St Athan Northern Access Road

Air Quality Impact Assessment

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List of Acronyms

AADT	Annual Average Daily Traffic (vehicles per day)
AQAP	Air Quality Action Plan
AQMA	Air Quality Management Area
AQO	Air Quality Objective
CAFE	Clean Air for Europe
CEMP	Construction Environmental Management Plan
CO	Carbon Monoxide
DCLG	Department for Communities and Local Government
DEFRA	Department for Environment, Food and Rural Affairs
EFT	Emission Factor Toolkit
EPUK	Environmental Protection UK

EU	European Union
HDV	Heavy Duty Vehicles
IAQM	Institute of Air Quality Management
km	Kilometres
kph	Kilometres per hour
LAQM	Local Air Quality Management
LDV	Light Duty Vehicles
M	Metres
NO	Nitric oxide
NO_2	Nitrogen dioxide
NO_X	Oxides of nitrogen
NGR	National Grid Reference
NPPF	National Planning Policy Framework
OS	Ordnance Survey
$PM_{2.5}$	Particulate Matter with an aerodynamic diameter of less than 2.5 micrometre
PM_{10}	Particulate Matter with an aerodynamic diameter of less than 10 micrometre
PPG	Planning Practice Guidance
SSSI	Site of Special Scientific Interest
TG	Technical Guidance
µg	Microgrammes
$\mu g/m^3$	Microgrammes (of pollutant) per cubic metre (of air)
UK	United Kingdom

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Executive Summary

The Welsh Government proposes to submit a planning application for a new access road to serve the Aerospace Business Park in St. Athan. The new road, referred to as the Northern Access Road, will provide a link from the B4265 near Llantwit Major in the west to Eglwys Brewis Road in Picketston in the east.

This report presents an air quality assessment of the proposed Northern Access Road. The assessment considers the potential for the proposed Northern Access Road to result in impacts on air quality during the construction and operational phases. The assessment demonstrates that the proposed Northern Access Road will not result in significant adverse effects on air quality and is therefore considered to be consistent with relevant planning policy.

The following conclusions can be made with regards to the air quality effects associated with the proposed Northern Access Road:

- The proposed Northern Access Road is not located within any of the Vale of Glamorgan Council's Air Quality Management Areas (AQMA), within which nitrogen dioxide (NO_2) annual mean concentrations have been identified to be above air quality objectives.
- The construction phase for the proposed Northern Access Road is expected to be carried out over a period of approximately 14 months. It is anticipated that emissions of airborne particulate matter generated by construction activities will be controlled using on site management practices to the extent that the proposed Northern Access Road should give rise to negligible short-term effects on dust deposition rates and concentrations of particulate matter at the nearest sensitive receptors.
- Once operational the proposed Northern Access Road will provide access to the Aerospace Business Park which occupies a large part of the former RAF camp. Traffic will be able to utilise the proposed Northern Access Road rather than the existing Eglwys-Brewis Road.
- Predicted annual mean NO_2 and Particulate Matter (PM_{10} and $PM_{2.5}$) concentrations are expected to be well below the annual mean objective at all receptors in the Study Area. Overall, receptors are predicted to experience a negligible effect in accordance with the Institute of Air Quality Management (IAQM) /Environmental Protection UK (EPUK) guidance (2015), which is considered to be not significant, in both the opening year of 2019 and the future year of 2034.
- No additional mitigation measures are recommended for air quality as part of the operational phase of the Proposed Northern Access Road.

1. Introduction

1.1 Introduction

The Welsh Government proposes to submit a planning application for a new access road to serve the Aerospace Business Park in St. Athan. AECOM has been appointed by the Welsh Government to assess the impact that the development proposals may have on local air quality.

The new road, referred to as the Northern Access Road, will provide a link from the B4265 near Llantwit Major in the west to Eglwys Brewis Road in Picketston in the east. If constructed, the new access road will be situated between Boverton and Eglwys-Brewis, to the north of the existing Eglwys-Brewis Road, within the Vale of Glamorgan Council (VoGC) administrative area. The Northern Access Road will pass between Froglands Farm and Rose Cottage.

Proposals for major development at St. Athan received outline planning permission in 2009 for a mixed-use, regeneration-led scheme, involving substantial new development of the existing site and the adjoining land. The purpose was to provide a Defence Technical College for the Ministry of Defence (MoD) and an expanded Aerospace Business Park for the Welsh Government, whilst part of the site, West Camp, was to remain as an operational military base. These developments required a new access road. The projects received outline planning permissions in December 2009 as part of which detailed permission was granted for the Northern Access Road.

The Defence Technical College did not proceed and the planning permissions have since expired. Nevertheless, the Welsh Government remains committed to the Aerospace Business Park and the Northern Access Road is considered essential in order to deliver the economic and social benefits associated with the Cardiff Airport St Athan Enterprise Zone.

The Northern Access Road will serve existing and proposed development at St. Athan including:

- The Aerospace Business Park, which occupies a large part of the former RAF camp, including the operational runway;
- The proposed Aston Martin car manufacturing facility, which will occupy the existing super hangar building on the Aerospace Business Park; and
- Proposed residential development on land lying south of the proposed Northern Access Road and between it and Eglwys Brewis Road.

The Northern Access Road will not serve the MoD camp at St Athan, which will continue to be served via its existing access road at Main Gate.

VoGC has declared one Air Quality Management Area (AQMA) due to exceedances of the annual mean nitrogen dioxide (NO_2) air quality objective. This AQMA was declared on the 1st August 2013, for a section of Windsor Road, Cogan, Penarth which is more than18 km to the east of the site (Vale of Glamorgan Council, 2015).

The potential effects of the proposed Northern Access Road on local air quality sensitive receptors have been considered with respect to existing planning policies and National Air Quality Objectives. Additional mitigation measures have been recommended where appropriate, to minimise the potential for adverse residual effects being experienced by sensitive receptors during the construction and operational phases of the proposed Northern Access Road.

1.2 Scope of Work

A review of the published ambient air quality data forms the basis for the prediction of current baseline conditions against which the magnitude of predicted impacts due to the proposed Northern Access Road has been assessed.

During the construction phase of the proposed Northern Access Road, there is the potential for earthworks and construction activities to generate fugitive emissions of particulate matter (dust and PM_{10}). There is the risk of such emissions giving rise to adverse effects on amenity or health at receptors located within 350 m of the source of emissions (IAQM, 2014) unless appropriate mitigation measures are adopted. There are receptors located within 350 m of the site boundary and therefore an assessment of the significance of effects from fugitive

emissions of dust and PM_{10} from the site has been undertaken. The assessment includes consideration of the risk of adverse effects associated with the potential trackout of material at receptors located within 50 m of roads extending up to 500 m from the site access.

There are no national or European designated ecological sites located within 50 m of the Site boundary, or within 50 m of roads extending up to 500 m from the site access. The nearest designated ecological site is the East Aberthaw Coast Site of Special Scientific Interest (SSSI), located approximately 4.5 km to the south east of the proposed Northern Access Road. Due to the distance, this SSSI and any other national or European designated ecological site located at a greater distance are unlikely to be affected by the construction and operation phases of the proposed Northern Access Road. As such, national or European designated ecological receptors have not been considered any further in this assessment.

The potential for changes to long term and short term mean concentrations of particulate matter (PM_{10} and $PM_{2.5}$) and NO_2 to occur as a result of predicted changes in road traffic movements on the local road network have been considered specifically for the following scenarios:

- 2015 Existing Baseline;
- 2019 Do-Minimum: including the 200 existing business park jobs and Aston Martin committed development (both accessed via existing Eglwys-Brewis Road); and
- 2019 Do-Something: including the 200 existing business park jobs and Aston Martin committed development (both accessed via the proposed Northern Access Road).

In addition to the above scenarios, a future year scenario 15 years after opening has been modelled for information, to consider the potential impacts associated with the potential expanded business park, local housing developments within the Vale of Glamorgan Local Development Plan (LDP) (VoGC, 2013).

- 2034 Do-Minimum: including Aston Martin committed development, housing developments in the LDP but not committed and 3,000 business park jobs (including the 200 existing jobs). All developments accessed via existing Eglwys Brewis Road; and
- 2034 Do-Something: including Aston Martin committed development, housing developments in the LDP but not committed, and 3,000 business park jobs (including the 200 existing jobs)). All developments accessed via the proposed Northern Access Road.

Potential changes to emissions may occur as a result of a change in the number of vehicle movements on the local road network and also with new emissions along the proposed Northern Access Road. The air quality assessment uses traffic flows provided by WYG, working on behalf of AECOM, in its Transport Assessment.

1.3 Aims and Objectives

The objectives of this air quality assessment are to:

- Determine existing local air quality within the Study Area through review of VoGC air quality monitoring data and modelling of a baseline scenario;
- Qualitatively assess the effects of the proposed Northern Access Road on local air quality during the construction phase; particularly with respect to effects associated with dust generation and construction traffic; and
- Quantitatively assess the effects of the proposed Northern Access Road on local air quality at sensitive receptors as a result of operation of the proposed Northern Access Road in relation to road emissions.

1.4 Report Structure

The report is structured as follows:

Section	Title	Description
Section 1	Introduction	-
Section 2	Regulatory Background	Provides an overview of the national and local planning policy relevant to the assessment of air quality effects associated with the Proposed Northern Access Road.
Section 3	Assessment Methods	Outlines the assessment methods used to undertake the air quality assessment.
Section 4	Baseline Conditions	Presents information in relation to local air quality around the proposed Northern Access Road, including current and future conditions.
Section 5	Assessment of Effects	Presents the results of the construction and operational phase air quality assessments.
Section 6	Mitigation Measures	Outlines the mitigation measures proposed for the construction and operational phases (where required).
Section 7	Summary	A summary of the overall conclusions of the air quality assessment.
Section 8	References	Lists the references cited within the report.
Appendix A	Figures	Contains the figures which support the air quality assessment.

2. Regulatory Background

2.1 Legislation

2.1.1 Air Quality Legislation

The Clean Air for Europe (CAFE) programme revisited the management of Air Quality within the EU and replaced the EU Framework Directive 96/62/EC (Council of European Communities, 1996), its associated Daughter Directives 1999/30/EC (Council of European Communities, 1999), 2000/69/EC (Council of European Communities, 2000), 2002/3/EC (Council of European Communities , 2004), and the Council Decision 97/101/EC (Council of European Communities, 1997) with a single legal act, the Ambient Air Quality and Cleaner Air for Europe Directive 2008/50/EC (Council of European Communities, 2008).

Directive 2008/50/EC is currently transcribed into UK legislation by the Air Quality Standards Regulations 2010 (Her Majesty's Stationery Office (HMSO), 2010). These limit values are binding on the UK and have been set with the aim of avoiding, preventing or reducing harmful effects on human health and on the environment as a whole.

2.1.2 National Air Quality Strategy

The UK National Air Quality Strategy (Department for Environment, Food and Rural Affairs (Defra), 2000) was initially published in 2000, under the requirements of the Environment Act 1995 (HMSO, 1995). The most recent revision of the Strategy (Defra 2007) sets objective values for key pollutants as a tool to help Local Authorities manage local air quality improvements in accordance with the EU Air Quality Framework Directive. Some of these objective values have been laid out within the Air Quality Standards (Wales) Regulations 2010 (HMSO, 2010)

The air quality objective values have been set down in regulation solely for the purposes of local air quality management. Under the local air quality management regime, VoGC has a duty to carry out regular assessments of air quality against the objective values and if it is unlikely that the objective values will be met in the given timescale, they must designate an Air Quality Management Area (AQMA) and prepare an Air Quality Action Plan (AQAP) with the aim of achieving the objective values. The boundary of an AQMA is set by the governing Local Authority to define the geographical area that is to be subject to the management measures to be set out in a subsequent action plan. Consequently, it is not unusual for the boundary of an AQMA to include within it relevant locations where air quality is not at risk of exceeding an air quality objective.

The UK's national air quality objective values for the pollutants of relevance to this assessment are displayed in Table 2.1.

Table 2.1: UK National Air Quality Objective Values

Pollutant	Averaging Period	Value (µg/m^3)	Maximum Permitted Exceedances	Target Date
Nitrogen Dioxide (NO_2)	Annual Mean	40	None	31/12/05
	Hourly Mean	200	18 times per year	31/12/05
Particulate Matter (PM_{10})	Annual Mean	40	None	31/12/04
	24-Hour Mean	50	35 times per year	31/12/04
Fine Particulate Matter ($PM_{2.5}$)	Annual Mean	25	None	2020

2.2 Planning Policy

There are both national and local policies for the control of air pollution within the VoGC local authority area. The effect of developments on the achievement of such policies and plans are matters that may be a material consideration when making decisions for individual planning/ consent applications.

2.2.1 National Planning Policy

Guidance on minimising and managing environmental risks and pollution, including air pollution is set out in Planning Policy Wales Edition 9 (Welsh Government, November 2016):

"Section 13.12.1 The potential for pollution affecting the use of land will be a material consideration in deciding whether to grant planning permission. Material considerations in determining applications for potentially polluting development are likely to include:

- *location, taking into account such considerations as the reasons for selecting the chosen site itself;*
- *impact on health and amenity;*
- *the risk and impact of potential pollution from the development, insofar as this might have an effect on the use of other land and the surrounding environment (the environmental regulatory regime may well have an interest in these issues, particularly if the development would impact on an Air Quality Management Area or a SAC);*
- *prevention of nuisance; "*

"13.12.3 Planning authorities may use planning conditions or obligations to meet planning aims to protect the environment where these are pertinent to the development proposed. It is important for planning authorities to understand the scope and purpose of conditions that can be imposed by pollution authorities so as to ensure that planning conditions neither duplicate nor conflict with such conditions. Proposed development should be designed wherever possible to prevent adverse effect to the environment but as a minimum to limit or constrain any effects that do occur".

2.2.2 Local Planning Policy

Vale of Glamorgan Council (VoGC) is currently developing a new Local Development Plan covering its administrative area. In the interim, The Vale of Glamorgan Adopted Unitary Development Plan 1996-2011 (UDP) constitutes the current development plan for the authority.

The UDP was adopted on 18th April 2005, and contains policy ENV 29 which relates directly to air quality:

"Policy ENV 29 - Protection of Environmental Quality

'Development will not be permitted if it would be liable to have an unacceptable effect on either people's health and safety or the environment:

(i) By releasing pollutants into water, soil or air, either on or off site; or

(ii) From smoke, fumes, gases, dust, smell, noise, vibration, light or other polluting emissions."

2.3 Local Air Quality Management

In line with the requirements of Part IV of the Environment Act (1995), VoGC has carried out a phased review and assessment of local air quality within their area since 1999 (VoGC, 2015).

VoGC has declared one Air Quality Management Areas (AQMAs) due to exceedances of the annual mean nitrogen dioxide (NO_2) objective. This AQMA was declared on the 1st August 2013, for a section of Windsor Road, Cogan, Penarth which is more than 18 km to the east of the site (VoGC, 2015).

3. Assessment Methods

3.1 Introduction

This chapter presents the methodology used to assess the potential effects of the proposed Northern Access Road on air quality during its construction and operational phases.

There is currently no statutory guidance on the methodology for air quality impact assessments. Several non-statutory bodies have published their own guidance relating to air quality and development control, such as that by Environment Protection United Kingdom (EPUK) and the Institute of Air Quality Management (IAQM) (IAQM, 2014 and IAQM/EPUK, 2015). This assessment has been carried out based on this guidance.

This chapter outlines the methods used to assess the magnitude of impact and the significance of effect on air quality for:

- Fugitive emissions of particulate matter from construction phase activities; and
- Emissions from road vehicles during the operational phase.

Air quality sensitive receptors that have the potential to be affected by the proposed Northern Access Road have been identified for each element of the assessment. The methods used to determine the significance of air quality effects are described in the Significance Criteria section (Section 3.9).

3.2 Construction Phase Fugitive Emissions of Particulate Matter

Fugitive emissions of airborne particulate matter (i.e. emissions which are not associated with a single release point) are readily produced through the action of abrasive forces on materials. A wide range of construction activities have the potential to generate this type of emission, including:

- Earthworks, including the handling, working and storage of materials;
- Construction activities; and
- Trackout (the transfer of dust-making materials from the Site onto the local road network).

Particulate matter in air is made up of particulates of a variety of sizes, and the concept of a 'size fraction' is used to describe particulates with sizes in a defined range. These definitions are based on the collection efficiency of specific sampling methods and each of the size fractions is especially associated with different types of impacts. In this assessment the term 'dust' is used to mean particulate matter in the size fraction 1–75 µm (micrometre) in diameter, as defined in BS 6069:1994 (British Standards Institute, 1994).

The size fraction called 'PM_{10}' is composed of material with an aerodynamic diameter of less than 10 µm in diameter and overlaps with the size fraction for dust. Air quality objectives for PM_{10} have been set for the protection of human health and the term 'PM_{10}' is only used in this assessment when referring to the potential impact of emissions of particulate matter from construction activities on human health receptors. The short-term, 24-hour mean objective for airborne concentrations of PM_{10} is the appropriate Air Quality Strategy (AQS) Objective for assessing the potential impact on health of short-term fugitive emissions from construction sites.

Dust impacts are considered in terms of the change in airborne concentration and the change in the rate of deposition of dust onto surfaces. The IAQM adopts a broad definition of 'dust' that includes the potential for changes in airborne concentration, changes in deposition rates, and the risk to human health and public amenity when considering the significance of effects from emissions of fugitive particulate matter. In this assessment, specific reference is made to the impacts associated with specific size fractions (dust, PM_{10}), before considering the overall effect on receptors using an approach that is consistent with the IAQM's guidance (IAQM, 2014).

The nature of a construction dust impact varies between different types of receptor. In general, receptors associated with higher baseline dust deposition rates (e.g. farms, light and heavy industry or outdoor storage facilities) are less sensitive to impacts. By comparison, some hi-tech industries and food processing plants operate under clean air conditions and increased airborne particulate matter concentrations may have an increased economic cost associated with the extraction of more material by the plants air filtration units.

Table 3.1 below provides some generic examples of the type of impacts that may result from fugitive emissions of particulate matter. The varying sensitivity of distinct receptor types to specified impacts is also listed in Table 3.1. For example, residential buildings are considered to be more sensitive to the impact of material becoming soiled by depositing material than agricultural land.

Table 3.1: Types of Impacts from Emissions of Particulate Matter

Nature of Impact	Receptor Types Affected	Relative Sensitivity
Change in 24 hour mean PM_{10} concentrations	Residential properties Schools Hospitals and clinics	Receptor sensitivity was considered when Air Quality Objective Value was set.
Change in rate at which air filtration units require maintenance	Hospitals and clinics	High
	Hi-tech industries	High
	Food processing industries	High
Change in the rate at which material accumulates on glossy surfaces, such as glass or paint work	Painting and furnishing operations	High
	Residential properties	Medium
	Schools	Medium
	Food retailers	Medium
	Offices	Medium
	Museums and Galleries	Medium
	Glasshouses	Medium
Change in the rate at which property or products becomes soiled by deposited material	Food processing industries	High
	Painting and furnishing operations	High
	Museum and galleries	High
	Residential Properties	High
	Food retailers	Medium
	Offices	Medium
	Horticultural land	Medium
Change in the rate at which mineral material is deposited onto vegetation	Ecological sites	Medium – low
	Horticultural land	Medium – low
	Agricultural land	Low
Change in chemical composition of mineral material deposited	Ecological sites	Medium – low
	Outdoor Storage	Medium – low
	Horticultural Land	Low
	Recreational green space	Low

The construction assessment methodology is consistent with the overarching approach to the assessment of the impacts of construction as set out in current guidance from the IAQM (IAQM, 2014). The method adopted for this assessment follows the IAQM's guidance in taking a conservative, site specific approach to assigning the significance of potential effects. The assessment considers the significance of potential effects without mitigation in place, and recommends mitigation measures appropriate to the identified risks to receptors, to minimise the significance of any impacts.

At present there are no statutory UK or EU standards relating to the assessment or control of nuisance dust. The emphasis of the regulation and control of demolition and construction dust should therefore be the adoption of good working practices on site. Good design practice is a process that is informed by impact assessments and is able to avoid the potential for significant adverse environmental effects at the design stage. The approach taken in this assessment assumes that mitigation measures that are identified as being necessary in the impact assessment (i.e. mitigation measures beyond those inherent in the proposed design) would be applied during works to ensure potential significant adverse effects do not occur.

It has also been assumed that good site practices will be utilised on site when assessing potential dust impacts. Examples of accepted good site practice include the IAQM guidance (IAQM, 2014), and BRE guidance (Buildings Research Establishment, 2003).

A qualitative assessment has been undertaken to assess the significance of any effects on sensitive receptors associated with the construction phase of the proposed Northern Access Road. The assessment is based on the IAQM guidance (IAQM, 2014) and considers potential sources of emissions on the basis of three main activity groupings associated with the Proposed Northern Access Road:

- Earthworks;
- Construction; and
- Trackout.

There is no demolition required for the proposed Northern Access Road and so it has not been included as an activity type in this assessment.

For each activity group the following steps are applied with respect to identifying potential impacts, before coming to an overall conclusion about the significance of the effects predicted:

- Identify the nature, duration, and location of activities being carried out;
- Establish the risk of significant effects occurring as a result of these activities;
- Review the proposed or embedded mitigation against good site practice;
- Identify additional mitigation measures, if necessary, to reduce the risk of a significant adverse effect occurring at receptors; and
- Summarise the overall effect of the works with respect to fugitive emissions of particulate matter and then report the significance of the effects.

3.3 Construction Phase Road Traffic Emissions

The construction phase of the proposals is likely to lead to a small increase in the number of vehicles on the local highway network for the duration of the construction works. EPUK (EPUK, 2010) set out criteria to establish the need for an air quality assessment for the construction phase of a development as being:

> *"Large, long-term construction sites that would generate large HGV flows (>200 per day) over a period of a year or more."*

It is considered that there would be significantly fewer than 200 construction vehicle movements per day, with an approximation of a maximum of 20 HGVs per day during the peak of construction, which is likely to occur during the surfacing of the new road. This approximation has been provided by the design team on the basis that there is a net balance of cut and fill on site, where all earthworks cut will be used for fill elsewhere on site. This will reduce the numbers of HGVs required during the earthworks.

The additional number of vehicle movements is not considered to be high enough to have the potential to cause a significant adverse air quality effect at receptors. Construction phase road traffic emissions are thus not considered further in the assessment as it can be concluded that the air quality effect on receptors would be not significant.

3.4 Operational Road Traffic Emissions

The incomplete combustion of fuel in vehicle engines results in the presence of hydrocarbons (HC) such as benzene and 1,3-butadiene, sulphur dioxide (SO_2), carbon monoxide (CO) and PM_{10} and $PM_{2.5}$ (aerodynamic diameter less than 2.5 µm) in exhaust emissions. Better emission control technology and fuel specifications are expected to reduce emissions per vehicle in the long-term.

Although SO_2, CO, benzene and 1,3-butadiene are present in motor vehicle exhaust emissions, detailed consideration of the associated effects on local air quality is not considered relevant in the context of this assessment. This is because road traffic emissions of these substances have been reviewed for the VoGC administrative area and nowhere within the administrative area is at risk of exceeding these objectives.

At the high temperatures and pressures found within vehicle engines, some of the nitrogen in air and fuel is oxidised to form oxides of nitrogen (NO_X), mainly in the form of nitric oxide (NO); which is then converted to NO_2

in the atmosphere. The presence of NO_2 in the atmosphere is associated with adverse effects on human health. Vehicle emissions can also result in the exposure at sensitive receptors to concentrations of particulate matter (PM_{10} and $PM_{2.5}$).

This assessment considers the impact of road traffic emissions on the long-term (annual) and short-term (hourly) NO_2, PM_{10} and $PM_{2.5}$ concentrations at local air quality sensitive receptors in the vicinity of the proposed Northern Access Road in its opening year (2019). A future year of 2034 has also been considered for information, to provide an indication of the potential impacts on air quality when other planned local developments have also been built. Further details of the scenarios modelled are provided earlier in this report, in section 1.2.

To undertake the assessment of road traffic emissions during the operational phase, the latest version of dispersion model software 'ADMS-Roads' (V4.0.1.0) has been used to quantify pollution levels at receptors. ADMS-Roads is a modern dispersion model that has an extensive published track record of use in the UK for the assessment of local air quality impacts, including model validation and verification studies (CERC, 2016).

3.5 Information Sources

The following sources of information that define the proposed Northern Access Road have been reviewed and form the basis of the assessment of likely significant effects on air quality:

- Traffic data provided by WYG for the baseline scenario (2015), opening year (2019) and future year (2034) of the proposed Northern Access Road with and without the development in operation; and
- Northern Access Road scheme design provided by AECOM's engineering team

3.5.1 Local Air Quality Data

A review of existing baseline air quality has been undertaken using air quality data provided by VoGC and information presented within the VoGC 2015 Air Quality Updating and Screening Assessment (VoGC, 2015).

VoGC monitors air quality at three automatic monitoring sites, located at Windsor Road in Penarth (Roadside site monitoring for NO_2, PM_{10} and O_3), Dinas Powys Infant School (Roadside site monitoring for NO_2), and Fonmon, Highwayman Inn (Rural site monitoring for NO_2, PM_{10}, Ozone (O_3) and SO_2).

VoGC also monitors NO_2 annual mean concentrations using passive diffusion tubes in their administrative area, with a total of 43 sites monitored during 2014.

Unfortunately, VoGC does not operate any air quality monitoring sites within the study area considered by this assessment.

3.6 Methods for Determining Sensitive Receptors

Sensitive receptors that have the potential to be affected by the proposed Northern Access Road have been considered for both the construction and operational phases. The methodology for determining sensitive receptors is described below.

3.6.1 Construction Dust Sensitive Receptors

As described in the IAQM guidance for construction dust (IAQM, 2014) a receptor is defined as:

> *"A location that may be affected by dust emissions during demolition and construction. Human receptors include locations where people spend time and where property may be impacted by dust. Ecological receptors are habitats that might be sensitive to dust."*

When assessing the impact of dust emissions generated during construction works, receptors are defined as the nearest potentially sensitive receptor to the boundary of the Site in each direction. These receptors have the potential to experience impacts of greater magnitude due to emissions of particulate matter generated by the works, when compared with other more distant receptors, or less sensitive receptors.

When assessing the impact of dust emissions generated during construction works, an assessment is required where there is:

- A human receptor within 350 m of the site boundary;

- A nationally or internationally designated ecological receptor within 50 m of the site boundary; or
- A human or nationally or internationally designated ecological receptor within 50 m of the route used by construction vehicles on the public highway (over a distance of 500 m from the site entrance).

Potential dust sensitive receptors during the construction phase of the proposed Northern Access Road were identified from publically available aerial photography and OS mapping. The majority of receptors within 200 m of the Site are residential properties, Froglands Farm, Rose Cottage, Old Froglands and Millands Farm, as well as the residential receptors on Cardigan Crescent and Heol Merioneth, and the existing commercial and residential properties along Eglwys-Brewis Road.

The identification of potential sensitive ecological receptors has been undertaken in line with current guidance. There are no ecological receptors within 50 m of the Site boundary, within 50 m from a route used by construction vehicles on the public highway, or within 500 m of the proposed Northern Access Road. The nearest nationally designated ecological site is the East Aberthaw Coast SSSI, located approximately 4.5 km to the south east of the proposed Northern Access Road. It is therefore considered highly unlikely that the proposed works would emit dust with the potential to significantly affect the nearest ecological receptor sites and the risk to such sites is not considered further in this assessment.

The IAQM guidance (IAQM, 2014) provides criteria to determine the sensitivity of the area around a construction site to dust soiling effects and the sensitivity of people to the health effects of PM_{10}. In terms of the sensitivity of the receptors, residential properties are considered to be of high sensitivity for effects on both amenity and human health. All other receptors in the Study Area can be considered to be of medium sensitivity to impacts on both amenity and human health. Taking into account the proximity of sensitive receptors to the proposed Northern Access Road, their number, and existing PM_{10} concentrations in the area, the Study Area as a whole is considered to be of low sensitivity to impacts on dust soiling and human health.

3.6.2 Operational Phase Sensitive Receptors

The concentration of pollutants emitted from road traffic associated with the proposed Northern Access Road, and the impact at the roadside or at sensitive receptors, will be influenced by a number of factors. These include background pollution levels, emissions of pollutants from road traffic (which are dictated by traffic flow rates, vehicle flow composition and speed).

The air quality objective values for pollutants associated with road traffic have been set by the Expert Panel of Air Quality Standards at a level below the lowest concentration at which the more sensitive members of society have been observed to be adversely affected by exposure to each pollutant. Therefore, all receptors that represent exposure of the public are of equal sensitivity; as any member of the public could be present at those locations.

Operational impacts from road traffic emissions have been quantified at 14 existing receptors in the vicinity of the proposed Northern Access Road and the road network which will potentially experience changes in traffic as a result of the proposed Northern Access Road. Each receptor chosen represents the anticipated maximum level of exposure that could be experienced by other receptors in their vicinity. The selected receptors are listed in Table 3.2 and their locations are shown on Figure 1, Appendix A.

Table 3.2: Air Quality Receptors

ID	Description	Type	Air Quality Objective Applicable	OS Coordinates		Receptor Height (m)	Floor
				x	y		
R1	Old Froglands	Residential	Annual Mean, Short Term Mean	299050	169116	1.5	Ground
R2	Froglands Farm	Residential	Annual Mean, Short Term Mean	298995	169236	1.5	Ground
R3	Millands Farm	Residential	Annual Mean, Short Term Mean	298752	169130	1.5	Ground
R4	30 Eagle Terrace	Residential	Annual Mean, Short Term Mean	298941	168901	1.5	Ground
R5	19 Mallory Close	Residential	Annual Mean, Short Term Mean	301482	169134	1.5	Ground

R6	6 Sycamore Avenue	Residential	Annual Mean, Short Term Mean	301008	169411	1.5	Ground
R7	5 Walnut Grove	Residential	Annual Mean, Short Term Mean	300815	169271	1.5	Ground
R8	5 Picketston Close	Residential	Annual Mean, Short Term Mean	300454	169290	1.5	Ground
R9	7 Church Meadow	Residential	Annual Mean, Short Term Mean	298751	168761	1.5	Ground
R10	The Parwg	Residential	Annual Mean, Short Term Mean	298738	168769	1.5	Ground
R11	10 Denbigh Drive	Residential	Annual Mean, Short Term Mean	298103	168970	1.5	Ground
R12	9 Heol Merioneth	Residential	Annual Mean, Short Term Mean	298187	168888	1.5	Ground
R13	40 Harding Close	Residential	Annual Mean, Short Term Mean	298402	168693	1.5	Ground
R14	Rose Cottage	Residential	Annual Mean, Short Term Mean	299002	169168	1.5	Ground
R15	Caravan Park	Residential	Annual Mean, Short Term Mean	298829	169189	1.5	Ground

3.7 Detailed Modelling

3.7.1 Dispersion model Selection

In order to determine operational phase air quality effects, dispersion modelling was used to calculate the effects of emissions from road traffic (ADMS-Roads v4.0.1.0). The ADMS models are modern dispersion models with an extensive published track record of use in the UK for air quality assessment as part of planning applications and validation studies.

The dispersion model input data and general model conditions used in the assessment for the proposed Northern Access Road are provided in Table 3.3.

Table 3.3: General ADMS-Roads Model Inputs

Variables	ADMS-Roads
Surface roughness at source	0.3
Minimum Monin-Obukhov length for stable conditions (m)	30
Terrain Types	Flat
Pollutants	NO_X, PM_{10}, $PM_{2.5}$
Emissions	Defra Emission Factor Toolkit
Meteorological data	1 year (2015) hourly sequential from Cardiff Airport (Rhoose)
Emission Profiles	None
Model Output	Long-term annual mean NO_X concentrations Long-term annual mean PM_{10} concentrations Long-term annual mean $PM_{2.5}$ concentrations

3.7.2 Modelling Scenarios

As set out in section 1.2, the scenarios considered within the assessment of road traffic effects for the Proposed Northern Access Road include:

- 2015 Existing Baseline;
- 2019 Do-Minimum: including the 200 existing business park jobs and Aston Martin committed development (both accessed via existing Eglwys-Brewis Road); and

- 2019 Do-Something: including the 200 existing business park jobs and Aston Martin committed development (both accessed via the proposed Northern Access Road).

In addition to the above scenarios, a future year scenario 15 years after opening has been modelled for information, to consider the potential impacts associated with the potential expanded business park, local housing developments within the LDP:

- 2034 Do-Minimum: including Aston Martin committed development, housing developments in local plan but not committed and 3000 business park jobs (including the 200 existing jobs). All developments accessed via existing Eglwys Brewis Road; and
- 2034 Do-Something: including Aston Martin committed development, housing developments in local plan but not committed, and 3000 business park jobs (including the 200 existing jobs)). All developments accessed via the proposed Northern Access Road.

3.7.3 Traffic Data

The traffic data used within this assessment for the baseline year (2015), the 2019 'Do Minimum' and 'Do Something' scenarios, and the 2034 'Do Minimum' and 'Do Something' scenarios are presented in Table 3.4 and Table 3.5.

The Annual Average Daily Traffic (AADT) flows and the percentage of Heavy Goods Vehicles (HGVs) and Average Speed data provided are presented in Table 3.4 and Table 3.5. For sections of road approaching junctions and on roundabouts, a slower average speed of 20 kph was applied to represent the slower vehicles speeds generally found in these areas, in line with the guidance provided in the local air quality management technical guidance document LAQM TG.16 (Department of Environment, Food and Rural Affairs, 2016).

Table 3.4: Traffic Data – 24 hour AADT Baseline and Do Minimum

Link ID	2015 Baseline			2019 'Do Minimum'			2034 'Do Minimum'		
	AADT (veh/day)	HDV (%)	Speed (kph)	AADT (veh/day)	HDV (%)	Speed (kph)	AADT (veh/day)	HDV (%)	Speed (kph)
B4265 Link 1	6,144	9	59	6,927	9	59	10,864	9	59
B4265 Link 2	6,144	9	59	6,927	9	59	10,864	9	59
B4265 Link 3	8,573	9	59	10,448	9	59	19,649	9	59
Eglwys-Brewis Road Link 1	2,144	8	55	4,145	8	55	15,555	8	55
Eglwys-Brewis Road Link 2	2,144	8	55	2,256	8	50	3,180	8	50

Table 3.5: Traffic Data – 24 hour AADT Do Something

Link ID	2019 'Do Minimum'			2034 'Do Minimum'		
	AADT (veh/day)	HDV (%)	Speed (kph)	AADT (veh/day)	HDV (%)	Speed (kph)
B4265 Link 1	6,927	9	59	10,864	9	59
B4265 Link 2	7,892	9	59	16,402	9	59
B4265 Link 3	10,448	9	59	19,649	9	59
Northern Access Road Link 1	1,889	8	64	12,689	8	64
Northern Access Road Link 2	1,889	8	64	11,516	8	64
Northern Access Road Link 3	1,889	8	64	11,516	8	64
Northern Access Road Link 4	1,889	8	64	11,234	8	64
Northern Access Road Link 5	4,145	8	64	14,018	8	64
Eglwys-Brewis Road Link 1	2,256	8	55	2,866	8	55
Eglwys-Brewis Road Link 2	2,256	8	50	3,180	8	50

3.7.4 Vehicle Emission Factors

Vehicle emission factors have been sourced from the EFT Version 7.0. Emission factors are predicted to decrease in future years; however, it is commonly agreed that the current rate of predicted decreases may be too optimistic. Therefore, the 2015 emission factors have been used for modelling the baseline scenario, 2017 emission factors have been used for the opening year scenario (2019), and 2025 emission factors have been used to model the future year (2034), in recognition of the fact that not all projected improvements in vehicle emissions may be realised by the opening year of the proposed Northern Access Road. Although it should be noted that improvements in air quality are still expected to occur over time.

3.7.5 Meteorological Data

One year (2015) of hourly sequential observation data from Cardiff Airport meteorological station has been used in this assessment. The station is located approximately 6.5 km south east of the proposed Northern Access Road and experiences meteorological conditions that are considered to be representative of those experienced in the VoGC area.

3.7.6 Background Data

Background concentration data have been sourced from Defra Background Maps (Defra, 2014a) and are presented in Table 3.6. It has been recognised that whilst background pollutant concentrations of NO_2, PM_{10} and $PM_{2.5}$ concentrations are unlikely to reduce to the levels projected by Defra for 2019, some reduction is expected to occur. As a conservative approach, 2015 background concentrations have been used for the baseline and 2017 background concentrations have been used for the opening year (2019) scenarios and 2025 backgrounds for the 2034 Scenarios.

Table 3.6: Defra Background Concentrations – 2015, 2017 and 2025

Receptors	Grid Square (OS Coordinate System)		2015 Annual Mean Background Concentration (µg/m^3)			2017 Annual Mean Background Concentration (µg/m^3)			2025 Annual Mean Background Concentration (µg/m^3)		
	X	Y	NO_2	PM_{10}	$PM_{2.5}$	NO_2	PM_{10}	$PM_{2.5}$	NO_2	PM_{10}	$PM_{2.5}$
R1	299500	169500	7.2	13.4	9.1	6.6	13.2	8.9	5.1	12.7	8.5
R2	298500	169500	7.3	12.5	8.7	6.7	12.3	8.5	5.1	11.8	8.1
R3	298500	169500	7.3	12.5	8.7	6.7	12.3	8.5	5.1	11.8	8.1
R4	298500	168500	8.1	12.7	9.0	7.4	12.5	8.8	5.6	12.0	8.4
R5	301500	169500	9.4	14.2	9.7	8.7	14.0	9.5	7.0	13.5	9.0
R6	301500	169500	9.4	14.2	9.7	8.7	14.0	9.5	7.0	13.5	9.0
R7	300500	169500	7.5	13.0	9.0	6.8	12.8	8.9	5.3	12.4	8.5
R8	300500	169500	7.5	13.0	9.0	6.8	12.8	8.9	5.3	12.4	8.5
R9	298500	168500	8.1	12.7	9.0	7.4	12.5	8.8	5.6	12.0	8.4
R10	298500	168500	8.1	12.7	9.0	7.4	12.5	8.8	5.6	12.0	8.4
R11	298500	168500	8.1	12.7	9.0	7.4	12.5	8.8	5.6	12.0	8.4
R12	298500	168500	8.1	12.7	9.0	7.4	12.5	8.8	5.6	12.0	8.4
R13	298500	168500	8.1	12.7	9.0	7.4	12.5	8.8	5.6	12.0	8.4
R14	299500	169500	7.2	13.4	9.1	6.6	13.2	8.9	5.1	12.7	8.5
R15	298500	169500	7.3	12.5	8.7	6.7	12.3	8.5	5.1	11.8	8.1

The in-grid contribution from Primary A Roads have been removed from the Defra background concentrations (presented in Table 3.6) in order to avoid double counting of those emissions included explicitly within the ADMS-Roads dispersion modelling.

3.7.7 NO_x to NO_2 Conversion

For road transport emissions a 'NO_X to NO_2' conversion spreadsheet (Defra, 2014b) was made available by the Department for Environment, Food and Rural Affairs (Defra) to accompany LAQM.TG(09) (Defra, 2009) as a tool

to calculate the road NO_2 contribution from modelled road NO_X contributions. The tool comes in the form of a Microsoft© Excel spreadsheet and uses local authority specific data to calculate annual mean concentrations of NO_2 from dispersion model output values of annual mean concentrations of NO_X. The most recent release of this tool (v5.1, released in June 2016) was used to calculate the total NO_2 concentrations at receptors from the modelled road NO_X contribution and associated background concentration. Due to the location of the proposed Northern Access Road, the 'All Other Non-Urban UK' traffic setting has been selected.

3.7.8 Road Traffic Emissions Model Verification

It has not been possible to verify the model due to the lack of monitoring locations within the study area. Consequently a verification factor of 2 based on professional judgement has been used to represent a conservative approach in lieu of measured concentrations. This verification factor has been agreed in consultation with VoGC, via consultation email sent on 5th October 2016 and reply received on 5th October 2016 from Specialist Enterprise Services at Vale of Glamorgan Council. Model bias was accounted for by applying the verification/correction factor (2) to modelled road NO_x concentrations.

In the absence of PM_{10} and $PM_{2.5}$ monitoring data from within the air quality study area, the factor applied to the primary pollutant NO_x has also been applied to these primary pollutants.

3.7.9 Predicting the Number of Days in which the PM_{10} 24-hr Mean Objective is Exceeded

In order to assess model results against the Air Quality Strategy 24-hour mean objective for PM_{10}, the guidance document LAQM.TG(03) (Defra, 2003) sets out the method by which the number of days in which the PM_{10} 24-hr objective is exceeded can be obtained based on a relationship with the predicted PM_{10} annual mean concentration.

The most recent Defra guidance (Defra, 2016) suggests no change to this method. As such, the formula used within this assessment is presented below, where C denotes the annual mean concentration of PM_{10}:

$$\text{No. of } Exceedances = 0.0014 * C^3 + \frac{206}{C} - 18.5$$

3.7.10 Predicting the Number of Days in which the NO_2 Hourly Mean Objective is Exceeded

The assessment evaluates the likelihood of exceeding the hourly mean NO_2 objective by comparing predicted annual mean NO_2 concentrations at all receptors to an annual mean equivalent threshold of 60 µg/m^3 NO_2. The threshold of 60 µg/m^3 is derived from research projects (AEA-Technology, 2008 and Laxen and Marner, 2003) carried out on behalf of Defra and the Devolved Administrations, which identified that the hourly mean NO_2 objective is unlikely to be exceeded if annual mean concentrations are predicted to be less the 60 µg/m^3.

In 2003, Laxen and Marner (Laxen and Marner, 2003) concluded:

> *"… local authorities could reliably base decisions on likely exceedances of the 1-hour objective for nitrogen dioxide alongside busy streets using an annual mean of 60 µg/m^3 and above."*

Their findings are further supported by AEA-Technology (2008) who revisited the investigation to complete an updated analysis including new monitoring results and additional monitoring sites. The recommendations of the AEAT report are:

> *"Local authorities should continue to use the threshold of 60 µg/m^3 NO_2 as the trigger for considering a likely exceedance of the hourly mean nitrogen dioxide objective."*

Where predicted concentrations are below this value, it can be concluded that the hourly mean NO_2 objective (200 µg/m^3 NO_2 not more than 18 times per year) will be achieved.

3.8 Consultation

The Specialist Services Officer (Specialist Enterprise Services) responsible for air quality at Vale of Glamorgan Council was consulted on the approach to this assessment on 5th October 2016, and this consultation confirmed that the approach proposed and latterly utilised within this assessment is satisfactory.

3.9 Significance Criteria

3.9.1 Construction Phase

For effects on amenity (including those associated with dust), the aim is to bring forward a construction scheme, including mitigation measures if necessary, that avoids the potential for complaints to be generated as a result of the proposed Northern Access Road.

Experience in the UK (IAQM, 2014) is that good site practice is capable of mitigating the impact of fugitive emissions of particulate matter effectively, so that in all but the most exceptional circumstances, effects at sensitive receptors can be controlled to ensure that effects are of negligible or minor adverse significance (i.e. 'not significant') (see Table 3.7). This process can be managed through the preparation and implementation of a Construction Environmental Management Plan (CEMP).

The scale of the risk of adverse effects occurring due to each type of construction activity, with mitigation in place is described using the terms 'high', 'medium' and 'low' risk. The basis for the choice of description is set out for each activity, comprising earthworks, construction and trackout, and is consistent with the IAQM's Guidance (IAQM, 2014).

Table 3.7: Descriptors Applied to the Predicted Effects of Fugitive Emission of Particulate Matter

Significance of Effect at Single Receptor	Description
Major	A significant effect that is likely to be a material consideration in its own right.
Moderate	A significant effect that may be a material consideration in combination with other significant effects, but is unlikely to be a material consideration in its own right.
Minor	An effect that is not significant but that may be of local concern.
Negligible	An effect that is not significant change.

Construction dust effects generally occur when high risk dust generating activities coincide with adverse meteorological conditions. Therefore, even without mitigation, any impact would be limited to events that are infrequent and short-term in nature.

At the time of assessment the duration of construction activities is expected to last for 14 months; although it is likely that works will not be undertaken in all areas of the Site at the same time.

3.9.2 Operation Phase

With regard to road traffic emissions, the change in pollutant concentrations, with respect to future baseline concentrations (i.e. the 'Without Development' scenario), has been described at receptors that are representative of exposure to impacts on local air quality within the Study Area. The absolute magnitude of pollutant concentrations in the baseline and the 'With Development' scenario is also described, and this is used to identify the risk of the air quality objective values being exceeded in each scenario.

For consideration of a change in NO_2, PM_{10} and $PM_{2.5}$ annual mean concentrations, the EPUK and IAQM have published recommendations for describing the effects of such impacts at individual receptors. These recommendations are presented in Table 3.7 and Table 3.8 (IAQM/EPUK, 2015).

Table 3.5: Effects Descriptors at Individual Receptors – Annual Mean NO_2 and PM_{10}

Annual Mean Pollutant Concentration at Receptor in Assessment Year (µg/m^3)	Change in Annual Mean Concentration of NO_2/PM_{10} (µg/m^3 as Proportion of Objective Value)				
	<1%	1% - 2%	2% - 5%	5% - 10%	>10%
≤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

Table 3.6: Effects Descriptors at Individual Receptors – Annual Mean $PM_{2.5}$

Annual Mean Pollutant Concentration at Receptor in Assessment Year (µg/m^3)	Change in Annual Mean Concentration of $PM_{2.5}$ (µg/m^3 as Proportion of Objective Value)				
	<1%	1% - 2%	2% - 5%	5% - 10%	>10%
≤18.9	Negligible	Negligible	Negligible	Slight	Moderate
18.9 - 23.6	Negligible	Negligible	Slight	Moderate	Moderate
23.6 - 25.6	Negligible	Slight	Moderate	Moderate	Substantial
25.6 - 27.4	Negligible	Moderate	Moderate	Substantial	Substantial
≥27.4	Negligible	Moderate	Substantial	Substantial	Substantial

The IAQM/EPUK (2015) guidance includes seven explanatory notes to accompany the terminology for the effect descriptors. In particular, it is noted that the descriptors are for individual receptors only and that overall significance is determined using professional judgement. Additionally, it is noted that it is unwise to ascribe too much accuracy to incremental changes or background concentrations, and this is especially important when total concentrations are close to the objective value. For a given year in the future, it is impossible to define the new total concentration without recognising the inherent uncertainty, which is why there is a category that has a range around the objective value, rather than being exactly equal to it.

A change in predicted annual mean concentrations of NO_2 or PM_{10} of less than 0.5% (0.2 µg/m^3) is considered to be so small as to be negligible. A change (impact) that is negligible, given normal bounds of variation, would not be capable of having a direct effect on local air quality that could be considered to be significant.

A change in predicted annual mean concentrations of $PM_{2.5}$ of less than 0.5% (0.12 µg/m^3) is considered to be so small as to be negligible. A change (impact) that is negligible, given normal bounds of variation, would not be capable of having a direct effect on local air quality that could be considered to be significant.

It is understood from the IAQM/EPUK (2015) guidance that it is the intention of the effect descriptors to capture the potential risk associated with cumulative development. Whereby changes of 1% of a relevant air quality objective could, under the IAQM/EPUK (2015) guidance, result in slight to moderate air quality effects at individual receptors. In practice this assessment inherently considers cumulative impacts through the use of traffic data including cumulative developments and Defra background concentrations. Therefore, it is considered highly unlikely that significant air quality impacts could occur with the proposed Northern Access Road for changes in concentrations of 1%.

Additionally, the IAQM/ EPUK (2015) guidance also includes the potential for slight to substantial air quality effects as a result of changes in pollutant concentrations between 2–5% of relevant air quality objectives. For annual average NO_2 concentrations, this relates to changes in concentrations ranging from 0.6–2.1 µg/m^3. In practice, changes in concentration of this magnitude, and in particular changes at the lower end of this band are likely to be very difficult to distinguish through any post-operational monitoring regime due to the number of

sources of NO_2 in an urban environment and the inter-annual effects of varying meteorological conditions. Therefore, in the overall evaluation of significance, the potential for significant air quality impacts within this band will be considered in this context.

Changes in concentration of more than 5% (the two highest bands) are considered to be of a magnitude which is far more likely to be discernible and as such carry additional weight within the overall evaluation of significance for air quality.

All relevant receptors that have been selected to represent locations where people are likely to be present are based on impacts on human health. The air quality objective values have been set at concentrations that provide protection to all members of society, including more vulnerable groups (such as the very young, elderly or unwell). Therefore, the sensitivity of receptors was considered in the definition of the air quality objective values and thus no additional subdivision of human health receptors on the basis of building or location type is necessary.

3.9.3 Overall Assessment of Significance

The significance of the reported effects is then considered for the proposed Northern Access Road in overall terms. The potential for the proposed Northern Access Road to contribute to or interfere with the successful implementation of policies and strategies for the management of local air quality are considered, if relevant, but the principal focus is in determining the significance of any change to the likelihood of future achievement of the air quality objective values set out in Table 2.1 for the following pollutants:

- Annual mean nitrogen dioxide (NO_2) concentration of 40 µg/m^3;
- Annual mean particulate matter (PM_{10}) concentration of 40 µg/m^3;
- Annual mean fine particulate matter ($PM_{2.5}$) concentrations of 25 µg/m^3;
- 24-hour mean PM_{10} concentration of 50 µg/m^3 not to be exceeded on more than 35 days per year; and
- 1-hour mean NO_2 concentration of 200 µg/m^3 not to be exceeded more than 18 times per year.

The achievement of local authority goals for local air quality management is directly linked to the achievement of the air quality objective values in Table 2.1 and as such this assessment focuses on the likelihood of future achievement of the air quality objective values as a result of the proposed Northern Access Road.

In terms of the significance of the consequences of any adverse impacts, an effect is reported as being either ‘not significant’ or as being ‘significant’. If the overall effect of the development on local air quality or on amenity is found to be ‘moderate’ or ‘major’ this is deemed to be ‘significant’. Effects found to be ‘minor’ are considered to be ‘not significant’; although they may be a matter of local concern. ‘Negligible’ effects are considered to be ‘not significant’.

3.9.4 Limitations and Assumptions

The assessment of the operational phase of the proposed Northern Access Road has adopted the following limitations and conservative assumptions:

- Modelling has used traffic datasets provided by WYG for the proposed Northern Access Road which includes growth and committed development traffic;
- 2017 background pollution concentrations have been assumed to provide a conservative estimate of background concentrations for the both future opening year (2019) scenarios;
- 2025 background pollution concentrations have been assumed to provide a conservative estimate of background concentrations for the both future opening year (2034) scenarios;
- 2017 vehicle emission factors have been used for the opening year as a conservative assumption for a completed development opening year of 2019;
- 2025 vehicle emission factors have been used for the opening year as a conservative assumption for a completed development opening year of 2034; and

- Worst-case receptors have been assumed, which represent the location of anticipated maximum exposure to air pollutants within an area.

4. Baseline Conditions

4.1 Local Air Quality Monitoring

VoGC monitored annual mean NO_2 at 43 diffusion tube sites and three automatic stations in their area during 2014. None of the diffusion tubes are located within 5 km of the proposed Northern Access Road site, and so are not representative of air quality within the study area.

Similarly, under their local air quality management responsibilities, VoGC monitors concentrations of NO_2 within its administrative area with three continuous monitoring units, none of which are in close proximity to the proposed Northern Access Road site and so monitoring from these sites is also not representative of air quality within the study area.

However, air quality modelling has been undertaken to establish baseline air quality conditions as described in the following two sub-sections.

4.2 Predicted Pollutant Concentrations

4.2.1 Existing Baseline (2015)

Predicted annual mean concentrations of NO_2, PM_{10} and $PM_{2.5}$ at the selected receptors in the baseline scenario (2015), are listed in Table 5.1.

Table 4.1: 2015 Annual Mean NO_2, PM_{10} and $PM_{2.5}$ Concentrations (µg/m^3) – Baseline Scenario

Receptor ID	NO_2	PM_{10}	$PM_{2.5}$
R1	7.4	13.4	9.1
R2	7.4	12.5	8.7
R3	7.5	12.5	8.7
R4	9.2	12.8	9.1
R5	9.5	14.2	9.7
R6	9.6	14.2	9.7
R7	8.8	13.2	9.1
R8	8.7	13.2	9.1
R9	9.9	12.9	9.1
R10	10.5	13.0	9.2
R11	9.3	12.8	9.1
R12	9.3	12.8	9.1
R13	9.8	12.9	9.1
R14	7.3	13.4	9.1
R15	7.4	12.5	8.7

For the 2015 baseline scenario, the results presented in Table 5.1 show that the NO_2 annual mean concentrations are well below the annual mean air quality objective value at all receptors, with predicted concentrations ranging from 7.3 – 10.5 µg/m^3.

Annual mean NO_2 concentrations in 2015 are predicted to be below 60 µg/m^3 at all receptors. This indicates that short-term NO_2 objective value exceedances are not anticipated at these locations.

For the 2015 baseline scenario, annual mean concentrations of PM_{10} and $PM_{2.5}$ are also predicted to be well below their relevant air quality objective values at all locations within the air quality Study Area.

The number of days where 24-hour PM_{10} concentrations are above 50 µg/m^3 is also predicted to be well below the objective value at all receptor locations within the air quality Study Area in the 2015 baseline scenario.

4.2.2 Predicted Future Do-Minimum Traffic Pollutant Concentrations

Opening year pollutant concentrations for 2019 without the Northern Access Road (i.e. 'Do Minimum' scenario) are shown in Table 5.2. The results presented only account for some of the reductions in background NO_2 concentrations predicted by the Defra background maps between 2015 and 2019, through use of 2017 background map data. Similarly the results only account for some of the predicted reduction in vehicle emissions between 2015 and 2019 through use of 2017 emissions factors for the 2019 scenarios. This approach therefore represents a conservative assessment.

Table 4.2: 2019 Annual Mean NO_2, PM_{10} and $PM_{2.5}$ Concentrations (µg/m^3) – 'Without Development' Scenario

Receptor ID	NO_2	PM_{10}	$PM_{2.5}$
R1	6.9	13.3	8.9
R2	6.8	12.3	8.5
R3	6.8	12.3	8.5
R4	9.0	12.7	8.8
R5	8.7	14.0	9.5
R6	8.9	14.0	9.5
R7	8.0	13.0	8.9
R8	7.9	13.0	8.9
R9	9.8	12.8	8.8
R10	10.7	13.0	8.8
R11	8.4	12.6	8.8
R12	8.4	12.6	8.8
R13	8.9	12.7	8.8
R14	6.7	13.2	8.9
R15	6.8	12.3	8.5

In the 2019 Do Minimum scenario, the calculated annual mean concentrations for NO_2 are below the annual mean air quality objective value (40 µg/m^3) at all relevant receptors. The predicted concentrations range from 6.7 –10.7 µg/m^3.

Annual mean NO_2 concentrations in 2019 are predicted to be below 60 µg/m^3 at all receptors. This indicates that short-term NO_2 objective value exceedances are not anticipated at these locations in the opening year of the proposed Northern Access Road (2019).

In the 2019 Do Minimum scenario, annual mean concentrations of PM_{10} and $PM_{2.5}$ are predicted to be well below their relevant air quality objective values at all locations within the air quality Study Area.

The number of days where 24-hour PM_{10} concentrations are above 50 µg/m^3 is also predicted to be well below the objective value at all receptor locations within the air quality Study Area in the 2019 Do Minimum scenario.

Future year pollutant concentrations for 2034 without the Northern Access Road (i.e. 'Do Minimum' scenario) are shown in Table 5.3. The results presented only account for some of the reductions in background NO_2 concentrations predicted by the Defra background maps between 2015 and 2034, through use of 2025 background maps for the 2034 scenario. Similarly the results only account for some of the predicted reduction in vehicle emissions between 2015 and 2034 through use of 2025 emissions factors for the 2034 scenarios. This approach therefore represents a conservative assessment.

Table 4.3: 2034 Annual Mean NO_2, PM_{10} and $PM_{2.5}$ Concentrations (µg/m^3) – 'Without Development' Scenario

Receptor ID	NO_2	PM_{10}	$PM_{2.5}$

R1	5.5	12.9	8.6
R2	5.3	11.9	8.1
R3	5.3	11.9	8.1
R4	8.1	12.7	8.8
R5	7.1	13.5	9.0
R6	7.1	13.6	9.1
R7	6.0	12.6	8.6
R8	6.0	12.6	8.6
R9	9.3	13.1	9.0
R10	10.7	13.5	9.2
R11	6.3	12.2	8.5
R12	6.3	12.2	8.5
R13	6.7	12.3	8.5
R14	5.3	12.8	8.5
R15	5.4	11.8	8.1

In the 2034 future Do minimum scenario, the calculated annual mean concentrations for NO_2 are below the annual mean air quality objective value (40 µg/m^3) at all relevant receptors. The predicted concentrations range from 5.3 –10.7 µg/m^3.

Annual mean NO_2 concentrations in 2034 are predicted to be below 60 µg/m^3 at all receptors. This indicates that short-term NO_2 objective value exceedances are not anticipated at these locations in the opening year of the Proposed Northern Access Road (2019).

In the 2034 Do Minimum scenario, annual mean concentrations of PM_{10} and $PM_{2.5}$ are predicted to be well below their relevant air quality objective values at all locations within the air quality Study Area.

The number of days where 24-hour PM_{10} concentrations are above 50 µg/m^3 is also predicted to be well below the objective value at all receptor locations within the air quality Study Area in the 2034 Do Minimum scenario.

4.3 Baseline Dust Climate

A background level of dust exists in all urban and rural locations in the UK. Dust can be generated on a local scale from vehicle movements and from the action of wind on exposed soils and surfaces. Dust levels can be affected by long range transport of dust from distant sources into the local vicinity.

This baseline rate of soiling is considered normal and varies dependent on prevailing climatic conditions. The tolerance of individuals to deposited dust is therefore shaped by their experience of baseline conditions.

Existing local sources of particulate matter include wind-blown dust from agricultural areas, exhaust emissions from road vehicles, brake and tyre wear from road vehicles, and the long range transport of material from outside the Study Area.

5. Assessment of Effects

5.1 Construction Phase Effects

The specific nature and duration of specific aspects of the construction works are as yet unknown, however the total duration of construction is expected to last 14 months. In the absence of detailed construction information, the assessment of construction dust effects has made assumptions on the likely activities and phasing to be undertaken during the construction works.

As with the majority of construction projects of this type, the early phases of the works are likely to involve excavations, cut and fill, and temporary stockpiling of potentially dusty materials. These activities are likely to be the principal sources of dust during these early phases. During the middle phases, when the road is being built, the principal sources of dust are likely to be from the cutting and grinding of materials and the movement of construction related road vehicles. The latter phases, when the majority of the infrastructure is complete, will involve the landscaping and finishing works. During these phases, the principal sources of dust will include the storage, handling and movement of materials.

The receptors located close enough to the application site to potentially be adversely affected by the works, are residential properties including Froglands Farm, Rose Cottage, Old Froglands and Millands Farm, as well as the residential receptors on Cardigan Crescent and Heol Merioneth, and the existing commercial and residential properties along Eglwys-Brewis Road. The potential impacts considered at the residential properties are:

- Effects on Amenity and Property including changes to the rate of deposition of particulate matter onto glossy surface and other property; and
- Changes in 24 hour mean concentrations that might increase the risk of exposure to PM_{10} at levels that could exceed the 24-hr air quality objective.

5.1.1 Earthworks

Site excavation, cut and fill, and the temporary stockpiling of material represent the principal activities that may generate emissions of particulate material from earthworks activity. The potential for stockpiles of materials to generate dust depends on the nature of the material. Earth is soft and friable compared to hardcore; however, hardcore generally has lower moisture content than soil, and consequently they can both be a potential source of dust.

The total area of potential earthworks is estimated to be more than 10,000 m^2. The potential dust emission magnitude for earthworks is therefore classified as large.

There are estimated to be between ten and 100 dust sensitive properties within 20 m of potential earthworks areas and along the route of the Proposed Northern Access Road. The sensitivity of the area to dust soiling due to earthworks is therefore considered to be high.

Annual mean background PM_{10} concentrations within the study area are currently between 10.2 and 14.2 $\mu g/m^3$. The sensitivity of the area to human health impacts due to earthwork activities is therefore considered to be low.

The large dust emission magnitude coupled with the low sensitivity of the area to human health impacts suggests that the risk of dust impacts to human health due to earthworks is low.

The large dust emission magnitude coupled with the high sensitivity to property and amenity effects suggests that the risk of dust impacts to property and amenity due to earthworks is high.

The level of dust risk from earthworks activities determines the mitigation measures that need to be applied in order to have no significant effect during this element of the works. A number of mitigation measures can be implemented on site to either avoid or reduce potential effects to neighbouring receptors. These measures are outlined in section 6: Mitigation Measures. The adoption of these mitigation measures will reduce the risk of potential impacts on the receptors (property and amenity; human health) to a low risk, resulting in a likely residual effect of negligible significance.

5.1.2 Construction

Dust emissions during construction can give rise to elevated dust deposition and PM_{10} concentrations. These are generally short-lived changes over a few hours or days, which occur over a limited time period of several weeks or months.

The total construction volume is estimated to be between 25,000 and 100,000 m^3. The potential dust emission magnitude for construction is therefore classified as medium.

There are estimated to be between ten and 100 dust sensitive properties within 20 m of potential construction work areas within the Site. The sensitivity of the area to dust soiling due to the construction activity is therefore considered to be high.

Annual mean background PM_{10} concentrations within the study area are currently between 10.2 and 14.2 µg/m^3. The sensitivity of the area to human health impacts, due to construction activity, is therefore considered to be low.

The medium dust emission magnitude coupled with the low sensitivity of the area to human health impacts suggests that the risk of dust impacts to human health due to construction activity is low.

The medium dust emission magnitude coupled with the high sensitivity to property and amenity effects suggests that the risk of dust impacts to property and amenity due to construction activity is medium.

The level of dust risk from construction activities determines the mitigation measures that need to be applied in order to have no significant effect during this element of the works. A number of mitigation measures can be implemented on site to either avoid or reduce potential effects to neighbouring receptors. These measures are outlined in section 6: Mitigation Measures. The adoption of these mitigation measures will reduce the risk of potential impact on the receptors (property and amenity; human health) to a low risk, resulting in a likely residual effect of negligible significance.

5.1.3 Trackout of Material

At the time of this assessment, exact details of HGV movements were unavailable, however an estimate has been provided by the design team of a maximum number of daily HGVs during the peak of construction of around 20. Therefore, a worst case scenario of between 5 and 25 daily outward HGV movements has been assumed for the construction period of the proposed Northern Access Road. This, along with the maximum distance which could be travelled on paved road (estimated to be greater than 500 m based on the site boundary), gives an overall potential dust emission magnitude for trackout classified as large.

It is estimated that there are over 100 sensitive properties are within 20 m of likely trackout routes. The sensitivity of the area to dust soiling due to trackout is therefore considered to be high.

Annual mean background PM_{10} concentrations within the study area are currently between 10.2 and 14.2 µg/m^3. The sensitivity of the area to human health impacts due to trackout, is therefore considered to be medium.

The large dust emission magnitude coupled with the medium sensitivity of the area to human health impacts suggests that the risk of dust impacts to human health due to the trackout of material is medium.

The large dust emission magnitude coupled with the high sensitivity to property and amenity effects suggests that the risk of dust impacts to property and amenity due to the trackout of material is high.

The level of dust risk from trackout of material determines the mitigation measures that need to be applied in order to have no significant effect during this element of the works. A number of mitigation measures can be implemented on site to either avoid or reduce potential effects to neighbouring receptors. These measures are outlined in section 6: Mitigation Measures. The adoption of these mitigation measures will reduce the risk of potential impact on the receptors (property and amenity; human health) to a low risk, resulting in a likely residual effect of negligible significance.

5.1.4 Overall Significance – Construction Dust Emissions

With the implementation of mitigation measures, in accordance with the IAQM (2014) guidance, the risk of the potential impacts on the receptors (property and amenity; human health) would be minimised or prevented, resulting in a low risk and a likely residual effect of negligible significance.

5.2 Operational Phase Effects

5.2.1 2019 Opening Year

Table 6.1 presents NO_2 annual mean concentration at existing receptors associated with the Northern Access Road in operation. The results presented only account for some of the reductions in background NO_2 concentrations predicted by the Defra background maps between 2015 and 2019, through use of 2017 background maps for the 2019 scenario. Similarly the results only account for some of the predicted reduction in vehicle emissions between 2015 and 2019 through use of 2017 emissions factors for the 2019 scenarios. This approach therefore represents a conservative assessment.

Table 5.1: 2019 Annual Mean NO_2 Concentrations (µg/m^3) – 'With Development' Scenario

Receptor ID	2019 'Without Development' Scenario	2019 'With Development' Scenario	Change between 'Without Development' and 'With Development' Scenarios
R1	6.9	6.9	+0.1
R2	6.8	7.0	+0.2
R3	6.8	7.0	+0.2
R4	9.0	8.4	-0.6
R5	8.7	8.8	<0.1
R6	8.9	8.9	<0.1
R7	8.0	8.0	<0.1
R8	7.9	7.9	<0.1
R9	9.8	8.9	-0.9
R10	10.7	9.4	-1.3
R11	8.4	8.6	+0.2
R12	8.4	8.9	+0.5
R13	8.9	9.1	+0.2
R14	6.7	7.3	+0.5
R15	6.8	6.9	+0.1

The predicted annual mean NO_2 concentrations meet the annual mean objective at all receptors. Overall, receptors are predicted to experience a maximum increase in NO_2 annual mean concentrations of 2-5% of the objective at most (R14), resulting in a negligible and not significant effect in accordance with the IAQM/EPUK guidance (2015) at all receptor locations, due to the low total concentrations.

The maximum improvement in NO_2 concentrations is predicted at receptor R10, with an improvement of 2-5% of the objective, resulting in a negligible and not significant effect in accordance with the IAQM/EPUK guidance (2015) due to the low total concentrations.

Predicted PM_{10} and $PM_{2.5}$ concentrations at existing receptors for the 'With Development' scenario are presented in Table 6.2 and Table 6.3 respectively.

Table 5.2: 2019 Annual Mean PM_{10} Concentrations (µg/m^3) – 'With Development' Scenario

Receptor ID	2019 'Without Development' Scenario	2019 'With Development' Scenario	Change between 'Without Development' and 'With Development' Scenarios
R1	13.3	13.3	<0.1
R2	12.3	12.3	<0.1
R3	12.3	12.3	<0.1
R4	12.7	12.6	-0.1
R5	14.0	14.0	<0.1
R6	14.0	14.0	<0.1

R7	13.0	13.0	<0.1
R8	13.0	13.0	<0.1
R9	12.8	12.7	-0.1
R10	13.0	12.8	-0.2
R11	12.6	12.6	<0.1
R12	12.6	12.6	<0.1
R13	12.7	12.7	<0.1
R14	13.2	13.3	0.1
R15	12.3	12.3	<0.1

Table 5.3: 2019 Annual Mean $PM_{2.5}$ Concentrations (µg/m^3) – 'With Development' Scenario

Receptor ID	2019 'Without Development' Scenario	2019 'With Development' Scenario	Change between 'Without Development' and 'With Development' Scenarios
R1	8.9	8.9	<0.1
R2	8.5	8.5	<0.1
R3	8.5	8.5	<0.1
R4	8.8	8.9	-0.1
R5	9.5	9.5	<0.1
R6	9.5	9.5	<0.1
R7	8.9	9.0	<0.1
R8	8.9	9.0	<0.1
R9	8.8	8.9	-0.1
R10	8.8	9.0	-0.1
R11	8.8	8.9	<0.1
R12	8.8	8.9	<0.1
R13	8.8	8.9	<0.1
R14	8.9	9.0	<0.1
R15	8.5	8.5	<0.1

The annual mean and daily PM_{10} and $PM_{2.5}$ objective values are expected to be met at all modelled receptors, with predicted concentrations well below the objective values.

Only negligible changes are predicted in annual mean PM_{10} and $PM_{2.5}$ concentrations due to the proposed Northern Access Road at all receptors. In accordance with the IAQM/ EPUK (2015) guidance, the effect is described as negligible and **not significant** at all receptors.

The number of days where 24-hour PM_{10} concentrations are above 50 µg/m^3 is predicted to be well below the objective value at all selected existing receptor locations with the Northern Access Road in place.

5.2.2 2034 Future Year

Table 6.4 presents NO_2 annual mean concentration at existing receptors associated with the Northern Access Road in operation. The results presented only account for some of the reductions in background NO_2 concentrations predicted by the Defra background maps between 2015 and 2034, through use of 2025 background maps for the 2034 scenario. Similarly the results only account for some of the predicted reduction in vehicle emissions between 2015 and 2034 through use of 2025 emissions factors for the 2034 scenarios. This approach therefore represents a conservative assessment.

Table 5.4: 2034 Annual Mean NO_2 Concentrations (µg/m^3) – 'With Development' Scenario

Receptor ID	2034 'Without Development'	2034 'With Development'	Change between 'Without

	Scenario	Scenario	Development' and 'With Development' Scenarios
R1	5.5	5.7	+0.1
R2	5.3	5.9	+0.6
R3	5.3	5.7	+0.4
R4	8.1	6.3	-1.8
R5	7.1	7.1	<0.1
R6	7.1	7.1	<0.1
R7	6.0	6.0	<0.1
R8	6.0	6.0	<0.1
R9	9.3	6.6	-2.7
R10	10.7	6.9	-3.8
R11	6.3	6.5	+0.2
R12	6.3	7.0	+0.6
R13	6.7	7.1	+0.4
R14	5.3	6.7	+1.4
R15	5.4	5.6	+0.2

The predicted annual mean NO_2 concentrations meet the annual mean objective at all receptors. Overall, receptors are predicted to experience a maximum increase in NO_2 annual mean concentrations of 2-5% of the objective at most (R14), resulting in a negligible and not significant effect in accordance with the IAQM/EPUK guidance (2015) at all receptor locations, due to the low total concentrations. At receptor R10 the decrease in predicted annual mean NO_2 concentration of -3.8 µg/m^3 with the proposed Northern Access Road in place (- 6-10% of the objective) is considered to be a slight beneficial effect in accordance with the IAQM/EPUK guidance (2015). The benefit is due to the additional traffic associated with the Aston Martin committed development, housing developments in local plan but not committed and 3,000 business park jobs (including the 200 existing jobs) using the Northern Access Road in place of Eglwys-Brewis Road.

Predicted PM_{10} and $PM_{2.5}$ concentrations at existing receptors for the 'With Development' scenario are presented in Table 6.5 and Table 6.6 respectively.

Table 5.5: 2034 Annual Mean PM_{10} Concentrations (µg/m^3) – 'With Development' Scenario

Receptor ID	2034 'Without Development' Scenario	2034 'With Development' Scenario	Change between 'Without Development' and 'With Development' Scenarios
R1	12.9	12.9	<0.1
R2	11.9	12.0	+0.2
R3	11.9	12.0	+0.1
R4	12.7	12.2	-0.5
R5	13.5	13.5	<0.1
R6	13.6	13.6	<0.1
R7	12.6	12.6	<0.1
R8	12.6	12.6	<0.1
R9	13.1	12.3	-0.8
R10	13.5	12.3	-1.1
R11	12.2	12.2	<0.1
R12	12.2	12.3	+0.1
R13	12.3	12.4	+0.1
R14	12.8	13.2	+0.4
R15	11.8	11.9	+0.1

Table 5.6: 2034 Annual Mean $PM_{2.5}$ Concentrations (µg/m^3) – 'With Development' Scenario

Receptor ID	2034 'Without Development' Scenario	2034 'With Development' Scenario	Change between 'Without Development' and 'With Development' Scenarios
R1	8.6	8.6	<0.1
R2	8.1	8.2	+0.1
R3	8.1	8.2	+0.1
R4	8.8	8.5	-0.3
R5	9.0	9.0	<0.1
R6	9.1	9.1	<0.1
R7	8.6	8.6	<0.1
R8	8.6	8.6	<0.1
R9	9.0	8.5	-0.5
R10	9.2	8.6	-0.6
R11	8.5	8.5	<0.1
R12	8.5	8.5	+0.1
R13	8.5	8.6	+0.1
R14	8.5	8.8	+0.2
R15	8.1	8.2	+01

The annual mean and daily PM_{10} and $PM_{2.5}$ objective values are expected to be met at all modelled receptors, with predicted concentrations well below the objective values.

Only negligible changes are predicted in annual mean PM_{10} and $PM_{2.5}$ concentrations due to the proposed Northern Access Road at all receptors. In accordance with the IAQM/ EPUK (2015) guidance, the effect is described as negligible and **not significant** at all receptors.

The number of days where 24-hour PM_{10} concentrations are above 50 µg/m^3 is predicted to be well below the objective value of all selected existing receptor locations with the proposed Northern Access Road in place.

5.2.3 Operational Summary

The predicted pollutant concentrations and predicted changes in concentrations at existing sensitive receptors indicate no significant impacts on NO_2, PM_{10} or $PM_{2.5}$ concentrations as a result of the proposed Northern Access Road in either of the opening year scenarios.

In the future 2034 scenarios considered for information, a slight beneficial impact is predicted at receptors along Eglwys-Brewis Road.

6. Mitigation Measures

6.1 Construction Phase

This chapter outlines the mitigation measures proposed for the construction phase of the proposed Northern Access Road.

It is recommended that, a Construction Dust Management Plan (CDMP) is put in place during the construction works and that the form and content of this CDMP is agreed with VoGC prior to commencement of construction works.

The assessment of the construction phase effects has been undertaken in line with current IAQM guidance (IAQM, 2014). To address the dust risks associated with the construction of the proposed Northern Access Road the following mitigation measures are proposed.

6.1.1 Plant Exhaust Emissions

Construction plant emissions have not been explicitly modelled, as these are considered to be a small, insignificant and temporary emission source relative to ambient conditions. However, suitable best-practice mitigation measures for site plant include:

- No vehicles or plant will be left idling unnecessarily;
- Non-road mobile machinery will be well maintained. Should any emissions of dark smoke occur (except during start up) then the relevant machinery will be stopped immediately and any problem rectified before being used;
- Engines and exhaust systems will be regularly serviced according to manufacturer's recommendations and maintained to meet statutory limits/ opacity tests;
- Plant will be located away from the boundaries close to residential areas; and
- Use of diesel or petrol powered generators will be avoided by using mains electricity or battery powered equipment where possible and if safety concerns can be overcome.

6.1.2 Road Vehicle Emissions

Vehicle movements to and from the Site should be managed carefully in order to prevent on-site congestion and prevent peaks in the number of vehicles arriving simultaneously, therefore limiting the impact on the local highway network.

To minimise the likelihood of congestion, monitoring and control of all vehicles associated with the proposed Northern Access Road as part of the works will be maintained by:

- Setting of specific delivery dates and collection times, where feasible;
- Consolidating deliveries where feasible;
- Using a system of 'just in time' deliveries;
- A requirement for authorisation when visiting the Site via vehicles; and
- Safely maintaining pedestrian access around the Site perimeter.

6.1.3 Dust Emissions

Mitigation measures for high risk sites specified in the IAQM (2014) guidance, which should be implemented during the construction work (earthworks, construction and trackout), include:

Earthworks

- Avoid scabbling (i.e. mechanical process of removing a thin layer of concrete from a structure, typically achieved by compressed air powered machines) if possible;

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

Construction

- Avoid scabbling (roughening of concrete surfaces) if possible;
- Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place;
- Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery; and
- For smaller supplies of fine powder materials ensure bags are sealed after use and stored to prevent dust.

Trackout

- Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the Site;
- Avoid dry sweeping of large areas;
- Ensure vehicles entering and leaving the Site are covered to prevent escape of materials during transport;
- Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable;
- Record all inspections of haul routes and any subsequent action in a Site log book;
- Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers and regularly cleaned;
- Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the Site where reasonably practicable);
- Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the Site exit, wherever site size and layout permits; and
- Access gates to be located as far (at least 10 m) from receptors as possible.

6.2 Operational Phase

The Northern Access Road in operation is not expected to result in significant air quality effects. No mitigation measures are therefore recommended for air quality as part of the operational phase of the Northern Access Road.

7. Summary

7.1 Effects during Proposed Northern Access Road Construction

Construction activities have the potential to generate fugitive dust emissions as a result of construction, earthworks and/or trackout of material. For the proposed Northern Access Road, the concentrations of any airborne particulate matter generated by these activities should be controlled using on site management practices to the extent that the proposed Northern Access Road should give rise to negligible short-term effects on dust deposition rates and concentrations of particulate matter at the nearest sensitive receptors.

Overall, the impact of fugitive emissions of dust and particulate matter from the proposed works will be managed during the construction processes and the effect is considered to be not significant with respect to potential impacts on health and amenity.

7.2 Effects during Proposed Northern Access Road Operation

Predictions of NO_2, PM_{10} and $PM_{2.5}$ concentrations at existing receptors in the vicinity of the proposed Northern Access Road and local road network indicate that there would be negligible changes in pollutant concentrations between the 'Without Development' and 'With Development' scenarios at all receptors for NO_2, PM_{10} and $PM_{2.5}$ in the 2019 opening year.

Given the conservative approach taken in respect to background concentrations and emissions factors used for the dispersion modelling, the impact of emissions from road sources during operation of the Northern Access Road to sensitive receptors is considered to be negligible and therefore not significant. Air quality effects are also not considered to be significant in the additional later 2034 scenario.

On the basis of the construction and operational assessments carried out, the overall effect of the proposed Northern Access Road on air quality is not considered to be significant and the proposals are considered to be compliant with relevant air quality planning policy.

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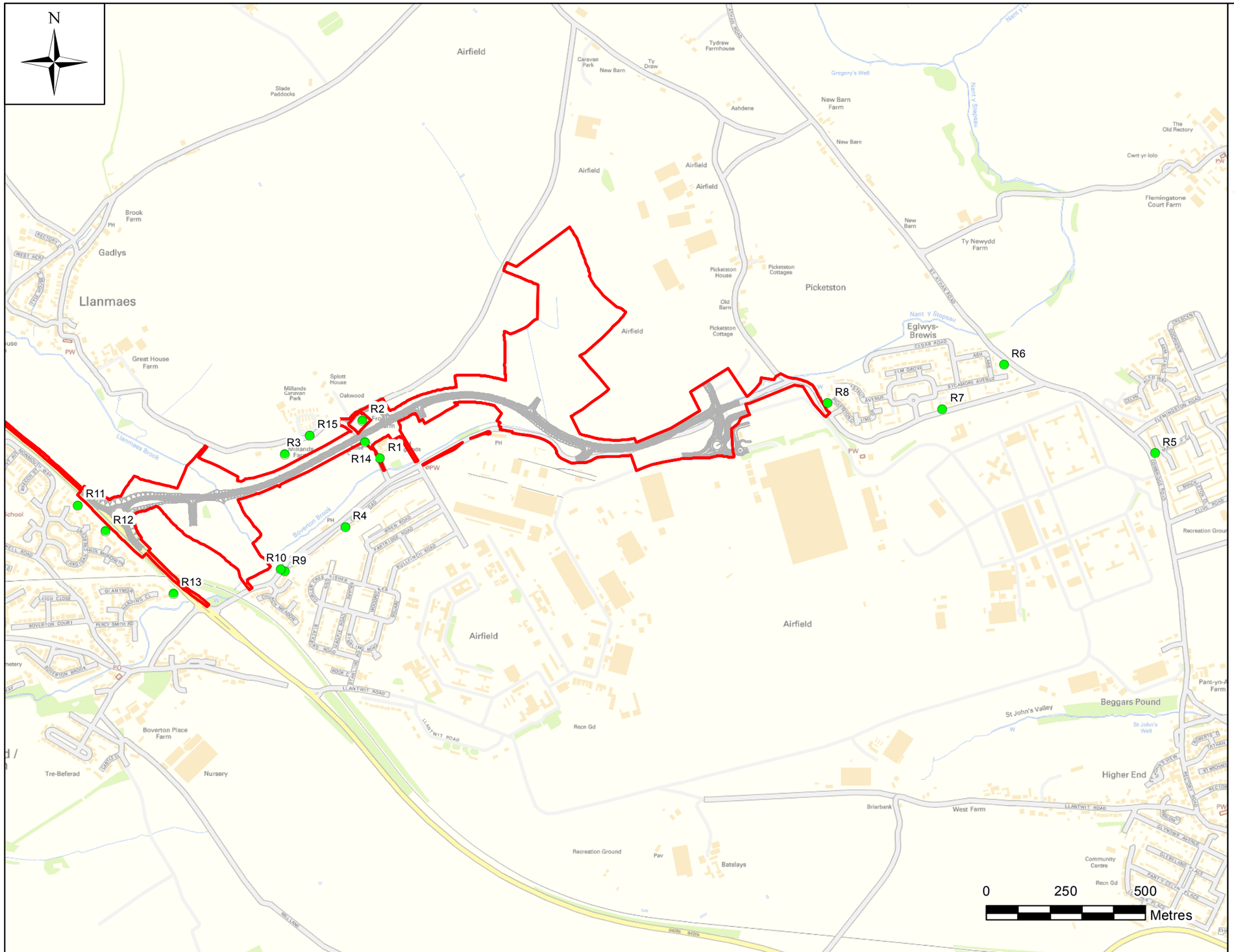
Welsh Government (2016) Planning Policy Wales Edition 9 – November 2016 – Chapter 13 Minimising and Managing Environmental Risks and Pollution

Appendix A Figures



Legend

- Receptors
- Red Line Boundary
- Northern Access Road

Client: Welsh Government	Title: Air Quality Study Area	AECOM Belvedere House Woodwater Park Pynes Hill Exeter EX2 5WS Tel: +44 1392 663200 www.aecom.com	Design: Final; Drawn: FB Chk'd: EC; App'd: DD Date: 13/03/2017; Scale at A3: 1:12,500 Drawing Number: Figure 1; A3
Project: St Athan Northern Access Road			

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