MODALIVING

A DESIGN FOR LIFE

PRINCES REACH, PRINCES DOCK

ENVIRONMENTAL STATEMENT

June 2016

Contents

1 Introduction

1.1.1 Moda Living is to submit a full planning application to enable the construction of a 34 storey residential tower (Use Class C3) comprising 304 private rented sector apartments and 40 car parking spaces (2 disabled), 8 motorcycle parking spaces, 76 cycle parking spaces together with plant, storage, reception, residential amenity areas and hard and soft landscaping on currently vacant brownfield land at William Jessop Way, Princes Dock, Liverpool, L3 1QP (Northing 390793, Easting 333737).

1.1.2 This Environmental Statement (ES) is a statutory document that presents the Environmental Impact Assessment (EIA) process undertaken for the proposal.

1.1.3 The Town and Country (Environmental Impact Assessment) Regulations 2011 ('the EIA Regulations')[1] as amended[2]. Require that, before consent is granted for certain types of development, an EIA must be undertaken. The EIA Regulations set out the types of development which must always be subject to an EIA (Schedule 1 development) and other types of development, which only require assessment if they give rise to significant environmental impacts (Schedule 2 development)

1.1.4 A screening opinion (to determine whether a particular development requires an EIA), was submitted to Liverpool City Council on 10th March 2016 which concluded that although the development did not fall directly within a highly sensitive area or a Schedule 1 or 2 criteria, Liverpool City Council considered that it would be beneficial to show how the development would not negatively impact on the environment and to assess certain disciplines clearly.

1.1.5 Regulation 13 of the EIA Regulations provides for applicants to ask Liverpool City Council (as the local planning authority) in writing the information that should be provided within the Environmental Statement. This was provided to Liverpool City Council in the 'Princes Reach Scoping Report' on 10th March 2016. Liverpool City Council provided Arup as the Applicant's agent with the responses to scoping and these are provided in Appendix 8.1 and 8.2 of this document.

1.1.6 The overall process that has been followed in undertaking this EIA is detailed below:

- Collating existing baseline date for the development site and the surrounding area;
- Undertaking environmental surveys to supplement existing baseline data;
- Identifying features of the existing environment likely to be affected by the proposed development;

[1] The Town and Country Planning (Environmental Impact Assessment) Regulations 2011 ('the EIA Regulations'). Last accessed October 2015 via http://www.legislation.gov.uk/uksi/2011/1824/contents/made
[2] The Town and Country Planning (Environmental Impact Assessment) (Amendment) Regulations 2015. Last accessed October 2015 via http://www.legislation.gov.uk/uksi/2015/660/pdfs/uksi_20150660_en.pdf

- Production of a Screening Letter and Scoping Report detailing the scope of the assessment;
- Undertaking a consultation process;
- Identifying the environmental impacts of the proposed development;
- Substantiation of the environmental impacts arising from the proposed development;
- Providing feedback into the design process;
- Identifying mitigation and enhancement measures; and
- Production of the ES to support the planning submission.

1.1.7 This ES includes information on the characteristics of the proposed development and the environmental features likely to be affected by the proposed development in accordance with Regulations 13(6) of the EIA Regulations.

1.1.8 The information in this report is set out as follows:

- Section 2 - Proposed structure and content of the ES;
- Section 3 – Description of the proposed development;
- Section 4 – Approach to the EIA;
- Section 5 - Description of the existing site and surrounding area;
- Section 6 – 13 - Provides an assessment of each discipline which was set out in the Princes Reach Scoping Report (March 2016)
- Section 14 - Provides an overall conclusion of the EIA and each specific discipline

2 Structure of the Environmental Statement

2.1 Introduction

2.1.1 The ES has been undertaken in accordance with the EIA Regulations1 (as amended)2, and the 2011 EIA Directive.

2.1.2 The ES includes the following main elements (as set out in Schedule 4 of the Regulations):

- A description of the proposed development;
- 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 development on the environment;
- A description of measures envisaged to prevent, reduce and where possible, offset any significant adverse effects on the environment;
- An indication of any difficulties encountered in compiling the required information; and
- A non-technical summary (NTS) of the information.

2.1.3 This ES contains the findings and the information of the full EIA, together with the information and data collected during the assessment. The ES comprises the Non-Technical Summary, ES Main Text and appendices:

Non-Technical Summary: This is a summary of the ES in non-technical language, it presents the existing site conditions, provides a description of the scheme and details the predicted environmental effects of the proposals.

ES Main Text – This comprises the introduction and policy context, followed by a chapter for each environmental issue examined based on the findings of the technical reports.

Appendices – This comprised the specialists' technical reports, and provides supportive background and technical information for the chapters within the ES main text.

2.1.4 The following chapters provide an assessment of significant environmental effects in each discipline taking into account mitigation measures to be implemented. The following topics have been assessed:

- Transport and Access
- Noise and Vibration
- Air Quality
- Archaeology and Cultural Heritage
- Daylight and Sunlight

- Ground Condition and Contamination
- Townscape and Visual Impact
- Wind

2.1.5 Each environmental topic listed above is reported in a similar format for ease of comparison (outlined below):

2.1.6 Following completion of the scoping exercise, and having due regard to the regulations, the key issues which require further investigation as part of the EIA process will be identified and addressed in the technical sections of the ES. The general format of each discipline is outlined below in Table 2.1

Table 2.1: Format of ES topic sections

Section	Description of content
Introduction	A brief overview of the environmental topic, setting out to the reader what this assessment is about.
Methodology and Scope	A detailed description of each topic specific methodology will be given in each topic section setting out significant legislation and relevant guidance.
Consultation	A summary of topic specific consultations undertaken during the EIA process will be reported.
Limitations and assumptions	An explanation of any limitations encountered in undertaking the topic assessment as well as any assumption made and why it is reasonable to make these assumptions will be provided.
Baseline Conditions	The environmental baseline conditions within the defined assessment area for each topic will be described.
Methodology of assessment	Description of key aspects of the proposed development which may be the source of effects as well as measures which have been embedded into the design, operation or construction impacts should be raised in this section. Findings will be presented under construction and operation impacts as appropriate to each topic.
Additional Mitigation Measures	Where required, additional mitigation options will also be considered on a topic-by-topic basis at the assessment stage in order to reduce potential impacts. This would be based on best practice guidance and an assessment of residual impacts following the implementation of any suggestion control methods.
Cumulative Impacts	The cumulative impacts from the proposed development will be considered during the EIA and reported in this section. There are two types of cumulative effects, impact interactions which are multiple effects from the Proposed Development to a particular response (e.g. properties) and in-combination effects which is the combined effect of the Proposed Development and other committed developments. In terms of impact interactions, many mitigation measures have been proposed as part of the EIA process, therefore many of the residual effects are considered likely to be reduced to negligible once these have been implemented.
Residual effects	Taking account of the supplementary mitigation options (where relevant), the residual effects will be reported.
Assessment Summary	A tabular summary of the effects and additional mitigation will be summarised within this section.

Section	Description of content
Conclusion	A summary of the impact and effects of the proposed scheme on each specific topic will be concluded.
Appendices	Any information and references mentioned within the above sections.

2.2 Baseline Studies

2.2.1 The baseline studies sought to focus on key issues that would support the planning application include:

- Air Quality Assessment
- Archaeological Statement
- Archaeological Watching Brief
- Daylight and Sunlight Report
- Design and Access Statement
- Heritage Impact Assessment
- Phase 1 Ground Conditions and Geotechnical Report
- Phase 1 Habitat Survey
- Planning Statement
- Transport Assessment and Travel Plan

2.2.2 These studies enabled a detailed understanding of the site's context together with a fuller understanding of its physical and social conditions.

3 The Proposal

3.1 Introduction

3.1.1 The development description for the proposed development is as follows:

"full planning application to enable the construction of a 34 storey residential tower (Use Class C3) comprising 304 private rented sector apartments and 40 car parking spaces (2 disabled), 8 motorcycle parking spaces, 76 cycle parking spaces together with plant, storage, reception, residential amenity areas, hard and soft landscaping and associated works on currently vacant brownfield land at William Jessop Way, Princes Dock, Liverpool, L3 1QP (Northing 390793, Easting 333737)".

3.1.2 LCC's Unitary Development Plan (2002) allocated the development site as a "site for various types of development" (UDP E6) and the Core Strategy submission draft (2012) shows the sites as one of the "major opportunity sites".

3.2 The Consideration of Alternatives

3.2.1 In accordance with the regulations, an ES is required to include an outline of the main alternatives considered in developing the proposal and the reasons for the choice to be taken forward. In this regard, consideration is given below to the potential, firstly for an alternative site and secondly for alternative development proposals. The vision for the site has been based on the original vision of the outline planning consent for Liverpool Waters (10O/2424) secured on 19th June 2013; which is regarded as playing a significant part in contributing to the objectives of key regeneration strategies and initiatives operating at the local, sub-regional and regional level.

3.2.2 The entire site represents a hugely important physical regeneration opportunity on a scale not witnessed in the City since the formation of the docks themselves over 200 years ago. Liverpool City Council have identified this prime waterfront location due to its strong links to the City Centre and its potential to generate transformational socio-economic benefits.

3.2.3 Although this development is not part of the Liverpool Waters Outline Consent, it does sit within the Liverpool Waters site and the proposed development sits in plot A-04 as identified in the outline consent. Plot A-04 benefits from outline planning consent for a residential development of up to 40 storeys (126.8m).

3.2.4 Therefore it is practical for this site to be the location of this development and through working closely with Liverpool City Council and in addition to supporting documents such as the Liverpool Waters Conformity Statement (June 2016) the team have shown how this development will fit well within this existing environment of Princes Dock and the Liverpool Waters outline consent. In the context of the above need for development, the aspirations for the continued growth of Liverpool in this specific area and the availability of this significant brownfield site in a highly sustainable location, there are considered to be no practicable or comparable alternative available sites.

3.2.5 Alternative development proposals have been discussed in detail within the design team and with Liverpool City Council at several pre-application meetings. As outlined in the Design and Access Statement (June 2016) the scheme has evolved through a series of discussions, internal design reviews and the findings from technical reports. These studies can be found within the supporting documentation of this application and the specific chapters within this ES.

3.2.6 The conclusion of these studies and discussions has enabled a detailed understanding of the site's context together with a fuller understanding of its physical, social and economic conditions. This has allowed the team to review alternative proposals for this scheme and creating a finalised design which is best suited for this location.

3.3 Nature of the Planning Application

3.3.1 Full planning permission is sought and if granted will be controlled by planning conditions should further details be required before occupation of development.

3.3.2 As mentioned, the site benefits from outline planning permission (10O/2424) but this application is a standalone application to this permission and should not be seen as a reserved matters application in relation to conditions set within this outline consent.

3.3.3 However, the parameters and development principles that were derived following extensive testing and consultation with stakeholders for the outline consent have been used and worked with to enable the application to be of high quality and ensure that the application conforms to the original outline permission as much as possible (see Liverpool Waters Conformity Statement (June 2016) for further details).

3.4 Further information

3.4.1 Site plans and other relevant information regarding the proposed development are provided within the specific chapters and appendices of this ES.

3.5 Land Use and Quantum of Development

3.5.1 As set out in the development description, the land use proposed for this scheme is residential development. The scheme proposes 304 private rental sector (PRS) apartments with amenity space and facilities.

3.5.2 To support the development, 40 car parking spaces (2 disabled) and 76 cycle parking spaces are proposed. Table 3.1 below, sets out the quantum of development.

Table 3.1: Princes Reach Quantum of Development

Use Class	**Floorspace (sqm)**
C3 – Dwellinghouse	25,560
Sui Generis - Car Parking	1,800
Servicing	535

4 Environmental Impacts Assessment Approach

4.1 Introduction

4.1.1 The overall aim of the ES is to provide an objective and systematic account of the significant environmental effects of the development and to assess the ability of the development site and the surrounding area to accept those impacts.

4.1.2 The EIA covers the physical extent of the proposed development as described in section 3 and indicated within the location plan. It is defined by the area of land to be used, the nature of the current environmental conditions and the manner in which impacts are likely to be generated. It is important to note however that the

influence of many predicted impacts can extend beyond the immediate site boundary. Where identified and relevant, these impacts have been assessed as part of the EIA.

4.1.3 The geographical extent of the EIA also considers the potential implications of related and unrelated development activities such as committed neighbouring development such as the Liverpool Waters outline consent. The potential cumulative effects of the development in association with other developments both during construction on completion are included where relevant as required within the EIA Regulations.

4.1.4 In order to ascertain the likely scope of the EIA, the scoping process involved:

- Identification of the planning application boundary;
- Identification of the key characteristics of the development site and the establishment of the environmental baseline through a series of desk and field studies;
- Identification of gaps in the baseline and the further survey work required to address these;
- Initial consideration of the potential sources and nature of environmental impacts through assessment against the environmental baseline; and
- Definition of impact assessment methodologies to be utilised.

4.2 Approach to assessment

4.2.1 The EIA has been carried out in stages as follows:

- Screening and Scoping;
- Baseline data gathering and consultation;
- Preliminary effect assessment;
- Identification of mitigation measures;
- Residual effects assessment;
- Preparation of the ES; and
- Preparation of the NTS.

4.2.2 The ES comprises Sections 1 – 14 of this document. A NTS has been produced as a separate document for ease of use and understanding. ES Appendices have also been produced as a separate document to the ES and NTS.

4.2.3 The Princes Reach EIA Scoping Report was submitted to LCC on 10th March 2016. As part of the formal scoping process LCC consulted with the relevant internal departments in the Council and externally with statutory consultees.

4.2.4 Informal discussions have taken place with LCC and at the time of writing there has been comments received by Environment Agency and MEAS (Merseyside

Environmental Advisory Service) back and LCC do not anticipate that they will be any further additions to this ES.

4.2.5 The topics that were agreed through the scoping process, i.e. those which have the potential to give rise to **significant** environment effects and are therefore addressed as part of this ES are listed below:

- Transport and Access
- Noise and Vibration
- Air Quality
- Archaeology and Cultural Heritage
- Daylight and Sunlight
- Ground Condition and Contamination
- Townscape and Visual Impact
- Wind

4.2.6 The specific focus of the above assessments is detailed within each chapter.

4.2.7 Issues which have been assessed as unlikely to give rise to significant environmental effects have been omitted (also termed as 'scoped out') from the EIA and are detailed below:

4.2.8 Ecology - It was identified that there are no potential for **significant** impacts upon species or habitats of nature conservation interest. Therefore, it is recommended that Ecology and Nature Conservation was removed from the EIA process and the subsequent ES. A Phase One habitat survey was undertaken to inform the baseline position, See Appendix 9.1, the results of which concurred that the proposal would not generate impacts of significance upon species or habitats of nature conservation interest.

4.3 Consultation

4.3.1 A full breakdown of the consultation process with LCC can be found in the supporting Princes Reach Statement of Community Involvement (June 2016). This document sets out the consultation process in full. Further information on the consultation process and the design devolution of the scheme can be found in the supporting Design and Access Statement (June 2016).

4.3.2 Consultation and stakeholder engagement has been an integral part of the process of undertaking the impact assessment as within each technical chapter of this ES. In summary, it has involved baseline data collection and scoping of impacts.

4.3.3 Where relevant, further information about consultation has been set out within each of the discipline's chapters.

4.4 Objectives

4.4.1 The overall aim of the ES is to provide an objective and systematic account of the significant environmental effects of the development and to assess the ability of the development site and the surrounding area to accept those impacts.

4.4.2 The objectives of EIA are:

- Improve the environmental design of the proposal.
- Check the environmental acceptability of the proposal in relation to the capacity of the site and the receiving environment.
- Ensure resources are used appropriately and efficiently.
- Identify appropriate measures for mitigation of the potential impacts of the proposal.
- Facilitate informed decision making, including setting the environmental terms and conditions for implementing the proposal.

4.5 Scope of Work

4.5.1 The EIA covers the physical extent of the proposed development as described and included in the location plan. It is defined by the area of land to be used, the nature of the current environmental conditions and the manner in which impacts are likely to be generated. It is important to note however that the influence of many predicted impacts can extend beyond the immediate site boundary. Where identified and relevant, these impacts have also been assessed as part of the EIA.

4.5.2 The geographical extent of the EIA also considers the potential implications of related and unrelated development activities

4.6 Assessment Criteria

4.6.1 The assessment to be presented within the ES must consider the potential for significant environmental impacts to affect the baseline conditions as a direct/indirect result of the proposed development. The baseline conditions are defined as the existing state of the environment and how it may develop in the future in the absence of the proposals. Therefore it is important to state that only two criteria's for each discipline has been assessed for each chapter:

- the existing site at the time of assessment (baseline conditions); and
- the proposals set out within the extant Liverpool Waters Outline Planning Consent (LPA Ref: 10O/2424).

4.6.2 There are other developments being worked up within Princes Dock at the time of submission which will be in close proximity of Princes Reach. However, these may differ from the Liverpool Waters Outline Consent and currently do not have planning permission and therefore cannot be assessed for EIA purposes. Where necessary, these emerging plot developments have been assessed within certain disciplines to show different environmental impacts on the surrounding area. It is

acknowledged however than for the EIA they cannot and will not be assessed as committed development and are only shown for the reader's information.

4.6.3 As there is no universally recognised term of what constitutes 'significance', and to assist in the interpretation of this EIA, a common framework of assessment criteria and terminology have been developed, for the presentation of predicted impacts and where there is no specific guidance available for certain disciplines. This is based on a widely used 'matrix approach' which is based on the characteristics of the impacts (magnitude and nature) and the sensitivity of the receptor, as described further below.

Sensitivity of Receptor

4.6.4 The sensitivity of a receptor refers to its importance i.e. its environmental value/attributes. This may include a feature's level of statutory designation (i.e. a site has a designation e.g. Special Area of Conservation, World Heritage Site etc.). It will generally be regarded as more important/sensitive than another site with a national or local designation (e.g. Local Nature Reserve, Conservation Area). The terminology defining sensitivity can very according to discipline. However, within this ES sensitivity it is generally determined as:

Table 3.2: Sensitivity Definitions

Sensitivity	Definition
Very High	The receptor has little or no ability to absorb change without fundamentally altering its present character, is of very high environmental value, or of international importance.
High	The receptor has low ability to absorb change without fundamentally altering its present character, is of high environmental value, or of national importance.
Medium	The receptor has moderate capacity to absorb change without significantly altering its present character, has some environmental value, or is of regional importance.
Low	The receptor is tolerant of change without detriment to its character, is low environmental value, or local importance.
Negligible	The receptor is resistant to change and is of little environmental value.

Determining Impact Magnitude and Nature of the Impact

4.6.5 Magnitude of impact on environmental baseline conditions is identified through consideration of the development taking into account the scale or degree of change from the existing situation as a result of the impact; the duration and reversibility of the impact as well as consideration of relevant legislative or policy standards or guidelines.

4.6.6 Where possible, magnitude will be quantified but where this will not be possible a fully defined qualitative assessment will be undertaken. The assessment of magnitude will be carried out considering any 'design mitigation' (i.e. relevant design features) in the proposal forming part of the development description. This may result in the need for 'additional mitigation' which results from the EIA process, to reduce impacts further. Therefore, the magnitude of impacts both before and after additional mitigation will be stated.

4.6.7 Magnitude will be defined within each chapter as:

Table 3.3: Magnitude Definitions

Magnitude	Definition
Substantial	Total loss or major alternation to key elements /features of the baseline conditions such that post development character/composition of baseline condition 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 of the baseline condition will be materially changed.
Slight	Minor shift away from baseline conditions. Changes arising from the alteration will be detectable but not material; the underlying character /composition of the baseline condition will be similar to the predevelopment situation.
Negligible	Very little change from baseline conditions. Change is barely distinguishable, approximating to a "no change" situation

Determining the Significance of effects

4.6.8 The table below shows how the interaction of sensitivity and magnitude can be combined to determine the significance of an environmental effect on a scale. Deviation from the terminology may occur in cases when an established methodology requires this but if this is the case, the deviation will be described within the chapter with reasoning.

Table 3.4: Significance of Effects

Sensitivity of Receptor	Magnitude of Impact			
	Substantial Magnitude	**Moderate Magnitude**	**Slight Magnitude**	**Negligible Magnitude**
Very High	Major	Major – Intermediate	Intermediate	Minor
High	Major – Intermediate	Intermediate	Intermediate – Minor	Neutral
Medium	Intermediate	Intermediate	Minor	Neutral
Low / Negligible	Intermediate - Minor	Minor	Minor – Neutral	Neutral

4.6.9 Any limitations or uncertainties associated with impact prediction or the sensitivity of receptors due to the absence of data or other factors will give rise to uncertainty in the assessment. In this case any limitations in the assessments will be referred to in the Limitations and Assumptions chapter and picked up when discussing confidence level within the assessment and summary table.

Mitigation

4.6.10 A description of the mitigation measures is one of the requirements of the Regulations and a description of the measures envisaged in order to avoid, reduce and if possible, remedy significant adverse effects will be included in the Mitigation chapter. If no mitigation is required a simple "none required" will be shown.

4.6.11 When describing mitigation they will generally fall under two headings, 'design mitigation' and 'additional mitigation'.

4.6.12 'Design mitigation' is where the design of the site has been altered to take into account a particular issues or accommodate an important feature. This will generally be part of the project description and incorporated into the scheme.

4.6.13 'Additional mitigation' is all other mitigation that has been identified as a result of the impact assessment that will be undertaken on the fixed design scheme. Clear details of when and how the mitigation measures identified will be implemented will be set within the Mitigation chapter.

Residual Impact Magnitude

4.6.14 Residual impacts refer to those environmental effects predicted to remain after the application of mitigation is outlined within each chapter of the ES.

4.6.15 An assessment of residual magnitude will be conducted following the determination of suitable additional mitigation measures and will use the same definitions as when defining the original impact magnitude.

Residual Significance of Effects

4.6.16 The assessment of residual significance will identify the residual environmental effects, these being the final outcome of the EIA process. Statements will be made up of whether residual effects are significant or not.

Confidence Level

4.6.17 It is considered that there is generally a high level of confidence regarding the assessment of the impacts and risks. This is based upon the degree of baseline information that will be available following surveys and reports and the assumption that strategies, designs and requirements will be adopted in accordance with legislation and the planning regime. This process would retain the requirement for full regulatory approval for the various phases of the works, thereby ensuring that LCC and statutory bodies are fully satisfied that all necessary controls and mitigation measures are in place to protect the environment.

4.6.18 The confidence level shows the level of certainty that an impact will occur as predicted:

- Low: 0-50% probability, where there has been many assumptions within the assessment
- High: 51-100% probability, where assessments have been based on satisfactory surveys and baseline information.

Consultation

4.6.19 Meetings regarding the proposed development have been held between the client team and LCC. At the time of scoping report submission the team have met LCC four times through formal pre-application meetings as referenced in the accompanying Princes Reach Statement of Community Involvement (June 2016)

4.6.20 Client team representatives from the planning, design and transport groups have discussed the following topics:

- Design evolution and scheme development;
- Supporting documentation and scope of application;
- ES scoping;
- Consultation process – statutory and non-statutory; and
- Planning approach, co-ordination and delivery.

4.6.21 Where relevant, further information about consultation has been set out within each of the discipline's chapters.

5 The Site and Surroundings

5.1 Site location

5.1.1 The site sits within Princes Dock to the north of Liverpool's Pier Head and is an established area for mixed use development comprising, residential, office, hotel and leisure uses. The Princes Dock site contains a number of high rise buildings including the tallest building directly fronting the River Mersey, that being Alexandra Tower at 88 metres.

5.1.2 Princes Dock is located within the Liverpool Maritime Mercantile City World Heritage Site Buffer Zone and is adjacent to a World Heritage Site Character Area (as identified in the LCC World Heritage Site SPD, 2009). The City's Central Business District (CBD) is a 5 minute walk away from Princes Dock to the east and Liverpool's shopping and leisure facilities including key museums and Liverpool One are 10 minutes' walk to the south of the site.

5.2 The existing site

5.2.1 Figure 5.1 shows an annotated aerial image of the site and surrounding area.

5.2.2 The development site is located on a vacant plot of land which has until recently been used for informal car parking for events within Princes Dock run by Peel Holdings.

5.3 History of the site

5.3.1 In the late 1700s, prior to the development as this area as Princes Dock, a river wall ran through the proposed development site, following a generally north-south alignment.

5.3.2 Following the development of Liverpool's closed dock system in the late 18th century, the construction of Princes Dock was the first substantial increase in the size of the docks. Completed in 1821, the eastern (landward) dock wall ran in a generally north-south alignment through the proposed development site. The dock wall and the earlier river wall did not share a common alignment, with the

dock wall located further to the west. Princes Dock was the first dock in Liverpool to have a boundary wall (which still exists along the eastern site boundary) and was the largest dock in Liverpool until 1832.

5.3.3 A series of transit sheds and offices stood on the east side of the dock. A fire in 1894 destroyed 47 feet of the east sheds which were subsequently repaired. In 1905 the whole west side of the original water area of Princes Dock was altered by the introduction of a concrete quayside structure complete with sheds. In 1929, construction work began on new sheds at the east, which entailed constructing piles immediately inside the dock wall upon which the shed decking floors were laid.

5.3.4 Eventually the landing stage was extended to 2,500 feet (762 metres), running from the Pier Head northwards the full length of the Princes Dock and becoming the embarkation point for transatlantic passenger liners. In 1895 Riverside Station was opened on the west site of the dock, bringing main line passengers directly to the point of embarkation via a series of covered bridges leading directly to the floating landing stage at two levels.

5.3.5 After its closure in 1981, Princes Dock was regarded as a potential area for new office development, and following the preparation of a masterplan in 1992, the first phase of development commenced at the southern end of the dock. The transit sheds and other dock buildings were cleared, the east quay was widened to create larger development sites, and the dock walls were partly rebuilt.

5.3.6 A revised masterplan prepared in 1998 provided a framework for the remainder of the site, including road access and the partial infilling of the dock. Further revisions were made in 2002, when a greater mix of uses was approved, together with higher development densities and indicative heights for each development plot. A new footbridge across the dock was constructed in 2001 and subsequently lifted to accommodate the passage of canal boats. Alterations were made to the north and south walls for the canal link, which opened in 2009.

5.3.7 Outline planning permission was approved for a 60ha mixed use development in 2013 known as “Liverpool Waters” (application reference 10O/2424), the development site included Princes Dock which formed the southern boundary of the proposed scheme. Further information regarding this recent application is set out in section 2.5.

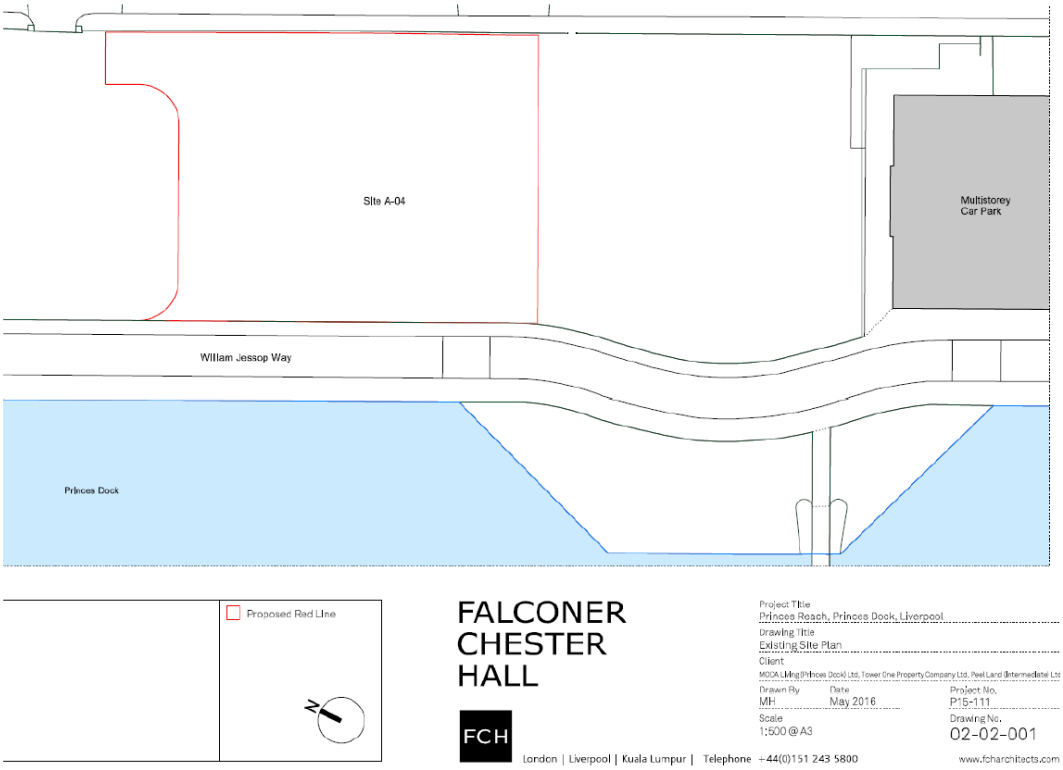


Figure 5.1 – Site location plan

5.4 The surrounding area

5.4.1 A number of receptors are found in the immediate vicinity of the site. Residential developments are found to the north, office buildings to the west and further office, leisure and hotel facilities are to the south of the site. Directly east of the site sits the dock boundary wall, a listed feature which is not within the site boundary and will not be physically impacted upon by this proposed development.

5.4.2 Further east sits the Central Business District where the City's core businesses are located. West Tower, the city's tallest building is positioned within this area on Brook Street and is 140m in height, this tower houses residential apartments and a restaurant.

5.4.3 The collection of buildings that sit together on the Pier Head which are also known as the 'Three Graces' are located south of Princes Dock and are within the World Heritage Site Character Area. This area of the Waterfront leads to the Albert Dock further south where further leisure, residential and business activities are located.

5.5 Liverpool Waters Outline Planning Application

5.5.1 As mentioned in section 2, Liverpool Waters was granted outline planning permission in 2013 and consisted of a 60ha mixed use development along the waterfront starting from Princes Dock and moving north ending at Northern Docks (application reference 10O/2424).

5.5.2 Princes Dock was highlighted as one of the five neighbourhoods within the scheme and consisted of predominately office and residential uses. The site for this new full planning application falls within plot A-04 and under the Liverpool Waters Planning Parameters Plans was given the following parameters to work with:

- Maximum building height of 126.8m;
- No more than 40 storeys;
- Majority of the scheme to be use class C3 – Dwelling Houses

5.5.3 This planning application will not be part of a reserved matters application within the Liverpool Waters Outline Consent but will form a standalone planning application. However, it is important to state that it conforms with the above parameters set within the outline consent in addition to local and national policy.

5.5.4 This will be explained in further detail within supporting documentation when submitting the full planning application.

6 Transport and Access

6.1 Introduction

6.1.1 This chapter assesses the impact of the proposed development on both the local and strategic transport network. In particular, it considers the potential effects of these transportation impacts in an environmental context.

6.2 Methodology and Scope

6.2.1 This technical study has been conducted with reference to the Institute for Environmental Assessment guidance note 'Guidelines for the Environmental Assessment of Road Traffic'. Additionally, complementary guidance is referred to within Volume 11 of the Design Manual for Roads and Bridges.

6.2.2 This ES Chapter assesses the baseline and potential effects of the development proposals in terms of environmental significance and therefore potential changes likely, as a result of the proposed development, have been examined. The ES Chapter is based on the findings of the supporting Transport Assessment (June 2016).

6.2.3 The Institute of Environmental Assessment (now the Institute of Environmental Management and Assessment (IEMA)) Guidance lists the following environmental impacts in relation to transport:

- Severance;
- Driver Delay;
- Pedestrian Delay;
- Pedestrian Amenity;
- Fear and Intimidation;
- Accidents and Safety;
- Hazardous Loads.

6.2.4 This chapter assesses the impact of the development under each of these themes.

6.2.5 The IEMA's Guidelines for the Environmental Assessment of Road Traffic set out the broad principles of how to assess the magnitude of effect for each category. This is summarised below.

Severance – The guidance states that "severance is the perceived division that can occur within a community when it becomes separated by a major traffic artery". Further, "Changes in traffic flow of 30%, 60% and 90% are regarded as producing 'slight', 'moderate' and 'substantial' changes in severance respectively". However, the guidance acknowledges that the measurement and prediction of severance is extremely difficult. The assessment of severance pays full regard to specific local conditions, in particular the location of

pedestrian routes to key local facilities and whether or not crossing facilities are provided.

Driver delay – such delays "… are only likely to be significant when the traffic on the network surrounding the development is already at, or close to, the capacity of the system".

Pedestrian delay – "Changes in the volume, composition or speed of traffic may affect the ability of people to cross roads". The guidance suggests that assessors "… use their judgement to determine whether pedestrian delay is a significant impact".

Pedestrian amenity – broadly defined as the relative pleasantness of a journey, it is affected by traffic flow, traffic composition and pavement width/separation from traffic. The guidance suggests a tentative threshold for judging the significance of changes in pedestrian amenity of where traffic flow (or its lorry component) is halved or doubled.

Fear and intimidation – the impact of this is dependent upon the volume of traffic, its HGV composition, its proximity to people or the lack of protection caused by such factors as narrow pavement widths. The guidance states that there are no commonly agreed thresholds for estimating this from known traffic and physical conditions, but it does nevertheless suggest some thresholds which could be used, based on previous research, and these are shown in Table 6.1.

Table 6.1: Magnitude of Effect

Degree of Hazard	Average traffic flow over 18hr day – (vehicles/hour 2-way)	Total 18 hour HGV flow	Average Vehicle Speed over 18 hour day (mph)
Extreme	+1,800	+ 3,000	+ 20
Great	1,200 – 1,800	2,000 – 3,000	15 – 20
Moderate	600 – 1,200	1,000 – 2,000	10 – 15
Small	<600	<1,000	<10

Please note: although no category is given in the guidance for flows less than the "Moderate" category, for the purposes of this assessment any flows below this threshold have been categorised as 'small'

Accidents and safety – the guidance suggests that "Professional judgement will be needed to assess the implications of local circumstances, or factors, which may elevate or lessen risks of accidents, e.g. junction conflicts".

Hazardous loads – the guidance states that the ES needs to clearly outline the estimated number and composition of such loads, but that the analysis should reflect the nature of the load in question. The IEMA guidelines acknowledge that most developments will not result in increases in the number of movements or hazardous/dangerous loads.

6.3 Consultation

6.3.1 Pre-application meetings with transport consultants in attendance were undertaken with Liverpool City Council (LCC) on 18th November 2015 and 21st April 2016. LCC Officers raised no environmental concerns related to transport for this development.

6.4 Limitations and assumptions

6.4.1 As agreed with LCC Officers, no traffic modelling was undertaken as part of the Transport Assessment (TA). This is due to the low number of car parking spaces provided within the development and the highly sustainable location proposed.

6.4.2 Instead, the TA was focused upon the assessment of people movements, as opposed to vehicles. As such, no detailed traffic data is included within this EIA.

6.5 Baseline Conditions

6.5.1 The existing site has previously been used as an occasional surface level car park with approximately 360 spaces in total. The car park has only been in use during special events at the Princes Dock on an ad-hoc basis. The development footprint would take up approximately 60 spaces from this surface level car park.

6.5.2 The nearest bus stops to the site are located a 2 minute walk to the development on Princes Parade, Bath Street and King Edward Street. The proposal site offers good access on foot to the three key bus hubs in the city, with Cook Street under 1km south east (12 minute walk), Liverpool One Bus Station within 1km south (14 minute walk) and Queen Square Bus Station within 1.3km east (17 minute walk) of the site..

6.5.3 The proposal site is located around 500m west of Moorfields railway station. Moorfields is located on both the Northern Line and Wirral Line of the Merseyrail network – providing excellent links across the city region. Moorfields also directly connects to Liverpool Lime Street station, via the Wirral Line. Lime Street itself is located approximately 1,600m east of the proposal site. Liverpool Lime Street mainline station offers national inter-city and regional services.

6.5.4 The internal road network of Princes Dock is privately maintained by Peel and does not form part of the Liverpool City Council adopted highway. Vehicular access to the site from the LCC adopted network is possible from two points. The southernmost is via St Nicholas Place via the New Quay / Chapel Street / St Nicholas Place / Queensway Tunnel signalised junction (the St Nicholas Place junction). The northern access point is from William Jessop Way via the William Jessop Way / Bath Street / Waterloo Road roundabout (the William Jessop Way roundabout).

6.5.5 William Jessop Way roundabout is trafficked by some 1,540 vehicles in the weekday morning peak and 1,625 in the weekday evening peak (traffic data taken from the accepted 2012 Transport Assessment for Princes Dock Cruise Liner Terminal). The St Nicholas Place junction is trafficked by some 4,150 vehicles in the weekday morning peak and 4,050 in the evening peak (traffic data taken from Peel's 2013 Cruise Liner Terminal Study).

Existing Pedestrian Severance and Delay

6.5.6 The DMRB Volume 11, Section 3, Part 8, Chapter 6 provides a set of measures to identify severance within a community in terms of the 2-way AADT flow on a link. Table 6.2 summarises these thresholds.

Table 6.2: Pedestrian Severance Levels (DMRB)

Severance Level	Traffic Flow (AADT)
Slight	<8,000
Moderate	8000 – 16,000
Severe	>16,000

6.5.7 Whilst traffic data has not been collected as part of the TA, the only link that is likely to have an AADT traffic flow of above 16,000 vehicles is A5052 King Edward Street, known locally as 'The Strand'.

6.5.8 The uncontrolled crossing at Bath Street (to the east of the development site) requires some pedestrian accessibility improvements as part of future Liverpool Waters and Princes Dock developments. Despite a lack of formalised pedestrian crossing facility, this crossing is well used by existing tenants of Princes Dock, with a strong pedestrian desire line between Princes Dock and the Business Quarter along Old Hall Street.

6.5.9 The transport statement for the proposed adjacent William Jessop House office development (15F/0560) makes reference to the Bath Street crossing, explaining that improvements are included within Liverpool City Councils Highways Capital Scheme.

Existing Pedestrian Amenity

6.5.10 Pedestrian amenity ('the relative pleasantness of a journey') is affected by traffic flows and composition, footway width and the degree of segregation.

6.5.11 Given that the proposal site is located within the identified Liverpool city centre area, walking infrastructure is generally well developed in the vicinity of the site and of a good standard, particularly within Princes Dock where wide footways are provided for pedestrians throughout the area.

6.5.12 Pedestrians can gain access to Liverpool City Centre's Commercial District and Historic Downtown to the east of the site by walking south on William Jessop Way, through the pedestrianised area outside the Crowne Plaza Hotel and use the signal crossing facilities to cross New Quay to Chapel Street.

6.5.13 A small opening in the Dock Wall directly to the rear of the development site offers a direct pedestrian access route to the Commercial District from Bath Street.

6.5.14 From the Dock Wall opening, pedestrians can cross Bath Street to a stepped footway to King Edward Street. From here, an uncontrolled pedestrian crossing to Brook Street and Old Hall Street is provided within the signal cycle, though no push button or 'green man' signal is provided. This route is not supported by DDA compliant crossings at all junctions and requires the ascent of steps to reach King Edward Street from Bath Street

Existing Driver Delay

6.5.15 The proposed development is located on a local access road within Princes Dock. Whilst some queuing can occur on this route, it is associated with access to the nearby MSCP. This is a no through route, and therefore delay is not considered to be detrimental to the working of the wider highway network.

6.5.16 Again, whilst traffic data has not been collected as part of the TA, the only link within close vicinity to the development site where driver delay can be significant in peak periods is the A5052 King Edward Street.

Existing Fear and Intimidation

6.5.17 Again, traffic data has not been collected as part of the TA. Both Bath Street and A5052 King Edward Street are likely to be categorised as Moderate and Great, respectively.

6.5.18 Princes Dock is an enclosed space, with no through route for traffic. Additionally pavement widths are generous, with some areas to the south accessible to pedestrians only.

Existing Accidents and Safety

6.5.19 Personal injury accident data has been obtained for the TA study area for the three year period (01.01.13 – 31.12.15).

6.5.20 During the three year study period a total of 9 accidents occurred in the study area. A total of 5 slight and 4 serious personal injury accidents occurred during the study period, with the total number of accidents peaking in 2015.

6.5.21 The existing accident rate does not appear to be excessive, with a bias towards slight accidents. Given the location of the study area i.e. within a major route through the City Centre the number of accidents that occurred is not considered to be excessive. It is therefore concluded that the development site is not located in an existing accident problem area.

Existing Hazardous Loads

6.5.22 No existing significant hazardous loads have been identified to be routing in the vicinity of the study area.

6.6 Assessment

Development Proposal – Key Transport Aspects

6.6.1 The development makes provision for 40 car parking spaces (2 disabled) for residents, with 8 motorcycle spaces in addition. The vehicle trip generation undertaken within TA suggests that there would be less than 20 trips generated within the peak periods.

6.6.2 The streets within Princes Dock controlled by Peel Holdings, ensuring they are protected from on-street parking. As such, the potential traffic generation from the development is likely to be very low.

6.6.3 The pedestrian trip generation undertaken within the TA suggests that the development would result in approximately 110 pedestrian movements within the 0800-0900 peak and 106 pedestrian movements within the 1700-1800 peak.

Demolition and Construction

6.6.4 The construction of the proposed development will result in an increase of Heavy Goods Vehicles (HGVs) and cars belonging to construction workers accessing the construction site. Construction traffic is likely to access the site via any of the proposed access points but where feasible it would be away from the built up residential areas.

6.6.5 It is considered that the volume of construction traffic when compared to the existing traffic flows on the highway network would not represent a long term significant increase and would be below the 10% to 30% increase in traffic set out in the IEA 'Guidelines for the Environmental Assessment of Road Traffic', which would necessitate detailed assessment.

Pedestrian Severance

6.6.6 Whilst it is accepted that the development will increase the number of pedestrian movements to and from the site, the provision of a pedestrian crossing (as set out in 1.5.9) is provided in a Highways Capital Scheme.

6.6.7 Considering the potential traffic generation from the development is very low, the significance of impact upon pedestrian severance can be considered as negligible.

Pedestrian Delay

6.6.8 Again, whilst there will be more pedestrians movements generated by the proposed development, the amount of delay is not adversely affected by additional traffic generated. Therefore, the significance of impact upon pedestrian delay can be considered as negligible.

Pedestrian Amenity

6.6.9 Negative changes in pedestrian amenity are assumed to be significant where traffic flows (or the HGV component) double or more. The traffic generation of

the development would not result in a doubling of flows and overall it is therefore concluded that the impact would be negligible.

Fear and Intimidation

6.6.10 The proposed development will not alter known traffic and physical transport conditions of the area. Therefore, the significance of impact upon fear and intimidation can be considered as negligible.

Hazardous Loads

6.6.11 The proposed development does not have any specific requirement for, or result in generation of, hazardous loads. Therefore, the significance of impact upon hazardous loads can be considered as negligible.

Accidents and Highway Safety

6.6.12 The development is unlikely to have an impact upon road safety from a vehicular traffic generation perspective; traffic generated is likely to be particularly low. New accesses to the development conform with design standards and have adequate visibility splays.

6.6.13 Whilst additional pedestrian movements are likely to occur across Bath Street, the provision of a pelican crossing is within an existing Highways Capital Scheme, improving road safety for vulnerable road users in this area.

6.6.14 Therefore, the significance of impact upon accidents and highway safety can be considered as negligible.

Driver Delay

6.6.15 The potential traffic generation from the development is likely to be very low. As such it is expected that there would be no impact upon junction capacities or highway journey times.

6.6.16 Therefore, the significance of impact upon accidents and highway safety can be considered as negligible.

6.7 Additional Mitigation Measures

Construction Phase

6.7.1 During the demolition and construction phase a Construction Traffic Management Plan (CTMP) would be required by LCC as a condition of planning consent if granted.

6.7.2 The CTMP would provide a robust management strategy and a package of measures that would be adhered to by all operations both on and off-site. These measures would range from education and training of operatives to adhere to safe and courteous working practices (limiting noise and minimising vehicle movements) to on-site wheel washing facilities for Plant and HGVs to ensure

material from the demolition and construction phase does not enter the public highway.

Pedestrian Severance

6.7.3 No mitigation is required.

Pedestrian Delay

6.7.4 No mitigation is required.

Pedestrian Amenity

6.7.5 No mitigation is required.

Fear and Intimidation

6.7.6 No mitigation is required.

Hazardous Loads

6.7.7 No mitigation is required.

Accidents and Highway Safety

6.7.8 No mitigation is required.

Driver Delay

6.7.9 No mitigation is required.

6.8 Cumulative Impacts

6.8.1 The proposed Liverpool Waters Development, extends from the northerly Bramley Moore Docks, south along the waterfront to the southerly edge of Princes Dock. The development will be built out in five phases between 2012 and 2041, with the most dominant land uses being residential and office use, supported by retail, education, health and leisure uses. The Liverpool Waters development at Princes Dock is expected to generate some 749 traffic trips in the weekday morning peak hour (490 arrivals and 259 departures) and 752 trips in the evening peak (254 arrivals and 498 departures).

6.8.2 The Liverpool Waters Transport Assessment sets out that minor alteration to the St. Nicholas Place / New Quay junction will be needed in terms of lining and alteration to an existing pedestrian island to provide width for three vehicles to wait whilst turning out of St. Nicholas Place onto the gyratory. Further improvements will be required at the William Jessop Way roundabout (signalisation and junction enlargement), however, neither of these alterations to junctions will be required until after all of the development in Princes Dock is

completed and development is well underway in other Liverpool Waters neighbourhoods.

6.8.3 To the south of the site, planning consent (15F/0560) has recently be given for a new eight storey office building with flexible ground floor space (William Jessop House). No on-site car parking will be provided with this approved development, but spaces will be allocated to it within the Princes Dock multi-storey car park. There are no conditional requirements for highway works related to this development. This development would be 8,879sqm, which at an average occupancy of one person per 25sqm would equate to a population of 355 using the site. As part of the planning application for this development, no transport issues were raised and it was anticipated that the development would not have a detrimental impact on the local highway network.

6.8.4 Based upon the evidence presented, there are no cumulative transport-related environmental impacts understood to arise from this development. The cumulative impact of these developments is perceived to be negligible.

6.9 Residual Effects

6.9.1 Once the mitigation measures described above are applied, the residual impacts of the development are perceived to be negligible.

6.10 Assessment Summary

Summary description of the identified impact	Sensitivity of Receptor	Impact Magnitude	Nature of the impact	Significance	Mitigation	Residual Impact Magnitude	Residual Significance of Effects	Confidence Level
Construction Phase	N/A	Negligible	Temporary	Low	Construction Traffic Management Plan (CTMP)	Negligible	Negligible	High
Pedestrian Severance	N/A	Negligible	Permanent	Low	None required	Negligible	Negligible	High
Pedestrian Delay	N/A	Negligible	Permanent	Low	None required	Negligible	Negligible	High
Pedestrian Amenity	N/A	Negligible	Permanent	Low	None required	Negligible	Negligible	High
Fear & Intimidation	N/A	Negligible	Permanent	Low	None required	Negligible	Negligible	High
Hazardous Loads	N/A	Negligible	Permanent	Low	None required	Negligible	Negligible	High
Accidents and Highway Safety	N/A	Negligible	Permanent	Low	None required	Negligible	Negligible	High
Driver Delay	N/A	Negligible	Permanent	Low	None required	Negligible	Negligible	High

6.11 Conclusion

6.11.1 The impact and effects of the proposed scheme are deemed to be **Negligible**, subsequent to mitigation of construction phase impacts.

6.11.2 The development is located in a highly sustainable location, which is reflected in the low number of car parking spaces proposed. Subsequently there are no transport-related impacts identified.

6.12 Appendices

6.12.1 Appendix 1.1 provides meeting minutes from pre-application discussions with LCC Highways Officers.

7 Acoustics

7.1 Introduction

7.1.1 This section of the (ES) has been prepared by Arup and assesses the likely significant effects of the development with respect to noise. It also describes the baseline conditions currently existing at the site and surrounding area and the methodology used for the assessment. Mitigation measures are proposed, where appropriate, and the likely residual effects after any such measures have been adopted are described.

7.1.2 The presented assessments are carried out in accordance with relevant national standards and following consultation with Liverpool City Council.

7.1.3 The detailed quantitative assessment of construction noise has been scoped out of the EIA because the nearest existing sensitive receptors are some distance from the development site. Additionally, the mitigation of construction noise is uncontroversial and well-rehearsed. It is considered that noise control can be secured by a suitably worded planning condition requiring a noise management plan to be put in place.

7.1.4 Direct operational noise effects for this development could result from mechanical services plant. Although the nearest existing noise sensitive receptors are some distance from the development site, it is necessary to ensure that building services noise does not impact upon future developments proposed for the area (see Appendix 2.4). Noise control for mechanical services plant is uncontroversial and can be secured by a suitably worded planning condition.

7.1.5 Indirect operational noise effects for this development could result from road traffic changes on the wider road network, however the number of parking spaces available to residents are very small. The development has good access to public transport, pedestrian and cycle accessibility. Therefore it is assumed that the level of traffic generated by the Princes Reach site will be small. The detailed quantitative assessment of indirect road traffic noise has therefore been scoped out of the EIA.

7.1.6 The suitability of the site for residential use (which is outside the scope of the EIA regulations) has also been assessed in Appendix 2.3. This considers the sound levels within habitable residential rooms due to existing off-site noise sources. Likewise intra-development noise issues, relating to the two adjacent committed development plots, (which is outside the scope of the EIA regulations) has been considered in Appendix 2.4.

7.2 Methodology and Scope

7.2.1 This section provides an overview of planning policy and other considerations relevant to noise and vibration and describes the assessment methodology.

National Planning Policy

7.2.2 The National Planning Policy Framework[3] (NPPF) provides guidance for local planning authorities and decision-makers when drawing up plans and as a material consideration in determining applications.

7.2.3 Its core principle is to advocate a presumption in favour of sustainable development, which in literal terms means that if the adverse impacts of a development are outweighed by the benefits, when assessed as a whole, then the development should be approved. Local policy should reflect this principle and therefore the Local Authority has a key role in determining within its Local Plan and noise policies, what is "acceptable risk" in terms of noise pollution within its area.

7.2.4 In Section 123 NPPF states that planning policies and decisions should aim to:

- avoid noise from giving rise to significant adverse impacts on health and quality of life as a result of new development;
- mitigate and reduce to a minimum other adverse impacts on health and quality of life arising from noise from new development, including through the use of conditions;
- recognise that development will often create some noise and existing businesses wanting to develop in continuance of their business should not have unreasonable restrictions put on them because of changes in nearby land uses since they were established.

Planning Practice Guidance - Noise

7.2.5 Planning Practice Guidance for Noise (PPG-N) draws on the principles of the Noise Policy Statement for England[4] (NPSE), in particular the concepts of 'no observed effect level' (NOEL), lowest observed adverse effect level (LOAEL) and significant observed adverse effect level (SOAEL). These terms are explained in the noise hierarchy taken from PPG-N and presented in 7.1.

[3] *National Planning Policy Framework*, Department for Communities and Local Government, 27 March 2012
[4] Noise Policy Statement for England (NPSE) – Defra, March 2010

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

Table 7.1: Noise exposure hierarchy

7.2.6 None of the policy documents gives numerical values for the effect levels, instead recognising that "the subjective nature of noise means that there is not a simple relationship between noise levels and the impact on those affected. This will depend on how various factors combine in any particular situation". These factors include:

- The source and absolute level of the noise together with the time of day it occurs. Some types and levels of noise will cause a greater adverse effect at night than if they occurred during the day – this is because people tend to be more sensitive to noise at night as they are trying to sleep. The adverse effect can also be greater simply because there is less background noise at night.

- For non-continuous sources of noise, the number of noise events, and the frequency and pattern of occurrence of the noise.
- The spectral content of the noise (i.e. whether or not the noise contains particular high or low frequency content) and the general character of the noise (i.e. whether or not the noise contains particular tonal characteristics or other particular features). The local topology and topography should also be taken into account along with the existing and, where appropriate, the planned character of the area.
- Consideration should also be given to whether adverse internal effects can be completely removed by closing windows and, in the case of new residential development, if the proposed mitigation relies on windows being kept closed most of the time. In both cases a suitable alternative means of ventilation is likely to be necessary.

7.2.7 The Environmental Impact Assessment (EIA) Regulations require "description of the likely significant effects of the development on the environment" and "description of the measures envisaged to prevent, reduce and where possible offset any significant adverse effects on the environment."

7.2.8 Significant in terms of EIA is not the same as significant in policy terms used in the definition of SOAEL. Significant used in SOAEL refers to a level of noise at or above a threshold at which defined effects on health and quality of life occur. Significance in EIA terms typically considers not only the level of noise, but other factors such as the change in noise level, the amount by which the assessment criterion is exceeded, the duration of the impact and the number of affected receptors.

Control of Pollution Act 1974

7.2.9 The Control of Pollution Act provides Local Authorities with the power to control noise from construction sites. This may include specific controls to restrict certain activities identified as causing particular problems. Also, conditions regarding hours of operation will generally be specified and noise and vibration limits at certain locations may be applied in some cases.

7.2.10 The powers include prosecution for failure to comply with the requirements of a notice served under the act, and a system of providing prior consents for works to be carried out in a specified manner so as to reduce the likelihood of causing disturbance ('s.61 consents'). Noise generators can use the defence that best practicable means have been employed to control noise emissions.

Environmental Protection Act 1990

7.2.11 The Environmental Protection Act provides local authorities and individuals with powers to serve, or request a magistrate to serve, abatement notices against noise (including vibration) from premises that are considered to be a nuisance. Noise generators can use the defence that best practicable means have been used to control noise emissions or (in relation to construction noise) that the alleged nuisance arose from activities that were compliant with an extant consent under s.61 of the Control of Pollution Act (prior consent).

Local Policy

7.2.12 Core strategy (submission draft) (2012) Strategic Policy 33 – 'Environmental impacts' advises – "New development should seek to avoid negative impacts on the environment through adoption of best practice. Where a negative effect is identified this should be mitigated by appropriate measures. Specifically, development proposals should minimise light and noise pollution through design"

7.2.13 The Unitary Development Plan (UDP) (2002) saved Policy EP11 – 'Pollution' states that "planning permission will not be granted for development which has the potential to create unacceptable air, water, noise or other pollution or nuisance". It is also stated that "in the case of new development close to existing uses which are authorised or licensed under pollution control legislation, and which are a potential nuisance to the proposed development, planning permission will not be granted unless the City Council is satisfied that sufficient measures can and will be taken to protect amenity and environmental health."

7.2.14 The UDP Supplementary Planning Guidance note 10 (undated) – 'New Residential development' advises the following with regards to noise:

7.2.15 'Layout' paragraph 13 – "Where new housing is proposed near to an operating railway or to a major road (e.g., motorway or busy dual carriageway) appropriate noise attenuation measures will be required. Applicants may be required to submit their own noise surveys."

7.2.16 'Layout' paragraph 14: Trees and shrubs can be effective noise barriers when planted at considerable density in wide belts (and they can also be useful in visually masking the noise source). Solutions to noise problems are likely to involve the use of a combination of the spatial separation of dwellings in relation to the noise source and the introduction of noise barriers/screens with some planting of trees/shrubs. Acoustic glazing to all windows facing the noise source and in some cases more specific acoustic insulation of the building may be required. However appropriate solutions will differ in all cases and should be derived from the conclusions of the noise survey.

Assessment Methodology

7.2.17 The proposed assessment approach has regard to the requirements of Government noise policy as described in the Noise Policy Statement for England (NPSE) and Planning Practice Guidance - Noise (PPG-N) (2014).

Construction noise

7.2.18 The control of construction noise is based on British Standard 5228-1:2009+A1:2014 - Code of practice for noise and vibration on construction and open sites - Part 1: Noise.

7.2.19 BS5228-1 provides practical guidance on the control of construction site noise. The legislative background to noise control is described and recommendations are given regarding procedures for creating effective liaison between developers, site operators and Local Authorities. Methods for predicting noise are presented and guidance is provided concerning measurement of noise.

7.2.20 The details of construction programme and methodology are not yet fully developed, therefore the construction noise assessment is necessarily high level in nature.

Operational Noise - Commercial/Industrial Noise

7.2.21 The assessment of noise of a commercial/industrial nature, including noise from building services plant is commonly based on British Standard 4142 (2014) - Methods for rating and assessing industrial and commercial sound.

7.2.22 Consistent with many schemes, details of new sources of commercial/industrial noise are unknown at this stage, but noise emission limits can be specified through a planning condition and controlled by design.

7.2.23 Noise limits have therefore been defined following the principles of BS4142, with regard to the requirements of the Local Planning Authority.

Significance Criteria

Operational Noise - Commercial/Industrial Noise

7.2.24 The assessment method in BS4142 is based on the difference between the background noise level (LA90,T) without the industrial source and the noise rating level of the industrial source at the receiver location.

7.2.25 The noise level from the industrial source, the 'specific noise level' (LAeq,Tr) is given a character correction of up to 15dB if it displays prominent acoustic features (such as tonality, impulsiveness or intermittency) and by 0dB if there are no such features. This level is then the noise rating level (LAr,Tr).

7.2.26 The background noise level is subtracted from the rating level and the difference used to assess the likelihood of impact as shown in Table 7.2. Typically the greater the difference, the greater the magnitude of the impact.

Difference between rating and background noise level	Assessment
+10 dB or more	Significant adverse impact
+5 dB	Adverse impact
< 0dB	Low impact

Table 7.2: Summary of BS 4142 assessment method

7.2.27 Liverpool City Council have advised that new noise sources of an industrial nature should not exceed a rating level of parity with the background noise level. This has therefore been adopted as a significance threshold. Below this threshold effects would be not significant in EIA terms.

7.3 Consultation

7.3.1 Consultation with the EHO of LCC has been undertaken in order to agree the scoping out of some aspects relating to noise and vibration from the EIA process. We have agreed significance criteria with LCC and have agreed the scope of the

baseline noise measurement survey. We have also agreed the scope of the Noise Impact Assessment required to support the planning application.

7.4 Limitations and assumptions

7.4.1 At this stage of the project there is insufficient detailed construction information available to inform precisely any construction noise calculations. Therefore a qualitative assessment has been conducted based upon professional judgement, to determine overall risk. Considering the distances involved to sensitive receptors the overall risk is considered to be low. A proposed CEMP will ensure that Best Practicable Means are employed as required by the Control of Pollution Act (CoPA).

7.4.2 At this stage of the project there is insufficient detailed design information to precisely inform any operational noise calculations. Therefore the approach that has been taken is to set noise limits which can be secured by a suitably worded planning condition and delivered during detailed design and construction of the development. This approach is considered acceptable in EIA terms because noise can be controlled such that there will be no significant effects through the use of mitigation that is uncontroversial. The approach taken is therefore considered to be robust.

7.5 Baseline conditions

7.5.1 The proposed development site is located within Princes Dock, Liverpool. The site is bounded to the west by, and accessed by, William Jessop Way, a local road allowing access to the businesses south of the site. Further west, Princes Parade provides access to the existing businesses and residential properties around Princes Dock. Immediately east, a 6m high dock boundary wall separates the site from Bath Street, an access road which leads to the A5052/New Quay road, a major route running alongside the River Mersey.

7.5.2 The site has vacant plots at either side of it. There are existing high-rise residential properties to the north, east, south and north-west. Commercial properties are to the east, beyond Bath Street and also across the dock to the west.

Baseline noise survey

7.5.3 Environmental noise surveys were conducted on 19th and 20th January 2016, and 9th and 10th March 2016 to establish the existing noise climate on site and in the area surrounding the proposed development.

7.5.4 Measurements have been taken to enable the assessment of proposed new noise sources forming part of the development that may affect existing sensitive receptors, in addition to noise from existing sources affecting the Proposed Development. The measurement positions are shown in 7.1. The site boundary of the development is outlined in red.

Figure 7.1: Site plan and measurement positions. Imagery ©2016 Google, map data ©2016 Google

Baseline noise results

7.5.5 Tables 7.3, 7.4 and 7.5 present a summary of the results of day, evening and night time noise measurements respectively, at the locations indicated in Figure . The full survey results are presented in Appendix 2.2.

7.5.6 For LAeq noise levels, the values presented in the tables are a logarithmic average of measured data, for LA90, LA10 and LAMax values, the arithmetic averages of measured data are presented.

7.5.7 During day time and evening periods, traffic noise from the A5052/New Quay Road dominated the measured noise levels. Otherwise, light traffic noise was audible from William Jessop Way and Princes Parade. During night time periods, building services noise dominated noise levels at measurements positions 3, 5 and 6, elsewhere distant traffic noise was the main noise source.

Measurement Location (see Figure 1)	Sound pressure level, dB re. 20µPa			
	$dBL_{A90,T}$	$dBL_{Aeq,T}$	$dBL_{A10,T}$	$dBL_{AMax,F}$
1 - Alexandra Tower	53	59	62	72
2 - City Lofts	52	62	65	76
3 - Bath Street	60	75	79	90
4 - William Jessop Way	55	60	62	72
5 - The Malmaison Hotel	58	64	67	74
6 - Beetham Tower / Radisson / West Tower	62	71	76	82
7 - Princes Dock offices No.12	53	56	58	63
8 - A5052	66	77	81	89

Table 7.3: Summary of measured day time noise levels

Measurement Location (see Figure 1)	Sound pressure level, dB re. 20µPa			
	$dBL_{A90,T}$	$dBL_{Aeq,T}$	$dBL_{A10,T}$	$dBL_{AMax,F}$
1 - Alexandra Tower	48	56	56	73
2 - City Lofts	48	54	54	73
3 - Bath Street	57	74	79	92
4 - William Jessop Way	55	58	61	66
5 - The Malmaison Hotel	54	60	64	73
6 - Beetham Tower / Radisson / West Tower	57	69	73	79
8 - A5052	61	76	81	91

Table 7.4: Summary of measured evening noise levels

Measurement Location (see Figure 1)	Sound pressure level, dB re. 20µPa			
	$dBL_{A90,T}$	$dBL_{Aeq,T}$	$dBL_{A10,T}$	$dBL_{AMax,F}$
1 - Alexandra Tower	43	46	48	59
2 - City Lofts	42	45	47	55
3 - Bath Street	50	64	65	80
4 - William Jessop Way	46	53	56	67
5 - The Malmaison Hotel	51	54	57	64
6 - Beetham Tower / Radisson / West Tower	52	60	62	74
8 - A5052	53	69	71	86

Table 7.5: Summary of measured night time noise levels

7.6 Assessment

Introduction

7.6.1 This section considers the potential noise effects associated with the construction and operation of the Proposed Development on existing sensitive receptors.

Construction

Effects

7.6.2 For the purposes of this EIA, construction is anticipated to take approximately 27 months. The current programme is that works will commence early 2017, allowing 12 to 14 months for appointing a principle contractor and discharging planning conditions.

Embedded mitigation

7.6.3 Construction works would be managed to control noise in accordance with the principles of best practicable means (BPM) as required by the Control of Pollution Act (CoPA). Typical BPM measures that could be applied including but not exclusively are:

- hours of working to be planned, taking into account the nature of land use in the areas concerned and duration of the work;
- where practicable and required, quiet working methods should be employed, including the use of the most suitable plant, and suitably sized plant;
- equipment should be switched off when not required;
- the drop height of materials should be minimised;
- plant and vehicles should be started up sequentially rather than all together;
- broadband (i.e. white noise) reversing alarms should be used rather than tonal alarms;
- the siting of plant should considered to avoid noise being directed towards dwellings; and

7.6.4 The appointed contractor will be required to produce and agree a CEMP to describe how construction will be managed to avoid, minimise and mitigate any adverse construction effects.

Assessment

7.6.5 Construction noise effects are assessed as not significant.

7.6.6 No significant evening or night time construction work is currently envisaged. Limited evening construction works may be practicable but any significant night time working is likely to result in adverse noise effects. Equipment such as de-

watering pumps and generators, suitably attenuated and located away from or otherwise screened from dwellings, would be able to operate 24 hours within the noise limits.

7.6.7 In the event that, despite use of BPM, extended periods of elevated construction noise levels are anticipated and/or significant night time working is required, then it may be appropriate for the contractor to seek a Section 61 agreement with the local authority under CoPA. A Section 61 is a formal agreement between the contractor and the local authority which allows the contractor and local authority to agree, for example, noise levels and hours of work.

Operational Noise - Commercial/Industrial Noise

Significance thresholds

7.6.8 The threshold for significant effects for commercial/industrial noise has been established as a rating level (determined according to BS4142) equal to the typical background noise levels (LA90), as shown in 7.6

Noise Sensitive Receptor (see Figure 1)	Threshold values in decibels (dB), $L_{Ar,Tr}$		
	Day (07:00 – 23:00)	Evening (19:00 – 23:00)	Night (23:00 – 07:00)
1 - Alexandra Tower	53	48	43
2 - City Lofts	52	48	42
5 - The Malmaison Hotel	58	54	51
6 - Beetham Tower / Radisson / West Tower	62	57	52
7* - Princes Dock offices No.12	53	-	-

Table 7.6: Threshold levels of significant effects for commercial/industrial noise

*Noise sensitive receptor 7 is a commercial property and is not occupied during evening and night time periods.

7.6.9 Notably, the limiting case with regards to commercial / industrial noise may be the adjacent empty plots. This matter is addressed in Appendix 2.4 – Intra-development noise.

Effects

7.6.10 The details of sources of commercial/industrial noise cannot currently be defined in detail. However the mitigation of this type of noise is uncontroversial and can therefore be secured by a suitably worded planning condition to ensure the designs comply with the assessment criteria.

7.6.11 By designing plant to comply with the adopted significance thresholds the effects of commercial noise are assessed as not significant.

7.7 Additional Mitigation Measures

Introduction

7.7.1 This chapter considers the potential mitigation of noise effects associated with the construction and operation of the Proposed Development.

Construction

7.7.2 To minimise the level of noise to which sensitive receptors will be exposed, the appointed contractor will be required to produce a Construction Environmental Management Plan (CEMP) to describe how construction will be managed to avoid, minimise and mitigate any adverse construction effects.

7.7.3 The CEMP will contain established control measures for environmental protection that will be adopted during construction. These measures will be based upon BS 5228 Part 1: Noise in order to achieve best practicable means (BPM) as required by the Control of Pollution Act (CoPA).

7.7.4 No specific additional mitigation measures are proposed to address construction noise impacts beyond those provided by the CEMP. This is because the net effect of the Proposed Development on these properties is assessed to be not significant.

7.7.5 Additionally, the local authority has powers under the CoPA to control noise from construction sites.

Operation - Commercial/Industrial Noise

7.7.6 To minimise the level of noise to which sensitive receptors will be exposed, the design of noise sources of a commercial/industrial nature will be conducted in accordance with the adopted significance thresholds, in turn based on the principles of BS4142.

7.7.7 The mitigation of this type of noise is uncontroversial and can therefore be secured by a suitably worded planning condition. The requirements of such a planning condition can then be discharged during detailed design of the development. Therefore no specific additional mitigation measures are proposed.

7.8 Cumulative Impacts

Introduction

7.8.1 This section provides an overview of cumulative effects resulting from the combined impacts of noise from the Proposed Development as well as other developments proposed as part of the broader Masterplan proposals for Princes Dock (Liverpool Waters Outline Consent Masterplan).

7.8.2 The assessment of intra-development noise issues (which is outside the scope of the EIA regulations) is considered in Appendix 2.4. Importantly in many cases this will be the limiting case, inherently limiting cumulative impacts to existing noise sensitive receptors.

Construction

7.8.3 Nearby committed development has the potential to contribute to cumulative effects of construction noise, if construction activities occur concurrently.

7.8.4 Even under such a scenario, the cumulative impact of two activities cannot result in a noise level more than 3dB higher than that from the single loudest activity.

7.8.5 Cumulative construction noise effects resulting from committed development are not considered to materially influence the outcome of this assessment at off-site sensitive receptors.

Operation - commercial/industrial noise

7.8.6 Commercial noise effects from nearby committed development has the potential to contribute to cumulative effects.

7.8.7 The assessment of commercial/industrial noise for the proposed development is based upon achieving a rating level of parity with background noise by reference to BS4142 at the nearest noise sensitive receptors.

7.8.8 Consequently cumulative noise effects resulting from a single committed development could theoretically result in a combined rating level of 3dB above background noise, in the absence of any acoustically distinguishing characteristics.

7.8.9 This level is still unlikely to cause an adverse impact as defined by reference to BS4142. Therefore the cumulative effect of the Proposed Development and the other committed developments is not considered to materially influence the outcome of this assessment.

7.9 Residual Effects

Introduction

7.9.1 This section considers the potential residual noise effects of construction and operation of the proposed development.

Construction

7.9.2 The assessment has concluded that, with the implementation of best practical means, captured within a CEMP, the residual effects of noise as a result of the construction activity is assessed as not significant.

Operation - Commercial/Industrial Noise

7.9.3 The residual effects of commercial noise on existing receptors is assessed to be not significant.

7.10 Assessment summary

Summary description of the identified impact	Sensitivity of Receptor	Impact Magnitude	Nature of the impact	Significance	Mitigation	Residual Impact Magnitude	Residual Significance of Effects	Confidence Level
Construction noise	High	Not significant	Temporary, direct	Not significant	None required beyond BPM and adherence to the CEMP	Not significant	Not significant	High
Operational noise (building services)	High	Not significant	Permanent, direct	Not significant	None required (design to comply with noise limits secured by planning condition)	Not significant	Not significant	High

7.11 Conclusion

7.11.1 Noise and vibration impacts from construction and operation of the proposed development do not cause significant effects at noise sensitive receptors. With the implementation of the identified mitigation measures (embedded or otherwise) and design to comply with noise criteria, the residual effects are assessed as being **not significant.**

7.12 Appendices

7.12.1 A glossary of acoustic terminology is presented in Appendix 2.1.

7.12.2 Full details and results of the baseline noise survey are presented in Appendix 2.2.

7.12.3 An assessment of the suitability of the site for residential development is presented in Appendix 2.3.

7.12.4 An assessment of intra-development noise issues is presented in Appendix 2.4.

8 Air Quality

8.1 Introduction

8.1.1 This section describes the likely significant effects of the proposed development on local air quality. This section outlines relevant air quality management policy and legislation, describes the existing air quality conditions in the vicinity of the proposed development and the potential air quality impacts associated with its construction and operation. Mitigation measures are also proposed where relevant which would be implemented to reduce the effect of the proposed development on air quality, as far as practicable. Potential changes to air quality in the area as a result of the operation of the proposed development have been considered in relation to the national and EU air quality standards to determine their significance.

8.2 Methodology and Scope

8.2.1 In May 2008 the Directive 2008/50/EC[5] on ambient air quality and cleaner air for Europe came into force. This Directive consolidates earlier directives (except the 4th Daughter Directive, which will be brought into the new Directive at a later date), providing EU limit values for specified pollutants and provides a new regulatory framework for $PM_{2.5}$. The European Directive has been transposed into domestic legislation in the Air Quality Standards 2010[6].

Air Quality Objectives and Limit Values

8.2.2 Air quality limit values and objectives are quality standards for clean air. Some pollutants have standards expressed as annual average (long-term) concentrations due to the chronic way in which they affect health or the natural environment (i.e. effects occur after a prolonged period of exposure to elevated concentrations) and others have standards expressed as 24-hour, 1-hour or 15-minute average (short-term) concentrations due to the acute way in which they affect health or the natural environment (i.e. after a relatively short period of exposure). Some pollutants have standards expressed in terms of both long-term and short-term concentrations Table 8.1 sets out these EU air quality limit values and national air quality objectives for the pollutants relevant to this study (NO2 and particulate matter).

[5] Directive 2008/50/EC of the European Parliament and of the Council of 21 May 2008 on ambient air quality and cleaner air for Europe

[6] HMSO, Air Quality Standards Regulations 2010 SI No. 1001

Table 8.1: Air Quality Standards

Pollutant	Averaging period	Limit value / Objective	Date for compliance
Nitrogen Dioxide (NO_2)	Annual mean	40µg/m^3	UK[6] 11 June 2010
			EU[5] 01 Jan 2010
	1-hour mean	200µg/m^3 not to be exceeded more than 18 times a year (99.8th percentile)	UK[6] 11 June 2010
			EU[5] 01 Jan 2010
Particulate Matter (PM_{10})	Annual mean	40µg/m^3	UK[6] 11 June 2010
			EU[5] 01 Jan 2005
	24-hour mean	50µg/m^3 not to be exceeded more than 35 times a year (90.4th percentile)	UK[6] 11 June 2010
			EU[5] 01 Jan 2005
Fine Particulate Matter ($PM_{2.5}$)	Annual mean	25µg/m^3	UK[6]/EU[5] 01 Jan 2015

Environment Act 1995

8.2.3 Part IV of the Environment Act 1995[7] places a duty on the Secretary of State for the Environment to develop, implement and maintain an Air Quality Strategy with the aim of reducing atmospheric emissions and improving air quality. The Air Quality Strategy[8] for England, Scotland, Wales and Northern Ireland provides the national air quality objectives and a framework for ensuring these values are complied with based on a combination of international, national and local measures to reduce emissions and improve air quality. This includes the statutory duty, also under Part IV of the Environment Act 1995, for local authorities to undergo a process of local air quality management and declare Air Quality Management Areas (AQMA) where pollutant concentrations exceed the national air quality objectives. Where an AQMA is declared the local authority would also need to produce an Air Quality Action Plan (AQAP) which outlines the strategy for improving air quality in these areas.

Dust Nuisance

8.2.4 Dust is the generic term used in the British Standard document BS 6069 (Part Two) to describe particulate matter in the size range 1–75µm in diameter. Dust nuisance is the result of the perception of the soiling of surfaces by excessive rates of dust deposition. Under provisions in the Environmental Protection Act 1990, dust nuisance is defined as a statutory nuisance.

8.2.5 There are currently no standards or guidelines for dust nuisance in the UK, nor are formal dust deposition standards specified. This reflects the uncertainties in dust monitoring technology and the highly subjective relationship between

7 Environment Act 1995, Chapter 25, Part IV Air Quality
8 Defra (2007) The Air Quality Strategy for England, Scotland, Wales and Northern Ireland, Volume 1, July 2007

deposition events, surface soiling and the perception of such events as a nuisance. In law, complaints about excessive dust deposition would have to be investigated by the local authority and any complaint upheld for a statutory nuisance to occur. However, dust deposition is generally managed by suitable on-site practices and mitigation rather than by the determination of statutory nuisance and/or prosecution or enforcement notice(s).

National Planning Policy Framework

8.2.6 The National Planning Policy Framework[9] (NPPF) was published in March 2012 with the purpose of planning to achieve sustainable development. Paragraph 124 of the NPPF on air quality states that:

"Planning policies should sustain compliance with and contribute towards EU limit values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and the cumulative impacts on air quality from individual sites in local areas. Planning decisions should ensure that any new development in Air Quality Management Areas is consistent with the local air quality action plan."

8.2.7 In addition, paragraph 120 states that:

"To prevent unacceptable risks from pollution and land instability, planning policies and decisions should ensure that new development is appropriate for its location. The effects (including cumulative effects) of pollution on health, the natural environment or general amenity, and the potential sensitivity of the area of proposed development to adverse effects from pollution, should be taken into account."

Local Planning Policy

8.2.8 Liverpool City Council (LCC) is in the process of producing a Local Plan for Liverpool which will set out the spatial vision and development management policies for determining planning applications in the city. The Draft Core Strategy[10] includes Strategic Policy 33: Environmental Impacts which states that:

"New development should seek to avoid negative impacts on the environment through adoption of best practice. Where a negative effect is identified this should be mitigated by appropriate measures. Specifically, development proposals should….minimise adverse impacts on, and include measures to improve, air quality within the city."

"While this policy seeks to ensure that development contributes to improving air quality in Liverpool, the Core Strategy more generally seeks to achieve this by reducing the need to travel, and encouraging increased use of sustainable transport modes, including walking and cycling."

8.2.9 The location of the proposed development near the city centre reduces the need for travel into the city centre and it is anticipated that future residents will use sustainable methods of transport to travel to and from the proposed development.

[9] Department for Communities and Local Government (2012) National Planning Policy Framework
[10] Liverpool City Council, Submission Draft, Liverpool Core Strategy, 2012

Methodology Overview

8.2.10 The overall approach to the air quality assessment comprises:

- A review of the existing air quality conditions at and in the vicinity of the proposed development site;
- An assessment of the potential changes in air quality arising from the construction and operation of the proposed development;
- Formulation of mitigation measures, where necessary, to ensure any adverse effects on air quality are minimised; and

8.2.11 The following data sources have been used to determine the baseline and future conditions of air quality in the study area:

- LCC review and assessment reports and local air quality monitoring data;
- The Defra Local Air Quality Management website[11];
- The Environment Agency website[12];

Methodology for establishing baseline conditions

8.2.12 Existing or baseline ambient air quality refers to the concentration of relevant substances that are already present in the environment. These are present from various sources, such as industrial processes, commercial and domestic activities, traffic and natural sources.

8.2.13 A desk-based review was undertaken using the data sources described above. The review identified the main sources of air pollution within a radius of 1km around the proposed development site, local air quality monitoring data for recent years and local background pollutant concentrations.

8.2.14 Sensitive receptors are defined as those properties/schools/hospitals that are likely to experience a change in pollutant concentrations and/or dust nuisance due to the construction of the proposed development.

Methodology for assessment of effects from construction

8.2.15 The effects from demolition and construction have been assessed using the qualitative approach described in the latest guidance[13] by the Institute of Air Quality Management (IAQM).

8.2.16 An ‘impact’ is described as a change in pollutant concentrations or dust deposition, while an ‘effect’ is described as the consequence of an impact. The main impacts that may arise during demolition and construction of the proposed development are:

[11] Defra Local Air Quality Management website; http://laqm.defra.gov.uk/; Accessed: April 2016
[12] Environment Agency website; http://maps.environment-agency.gov.uk/wiyby/dataSearchController?topic=pollution&lang=_e; Accessed: April2016
[13] Institute of Air Quality Management (2014); Guidance on the assessment of dust from demolition and construction

- Dust deposition, resulting in the soiling of surfaces;
- Visible dust plumes;
- Elevated PM_{10} concentrations as a result of dust generating activities on site; and
- An increase in NO2 and PM_{10} concentrations due to exhaust emissions from non-road mobile machinery and vehicles accessing the site.

8.2.17 The IAQM guidance considers the potential for dust emissions from activities such as demolition of existing structures, earthworks, construction of new structures and trackout. Earthworks refer to the processes of soil stripping, ground levelling, excavation and land capping, while trackout is the transport of dust and dirt from the site onto the public road network where it may be deposited and then re-suspended by vehicles using the network. This arises when vehicles leave the site with dust materials, which may then spill onto the road, or when they travel over muddy ground on site and then transfer dust and dirt onto the road network.

8.2.18 For each of these dust-generating activities, the guidance considers three separate effects: annoyance due to dust soiling; harm to ecological receptors; and the risk of health effects due to a significant increase in PM_{10} exposure. The receptors can be human or ecological and are chosen based on their sensitivity to dust soiling and PM_{10} exposure.

8.2.19 The methodology takes into account the scale to which the above effects are likely to be generated (classed as small, medium or large), along with the levels of background PM10 concentrations and the distance to the closest receptor, in order to determine the sensitivity of the area. This is then taken into consideration when deriving the overall risk for the site. Suitable mitigation measures are also proposed to reduce the risk of the site.

8.2.20 There are five steps in the assessment process described in the IAQM guidance. A further description is provided in the following paragraphs.

Step 1: Need for assessment

8.2.21 The first step is the initial screening for the need for a detailed assessment. According to the IAQM guidance, an assessment is required where there are sensitive receptors within 350m of the site boundary (for ecological receptors that is 50m) and/or within 50m of the route(s) used by the construction vehicles on the public highway and up to 500m from the site entrance(s).

Step 2: Assess the risk of dust impacts

8.2.22 This step is split into three sections as follows:

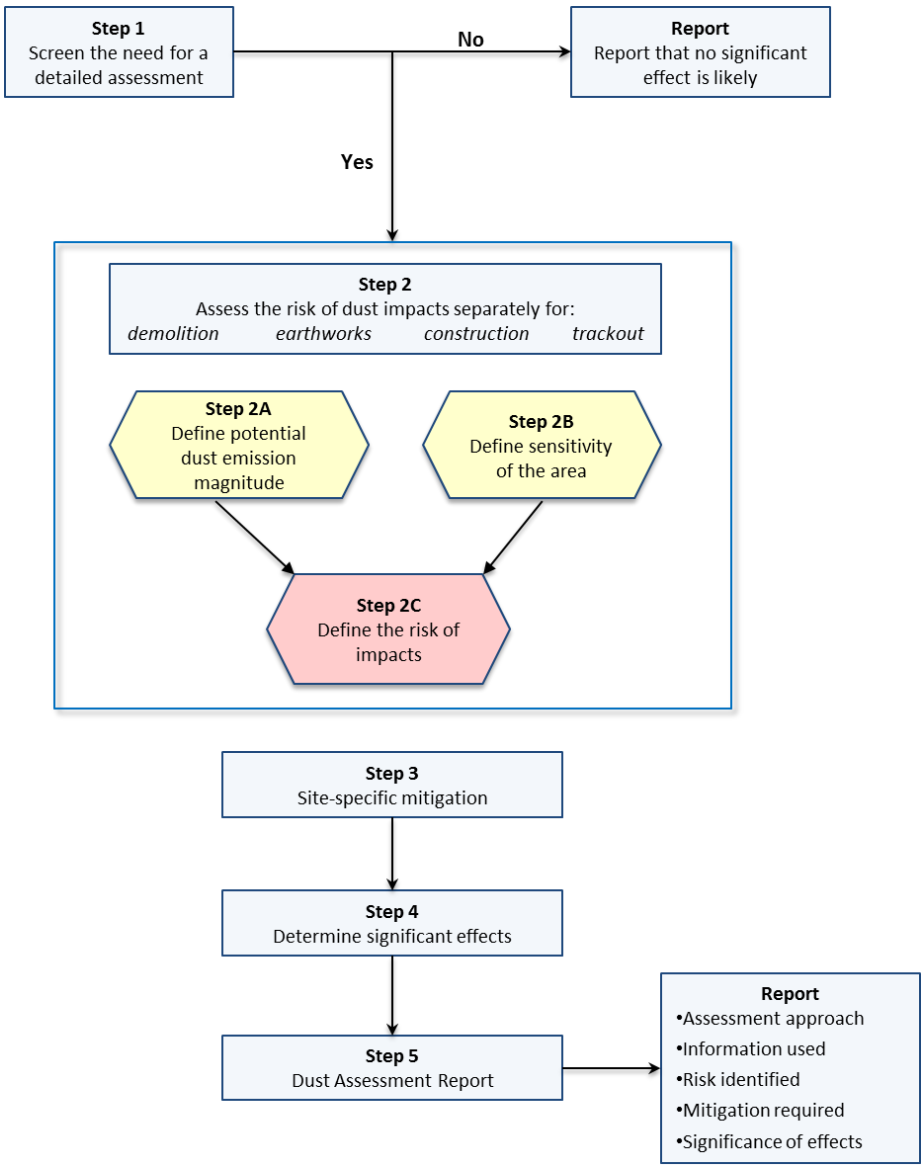
- 2A. Define the potential dust emission magnitude;
- 2B. define the sensitivity of the area; and
- Define the risk of impacts.

8.2.23 Each of the dust-generating activities is given a dust emission magnitude depending on the scale and nature of the works (step 2A) based on the criteria shown in Table A.1 (Appendix 3.1).

8.2.24 The sensitivity of the surrounding area is then determined (step 2B) for each dust effect from the above dust-generating activities, based on the proximity and number of receptors, their sensitivity to dust, the local PM10 background concentrations and any other site-specific factors. Tables A.2 to A.4 (Appendix 3.1) show the criteria for defining the sensitivity of the area to different dust effects.

8.2.25 The overall risk of the impacts for each activity is then determined (step 2C) prior to the application of any mitigation measures (Table A.5, Appendix 3.1) and an overall risk for the site derived.

Figure 8.1: IAQM dust assessment methodology



Step 3: Determine the site-specific mitigation

8.2.26 Once each of the activities is assigned a risk rating, appropriate mitigation measures are identified. Where the risk is negligible, no mitigation measures beyond those required by legislation are necessary.

Step 4: Determine any significant residual effects

8.2.27 Once the risk of dust impacts has been determined and the appropriate dust mitigation measures identified, the final step is to determine whether there are any residual significant effects. The IAQM guidance notes that it is anticipated that with the implementation of effective site-specific mitigation measures, the environmental effect will not be significant in most cases.

Step 5: Prepare a dust assessment report

8.2.28 The last step of the assessment is the preparation of a Dust Assessment Report. This forms part of this ES chapter.

Methodology for assessment of effects from operation

Road Traffic Emissions

8.2.29 The development has the potential to impact on existing air quality as a result of road traffic exhaust emissions, such as NO2 and PM10, associated with vehicles travelling to and from the site during the operational phase. A screening assessment was therefore undertaken using the criteria contained within the EPUK/IAQM land-use guidance document[14] to determine the potential local air quality effects associated with the potential trip generation as a result of the proposed development.

8.2.30 As the proposed development lies in an AQMA, the EPUK/IAQM guidance document states the following criteria to help establish when an air quality assessment is likely to be considered necessary:

- A change of Light Duty Vehicle flows of more than 100 Annual Average Daily Traffic (AADT) movements; and
- A change of Heavy Duty Vehicle flows of more than 25 AADT movements;

8.2.31 Should screening of the traffic data indicate that any of the above criteria are met, then potential impacts at sensitive receptor locations can be assessed by calculating the predicted change in NO2 and PM10 concentrations as a result of the proposed development. The significance of predicted impacts can then be determined in accordance with the methodology outlined in the EPUK/IAQM guidance. Should the criteria above not be met as a result of the proposed development, then the EPUK/IAQM guidance document consider air quality

[14] Moorcroft and Barrowcliffe. et al. (2015) Land-use Planning & Development Control: Planning for Air Quality. Institute of Air Quality Management, London

impacts associated with road traffic emissions of a scheme to be negligible and no further assessment is required.

Combustion Plant Emissions

8.2.32 Emissions associated with the proposed combustion plant to be installed as part of the development have the potential to cause increases in pollutant concentrations in the vicinity of the site. The design team has provided the following information on which the assessment of air quality effects has been based:

- 1 x 1,038kWth input CHP; and
- 2 x 1,000kW gas fired boilers.

8.2.33 Emissions from on-site back-up generators have been scoped out of the detailed assessment as they will be used only in emergencies. Emissions from this source will therefore have a negligible impact on the local air quality.

8.2.34 A detailed assessment of air quality effects has been undertaken following EPUK/IAQM guidance, as the on-site combustion plant will have a total capacity of greater than 300kW. The effect on local air quality has been quantified through dispersion modelling in accordance with the methodology described in the following sections.

8.2.35 An industry standard atmospheric dispersion model, ADMS 5, was used to calculate resulting concentrations of NO2. As the combustion plant is proposed to be gas-fired, emissions of particulate matter would be negligible and therefore this pollutant has been scoped out of the assessment.

8.2.36 The modelling procedure was as follows:

- Information on stack dimensions and position, as well as boiler operating conditions, were obtained for the proposed development;
- Appropriate data to describe meteorological conditions in the vicinity of the site was obtained from Atmospheric Dispersion Modelling (ADM) Ltd for the latest three years of data;
- A receptor grid of potentially sensitive locations was identified in the vicinity of the installation using digital mapping;
- Information on buildings surrounding the development was obtained;
- The above information was entered into the dispersion model;
- The dispersion model was run to determine pollutant concentrations in the vicinity of the site. The interpretation of the results was based on the modelled concentrations at potential receptor locations; and
- The study results were compared with the relevant assessment criteria.

Dispersion Model

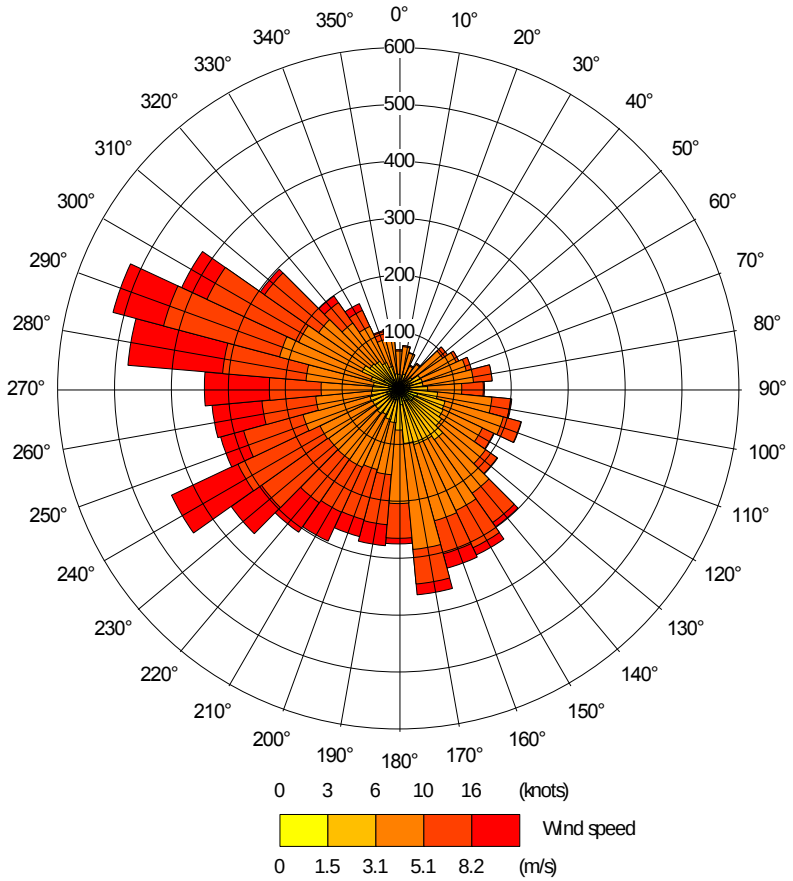
8.2.37 The ADMS 5 dispersion model (version 5.1.2) has been used for this assessment. This was the most up-to-date version of the model at the time of the assessment[15].

8.2.38 The ADMS model has been widely validated for point sources and is accepted by the industry as being 'fit-for-purpose' for air quality assessments of stack releases. It is regularly tested against other dispersion models by the EA's Air Quality Modelling and Assessment Unit (AQMAU) and is suitable for EIAs. The model incorporates the latest understanding of boundary layer meteorology and dispersion.

Meteorological data

8.2.39 Meteorological data used in this assessment was measured at Liverpool John Lennon Airport meteorological station over the period 1st January 2013 to 31st December 2015 (inclusive). Liverpool John Lennon Airport is located approximately 12km south east of the proposed development. Figure 8.2 shows the wind rose for the latest full year of data, 2015; it can be seen that the predominant wind direction is north westerly**.**

Figure 8.2: Wind Rose for 2015 meteorological data



15 CERC (2012); ADMS 5 Atmospheric Dispersion Modelling System User Guide

Building effects

8.2.40 Buildings can have a significant effect on the dispersion of pollutants. If tall buildings are close to a stack, the plume can be entrained in the cavity zone downwind of the building. This can lead to higher ground concentrations near the stack than would be expected in the absence of buildings and can affect the dispersion of pollutants in the atmosphere.

8.2.41 Therefore, two scenarios have been considered in the assessment of combustion plant emissions to ensure a worst case scenario is considered. The first scenario is representative of the existing situation with the addition of the proposed development in place; this scenario considers the effect of the proposed development and the existing 10-11 Brook Street tower building on dispersion of pollutants from the combustion plant. The second scenario considers, in addition, the inclusion of nearby high rise consented development which could be built out as part of the Liverpool Waters outline planning application.

8.2.42 Table 8.2 shows the buildings which have been included in the dispersion model for each scenario. Buildings can only be added as rectangular or circular shapes therefore some simplification has been made. It should be noted that the consented development buildings for the Liverpool Waters consented scenario have been included based on the information provided as part of the outline planning application and therefore these may change with detailed design. Details of building geometries included in the model are provided in Table 8.2.

Figure 8.3: Modelled Buildings in Existing Scenario plus Proposed Development

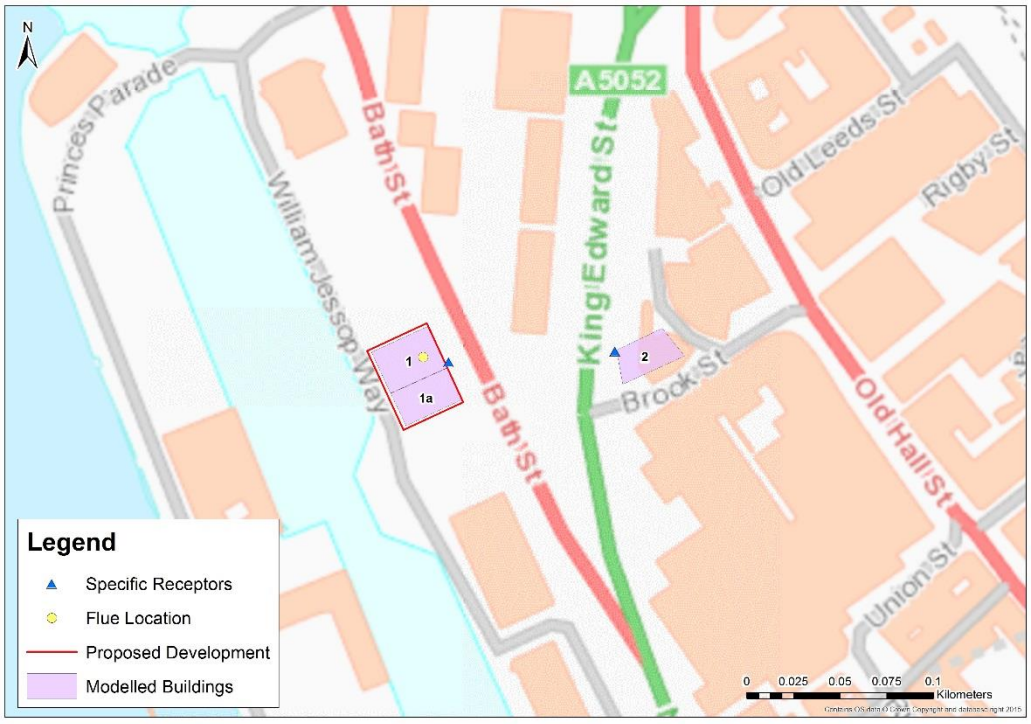


Figure 8.4: Modelled Buildings in the Liverpool Waters Consented Development Scenario

Table 8.2: Modelled Building Parameters

ID	Name	Easting	Northing	Height (m)	Length (m)	Width (m)	Angle of building (degrees)	Scenario
1	Proposed Development	333715	390807	110	34	24	65	Both
1a	Proposed Development Car Park and Roof Terrace	333725	390788	10	34	19	65	Both
2	8-10 Brook Street	333843	390810	134	27	17	63	Both
3	Liverpool Waters Plot A-03	333738	390761	34	35	34	68	Liverpool Waters consent only
4	Liverpool Waters Plot B-01	333777	390824	148	35	38	67	Liverpool Waters consent only
5	Liverpool Waters Plot B-04	333801	390987	174	43	25	76	Liverpool Waters consent only
6	Liverpool Waters Plot B-05	333728	391022	170	71	28	76	Liverpool Waters consent only
7	Liverpool Waters Plot A-06	333682	390894	196	31	38	65	Liverpool Waters consent only

ID	Name	Easting	Northing	Height (m)	Length (m)	Width (m)	Angle of building (degrees)	Scenario
8	Liverpool Waters Plot A-05	333691	390843	34	14	35	64	Liverpool Waters consent only

Assessment extents

8.2.43 The assessment has been undertaken to assess the predicted concentrations in areas where the air quality objectives apply for NO2. The long-term annual mean objective applies at locations where sensitive receptors are located, these would include residential properties, hospitals and schools. The short-term hourly mean objective applies at locations where members of the public may spend more than an hour at a single location.

8.2.44 The area surrounding the proposed development is currently commercial but residential development will be progressed in the area as part of the Liverpool Waters consent. A grid of results was run across a 1x1 km area with a 10m grid spacing. This method ensures that potential impacts are assessed across the entire study area. The receptor grid has been modelled at heights of 1.5m (representative of ground level), 10m (representative of the communal terrace proposed as part of the development) and 110m (representative of roof level).

8.2.45 Specific receptors have also been assessed at the closest façades of each of the high rise buildings included in the model to the proposed development for each scenario. Receptors have been included at 25m intervals up to roof level[16] to assess likely concentrations at height as well as at ground level. Specific receptor locations are shown on Figure 8.3 and Figure 8.4 for each of the scenarios assessed.

Process conditions

8.2.46 The design of the proposed development includes the installation of two natural gas boiler units and one combined heat and power (CHP) unit. At the time of writing it is unclear whether the exhaust gases from each of the units will be combined into a single flue or whether each unit will have a separate flue. A sensitivity test was undertaken which showed that separate flues provided the highest pollutant concentrations, therefore, it has been assumed for the purposes of this assessment that each of the units will exhaust to air through a separate flue. The approximate flue location is shown in Table 8.3. Details of the exhaust gas parameters included in the dispersion model are provided in Table 8.3. It has been assumed that the gas boiler and CHP would operate continuously, to provide a worst case scenario.

[16] Roof level as listed in the Liverpool Waters outline planning application

Table 8.3: Process conditions

Parameter	Unit	Gas Boiler 1	Gas Boiler 2	CHP
Combustion plant, thermal input capacity	kW	1,000	1,000	1,038
Stack location	NGR	333722, 390809	333722, 390809	333722, 390809
Stack diameter	mm	0.2	0.2	0.2
Flue gas efflux velocity	m/s	15	15	15
Temperature	˚C	80	80	70
Stack height – above building	m	3	3	3
NOx Emission Rate	g/s	0.01	0.01	0.14

NOx to NO2

8.2.47 The model predicts NOx concentrations which comprise nitric oxide (NO) and nitrogen dioxide (NO2). NOx is emitted from combustion processes, primarily as NO with a small percentage of NO2. The emitted NO reacts with oxidants in the air (mainly ozone) to form NO2. NO2 is associated with effects on human health and therefore the air quality standards for the protection of human health are based on NO2 rather than total NOx or NO. A suitable NOx:NO2 conversion has been applied to the modelled NOx concentrations in order to determine the impact of the NOx emissions on ambient concentrations of NO2. This assessment has followed the methodology set out by the EA which states it should be assumed as a worst case scenario that 70% of long-term and 35% of short-term NOx concentrations will convert to NO2[17].

Assessment of Significance

8.2.48 The 2015 EPUK/IAQM guidance note 'Land-Use Planning & Development Control' provides an approach to determining the air quality impacts resulting from a proposed development and the overall significance of local air quality effects arising from a proposed development.

8.2.49 Firstly, impact descriptors are determined based on the magnitude of incremental change as a proportion of the relevant assessment level, in this instance the annual mean NO2 objective. The change is then examined in relation to the predicted total pollutant concentrations in the assessment year and its relationship with the annual mean NO2 objective.

8.2.50 The assessment framework for determining impact descriptors at each of the assessed receptors is shown in Table 8.4.

[17] Environment Agency; *Air Quality Modelling and Assessment Unit, Conversion ratios for NO_x and NO_2*

Table 8.4: Impact Descriptors

Annual average concentrations at receptor in the assessment year	**% Change in concentrations relative to annual mean NO_2 and hourly mean objectives**			
	1	**2-5**	**6-10**	**>10**
75% or less of objective	Negligible	Negligible	Slight	Moderate
76-94% of objective	Negligible	Slight	Moderate	Moderate
95-102% of objective	Slight	Moderate	Moderate	Substantial
103-109% of objective	Moderate	Moderate	Substantial	Substantial
110% of more of objective	Moderate	Substantial	Substantial	Substantial

Note: Changes in pollutant concentrations of 0% i.e. <0.5% would be described as negligible

8.2.51 The guidance also provides advice for determining the magnitude of change for hourly mean NO2 concentrations, which is shown in Table 8.5. The impact descriptor is determined by considering the process contribution only. However, consideration is also given to total pollutant concentrations, including background concentrations, and comparison of these with the hourly mean NO2 objective.

Table 8.5: Magnitude of Change for Hourly Mean NO2 Concentrations

Change in hourly mean concentrations at receptor in the assessment year	**Magnitude of Change**	**Impact Descriptor**
<10% of hourly mean NO_2 threshold	Imperceptible	Negligible
10-20% of hourly mean NO_2 threshold	Small	Slight
20-50% of hourly mean NO_2 threshold	Medium	Moderate
>50% of hourly mean NO_2 threshold	Large	Substantial

8.2.52 The impact descriptors at each of the assessed receptors can then be used as a starting point to making a judgement on the overall significance of effect of a proposed development, however other influences would also need to accounted for, such as:

- The existing and future air quality in the absence of the development;
- The extent of current and future population exposure to the impacts; and
- The influence and validity of any assumptions adopted when undertaking the prediction of impacts.

8.2.53 Professional judgement should be used to determine the overall significance of effect of the proposed development, however in circumstances where the proposed development can be judged in isolation, it is likely that a 'moderate' or 'substantial' impact will give rise to a significant effect and a 'negligible' or 'slight' impact will not result in a significant effect.

8.3 Consultation

8.3.1 Consultation has been undertaken with LCC via the scoping exercise to agree the approach to the air quality assessment.

8.4 Limitations and assumptions

8.4.1 In the course of undertaking this assessment, no limitations to the assessment process were encountered.

8.4.2 During the construction phase of the development it has been assumed that none of the Liverpool Waters consented developments will have been built out and therefore the existing situation has been used to determine potential sensitive receptors.

8.4.3 Detailed design information for the on-site combustion plant proposed to be installed is not available at the time of writing, therefore, the assessment has been based on manufacturer's technical datasheets for indicative CHP units and gas-fired boilers.

8.4.4 As the Liverpool Waters development would introduce a number of high rise buildings to the area surrounding the proposed development, an assessment scenario has been included to determine the effect of these buildings on dispersion from the on-site combustion plant. These buildings were included based on the indicative information available from the Liverpool Waters outline planning application.

8.5 Baseline Conditions

Sources of air pollution

Industrial processes

8.5.1 Industrial air pollution sources are regulated through a system of operating permits or authorisations, requiring stringent emission limits to be met and ensuring that any releases to the environment are minimised or rendered harmless. Regulated (or prescribed) industrial processes are classified as Part A or Part B processes, regulated through the Pollution Prevention and Control (PPC) system[18,19]. The larger more polluting processes are regulated by the Environment Agency (EA) and the smaller less polluting ones by the local authorities.

8.5.2 There are no regulated processes within 1km of the proposed development listed on the EA website.

[18] Directive 2010/75/EU of the European Parliament and of the Council of 24 November 2010 on industrial emissions (integrated pollution prevention and control)
[19] The Environmental Permitting (England and Wales) (Amendment) Regulations 2013, SI 2013/390

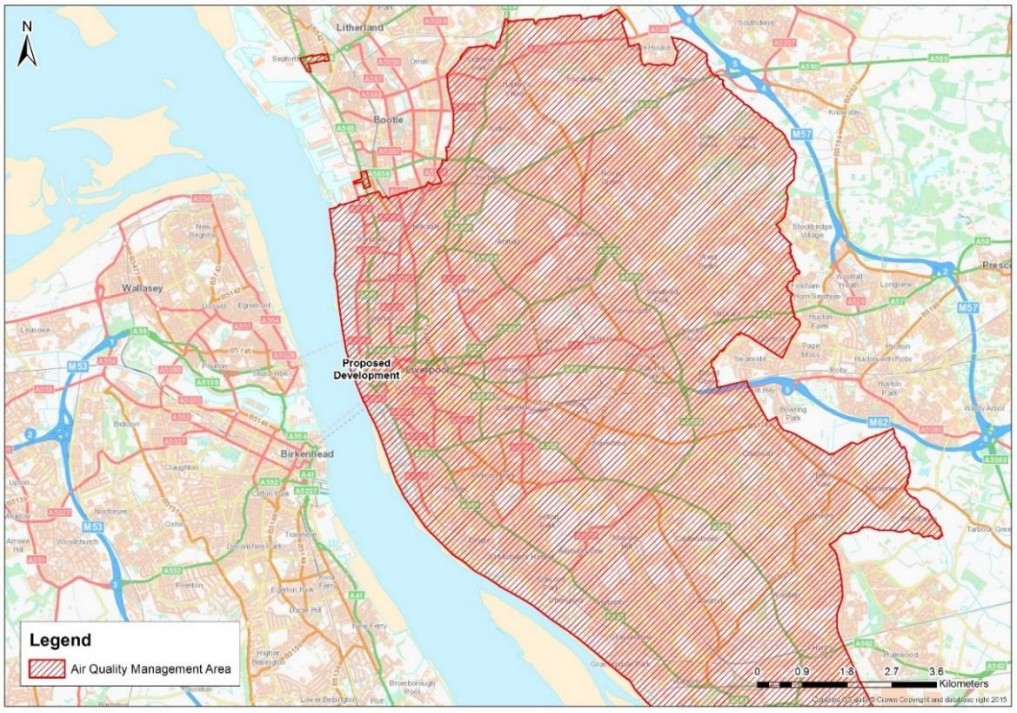
8.5.3 Part B processes are regulated and reviewed by LCC and, given the nature of these processes, are unlikely to significantly affect ambient air quality in the vicinity of the proposed development.

Local air quality

8.5.4 As discussed, the Environment Act 1995 requires local authorities to review and assess air quality with respect to the objectives for seven pollutants specified in the National Air Quality Strategy. Local authorities are required to carry out an Updating and Screening Assessment of their area every three years. If this assessment identifies potential hotspot areas likely to exceed air quality objectives, then a further Detailed Assessment of those areas is required. Where objectives are not predicted to be met, local authorities must declare the area as an AQMA. In addition, local authorities are required to produce an Air Quality Action Plan which includes measures to improve air quality within the AQMA.

8.5.5 LCC has declared an area encompassing the entire city centre as an AQMA for exceedences of the annual mean NO2 objective, the extent of the AQMA is shown in Figure 8.5, and as required LCC produced an AQAP in January 2011[20]. This AQAP outlines measures that are to be implemented to improve local air quality in the city.

Figure 8.5: Liverpool City Council AQMA



8.5.6 The council carries out monitoring of NO2 concentrations using passive diffusion tubes within the vicinity of the proposed development. The locations of the monitoring sites in relation to the proposed development are shown in Figure 8.6.

[20] Liverpool City Council, Air Quality Action Plan for the City-Wide AQMA, January 2011

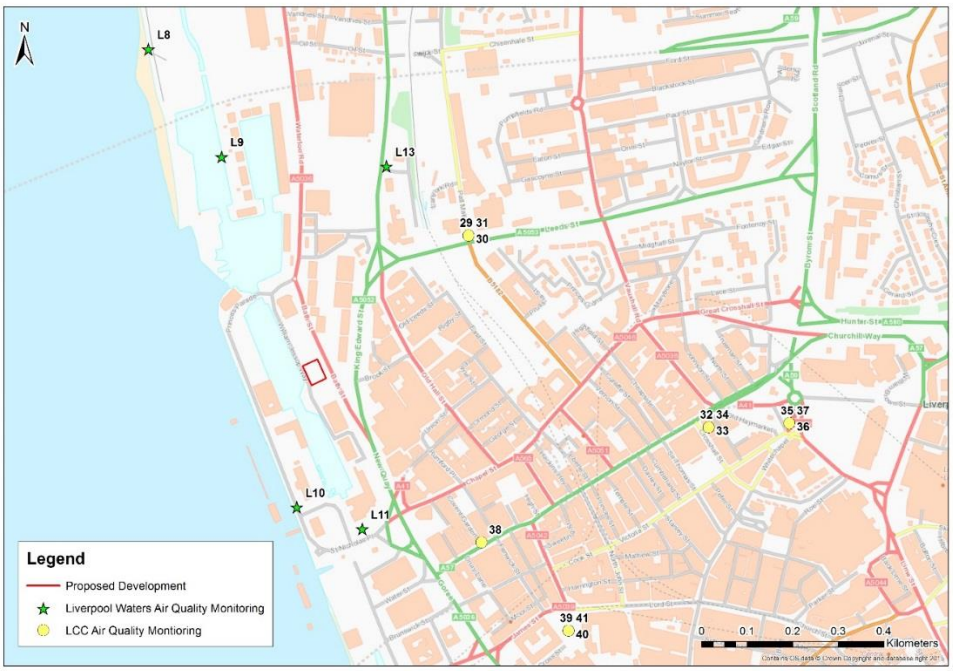
8.5.7 No monitoring of particulate matter is undertaken within the vicinity of the proposed development. Details of the monitoring locations and monitored concentrations between 2010 and 2014 are shown in Table 8.6.

8.5.8 Air quality monitoring undertaken by LCC shows that the annual mean NO2 objective is exceeded at roadside locations within the vicinity of the proposed development. Local Air Quality Management Technical Guidance (LAQM.TG16) states that where monitored annual mean NO2 concentrations are greater than 60µg/m3, there is the potential for the hourly mean NO2 objective to also be exceeded.

Table 8.6: LCC Monitored Annual Mean NO2 Concentrations (µg/m3)

ID	Site	Location type	2010	2011	2012	2013	2014
			Annual Mean NO_2 concentrations ($\mu g/m^3$)				
29/30/31	Leeds Street/Pall Mall Roadside	Urban Roadside	**59.7**	**52**	**53.3**	**53.3**	**51**
32/33/34	Crosshall Street	Urban Roadside	**62.3**	**61.7**	**67.7**	**71**	**68.3**
35/36/37	Old Haymarket	Urban Roadside	**60.7**	**56.3**	**60.7**	**61.3**	**56.7**
38	Covent Garden/Dale Street	Urban Roadside	**54**	**44**	**52**	**50**	**46**
39/40/41	Strand Street/Water Street	Urban Roadside	**74**	**67**	**69.7**	**71.3**	**67.6**

Figure 8.6: Air Quality Monitoring Locations



8.5.9 Passive NO2 diffusion tube monitoring was also undertaken as part of the Liverpool Waters outline planning application[21] for a period of six months

[21] Peel Holdings Ltd, Liverpool Waters, Environmental Statement, Appendix 10.4: Nitrogen Dioxide Monitoring Survey

between December 2008 and June 2009. This monitoring would have been more representative of the proposed development site itself than monitoring undertaken by LCC at roadside sites in the city undertaken over the same time period, but is now considered out of date compared with the alternative sources of data described below. Monitored data is shown in Table 8.7 which provides an annual mean NO2 concentration derived from the six month monitoring survey.

8.5.10 Given the length of time since this monitoring data was collected, it is unlikely that this is representative of the current conditions in the area. Therefore, more recent information available from Defra has been used to determine background pollutant concentrations.

Table 8.7: Liverpool Waters Monitored Annual Mean NO2 Concentrations (µg/m3)

ID	Site	Location type	Annual Mean NO_2 Concentration
L8	Trafalgar Dock Wall	Urban Background	23.1
L9	West Waterloo Dock	Urban Background	20.9
L10	Lamppost, Princess Parade	Urban Background	26.4
L11	St Nicholas Place, Crowne Plaza Hotel gate	Urban Background	31.1
L13	A565 (Great Howard Street)	Roadside	32.0

Background concentrations

8.5.11 Background pollutant concentrations are available on the Defra air quality website[22] for every 1km x 1km grid square across the UK. Background pollutant concentrations for the latest full year of data (2015) have been obtained for the grid squares in which the proposed development lies, these are shown in Table 8.8. Defra background pollutant concentrations are below the relevant air quality objectives.

Table 8.8: Baseline (2015) background pollutant concentrations (µg/m3)

OS grid square		2015		
X	**Y**	**NOx**	**NO_2**	**PM_{10}**
333500	390500	30.6	21.1	14.5

8.5.12 LCC operate an urban background monitoring using both continuous and passive methods at the Speke Defra site on Tarbock Road. The continuous monitor at this location is part of the Automatic Urban and Rural Network (AURN). The site is approximately 6.4km south east of the proposed development site. Monitored pollutant concentrations for recent years are shown in Table 8.9. It can be seen the monitored pollutant concentrations are similar to the published Defra background concentrations, therefore the background concentrations shown

[22] Background Pollutant Concentrations, Defra Air Quality Website, http://uk-air.defra.gov.uk/data/laqm-background-maps?year=2011

in Table 8.9 have been used as an input to the modelling of total pollutant concentrations.

Table 8.9: Monitored NO2 and PM10 concentrations (µg/m3)

Site	Location type	2013	2014	2015	2013	2014	2015
		Annual Mean NO_2 Concentrations			Annual Mean PM_{10} Concentrations		
Speke Continuous Monitor, Tarbock Rd	Urban Background	23	24.7	22.3	14	14	13.9
B56, Speke Diffusion Tube	Urban Background	25	27	-	N/A	N/A	N/A
B57, Speke Diffusion Tube	Urban Background	25	25	-	N/A	N/A	N/A
B58, Speke Diffusion Tube	Urban Background	27	25	-	N/A	N/A	N/A

8.6 Assessment

Assessment of effects from construction

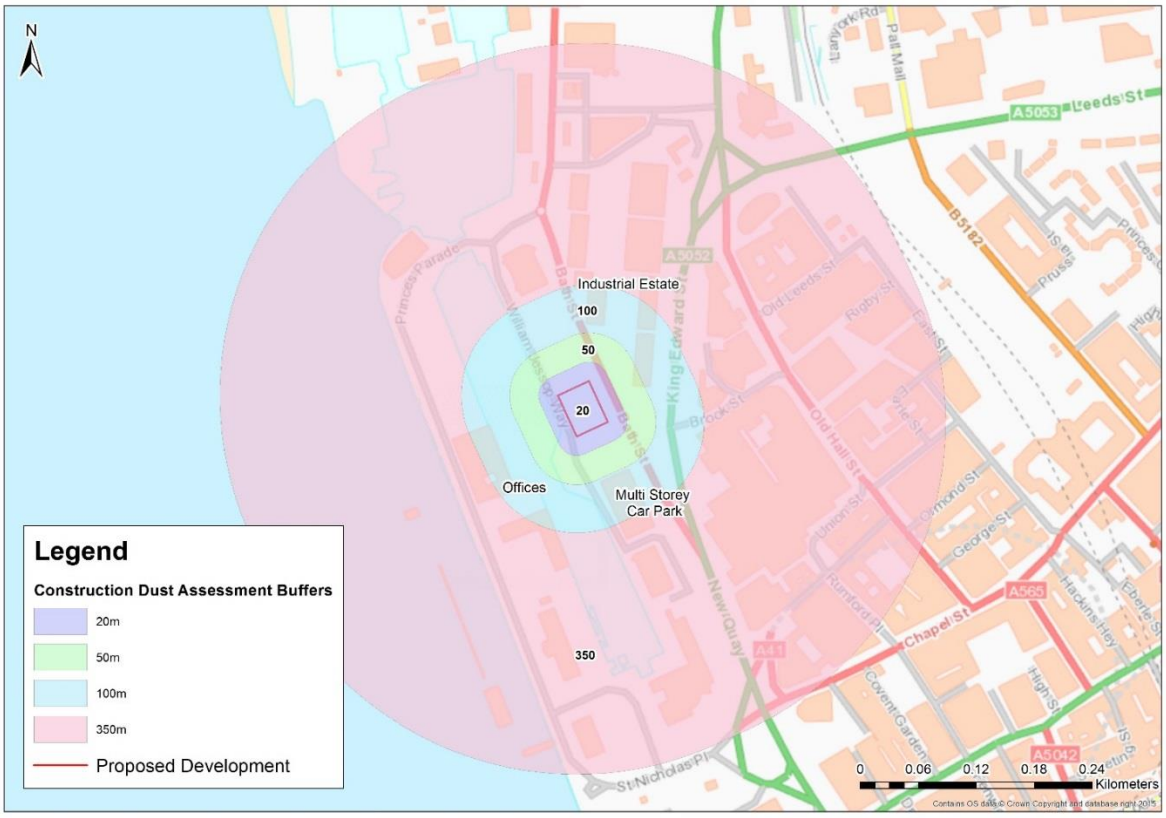
8.6.1 As discussed above the IAQM guidance takes into consideration four dust generating activities: demolition, earthworks, construction and trackout. The development land is currently vacant and no demolition is required to enable the proposed development. No assessment has therefore been required of effects associated with demolition. The site of the proposed development covers an area of approximately 0.25 hectares.

8.6.2 The closest sensitive receptors are within 100m of the site boundary (Figure 8.7); these are mainly commercial properties and a multi storey car park to the south of the proposed development, there are no residential properties within 100m of the site boundary. It has been assumed that no other properties consented as part of the Liverpool Waters outline application will have been progressed by the construction phase of the proposed development.

8.6.3 The sensitivity of nearby receptors to dust soiling and PM10 exposure has been classified as medium according to the IAQM guidance.

8.6.4 No ecological receptors sensitive to changes in dust have been identified within 50m of the site boundary.

Figure 8.7: Construction dust buffers



Dust emission magnitude

8.6.5 Each dust generating activity has been assigned a dust emission magnitude as shown in Table 8.10. This has been determined based on information provided by the construction/design team.

Table 8.10: Dust emission magnitude for dust generating activities

Activity	Dust emission magnitude	Reasoning
Earthworks	Small	It is likely that earthworks will occur across an area of the site of approximately 1,600m^2. The tonnage of material to be moved is approximately 5,000 tonnes.
Construction	Medium	Total volume of building to be constructed is approximately 92,000m^3; Piling is also likely to be employed as a construction method.
Trackout	Medium	It has been assumed that between 10 – 50 additional HGV movements would be required per day as a result of the construction phase; It is also likely that construction vehicles would travel along paved roads for the entirety of their journey.

Sensitivity of the area

8.6.6 The sensitivity of the area to dust soiling and human health effects has been assigned as low, due to the presence of medium sensitivity receptors within 100m of the site boundary.

Risk of impacts

8.6.7 Taking into consideration the dust emission magnitude and the sensitivity of the area, the site has been classified as low risk to dust soiling and human health impacts for all activities at worst (Table 8.11). Specific mitigation to minimise the risk of dust soiling and human health impacts is described in section 8.7.

Table 8.11: Summary dust risk table prior to mitigation

Activity	Dust soiling	Human health
Earthworks	Negligible	Negligible
Construction	Low risk	Low risk
Trackout	Low risk	Low risk

Assessment of effects from operation

Road Traffic Emissions

8.6.8 The transport consultants for the scheme (Mott Macdonald) have produced a Transport Assessment[23] (TA) for the proposed development. The proposed development is located close to the city centre where public transportation is readily accessible. A total of 40 car parking spaces (2 disabled), 8 motorcycle spaces and 76 bicycle spaces will be available as part of the proposed development.

8.6.9 As a result of limited car parking and good access routes into the city centre including walking, cycling and public transport options, the TA shows that weekday trips would be below 100 additional movements per day. This does not meet the change criteria discussed in paragraph 8.2.30. Therefore, following EPUK/IAQM guidance it is likely that air quality effects associated with vehicle movements to and from the site would be negligible and no further assessment was required.

8.6.10 The TA also includes a travel plan for the proposed development which aims to improve the quality of non-car modes and provide disincentives for the use of private vehicles.

[23] Mott Macdonald, Transport Assessment and Framework Travel Plan, April 2016

Combustion Plant Emissions

Existing Situation plus Proposed Development

8.6.11 The maximum predicted process contribution from on-site combustion plant at ground level is presented in Table 8.12 for all meteorological years assessed. The results show that interannual variability between the meteorological years assessed is low. 2014 meteorological data produce the highest ground level concentrations for annual and hourly mean NO2 concentrations. The maximum point of impact for long-term concentrations occurs at the northern façade of the proposed development.

8.6.12 The maximum process contribution to annual mean NO2 concentrations is predicted to be 0.3 µg/m3 (<1 % of the annual mean NO2 objective). The maximum process contribution to hourly mean NO2 concentrations is predicted to be 1.7 µg/m3 (<1% of the hourly mean NO2 objective).

Table 8.12: Modelled Process Contributions to NO2 and PM10 Concentrations (µg/m3) for all Meteorological Years Assessed

Meteorological Year	Process Contribution (µg/m^3)	
	Annual Mean NO_2	Hourly Mean NO_2 (99.79th Percentile)
2013	0.2	1.6
2014	0.3	1.7
2015	0.2	1.7

8.6.13 At the area of maximum impact and across the study area assessed, background levels of annual mean NO2 have been assumed to be 21.1µg/m3 as set out in Table 8.. Following LAQM.TG16 background hourly mean NO2 concentrations have been calculated by doubling the annual mean NO2 concentration (42.2µg/m3). Therefore, both annual and hourly mean NO2 concentrations are predicted to be below the relevant objectives at ground level.

8.6.14 Predicted annual mean and hourly mean NO2 concentrations at various modelled grid heights are summarised in Figure 8.8 to Figure 8.11, which include the process contribution from the on-site combustion plant as well as background pollutant concentrations. Figure 8.8 to Figure 8.10 shows predicted annual mean NO2 concentrations at heights of 1.5m, 10m and 110m.

8.6.15 Figure 8.11 shows predicted hourly mean NO2 concentrations at 110m representative of roof level at the proposed development.

8.6.16 Modelling was undertaken assuming an absolute worst case whereby the two boilers and CHP are fully operational for a full year.

Figure 8.8: Predicted Annual Mean NO2 Concentrations at ground level, 1.5m

Figure 8.9: Predicted Annual Mean NO2 Concentrations at height of proposed communal terrace, 10m

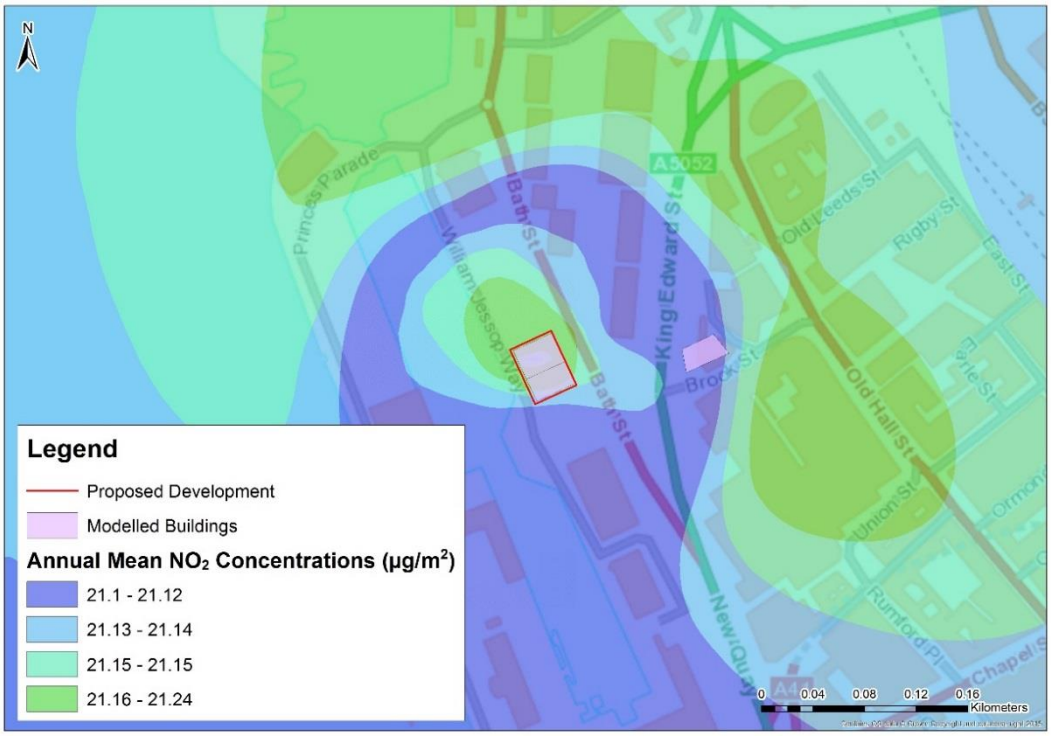
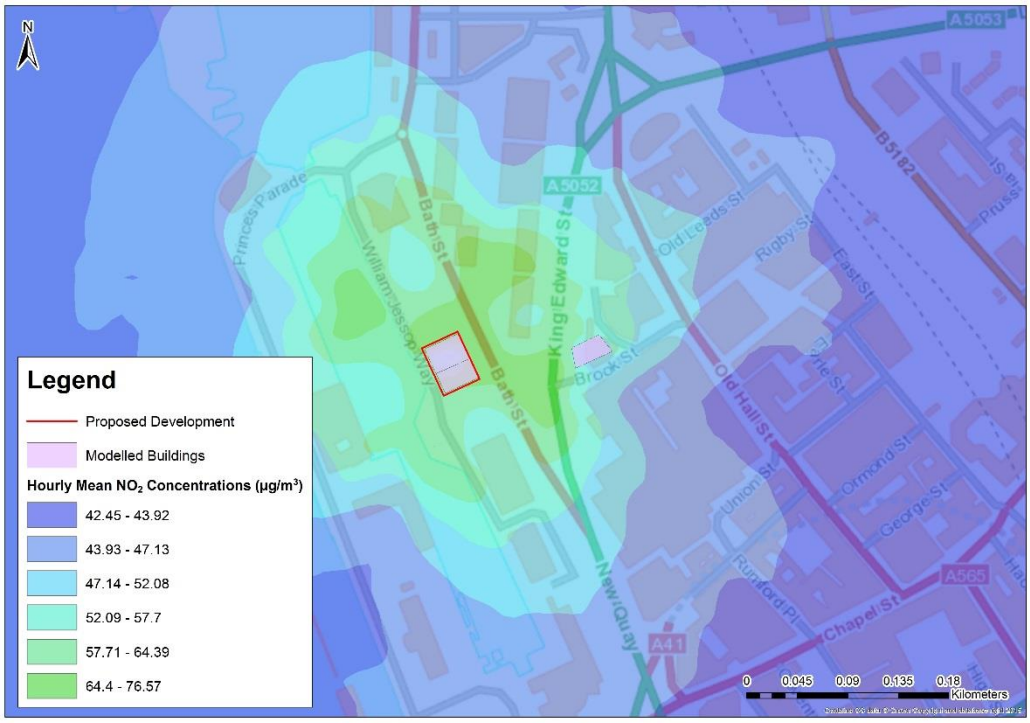


Figure 8.10: Predicted Annual Mean NO2 Concentrations at roof level, 110m

Figure 8.11: Predicted Hourly Mean NO2 Concentrations at roof level, 110m



Assessed Receptors

8.6.17 Specific receptors have been assessed as well as the modelled grid discussed above. Receptors have been included at the façade of the proposed development

and at 8-10 Brook Street. The maximum predicted process contribution at each location as well as the total annual and hourly mean NO2 concentrations is shown in Table 8.13.

Table 8.13: Predicted Concentrations at Assessed Receptors

Receptor Building ID	Height above ground level (m)	Process Contribution (µg/m^3)		Total Pollutant Concentration (µg/m^3)	
		Annual Mean NO_2	Hourly Mean NO_2 (99.79th Percentile)	Annual Mean NO_2	Hourly Mean NO_2 (99.79th Percentile)
8-10 Brook Street	1.5	<0.1	0.2	21.1	42.4
8-10 Brook Street	25	<0.1	0.2	21.1	42.4
8-10 Brook Street	50	<0.1	0.6	21.1	42.8
8-10 Brook Street	75	0.1	1.5	21.2	43.7
8-10 Brook Street	100	0.6	4.6	21.7	46.8
8-10 Brook Street	125	0.3	4.1	21.4	46.3
8-10 Brook Street	134	0.1	2.0	21.2	44.2
Proposed Development	1.5	0.1	1.5	21.2	43.7
Proposed Development	25	0.1	1.5	21.2	43.7
Proposed Development	50	0.1	1.5	21.2	43.7
Proposed Development	75	0.1	1.5	21.2	43.7
Proposed Development	100	0.1	1.5	21.2	43.7
Proposed Development	110	2.9	34.9	24.0	77.1

8.6.18 The impact descriptor for each of the assessed receptors has been determined and is shown in Table 8.14. As the predicted increase is less than 4% of the annual mean NO2 objective at all receptors assessed, with exception of roof level at the proposed development, the impact descriptor is negligible for annual mean NO2 concentrations at the majority of receptor. At roof level of the proposed development the impact descriptor is slight adverse as the increase in annual mean NO2 concentrations is 7% of the annual mean NO2 objective.

8.6.19 Similarly to the annual mean NO2 concentrations, the predicted increase in hourly mean NO2 concentrations is higher at roof level of the proposed development and is greater than 10% of the hourly mean NO2 objective. Therefore, the magnitude of change is small and the impact descriptor is slight adverse at this location. It is unlikely that this would be representative of an area where members of the public would spend more than one hour, notwithstanding this total pollutant concentrations are well below the hourly mean NO2 threshold and no exceedences of the hourly mean NO2 objective are predicted. The magnitude of change at all other receptors is imperceptible and the impact is considered to be negligible.

Table 8.14: Impact Descriptor at Assessed Receptors

Receptor Building ID	Height above ground level (m)	Impact Descriptor	
		Annual Mean NO_2	Hourly Mean NO_2 (99.79th Percentile)
8-10 Brook Street	1.5	Negligible	Negligible
8-10 Brook Street	25	Negligible	Negligible
8-10 Brook Street	50	Negligible	Negligible
8-10 Brook Street	75	Negligible	Negligible
8-10 Brook Street	100	Negligible	Negligible
8-10 Brook Street	125	Negligible	Negligible
8-10 Brook Street	134	Negligible	Negligible
Proposed Development	1.5	Negligible	Negligible
Proposed Development	25	Negligible	Negligible
Proposed Development	50	Negligible	Negligible
Proposed Development	75	Negligible	Negligible
Proposed Development	100	Negligible	Negligible
Proposed Development	110	Slight	Slight

Liverpool Waters Consented Development plus Proposed Development

8.6.20 The maximum predicted process contribution from on-site combustion plant at ground level is presented in Table 8.15 for all meteorological years assessed. The results show that interannual variability between the meteorological years assessed is low. 2014 meteorological data produce the highest ground level concentrations for annual mean NO2 and 2015 data produces the highest hourly mean NO2 concentrations. The maximum point of impact for long-term concentrations occurs at the northern façade of the proposed development.

8.6.21 The maximum process contribution to annual mean NO2 concentrations is predicted to be 0.3 µg/m3 (<1 % of the annual mean NO2 objective). The maximum process contribution to hourly mean NO2 concentrations is predicted to be 1.8 µg/m3 (<1% of the hourly mean NO2 objective).

Table 8.15: Modelled Process Contributions to NO2 and PM10 Concentrations (µg/m3) for all Meteorological Years Assessed

Meteorological Year	Process Contribution (µg/m^3)	
	Annual Mean NO_2	Hourly Mean NO_2 (99.79th Percentile)
2013	0.3	1.7
2014	0.3	1.8
2015	0.3	1.8

8.6.22 Background pollutant concentrations for the Liverpool Waters consented development scenario are the same as discussed in 8.6.13, and both annual and

hourly mean NO2 concentrations are predicted to be below the relevant objectives at ground level

8.6.23 Predicted annual mean and hourly mean NO2 concentrations at various modelled grid heights are summarised in Figure 8.12 to Figure 8.15 which include the process contribution from the on-site combustion plant as well as background pollutant concentrations. Figure 8.12 to Figure 8.14 shows predicted annual mean NO2 concentrations at heights of 1.5m, 10m and 110m.

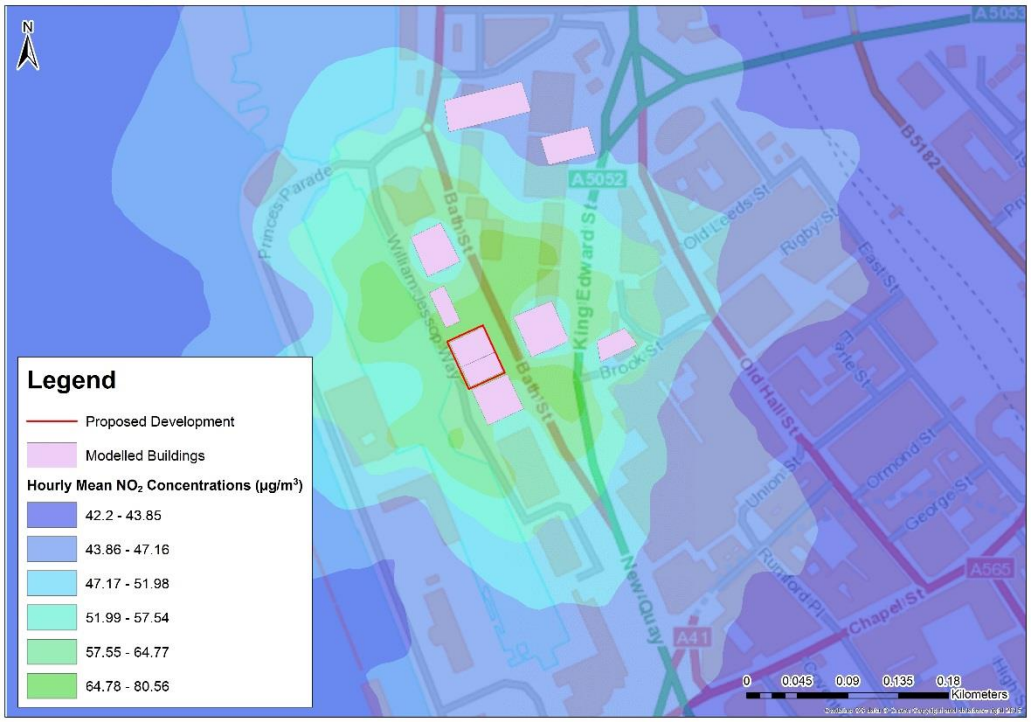
8.6.24 Figure 8.15 shows predicted hourly mean NO2 concentrations at 110m representative of roof level at the proposed development.

Figure 8.12: Predicted Annual Mean NO2 Concentrations at ground level, 1.5m

Figure 8.13: Predicted Annual Mean NO2 Concentrations at height of proposed communal terrace, 10m

Figure 8.14: Predicted Annual Mean NO2 Concentrations at roof level, 110m

Figure 8.15: Predicted Hourly Mean NO2 Concentrations at roof level, 110m



8.6.25 As shown above, predicted annual and hourly mean NO2 concentrations meet the annual mean NO2 objective (40µg/m3) and hourly mean NO2 objective (200µg/m3).

Assessed Receptors

8.6.26 Specific receptors have been assessed as well as the modelled grid discussed above. Receptors have been included at the facades closest to the flue location of the high rise properties included in the model. The maximum predicted process contribution at each location as well as the total annual and hourly mean NO2 concentrations is shown in Table 8.16.

Table 8.16: Predicted Concentrations at Assessed Receptors

Receptor Building ID	Height above ground level (m)	Process Contribution (µg/m^3)		Total Pollutant Concentration (µg/m^3)	
		Annual Mean NO_2	Hourly Mean NO_2 (99.79th Percentile)	Annual Mean NO_2	Hourly Mean NO_2 (99.79th Percentile)
8-10 Brook Street	1.5	0.1	0.7	21.2	42.9
Liverpool Waters Plot B-01	1.5	0.1	1.3	21.2	43.5
Liverpool Waters Plot B-01	1.5	<0.1	0.6	21.1	42.8
Liverpool Waters Plot B-05	1.5	0.1	0.6	21.2	42.8
Liverpool Waters Plot A-06	1.5	<0.1	1.2	21.1	43.4
Proposed Development	1.5	0.2	1.6	21.3	43.8
8-10 Brook Street	25	0.1	0.7	21.2	42.9
8-10 Brook Street	50	0.1	0.8	21.2	43.0
8-10 Brook Street	75	0.1	1.5	21.2	43.7
8-10 Brook Street	100	0.3	4.0	21.4	46.2
8-10 Brook Street	125	0.4	4.7	21.5	46.9
8-10 Brook Street	134	0.1	2.3	21.2	44.5
Liverpool Waters Plot B-01	25	0.1	1.3	21.2	43.5
Liverpool Waters Plot B-01	50	0.1	1.3	21.2	43.5
Liverpool Waters Plot B-01	75	0.1	1.3	21.2	43.5
Liverpool Waters Plot B-01	100	0.1	1.8	21.2	44.0
Liverpool Waters Plot B-01	125	0.5	15.7	21.6	57.9
Liverpool Waters Plot B-01	150	<0.1	0.7	21.1	42.9
Liverpool Waters Plot B-01	25	0.1	0.7	21.2	42.9
Liverpool Waters Plot B-01	50	0.1	0.8	21.2	43.0
Liverpool Waters Plot B-01	75	0.1	1.6	21.2	43.8
Liverpool Waters Plot B-01	100	0.3	10.9	21.4	53.1
Liverpool Waters Plot B-01	125	0.1	1.5	21.2	43.7

Receptor Building ID	Height above ground level (m)	Process Contribution (µg/m^3)		Total Pollutant Concentration (µg/m^3)	
		Annual Mean NO_2	Hourly Mean NO_2 (99.79th Percentile)	Annual Mean NO_2	Hourly Mean NO_2 (99.79th Percentile)
Liverpool Waters Plot B-01	150	<0.1	0.7	21.1	42.9
Liverpool Waters Plot B-01	175	<0.1	0.5	21.1	42.7
Liverpool Waters Plot B-05	25	0.1	0.6	21.2	42.8
Liverpool Waters Plot B-05	50	0.1	0.8	21.2	43.0
Liverpool Waters Plot B-05	75	0.1	1.3	21.2	43.5
Liverpool Waters Plot B-05	100	0.3	6.1	21.4	48.3
Liverpool Waters Plot B-05	125	0.1	2.1	21.2	44.3
Liverpool Waters Plot B-05	150	<0.1	0.6	21.1	42.8
Liverpool Waters Plot B-05	170	<0.1	0.5	21.1	42.7
Liverpool Waters Plot A-06	25	<0.1	1.2	21.1	43.4
Liverpool Waters Plot A-06	50	<0.1	1.2	21.1	43.4
Liverpool Waters Plot A-06	75	<0.1	1.2	21.1	43.4
Liverpool Waters Plot A-06	100	0.4	4.7	21.5	46.9
Liverpool Waters Plot A-06	125	0.8	12.3	21.9	54.5
Liverpool Waters Plot A-06	150	<0.1	1.9	21.1	44.1
Liverpool Waters Plot A-06	175	<0.1	0.3	21.1	42.5
Liverpool Waters Plot A-06	195	<0.1	0.1	21.1	42.3
Proposed Development	25	0.2	1.6	21.3	43.8
Proposed Development	50	0.2	1.6	21.3	43.8
Proposed Development	75	0.2	1.6	21.3	43.8
Proposed Development	100	0.2	1.6	21.3	43.8

Receptor Building ID	Height above ground level (m)	Process Contribution (µg/m^3)		Total Pollutant Concentration (µg/m^3)	
		Annual Mean NO_2	Hourly Mean NO_2 (99.79th Percentile)	Annual Mean NO_2	Hourly Mean NO_2 (99.79th Percentile)
Proposed Development	110	1.2	24.5	22.3	66.7

8.6.27 Following the guidance outlined in Table 8.17 for determining the impact descriptor, the impact descriptor for each of the assessed receptors has been determined. As the predicted increase is less than 4% of the annual mean NO2 objective at all receptors assessed, the impact descriptor is negligible for annual mean NO2 concentrations.

8.6.28 The predicted increase in hourly mean NO2 concentrations is greater than 10% of the hourly mean NO2 objective at roof level of the proposed development, therefore the magnitude of change is small and the impact descriptor is slight adverse. It is unlikely that this would be representative of an area where members of the public would spend more than one hour, notwithstanding this total pollutant concentrations are well below the hourly mean NO2 threshold and no exceedences of the hourly mean NO2 objective are predicted. The magnitude of change at all other receptors is imperceptible and the impact is considered to be negligible.

Table 8.17: Impact Descriptor at Assessed Receptors

Receptor Building ID	Height above ground level (m)	Impact Descriptor	
		Annual Mean NO_2	Hourly Mean NO_2 (99.79th Percentile)
8-10 Brook Street	1.5	Negligible	Negligible
Liverpool Waters Plot B-01	1.5	Negligible	Negligible
Liverpool Waters Plot B-01	1.5	Negligible	Negligible
Liverpool Waters Plot B-05	1.5	Negligible	Negligible
Liverpool Waters Plot A-06	1.5	Negligible	Negligible
Proposed Development	1.5	Negligible	Negligible
8-10 Brook Street	25	Negligible	Negligible
8-10 Brook Street	50	Negligible	Negligible
8-10 Brook Street	75	Negligible	Negligible
8-10 Brook Street	100	Negligible	Negligible
8-10 Brook Street	125	Negligible	Negligible
8-10 Brook Street	134	Negligible	Negligible
Liverpool Waters Plot B-01	25	Negligible	Negligible
Liverpool Waters Plot B-01	50	Negligible	Negligible
Liverpool Waters Plot B-01	75	Negligible	Negligible
Liverpool Waters Plot B-01	100	Negligible	Negligible
Liverpool Waters Plot B-01	125	Negligible	Negligible

Receptor Building ID	Height above ground level (m)	Impact Descriptor	
		Annual Mean NO_2	Hourly Mean NO_2 (99.79th Percentile)
Liverpool Waters Plot B-01	150	Negligible	Negligible
Liverpool Waters Plot B-01	25	Negligible	Negligible
Liverpool Waters Plot B-01	50	Negligible	Negligible
Liverpool Waters Plot B-01	75	Negligible	Negligible
Liverpool Waters Plot B-01	100	Negligible	Negligible
Liverpool Waters Plot B-01	125	Negligible	Negligible
Liverpool Waters Plot B-01	150	Negligible	Negligible
Liverpool Waters Plot B-01	175	Negligible	Negligible
Liverpool Waters Plot B-05	25	Negligible	Negligible
Liverpool Waters Plot B-05	50	Negligible	Negligible
Liverpool Waters Plot B-05	75	Negligible	Negligible
Liverpool Waters Plot B-05	100	Negligible	Negligible
Liverpool Waters Plot B-05	125	Negligible	Negligible
Liverpool Waters Plot B-05	150	Negligible	Negligible
Liverpool Waters Plot B-05	170	Negligible	Negligible
Liverpool Waters Plot A-06	25	Negligible	Negligible
Liverpool Waters Plot A-06	50	Negligible	Negligible
Liverpool Waters Plot A-06	75	Negligible	Negligible
Liverpool Waters Plot A-06	100	Negligible	Negligible
Liverpool Waters Plot A-06	125	Negligible	Negligible
Liverpool Waters Plot A-06	150	Negligible	Negligible
Liverpool Waters Plot A-06	175	Negligible	Negligible
Liverpool Waters Plot A-06	195	Negligible	Negligible
Proposed Development	25	Negligible	Negligible
Proposed Development	50	Negligible	Negligible
Proposed Development	75	Negligible	Negligible
Proposed Development	100	Negligible	Negligible
Proposed Development	110	Negligible	Slight

Assessment of Significance

8.6.29 The assessment of significance has taken into account both scenarios assessed.

8.6.30 Predicted annual and hourly mean NO2 concentrations are less than the relevant air quality objectives with the proposed on-site combustion plant operational continuously. Predicted increases in concentrations at ground level are minimal, less than 1% of the relevant air quality objectives. The impact descriptor for annual mean NO2 concentrations is negligible for annual mean NO2 concentrations at all locations, with the exception of roof level at the proposed

development where the impact descriptor is slight adverse at worst. The impact hourly mean NO2 concentrations is slight adverse at worst which is representative of roof level at the proposed development. This location is unlikely to be an area representative of public exposure and hourly mean NO2 concentrations are less than half of the hourly mean NO2 threshold. At all other locations the impact on hourly mean NO2 concentrations is negligible.

8.6.31 Following the guidance outlined in the EPUK/IAQM land-use planning guidance, the effect of the proposed development would be not significant on local air quality.

8.7 Additional Mitigation Measures

Construction

8.7.1 The dust emitting activities assessed in section 8.6 can be greatly reduced or eliminated by applying the site specific mitigation measures for low risk sites according to the IAQM guidance. High risk mitigation measures are included as a precautionary measure and to ensure best practice is followed for all on site activities. The following measures from the guidance are relevant and should be included in the Construction Management Plan for the site.

General

- Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary. This may be the environment manager/engineer or the site manager.
- Display the head or regional office contact information.
- Develop and implement a Dust Management Plan, which will include measures to control other emissions, approved by the local authority.

Site management

- Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner and record the measures taken.
- Make the complaints log available to the local authority when asked.
- Record any exceptional incidents that cause dust and/or air emissions, either on or off-site and the action taken to resolve the situation in the log book.

Monitoring

- Undertake daily on-site and off-site inspection, where receptors (including roads) are nearby, to monitor dust, record inspection results, and make the log available to the local authority when asked. This should include regular dust soiling checks of surfaces such as street furniture, cars and window sills within 100m of site boundary, with cleaning to be provided if necessary.

- Carry out regular site inspections to monitor compliance with the Dust Management Plan, record inspection results and make an inspection log available to the local authority, when asked.
- Increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions.

Site maintenance

- Plan site layout so that machinery and dust causing activities are located away from receptors, as far as possible.
- Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site.
- Fully enclose site or specific operations where there is a high potential for dust production and the site is active for an extensive period.
- Avoid site runoff of water or mud.
- Keep site fencing, barriers and scaffolding clean using wet methods.
- Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site.
- Cover, seed or fence stockpiles to prevent wind whipping.
- Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out.

Operating vehicle/machinery and sustainable travel

- Ensure all vehicles switch off engines when stationary – no idling vehicles.
- Avoid the use of diesel or petrol powered generators and use mains electricity or battery powered equipment where practicable.
- Impose and signpost a maximum speed limit of 15mph on surfaced and 10mph on un-surfaced haul roads and work areas.
- Ensure vehicles entering and leaving the site are covered to prevent escape of materials during transport.

Operations

- Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques, such as water sprays or local extraction.
- Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate.
- Use enclosed chutes and conveyors and covered skips.

- Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use the fine water sprays on such equipment wherever appropriate.

Waste management

- Fires will not be held on site.

Specific Measures

Construction

- Avoid scabbling (roughening of concrete surfaces) if possible.

Trackout

- Regularly use water-assisted dust sweeper(s) on the access and local roads, to remove, as soon as practicable any material tracked out of the site.
- Avoid dry sweeping of large areas.
- Ensure vehicles entering and leaving the site are covered to prevent escape of materials during transport.
- Inspect haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable.
- Record all inspections of haul routes and any subsequent action in a site log book.
- Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable).

Operation

8.7.2 As the operational phase is predicted to have a negligible effect on local air quality, no mitigation is required nor proposed.

8.8 Cumulative Impacts

Construction

8.8.1 As discussed above, the application of appropriate mitigation measures during construction of the proposed development would reduce any impacts to be negligible and the residual effect would be not significant.

8.8.2 There is the potential for cumulative effects to be generated where any committed development sites within 350m of the site boundary were undertaking demolition/construction works during the same time period as the proposed development. Other construction sites in the vicinity of the proposed development site would also be subject to the planning process which would take

into account requirements for mitigation of dust effects. Therefore the risk of cumulative dust impacts would be not significant.

Operation

8.8.3 At the time of writing no cumulative effects have been identified as a result of the operation of the proposed development. There is the potential for cumulative effects should combustion plant be included in the detailed design of buildings consented as part of the Liverpool Waters outline planning application. The potential impacts on the consented buildings near the proposed development has been included in the assessment of operational impacts.

8.8.4 The potential for cumulative air quality effects from vehicle movements to and from the entire Liverpool Waters consented development was included in the outline application.

8.9 Residual Effects

Construction

8.9.1 Following implementation of appropriate mitigation measures the residual effects would be not significant. Therefore, assuming the application of the mitigation measures recommended above, the residual effects would be not significant during the construction phase of the proposed development.

Operation

8.9.2 Since no significant effects have been identified from the operation of the proposed development, the residual effects remain, not significant, as assessed in paragraphs above.

8.10 Assessment Summary

8.10.1 Table presents a summary of the air quality assessment

Table 8.18: Local Air Quality Assessment Summary

Summary description of the identified impact	Sensitivity of Receptor	Impact Magnitude	Nature of the impact	Significance	Mitigation	Residual Impact Magnitude	Residual Significance of Effects	Confidence Level
Dust impacts from construction	Medium	Medium	Temporary, Direct	Medium Risk	Dust control measures (section 8.7)	Not Significant	Not Significant	High
Increased pollutants from traffic movements	High	Negligible	Permanent, Direct	Not Significant	N/A	Not Significant	Not Significant	High
Increased pollutants from on-site combustion plant	High	Negligible to Slight Adverse	Permanent, Direct	Not Significant	N/A	Not Significant	Not Significant	High

8.11 Conclusion

8.11.1 An assessment of likely air quality effects arising as a result of the construction and operation of the proposed development has been undertaken.

8.11.2 The proposed development lies within an air quality management area designated for NO2 by LCC. A review of air quality monitoring undertaken by LCC in the area of the proposed development indicates that annual mean NO2 concentrations exceed the annual mean NO2 objective at the roadside, however annual mean PM10 concentrations are well within the annual mean PM10 objective.

8.11.3 The assessment of effects indicates that the proposed development will have a negligible effect on local air quality during both the construction and operation phases. Mitigation measures to limit the impact of dust soiling and exposure to PM10 should be implemented during the construction phase as the proposed development has been assessed to be a high risk for dust generation. The effect of traffic movements associated with the proposed development have been predicted to negligible for local air quality in the surrounding area. The effect of on-site combustion plant on local pollutant concentrations have been predicted to be negligible to slight adverse, at areas where members of the public might be present for time periods consistent with the objective.

8.11.4 The effect of the proposed development on local air quality is predicted to be not significant.

8.12 Appendices

8.12.1 A methodology of the assessment of construction effects can be found in Appendix 3.1

9 Archaeology and Cultural Heritage

9.1 Introduction

9.1.1 This chapter sets out an assessment of the potential effects of the proposed residential development on land at Princes Reach, Princes Dock, Liverpool on cultural heritage assets. It takes the form of a desk-based assessment of the application site and its immediate vicinity, and draws on existing information in order to identify the resource in terms of baseline conditions, and the resultant potential impacts of development. In this way the significance of the impact is assessed and relevant recommendations can be made for mitigation, if required.

9.1.2 The assessment has been carried out by Sarah-Jane Farr MA MSc MCIfA, Archaeology Consultant and Peter de Figueiredo Dip Arch MA RIBA IHBC, Heritage Consultant. The assessment draws on accompanying supporting documentation provided in an Archaeology Statement and Heritage Statement.

9.1.3 Archaeology can be described as the study of past human societies or people through physical evidence of their material culture. In this assessment, the term refers to sub-surface remains and artefacts. Archaeological evidence can be described as ‘in situ’, which means that it has not been significantly disturbed or moved from its original place. Artefacts may also be in situ or they may be described as ‘residual’. This means that they have been disturbed by later activity, accidental or deliberate, and so are found in a context which they did not occupy when in use.

9.1.4 Cultural Heritage encompasses archaeological resources in addition to other built elements of heritage, such as historic buildings and structures, and other elements such as urban topography, spaces, water bodies and surface materials which form historic landscapes.

9.1.5 Historic Assets can be represented by a wide range of features, both extant and hidden, that have been created by past human occupation and use of the landscape. They are a non-renewable resource. The presence of heritage assets is a material consideration in determining planning applications. Assessment of potential impact requires consideration of the following matters:

- Development can have an impact on heritage assets directly, such as through the effects of construction on buried features, and indirectly, through such factors as changes to the ground-water regime or visual impacts on the setting of neighbouring monuments.
- Desk-based assessment and walk-over surveys involve the review of currently available information. It is possible that further features exist at the site that are invisible or not yet known. The potential for this may be assessed from ground conditions, features within the wider area and a history of land use in the proposed development area.

9.2 Methodology and Scope

Introduction

9.2.1 This assessment has been informed by current best practice and by a range of national and local planning policy and guidance documents. The importance of cultural heritage remains is recognised in legislation and in national and local planning policy.

Legislation

9.2.2 The principal legislation in force in England is:

9.2.3 The Ancient Monuments and Archaeological Areas Act 1983 and 2002. This gives provision for a schedule of monuments which are protected. By legal definition, these Scheduled Monuments are considered as being of national importance.

9.2.4 The Planning (Listed Buildings and Conservation Areas) Act 1990 provides for the definition and protection of listed buildings and conservation areas. Listed buildings are recognised as being of special architectural or historic interest.

9.2.5 Other legislation that may have an effect on the treatment of heritage assets includes the Town and Country Planning Act 1990, Hedgerow Regulations 1997 and the Treasure Act 1996. The effects of the Localism Act 2012 may also be relevant in some cases.

National Policy

9.2.6 National policy is set out in the National Planning Policy Framework (NPPF), published by the Department for Communities and Local Government in March 2012. The NPPF requires local planning authorities to identify and assess the significance of heritage assets that may be affected by development. One of the core principles of the document is that 'Planning should...conserve heritage assets in a manner appropriate to their significance, so that they can be enjoyed for their contribution to the quality of life of this and future generations. Definitions of 'historic environment', 'archaeological interest', 'heritage asset', and 'designated heritage asset' are set out in the NPPF.

9.2.7 In addition, Planning Practice Guide: Conserving and enhancing the historic environment (2014) provides guidance in relation to archaeology and cultural heritage.

9.2.8 The Historic England guide Conservation Principles: policies and Guidance for the Sustainable Management of the Historic Environment has been used as a template for parts of this assessment.

Local Policy

9.2.9 Local policy and guidance is provided through the Liverpool Unitary Development Plan (2002). Relevant policies are HD1: Listed Buildings, HD4: Alterations to Listed Buildings; HD5: Development affecting the Setting of a Listed Building; HD8: Preservation and Enhancement of Conservation Areas; HD12: New Development adjacent to Conservation Areas; HD16: Protection of Ancient Monuments; HD17: Protection of Archaeological Remains; and HD18: General Design Requirements.

9.2.10 The Liverpool World Heritage Site Supplementary Planning Document (2009) provides detailed guidance for new development, regeneration and conservation in the WHS and its Buffer Zone. It supplements the existing "saved" UDP, and will deal with the management of the site, acting as a guide to future development in and around the site and embodying the principles in the existing WHS Management Plan.

9.2.11 In addition to policies and guidance relating to the WHS as a whole, the document includes a section on the Stanley Dock Conservation (Character Area 3), which makes reference to the adjoining areas that are within the Buffer Zone. The Council's declared vision for this area includes the following statement: The Princes Dock redevelopment programme will be completed with significant townscape character benefits for the WHS and wider cityscape.

9.2.12 Paragraph 6.4.29 of the SPD requires that the completion of Princes Dock should be a priority. The principles for redevelopment of the Princes Dock should be:

(i) strong urban form with active frontages and an ordered overall perspective;

(ii) enhanced linkages and connectivity;

(iii) comfortable relationships with surroundings, especially important will be Plot 7 which is most visible from the Pier Head;

(iv) protection of view corridors;

(v) increased activity; and

(vi) respect for heritage and response to historical context.

9.2.13 Paragraph 6.4.8, refers to development that takes place west of the Dock Boundary Wall and states: …development must respect the integrity and setting of the Dock Wall and the opportunity should be taken to conserve the wall and its associated features such as gates, shelters and drinking fountains. Development should retain and conserve surviving historic surfaces, kerbs, rail tracks and other ancillary historic structures. Any new buildings west of the Dock Wall should generally be set back at least 9 metres from the wall in order: to provide an adequate setting for that wall; to enable these historic surfaces and features to be retained and; to create a useable corridor for cycling and walking.

9.2.14 Paragraph 5.7 refers to archaeology, and states that The City Council considers that the entirety of the WHS is an area of suspected archaeological importance under the terms of UDP policy HD17. All developments in the WHS will

therefore need to follow the guidance set out in the development policy HD17i, ii, iii and iv.

Assessment Methodology

9.2.15 The study comprised a review of pertinent cartographic and other historical sources, and Historic Environment Record (HER) entries. A site walk-over survey and a detailed examination of existing buildings were also carried out.

9.2.16 This assessment covers the entirety of the application site, together with additional features within the vicinity. Consideration is also given to the potential cumulative impact with other currently proposed development sites.

9.2.17 The EIA regulations stipulate that an ES should, where possible, identify, describe and assess the likely significant effects of the development on the environment. The methodology sets out three stages to identify the significant effects:

- Receptors
- Environmental Impacts
- Significant Effects

Potential Receptors

Table 9.1: Relative Sensitivity of Different Receptors

Sensitivity	Examples of Receptors
Very High	World Heritage Sites, Grade I and II* Listed Buildings, Scheduled Ancient Monuments
High	Grade II Listed Buildings Conservation Areas, sites of national importance
Medium	Sites of Regional/County importance
Low	Sites of local interest, Sites with a low local value or interest for education or cultural appreciation, Sites that are so badly damaged that too little remains to justify inclusion into a higher grade.

Designated Features

9.2.18 The significance of an effect is relative to the sensitivity or quantity of a receptor. Receptors are set out in accordance with the magnitude of their importance. Some receptors are given relatively high levels of importance through legislation, such as designated heritage assets. Determining the importance of other receptors can

be more subjective. The environmental statement assesses each one in relation to the hierarchy shown in Table 9.1 above.

9.2.19 There are no scheduled monuments within or in the immediate vicinity of the study area.

9.2.20 There are 10 listed buildings within the wider area. The Royal Liver Building is a Grade I listed building situated 500m to the south of the application site; the Cunard Building and the Port of Liverpool Building are Grade II* listed building at 600 and 700 m to the south; Tower Buildings is also listed Grade II* and is 500 m to the south east. The other six buildings or structures are listed Grade II and are St Nicholas Church, The St George's Dock Ventilation and Control Station, Princes Half Tide Dock, East Waterloo Dock, Waterloo Warehouse and the dock boundary wall and gateways.

Other Heritage Features

9.2.21 Other non-designated heritage assets include the historic surfacing within the application site and adjoining plots at Princes Dock, and below ground archaeology.

Historic Environment Record (HER)

9.2.22 A search of the Merseyside Historic Environment Record (HER) was undertaken for an area of 300m in diameter from the centre of the Site (December 2015). This wider search delivered a total of 81 records of which 36 are listed buildings, 2 classed as buildings, 4 are individual findspots (i.e. artefact finds) and 29 classed as 'sites' (the location of former buildings/structures derived from mainly documentary research and 18th Century pre–Ordnance survey mapping and, now most likely buried and/or part destroyed by subsequent development). The majority of the HER records are located outside the Site and its immediate environs, c. 200m to 300m mainly to the south east around Old Hall street and Castle St (mainly listed buildings and not visible from the Site).

9.2.23 Other than the designated heritage assets, the majority of information sourced was not yet available in the HER database at the time of enquiry. The gazetteer (Appendix 4.2) contains those HER sites relevant to the Site, and its immediate vicinity as well as those new sites generated from previous desk-based research, archaeological excavations and new work commissioned by Moda Living.

Magnitude of Impact

9.2.24 The magnitude of an impact is the degree of the effect of the development on the heritage asset. It can be defined as substantial, moderate, slight, or negligible. Magnitude of impact is ranked without regard to the value of the asset, as summarised in Table 9.2. Environmental impacts can be beneficial and adverse; short, medium or long-term; direct or indirect; permanent or temporary; and cumulative.

Table 9.2: Criteria used to Determine Magnitude of Impact

Magnitude of Impact	Description
Substantial	Significant change in surrounding environment; Complete destruction of the site or feature. Change to the site or feature resulting in a fundamental change in ability to understand and appreciate the heritage asset and its cultural heritage value/historical context and setting
Moderate	Significant change in environmental factors; Change to the site or feature resulting in an appreciable change in ability to understand and appreciate the resource and its cultural heritage value/historical context and setting
Slight	Change to the site or feature resulting in a small change in our ability to understand and appreciate the heritage asset and its cultural heritage value/historical setting
Negligible	Negligible change or no material change to the site or feature. No real change in our ability to understand and appreciate the heritage asset and its cultural heritage value/historical context and setting

Significance of Impact

9.2.25 The significance of impact is assessed by combining the relative magnitude of impact (Table 2) with the relative sensitivity of a particular receptor (Table 9.1). A matrix is used of the criteria defined in Tables 9.1 and 9.2 to calculate the significance of the impact and this is shown in Table 9.3.

9.2.26 Impacts have been identified as those that would potentially lead to a change to the receptor or site significantly outside the existing range of baseline conditions.

9.2.27 Using the criteria in Table 9.1, each of the heritage assets identified in the gazetteer has been assessed for its sensitivity as shown below in Table 9.4. Levels of sensitivity of heritage assets have been assessed in accordance with policies in the NPPF, as well as the English Heritage Conservation Principles: Policies and Guidance for the Sustainable Management of the Historic Environment.

9.2.28 The study area for the present assessment includes part of the WHS and the WHS buffer zone, parts of the Stanley Dock, Pier Head, and Castle Street/Dale Street/Old Hall Street/Commercial District Conservation Areas, and 10 listed buildings. Out of 45 heritage assets, 16 are of very high sensitivity, 11 are high, 4 are medium, and 14 are of low sensitivity. Sites have been assessed to be of low significance where they appear to have been completely, or almost completely,

destroyed, or where they do not relate directly to the historic functions of the waterfront.

Table 9.3: Impact Significance Matrix

Sensitivity	Magnitude of Impact			
	Substantial	**Moderate**	**Slight**	**Negligible**
Very High	Major	Major/ Intermediate	Intermediate	Minor
High	Major/Intermediate	Intermediate	Intermediate/ Minor	Neutral
Medium	Intermediate	Intermediate/ Minor	Minor	Neutral
Low	Intermediate/Minor	Minor	Minor/Neutral	Neutral

Residual Impacts

9.2.29 The impact significance category for each receptor is described and assessed, and recommended mitigation measures are identified for impacts that are of intermediate significance or above. The residual impact assessment takes into consideration the ability of mitigation to reduce or offset the impact.

Relevant Scheme Design Features Considered

9.2.30 Following good practice, the EIA process has been integrated into the design of the project. This has enabled environmental constraints to be identified at an early stage and the design to be reflective of the cultural heritage and archaeological context. A widely accepted hierarchical strategy for considering mitigation exists in EIA. This involves mitigation which can be termed prevention, reduction, off-setting or enhancing. The current development proposal includes design features that take into account archaeological and cultural heritage significance and offer varying degrees of in-built mitigation such as avoidance of basements to reduce impact on historic dock walls; preservation and reuse of all historic surface materials; and set back of development the recommended distance from the dock boundary wall as specified in the Liverpool WHS Supplementary Planning Document (LCC 2009).

9.2.31 In addition, the applicant is committed to a number of overall safeguards designed to ensure that heritage assets and wider heritage interests are respected responsibly, in accord with national planning policy guidance and good practice. These safeguards relate both to heritage assets and other potential sites or features. These principally address two particular matters:

i. In the development process, some uncertainty inevitably remains regarding underground assets and features until the ground is excavated.

ii. Unless good practice site management is put in place, harm can arise inadvertently to features of general or specific heritage interest.

9.2.32 The safeguards are brought about voluntarily by the applicant and can be secured formally through conditions attached to a planning permission. They relate to the considerations in the following paragraphs.

9.2.33 The planning application proposals are designed carefully to respect heritage assets on the basis of thorough research and appraisal by specialists, including details of foundations and associated features. For example, it is recognised that the inner and outer faces of the dock and sea walls were battered and were, therefore, wider at the bottom than the upper courses that have been depicted on maps and plans. Also in this regard, it is recognised that the extent of sites identified from historic mapping are subject to inherent inaccuracies as a result of variable survey techniques and standards over time.

9.2.34 This EIA has been conducted on the basis that development as shown in the application drawings has been designed to minimise harm to heritage features on the site and to use them where reasonably possible. In advance of commencement of construction work on site, further geotechnical and archaeological investigation will be undertaken to confirm - in detail - the likely sub-surface extent of heritage assets or other potential sites or features to a brief agreed with the Council. Such works can have the additional benefit of enhancing the understanding of the historic features of the site.

9.2.35 Service Runs and Infrastructure Installation: On a similar basis to the procedures just described, the line and depth of service runs and of other infrastructure, such as the access road, needs to be planned carefully to ensure no harm to heritage interests or to minimise their potential impact. Where sub-surface heritage assets are known to exist, selective trial trenching will be undertaken prior to any excavation to ensure their preservation.

9.2.36 Development Management: Surface features, such as setts and rail tracks remain visible on the site and, without normal safeguards, might be impacted during construction work. There is also the potential, without such safeguards, for damage to surface features of heritage interest as a result of the movement of heavy plant, particularly machines with metal tracks, and the installation of large rigs, such as cranes and pile drilling equipment. To ensure that these features are not harmed and that they are either protected or that they can be re-used elsewhere on the site as appropriate, the normal course is to undertake a detailed survey and audit of such features which can then provide the basis of a heritage management protocol to be agreed with the Council ensuring reasonable care and protection. A relatively detailed survey of these features has already been undertaken which could be enhanced prior to commencement of construction, together with details plans showing how these features are to be protected and reused on site.

9.3 Consultation

9.3.1 No consultations were undertaken during the EIA process.

9.4 Limitations and assumptions

9.4.1 This assessment is based on existing information for the Site. Some limited ground investigations have confirmed current conditions, contamination and identified some heritage assets of archaeological interest. Further intrusive investigations will be required prior to development.

9.5 Baseline Condition

Background

9.5.1 Following the development of Liverpool's closed dock system in the late 18th century, the construction of Princes Dock was the first substantial increase in the size of the docks. It was also the first 19th century dock to be built in the town, with initial designs drawn up in 1800 by the engineer William Jessop and in 1810 by John Rennie. It was remarkable for the use of steam power and an iron railway to remove spoil. Jessop commented on the silting of those older dock entrances such as the Georges Dock with tidal basins, and proposed the installation of proper locks as a solution, together with improvements to the construction of the retaining walls. By this time it had also been recognised that there were structural flaws to the use of sandstone walls set into the made ground, as it had been observed that the sheer weight of the walls made them prone to subsidence which left cracks and gaps in the dry bond.

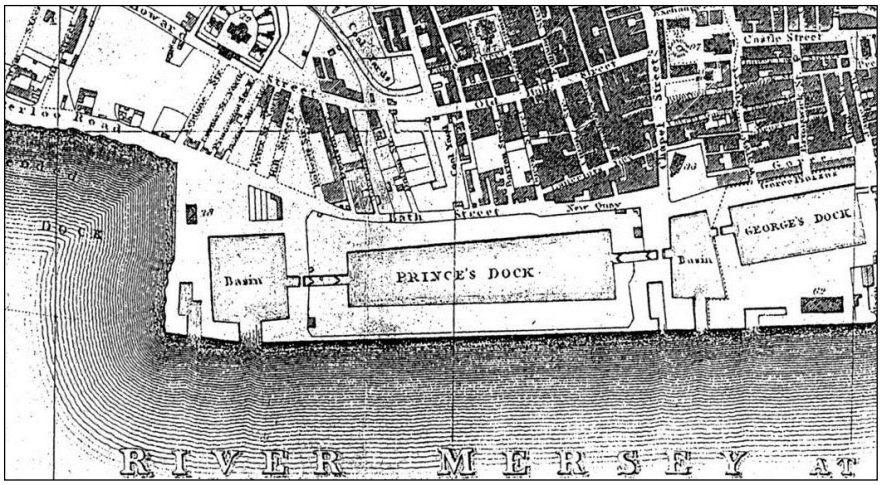


Figure 9.1: Swire 1823-4

9.5.2 Problems with raising funds and securing land for development meant that work did not commence until 1810, a full ten years after the original Act to construct the dock had been passed in parliament. These problems were compounded by the Napoleonic Wars which limited the supply of men and horses for moving materials. By 1810, the full complement of land was still not available so work began on the construction of a dock which was now much reduced in size from the original proposal. At the same time, the sea wall that now forms the boundary of the current marine parade was also being built. Stone for the works was shipped across the river from quarries at Runcorn. By July 1811, the name of Princes Dock had been bestowed by the Dock Committee.

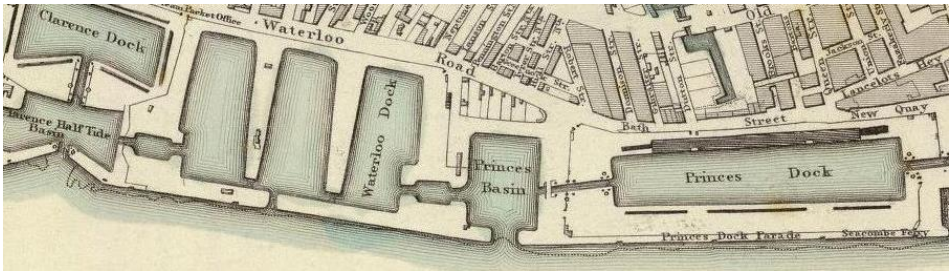


Figure 9.2: 1836 map

9.5.3 The site of the Princes Dock was previously off-shore, with a public baths projecting out from the shoreline. Work involved the construction of a new river wall and ground reclamation. The Dock was completed in 1821 by the Dock Engineer John Foster. Until 1832, it was the largest dock in Liverpool, and was intended to be a flagship for Liverpool's trade with North America, principally imported cotton and emigrating people. The dock covered an area of 4.6 hectares, with a lock at the southern end connecting it to Georges Dock. At the north end was a second lock leading through to Princes Dock Basin, providing access to the Mersey. It was intended originally to build another dock on the north side of Princes Basin (Swire map 1823-4), but this area was not developed until the 1830s. A swing bridge provided access to the island forming the western side of the dock and a series of transit sheds, as well as the Dock Master's and Pier Master's offices (OS 1851). Further buildings, such as a police station were on the east side of the dock.

9.5.4 Access to Princes Dock from the town was controlled by a dock boundary wall, the first to be built in Liverpool, begun in 1816 and completed in 1821 when the dock opened. Also built by Foster, the wall was of red brick, four courses thick, with sandstone copings and a gateway with sandstone piers in the Greek Revival style. Originally the wall extended around the dock but only the east side now survives in situ. The buildings around Princes Dock were also characteristic of this phase of building as the newly constructed transit sheds were built to be easily constructed and dismantled. Archaeological excavation by Oxford Archaeology North in 2007-08 in the area of Princes Dock showed that despite the transitory nature of these structures, they were furnished with substantial foundations and associated crane bases.

9.5.5 Dock extensions soon took place to the north of Princes Dock, with the opening of the Clarence Dock in 1830, and the completion of the Waterloo, Victoria and Trafalgar Docks by Foster's successor Jesse Hartley in the mid-1830s. These and later docks could accommodate the larger steamships, and the Princes Dock moved into high value, low bulk goods such as coffee and spices. In 1868 the Princes Basin was modernised to serve as a Half Tide Dock, giving access to the remodelled Waterloo Dock to the north and the Princes Dock to the south. This work was carried out by G F Lyster, Hartley's successor, who also infilled the Georges Basin, allowing for the construction of a long floating roadway that led down to the Liverpool Landing Stage that served the ferries and cross-river traffic at Princes Dock and the Pier Head.

9.5.6 Eventually, the landing stage was extended to 2,500 feet (762 metres), running from the Pier Head northwards the full length of the Princes Dock, becoming the

principal point of embarkation for transatlantic passenger liners. To cater for travellers, the landing stage was equipped with waiting rooms, customs points and baggage handling facilities. In 1895 Riverside Station was opened on the west side of Princes Dock, bringing main line passengers right down to the river's edge, with covered bridges leading directly to the floating landing stage at two levels. The rail link to Riverside Station came in from the Waterloo Dock Goods Yard, only a short distance away.

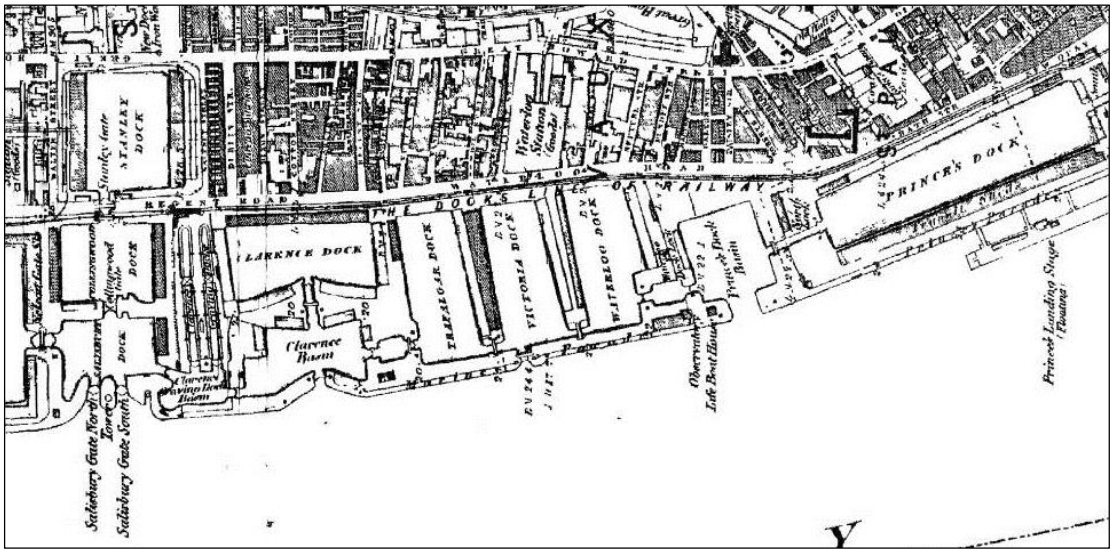


Figure 9.3: OS 1851

Figure 9.4: Dock Plan c.1900

9.5.7 At the north end of the Liverpool Landing Stage, Princes Jetty was built in 1899-1900. Designed by AG Lyster, in association with Gustave Mouchel, it was the first reinforced concrete structure in the docks and is one of the earliest examples of the use of the Hennebique system in Britain. Princes Jetty incorporates two substantial components, which appear to be constructed of timber with a concrete deck, and following the removal of the original iron and timber structure in 1975, it is the only surviving element of the Liverpool Landing Stage. It incorporates the former fire-damaged remains of a timber shelter and a moveable bridge.

9.5.8 The Liverpool Overhead Railway was built 1889-93 and a section ran along the edge of the dock boundary wall. By 1908 additional railway tracks were added between the quayside transit sheds and the overhead railway.

9.5.9 The dock itself remained largely unchanged until 1905, by which time its shallow depth combined with the cambered profile of the dock walls made it unsuitable for the deeper, more square-sided steamers that were liable to suffer damage when mooring alongside the wall. A new quayside structure was therefore built within the dock, complete with sheds and a concrete deck, occupying the whole of the west side of the original water area.

Figure 9.5: View looking from Liver Building 1934

9.5.10 This intervention into the water body proved a success, and in 1928-29 a similar structure was inserted along the east side of the dock. It established, belatedly, a specialised facility for coastal trade, with an emphasis on Irish traffic. A "roll on/roll off" terminal was installed in 1967 at the southern end of the dock, for the Irish Packet, but continuing declines in passenger numbers and the construction of the new terminal at Victoria Dock made it redundant in 1981. Despite an illustrious and varied history the dock fell into decline until the 1990s when a new phase of regeneration saw the dock placed at the heart of the newly founded waterfront business district.

9.5.11 After its closure in 1981, being close to the central business district, Princes Dock was regarded as a potential area for new office development, and in 1988 Merseyside Development Corporation commissioned a masterplan from Tibbalds Monro. In 1992 development was commenced under the direction of The Princes Dock Development Company. The transit sheds and other buildings were cleared, the east quay was widened to create larger development sites, and the dock walls were rebuilt. The first phases included the Crowne Plaza Hotel, and a section of Princes Parade extending northwards on the western side of the dock.

9.5.12 A revised masterplan was prepared in 1998 by Taylor Young for the Princes Dock Development Company. This provided the framework for the remainder of the site, including access to Waterloo Road/Bath Street, the partial infilling of Princes Dock and the identification of additional parcels of land for development.

9.5.13 With changes in the property market, and differing aspirations since the 1998 masterplan, further revisions were approved in April 2002. The new plan

introduced a greater mix of uses, higher densities, and indicative heights for each development plot. Some new plots were allocated for development. Whilst the emphasis of this masterplan was to deliver commercial development, it was agreed with the Princes Dock Development Company that the original aspiration should be relaxed to allow for a greater proportion of new residential development around the dock. This has mostly been in the form of individual tall buildings.

9.5.14 At the south end of the dock, the blocked passage to the former Georges Basin and the original coursed sandstone quay wall survive. Along the riverside, where a set of derelict steps remain, it is possible to see sections of the original river wall. In 2007 work commenced on the Liverpool Canal Link which directly impacted upon the Princes Dock. In 2008, as part of the bulk excavation, elements of the transit shed foundations and the north wall of the Georges Dock Basin were uncovered. The original sea wall and temporary works wall were also identified during the course of the works. The 1967 roll on-roll off ramp was re-exposed and removed in order to allow the construction of a culvert leading from the dock through to the Pier Head. To facilitate access a pedestrian bridge was constructed spanning the dock.

Figure 9.6 View from north end of Princes Dock towards the Liver Building, with development site to the left

Historic and Architectural Character Assessment

9.5.15 The Princes Dock is approaching its 200th anniversary, over which time it has played a major role in the economic, social and community life of Liverpool. Unlike the earlier docks such as the Old Dock or George's Dock it was never infilled and developed after becoming unsuited for use by the latest types of ships. It was successively adapted for other craft, and images show that it has undergone a gradual and at times dramatic series of transformations.

Figure 9.7: View from Princes Half Tide Dock looking towards St Nicholas' Church, c.1880

Figure 9.8: View from Liver Building looking north, c.1960

Figure 9.9: View from north end of Princes Dock looking towards Liver Building, c.1970

9.5.16 Although the water basin remains as the central feature of the area today, it has been significantly reduced in width and depth, and the walls that contain it are mostly 20th century. The sea wall too has been largely refaced. The original walls and other subterranean structures remain as discussed in the archaeological report, but are not currently visible, and therefore do not contribute to the townscape character of the area.

Figure 9.10: Current view from north end of Princes Dock looking towards Liver Building

9.5.17 In addition to the water basin, the other major historic feature is the dock boundary wall, which stretches the full length of the dock on the east side along Bath Street and New Quay, and gives enclosure to the area. Also of historic interest are the surviving surfacing materials on the east side of the dock, and particularly within the strip of land adjoining the boundary wall.

9.5.18 The openness of the river on the west side provides important evidence of the history of the dock, and although the river was blocked off from view firstly by the eastern dock boundary wall and the transit sheds, and later by the Riverside Station and its associated buildings, the relationship between the dock and the river are crucial aspects of understanding the heritage significance of the area.

9.5.19 The views north and south across the water body are likewise important for understanding the historical development of the dock estate, firstly with the continued expansion along the river edge, and later with the redevelopment of the George's Dock for the great trio of Pier Head buildings which symbolise the pre-eminence of Liverpool as a global maritime mercantile city.

Townscape Character Assessment

9.5.20 Understanding the north dockland landscape in its totality is important for the protection and presentation of the aspects of Outstanding Universal Value (OUV) which are enshrined in the World Heritage Site (WHS) inscription. Four essential topographical characteristics were identified in the Liverpool Waters heritage baseline evaluation:

- The series of continuous and connected water spaces, resulting from notions of functional efficiency, and producing a strong visual structure. This depends on the continuity of water running through the site, joining together the two groups of historic water bodies at each end.
- The dockland strip was built on land reclaimed from the River Mersey, and is therefore flat in contrast with the land that rises gently from the former shoreline beyond. This provides a horizontality of land form, which is reflected in the architectural forms of buildings on the waterfront such as the Albert Dock warehouses, the Echo Arena and the Museum of Liverpool.
- The vistas that a wide river affords provide a remarkable panorama of a city in which the rising land form contrasting with the horizontality of the reclaimed dockland is enhanced by the contribution of tall buildings. These commenced in the late 19th century with 'skyscrapers' such as the White Star Line offices, and then in the 20th century with the Liver Building, and more recently with the cluster of emerging towers in the commercial district.
- The built form which is characterised by a strong geometrical layout, heroic scale of construction and robustness of surface and materials. The distance of view that a wide river affords demands development of a scale sufficient to make an impact.

9.5.21 Therefore, although the Princes Dock is outside the WHS, it remains an essential part of the dockland landscape, so that the design and scale of developments need to respond to and respect their context.

9.5.22 The Liverpool World Heritage Site Supplementary Planning Document (SPD) states that there is no uniformity of building heights within the WHS, and that variation of height is an aspect of character. However, one of the conditions imposed at the time of inscription is that 'the height of any new construction in the WHS should not exceed that of structures in the immediate surroundings'.

This has led to the policy that new buildings in the WHS should not generally exceed the height of the tallest building in the immediate vicinity of the street(s) that they address'. While Princes Dock is not within the WHS, development within it has the potential to affect the setting of the WHS itself, and therefore that policy has some relevance. However, there are no conventional streets within the dock, and it is not entirely clear what would be considered to be the immediate surroundings of any particular site.

9.5.23 No listed structures survive at the Princes Dock, other than the boundary wall with its gateways and attached features, so its existing architectural character is established by the buildings erected over the past 20 years. The earliest buildings such as 8 Princes Parade and the Crowne Plaza Hotel were modest in scale and architecturally unremarkable, but in later phases both the height of development and architectural ambitions increased. The Malmaison Hotel and 12 Princes Parade offer different aesthetic approaches, the former fortress-like and clad in granite, echoing the toughness of the city's industrial past, while the latter is more varied and uses modular cladding of a less substantial character.

9.5.24 The taller residential buildings at the northern end of the dock are part of the cluster of towers which are focussed on the central business district, and which are intended to be strengthened through the implementation of the Liverpool Waters masterplan.

Figure 9.11: View from south end of Princes Dock looking towards taller residential buildings, with Malmaison Hotel and multi-storey car park on right

Views

9.5.25 The views into, from and within the WHS are an important aspect of OUV as stated in the WHS SPD. The Evidential Report that accompanies the SPD includes a number of key views in which principal features of significance are visible. These views are structured by the topography of the wider city, its relationship with the river, the location of landmark buildings and the urban form and skyline of the WHS and its Buffer Zone. In terms of OUV, the test of significance is how the views contribute to appreciation and understanding of the

tangible and intangible attributes enshrined in the Statement of OUV and what impact, if any, the development proposals would have on those values.

9.5.26 An important viewpoint is from the northern edge of Princes Dock looking south towards the Liver Building, which is part of the Pier Head Complex of landmark buildings that form a fundamental part of the WHS's OUV and wider city's visual structure.

9.5.27 Other viewpoints that have been considered in relation to the proposed development are from the Liver Building; from the river front looking along the line of the pedestrian bridge across the dock; and from The Strand looking north.

Character of the Application Site

9.5.28 The development site is an area of cleared land, which has previously been in use for surface car parking. The ground surface includes areas of historic granite setts and stone pavings, together with rail tracks which remain from the time when it was a working dock.

Figure 9.12: View looking north across the rear part of the site showing the rail tracks in use, and transit sheds on the left, c.1950

9.5.29 Immediately to the south of the site is a further area of hand standing. This plot has planning permission for an eight storey building to be known as William Jessop House, with seven storeys of B1 office space above a ground floor providing B1 or A1, A2, A3 or A4 retail space.

9.5.30 Beyond William Jessop House is the decked car park, which is nine storeys high, with a maximum height of 28.4 metres. It is a precast concrete framed building, with the structure clearly and simply expressed externally. Planning permission

has been granted for an extra four decks of parking. To the south of the car park is the 11 storey Malmaison Hotel, clad in grey granite slabs.

9.5.31 The land to the north of the site is also cleared. Further to the north are the 24 storey City Lofts and the 26 storey Alexandra Tower residential developments. Other tall buildings in the vicinity are the 30 storey Beetham Tower and the 40 storey West Tower which occupy sites on the eastern side of Bath Street, and are part of a cluster of tall buildings.

9.5.32 On the east side, the site is bounded by the Grade II Princes Dock boundary wall. One of the historic gateways with massive sandstone gate piers is located just to the north of the Princes Reach site.

9.5.33 On the west side is William Jessop Way, with a footway running along the quayside of Princes Dock. Princes Parade, the roadway on the west side of Princes Dock gives access to three modern commercial buildings of five and six storeys. These pre-date the Liverpool Waters planning permission.

Archaeology

9.5.34 The Archaeological Statement (June 2016) fully summarises the archaeological and historical background to the Site. The following summarises previous and more recent archaeological investigations that have assisted understanding of the character and potential of the Site.

Archaeological Investigations at Liverpool's waterfront

9.5.35 A series of excavations were carried out between 2001 and 2009 in response large-scale development at Liverpool's waterfront. Investigations along the line of the Liverpool Canal Link, at Mann Island, the Museum of Liverpool, on the line of the proposed Tram route, Dukes Dock and Liverpool One, have provided significant insights into the development and growth of the City from the eighteenth century and demonstrated the survival and significance of Liverpool's waterfront archeology. They have in particular provided evidence for dock wall construction, land reclamation, the nature of settlement and industrial activity with the associated artefacts. The investigations undertaken at Liverpool One (including the site of the 'Old Dock') have not been fully research or published. However, the recent publication of 'Archaeology at the Waterfront – Investigating Liverpool's Historic Docks' (OAN 2014) provides the first synthesis of the canal, Mann Island and Museum of Liverpool excavations.

Archaeological Watching Brief at Princes Half Tide Dock

9.5.36 An archaeological desk-based assessment and a watching brief was carried out in 2006 during excavation of geotechnical test pits in advance of development on land adjacent to Princes half Tide Dock at the site (SJ 336 909), Pevely & Adams 2006 & 2007). The watching brief found deposits immediately the ground surface was primarily make-up {i.e. deposits used to make up the land) deposited during the construction of the basin and remodelling in the 1860s. The most significant artefacts recovered were fragments of sugar mould, probably dated to 1787-1820. These were in pale sand deposits at approximately 3 metres from the surface.

Layers of silts and clays lay below the makeup deposits, which most likely represent the pre-dock foreshore. Additional watching brief was undertaken in 2007 which recovered further sugar mould and ceramics.

Archaeological Watching Brief on Canal Link at Princes Dock passage

9.5.37 In 2007 work commenced on the Liverpool Canal Link, which directly impacted upon the Princes Dock. In 2008, an archaeological watching brief was undertaken as part of the bulk excavation during which elements of the transit shed foundations and the north wall of the Georges Dock Basin were uncovered. The original sea wall and temporary works wall were also identified during the course of the works (Sites 19 & 20). The temporary retaining wall was constructed of yellow sandstone ashlar masonry with some pink sandstone quarry waste packing. Part of the wall was constructed using recycled architectural stone.

Liverpool Waters

9.5.38 The Site forms part of an area researched as part of the Environmental Statement Liverpool Waters scheme (for which outline consent was granted in 2013). Cultural heritage assessment was undertaken along with the research and delivery of an 'Archaeological Deposit Model' (10O/2424 Liverpool Waters Outline Consent, November 2011). The Archaeological Deposit Model is a digital, geographic information system (GIS) archaeological deposit model (compiled by CgMs). It was produced to assist identifying areas of high, medium and low archaeological potential. It consolidates historic map data covering the period 1785 to 1956 and used baseline information on heritage assets and aerial photographs to identify structures associated with the docks, alterations and demolitions.

Archaeological Watching Brief on during ground investigation (geotechnical) works at the Site

9.5.39 Moda Living commissioned an archaeological watching brief during ground investigations carried out at the Site (Vacant Land, Princes Dock, William Jessop Way, Liverpool, NGR SJ337 907). Prior to this the nearest archaeological investigations relate to those carried out at Princes Half Tide Dock and at the south of Princes Dock passage. In planning the Stage One ground investigations (GI) at the Site, Arup engineers used the Archaeological Deposit Model (ADM) as part of their research and liaised with the Archaeological Consultant. This resulted in identifying the best locations for determining subsurface features at the Site, including the likely location of the buried Princes Dock Wall and sea walls (identified from the ADM and additional cartographic analysis).

9.5.40 Archaeological Watching brief on phase one ground investigations was undertaken by Archaeological Services, National Museums Liverpool (ASNML) between the 29th February and the 4th March 2016. The results are summarised in the Archaeology Statement (April 2016) and fully presented in the ASNML report (Adams 2016), which forms part the supporting planning documentation for the Site.

9.5.41 Princes Dock Wall was located in two enlarged test trenches. Consisting of yellow and red sandstone, thee wall is badly damaged in its upper courses but otherwise remains substantially intact and its location within the site can now be accurately predicted. It lies c 0.70m below ground level at a height of c. 6.8m AOD in TT301/305 and c. 0.35m below surface at height of c. 6.95m AOD in TT 302/303. Although damaged in its upper levels it remains a significant component of the heritage value of the site.

9.5.42 The earlier, c. 1803 (as seen on Horwood's map), sea wall is deeply buried. Within TT306 in situ evidence was c. 4m below ground level, (c 3.2m AOD); in TT304 a possible sandstone block was c 3.5 m below ground level (c. 3.6m AOD). Likely representing the remains of the sea wall, it is in a relatively poor condition and its line remains uncertain, particularly at the southern end of the site, though it is likely that that section was destroyed when Princes Dock was constructed.

9.5.43 A couple of brick culverts were located in TT304 and TT306. The deposits of sand and crushed sandstone found in theses trenches almost certainly represent material deposited behind the retaining wall of Princes Dock in the period 1810-1820, either from the excavation to create the dock and/or quarry waste imported from the quarries (mainly in the Runcorn area) with the stone used to build the dock retaining walls. The silts and clays noted at the base of both trenches may represent tidal flat deposits associated with the tidal zone of the River Mersey excavated during construction of Princes Dock and redeposited behind the retaining wall. (Adams 2016 pg 9)

9.5.44 At Princes Dock there appears to be little cultural material within the fills behind the retaining walls (Adams 2016 pg 9). Analogy with other areas (e.g. Princes Half-Tide Basin; Pevely & Adams 2006) suggests that occasional lenses of material relatively rich in material such as ceramics may be present, particularly to the base of the profile. The lower fills east of the 1803 sea wall may be richer in cultural material, in general the fill used in earlier areas of Liverpool's docks was more heterogeneous than that used from the early to mid-19th century, often being derived from a range of sources in central Liverpool. Analogy with other sites in the area suggests that these lower fills (i.e. below c. 3.5 m BGL) may be of slightly greater archaeological potential.

9.6 Assessment

Table 9.4: Assessment of Sensitivity of each Receptor Identified in the Gazetteer

Princes Reach Site Receptors	Gazetteer No. (World Heritage Site or Buffer Zone)	Listed Buildings (Showing Grade)	Sensitivity
Gate to Waterloo Dock	1 WHS		Very High
Waterloo Grain Warehouse	2 WHS	Grade II	Very High
Waterloo West Dock	3 BZ		High
Waterloo East Dock	4 WHS		Very High
Site of Swing Bridge between Princes Half Tide Dock and West Waterloo Dock	5 WHS		High
South Gate to Victoria, Princes and Waterloo Docks	6 WHS	Grade II	Very High
Sprague Brothers Engineering Building, 2-4 Roberts Street	7 BZ		Medium
Boundary wall and gates, Roberts Street	8 WHS		Very High
Entrance to Princes Half Tide Dock	9 WHS		Very High
Princes Half Tide Dock	10 WHS	Grade II	Very High
Site of Riverside Branch Railway	11 BZ		Medium
Site of Princes Dock station, Waterloo Rd	12 BZ		Low
Princes Dock Gates (north), including railway furniture	13 WHS	Grade II	Very High
Dock gates (south)	14 WHS		Very High
Cast Iron Drinking Fountain Series	15 WHS		High
Princes Dock	16 BZ		High
Princes Dock Boundary wall and piers, Bath Street	17 WHS	Grade II	Very High
Sea Wall	18 WHS/BZ		High
Sea Wall (c 1760)	19 BZ		Medium
Temporary Retaining or Buttress Wall	20 BZ		High
Dockside Railway at Princes Dock	21 BZ		High
Princes Jetty	22 BZ		Very High
Site of Riverside Railway Station/Offices	23 BZ		Low
Princes Dock Transit Shed	24 BZ		Low
West Waterloo Dock River Entrance and Extension	25 BZ		Medium
Cunard Building	26 WHS	Grade II*	Very High
Port of Liverpool Building	27 WHS	Grade II*	Very High
Mersey Road Tunnel Ventilation and Central Station	28 WHS	Grade II	Very High
St Nicholas' Church	29 WHS	Grade II	Very High
Liver Building	30 WHS	Grade I	Very High
George's Dock Basin	31 WHS		High
Clarke's Basin	32 BZ		Low
Seacombe Basin	33 BZ/WHS		High

Boat Yard	34 BZ		Low
Warehouse	35 BZ		Low
Fort	36 BZ		Low
Princes Dock Basin	37 WHS		Low
Bath House	38 BZ		Low
Kiln	39 BZ		Low
Mr Brooks Brick Yard	40 BZ		Low
Pottery findspot	41 BZ		Low
Location of Limestone Perch	42 BZ		Low
Pottery	43 BZ		Low
Sea Wall	44 BZ		High
Princes Dock Wall	45 BZ		High

9.6.1 The following is a summary of the assessment of the likely significant effects of the proposal on the archaeology and cultural heritage. The identified potential impact, prior to mitigation, is detailed in the assessment summary table 9.5. The text in this section takes into account the overall safeguards set out in this document. The assessment has been prepared with general reference to the legislative framework, planning policies and guidelines.

9.6.2 The assessment relates to heritage assets, that is, those parts of the historic environment that have significance because of their historic, archaeological, architectural or artistic interest, as defined in the NPPF. It is sub-divided into sections that assess potential impacts associated with:

- the construction phases of the project;
- the operational phases;
- cumulative impacts; and
- the overall effect of the proposals on the Outstanding Universal Value of the World Heritage Site.

Potential Construction Impact

9.6.3 There are two main forms of impact that can negatively affect sites of archaeological and cultural heritage significance during the construction phase of the development:

- The first of these comprises direct damage to sub-surface and exposed remains as a result of ground works, and vibration and displacement that might result from works being undertaken in areas adjacent to sites of interest. The risk of such damage is normally addressed, and fully mitigated, by a management protocol on the lines outlined as part of the overall safeguards. That is what is proposed for Princes Reach.
- The second form of potentially negative impact during construction relates to the temporary diminution in the quality of the setting of sites. For example, this could be a result of the presence of cranes and conspicuous machinery and materials.

9.6.4 Potential impacts could, therefore, involve both physical damage to heritage assets and the temporary impairment of an appreciation of the docks. This will be mitigated in the context of the overall safeguards described in this document.

9.6.5 Princes Dock consists of areas that have been subject to redevelopment during the late twentieth and early twenty-first centuries, including the infilling of part of the eastern side of the docks.

9.6.6 The proposed development could have a temporary negative impact upon the visual setting of Princes Dock (Site 16). Temporary negative impacts on the setting of the docks boundary wall (Site 17) could also result from the presence of conspicuous construction works and equipment.

9.6.7 In the latter regard, View E as defined in the WHS SPD, is relevant. This is taken from the road bridge over Princes Half-tide/Princes Dock passage looking south, focussing on the Liver Building and pedestrian bridge. This view may be slightly impacted upon by construction, although it will not obscure the view of the Royal Liver Building.

9.6.8 Construction works will be undertaken in an area where desk-based research and archaeological watching brief recording has shown that structural archaeological remains survive, but the full extent of their survival condition and extent is not yet fully confirmed. The line of the original Princes Dock dock wall and former sea wall is within the footprint of proposed buildings, and the area formerly occupied by the associated quayside may be disturbed by construction works. Further geotechnical ground and archaeological investigation is proposed by condition. This will inform the detailed foundation design and assist minimise harm.

Potential Operational Impact

9.6.9 Operational activities may have both negative and positive effects. These may be summarised briefly as follows.

9.6.10 There are two main forms of impact that can negatively affect sites of heritage interest during the operational phase of the development:

- The first of these comprises direct damage to sub-surface and exposed remains of heritage assets as a result of ongoing intrusive activity, such as the growth of roots in areas of tree planting.
- There is also the potential for negative impacts on the setting of heritage assets during the operational phase as a result of the presence of buildings that obscure views of heritage assets or those that conflict with their setting. Without mitigation, the severity of potential impacts, in the form of the destruction of heritage assets or the impairment of the intellectual understanding or readability of the docks, might be substantially increased.

9.6.11 As regards potential positive impacts during the operational phase, the main benefit is likely to relate to improved physical access, and opportunities to present information relating to the historic development of Liverpool docks and the activities formerly undertaken within the area, for example, through the use of

information boards and digital graphic media. This would offer significant public benefits by reparation and creation of a widespread intellectual understanding and readability of the docks.

9.6.12 It is important to note that the visual aspects of the proposed development are considered in greater detail in the separate Heritage Impact Assessment, which is submitted as an application document assessment. This assesses the effects of the proposals on the OUV of the WHS, and is summarised below. To avoid repetition, visual considerations have therefore been largely omitted in the following paragraphs. The visual assessment in the Heritage Impact Assessment focuses on what is important in terms of protecting, conserving and presenting the OUV of the Liverpool WHS and this includes consideration of impacts on all heritage assets. Each asset has also been individually assessed in terms of localised changes to setting and the resulting impacts are detailed in Table 9.5.

9.6.13 The current buildings within this area broadly follow the alignment of the dock water spaces with most of the buildings that lie to each side of the docks running parallel to them. The tallest of the current buildings lie at the northern end of Princes Dock, but Princes Reach will be taller than these. Although the current buildings are much taller and more robust than the long and low buildings that would previously have been present in this area, the general layout of development is broadly consistent with the historic layout of the docks, which was characterised by rectangular transit sheds running parallel to the edges of the water spaces. Modern road surfacing forming a complete circuit around the dock is also consistent with the former layout of the quayside.

9.6.14 In addition to the heritage assets considered above, positive impacts on the understanding of the historic context of the docks might be attained through interpretation of the archaeological interest of the site. As noted earlier, this will be considered in more detail through the discharge of conditions.

Cumulative Impact

9.6.15 There will be positive and negative cumulative impacts during the operational phase as a result of the proposed development.

9.6.16 Positive cumulative impacts arise from the gradual return to use of the Princes Dock with increased maritime activity and commerce. The development of vacant sites which contribute to a sense of neglect and dereliction around the dock will also make a cumulative positive impact. There will be a positive cumulative impact as a result of the planned provision of information relating to the historic environment. This will enable an informed understanding of the historic environment of the wider docklands that have never been previously accessible to visiting members of the public.

9.6.17 There will not be any cumulative impacts on the setting of the heritage assets of the site as a result of other nearby major developments.

The Archaeology and Heritage Impact Assessment

9.6.18 The Archaeology and Heritage Impact Assessment (HIA) relating to Princes Reach has been carried out in accordance with the International Council on Monuments and Sites (ICOMOS) Guidance on Heritage Impact Assessments for Cultural World Heritage Properties (2011), a methodology which was prepared at the request of the World Heritage Committee. The document is included as a planning application document. The report focuses solely on heritage issues, and does not take account of wider benefits, which are addressed in other planning application documents.

9.6.19 World Heritage Sites are recognised under the World Heritage Convention to be of Outstanding Universal Value (OUV) through inscription on the World Heritage List. The concept of OUV is encapsulated at the time of inscription in a Statement of OUV, which clearly defines its international value. Applications for planning permission within a WHS or its Buffer Zone are assessed for their potential impact on OUV as well as the aspects of integrity and authenticity which are also defined in the Statement of OUV.

9.6.20 The ICOMOS methodology used in the report states that assessments should provide the evidence on which decisions can be made in a clear, transparent and practicable way, and states that 'the assessment process is in essence very simple:

- What is the heritage at risk and why is it important – how does it contribute to OUV?
- How will change or a development proposal impact on OUV?
- How can these effects be avoided, reduced, rehabilitated or compensated?'

9.6.21 In order to reach such decisions, the potential impact of development on aspects of the historic environment that convey OUV has been assessed under the following five categories:

- Direct impacts on a schedule of heritage assets identified as reflecting OUV
- Impact on key views of and from the Liverpool Waters site identified in pre-application discussions
- Impact on views and setting of strategic landmark buildings within the WHS and buffer zone
- Compliance with guidance in Liverpool City Council's WHS Supplementary Planning Document (which sets out detailed policy and design guidance for protecting the OUV of the Liverpool WHS)
- Cumulative Impact Assessment on OUV

9.6.22 In the methodology used, heritage resources are evaluated in accordance with statutory designations, and assessed for their contribution to OUV. The assessment draws on the English Heritage Conservation Principles, 2008 for guidance on evaluation of significance, and the English Heritage guidance Seeing the History in the View, 2011 for views analysis.

9.6.23 Where assets have not been statutorily designated, the archaeology assessment of the significance and value of the heritage asset has been considered using professional judgment with reference to national published guidance and in accordance with the policies stated within the National Planning Policy Framework (NPPF, DCLG 2012) and the related guidance Planning Practice Guide (DCLG).

9.6.24 The scale or severity of impacts are judged taking account of both direct and indirect effects and then weighted in accordance with the value ascribed to the heritage asset or view. In evaluating the overall impact on OUV, careful consideration has been given to the balance of heritage benefits and disbenefits and, in order to reach a balanced judgement, who will benefit.

9.7 Additional Mitigation Measures

9.7.1 Mitigation is proposed by the applicant to prevent, reduce or offset potentially adverse effects identified in the assessment tables and summarised in this chapter of the ES. These mitigation measures are of two main kinds:

- Mitigation by Design: The proposals have been designed specifically to be heritage-based. This includes the height, massing and design of the building, which take reference from its historic context; the design of foundations, which is informed by archaeological constraints; and the layout of the public realm, which makes best use of the historic surface features
- Mitigation through Overall Safeguards: Overall safeguards are an integral part of the proposals to ensure that heritage assets and heritage features are addressed responsibly in accord with international obligations associated with the WHS status of part of the site, national heritage planning policies and associated guidance. Conditions attached to a planning permission are expected to be imposed relating to the detailed design of the building, further archaeological evaluation in areas of sensitivity or particular interest prior to any excavation in relation to buildings, service runs or infrastructure; and to the protection and reuse of historic surface materials.

9.7.2 Mitigative proposals relating to the provision services are planned to include strategic routing in order to avoid heritage assets and the adoption of methods of construction or installation that minimise impacts on such sites. For example, the latter is likely to include use of drilled conduits in sub-surface walling for narrow services or ramps to raise the proposed ground level and associated disturbance above heritage assets or other sites. Where such an approach is not achievable, full excavation and recording of remains is likely to take place as detailed above and to be agreed with the Council.

9.7.3 An additional, more detailed, archaeological survey/audit of historic features and fabric, such as setts and stone paving and railway tracks relating to the former docks use of the site;

9.7.4 A heritage management protocol to be agreed with the Council ensuring the reasonable care and protection of surface features identified in the above audit during construction and operation of the proposed development. This protocol, will be tied to the submitted Conservation Management Plan, and will deal with

protection of the heritage assets and features of the site during construction, including procedures for vehicle movements. The applicant will be responsible for ensuring that this is implemented.

9.7.5 In addition, whilst not something required to mitigate potential impact, the applicant is committed to arrangements for presenting the heritage of the site to the public. Opportunities will also be taken to enhance the understanding of visible heritage assets and expose any significant features which lie just beneath the modern surface.

9.7.6 The assessment of residual impact following mitigation (a) during construction and (b) during operation of the proposed development is detailed in the final column of Table 9.5.

Summary of the Heritage and Archaeology Impact Assessments

9.7.7 The studies provide an independent heritage and archaeology assessment of the proposed development at Princes Reach, Princes Dock. An analysis is made of the major designated and non-designated heritage assets included in the vicinity of the site, and the other attributes that contribute to the OUV of the Liverpool WHS.

9.7.8 The potential effects of development are summarised in Tables 9.5 and 9.6 below, where it can be seen that with appropriate mitigation in terms of design and conservation, there will be no adverse impacts on OUV. A slight beneficial impact on heritage will be provided by the development. As such the application complies with international, national and local planning policy and guidance on the historic environment.

Table 9.5: Heritage Impact Assessment - Significance of Impact

Items	Identified Impact	Sensitivity	Magnitude of Impact	Significance of impact
Dock Boundary Wall	Minor beneficial physical impact. Height consistent with existing planning permission Minor adverse impact on setting	Very High	Negligible	**Neutral**
Princes Dock	No physical impact Building will consolidate regeneration of Princes Dock	High	Negligible	**Neutral**

Items	Identified Impact	Sensitivity	Magnitude of Impact	Significance of impact
Historic surfacing	Lifting and relaying with some relocation of material	Medium	Minor Beneficial	**Slight beneficial**
Views of the Liver Building	None	Very High	Negligible	**Neutral**
Views from The Strand	Strengthens the identity of the Princes Dock and the coherence of the city centre cluster of tall buildings	High	Minor	**Slight beneficial**
Views from river and Wirral	Strengthens the identity of the Princes Dock and the coherence of the city centre cluster of tall buildings	Very high	Minor	**Slight beneficial**
View from Pier Head	None	Very High	Negligible	**Neutral**
View from Waterloo Road	Provides a focal point to the view	High	Negligible	**Neutral**
Landmark Buildings	None	Very High	Negligible	**Neutral**
SPD Design Guidance	-	-	-	**Medium Compliance**

Table 9.6: Archaeological Impact Assessment – Significance of Impact

Items	Identified Impact	Sensitivity	Magnitude of Impact	Significance of Impact
Princes Dock Wall	Physical localised impact – likely from construction of core lift pit on site of part of the dock wall; possible localised physical impact of possible slab and pile foundation at dock wall	High	Slight	**Intermediate/Minor**
Transit Sheds	Physical impact – removal of any surviving floor surfaces	Low	Moderate	**Minor**
Bath House	Physical impact – if any remains survive, this is likely to be immediately to the south of the Site	Low	Negligible	**Neutral**
Sea Walls	Physical impact – possible from construction if any walls may survive at height within the Site.	High	Slight	**Intermediate/Minor**

9.8 Assessment Summary

9.8.1 A tabular summary of the effects and additional mitigation is summarised in this section using the table below, where constructional impacts and operational impacts are separately assessed and tabulated.

Table 9.7: Construction Impact

Site	Heritage Asset	Summary of Identified Potential Impact	Sensitivity of Receptor	Magnitude of Impact	Significance of Impact Without Mitigation	Mitigation	Residual Impact With Mitigation
	(1) CONSTRUCTION IMPACT - -						
Princes Reach							
1WHS	Gate to Waterloo Dock	None	Very High	Negligible	Neutral	None	Neutral
2WHS	Waterloo Grain Warehouse	None	Very High	Negligible	Minor Adverse	None	Neutral
3WHS	Waterloo West Dock	None	High	Negligible	Neutral	None	Neutral
4WHS	Waterloo East Dock	None	Very High	Negligible	Neutral	None	Neutral
5WHS	Site of Swing Bridge	None	High	Negligible	Neutral	None	Neutral

Site	Heritage Asset	Summary of Identified Potential Impact	Sensitivity of Receptor	Magnitude of Impact	Significance of Impact Without Mitigation	Mitigation	Residual Impact With Mitigation
	(1) CONSTRUCTION IMPACT - -						
	between Princes Half Tide and East Waterloo Docks						
6WHS	South Gate to Victoria, Princes and Waterloo Docks	None	Very High	Negligible	Neutral	None	Neutral
7BZ	Sprague Brothers Engineering Building, 2-4 Roberts Street	None	Medium	Negligible	Neutral	None	Neutral
8WHS	Boundary wall and gates, Roberts Street	None	Very High	Negligible	Neutral	None	Neutral
9WHS	Entrance to Princes Half Tide Dock	None	Very High	Negligible	Neutral	None	Neutral
10WHS	Princes Half Tide Dock	None	Very High	Negligible	Minor Adverse	None	Neutral

Site	Heritage Asset	Summary of Identified Potential Impact	Sensitivity of Receptor	Magnitude of Impact	Significance of Impact Without Mitigation	Mitigation	Residual Impact With Mitigation
	(1) CONSTRUCTION IMPACT - -						
11BZ	Site of Riverside Branch Railway	None	Medium	Negligible	Neutral	None	Neutral
12BZ	Site of Princes Dock station, Waterloo Road	None	Low	Negligible	Neutral	None	Neutral
13WHS	Princes Dock Gates (north)	Temporary negative impact on setting resulting from presence of construction works and plant.	Very High	Moderate	Intermediate-Minor Adverse	Induction to operators stressing importance of avoiding extant structure. Signage and hazard marking. Use of banksmen to direct abnormally large loads.	Minor Adverse
14WHS	Dock gates (south)	Negative impact resulting from	Very High	Negligible	Minor Adverse	Induction to operators stressing importance of	Neutral

Site	Heritage Asset	Summary of Identified Potential Impact	Sensitivity of Receptor	Magnitude of Impact	Significance of Impact Without Mitigation	Mitigation	Residual Impact With Mitigation
	(1) CONSTRUCTION IMPACT - -						
		damage to fabric caused by collision by plant or vehicles.				avoiding extant structure. Signage and hazard marking. Use of banksmen to direct abnormally large loads.	
15WHS	Cast Iron Drinking Fountain Series	Temporary negative impact on setting resulting from presence of construction works and plant.	High	Negligible	Neutral	None	Neutral
16 BZ	Princes Dock	Damage to surfaces as a result of plant movement	High	Slight	Minor Adverse	Use of rubber tracks or similar in order to minimise impact by tracked equipment, or	Neutral

Site	Heritage Asset	Summary of Identified Potential Impact	Sensitivity of Receptor	Magnitude of Impact	Significance of Impact Without Mitigation	Mitigation	Residual Impact With Mitigation
	(1) CONSTRUCTION IMPACT - -						
		and heavy equipment.				provision of protective material to overlie surfaces when machines without rubber tracks, or heavy vehicles and equipment, are to be used.	
17WHS	Princes Dock Boundary wall and Piers, Bath Street	Temporary negative impact on setting resulting from presence of construction works and plant.	Very High	Slight	Intermediate-Minor Adverse	Induction to operators stressing importance of avoiding extant structure. Signage and hazard marking. Use of banksmen to direct abnormally large loads.	Minor Adverse
18BZ	Varied phases of the Sea wall	None	High	Negligible	Neutral	None	Neutral

Site	Heritage Asset	Summary of Identified Potential Impact	Sensitivity of Receptor	Magnitude of Impact	Significance of Impact Without Mitigation	Mitigation	Residual Impact With Mitigation
	(1) CONSTRUCTION IMPACT - -						
19BZ	Sea Wall (c. 1760)	None	Medium	Negligible	Neutral	None	Neutral
20BZ	Temporary retaining or buttress wall	None	Medium	Negligible	Neutral	None	Neutral
21BZ	Dockside Railway at Princes Dock	Damage to rail tracks/ associated surfacing as a result of ground works.	High	Moderate	Intermediate Adverse	Archaeological recording of all features prior to their disturbance. Accurate reinstatement of temporarily displaced surfacing materials and furniture in their original locations. Reinstatement of permanently displaced surfacing materials and furniture in	Minor Adverse

Site	Heritage Asset	Summary of Identified Potential Impact	Sensitivity of Receptor	Magnitude of Impact	Significance of Impact Without Mitigation	Mitigation	Residual Impact With Mitigation
	(1) CONSTRUCTION IMPACT - -						
						locations that are appropriate to their date, function, and style. Provision of publicly accessible information during and after construction works relating to the nature of the local historic environment.	
22BZ	Princes Jetty	None	High	Negligible	Neutral	None	Neutral
23BZ	Site of Riverside Railway Station/Offices	None	Low	Negligible	Neutral	None	Neutral
24BZ	Princes Dock Transit Shed	Damage to foundations and	Low	Moderate	Minor Adverse	Archaeological recording of all features prior to	Neutral

Site	Heritage Asset	Summary of Identified Potential Impact	Sensitivity of Receptor	Magnitude of Impact	Significance of Impact Without Mitigation	Mitigation	Residual Impact With Mitigation
	(1) CONSTRUCTION IMPACT - -						
		associated surfacing as a result of ground works.				their disturbance. Accurate reinstatement of temporarily displaced surfacing materials and furniture in their original locations. Reinstatement of permanently displaced surfacing materials and furniture in locations that are appropriate to their date, function, and style. Provision of publicly accessible information during and after	

Site	Heritage Asset	Summary of Identified Potential Impact	Sensitivity of Receptor	Magnitude of Impact	Significance of Impact Without Mitigation	Mitigation	Residual Impact With Mitigation
	(1) CONSTRUCTION IMPACT - -						
						construction works relating to the nature of the local historic environment.	
25BZ	West Waterloo Dock River Entrance	None	Medium	Negligible	Neutral	None	Neutral
26WHS	Cunard Building	None	Very High	Negligible	Neutral	None	Neutral
27WHS	Port of Liverpool Building	None	Very High	Negligible	Neutral	None	Neutral
28WHS	Mersey Road Tunnel Ventilation and Central Station	None	Very High	Negligible	Neutral	None	Neutral
29WHS	St Nicholas Church	None	Very High	Negligible	Neutral	None	Neutral
30WHS	Liver Building	Temporary negative impact on setting	Very High	Negligible	Minor Adverse	None	Minor Adverse

Site	Heritage Asset	Summary of Identified Potential Impact	Sensitivity of Receptor	Magnitude of Impact	Significance of Impact Without Mitigation	Mitigation	Residual Impact With Mitigation
	(1) CONSTRUCTION IMPACT - -						
		resulting from presence of construction works and plant.					
31WHS	George's Dock Basin	None	High	Negligible	Neutral	None	Neutral
32BZ	Clarke's Basin	None	Low	Negligible	Neutral	None	Neutral
33BZ/WHS	Seacombe Basin	None	High	Negligible	Neutral	None	Neutral
34BZ	Boat Yard	None	Low	Negligible	Neutral	None	Neutral
35BZ	Warehouse	None	Low	Negligible	Neutral	None	Neutral
36BZ	Fort	None	Low	Negligible	Neutral	None	Neutral
37WHS	Princes Dock Basin	None	Low	Negligible	Neutral	None	Neutral
38BZ	Bath House	Damage to foundations	Low	Negligible	Neutral	Archaeological investigation and	Neutral

		from ground works if remains exist and are located within the Site.				recording of all features prior to their disturbance. Retention of structure *in situ* where feasible. Provision of publicly accessible information during and after construction works relating to the nature of the local historic environment**.**	
39BZ	Kiln	None	Low	Negligible	Neutral	None	Neutral
40BZ	Mr Brooks Brick Yard	None	Low	Negligible	Neutral	None	Neutral
41BZ	Pottery findspot	None	Low	Negligible	Neutral	None	Neutral
42BZ	Location of Limestone Perch	None	Low	Negligible	Neutral	None	Neutral
43BZ	Pottery	None	Low	Negligible	Neutral	None	Neutral

44BZ	Sea Wall	Damage and displacement of sea wall by ground works if remains survive within the Site.	High	Slight	Intermediate/ Minor Adverse	Archaeological investigation and recording of all features prior to their disturbance. Retention of structure *in situ*	Neutral

						where feasible. Provision of publicly accessible information during and after construction works relating to the nature of the local historic environment**.**	
45BZ	Princes Dock Wall	Damage to dock wall from ground works, placement and movement of plant	High	Slight	Intermediate/ Minor Adverse	Archaeological investigation and recording of all features prior to their disturbance. Retention of structure *in situ.* Protective membranes to assist further decay of any unstable structure. Provision of publicly accessible information during and after construction works relating to the nature of the local historic environment	Neutral

Table 9.8: Operational Impact

Site	Heritage Asset	Summary of Identified Potential Impact	Sensitivity of Receptor	Magnitude of Impact	Significance of Impact Without Mitigation	Mitigation	Residual Impact With Mitigation
	(2) OPERATIONAL IMPACT - -						
Princes Reach							
1WHS	Gate to Waterloo Dock	None	Very High	Negligible	Neutral	None	Neutral
2WHS	Waterloo Grain Warehouse	None	Very High	Negligible	Neutral	None	Neutral
3WHS	Waterloo West Dock	None	High	Negligible	Neutral	None	Neutral
4WHS	Waterloo East Dock	None	Very High	Negligible	Neutral	None	Neutral
5WHS	Site of Swing Bridge between Princes Half Tide and East Waterloo Docks	None	High	Negligible	Neutral	None	Neutral
6WHS	South Gate to Victoria, Princes and	None	Very High	Negligible	Neutral	None	Neutral

Site	Heritage Asset	Summary of Identified Potential Impact	Sensitivity of Receptor	Magnitude of Impact	Significance of Impact Without Mitigation	Mitigation	Residual Impact With Mitigation
	(2) OPERATIONAL IMPACT - -						
	Waterloo Docks						
7BZ	Sprague Brothers Engineering Building, 2-4 Roberts Street	None	Medium	Negligible	Neutral	None	Neutral
8WHS	Boundary wall and gates, Roberts Street	None	Very High	Negligible	Neutral	None	Neutral
9WHS	Entrance to Princes Half Tide Dock	None	Very High	Negligible	Neutral	None	Neutral
10WHS	Princes Half Tide Dock	None	Very High	Negligible	Neutral	None	Neutral
11BZ	Site of Riverside Branch Railway	None	Medium	Negligible	Neutral	None	Neutral
12BZ	Site of Princes Dock station, Waterloo Road	None	Low	Negligible	Neutral	None	Neutral
13WHS	Princes Dock Gates (north)	Change in setting due	Very High	Slight	Intermediate/Minor Adverse	Restoration of dock gates	Neutral

Site	Heritage Asset	Summary of Identified Potential Impact	Sensitivity of Receptor	Magnitude of Impact	Significance of Impact Without Mitigation	Mitigation	Residual Impact With Mitigation
	(2) OPERATIONAL IMPACT - -						
		to presence of tall building				and provision of publicly accessible information displayed at the site relating to the nature of the local historic environment	
14WHS	Dock gates (south)	Change in setting due to presence of tall building	Very High	Slight	Intermediate Adverse	Restoration of dock gates and provision of publicly accessible information displayed at the dock relating to the nature of the local historic environment	Neutral

Site	Heritage Asset	Summary of Identified Potential Impact	Sensitivity of Receptor	Magnitude of Impact	Significance of Impact Without Mitigation	Mitigation	Residual Impact With Mitigation
	(2) OPERATIONAL IMPACT - -						
15WHS	Cast Iron Drinking Fountain Series	Change in setting due to presence of tall building	High	Negligible	Neutral	None	Neutral
16BZ	Princes Dock	None	High	Neutral	Neutral		Neutral
17WHS	Princes Dock Boundary wall and Piers, Bath Street	Change in setting due to presence of tall building.	Very High	Slight	Intermediate Adverse	Restoration of boundary wall and provision of publicly accessible information displayed at the dock relating to the nature of the local historic environment	Neutral
18WHS/BZ	Sea wall	None	High	Negligible	Neutral	None	Neutral
19BZ	Sea Wall (c. 1760)	None	Medium	Negligible	Neutral	None	Neutral

Site	Heritage Asset	Summary of Identified Potential Impact	Sensitivity of Receptor	Magnitude of Impact	Significance of Impact Without Mitigation	Mitigation	Residual Impact With Mitigation
	(2) OPERATIONAL IMPACT - -						
20BZ	Temporary Retaining or Buttress Wall	None	Medium	Negligible	Neutral	None	Neutral
21BZ	Dockside Railway at Princes Dock	None	High	Negligible	Neutral	None	Neutral
22BZ	Princes Jetty	None	High	Negligible	Neutral	None	Neutral
23BZ	Site of Riverside Railway Station/Offices	None	Low	Negligible	Neutral	None	Neutral
24BZ	Princes Dock Transit Shed	None	Low	Negligible	Neutral	None	Neutral
25BZ	West Waterloo Dock River Entrance and Extension	None	Medium	Negligible	Neutral	None	Neutral
26WHS	Cunard Building	None	Very High	Negligible	Neutral	None	Neutral
27WHS	Port of Liverpool Building	None	Very High	Negligible	Neutral	None	Neutral

Site	Heritage Asset	Summary of Identified Potential Impact	Sensitivity of Receptor	Magnitude of Impact	Significance of Impact Without Mitigation	Mitigation	Residual Impact With Mitigation
	(2) OPERATIONAL IMPACT - -						
28WHS	Mersey Road Tunnel Ventilation and Central Station	None	Very High	Negligible	Neutral	None	Neutral
29WHS	St Nicholas Church	None	Very High	Negligible	Neutral	None	Neutral
30WHS	Liver Buildings	None	Very High	Neutral	Neutral	None	Neutral
31WHS	George's Dock Basin	None	High	Negligible	Neutral	None	Neutral
32BZ	Clarke's Basin	None	Low	Negligible	Neutral	None	Neutral
33BZ/WHS	Seacombe Basin	None	High	Negligible	Neutral	None	Neutral
34BZ	Boat Yard	None	Low	Negligible	Neutral	None	Neutral
35BZ	Warehouse	None	Low	Negligible	Neutral	None	Neutral
36BZ	Fort	None	Low	Negligible	Neutral	None	Neutral
37WHS	Princes Dock Basin	None	Low	Negligible	Neutral	None	Neutral
38BZ	Bath House	None	Low	Negligible	Neutral	None	Neutral

Site	Heritage Asset	Summary of Identified Potential Impact	Sensitivity of Receptor	Magnitude of Impact	Significance of Impact Without Mitigation	Mitigation	Residual Impact With Mitigation
	(2) OPERATIONAL IMPACT - -						
39BZ	Kiln	None	Low	Negligible	Neutral	None	Neutral
40BZ	Mr Brooks Brick Yard	None	Low	Negligible	Neutral	None	Neutral
41BZ	Pottery findspot	None	Low	Negligible	Neutral	None	Neutral
42BZ	Location of Limestone Perch	None	Low	Negligible	Neutral	None	Neutral
43BZ	Pottery	None	Low	Negligible	Neutral	None	Neutral
44BZ	Sea Wall	Potential impact from any landscaping surfaces and planting (i.e. trees) if remains survive within the Site.	High	Slight	Intermediate/ Minor Adverse	Design landscaping to avoid impacts on any surviving sea wall. Protective membranes to avoid damage to structure.	Neutral
45BZ	Princes Dock Wall	Potential impact from	High	Slight	Intermediate/ Minor Adverse	Design landscaping	Neutral

Site	Heritage Asset	Summary of Identified Potential Impact	Sensitivity of Receptor	Magnitude of Impact	Significance of Impact Without Mitigation	Mitigation	Residual Impact With Mitigation
	(2) OPERATIONAL IMPACT - -						
		any landscaping and planting (i.e. trees) Site.				to avoid impacts on any surviving sea wall. Protective membranes to avoid damage to structure.	

9.9 Conclusion

9.9.1 The study has identified 45 heritage assets in the vicinity of the development site. There will be no potential direct impacts on the majority of these assets, with the possible exception of below ground remains of Princes Dock wall and earlier sea walls, not yet fully identified. The assessment demonstrates that the overall impact on heritage assets will be broadly neutral.

9.9.2 With mitigation through design, overall safeguards, and mitigation as proposed, it is concluded that the potential for negative impact can be controlled satisfactorily, in accord with relevant policy standards. There will be minor adverse impacts during the Construction stage on the Princes Dock Gates (north), the Dock Gates (south), the Princes Dock boundary wall, the Dockside Railway and the Liver Building. There will no adverse impacts during the Operational stage.

9.9.3 The Heritage Impact Assessment identifies that any potential harm to heritage assets will be outweighed by the benefits offered.

9.9.4 Following implementation of the mitigation measures, the proposed development would not result in any significant adverse effects on heritage assets or features.

9.10 Appendices

9.10.1 A location plan of all the sites listed in the gazetteer can be found in Appendix 4.1

9.10.2 A full detailed list of the sites in the gazetteer can be found in Appendix 4.2

9.11 References

Maps

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