HORIZON NUCLEAR POWER

WYLFA NEWYDD

ENERGY WORKING FOR BRITAIN

Wylfa Newydd Project

6.7.17 ES Volume G - A5025 Off-line Highway Improvements App G5-1 - Construction Dust Assessment - A5025 Off-line Highway Improvements

PINS Reference Number: EN010007

Application Reference Number: 6.7.17

June 2018

Revision 1.0

Regulation Number: 5(2)(a)

Planning Act 2008
Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009

Horizon Internal DCRM Number: WN0902-JAC-PAC-APP-00115

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1 Executive summary

1.1.1 Major construction sites can give rise to increased long-term and short-term particulate matter concentrations at off-site locations, and may also cause annoyance to people and damage to vegetation due to the soiling of surfaces by dust, unless the appropriate mitigation measures are implemented. The effects of dust from the activities associated with the construction of the A5025 Off-line Highway Improvements have therefore been evaluated in this assessment.

1.1.2 The results of the dust assessment indicate that, at sensitive human receptors, the risks determined for the overall scheme show that all activities are predicted to be either a Low risk or Negligible risk for potential human health impacts. For potential dust soiling impacts, there is predicted to be a maximum of a High risk from earthworks activities, a Medium risk from demolition and trackout activities and a Low risk from construction activities.

1.1.3 For a single assessed ecological receptor (ancient woodland), there is predicted to be a Low risk from earthworks and trackout activities with regard to dust soiling impacts and a Negligible risk from demolition and construction activities.

1.1.4 Based on experience of the application of existing mitigation methods at other major construction sites, it is considered that all High, Medium and Low risks identified can be managed through the adoption of a suite of good practice mitigation measures and a monitoring programme to monitor the effectiveness of their application at reducing off-site impacts.

1.1.5 The measures taken forward from this assessment to control dust emissions and monitor the effectiveness of the mitigation are included as part of the air quality management strategies set out in the Wylfa Newydd Code of Construction Practice (CoCP) (Application Reference Number: 8.6) and A5025 Off-Line Highway Improvements sub-CoCP (Application Reference Number: 8.12).

1.1.6 Institute of Air Quality Management (IAQM) guidance [RD1] notes that with the application of good practice mitigation measures of the type available for use on this project, the environmental effect will not be significant at any off-site receptor. IAQM guidance [RD1] also notes that, even with a rigorous package of mitigation measures in place, such as those taken forward from this assessment and included as part of the air quality management strategies set out in the Wylfa Newydd CoCP (Application Reference Number: 8.6) and A5025 Off-Line Highway Improvements sub-CoCP (Application Reference Number: 8.12), occasional impacts may occur. The Wylfa Newydd CoCP (Application Reference Number: 8.6) and A5025 Off-Line Highway Improvements sub-CoCP (Application Reference Number: 8.12) provides a framework by which the level of mitigation is adapted to respond proactively to the changing risk of dust emissions, so that significant effects are prevented.

1.1.7 The appraisal of the potential dust emissions from activities associated with the construction of the A5025 Off-line Highway Improvements shows that

dust is likely to be generated from site activities and there would be a maximum of a High risk of impacts to human receptors and a Low risk to ecological receptors. However, it is considered that all risks can be effectively managed through the application of appropriate good practice mitigation measures. Therefore, it is concluded that these works are not likely to generate unacceptable dust impacts to receptors and the effect would be not significant.

2 About this report

2.1 Purpose and applicability

2.1.1 Emissions of dust to air can occur from works associated with the preparation of land (e.g. demolition, land clearing or grading, and earth moving and excavation) and during construction. This report sets out the assessment of dust which could potentially be emitted to air from the activities associated with the construction of the A5025 Off-line Highway Improvements.

2.2 Terms and definitions

Table 2-1 Terms and definitions

Term	Definition
A5025 Off-line Highway Improvements	Highway improvements that involve the construction of new sections of the A5025. These would involve the construction of new junctions, new sections of road to bypass local communities, and localised bend improvements generally beyond the existing highway boundaries.
A5025 On-line Highway Improvements	Highway improvements that are made to the existing A5025 road, generally within the existing highway corridor. The A5025 On-line Highway Improvements are being consented under a separate Town and Country Planning Act 1990 (TCPA) application. The improvements are to be made between the A5 east of Valley Junction to the proposed Power Station Access Road Junction, to include reconstruction and localised widening of the existing pavement and application of a surface dressing. The proposals also comprise a temporary Construction Compound including a temporary pavement recycling facility, and other associated works such as drainage infrastructure, boundary treatments, planting, new signage and road markings.
Abnormal Indivisible Loads (AILs)	A load that cannot be divided for the purpose of being carried on a road without undue expense or risk of damage.
Alternative Emergency Control Centre (AECC)	A component of the Off-site Power Station Facilities which provides back-up command and communications facilities that would be used to manage an incident at the Power Station Site in the extremely unlikely event that the primary facilities on the Power Station Site were not available.

Term	Definition
Ancient woodland	A woodland that has existed continuously since 1600 or before in England, Wales and Northern Ireland.
Annoyance (dust)	Loss of amenity due to dust deposition or visible dust plumes, often related to people making complaints, but not necessarily sufficient to constitute a nuisance according to legal definition.
Associated Development	Works included in the DCO which facilitate the delivery of the NSIP, and which include: the Site Campus; Park and Ride; Logistics Centre; and the A5025 Off-line Highway Improvements.
Construction	Any activity involved with the provision of a new structure (or structures), its modification or refurbishment. The term 'structure' is defined to include a road, bridge, pipeline, building etc.
Cooling Water System	The once-through system that removes, using Cooling Water, the proportion of heat energy produced by the Units which cannot be converted into electricity, and includes the intakes, pumphouses, breakwaters, seal pits and outfall structures as well as connecting pipelines and tunnels for each Unit.
Demolition	Any activity involved with the removal of an existing structure (or structures). This may also be referred to as deconstruction, specifically when a building is to be removed a small part at a time.
Deposited dust	Dust that is no longer in the air and which has settled onto a surface. Deposited dust is also sometimes called amenity dust or nuisance dust, with the term nuisance applied in the general sense rather than the specific legal definition.
Development Consent Order (DCO)	The consent for an NSIP required under Section 37 of the Planning Act 2008.
Dust	Solid particles that are suspended in air, or have settled out onto a surface after having been suspended in air. The terms dust and particulate matter (PM) are often used interchangeably, although in some contexts one term tends to be used in preference to the other. In this assessment the term 'dust' has been used to include the particles that give rise to soiling, and to human health (i.e. PM_{10} or $PM_{2.5}$) and ecological effects. Note: this is different to the definition given in BS 6069-2:1994, where dust refers to particles up to 75µm in diameter [RD2].

Term	Definition
Earthworks	Covers the processes of soil-stripping, ground-levelling, excavation and landscaping.
Effects	The consequences of the changes in airborne concentrations and/or dust deposition for a receptor. These might manifest themselves as annoyance due to an increase in the dust deposition rate, increased health effects due to exposure to PM_{10} or $PM_{2.5}$ or plant dieback due to reduced photosynthesis. The term 'significant effect' has a specific meaning in EIA. The opposite is a 'not significant effect'. In the context of construction impacts, any effect will usually be adverse; however, professional judgement is required to determine whether this adverse effect is significant based on the evidence presented.
Enabling Works	Works comprising the A5025 On-line Highway Improvements and Site Preparation and Clearance Proposals which are being consented under the TCPA.
Environmental Impact Assessment (EIA)	The process through which the likely significant effects of a development on the environment are identified and assessed.
Environmental Survey Laboratory (ESL)	A component of the Off-site Power Station Facilities that performs a normal operating function for environmental monitoring and, as such, would contain facilities such as monitoring equipment to conduct radiological surveys in the local area.
Heavy Duty Vehicle (HDV)	Heavy duty vehicles include a vehicle with a gross weight of more than 3.5 tonnes and buses.
Impacts	The changes in airborne concentrations and/or dust deposition. A scheme can have an 'impact' on airborne dust without having any 'effects', for instance if there are no receptors to experience the impact.
Logistics Centre	A temporary secure facility from where deliveries to the Power Station Site during construction would be managed to reduce traffic on and impacts to the local road network.
Main Construction	Construction activities within the Wylfa Newydd Development Area that would result in the completion of the Power Station, including final levelling and deep excavations for the Power Station foundations, civil construction activities, commissioning of both Units and site finishing.

Term	Definition
Marine Off-Loading Facility (MOLF)	A facility comprising three purpose built quays: one mainly for the delivery of large construction components including AILs, and two mainly for bulk materials such as aggregates and cement.
Mobile Emergency Equipment Garage (MEEG)	A component of the Off-site Power Station Facilities which would provide managed storage of vehicles and equipment for responding to any incidents that might arise during the operational phase of the Power Station.
Nationally Significant Infrastructure Project (NSIP)	A type of project listed in the Planning Act 2008, which must be consented by a DCO. These include proposals for power plants, large renewable energy projects, new airports and airport extensions and major road projects.
Non-road mobile machinery	Any mobile machine, item of transportable industrial equipment, or vehicle – with or without bodywork – that is not intended for carrying passengers or goods on the road and is installed with an internal combustion engine.
Nuisance	The term nuisance dust is often used in a general sense when describing amenity dust. However, this term also has specific meanings in environmental law: (a) statutory nuisance, as defined in S79(1) of the Environmental Protection Act 1990 (as amended); (b) private nuisance, arising from substantial interference with a person's enjoyment and use of their land; and (c) public nuisance, arising from an act or omission that obstructs, damages or inconveniences the rights of the community. Each of these applies as far as the nuisance relates to the unacceptable effects of emissions. It is recognised that a significant loss of amenity may occur at lower levels of emission than would constitute a statutory nuisance.
Numerical Weather Prediction (NWP)	A method of predicting weather through the use of a series of mathematical equations.
Off-site Power Station Facilities	Comprising the AECC, ESL and MEEG.
Park and Ride	A temporary facility where workers could park their vehicles securely and transfer to shuttle buses, which would take them to the Power Station Site. The site is designed to include a zone for buses to collect and drop off passengers, with a management office and parking for staff (working at the Park and Ride).
Particulate Matter (PM)	Airborne particulate matter is made up of a collection of solid and/or liquid materials of various sizes that range from a few nanometres in diameter (about the size of a virus) to around 100 micrometres (about the thickness of a human hair).

Term	Definition
Planning Act 2008	The Planning Act 2008 is the primary legislation that establishes the legal framework for applying for, examining and determining DCO applications for NSIP.
PM_{10}	Particulate matter with an aerodynamic diameter of 10 microns or less.
$PM_{2.5}$	Particulate matter with an aerodynamic diameter of 2.5 microns or less.
Power Station	The proposed new nuclear power station at Wylfa, including two UK Advanced Boiling Water Reactors, the Cooling Water System, supporting facilities, buildings, plant and structures, radioactive waste and spent fuel storage buildings and the Grid Connection.
Power Station Site	The indicative areas of land and sea within which the majority of the permanent Power Station, Marine Works and other on-site development would be situated.
Receptor	A location that may be affected by air pollution, including dust deposition.
Risk	The likelihood of an adverse event occurring.
Site Campus	A temporary facility that would house up to 4,000 construction workers in modular type accommodation blocks, providing an independent living space for each worker, with shared campus-style amenities.
Site of Special Scientific Interest (SSSI)	Site designated as being of special interest for its flora, fauna or geological or physiographical features and protected under the Wildlife and Countryside Act 1981.
Site Preparation and Clearance Proposals (SPC Proposals)	The Site Preparation and Clearance Works and associated proposals for methods of working and temporary road closures. The SPC Proposals will be consented under the TCPA and also form part of the DCO application.
Special Area of Conservation (SAC)	An area which has been identified as being important for a range of vulnerable habitats, plant and animal species within the European Union and are designated under the Habitats Directive.

Term	Definition
Sub-Code of Construction Practice (sub-CoCP)	A certified document which sets site-specific commitments to mitigate the effects identified in the Environmental Statement and other assessments. There are 6 sub-CoCPs for the Wylfa Newydd Project including: • Main Power Station Site sub-CoCP; • Marine Works sub-CoCP • Off-Site Power Station Facilities sub-CoCP; • Park and Ride facility sub-CoCP; • Logistics Centre sub-CoCP; and • A5025 Off-line sub-CoCP.
Town and Country Planning Act 1990 (TCPA)	The Act that forms part of the land use planning regime in the UK and (among other things) establishes the legal framework in respect of applications for, and determination of, planning permissions.
Trackout	The transport of dust from the construction/demolition site onto the public road network, where it may be deposited and then re-suspended by vehicles using the network. This arises when HDVs leave the construction/demolition site with dusty materials, which may then spill onto the road, and/or when HDVs transfer dust and dirt onto the road having travelled over muddy ground on-site.
UK Advanced Boiling Water Reactor (UK ABWR)	The UK ABWR derives from the generic design of the ABWR. The standard design of the first ABWRs (Kashiwazaki-Kariwa units 6 & 7 in Japan) together with improvements and optimisation from subsequent ABWR plants (Ohma and Shimane 3) and implementation of learning from the Fukushima-Daichii represent the reference plant for the Power Station.
Wildlife Site	A non-statutory designated site of nature conservation interest.
Wylfa Newydd Development Area	The indicative areas of land and sea including the Power Station Site and the surrounding areas that would be used for the construction and operation of the Wylfa Newydd Development Area Development.

Term	Definition
Wylfa Newydd Code of Construction Practice (Wylfa Newydd CoCP)	A document to set out and secure project-wide environmental requirements in accordance with the mitigation of construction activities relied on in the Environmental Statement, as well as construction commitments made through other assessment processes undertaken for the Wylfa Newydd Project (such as: • the Welsh Language Impact Assessment; • Health Impact Assessment; • HRA; • WFD Compliance Assessment, and • Equality Impact Assessment). The Wylfa Newydd CoCP and accompanying sub-CoCPs will be submitted and approved as part of the DCO application for the Wylfa Newydd DCO Project.
Wylfa Newydd Development Area	The indicative areas of land and sea including the Power Station Site and the surrounding areas that would be used for the construction and operation of the Wylfa Newydd Development Area Development.
Wylfa Newydd DCO Project	The elements of the Wylfa Newydd Project for which consent is being sought through the DCO comprising the construction and operation of the Power Station, other on-site development, the Marine Works, the Off-Site Power Station Facilities and the Associated Development.
Wylfa Newydd Project	The Wylfa Newydd Project (the Project) comprises the Wylfa Newydd DCO Project and the Enabling Works.

2.3 Responsible parties

Table 2-2 Responsible parties

Responsible party	Description
Horizon Nuclear Power Wylfa Ltd (Horizon)	Horizon is a UK energy company developing a new generation of nuclear power stations to help meet the UK's need for stable and sustainable low carbon energy. Horizon's ultimate parent company is Hitachi Ltd., a Japanese corporation and the parent company of the multi-national Hitachi group of companies. Horizon is part of the Horizon Nuclear Power Limited group of companies which has premises in Gloucestershire and a site office on Anglesey.
Isle of Anglesey County Council (IACC)	The local authority governing the area within which the Wylfa Newydd Project is intended to be constructed.
Jacobs UK Ltd (Jacobs)	Consultants appointed by Horizon to undertake the Environmental Impact Assessment for the Wylfa Newydd Project.
Natural Resources Wales (NRW)	The public body whose stated purpose is to ensure that the natural resources of Wales are sustainably maintained, enhanced and used, now and in the future. It absorbed the regulatory and advisory duties of the Environment Agency Wales, Countryside Council for Wales and the Forestry Commission in Wales.

2.4 Scope

2.4.1 This report sets out the assessment of emissions of dust which could potentially occur from the construction of the A5025 Off-line Highway Improvements which are described as follows:

- Section 1 – A5 east of Valley Junction to north of Valley Junction, (hereafter referred to as 'section 1');
- Section 3 – north of Llanynghenedl to north of Llanfachraeth, (hereafter referred to as 'section 3');
- Section 5 – south of Llanfaethlu to north of Llanfaethlu, (hereafter referred to as 'section 5');
- Section 7 – north of Llanrhyddlad to north of Cefn Coch, (hereafter referred to as 'section 7'); and
- New Power Station Access Road Junction – North of Cefn Coch.

2.4.2 This assessment has been carried out in accordance with the latest IAQM guidance [RD1], on the assessment of dust from demolition and construction. This report sets out the full construction dust assessment, including a description of the methodology, relevant input data, the

assessment itself, recommended mitigation and monitoring measures and conclusions.

3 Assessment methodology

3.1 Introduction

3.1.1 Activities carried out on construction sites can give rise to emissions of dust which could cause annoyance to people or damage to vegetation due to the soiling of surfaces. These activities can also lead to increased short-term and long-term concentrations of fine particulate matter (e.g. PM_{10} and $PM_{2.5}$) at off-site locations which may affect human health, unless appropriate mitigation measures are implemented. The impacts of dust emissions from the works associated with the construction of the A5025 Off-line Highway Improvements therefore need to be addressed in order to identify the required mitigation measures.

3.1.2 The assessment of dust during construction has been carried out using a qualitative risk-based appraisal with reference to the locations of section 1, 3, 5 and 7 and Power Station Access Road Junction in relation to sensitive receptors, the planned process and site characteristics, as described in IAQM guidance [RD1].

3.1.3 IAQM guidance [RD1] aims to estimate the impacts of both PM_{10} and dust together, through a combined risk-based assessment procedure. IAQM guidance [RD1] provides a methodological framework, but notes that professional judgement is required to assess impacts. This assessment does not consider the air quality impacts of exposure to contaminated dust that could arise from the remediation of contaminated land. Although $PM_{2.5}$ is not specifically included as a parameter within the assessment, the risk levels associated with PM_{10} and any subsequent mitigation measures would also apply to $PM_{2.5}$ as $PM_{2.5}$ is included within the PM_{10} fraction.

3.2 Potential sources

3.2.1 The temporary and varied nature of construction or other processes which include similar emission sources differentiates it from other fugitive dust sources as to the estimation and control of emissions. The process usually consists of a series of different operations, each with its own duration and potential for dust generation. Dust emissions from any single site can be expected to have a definable beginning and end but would also vary between the same types of activities. On large sites, the location and scale of potentially dust-generating activities would also vary throughout the works.

3.2.2 There are potentially sensitive locations close to or within the boundary of sections 1, 3, 5 and 7 and Power Station Access Road Junction, including residential properties, Public Rights of Way and ecological sites. Activities associated with the construction of the A5025 Off-line Highway Improvements have the potential to produce emissions of dust that could be transported towards receptors by the wind. These are close enough to some sections of the A5025 Off-line Highway Improvements that without mitigation measures, they could perceive increases in the rate of dust deposition to property surfaces.

3.2.3 The activities associated with the construction of the A5025 Off-line Highway Improvements are described in detail in chapter G1 (proposed development) (Application Reference Number: 6.7.1) of the Environmental Statement. The key potential construction dust emission sources associated with these activities are summarised below. Where possible, these have been assigned into the four categories used for the IAQM dust assessment method of demolition, earthworks, construction and trackout. These are described below.

- Demolition activities: demolition of redundant sections of the existing A5025 and the removal of walls, gates and fencing, where appropriate, within the respective sections of the A5025 Off-line Highway Improvements.
- Earthworks: including the removal of all above-ground vegetation and topsoil stripping. To enable construction of the A5025 Off-line Highway Improvements, excavation would be required prior to the installation of the capping layer, sub-base and layers of bituminous material used for road construction. Further earthworks activities include establishing the respective site compounds, the installation of drainage, formation of embankments and cutting works where necessary and landscaping. Another potential source is wind picking up dust from material stockpiles and storage mounds which could occur if the wind speed is high enough and the stored material is dry, friable and mitigation measures were not in place.
- Construction activities: including construction of the individual bypass sections, roundabouts (section 1 and the Power Station Access Road Junction), a viaduct (section 3), an overbridge (section 3 and 7) and an underpass (section 3, 5 and 7), and associated activities relating to the construction of the temporary site compounds (to accommodate the storage of materials, equipment and welfare facilities).
- Vehicle movement and trackout: vehicles moving on and around section 1, 3, 5 and 7 and the Power Station Access Road Junction, emitting exhaust particulate matter and re-suspending loose material on the road. There would be the potential for spillage from transferring material around the sites and from particulates being lifted from open container vehicles by the wind generated by vehicle movement. Material tracked out onto the local road network on the wheels of site traffic could be re-suspended by passing traffic.

3.2.4 The construction dust assessment comprises a qualitative risk-based appraisal of the potential sources of dust and the impacts at the sensitive locations close to sections 1, 3, 5 and 7 and the Power Station Access Road Junction. Based on the calculated risk level, the IAQM guidance [RD1] sets out clear requirements for the recommended mitigation measures, which can be used to minimise the impact of dust during the construction phase of the development. The mitigation measures taken forward from this assessment are included as part of the approved air quality management strategies set

out in the Wylfa Newydd CoCP (Application Reference Number: 8.6) and A5025 Off-Line Highway Improvements sub-CoCP (Application Reference Number: 8.12).

3.2.5 Larger dust particles (greater than 30µm) make up the greatest proportion of dust emission from mineral workings or earthworks and will largely deposit within 100m of sources [RD3]. Intermediate sized particles (10µm–30µm) are likely to travel further distance. PM_{10}, including the smaller $PM_{2.5}$ particulates are reported to make up a smaller proportion (approximately 10%) of dust emitted from most workings and the emissions become diluted as they disperse down-wind [RD4].

3.3 Baseline conditions

3.3.1 The assessment requires characterisation of the existing conditions with regard to PM_{10} concentrations to determine the sensitivity of the area. A PM_{10} concentration of 14.9µg/m^3 has been used in this assessment to represent the background concentration. This concentration was recorded by the IACC during 2016 at a location adjacent to the Wylfa Newydd Development Area. In accordance with the IAQM methodology [RD1], the contribution from other local sources was also taken into account. In this case, the contribution to the background concentration from road traffic emissions on the A5025 and other nearby roads, including the A55 (for section 1 only), which was anticipated to occur during activities associated with construction of the A5025 Off-line Highway Improvements was included using dispersion modelling. This resulted in a predicted total PM_{10} concentration of between 15.1µg/m^3 to 16.7µg/m^3 across the respective sites at any of the relevant receptors considered as part of the construction dust assessment. Details of the dispersion modelling of road traffic emissions are provided in chapter C4 (air quality effects of traffic) (Application Reference Number: 6.3.4) of the Environmental Statement.

3.3.2 The IACC also undertook measurements of dust deposition rates at several locations in the vicinity of the Wylfa Newydd Development Area in 2012, 2013 [RD5] and 2016 [RD6]. The measured dust deposition rates ranged from 25.8 to 35.8 milligrams per square metre per day (mg/m^2/day). These were reported by the IACC to be indicative of dust deposition rates for 'open country', and are well below the levels of dust deposition rate that could possibly affect amenity. Suggested guidelines for the dust deposition rate for when complaints are likely set out in *Suggested Guidelines for Deposited Ambient Dust* [RD7] and range from 140mg/m^2/day for open countryside to 200mg/m^2/day for residential areas and the outskirts of towns (based on a large number of UK measurements [RD7]). The value for indicating when complaints are likely, based on site-specific baseline measurement data in the vicinity of the Wylfa Newydd Development Area, would be lower than the 140mg/m^2/day value as the baseline measurements are generally lower than the UK-wide rural dataset. The measurements are also below the levels of dust deposition rates that could potentially affect sensitive vegetation [RD8].

3.3.3 The dust deposition measurements recorded in the vicinity of the Wylfa Newydd Development Area would be broadly representative of the dust deposition in most rural locations on Anglesey that are not close to specific

sources of dust. As there are no significant sources of dust emissions near to the A5025 Off-line Highway Improvements, the dust deposition in the vicinity of the respective sites would be expected to be similar.

3.4 Local climatic conditions

3.4.1 Although not specifically required as part of the IAQM dust assessment method [RD1], analysis of the local climatic conditions was also undertaken to provide additional context to the risk assessment and assist in the determination of the sensitivity of the area.

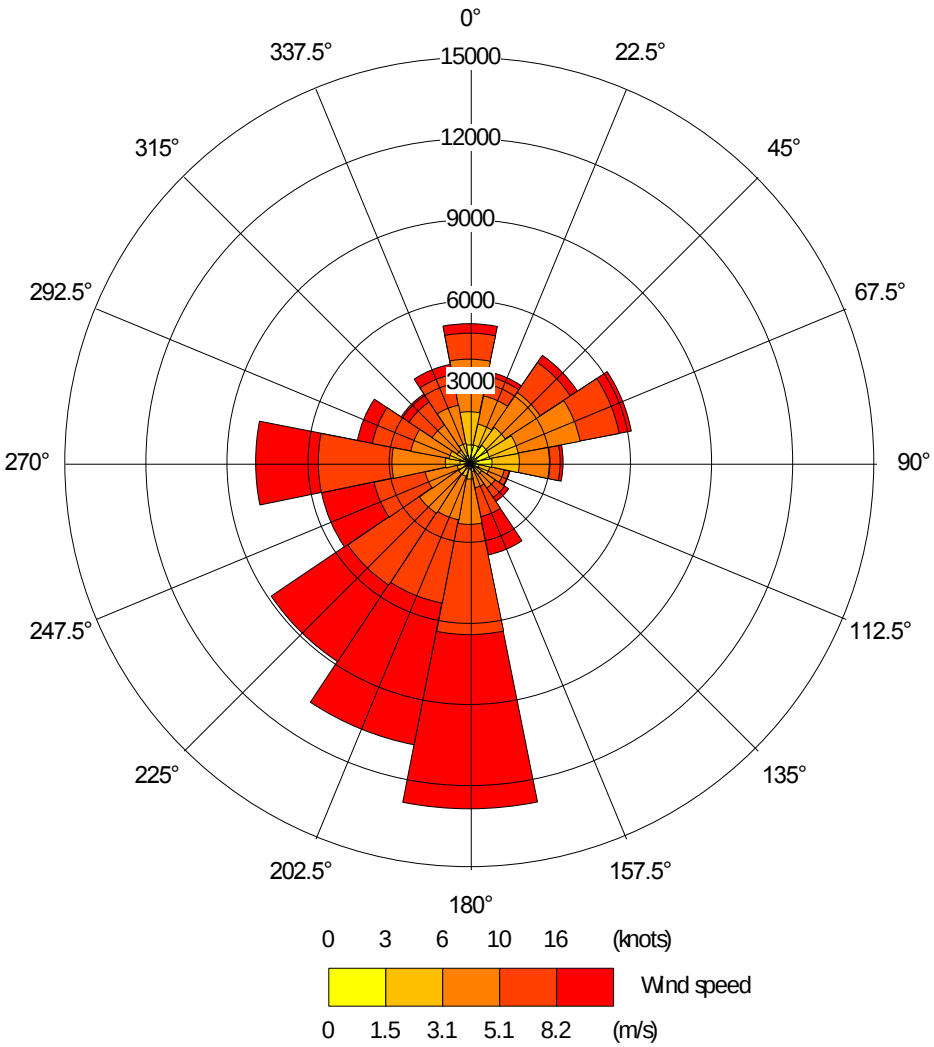
3.4.2 Local climatic conditions such as wind speed and precipitation (rainfall) will affect the probability of airborne dust occurring from potentially dusty activities or open areas and stockpiles and can also affect the dispersion of dust in the air. The wind direction is a useful parameter to understand the likelihood of effects occurring at sensitive locations if dust is emitted or becomes airborne and how severe its effects could potentially be.

3.4.3 Meteorological Office data covering the period 1 January 2007 to 31 December 2016 were obtained from the RAF Valley weather station and for the location of the Wylfa Newydd Development Area. The RAF Valley weather station is approximately 3.4km south-southeast of section 1 and 5.5km south of section 3 and meteorological data recorded at this station are considered representative of the climatic conditions experienced at both section 1 and section 3. Meteorological Office data were obtained for the location of the Wylfa Newydd Development Area, based on the Numerical Weather Prediction (NWP) model. The Wylfa Newydd Development Area is approximately 5.5km northeast of section 5, 1km northeast of section 7 and adjacent to the Power Station Access Road Junction and the data collected for this location is considered representative of the climatic conditions experienced at these sites. The wind data and associated precipitation rate data for both RAF Valley and the Wylfa Newydd Development Area were examined to determine the frequency of occurrence of winds that blow towards receptor locations, strength of winds, and frequency of rainfall in order to evaluate the likelihood of sensitive receptors located in the vicinity of the assessed sites, being affected by fugitive dust emissions.

RAF Valley NWP data analysis

3.4.4 A wind rose for RAF Valley data for the period 1 January 2007 to 31 December 2016 is provided in figure 3-1. The wind rose plot shows the direction the wind blows from (wind sector), in five wind speed categories and the number of hours that it blows in each combination of speed and direction.

Figure 3-1 Wind rose – RAF Valley 2007–2016



3.4.5 Table 3-1 (below) tabulates the wind speed and direction data (based on hourly data) into 16 wind direction sectors, each of 22.5°, representing the commonly described wind directions (e.g. south (S) centred on 180°, south-southwest (SSW) centred on 202.5°, southwest (SW) centred on 225°, and so on). Table 3-2 (below) tabulates the wind speed and direction for dry periods (i.e. days with less than 1mm precipitation).

Table 3-1 RAF Valley data wind analysis (1 January 2007 to 31 December 2016)

Wind speed at height of 10m (m/s)	Wind direction sector																Total
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 – 0.5	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	**0.3%**
0.5 – 5.0	4.2%	2.8%	3.3%	4.5%	3.4%	1.5%	1.3%	1.0%	2.3%	2.2%	2.2%	1.7%	2.9%	2.4%	1.7%	2.2%	**39.5%**
5.0 – 7.5	1.1%	0.8%	1.5%	1.6%	0.4%	0.2%	0.5%	0.9%	3.4%	2.7%	2.9%	1.8%	2.6%	1.5%	1.1%	1.3%	**24.4%**
7.5 – 10.0	0.4%	0.3%	0.6%	0.7%	0.2%	0.0%	0.2%	1.0%	3.8%	2.9%	2.5%	1.5%	2.0%	0.7%	0.5%	0.5%	**17.7%**
>10	0.2%	0.1%	0.1%	0.2%	0.0%	0.0%	0.1%	1.1%	5.2%	4.3%	2.5%	1.5%	1.6%	0.3%	0.2%	0.2%	**17.6%**
Total	**6.1%**	**4.0%**	**5.5%**	**7.0%**	**4.0%**	**1.8%**	**2.0%**	**4.0%**	**14.7%**	**12.2%**	**10.1%**	**6.4%**	**9.1%**	**4.9%**	**3.5%**	**4.3%**	**99.6%**

Note: 0.4% of the wind direction / speed data were not available

Table 3-2 RAF Valley data wind analysis during dry days (daily rainfall less than 1mm) (1 January 2007 – 31 December 2016)

Wind speed at height of 10m (m/s)	Wind direction sector																Total
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 – 0.5	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	**0.3%**
0.5 – 5.0	3.4%	2.3%	2.8%	3.6%	2.3%	1.0%	0.8%	0.7%	1.6%	1.6%	1.6%	1.1%	2.0%	1.6%	1.3%	1.7%	**29.4%**
5.0 – 7.5	0.7%	0.7%	1.2%	1.2%	0.2%	0.1%	0.1%	0.4%	2.1%	1.8%	1.8%	1.0%	1.6%	0.9%	0.8%	1.0%	**15.6%**
7.5 – 10.0	0.2%	0.2%	0.4%	0.5%	0.1%	0.0%	0.1%	0.3%	1.8%	1.6%	1.3%	0.7%	0.9%	0.3%	0.2%	0.2%	**9.0%**
>10	0.1%	0.0%	0.1%	0.1%	0.0%	0.0%	0.0%	0.2%	1.5%	1.6%	0.8%	0.5%	0.7%	0.1%	0.1%	0.1%	**6.0%**
Total	**4.5%**	**3.1%**	**4.5%**	**5.4%**	**2.7%**	**1.1%**	**1.1%**	**1.6%**	**7.1%**	**6.6%**	**5.5%**	**3.3%**	**5.1%**	**3.0%**	**2.3%**	**3.1%**	**60.2%**

3.4.6 Table 3-1 presents the frequency of winds as a percentage of all winds at RAF Valley between 2007 and 2016 for each 22.5° wind direction sector within specified wind speed bands. Table 3-1 and figure 3-1 illustrate that the most frequently occurring wind direction is from a southerly direction occurring for 14.7% of the time, with winds from a south-southwesterly direction also occurring frequently (12.2%). This indicates that receptors to the north or north-northeast of any construction activity generating dust emissions would have the highest probability of experiencing potential increases in dust deposition or PM_{10} concentrations.

3.4.7 The wind speed required to raise dust particles into the air from a surface, known as wind erosion, is dependent upon the size of the particle and other factors. In general, the higher the wind speed the greater the potential for the generation of airborne dust. It is generally accepted that wind erosion only becomes significant at wind speeds in excess of 5.0m/s at the surface based on a reference wind speed height at 10m. Table 3-1 shows that calm conditions (<0.5m/s) occur for approximately 0.3% of the time. Wind speeds between 0.5m/s and 5.0m/s occur for approximately 39.5% of the time, and wind speeds greater than 5.0m/s occur for 59.7% of the time.

3.4.8 However, the potential for dust to be emitted to air is higher during periods of extended dry weather. During periods of wet weather, dust emissions from surfaces would be decreased, as surfaces will be wet. Any coarse dust that becomes airborne would also be minimised through removal from the atmosphere through washout during periods of rainfall. When considering the lower potential for wind erosion to occur on days when it has been raining (assumed to be where the total rainfall in a day was 1mm or greater), table 3-1 shows that the percentage of time when the wind is above 5.0m/s and the conditions were dry is much lower, at approximately 30.6% of the time.

3.4.9 Table 3-3 displays an analysis of precipitation rate data between 2007 and 2016 for the RAF Valley weather station and indicates that dry hours occur for over two-thirds of the total hours considered from the 10 years of meteorological data considered.

Table 3-3 RAF Valley precipitation data analysis (1 January 2007 to 31 December 2016)

Precipitation rate (mm/hour)	Frequency
0	86.9%
0.1 - 0.5	7.2%
0.5 - 1.0	2.1%
1.0 - 1.5	1.5%
1.5 - 2.0	0.6%
2.0 - 2.5	0.5%
2.5 - 3.0	0.2%
>3.0	0.5%

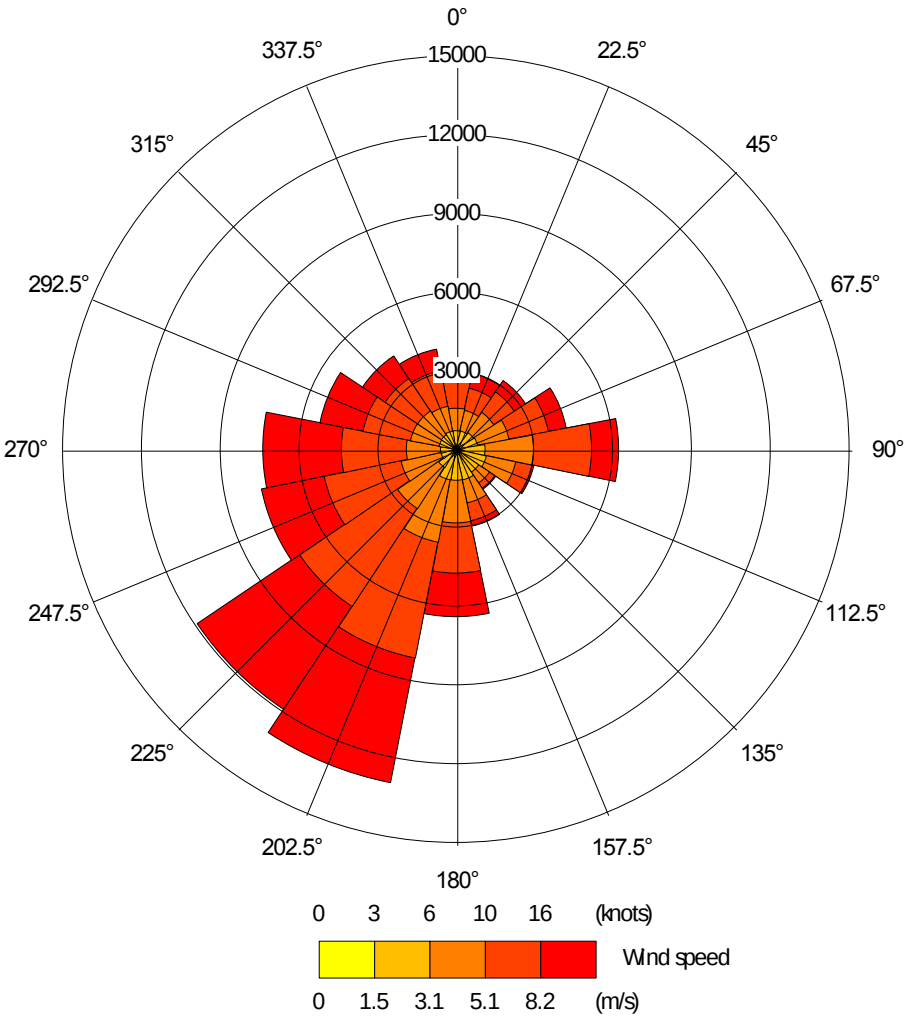
Note: 0.5% of the precipitation data were not available

3.4.10 Considering the above wind and rain analysis, the likelihood that the conditions which could lead to dust being emitted due to wind erosion when the wind speed is high enough (i.e. 5.0m/s or higher), and then transported in the air to nearby receptors is likely to be relatively low. For example, for the wind direction which occurs most frequently (i.e. south) the frequency of winds on dry days above 5.0m/s is only 5.4%, which equates to approximately 20 days in the year (see table 3-2).

Wylfa Newydd Development Area NWP data analysis

3.4.11 A wind rose for the Wylfa Newydd Development Area data for the period 1 January 2007 to 31 December 2016 is provided in figure 3-2.

Figure 3-2 Wind rose – Wylfa Newydd Development Area NWP 2007 - 2016



3.4.12 Table 3-4 tabulates the wind speed and direction data (based on hourly data) into the same 16 wind direction sectors as for the Wylfa Newydd Development Area dataset. Table 3-5 tabulates the wind speed and direction for dry periods (i.e. days with less than 1mm precipitation).

Table 3-4 Wylfa Newydd Development Area NWP data wind analysis (1 January 2007 to 31 December 2016)

Wind speed at height of 10m (m/s)	Wind direction sector																Total
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 – 0.5	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	**0.3%**
0.5 – 5.0	1.7%	1.7%	1.9%	2.3%	3.2%	2.6%	1.8%	2.4%	3.1%	3.9%	2.9%	2.3%	2.0%	1.9%	1.9%	1.8%	**37.5%**
5.0 – 7.5	1.0%	0.8%	1.0%	1.5%	2.2%	0.7%	0.3%	0.7%	1.8%	4.2%	4.1%	2.8%	2.3%	1.7%	1.5%	1.4%	**28.2%**
7.5 – 10.0	0.5%	0.5%	0.5%	0.8%	1.1%	0.1%	0.1%	0.3%	1.4%	3.5%	3.5%	1.9%	1.9%	1.4%	0.9%	0.7%	**19.1%**
>10	0.3%	0.3%	0.3%	0.3%	0.5%	0.0%	0.0%	0.1%	1.0%	3.2%	3.1%	1.6%	2.1%	1.0%	0.6%	0.5%	**14.8%**
Total	**3.6%**	**3.4%**	**3.7%**	**4.9%**	**7.1%**	**3.5%**	**2.1%**	**3.5%**	**7.3%**	**14.8%**	**13.6%**	**8.7%**	**8.4%**	**6.0%**	**4.9%**	**4.5%**	**100.0%**

Table 3-5 Wylfa Newydd Development Area NWP data wind analysis during dry days (daily rainfall less than 1mm) (01 January 2007 – 31 December 2016)

Wind speed at height of 10m (m/s)	Wind direction sector																Total
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 – 0.5	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	**0.2%**
0.5 – 5.0	1.4%	1.4%	1.6%	1.8%	2.4%	1.8%	1.1%	1.5%	2.0%	2.6%	1.9%	1.4%	1.3%	1.3%	1.5%	1.5%	**26.4%**
5.0 – 7.5	0.8%	0.7%	0.8%	1.2%	1.5%	0.4%	0.1%	0.2%	0.6%	2.3%	2.2%	1.4%	1.3%	1.1%	1.0%	1.0%	**16.5%**
7.5 – 10.0	0.4%	0.4%	0.4%	0.5%	0.7%	0.0%	0.0%	0.1%	0.3%	1.3%	1.4%	0.7%	0.8%	0.8%	0.5%	0.5%	**8.7%**
>10	0.2%	0.1%	0.1%	0.2%	0.3%	0.0%	0.0%	0.0%	0.1%	0.7%	0.9%	0.4%	0.8%	0.4%	0.3%	0.3%	**4.8%**
Total	**2.8%**	**2.5%**	**2.8%**	**3.8%**	**4.9%**	**2.2%**	**1.2%**	**1.7%**	**3.0%**	**7.0%**	**6.4%**	**4.0%**	**4.2%**	**3.6%**	**3.3%**	**3.3%**	**56.7%**

3.4.13 Table 3-4 presents the frequency of winds as a percentage of all winds between 2007 and 2016 for each 22.5° wind direction sector within specified wind speed bands. Table 3-4 illustrates that the most frequently occurring wind direction is from a south-southwest direction occurring for 14.8% of the time, with winds from a southwesterly direction occurring frequently (13.6%). This indicates that nearby receptors to the north-northeast or northeast of any construction activity which generated dust emissions would have the highest potential to experience increases in dust deposition or PM_{10} concentrations.

3.4.14 Table 3-4 shows that calm conditions (<0.5m/s) occur for approximately 0.3% of the time. Wind speeds between 0.5m/s and 5.0m/s occur for approximately 37.5% of the time, and wind speeds greater than 5.0m/s occur for 62.1% of the time.

3.4.15 When considering the lower potential for wind erosion to occur on days when it has been raining (assumed to be where the total rainfall in a day was 1mm or greater), table 3-5 shows that the percentage of time when the wind is above 5.0m/s and the conditions were dry is much lower, at 30% of the time.

3.4.16 Table 3-6 displays an analysis of precipitation rate data between 2007 and 2016 for the Wylfa Newydd Development Area and indicates that dry hours occur for over two-thirds of the total hours considered from the 10 years of meteorological data considered.

Table 3-6 Wylfa Newydd Development Area NWP precipitation data analysis (01 January 2007 to 31 December 2016)

Precipitation rate (mm/hour)	Frequency
0	72.2%
0.1 - 0.5	21.5%
0.5 - 1.0	2.4%
1.0 - 1.5	1.3%
1.5 - 2.0	0.8%
2.0 - 2.5	0.6%
2.5 - 3.0	0.3%
>3.0	1.0%

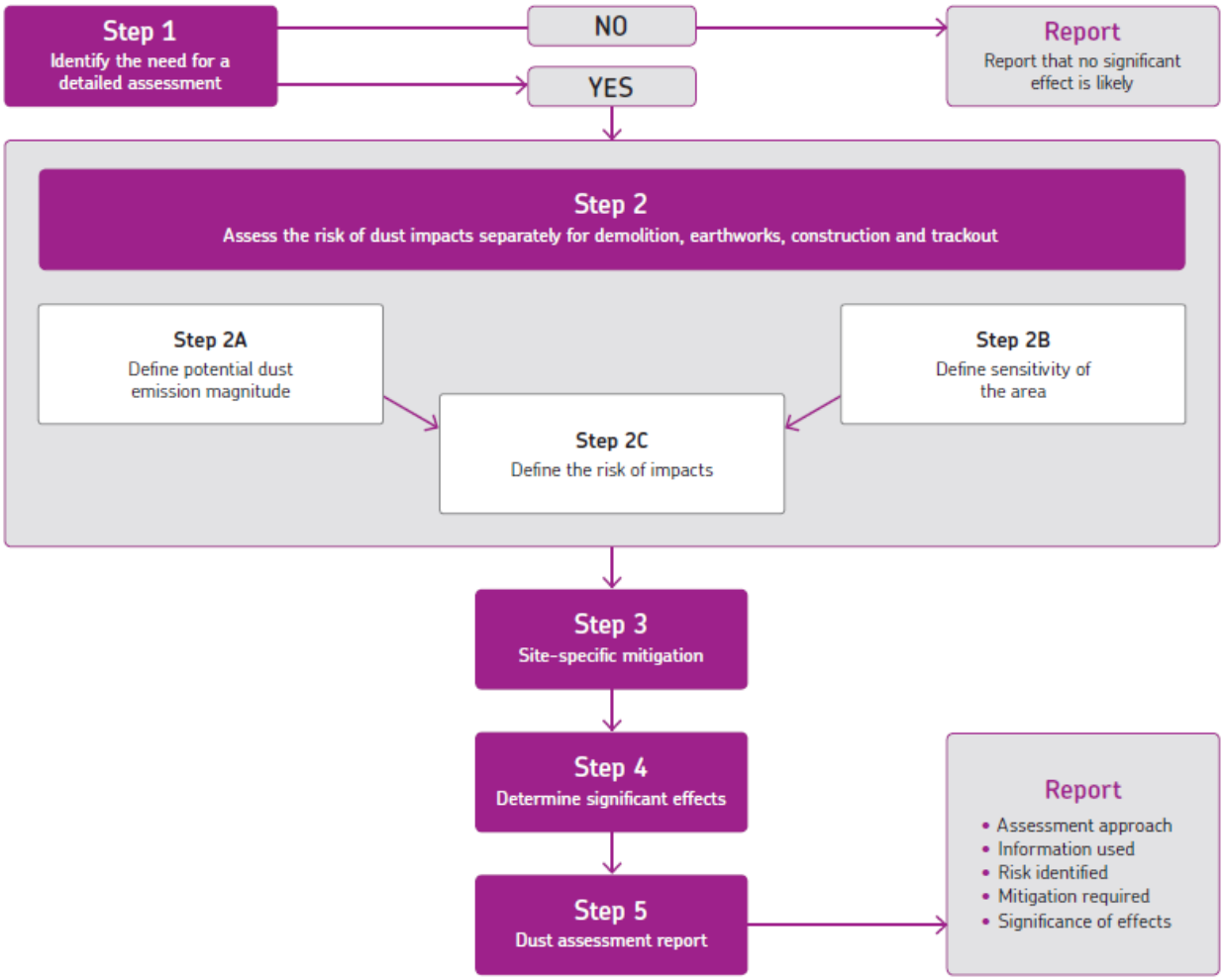
3.4.17 Considering the above wind and rain analysis, the likelihood that the conditions which could lead to dust being emitted due to wind erosion when the wind speed is high enough (i.e. 5.0m/s or higher), and then transported in the air to nearby receptors is likely to be relatively low. For example, for the wind direction which occurs most frequently (i.e. south-southwest) the frequency of winds on dry days above 5.0m/s is only 4.3%, which equates to approximately 16 days in the year (see table 3-5).

3.5 IAQM assessment methodology

Outline of method

3.5.2 The methodology for the assessment of construction impacts is based on a five-step approach as set out in figure 3-3.

Figure 3-3 Structure of construction dust assessment



Step 1 Identify the need for a detailed assessment

3.5.3 An assessment is required where there is:

- a human receptor within 350m of the respective boundaries of section 1, 3, 5 and 7 and the Power Station Access Road Junction and/or within 50m of the respective access route(s) used by construction vehicles on the public highway, up to 500m from the respective site entrance(s); and/or
- an ecological receptor within 50m of the respective boundaries of section 1, 3, 5 and 7 and the Power Station Access Road Junction

and/or within 50m of the access route(s) used by construction vehicles on the public highway, up to 500m from the respective site entrance(s).

3.5.4 The requirement for a dust risk assessment can be screened out where the criteria above are not met, therefore it can be concluded that the level of risk is Negligible and any effects would be not significant. If there are human or ecological receptors within the distance criteria set out in Step 1, then Steps 2 to 4 should be undertaken, as shown in figure 3-3.

Step 2 Assess the risk of dust impacts

Step 2A Define the potential dust emission magnitude for section 1, 3, 5 and 7 and Power Station Access Road Junction

Demolition

3.5.5 The following are descriptors for the different dust emission magnitudes for demolition.

Large: total building volume greater than 50,000m^3, potentially dusty construction material (e.g. concrete), on-site crushing and screening, demolition activities greater than 20m above ground level.

Medium: total building volume 20,000m^3 to 50,000m^3, potentially dusty construction material, demolition activities 10m to 20m above ground level.

Small: total building volume less than 20,000m^3, construction material with low potential for dust release (e.g. metal cladding or timber), demolition activities less than 10m above ground, demolition during wetter months.

Earthworks

3.5.6 The following are descriptors for the different dust emission magnitudes for earthworks.

Large: total site area greater than 10,000m^2, potentially dusty soil type (e.g. clay, which would be prone to suspension when dry due to small particle size), more than 10 heavy earth-moving vehicles active at any one time, formation of bunds greater than 8m in height, total material moved greater than 100,000 tonnes.

Medium: total site area 2,500m^2 to 10,000m^2, moderately dusty soil type (e.g. silt), five to 10 heavy earth-moving vehicles active at any one time, formation of bunds 4m to 8m in height, total material moved 20,000 tonnes to 100,000 tonnes.

Small: total site area less than 2,500m^2, soil type with large grain size (e.g. sand), less than five heavy earth moving vehicles active at any one time, formation of bunds less than 4m in

height, total material moved less than 20,000 tonnes, earthworks during wetter months.

Construction

3.5.7 The following are descriptors for the different dust emission magnitudes for construction.

Large: total building volume greater than 100,000m^3, piling, on-site concrete batching; sandblasting.

Medium: total building volume 25,000m^3 to 100,000m^3, potentially dusty construction material (e.g. concrete), piling, on-site concrete batching.

Small: total building volume less than 25,000m^3, construction material with low potential for dust release (e.g. metal cladding or timber).

Trackout

3.5.8 Trackout refers to the transport of dust and dirt from the assessed sections of the A5025 Off-line Highway Improvements sites onto the public road network, where it may be deposited and re-suspended by other vehicles using the road network. Only receptors within 50m of the route(s) used by vehicles on the public highway up to 500m from the respective site entrance(s) are considered to be at risk.

3.5.9 The following are descriptors for the different dust emission magnitudes for trackout.

Large: greater than 50 HDV outward movements in any one day, potentially dusty surface material (e.g. high clay content), unpaved road length greater than 100m.

Medium: 10 to 50 HDV outward movements in any one day, moderately dusty surface material (e.g. high clay content), unpaved road length 50m to 100m.

Small: fewer than 10 HDV outward movements in any one day, surface material with low potential for dust release, unpaved road length less than 50m.

Step 2B Define the sensitivity of the area for section 1, 3, 5 and 7 and Power Station Access Road Junction

3.5.10 The sensitivity of the area takes account of a number of factors:

- the specific sensitivities of receptors in the area;
- the proximity and number of those receptors;
- the local background PM_{10} concentrations; and
- site-specific factors.

3.5.11 For this assessment of the sensitivities of people to dust soiling effects and to the health effects of PM_{10}, the receptors have been identified as 'High', 'Medium' or 'Low' sensitivity based on Box 6 in the IAQM guidance [RD1] as reproduced below.

Sensitivities of people to dust soiling effects

High:

- users can reasonably expect the enjoyment of a high level of amenity; or
- the appearance, aesthetics or value of their property would be diminished by soiling, and the people or property would reasonably be expected to be present continuously, or at least regularly for extended periods, as part of the normal pattern of use of the land.

Indicative examples include dwellings, museums and other culturally important collections, medium and long-term car parks and car showrooms.

Medium:

- users would expect to enjoy a reasonable level of amenity, but would not reasonably expect to enjoy the same level of amenity as in their homes;
- the appearance, aesthetics or value of their property would be diminished by soiling; or
- the people or property would not reasonably be expected to be present continuously or regularly for extended periods as part of the normal pattern of use of the land.

Indicative examples include parks and places of work.

Low:

- the enjoyment of amenity would not reasonably be expected;
- property would not reasonably be expected to be diminished in appearance, aesthetics or value by soiling; or
- there is transient exposure, where the people or property would reasonably be expected to be present only for limited periods as part of the normal pattern of use of the land.

Indicative examples include playing fields, farmland (unless it is commercially-sensitive horticultural farmland), footpaths, short-term car parks and roads.

Sensitivities of people to the health effects of PM_{10}

High:

- locations where members of the public are exposed over a period relevant to the Air Quality Objective for PM_{10} (in the case of the 24-hour objectives, a relevant location would be one where individuals may be exposed for eight hours or more in a day).

Indicative examples include residential properties. Hospitals, schools and residential care homes (if present) should also be considered as having equal sensitivity to residential areas for the purpose of this assessment.

Medium:

- locations where the people exposed are workers, and exposure is over a period relevant to the Air Quality Objective for PM_{10} (in the case of the 24-hour objectives, a relevant location would be one where individuals may be exposed for eight hours or more in a day).

Indicative examples may include office and shop workers, but will generally not include workers occupationally exposed to PM_{10}, as protection is covered by Health and Safety at Work legislation.

Low:

- locations where human exposure is transient.

Indicative examples include public footpaths, playing fields, parks and shopping streets.

Sensitivities of receptors to ecological effects

3.5.12 For the assessment of the sensitivity of the area with regard to impacts on ecological receptors, the relevant ecological receptors have been identified as High, Medium or Low sensitivity as advised in the IAQM guidance [RD1], as described below.

High:

- locations with an international or national designation and the designated features may be affected by dust soiling; or
- locations where there is a community of a particularly dust-sensitive species such as vascular species included in the Red Data List for Great Britain [RD9].

Indicative examples include a Special Area of Conservation designated for acid heathlands or a local site designated for lichens adjacent to the demolition of a large site containing concrete (alkali) buildings.

Medium:

- locations where there are particularly important plant species, where dust sensitivity is uncertain or unknown; or
- locations with a national designation where the features may be affected by dust deposition.

An indicative example is a Site of Special Scientific Interest (SSSI) with dust sensitive features.

Low:

- locations with a local designation where the features may be affected by dust deposition.

An indicative example is a Wildlife Site with dust sensitive features.

3.5.13 Table 3-7 and table 3-8 set out the selection criteria for the sensitivity of the area to dust soiling effects on people and property, and the selection criteria for the sensitivity of the area to human health impacts, respectively. Table 3-9 sets out the selection criteria for the sensitivity of the area with regard to impacts on ecological receptors.

Table 3-7 Criteria for the sensitivity of the area to dust soiling effects on people and property

Receptor sensitivity	Number of receptors	Distance from the source (m)			
		<20	<50	<100	<350
High	>100	High	High	Medium	Low
	10 – 100	High	Medium	Low	Low
	1 – 10	Medium	Low	Low	Low
Medium	>1	Medium	Low	Low	Low
Low	>1	Low	Low	Low	Low

Table 3-8 Criteria for the sensitivity of the area to human health

Receptor sensitivity	Annual mean PM_{10} concentration	Number of receptors	Distance from the source (m)				
			<20	<50	<100	<200	<350
High	> 32µg/m^3	>100	High	High	High	Medium	Low
		10 – 100	High	High	Medium	Low	Low
		1 – 10	High	Medium	Low	Low	Low
	28 – 32µg/m^3	>100	High	High	Medium	Low	Low
		10 – 100	High	Medium	Low	Low	Low
		1 – 10	High	Medium	Low	Low	Low
	24 – 28µg/m^3	>100	High	Medium	Low	Low	Low
		10 – 100	High	Medium	Low	Low	Low
		1 – 10	Medium	Low	Low	Low	Low
	< 24µg/m^3	>100	Medium	Low	Low	Low	Low
		10 – 100	Low	Low	Low	Low	Low
		1 – 10	Low	Low	Low	Low	Low
Medium	> 32µg/m^3	>10	High	Medium	Low	Low	Low
		1 – 10	Medium	Low	Low	Low	Low
	28 – 32µg/m^3	>10	Medium	Low	Low	Low	Low
		1 – 10	Low	Low	Low	Low	Low
	24 – 28µg/m^3	>10	Low	Low	Low	Low	Low
		1 – 10	Low	Low	Low	Low	Low
	< 24µg/m^3	>10	Low	Low	Low	Low	Low
		1 – 10	Low	Low	Low	Low	Low
Low	n/a	>1	Low	Low	Low	Low	Low

Table 3-9 Criteria for the sensitivity of the area to ecological impacts

Receptor sensitivity	Distance from the source (m)	
	<20	<50
High	High	Medium
Medium	Medium	Low
Low	Low	Low

Step 2C Define the risk of impacts

3.5.14 The dust emission magnitude is then combined with the sensitivity of the area to determine the risk of impacts with no mitigation measures applied. The matrices in table 3-10 provide a method of assigning the level of risk for each activity. These can then be used to determine the level of mitigation that is required.

Table 3-10 Determination of risk of dust impacts

Sensitivity	Dust emission magnitude		
	Large	Medium	Small
Demolition			
High	High risk	Medium risk	Medium risk
Medium	High risk	Medium risk	Low risk
Low	Medium risk	Low risk	Negligible
Earthworks			
High	High risk	Medium risk	Low risk
Medium	Medium risk	Medium risk	Low risk
Low	Low risk	Low risk	Negligible
Construction			
High	High risk	Medium risk	Low risk
Medium	Medium risk	Medium risk	Low risk
Low	Low risk	Low risk	Negligible
Trackout			
High	High risk	Medium risk	Low risk
Medium	Medium risk	Low risk	Negligible
Low	Low risk	Low risk	Negligible

Step 3 Site-specific mitigation

3.5.15 During the construction phase, it would be important to control dust levels for High, Medium and Low risk construction activities. In order to avoid significant impacts from dust during the construction phase, suitable mitigation measures should be adopted. Following the identification of the overall risk category for the demolition, earthworks, construction and trackout activities based on table 3-10, appropriate mitigation measures can be identified for the A5025 Off-line Highway Improvements. Activities identified as a High risk would require a greater level of mitigation than those identified as Low risk.

3.5.16 A selection of these measures has been specified for Low risk to High risk sites in the IAQM guidance [RD1] as measures suitable to mitigate dust

emissions from activities such as those which would be undertaken during the construction of the A5025 Off-line Highway Improvements.

Step 4 Determine significant effects

3.5.17 Following Step 2 (determining the risk of dust impacts for each activity) and Step 3 (identification of appropriate site-specific mitigation), the significance of the potential dust effects can be determined. The recommended mitigation measures are considered to be sufficient based on the successful application of these measures at other large construction sites to reduce emissions of dust, such that a significant effect would not occur at off-site receptors.

3.5.18 The approach in Step 4 of the IAQM dust assessment guidance [RD1] has been adopted to determine the significance of effects with regard to dust emissions. The guidance states the following:

> "For almost all construction activity, the aim should be to prevent significant effects on receptors through the use of effective mitigation. Experience shows that this is normally possible. Hence the residual effect will normally be not significant."

3.5.19 The IAQM guidance also states that:

> "Even with a rigorous DMP [Dust Management Plan] in place, it is not possible to guarantee that the dust mitigation measures will be effective all the time, and if, for example, dust emissions occur under adverse weather conditions, or there is an interruption to the water supply used for dust suppression, the local community may experience occasional, short-term dust annoyance. The likely scale of this would not normally be considered sufficient to change the conclusion that with mitigation the effects will be not significant."

3.5.20 Step 4 of the IAQM guidance [RD1] recognises that the key to the above approach is that it assumes that the regulators, such as the IACC and NRW, ensure that the proposed mitigation measures are implemented. The management plan should include the necessary systems and procedures to facilitate regular checking by the regulators to ensure the mitigation is being delivered, and that it is effective at reducing any residual effect to not significant in line with the guidance.

4 Step 1 Identify the need for a detailed assessment

4.1.1 An assessment of potential demolition and construction impacts was undertaken in accordance with the IAQM methodology described earlier and as set out in section 3. The first step is Step 1, where the need for a detailed assessment is determined based on the location of receptors within the vicinity of each section of the A5025 Off-line Highway Improvements.

4.1.2 There are human receptors (i.e. residential properties or commercial premises, etc.) within 350m of the boundary of each section and, therefore, further assessment is required. There are also human receptors within 50m of the local road network, up to 500m from the site entrances, which would be utilised during the construction works. A count of the relevant human receptors within the specified assessment bands (i.e. up to 20m, 50m, 100m and 350m from the construction site boundary (as represented by the Order Limits shown on figure 9-1 and figure 9-3 for sections 1, 3, 5 and 7 and Work Package 1J shown on figure 9-3 for the Power Station Access Road Junction) was carried out as recommended in IAQM guidance [RD1], the results of which are set out for each section of the A5025 Off-line Highway Improvements within this section of the report. The receptors have been identified as being of High, Medium or Low sensitivity as per the criteria set out in paragraph 3.5.11. In addition, IAQM guidance [RD1] recommends a trackout count (i.e. those receptors within 50m of the route(s) used by construction vehicles on the public highway, up to 500m from the site entrance(s)) be undertaken. However, the site access and haul routes for each section are still to be finalised. In the absence of this information, the sensitivity of the area has been assumed to be High for trackout activities for sections 1, 3, 5 and 7 and a Medium sensitivity has been assigned for trackout activities at the Power Station Access Road Junction, with regard to dust soiling at human receptors. This is considered to represent a conservative approach to the assessment, as the sensitivity of the area is likely to be less than High for sections 1, 3, 5 and 7. The sensitivity of the area with regard to human health was assumed to be Low at all sections.

4.1.3 The effects of construction dust on ecological sites have also been considered. The presence of any ecological receptors within 50m of the boundary of each road section is discussed within this section of the report, together with a description of the ecological site, and its potential sensitivity to dust soiling, in accordance with Step 2B.

4.2 Section 1: A5 east of Valley Junction to north of Valley Junction

4.2.1 The human receptors within the assessment bands around the section 1 construction boundary are set out in table 4-1. A figure of the relevant receptors within the assessment bands is provided in figure 9-1 (see section 9 of this report).

Table 4-1 Dust soiling and human health receptor count

Receptor count				
Demolition, earthworks and construction		**Receptor sensitivity**		
		High	**Medium**	**Low**
Distance from section 1 site boundary	<20m	0	3	1
	<50m	3	6	1
	<100m	9	11	1
	<350m	136	48	3

4.2.2 There are no relevant ecological sites within 50m of the boundary of section 1 or ecological sites within 50m of the possible route(s) used by construction vehicles up to 500m from the site entrance(s). Therefore, the potential effects of construction dust on ecological sites was not required to be considered further. The nearest ecological receptor is Gwely Cyrs Caergeiliog Wildlife Site which is approximately 150m southeast of section 1.

4.3 Section 3: North of Llanynghenedl to north of Llanfachraeth

4.3.1 The human receptors within the assessment bands around the section 3 construction boundary are set out in table 4-2. A figure of the relevant receptors within the assessment bands is provided in figure 9-1 (see section 9 of this report).

4.3.2 There are ten public footpaths within 350m of the boundary of section 3. These have been included in the receptor count as having Low sensitivity as per IAQM guidance [RD1]. The public footpaths are described in chapter G4 (public access and recreation) (Application Reference Number: 6.7.4) of the Environmental Statement.

Table 4-2 Dust soiling and human health receptor count

Receptor count				
Demolition, earthworks and construction		**Receptor sensitivity**		
		High	**Medium**	**Low**
Distance from section 3 site boundary	<20m	4	0	5
	<50m	17	0	6
	<100m	43	1	7
	<350m	186	6	10

4.3.3 The nearest ecological receptor is Beddmanarch-Cymyran SSSI which is located approximately 150m west of the section 3 site at its closest point. Therefore, the potential effects of construction dust on ecological sites at section 3 were not required to be considered further.

4.4 Section 5: South of Llanfaethlu to north of Llanfaethlu

4.4.1 The human receptors within the assessment bands around the section 5 construction boundary are set out in table 4-3. A figure of the relevant receptors within the assessment bands is provided in figure 9-2 (see section 9 of this report).

4.4.2 There are two public footpaths within 20m of the boundary of section 5. These have been included in the receptor count as having Low sensitivity as per IAQM guidance [RD1]. The public footpaths are described in chapter G4 of the Environmental Statement (Application Reference Number: 6.7.4).

4.4.3 As per IAQM guidance [RD1], high sensitivity receptors presented in table 4-3 include the approximate number of pupils and staff expected to attend Llanfaethlu Primary School (up to 180 pupils and staff).

Table 4-3 Dust soiling and human health receptor count

Receptor count				
Demolition, earthworks and construction		**Receptor sensitivity**		
		High	**Medium**	**Low**
Distance from section 5 site boundary	<20m	9	0	2
	<50m	190	0	3
	<100m	195	0	3
	<350m	295	4	9

4.4.4 The nearest relevant ecological receptors are an area of ancient semi-natural woodland, Coed Carreglwyd Wildlife Site and Llyn Garreg-Lwyd SSSI approximately 700m northwest of the site. Therefore, the potential effects of construction dust on ecological sites at section 5 was not required to be considered further.

4.5 Section 7: North of Llanrhyddlad to north of Cefn Coch

4.5.1 The human receptors within the assessment bands around the section 7 construction boundary are set out in table 4-4. A figure of the relevant receptors within the assessment bands is provided in figure 9-2 (see section 9 of this report).

4.5.2 There are three public footpaths within 20m of the boundary of section 7. These have been included in the receptor count as having Low sensitivity as per IAQM guidance [RD1]. The public footpaths are described in chapter G4 of the Environmental Statement (Application Reference Number: 6.7.4).

Table 4-4 Dust soiling and human health receptor count

Receptor count				
Demolition, earthworks and construction		**Receptor sensitivity**		
		High	**Medium**	**Low**
Distance from section 7 site boundary	<20m	1	0	3
	<50m	5	0	3
	<100m	9	0	3
	<350m	17	0	12

4.5.3 There is a parcel of ancient woodland (ID 26051) adjacent to the site boundary which has therefore been considered in the assessment. The parcel of Ancient Woodland has been classed as a Low sensitivity receptor in accordance with IAQM guidance [RD1]. The next nearest ecological site is the Llyn Llygeirian SSSI which is approximately 300m to the east of the site and is therefore not required to be considered in the assessment.

4.6 Power Station Access Road Junction

4.6.1 The human receptors within the assessment bands around the Power Station Access Road Junction construction boundary are set out in table 4-5. A figure of the relevant receptors within the assessment bands is provided in figure 9-3 (see section 9 of this report).

4.6.2 It should be noted there are four public footpaths within 350m of the boundary of the Power Station Access Road Junction. These have been included in the receptor count as having Low sensitivity as per IAQM guidance [RD1]. The public footpaths are described in chapter G4 of the Environmental Statement (Application Reference Number: 6.7.4).

Table 4-5 Dust soiling and human health receptor count

Receptor count				
Demolition, earthworks and construction		**Receptor sensitivity**		
		High	**Medium**	**Low**
Distance from Power Station Access Road Junction site boundary	<20m	0	0	0
	<50m	0	0	2
	<100m	2	0	2
	<350m	3	0	4

4.6.3 The nearest ecological receptor is Cae Gwyn Site of Special Scientific Interest which is located approximately 150m west of the site boundary. Therefore, the potential effects of construction dust on ecological sites at the Power Station Access Road Junction were not required to be considered further.

5 Step 2 Assess the risk of dust impacts

5.1 Step 2A Define the potential dust emission magnitude

5.1.1 The works associated with the construction of each section of the A5025 Off-line Highway Improvements would be split into several stages, which would involve different periods of demolition, earthworks, construction and trackout, and activity levels would not necessarily peak simultaneously.

5.1.2 The dust emission magnitudes of each activity have been specified using the definitions of dust emission magnitudes in section 3.5 and using professional judgement in line with IAQM guidance [RD1]. These are provided below for each section of the A5025 Off-line Highway Improvements. Table 5-1 presents a summary of all the dust emission magnitudes determined for each activity and A5025 Off-line Highway Improvements section. These are based on the criteria set out in section 3.5.

Section 1: A5 east of Valley Junction to north of Valley Junction

Demolition: Demolition activities include the demolition and removal of stone walls (approximately 80m^3) and removal of existing road pavement (approximately 1,100m^3). The demolition material includes pavement bituminous materials, stone and mortar and may be potentially dusty. Demolition activities will be at a height of less than 10m above ground level. There are no on-site crushing and screening activities anticipated. The total demolition volume is approximately 1,200m^3. On this basis, the assessment for demolition is based on a dust emission class of 'Small'.

Earthworks: Earthworks activities include site clearance of vegetation, topsoil and field boundaries. Other earthworks are required for establishing the temporary site compound, excavation to enable a suitable sub-base foundation, drainage, formation of embankments or cutting works where necessary and landscaping. The total amount of material to be excavated or moved is estimated at approximately 26,000 tonnes. There are likely to be between five and 10 heavy earth-moving machines active at any one time. The soil profile comprises a clay soil which may be prone to suspension when dry due to small particle size. The formation of topsoil mounds would be at a maximum height of 2m. Although the site area is in excess of 10,000m^2 (approximately 104,000m^2), the earthworks equate to the tonnage for a Medium dust emission magnitude. Therefore, on balance,

the proposed earthworks were categorised as a dust emission class of 'Medium'.

Construction: Construction activities include a new four-arm roundabout and bypass connecting the A5 with the A5025. New and improved footways and cycle ways would be included at the roundabout to provide safe routes for walkers and cyclists along the A5. Road surfacing would be installed, along with kerbs and footways. Further construction activities include the construction of the temporary site compound. As well as the crushed material for the compound and sub-base granular material and pavement bituminous materials for road construction, the construction stage will also utilise potentially dusty construction materials such as concrete, however, this will be delivered and placed whilst wet. On-site concrete batching and sandblasting are not anticipated. The total construction volume for section 1 is estimated at approximately 7,500m^3. On this basis, the assessment for construction is based on a dust emission class of 'Small'.

Trackout: During the construction phase, the maximum number of daily outward movements of HDVs is anticipated to be approximately 38 in any one day. On this basis, the assessment for trackout is based on a dust emission class of 'Medium'.

Section 3: North of Llanynghenedl to north of Llanfachraeth

Demolition: Demolition activities include the demolition and removal of stone walls (approximately 300m^3) and removal of existing road pavement (approximately 1,300m^3). The demolition material includes pavement bituminous materials, stone and mortar. Demolition activities will be at a height of less than 10m above ground level. There are no on-site crushing and screening activities anticipated. The total demolition volume is approximately 1,600m^3. On this basis, the assessment for demolition is based on a dust emission class of 'Small'.

Earthworks: Earthworks activities include site clearance of vegetation, topsoil and field boundaries. Other earthworks are required for establishing the temporary site compound, excavation to enable a suitable sub-base foundation and landscaping. Excavation will also be required for the foundations for the Llanfachraeth viaduct and overbridge, formation of embankments or cutting works where necessary. The total amount of material to be excavated or moved is estimated to be approximately 240,000 tonnes which includes construction material (e.g. sub-

base, paving and crushed material to provide the porous hardstanding across the site) and there are likely to be between five and 10 heavy earth-moving machines active at any one time. The soil profile comprises a clayey soil which may be prone to suspension when dry due to small particle size. The formation of topsoil mounds would be at a maximum height of 2m. The site area is approximately 200,000m^2. Therefore, the proposed earthworks have been classified as a dust emission class of 'Large'.

Construction: Construction activities include a new 2.2km highway to provide a bypass to the east of the Llanfachraeth linking into the existing A5025 north and south of the settlement. Further construction activities include the construction of the temporary site compound, an overbridge to accommodate the side road that intersects the route, an elevated viaduct to allow traffic to cross the Afon Alaw and an underpass to provide access for agricultural vehicles and herding cattle. Road surfacing would be installed, along with kerbs and footways. As well as the construction materials referred to above for section 1, the construction stage will utilise materials such as concrete, however, this will be delivered and placed whilst wet. On-site concrete batching and sandblasting activities are not anticipated. The construction material volume for the bypass works is estimated to be approximately 16,500m^3. The construction volume for the overbridge and viaduct are likely to be less than 1,000m^3. Therefore, the total construction volume would be less than 25,000m^3. On this basis, the assessment for construction is based on a dust emission class of 'Small'.

Trackout: During the construction phase, the maximum number of daily outward movements of HDVs is anticipated to be approximately 38 in any one day. On this basis, the assessment for trackout is based on a dust emission class of 'Medium'.

Section 5: South of Llanfaethlu to north of Llanfaethlu

Demolition: Demolition activities include the demolition and removal of stone walls (approximately 400m^3) and removal of existing road pavement (approximately 2,100m^3) which may involve potentially dusty construction material including pavement bituminous materials, stone and mortar. Demolition activities will be at a height of less than 10m above ground level. There are no on-site crushing and screening activities anticipated. The total demolition volume is approximately 2,500m^3. On this

basis, the assessment for demolition is based on a dust emission class of 'Small'.

Earthworks: Earthworks activities include site clearance of vegetation, topsoil and field boundaries. Other earthworks are required for establishing the temporary site compound, excavation to enable a suitable sub-base foundation, formation of embankments or cutting works where necessary and landscaping. The total amount of material to be excavated or moved is estimated to be approximately 110,000 tonnes which includes construction material (e.g. sub-base, paving and crushed material to provide the porous hardstanding across the site). There are likely to be between five and 10 heavy earth-moving machines active at any one time. The soil profile comprises a clayey soil which may be prone to suspension when dry due to small particle size. The formation of topsoil mounds would be at a maximum height of 2m. The site area is approximately 90,000m^2. Therefore, the proposed earthworks have been classified as a dust emission class of 'Large'.

Construction: For section 5, it is proposed a new 2.5km bypass be constructed to realign the existing A5025 and circumvent the two sharp radii bends in the vicinity of Llanfaethlu. A new junction will be constructed to maintain access to the properties near the Black Lion pub, a new footpath would be constructed to the west of the highway and a safe crossing point would be constructed across the A5025. In addition, a 22m-long cattle underpass would be constructed. Further construction activities include the construction of the temporary site compound. The construction stage will utilise construction materials such as wet concrete, however, this will be delivered and placed whilst wet. On-site concrete batching and sandblasting activities are not anticipated. The construction material volume for the bypass works is estimated to be approximately 10,500m^3. The construction volume for the underpass is likely to be less than 1,000m^3. Therefore, the total construction material would be less than 25,000m^3. On this basis, the assessment for construction is based on a dust emission class of 'Small'.

Trackout: During the construction phase, the maximum number of daily outward movements of HDVs is anticipated to be approximately 38 in any one day. On this basis, the assessment for trackout is based on a dust emission class of 'Medium'.

Section 7: North of Llanrhyddlad to north of Cefn Coch

Demolition: Demolition activities include the demolition and removal of stone walls (approximately 200m^3) and removal of existing road pavement (approximately 700m^3) which may involve potentially dusty construction material including pavement bituminous materials, stone and mortar. Demolition activities will be at a height of less than 10m above ground level. The total demolition volume is approximately 900m^3. There are on-site crushing and screening activities anticipated. As per IAQM guidance [RD1], the requirement for on-site crushing equipment means it may be considered appropriate to increase the dust emission magnitude by one class. However, the limited demolition activities required mean the assessment for demolition is based on a dust emission class of 'Small'.

Earthworks: Earthworks activities include site clearance of vegetation, topsoil and field boundaries. Other earthworks are required for establishing the temporary site compound, excavation to enable a suitable sub-base foundation, formation of embankments or cutting works where necessary and landscaping. The total amount of material to be excavated or moved is estimated to be approximately 145,000 tonnes which includes construction material (e.g. sub-base and paving and crushed material to provide the porous hardstanding across the site) and there are likely to be between five and 10 heavy earth-moving machines active at any one time. The soil profile comprises a clayey soil which may be prone to suspension when dry due to small particle size. The formation of topsoil mounds would be at a maximum height of 2m. The site area is approximately 90,000m^2. Therefore, the proposed earthworks have been classified as a dust emission class of 'Large'.

Construction: Construction activities include a new 1.3km section of road to bypass the small settlement of Cefn Coch including an overbridge and underpass to facilitate the safe movement of cattle and vehicles. Road surfacing would be installed, along with kerbs and footways. The construction stage will utilise potentially dusty construction materials such as concrete, however, this will be delivered and placed whilst wet. On-site batching and sandblasting activities are not anticipated. The construction material volume for the bypass works is estimated to be approximately 9,800m^3. The construction volume for the overbridge and underpass are likely to be less than 1,000m^3. Therefore, the total construction volume is less than 25,000m^3. On this basis,

the assessment for construction is based on a dust emission class of 'Small'.

Trackout: During the construction phase, the maximum number of daily outward movements of HDVs is anticipated to be approximately 38 in any one day. On this basis, the assessment for trackout is based on a dust emission class of 'Medium'.

Power Station Access Road Junction

Demolition: Demolition activities include the demolition and removal of stone walls (approximately 50m^3) and removal of existing road pavement (approximately 850m^3) which may involve potentially dusty construction material including pavement bituminous materials, stone and mortar. Demolition activities will be at a height of less than 10m above ground level. There are no on-site crushing and screening activities anticipated. The total demolition volume is approximately 900m^3. On this basis, the assessment for demolition is based on a dust emission class of 'Small'.

Earthworks: Earthworks activities include site clearance of vegetation, topsoil and field boundaries. Other earthworks are required for establishing the temporary site compound, excavation to enable a suitable sub-base foundation, formation of embankments or cuttings where necessary and landscaping. The total amount of material to be excavated or moved is estimated to be approximately 25,000 tonnes which includes construction material (e.g. sub-base and paving). There are likely to be between five and 10 heavy earth-moving machines active at any one time. The soil profile comprises a clayey soil which may be prone to suspension when dry due to small particle size. The formation of topsoil mounds would be at a maximum height of 2m. Although the site area is in excess of 10,000m^2 (approximately 36,000m^2), the earthworks equate to the tonnage for a Medium dust emission magnitude. Therefore, on balance, the proposed earthworks were categorised as a dust emission class of 'Medium'.

Construction: The Power Station Access Road Junction comprises a new three-arm roundabout junction which would link the proposed Power Station Access Road to the A5025 north of Cefn Coch. The existing A5025 would require a slight realignment in order to accommodate the new roundabout junction. Road surfacing would be installed, along with

kerbs and footways. Further construction activities include the construction of the temporary site compound. The construction stage will utilise construction materials such as concrete, however, this will be delivered and placed whilst wet. On-site batching and sandblasting activities are not anticipated. The construction volume for the Power Station Access Road Junction works is estimated to be approximately 3,000m^3. On this basis, the assessment for construction is based on a dust emission class of 'Small'.

Trackout: During the construction phase, the maximum number of daily outward movements of HDVs is anticipated to be approximately 25 in any one day. On this basis, the assessment for trackout is based on a dust emission class of 'Medium'.

Summary of dust emission magnitudes

5.1.3 Table 5-1 presents the dust emission magnitudes for each activity and section of the A5025 Off-line Highway Improvements based on the criteria set out in section 3.5.

Table 5-1 Dust emission magnitude

Activity	Dust emission magnitude				
	Section 1	Section 3	Section 5	Section 7	Power Station Access Road Junction
Demolition	Small	Small	Small	Small	Small
Earthworks	Medium	Large	Large	Large	Medium
Construction	Small	Small	Small	Small	Small
Trackout	Medium	Medium	Medium	Medium	Medium

5.2 Step 2B Define the sensitivity of the area

5.2.1 Section 1 of the A5025 Off-line Highway Improvements is bounded by the community of Valley to the west and an area of flat and low-lying farmland to the east. The A5025 and A5 border the site to the north and south respectively. There is a commercial property within 20m to the west of the site and residential properties within 50m to the west of the site. The hourly sequential meteorological data as described in section 3.4 shows that the most frequently occurring wind direction is from the south and south-southwest. This means that, on average, receptors to the north and north-northeast of the section 1 site would be most susceptible to any potential fugitive dust emissions from the activities as described in section 5.1.

5.2.2 Section 3 of the A5025 Off-line Highway Improvements site is bounded by the community of Llanfachraeth to the west and isolated farmsteads and

residential properties to the east. The existing A5025 carriageway borders the site to the north and south. There are four residential properties located within 20m of the western boundary of the section 3 site. The hourly sequential meteorological data as described in section 3.4 shows that the predominant wind directions are from the south and south-southwest. This means that, on average, receptors to the north and north-northeast of the section 3 site would be most susceptible to any potential fugitive dust emissions from the activities as described in section 5.1.

5.2.3 Section 5 bypasses the village of Llanfaethlu with 10 properties and isolated farmsteads within 20m of the site boundary. The grounds of the new Llanfaethlu Primary School are approximately 25m from the western boundary of the nearest section of the new road, at its closest point. The hourly sequential meteorological data as described in section 3.4 shows that the predominant wind direction is from the south-southwest and southwest. This means that, on average, receptors to the north-northeast and northeast of the section 5 site would be most susceptible to any potential fugitive dust emissions from the activities as described in section 5.1.

5.2.4 Section 7 is bounded by the small community of Cefn Coch. There are two residential properties located within 20m of the boundary of the site. The hourly sequential meteorological data as described in section 3.4 shows that the predominant wind directions are from the south-southwest and southwest. This means that, on average, receptors to the north-northeast and northeast of the section 7 site would be most susceptible to any potential fugitive dust emissions from the activities as described in section 5.1.

5.2.5 The Power Station Access Road Junction is located north of section 7 and is bound predominantly by open farmland with the A5025 located along its eastern boundary. There are two residential properties within 100m of the southwestern boundary of the site. The hourly sequential meteorological data as described in section 3.4 shows that the predominant wind directions are from the south-southwest and southwest. This means that, on average, receptors to the north-northeast and northeast of the Power Station Access Road Junction site would be most susceptible to any potential fugitive dust emissions from the activities as described in section 5.1.

5.2.6 Table 5-2 displays the sensitivities of the surrounding area to demolition, earthworks, construction and trackout based on the criteria set out in table 3-7 and table 3-8, numbers of receptors within certain distance bands of the boundary of each section of the A5025 Off-line Highway Improvements (see table 4-1 to table 4-5) and existing PM_{10} concentrations. The IAQM guidance [RD1] recommends that the receptor distance is based on the distance from the source rather than the site boundary. This assessment was undertaken on the basis that all activities (i.e. demolition, earthworks, construction and trackout) take place at the construction boundary of each section. This represents a conservative assumption, as in practice most activities would not take place at the site boundary, thus increasing the distance between the source and the receptor.

Table 5-2 Sensitivity of the area for human receptors at each section

Section	Potential impact	Sensitivity of the surrounding area			
		Demolition	Earthworks	Construction	Trackout[1]
Section 1	Dust soiling	Medium	Medium	Medium	High
	Human health	Low	Low	Low	Low
Section 3	Dust soiling	Medium	Medium	Medium	High
	Human health	Low	Low	Low	Low
Section 5	Dust soiling	High	High	High	High
	Human health	Low	Low	Low	Low
Section 7	Dust soiling	Medium	Medium	Medium	High
	Human health	Low	Low	Low	Low
Power Station Access Road Junction	Dust soiling	Low	Low	Low	Medium
	Human health	Low	Low	Low	Low

Note 1: As site access locations and haul routes for each section are still to be finalised, a High sensitivity for dust soiling impacts has been assigned for trackout activities at sections 1, 3, 5 and 7 and a Medium sensitivity has been assigned for trackout activities at the Power Station Access Road Junction. For human health impacts, a Low sensitivity has been assigned for all sections of the proposed scheme.

5.2.7 Table 5-2 shows that, based on the number of receptors within proximity of the new road sections, the sensitivity of the area for dust soiling impacts is generally highest for section 5 (High) for all activities, with section 1, 3, 5 and 7 categorised as Medium or High for each activity. The sensitivity of the area for the Power Station Access Road Junction is mostly Low, with Medium assigned for trackout. Based on the number of receptors in proximity of each road section and the background PM_{10} concentration, the sensitivity of the area for human health impacts is categorised as Low for all stages of the development for all sections of the A5025 Off-line Highway Improvements.

5.2.8 Table 5-3 displays the sensitivities of the assessed ecological site to earthworks, construction and trackout activities based on the proximity of the site and the value of the site's ecological assets and in line with the IAQM guidance [RD1]. The sensitivity of the ancient woodland is categorised as Low for all relevant activities.

Table 5-3 Sensitivity of the assessed ecological sites

Section	Ecological site	Sensitivity of the ecological sites			
		Demolition	Earthworks	Construction	Trackout[1]
Section 7	Ancient Woodland (ID 26051)	Low	Low	Low	Low

Note 1: As site access locations and haul routes are still to be finalised, a Low sensitivity for trackout activities has been assigned for the parcel of Ancient Woodland as per IAQM guidance [RD1]

5.3 Step 2C – Define the risk of impacts

5.3.1 Using the dust emission magnitudes for the various activities in table 5-1 and the sensitivity of the area provided in table 5-2, the risks associated with each activity at each section of the A5025 Off-line Highway Improvements are provided in table 5-4 for dust soiling and human health impacts. For the assessed ecological site, the dust emission magnitudes in table 5-1 were combined with the sensitivity of the ancient woodland provided in table 5-2 to provide the associated risk. This is also provided in table 5-4. The highest risk determined for each activity for the A5025 Off-line Highway Improvements is also presented in table 5-4.

Table 5-4 Dust risk at human and ecological receptors

Section	Potential impact	Risk			
		Demolition	Earthworks	Construction	Trackout
Section 1	Dust soiling	Low risk	Medium risk	Low risk	Medium risk
	Human health	Negligible risk	Low risk	Negligible risk	Low risk
	Ecological	N/A			
Section 3	Dust soiling	Low risk	Medium risk	Low risk	Medium risk
	Human health	Negligible risk	Low risk	Negligible risk	Low risk
	Ecological	N/A			
Section 5	Dust soiling	Medium risk	High risk	Low risk	Medium risk
	Human health	Negligible risk	Low risk	Negligible risk	Low risk
	Ecological	N/A			
Section 7	Dust soiling	Low risk	Medium risk	Low risk	Medium risk
	Human health	Negligible risk	Low risk	Negligible risk	Low risk
	Ecological	Negligible risk	Low risk	Negligible risk	Low risk
Power Station Access Road Junction	Dust soiling	Negligible risk	Low risk	Negligible risk	Low risk
	Human health	Negligible risk	Low risk	Negligible risk	Low risk
	Ecological	N/A			
Highest dust soiling risk		**Medium risk**	**High risk**	**Low risk**	**Medium risk**
Highest human health risk		**Negligible risk**	**Low risk**	**Negligible risk**	**Low risk**
Highest ecological risk		**Negligible risk**	**Low risk**	**Negligible risk**	**Low risk**

5.3.2 The results in table 5-4 indicate that for the A5025 Off-line Highway Improvements, there would be a High risk to sensitive human receptors with regard to dust soiling effects from earthworks activities, a Medium risk from demolition and trackout activities and a Low risk from construction activities. It would therefore be necessary to adopt an appropriate level of good practice mitigation measures to reduce the risks of causing a significant effect to amenity or human health.

5.3.3 For human health effects, although the results in table 5-4 indicate that there would be Low to Negligible risk to sensitive receptors, the proposed mitigation measures would be developed from the High risk identified for dust soiling effects. This would also prevent or reduce potential dust or PM_{10} (and $PM_{2.5}$) emissions which are associated with health effects such as exacerbating existing conditions including asthma and other lung conditions.

5.3.4 The results in table 5-4 indicate that there would potentially be a Low risk for the ecological receptor with regard to dust soiling effects from earthworks and trackout activities and a Negligible risk from demolition and construction activities. Although identified as a Low risk, it will be necessary to put mitigation measures in place to reduce the potential for ecological impacts to occur due to these activities.

6 Step 3 A5025 Off-line Highway Improvements – specific mitigation

6.1 Recommended mitigation measures

6.1.1 The results in section 5 of this report indicate that the A5025 Off-line Highway Improvements works are a High risk for dust soiling impacts at sensitive human receptors and a Low risk for human health impacts. For ecological receptors, there would be a Low risk for dust soiling affecting vegetation. Good practice mitigation measures would be needed to reduce the potential for dust emissions to lead to significant effects in the vicinity of the A5025 Off-line Highway Improvements. The suggested good practice mitigation measures which should be adopted for the A5025 Off-line Highway Improvements are set out below.

6.1.2 The mitigation measures have been derived from those specified in the IAQM guidance [RD1] and where possible at this stage, adapted to the activities associated with construction of the A5025 Off-line Highway Improvements. Measures such as those specified in the guidance would normally be sufficient to reduce construction dust nuisance, risks to human health or effects on ecological sites to a not significant effect. These measures are listed in table 6-1 to table 6-6 with a recommendation as to whether or not they should be applied based on the risk levels identified in the dust assessment. Some specific comments or observations have been added or amendments to the text undertaken, where appropriate. Some of the mitigation measures listed within IAQM guidance for trackout (mitigation numbers 44, 46, 47 and 48) were considered to represent general on-site activities and operation of haul roads, and were moved to the 'Operations' section (see table 6-2) of the general mitigation measures required for all sites. The general mitigation measures were specified based on the highest risk category (i.e. based on the High risk to human receptors from dust soiling) as recommended by IAQM guidance [RD1]. It may not be necessary to adopt all the good practice mitigation measures set out below at some sections of the A5025 Off-line Highway Improvements (i.e. for those sections where the risks were found to be negligible or low, see table 5-4).

6.1.3 As specified above, the measures to control dust emissions taken forward from this assessment, derived from the highly recommended or desirable measures (see table 6-1 to table 6-6) and the monitoring of the effectiveness of the mitigation, would be included in the air quality management strategies set out in the Wylfa Newydd CoCP (Application Reference Number: 8.6) and A5025 Off-Line Highway Improvements sub-CoCP (Application Reference Number: 8.12). These would be delivered during construction.

6.1.4 When applying the mitigation measures, IAQM guidance [RD1] states the following:

> "The most important aspects of the Dust Management Plan are assigning responsibility for dust management to an individual member of staff of the principal contractor, training staff to understand the importance of the issue,

and communicating with the local community. Good dust management practices implemented at high risk sites have resulted in no or minimal complaints, which illustrates the value of the recommended approach."

6.1.5 The mitigation measures set out in table 6-1 to table 6-6 do not specifically include assigning responsibility for dust management to a staff member or training staff on the importance of dust management and awareness of dust issues. However, these would be included within the proposed mitigation measures.

6.1.6 For use of on-site crushing equipment required during demolition activities (for example at section 7 of the A5025 Off-line Highway Improvements), all crushing equipment would be designed and operated in accordance with the most recent version of the Process Guidance Note 3/16 [RD10] for mobile crushing and screening, where relevant.

Table 6-1 Mitigation for the overall scheme: communications

Mitigation measure	Overall scheme: Highly recommended / Desirable / Not required
1. Develop and implement a stakeholder communications plan that includes community engagement before work commences on the A5025 Off-line Highway Improvements site.	Highly recommended
2. Display the name and contact details of person(s) accountable for air quality and dust issues on the respective A5025 Off-line Highway Improvements site boundaries. This may be the environment manager/engineer or the site manager.	Highly recommended
3. Display the head or regional office contact information.	Highly recommended *Display the Horizon Enquiries number*

Table 6-2 Mitigation for the overall scheme: dust management

Mitigation measure	Overall scheme: Highly recommended / Desirable / Not required
4. Develop dust mitigation and control measures as part of the air quality management strategies as set out in the Wylfa Newydd CoCP (Application Reference Number: 8.6) and A5025 Off-Line Highway Improvements sub-CoCP (Application Reference Number: 8.12) and implement these on-site through an appropriate management plan which is derived from the approved Wylfa Newydd CoCP (Application Reference Number: 8.6) and A5025 Off-Line Highway Improvements sub-CoCP (Application Reference Number: 8.12). This may also include measures to control other pollutant emissions. The level of detail will depend on the risk, and should include as a minimum the highly recommended measures in this assessment. The desirable measures should be included as appropriate for the respective A5025 Off-line Highway Improvements sites.	Highly recommended
Site management	
5. Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner and record the measures taken.	Highly recommended
6. Make the complaints log available to the local authority when asked.	Highly recommended
7. Record any exceptional incidents that cause dust and/or air emissions, either on-site or off-site, and the action taken to resolve the situation in the log book.	Highly recommended
8. Hold regular liaison meetings with other high-risk construction sites within 500m of the respective A5025 Off-line Highway Improvements sites, to ensure plans are co-ordinated and dust and particulate matter emissions are minimised. It is important to understand the interactions of the off-site transport/deliveries which might be using the same strategic road network routes.	Highly recommended

Mitigation measure	Overall scheme: Highly recommended / Desirable / Not required
Monitoring	
9. Undertake daily on-site and off-site inspection, where receptors (including roads) are nearby, to monitor dust and record inspection results, and make the log available to the local authority when asked. This should include regular dust soiling checks of surfaces such as street furniture, cars and window sills within 100m of the respective A5025 Off-line Highway Improvements site boundaries, with cleaning to be provided if necessary.	Highly recommended
10. Carry out regular site inspections to monitor compliance with the DAQMP, record inspection results and make an inspection log available to the local authority when asked.	Highly recommended
11. Increase the frequency of site inspections by the person accountable for air quality and dust issues on-site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions.	Highly recommended
12. Agree dust deposition, dust flux or real-time PM_{10} continuous monitoring locations with the local authority. Where possible, commence baseline monitoring at least three months before work commences on-site or, if at a large site, before work on a phase commences. Further guidance is provided by IAQM [RD11] on monitoring during demolition, earthworks and construction (see section 6.2).	Highly recommended
Preparing and maintaining the site	
13. Plan site layout so that machinery and dust-causing activities are located away from receptors, as far as is possible.	Highly recommended
14. Erect solid screens or barriers around dusty activities, or the respective A5025 Off-line Highway Improvements site boundaries, which are at least as high as any stockpiles on-site.	Highly recommended
15. Fully enclose site or specific operations where there is a high potential for dust production and the respective A5025 Off-line Highway Improvements site boundaries are active for an extensive period.	Highly recommended

Mitigation measure	Overall scheme: Highly recommended / Desirable / Not required
16. Avoid site runoff of water or mud.	Highly recommended
17. Keep the respective A5025 Off-line Highway Improvements sites fencing, barriers and scaffolding clean using wet methods.	Highly recommended
18. Remove materials that have a potential to produce dust from the respective A5025 Off-line Highway Improvements site as soon as possible, unless being re-used on-site. If they are being re-used on-site, cover as described below.	Highly recommended
19. Cover, seed or fence stockpiles to prevent wind whipping.	Highly recommended
Operating vehicles/machinery and sustainable travel	
21. Ensure all vehicles switch off engines when stationary - no idling vehicles.	Highly recommended
22. Avoid the use of diesel or petrol powered generators and use mains electricity or battery powered equipment where practicable.	Highly recommended
23. Impose and signpost a maximum speed limit of 15mph on surfaced and 10mph on unsurfaced haul roads and work areas (if long haul routes are required these speeds may be increased with suitable additional control measures provided, subject to the approval of the nominated undertaker and with the agreement of the local authority, where appropriate).	Highly recommended

Mitigation measure	Overall scheme: Highly recommended / Desirable / Not required
24. Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials.	Highly recommended *As part of the DCO application, the measures to manage/mitigate the effects of constructing the A5025 Off-line Highway Improvements will be covered within the traffic and transport management strategy as set out in the wider Wylfa Newydd CoCP (Application Reference Number: 8.6).*
25. Implement a Travel Plan that supports and encourages sustainable travel (public transport, cycling, walking and car sharing).	Highly recommended *As part of the DCO application, the measures to manage/mitigate the effects of constructing the A5025 Off-line Highway Improvements will be covered within the traffic and transport management strategy as set out in the wider Wylfa Newydd CoCP (Application Reference Number: 8.6).*

Mitigation measure	Overall scheme: Highly recommended / Desirable / Not required
Operations	
26. Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems.	Highly recommended
27. Ensure an adequate water supply on the respective A5025 Off-line Highway Improvements site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate.	Highly recommended
28. Use enclosed chutes and conveyors and covered skips.	Highly recommended
29. Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate.	Highly recommended
30. Ensure equipment is readily available on-site to clean any dry spillages, and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods.	Highly recommended
44. Avoid dry sweeping of large areas.	Highly recommended
46. Inspect on-site haul routes for integrity and instigate any necessary repairs to the surface as soon as reasonably practicable.	Highly recommended
47. Record all inspections of haul routes and any subsequent action in a site log book.	Highly recommended
48. Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers, and regularly cleaned.	Highly recommended
Waste management	
31. Avoid bonfires and burning of waste materials.	Highly recommended

Table 6-3 Mitigation measures specific to demolition for the overall scheme

Mitigation measure	Overall scheme: Highly recommended / Desirable / Not required
32. Soft strip inside buildings before demolition (retaining walls and windows in the rest of the building where possible, to provide a screen against dust).	Not required *The demolition of buildings is not anticipated*
33. Ensure effective water suppression is used during demolition operations. Hand-held spays are more effective than hoses attached to equipment as the water can be directed to where it is needed. In addition, high-volume water suppression systems, manually controlled, can produce fine water droplets that effectively bring the dust particles to the ground.	Highly recommended
34. Avoid explosive blasting, using appropriate manual or mechanical alternatives.	Highly recommended
35. Bag and remove any biological debris or damp down such material before demolition.	Highly recommended

Table 6-4 Mitigation measures specific to earthworks for the overall scheme

Mitigation measure	Overall scheme: Highly recommended / Desirable / Not required
36. Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable.	Highly recommended
37. Use hessian fabric, mulches or tackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as practicable.	Highly recommended
38. Only remove the cover in small areas during work and not all at once.	Highly recommended

Table 6-5 Mitigation measures specific to construction for the overall scheme

Mitigation measure	Overall scheme: Highly recommended / Desirable / Not required
39. Avoid scabbling (roughening of concrete surfaces) if possible.	Desirable
40. 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.	Desirable
41. 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.	Not required
42. For smaller supplies of fine powder materials, ensure bags are sealed after use and stored appropriately to prevent dust.	Not required *Recommended as best practice*

Table 6-6 Mitigation measures specific to trackout for the overall scheme

Mitigation measure	Overall scheme: Highly recommended / Desirable / Not required
43. Use water-assisted dust sweeper(s) on the access and local roads to remove, as necessary, any material tracked out of the site. This may require the sweeper being continuously in use.	Highly recommended
45. Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport.	Highly recommended
49. Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable).	Highly recommended
50. Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits.	Highly recommended
51. Access gates to be located at least 10m from receptors where possible.	Highly recommended

6.2 Air quality monitoring

6.2.1 As the highest risk for the A5025 Off-line Highway Improvements has been categorised as High, an appropriate monitoring survey, as recommended in table 6-2, would be implemented to form a key part of the overall dust mitigation and management process. However, consideration should be given to the predicted risk for each section prior to the development of an air quality monitoring scope.

6.2.2 The approach and scope of the air quality monitoring survey would be informed by the IAQM guidance on monitoring near demolition and construction sites [RD11], which states that:

"Monitoring may be carried out in order to fulfil a number of objectives:

- *to ensure that the construction activities do not give rise to any exceedances of the air quality objectives/limit values for PM_{10} and/or $PM_{2.5}$, or any exceedances of recognised threshold criteria for dust deposition/soiling;*
- *to ensure that the agreed mitigation measures to control dust emissions are being applied and are effective;*
- *to provide an "alert" system with regard to increased emissions of dust, and a trigger for cessation of site works or application of additional abatement controls;*
- *to provide a body of evidence to support the likely contribution of the site works in the event of complaints; and*
- *to help to attribute any high levels of dust to specific activities on-site in order that appropriate action may be taken."*

6.2.3 Continuous automatic monitoring of ambient particulate concentrations would be appropriate for sections where a High risk was identified. In this case, monitoring would be proposed at one location in the vicinity of section 5 of the Off-line Highway Improvements at Llanfaethlu. Depending on the selected technique, this may include monitoring of total suspended particulates, PM_{10} and $PM_{2.5}$.

6.2.4 The monitoring would also include dust deposition monitoring using passive dust deposition gauges at all sections of the A5025 Off-line Highway Improvements. Supplementary monitoring of weather conditions including wind speed, wind direction and rainfall would be undertaken.

6.2.5 The scope of the particulates and dust deposition monitoring and the appropriate thresholds for identifying potential dust soiling nuisance and air quality effects would be included as part of the air quality management strategies set out in the Wylfa Newydd CoCP (Application Reference Number: 8.6) and A5025 Off-line Highway Improvements sub-CoCP (Application Reference Number: 8.12).

6.2.6 The results of the continuous particulate monitoring (based on the real-time measurements) and dust deposition monitoring (based on the fortnightly or monthly dust deposition sampling results) would be used to identify if the

agreed thresholds have been exceeded. If the agreed thresholds are exceeded, then further investigation would be carried out to determine if additional mitigation is required to reduce dust emissions from site activities (or if site activities need to be altered or temporarily suspended).

7 Step 4 Determine significant effects

7.1.1 The assessment has identified that there are potentially sensitive dust receptors located in close proximity to the A5025 Off-line Highway Improvements (see figure 9-1, figure 9-2 and figure 9-3), including residential properties and a primary school in Llanfaethlu. There are numerous high sensitivity receptors located within 100m of the respective site boundaries (see table 4-1 to table 4-5). The receptor locations are reported from the respective site boundaries and not the actual location of activities with the potential to generate dust and the distances used in the assessment are therefore cautious, as activities with high potential to generate dust (including PM_{10} and $PM_{2.5}$) would be offset from the respective boundaries. The sensitivity of the area, which takes into consideration the number and distance of receptors from the site and baseline conditions, are summarised in table 5-2 as being Low sensitivity with respect to emissions of PM_{10} and $PM_{2.5}$ and Low, Medium and High sensitivity with respect to changes in dust deposition rates and associated effects on amenity.

7.1.2 Consideration of the meteorological conditions experienced within the respective study areas (section 3.4) has identified that there is the potential for dust generated onsite to be blown towards receptors on all sides of the respective A5025 Off-line Highway Improvements sites, receptors located to the north and northeast will be downwind more frequently. The scale of the proposed works has been used to judge the dust emission magnitude as being between Small and Large magnitude for the activities associated with the construction of the A5025 Off-line Highway Improvements.

7.1.3 Based on the matrix of relationships between sensitivity of the area and the dust emission magnitude, it is considered that the proposed demolition, earthworks, and trackout activities are predicted to be Negligible or Low risk with regard to human health (see table 5-4) as there is limited potential for emissions of PM_{10} and $PM_{2.5}$ to increase baseline concentrations to a value that is above the air quality objective values set for the protection for human health. For potential dust soiling effects at human receptors, there is predicted to be a High risk from earthworks and a Medium risk from demolition and trackout (see table 5-4). There is the potential for infrequent, short term episodes when baseline dust deposition rates could be increased by an amount that residents could perceive. There is a Low risk from construction activities to cause significant dust soiling effects.

7.1.4 The adoption of good practice dust mitigation measures to manage the generation of emissions at source will therefore be required, as proposed in the air quality management strategies set out in the Wylfa Newydd CoCP (Application Reference Number: 8.6) and A5025 Off-Line Highway Improvements sub-CoCP (Application Reference Number: 8.12).

7.1.5 The A5025 Off-line Highway Improvements encompasses a large area, but not unusual in scale in comparison with other major infrastructure projects. There are mitigation methods already available that have been successfully applied on other schemes to manage emissions of dust so that significant

off-site effects have not occurred. Such measures are considered to be no more than normal good practice that would be adopted by any contractor meeting the requirements of the Wylfa Newydd CoCP (Application Reference Number: 8.6) and A5025 Off-Line Highway Improvements sub-CoCP (Application Reference Number: 8.12). It is considered that there are no potentially dust generating activities proposed that could not be managed using normal good practices [RD1] so as to prevent significant effects at any off-site receptor, including those located within 20m of the boundary.

7.1.6 This should be considered in conjunction with the analysis of local climatic conditions (see section 3.4) which shows that the likelihood of dust being emitted by wind erosion and being transported to off-site receptor locations is relatively low.

7.1.7 For the single assessed ecological receptor (ancient woodland), there is predicted to be a Low risk for predicted impacts from earthworks and trackout activities and a Negligible risk from demolition and construction activities.

7.1.8 IAQM guidance [RD1] notes that with the application of good practice mitigation measures of the type available for use on this project the environmental effect will not be significant at any off-site receptor. IAQM guidance [RD1] also notes that, even with a rigorous package of mitigation measures in place, such as those taken forward from this assessment and included as part of the air quality management strategies set out in the Wylfa Newydd CoCP (Application Reference Number: 8.6) and A5025 Off-Line Highway Improvements sub-CoCP (Application Reference Number: 8.12), occasional impacts may occur. The Wylfa Newydd CoCP (Application Reference Number: 8.6) and A5025 Off-Line Highway Improvements sub-CoCP (Application Reference Number: 8.12) provides a framework by which the level of mitigation is adapted to respond proactively to the changing risk of dust emissions, so that significant effects are prevented.

8 References

Table 8-1 Schedule of references

ID	Reference
RD1	Institute of Air Quality Management (IAQM). 2016. *Guidance on the Assessment of Dust from Demolition and Construction Version 1.1*. London: Institute of Air Quality Management.
RD2	British Standards Institution. 1994. *BS 6069-2 Characterisation of Air Quality. Glossary*, 94th Edition, 15 August 15, 1994. London: British Standards Institution.
RD3	The Scottish Office. 1998. *Planning Advice Note PAN 50 Annex B, Controlling the Environmental Effects of Surface Mineral Workings, Annex B: The Control of Dust at Surface Mineral Workings*. Edinburgh: The Scottish Office Development Department.
RD4	Arup. 1995. *The Environmental Effects of Dust from Surface Mineral Workings*. PECD 7/1/468. Report on behalf of the Department of the Environment. London: HMSO
RD5	Isle of Anglesey County Council (IACC). *2014 Air Quality Progress Report for Isle of Anglesey County Council*. Isle of Anglesey County Council, Llangefni.
RD6	The Isle of Anglesey County Council. 2017. Air quality monitoring data provided in an email from the IACC on 08 March 2017.
RD7	Vallack, H. W. Shillito, D. E. 1998. Suggested guidelines for deposited ambient dust. *Atmospheric Environment*, Vol. 32, No. 16, 08.1998, pp. 2737-2744.
RD8	Environment Agency. 2003. *Assessment of noise disturbance upon birds and dust on vegetation and invertebrate species*. Report Ref. 6502-E.075EA.
RD9	Cheffings, C.M. and Farrell, L. (Eds.), Dines, T.D., Jones, R.A., Leach, S.J., McKean, D.R., Pearman, D.A., Preston, C.D., Rumsey, F.J., Taylor, I. 2005. *The Vascular Plant Red Data List for Great Britain*. Species Status 7: 1-116. Peterborough: Joint Nature Conservation Committee.
RD10	Department for Environment, Food and Rural Affairs. 2012. *Process Guidance Note 3/16(12) Statutory guidance for mobile crushing and screening*, September 2012.
RD11	Institute of Air Quality Management. 2012. *Guidance on Air Quality Monitoring in the Vicinity of Demolition and Construction Sites*. London: Institute of Air Quality Management.

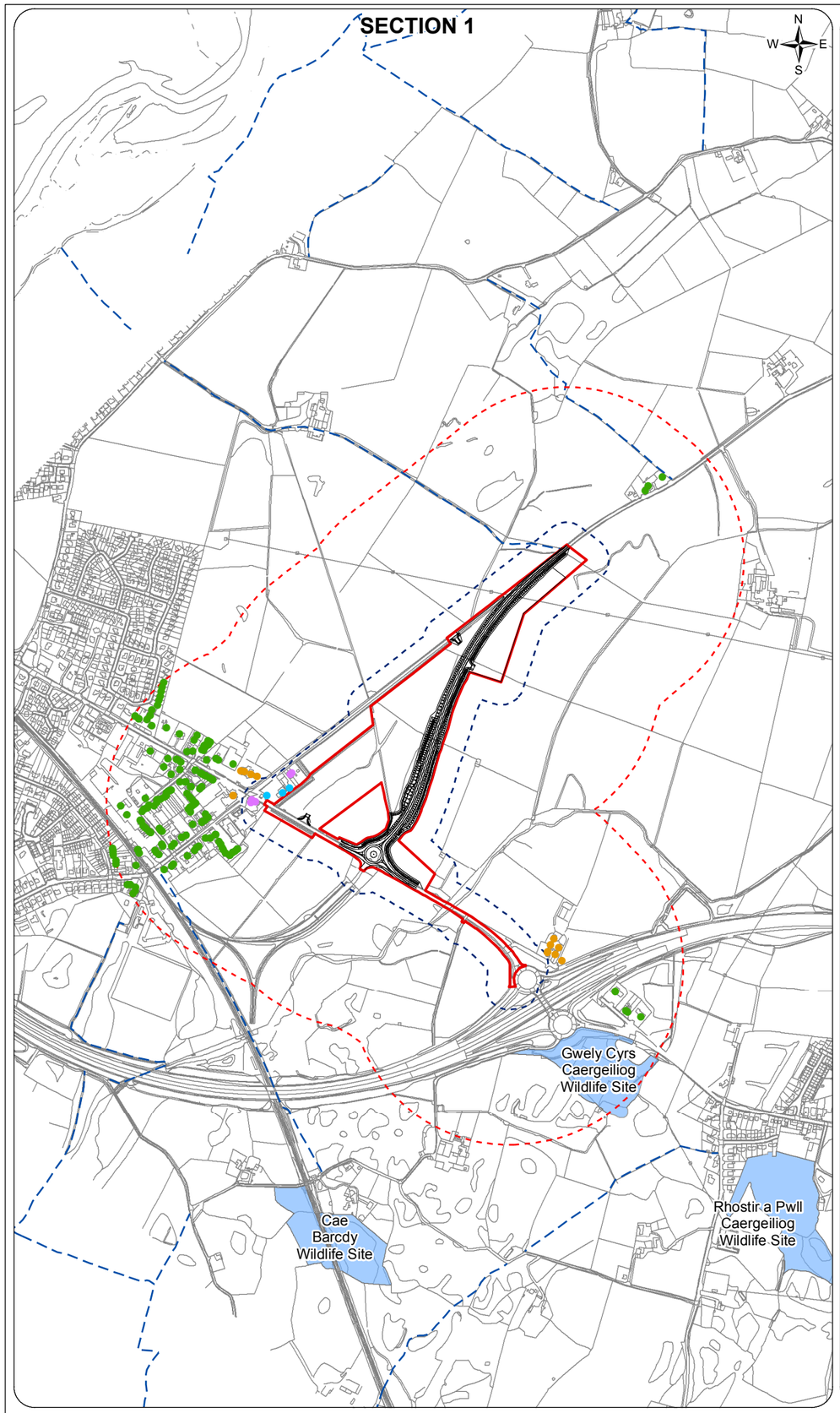
9 Figures

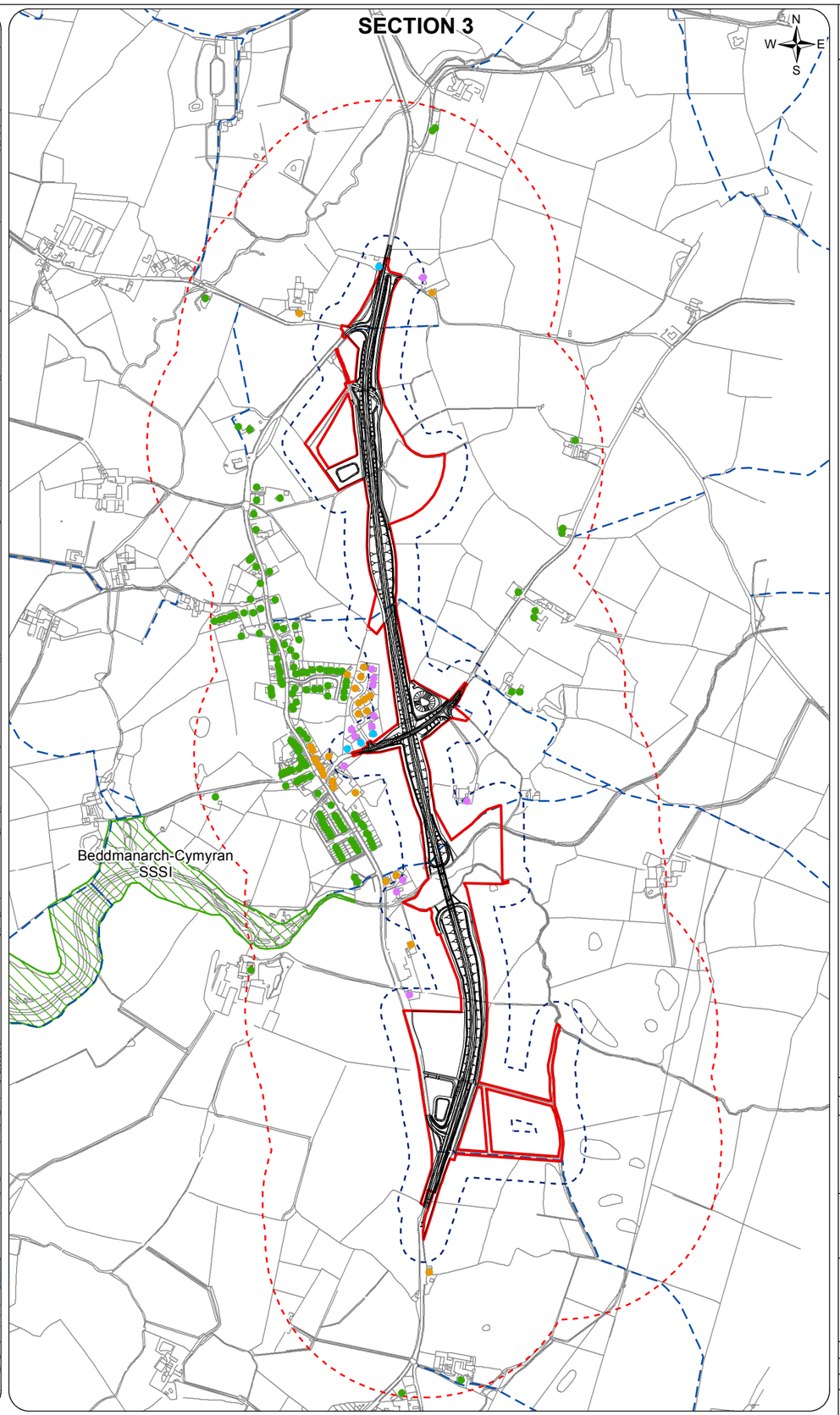
Figure 9-1 Construction dust assessment - study area for human and ecological receptors (Section 1 and 3)

Figure 9-2 Construction dust assessment – study area for human and ecological receptors (Section 5 and 7)

Figure 9-3 Construction dust assessment- study area for human and ecological receptors (Power Station Access Road Junction)

FIGURE 9-1





Legend

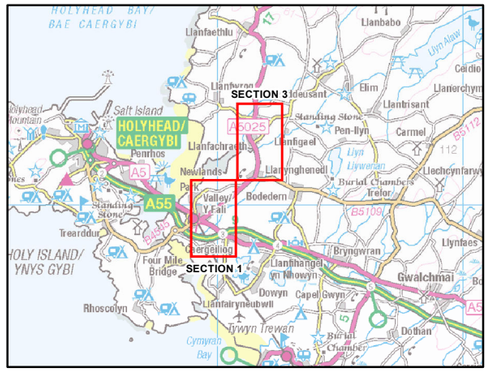
- A5025 Off-line Highway Improvements order limit
- Construction dust assessment study area for ecological receptors (50m from the Off-line section)
- Construction dust assessment study area for human receptors (350m from the Off-line section)
- A5025 Off-line Highway Improvements section
- Public Rights of Way

A5025 Off-line Highway Improvements sections 1 & 3 human receptor locations

- 0-20m
- 20-50m
- 50-100m
- 100-350m

Ecological receptor

- Site of Special Scientific Interest (SSSI)
- Wildlife Site



Rev.	Date	Purpose of revision	Drawn	Check'd	Rev'd	Appr'd
1.0	MAR 18	DCO submission	HNPWL	HNPWL	HNPWL	HNPWL

Client: HORIZON NUCLEAR POWER

Project: WYLFA NEWYDD PROJECT
ENVIRONMENTAL STATEMENT

Drawing Title: CONSTRUCTION DUST ASSESSMENT STUDY AREA AND HUMAN AND ECOLOGICAL RECEPTORS (SECTION 1 AND 3)

Scale @ A3	1:11,500	DO NOT SCALE
Jacobs No.	60PO8077	
Client No.		

Drawing No. 60PO8077_DCO_VOL_G_APP_05_01_09_01

0 50 100 200 300 400 500 Metres

FIGURE 9-2

SECTION 5

SECTION 7

Llyn Garreg-Lwyd SSSI

Coed Carreglwyd Wildlife Site

Ancient woodland (26028)

Llyn Llygeirian SSSI

N W E S

Legend

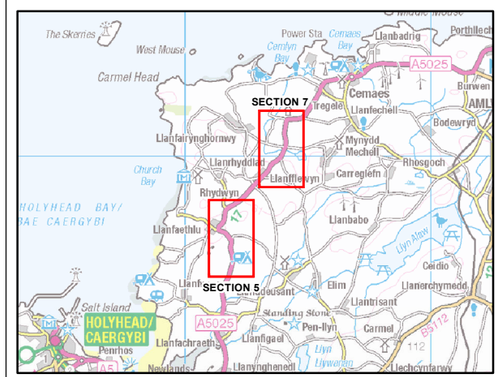
- A5025 Off-line Highway Improvements order limit
- Construction dust assessment study area for ecological receptors (50m from the Off-line section)
- Construction dust assessment study area for human receptors (350m from the Off-line section)
- A5025 Off-line Highway Improvements section
- Public Rights of Way

A5025 Off-line Highway Improvements sections 5 & 7 human receptor locations

- 0-20m
- 20-50m
- 50-100m
- 100-350m

Ecological receptor

- Site of Special Scientific Interest (SSSI)
- Wildlife Site
- Ancient woodland



Rev.	Date	Purpose of revision	Drawn	Check'd	Rev'd	Appr'd
1.0	MAR 18	DCO submission	HNPWL	HNPWL	HNPWL	HNPWL

Client: HORIZON NUCLEAR POWER

Project: WYLFA NEWYDD PROJECT
ENVIRONMENTAL STATEMENT

Drawing Title: CONSTRUCTION DUST ASSESSMENT STUDY AREA AND HUMAN AND ECOLOGICAL RECEPTORS (SECTION 5 AND 7)

Scale @ A3	1:11,500	DO NOT SCALE
Jacobs No.	60PO8077	
Client No.		

Drawing No. 60PO8077_DCO_VOL_G_APP_05_01_09_02

Licence information for additional legend items can be found in Appendix A1-1, Application Reference Number: 6.1.8

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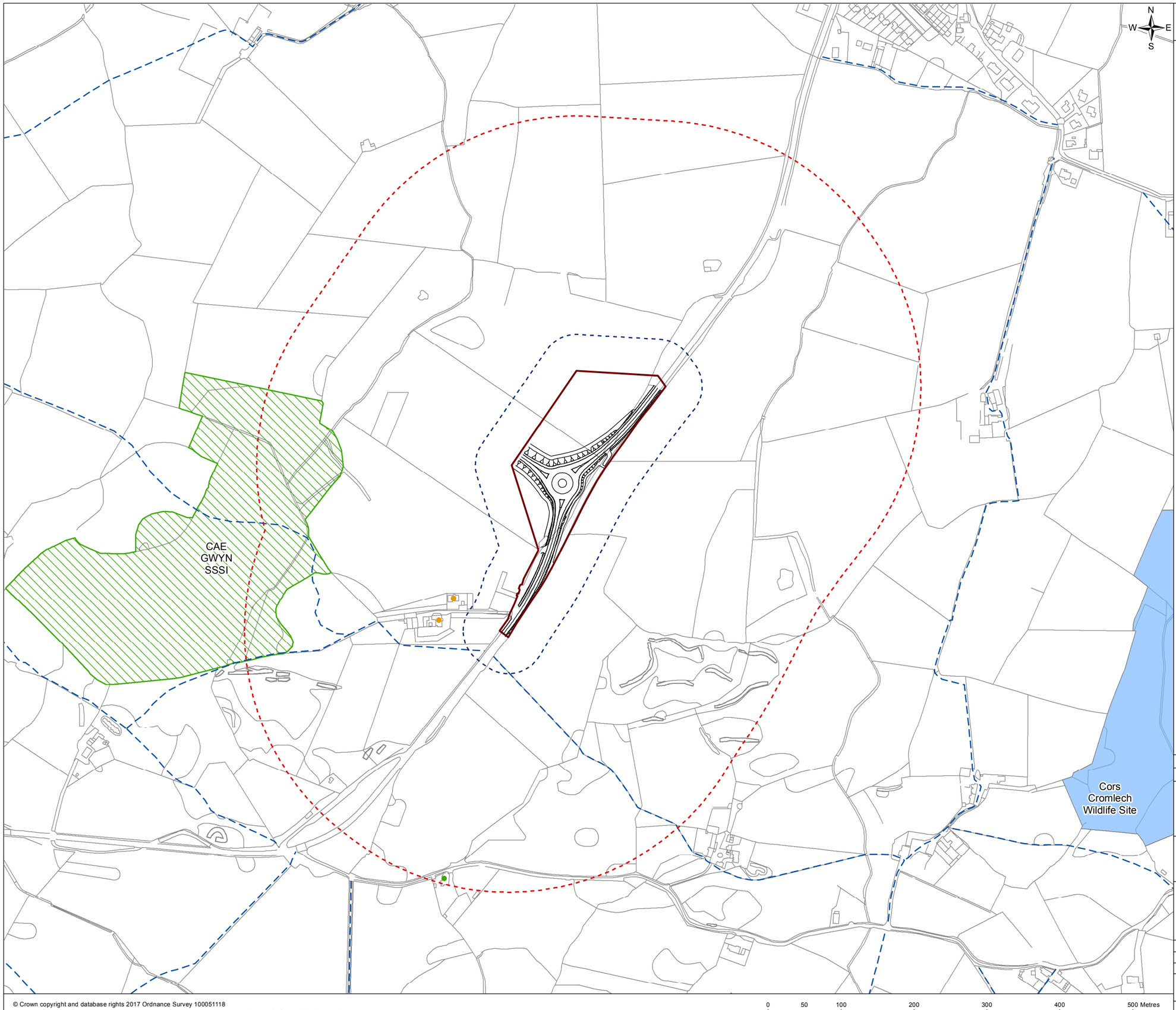
FIGURE 9-3



Legend

- Work package 1J
- Construction dust assessment study area for ecological receptors (50m from the Power Station access route junction)
- Construction dust assessment study area for human receptors (350m from the Power Station access route junction)
- A5025 Off-line Highway Improvements
- Public Rights of Way

Human receptor locations

- 50-100m
- 100-350m

Ecological receptor

- Site of Special Scientific Interest (SSSI)
- Wildlife Site

Rev.	Date	Purpose of revision	Drawn	Check'd	Rev'd	Appr'd
1.0	MAR 18	DCO submission	HNPWL	HNPWL	HNPWL	HNPWL

Client

HORIZON NUCLEAR POWER

Project

WYLFA NEWYDD PROJECT
ENVIRONMENTAL STATEMENT

Drawing Title

CONSTRUCTION DUST ASSESSMENT STUDY AREA
AND HUMAN AND ECOLOGICAL RECEPTORS
(POWER STATION ACCESS ROAD JUNCTION)

Scale @ A3	1:5,000	DO NOT SCALE
Jacobs No.	60PO8077	
Client No.		

Drawing No. 60PO8077_DCO_VOL_G_APP_05_01_09_03

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