

Appendix 14.2

Air Quality Assessment

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Glossary

Term	Definition
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.
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.
Standards	A nationally defined set of concentrations for nine pollutants below which health effects do not occur or are minimal.
The proposed development	Y Bryn Wind Farm development.

List of Abbreviations

Abbreviation	Description
AADT	Annual Average Daily Traffic
AIL	Abnormal Indivisible Load
APIS	Air Pollution Information System
AQMA	Air Quality Management Area
AURN	Automatic Urban and Rural Network
AW	Ancient Woodland
BCBC	Bridgend County Borough Council
DEFRA	Department for Environment, Food and Rural Affairs
DfT	Department for Transport
DMRB	Design Manual for Roads and Bridges
EFT	Emission Factor Toolkit
EPUK	Environmental Protection UK
HGV	Heavy Goods Vehicle (> 3.5 tonnes)
HMSO	Her Majesty's Stationery Office
IAQM	Institute of Air Quality Management
LAQM	Local Air Quality Management
LGV	Light Duty Vehicles (<3.5 tonnes)
LNR	Local Nature Reserve
µg/m ³	Microgrammes per cubic metre
NO	Nitric oxide
NO ₂	Nitrogen dioxide
NOx	Nitrogen oxides (taken to be NO ₂ + NO)
NPTCBC	Neath Port Talbot County Borough Council
PM ₁₀	Small airborne particles, more specifically particulate matter less than 10 micrometres in aerodynamic diameter
SINC	Site of Importance for Nature Conservation
TAN	Technical Advice Note
TEA	Triethanolamine – used to absorb nitrogen dioxide
WHO	World Health Organisation

A14.2 Introduction

- A14.2.1 This appendix describes the potential air quality impacts associated with the construction of the proposed Y Bryn Wind Farm, which will consist of up to 18 turbines. The assessment has been prepared by Air Quality Consultants Ltd.
- A14.2.2 The proposed development will result in an increase in vehicle movements during the construction phase, which may impact air quality at existing residential properties (with particular focus on the Neath Port Talbot Air Quality Management Area (AQMA)), as well as nearby sensitive designated ecological habitats. Once operational the turbines would not add any emissions to air and vehicle movements to and from the site as service and maintenance would be infrequent, therefore there is no requirement to assess air quality impacts during operation of the proposed development, as these will be not significant. During the decommissioning phase, vehicle numbers will be no greater than during the construction phase likely significantly lower. In addition at the time of decommissioning (likely the 2070's) it is expected emissions from transportation will be significantly lower than emissions generated today, possibly even net zero.
- A14.2.3 The main air pollutants of concern related to human health impacts are nitrogen dioxide (NO₂) and fine particulate matter (PM₁₀ and PM_{2.5}). The principal pollutants of potential concern for the designated habitats, due to the proposed development, are nitrogen oxides (NO_x) and ammonia (NH₃); both pollutants can have a direct effect on sensitive ecology, as well as contribute to nutrient nitrogen deposition and acid deposition. The air quality assessment responds to comments in the Scoping Direction from the Planning Inspectorate (PINS now known as Planning and Environment Decisions Wales – PEDW) (in relation to construction traffic emissions impacts on sensitive ecology) and Neath Port Talbot County Borough Council (NPTCBC) in relation to construction traffic emissions impacts in the Neath Port Talbot AQMA.
- A14.2.4 This appendix describes existing local air quality conditions (base year 2019: 2020/2021 was not used due to the impacts of the Covid-19 pandemic), and the predicted air quality during the construction phase of the proposed development. The year of construction is not currently known, as this will depend on when the proposed development can be connected to the grid. An estimated year of 2025 has been considered for the purposes of the assessment, but the actual period may be later.
- A14.2.5 This appendix has been prepared taking into account all relevant local and national guidance and regulations.

Policy Context and Assessment Criteria

- A14.2.6 All European legislation referred to in this report is written into UK law and remains in place.

Air Quality Strategy

- A14.2.7 The Air Quality Strategy¹ 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 AQMA, and prepare an action plan which identifies appropriate measures that will be introduced in pursuit of the objectives.

¹ Defra (2007) The Air Quality Strategy for England, Scotland, Wales and Northern Ireland. Defra

² Defra (2019) Clean Air Strategy 2019, Available [Online]. Available at: <https://www.gov.uk/government/publications/clean-air-strategy-2019> [15/12/2023]

Clean Air Strategy

- A14.2.8 The Clean Air Strategy² 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

- A14.2.9 In August 2020, the Welsh Government published the Clean Air Plan for Wales³, 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’.*
- A14.2.10 The Plan details intentions to publish a Clean Air Zone Framework, 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*’.
- A14.2.11 The Plan also includes strategies 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*’.
- A14.2.12 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 World Health Organisation (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.’*

³ Welsh Government (2020) The Clean Air Plan for Wales, [Online]. Available at: <https://gov.wales/sites/default/files/publications/2020-08/clean-air-plan-for-wales-healthy-air-healthy-wales.pdf> [Accessed 15/12/2023]

National Policies

- A14.2.13 Land-use planning policy in Wales is established within the policy document Planning Policy Wales (PPW)⁴, 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’.*
- A14.2.14 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.

⁴ Welsh Government (2021) Planning Policy Wales Edition 11, [Online]. Available at: https://gov.wales/sites/default/files/publications/2021-02/planning-policy-wales-edition-11_0.pdf [Accessed 15/12/2023]

⁵ Welsh Government (2015) Well-being of Future Generations (Wales) Act 2015, [Online]. Available at: <http://futuregenerations.wales/about-us/future-generations-act/> [Accessed 15/12/2023]

⁶ Welsh Government. (2007) Technical Advice Note (TAN) 18: Transport, [Online]. Available at: <http://gov.wales/topics/planning/policy/tans/tan18/?lang=en> [Accessed 15/12/2023]

⁷ The Council of European Communities (1992) European Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora, [Online]. Available at: <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:31992L0043> [Accessed 15/12/2023]

⁸ HMSO (2010) The Conservation of Habitats and Species Regulations 2010 Statutory Instrument 490, [Online]. Available at: http://www.legislation.gov.uk/uksi/2010/490/pdfs/uksi_20100490_en.pdf [Accessed 15/12/2023]

- A14.2.15 PPW also places considerable emphasis on the Well-being of Future Generations Act⁵ 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’.
- A14.2.16 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.
- A14.2.17 With respect to planning policy guidance, TAN 18 on transport⁶ makes reference to local air quality and the need for Air Quality Action Plans to be prepared for any Air Quality Management Areas declared.
- A14.2.18 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.

Policy for the Protection of Sensitive Ecosystems

European Policies

- A14.2.19 The ‘Habitats Directive’⁷ requires member states to introduce a range of measures for the protection of habitats and species. The Conservation of Habitats and Species Regulations⁸ 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’⁹, which is implemented in UK law through the Conservation of Habitats and Species. These sites form a network termed ‘Natura 2000’.
- A14.2.20 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.

National Policies

- A14.2.21 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 Act¹⁰, SSSIs have been re-notified under the Wildlife and Countryside Act¹¹. Improved provisions for the protection and management of SSSIs (in England and Wales) were introduced by the Countryside and Rights of Way Act¹¹ (the ‘CRoW’ act). If a development is ‘likely to damage’ a SSSI, the CRoW act requires that a relevant conservation body (i.e. Natural England) 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 Act¹² and the Natural Environment and Rural Communities Act¹³ both require the conservation of biodiversity.

⁹ The European Parliament and the Council of the European Union (2009) Directive 2009/147/EC of the European Parliament and of the Council, [Online]. Available at: <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32009L0147> [Accessed 15/12/2023]

¹⁰ National Parks and Access to the Countryside Act (1949), [Online]. Available at: <https://www.legislation.gov.uk/ukpga/Geo6/12-13-14/97> [Accessed 15/12/2023]

¹¹ Wildlife and Countryside Act (1981)

¹² HMSO (1995) Environment Act

¹³ HMSO (2006) Natural Environment and Rural Communities Act

- A14.2.22 National planning policy on biodiversity and conservation is set out in the National Planning Policy Framework (NPPF)¹⁴. 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.
- A14.2.23 The Environment (Wales) Act¹⁵ replaces the biodiversity duty in the Natural Environment and Rural Communities Act¹⁶. 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.
- A14.2.24 With respect to planning policy guidance, TAN 5 on Nature Conservation and Planning¹⁷ makes reference to the need for impacts on designated ecological sites to be considered by developers. An assessment of the in-combination impacts is also required for European and internationally designated sites; there are no European or internationally designated sites within the study area.
- A14.2.25 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.

Local Policies

- A14.2.26 The Bridgend County Borough Council (BCBC) Local Development Plan¹⁸ includes Policy ENV4 which relates to local and regional conservation sites and states:
- ‘Development within or adjacent to a:*
- ENV4(1) Local Nature Reserve (LNR);*
- ENV4(2) Site of Importance for Nature Conservation (SINC); or*
- ENV4(3) Regionally Important Geodiversity Site (RIGS);*
- should be compatible with the nature conservation or scientific interest of the area, whilst promoting their educational role.*
- Developments which would have an adverse impact on these sites will not be permitted unless the benefits associated with the development can be demonstrated to outweigh the harm and/or the harm can be reduced or removed by appropriate mitigation and/or compensation measures.’*
- A14.2.27 BCBC is currently in the process of developing a new Local Development Plan, however a final version of this has not been published.
- The Neath Port Talbot Local Development Plan¹⁹ includes Policy EN7 on Important Natural Features which states:

‘Development proposals that would adversely affect ecologically or visually important natural features such as trees, woodlands, hedgerows / field boundaries, watercourses or ponds will only be permitted where:

- 1. Full account has been taken of the relevant features in the design of the development, with measures put in place to ensure that they are retained and protected wherever possible; or*
- 2. The biodiversity value and role of the relevant feature has been taken into account and where removal is unavoidable, mitigation measures are agreed.’*

Assessment Criteria

Health Criteria

- A14.2.28 The 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 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 (England) Regulations²⁰ and the Air Quality (England) (Amendment) Regulations²¹.
- A14.2.29 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. Measurements across the UK have shown that the 1-hour nitrogen dioxide objective is unlikely to be exceeded at roadside locations where the annual mean concentration is below 60 µg/m^{3,22}. Therefore, 1-hour nitrogen dioxide concentrations will only be considered if the annual mean concentration is above this level. Measurements have also shown that the 24-hour mean PM₁₀ objective could be exceeded at roadside locations where the annual mean concentration is above 32 µg/m³. The predicted annual mean PM₁₀ concentrations are thus used as a proxy to determine the likelihood of an exceedance of the 24-hour mean PM₁₀ objective. Where predicted annual mean concentrations are below 32 µg/m³ it is unlikely that the 24-hour mean objective will be exceeded.
- A14.2.30 EU Directive 2008/50/EC²³ sets limit values for nitrogen dioxide, PM₁₀ and PM_{2.5}, and is implemented in UK law through the Air Quality Standards Regulations²⁴. 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 DfT’s Joint Air Quality Unit (JAQU).
- A14.2.31 The relevant air quality criteria for this assessment are provided in Table A14.2.1.

¹⁴ Ministry of Housing, Communities & Local Government (2023) National Planning Policy Framework

¹⁵ Welsh Government (2016) Environment (Wales) Act

¹⁶ HMSO (2006) Natural Environment and Rural Communities Act

¹⁷ Welsh Government. (2007) Technical Advice Note (TAN) 5: Nature Conservation and Planning, [Online]. Available at: <https://gov.wales/sites/default/files/publications/2018-09/tan5-nature-conservation.pdf> [Accessed 15/12/2023]

¹⁸ Bridgend County Borough Council (2013) Bridgend Local Development Plan, [Online]. Available at: <https://ldp.bridgend.gov.uk/policies/ldp/ldp.html> [Accessed 15/12/2023]

¹⁹ Neath Port Talbot County Borough Council (2016) Local Development Plan (2011- 2026), [Online]. Available at: https://www.npt.gov.uk/media/7321/ldp_written_statement_jan16.pdf?v=20170727124344 [Accessed 15/12/2023]

²⁰ HMSO (2000) The Air Quality (England) Regulations 2000 Statutory Instrument 928

²¹ HMSO (2002) The Air Quality (Amendment) (Wales) Regulations 2002 Statutory Instrument 3182 (W. 298)

²² Defra (2021) Review & Assessment: Technical Guidance LAQM.TG16 April 2021 Version, [Online]. Available at: <https://laqm.defra.gov.uk/documents/LAQM-TG16-April-21-v1.pdf> [Accessed 15/12/2023]

²³ The European Parliament and the Council of the European Union (2008) Directive 2008/50/EC of the European Parliament and of the Council, [Online]. Available at: <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32008L0050> [Accessed 15/12/2023]

²⁴ HMSO (2010) The Air Quality Standards Regulations 2010 Statutory Instrument 1001, [Online]. Available at: http://www.legislation.gov.uk/ukxi/2010/1001/pdfs/ukxi_20101001_en.pdf [Accessed 15/12/2023]

Table A14.2.1: Air Quality Criteria for Nitrogen Dioxide, PM₁₀ and PM_{2.5}

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
PM ₁₀	24-hour Mean	50 µg/m ³ not to be exceeded more than 35 times a year
	Annual Mean	40 µg/m ³ ^a
PM _{2.5} ^b	Annual Mean	25 µg/m ³

^a A proxy value of 32 µg/m³ as an annual mean is used in this assessment to assess the likelihood of the 24-hour mean PM₁₀ objective being exceeded. Measurements have shown that, above this concentration, exceedances of the 24-hour mean PM₁₀ objective are possible²².

^b 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

- A14.2.32

Objectives for the protection of vegetation and ecosystems have been set by the UK Government. They are the same as the EU 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-level designation such as ancient woodland which are the subject of this assessment; reflecting the relative sensitivity of the sites as well as their perceived ecological value.
- A14.2.33

The Critical Levels for annual mean and maximum 24-hour mean Nitrogen Oxides (NOx) concentrations are set out in Table A14.2.2. Critical loads for individual sites have been derived from APIS²⁵ and are set out in Table A14.2.3.

Table A14.2.2: Vegetation and Ecosystem Critical Levels ^a

Pollutant	Time Period	Critical Level
Nitrogen Oxides (expressed as NO ₂)	Annual Mean ^b	30 µg/m ³
	24-hour Mean ^c	75 µg/m ³

^a The critical levels as defined by the WHO²⁶.

^b Away from major sources, this critical level is set as an objective¹ and a limit value²³.

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

Table A14.2.3: Vegetation and Ecosystem Critical Loads

Habitat	Nutrient Nitrogen Deposition kgN/ha/yr	Acid Deposition 'Nmax' (keq/ha/yr) ^a
Broadleaved Woodland	10	1.14
Coniferous Woodland	5	1.14
Acid Grassland	5	0.56
Bogs	5	0.93
Calcareous Grassland	5	4.99
Improved Grassland	Not Sensitive	
Neutral Grassland	10	4.99
Dwarf Shrub	10	1.23
Fen Marsh and Swamp	Not Sensitive	

^a Nmax is the value above which additional nitrogen deposition will lead to an exceedance. The value of Nmax 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 'Nmin' value, the nitrogen deposition (in keq/ha/yr) has been compared directly against the Nmax.

Screening Criteria Human Health

- A14.2.34

Environmental Protection UK (EPUK) and the Institute of Air Quality Management (IAQM) recommend a two-stage screening approach²⁷ to determine whether emissions from road traffic generated by a development have the potential for significant air quality impacts. The approach first considers the size of a development; for non-residential development, if the development will cover a site area of less than 1 ha, then there is no need to progress to a detailed assessment.
- A14.2.35

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 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 judgment'*.

²⁵ APIS (2022). Available at: <http://www.apis.ac.uk/> [Accessed 15/12/2023]

²⁶ WHO (2000) Air Quality Guidelines for Europe; 2nd Edition, [Online]. Available at: http://www.euro.who.int/_data/assets/pdf_file/0005/74732/E71922.pdf [Accessed 15/12/2023]

²⁷ Moorcroft and Barrowcliffe et al. (2017) Land-Use Planning & Development Control: Planning For Air Quality v1.2. IAQM, London, [Online]. Available at: <http://iaqm.co.uk/guidance/> [Accessed 15/12/2023]

Assessment Methodology

Study Area

A14.2.36 The study area for the assessment has been identified using professional judgement, focussing on the areas where impacts are anticipated to be greatest. It includes the application site itself and all of the roads along which the development will lead to a potentially significant change in traffic flows. The study area is effectively shown in Figure A14.1.

Existing Conditions

- A14.2.37 Existing sources of emissions and baseline air quality conditions within the study area have been defined using a number of approaches:
- local sources have been identified through examination of the Council’s Air Quality Review and Assessment reports;
 - information on existing air quality has been obtained by collating the results of monitoring carried out by NPTCBC and BCBC;
 - background concentrations have been defined using Defra’s 2018-based background maps²⁸. These cover the whole of the UK on a 1 x 1 km grid;
 - background nitrogen deposition fluxes to the Ancient Woodland (AW), Local Nature Reserves (LNRs) and Site of Importance for Nature Conservation (SINCs) have been taken from the APIS website²⁵; and
 - whether or not there are any exceedances of the annual mean limit value for nitrogen dioxide in the study area has been identified using the maps of roadside concentrations published by Defra^{29,30}, as well as from any nearby Automatic Urban and Rural Network (AURN) monitoring sites (which operate to the required data quality standards). These are the maps used by the UK Government, together with AURN results, to identify and report exceedances of the limit value. The national maps of roadside PM₁₀ and PM_{2.5} concentrations³⁰, which are available for the years 2009 to 2019, show no exceedances of the limit values anywhere in the UK in 2019.

Impacts on Human Health

A14.2.38 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 guidance²⁷. Where impacts can be screened out there is no need to progress to a more detailed assessment.

Impacts on Designated Ecological Sites

A14.2.39 The first step in considering the road traffic impacts on designated ecological sites, has been to identify nearby ecological sites within 200 m of construction vehicle routes. It has been assumed that all identified ecological sites have habitats sensitive to NO_x and nitrogen and acid deposition. The screening criteria from the DMRB³¹ guidance of 1,000 Annual Average Daily Traffic movements (AADT) has been used to screen out the potential for significant impacts on locally designated sites. Therefore the impacts of construction traffic on nearby designated ecological sites have been assessed qualitatively.

²⁸ Defra (2021) Local Air Quality Management (LAQM) Support Website, [Online]. Available at: <http://laqm.defra.gov.uk/> [Accessed 15/12/2023]

²⁹ Defra (2020) 2020 NO₂ projections data (2018 reference year), [Online]. Available at: <https://uk-air.defra.gov.uk/library/no2ten/2020-no2-pm-projections-from-2018-data> [Accessed 15/12/2023]

³⁰ Defra (2021) UK Ambient Air Quality Interactive Map, [Online]. Available at: <https://uk-air.defra.gov.uk/data/gis-mapping> [Accessed 15/12/2023]

Assessment of Significance Human Health

A14.2.40 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 IAQM²⁷ 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 chapter is set out in Chapter 1 of this ES.

Assessment of Significance Ecological Sites

A14.2.41 The judgement of significance will be based on professional judgement with reference to the screening criteria, timescales for impact and the sensitivity of the designated site.

Baseline Conditions

Relevant Features

A14.2.42 The proposed development is located near to the Neath Port Talbot AQMA as shown in Figure A14.1. This AQMA was declared in July 2000 for exceedances of the 24-hour mean PM₁₀ objective, due a large number of industrial activities in Port Talbot.

Local Air Quality Monitoring

A14.2.43 NPTCBC operated six automatic monitoring sites in 2019 and a further three sites prior to 2018. The Council also operates a number of nitrogen dioxide monitoring sites using diffusion tubes prepared and analysed by Socotec (using the 50% triethanolamine (TEA) in acetone method). These include one deployed at Port Talbot fire station, another at the old fire station and one adjacent to College Green. There are also a number of diffusion tube monitoring sites operated by BCBC; these sites are in roadside location within Maesteg, outside of the AQMA. Annual mean results for the years 2015 to 2019 are summarised in Table A14.2.4; the data for 2019 are the most recent published data for both NPTCBC and BCBC. Results relating to the 1-hour mean objective are summarised in Table A14.2.5. The monitoring locations are shown in Figure A14.2. The monitoring data have been taken from NPTCBC’s 2020 Annual Status Report³² and BCBC’s 2020 Annual Status Report³³.

Table A14.2.4: Summary of annual mean NO₂ monitoring (2015-2019) (µg/m³)

Site No.	Site Type	Location	2015	2016	2017	2018	2019
25	Roadside	Old Fire Station	24.2	26.8	26.4	24.1	27.7
PT2	Industrial	Port Talbot Fire Station	17.0	21.0	16.0	15.0	15.0
19	Industrial	Port Talbot Fire Station	16.6	16.8	15.6	13.7	15.7
3	Urban Background	11 College Green	14.5	14.0	13.2	12.1	12.9
OBC-125	Roadside	Commercial Street	-	-	-	-	18.8
NPR	Roadside	Newton Primary Reception	-	-	-	-	7.9
NPP	Roadside	Newton Primary Playground	-	-	-	-	7.1
Objective			40				

³¹ Highways Agency, 2007, Design Manual for Roads and Bridges, Volume 11 Environmental Assessment, Section 3 Environmental Assessment Techniques, Part 1 HA207/07 Air Quality

³² Neath Port Talbot County Borough Council (2020) Air Quality Annual Status Report

³³ Bridgend County Borough Council (2020) Annual Air Quality Progress Report for Bridgend County Borough Council, [Online]. Available at: <https://democratic.bridgend.gov.uk/documents/s22523/Bridgend%20Council%202020%20Air%20Quality%20Progress%20Report%20Appendix.pdf?LLL=0> [Accessed 15/12/2023]

Table A14.5: Number of hours with NO₂ concentrations above 200 µg/m³

Site No.	Site Type	Location	2015	2016	2017	2018	2019
PT2	Industrial	Port Talbot Fire Station	0	0	0	0	0
Objective			18				

- A14.2.44 No exceedances of the annual mean or 1-hour mean nitrogen dioxide objective were measured from 2015 to 2019.
- A14.2.45 There are several industrial automatic monitoring stations, which measured PM₁₀ concentrations in 2019. The PT2 and PS2 monitors also measure PM_{2.5} concentrations. Annual mean results for the years 2015 to 2019 are summarised in Table A14.2.6, while results relating to the daily mean objective are summarised in Table A14.2.7.

Table A14.2.6: 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
PS2	Industrial	Prince Street	-	23	25	23	20
DK1	Industrial	Port Talbot Docks	20	20	-	-	-
TR1	Roadside	Talbot Road	22	16	-	-	-
TH1	Industrial	Theodore Road	23	20	-	-	-
TW1	Industrial	Twll-yn-y-Wal Park	26	24	21	21	21
DS1	Industrial	Dyffryn School	20	18	21	-	22
Objective			40				
PM _{2.5}							
PT2	Industrial	Port Talbot Fire Station	10	9	10	11	11
PS2	Industrial	Prince Street	10	10	10	9	9
Objective			25 ^a				

^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.

Table A14.2.7: 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
PS2	Industrial	Prince Street	-	9	18	12	8
DK1	Industrial	Port Talbot Docks	6	2	-	-	-
TR1	Roadside	Talbot Road	4	0	-	-	-
TH1	Industrial	Theodore Road	4	1	-	-	-
TW1	Industrial	Twll-yn-y-Wal Park	10	4	3	9	10
DS1	Industrial	Dyffryn School	5	0	2	-	2(31)
Objective			35 (50)				

A14.2.46 The annual mean PM₁₀ and PM_{2.5} concentrations were below the objectives for all years from 2015 to 2019. The 24-hour mean PM₁₀ objective was also not exceeded in any year.

Exceedances of EU Limit Value

A14.2.47 The PT2 AURN monitoring site lies within the study area and shows no exceedance of the annual mean nitrogen dioxide limit value in 2019 (Table A14.2.4). Defra's roadside annual mean nitrogen dioxide concentrations³⁴, which are used to report exceedances of the limit value to the EU, identify exceedances of the limit value in 2018 along the M4. Defra's predicted concentrations for 2024³⁵ identify any exceedances within the study area of the application site in any scenario. As such, there is considered to be no risk of a limit value exceedance in the vicinity of the proposed development by the time that it is operational.

Background Concentrations

National Background Pollution Maps

A14.2.48 Estimated background concentrations in the study area are set out in Table A14.2.8 and are all well below the objectives. A range of values is presented as the study area covers multiple 1 x 1 km grid squares.

Table A14.2.8: Estimated annual mean background pollutant concentrations in 2019 and 2024 (50 µg/m³)

Year	NO _x	NO ₂	PM ₁₀	PM _{2.5}
2019	7.4 - 23.2	5.9 - 16.6	10.4 - 14.4	6.7 - 9.2
2024	6.3 - 19.2	5.0 – 14.5	9.7 - 13.8	6.2 - 8.6
Objectives	-	40	40	25 ^a

^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.

Background Deposition and Acidity

A14.2.49 There are a number of designated ecological sites within the vicinity of the Y Bryn site, as well as within 200 m of roads used by construction vehicles (see Figure A14.3). Background nitrogen deposition fluxes to the habitats are presented in Table A14.2.9. As a worst-case it has been assumed that the habitat with the lowest critical load applies to all AWS, LNR and SINC. Background nutrient and acid nitrogen deposition rates both exceeded the critical load in this period, which is the case for a large proportion of designated ecological sites across the UK.

Table A14.2.9: Estimated annual mean background nitrogen deposition

Habitat	Nutrient Nitrogen Deposition (kgN/ha/yr)	Acid Nitrogen Deposition (keq/ha/yr)
Ancient Woodland/Local Nature Reserve	12.6	1.09
Critical Load	5	0.56
SINC	20.3	1.68
Critical Load	5	1.14

Impact Assessment

A14.2.50 The construction of the Y Bryn Wind Farm will generate construction traffic associated with:

- Mobilisation – the initial delivery of plant and equipment to the site;
- Daily service and deliveries
- Delivery of components which include Abnormal Indivisible Loads (AILs); and

³⁴ Defra. (2021) UK Pollutant Release and Transfer Register, [Online]. Available at: <http://prtr.defra.gov.uk/map-search> [Accessed 15/12/2023]

³⁵ Defra. (2020) 2020 NO2 projections data (2018 reference year), [Online]. Available at: <https://uk-air.defra.gov.uk/library/no2ten/2020-no2-pm-projections-from-2018-data> [Accessed 15/12/2023]

- Demobilisation (the reverse of mobilisation).

A14.2.51 All construction traffic will access the Y Bryn site at three access points and use the existing road network, principally Afan Valley Road and B4282. All AILs which are too large to use the local road network, will access the Y Bryn site from the new access junction from the M4. Once the AILs loads are delivered, the vehicles will be downgraded to Heavy Goods Vehicles (HGVs) and exit the Y Bryn site using the existing road network.

Construction Traffic Trip Generation

A14.2.52 A large portion of the construction traffic will be HGVs. Construction will take place over a 24-month period, with the peak traffic occurring over a 12-month period from month 2 to month 14; the worst-case annual average daily traffic movements (i.e. the average daily traffic between month 2 and month 14) are presented in Table A14.2.10. These accord to the maximum within any 12-month period, but given that construction may not commence at the start of a calendar year, these are unlikely to represent AADT which is a calendar-year metric and is anticipated to be lower. The largest number of vehicle movements are associated with the completion of the access track and concrete pours for the turbine foundations.

A14.2.53 There are a number of routes, along which construction traffic will travel to and from the three main site access points, as shown in Figure 11.1. Traffic movements along the eastbound M4 for the new junction which will connect the M4 at access point 1 to the proposed development will only be used by AILs in one direction, to the site. Traffic movements have been averaged over a 12-month period and include both AILs and escort vehicles for each convoy:

- 210 AILs;
- 840 police motorcycles;
- 210 police cars;
- 210 traffic management vehicles; and
- 210 civilian escort vehicles.

Table A14.2.10: Traffic During the Construction Phase

Road Link	Total Traffic Flow (AADT)	LGVs (AADT)	HGVs (AADT)
A4107 to Junction with B4282	72	42	29
B4282 from West to Access Point 2	64	35	29
B4282 from Maesteg to Access Point 2	37	15	21
Goytre Road to Access Point 3	7	4	3
B4282 from Maesteg to Junction 36 of M4	52	31	21

A14.2.54 The majority of construction traffic will comprise HGVs. Whilst historically HGVs have had significantly higher emissions than LGV, the most recent Euro 6 HGVs have similar NOx emissions to a standard fleet mix of LGVs. Therefore, whilst HGVs have been considered separately with regards to the IAQM screening criteria, the actual difference in emissions is not significant.

Human Health Impacts

A14.2.55 The majority of construction traffic will access the Y Bryn site from the M4 and its junction with Afan Valley Road and Dyffryn Road. This junction is adjacent to the Neath Port Talbot AQMA. It is anticipated that 72 vehicles (29 HGVs) will travel along construction route ‘A4107 to the junction with B4282’ and 7 vehicles (3 HGVs) on Goytre Road to Access Point 3’ and 5 vehicles (1 HGV) on average associated with AILs eastbound on the M4 between Junction 40 and the new junction at access point 1. Combined these roads will lead to an increase in 33 HGVs

and 51 LGVs on the M4 close to the Neath Port Talbot AQMA. This AQMA was declared for exceedances of the 24-hour mean PM₁₀ objective, as a result of industrial uses. Baseline traffic flows along the M4 were recorded in 2019 by the DfT, giving a baseline flow of 51,663 AADT (4,288 HGVs). The increase of 33 HGVs is a very small proportion of the existing flows on the M4. Using Defra’s EFT^{28,36} to calculate vehicle emissions for the M4, the increase in traffic of 51 LGVs and 33 HGVs can be calculated as being a 0.16% increase in NO_x emissions, and a 0.30% increase in both PM₁₀ and PM_{2.5} emissions on the M4 close to the AQMA²⁸.

A14.2.56 Whilst the increase in HGV traffic is above the IAQM screening criteria of 25 AADT within an AQMA the proposed development will not lead to significant increases in PM concentrations such that it would affect 24-hour mean concentrations. Road traffic is typically not a concern in relation to the 24 hr PM₁₀ objectives; in addition, the 24-hour mean PM₁₀ objective has not been exceeded within the AQMA since 2013³⁷. The AQMA is not designated as a result of road traffic emissions and therefore PM contribution from the small increase in traffic as a result of the scheme, is unlikely to impact the same receptors affected by industrial emissions.

Therefore, the impacts of the increases in traffic are judged to be ‘not significant’.

Ecological Impacts

A14.2.57 The assessment has identified that a number of AWs, the Bryn Tip LNR and a number of SINC’s lie within 200 m of roads used as construction traffic routes and therefore may experience increases in NOx concentrations, Nitrogen Deposition and Acid Deposition.

A14.2.58 The construction phase will generate a maximum of 29 HGVs and up to 42 LGVs daily on any one road close to a designated site. The sites experiencing the largest increases in traffic are AWs located to the west of the proposed development on Afan Valley Road. These increases in traffic are well below the DMRB screening criteria of 200 HGVs and 1,000 LGVs and therefore the impacts of the scheme are judged to be ‘not significant’ in isolation.

A14.2.59 The designated sites are also all locally designated and therefore are less sensitive than nationally or internationally designated sites such as SSSIs, SACs and SPAs. They are therefore not afforded the same level of protection and are not subject to the Habitats Directive and the need to undertake an appropriate assessment which includes the requirement to consider effects ‘in combination’.

A14.2.60 Further, the construction phase will last for 24 months, with peak construction traffic only occurring during a 12-month window, therefore the increases in NOx, NH₃, nitrogen deposition and acid deposition will be temporary in nature.

A14.2.61 The effects are therefore judged to be ‘not significant’.

Cumulative Impacts

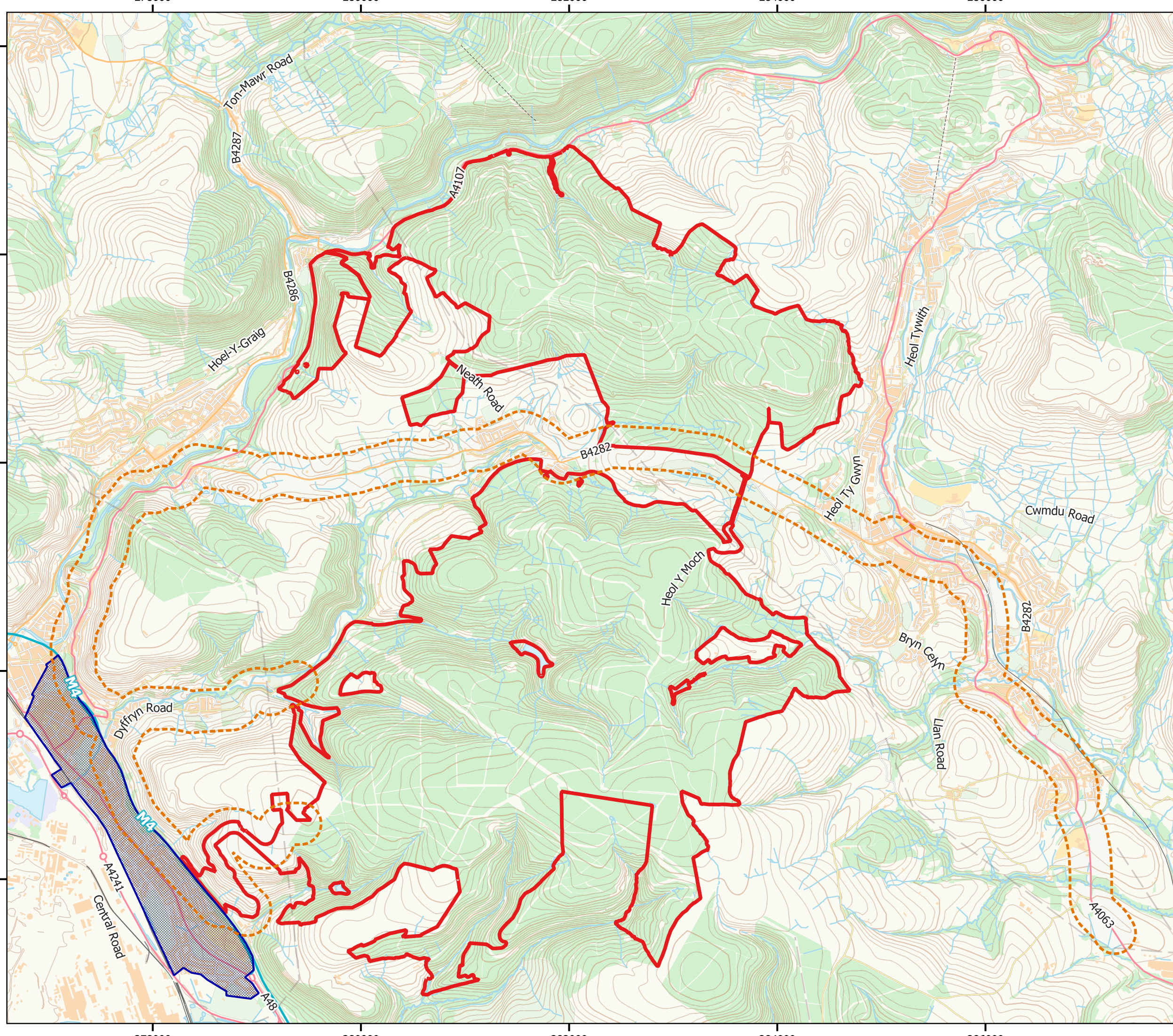
A14.2.62 The peak construction traffic will only last for a year, and the full construction period will be a maximum of 24-months. It is currently considered unlikely that there will be any large cumulative schemes which will become fully operational during the Y Bryn Wind Farm construction phase, however should this be the case then working with local planning and highways authorities a combined traffic management plan will ensure that no air quality thresholds are breached; there is therefore not expected to be a significant increase in traffic along the affected road network as a result of cumulative schemes. The cumulative impacts on both human health and ecology are judged to be ‘not significant’.

Conclusion

A14.2.63 The impacts of traffic generated by the construction phase of the proposed development on both human health and locally designated ecological sites have been assessed. The overall impacts are anticipated to be ‘not significant’.

³⁶ EFT v11.0, Area = Wales, Year = 2024, Traffic Format = Basic Split, Road Type = (Motorway (Not London), Speed = 80 kph

³⁷ Neath Port Talbot County Borough Council (2017) Air Quality Annual Status Report



Project:
**Y Bryn Wind Farm, Neath
Port Talbot/Bridgend**

Title:
**Figure A14.1: Y Bryn Wind Farm Air
Quality Study Area**

Key

-  Site Boundary
-  Air Quality Management Area
-  Air Quality Study Area (200m from Roads)

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Scale @ A3 1:36,840.466479

Coordinate System: British National Grid

0

0.5

1

1.5

2 km



Date: 18-12-23	Prepared by: IS	Checked by: LH
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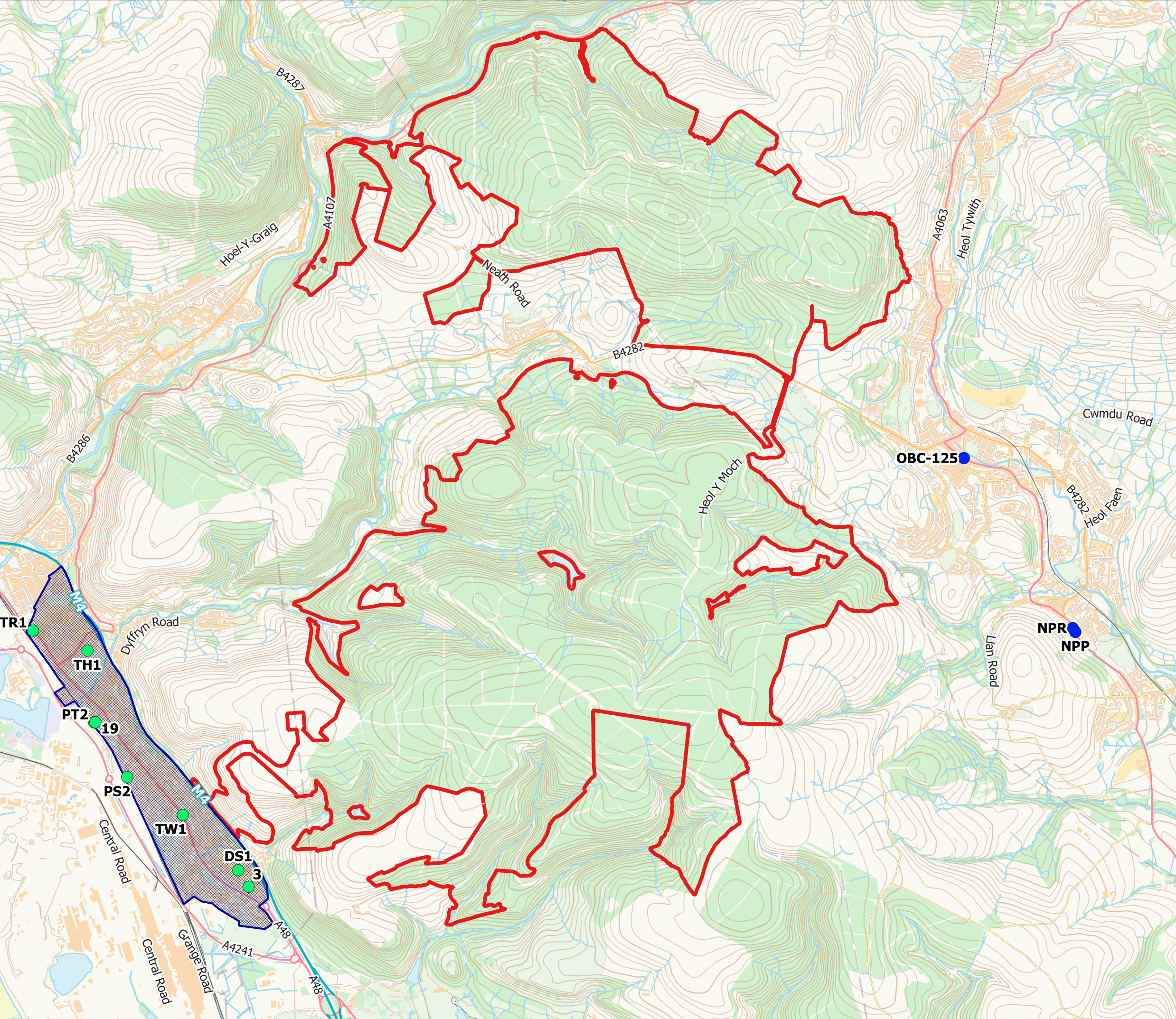
Ref:

Drawing by:
Air Quality Consultants Ltd
23 Coldharbour Road
Bristol
BS6 7 JT









Project:
**Y Bryn Wind Farm, Neath
Port Talbot/Bridgend**

Title:
**Figure A14.2: Air Quality Monitoring
Locations**

- Key**
-  Site Boundary
 -  Air Quality Management Area
 -  Neath Port Talbot Monitoring
 -  Bridgend Monitoring

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Scale @ A3: 1:35,208.180774
Coordinate System: British National Grid

0

0.5

1

1.5

2 km



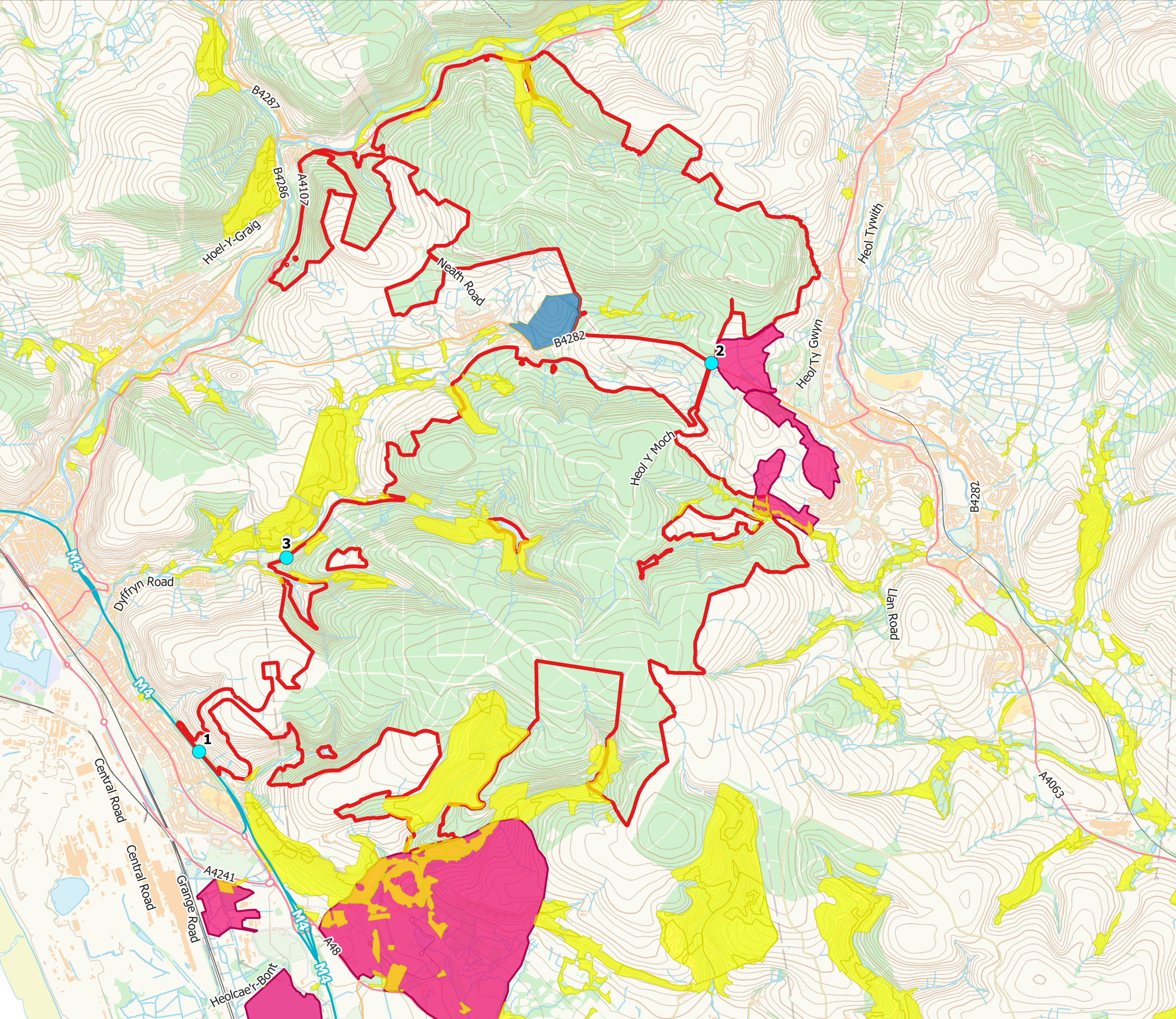
Date: 17-10-23	Prepared by: IS	Checked by: LH
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Bristol BS6 7JT







Project:

Y Bryn Wind Farm, Neath Port Talbot/Bridgend

Title:

Figure A14.3: Designated Ecological Sites considered in the Air Quality Assessment

Key

- Site Boundary
- Site Access Points

Designated Ecological Sites

- Ancient Woodland
- Local Nature Reserve
- Sites of Importance for Nature Conservation

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Scale @ A3 1:39,409.777097

Coordinate System: British National Grid

00.511.52

km

N

Date: 17-10-23

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