RECEIVED: 29/01/2026

Contents

INTRODUCTION 1
Background 1
Scope of Work 2
Consultations / Consultees 2
Contributors / Author(s) 2
Limitations / Difficulties Encountered 3

REGULATORY BACKGROUND 3
Legislation 3
Planning Policy and Development Control 5
Guidelines Extractive Industry Emissions Limit Values 5
Air Quality and Ecological Receptors 6
Air Quality and Health Effects 7
Site Specific Dust Deposition Emission Limits 7

RECEIVING ENVIRONMENT 8
Study Area 8
Baseline Study Methodology 8
Sources of Information 8
Field Survey / Monitoring / Inspection Works 8
Background Air Quality 9
Meteorology: Dispersion of Emissions 9
Local Wind Speed and Direction Data 10
Rainfall Data 10
Sensitive Receptors 10

IMPACT ASSESSMENT - METHODOLOGY 12
Evaluation Methodology 12
Significance Criteria 12
Soil Stripping, Berm Construction, and Restoration - Methodology 14
Operation Stage Dust Impacts - Methodology 14
PM_{10} Contribution from Site-Based Activities - Methodology 16
Traffic Emissions - Methodology 16

ASSESSMENT OF IMPACTS 16
Soil Stripping, Placement and Restoration – Assessment 16
Operational Stage Dust Impact – Assessment 17

Making Sustainability Happen

RECEIVED: 29/01/2026

Traffic Emissions - Assessment 20
PM_{10} Contribution from Extraction / Production Activities - Assessment 21
Unplanned Events (i.e., Accidents) 21
Cumulative / Synergistic Impacts 21
Interaction with Other Impacts 22

MITIGATION MEASURES – DUST SUPPRESSION 22
Sand Extraction & Processing 22
Soil Stripping and Restoration Activities 24
Trackout Measures 24

RESIDUAL IMPACT ASSESSMENT 24
Soil Stripping, Berm Construction and Restoration Activities 24
Sand Extraction & Processing 24

MONITORING 25

FIGURES 26

Tables

Table 8-1 Relevant Air Quality Limit Values for Protection of Human Health 4
Table 8-2 Summary of Air Quality Limit Values: Protection of Vegetation 4
Table 8-3 Background PM_{10} Concentrations Enniscorthy, Co. Wexford 9
Table 8-4 Dust Deposition Monitoring Results 9
Table 8-5 Sensitive Receptors within 500 m of the Extraction Area Boundary 11
Table 8-6 Methodology for Defining Sensitivity to Dust and PM_{10} Effects 13
Table 8-7 Impact Significance Matrix – Dust Effects (with Mitigation) 13
Table 8-8 Determination of Risk Category from Earthworks Activities 14
Table 8-9 Determination of Risk Category from Trackout Movements 14
Table 8-10 Site Activities: Sources of Dust Emissions 17
Table 8-11 Construction / Restoration Stage Activities: Risk of Dust Emissions 17
Table 8-12 Sources of Particulate Emissions 18
Table 8-13 Dust Risk Assessment Screening (Without Mitigation Measures) 19
Table 8-14 Particulate Emission Mitigation Measures 23
Table 8-15 Particulate Emissions Mitigation Measures 24

Figures

Figure 8-1 Dust Monitoring & Receptor Locations 26
Figure 8-2 Windrose for Johnstown Castle Meteorological Station 2002-2020 26

APPENDICES

Appendix 8-A: Dust Risk Screening Assessment Methodology

RECEIVED: 29/01/2026

Introduction

Background

8.1 This Chapter of the Environmental Impact Assessment Report (EIAR), prepared by SLR Consulting Ireland, addresses the potential effects on air quality of continued use and extension of the sand & gravel pit, located at Ballymacoonoge, Glentire, Ballynamonabeg Tds., Ballaghkeen, County Wexford (hereafter referred to as the 'application site').

8.2 The proposed development being applied for under this current planning application is shown on EIAR Figures 2-2 to 2-4 and will consist of:

- Continued use of the existing sand & gravel pit for completion of extraction and restoration (c. 4 hectares) under planning permission ref. 20191259);
- Extension to the existing sand & gravel pit over an extraction area of c. 11 hectares;
- Extraction to final level two metres above the groundwater table;
- Screening berms and operational landscaping;
- Continued processing of sand & gravel using permitted mobile screening plant located on the pit floor;
- Continuance of use of the existing permitted access and internal access road to / from the R744 regional road;
- Continuance of use of existing permitted ancillary facilities: Office, portaloo, storage container, wheelwash and fuel storage;
- Phased and final restoration of the lands to agricultural use;
- Proposed duration c. 18 years plus 2 years for final restoration, total permission duration of 20 years;
- Within an overall planning application area of c. 23.2 hectares.

8.3 Further information on the proposed development is provided in the Chapter 2 of this EIAR.

8.4 The proposed development will have the potential to generate fugitive dust emissions and particulates (PM_{10}), which may result in impacts on local air quality. Combustion emissions (primary PM_{10}, and oxides of nitrogen) from vehicle exhaust emissions associated with the extraction and transportation of sand may also have the potential to impact on local air pollution.

8.5 The proposed development will continue similar operations in place at the existing sand & gravel pit, planning permission ref. 20191259.

8.6 HGV traffic arising from the proposed development will continue to use the regional and national road network, except in the case of local deliveries. The site access route is directly onto / from the R744 regional road. The proposed level of traffic generated by the existing sand & gravel pit and the proposed development is / will be low – a maximum of 3 to 4 heavy goods vehicle (HGV / truck) trips per hour, at the maximum annual extraction rate output of 200,000 tonnes per year.

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Scope of Work

8.7 The focus of this assessment is the potential impact on local residential amenity of fugitive dust emissions and particulate matter generated by the proposed sand pit extension. Dust emissions are likely to arise during the following activities:

- soil stripping, earthworks, (site preparation and restoration)
- trafficking by heavy goods vehicles (HGVs) over paved / unpaved surfaces
- extraction and processing activities.

8.8 With respect to the potential for air quality impacts, the key objective at the application site is to manage activities to ensure that air emissions are prevented where possible, and the effects of any residual releases are minimised.

8.9 This EIAR chapter describes and assesses the existing air quality baseline characteristics of the area at and around the proposed development based on site specific surveys and EPA data. Air emissions arising from the activities at the sand pit are then applied to these baseline conditions and the resulting air quality impacts assessed. Mitigation measures are identified where required, to eliminate and reduce these impacts insofar as practical.

8.10 The following sections of this chapter describe the potential air quality impacts associated with the planned development activities. The following issues are addressed separately:

- relevant legislation, standards, and guidance
- baseline conditions pertaining to measured (or estimated) existing air quality levels around the existing sand pit
- methodology used to assess the potential impacts of planned activities on air quality at local properties
- assessment of the impacts
- summary of any residual impacts and reinstatement
- summary of cumulative impacts
- monitoring proposals.

Consultations / Consultees

8.11 The application relates to extension of the existing sand & gravel. A pre-planning meeting was held with the Planning Department, Wexford Co. Council on the 18th November 2025 (Ref. 20250386).

8.12 The key environmental considerations for the proposed development are well understood from the previous planning application and environmental impact assessment carried out for the existing sand & gravel pit. Accordingly, it was considered that there was no requirement for any further formal external consultations to be carried out in respect of air quality for the purposes of this assessment.

Contributors / Author(s)

8.13 The air quality impact assessment presented in this Chapter was prepared by SLR Consulting Ireland. The consultant for the study was Tim Paul MSc., CEng, MIEI, MRICS, MIQ.

Limitations / Difficulties Encountered

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8.14 This assessment is compiled based on published regional and local data, guidance documents, and site-specific field surveys. No difficulties were encountered in compiling the required information.

Regulatory Background

8.15 The following sections describe the main legislative policy requirements in respect of air quality associated with the proposed development.

Legislation

Air Quality Standards

8.16 The Government's policy on air quality within Ireland is set out in the Air Quality Standards (AQS) Regulations 2011. The CAFE Directive was transposed into Irish legislation by the Air Quality Standards Regulations 2011 (S.I. No. 180 of 2011). It replaces the Air Quality Standards Regulations 2002 (S.I. No. 271 of 2002), the Ozone in Ambient Air Regulations 2004 (S.I. No. 53 of 2004) and the EPA Act 1992 (Ambient Air Quality Assessment and Management) Regulations 1999 (S.I. No. 33 of 1999). The 4th Daughter Directive was transposed by the Arsenic, Cadmium, Mercury, Nickel, and Polycyclic Aromatic Hydrocarbons in Ambient Air Regulations 2009 (S.I.no. 58 of 2009).

8.17 The AQS sets out a framework for reducing hazards to health from air pollution and ensuring that international commitments are met in Ireland.

8.18 The AQS sets standards and objectives for ten priority pollutants. Standards establish concentrations of pollutants in the atmosphere which can broadly be taken to provide a certain level of environmental quality. Objectives are policy targets, often expressed as maximum concentrations, not to be exceeded (either without exception, or with a limited number of exceedances within a specified timescale).

8.19 Under the AQS, the following pollutants are monitored and controlled:

- nitrogen oxides
- sulphur dioxide
- carbon monoxide
- ozone
- particulate matter (PM_{10}, $PM_{2.5}$ and black smoke)
- benzene and volatile organic compounds
- heavy metals; and
- polycyclic aromatic hydrocarbons.

8.20 These pollutants are monitored at 32 stations across the country and together they form the national ambient air quality network. A summary of relevant air quality limit values in relation to human health are presented in Table 8-1. Air quality limit values in relation to vegetation protection are presented separately in Table 8-2.

8.21 The air quality monitoring network is coordinated and managed by the EPA, as the National Reference Laboratory for air quality. The results of the monitoring are compared to limit values set out in EU and national legislation on ambient air quality. Map-based assessments of air quality are prepared and published by the EPA.

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Table 8-1 Relevant Air Quality Limit Values for Protection of Human Health

Human Health	Limit or Target Value			Information and Alert Thresholds (where applicable)		Long Term Objective
Pollutant	**Averaging Period**	**Value**	**Maximum Number of Allowed Occurrences**	**Period**	**Threshold Value**	
Nitrogen Dioxide (NO_2)	Hour	200 µg/m³	18	1 hour alert	400 µg/m³ Exceeded for 3 consecutive hours	
	Year	40 µg/m³	0			
Sulphur Dioxide (SO_2)	Hour	350 µg/m³	24	1 hour alert	500 µg/m³ Exceeded for 3 consecutive hours	
	Day	125 µg/m³	3			
Particulate matter with aerodynamic diameter of less than 10 µm (PM_{10})	Day	50 µg/m³	35			
	Year	40 µg/m³	0			
		20 µg/m³ (ECO)				

Table 8-2 Summary of Air Quality Limit Values: Protection of Vegetation

Vegetation		Critical level or Target Value		Long-term Objective
Pollutant	**Averaging Period**	**Value**	**Value**	**Date**
Nitrogen dioxide (NOx)	Calendar year	30 µg/m³		
Sulphur Dioxide (SO_2)	Calendar year and winter (October to March)	20 µg/m³		

Planning Policy and Development Control

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National Spatial Strategy (NSS) / National Planning Framework – Project Ireland 2040

8.22 The National Planning Framework 2040 (published in February 2018) is a national planning framework for Ireland. The framework provides the policies for all regional and local plans. In the framework, the extractive industries are recognised as important for the supply of aggregates and construction materials to variety of sectors. It emphasises that the planning process will play a key role in realising the potential of the extractive industries and protecting reserves of aggregates and minerals. Aggregates and minerals will continue to be enabled where this is compatible with protection of the environments.

8.23 There are no specific policies in relation to air emissions in NPF for extractive or production of construction aggregates and materials. The general objective is to facilitate development and to protect the environment at the same time.

Local Planning Policy – Wexford County Development Plan

8.24 The current Wexford County Development Plan 2022 – 2028 was adopted on the 13th June 2022 and came into effect on the 15th July 2022.

8.25 The development plan also contains strategies providing the spatial framework to deliver environmental protection and sustainable development, stating:

"To protect environmental quality by ensuring that land use and developments do not negatively affect air quality or give rise to noise or light pollution."

8.26 Objective EM05 sets out policy in relation to Air Quality:

"To implement the provisions of EU and National legislation and other relevant legislative requirements on protecting and improving surface and ground water quality, air quality and climate, and on reducing adverse noise and light nuisance, as appropriate and in conjunction with all relevant stakeholders in the interests of the protection of the environment, public health and the sustainable development of the county."

8.27 Objective AQ01:

"To have regard to the Air Quality Standards Regulation 2011 (S.I. No. 180 of 2011) when assessing planning applications for development which may have effects on air quality."

8.28 Objective AQ04:

"*To require the submission of measures to prevent and reduce dust and airborne particulate emissions for activities that may have a negative effect on air quality."*

Guidelines Extractive Industry Emissions Limit Values

8.29 Section 261 of the Planning and Development Act 2000 (as amended), which regulated a significant proportion of established extractive development, came into effect in April 2004. The planning guidelines[1] for the extractive industries '*Quarries and Ancillary Activities – Guidelines for Planning Authorities'* were published by the Department of the Environment, Heritage, and Local Government (DoEHLG) at around the same time.

[1] Quarries and Ancillary Activities – Guidelines for Planning Authorities (DoEHLG, 2004)

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8.30 Separately, in 2006, the EPA published complementary guidance aimed at quarry operators, planning authorities and the general public *Environmental Management Guidelines for Environmental Management in the Extractive Industry (Non-Scheduled Minerals)*[2].

Specific Guidance Relating to Air Quality / Dust Nuisance

8.31 A range of monitoring techniques exists for dust deposition rates (i.e., Bergerhoff and Frisbee gauges). There is currently no Irish, European Union (EU) or World Health Organisation (WHO) statutory standards or limits appropriate for the assessment of deposited dust and its propensity to generate annoyance.

8.32 Industry standard criteria levels for the gravimetric assessment of dust deposition from extractive industry in Ireland are set out in the DoEHLG (2004) planning guidelines for the extractive industry[3], the ICF Guidelines (2005) and EPA (2006) Environmental Management Guidelines[4]. Each of these Guidelines recommend the use of the Bergerhoff method for measuring dust deposition. In line with this approach, the guidelines recommend the TA Luft dust deposition limit value of 350 mg/m^2/day (total dust deposition averaged over a 30-day period), measured at site boundaries

8.33 When the rate of accumulation of the coarser fraction of dust (referred to as deposited dust) is sufficiently rapid to cause fouling or discolouration, then it is generally considered to introduce a nuisance. The point at which an individual perceives dust deposition as a nuisance and causes a complaint is highly subjective.

8.34 The action of wind over dry ground will carry dust particles into the air. Although large emissions of dust occur naturally, man-made dust events are caused by a range of activities including agriculture, road traffic, construction works (including the handling and storage of soils and particulate matter) and by vehicles using paved and unpaved haul roads.

8.35 For operations involving the mechanical break up of solids, the most common concern regarding dust emissions is the potential nuisance effect from the larger fractions of dust.

Guidance on Assessment of Mineral Dust Impacts for Planning

8.36 Guidance on the assessment of the impacts of extractive operations on air quality has been prepared by the Institute of Air Quality Management (IAQM, 2016)[5]. This guidance uses a simple distance-based screening process to identify those operations where the dust impacts are unlikely to be significant and therefore require no further assessment. Where more detailed assessment is required, a basic assessment framework is presented which employs the Source-Pathway-Receptor approach to evaluate risk of impacts and effects.

Air Quality and Ecological Receptors

8.37 Much of the research on the effects of particulate matter on vegetation has focussed on the chemical effects of alkaline dusts. A summary of a review of available research on behalf of the UK's Department for the Environment Transport and Regions (DETR) concluded that:

"The issue of dust on ecological receptors is largely confined to the associated chemical effect of dust, and particularly the effect of acidic or alkaline dust influencing vegetation through soils."

[2] https://www.epa.ie/pubs/advice/general/EPA_management_extractive_industry.pdf

[3] http://www.housing.gov.ie/sites/default/files/migrated-files/en/Publications/DevelopmentandHousing/Planning/FileDownLoad%2C1606%2Cen.pdf

[4] https://www.epa.ie/pubs/advice/general/EPA_management_extractive_industry.pdf

[5] http://www.iaqm.co.uk/text/guidance/mineralsguidance_2016.pdf

8.38 An Interim Advice Note (IAN) prepared as a supplement for Volume 11, Section 3, Part 1 of the UK DMRB (Design Manual for Roads and Bridges) and now incorporated into LA 105) suggests that only dust deposition levels above 1,000 mg/m^2/day are likely to affect sensitive ecological receptors. This level of dust deposition is approximately five times greater than the level at which most dust deposition may start to cause a perceptible nuisance to humans. It states that most species appear to be unaffected until dust deposition rates are at levels considerably higher than this.

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Air Quality and Health Effects

8.39 The main health effects of air pollution can include stroke, heart disease, lung cancer, and both chronic and acute respiratory diseases, including asthma. These conditions can lead to sickness and ill health as well as premature mortality.

8.40 The recent EPA reports, *Air Quality in Ireland 2021* [6] and *Ireland's Environment, An Assessment 2020*[7] detail the main air quality trends based on monitoring from the national ambient air quality network.

8.41 Ireland met all the EU legal requirements in 2021 but failed to meet the WHO guidance levels for health in 2021. Selected pollutants that failed the WHO AQG levels in 2021 were: PM_{10}, $PM_{2.5}$, NO_2, Ozone, SO_2, and PAHs.

8.42 Europe as part of the Green Deal and the EU's Zero pollution visions for 2050 is revising its air quality standards to align them closely with the lower WHO recommendations.

8.43 A summary of relevant Air Quality limit values in relation to human health was presented previously in Table 8-1.

Site Specific Dust Deposition Emission Limits

8.44 Condition No.14(a) attached by Wexford County Council to planning permission ref. 20191259 for the existing sand & gravel pit, states that:

> *"The total dust emission arising from the on-site operations when measured at any point along the site boundary (i.e. boundary with land not under the owners / operators operators ownership / control) shall not exceed 350 milligrams per square metre per day in accordance with the German TA Luft Air Quality standard.*

[6] Environmental Protection Agency, Air Quality in Ireland 2021 - Key Indicators of Ambient Air Quality. Available at: Monitoring & Assessment: Air Publications | Environmental Protection Agency (epa.ie)
[7] Environmental Protection Agency, Ireland's Environment, An Assessment 2020. Available at: State of the Environment | Environmental Protection Agency (epa.ie)

Receiving Environment

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Study Area

8.45 The application site is located southeast of Ballaghkeen, County Wexford, refer to EIAR Figure 1-1.

Baseline Study Methodology

Dust Deposition Monitoring

8.46 Ongoing, site-specific dust monitoring is undertaken as part of ongoing environmental management programme at the existing operational sand pit (refer to Figure 8-1).

8.47 Monitoring was undertaken using the 'Bergerhoff method' referred to in the TA Luft Air Quality Standard. The 'Bergerhoff' dust deposition gauge used in the survey comprises a plastic collection bottle with protective basket, mounted on a post and set at 1500 mm above ground level. The input of atmospheric borne particulate material into the collection bottle takes place over a pre-determined measurement period (usually one month) by exposing it to the environment. The total dust collected in the bottle is expressed as deposition of total particulate matter (mg/m^2/day) arising from human activity in the area surrounding the application site.

PM_{10} Monitoring

8.48 The application site and surrounding area fall into Air Quality Zone D, categorised as rural east Ireland. The air quality in each zone is assessed and classified with respect to upper and lower assessment thresholds based on measurements over eight years from 2014 to 2021. Upper and lower assessment thresholds are prescribed in legislation for each pollutant. The number of monitoring locations required is dependent on population size and whether ambient air quality concentrations exceed the upper assessment threshold, are between the upper and lower assessment thresholds, or are below the lower assessment threshold.

8.49 The closest air quality monitoring locations to the application site, and in a similar Zone D rural area, is located at Enniscorthy, Co. Wexford. As such, it is considered the most appropriate dataset available for assessment of air quality baseline concentrations in the study area around the application site.

Sources of Information

8.50 A desk study was carried out to examine all relevant information relating to air quality conditions around the application site. Met Eireann, the National Meteorological Service, was consulted in relation to the climate / weather data in respect of the study area (http://www.met.ie). The EPA website was examined to note information on baseline air monitoring data around the application site (http://www.epa.ie/air/quality/data/).

8.51 Information published on its website by the National Parks and Wildlife Service (NPWS) (http://webgis.npws.ie/npwsviewer/), (part of the Department of the Environment, Community and Local Government, DoECLG), in respect of designated ecological sites, protected habitats and species was also reviewed, together with Ordnance Survey maps and aerial photography (http://map.geohive.ie/mapviewer.html).

Field Survey / Monitoring / Inspection Works

8.52 Dust deposition surveys were carried out at two monitoring locations shown in Figure 8-1. The recent dust deposition monitoring results recorded are presented and reviewed as part

of this assessment. A survey of the extent of existing residential housing around the application site was also undertaken.

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8.53 The locations of dust deposition monitoring gauges are as follows:

- D01 – at the boundary on the northern side of the existing pit (application area);
- D02 – at the boundary on the western side of the existing pit (application area).

Background Air Quality

8.54 As previously noted, the closest air quality monitoring location to the pit in a similar Zone D area is located at Enniscorthy, Co. Wexford. Monitoring stations continuously monitor concentrations of particulate matter with an aerodynamic diameter of less than 10 µm (PM_{10}). The annual mean concentration monitored at Enniscorthy (published on the EPA website[8]) for 2022 is provided in Table 8-3 below.

Table 8-3 Background PM_{10} Concentrations Enniscorthy, Co. Wexford

Year	Annual Mean (µg/m³)	Number of Days >50 µg/m³
2022	15.0	0

8.55 Table 8-3 above indicates that PM_{10} concentrations monitored at the Enniscorthy monitoring site are below the annual mean Air Quality Standards (AQS) of 40 µg/m³ and comply with the requirement that a 24-hour mean of 50 µg/m³ should not be exceeded more than 35 times in a calendar year.

8.56 For rural areas, such as those surrounding the application site, the primary source of PM_{10} would be residential solid fuel emissions and local agricultural or rural based activities for deposited dust.

Dust Deposition Monitoring

8.57 The results of the dust deposition monitoring for 2025 are presented in Table 8-4 below.

Table 8-4 Dust Deposition Monitoring Results

Start Date	End Date	D01	D02
10/08/2025	09/10/2025	216	174
10/09/2025	09/10/2025	245	187
10/10/2025	09/12/2025	137	93

8.58 The monitoring results show compliance with the dust emission limit values set out in condition 14(a) attached to planning permission ref. 20191259.

Meteorology: Dispersion of Emissions

8.59 The most important climatological parameters governing the atmospheric dispersion of particles are as follows:

[8] Secure Archive for Environmental Research Data – http://erc.epa.ie/safer/.

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- wind direction determines the broad transport of the emission and the sector of the compass into which the emission is dispersed; and
- wind speed will affect ground level emissions by increasing the initial dilution of particles in the emission. It will also affect the potential for dust entrainment.

8.60 Rainfall is also an important climatological parameter in the generation of dust, enough rainfall can suppress dust at the source and eliminate the pathway to the receptor. According to Arup (1995)[9], rainfall greater than 0.2 mm per day is sufficient to suppress dust emissions.

Local Wind Speed and Direction Data

8.61 The closest weather station with sufficient records of wind direction and wind speed considered representative of conditions experienced at the application site is Johnstown Castle Meteorological Station. This meteorological station is located approximately 20 km southwest of the site.

8.62 A windrose for the average conditions recorded at Johnstown Castle over an eighteen-year period (2002 – 2020) is presented in Figure 8-2.

Rainfall Data

8.63 Relevant rainfall data applicable to the project site has been obtained from the Meteorological Office for Rosslare (1978 – 2007). The annual average number of days with rainfall greater than 0.2 mm is 175 days per year. Natural dust suppression is, therefore, considered to be effective for 48% of the year.

Sensitive Receptors

Ecological Receptors

8.64 The application site is not subject to any statutory nature conservation designation. There are no designated European sites or proposed Natural Heritage Areas (pNHA) within 2 km of the application area, refer to EIAR Figures 5-3 and 5-4

8.65 Based on the nature, size, and scale of the planned development, it is considered that the maximum distance for which the project should be evaluated in terms of Natura 2000 or designated nature sites is up to a maximum radius of 2 km unless there are any potential source-pathway-receptor links between the proposed development and Natura 2000 or designated site(s) beyond this distance. At a distance greater than 2 km, and in the absence of any potential source-pathway-receptor link, it is generally considered that no Natura 2000 or designated sites would be affected by any direct loss of habitat or otherwise impacted upon by the effects of dust.

8.66 Accordingly, there is no requirement to consider these ecological receptors further in the assessment.

Human Receptors

8.67 Sensitive locations are those where people may be exposed to dust from existing or planned activities. Locations with a high sensitivity to dust include hospitals and clinics, hi-tech

[9] Arup Environmental, Ove Arup and Partners (1995) The Environmental Effects of Dust from Surface Mineral Workings, HMSO, London (ISBM 11 75 3186 3)

industries, painting and furnishing and food processing. Locations classed as being moderately sensitive include schools, residential areas, and food retailers.

8.68 Receptors have been identified within a 500 m distance of the extraction area boundary at the application site, refer to Table 8-5 below and their locations shown in Figure 8-1.

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Table 8-5 Sensitive Receptors within 500 m of the Extraction Area Boundary

Receptor Reference	Receptor	Sensitivity	Distance (m) / Direction from Extraction Area (Approx.)	Location of Receptor Relative to Site
R1	Residential	Medium	430	NE
R2	Residential	Medium	375	NE
R3	Residential	Medium	270	NE
R4	Residential	Medium	220	NE
R5	Residential	Medium	140	NE
R6	Residential	Medium	115	NE
R7	Residential	Medium	100	NE
R8	Residential	Medium	105	E
R9	Residential	Medium	100	S
R10	Residential	Medium	135	S
R11	Residential	Medium	165	S
R12	Residential	Medium	150	S
R13	Residential	Medium	240	S
R14	Residential	Medium	270	S
R15	Residential	Medium	300	S
R16	Residential	Medium	300	S
R17	Residential	Medium	390	S
R18	Residential	Medium	410	S
R19	Residential	Medium	105	S
R20	Residential	Medium	145	SW
R21	Residential	Medium	110	W
R22	Residential	Medium	155	W
R23	Residential	Medium	225	W
R24	Residential	Medium	230	W
R25	Residential	Medium	330	W
R26	Residential	Medium	370	W

IMPACT ASSESSMENT - METHODOLOGY

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Evaluation Methodology

8.69 Fugitive dust emissions and particulate matter arising from the application site activities have the potential to affect existing sensitive receptors in the area due to a potential increase in airborne dust deposition.

8.70 Given the short-term period of soil stripping, berms construction and restoration activities, the magnitude for particulate matter release will be low. Given the nature of the sand extractions operation activities, the magnitude for particulate matter release will be low.

8.71 Increased combustion emissions (primarily oxides of nitrogen) from vehicle exhaust emissions associated with the proposed extraction also have the potential to contribute to local air pollution.

8.72 The significance of impacts due to emissions from the application site are dependent upon the magnitude of the emissions, the prevailing meteorological conditions for the location, and the proximity of sensitive locations to the emission sources.

8.73 This impact assessment is based upon a comparison of the baseline (both current and projected without the new development proposals) situation against the air quality impacts resulting from the 'with development' proposal scenario. The potential for 'in-combination' effects from other planned or proposed sources or air pollutants in the area has also been considered.

8.74 Each of the activities associated with extraction development have been assessed for potential air quality impacts including:

- emission from preparatory works, stripping, placement of soil (earthworks / trackout) and restoration
- emissions from extraction and processing including material transfer, end-tipping, stockpiling.
- PM_{10} contribution from operational activities
- traffic exhaust emissions.

8.75 The methodology used in each assessment is presented in the sub-sections below which also provide an explanation of the significance criteria to describe the impacts of the proposed development on air quality.

8.76 For the purposes of environmental assessment of releases of dust from construction and mineral activities, the classifications of PM_{10} and 'deposited dust' are typically applied. The impacts associated with PM_{10} are related to potential health impacts while deposited dust is related to potential nuisance effects. The assessment of the potential impacts of each fraction has, therefore, been undertaken separately.

Significance Criteria

8.77 The following air quality specific significance criteria have been used to assess the significance of air quality impacts in preference to overall descriptors of significance.

8.78 To determine the significance of particulate matter effects associated with the development, an evaluation of the sensitivity of the surrounding area is required. Receptors can demonstrate different sensitivities to changes in environment and are classified as per Table 8-6 below (and IAQM Construction Dust Guidance).

Table 8-6 Methodology for Defining Sensitivity to Dust and PM_{10} Effects

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Sensitivity of Area	Human receptors	Ecological Receptors(a)
Very High	Very densely populated area More than 100 dwellings within 20 m Local annual mean PM_{10} concentrations exceed the Objective. Works continuing in one area of the site for more than 1-year	European Designated sites
High	Densely populated area. 10-100 dwellings within 20 m of site. Local annual mean PM_{10} concentrations close to the Objective (36 – 40 µg/m^3)	Nationally Designated sites
Medium	Suburban or edge of town Less than 10 receptors within 20 m Local annual mean PM_{10} concentrations below the Objective (30 – 36 µg/m^3)	Locally designated sites
Low	Rural area; industrial area No receptors within 20 m Local annual mean PM_{10} concentrations well below the Objective (<30 µg/m^3) Wooded area between site and receptors	No designations
Notes: (a)-Only applicable if ecological habitats are present which may be sensitive to dust effects.		

8.79 Table 8-7 below illustrates how the interaction of magnitude and sensitivity results in the significance of an environmental effect, with the application of mitigation measures as per the IAQM Construction Dust Guidance.

Table 8-7 Impact Significance Matrix – Dust Effects (with Mitigation)

Sensitivity of Surrounding Area	Risk of Site Giving Rise to Dust or PM_{10} Effects		
	High	Medium	Low
Very High	Slight Adverse	Slight Adverse	Negligible
High	Slight Adverse	Negligible	Negligible
Medium	Negligible	Negligible	Negligible
Low	Negligible	Negligible	Negligible

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Soil Stripping, Berm Construction, and Restoration - Methodology

8.80 The Institute of Air Quality Management (IAQM) assessment of risk at construction stage is determined by considering the predicted change in conditions because of the proposed development. The risk category for potential effects arising from preparatory site works is divided into two potential activities:

- earthworks
- HGV trackout.

8.81 Based on the scale and nature of the works including areas, soils and operations at the site, a dust emission class is defined for each of the activities. These dust emission classes are then used to determine the risk categories presented below. These risk categories determine the potential risk of dust soiling effects assuming no mitigation measures are applied.

8.82 Table 8-8 illustrates how the interaction of distance to the nearest receptor and the dust emission class results in the determination of risk category from ***earthworks activities.***

Table 8-8 Determination of Risk Category from Earthworks Activities

Distance To Nearest Receptor		Dust Emission Class		
Human (m)	Ecological (m)	Large	Medium	Small
<20	-	High Risk Site	High Risk Site	Medium Risk Site
20 – 50	-	High Risk Site	Medium Risk Site	Low Risk Site
50 – 100	<20	Medium Risk Site	Medium Risk Site	Low Risk Site
100 – 200	20 – 40	Medium Risk Site	Low Risk Site	Negligible
200 – 350	40 – 100	Low Risk Site	Low Risk Site	Negligible

8.83 Table 8-9 illustrates how the interaction of distance to the nearest receptor and the dust emission class results in the determination of risk category from ***trackout movements***.

Table 8-9 Determination of Risk Category from Trackout Movements

Distance To Nearest Receptor		Dust Emission Class		
Human (m)	Ecological (m)	Large	Medium	Small
<20	-	High Risk Site	Medium Risk Site	Medium Risk Site
20 – 50	<20	Medium Risk Site	Medium Risk Site	Low Risk Site
50 – 100	20 – 100	Low Risk Site	Low Risk Site	Negligible

8.84 Mitigation measures are recommended based on the evaluation of risk in accordance with the IAQM Dust and Air Emissions Mitigation Measures Guidance.

Operation Stage Dust Impacts - Methodology

8.85 A staged approach has been adopted to the assessment of operations stage impacts; this ensures that the approach taken for the assessment of risk is proportional to the risk of an unacceptable impact being caused. As such, where a simple review of the situation shows that risk of a health or nuisance impact is negligible, this will be sufficient. In cases where the risk cannot be regarded as insignificant, a more detailed assessment may be required, such as a quantitative screening assessment or an advanced dispersion modelling exercise, as appropriate.

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8.86 Guidance on the assessment of the impacts of extractive operations on air quality has been prepared by the Institute of Air Quality Management (IAQM). This guidance uses a simple distance-based screening process to identify those operations where the dust impacts are unlikely to be significant and therefore require no further assessment. Where assessment that is more detailed is required, a basic assessment framework is presented which employs the Source-Pathway-Receptor approach to evaluate risk of impacts and effects.

8.87 The predicted scale of dust effects may be classified as either 'significant', or not 'significant'. Where effects are predicted to be 'significant', further mitigation is likely required before the proposals are to be acceptable under planning policy.

8.88 A semi-quantitative assessment of fugitive dust emissions from the proposed extraction and restoration activities has been undertaken. The assessment has been undertaken by constructing a conceptual model that takes into consideration the potential sources, surrounding receptors, and the pathway between source and receptor to assess the magnitude of risk of impact on local amenities.

8.89 The distance from the source to the sensitive receptor is crucial. The initial risk screening stage (Tier 1) focuses upon the potential for dust generation at the site and the distance between source and receptors. In Tier 1 of the assessment, a representative selection of dust sensitive receptors in each direction of the application site is identified within the 1 km study area.

8.90 Further assessment is carried out for those receptors within 500 m of the extraction area and these receptors progress onto a Tier 2 assessment. Other residential receptors beyond 500 metres are considered too far away to be impacted by potential dust from the site and not considered any further in this assessment.

8.91 Tier 2 involves identifying source-pathway-receptor linkages and a semi-quantitative assessment of the likelihood and magnitude of any effects that could be associated with each pollutant linkage. This assessment takes account of:

- wind direction and speed data (to estimate frequency of exposure)
- proximity to source (to estimate magnitude of exposure)
- sensitivity of receptor
- occurrence of natural dust suppression (rainfall patterns).

8.92 This information is used to inform a semi-quantitative assessment of the likely magnitude of impact and is based upon professional experience of the assessor as the issue of dust nuisance on local receptors is a subjective issue, where public perception on what constitutes 'acceptable' levels varies from one person to the next. Assigning significance to nuisance impacts is qualitative and involves a judgement based on the likely magnitude, frequency, duration, and reversibility (or recovery) of the impact. In this context, significant impact is taken to mean what is generally not publicly acceptable and desirable.

8.93 Note that the Tier 2 risk screening assessment **does not consider proposed mitigation measures** to be implemented at the proposed development. These will include provision of perimeter screening berms, dust suppression measures etc., identified in the section dealing with Mitigation Measures later in this chapter.

8.94 Following the results of the risk assessment, mitigation measures are detailed, and the residual impact assessed. The detailed methodology used within the assessment is described in more detail in Appendix 8-A.

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PM_{10} Contribution from Site-Based Activities - Methodology

8.95 In terms of whether the PM_{10} concentration in the local area is likely to exceed the AQS, the following information has been reviewed:

- existing PM_{10} concentrations
- expected additional contribution of PM_{10} from site operations.

8.96 In terms of estimating the potential magnitude of impact from site operations, a UK edition of the LAQM Technical Guidance (LAQM.TG (03)) stated that fugitive dust from stockpiles and pit operations can potentially contribute up to 5 µg/m^3 towards annual mean background concentrations of the coarse fraction of particulates (2.5 – 10 µm diameters) in the surrounding area.

8.97 Given the nature and scale of proposed activities, the potential PM_{10} impact of increased intake is similar or lower. However, to ensure a robust assessment of potential PM_{10} impacts, the upper limit of 5 µg/m^3 has been applied to represent the development contribution to annual ambient PM_{10} concentrations. This value has then been added to existing background levels to assess whether the Air Quality Standards objective is likely to be exceeded.

Traffic Emissions - Methodology

8.98 Atmospheric emissions related to site proposals are primarily associated with the exhaust emissions from heavy duty vehicles (HDVs / HGV's). The decision as to whether an assessment of potential impact is required is based upon the criteria set out in the DMRB.

8.99 The criterion for assessment of air quality contained within the latest DMRB guidance (LA 105) focuses on roads with relatively high changes in flows or high proportion of HDV / HGV traffic.

8.100 The following traffic scoping criteria shall be used to determine whether the air quality impacts of a project can be scoped out or require an assessment based on the changes between the do something traffic (with the project) compared to the do minimum traffic (without the project) in the opening year:

- annual average daily traffic (AADT) change by >= 1,000; or
- heavy duty vehicle (HDV) AADT change by >= 200; or
- daily average speed change by >= 10 km/hr; or
- peak hour speed change by 20 km/hr; or
- a change in carriageway alignment by >= 5 m.

Assessment of Impacts

Soil Stripping, Placement and Restoration – Assessment

8.101 An overview of the sources and processes associated with the preparatory site works and the infrastructure installation activities, and their respective potential for dust deposition (both dust and smaller particles), is presented below in Table 8-10.

Table 8-10 Site Activities: Sources of Dust Emissions

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Activity	Source	Emission potential	Comments
Earthworks and Trackout	Excavator / Dump Truck	Medium - dry or fine materials during strong windy weather	Temporary, variable from day to day depending on prevailing meteorological conditions, level, and location of activity. Soils immediately used to construct berms, used in restoration works or placed in stockpiles.
		Small – coarse or wet materials during conditions of low wind speed	
Temporary stripping & placement work & restoration work.	Excavator / Dump Truck	Medium - dry or fine materials during strong windy weather	Temporary, variable from day to day depending on prevailing meteorological conditions, level, and location of activity. Soils placed directly into storage area or in progressive works.

8.102 A summary of the determined risk category for the proposed operation identified is presented in Table 8-11.

Table 8-11 Construction / Restoration Stage Activities: Risk of Dust Emissions

Source	Humans Receptors - Risk
Earthworks	Low
Trackout	Low

8.103 The overall dust risk during the construction restoration stages has been assessed as ‘low’ for human receptors without mitigation measures in place.

Operational Stage Dust Impact – Assessment

8.104 When commenced and operational, the principal air quality impacts generated by the sand pit extension and extraction will be dust and traffic related emissions. An overview of the sources and processes associated with the extraction activities, and their respective potential for dust deposition, is presented in Table 8-12 below.

Table 8-12 Sources of Particulate Emissions

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Activity	Source	Emission potential	Comments
Material transfer to processing area	On-site vehicle, Dry loose material.	Medium when dry material being handled during strong windy weather	Emissions due to prevailing meteorological conditions and amount of dry loose material. Emissions due to re-suspension of loose material on surfaces.
Processing	Processing plant, Dry loose material	Medium when dry material being processed during strong windy weather	Emissions due to prevailing meteorological conditions (high winds).
Material transfer to storage area	On-site vehicle, Dry loose material	Medium when dry material being handled during strong windy weather	Emissions due to prevailing meteorological conditions and amount of dry loose material. Emissions due to re-suspension of loose material on surfaces.
Material storage	Dry loose material in stockpiles	Medium when dry material being stored during strong windy weather	Emissions due to prevailing meteorological conditions (high winds).
Material loading to HGV	On-site vehicle, Dry loose material	Medium when dry material being handled during strong windy weather	Emissions due to prevailing meteorological conditions and amount of dry loose material. Emissions due to re-suspension of loose material on surfaces.
Transfer off site / traffic off site	HGV / Road vehicles	Low - on paved road surfaces	Dependent on the amount of loose material on road surface available for re-suspension and track out.

Human Receptors

8.105 A total of 26 receptors were identified within the c. 500m of the proposed extraction area.

8.106 These receptors have progressed onto a Tier 2 assessment as they are considered to have a greater risk of dust impact. Each receptor is assessed against the frequency of exposure and the distance from the source to the receptor (i.e., the pathway) in accordance with the methodology described in **Appendix 8-A.**

8.107 The frequency of exposure of each receptor is based upon the frequency of winds capable of carrying dust particles blowing in the direction, from the source to the receptor, on days when rainfall does not inhibit dust from becoming airborne. Representative data on the local wind climate is therefore required for this section of the assessment.

8.108 A wind-rose for the site is presented in Figure 8-2 for Johnstown Castle Meteorological Station and illustrates the predominant wind directions from the south-west. The potential for the generation of airborne dust will increase with wind speed, with winds greater than 3 m/s capable of carrying airborne dust[10].

8.109 A wind rose showing the frequency of winds at wind speeds of greater than 2 m/s is presented in Figure 8-2 with the individual frequences for each 10-degree compass sector used within the assessment. In this assessment, wind speeds over 2 m/s were used as this is how the

[10] Department of the Environment, Transport, and the Regions, 1995. *The Environmental Effects of Dust from Surface Mineral Workings* – Volume 2. Technical Report. December 1995.

data on percentage occurrence of wind frequency and wind speed is calculated and presented by Met Eireann. For this reason, the impact assessment presented herein is conservative.

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8.110 A summary of the risk assessment of dust impacts at the selected Tier 2 properties / locations arising from the proposed development activities (in the absence of any mitigation measures) is presented in Table 8-13 below.

Table 8-13 Dust Risk Assessment Screening (Without Mitigation Measures)

Receptor	Distance from Operations (m)	Relevant. Wind Direction (A)	Potential Exposure Duration (B)	Relative Wind / Distance Rank (C)	Risk Evaluation (without mitigation)
R1	430	220-240	5.6	2/3	Insignificant
R2	375	220-240	5.6	2/3	Insignificant
R3	270	220-240	5.6	2/4	Acceptable
R4	220	220-240	5.6	2/4	Acceptable
R5	140	220-240	5.6	2/5	Acceptable
R6	115	220-240	5.6	2/5	Acceptable
R7	100	220-240	5.6	2/5	Acceptable
R8	105	255-275	4.0	2/5	Acceptable
R9	100	350-010	2.0	1/5	Insignificant
R10	135	350-010	2.0	1/5	Insignificant
R11	165	350-010	2.0	1/5	Insignificant
R12	150	350-010	2.0	1/5	Insignificant
R13	240	350-010	2.0	1 / 4	Insignificant
R14	270	350-010	2.0	1 / 4	Insignificant
R15	300	350-010	2.0	1/3	Insignificant
R16	300	350-010	2.0	1/3	Insignificant
R17	390	350-010	2.0	1/3	Insignificant
R18	410	350-010	2.0	1 / 2	Insignificant
R19	105	350-010	2.0	1 / 5	Insignificant
R20	145	35-55	1.0	1 / 5	Insignificant
R21	110	80-100	2.0	1/ 5	Insignificant
R22	155	80-100	2.0	1/5	Insignificant
R23	225	80-100	2.0	1 / 4	Insignificant

Receptor	Distance from Operations (m)	Relevant. Wind Direction (A)	Potential Exposure Duration (B)	Relative Wind / Distance Rank (C)	Risk Evaluation (without mitigation)
R24	230	80-100	2.0	1/ 4	Insignificant
R25	330	80-100	2.0	1 / 3	Insignificant
R26	370	80-100	2.0	1/3	Insignificant
(A) – relevant wind direction based on upwind sector which would potentially convey from site towards the receptor.					
(B) – Potential duration of exposure based on frequency of moderate to high wind speed (adjusted for dry days only) as described in the methodology in Appendix 8-A					
(C) – Ranking as per methodology in Appendix 8-A. Refer to Error! Reference source not found. *for Receptor Locations*					

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8.111 From Table 8-13 above, the risk of impact associated with dust deposition at receptors is highest at Receptors located closest to the northeast and east of the development. An Acceptable risk was evaluated for the following nine receptors: R3, R4, R5, R6, R7 and R8. All other receptors evaluated in this assessment are expected to have an insignificant risk of deposited dust impacts.

8.112 Note that ***this assessment does not consider implementation of mitigation measures within the proposed development*** that include provision of perimeter screening berms; location of the processing plant within the pit floor to maximise topographic screening; and dust suppression measures etc. (as outlined in the section of Mitigation Measures section below). This assessment is conservative based on the moderate wind speeds included in the risk evaluation.

8.113 Details of the existing / proposed dust mitigation measures to reduce dust deposition impact levels at receptors to levels of 'lower risk' are described in the 'Mitigation' section of this chapter.

Ecological Receptors

8.114 As stated above, the application site is not subject to any statutory nature conservation designation. There are no designated European sites or proposed Natural Heritage Areas (pNHA) within 2 km of the application area, refer to EIAR Figures 5-2 and 5-4.

8.115 Based on the nature, size, and scale of the planned development, it is considered that the maximum distance for which the project should be evaluated in terms of Natura 2000 or designated nature sites is up to a maximum radius of 2 km unless there are any potential source-pathway-receptor links between the proposed development and Natura 2000 or designated site(s) beyond this distance. At a distance greater than 2 km, and in the absence of any potential source-pathway-receptor link, it is generally considered that no Natura 2000 or designated sites would be affected by any direct loss of habitat or otherwise impacted upon by the effects of dust.

8.116 Accordingly, there is no requirement to consider these ecological receptors further in the dust assessment.

Traffic Emissions - Assessment

8.117 The traffic associated with the development will generate a maximum of 3 to 4 heavy goods vehicle (HGV / truck) trips per hour, at the maximum annual extraction rate output of 200,000 tonnes per year

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8.118 In view of:

- the existing permitted levels of pit output and associated HGV traffic movements across the road network;
- the fact that none of the roads in the surrounding local road network meet any of the traffic / alignment change criteria set out in LA 105, refer to section 8.101.

8.119 It is considered that the extent of any change and the likely impact of the proposed development can be deemed 'negligible' in terms of local air quality and that no further air quality assessment of traffic emissions is necessary.

8.120 On this basis, the impact of the proposed development can be screened out and combustion emissions (primarily oxides of nitrogen) from vehicle exhaust emissions associated with the transportation of materials will not have the potential to contribute to local air pollution.

PM_{10} Contribution from Extraction / Production Activities - Assessment

8.121 In terms of PM_{10}, the maximum annual mean measured baseline background concentration was 15 µg/m^3 in 2022 at Enniscorthy, Co. Wexford monitoring station. Therefore, the potential contribution up of 5 µg/m^3 towards annual mean background concentrations of the coarse fraction (2.5 – 10 µm diameters) of particulates (in the immediate area of the site) is insignificant and well below the annual objective of 40 µg/m^3.

8.122 Therefore, the potential impacts in relation to increase in ambient PM_{10} concentrations can be classified as 'negligible'.

Unplanned Events (i.e., Accidents)

8.123 Accidents, malfunctions, and unplanned events refer to events or upset conditions that are not part of any activity or normal operation of the proposed development planned by the Applicant. Even with the best planning and the implementation of preventative measures, the potential exists for accidents, malfunctions, or unplanned events to occur during the proposed extraction activities.

8.124 Many accidents, malfunctions and unplanned events are, however, preventable and can be readily addressed or prevented by good planning, design, emergency response planning, and mitigation. In terms of air quality impact, the following unplanned events could influence the local area:

- equipment malfunction
- vehicle collision
- dry and windy weather conditions with dust suppression equipment malfunction
- accidental material spillages during transport.

8.125 The continued implementation of existing mitigation measures described below (including covering of HGV loads before vehicles exit the site; dust suppression using robust methods water bowsers etc.) will ensure that the air quality impacts of any unplanned events are negligible.

Cumulative / Synergistic Impacts

8.126 In essence, cumulative impacts are those which result from incremental changes caused by other past, present, or reasonably foreseeable actions together with those generated by the proposed development. Therefore, the potential impacts of the proposed development cannot be considered in isolation but must be considered in addition to impacts already arising from existing or planned development.

8.127 This air quality impact assessment herein indicates that the proposed development will not contribute to a significant increase in local air pollution by way of excessive air / dust emissions. There are no other significant sources of air emissions approved or planned within 1 km of the application site and no potential for significant cumulative impacts has been identified. The cumulative impact of the proposed development is therefore classified as insignificant.

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Interaction with Other Impacts

8.128 The potential impact on air quality by the project on sensitive receptors including sensitive ecological receptors and people living in the area has been fully assessed in this chapter. The overall impact of the project on these receptors is further considered in EIAR Chapter 4 Population & Human Health and Chapter 5 Biodiversity.

Mitigation Measures – Dust Suppression

Sand Extraction & Processing

8.129 A large range of existing dust suppression mitigation measures are implemented at the existing pit and these will continue to be implemented for the proposed development. These measures are consistent with the recommended best practice for the sector set out in the DoEHLG (2004) quarry planning guidelines and EPA (2006) environmental management guidelines. The effectiveness of these measures implemented at the existing pit is demonstrated by the results of the dust deposition monitoring programme. The dust suppression mitigation measures are listed in Table 8-14 below:

Table 8-14 Particulate Emission Mitigation Measures

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Source	Emission Potential	Recommended Mitigation Measures	Effectiveness
Excavator / Loading shovel	High – dry or fine material during strong windy weather	Minimise drop heights when handling materials. Maximise use of excavated soil in construction of vegetated screening berms or in pit restoration works. Dampen materials using water sprays / water bowser.	High
	Low – material of high moisture content during conditions of low wind speed	Minimise drop heights when handling material. Protect from wind where possible.	High
On-site Vehicles	High when travelling over un-surfaced and dry site roads.	Minimise length of on-site haul routes.	High
		Use of water bowser to dampen haul routes during dry weather periods.	High
		Restrict on site vehicle speeds to less than 20 kph.	High
		Routing of traffic and away from any surrounding sensitive receptors.	High
Road Vehicles (transfer off-site)	Low / Moderate on paved road surfaces	Where necessary, use of road sweeper to reduce the amount of material available for re-suspension.	Moderate / High
		Travel over paved surfaces / access road and existing wheelwash in place.	High
		All loaded HGV's exiting the site have their loads covered.	High
Stockpiles / Screening Berms	High when dry or fine material being stored or handled during strong windy weather	Seed / vegetate surfaces of screening berms.	High
		Continue to locate stockpiles within the pit area to take advantage of any available shelter from wind and topographic screening.	High
		Use of water bowser to moisten materials during periods of dry and windy weather	High
		Limit mechanical disturbance of materials more likely to become airborne and/or time operations having regard to expected weather conditions	High
Processing Plant	High – during dry and strong windy weather	Continued location of the existing permitted processing plant on the pit floor to maximise topographic screening and eliminate potential for dust to migrate beyond the site boundary.	High

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Soil Stripping and Restoration Activities

8.130 Specific mitigation measures are listed in Table 8-15.

Table 8-15 Particulate Emissions Mitigation Measures

Source	Emission Potential	Recommended Mitigation Measures	Effectiveness
Excavator/HDV	High – dry or fine silty material during strong windy weather	Minimise drop heights when handling material Soils placed directly into screening berms or in progressive restoration works to avoid double handling. Avoid working in adverse/ windy conditions.	High
	Low – soils of high moisture content during conditions of low wind speed	Minimise drop heights when handling material, protection from wind where possible.	High

Trackout Measures

8.131 When adverse conditions apply (dry, windy weather), water from a bowser will be sprayed on dry unpaved road surfaces to minimize dust rise. Any paved surfaces around the site and/or along the access road leading in and out of the pit will also be sprayed as required.

8.132 All loaded HGV vehicles leaving the site will continue to have their loads covered to prevent any dust blow during transport.

8.133 There is an existing wheelwash in place.

Residual Impact Assessment

Soil Stripping, Berm Construction and Restoration Activities

8.134 In the absence of mitigation measures, the assessment of risk identified that the risk of impact at receptors during soil stripping, berms construction and restoration activities would be Low. With the provision of mitigation measures set out above, this risk would reduce even further to Negligible.

Sand Extraction & Processing

8.135 With the range of mitigation measures currently implemented and to be implemented and design measures to be incorporated into the working scheme, it is considered that the risk of dust impact at receptors evaluated to be at Acceptable / Insignificant risk from the proposed activities (without mitigation measures) will reduce to Insignificant / Negligible (with mitigation measures in place).

8.136 Based on the assessment presented above, it is concluded that the proposed development, with the range of mitigation measures to be implemented and design measures incorporated into the working scheme (screening berms, location of processing plant on the pit floor, progressive restoration etc.), will not have any significant dust impact on assessed receptors.

8.137 Current dust deposition monitoring carried out at the sand pit boundaries indicates that the current sand pit operations have complied with the recommended dust deposition emission limit value of 350 mg/m2/day (averaged over 30 days) as set out in Condition No.14(a) Planning Ref. No. 20191259. This demonstrates the effectiveness of the existing mitigation / proposed mitigation measures for dust suppression, for the development.

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Monitoring

8.138 Dust deposition monitoring will continue to be carried out at the site for the duration of extraction activities at the proposed development (in accordance with EPA and DoEHLG guidelines). Dust monitoring will be undertaken at the monitoring locations D1 – D2, as shown on Figure 8-1. An additional monitoring location D3 will be located on the southern boundary.

8.139 The dust deposition monitoring will continue to be carried out using the Bergerhoff Method that monitors dust deposition continuously over a 30 day period. The frequency of monitoring shall be at least twice per year during the months April to September (i.e. the driest period of the year).

8.140 The results of the dust deposition monitoring will be submitted to Wexford Co. Council on a regular basis for review and record purposes.

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Figures

Figure 8-1 Dust Monitoring & Receptor Locations

Figure 8-2 Windrose for Johnstown Castle Meteorological Station 2002-2020

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Notes:

1. Based on 1:2,500 OSI Place Mapping - Map No. 5145-D & 5146-C

Legend:

- PLANNING PERMISSION AREA (c.23.2 Hectares)
- EXTRACTION BOUNDARY
- 500m RADIUS FROM EXTRACTION BOUNDARY
- R1 — RECEPTOR LOCATION
- D2 — DUST MONITORING LOCATION
- D3 — PROPOSED ADDITIONAL DUST MONITORING LOCATION

Receptor Location	Distance (m)
R1	430
R2	375
R3	270
R4	220
R5	140
R6	115
R7	100
R8	105
R9	100
R10	135
R11	165
R12	150
R13	240
R14	270
R15	300
R16	300
R17	390
R18	410
R19	105
R20	145
R21	110
R22	155
R23	225
R24	230
R25	330

Rev	Amendments	Date	By	Chk	Auth

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Figure Title
DUST MONITORING & RECEPTOR LOCATIONS

Scale	SLR Project No.
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Date 01/26	Date 01/26	Date 01/26	Date 01/26

Figure Number **FIGURE 8-1** Rev. **0**

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Scale 1:5,000

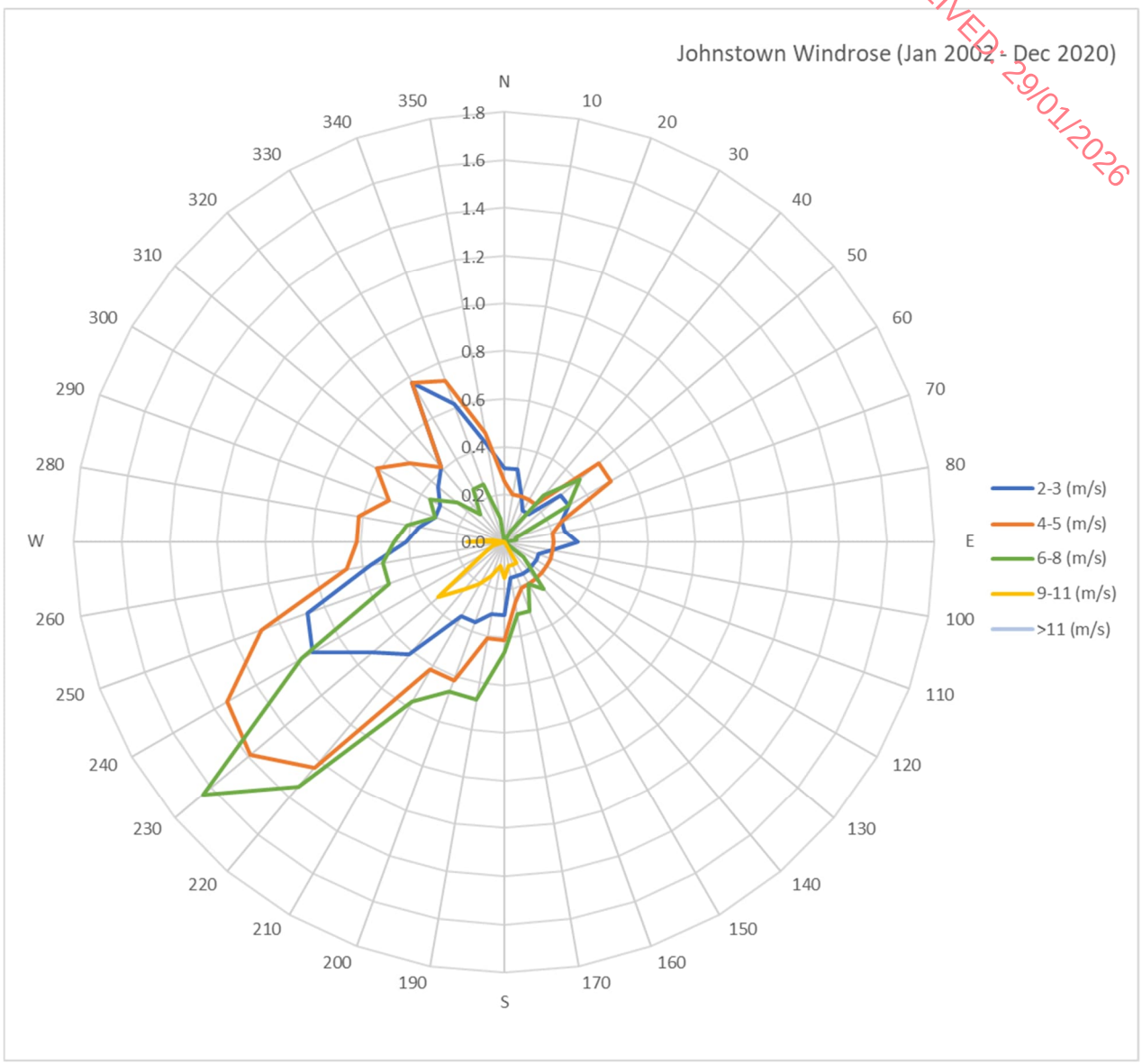
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Figure 8-2 Windrose for Johnstown Castle Meteorological Station 2002 – 2020



Appendices

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Appendix 8-A: Dust Risk Screening Assessment Methodology

DUST RISK SCREENING ASSESSMENT METHODOLOGY

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The methodology applied in the assessment is a semi-quantitative risk assessment methodology, in which the probability of an impact occurring and the magnitude of the impact, if it were to occur, are considered. This methodology is the Tier 2 assessment of the dust assessment methodology. If identified dust sensitive receptors are not screened out within Tier 1, this approach provides a mechanism for identifying the areas where mitigation measures are required, and for identifying mitigation measures appropriate to the risk presented by the development, (i.e., the assessment does not take account of proposed mitigation being put in place).

The magnitude of the potential risk at each receptor is classified depending on the frequency of exposure and the distance from the site to the receptor. Frequency of exposure is represented by the percentage of moderate to high winds (over 3 m/s) from the direction of the site.

The screening assessment tool assesses the significance of the distance from site and the frequency of exposure of each receptor by assigning a ranked number. Receptors with a higher potential for dust impacts would therefore result in a higher value whilst receptors with lower potential would expect to carry a lower value. The value corresponding to an evaluation of risk is a product of the significance of the distance and frequency of exposure, each is assigned a value representing its significance. The multiplication of the two values assigned gives a total, which is then corresponded to a qualitative term of risk magnitude.

A.1.1 Frequency of Exposure Criterion

The potential for any site to emit dust is greatly influenced by weather. Increased wind speed increases the potential for the generation of airborne dust due to the suspension and entrainment of particles in airflow. A worst-case situation would be strong, warm, drying winds which increase the rate at which dust is lifted from an untreated surface and emitted into the air. Wind can also have the effect of spreading dust over a large area. Conversely, rainfall decreases dust emissions, due to both surface wetting and increasing the rate at which airborne dust is removed from air. An article on dust generation from quarry/pit operations[11] suggests that rainfall of greater than 0.2 mm per day is considered sufficient to effectively suppress windblown dust emissions.

The frequency of exposure to dust emissions represents the percentage of time that wind speeds capable of carrying airborne dust (greater than 3 m/s) are blowing from the site to the direction of the receptor. Frequencies are calculated based on meteorological data. For screening assessment wind speeds greater than 2 m/s were considered as this is how data on percentage occurrence of wind frequency and wind speed is calculated and presented by Met Eireann. For this reason, the assessment is conservative.

For the screening assessment, a value of 1 mm would be used for the criteria to classify days as ‘dry’ or ‘wet’; five times the recommended value, using annual average rainfall data. The average number of days when rainfall exceeds 1 mm would be provided for each month and calculated over the year to provide an average.

The resulting frequency of moderate to high wind speeds with the potential of carrying airborne dust towards receptors would then be classified into the criteria in Table 8 A-1 with the respective rank value assigned.

[11] Leeds University. Good Quarry. http://www.goodquarry.com/article.aspx?id=55&navid=2

Table 8 A-1 Frequency of Exposure – Risk Classification

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Risk Category	Criteria
1	Frequency of winds (>2 m/s) from the direction of the dust source on dry days are less than 3%
2	The frequency of winds (>2 m/s) from the direction of the dust source on dry days are between 3% and 6%
3	The frequency of winds (>2 m/s) from the direction of the dust source on dry days are between 6% and 9%
4	The frequency of winds (>2 m/s) from the direction of the dust source on dry days are between 9% and 12%
5	The frequency of winds (>2 m/s) from the direction of the dust source on dry days are between 12% and 15%
6	The frequency of winds (>2 m/s) from the direction of the dust source on dry days are greater than 15%

A.1.2 Distance to Source Criterion

In assessing dust impacts, the distance from the source to the sensitive location is crucial, as airborne, and deposited dust tend to settle out close to the emission source. Smaller dust particles remain airborne for longer, dispersing widely and depositing more slowly over a wider area.

Guidance indicates that larger dust particles (greater than 30 µm) will largely deposit within 100 m of sources. Smaller particles (less than 10 µm) are only deposited slowly. Concentrations decrease rapidly on moving away from the source, due to dispersion and dilution.

To allow for this effect of distance, buffer zones are often defined by mineral planning authorities around potentially dusty activities to ensure that sufficient protection is provided. They have not been established in any rigorous scientific way, but usually range from 50 m to 200 m. The 1995 UK DoE Guidance on dust from surface mineral working's, however, recommends a stand-off distance of 100-200 m from significant dust sources (excluding short-term sources), although it is recognised that these distances can be reduced if effective mitigation measures are identified and implemented. In terms of identifying sensitive locations therefore, and to represent an extreme worst-case scenario, consideration only needs to be given to sensitive receptors within 250 m of the site boundary. Receptors at a distance greater than 250 m have therefore been screened out in Tier 1 of the assessment.

The criteria for classifying the distance from receptor to source and thus assigning a rank value has therefore been based on the various references to dust behaviour described above. The rank classifications are presented below in Table 8 A-2.

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Table 8 A-2 Distance to Source – Risk Classification

Risk Category	Criteria
1	Receptor is more than 500 m from the dust source
2	Receptor is between 400 m and 500 m from the dust source
3	Receptor is between 300 m and 400 m from the dust source
4	Receptor is between 200 m and 300 m from the dust source
5	Receptor is between 100 m and 200 m from the dust source
8	Receptor is less than 100 m from the dust source

A.1.3 Sensitivity of Receptors

Sensitive locations are those where the public may be exposed to dust from the site. Locations with a high sensitivity to dust include hospitals and clinics, hi-tech industries, painting and furnishing and food processing. Locations classed as being moderately sensitive include schools, residential areas, and food retailers. Table 8 A-3 below[12] shows examples of dust sensitive facilities.

Table 8 A-3 Examples of Dust Sensitive Facilities

High sensitivity	Medium sensitivity	Low sensitivity
Hospitals and clinics	Schools and residential areas	Farms
Retirement homes	Food retailers	Light and heavy industry
Hi-tech industries	Greenhouses and nurseries	Outdoor storage
Painting and furnishing	Horticultural land	
Food processing	Offices	

A.1.4 Evaluation of Risk

Once a rank value has been assigned to the frequency of exposure and distance to source, an overall risk can be evaluated by combining the two risk categories, along with consideration of the sensitivity of the receptor. For low sensitivity receptors the risk of dust impact is considered to be significantly lower than for medium and high sensitive receptors. Therefore, a factor of 0.5 would be applied to the final risk evaluation ranking.

For each receptor, the relative magnitude of risk is given by identifying which of the score categories in Table 8 A-4 it falls into. This final evaluation represents the risk of dust impacts prior to control and mitigation measures being employed on site.

[12] **Ireland M. (1992)** "Dust: Does the EPA go far enough?", Quarry Management, pp23-24.

Table 8 A-4 Risk Evaluation Ranking (Without Mitigation)

Magnitude of Risk	Score
Insignificant	7 or less
Acceptable	8 to 14
Slight Adverse	15 to 24
Moderate Adverse	25 or more

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