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INTRODUCTION

Background

8.1 This Chapter of the Environmental Impact Assessment Report (EIAR), prepared by SLR Consulting Ireland, addresses the potential air quality related impacts associated with soil and stone waste recovery activities on the western side of the South Quarry void at Huntstown Quarry Complex, North Road, Finglas, Dublin 11. These activities will facilitate backfilling of the quarry to original (pre-extraction) ground level and the ultimate restoration of the quarry to grassland.

8.2 The existing parent permission for the Huntstown Quarry Complex (Planning Ref. FW12A/0022 and An Bord Pleanála Ref. No. 06F.241693) was granted in August 2014 and provides for continuation of quarrying activity for 20 years up to 2034. That permission also includes provision for the restoration of all quarry voids within the Huntstown Quarry complex, including the South Quarry, by backfilling to former (original) ground level by placement and recovery of naturally occurring soil and stone waste generated by construction and development activity across the Greater Dublin Area.

8.3 In order to facilitate the transfer and re-location of soil waste recovery activities from the North Quarry (where they are currently ongoing) to the South Quarry, a waste licence review application is to be submitted to the EPA to provide for the following:

- importation of soil and stone waste to the western side of Huntstown South Quarry at a maximum rate of 750,000 tonnes per annum (as permitted by Planning Ref. FW12A/0012);
- extension of the licensed site boundary to incorporate the proposed waste recovery area on the western side of the South Quarry and the haul roads leading to / from it;
- an increase in the total permitted (lifetime) soil and stone waste intake to the (extended) waste facility to 18.76 million tonnes;
- continued use of pre-existing site infrastructure to support recovery activities; and
- re-routing of traffic flows via existing internal haul roads (i.e. within the quarry complex) to access the backfilling / recovery area at the South Quarry.

8.4 No new infrastructure is required to facilitate transfer and re-location of established soil waste recovery operations from Huntstown North Quarry across to the western side of the South Quarry or the extension of the waste licence boundary to include this area.

8.5 It is currently envisaged that backfilling of the South Quarry will commence in early 2023, at which time it is expected that the ongoing backfilling of the North Quarry to surrounding ground level will be largely complete and the importation, backfilling and recovery of soil and stone waste at that location will cease.

8.6 The licensed site to which this waste licence review application relates is located entirely within the townlands of Coldwinters, Kilshane, Huntstown, Johnstown, Cappogue and Grange, Co. Dublin, approximately 2.5km north-west of the Dublin suburb of Finglas, 1km west of the interchange between the N2 Dual Carriageway and the M50 Motorway and immediately east of the Cappagh Road (L3080), as shown on Figure 8-1.

8.7 The planned extension to the waste licence area covers an area of 22.5 hectares. It comprises the western side of Huntstown South Quarry and pre-existing internal haul roads leading to it within the wider quarry complex.

8.8 Further details on the proposed restoration works at the South Quarry (including details of site infrastructure, backfilling and recovery activities, environmental management systems and controls etc.) are provided in Chapter 2 of this EIAR.

8.9 The backfilling and soil and stone waste recovery activities at the South Quarry will have the potential to generate additional fugitive particulate matter, including visible dust which may result in impacts on local air quality.

8.10 Combustion emissions (principally finer particulates (PM_{10}) and oxides of nitrogen) from vehicle exhaust emissions associated with the transfer and handling of the inert soil and stone waste intake will also have the potential to impact on local air quality.

Scope of Work

8.11 The main focus of this air quality impact assessment is the potential impact on local residential amenity as a result of increased fugitive dust emissions from the backfilling and soil recovery activities at the South Quarry. Dust emissions are likely to arise in the course of the following activities:

- trafficking by heavy goods vehicles (HGVs) over paved / unpaved surfaces; and
- end-tipping, handling and stockpiling of soil waste materials.

8.12 With respect to the potential for air quality impacts, the key objective at the future recovery area at the South Quarry is to manage activities in order to ensure that air emissions are prevented where possible, and the effects of any residual releases are minimised.

8.13 This Chapter describes and assesses the existing air quality baseline characteristics of the area in and around the South Quarry at Huntstown, based on site specific surveys and published EPA data. Air emissions arising from the future backfilling and recovery activities at the quarry are then applied to these baseline conditions and the resulting air quality impacts assessed. Mitigation measures are identified where required, to eliminate and reduce impacts insofar as practical.

8.14 The following sections of this Chapter describe the potential air quality impacts associated with future backfilling activities at the soil recovery facility at Huntstown South Quarry. The following issues are addressed separately within this Chapter:

- relevant legislation, standards and guidance;
- baseline conditions pertaining to the measured (or estimated) existing air quality levels around the recovery facility;
- methodology used to assess the potential impacts of the activities at the recovery facility on air quality at local properties;
- assessment of the impacts;
- description of mitigation measures that are incorporated into the construction, design and operation of the recovery facility to eliminate or reduce the potential for increased air quality impacts (if required);
- summary of any residual impacts and reinstatement;
- summary of cumulative impacts; and
- monitoring proposals.

Consultations / Consultees

8.15 Following a review of the proposed activities, existing consents and site mapping / surveys, it was considered that there was no requirement for formal external consultations to be carried out in respect of dust / air quality impact for the purposes of this assessment. There was however some consultation with other specialist contributors.

Contributors / Author(s)

8.16 The air quality impact assessment presented in this Chapter was prepared by SLR Consulting Ireland. The lead consultant for the study was Aldona Binchy MSc. Eng PIEMA Environmental Engineering.

Limitations / Difficulties Encountered

8.17 This assessment was compiled on the basis of published guidance documents, and site-specific field surveys. No difficulties were encountered in compiling the required information.

REGULATORY BACKGROUND

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

Air Quality Standards

8.19 The Government's policy on air quality within Ireland is set out in the Air Quality Standards (AQS) Regulations 2011. The Ambient Air Quality and Cleaner Air for Europe (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)*.

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

8.21 The AQS Regulations set 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).

8.22 Under the AQS Regulations, the following air 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.

8.23 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 set by the CAFE Directive (2008/50/EC) are presented in Table 8-1. Air quality limit values in relation to vegetation protection are presented separately in Table 8-2.

8.24 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 are also prepared and published by the EPA.

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 Year	200 µg/m^3 40 µg/m^3	18/yr -	1 hour alert	400 µg/m^3 Exceeded for 3 consecutive hours	
Sulphur Dioxide (SO_2)	Hour Day	350 µg/m^3 125 µg/m^3	24/yr 3/yr	1 hour alert	500 µg/m^3 Exceeded for 3 consecutive hours	
Particulate matter with aerodynamic diameter of less than 10µm (PM_{10})	Day Year	50 µg/m^3 40 µg/m^3	35/yr -			
Particulate matter with aerodynamic diameter of less than 2.5µm ($PM_{2.5}$)	Year	25 µg/m^3 20 µg/m^3	-			8.5 to 18 µg/m^3

Table 8-2
Summary of Air Quality Limit Values : Protection of Vegetation[1]

Vegetation	Critical Level or Target Value	
Pollutant	Averaging Period	Value
Nitrogen dioxide (NOx)	Calendar year	30 µg/m^3
Sulphur Dioxide (SO_2)	Calendar year and winter (1 October to 31 March)	20 µg/m^3

[1] Limit values of CAFE Directive 2008/50/EC

National Planning Policy

8.25 The National Planning Framework (NPF) 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 industry is recognised as important for the supply of aggregates and construction materials to a variety of sectors.

8.26 There are no specific policies in relation to air emissions in the NPF for quarry extraction or associated restoration activities. The stated general development objective is to facilitate development while at the same time protecting the environment.

Extractive Industry Relevant Guidelines

8.27 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 Department of Environment planning guidelines for the extractive industries '*Quarries and Ancillary Activities – Guidelines for Planning Authorities' (DoEHLG 2004)* were published around the same time.

8.28 Separately, in 2006, the EPA published its *Environmental Management Guidelines for Environmental Management in the Extractive Industry (Non-Scheduled Minerals).*

8.29 The Irish Concrete Federation (ICF), the trade body representing the interests of quarry operators and producers of construction materials, has also published the ICF Environmental Code which provides guidance for its members on best practice in the environmental management of quarries. The document was most recently updated in 2005.

Specific Guidance Relating to Air Quality / Dust Nuisance

8.30 Fractions of dust greater than 10µm (micrometres) in diameter are not covered within the Air Quality Standards and typically relate to nuisance effects.

8.31 A range of monitoring techniques exist to determine dust deposition rates (e.g. use of 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 for the gravimetric assessment of dust deposition from the extractive industry in Ireland are set out in the DoEHLG (2004) planning guidelines for the extractive industry, the ICF Guidelines (2005) and EPA Environmental Management Guidelines (2006). 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 350mg/m^2/day (total dust deposition averaged over a 30-day period), measured at site boundaries.

8.33 When the rate of accumulation of this coarser fraction of dust (>10 µm, 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 colour and type of dust can influence the perception of nuisance and what is considered tolerable, for example, black coal dust may have a high contrast with its background.

8.35 The action of wind over bare, dry ground will carry dust particles into the air. Although large emissions of dust occur naturally, dust events are also caused by a range of human related activities including agriculture, construction works (including the handling, placement and storage of soils) and vehicular traffic over paved and unpaved roads.

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). 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 the risk of impacts and effects.

Air Quality and Ecological Receptors

8.37 A majority 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."

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 incorporated into HA207/07[2] suggests that only dust deposition levels above 1,000mg/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.

Assessment of Air Quality Impacts on Designated Nature Conservation Areas

8.39 Guidance on the assessment of the air quality impacts of development on designated nature conservation sites has been prepared by the Institute of Air Quality Management (IAQM, 2020)[3]. This guidance is also useful to evaluate the effects of air pollution on habitats and species using air quality assessment.

8.40 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.

Air Quality and Health Effects

8.41 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.

8.42 Two recent EPA reports, *Air Quality in Ireland 2019*[4] and *Ireland's Environment, An Assessment 2020*[5] detail the main air quality trends based on monitoring from the national ambient air quality network. In 2019, there was one exceedance of EU annual average legal limit values at an urban monitoring station in Dublin due to transport emissions. World Health Organization (WHO) air quality guideline value levels were also exceeded at 33 monitoring sites – mostly due to the burning of solid fuel in our

[2] Highways England, 2007 Design Manual for Roads and Bridges (DMRB) *HA207/07 Air Quality* (informed by IAN 061/05 - *Guidance for Undertaking Environmental Assessment of Air Quality for Sensitive Ecosystems in Internationally Designated Nature Conservation Sites and SSSIs).*

[3] IAQM, 2020 *A guide to the assessment of air quality impacts on designated nature conservation sites.* Version 1.1

[4] Environmental Protection Agency, 2020. Air Quality in Ireland 2019 - Key Indicators of Ambient Air Quality. Available at: https://www.epa.ie/publications/monitoring--assessment/air/air-quality-in-ireland-2019.php

[5] Environmental Protection Agency, 2020. Ireland's Environment, An Integrated Assessment 2020. Available at: https://www.epa.ie/our-services/monitoring--assessment/assessment/irelands-environment/state-of-environment-report

cities, towns and villages. European Environment Agency (EEA) reference levels for PAH were also exceeded at 4 monitoring sites due to the burning of solid fuel.

8.43 These reports highlight the main challenges of reducing air pollution from key sources such as particulate matter emissions from solid fuel burning (e.g. peat, coal and wood) in the residential sector and NOx emissions from vehicles in the transport sector. A summary of relevant Air Quality limit values in relation to human health was presented previously in Table 8-1.

RECEIVING ENVIRONMENT

Study Area

8.44 The proposed licence extension area comprises the existing South Quarry, the lands immediately surrounding it and the haul routes leading to it within the Huntstown Quarry Complex. It straddles the townlands of Huntstown, Cappoge and Grange in North Co. Dublin and is located approximately 2.5 km north-west of Finglas and 1km west of the interchange between the N2 Dual Carriageway and the M50 Motorway.

8.45 The Central Quarry and construction materials production facilities extend across lands immediately to the north of the proposed licence extension area. The lands immediately to the south of it remain in use as agricultural grassland, as do the lands to the east of the South Quarry, beyond the eastern (by-product) backfill area .

8.46 The lands to the west and north-west (beyond the proposed backfill and recovery area) comprise light industry and science and technology parks along the Cappagh Road (including Stadium Business Park, Huntstown Business Park and Millennium Business Park).

8.47 The study area for the purposes of this air quality impact assessment is taken to be the proposed licence extension area and everything within 500m thereof. For completeness, a number of more distant properties located downwind of the recovery area, along the R135 Regional Road (also known as the North Road) have also been included for impact assessment purposes. These properties are also potentially impacted by HGV traffic movements generated by ongoing (and future) backfilling and recovery activities.

8.48 The proposed licence extension area is not subject to any statutory or non-statutory nature conservation designations and there are no such sites within a 2km radius.

Baseline Study Methodology

Baseline Dust Monitoring

8.49 Dust monitoring undertaken at Huntstown is based on the 'Bergerhoff method' referred to in the TA Luft Air Quality Standard and forms the basis for assessing compliance with the 350mg/m^2/day emission limit set by the existing extractive planning permission and EPA waste licence and as also prescribed in environmental guidance / standards for the extractive sector.

8.50 The 'Bergerhoff' dust deposition gauge used in dust deposition surveys comprises a glass or plastic collection bottle with protective basket, mounted on a post and set at 1500mm 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 surrounding area.

Sources of Information

8.51 A desk study was carried out to examine all relevant information relating to air quality conditions around the licenced site at Huntstown (and proposed extension area). Met Eireann, the National Meteorological Service, was consulted to obtain climate / weather data in respect of the local area (http://www.met.ie). The EPA website was also examined to obtain any relevant information on baseline air monitoring data around the site (http://www.epa.ie/air/quality/data/).

8.52 Information published on its website by the National Parks and Wildlife Service (NPWS) (http://webgis.npws.ie/npwsviewer/), (part of the Department of Housing, Local Government and Heritage, DHLGH), 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

8.53 Dust deposition surveys were undertaken at and around the Huntstown quarry complex (including the licence extension area) for the full year period from January 2019 to December 2019, refer to Figure 8-1 for monitoring locations. The dust deposition monitoring results recorded over this period are reviewed as part of this assessment. The locations of dust deposition monitors are shown on Figure 8-1:

- D1 - adjacent to the site entrance;
- D2 – far northern limit of the existing licenced site area – at northern property boundary.
- D3 – north-west of the licence extension area – at south-western corner of the West Quarry;
- D4 – further north west of the licence extension area – near the property boundary along the Kilshane Road;
- D5 – immediately north of the licence extension area – within quarry complex;
- D6 – north of the licence extension area, at central infrastructure / production area.

8.54 A survey of the extent of existing residential housing and potential sensitive receptors was also undertaken.

8.55 The results of the dust deposition monitoring are presented in Table 8-3

Table 8-3
Baseline Dust Deposition

Date	D1 mg/m²/day	D2 mg/m²/day	D3 mg/m²/day	D4 mg/m²/day	D5 mg/m²/day	D6 mg/m²/day
Jan-19	250	**449**	121	106	177	221
Feb-19	281	33	59	161	-	212
Mar-19	29	28	16	37	24	8
Apr-19	19	20	142	31	35	23
May-19	17	50	53	47	74	69
Jun-19	*510*	*391*	89	**864**	231	*763*
Jul-19	*457*	338	**1207**	309	*373*	327
Aug-19	145	277	127	141	317	16

Date	D1 mg/m²/day	D2 mg/m²/day	D3 mg/m²/day	D4 mg/m²/day	D5 mg/m²/day	D6 mg/m²/day
Sep-19	134	328	**569**	238	**442**	102
Oct-19	22	79	64	34	54	39
Nov-19	48	75	51	26	67	25
Dec-19	146	124	80	228	118	59

8.56 As will be noted, several exceedances of the emission limit value (ELV) of 350mg/m2/day were recorded at the Huntstown quarry complex (from all site activities) over the reference period. Of a total of 10 No. recorded exceedances from a dust monitoring dataset of 72 readings, 5 No. (in italics above) recorded in the months of June and July could be attributed to the presence of increased amounts of non-mineral organic dust (most likely from agricultural activity on surrounding lands) in dust sample jars. The remaining 5 No. exceedances (in bold above), (i.e. at D2, D3, D4 and D5) were all recorded at the Roadstone property boundary, principally in summer months.

Background Air Quality

8.57 The existing licenced site and proposed extension area lie in air quality Zone A. The closest air quality monitoring station to the quarry at Huntstown, and in a similar Zone A area, is located 2.1km away at Finglas (Mellowes Road).

8.58 The monitoring stations continuously monitor concentrations of particulate matter with an aerodynamic diameter of less than 10µm (PM_{10}). Recent annual mean concentrations monitored at Finglas (published on the EPA website[6]) are presented in Table 8-4 below.

Table 8-4
Background PM_{10} Concentrations

Year	Annual Mean (µg/m³)	Number of Days >50µg/m³
2019	14	4

8.59 Table 8-4 above indicates that PM_{10} concentrations monitored at the Finglas monitoring site are below the annual mean AQS of 40µg/m³ and comply with the requirement that a 24-hour mean of 50µg/m³ should not be exceeded more than 35 times in a calendar year.

Meteorology: Dispersion of Emissions

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

- 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.

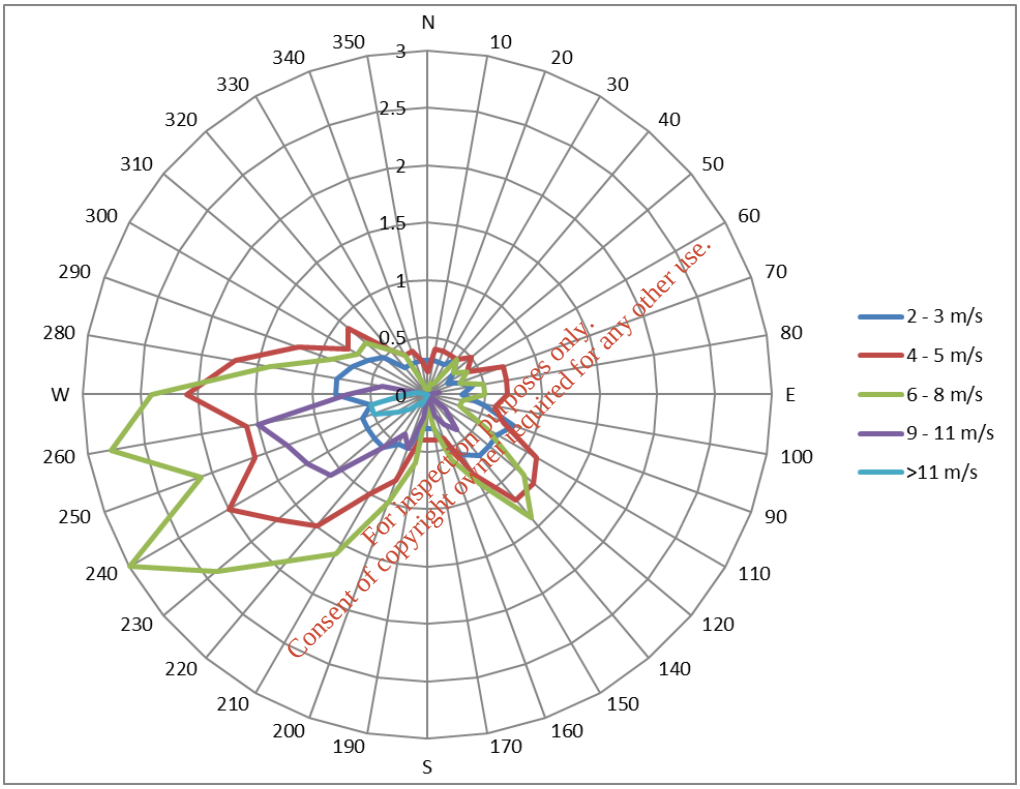
[6] Secure Archive for Environmental Research Data – http://erc.epa.ie/safer/.

8.61 Rainfall is also an important climatological parameter in the generation of dust; sufficient amounts of rainfall can suppress dust at the source and eliminate the pathway to the receptor. According to Arup (1995)[7], rainfall greater than 0.2mm per day is sufficient to suppress dust emissions.

Local Wind Speed and Direction Data

8.62 The closest weather station with sufficient records of wind direction and wind speed considered representative of conditions experienced at the licenced site at Huntstown is Dublin Airport Meteorological Station. A windrose for the average conditions recorded at Dublin Airport over the ten-year period 2009-2018 is presented in Figure 8-2. As can be seen, the predominant wind direction is from the south-western quadrant.

Figure 8- 2
Windrose for Dublin Airport Meteorology Station



Rainfall Data

8.63 Relevant rainfall data applicable to the overall site has been obtained from the Irish Meteorological Service website for the Dublin Airport Meteorological Station (2009-2018), which is located approximately 6.5km east of the recovery area at the South Quarry. The annual average days with rainfall greater than 0.2mm is 191 days per year. Natural dust suppression (from rainfall) is therefore considered to be effective for 52% of the year.

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

Sensitive Receptors

Human Receptors

8.64 Sensitive locations are those where people may be exposed to dust from the existing or planned future activities. 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.

8.65 Receptors have been identified within a 500m distance of the licence extension area at the South Quarry, (refer to Figure 8-1). On this basis, there are 12 sensitive residential receptors identified for dust impact assessment purposes, all along Cappagh Road (L3080) to the south-west. As the residences at Cappagh Cottages occur as a cluster (of 10 properties), they are identified as a single receptor for impact assessment purposes below, at the closest distance to the extended licence boundary.

8.66 For completeness, a number of more distant properties located along (or accessed off) the R135 Regional Road (North Road) (9 No.) have also been included in the assessment. A total of 12 sensitive receptors (including 1 cluster) are therefore brought forward for dust impact assessment. These are listed in Table 8-5 below, together with details of their proximity to the extended licence boundary.

Table 8-5
Sensitive Receptors Brought Forward for impact Assessment

Receptor Reference	Receptor	Sensitivity	Distance (m) / Direction from Boundary (approx.)
R1	Residential/ Farm	Medium	540 NE
R2	Residential	Medium	634 NE
R3	Residential	Medium	657 NE
R4	Residential/ Farm	Medium	752 NE
R5	Residential	Medium	908 E
R6	Residential/ Farm	Medium	944 E
R7	Residential	Medium	938 E
R8	Residential	Medium	972 E
R9	Residential	Medium	625 E
R10	Residential	Medium	508 S
Group R11	Residential	Medium	195 S
R12	Residential	Medium	50 SW

Ecological Receptors

8.67 Based on the nature, size and scale of future backfilling and recovery activities at the South Quarry, it is considered that the maximum distance for which the project should be evaluated in terms of Natura 2000 and /or designated sites is up to a maximum radius of 2km away unless there are any potential source-pathway-receptor links between the proposed development at Huntstown and any designated site(s) beyond this distance.

PROPOSED DEVELOPMENT

8.68 The proposed development is described in detail within Chapter 2 of this EIAR. The proposal provides for licensing of soil backfilling and recovery activities at Huntstown South Quarry and extension of the existing licensed site area to include the western side of the quarry and some internal access roads leading to it.

8.69 Backfilling on the western side of the quarry (using imported inert soil and stone waste) will extend from the quarry floor level up to original (former) ground level. In addition to imported materials, some soil and stone in existing screening berms and/or stockpiles across the quarry complex site will also be used in the final restoration of the quarry. On completion, the backfilled quarry will be returned to agricultural grassland, in keeping with some of the surrounding landscape.

8.70 The estimated volume of inert soil and stone material to be placed at the South Quarry to backfill it to former ground level is approximately 12.4 million m^3 (equivalent to approximately 22.32 million tonnes). Of this, approximately 5.2 million m^3 (or 9.36 million tonnes) will comprise soil and stone imported managed as waste which will be placed and recovered on the western side of the quarry. This is equivalent to approximately 468,000 HGV / truck return trips (at 20 tonnes per load) in order to completely backfill the western side of the quarry void.

8.71 Assuming soil waste intake for backfilling and recovery activities at the South Quarry is sustained at a permitted maximum rate of 750,000 tonnes per annum, this would correspond to an average of

- 37,500 HGV / truck return trips per year (assuming an average of 20 tonnes per load);
- 125 return trips per day (assuming 300 working days in a calendar year)
- 12 return trips per hour (assuming an 11-hour working day).

8.72 The backfilling and recovery activities at the South Quarry as proposed will therefore generate an average of 12 movements to and 12 movements from the quarry every hour of every working day (and a total of 24 movements per hour). This compares with the current average rate of 23 movements per hour in each direction (or a total of 46 movements per hour) which is currently permitted for the ongoing backfilling and recovery operations at the North Quarry.

8.73 Traffic access to the South Quarry is obtained via the access road leading into the Huntstown Quarry Complex off the R135 Regional Road. Within Roadstone's landholding, HGV traffic to and from the South Quarry runs across a network of internal paved haul roads which lead either to the main quarry descent at the northern face or around to its eastern side.

8.74 Inert materials will continue to be accepted between 08.00 hours and 18.00 hours each weekday (Monday to Friday) and on Saturdays from 08.00 hours to 13.00 hours, in accordance with Condition 1.7 of the existing waste licence in respect of backfilling at the North Quarry (Ref. W0-277-03). No materials will be accepted, or backfilling operations undertaken outside of those times including Sundays and Public Holidays.

ASSESSMENT OF IMPACTS

Evaluation Methodology

8.75 Fugitive dust emissions and particulate matter arising from future backfilling and recovery activities at the South Quarry have the potential to affect sensitive receptors in the surrounding area due to a potential increase in airborne dust deposition.

8.76 Combustion emissions (primarily oxides of nitrogen) from vehicle exhaust emissions associated with the backfilling and soil waste recovery activities also have the potential to contribute to local air pollution.

8.77 The significance of impacts is dependent upon the magnitude of the dust emissions, the prevailing meteorological conditions for the location and the proximity of sensitive locations to the emission sources.

8.78 The impact assessment is based upon a comparison of the baseline situation (both current and projected without the proposed development) 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.

8.79 Each of the activities associated with backfilling / recovery activities have been assessed for potential air quality impacts including:

- emission from earthworks and trackout;
- emission from material stockpiling, placement and restoration;
- PM_{10} contribution from operational activities; and
- traffic exhaust emissions.

8.80 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.

8.81 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

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

8.83 To determine the significance of particulate matter effects associated with the proposed 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 (based on IAQM Construction Dust Guidance[8]).

[8] https://iaqm.co.uk/text/guidance/construction-dust-2014.pdf

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

Sensitivity of Area	Examples	
	Human Receptors	Ecological Receptors(A)
Very High	Very densely populated area. More than 100 dwellings within 20m. 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 20m of site. Local annual mean PM_{10} concentrations close to the Objective (36 – 40µg/m^3)	Nationally Designated Sites
Medium	Suburban or edge of town. Less than 10 receptors within 20m. Local annual mean PM_{10} concentrations below the Objective (30 – 36µg/m^3)	Locally Designated Sites
Low	Rural area; industrial area. No receptors within 20m. Local annual mean PM_{10} concentrations well below the Objective (<30µg/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.		

8.84 Table 8-7 indicates how the interaction of magnitude and sensitivity contributes to the assessment of the likely significance of an environmental effect *with the application of appropriate and effective mitigation measures* (in line with the IAQM Minerals Guidance[9]).

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

Operation Stage Dust Impacts - Methodology

8.85 A staged approach has been adopted for assessment of operation stage impacts from soil handling, placement and/or stockpiling. 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

[9] https://iaqm.co.uk/text/guidance/mineralsguidance_2016.pdf

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.

8.86 Guidance on the assessment of the specific impacts of extractive type operations on air quality has been prepared by the 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 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.

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 can be deemed acceptable.

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

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

8.90 Further assessment is undertaken for all those receptors potentially impacted by dust generating activities from recovery activities at the South Quarry. Receptors are progressed to a Tier 2 assessment which involves identifying source-pathway-receptor linkages and making 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; and
- occurrence of natural dust suppression (rainfall patterns).

8.91 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.

8.92 Note that the Tier 2 risk screening assessment **does not consider mitigation measures** implemented at the recovery area. These currently include provision of dust suppression measures etc., refer to the section which considers Mitigation Measures later in this Chapter.

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

Traffic Emissions - Methodology

8.94 Atmospheric emissions related to site proposals are primarily associated with the exhaust emissions from heavy goods vehicles (HGVs). The decision as to whether an assessment of potential impact is required is based upon the criteria set out in latest DMRB guidance (LA 105, 2019)[10].

8.95 The criterion for assessment of air quality contained within LA 105 is focussed on roads with relatively high changes in flows or high proportion of HGV traffic.

8.96 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) ≥ 1,000; or
- heavy goods vehicle (HGV) AADT ≥ 200; or
- a change in speed band; or
- a change in carriageway alignment by ≥ 5m.

PM_{10} Contribution from Activities - Methodology

8.97 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; and
- expected additional contribution of PM_{10} from prospective intensification of site activities at the South Quarry.

8.98 In terms of estimating the potential magnitude of impact from site operations, an early version of the UK Local Air Quality Management (LAQM) Technical Guidance (LAQM.TG03) stated that fugitive dust from stockpiles and earth moving operations can potentially contribute up to 5µg/m^3 towards annual mean background concentrations of the coarse particulate fraction (2.5 – 10µm diameter) in the immediate area.

8.99 Given the nature and scale of existing extraction activities at the South Quarry and the existing backfilling operations at the North Quarry, the potential PM_{10} impact of future (intensified) soil intake and recovery activity at the South Quarry is likely to be similar to that which currently prevails, and current concentrations of ambient PM_{10} can be assumed to be representative of those that will likely arise in the future, should the proposed waste recovery activities proceed.

8.100 Notwithstanding this however, and to ensure a robust assessment of potential PM_{10} impacts, the upper limit of 5µg/m^3 suggested by LAQM.TG03 Guidance has been applied to represent potential additional development contribution to annual ambient PM_{10} concentrations. This value has then been added to existing background levels to assess whether the AQS objective is likely to be exceeded.

Operational Stage Dust Impact - Assessment

8.101 Given the inert nature of the soil and stone materials being imported and used to restore the South Quarry and the absence of biodegradable (organic) wastes, no landfill gas emissions will arise from future waste recovery activities there. The principal air quality impacts arising from the activity will be dust and traffic related emissions.

[10] Highways England (2019), LA 105, Air Quality (Sustainability and Environment Appraisal), November

8.102 An overview of the sources and processes associated with the soil recovery activities, and their respective potential for dust deposition, is presented below in Table 8-8.

Table 8-8
Sources of Particulate Emissions

Activity	Source	Emission Potential	Comments
Material placement and onsite handling	Onsite plant and equipment handling dry loose material.	High when dry material being handled during strong windy weather. High on unpaved road surfaces	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	High when dry material being stored during strong windy weather	Emissions due to prevailing meteorological conditions (high winds).
Material transfer on-site and traffic moving off site	HGVs / Road vehicles	Low - on paved road surfaces High on unpaved road surfaces	Dependant on the amount of loose material on road surface available for re-suspension and track out.

Human Receptors

8.103 As noted previously, 12 residential receptors (including one cluster) have been identified within the 500m study area around the South Quarry recovery area or at greater distance (downwind) along the R135 Regional Road. All these receptors have been progressed to a Tier 2 assessment to assess the potential 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.

8.104 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.

8.105 A wind-rose for the site is presented in Figure 8-2 for the Meteorological Station at Dublin Airport and illustrates the predominant wind direction is from the south-west and 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[11].

8.106 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 frequencies for each 10-degree compass sector used within the assessment. In this assessment however, wind speeds over 2m/s were used as this is how the data on percentage occurrence of wind frequency and wind speed is calculated and presented by Met Eireann. For this reason, therefore, the impact assessment presented herein should be considered to be conservative.

8.107 A summary of the risk assessment of dust impacts from sources within the proposed development is presented in Table 8-9.

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

Table 8-9
Dust Risk Assessment Screening (Without Mitigation Measures)

Receptor Reference	Distance from Operations (m)	Relevant. Wind Direction (A)	Potential Exposure Duration (B)	Relative Wind / Distance Rank (C	Risk Evaluation
R1	540 NE	200-230	8.9	3/1	Insignificant
R2	634 NE	210-240	11.2	4/1	Insignificant
R3	657 NE	210-240	11.2	4/1	Insignificant
R4	752 NE	220-240	9.3	4/1	Insignificant
R5	908 E	230-260	13.7	5/1	Insignificant
R6	944 E	230-260	13.7	5/1	Insignificant
R7	938 E	240-270	13.8	5/1	Insignificant
R8	972 E	240-270	13.8	5/1	Insignificant
R9	625 E	230-340	24.5	6/1	Insignificant
R10	508 S	330-30	2.8	1/1	Insignificant
Group R11	195 S	320-40	4.1	2/5	Acceptable
R12	50 SW	340-80	5.5	2/8	Slight Adverse

Table Note:

(A) – relevant wind direction based on upwind sector (i.e. the direction its blowing from) which would potentially convey emissions from site towards the receptor.

*(B) – Potential duration of exposure based on frequency of moderate to high wind speed (adjusted for dry days only) expressed as overall % of time (as described in the methodology in **Appendix 8-A**).*

*(C) – Ranking as per methodology in **Appendix 8-A***

*Refer to **Figure 8-1** for Receptor Locations*

8.108 From Table 8-9 above, it is observed that the risk of impact from dust emissions associated with the backfilling and recovery activities at Huntstown South Quarry (without any mitigation measures in place) generally varies from:

- Slight Adverse at receptor R12; to
- Acceptable and/or Insignificant at all remaining receptors.

8.109 Note that this assessment ***does not consider*** implementation of mitigation measures in respect of the planned activities that include retention / strengthening of perimeter vegetation / hedgerows and screening berms, dust suppression measures etc. (refer to section on Mitigation Measures below). Furthermore, it should be noted that this assessment is likely conservative on the basis of the moderate wind speeds (>2m/s) adopted in the risk evaluation.

Ecological Receptors

8.110 As previously noted, it is considered that the maximum distance for which the proposed backfilling and recovery activities should be evaluated in terms of potential dust / air quality impacts on designated (ecological) sites is up to a maximum radius of 2km, unless there are any potential source-pathway-receptor links between it and any designated site(s) beyond this distance.

8.111 At a distance greater than 2km and in the absence of any potential source-pathway-receptor link, it is considered that no designated sites would be affected by any direct loss of habitat or otherwise impacted by the effects of dust deposition or traffic emissions.

8.112 As there are no designated ecological sites within 2km radius of the proposed backfilling and recovery area, no dust or air quality impact will arise at any such site.

Traffic Emissions - Assessment

8.113 Backfilling and recovery activities at the South Quarry as proposed will generate an average of 12 movements to and 12 movements from the quarry every hour of every working day (and a total of 24 movements per hour). This compares with the current average rate of 23 movements per hour in each direction (or a total of 46 movements per hour) which is currently permitted for the ongoing (licensed) backfilling and recovery operations at the North Quarry.

8.114 Given that there will be a reduction in HGV traffic levels (relative to present day levels) should backfilling and recovery activities proceed as proposed at the South Quarry, and as none of the public roads in the surrounding local road network will therefore meet any of the traffic criteria requiring air quality impact assessment set out in LA 105, the impact of traffic emissions can be deemed 'negligible' in terms of local air quality, and no further air quality assessment is considered necessary.

8.115 On this basis, the impact of the future backfilling / soil recovery activities at the South Quarry from changes in HGV traffic levels can be screened out and it is considered that combustion emissions (primarily oxides of nitrogen) from vehicle exhaust emissions associated with the transportation of materials to and from the recovery facility will not have the potential to contribute to any increase in local air pollution.

PM_{10} Contribution from Soil Recovery Activities - Assessment

8.116 In terms of PM_{10}, the maximum annual mean measured baseline background concentration was 14µg/m³ in 2019 at the Finglas monitoring station. Therefore, even allowing for the highly conservative assumption of a potential additional contribution of 5µg/m³ to the annual mean background concentration of the coarse particulate fraction (2.5 to 10µm diameters) around the South Quarry recovery area, the resulting change would be insignificant, with ambient concentrations remaining well below the threshold mean annual concentration of 40µg/m³.

8.117 On this basis, the potential impacts of future recovery activity at the South Quarry on ambient PM_{10} concentration can be classified as 'negligible', particularly when the limited duration of conditions and the nature and magnitude of the projected change in site activities at the quarry are considered.

Unplanned Events (i.e. Accidents)

8.118 Accidents, malfunctions and unplanned events refer to events or upset conditions that are not part of any activity or normal operations planned by Roadstone. 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 backfilling and recovery activities.

8.119 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 have an effect on the local area:

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

8.120 In relation to air quality, the impacts of any unplanned events are considered to be negligible. If unplanned events were not mitigated, the effects of dust during dry and windy conditions could possibly lead to occasional increases in nuisance dust and 24-hour mean PM_{10} concentration immediately surrounding the existing quarry and access road. However, these are not considered to be significant given the limited duration of such meteorological conditions and the likely limited scale of any incident.

Cumulative / Synergistic Impacts

8.121 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 planned 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 future development.

8.122 Although there are a number of other waste related developments approved and/or in planning around the Huntstown quarry complex (including the Roadstone C&D facility, Rathdrinagh Land research facility and Irish Water Regional Biosolids Storage facility), these largely provide for waste activities and processes to be undertaken within enclosed structures rather than outdoors, and as a result any dust emissions are unlikely to be significant.

8.123 This air quality impact assessment has determined that soil recovery activities at Huntstown South Quarry will not contribute to local air pollution by way of increased air emissions. In view of the separation distance between the quarry and other development locations and the nature of those developments, no potential for significant cumulative air quality impacts has been identified. The cumulative impact of the proposed future development is therefore classified as insignificant.

Interaction with Other Impacts

8.124 The potential impact of recovery activity at the South Quarry on air quality at sensitive receptors, including at residential property and sensitive ecological receptors in the wider area has been assessed in this Chapter. The overall impact of the project on these receptors is further considered in Chapter 4 (Population and Human Health) and Chapter 5 (Biodiversity).

MITIGATION MEASURES

8.125 A number of mitigation measures are recommended in respect of backfilling and soil recovery activities at Huntstown. The principal factor which will reduce and mitigate emissions from recovery activities at the South Quarry will be placing soils within the existing quarry void, often significantly below the surrounding ground level, below and/or behind existing perimeter slopes and screening berms, the effect of which will be to effectively inhibit and/or limit emission of fugitive dust off-site.

Site Specific Mitigation Measures

8.126 The South Quarry at Huntstown will be backfilled progressively in phases on the western side of the quarry and upwards from the quarry floor to original (proposed restoration) ground level. As backfilling advances restored ground will be seeded at the earliest opportunity to minimise the area of exposed soil and the volume of soil particulates which potentially could become airborne.

8.127 In addition to these measures, a number of further control measures will be implemented to reduce or mitigate potential dust impacts at the recovery facility so as to achieve specified dust emission limits. Mitigation measures to be implemented are set out in Table 8-10 overleaf.

Table 8-10
Particulate Emission Mitigation Measures

Source	Emission Potential	Recommended Mitigation Measures	Effectiveness
Excavator / HGV	High – dry or fine particulate matter during strong windy weather	Minimise drop heights when handling waste materials. Dampen materials using sprinklers or water bowser. Time / schedule recovery activities close to the site perimeter having regard to expected weather conditions.	High
	Low – wet particulate matter during conditions of low wind speed	Minimise drop heights when handling waste materials, protection from wind where possible.	High
Onsite Vehicles	High when travelling over unpaved and dry site roads	Minimise distances of on-site haul routes.	High
		Use of water sprays / tractor and bowser to moisten surfaces during dry weather.	High
		Restrict vehicle speeds through signage / staff training.	High
		Location of haul routes away from sensitive receptors.	High
Road Vehicles (transfer off-site)	Low / Moderate on paved road surfaces	All HGVs exiting the facility to be routed through a wheelwash facility and over paved ground thereafter.	High
		Use of road sweeper to reduce the amount of available material for re-suspension.	Moderate / High
		Consider paving additional sections of the access road leading to the recovery facility (if necessary to achieve emission limit).	High
		Consider installation of sprinkler system along haul roads and/or around perimeter of the waste recovery facility (if necessary to achieve emission limits).	High
Stockpiles	Potentially high when dry or fine material stored or handled during windy weather (dependent on overall volume)	Seed / vegetate soil surfaces and stockpiles which may be undisturbed / exposed for extended periods of time.	High
		Limit mechanical disturbance of materials more likely to become airborne and time activities having regard to expected weather conditions.	

Source	Emission Potential	Recommended Mitigation Measures	Effectiveness
Moderate and Slight Adverse Risk Receptors	High – during dry and strong windy weather	Retain existing perimeter slope / screening berm and strengthen / reinforce with additional planting if necessary.	High
		Time / schedule recovery activities close to the quarry perimeter having regard to expected weather conditions.	
		Hardstanding areas / site roads and stockpiles with the potential to give rise to dust will be regularly watered as appropriate during dry and/or windy conditions by water bowser and/or sprinklers.	

Good Practice Measures

8.128 Effective site management practices are critical to demonstrate the facility operator's commitment to control dust emissions. Monitoring of dust deposition and recording of any complaints shall be carried out to take appropriate measures to reduce emissions in a timely manner.

8.129 Training on dust mitigation measures shall be provided to site-based staff. Training will also cover an 'emergency preparedness plan' to react quickly in case of any failure of dust mitigation measures.

8.130 When adverse conditions apply, sprayed water from a bowser should be used to dampen down particulate materials from operations and/or stockpiles as and when required, principally in windy periods during extended dry spells. As noted above, should it be necessary to ensure emissions limits are consistently below threshold values, automated sprinkler systems should be installed around the recovery facility to systematically dampen down stockpiled / exposed soils.

Trackout Measures

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

8.132 All heavy goods vehicles leaving the South Quarry recovery facility will be routed through the established wheelwash facility in order to remove and / or dampen any dust / clay material attaching to the undercarriage and to prevent transport of fine particulates off-site, onto the local public road network.

RESIDUAL IMPACT ASSESSMENT

8.133 Between the range of mitigation measures incorporated by design and those actively implemented as part of the environmental management scheme, it is considered that the risk of dust impact at receptors from future backfilling and recovery activity at the South Quarry reduces further.

8.134 After an assessment of potential adverse effects produced by the development, it was concluded that there would be no significant adverse air quality effects for both human and ecological receptors which cumulatively would not hinder the licence extension area or the surrounding lands. Overall, the effects of the proposed development on air quality are considered to be negligible to acceptable.

8.135 A summary of the residual dust risk impact assessment is provided in Table 8-11.

Table 8-11
Residual Dust Risk Assessment (With Mitigation Measures)

Receptor Reference	Risk Evaluation
R1	Insignificant
R2	Insignificant
R3	Insignificant
R4	Insignificant
R5	Insignificant
R6	Insignificant
R7	Insignificant
R8	Insignificant
R9	Insignificant
R10	Insignificant
Group R11	Insignificant
R12	Acceptable

8.136 On the basis of the assessment presented above it is concluded that the proposed quarry backfilling and recovery activities at the South Quarry, with the range of mitigation measures to be implemented and design measures incorporated into the working scheme, will not have a dust deposition impact on any identified sensitive receptors.

MONITORING

8.137 Dust deposition monitoring will continue to be undertaken at and around the licensed waste site at Hunstown Quarry. In addition to the existing monitoring stations, 2 additional stations (designated D11 and D12) will be established just beyond the western and north-eastern limit of the South Quarry footprint, as indicated in Figure 8-1.

8.138 Dust monitoring locations shall be reviewed and agreed with regulatory bodies as and when necessary. The results of the dust monitoring shall be submitted to Fingal County Council and the Environmental Protection Agency as required on a regular basis for review and record purposes.

FIGURES

Figure 8-1
Dust Monitoring and Receptors Locations

N

KILSHANE KENNELS

NORTHWEST BUSINESS PARK

MITCHELSTOWN HOUSE

JAVA REPUBLIC

NORTHWEST BUSINESS PARK

MONITORING STATION INSTALLED JANUARY 2021

J&D FURNITURE

MILLENIUM BUSINESS PARK

HUNTSTOWN BUSINESS PARK

ROSEMOUNT BUSINESS PARK

NATIONAL TRUCK RENTAL

HARVEY NORMAN WAREHOUSE

STADIUM BUSINESS PARK

PREMIER BUSINESS PARK

VIRIDIAN POWER STATION
(NOT OWNED BY ROADSTONE LIMITED)

ENERGIA AD PLANT
(NOT OWNED BY ROADSTONE LIMITED)

DOGS TRUST IRELAND

BEECH VISTA GARDEN CENTRE

VETERINARY CLINIC

ESB 220 Kv STATION

PROPOSED FUTURE DUST MONITORING LOCATION

PROPOSED FUTURE DUST MONITORING LOCATION

1km

500m

0 100 200 300 400m 600 800 1000

Metres 1:10,000

NOTES

1. EXTRACT FROM 1:2,500 ORDNANCE SURVEY DIGITAL SHEET **NO'S. 3062-A, 3062-B, 3062-C, 3062-D, 3063-A, 3063-C, 3130-A & 3130-B.**

2. **CYAL50167032** (C) ORDNANCE SURVEY IRELAND / GOVERNMENT OF IRELAND

LEGEND

- ROADSTONE LIMITED LAND INTEREST **(C. 171.8 HA)**
- AMENDED WASTE LICENCE AREA (COMPRISING EXISTING LICENCE AREA AND PROPOSED EXTENSION) **(C. 77.5 HA)**
- PROPOSED EXTENSION TO CURRENT WASTE LICENCE AREA
- D1 DUST MONITORING LOCATION
- R RECEPTOR LOCATIONS
- 500M & 1KM OFFSET FROM APPLICATION AREA

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ROADSTONE LTD.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WASTE LICENCE REVIEW APPLICATION
NORTH ROAD, FINGLAS, DUBLIN 11

DUST MONITORING LOCATIONS

FIGURE 8-1

Scale: 1:10,000 @ A3

Date: NOVEMBER 2021

0180.00313.0.Fig 8-1.WLR.Dust Monitoring Locations.dwg

Last Updated: 01 Dec 2021 16:06:25

APPENDIX 8–A
DUST RISK SCREENING ASSESSMENT METHODOLOGY

APPENDIX 8-A
DUST RISK SCREENING ASSESSMENT METHODOLOGY

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. In the event that 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 existing mitigation in place at the quarry).

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 3m/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 of which 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.

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. Guidance published by the IAQM[12] suggests that rainfall of greater than 0.2mm 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 3m/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 2m/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 considered to be conservative.

For the screening assessment purposes, a value of 0.2mm would be used for the criteria to classify days as 'dry' or 'wet'; using annual average rainfall data. The average number of days when rainfall exceeds 0.2mm 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 for carrying airborne dust towards receptors would then be classified into the criteria in Table 8 A-1 with the respective rank value assigned.

[12] Institute of Air Quality Management (2016) Guidance on the Assessment of Mineral Dust Impacts for Planning, IAQM, May

Table 8 A- 1
Frequency of Exposure – Risk Classification

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%

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 30µm) will largely deposit within 100m of sources. Smaller particles (less than 10µm) 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 50m to 200m. The 1995 UK DoE Guidance on dust from surface mineral working's, however, recommends a stand-off distance of 100-200m 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 typically needs to be given to sensitive receptors within 500m of the site boundary. Receptors at a distance greater than 500m may therefore be 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. A risk category is maintained for receptors in excess of 500m for circumstances where although a receptor is beyond 500m from the dust source, its sensitivity for example may be sufficient for it to be taken onto a Tier 2 assessment.

Table 8 A- 2
Distance to Source – Risk Classification

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

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[13] 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	

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 impacts is considered to be significantly lower than for medium and high sensitive receptors. Therefore, a factor of 0.5 could 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.

[13] 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	24 or more