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Air Quality Assessment: Crymlyn Parc, Skewen

Client: Hale Group

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1. Introduction

1.1. This Air Quality Assessment has been prepared by Air Pollution Services (APS), part of KALACO Group, on behalf of Hale Group ('the Applicant') in support of an outline application for a planning permission for the development (the 'Proposed Development') at Crymlyn Parc, Skewen ('the Site'), within the Neath Port Talbot area.

1.2. This report describes the Proposed Development and the scope of the assessment (Section 2), a baseline air quality review (Section 3), an assessment of impacts due to the Proposed Development (Section 4), mitigation (Section 5) and the conclusions (Section 6).

1.3. The assessment has been carried out by APS. It is important air quality assessments are carried out by suitably qualified experts with professional accreditations, such as being a member of the Institute of Air Quality Management (IAQM), further details of the assessment authors are set out in Section 9.

1.4. A glossary of terms and references are set out in Sections 7 and 8, respectively.

2. The Proposed Development

2.1. The development comprises of the erection of 154 dwellings of mixed house types, associated landscaping and infrastructure works.

2.2. The Proposed Development and ground floor layout is shown in Figure 1 and respectively. The figures are for illustrative purposes only and Figure 2 represents only one type of dwelling at the Proposed Development (two storey one bed flat).

2.3. The Proposed Development is anticipated to be operational in late 2026 at the earliest. The concentrations of pollutants are indicated to improve in future years. Therefore, 2026 is considered an appropriate conservative assessment year.

Figure 1: The Proposed Development

Figure notes: Drawing provided by Spring Design Consultancy.

Figure 2: The Proposed Development Ground Floor Layout

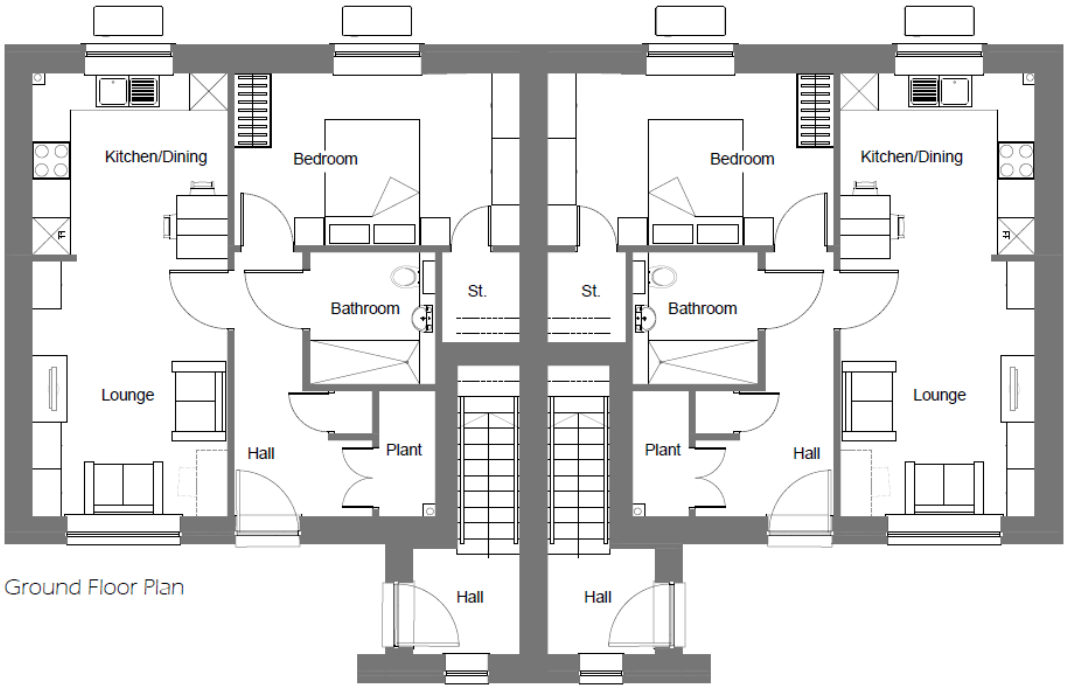

Figure notes: Drawing provided by Spring Design Consultancy.

Location

2.4. The Proposed Development is located within the administrative area of Neath Port Talbot Council (NPTC). The administrative boundary of Swansea Council (SC) is located within approximately 80 m.

2.5. The location of the Proposed Development is shown in Figure 3 and Figure 4.

Figure 3: Location of Proposed Development in relation to Local Authority Administrative Areas

Figure notes: Imagery © 2025 Google, Map data © 2025.

Figure 4: Site Location

Figure notes: Imagery © 2025 Google, Map data © 2025.

Design for Air Quality

2.6. The Environment Protection UK (EPUK) and IAQM guidance on planning for air quality (2017) is clear that it is important that proposed developments should incorporate good design and best practice measures to ensure any impacts are minimised as far as practicable, even where air pollutants are predicted to be below the air quality objectives (AQOs)/limit values (LVs). The Proposed Development includes the following good design and best practice measures:

- the Proposed Development will not include a centralised energy plant for provision of power, hot water or heating. These services will be provided through a combination of roof mounted photovoltaic panels and air source heat pumps at each dwelling;
- the Proposed Development will provide cycle parking spaces to reduce reliance on car use by future users; and
- the Proposed Development is located approximately 450 m from a bus stop with one bus route towards Neath Skewen Railway Station is located approximately 1.5 km from the Proposed Development. These facilities enable users to easily access the Proposed Development via public transport.

Traffic Generation

2.7. Traffic generation data was provided by Acstro, the transport consultants for the project. The annual average daily traffic (AADT) generated by the development is estimated to be 686, with 343 arrivals and 343 departures. Figure 3 shows the distribution of the car trips provided by Acstro, which suggests that the traffic associated with the Proposed Development may lead to changes of vehicle movements on local roads, releasing pollutant emissions.

2.8. It is anticipated that one car parking space will be provided per bedroom. The provision of EV charging points is unknown at this stage.

Figure 5: The Distribution of Trips

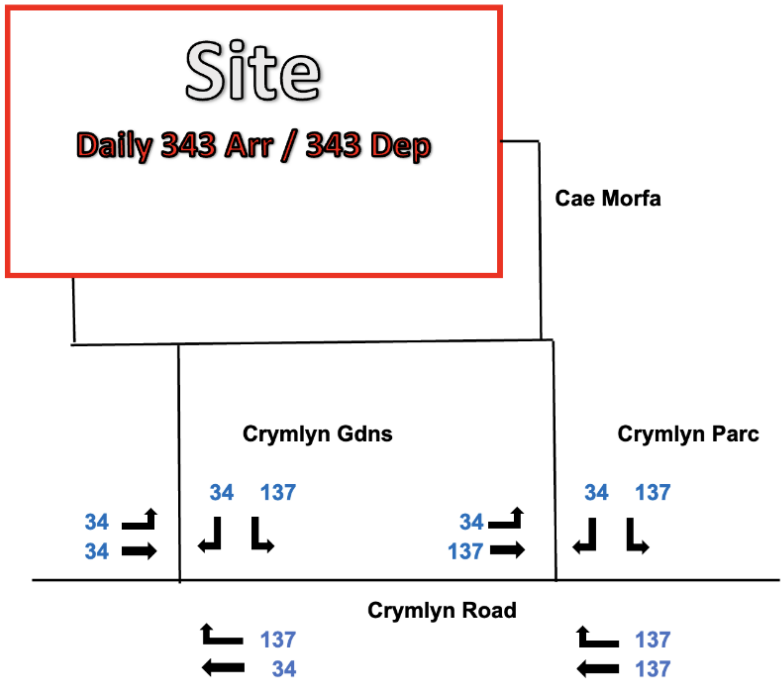

Figure notes: Diagram provided by Acstro.

2.9. The traffic generated during the construction phase of the Proposed Development is unknown, however, it is unlikely to be more than 50 heavy duty vehicles (HDVs) as an AADT.

On-site Combustion Plant

2.10. No significant centralised on-site combustion plant is expected to be included in the Proposed Development.

In Scope of Assessment

2.11. The scope of assessment includes several elements, and this report is part of a series of documents addressing air quality. It should be read in conjunction with the latest version of each document.

2.12. The scope and appended documents covered are set out below:

- Air Quality Policy/Legislation Context: Crymlyn Parc, Skewen
- Baseline Air Quality Review: Crymlyn Parc, Skewen
- Dispersion Modelling Approach: Crymlyn Parc, Skewen
- Construction Dust Risk Assessment (CDRA): Crymlyn Parc, Skewen
- Air Quality at Locations of Human Health Exposure: Crymlyn Parc, Skewen
- Site Suitability: Crymlyn Parc, Skewen

2.13. The pollutants of most concern for human exposure are nitrogen dioxide (NO_2) and fine particulate matter (both PM_{10} and $PM_{2.5}$). Concentrations of NO_2, PM_{10} and $PM_{2.5}$ have been predicted for:

- the existing year of 2022 (latest year with relevant monitoring data); and

- the future year of 2026 (earliest operational year).

2.14. This report is an assessment of air quality at locations of human health exposure (i.e. the quality of the air) which can be linked to health effects; however, it is not an assessment of the effect on human health from poor air quality.

Not in Scope of Assessment

2.15. This report does not consider the following:

- Impacts on human exposure and sensitive ecological exposure in the local area due to emissions from Non-Road Mobile Machinery (NRMM) associated with the Proposed Development during the construction phase; and
- Impacts on sensitive ecological exposure in the local area due to emissions from construction and operational traffic associated with the Proposed Development.

3. Review of Baseline Air Quality

3.1. The Proposed Development is not located within any Clean Air Zone (CAZ), Low Emission Zone (LEZ), Ultra Low Emission Zone (ULEZ), NRMM Zone, or Air Quality Management Area (AQMA). The closest AQMA is the Swansea AQMA located approximately 4.6 km southwest of the Application Site.

3.2. The baseline concentrations of pollutants are considered in relation to three separate types of criteria, covered by different legislation, policy, and guidance. These AQOs, LVs, and World Health Organization (WHO) Interim Targets (ITs) and Air Quality Guidelines (AQGs).

Air Quality Objectives

Nitrogen Dioxide

3.3. Two monitoring sites ('415' and '56') presented in the baseline review are considered to be representative of the conditions at the Application Site; with the remaining nearby sites providing useful context in understanding the local conditions. Annual mean NO_2 concentrations did not exceed the annual mean AQO of 40 µg/m^3 at any of the relevant monitoring sites between 2017 and 2022. Measured concentrations may be demonstrating a slight reduction in annual mean NO_2 concentrations, which is likely to be due to continued improvement in vehicle technologies. However, long term trends of annual means require at least 5 years of data; and the COVID-19 pandemic has potentially skewed the more recent data. The concentrations are expected to decline further into the future.

3.4. Defra predicted background NO_2 concentrations at the Proposed Development are significantly below the AQO. The modelled predicted concentrations in the local area are also significantly below the AQO and thus, it is unlikely that the future users of the Proposed Development will be at risk of exposure to high levels of air pollution.

Particulate Matter

3.5. There is little information on PM concentrations relevant to the Application Site, as there are no PM monitoring sites representative of the conditions in the Study Area.

3.6. The Defra predicted background concentrations suggest that the annual mean concentrations of PM_{10} and $PM_{2.5}$ at the Proposed Development are likely to be well below the AQOs of 40 µg/m^3 and

25 µg/m^3, respectively. The modelled concentrations of PM_{10} and $PM_{2.5}$ in the local area are also below the respective AQOs and it is thus unlikely that the future users of the Proposed Development will be at risk of exposure to high levels of air pollution.

Limit Value Compliance

3.7. There is one road with Defra predicted roadside concentrations in the Study Area. This road has predicted concentrations of NO_2, PM_{10} and $PM_{2.5}$ significantly below, and therefore compliant with, the LVs.

World Health Organization Guidelines

3.8. Table 1 provides an indication of the baseline air quality at the Application Site in the assessment year with respect to the WHO annual mean ITs and AQG. In reality, the concentrations will vary across the Application Site with the highest concentrations occurring alongside the northern border of the Proposed Development, close to the M4 motorway.

Table 1: Indicative Achievement of Annual Mean WHO Guidelines / Interim Targets (µg/m^3) on the Application Site in 2026

Pollutant	IT1	IT2	IT3	IT4	AQG
NO_2	✓	✓	✓	n/a	x
PM_{10}	✓	✓	✓	✓	✓
$PM_{2.5}$	✓	✓	✓	✓	x
Table notes: ? may achieve IT/AQG; x IT/AQG not achieved; ✓ IT/AQG achieved; n/a not applicable.					

4. Assessment of Impacts

Construction Dust Risk Assessment

4.1. The construction works have the potential to create dust and emissions. Following IAQM Guidance (2024), a risk assessment of potential dust effects has been undertaken, see appended document *'Construction Dust Risk Assessment: Crymlyn Parc, Skewen'*. The Proposed Development is identified as *Medium* Risk for dust soiling effects during the earthworks, construction and trackout. In terms of human health and ecology, the Proposed Development has been identified as *Low* and *Negligible* Risk during the earthworks, construction and trackout, respectively. No demolition is expected to take place at the Application Site.

4.2. It will therefore be necessary to apply a package of mitigation measures to minimise dust emission during earthworks, construction and trackout. With these measures in place, it is expected that any residual effects will be '*not significant*' as set out in the construction dust risk assessment. The IAQM guidance recognises that even with a rigorous dust management plan in place, it is not possible to guarantee that the dust mitigation measures will be effective all the time, for instance under adverse weather conditions. The local community may therefore experience occasional, short-term annoyance. The scale of this would not normally be considered sufficient to change the conclusion that the effects will be '*not significant*'.

Air Quality Impact on Locations of Human Exposure

4.3. The operational air quality effects on locations of human health exposure without additional mitigation are judged to be 'not significant'. This professional judgement takes account of the assessment that:

- The annual mean impacts of pollutant emissions at relevant human health receptors are described as *negligible*, as set out in Table 2 ; and
- The short-term mean impacts of pollutant emissions at relevant human health receptors are *negligible*, as set out in Table 2.

Table 2: Human Health Impact Descriptors

Pollutant	Annual mean	Short-term mean
NO_2	Negligible at all assessed locations	Negligible at all assessed locations
PM_{10}	Negligible at all assessed locations	Negligible at all assessed locations
$PM_{2.5}$	Negligible at all assessed locations	Negligible at all assessed locations
Table notes: -		

4.4. The maximum change in annual mean NO_2 concentration in 2026 is 0.3 µg/m^3 which is <1% of the AQO and described as a *negligible* magnitude of change. Due to uncertainty in the modelling, 2 µg/m^3 has been removed from the NO_2 AQO of 40 µg/m^3 to provide a conservative assessment; however, the overall change in concentrations remained below <1% and therefore negligible. The Proposed Development is predicted to contribute a maximum of 0.1 µg/m^3 of both PM_{10} and $PM_{2.5}$ at receptors in the local area which is not sufficient to impede compliance with respective AQOs.

Site Suitability

4.5. The air quality at the Proposed Development in 2026 has been assessed using predicted background and modelled concentrations, details of the assessment are set out in the appended document *'Air Quality Site Suitability: Crymlyn Parc, Skewen'*.

4.6. Although concentrations are below regulated thresholds, it is acknowledged that health effects from air pollution can occur at concentrations below these levels. Consideration has therefore been given to the WHO guidelines and the relative context of the Proposed Development compared to ambient background concentrations in the wider area.

4.7. The future users of the Proposed Development are likely to be introduced to exposure at up to Air Quality Level (AQL) 2 for NO_2 and $PM_{2.5}$, and AQL 1 for PM_{10}, posing a *Negligible* to *Medium* risk to human health. To reduce potential risk of adverse health effects, opportunities to improve air quality for the future users of the Proposed Development have been explored.

4.8. The assessment has demonstrated that the location of the Proposed Development is considered appropriate, with the overall pollution concentrations below regulated thresholds. The air quality impacts of local emissions sources on the Proposed Development will be 'not significant' in terms of compliance with AQOs and LVs.

Risk of Worsening Air Quality

4.9. The Proposed Development is not located within an AQMA, and thus the existing air quality in the vicinity of the Proposed Development is not considered to be poor. Despite that, it is important to consider whether the Proposed Development would lead to a worsening of air quality.

4.10. An assessment has been carried out that demonstrates that the Proposed Development will not worsen local air quality, details of which are set out in appended document *'Air Quality at Locations of Human Health Exposure: Crymlyn Parc, Skewen'*. Additionally, the incorporation of design-based features, outlined in Section 2, ensures that the development does not contribute to deteriorating air quality.

4.11. It is thus considered that the Proposed Development will not impede the Council's objective to improve air quality in the local area.

5. Mitigation

5.1. NPTC published a 2011 – 2026 Local Development Plan (NPTC, 2016a), in which it requires all developments likely to create new, or exacerbate existing, air quality problems to reduce the risk by implementing appropriate mitigation measures.

5.2. As outlined above, the Proposed Development is unlikely to worsen air quality in the local area. The future users of the Proposed Development are also unlikely to be exposed to poor air quality; however a recommendation to install provision for EV charging points has been made and design measures, which are set out in Section 2, have been considered for the Proposed Development.

6. Conclusion

6.1. The air quality impacts of the Proposed Development have been assessed.

6.2. The Proposed Development's trip generation is above the screening criteria set out in the EPUK/IAQM guidance (2017). Thus, it was necessary to conduct a detailed assessment. A detailed assessment of combustion plant impacts on air quality was screened out as no centralised combustion plant is expected to be used.

6.3. The baseline review of air quality did not show any exceedance of the annual mean NO_2 AQO (40 µg/m^3) in 2022. The Council does not operate any PM monitoring sites representative of conditions at the Application Site.

6.4. The construction works have the potential to create dust and emissions. During construction it will therefore be necessary to apply a package of mitigation measures to minimise dust emission (outlined in Table 5 to Table 9 of appended document *'Construction Dust Risk Assessment: Crymlyn Parc, Skewen'*. With these measures in place, it is expected that any residual effects will be 'not significant'.

6.5. The Proposed Development is not expected to worsen the air quality in the local area, with all pollutant concentrations below the respective AQOs and LVs. As set out in the appended document '*Air Quality at Locations of Human Health Exposure: Crymlyn Parc, Skewen'*, the maximum change in annual mean concentrations in 2026 is less than 1% of the respective AQOs. Thus, all changes in pollutant concentrations are described as '*negligible*'.

6.6. Air quality for future users of the Proposed Development, at all relevant locations of sensitive air quality exposure, has been demonstrated to be acceptable, with concentrations below the regulatory standards at relevant exposure throughout the Proposed Development.

6.7. The Proposed Development complies with the requirements NPTC Local Development Plan 2011 – 2026 (NPTC, 2016a), specifically Policy SP 16 and Policy EN8 and in consideration of the Pollution Supplementary Planning Guidance (SPG) (NPTC, 2016b).

6.8. Overall, based on the results of the air quality assessment, the air quality effects are compliant with all regulatory standards and are judged to be 'not significant'. Thus, the site is considered suitable for the proposed end use.

7. Glossary

AADT	Annual Average Daily Traffic
Air Quality Standards	Concentrations recorded over a given time period, which are considered to be acceptable in terms of what is scientifically known about the effects of each pollutant on health and on the environment.
An exceedance	A period of time (defined for each standard) where the concentration is higher than that set out in the Standard.
An objective	The target date on which exceedances of a Standard must not exceed a specified number.
APS	Air Pollution Services
AQG	Air Quality Guidelines
AQL	Air Quality Level
AQMA	Air Quality Management Area
AQO	Air Quality Objective
CAZ	Clean Air Zone
CDRA	Construction Dust Risk Assessment
EPUK	Environmental Protection UK
HDV	Heavy Duty Vehicle
IAQM	Institute of Air Quality Management
IT	Interim Targets
LEZ	Low Emission Zone
Limit Values (LVs)	Legally binding parameters that must not be exceeded. Limit values are set for individual pollutants and are made up of a concentration value, an averaging time over which it is to be measured, the number of exceedances allowed per year, if any, and a date by which it must be achieved. Some pollutants have ore than one limit value covering different endpoints or averaging times.

NO_2	Nitrogen dioxide
NPTC	Neath Port Talbot Council
NRMM	Non-Road Mobile Machinery
PM_{10}	Small airborne particles, more specifically particulate matter less than 10 micrometres in aerodynamic diameter
$PM_{2.5}$	Small airborne particles, more specifically particulate matter less than 2.5 micrometres in aerodynamic diameter
SC	Swansea Council
SPG	Supplementary Planning Guidance
ULEZ	Ultra Low Emission Zone
WHO	World Health Organization
$\mu g/m^3$	Microgrammes per cubic metre

8. References

EPUK/IAQM. (2017). Land-Use Planning & Development Control: Planning For Air Quality.

IAQM. (2024). Guidance on the assessment of dust from demolition and construction.

NPTC. (2016a). Local Development Plan 2011 - 2026.

NPTC. (2016b). Pollution Supplementary Planning Guidance.

9. Professional Experience

Dr Claire Holman, BSc (Hons), PhD CSci CEnv FIEnvSc FIAQM

Claire is a director of Air Pollution Services, has nearly 40 years of experience of air quality management. She has advised national governments in Europe, Asia and Africa, as well as the European Commission on a range of strategic air quality and climate change issues. Claire has contributed to the development of IAQM and EPUK professional guidance, is former chair of the Institute, has been a member of a government air quality review group, and advised the Department for Transport on their cleaner vehicles and fuels research programme.

Kieran Laxen, MEng (Hons) MIEnvSc MIAQM

Kieran is a Director and founder of Air Pollution Services and has 16 years' experience in the field of air quality. He has worked on hundreds of projects, including port schemes, road schemes, residential and commercial developments, industrial processes, energy from waste sites, infrastructure projects. Kieran is an active member of the IAQM committee (and a current Vice Chair), has led a number of air quality position statements and has been involved in developing IAQMs guidance. He has extensive experience of ambient air quality monitoring and dispersion modelling at sub-regional scales for planning and permit applications. He developed KALACO's

meteorological data services, processing Met Office data and creating numerical weather prediction (NWP) data in a range of formats to suit different dispersion models. He has developed KALACO's in-house EMEP regional chemical transport model capability running regional models for Europe. He has completed a number of research projects for the regulators. He provided technical advice and co-ordinated stakeholder engagement for the selection and implementation of the dispersion model in JNCC's UK Air Pollution Assessment Service (UK APAS) and has carried out a review of observational and NWP data for use in modelling for the project with a clear understand of regulatory requirements. He has substantial experience in assessing air quality, dust and odour for planning applications, for a diverse range of developments, and supporting local authorities with their LAQM duties, such as AQMA and AQAP development.

Liana Malynczakova, MSc BA (Hons) AMIEnvSc AMIAQM

Liana is an Assistant Consultant, having previously completed a MSc Sustainability degree at University of Southampton where she was involved in a European research project on shipping emissions, drawing on her previous six months' research internship at the Air Quality Management Resource Centre (AQMRC) at University of the West of England (UWE) where she also completed BA Geography degree. She is currently gaining experience in undertaking air quality, odour, dust, climate change, indoor air quality and bioaerosol assessments for a wide range of developments for planning and permit applications and support for local authorities.

Elen Jones, BSc AMIEnvSc AMIAQM

Elen is a Consultant at Air Pollution Services, with experience in preparing air quality and climate change assessments for planning and permitting applications as well as support for local authorities. This has included residential developments and power generation facilities. She completed a BSc Geography degree at UWE. In addition, she has experience in meteorology, having carried out measurements of surface albedo and surface air temperature of different land surfaces and undertaken research into methods for cooling urban pavements to reduce urban heat island effects.

George Bratchel, BSc (Hons) AMIEnvSc AMIIAQM

Geroge is a Senior Consultant at Air Pollution Services with over four years' of experience in air quality and odour assessment across a diverse array of projects, including residential, commercial, leisure, retail, industrial, agricultural, waste, and power generation developments. His expertise extends to both planning and permitting applications for projects of various sizes. He has substantial experience in air quality monitoring as well as in conducting greenhouse gas and indoor air quality assessments.

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KALACO Group Limited, companies house registration number: 11808160

C1. Introduction

C1.1. Air Pollution Services (APS), part of KALACO Group Ltd, has been commissioned to assess the air quality impacts associated with the proposed development at Crymlyn Parc, Skewen (herein the 'Proposed Development'). The Proposed Development is located within the administrative area of Neath Port Talbot Council (NPTC).

C1.2. This section sets out the relevant air quality legislation (Section C2), national planning context (Section C3), and local planning context (Section C4) which are a material consideration in determining planning applications.

C2. Air Quality Legislation

C2.1. Relevant Air Quality Legislation is set out in Table 1.

Table 1: Relevant Air Quality Legislation

Legislation	Text
The Environment (Air Quality and Soundscapes) (Wales) Act 2024	This Act aims to improve air quality and noise pollution in Wales. In regard to air quality, the Act provides a new framework for the setting Welsh air quality targets and places a duty on Welsh Ministers to promote awareness of air pollution. It also amends existing legislation relating to the national air quality strategy, local air quality management (LAQM), smoke control, clean air zones/low emission zones and vehicle idling. The Act makes the following changes to the LAQM regime: • Local authorities are required to review air quality in their area on an annual basis; and, • Action plans must be designed to ensure that air quality standards and objectives are achieved, with a target date set. The Act has also set out the requirement for Welsh Ministers to set at least one target in respect of the annual mean level of $PM_{2.5}$ in ambient air in Wales.
Well-being of Future Generations (Wales) Act 2015	The Well-being of Future Generations (WFG) Act 2015 places seven well-being goals into law and requires public bodies to apply the sustainable development principle in a number of ways. This has led to the establishment of average population exposure to nitrogen dioxide being one of the Welsh Government's national indicators used to measures progress towards well-being goals. Consequently, regulations made under the WFG Act 2015 require public services boards to consider air quality when carrying out their statutory assessments of local well-being under the Act.
Air Quality Standards Regulations 2010 (SI 210/1001) Air Quality Standards (Amendment) Regulations 2016 The Environment (Miscellaneous Amendments) (EU Exit) Regulations 2020 (SI 2020/1313)	In addition to air quality objectives (AQOs), the European Union (EU) has set limit and target values for the protection of human health and critical levels for the protection of ecosystems. These were transposed into UK legislation by the 2010 Regulations. The 2016 amendment makes changes to the sampling methodology in Part 3 Schedule 1 and requires the Secretary of State to fully document the monitoring network design. This must be reviewed every five years. The Environment (Miscellaneous Amendments) (EU Exit) Regulations 2020 reduced the EU annual mean limit value for particulate matter ($PM_{2.5}$) from 25 to 20 µg/m^3. The limit values, target values and critical levels are set for individual pollutants and are made up of a concentration value, an averaging time over which it is to be measured, the number of exceedances allowed per year (if any) and a date by which it must be achieved. Some pollutants have more than one value covering different dates or averaging times.
Air Quality Regulations 2000 (SI 2000/98) Air Quality (Wales) (Amendment)	Part IV of The Environment Act 1995 established the local air quality managememnt (LAQM) regime.LAQM requires local authorities to carry out regular reviews and assessments of air quality in its area to identify whether the AQOs have been, or will be, achieved at relevant locations. If this is not the case, the authority must declare an Air

Table 1: Relevant Air Quality Legislation

Legislation	Text
Regulations 2002 (SI 2002/3043)	Quality Management Area (AQMA) and prepare an action plan which identifies appropriate measures to be introduced in pursuit of the objectives. The AQOs are expressed as a maximum ambient concentration, for a specific averaging period, not to be exceeded, either without exception or with a permitted number of exceedances, within a specified timescale. They apply to the protection of human health and the natural environment.
Table notes: All legislation cited is available at legislation.gov.uk The Statutory Instrument (SI) number for Regulations is given in brackets.	

Useful Information

C2.2. In addition, the 2020 coroners court case investigating a young girl's death in 2013 concluded that air pollution was a significant contributing factor to both the induction of the girl's asthma and the exacerbation of her symptoms, due to exposure in exceedance of World Health Organization (WHO) guidelines for pollutants. This set a precedence to consider WHO guidelines when determining the potential for health impacts of air quality and has thus been considered when undertaking this assessment.

C2.3. For the protection of semi-natural habitats, the United Nations Economic Commission for Europe (UNECE), under the auspices of the Convention on Long-range Transboundary Air Pollution (CLTAP), has adopted a series of critical levels above which adverse effect on ecosystems may occur, and critical loads below which harmful effects on sensitive ecosystems does not occur based on current knowledge. The critical loads are typically expressed as a range in recognition of their uncertainty.

C2.4. The UK Government is a signatory of CLTAP and its protocols.

C3. National Planning Policy, Strategies and Action Plans

Planning Policy

C3.1. Relevant information on national planning policy in Wales is set out in Table 2 for context.

Table 2: National Planning Policy

Document	Content
Planning Policy Wales (PPW) (Welsh Government, 2024)	PPW (2024) sets out the Government's planning policies for Wales and how these are expected to be applied. To prevent unacceptable risks from air pollution, the PPW (2024) states that: *"Development should prevent problems from occurring or getting worse, such as the generation of carbon emissions and poor air quality".* The planning system should aim to reduce average population exposure to air and tackle high pollution hotspots. It must consider both the effects proposed developments may have, and the effects which existing air quality may have on the proposed developments. It further states that: *"In proposing new development, planning authorities and developers must, therefore:* • *address any implication arising as a result of its association with, or location within, air quality management areas, noise action planning priority areas or areas where there are sensitive receptors;* • *not create areas of poor air quality or inappropriate soundscape; and* • *seek to incorporate measures which reduce overall exposure to air and noise pollution and create appropriate soundscapes"*

	PPW highlights the importance of ensuring that sensitive receptors are not introduced in areas of poor air quality. As such, developments of sensitive uses (such as schools, hospitals, and residential properties) should not be located adjacent to busy roads. If the developments of sensitive uses are located adjacent to busy roads, they should be designed to limit the exposure to harmful substances. It states that: *"Taking a sustainable approach will mean balancing short-term needs against long-term objectives to reduce public exposure to airborne pollution and giving particular consideration to the presence of air quality management areas, noise action planning priority areas and areas with sensitive receptors when proposing new development and particularly when preparing development plans. It will be important to identify wider mitigation solutions to reduce air and noise pollution and to avoid exacerbating problems in existing air quality management areas …"* In regard to construction of developments, planning authorities must consider the temporary environmental risks, including airborne pollution; and that, *"where appropriate planning authorities should require a construction management plan, covering pollution prevention, noisy plant, hours of operation, dust mitigation and details for keeping residents informed about temporary risks."*
Future Wales: The National Plan 2040 (Welsh Government, 2021)	The National Plan 2040 is the national development framework. It sets out the direction for development in Wales to 2040. It is a development plan with a strategy for addressing key national priorities through the planning system, including the planning framework for addressing air quality. Policy 12 – Regional Connectivity, section on developing infrastructure responsibly, states the following: *"Planning Policy Wales contains the planning policy framework for addressing air quality, soundscape and noise. When proposing new transport infrastructure or new development, average population exposure to air and noise pollution should be reduced and soundscapes improved where it is practical and feasible to do so. At the very least, exposure to pollution should be minimised. This will include taking into account the long-term effects of current and predicted levels of air and noise pollution on individuals, society and the environment arising as a result of proposals for transport infrastructure or development".*
Table notes: -	

Relevant Government Strategies

C3.2. The Government has also published a number of strategies and plans which relate to air quality. The most relevant strategies and plans are set out in Table 3.

Table 3: Government Strategies

Strategy	Relevant Information
Transport Decarbonisation Plan (Department for Transport , 2021)	This document sets out the Government's commitments to decarbonise all forms of transport including freight transport. For road transport the commitments are: • End the sale of new petrol and diesel cars and vans from 2030 • All new cars and vans must be 100% zero emission at the tailpipe from 2035 • All new two/three wheeled powered vehicles to be fully zero emission from 2035 • End the sale of all non-zero emission HGVs from 2040.
The Clean Air Plan for Wales (Welsh Government, 2020)	The Plan sets out the Government's commitment and long-term ambition to improve air quality and reduce the impacts of air pollution on human health, biodiversity, the natural environment and the economy. The Plan sets out a ten-year pathway to achieving cleaner air and is structured around the following four themes: 1. People: protecting the health and well-being of current and future generations. 2. Environment: taking action to support our natural environment, ecosystems and biodiversity. 3. Prosperity: working with industry to reduce emissions, supporting a cleaner and more prosperous Wales.

	4. Place: creating sustainable places through better planning, infrastructure and transport.
Prosperity for All: the National Strategy (Welsh Government, 2017b)	In 2017 the Welsh Government published 'Prosperity for All: the National Strategy' (2017b) which sets out a cross-government commitment to reducing emissions and delivering vital improvements in air quality through planning, infrastructure, regulation, and health communication measures.
Table notes: -	

Relevant Planning Guidance

C3.3. Relevant information on government guidance is set out in Table 4 for context.

Table 4: Government Guidance

Document	Content
TAN 11 (Draft): Air Quality, Noise and Soundscape (Welsh Government, 2022)	The draft Technical Advice Note (TAN) 11 (2022) sets out general expectations and requirements for developers, designers, consultants and planning authorities regarding airborne pollution. It outlines some of the main considerations which local planning authorities should take into account in drawing up development plan policies and when determining planning applications for development which will either generate air pollution or will introduce exposure to existing air pollution sources.
Table notes: -	

C4. Local Planning Policy, Strategies and Action Plans

Local Planning Context

C4.1. Relevant information on local planning policy, strategy and guidance is set out in Table 5 for context.

Table 5: Local Planning Policy and Strategy

Document	Content
Local Development Plan (2011 – 2026) (NPTC, 2016)	The Local Development Plan (2016) sets out the clear vision of the Council for the sustainable development of the county borough. The Plan considers strategic issues, including the economy, transport, heritage and the environment. **Policy SP 16: Enviornmental Protection** states that air, water and ground quality will be protected, and improved if feasible, through: *"1. Ensuring that proposals have no signifcant adverse efects on water, ground or air quality and do not signifcantly increase pollution levels;* *2. Giving preference to the development of brownfeld sites over greenfeld sites where appropriate and deliverable;* *3. Ensuring that developments do not increase the number of people exposed to signifcant levels of pollution."* **Policy EN8: Pollution and Land Stability** states that proposals which are likely to have an unacceptable adverse effects on health, biodiversity or local amenity, or would expose people to unacceptable risks due to air pollution, will not be permitted. If proposals are likely to create new, or exacerabate existing, problems, they will be permited only if mitigation measures reduce the risk to an acceptable level. **Policy RE2: Renewable and Low Carbon Energy in New Development** states the following: *"Schemes that connect to existing sources of renewable energy, district heating networks and incorporate on-site zero / low carbon technology (including microgeneration technologies) will be encouraged.*

Table 5: Local Planning Policy and Strategy

Document	Content
	The following proposals will be required to submit an Energy Assessment to determine the feasibility of incorporating such a scheme and where viable, would be required to implement the scheme: *(a) Residential development for 100 or more dwellings;* *(b) Development with a total foorspace of 1,000 sqm or more."*
Pollution Supplmenetary Planning Guidance (SPG) (NPTC, 2016)	The Pollution SPG (2016) supplements the policies set out in the Local Development Plan (2016) and forms the basis for decision-making on land use planning up to 2026 by setting out issues which needs to be taken into consideration during the planning stage. It states that all submitted proposals will be required to comply with **Policy EN8: Pollution and Land Stability**. Additionally, it states that a construction impact assessment should be undertaken in accordance with the Insitute of Air Quality Managmenet guidance; assessing the risk of dust impacts and identification of appropriate mitigation measures. If necessary, the construction impact assessment should inform the contexts of the Construction Management Plan.
Table notes: -	

Local Air Quality Action Plan

C4.2. The Council has declared one AQMA, covering the majority of land between the Corus Steel Works and the M4 Motorway (known as Neath Port Talbot AQMA Taibach/Margam). The AQMA was declared in 2000 for exceedances of the 24-hour mean PM_{10} AQO. As part of their statutory duties, the Council has published a draft Air Quality Action Plan for 2024 – 2029 (NPTC, 2024), which outlines actions that need to be taken to improve the air quality in the local area. The actions cover the following nine broad topics:

- Alternatives to private vehicle use;
- Environmetnal permits;
- Policy guidance and development control;
- Promoting low emission plants;
- Promoting low emission transprot;
- Promoting transport alternatives;
- Public information;
- Transport planning and infrastructure, and;
- Traffic management.

C5. Glossary

APS	Air Pollution Services
AQMA	Air Quality Management Area
AQO	Air Quality Objective
CLTAP	Convention on Long-range Transboundary Air Pollution
EIP	Environmental Improvement Programme
EU	European Union

LAQM	Local Air Quality Management
NH_3	Ammonia
NOx	Nitrogen oxides
NO_2	Nitrogen dioxide
NPTC	Neath Port Talbot Council
PM	Particulate Matter
PM_{10}	Small airborne particles, more specifically particulate matter less than 10 micrometres in aerodynamic diameter
$PM_{2.5}$	Small airborne particles, more specifically particulate matter less than 2.5 micrometres in aerodynamic diameter
PPW	Planning Policy Wales
SPG	Supplementary Planning Guidance
TAN	Technical Advice Note
UNECE	United Nations Economic Commission for Europe
WFG	The Well-being of Future Generations
WHO	World Health Organization

C6. References

Defra and Devolved Administrations. (2007). *Air Quality Strategy for England, Scotland, Wales and Northern Ireland.*

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Air Quality Baseline: Crymlyn Parc, Skewen

Client: Hale Group

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D1. Introduction

D1.1. Air Pollution Services (APS) has been commissioned by Hale Group to assess the air quality impacts associated with the proposed development at Crymlyn Parc, Skewen (herein the 'Proposed Development'). The Proposed Development is located within the administrative area of Neath Port Talbot Council (NPTC).

D1.2. This document sets out a review of baseline air quality relevant for the Proposed Development, including the methodology (Section D2), air quality zones (Section D3), monitoring surveys (Section D4), Defra predicted concentrations (Section D5), modelled predicted concentrations (Section D6), other sources of air pollution (Section D7), the overall baseline conditions (Section D8), and a glossary of useful terms used within the assessment (Section D9).

D1.3. This baseline review considers concentrations of nitrogen dioxide (NO_2), particulate matter less than 10 micrometres in diameter (PM_{10}) and particulate matter less than 2.5 micrometres in diameter ($PM_{2.5}$).

D2. Methodology

D2.1. A baseline air quality review was undertaken to determine the existing air quality in the vicinity of the site. This desk-top study was undertaken using the following sources:

- Aerial photography from Google Satellite.
- Information on existing air quality has been obtained by collating the results of monitoring carried out by the local authority and where available other monitoring networks. This covers both the Application Site and the surrounding area, the latter being used to provide context to the assessment.
- Industrial and waste management sources that may affect the area have been identified using the UK Pollutant Release and Transfer Register (PRTR) (Defra, 2022). Local sources have also been identified through examination of maps and the Council's Air Quality Review and Assessment reports.
- Background concentrations of NO_2 and particulate matter (PM_{10} and $PM_{2.5}$) have been defined using the national pollution maps published by Defra (2023b). These cover the whole of the country on a 1x1 km^2 grid of average concentrations.
- Predicted roadside concentrations of NO_2 in the study area have been identified using the maps of roadside concentrations published by Defra (2023c) as part of its 2017 Air Quality Plan for the baseline year 2015 and for the future years 2017 to 2030. These maps are used by the UK Government, to report exceedances of the Limit Value (LV). The national maps of roadside PM_{10} and $PM_{2.5}$ concentrations (Defra, 2023a), which are available for the years 2009 to 2030, show no exceedances of the LVs anywhere in the UK in 2015 or thereafter.
- Predicted concentrations based on the dispersion modelling exercise (see appended document '*Dispersion Modelling Approach: Crymlyn Parc, Skewen*') carried out to support this assessment, which includes predictions of NO_2 and particulate matter (PM_{10} and $PM_{2.5}$) in the local area in 2026.

D2.2. Baseline information is only provided for pollutants that may be affected by or affect the Proposed Development

D3. Air Quality Zones

D3.1. There are no declared Clean Air Zones (CAZs), Low Emission Zones (LEZs), Ultra Low Emission Zones (ULEZs), Non-Road Mobile Machinery (NRMM) Zones, or Air Quality Management Areas (AQMAs) in the vicinity of the Application Site.

Air Quality Management Areas

D3.2. The Proposed Development is located approximately 4.6 km northeast from the Swansea AQMA, as shown in Figure 1. The AQMA was declared by Swansea Council (SC) in 2001, and amended in 2010, for exceedances of the annual mean NO_2 air quality objective (AQO).

Figure 1: Location of the Proposed Development site in relation to the AQMA

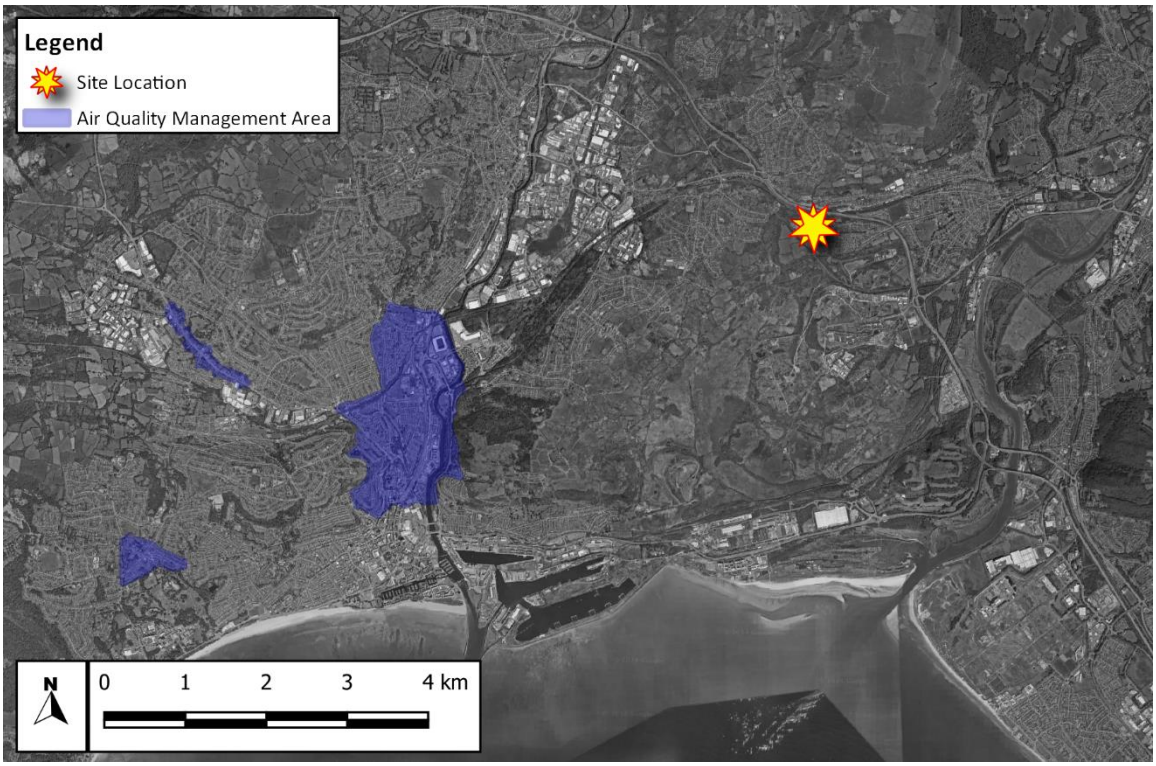

Figure notes: Imagery © 2024 Google, Map data © 2024.

D4. Monitoring Surveys

D4.1. NPTC measures NO_2 concentrations at many locations across the borough using both automatic monitoring and passive monitors (diffusion tubes). It measures PM_{10} concentrations at six locations, and $PM_{2.5}$ concentrations at four locations. However, there are no relevant NPTC monitoring sites in the Study Area.

D4.2. Thus, monitoring sites from a neighbouring county, Swansea, were considered in this study. SC measures NO_2 concentrations at many locations across the borough using both automatic monitoring and passive monitors (diffusion tubes), PM_{10} concentrations at five locations, and $PM_{2.5}$ concentrations at three locations.

D4.3. National Government measures concentrations of NO_2 and PM at monitoring sites across the UK, as part of the Automatic Urban and Rural Network (AURN) regime; however, there are no National Government monitoring sites within the vicinity of the site.

D4.4. The locations of SC's relevant monitoring sites are shown in Figure 2.

D4.5. Figure 2 shows that the closest NO_2 monitoring site is '418', located approximately 720 m northwest of the Proposed Development. It is not considered representative of the conditions at the Application Site due to the location alongside a road with a larger volume of traffic, and streetscape different to that around the Proposed Development. Similarly, monitoring sites '50', '54', '55' and '104' are also located on roads which experience larger volumes of traffic. Monitoring sites '416', '417' and '419' are located on the same road, where traffic flow is anticipated to be higher than on the road adjacent to the Proposed Development. The streetscape alongside the three monitoring sites is predominantly residential; but slightly different than that at the Application Site. They are all considered useful in understanding the air quality conditions in the local area.

D4.6. Monitoring sites '415' and '56' are considered to be the most representative of the conditions at the Proposed Development. Similarly to the northern boundary of the Proposed Development, the monitoring sites '415' and '56' are located next to the motorway M4; however, they are in closer proximity to the motorway than the Proposed Development and the measured concentrations may thus be slightly elevated compared to those at the Proposed Development.

D4.7. There is one automatic monitoring site 'CM2' which measures NO_2 and $PM_{2.5}$ concentrations in the Study Area. However, due to its location near a heavily trafficked road, the concentrations are not considered representative of the conditions at the Application Site. The monitoring site is useful in understanding the conditions in the local area.

D4.8. There are no monitoring sites measuring PM_{10} in the Study Area.

Figure 2: Site Location and Relevant Monitoring Sites

Figure notes: Imagery © 2024 Google, Map data © 2024.

D4.9. Measured concentrations in 2017 to 2023 at the relevant monitoring sites have been taken from SC's Annual Progress Reports (APRs) for 2022 and 2023, both of which were published in 2023 (SC, 2023a; SC, 2023b). Monitoring sites '415', '416', '417', '418' and '419' were not operating in 2017.

D4.10. The air quality data for 2020 and 2021 are not considered representative of typical conditions at the monitoring stations due to restrictions associated with the COVID-19 pandemic. Data for 2023 was not available at the time of the assessment.

D4.11. Measured annual mean NO_2 concentrations are presented in Table 1. No exceedances were measured at any of the monitoring sites between 2017 and 2022. In 2022, monitoring sites 'CM2', '50', '54', '55', '56' and '415' met the World Health Organization (WHO) Interim Target (IT) 2 (30 µg/m^3). The remaining monitoring sites ('104', '416', '417', '418' and '419') met IT 3 of 20 µg/m^3.

Table 1: Measured NO_2 Annual Mean Concentrations (µg/m^3) [a]

Monitoring Site – Site Name (Type)	Distance from Road (m) [f]	Network [b]	2017	2018	2019	2020 [e]	2021 [e]	2022
Automatic Monitoring - Annual Mean Concentrations (µg/m^3)								
CM2 – Morriston Groundhog (Roadside)	4.5	A	20.6	18.1	23.5	11.4	21.3	20.6
Diffusion Tube Monitoring - Annual Mean Concentrations (µg/m3)								
50 – Nantyffin Road (Roadside)	-	A	30.8	28.7	26.3	21.4	24.6	22.1
54 – Peniel Green Road (Roadside)	-	A	26.6	26.3	24.5	19.7	23.6	20.7
55 – Peniel Green Road (Roadside)	-	A	25.9	26.4	24.6	19.5	25.2	20.5
56 – Ynysallan Road (Roadside)	2.0	A	15.8	27.5	27.7	23.1	24.0	22.0
104 – Nantyffin Road (Roadside)	-	A	22.1	22.0	20.6	17.4	19.9	18.2
415 – Danycoed (Kerbside)	0.5	A	-	29.6	25.9	21.1	23.3	21.5
416 – Birchgrove Road (Kerbside)	0.5	A	-	20.3	18.2	14.9	16.2	14.2
417 – Birchgrove Road (Kerbside)	-	A	-	24.5	22.7	16.8	18.3	15.7
418 – Birchgrove Road (Kerbside)	-	A	-	24.6	21.0	16.9	20.2	15.2
419 – Birchgrove Road (Kerbside)	-	A	-	24.4	22.9	17.9	21.4	17.0
AQO			**40**					
LV [c]			**40**					
WHO AQG Level (IT 1, IT 2, IT 3) [d]			**10 (40, 30, 20)**					

Table notes:

a. Concentrations above the AQO are presented in bold. These do not necessary represent relevant exposure nor exceedances of the AQO.

b. A - Local Authority network, B – AURN.

c. Reporting of LV exceedances is only carried out based on approved reference monitoring and at relevant reporting locations. Therefore, while the value is included, the monitoring presented is unlikely to comply with the requirements for LV reporting and assessment.

d. Not required to be achieved within UK legislation.

e. Air quality monitoring carried out includes periods of national travel restrictions due to the COVID-19 pandemic; measured concentrations are therefore not likely to be representative of typical conditions.

f. The distances for monitoring sites '50', '54', '55', '104', '417', '418' and '419' were not available in the ASR.

D4.12. The measured number of 1-hour mean NO_2 concentrations above 200 µg/m^3 for the monitoring station which measure 1-hour averages is presented in Table 2. No exceedances were measured between 2017 and 2023.

D4.13. The monitoring station does not measure 24-hour mean NO_2 concentrations; the concentrations are therefore not presented.

Table 2: Measured Number of NO_2 1-hour Concentrations above 200 (µg/m^3) [a]

Monitoring Site – Site Name (Type)	Distance from Road (m)	Network [b]	2017	2018	2019	2020 [d]	2021 [d]	2022
CM2 – Morriston Groundhog (Roadside)	4.5	A	0	0	0	3	0	0
AQO			**18 (200) [c]**					
LV			**18 (200) [c]**					

Table notes:

a. Exceedances of the AQO are presented in bold.

b. A - Local Authority network, B – AURN.

c. Where data capture was low the 99.79th percentile of 1-hour mean concentrations is provided in brackets.

d. Air quality monitoring carried out in 2020 includes periods of national travel restrictions due to the COVID-19 pandemic; measured concentrations are therefore not likely to be representative of typical conditions.

D4.14. There are no monitoring sites measuring PM_{10} in the Study Area; thus, the measured PM_{10} concentrations are not presented.

D4.15. Measured annual mean $PM_{2.5}$ concentrations at the monitoring site 'CM2' are shown in Table 3. The measured annual mean concentrations did not exceed the AQO between 2017 and 2022; and met WHO IT 4 (10 µg/m^3) in 2022.

D4.16. The number of 24-hour mean $PM_{2.5}$ concentrations above the WHO AQG and ITs was not available is therefore not presented.

Table 3: Measured $PM_{2.5}$ Annual Mean Concentrations (µg/m^3) [a]

Monitoring Site – Site Name (Type)	Distance from Road (m)	Network [b]	2017	2018	2019	2020 [e]	2021 [e]	2022
CM2 – Morriston Groundhog (Roadside)	4.5	A	10.0	10.9	9.3	11.4	11.8	9.4
AQO [c]			**25**					
LV [d]			**20**					
WHO AQG Level (IT 1, IT 2, IT 3, IT 4) [c]			**5 (35, 25, 15, 10)**					

Table notes:

a. Concentrations above the AQO are presented in bold. These do not necessary represent relevant exposure nor exceedances of the AQO.

b. A - Local Authority network, B – AURN.

c. Not required to be achieved within UK legislation.

d. Reporting of LV exceedances is only carried out based on approved reference monitoring and at relevant reporting locations. Therefore, while the value is included, the monitoring presented is unlikely to comply with the requirements for LV reporting and assessment.

e. Air quality monitoring carried out includes periods of national travel restrictions due to the COVID-19 pandemic; measured concentrations are therefore not likely to be representative of typical conditions.

D5. Defra Predicted Concentrations

Background Predicted Concentration

D5.1. Predicted background NO_2, PM_{10} and $PM_{2.5}$ concentrations are shown in Table 4.

D5.2. All predicted background concentrations are significantly below the respectively NO_2, PM_{10} and $PM_{2.5}$ AQOs and LVs. In respect to WHO ITs, NO_2 and PM_{10} concentrations are below the air quality guidelines (AQGs) of 10 µg/m^3 and 15 µg/m^3, respectively; and $PM_{2.5}$ concentrations are below the IT 4 (10 µg/m^3).

Table 4: Defra Predicted Background Mapped Concentrations (µg/m^3) [a]

Year	NO_2	PM_{10}	$PM_{2.5}$
2022	10.4	11.8	7.5
2026	8.9	11.4	7.2
AQO	**40**	**40**	**25** [`b]
LV	**40**	**40**	**20**
WHO AQG Level (IT) [c]	**10 (40, 30, 20)**	**15 (70, 50, 30, 20)**	**5 (35, 25, 15, 10)**

Table notes:
a. These do not necessary represent relevant exposure.
b. Not required to be achieved within UK legislation.
c. Not in Regulations and there is no legal requirement for local authorities to meet it.

Roadside Predicted Concentration

D5.3. Defra has predicted roadside concentrations of NO_2 for the main roads in the UK (Defra, 2023c) for the years 2017 to 2030 as part of Defra's commitment to report exceedances of the LV. There is one road with predictions within 200 m of the Application Site, as shown in Figure 3.

D5.4. The available Defra predicted roadside concentrations for the road nearest to the Proposed Development (A4230) are shown in Table 5. The predicted roadside concentrations are significantly below the respective NO_2, PM_{10} and $PM_{2.5}$ LVs in both years presented.

Table 5: Defra Predicted Roadside Concentrations (µg/m^3)

Road (Census ID)	2022			2026		
	NO_2	PM_{10}	$PM_{2.5}$	NO_2	PM_{10}	$PM_{2.5}$
A4230 (74084)	19.4	12.8	8.2	15.8	12.5	7.9
LV	**40**	**40**	**20**	**40**	**40**	**20**

Table notes: -

Figure 3: PCM Modelled NO_2 Concentrations for 2026 and Location of the Application Site

Figure notes: Imagery © 2025 Google, Map data © 2025.

D6. Modelled Predicted Concentrations

D6.1. The assessment has also included a dispersion modelling exercise (see appended document *'Dispersion Modelling Approach: Crymlyn Parc, Skewen'*) which includes predictions of NO_2, PM_{10} and $PM_{2.5}$ in the local area.

D6.2. Table 6 sets out the predicted concentrations in 2026, the locations of the modelled receptors are shown in Figure 4. With the Proposed Development, no exceedances of respective AQOs are predicted in the local area.

D6.3. The modelled NO_2 concentrations meet WHO IT 3 (20 µg/m^3) at the majority of locations, and the modelled PM_{10} concentrations meet WHO AQG of 15 µg/m^3. The modelled $PM_{2.5}$ concentrations are below WHO IT 4.

Table 6: Predicted Annual Mean Concentrations (µg/m^3) in the Local Area in 2026

Receptor (Height)	NO_2	PM_{10}	$PM_{2.5}$
E1 (1.5 m)	10.3	11.3	7.3
E2 (1.5 m)	10.3	11.3	7.3
E3 (1.5 m)	10.1	11.3	7.3
E4 (1.5 m)	10.4	11.4	7.4
E5 (1.5 m)	10.5	11.5	7.5
E6 (1.5 m)	12.6	11.9	7.9
E7 (1.5 m)	11.6	11.7	7.7

E8 (1.5 m)	10.4	11.5	7.4
E9 (1.5 m)	10.4	11.5	7.4
E10 (1.5 m)	10.2	11.4	7.3
E11 (1.5 m)	9.9	11.1	7.2
E12 (1.5 m)	9.6	11.2	7.1
E13 (1.5 m)	10.6	11.0	7.1
E14 (1.5 m)	9.6	11.1	7.1
E15 (1.5 m)	9.5	11.2	7.1
E16 (1.5 m)	9.8	11.3	7.2
E17 (1.5 m)	9.9	11.4	7.2
E18 (1.5 m)	10.7	11.5	7.5
E19 (1.5 m)	10.4	11.5	7.4
AQO	**40**	**40**	**25 [a]**
LV	**40**	**40**	**20**
WHO AQG Level (IT) [b]	**10 (40, 30, 20)**	**15 (70, 50, 30, 20)**	**5 (35, 25, 15, 10)**

Table notes:
a. Not required to be achieved within UK legislation.
b. Not in Regulations and there is no legal requirement for local authorities to meet it.

Figure 4: Locations of Predicted Concentrations in the Local Area (closest to the Application Site)

Figure notes: Imagery © 2025 Google, Map data © 2025.

D7. Other Sources of Air Pollution

Permitted Facilities

D7.1. Defra and the Devolved Administrations maintain a database of sites which are at risk of contributing significantly to pollutant concentrations called the UK Pollutant Release and Transfer Register (Defra, 2022). A search of the 2022 database has not identified any regulated facilities within 1 km of the Proposed Development.

Railways

D7.2. The northern boundary of the Proposed Development is located less than 50 m south of a railway line; with the south and southwest boundary located less than 80 m from another railway line. Diesel locomotive emissions from these railway lines have been explicitly modelled, and are included in the 2026 baseline data provided in appended document *'Air Quality at Locations of Human Health Exposure: Crymlyn Parc, Skewen'*.

D8. Overall Baseline Conditions

Air Quality Objectives

Nitrogen Dioxide

D8.1. Two monitoring sites ('415' and '56') presented in the baseline review are considered to be representative of the conditions at the Application Site; with the remaining providing useful context in understanding the local conditions. Annual mean NO_2 concentrations did not exceed the annual mean AQO of 40 µg/m^3 at any of the monitoring sites close to the Proposed Development between 2017 and 2022. Measured concentrations may be demonstrating a slight reduction in annual mean NO_2 concentrations, which is likely to be due to continued improvement in vehicle technologies. However, long term trends of annual means require at least 5 years of data; and the COVID-19 pandemic has potentially skewed the more recent data. The concentrations are expected to decline further into the future.

D8.2. Defra predicted background NO_2 concentrations at the Proposed Development are significantly below the AQO. The modelled predicted concentrations in the local area are also significantly below the AQO and thus, it is unlikely that the future users of the Proposed Development will be at risk of exposure to high air pollution.

Particulate Matter

D8.3. There is little information on PM concentrations relevant to the Application Site, as there are no PM monitoring sites representative of the conditions in the Study Area.

D8.4. The Defra predicted background concentrations suggest that the annual mean concentrations of PM_{10} and $PM_{2.5}$ at the Proposed Development are likely to be well below the AQOs of 40 µg/m^3 and 25 µg/m^3, respectively. The modelled concentrations of PM_{10} and $PM_{2.5}$ in the local area are also below the respective AQOs and it is thus unlikely that the future users of the Proposed Development will be at risk of exposure to poor air quality.

Limit Value Compliance

D8.5. There is one road with Defra predicted roadside concentrations in the Study Area. The road has predicted concentrations of NO_2, PM_{10} and $PM_{2.5}$ significantly below and therefore compliant with the LVs.

World Health Organization Guidelines

D8.6. Table 7 provides an indication of the baseline air quality at the Application Site in the assessment year with respect to the WHO annual mean ITs and AQG. In reality, the concentrations will vary across the Application Site with the highest concentrations occurring alongside the northern border of the Proposed Development, close to the M4 motorway.

Table 7: Indicative Achievement of Annual Mean WHO Guidelines / Interim Targets (µg/m^3) on the Application Site in 2026

Pollutant	IT1	IT2	IT3	IT4	AQG
NO_2	✓	✓	✓	n/a	x
PM_{10}	✓	✓	✓	✓	✓
$PM_{2.5}$	✓	✓	✓	✓	x
Table notes: ? may achieve IT/AQG; x IT/AQG not achieved; ✓ IT/AQG achieved; n/a not applicable.					

D9. Glossary

Air Quality Standards	Concentrations recorded over a given time period, which are considered to be acceptable in terms of what is scientifically known about the effects of each pollutant on health and on the environment.
An exceedance	A period of time (defined for each standard) where the concentration is higher than that set out in the Standard.
An objective	The target date on which exceedances of a Standard must not exceed a specified number.
APS	Air Pollution Services
APR	Annual Progress Report
AQG	Air Quality Guidelines
AQMA	Air Quality Management Area
AQO	Air Quality Objective
AURN	Automatic Urban and Rural Network
CAZ	Clean Air Zone
IT	Interim Targets
LEZ	Low Emission Zone

Limit Values (LVs)	Legally binding parameters that must not be exceeded. Limit values are set for individual pollutants and are made up of a concentration value, an averaging time over which it is to be measured, the number of exceedances allowed per year, if any, and a date by which it must be achieved. Some pollutants have more than one limit value covering different endpoints or averaging times.
NO_2	Nitrogen dioxide
NPTC	Neath Port Talbot Council
NRMM	Non-Road Mobile Machinery
PM_{10}	Small airborne particles, more specifically particulate matter less than 10 micrometres in aerodynamic diameter
$PM_{2.5}$	Small airborne particles, more specifically particulate matter less than 2.5 micrometres in aerodynamic diameter
PRTR	Pollutant Release and Transfer Register
SC	Swansea Council
WHO	World Health Organization
$\mu g/m^3$	Microgrammes per cubic metre

D10. References

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Dispersion Modelling Study: Crymlyn Parc, Skewen

Client: Hale Group

Reference: APS_P1248A_E1-2 **Date Published:** 25 February 2025

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E1. Introduction

E1.1. Air Pollution Services (APS), part of KALACO Group, has been commissioned to assess the air quality impacts associated with the proposed development at Crymlyn Parc, Skewen (herein the 'Proposed Development'). The Proposed Development is located within the administrative area of Neath Port Talbot Council (NPTC).

E1.2. To carry out the assessment, a detailed dispersion modelling study has been completed. Details of the modelling approach are presented in this document.

E1.3. It provides a modelling overview (Section E2); description of the model used (Section E3); the list of the modelled receptors (Section E4); the meteorology and surface characteristics used (Section E5); details of roads modelling (Section E6); details of railway modelling (Section E7); post-processing of model outputs (Section E8); uncertainties and limitations (Section E9) and a glossary of useful terms used in this assessment (Section E10).

Location Context

E1.4. The location of the Proposed Development is presented in Figure 1 for context.

Figure 1: Proposed Development Location

Figure notes: Imagery © 2025 Google, Map data © 2025.

Assessment Year

E1.5. The Proposed Development is anticipated to be operational at the earliest in 2026 and this was used as the assessment year.

E2. Modelling Overview

E2.1. Concentrations of nitrogen dioxide (NO_2) and particulate matter (PM_{10} and $PM_{2.5}$) have been predicted for:

- the existing year of 2022 (latest year with relevant monitoring data); and,
- the future year of 2026 (the earliest year when the Proposed Development may be operational).

E3. The Model

E3.1. Concentration contributions associated with the Proposed Development have been predicted across the local area using the Atmospheric Dispersion Modelling System (ADMS) suite of tools developed and validated by Cambridge Environmental Research Consultants (CERC).

E3.2. ADMS-Roads is used extensively throughout the UK for regulatory compliance purposes and Local Air Quality Management (LAQM) and is accepted as an appropriate tool by local authorities, Government and regulators. Version 5.0.0.1 of the model has been used for modelling of the road transport emissions.

E3.3. The model requires a range of input parameters which are discussed below.

E4. Modelled Receptors

E4.1. The model output locations are often referred to as receptors, although in some cases the locations may not represent locations of relevant exposure. For ease, this study uses the phrase receptor to represent the modelled output location.

Discrete Modelled Locations

E4.2. Concentrations of NO_2, PM_{10} and $PM_{2.5}$ have been predicted at:

- 19 receptor locations within the local area (prefixed with E) (shown in Figure 2). These receptors have been selected to represent likely worst-case locations of relevant exposure along the local road network where impacts are most likely to occur.
- 13 receptor locations within the Proposed Development (prefixed with P) (shown in Figure 3). These receptors represent a range of exposure throughout the Proposed Development.
- Three monitoring site locations to carry out a model performance verification for the roads modelling as shown in Figure 4.

E4.3. The receptors have been modelled at a height of 1.5 m to represent ground floor locations of worst-case exposure at the Proposed Development, closest to the key pollution sources (road and rail traffic).

Figure 2: Receptor Locations in the Local Area

Figure notes: Imagery © 2025 Google, Map data © 2025.

Figure 3: Receptor Locations at the Proposed Development

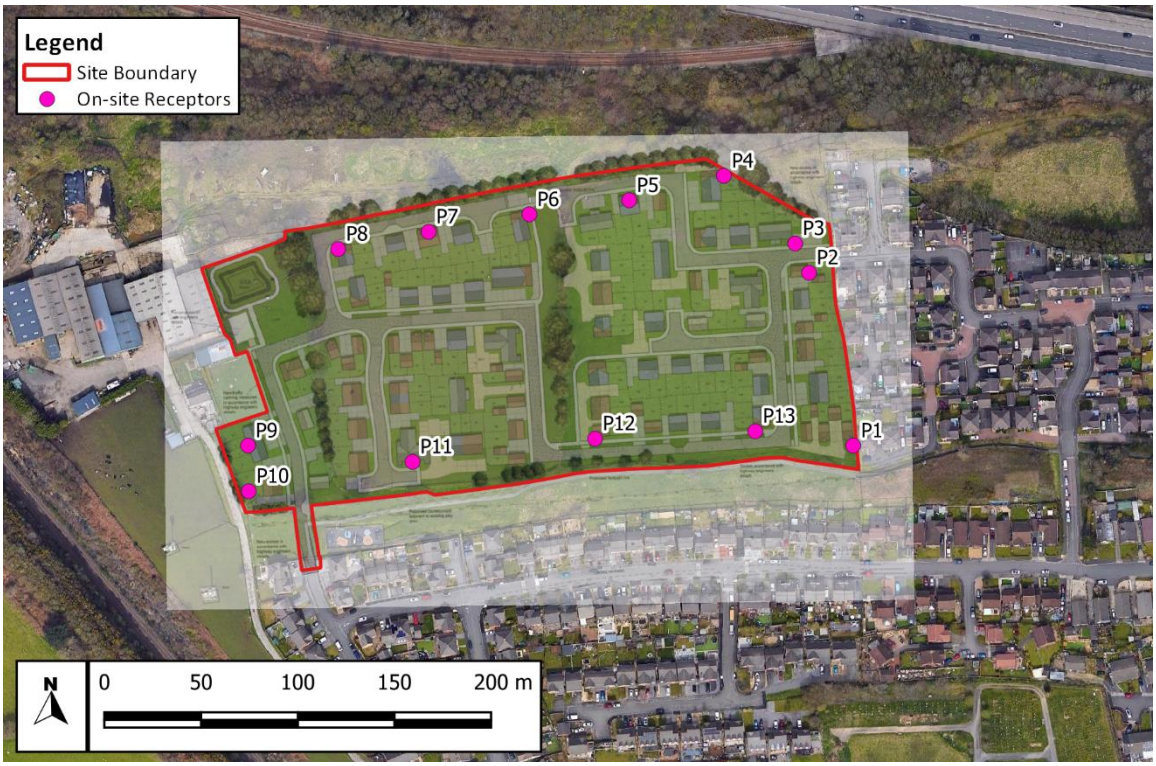

Figure notes: Imagery © 2025 Google, Map data © 2025

Figure 4: Modelled Monitoring Site Locations

Figure notes: Imagery © 2024 Google, Map data © 2024.

E5. Meteorology and surface characteristics

Meteorology

E5.1. The dispersion model includes a meteorological pre-processor developed by the UK Met Office to calculate values of meteorological parameters in the boundary-layer. The pre-processor requires a set of meteorological parameters on an hour-by-hour basis: wind speed, wind direction, temperature and cloud cover.

E5.2. It is important to use meteorological data which is representative of the conditions within the study area. The Proposed Development is located in a flat lying location; and while the application site is not far from the coast, it is expected that coastal effects on meteorological conditions are not likely to be significant in the study area.

E5.3. There are a limited number of sites in the UK where this data is measured and recorded. The nearest meteorological station, Mumbles Head, is located 12.7 km southwest of the Proposed Development. The wind roses for the years 2019 to 2023 for this site are shown in Figure 5. Theoretically, the observed meteorological data typically represents measurements at a height of approximately 10 m above ground level.

E5.4. As an alternative to observational data, numerical weather prediction (NWP) prognostic data for the meteorological conditions at the Proposed Development are available. APS's sister company, Enviro Data Services, have produced NWP data across the entire UK at a 3x3 km resolution using the widely accepted Weather Research and Forecasting (WRF) Model and reanalysis data (data which includes measured observational information). Wind roses showing the frequency of wind

speeds and directions for the 3x3 km grid the Proposed Development is located within for the years of 2019 to 2023 are shown in Figure 6.

E5.5. Following a review of the available datasets, it is considered that the data from NWP model for the specific site location is likely to be most representative of the conditions in the study area and this has been used in the study.

Figure 5: Windrose of Wind Speed and Direction for Each Year from 2019 (Top Left) to 2023 (Bottom Right) of Observational Data at Mumbles Head

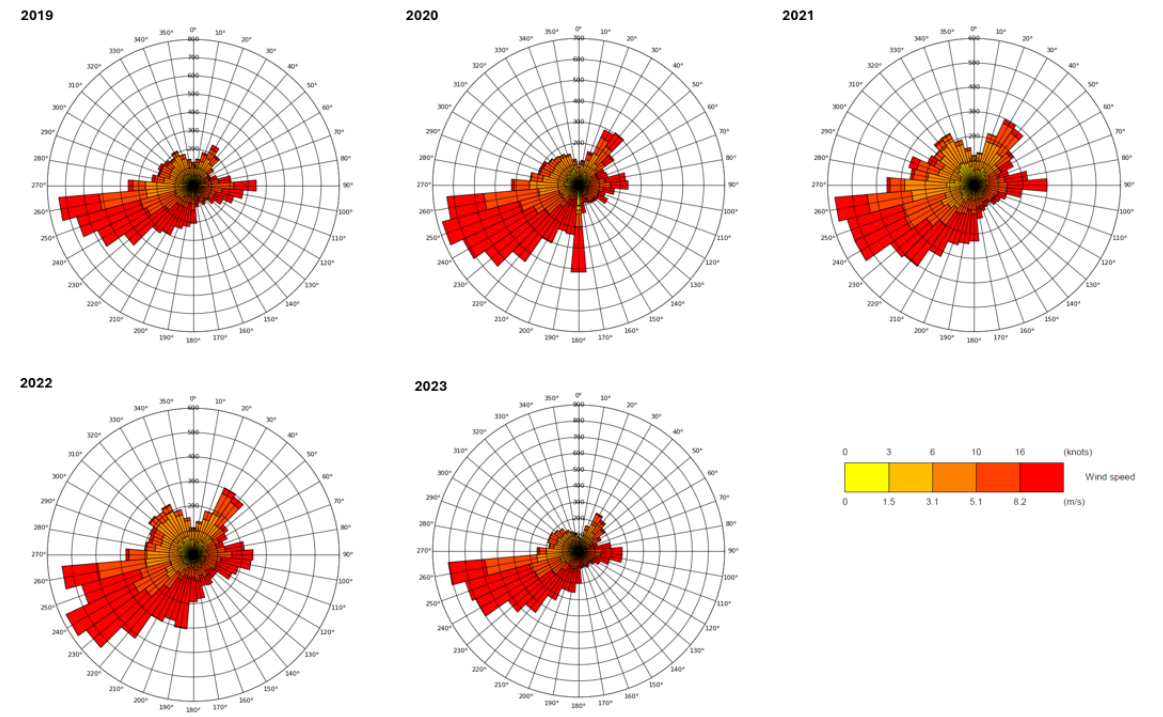

Figure notes: -

Figure 6: Windrose of Wind Speed and Direction for Each Year from 2019 (Top Left) to 2023 (Bottom Right) of Numerical Weather Prediction (NWP) data for the 3x3 km grid square covering the Proposed Development Location

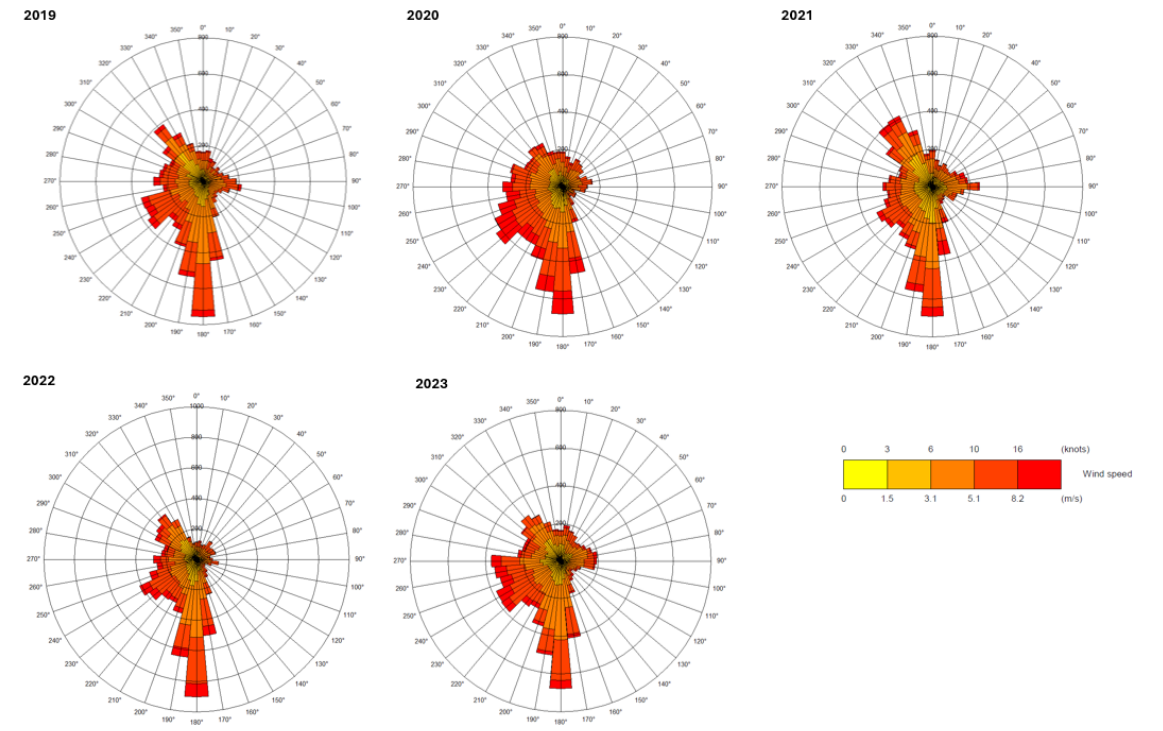

Figure notes: -

Surface Characteristics

E5.6. In addition to the meteorological data, the model requires values to be set for a number of meteorological related parameters, representing both the area and the study area. Land-use and surface characteristics have an important influence in determining turbulent fluxes and, hence, the stability of the boundary layer and atmospheric dispersion. Details of the parameter values used in the modelling are provided in Table 1 below.

E5.7. Surface roughness length used within the model represents the aerodynamic effects of surface friction and is defined as the height at which the extrapolated surface layer wind profile tends to zero. This value is an important parameter used by the built-in meteorological pre-processor of ADMS to interpret the vertical profile of wind speed and estimate friction velocities which are, in turn, used to define heat and momentum fluxes and, consequently, the degree of turbulent mixing. Surface roughness values for different land-use classifications have been specified. Accounting for differences between the area the data represents and the study area is essential. Due to the size of the model domain, a variable surface roughness file has been used within the model based on the spatially variable land-uses and the equivalent roughness values from the dataset. Figure 7 shows the values used across the modelled domain. For the NWP data, surface roughness is calculated based on land-use up to 1 km from the centre point of the modelled grid cell and is an inverse distance weighted geometric mean.

Figure 7: Modelled Surface Roughness

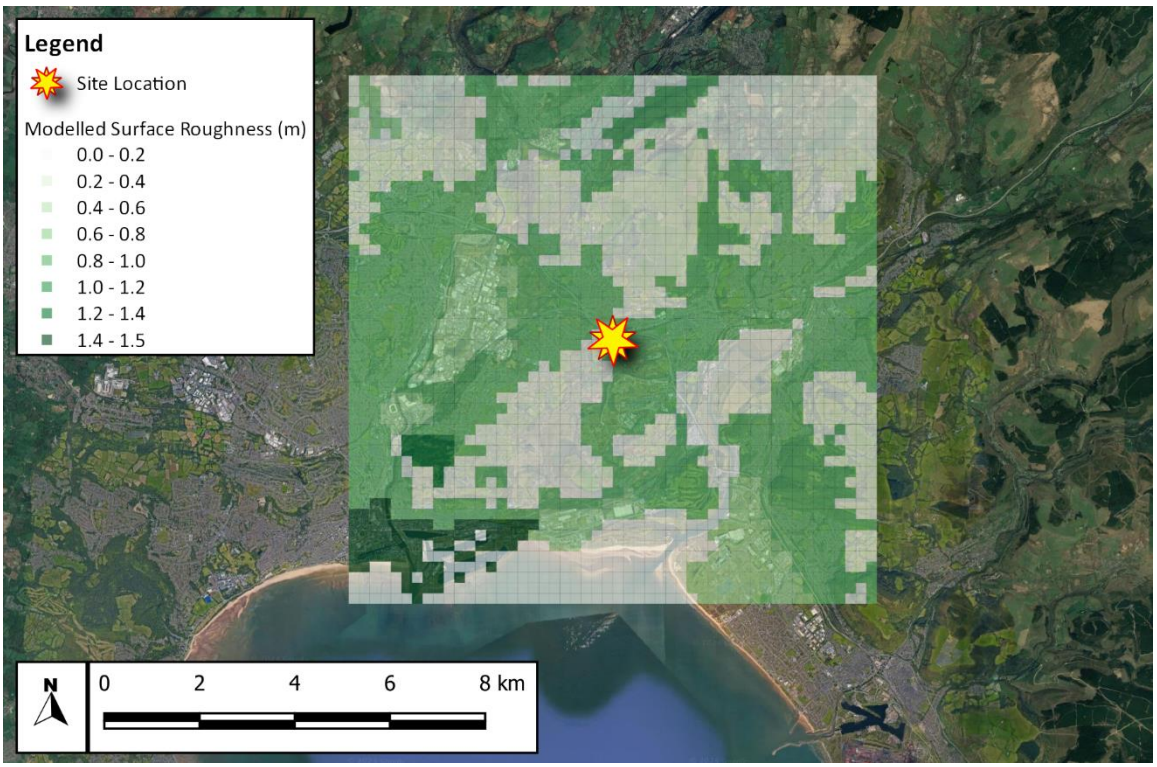

Figure notes: Imagery © 2024 Google, Map data © 2024.

E5.8. The surface albedo is the ratio of reflected to incident shortwave solar radiation at the surface of the earth. This varies depending on the land use, and thus area-weighted average albedos have been derived for the meteorological data area and the dispersion site study area and used in the models. Albedo values have been associated with the different land uses. For this study the albedo has been calculated based on land-use up to 5 km from the centre point (both the site and the NWP grid centre) and is an arithmetic mean. The mean includes an inverse distance weighting for distances over 1 km.

E5.9. The Priestley-Taylor parameter is a parameter representing the surface moisture available for evaporation. A Priestley-Taylor parameter of 1 has been set in the model.

E5.10. The CERC user guide explains that *"the Monin-Obukhov length provides a measure of the stability of the atmosphere. In very stable conditions in a rural area its value would typically be 2 to 20 m. In urban areas, there is a significant amount of heat generated from buildings and traffic, which warms the air above the town/city".* For large urban areas this is known as the urban heat island. It has the effect of preventing the atmosphere from ever becoming very stable. Minimum Monin-Obukhov length can be defined in the model to account for the urban heat island effect which is not represented by the meteorological data. Minimum M-O ratio is calculated based on land-use up to 5 km from the centre point (both the site and the NWP grid centre) and is a geometric mean. The mean includes an inverse distance weighting for distances over 1 km.

Table 1: Meteorological Parameters Values Used in the Model

Parameter	Dispersion Site Value	NWP Grid Value
Latitude (°)	51.66	51.65
Surface roughness (m)	0.591 [a]	0.0957

Surface albedo	0.212	0.208
Minimum Monin-Obukhov length (m)	21.563	20.336 [b]
Priestley-Taylor parameter	1	1

Table notes:
a, This value has not been utilised in the model since a variable surface roughness file has been used instead.
b, This value has not been utilised in the model; instead, dispersion site value was used.

Terrain

E5.11. The effects of complex topography on atmospheric flows can result in elevated pollutant concentrations. These effects are most pronounced when the terrain gradient exceeds 1 in 10, i.e. a 100 m change in elevation per 1 km step in horizontal plane. The gradients in the area surrounding the Proposed Development are relatively flat within 8 km. Therefore, the terrain module has not been used within model as the terrain would not have a significant impact on atmospheric flows.

Processed Meteorological Data

E5.12. The meteorological parameters alter the meteorological data inputted into the model to reflect conditions at the dispersion site (the study area). For example, if the dispersion site has a higher surface roughness value than the NWP grid cell, then the model will reduce the wind speed at the dispersion site to reflect this. Figure 8 shows the processed versus unprocessed meteorological data of frequency of wind speeds and directions for 2022.

Figure 8: Windrose of Wind Speed and Direction for 2022 of Processed (right) versus Unprocessed (left) Numerical Weather Prediction (NWP) data for the 3x3 km grid square covering the Proposed Development Location

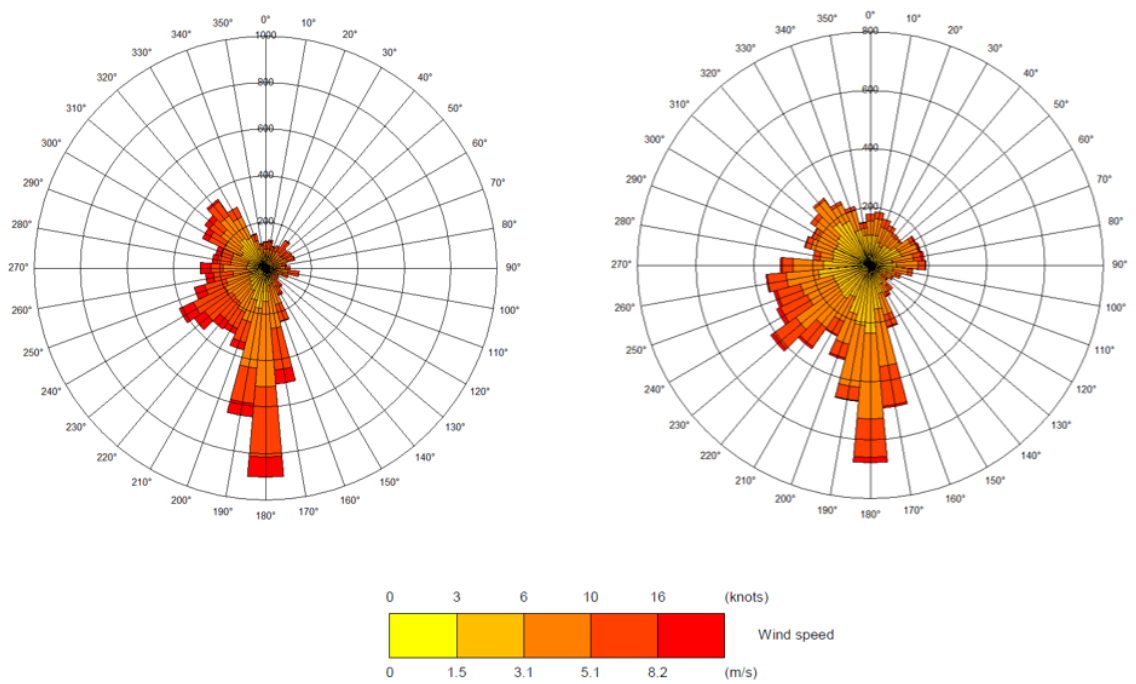

Figure notes: -

E6. Roads Modelling

Traffic Flows

E6.1. Traffic data for roads within the vicinity of the Proposed Development was provided by Acstro, the transport consultant for the project. Traffic data was provided for 2022 and 2026 as annual average daily traffic (AADT) flows; the 2026 data was provided with and without the traffic generated by the Proposed Development. Traffic data for roads in the local area were obtained from the Department for Transport (DfT) count points (CPs) published in the Road Traffic Statistics database (DfT, 2022). Data from four count points was used:

- CP 74085
- CP 951046
- CP 50594
- CP 50625

E6.2. The transport consultant for the project provided two growth factors of 1.0137 (2019 to 2022) and 1.0247 (2022 to 2026) to forecast the traffic flows obtained from the DfT's CPs. The factors were derived from DfT's Trip End Model Presentation Program (TEMPro) which extracts information from the National Trip End Model (DfT, 2017).

E6.3. The traffic data for roads used in the three modelled scenarios are provided in Table 2. The modelled road links, coloured to show the traffic flows, are shown in Figure 9 to Figure 12.

Table 2: Modelled AADT Flows

Modelled Road	2022 Baseline (%HDV)	2026 Baseline (%HDV)	2026 Baseline with Development (%HDV)
Motorway M4	93,031 (5.4%)	95, 329 (5.4%)	95, 329 (5.4%)
Road B4625	8,288 (1.5%)	8,493 (1.5%)	8,493 (1.5%)
Peniel Green Road	9,590 (2.8%)	9,827 (2.8%)	9,827 (2.8%)
Peniel Green Road (bus stop)	132 (100%)	135 (100%)	135 (100%)
Peniel Green Road (road adjacent to bus stop)	9,326 (0%)	9,556 (0%)	9,556 (0%)
Neath Road (A4067)	34,859 (2.2%)	35,720 (2.2%)	35,720 (2.2%)
Crymlyn Road	1,876 (4.0%)	1,923 (4.0%)	2,265 (3.4%)
Crymlyn Road (towards Carmel Road)	2,022 (2.0%)	2,072 (2.0%)	2,208 (3.8%)
Crymlyn Road (towards Wern Road)	3,049 (4.0%)	3,124 (4.0%)	3,672 (3.4%)
Crymlyn Gardens	599 (2.0%)	613 (2.0%)	955 (1.3%)
Crymlyn Parc	1,347 (2.0%)	1,347 (2.0%)	1,722 (1.6%)
Cae Morfa	1,347 (2.0%)	1,347 (2.0%)	1,722 (1.6%)
Table notes: Rows shaded in grey represent traffic data obtained from DfT count points.			

Figure 9: Modelled Road Links with 2022 Traffic Flows

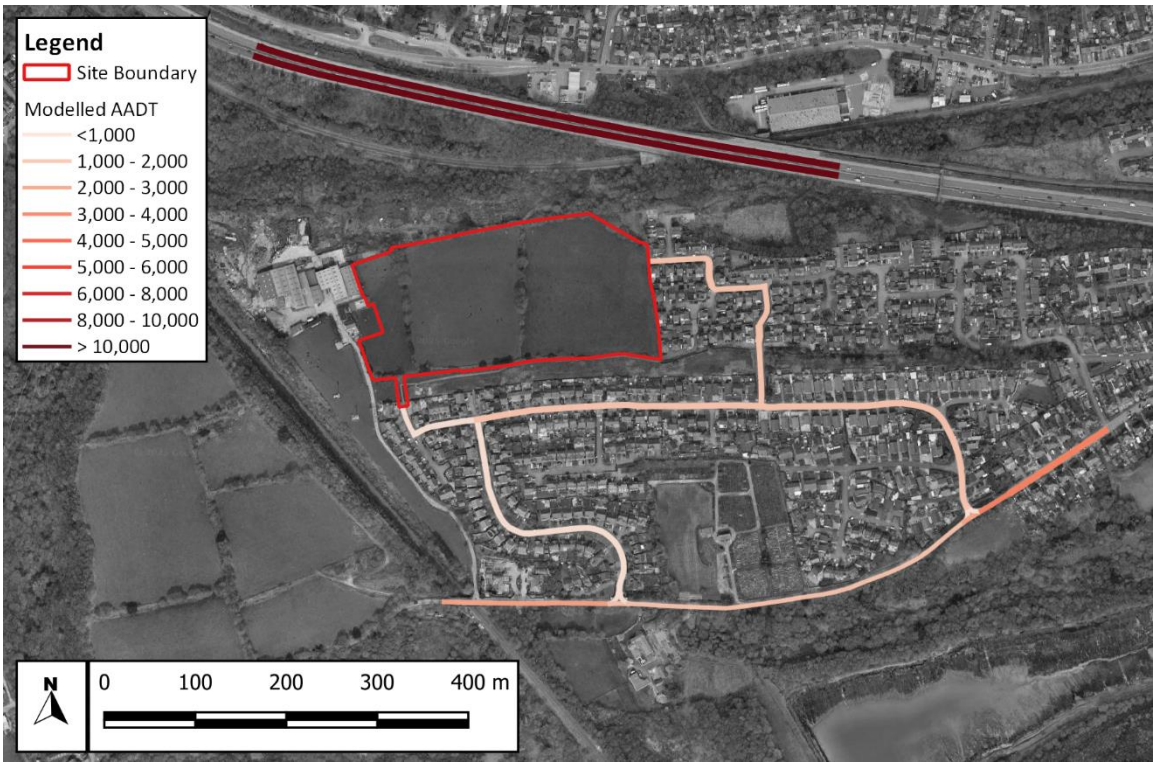

Figure notes: Imagery © 2025 Google, Map data © 2025.

Figure 10: Modelled Road Links with 2022 Traffic Flows

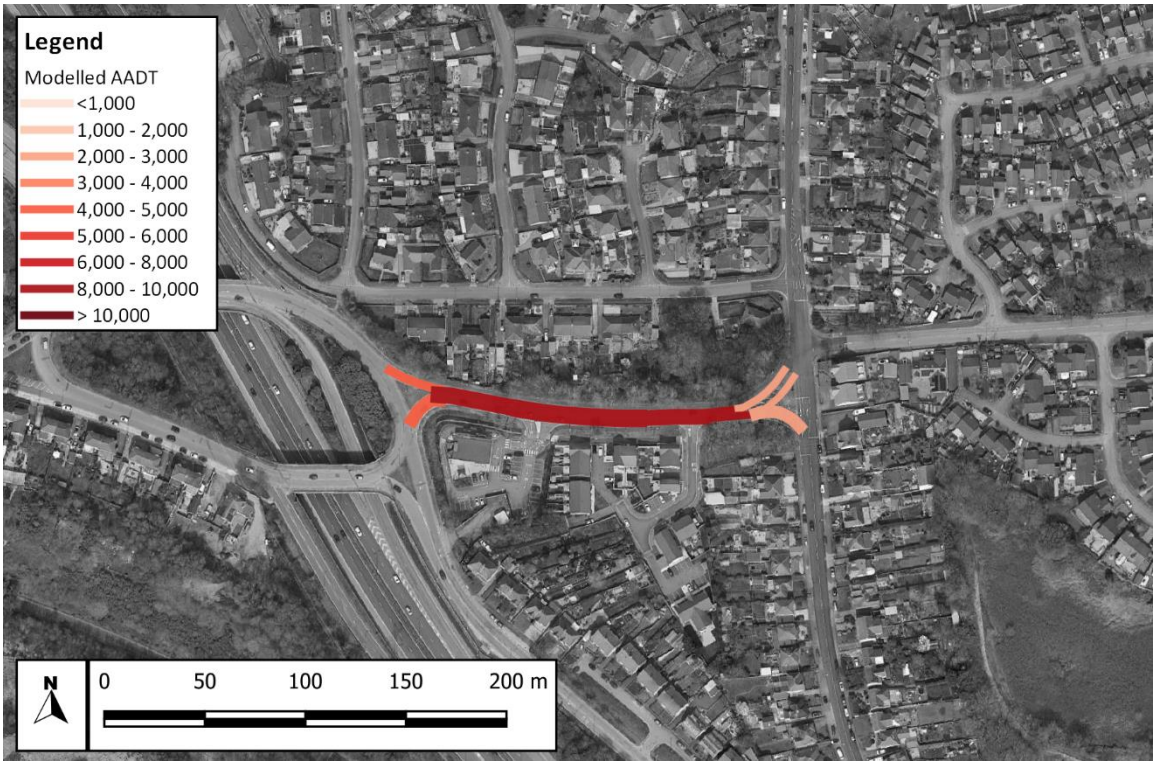

Figure notes: Imagery © 2024 Google, Map data © 2024.

Figure 11: Modelled Road Links with 2022 Traffic Flows

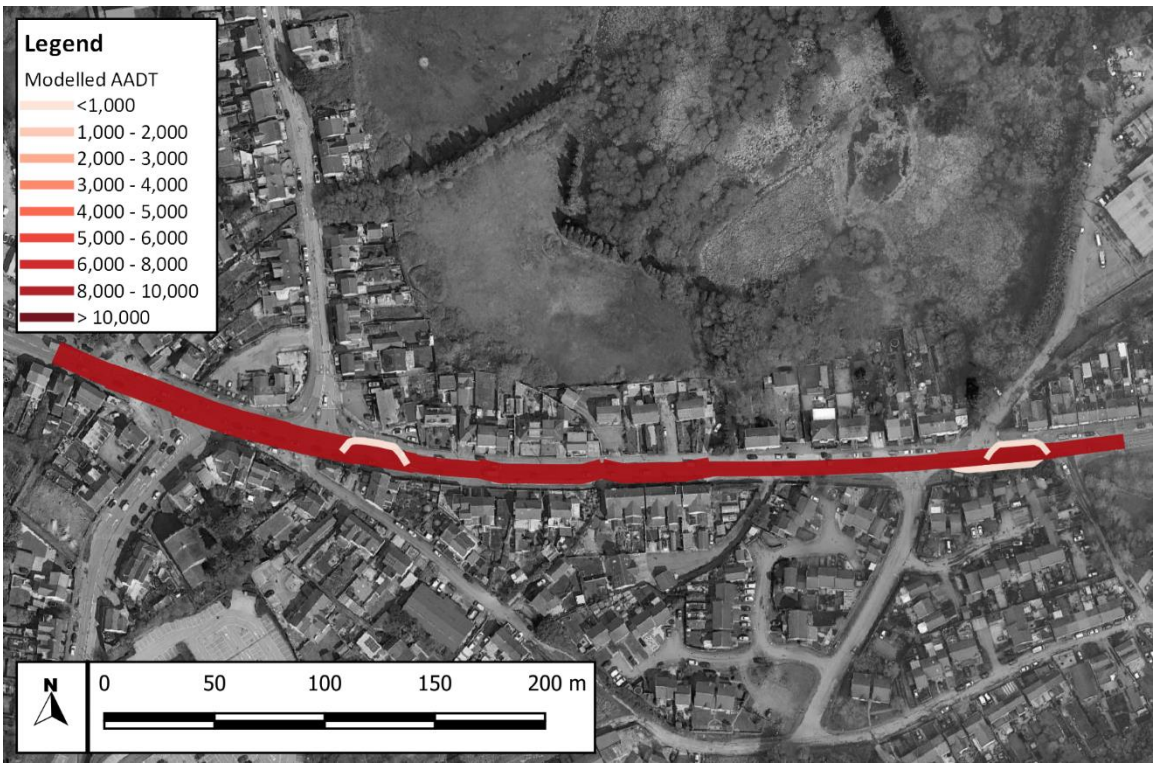

Figure notes: Imagery © 2024 Google, Map data © 2024.

Figure 12: Modelled Road Links with 2022 Traffic Flows

Figure notes: Imagery © 2024 Google, Map data © 2024.

Time-Based Profiles

E6.4. Vehicle emissions vary over time depending on the volume of traffic, this includes hourly, daily and seasonal variations. Seasonal (monthly) and diurnal (hourly) traffic flow profiles have been taken from DfT national statistics (DfT, 2020). Both profiles have been assumed to follow an urban traffic profile for all modelled roads. These have been used in the model to adjust the emissions for each hour of the year modelled. Diurnal and seasonal traffic flow profiles are shown in Figure 13 and Figure 14.

Figure 13: Urban diurnal profile for each day of the week used in the model, where the factor is the value that the average daily emissions are multiplied by in the model

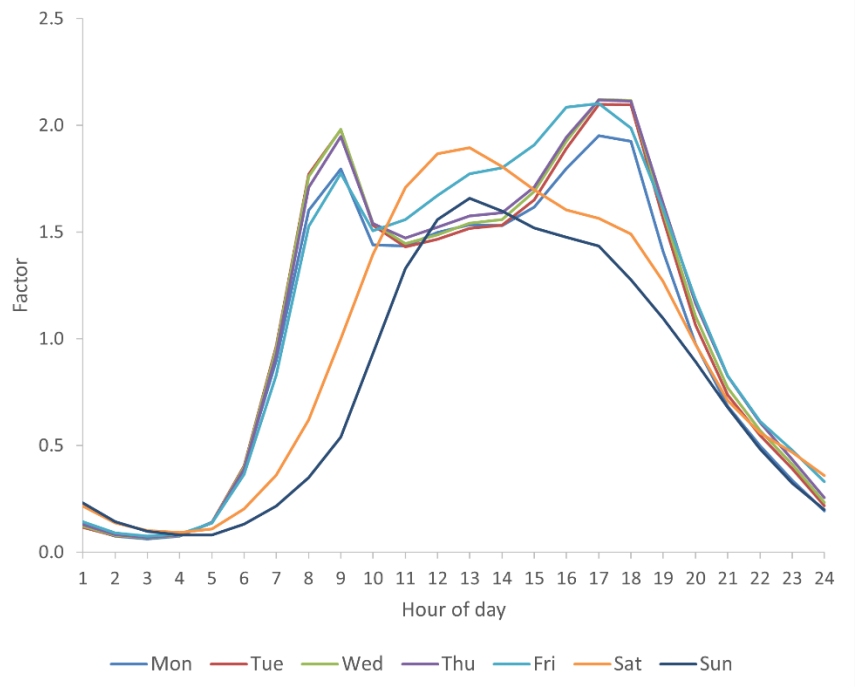

Figure notes: -

Figure 14: Urban seasonal profile for each month of the year used in the model

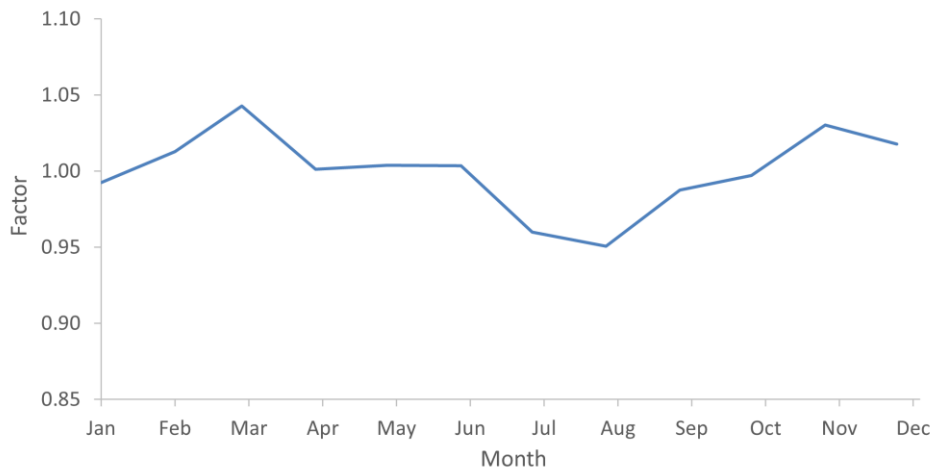

Figure notes: -

Vehicle Speeds

E6.5. Daily average vehicle speeds are required to calculate the pollutant emissions. These have been derived based on speed limits, road layout and information from Google traffic maps on typical speeds during different times of the day. The traffic speeds used in the model are shown in Figure 15 to Figure 18.

Figure 15: Modelled Traffic Speeds

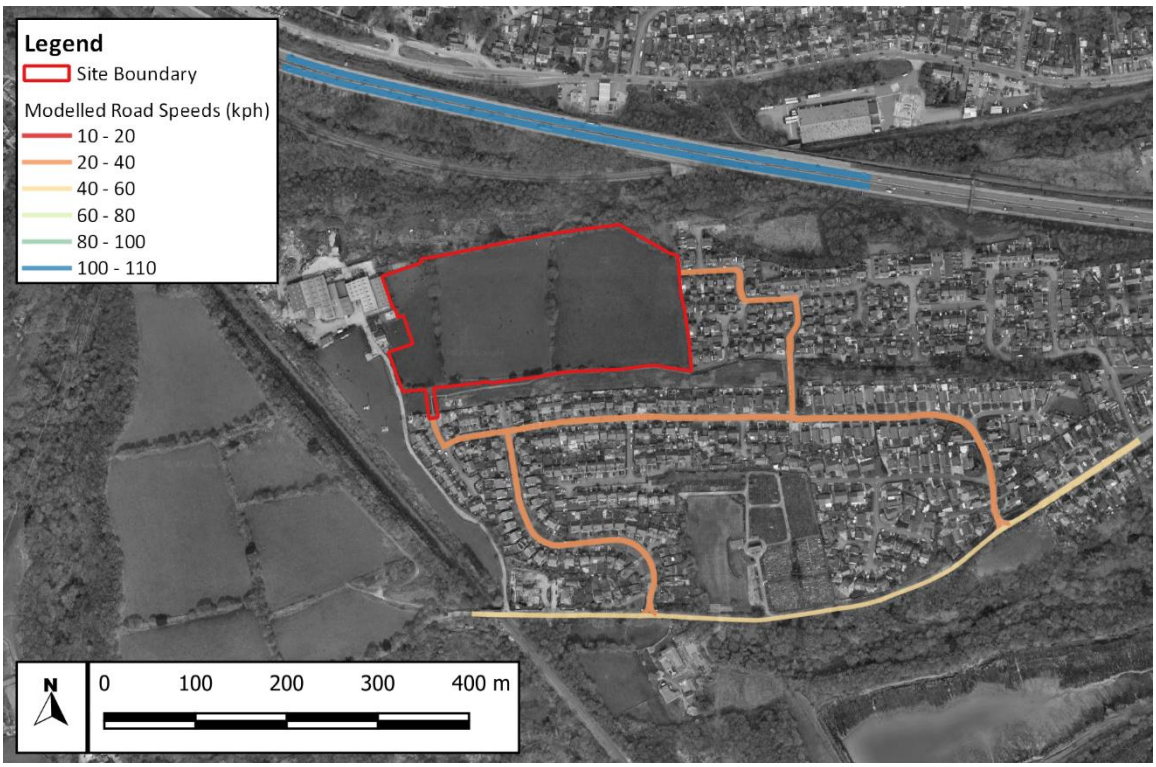

Figure notes: Imagery © 2025 Google, Map data © 2025.

Figure 16: Modelled Traffic Speeds

Figure notes: Imagery © 2024 Google, Map data © 2024.

Figure 17: Modelled Traffic Speeds

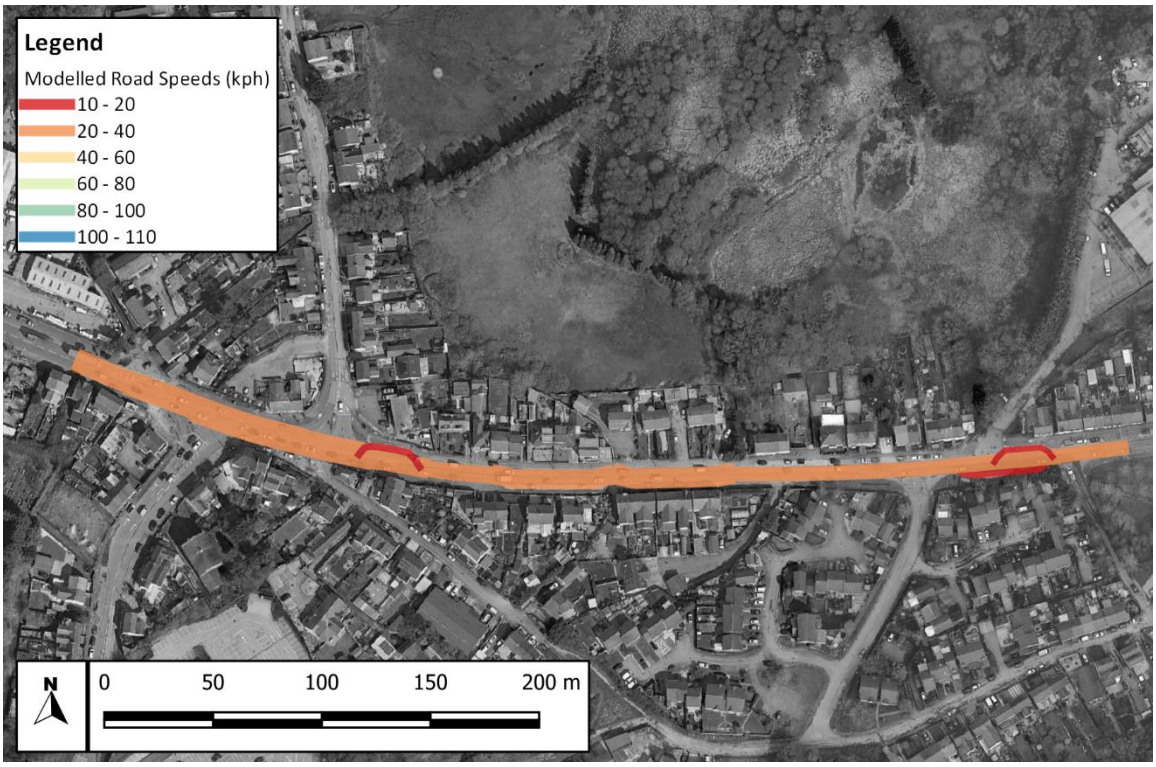

Figure notes: Imagery © 2024 Google, Map data © 2024.

Figure 18: Modelled Traffic Speeds

Figure notes: Imagery © 2024 Google, Map data © 2024.

Road Gradients

E6.6. The road gradients included when calculating emissions have been derived from LIDAR data obtained from the Welsh Government's data catalogue (2024).

Vehicle Emissions

E6.7. Emissions of road-NOx (i.e. the contribution from vehicles using roads), road-PM_{10} and road-$PM_{2.5}$ have been derived from the latest version of Defra's Emissions Factors Toolkit (EFT) (v12.1) using the traffic data presented in Table 2. The EFT is based on the COPERT 5 (Computer Programme to calculate Emissions from Road Transport) vehicle emission model and provides speed-average based emission rates. The EFT provides vehicle emission rates for the years 2018-2050; future years are based on a range of factors, such as expected vehicle fleet turnover rates, anticipated improvements in emission reduction technologies, expected uptake rates of different vehicles based on government policies, etc. It is, therefore, possible that the expected future emission rates in the EFT may differ from reality.

E6.8. As a result of the pandemic, the vehicle fleet turnover in the UK has been slower than expected. New vehicle sales were reduced, with higher rates of private vehicle owners retaining their existing vehicles. However, battery electric vehicle registration have increased over the same period, accounting for approximately one in six new car registrations in 2023. While there may be some uncertainty in the EFT's emission factors, overall, they are considered to be broadly representative.

Fraction of Primary NO_2

E6.9. In addition to emission rates, the fraction of primary NO_2 (f-NO_2) has been obtained from the EFT. This represents the amount of NO_2 released from vehicle exhausts, before any further chemical reactions in the atmosphere, which becomes an important variable when post-processing the model predictions. In order to obtain the f-NO_2 value at each receptor location, the nitrogen oxides (NOx) emission rates have been multiplied by f-NO_2 values to derive NO_2 emission rates. These NO_2 emissions have been included in the model and primary NO_2 concentrations have been predicted at the receptors. The predicted NOx concentrations have been divided by the predicted primary NO_2 concentrations to calculate the f-NO_2 values at the receptor locations. The f-NO_2 values have been used in the model post-processing.

Wake Effects

E6.10. As vehicles travel along a road a wake is left behind the vehicles as air in the path of travel is forced around the vehicle. The wake can be considered the turbulence induced by the movement of the vehicle, which affects the dispersion of pollution away from roads. The AADT traffic flows have been entered into the ADMS-roads dispersion modelling in order to account for vehicle wake effects which will vary on each link depending on the proportion of large vehicles to small vehicles.

Modelled Roads

E6.11. The road geometries, widths, and heights included in the dispersion model have been aligned with data from Google Satellite and Ordinance Survey maps, which included carefully considering relative distances from the links to receptors and monitoring sites. The modelled roads are shown in earlier figures (Figure 9 – Figure 12 and Figure 15 – Figure 18).

E6.12. A proportion of the roads in the local area are enclosed by buildings and vegetation, leading to restricted dispersion of pollution away from the roads and recirculation ('or trapping') of pollution within the streetscape area resulting in higher concentrations. This is known as a 'street canyon' effect. These roads have therefore been modelled as asymmetric street canyons using the Advanced Street Canyon Module, within the ADMS-Roads model, accounting for the fraction of 'covered' canyons. Where dispersion may be significantly affected, canyons have been included to account for this. Where there are no modelled receptor locations, adjacent to road links, no canyons have been entered for those links, but this does not mean there are not canyon like parameters along these road links. The widths of the modelled canyons are shown in Figure 19 to Figure 21.

Figure 19: Modelled ‘Street Canyon’ Road Links

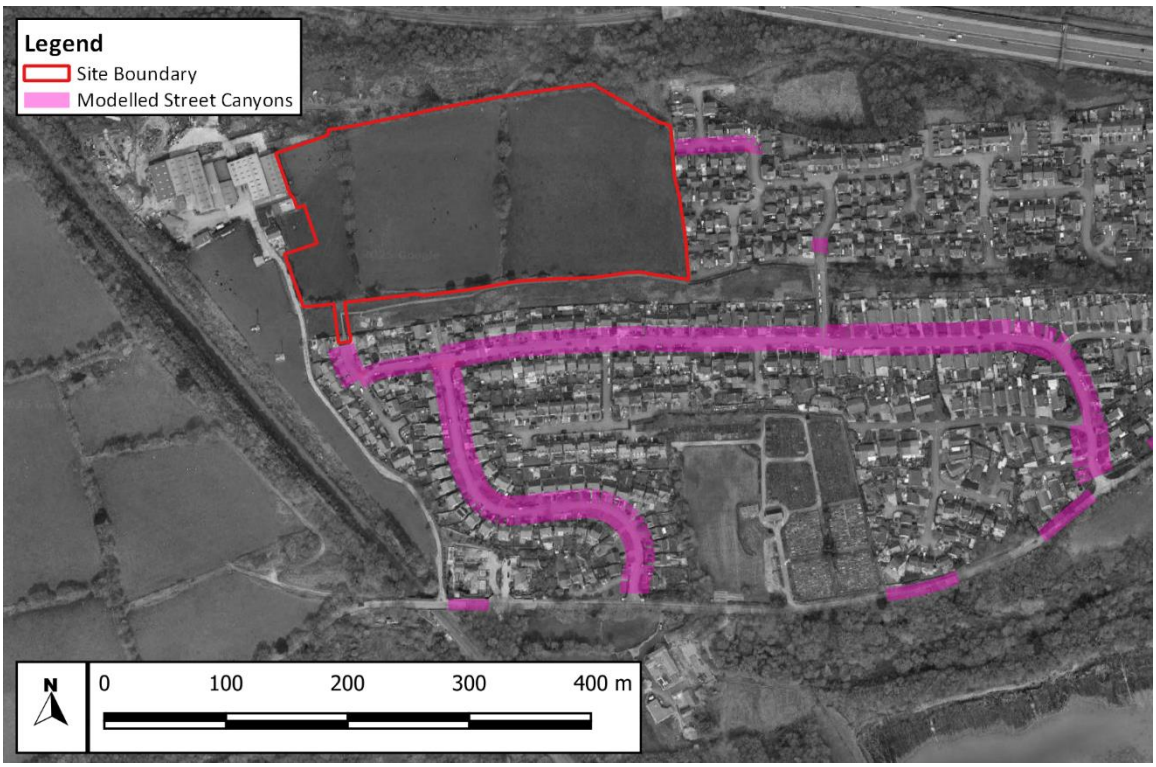

Figure notes: Imagery © 2025 Google, Map data © 2025.

Figure 20: Modelled ‘Street Canyon’ Road Links

Figure notes: Imagery © 2024 Google, Map data © 2024.

Figure 21: Modelled ‘Street Canyon’ Road Links

Figure notes: Imagery © 2024 Google, Map data © 2024.

Model Performance

E6.13. The modelling will inherently have some uncertainties and may not reflect real conditions in the local area. An important part of modelling is reviewing the model results carefully and checking the model setup parameters and input data to minimise uncertainties.

E6.14. LAQM.TG22 (Defra, 2022), provides local authorities with advice on good practice for modelling air quality. This advice is widely applied for air quality assessments of proposed developments, although it is specifically aimed at local authority’s duties to review and assess air quality. LAQM.TG22 states that model verification, defined as a comparison of modelled results with monitoring results at relevant locations, is necessary (paragraph 7.550).

E6.15. There are many reasons why there may be a difference between modelled and monitored concentrations and LAQM.TG22 states “*Model verification is the process by which these and other uncertainties are investigated and where possible minimized” (*paragraph 7.552). It provides a list of the factors that may explain the differences including meteorological data, source activity data (e.g. data flow and speed), emission factors, model input parameters such as roughness length, and monitoring data.

E6.16. The advice in LAQM.TG22 is generic for all dispersion models. ADMS has been shown to predict concentrations well given sufficiently accurate data inputs.

E6.17. It is important to review the results of the modelling carefully and check the model setup parameters and input data. Once reasonable effects have been made to reduce the uncertainties of input data for a model, further comparison of modelled and monitored results should be undertaken. Where discrepancies remain, consideration may be given to adjusting the model.

E6.18. Using good modelling techniques provides confidence that the model is performing as well as possible everywhere in the modelling area in the base year, not just at the monitoring locations. Modelling is often an iterative process that involves improving the model setup and evaluating the impact on model performance. The same principles need to be applied to the entire modelling study area to ensure the model performs well throughout the study area.

E6.19. All reasonable efforts have been made to improve the model inputs. The model has gone through several modelling iterations to consider whether the performance of the modelled inputs can be improved. Improvements are based on comparisons with the measured concentrations at specific monitoring locations and where improvements have been made, they have been applied as a holistic approach with systematic updates to the entire model study area to ensure that the model is not performing well exclusively at the monitoring locations. Iterations to the model can include changes in streetscape parameters, widths of road links, the heights of receptors and examining traffic data to improve the model performance using a systematic approach, ultimately providing a model representative of the modelling area.

E6.20. A final model verification exercise has been undertaken to determine whether there are any final discrepancies and to derive a factor with which to adjust the predicted concentrations from the model so that they match local conditions as closely as possible.

E6.21. A good model performance is considered to be where:

- The comparison between the modelled and measured road NOx should be on average, less than a factor of two; and
- The final modelled and measured NO_2 root mean square error (RMSE) should be less than two $\mu g/m^3$.

E6.22. Where this is not the case and all reasonable efforts have been made to improve the model, it is then considered likely that the error is due to a fundamental input such as the raw traffic data. In these situations, it is considered important that the assessment should then account for the greater uncertainty in the analysis of the results.

Final Model Verification

E6.23. A final model verification exercised has been undertaken, following the guidance set out by Defra in Box 7.17 and Box 7.18 of LAQM.TG22 (Defra, 2022).

E6.24. Concentrations of road-NOx and primary NO_2, have been predicted for the year of 2022 using the ADMS-roads dispersion model at the following relevant monitors:

- CM2– Morriston Groundhog;
- 55 – Peniel Green Road; and,
- 418 – Birchgrove Road.

E6.25. Predictions have been made at the heights of the monitor inlets. The monitoring sites are shown in Figure 22 to Figure 23.

Figure 22: Monitoring Site Locations

Figure notes: Imagery © 2024 Google, Map data © 2024.

Figure 23: Monitoring Sites Streetview

CM2	55
418	

Figure notes: Imagery © 2024 Google, Map data © 2024.

NO_2

E6.26. Initially, the measured NO_2 concentrations at the monitoring sites were inputted into Defra's NOx to NO_2 Calculator, along with the background NO_2 concentrations and f-NO_2 values, in order to obtain 'measured' road-NOx concentrations at the monitoring sites. The f-NO_2 factor at each monitoring site was calculated by taking the ratio of predicted primary NO_2 concentration to predicted road-NOx concentration.

E6.27. The predicted road-NOx concentrations have been compared to the 'measured' road-NOx concentrations and NOx factor calculated for each monitor, see Table 3.

Table 3: Measured and Modelled NOx Comparison

Monitor	Measured NO_2	Background NO_2	Predicted f-NO_2	Measured Road-NOx	Modelled Road-NOx	NOx Factor
CM2	20.6	10.6	0.18	21.0	7.6	2.8
55	20.7	10.4	0.17	21.9	9.8	2.3
418	15.2	12.6	0.17	5.2	5.2	1.0
Table notes: -						

E6.28. In general, the target is for the NOx factor to be less than two. Table 3 demonstrates that the model is performing well at monitoring site '418' and underpredicting at the remaining two monitoring sites ('CM2' and '55') as the factors are above the target value of two. As the factor is above the ideal value, there is the potential for slightly greater uncertainty in the model than otherwise.

E6.29. Multiple attempts were made at changing the model input parameters at monitoring sites 'CM2' and '55' to better represent conditions at the monitoring sites. However, it is suspected that there may be an additional influence on pollution concentration affecting the monitor, which are unable to be taken account of in the model (such as parking located next to monitoring site '55').

E6.30. The comparison of road-NOx concentrations to 'measured' road-NOx concentrations is presented in Figure 24. An adjustment factor of 2.227 has been derived from the equation of the linear trend line that has been fitted through zero. Since the model underpredicted concentrations, the predicted road-NOx concentrations have been adjusted with the adjustment factor to uplift the values to broadly match those measured at the monitoring sites, as shown in Figure 24.

Figure 24: Comparison of predicted NOx to 'measured' road-NOx

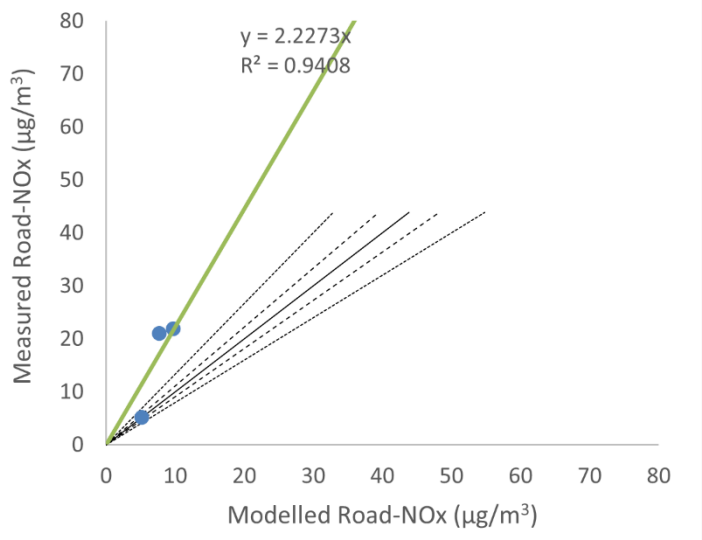

Figure Notes: -

E6.31. Figure 25 shows a comparison of the measured NO_2 concentrations and the total (i.e. road plus background) predicted NO_2 concentrations. Statistics of this comparison are given in Table 4, which demonstrate that the predicted NO_2 concentrations have an insignificant fractional bias (~0), and RMSE slightly above the target of 2 µg/m³.

Figure 25: Comparison of predicted NO_2 to 'measured' NO_2

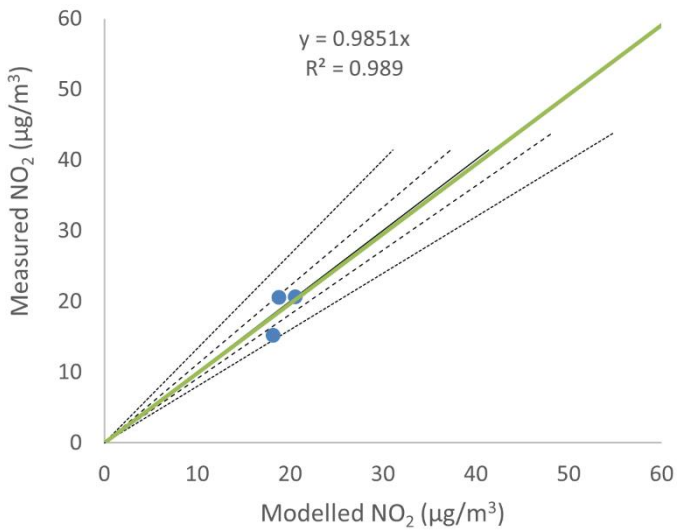

Figure Notes: -

Table 4: Correlation Coefficient, RMSE, and Fractional Bias

Statistic	NO_2
Correlation Coefficient (r) [a]	0.708
Root Mean Square Error (RMSE) [b]	2.012
Fractional Bias (FB) [c]	-0.017

Table Notes:

a. This is used to measure the linear relationship between predicted and measured concentrations. A value of zero means no relationship and a value of 1 means absolute relationship (ideal value).

b. RMSE is used to define the average error or uncertainty in the model. The ideal value for NO^2 is zero, and a value within 10% of the objective (i.e., 4 µg/m^3) is general acceptable although models should always be improved where possible even where the value is less than 10% of the objective. If the value is greater than 25% of the objective (i.e., 10 µg/m^3) then it is recommended that the model be revisited (this only applies to NO_2).

c. This is used to identify if the model shows a systematic tendency to over or under predict. FB values range between -2 and +2 and has an ideal value of zero. Negative values indicate a model over-prediction and positive values indicate a model under-prediction.

PM_{10} and $PM_{2.5}$

E6.32. Swansea Council, the neighbouring local authority whose monitoring sites were used in the verification of the dispersion modelling, operates monitoring site 'CM2' which measures $PM_{2.5}$ concentrations. The measured concentrations were higher than the background predicted concentrations by ~2 µg/m^3. The monitoring site does not measure PM_{10} concentrations.

E6.33. Based on that, it was deemed appropriate to use the factor derived for NOx as a PM factor, and therefore, the NOx factor has been applied to all predicted road-PM_{10} and road-$PM_{2.5}$ concentrations. It is acknowledged that applying the NOx factor may result in higher predictions of PM_{10} and $PM_{2.5}$, which has been considered in the site suitability and human health air quality assessments.

E7. Railway Modelling

Railway Locomotive Emissions

E7.1. Emissions of rail-NOx (i.e. the contribution from locomotives using the railway line), rail-PM_{10} and rail-$PM_{2.5}$ have been derived from the latest information available from the National Atmospheric Emissions Inventory (NAEI, 2020). The NAEI provides annual emissions of different source types, one of which is railways, on a 1x1km grid across the UK.

E7.2. Annual emissions of NOx, PM_{10} and $PM_{2.5}$ for the grid cell that the modelled railway lines are within have been used and are presented in Table 5. Emission rates (in g/km/s) have been derived from these emissions for the modelled railway, as set out in Table 5.

Table 5: Derivation of Railway Locomotive Emission Rates

1 km x 1 km Grid Cell	Parameter	NOx	PM_{10}	$PM_{2.5}$
270,500, 197,500	Emission (tonnes/annum)	10.91	45.65	29.61
	Emission (g/s)	0.03	0.14	0.09
	Railway line length within grid cell (km) [a]	1.34		
	Emission rate (g/s/km) [b]	0.03	0.11	0.07
271,500, 197,500	Emission (tonnes/annum)	8.12	26.08	16.65
	Emission (g/s)	0.03	0.08	0.05
	Railway line length within grid cell (km) [a]	1.04		
	Emission rate (g/s/km) [b]	0.02	0.08	0.05
270,500, 196, 500	Emission (tonnes/annum)	2.32	6.94	4.48
	Emission (g/s)	0.01	0.02	0.01
	Railway line length within grid cell (km) [a]	0.72		

	Emission rate (g/s/km) [b]	0.0	0.03	0.02
271,500, 196,500	Emission (tonnes/annum)	3.52	16.0	10.18
	Emission (g/s)	0.01	0.05	0.03
	Railway line length within grid cell (km) [a]	1.10		
	Emission rate (g/s/km) [b]	0.01	0.05	0.03

Table Notes:
a. This is the total length of all modelled railways links within this grid square.
b. This is the average emissions of all the modelled railway links within this grid square.

Modelled Railways

E7.3. The railway geometries, widths, and heights included in the dispersion model have been aligned with data from Google Satellite and Ordinance Survey maps, which included carefully considering relative distances from the links to receptors and monitoring sites. The modelled railways are shown in Figure 26.

Figure 26: Modelled Rail Links

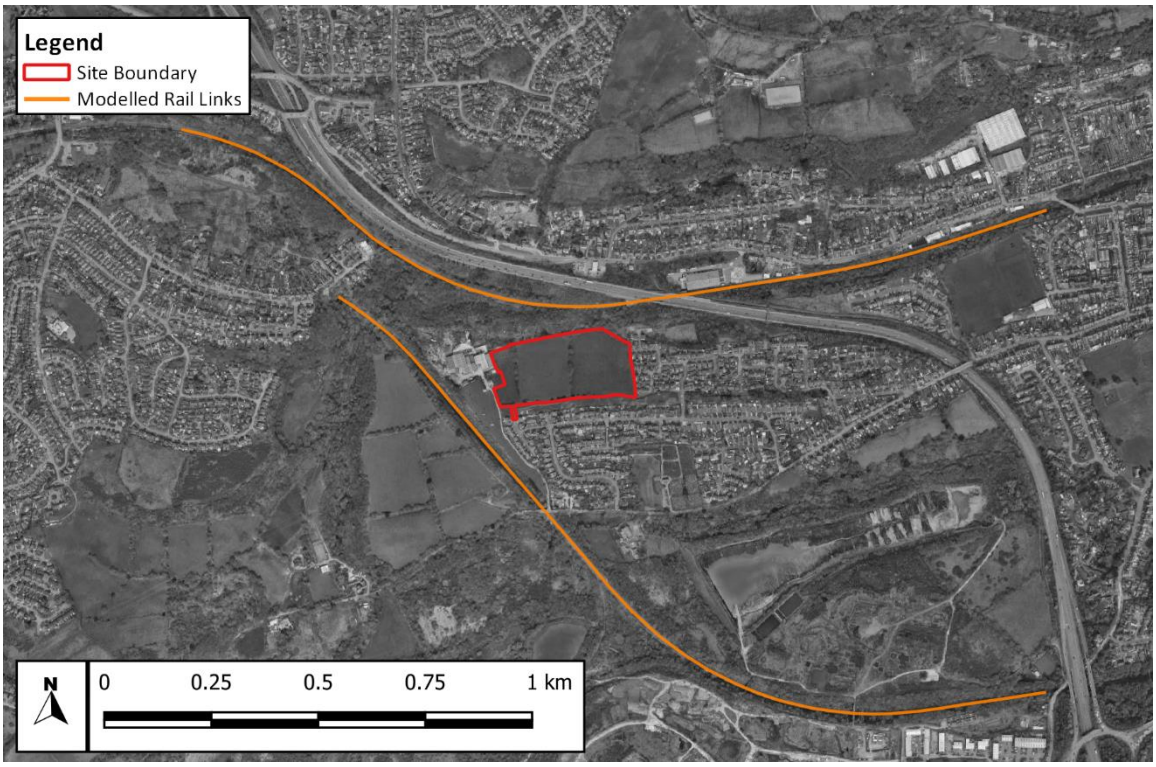

Figure notes: Imagery © 2025 Google, Map data © 2025.

E8. Post Processing

Chemistry (Conversion of NOx to NO_2)

Roads

E8.1. Concentrations of road-NOx and primary NO_2 have been predicted at each receptor using the ADMS-Roads model. The f-NO_2 at each receptor has been calculated by taking the ratio of predicted primary NO_2 concentration to road-NOx concentration.

E8.2. The f-NO_2 values along with the adjusted modelled road-NOx concentrations and background NO_2 concentrations have been inputted into Defra's NOx to NO_2 calculator (v8.1) in order to obtain predicted road-NO_2 concentrations at each receptor. This tool has been run assuming the traffic is described as 'All Other Urban UK traffic', which is considered appropriate for the traffic associated with Neath Port Talbot. It should be noted, however, that receptor specific f-NO_2 values have been used in the NOx to NO_2 calculated, which supersede the traffic selection.

E9. Uncertainty and limitations

E9.1. The assessment involves a range of uncertainties, including the model inputs, assumptions, the model and post-processing of model results.

E9.2. Although there is uncertainty associated with air quality modelling, the predictions made by this assessment have been carried out in a robust manner in order to minimise uncertainties where possible; the approach has been to use reasonable worst-case assumptions.

E9.3. A brief overview of the key uncertainties is discussed below.

Roads modelling

E9.4. There are inherent uncertainties associated with the traffic data. In the case of this modelling study, assumptions had to be made regarding the AADT for roads directly adjacent to the Proposed Development. As no traffic data was available for these roads, to provide a conservative assessment, the AADT flows provided by the transport consultants for the project for roads within the vicinity of the Proposed Development were used.

E9.5. The emission factors also involve a considerable amount of uncertainty. Emissions from the EFT are link averages and do not explicitly take account of acceleration or deceleration. Modelled speeds have been adjusted to account for this where possible. Future year vehicle emission rates are also based on a range of factors, such as expected improvements in emission reduction technologies, expected uptake rates of different vehicles based on government policies, etc. It is therefore possible that the expected future emission rates in the EFT may differ from reality. Historically, evidence suggests that Defra's EFT over estimated reductions in NOx emissions from diesel vehicles which were not seen in practice. However, analyses of recent NOx measurements now provide evidence that diesel vehicle emission controls are working and as a result Defra's EFT (v12.1) is considered to be a reasonable reflection of the rate of reductions of specific vehicle emissions into the future. There remains uncertainty of the future traffic fleet composition (built into the EFT). In the absence of officially published alternative emissions, the approach of this assessment has been to utilise the EFT as recommended by Defra in the LAQM.TG22 guidance (Defra, 2022).

E9.6. The model itself is based on assumptions of a range of parameters, including road geometries, road widths, street canyons and meteorological related parameters. There is uncertainty in all these parameters, but the modelling has been setup in a robust way based on professional experience to best represent the conditions.

E9.7. The ambient background concentrations are also uncertain. While these are provided by Defra, the 1x1 km resolution is coarse, and the maps do not include all sources of pollution. Given the urban fringe location of the Proposed Development, it is considered likely that the background maps for this area are reasonable. To minimise uncertainty in the spatial resolution of the maps, the

background concentrations have been interpolated to each receptor; essentially smoothing out the coarseness of the maps.

E9.8. Evidence (Grange, S, et al., 2017) suggests that the f-NO_2 has been decreasing in recent years, which is not taken into account within Defra's EFT or NOx to NO_2 Calculator. If lower f-NO_2 values were assumed, then the predicted concentrations would likely be slightly lower throughout the Proposed Development and local area. Until more detailed scientific analysis is undertaken to understand the full extent of why f-NO_2 is decreasing and how it will behave in the future, it remains an uncertainty.

E9.9. A model verification exercise has been undertaken to adjust the predicted concentrations from the model so that they match local conditions as best as possible. This has adjusted concentrations to match average conditions; however, some locations will remain underpredicted.

E10. Glossary

AADT	Annual Average Daily Traffic flow
ADMS	Atmospheric Dispersion Modelling System
APS	Air Pollution Services
CERC	Cambridge Environmental Research Consultants
COPERT 5	Computer Programme to Calculate Emissions from Road Transport
CP	Count Point
DfT	Department for Transport
EFT	Emissions Factors Toolkits
f-NO_2	Fraction of nitrogen dioxide
HDV	Heavy Duty Vehicles
LAQM	Local Air Quality Management
NO_2	Nitrogen dioxide
NOx	Nitrogen oxides
NPTC	Neath Port Talbot Council
NWP	Numerical Weather Prediction
PM_{10}	Small airborne particles, more specifically particulate matter less than 10 micrometres in aerodynamic diameter
$PM_{2.5}$	Small airborne particles, more specifically particulate matter less than 2.5 micrometres in aerodynamic diameter
RMSE	Root mean square error
TEMPro	Trip End Model Presentation Program
WRF	Weather Research and Forecasting
µg/m^3	Microgrammes per cubic metre

E11. References

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F1. Introduction

F1.1. Air Pollution Services (APS) has been commissioned by Hale Group to assess the air quality impacts associated with the proposed development at Crymlyn Parc, Skewen (herein the 'Proposed Development'). The Proposed Development is located within the administrative area of Neath Port Talbot Council (NPTC).

F1.2. This document sets out a risk assessment of dust impacts associated with the construction phase of the Proposed Development and sets out relevant mitigation for the construction works.

F2. Guidance

F2.1. The assessment has been carried out using approach set out in the following guidance.

IAQM Guidance

F2.2. The Institute of Air Quality Management (IAQM) produced guidance (2024) on the assessment of dust from demolition and construction. This document provides a risk-based methodology for assessing construction impacts, including demolition and earthworks where appropriate. The guidance has been used throughout this assessment, which should be read in conjunction with this document.

F3. Construction Dust Assessment Approach

F3.1. The assessment method follows the approach provided by the IAQM guidance document (2024) which follows a sequence of steps:

- Step 1 is a basic screening stage, to determine whether the more detailed assessment provided in Step 2 is required.
- Step 2 is to assess the risk of dust impacts.
  - Step 2a determines the potential for dust to be raised from on-site works and by vehicles leaving the site.
  - Step 2b defines the sensitivity of the area to any dust that may be raised.
  - Step 2c combines the information from Steps 2a and 2b to determine the risk of dust impacts without appropriate mitigation.
- Step 3 uses this information to determine the appropriate level of site-specific mitigation required to ensure that there should be no significant impacts.
- Step 4 is to examine the residual effects and to determine whether these are significant.

F3.2. The approach developed by IAQM (2024) divides the activities on construction sites into four types to reflect their different potential impacts. These are:

- demolition;
- earthworks;
- construction; and
- trackout.

F4. The Proposed Development

F4.1. The site location of the Proposed Development is shown in Figure 1.

F4.2. The Proposed Development's construction works may give rise to a risk of dust impacts during earthworks, construction and trackout.

Figure 1: Proposed Development Site Location

Figure notes: Imagery © 2025 Google, Map data © 2025.

F5. Step 1

F5.1. Step 1 of the assessment procedure is to screen the need for a detailed assessment. The guidance provides distance-based criterion in Box 1 of the guidance which states:

An assessment will normally be required where there is:

- *a 'human receptor' within:*
  - 250 m of the boundary of the site; or
  - 50 m of the route(s) used by construction vehicles on the public highway, up to 250 m from the site entrance(s).
- *an 'ecological receptor' within:*
  - 50 m of the boundary of the site; or
  - 50 m of the route(s) used by construction vehicles on the public highway, up to 250 m from the site entrance(s).

F5.2. There are human receptors within the distances set out in the guidance (see Figure 1), thus a detailed assessment is required for human receptors.

F6. Step 2

F6.1. The following section sets out Step 2 of the assessment procedure.

Potential Dust Emission Magnitude

F6.2. The guidance explains that the dust emission magnitude is based on the scale of the anticipated works and should be classified as Small, Medium, or Large. The guidance provides examples of the magnitude classification for each of the potential stages.

Demolition

F6.3. No demolition is expected to take place at the application site. Therefore, this stage of construction is not considered further.

Earthworks

F6.4. The dust generated by the earthworks depends on the nature of the earth and soil at the application site. The characteristics of the soil have been defined using the British Geological Survey's UK Soil Observatory website (2024) and are set out in Table 1. Overall, it is considered that, when dry, this soil is not very dusty.

Table 1: Soil Conditions at the Application Site

Category	Record
Soil layer thickness	Shallow
Soil texture	Loam to Sandy Loam
Subsoil grain size	Arenaceous / Mixed
European Soil Bureau Description	Sandstone
Table notes: -	

F6.5. The area of earthworks is unknown but the whole site covers an area that is approximately 55,000 m^2. Dust will arise mainly from the handling and transport of dusty materials (such as dry soil). The Proposed Development will likely be completed in two phases, helping to minimise dust. However, to provide a conservative assessment, phasing has not been taken into account. Based on the illustrative criteria in the IAQM guidance document, the dust emission magnitude for earthworks is considered *Medium.*

Construction

F6.6. The Proposed Development includes the erection of 154 residential dwelling and associated works. The total volume for construction is currently unknown, but to provide a conservative assessment, it is estimated that the volume will be above 75,000 m^3. The duration of the construction is expected to be up to three years. Based on the illustrative criteria in the IAQM, the dust emission magnitude for construction is considered *Large*.

Trackout

F6.7. The number of heavy-duty vehicles (HDVs) leaving the site on a single day is unknown at this stage. To provide a conservative assessment, although this is unlikely to be the case due to the construction of the Proposed Development being phased, there is expected to be up to 50 HDV

movements per day. These HDVs may lead to dust and dirt being tracked out. Based on the example definitions set out in the IAQM guidance, the dust emission magnitude for trackout is considered *Medium.*

Summary of Potential Dust Emission Magnitude

F6.8. Table 2 summarises the dust emission magnitude from the construction phases of the Proposed Development.

Table 2: Summary of Potential Dust Emission Magnitudes

Activity	Dust Emission Magnitude
Demolition	n/a
Earthworks	Medium
Construction	Large
Trackout	Medium
Table notes: -	

Sensitivity of the Study Area

F6.9. The guidance explains that the sensitivity of the area should take account of a number of factors including:

- the specific sensitivities of receptors in the area;
- the proximity and number of those receptors;
- in the case of PM_{10}, the local baseline concentration; and
- site-specific factors, such as whether there are natural shelters, such as trees, to reduce the risk of wind-blown dust.

F6.10. The IAQM guidance document provides examples of high, medium and low sensitivity receptors for each of the potential effects. These are provided in Box 6 to Box 8 of the guidance and consideration should be given to the additional factors presented in Box 9 of the guidance. The guidance also provides a series of matrices (Tables 2, 3 and 4 of the guidance document) to determine the sensitivity of the area based on the receptor sensitivity, number of receptors, the proximity to the dust emission activity and baseline PM_{10} concentration. Residential properties are considered high sensitivity receptors to dust soiling and elevated levels of PM_{10}.

F6.11. The guidance recommends considering the risk of impacts up to 250 m from the site boundary.

F6.12. Figure 2 shows the site location with several bands representing 20 m, 50 m, 100 m and 250 m distances from the Application Site. There are between 10 to 100 high sensitivity properties within 20 m of the Application Site. Based on Table 2 of the IAQM guidance document, the sensitivity of the area to dust soiling impacts will be *Medium.*

F6.13. Annual mean PM_{10} predicted background concentrations in the vicinity of the Proposed Development are predicted to be a maximum of 12.8 µg/m^3 (most appropriate value set out in appended document *'Air Quality Baseline: Crymlyn Parc, Skewen')*. There are between 10 to 100 high sensitivity properties that are likely to be exposed to these concentrations within 20 m of the

Application Site. Based on Table 3 of the IAQM guidance, the sensitivity of the area to human health impacts due to elevated levels of PM_{10} during the earthworks and construction stages will be *Low*.

F6.14. There are no sensitive ecological sites that are within 50 m of the Application Site. Based on Table 4 of the IAQM guidance, the sensitivity of the area to ecological impacts due to dust during the earthworks and construction stages will be *Negligible*.

Figure 2: Distance Buffers from Application Site

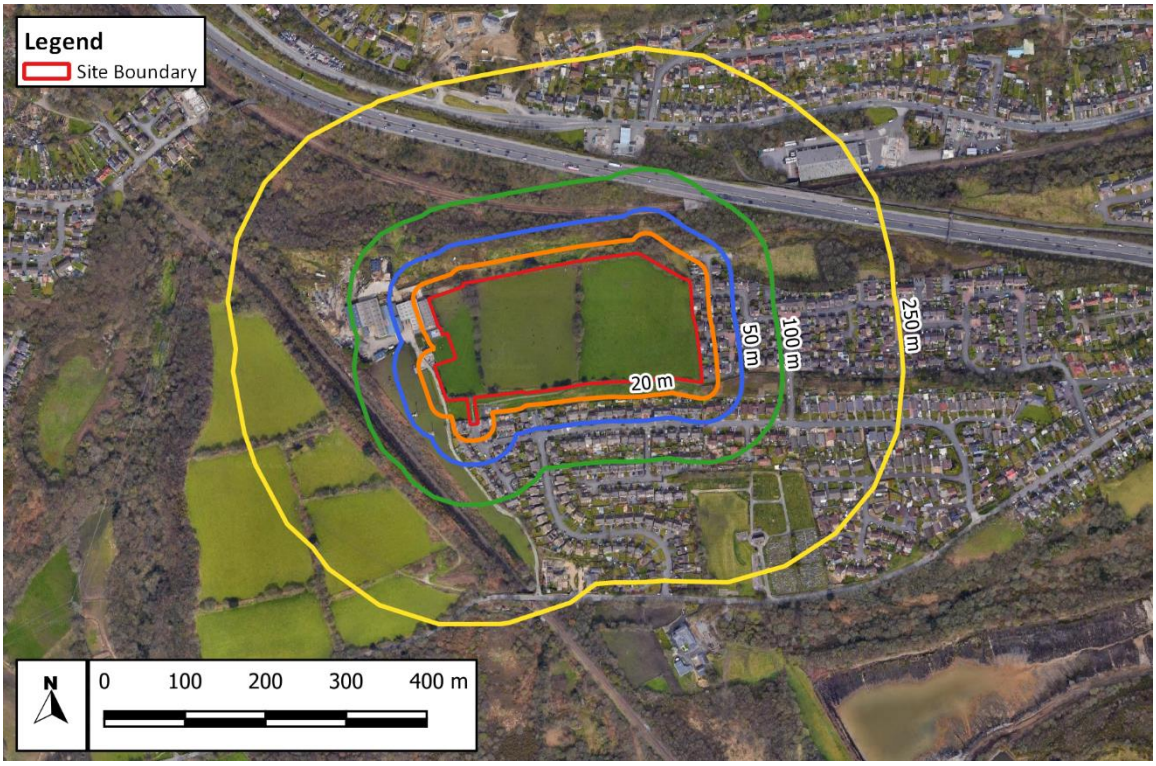

Figure notes: Imagery © 2025 Google, Map data © 2025.

F6.15. The potential for trackout along all routes within 250 m has been considered. The guidance explains that there is a risk to receptors within 50 m of the road that material is being tracked out along, which is shown in Figure 3. There will be between 10 to 100 high sensitivity properties within 20 m of the road along which material could be tracked, and thus the area is considered to be of *Medium* sensitivity to dust soiling impacts due to trackout. In terms of human health, the area is considered to be of *Low* sensitivity.

F6.16. There are no sensitive ecological sites that are within 50 m of the roads along which material could be tracked. Based on Table 4 of the IAQM guidance, the sensitivity of the area to ecological impacts due to trackout will be *Negligible*.

Figure 3: Distance Buffers from road lanes where dirt may be tracked out from the site

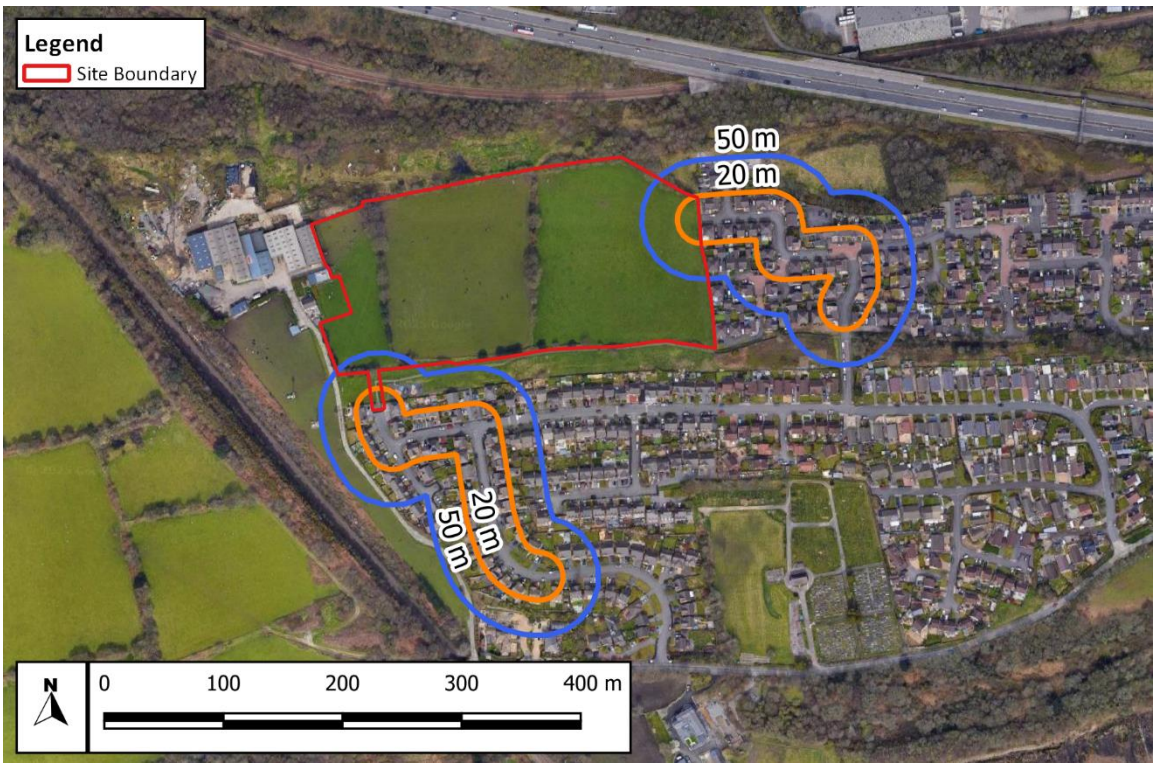

Figure notes: Imagery © 2025 Google, Map data © 2025.

F6.17. Table 3 summarises the sensitivity of the area around the proposed construction works based on the highest level of sensitivity determined for each stage.

Table 3: Summary of Sensitivity of the Surround Area

Potential Impact	Sensitivity of the Surrounding Area			
	Demolition	Earthworks	Construction	Trackout
Dust Soiling	n/a	Medium	Medium	Medium
Human Health	n/a	Low	Low	Low
Ecology	n/a	Negligible	Negligible	Negligible
Table notes: -				

Risk of Dust Effect

F6.18. The guidance has, helpfully, provided a series of matrices (Table 2, Table 3 and Table 4 of the guidance document) to determine the potential impact at receptors based on the receptor sensitivity, number of receptors and the proximity to the dust emission activity.

F6.19. The dust emission magnitudes in Table 2 have been combined with the sensitivities of the area in Table 3 using the matrices in the guidance (Table 6, Table 7, Table 8 and Table 9 of the guidance), in order to assign a risk category to each activity. The resulting risk categories for the four construction activities, without mitigation, are set out in Table 4.

Table 4: Summary of Dust Risk for each Stage

Potential Impact	Risk			
	Demolition [a]	Earthworks [b]	Construction [c]	Trackout [d]

Table 4: Summary of Dust Risk for each Stage

Dust Soiling	n/a	Medium Risk	Medium Risk	Medium Risk
Human Health	n/a	Low Risk	Low Risk	Low Risk
Ecological	n/a	Negligible	Negligible	Negligible

Table notes:
a. Based on Table 6 of the IAQM guidance document.
b. Based on Table 7 of the IAQM guidance document.
c. Based on Table 8 of the IAQM guidance document.
d. Based on Table 9 of the IAQM guidance document.

Significance of effects

F6.20. The IAQM guidance does not provide a method for assessing the significance of effects before mitigation and advises that pre-mitigation significance should not be determined.

F7. Step 3

F7.1. The risk categories set out in Table 4 have been used to determine the appropriate level of mitigation as set out in Section F8 below of this document (step 3 of the assessment procedure).

F8. Mitigation

F8.1. Measures to mitigate emissions will be required during the construction phase of the Proposed Development in order to minimise impacts upon nearby sensitive receptors.

F8.2. The Proposed Development has been identified as *Medium Risk* for dust soiling effects during the earthworks, construction and trackout phases of construction. In terms of human health, the Proposed Development has been identified as *Low Risk* during the earthworks, construction and trackout. In terms of ecology, the Proposed Development has been as *Negligible Risk*, as set out in Table 4.

F8.3. The IAQM guidance document describes measures that should be employed, as appropriate, to reduce the impacts. In addition to this the IAQM has also published guidance on monitoring during demolition and construction (IAQM, 2018). Based on the finding of this assessment, a set of measures that are both highly recommended and desirable to be incorporated into the specification for the construction works has been drawn up. These measures are shown in Table 5 to Table 9.

F8.4. The mitigation measures for the application site should be written into a dust management plan (DMP). The DMP may be integrated into a Code of Construction Practice or the Construction Environmental Management Plan and may require monitoring.

F8.5. Where mitigation measures rely on water, it is expected that only sufficient water will be applied to damp down the material. There should not be any excess to potentially contaminate local watercourses.

Table 5: Communication

Measure	Highly Recommend / Desirable
Develop and implement a stakeholder communications plan that includes community engagement before work commences on site.	Highly Recommended
Display the name and contact details of person(s) account- able for air quality and dust issues on the site boundary. This may be the environment manager/engineer or the site manager.	Highly Recommended
Display the head or regional office contact information.	Highly Recommended
Develop and implement a 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 highly recommended measures in this document. The desirable measures should be included as appropriate for the site. In London additional measures may be required to ensure compliance with the Mayor of London's guidance. The DMP may include monitoring of dust deposition, dust flux, real-time PM_{10} continuous monitoring and/or visual inspections.	Highly Recommended

Table 6: Dust Management

Measure	Highly Recommend / Desirable
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.	Highly Recommended
Make the complaints log available to the local authority when asked.	Highly Recommended
Record any exceptional incidents that cause dust and/or air emissions, either on- or off- site, and the action taken to resolve the situation in the log book.	Highly Recommended
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 100 m of site boundary, with cleaning to be provided if necessary.	Desirable
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.	Highly Recommended
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.	Highly Recommended
Agree dust deposition, dust flux, or real-time PM_{10} continuous monitoring locations with the Local Authority. Where possible commence baseline monitoring at least three months before work commences on site or, if it a large site, before work on a phase commences. Further guidance is provided by IAQM on monitoring during demolition, earthworks and construction.	Highly Recommended
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.	Highly Recommended
Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site.	Highly Recommended
Fully enclose site or specific operations where there is a high potential for dust production and the site is actives for an extensive period.	Highly Recommended
Avoid site runoff of water or mud.	Highly Recommended

Keep site fencing, barriers and scaffolding clean using wet methods.	Highly Recommended
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.	Highly Recommended
Cover, seed or fence stockpiles to prevent wind whipping.	Highly Recommended
Operating vehicle/machinery and sustainable travel	
Ensure all vehicles switch off engines when stationary - no idling vehicles.	Highly Recommended
Avoid the use of diesel- or petrol-powered generators and use mains electricity or battery powered equipment where practicable.	Highly Recommended
Impose and signpost a maximum-speed-limit of 15 mph on surfaced and 10 mph 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).	Desirable
Implement a Travel Plan that supports and encourages sustainable travel (public transport, cycling, walking, and car-sharing).	Highly Recommended
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.	Highly Recommended
Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate.	Highly Recommended
Use enclosed chutes and conveyors and covered skips.	Highly Recommended
Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate.	Highly Recommended
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.	Highly Recommended
Waste management	
Avoid bonfires and burning of waste materials.	Highly Recommended

Table 7: Measure Specific to Earthworks

Measure	Highly Recommend / Desirable
Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable.	Desirable
Use Hessian, mulches or tackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as practicable.	Desirable
Only remove the cover in small areas during work and not all at once.	Desirable

Table 8: Measure Specific to Construction

Measure	Highly Recommend / Desirable
Avoid scabbling (roughening of concrete surfaces) if possible.	Desirable
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.	Highly Recommended

Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery.	Desirable
For smaller supplies of fine power materials ensure bags are sealed after use and stored appropriately to prevent dust.	Desirable

Table 9: Measure Specific to Trackout

Measure	Highly Recommend / Desirable
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.	Highly Recommended
Avoid dry sweeping of large areas.	Highly Recommended
Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport.	Highly Recommended
Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable.	Highly Recommended
Record all inspections of haul routes and any subsequent action in a site logbook.	Highly Recommended
Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers and regularly cleaned.	Highly Recommended
Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable).	Highly Recommended
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.	Highly Recommended
Access gates to be located at least 10 m from receptors where possible.	Highly Recommended

F9. Summary

F9.1. The construction works have the potential to create dust and emissions. During construction it will therefore be necessary to apply a package of mitigation measures to minimise dust emission. With these measures in place, it is expected that any residual effects will be '*not significant*'. The IAQM guidance recognises that even with a rigorous dust management plan in place, it is not possible to guarantee that the dust mitigation measures will be effective all the time, for instance under adverse weather conditions. The local community may therefore experience occasional, short-term annoyance. The scale of this would not normally be considered sufficient to change the conclusion that the effects will be '*not significant*'.

F10. Glossary

APS	Air Pollution Services
DMP	Dust Management Plan
HDV	Heavy Duty Vehicle
IAQM	Institute of Air Quality Management
µg/m^3	Microgrammes per cubic metre
NPTC	Neath Port Talbot Council

PM_{10}	Small airborne particles, more specifically particulate matter less than 10 micrometres in aerodynamic diameter

F11. References

British Geological Survey. (2024). *UK Soil Observatory (UKSO)*. Retrieved from British Geological Survey: http://mapapps2.bgs.ac.uk/ukso/home.html

IAQM. (2018). *Guidance on Monitoring in the Vicinity of Demolition and Construction Sites.*

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Air Quality at Locations of Human Health Exposure: Crymlyn Parc, Skewen

Client: Hale Group

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G1. Introduction

G1.1. Air Pollution Services (APS), part of KALACO Group, has been commissioned to assess the air quality impacts associated with the proposed development at Crymlyn Parc, Skewen (herein the 'Proposed Development'). The Proposed Development is located within the administrative area of Neath Port Talbot Council (NPTC).

Location Context

G1.2. NPTC has investigated air quality within the administrative area as part of its responsibilities under the Local Air Quality Management (LAQM) regime. The Council has declared one air quality management area (AQMA) covering the majority of land between the Corus Steel Works and the M4 Motorway (known as Neath Port Talbot AQMA Taibach/Margam). The AQMA was declared in 2000 for exceedances of the 24-hour mean PM_{10} air quality objective (AQO). The AQMA is located over 9 km southeast from the Proposed Development.

G1.3. The closest AQMA to the Proposed Development is the Swansea AQMA, declared by Swansea Council (SC) in 2001, and amended in 2010, for exceedances of the annual mean NO_2 AQO. It is located approximately 4.6 km southwest of the Proposed Development.

G1.4. The Proposed Development is not located within any air quality zones. There are human health receptors (residential properties) in immediate proximity to the application site, including the adjacent buildings and along the roads connecting to the application site.

G2. Methodology

Guidance

G2.1. The assessment has been carried out using the approaches set out in the following guidance.

Guidance on Land-Use Planning & Development Control: Planning For Air Quality

G2.2. Environmental Protection UK (EPUK) in partnership with The Institute of Air Quality Management (IAQM) have produced guidance on Land-Use Planning & Development Control: Planning For Air Quality (2017). =This guidance was produced to ensure that air quality is adequately considered in the land-use planning and development control processes. It provides a means of reaching decisions, having regard to the air quality implications of development proposals by suggesting a framework for the assessment of the impacts of developments on local air quality.

LAQM Technical Guidance

G2.3. Defra and the devolved administrations have published a guidance document on Local Air Quality Management (LAQM) - Local Air Quality Management Technical Guidance (LAQM.TG22) (Defra, 2022). This document is designed to support local authorities in carrying out their statutory LAQM duties to monitor, assess, and take action to improve local air quality. The Technical Guidance provides tools, approaches and technical information related to air quality.

Approach Overview

G2.4. Standard practice is to assess the impacts of a proposed development on local air quality in relation to human health exposure, using the EPUK and IAQM guidance on Land-Use Planning & Development Control: Planning For Air Quality (2017).

G2.5. The EPUK and IAQM guidance provides a staged approach to considering air quality assessments:

- Stage 1) Initial screening
- Stage 2) Detailed screening
- Stage 3) Simple or Detailed assessment

G2.6. The approach includes elements of professional judgement.

Impacts of the Development on the Local Area

G2.7. Table 6.1 of the EPUK and IAQM guidance (2017) provides the Stage 1 screening criteria. The approach first considers the size and parking provision of a development; if the development is residential and is for fewer than ten homes or covers less than 0.5 ha, or is non-residential and will provide less than 1000 m^2 of floor space or cover a site area of less than 1 ha, and will provide ten or fewer parking spaces, then there is no need to progress to a Stage 2 and in general there is no need to consider the impacts of the development on the local area.

Stage 2 Screening Criteria

G2.8. The guidance provides example criteria and states the following in relation to the criteria:

"They are intended to function as a sensitive "trigger" for initiating an assessment in cases where there is a possibility of significant effects arising on local air quality. This possibility will, self-evidently, not be realised in many cases. The criteria should not be applied rigidly; in some instances, it may be appropriate to amend them on the basis of professional judgement, bearing in mind that the objective is to identify situations where there is a possibility of a significant effect on local air quality"

G2.9. The guidance notes that consideration should still be given to the potential impacts of neighbouring sources on the site, even if assessment of impacts of the development on the surrounding area is screened out.

Road Traffic Assessments

G2.10. The second stage then compares the changes in vehicle flows on local roads that a development will lead to against specified screening criteria. Where these criteria are exceeded, a detailed assessment is required, although the guidance advises that *"the criteria provided are precautionary and should be treated as indicative"*, and *"it may be appropriate to amend them on the basis of professional judgement"*.

G2.11. The criteria relating to road traffic are:

- A change of light-duty vehicle (LDV) flows of:
  - more than 100 AADT within or adjacent to an AQMA
  - more than 500 AADT elsewhere.

- A change of heavy-duty vehicle (HDV) flows of:
  - more than 25 AADT within or adjacent to an AQMA
  - more than 100 AADT elsewhere.
- Where roads are realigned near to sensitive receptors and the change in alignment is 5 m or more and the road is within an AQMA. Applies to junctions that cause traffic to significantly change vehicle acceleration/deceleration, e.g. traffic lights, or roundabouts.

Simple or Detailed Assessments

G2.12. Where an air quality assessment is identified as being required, then this may take the form of either a Simple Assessment or a Detailed Assessment. It is not uncommon for assessments to utilise detailed dispersion models to predict pollutant concentrations and impacts on local air quality (Detailed Assessment), however, it should be noted that exceeding a screening criterion in Table 6.2 of the guidance does not automatically lead to the requirement for a Detailed Assessment and the use of professional judgement and sufficient evidence can be considered appropriate at times (Simple Assessment).

G2.13. The guidance also outlines what the content of the air quality assessment should include, and this has been adhered to in the production of this report.

G2.14. Given the nature of the Proposed Development, a detailed assessment has been carried out.

Criteria for this Assessment

G2.15. The human-health related Air Quality Objectives (AQOs) and Limit Values (LVs) for Wales for the pollutants relevant to this project are detailed in Table 1.

Table 1: Air Quality Objectives and Limit Values

Pollutant	Time Period	Source of AQAL [a]	Concentration, and the number of exceedances allowed per year (Percentile if applies)	Date AQAL to be Achieved From and Maintained After
Human Health				
Nitrogen Dioxide (NO_2)	1-hour Mean	AQO / Limit Value	200 µg/m^3 not to be exceeded more than 18 times a year (99.79th percentile)	31st December 2005 / 1st January 2010
	Annual Mean	AQO / Limit Value	40 µg/m^3	31st December 2005 / 1st January 2010
Particulate Matter (PM_{10})	24-hour Mean	AQO / Limit Value	50 µg/m^3 not to be exceeded more than 35 times a year (90.41th percentile)	31st December 2004 / 1st January 2005
	Annual Mean	AQO / Limit Value	40 µg/m^3	31st December 2004 / 1st January 2005
Particulate Matter ($PM_{2.5}$)	Annual Mean	AQO / Target Value	25 µg/m^3 / 20 µg/m^3	2020

Table notes:
[a] Air Quality Objectives (AQOs) from the Air Quality Strategy; limit values, target values and critical levels from the Air Quality Standards Regulations.

Relevant exposure

G2.16. The locations of relevant exposure for AQOs and LVs are set out in Table 2.

Table 2: Locations of relevant exposure

Receptor Locations	Relevant exposure
AQO	The annual mean AQO applies at locations where members of the public might be regularly exposed, such as building façades of residential properties, schools, hospitals, and care homes. The 24-hour mean AQO applies at the annual mean locations of exposure as well as at hotels and residential gardens. The 1-hour mean AQO applies at the annual mean locations of exposure and at hotels, residential gardens and any outdoor location where members of the public might reasonably be expected to spend one hour or longer, such as busy pavements, outdoor bus stations and locations with outdoor seating. Places of work like factories or offices are not considered places where members of the public might be regularly exposed and therefore the AQO's do not apply at these locations.
LV	In accordance with Article 2(1), Annex III, Part A, paragraph 2 of Directive 2008/50/EC detailed locations where compliance with the LVs does not need to be assessed: *"Compliance with the limit values directed at the protection of human health shall not be assessed at the following locations:* *a) Any locations situated within areas where members of the public do not have access and there is no fixed habitation;* *b) In accordance with Article 2(1), on factory premises or at industrial installations to which all relevant provisions concerning health and safety at work apply; and* *c) On the carriageway of roads; and on the central reservation of roads except where there is normally pedestrian access to the central reservation".* The government models compliance with the Directive at locations 4 m from the kerbside, 2 m high, more than 25 m from major road junctions and adjacent to at least 100 m of road length where the LVs apply.
Table notes: -	

Describing Impacts and Defining Significance

Long-term (Annual Mean) Impacts on Air Quality at Locations of Human Health Exposure

G2.17. The approach set out in the EPUK and IAQM guidance provides a method for describing the impacts on local air quality arising from development.

G2.18. Impact descriptors for individual receptors are used which expresses the magnitude of incremental change as a proportion of a relevant AQAL and then examining this change in the context of the new total concentration and its relationship with the assessment criterion. Table 3 sets out the matrix for determining the impact descriptor for annual mean concentrations at individual receptors, based on Table 6.3 in the EPUK and IAQM guidance document (EPUK/IAQM, 2017).

G2.19. As part of the dispersion modelling study a comparison between modelled concentrations and measured concentrations has been carried out (*see appended document: 'Dispersion Modelling Approach: Crymlyn Parc, Skewen*). Due to the uncertainty in the modelling, a pragmatic approach for defining the AQAL for use with Table 3 has been applied. This approach is to deduct the calculated root mean square error (RMSE) calculated from the NO_2 comparison (approximately 2 µg/m^3) from the AQOs. This results in a more stringent approach when assessing the operational impacts of the Proposed Development on the local area.

Table 3: Annual Mean Impact Descriptors for Individual Receptors

Annual Mean Concentration with Proposed Development (µg/m³)	% Change in Concentration relative to the AQO (µg/m³)			
	1	2-5	6-10	>10
75% or less of AQO	Negligible	Negligible	Slight	Moderate
76-94% of AQO	Negligible	Slight	Moderate	Moderate
95-102% of AQO	Slight	Moderate	Moderate	Substantial
103-109% of AQO	Moderate	Moderate	Substantial	Substantial
110% or more of AQO	Moderate	Substantial	Substantial	Substantial
Table notes: -				

Short-term (24-hour, 8-hour, 1-hour and 15-minute mean) Impacts on Human Health

G2.20. Previous research carried out on behalf of Defra and the devolved administrations identified that, where road traffic is the dominate pollutant source, exceedances of the 1-hour mean NO_2 AQO are unlikely to occur where the annual mean is below 60 µg/m³ (Defra, 2021). Where annual mean concentrations are below this level the short-term impacts are considered negligible.

Planning Significance

G2.21. The approach developed by EPUK and IAQM (2017) has been used. The guidance is that the assessment of significance should be based on professional judgement, with the overall air quality impact of the development described as either 'significant' or 'not significant'.

G2.22. If none of the criteria in Stage 1 and 2 are met, then there should be no requirement to carry out an air quality assessment for the impact of the development on the local area, and the impacts can be considered as having a not significant effect.

G2.23. Where the impacts are negligible the overall significance is judged to be 'not significant'.

G2.24. Where a Simple or Detailed assessment is carried out, in drawing the determination of significance, the following factors should be taken account of:

- the existing and future air quality in the absence of the development;
- the extent of current and future population exposure to any impacts;
- the influence and validity of any assumptions adopted when undertaking the prediction of impacts;
- the potential for cumulative impacts. In such circumstances, several impacts that are described as "slight" individually could, taken together, be regarded as having a significant effect for the purposes of air quality management in an area, especially where it is proving difficult to reduce concentrations of a pollutant. Conversely, a "moderate" or "substantial" impact may not have a significant effect if it is confined to a very small area and where it is not obviously the cause of harm to human health; and
- the judgement on significance relates to the consequences of the impacts; i.e. will they have an effect on human health that could be considered as significant? In the majority of cases, the impacts from an individual development will be insufficiently large to result in measurable changes in health outcomes that could be regarded as significant by health care professionals.

G2.25. The guidance is clear that other factors may be relevant in individual cases.

Assessment Approach - Compliance with the Limit Values

G2.26. There is no magnitude of change in relation to compliance with the limit values. Good practice in relation to the Limit Value assessment is to consider whether the Proposed Development causes a delay in compliance or causes a breach. The effect is based on whether any location which would be used for compliance reporting is impacted. A delay in compliance is judged to be significant.

G3. Operational Phase Impact Assessment

Impacts on Air Quality Objectives

G3.1. The potential air quality impacts during the operation of the Proposed Development are discussed in this section. The predicted concentrations in 2026 at the modelled locations in the local area both with and without the Proposed Development in operation are discussed with relation to the AQOs.

G3.2. The locations of the modelled receptors are shown in Figure 1.

Figure 1: Modelled Receptor Locations near the Proposed Development

Figure notes: Imagery © 2025 Google, Map data © 2025.

Annual Mean Impacts

G3.3. The predicted annual mean concentrations at each receptor, as well as the impact descriptors, are given in Table 4, Table 5 and Table 6 for NO_2, PM_{10} and $PM_{2.5}$ respectively. All values are well below the AQOs, and no new exceedances are created. The impact of the Proposed Development are thus described as negligible at all receptor locations.

Table 4: Predicted Annual Mean NO_2 Concentrations in 2026 and Impact Descriptor (µg/m^3)

Receptor (height)	No Development	With Development	Impact Descriptor
E1 (1.5 m)	10.2	10.3	Negligible
E2 (1.5 m)	10.1	10.3	Negligible
E3 (1.5 m)	9.9	10.1	Negligible
E4 (1.5 m)	10.3	10.4	Negligible
E5 (1.5 m)	10.4	10.5	Negligible
E6 (1.5 m)	12.4	12.6	Negligible
E7 (1.5 m)	11.4	11.6	Negligible
E8 (1.5 m)	10.3	10.4	Negligible
E9 (1.5 m)	10.3	10.4	Negligible
E10 (1.5 m)	10.1	10.2	Negligible
E11 (1.5 m)	9.8	9.9	Negligible
E12 (1.5 m)	9.5	9.6	Negligible
E13 (1.5 m)	10.6	10.6	Negligible
E14 (1.5 m)	9.5	9.6	Negligible
E15 (1.5 m)	9.4	9.5	Negligible
E16 (1.5 m)	9.7	9.8	Negligible
E17 (1.5 m)	9.9	9.9	Negligible
E18 (1.5 m)	10.5	10.7	Negligible
E19 (1.5 m)	10.3	10.4	Negligible
AQO	**40**		**-**
Table notes: -			

Table 5: Predicted Annual Mean PM_{10} Concentrations in 2026 and Impact Descriptor (µg/m^3)

Receptor (height)	No Development	With Development	Impact Descriptor
E1 (1.5 m)	11.3	11.3	Negligible
E2 (1.5 m)	11.3	11.3	Negligible
E3 (1.5 m)	11.3	11.3	Negligible
E4 (1.5 m)	11.4	11.4	Negligible
E5 (1.5 m)	11.4	11.5	Negligible
E6 (1.5 m)	11.8	11.9	Negligible
E7 (1.5 m)	11.7	11.7	Negligible
E8 (1.5 m)	11.4	11.5	Negligible
E9 (1.5 m)	11.4	11.5	Negligible
E10 (1.5 m)	11.4	11.4	Negligible
E11 (1.5 m)	11.1	11.1	Negligible
E12 (1.5 m)	11.1	11.2	Negligible
E13 (1.5 m)	11.0	11.0	Negligible
E14 (1.5 m)	11.1	11.1	Negligible
E15 (1.5 m)	11.2	11.2	Negligible

Table 5: Predicted Annual Mean PM_{10} Concentrations in 2026 and Impact Descriptor (µg/m^3)

Receptor (height)	No Development	With Development	Impact Descriptor
E16 (1.5 m)	11.3	11.3	Negligible
E17 (1.5 m)	11.3	11.4	Negligible
E18 (1.5 m)	11.5	11.5	Negligible
E19 (1.5 m)	11.5	11.5	Negligible
AQO	**40**		**-**
Table notes: -			

Table 6: Predicted Annual Mean $PM_{2.5}$ Concentrations in 2026 and Impact Descriptor (µg/m^3)

Receptor (height)	No Development	With Development	Impact Descriptor
E1 (1.5 m)	7.2	7.3	Negligible
E2 (1.5 m)	7.3	7.3	Negligible
E3 (1.5 m)	7.2	7.3	Negligible
E4 (1.5 m)	7.4	7.4	Negligible
E5 (1.5 m)	7.4	7.5	Negligible
E6 (1.5 m)	7.8	7.9	Negligible
E7 (1.5 m)	7.6	7.7	Negligible
E8 (1.5 m)	7.3	7.4	Negligible
E9 (1.5 m)	7.3	7.4	Negligible
E10 (1.5 m)	7.3	7.3	Negligible
E11 (1.5 m)	7.1	7.2	Negligible
E12 (1.5 m)	7.1	7.1	Negligible
E13 (1.5 m)	7.1	7.1	Negligible
E14 (1.5 m)	7.1	7.1	Negligible
E15 (1.5 m)	7.1	7.1	Negligible
E16 (1.5 m)	7.2	7.2	Negligible
E17 (1.5 m)	7.2	7.2	Negligible
E18 (1.5 m)	7.4	7.5	Negligible
E19 (1.5 m)	7.3	7.4	Negligible
AQO	**25 [a]**		**-**
Table notes: a. Not in Regulations and there is no legal requirement for local authorities to meet it.			

Short-term Impacts

G3.4. The predicted short-term NO_2 and PM_{10} AQOs are likely to be achieved as the predicted concentrations are well below the indicative annual mean equivalents for these AQOs of 60 µg/m^3 for 1-hour NO_2 (see Table 4) and 32 µg/m^3 for 24-hour mean PM_{10} (see Table 5). The impacts on the short-term AQOs are therefore considered negligible.

Limit Value Compliance

G3.5. Existing levels of air pollution are predicted by Defra to be below the LVs in the current year (2024) and is predicted to improve when the Proposed Development is operational in 2026. Predicted concentrations within the Proposed Development are below all the LV and will therefore not lead to any delay in the compliance of the limit values.

G4. Significance of Operational Air Quality Effects on Human Health

Summary

G4.1. The maximum change in annual mean concentration in 2026 occurs for NO_2 and is 0.3 µg/m^3 which is <1% of the AQO and described as a negligible magnitude of change. Due to slight uncertainty in the modelling, 2 µg/m^3 has been removed from the NO_2 AQO of 40 µg/m^3 to provide conservative results; however, the overall change in concentrations still remained below <1% and therefore negligible.

G4.2. The Proposed Development is predicted to contribute a maximum of 0.1 µg/m^3 of both PM_{10} and $PM_{2.5}$ to receptors in the local area which is not sufficient to impede compliance with respective AQOs.

G4.3. A summary of the impacts in relation to the air quality at locations of human exposure are set out in Table 7.

Table 7: Human Health Impact Descriptors

Pollutant	Annual mean	Short-term mean
NO_2	Negligible at all assessed locations	Negligible at all assessed locations
PM_{10}	Negligible at all assessed locations	Negligible at all assessed locations
$PM_{2.5}$	Negligible at all assessed locations	Negligible at all assessed locations
Table notes: -		

Significance of Operational Air Quality Effects

G4.4. The operational air quality effects on locations of human health exposure without additional mitigation are judged to be 'not significant'. This professional judgement takes account of the assessment that:

- The annual mean impacts of pollutant emissions in relation to the human health receptors are described as negligible, as set out in Table 7 ; and
- The short-term mean impacts of pollutant emissions in relation to the human health receptors are negligible, as set out in Table 7.

G5. Glossary and References

Glossary

AADT Annual Average Daily Traffic

Air Quality Standards	Concentrations recorded over a given time period, which are considered to be acceptable in terms of what is scientifically known about the effects of each pollutant on health and on the environment.
An exceedance	A period of time (defined for each standard) where the concentration is higher than that set out in the Standard.
An objective	The target date on which exceedances of a Standard must not exceed a specified number.
APS	Air Pollution Services
AQO	Air Quality Objective
EAL	Environmental assessment level
EPUK	Environmental Protection UK
HDV	Heavy Duty Vehicle (which comprise of heavy goods vehicles, buses, and coaches)
IAQM	Institute of Air Quality Management
LAQM	Local Air Quality Management
LDV	Light Duty Vehicle (which comprise of motorcycles, cars, taxis, and light goods vehicles)
Limit Values (LV)	Legally binding EU parameters that must not be exceeded. Limit values are set for individual pollutants and are made up of a concentration value, an averaging time over which it is to be measured, the number of exceedances allowed per year, if any, and a date by which it must be achieved. Some pollutants have more than one limit value covering different endpoints or averaging times.
NO_2	Nitrogen dioxide
NOx	Nitrogen oxides
PM_{10}	Small airborne particles, more specifically particulate matter less than 10 micrometres in aerodynamic diameter
$PM_{2.5}$	Small airborne particles, more specifically particulate matter less than 2.5 micrometres in aerodynamic diameter
WHO	World Health Organization
$\mu g/m^3$	Microgrammes per cubic metre

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Air Quality Site Suitability: Crymlyn Parc, Skewen

Client: Hale Group

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I1. Introduction

I1.1. Air Pollution Services (APS), part of KALACO Group, has been commissioned to assess the air quality impacts associated with the proposed development at Crymlyn Parc, Skewen (herein the 'Proposed Development'). The Proposed Development/Facility is located within the administrative area of Neath Port Talbot Council (NPTC).

I1.2. This document sets out the site suitability of the Proposed Development with regards to air quality.

Location Context

I1.3. The Proposed Development will introduce human health exposure to the application site. Future occupiers may be affected by both short-term and long-term exposure to air pollutants.

I1.4. The main air quality concern regarding the suitability of the application site for future occupants is the combined effects of background pollutant concentrations and pollutant contributions from local roads and the railways.

I2. Methodology

Approach

I2.1. The approach to determining site suitability and its rationale is set out in Air Quality Site Suitability Guidance (Air Pollution Services, 2023). It considers two elements:

- Compliance with regulatory thresholds in the context of the planning regime; and
- An approach based on the World Health Organization (WHO) Air Quality Guidelines and Interim Targets (World Health Organisation, 2021) for NO_2, PM_{10}, and $PM_{2.5}$.

Compliance with regulatory thresholds

I2.2. The Air Quality Objectives (AQOs) and Limit Values (LVs) set for the protection of human health are set out in Table 1.

Table 1: Air Quality Objectives and Limit Values [a]

Pollutant	Time Period	Criteria Type	Concentration, and the number of exceedances allowed per year (if any)	Date AQO / LV to be Achieved From and Maintained After
Nitrogen Dioxide (NO_2)	1-hour Mean	AQO / LV	200 µg/m³ not to be exceeded more than 18 times a year	31st December 2005 / 1st January 2010
	Annual Mean	AQO / LV	40 µg/m³	31st December 2005 / 1st January 2010
Fine Particles (PM_{10})	24-hour Mean	AQO / LV	50 µg/m³ not to be exceeded more than 35 times a year	31st December 2004
	Annual Mean	AQO / LV	40 µg/m³	31st December 2004
Fine Particles ($PM_{2.5}$) [a]	Annual Mean	AQO / LV	25 µg/m³ / 20 µg/m³	2020 / 2020

Table notes:
a. Air Quality Objectives (AQOs) from the Air Quality Strategy; limit values from the Air Quality Standards Regulations.

Air Quality Health Risk

I2.3. The WHO air quality guidelines (AQGs) and interim targets (ITs) for NO_2, PM_{10}, and $PM_{2.5}$, used to assess the health risk, are shown in Table 2.

Table 2: WHO Guidelines

Pollutant	Time Period	IT Levels				AQG Level
		1	2	3	4	
Nitrogen Dioxide (NO_2)	1-hour Mean	-	-	-	-	200 µg/m³
	24-hour Mean	120	50	-	-	25 µg/m³
	Annual Mean	40	30	20	-	10 µg/m³
Fine Particles (PM_{10})	24-hour Mean	150	100	75	50	45 µg/m³
	Annual Mean	70	50	30	20	15 µg/m³
Fine Particles ($PM_{2.5}$)	24-hour Mean	75	50	37.5	25	15 µg/m³
	Annual Mean	35	25	15	10	5 µg/m³
Table notes: -						

I2.4. The WHO AQGs are based solely on the latest epidemiological evidence, whereas the AQOs and LVs were based on health evidence largely from the 1990s. The latter also take account of other factors such as the technical and economic feasibility of meeting the standard by a defined date.

I2.5. The AQGs are not legally binding standards; however, they should be used to inform legislation and policy. Ultimately, the goal of the AQGs is to help reduce the health burden resulting from exposure to air pollution. Air pollution increases morbidity and mortality from cardiovascular and respiratory disease and from lung cancer and there is increasing evidence of effects on all other human organ systems.

I2.6. WHO acknowledges that achieving the AQGs is difficult and has set ITs to encourage the reduction in air pollution towards the AQGs.

I2.7. A pragmatic approach has been adopted for identifying an appropriate local level (IT or AQG) for this assessment based on the background concentrations in the local area in the assessment year (2026). This is the air quality members of the public can reasonably expect to enjoy if well away from local emission sources such as road traffic.

I2.8. The modelling carried out for the assessment is not suitable for assessing against the WHO short term ITs and there is currently no proxy method for assessment; therefore, the focus is on the annual mean levels.

Step 1 – Define AQLs

I2.9. Table 3 provides descriptions and Air Quality Levels (AQLs) based on the WHO AQGs and ITs. The descriptors are in the context of current air quality in the UK and over time, as air quality improves, will need to be updated to drive reductions in air pollution.

I2.10. Two AQLs are identified for the first year of occupation of the development:

- ***Background AQL*** derived from the background concentrations in the 1km x 1km grid where the development is located (Defra, 2023)[1]. Where a development covers several grids or is close to the boundary of one with much lower concentrations, the highest background is used as a worst-case scenario.
- ***Proposed Development AQL*** derived from the predicted concentrations at the site, i.e. taking into account local sources of air pollution, such as the emissions from nearby roads. This would be at dwellings located within the site boundary closest to the pollution sources (outline applications).

Table 3: Air Quality Levels (AQLs)*

Pollutant	Concentrations (µg/m³) *	AQL	Description
NO_2**	≤10 µg/m³	1	Achieves WHO AQG.
	11-20 µg/m³	2	Achieves WHO IT3.
	21-30 µg/m³	3	Achieves WHO IT2.
	31-40 µg/m³	4	Achieves WHO IT1.
	>40 µg/m³	5	Exceeds regulatory thresholds. ***
PM_{10}	≤15 µg/m³	1	Achieves WHO AQG.
	16-20 µg/m³	2	Achieves WHO IT4.
	21-30 µg/m³	3	Achieves WHO IT3.
	31-40 µg/m³	4	Achieves WHO IT2.
	>40 µg/m³	5	Exceeds regulatory thresholds. ***
$PM_{2.5}$	≤5 µg/m³	1	Achieves WHO AQG.
	6-10 µg/m³	2	Achieves WHO IT4.
	11-15 µg/m³	3	Achieves WHO IT3
	16-20 µg/m³	4	Achieves WHO IT2
	>20 µg/m³	5	Exceeds regulatory thresholds. ***

Note:
* Concentrations should be rounded to the nearest whole number.
** For NO_2 there is no WHO IT4.
*** Regulatory thresholds refer to the limit values and air quality objectives.

Step 2 – Define Risk

I2.11. The difference between the development AQL and the background AQL along with the future AQL at the proposed development are used to assess the suitability of the site relative to exposure in the general wider area, as illustrated in Table 4.

Table 4: Health Risk for Future Occupiers of the Proposed Development

Future AQL at Proposed Development	Number of AQL changes in future year at site (i.e. Background AQL – Maximum AQL at Proposed Development) *				
	0	-1	-2	-3	-4
AQL 1	Negligible	**	**	**	**

[1] Or equivalent background maps for the other nations.

Table 4: Health Risk for Future Occupiers of the Proposed Development

AQL 2	Low	Medium	**	**	**
AQL 3	Medium	High	High	**	**
AQL 4	High	High	Extremely high	Extremely high	**
AQL 5	Extremely high	Extremely high	Extremely high	Extremely high	Extremely high

Notes:
* The difference in Background Air Quality Level – Proposed Development Air Quality Level (see Table 3)
** The grey cells are non-feasible options

Step 3 - Evaluation

I2.12. Where the future background is AQL 5, i.e. one or more of the regulatory thresholds will be exceeded, this is addressed in the section on compliance with regulatory thresholds. High and extremely high sites may not be suitable for sensitive land-uses, unless suitable exposure reduction measures are introduced to ensure appropriate exposure.

I2.13. A proportionate health impact assessment is recommended for extremely high-risk sites, while it may also be beneficial for high-risk sites in supporting a determination of significant effects on health. Any air pollution focused HIA should be reviewed by both air quality and public health officers of the local authority.

I2.14. Where the risk is assessed to be medium or above, opportunities to improve air quality should be explored, taking into account the risk of disbenefits of other environmental factors, such as the need to meet net zero emissions. This is particularly the case where a large number of people will be exposed and/or the people exposed are likely to be from deprived communities, or other groups of the population who tend to have a greater risk of poor health due to air pollution.

Relevant exposure

I2.15. The locations of relevant exposure for each type of AQAL are set out in Table 5.

Table 5: Locations of relevant exposure

Receptor Locations	Relevant Exposure
AQO	The annual mean AQO applies at locations where members of the public might be regularly exposed, such as building façades of residential properties, schools, hospitals, and care homes. The 24-hour mean AQO applies at the annual mean locations of exposure as well as at hotels and residential gardens. The 1-hour mean AQO applies at the annual mean locations of exposure and at hotels, residential gardens and any outdoor location where members of the public might reasonably be expected to spend one hour or longer, such as busy pavements, outdoor bus stations and locations with outdoor seating. Places of work like factories or offices are not considered places where members of the public might be regularly exposed and therefore the AQO's do not apply at these locations.
LV	In accordance with Article 2(1), Annex III, Part A, paragraph 2 of Directive 2008/50/EC detailed locations where compliance with the LVs does not need to be assessed: "Compliance with the limit values directed at the protection of human health shall not be assessed at the following locations: a) Any locations situated within areas where members of the public do not have access and there is no fixed habitation; b) In accordance with Article 2(1), on factory premises or at industrial installations to which all relevant provisions concerning health and safety at work apply; and

	c) On the carriageway of roads; and on the central reservation of roads except where there is normally pedestrian access to the central reservation". The government models compliance with the Directive at locations 4 m from the kerbside, 2 m high, more than 25 m from major road junctions and adjacent to at least 100 m of road length where the LVs apply.
WHO	The WHO criteria apply wherever there is relevant exposure in relation to each time period for each pollutant.
Table notes: n/a	

Planning Significance

I2.16. The EPUK and IAQM (2017) guidance is that the assessment of significance should be based on professional judgement, with the overall air quality impact described as either 'significant' or 'not significant' (i.e. the site is suitable or not suitable for the proposed use).

I2.17. In drawing the determination of significance, the following factors should be taken account of:

- the extent of future population exposure to any impacts;
- the influence and validity of any assumptions adopted when undertaking the prediction of impacts; and
- the judgement on significance relates to the consequences of the impacts; i.e. will they have an effect on human health that could be considered as significant?

I2.18. The guidance is clear that other factors may be relevant in individual cases. It also states that the effect on the users of any new development where an AQO is not met will be judged as significant.

I3. Site Suitability Assessment

I3.1. The suitability of the site for future users has been considered. The existing conditions are based on the information provided in the appended documents *'Air Quality Baseline: Crymlyn Parc, Skewen'* and the *'Dispersion Modelling Approach: Crymlyn Parc, Skewen'*.

Predicted Concentrations

I3.2. Table 6 shows the modelled annual mean concentrations for NO_2, PM_{10} and $PM_{2.5}$ at modelled on-site receptors for the year of 2026 (the earliest year of first occupation). The concentrations have been predicted across the Proposed Development to represent the worst-case locations. The locations of the receptors are shown in Figure 1.

Table 6: Predicted Annual Mean Concentrations at the Proposed Development in 2026 (µg/m^3)

Receptor	NO_2	PM_{10}	$PM_{2.5}$
P1	10.3	11.4	7.3
P2	11.6	11.7	7.5
P3	11.9	11.7	7.6
P4	13.0	11.9	7.7
P5	12.3	11.8	7.6
P6	11.9	11.7	7.6
P7	11.5	11.7	7.5
P8	11.2	11.6	7.5

Table 6: Predicted Annual Mean Concentrations at the Proposed Development in 2026 (µg/m^3)

Receptor	NO_2	PM_{10}	$PM_{2.5}$
P9	10.3	11.4	7.3
P10	10.3	11.3	7.3
P11	10.1	11.4	7.3
P12	10.2	11.4	7.3
P13	10.3	11.5	7.3
AQO	**40**	**40**	**25 [a]**
LV [b]	**40**	**40**	**20**
WHO AQG Level (ITs) [a]	**10 (40, 30, 20)**	**15 (70, 50, 30, 20)**	**5 (35, 25, 15, 10)**
Environmental Target - AMCT (Interim Target) [c]	**-**	**-**	**10 (12)**

Table notes:

a. Not in Regulations and there is no legal requirement for local authorities to meet it.

b. Reporting of LV exceedances is only carried out based on approved reference monitoring and at relevant reporting locations. Therefore, while the value is included, the monitoring presented is unlikely to comply with the requirements for LV reporting and assessment.

c. Environmental target of 10 µg/m^3 needs to be met by 2040 and the interim target of 12 µg/m^3 needs to be met by 2028.

Figure 1: Receptor Locations within the Proposed Development

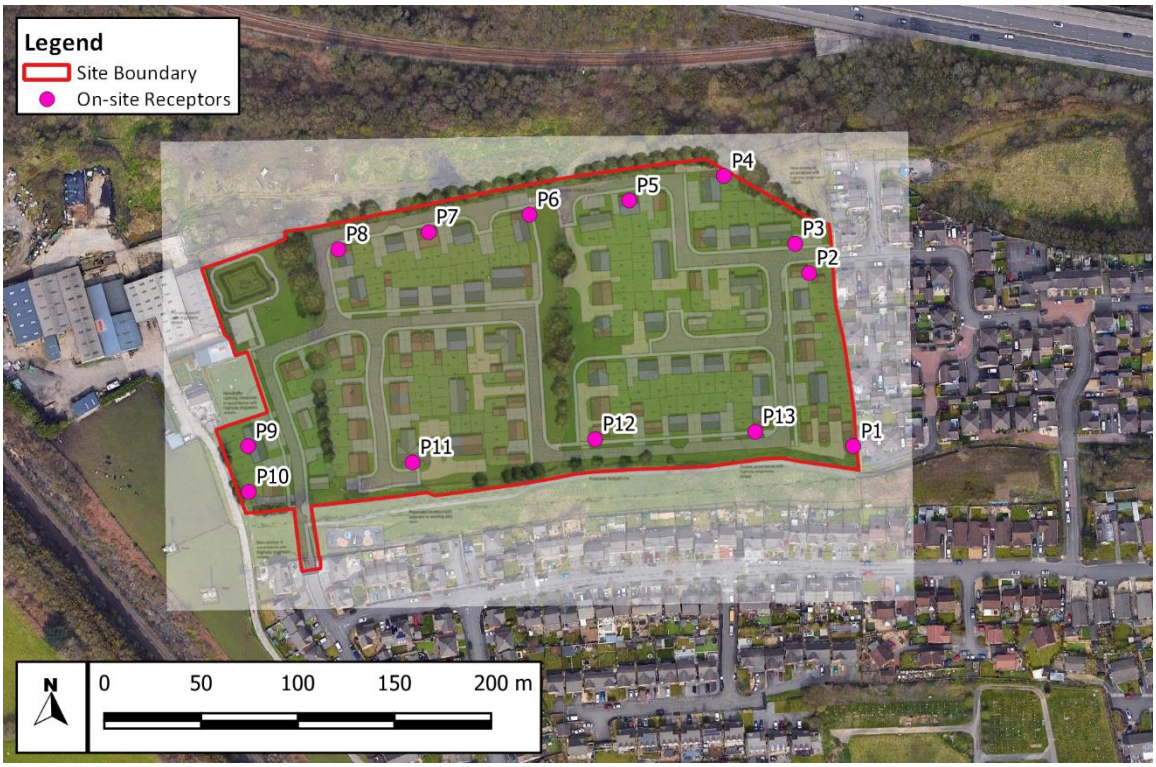

Figure notes: Imagery © 2025 Google, Map data © 2025.

Compliance with regulatory thresholds and statutory standards

Air Quality Objectives

I3.3. Concentrations are predicted to be below the annual mean AQOs at all receptors.

I3.4. The predicted short term NO_2 and PM_{10} AQOs are also likely to be achieved (at all receptors) as the predicted concentrations are well below the proxy annual mean equivalents for these AQOs of 60 µg/m$_3$ for 1-hour NO_2 and 32 µg/m^3 for 24-hour mean PM_{10}.

Limit Values

I3.5. The application site boundary is over 4 m from the kerb of the local major roads e.g. A4230 (i.e. the location used for LV compliance reporting).

I3.6. In recognition that LV apply anywhere members of the public can access, concentrations at the Proposed Development have been considered. The maximum predicted concentrations within the Proposed Development in 2026 are all well below the LVs. There is thus unlikely to be a breach of the LVs within the Proposed Development.

Air Quality Health Risk

I3.7. Table 7 sets out the predicted background concentrations in the Proposed Development site, the applicable AQL which the background concentration achieves, the maximum predicted concentration at the application site, and the AQL that is predicted to be achieved at the Proposed Development in 2026.

Table 7: 2026 Annual Mean Concentrations and Relevant AQLs

Pollutant	Background Concentrations (µg/m³) [a]	Applicable background AQL	Maximum predicted concentration on Application Site (µg/m³)	Development AQL achieved	Change in AQL	Risk
NO_2	9.1	1	13.0	2	- 1 level	Medium
PM_{10}	11.5	1	11.9	1	0 levels	Negligible
$PM_{2.5}$	7.2	2	7.7	2	0 levels	Low

Table notes:
a) Taken from Defra background predicted concentrations (2023).

I3.8. The Proposed Development will introduce exposure at AQL 2 for NO_2, posing *Medium* risk to human health. Due to the low background predicted NO_2 concentrations, the exposure at AQL 2 for NO_2 in 2026 is expected to be the case for much of the local area and is not unique to the Proposed Development. Exposure at AQL 2 and AQL 1 is expected for PM_{10} and $PM_{2.5}$, posing Negligible and Low risk, respectively.

I3.9. Concentrations of PM_{10} and $PM_{2.5}$ are expected to remain at the same AQL as the background (therefore no change in AQL), whilst the concentrations of NO_2 are predicted to be slightly higher than the background concentrations at the Proposed Development. This suggests that local road traffic sources are likely to have an impact on the NO_2 concentrations at the Proposed Development.

Mitigation Measures

I3.10. Because the NO_2 concentrations at the Proposed Development are predicted to pose Medium risk to human health, it is prudent to explore easy and practical mitigation measures that can be implemented at the Proposed Development.

I3.11. Alongside the measures already implemented in the design, outlined in appended document *'Air Quality Assessment: Crymlyn Parc, Skewen'*, it is recommended to install provision for EV charging points at all dwellings at the Proposed Development. This can reduce on-site NO_2 emissions and contribute to the improvement of air quality in the local area.

I4. Summary

I4.1. The air quality at the Proposed Development has been considered for the year of 2026, and the application site is considered to be suitable for residential development.

I4.2. There are acknowledged non-threshold effects of the pollutants, so there is a small potential risk of adverse health effects. To reduce potential risk, it is prudent to explore easy and practical opportunities to improve air quality at the Proposed Development, which has been done for the development.

I4.3. Overall, the air quality impacts of local emissions sources on the Proposed Development will be 'not significant' in terms of compliance with AQOs and LVs.

I5. Glossary

APS	Air Pollution Services
AQG	Air Quality Guideline
AQL	Air Quality Level
AQO	Air Quality Objective
IT	Interim Target
LV	Limit Value
NO_2	Nitrogen dioxide
NPTC	Neath Port Talbot Council
PM_{10}	Small airborne particles, more specifically particulate matter less than 10 micrometres in aerodynamic diameter
$PM_{2.5}$	Small airborne particles, more specifically particulate matter less than 2.5 micrometres in aerodynamic diameter
WHO	World Health Organization

I6. References

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