

Air Quality Assessment: Asphalt Plant, Former Edwards works, Llandarcy

September 2021



Experts in air quality
management & assessment



Document Control

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Executive Summary

The air quality, dust and odour impacts associated with the proposed asphalt plant at the Former Edwards works in Llandarcy have been assessed. Operations will comprise the production of asphalt, which will require the importation of bitumen, sand and aggregate, and export of asphalt by road.

The proposed development has the potential to generate dust and odour emissions from the handling of dusty material and the production of asphalt. However, the nearest sensitive receptors are distant to the site, thus the risk of impacts is judged to be 'not significant'.

The proposed development will generate a small volume of vehicle movements on the local road network, below established screening criteria, thus it will not have a significant impact upon local roadside air quality as a result of its traffic generation.

The asphalt plant involves two combustion processes, one to dry aggregate and one to heat bitumen. Both will generate pollutant emissions from a stack. The assessment has shown that the resultant impacts to both human and ecological receptors will be 'not significant'.

Overall, the air quality effects of the proposed development are judged to be 'not significant'.

Since the assessment was undertaken (June 2021), it has been confirmed by the operator that one of the two burners (known as the 'Heating Burner') will now be powered using electricity, rather than liquefied petroleum gas. This will leave emissions from one stack only and reduce the overall impact from the site. Therefore, the stack emissions assessment will overestimate the impact from the site and is considered worst case. Overall, the air quality effects of the proposed development are still judged to be 'not significant'.

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1 Introduction

- 1.1 This report describes the potential air quality, odour and dust impacts associated with the proposed asphalt plant at the Former Edwards works, Llandarcy. The assessment has been carried out by Air Quality Consultants Ltd on behalf of G D Harries and Sons Ltd.
- 1.2 The development will lead to changes in vehicle flows on local roads, which may impact on air quality at existing residential properties and local ecological sites. The main air pollutants of concern related to road traffic emissions are nitrogen dioxide (NO₂) and fine particulate matter (PM₁₀ and PM_{2.5}).
- 1.3 The asphalt plant will release emissions from two stacks serving burners used for the drying of aggregates and heating of bitumen. The burners will be fuelled by Liquefied Petroleum Gas (LPG), with the main pollutant emission of concern from the combustion of LPG being nitrogen oxides (NO_x), and the resultant impacts in terms of nitrogen dioxide (NO₂) concentrations at human health receptors, and NO_x concentrations and nutrient and acid nitrogen deposition at nearby ecological sites.
- 1.4 The development will also represent a potential source of dust, which could lead to nuisance and health-related impacts in terms of PM₁₀ and PM_{2.5}; there is also the potential for emissions of odours, which could also lead to loss of amenity.
- 1.5 The location and setting of the proposed development are shown in Figure 1, along with the relevant nearby designated ecological sites.
- 1.6 Since the assessment was undertaken (June 2021), it has been confirmed by the operator that one of the two burners (known as the 'Heating Burner') will now be powered using electricity, rather than liquefied petroleum gas. The site is now proposed to emit pollutants from one stack only (the dryer stack). The assessment of impacts of emissions from both burners presented in this report, therefore, represents a worst-case scenario.

2 Policy Context

- 2.1 All European legislation referred to in this report is written into UK law and remains in place, although there is uncertainty at this point in time as to who will enforce the requirements of some of this legislation.

Air Quality Strategy

- 2.2 The Air Quality Strategy (Defra, 2007) published by the Department for Environment, Food, and Rural Affairs (Defra) and Devolved Administrations, provides the policy framework for air quality management and assessment in the UK. It provides air quality standards and objectives for key air pollutants, which are designed to protect human health and the environment. It also sets out how the different sectors: industry, transport and local government, can contribute to achieving the air quality objectives. Local authorities are seen to play a particularly important role. The strategy describes the Local Air Quality Management (LAQM) regime that has been established, whereby every authority has to carry out regular reviews and assessments of air quality in its area to identify whether the objectives have been, or will be, achieved at relevant locations, by the applicable date. If this is not the case, the authority must declare an Air Quality Management Area (AQMA), and prepare an action plan which identifies appropriate measures that will be introduced in pursuit of the objectives.

Medium Combustion Plant Directive (MCPD) and The Environmental Permitting (England and Wales) (Amendment) Regulations 2018

- 2.3 Pollutant emissions from combustion plant with a rated input between 1 and 50 megawatts (MW_{th}) are regulated through the MCPD (The European Parliament and the Council of the European Union, 2015). The MCPD was transposed into UK law in January 2018 through an amendment to the Environmental Permitting Regulations (2018). Asphalt plants are not covered by MCPD as combustion plant used for direct heating and drying are not within the scope of the Directive. Asphalt plants are, however, still regulated through The Environmental Permitting Regulations and will require an Environmental Permit to operate.

Clean Air Act 1993 & Environmental Protection Act

- 2.4 Small combustion plant of less than 20 MW net rated thermal input are controlled under the Clean Air Act 1993 (1993). This requires the local authority to approve the chimney height. The local authority's approval will, therefore, be required for the plant to be installed in the proposed development.
- 2.5 Measures to ensure adequate dispersion of emissions from discharging stacks and vents are included in Technical Guidance Note D1 (Dispersion) (1993), issued in support of the Environmental Protection Act (1990).

Clean Air Strategy 2019

- 2.6 The Clean Air Strategy (Defra, 2019b) sets out a wide range of actions by which the UK Government, in partnership with the Governments of Scotland, Wales and Northern Ireland, will seek to reduce pollutant emissions and improve air quality. Actions are targeted at four main sources of emissions: Transport, Domestic, Farming and Industry. At this stage, there is no straightforward way to take account of the expected future benefits to air quality within this assessment.

The Clean Air Plan for Wales

- 2.7 In August 2020, the Welsh Government published the Clean Air Plan for Wales (Welsh Government, 2020), which aims to *“improve air quality and reduce the impacts of air pollution on human health, biodiversity, the natural environment and our economy”*. The Plan sets out the following four themes, around which the plan is structured, with actions in order to enable collaborative approaches to reducing air pollution:
- People: Protecting the health and well-being of current and future generations;
 - Environment: Taking action to support our natural environment, ecosystems and biodiversity;
 - Prosperity: Working with industry to reduce emissions, supporting a cleaner and more prosperous Wales; and
 - Place: Creating sustainable places through better planning, infrastructure and transport.
- 2.8 The Plan details intentions to publish a Clean Air Zone Framework in Spring 2021, stating an expectation *“to see Clean Air Zones established in towns and cities throughout Wales to reduce the impact of transport emissions on health. Some of these may be supported by a charging element. Clean Air Zones, where appropriate, would enable a range of co-ordinated actions to deliver significant reductions in public and environmental exposure to harmful airborne pollutants from all sources”*.
- 2.9 The Plan also includes plans to *“introduce LAQM policy changes by 2023 to ensure the regime is public health focused and proactively finding and tackling areas of pollution”*. These changes include a focus on the human health impacts of PM_{2.5}, stating *“In the current regime, monitoring of PM_{2.5} is encouraged but not mandatory. In the context of the known health impacts associated with PM_{2.5}, we propose to investigate the extent to which Local Authorities can support monitoring, reporting and action on PM_{2.5} as part of their existing LAQM functions”*.
- 2.10 The Plan states that the Welsh Government will *“publish and consult on a White Paper on a Clean Air Act for Wales before the end of this Senedd Term”*, which will include:
- *“New powers for smoke control linked to tackling air pollution from domestic burning (PM_{2.5})”*
 - *A requirement for a Clean Air Plan / Strategy to be published / reviewed every 5 years*

- *Potential new air quality targets (for example, taking account of WHO guidelines for air quality)*
- *Clarified and strengthened local air quality management legislation*
- *Strengthened powers to address road vehicle idling*
- *Consolidated powers to implement Clean Air Zones / Low Emission Zones*
- *Focused powers to protect vulnerable groups from the effects of air pollution*
- *Enhanced air quality monitoring and modelling*
- *A potential new duty on public bodies to adhere to guidance encouraging different ways of working and actions to reduce air pollution and support decarbonisation.”*

Reducing Emissions from Road Transport: Road to Zero Strategy

- 2.11 The Office for Low Emission Vehicles (OLEV) and Department for Transport (DfT) published a Policy Paper (DfT, 2018) in July 2018 outlining how the government will support the transition to zero tailpipe emission road transport and reduce tailpipe emissions from conventional vehicles during the transition. This paper affirms the Government's pledge to end the sale of new conventional petrol and diesel cars and vans by 2040, and states that the Government expects the majority of new cars and vans sold to be 100% zero tailpipe emission and all new cars and vans to have significant zero tailpipe emission capability by this year, and that by 2050 almost every car and van should have zero tailpipe emissions. It states that the Government wants to see at least 50%, and as many as 70%, of new car sales, and up to 40% of new van sales, being ultra-low emission by 2030.
- 2.12 The paper sets out a number of measures by which Government will support this transition, but is clear that Government expects this transition to be industry and consumer led. The Government has since announced that the phase-out date for the sale of new petrol and diesel cars and vans will be brought forward to 2030 and that all new cars and vans must be fully zero emission at the tailpipe from 2035. If these ambitions are realised, then road traffic-related NO_x emissions can be expected to reduce significantly over the coming decades.

Planning Policy

National Policies

- 2.13 Land-use planning policy in Wales is established within the policy document Planning Policy Wales (PPW) (Welsh Government, 2021), which provides the strategic policy framework for the effective preparation of local planning authority development plans. With regard to pollution and health effects, it states:

“Planning authorities have a role to play in the prevention of physical and mental illnesses caused, or exacerbated, by pollution, disconnection of people from social activities (which contributes to

loneliness) as well as the promotion of travel patterns which facilitate active lifestyles. The planning system must consider the impacts of new development on existing communities and maximise health protection and well-being and safeguard amenity. This will include considering the provision of, and access to, community and health assets, such as community halls, libraries, doctor's surgeries and hospitals. Health impacts should be minimised in all instances, and particularly where new development could have an adverse impact on health, amenity and well-being. In such circumstances, where health or amenity impacts cannot be overcome satisfactorily, development should be refused".

"Planning authorities should develop and maintain places that support healthy, active lifestyles across all age and socio-economic groups, recognising that investment in walking and cycling infrastructure can be an effective preventative measure which reduces financial pressures on public services in the longer term. The way a development is laid out and arranged can influence people's behaviours and decisions and can provide effective mitigation against air and noise pollution. Effective planning can provide calming, tranquil surroundings as well as stimulating and sensory environments, both of these make an important contribution to successful places"

"Green infrastructure can be an effective means of enhancing health and well-being, through linking dwellings, workplaces and community facilities and providing high quality, accessible green spaces. In all development and in public spaces especially, there should be sensitive management of light, and exposure to airborne pollution should be kept as low as reasonably practicable. The compatibility of land uses will be a key factor in addressing air quality and creating appropriate soundscapes which are conducive to, and reflective of, particular social and cultural activities and experiences, particularly in busy central areas of towns and cities. Equally, the provision of quiet, tranquil areas which provide peaceful sanctuaries in otherwise noisy environments can help to reduce general levels of pollution and promote both mental and physical well-being".

- 2.14 PPW places a general presumption in favour of sustainable development, stressing the importance of local development plans, and states that the planning system should perform an environmental role to minimise pollution. Local development plans should enable consideration of the effects that the proposed development may have on air quality, as well as the effect that air quality may have on the proposed development. To prevent unacceptable risks from air pollution, planning decisions should ensure that new development is appropriate for its location.
- 2.15 PPW also places considerable emphasis on the Well-being of Future Generations Act (Welsh Government, 2015) with the intention to improve the social, economic, environmental and cultural well-being of Wales, and outlines how this can be achieved through the concept of 'Placemaking'.
- 2.16 PPW is supported by a series of Technical Advice Notes (TANs) and National Assembly for Wales Circulars. Local planning authorities have to take PPW, TANs and Circulars into account when preparing Development Plans.

- 2.17 With respect to planning policy guidance, TAN 18 on transport (Welsh Government, 2007) makes reference to local air quality and the need for Air Quality Action Plans to be prepared for any Air Quality Management Areas declared.
- 2.18 The need for compliance with any statutory air quality limit values and objectives is stressed, and the presence of AQMAs must be accounted for in terms of the cumulative impacts on air quality from individual sites in local areas. New developments in AQMAs should be consistent with local air quality action plans.

Local Policies

- 2.19 The Neath Port Talbot County Borough Council Local Development Plan (Neath Port Talbot County Borough Council, 2016) was adopted in January 2016, and within this document there are two policies which refer to air quality. Policy EN 9 refers to development within Port Talbot and states that:

“Developments in the central Port Talbot area that could result in breaches of air quality objectives during their construction phase, will be required to be undertaken in accordance with a Construction Management Plan submitted as part of the planning process and agreed by the Council.”

- 2.20 Policy Sp16 of the Local Plan refers specifically to air quality and states that:

“Air, water and ground quality and the environment generally will be protected and where feasible improved through the following measures:

- 1. Ensuring that proposals have no significant adverse effects on water, ground or air quality and do not significantly increase pollution level....*
- 3. Ensuring that developments do not increase the number of people exposed to significant levels of pollution.”*

Air Quality Action Plans

National Air Quality Plan

- 2.21 Defra and the devolved administrations have produced an Air Quality Plan to tackle roadside nitrogen dioxide concentrations in the UK (Defra, 2017). Alongside a package of national measures, the Plan requires those Welsh Local Authorities that are predicted to have exceedances of the limit values beyond 2020 to have produced local action plans by December 2018. These plans must have measures to achieve the statutory limit values within the shortest possible time, which may include the implementation of a Clean Air Zone (CAZ). There is currently no practical way to take account of the effects of the national Plan in this assessment; however, consideration has been given to whether there is currently, or is likely to be in the future, a limit value exceedance in the

vicinity of the proposed development. This assessment has principally been carried out in relation to the air quality objectives, rather than the EU limit values that are the focus of the Air Quality Plan.

Welsh Government Supplemental Air Quality Plan

- 2.22 The Welsh Government has produced a supplemental plan to the 2017 UK plan for tackling roadside nitrogen dioxide concentrations (Welsh Government, 2018). The document sets out the work done to date to identify how the Welsh Government will reduce concentrations of nitrogen dioxide around roads where levels are above legal limits. The plan expands on Section 7.6 (Additional Actions in Wales) of the 2017 UK plan for tackling roadside nitrogen dioxide concentrations, and sets out how the Welsh Government will comply within the shortest possible time with the limit values for nitrogen dioxide.

Local Air Quality Action Plan

- 2.23 The Neath Port Talbot County Borough Council Air Quality Action Plan (Neath Port Talbot County Borough Council, 2012) sets out a series of measures by which the Council will seek to achieve the air quality objectives in their AQMA. None of the policies are especially relevant to this assessment, being focussed on locations outside of the assessment study area.

Policy for the Protection of Sensitive Ecosystems

European Policies

- 2.24 The “Habitats Directive” (The Council of the European Communities, 1992) requires member states to introduce a range of measures for the protection of habitats and species. The Conservation of Habitats and Species Regulations (2017) transpose the Directive into UK law. They require the Secretary of State to provide the European Commission with a list of sites which are important for the habitats or species listed in the Directive. The Commission then designates worthy sites as Special Areas of Conservation (SACs). The Regulations also require the compilation and maintenance of a register of European sites, to include SACs and Special Protection Areas (SPAs), with the latter classified under the “Birds Directive” (The European Parliament and the Council of the European Union, 2009), which is implemented in UK law through the Conservation of Habitats and Species Regulations (2010). These sites form a network termed “Natura 2000”.
- 2.25 The Regulations primarily provide measures for the protection of European Sites and European Protected Species, but also require local planning authorities to encourage the management of other features that are of major importance for wild flora and fauna.
- 2.26 In addition to SACs and SPAs, some internationally important UK sites are designated under the Ramsar Convention. Originally intended to protect waterfowl habitat, the Convention has broadened its scope to cover all aspects of wetland conservation.

- 2.27 The Habitats Directive (as implemented by the Regulations) requires the competent authority, which in this case will be the planning authority, to firstly evaluate whether the development is likely to give rise to a significant effect on the European site. Where this is the case, it has to carry out an 'appropriate assessment' in order to determine whether the development will adversely affect the integrity of the site.

National Policies

- 2.28 Sites of national importance may be designated as Sites of Special Scientific Interest (SSSIs). Originally notified under the National Parks and Access to the Countryside Act (1949), SSSIs have been re-notified under the Wildlife and Countryside Act (1981). Improved provisions for the protection and management of SSSIs (in England and Wales) were introduced by the Countryside and Rights of Way Act (2000) (the "CROW" act). If a development is "*likely to damage*" a SSSI, the CROW act requires that a relevant conservation body (i.e. Natural Resources Wales) is consulted. The CROW act also provides protection to local nature conservation sites, which can be particularly important in providing 'stepping stones' or 'buffers' to SSSIs and European sites. In addition, the Environment Act (1995) and the Natural Environment and Rural Communities Act (2006) both require the conservation of biodiversity.
- 2.29 National planning policy on biodiversity and conservation is set out in the NPPF (2019a). This emphasises that the planning system should seek to minimise impacts on biodiversity and provide net gains in biodiversity wherever possible as part of the Government's commitment to halting declines in biodiversity and establishing coherent and resilient ecological networks.
- 2.30 The Environment (Wales) Act (Welsh Government, 2016) replaces the biodiversity duty in the Natural Environment and Rural Communities Act (2006). This duty requires that public authorities seek to maintain and enhance biodiversity in the proper exercise of their functions. The duty also helps to deliver the sustainable management of natural resources, as it will require public authorities, in delivering the new biodiversity duty, to promote the resilience of ecosystems.
- 2.31 Local planning authorities should set criteria-based policies against which proposals for any development on or affecting protected wildlife sites will be judged, making distinctions between different levels of site designation. If significant harm from a development cannot be prevented, adequately mitigated against, or compensated for, then planning permission should be refused.

3 Assessment Criteria

Health Criteria

- 3.1 The UK Government has established a set of air quality standards and objectives to protect human health. The 'standards' are set as concentrations below which effects are unlikely even in sensitive population groups, or below which risks to public health would be exceedingly small. They are based purely upon the scientific and medical evidence of the effects of an individual pollutant. The 'objectives' set out the extent to which the UK Government expects the standards to be achieved by a certain date. They take account of economic efficiency, practicability, technical feasibility and timescale. The objectives for use by local authorities are prescribed within the Air Quality (Wales) Regulations (2000) and the Air Quality (Amendment) (Wales) Regulations (2002). The UK-wide objectives for nitrogen dioxide and PM₁₀ were to have been achieved by 2005 and 2004 respectively and continue to apply in all future years thereafter. The PM_{2.5} objective was to be achieved by 2020.
- 3.2 The objectives apply at locations where members of the public are likely to be regularly present and are likely to be exposed over the averaging period of the objective. Defra and the devolved administrations explain where these objectives will apply in the Local Air Quality Management Technical Guidance (Defra, 2021a). The annual mean objectives for nitrogen dioxide, PM₁₀ and PM_{2.5} are considered to apply at the façades of residential properties, schools, hospitals etc.; they do not apply at hotels. The 24-hour mean objective for PM₁₀ is considered to apply at the same locations as the annual mean objective, as well as in gardens of residential properties and at hotels. The 1-hour mean objective for nitrogen dioxide applies wherever members of the public might regularly spend 1-hour or more, including outdoor eating locations and pavements of busy shopping streets.
- 3.3 EU Directive 2008/50/EC (The European Parliament and the Council of the European Union, 2008) sets limit values for nitrogen dioxide, PM₁₀ and PM_{2.5}, and is implemented in UK law through the Air Quality Standards Regulations (2010). The limit values for nitrogen dioxide are the same numerical concentrations as the UK objectives, but achievement of these values is a national obligation rather than a local one. In the UK, only monitoring and modelling carried out by UK Central Government meets the specification required to assess compliance with the limit values. Central Government does not normally recognise local authority monitoring or local modelling studies when determining the likelihood of the limit values being exceeded, unless such studies have been audited and approved by Defra and devolved administrations and DfT's Joint Air Quality Unit (JAQU).
- 3.4 The relevant air quality criteria for this assessment are provided in Table 1.

Table 1: Air Quality Criteria

Pollutant	Time Period	Objective
Nitrogen Dioxide	1-hour Mean	200 µg/m ³ not to be exceeded more than 18 times a year
	Annual Mean	40 µg/m ³
Fine Particles (PM₁₀)	24-hour Mean	50 µg/m ³ not to be exceeded more than 35 times a year
	Annual Mean	40 µg/m ³
Fine Particles (PM_{2.5})^a	Annual Mean	25 µg/m ³

^a The PM_{2.5} objective, which was to be met by 2020, is not in Regulations and there is no requirement for local authorities to meet it.

Vegetation and Ecosystems Criteria

3.5 Objectives for the protection of vegetation and ecosystems have been set by the UK Government. They are the same as the limit values. The limit values and objectives only apply a) more than 20 km from an agglomeration (about 250,000 people), and b) more than 5 km from Part A industrial sources, motorways and built up areas of more than 5,000 people. Critical levels and critical loads are the ambient concentrations and deposition fluxes below which significant harmful effects to sensitive ecosystems are unlikely to occur. Some of the critical levels are set at the same concentrations as the objectives, but do not have the same legal standing. Typically, the potential for exceedances of the critical levels and critical loads is considered in the context of the level of protection afforded to the ecological site as a whole. For example, the level of protection afforded to an internationally-designated site (such as a SAC) is significantly greater than that afforded to a local nature reserve; reflecting the relative sensitivity of the sites as well as their perceived ecological value. The critical levels relevant to this assessment are set out in Table 2, while the critical loads are provided in Table 3. It should be noted that the Pant-Y-Sais SSSI covers the same physical area as part of the Cors Crymlyn SAC, but is declared for different ecological features.

Table 2: Vegetation and Ecosystem Critical Levels^a

Pollutant	Time Period	Critical Level
Nitrogen Oxides (expressed as NO₂)	Annual Mean ^{a,b}	30 µg/m ³
	24-Hour Mean ^{a,c}	75 µg/m ³

^a The critical levels are defined by the World Health Organisation (WHO, 2000).

^b Away from major sources (see Paragraph 3.5), this critical level is set as an objective (Defra, 2007) and a limit value (The European Parliament and the Council of the European Union, 2008).

^c This critical level is not an objective and thus does not have the same legal standing.

Table 3: Vegetation and Ecosystem Critical Loads

Ecological Site	Habitat Type (and EUNIS code) ^a	Nutrient Nitrogen (kgN/ha/yr) ^b	Acid Deposition 'N _{max} ' (keq/ha/yr) ^c
Crymlyn Bog/ Cors Crymlyn SAC	Transition mires and quaking bogs (D2.3)	5	0.661
Earlswood Road Cutting And Ferryboat Inn Quarries SSSI	No selected features ^d	n/a	n/a
Crymlyn Burrows SSSI	littoral sediments (A2)	Not sensitive	Not sensitive
Pant-Y-Sais SSSI	Valley mires, poor fens and transition mires (D2) and acid grassland (E4.2)	10	0.366
Cors Crymlyn / Crymlyn Bog SSSI	Northern wet heath (F4.11) and acid grassland (E4.2)	10	0.428
Ancient Woodlands	Broadleaved woodland (G1)	10 ^e	1.493 ^e

^a The European Nature Information System. (European Environment Agency, 2021).

^b Critical loads for nutrient nitrogen have been taken from APIS (2021).

^c Critical loads for acid deposition have also been taken from APIS (2021). N_{max} is the value above which additional nitrogen deposition will lead to an exceedance. The value of N_{max} used is the most stringent across the entire site and is not specific to the receptors assessed.

^d APIS states: *"the selected site has no features in the database"*. This site has been declared for geological reasons (*exposures of late Carboniferous rocks*)¹ and has not been assessed further.

^e The site is sensitive to nutrient nitrogen and acid deposition; however, no site-specific data is available. Generic values for broadleaved woodland habitat have been used (APIS, 2013).

¹<https://www.whatdotheyknow.com/request/14659/response/85250/attach/3/SSSI%200803%20Citation%20EN001.pdf>
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Operational Dust Guidance and Criteria

- 3.6 Dust is categorised into two size classifications: 'suspended dust' with diameters below 10µm and 2.5 µm (PM₁₀ and PM_{2.5}) and 'disamenity' dust with diameters between 10µm to 75µm.
- 3.7 Suspended dusts remain in the air for long periods and are fine enough to be inhaled, potentially causing health effects. Disamenity dusts have a larger particle size, which deposit on surfaces more easily, may be visible to the naked eye, and can cause loss of amenity through soiling and staining, being generally associated with nuisance impacts.
- 3.8 The assessment criteria for suspended dust are the air quality objectives for PM₁₀ and PM_{2.5}, which are presented in Table 1. There are currently no statutory standards in the UK covering the release and subsequent impacts of disamenity dust, or levels for dust deposition above which 'nuisance' is deemed to exist. This is due to the inherently subjective nature of nuisance, and is highly dependent upon the existing conditions. Determination of whether or not dust constitutes a statutory nuisance in these cases is usually the responsibility of the local planning authority or National Resources Wales (NRW).
- 3.9 The Institute of Air Quality Management (IAQM)² has produced guidance on the Assessment of Mineral Dust Impacts for Planning (IAQM, 2016). Full details of this approach are provided in Appendix A2. This guidance is considered to be the most appropriate for the proposed development as the site will handle a large volume of aggregates (minerals).

Odour Guidance and Criteria

- 3.10 There are currently no statutory standards in the UK covering the release and subsequent impacts of odours. This is due to complexities involved with measuring and assessing odours against compliance criteria, and the inherently subjective nature of odours.
- 3.11 It is recognised that odours have the potential to pose a nuisance for residents living near to an offensive source of odour. Determination of whether or not an odour constitutes a statutory nuisance in these cases is usually the responsibility of the local planning authority or NRW. The Environmental Protection Act 1990 (1990) outlines that a local authority can require measures to be taken where any:

"dust, steam, smell or other effluvia arising on an industrial, trade and business premises and being prejudicial to health or a nuisance..." or

"fumes or gases are emitted from premises so as to be prejudicial to health or cause a nuisance".

² The IAQM is the professional body for air quality practitioners in the UK.

- 3.12 Odour can also be controlled under the Statutory Nuisance provisions of Part III of the Environmental Protection Act.

National Resources Wales (NRW) Guidance

- 3.13 NRW has produced a horizontal guidance note (H4) on odour assessment and management (NRW, 2014), which is designed for operators of Agency-regulated processes (i.e., those which classify as Part A(1) processes under the Pollution Prevention and Control (PPC) regime). The H4 guidance document is primarily aimed at methods to control and manage the release of odours, but also contains a series of recommended assessment methods which can be used to assess potential odour impacts.

Institute of Air Quality Management Guidance

- 3.14 The latest UK guidance on odour was published by the IAQM in 2018 (IAQM, 2018). The IAQM guidance sets out assessment methods which may be utilised in the assessment of odours for planning applications. It is the only UK odour guidance document which contains a method for estimating the significance of potential odour impacts.

Screening Criteria

Road Traffic Assessments

- 3.15 Environmental Protection UK (EPUK) and the IAQM recommend a two-stage screening approach (Moorcroft and Barrowcliffe et al, 2017) to determine whether emissions from road traffic generated by a development have the potential for significant air quality impacts. The approach, as described in Appendix A1, 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 1,000 m² 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 detailed assessment.
- 3.16 The second stage then compares the changes in vehicle flows on local roads that a development will lead to against specified screening criteria. The screening thresholds (described in full in Appendix A1) inside an AQMA are a change in flows of more than 25 heavy duty vehicles or 100 light duty vehicles per day; outside of an AQMA the thresholds are 100 heavy duty vehicles or 500 light duty vehicles. Where these criteria are exceeded, a detailed assessment is likely to be 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”*.

Point Source Assessments

- 3.17 EPUK and the IAQM have developed an approach (Moorcroft and Barrowcliffe et al, 2017) to determine whether emissions from point sources, such as energy plant, have the potential for

significant air quality impacts. The first step of the approach, as described in Appendix A1, is to screen the emissions and the emissions parameters to determine whether an assessment is necessary:

“Typically, any combustion plant where the single or combined NO_x emission rate is less than 5 mg/sec is unlikely to give rise to impacts, provided that the emissions are released from a vent or stack in a location and at a height that provides adequate dispersion.

In situations where the emissions are released close to buildings with relevant receptors, or where the dispersion of the plume may be adversely affected by the size and/or height of adjacent buildings (including situations where the stack height is lower than the receptor) then consideration will need to be given to potential impacts at much lower emission rates.

Conversely, where existing nitrogen dioxide concentrations are low, and where the dispersion conditions are favourable, a much higher emission rate may be acceptable”.

- 3.18 This screening approach requires professional judgement, and the experience of the consultants preparing the assessment is set out in Appendix A3.

Vegetation and Ecosystems

- 3.19 In terms of the potential for ecological impacts on local (as opposed to national or European) wildlife sites, Environment Agency guidance (Environment Agency, 2016) discounts as insignificant any impacts where the PC is less than 100% of the long-term or short-term environmental standard. Therefore, this screening criterion has been used when assessing the impacts of the facility's emissions at locally-designated sites.
- 3.20 For national or European sites, the Environment Agency's guidance explains that, regardless of the baseline environmental conditions, a process can be considered as insignificant if:
- the long-term (annual mean) process contribution is <1% of the long-term environmental standard; and
 - the short-term (24-hour mean) process contribution is <10% of the short-term environmental standard.
- 3.21 The next step in the Environment Agency's screening process for long-term contributions is to add the process contribution (PC) to the local background concentration to calculate the predicted environmental concentration (PEC). For short-term contributions the PC is compared against the short-term environmental standard minus twice the long-term background concentration.
- 3.22 For the purposes of this assessment, wherever the detailed modelling shows that concentrations and fluxes are below the critical level or critical load, it is considered that there will be no significant impacts.

Dust Assessments

- 3.23 The IAQM Guidance on the assessment of Mineral Dust Impacts for Planning (IAQM, 2016) details screening criteria to determine whether dust emissions have the potential for significant air quality impacts. The screening criteria are designed for minerals sites, but in the absence of other published criteria, they have been applied in this assessment. The screening criteria are based on the distance of receptors to dust-generating activities.
- 3.24 The screening criteria are as follows:
- if there are no relevant receptors within 1 km of the operations, then a detailed dust assessment can be screened out. In such a case, it is considered that, irrespective of the nature, size and operation of the site, the risk of an impact is likely to be “negligible” and any resulting effects are likely to be ‘not significant’;
 - in cases whereby receptors are located between 400 m (for hard rock quarries)/250 m (for sand and gravel quarries) and 1 km of operations, it would normally be assumed that a detailed disamenity dust impact assessment is not required. However, the decision on whether to assess should be made and justified on a site-specific basis; and
 - if there are relevant human and/or ecological receptors within 250 m or 400 m (depending on the rock type) then a disamenity dust impact assessment will almost always be required.
- 3.25 Where the potential dust impact of a mineral site cannot be ‘screened out’, a more detailed dust assessment will be required.

Odour Assessments

- 3.26 The IAQM Guidance on the assessment of Odour Impacts for Planning (IAQM, 2018) does not specify criteria to screen the risk of odour impacts based on distances to relevant exposure. However, the qualitative risk assessment approach described in the guidance can be used to determine whether there is a risk of odour impacts. The risk assessment utilises the Source-Pathway-Receptor approach, which is based on the assumption that for an impact to occur there needs to be a source of odour, a pathway by which exposure might occur and a receptor that could be adversely affected.

4 Assessment Approach

Study Area

- 4.1 The study area for the assessment has been identified using professional judgement, focussing on the areas where impacts are anticipated to be greatest. The assessment of the asphalt plant burner emissions has utilised a 10 km x 10 km model domain, centred on the burner exhausts (detailed further in Paragraph 4.4). The focus of the assessment has been on the areas within 2.5 km of the proposed development, with this area hereafter referred to as the “study area”.
- 4.2 The focus of the assessment of odour and dust impacts has been further restricted, covering all areas within 1 km of the site; guidance suggests that locations beyond this distance are unlikely to be affected by normal operations.

Receptors

- 4.3 Seven existing residential properties have been identified as specific sensitive receptors for the assessment, these being the residential properties nearest the development. Similarly, receptors have been modelled at the nearest points of five nearby ecological sites. These locations are described in Table 4 and shown in Figure 2. It should be noted that the Pant-Y-Sais SSSI covers the same physical area as part of the Cors Crymlyn SAC, but is declared for different ecological features.
- 4.4 As stated in Paragraph 4.1, impacts have been predicted over a 10 km x 10 km model domain, with the proposed development at the centre. Concentrations have been predicted across this area using nested Cartesian grids. These grids have a spacing of 5 m x 5 m within 200 m of the facility, 25 m x 25 m within 400 m, 50 m x 50 m within 1,000 m, 250 m x 250 m within 2,000 m, and 500 m x 500 m within 5,000 m of the facility. The receptor grid has been modelled at a height of 1.5 m above ground level.

Table 4: Description of Receptor Locations

Receptor	Type	X coordinate	Y coordinate	Heights Modelled (m) ^a
Existing Properties – Residential				
Receptor 1	Residential	273547	194827	1.5
Receptor 2	Residential	271555	195228	1.5
Receptor 3	Residential	271919	194937	1.5
Receptor 4	Residential	272178	195566	1.5
Receptor 5	Residential	273686	195396	1.5
Receptor 6	Residential	271699	194035	1.5
Receptor 7	Residential	273185	194131	1.5
Existing Sites – Ecological				
Receptor A	Ancient Woodland	272530	195856	1.5
Receptor B	Cors Crymlyn SAC	270616	195657	1.5
Receptor C	Ancient Woodland	272340	195137	1.5
Receptor D	Cors Crymlyn SAC /Pant-Y-Sais SSSI	272007	194545	1.5
Receptor E	Ancient Woodland	273146	194585	1.5

^a A height of 1.5 m is used to represent ground-floor level exposure for human health receptors. Ecological receptors have also been modelled at 1.5 m above ground level to be consistent with Defra's national modelling of ecosystem impacts, i.e. this is the average height of the monitors which underpin the Concentration Based Estimated Deposition (CBED) model which generates predictions used by UK Government.

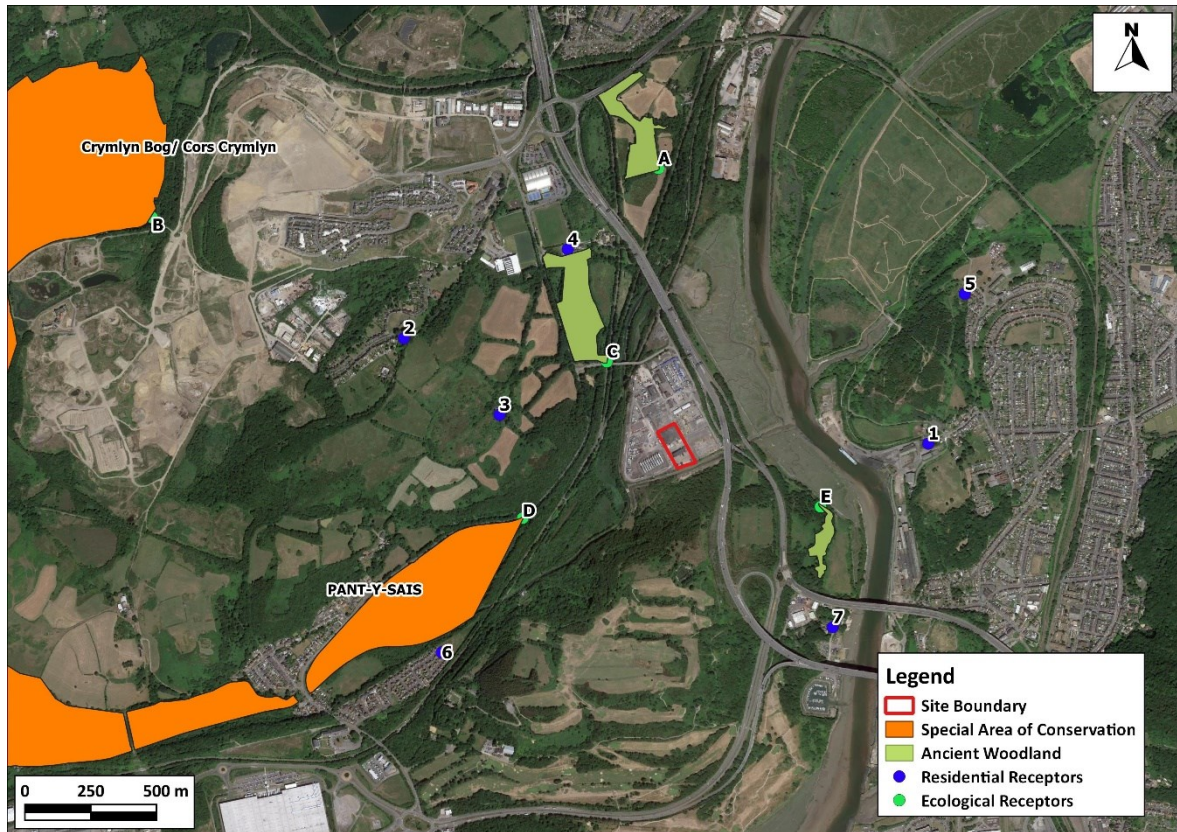


Figure 2: Receptor Locations

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 Map Data ©2021

Road Traffic Impacts

- 4.5 The first step in considering the road traffic impacts of the proposed development has been to screen the development and its traffic generation against the criteria set out in the EPUK/IAQM guidance (Moorcroft and Barrowcliffe et al, 2017), as described in Paragraph 3.15 and detailed further in Appendix A1. Where impacts can be screened out there is no need to progress to a more detailed assessment.

Impacts of the Asphalt Plant Burner Emissions

- 4.6 The proposed asphalt plant will be provided by Sima Asphalt and have a production capacity of 40,000 tonnes per annum (tpa). The plant comprises of two LPG fired burners; one which serves the rotary dryer and is used to dry the aggregate before being coated with bitumen; the other being used to heat bitumen, and the finished product (asphalt), which are stored within tanks. The dryer emissions are dispersed through a stack from the top of the plant at 16 m above ground level, with the heater emissions dispersed through an 8 m high stack.

- 4.7 The following sections describe the approach to dispersion modelling of the plant emissions, which has been required for this project.

Emissions Data

- 4.8 The emissions data input into the model for the energy plant have been provided by the plant manufacturer Sima Asphalt. Further details of the emissions data used in this assessment are provided in Appendix A4.

Modelling Methodology

- 4.9 The impacts of emissions from the proposed asphalt plant have been modelled using the ADMS-5 dispersion model. ADMS-5 is a new generation model that incorporates a state-of-the-art understanding of the dispersion processes within the atmospheric boundary layer. The model input parameters are set out in Appendix A4. The air quality modelling has been carried out based on a number of necessary assumptions, detailed further in Paragraph 4.20 and in Appendices A4. Where possible a realistic worst-case approach has been adopted.
- 4.10 Deposition fluxes have been calculated from the predicted concentrations of nitrogen dioxide. Details on the method for calculating the deposition rates are provided in Appendix A4.

Impact Description

Annual Mean Concentrations

- 4.11 The approach developed jointly by EPUK and the IAQM (Moorcroft and Barrowcliffe et al, 2017) provides a method for describing the impacts on local air quality arising from development. Impact description involves expressing the magnitude of incremental change as a proportion of a relevant assessment level and then examining this change in the context of the new total concentration. Table 5 sets out the matrix for determining the impact descriptor for annual mean concentrations at individual receptors, having been adapted from the table presented in the guidance document.
- 4.12 From this, a simple initial screening criterion can be derived, this being that any change in concentration smaller than 0.5% ($0.2 \mu\text{g}/\text{m}^3$) of the long-term (annual mean) environmental standard will be *negligible*, regardless of the existing air quality conditions.
- 4.13 Where all impacts are negligible the overall effect will be 'not significant'.

Table 5: Air Quality Impact Descriptors for Individual Receptors for Annual Mean Nitrogen Dioxide Concentrations

Annual Mean Concentration At Receptor In Assessment Year ($\mu\text{g}/\text{m}^3$)	Change in Concentration ($\mu\text{g}/\text{m}^3$)				
	<0.2	0.2 - 0.6	0.6 - 2.2	2.2 - 4.2	>4.2
<30.2	Negligible	Negligible	Negligible	Slight	Moderate
30.2 - 37.8	Negligible	Negligible	Slight	Moderate	Moderate
37.8 - 41.0	Negligible	Slight	Moderate	Moderate	Substantial
41.0 - 43.8	Negligible	Moderate	Moderate	Substantial	Substantial
>43.8	Negligible	Moderate	Substantial	Substantial	Substantial

Short-term (1-hour mean) Concentrations

- 4.14 Given that the hourly mean nitrogen dioxide objective allows a certain number of hours with concentrations exceeding the standard, rather than being a single concentration not to be exceeded, it is not possible to usefully assign a magnitude of change. The objective and limit value allow 18 hours a year to exceed the standard of $200 \mu\text{g}/\text{m}^3$, thus, in order for them not to be exceeded, the 19th highest hour in a year must not exceed this concentration. The 19th highest hour in a year can be expressed as a 99.79th percentile of hourly mean concentrations, and it is the proposed development's contribution to the 99.79th percentile of hourly mean concentrations that has been determined in this assessment.
- 4.15 EPUK/IAQM guidance (Moorcroft and Barrowcliffe et al, 2017) and Environment Agency guidance (Environment Agency, 2016) both recommend a screening criterion of 10% of the short-term environmental standard when assessing short-term concentrations. Thus, if the 99.79th percentile of hourly mean process contributions from the facility is less than 10% of the objective level ($<20 \mu\text{g}/\text{m}^3$), the contribution can be considered insignificant without the need to consider total concentrations.

Vegetation and Ecosystems Impacts

- 4.16 In terms of the potential for ecological impacts, screening criteria from Environment Agency guidance, described in Paragraph 3.20, have been used. Where it is not possible to screen the impacts out, the PEC has been calculated (see Paragraph 3.21) and compared with the relevant critical levels and critical loads.
- 4.17 For the purposes of this assessment, wherever the detailed modelling shows that the PEC concentrations and fluxes are below the critical level or critical load, it is considered that there will be no significant impacts.

Uncertainty

- 4.18 The point source dispersion model used in the assessment is dependent upon emission rates, flow rates, exhaust temperatures and other parameters for each source, all of which in reality are variable

as the plant will operate at different loads at different times. The assessment has, however, addressed this by applying worst-case assumptions, where necessary.

- 4.19 There are then additional uncertainties, as models are required to simplify real-world conditions into a series of algorithms. These uncertainties cannot be easily quantified, and it is not possible to verify the point-source model outputs.

Assumptions

- 4.20 The following assumptions have been made in carrying out the energy plant emissions modelling, with the assumptions generally seeking to reflect a realistic worst-case scenario:
- that the plant will be installed and fully operational in the year 2021; and
 - that the asphalt plant will operate 24 hours a day, which will over-state the emissions from the plant.

Operational Dust Impacts

- 4.21 The handling of materials such as aggregates and sand have the potential to generate dust emissions. The operational dust assessment considers the potential for impacts within certain distances of the site boundary. The first stage of the assessment is to consider the location of dust generating sources in the site boundary and the distance to nearby receptors. The assessment of dust emissions is undertaken in a qualitative manner and, if a detailed dust assessment is required, a risk-based approach based on a Source-Pathway-Receptor approach is implemented.
- 4.22 The dust risk assessments for both suspended and disamenity dust follow the approach set out in the IAQM Guidance on the Assessment of Mineral Dust Impacts for Planning described in Appendix A2.

Operational Odour Impacts

- 4.23 The asphalt plant has the potential to generate fugitive releases of odours. The potential for odours from the asphalt plant have been assessed qualitatively, taking into consideration the 'FIDOR' factors for odour exposure, as outlined in the IAQM guidance on assessment of odours for planning (IAQM, 2018). The FIDOR factors are:
- **F**requency – the frequency with which odours are detected;
 - **I**ntensity – the intensity of odours detected;
 - **D**uration – the duration of exposure to detectable odours;
 - **O**ffensiveness – the level of pleasantness or unpleasantness of odours; and

- **Receptor** – the sensitivity of the location where odours are detected, and/or the proximity of odour releases to an odour-sensitive location.

4.24 The risk of odour impacts has been determined based on the outcome of the qualitative odour assessment which is a risk-based approach based on a Source-Pathway-Receptor approach.

Assessment of Significance

Operational Significance

4.25 There is no official guidance in the UK in relation to development control on how to assess the significance of air quality impacts. The approach developed jointly by EPUK and the IAQM (Moorcroft and Barrowcliffe et al, 2017) has therefore been used. The overall significance of the air quality impacts is determined using professional judgement, taking account of the impact descriptors; the experience of the consultants preparing the report is set out in Appendix A3. Full details of the EPUK/IAQM approach are provided in Appendix A1.

Operational Dust

4.26 In the absence of formal criteria, the significance of the impacts has been judged based on professional experience of the consultants preparing the report, and taking account of the IAQM Guidance on the Assessment of Mineral Dust Impacts for Planning (IAQM, 2016). This includes defining impact descriptors at individual receptors, which take account of the dust generation potential of the sources and the distance and direction of receptors from these sources. Full details of the IAQM approach are provided in Appendix A2. The approach includes elements of professional judgement, and the experience of the consultants preparing the report is set out in Appendix A3.

Odour

4.27 There are no formal assessment criteria for quantifying odours. In the absence of formal criteria, the significance of the impacts has been judged based on professional experience and taking account of the H4 guidance published by the NRW and the IAQM Guidance on the Assessment of Odour for Planning (IAQM, 2018). The approach includes elements of professional judgement, and the experience of the consultants preparing the report is set out in Appendix A3.

5 Baseline Conditions

Relevant Features

- 5.1 The proposed development is located approximately 1 km to the south-east of Llandarcy, 3.5 km to the south-west of Neath and 6 km to the north-west of Port Talbot. The application site is bounded by other users of the industrial estate, and forest to the south. It currently consists of disused industrial space. The closest residential property is 600 m to the west of the site, with a number of ecological receptors within 2 km of the site.
- 5.2 The proposed development is located 6.5 km to the north-west of the Port Talbot AQMA. This AQMA includes the M4 motorway, along which some traffic from the proposed development may travel.

Industrial sources

- 5.3 A search of the UK Pollutant Release and Transfer Register (Defra, 2019a) has not identified any significant industrial or waste management sources that are likely to affect existing air quality. There is a scrap metal facility and industrial storage sites; these may represent minor existing sources of odour and dust.

Local Air Quality Monitoring

- 5.4 Neath Port Talbot County Borough Council operates seven automatic monitoring stations within its area, however, none of these are within the study area. The Council also operates a number of nitrogen dioxide monitoring sites using diffusion tubes. These include five deployed in Britton Ferry, adjacent to the A474. Annual mean results for these sites for the years 2015 to 2019 are summarised in Table 6, with their locations shown in Figure 3. The monitoring data have been taken from Neath Port Talbot County Borough Council's 2020 Annual Status Report (Neath Port Talbot County Borough Council, 2020).

Table 6: Summary of Annual Mean NO₂ Monitoring (2015-2019) (µg/m³)

Site No.	Site Type	Location	2015	2016	2017	2018	2019
7	Roadside	Moby's, Neath Road, Briton Ferry	27.9	27.6	30.2	24.5	26.3
8	Roadside	185 Neath Road, Briton Ferry	28.1	27.5	29.0	24.9	23.9
9	Roadside	179 Neath Road, Briton Ferry	28.6	26.3	28.3	23.5	25.1
10	Roadside	187 Neath Road, Briton Ferry	28.0	26.1	28.9	24.6	26.1
11	Roadside	189 Neath Road, Briton Ferry	28.1	27.3	29.2	23.8	26.1
Objective			40				

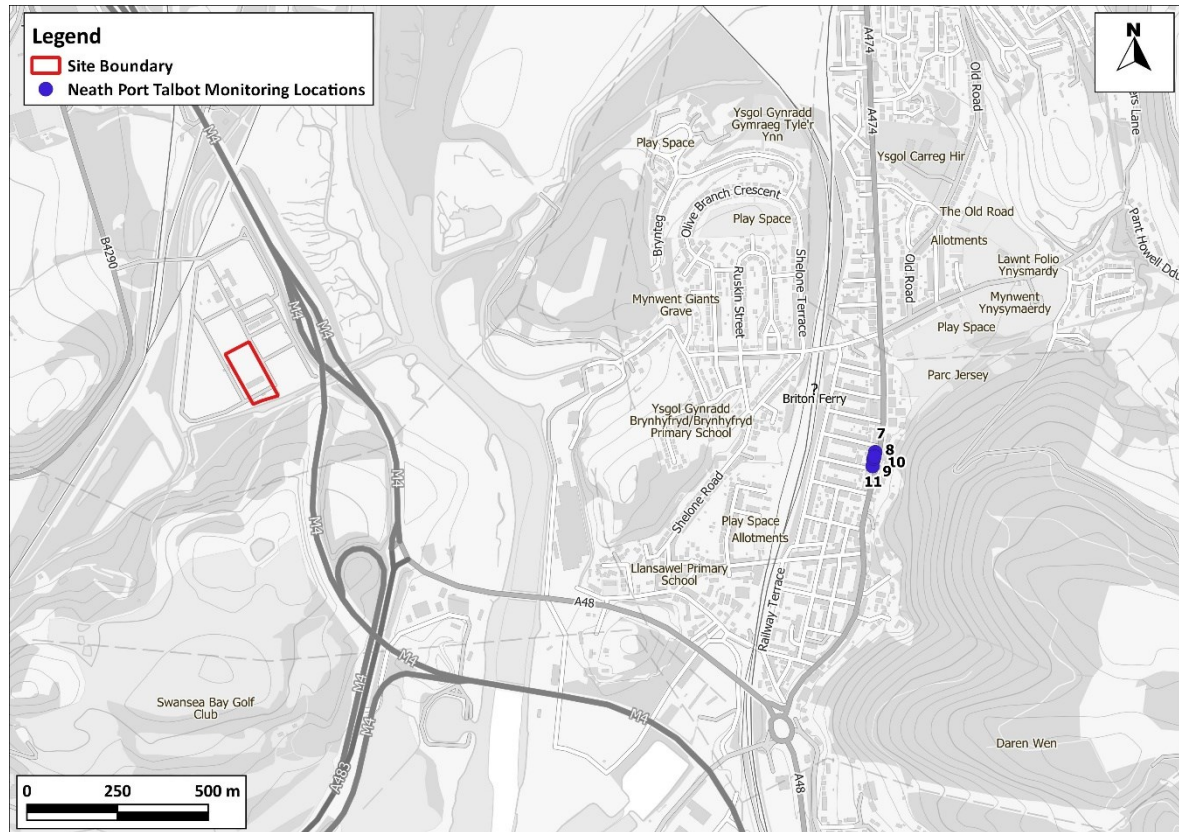


Figure 3: Monitoring Locations

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Map Data ©2021

- 5.5 No exceedances of the annual mean nitrogen dioxide objective have been recorded within the study area. Data from the last 5 years indicates a slight downward trend in local roadside concentrations.
- 5.6 The majority of local monitoring is outside of the study area; only the tubes deployed in Britton Ferry are within the study area. All automatic monitors in the Council's jurisdiction are in Port Talbot and are likely to be heavily influenced by industrial activity in the area. The particulate matter concentrations from the local AURN station within Port Talbot have been presented to give a conservative estimate of local concentrations; PM₁₀ concentrations at receptors near the development site are likely to be considerably lower than those measured in Port Talbot. Annual mean results for the years 2015 to 2019 are summarised in Table 7, while results relating to the daily mean objective are summarised in Table 8.

Table 7: Summary of Annual Mean PM₁₀ and PM_{2.5} Monitoring (2015-2019) (µg/m³)

Site No.	Site Type	Location	2015	2016	2017	2018	2019
PM ₁₀							
PT2	Industrial	Port Talbot Fire Station	27	22	23	23	21
Objective			40				
PM _{2.5}							
PT2	Industrial	Port Talbot Fire Station	10	9	10	11	11
Objective			25 ^a				

^a The 25 µg/m³ PM_{2.5} objective, which was to be met by 2020, is not in Regulations and there is no requirement for local authorities to meet it.

Table 8: Number of Days With PM₁₀ Concentrations Above 50 µg/m³

Site No.	Site Type	Location	2015	2016	2017	2018	2019
PT2	Industrial	Port Talbot Fire Station	28	8	17	11	12
Objective			35				

- 5.7 No exceedances of the PM₁₀ objectives have been measured at the Port Talbot AURN site; it is, therefore, very unlikely that there would be exceedances in the study area for this assessment.

Exceedances of Limit Value

- 5.8 There are no AURN (Defra, 2021c) monitoring sites within the study area with which to identify exceedances of the annual mean nitrogen dioxide limit value. Defra's roadside annual mean nitrogen dioxide concentrations (Defra, 2021b), which are used to identify and report exceedances of the limit value, identify exceedances of the limit value in 2019 along the M4 near the site. Using the same Defra roadside concentration data, compliance along the M4 is expected by 2021; however, changes to activities effected by the COVID-19 pandemic and the anticipated 'reopening' may have an impact on this timescale.

Background Concentrations

National Background Pollution Maps

- 5.9 Estimated background concentrations in the study area are set out in Table 9 and are all well below the objectives. A range of values is presented as the study area covers multiple 1x1 km grid squares.

Table 9: Estimated Annual Mean Background Pollutant Concentrations in 2021

Year	NO _x	NO ₂	PM ₁₀
2021	9.1 – 17.2	7.4 – 13.0	10.7 – 12.8
Objective	-	40	40

Background Deposition and Acidity

5.10 Background nitrogen deposition fluxes for all nearby ecological sites are presented in Table 10.

Table 10: Estimated Annual Mean Background Nitrogen Deposition

Site	Nutrient Nitrogen Deposition (kgN/ha/yr)	Acid Nitrogen Deposition (keq/ha/yr)
Ancient Woodland	22.9	1.82
Cors Crymlyn SAC	14.7	1.10
Ancient Woodland	22.9	1.82
Pant-Y-SAIS SAC	10.5	0.80
Ancient Woodland	17.1	1.40

6 Impact Assessment

Assessment of Development-Generated Road Traffic Emissions

- 6.1 The proposed development is expected to generate a total of 20 daily light-duty vehicle (LDV) trips and 80 daily heavy-duty vehicle (HDV) trips; these daily trip rates are below the screening thresholds of 100 and 500 for LDVs and HDVs, respectively, recommended for use outside of an AQMA in the EPUK/IAQM guidance (Moorcroft and Barrowcliffe et al, 2017) (see Paragraph 3.16). It is anticipated that up to 18 of the HDV trips will travel to and from Newport, therefore passing through the Port Talbot AQMA; this trip number is below the screening threshold of 25 HDVs recommended for use within an AQMA. As such, it is judged that the relevant screening thresholds will not be exceeded and there is no requirement for a detailed assessment of road traffic impacts at existing receptors.
- 6.2 Operational movements from the development are expected to increase vehicle trips on the M4. The number of HDV trips are anticipated to be less than 62 AADT³ near any ecological sites, which is below the Design Manual for Roads and Bridges (Highways England, 2020) threshold of 200 HDV AADT. The development is more than 12 km from the nearest national or internationally designated site. Furthermore, the M4 is a strategic route which is likely to be affected by new development across South Wales regardless of its precise location. Because of this, the in-combination impacts have not been considered further.
- 6.3 Based on the above, it can be concluded that road traffic associated with the proposed development will not have a significant impact on local air quality.

Detailed Assessment of Burner Emissions

Human Receptors

Annual Mean Concentrations

- 6.4 The calculated total NO_x emission rate from the burners (540.7 mg/s of NO_x in total) exceeds the screening threshold of 5 mg/s set out in the EPUK/IAQM guidance (see Appendix A1). As such, dispersion modelling has been undertaken.
- 6.5 The predicted annual mean nitrogen dioxide concentrations in 2021 at each existing receptor are shown in Table 11 for both the “Without Scheme” and “With Scheme” scenarios. The impact at each receptor is also described using the impact descriptors given in Table 5. The “Without Scheme” concentration used for each receptor is the relevant background concentration for that receptor; none of the receptors are close to busy roads, thus baseline concentrations will be close to

³ This is conservative assumption; the applicant is predicting 62 HDV AADT heading to West Wales, with the majority likely to head along the M4 westbound and then distribute along the network. No detailed distribution is currently available.

background levels. A contour plot of the two burners' total process contribution (PC) to annual mean nitrogen dioxide concentrations is shown in Figure 4.

Table 11: Predicted Annual Mean Nitrogen Dioxide (NO₂) Concentrations in 2021 (µg/m³)

Receptor ^a	Without Scheme	PC	With Scheme	% Change ^b	Impact Descriptor
Receptor 1	11.10	0.20	11.30	0	Negligible
Receptor 2	8.10	0.05	8.15	0	Negligible
Receptor 3	7.40	0.15	7.55	0	Negligible
Receptor 4	13.00	0.07	13.07	0	Negligible
Receptor 5	8.70	0.21	8.91	1	Negligible
Receptor 6	7.40	0.17	7.57	0	Negligible
Receptor 7	11.10	0.18	11.28	0	Negligible
Objective	40	-	40	-	

^a Modelled at a height of 1.5 m.

^b % changes are relative to the objective and have been rounded to the nearest whole number.

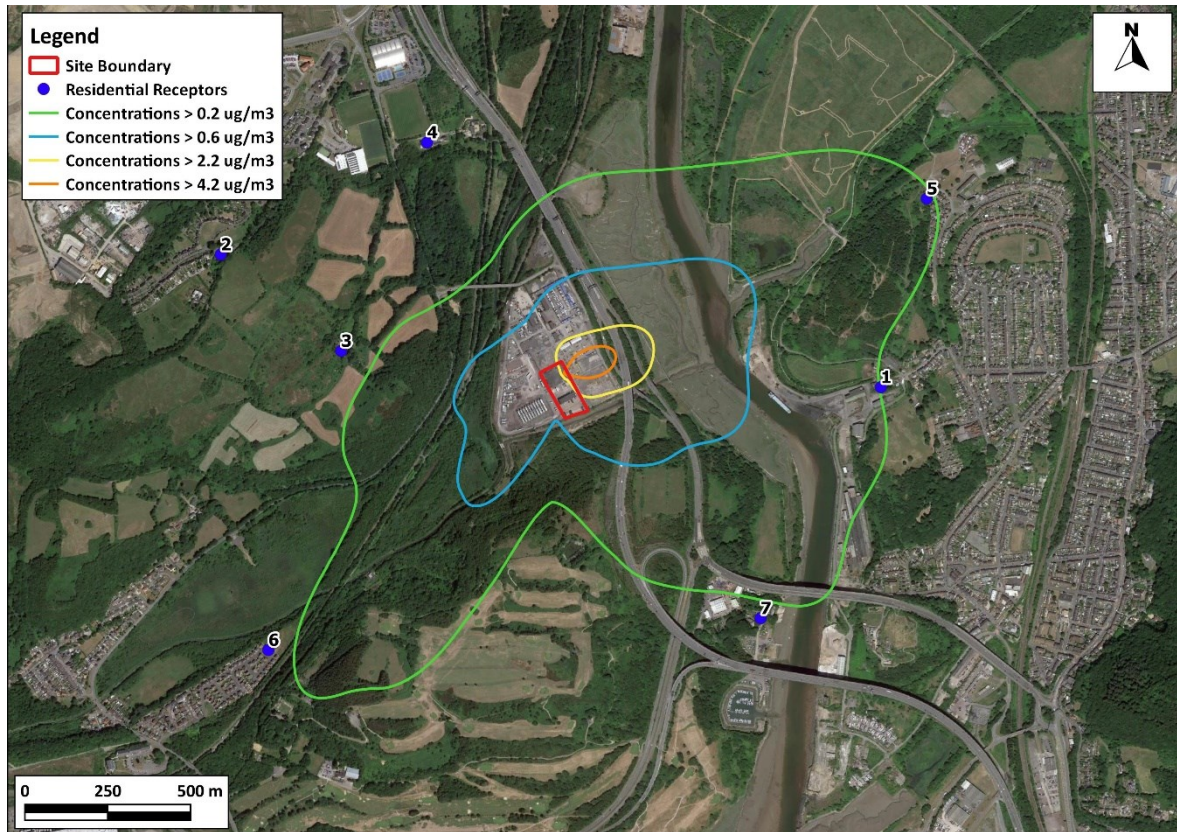


Figure 4: Annual Mean Nitrogen Dioxide Contribution Contours ($\mu\text{g}/\text{m}^3$)

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- 6.6 The annual mean nitrogen dioxide concentrations are all well below the objective at all receptors, with or without the proposed development. Only one receptor will experience a change in concentration of more than $0.2 \mu\text{g}/\text{m}^3$ (0.5% of the objective), this being Receptor 5. Using the matrix in Table 5, the impacts are all described as *negligible*.
- 6.7 There are no roadside receptors adjacent to major roads within the green $0.2 \mu\text{g}/\text{m}^3$ contour in Figure 4. As such, all impacts at roadside receptors further afield will be *negligible*, regardless of the baseline concentration.

Short-term Impact Assessment

- 6.8 Figure 5 shows the area within which the asphalt plant's process contribution to the 99.79th percentile of 1-hour mean nitrogen dioxide concentrations will exceed $20 \mu\text{g}/\text{m}^3$, or 10% of the objective. There are no locations of relevant exposure within the contour. As such, it can be concluded that the proposed development will not have a significant impact on achievement of the 1-hour mean nitrogen dioxide objective (see Paragraph 4.15).

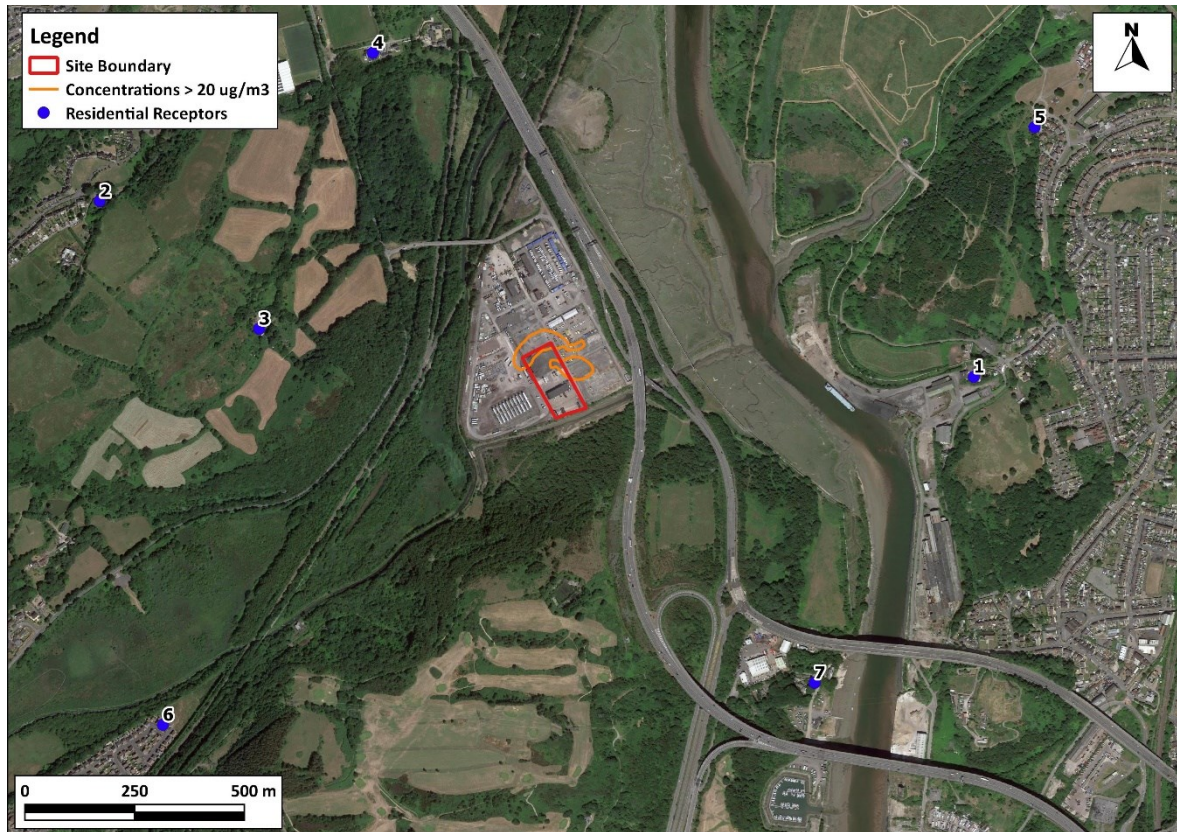


Figure 5: 99.79th Percentile of 1-hour Mean Nitrogen Dioxide Process Contributions ($\mu\text{g}/\text{m}^3$)

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Map Data ©2021

Ecological Receptors

Initial Screening of Process Contributions

- 6.9 The predicted NO_x concentrations and rates of nutrient nitrogen and acid deposition associated with emissions from the proposed facility are shown in Table 12 to Table 14. Where no critical load is available and sensitive features are present, a generic woodland value has been assigned. Concentrations at the Earlswood Road Cutting and Ferryboat Inn Quarries SSSI are not presented as the site contains no features that are sensitive to air pollution impacts, being declared for geological features. It should again be noted that the Pant-Y-Sais SSSI covers the same physical area as part of the Cors Crymlyn SAC, but is declared for different ecological features.

Table 12: Predicted Maximum Process Contributions in relation to NOx Critical Levels

Site (Receptor)	Annual Mean NOx ^a			Maximum 24-hour Mean NOx ^a		
	PC (µg/m ³)	% of EAL	Screening Criterion (% of EAL)	PC (µg/m ³)	% of EAL	Screening Criterion (% of EAL)
Ancient Woodland (A)	0.11	0.4	100	1.32	1.8	100
Cors Crymlyn SAC ^b (D)	0.32	1.1	1	3.31	4.4	10
Ancient Woodland (C)	0.33	1.1	100	3.92	5.2	100
Pant-Y-SAIS SSSI (D)	0.32	1.1	1	3.31	4.4	10
Ancient Woodland (E)	0.59	2.0	100	4.76	6.3	100
Critical Level	30	-	-	75	-	-

^a Exceedances of the objectives are shown in bold.

^b Maximum concentration at either receptor B or D.

Table 13: Predicted Maximum Process Contributions in relation to the Nutrient Nitrogen Deposition Critical Loads

Site (Receptor)	Annual Mean Nutrient Nitrogen Deposition Rate (kg-N/ha/yr)			
	PC	% of EAL	Critical Load	Screening Criterion (% of EAL)
Ancient Woodland (A)	0.02	0.2	10	100
Cors Crymlyn SAC ^a (D)	0.03	0.6	5	1
Ancient Woodland (C)	0.06	0.6	10	100
Pant-Y-SAIS SSSI (D)	0.03	0.3	10	1
Ancient Woodland (E)	0.12	1.2	10	100

^a Maximum concentration at either receptor B or D.

Table 14: Predicted Maximum Process Contributions in relation to the Acid Nitrogen Deposition Critical Loads

Site (Receptor)	Annual Mean Acid Deposition Rate (keq/ha/yr)			
	PC	% of EAL	Critical Load (minClmaxN) ^a	Screening Criterion (% of EAL)
Ancient Woodland (A)	0.0008	0.1	1.1493	100
Cors Crymlyn SAC ^b (D)	0.0023	0.3	0.661	1
Ancient Woodland (C)	0.0023	0.2	1.1493	100
Pant-Y-SAIS SSSI ^b (D)	0.0023	0.6	0.366	1
Ancient Woodland (E)	0.0043	0.4	1.1493	100

^a N_{max} is the value above which additional nitrogen deposition will lead to an exceedance. The value of N_{max} used is the most stringent across the entire designation and is not specific to the receptors assessed. For this assessment, and following the approach recommended by APIS for situations where the baseline flux exceeds the equivalent 'N_{min}' value, the total acid deposition (in keq/ha/yr) has been compared directly against the N_{max}. In this case the baseline concentrations exceed the 'N_{min}' value.

^b Maximum concentration at either receptor B or D.

- 6.10 Table 12 shows that the contributions from the asphalt plant to the annual mean NO_x concentrations at the Cors Crymlyn SAC and Pant-Y-SAIS SSSI designated sites exceed the screening criteria, thus further assessment (considering total concentrations) is required. The predicted maximum process contributions to maximum 24-hour mean NO_x concentrations and nutrient (Table 13) and acid (Table 14) nitrogen deposition rates are all below the relevant screening criteria, thus it can be concluded that the impact of the proposed development on nearby habitats will be 'not significant' in terms of these pollutants and averaging periods.

Further Assessment Considering Total Concentrations

- 6.11 The areas of the SAC and SSSI where the NO_x screening criteria are exceeded are away from roads, and therefore the background concentration of 9.8 µg/m³ (see Table 9) is considered appropriate to use as the baseline concentration when calculating the PEC. The calculated PECs are presented in Table 15; as the total PEC is less than the NO_x annual mean critical level of 30 µg/m³, impacts from the proposed development are considered insignificant at all ecological receptors (see Paragraph 4.17). The area where the screening criteria is exceeded can be seen in Figure 6.

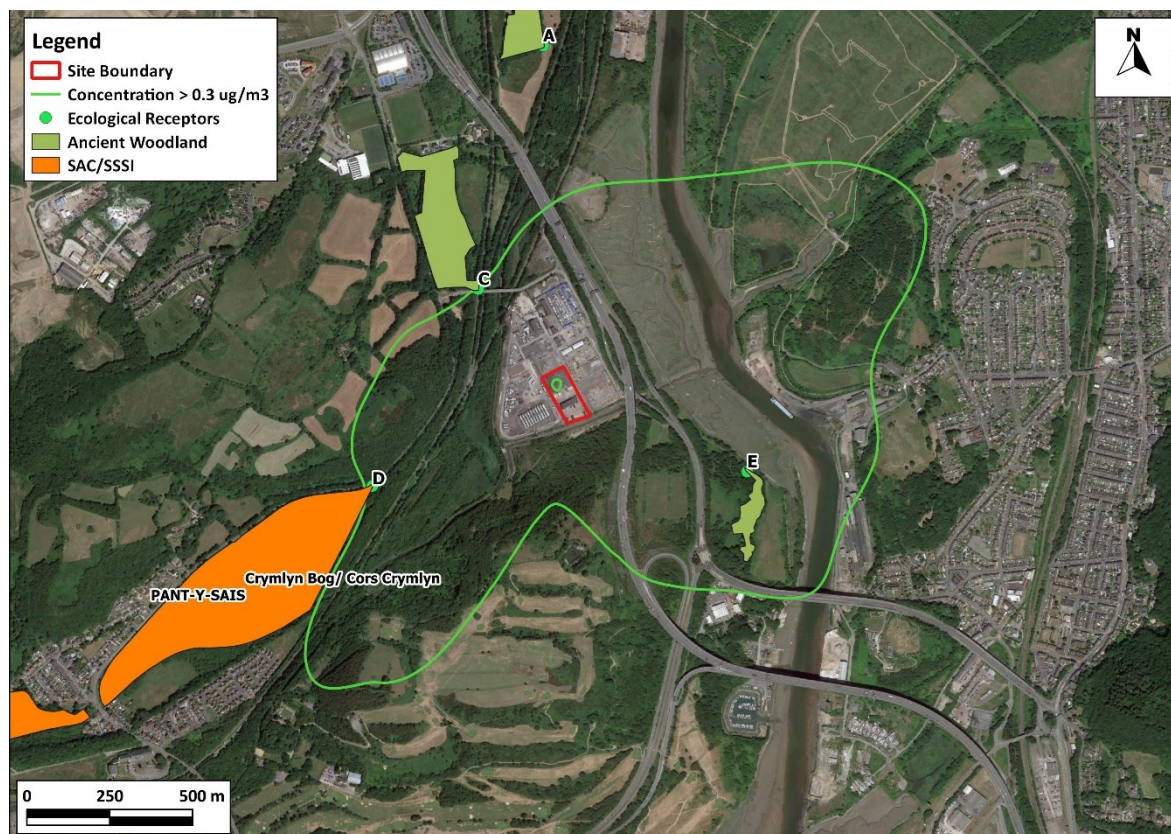


Figure 6: Annual Mean NOx Process Contributions ($\mu\text{g}/\text{m}^3$)

Imagery ©2021 Getmapping plc, Infoterra Ltd & Bluesky, Maxar Technologies, The Geoinformation Group, Map Data ©2021

Table 15: Predicted Environmental Concentrations in Relation to NOx Annual Mean Critical Level

Receptor ID	Annual Mean NOx PEC	
	$\mu\text{g}/\text{m}^3$	% AQS
Cors Crymlyn SAC ^a	10.12	33.7
Pant-Y-SAIS SSSI	10.12	33.7
Criteria	30	-

^a Maximum concentration at either receptor B or D.

Combined Plant and Road Traffic Impacts

- 6.12 There are no residential properties adjacent to roads along which development traffic is likely to route, within the areas where potentially significant air quality impacts from the burner emissions are predicted (see Figure 4).
- 6.13 One nearby ecological site (an Ancient Woodland represented by Receptor C) is in a location where combined impacts from plant and road traffic cannot be immediately ruled out. However, the amount

of HDV traffic is below the Design Manual for Roads and Bridges (Highways England, 2020) threshold of 200 HDV AADT (the site is only expected to generate 80 heavy vehicle and 20 light vehicle trips per day), and the impact from plant emissions is predicted to be just 0.4% of the annual mean NO_x critical level. Bearing these points in mind alongside the designation of this habitat (Ancient Woodland), significant impacts can reasonably be discounted, and the combined impact will certainly be considerably less than the 100% of the critical level screening threshold that Environment Agency guidance recommends.

- 6.14 As such, it is judged that there is no risk of significant combined impacts and more detailed assessment is not deemed necessary.

Dust Impact Assessment

Process Description

- 6.15 The site has the capacity to produce 40,000 tonnes per annum (tpa) of asphalt, with approximately 10,000 tpa of sand and aggregate being imported by road.
- 6.16 The production of asphalt has the potential to generate dust via the following mechanisms:
- wind-whipping of dust from aggregate being transported to the site by HDV;
 - imported aggregate being tipped into covered storage bays;
 - aggregate being moved from the storage bays to the asphalt plant; and
 - HDV and other machinery moving over dusty ground.
- 6.17 To reduce the risk from dust, aggregate being stored onsite will be covered.
- 6.18 The potential for dust emissions is considered to be *small*, as the total volume of material handled is small, dustier material will be stored in covered bays, the presence of paved access roads, and not all of the material will represent a source of dust (e.g. asphalt).

Disamenity Dust Risk Assessment

- 6.19 The risk of dust impacts at nearby sensitive receptors depends on a number of factors, including the frequency of exposure, distance to operations, the activities undertaken, material handled, dust control measures implemented and the physical terrain and features. The IAQM guidance advises that *“dust impacts will occur mainly within 400 m of the operation, even at the dustiest of sites”*.
- 6.20 The guidance presents a screening approach whereby the need for a detailed assessment can be screened out if there are no receptors within a given distance and there are no special circumstances, such as high local PM₁₀ concentration due to other sources. The distances recommended are 400 m for hard rock quarries and 250 m for sand and gravel quarries. The

screening criteria for sand and gravel quarries is considered most appropriate for the proposed development, as the dusty materials that the site will handle are sand and aggregates (gravel).

- 6.21 The nearest high sensitivity human receptors are residential properties located 600 m from the site. With the Earlswood Road Cutting And Ferryboat Inn Quarries SSSI being declared for geological reasons, and thus not sensitive to dust deposition; there are no sensitive ecological receptors within 250 m of the site. As such, there is no risk of impacts at high sensitivity human receptors, or at any ecological receptors.
- 6.22 The only other receptors of relevance are the other industrial uses within the industrial estate, which will be low sensitivity receptors. Given that the proposed development will represent a *small* source, according to the guidance the risk of dust impact is, at worst, *low*. Combining a *low* risk of dust impacts with a low sensitivity receptor gives a *negligible* effect.
- 6.23 In accordance with the methodology detailed in Appendix A2, the potential dust impacts are, therefore, considered 'not significant', and a more detailed disamenity dust assessment is not considered necessary.

Suspended Dust (Human Health) Risk Assessment

- 6.24 There are sensitive human receptors within 1 km of the proposed development and therefore an assessment of suspended dust effects is required. The process to assess the effects of suspended dust firstly considers the existing baseline annual mean concentration of PM₁₀. If baseline concentrations are below 17 µg/m³, then there is little risk of an objective exceedance no further assessment is required.
- 6.25 The background concentration at the site is 12.8 µg/m³ (Table 9), which is well below the annual mean objective and the above screening criterion. Nearby industrial processes, which have the potential to generate dust emissions, will not increase PM₁₀ concentrations sufficiently for the baseline to be above 17 µg/m³. Therefore, the impact of development-generated suspended dust on existing receptors will be 'not significant'.

Odour Impact Assessment

- 6.26 The proposed asphalt plant has the potential to generate odour emissions due to the fugitive release of volatile organic compounds from the bitumen used in the process.
- 6.27 The assessment of the potential odour impacts resulting from the asphalt production process has examined the FIDOR factors set out in Paragraph 4.23.
- Frequency and Duration: a batch manufacturing process is used for the production of asphalt. The bitumen, which is stored in tanks and heated via a LPG burner, will be combined with aggregate and mixed. This will be undertaken during operational hours of Monday to Friday 05:30-17:00 and weekends 05:30 to 13:00. Mixing may not be

undertaken continually during these periods. Outside operational hours the potential for odour emissions will be limited as bitumen is stored in tanks and will not be agitated.

- Intensity: odours released are likely to be moderate in intensity. The bitumen is heated to high temperatures which will destroy some of the odorous compounds, but higher temperatures result in the release of more volatile organic compounds than at lower temperatures. The largest potential for odours is judged to be from loading the trucks/storage tanks with the finished asphalt due to the agitation of the material which will increase the surface area for odour release;
- Offensiveness: the degree of offensiveness of potential odour emissions from the asphalt has been determined based on the hedonic scores presented for various odours in Table A1.6 of the Scottish Environment Protection Agency's (SEPA's) 'Odour Guidance' document (SEPA, 2010). The hedonic scale describes odours on a range of +4 to -4, where unpleasant odours (e.g. manure) are ranked with a negative value and pleasant odours (e.g. baked bread) are ranked with a positive value. The odours which are most likely to be associated with the asphalt plant could be described as 'tar' within the SEPA guidance, which has a hedonic score of -1.63. This is considered to be moderately unpleasant.

6.28 The closest high sensitivity receptors are the residential properties located 600 m to the northwest of the site, as shown in Figure 2. The prevailing wind direction is from the west (Figure A4.1) and the nearest sensitive receptors downwind under these prevailing wind conditions are over 1 km from the site.

6.29 It is extremely unlikely that odours from the proposed asphalt plant would be detectable at such distances, let alone be at high enough concentrations to cause annoyance. Taking into account the FIDOR factors above and the significant distance from the odour source to the nearest highly sensitive receptors, the potential impacts at all receptors are judged to be negligible and therefore 'not significant', without the need for more detailed assessment.

Significance of Operational Air Quality Effects

The operational air quality effects without mitigation are judged to be 'not significant'. This professional judgement is made in accordance with the methodologies set out in Appendix A1 and A2, and takes account of the assessment that:

- nitrogen dioxide concentrations at all of the selected worst-case existing residential receptors will be well below the air quality objectives, and all the impacts from the plant are predicted to be *negligible*;

- the impacts from the plant are predicted to be below relevant screening thresholds at the majority of nearby ecological sites. Where the impacts are above the screening thresholds, the annual NO_x critical levels are not predicted to be exceeded;
- traffic increases due to the development will be below all IAQM screening thresholds, and there is no risk of significant impacts as a result of road traffic. The chance of road traffic and plant contributions combining to give significant impacts can reasonably be discounted; and
- the dust and odour impacts will be 'not significant'

7 Mitigation

Good Design and Best Practice

- 7.1 The EPUK/IAQM guidance advises that good design and best practice measures should be considered, whether or not more specific mitigation is required. The proposed development will require an Environmental Permit to operate, and the site will need to implement Best Available Techniques (BAT) to prevent and minimise emissions of pollutants, dust and odours.
- 7.2 The application site itself is located in an ideal location in an industrial area away from sensitive receptor locations.
- 7.3 More specifically, the proposed development incorporates the following good design and best practice measures:
- aggregate will be stored in aggregate bays which enclose the material, minimising the potential for emissions from the stockpile surface;
 - all vehicles will have their engines switched off when stationary;
 - all vehicle loads entering and leaving the site will be covered;
 - conveyor belts will be covered and furnished with scrapers to remove material, with the collection of scraping in containers;
 - feed hoppers, transfer points and discharges will be shrouded; and
 - hopper loading systems will be designed to ensure a good match with truck size, and will be fully enclosed on all sides

Asphalt Plant

- bitumen tanks will be temperature controlled to minimise odour emissions;
- materials such as bitumen will be transferred through a closed system of heavy duty hoses to storage silos, using compressed air as a carrier medium;
- silos will be vented to allow air to escape through bag filters;
- filters will be regularly inspected and maintained to prevent them from becoming blocked and pressure relief valves on the top of silos will be regularly maintained;
- automatic protection systems will be installed to control the delivery of material from the cement tanker so that it is not possible to over-fill or over-pressurise the silo and cause unacceptable emissions; and
- the plant stack will be fitted with a bag filter to remove particulate matter from the exhaust air.

Recommended Mitigation

Road Traffic Impacts

- 7.4 The additional traffic generated by the scheme is below established screening criteria and the overall effect of the proposed development will be 'not significant'. It is, therefore, not considered appropriate to propose traffic-related mitigation.

Burner Emissions Impacts

- 7.5 The assessment has demonstrated that the emissions from the burners will have an insignificant impact on air quality at existing nearby receptors. As such, there is no requirement for mitigation beyond the best practice design measures highlighted above.

Dust and Odour Impacts

- 7.6 The risk of dust and odour impacts on the amenity of existing local residents is assessed as 'not significant'. It is not considered necessary to propose any measures beyond those considered BAT, which will be required under the site's Environmental Permit.

8 Conclusions

- 8.1 The air quality impacts of the proposed asphalt plant have been assessed with regard to potential pollutant emissions from road traffic and combustion plant, and dust and odour emissions from the site operations.

Operational Impacts

Impacts

- 8.2 The additional traffic generated by the scheme is below established screening criteria, thus it will not have a significant impact on local roadside air quality.
- 8.3 The risk of impacts related to dust and odours has been assessed qualitatively. The site is located within a sparsely populated area, away from sensitive residential receptors, and impacts of disamenity dust, suspended dust and odours are judged to be negligible. Measures to reduce emissions from the site in accordance with good practice are specified, and will be enforced via the Environmental Permit required for the site's operation.
- 8.4 With regard to emissions from the gas-fired plant at the facility, the impacts on concentrations of nitrogen dioxide will be negligible at all existing residential receptors. Furthermore, the impacts from the plant are predicted to be below relevant screening thresholds at the majority of nearby ecological sites. The screening thresholds are only exceeded for annual mean NO_x critical level in a small section of one area designated for its ecological features; total annual mean NO_x concentrations will remain well below the critical level, therefore there will be no significant impact.

Mitigation

- 8.5 The proposed development will incorporate a number of measures to minimise its dust and odour emissions (detailed in Paragraph 7.3), as required under its Environmental Permit. Given that all impacts relating to the proposed development have been demonstrated to be 'not significant', no further mitigation is required.

Significance

- 8.6 The overall operational air quality effects of the proposed development are judged to be 'not significant'. This conclusion is based on the concentrations at existing human receptors nearest the site being well below the objectives and impacts of the facility's emissions all being *negligible*, there being no exceedances of any critical level or critical load at nearby ecological sites and the impacts of disamenity dust, suspended dust and odours also being negligible.

- 8.7 Since the assessment was undertaken (June 2021), it has been confirmed by the operator that one of the two burners (known as the 'Heating Burner') will now be powered using electricity, rather than LPG. There will therefore only be emissions from one stack, reducing the overall impact from the site. Therefore, the stack emissions assessment presented in this report overestimates the impact from the site and is considered worst case. Overall, the air quality effects of the proposed development are still judged to be 'not significant'.

Policy Implications

- 8.8 Taking into account these conclusions, it is judged that the proposed development is consistent with the overarching aims of the PPW; the development does not threaten compliance with any statutory air quality limit values and objectives or, worsen local amenity. The proposed development is also consistent with Policy EN 9 and Sp16 of the Neath Port Talbot County Borough Council Local Development Plan, as it will not have a significant detrimental effect on air quality within Port Talbot or increase the number of people exposed to significant levels of pollution.

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10 Glossary

AADT	Annual Average Daily Traffic
ADMS-5	Atmospheric Dispersion Modelling System model for point sources
APIS	Air Pollution Information System
AQAL	Air Quality Assessment Level
AQC	Air Quality Consultants
AQMA	Air Quality Management Area
AURN	Automatic Urban and Rural Network
BAT	Best Available Techniques
CAZ	Clean Air Zone
CROW	Countryside and Rights of Way Act
Defra	Department for Environment, Food and Rural Affairs
DfT	Department for Transport
DMP	Dust Management Plan
DMRB	Design Manual for Roads and Bridges
EPUK	Environmental Protection UK
EU	European Union
EUNIS	European Nature Information System
Exceedance	A period of time when the concentration of a pollutant is greater than the appropriate air quality objective. This applies to specified locations with relevant exposure
HDV	Heavy Duty Vehicles (> 3.5 tonnes)
HMSO	Her Majesty's Stationery Office
IAQM	Institute of Air Quality Management
JAQU	Joint Air Quality Unit
kph	Kilometres Per hour
kW	Kilowatt
LAQM	Local Air Quality Management
LDV	Light Duty Vehicles (<3.5 tonnes)

LGV	Light Goods Vehicle
µg/m³	Microgrammes per cubic metre
MCPD	Medium Combustion Plant Directive
MW_{th}	Megawatts Thermal
NO	Nitric oxide
NO₂	Nitrogen dioxide
NO_x	Nitrogen oxides (taken to be NO ₂ + NO)
NPPF	National Planning Policy Framework
Objectives	A nationally defined set of health-based concentrations for nine pollutants, seven of which are incorporated in Regulations, setting out the extent to which the standards should be achieved by a defined date. There are also vegetation-based objectives for sulphur dioxide and nitrogen oxides
OLEV	Office for Low Emission Vehicles
PC	Process Contribution
PEC	Predicted Environmental Concentration
PM₁₀	Small airborne particles, more specifically particulate matter less than 10 micrometres in aerodynamic diameter
PM_{2.5}	Small airborne particles less than 2.5 micrometres in aerodynamic diameter
PPG	Planning Practice Guidance
PPW	Planning Policy Wales
RDE	Real Driving Emissions
SAC	Special Area of Conservation
SSSI	Site of Special Scientific Interest
Standards	A nationally defined set of concentrations for nine pollutants below which health effects do not occur or are minimal
TAN	Technical Advice Note
WHO	World Health Organisation

11 Appendices

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A1 EPUK & IAQM Planning for Air Quality Guidance

- A1.1 The guidance issued by EPUK and IAQM (Moorcroft and Barrowcliffe et al, 2017) is comprehensive in its explanation of the place of air quality in the planning regime. Key sections of the guidance not already mentioned above are set out below.

Air Quality as a Material Consideration

“Any air quality issue that relates to land use and its development is capable of being a material planning consideration. The weight, however, given to air quality in making a planning application decision, in addition to the policies in the local plan, will depend on such factors as:

- *the severity of the impacts on air quality;*
- *the air quality in the area surrounding the proposed development;*
- *the likely use of the development, i.e. the length of time people are likely to be exposed at that location; and*
- *the positive benefits provided through other material considerations”.*

Recommended Best Practice

- A1.2 The guidance goes into detail on how all development proposals can and should adopt good design principles that reduce emissions and contribute to better air quality management. It states:

“The basic concept is that good practice to reduce emissions and exposure is incorporated into all developments at the outset, at a scale commensurate with the emissions”.

- A1.3 The guidance sets out a number of good practice principles that should be applied to all developments that:

- include 10 or more dwellings;
- where the number of dwellings is not known, residential development is carried out on a site of more than 0.5 ha;
- provide more than 1,000 m² of commercial floorspace;
- are carried out on land of 1 ha or more.

- A1.4 The good practice principles are that:

- New developments should not contravene the Council's Air Quality Action Plan, or render any of the measures unworkable;
- Wherever possible, new developments should not create a new “street canyon”, as this inhibits pollution dispersion;

- Delivering sustainable development should be the key theme of any application;
- New development should be designed to minimise public exposure to pollution sources, e.g. by locating habitable rooms away from busy roads;
- The provision of at least 1 Electric Vehicle (EV) “rapid charge” point per 10 residential dwellings and/or 1000 m² of commercial floorspace. Where on-site parking is provided for residential dwellings, EV charging points for each parking space should be made available;
- Where development generates significant additional traffic, provision of a detailed travel plan (with provision to measure its implementation and effect) which sets out measures to encourage sustainable means of transport (public, cycling and walking) via subsidised or free-ticketing, improved links to bus stops, improved infrastructure and layouts to improve accessibility and safety;
- All gas-fired boilers to meet a minimum standard of <40 mgNO_x/kWh;
- Where emissions are likely to impact on an AQMA, all gas-fired CHP plant to meet a minimum emissions standard of:
 - Spark ignition engine: 250 mgNO_x/Nm³;
 - Compression ignition engine: 400 mgNO_x/Nm³;
 - Gas turbine: 50 mgNO_x/Nm³.
- A presumption should be to use natural gas-fired installations. Where biomass is proposed within an urban area it is to meet minimum emissions standards of 275 mgNO_x/Nm³ and 25 mgPM/Nm³.

A1.5 The guidance also outlines that offsetting emissions might be used as a mitigation measure for a proposed development. However, it states that:

“It is important that obligations to include offsetting are proportional to the nature and scale of development proposed and the level of concern about air quality; such offsetting can be based on a quantification of the emissions associated with the development. These emissions can be assigned a value, based on the “damage cost approach” used by Defra, and then applied as an indicator of the level of offsetting required, or as a financial obligation on the developer. Unless some form of benchmarking is applied, it is impractical to include building emissions in this approach, but if the boiler and CHP emissions are consistent with the standards as described above then this is not essential”.

A1.6 The guidance offers a widely used approach for quantifying costs associated with pollutant emissions from transport. It also outlines the following typical measures that may be considered to offset emissions, stating that measures to offset emissions may also be applied as post assessment mitigation:

- Support and promotion of car clubs;
- Contributions to low emission vehicle refuelling infrastructure;
- Provision of incentives for the uptake of low emission vehicles;
- Financial support to low emission public transport options; and
- Improvements to cycling and walking infrastructures.

Screening

Impacts of the Local Area on the Development

“There may be a requirement to carry out an air quality assessment for the impacts of the local area’s emissions on the proposed development itself, to assess the exposure that residents or users might experience. This will need to be a matter of judgement and should take into account:

- the background and future baseline air quality and whether this will be likely to approach or exceed the values set by air quality objectives;*
- the presence and location of Air Quality Management Areas as an indicator of local hotspots where the air quality objectives may be exceeded;*
- the presence of a heavily trafficked road, with emissions that could give rise to sufficiently high concentrations of pollutants (in particular nitrogen dioxide), that would cause unacceptably high exposure for users of the new development; and*
- the presence of a source of odour and/or dust that may affect amenity for future occupants of the development”.*

Impacts of the Development on the Local Area

A1.7 The guidance sets out two stages of screening criteria that can be used to identify whether a detailed air quality assessment is required, in terms of the impact of the development on the local area. The first stage is that you should proceed to the second stage if any of the following apply:

- 10 or more residential units or a site area of more than 0.5 ha residential use; and/or
- more than 1,000 m² of floor space for all other uses or a site area greater than 1 ha.

A1.8 Coupled with any of the following:

- the development has more than 10 parking spaces; and/or
- the development will have a centralised energy facility or other centralised combustion process.

A1.9 If the above do not apply then the development can be screened out as not requiring a detailed air quality assessment of the impact of the development on the local area. If they do apply then you proceed to stage 2, which sets out indicative criteria for requiring an air quality assessment. The stage 2 criteria relating to vehicle emissions are set out below:

- the development will lead to a change in LDV flows of more than 100 AADT within or adjacent to an AQMA or more than 500 AADT elsewhere;
- the development will lead to a change in HDV flows of more than 25 AADT within or adjacent to an AQMA or more than 100 AADT elsewhere;
- the development will lead to a realigning of roads (i.e. changing the proximity of receptors to traffic lanes) where the change is 5m or more and the road is within an AQMA;
- the development will introduce a new junction or remove an existing junction near to relevant receptors, and the junction will cause traffic to significantly change vehicle acceleration/deceleration, e.g. traffic lights or roundabouts;
- the development will introduce or change a bus station where bus flows will change by more than 25 AADT within or adjacent to an AQMA or more than 100 AADT elsewhere; and
- the development will have an underground car park with more than 100 movements per day (total in and out) with an extraction system that exhausts within 20 m of a relevant receptor.

A1.10 The criteria are more stringent where the traffic impacts may arise on roads where concentrations are close to the objective. The presence of an AQMA is taken to indicate the possibility of being close to the objective, but where whole authority AQMAs are present and it is known that the affected roads have concentrations below 90% of the objective, the less stringent criteria are likely to be more appropriate.

A1.11 On combustion processes (including standby emergency generators and shipping) where there is a risk of impacts at relevant receptors, the guidance states that:

“Typically, any combustion plant where the single or combined NO_x emission rate is less than 5 mg/sec is unlikely to give rise to impacts, provided that the emissions are released from a vent or stack in a location and at a height that provides adequate dispersion. As a guide, the 5 mg/s criterion equates to a 450 kW ultra-low NO_x gas boiler or a 30kW CHP unit operating at <95mg/Nm³.

In situations where the emissions are released close to buildings with relevant receptors, or where the dispersion of the plume may be adversely affected by the size and/or height of adjacent buildings (including situations where the stack height is lower than the receptor) then consideration will need to be given to potential impacts at much lower emission rates.

Conversely, where existing nitrogen dioxide concentrations are low, and where the dispersion conditions are favourable, a much higher emission rate may be acceptable”.

- A1.12 Should none of the above apply then the development can be screened out as not requiring a detailed air quality assessment of the impact of the development on the local area, provided that professional judgement is applied; the guidance importantly states the following:

“The criteria provided are precautionary and should be treated as indicative. 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”.

- A1.13 Even if a development cannot be screened out, the guidance is clear that a detailed assessment is not necessarily required:

“The use of a Simple Assessment may be appropriate, where it will clearly suffice for the purposes of reaching a conclusion on the significance of effects on local air quality. The principle underlying this guidance is that any assessment should provide enough evidence that will lead to a sound conclusion on the presence, or otherwise, of a significant effect on local air quality. A Simple Assessment will be appropriate, if it can provide this evidence. Similarly, it may be possible to conduct a quantitative assessment that does not require the use of a dispersion model run on a computer”.

- A1.14 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.

Assessment of Significance

- A1.15 There is no official guidance in the UK in relation to development control on how to describe the nature of air quality impacts, nor how to assess their significance. The approach within the EPUK/IAQM guidance has, therefore, been used in this assessment. This approach involves a two stage process:

- a qualitative or quantitative description of the impacts on local air quality arising from the development; and
- a judgement on the overall significance of the effects of any impacts.

- A1.16 The guidance recommends 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’. In drawing this conclusion, the following factors should be taken into account:

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

A1.17 The guidance is clear that other factors may be relevant in individual cases. It also states that the effect on the residents of any new development where the air quality is such that an air quality objective is not met will be judged as significant. For people working at new developments in this situation, the same will not be true as occupational exposure standards are different, although any assessment may wish to draw attention to the undesirability of the exposure.

A1.18 A judgement of the significance should be made by a competent professional who is suitably qualified. A summary of the professional experience of the staff contributing to this assessment is provided in Appendix A2.

A2 Mineral Dust Assessment Procedure

- A2.1 The guidance developed by the IAQM on the Assessment of Mineral Dust Impacts for Planning (IAQM, 2016), provides criteria to screen the need for a detailed assessment, and, if required, a suggested approach to the detailed assessment of mineral developments.

Screening Assessment

- A2.2 The guidance sets out screening criteria that can be used to determine whether a detailed air quality assessment is required.
- A2.3 If there are no relevant receptors within 1 km of the operations, then a detailed dust assessment can be screened out. In such a case, it is considered that irrespective of the nature, size and operation of the site, the risk of an impact is likely to be “negligible” and any resulting effects are likely to be ‘not significant’.
- A2.4 In cases whereby receptors are located between 400 m, or 250 m (depending on the rock type) and 1 km of operations, it would normally be assumed that a detailed disamenity dust impact assessment is not required. However, the decision on whether to assess should be made and justified on a site-specific basis by a suitably experienced air quality professional taking into account local factors.
- A2.5 If there are relevant human and / or ecological receptors within 250 m or 400 m (depending on the rock type) then a disamenity dust impact assessment will almost always be required. This step is deliberately chosen to be conservative (and will in practice result in assessments being required for most minerals development schemes).

Detailed Assessment

- A2.6 If a detailed assessment is required the guidance describes the assessment approach in three steps, which are described in detail in the sections below.

Table A2.1: Detailed Assessment Steps

Step	Action	Consideration
Step 1	Describe Site Characteristics and Baseline Conditions	Such as extent of site boundary, operations, mineral type, production rate, working method, scale and duration of works, consideration of existing baseline conditions and dust sources
Step 2	Estimate Dust Risk	Consideration of pathway effectiveness and residual source emissions
Step 3	Estimate Likely Magnitude of Effect	Consideration of dust impact risk and receptor sensitivity

Step 2

Determination of Residual Source Emissions

A2.7 The residual source emission is determined considering site characteristics and the potential for emissions from each source, taking in account designed in mitigation measures.

A2.8 As stated within the guidance the following factors should be considered:

- the activities being undertaken (blasting, crushing, screening, methods of handling and storage etc.);
- the types and properties of the materials involved;
- the size of the site and, specifically, the area of land being worked (and hence the quantities of materials involved and the number of vehicles and plant etc.);
- the durations and frequencies of the activities;
- the likely effectiveness of the dust control measures incorporated into the design of the submitted development scheme, including design features, management controls (ideally formalised within a Dust Management Plan) and, where appropriate, engineering controls;
- other mitigation measures applied to reduce or eliminate dust; and
- the meteorological conditions that can promote or inhibit the raising of dust at the source (high winds and rainfall, respectively).

A2.9 The guidance provides examples illustrating factors that need to be considered when making a professional judgement as to the residual source emissions.

Table A2.2: Factors to Consider When Determining Residual Source Emissions

Source Activity	Factor Consideration
Site Preparation/Restoration	Size of working area
	Height of bunds
	Volume of Material movement
	No. of heavy plant
	Whether bunds are seeded or sealed
	Potential of material for dust generation
Mineral Extraction	Size of working area
	Extraction method (low or high energy)
	Potential of material for dust generation
Materials Handling	No. of heavy plant
	Type of surface (paved or unconsolidated)

Source Activity	Factor Consideration
	Distance of activities to site boundary (or in void)
	Potential of material for dust generation
On-site Transportation	Transport method (un-consolidated haul road or use of conveyors)
	Type of haul road (unpaved or paved)
	Dust potential of road surface
	No. of heavy vehicle movements
	Length of haul roads
	Vehicle speed (controlled or uncontrolled)
Mineral Processing	Potential of raw material for dust generation
	Potential of end product for dust generation
	Complexity of process
	Volume of material processed
Stockpiles/exposed surfaces	Length of stockpile storage
	Frequency of material transfer
	Potential of raw material for dust generation
	Type of surface (paved or unconsolidated)
	Distance of stockpiles to site boundary (or in void)
	Area of exposed surfaces
	Wind speed and dust threshold
Off-site Transportation	No. of HGV movements
	Type of Access Road (unpaved or paved)
	Vehicle cleaning facility provision
	Length of access road

Estimation of Pathway Effectiveness

A2.10 The effectiveness of pathway is determined based on site-specific factors considering the distance and direction of each receptor relative to the prevailing wind direction. The frequencies of wind in each direction are calculated based on meteorological data for five years from a nearby meteorological station. The frequency of exposure of receptors to moderate to high winds from the direction of the source is categorised as follows in Table A2.3 and the distance of the receptor to source as detailed within Table A2.4. Consideration of topography and physical features is also required.

Table A2.3: Categorisation of Frequency of Potentially Dusty Winds

Frequency Category	Criteria
Infrequent	Frequency of winds (>5m/s) from the direction of the dust source on all days are less than 5%
Moderately frequent	The frequency of winds (>5m/s) from the direction of the dust source on dry days are between 5% and 12%
Frequent	The frequency of winds (>5 m/s) from the direction of the dust source on dry days are between 12% and 20%
Very frequent	The frequency of winds (>5 m/s) from the direction of the dust source on dry days are greater than 20%

Table A2.4: Categorisation of Receptor Distance from Source

Category	Criteria
Distant	Receptor is between 200 m and 400 m from the dust source
Intermediate	Receptor is between 100 m and 200 m from the dust source
Close	Receptor is less than 100 m from the dust source

A2.11 The resulting pathway effectiveness for each receptor is identified using the criteria in Table A2.3 and Table A2.4 as shown in Table A2.5.

Table A2.5: Pathway Effectiveness

		Frequency of potentially dusty winds			
		Infrequent	Moderately frequent	Frequent	Very frequent
Receptor Distance Category	Close	Ineffective	Moderately Effective	Highly Effective	Highly Effective
	Intermediate	Ineffective	Moderately Effective	Moderately Effective	Highly Effective
	Distant	Ineffective	Ineffective	Moderately Effective	Moderately Effective

A2.12 The risk ratings for residual source emissions and pathway effectiveness (for each receptor) identified using the criteria in Table A2.2 and Table A2.5 are then combined using the matrix shown in Table A2.6 to estimate an overall risk of dust impact at each specific receptor location.

Table A2.6: Estimation of Dust Impact Risk

		Residual Source Emissions		
		Small	Medium	Large
Pathway Effectiveness	Highly effective pathway	Low Risk	Medium Risk	High Risk
	Moderately effective pathway	Negligible Risk	Low Risk	Medium Risk
	Ineffective pathway	Negligible Risk	Negligible Risk	Low Risk

Step 3

A2.13 The next stage of the risk assessment is to identify the potential dust effect at each receptor location. This is done using the matrix presented in Table A2.7, which combines the overall dust impact risk descriptor for each receptor with the receptor sensitivity.

Table A2.7: Assessment of Dust Magnitude of effects

		Receptor Sensitivity		
		Low	Medium	High
Dust Impact Risk	High Risk	Slight Adverse Effect	Moderate Adverse Effect	Substantial Adverse Effect
	Medium Risk	Negligible Effect	Slight Adverse Effect	Moderate Adverse Effect
	Low Risk	Negligible Effect	Negligible Effect	Slight Adverse Effect
	Negligible Risk	Negligible Effect	Negligible Effect	Negligible Effect

A2.14 As a final stage of assessment, an overall significance of dust effects is determined, based on professional judgment and taking into account the significance of effect at each specific receptor location for each activity.

A3 Professional Experience

Dr Denise Evans, BSc (Hons) PhD MEnvSc MIAQM

Dr Evans is an Associate Director with AQC, with more than 21 years' relevant experience. She has prepared air quality review and assessment reports for local authorities, and has appraised local authority air quality assessments on behalf of the UK governments, and provided support to the Review and Assessment helpdesk. She has extensive modelling experience, completing air quality and odour assessments to support applications for a variety of development sectors including residential, mixed use, urban regeneration, energy, commercial, industrial, and road schemes, assessing the effects of a range of pollutants against relevant standards for human and ecological receptors. Denise has acted as an Expert Witness and is a Member of the Institute of Air Quality Management.

Ricky Gellatly, BSc (Hons) CSci MEnvSc MIAQM

Mr Gellatly is a Principal Consultant with AQC with over nine years' relevant experience. He has undertaken air quality assessments for a wide range of projects, assessing many different pollution sources using both qualitative and quantitative methodologies, with most assessments having included dispersion modelling (using a variety of models). He has assessed road schemes, airports, energy from waste facilities, anaerobic digesters, poultry farms, urban extensions, rail freight interchanges, energy centres, waste handling sites, sewage works and shopping and sports centres, amongst others. He also has experience in ambient air quality monitoring, the analysis and interpretation of air quality monitoring data, the monitoring and assessment of nuisance dust and odours and the monitoring and assessment of construction dust. He is a Member of the Institute of Air Quality Management and is a Chartered Scientist.

Adam Dawson, BSc (Hons) MSc MIAQM AMEnvSc

Mr Dawson is a Senior Consultant with AQC with over seven years' experience in the field of air quality assessment. He undertakes air quality and odour assessments for AQC, covering residential and commercial developments, industrial installations, energy centres and waste facilities. He has experience using a range of dispersion models including ADMS-Roads, ADMS-5 and Breeze AERMOD to complete quantitative modelling assessments, for both planning and permitting purposes. He previously spent over two years as part of the Environment Agency's permitting team, so has extensive experience of the permitting process and industrial emissions. He is a Member of the Institute of Air Quality Management and an Associate Member of the Institution of Environmental Sciences.

A4 Modelling Methodology

Model Inputs

- A4.1 The impacts of emissions from the burners at the proposed asphalt plant have been predicted using the ADMS-5 dispersion model. ADMS-5 is a new generation model that incorporates a state-of-the-art understanding of the dispersion processes within the atmospheric boundary layer. The model has been run to predict the contribution of the proposed asphalt plant emissions to annual mean concentrations of nitrogen oxides and the 99.79th percentile of 1-hour mean nitrogen oxides concentrations. Model input selections are summarised in Table A4.1, and, where considered necessary, discussed further below. Input emission parameters are presented later in Table A4.2.

Table A4.1: Summary of Model Inputs

Model Parameter	Value Used
Terrain Effects Modelled?	Yes – 10km x 10km Cartesian grid at 50m resolution
Variable Surface Roughness File Used?	Yes – 10km x 10km Cartesian grid at 50m resolution
Building Downwash Effects Modelled?	No
Meteorological Monitoring Site	Mumbles Head
Meteorological Data Years	2016-2020
Dispersion Site Surface Roughness Length (m)	N/A (variable surface roughness file used)
Dispersion Site Minimum MO Length (m)	10
Met Site Surface Roughness Length (m)	0.1
Met Site Surface Minimum MO Length (m)	1

- A4.1 The proposed asphalt plant will contain two emissions points; an 11.5m MW_{th} burner used to run the dryer and a 1.2 MW_{th} burner to warm the bitumen prior to offsite removal. The emission rates, fuel throughput, exit velocity, stack diameter, exit temperature and stack heights for the main 11.5 MW_{th} burner have been provided by the asphalt plant manufacturer and are detailed in Table A4.2. For the second burner, the emission rates, stack diameter, exit temperature and stack heights have been provided by the plant manufacturer, while the exit velocity has been calculated based on the complete combustion of the input LPG fuel and is deemed consistent with the size of the burner and maximum fuel throughput provided within the technical specifications. These emission parameters are also set out in Table A4.2

Table A4.2: Plant Specifications, Emissions and Release Conditions

Parameter	Unit	Dryer Burner	Heating Burner
Stack Location	OSGB (m)	272574, 194855	272566, 194856
Stack Height (above ground level)	m	16	8
Net Fuel Input	kW	7221 ^a	1250 ^b
Fuel Input	m ³ /h	750	129.8
NOx Emission Rate	mg/Nm ³ ^{c,d}	230	230
	g/s ^e	0.466	0.0804
Exit Diameter	m	0.9	0.5
Exit Temperature	°C	75	160
Assumed Operational Hours per Annum	Hours	8760	8760

^a While this burner has a maximum capacity of 11.5 MW, the operator has advised that its average fuel consumption while operational in a plant of this kind is 750 m³/hour, equivalent to 7,221 kW.

^b Based on the maximum net fuel input provided within the manufacturer's technical specification.

^c Normalised conditions are 0 °C, 101 kPa, 3 % O₂ in dry gas.

^d Calculated based on the NOx emission factor of 2240 kg/10⁶m³ provided by the Manufacturer.

^e Derived from the fuel input rate and NOx emission factor of 2240 kg/10⁶m³ provided by the manufacturer.

A4.2 Hourly sequential meteorological data in sectors of 10 degrees from Mumbles Head for 2016-2020 have been used in the model. The Mumbles Head meteorological monitoring station is located at the HM Coastguard site, approximately 12.5 km to the south-west of the proposed development. It is deemed to be the nearest monitoring station representative of meteorological conditions in the vicinity of the proposed development; while the Mumbles Head meteorological monitoring station is located directly on the coast, whereas the dispersion site is near-coastal, it is deemed more appropriate than the nearest inland site, which is over 40 km away and located within hilly topography. A wind rose for the site for the years 2016-2020 is provided in Figure A4.1. The station is operated by the UK Met Office. Raw data were provided by the Met Office and processed by AQC for use in ADMS.

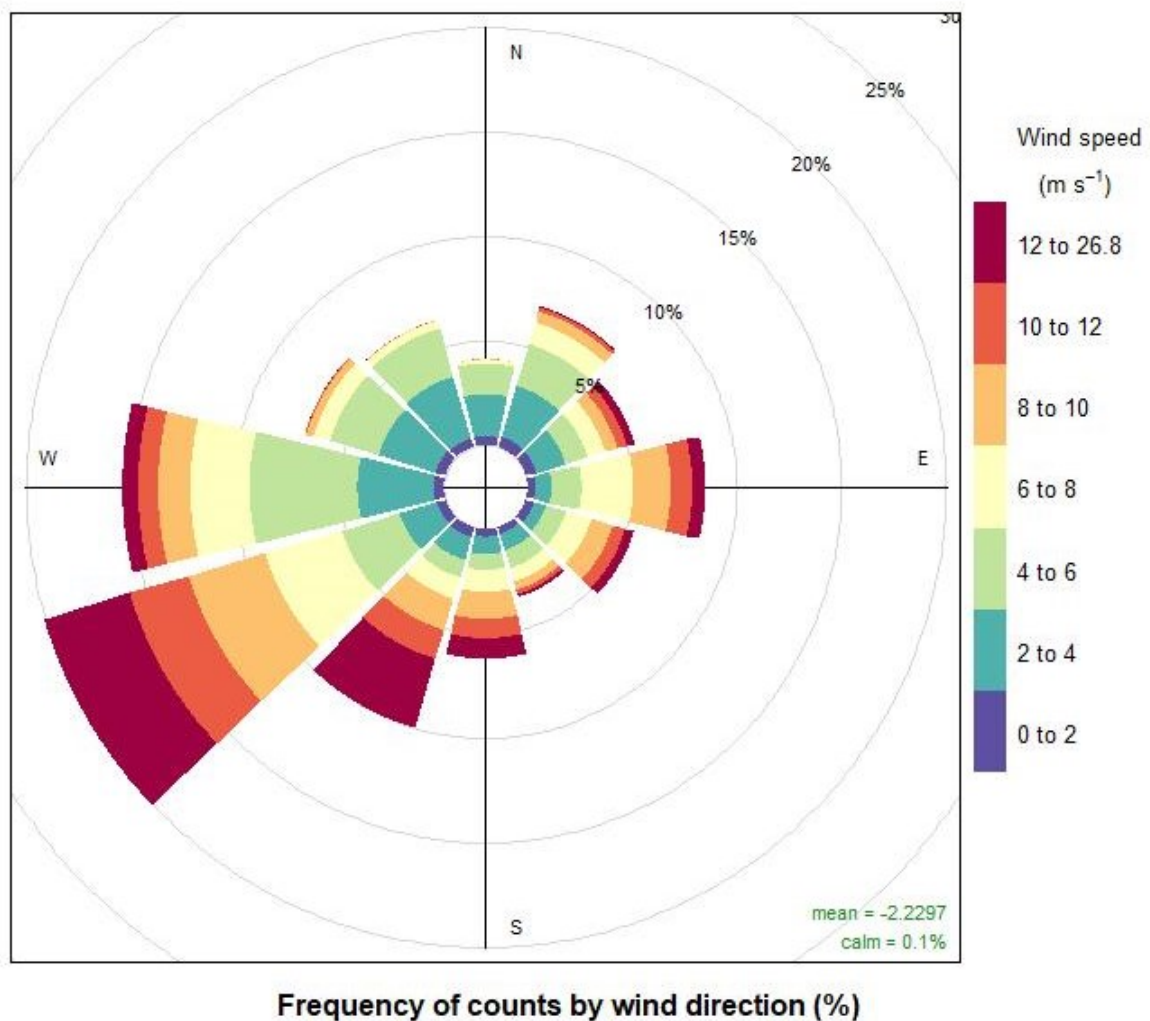


Figure A4.1: Wind Rose for Mumbles Head 2016-2020

Post-processing

A4.3 Emissions from the burners will be predominantly in the form of nitrogen oxides (NO_x). ADMS-5 has been run to predict the contribution of the burner emissions to annual mean concentrations of nitrogen oxides and to the 99.79th percentile of 1-hour mean nitrogen oxides concentrations. The approach recommended by the Environment Agency (2005) has been used to predict nitrogen dioxide concentrations, assuming that:

- annual mean NO₂ concentration = annual mean NO_x concentration multiplied by 0.7; and
- 99.79th percentile of 1-hour mean NO₂ concentrations = 99.79th percentile of 1-hour mean NO_x concentrations multiplied by 0.35.

Deposition Rates

- A4.4 Deposition has not been included within the dispersion model because the principal depositing component of concern is nitrogen dioxide and this is calculated from nitrogen oxides outside of the model. Instead, deposition has been calculated from the predicted ambient concentrations using the deposition velocities set out in Table A4.3. Deposition velocities refer to a height above ground, typically 1 or 2 m, although in practice the precise height makes little difference and here they have been applied to concentrations predicted at a height of 1.5 m above ground. The velocities are applied simply by multiplying a concentration ($\mu\text{g}/\text{m}^3$) by the velocity (m/s) to predict a deposition flux ($\mu\text{g}/\text{m}^2/\text{s}$). Subsequent calculations required to present the data as kg/ha/yr of nitrogen or sulphur and as keq/ha/yr for acidity follow basic chemical and mathematical rules⁴.

Table A4.3: Deposition Velocities Used in This Assessment

Pollutant	Deposition Velocity (m/s)	Reference
Nitrogen Dioxide	0.0015 m/s (Grassland)	AQTAG06 (AQTAG, 2011)
	0.003 m/s (Woodland)	AQTAG06 (AQTAG, 2011)

- A4.5 Wet deposition has been discounted. Wet deposition of the emitted pollutants this close to the emission source will be restricted to wash-out, or below cloud scavenging. For this to occur, rain droplets must come into contact with the gas molecules before they hit the ground. Falling raindrops displace the air around them, effectively pushing gasses away. The low solubility of nitrogen dioxide means that any scavenging of this gas will be a negligible factor.

⁴ For example, 1 kg N/ha/yr = 0.071 keq/ha/yr