



# Land at Mwyndy

## Air Quality Assessment

### Talbot Green Developments Ltd

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SLR Project No.: 416.065822.00001

9 February 2026

Revision: 2.0

## Revision Record

Revision	Date	Prepared By	Checked By	Authorised By
1.0	18 November 2025	LB	MF	MF
2.0	9 February 2026	LB	MF	MF

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## Table of Contents

<b>1.0 Introduction</b> .....	<b>1</b>
1.1 Scope of Assessment.....	1
<b>2.0 Relevant Air Quality Legislation and Guidance</b> .....	<b>2</b>
2.1 Legislation .....	2
2.2 Policy .....	4
2.3 Protection of Nature Conservation Sites .....	5
2.4 Guidance.....	6
<b>3.0 Assessment Methodology</b> .....	<b>7</b>
3.1 Construction Phase .....	7
3.2 Operational Phase.....	7
<b>4.0 Baseline Environment</b> .....	<b>22</b>
4.1 Baseline Air Quality .....	22
4.2 Baseline Conditions at Ecological Receptors.....	24
<b>5.0 Construction Dust Assessment</b> .....	<b>27</b>
5.1 Assessment Screening.....	27
5.2 Potential Dust Emission Magnitude .....	27
5.3 Sensitivity of the Area.....	28
5.4 Risk of Impacts (Unmitigated).....	29
<b>6.0 Operational Phase Assessment</b> .....	<b>31</b>
6.1 Road Traffic Screening Assessment.....	31
6.2 Combustion Emissions Assessment.....	31
<b>7.0 Mitigation Measures</b> .....	<b>39</b>
7.1 Construction Phase .....	39
7.2 Operational Phase.....	41
<b>8.0 Conclusions</b> .....	<b>42</b>
8.1 Option 1 .....	42
8.2 Option 2 .....	42



## Tables in Text

Table 2-1: Relevant Ambient AQALs (Wales) .....	3
Table 2-2: Human Health Relevant Exposure .....	3
Table 2-3: Critical Levels for the Protection of Vegetation and Ecosystems .....	6
Table 3-1: Emission Parameters .....	8
Table 3-2: Data Centre Assessment Scenarios .....	9
Table 3-3: Emission Parameters – Adjacent Data Centre .....	9
Table 3-4: Modelled Human Receptors .....	11
Table 3-5: Modelled Designated Ecological Sites .....	12
Table 3-6: Applied Surface Characteristics .....	16
Table 3-7: Model Output .....	18
Table 3-8: Impact Descriptors .....	18
Table 3-9: Applied Deposition Velocities .....	19
Table 4-1: LAQM Diffusion Tube Monitoring Sites: Details .....	22
Table 4-2: LAQM Diffusion Tube Monitoring Sites: Results .....	23
Table 4-3: Defra Background Pollutant Concentrations (2024).....	23
Table 4-4: Nitrogen Critical Loads and Current Loads.....	24
Table 4-5: Acid Critical Load Functions and Current Loads.....	24
Table 4-6: Baseline Concentrations .....	25
Table 5-1: Potential Dust Emission Magnitude .....	28
Table 5-2: Sensitivity of the Area .....	28
Table 5-3: Risk of Dust Impacts (Unmitigated) .....	29
Table 6-1: Maximum Road Traffic Flows Generated on the Local Road Network.....	31
Table 6-2: Testing and Maintenance – Annual Mean NO <sub>2</sub> Impacts .....	32
Table 6-3: Testing and Maintenance – Impacts on Critical Levels .....	33
Table 6-4: Testing and Maintenance – Impacts on Nitrogen Critical Loads .....	34
Table 6-5: Testing and Maintenance – Impacts on Acid Critical Loads.....	34
Table 6-6: Emergency Outage – Annual Mean NO <sub>2</sub> Impacts.....	34
Table 6-7: Emergency Outage – Impacts on Critical Levels .....	36
Table 6-8: Emergency Outage – Impacts on Nitrogen Critical Loads .....	36
Table 6-9: Emergency Outage – Impacts on Acid Critical Loads.....	36
Table 7-1: Construction Dust Mitigation Measures .....	39



## Figures in Text

Figure 3-1: Modelled Human Receptor Locations .....	13
Figure 3-2: Modelled Ecological Receptor Locations.....	14
Figure 3-3: Modelled Indicative Buildings and Structures .....	15
Figure 3-4: Topography.....	16
Figure 3-5: Windrose (2020 – 2024).....	17
Figure 4-1: Local Monitoring Locations Relative to Site.....	26
Figure 5-1: Construction Dust Assessment Buffers .....	30
Figure 6-1: Testing and Maintenance – Annual Mean NO <sub>2</sub> Process Contribution .....	37
Figure 6-2: Testing and Maintenance – 24-hour Mean NO <sub>x</sub> Process Contribution .....	38



## 1.0 Introduction

SLR Consulting Ltd (SLR) has been commissioned by Talbot Green Developments Ltd to undertake an air quality assessment in support of two full planning applications for a proposed employment facility (the 'Proposed Development') on land off the A4119, Mwyndy, Pontyclun, Wales (the 'Site').

Two options, one of which will be taken forward, are being considered:

- **Option 1:** "*Erection of employment facility Option 1: Erection of a 9,980sqm Class B1c light industrial building with associated access, parking, drainage, landscaping, services and utilities.*"; or
- **Option 2:** "*Erection of employment facility Option 2: Erection of a 21,490sqm Class B8 data centre with associated access, parking, drainage, landscaping, services and utilities.*"

The Site is in the administrative area of Rhondda Cynon Taf County Borough Council (RCTCBC) at the approximate National Grid Reference (NGR): x305440, y182180.

It is bounded by the following:

- Afon Clun and woodland and green space, designated as a Site of Important Nature Conservation (SINC), to the north with the A473 and residential properties beyond;
- Woodland and green space designated as a SINC to the east, with agricultural land beyond;
- Arthur Llewellyn Jenkins furniture store to the south with additional commercial / industrial uses beyond; and
- Cefn-y-Parc Cemetery, isolated residential dwellings, and agricultural land; part of which has gained planning permission for a data centre (RCTCBC application reference: 25/0138/FUL) to the west. The Cefn Yr Hendy development, approved under RCTCBC application reference: 16/1385/OUT, is located further west beyond the A4119.

## 1.1 Scope of Assessment

The following scope of works has been based on national and local planning policy and guidance, and established best practices:

- Baseline Evaluation;
- Construction Phase Assessment;
- Operational Phase Assessment; and
- Mitigation Measures.



## 2.0 Relevant Air Quality Legislation and Guidance

### 2.1 Legislation

A dual set of regulations, separately applicable to National and Local Government, are currently operable within the UK.

#### 2.1.1 National Obligations

The Air Quality Standards (Wales) Regulations 2010<sup>1</sup> (AQSR) transpose both the EU Ambient Air Quality Directive (2008/50/EC), and the Fourth Daughter Directive (2004/107/EC) within Welsh legislation. The AQSR includes Limit Values which are legally binding ambient concentration thresholds which, however, are only applicable at specific locations (Schedule 1: AQSR)<sup>2</sup>.

Following the UK's withdrawal from the EU, the Environment (Miscellaneous Amendments) (Wales) (EU Exit) Regulations 2020<sup>3</sup> was introduced to mirror revisions to supporting EU legislation. As a result, the fine particulate matter (PM<sub>2.5</sub>) Limit Value was reduced to 20µg/m<sup>3</sup> (to be met by 2020).

The responsibility of achieving the AQSR is a National obligation for the Welsh Government who undertake assessments on an annual basis. Local Authorities have no statutory obligation to achieve the AQSR or the European equivalent Directives.

On 14 February 2024, The Environment (Air Quality and Soundscapes) (Wales) Act became law in Wales. The act supports delivery of the measures set out in The Clean Air Plan for Wales to improve air quality. The Act imposes a duty on Welsh Ministers to set at least one target, in regulations, in respect of annual mean fine particulate matter (PM<sub>2.5</sub>) levels.

#### 2.1.2 Local Obligations

Part IV of the Environment Act 1995 (as amended by the Environment Act 2021) requires the Welsh Ministers to review the national Air Quality Strategy (AQS) every five years and modify this if required. It also established the system of Local Air Quality Management (LAQM) for Local Authorities to regularly review and assess air quality within their respective administrative areas.

The Air Quality (Wales) Regulations 2000, as amended by the Air Quality (Wales) (Amendment) Regulations 2002, provide the statutory basis for the Air Quality Objectives. Local Authorities must adhere to under LAQM in Wales. PM<sub>2.5</sub> is not currently part of the LAQM framework; however, as per the national AQS, Local Authorities are required to work towards reducing PM<sub>2.5</sub>.

The Air Quality Objectives apply at locations where members of the public are regularly present and might reasonably be expected to be exposed to pollutant concentrations over the relevant averaging period (referred to as 'relevant exposure'). Table 2-2 provides an indication of those locations. Where any of the prescribed Air Quality Objectives are not likely to be achieved, the authority must designate an Air Quality Management Area (AQMA). For each AQMA, the local authority is required to prepare an Air Quality Action

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<sup>1</sup> The Air Quality Standards (Wales) Regulations 2010, Wales Statutory Instrument No. 1433 (W. 126).

<sup>2</sup> [Schedule 1 of the 2010 AQSR](#) provides the locations of the sampling points where the AQSR Limits Values can be assessed.

<sup>3</sup> The Environment (Miscellaneous Amendments) (Wales) (EU Exit) Regulations 2020, Wales Statutory Instrument No. 1215 (W. 274).



Plan (AQAP), which details measures the authority intends to introduce to deliver improvements in local air quality and achieve compliance.

In 2020, the Welsh Government published The Clean Air Plan for Wales<sup>4</sup> which sets out the over-arching strategic framework for air quality management in Wales. In 2023, following a review of the AQS for England, Scotland, Wales and Northern Ireland, which was published in 2007<sup>5</sup>, the Welsh Government formerly adopted The Clean Air Plan for Wales as the National AQS for Wales, to replace the 2007 document. However, the objectives of the former 2007 strategy were retained.

The ambient air quality standards of relevance to this assessment (collectively termed Air Quality Assessment Levels (AQALs) throughout this report) are provided in Table 2-1. These are primarily based upon the Air Quality Objectives Local Authorities are responsible for achieving. The PM<sub>2.5</sub> AQSR AQAL has also been included for completeness.

**Table 2-1: Relevant Ambient AQALs (Wales)**

Pollutant	Standard (µg/m <sup>3</sup> )	Averaging Period
Nitrogen Dioxide (NO <sub>2</sub> )	40	Annual mean
	200	1-hour mean (not to be exceeded on more than 18 occasions per annum)
Particles (as PM <sub>10</sub> )	40	Annual mean
	50	24-hour mean (not to be exceeded on more than 35 occasions per annum)
Particles (as PM <sub>2.5</sub> )	20	Annual mean

**Table 2-2: Human Health Relevant Exposure**

AQAL Averaging Period	AQALs should apply at	AQALs should not apply at
Annual mean	Building facades of residential properties, schools, hospitals etc.	Facades of offices Hotels Gardens of residences Kerbside sites
24-hour mean	As above together with hotels and gardens of residential properties	Kerbside sites where public exposure is expected to be short term
1-hour mean	As above together with kerbside sites of regular access, car parks, bus stations etc.	Kerbside sites where public would not be expected to have regular access

### 2.1.3 Environmental Protection Act 1990

The Environmental Protection Act 1990<sup>6</sup> sets out provisions for the regulation of statutory nuisances. Section 79 sets out this statutory nuisance as, 'any dust, steam, smell or other effluvia arising on industrial, trade or business premises and being prejudicial to health or a nuisance'.

<sup>4</sup> Welsh Government, The Clean Air Plan for Wales: Healthy Air, Healthy Wales, 2020.

<sup>5</sup> Defra, The Air Quality Strategy for England, Scotland, Wales and Northern Ireland, July 2007.

<sup>6</sup> The Environmental Protection Act 1990. Available at <http://www.legislation.gov.uk/ukpga/1990/43/contents>.



Fractions of dust greater than 10µm (i.e. greater than PM<sub>10</sub>) in diameter typically relate to nuisance effects as opposed to potential health effects and therefore are not covered within the UK AQS. In legislation there are currently no numerical limits in terms of what level of dust deposition constitutes a nuisance.

## 2.1.4 Environmental Permitting Regulations

In relation to the potential data centre, it has been assumed that the potential generators are Medium Combustion Plant (MCP) and have an aggregated thermal rated input of <50MWth.

The Site would therefore be regulated under The Environmental Permitting (England and Wales) (Amendment) Regulations 2018, which implements European Union Directive 2015/2193/EU (the Medium Combustion Plant Directive, MCPD) in Schedule 25A.

## 2.2 Policy

### 2.2.1 National Planning Policy

The Planning Policy Wales (PPW)<sup>7</sup> document sets out the Welsh Government's land use planning policies for development across Wales.

The document states the following in relation to air quality and planning:

*“6.1.32 When considering a scheme of enabling development, planning permission should be granted only where all of the following can be applied:*

*[...] the enabling development does not give rise to significant risks, for example residential development in the floodplain or significantly impact on air quality or soundscape.”*

Furthermore, in relation to addressing air quality in the planning system:

*“6.7.4 The planning system should maximise its contribution to achieving the well-being goals, and in particular a healthier Wales, by aiming to reduce average population exposure to air and noise pollution alongside action to tackle high pollution hotspots. In doing so, it should consider the long-term effects of current and predicted levels of air and noise pollution on individuals, society and the environment and identify and pursue any opportunities to reduce, or at least, minimise population exposure to air and noise pollution, and improve soundscapes, where it is practical and feasible to do so.*

*6.7.5 In taking forward these broad objectives the key planning policy principle is to consider the effects which proposed developments may have on air or soundscape quality and the effects which existing air or soundscape quality may have on proposed developments. Air Quality and soundscape influence choice of location and distribution of development and it will be important to consider the relationship of proposed development to existing development and its surrounding area and its potential to exacerbate or create poor air quality or inappropriate soundscapes. The agent of change principle says that a business or person responsible for introducing a change is responsible for managing that change. In practice, for example, this means a developer would have to ensure that solutions to address air quality or noise from nearby pre-existing infrastructure, businesses or venues can be found and implemented as part of ensuring development is acceptable.”*

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<sup>7</sup> Welsh Government, Planning Policy Wales, Edition 12, February 2024.



PPW is supported by Future Wales: The National Plan 2040<sup>8</sup> which is the national development framework for Wales. Air quality is a key theme throughout the framework.

## 2.2.2 Local Planning Policy

RCTCBC's current Local Development Plan (LDP)<sup>9</sup> was adopted in 2011 and covers the period 2006 – 2021.

It contains the following policy of relevance to air quality:

### Policy AW 10 – Environmental Protection and Public Health

*“Development proposals will not be permitted where they would cause or result in a risk of unacceptable harm to health and / or local amenity because of:-*

1. *Air pollution;*

*[...]*

9. *Or any other identified risk to the environment, local amenity and public health or safety*

*unless it can be demonstrated that measures can be taken to overcome any significant adverse risk to public health, the environment and / or impact upon local amenity.”*

RCTCBC have commenced the preparation of a revised LDP.

## 2.3 Protection of Nature Conservation Sites

Sites of nature conservation importance at a European, national, and local level are provided environmental protection with respect to air quality. Standards for the protection of ecological receptors are as Critical Levels (CLe) (for airborne concentrations) and Critical Loads (CLo) (for deposition rates).

The Natural Resourced Wales (NRW) guidance for MCP requires that designated ecological sites of should be screened against relevant standards if they are located within set distances from the Site. These distances are based on the fuel type and rated thermal input (MWth) of each individual MCP.

For the Site, the relevant screening distances are as follows:

- Sites of Special Scientific Interest (SSSIs) within 1,500m; and
- Special Areas of Conservation (SACs), Special Protection Areas (SPAs), or Ramsar sites within 1,500m.

It is noted that several Ancient Woodlands and SINCs are also located within 1,500m of the Site. Potential impacts at these sites have been considered as part of the dispersion modelling assessment.

### 2.3.1 Critical Levels (CLe)

CLe are a quantitative estimate of exposure to one or more airborne pollutants in gaseous form, below which significant harmful effects on sensitive elements of the environment do not occur, according to present knowledge. The relevant CLe for the protection of vegetation and ecosystems are presented in Table 2-3.

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<sup>8</sup> Welsh Government, Future Wales: The National Plan 2040, February 2021.

<sup>9</sup> Rhondda Cynon Taf County Borough Council, Rhondda Cynon Taf Local Development Plan up to 2021, Adopted March 2011.



**Table 2-3: Critical Levels for the Protection of Vegetation and Ecosystems**

Pollutant	CLe ( $\mu\text{g}/\text{m}^3$ )	Habitat and Averaging Period	Habitat
NOx	30	Annual mean	All
	200	Daily mean	Where <b>a)</b> ozone is below the AOT40 Critical Level and <b>b)</b> SO <sub>2</sub> is below the lower Critical Level of 10 $\mu\text{g}/\text{m}^3$
	75		All other

### 2.3.2 Critical Loads

CLO are a quantitative estimate of exposure to deposition of one or more pollutants, below which significant harmful effects on sensitive elements of the environment do not occur, according to present knowledge. CLO are set for the deposition of various substances to sensitive ecosystems. In relation to combustion emissions CLO for acidification are relevant which can occur via both wet and dry deposition; however, on a local scale only dry (direct deposition) is considered significant. Deposition of nitrogen can cause eutrophication and acidification.

## 2.4 Guidance

This assessment has been informed by the principles contained within the guidance documents below.

- Department for Environment, Food and Rural Affairs (Defra) in partnership with the Welsh Government: Local Air Quality Management Technical Guidance (TG22) (LAQM.TG22)<sup>10</sup>;
- Environment Agency (EA): Air emissions risk assessment for your environmental permit<sup>11</sup>;
- Environmental Policy Implementation Community (EPIC) (formerly EPUK) and the Institute of Air Quality Management (IAQM): Land-Use Planning & Development Control: Planning for Air Quality<sup>12</sup>;
- IAQM: Guidance on the Assessment of Dust from Demolition and Construction<sup>13</sup> ('IAQM dust guidance'); and
- IAQM: A Guide to the Assessment of Air Quality Impacts on Designated Nature Conservation Sites<sup>14</sup>; and
- NRW: What to do before you apply for a standalone Medium Combustion Plant (MCP) permit between 1 and less than 20 MW thermal input<sup>15</sup>.

<sup>10</sup> Local Air Quality Management Technical Guidance (TG22), Published by Defra in partnership with the Scottish Government, Welsh Government and Department of Agriculture, Environment and Rural Affairs Northern Ireland. May 2025.

<sup>11</sup> Environment Agency, Air emissions risk assessment for your environmental permit. Available: <https://www.gov.uk/guidance/air-emissions-risk-assessment-for-your-environmental-permit>.

<sup>12</sup> EPIC (formerly EPUK) and IAQM, Land-Use Planning and Development Control: Planning for Air Quality, v1.2 2017.

<sup>13</sup> IAQM, Guidance on the Assessment of Dust from Demolition and Construction, v2.2 January 2024.

<sup>14</sup> IAQM, A Guide to the Assessment of Air Quality Impacts on Designated Nature Conservation Sites, v1.1 2020.

<sup>15</sup> NRW, What to do before you apply for a standalone Medium Combustion Plant (MCP) permit between 1 and less than 20 MW thermal input. [Available via Link](#).



## 3.0 Assessment Methodology

### 3.1 Construction Phase

The assessment has been undertaken in accordance with the IAQM dust guidance. The assessment of risk is determined by considering the risk of dust effects arising from four activities in the absence of mitigation:

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

The assessment methodology considers three separate dust impacts with account being taken of the sensitivity of the area that may experience these effects:

- Annoyance due to dust soiling;
- The risk of health effects due to an increase in exposure to PM<sub>10</sub>; and
- Harm to ecological receptors.

The first stage of the assessment involves a screening to determine if there are sensitive receptors within threshold distances of the Site activities associated with the construction phase of the scheme. A detailed assessment is required where a:

- Human receptor is located within 250m of the Site, and/or within 50m of routes used by construction vehicles up to 250m from the Site entrance(s) (referred to as 'identified trackout routes'); and/or
- Ecological receptor is located within 50m of the Site, and/or within 50m of identified trackout routes up to 250m from the Site entrance(s).

The dust emission class (or magnitude) for each activity is determined on the basis of the guidance, indicative thresholds and professional judgement. The risk of dust effects arising is based upon the relationship between the dust emission magnitude and the sensitivity of the area. The risk of impact is then used to determine the appropriate mitigation requirements, whereby through effective application, residual effects are considered to be 'not significant'.

Given the short-term nature of the construction phase and the low volume of vehicle movements that will likely arise compared to the operational phase, there is not considered to be any potential for significant air quality effects from construction-generated road traffic emissions. Such potential effects have therefore been scoped out from requiring assessment based on their assumed insignificant impact.

### 3.2 Operational Phase

#### 3.2.1 Road Traffic Emissions Screening

The assessment of air quality effects in relation to the development's operational phase has been undertaken in accordance with EPIC & IAQM guidance.

The EPIC & IAQM guidance provides a series of indicative screening criteria where, if exceeded, further assessment is required. If the Site is found not to exceed any of the relevant indicative criteria presented, then a detailed impact assessment is consequently not required, and effects are concluded to be 'insignificant'.



The indicative screening criteria relevant for this assessment (for locations outside of AQMAs) are as follows:

- A change of Light Duty Vehicle (LDV) flows of more than 500 Annual Average Daily Traffic (AADT); and/or
- A change of Heavy Duty Vehicle (HDV) flows of more than 100 AADT.

Traffic data used for the purposes of the screening assessment has been provided by Pell Frischmann – the appointed transport consultant.

### 3.2.2 Combustion Emissions Assessment

The assessment of combustion emissions is applicable for Option 2 only, which includes the data centre use. The assessment comprises dispersion modelling to assess potential impacts of the operation of on-site generators.

The generators would be stand-by, and their primary purpose is to provide emergency power to the Site in the event of an electrical grid outage. Although, this is a rare occurrence. The more routine operation is associated with the testing and maintenance of the generators (limited to a maximum of 50 hours per year).

Consistent with prevailing guidance, the principal release of nitrogen oxides (NO<sub>x</sub>) has been assessed. The objective of the study is to assess the impact of NO<sub>x</sub> emissions against the relevant Air Quality Standards for NO<sub>2</sub> for the protection of human health and the relevant Critical Levels and Critical Loads for the protection of designated ecological receptors, if present within the relevant screening distances.

#### 3.2.2.1 Emission Points

Reflective of the Option 2 parameter plans, it has been assumed that 8No. generators will support the data centre, and the aggregated thermal rated input will be <50MWth.

Based on this and experience of other data centre projects, an appropriate generator has been selected for use in the assessment – the Caterpillar 3516B generator. Each generator has a thermal rated input of approximately 5.7MWth and an output of 2.0MWe.

#### 3.2.2.2 Emission Parameters

The emission parameters applied in the modelling are provided in Table 3-1. These parameters have been input on the basis of manufacturer's design and specifications.

**Table 3-1: Emission Parameters**

Parameter / Source	Cat 3516B
Number of Generators	8
Stack Height (m)	18.0
Flow (Am <sup>3</sup> /s)	8.1
Stack Diameter (m)	0.5
Velocity (m/s)	41.4
Emission Temperature (°C)	511
Flow (Nm <sup>3</sup> /s) <sup>(A)</sup>	1.8
NO <sub>x</sub> Concentration (mg/Nm <sup>3</sup> )	2,000
NO <sub>x</sub> Emission (g/s)	3.5

<sup>(A)</sup> Normalised to 273K, dry, 5% O<sub>2</sub> assuming in-stack O<sub>2</sub> concentration of 10.1% dry and H<sub>2</sub>O of 8.2%.



### 3.2.2.3 Operating Scenarios

The proposed data centre operating scenarios assessed include the following:

- Routine Testing and Maintenance – the predictable, managed testing and maintenance activity for the standby generators; and
- Emergency Outage – the unpredictable emergency grid outage any time during the year requiring the maximum plant to operate for the required outage duration.

The approach to modelling each operating scenario and the assumptions made are as presented in Table 3-2.

**Table 3-2: Data Centre Assessment Scenarios**

Operational Scenarios		Model Scenarios
Routine Testing and Maintenance	Monthly test: Each generator tested individually. Once a month for 1 hour.	Equates to 12 hours of testing per generator per year (12 months x 1 hour). A total of 96 hours for 8 generators (12 hours x 8 generators). It has been assumed that the 8 generators could be tested in the same day.
	Annual test: All generators tested together. Once a year for 1 hour.	1 hour with all 8 generators operating.
Emergency Outage	All generators operate to provide back-up power to the data centre.	8 generators associated with the Site operating. Modelled for a hypothetical outage scenario of 2 hours.

### 3.2.2.4 Cumulative Assessment

It is acknowledged that a data centre development adjacent to the west of the Site has been approved under planning application reference: 25/0138/FUL.

The air quality assessment<sup>16</sup> to support the adjacent data centre assumed that 3No. stand-by generators would be installed at the site and would be fitted with Selective Catalytic Reduction (SCR) technology to reduce NO<sub>x</sub> emissions. Table 3-3 provides the emission parameters of the adjacent data centre, as presented within the air quality assessment.

**Table 3-3: Emission Parameters – Adjacent Data Centre**

Parameter / Source	Kohler KD2500-E
Number of Generators	3
Stack Height (m)	13.9
Flow (Am <sup>3</sup> /s)	8.15
Stack Diameter (m)	0.5
Velocity (m/s)	41.5

<sup>16</sup> ERM, prepared for Vantage Data Centers UK Ltd, CWL31 Air Quality Impact Assessment, Date: 04 Dec 2024, Reference: 0739416.



Parameter / Source	Kohler KD2500-E
Emission Temperature (°C)	514
Flow (Nm <sup>3</sup> /s)	2.0
NO <sub>x</sub> Concentration (mg/Nm <sup>3</sup> ) (no SCR)	1,766
NO <sub>x</sub> Concentration (mg/Nm <sup>3</sup> ) (with SCR)	494
NO <sub>x</sub> Emission (g/s) (with SCR – time weighted for 20min SCR warm-up)	1.83

It is assumed that the adjacent data centre will be built and operational prior to the Option 2 Proposed Development. This has been considered as part of a cumulative assessment, each scenario discussed in turn:

- Routine Testing and Maintenance – the maximum annual mean NO<sub>2</sub> contribution (0.011µg/m<sup>3</sup>) from the testing and maintenance schedule (as quoted in the air quality assessment) has been added to the applied background concentration. This scenario is consistent, occurring every year.
- Emergency Outage – it has been assumed that a grid outage would also impact the 3 generators of the adjacent data centre. The 2-hour hypothetical outage has been modelled using the parameters presented in Table 3-3 and the annual mean NO<sub>2</sub> contributions have been summed to the applied background concentration at each receptor location.

### 3.2.2.5 Model Setup

For this assessment the AERMOD model<sup>17</sup> has been applied; this model is widely used and accepted by Local Planning Authorities and the EA for undertaking such assessments and its predictions have been validated against real-time monitoring data by the United States (US) Environmental Protection Agency (EPA). It is therefore considered a suitable model for this assessment.

### 3.2.2.6 Model Domain and Receptors

The modelling has been undertaken using a receptor grid across a map of the study area. Pollutant exposure isopleths are generated by interpolation between receptor points and superimposed onto the map. This method allows the maximum ground level concentration outside the Site boundary to be assessed.

A nested receptor grid extending 10km from the Site was applied as follows:

- 500m x 500m at 50m grid resolution;
- 1,000m x 1,000m at 100m grid resolution;
- 2,000m x 2,000m at 200m grid resolution;
- 5,000m x 5,000m at 200m grid resolution; and
- 10,000m x 10,000m at 500m grid resolution.

In addition, the modelling of discrete sensitive receptor locations (as described in the following sections) has been undertaken to assess the impact at relevant exposure locations for annual mean impact and facilitate the discussion of results.

<sup>17</sup> Software used: Lakes AERMOD View, (Executable Aermod\_24142).



## Human Receptors

According to LAQM.TG22, AQALs should only apply to locations where members of the public may be reasonably likely to be exposed to air pollution for the duration of the relevant AQAL.

As such, forty locations surrounding the Site have been selected to inform the risk assessment in terms of relevant exposure, as detailed in Table 3-4 and displayed in Figure 3-1 as HR1 to HR40.

**Table 3-4: Modelled Human Receptors**

Model ID	X	Y	Z (m)
HR1	305467	181592	1.5
HR2	305280	181772	1.5
HR3	305349	181861	1.5
HR4	304960	181933	1.5
HR5	304657	181895	1.5
HR6	305155	182025	1.5
HR7	305706	182044	1.5
HR8	304479	182612	1.5
HR9	304781	182646	1.5
HR10	305133	182523	1.5
HR11	305246	182539	1.5
HR12	305335	182554	1.5
HR13	305439	182640	1.5
HR14	305459	182943	1.5
HR15	304484	183317	1.5
HR16	304637	183282	1.5
HR17	304817	183288	1.5
HR18	304900	183288	1.5
HR19	305141	183108	1.5
HR20	305187	183268	1.5
HR21	305101	183274	1.5
HR22	304860	183395	1.5
HR23	304937	183637	1.5
HR24	304842	183705	1.5
HR25	305052	183719	1.5
HR26	305211	183672	1.5
HR27	305309	183675	1.5
HR28	305289	183795	1.5
HR29	305935	183456	1.5
HR30	306239	183505	1.5



Model ID	X	Y	Z (m)
HR31	307025	183403	1.5
HR32	307089	183324	1.5
HR33	305731	182901	1.5
HR34	306382	182779	1.5
HR35	307023	182717	1.5
HR36	307672	182147	1.5
HR37	306885	182244	1.5
HR38	306443	181540	1.5
HR39	306054	181007	1.5
HR40	304925	181585	1.5

### Ecological Receptors

The designated ecological sites within the relevant screening distances are detailed in Table 3-5 and the locations relative to the Site displayed in Figure 3-2.

The Brofiscin Quarry, Groes Faen SSSI has not been assessed as it is designated for geological interest and is therefore not sensitive.

Ancient Woodland and SINCs located in the vicinity of the Site considered as part of the dispersion modelling assessment are displayed in Figure 3-2.

**Table 3-5: Modelled Designated Ecological Sites**

Model ID	Site Name	Designation	Approx. Distance to Site (km)
ER1	Llantrisant Common and Pastures	SSSI	1.4
ER2	Ely Valley	SSSI	1.4



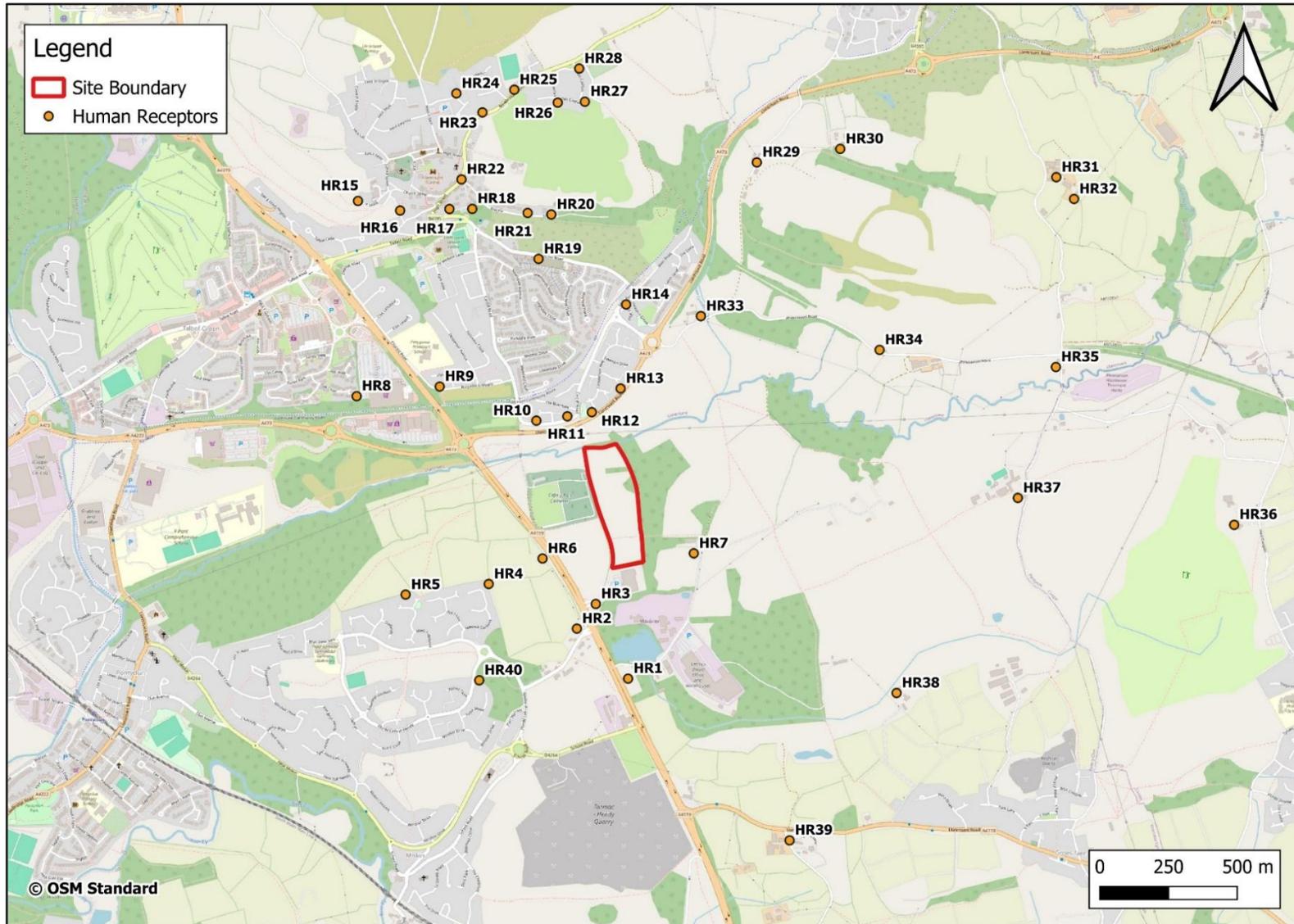


Figure 3-1: Modelled Human Receptor Locations



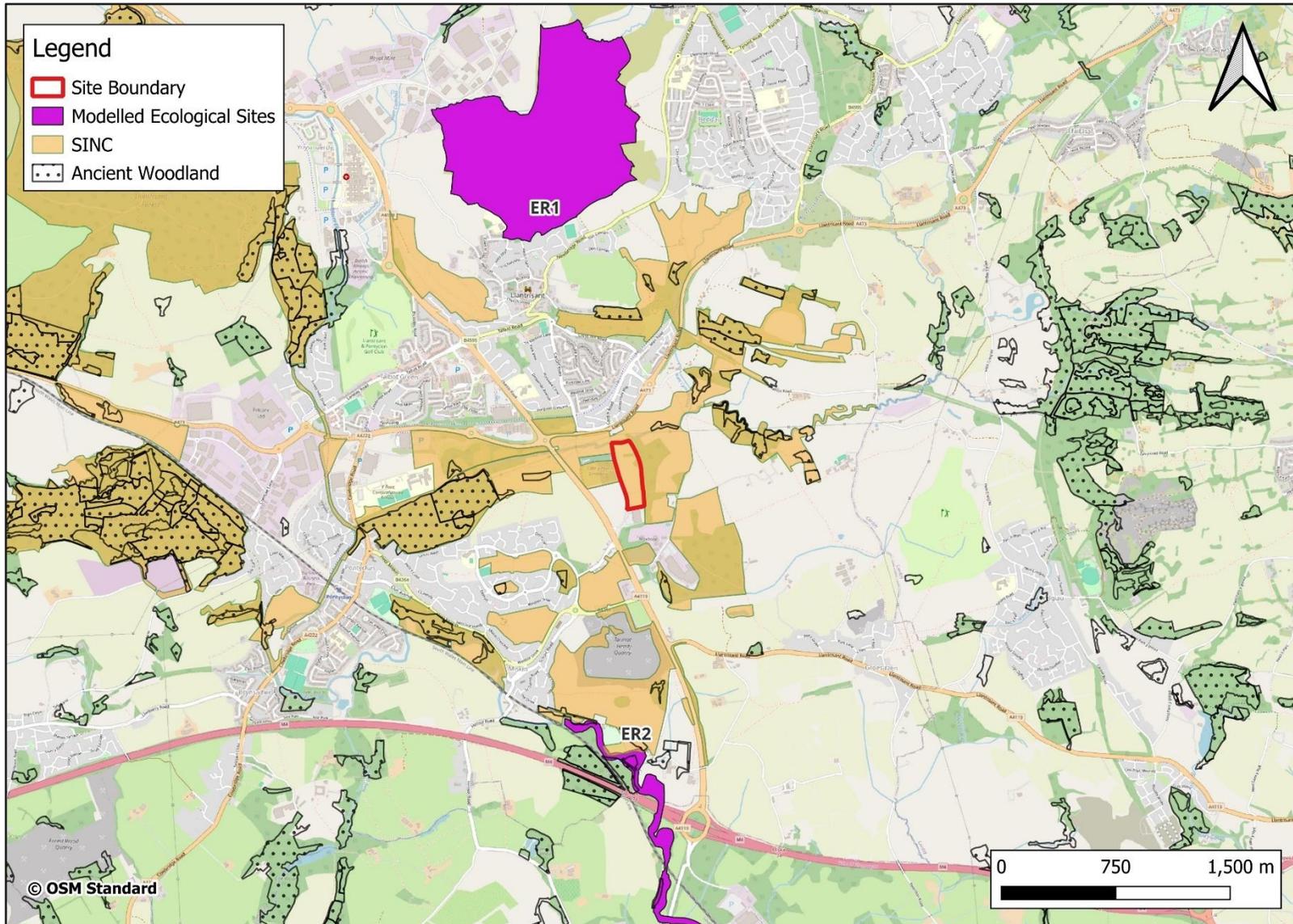


Figure 3-2: Modelled Ecological Receptor Locations



### 3.2.2.7 Building Downwash

Building downwash occurs when turbulence, induced by nearby structures, causes pollutants emitted from an elevated source to be displaced and dispersed rapidly towards the ground, resulting in elevated ground level concentrations. Building downwash has been considered for buildings that have a maximum height equivalent to at least 40% of the emission height and which are within a distance defined as five times the lesser of the height or maximum projected width of the building.

The integrated Building Profile Input Programme (BPIP) module within AERMOD was used to assess the potential impact of building downwash upon predicted dispersion characteristics. Indicative structures input to the model are represented in Figure 3-3.



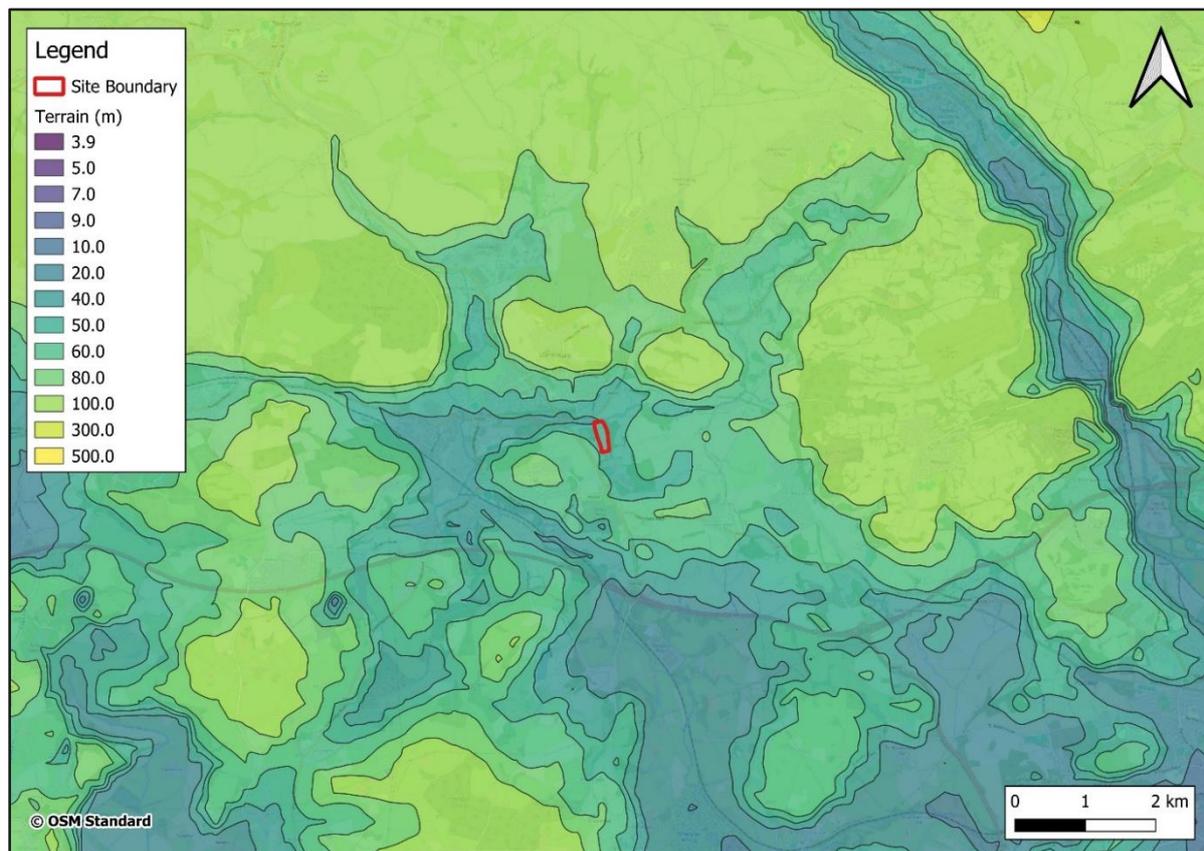
**Figure 3-3: Modelled Indicative Buildings and Structures**

### 3.2.2.8 Topography

The presence of elevated terrain can significantly affect the dispersion of pollutants and the resulting ground level concentration in a number of ways. Elevated terrain reduces the distance between the plume centre line and the ground level, thereby increasing ground level concentrations. Elevated terrain can also increase turbulence and, hence, plume mixing with the effect of increasing concentrations near to a source and reducing concentrations further away.

AERMOD utilises digital elevation data to determine the impact of topography on dispersion from a source. Topography was incorporated within the modelling using 30m resolution Shuttle Radar Topography Mission (SRTM) terrain data files. Data was processed by the AERMAP function within AERMOD to calculate terrain heights and has been incorporated into the model, as illustrated in Figure 3-4.





**Figure 3-4: Topography**

### 3.2.2.9 Meteorological Data and Preparation

The meteorological data provider was consulted for the closest and most representative meteorological station recording all the parameters necessary for dispersion modelling.

The closest stations to the Site are located at St Athan and Cardiff airports, which are both near the coast and therefore not directly comparable to the Site’s location. Preference was therefore to use Numerical Weather Prediction (NWP) data, which is specific to the Site location.

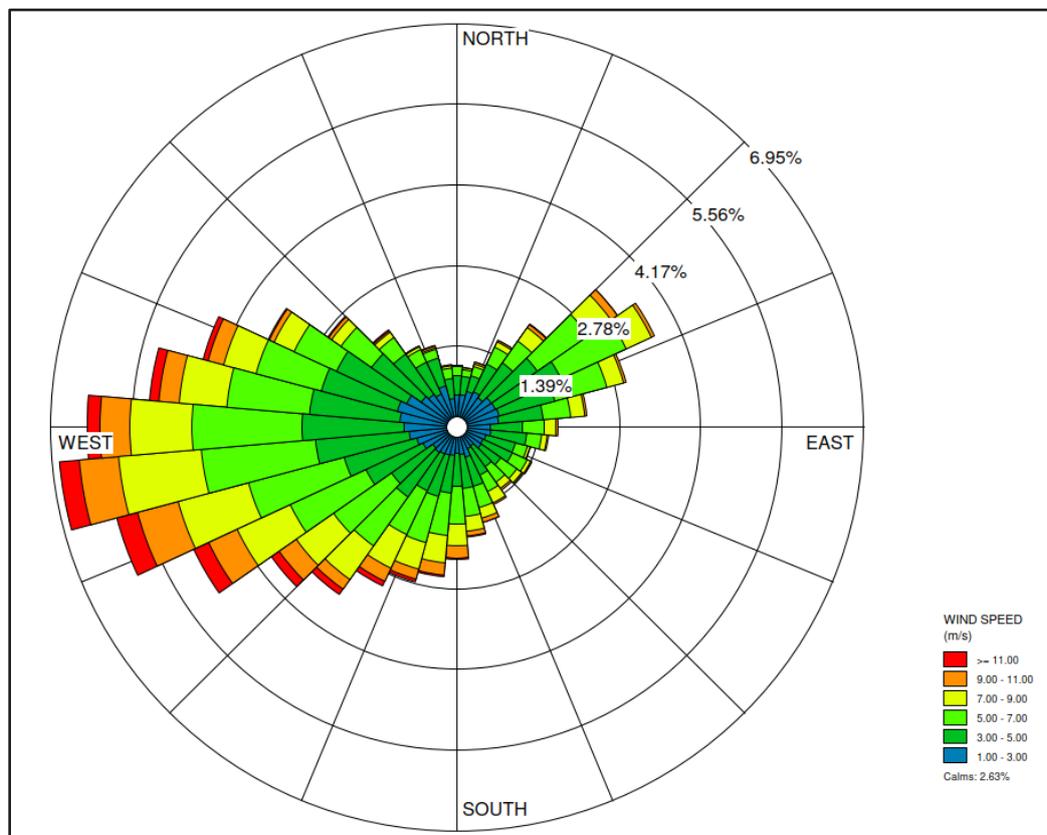
The meteorological data (5 years of hourly sequential data for 2020-2024 inclusive) was obtained in .met format from the data supplier and converted to the required surface and profile formats for use in AERMOD using AERMET View meteorological pre-processor. Details specific to the Site location were used to define the surface characteristics; albedo, bowen ratio and surface roughness, applied in the conversion (see Table 3-6). A windrose is presented in Figure 3-5.

**Table 3-6: Applied Surface Characteristics**

Zone (Start)	Zone (End)	Albedo	Bowen Ratio	Surface Roughness (m)
0	45	0.18	0.64	0.099
45	90			0.087
90	135			0.088
135	180			0.063



Zone (Start)	Zone (End)	Albedo	Bowen Ratio	Surface Roughness (m)
180	225			0.085
225	270			0.109
270	315			0.112
315	0			0.147



**Figure 3-5: Windrose (2020 – 2024)**

### 3.2.2.10 Dispersion Model Uncertainty

Model validation studies<sup>18</sup> for AERMOD generally suggest that these dispersion models are for the vast majority of cases able to predict maximum short-term high percentiles concentrations well within a factor of two and the latest evaluation study for AERMOD shows the composite (geometric mean) ratio of predicted to observed short-term averages from ‘test sites’ (where real-time monitoring data is available to validate model performance), to be between 0.96 and 1.2.

### 3.2.2.11 Treatment of Model Output

The assessment of impacts against the AQALs is undertaken using model output as described in Table 3-7.

<sup>18</sup> US EPA, AERMOD: Latest Features and Evaluation Results, EPA-454/R-03-003, June 2003.



As per the EA Air Quality Modelling and Assessment Unit (AQMAU) guidance<sup>19</sup> on conversion ratio for NO<sub>x</sub> and NO<sub>2</sub>, it has been assumed that 70% of NO<sub>x</sub> is present as NO<sub>2</sub> in relation to long-term impacts and 35% of NO<sub>x</sub> is present as NO<sub>2</sub> in relation to short-term impacts.

**Table 3-7: Model Output**

Averaging Period	Model Output – Process Contribution (PC)	Predicted Environmental Concentration (PEC)
1-hour mean NO <sub>2</sub> (not to be exceeded more than 18 times a calendar year)	99.79%ile of 1-hour means. Threshold violation file (threshold set at 200µg/m <sup>3</sup> minus 2x annual mean background, converted to NO <sub>x</sub> ) counts number of hours per annum exceeding threshold. Probability of exceedance calculated using hypergeometric distribution.	
Annual mean (NO <sub>x</sub> and NO <sub>2</sub> )	Annual mean from 5 met. years (factored for operational hours).	PC + annual mean background
NO <sub>x</sub> daily mean CLe	Maximum 24-hour mean	PC + 2 x annual mean background

### 3.2.2.12 Assessment of Impacts on Human Receptors

#### Annual Mean Impacts

Descriptors for predicted annual mean NO<sub>2</sub> impacts applied in this assessment are taken from the EPIC & IAQM guidance. The matrix for assessment against annual mean AQALs is reproduced in Table 3-8.

**Table 3-8: Impact Descriptors**

Long Term Average Concentration in the Assessment Year (i.e. the PEC)	% Change in Concentration (i.e. the PC) Relative 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	Moderate	Substantial
103-109% of AQAL	Moderate	Moderate	Substantial	Substantial
110% or more of AQAL	Moderate	Substantial	Substantial	Substantial

#### Short-term Impacts

The approach to assessment of short-term impacts is consistent with EA guidance which provides a methodology for assessment with the use of statistical analysis.

This requires modelling the impact of the generators for the full year (i.e. 8,760 hours) to ensure that the operating hours coincide with the worst-case dispersal conditions.

In order to determine the probability of an exceedance of the hourly mean AQAL for a short-term infrequent operation, the cumulative hypergeometric distribution has been used (with

<sup>19</sup> EA, Air Quality Modelling and Assessment Unit, 'Conversion Ratios for NO<sub>x</sub> and NO<sub>2</sub>' (no date).



the 2.5 factor applied for consecutive operating hours) to assess the likelihood of exceedance hours coinciding with the operational hours.

The EA guidance provides the following framework to apply to the calculated probability:

- 1% or less – exceedances are highly unlikely;
- Less than 5% – exceedances are unlikely; and
- More than or equal to 5% – there’s potential for exceedances.

The operational hours associated with the scenarios have been considered.

### Significance

The EPIC & IAQM guidance requires a judgment on the significance of the ‘effect’ as ‘significant’ or ‘not significant’. Primarily this is based upon the impact descriptors (i.e. it states ‘it is likely that a ‘moderate’ or ‘substantial’ impact will give rise to a significant effect and a ‘negligible’ or ‘slight’ impact will not have a significant effect’), however other considerations may also have a bearing, for example:

- The existing and future air quality in the absence of the development;
- The extent of current and future population exposure to the impacts;
- The worst-case assumptions adopted when undertaking the prediction of impacts; and
- The extent to which the Site has adopted best practice to eliminate and minimise emissions.

The above factors have been considering when determining the significance of effect.

### 3.2.2.13 Assessment of Impacts on Ecological Receptors

#### Calculation of Contribution to Critical Loads

Deposition rates were calculated using empirical methods recommended by the EA AQTAG06<sup>20</sup>. Dry deposition flux was calculated using the following equation:

$$\text{Dry deposition flux } (\mu\text{g}/\text{m}^2/\text{s}) = \text{ground level concentration } (\mu\text{g}/\text{m}^3) \times \text{deposition velocity } (\text{m}/\text{s})$$

Wet deposition occurs via the incorporation of the pollutant into water droplets which are then removed in rain or snow and is not considered significant over short distances compared with dry deposition and therefore for the purposes of this assessment, wet deposition has not been considered. The applied deposition velocities are as shown in Table 3-9.

**Table 3-9: Applied Deposition Velocities**

Chemical Species	Recommended Deposition Velocity (m/s)	
NO <sub>2</sub>	Grassland	0.0015
	Woodland	0.0030

<sup>20</sup> EA, AQTAG06 – Technical Guidance on detailed modelling approach for an appropriate assessment for emissions to air, March 2014 version.



## Critical Loads – Eutrophication

The CLo for nitrogen deposition (N) are recorded in units of kgN/ha/yr. The deposition PC is converted from  $\mu\text{g}/\text{m}^2/\text{s}$  to units of kgN/ha/year by multiplying the dry deposition flux by the standard conversion factor of 95.9.

## Critical Loads – Acidification

The predicted deposition rates are converted to units of equivalents ( $k_{\text{eq}}/\text{ha}/\text{year}$ ), which is a measure of how acidifying the chemical species can be, by multiplying the dry deposition flux ( $\mu\text{g}/\text{m}^2/\text{s}$ ) by the standard conversion factor of 6.84.

## Calculation of PC as a Percentage of Acid Critical Load Function

The calculation of the process contribution of N to the acid CLo function has been carried out according to the guidance on Air Pollution Information System (APIS)<sup>21</sup>, which is as follows:

*“The potential impacts of additional sulphur and/or nitrogen deposition from a source are partly determined by PEC, because only if PEC of nitrogen deposition is greater than CLminN will the additional nitrogen deposition from the source contribute to acidity. Consequently, if PEC is less than CLminN only the acidifying affects of sulphur from the process need to be considered:*

*Where PEC N Deposition < CLminN*

$$PC \text{ as } \% \text{ CL function} = (PC \text{ S deposition}/CL_{\text{maxS}})*100$$

*Where PEC is greater than CLminN (the majority of cases), the combined inputs of sulphur and nitrogen need to be considered. In such cases, the total acidity input should be calculated as a proportion of the CLmaxN.*

*Where PEC N Deposition > CLminN*

$$PC \text{ as } \% \text{ CL function} = ((PC \text{ of S+N deposition})/CL_{\text{maxN}})*100”$$

## Significance of Effect on Ecological Receptors

In addition to the AERA guidance, the EA’s Operational Instruction 66\_12<sup>22</sup> details how the air quality impacts on ecological sites should be assessed. This guidance provides risk-based screening criteria to determine whether impacts will have ‘no likely significant effects (alone and in-combination)’ for international sites, ‘no likely damage’ for SSSIs, and ‘no significant pollution’ for other sites (Ancient Woodland and SINCS), as follows:

- PC does not exceed 1% long-term CLe and/or CLo or that the PEC does not exceed 70% long-term CLe and/or CLo for international sites and SSSIs;
- PC does not exceed 10% short-term CLe for international sites and SSSIs;
- PC does not exceed 100% long-term CLe and/or CLo for other sites;
- PC does not exceed 100% short-term CLe for other sites.

Where impacts cannot be classified as resulting in ‘no likely significant effect’, more detailed assessment may be required depending on the sensitivity of the feature in accordance with the EA’s Operational Instruction 67\_12<sup>23</sup>. This can require the consideration of the potential

<sup>21</sup> APIS, <http://www.apis.ac.uk/>.

<sup>22</sup> EA Operational Instruction 66\_12 – Simple assessment of the impact of aerial emissions from new or expanding IPPC regulated industry for impacts on nature conservation.

<sup>23</sup> EA Operational Instruction 67\_12 – Detailed assessment of the impact of aerial emissions from new or expanding IPPC regulated industry for impacts on nature conservation.



for in-combination effects, the actual distribution of sensitive features within the site, and local factors (such as the water table).

The guidance provides the following further criteria:

- If the PEC does not exceed 100% of the appropriate limit it can be assumed there will be no adverse effect;
- If the background is below the limit, but a small PC leads to an exceedance – decision based on local considerations;
- If the background is currently above the limit and the additional PC will cause a small increase – decision based on local considerations;
- If the background is below the limit, but a significant PC leads to an exceedance – cannot conclude no adverse effect; and
- If the background is currently above the limit and the additional PC is large – cannot conclude no adverse effect.



## 4.0 Baseline Environment

### 4.1 Baseline Air Quality

Pollutant concentrations monitored during 2020 and 2021 (i.e. affected by the COVID-19 pandemic) are expected to be atypical and have therefore not been considered for the determination of baseline conditions.

#### 4.1.1 LAQM Review and Assessment

RCTCBC, in fulfilment of statutory requirements, has conducted an on-going exercise to review and assess air quality within their administrative area. The most recent 2025 Air Quality Progress Report<sup>24</sup> (APR) has been reviewed.

RCTCBC presently has 6 AQMAs declared due to exceedances of the NO<sub>2</sub> AQALs at locations of relevant exposure – 5 AQMAs declared for the annual mean AQAL, and 1 AQMA declared for both the annual and 1-hour mean AQALs.

Historically, the Mwyndy AQMA was located on the A4119 approximately 350m south of the Site. However, the Mwyndy AQMA along with several other AQMAs were revoked by RCTCBC in June 2025 due to monitored concentrations being persistently below the relevant AQALs. As such, there are no AQMAs within 5km of the Site.

#### 4.1.2 Review of Air Quality Monitoring

##### 4.1.2.1 Automatic Air Quality Monitoring

During 2024, RCTCBC undertook automatic air quality monitoring at four locations across their administrative area.

The closest of these monitors is >7.5km from the Site. Furthermore, there are no monitors associated with the Automatic Urban and Rural Network (AURN) in proximity of the Site. Given the separation distances, automatic monitoring has not been considered further.

##### 4.1.2.2 Passive Diffusion Tube Monitoring

Passive NO<sub>2</sub> diffusion tube monitoring is currently undertaken by RCTCBC at several locations across their administrative area, in fulfilment of statutory LAQM obligations.

The details and results of the monitoring locations of relevance to the Site (i.e. located within 4km) are presented in Table 4-1 and Table 4-2 respectively, whilst their locations are illustrated in Figure 4-1. All monitoring data presented has been ratified by RCTCBC.

**Table 4-1: LAQM Diffusion Tube Monitoring Sites: Details**

Site ID	Site Name	Site Type	NGR (m)		Approx. Distance to Site (km)
			X	Y	
37	Lakeside Court, A4119	Roadside	305442	181579	0.4
82	Main Road, Llantwit Fardre	Roadside	307281	184886	3.1
103	Ty Mawr Farm, Efail Isaf	Rural Background	308817	183891	3.7
110	Cowbridge Road	Roadside	303533	181287	2.0
132	Cowbridge Rd, Talygarn	Roadside	302880	180517	2.9

<sup>24</sup> Rhondda Cynon Taf County Borough Council, 2025 Air Quality Progress Report, September 2025.



**Table 4-2: LAQM Diffusion Tube Monitoring Sites: Results**

Site ID	Valid Data Capture 2024 (%)	Annual Mean NO <sub>2</sub> Concentration (µg/m <sup>3</sup> )				
		2020	2021	2022	2023	2024
37	91.7	22.7	27.8	28.0	26.5	23.0
82	91.7	19.4	22.9	23.4	22.8	19.5
103	91.7	5.6	7.4	6.3	7.0	5.1
110	91.7	18.6	23.2	23.2	23.4	18.0
132	91.7	19.6	24.4	22.8	22.4	18.7

As displayed in Table 4-2, annual mean NO<sub>2</sub> concentrations at the monitors presented have been below the annual mean AQAL (40µg/m<sup>3</sup>) across the period presented.

Monitor 37 is located closest to the Site, approximately 400m to the south. The monitor is at the roadside of the A4119, where elevated concentrations may be anticipated. Some of the closest receptors to the Site are also in the vicinity of A-roads, where data from this monitor would be considered representative.

The empirical relationship given in LAQM.TG22 states that exceedances of the 1-hour mean AQAL for NO<sub>2</sub> is unlikely to occur where annual mean concentrations are <60µg/m<sup>3</sup>. This indicates that an exceedance of the 1-hour mean AQAL was unlikely to have occurred at the monitors presented for the period assessed.

#### 4.1.3 Defra Mapped Background Concentrations

Defra maintains a nationwide model of existing and future background air quality concentrations at a 1km grid square resolution. The data sets include annual average concentration estimates for NO<sub>x</sub>, NO<sub>2</sub>, PM<sub>10</sub> and PM<sub>2.5</sub> using a reference year of 2021 (the year in which comparisons between modelled and monitored concentrations are made)<sup>25</sup>.

The Defra mapped annual mean background concentrations for the base year adopted (2024 – the latest year of RCTCBC monitoring data) for the grid squares containing the Site are presented in Table 4-3.

The mapped background concentrations are well below the respective annual mean AQALs.

**Table 4-3: Defra Background Pollutant Concentrations (2024)**

Grid Square (X, Y)	Annual Mean Background Concentration (µg/m <sup>3</sup> )			
	NO <sub>x</sub>	NO <sub>2</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>
305500, 181500	8.3	6.6	13.6	6.8
305500, 182500	8.1	6.4	11.5	6.8
<b>AQAL</b>	-	<b>40</b>	<b>40</b>	<b>20</b>

#### 4.1.4 Application of Baseline Data

A background concentration of 23.0µg/m<sup>3</sup>, measured at RCTCBC diffusion tube 37 in 2024, has been applied to all selected modelled human receptor locations. Diffusion tube 37 is one of the closest monitors to the Site, and its use presents a reasonable approach for receptors

<sup>25</sup> Defra, Background Mapping data for local authorities - 2021.



close to A-roads but is precautionary and likely to overestimate background concentrations at more rural receptor locations.

Further, annual mean NO<sub>2</sub> contributions from the adjacent data centre operating scenarios have been summed to the applied background concentrations where relevant, as detailed in Section 3.2.2.3.

## 4.2 Baseline Conditions at Ecological Receptors

The APIS is a supportive tool for assessment of potential effects of air pollutants on habitats and species developed in partnership by the UK conservation agencies and regulatory agencies and the Centre for Ecology and Hydrology.

APIS and the UK AIR website<sup>26</sup>, in addition to online literature sources and satellite imagery has been used to provide information on:

- Identification and sensitivity of the habitats present;
- CLo for nitrogen and current loads (Table 4-4);
- CLo functions for acidity and current loads (Table 4-5); and
- Baseline concentrations (Table 4-6).

**Table 4-4: Nitrogen Critical Loads and Current Loads**

ID	APIS CLo Class	CLo Range (kg N/ha/yr)	CLo Applied in Assessment (kg N/ha/yr)	Current Load (kg N/ha/yr)
ER1	Valley mires, poor fens and transition mires	5-15	5	12.8
ER2 <sup>(A)</sup>	Broadleaved deciduous woodland	10-15	10	21.3

Table note:  
<sup>(A)</sup> Values for the sensitive features of ER2 are not available on APIS. On review of Google Satellite imagery, the woodland habitat (designated as a SINC and Ancient Woodland in parts) has been adopted instead, to allow for an assessment.

**Table 4-5: Acid Critical Load Functions and Current Loads**

ID	APIS CLo Class	CLo Function (k <sub>eq</sub> /ha/yr)			Current Load (k <sub>eq</sub> /ha/yr)	
		CLmaxS	CLminN	CLmaxN	N	S
ER1	Bogs	0.47	0.32	0.79	0.91	0.23
ER2 <sup>(A)</sup>	Broadleaved/Coniferous unmanaged woodland	1.80	0.14	1.95	1.52	0.25

Table note:  
<sup>(A)</sup> Values for the sensitive features of ER2 are not available on APIS. On review of Google Satellite imagery, the woodland habitat (designated as a SINC and Ancient Woodland in parts) has been adopted instead, to allow for an assessment.

<sup>26</sup> <https://compliance-data.defra.gov.uk/datasets/Defra::ozone-aot40-modelled-background-2024/explore?location=51.528805%2C-3.356466%2C14.40>.



**Table 4-6: Baseline Concentrations**

ID	NO <sub>x</sub> Annual Mean (µg/m <sup>3</sup> ) (A)	SO <sub>2</sub> Annual Mean (µg/m <sup>3</sup> )	Ozone AOT40 Modelled Background 2024 (µg/m <sup>3</sup> ).h
ER1	11.2	2.6	3,763
ER2	13.0	1.8	3,713

Table note:  
(A) The maximum annual mean NO<sub>x</sub> contribution (0.016µg/m<sup>3</sup>) from the adjacent data centre's routine testing and maintenance schedule has been added to the background (as back calculated from the air quality assessment).

Table 4-6 presents a summary of the maximum modelled ozone AOT40 background concentrations. At both ER1 and ER2 these are below the CLe (6,000µg/m<sup>3</sup>). Further, the maximum annual mean SO<sub>2</sub> concentrations from APIS are well below the SO<sub>2</sub> CLe of 10µg/m<sup>3</sup>.

Given the above and in line with the AERA guidance, it is considered appropriate to apply the 24-hour mean CLe of 200µg/m<sup>3</sup> in the assessment.



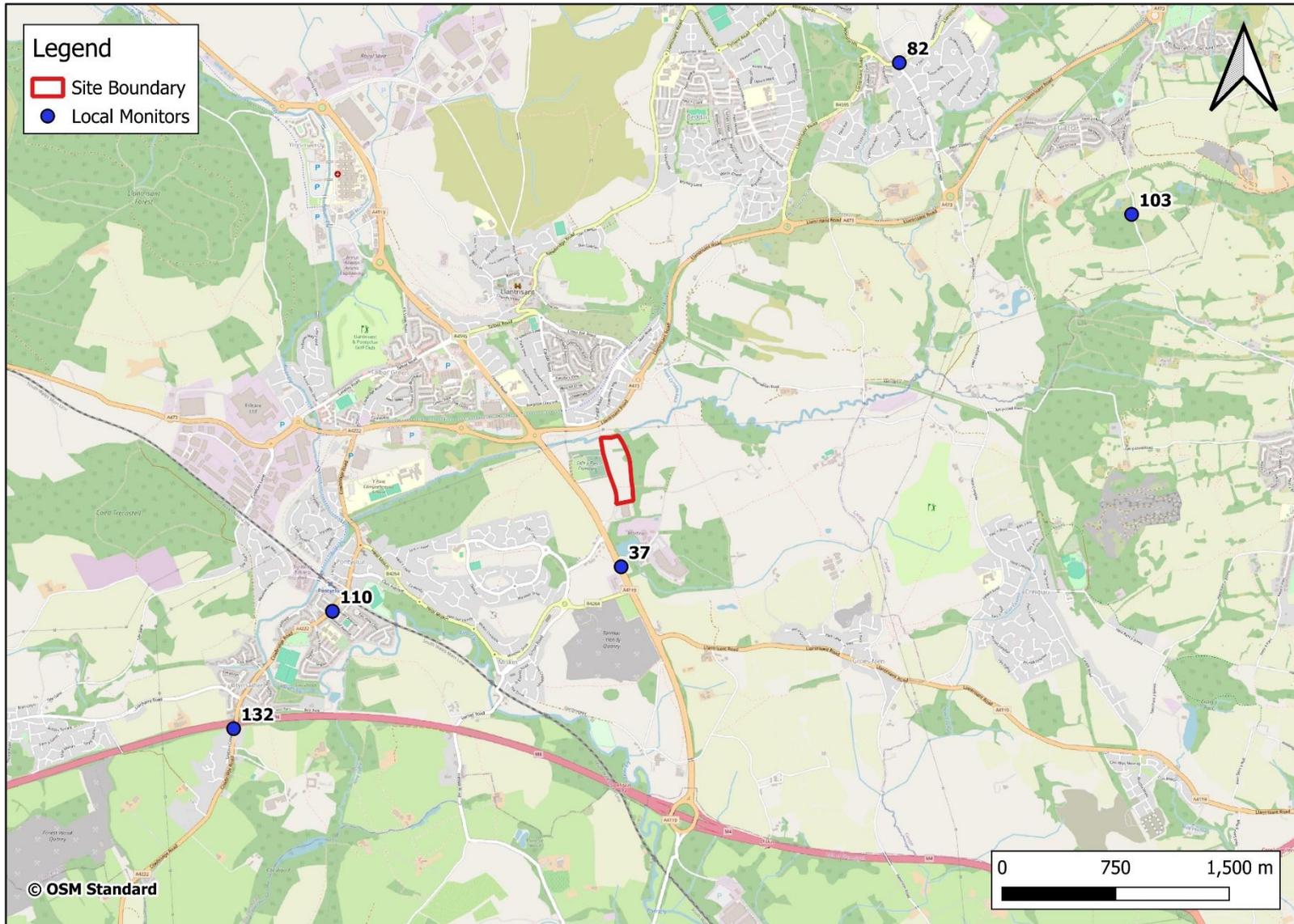


Figure 4-1: Local Monitoring Locations Relative to Site



## 5.0 Construction Dust Assessment

Where figures relating to area of the site, volumes, approximate number of construction vehicles or distances to receptors are given, these relate to thresholds as defined in the IAQM guidance to guide the assessor to define the dust emissions magnitude and sensitivity of the area.

Both development options have been considered although construction activities are anticipated to be similar. Any differences in the assessment outcomes are highlighted.

### 5.1 Assessment Screening

As shown in Figure 5-1, there are 'human receptors' within 250m of the Site and SINC's within/surrounding the Site. Therefore, an assessment of construction dust on both human and ecological receptors is required.

### 5.2 Potential Dust Emission Magnitude

#### 5.2.1 Demolition

The Site comprises of agricultural land with no existing buildings or structures that require demolition. Demolition activities have therefore been scoped out of the assessment for both development options.

#### 5.2.2 Earthworks

The total Site area requiring earthworks is 18,000m<sup>2</sup> – 110,000m<sup>2</sup>. Furthermore, it is anticipated that 5 – 10 heavy earth moving vehicles could be active at any one time.

The dust emission magnitude for earthworks is therefore considered to be 'medium' for both development options.

#### 5.2.3 Construction

Both development options include for construction of one large building (similar to a warehouse).

The total building volume requiring construction is estimated to be >75,000m<sup>3</sup>, however it is unlikely that this will all be constructed at the same time. Further, for both development options, materials with low dust emission potential (e.g. metal cladding) are proposed.

The dust emission magnitude for construction is therefore considered to be 'medium' for both development options.

#### 5.2.4 Trackout

Given the scale of both development options, the maximum outward HDV movements in any day are predicted to be 20 – 50. Furthermore, the unpaved road length is likely to be 50m – 100m at any given time.

The dust emission magnitude for trackout is therefore considered to be 'medium' for both development options.

#### 5.2.5 Summary

A summary of the dust emission magnitude for the assessed activities is detailed in Table 5-1.



**Table 5-1: Potential Dust Emission Magnitude**

Activity	Dust Emission Magnitude
Earthworks	Medium
Construction	Medium
Trackout	Medium

### 5.3 Sensitivity of the Area

The sensitivity of the area does not differ for each of the development options as it is determined from the Site surrounds.

#### 5.3.1 Dust Soiling Impacts

From review of the Site locale, there is >1 medium sensitivity receptor within 20m of the Site boundary, and <100 high sensitivity receptors within 50m of the Site boundary.

In addition, there are 1 – 10 high sensitivity residential receptors located within 20m of the identified trackout routes and <100 within 50m.

The sensitivity of the area with respect to dust soiling effects on people and property in relation to earthworks, construction and trackout is therefore ‘medium’.

#### 5.3.2 Human Health Impacts

The maximum 2024 mapped background PM<sub>10</sub> concentration for the grid square centred on the Site is estimated to be 13.6µg/m<sup>3</sup> (i.e. falls into the <24µg/m<sup>3</sup> class) (see Table 4-3).

Based on the above figures regarding the number and sensitivity receptors within 20m/50m of the Site boundary and trackout routes. The sensitivity of the area with respect to human health impacts in relation to earthworks, construction and trackout is considered ‘low’.

#### 5.3.3 Ecological Impacts

There are SINC’s within and adjacent to the Site, and within 20m of the Site and identified trackout routes. In accordance with the IAQM guidance, SINC’s have been classified as low sensitivity receptors.

The sensitivity of the area with respect to ecological impacts in relation to earthworks, construction and trackout is considered ‘low’.

#### 5.3.4 Summary

A summary of the sensitivity of the surrounding area is detailed in Table 5-2, whilst the Site locale is displayed in Figure 5-1.

**Table 5-2: Sensitivity of the Area**

Potential Impact	Sensitivity of Surrounding Area		
	Earthworks	Construction	Trackout
Dust Soiling	Medium	Medium	Medium
Human Health	Low	Low	Low
Ecological	Low	Low	Low



## 5.4 Risk of Impacts (Unmitigated)

The outcome of the assessment of the potential ‘dust emission magnitude’, and the ‘sensitivity of the area’ are combined in Table 5-3 below to determine the risk of impact which is used to inform the selection of appropriate mitigation.

**Table 5-3: Risk of Dust Impacts (Unmitigated)**

Potential Impact	Earthworks	Construction	Trackout
Dust Soiling	Medium Risk	Medium Risk	Medium Risk
Human Health	Low Risk	Low Risk	Low Risk
Ecological	Low Risk	Low Risk	Low Risk

Following the construction dust assessment, the Site is found to be at worst ‘medium risk’ in relation to dust soiling effects on people and property, and ‘low risk’ in relation to human health and ecological impacts (Table 5-3). The outcome is the same for both development options.

Potential dust effects during the construction phase are considered to be temporary in nature and may only arise at particular times (i.e. certain activities and/or meteorological conditions).

Commensurate with the above designation of dust risk, mitigation measures, as identified by IAQM guidance are required to ensure that any potential impacts arising from the construction phase of the Proposed Development are reduced and, where possible, completely removed. In accordance with IAQM guidance, providing effective mitigation measures are implemented, such as those outlined in Section 7.1, construction dust effects are considered to be ‘not significant’.



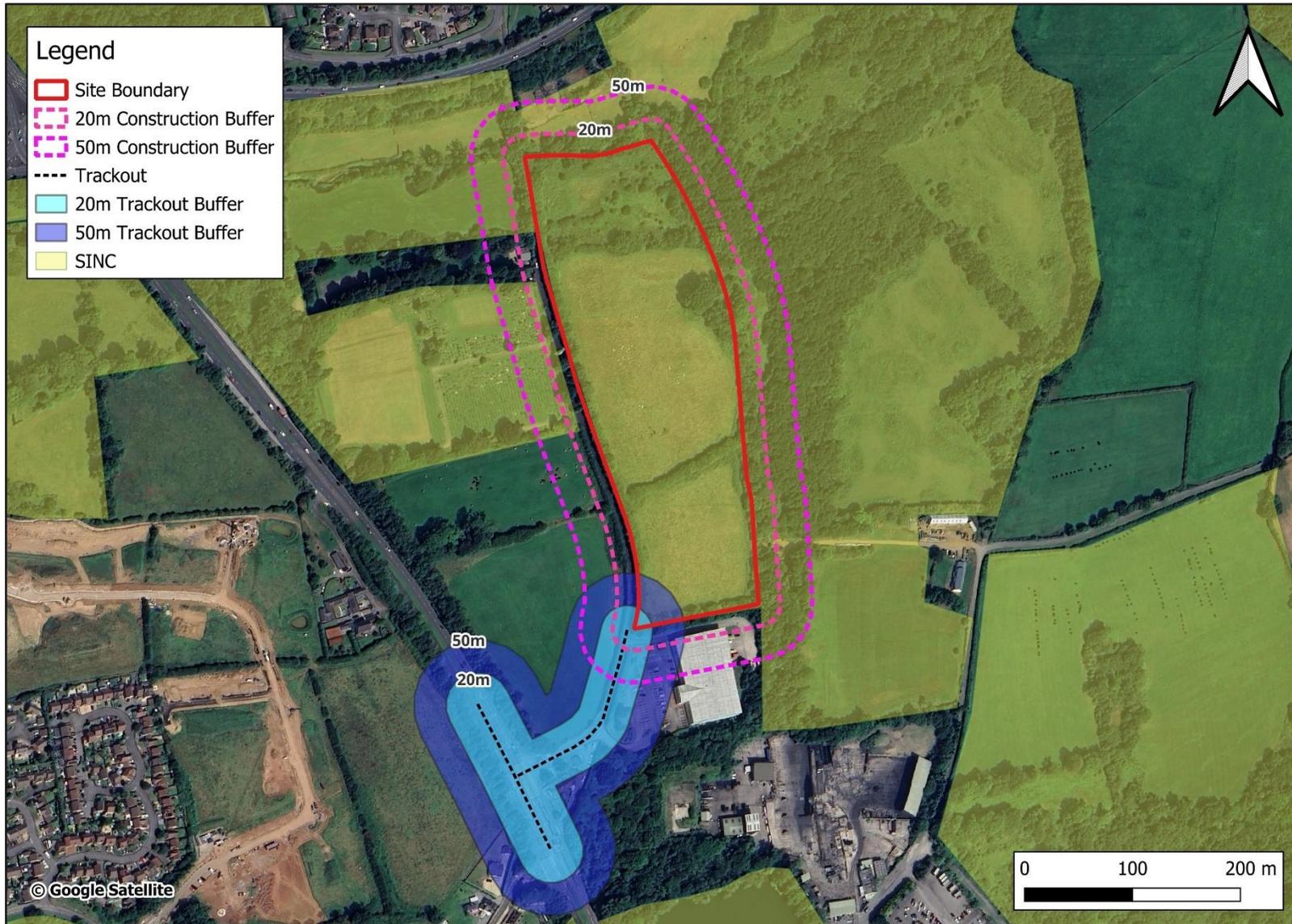


Figure 5-1: Construction Dust Assessment Buffers



## 6.0 Operational Phase Assessment

This section presents the potential air quality impacts and effects associated with the operation of the Proposed Development.

### 6.1 Road Traffic Screening Assessment

Table 6-1 details the maximum road traffic flows generated by the Proposed Development for each of the options, as provided by Pell Frischmann – the appointed transport consultant<sup>27</sup>.

The traffic flows have been compared to the relevant EPIC & IAQM indicative screening criteria.

**Table 6-1: Maximum Road Traffic Flows Generated on the Local Road Network**

Option	AADT		
	LDVs	HDVs	Total
Option 1 – Light Industrial Building	256	50	306
Option 2 – Data Centre	365	11	376
<b><i>EPIC &amp; IAQM Screening Criteria</i></b>	<b>500</b>	<b>100</b>	-

As presented in Table 6-1, for both options, the maximum road traffic flows generated by the Proposed Development on the local road network are below the relevant EPIC & IAQM indicative screening criteria. The traffic flows would further distribute with distance from the Site.

Given this, the operational effects on local air quality arising from road traffic emissions associated with the Proposed Development for either option can be considered 'insignificant'.

### 6.2 Combustion Emissions Assessment

#### 6.2.1 Testing and Maintenance

##### 6.2.1.1 Annual Mean NO<sub>2</sub> Impacts

Predicted annual mean NO<sub>2</sub> impacts at the modelled receptor locations are summarised in Table 6-2. A contour plot is presented in Figure 6-1.

In accordance with the EPUK & IAQM guidance, the PCs and resultant PECs associated with the assessed routine testing and maintenance schedule are considered to cause 'negligible' impacts at all selected receptor locations.

<sup>27</sup> During design development, the proposed floorspace quantum (sqm) of each development option has reduced slightly. The traffic flows presented in Table 6-1 are from an earlier iteration of a larger quantum and are therefore greater than the traffic flows associated with the current design. The traffic flows presented are therefore worst-case, associated with the maximum design envelope.



**Table 6-2: Testing and Maintenance – Annual Mean NO<sub>2</sub> Impacts**

ID	Site PC (µg/m <sup>3</sup> )	Site PC as % of AQAL	Cumulative PEC (µg/m <sup>3</sup> )	Cumulative PEC as % of AQAL	Impact Descriptor
HR1	0.01	0.02%	23.0	57.5%	Negligible
HR2	0.02	0.04%	23.0	57.6%	Negligible
HR3	0.02	0.04%	23.0	57.6%	Negligible
HR4	0.03	0.08%	23.0	57.6%	Negligible
HR5	0.02	0.05%	23.0	57.6%	Negligible
HR6	0.05	0.11%	23.1	57.6%	Negligible
HR7	0.08	0.20%	23.1	57.7%	Negligible
HR8	0.01	0.02%	23.0	57.5%	Negligible
HR9	0.01	0.02%	23.0	57.5%	Negligible
HR10	0.01	0.04%	23.0	57.6%	Negligible
HR11	0.02	0.05%	23.0	57.6%	Negligible
HR12	0.02	0.05%	23.0	57.6%	Negligible
HR13	0.02	0.05%	23.0	57.6%	Negligible
HR14	0.01	0.03%	23.0	57.6%	Negligible
HR15	<0.01	0.01%	23.0	57.5%	Negligible
HR16	<0.01	0.01%	23.0	57.5%	Negligible
HR17	<0.01	0.01%	23.0	57.5%	Negligible
HR18	0.01	0.01%	23.0	57.5%	Negligible
HR19	0.01	0.02%	23.0	57.5%	Negligible
HR20	0.01	0.02%	23.0	57.5%	Negligible
HR21	0.01	0.02%	23.0	57.5%	Negligible
HR22	<0.01	0.01%	23.0	57.5%	Negligible
HR23	<0.01	0.01%	23.0	57.5%	Negligible
HR24	<0.01	0.01%	23.0	57.5%	Negligible
HR25	<0.01	0.01%	23.0	57.5%	Negligible
HR26	<0.01	0.01%	23.0	57.5%	Negligible
HR27	<0.01	0.01%	23.0	57.5%	Negligible
HR28	<0.01	0.01%	23.0	57.5%	Negligible
HR29	0.01	0.01%	23.0	57.5%	Negligible
HR30	0.01	0.01%	23.0	57.5%	Negligible
HR31	<0.01	0.01%	23.0	57.5%	Negligible
HR32	<0.01	0.01%	23.0	57.5%	Negligible
HR33	0.01	0.03%	23.0	57.6%	Negligible
HR34	0.01	0.03%	23.0	57.6%	Negligible
HR35	0.01	0.02%	23.0	57.5%	Negligible



ID	Site PC ( $\mu\text{g}/\text{m}^3$ )	Site PC as % of AQAL	Cumulative PEC ( $\mu\text{g}/\text{m}^3$ )	Cumulative PEC as % of AQAL	Impact Descriptor
HR36	0.01	0.01%	23.0	57.5%	Negligible
HR37	0.01	0.03%	23.0	57.6%	Negligible
HR38	0.01	0.03%	23.0	57.6%	Negligible
HR39	0.01	0.01%	23.0	57.5%	Negligible
HR40	0.01	0.03%	23.0	57.6%	Negligible

### 6.2.1.2 1-hour Mean NO<sub>2</sub> Impacts

The risks of exceedances of the 1-hour mean NO<sub>2</sub> AQAL at the modelled receptor locations was considered for the assessed testing and maintenance schedule.

With just one generator operating (i.e. the monthly tests), there are no occurrences where the PEC exceeds 200 $\mu\text{g}/\text{m}^3$ .

With all generators operating (i.e. the annual test), the risk of exceedance is <1% and therefore 'highly unlikely'.

On the basis, 1-hour mean NO<sub>2</sub> impacts are not considered to be significant.

### 6.2.1.3 Impacts on Critical Levels

The results of the assessment of impacts on CLe are presented in Table 6-3. The findings are that:

- The annual mean PCs do not exceed 1% of the long-term CLe;
- The 24-hour mean PCs do not exceed 10% of the short-term CLe. A contour plot is presented in Figure 6-2;
- The impacts are therefore considered to cause 'no likely damage' to the SSSIs; and
- When considering the nearby SINC / AW, the maximum impacts on the modelled receptor grid do not exceed 100% of the annual or 24-hour mean CLe and would therefore result in 'no significant pollution'.

**Table 6-3: Testing and Maintenance – Impacts on Critical Levels**

ID	CLe	Site PC ( $\mu\text{g}/\text{m}^3$ )	Site PC as % of CLe
ER1	Annual Mean	0.006	<0.1%
	24-hour Mean	6.8	3.4%
ER2	Annual Mean	0.005	<0.1%
	24-hour Mean	4.8	2.4%

### 6.2.1.4 Impacts on Critical Loads

The results of the assessment of impacts on CLo are presented in Table 6-4 and Table 6-5. The findings are that:

- The PCs do not exceed 1% of the nitrogen and acid CLo. The impacts are therefore considered to cause 'no likely damage' to the SSSIs; and



- When considered the nearby SINC's / AW and the maximum impacts predicted on the modelled receptor grid, it is considered highly unlikely that the PC's would exceed 100% of the CLo and would therefore result in 'no significant pollution'.

**Table 6-4: Testing and Maintenance – Impacts on Nitrogen Critical Loads**

ID	Applied CLo (kgN/ha/yr)	Site PC	Site PC as % of CLo
ER1	5	0.001	0.01%
ER2	10	0.001	0.01%

**Table 6-5: Testing and Maintenance – Impacts on Acid Critical Loads**

ID	Applied CLo Max N (keq/ha/yr)	Site N PC	Site PC as % of CLo
ER1	0.790	<0.001	0.01%
ER2	1.945	<0.001	<0.01%

## 6.2.2 Emergency Outage

### 6.2.2.1 Annual Mean NO<sub>2</sub> Impacts

Predicted annual mean NO<sub>2</sub> impacts at the modelled receptor locations are summarised in Table 6-6.

In accordance with the EPUK & IAQM guidance, the PC's and resultant PEC's associated with a 2-hour outage period are considered to cause 'negligible' impacts at all selected receptor locations.

**Table 6-6: Emergency Outage – Annual Mean NO<sub>2</sub> Impacts**

ID	Site PC (µg/m <sup>3</sup> )	Site PC as % of AQAL	Cumulative PEC (µg/m <sup>3</sup> )	Cumulative PEC as % of AQAL	Impact Descriptor
HR1	<0.01	<0.01%	23.0	57.5%	Negligible
HR2	<0.01	0.01%	23.0	57.5%	Negligible
HR3	<0.01	0.01%	23.0	57.5%	Negligible
HR4	<0.01	0.01%	23.0	57.5%	Negligible
HR5	<0.01	0.01%	23.0	57.5%	Negligible
HR6	0.01	0.02%	23.0	57.5%	Negligible
HR7	0.01	0.03%	23.0	57.6%	Negligible
HR8	<0.01	<0.01%	23.0	57.5%	Negligible
HR9	<0.01	<0.01%	23.0	57.5%	Negligible
HR10	<0.01	0.01%	23.0	57.5%	Negligible
HR11	<0.01	0.01%	23.0	57.5%	Negligible
HR12	<0.01	0.01%	23.0	57.5%	Negligible
HR13	<0.01	0.01%	23.0	57.5%	Negligible
HR14	<0.01	<0.01%	23.0	57.5%	Negligible
HR15	<0.01	<0.01%	23.0	57.5%	Negligible



ID	Site PC ( $\mu\text{g}/\text{m}^3$ )	Site PC as % of AQAL	Cumulative PEC ( $\mu\text{g}/\text{m}^3$ )	Cumulative PEC as % of AQAL	Impact Descriptor
HR16	<0.01	<0.01%	23.0	57.5%	Negligible
HR17	<0.01	<0.01%	23.0	57.5%	Negligible
HR18	<0.01	<0.01%	23.0	57.5%	Negligible
HR19	<0.01	<0.01%	23.0	57.5%	Negligible
HR20	<0.01	<0.01%	23.0	57.5%	Negligible
HR21	<0.01	<0.01%	23.0	57.5%	Negligible
HR22	<0.01	<0.01%	23.0	57.5%	Negligible
HR23	<0.01	<0.01%	23.0	57.5%	Negligible
HR24	<0.01	<0.01%	23.0	57.5%	Negligible
HR25	<0.01	<0.01%	23.0	57.5%	Negligible
HR26	<0.01	<0.01%	23.0	57.5%	Negligible
HR27	<0.01	<0.01%	23.0	57.5%	Negligible
HR28	<0.01	<0.01%	23.0	57.5%	Negligible
HR29	<0.01	<0.01%	23.0	57.5%	Negligible
HR30	<0.01	<0.01%	23.0	57.5%	Negligible
HR31	<0.01	<0.01%	23.0	57.5%	Negligible
HR32	<0.01	<0.01%	23.0	57.5%	Negligible
HR33	<0.01	0.01%	23.0	57.5%	Negligible
HR34	<0.01	0.01%	23.0	57.5%	Negligible
HR35	<0.01	<0.01%	23.0	57.5%	Negligible
HR36	<0.01	<0.01%	23.0	57.5%	Negligible
HR37	<0.01	<0.01%	23.0	57.5%	Negligible
HR38	<0.01	<0.01%	23.0	57.5%	Negligible
HR39	<0.01	<0.01%	23.0	57.5%	Negligible
HR40	<0.01	<0.01%	23.0	57.5%	Negligible

### 6.2.2.2 1-hour Mean NO<sub>2</sub> Impacts

Based on a 2-hour outage period, the probability of exceedance of the 1-hour mean NO<sub>2</sub> AQAL is considered 'highly unlikely' at all modelled receptor locations. Such outage scenarios are considered unlikely, and the overall risk of exceedance is low.

### 6.2.2.3 Impacts on Critical Levels

The results of the assessment of impacts on CLe are presented in Table 6-7. The findings are that:

- The annual mean PCs do not exceed 1% of the long-term CLe;
- The 24-hour mean PCs do not exceed 10% of the short-term CLe;
- The impacts are therefore considered to cause 'no likely damage' to the SSSIs; and



- When considering the nearby SINC<sub>s</sub> / AW, the maximum impacts on the modelled receptor grid do not exceed 100% of the annual or 24-hour mean CLe and would therefore result in 'no significant pollution'.

**Table 6-7: Emergency Outage – Impacts on Critical Levels**

ID	CLe	Site PC (µg/m <sup>3</sup> )	Site PC as % of CLe
ER1	Annual Mean	<0.01	<0.01%
	24-hour Mean	12.0	6.0%
ER2	Annual Mean	<0.01	<0.01%
	24-hour Mean	7.4	3.7%

#### 6.2.2.4 Impacts on Critical Loads

The results of the assessment of impacts on CLo are presented in Table 6-8 and Table 6-9. The findings are that:

- The PC<sub>s</sub> do not exceed 1% of the nitrogen and acid CLo. The impacts are therefore considered to cause 'no likely damage' to the SSSIs; and
- When considered the nearby SINC<sub>s</sub> / AW and the maximum impacts predicted on the modelled receptor grid, it is considered highly unlikely that the PC<sub>s</sub> would exceed 100% of the CLo and would therefore result in 'no significant pollution'.

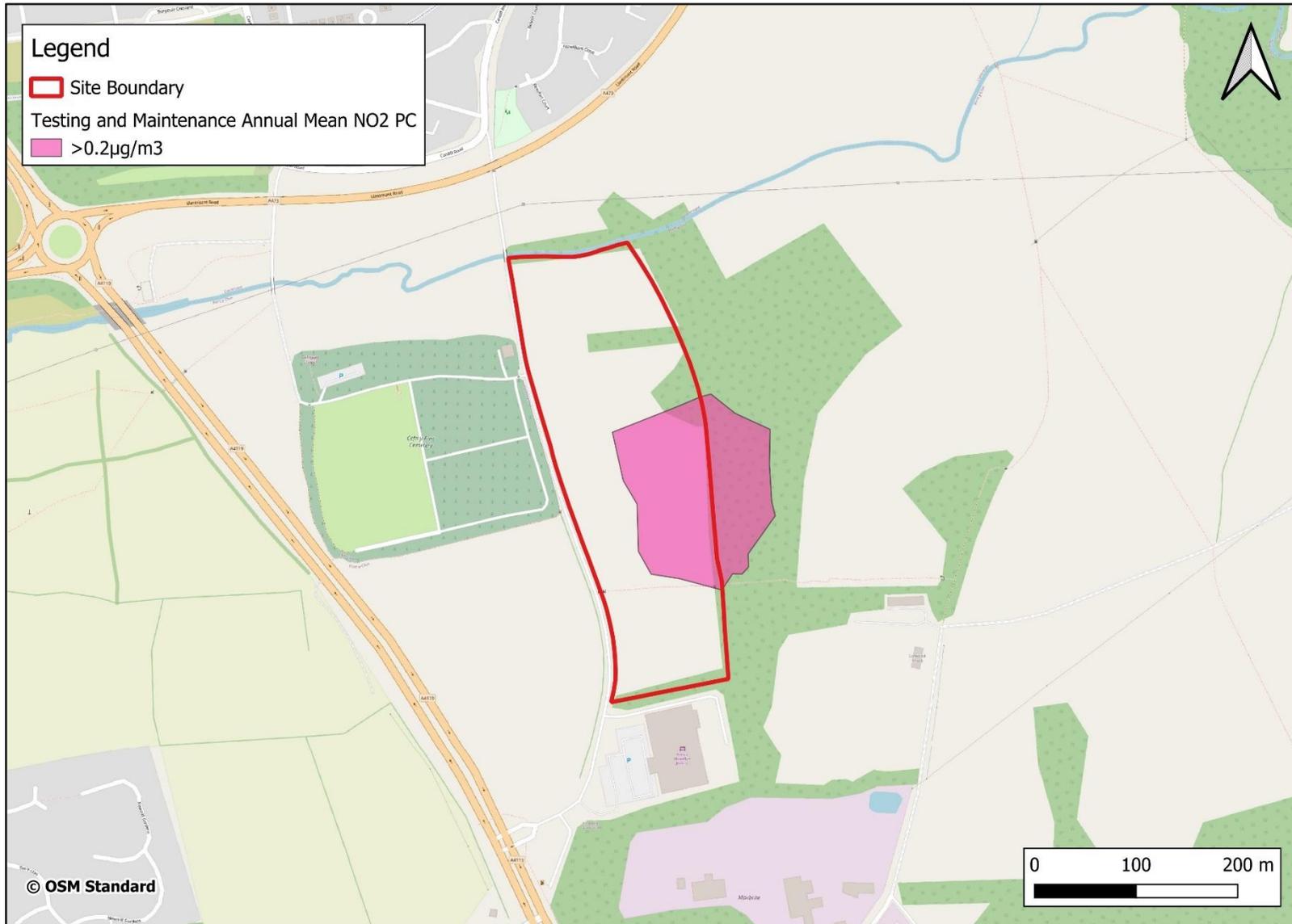
**Table 6-8: Emergency Outage – Impacts on Nitrogen Critical Loads**

ID	Applied CLo (kgN/ha/yr)	Site PC	Site PC as % of CLo
ER1	5	<0.001	<0.01%
ER2	10	<0.001	<0.01%

**Table 6-9: Emergency Outage – Impacts on Acid Critical Loads**

ID	Applied CLo Max N (keq/ha/yr)	Site N PC	Site PC as % of CLo
ER1	0.790	<0.001	<0.01%
ER2	1.945	<0.001	<0.01%





**Figure 6-1: Testing and Maintenance – Annual Mean NO<sub>2</sub> Process Contribution**



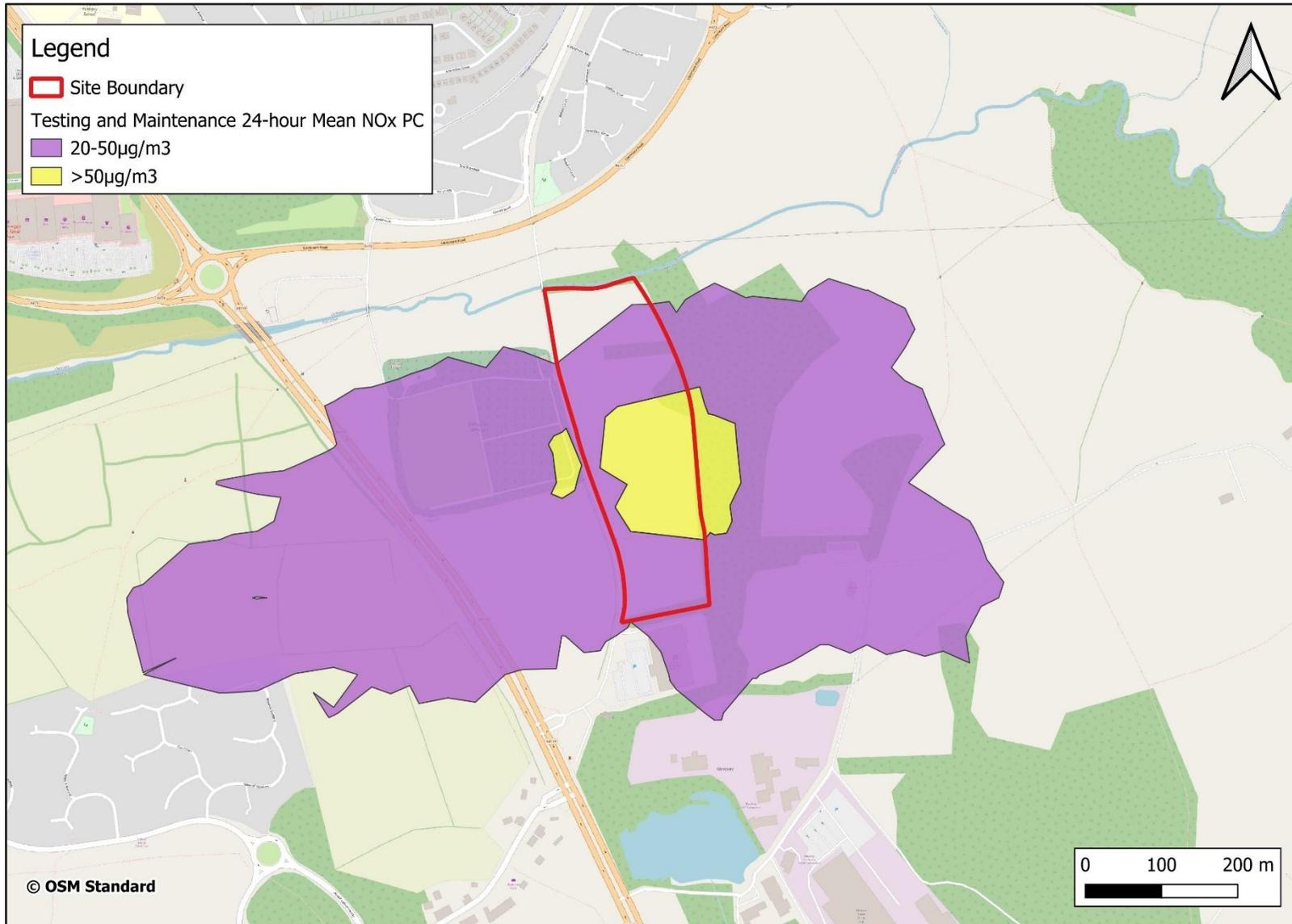


Figure 6-2: Testing and Maintenance – 24-hour Mean NO<sub>x</sub> Process Contribution



## 7.0 Mitigation Measures

This section presents any proportionate mitigation measures required during the construction and operational phases of the Proposed Development.

### 7.1 Construction Phase

The IAQM guidance outlines a number of site-specific mitigation measures based on the assessed site risk. The measures are grouped into those which are highly recommended and those which are desirable. The IAQM measures considered applicable to the Site and the required construction activities are detailed in Table 7-1, suitable for inclusion within a Construction Environmental Management Plan (CEMP) or similar. With the effective application of these dust mitigation measures, residual effects are considered to be ‘not significant’.

**Table 7-1: Construction Dust Mitigation Measures**

Site Application	Mitigation Measure
<b>Highly Recommended</b>	
Communications	Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary. This may be the environment manager/engineer or the site manager.
	Display the head or regional office contact information.
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 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.
Monitoring	Carry out regular site inspections to monitor compliance with implemented controls, record inspection results, and make an inspection log available to the local authority when asked.
	Increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions.
	Agree visual inspection locations with the Local Authority. Further guidance is provided by IAQM on monitoring during demolition, earthworks and construction.
Operating Vehicle / Machinery and Sustainable Travel	Ensure all vehicles switch off engines when stationary - no idling vehicles.
	Avoid the use of diesel or petrol powered generators and use mains electricity or battery powered equipment where practicable.



Site Application	Mitigation Measure
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.
	Avoid site runoff of water or mud.
	Keep site fencing, barriers and scaffolding clean using wet methods.
	Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site. If they are being re-used on-site cover as described below.
	Cover, seed or fence stockpiles to prevent wind whipping.
Site Management	Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken.
	Make the complaints log available to the local authority when asked.
	Record any exceptional incidents that cause dust and/or air emissions, either on- or offsite, and the action taken to resolve the situation in the logbook.
Construction	Ensure sand and other aggregates are stored in bunded areas and 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.
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.
	Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable.
	Record all inspections of haul routes and any subsequent action in a site log book.
	Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable).
	Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits.
	Access gates to be located at least 10m from receptors where possible.
Waste Management	Avoid bonfires and burning of waste materials.
<b>Desirable</b>	
Construction	Avoid scabbling (roughening of concrete surfaces) if possible.
	Ensure sand and other aggregates are stored in bunded areas and 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 smaller supplies of fine power materials ensure bags are sealed after use and stored appropriately to prevent dust.



Site Application	Mitigation Measure
Earthworks	Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable.
	Use Hessian, mulches or tackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as practicable
Monitoring	Undertake daily on-site and off-site inspection, where receptors (including roads) are nearby, to monitor dust, record inspection results, and make the log available to the local authority when asked. This should include regular dust soiling checks of surfaces such as street furniture, cars and windowsills within 100m of site boundary, with cleaning to be provided if necessary.
Operating Vehicle / Machinery and Sustainable Travel	Impose and signpost a maximum-speed-limit of 15mph on surfaced and 10mph on unsurfaced haul roads and work areas (if long haul routes are required these speeds may be increased with suitable additional control measures provided, subject to the approval of the nominated undertaker and with the agreement of the local authority, where appropriate).

## 7.2 Operational Phase

### 7.2.1 Road Traffic Emissions

In accordance with EPIC & IAQM guidance, road traffic impacts associated with the operation of the Site can be considered as having an insignificant effect on local air quality.

Long-term scheme-specific mitigation measures are therefore not required to mitigate operational effects, however, will be considered and included as part of the detailed design. For example, the initial design of both Options includes for appropriate Electric Vehicle (EV) charging infrastructure provision at the Site.

### 7.2.2 Combustion Emissions

Under Option 2, any potential data centre use would be regulated by an Environmental Permit issued by NRW, who will only issue an Environmental Permit where they are satisfied that there are no unacceptable risks to the environment. The Permit may include conditions requiring Best Available Techniques (BAT) to be applied to emission points to air.

Based on the design assumptions applied in this assessment, and the resultant air quality effects, no further mitigation is required. These design assumptions should be considered during any detailed data centre design.



## 8.0 Conclusions

SLR has undertaken an air quality assessment to support two full planning applications for a proposed employment facility on land off the A4119, Mwyndy, Pontyclun, Wales.

Two options, one of which will be taken forward, have been considered in the assessment:

- **Option 1:** “*Erection of employment facility Option 1: Erection of a 9,980sqm Class B1c light industrial building with associated access, parking, drainage, landscaping, services and utilities.*”; or
- **Option 2:** “*Erection of employment facility Option 2: Erection of a 21,490sqm Class B8 data centre with associated access, parking, drainage, landscaping, services and utilities.*”

The assessment outcomes for each option are summarised below.

### 8.1 Option 1

Appropriate dust mitigation measures have been identified (Table 7-1) as part of a construction dust assessment. Providing such measures are effectively implemented, residual effects from dust emissions arising during the construction phase are considered to be ‘not significant’.

Option 1 is expected to generate road traffic volumes below the relevant indicative EPIC & IAQM screening criteria. As such, the operational effects on local air quality arising from road traffic emissions associated with Option 1 can be considered ‘insignificant’.

### 8.2 Option 2

Appropriate dust mitigation measures have been identified (Table 7-1) as part of a construction dust assessment. Providing such measures are effectively implemented, residual effects from dust emissions arising during the construction phase are considered to be ‘not significant’.

Option 2 is expected to generate road traffic volumes below the relevant indicative EPIC & IAQM screening criteria. As such, the operational effects on local air quality arising from road traffic emissions associated with Option 2 can be considered ‘insignificant’.

To assess the potential data centre, a dispersion modelling assessment has quantified and assessed the potential air quality impacts associated with combustion emissions from on-site generators against published AQALs for the protection of human health and designated ecological sites. A hypothetical routine testing and maintenance schedule, and emergency outage scenario have been considered.

Based on the impacts predicted at human receptors, the overall effect of the assessed routine testing and maintenance schedule is considered ‘not significant’. Furthermore, impacts on the SSSI designations (ER1 and ER2) are considered to cause ‘no likely damage’.

The risk of occurrence of an emergency outage is low, and associated impacts are therefore considered unlikely. A potential 2-hour outage scenario has been assessed cumulatively with the adjacent approved data centre, and associated effects on both human and ecological receptors are considered ‘insignificant’.



