Sure Partners Limited

ARKLOW BANK WIND PARK PHASE 2 ONSHORE GRID INFRASTRUCTURE

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

VOLUME II

Chapter 7 Air Quality

ARUP

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Contents

7 Air Quality

7.1 Introduction

This chapter assesses the likely significant effects of the proposed development on air quality including a qualitative assessment of air emissions.

Chapter 5 *Description of Development* provides a description of the proposed development and **Chapter 6** *Construction Strategy* describes the construction strategy for the proposed development. The following aspects are particularly relevant to the air quality assessment:

- Construction and Decommissioning:
  - Aspects relating particularly to the construction of the proposed development, including mitigation measures to reduce dust impacts.
- Operation:
  - Aspects relating particularly to the operation and maintenance of the proposed development.

The potential effects of emissions of carbon due to the proposed development are considered in the context of Ireland's national climate change obligations, in **Chapter 8** *Climate*.

7.2 Assessment Methodology

7.2.1 General

Air quality assessments are concerned with the presence of airborne pollutants in the atmosphere. The likely significant effects of the proposed development on air quality have been assessed by considering the background concentration levels of pollutants in the atmosphere and the potential for construction, operational and decommissioning (where relevant) effects associated with the proposed development.

This assessment has been undertaken with regard to the National Roads Authority (NRA (now Transport Infrastructure Ireland (TII)) (2011) *Guidelines for the Treatment of Air Quality during the Planning and Construction of National Roads Schemes* (TII Guidelines) and Institute of Air Quality Management (IAQM) (2014) *Guidance on the assessment of dust from demolition and construction* (IAQM Guidance).

These guidelines provide a methodology for the assessment, management and mitigation of air quality which can be adapted accordingly depending on the nature of the works.

The TII guidelines state that increases in Annual Average Daily Traffic (AADT) flows of less than 5% and 10% during the operational and construction phases respectively are unlikely to result in significant air quality effects.

Likely significant effects on air quality are therefore assessed when the AADT flows are projected to increase above these thresholds due to the construction and/or operation of the proposed development. As there is no projected increase in traffic volumes above 5% during the operational phase, this has been scoped out of the assessment. Only the construction phase traffic has been assessed. Potential impacts are assessed using the Highways England (2007) *UK Design Manual for Roads and Bridges (DMRB) Screening Method.*

Predicted concentrations due to the construction / operation of the proposed development are then compared to the relevant limit values described in **Section 7.2.2** to determine likely significant effects. Where possible, excavated material will be reused and quantities of waste minimised, reducing the emissions associated with the proposed development.

7.2.2 Guidance and Legislation

Limit values for a range of air pollutants have been set through European and national legislation. These limit values are set for the protection of human health and ecosystems.

7.2.2.1 Air Quality Standards

On 12 April 2011, the *Air Quality Standards (AQS) Regulations 2011* came into force and transposed *EU Directive 2008/50/EC* on ambient air quality and cleaner air for Europe into Irish law. The purpose of the AQS Regulations is to:

- establish limit values and alert thresholds for concentrations of certain pollutants;
- to provide for the assessment of certain pollutants using methods and criteria common to other European Member States;
- to ensure that adequate information on certain pollutant concentrations is obtained and made publicly available; and
- to provide for the maintenance and improvement of ambient air quality where necessary.

The limit values established under the AQS Regulations relevant to this assessment (pollutants of concern) are included in **Table 7.1**.

Table 7.1 Limit values in the AQS Regulations

Pollutant	Limit value for the protection of:	Averaging period	Limit value ($\mu g/m^3$)	Basis of application of limit value
NO_2	Human Health	1-hour	200	≤ 18 exceedances p.a. (99.79%ile)

Pollutant	Limit value for the protection of:	Averaging period	Limit value ($\mu g/m^3$)	Basis of application of limit value
(Nitrogen Dioxide)		Calendar year	40	Annual mean
NO_x (Oxides of Nitrogen)	Vegetation	Calendar year	30	Annual mean
PM_{10} (Particulate Matter)	Human Health	24-hours	50	≤ 35 exceedances p.a. (90%ile)
		Calendar year	40	Annual mean
$PM_{2.5}$ (Particulate Matter)	Human Health	Calendar year	25	Annual mean
Carbon Monoxide	Human Health	8 hours	10,000	Maximum daily 8 hour mean
Benzene	Human Health	Calendar year	5	Annual mean

There are no statutory limits for dust at a European or national level. However, TA Luft (2002) *Technical Instructions on Air Quality* provides a guideline for the rate of dust deposition of 350 mg/m^2/day averaged over one year. The EPA concurs that this guideline may be applied, although the EPA typically applies the guideline limit as a 30-day average.

7.2.2.2 Institute of Air Quality Management Guidance

The Institute of Air Quality Management (IAQM) *Guidance on the assessment of Dust from Demolition and Construction*, 2014 gives guidance to air quality consultants and environmental health officers on how to assess air quality impacts from construction activities. The IAQM guidance provides a method for classifying the significance of effect from construction activities based on the 'dust magnitude' (high, medium or low) and proximity of the site to the closest receptors. The guidance recommends that once the significance of effect from construction is identified, the appropriate mitigation measures are implemented. The guidance notes that once the appropriate mitigation measures are applied, in most cases the resulting dust impacts can be reduced to negligible levels.

7.2.3 Study Area

The Arklow Bank Wind Park (ABWP) is an offshore wind farm, located off the coast of County Wicklow, on the east coast of Ireland.

The proposed development will comprise the onshore grid infrastructure associated with the Arklow Bank Wind Park Phase 2 (the Project).

This proposed development includes 220kV onshore export cable circuits and fibre optic cables, from the landfall of the offshore export cable circuits at Johnstown North, to a proposed onshore 220kV substation at Shelton Abbey and from the new substation to the National Electricity Transmission Network (NETN). An overview of the proposed development is shown in **Figure 5.1** of **Chapter 5** *Description of Development.*

Most of the cable route is through private lands, with small sections along public roads. The land along and adjacent to the proposed cable route is primarily zoned as agricultural with some single residential dwellings. Some sections of the route are classed as mixed land use and new residential, with some small sections of the route passing through areas that are primarily urban in nature (being in public roads within Arklow). The urban areas are zoned as employment areas (according to the Arklow and Environs LAP 2018-2024), residential areas and commercial areas.

Land use is dominated by intensive agriculture and the field size is generally large with few internal hedgerows. Arable crops predominate and large arable fields are generally of low ecological value.

Sensitive receptor locations are defined by TII guidance as *residential housing, schools, hospitals, places of worship, sports centres and shopping areas, i.e. locations where members of the public are likely to be regularly present.*

There are a number of sensitive receptors located in the vicinity of the proposed development. The closest sensitive receptors include some single residential dwellings in agricultural areas along the proposed cable route, see **Figure 7.1**.

The closest receptors include residential dwellings c. 10-20m from the cable route, located near roadsides.

There are three locations where horizontal directional drilling (HDD) will take place during the construction phase, including; the landfall, the R772 and the M11 (worst-case option). The closest sensitive receptors to these works are located c. 300m from the landfall, c. 180m from the M11 HDD crossing and c. 100m from the R772 crossing.

Other sensitive receptors along the proposed cable route include the following;

- Aisling House Nursing Home located c. 300m east of the proposed cable route at Seabank;
- The visitor's walkway to Porter's Rock located c. 730m east of the proposed cable route;
- The Asgard Lodge Nursing Home and Irish Wheelchair Association are located c. 150m south of the proposed cable route at Kilbride; and
- The Templerainy Church and St Joseph's National School are located c. 1km east of the proposed cable route.

There is also residential ribbon development located along the proposed cable route at Kilbride, close to the M11 crossing.

The proposed substation site is located within an industrial area in the Avoca River Business Park, Shelton Abbey.

There is a Right of Way along the canal adjacent to the Avoca River which borders the substation site. There is a sports facility and a Gaelcholáiste located c. 1.25km south-east of the proposed substation site.

The Buckroney-Brittas Dunes and Fen SAC (000729) and pNHA are located c. 500m north of the landfall. The Arklow Town Marsh pNHA (001931) is located c. 480m southeast of the substation site. The Avoca River Valley pNHA (001748) is located c. 730m southwest of the substation. The Arklow Sand Dunes pNHA (001746) is located c. 1km east of the cable route at Seabank. The ecological sensitivities associated with these areas are assessed in **Chapter 12** *Biodiversity*.

7.2.4 Categorisation of the Baseline Environment

A desk-based study of the baseline environment of the proposed development area was undertaken in order to inform this assessment. The following EPA Air Quality Reports were referred to:

- Environmental Protection Agency (2020) Air Quality in Ireland 2019- Indicators of Air Quality
- Environmental Protection Agency (2019). Air Quality in Ireland 2018- Indicators of Air Quality
- Environmental Protection Agency (2018) Air Quality in Ireland 2017- Indicators of Air Quality

7.2.5 Impact Assessment Methodology

7.2.5.1 Significance Criteria

Dust Assessment

The construction effects have been assessed using the qualitative approach described in the latest IAQM guidance, as detailed in **Section 7.2.2.2**. The guidance applies to the assessment of dust from construction and demolition activities.

An ‘impact’ is described as a change in pollutants concentrations or dust deposition, while an ‘effect’ is described as the consequence of an impact. The main impacts that may arise during construction of the proposed development are:

- dust deposition, resulting in the soiling of surfaces;
- visible dust plumes;
- elevated PM_{10} concentrations as a result of dust generating activities on site; and
- an increase in NO_2 and PM_{10} concentrations due to exhaust emissions from non-road mobile machinery (NRMM) and vehicles accessing the site.

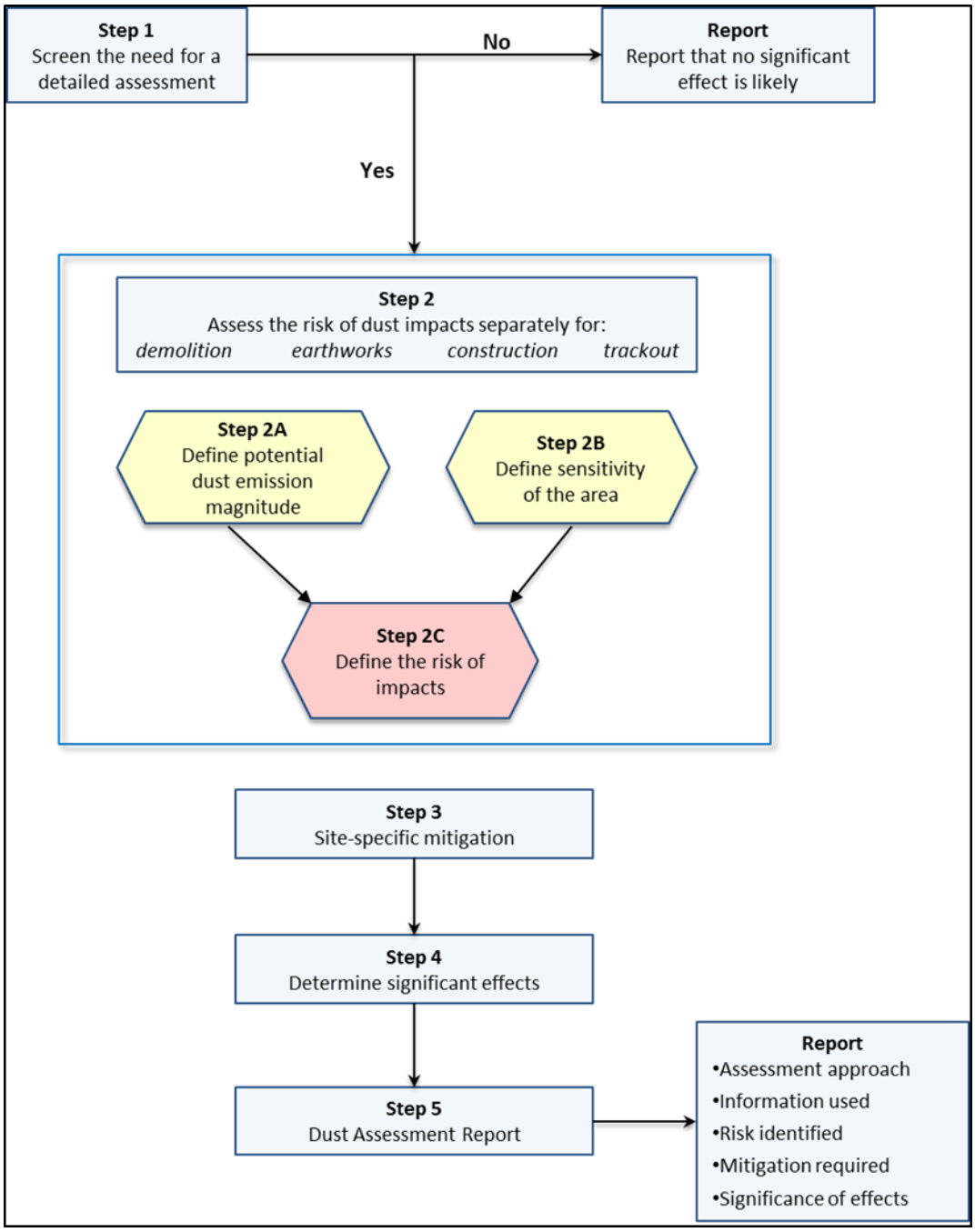
The IAQM guidance considers the potential for dust emissions from dust-generating activities, such as demolition of existing structures, earthworks, construction of new structures and track-out. Earthworks refer to the processes of soil stripping, ground levelling, excavation and land capping, while track-out is the transport of dust and dirt from the site onto the public road network where it may be deposited and then re-suspended by vehicles using the network. This arises when vehicles leave the site with dusty materials, which may then spill onto the road, or when they travel over muddy ground on site and then transfer dust and dirt onto the road network.

For each of these dust-generating activities, the guidance considers three separate effects: annoyance due to dust soiling; harm to ecological receptors; and the risk of health effects due to a significant increase in PM_{10} exposure.

The receptors can be human or ecological and are chosen based on their sensitivity to dust soiling and PM_{10} exposure.

The methodology takes into account the scale to which the above effects are likely to be generated (classed as small, medium or large), along with the levels of background PM_{10} concentrations and the distance to the closest receptor, in order to determine the sensitivity of the area. This is then taken into consideration when deriving the overall risk for the site. Suitable mitigation measures are also proposed to reduce the risk of the site. **Table 7.2** outlines the steps to be undertaken, as per the IAQM guidance.

Table 7.2 Steps to undertaking dust assessment (Source: IAQM Guidance)



Step 1: Screen need for assessment

The first step is the initial screening to determine whether a detailed assessment is required. According to the IAQM guidance, an assessment is required where there are sensitive receptors within 350m of the site boundary, for ecological receptors within 50m of the site boundary and/or within 50m of the route(s) used by the construction vehicles on the public highway and up to 500m from the site entrance(s).

There are sensitive receptors within 350m of the site boundary so therefore an assessment of the air quality effects are required.

There are no ecological sensitive areas in proximity to the proposed development (as per above thresholds), therefore, the potential air quality effects on such receptors can be screened out and do not need to be considered further.

Step 2: Assess the risk of dust impacts

This step is split into three sections as follows:

- Define the potential dust emission magnitude;
- Define the sensitivity of the area; and
- Define the risk of impacts.

Each of the dust-generating activities is given a dust emission magnitude depending on the scale and nature of the works (Step 2A) based on the criteria shown in **Table 7.3**.

Table 7.3 Categorisation of dust emission magnitude

Dust Emission Magnitude		
Small	Medium	Large
Demolition		
• total building volume <20,000m^3 • construction material with low potential for dust release (e.g. metal cladding or timber) • demolition activities <10m above ground • demolition during wetter months	• total building volume 20,000 - 50,000m^3 • potentially dusty construction material • demolition activities 10 - 20m above ground level	• total building volume >50,000m^3 • potentially dusty construction material (e.g. concrete) • on-site crushing and screening • demolition activities >20m above ground level
Earthworks		
• total site area <2,500m^2 • soil type with large grain size (e.g. sand) • <5 heavy earth moving vehicles active at any one time • formation of bunds <4m in height • total material moved <10,000 tonnes • earthworks during wetter months	• total site area 2,500m^2 - 10,000m^2 • moderately dusty soil type (e.g. silt) • 5 – 10 heavy earth moving vehicles active at any one time • formation of bunds 4 - 8m in height • total material moved 20,000 - 100,000 tonnes	• total site area >10,000m^2 • potentially dusty soil type (e.g. clay, which will be prone to suspension when dry due to small particle size) • >10 heavy earth moving vehicles active at any one time • formation of bunds >8m in height • total material moved >100,000 tonnes
Construction		
• total building volume <25,000 m^3 • construction material with low potential for dust release (e.g. metal cladding or timber)	• total building volume 25,000 - 100,000m^3 • potentially dusty construction material (e.g. concrete)	• total building volume >100,000m^3 • on-site concrete batching • sandblasting

Dust Emission Magnitude		
	• on-site concrete batching	
Trackout		
• <10 HDV (>3.5t) outward movements in any one day • surface material with low potential for dust release • unpaved road length <50m	• 10 – 50 HDV (>3.5t) outward movements in any one day • moderately dusty surface material (e.g. high clay content) • unpaved road length 50 – 100m;	• >50 HDV (>3.5t) outward movements in any one day • potentially dusty surface material (e.g. high clay content) • unpaved road length >100m

The sensitivity of the surrounding area is then determined (Step 2B) for each dust effect from the above dust-generating activities, based on the proximity and number of receptors, their sensitivity to dust, the local PM_{10} background concentrations and any other site-specific factors. **Table 7.4** and **Table 7.5** show the criteria for defining the sensitivity of the area to different dust effects.

The health effects of PM_{10} on *high sensitivity receptors* includes residential areas, residential properties, schools and residential care homes in close proximity to the proposed development.

Table 7.4 Sensitivity of the area to human health impacts

Background PM_{10} concentrations (annual mean)	**Number of receptors**	**Distance from the source (m)**				
		< 20	**< 50**	**< 100**	**< 200**	**< 350**
High receptor sensitivity						
> 32µg/m^3	> 100	High	High	High	Medium	Low
	10 – 100			Medium	Low	
	< 10		Medium	Low		
28 – 32µg/m^3	> 100	High	High	Medium	Low	Low
	10 – 100		Medium	Low		
	< 10					
24 – 28µg/m^3	> 100	High	Medium	Low	Low	Low
	10 – 100					
	< 10	Medium	Low			
< 24µg/m^3	> 100	Medium	Low	Low	Low	Low
	10 – 100	Low				
	< 10					
Medium receptor sensitivity						
–	> 10	High	Medium	Low	Low	Low
	< 10	Medium	Low			
Low receptor sensitivity						
–	> 1	Low	Low	Low	Low	Low

Table 7.5 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
	< 10	Medium	Low	Low	Low
Medium	> 1	Medium	Low	Low	Low
Low	> 1	Low	Low	Low	Low

The overall risk of the impacts for each activity is then determined (Step 2C) prior to the application of any mitigation measures (defined in **Table 7. 6**) and an overall risk for the site is derived.

Table 7. 6 Risk of dust impacts

Sensitivity of area	Dust Emission Magnitude		
	Large	**Medium**	**Small**
Demolition			
High	High risk site	Medium risk site	Medium risk site
Medium	High risk site	Medium risk site	Low risk site
Low	Medium risk site	Low risk site	Negligible
Earthworks			
High	High risk site	Medium risk site	Low risk site
Medium	Medium risk site	Medium risk site	Low risk site
Low	Low risk site	Low risk site	Negligible
Construction			
High	High risk site	Medium risk site	Low risk site
Medium	Medium risk site	Medium risk site	Low risk site
Low	Low risk site	Low risk site	Negligible
Trackout			
High	High risk site	Medium risk site	Low risk site
Medium	Medium risk site	Low risk site	Negligible
Low	Low risk site	Low risk site	Negligible

Traffic Assessment

The air quality assessment utilises the traffic data provided in **Chapter 13** *Traffic and Transportation* to assess the likely significant effects of construction traffic on air quality.

As noted in **Section 7.2.1**, the TII guidelines state that increases in AADT flows during the construction phase of less than 10% are unlikely to result in significant effects on air quality.

As described in **Section 7.5.2.2**, there are four locations where construction traffic will result in a significant increase (>10%) in AADT flows due to traffic diversions and numbers of anticipated construction vehicles.

The Highways England (2007) *UK Design Manual for Roads and Bridges (DMRB) Screening Method* spreadsheet is used in this assessment to assess the likely significant effects of construction traffic on sensitive receptors. This spreadsheet calculates annual average concentrations of NO_x, NO_2, Benzene, CO and PM.

As outlined in the Highways England (2020) *UK Design Manual for Roads and Bridges Environmental and Sustainability Appraisal – Air Quality*, the DMRB spreadsheet can be used for simple air quality assessments. Given the nature of the changes in traffic levels associated with the proposed development, this assessment methodology is considered appropriate.

The DMRB spreadsheet method computes concentrations of pollutants based on factors including:

- Distance of receptors to the centreline of each road;
- Annual Average Daily Traffic (AADT) flows;
- Design speed of each road;
- Heavy Goods Vehicle (HGV) percentage;
- Road type; and
- Background pollutant concentrations.

Annual average concentrations for the traffic related pollutants NO_x, NO_2, PM, benzene and CO were modelled at each sensitive receptor identified in **Section 7.5.2.2**. The predicted concentrations of each pollutant are compared to the AQS limit values, as outlined in **Table 7.1**.

Significance criteria have been adopted from the TII Guidelines and are presented in **Table 7.7** to **Table 7.9**. These criteria provide a basis for assessing the level of effects due to the additional traffic present during construction.

Table 7.7 Definition of impact magnitude for changes in ambient pollutant concentrations

Magnitude of Change	Annual Mean NO_2/PM_{10}	Annual Mean $PM_{2.5}$
Large	Increase/decrease 4 ≥ µg/m^3	Increase/decrease ≥2.5 µg/m^3
Medium	Increase/decrease 2-<4µg/m^3	Increase/decrease 1.25 -<2.5µg/m^3
Small	Increase/decrease 0.4-<2µg/m^3	Increase/decrease 0.25-<1.25µg/m^3
Imperceptible	Increase/decrease <0.4µg/m^3	Increase/decrease <0.25µg/m^3

Table 7.8 Air quality effect descriptors for changes to annual mean nitrogen dioxide and PM_{10} and $PM_{2.5}$ concentrations at a receptor

Absolute Concentration in Relation to Objective/Limit Value	**Change in Concentration***		
	Small	Medium	Large
Increase with Scheme			
Above Objective/Limit Value With Scheme (≥40 μg/m^3 of NO_2 or PM_{10}) (≥25μg/m^3 of $PM_{2.5}$)	Slight Adverse	Moderate Adverse	Substantial Adverse
Just Below Objective/Limit Value With Scheme (36≤40 μg/m3 of NO_2 or PM_{10}) (22.5≤25μg/m^3 of $PM_{2.5}$)	Slight Adverse	Moderate Adverse	Moderate Adverse
Below Objective/Limit Value With Scheme (30≤36 μg/m^3 of NO_2 or PM_{10}) (18.75≤22.5 μg/m^3 of $PM_{2.5}$)	Negligible	Slight Adverse	Slight Adverse
Well Below Objective/Limit Value With Scheme (<30 μg/m^3 of NO_2 or PM_{10}) (<18.75μg/m^3 of $PM_{2.5}$)	Negligible	Negligible	Slight Adverse
Decrease with Scheme			
Above Objective/Limit Value Without Scheme (≥40 μg/m^3 of NO_2 or PM_{10}) (≥25μg/m^3 of $PM_{2.5}$)	Sight Beneficial	Moderate Beneficial	Substantial Beneficial
Just Below Objective/Limit Value Without Scheme (36-<40 μg/m^3 of NO_2 or PM_{10}) (22.5-<25μg/m^3 of $PM_{2.5}$)	Sight Beneficial	Moderate Beneficial	Moderate Beneficial
Below Objective/Limit Value Without Scheme (30-<36 μg/m^3 of NO_2 or PM_{10}) (18.75-<22.5 μg/m^3 of $PM_{2.5}$)	Negligible	Slight Beneficial	Slight Beneficial
Well Below Objective/Limit Value Without Scheme (<30 μg/m^3 of NO_2 or PM_{10}) (<18.75μg/m3 of $PM_{2.5}$)	Negligible	Negligible	Slight Beneficial

***** Where the impact magnitude is imperceptible, then the impact description is negligible.

Table 7.9 Air quality effect descriptors for changes to number of days with PM_{10} concentration greater than 50 μg/m^3 at a receptor

Absolute Concentration in Relation to Objective/Limit Value	**Changes in Concentration**		
	Small	**Medium**	**Large**
Increase with Scheme			
Above Objective/Limit Value with scheme (≥35 days)	Slight Adverse	Moderate Adverse	Substantial Adverse
Just Below Objective/Limit Value with scheme (32-<35 days)	Slight Adverse	Moderate Adverse	Moderate Adverse
Below Objective/Limit Value with scheme (26-<32 days)	Negligible	Slight Adverse	Slight Adverse

Absolute Concentration in Relation to Objective/Limit Value	Changes in Concentration		
	Small	**Medium**	**Large**
Well Below Objective/Limit Value with scheme (<26 days)	Negligible	Negligible	Slight Adverse
Decrease with Scheme			
Above Objective/Limit Value without scheme (≥35 days)	Slight Beneficial	Moderate Beneficial	Substantial Beneficial
Just Below Objective/Limit Value without scheme (32-<35 days)	Slight Beneficial	Moderate Beneficial	Moderate Beneficial
Below Objective/Limit Value without scheme (26-<32 days)	Negligible	Slight Beneficial	Slight Beneficial
Well Below Objective/Limit Value without scheme (<26 days)	Negligible	Negligible	Slight Beneficial

7.3 Baseline Conditions

The Environmental Protection Agency (EPA) *Air Quality in Ireland Reports* describes the air quality zoning adopted in Ireland under the *Air Quality Standards Regulations, 2011* as follows:

- Zone A (Dublin conurbation);
- Zone B (Cork conurbation);
- Zone C (24 Cities and towns); and
- Zone D (Rural Ireland: areas not in Zones A, B and C).

The site falls within Zone D. Background levels from 2019, 2018 and 2017 air quality monitoring of NO_2, NO_x, CO, Benzene, $PM_{2.5}$ and PM_{10} in Zone D provided by the EPA are presented in **Table 7.10**.

Concentrations of each pollutant recorded in Zone D are averaged to represent typical background levels. Average concentrations were obtained from all stations where 90% data capture was achieved. This is in accordance with *Directive 2008/50/EC* which specifies that any site used for assessment purposes must comply with 90% data capture.

Pollutant background concentrations are considered in this assessment. **Table 7.10** presents a three-year average of background pollutant concentration values for NO_2, $PM_{2.5}$ and PM_{10}. The EPA monitoring reports state that the NO_x annual mean limit value for the protection of vegetation only applies to Zone D.

In the absence of data for Zone D, Zone C data was used to establish an appropriate baseline.

Table 7.10 Annual Mean Background Pollutant Concentrations for Zone D

Year	Annual Average NO_2 ($\mu g/m^3$)	Annual Average PM_{10} ($\mu g/m^3$)	Annual Average $PM_{2.5}$ ($\mu g/m^3$)	Annual Average NO_x ($\mu g/m^3$)	8-hr Annual Average CO ($\mu g/m^3$)	Annual Average Benzene ($\mu g/m^3$)
Limit	40 µg/m³	40 µg/m³	20 µg/m³	30 µg/m³	10,000 µg/m³)	5µg/m³)
2019	5.7	13.0	10.3	7.8	100 (Zone C)	0.1 (Zone C)
2018	3.3	10.7	7.5	6.7	200 (Zone C)	-
2017	4.4	9.9	7.4	5.7	200 (Zone C)	-
Average	4.6	11.2	8.4	6.7	167.7	0.1

7.4 Description of the Proposed Development

Chapter 5 *Description of Development* provides a description of the proposed development. The proposed development does not include any significant operational emissions.

The following aspects are particularly relevant to the air quality assessment during the construction phase:

- Dust associated with construction activities at the landfall at Johnstown North;
- Dust associated with the open cut trench and horizontal directional drilling for the proposed cable route particularly at road crossings; and
- Dust associated with construction activities at the proposed substation site and NETN connection at Shelton Abbey, particularly the ground preparation works.

The locations of the temporary construction compounds are shown in **Chapter 6** *Construction Strategy.*

The proposed development provides for two temporary construction compounds at Johnstown North at the landfall approach. One construction compound will support HDD operations (up to 4,900m^2 in area) and the other construction compound will support the construction of the eastern end of the onshore export cable route (up to 15,000m^2 in area).

There will also be temporary construction (HDD) compounds at the R772 and the M11 crossings to support the HDD in these locations. Each entry and exit compound is up to 3,000m^2 in area, except the HDD compound on the west of the M11, which is located in an area of immature woodland, and which will be up to 4,000m^2 in area, including an access route.

The substation temporary construction compound will be established within the footprint of the permanent works at the Shelton Abbey substation site (up to 10,000m^2).

The temporary construction compounds will be reinstated on completion of construction, whereupon they can be returned to arable use, with the exception of the substation compound, which is located within the permanent substation footprint. The area of woodland at the temporary construction compound west of the M11 crossing will generally be reinstated. However, the ground directly over the cable circuits will be replanted with shallow-rooted species.

7.5 Likely Significant Effects

7.5.1 'Do-Nothing' Scenario

In the scenario where the proposed development did not proceed, none of the construction or operational effects as set out in this chapter would occur.

7.5.2 Construction

7.5.2.1 Direct Effects

Chapter 5 *Description of Development* provides a description of the proposed development with **Chapter 6** *Construction Strategy* providing details of the proposed construction strategy for the proposed development.

Dust emissions are likely to arise from the following activities:

- Site clearance;
- Utility diversions;
- Foundation construction;
- Site excavation;
- Open-cut trench methods;
- Horizontal directional drilling (HDD) operations;
- Piling;
- Use of generators;
- Stockpiling of excavated materials;
- Handling of construction materials; and
- Construction traffic movements.

Dust Emission Magnitude

Following the methodology outlined in **Section 7.2.5** each dust generating activity has been assigned a dust emission magnitude as shown in **Table 7.11**.

For earthworks, as a worst case it has been assumed that these will occur over the whole site area.

As outlined in **Section 7.2.5**, the IAQM guidance was used to assess the potential air quality impacts on sensitive receptors during the construction phase.

Table 7.11 presents the dust emission magnitude for the various construction activities in accordance with **Table 7.3**.

Table 7.11 Dust emission magnitude for construction activities

Activity	Dust emission magnitude	Reasoning
Demolition	Small	Demolition activities <10m above ground
Earthworks	Large	Total site area >10,000 m^2
Construction	Medium	Potentially dusty construction material.
Trackout	Large	Unpaved road length >100m

Sensitivity of the Area

The sensitivity of the area to dust soiling has been assigned as *medium*, due to the number of sensitive receptors within proximity of dust generating activities.

The sensitivity of the area to human health has been assigned as *low* as the background PM_{10} concentration is less than the lower value of 24µg/m^3 outlined in Table 3 of the IAQM Guidance.

The overall sensitivity has been summarised as shown in **Table 7.12**.

Table 7.12 Sensitivity of the area

Potential Impact	Sensitivity
Human Health	Low
Dust Soiling	Medium

Risk of Impacts

Taking into consideration the dust emission magnitude and the sensitivity of the area, the risk of dust impacts is presented in **Table 7.13**.

Table 7.13 Risk of dust impacts

Potential Impact	Sensitivity of the surrounding area			
	Demolition	Earthworks	Construction	Trackout
Human Health	Negligible	Low	Low	Low
Dust Soiling	Low	Medium	Medium	Medium

Overall the site has been classified as *low risk* for demolition and *medium risk* for construction, earthworks and track-out, without mitigation as shown in **Table 7.14**.

Table 7.14 Result of dust assessment prior to mitigation

Activity	Dust risk prior to mitigation
Demolition	Low
Earthworks	Medium
Construction	Medium
Track-out	Medium

There are a number of receptors located relatively close to the proposed works, as described in **Section 7.2.3**, therefore, there is potential for air quality effects arising from dust during construction activities. The impact risk is assigned a worst-case 'medium' risk due to earthworks, construction and track-out, as shown in **Table 7.14**, prior to the implementation of mitigation measures. In accordance with IAQM guidance significance of effects is determined after the application of mitigation measures (as shown in **Table 7.2**). Specific mitigation is described in **Section 7.6**.

7.5.2.2 Indirect Effects

Traffic

The traffic assessment predicts pollutants where construction traffic increases by more than 10% due to the construction phase of the proposed development. This is detailed in **Chapter 13** *Traffic and Transport*.

The locations identified are the R750 (closest receptor R01), the L6179 (closest receptor R02), Forest Road (closest receptor R03) and L2180 (closest receptor R04). The receptor locations are shown on **Figure 7.1**.

Table 7.15 presents the results for the predicted air quality increases from traffic during the construction phase due to construction vehicles and diversions based on the Highways England (2007) *UK Design Manual for Roads and Bridges (DMRB) Screening Method* spreadsheet. Background concentrations outlined in **Table 7.10** are included in the values provided in **Table 7.15**.

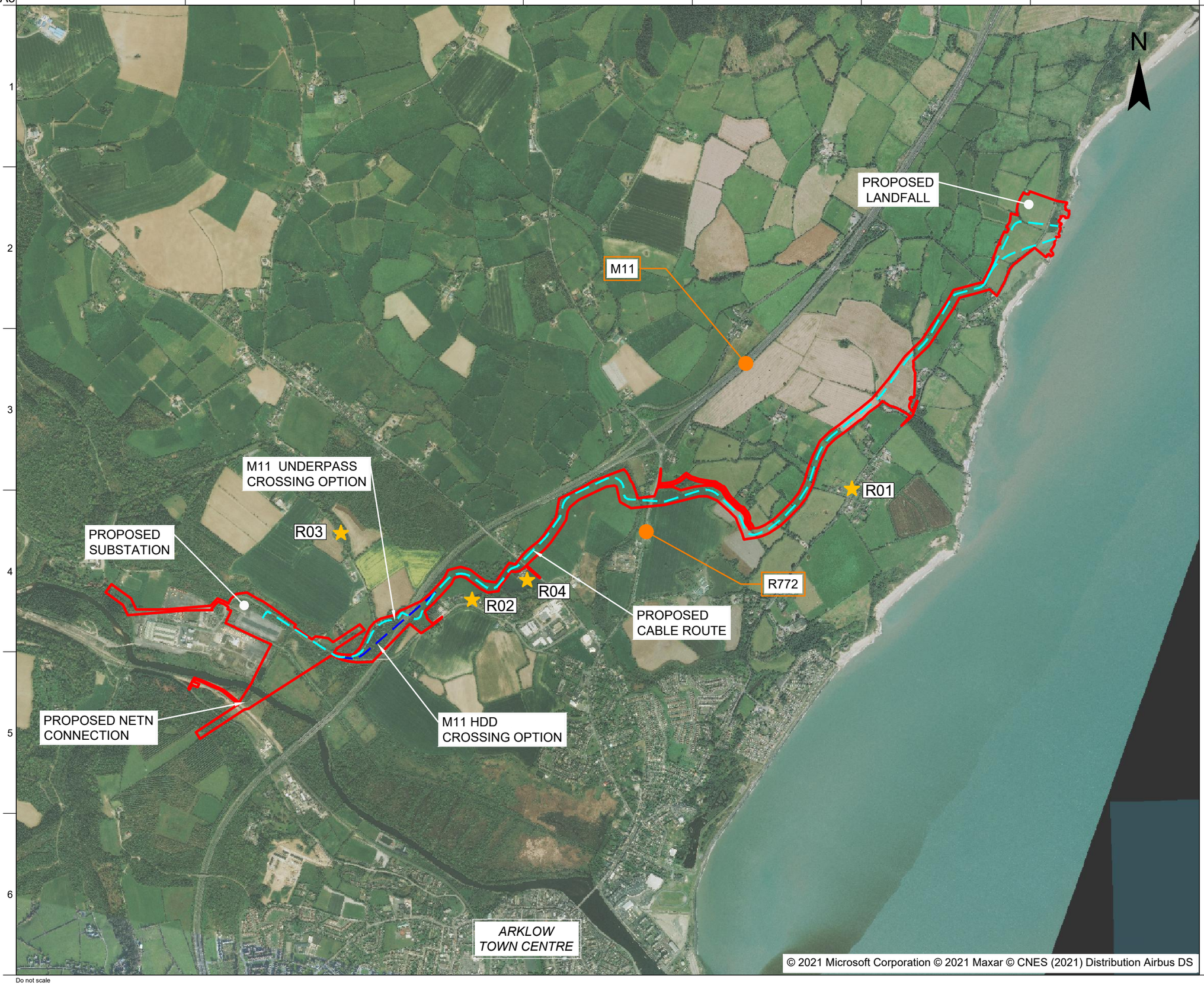
Table 7.15 Predicted air quality increases during the construction phase

Receptor (see Figure 7.1)	**Scenario**	**NO_2 (µg/m³)**	**PM_{10} (µg/m³)**	**NOx (µg/m³)**	**PM_{10} (Days > 50 µg/m³)**	**CO (µg/m³)**	**Benzene (µg/m³)**
	Limit Values	***40***	***40***	***25***	***35***	***10,000***	***5***
R01 R750	Existing	4.7	11.22	6.9	<1	169	0.1
	From construction vehicles	5.4	11.29	8.3	<1	170	0.1
	Increase	0.7	0.07	1.4	0	1	0
	Impact Rating	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible

Receptor (see Figure 7.1)	**Scenario**	**NO_2 (µg/m³)**	**PM_{10} (µg/m³)**	**NOx (µg/m³)**	**PM_{10} (Days > 50 µg/m³)**	**CO (µg/m³)**	**Benzene (µg/m³)**
	Limit Values	***40***	***40***	***25***	***35***	***10,000***	***5***
R02 L6179	Existing	5	11.26	7.4	<1	170	0.1
	From construction vehicles	6	11.37	9.7	<1	173	0.1
	Increase	1	0.11	2.3	0	3	0
	Impact Rating	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible
R03 Forest Road	Existing	4.7	11.21	6.8	<1	168	0.1
	From construction vehicles	4.8	11.23	7.1	<1	169	0.1
	Increase	0.1	0.02	0.3	0	1	0
	Impact Rating	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible
R04 L2180	Existing	5.7	11.46	8.9	<1	179	0.1
	From construction vehicles	6.5	11.58	11.2	<1	182	0.1
	Increase	0.8	0.12	2.3	0	3	0
	Impact Rating	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible

Negligible impacts on air quality are predicted at all receptors as a result of the change in traffic emissions due to the proposed development.

A3



LEGEND:

- RED LINE BOUNDARY
- PROPOSED CABLE ROUTE
- PROPOSED M11 CROSSING HDD OPTION
- RECEPTOR LOCATIONS

Rev	Date	By	Chkd	Appd
D1	16.02.21	SB	EO'G	MW

ARUP

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Client
Sure Partners Limited

Project Title
Arklow Bank Wind Park
Phase 2

Drawing Title
Receptor Locations

Scale at A3
1:20,000

Role
Civil

Suitability
For Information

Arup Job No
271715-00

Rev
D1

Name

Figure 7.1

Do not scale

Substation Site Remediation

As outlined in **Chapter 6** *Construction Strategy*, the substation site is currently covered by asphalt, however, recent site investigations indicate that some fertiliser by-product material was buried on the site.

The potential for ground gas was also considered at the substation site, in the context of a substation site remediation strategy. Ground gas monitoring has been completed at the site, as described in **Chapter 9** *Land and Soils*. While elevated methane and carbon dioxide and trace levels of hydrogen sulphide were initially detected, these levels have gradually reduced over time, as detected by monitoring. Overall, concentration levels are low and do not exceed the relevant thresholds. The building foundations will include measures to mitigate any residual ground gas risk. As such, the predicted effects of this would be a **slight, temporary** effect, without mitigation measures implemented.

7.5.3 Operation

7.5.4 Direct Effects

There will be two standby diesel generators, approximately 500kVA in size, available for operation in the event the normal electrical supply is lost, with up to three days of fuel storage located on the substation site. It is expected that the generators would be used once every five years for up to three days. Generators will be tested for one hour every month (one at a time) as part of routine maintenance. There are no significant negative effects envisaged.

7.5.5 Indirect Effects

There will be no significant change in traffic volumes as a result of the operational phase and no significant operational air emissions sources. Therefore, no indirect air quality effects are predicted during the operational phase.

7.5.6 Decommissioning

As mentioned in **Chapter 5** *Description of Development*, the design life of the substation is c. 50 years but may be extended beyond this. When the proposed development reaches the end of its useful life, it may be either refurbished and replaced, or it will be decommissioned.

If decommissioned, all buildings and above ground structures on the substation site will be removed. All above ground structures along the cable route will be removed. It is likely that the ducts and cables will be left in place, as to remove them would be likely to cause a more substantial environmental impact than leaving them in-situ.

The proposed substation decommissioning activities have the potential to generate dust, but the intensity and duration of the activities will be less than that associated with the construction phase. i.e. **imperceptible, temporary** effects are predicted.

7.6 Mitigation Measures and Monitoring

Appropriate mitigation and monitoring measures are proposed to minimise the direct, indirect and cumulative effects of the proposed development. These are detailed below.

7.6.1 Construction Phase

7.6.1.1 Mitigation Measures

The following mitigation measures will be implemented for the construction phase of the proposed development, in order to reduce the dust risk associated with the construction, earthworks and track-out.

Mitigation for all sites

- A Community Liaison Plan that includes community engagement before work commences on site is included in the Construction Environmental Management Plan (CEMP) (**Appendix 6.1** of **Volume 3**).
- Dust mitigation measures are included in the CEMP (**Appendix 6.1** of **Volume 3**). All measures therein will be implemented.

Site Management

- Record all dust and air quality incidents, complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken.
- Hold regular liaison meetings with other construction sites within 500m to the site boundary, to ensure plans are co-ordinated and dust and particulate matter emissions are minimised, refer to **Chapter 21** *Summary of Cumulative Effects*.

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.
- Erect a 2m minimum site hoarding around construction compounds.
- Keep site fencing, barriers and scaffolding clean using wet methods.
- Cover, seed or fence stockpiles to prevent wind whipping.

Construction Operations

- Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation.
- Use enclosed chutes and conveyors and covered skips.
- Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate.

- Ensure equipment and spill kits are 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.

Measures specific to Earthworks

- Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable.
- Only remove the cover in small areas during work and not all at once.

Measures specific to Trackout

- Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site.
- Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport.
- Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable).
- Access gates to be located at least 10m from receptors where possible.

Measures specific to Substation Site Remediation

- Dust generation and dermal exposure during site construction works will be controlled by appropriate dust control measures e.g. water sprays and appropriate personal protective equipment (PPE).
- Where the asphalt layer is removed at the substation site this will occur in a phased basis and will be replaced with granular hardcore as soon as possible to prevent the generation of windblown dust.
- There will be a gas drainage layer and ventilation system, incorporated into the substation site remediation works, which will ensure there is no build-up of ground gas (as described in **Chapter 9** *Land and Soils*).

Surveys will be undertaken to identify the risk of asbestos on site. Although unlikely, given ground investigations to date, if asbestos is uncovered on site during construction, it will be double-bagged and removed from site by a competent contractor and disposed of in accordance with the relevant procedures and legislation.

7.6.1.2 Monitoring

The following monitoring measures, will be implemented for the construction phase of the proposed development:

- The contractor will undertake on-site and off-site inspection, where receptors (including roads) are nearby, to monitor dust, record inspection results, and make the log available to Wicklow County Council on request. The frequency of the inspections will be increased during site activities with a high potential to produce dust are being carried out.

- Dust monitoring will be undertaken at the three nearest sensitive receptors (with agreement from the landowner) to the works during the construction phase. The TA Luft dust deposition limit values of 350 mg/m^2/day applied as a 30-day average.

The monitoring measures are included in the Construction Environmental Management Plan (CEMP) (**Appendix 6.1** of **Volume 3**).

7.6.2 Operation Phase

As there are no significant adverse effects on air quality predicted during the operational phase of the proposed development, no mitigation or monitoring measures are proposed.

7.6.3 Decommissioning

The mitigation and monitoring measures, described for the construction phase, updated to reflect best practice at the time, will be implemented for the decommissioning phase. Where possible, removed material will be reused and quantities of waste minimised, reducing the emissions associated with the proposed development. The construction activities required during the decommissioning phase will be considerably less than the construction phase, and thus there are no significant effects to air quality expected.

7.7 Cumulative Effects

This section considers the potential for cumulative effects arising from the proposed development in association with other developments. Specifically, it considers a worst-case scenario, where both the proposed development and other developments for which construction timelines are not known are under construction and/or operation at the same time.

A two-tiered approach to the cumulative assessment has been undertaken, in which the proposed development is considered cumulatively with other projects as follows:

Tier 1 -

- ABWP Phase 2 Offshore Infrastructure;
- ABWP Phase 2 Operations and Maintenance Facility (OMF);
- EirGrid Grid Upgrade Works; and
- Irish Water Upgrade Works.

Tier 2 -

- Other relevant projects currently under construction;
- Other relevant projects with consent;
- Other relevant projects in the planning process; and

- Other existing projects that were not operational when baseline data were collected.

There are a number of other developments identified (not included in the list above) that are currently permitted or proposed in Arklow but were not assessed as the nature and scale of these developments are such that these projects in combination with the proposed development would not give rise to significant effects on air quality.

A summary of the cumulative effects is provided in **Chapter 21** *Summary of Cumulative Effects*.

7.7.1 Tier 1

7.7.1.1 Arklow Bank Wind Park Phase 2 Offshore Infrastructure, Operations and Maintenance Facility and Proposed Development

Considering the distance from the Arklow Bank Wind Park Phase 2 Offshore Infrastructure works and the Arklow Bank Wind Park Phase 2 Operations and Maintenance Facility (OMF) to the proposed development, no significant cumulative effects are predicted during the construction phase. There will be maintenance trips carried out for the offshore infrastructure which may have potential for operational emissions offshore (as outlined in the Arklow Bank Wind Park Phase 2 Offshore Infrastructure EIAR), however, considering there are no significant operational emissions associated with the proposed development and given the distance to the offshore infrastructure and OMF, there are no significant cumulative air quality effects predicted during the operational phase.

7.7.1.2 EirGrid Grid Upgrade Works, the Irish Water Upgrade Works and Proposed Development

Given the nature and scale of the construction activities and construction traffic associated with the EirGrid grid upgrade works and the Irish Water connection upgrade works (in proximity to the proposed development), no significant cumulative air quality effects are predicted during the construction phase. There are no air emission sources or operational traffic associated with the upgrade works or the proposed development, therefore no significant cumulative air quality effects are predicted during the operational phase.

7.7.1.3 All Tier 1 Projects and the Proposed Development

As there are no significant air emission sources associated with the construction, operation or decommissioning phases of the proposed development and the proposed Tier 1 developments, no significant cumulative operation or construction effects are predicted.

7.7.2 Tier 2

7.7.2.1 Developments within the vicinity of the Avoca River Business Park and the Proposed Development

There are a number of permitted and proposed developments in the vicinity of the Avoca River Business Park that have the potential to overlap during the construction phase. These developments include:

- the permitted Crag Digital Avoca Ltd data centre (Planning Reference 18940),
- the permitted Rappel Enterprises Ltd office development (Planning Reference 138823),
- the permitted Harmony Timber Solutions Ltd office and factory development (Planning Reference 1954),
- the proposed (not yet permitted) Crag Digital Avoca Ltd 110kV Substation (Planning Reference PL27.307256), and
- the proposed (not yet permitted) Crag Digital Avoca Ltd data centre new application (Planning Reference 201285).

In respect of the two Crag Digital Avoca Ltd. data centre proposals, it should be noted that both the permitted and proposed data centre developments have one data hall, located on the proposed substation site, which will not be built if the proposed development proceeds.

Considering the close proximity of these developments to the proposed development and the potential overlap of construction phases, there is potential for cumulative effects on air quality to arise during the construction phase. As there are no significant operational traffic volumes or operational emissions associated with the proposed development there are no cumulative effects to air quality expected during the operational phase.

7.7.2.2 Flood Defence Embankment Works in the Avoca River Business Park

There will be possible maintenance and repair works to the existing flood embankment around the Avoca River Business Park as part of a regular inspection, maintenance and repair programme, to manage residual risk of flooding from a potential breach of the embankment. Investigations are to be undertaken which will determine the nature and extent of the works required. Any required maintenance or reinforcement works, will be undertaken in advance of the substation construction, with ongoing maintenance and repair thereafter, subject to regular inspection and monitoring.

As any required works are not expected to overlap with the construction of the substation there are no significant cumulative effects to air quality expected. As there are no significant operational traffic volumes or operational emissions associated with the proposed development there are no cumulative effects to air quality expected during the operational phase.

7.7.2.3 Crag Digital Permitted Data Centre and Proposed Development

The Crag Digital Avoca Ltd data centre has received planning permission immediately adjacent to the substation site. As outlined in the Crag Digital Avoca Ltd data centre EIAR, there is potential for cumulative effects to arise due to the construction works which have the potential to generate construction dust. However, considering the dust mitigation measures outlined for both the Crag Digital Avoca Ltd development (as included in the EIAR) and the proposed development, it is not likely to give rise to any significant effects. During the operational phase there will be gas engines and diesel-fuelled back-up generator sets in the data centre. However, as there are no air emissions associated with the operation of the proposed development, no significant cumulative effects are predicted.

7.7.2.4 Crag Digital New Data Centre Application and Proposed Development

An amended application has been made by Crag Digital Avoca Ltd (Planning Reference 201285). It is not expected that this will have any significant change to the cumulative effects to air quality (from that of the permitted data centre) should this application receive planning permission.

7.7.2.5 Crag Digital 110kV Substation, Permitted Data Centre and Proposed Development

The proposed Crag Digital Avoca Ltd 110kV Substation EIAR details the potential dust impacts associated with the construction activities. Considering the close proximity to the proposed development (immediately adjacent to the substation site) there is potential for cumulative effects from dust during the construction phase. However, there are stringent mitigation measures in place for the Crag Digital Avoca Ltd 110kV Substation (as included in the EIAR), the permitted and proposed Crag Digital data centres and the proposed development in order to control dust emissions during the construction phase. Therefore, there are no significant cumulative effects predicted.

There are no significant operational effects on air quality associated with the proposed Crag Digital 110 kV substation, so no significant cumulative operational effects on air quality are predicted, with the proposed development and with the proposed and permitted data centre developments.

7.7.2.6 Other Developments within the vicinity of the Avoca River Business Park and the Proposed Development

The proposed development and the other developments within the Avoca River Business Park are not likely to give rise to any significant cumulative effects during construction once mitigation measures, as outlined in **Section 7.6**, are implemented.

As there are no changes in operational traffic volumes and no air emission sources associated with the operation of the proposed development, no significant cumulative effects are predicted during the operational phase.

7.7.2.7 All Tier 2 Projects and the Proposed Development

Only the Tier 2 projects listed were considered to have the potential for a cumulative effect with the proposed development with regard to air quality.

It is not expected that there will be significant cumulative effects to air quality caused by the Tier 2 projects and the proposed development.

7.8 Residual Effects

With the implementation of the mitigation measures outlined in **Section 7.6**, no significant adverse residual effects on air quality are envisaged during the construction, operation or decommissioning of the proposed development.

7.9 References

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