Proposed Pedestrian and Cycle Bridge between The Marl and Hamadryad Park

EIA Scoping Report

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Abbreviations

Abbreviation	Definition
AADT	Annual Average Daily Traffic
AQMA	Air Quality Management Area
AQS	Air Quality Strategy
BPM	Best Practicable Measures
BQE	Biological Quality Element
CEMP	Construction Environmental Management Plan
CHA	Cardiff Harbour Authority
CHDBA	Cultural Heritage Desk-Based Assessment
CIfA	Chartered Institute for Archaeologists
CIRIA	Construction Industry Research and Information Association
CTMP	Construction Traffic Management Plan
DAM	Development Advice Map
Defra	Department for Environment, Food and Rural Affairs
DMRB	Design Manual for Roads and Bridges

Abbreviation	Definition
EcIA	Ecological Impact Assessment
EIA	Environmental Impact Assessment
EPUK	Environmental Protection UK
ES	Environmental Statement
GCN	Great Crested Newt
GGAT	Glamorgan-Gwent Archaeological Trust
GLTA	Ground Level Tree Assessment
HDV	Heavy Duty Vehicle
HER	Historic Environment Record
HLC	Historic Landscape Character
IAQM	Institute of Air Quality Management
ICOMOS	International Council on Monuments and Sites
IEF	Important Ecological Feature
INNS	Invasive Non-Native Species
km	Kilometre(s)

Abbreviation	Definition
LBAP	Local Biodiversity Action Plan
LDP	Local Development Plan
LDV	Light Duty Vehicle
LLFA	Lead Local Flood Authority
LNR	Local Nature Reserve
m	Metre(s)
MAGIC	Multi Agency Geographic Information for the Countryside
NO_2	Nitrogen Dioxide
NRW	Natural Resources Wales
OCEMP	Outline Construction Environmental Management Plan
PEA	Preliminary Ecological Appraisal
PM_{10}	Particulate Matter less than 10 microns in aerodynamic diameter
PPW	Planning Policy Wales
RPA	Root Protection Area
SAC	Special Area of Conservation

Abbreviation	Definition
SAM	Scheduled Ancient Monument
SINC	Site of Nature Conservation Importance
SPA	Special Protection Area
SPG	Supplementary Planning Guidance
SRS	Shared Regulatory Services
SSSI	Site of Special Scientific Interest
SuDS	Sustainable Drainage Systems
TA	Transport Assessment
TAN15	Technical Advice Note 15
TGN	Technical Guidance Note
TPO	Tree Protection Order
WCC	White-clawed Crayfish
WFD	Water Framework Directive
ZoI	Zone of Influence
ZTV	Zone of Theoretical Visibility

Glossary

Term	Definition
Air Quality Management Area	An area, declared by a local authority, where air quality does not meet Defra's national air quality objectives.
AQS Objective	Air Quality Strategy Objective: Objective set by the Air Quality Strategy for England, Scotland, Wales and Northern Ireland to improve air quality in the UK in the medium term. Objectives are focused on the main air pollutants to protect health.
Assemblages	A collection or gathering of species that share an attribute of habitat or taxonomic similarity, or taxon.
Barrage	An artificial barrier across a river or estuary to prevent flooding, aid irrigation or navigation
Cadw	The Welsh Government Historic Environment Service
Compensation (Ecology)	Measures taken to offset the loss of, or permanent damage to, ecological features despite mitigation.
Ecological Feature	Habitats, species or ecosystems.
Eutrophic	(Of a lake or other body of water) rich in nutrients and so supporting a dense plant population
Fish pass	A structure on or around artificial and natural barriers to facilitate diadromous fishes' natural migration
Heavy Duty Vehicle	Heavy Duty Vehicle (goods vehicles and buses >3.5t gross vehicle weight)
Important Ecological Feature	Ecological features requiring specific assessment. Ecological features can be important for a variety of reasons (e.g. quality and extent of designated sites or habitats, habitat / species rarity).
Invertebrates	An animal lacking a backbone

Term	Definition
Light Duty Vehicle	Light Duty Vehicle (cars and small vans <3.5t gross vehicle weight)
Macrophytes	An aquatic plant large enough to be seen by the naked eye
Mitigation	Measures taken to avoid or reduce (significant) adverse impacts and effects.
Phytobenthos	Autotrophic organisms found attached to bottom surface aquatic environments
Phytoplankton	Plankton consisting of microscopic plants
Piling	Heavy stakes or posts installed to support the foundations of a superstructure
Sensitive Receptor (AQ)	Refers to living organisms or materials which are affected by air quality, such as residential properties, schools, parks and ecological sites.
Significant Effect (ecology)	An effect that either supports or undermines biodiversity conservation objectives for ‘important ecological features’
SuDS	Drainage systems designed to manage stormwater locally (as close its source as possible), to mimic natural drainage and encourage its infiltration, attenuation and passive treatment.
Transit	The action of passing through or across a place
Tributaries	A river or stream flowing into a larger river or lake
Zooplankton	Plankton consisting of small animals and the immature stages of larger animals
Zone C1	Areas of floodplain served by significant flood defence infrastructure
Zone B	Areas of land known to have flooded in the past

Executive Summary

Cardiff Council intends to develop a foot and cycle bridge over the River Taff in Cardiff.

The purpose of this Environmental Impact Assessment (EIA) Scoping Report is to establish the scope of the EIA to ensure that potential impacts that could give rise to 'likely significant effects' are addressed in the Environmental Statement.

The table below summarises the proposed scope of the EIA. Justification for the scope proposed is provided in Sections 5 to 15.

Topic	Construction	Operation/use
Air Quality	Scoped in – dust Scoped out – construction vehicle emissions	Scoped out
Climate	Scoped in – greenhouse gas emissions Scoped out – climate change adaptation, in-combination climate impacts	Scoped in – climate change adaptation Scoped out – greenhouse gas emissions, in-combination climate impacts
Terrestrial Ecology and Arboriculture	***Designated sites:*** Scoped in – Severn Estuary SPA, SAC, Ramsar Site, SSSI, Cardiff Bay Wetlands and Hamadryad Park LNR, River Taff/ Afon Taff SINC, Coastal Saltmarsh NRW Priority Area). Scoped out – Cwm Cydfin, Leckwith SSSI, B-Line. ***Notable habitats:*** Scoped in – semi-natural broadleaved woodland, dense scrub, parkland trees. ***Protected / notable species:*** Scoped in – Bats, Badgers, Birds, Hedgehogs, Reptiles, Otters, invasive non-native species. Scoped out – Dormice, Great Crested Newt (GCN) and common Amphibians, Water Vole, Terrestrial Invertebrates, White-clawed Crayfish.	Scoped out – all ecological receptors

Topic	Construction	Operation/use
	Arboriculture: Scoped in – Moderate-quality and low-quality trees and tree groups. Scoped out – High-quality trees and tree groups, ancient woodland, ancient or veteran trees.	
Aquatic Ecology	Scoped in – designated sites, freshwater habitats and invertebrates, fish Scoped out - in-channel aquatic Macrophytes, Phytobenthos & Plankton, marine mammals.	Scoped in – freshwater habitats and invertebrates, fish Scoped out – designated sites, in-channel aquatic Macrophytes, Phytobenthos & Plankton, marine mammals.
Ground conditions (including Soils)	Scoped in – hazards to workers, contamination pathways, contamination of controlled waters, soil resources	Scoped in – contamination of controlled waters Scoped out – hazards to future site users,
Health	Scoped in – accessibility and active travel, neighbourhood amenity. Scoped out – crime reduction and community safety, access to work and training, social cohesion and inclusive design, access to healthcare and social care services and other social infrastructure, access to open space and nature, housing design and affordability, access to healthy food, minimising the use of resources, climate change.	Scoped in – accessibility and active travel, social cohesion and inclusive design, access to open space and nature. Scoped out – crime reduction and community safety, access to work and training, neighbourhood amenity, access to healthcare and social care services and other social infrastructure, housing design and affordability, access to healthy food, minimising the use of resources, climate change.
Historic Environment	Scoped in – the Wreck of the 'Louisa' and unknown archaeological assets within the Site Scoped out – listed buildings within the study area, non-designated heritage assets within 1km of the Site	Scoped out
Landscape and visual	Scoped in – townscape/landscape character and visual amenity	Scoped in – townscape/landscape character and visual amenity

Topic	Construction	Operation/use
Major accidents and/or disasters	Scoped out	Scoped out
Noise and Vibration	Scoped out	Scoped out
Socio-economics	Scoped out	Scoped out
Transport	Scoped in – local road network Scoped out – navigation channel (river users)	Scoped out
Waste	Scoped out	Scoped out
Water Environment	Scoped in – flood risk from rivers and the sea and temporary effects on surface water quality Scoped out - flood risk from surface water, groundwater and artificial sources (sewers, reservoirs), temporary changes to the land drainage regime / surface water flood risk, changes to hydromorphology, detriment to existing water interests (surface water abstractions and discharges)	Scoped in – flood risk from rivers and the sea Scoped out - flood risk from surface water, groundwater and artificial sources (sewers, reservoirs), permanent effects on surface water quality, changes to hydromorphology, detriment to existing water interests (surface water abstractions and discharges)

1 Introduction

1.1 Background

1.1.1 Arcadis has been appointed by Cardiff Council (the 'applicant') to conduct an Environmental Impact Assessment (EIA) for a proposed foot and cycle bridge over the River Taff in Cardiff (the 'Proposed Development').

1.1.2 This report sets out the proposed scope and methodology of the EIA for the Proposed Development. The topic assessments and their findings will be reported in an Environmental Statement (ES) to be submitted with the application for full planning permission for the Proposed Development.

1.1.3 This Scoping Report is to be submitted to Cardiff Council who are the Local Planning Authority, and a scoping opinion will be requested in accordance with Regulation 14 (1) of the Town & Country Planning (Environmental Impact Assessment) (Wales) Regulations 2017, as amended ('the T&CP EIA Regulations') (Ref 1.1). The scoping opinion will set out the Local Planning Authority views on the scope of the EIA. The EIA will be carried out in line with the scoping opinion and the process and findings will be documented in the ES. In addition, this Scoping Report will be submitted to Natural Resources Wales (NRW), as NRW has advised that a marine licence is required.

1.2 Purpose of EIA Scoping

1.2.1 Scoping is an important component of the EIA process. While Scoping is not a statutory requirement, it is considered best practice as it identifies the key issues to be addressed in the EIA process at an early stage and facilitates engagement with stakeholders on these issues.

1.2.2 The scoping process identifies the potential significant environmental effects that may occur as a result of the Proposed Development and the methods that will be used to assess these effects. It also identifies the aspects of the environment that can be scoped out as the potential for significant effects is considered unlikely.

1.2.3 Regulation 14, paragraph 2a of the T&CP EIA Regulations (Ref 1.1) lists the information to be provided by an applicant when requesting a scoping opinion from a local planning authority. Table 1-1 presents the information required and where it can be found in this report.

Table 1-1 Required Scoping Information

Required information	Location in Scoping Report
A plan sufficient to identify the land	Appendix B1 Figure 1
A brief description of the nature and purpose of the development, including its location and technical capacity	Sections 3 and 4
An explanation of the likely significant effects of the development on the environment	Sections 5 to 15
Such other information or representations as the person making the request may wish to provide or make	Sections 5 to 15

1.3 Structure of this report

1.3.1 This report includes the following:

- Summary of proposed EIA scope (Executive summary);
- EIA Regulations and approach to the EIA (section 2);
- A description of the application site and its surroundings (section 3);
- A description of the Proposed Development including a plan to identify the land (section 4);
- The environmental topics proposed to be included in the EIA and their scope (sections 5 to 14); and
- The environmental topics proposed to be scoped out with a justification provided for each (section 15).

2 EIA Regulations and approach to the EIA

2.1 The need for an EIA

2.1.1 According to the Town & Country Planning (Environmental Impact Assessment) Regulations 2017, as amended ('the T&CP EIA Regulations') (Ref 2.1), an EIA is required for every project type that is listed in Schedule 1 of the Regulations. An EIA is also required when a Proposed Development falls under the types of development listed in Column 1 of Schedule 2 and meets or exceeds thresholds within Column 2 and is likely to have a significant effect on the environment.

2.1.2 The Proposed Development is considered to be an urban development project under Schedule 2, paragraph 10(b) of the EIA Regulations. The Proposed Development exceeds the threshold of 1 hectare set out in the EIA Regulations of urban development which is not dwellinghouse development. In addition, due to the nature of the Proposed Development, the Marine Works (Environmental Impact Assessment) Regulations 2017, as amended, also apply. The Proposed Development falls under 'urban development projects' in Schedule 2A. Such projects under both regulations will require an EIA if the project in question is likely to have significant effects on the environment due to factors such as its size, nature or location. Taking into account the characteristics and location of the Proposed Development and the potential for it to give rise to likely significant environmental effects, an EIA will be undertaken, and subsequently an ES will be prepared to accompany the planning application and the application for a marine licence.

The EIA will be undertaken in line with the T&CP EIA Regulations (Ref 2.1) and the Marine Works EIA Regulations (Ref 2.2). One Environmental Statement covering both offshore and onshore works will be produced.

2.2 Approach to EIA Scoping

2.2.1 Scoping involves identifying the likely significant effects of the Proposed Development that need to be assessed in the Environmental Statement. It also confirms the methodologies that will be used to undertake the assessment of these effects.

2.2.2 This scoping process identifies the key receptors for each environmental topic that could be affected by the Proposed Development and whether these receptors could experience likely significant effects based upon baseline information and the likely magnitude of change. As part of this process, potential mitigation measures have also been identified, and have informed the judgements presented in this Scoping Report about the scope of the ES. Where sufficient information exists to inform expert judgement that there will not be a significant effect, the environmental receptor and topic is scoped out.

2.2.3 The potential for cumulative effects to arise from the identified effects acting in-combination with other existing and/or approved projects has been considered as part of the scoping process. The potential for effects to overlap temporally or spatially with those of the other planned developments was considered and an assessment was undertaken to determine whether projects could act in-combination and result in a cumulative effect.

2.2.4 For effects that are likely to be significant, this Scoping Report sets out the work that is needed to undertake the assessment in the ES.

2.3 Approach to the EIA

2.3.1 This section describes the broad approach that will be used to assess the potential effects as a result of the Proposed Development. In accordance with the EIA Regulations 2017, the assessments will identify and evaluate the likely significant environmental effects from the proposed construction and operational phases and this will be reported in the ES.

2.3.2 The key stages of the EIA process are:

- Data review – collating and reviewing available desk-study data;
- Scoping - identifying the potential for likely significant effects on environmental receptors (this is documented in this Scoping Report and will be further informed by the outcome of the scoping opinion);
- Baseline surveys - undertaking baseline surveys to determine the existing environmental conditions and then determining the likely future baseline;
- Consultation - seeking feedback from technical consultees in relation to key environmental issues, design responses and ES methodologies as well as seeking feedback from the general public on the Proposed Development;
- Assessment and iteration - assess likely effects of the Proposed Development, evaluate alternatives, provide feedback to design team on any adverse impacts, incorporate mitigation and assess the residual (post-mitigation) effects of the Proposed Development; and
    - Preparation of the ES and the Non-Technical Summary (NTS). This will document the assessment process and report the likely significant effects of the Proposed Development. The aim is to drive the environmental design process such that the Proposed Development gives rise to as few likely significant adverse effects as practicable, and that opportunities to achieve beneficial environmental effects are taken.

2.3.3 In each technical topic chapter of the ES, the effects will be described as significant or not significant, and beneficial, adverse or neutral, and will encompass all types of effects required by the EIA Regulations (direct, indirect, cumulative, etc.). Where any likely significant adverse effects are identified, suitable mitigation measures will be identified to reduce these where possible.

2.3.4 The approach to determining the significance of likely effects is tailored to each discipline and will be informed by industry best practice guidance, where available. A general approach that may be applied (and adapted) is the combined consideration of the magnitude of impact and the sensitivity of a potential receptor to establish a level of significance of the effect. Table 2-1 shows a visual representation of this.

2.3.5 In general, residual (post-mitigation) effects found to be 'moderate' or 'major' tend to be considered 'significant'. Effects found to be 'minor' are usually regarded as 'not significant', although they may be a matter of local concern. 'Negligible' and 'Neutral' effects tend to be considered 'not significant' and not a matter of local concern. This will be confirmed in the Environmental Statement for each topic assessment.

Table 2-1: Determining significance of effect through the combined consideration of magnitude of impact and the sensitivity/value of a receptor

Sensitivity/value of receptor	**Magnitude of impact**			
	High (Major)	Medium (Moderate)	Low (Minor)	Negligible
High	Major	Major	Moderate	Minor
Medium	Major	Moderate	Minor	Negligible
Low	Moderate	Minor	Negligible	Negligible
Very Low	Minor	Negligible	Negligible	Negligible

2.3.6 The EIA will be undertaken by Arcadis, with the exception of the following: APEM Ltd will undertake the Ecology (both Terrestrial and Aquatic) assessment, and TR33 Ltd will undertake the Arboricultural assessment. Each of these consultants has prepared the corresponding section of this scoping report.

Mitigation

2.3.7 The design process is an iterative process that allows for the mitigation of potential environmental effects to form part of the scheme (also referred to as 'embedded mitigation'), i.e. measures committed to by the Applicant. For example, design measures proposed to mitigate foreseeable effects, Best Practicable Measures (BPM), and construction environmental management procedures/measures. The effects assessment would identify the significance of likely environmental effects on receptors, taking into account embedded mitigation.

2.3.8 Where any likely significant adverse effects are identified by the assessment (taking into account the embedded mitigation), additional measures will be proposed to address these where appropriate. Proposals for mitigation would follow the mitigation hierarchy of avoid, reduce, remedy and compensate for adverse effects identified during construction and operation.

2.3.9 A Construction and Environmental Management Plan (CEMP) will be implemented to ensure that any adverse effects are appropriately avoided or mitigated. An Outline CEMP (OCEMP) will be submitted as part of the planning application submission. This CEMP would be further developed and implemented by a works contractor, following their appointment.

Cumulative Effects

2.3.10 The EIA Regulations require that, in assessing the effects of a particular development proposal, consideration is also given to the cumulative effects.

2.3.11 Cumulative effects would be assessed in the EIA as:

- The combination of interrelated specific environmental effects having an effect on a single receptor (sometimes referred to as intra-project effects); and
- The effects of the Proposed Development combined with those from other planned developments on a single resource/receptor (sometimes referred to as inter-project effects).

2.3.12 A draft methodology for the identification of relevant developments is included in Appendix A1, along with a draft list of developments to be assessed for cumulative (inter-project) effects. The approach to cumulative effects assessment and which developments to consider from the list may vary between disciplines.

Approach to Alternatives

2.3.13 The EIA process must consider reasonable alternatives and their respective environmental effects. In accordance with the EIA Regulations, the ES would describe those alternatives that were considered by the Applicant and the project design team, including:

- A description of the reasonable alternatives (for example in terms of project design, technology, location, size and scale), including a 'do-nothing' approach, studied by the Applicant, which are relevant to the Proposed Development, the regulated activity and their specific characteristics, and an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects.

2.3.14 In addition, the alternatives assessment would consider the responses of statutory consultees and the outcomes of the public consultation.

2.4 Structure of the Environmental Statement

2.4.1 The proposed structure of the ES is set out below:

- Environmental Statement Volume 1– Main Text
- Environmental Statement Volume 2 – Figures
- Environmental Statement Volume 3 – Appendices
- Non-Technical Summary (a standalone document)

2.5 Accompanying documents

2.5.1 In addition to an ES, the planning submission will be supported by the following environment-related documents:

- Flood Consequence Assessment (FCA) Stage 1
- Habitats Regulations Assessment (HRA) Initial Screening
- Water Framework Directive (WFD) assessment Screening
- Equalities Impact Assessment
- Outline Construction Environmental Management Plan
- Transport Assessment

3 The Site and surrounding area

3.1 Scheme Location

3.1.1 The Proposed Pedestrian and Cycle Bridge between The Marl and Hamadryad Park ('the Proposed Development') is located within the Unitary Authority of Cardiff Council, in the area of Grangetown (approximate grid reference ST1821174120) and crosses the River Taff. Appendix B1: Figure 1 shows the location of the Site and the indicative application site boundary ('the Site'). The Site area is approximately 3.3 hectares spanning from the west at The Marl heading east over the River Taff towards Hamadryad Park. The proposed bridge has an expected length of approximately 175m.

3.1.2 On both the eastern and western embankments of the Site, the land use is currently leisure in the form of green space with the Cardiff Bay Trail running in parallel to the River Taff. Adjacent to the Site on both sides there are currently leisure facilities. On the western side of the Site lies The Marl, a park with various sporting facilities and open space, and on the eastern side sits Hamadryad Park, a fairly well-maintained park. Adjacent to both of these green spaces are urban areas comprising various residential and commercial properties.

3.1.3 Appendix B2: Figure 2 shows the environmental designations within 1km of the Site. Land cover in the local area is predominantly well-maintained amenity grassland playing fields, in both The Marl and Hamadryad Park. Areas of dense scrub are present on both sides of the Site surrounded by less managed areas of tall ruderal vegetation. A small patch of semi-natural broad-leaved woodland exists in the southern extent of Hamadryad Park and parkland trees of various ages/ sizes are present across the Site. The surrounding area of the Site is home to a range of terrestrial and marine species and habitats and the area is likely functionally linked with sensitive designations for habitats in reasonably close proximity. This includes:

- The River Taff Site of Importance for Nature Conservation (SINC) located within the application site boundary;
- The Cardiff Bay Wetlands and Hamadryad Park Local Nature Reserve (LNR) located within the application site boundary (eastern only);
- The River Taff / Afon Taff SINC located adjacent to the application site boundary;
- Severn Estuary (Wales) Ramsar and Special Protection Area (SPA) located approximately 1480m south-east of the application site boundary;
- Severn Estuary (England) Special Area of Conservation (SAC) located approximately 1480m south-east of the application site boundary;
- Cwm Cydfin Leckwith Site of Specific Scientific Interest (SSSI) located approximately 1.5km from the application site boundary;
- Gwent Levels SSSI located approximately 1.6km from the application site boundary; and
- An Important Bird Area (IBA) located approximately 1.6km from the application site boundary.

3.1.4 There is one Scheduled Monument located within the Site – namely, the Wreck of the 'Louisa'. The scheduled area is a rectangle centred on the wreck at ST18147402 and it measures 60m along the shore and extends 40m out into the River Taff (Ref 3.1). Although the current condition of the wreck is unknown, the vessel is thought to survive largely intact up to the hanging iron knees for the lower deck beams for almost half the original length of the vessel and two thirds of the length at the keel. The interior of the vessel is filled with mud. The offshore end of the vessel has been washed away. Since the impoundment of Cardiff Bay, the wreck is submerged at all times.

3.1.5 There are two further Scheduled Monuments and two Conservation Areas within 2km of the Site. There are no Registered Parks and Gardens within 2km of the Site. There are no listed buildings within the Site, however, there are 144 Listed Buildings (139 Grade II, 4 Grade II* and one Grade I) located within 2km of the Site. The closest of which is 19 Windsor Esplanade (a Grade II Listed Building), which at its closest point is located approximately 400m east of the Proposed Development. These designated heritage assets relate to Cardiff and include buildings such as churches, train stations, war memorials, residential properties, banks, former pumping stations, docks and gas works. Further details of the existing cultural heritage features and designations are provided in section 11 of this report.

3.1.6 There are no National Parks or Heritage Coasts, Areas of Outstanding Natural Beauty (AONB) or World Heritage Sites within 2km of the Site.

3.1.7 The majority of the Site falls within Natural Resources Wales High Flood Risk zones from Rivers (land assessed as having up to 1 in 30 year Annual Exceedance Probability (AEP) of river flooding) and the Sea (land assessed as having up to 1 in 30 year AEP of sea flooding). Thus, it falls within a Natural Resource Wales Flood Warning Area. The Site is within a Low Flood Risk from Surface Water & Small Watercourses zone (between 1 in 100 year and 1 in 1000 year AEP).

3.1.8 The Site is not located within an Air Quality Management Area (AQMA). The Site is enclosed by residential and commercial property receptors to both the east and west.

3.2 Potential Sensitive Receptors

3.2.1 A desk-based study has identified the following potential sensitive receptors to the Proposed Development during construction and operation:

- Existing and future commercial and residential properties within 2km of the application site boundary;
- The Wreck of the 'Louisa', a Scheduled Monument located approx. 15m south of the application site boundary;
- Listed Buildings within 2km of the application site boundary; and
- Ecological receptors within and nearby the application site boundary:
  - Sites designated for nature conservation, such as The River Taff SINC, Cardiff Bay Wetlands and Hamadryad Park LNR, Severn Estuary (Wales) Ramsar and SPA, Severn Estuary (England) SAC, Cwm Cydfin Leckwith SSSI, Gwent Levels SSSI and the IBA; and
  - Protected species which may be using the Site and surrounding area (e.g., birds and bats).

4 The Proposed Development

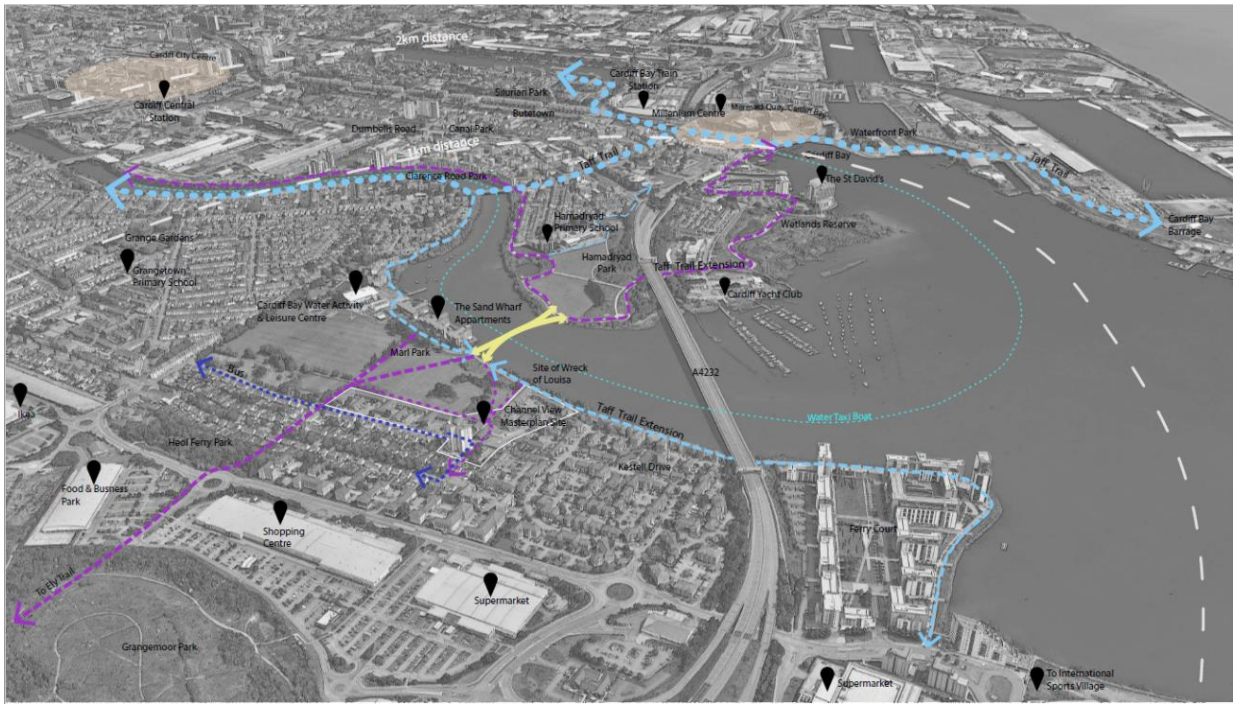
4.1 Need for The Proposed Development

4.1.1 The proposed Channel View foot and cycle bridge will be a landmark crossing over the River Taff that forms part of an ambitious scheme to regenerate the Channel View Estate with well-designed, high-quality housing for the existing community. The bridge will create a better relationship between the housing and public realm and improve accessibility for the wider community by promoting linkages across the river, connecting immediate and valuable green spaces including The Marl and Hamadryad Park, as well as local landmarks east and west of the river.

4.1.2 The mouth of the River Taff is currently crossed by a bridge carrying the Cardiff Bay Link Road. Whilst the bridge is not unattractive, due to its scale and positioning, the views are restricted. The flow of traffic is constantly high and at speeds of 50mph which makes it a less desirable environment for pedestrians and cyclists. There is also a bridge located further into Grangetown on Clarence Road, which links the area into the Northern side of the bay. Similar to the Cardiff Bay Link Road bridge, the constant flow of traffic renders the pedestrian environment being less than ideal. Both bridges are used by parents and children attending Hamadryad Primary School.

4.1.3 Following completion, the Proposed Development would provide an alternative solution to improve the sustainability, safety and connectivity in this part of the city for local residents and other users. Figure 4-1 shows the location of the Proposed Development in the context of local connections. Currently, Channel View Road and The Marl are isolated from Hamadryad Park, Windsor Quay, and more widely, Butetown. There are several important focal points in the immediate area on both sides of the river. To the west, there will be the proposed Channel View Estate residential development and The Marl, to the east is Hamadryad Park and the neighbouring primary school, and beyond that Cardiff Bay & Mermaid Quay with their retail, leisure and entertainment facilities. The current lack of connectivity is only expected to become more pronounced as the aforementioned proposed Channel View Estate - and the associated 319 residential properties – has been given approval. The Proposed Development will ameliorate this lack of connectivity, improving accessibility and inclusivity to social and economic opportunities via more sustainable means of travel.

Figure 4-1: Enhancing connectivity (source: Arcadis)



4.1.4 The bridge will not only serve as a link between the east and west banks of the River Taff and its onwards routes, but also as a destination from which to enjoy views of Cardiff Bay and the City's skyline, as well as emphasising the historical Wreck of the Louisa, west of the river.

4.1.5 Furthermore, there is a recognition that a new crossing of the River Taff would not only offer better connectivity for residents at Channel View, but also encourage active travel – for example, cycling and walking, and associated infrastructure and linkages. There are several trails and cycle paths in the area (Cardiff Bay Trail, Ely Trail, Taff Trail, Wales Coast Path) as well as a number of surrounding green spaces. The new bridge would provide a link between these spaces and encourage a more direct East-West route for walkers, runners & cyclists, adding in a vital link helping develop a wider active travel network. This has benefits for both physical and mental well-being for the community with the potential to simultaneously help reduce greenhouse gas emissions from the use of vehicles.

4.1.6 Overall, it is expected that the Proposed Development would aid in achieving the following objectives:

- Improve east / west connectivity to community facilities, employment opportunities and other key destinations;
- Encourage sustainable, healthy active travel such as walking and cycling;
- Encourage public transportation use due to increased accessibility to the Cardiff Bus public transportation network;
- Refresh this area of the city's relationship between housing and parks / open space;
- Enhance the natural and physical environment, making the area safe and attractive to residents and visitors;
- Educate the public about the historical Wreck of the Louisa; and
- Improve access to the river for recreation and well-being.

4.2 Scheme Description

4.2.1 Design development is ongoing at the time of preparing this Scoping Report, however the Proposed Development is likely to comprise of the following:

- 175m S-shaped pedestrian bridge across the River Taff (separated into 4 Spans);
- Width of the proposed bridge is to be determined - it is estimated that it will be up to 7m;
- The bridge will comprise segregated foot and cycle lanes;
- 2 abutments at the river banks and 3 piers within the river;
- 2 earthwork approach ramps;
- Steel beam construction;
- Lighting will be integrated into the parapet/handrail and designed to avoid obtrusive light, as far as practicable;
- Soft landscaping to east and west riverbanks (approximately 1,500m^2);
- Associated civil works to link to public access ways, i.e. the Taff Trail and Cardiff Bay Trail.

4.2.2 It is estimated that the Proposed Development will be no greater than approximately 25m AOD in height.

4.2.3 The bridge will be designed to allow boats to continue to pass underneath. It is anticipated that there will be a minimum height clearance of 12m AOD.

4.2.4 The design life of the Proposed Development is 120 years. Maintenance will include repainting works, bearing replacement, expansion joint replacement, deck resurfacing, repair/replacement of parapets.

4.3 Construction Phase

4.3.1 Construction of the Proposed Development is expected to require the following activities:

- Enabling works
- Excavation and construction of abutments
- Installation of temporary works for construction of river piers
- Construction of piers
- Construction of superstructure
- Construction of ramps
- Installation of lighting and finishes
- Landscaping of ramps

4.3.2 The estimated duration of the construction phase is approximately 18-24 months. At present, it is anticipated that construction works may commence in 2024/2025, but this may be subject to change.

4.3.3 Although the details of phasing of the construction works have not been determined at the time of preparing this Scoping Report, it is currently anticipated that the construction of the Proposed Development would comprise a number of stages. It is anticipated that construction works in the River Taff will be approximately 12 months.

4.3.4 The ES will provide details of an indicative construction phase programme, which would include any enabling works together with proposed construction activities and methods, and their anticipated duration. Information to be provided will include site preparation and construction logistics, including site access and egress; welfare facilities; and working hours. Details of any assumptions made would be outlined. In addition to the workforce, a project schedule of deliveries and other construction phase vehicle trips (including waste transfer) will be considered. An estimate of the peak periods of daily Heavy Good Vehicle (HGV) movements would be provided where sufficient construction information is available. It is currently assumed that as a worst-case scenario, all construction trips will be completed by vehicle using the existing highway network. There is an aspiration for a significant number of construction deliveries to and from the development site to be made by water transport.

4.3.5 It is anticipated that the construction compounds will be located in The Marl and Hamadryad Park. Access to the construction site may be via Channel View Road (this is to be confirmed).

4.3.6 As far as is practicable, noisy construction works will adhere to the permitted hours as set out in the Shared Regulatory Services (SRS) Pollution Control Construction Site Handbook (Ref 15.1), i.e., Mon-Fri 08:00-18:00, Sat 08:00 – 13:00, Sun and bank holidays - no noisy activities to be carried out. It is unknown at this stage whether there will be a need to work outside of these permitted working hours.

4.4 The Planning Application

Planning Permission

4.4.1 It is recognised that the works associated with the Proposed Development constitute ‘development’ as defined in Section 55 of the Town and Country Planning Act 1990 (as amended) so will require planning permission. Therefore, a planning application will be submitted to the LPA, Cardiff Council.

Marine Licence

4.4.2 In accordance with the provisions of the Marine and Coastal Access Act 2009 (Ref 4.1), NRW is responsible for marine licensing of any licensable activity (as defined in Section 66 of the Act) undertaken within the marine licensable area. As stated on the Natural Resources Wales website:

> *The Welsh marine licensable area includes the Welsh inshore and Welsh offshore region. The Welsh inshore region extends seaward 12 nautical miles from Mean High Water Springs (MHWS) to the territorial limit. The Welsh offshore region extends beyond the territorial limit to include all areas of the sea in the Welsh Zone. This area is defined in the Marine and Coastal Access Act (section 42) as any area submerged at mean high water spring tide, and the waters of every estuary, river or channel, so far as the tide flows at mean high water spring tide. The licensable area also includes waters in any area which is closed, whether permanently or intermittently, by a lock or other artificial means against the regular action of the tide, but into which seawater is caused or permitted to flow, whether continuously or from time to time, and from which seawater is caused or permitted to flow, whether continuously or from time to time.*

4.4.3 Based upon the current proposals, the Proposed Development would require a marine licence and this has been confirmed by Natural Resources Wales.

5 Air Quality

5.1.1 This chapter provides a summary of the scope proposed. This is followed by a detailed rationale for this scope taking into account potential impacts arising from the Proposed Development, potential receptors likely to be affected and potential impact pathways as well as the potential for likely significant effects. Draft mitigation commitments are identified to support the assessment scope proposed, this is followed by a description of the assessment process and methodology to be adopted.

5.2 Assessment Scope - Potential Environmental Effects

5.2.1 Table 5-1 presents a summary of the proposed scope of the Air Quality assessment that will form part of the EIA.

Table 5-1: EIA Scope – Air Quality

Sub-topic and/or receptor	Development phase/s	Scope in (✓) or Scope out (×)	Summary of rationale for the scope proposed
Construction dust	Construction	✓	Potential for fugitive dust emissions from construction activities to result in dust deposition and human health impacts. A construction dust risk assessment will identify the risk associated with unmitigated impacts and identify relevant mitigation measures so that effects are not significant.
Construction vehicle emissions	Construction	×	Baseline data indicates existing air quality at the Site is below relevant limit values. Construction traffic anticipated to be below Institute of Air Quality Management (IAQM) screening criteria (Ref 5.1) and therefore impacts considered to be negligible. Construction vehicle emissions would be transient and temporary in nature and mitigated with best practice measures.
Operational air quality	Operational	×	Baseline data indicates existing air quality at the Site is below relevant limit values. There are no operational emissions associated with the Proposed Development to result in potential air quality impact. There are no air quality sensitive receptors associated with the operation/use of the Proposed Development.

Rationale for the scope proposed

5.2.2 The rationale for the scope proposed in Table 5-1 is explained below.

Construction Dust

5.2.3 During the construction phase of the Proposed Development, there is the potential for fugitive dust emissions from activities such as demolition, excavation, ground works, cutting, construction and storage of materials. Vehicle movements both on-site and on the local road network also have the potential to result in the resuspension of dust from haul road and highway surfaces. The assessment of construction phase dust impacts is therefore scoped in.

Construction Vehicle Emissions

5.2.4 There is the potential for air quality impacts from road traffic exhaust emissions from additional construction vehicles on the local highway. There are existing residential receptors within the 200m of the likely routes used to access the Site which could be impacted by an increase in pollutant concentrations due to the additional construction vehicles.

5.2.5 The Institute of Air Quality Management (IAQM) criteria (Ref 5.1) to determine whether further assessment is required are as follows:

- A change of Light Duty Vehicle (LDV) flows of more than 100 Annual Average Daily Traffic (AADT) within or adjacent to an AQMA or more than 500 AADT elsewhere; and
- A change of Heavy Duty Vehicle (HDV) flows of more than 25 AADT within or adjacent to an AQMA or more than 100 AADT elsewhere.

5.2.6 If these criteria are not exceeded, then the IAQM development control guidance (Ref 5.1) considers air quality impacts associated with a scheme in terms of traffic emissions to be negligible and no further assessment of vehicles emissions is required. It is anticipated that this will be the case for the Proposed Development, and therefore the assessment of construction and operational phase vehicle emissions impacts is scoped out of the EIA.

Operational Air Quality

5.2.7 There are no operational emissions associated with the Proposed Development to result in potential air quality impact.

Baseline Conditions and Future Baseline

5.2.8 As required by the Environment Act (1995) (Ref 5.2), Cardiff Council has undertaken Review and Assessment of air quality within their area of jurisdiction. This process has indicated that annual mean concentrations of Nitrogen Dioxide (NO_2) exceed the annual mean Air Quality Strategy (AQS) objective within the district, with road vehicle emissions as the primary source of air pollution concern. As such, Cardiff Council has declared the following four air quality management areas (AQMAs) (Ref 5.3):

- Cardiff City Centre AQMA – declared 1st April 2013;
- Llandaff AQMA – declared 1st April 2013;
- Stephenson Court AQMA – declared 1st December 2010; and

- Ely Bridge AQMA – declared 1st Feb 2007.

5.2.9 The Proposed Development site is located approximately 1.5km south from the Cardiff City Centre AQMA, the closest of the declared Cardiff Council AQMAs. Therefore, NO_2 concentrations are expected to be below the NO_2 limit value at the Site.

5.2.10 In 2019, Cardiff had three automatic air quality monitoring sites located at Frederick Street in the City Centre, Richard's Terrace, just off Newport Road and Lakeside Primary School. Recent monitoring data indicates that all three automatic monitoring sites are compliant with the relevant air quality standards for NO_2 and PM_{10}. In 2019 there were 100 non automatic monitoring sites across Cardiff, consisting of diffusion tubes which monitored NO_2 concentrations. Monitoring results from 2019 documents six exceedances of the annual average NO_2 objective, all located within the City Centre and Llandaff AQMAs (Ref 5.3).

5.2.11 Monitoring results within Cardiff indicate an overall downward trend in both NO_2 and PM_{10} concentrations (Ref 5.3). Defra background pollutant concentrations predict a decrease in concentrations in future years associated with increased uptake of electric vehicles, advances in emissions standards and improvement in technologies.

5.3 Design, Mitigation and Enhancement Measures

5.3.1 Construction dust mitigation measures would be recommended as a function of the dust soiling and human health risk ratings allocated following the IAQM construction dust risk assessment. The IAQM construction dust guidance (Ref 5.4) provides potential mitigation measures to reduce impacts as a result of fugitive dust emissions during the construction phase. These would be adapted for the Proposed Development based on the risk of dust effects for each activity and for the overall Site.

Table 5-2: Draft register of commitments for Air Quality

Measures	Delivery mechanism	Development phase
Best practice construction dust mitigation measures such as: • Cover stockpiles • No idling of vehicles • Employ dust suppression techniques • Wheel washing • Adjusting the **timing of site deliveries** (for example, to avoid local school pick-up and drop-off times), if practicable	OCEMP – to be submitted as part of the planning application submission. To be developed further by the appointed Principal Contractor subsequent to any planning consent granted	Construction
Dust monitoring to include site inspections and soiling checks.	Dust Management Plan – to form part of the CEMP produced by the appointed Principal Contractor	Construction

Enhancement opportunities

5.3.2 There are no enhancement opportunities proposed related to air quality.

5.4 Assessment Process and Methodology

5.4.1 The paragraphs below set out the proposed assessment methodology and a summary of consultation undertaken to date as well as future planned consultation.

Relevant Legislation, Policy and Guidance

5.4.2 The following legislation, policy and guidance will be used to inform the assessment:

- EU Framework Directive 96/62/EC (Ref 5.5) – aims to protect human health and the environment by avoiding, reducing or preventing harmful concentrations of air pollutants.
- Directive 2008/50/EC on ambient air quality and cleaner air for Europe (Ref 5.6) – defines objectives for ambient air quality designed to avoid, prevent or reduce harmful effects on human health and the environment as a whole.
- Section 79 of Part III of the Environmental Protection Act (1990) (Ref 5.7) – legislation dealing with statutory nuisance in relation to dust and deposits.
- Air Quality (Wales) Regulations 2000, No. 1940 (Wales 138) (Ref 5.8) and Air Quality (Amendment) (Wales) Regulations 2002, No 3182 (Wales 298) (Ref 5.9) – the air quality objectives applicable to local air quality management in Wales.
- Cardiff Local Development Plan 2006-2026 (Ref 5.10) – local planning policy in relation to air quality.
- Institute of Air Quality Management Guidance on the assessment of dust from demolition and construction, 2014 (Ref 5.4)
- IAQM Land-use Planning & Development Control: Planning for Air Quality (Ref 5.1) – guidance from Environmental Protection UK and the Institute of Air Quality Management for the consideration of air quality within the land-use planning and development control processes.

Consultation

5.4.3 No consultation has been undertaken to date in relation to air quality. No further consultation is proposed other than to agree the scope of the assessment with the local planning authority as presented in this scoping report.

Methodology

Study Area

5.4.4 The IAQM construction dust guidance (Ref 5.4) requires that construction dust impacts are assessed up to 350m from the locations of demolition, construction and earthworks activities. Often, the exact location of the construction activities within the application site boundary are unknown. As a precaution against this uncertainty, the assessment would consider impacts within 350m of the application site boundary. For trackout (the transport of dust and dirt from the construction site onto the public road network), impacts are assessed up to a distance of 500m from site entrances on roads used by construction traffic. Trackout impacts are then considered within 50m of these roads.

Baseline

5.4.5 A desk-based study will be undertaken to establish the existing and future baseline conditions in relation to air quality. Baseline information on air quality will be collated using the information outlined in 5.1.7 to 5.1.10 above and reviewed from the following sources:

- Online map and aerial photograph resources (including Google Maps (Ref 5.11), Magic.gov.uk (Ref 5.12), and digital Ordnance Survey mapping (5.13);
- Defra UK Air website (https://uk-air.defra.gov.uk/) (Ref 5.14);
- 2020 Annual Air Quality Progress Report for Cardiff Council (Ref 5.3); and
- Cardiff Council website (Ref 5.15).

Assessment Methodology

Construction

5.4.6 The potential dust impacts during the construction phase will be assessed qualitatively using the approach defined in the IAQM construction dust guidance (Ref 5.4).

5.4.7 This assessment will be carried out using the following steps:

- Determine the potential dust emission magnitude for the four construction dust activities (demolition, earthworks, construction and trackout);
- Define the sensitivity of the area;
- Define the risk of impacts;
- Identify site-specific mitigation; and
- Determine residual impacts.

Determining Significance

5.4.8 For construction phase dust impacts, significance of effects is not defined. Rather, the risk of unmitigated impacts is calculated through application of the IAQM construction dust guidance (Ref 5.4) and consequently, proportional mitigation measures are recommended. Where such mitigation measures are implemented, it is generally expected that the residual effect from all dust generating activities to be negligible and not significant. More detail on the approach will be provided in the ES.

Assumptions and limitations

5.4.9 To ensure transparency within the EIA process, the following limitations and assumptions have been identified:

- The construction dust assessment assumes all construction activity to take place up to the edge of the application site boundary as a worst-case approach; and
- It is assumed that the annual average daily traffic flow of construction vehicles during the construction phase will fall below the IAQM development control screening criteria (Ref 5.1) for further assessment. Should the traffic criteria be exceeded, then further assessment of construction vehicle traffic effects would be required.

6 Climate

6.1.1 This chapter provides a summary of the scope proposed. This is followed by a detailed rationale for this scope taking into account potential impacts arising from the Proposed Development, potential receptors likely to be affected and potential impact pathways as well as the potential for likely significant effects. Draft mitigation commitments are identified to support the assessment scope proposed, this is followed by a description of the assessment process and methodology to be adopted.

6.2 Assessment Scope - Potential Environmental Effects

6.2.1 Table 6-1 presents the proposed scope of the climate assessment that will form part of the EIA.

Table 6-1: EIA Scope – Climate

Sub-topic and/or receptor	Development phase/s	Scope in (✓) or Scope out (✗)	Summary of rationale for the scope proposed
Greenhouse Gas (GHG) Emissions	Construction	✓	A large number of natural resources will be required to construct the Proposed Development, which would contribute towards GHG emissions.
GHG Emissions	Operation	✗	It is expected that during the lifetime of the Proposed Development, a limited volume of natural resources (i.e. materials for replacing the bridge surface) would be required for routine maintenance.
Climate Change Adaptation	Construction	✗	Construction phase impacts are short-term and temporary. Construction impacts (related to climate change adaptation) will be managed in accordance

Sub-topic and/or receptor	Development phase/s	Scope in (✓) or Scope out (×)	Summary of rationale for the scope proposed
			with best practise via the CEMP.
Climate Change Adaptation	Operation	✓	In order to adapt to climate change and due to the expected lifespan of the bridge, an assessment of the resilience of the bridge to more extreme weather events will need to be undertaken.
In-combination Climate Change Impacts	Construction and Operation	×	During construction, the associated changes in climate are expected to be relatively small compared to the current baseline due to the short construction timescales. Therefore, it has been assumed that sufficient mitigation measures would already be in place during the construction programme to ensure resilience under current climate conditions. No potential likely significant effects associated with the operation of the Proposed Development have been identified.

Rationale for the scope proposed

GHG Emissions

Construction

6.2.2 A large number of natural resources (i.e. materials and energy) would be required to construct the Proposed Development, which would contribute towards GHG emissions and therefore climate change. This includes:

- Emissions from raw materials supply and materials production;
- Emissions from transport of workers, materials and waste to and from Site;
- Emissions from construction plant onsite; and
- Emissions from water consumption onsite.

Operation

6.2.3 It is expected that during the lifetime of the Proposed Development, limited numbers of natural resources (i.e. materials for replacing the road surface and energy for lighting) would be required for routine maintenance. The GHG emissions that would be produced during the operation of the Proposed Development would therefore be a very small percentage of the total emissions within the study area, thus would have a negligible effect on climate change.

6.2.4 It is expected that the construction of the bridge will encourage a shift from car travel to active travel such as walking and cycling, as well as encourage public transportation use due to increased accessibility to the Cardiff Bus public transportation network. This will result in net positive carbon.

Climate Change Adaptation

Construction

6.2.5 During construction, drought, high rainfall intensities and high winds could give rise to an increased risk of dust or water pollution, damage the landscape planting and increased vulnerability to flood events.

6.2.6 Construction impacts (related to climate change adaptation) will be managed in accordance with best practise via the CEMP.

Operation

6.2.7 Climate change is projected to increase peak rainfall intensity, and thus, increase coastal change and runoff rates and volumes. Flooding is similarly expected to increase; therefore, scour, bank erosion and exceedance of current design rates for drainage would potentially be more likely in the future. Rising sea levels may further increase the risk of flooding and erosion along the coastline.

6.2.8 Extreme rainfall events coupled with storm surges, projected by some climate models, may increase peak flow velocity under the bridge, that might carry risks of stronger structural stresses on the bridge foundations and may hinder its structural integrity and might even cause collapse.

6.2.9 An increase in climatic variability could lead to higher groundwater levels and more saturated soils, but also increased risk of extreme drought. Both mechanisms can affect ground stability in locations on vulnerable soils. Low to high emissions scenarios could lead to soil moisture fluctuations and therefore, potentially increased risk of shrink-swell related failures.

6.2.10 Vegetation stress due to drought conditions could be a risk to the Proposed Development depending on the width of soft estate, steepened slopes and potential damage to root systems. Adding in the effect of increased wind velocities due to climate change, it is possible that increasing loss / damage to trees could occur.

6.2.11 Table 6-2 presents the primary weather events currently affecting the study area and provides a high-level overview of the types of potential effects.

Table 6-2: Climate - Summary of primary weather events and potential impacts

Primary Weather Event	Potential Impacts
Heavy rain / flooding	Raised sea levels, flooded drains, collapsed culverts. Bridge closures. Contaminated water. Fallen trees.
High winds	Damage to structures and power cuts. Fallen trees. Bridge closure.
Heat wave	Health impacts from breathing problems and sunstroke. Impact to biodiversity. Fires. Structural damage. Impacts on active travel
Lightning	Structural damage. Power surge and tripping electricity breakers. Fires. Health impacts from direct strikes.

Primary Weather Event	Potential Impacts
Snow and Ice	Bridge closure. Dangerous conditions for walking & cycling. Damage to bridge. Health impacts from slipping on ice and chest illnesses.
Fog	Dangerous walking and cycling conditions.

6.2.12 Due to these projected effects outlined above, climate change adaptation in relation to the operation/use phase will be considered as part of the climate assessment.

In-combination Climate Change Impact

Construction

6.2.13 The associated changes in climate are expected to be relatively small compared to the current baseline due to the short construction timescales. Therefore, it has been assumed that sufficient mitigation measures would already be in place during the construction programme to ensure resilience under current climate conditions.

Operation

6.2.14 There have not been any significant impacts identified during the operation of the Proposed Development.

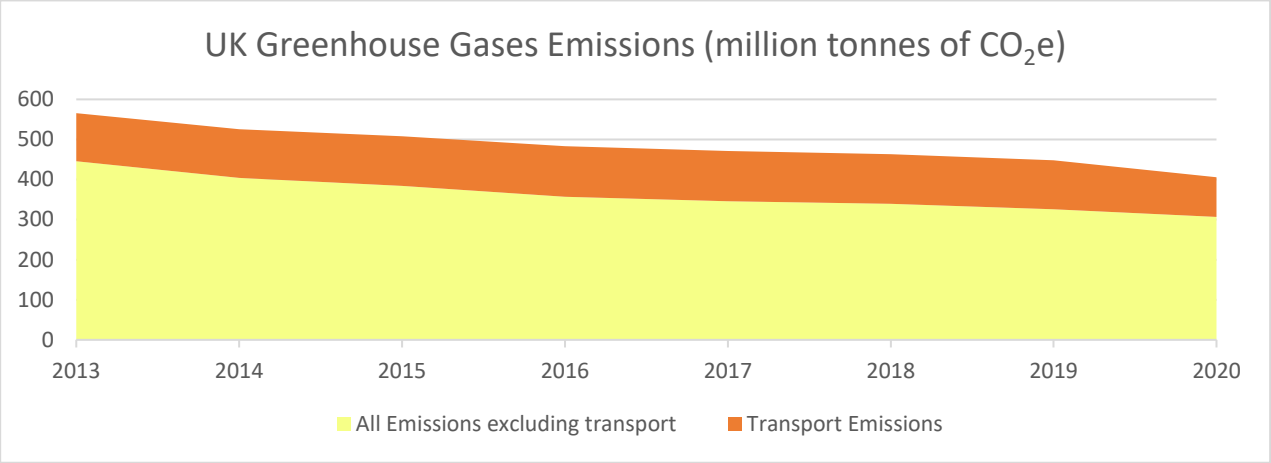
Baseline Conditions and Future Baseline

Greenhouse Gas Emissions

6.2.15 The Government has set out a legally binding framework to cut GHG emissions by 100% by 2050 from a 1990 baseline in the Climate Change Act 2008 (Ref 6.1). The UK total GHG emissions for 2020 is 405.5 million tonnes CO2 tonnes of carbon dioxide equivalent (MtCO2e) with transport being 24% of the total, the largest emitting sector (Ref 6.2).

6.2.16 The total provisional GHG emissions from transport in the UK are presented in Figure 6-1. These figures are by source (Ref 6.2), which means that they include direct emissions and do not include emissions resulting from the production of the fuels used.

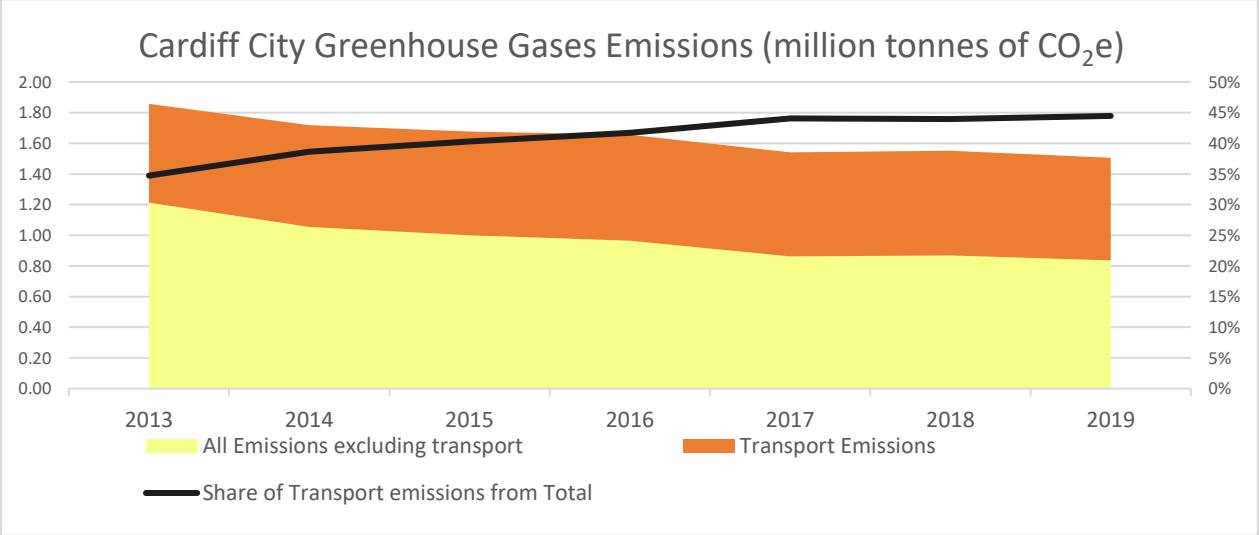
Figure 6-1: GHG emissions in UK (Ref 6.2)



6.2.17 In 2019, it was estimated that the Cardiff City's (Net) Total Green House Gas Emissions stood at 1,626,059 tonnes CO2e within its boundaries (Scope 1 – Direct and Scope 2 – Indirect only) (Ref 6.3). Figure 6.3 show Greenhouse Gases Emissions in Cardiff city boundaries between 2013-2019.

6.2.18 Emissions from transportation were by far the biggest contributors to the emissions in Cardiff and as such, these are key areas of focus in the One Planet Cardiff Strategy (Ref 6.3). As other carbon emissions sources have decreased in the last decade, transport emissions have stayed on the same level of about 650,000 tonnes CO2e annually, and their share of the total have increased to 45%. Therefore, reducing transport emissions is key to Cardiff's carbon ambitions.

Figure 6-2: GHG emissions in Cardiff City (Ref 6.3)



Climate Change Adaptation

Observed Climate Change

6.2.19 Globally, the 21 warmest years on record (since 1880) have all occurred within the 23 years since 1995 (Ref 6.4). Average temperatures in Wales have risen by approximately 0.9 degrees Celsius since the 1980s, with 2021 being the warmest year on record (Ref 6.5).

6.2.20 Annual mean precipitation over Wales has increased by 2.0% since the mid-1970s. Seasonal rainfall is highly variable, but over the same period has decreased in summer and increased in autumn and winter; 28% more in autumn, approximately 16% more in winter and approaching 9% less in summer. (Ref 6.5)

6.2.21 A clear trend is emerging for increasing sunshine hours for all parts of the UK including Wales, where there was a 6.1% increase in average sunshine hours from the period of mid 1970s to mid-2010s to 2010-2019. Spring 2020 was the sunniest on record for all UK countries in a series stretching back to 1929 (Ref 6.6).

6.2.22 Severe windstorms around the UK have become more frequent in the past few decades, although not above that seen in the 1920s. The 1990s saw 14 strong wind events, compared to 4, 5 and 8 in the 1960s, 1970s and 1980s respectively. These observations are correlated with the strength of the North Atlantic Oscillation for which no trend is identifiable (Ref 6.6).

6.2.23 A UK-wide sea level index suggests that sea level has risen by between 1.2 and 1.6mm per year since 1901. National variations are projected in future as outlined in the following section (Ref 6.7).

Climate Change Projections

6.2.24 It is predicted that climate change will increase the frequency and severity of some types of extreme weather events in Wales. UK Climate Projections 2021 (UKCP18) (Ref 6.6) generally show that warmer, drier summers are more likely along with warmer, wet winters. By the 2050s, central estimates are that mean summer temperatures in Cardiff will increase by 1.1-1.2ºC (with the warmest summer day being 4 – 6ºC hotter) and that precipitation will increase by 6% in the winter and decrease by 15% in the summer. Upper and lower estimates are more extreme but are equally likely to occur as the central estimates. The range of projected change for a variety of climate variables from UKCP18 (Ref 6.7) in South Wales is shown in Table 6-3.

Table 6-3: Projected changes in climate for Cardiff (Ref 6.7)

Variable	Decade				
	2020s	2050s		2080s	
	Current	Medium Emissions Scenario	High Emissions Scenario	Medium Emissions Scenario	High Emissions Scenario
Mean Temperature	10.4ºC	11.6ºC	11.5ºC	11.7ºC	12.7ºC
Summer warmest day	32.5ºC	33ºC	35ºC	37ºC	39.2ºC
Winter mean precipitation (mm per month)	110	116	116	118	124
Summer mean precipitation (mm per month)	90	76	76	74	66
Relative sea level (cm)	10	22	28	43	76

6.2.25 The frequency and intensity of extreme temperature and rainfall events may also increase in the future, depending on global efforts to reduce greenhouse gas emissions. Summers with days above 40°C in Wales have a return time of 100-300 years at present, but in a high climate change scenario, this could become much more likely - occurring once every 3.5 years by 2100. In summer, despite wet days projected to become less frequent, projections suggest that when it does rain, the rainfall will be more intense.

6.3 Design, Mitigation and Enhancement Measures

Table 6-4: Draft register of commitments for Climate

Measures	Delivery mechanism	Development phase
Assess how the design will encourage modal shift from high carbon transport to modes to walking, cycling, and public transport	Assessment of how design elements such as shading and width of bridge will encourage more people to use it.	Design
Measures to minimise GHG emissions during construction.	Measures to minimise GHG emissions during construction would be documented in a CEMP. For example, the implementation of materials and logistics saving measures (e.g. the Waste Hierarchy would be followed when managing waste); materials with low embodied carbon would be used when possible; a staff travel plan dealing with emissions associated with staff commuting would be implemented, etc.	Construction
Climate change adaptation measures during construction	To be documented in the CEMP, such as, adapting construction practises on days of extreme weather.	Construction
Measures to mitigate increased flooding risk due to climate change	The Proposed Development would follow Environmental Agency (EA) guidance (Ref 6.8) on allowances for rainfall and flood probability due to climate change, within the context of Flood Risk Assessments (FRA). The appropriate climate scenario would be chosen for reference of structural specifications, and the effect of sea level rise and storm surges will be taken into account.	Operation
Measures to mitigate increased heating risk due to climate change	Materials durability in heat will be assessed in material choice. Additional shading elements will be assessed.	Operation

Enhancement opportunities

6.3.1 The design team will look for opportunities in the detailed design to reduce carbon in materials and construction. Some of the opportunities that have been raised are:

- Use of timber throughout the structure as a secondary material, or a composite steel/timber.
- For piles/ substructure, low carbon alternatives such as timber piles will be assessed
- Deck width will be optimised in order to minimise material usage whist also providing sufficient width to encourage low carbon travel
- End of life and reuse opportunities will be considered in the design
- Local source for materials will be assessed and preferably used
- Other energy/carbon saving measures will be assessed such as:
  - LED lighting
  - Sensor/timers to reduce light levels
  - Mounted solar panels

6.4 Assessment Process and Methodology

6.4.1 The paragraphs below set out the proposed assessment methodology and a summary of consultation undertaken to date as well as future planned consultation.

Relevant Legislation, Policy and Guidance

6.4.2 A brief description of the main European and national legislation, policy and guidance impacting on climate change in the UK (relevant to Wales).

International

- Paris Agreement (2015) (Ref 6.9) – Its purpose is to strengthen the global response to the threat of climate change by holding the global temperature increase well below 2°C above pre-industrial levels.
- Glasgow Climate Pact (2021) (Ref 6.10)

National

- The Climate Change Act 2008 (2019 Amendment) (Ref 6.1) – The Act sets up a framework for the UK to achieve its long-term goals of reducing GHG 100% from 1990 baseline by 2050, with intermediate goals set by the UK Carbon Budgets, and to ensure steps are taken towards adapting to the impact of cli-mate change. The Act introduces a system of carbon budgeting which constrains the total amount of emissions in a given time period and sets out a procedure for assessing the risks of the impact of climate change for the UK, and a requirement on the Government to develop an adaptation programme. The Act introduced new powers and duties on climate change adaptation and mitigation.
- Department for Business, Energy & Industrial Strategy Net Zero Strategy: Build Back Greener 2021 (Ref 6.12)

- Carbon Budgets (Climate Change Committee) (Ref 6.13) – Under a system of carbon budgets, every tonne of greenhouse gases emitted between now and 2050 will count. Where emissions rise in one sector, the UK will have to achieve corresponding falls in another. The Proposed Development's construction phase will take place during the 4th Budget (2023-2027). The operation/use phase of the Proposed Development will be in the 5th (2028-2032) and 6th (2033-2037) Carbon Budgets and beyond.
- The Green Construction Board PAS 2080:2016 Carbon Management in Infrastructure 2016 (Ref 6.14) – Publicly Available Specification (PAS) 2080:2016 provides a common framework for all infrastructure sectors and value chain members on how to manage whole life carbon when delivering infrastructure assets and programmes of work. PAS 2080:2016 promotes reduced carbon, reduced cost infrastructure delivery, more collaborative ways of working and a culture of challenge in the infrastructure value chain through which innovation can be fostered.

Wales and City-wide (Cardiff)

- Environment (Wales) Act 2016 (Ref 6.15) – The Act places a duty on Welsh Ministers to set targets for reducing greenhouse emissions and also to set carbon budgets. Statutory targets and a more robust governance framework will allow for a better evaluation of progress and provide certainty to help drive investment for a low-carbon Wales.
- The Climate Change (Carbon Budgets) (Wales) Regulations 2018 (amended 2021) (Ref 6.16) – These Regulations provide for a maximum total amount for the net Welsh emissions account (a carbon budget) for the first two budgetary periods, 2016-2020 and 2021- 2025. In March 2021 Senedd Cymru approved a net zero target for 2050.
- Welsh Government, Prosperity for All: A Low Carbon Wales (2019) (Ref 6.17) – Wales' commitment to tackling climate change. The Welsh Government is putting Wales at the forefront of a shift towards active travel and a low carbon public transport system which is accessible to all and contributes to liveable and sustainable communities
- Welsh Government, Prosperity for all: A Climate conscious Wales (2019) (Ref 6.18) – A climate change adaptation plan for Wales, sets out plan on how to respond to the risks for Wales with a focus on those risks given in the UK Climate Change Risk Assessment summary for Wales, as 'more urgent'.
- One Planet Cardiff Strategy (2021) (Ref 6.3) – One Planet Cardiff (OPC) presents the response to the climate emergency and sets out our approach across the next decade. It establishes targets for the Council to be Carbon Neutral in its activities by 2030, and to work in partnership with stakeholders to develop a pathway for a Carbon Neutral City by 2030 too. Relevant policy to CVF include:
  - Reduce GHG emissions from road travel by 50% across the City; and
  - Favour low carbon supply activities and to embed circular economy principles where possible.

Consultation

6.4.3 Consultation with relevant stakeholders will be undertaken to support the design and the scope the assessment. A summary of proposed future consultation is presented in Table 6-5 below.

Table 6-5: Climate – Proposed future consultation with stakeholders

Consultee*	Contact/ Date	Summary of Issues Raised/Agreed
Cardiff Council – Climate Change *Principal Sustainable Development Officer* *Sustainable Development Group Leader*	-	Key targets and commitments to be discussed are: • Support the delivery of Cardiff Council policy of Carbon Neutral City by 2030, as stated in One Planet Cardiff Vision and wider Wales' Net Zero Wales plan; • Other local area objectives – climate change targets, aims and commitments would be requested, particularly for infrastructure schemes; • Methodology of review and calculation of the likely carbon footprint; • Embodied carbon related issues as: Materials, structural form, transport of workers, materials, and waste; and • Operational carbon related issues as: lighting, active travel, maintenance.
Cardiff Council – Flood Risk and Drainage *Flood and Coastal Risk Management*		Assessing how climate change impacts as change in precipitation patterns and sea level rise will increase climatic risks to the bridge and its surroundings from, but not limited to: • Sea level rise; • Alteration to vegetation growth patterns; and • Coastal erosion.

* *Please note: Names of consultees have been kept confidential. Job titles have been provided.*

Methodology

Study Area

GHG Emissions

6.4.4 In relation to GHG emissions, the study area would cover the GHG emissions arising from activities undertaken within the application site boundary during the construction of the Proposed Development. It would also include embodied carbon emissions from the construction material resources used for the Proposed Development as well as emissions arising from the transportation of material resources and waste to and from the Site.

6.4.5 The spatial coverage of the assessment of the construction phase is therefore the area of construction works falling within the application site boundary.

Climate Change Adaptation

6.4.6 In relation to climate change adaptation, the study area would comprise the application site boundary of the Proposed Development.

Baseline

GHG Emissions

6.4.7 Baseline conditions for GHG emissions have been established through desk-top research, including the interrogation of key datasets such as the Department for Business and the Energy and Industrial Strategy UK Greenhouse Gas Emissions (Ref 6.2) and the University of Bath ICE Database (Ref 6.19). Current use of land in the application site boundary of development is considered insignificant in its current carbon emissions, due to the land being park of the Hamadryad Park, River Taff and The Marl.

Climate Change Adaptation

6.4.8 Future baseline conditions for climate change adaptation will be established through desk-top research, including the Energy and Emissions Projections. UKCP18 (Ref 6.6) is a climate analysis tool, released in 2021, that provides probabilistic projections for the whole of the UK, at regional level and at local level. To identify the future changes to the climate baseline, the following factors would be identified and used in the assessment:

- The lifespan of the Proposed Development (including operational life cycle stages); and
- Climate trends associated with the UKCP18 high emissions scenario (50% probability) projection.

6.4.9 The future baseline will include a range of different climate variables from UKCP18 (e.g., UK mean daily temperature for summer and winter, mean daily maximum temperatures for summer and mean daily minimum temperatures for winter).

Assessment Methodology

6.4.10 This section describes the methodology which would be used for the assessment of climate which may affect, or be affected by, the construction and operation of the Proposed Development. The assessment of climate would cover the following elements as required by the EIA Regulations (Ref 6.20):

- GHG Emissions (construction); and
- Climate change adaptation (operation).

GHG Emissions

6.4.11 The construction phase of the Proposed Development would be considered for the GHG assessment. The GHG emissions assessment would take an approach consistent with the principles set out in PAS 2080:2016 (Ref 6.13). The GHG emissions associated with the construction and operation of the Proposed Development would be reported in the form of the 'carbon footprint' – reported in tonnes of carbon dioxide equivalent (tCO_2e).

6.4.12 Direct and indirect emissions would be considered in line with GHG reporting and the total carbon footprint is reported in CO_2 equivalents (CO_2e). This would allow for the emissions of the 6 key GHGs: carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulphur hexafluoride (SF_6); to be expressed in terms of their equivalent global warming potential in mass of CO_2e.

6.4.13 The assessment of GHG emissions associated with the Proposed Development would be considered through the following stages:

- Construction of the Proposed Development, including material supply, transport, manufacturing and construction process:
  - The GHG emitted through the materials used to construct the Proposed Development, and the significance of the effects of this; and
  - The GHG emitted through the construction activities associated to the Proposed Development, calculated in line with PAS2080 (Ref 6.13) methodology.

6.4.14 The cumulative effects assessment would consider any future development that could potentially produce substantial quantities of GHG emissions during the construction of the Proposed Development. Details on forecast GHG emissions and construction dates of these other projects would be sourced from the council's planning portal, if available.

Climate Change Adaptation

6.4.15 A 4-stage framework would be adopted for the assessment, which would look at the likelihood and consequence of the impact occurring to each receptor, leading to evaluation of the significance of the effect.

6.4.16 Stage 1 would involve the assessment of climate effects on the Proposed Development using the lifespan of the Proposed Development (taken as 120 years) and the long-term lifecycle stage (2080s) over which the baseline projections have been presented within Section 6.2.

6.4.17 The UKCP programme provides probabilistic projections for the whole of the UK, at regional level and at local level. To identify the future changes to the climate baseline, the following factors would be identified and used in the assessment:

- The lifespan of the Proposed Development (including operational life cycle stages);
- Climate trends associated with the UKCP high emissions scenario (50% probability) projection; and
- UKCP09 and UKCP18 projections include a range of different climate variables (e.g. mean daily temperature for summer and winter, mean daily maximum temperatures for summer and mean daily minimum temperatures for winter).

6.4.18 Stage 2 would involve the identification of receptors which are vulnerable to climate change. The third stage would involve the identification of the impacts (hazards and opportunities) for each receptor using the UKCP18 data, including the vulnerability of the Proposed Development to both normal weather and extreme weather-related disaster scenarios.

6.4.19 The 4th stage of the framework would include an assessment of the identified impacts. The assessment would be undertaken using the categories in Table 6-6 and Table 6-7, which have been developed using professional opinion.

6.4.20 The cumulative effects assessment will consider future development in the proximity of the Proposed Development that might give rise to potential significant cumulative effects in terms of increasing climate change risks, e.g., related to drainage.

Table 6-6: Climate – Likelihood Categories

Likelihood Category	Description (probability and frequency of occurrence)
Very high	The event occurs multiple times during the lifetime of the project (120 years) e.g. approximately annually, typically 120 events.
High	The event occurs several times during the lifetime of the project (120 years) e.g. approximately once every 5 years, typically 24 events.
Medium	The event occurs limited times during the lifetime of the project (120 years) e.g. approximately once every 15 years, typically 8 events.
Low	The event may occur once during the lifetime of the project (120 years).

Table 6-7: Climate – Measure of Consequence

Consequence of Impact	Description
Very large adverse	National level (or greater) disruption to strategic route(s) lasting more than 1 week.
Large adverse	National level disruption1 to strategic route(s) lasting more than 1 day but less than 1 week Or Regional level disruption to strategic route(s) lasting more than 1 week.
Moderate adverse	Regional level disruption to strategic route(s) lasting more than 1 day but less than 1 week.
Minor adverse	Regional level disruption to strategic route(s) lasting less than 1 day.
Negligible	Disruption to an isolated section of a strategic route lasting less than 1 day.

Determining Significance

6.4.1 The significance of effects would be assessed by comparing the estimated GHG emissions arising from the Proposed Development with UK carbon budgets, and the associated reduction targets, outlined in Table 6-8.

Table 6-8: GHG Emissions from Transport in the UK

Carbon Budget	Carbon Budget Level	Reduction Below 1990 Levels
3rd carbon budget (2018 – 2022)	2,544 $MtCO_2e$	37% by 2020
4th carbon budget (2023 – 2027)	1,950 $MtCO_2e$	51% by 2025
5th carbon budget (2028 – 2032)	1,725 $MtCO_2e$	57% by 2030

6.4.2 The outcomes of the climate change adaptation assessment would be the categorisation of each environmental topic based on the significance criteria outlined in Table 6-9.

Table 6-9: Significance Matrix – Climate change adaptation assessment

Consequence of Impact	Measure of Likelihood			
	Low	Medium	High	Very High
Negligible	Not Significant	Not Significant	Not Significant	Not Significant
Minor	Not Significant	Not Significant	Significant	Significant
Moderate	Not Significant	Significant	Significant	Significant
Large	Significant	Significant	Significant	Significant
Very Large	Significant	Significant	Significant	Significant

Assumptions and limitations

6.4.3 To ensure transparency within the EIA process, the following limitations and assumptions have been identified:

- The calculations of benefits will be based on external data provided by third parties and the accuracy of the carbon balance will depend on its reliability.

7 Ecology (Terrestrial) and Arboriculture

7.1.1 This chapter provides a summary of the scope proposed. This is followed by a detailed rationale for this scope taking into account potential impacts arising from the Proposed Development, potential receptors likely to be affected and potential impact pathways as well as the potential for likely significant effects. Draft mitigation commitments are identified to support the assessment scope proposed, this is followed by a description of the assessment process and methodology to be adopted.

7.2 Assessment Scope – Potential Environmental Effects

7.2.1 Table 7-1 presents the proposed scope of the terrestrial ecology and arboricultural assessment that will form part of the EIA.

Table 7-1: EIA Scope – Terrestrial Ecology

Receptor	Development phase/s	Scope in (✓) or Scope out (×)	Summary of rationale for the scope proposed
Designated Sites			
Severn Estuary SPA, SAC, Ramsar and SSSI	Construction Operation	✓ ×	The construction phase is scoped in due to the hydrological connectivity from the Site via the River Taff/ Afon Taf. It is anticipated that the operation/use phase does not have the potential to give rise to likely significant effects on this designated site. A HRA Screening Assessment will be undertaken.
Cwm Cydfin, Leckwith SSSI	Construction and Operation	×	Large intervening distances and no habitat connectivity.
Cardiff Bay Wetlands and Hamadryad Park LNR	Construction Operation	✓ ×	The construction phase is scoped in as this receptor is located within the application site boundary. It is anticipated that the operation/use phase does not have the potential to give rise to likely significant effects on this LNR. This is due to the nature of the Proposed Development; impacts are unlikely to be of a scale/magnitude that may result in significant effects.

Receptor	Development phase/s	Scope in (✓) or Scope out (×)	Summary of rationale for the scope proposed
The River Taff/ Afon Taf SINC	Construction Operation	✓ ×	The construction phase is scoped in as this receptor is located within the application site boundary. It is anticipated that the operation/use phase does not have the potential to give rise to likely significant effects on this SINC. This is due to the nature of the Proposed Development; impacts are unlikely to be of a scale/magnitude that may result in significant effects.
B-Line	Construction and Operation	×	The habitats on Site are unlikely to support a diverse assemblage of invertebrates.
Coastal Saltmarsh NRW Priority Area	Construction Operation	✓ ×	The construction phase is scoped in due to the hydrological connectivity from the Site via the River Taff/ Afon Taff. It is anticipated that the operation/use phase does not have the potential to give rise to likely significant effects on this receptor. This is due to the nature of the Proposed Development; impacts are unlikely to be of a scale/magnitude that may result in significant effects.
Notable Habitats			
Semi-natural Broadleaved Woodland	Construction Operation	✓ ×	The construction phase is scoped in. This Priority Habitat is situated within the application site boundary. It is currently unknown how it will be impacted. It is anticipated that the operation/use phase does not have the potential to give rise to likely significant effects on this Notable Habitat. This is due to the nature of the Proposed Development; impacts are unlikely to be of a scale/magnitude that may result in significant effects.
Dense Scrub	Construction Operation	✓ ×	The construction phase is scoped in. This receptor is considered important up the local level due to its large size. It is currently unknown how this habitat will be impacted.

Receptor	Development phase/s	Scope in (✓) or Scope out (×)	Summary of rationale for the scope proposed
			It is anticipated that the operation/use phase does not have the potential to give rise to likely significant effects on this Notable Habitat. This is due to the nature of the Proposed Development; impacts are unlikely to be of a scale/magnitude that may result in significant effects.
Parkland Trees	Construction Operation	✓ ×	The construction phase is scoped in. Several trees are mature in age and are considered important ecological features. It is currently unknown how this habitat will be impacted. It is anticipated that the operation/use phase does not have the potential to give rise to likely significant effects on this Notable Habitat. This is due to the nature of the Proposed Development; impacts are unlikely to be of a scale/magnitude that may result in significant effects.
Protected / Notable Species			
Bats	Construction Operation	✓ ×	The construction phase is scoped in. Biological records present within 2km and suitable roosting, foraging and commuting habitat on Site. Operational effects could arise from increase in lighting, however proposed bridge lighting will be minimal, i.e., integrated into the parapet/handrail. Bankside lighting does not form part of the Proposed Development. Should this change (i.e., additional lighting on Site), potential impacts on ecology will be reviewed. In addition, the Site comprises a busy park in the city centre so increases in human activity are unlikely to give rise to significant effects.
Badgers	Construction Operation	✓ ×	The construction phase is scoped in as there is suitable sett building, foraging and commuting habitat on Site. Operational effects could arise from increase in lighting, however proposed bridge lighting will be minimal, i.e., integrated into the parapet/handrail. Bankside lighting does not

Receptor	Development phase/s	Scope in (✓) or Scope out (×)	Summary of rationale for the scope proposed
			form part of the Proposed Development. Should this change (i.e., additional lighting on Site), potential impacts on ecology will be reviewed. In addition, the Site comprises a busy park in the city centre so increases in human activity are unlikely to give rise to significant effects.
Birds (inc. Schedule 1 species)	Construction Operation	✓ ×	The construction phase is scoped in. Records of schedule 1 species on site. Suitable nesting habitat for a variety of nesting birds. It is anticipated that the operation/use phase does not have the potential to give rise to likely significant effects on birds, as this will not involve vegetation removal.
Dormice	Construction and Operation	×	No biological records, very limited suitable habitat on/ adjacent to the Site.
Great crested newt and Common Amphibians	Construction and Operation	×	No biological records, very limited suitable habitat on/ adjacent to the Site.
Hedgehogs	Construction Operation	✓ ×	The construction phase is scoped in. Biological records within 2km and suitable habitat on Site. Operational effects could arise from increase in lighting, however proposed bridge lighting will be minimal, i.e., integrated into the parapet/handrail. Bankside lighting does not form part of the Proposed Development. Should this change (i.e., additional lighting on Site), potential impacts on ecology will be reviewed. In addition, the Site comprises a busy park in the city centre so increases in human activity are unlikely to give rise to significant effects.
Reptiles	Construction Operation	✓ ×	The construction phase is scoped in. Biological records within 2km and suitable habitat on Site. It is anticipated that the operation/use phase does not have the potential to give rise to

Receptor	Development phase/s	Scope in (✓) or Scope out (×)	Summary of rationale for the scope proposed
			likely significant effects on reptiles, as it would not involve the loss of any suitable habitat.
Otter	Construction Operation	✓ ×	The construction phase is scoped in. Biological records within 2km and suitable habitat adjacent to the Site. Operational effects could arise from increase in lighting, however proposed bridge lighting will be minimal, i.e., integrated into the parapet/handrail. Bankside lighting does not form part of the Proposed Development. Should this change (i.e., additional lighting on Site), potential impacts on ecology will be reviewed. In addition, the Site comprises a busy park in the city centre so increases in human activity are unlikely to give rise to significant effects.
Water vole	Construction and Operation	×	No biological records, no suitable habitat on/ adjacent to the Site.
Terrestrial invertebrates	Construction and Operation	×	The habitats on Site are unlikely to support a diverse assemblage of invertebrates.
White-clawed crayfish	Construction and Operation	×	No biological records, no suitable habitat on/ adjacent to the Site.
Invasive non-native species	Construction Operation	✓ ×	The construction phase is scoped in. Biological records on site. Non-native species were recorded during the Phase 1 Survey. It is anticipated that the operation/use phase does not have the potential to give rise to likely significant effects. This is due to the nature of the Proposed Development; impacts are unlikely to be of a scale/magnitude that may result in significant effects.

Table 7-2: EIA Scope – Arboriculture

Sub-topic and/or receptor	Development phase/s	Scope in (✓) or Scope out (×)	Summary of rationale for the scope proposed
Ancient woodland	Construction	×	Ancient woodland was not identified as a potential receptor as it was not identified in the study area.
Ancient or veteran trees	Construction	×	The presence of ancient or veteran trees as potential receptors can be discounted based on the findings from the walkover tree survey carried out in May 2022.
High-quality, moderate-quality and low-quality trees and tree groups.	Construction	✓	High-quality trees and tree groups are not present within the study area (see Appendix C3). Adverse impacts may arise in respect of moderate and low-quality trees and tree groups, depending on the design. Adverse impacts should be mitigated wherever this is reasonably practicable.
Tree Preservation Orders (TPO)	Construction	×	No TPOs are present within the study area.

Rationale for the scope proposed

Terrestrial Ecology

7.2.2 The current baseline conditions on site determined by a desk study and an Extended Phase 1 Habitat Survey show that a number of sensitive ecological features may be present. The baseline information gathered to date has informed the scope proposed. Please refer to Appendix C1 for a summary of baseline data and Appendix C2 for the Preliminary Ecological Appraisal (PEA) report. The rationale for the scope proposed in Table 7-1 above is explained below.

Cardiff Bay Wetlands and Hamadryad Park LNR

7.2.3 Hamadryad Park LNR is located on the eastern landing site The proposed works may have the potential to cause a direct significant effect to the LNR through the loss of green space (although the extent of this is currently unknown), ground disturbance/ damage (from vehicle tracking and storage of materials). Cardiff Bay Wetlands LNR is located to the southeast of the Site and indirect effects including pollution via dust and silt may occur.

River Taff/ Afon Taf SINC

7.2.4 The Site is located either side of the River Taff/ Afon Taf SINC. The exact methods and extent of the works are currently unknown; however, it is anticipated that some construction adjacent to (bridge landings) and within the watercourse (circa. 3 supporting piers) will be required. Therefore, there is the potential for both direct (through damage to the banks/ riverbed) and indirect (through pollution) effects to the SINC.

Severn Estuary SAC, SPA, Ramsar Site and SSSI

7.2.5 The River Taff/ Afon Taf (adjacent to the Site) flows directly into the Severn Estuary SAC, SPA, Ramsar Site and SSSI which is located approximately 1,480m south-east from the Site. As there is direct connectivity to the Severn Estuary, there is the potential for indirect significant effects to occur through pollution.

Natural Resources Wales (NRW) Priority Habitats

7.2.6 The data search shows that coastal saltmarsh (an NRW Priority habitat) is present on Site. This habitat was not identified during the Phase 1 survey and so direct effects are not anticipated. Due to hydrological connectivity from the Site, there is the potential for indirect (through pollution) effects to coastal saltmarsh, should it exist downstream of the River Taff/ Afon Taf.

Habitats

7.2.7 The broad-leaved woodland located in the south-eastern extent of the Site (in Hamadryad Park) is a Priority Habitat (Ref 7.2) and the mature parkland trees are considered important ecological features (Ref 7.3). The dense scrub across both sides of the Site is considered important up the local level due to its large size and relative maturity. At this stage in the iterative design process, it is not possible to scope out the potential for likely significant effects to habitats on Site, therefore this is scoped in to the EIA.

Bats (roosting, foraging and commuting)

7.2.8 Two trees and one group of trees across the Site have been noted as having potential to support roosting bats (Ref 7.4) (see Appendix C2: PEA report). If trees that have bat potential are felled or damaged and in the absence of mitigation, disturbance and destruction of bat roosts is possible. Disturbance to a bat roost (if present) could also occur if the works are located adjacent or in close proximity to the trees. From the indicative application site boundary, it appears that the works area is located circa. 50 m from G1 and 70 m from T1 (See Appendix C2). If all works remain at these distances, adverse indirect effects to roosting bats are unlikely to occur.

7.2.9 The Site itself is of moderate value to foraging and commuting bats due to the presence of mature trees and large areas of scrub. It is likely that bats use these areas during the active bat season (April to end-October). It is not possible to determine the scale impacts of the proposals on foraging or commuting bats at this stage due to the limited information available.

7.2.10 Operational effects could arise from increase in lighting, however proposed bridge lighting will be minimal, i.e., integrated into the parapet/handrail. Bankside lighting does not form part of the Proposed Development. Should this change (i.e., additional lighting on Site), potential impacts on ecology will be reviewed. In addition, the Site comprises a busy park in the city centre so increases in human activity are unlikely to give rise to significant effects.

Badgers

7.2.11 It is not currently known what habitats will be directly affected by the works however it appears (from the indicative application site boundary), that the works will occur within the 30m of suitable sett building habitat on the eastern portion of the Site. If a sett is present within these areas and in the absence of mitigation, disturbance and/ or destruction of a badger sett could occur. It is not possible to determine any long-term effects associated with the loss of foraging habitat or lighting at this stage due to the current design not being completed.

7.2.12 Badgers are likely to pass through the Site and therefore there is the potential for adverse effects to commuting/ foraging badgers such as injury during the construction phase.

7.2.13 Operational effects could arise from increase in lighting, however proposed bridge lighting will be minimal, i.e., integrated into the parapet/handrail. Bankside lighting does not form part of the Proposed Development. Should this change (i.e., additional lighting on Site), potential impacts on ecology will be reviewed. In addition, the Site comprises a busy park in the city centre so increases in human activity are unlikely to give rise to significant effects.

Otter

7.2.14 The River Taff/ Afon Taf provides suitable commuting and foraging habitat for otter. There is the potential for adverse effects to this species such as harm during the construction phase and/ or habitat loss, should they be present.

7.2.15 Operational effects could arise from increase in lighting, however proposed bridge lighting will be minimal, i.e., integrated into the parapet/handrail. Bankside lighting does not form part of the Proposed Development. Should this change (i.e., additional lighting on Site), potential impacts on ecology will be reviewed. In addition, the Site comprises a busy park in the city centre so increases in human activity are unlikely to give rise to significant effects.

Common and Schedule 1 birds

7.2.16 Nesting habitat for Schedule 1 birds (such as kingfisher) on Site is restricted to the marginal vegetation along the River Taff/ Afon Taf corridor. Depending on the location and timing of the works, there may be the potential to disturb Schedule 1 birds.

7.2.17 The woodland, trees and scrub are suitable for a variety of nesting birds and if vegetation removal is required during the nesting bird season (March to August, inclusive) this has the potential to directly affect nesting birds through damage to nests or eggs.

7.2.18 The vegetation on Site may be an important nesting resource for the local bird population as it offers extensive nesting provisions in an otherwise urban environment. The loss of a significant number of trees or scrub on Site could reduce the availability of nesting sites and cause long-term significant adverse effects to nesting birds.

Hedgehog

7.2.19 Hedgehogs are likely to use the grassland and scrub on Site for forging and commuting. Any development has the potential for adverse effects to commuting/ foraging hedgehog such as injury during the construction phase.

7.2.20 Operational effects could arise from increase in lighting, however proposed bridge lighting will be minimal, i.e., integrated into the parapet/handrail. Bankside lighting does not form part of the Proposed Development. Should this change (i.e., additional lighting on Site), potential impacts on ecology will be reviewed. In addition, the Site comprises a busy park in the city centre so increases in human activity are unlikely to give rise to significant effects.

Reptiles

7.2.21 The less managed areas of the Site including the tall ruderal and scrub in the south of The Marl and Hamadryad Park offer some suitability for reptiles. Log piles and deadwood were also identified which may offer suitable refuge and hibernation opportunities. The removal of these habitats has the potential to adversely affect reptiles through killing/ injury. Significant loss of suitable habitat could also cause long term-adverse effects to reptile species.

Invasive species

7.2.22 Numerous records of invasive species were identified during the desk study (Appendix C2) within 2 km of the Site including Himalayan balsam (I*mpatiens glandulifera*) and Japanese Knotweed (*Fallopia japonica*). A record of Himalayan Balsam is present along the River Taff/ Afon Taf (adjacent to Hamadryad Park) in 2008 and the closest record of Japanese Knotweed is located adjacent to The Marl within residential gardens. Butterfly bush (*Buddleja davidii*) was also noted within the scrub during the survey.

7.2.23 As the Phase 1 habitat survey was undertaken towards the end of the optimal survey season for botanical assessment (Ref 7.5), it is possible that some invasive non-native species were dormant and were therefore unrecorded. The works have the potential to cause the spread of invasive species, should they be present.

Rationale for Scoped Out Ecological Receptors

- Cwm Cydfin, Leck with SSSI – Due to the urban nature of the intervening land, and the lack of habitat connectivity between the Site and the SSSI (which is located approximately 1,570m west), no direct or indirect effects are anticipated.
- B-Line insect pathway – Whilst the Proposed Development is expected to result in the loss of some green space, this is likely to comprise grassland of limited value to insects due to a low botanical diversity. Any loss of this habitat is unlikely to cause significant effects to the insect pathway.
- Habitats – The hardstanding and amenity grassland are not considered ecologically important due to their low species diversity and/ or intensively managed state.

- Species – Terrestrial invertebrates, dormice, great crested newts, white-clawed crayfish and water vole have been scoped out of the ecological assessment based on an absence of biological records and/ or a lack of suitable habitat on and/ or adjacent to the Site.

Arboriculture

7.2.24 The rationale for the scope proposed in Table 7-2 is explained below.

Baseline Conditions and Future Baseline

7.2.25 Baseline conditions are defined as including all trees, tree groups and wooded areas within 50m of the indicative application site boundary. Baseline conditions include:

- An absence of any recorded areas of ancient woodland or other wooded areas which exceed 0.5 hectares with a minimum 20% canopy cover (or the potential to achieve it);
- An absence of any recorded ancient or veteran trees;
- Trees shown within TPO 'City and County of Cardiff (Royal Hamadryad Hospital, Butetown) TPO 1996' (Ref 7.6) and within the 50m study area are no longer present.
- The presence of approximately 70 individual trees. These comprise moderate (BS 5837 category B) and low (BS 5837 category C) quality trees; and,
- The presence of approximately 1.7 hectares of tree groups and wooded areas. Again, these are low and moderate-quality.

7.2.26 Future baseline conditions may be influenced by the presence of pests, disease or environmental stresses such as drought, flood or extremes of heat. The prediction of future baseline conditions requires an understanding of the tree species which are present, their age and general health.

Ancient Woodland

7.2.27 There are no instances of recorded ancient woodland present within the baseline resource nor are there any records of other woodland which may, following further assessment, have the potential to be defined as ancient. These absences are sufficient reason to discount ancient woodland as a potential receptor during construction and operation.

Ancient or Veteran Trees

7.2.28 There are no instances of recorded ancient or veteran trees within the baseline resource. However, records held on the Ancient Tree Inventory (Ref 7.7) (Ref 7.8) (Ref 7.9) are collected on a voluntary basis, therefore the absence of records does not demonstrate the absence of ancient, veteran or notable trees but may simply indicate a gap in recording coverage. Ancient or veteran trees may be defined as 'irreplaceable habitat' the value of which may be adversely impacted should a tree become damaged or require removal.

7.2.29 A tree survey undertaken in May 2022 found that no ancient and veteran trees were present within the study area and thus can be discounted as potential receptors.

Moderate-Quality and Low-Quality Trees and Tree Groups

7.2.30 It is probable that some trees or tree groups may require removal in order to facilitate construction. It is also possible that construction activities may occur within the root protection area of retained trees and tree groups. In the absence of mitigation, construction activities within the root protection area may result in temporary or permanent damage to retained arboricultural features.

7.2.31 Major or moderate adverse impacts would arise where several or more moderate-quality features are removed. Minor or moderate adverse impacts would arise where many low-quality arboricultural features are removed such that their contribution to the baseline arboricultural resource is notably decreased.

7.2.32 The tree survey undertaken in May 2022 found that the baseline arboricultural resource comprises entirely of moderate (BS 5837 category B) and low (BS 5837 category C) quality trees and tree groups (See Appendix C3).

Tree Preservation Orders

7.2.33 No TPOs are present within the 50m study area. It is for this reason that this receptor will be scoped out of the assessment.

7.3 Design, Mitigation and Enhancement Measures

7.3.1 Mitigation, monitoring and enhancement measures will be further considered and refined once any necessary ecological surveys have taken place and further design information is available.

7.3.2 These mitigation measures will be revised and informed by any ecological surveys that are yet to be completed/considered. Depending on the development of the design, these surveys may include reptile surveys, badger survey, otter survey, invasive species survey and breeding bird surveys.

Table 7-3: Draft register of commitments for Terrestrial Ecology

Measures	Delivery mechanism	Development phase
Monitoring of habitat compensation and enhancement measures	Landscape and Ecology Management Plan (LEMP)	Construction and operation
Vegetation removal should be undertaken outside of nesting bird season (March-August). Where it is unavoidable in this period, a nesting bird survey should be undertaken by an ecologist no more than 48 hours prior to the removal.	CEMP	Construction

Measures	Delivery mechanism	Development phase
Minimising light spill to avoid adverse effects on nocturnal species.	Lighting to be designed in line with Bat Conservation Trust Guidance Note (Ref 7.15))	Operational
Root Protection Area (RPA) for trees in arboricultural report for roosting bats	LEMP & CEMP	Construction
Best practice measures such as covering excavations or open pipework at the end of each day should be adhered to, to avoid any mammals (and other wildlife) becoming trapped.	CEMP	Construction
Best practice pollution prevention should be adhered to throughout the works including the use of dust and silt control	CEMP	Construction
Avoid removal of large area of scrub, tall ruderal and woodland.	Embedded within the project design.	Construction and operational

Table 7-4: Draft register of commitments for Arboriculture

Mitigation and Monitoring	Delivery mechanism	Development phase
Moderate and low-quality trees and tree groups	Protection of retained trees during construction and the planting of new trees to mitigate for any removals. Mitigation shall be secured via the CEMP and through provision of an Arboricultural Method Statement. Mitigation shall be the responsibility of the design team and Principal Contractor.	Construction

Enhancement opportunities

Terrestrial Ecology

7.3.3 Ecological enhancement opportunities will be considered in consultation with the applicant and Cardiff Council. The installation of otter ledges has been suggested by the Council as part of pre-application discussions in May 2022.

Arboriculture

7.3.4 Arboricultural enhancement opportunities will be considered in consultation with the applicant and Cardiff Council.

7.4 Assessment Process and Methodology

7.4.1 The paragraphs below set out the proposed assessment methodology and a summary of consultation undertaken to date as well as future planned consultation.

Relevant Legislation, Policy and Guidance

Terrestrial Ecology

The ecological assessment will be carried out in accordance with the requirements set out in the following legislation and guidelines:

- Conservation of Natural Habitats and of Wild Fauna and Flora (92/43/EEC) (the 'Habitats Directive'); The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019 (Ref 7.10);
- EU Alien Invasive Species Regulation (Regulation No 1143/2014) (Ref 7.22), which is designed to establish a framework for action to prevent, minimise and mitigate the adverse impacts of invasive non-native species on biodiversity and ecosystem services;
- Convention on the Conservation of European Wildlife and Natural Habitats (the 'Bern Convention') (Ref 7.23), which aims to ensure conservation and protection of all wild plant and animal species and their natural habitats (listed in Appendices I and II of the Convention);
- Convention on the Conservation of Migratory Species of Wild Animals (the 'Bonn Convention') (Ref 7.24), which aims to conserve migratory species and their habitats by providing strict protection for endangered migratory species (listed in Appendix 1 of the Convention);
- Convention on Biological Diversity 1992 (Ref 7.25), focuses on the conservation of all species and ecosystems and, therefore, provides protection to all biodiversity;
- Wildlife and Countryside Act 1981 (as amended) (Ref 7.11);
- Environment (Wales) Act (2016) (Ref 7.2);
- Planning Policy Wales, Edition 11, February 2021 (Ref 7.12);
- Cardiff Local Biodiversity Action Plan 2008 (LBAP) (Ref 7.13);

- Adopted Cardiff Local Development Plan 2006-2026 (2016) (Ref 7.14);
- Cardiff Council, Green Infrastructure Supplementary Planning Guidance (SPG) (2017) (Ref 7.21)
- Bat Conservation Trust and Institution of Lighting Professionals Guidance Note 08/18 (2018) (Ref 7.15);
- Chartered Institute of Ecology and Environmental Management's (CIEEM) Guidelines for Ecological Impact Assessment in the United Kingdom (2018) (Ref 7.3).

Arboriculture

7.4.2 The arboricultural assessment shall be informed by the following policy and guidance.

- Planning Policy Wales Edition 11 (Ref 7.12);
- Technical Advice Note 5: Nature Conservation and Planning (Ref 7.16);
- Cardiff Local Development Plan 2006 – 2026 (Ref 7.14);
- Cardiff Green Infrastructure SPG Trees and Development Technical Guidance Note (TGN) (Ref 7.17); and,
- BS 5837: 2012 Trees in relation to design, demolition and construction – Recommendations (Ref 7.1).

Consultation

Terrestrial Ecology

7.4.3 Consultation will be undertaken with Cardiff Council and NRW. The purpose of the consultation will be to agree ecological survey requirements and the assessment methodology to be used (including the mitigation measures proposed).

Arboriculture

7.4.4 As part of pre-application consultation with the local planning authority in April/May 2022, the Tree Protection Team has advised that the arboricultural survey/assessment should be undertaken in accordance with Cardiff Green Infrastructure SPG Trees and Development TGN (Ref 7.15). It is proposed that further consultation is undertaken with the County Arboriculturist, as required.

Methodology

Terrestrial Ecology

Study Area

7.4.5 Two parcels of land either side of the River Taff/ Afon Taf (consisting of The Marl Park (east) and Hamadryad Park (west)) were used as the survey area. These areas had natural boundaries formed by the banks of the river, footpaths and roads. The survey area is considered sufficient to cover the potential zone of influence (ZoI) (Ref 7.3)) of the Proposed Development.

Baseline

7.4.6 Records from Southeast Wales Biodiversity Records Centre were obtained in November 2021 (Ref 7.18). The desk-based assessment has already been undertaken and will inform on-going survey efforts and provide a historical and regional context for the assessment.

7.4.7 To establish the baseline conditions on site, a Phase 1 Habitat Survey was carried out in October 2021. During the ecology survey, habitats were mapped according to Phase 1 Habitat survey methodology (Ref 7.5). The survey area was inspected for field evidence and suitability to support protected and notable species. This survey will inform the on-going survey effort (see Appendix C2: PEA Report) as well as any required mitigation, compensation or enhancement measures. Depending on the development of the design, surveys may be required for reptiles, badgers, otters, invasive species and breeding birds.

Assessment Methodology

7.4.8 The approach taken to the assessment of ecological effects will follow the CIEEM's 2018 Guidelines for Ecological Impact Assessment in the United Kingdom and Ireland (Ref 7.3). This will include determination of impact / receptor effect pathways, magnitude of impact, the conservation value of receptors and sensitivity of receptors to effects. All of this information will be considered to determine a significance level for each identified effect. For effects considered to be significant adverse, mitigation measures will be proposed, as appropriate.

7.4.9 These guidelines set out the process for assessment through the following stages:

- Describing the ecological baseline through survey and desk study;
- Identifying and evaluating 'Important Ecological Features' (IEFs);
- Identifying and characterising the likely effects on IEFs;
- Determining the significance of effects in the absence of mitigation;
- Describing mitigation, compensation and/or enhancement measures associated with the development and assessing residual significance; and
- Identifying monitoring requirements.

7.4.10 More detail on the approach, including determining the significance of likely effects, will be provided in the ES.

Arboriculture

Study Area

7.4.11 The proposed study area is defined as the area within which trees, tree groups and wooded areas may be adversely impacted during construction (i.e., 50m beyond the application site boundary). Adverse impacts may arise in instances where construction activity occurs within the RPA.

7.4.12 The purpose of the 50m study area is to ensure compliance with BS 5837 (Ref 7.1) which recommends that all arboricultural features whose RPAs extend into the developable area are identified, surveyed and subsequently assessed. The BS 5837 (Ref 7.1) caps RPAs with a maximum radius of 15m.

Baseline

7.4.13 Baseline conditions have been established through the completion of a walkover arboricultural survey in May 2022. The survey was undertaken in accordance with recommendations provided within BS 5837:2012 Trees in relation to design, demolition and construction – Recommendations (Ref 7.1).

7.4.14 Baseline data has been collected during outline design with the benefit of a topographical survey. The use of a topographic survey identifies tree stem locations and vegetative canopies and permits the accurate positioning of surveyed arboricultural features.

Assessment Methodology

Construction

7.4.15 Likely arboricultural impacts, proposed mitigation or compensation will be determined in accordance with BS 5837 Clause 5.4. (Ref 7.1) Matters to be addressed include:

- The identification of trees to be removed and retained;
- The identification of any tree pruning requirements;
- An evaluation of any impacts which may arise from the removal of trees;
- An evaluation of the constraints associated with retained trees; and,
- The identification of tree protection measures which will be applied during construction and which will be addressed within an Arboricultural Method Statement.

Operation

7.4.16 Arboricultural impacts which may arise during operation will relate to the undertaking of routine maintenance activities. These include items such as the pruning of branches to maintain visibility splays and access routes or the removal of trees where they become unsafe or infected by disease. Such activities do not generate adverse impacts which give rise to reductions in the quality of retained arboricultural features, nor do they result in impacts which exceed those which arise during construction. On this basis arboricultural impacts which may arise during operation are likely to be negligible in magnitude and will not be assessed.

Determining Significance

7.4.17 Although BS 5837 (Ref 7.1) requires an evaluation of effects it does not provide explicit parameters for measuring the sensitivity of an arboricultural feature nor does it provide a methodology for the classification of effects. Initially, the assessment methodology will be a quantitative evaluation of effects with reference made to the quality of each arboricultural feature as a means of expressing their value from an arboricultural, landscape and cultural/conservation perspective. Quality will be identified with reference to BS 5837 Table 1 (Ref 7.1). The significance of an effect is derived using the Table 2-1 in section 2 of this report.

Assumptions and Limitations – Terrestrial Ecology and Arboriculture

7.4.18 To ensure transparency within the EIA process, the following limitations and assumptions have been identified:

- The results presented in this report represent those at the time of survey and reporting, and data collected from available sources;
- The purpose of the Extended Phase 1 Habitat Survey was to conduct a broad assessment, in anticipation that more detailed surveys will be undertaken in the future;
- As the Extended Phase 1 Habitat Survey was undertaken towards the end of the optimal survey season for botanical assessment (Ref 7.5) it is possible that some plant species (including invasive non-native species) were dormant and were therefore unrecorded. Due to the managed and urban nature of the habitats on Site, this was not deemed to be a significant limitation with regards to habitat classification.
- Due to the presence of steep banks and dense vegetation along the River Taff/ Afon Taf, it was not possible to complete the otter survey on foot. It may be possible to carry out this survey at a later date, by boat.
- All construction activities, both permanent and temporary, will occur solely within the application site boundary.

8 Ecology (Aquatic)

8.1.1 This chapter provides a summary of the scope proposed. This is followed by a detailed rationale for this scope taking into account potential impacts arising from the Proposed Development, potential receptors likely to be affected and potential impact pathways as well as the potential for likely significant effects. Draft mitigation commitments are identified to support the assessment scope proposed, this is followed by a description of the assessment process and methodology to be adopted.

8.2 Assessment Scope – Potential Environmental Effects

8.2.1 Table 8-1 presents the proposed scope of the Aquatic Ecology assessment that will form part of the EIA.

Table 8-1: EIA Scope – Aquatic Ecology

Sub-topic	Development phase/s	Scope in (✓) or Scope out (×)	Summary of rationale for the scope proposed
Designated Sites	Construction Operation	✓ ×	The Severn Estuary SAC, SPA, SSSI and Ramsar Site is located approximately 1,480m from the Site. The River Taff is functionally linked to the Severn Estuary designations, supporting some of the designated migratory fish species. Underwater noise and vibration during construction could cause potential significant effects to migratory fish features. There is no pathway of effect during operation.
In-channel aquatic Macrophytes, Phytobenthos & Plankton	Construction & Operation	×	Benthic habitat classified as mud (Ref 8.1), with minimal benthic macrophytes assumed. There is no pathway of effect from any planned activity during construction and operation assuming best practice construction practices are adopted to limit potential for pollution and sediment disturbance.
Freshwater Habitats & Invertebrates	Construction & Operation	✓	Benthic habitat classified as mud. NRW river macroinvertebrate survey data are available within 6 km of the Site (Ref 8.2). Further assessment is required to determine the potential significant effects associated with several impact pathways including loss of habitat, physical disturbance and displacement, spread of Invasive Non-Native Species (INNS), accidental pollution events and shading from the Proposed Development during construction and operation.
Fish	Construction & Operation	✓	Several migratory fish species of conservation importance are present within or are known to transit Cardiff Bay. Loss of habitat, physical disturbance and displacement, underwater noise and vibration, artificial lighting and accidental pollution events could

Sub-topic	Development phase/s	Scope in (✓) or Scope out (×)	Summary of rationale for the scope proposed
			cause potential significant effects to fish species during construction and operation.
Marine Mammals	Construction & Operation	×	Marine mammals are recorded in low densities within the central Severn Estuary. There are no records of marine mammals within Cardiff Bay. There is no pathway of effect from any planned activities for the Proposed Development during construction or operation due to the presence of the Cardiff Bay barrage as a physical barrier for movement of marine mammals to Site or for any effects to occur on marine mammals within the Severn Estuary.

Rationale for the scope proposed

8.2.2 The rationale for the scope proposed in Table 8-1 is explained below.

Baseline Conditions and Future Baseline

8.2.3 This section sets out the baseline data that has been collected to characterise the aquatic ecology baseline within the study area. Information has been collected through desk study and consultation with NRW. This information on potential receptors, in conjunction with the consideration of potential impacts and impact pathways and the potential significant effects on those receptors, form the rationale for the scope proposed.

Designated Sites

8.2.4 The Proposed Development Site is located approximately 1,480m from The Severn Estuary SAC, SPA, SSSI and Ramsar Site. There are three Annex II species associated with the SAC i.e. sea lamprey *Petromyzon marinus*, river lamprey *Lampetra fluviatilis* and twaite shad *Alosa fallax* (Ref 8.3). These three species together with salmon *Salmo salar*, sea trout *Salmo trutta*, eel *Anguilla 58pprox.58* and allis shad *Alosa alosa* are also a designated feature of the Ramsar Site (Ref 8.4). The Cardiff Bay barrage incorporates a fish pass which could allow migratory fish (features of the designated site) to transit through the Site. Without mitigation, there is potential for significant construction phase effects on migratory fish. Therefore, designated sites have been scoped into the EIA. Potential effects on European sites will also be assessed within the Project HRA.

In-channel aquatic Macrophytes, Phytobenthos & Phytoplankton

8.2.5 In 2021, the Water Framework Directive (WFD) macrophytes and phytoplankton status for the 'Taff – conf Rhondda R to castle Street' water body was 'Good'. Data from two NRW KiEco Freshwater Ecology: River Macrophytes survey locations are available within 6 km of the Site (Ref 8.2), with local benthic macrophyte cover assumed to be minimal. Phytoplankton biomass data for Cardiff Bay determined that phytoplankton communities were healthy and highly productive, whilst zooplankton assemblages were typical of other eutrophic lakes (Ref 8.5) (Ref 8.6). During construction and operation, potential impact pathways for plankton (and macrophytes) relate principally to accidental pollution events from construction activities. However, with embedded/tertiary mitigation (e.g. spill prevention measures as part of the Construction Environmental Management Plan for the project) the risk of adverse effect is very low. Therefore, in-channel aquatic Macrophytes, Phytobenthos & Phytoplankton have been scoped out of the EIA. Note that systematic assessment of all WFD supporting elements will be undertaken in the Project WFD Assessment.

Freshwater Habitats & Invertebrates

8.2.6 Sampling of aquatic macroinvertebrates at the Cardiff Bay Wetland Reserve, located within the northern end of Cardiff Bay and approximately 0.8 km from the Proposed Development Site, recorded a total of 23 taxa. The most dominant taxa recorded were Chironomidae, Gammaridae and Physidae (Ref 8.7). Two species of invertebrate INNS are also present throughout Cardiff Bay and within the lower reaches of the Rivers Taff and Ely i.e. zebra mussel *Dreissena polymorpha* and killer shrimp *Dikerogammarus villosus* (Ref 8.8) (Ref 8.9). Data from two NRW KiEco Freshwater Ecology: River Macroinvertebrate survey locations are available within 6 km of the Site (Ref 8.2). During construction and operation, potential impact pathways for freshwater habitats and invertebrates include loss of habitat, physical disturbance and displacement, spread of INNS, accidental pollution events and shading from the Proposed Development which could cause potential adverse effects. Therefore, freshwater habitats and invertebrates have been scoped into the EIA.

Fish

8.2.7 The Severn Estuary is important for the migration of several fish species which transit between the estuary and its tributaries, including salmon, sea trout, sea lamprey, river lamprey, allis shad, twaite shad and eel (Ref 8.10); (Ref 8.11). All of these species with the exception of sea trout are listed under Annex II of the Habitats Directive, with Atlantic salmon and river lamprey also listed under Annex V. All seven of the migratory species are considered as Species of Principal Importance under the Environment (Wales) Act (2016) (Ref 8.12), Section 7, as well as supporting the severn Estuary designated sites. During construction, there are several potential pathways of impact that could affect fish including loss of habitat, physical disturbance and displacement, underwater noise and vibration, artificial lighting and accidental pollution events which could cause potential significant effects. During operation, impact pathways could include the effects of artificial lighting. Therefore, fish have been scoped into the EIA.

Marine Mammals

8.2.8 Five species of cetacean are recorded within the Severn Estuary (Ref 8.13, Ref 8.14). Of these, harbour porpoise *Phocoena phocoena* and common dolphin *Delphinus delphis* are the most common. The only pinniped known to occur within the Severn Estuary is the grey seal *Halichoerus grypus* (Ref 8.13); (Ref 8.15). NBN Atlas Wales indicate no records of marine mammals within Cardiff Bay or River Taff. During construction, the primary impact pathway to marine mammals is underwater noise and vibration from piling during construction. However, the Cardiff Bay barrage would act as a physical barrier to prevent marine mammals transiting through the Proposed Development Site. Additionally, the barrage would also act as an effective sound barrier to the impacts of underwater noise and vibration. Therefore, it is considered that any effects to marine mammals can be scoped out. Therefore, marine mammals have been scoped out of the EIA.

Future Baseline

8.2.9 Despite anticipated climate change over the anticipated lifetime of the project, any aquatic ecology habitat and/or species change at this location is predicted to be negligible in the context of an impact assessment.

8.3 Design, Mitigation and Enhancement Measures

Table 8-2: Draft register of commitments for Aquatic Ecology

Measures	Delivery mechanism	Development phase
Mitigation to reduce the risk of accidental spills or leakages, and the dispersal of silt laden water.	Outline Construction Environmental Management Plan (Applicant) – to be submitted as part of the planning application submission. Construction Environmental Management Plan (Principal Contractor) – to be secured via a planning condition. The development of the design will be cognisant of mitigating, as far as practicable, the dispersal of silt laden water. A drainage design for the operation/use phase shall be prepared in consultation with NRW (it is expected that this would be secured via a planning condition).	Construction & Operation
Mitigation to reduce the risk of INNS.	Biosecurity Plan (Principal Contractor) – to be secured via a planning condition.	Construction & Operation

Enhancement opportunities

8.3.1 Opportunities to provide enhancement measures within the Proposed Development Site to deliver benefits to Aquatic Ecology are expected to be minimal given the small in-channel development footprint, however these will be considered as appropriate.

8.4 Assessment Process and Methodology

8.4.1 The paragraphs below set out the proposed assessment methodology and a summary of consultation undertaken to date as well as future planned consultation.

Relevant Legislation, Policy and Guidance

8.4.2 Key legislation, policy and guidance relevant specifically to inform the assessment of aquatic ecology includes, but is not restricted to, the following:

International

- Conservation of Natural Habitats and of Wild Fauna and Flora (92/43/EEC) (the 'Habitats Directive') (Ref 8.16), which provides a framework for the conservation and management of natural habitats, wild fauna (except birds) and flora in Europe.
- Water Framework Directive (WFD) (2000/60/EC) (Ref 8.17), which establishes a framework for the management and protection of Europe's water resources. It is implemented in England and Wales.
- EU Alien Invasive Species Regulation (Regulation No 1143/2014) (Ref 8.18), which is designed to establish a framework for action to prevent, minimise and mitigate the adverse impacts of invasive non-native species on biodiversity and ecosystem services.
- Convention on the Conservation of European Wildlife and Natural Habitats (the 'Bern Convention') (Ref 8.19), which aims to ensure conservation and protection of all wild plant and animal species and their natural habitats (listed in Appendices I and II of the Convention).
- Convention on the Conservation of Migratory Species of Wild Animals (the 'Bonn Convention') (Ref 8.20), which aims to conserve migratory species and their habitats by providing strict protection for endangered migratory species (listed in Appendix 1 of the Convention).
- Convention on Biological Diversity 1992 (Ref 8.21), focuses on the conservation of all species and ecosystems and, therefore, provides protection to all biodiversity.
- Council Regulation (EC) No. 1100/2007: Establishing measures for the recovery of the stock of European eel (Ref 8.22), which aims to reduce anthropogenic mortality to a level that permits the escapement to the sea of at least 40% of the silver eel biomass, relative to the best estimate of escapement that would have existed with no anthropogenic influence.

National

- Salmon and Freshwater Fisheries Act 1975 (as amended) (Ref 8.23), which makes it an offence to discharge effluents which may damage fish, their food or their spawning grounds.

- The Wildlife and Countryside Act 1981 (as amended) (Ref 8.24) is the principal mechanism for the legislative protection of wildlife in Britain. It consolidates and amends existing national legislation to implement the Bern Convention and Birds Directive.
- The Water Resources Act 1991 and amendment (England and Wales) Regulations 2009 (Ref 8.25), which regulates water resources, water quality, pollution and flood defence.
- Environment (Wales) Act 2016 (Ref 8.12), which puts into place the necessary legislation to enable the planning and management of the natural resources of Wales in a more sustainable, pro-active and joined-up way.
- Water Act 2014 (Ref 8.26) which focusses on the Environmental Permitting regime in relation to water abstraction and pollution prevention and control.
- The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017 as amended (Ref 8.27), which amend the 2003 WFD Regulations to provide specific powers for the designation of shellfish waters. The Floods and Water (Amendment etc.) (EU Exit) Regulations 2019 (Ref 8.37) are also applicable.
- The Eels (England and Wales) Regulations 2009 (SI 2009 No. 3344) (Ref 8.28), which establishes measures for the recovery of the stock of European eel into law in England and Wales.
- Environmental Permitting (England and Wales) Regulations 2016 (EPR 2016) (Ref 8.29), which sets out the permitting regime for discharges to controlled waters.
- The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019 (Ref 8.30), which consolidates the Conservation of Habitats and Species Regulations 2010 with subsequent amendments and make provision for the protection and management of sites, including the control of potentially damaging operations that may affect designated sites.

Policy & Guidance

- Planning Policy Wales, Edition 11, February 2021 (Ref 8.34);
- Cardiff Local Biodiversity Action Plan 2008 (LBAP) (Ref 8.35);
- Adopted Cardiff Local Development Plan 2006-2026 (2016) (Ref 8.36)
- The Cardiff Green Infrastructure Supplementary Planning Guidance (SPG) provides planning advice on a number of related development areas including the environment, river corridors, and ecology and biodiversity. Detailed guidance in respect to ecology and biodiversity and river corridors are provided in Technical Guidance Notes which inform various Local Development Plan (LDP) policies (Ref 8.31).
- The Cardiff Harbour Authority (CHA) Environmental Policy Statement states that CHA is responsible for the management of the Cardiff Bay Barrage and "has the objective of maintaining the best environmental standards throughout Cardiff Bay and is committed to protecting the environment and its biodiversity" (Ref 8.32).
- Chartered Institute of Ecology and Environmental Management's (CIEEM) Guidelines for Ecological Impact Assessment in the United Kingdom (2018) (Ref 8.33)

Consultation

8.4.3 Consultation is currently being undertaken with NRW and the CHA to determine any consents and permissions required for undertaking freshwater surveys. Consultation will also be carried out with NRW to gather relevant datasets for freshwater habitats, invertebrates and fish, to supplement a) those data that are available online, and b) the proposed additional macroinvertebrate survey data.

Methodology

Study Area

8.4.4 The proposed study area for both construction and operation will include all aquatic ecology features within the application site boundary in addition to a ZoI around the application site boundary. The ZoI for each impact pathway will be determined at the Environmental Statement (ES) stage once further construction design details become available such as the number and size of piles, piling methodology and duration of piling activity. For the construction phase, the largest ZoI is expected to be that associated with potential underwater noise and vibration impacts. For the operation phase, the ZoI is expected to be limited to the application site boundary for impact pathways that include light pollution and shading. Note that designated site receptors beyond the immediate ZoI will be considered where potential impacts are identified on relevant supporting species.

Baseline

8.4.5 To assess the potential impact of the Proposed Development to Aquatic Ecology, a desk-based review will be conducted for aquatic Biological Quality Elements (BQEs) including freshwater macrophytes, invertebrates, and fish. An initial, rapid review of baseline information has been made to inform scoping for Aquatic Ecology and the baseline will be fully reported within the Aquatic Ecology ES Chapter. The baseline will involve a review of statutory and non-statutory designated sites, notable habitats and species using existing ecological data including, but not restricted to, the following:

- published and grey literature;
- previous aquatic ecology surveys;
- NBN Atlas Wales; and
- NRW receptor datasets.

8.4.6 Macroinvertebrate samples will be collected from the Proposed Development footprint to ensure site-specific baseline data. It is likely that samples will be collected using airlift sampler, which is considered best practice for collecting benthic macroinvertebrates in deep watercourses.

Assessment Methodology

8.4.7 The general approach to the Ecological Impact Assessment (EcIA) will follow the Guidelines for Ecological Impact Assessment produced by the Chartered Institute of Ecology and Environmental Management (Ref 8.33). This will include determination of impact / receptor effect pathways, magnitude of impact, the conservation value of receptors and sensitivity of receptors to effects. All of this information will be considered to determine a significance level for each identified effect. For effects considered to be significant adverse, mitigation measures will be proposed, as appropriate.

8.4.8 These guidelines set out the process for assessment through the following stages:

- Describing the ecological baseline through survey and desk study;
- Identifying and evaluating 'Important Ecological Features' (IEFs);
- Identifying and characterising the likely effects on IEFs;
- Determining the significance of effects in the absence of mitigation;
- Describing mitigation, compensation and/or enhancement measures associated with the development and assessing residual significance; and
- Identifying monitoring requirements.

8.4.9 More detail on the approach, including determining the significance of likely effects, will be provided in the ES.

Assumptions and limitations

8.4.10 The following assumptions have been identified:

- Baseline characterisations will be principally based on desk-based study, with the exception of a proposed macroinvertebrate survey. This is deemed appropriate given the scale (footprint) of development, likely impact types, provisional consideration of receptor sensitivities, and presence of existing data.

9 Ground Conditions (and Soils)

9.1.1 This chapter provides a summary of the scope proposed. This is followed by a detailed rationale for this scope taking into account potential impacts arising from the Proposed Development, potential receptors likely to be affected and potential impact pathways as well as the potential for likely significant effects. Draft mitigation commitments are identified to support the assessment scope proposed, this is followed by a description of the assessment process and methodology to be adopted.

9.2 Assessment Scope – Potential Environmental Effects

9.2.1 Table 9-1 presents the proposed scope of the Ground conditions and Soils assessment that will form part of the EIA.

Table 9-1: EIA Scope – Ground Conditions (and Soils)

Sub-topic and/or receptor	Development phase/s	Scope in (✓) or Scope out (×)	Summary of rationale for the scope proposed
Hazards to workers	Construction	✓	Based on the site history having been subjected to landfilling, potential hazards to human health during the construction phase have been identified. Given the likely exposure frequency and use of Personal Protective Equipment during works these are considered to be low risk but should be assessed and managed as part of the works.
Hazards to Future Site Users	Operation	×	Based on the site history, potential hazards that could affect human health during the operational phase have been identified. However, hazards can be managed during construction through material management to break source-pathway-receptor linkages.
Contamination pathways	Construction	✓	Land situated on the banks of the river (both east and west) identified as formally having been subjected to landfilling. Potential hazards which may impact controlled waters have been identified (during both construction and operation). Construction works will require foundations to be installed potentially through the Tidal Flat Deposits (Secondary undifferentiated Aquifer) into the Mercia Mudstone (Secondary B Aquifer). Foundations will need to be installed / constructed so that they do not act as a preferential pathway for contamination.
Contamination of controlled waters	Construction	✓	
Contamination of controlled waters	Operation	✓	

Sub-topic and/or receptor	Development phase/s	Scope in (✓) or Scope out (×)	Summary of rationale for the scope proposed
Contamination pathways	Operation	×	Once construction is complete, the potential for preferential contamination pathways to be generated or impacted would be considered to have ceased. This is based on the assumption that the potential for finished features which could act as preferential pathways, such as utilities/services runs, are considered as part of the management of potential land quality risks.
Soil resources	Construction	✓	Available topsoil resources will be stripped to enable construction activities. The topsoil resource should be handled appropriately so it is available to support site restoration/landscaping.

Rationale for the scope proposed

9.2.2 The Proposed Development will entail the construction of a pedestrian bridge across the River Taff, with associated civil works to construct public access ways and limited areas of soft landscaping on the opposing riverbanks (east and west). The pedestrian bridge will be supported by 3 piers within the river channel.

9.2.3 Data sources (see Appendix D1) indicate historical landfilling within the Proposed Development area (east and west banks of the River Taff), with topsoil capping.

9.2.4 The environmental quality of material present within landfill is unknown, as the landfills pre-date modern waste management regulations. Therefore, the potential for contaminated material to be present cannot be discounted and the potential for hazards to both human health and environmental receptors exist.

9.2.5 Construction works will necessitate the excavation and movement of materials. During this phase the potential exposure of construction workers with contaminated materials is high. Based on the limited exposure duration, use of appropriate controls (e.g., Personal Protective Equipment (PPE)) and prior environmental site assessment to assess soil quality before construction, the potential risks can be reduced to low.

9.2.6 During the operational phase, potential risks to future users from contaminated materials based on a recreational use is considered to be low. Environmental site assessment and, if necessary, remediation or material management planning can reduce potential risk to very low /negligible.

9.2.7 The historical landfill hazards are considered to present a potential risk to controlled waters, given the proximity to the river. The pathway of concern is leaching of contamination from soil. This potential source-pathway-target linkage will be assessed as part of the proposed land quality risk assessment works and mitigative measures implemented should potential risks be identified.

9.2.8 The potential impacts of the Proposed Development on controlled waters are proposed to be assessed and controlled during the construction and operation phases to demonstrate construction of the footbridge has not created a preferential pathway for contaminant migration into the River.

Baseline Conditions and Future Baseline

9.2.9 The baseline conditions at the Site may be summarised as follows:

- The Site comprises two areas public open space known as Hamadryad Park (to the east of the river) and The Marl (to the west), with the River Taff flowing from north to south through its centre;
- Other than historical landfilling the Site has generally been undeveloped and has not been used for industrial / commercial purposes with a significant potential for ground contamination.
- Known historical landfilling includes:
  - A landfill for inert, industrial and household waste operated by Davies Ltd, (March 1994 to June 1996) in Hamadryad Park. Operation of the landfill appears to coincide with the reclamation of land from the sea as part of the development of the Cardiff Bay Link Road.
  - A landfill for inert, industrial, commercial, household and special Environmental Permitting waste between 1936 and 1945 located within The Marl.
- A review of historical mapping for these periods suggests the landfilling operations undertaken in the area may be better characterised as the formation of new land mass/reclamation of land from the sea by the deposition of waste; as opposed to a discrete excavation within existing land being infilled with waste and subsequently capped.
- Based on the timing of the landfilling in the area, the landfills are expected to be unconstrained*, i.e.* without a clay or other synthetic/engineered barrier system preventing off site migration of gases, leachate and other contaminants,
- The baseline condition of these landfilled areas is considered likely to be a scenario where contamination present could leach / mobilise from the landfill.
- This is considered significant as
  - It is considered likely that residual contamination within the landfills will have been attenuating/have attenuated since deposition; and,
  - The Proposed Development works are considered likely to reduce the potential for preferential contaminant migration pathways than currently exist.

9.2.10 In the wider area, the land on the west bank of the river has formerly been associated with a sand and gravel yard, with unspecified ground workings shown on mapping from c.1915 and the sand and gravel yard operation labelled in 1953. The location and orientation of buildings and conveyors in the area suggest sand and gravel may have been commercially extracted from the west riverbank for some period.

Geology and Ground Conditions

9.2.11 Published geological data indicates the Site to be underlain by superficial Tidal Flat Deposits and bedrock geology of the Mercia Mudstone Group.

Soils

9.2.12 Published soil mapping (at 1:250,000 scale) (ref 9.1) shows the area to be urban. However, the Predictive Agricultural Land Classification indicates that, should the land be in agricultural use, it could potentially be Grade 1 land.

9.2.13 Borehole logs (see Appendix D1) describe topsoil (varying between 8mm and 25mm; slightly sandy silt with occasional fine to medium gravel) over made ground (black silty sand with varying amounts of gravel, ash, clinker, cobbles, concrete to 68pprox.. 2.3m to 4m bgl) which overlies clay alluvium.

Hydrology and Hydrogeology

9.2.14 The most significant receptor for controlled waters is considered to be the River Taff, which flows through the Site.

9.2.15 The superficial geology in the area is classified as a Secondary (undifferentiated) aquifer whilst the bedrock geology is a Secondary B aquifer. The aquifers were assessed under the Water Framework Directive in 2016 and found to have a Good overall rating.

9.2.16 The River Taff was similarly assessed in 2016 and was found to have a Moderate overall rating (moderate ecological rating and failed chemical rating). At the same time, Cardiff Bay was found to have a Moderate ecological rating and Good chemical rating (moderate overall).

9.2.17 No potable water abstractions have been identified within 2km of the Site. The nearest non-potable active abstraction identified is situated approximately 350m to the north, associated with water for a heat pump.

Sensitive Uses and Heritage

9.2.18 No SSSIs, Ramsar Sites, SACs, SPAs or National Nature Reserves (NNR) have been identified within 500m of the Site. The Site is situated within the Cardiff Bay Wetlands and Hamadryad Park LNR.

9.2.19 A Scheduled Ancient Monument – The Wreck of the “Louisa” – is also present approximately 15m south of the application site boundary.

Potential Impacts

Human Health: During Construction and Operation

9.2.20 Potentially active pathways during construction and operational phases are direct contact with soil and airborne pathways (dust, vapour and ground gases).

9.2.21 During the construction phase, the potential inhalation / dermal contact of soil dust by ground workers is considered to represent the highest risk exposure pathway. Historical landfill material may contain asbestos containing materials.

9.2.22 During the operational phase, visitors to the Site are considered to have limited exposure to soils, dust, vapours or ground gases. Potential risks to human health are therefore considered to be low.

9.2.23 It is noted that the landfill material present on site is likely to be near the ground surface (based on the assumption the two landfill areas represent two areas reclaimed from the sea/land raised by infilling).

9.2.24 The Proposed Development will provide an opportunity for underlying land quality and associated risks to be assessed.

9.2.25 Based on the desk study review undertaken (see Appendix D1), potentially significant effects from contaminated soils are considered to be low. Where practicable and suitable the existing topsoil capping materials should be stripped and re-used on site to support final site restoration and landscaping. A cover system of chemically validated topsoil/subsoil may be required, effectively providing betterment to the current baseline conditions for human health.

9.2.26 The process of developing the conceptual site model and identifying if remedial measures are required, will be agreed in writing with the Regulators under the UK planning regime.

Controlled Waters: During Construction and Operation

9.2.27 In relation to controlled waters, potential for effects from impacts beyond those already being realised as part of the baseline condition at the Site are considered to be low.

9.2.28 If contaminated soils are present within the historical landfill material these impacts may already have viable pathways to affect the river, these are expected to be reduced by the construction or operation of the Proposed Development.

9.2.29 A ground investigation will be undertaken to assess the environmental quality of the material and enable controls to manage potential risks to human health or controlled waters.

9.2.30 As with human health, the Proposed Development is considered to provide an opportunity to provide betterment as part of the implementation of the scheme through management of contaminated soils.

Contamination Pathways: During Construction

9.2.31 As part of the proposed construction works, there is some limited potential for contaminant pathways which do not currently exist to be created.

9.2.32 Should the ground investigation identify potential leachable contamination to be present within soil at the Site, considerations may need to be given for the construction phase to prevent mobilisation of contamination to surface water receptors and / or the Secondary B Aquifer.

9.2.33 Should such potential impacts be identified, these can be managed via remediation or mitigation measures (e.g. proactive removal of contaminated soils), or employment of specific construction techniques which could prevent the impacts effecting the water resource receptors (e.g. piling).

9.2.34 If impacts are identified these should be further assessed with the Regulators with supporting design and risk management documents (e.g. a Piling Risk Assessment) produced as necessary.

9.3 Design, Mitigation and Enhancement Measures

Table 9-2: Draft register of commitments for Ground Conditions and Soils

Measures	Delivery mechanism	Development phase
Ground investigation	Ground investigation designed by a suitably qualified and experience geo-environmental consultant appointed by the Designer, prior to construction works commencing, as part of the Proposed Development design and implementation	Pre-Construction
Implementation of remedial and risk mitigation measures as necessary by proactive interpretative reporting (if required)	Should the Ground Investigation identify contaminants of concern at concentrations which may present a potential risk to receptors, a Remediation Strategy (this could be a Material Management Plan) would be required to detail how the soils would be managed during the Construction Phase to negate the potential risks identified. This is expected to be required to discharge pre-commencement Planning Conditions. Implementation of the agreed Remediation Strategy by the Principal Contractor/Contractors.	Pre-Construction / Construction
Production of a Validation Report in line with Land Contamination: Risk Management (LC:RM) guidance (ref 9.2) demonstrating the agreed Remediation Strategy was	Factual data should be collated by the Contractor responsible for implementing remediation works and these records provided to the geo-environmental consultant for them to produce a Validation Report. This should include details and records of waste streams produced.	Construction (End)

Measures	Delivery mechanism	Development phase
implemented as agreed (if required)		
Soil Management Plan	Soil Management Plan to be produced based on pre-construction soil survey and to be included within the CEMP.	Construction

Enhancement opportunities

9.3.1 Based on the scope of the Proposed Development the potential opportunities for enhancement are considered to comprise improvement of shallow soil quality and removal of legacy contamination that may be present from historical landfilling/ deposition of anthropogenic materials (i.e. Made Ground) which may contain a residuum of contamination.

9.4 Assessment Process and Methodology

9.4.1 The paragraphs below set out the proposed assessment methodology and a summary of consultation undertaken to date as well as future planned consultation.

Relevant Legislation, Policy and Guidance

9.4.2 The following relevant legislation, policy and guidance will be referred to and used in the assessment:

- Environment Agency (2021) Land Contamination: Risk management (LC:RM) guidance (Ref 9.2)
- Land Quality Management Ltd and the Chartered Institute of Environmental Health (2015) S4Uls for Human Health Risk Assessment (Ref 9.3)
- CLAIRE (2014) Category 4 Screening Levels (C4SLs) (Ref 9.4)
- Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy (Ref 9.5)
- Institute of Environmental Management and Assessment (2022). A New Perspective on Land and Soils in Environmental Impact Assessment (Ref 9.6)
- Environment Agency Revised March (2017) Groundwater Protection: Principles and Practice (GP3) (Ref 9.7)
- Environment Agency, (2015). Contaminated Land Exposure Assessment (CLEA) tool. Environment Agency. (Ref 9.8)
- Department for Environment, Food and Rural Affairs, (2012). Environmental Protection Act 1990: Part 2A Contaminated Land Statutory Guidance. London. The Stationery Office Limited. (Ref 9.9)
- Department for Environment, Food and Rural Affairs, (2013). Environmental Permitting Guidance, Core Guidance For the Environmental Permitting (England and Wales) Regulations 2010. London. The Stationery Office Limited. (Ref 9.10)

- British Standards, (2001). BS:10175 Code of Practice for the Investigation of Potentially Contaminated Sites. London. British Standards Institution. (Ref 9.11)
- British Standards, (2015). BS:8485 Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings. London. British Standards Institution. (Ref 9.12)
- Construction Industry Research and Information Association (CIRIA) 2006. CIRIA C665 Assessing risks posed by hazardous ground gases to buildings. London. Construction Industry Research and Information Association Consultation. (Ref 9.13)
- Defra: Construction Code of Practice for the Sustainable Use of Soils on Construction Sites. (Ref 9.14)
- Cardiff Green Infrastructure SPG Soils and Development TGN, Consultation Draft, June 2017 (Ref 9.15)

Consultation

9.4.3 No consultations with Regulators have been undertaken to date. These will be undertaken particularly in relation to any further information – such as historical records, anecdotal information or ground investigation data relating to the two identified areas of landfill.

9.4.4 As part of pre-application consultation with the local planning authority in April/May 2022, the Tree Protection Team has advised that the soils assessment should be undertaken in accordance with Cardiff Green Infrastructure SPG Soils and Development TGN (Ref 9.15).

Methodology

Study Area

9.4.5 The study area for the purposes of the assessments comprises the two land-based areas of the Proposed Development situated to the east and west of the River Taff, Cardiff.

Baseline

9.4.6 The current baseline at the Site has been assessed via Phase 1 Environmental Site Assessment (Desk Study), see Appendix D1.

9.4.7 A ground investigation will be required prior to design and commencement of works, due to the presence of the historical landfills. This work will provide a baseline for soil and groundwater quality.

Assessment Methodology

Construction and Operation

9.4.8 In relation to contaminated land, a source, pathway receptor approach in accordance with the Land Contamination: Risk Management (LC:RM) guidance (Ref 9.2) would be adopted for assessing risks from contaminated soils / groundwater.

9.4.9 In relation to human health, contaminant concentrations, when available, would be screened against appropriate screening values such as the Land Quality Management/Chartered Institute of Environmental Health (LQM/CIEH) Suitable 4 Use Levels for a Public Open Space (park) exposure scenario (ref 9.3).

9.4.10 In relation to controlled waters, an assessment of effects will be undertaken that considers derogation (water level and water quality) potential to controlled waters receptors.

9.4.11 If required, a site specific Detailed Quantitative Risk Assessment (DQRA) could be completed to avoid use of generic assessment criteria. Once ground investigation results are available and a generic risk assessment has been completed, the need for a DQRA can be determined.

9.4.12 Should the ground investigation identify contamination that presents a potentially unacceptable risk to receptors then a remediation scheme or material management plan will be developed and implemented. The Contractor will need to validate scheme prior to operation. It is not anticipated that further work / controls will be required during operation.

9.4.13 Based on the site history and nature of the potential impacts to the identified receptors, no potential cumulative impacts are anticipated.

Determining Significance

9.4.14 If required, comparison of environmental quality pre and post construction will be compared to thresholds agreed with Regulators/statutory consultees to determine significance of residual effects.

9.4.15 With regards to the ground conditions assessment, determining the significance of effects will be informed by the following guidance:

- The LC:RM guidance (Ref 9.2),
- Supporting publications relating to the assessment of risks to human health (i.e. S4UL/C4SL framework) (Ref 9.3) (Ref 9.4),
- The Water Framework Directive (2000/60/EC) (and other supporting publications in relation to suitable screening criteria for the protection of controlled water), (Ref 9.5),
- Institute of Environmental Management and Assessment guidance on Land and Soil (Ref 9.6),
- In the event that asbestos is identified in the landfill material, industry guidance produced in relation to the assessment and management of potential risks presented by asbestos in soils (i.e. CL:AIRE Joint Industry Working Group (JIWG) publications).

9.4.16 More detail on the approach will be provided in the ES.

9.4.17 The soil assessment will determine significance of effects in line with IEMA guidance (Ref 9.6). The sensitivity of receptors will be assessed based on the criteria set out in

9.4.18 Table 9-3. The magnitude of impacts will be assessed based on the criteria set out in Table 9-4.

Table 9-3: Sensitivity of Receptor Criteria – Soils Assessment

Receptor sensitivity (in-situ soils)	Soil resource and soil functions
Very High	***Biomass production***: ALC Grades 1 & 2 ***Ecological habitat, soil biodiversity and platform for landscape***: Soils supporting protected features within a European site (e.g., SAC, SPA, Ramsar Site); Peat soils; Soils supporting a National Park, or Ancient Woodland ***Soil carbon***: Peat soils Soils with potential for ecological/landscape restoration ***Soil hydrology***: Very important catchment pathway for water flows and flood risk management ***Archaeology, Cultural heritage, Community benefits and Geodiversity***: SAMs and adjacent areas; World Heritage and European designated sites; Soils with known archaeological interest; Soils supporting community/recreational/educational access to land covered by National Park designation ***Source of materials***: Important surface mineral reserves that would be sterilised (i.e., without future access)
High	***Biomass production***: ALC Grade 3a ***Ecological habitat, soil biodiversity and platform for landscape***: Soils supporting protected features within a UK designated site (e.g., UNESCO Geoparks, SSSI or AONB, Special Landscape Area and Geological Conservation Review sites); Native Forest and woodland soils; Unaltered soils supporting semi-natural vegetation ***Soil carbon***: Organo-mineral soils (e.g. peaty soils) ***Soil hydrology***: Important catchment pathway for water flows and flood risk management ***Archaeology, Cultural heritage, Community benefits and Geodiversity***: Soils with probable but as yet unproven (prior to being revealed by construction) archaeological interest; Historic parks and gardens; RIGS; Soils supporting community/recreational/educational access to RIGS and AONBs; ***Source of materials***: Surface mineral reserves that would be sterilised (i.e., without future access)
Medium	***Biomass production***: ALC Grade 3b ***Ecological habitat, soil biodiversity and platform for landscape***: Soils supporting protected or valued features within non-statutory designated sites (e.g. Local Nature Reserves (LNR), Local Geological Sites (LGSs), Sites of Nature Conservation Importance (SNCIs), Special Landscape Areas; Non-Native Forest and woodland soils ***Soil carbon***: Mineral soils ***Soil hydrology***: Important minor catchment pathway for water flows and flood risk management ***Archaeology, Cultural heritage, Community benefits and Geodiversity***: Soils with possible but as yet unproven (prior to being revealed by construction) archaeological interest; Soils supporting community/recreational/educational access to land ***Source of materials***: Surface mineral reserves that would remain accessible for extraction
Low	***Biomass production***: ALC Grade 4 and 5

	Ecological habitat, soil biodiversity and platform for landscape: Soils supporting valued features within non-designated notable or priority habitats/landscapes. Agricultural soils ***Soil carbon***: Mineral soils ***Soil hydrology***: Pathway for local water flows and flood risk management ***Archaeology, Cultural heritage, Community benefits and Geodiversity***: Soils supporting no notable cultural heritage, geodiversity nor community benefits; Soils supporting limited community/recreational/educational access to land ***Source of materials***: Surface mineral reserves that would remain accessible for extraction
Negligible	As for low sensitivity, but with only indirect, tenuous, and unproven links between sources of impact and soil functions

Table 9-4: Magnitude Criteria – Soils Assessment

Magnitude of impact (change)	Description of impacts restricting proposed land use
Large	Permanent, irreversible loss of one or more soil functions or soil volumes (including permanent sealing or land quality downgrading), over an area of more than 20ha or loss of soil-related features set out in Table 3.7.3 above, as advised by other topic specialists in EIA team (including effects from 'temporary developments'*) or Potential for permanent improvement in one or more soil functions or soil volumes due to remediation or restoration over an area of more than 20ha, or gain in soil-related features set out in Table 3.7.3 above, as advised by other topic specialists in EIA team (including effects from 'temporary developments'*)
Medium	Permanent, irreversible loss of one or more soil functions or soil volumes, over an area of between 5 and 20ha or loss of soil-related features set out in Table 3.7.3 above, as advised by other topic specialists in EIA team (including effects from 'Temporary Developments'*) or Potential for improvement in one or more soil functions or soil volumes due to remediation or restoration over an area of between 5 and 20ha, or gain in soil-related features set out in Table 3.7.3 above, as advised by other topic specialists in EIA team
Small	Permanent, irreversible loss over less than 5ha or a temporary, reversible loss of one or more soil functions or soil volumes), or temporary, reversible loss of soil-related features set out in Table 3.7.3 above, as advised by other topic specialists in EIA team or Potential for permanent improvement in one or more soil functions or soil volumes due to remediation or restoration over an area of less than 5ha or a temporary improvement in one or more soil functions due to remediation or restoration or off-site improvement, or temporary gain in soil-related features set out in Table 3.7.3 above, as advised by other topic specialists in EIA team
Negligible	No discernible loss or reduction or improvement of soil functions or soil volumes that restrict current or proposed land use

9.4.19 Table 9-5 shows the significance matrix that will be used for the Soils assessment.

Table 9-5: Significance Matrix – Soils Assessment (Ref 9.6)

		Nature of impact (magnitude/probability/reversibility)				
		No Change	**Negligible**	**Minor**	**Moderate**	**Major**
Nature of Receptor (sensitivity/ value/ importance)	**Very high**	Neutral	Slight	Moderate or large	Large or very large	Very large
	High	Neutral	Slight	Slight or moderate	Moderate or large	Large or very large
	Medium	Neutral	Neutral or slight	Slight	Moderate	Moderate or large
	Low	Neutral	Neutral or slight	Neutral or slight	Slight	Slight or moderate
	Negligible	Neutral	Slight	Neutral or slight	Neutral or slight	Slight

Assumptions and limitations

9.4.20 To ensure transparency within the EIA process, the following limitations and assumptions have been identified:

- For the purposes of the assessments presented herein, the identified landfills have been assumed not to have been engineered to current standards (i.e. have been constructed with clay base layer and appropriate cap). Therefore, if contamination is present within the waste, it is potentially mobile and could already migrate into the adjacent river.

10 Health

10.1.1 This chapter provides a summary of the scope proposed. This is followed by a detailed rationale for this scope taking into account potential impacts arising from the Proposed Development, potential receptors likely to be affected and potential impact pathways as well as the potential for likely significant effects. Draft mitigation commitments are identified to support the assessment scope proposed, this is followed by a description of the assessment process and methodology to be adopted.

10.2 Assessment Scope – Potential Environmental Effects

10.2.1 Table 10-1 presents the proposed scope of the Health assessment that will form part of the EIA.

Table 10-1: EIA Scope – Health

Sub-topic and/or receptor	Development phase/s	Scope in (✓) or Scope out (×)	Summary of rationale for the scope proposed
Accessibility and active travel	Construction Operation	✓ ✓	Potential health impacts during construction may relate to perceptions of changes to accessibility or the ability of people to walk or cycle as a result of construction activities / presence of construction traffic. Other potential impacts on accessibility may affect river users during the construction phase. These effects can be managed through appropriate best practice construction measures (for example, community engagement and a CEMP or similar). Effects during operation are likely to be beneficial and significant due to increased connectivity.
Crime reduction and community safety	Construction Operation	× ×	During construction, impacts may arise as a result of the presence of work sites and construction workers from outside of the area. Impacts can be managed through best practice measures (e.g. hoarding / security measures and by signing up to a Considerate Contractors programme). As advised by the Planning Department at Cardiff Council, crime reduction and community safety will be covered in the Planning Statement and has therefore been scoped out of the EIA.

Sub-topic and/or receptor	Development phase/s	Scope in (✓) or Scope out (×)	Summary of rationale for the scope proposed
Access to work and training	Construction Operation	× ×	Impacts may arise as a result of access to construction employment or training opportunities (construction phase) or improved connectivity to a wider range of jobs and training (operation/use). Effects are likely to be beneficial. Impacts on river users during the construction phase will be considered in terms of access to work (for example, water taxis). As advised by the Planning Department at Cardiff Council, access to work and training is to be covered in the Planning Statement and has therefore been scoped out of the EIA.
Social cohesion and inclusive design	Construction Operation	× ✓	Construction effects are scoped out as impacts such as physical barriers and severance affecting social cohesion are not considered likely to be significant. The Proposed Development may have beneficial impacts on social cohesion through improved connectivity, enhancing community activity and associated benefits.
Neighbourhood amenity	Construction Operation	✓ ×	Construction activities may lead to changes in neighbourhood amenity, assessed through changes in factors including air quality, noise levels and visual impacts, thus there is the potential for likely significant effects to arise. The CEMP (or equivalent) will include best practice measures to prevent and mitigate any adverse effects associated with neighbourhood amenity. Operational/use effects are scoped out, due to the nature of the development, i.e., it will not generate noise and air pollution from vehicles and commercial uses. While operational effects could arise from an increase in lighting, the proposed bridge lighting will be minimal, i.e., integrated into the parapet/handrail. Bankside lighting does not form part of the Proposed Development.

Sub-topic and/or receptor	Development phase/s	Scope in (✓) or Scope out (×)	Summary of rationale for the scope proposed
			Should this change (i.e., additional lighting on Site), potential impacts on neighbourhood amenity will be reviewed. The design of the proposed lighting will aim to avoid obtrusive light, as far as practicable.
Access to healthcare and social care services and other social infrastructure	Construction Operation	× ×	The Proposed Development may enable residents from communities on both sides of the River Taff to more easily and safely access a greater range of social infrastructure facilities than otherwise. These include opportunities to walk or cycle to school. Effects are likely to be beneficial. As advised by the Planning Department at Cardiff Council, access to healthcare and social care services and other social infrastructure is to be covered in the Planning Statement and has therefore been scoped out of the EIA.
Access to **open** space and nature	Construction Operation	× ✓	Access to The Marl and Hamadryad Park may be affected during the construction phase, but this will be temporary. There are other alternative open spaces in the vicinity, such as Cardiff Bay Wetlands and Grangemoor Park. In addition, The Marl is to be regenerated as part of the approved application 21/01666/MJR. The potential for a significant effect is unlikely. The Proposed Development may enable residents from communities on both sides of the River Taff to more easily and safely access open space and nature, thereby promoting physical activity and both mental and physical wellbeing. Effects are likely to be beneficial and may be significant.
Housing design and affordability Access to healthy food Minimising the use of resources	Construction Operation	× ×	No direct relationship between the Proposed Development and these health determinants.

Sub-topic and/or receptor	Development phase/s	Scope in (✓) or Scope out (×)	Summary of rationale for the scope proposed
Climate change			

Rationale for the scope proposed

10.2.2 The World Health Organisation (WHO) defines health as a *'state of complete physical, mental and social well-being and not merely the absence of disease or infirmity'*. The range of personal, social, economic and environmental factors that influence health status are known as health determinants and include the physical environment, income levels, employment, education, social support and housing. The purpose of the health assessment is to identify changes to health determinants as a result of a project or programme, setting out where improvements and potential harm to health might occur.

10.2.3 An initial health screening assessment was completed using the London Healthy Urban Development Unit screening tool (Ref 10.1)) in order to identify aspects of the Proposed Development which may give rise to effects on health. Supplementary Planning Guidance 'Planning for Health and Wellbeing' produced by Cardiff Council (Ref 10.2) refers to the healthy urban planning checklist and states that *'developers will need to identify what is relevant and ensure it is included in supporting documentation'*.

10.2.4 Potential construction impacts which may have an adverse effect on health include temporary changes in people's ability to walk or cycle (for example, this may be due to the presence of construction traffic in the local area, which changes people's perceptions about safety or quality of the environment); and potential impacts on health as a result in changes in air quality, noise and neighbourhood amenity.

10.2.5 During operation, there may be a number of potentially positive impacts on health, including health benefits associated with increased levels of walking and cycling; improved connectivity resulting in better access to open space and nature; benefits associated with community cohesion.

Baseline Conditions and Future Baseline

10.2.6 The Proposed Pedestrian and Cycle Bridge between The Marl and Hamadryad Park will span from The Marl on the west bank of the River Taff across to Hamadryad Park in the east, linking two areas of green space, and the residential communities of Grangetown and Butetown. A summary of key population characteristics and health attributes of these two communities is provided below:

- Grangetown and Butetown both exhibit similar characteristics in terms of their broad population make-up, including a higher proportion of younger people and a high proportion of the population being from ethnically diverse backgrounds.
- The Welsh Index of Multiple Deprivation (WIMD) (Ref 10.3) measures relative deprivation for small areas in Wales. Both Butetown and Grangetown contain areas ranked within the 10% most deprived areas in Wales. For individual deprivation domains (for example housing, community safety and physical environment) the proportion of areas within the 10% most deprived is much higher (Ref 10.4) (Ref 10.5).
- Life expectancy in Cardiff has increased over the last twenty years. However, increasing life expectancy at the city level hides a growing gap between the life expectancy and healthy life expectancy of the most and least deprived people in the city (Ref 10.6)). Men living in the least deprived communities can expect a healthy life expectancy of 24 years more than for their counterparts in the most deprived areas (the equivalent figure for women is 22 years) (Ref 10.7)).
- Both Butetown and Grangetown experience higher levels of crime than other parts of Cardiff, ranking within the top ten wards (out of 30) for all types of crime (anti-social behaviour, violence with / without injury, residential burglary and vehicle theft) (Ref 10.8)
- Claimant counts in November 2021 were higher in both areas than for Cardiff as a whole (6.4% for Grangetown and 5.3% for Butetown compared to less than 5% for Cardiff) (Ref 10.9)).
- Nearly a third of Cardiff residents are physically active for less than 30 minutes a week.
- Over half of the adult population of Cardiff are reported as being overweight or obese (55%), although this proportion increases when deprivation is factored in, with the percentage of obese adults from the most deprived areas of Cardiff being almost double the percentage of obese adults from the least deprived areas (Ref 10.10). Over a fifth of reception-aged children are overweight or obese (23.2%).

10.2.7 Community facilities and services on either side of the bridge landing points include schools (for example, the Hamadryad Primary School in Butetown), healthcare facilities (for example Grangetown Health Centre) and areas of public open space such as The Marl, Hamadryad Park and Grangemoor Park.

10.2.8 There are a range of users of the River itself, for a variety of recreational, leisure and business purposes. Key groups of river users and currently identified usage levels include:

- Water buses – these operate twice an hour and pass one another at the location of the bridge;
- Rowers – daily use of the river by up to 12 boats, but weather and season dependent;
- Slipway permit holders – approximately 200 permit holders with power boats/sailing boats/paddle boats; again, usage is very seasonal and particularly busy during the summer months;
- There are approximately 12 moorings to the north of the bridge, most of which appear to be static; and

- Harbour Authority work boats – these are larger vessels than those described above and are extremely infrequent in terms of usage.

10.2.9 Future baseline characteristics include population increase arising from new developments. The population of Cardiff is projected to grow by over 20% in the next 20 years, an increase of around 73,000 people. The numbers of young people and older people in particular are expected to rise significantly (Ref 10.11). In the vicinity of the Proposed Development, there is a current proposal for 319 new dwellings as part of the Channel View regeneration proposals.

10.3 Design, Mitigation and Enhancement Measures

10.3.1 There is a growing body of advice on the integration of planning and health, in which all aspects of everyday lifestyles have been found to impact on the health and wellbeing of residents, from employment, transport, community engagement and the environment.

10.3.2 During construction, the potential impacts identified can largely be managed through standard environmental mitigation and traffic management practices. Mitigation measures associated, for example, with air quality and traffic and transport are covered in the relevant chapters of this Scoping Report.

10.3.3 Inclusive design is integral to the Proposed Development. Design measures that are currently being explored are outlined in Table 10-2.

Table 10-2 Draft register of commitments for Health

Measures	Delivery mechanism	Development phase
Inclusive design: • **All gradients will be a maximum of 5% for the benefit of anyone with reduced mobility.** • **The design team is investigating the incorporation of design elements, such as, tapping rails to aid those who are visually impaired.** • **The curved design of the bridge improves 'readability' and wayfinding.** • **As appropriate, the design will be informed by 'PAS 6463 Design for the mind – Neurodiversity and the built environment' (Ref 10.12) and 'BS 8300-1:2018 Design of an accessible and inclusive built environment – External environment. Code of practice' (Ref 10.13)**	The iterative design process	Operation/use

Enhancement opportunities

10.3.4 Consultation with Cardiff Council officers may identify relevant enhancement opportunities associated with the Proposed Development.

10.4 Assessment Process and Methodology

10.4.1 The paragraphs below set out the proposed assessment methodology and a summary of consultation undertaken to date as well as future planned consultation.

Relevant Legislation, Policy and Guidance

10.4.2 The assessment will be informed by a range of legislation, planning policy and guidance.

10.4.3 Relevant legislation includes the Wellbeing of Future Generations (Wales) Act 2015 (Ref 10.14) and the Public Health (Wales) Act 2017 (Ref 10.15) which sets out a range of provisions designed to improve health and prevent avoidable harm.

10.4.4 Relevant planning policy for consideration includes:

- Planning Policy Wales (PPW), Edition 11, February 2021 (Ref 10.16)
- Cardiff Council Planning for Health and Wellbeing Supplementary Planning Guidance (SPG), 2017 (Ref 10.2)
- Cardiff Local Development Plan 2006-2026, January 2016 (Ref 10.17)

10.4.5 Guidance used to inform the health assessment will comprise:

- NHS London Healthy Urban Development Unit (HUDU), Planning for Health: Rapid Health Impact Assessment Tool (Edition 4, October 2019) (Ref 10.1) – the HUDU guidance helps identify those determinants of health likely to be influenced by a specific project or proposal.
- IEMA, Health in Environmental Impact Assessment – A Primer for a Proportionate Approach (June 2017) (Ref 10.18), is primarily a discussion document designed to outline and identify issues arising from changes to the EIA Directive 2014/52/EU that came into force in the UK in May 2017.

Consultation

10.4.6 As part of pre-application discussions with a Planner at Cardiff Council in May 2022, it was advised that the following issues could be scoped out of the EIA and instead covered in the Planning Statement:

- Crime reduction and community safety
- Access to work and training
- Access to healthcare and social care services and other social infrastructure

10.4.7 Further consultation shall include Public Health officials from Cardiff Council to understand baseline conditions across the study area, how health may be impacted by the Proposed Development and opportunities for mitigation and enhancement.

Methodology

Study Area

10.4.8 The study area for the health assessment will encompass the wards of Grangetown and Butetown within Cardiff. The Cardiff local authority boundary will be used to provide comparable data where appropriate. It will also take into account consideration of other topic assessments which may have health-related impacts (for example, the air quality study areas) and the outcome of ongoing consultation with local health stakeholders.

Baseline

10.4.9 Existing baseline conditions will be established using desktop resources, including data from the following sources:

- Public Health Wales Observatory (Ref 10.7);
- Office for National Statistics (Ref 10.19);
- Public Health Wales (Ref 10.20);
- National Survey for Wales (Ref 10.21); and
- NHS Wales Informatics Service (Ref 10.22).

Assessment Methodology

10.4.10 The purpose of the health assessment is to identify changes to health determinants as a result of the Proposed Development, setting out where improvements or potential harm to health might occur. There are interdependencies between the assessment of impacts on health and other topics assessed within the ES and elsewhere (notably air quality, and transport).

10.4.11 The approach for defining significance will be derived from professional judgement and the interaction between the magnitude of impacts and the sensitivity of the resources and receptors. The following will be considered:

- the magnitude of the impact on a health determinant; and
- the sensitivity of the population or receptors that will experience the impact. Sensitivity will be identified according to the size of the population exposed to an impact (including the presence of vulnerable populations – for example where there are higher levels of social deprivation or relatively poor health status, as well as groups such as children, young people and the elderly).

10.4.12 Health and wellbeing impacts during construction and operation will be classified as:

- Minor: slight, very short or highly localised impact
- Moderate: limited impact (by extent, duration or magnitude) which may be considered significant
- Major: considerable impact (by extent, duration or magnitude) of more than local significance (for example a sizeable change in relation to the baseline, or affecting a wide geographic area)

10.4.13 Moderate and major impacts will be classified as significant effects.

Assumptions and limitations

10.4.14 To ensure transparency within the EIA process, the following limitations and assumptions have been identified:

- health effects have been identified using evidence to suggest where there are credible links, together with professional judgement; and
- generally, there is a level of uncertainty around health effects arising from a particular intervention by virtue of the interrelationships of other factors for example age or pre-existing health conditions.

11 Historic Environment

11.1.1 This chapter provides a summary of the scope proposed. This is followed by a detailed rationale for this scope taking into account potential impacts arising from the Proposed Development, potential receptors likely to be affected and potential impact pathways as well as the potential for likely significant effects. Draft mitigation commitments are identified to support the assessment scope proposed, this is followed by a description of the assessment process and methodology to be adopted.

11.2 Assessment scope - Potential Environmental Effects

11.2.1 Table 11-1 presents the proposed scope of the Historic Environment assessment that will form part of the EIA.

Table 11-1: EIA Scope – Historic Environment

Sub-topic and/or receptor	Development phase/s	Scope in (✓) or Scope out (×)	Summary of rationale for the scope proposed
Scheduled Ancient Monument (SAM) – The wreck of the "Louisa" (GM553)	Construction	✓	Asset of high significance 15m from the application site boundary. The Significance of impact is to be assessed by inclusion within a Cultural Heritage Desk Based Assessment (CHDBA), with the appropriate mitigation measures subsequently proposed. This could include the creation of a buffer exclusion zone.
Listed Buildings within Pierhead Conservation Area (CA) (including the Listed Buildings of Nos. 1 - 19 Windsor Esplanade) and Mount Stuart Square CA	Construction	×	These assets of medium significance will not be physically impacted, and the significance of their settings will also not be impacted. They can therefore be scoped out of further assessment.
The five Listed Buildings to northwest of the Site (13770, 13807, 14067, 19088 and 19089)	Construction	×	These assets of medium significance will not be physically impacted, and the significance of their settings will also not be impacted. They can therefore be scoped out of further assessment.
Non-Designated Heritage Assets within 1km of the Site	Construction	×	These assets of low to medium significance will not be physically impacted, the significance of their settings will also not be impacted.

			These can therefore be scoped out of further assessment.
Unknown archaeological assets within the Site	Construction	✓	The survival and truncation levels of any potential below-ground archaeological remains are currently unknown, as are the significance levels of such assets.

Rationale for the scope proposed

11.2.2 The rationale for the scope proposed in Table 11-1 is explained below.

11.2.3 No detailed analysis and assessment have previously been undertaken. A summary of the baseline data has therefore been produced for inclusion within this assessment and full tables of the designated and non-designated heritage assets using the appropriate Cadw and Glamorgan-Gwent Archaeological Trust Historic Environment Record (GGAT HER) search references used within this section, can be seen in Appendix E1.

11.2.4 All asset locations and distances described below are taken from their closest point to the Site unless stated otherwise. Appendix B2: Figure 2 shows key environmental constraints, including the locations of listing buildings and the Wreck of the “Louisa”.

Baseline Conditions and Future Baseline

Designated Heritage Assets

11.2.5 No designated heritage assets are located within the Site.

11.2.6 No World Heritage Sites, Battlefields or Registered Parks and Gardens are noted within the 1km study area. There is one Scheduled Monument, 101 Listed Buildings and two Conservation Areas within the 1km study area.

Scheduled Ancient Monuments (SAM)

11.2.7 The Wreck of the “Louisa” (**GM553**) is a stabilised wreck located below the water-line approximately 15m south of the Site at its closest point. This ship was originally constructed as a sea going merchant vessel in Nova Scotia, Canada in 1851. Cadw indicates the Louisa is of *“… national importance for its potential to enhance our knowledge of maritime transport. It retains significant archaeological potential, with a strong probability of the presence of associated archaeological features and deposits. The scheduled area comprises the remains described and areas around them within which related evidence may be expected to survive.* (GM553)*”* (Ref 11.1).

Conservation Areas (CA)

11.2.8 Pierhead CA (**294**) is located approximately 285m east of the Site. The character appraisal for this area (Ref 11.2) indicates that the area is an important part of Butetown's historic dock area and associated workers dwellings, recognised for its historical and architectural quality and also includes Windsor Esplanade, Windsor Terrace and Bute Esplanade. The appraisal also notes that the key views and focal points are to the north and south, and not in the direction of the Site.

11.2.9 Mount Stuart Square CA (**295**) is located approximately 455m to the northeast of the Site. The character appraisal for this area indicates that the area is important due to its distinctive wealthy and prosperous maritime and commercial character created "*during the heyday of the iron and coal industries and the development of the city's docks into a major sea port*" (Ref 11.3)). The appraisal also notes that the key views and focal points are primarily following the streets themselves, and not in the direction of the Site.

Listed Buildings

11.2.10 There are 101 Listed Buildings noted within the study area (one Grade I, four Grade II* and 96 Grade II). A total of 96 of these assets are situated to the east and northeast of the Site within the Pierhead and Mount Stuart Square CAs (**294** and **295**). In summary, these assets broadly represent post-medieval dockland activity as well as associated dwellings, commercial and religious activity as described in paragraphs 11.1.7 and 11.1.8 above.

11.2.11 The remaining five assets are all Grade II listed and situated between 500m and 925m to the northwest of the Site. These assets are listed as follows;

- The late medieval to post-medieval Grange Farm House (**13807**);
- The Parish Church of St Paul (**13770**);
- The War Memorial in Grange Gardens, including enclosure railings (**19088**);
- The Shelter in Grange Gardens (**19089**); and
- The Gas Holder at British Gas Grangetown Works (**14067**).

11.2.12 In summary, none of the Listed Buildings are likely to either be physically impacted or have their setting, key views and focal points affected by the Proposed Development.

Non-Designated Heritage Assets

11.2.13 There are no non-designated assets recorded within the Site by the GGAT HER (Search ref. 6721).

11.2.14 A total of 75 non-designated heritage assets are recorded within 1km of the Site. Of these, there are 20 monuments, 45 Locally Listed Buildings, one locally listed garden, two vessels, one roadway, one event and five are findspots.

11.2.15 Broadly, the non-designated evidence comprises of two records of Prehistoric (Holocene) activity, two Roman-British, no early medieval, 14 medieval, 52 post-medieval, 17 modern and two undated. This shows that the study area has been occupied, albeit to varying extents, since at least the Romano-British period onwards, with more substantial activity during the post-medieval and modern periods.

Archaeological Potential

11.2.16 There are no previous archaeological events recorded within the Site by the GGAT HER.

11.2.17 A total of 32 archaeological investigations have been recorded by the GGAT HER within 1km of the Site and comprise of 14 desk-based assessments, 6 field surveys, 10 projects, and two building surveys.

11.2.18 There is a potential for as-yet unknown archaeological remains within the Site to be physically harmed by the Proposed Development. These remains would likely date from the Prehistoric period onwards based on the prevalence of the records noted surrounding the Site. The survival and truncation levels of any potential below-ground archaeological remains are currently unknown.

11.3 Design, Mitigation and Enhancement Measures

Table 11-2: Draft register of commitments for Cultural Heritage

Measures	Delivery mechanism	Development phase
Primary	Ensure the SAM (The wreck of the "Louisa" (**GM553**)) is avoided/ mitigated against during the design phase. The asset would need to be assessed by inclusion within a CHDBA, with the appropriate mitigation measures subsequently proposed (for example, a buffer zone surrounding the asset).	Construction (Pre-commencement)
Secondary	Completion of a CHDBA to feed into a Cultural Heritage Environmental Statement (ES) chapter, with the appropriate mitigation measures subsequently proposed.	Construction (Pre-commencement)

Enhancement opportunities

11.3.1 Consultation with the Glamorgan-Gwent Archaeological Trust (GGAT) officer acting on behalf of Cardiff Council and Cadw would be required to determine the nature and extent of any potential enhancement opportunities. Initial consultation took place in August 2022 with Cadw and the Royal Commission on the Ancient and Historical Monuments of Wales. It was discussed that with regards to the Wreck of the Louisa, there is the potential for telling the historical story as part of the Proposed Development through noticeboards and augmented reality.

11.4 Assessment Process and Methodology

11.4.1 The paragraphs below set out the proposed assessment methodology and a summary of consultation undertaken to date as well as future planned consultation.

Relevant Legislation, Policy and Guidance

11.4.2 The following Legislation applies:

- The Town and Country Planning Act, 1990 (Ref 11.5)
- Planning (Listed Buildings and Conservation Areas) Act, 1990 (Ref 11.6)
- Ancient Monuments and Archaeological Areas Act, 1979 (Ref 11.7)
- Well-being of Future Generations (Wales) Act, 2015 (Ref 11.8)
- Historic Environment (Wales) Act, 2016 (Ref 11.9)

11.4.3 The following National Policies apply:

- Planning Policy Wales (PPW), Edition 11, February 2021 (Ref 11.10)

11.4.4 The following Local Policies apply:

- Cardiff Local Development Plan 2006 – 2026, January 2016 (Ref 11.11)

11.4.5 The following Guidance documents apply:

- CIfA
  - Code of Conduct (2019). (Ref 11.12)
  - Standards and Guidance for Historic Environment Desk-Based Assessment (2020). (Ref 11.13)
  - Standard and Guidance for Commissioning Work or Providing Consultancy Advice on Archaeology and the Historic Environment (2020) (Ref 11.14)
- Cadw
  - Heritage Impact Assessment in Wales, May 2017 (Ref 11.15)
  - Setting of Historic Assets in Wales, May 2017 (Ref 11.16)
  - Conservation Principles for the Sustainable Management of the Historic Environment in Wales, 2011 (Ref 11.17)
  - Historic Environment Records in Wales: Compilation and Use, 2017 (Ref 11.18)
- Welsh Government Guidance
  - Future Wales, The National Plan 2040, February 2021 (Ref 11.19)
  - Planning Policy Wales, Technical Advice Note 24: The Historic Environment, May 2017 (Ref 11.20)
  - The Historic Environment Supplementary Planning Guidance, 2019 (Ref 11.21)
- Cardiff Council
  - Archaeology & Archaeologically Sensitive Areas Supplementary Planning Guidance, July 2018 (Ref 11.22)
- Southeast Wales, A Research Framework for the Archaeology of Wales, 2017 (Ref 11.23)

Consultation

11.4.6 An initial online consultation meeting was held on 4th August 2022 between Arcadis, Cadw, Royal Commission on the Ancient and Historical Monuments of Wales, Cardiff Bay Harbour Master and Cardiff Council. The main points discussed are summarised below:

- The location, depth and status of the wreck of the Louisa needs to be identified
- Works need to be kept 50m away from the location of the wreck, an exclusion zone will be required
- As part of the EIA its current condition will need to be understood
- Water flows form the addition of piers within the river may affect the wreck – need to understand this as part of the EIA
- Bathymetric survey / diver survey are potential options for identifying location and condition
- Survey work will require a Band 1 marine license from NRW
- Section 42 consent required for surveys of the wreck (under the Ancient Monument and Archaeological Areas Act 1979, Ref 11.7)
- Potential for telling the historical story as part of the scheme through notice boards and augmented reality.

11.4.7 Further consultation with the GGAT officer and Cadw will be undertaken as part of the EIA, as follows:

- Once the design of the Proposed Development has been finalised, advice will be sought with regards to the CHDBA.
- Consultation regarding the scope of any archaeological investigations which may take the form of geophysical survey and field evaluation in the areas of the proposed works to inform any subsequent EIA chapter inputs.
- Subsequent consultation will be required to determine nature and extent of mitigation based on the results of the above.

Methodology

Study Area

11.4.8 An initial study area of 1km from the application site boundary was drawn to assess all nationally designated and non-designated heritage assets. Following consultation with the GGAT Officer and Cadw, this study area may be altered to be more proportionate.

Baseline

11.4.9 All nationally designated and non-designated heritage assets both within the Site and study area will form part of this assessment.

Assessment Methodology

11.4.10 This assessment would be undertaken using professional judgement and the methodology outlined below which draws on sources of guidance including from the PPW (Ref 11.10), and the Chartered Institute for Archaeologists (CIfA). The International Council on Monuments and Sites (ICOMOS) provides guidance on assessing the value (in this case, 'heritage significance') of all heritage assets, not just World Heritage Sites. ICOMOS also provides guidance on how to assess impacts on heritage assets using a matrix system (Ref 11.24).

Construction

11.4.11 It is proposed that a CHDBA is first undertaken of the Site and surrounding study area to inform both the future EIA chapter and potentially inform the locations of any required future non-intrusive or intrusive archaeological works. This will more accurately determine the location and nature of any known or as-yet unknown archaeological remains, the locations of any known or as-yet unknown ground disturbance within the Site caused by activity such as riverine activity associated with the River Taff or any previous construction. The results of the CHDBA will then inform on the likely locations of the next phase of archaeological works that will be required, as discussed below. This process also has the potential to inform the construction methodology. The specific measures required to undertake this survey will be discussed with Cadw and the GGAT officer as part of the consultation process.

11.4.12 It is proposed that a survey or surveys of the wreck of the Louisa be carried out to determine its exact location and its current condition. This will be required to inform construction methodology and further advice on heritage mitigation.

11.4.13 The proposed works have the potential to disturb, truncate or remove archaeological features and deposits associated with the SAM of the Louisa. It is proposed that an adequate buffer zone is put in place surrounding this asset to avoid potential damage from river traffic/ construction works associated with the bridge construction. The specific measures required to avoid damaging this asset and any potential associated archaeological works will need to be discussed and be approved by Cadw and the GGAT officer.

11.4.14 The proposed works have the potential to disturb, truncate or remove as-yet unknown archaeological deposits. The specific measures required to undertake this development and any associated archaeological works will need to be discussed with Cadw and the GGAT officer as part of the consultation process.

Operation

11.4.15 Any potential impact on the settings of the Scheduled Monument, Conservation Areas or Listed Buildings are likely to be negligible. Due to the existing visual intrusion of the following structures, the works will not cause significant changes concerning the settings of the designated and non-designated heritage assets;

- The Cardiff Bay Link Road Bridge (A4232),
- Clarence Road Bridge (A4119),
- The modern 'Sand Wharf' development to the northeast of the Marl,
- Modern terraced housing and south of the Marl, *and*

- Modern buildings fronting Hamadryad Road and Clarence Embankment.

Determining Significance

11.4.16 A CHDBA and an EIA chapter will be prepared to determine the significance of the designated and non-designated heritage assets. The results of these desk-top studies will then assist in determining any further heritage requirements pre-commencement of the construction phase.

11.4.17 Using the above guidance (i.e. PPW, CIfA and ICOMOS) and professional judgement, an assessment of the heritage significance of each heritage asset would be made (**Error! Reference source not f ound.**). Assessment of heritage significance will be made using professional judgement and reference to PPW (Ref 11.10) and the aforementioned guidance. Following determination of heritage significance, an assessment of the magnitude of impact would be made based upon professional judgement (**Error! Reference source not found.**), and guided by legislation, national policies, a cknowledged standards, designations, criteria and research priorities.

11.4.18 Significance (for heritage policy) is defined by Cadw as "*Their physical remains and surviving fabric, pictorial and documentary records that help us understand them, their capacity to illuminate aspects of the past and connect us to it, their aesthetic qualities, the value they have to the people who relate to them*" (Ref 11.4).

Table 11-3: Table of Heritage Significance

Heritage significance	**Factors Determining Heritage Significance**
Very High	World Heritage Sites Other heritage assets of recognised international importance Assets that can contribute significantly to acknowledged international research objectives
High	Scheduled Monuments Grade I and Grade II* Listed Buildings Grade I and Grade II* Registered Parks and Gardens Non-designated assets of equivalent heritage significance to a Scheduled Monument Registered Battlefields Protected Wrecks
Medium	Grade II Listed Buildings Grade II Registered Parks and Gardens Conservation Areas Some non-designated heritage assets
Low	Some non-designated heritage assets Locally listed buildings
Negligible	Assets with little heritage significance, e.g. an element of the historic environment which may not be considered of sufficient significance to be deemed a non-designated heritage asset (meriting consideration in the planning process)

11.4.19 **Error! Reference source not found.** sets out the criteria for assessing the magnitude of impact to h eritage assets and has been adapted from the guidance provided by ICOMOS, making it relevant to the current legislation, policy and guidance framework, using professional judgement.

Table 11-4: Magnitude of Impact – Historic Environment

Magnitude of Impact	Example
Major	Physical change (whether direct or indirect) to a heritage asset such that its heritage significance is harmed to a large degree, very much reduced or totally removed; or Changes to setting which result in a large or very large reduction of the heritage significance or total loss of significance of the asset.
Moderate	Physical change (whether direct or indirect) to a heritage asset such that its heritage significance is moderately reduced; or Changes to setting that result in a moderate reduction of the heritage significance of the asset.
Minor	Physical change (whether direct or indirect) to a heritage asset such that its heritage significance is slightly reduced; or Change to setting that slightly reduces the heritage significance of the asset.
Negligible	Physical change (whether direct or indirect) to a heritage asset such that its heritage significance is hardly reduced; or Changes to setting that hardly reduce the heritage significance of an asset.
No Change	Physical change (whether direct or indirect) to a heritage asset such that its heritage significance is not affected; No physical change (whether direct or indirect) to a heritage asset; or No change, or, change within the setting of an asset which does not affect its heritage significance.

11.4.20 **Error! Reference source not found.** illustrates how information on the heritage significance of the a sset and the magnitude of impact is combined to arrive at an assessment of the significance of effect arising from the Proposed Development, referred to as the ‘significance of effects matrix’.

Table 11-5: Significance of Effects Matrix – Historic Environment

Heritage significance of asset	**Magnitude of Impact**				
	Major	**Moderate**	**Minor**	**Negligible**	**No Change**
Very high	Very large	Large or very large	Moderate/ large	Slight	Neutral
High	Large or very large	Moderate/ large	Moderate/ slight	Slight	Neutral
Medium	Moderate/ large	Moderate	Slight	Neutral/Slight	Neutral
Low	Slight/ moderate	Slight	Neutral/Slight	Neutral/Slight	Neutral
Negligible	Slight	Neutral/Slight	Neutral/Slight	Neutral	Neutral

11.4.21 Based on professional judgement and guidance, an effect on a heritage asset that is assessed as 'moderate' or 'large/very large' could be a 'significant effect'.

11.4.22 Following an assessment of the significance of effect, the harm to heritage assets would be identified as 'substantial harm' or 'less than substantial harm'. Significance of effect in heritage terms cannot be correlated directly to harm. For example, a very large effect does not necessarily equate to substantial harm. Therefore, following an assessment of the significance of effect using the methodology outlined above, the level of harm would be clearly identified. This approach is compliant with the EIA Regulations. Relevant Legislation, Policy and Guidance.

Assumptions and limitations

11.4.23 To ensure transparency within the EIA process, the following limitations and assumptions have been identified:

- No information on the Historic Landscape Character (HLC) of the areas has been provided by the GGAT HER at his stage but HLC will form part of the analysis.
- The report is based on information available at the time. Data from Historic Environment Records (HERs) and other national datasets consists of secondary information derived from varied sources, only some of which were directly examined during the compilation of this report.

12 Townscape and Visual

12.1.1 This chapter provides a summary of the scope proposed. This is followed by a detailed rationale for this scope taking into account potential impacts arising from the Proposed Development, potential receptors likely to be affected and potential impact pathways as well as the potential for likely significant effects. Draft mitigation commitments are identified to support the assessment scope proposed, this is followed by a description of the assessment process and methodology to be adopted.

12.2 Assessment Scope - Potential Environmental Effects

12.2.1 Table 12-1 presents the proposed scope of the Townscape and Visual assessment that will form part of the EIA.

Table 12-1: EIA Scope – Townscape and Visual

Sub-topic and/or receptor	Development phase/s	Scope in (✓) or Scope out (×)	Summary of rationale for the scope proposed
People in residential properties: Residents of Channel View Road, Sand Wharf and The Piazza.	Construction and operation	✓	- The proximity of the properties in these locations to the Site (within 300m of the approximate centre of the Proposed Development). - The alignment of the properties is generally towards the Proposed Development. - The presence of clear lines of sight from these properties towards the Site.
People in residential properties: Other residents, including those in Ferry Court, Clarence Embankment, Hamadryad Road, Hamadryad Court and Windsor Esplanade.	Construction and operation	×	- The distance of the properties in these locations to the Site (beyond 300m to the approximate centre of the Proposed Development). - The alignment of these properties is generally away from / oblique to the Proposed Development. - The lack of clear lines of sight towards the Site on account of intervening built-up areas, landform, other structures and vegetation. - The existing complexity of built-form in views across the City that the Proposed Development may feature in.
Users of Long Distance Paths: The Wales Coast Path, and the Taff Trail.	Construction and operation	✓	- There are views to the Site from the Wales Coast Path as it passes along the Cardiff Bay Barrage and along some of the edges of Cardiff Bay.

Sub-topic and/or receptor	Development phase/s	Scope in (✓) or Scope out (×)	Summary of rationale for the scope proposed
			- There are views to the Site from the Taff Trail as it crosses the River Taff along the A4119.
Users of National Cycle Network: National Cycle Route 8.	Construction and operation	✓	- There are views to the Site from the section of the route through Hamadryad Park and the crossing of the A4119 over the River Taff.
Users of promoted cycle trails: Cardiff Bay Trail.	Construction and operation	✓	- There are views from the traffic free cycle route as it passes through the Site within the Marl, as well as through Hamadryad Park and along the Cardiff Bay Barrage.
Users of public open spaces and waterscapes: Hamadryad Park, The Marl, Grangemoor Park, Avondale Gardens (river frontage), Cardiff Bay, Cardiff Bay Barrage and the River Taff.	Construction and operation	✓	- The proximity of some parts of these open spaces and waterscapes to the Site. - The alignment of views from some parts of these are generally towards the Proposed Development.
Users of public open spaces and waterscapes: Other public open spaces, including: Cardiff Bay Wetlands Reserve, Hamadryad Park South.	Construction and operation	×	- The lack of proximity of some parts of these open spaces and waterscapes to the Site. - The alignment of them is generally away from / oblique to the Proposed Development. - The lack of clear lines of sight towards the Site on account of intervening built-up areas, structures and vegetation. - The existing complexity of built-form in views across the city that the Proposed Development may feature in.
Other Public Rights of Way, and other pedestrian routes.	Construction and operation	×	- There are no other public rights of way or pedestrian routes beyond those covered by the publicly accessible routes/spaces outlined above along which users are likely to experience significant effects, given: the distances from the Site; intervening landform, buildings/structures and vegetation; and the existing complexity of built-form in views across the city that the

Sub-topic and/or receptor	Development phase/s	Scope in (✓) or Scope out (×)	Summary of rationale for the scope proposed
			Proposed Development may feature in.
Vehicular user of Roads: Vehicular users of A4119 Butetown Link (approx. 0.7km north of the Site as it crosses River Taff), and A4232 Clarence Road (approx. 0.2km south of the Site as it crosses River Taff)	Construction and operation	✓	- Users of these stretches of these roads have clear lines of sight to the Site.
Townscape / Landscape Character areas: The characteristics and qualities of the relevant NRW LANDMAP '*aspect areas'* within the study area, as defined by the filtering process set out within NRW's LANDMAP guidance (Ref 12.1) and also informed by the perspective Zone of Theoretical Visibility for the development.	Construction and operation	✓	- Defined by the NRW recommended process: GN64: '*Using LANDMAP in Landscape and Visual Impact Assessments*' (Ref 12.1). - There are no other publicly accessible more localised townscape / landscape character assessments available.

Rationale for the scope proposed

12.2.2 There is the potential for adverse effects on visual amenity and townscape / landscape character receptors as identified in Table 12-1 during both construction and operational phases of the development.

Baseline Conditions and Future Baseline

Visual Receptors

12.2.3 The potential height of the Proposed Development (currently considered to be no greater than 25m AOD) and the provisional proposed land take and activity (albeit temporary) needed to construct it, informs the extent of the Proposed Development's visual context. The broad area included within this includes the surrounding built-up areas of south Cardiff, the open spaces between them (including public open spaces, the River Taff and Cardiff Bay), and the areas of higher ground to the west and south-west of the city – which have views over the conurbation. Within these areas there are a number of receptors that have the potential to experience significant visual effects. These are residents at home, recreational users of the public open spaces and publicly accessible waterscapes, and travellers along roads, paths and trails.

12.2.4 The predominantly flat topography of, and the density of buildings within the built-up areas surrounding the Site combine to limit the locations where there is the potential for significant visual effects to occur to receptors. The residual areas where there is such potential therefore include the immediate edges of the open spaces that surround the Site (such as Channel View Road and The Piazza) and residential receptors within the nearby high-rise buildings (such as Sand Wharf and the Channel View Flats).

12.2.5 Because of their orientation and intervening built-form, structures and vegetation, there are other built-up areas, however, that lie along the immediate edges of the open spaces near to the Site which are unlikely to experience significant effects. These include Ferry Court, Clarence Embankment, Hamadryad Road, Hamadryad Court and Windsor Esplanade.

12.2.6 Where the Proposed Development is likely to be visible from built-up areas on higher ground surrounding the Site, for example Llandough and Penarth Head, the complexity of existing built-form upon the skyline (i.e. existing high-rise buildings, chimneys, stadiums and industrial/retail complexes) in most views is such that the Proposed Development is unlikely to have a significant visual effect on receptors in these locations.

12.2.7 The visual receptors to the Proposed Development using the public open spaces and publicly accessible waterscapes that surround the Site that have the potential to experience significant effects include recreational users of The Marl, Hamadryad Park, the River Taff and Cardiff Bay. The users of other nearby spaces, however, such as Cardiff Bay Wetlands Reserve and Hamadryad Park South are unlikely to experience significant effects on account of their orientation and the intervening built-form, structures and vegetation between them and the Site.

12.2.8 Users of the Wales Coast Path and Taff Trail long distance paths, users of National Cycle Route 8, users of the Cardiff Bay Trail (a locally promoted cycle route), and other public rights of way/unpromoted pedestrian and cycle routes also have the potential to experience significant effects as a result of the Proposed Development. The areas in which users of these paths have such potential is however limited to where they pass through the public open spaces identified above, parts of the Cardiff Bay Barrage (in terms of the Wales Coast Path and Cardiff Bay Trail), and the A4119 as it crosses the River Taff (in terms of the Taff Trail and National Cycle Route 8).

<u>Townscape Character Receptors</u>

12.2.9 The character of the Site and its surroundings, upon which the effect of the Proposed Development would be assessed, will be informed by:

- The character descriptions and evaluations contained in the relevant ‘aspect areas’ of NRW’s LANDMAP (Ref 12.2) within the study area. The filtering process to identify the relevant ‘aspect areas’ is set out within NRW’s LANDMAP guidance document GN46 (Ref 12.1).
- The Zone of Theoretical Visibility that would be prepared for the Proposed Development.
- Desk-based and field work to identify finer grain character of the Site and its surrounds.

12.2.10 The desk-based and field work would focus upon the character and sensitivities of the Site and the open spaces/waterscape it sits within and near to. This will include the character of the potentially affected parts of The Marl and Hamadryad Park, Grangetown and Butetown, and the River Taff and Cardiff Bay.

Designations

12.2.11 The closest identified landscape character and visual amenity-related planning designations are:

- Pierhead Conservation Area (285m to the east),
- Mount Stewart Square Conservation Area (455m to the north-east)
- St Mary's Street Conservation Area (1.7km to the north), and
- the locally listed Grange Gardens (700m to the north)

12.2.12 These are all located within the denser and taller built-up areas of the City to the north and east of the Site. As such, with limited intervisibility between these and the Site, their key characteristics and qualities are not considered likely to experience significant effects arising from the Proposed Development and are therefore scoped out of the assessment.

12.2.13 Approximately 1.4km to the east of the Site lies the 'Cwrt-yr-Ala Basin Special Landscape Area', as designated within the Vale of Glamorgan Local Development Plan, 2017 (Ref 12.3). Given the distance between this area and the Site, and the fact that the views of most receptors within it are suitably restricted by intervening buildings and vegetation, and/or their views containing the Site are already characterised by a complex urban skyline of tall buildings and structures, the designation is considered unlikely to experience significant effects arising from the Proposed Development and is therefore scoped out of the assessment.

Future Baseline

12.2.14 A hybrid application to demolish the existing Channel View Flats high-rise tower block and the area of housing at its base, and then re-develop the entire area with new high-rise housing and substantial new open space (including the formalisation of the southern part of The Marl) was granted planning permission on 19 October 2022. This scheme comprises up to 319 residential properties, up to 285m^2 of retail floorspace, communal gardens, children's play space and the regeneration of The Marl. The first phase of this scheme includes two tower blocks (8-13 storeys) providing 81 residential units, a community cafe, communal gardens incorporating allotments and picnic areas, landscaping of the southern section of The Marl, surface drainage infrastructure, footpaths, roads and parking.

12.2.15 There is potential for cumulative townscape and visual impact upon the receptors highlighted above with the proposed Channel View redevelopment proposals, and so an assessment of these will be included.

12.3 Design, Mitigation and Enhancement Measures

12.3.1 The design of the Proposed Development will iteratively evolve in collaboration with the TVIA so that where it is considered potential adverse townscape / landscape and visual effects may arise, mitigation measures will be proposed to avoid or reduce these. The TVIA will take into consideration the following hierarchy of mitigation measures:

- Primary measures, employed through the iterative design process which are to be embedded into the Proposed Development such as the: careful planning, siting, design and materiality of the built form of the bridge, its landing areas and the physical integration of these into the landscape and public open spaces on either side of the River Taff.
- Secondary measures, designed to address any adverse effects remaining after primary measures; and
- Standard construction and operational management practices for avoiding and reducing environmental effects.

Table 12-2: Draft register of commitments for Townscape & Visual Impact Assessment

Measures	**Delivery mechanism**	**Development phase**
Appropriate temporary footpath/cycleway diversion during construction.	Measures agreed through the CEMP.	Construction
Appropriately sized construction materia**l** stockpiles, accommodation buildings and soil/spoil storage mounds.	Measures agreed through the CEMP.	Construction
Appropriately designed hording around construction sites.	Measures agreed through the CEMP.	Construction
Restrictions on obtrusive light spill, glare and sky glow from construction lighting.	Measures agreed through the CEMP.	Construction
Appropriately designed landscape / public realm to integrate the Proposed Development with the character of The Marl and Hamadryad Park.	Detailed landscape and public realm proposals - agreed through a planning condition.	Operation
The successful establishment of any potential planting works.	Secured through a Landscape Management Plan and agreed through a planning condition.	Operation
Restrictions on obtrusive light spill, glare and sky glow from operational lighting.	Detailed lighting proposals - agreed through a planning condition.	Operation

Enhancement opportunities

12.3.2 There is likely to be an enhancement to the overall visual experience of some of the already identified visual receptors as a result of the Proposed Development. Opportunities would be sought for the maximising of these through the design of the bridge and its landings.

12.4 Assessment Process and Methodology

12.4.1 The paragraphs below set out the proposed assessment methodology and future planned consultation relevant to the TVIA.

Relevant Legislation, Policy and Guidance

12.4.2 The local planning policies, which relate to the townscape / landscape character and/or visual amenity of the Site and its surroundings, and which will be referred to in the TVIA, where these may have a bearing on the Proposed Development and its potential impacts are:

- National Policy Future Wales: The National Plan 2040 (Ref 12.4)
- Planning Policy Wales (PPW) Edition 11, February 2021 (Ref 12.5)
- Cardiff Local Development Plan 2006 – 2026 (Ref 12.6)
- Tall Buildings SPG, Cardiff Council, January 2017 (Ref 12.7)

12.4.3 Planning Policy Wales is supplemented by Technical Advice Notes (TAN), those of relevance to the townscape / landscape and visual aspects are set out below:

- TAN 5 Nature Conservation and Planning (Ref 12.8)
- TAN 12 Design (Ref 12.9)

Consultation

12.4.4 Consultation with Cardiff Council will be required to agree the following:

- The TVIA study area extent, once the Zone of Theoretical Visibility (ZTV) for the Proposed Development is prepared.
- The locations of viewpoints for inclusion in the TVIA.
- Type of visualisations of the Development to be used within the TVIA.
- The NRW LANDMAP Aspect Areas for inclusion within the TVIA.

Methodology

Study Area

12.4.5 The study area will be determined through the desk-based research, the preparation of a ZTV and field work to ground-truth these.

12.4.6 Our review of the TVIA (Environmental Statement, Chapter 4) that has been prepared and submitted as part of the approved planning application for the 'Channel View' development (Ref 12.10), that lies immediately to the south of the Site, identified that a study area with a radius of 3km was considered appropriate - for a maximum proposed building height of 37.9m AOD. As it is currently considered unlikely that the height of the bridge structure within the Proposed Development will exceed 25m AOD, a study area with a 3km radius is also deemed appropriate. This is to be agreed with the local planning authority.

Baseline

12.4.7 The methodology for collating baseline data and site assessment will be carried out in accordance with '*Guidelines for Landscape and Visual Impact Assessment, Third Edition*' (Ref 12.11) (GLVIA3).

12.4.8 Desk based work would include research into the area's existing topography, vegetative cover, land use, historical and cultural associations, settlement patterns and built form vernacular, accessibility, and recreational usage. A review of townscape / landscape-relevant planning policies to the area will also be carried out.

12.4.9 A site visit will be carried out by a Chartered Landscape Architect and involve a walkover of the Site, walking roads, PRoWs and other publicly accessible routes in the local area to help determine the townscape / landscape character and visual context of the Site and surrounding area and to ground-truth the ZTV.

Assessment Methodology

12.4.10 The TVIA will be prepared by a Chartered Landscape Architect and its methodology would be based on the recommendations set out in:

- GLVIA3 (Ref 12.11)
- The Landscape Institute: '*GLVIA3 Statement of Clarification 1/13 10-06-13*' (Ref 12.12).
- The Landscape Institute: '*Visual Representation of Development Proposals Technical Guidance Note 06/19*' (Ref 12.13).
- The Landscape Institute: '*Technical Information Note 05/2017 Townscape Character Assessment, Revised April 2018*' (Ref 12.14).

12.4.11 The TVIA will be reported in the ES, setting out: an introduction to the topic, a detailed assessment methodology, the findings of desktop and field work baseline research, mitigation measures, an assessment of effects during the construction and operational phases of the Proposed Development (including cumulative considerations), and an overall summary.

12.4.12 The methodology would include:

- Establishment of the baseline townscape / landscape character receptors against which the effects of the Proposed Development would be assessed.
- Determination of the 'value' of the landscape character receptors, and their 'susceptibility' to change - as based upon the definitions set out in GLVIA3, to ascertain their 'sensitivity'.
- Establishment of the ZTV of the Proposed Development and identification of potential visual receptors within this.
- Determination of the 'value' of the visual receptors (i.e. potential viewers and/or viewing groups) at each viewpoint, and their 'susceptibility' to receive change, to ascertain their 'sensitivity'.
- Consideration of the nature of the impact likely to occur on receptors, i.e. the magnitude of change including during the proposed construction, at full completion of the Proposed Development and 15 years after completion.
- Ongoing involvement with design process to ensure adverse effects identified are avoided, reduced, abated and/or compensated for.
- Assessment of the Proposed Development with respect to magnitude of change on townscape / landscape character and visual receptors (with and without mitigation in place).
- An assessment of whether a likely significant adverse or beneficial effect would occur upon any receptor by considering the predicted magnitude of change upon the receptor together with its sensitivity.
- Following the implementation of proposed mitigation measures, the significance of residual effects upon townscape / landscape character and visual amenity.
- An assessment of the cumulative townscape / landscape and visual impact of the Proposed Development.

Determining Significance

12.4.13 Significance of an effect will be determined in line with current best practice guidance from the Landscape Institute, as noted above.

12.4.14 The significance of an effect, whether adverse or beneficial, will be assessed by comparing the sensitivity of the receptor relative to the magnitude of change. *Major* effects are those that are likely to be considered 'significant', especially if they are long term, permanent and/or not reversible. *Minor* or *Negligible* effects are those that are likely to be considered as 'not significant'.

12.4.15 Where the significance of the effect is considered to be 'moderate', reasoned professional judgement is used to determine whether or not this is 'significant'. There are effects that are 'not significant', but which may be important considerations in decision making concerning the Proposed Development. In addition, in some instances the effect may be offset by other considerations, for example, through the mitigation proposals, and the resulting effect is neither beneficial nor adverse and would be classed as 'neutral' and 'not significant'.

Assumptions and limitations

12.4.16 To ensure transparency within the EIA process, the following limitations and assumptions have been identified:

- The collection of photographs that will inform the effect on agreed viewpoints would only occur from publicly accessible locations and would not be collected from private property.

13 Transport

13.1.1 This chapter provides a summary of the scope proposed. This is followed by a detailed rationale for this scope taking into account potential impacts arising from the Proposed Development, potential receptors likely to be affected and potential impact pathways as well as the potential for likely significant effects. Draft mitigation commitments are identified to support the assessment scope proposed, this is followed by a description of the assessment process and methodology to be adopted.

13.2 Assessment Scope – Potential Environmental Effects

13.2.1 Table 13-1 presents the proposed scope of the Transport assessment that will form part of the EIA.

Table 13-1: EIA Scope – Transport

Sub-topic and/or receptor	Development phase/s	Scope in (✓) or Scope out (✗)	Summary of rationale for the scope proposed
A. Ferry Road (interconnecting between the A4232 junction and The Marl) - Pedestrian severance - Pedestrian amenity - Pedestrian delay - Pedestrian fear and intimidation - Driver delay - Accidents and safety	Construction	✓	• Potential increase in HGV traffic greater than or equal to 10% in comparison to baseline conditions. • Residential area. • Potential effects of hazardous loads will be scoped out of the EIA. • Temporary short-term impact.
B. Avondale Road (interconnecting between The Marl and the A4119 Clarence Road) - Pedestrian severance - Pedestrian amenity - Pedestrian delay - Pedestrian fear and intimidation - Driver delay - Accidents and safety	Construction	✓	• Potential increase in HGV traffic greater than or equal to 10% in comparison to baseline conditions. • Residential area. • Interface with Grangetown Nursery School/ playground area. • Interface with places of worship. • Potential effects of hazardous loads will be scoped out of the EIA. • Temporary short-term impact.
C. A4119 Clarence Road (interconnecting between Avondale Road/ A4119	Construction	✓	• Potential increase in HGV traffic greater than or equal to 10% in comparison to baseline conditions.

Sub-topic and/or receptor	Development phase/s	Scope in (✓) or Scope out (×)	Summary of rationale for the scope proposed
Clarence Road roundabout and Clarence Embankment) - Pedestrian severance - Pedestrian amenity - Pedestrian delay - Pedestrian fear and intimidation - Driver delay - Accidents and safety			• Residential area. • Potential effects of hazardous loads will be scoped out of the EIA. • Temporary short-term impact.
D. Clarence Embankment (interconnecting between the A4119 Clarence Road and Hamadryad Park) - Pedestrian severance - Pedestrian amenity - Pedestrian delay - Pedestrian fear and intimidation - Driver delay - Accidents and safety	Construction	✓	• Potential increase in HGV traffic greater than or equal to 10% in comparison to baseline conditions. • Residential area. • Potential effects of hazardous loads will be scoped out of the EIA. • Temporary short-term impact.
Highway references A-D	Operational	×	• During operation of the Proposed Development, there would be a negligible number of traffic movements associated with routine maintenance. • Not anticipated to exceed IEMA Guidelines (1994) traffic thresholds outlined for rules 1 and 2 (Ref 13.25). • Negligible impact on sensitive receptor sites.
Navigation channel – river users • River buses • Rowers • Slipway permit holders • Moorings • Harbour Authority work boats	Construction and operation	×	• In relation to the proposed Ground Investigation works and certain construction activities, the navigation channel will need to be closed. However, closures, and therefore impacts, are likely to be short-term and temporary. • The impact is likely to be greatest on users of the river bus in terms of severance, which can be managed.

Sub-topic and/or receptor	Development phase/s	Scope in (✓) or Scope out (×)	Summary of rationale for the scope proposed
			Appropriate mitigation measures to be identified in the CEMP, in consultation with regular river users.

Rationale for the scope proposed

13.2.2 The rationale for the scope proposed in Table 13-1 is explained below.

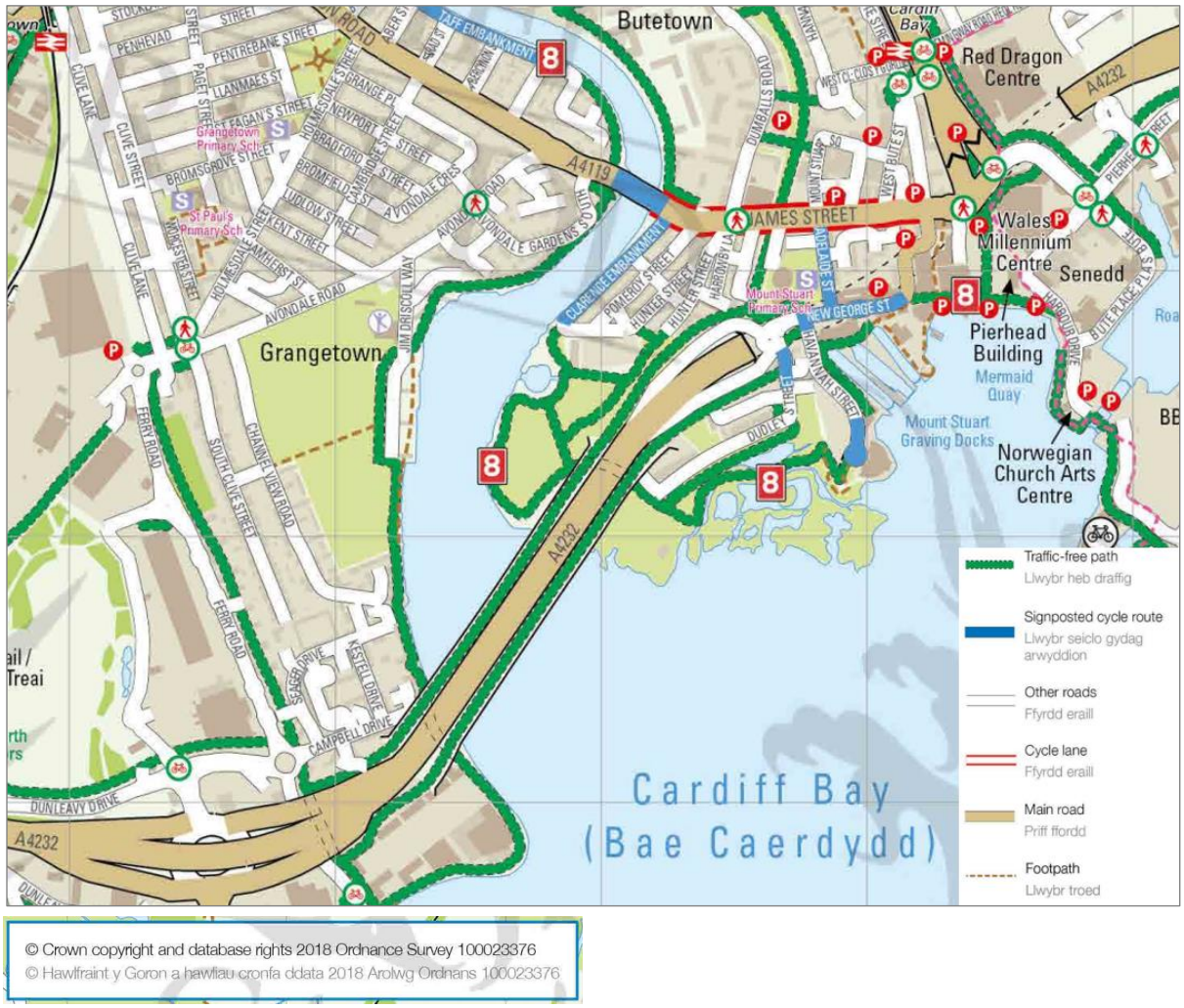
Baseline Conditions and Future Baseline

Walking and Cycling

13.2.3 A continuous shared use path is provided on the eastern side of the carriageway heading north-south along Ferry Road. Pedestrian crossing opportunities along Ferry Road comprises a signalised pedestrian crossing north of Asda Cardiff Bay and a raised zebra crossing adjacent to The Marl, as well as refuges with dropped kerbs located on roundabout arms.

13.2.4 As shown in Figure 13-1, there are numerous traffic free routes that bound the River Taff, including through The Marl and Hamadryad Park. Most notably, this includes the Sustrans National Cycle Network (NCN) Route 8 and a shared use path along the A4232 – Cardiff Bay Link Road.

Figure 13-1: Cardiff Cycling and Walking Map[1]



Public Transport

13.2.5 The primary bus operators in the study area are Cardiff Bus and New Adventure Travel (NAT) Group. There are a number of bus stops situated along Ferry Road that provide access to retail and leisure trip attractors including Cardiff Bay Retail Park and The Marl.

13.2.6 Given the study area's proximity to Cardiff Bay and the River Taff, there are numerous 'water taxi' ferry services located within the application site boundary.

13.2.7 Located directly east of The Marl and on the western side of the River Taff, Aquabus provide a service from the Channel View Pier that connects the City Centre to the Bay. The vast majority of other water taxi services are located at Cardiff Bay Waterfront Plaza, including Cardiff Bay Aquabus Pier, Berry Boats and Cardiff Jet.

[1] Extract from Cardiff Cycling and Walking Map (2018) (Ref 13.33)

Highway Network and Access

13.2.8 **Ferry Road** is situated to the west of the Site and predominantly comprises a single carriageway in each direction. There is however a brief stretch of dual carriageway at its southern extent where it meets International Drive at a four-arm roundabout. North-south movements are subject to a 30mph speed limit and are interspersed by roundabouts. These include a four-arm roundabout that connects to Dunleavy Drive on its western arm and a three-arm roundabout providing access to Cardiff Bay Retail Park. At its northern extent, Ferry Road heads eastbound via a five-arm roundabout, before merging with Avondale Road adjacent to The Marl. This section of carriageway is subject to a 20mph speed limit.

13.2.9 **Avondale Road** continues eastbound from Ferry Road. It is a single carriageway road (in each direction) and is subject to a 20mph speed limit. Continuing eastbound, it meets the A4119 Corporation Road/ Clarence Road at a three-arm roundabout.

13.2.10 The **A4119 – Clarence Road** comprises a single carriageway in each direction and is subject to a 20mph speed limit. At its western extent, it meets Avondale Road and the A4119 – Corporation Road at a three-arm roundabout. Heading eastbound, it passes over the River Taff via a road bridge, before merging with James Street east of the junction with Dumballs Road.

13.2.11 **Clarence Embankment** is a single-lane, 20mph section of road that heads south of the priority-controlled junction with the A4119 – Clarence Road, adjacent to the River Taff. In some instances, the effective carriageway width is reduced due to high levels of on-street parking.

Potential Impacts

Construction

13.2.12 The assessment of potential construction traffic and transport impacts would draw upon information gathered for the Transport Assessment, which would accompany the planning application for the Proposed Development.

Operational

13.2.13 During operation of the Proposed Development, there would be a negligible number of traffic movements associated with routine maintenance. Potential traffic and transport impacts associated with the operational phase will be **scoped out** of the EIA.

13.3 Design, Mitigation and Enhancement Measures

Construction

13.3.1 Whilst there is an aspiration for construction materials and waste to be transported to and from the development site by water, it is currently assumed that as a worst-case scenario, the majority of construction trips will be by road. During the construction phase, it is therefore anticipated that the following mitigation and enhancement measures would be put in place:

- A Construction Worker Travel Plan (‘CWTP’) would identify measures that would mitigate the impacts of the construction worker travel on the transport network.

- An Outline CTMP would identify measures required to minimise the impact of construction traffic on the road network capacity and safety.
- Off-site transport infrastructure improvements may need to be developed as mitigation of the effects.

Operational

13.3.2 It is not anticipated that additional mitigation and enhancement measures will be required other than primary mitigation embedded within the Proposed Development's design (i.e., no requirement for a site-specific Travel Plan or other off-site transport infrastructure improvements).

Table 13-2: Draft register of commitments for Transport

Measures	Delivery mechanism	Development phase
Primary Mitigation	CWTP to be completed by the Principal Contractor	Construction
Primary Mitigation	Outline CTMP to be completed by the Principal Contractor	Construction
Primary Mitigation	Off-site transport infrastructure improvements to be considered by the project design team, if appropriate	Construction
Primary Mitigation	Integral design modifications associated with the proposed walking and cycling route/ footbridge to be considered by the project design team	Operational

13.4 Assessment Process and Methodology

13.4.1 The paragraphs below set out the proposed assessment methodology and a summary of consultation undertaken to date, as well as future planned consultation.

Relevant Legislation, Policy and Guidance

13.4.2 The following legislation, planning policy and strategies and guidance will be used to inform the assessment.

National Legislation

- Well-being of Future Generations (Wales) Act (2015) (Ref 13.1)
- Active Travel (Wales) Act (2013) (Ref 13.2)
- Planning Wales Act (2015) (Ref 13.3)
- Environment (Wales) Act 2016 (Ref 13.4)

National Policies and Strategies

- Llwybr Newydd: A New Wales Transport Strategy (2021) (Ref 13.5)
- Planning Policy Wales | Edition 11 (2021) (Ref 13.6)
- Future Wales: The National Plan 2040 (2021) (Ref 13.7)
- Net Zero Wales Carbon Budget 2 (2021 to 2025) (Ref 13.8)
- Welsh Government: Climate Emergency Declaration (Ref 13.9)
- Clean Air Plan for Wales: Healthy Air, Healthy Wales (2020) (Ref 13.10)
- Prosperity for All | A Low Carbon Wales (2019) (Ref 13.11)

Regional Policies and Strategies

- Cardiff Council – Cardiff Local Development Plan (2006 – 2026) Adopted Plan (January 2016) (Ref 13.12)
- Cardiff's Transport White Paper: Transport Vision to 2030 (Ref 13.13)
- Cardiff Council – Local Transport Plan (2015 – 2020) (Ref 13.14)
- Cardiff's Transport & Clean Air Green Paper (Ref 13.15)
- Cardiff Well-being Plan (2018 – 2023) (Ref 13.16)
- Draft Cardiff Cycling Strategy (2016 – 2026) (Ref 13.17)
- Draft Cardiff Transport Strategy (Ref 13.18)
- Cardiff Capital Region | State of the Region Reports (Ref 13.19), (Ref 13.20) (Ref 13.21)
- Cardiff Capital Region | Industrial and Economic Plan (Ref 13.22)
- Cardiff Capital Region | Industrial and Economic Plan Covid-19 Addendum May 2020 (Ref 13.23)
- Cardiff Capital Region | City Deal Business Plan 2020/21 (Ref 13.24)

Guidance

- Institute of Environmental Assessment (IEMA) (1994); Guidelines of the Environmental Assessment of Road Traffic – hereby referred to as IEMA Guidelines (1994) (Ref 13.25)
- DMRB LA104 Environmental Assessment and Monitoring (August 2020; Version 1) (Ref 13.26)
- National Planning Policy Guidance (Department for Levelling Up, Housing and Communities and Ministry of Housing, Communities & Local Government; May 2020); Environmental Impact Assessment. (Ref 13.27)
- National Planning Policy Guidance (Department for Levelling Up, Housing and Communities and Ministry of Housing, Communities & Local Government; March 2014); Travel Plans, Transport Assessments and Statements (Ref 13.28)
- Department for Communities and Local Government / Department for Transport, 2007: The Manual for Streets (Ref 13.29)
- Department for Communities and Local Government/ Department for Transport, 2010: The Manual for Streets 2, CIHT, 2010 – a companion guide to Manual for Streets (Ref 13.30)
- Planning Policy Wales; Technical Advice Note (TAN) 18: Transport (2007) (Ref 13.31)

- Cardiff Council – Managing Transportation Impacts (Incorporating Parking Standards) Supplementary Planning Guidance (July 2018) (Ref 13.32)

Consultation and Scoping

13.4.3 No consultations have been undertaken as part of this scoping assessment. A comprehensive consultation and scoping exercise will be completed with the Local Highways Authority to agree the structure and requirements for the supporting TA.

Methodology

Study Area

13.4.4 The study area has been considered in accordance with the IEMA Guidelines (1994) which outlines the following rules to limit the scale and extent of the assessment:

- Rule 1: Include highway links where traffic flows will increase by more than 30% (or the number of Heavy Goods Vehicles (HGVs) will increase by more than 30%).
- Rule 2: Include any other specifically sensitive areas where traffic flows will increase by 10% or more.

13.4.5 Given the characteristics of the Proposed Development and the anticipated negligible impacts resulting from operational use of the new footbridge, the study area has predominantly been defined by identifying construction routes to/ from the Proposed Development site that are anticipated to satisfy one of the two rules above. The following road links have therefore been identified as follows:

- Ferry Road (interconnecting between the A4232 junction and The Marl)
- Avondale Road (interconnecting between The Marl and the A4119 Clarence Road)
- A4119 Clarence Road (interconnecting between Avondale Road/ A4119 Clarence Road roundabout and Clarence Embankment)
- Clarence Embankment (interconnecting between the A4119 Clarence Road and Hamadryad Park)

13.4.6 The study area will include public rights of way, walking/ cycling routes and public transport services within the vicinity of the development site and linking to local areas. The final agreed study area for the assessment of traffic and transport effects during construction will be defined in a draft TA scoping report and consulted on with the local planning authority. Following consultation, the assumed study area may be altered to be more proportionate.

Baseline Conditions

13.4.7 Desk studies will assist with identifying the baseline conditions in relation to existing sustainable travel (walking, cycling and public transport), highway and sensitive areas to establish the baseline conditions within the study area and any areas where there are likely to be significant effects.

13.4.8 The desktop study will be used in conjunction with a detailed site visit undertaken within the agreed study area, which will consider the existing baseline conditions for walking, cycling, public transport and the highway network, as well as identifying receptors and roads which are considered to be sensitive.

13.4.9 Pedestrian and cycling surveys within the vicinity of the Proposed Development will be completed. This analysis will capture existing walking and cycling trips and seek to establish forecast use of the proposed footbridge. Details of the proposed surveys will be outlined as part of the TA scoping exercise.

13.4.10 Traffic data will be obtained for each of the key highway links considered within the study area. The future year baseline situation will be forecast by applying TEMPro growth factors and accumulating traffic flows associated with identified committed development. Key assumptions associated with the application of committed development traffic flows will be clearly outlined within the TA.

Assessment Methodology

Construction

13.4.11 The approach to the assessment of traffic and transport impacts would be in accordance with IEMA Guidelines (1994). As noted previously, the guidelines recommend that two rules are considered when considering the effect of development traffic on a highway link:

- Rule 1: Include highway links where total traffic flows will increase by more than 30% (or the number of Heavy Goods Vehicles (HGVs) will increase by more than 30%).
- Rule 2: Include any other specifically sensitive areas where traffic flows will increase by 10% or more.

13.4.12 The impacts of traffic may be on the following receptors, as set out in the IEMA Guidelines (1994):

- People at home
- People at work
- Sensitive groups including children, elderly and disabled
- Sensitive locations such as hospitals, churches, schools, and historical buildings
- People walking
- People cycling
- Open spaces, recreational areas, shopping areas
- Sites of ecological/nature conservation value
- Sites of tourist/ visitor attraction

13.4.13 The environmental effects considered and therefore scoped into the assessment, cover the following areas of concern:

- Pedestrian severance
- Pedestrian amenity
- Pedestrian delay
- Pedestrian fear and intimidation
- Driver delay
- Accidents and safety

13.4.14 It is assumed that there would be no hazardous loads associated with construction. Therefore, the potential effects of hazardous loads will be **scoped out** of the EIA. Impacts associated with dust and dirt have been identified in Chapter 5 and will be addressed as part of the Air Quality and Dust assessment.

13.4.15 There is currently limited information available on the proposed construction works. The transport and access effects of the construction of the Proposed Development would be dependent on various factors including the final programme and phasing of construction works, import/ export of materials and construction processes adopted.

13.4.16 The number of construction vehicle HGVs will therefore need to be calculated by considering the type and amount of construction and demolition material and waste arisings for each assessment year. The total yearly material and waste arising will be calculated by volume and the corresponding total yearly number of HGVs required to transport the load was estimated.

13.4.17 The assessment will draw upon information gathered for the TA to consider the likely significant transport and access effects of the proposed construction works. This will be based on an estimation of reasonable worst-case conditions and will seek to consider those aspects of the construction works that could lead to significant effects. The assessment will draw upon Arcadis's experience of assessing the environmental effects of similar developments.

13.4.18 Suitable management and control measures will be identified which will be incorporated into the Strategic CEMP and noted for inclusion as part of the Proposed Development's CTMP, for completion prior to the commencement of works on site.

13.4.19 The traffic assessment scenarios will be confirmed as part of the TA scoping exercise but will be likely to include:

- Base year (2022)
- Peak construction year (tbc) + committed development

<u>Operational</u>

13.4.20 Given the characteristics of the Proposed Development, it is anticipated that neither rule 1 nor rule 2 thresholds will be exceeded. No assessment of operational impacts is therefore proposed.

Determining Significance

13.4.21 In order to determine the significance of effects, the following parameters will be considered:

- The sensitivity of each link.
- The percentage increase in total traffic and/or HGVs as a result of the Proposed Development along each link (magnitude of impact).
- The environmental effects as set out within IEMA Guidelines on each link where the impacts of the Proposed Development are above the significance thresholds.

13.4.22 The criteria for determining value (sensitivity) and magnitude of impact (change) will be detailed in the ES Chapter. The guidance contained within DMRB LA104 Environmental Assessment and Monitoring (August 2020; Version 1) (Ref 13.26) will be used to determine the significance of effects.

Assumptions and Limitations

13.4.23 To ensure transparency within the EIA process, the following limitations, assumptions and uncertainties have been identified:

- It is currently assumed that as a worst-case scenario, all construction trips (including any abnormal loads) will be completed by vehicle using the existing highway network. As noted, there is an aspiration for a significant number of construction deliveries to and from the development site to be made by water transport.
- The completion of new traffic and pedestrian/ cycle surveys is subject to agreement with the local planning authority.
- The study area and supporting TA are subject to a scoping exercise with the local planning authority.

14 Water Resources and Flood Risk

14.1.1 This chapter provides a summary of the scope proposed. This is followed by a detailed rationale for this scope taking into account potential impacts arising from the Proposed Development, potential receptors likely to be affected and potential impact pathways as well as the potential for likely significant effects. Draft mitigation commitments are identified to support the assessment scope proposed, this is followed by a description of the assessment process and methodology to be adopted.

14.2 Assessment Scope - Potential Environmental Effects

14.2.1 Table 14-1 presents the proposed scope of the Water Resources and Flood Risk assessment that will form part of the EIA.

Table 14-1: EIA Scope – Water Environment

Sub-topic	Development phase/s	Scope in (✓) or Scope out (×)	Summary of rationale for the scope proposed
Flood risk from rivers and the sea	Construction and Operation	✓	Beyond the confines of the channel of the River Taff, the Proposed Development is located partially in Development Advice Map (DAM) zone C1 on the TAN15 development advice map (Ref 14.1). In-channel and floodplain works are proposed, therefore further assessment is required to confirm the mitigation measures needed to avoid a likely significant adverse effect.
Flood risk from surface water, groundwater and artificial sources (sewers, reservoirs)	Construction and Operation	×	Baseline risk of flooding from these sources is low and, due to the nature of the Proposed Development (with only a minor increase in the footprint of permanent impermeable land cover), this baseline status would not be adversely affected.
Temporary changes to the land drainage regime / surface water flood risk	Construction	×	Baseline surface water flood risk across the Site is very low (with reference to NRW mapping). Following implementation of measures to manage construction site runoff, secured via the CEMP, this baseline status would not be adversely affected.
Temporary effects on surface water quality	Construction	✓	Due to the nature of the Proposed Development, which includes in-channel works, further assessment is required to determine the mitigation measures needed to avoid a likely significant adverse effect during construction of the in-channel elements of the project.

Sub-topic	Development phase/s	Scope in (✓) or Scope out (×)	Summary of rationale for the scope proposed
Permanent effects on surface water quality	Operation	×	The proposed bridge is for non-motorised users therefore rainfall runoff from the Proposed Development would be at low risk of contaminating the receiving water environment.
Changes to hydromorphology	Construction and Operation	×	The footprint of the proposed in-channel works is relatively small as a proportion of the channel cross section. Also, in-channel works would be designed and constructed to reduce impacts locally on the rivers flow regime and to prevent scour/erosion. The main way of minimising the impact is achieved via the shape of the substructure below the water line and local additions at the base of piers/abutments to prevent scour.
Detriment to existing water interests (surface water abstractions and discharges)	Construction and Operation	×	New consumptive abstraction is not proposed, and the water quality of the River Taff would be safeguarded. The river would therefore continue to assimilate existing discharges and supply existing abstractions as in the baseline scenario.

Rationale for the scope proposed

14.2.2 With regard to the Water Environment, as summarised in Table 14-1, it is proposed to scope out the assessment of effects on several attributes, justified by the lack of an impact pathway, or due to the nature of the Proposed Development and its limited potential to result in changes to baseline conditions.

14.2.3 It is proposed to scope in two aspects, namely temporary water quality effects during construction, and potential for impacts on flood risk from rivers and the sea during construction and operation/use.

Baseline Conditions and Future Baseline

14.2.4 This section sets out the baseline data that has been collected to characterise the water environment baseline within the study area. Information has been collected through desk study and consultation with NRW.

Surface Water Features

14.2.5 The Proposed Development crosses the River Taff, an NRW designated Main River and Site of Importance for Nature Conservation (SINC). The River Taff discharges into the Severn Estuary approximately 1,480m downstream of the Site via the Cardiff Bay tidal barrage. The Severn Estuary is characterised as a SPA, SAC, Ramsar Site and SSSI. The River Ely is located approximately 1km to the west of the Site. Given that the river does not drain the Site and there are no pathways to this receptor, the River Ely has been scoped out of any further assessment. There are no other ordinary watercourses or land drains illustrated on Ordnance Survey mapping that cross the Site.

Existing Water Quality

14.2.6 NRW monitors the water quality of designated 'Main Rivers' in line with the requirements of the WFD. The River Taff, which is located in the Severn River Basin District has a current overall status along the reach of interest of Moderate, failing for water chemistry and with an ecological quality status of moderate.

Existing Flood Risk

14.2.7 The Planning Policy Wales Technical Advice Note 15 Development and Flood Risk (TAN15) (Ref 14.1) Development Advice Map (DAM) classifies a large portion of the Site as being located within Flood Zone C1. Flood Zone C1 is described as, "Areas of floodplain served by significant flood defence infrastructure". The remainder is in Zone B, signifying land 'known to have flooded in the past'. NRW flood mapping indicates a range of risk zones for flooding from rivers and the sea within the Site, ranging from high immediately adjacent to the Taff channel, reducing to low risk further from the river. This is illustrated in Appendix B2: Figure 2.

14.2.8 The NRW surface water flood risk map (Ref 14.2) shows that the risk of flooding from this source to the entirety of the Site is very low (annual chance of flooding of less than 1 in 1000 or 0.1%). With regard to other potential sources of flooding, the NRW Risk of Flooding from Reservoirs Map shows the Site is partially located in flood extents associated with failure of a series of reservoirs upstream including Beacons, Cantref, Pontsticill (Taf Fechan), Lluest-Wen and Llwyn-On, however this is considered to represent a very low residual risk. As the Site comprises open green space, baseline sewer flooding risk is classified as low and due to the nature of the underlying geology, the risk of groundwater flooding at the Site is also low.

Surface Water Abstractions and discharges

14.2.9 With regard to existing water interests, it is expected that the River Taff supports licenced abstractions and receives consented discharges, diluting and transporting e.g. treated sewage and trade effluents. As described in Table 14-1, there would be no significant adverse effects on these attributes of the Taff and no further assessment is proposed.

14.3 Design, Mitigation and Enhancement Measures

Table 14-2: Draft register of commitments for the Water Environment

Measures	Delivery mechanism	Development phase
Locate construction compounds and spoil storage areas out with Flood Zone C1 and implement a Flood Emergency Plan. Undertake any works within Flood Zone C in accordance with a Flood Risk Activity Permit.	OCEMP (Applicant) CEMP (Contractor)	Construction
Manage construction site runoff to prevent uncontrolled discharges off Site and reduce silting or other contamination and prepare Spillage Response Plan.	OCEMP (Applicant) CEMP (Contractor)	Construction
In-channel works undertaken in accordance with all conditions set by relevant Environmental Permit (Marine Licence)	NRW Marine Licence	Construction
Design of piers to prevent localised scour and erosion and minimise impacts on River Taff flow regime – potentially achieved via the shape of the piers at river level, and other design measures if necessary	Embedded design measure (Lead Designer)	Operation

Enhancement opportunities

14.3.1 Whilst no significant effects on the water environment are anticipated, opportunities to provide for enhancement of the riverine corridor within the Site, to deliver multiple benefits, would be considered as appropriate when the environmental impact assessment is undertaken.

14.4 Assessment Process and Methodology

14.4.1 The paragraphs below set out the proposed assessment methodology for those aspects scoped in to the water environment assessment.

Relevant Legislation, Policy and Guidance

- The Water Framework Directive (WFD) Regulations, amended by the Floods and Water (Amendment etc.) (EU Exit) Regulations 2019 (Ref 14.3) – this provides for the protection of (fresh) water, estuaries, coastal waters and groundwater, with the objectives of enhancing their status, and preventing further deterioration of aquatic ecosystems.

- The Flood and Water Management Act 2010 (Ref 14.4) – this encourages the use of sustainable drainage techniques. Schedule 3 of the Act requires surface water drainage for new developments comply with mandatory national standards for sustainable drainage (SuDS). Statutory standards have yet to be published by Welsh Government, however in its absence, the CIRIA 753: The SuDS Manual should be followed.
- The Water Resources Act 2003 (Ref 14.5)– this makes it a criminal offence to knowingly permit any poisonous, noxious or polluting matter or any solid waste matter to enter any controlled waters.
- Planning Policy Wales (PPW) (Ref 14.6) sets out the land use planning policies of the Welsh Government and is supported by a series of Technical Advice Notes (TANs).
    - TAN 15: Development and Flood Risk (Ref 14.1) advises on development and flood risk and provides a framework within which risks arising from both river and coastal flooding, and from additional runoff from development, in any location, can be assessed.
    - The Local Development Plan (2006-2026) (Ref 14.7), adopted by Cardiff Council in 2016, incorporates policies to mitigate the effects of climate change (KP15), deliver sustainable development (KP18), and to protect water resources (EN11) and the river corridors of Cardiff (EN4), as well as to guide development to the lowest areas of flood risk (EN14).

Consultation

14.4.2 Consultation has been carried out with NRW to gather baseline flood data that has informed the emerging design of the Proposed Development. Further engagement with NRW, as well as with Cardiff Council in their role as Lead Local Flood Authority (LLFA), is proposed to agree the scope and conclusions of a Flood Consequences Assessment and a WFD Screening Assessment. These assessments are proposed to inform the EIA and to identify suitable mitigation measures to prevent or reduce any likely significant adverse effects.

Methodology

Study Area

14.4.3 The proposed study area, relevant to both construction and operation, includes all land and water features within the application site boundary, as well as the reach of the River Taff extending up to 1km downstream of the proposed crossing location. This is considered an appropriate study area and has been set following consideration of the distance over which likely significant effects can reasonably have the potential to occur.

Baseline

14.4.4 A desk study review of published Welsh Government and NRW mapping and water environment datasets has been undertaken to establish baseline conditions. In addition, data will be obtained from NRW's flood model and the WFD Assessment will be informed by the ecological surveys and assessments undertaken. Future baseline conditions will be forecast, drawing on current best practice guidelines (Ref 14.8) regarding the likely impacts of climate change, and legislative drivers such as implementation of future cycles of WFD management plans.

Assessment Methodology

14.4.5 The assessment will be based on guidance set out in Part 10 of Volume 11 of the Design Manual for Roads and Bridges (DMRB), LA113 (Ref 14.9). This promotes assessment that is proportionate to the scale and nature of the proposals and that considers the sensitivity of the local water environment to change, and the methodology is applicable to assessing both construction and operational effects.

14.4.6 The methodology comprises assigning receptors within the study area a value, ranging from Very High to Low, based on several criteria including scale and quality. The next stage involves assigning impacts on these receptors a magnitude following consideration of the scale/extent of the predicted change and the nature and duration of the impact.

Determining Significance

14.4.7 The significance of an effect is derived using the matrix set out in Table 2-1 in section 2.3: Approach to the EIA. Likely significant effects are effects which are moderate or above.

Assumptions and Limitations

14.4.8 To ensure transparency within the EIA process, the following limitations and assumptions have been identified:

- It has been assumed that sufficient data is available from NRW and the LLFA to inform a site-specific Flood Consequences Assessment.
- No water quality or river sediment sampling and analysis is proposed. It is assumed that sufficient data is available from NRW to characterise these attributes of the River Taff.

15 Topics to be Scoped Out

15.1 Major Accidents and Disasters

15.1.1 The consideration of major accidents and disasters in EIA has the following two aspects:

- the potential hazard presented by a development, i.e. whether an accident or disaster arising from the development would be likely to give rise to significant effects on environmental receptors
- the vulnerability of a development to external hazards, i.e. whether accidents or disasters occurring offsite would be likely to lead to significant effects on the environment due to interaction with the Proposed Development.

15.1.2 The Proposed Development is not a source of hazard that could result in a major accident, nor would it interact with an external source of hazard (such as being located in proximity to a hazardous site) and potentially increase the risk of that hazard occurring at its external source. Additionally, if an external disaster was to occur (e.g. flood, storm, fire), the presence of the Proposed Development is not expected to increase the risk of serious damage to an environmental receptor occurring when compared to the baseline of the same hazard occurring without the Proposed Development. The Construction (Design and Management) Regulations 2015 process will serve to identify and manage any such risks. In addition, a FCA Stage 1 will be undertaken, which will assess flood risks and impacts.

15.1.3 On this basis, it can be concluded that there is unlikely to be an increase in risk related to a major accident and/or disaster and therefore this topic is proposed to be scoped out.

15.2 Noise and Vibration

15.2.1 As far as is practicable, noisy construction works will adhere to the permitted hours as set out in the Shared Regulatory Services (SRS) Pollution Control Construction Site Handbook (Ref 15.1). It is unknown at this stage whether there will be a need to work outside of these permitted working hours. If there are circumstances where the restriction on hours of work (in relation to noisy works) cannot be adhered to, a Section 61 Application would be submitted at a later stage (i.e., post-submission) under the Control of Pollution Act 1974.

15.2.2 While piling will take place in the river during construction, noise and vibration will be managed through the implementation of BPM.

15.2.3 Appropriate BPM, as defined in the latest BS5228 Parts 1 and 2 (Ref 15.2, Ref 15.3), will be secured via an OCEMP, which will be submitted as part of the forthcoming planning application submission. The OCEMP will be further developed by the appointed contractor following planning consent.

15.2.4 It is expected that there will be no generators or other noise generating plant on site during operation/use. Occasional maintenance may be required during operation/use, but any works and traffic movements associated with this maintenance is likely to minimal.

15.2.5 In light of the above, it is proposed that the topic of Noise and Vibration is scoped out of the EIA. The Council's Neighbourhood Services Team has agreed with this approach (See Appendix F1).

15.3 Socio-economics

15.3.1 There would be some employment generation during construction of the Proposed Development. Based on an estimated total construction cost of approximately £10million and dividing this figure by the UK average turnover per construction employee of £178,869, results in an estimated 56 Full Time Equivalent (FTE) construction workers employed during the construction period (Ref 15.4).This is not considered to be significant in the context of the construction sector in Cardiff, which according to the Business Register and Employment Survey latest data includes approximately 9,000 workers in the construction sector in Cardiff (Ref 15.5). Given the relatively small number of construction workers required for the Proposed Development, there is anticipated to be an adequate supply of labour.

15.3.2 There is likely to be some benefit to local businesses through increased spending from staff at the Site during construction. However, in the context of Cardiff and construction projects that have taken place in the area in recent years, this is not anticipated to be significant.

15.3.3 The Applicant has committed to ensuring that best practice construction and traffic management practices are implemented, such that any disruption and/or severance to local businesses and residents will be managed and is not likely to be significant.

15.3.4 Upon completion, the Proposed Development may enable residents from communities on both sides of the River Taff to more easily and safely access open space and nature, thereby promoting physical activity and both mental and physical wellbeing. The effect of this will be assessed as part of the health assessment.

15.3.5 The Proposed Development is intended to be a destination in itself, therefore during the operation/use phase, there is likely to be some benefit to local businesses through increased spending by people visiting it and its surroundings, and due to greater connectivity. This is not anticipated to be significant in the context of the local economy of Cardiff.

15.3.6 As per the advice from the Planning Department at Cardiff Council, the impact of the Proposed Development on access to work and training will be discussed in the Planning Statement, which will form part of the planning application submission.

15.3.7 In summary, socio-economic effects arising from the Proposed Development are not likely to be significant and it is therefore proposed that this topic is scoped out.

15.4 Waste

15.4.1 The area within the indicative application site boundary consists predominantly of park land including grass, trees and hedgerows, and the River Taff.

15.4.2 Key waste arisings are likely to comprise vegetation and excavated material and possibly localised riverbed dredging; the latter is to be confirmed once the Principal Contractor has been appointed. Whilst quantities and quality are currently unknown, volumes are not expected to be vast. There are two landfills within 15 miles of the Site. The closest one to the proposed footbridge is 7 miles away, in Wenvoe, the other in Newport. They have remaining void capacity of 33,750m^3 & 572,306m^3 respectively (Ref 15.6 and therefore, sufficient capacity to deal with any waste generated from the construction works. Due to the nature of the material, it is likely to be used for landfill engineering or cover requirements. Other construction waste is expected to utilise the Materials Recycling Facility in Rumney, 6 miles from the Site or the Cardiff Energy Recovery Facility, 3 miles from the Site. Both have sufficient capacity to take the likely volumes of expected construction waste.

15.4.3 Any waste effects will be mitigated through a range of measures and operational practices. These will be framed within the CEMP, which will provide a context and framework for a number of issues relating to the potential interactions or impacts of waste. The following will feature within the framework of the CEMP:

- Construction sequencing and programming;
- Air, noise, dust and odour issues;
- Site Waste Management Plan (SWMP); and
- Materials management (from enabling and construction works).

15.4.4 Through the application of mitigation, this will result in no residual significant effects, and as such it is proposed that waste and materials is scoped out of the EIA.

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Appendix A

Appendix to the EIA Regulations and Approach to the EIA Section

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Appendix A1: Draft methodology for the identification of cumulative developments

A1 Introduction

This appendix sets out the draft information for identifying developments to be included in the assessment of cumulative effects. Following receipt of the scoping opinion from Cardiff Council, a final list of developments will be prepared and their effects cumulatively with the Proposed Development will be reported in the Environmental Statement (ES).

A2 Methodology

The EIA Regulations require that, in assessing the effects of a particular development proposal, consideration is also given to the cumulative effects. The purpose of undertaking a cumulative assessment is to identify whether other developments together with the Proposed Development may lead to an elevated effect on the environment during construction or once a development is built and in use. These effects can be the combined effect of individual effects, for example noise, airborne dust, or traffic on a single receptor ('in combination effects); and the combined effects of nearby consented or under construction development schemes which may, on an individual basis be insignificant but, cumulatively, have a likely significant effect on a single resource/receptor ('cumulative effects'). Cumulative effects will be considered within the topic chapters but would also be summarised in the cumulative effects chapter in the ES.

Other developments need to be of a sufficient scale or proximity to the development being assessed for cumulative effects to be likely. Other developments may precede the development being assessed thereby changing the future baseline conditions, in some cases introducing new sensitive receptors.

Developments will be considered for inclusion up to three months before application submission to allow sufficient time for the assessment to be carried out prior to completion of the ES and its submission with the planning application.

The Council planning application portal and the Planning Inspectorate register of applications for Nationally Significant Infrastructure Projects will be used to gather information on other developments and generate a list of other developments to consider in this assessment. Limitations on the information available for the identified developments can be a constraint for cumulative assessment. Often there is considerable uncertainty regarding the timing of development. In addition, there is often limited information available regarding their construction methods. Some developments also may not have been subject to EIA, further reducing the available information to inform the cumulative assessment. In all cases, worst case assumptions have been made to counter these limitations, allowing the likely significant cumulative effects to be identified. For example, where information on the timing of construction and operation is not available, it will be assumed that sensitive receptors are in place before construction of the Proposed Development commences and also that there would be concurrent construction activities. This approach will allow a reasonable worst case to be applied.

The following sections describe the catchment area that has been identified and the criteria applied to select developments for inclusion in the cumulative effects assessment.

A2.1 Catchment area

A catchment area has been identified, representing the area in which developments may interact with the Proposed Development, accounting for the size and location of the Proposed Development and the nature and density of the surrounding area.

It is considered that for the majority of technical assessments, the reasonable catchment area will not exceed 1km, although some technical assessments may take into account a larger study area. For example, the study area of the Townscape and Visual Impact Assessment (TVIA) will be determined via desk-based research, a

ZTV and fieldwork to ground-truth these. It is proposed that a 3km radius would be appropriate for the TVIA, this is to be agreed with the local planning authority.

A2.2 Type/size of developments

The assessment will consider only major development as there is a greater potential for significant environmental cumulative effects or the creation of future receptors. For the purposes of this assessment, major developments are defined as those providing more than 50 houses and/or 1,000 m^2 gross floorspace of non-residential use.

A2.3 Planning status

Developments within the catchment area and which meet the criteria described will be at one of three stages in the planning process:

- under construction
- permitted but not yet implemented
- submitted but not yet determined

Developments identified in the adopted and emerging development plans will also be included as appropriate.

The stage of each development will determine whether it will precede the construction of the Proposed Development (and hence potentially change future baseline conditions, including the introduction of new receptors) or be concurrent with the construction and operation of it. Developments may also be phased and therefore have the potential to change both baseline conditions as well as creating the potential for cumulative effects.

A2.4 Draft list of developments

By applying the methodology described above, the developments listed in Table A have been identified. This table will be updated during the preparation of the ES.

Table A: Draft list of developments to be considered in cumulative effects assessment

Address	Application Reference No.	Date Validated	Description of the Development	Approx. Direction and Distance from the Site	Status of Application	Decision	Date of Decision	Link to Planning Application
RED DRAGON CENTRE AND COUNTY HALL, ATLANTIC WHARF, CARDIFF	21/02687/MJR	19/11/2021	Mixed-Use including 890 residential dwellings, 1090 hotel bed spaces, 19,500sqm of employment floorspace, 27,500 sqm of leisure floorspace and 12,310 sqm of retail floorspace.	1.4km	Registered	Awaiting Decision	n/a	https://www.cardiffidoxcloud.wales/publicaccess/applicationDetails.do?activeTab=summary&keyVal=ZZZHX8ECDR946
FORMER BRANDON HIRE PLC, 151-153 BUTE STREET, BUTETOWN, CARDIFF	21/01720/MJR	09/07/2021	45 apartment older persons' community living scheme, community sports facility and associated works	1.2km	Registered	Awaiting Decision	n/a	https://www.cardiffidoxcloud.wales/publicaccess/applicationDetails.do?activeTab=summary&keyVal=ZZZHXAECDR125
PHASE 2, PLOT 2, CENTRAL QUAY AT FORMER BREWERY SITE, CRAWSHAY STREET, BUTETOWN, CARDIFF	21/02884/MJR	13/12/2021	Mixed-use building providing commercial and residential uses.	1.6km	Registered	Awaiting Decision	n/a	https://www.cardiffidoxcloud.wales/publicaccess/applicationDetails.do?activeTab=summary&keyVal=ZZZHX8ECDR494

Address	Application Reference No.	Date Validated	Description of the Development	Approx. Direction and Distance from the Site	Status of Application	Decision	Date of Decision	Link to Planning Application
PHASE 2, PLOT 1, CENTRAL QUAY AT FORMER BREWERY SITE, CRAWSHAY STREET, BUTETOWN, CARDIFF	21/02883/MJR	13/12/2021	Mixed-use building providing commercial and residential uses.	1.6km	Registered	Awaiting Decision	n/a	https://www.cardiffidoxcloud.wales/publicaccess/applicationDetails.do?activeTab=summary&keyVal=ZZZHX8ECDR495
LAND AT DUMBALLS ROAD, BUTETOWN, CARDIFF	17/00159/MJR	25/01/2017	Mixed use development comprising 109 apartments with a commercial unit and other associated works.	1.3km	Awaiting Decision	n/a	n/a	https://www.cardiffidoxcloud.wales/publicaccess/applicationDetails.do?activeTab=summary&keyVal=ZZZHXQECDR170
PART OF LAND AT, SCHOONER WAY, ATLANTIC WHARF	19/00632/MJR	15/03/2019	Proposed mixed-use comprising 12 residential, 520sqm of office space and 234sqm of retail space	1.7km	Awaiting decision	n/a	n/a	https://www.cardiffidoxcloud.wales/publicaccess/applicationDetails.do?activeTab=summary&keyVal=ZZZHXIECDR972
LAND ADJACENT TO, 12 - 14 DRAKE WALK, ATLANTIC WHARF, CARDIFF, CF10 4AN	18/01280/MJR	26/07/2018	Six storey apart-hotel comprising serviced apartments with ground floor commercial/amenity space, re-routing of public riverside walkway and renovation of existing dock feeder footbridge	1.8km	Awaiting decision	n/a	n/a	https://www.cardiffidoxcloud.wales/publicaccess/applicationDetails.do?activeTab=summary&keyVal=ZZZHXMECDR084

Address	Application Reference No.	Date Validated	Description of the Development	Approx. Direction and Distance from the Site	Status of Application	Decision	Date of Decision	Link to Planning Application
LAND AT CHANNEL VIEW ROAD, GRANGETOWN, CARDIFF	21/01666/MJR	21/07/2021	HYBRID APPLICATION FOR MIXED-USE DEVELOPMENT. OUTLINE PERMISSION FOR: THE REDEVELOPMENT AND EXTENSION OF PART OF THE CHANNEL VIEW ESTATE FOR UP TO 319 RESIDENTIAL APARTMENTS AND HOUSES, UP TO 285 SQ.M OF RETAIL FLOORSPACE (USE CLASS A1), COMMUNAL GARDENS INCORPORATING ALLOTMENTS AND PICNIC AREAS, FORMAL AND INFORMAL CHILDREN'S PLAY SPACE, LANDSCAPING, CYCLEPATHS/FOOTPATHS, DRAINAGE INFRASTRUCTURE, ROADS AND PARKING; THE REGENERATION OF THE MARL PUBLIC OPEN SPACE TO INCLUDE NEW/IMPROVED SPORTS PITCHES, CHILDREN'S PLAY SPACE, A NEW 'BEACH', WATER FEATURES, LANDSCAPING, AND CYCLEPATHS/FOOTPATHS; THE PROVISION OF A NEW BUS/CYCLE/PEDESTRIAN LINK BETWEEN CHANNEL VIEW ROAD AND SOUTH CLIVE STREET AND A NEW CYCLE/PEDESTRIAN LINK BETWEEN SOUTH CLIVE STREET AND FERRY ROAD; THE PROVISION OF A NEW PARKING AREA; TOGETHER WITH ASSOCIATED WORKS (ALL MATTERS RESERVED FOR FUTURE CONSIDERATION). FULL PERMISSION IS SOUGHT FOR A FIRST PHASE OF DEVELOPMENT COMPRISING OF NEW TOWER BLOCKS (8-13 STOREYS) PROVIDING 81 OLDER-PERSONS (OVER 55S), COMMUNITY-LIVING ACCOMMODATION UNITS, A	200m	Decided	Permission granted	19/10/2022	https://www.cardiffidox-cloud.wales/publicaccess/applicationDetails.do?activeTab=summary&keyVal=ZZZHXAECDR195

Address	Application Reference No.	Date Validated	Description of the Development	Approx. Direction and Distance from the Site	Status of Application	Decision	Date of Decision	Link to Planning Application
			115SQ.M COMMUNITY CAFE, COMMUNAL GARDENS INCORPORATING ALLOTMENTS AND PICNIC AREAS, LANDSCAPING, DRAINAGE INFRASTRUCTURE, FOOTPATHS, ROADS, PARKING AND ASSOCIATED WORKS.					
CARDIFF BAY STATION, BUTE STREET, BUTETOWN, CARDIFF	PRAP/22/00032/MJR	20/06/2022	NEW BUTETOWN STATION CONSISTING OF PLATFORMS, ACCESSES AND ANCILLARY WORKS; UPGRADED STATION AT CARDIFF BAY INCLUDING PLATFORMS, ACCESSES, NEW SQUARE AND ANCILLARY WORKS; PLUS ALTERATIONS TO EXISTING EAST-WEST ROUTES	1.15km	Registered	n/a	n/a	https://www.cardiffidoxcloud.wales/publiccaccess/applicationDetails.do?activeTab=summary&keyVal=ZZZHX6ECDR547

Address	Application Reference No.	Date Validated	Description of the Development	Approx. Direction and Distance from the Site	Status of Application	Decision	Date of Decision	Link to Planning Application
PLOT NO. 9, CENTRAL QUAY, THE FORMER BRAINS BREWERY SITE, CRAWSHAY STREET, BUTETOWN, CARDIFF	22/00378/MJR	25/03/2022	PROPOSED DEVELOPMENT OF A HOTEL (USE CLASS C1) TOGETHER WITH ASSOCIATED VEHICULAR AND PEDESTRIAN ACCESS, CYCLE PARKING, REFUSE STORAGE, HARD AND SOFT LANDSCAPING (INCLUDING GREEN ROOF), DRAINAGE, AND OTHER ANCILLARY WORKS AND USES	1.48km	Registered	n/a	n/a	https://www.cardiffidox-cloud.wales/publicaccess/applicationDetails.do?activeTab=summary&keyVal=ZZZHX7ECDR740
LAND ADJACENT TO UNIT 4, HADFIELD ROAD, LECKWITH, CARDIFF, CF11 8AQ	22/00643/MNR	16/05/2022	CONSTRUCTION OF TWO INDUSTRIAL UNITS WITHIN USE CLASS B1, B2 AND B8	1.73km	Registered	n/a	n/a	https://www.cardiffidox-cloud.wales/publicaccess/applicationDetails.do?activeTab=summary&keyVal=ZZZHX7ECDR394
CRAWSHAY COURT, 6 CURRAN ROAD, BUTETOWN, CARDIFF, CF10 5TG	19/01930/MJR	11/07/2019	188 Unit Apartment Building with ancillary areas, parking, public open space and a roof terrace.	1.5km	Decided	Permission granted	10/12/2021	https://www.cardiffidox-cloud.wales/publicaccess/applicationDetails.do?activeTab=summary&keyVal=ZZZHXHECDR717

Address	Application Reference No.	Date Validated	Description of the Development	Approx. Direction and Distance from the Site	Status of Application	Decision	Date of Decision	Link to Planning Application
WALTERS BUILDING, CLARENCE ROAD, BUTETOWN, CARDIFF, CF10 5FA	18/02999/MJR	20/12/2018	Demolition of existing building and erection of a 4/6-storeys residential apartment block.	648.8m	Decided	Permission granted	01/04/2021	https://www.cardiffidoxcloud.wales/publicaccess/applicationDetails.do?activeTab=summary&keyVal=ZZZHXJECDR717
LAND AT HADFIELD COURT, HADFIELD ROAD, LECKWITH, CARDIFF, CF11 8AQ	20/02605/MNR	23/12/2020	Construction of two industrial units	1.9km	Decided	Permission granted	12/03/2021	https://www.cardiffidoxcloud.wales/publicaccess/applicationDetails.do?activeTab=summary&keyVal=ZZZHXDECDR136
LAND OFF HARBOUR DRIVE, CARDIFF BAY, CARDIFF	19/02506/MJR	05/11/2019	Construction of a Military Medicine Museum	1km	Decided	Permission granted	18/12/2020	https://www.cardiffidoxcloud.wales/publicaccess/applicationDetails.do?activeTab=summary&keyVal=ZZZHXHECDR041
TELECOMMUNICATIONS MAST, HOLDEN ROAD, LECKWITH	20/01212/MNR	29/06/2020	Construction of both commercial/industrial units with associated works	1.8km	Decided	Permission granted	24/11/2020	https://www.cardiffidoxcloud.wales/publicaccess/applicationDetails.do?activeTab=summary&keyVal=ZZZHXEECDR707
CARDIFF AND VALE COLLEGE, DUMBALLS ROAD, BUTETOWN, CARDIFF, CF10 5FE	20/00384/MJR	14/02/2020	Multi use games area sports pitches with an air dome cover	1.3km	Decided	Permission granted	17/08/2020	https://www.cardiffidoxcloud.wales/publicaccess/applicationDetails.do?activeTab=summary&keyVal=ZZZHXFECDR655

Address	Application Reference No.	Date Validated	Description of the Development	Approx. Direction and Distance from the Site	Status of Application	Decision	Date of Decision	Link to Planning Application
SITE ADJACENT TO ST MARY THE VIRGIN CHURCH, BUTE STREET, BUTETOWN, CARDIFF	19/02851/MJR	28/10/2019	New Build 2 Form Primary School	1.2km	Decided	Permission granted	27/05/2020	https://www.cardiffidoxcloud.wales/publicaccess/applicationDetails.do?activeTab=summary&keyVal=ZZZHXGECDR794
TRACK 2000, RESOURCE HOUSE, 54B PENARTH ROAD, GRANGETOWN, CARDIFF, CF11 6NG	18/02622/MJR	07/11/2018	Residential development of 74 units.	1.4km	Decided	Permission granted	29/11/2019	https://www.cardiffidoxcloud.wales/publicaccess/applicationDetails.do?activeTab=summary&keyVal=ZZZHXKECDR134
PLOT J, CAPITAL QUARTER, TYNDALL STREET, ATLANTIC WHARF	18/02634/MJR	09/11/2019	307 Private Rented Sector Units and associated works	1.9km	Decided	Permission granted	07/08/2019	https://www.cardiffidoxcloud.wales/publicaccess/applicationDetails.do?activeTab=summary&keyVal=ZZZHXKECDR122
6 CURRAN ROAD, BUTETOWN, CARDIFF, CF10 5TG	17/01672/MJR	07/07/2017	Demolition of existing buildings and construction of 25 storey apartment building with associated works.	1.4km	Decided	Permission granted	07/08/2019	https://www.cardiffidoxcloud.wales/publicaccess/applicationDetails.do?activeTab=summary&keyVal=ZZZHXOECDR859

Address	Application Reference No.	Date Validated	Description of the Development	Approx. Direction and Distance from the Site	Status of Application	Decision	Date of Decision	Link to Planning Application
ABERDARE HOUSE, MOUNT STUART SQUARE, BUTETOWN, CARDIFF, CF10 5FJ	18/03002/MJR	19/12/2018	Redevelopment of car park into 27 flats in two structures.	915m	Decided	Permission granted	29/07/2019	https://www.cardiffidox-cloud.wales/publiccaccess/applicationDetails.do?activeTab=summary&keyVal=ZZZHXJECDR852
FORMER BROWNING JONES AND MORRIS, DUMBALLS ROAD, BUTETOWN, CARDIFF, CF10 5FE	17/02404/MJR	10/10/2021	Demolition of existing warehouse and erection of 206 residential properties with associated works.	1.3km	Decided	Permission granted	29/06/2018	https://www.cardiffidox-cloud.wales/publiccaccess/applicationDetails.do?activeTab=summary&keyVal=ZZZHXNECDR998
LAND AT CARGO ROAD, CARGO ROAD, CARDIFF	18/00792/MJR	06/04/2018	Construction of HMS Cambria secure training and education facility	1.3km	Decided	Permission granted	21/05/2018	https://www.cardiffidox-cloud.wales/publiccaccess/applicationDetails.do?activeTab=summary&keyVal=ZZZHXMECDR314
LAND TO THE SOUTH OF HAMADRYAD CENTRE, HAMADRYAD ROAD, BUTETOWN, CARDIFF, CF10 5UY	16/02916/MJR	06/01/2017	New 2 storey primary school building with associated works	350m	Decided	Permission granted	06/07/2017	https://www.cardiffidox-cloud.wales/publiccaccess/applicationDetails.do?activeTab=summary&keyVal=ZZZHXQECDR593

Address	Application Reference No.	Date Validated	Description of the Development	Approx. Direction and Distance from the Site	Status of Application	Decision	Date of Decision	Link to Planning Application
THE WHARF, MANAGERS FLAT AND BOATSHED, 121 SCHOONER WAY, ATLANTIC WHARF, CARDIFF, CF10 4EU	16/00660/MJR	22/03/2016	Mixed use residential development of 180 dwellings with commercial and retail use aspects.	1.7km	Decided	Permission granted	15/06/2017	https://www.cardiffidox-cloud.wales/publiccaccess/applicationDetails.do?activeTab=summary&keyVal=ZZZHXTECDR376
LAND AT JOHN STREET, BUTETOWN, CARDIFF, CF10 5PE	16/01584/MJR	11/07/2016	New office building, three blocks of 20 floors, 10 floors and 8 floors.	1.8km	Decided	Permission granted	01/03/2017	https://www.cardiffidox-cloud.wales/publiccaccess/applicationDetails.do?activeTab=summary&keyVal=ZZZHXSECDR239

Appendix B

Appendix to the Site and Surrounding Area Section

Appendix B1: Figure 1 Site Location Plan

Appendix B2: Figure 2 Environmental Constraints Plan

Appendix C

Appendices to the Terrestrial Ecology and Arboriculture Section

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Appendix C1: Summary of baseline data (Terrestrial Ecology)

Appendix C2: Preliminary Ecological Appraisal Report (Prepared by APEM)

Appendix C3: Arboricultural Constraints Plan and Survey Schedule (Data provided by TR33 Ltd)

Appendix C1: Summary of baseline data (Terrestrial Ecology)

Designated Sites

A review of records from Southeast Wales Biodiversity Records Centre (Ref 7.18), Multi Agency Geographic Information for the Countryside (MAGIC) Interactive (Ref 7.19), has identified international statutory designated sites of nature conservation value within 5 km and national statutory and non-statutory designated sites within 2 km of the Development, which may have the potential to be affected by the Development, as summarised in Table B.

Table B: Designated Sites

Site Name	Designation	Distance (m) and Direction from Site
Statutory Sites		
Severn Estuary	Special Area of Conservation (SAC), Special Protection Area (SPA), Ramsar Site and Site of Special Scientific Importance (SSSI)	Approx. 1,480 south-east
Cwm Cydfin, Leckwith	SSSI	Approx. 1,570 west
Non-Statutory Sites		
Cardiff Bay Wetlands and Hamadryad Park	Local Nature Reserve (LNR)	On Site (eastern only)
The River Taff/ Afon Taff	SINC	On Site
B-Line	Buglife Insect B-Line[2]	On Site
Coastal Saltmarsh	NRW Priority Area[3]	On Site

Survey Findings to date

Extended Phase 1 Habitat Survey

An Extended Phase 1 Habitat Survey was completed in October 2021 to provide an ecological baseline against which to assess the effects of the Development. During the ecology survey, habitats within the site were mapped according to Phase 1 Habitat survey methodology (JNCC, 2010). The survey area was also inspected for field evidence and suitability to support protected and notable species.

The site is dominated by well-maintained amenity grassland playing fields, in both The Marl and Hamadryad Park. Areas of dense scrub are present in both sides of the site surrounded by less managed areas of tall ruderal vegetation. A small patch of semi-natural broad-leaved woodland exists in the southern extent of Hamadryad Park and parkland trees of various ages/ sizes are present across the site.

[2] B-Lines are a series of 'insect pathways' running through countryside and towns. They link existing wildlife areas together, creating a network that will weave across the British landscape.

[3] The NRW Priority Areas are large scale areas which were prioritised for targeted conservation work, based on factors including the habitats within them.

Species

Table C: Status of Protected/ Notable Species on/ adjacent to the site

Species name	Desk Study Records	Site Suitability / Presence
Bats (*Chiroptera* spp.)	Records of a variety of species including common pipistrelle (*Pipistrellus pipistrellus*); and lesser horseshoe (*Rhinolophus hipposideros*). The closest confirmed roost record is located adjacent to the eastern boundary of The Marl Park and comprised a small bat roost (circa. five bats) roosting within the waterfront apartments in 2011.	Two trees and one group of trees across the Site were noted as having potential to support roosting bats (Ref 7.4). Please refer to the PEA report in appendix C2 for further information. The Site is of moderate value to foraging/ commuting bats due to the presence of mature trees and scrub. It is likely that bats use these areas during the active season (April to end-October).
Badgers (*Meles meles*)	Two records, the closest of which was located circa. 1940 m south of the Site, in 2014.	No confirmed evidence of badgers was identified during the survey. The site is suitable foraging habitat for badgers (amenity grassland, scrub and woodland). There is suitable sett building habitat in the woodland and within the dense scrub.
Birds	Over 3000 records of bird species from within 2 km of the Site. Including records Schedule 1 species (HMSO, 1981) including bittern (*Botaurus stellaris*) and kingfisher (*Alcedo atthis*). These records were located on and adjacent to the Site, along the River Taff/ Afon Taff and in The Marl between 2010 and 2019.	Nesting habitat for Schedule 1 birds (such as kingfisher) on Site is restricted to the marginal vegetation along the River Taff/ Afon Taf corridor. The vegetation on Site is likely to be an important nesting resource for the local bird population as it offers extensive nesting provisions in an otherwise urban environment.
Dormice (*Muscardinus avellanarius)*	None.	The woodland, trees and dense scrub at the site offer structurally suitable habitat for dormice (foraging and nesting building), however these areas are subject to regular disturbance from public footpaths and are fragmented from other areas of suitable habitat.

Species name	Desk Study Records	Site Suitability / Presence
Amphibians	No records of great crested newt (GCN). Records of common amphibians, the closest of which was of a common toad located 200 m east in 2013.	The River Taff/ Afon Taf is not considered suitable breeding (aquatic) habitat due to its fast-flowing nature. A pond is located circa 250 m east of Hamadryad Park. The connectivity from this pond to the Site is severed by a road and carpark and the terrestrial habitat surrounding the pond appears to be dominated by hardstanding and well-managed grassland (Ref 7.20), which is suboptimal for this species. The terrestrial habitat on Site is largely dominated by amenity grassland, which is sub-optimal for GCN and/ or other amphibians.
Hedgehogs (*Erinaceus europaeus*)	23 records, the closest record was 360 m west in 2020.	Hedgehogs are likely to use the grassland and scrub on Site for forging and commuting.
Reptiles	Records of common lizard (*Zootoca vivipara*), slow worm (*Anguis fragilis*). The nearest species was a slow worm located c. 350 m west of the Site in 2020.	Majority of the site is sub-optimal for reptiles due to closely mown amenity grassland and high levels of footfall. The less managed areas of the site including the tall ruderal and scrub in the south of The Marl and Hamadryad Park offer some suitability.
Otter (*Lutra lutra*)	Five records of otter, the majority of which were located along the River Taff/ Afon Taff.	The River Taff/ Afon Taf provides suitable habitat for otter.
Water vole (*Arvivola amphibius*)	None.	River Taff/ Afon Taf is not deemed to be suitable due to the wide channel and fast flowing water.
Terrestrial invertebrates	Numerous records of butterflies and moth including Species of Principal Importance including wall (*Lasiommata megera*), grayling (*Hipparchia semele*) and small heath butterfly (*Coenonympha pamphilus*).	The site is dominated by amenity grassland which is unlikely to support protected or notable invertebrates due to its low botanical diversity and intensively managed state.
White-clawed crayfish (*Austropotamobius pallipes)*	No records of white-clawed crayfish.	The area of river located near the site is saline and WCC are not known to inhabit saline environments.
Invasive non-native species (INNS)	A record of Himalayan Balsam is present along the River Taff/ Afon Taff (adjacent to Hamadryad Park) in 2008 and the closest record of Japanese Knotweed is located	Butterfly bush (*Buddleja davidii*)[4] was noted within the scrub during the survey. As the field survey was undertaken towards the end of the optimal survey season in October 2021, it is possible

[4] A non-native species, which can become invasive.

Species name	Desk Study Records	Site Suitability / Presence
	adjacent to The Marl within residential gardens.	that some INNS were dormant and were therefore unrecorded. However, due to the highly managed and urban nature of the habitats on Site, this was not deemed to be a significant limitation.

Appendix D

Appendix to the Ground Conditions (and Soils) Section

Appendix D1: Geo-environmental Desk Study Report

Appendix E

Appendix to the Historic Environment Section

Appendix E1: Cultural Heritage Gazetteer

Designated Heritage Assets

Name	Grade	NPRN Number	Easting	Northing
Scheduled Monuments				
The Wreck of the “Louisa”	SAM	GM553	318148	174021
Conservation Areas				
Mount Stuart Square	CA	295	319016	174703
Pierhead	CA	294	319138	174445
Listed Buildings				
Parish Church of St Paul.	II	13770	317794	174804
Grange Farm House	II	13807	317561	174983
Dead End Saloon	II	13952	319159	174563
,6,Bute Crescent, South Glamorgan	II	13953	319159	174558
Eli Jenkins	II	13954	319158	174552
,8,Bute Crescent, South Glamorgan	II	13955	319159	174545
Ocean Building	II	13956	319159	174531
,3,Bute Esplanade, South Glamorgan	II	13958	318871	174293
,4,Bute Esplanade, South Glamorgan	II	13959	318877	174293
,1,Bute Place, South Glamorgan	II	13960	319145	174641
,3,Bute Place, South Glamorgan	II	13961	319131	174640
Cardiff Bay Station	II*	13963	319070	174875
Pascoe House	II	13964	319097	174807
Meandros House	II	13965	319101	174789
,54b,Bute Street, South Glamorgan	II	13966	319104	174774
,54c,Bute Street, South Glamorgan	II	13967	319106	174762
4 Dock Chambers (Emlyn House)	II	13968	319108	174748

Name	Grade	NPRN Number	Easting	Northing
5 Dock Chambers (Emlyn House)	II	13969	319109	174738
Seaway House	II	13970	319113	174731
Former H.M.Immigration Office	II	13971	319128	174682
Cory's Building	II	13972	319118	174651
Midland Bank	II	13973	319095	174597
National Westminster Bank	II*	13974	319072	174705
Baltimore Hotel	II	13975	319081	174727
,122,Bute Street, South Glamor-gan	II	13976	319073	174763
,123,Bute Street, South Glamor-gan	II	13977	319073	174770
,124,Bute Street, South Glamor-gan	II	13978	319072	174776
Royal Bank of Scotland	II	13979	319073	174786
,126,Bute Street, South Glamor-gan	II	13980	319021	174829
Cast Iron Posts and Railings to E of Dock Lane	II	13985	319158	174655
Lloyd's Bank	II	13990	319001	174712
Phoenix Buildings	II	13991	318998	174697
Coptic House	II	13992	318997	174685
,6,Mount Stuart Square, South Glamorgan	II	13993	318995	174677
,7,Mount Stuart Square, South Glamorgan	II	13994	318994	174672
,8,Mount Stuart Square, South Glamorgan	II	13995	318992	174665
,9,Mount Stuart Square, South Glamorgan	II	13996	318991	174659
Kilsby and Williams	II	13997	318991	174652
Crichton House	II	13998	318990	174639

Name	Grade	NPRN Number	Easting	Northing
Telephone Call Box adjoining E Side Of The Former Coal Ex-change	II	13999	318980	174713
Pillar Box Outside former Coal Ex-change	II	14000	318975	174684
Baltic House	II	14001	318940	174641
,20,Mount Stuart Square, South Glamorgan	II	14002	318924	174640
Marine House	II	14003	318915	174640
Mount Stuart House	II	14004	318896	174617
Aberdare House	II	14006	318881	174673
Empire House	II*	14007	318981	174750
,58,Mount Stuart Square, South Glamorgan	II	14008	318993	174746
,59,Mount Stuart Square, South Glamorgan	II	14009	319000	174744
St Line House	II	14010	319008	174743
Cambrian Buildings	II	14011	319031	174736
Cymric Buildings	II	14012	319035	174756
Pillar Box Outside Cambrian Build-ings.	II	14013	319042	174719
The Point (Formerly St Stephen's Church)	II	14014	319025	174705
Cardiff Exchange Building	II*	14015	318943	174698
Scott's Brasserie (Former Pilotage Office).	II	14017	319067	174428
Railings & Gates behind Scott's Brasserie (Former Pilotage Office)	II	14018	319059	174417
The Big Windsor	II	14019	319032	174418
The Jug & Platter (Formerly The Bute Dock)	II	14020	319065	174726
,33 West Bute Street, South Gla-morgan	II	14021	319050	174802
34 & 35	II	14022	319052	174811

Name	Grade	NPRN Number	Easting	Northing
36 & 37	II	14023	319053	174824
Pillar Box Outside Royal Bank of Scotland	II	14024	319070	174797
,1 Windsor Esplanade, South Glamorgan	II	14026	318840	174233
,2 Windsor Esplanade, South Glamorgan	II	14027	318835	174230
,3 Windsor Esplanade, South Glamorgan	II	14028	318829	174226
,4 Windsor Esplanade, South Glamorgan	II	14029	318824	174224
,5 Windsor Esplanade, South Glamorgan	II	14030	318818	174221
,6 Windsor Esplanade, South Glamorgan	II	14031	318812	174219
,7 Windsor Esplanade, South Glamorgan	II	14032	318806	174216
,8 Windsor Esplanade, South Glamorgan	II	14033	318800	174213
,9 Windsor Esplanade, South Glamorgan	II	14034	318794	174210
,10 Windsor Esplanade, South Glamorgan	II	14035	318789	174207
,11 Windsor Esplanade, South Glamorgan	II	14036	318782	174205
,12 Windsor Esplanade, South Glamorgan	II	14037	318777	174202
,13 Windsor Esplanade, South Glamorgan	II	14038	318771	174199
,14 Windsor Esplanade, South Glamorgan	II	14039	318765	174197
,15 Windsor Esplanade, South Glamorgan	II	14040	318759	174193
,16 Windsor Esplanade, South Glamorgan	II	14041	318753	174190
,17 Windsor Esplanade, South Glamorgan	II	14042	318748	174188

Name	Grade	NPRN Number	Easting	Northing
,18 Windsor Esplanade, South Glamorgan	II	14043	318742	174185
,19 Windsor Esplanade, South Glamorgan	II	14044	318735	174183
Power House at Mount Stuart Graving Docks	II	14045	319005	174245
Mount Stuart Graving Dock No.3	II	14046	318977	174304
Mount Stuart Graving Dock No.2	II	14047	319017	174320
Mount Stuart Graving Dock No.1	II	14048	319058	174338
Sea Wall to East of former Mount Stuart Shiprepair Yard	II	14049	319108	174372
Signal Platform in Bay	II	14050	319170	174379
Signal Platform in Bay	II	14051	319160	174333
Bute West Dock Basin, including Sea Walls and Catch Pit	II	14052	319217	174455
One of a Pair of Navigation Lamps to E of Bute West Dock Basin	II	14053	319241	174455
One of a Pair of Navigation Lamps to E of Bute West Dock Basin	II	14054	319242	174476
Pier Head Building	I	14055	319275	174484
Sea Wall and Lock of Bute East Dock Basin	II	14056	319314	174434
Former Warehouse (The "D" Shed)	II	14057	319177	174731
Sloping Stone Sea Wall between Entrance to Bute East Dock and Roath Basin, including 5 Dolphins	II	14058	319356	174306
Former H.M.Customs and Excise Office	II	14059	319407	174352
Gas Holder at British Gas Grangetown Works	II	14067	317409	174319
War Memorial in Grange Gardens, including enclosure railings	II	19088	317996	174905
Shelter in Grange Gardens	II	19089	318033	174948
White Hart Public House	II	20282	318866	174614

Non-Designated Heritage Assets

Asset Name	Site Type	Period	HER Number	Easting	Northing
Penarth Railway, Harbour Branch Line	Railway	Post-medieval	02914s	317492	174876
Glamorganshire Canal	Monument	Post-medieval	01682.0s	318755	176365
Grangetown Gasworks, Cardiff, South Wales -ulna	Findspot	Holocene	27403	-	-
Grangetown Gasworks, Cardiff, South Wales - horncore	Findspot	Holocene	27402	-	-
Findspot, Mount Stuart Graving Docks	Findspot	Romano-British	GGAT00060s	319000	174300
Grangetown	Findspot	Romano-British	GGAT00061s	317900	174700
Sea-Pound Crane	Monument	Post-medieval	GGAT00899s	318830	174680
Mount Stuart Public House, 1 Bute Crescent	Locally Listed Building	Post-medieval	GGAT01099s	319170	174470
2 Bute Crescent	Locally Listed Building	Post-medieval	GGAT01100s	319170	174480
5 Bute Crescent	Locally Listed Building	Post-medieval	GGAT01101s	319170	174550
6,Bute Crescent	Locally Listed Building	Post-medieval	GGAT01102s	319170	174550
7 Bute Crescent	Locally Listed Building	Post-medieval	GGAT01103s	319170	174550
8 Bute Crescent	Locally Listed Building	Post-medieval	GGAT01104s	319170	174550
9 Bute Crescent	Locally Listed Building	Post-medieval	GGAT01105s	319170	174550
10 Bute Crescent	Locally Listed Building	Post-medieval	GGAT01106s	319170	174550
11 Bute Crescent	Locally Listed Building	Post-medieval	GGAT01107s	319170	174550
12 Bute Crescent	Locally Listed Building	Post-medieval	GGAT01108s	319170	174550
Bute Warehouse	Locally Listed Building	Post-medieval	GGAT01109s	319000	174000
Cast Iron Canopy, Butetown	Monument	Modern	GGAT01110s	319130	174620
1 And 3 Bute Place	Locally Listed Building	Post-medieval	GGAT01111s	319130	174630
James Street No 1	Locally Listed Building	Post-medieval	GGAT01172s	319100	174600

Asset Name	Site Type	Period	HER Number	Easting	Northing
The Coal Exchange	Locally Listed Building	Post-medieval	GGAT01183s	318950	174700
Lloyds Bank	Locally Listed Building	Post-medieval	GGAT01184s	319001	174712
4 And 5 Mt Stuart Square	Locally Listed Building	Post-medieval	GGAT01185s	318990	174680
6 And 7 Mt Stuart Square	Locally Listed Building	Post-medieval	GGAT01186s	318990	174660
8 And 9 Mt Stuart Square	Locally Listed Building	Post-medieval	GGAT01187s	318990	174640
15 And 16 Mt Stuart Square	Locally Listed Building	Post-medieval	GGAT01188s	318960	174650
21-23 Mt Stuart Square	Locally Listed Building	Post-medieval	GGAT01190s	318915	174640
Casablanca Club	Locally Listed Building	Post-medieval	GGAT01191s	318910	174750
28 And 29 Mt Stuart Square	Locally Listed Building	Post-medieval	GGAT01192s	318881	174673
60 Mt Stuart Square	Locally Listed Building	Modern	GGAT01193s	319008	174743
Church Of St Stephen	Locally Listed Building	Post-medieval	GGAT01245s	319080	174520
St Pauls	Locally Listed Building	Post-medieval	GGAT01266s	317800	174800
Glamorganshire Canal	Monument	Post-medieval	GGAT01682.0s	318755	176365
Sea Lock, Glamorganshire Canal; Glamorganshire Canal,Lock 51	Monument	Post-medieval	GGAT01682.16s	318778	174380
Cardiff Sea Lock, Glamorganshire Canal	Monument	Post-medieval	GGAT01682.17s	318727	174312
Telephone Box, Mount Stuart Square	Locally Listed Building	Modern	GGAT02101s	318980	174713
Pilotage House/stables, Butetown	Locally Listed Building	Post-medieval	GGAT02148s	319100	174400
Empire House	Locally Listed Building	Modern	GGAT02150s	318981	174750
Baltic House, Mount Stuart Square	Locally Listed Building	Modern	GGAT02151s	318940	174640

Asset Name	Site Type	Period	HER Number	Easting	Northing
Telephone Box, former Coal Exchange, Butetown	Monument	Modern	GGAT02172s	318980	174713
PUBLIC LIBRARY	Locally Listed Building	Post-medieval	GGAT02242s	318500	175100
The Louisa (wreck), Butetown, Cardiff	Vessel	Post-medieval	GGAT02730s	318200	174000
Glamorganshire Canal and Sea Lock, Butetown, Cardiff	Monument	Post-medieval	GGAT02736s	318731	174320
Hamadryad Hospital Ship, Butetown, Cardiff	Vessel	Post-medieval	GGAT02737s	318586	174335
Ferry Road Swing Bridge, Grangetown, Cardiff	Monument	Post-medieval	GGAT02738s	318269	174458
Fever Hospital and Dead House, Butetown, Cardiff	Locally Listed Building	Post-medieval	GGAT02739s	318580	174424
Penarth Railway, Harbour Branch Line	Monument	Post-medieval	GGAT02914s	318025	173887
Windsor Slipways And Graving Docks	Monument	Post-medieval	GGAT02915s	318200	174560
Ferry Road	Road	Post-medieval	GGAT02916s	317630	174340
Red House Inn Formely The Penarth Railway Inn	Locally Listed Building	Post-medieval	GGAT02917s	318100	173240
Imperial Wharf	Monument	Post-medieval	GGAT02918s	318100	173240
Masonry Embankment north of Red House	Monument	Unknown	GGAT02919s	318030	173430
Event record	-	-	GGAT02920s	318300	173700
Windsor Slipways And Graving Dock	Monument	Post-medieval	GGAT03466s	318200	174560
Butetown Cannon, Cardiff Bay	Findspot	Post-medieval	GGAT03709s	318800	174900
Messrs Curran's Metals and Munitions, Hurman Street, Cardiff	Locally Listed Building	Modern	GGAT05056s	318775	174831

Asset Name	Site Type	Period	HER Number	Easting	Northing
Royal Hamadryad Seamans Hospital, Butetown, Cardiff	Locally Listed Building	Modern	GGAT05063s	318509	174347
National Shell Factory, Cardiff Rope Works, Ferry Road, Grangetown, Cardiff	Locally Listed Building	Modern	GGAT05070s	317598	174242
Bute West Dock Basin	Monument	Post-medieval	GGAT05104s	319216	174454
Signal platform	Monument	Post-medieval	GGAT05106s	319170	174379
Signal platform	Monument	Post-medieval	GGAT05107s	319160	174332
Former YMCA, Grangetown	Locally Listed Building	Modern	GGAT05254s	318004	175047
33-34 Mount Stuart Square, Cardiff	Locally Listed Building	Post-medieval	GGAT05299s	318895	174699
3 James Street, Butetown, Cardiff	Locally Listed Building	Post-medieval	GGAT05300s	319076	174603
Grange Gardens, Grangetown	Locally Listed Garden	Post-medieval	GGAT05320s	318004	174886
Ocean House, James Street	Locally Listed Building	Modern	GGAT05439s	318762	174575
94 Bute Street	Locally Listed Building	Post-medieval	GGAT05440s	319096	174572
Royal Stuart Warehouse, Glamorganshire Canal	Locally Listed Building	Post-medieval	GGAT05505s	318841	174554
Bethel Baptist Church, Pomeroy Street, Cardiff	Locally Listed Building	Modern	GGAT05918s	318643	174568
Engineering Works, The Dumballs, Cardiff	Locally Listed Building	Modern	GGAT05939s	318460	175080
Industrial Tanks, The Dumballs, Cardiff	Monument	Modern	GGAT05944s	318190	175090
Tramway, Penarth Road, The Dumballs	Monument	Modern	GGAT05963s	319799	176756
Works (Wheel & Chain Factory in 1954/69), The Dumball, Cardiffs	Locally Listed Building	Modern	GGAT05969s	318529	175050

Asset Name	Site Type	Period	HER Number	Easting	Northing
Warehouse, The Dumballs, Cardiff	Locally Listed Building	Modern	GGAT05970s	318611	175022

Previous Archaeological Events

Event Name	Event Date	Event Type	HER Number	Easting	Northing
Field visit Imperial wharf	2005	Field visit	E001276	318100	173240
GGat Project A487	-	Assessment	E000968	318300	173700
Building Recording of Bethel Baptist Church, Pomeroy Street	2013	Building Recording	E004423	318640	174570
Cardiff Sea Lock, Glamorganshire Canal, Survey, 19	1977	Survey	E000234	318680	174300
GGAT150: Rapid Coastline Zone Assessment	2018	Project	E006100	303141	185169
The Rural Settlement of Roman Britain	2015	Project	E005431	299796	183605
Waterfronts in Southeast Wales: phase 1	2004	Desk based assessment	E001379	322345	185555
Dumballs Road, Cardiff	2014	Desk Based Assessment	E006242	318369	175295
Dumballs Road, Cardiff	2014	Field Visit	E006261	318316	175195
Prospect Place, Cardiff. Cultural Heritage	1998	Desk Based Assessment	E002276	318176	173441
Archaeological implications of land reclamation at Tremorfa:	-	Desk based assessment	E001487	320287	175705
Prospect Place Cultural Heritage Archaeological Assessment	1998	Desk Based Assessment	1646	318180	173450
Ggat Project A487	-	Desk Based Assessment	GGATE000968	318300	173700
Cardiff Sea Lock, Glamorganshire Canal, Survey, 1977	1977	Survey	GGATE000234	318680	174300
Field visit Imperial wharf	2005	Survey	GGATE001276	318100	173240
Waterfronts in Southeast Wales:phase 1	2005	Desk Based Assessment	GGATE001379	353624	193805

Waterfronts in Southeast Wales:phase 1	2005	Desk Based Assessment	GGATE001379	332175	186170
Waterfronts in Southeast Wales:phase 1	2005	Desk Based Assessment	GGATE001379	318199	175409
Waterfronts in Southeast Wales:phase 1	2005	Desk Based Assessment	GGATE001379	266116	193199
Archaeological implications of land reclaimation at Tremorfa	1989	Desk based assessment	GGATE001487	320500	175600
Building Recording of Bethel Baptist Church, Pomeroy Street	2013	Building Survey	GGATE004423	318640	174570
Prospect Place, Cardiff	1998	Desk Based Assessment	GGATE002276	318300	173700
The Rural Settlement of Roman Britain	2015	Project	GGATE005431	258585	187907
The Rural Settlement of Roman Britain	2015	Project	GGATE005431	303367	169850
The Rural Settlement of Roman Britain	2015	Project	GGATE005431	346272	187763
The Rural Settlement of Roman Britain	2015	Project	GGATE005431	330381	214970
GGAT150: Rapid Coastline Zone Assessment	2016-17	Project	GGATE006100	257115	199529
GGAT150: Rapid Coastline Zone Assessment	2016-17	Project	GGATE006100	248128	185240
GGAT150: Rapid Coastline Zone Assessment	2016-17	Project	GGATE006100	266834	191638
GGAT150: Rapid Coastline Zone Assessment	2016-17	Project	GGATE006100	285387	176101
Dumballs Road, Cardiff	2014	Desk Based Assessment	GGATE006242	318365	175287
Dumballs Road, Cardiff	2014	Survey	GGATE006261	318365	175287

Appendix F

Appendix to the Noise and Vibration Section

Appendix F1: Email correspondence with the LPA

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