MORAY WEST
OFFSHORE WINDFARM

# Onshore Transmission Infrastructure Environmental Impact Assessment (EIA)

Moray Offshore Windfarm (West) Limited

## Chapter 11 Air Quality

## Table of Contents



## List of Tables

## Figures

See EIA Report Volume 3.

## Appendices

See EIA Report Volume 4.

| Acronyms | |
|---|---|
| **Acronym** | **Expanded Term** |
| AADT | Annual Average Daily Traffic |
| AC | Aberdeenshire Council |
| AQAP | Air Quality Action Plan |
| AQMA | Air Quality Management Area |
| AQO | Air Quality Objective |
| AQS | Air Quality Standard |
| BS | British Standard |
| CTMP | Construction Traffic Management Plan |
| Defra | Department for Environment, Food and Rural Affairs |
| DMP | Dust Management Plan |
| DMRB | Design Manual for Roads and Bridges |
| EIA | Environmental Impact Assessment |
| EPUK | Environmental Protection UK |
| EU | European Union |
| HDV | Heavy duty vehicle |
| HGV | Heavy goods vehicle |
| IAQM | Institute of Air Quality Management |
| LAQM | Local Air Quality Management |
| LDP | Local Development Plan |
| LDV | Light duty vehicle |
| MC | Moray Council |
| Moray West | Moray Offshore Windfarm (West) Limited |
| NO2 | Nitrogen dioxide |
| NOx | Nitrogen oxide |
| NPF3 | National Planning Framework 3 |
| NRMM | Non-Road Mobile Machinery |
| OnTI | Moray West Onshore Transmission Infrastructure |
| PAB | Planning Application Boundary |

| Acronyms | |
|---|---|
| **Acronym** | **Expanded Term** |
| PM | Particulate matter |
| PM2.5 | Particulate matter (<2.5 µm) |
| PM10 | Particulate matter (>10 µm) |
| SSSI | Site of Special Scientific Interest |
| UK | United Kingdom |

| Glossary of Terms | |
|---|---|
| **Term** | **Definition** |
| Air Quality Management Area | If a Local Authority identifies any locations within its boundaries where the Air Quality Objectives are not likely to be achieved, it must declare the area as an Air Quality Management Area. The area may encompass just one or two streets, or it could be much bigger. The Local Authority is subsequently required to put together a plan to improve air quality in that area - a Local Air Quality Action Plan. |
| Air Quality Objectives | The Air Quality Objectives are policy targets generally expressed as a maximum ambient concentration to be achieved, either without exception or with a permitted number of exceedances, within a specified timescale. The Objectives are set out in the UK Government's Air Quality Strategy for the key air pollutants. |
| Annual Mean | The annual mean is the average concentration of a pollutant measured over one year. This is normally for a calendar year, but some species are reported for the period April to March, which is known as a pollution year. This period avoids splitting a winter season between two years, which is useful for pollutants that have higher concentrations during the winter months. |
| Automatic Monitoring | Monitoring is usually termed 'automatic' or 'continuous' if it produces real-time measurements of pollutant concentrations. Automatic fixed point monitoring methods exist for a number of pollutants, providing high resolution data averaged over very short time periods. |
| Construction | Used both to refer to the whole construction phase of a project, and more specifically to refer to an activity involved in the provision of a new structure. |
| Data Capture | 'Data capture' is the term given to the percentage of measurements for a given period that were validly measured. |
| Demolition | An activity involved with the removal of an existing structure or structures. |
| Diffusion tubes | Passive diffusion tube samplers collect nitrogen dioxide and other pollutants by molecular diffusion along an inert tube to an efficient chemical absorbent. After exposure for a known time, the absorbent material is chemically analysed and the concentration calculated. |
| Dispersion modelling | Dispersion modelling is a means of calculating air pollution concentrations using information about the pollutant emissions and the nature of the atmosphere. |
| Earthworks | The processes of soil-stripping, ground-levelling, excavation and landscaping. |

| Glossary of Terms | |
|---|---|
| **Term** | **Definition** |
| The EIA Regulations | The Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2017. |
| EU Directives | The European Union has been legislating to control emissions of air pollutants and to establish air quality objectives since the early 1970s. European Directives on ambient air quality require the UK to undertake air quality assessment and to report the findings to the European Commission on an annual basis. |
| Exceedance | An exceedance defines a period of time during which the concentration of a pollutant is greater than, or equal to, the appropriate air quality criteria. For Air Quality Standards, an exceedance is a concentration greater than the Standard value. |
| Local Air Quality Management | The Local Air Quality Management process requires Local Authorities to periodically review and assess the current and future quality of air in their areas. |
| Micrograms per cubic metre (µgm−3) | A measure of concentration in terms of mass per unit volume. A concentration of 1 µgm−3 means that one cubic metre of air contains one microgram (10-6 grams) of pollutant. |
| Particulate matter | Airborne particulate matter includes a wide range of particle sizes and different chemical constituents. It consists of both primary components, which are emitted directly into the atmosphere, and secondary components, which are formed within the atmosphere as a result of chemical reactions. |
| Trackout | The transport of dust and dirt from the site onto the public road network. This arises when vehicles leave site with dusty materials or transfer dust and dirt onto the road having travelled over muddy ground on-site. |
| Air Quality Management Area | If a Local Authority identifies any locations within its boundaries where the Air Quality Objectives are not likely to be achieved, it must declare the area as an Air Quality Management Area. The area may encompass just one or two streets, or it could be much bigger. The Local Authority is subsequently required to put together a plan to improve air quality in that area - a Local Air Quality Action Plan. |

# 11 Air Quality

## 11.1 Introduction

11.1.1.1 This chapter of the Environmental Impact Assessment (EIA) Report considers the potentially significant effects on air quality associated with the construction, operation and decommissioning of the Moray West Onshore Transmission Infrastructure (OnTI). The specific objectives of this chapter are to determine the impact of the OnTI on air quality.

11.1.1.2 This chapter is supported by the following figures:

- Figure 11.3.1 – Locations of Passive Monitoring Sites; and
- Figure 11.5.1 – Sensitive Air Quality Receptors.

11.1.1.3 This chapter of the EIA Report has been prepared by Dr. Christelle Escoffier MIES (Member of the Institution of Environmental Sciences), MIAQM (Member of the Institute of Air Quality Management). Christelle is a Principal Consultant within the Environmental Assessment department of Wood Environment & Infrastructure Solutions UK Limited (Wood) who has 17 years' experience in air quality consultancy.

## 11.2 Approach to Assessment

### *11.2.1 Planning Policy Context and Guidance*

**Legislation**

11.2.1.1 The legislative framework for air quality consists of legally enforceable European Union (EU) limit values that are transposed into UK legislation as Air Quality Standards (AQSs). Action in the UK is then driven by the UK's Air Quality Strategy that sets national Air Quality Objectives (AQOs).

11.2.1.2 The EU limit values are set by the European Directive on air quality and cleaner air for Europe (2008/50/EC) and the European Directive relating to arsenic, cadmium, mercury, nickel, and polycyclic aromatic hydrocarbons in ambient air (2004/107/EC) as the principal instruments governing outdoor ambient air quality policy in the EU.

11.2.1.3 The two Directives, as well as the European Council's decision on exchange of information, were transposed into UK Law via the Air Quality Standards Regulations 2010, which came into force in the UK on 11 June 2010, replacing the AQS Regulations 2007. AQS are concentrations recorded over a given time period, which are considered to be acceptable in terms of what is scientifically known about the effects of each pollutant on health and on the environment. AQOs give target dates and some interim target dates to help the UK move towards achievement of the EU limit values. The AQOs are a statement of policy intentions or policy targets and as such, there is no legal requirement to meet these objectives except in as far as they mirror any equivalent legally binding limit values in EU legislation. The most recent UK Air Quality Strategy was published in July 2007. The Government also published an Air Quality Plan for nitrogen dioxide (NO2) in July 2017.

11.2.1.4 Since Part IV of the Environment Act 1995 came into force, local authorities have been required periodically to review concentrations of the UK Air Quality Strategy pollutants within their areas and to identify areas where the AQOs may not be achieved by their relevant target dates. This process of Local Air Quality Management (LAQM) is an integral part of delivering the Government's AQOs detailed in the Strategy. When areas are identified where some or all of the AQOs might potentially be exceeded and where there is relevant public exposure, i.e. where members of the public would regularly be exposed over the appropriate averaging period, the local authority has a duty to declare an LAQM and to implement an Air Quality Action Plan (AQAP) to reduce air pollution levels towards the AQOs. The latest guidance on the LAQM process is given in Department for Environment, Food and Rural Affairs (Defra) 2016 Local Air Quality Management Technical Guidance (LAQM TG (16)).

11.2.1.5 Table 11.2.1 sets out the AQOs set by the UK Government and the Devolved Administrations that are relevant to this assessment, and the dates by which they are to be achieved.

11.2.1.6 For $NO_2$, it is the annual mean objective that is the more stringent AQO; it is generally considered that the 1-hour mean $NO_2$ AQO will not be exceeded if the annual mean objective is not exceeded. The likelihood of exceedance of the $NO_2$ can be assessed with reference to the predicted annual means and the relationships recommended by LAQM.TG(16): The 1-hour mean $NO_2$ objective is unlikely to be exceeded if the annual mean is less than 60 $\mu gm^{-3}$. For particulate matter smaller than 10 microns ($PM_{10}$), the 24-hour mean objective is more stringent than the annual mean. An estimate of potential exceedances of the 24-hour mean PM10 objective can be calculated (- 18.5 + 0.00145 x annual mean$^3$ + 206 / annual mean). On the basis of this calculation, the 24-hour mean objective for $PM_{10}$ is likely to be met if the predicted annual-mean $PM_{10}$ concentration is 31.8 $\mu gm^{-3}$ or less for all the UK's AQO, and 22.3 $\mu gm^{-3}$ or less for Scotland's AQO.

**Table 11.2.1: Summary of Relevant AQSs and AQOs**

| Pollutant | Objective (UK) | Averaging Period | Date to be Achieved by and Maintained Thereafter (UK) |
|---|---|---|---|
| Nitrogen dioxide - $NO_2$. All UK authorities. | 200 $\mu gm^{-3}$ not to be exceeded more than 18 times a year. | One-hour mean | 31 December 2005 |
| | 40 $\mu gm^{-3}$ | Annual mean | 31 December 2005 |
| Particulate matter smaller than 10 microns - $PM_{10}$. All UK authorities. | 50 $\mu gm^{-3}$ not to be exceeded more than 35 times a year. | 24-hour mean | 31 December 2004 |
| | 40 $\mu gm^{-3}$ | Annual mean | 31 December 2004 |
| Particulate matter smaller than 10 microns - $PM_{10}$. Authorities in Scotland only. | 50 $\mu gm^{-3}$ not to be exceeded more than 7 times a year. | 24-hour mean | 31 December 2010 |
| | 18 $\mu gm^{-3}$ | Annual mean | 31 December 2010 |
| Particulate matter smaller than 2.5 microns - $PM_{2.5}$. All UK authorities. | 25 $\mu gm^{-3}$ (target) | Annual mean | 2020 |
| | Target of 15% reduction in concentration at urban background locations. | 3 years mean | 2010 - 2020 |
| Particulate matter smaller than 2.5 microns - $PM_{2.5}$. Authorities in Scotland only. | 10 $\mu gm^{-3}$ (limit) | Annual mean | 2020 |
| Nitrogen oxides - $NO_X$. All UK authorities. | 30 $\mu gm^{-3}$ | Annual mean | 2001 |

**Development Planning**

11.2.1.7 Planning policies and related guidance with regard to air quality are summarised in Table 11.2.2.

| Table 11.2.2: Planning Policy Context | |
|---|---|
| **Policy** | **Key Provisions** |
| **National Planning Policy** | |
| National Planning Framework 3 (2014) (NPF3) | NPF3 sets out the Scottish Government's planning policies for Scotland and how these are expected to be applied. The NPF states: *"Reducing the impact of the car on city and town centres will make a significant contribution to realising their potential as sustainable places to live and invest by addressing congestion, air pollution and noise and improving the public realm. Significant health benefits could be achieved by substantially increasing active travel within our most densely populated areas"*. |
| Scottish Planning Policy (2014) | Includes a presumption in favour of sustainable development, including avoiding over-development, protecting the amenity of new and existing development and considering the implications of development for air quality. |
| Planning Advice Note 51: Planning, Environmental Protection and Regulation | Supports existing policy on the role of the planning system in relation to various environmental protection regimes, including those covering air quality. |
| **Local Planning Policy** | |
| Aberdeenshire Local Development Plan (LDP) (2017): Policy P4 Hazardous and potentially polluting developments and contaminated land | Any proposed development which could have a significant detrimental impact on air quality, including the exacerbation of existing air quality issues, must provide appropriate mitigation measures. |
| Moray LDP (2015): Policy EP8 Pollution | The Council requires a detailed assessment report to accompany planning applications for developments that may cause significant pollution in terms of air. |
| Moray LDP (2015): Policy EP12 Air Quality | Seeks to protect air quality by requiring development proposals that could result in negative effects to provide information on how they will be sufficiently mitigated. |

**Guidance**

11.2.1.8 The Institute of Air Quality Management (IAQM) has developed guidance (IAOM, 2014) regarding the assessment of the impacts of construction on air quality and the determination of their significance.

11.2.1.9 Local communities can be concerned that proposed development activities (particularly construction works) will result in regular and persistent dust emissions, which may affect local amenity and quality of life. The level of concern, and potential for annoyance, is directly related to the existing baseline dust levels, the number and proximity of residential areas to a proposed development, and the exact nature of the activities onsite. The degree of actual annoyance will also depend on factors, such as, the rate of dust deposition, and the application of mitigation measures on site.

11.2.1.10 Dust complaints are usually associated with periods of peak deposition, occurring during particular weather conditions. There is a 'normal' level of dust deposition in every community and it is only when the rate of deposition is high relative to the norm that complaints tend to occur. The guidance sets out the factors which includes the effects of dust on a community.

The risk of demolition and construction activities causing exceedance of $PM_{10}$ AQOs is also considered.

11.2.1.11 The IAQM and Environmental Protection UK (EPUK) have produced guidance (2017) regarding the assessment of air quality issues within planning applications, which includes a summary of relevant legislation and the assessment of significance. Using this guidance, the magnitude of impact due to an increase / decrease in the annual mean concentration of $NO_2$ and $PM_{10}$ and other pollutants due to a proposed development is described using specified criteria presented in Section 11.2.4. The overall significance of a proposed development is then determined using professional judgement.

### *11.2.2 Scope of Assessment*

11.2.2.1 The Moray West Onshore Transmission Infrastructure Scoping Report (Moray Offshore Windfarm (West) Limited [Moray West], 2017) noted that there are no Air Quality Management Areas (AQMAs) within the Aberdeenshire Council (AC) or Moray Council (MC) areas. It stated that the OnTI may give rise to air quality impacts during construction from vehicle / plant emissions and dust. However, it was considered that any impacts are likely to be low in magnitude and that they can be successfully managed through best practice onsite. The Scoping Report proposed that air quality be scoped out of the EIA.

11.2.2.2 In the joint Scoping Opinion (August 2017) MC agreed that air quality could be scoped out of the EIA; however, AC requested that an assessment be undertaken considering dust and traffic movements. For completeness and in accordance with the scoping opinion, this assessment considers these air quality impacts across the whole Planning Application Boundary (PAB) in both the AC and the MC areas.

11.2.2.3 Operation of the OnTI will largely be maintenance free with occasional visits being made by small numbers of staff to carry out inspections and testing. In the event of damage or faults, testing will identify their location so that disruption from any intrusive works, e.g. equipment replacement, will be isolated. Should the OnTI be decommissioned, it is envisaged that the cable circuits will likely remain in-situ, with only the above ground equipment being removed from the onshore substation site. It is considered that any air quality effects during operation and maintenance of the OnTI will be considerably less than those predicted for its construction; the operation and maintenance phase has been scoped out of the assessment. As clearance of the onshore substation site may require some demolition, decommissioning effects have been assessed.

**Construction Dust**

11.2.2.4 The scope of the assessment has been determined through the consideration of emission sources.

11.2.2.5 The potential effects of dust generation and dispersion arising from activities such as excavation, movement of vehicles (on and off-site) and general construction activities have been assessed. Dust and $PM_{10}$ emissions have the potential to cause annoyance at receptors close to the OnTI if not properly managed.

**Construction Vehicle Emission**

11.2.2.6 The pollutants of concern are those generated from the exhaust of road vehicles (see Table 11.2.1) resulting in exposure to concentration levels deemed potentially damaging to human health or ecological sites. The future exposure of human and ecological receptors to road traffic generated pollutants has been assessed through quantification of annual average daily traffic (AADT) data for the construction phase. For the decommissioning phase, it has not yet been possible to specify traffic data, so the AADT for the construction phase is assumed as an upper bound.

11.2.2.7 The air quality studies undertaken by AC and MC confirm that concentrations of Carbon monoxide (CO), Sulfur dioxide ($SO_2$), 1,3 butadiene and benzene are very unlikely to exceed the AQOs in the location of the PAB. The small incremental change due to the OnTI will not change this situation. As a result, these pollutants have been scoped out of further assessment.

11.2.2.8 The air pollutants to be assessed for human receptors are therefore annual mean $NO_2$, 99.79$^{th}$ percentile hourly mean $NO_2$ (18 hours of exceedances of 200 µgm$^{-3}$ AQS allowed), annual mean $PM_{10}$, 90.41$^{st}$ percentile (35 days of exceedances allowed) and 98.08$^{th}$ percentile (seven days of exceedances allowed) daily mean $PM_{10}$ and annual mean $PM_{2.5}$. The air pollutants to be assessed for ecological receptors are annual mean NOX, maximum daily mean NOX, annual mean nitrogen deposition and annual mean acidity deposition.

11.2.2.9 Where it is not possible to scope out emissions from road traffic, a dispersion modelling assessment has been carried out.

11.2.2.10 The ADMS-Roads dispersion modelling tool (Cambridge Environmental Research Consultants, 2017) has been used to calculate both emissions and concentrations from the road traffic generated by the OnTI as well as non-development traffic. Emissions have been calculated using factors from v8 of Defra's Emission Factors Toolkit (Defra, 2017b).

11.2.2.11 Concentrations have been calculated at human receptors along the roads modelled and within the PAB. Concentrations have also been calculated at the locations where the designated ecological sites are closest to the road. Receptor locations are discussed in Section 11.5.1.

11.2.2.12 Baseline traffic flows have been taken from traffic modelling forecasts for 2017 and future construction traffic flow from traffic modelling forecasts for 2023 (see Chapter 9: Traffic and Transport).

11.2.2.13 Meteorological data from Lossiemouth meteorological station, approximately 32 km west of the PAB, for 2016 was used.

11.2.2.14 The ADMS-Roads model has been widely validated for this type of assessment. However, it has not included validation in the vicinity of the PAB specifically. It is therefore necessary to perform a comparison of modelled results with local monitoring data at relevant locations. This process of verification attempts to minimise modelling uncertainty and systematic error by correcting modelled results through an adjustment factor to gain greater confidence in the final results. Monitoring data for 2016 at two diffusion tube sites in Keith was used to undertake the verification process. The verification model also used traffic modelling forecasts for 2017 as they were not available for 2016. An adjustment factor of 2.5 was calculated and used to adjust concentrations for the final results. This factor is within the range of factors commonly obtained for this type of modelling.

### *11.2.3 Data Gathering*

**Study Area**

11.2.3.1 The study area for the construction dust assessment has been derived according to the IAQM (2014) guidance. As the exact location of the OnTI is yet to be defined, the PAB is considered to offer a conservative approach to defining the construction area.

11.2.3.2 The roads likely to be used during the construction phase of the OnTI are identified in Chapter 9: Traffic and Transport. The roads modelled are representative of the links between major junctions. Sensitive receptors for each link have been selected to represent the worst case scenario.

**Desk Study / Field Survey**

11.2.3.3 The data sources used to inform the air quality assessment are listed below:

- Defra background mapping (UK-AIR database);
- Defra list of AQMAs by local authorities;

- LAQM Reports by MC and AC, including the 2017 Annual Progress Reports;
- $NO_2$ diffusion tube network MC and AC;
- Traffic counts and predictions from the Chapter 9: Traffic and Transport; and
- Construction data from the indicative construction programme.

### *11.2.4 Evaluation of Effects*

**Construction Dust**

11.2.4.1 The IAQM guidance (IAQM, 2014) provides a method to assess the significance of construction effects by considering the annoyance due to dust soiling as well as harm to ecological receptors and the risk of health effects due to any significant increases to $PM_{10}$ or $PM_{2.5}$. Site activities are divided into four types to reflect their different potential effects:

- Demolition – an activity involved with the removal of an existing structure or structures;
- Earthworks – the processes of soil-stripping, ground-levelling, excavation and landscaping;
- Construction – an activity involved in the provision of a new structure; and
- Trackout (i.e. movement of vehicles) – the transport of dust and dirt from the site onto the public road network. This arises when vehicles leave site with dusty materials or transfer dust and dirt onto the road having travelled over muddy ground onsite.

11.2.4.2 A detailed assessment is deemed to be required as described in the IAQM guidance (2014) where there is:

- A 'human receptor' located within: 350 m from the site boundary; and / or within 50 m of the route(s) used by vehicles on the public highway, up to 500 m from the site entrance(s); or
- An 'ecological receptor' located within: 200 m of the boundary of the site; or 200 m of the route(s) used by construction vehicles on the public highway, up to 500 m from the site entrance.

11.2.4.3 The PAB has been classified according to the risk of effects (based upon the scale and nature of the works, plus the proximity of sensitive receptors), appropriate site-specific mitigation measures have been identified and the significance of effects has been determined.

**Construction Vehicle Emissions**

11.2.4.4 Guidance from the IAQM and EPUK (2017) suggests that the impact of emissions from additional road traffic vehicles can be scoped out of an assessment if the change in heavy duty vehicle (HDV) flows on local roads with relevant human receptors is less than 25 AADT movements within or adjacent to an AQMA or 100 elsewhere, and the change in light duty vehicle (LDV) flows on local roads is less than 100 AADT within or adjacent to an AQMA and 500 elsewhere. Also, with regard to sensitive ecological receptors, the Design Manual for Roads and Bridges (DMRB) (The Highway Agency *et al.*, 2007) criteria are appropriate for determining the significance of effects being defined as more than 200 AADT HDV and 1,000 AADT LDV on any roads (all vehicles). Using these criteria, the impact of emissions from additional road traffic vehicles during the construction phase has been scoped in for assessment by dispersion modelling. The evidence of predicted HDV flows is provided in Table 11.5.5.

11.2.4.5 The plant and Non-Road Mobile Machinery (NRMM) onsite at any one time will be of a relatively small number. Although the PAB is not located in London, any NRMM used will as a matter of best practice comply with London NRMM emission standards and guidance from the Control of Dust and Emissions during Construction and Demolition Supplementary Planning Guidance (Mayor of London, 2013). Consequently, the potential effects of emissions from NRMM on air quality are not likely to be significant and therefore do not require further assessment.

11.2.4.6 The impact of emissions from the additional road traffic vehicles during the construction phase has been considered in order to determine the air quality impact on nearby human and ecological receptors as change in LDV flow is more than 500 AADT at some locations and change in HDV flow is more than 100 AADT at some locations.

**Sensitivity of Receptor**

11.2.4.7 The sensitivity / importance of the environment with regards to dust soiling impacts is defined in Table 11.2.3. These are sourced from IAQM (2014).

**Table 11.2.3: Sensitivity / Importance of the Environment in Respect to Dust Soiling**

| Receptor Sensitivity / Importance | Description / Reason |
|---|---|
| High | The IAQM (2014) guidance states that high sensitivity receptors (people and their property) are where:<br>• Users can reasonably expect enjoyment of a high level of amenity;<br>• The appearance, aesthetics or value of their property will be diminished by soiling; and<br>• The people or property will 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.<br>High sensitivity ecological receptors include:<br>• Locations with an international or national designation and the designated features may be affected by dust soiling; or<br>• 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. |
| Moderate | The IAQM (2014) guidance suggests that moderate sensitivity receptors (people and their property) are where:<br>• Users will expect to enjoy a reasonable level of amenity, but will not reasonably expect to enjoy the same level of amenity as in their home; or<br>• The appearance, aesthetics or value of their property could be diminished by soiling; or<br>• The people or property will not reasonably be expected to be present here continuously or regularly for extended periods as part of the normal pattern of use of the land.<br>Moderate sensitivity ecological receptors include:<br>• Locations where there is a particularly important plant species, where its dust sensitivity is uncertain or unknown; or<br>• Locations with a national designation where the features may be affected by dust deposition. |
| Low | The IAQM (2014) guidance suggests that low sensitivity receptors (people and their property) are where:<br>• The enjoyment of amenity would not reasonably be expected; or<br>• Property would not reasonably be expected to be diminished in appearance, aesthetics or value by soiling; or<br>• There is transient exposure, where the people or property would reasonably be expected to be present only for limited periods of time as part of the normal pattern of use of the land. |

| Table 11.2.3: Sensitivity / Importance of the Environment in Respect to Dust Soiling | |
|---|---|
| **Receptor Sensitivity / Importance** | **Description / Reason** |
| | Low sensitivity ecological receptors include<br>• Locations with a local natural designation where the features may be affected by dust deposition.<br>• Indicative example is a Local Natural Reserve with dust-sensitive features. |
| Negligible | Not defined in IAQM (2014) guidance but it is assumed to be relevant where there are no dust soiling activities. |

11.2.4.8 The sensitivity of people to the health effect of $PM_{10}$ is defined in Table 11.2.4. These are sourced from IAQM (2014). It depends on whether or not the receptor is likely to be exposed to elevated concentrations over a 24-hour period.

| Table 11.2.4: Sensitivity of People to the Health Effect of PM10. | |
|---|---|
| **Receptor Sensitivity / Importance** | **Description / Reason** |
| High | Locations where members of the public are exposed over a time 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).<br>Indicative examples include residential properties. Hospitals, schools and residential care homes should also be considered as having equal sensitivity to residential areas for the purposes of this assessment. |
| Moderate | Locations where the people exposed are workers, and exposure is over a time period relevant to the air quality objectives 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).<br>Indicative examples 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.<br>Indicative examples include public footpaths, playing fields, parks and shopping streets. |
| Negligible | Not defined in IAQM (2014) guidance, but it is assumed to be relevant where there are no human exposures. |

**Magnitude of Impact**

11.2.4.9 The dust emission magnitude is based on the scale of the anticipated works and is classified as negligible, low, moderate or high. IAQM (2014) guidance provides examples of how the potential dust emission magnitude for different activities can be defined. The magnitude of impact is defined in Table 11.2.5.

| Table 11.2.5: Magnitude of Impact in Respect of Dust | | |
|---|---|---|
| **Phase** | **Magnitude** | **Examples** |
| Demolition | High | Total building volume > 50,000 $m^3$, potentially dusty construction material (e.g. concrete), on-site crushing and screening, demolition activities > 20 m above ground level. |
| | Moderate | Total building volume 20,000 – 50,000 $m^3$, potentially dusty construction material, demolition activities 10 - 20 m above ground level. |
| | Low | Total building volume < 20,000 $m^3$, construction material with low potential for dust release (e.g. metal cladding or timber), demolition activities < 10 m above ground, demolition during wetter months. |
| | Negligible | IAQM (2014) guidance does not provide a definition for negligible magnitude but it is assumed to be relevant where there are no planned demolition activities. |
| Earthworks | High | Total building volume > 50,000 $m^3$, potentially dusty construction material (e.g. concrete), on-site crushing and screening, demolition activities > 20 m above ground level. |
| | Moderate | Total building volume 20,000 – 50,000 $m^3$, potentially dusty construction material, demolition activities 10 - 20 m above ground level. |
| | Low | Total building volume < 20,000 $m^3$, construction material with low potential for dust release (e.g. metal cladding or timber), demolition activities < 10 m above ground, demolition during wetter months. |
| | Negligible | IAQM (2014) guidance does not provide a definition for negligible magnitude but it is assumed to be relevant where there are no planned earthworks activities. |
| Construction | High | Total building volume > 100, 000 $m^3$, on site concrete batching, sandblasting. |
| | Moderate | Total building volume 25,000 – 100,000 $m^3$, potentially dusty construction material (e.g. concrete), on site concrete batching. |
| | Low | Total building volume < 25,000 $m^3$, construction material with low potential for dust release (e.g. metal cladding or timber). |
| | Negligible | IAQM (2014) guidance does not provide a definition for negligible magnitude but it is assumed to be relevant where there are no planned construction activities. |
| Trackout | High | > 50 HGV (> 3.5 t) outward movements in any one day, potentially dusty surface material (e.g. high clay content), unpaved road length > 100 m. |
| | Moderate | 10 - 50 HGV (> 3.5 t) outward movements in any one day, moderately dusty surface material (e.g. high clay content), unpaved road length 50 – 100 m. |
| | Low | < 10 HGV (> 3.5 t) outward movements in any one day, surface material with low potential for dust release, unpaved road length < 50 m. |
| | Negligible | IAQM (2014) guidance does not provide a definition for negligible magnitude but it is assumed to be relevant where there are no planned trackout activities. |

**Significance of Effect: Risk of Dust Impact**

11.2.4.10 The significance of the impact of windblown dust from the OnTI is generally assigned after applying the site-specific mitigation. This takes account of the risk of effects, and other factors that might influence the risk of dust effects arising, even after any site-specific mitigation has been implemented. The overall significance of the effects arising from the entire construction phase of the OnTI is based on professional judgement, taking into account the significance of the effects of each of the four activities.

11.2.4.11 The following significance matrices are based on industry standards provided in the IAQM (2014) guidance. This guidance provides a different matrix for each activity (demolition, construction, earthworks and trackout) to determine the level of mitigation required for each activity individually.

11.2.4.12 The assessment of the significance of potential effects is determined by assessing the risk of dust impacts for demolition, earthworks and construction, and trackout activities as described in Tables 11.2.6, 11.2.7 and 11.2.8 respectively, taking into account the dust emission magnitude combined with the sensitivity of the area.

11.2.4.13 It is considered for the purpose of the assessment that high and moderate risks of dust impacts (in IAQM terms) represent major and moderate significant effects respectively; these are considered significant in terms of The Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2017 (the EIA Regulations). A low risk of dust impact (in IAQM terms) represents a minor significant effect, which is considered not significant in terms of the EIA Regulations.

**Table 11.2.6: Significance of Effects (Risk of Dust Impacts) for Demolition Activities**

| **Sensitivity** | **Magnitude of Impact** | | | |
|---|---|---|---|---|
| | **Negligible** | **Low** | **Moderate** | **High** |
| **Negligible** | Negligible | Negligible | Negligible | Negligible |
| **Low** | Negligible | Negligible | Minor (Low Risk) | Moderate (Moderate Risk) |
| **Moderate** | Negligible | Minor (Low Risk) | Moderate (Moderate Risk) | Major (High Risk) |
| **High** | Negligible | Moderate (Moderate Risk) | Moderate (Moderate Risk) | Major (High Risk) |

**Table 11.2.7: Significance of Effects (Risk of Dust Impacts) for Earthworks and Construction Activities**

| **Sensitivity** | **Magnitude of Impact** | | | |
|---|---|---|---|---|
| | **Negligible** | **Low** | **Moderate** | **High** |
| **Negligible** | Negligible | Negligible | Negligible | Negligible |
| **Low** | Negligible | Negligible | Minor (Low Risk) | Minor (Low Risk) |
| **Moderate** | Negligible | Minor (Low Risk) | Moderate (Moderate Risk) | Moderate (Moderate Risk) |
| **High** | Negligible | Minor (Low Risk) | Moderate (Moderate Risk) | Major (High Risk) |

| Table 11.2.8: Significance of Effects (Risk of Dust Impacts) for Trackout Activities | | | | |
|---|---|---|---|---|
| **Sensitivity** | **Magnitude of Impact** | | | |
| | **Negligible** | **Low** | **Moderate** | **High** |
| **Negligible** | Negligible | Negligible | Negligible | Negligible |
| **Low** | Negligible | Negligible | Minor (Low Risk) | Minor (Low Risk) |
| **Moderate** | Negligible | Negligible | Minor (Low Risk) | Moderate (Moderate Risk) |
| **High** | Negligible | Minor (Low Risk) | Moderate (Moderate Risk) | Major (High Risk) |

**Significance of Effect: Air Quality Pollutants**

11.2.4.14 Although no official procedure exists for classifying magnitude of impact and significance of effect for air quality from a new development for planning purposes, IAQM and EPUK guidance (2017) suggests ways to address the issue. In the IAQM and EPUK guidance, the magnitude of impact due to an increase / decrease in annual mean concentration takes into account both the change in concentration at a receptor brought about by a new development as a percentage of the assessment level, and the actual concentration at that receptor. Descriptors are given in Table 11.2.9.

11.2.4.15 It must be emphasised that these descriptors are not intended to be used as exact measures of the significance (in EIA terms) of a proposed development. As the IAQM and EPUK guidance states *"The overall significance is determined using professional judgement. For example, a 'moderate' adverse impact at one receptor may not mean that the overall impact has a significant effect. Other factors need to be considered"*.

11.2.4.16 These descriptors are only designed for annual mean concentrations. Descriptors for short-term (daily or hourly) concentrations are not available.

| Table 11.2.9: Impact Descriptors for Increases in Annual Mean Concentrations | | | | | |
|---|---|---|---|---|---|
| **Absolute Concentration with OnTI, Relative to Assessment Level** | **Increase in Concentration Relative to Assessment Level** | | | | |
| | **0 %** | **1 %** | **2–5 %** | **6-10 %** | **>10 %** |
| 75 % or less | Negligible | Negligible | Negligible | Minor | Moderate |
| 76–94 % | Negligible | Negligible | Minor | Moderate | Moderate |
| 95–102 % | Negligible | Minor | Moderate | Moderate | Major |
| 103–109 % | Negligible | Moderate | Moderate | Major | Major |
| 110 % or more | Negligible | Moderate | Major | Major | Major |

## 11.3 Baseline Conditions

11.3.1.1 Neither AC or MC has designated any AQMA. The closest AQMA is Anderson Drive declared by Aberdeen City Council and located 57 km to the south-east of the PAB. This confirms the PAB is not located within an AQMA or in the vicinity of one.

11.3.1.2 In 2016 MC undertook passive monitoring of $NO_2$ at 19 locations and AC at 15 locations. The nearest passive monitoring location to the PAB in 2016 was located 1.9 km to the west operated by MC. There are no monitoring stations operated by AC in the vicinity of the PAB. Details of the closest diffusion tubes to the PAB and their concentrations from 2013 to 2016 are provided in Tables 11.3.1 and 11.3.2.

**Table 11.3.1: Locations of Passive Monitoring Sites Near to the PAB**

| Site Name | Site ID | Classification Type | X Coordinate | Y Coordinate | Distance from PAB (m) | In AQMA? |
|---|---|---|---|---|---|---|
| Keith 1 | DT14 | Roadside | 343323 | 850458 | 1500 | N |
| Keith 2 | DT15 | Kerbside | 343329 | 850415 | 1500 | N |

**Table 11.3.2: Summary of Passive Monitoring Data: NO2 Annual Mean (µgm-3)**

| Site Name | 2013 | 2014 | 2015 | 2016 |
|---|---|---|---|---|
| Keith 1 | 28.8 | 25.8 | 23.8 | 25.3 |
| Keith 2 | 22.8 | 23.1 | 20.9 | 21.3 |

11.3.1.3 Table 11.3.2 shows that $NO_2$ concentrations around the vicinity of the PAB are below the AQO of 40 $\mu gm^{-3}$. Annual mean concentrations of 25.3 and 21.3 $\mu gm^{-3}$ were recorded in 2016 at diffusion tubes DT14 and DT15, which are the closest diffusion tubes to the PAB. Figure 11.3.1 shows the location of the closest diffusion tubes to the PAB.

11.3.1.4 Defra has made estimates of background pollution concentrations on a 1 $km^2$ grid for the UK for seven of the main pollutants, including $NO_2$ and $PM_{10}$, using data for a base year of 2015, making projections for years from 2011 to 2030 inclusive. The estimated values of the pollutants for construction year 2023 for the cells representative of the sensitive receptors vary from 2.9 $\mu gm^{-3}$ to 5.4 $\mu gm^{-3}$ for $NO_x$, 2.3 $\mu gm^{-3}$ to 4.3 $\mu gm^{-3}$ for $NO_2$ and 6.2 $\mu gm^{-3}$ to 10.9 $\mu gm^{-3}$ for $PM_{10}$. The Defra gridded values have been used in the modelling.

### *11.3.2 Future Baseline*

11.3.2.1 It is considered that the current air quality baseline is likely to improve in the future due to the uptake of lower emission vehicles and the replacement of older vehicles.

### *11.3.3 Data Limitations*

11.3.3.1 Traffic data supplied includes a number of assumptions for construction trip generation and trip distribution (see Chapter 9: Traffic and Transport). There is limited information on routes used by traffic, so a simple but conservative approach to modelling traffic emissions has been used. $NO_2$ diffusion tube results provided in Section 11.3 have a level of uncertainty of ±20% (Defra, 2016).

## 11.4 Embedded Mitigation

11.4.1.1 The assessment set out in Section 11.5 assumes the following measures will be adopted by the OnTI:

- A Construction Travel Plan and Construction Traffic Management Plan (CTMP) will be set in place to reduce the impact of dust in the vicinity of the OnTI (see Chapter 9: Traffic and Transport);
- IAQM (2014) guidance standard measures for mitigating the impacts of dust during construction and demolition will be followed; and
- The principles of 'good practice' will be applied to the OnTI, as set out in Chapter 5 of the IAQM and EPUK guidance (2017). The OnTI does not contravene the Council's AQAP, or render any of the measures unworkable. The OnTI will not create a new 'street canyon' or building configuration that inhibits effective pollution dispersion. Delivering sustainable development is a key theme of the application. The OnTI will be designed to minimise public exposure to pollution sources.

## 11.5 Assessment of Potential Effects

### *11.5.1 Potential Construction and Demolition Effects*

11.5.1.1 Construction of the OnTI may give rise to fugitive dust emissions (due to leaks and other unintended or irregular releases of dust during construction), although these will likely be temporary in nature and restricted to areas close to construction activity. Construction activities that are considered to be the most significant potential sources of fugitive dust emissions are:

- Earthworks – large risk due to the excavation, handling, storage and disposal of soil and subsoil materials on a total site area >10,000 $m^2$;
- Construction – large risk due to the transport, unloading, storage and use of dry and dusty materials (such as cement and sand) over a long period; and
- Trackout – large risk due to movement of vehicles over surfaces where muddy materials have been transferred off site (for example, on to public highways) with >50 HDV outward movement in any one day (worst case).

**Temporary Increases in Dust / $PM_{10}$ on Human and Ecological Receptors**

11.5.1.2 Dust is defined as *"solid particles that are suspended in air, or have settled out onto a surface after having been suspended in air"*. The terms dust and PM are often used interchangeably, although in some contexts one term tends to be used in preference to the other. In the IAQM (2014) guidance the term 'dust' has been used to include the particles that give rise to soiling, and to human health and ecological effects. Note: this is different to the definition given in British Standard (BS) 6069 (British Standards Institute, 1994), where dust refers to particles up to 75 µm in diameter. In this chapter of the EIA Report, dust / $PM_{10}$ is used to include particles smaller and particles larger than 10 microns.

11.5.1.3 As per the IAQM (2014) guidance, the risk associated with the OnTI to potentially generate dust / $PM_{10}$ in the absence of any additional mitigation has been determined and the required site-specific measures have been identified to ensure residual dust / $PM_{10}$ effects associated with the construction phase are not significant.

11.5.1.4 Table 11.5.1 details the human and ecological receptors near the OnTI considered for the assessment. Figure 11.5.1 shows the locations with reference to the OnTI. Receptors inside the PAB are taken into account for the construction dust assessment. In addition, samples of residential and commercial receptors are selected along the roads identified as experiencing the largest change in traffic flows during construction as representative of all other receptors along these roads. The road traffic effect on air quality at these receptors is considered the maximum effect of the construction traffic.

| Table 11.5.1: Human and Ecological Receptors Near to the OnTI | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Receptor ID** | **Receptor Type** | **Receptor** | **Easting (m)** | **Northing (m)** | **Height Above Ground (m)** | **Distance from PAB (m)** | **Distance from Roads used during Construction (m)** | **Sensitivity** | **Reason for Selection** |
| R1 | Residential | Cullen | 351198 | 867142 | 1.5 | 4579 | 10 | High | Residents can reasonably expect enjoyment of a high level of amenity and the appearance, aesthetics or value of their property has the potential to be diminished by soiling. |
| R2 | Residential | Lintmill | 351641 | 865418 | 1.5 | 2166 | 3 | High | |
| R3 | Residential | Portsoy | 358854 | 865958 | 1.5 | 1546 | 6 | High | |
| R4 | Residential | Sandend 1 | 355563 | 865578 | 1.5 | 0 | 8 | High | |
| R5 | Residential | Deskford | 350422 | 861245 | 1.5 | 298 | 9 | High | |
| R6 | Residential | Longmuir Farm | 357263 | 861451 | 1.5 | 2229 | 253 | High | |
| R7 | Commercial | Inchgower Distillery | 342710 | 863940 | 1.5 | 7762 | 14 | Moderate | 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 home. |
| R8 | Residential | Crossroads Primary School | 347903 | 854533 | 1.5 | 309 | 11 | High | Vulnerable receptors. |
| R9 | Residential | Davoch of Grange | 347941 | 851524 | 1.5 | 54 | 50 | High | Residents can reasonably expect enjoyment of a high level of amenity and the appearance, aesthetics or value of their property has the potential to be diminished by soiling. |
| R10 | Residential | Drumnagorrach | 352301 | 852738 | 1.5 | 3699 | 12 | High | |
| R11 | Residential | Keith 1 | 343327 | 850509 | 1.5 | 1552 | 8 | High | |
| R12 | Residential | Keith 2 | 343270 | 850000 | 1.5 | 1043 | 9 | High | |
| R13 | Residential | Rosarie House | 338381 | 849992 | 1.5 | 4696 | 3 | High | |
| R14 | Residential | Brodie Cottage | 345202 | 846011 | 1.5 | 259 | 16 | High | |
| R15 | Residential | Forgie | 338342 | 855232 | 1.5 | 7946 | 130 | High | |

| Table 11.5.1: Human and Ecological Receptors Near to the OnTI | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Receptor ID** | **Receptor Type** | **Receptor** | **Easting (m)** | **Northing (m)** | **Height Above Ground (m)** | **Distance from PAB (m)** | **Distance from Roads used during Construction (m)** | **Sensitivity** | **Reason for Selection** |
| R16 | Residential | Sandend 2 | 355485 | 865745 | 1.5 | 158 | 158 | High | |
| R17* | Residential | Fordyce 1 | 355422 | 863834 | 1.5 | 0 | 1746 | High | |
| R18 | Residential | Residence near Mains of Glassaugh | 355532 | 864950 | 1.5 | 0 | 636 | High | |
| R19* | Residential | Fordyce 2 | 355101 | 863278 | 1.5 | 0 | 2300 | High | |
| R20* | Residential | Fordyce 3 | 354877 | 862642 | 1.5 | 0 | 2860 | High | |
| R21* | Residential | Fordyce 4 | 354785 | 862066 | 1.5 | 0 | 2797 | High | |
| R22* | Residential | Ardiecow 1 | 353165 | 861978 | 1.5 | 0 | 2789 | High | |
| R23 | Residential | Ardiecow 2 | 352304 | 861451 | 1.5 | 0 | 1865 | High | |
| R24* | Residential | Ardiecow 3 | 351865 | 861135 | 1.5 | 0 | 1446 | High | |
| R25* | Residential | Hoggie | 351512 | 860161 | 1.5 | 0 | 1417 | High | |
| R26 | Residential | Backies | 350310 | 859339 | 1.5 | 0 | 1620 | High | |
| R27 | Residential | Crannoch 1 | 349043 | 855848 | 1.5 | 0 | 1412 | High | |
| R28* | Commercial | Mains Of Auchoynanie | 345394 | 849553 | 1.5 | 0 | 2135 | Moderate | |
| R29 | Residential | Crannoch 2 | 348779 | 854520 | 1.5 | 0 | 742 | High | |
| R30 | Residential | Blackhillock 3 | 344662 | 847177 | 1.5 | 0 | 963 | High | |
| R31 | Residential | Blackhillock 4 | 343788 | 846528 | 1.5 | 0 | 645 | High | |
| R32 | Residential | Blackhillock 1 | 343498 | 848081 | 1.5 | 0 | 1819 | High | |
| R33 | Residential | Blackhillock 2 | 343595 | 848636 | 1.5 | 0 | 1290 | High | |

| Table 11.5.1: Human and Ecological Receptors Near to the OnTI | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Receptor ID** | **Receptor Type** | **Receptor** | **Easting (m)** | **Northing (m)** | **Height Above Ground (m)** | **Distance from PAB (m)** | **Distance from Roads used during Construction (m)** | **Sensitivity** | **Reason for Selection** |
| E1 | Ecological | Cullen to Stake Coast Site of Special Scientific Interest (SSSI) Sandend | 356132 | 866052 | 0.0 | 0 | 538 | High | Location with a national designation with designated features which may be affected by dust soiling. |
| E2 | Ecological | Cullen to Stake Coast SSSI Portsoy | 359209 | 866127 | 0.0 | 1868 | 201 | High | |
| E3 | Ecological | Cullen to Stake Coast SSSI Cullen | 350983 | 867280 | 0.0 | 4821 | 179 | High | |
| E4 | Ecological | Shiel Wood Pastures SSSI | 353311 | 853112 | 0.0 | 4451 | 281 | High | |
| E5* | Ecological | Mill Wood SSSI | 345859 | 850259 | 0.0 | 5 | 1984 | Moderate | Location with a national designation which may have designated features affected by dust soiling. |
| E6 | Ecological | Den of Pitlurg SSSI | 344409 | 845416 | 0.0 | 162 | 778 | Moderate | Location with a national designation which may have designated features affected by dust soiling. |

*Receptors within the PAB but not near a modelled road.

**Magnitude of Impact**

11.5.1.6 Potential sources of impacts associated with earthworks, including ground preparation activities and remediation (if required), include fugitive dust / $PM_{10}$ emissions resulting from disturbance of dusty materials by construction plant, the construction materials used, vehicle movements, and wind action. The OnTI exceeds the IAQM (2014) screening criteria of 10,000 $m^2$ in area. As a result, it is considered that there will be a **high dust emission magnitude** for earthworks.

11.5.1.7 Potential sources of impacts associated with construction of structures include fugitive dust / $PM_{10}$ emissions resulting from disturbance of dusty materials by construction plant, the construction materials used, vehicle movements and wind action. It is considered that there will be a **high dust emission magnitude** for construction activities associated with the structures and supporting infrastructure. The OnTI will include little above ground infrastructure, but the volume of all infrastructure together will be over the IAQM (2014) screening criterion of 100,000 $m^3$. The onshore cable circuits will largely be installed by open cut trenching. The excavation will be approximately 4 m wide (at the surface) and the onshore cable circuits will be installed at a target depth of 1 m (to the top of the ducting). The route for the onshore cable circuits will be approximately 28 km long. The onshore substation permanent infrastructure will be on a footprint of approximately 60,000 $m^2$.

11.5.1.8 Dust emissions during trackout may occur from the transport of dust and dirt from the construction site onto the public road network, where it may be deposited and then re-suspended by vehicles using the network. As a result of the size of the OnTI, there is expected to be over 50 HGV movements per day in some locations. It is considered that there will be a **high dust emission magnitude** for trackout.

11.5.1.9 The magnitude of impacts from the above four activities is summarised in Table 11.5.2.

**Table 11.5.2: Construction Dust Emissions Magnitude as Defined by the IAQM (2014) Guidance**

| Source | Dust Emission Magnitude |
|---|---|
| Demolition | Negligible (none proposed) |
| Earthworks | High |
| Construction | High |
| Trackout | High |

**Sensitivity of Receptors**

11.5.1.10 There are more than 100 residential properties located within the PAB. It is unlikely than more than 100 residential property will be within 50 m from the OnTI. However, a worse case has been assumed that more than 100 residential properties might be located within 50 m from the OnTI. The sensitivity of the current area assessed using Table 2 of IAQM (2014) with respect to dust soiling effects on people and property in relation to earthworks and construction activities is therefore considered to be **high**.

11.5.1.11 There are less than 10 residential properties located within 50 m of each road that may be used by construction traffic up to 500 m from the PAB. The sensitivity of the area with respect to dust soiling effects on people and property in relation to trackout is therefore considered to be **low**.

11.5.1.12 The maximum estimated existing background $PM_{10}$ concentration at the PAB is 10.0 $\mu gm^{-3}$ (Defra, 2017). There are more than 100 residential properties located within the PAB. While it is highly likely that most construction activities will be located beyond 20 m from residential properties, this may not be possible for certain activities (e.g. the upgrading of existing access tracks for temporary use). Given this, and that the $PM_{10}$ annual mean is smaller than 14 $\mu gm^{-3}$, the assessment assumes that works may occur within 20 m of some residential properties as a worst case. The sensitivity of the area assessed using Table 3 of IAQM (2014) with respect to human health impacts in relation to earthworks and construction is therefore **moderate**.

11.5.1.13 As noted above, there are less than 10 residential properties located within 50 m of each road to be used by construction traffic up to 500 m from the OnTI. Given this and the background $PM_{10}$ concentration of 10.0 $\mu g\ m^{-3}$ maximum, the sensitivity of the area with respect to human health impacts in relation to trackout is **low**.

11.5.1.14 There are two ecological sites potentially located within 20 m of earthworks and construction activities. Cullen to Stake Ness Coast SSSI and Mill Wood SSSI are considered **high** and **moderate** sensitivity receptors respectively. Also, Den of Pitlurg SSSI (located approximately 200 m to the south of the PAB) is considered a **moderate** sensitivity receptor.

11.5.1.15 There are no ecological sites located within 50 m of roads that may be used by construction traffic up to 500 m from the PAB. The sensitivity of the area with respect to dust soiling effects on ecological receptors in relation to trackout is therefore considered to be **negligible**.

11.5.1.16 The sensitivity of the surrounding area is summarised in Table 11.5.3.

**Table 11.5.3: Sensitivity of Surrounding Area**

| Potential Impact | Sensitivity to Impact Source | | |
|---|---|---|---|
| | Earthworks | Construction | Trackout |
| Dust soiling | High | High | Low |
| Human health | Moderate | Moderate | Low |
| Cullen to Stake Ness Coast SSSI | High | High | Negligible |
| Mill Wood SSSI / Den of Pitlurg SSSI | Moderate | Moderate | Negligible |

**Risk Categorisation of Dust Impacts**

11.5.1.17 The risk of dust impacts is defined using Tables 7, 8 and 9 in the IAQM (IAQM, 2014) guidance for earthworks, construction and trackout, respectively. The dust emission magnitude classes combined with the sensitivity of surrounding area classes, result in the OnTI risk categories (before mitigation) shown in Table 11.5.4.

| Table 11.5.4: Construction Dust Summary of Dust Risk as Defined by IAQM Guidance, Before Mitigation | | | |
|---|---|---|---|
| **Potential Impact** | **Risk** | | |
| | **Earthworks** | **Construction** | **Trackout** |
| Dust soiling | High Risk | High Risk | Low Risk |
| Human health | Moderate Risk | Moderate Risk | Low Risk |
| Cullen to Stake Ness Coast SSSI | High Risk | High Risk | Negligible |
| Mill Wood SSSI / Den of Pitlurg SSSI | Moderate Risk | Moderate Risk | Negligible |

11.5.1.18 The IAQM (2014) guidance considers the risk of effects in the absence of 'site-specific' mitigation measures so that they can be developed accordingly. Before mitigation measures are applied, the risk categorisation of construction dust impacts is assessed to be **high** for earthworks, construction and trackout activities with regard to dust soiling impacts; **moderate** with regard to human health impacts; **high** with regard to Cullen to Stake Ness Coast SSSI; and **moderate** with regard to Mill Wood SSSI and Den of Pitlurg SSSI.

**Significance of Effects**

11.5.1.19 IAQM recommends that significance is only assigned to an effect after considering the construction activity with 'site-specific' mitigation measures applied. The finding that without dust controls there would be a high risk of impact has helped inform the mitigation measures to be applied (identified in Section 11.6); these measures are expected to ensure that the risk of impact is reduced to negligible levels. The significance of effects is set out in Table 11.7.1.

**Temporary Increases in Traffic Based Air Quality Pollutant Concentrations – Human and Ecology Receptor Locations**

11.5.1.20 Table 11.5.5 shows the predicted construction vehicles in AADT for the proposed OnTI during the construction phase.

| Table 11.5.5: Predicted Construction Traffic Flows in AADT for the OnTI | | | |
|---|---|---|---|
| **Roads** | **All Vehicles** | **HGVs** | **HGVs %** |
| A98 south of Buckie | 107 | 9 | 9 |
| A98 Cullen | 107 | 9 | 9 |
| B9018 Lintmill | 130 | 102 | 78 |
| A98 south of Sandend | 95 | 95 | 100 |
| A98 Portsoy | 95 | 95 | 100 |
| B9022 East of Longmuir Farm | 291 | 134 | 46 |

| Table 11.5.5: Predicted Construction Traffic Flows in AADT for the OnTI | | | |
|---|---|---|---|
| **Roads** | **All Vehicles** | **HGVs** | **HGVs %** |
| B9018 northeast of Berryhillock | 130 | 102 | 78 |
| B9018 Grange Crossroads | 97 | 3 | 3 |
| A95 Drumnagorrach | 291 | 134 | 46 |
| A95 west of Davoch of Grange | 291 | 134 | 46 |
| A96 Keith | 597 | 149 | 25 |
| A96 northwest of Forgie | 322 | 15 | 5 |
| A96 Moss Street northeast of Blackhillock Querry | 597 | 149 | 25 |

11.5.1.21 Table 11.5.5 shows the estimated construction vehicles for the OnTI based on a conservative worst-case scenario. The worst case predicted HGV two-way AADT during the construction phase is 149 on the A96, which is above the indicative AADT criteria for undertaking a detailed air quality assessment under IAQM guidance of 100 AADT (outside an AQMA) (IAQM, 2017). This indicates that dispersion modelling is required to determine the impact of construction traffic on human receptors.

11.5.1.22 As a conservative approach, all traffic impacts have been included in the dispersion assessment even when below the indicative criterion of 100 AADT (outside an AQMA).

11.5.1.23 For sensitive ecological receptors, the predicted construction traffic is below the DMRB significance criteria of more than 200 HGVs and 1000 LDVs AADT. Nevertheless, for completeness ecological receptors are included in the dispersion assessment triggered by human receptors impact assessment.

11.5.1.24 A dispersion modelling assessment has therefore been carried out and concentrations predicted at all identified receptors.

11.5.1.25 The calculated concentrations of annual mean $NO_2$ at relevant human receptors are shown in Table 11.5.6 (receptors not alongside a modelled road have not been shown, the results at these receptors will be less than the maximum as the pollutant concentrations generated by the road traffic decrease with distance to the road). These concentrations may be compared with the AQS of 40 $\mu g\ ^{m-3}$. It shows that the change in concentration due to the construction traffic is negligible under the IAQM (2017) criteria. The magnitude of the impact will therefore be **negligible**, which is considered **not significant** in terms of the EIA Regulations.

| Table 11.5.6: Modelled Annual Mean NO2 Concentrations With and Without Construction Traffic at Human Receptors | | | | | |
|---|---|---|---|---|---|
| Receptor | Without OnTI | | With OnTI | | Difference |
| | Road $NO_2$ (µg $m^{-3}$) | Total $NO_2$ (µg $m^{-3}$) | Road $NO_2$ (µg $m^{-3}$) | Total $NO_2$ (µg $m^{-3}$) | Total $NO_2$ (µg $m^{-3}$) |
| R1 | 2.1 | 4.9 | 2.1 | 4.9 | >0.1 |
| R2 | 0.6 | 3.1 | 0.8 | 3.3 | 0.2 |
| R3 | 5.3 | 8.3 | 5.6 | 8.5 | 0.3 |
| R4 | 1.3 | 3.9 | 1.3 | 4.0 | >0.1 |
| R5 | 0.3 | 2.7 | 0.3 | 2.8 | 0.1 |
| R6 | >0.1 | 2.5 | 0.0 | 2.5 | >0.1 |
| R7 | 3.2 | 6.1 | 3.2 | 6.1 | >0.1 |
| R8 | 0.3 | 2.8 | 0.3 | 2.8 | >0.1 |
| R9 | 0.4 | 2.8 | 0.4 | 2.9 | 0.1 |
| R10 | 0.5 | 2.9 | 0.7 | 3.1 | 0.1 |
| R11 | 8.0 | 12.3 | 8.4 | 12.7 | 0.4 |
| R12 | 7.8 | 12.1 | 8.2 | 12.5 | 0.4 |
| R13 | 2.0 | 4.4 | 2.0 | 4.4 | >0.1 |
| R14 | 1.3 | 3.8 | 1.4 | 3.9 | 0.1 |
| R15 | 0.3 | 2.9 | 0.4 | 2.9 | >0.1 |
| R16 | 0.2 | 2.9 | 0.3 | 2.9 | >0.1 |
| R18 | >0.1 | 2.5 | >0.1 | 2.5 | >0.1 |
| R26 | >0.1 | 2.4 | >0.1 | 2.4 | >0.1 |
| R27 | >0.1 | 2.4 | 0.1 | 2.4 | >0.1 |
| R29 | >0.1 | 2.4 | >0.1 | 2.4 | >0.1 |
| R30 | 0.4 | 3.6 | 0.4 | 3.6 | >0.1 |
| R31 | 0.2 | 2.6 | 0.3 | 2.6 | >0.1 |
| R32 | 0.1 | 3.1 | 0.1 | 3.1 | >0.1 |
| R33 | 0.2 | 3.1 | 0.2 | 3.1 | >0.1 |

11.5.1.26 The calculated annual concentrations being all well below 60 µg $m^{-3}$, it is unlikely that they will be any exceedance of the $NO_2$ hourly AQO. The magnitude of the impact will be negligible at all receptors, which is considered not significant in terms of the EIA Regulations.

11.5.1.27 The calculated concentrations of annual mean $PM_{10}$ at relevant human receptors are shown in Table 11.5.7 (receptors not alongside a modelled road have not been shown, the results at these receptors will be less than the maximum as the pollutant concentrations generated by the road traffic decrease with distance to the road). These concentrations may be compared with the AQS of 40 µg $m^{-3}$. It shows that the change in concentration due to the construction is negligible under the IAQM (2017) criteria. The magnitude of the impact will therefore be **negligible**, which is considered **not significant** in terms of the EIA Regulations.

**Table 11.5.7: Modelled Annual Mean PM10 Concentrations With and Without Construction Traffic at Human Receptors**

| Receptor | Without OnTI | | With OnTI | | Difference |
|---|---|---|---|---|---|
| | Road $PM_{10}$ (µg $m^{-3}$) | Total $PM_{10}$ (µg $m^{-3}$) | Road $PM_{10}$ (µg $m^{-3}$) | Total $PM_{10}$ (µg $m^{-3}$) | Total $PM_{10}$ (µg $m^{-3}$) |
| R1 | 0.2 | 8.1 | 0.2 | 8.1 | >0.1 |
| R2 | 0.1 | 9.0 | 0.1 | 9.0 | >0.1 |
| R3 | 0.5 | 10.4 | 0.5 | 10.4 | >0.1 |
| R4 | 0.2 | 10.4 | 0.2 | 10.4 | >0.1 |
| R5 | >0.1 | 10.1 | >0.1 | 10.1 | >0.1 |
| R6 | >0.1 | 8.9 | >0.1 | 8.9 | >0.1 |
| R7 | 0.4 | 8.6 | 0.4 | 8.6 | >0.1 |
| R8 | >0.1 | 7.5 | >0.1 | 7.5 | >0.1 |
| R9 | >0.1 | 9.5 | 0.1 | 9.5 | >0.1 |
| R10 | 0.1 | 7.4 | 0.1 | 7.4 | >0.1 |
| R11 | 0.7 | 8.5 | 0.7 | 8.5 | >0.1 |
| R12 | 0.7 | 8.5 | 0.7 | 8.5 | >0.1 |
| R13 | 0.3 | 6.4 | 0.3 | 6.4 | >0.1 |
| R14 | 0.2 | 6.7 | 0.2 | 6.7 | >0.1 |
| R15 | >0.1 | 7.0 | >0.1 | 7.0 | >0.1 |
| R16 | >0.1 | 10.2 | >0.1 | 10.2 | >0.1 |
| R18 | >0.1 | 9.0 | >0.1 | 9.0 | >0.1 |
| R26 | >0.1 | 7.6 | >0.1 | 7.6 | >0.1 |
| R27 | >0.1 | 8.3 | >0.1 | 8.3 | >0.1 |

| Table 11.5.7: Modelled Annual Mean PM10 Concentrations With and Without Construction Traffic at Human Receptors | | | | | |
|---|---|---|---|---|---|
| **Receptor** | **Without OnTI** | | **With OnTI** | | **Difference** |
| | **Road $PM_{10}$ (µg $m^{-3}$)** | **Total $PM_{10}$ (µg $m^{-3}$)** | **Road $PM_{10}$ (µg $m^{-3}$)** | **Total $PM_{10}$ (µg $m^{-3}$)** | **Total $PM_{10}$ (µg $m^{-3}$)** |
| R29 | >0.1 | 9.0 | >0.1 | 9.0 | >0.1 |
| R30 | >0.1 | 7.8 | >0.1 | 7.8 | >0.1 |
| R31 | >0.1 | 6.4 | >0.1 | 6.4 | >0.1 |
| R32 | >0.1 | 6.8 | >0.1 | 6.8 | >0.1 |
| R33 | >0.1 | 6.8 | >0.1 | 6.8 | >0.1 |

11.5.1.28 With the calculated $PM_{10}$ concentrations being well below, and well below 22.3 µg $m^{-3}$ (Scotland AQO) it is unlikely that they will be any exceedance of the $PM_{10}$ daily AQO. The magnitude of the impact will be **negligible** at all receptors, which is considered **not significant** in terms of the EIA Regulations.

11.5.1.29 The calculated concentrations of annual mean $PM_{2.5}$ at relevant (human) receptors are shown in Table 11.5.8 (receptors not alongside a modelled road have not been shown, the results at these receptors will be less than the maximum as the pollutant concentrations generated by the road traffic decrease with distance from the road). These concentrations may be compared with the AQS of 25 µg $m^{-3}$ (UK) and 10 µg $m^{-3}$ (Scotland). It shows that the change in concentration due to the construction traffic is classified as negligible under the IAQM (2017) criteria. The magnitude of the impact will therefore be **negligible**, which is considered **not significant** in terms of the EIA Regulations.

| Table 11.5.8: Modelled Annual Mean PM2.5 Concentrations With and Without Construction Traffic at Human Receptors | | | | | |
|---|---|---|---|---|---|
| **Receptor** | **Without OnTI** | | **With OnTI** | | **Difference** |
| | **Road $PM_{2.5}$ (µg $m^{-3}$)** | **Total $PM_{2.5}$ (µg $m^{-3}$)** | **Road $PM_{2.5}$ (µg $m^{-3}$)** | **Total $PM_{2.5}$ (µg $m^{-3}$)** | **Total $PM_{2.5}$ (µg $m^{-3}$)** |
| R1 | 0.1 | 5.0 | 0.1 | 5.0 | >0.1 |
| R2 | >0.1 | 5.4 | >0.1 | 5.4 | >0.1 |
| R3 | 0.3 | 6.2 | 0.3 | 6.2 | >0.1 |
| R4 | 0.1 | 6.1 | 0.1 | 6.1 | >0.1 |
| R5 | >0.1 | 5.9 | >0.1 | 5.9 | >0.1 |
| R6 | >0.1 | 5.2 | >0.1 | 5.2 | >0.1 |
| R7 | 0.2 | 5.2 | 0.2 | 5.3 | >0.1 |

**Table 11.5.8: Modelled Annual Mean PM2.5 Concentrations With and Without Construction Traffic at Human Receptors**

| Receptor | Without OnTI | | With OnTI | | Difference |
|---|---|---|---|---|---|
| | Road $PM_{2.5}$ (µg $m^{-3}$) | Total $PM_{2.5}$ (µg $m^{-3}$) | Road $PM_{2.5}$ (µg $m^{-3}$) | Total $PM_{2.5}$ (µg $m^{-3}$) | Total $PM_{2.5}$ (µg $m^{-3}$) |
| R8 | >0.1 | 4.8 | >0.1 | 4.8 | >0.1 |
| R9 | >0.1 | 5.7 | >0.1 | 5.7 | >0.1 |
| R10 | >0.1 | 4.7 | 0.1 | 4.7 | >0.1 |
| R11 | 0.4 | 5.5 | 0.4 | 5.5 | >0.1 |
| R12 | 0.4 | 5.5 | 0.4 | 5.5 | >0.1 |
| R13 | 0.1 | 4.2 | 0.1 | 4.2 | >0.1 |
| R14 | 0.1 | 4.3 | 0.1 | 4.3 | >0.1 |
| R15 | >0.1 | 4.5 | >0.1 | 4.5 | >0.1 |
| R16 | >0.1 | 6.1 | >0.1 | 6.1 | >0.1 |
| R218 | >0.1 | 5.4 | >0.1 | 5.4 | >0.1 |
| R26 | >0.1 | 4.8 | >0.1 | 4.8 | >0.1 |
| R27 | >0.1 | 5.1 | >0.1 | 5.1 | >0.1 |
| R29 | >0.1 | 5.5 | >0.1 | 5.5 | >0.1 |
| R30 | >0.1 | 4.9 | >0.1 | 4.9 | >0.1 |
| R31 | >0.1 | 4.2 | >0.1 | 4.2 | >0.1 |
| R32 | >0.1 | 4.4 | >0.1 | 4.4 | >0.1 |
| R33 | >0.1 | 4.4 | >0.1 | 4.4 | >0.1 |

11.5.1.30 Representation of ecological receptors have been taken at the closest points to the modelled roads and to the PAB for each sensitive area.

11.5.1.31 Concentrations of annual mean $NO_X$ at the ecological receptors are shown in Table 11.5.9 (receptor E5 is not alongside a modelled road and has not been shown, the results at this receptor will be less than the maximum as the pollutant concentrations generated by the road traffic decrease with distance from the road). These concentrations may be compared with the AQS of 30 µg $m^{-3}$. It shows that the increase in concentrations due to the OnTI is less than 0.1 µg $m^{-3}$ at all ecological receptors. The Total NOx is also well below the AQS. The magnitude of the impact will therefore be **negligible** at all sites, which is considered **not significant** in terms of the EIA Regulations.

| Table 11.5.9: Modelled Annual Mean NOX Concentrations With and Without Construction Traffic at Ecology Receptors | | | | | |
|---|---|---|---|---|---|
| **Receptor** | **Without OnTI** | | **With OnTI** | | **Difference** |
| | **Road $NO_X$ (µg $m^{-3}$)** | **Total $NO_X$ (µg $m^{-3}$)** | **Road $NO_X$ (µg $m^{-3}$)** | **Total $NO_X$ (µg $m^{-3}$)** | **Total $NO_X$ (µg $m^{-3}$)** |
| E1 | 0.2 | 3.3 | 0.2 | 3.3 | >0.1 |
| E2 | 0.4 | 3.6 | 0.4 | 3.6 | >0.1 |
| E3 | 0.7 | 4.1 | 0.7 | 4.1 | >0.1 |
| E4 | 0.1 | 3.1 | 0.1 | 3.1 | >0.1 |
| E6 | 0.1 | 2.9 | 0.1 | 2.9 | >0.1 |

11.5.1.32 Deposition rates of nitrogen onto ecological receptors from road traffic assessment (without background) are shown in Table 11.5.10. These concentrations may be compared with a minimum critical load of 10 kg N ha-1 yr-1 (valid for all SSSIs). It shows that the increase in concentrations due to the OnTI is less than 0.01 µg $m^{-3}$ and is less than 1 % of the critical load at all receptors. The magnitude of the impact will therefore be **negligible**, which is considered **not significant** in terms of the EIA Regulations.

| Table 11.5.10: Modelled Nitrogen Deposition Rates With and Without Construction Traffic at Ecology Receptors | | | |
|---|---|---|---|
| **Receptor** | **Without OnTI** | **With OnTI** | **Difference** |
| | **Road N (kg N $ha^{-1}$ $yr^{-1}$)** | **Road N (kg N $ha^{-1}$ $yr^{-1}$)** | **Road N (kg N $ha^{-1}$ $yr^{-1}$)** |
| E1 | 0.7 | 0.7 | >0.01 |
| E2 | 0.8 | 0.8 | >0.01 |
| E3 | 0.9 | 0.9 | >0.01 |
| E4 | 0.7 | 0.7 | >0.01 |
| E5 | 0.8 | 0.8 | >0.01 |
| E6 | 0.7 | 0.7 | >0.01 |

11.5.1.33 Deposition rates of acidity onto ecological receptors from road traffic assessment (without background) are shown in Table 11.5.11. These concentrations may be compared with a minimum MinCLminN of 0.142 (minimum for all SSSIs). It shows that the increase in concentrations due to the OnTI is less than 1 % of the critical load at all receptors. The magnitude of the impact will therefore be **negligible**, which is considered **not significant** in terms of the EIA Regulations.

| Table 11.5.11: Modelled Acidity Deposition Rates With and Without Construction Traffic at Ecology Receptors | | | |
|---|---|---|---|
| **Receptor** | **Without OnTI** | **With OnTI** | **Difference** |
| | **Road N (keq $ha^{-1}$ $yr^{-1}$)** | **Road N (keq $ha^{-1}$ $yr^{-1}$)** | **Road N (keq $ha^{-1}$ $yr^{-1}$)** |
| E1 | 0.05 | 0.05 | >0.001 |
| E2 | 0.06 | 0.06 | >0.001 |
| E3 | 0.06 | 0.06 | >0.001 |
| E4 | 0.05 | 0.05 | >0.001 |
| E5 | 0.06 | 0.06 | >0.001 |
| E6 | 0.05 | 0.05 | >0.001 |

### *11.5.2 Potential Decommissioning Effects*

**Temporary Increases in Dust / $PM_{10}$ on Human and Ecological Receptors**

11.5.2.1 After the lifetime of the Moray West Offshore Wind Farm (assumed to be up to 50 years), it is possible that the onshore substation may be retained and not decommissioned, in line with a consent in perpetuity. However, in accordance with the Scoping Report and Scoping Opinion, the most likely decommissioning scenario for the OnTI is also considered here. It is assumed that all underground equipment and the onshore substation foundations will remain in-situ. Above ground equipment at the onshore substation site will be cleared and the site reinstated. It is assumed that the demolition of buildings will be required.

**Magnitude of Impact**

11.5.2.2 It is estimated that the total volume of the OnTI to be decommissioned will be below 20,000 $m^3$, with low potential for dust release. As a result, the dust emission magnitude for demolition activities at the onshore substation site is considered to be **low**, as defined by the IAQM (2014).

**Sensitivity of Receptors**

11.5.2.3 There are currently limited receptors in the vicinity of the onshore substation site. In addition, it is not possible to predict the future presence / occurrence of receptors. As for the construction dust assessment, and as a worst case, the sensitivity of the area with respect to dust soiling effects on people and property in relation to demolition activities during decommissioning is considered to be **high**, based on IAQM guidance.

11.5.2.4 The maximum estimated existing background $PM_{10}$ concentration within the PAB is 10.0 $\mu gm^{-3}$ (taken from Defra background maps). As the presence / occurrence of receptors cannot be predicted, and as a worst case, the sensitivity of the area with respect to human health impacts in relation to demolition during decommissioning is considered to be **moderate**, as defined by IAQM guidance.

11.5.2.5 There are no ecological sites located within 50 m of the onshore substation site. The closest ecological site is Den of Pitlurg SSSI located more than 200 m away. The sensitivity of the area with respect to dust soiling effects on ecological receptors in relation to demolition is therefore considered to be **low**.

11.5.2.6 The sensitivity of the surrounding area is summarised in Table 11.5.12.

| Table 11.5.12: Sensitivity of Surrounding Area to Demolition as Defined by IAQM (2014) Guidance | |
|---|---|
| **Potential Impact** | **Sensitivity** |
| Dust soiling | High |
| Human health | Moderate |
| Den of Pitlurg SSSI | Low |

**Risk Categorisation of Dust Impacts**

11.5.2.7 The dust emission magnitude classes combined with the sensitivity of surrounding area classes, result in the site risk categories shown in Table 11.5.13.

| Table 11.5.13: Summary of Dust Risk for Demolition Decommissioning as Defined by IAQM (2014) Guidance | |
|---|---|
| **Potential Impact** | **Risk** |
| Dust soiling | Moderate risk |
| Human health | Low risk |
| Den of Pitlurg SSSI | Low risk |

11.5.2.8 The IAQM guidance considers the risk of effects in the absence of 'site-specific' mitigation measures so that they can be developed accordingly. The risk of demolition dust during the decommissioning phase is considered to be **moderate** with regard to dust soiling impact on people and properties, and **low** with regard to human health impact and to ecological impact at Pitlurg SSSI before 'site-specific' mitigation measures are applied.

**Significance of Effects**

11.5.2.9 IAQM recommends that significance is only assigned to an effect after considering the construction activity with 'site-specific' mitigation measures applied. The finding that without dust controls there would be a moderate risk of impact has helped inform the mitigation measures to be applied (identified in Section 11.6); these measures are expected to ensure that the risk of impact is reduced to negligible levels. The significance of effects is set out in Table 11.7.1.

**Temporary Increases in Traffic Based Air Quality Pollutant Concentrations – Human and Ecology Receptor Locations**

11.5.2.10 It is not currently possible to specify traffic data for the decommissioning phase. The AADT for the construction phase is therefore assumed as an upper bound, and the conclusions reached for the traffic based construction assessment are considered valid for the road traffic generated by the OnTI during decommissioning.

## 11.6 Additional Mitigation and Enhancement Measures

11.6.1.1 Table 11.6.1 lists standard highly recommended 'site specific' mitigation measures according to IAQM (IAQM, 2014) guidance that should be incorporated during construction and decommissioning based on the dust risk assessment undertaken in this chapter. It is considered that these measures can be secured via planning conditions relating to documents guiding construction activities.

| Table 11.6.1: Air Quality Additional Mitigation Measures | |
|---|---|
| **Mitigation Area** | **Additional Mitigation Measure to be Incorporated** |
| Communication | • Develop and implement a stakeholder communications plan that includes community engagement before work commences on site;<br>• Display the name and contact details of person(s) accountable for air quality and dust issues. This may be the environment manager / engineer or the site manager;<br>• Display the head or regional office contact information; and<br>• Develop and implement a Dust Management Plan (DMP), which may include measures to control other emissions, approved by the Local Authority. The level of detail will depend on the risk, and should include as a minimum the highly recommended measures in this document. The desirable measures should be included as appropriate for the site. |
| Site management | • Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken;<br>• Make the complaints log available to the local authority when asked;<br>• Record any exceptional incidents that cause dust and / or air emissions, either on- or offsite, and the action taken to resolve the situation in the log book; and<br>• Hold regular liaison meetings with other high risk construction sites within 500 m of the PAB, 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. |
| Preparing and maintaining the site | • Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible;<br>• Erect solid screens or barriers around dusty activities that are at least as high as any stockpiles on site;<br>• Fully enclose site or specific operations where there is a high potential for dust production and the site is active for an extensive period;<br>• Avoid site runoff of water or mud;<br>• Keep site fencing, barriers and scaffolding clean using wet methods;<br>• Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site. If they are being re-used onsite cover as described below; and<br>• Cover, seed or fence stockpiles to prevent wind whipping. |
| Operating vehicle / machinery and sustainable travel | • Ensure all vehicles switch off engines when stationary – no idling vehicles;<br>• Avoid the use of diesel or petrol powered generators and use mains electricity or battery powered equipment where practicable;<br>• Impose and signpost a maximum-speed-limit of 15 mph on surfaced and 10 mph on unsurfaced haul roads and work areas (if long haul routes are required these speeds may be increased with suitable additional control measures provided, subject to the approval of the nominated undertaker and with the agreement of the local authority, where appropriate);<br>• Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials; and |

| Table 11.6.1: Air Quality Additional Mitigation Measures | |
|---|---|
| **Mitigation Area** | **Additional Mitigation Measure to be Incorporated** |
| | • Implement a Travel Plan that supports and encourages sustainable travel (public transport, cycling, walking, and car-sharing). |
| Operations | • Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems;<br>• Ensure an adequate water supply on the site for effective dust / particulate matter suppression / mitigation, using non-potable water where possible and appropriate'<br>• Use enclosed chutes and conveyors and covered skips;<br>• Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate; and<br>• 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. |
| Waste management | • Avoid bonfires and burning of waste materials; and<br>• Dispose of waste in accordance with Site Waste Management Plan. |
| Earthworks | • Re-vegetate earthworks and exposed areas / soil stockpiles to stabilise surfaces as soon as practicable;<br>• Use Hessian, mulches or trackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as practicable; and<br>• Only remove the cover in small areas during work and not all at once |
| Construction | • Avoid scabbling (roughening of concrete surfaces) if possible;<br>• 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;<br>• Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery; and<br>• For smaller supplies of fine power materials ensure bags are sealed after use and stored appropriately to prevent dust. |
| Trackout | • Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site. This may require the sweeper being continuously in use;<br>• Avoid dry sweeping of large areas;<br>• Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport;<br>• Inspect onsite haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable;<br>• Record all inspections of haul routes and any subsequent action in a site log book;<br>• Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers and regularly cleaned;<br>• Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable); |

| Table 11.6.1: Air Quality Additional Mitigation Measures | |
|---|---|
| **Mitigation Area** | **Additional Mitigation Measure to be Incorporated** |
| | • Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits; and<br>• Access gates to be located at least 10 m from receptors where possible. |
| Demolition during decommissioning | • Ensure effective water suppression is used during demolition operations. Hand held sprays 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;<br>• Avoid explosive blasting, using appropriate manual or mechanical alternatives; and<br>• Bag and remove any biological debris or damp down such material before demolition. |

## 11.7 Residual Effects

11.7.1.1 A summary of the assessments undertaken and the residual effects is included in Table 11.7.1.

| Table 11.7.1: Summary of Assessment | | | | | | |
|---|---|---|---|---|---|---|
| **Potential Effect** | **Nature** | **Probability** | **Sensitivity of Receptor** | **Magnitude of Impact** | **Significance of Effect** | **Rationale** |
| **Construction** | | | | | | |
| Construction dust – dust soiling. | Direct, temporary. | Likely | High | Negligible | Negligible (Not Significant) | Application of additional mitigation measures. |
| Construction dust – human health. | Direct, temporary. | Likely | High | Negligible | Negligible (Not Significant) | Application of additional mitigation measures. |
| Construction dust – Mill Wood SSSI / Den of Pitlurg SSSI. | Direct, temporary. | Likely | High | Negligible | Negligible (Not Significant) | Application of additional mitigation measures. |
| Construction dust – Cullen to Stake Ness Coast SSSI. | Direct, temporary. | Likely | High | Negligible | Negligible (Not Significant) | Application of additional mitigation measures. |
| Traffic based pollutants – human receptors. | Direct, temporary. | Likely | High | Negligible | Negligible (Not Significant) | Increase in concentrations well below criteria. |
| Traffic pollutants – ecology receptors. | Direct, temporary. | Likely | Moderate – High | Negligible | Negligible (Not Significant) | Increase in concentrations well below critical load. |
| **Operational** | | | | | | |
| Scoped out. | | | | | | |

| Table 11.7.1: Summary of Assessment | | | | | | |
|---|---|---|---|---|---|---|
| **Potential Effect** | **Nature** | **Probability** | **Sensitivity of Receptor** | **Magnitude of Impact** | **Significance of Effect** | **Rationale** |
| **Decommissioning** | | | | | | |
| Demolition dust – dust soiling. | Direct, temporary | Possible | High | Negligible | Negligible (Not Significant) | Application of additional mitigation measures. |
| Demolition dust impacts – human receptors | Direct, temporary | Possible | High | Negligible | Negligible (Not Significant) | Application of additional mitigation measures. |
| Demolition dust impacts – Den of Pitlurg SSSI | Direct, temporary | Possible | Moderate | Negligible | Negligible (Not Significant) | Application of additional mitigation measures. |

## 11.8 Cumulative Effects

11.8.1.1 As noted in Chapter 3: The Environmental Impact Assessment Process, there are two other proposed developments within 5 km of the PAB, the potential effects of which could be significant when considered cumulatively with those of the OnTI. The other proposed developments are Aultmore Wind Energy Project and Lurg Hill Wind Farm. It should be noted that the Environmental Statements for both of these proposed developments do not contain air quality assessments; it is therefore not possible to undertake a detailed cumulative assessment.

11.8.1.2 Specific construction timelines for both of these wind energy developments are not known. However, Aultmore Wind Energy Project is consented and its construction is proposed to last 10 months. The planning application for Lurg Hill Wind Farm remains undetermined; it's construction programme is proposed to last seven to eight months and it is proposed that this commences during 2019. It is considered likely that both of these other proposed developments will be constructed prior to the OnTI, the construction of which is proposed to commence in 2022.

11.8.1.3 Depending upon the final route of the onshore cable circuits, should the construction programmes of one, or both of the wind energy developments overlap with that of the OnTI, there will be potential for cumulative air quality effects. However, due to the temporary nature of cable circuit installation, and the fact that it is only likely to be occurring in specific locations within the PAB at any one time, it is considered unlikely that the associated emissions will significantly contribute to those from the other proposed developments. As the onshore substation site is over 10 km from the sites of either wind energy development, OnTI construction activities in this location are also unlikely to give rise to any cumulative effects.

## 11.9 References

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