

# Air Quality Assessment Plot 1

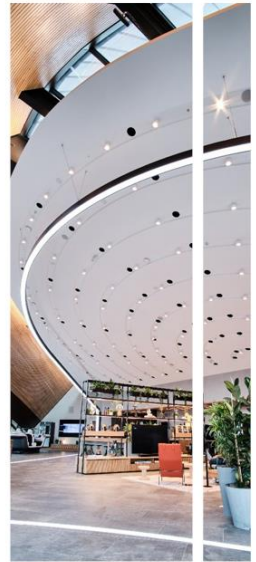
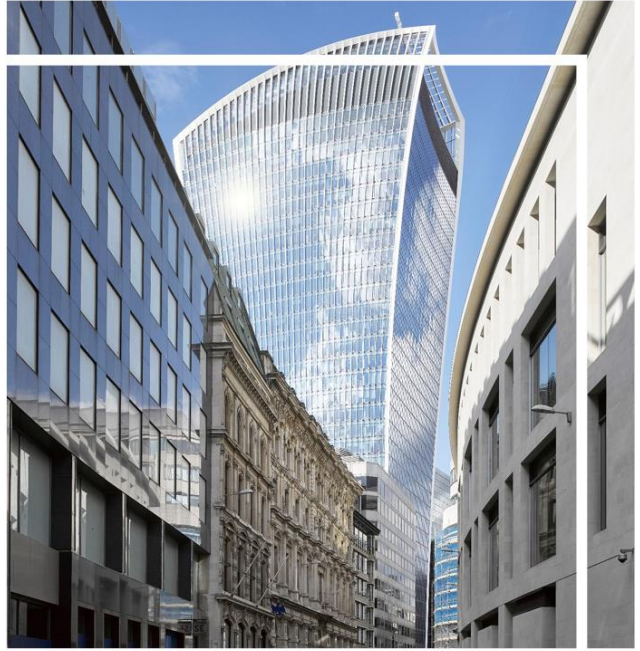
**Cardiff Peninsula Plot 1**  
**Orion Land & Leisure Ltd**

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## Executive Summary

Hilson Moran has been instructed by Orion Land and Leisure Limited to undertake an Air Quality Assessment (AQA) for the Proposed Development at Plot 1, Cardiff Peninsula, Cardiff.

This report presents the findings of the assessment, which addresses the potential air quality impacts during both the construction and operational stages of the Proposed Development. The assessment has been undertaken in line with the relevant policy and guidance, and where necessary outlines the required mitigation measures to minimise impacts.

A qualitative assessment of construction phase impacts has been carried out. There is a Medium risk of dust soiling during demolition, earthworks, construction, and trackout activities. There is a Low risk to human health during demolition, but a Medium Risk during earthworks, construction trackout activities. Through good site practice, the implementation of suitable mitigation measures, the impact of dust and PM<sub>10</sub> releases will be minimised. The residual effect of the construction phase on air quality is therefore not significant.

The Proposed Development results in a small increase in road traffic, however this does not exceed the thresholds set out in the EPUK & IAQM Guidance document, therefore a detailed assessment has been scoped out. However, a review of local air quality monitoring and a trend analysis exercise has been undertaken to determine local trends in air quality. The findings of the assessment included:

- Local monitoring data for NO<sub>2</sub>, PM<sub>10</sub> and PM<sub>2.5</sub> in the vicinity of the Application Site indicated compliance with the relevant annual and hourly AQS objectives;
- The trend analysis undertaken for NO<sub>2</sub> identified statistically significant downward trends at diffusion tube locations 147, 148 and 149 in the vicinity of the Application Site; and,
- The trend analysis undertaken for PM<sub>10</sub> did not demonstrate statistically significant trends. However, PM<sub>10</sub> concentrations remained below the relative objectives throughout the monitoring period.

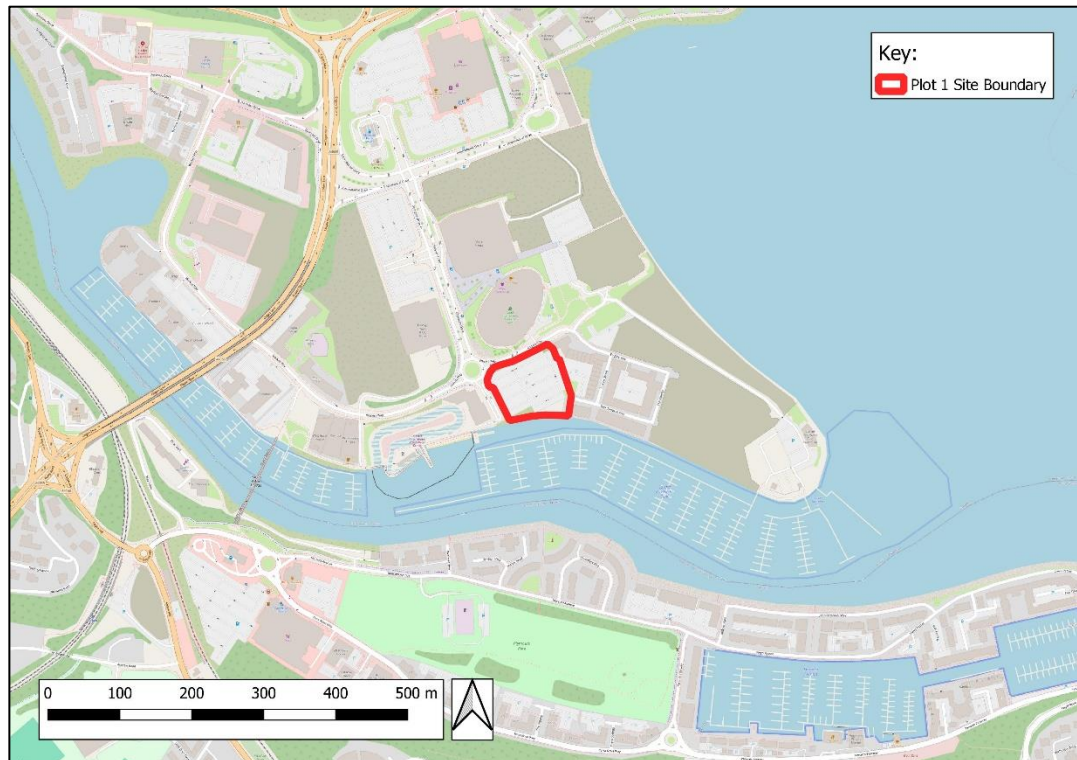
Based on the findings of the assessment site specific mitigation to protect existing receptors and future users of the Proposed Development from poor air quality is not required.

The residual effect is not significant.

Overall, with the recommended mitigation measures (construction phase only) in place the proposals would be compliant with legislation and policy.

# 1. Introduction

Hilson Moran has been instructed by Orion Land and Leisure Ltd to undertake an Air Quality Assessment (AQA) for the Proposed Development at Plot 1, Cardiff Peninsula, Cardiff, hereafter referred to as the 'Proposed Development' or 'Application Site'. The Application Site is located in the administrative area of Cardiff City Council (CCC) (National Grid Reference 318500 172500), as identified in **Figure 1.1**.



*Figure 1.1 Site Boundary (OpenStreetMap 2024)*

## 1.1. Proposed Development

The proposals comprise of the following:

*'Senior living accommodation with associated car parking, cycle parking, and landscaping'*

## 1.2. Potential Impacts

This report presents the findings of the AQA for both the operational and construction phases. During the construction phase, activities on the Application Site could give rise to dust, which, if transported beyond the site boundary, could have an adverse effect on local air quality and cause a statutory 'nuisance'. During the operational phase, emissions from road traffic has the potential to affect local pollution levels at existing and proposed receptors. For both phases, the impacts are identified and the mitigation measures that should be implemented to minimise the impact are described.

The AQA considers the potential impact on future users of the Proposed Development as the site is located in proximity to an existing Air Quality Management Area (AQMA).



A glossary of terms is provided in **Appendix A**.

### **1.3. Limitation & Copyright**

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## 2. Legislation, Policy & Guidance

### 2.1. Legislation

A summary of relevant air quality legislation is provided below.

#### 2.1.1. Air Quality Strategy for England, Scotland, Wales and Northern Ireland

The Government's policy on air quality within the UK is set out in the Air Quality Strategy (AQS) for England, Scotland, Wales and Northern Ireland<sup>i</sup>, most recently updated in 2023. The AQS sets out a framework for reducing hazards to health from air pollution and ensuring that the European Union and International agreements are met in the UK.

The AQS covers the following air pollutants: ammonia (NH<sub>3</sub>), benzene (C<sub>6</sub>H<sub>6</sub>), 1,3 butadiene (C<sub>4</sub>H<sub>6</sub>), carbon monoxide (CO), lead (Pb), oxides of nitrogen (NO<sub>x</sub>) (including nitrogen dioxide (NO<sub>2</sub>)), particulate matter (PM<sub>10</sub> and PM<sub>2.5</sub>), sulphur dioxide (SO<sub>2</sub>), ozone (O<sub>3</sub>) and polycyclic aromatic hydrocarbons (PAHs).

The AQS sets standards and objectives for the listed pollutants for the protection of human health, vegetation and ecosystems. The standards are based on recommendations by the Expert Panel on Air Quality Standards (EPAQS) and the World Health Organisation (WHO) based on current understanding and scientific knowledge about the effects of air pollution on health and the environment. The air quality objectives are policy based targets set by the UK Government that are often expressed as maximum concentrations not to be exceeded either without exception or with a limited number of exceedances within a specified timescale.

For the pollutants considered in this assessment, there are both a long-term (e.g., annual mean) and short-term (e.g., one hour mean) standard. In the case of NO<sub>2</sub>, the short-term standard is for a 1-hour averaging period (no more than 18 exceedances of 200 µg/m<sup>3</sup> per year), whereas for PM<sub>10</sub> it is a 24-hour averaging period (no more than 35 exceedances of 50 µg/m<sup>3</sup> per year). The variation in time period reflects the varying impacts on health of differing exposures to pollutants.

In the 2023 update to the targets an annual mean PM<sub>2.5</sub> target of 10 µg/m<sup>3</sup> to be achieved by 2040 and an average population exposure reduction of 35% in 2040 compared to a 2018 baseline.

#### 2.1.2. Air Quality Regulations

The air quality objectives in the AQS are statutory in Wales within the Air Quality (Wales) Regulations 2000<sup>ii</sup> and the Air Quality (Wales) (Amendment) Regulations 2002<sup>iii</sup> for the purpose of Local Air Quality Management (LAQM).

The Regulations require likely exceedances of the AQS objectives to be assessed in relation to:

*‘...the quality of air at locations which are situated outside of buildings or other natural or man-made structures, above or below ground, and where members of the public are regularly present...’*

The Air Quality Standards (Amendment) Regulations 2016<sup>iv</sup> transpose the European Union Ambient Air Quality Directive (2008/50/EC) into law in Wales, with the Air Quality (Amendment of Domestic Regulations) (EU Exit) Regulations 2019 ensuring continuation of the transposition of the Directive. This Directive sets legally binding limit values for concentrations in outdoor air of major air pollutants that impact public health such as NO<sub>2</sub>, PM<sub>10</sub> and PM<sub>2.5</sub>. The limit values for NO<sub>2</sub> and PM<sub>10</sub> are the same concentration levels as the relevant AQS objectives and the limit value for PM<sub>2.5</sub> is a concentration of 20 µg/m<sup>3</sup>. The relevant air quality objectives are presented in Table 2.1.

**Table 2.1 Air Quality Objectives for Relevant Pollutants**

Pollutant	Concentration	Measured as
NO <sub>2</sub>	200 µg/m <sup>3</sup>	1-hour mean, not to be exceeded more than 18 times a year (99.79 %ile)
	40 µg/m <sup>3</sup>	Annual mean
PM <sub>10</sub>	50 µg/m <sup>3</sup>	24-hour mean, not to be exceeded more than 35 times a year (90.41 %ile)
	40 µg/m <sup>3</sup>	Annual mean
PM <sub>2.5</sub>	20 µg/m <sup>3</sup>	Annual mean

### 2.1.3. Environment (Air Quality and Soundscapes) (Wales) Act 2024

The Environment (Air Quality and Soundscapes) (Wales) Act 2024<sup>v</sup> sets out the provision for improving air quality in Wales; for a national strategy for assessing and managing soundscapes in Wales; and for connected purposes. The act sets out the air quality targets, the effects of air pollution and guidance on how local authorities should review, monitor, and report local air quality. Local authorities are to periodically review and assess the quality of air within their administrative area. Where the objectives are not likely to be achieved, an authority is required to designate an AQMA. For each designated AQMA the local authority is required to produce an Air Quality Action Plan (AQAP) that works to ensure compliance with the objectives by implementing a number of air quality improvements measures.

### 2.1.4. WHO Guidelines

Table 2.2 states the World Health Organisation (WHO) Air Quality Guidelines for NO<sub>2</sub>, PM<sub>10</sub> and PM<sub>2.5</sub>. Whilst these guidelines are not targeted in the UK there is a push meet the guidelines and be more stringent with air quality control.

**Table 2.2 WHO Air Quality Guidelines**

Pollutant	Concentration	Measured as
NO <sub>2</sub>	25 µg/m <sup>3</sup>	24-hour mean, not to be exceeded more than 3-4 times a year (99.79 %ile)
	200 µg/m <sup>3</sup>	1 hour mean, not to be exceeded more than 3-4 times a year (99.79 %ile)
	10 µg/m <sup>3</sup>	Annual mean
PM <sub>10</sub>	45 µg/m <sup>3</sup>	24-hour mean, not to be exceeded more than 35 times a year (90.41 %ile) for UK, not to exceeded more than 3 to 4 times a year (99 <sup>th</sup> %ile) under WHO
	15 µg/m <sup>3</sup>	Annual mean
PM <sub>2.5</sub>	15 µg/m <sup>3</sup>	24-hour mean, not to exceeded more than 3 to 4 times a year (99 <sup>th</sup> %ile)
	5 µg/m <sup>3</sup>	Annual mean

## 2.2. Planning Policy

A summary of the national and local planning policy relevant to air quality and the Proposed Development is detailed below.

### 2.2.1. National

#### 2.2.1.1. Planning Policy Wales

Planning Policy Wales (PPW)<sup>vi</sup> sets out the land use planning policies of the Welsh Government. It is supplemented by a series of Technical Advice Notes (TANs), Welsh Government Circulars, and policy clarification letters, which together with PPW provide the national planning policy framework for Wales. PPW, the TANs, MTANs and policy clarification letters comprise national planning policy.

The primary objective of PPW is to ensure that the planning system contributes towards the delivery of sustainable development and improves the social, economic, environmental, and cultural well-being of Wales, as required by the Planning (Wales) Act 2015, the Well-being of Future Generations (Wales) Act 2015 and other key legislation and resultant duties such as the Socio-economic Duty. A well-functioning planning system is fundamental for sustainable development and achieving sustainable places.

PPW promotes action at all levels of the planning process which is conducive to maximising its contribution to the well-being of Wales and its communities. It encourages a wider, sustainable, and problem-solving outlook which focuses on integrating and addressing multiple issues rather than on an approach which is fragmented, un-coordinated and deals with issues in isolation. It provides an opportunity to remove any actual or perceived problems in current approaches and stimulate and support innovative and creative ideas as well as high standards of evidence and assessment to underpin the preparation of development plans and strategies and individual proposals.

Monitoring and learning from development outcomes to drive sustainable improvements in planning practice is also important.

Section 6.7 of the PPW sets out how air quality should be considered in the context of planning and the development of sustainable places.

## 2.2.2. Local

### 2.2.2.1. Cardiff City Council Local Development Plan

Local planning policy is provided in Cardiff City Council's Local Development Plan (LDP) (2006-2026)<sup>vii</sup>. The LDP provides guidance on how CCC will achieve the following 7 items:

- Provision of new homes and jobs;
- Putting in place a framework to manage future growth and encourage high quality, sustainable design;
- Bring forward new infrastructure;
- Deliver sustainable transport solutions;
- Response to evidenced based economic needs;
- Response to evidenced based social needs; and,
- Respect Cardiff's environment and response to climate change.

The main planning policy relating to air quality is provided by Policy EN13, which states:

*“Development will not be permitted where it would cause or result in unacceptable harm to health, local amenity, the character and quality of the countryside, or interests of nature conservation, landscape or built heritage importance because of air, noise, light pollution or the presence of unacceptable levels of land contamination.”*

The existing LDP is currently undergoing review. Consultation has been completed and the next stage in the process will be publishing a new draft LDP for 2021 to 2036.

## 2.3. Guidance

A summary of the publications referred to in undertaking the air quality assessment is provided below.

### 2.3.1. Local Air Quality Management Review and Assessment Technical Guidance

The Department for Environment, Food and Rural Affairs (Defra) has published technical guidance for use by local authorities. This technical guidance, identified as LAQM.TG(22)<sup>viii</sup>, is for used by local authorities for their review and assessment work and has been applied where appropriate to this assessment.

### 2.3.2. Land-Use Planning and Development Control: Planning for Air Quality

Environmental Protection UK (EPUK) and the Institute of Air Quality Management (IAQM) have published guidance<sup>ix</sup>, which offers advice as to when an air quality assessment may or may not be required. The guidance document details what should be included within

an assessment, how to determine the significance of impacts and the likely mitigation measures required to minimise the impacts.

### **2.3.3. Guidance on the Assessment of Dust from Demolition and Construction**

This document<sup>x</sup>, published by the IAQM, provides guidance on how to assess the impact of construction activities on air quality associated with new developments. The methodology prescribed within the document allows the impacts to be categorised based on risk (with reference to dust and PM<sub>10</sub> on sensitive human and ecological receptors) and, where applicable, identify mitigation measures associated to the risk classification determined.

## 3. Assessment Methodology

### 3.1. Scope of Assessment

The scope of the assessment has been determined in the following way:

- Consultation with the Environmental Health Officer (EHO) at CCC Council to agree the scope of the assessment and the methodology to be applied;
- Review of CCC's latest review and assessment reports and the air quality data for the area surrounding the Application Site, including CCC and Defra;
- Desk study to confirm the locations of nearby existing receptors that may be sensitive to changes in local air quality, and a review of the Proposed Development to establish the location of new sensitive receptors; and,
- Review of the traffic data provided by Apex (the Applications Transport Consultant).

The scope of the assessment includes consideration of the potential impacts on local air quality resulting from:

- Dust and particulate matter generated by on-site activities during the construction phase;
- Increases in pollutant concentrations as a result of exhaust emissions arising from construction traffic and plant; and
- Increases in pollutant concentrations as a result of exhaust emissions arising from traffic generated by the Proposed Development once operational.

It is understood that the proposals do not include for any proposed Combined Heat and Power (CHP) Units, gas-fired boilers, or diesel generators for the purposes of providing heating and cooling (where necessary) and hot water. At this stage, it is understood that the proposals (which do not form part of this planning application) include for an all-electric district energy centre which would provide heating, cooling, and hot water to the Proposed Development. It has been assumed that this all-electric district energy centre would come online alongside the Proposed Development, however, should this not occur, allowances have been made through the provision of individual air source heat pumps (ASHP's) to provide the requirements to Plot 1.

As the proposals in either scenario do not include for combustion plant, a detailed assessment of emissions associated with this source has been scoped out.

### 3.2. Construction Phase

Assessment of the risk of impact associated with the generation of dust during the construction phase of the Proposed Development and determination of subsequent mitigation measures necessary has been undertaken following IAQM guidelines.

The assessment is based on a series of steps: screening the requirement for a detailed assessment, classification of the likely magnitude of dust emissions; characterisation of the area of influence and establishment of its sensitivity to dust; and establishment of the overall risk of impact. The risk of impact from dust emissions from the Proposed

Development considers effects on human health, nuisance as a result of dust soiling and ecological receptors from four main activities: demolition; earthworks; construction; and trackout. The potential for dust emissions from each activity should be considered, unless any of them are not relevant to the Proposed Development.

### 3.2.1. Identification of Receptors

The guidelines identify appropriate screening criteria for the identification of potential receptors, based on a conservative approach and in consideration of the exponential decline in both airborne concentrations and the rate of deposition with distance. A detailed assessment of the impact of dust from construction sites will be required where:

- A 'human receptor' is located within 350m of the boundary of the Site or within 50m of the route(s) used by construction vehicles on the public highway, up to 500m from the Site entrance;
- An 'ecological receptor' is located within 50m of the boundary of the Site or within 50m of the route(s) used by construction vehicles on the public highway, up to 500m from the Site entrance.

Tables 3.2, 3.3, 3.4 and 3.5 provide the criteria to define receptor sensitive to dust soiling and fugitive PM<sub>10</sub> emissions associated with construction activities.

Receptor sensitivity ranges from low (indicative examples include public footpaths, playing fields and parks), to medium (offices and shops) to high sensitivity (residential dwellings, hospitals, schools, and care homes).

Sensitive ecological receptors are defined as a site with features determined to be sensitive to NO<sub>x</sub>, NO<sub>2</sub>, PM<sub>10</sub> or PM<sub>2.5</sub>, either directly or indirectly. No ecological receptors are within 50m of the Proposed Development and/or 200m of the likely construction route, therefore ecological construction phase impacts are scoped out of this assessment.

### 3.2.2. Establishing Risk

The magnitude of dust emissions for each activity is classified as small, medium or large depending upon the scale of the works proposed, materials involved, and level of activity required. The IAQM guidelines provide examples of how the magnitude of emission can be defined, which are identified in Table 3.1. The Proposed Development is unlikely to satisfy all criteria within the examples, therefore professional judgement and site-specific information are used to identify appropriate emission magnitude.



**Table 3.1 Dust Emission Magnitude** (Source: IAQM Guidance, v2.2 Updated January 2024)

Activity	Small	Medium	Large
Demolition	<ul style="list-style-type: none"> <li>Total building volume &lt;12,000m<sup>3</sup></li> <li>Construction material with low potential for dust release (e.g. metal cladding or timber)</li> <li>Demolition activities &lt;6m above ground level</li> <li>Demolition during wetter months</li> </ul>	<ul style="list-style-type: none"> <li>Total building volume 12,000 – 75,000m<sup>3</sup></li> <li>Potentially dusty construction material</li> <li>Demolition activities 6-12m above ground level</li> </ul>	<ul style="list-style-type: none"> <li>Total building volume &gt;75,000m<sup>3</sup></li> <li>Potentially dusty construction material (e.g., concrete)</li> <li>On-site crushing and screening</li> <li>Demolition activities &gt;12m above ground level</li> </ul>
Earthworks	<ul style="list-style-type: none"> <li>Total site area &lt;18,000m<sup>2</sup></li> <li>Soil type with large grain size (e.g. sand)</li> <li>&lt;5 heavy earth moving vehicles active at any one time</li> <li>Formation of bunds &lt;4m in height</li> </ul>	<ul style="list-style-type: none"> <li>Total site area 18,500 – 110,000m<sup>2</sup></li> <li>Moderately dusty soil type (e.g. silt)</li> <li>5 – 10 heavy earth moving vehicles active at any one time</li> <li>Formation of bunds 3 – 6m in height</li> </ul>	<ul style="list-style-type: none"> <li>Total site area &gt;110,000m<sup>2</sup></li> <li>Potentially dusty soil type (e.g. clay)</li> <li>&gt;10 heavy earth moving vehicles at any one time</li> <li>Formation of bunds &gt;6m in height</li> </ul>
Construction	<ul style="list-style-type: none"> <li>Total building volume &lt;12,000m<sup>3</sup></li> <li>Construction material with low potential for dust (e.g. metal cladding or timber)</li> </ul>	<ul style="list-style-type: none"> <li>Total building volume 12,000 – 75,000m<sup>3</sup></li> <li>Potentially dusty construction material (e.g. concrete)</li> <li>On-site concrete batching</li> </ul>	<ul style="list-style-type: none"> <li>Total building volume &gt;75,000m<sup>3</sup></li> <li>On-site concrete batching, sandblasting.</li> </ul>
Trackout	<ul style="list-style-type: none"> <li>&lt;20 HDV (&gt;3.5t) outward movements* in any one day<sup>#</sup></li> <li>Surface material with low potential for dust release</li> <li>Unpaved road length &lt;50m</li> </ul>	<ul style="list-style-type: none"> <li>20 – 50 HDV (&gt;3.5t) outward movements* in any one day<sup>#</sup></li> <li>Moderately dusty surface material (e.g. high clay content)</li> <li>Unpaved road length 50 – 100m</li> </ul>	<ul style="list-style-type: none"> <li>&gt;50 HDV (&gt;3.5t) outward movements* in any one day<sup>#</sup></li> <li>Potentially dusty surface material (e.g. high clay content)</li> <li>Unpaved road length &gt;100m</li> </ul>
<p>* A vehicle movement is a one way journey, i.e. from A to B, and excludes the return journey.</p> <p># HDV movements during a construction project vary over its lifetime, and the number of movements is the maximum not the average.</p>			

Consideration is given to the likely sensitivity of the area to the impacts of dust, establishing a sensitivity of low, medium, or high for dust soiling, human health and ecological receptors. The sensitivity of the area considers a number of factors, including the specific sensitivities of receptors in the area, the proximity and number of those receptors, local baseline conditions such as background concentrations and site-specific factors.

The first step in identifying the sensitivity of the area is to establish the sensitivity of the receptor, based on the presence or level of activity associated with the area influenced by the Proposed Development. Professional judgement and site-specific information are used to assign an appropriate level of receptor sensitivity using the principles outlined in Table 3.2. Following this, the sensitivity of the area can be established from Tables 3.3 to 3.5 based on the sensitivity of the receptor, number of receptors (in the case of human health and dust soiling) and the distance from source.

**Table 3.2** *Receptor Sensitivity Definitions (Source: IAQM Guidance, v2.2 Updated January 2024)*

Activity	Low	Medium	High
Dust Soiling	<ul style="list-style-type: none"> <li>• Enjoyment of amenity would not reasonably be expected;</li> <li>• There is property that would not reasonably be expected to be diminished in appearance, aesthetics or value by soiling;</li> <li>• Transient exposure, where people or property is only expected to be present for limited periods of time as part of the normal pattern of use;</li> <li>• Indicative examples including playing fields, farmland, footpaths, short-term car parks and roads.</li> </ul>	<ul style="list-style-type: none"> <li>• Users would expect to enjoy a reasonable level of amenity, but not reasonably at same level as in their home;</li> <li>• The appearance, aesthetics or value of property could be diminished by soiling;</li> <li>• Indicative examples include parks and places of work.</li> </ul>	<ul style="list-style-type: none"> <li>• Users can reasonably expect enjoyment of a high level of amenity;</li> <li>• The appearance, aesthetics or value of property would be diminished by soiling, and continuous or regularly extended periods of presence expected during normal pattern of land use;</li> <li>• Indicative examples include dwellings, museum and other culturally important collections, medium and long-term car parks and car showrooms.</li> </ul>
Human Health	<ul style="list-style-type: none"> <li>• Locations where human exposure is transient;</li> <li>• Indicative examples include public footpaths, playing fields, parks and shopping streets.</li> </ul>	<ul style="list-style-type: none"> <li>• Locations where the people exposed are workers<sup>#</sup>, and exposure is over a time period relevant to the air quality objective for PM<sub>10</sub>*;</li> <li>• Indicative examples include office and shop workers, but not those occupationally exposed to dust.</li> </ul>	<ul style="list-style-type: none"> <li>• Locations where members of the public are exposed over a period of time relevant to the air quality objective for PM<sub>10</sub>*;</li> <li>• Indicative examples include residential properties, hospitals, schools and residential care homes.</li> </ul>
Ecological	<ul style="list-style-type: none"> <li>• Locations with a location designation where the features may be affected by dust deposition, e.g. Local Nature Reserve.</li> </ul>	<ul style="list-style-type: none"> <li>• Locations where there is a particularly important plant species, where its dust sensitivity is uncertain or unknown;</li> <li>• Locations with a national designation where the features may be affected by dust deposition, e.g. Site of</li> </ul>	<ul style="list-style-type: none"> <li>• Locations with an international or national designation and the designated features may be affected by dust soiling, e.g. Special Area of Conservation with acid heathland;</li> <li>• Location where there is a community of a</li> </ul>

Activity	Low	Medium	High
		Special Scientific Interest.	particularly dust sensitive species such as vascular species included in the Red Data List for Great Britain.
<p>* In the case of the 24-hour objectives, a relevant location would be one where individuals may be exposed for eight hours or more in a day, following Defra guidance.</p> <p># Workers are considered to be less sensitive than the general public as a whole because the most sensitive to the effects of air pollution, such as young children, are not normally workers.</p>			

**Table 3.3** Sensitivity of the Area to Dust Soiling Effects on People and Property  
(Source: IAQM Guidance, v2.2 Updated January 2024)

Receptor Sensitivity	Number of Receptors	Distance from Source			
		<20m	<50m	<100m	<250m
High	>100	High	High	Low	Low
	10 – 100	High	Medium	Low	Low
	1 – 10	Medium	Low	Low	Low
Medium	>1	Medium	Low	Low	Low
Low	>1	Low	Low	Low	Low

**Table 3.4** Sensitivity of the Area to Human Health Impacts (Source: IAQM Guidance, v2.2 Updated January 2024)

Receptor Sensitivity	Annual Mean PM <sub>10</sub> Concentration	Number of Receptors	Distance from Source			
			<20m	<50m	<100m	<250m
High	>32 µg/m <sup>3</sup>	>100	High	High	High	Medium
		10 – 100	High	High	Medium	Low
		1 – 10	High	Medium	Low	Low
	28 – 32 µg/m <sup>3</sup>	>100	High	High	Medium	Low
		10 – 100	High	Medium	Low	Low
		1 – 10	High	Medium	Low	Low
	24 - 28 µg/m <sup>3</sup>	>100	High	Medium	Low	Low
		10 – 100	High	Medium	Low	Low
		1 – 10	Medium	Low	Low	Low
<24 µg/m <sup>3</sup>	>100	Medium	Low	Low	Low	

Receptor Sensitivity	Annual Mean PM <sub>10</sub> Concentration	Number of Receptors	Distance from Source			
			<20m	<50m	<100m	<250m
		10 – 100	Low	Low	Low	Low
		1 – 10	Low	Low	Low	Low
Medium	>32 µg/m <sup>3</sup>	>10	High	Medium	Low	Low
		1 – 10	Medium	Low	Low	Low
	28 - 32 µg/m <sup>3</sup>	>10	Medium	Low	Low	Low
		1 – 10	Low	Low	Low	Low
	24 - 28 µg/m <sup>3</sup>	>10	Low	Low	Low	Low
		1 – 10	Low	Low	Low	Low
<24 µg/m <sup>3</sup>	>10	Low	Low	Low	Low	
	1 – 10	Low	Low	Low	Low	
Low	-	>1	Low	Low	Low	Low

**Table 3.5** Sensitivity of the Area to Ecological Impacts (Source: IAQM Guidance, v2.2 Updated January 2024)

Receptor Sensitivity	Distance from Source	
	<20m	<50m
High	High	Medium
Medium	Medium	Low
Low	Low	Low

### 3.2.3. Establishing Significance

The risk of dust related impacts from the Proposed Development is established from the sensitivity of the area and the likely dust emission magnitude. The risk should be established, on the worst-case area sensitivity and in the absence of mitigation, for each of the construction related activities (demolition, earthworks, construction and trackout) following the matrix in Table 3.6.

**Table 3.6** Risk of Dust Impacts from Each Activity (Source: IAQM Guidance, v2.2 Updated January 2024)

Sensitivity of Area	Activity	Dust Emission Magnitude		
		Large	Medium	Small
High	Demolition	High Risk	Medium Risk	Medium Risk
	Earthworks	High Risk	Medium Risk	Low Risk

Sensitivity of Area	Activity	Dust Emission Magnitude		
		Large	Medium	Small
	Construction	High Risk	Medium Risk	Low Risk
	Trackout	High Risk	Medium Risk	Low Risk
Medium	Demolition	High Risk	Medium Risk	Low Risk
	Earthworks	Medium Risk	Medium Risk	Low Risk
	Construction	Medium Risk	Medium Risk	Low Risk
	Trackout	Medium Risk	Low Risk	Negligible
Low	Demolition	Medium Risk	Low Risk	Negligible
	Earthworks	Low Risk	Low Risk	Negligible
	Construction	Low Risk	Low Risk	Negligible
	Trackout	Low Risk	Low Risk	Negligible

The IAQM guidelines identify a range of mitigation measures intended to reduce the emission and effects of dust from construction sites and identify their likely applicability to a development based on the level of impact risk attributed. Consideration is given to these in the development of mitigation measures, with the significance of the residual effect based on professional judgement.

### 3.3. Operational Phase

#### 3.3.1. Road Traffic Emissions

Road traffic has been identified as the main source of local pollution with respect to NO<sub>2</sub>, PM<sub>10</sub> and PM<sub>2.5</sub>.

Following consultation with Apex (project Transport Consultants), it is understood that the Proposed Development will result in a small increase in road traffic. However, this increase (+120 LGV trips and +0 HGV trips) does not warrant detailed dispersion modelling as detailed in IAQM & EPUK Air Quality Guidance (+/- 500 Annual Average Daily Traffic (AADT) for LGV and or +/- 100 AADT for HGVs for sites outside of an AQMA).

On this basis, a detailed road traffic assessment of development-generated traffic has been scoped out.

##### 3.3.1.1. Point Source Emissions

Following consultation with Hilson Moran (project Energy / M&E engineers), it is understood that the provision of heating and hot water will be from an all-electric approach.

At this stage, there is no onsite combustion plant, in the form of Combined Heat and Power (CHP) Units, boilers or generators proposed – as such a detailed assessment of these sources has been scoped out. However, as part of the proposals, there is a UPS

system for supporting the domestic sprinkler system, however there is non-combustion source.

### 3.4. Significance Criteria

#### 3.4.1. Existing Receptors

The EPUK and IAQM provide guidance for establishing the significance of air quality impacts arising as a result of the proposed development. The impact on individual receptors is dependent upon the long-term average pollutant concentrations at the receptor in the assessment year and the percentage change relative to the Air Quality Assessment Level (AQAL). The assessment of significance within this chapter is based on these criteria, as identified in Table 3.8.

**Table 3.7** *Impact Descriptors*

Long-term Average Concentration at Receptor in Assessment Year	Percentage Change in Concentrations to AQAL*			
	1	2-5	6-10	>10
75% or less of AQAL	Negligible	Negligible	Slight	Moderate
76 – 94% of AQAL	Negligible	Slight	Moderate	Moderate
95 – 102% of AQAL	Slight	Moderate	Substantial	Substantial
103 – 109% of AQAL	Moderate	Moderate	Substantial	Substantial
110% or more of AQAL	Moderate	Substantial	Substantial	Substantial
* Where the % change is <0.5% the change is described as ‘Negligible’ regardless of concentration.				

In addition to predicting the effect of significance at individual existing receptor locations, IAQM guidance states that other influences should be accounted for, such as:

- The existing and future air quality in the absence of the development, notably whether the Air Quality Objectives are likely to be met or the scale of exceedances in the long-term and short-term concentrations;
- The extent of current and future population exposure to the impacts, notably the number of properties and/or people present and the scale of impact (e.g., whether the majority of the local population is subject to substantial or minor impacts);
- The influence and validity of any assumptions adopted when undertaking the prediction of impacts, such as establishing a worst-case scenario for sensitive receptors.
- These factors are considered to determine whether the overall impact of the operational phase is adverse or beneficial.

### 3.4.2. Proposed Receptors

As the proposed receptor locations are introduced to the site through the proposed development, a change in pollutant concentrations from the baseline cannot be assessed at these locations. Instead, the modelled results at proposed receptor locations will be compared to the relevant AQOs to determine the potential of any exceedances.

Where a relevant AQO is predicted to be exceeded, the significance of effect is considered ‘Substantial’ in the absence of mitigation. Where no exceedance is predicted, the effect is considered of ‘Negligible’ significance and no mitigation is required to prevent exposure to elevated pollution concentrations. This criterion is set out in Table 3.9 below.

**Table 3.8** *Significance Criteria – Proposed Receptors*

Significance Criteria for Proposed Receptors Category	Applicable Annual Mean AQO	Significance	Recommendation
Below AQO	40 µg/m <sup>3</sup> (NO <sub>2</sub> and PM <sub>10</sub> ) 20 µg/m <sup>3</sup> (PM <sub>2.5</sub> )	Negligible (Not Significant)	No mitigation required beyond the best practice measures already incorporated into the design
Equal to or greater than AQO	40 µg/m <sup>3</sup> (NO <sub>2</sub> and PM <sub>10</sub> ) 20 µg/m <sup>3</sup> (PM <sub>2.5</sub> )	Substantial (Significant)	Additional mitigation required in addition to the best practice measures already incorporated into the design.

### 3.5. Sensitive Receptors

Sensitive human receptors are defined as locations that have potential to be impacted by emissions from road traffic emissions. These locations include those sensitive land uses (residential dwellings, hospitals, schools and care homes), in worst-case locations, in the vicinity of highways used by traffic travelling to and from the proposed development.

The locations of nearby designated sites have been considered within this assessment; no designated sites are within 200m of the road network likely to be utilised by traffic generated by the proposed development. Therefore, impacts on these ecological receptors have been scoped out of this assessment.

Defra provides guidance on locations where the air quality objectives should apply and Table 3.8 and professional judgement have been used to select receptors where likely significant exposure to pollutant concentrations may occur.

**Table 3.9** *Examples of where the Air Quality Objectives apply/do not apply*

Averaging Period	Objectives Should Apply	Objectives Should Generally Not Apply
Annual Mean	All locations where members of the public might be regularly	Building facades of offices or other places of work where

Averaging Period	Objectives Should Apply	Objectives Should Generally Not Apply
	<p>exposed. Building facades of residential properties, schools, hospitals, care homes etc.</p>	<p>members of the public do not have regular access.</p> <p>Hotels, unless people live there as their permanent residence.</p> <p>Gardens of residential properties.</p> <p>Kerbside sites (as opposed to locations at the building façade), or any other locations where public exposure is expected to be short-term.</p>
24-Hour Mean	<p>All locations where the annual mean objective would apply, together with hotels.</p> <p>Gardens of residential properties.</p>	<p>Kerbside sites (as opposed to locations at the building façade), or any other locations where public exposure is expected to be short-term.</p>
1-Hour Mean	<p>All locations where the annual mean and 24-hour mean objectives apply.</p> <p>Kerbside sites (for example pavements of busy shopping streets).</p> <p>Those parts of car parks, bus stations and railway stations etc. which are not fully enclosed, where members of the public might reasonably be expected to spend one hour or more.</p> <p>Any outdoor locations where members of the public might reasonably be expected to spend 1 hour or longer.</p>	<p>Kerbside sites where the public would not be expected to have regular access.</p>
15-Minute Mean	<p>All locations where members of the public might reasonably be exposed for a period of 15 minutes or longer.</p>	



### 3.6. Assumptions & Limitations

Professional judgement has been used in the completion of the construction phase dust assessment for the proposed development.

The ADMS-Urban dispersion model has been used in this assessment to assess the current and future baseline pollution concentrations in the vicinity of the Proposed Development. The dispersion models rely on input data, such as traffic data and predicted emissions data, etc., which may have uncertainties associated with them. The models simplify complex environments and does not always accurately reflect local micro-climatic conditions which may ultimately affect the predicted pollutant concentrations.

It is assumed that the information provided by the project Transport Consultant (Apex) for use in the air quality assessment is accurate.

It is assumed that the information provided by the project M&E engineers and the energy consultant (Hilson Moran) to scope out the inclusion of any onsite combustion plant is accurate.

The assumptions made in the assessment are considered reasonable and robust.

## 4. Baseline Conditions

### 4.1. Local Air Quality Information

CCC have declared four Air Quality Management Areas within Cardiff. These areas are at locations within Ely Bridge, Llandaff, Stephenson Court on Newport Road, and Cardiff City Centre. In 2022, all monitoring locations within the AQMAs were compliant with the relevant objectives for NO<sub>2</sub>. However, one non-automatic monitoring site located within the Llandaff AQMA was close to the annual air quality objective limit of 40µg/m<sup>3</sup>, with a result of 39.3µg/m<sup>3</sup>. The extent of the AQMA's in the context of the Application Site is shown in **Figure 4.1**.

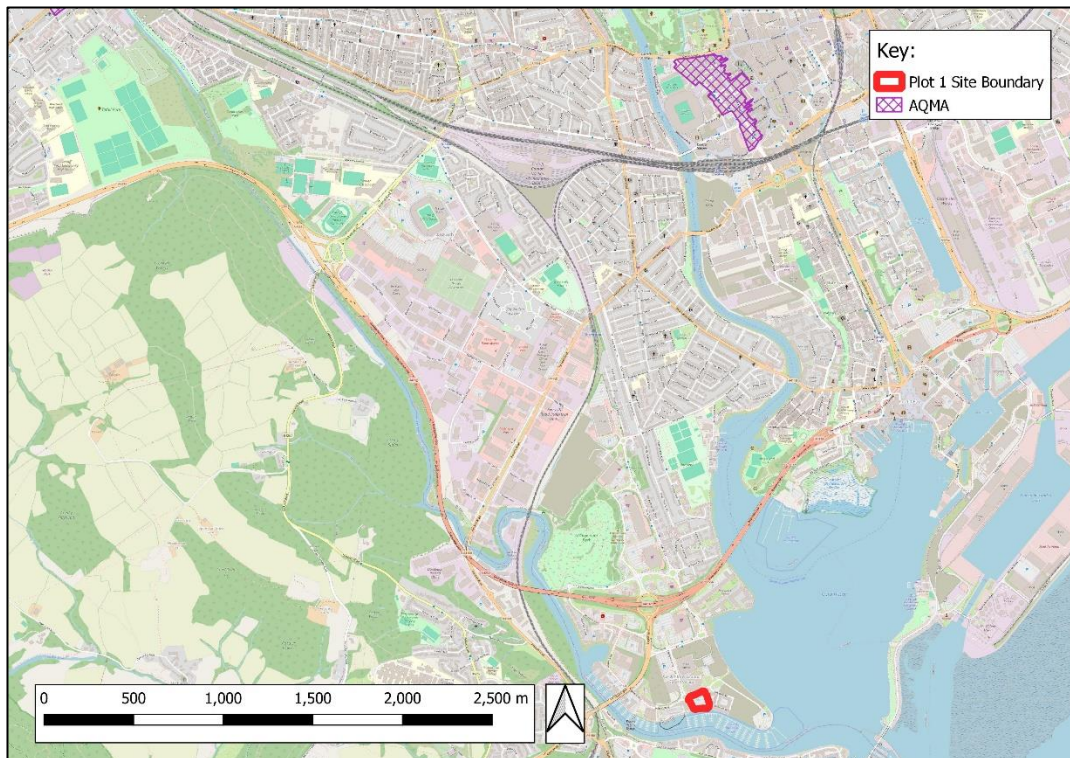


Figure 4.1 Air Quality Management Area (OpenStreetMap 2024)

#### 4.1.1. Defra Background Concentrations

The UK Air Information Resource (AIR) is operated by Defra and includes computer modelled predictions of background concentrations of air pollutants over the whole of the UK with a grid resolution of 1km<sup>2</sup>. The background concentrations for relevant pollutants in the grid square in which the Proposed Development is located (318500 172500) are presented in Table 4.1.

Table 4.1 Defra Background Concentrations (µg/m<sup>3</sup>)

Grid Square	Pollutant	2023	2030
318500, 172500	NO <sub>2</sub>	9.2	7.7
	PM <sub>10</sub>	11.6	11.3
	PM <sub>2.5</sub>	7.5	7.3

\*Bold indicates an exceedance of the relevant AQS objective.

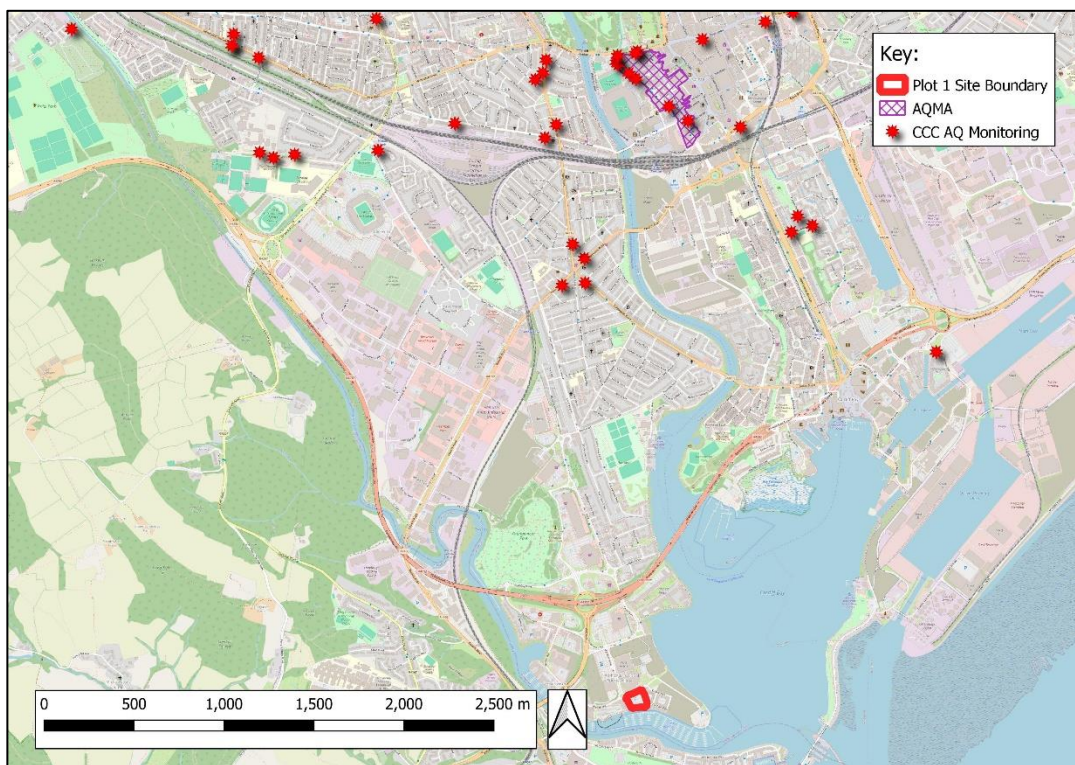
The Defra background concentrations for NO<sub>2</sub>, PM<sub>10</sub> and PM<sub>2.5</sub> for 2023 are below the relevant AQS objectives (40µg/m<sup>3</sup> for NO<sub>2</sub> and PM<sub>10</sub>, and 20µg/m<sup>3</sup> for PM<sub>2.5</sub>).

### 4.1.2. Local Air Quality Monitoring Data

CCC have a network of air quality monitoring stations, including 3 continuous monitors and 135 passive diffusion tube sites. The latest monitoring report published in 2023<sup>xi</sup>, presents the latest monitoring results from these locations.

It is acknowledged that monitoring results from the years 2020 and 2021 should be treated with caution due to the impacts the national lockdowns associated with COVID-19 had on traffic levels and air quality.

A summary of the monitoring locations most representative of the proposed development are identified in **Figure 4.2** and Tables 4.2 to 4.6 below.



**Figure 4.2** Local Air Quality Monitoring Locations (OpenStreetMap 2024)

#### 4.1.2.1. Nitrogen Dioxide

The annual mean NO<sub>2</sub> concentrations and number of exceedances of the 1-hour NO<sub>2</sub> objective at the 3 automatic monitoring sites at are identified in Table 4.2 and 4.3, respectively. It is noted that this monitor is not located within the vicinity of the proposed development, however the automatic survey results are included within this report for completeness.

Annual mean NO<sub>2</sub> concentrations at all locations are compliant with the AQS objective between 2018-2022. The monitoring results also indicate no exceedances of the 1-hour NO<sub>2</sub> objective between 2018 and 2022 were recorded.

**Table 4.2 LPA Continuous Monitoring Results – Annual Mean NO<sub>2</sub>**

Site ID	X, Y	Type	Annual Mean Concentrations (µg/m <sup>3</sup> )				
			2018	2019	2020*	2021*	2022
Cardiff City Centre AURN	318416, 176525	Urban Background	18	12	16	16	17
Cardiff, Newport Road AURN	320095, 177520	Roadside	-	29	19	22	22
Cardiff Castle	318055, 176459	Roadside	-	-	-	25	34

**Bold** indicates exceedance.

\*Monitoring data collected in 2020 and 2021 should be treated with caution due to the impact of COVID-19 on air quality monitoring data.

**Table 4.3 LPA Continuous Monitoring Results – 1-Hour Mean NO<sub>2</sub>**

Site ID	X, Y	Type	Number of Exceedances of the 1-Hour Mean (>200µg/m <sup>3</sup> )				
			2018	2019	2020	2021	2022
Cardiff City Centre AURN	318416, 176525	Urban Background	0	0	0	0	0
Cardiff, Newport Road AURN	320095, 177520	Roadside	-	0	0	0	0
Cardiff Castle	318055, 176459	Roadside	-	-	-	0	0

**Bold** indicates exceedance.

\*Monitoring data collected in 2020 and 2021 should be treated with caution due to the impact of COVID-19 on air quality monitoring data.

The annual mean NO<sub>2</sub> concentrations for the diffusion tube monitoring sites located in close proximity to the proposed development are presented in Table 4.4.

Annual mean NO<sub>2</sub> concentrations at all monitor locations are compliant with the AQS objective between 2018 and 2022.

**Table 4.4 LPA Diffusion Tube Monitoring Results – Annual Mean NO<sub>2</sub>**

Site ID	X, Y	Type	Annual Mean Concentrations (µg/m <sup>3</sup> )				
			2018	2019	2020*	2021*	2022
258 - Lamppost 116 Penarth Road	317760, 175310	Roadside	-	-	-	29.4	29.5
147 - 211 Penarth Road	317636, 175161	Roadside	29.3	26.9	20.5	23.8	24.3
148 - 161 Clare Road	317695, 175389	Roadside	26.6	25.6	21.3	23.9	24.0
149 - 10 Corporation Road	317764, 175174	Roadside	31.3	30.1	26.8	25.9	27.1
263 - Pierhead Street	319715, 174791	Roadside	-	-	-	-	14.4
TRO 019 - St Cuthberts Primary School	319027, 175493	Kerbside	-	-	-	14.5	14.5
TRO 020 - Letton Road	318910, 175456	Kerbside	-	-	-	14.7	15.3
TRO 021 - 58 Letton Road	318945, 175546	Kerbside	-	-	-	17.2	16.5

**Bold** indicates exceedance.

\*Monitoring data collected in 2020 and 2021 should be treated with caution due to the impact of COVID-19 on air quality monitoring data.

#### 4.1.2.2. Particulate Matter

##### PM<sub>10</sub>

The annual mean PM<sub>10</sub> concentrations for the 3 automatic monitoring sites at are identified in Table 4.5. Annual mean PM<sub>10</sub> concentrations at all locations are compliant with the AQS objective between 2018-2022.

**Table 4.5 LPA Continuous Monitoring Results – Annual Mean PM<sub>10</sub>**

Site ID	X, Y	Type	Annual Mean Concentrations (µg/m <sup>3</sup> )				
			2018	2019	2020*	2021*	2022
Cardiff City Centre AURN	318416, 176525	Urban Background	17	23	14	13	16
Cardiff, Newport Road AURN	320095, 177520	Roadside	-	19	17	17	18

Site ID	X, Y	Type	Annual Mean Concentrations ( $\mu\text{g}/\text{m}^3$ )				
			2018	2019	2020*	2021*	2022
Cardiff Castle	318055, 176459	Roadside	-	-	-	12	20

**Bold** indicates exceedance.

\*Monitoring data collected in 2020 and 2021 should be treated with caution due to the impact of COVID-19 on air quality monitoring data.

### PM<sub>2.5</sub>

The annual mean PM<sub>2.5</sub> concentrations for the 2 automatic monitoring sites at are identified in Table 4.6. Annual mean PM<sub>2.5</sub> concentrations at all locations are compliant with the AQS objective between 2018-2022.

**Table 4.6** LPA Continuous Monitoring Results – Annual Mean PM<sub>2.5</sub>

Site ID	X, Y	Type	Annual Mean Concentrations ( $\mu\text{g}/\text{m}^3$ )				
			2018	2019	2020*	2021*	2022
Cardiff City Centre AURN	318416, 176525	Urban Background	-	12	7	9	11
Cardiff Castle	318055, 176459	Roadside	-	-	-	9	10

**Bold** indicates exceedance.

\*Monitoring data collected in 2020 and 2021 should be treated with caution due to the impact of COVID-19 on air quality monitoring data.

## 5. Effects Appraisal & Site Suitability

### 5.1. Construction

#### 5.1.1. Assessment of Potential Dust Emission Magnitude

The likely magnitude of dust emissions from the Proposed Development for the four main activities has been assessed, as identified in Table 5.1.

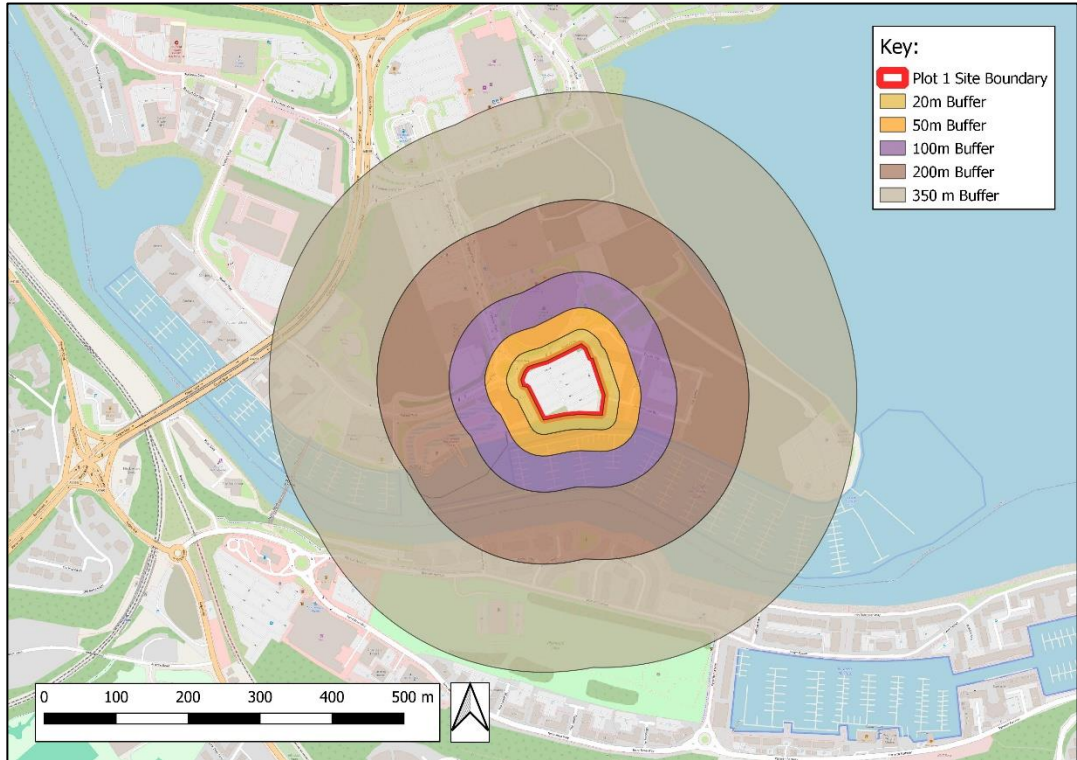
*Table 5.1 Predicted Magnitude of Dust Emissions from Proposed Development*

Activity	Magnitude	Justification
Demolition	Small	No demolition activities are proposed as such, however there will be a need to break the slab of the existing car park. This has the potential for dust release. As works will be at ground level, the magnitude has been classified as Small.
Earthworks	Medium	The total site area is <math><18,000\text{m}^2</math>. The soil type is considered to be potentially dusty, and it is anticipated that between 5-10 heavy earth moving vehicles may operate simultaneously. The magnitude of impact has been classified as Medium.
Construction	Medium	The total building volume is expected to range between 12,000-75,000 $\text{m}^3$ . The material for construction is concrete which is potentially dusty. The magnitude of impact has been classified as Medium.
Trackout	Medium	It is anticipated that between 20-50 HDV movements would occur in a single day at the peak of construction. The unpaved road length could be upwards of 100m with a dusty surface. The magnitude of impact has been classified as Medium.

#### 5.1.2. Sensitivity of the Area

A wind rose for Cardiff is provided in **Appendix B** and this indicates that the prevailing wind direction is from the west, with minor contributions from the east. Therefore, existing receptors that are located to the east are most likely to fall within the area of influence from dust emissions generated by the construction phase.

The majority of dust generated by the construction phase is likely to be deposited in close proximity to the source (see **Figure 5.1**). Surrounding the Application Site there are a number of highly sensitive existing residential receptors (>100 within 100m). There are no ecological receptors located within 50m of the Application Site, or within 500m of the likely construction traffic route and therefore consideration of these receptors has been scoped out.



**Figure 5.1** *Zones of Construction Influence (OpenStreetMap 2024)*

The Defra background PM<sub>10</sub> concentration is 11.6µg/m<sup>3</sup> in 2023 which is well below the annual mean air quality objective.

The sensitivity of the area to each of the previously identified impact types associated with the Proposed Development are identified in Table 5.2.

### 5.1.3. Receptor Sensitivity

The sensitivity of the area to each of the previously identified impact types associated with the Application Site are identified in Table 5.2.

**Table 5.2** *Sensitivity of Receptors to Dust Emission Effects*

Impact Type	Sensitivity of Surrounding Area			
	Demolition	Earthworks	Construction	Trackout
Dust Soiling	High	High	High	High
Human Health	Medium	Medium	Medium	Medium
Ecological	N/A	N/A	N/A	N/A

The sensitivity of the surrounding area for dust soiling is classified as high and for human health the sensitivity is classified as medium.



### 5.1.4. Risk of Impact

To determine the risk of impacts prior to the implementation of mitigation the dust emission magnitude and the sensitivity of the area have been combined. Table 5.3 below summaries the potential risk of impacts during the construction phase.

**Table 5.3 Potential Risk During the Construction Phase**

Impact Type	Risk			
	Demolition	Earthworks	Construction	Trackout
Dust Soiling	Medium Risk	Medium Risk	Medium Risk	Medium Risk
Human Health	Low Risk	Medium Risk	Medium Risk	Medium Risk
Ecological	N/A	N/A	N/A	N/A

The risk of dust soiling impacts on the Proposed Development on existing receptors in the vicinity of the Application Site is Medium Risk for demolition, earthworks and construction and trackout activities, without the implementation of mitigation. The risk of human health impacts from the Proposed Development on existing receptors is low for demolition and medium risk for earthworks, construction and trackout activities, without the implementation of mitigation.

### 5.1.5. Construction Road Traffic & Non-Road Mobile Machinery

The greatest impact on air quality due to construction traffic and NRMM is likely to be along roads in the vicinity of the Application Site. It is likely that construction traffic will enter the Application Site via Empire. It is likely that the volume of construction traffic will be low compared to the existing traffic flows.

Based on the current local air quality in the area, the proximity of sensitive receptors to the roads likely to be used by construction vehicles, the impacts are therefore considered to be slight adverse without the implementation of mitigation.

## 5.2. Operational

Trend analysis has been undertaken for annual mean monitoring data for NO<sub>2</sub>, PM<sub>10</sub> and PM<sub>2.5</sub> using the Mann-Kendall Test and Sen's Slope Estimates for the Trend of Annual Data (version 1.0) available from the Finnish Meteorological Institute<sup>xii</sup>.

There are four tested significance levels, and the following symbols are used to signify the level of significance:

- \*\*\* if trend at  $\alpha = 0.001$  level of significance (*i.e.*, 99.9%);
- \*\* if trend at  $\alpha = 0.01$  level of significance (*i.e.*, 99%);
- \* if trend at  $\alpha = 0.05$  level of significance (*i.e.*, 95%); and,
- + if trend at  $\alpha = 0.1$  level of significance (*i.e.*, 90%).

The annual mean data utilised is presented in Tables 4.2, 4.4 and 4.5 (2018-2019), annual mean data from previous years (2009-2017) for these monitoring locations was also utilised and taken from earlier ASR reports<sup>xiii</sup>. Monitoring data collected in 2020 and 2021 has been excluded due to the impact COVID-19 had on concentrations during these years.

### **5.2.1. Annual Mean NO<sub>2</sub>**

The trend analysis undertaken for annual mean NO<sub>2</sub> identified a statistically significant downward trend in concentrations at three of the longstanding diffusion tubes: 147, 148 and 149.

The downward trend at diffusion tube locations 147 (Penarth Road) and 148 (Clare Road) were found to be statistically significant at the 95% confidence level (0.05 level of significance), at monitor 149 (Corporation Road) the trend was found to be significant to the 99% confidence level (0.01 level of significance).

At the remaining monitoring locations whilst no statistically significant trends were found, annual mean NO<sub>2</sub> concentrations remained below the AQS objective throughout the monitoring period.

### **5.2.2. Annual Mean PM<sub>10</sub>**

The trend analysis undertaken for annual mean PM<sub>10</sub> found no statistically significant trends.

Concentrations of PM<sub>10</sub> have been measured at the Cardiff City Centre AURN since 2009, and whilst there has been gradual decrease in annual mean PM<sub>10</sub> over the years at this monitor, a small increase in concentrations was measured between 2018-2019. Despite the increase in concentrations during 2019, concentrations have always remained well below the AQS objective and in 2022 concentrations saw a reduction from 2019 levels.

No trend analysis was undertaken for PM<sub>2.5</sub> as monitoring for this pollutant only commenced in 2019.

## 6. Mitigation

### 6.1. Construction Phase

The IAQM guidelines provide an indication of the mitigation measures that would be appropriate for inclusion within the Proposed Development, based on the level of risk of dust related impacts identified for each of the activities. Consequently, the following mitigation measures should be incorporated into the Proposed Development and delivered through the implementation of a Construction Environment Management Plan (CEMP).

Mitigation measures that are generic to each of the activities, and therefore should be implemented for the duration of the construction related works where applicable are identified in Table 6.1, whilst activity specific mitigation measures are identified in Table 6.2.

**Table 6.1** *Mitigation to be implemented during the Construction Phase*

<b>Development Element</b>	<b>Mitigation Measure</b>
Communication	<p>Develop and implement a stakeholder communications plant that includes community engagement before work commences on site.</p> <p>Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary. This may be the environment manager/engineer or the site manager.</p> <p>Display the head or regional office contact information.</p>
Planning	<p>Develop and implement a Dust Management Plan (DMP), which may include measures to control other emissions, approved by the Local Authority. The level of detail will depend on the risk, and should include as a minimum the measures recommended in this table.</p>
Site Management	<p>Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken.</p> <p>Make the complaints log available to the local authority when asked.</p> <p>Record any exceptional incidents that cause dust and/or emissions, either on- or off- site, and the action taken to resolve the situation in the log book.</p>
Monitoring	<p>Undertake daily on-site and off-site inspection, where receptors (including roads) are nearby, to monitor dust, record inspection results, and make the log available to the local authority when asked. This should include regular dust soiling checks of surfaces such as street furniture, cars and windowsills within 100m of the site boundary, with cleaning provided if necessary.</p> <p>Carry out regular site inspections to monitor compliance with the DMP, record inspection results, and make an inspection log available to the local authority when asked.</p> <p>Increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions.</p>

Development Element	Mitigation Measure
	Agree dust deposition, dust flux, or real-time PM <sub>10</sub> continuous monitoring locations with the Local Authority. Where possible commence baseline monitoring at least three months before work commences on site or, if at a large site, before work on a phase commences. Further guidance is provided by IAQM on monitoring during demolition, earthworks and construction.
Preparing and Maintaining the Site	Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible. Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site. Fully enclose site or specific operations where there is a high potential for dust production and the site is active for an extensive period. Avoid site run-off of water or mud. Keep site fencing, barriers and scaffolding clean using wet methods. Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site. If they are being re-used on-site cover as described below.
Operating Vehicle/ Vehicle Movements	Ensure all vehicles switch off engines when stationary – no idling vehicles. Avoid the use of diesel or petrol powered generators and use mains electricity or battery powered equipment where practicable. Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials. Implement a Travel Plan that supports and encourages sustainable travel (public transport, cycling, walking and car-sharing).
Operations	Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems. Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate. Use enclosed chutes and conveyors and covered skips. Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate. Ensure equipment is readily available on site to clean any dry spillages, and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods.
Waste Management	Avoid bonfires and burning of waste materials.

**Table 6.2** Activity Specific Mitigation Measures to be implemented during the Construction Phase

Development Element	Mitigation Measure
Demolition	Soft strip inside buildings before demolition (retaining walls and windows in the rest of the building where possible, to provide a screen against dust). Ensure effective water suppression is used during demolition operations. Hand held sprays are more effective than hoses attached to equipment as the water can be directed to where it is needed. In addition high volume water suppression systems, manually controlled, can produce fine water droplets that effectively bring the dust particles to the ground. Avoid explosive blasting, using appropriate manual or mechanical alternatives. Bag and remove any biological debris or damp down such material before demolition.
Earthworks	Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as

Development Element	Mitigation Measure
	soon as practicable. Use Hessian, mulches or trackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as practicable. Only remove the cover in small areas during work and not all at once.
Construction	Avoid scabbling (roughening of concrete surfaces) if possible. Ensure sand and other aggregates are stored in bunds in areas that are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place. For small supplies of fine powder materials, ensure bags are sealed after use and stored appropriately to prevent dust.
Trackout	Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site. This may require the sweeper being continuously in use. Avoid dry sweeping of large areas. Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport. Record all inspections of access roads and any subsequent action in a site log book. Access gates to be located at least 10m from receptors where possible.

### 6.1.1. Residual Effects

The residual effects of dust and PM<sub>10</sub> generated by construction activities following the application of the mitigation measures described above and good site practice is not significant.

The residual effects of emissions to air from construction vehicles and NRMM on local air quality is not significant following the implementation of the recommended mitigation measures.

## 6.2. Operational Phase

As summarised above, air quality in the vicinity of the Application Site, based on current monitoring data, is compliant with the relevant AQS objectives for NO<sub>2</sub>, PM<sub>10</sub> and PM<sub>2.5</sub>. In the future, we would expect further reductions as cleaner vehicles come onto the network. Therefore, site specific mitigation is not required.

However, this does not deter from best practice design, and therefore the following recommendations are made:

- Where possible locate air intake along facades that face away from roads;
- Locate air intakes at height; and,
- Be mindful of the location of air intakes at roof level – where roof level intakes are necessary it is important to consider existing flues (energy plant/kitchen extracts) associated with any neighbouring buildings and any exhausts (kitchen or ventilation) associated with the Proposed Development itself. This will reduce the likelihood of recirculating ‘dirty’ air. Where possible air intakes should be located approximately 20m from any exhausts (See Part F of the Building Regulations).

### 6.2.1. Residual Effects

The overall residual effect for the operational phase is not significant.

## 7. Conclusion

This report presents the findings of the assessment, which addresses the potential air quality impacts during both the construction and operational stages of the Proposed Development. The assessment has been undertaken in line with the relevant policy and guidance, and where necessary outlines the required mitigation measures to minimise impacts.

A qualitative assessment of construction phase impacts has been carried out. There is a Medium risk of dust soiling during demolition, earthworks, construction, and trackout activities. There is a Low risk to human health during demolition, but a Medium Risk during earthworks, construction trackout activities. Through good site practice, the implementation of suitable mitigation measures, the impact of dust and PM<sub>10</sub> releases will be minimised. The residual effect of the construction phase on air quality is therefore not significant.

The Proposed Development results in a small increase in road traffic, however this does not exceed the thresholds set out in the EPUK & IAQM Guidance document, therefore a detailed assessment has been scoped out. However, a review of local air quality monitoring and a trend analysis exercise has been undertaken to determine local trends in air quality. The findings of the assessment included:

- Local monitoring data for NO<sub>2</sub>, PM<sub>10</sub> and PM<sub>2.5</sub> in the vicinity of the Application Site indicated compliance with the relevant annual and hourly AQS objectives;
- The trend analysis undertaken for NO<sub>2</sub> identified statistically significant downward trends at diffusion tube locations 147, 148 and 149 in the vicinity of the Application Site; and,
- The trend analysis undertaken for PM<sub>10</sub> did not demonstrate statistically significant trends. However, PM<sub>10</sub> concentrations remained below the relative objectives throughout the monitoring period.

Based on the findings of the assessment site specific mitigation to protect existing receptors and future users of the Proposed Development from poor air quality is not required.

The residual effect is not significant.

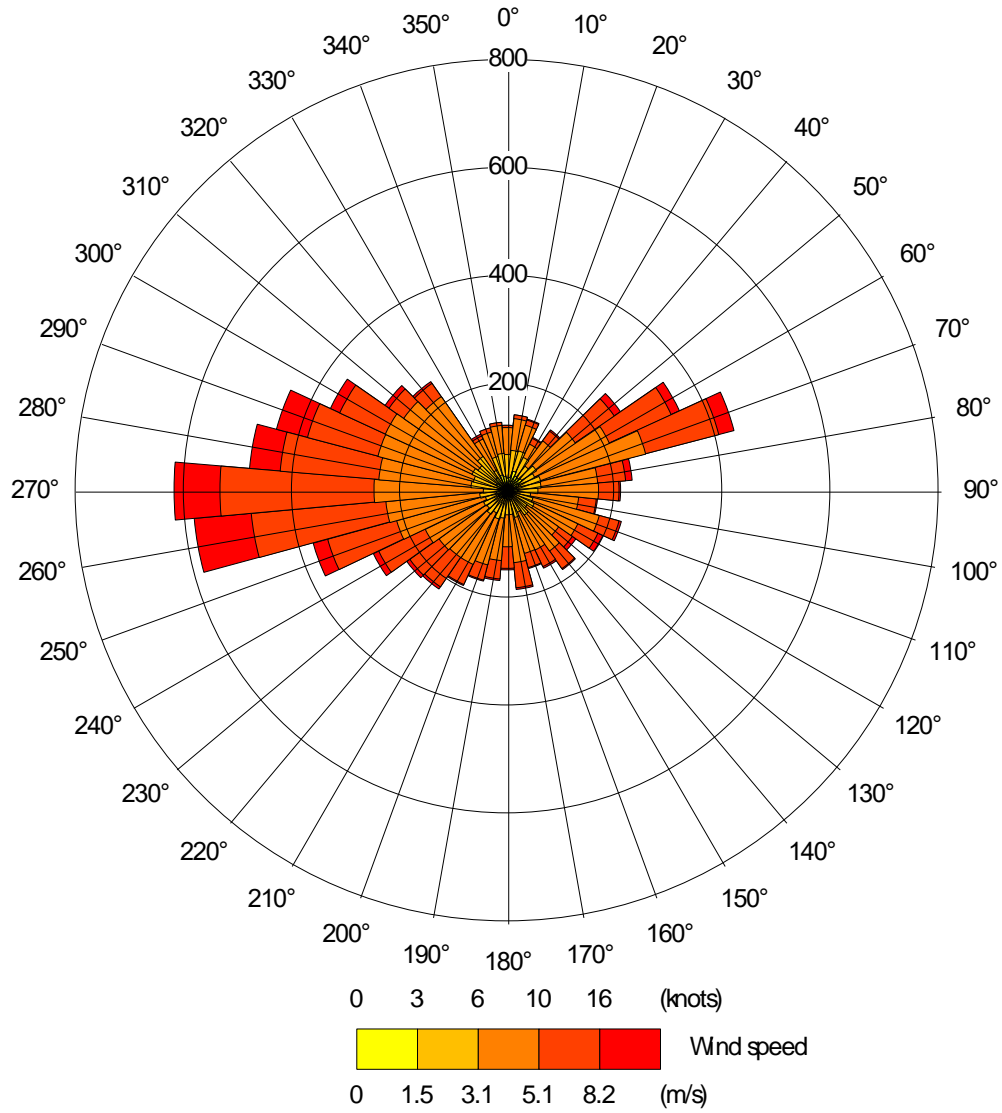
Overall, with the recommended mitigation measure (construction phase only) in place the proposals would be compliant with legislation and policy.

## Appendix A – Glossary

Term	Definition
AADT - Annual Average Daily Traffic	A daily total traffic flow (24 hrs), expressed as a mean daily flow across all 365 days of the year.
Air Quality Objective	Policy target generally expressed as a maximum ambient concentration to be achieved, either without exception or with a permitted number of exceedances within a specific timescale (see also air quality standard).
Air Quality Standard	The concentrations of pollutants in the atmosphere which can broadly be taken to achieve a certain level of environmental quality. The standards are based on the assessment of the effects of each pollutant on human health including the effects on sensitive sub groups (see also air quality objective)
Ambient Air	Outdoor air in the troposphere, excluding workplace air.
Annual Mean	The average (mean) of the concentrations measured for each pollutant for one year.
AQMA	Air Quality Management Area.
Conservative	Tending to over-predict the impact rather than under-predict.
Data Capture	The percentage of all the possible measurements for a given period that were validly measured.
Defra	Department for Environment, Food and Rural Affairs
DfT	Department for Transport.
Dust	Dust comprises particles typically in the size range 1-75 micrometres (µm) in aerodynamic diameter and is created through the action of crushing and abrasive forces on materials.
Exceedance	A period of time where the concentrations of a pollutant is greater than the appropriate air quality standard.
HDV/HGV	Heavy Duty Vehicle/Heavy Goods Vehicle
LAQM	Local Air Quality Management
NO <sub>2</sub>	Nitrogen dioxide
NO <sub>x</sub>	Nitrogen oxides
PM <sub>10</sub>	Particulate matter with an aerodynamic diameter of less than 10 micrometres (µm)
PM <sub>2.5</sub>	Particulate matter with an aerodynamic diameter of less than 2.5 micrometres (µm)
Trackout	The transport of dust and dirt from the construction/demolition site onto the public road network, where it may be deposited and then re-suspended by vehicles using the network. This arises when heavy duty vehicles (HDVs) leave the construction/ demolition site with dusty materials, which may then spill onto the road, and/or when HDV's transfer dust and dirt onto the road having travelled over muddy ground on site.



## Appendix B – Meteorological Data



## References

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- <sup>i</sup> Air Quality Strategy for England, Scotland, Wales and Northern Ireland (2023).
- <sup>ii</sup> The Air Quality (Wales) Regulations 2000 – Statutory Instrument 2000 No. 928.
- <sup>iii</sup> The Air Quality (Wales) (Amendment) Regulations 2002 – Statutory Instrument 2002 No. 3043.
- <sup>iv</sup> The Air Quality Standards (Wales) Regulations 2016 – Statutory Instrument 2016 No. 1184.
- <sup>v</sup> Environment (Air Quality and Soundscapes) (Wales) Act 2024.
- <sup>vi</sup> Ministry of House Communities and Local Government (December 2023). National Planning Policy Framework
- <sup>vii</sup> Cardiff City Council Local Development Plan (2006-2026).
- <sup>viii</sup> Local Air Quality Management Review and Assessment Technical Guidance (LAQM. TG22) (August 2022).
- <sup>ix</sup> IAQM. Land-Use Planning and Development Control: Planning for Air Quality (v1.2) (2017).
- <sup>x</sup> IAQM. Guidance on the Assessment of Dust from Demolition and Construction. (v2.2) (2024).
- <sup>xi</sup> Cardiff City Council (November 2023) 2023 Air Quality Progress Report.
- <sup>xii</sup> Mann-Kendall Test and Sen's Slope Estimates for the Trend of Annual Data (2002). Available at: <https://en.ilmatiiteenlaitos.fi/makesens>. Accessed 11/11/2023.
- <sup>xiii</sup> Cardiff City Council (August 2016) 2016 Air Quality Progress Report.



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