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INTRODUCTION

8.1 This chapter of the Environmental Impact Statement (EIS), prepared by SLR Consulting Ireland, provides supporting information to accompany a Planning Application to Fingal County Council by Roadstone Limited. It primarily addresses potential dust related impacts from the proposed increase in the rate inert soil and stone waste intake at the existing waste recovery facility at the Huntstown Quarry complex, in Finglas, Dublin 11, from a maximum of 750,000 tonnes per annum at the present time to 1,500,000 tonnes per annum in future years.

8.2 The restoration of the entire quarry complex at Huntstown comprising backfilling of 4 separate quarry voids using imported soil and stone waste has previously been granted planning permission (Ref. FW12-0022 and An Bord Pleanála (ABP) Ref. 241693). An existing EPA waste licence (Ref. W0277-01) only applies in respect of ongoing backfilling and waste recovery activities at the North Quarry. Waste recovery activity at this facility has been ongoing since October 2015.

8.3 The existing West Quarry was previously stripped of overburden soils to a depth of up to 3m in anticipation of its future development as a quarry. Having undertaken a detailed review of structural geology and extractable resources at the West Quarry in recent years however, Roadstone has decided not to proceed with further development of the planned West Quarry and to bring forward the backfilling and restoration of this area (which has been approved previously).

8.4 It is understood that in the short-to-medium term future, the proposed intensification of backfilling and waste recovery activities will be confined to the North Quarry and West Quarry at Huntstown. Further information on the site infrastructure, operations, environmental management systems and controls at the established facility is provided in the Chapter 2 of this EIS.

8.5 The proposed increase in the rate of inert waste intake will have the potential to generate additional fugitive particulate matter, including visible dust which may result in impacts on local air quality.

8.6 The existing development provides for a doubling of existing consented waste intake rates and an additional soil and stone waste intake of 750,000 tonne per annum, together with an expedited backfilling and restoration of both the North Quarry and West Quarry.

8.7 The proposed increase in waste intake and intensification of operations will continue to use existing established access and traffic routes. An increase in the annual intake rate of 750,000 tonnes / year corresponds to an average increase of 12 trips per hour during a working day (equivalent to 24 additional movements in and out of the Huntstown facility per hour).

Scope of Work

8.8 The main focus of this assessment is the potential impact on local amenity from increased fugitive dust emissions from the increased waste recovery activity at the existing facility.

8.9 The principal air quality impact associated with the recovery of inert soils through deposition on land is fugitive dust emission. Dust emissions are likely to arise in the course of the following activities:

- trafficking by heavy goods vehicles (HGVs) over paved / unpaved surfaces;
- end-tipping, handling and compaction of inert soil;
- placement of small quantities of aggregate for road construction;

- stockpiling of topsoil pending final surface restoration works
- landscaping and final restoration activities.

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

8.11 This Chapter describes and assesses the existing air quality baseline characteristics of the area at and around the Huntstown Quarry complex based on site specific surveys and EPA data. Air emissions arising from the increased activity at the waste recovery facility 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.

8.12 The following sections of this Chapter describe the potential air quality impacts associated with activities within the development. The following issues are addressed separately:

- relevant legislation, standards and guidance;
- methodology used to assess the potential impacts of the activities at the recovery facility on air quality at local properties;
- baseline conditions pertaining to the measured (or estimated) existing air quality levels around the facility;
- 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;
- monitoring proposals.

LEGISLATIVE FRAMEWORK / PLANNING POLICY

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

Air Quality Standards

8.14 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)*.

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

8.16 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).

8.17 Under the AQS, the following pollutants are monitored: 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. These pollutants are monitored at 29 stations across the country and together they form the national ambient air quality network.

8.18 The 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 Irish legislation on ambient air quality. As recommended in the 2011 Review of the Environmental Protection Agency, map-based assessments are prepared and presented by the EPA.

National Planning Policy

8.19 The National Spatial Strategy (NSS) 2002-2020 (published on 28th November 2002) is a 20-year coherent national planning framework for Ireland. It aims to achieve a better balance of social, economic, and physical development across Ireland, supported by more effective and integrated planning. The strategy emphasises continued strong growth in the Greater Dublin Area (GDA), but with significant improvement in other regions to achieve more balanced regional development. The NSS provides the policy framework for all regional and local plans.

8.20 At present, there are no specific policies relating to air emissions in National Planning Policy for extractive related industries. It is left to Local Authorities to consider the land use and planning issues associated with extractive industry and related activities in preparing their County Development Plans. The general objective in planning is to ensure that activity and outputs are managed in a sustainable way, so as to achieve a balance between environmental, economic and social considerations.

Local Planning Policy – Fingal Development Plan

8.21 The current Fingal County Development Plan which was adopted in 2011, includes a number policies and objectives for the planning and sustainable development of the County from 2011 to 2017. The Council's policy in respect of emissions to air (AQ1) is :

- *AQ1 – Implement the provisions of national policy and air pollution legislation in conjunction with other agencies as appropriate.*

Extractive Industry Relevant Guidelines

8.22 Section 261 of the Planning and Development Act 2000 (as amended), which regulates quarry development, came into effect in April 2004. The Department of Environment guidance document *Quarries and Ancillary Activities – Guidelines for Planning Authorities (DoEHLG 2004)* was published around the same time

8.23 In 1996, the Irish Concrete Federation, the trade body representing the interests of quarry operators and producers of construction materials, published the *ICF Environmental Code* (updated in 2005) for its members, providing guidance on best practice in the environmental management of quarries

8.24 In 2006 the EPA published *Environmental Management Guidelines for Environmental Management in the Extractive Industry*.

Existing Site Emission Limits

8.25 Condition No. 7 of the existing planning permission for development at the Huntstown Quarry complex, which includes quarry backfilling, restoration and waste recovery activities (Fingal County Council Ref. No FW12A-0022 and An Bord Pleanala Ref. No. 06F.241693) states that '

"….*dust levels at the site boundary and sensitive locations shall not exceed 350milligrams per square metre per day averaged over a period of 30 days (Bergerhoff Gauge)*". '

8.26 Schedule B.4 of the existing EPA Waste Licence (Ref. W0277-01), states that:

"Dust deposition limits from the site shall not exceed 350 milligrams/square metre per day averaged over a continuous period of 30 days".

Guidance Relating to Dust

Dust Deposition Limits

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

8.28 A range of monitoring techniques exists for dust deposition rates (i.e. Bergerhoff and Frisbee gauges). There are 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.

8.29 Industry standard criteria levels for the gravimetric assessment of dust deposition which are generally used across extractive industry in Ireland include the DoEHLG (2004), ICF (2005) and EPA (2006) Environmental Management Guidelines[1]. The 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

8.30 When the rate of accumulation of this 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.

8.31 Surface soiling measures the effective area cover (EAC) as an indication of dust nuisance, assessing soiling rates as opposed to gravimetric methods which measure the mass of deposited dust. Research indicates that a soiling rate of 0.2% EAC / day is noticeable, whilst 0.5% EAC / day is judged to be the maximum generally acceptable.

8.32 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.

8.33 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 by vehicles using paved and unpaved site haul roads.

[1] Environmental Protection Agency 2006. Environmental Management Guidelines; Environmental Management in the Extractive Industry (Non-Schedules Minerals).

8.34 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.

Dust and Ecological Receptors

8.35 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."*

8.36 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 HA207/07) 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.

UK Planning Guidance on Assessment of Mineral Dust Impacts

8.37 Guidance on the assessment of the impacts of mineral sites 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 minerals sites 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.

8.38 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.

RECEIVING ENVIRONMENT

Description of Study Area

8.39 The existing inert soil waste recovery facility is located entirely within the townlands of Huntstown, Johnstown and Kilshane, Co. Dublin, approximately 2.5km north-west of the Dublin suburb of Finglas and 2km north-west of the interchange between the N2 Dual Carriageway and the M50 Motorway.

8.40 The application site extends to 48.65 hectares (117.2 acres). The existing licensed facility covers an area of approximately 36.1 hectares (87.0 acres) and comprises an existing limestone quarry void (the 'North Quarry') with perimeter screening / overburden mounds, together with adjoining, established site infrastructure required to operate the inert waste / soil recovery facility. The quarry void which is now being gradually backfilled originally covered an area of approximately 11.2 hectares (27.0 acres) within the overall licensed area.

8.41 As part of the waste licence review, the licenced area will be extended to facilitate backfilling of the West Quarry (planning permission for which has already been secured). The existing West Quarry covers an area of approximately 12.2 hectares. This area was previously stripped of overburden soils at the time the

Northern Cross Motorway (M50) was being constructed around 1995 / 1996, in anticipation of its future development as a quarry.

Surrounding Land Use

8.42 The lands surrounding the application site and existing quarry comprise farm fields to the south-east and north-west, with industrial and commercial areas to the east, south and west of the application site.

8.43 The application site is not subject to any statutory or non-statutory nature conservation designations and there are no such sites within a 2km radius.

8.44 Dwellings within the vicinity of the site generally comprise one-off housing along the local road network. The nearest dwellings to the landholding site boundary are identified on Figure 8-1.

Sources of Information

8.45 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.

8.46 Information published on its website by the National Parks and Wildlife Service (NPWS) (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.

Baseline Dust Deposition Monitoring

Site Specific Monitoring

8.47 Dust monitoring was conducted at and around the application site using the 'Bergerhoff method' referred to in the TA Luft Air Quality Standard. The deposition gauge used in the survey was the 'Bergerhoff' dust gauge, which comprises a plastic collection bottle and a post with protective basket, set at 1500mm above ground level. The input of the atmospheric material into the bottle is determined over a planned period measurement (usually one month) by exposing the plastic collection bottle to the environment. The total dust collected in the bottle is expressed as deposition of insoluble particulate matter (mg/m^2/day) arising from fugitive actions in the area surrounding the application site.

8.48 Dust deposition surveys were undertaken at and around the application site in Huntstown in period from January 2015 to April 2016, refer to Figure 8-1 for monitoring locations. The dust deposition monitoring results recorded over this period are reviewed as part of this assessment. A survey of the extent of existing residential housing in the area of the quarry was also undertaken.

Monitoring Locations and Results

8.49 The location of the dust deposition monitors are shown on Figure 8-1:

- D1 - adjacent to the site entrance.
- D2 - southeast of the application area.
- D3 - south of the application area.
- D4 - west of the application area.

8.50 The results of the dust deposition monitoring are presented in Table 8-1 below.

Table 8-1
Dust Deposition Monitoring Results

Month	D1 (mg/m^2/day)	D2 (mg/m^2/day)	D3 (mg/m^2/day)	D4 (mg/m^2/day)
Jan '15	104	98	57	67
Feb '15	47	148	58	71
Mar '15	91	122	87	164
Apr '15	62	90	72	61
May '15	88	149	55	53
Jun '15	147	149	117	133
Jul '15	202	183	163	107
Aug '15	167	201	163	159
Sep '15	136	141	123	87
Oct '15	122	160	87	106
Nov '15	81	52	93	48
Dec '15	60	207	110	152
Jan '16	152	147	80	91
Feb '16	80	101	55	97
Mar '16	180	144	91	141
Apr '16	62	90	72	61

8.51 Dust emissions recorded over the last two months of 2015 and the first three to four months of 2016 correspond to a period when the rate of soil waste intake and acceptance at the existing recovery facility at Huntstown was broadly comparable to that for which planning permission in now being sought (approximately 6,250 HGV loads brought to site per month). This rate of intake was precipitated by a very strong market demand for soil waste recovery in early 2016 generated by the lift in construction and development related activities around Dublin. Roadstone has subsequently taken measures to reduce intake rates to levels more in line with existing planning and waste consents.

8.52 As will be noted, the recorded dust deposition rates at the Huntstown quarry complex (from all site activities) over the recent period are below emission limit values (ELV's).

Meteorology : Dispersion of Emissions

8.53 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.

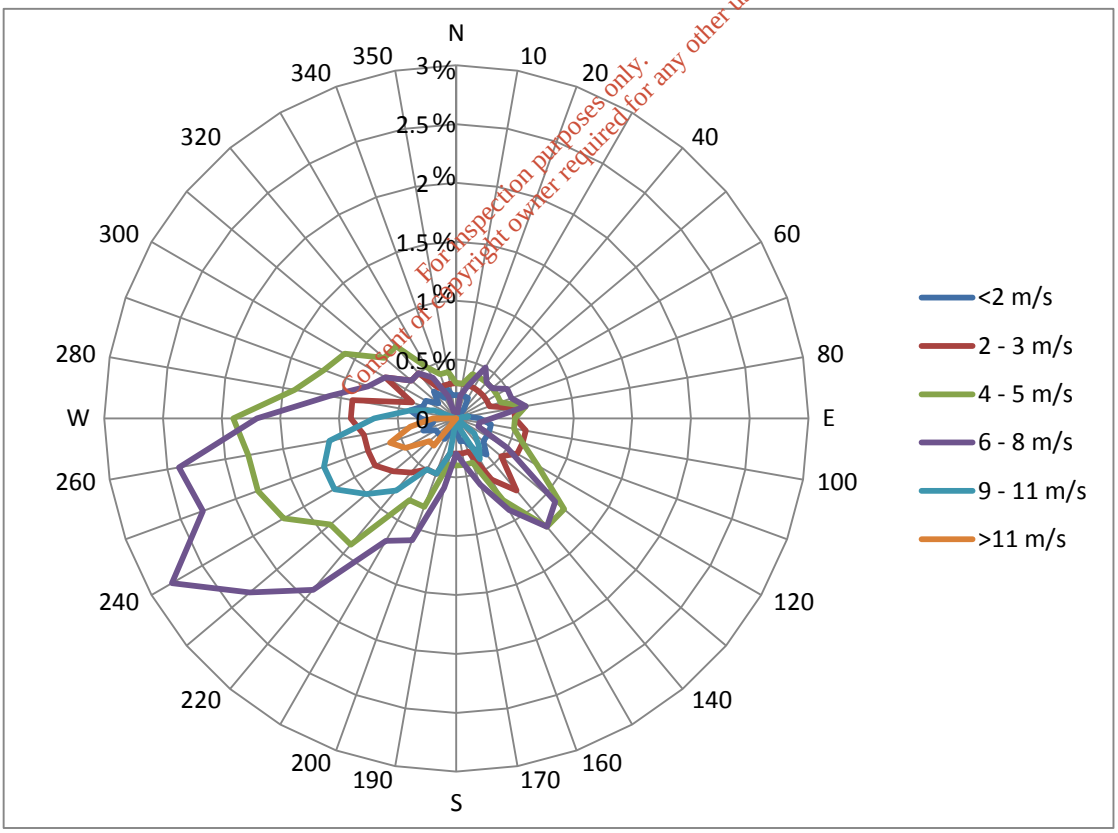
8.54 Rainfall is also an important climatological parameter in the generation of dust; sufficient amounts of rainfall can suppress dust at the source and eliminate the pathway to the receptor. According to Arup (1995)[2] rainfall greater than 0.2mm per day is sufficient to suppress dust emissions.

Local Wind Speed and Direction Data

8.55 The closest weather station with sufficient records of wind direction and wind speed considered representative of conditions experienced at the application site is Dublin Airport Meteorological Station, which is located approximately 6 km to the east of the application site.

8.56 A windrose for the average conditions recorded at Dublin Airport, over a ten year period, is presented in Figure 8-2. The predominant wind direction is from the south-western quadrant. Moderate to high-speed winds (≥ 2 m/s) occur for approximately 87.7% of the time.

Figure 8-2
Windrose for Dublin Airport Meteorology Station



[2] Arup Environmental. Environment Effects of Surface Mineral Workings. UK DoE, October 1995

Rainfall Data

8.57 Relevant rainfall data applicable to the site has been obtained from the Irish Meteorological Service website for the Dublin Airport station (1981 – 2010), approximately 6km east of the quarry. The annual average days with rainfall greater than 0.2 mm is 191 days per year.[3] Natural dust suppression (from rainfall) is therefore considered to be effective for 52% of the year.

Dust Sensitive Receptors

Ecological Receptors

8.58 The application site is not subject to any statutory nature conservation designation.

Human Receptors

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

8.60 Receptors have been identified within a 1km distance of the application site boundary at Huntstown (refer to Figure 8-1). This is a cautious approach, as dust generating activities are located at greater distances within the site. The relevant receptors are listed in Table 8-2 and their locations are shown in Figure 8-1. As warehouses are clustered in some areas, receptors have been identified at the nearest location to the application site boundary.

Dust Sensitive Receptors

8.61 There are 47 sensitive receptors identified within the 1km study area of the application site. A summary of the closest dust sensitive receptors in each direction surrounding the planning application area and their respective proximity to the nearest dust generating activity within the site is presented in Table 8-2 below.

Table 8-2
Dust Sensitive Receptors within 1km

Receptor Reference	Receptor	Sensitivity	Distance (m) / Direction from site activities
1	Residential/Farm	Medium	837(SE)
2	Residential/Commercial	Medium	868(E)
3	Residential	Medium	905(E)
4	Commercial	Medium	812(E)
5	Residential	Medium	738(E)
6	Residential	Medium	696(E)
7	Commercial	Medium	553(E)
8	Commercial	Medium	195(E)

[3] http://www.met.ie/climate-ireland/1971-2000/casement.html

Receptor Reference	Receptor	Sensitivity	Distance (m) / Direction from site activities
9	Residential	Medium	411(E)
10	Residential	Medium	405(E)
11	Commercial	Medium	403(E)
12	Commercial	Medium	913(E)
13	Residential	Medium	530(NE)
14	Residential	Medium	552(NE)
15	Commercial	Medium	642(NE)
16	Residential	Medium	638(NE)
17	Residential	Medium	665(NE)
18	Residential	Medium	678(NE)
19	Commercial	Medium	757(NE)
20	Residential	Medium	923(NE)
21	Residential	Medium	529(N)
22	Residential	Medium	439(N)
23	Residential	Medium	441(N)
24	Residential	Medium	544(N)
25	Commercial	Medium	485(N)
26	Residential	Medium	752(N)
27	Residential	Medium	971(N)
28	Commercial	Medium	462(NW)
29	Commercial	Medium	306(NW)
30	Residential	Medium	134(W)
31	Commercial	Medium	230(W)
32	Commercial	Medium	300(W)
33	Commercial	Medium	150(W)
34	Commercial	Medium	300(W)
35	Commercial	Medium	40(SW)
36	Commercial	Medium	>500(W)
37	Commercial	Medium	>500(W)
38	Commercial	Medium	>500(W)
39	Commercial	Medium	>500(W)
40	Commercial	Medium	>500(SW)
41	Commercial	Medium	>500(SW)
42	Commercial	Medium	>500(SW)
43	Commercial	Medium	>500(SW)

Receptor Reference	Receptor	Sensitivity	Distance (m) / Direction from site activities
44	Commercial	Medium	>500(SW)
45	Commercial	Medium	>500(SW)
46	Residential	Medium	782(SW)
47	Commercial	Medium	>500(SW)

Difficulties Encountered

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

IMPACT ASSESSMENT

8.63 Particulate matter arising from the application site activities has the potential to affect existing sensitive receptors in the area due to a potential increase in airborne dust deposition.

8.64 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.

8.65 The assessment is based upon a comparison of the baseline situation (both current and projected without the 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.

Evaluation Methodology

8.66 Each of the activities associated with inert waste facility have been assessed for potential air quality impacts, principally particulate dust emissions.

8.67 The methodology used in the impact assessment is presented in the sub-sections below. They also provide an explanation of the significance criteria to describe the impact of the proposed development on air quality.

8.68 For the purposes of environmental assessment of releases of dust from construction and mineral activities, the classification of 'deposited dust' is applied which is predominantly to potential nuisance effects.

8.69 A staged approach has been adopted; 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 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.

Inert Soil Intake and Final Restoration

8.70 The Institute of Air Quality Management (IAQM) assessment of risk is determined by considering the predicted change in conditions as a result of the proposed

development. The risk category for potential dust effects arising from site works is divided into two potential activities:

- earthworks,
- trackout.

8.71 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.

8.72 Table 8-3 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 8-3
Determination of Risk Category from Earthworks Activities

Distance to Nearest Receptor		Dust Emission Class		
Human	Ecological	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

8.73 Table 8-4 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 8-4
Determination of Risk Category from Trackout Movements

Distance to Nearest Receptor		Dust Emission Class		
Human	Ecological	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

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

Inert Soils Intake - Deposited Dust

8.75 A semi-quantitative assessment of fugitive dust emissions from the existing waste recovery facility 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 in order to assess the magnitude of risk of impact on local amenities.

8.76 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 1km study area.

8.77 Further assessment is considered to be required for those receptors within 500m of dust generating activities. Receptors within 500m of dust generating processes progress onto a Tier 2 assessment.

8.78 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; and
- occurrence of natural dust suppression (rainfall patterns).

8.79 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.

8.80 Note that the following assessment **does not take into account mitigation measures** implemented at the proposed development. These currently include provision of perimeter screening berms, dust suppression measures etc., refer to the section dealing with Mitigation Measures later in this Chapter.

8.81 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 Appendix 8-A.

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 overall descriptors of significance.

8.83 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 8-5 below (and IAQM Construction Dust Guidance).

Table 8-5
Methodology for Defining Sensitivity to Dust Effects

Sensitivity	Human Receptors	Ecological Receptors[(a)]
Very High	Very densely populated area More than 100 dwellings within 20m 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.	Nationally Designated sites
Medium	Suburban or edge of town Less than 10 receptors within 20m	Locally designated sites
Low	Rural area; industrial area No receptors within 20m 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 8-6 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 8-6
Impact Significance Matrix – Dust Effects (With Mitigation)

Sensitivity of Surrounding Area	Risk of Site Giving Rise to Dust Effects		
	High	Medium	Low
Very High	Slight Adverse	Slight Adverse	Negligible
High	Slight Adverse	Negligible	Negligible
Medium	Negligible	Negligible	Negligible
Low	Negligible	Negligible	Negligible

Assessment

Inert Soils Intake and Final Restoration

8.85 An overview of the sources and processes associated with the soil deliveries and restoration activities, and their respective potential for particulate dust emissions is presented below in Table 8-7 below.

Table 8-7
Inert Soils Intake and Final Restoration : Sources of Particulate Emissions

Activity	Source	Emission Potential	Comments
Inert soils deliveries and restoration works	Excavators/ Dozers / HDV	High - 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 in progressive works.
		Low – coarse or wet materials during conditions of low wind speed	

8.86 During the inert soil intake and final restoration activities, earthworks will be confined within existing quarry voids. In light of this and the separation distance to receptors the dust risk category is considered to be 'low risk' to 'negligible'.

8.87 During the inert soil intake to the recovery facility and final restoration activities, given the limited length of off-road routes (with no hardstanding), the trackout dust risk category is considered to be 'negligible'.

8.88 A summary of the determined risk category for proposed operation identified is presented within Table 8-8.

Table 8-8
Inert Soils Intake and Final Restoration : Risk of Particulate Emissions

Source	Risk of Dust Soiling Effects	Ecological Effects
Earthworks	Low Risk to Negligible	Negligible
Trackout	Negligible	Negligible

8.89 While the overall risk category has been assessed as 'negligible, if the inert soil deliveries and final restoration activities were not mitigated, the effects of dust during dry and windy conditions could possibly lead to occasional increases in nuisance dust immediately surrounding the application area. However, these are not considered to be significant given the limited duration of such meteorological conditions and the limited change in the extent and scale of proposed activities.

Tier 1 Assessment

8.90 Table 8-2 identifies receptors within the 1km study area around the application site. There are 47 receptors rated as being of medium sensitivity within 1km of the site boundary.

8.91 Using the tiered assessment methodology, receptors located within 500m have progressed onto a Tier 2 assessment as they are considered to have a greater risk of dust impact. Those receptors that are assessed within Tier 2 are detailed below in Table 8-9.

Table 8-9
Receptors Progressing to Tier 2

Receptor Reference	Receptor	Sensitivity	Distance (m) / Direction from Site Activities (approx.)
8	Commercial	Medium	195(E)
9	Residential	Medium	411(E)
10	Residential	Medium	405(E)
11	Commercial	Medium	403(E)
22	Residential	Medium	439(N)
23	Residential	Medium	441(N)
25	Commercial	Medium	485(N)
28	Commercial	Medium	462(NW)
29	Commercial	Medium	306(NW)

Receptor Reference	Receptor	Sensitivity	Distance (m) / Direction from Site Activities (approx.)
30	Residential	Medium	134(W)
31	Commercial	Medium	230(W)
32	Commercial	Medium	300(W)
33	Commercial	Medium	150(W)
34	Commercial	Medium	300(W)
35	Commercial	Medium	40(SW)

Tier 2 : Semi-Quantitative Assessment

8.92 Each receptor identified in Table 8-9 above is assessed against the frequency of exposure and the distance from the source to the receptor (i.e. the pathway). The methodology is described fully in Appendix 8-A.

8.93 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.

8.94 A wind-rose for the site is presented in Figure 8-2 for Dublin Airport 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[4].

8.95 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, wind speeds over 2 m/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 is conservative.

8.96 A summary of the risk assessment of dust impacts from sources within the proposed development is presented in Table 8-10 below.

Table 8-10
Dust Risk Assessment (Without Mitigation Measures)

Receptor Reference	Risk Evaluation
8	Moderate Adverse
9	Acceptable
10	Acceptable
11	Acceptable
22	Acceptable
23	Acceptable

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

Receptor Reference	Risk Evaluation
25	Acceptable
28	Acceptable
29	Slight Adverse
30	Moderate Adverse
31	Slight Adverse
32	Acceptable
33	Slight Adverse
34	Insignificant
35	Slight Adverse

Refer to Figure 8-1 for Receptor Locations / Appendix 8-B for Dust Risk Assessment Calculations

8.97 From Table 8-10, it is observed that the risk of impact from dust emissions associated with the proposed soil waste recovery facility at Huntstown Quarry (without any mitigation measures in place) generally varies from insignificant to acceptable at assessed receptors within 500 meters of the dust generating activities, apart from Receptors 29, 31, 33, 35, where the risk of impact from dust emissions is evaluated to be *slight adverse* and Receptors 8, 30 where the risk of impact from dust emissions is evaluated to be *moderate adverse*.

Ecological Receptors

8.98 The application site is not subject to any statutory nature conservation designation and there are no designated sites within 2km of the site.

Human Receptors

8.99 Earth moving and compaction activities generate dust, particularly in dry weather conditions. Using a screening assessment tool, the Air Quality Assessment (outlined in Appendix 8A) considers that there is generally an insignificant to acceptable risk that dust may cause an impact at sensitive receptors within 500m of the source of the dust generated activities, apart from Receptors 29, 31, 33, 35, where the risk of impact from dust emissions is evaluated to be *slight adverse* and Receptors 8, 30 where the risk of impact from dust emissions is evaluated to be *moderate adverse*.

8.100 Note that this assessment *does not take into account implementation of mitigation measures* within the proposed development that include provision of perimeter screening berms, dust suppression measures etc. (outlined in the Mitigation Measures section below). This assessment is considered to be conservative on the basis of the moderate wind speeds included in the risk evaluation.

MITIGATION MEASURES

8.101 A large range of mitigation measures are recommended for continued implementation at the existing waste recovery facility at Huntstown Quarry. The principal factor which will reduce and mitigate emissions from recovery activities will be the working within the existing quarry void, below surrounding ground level, with the high quarry faces effectively inhibiting emission of fugitive dust off-site. Specific mitigation measures are listed in Table 8−11 below.

8.102 In addition to this however, a number of existing or additional measures are outlined in this section which will further reduce or mitigate potential dust impacts from the planned development.

Site Specific Mitigation Measures

Table 8-11
Particulate Emission Mitigation Measures

Source	Emission Potential	Recommended Mitigation Measures	Effectiveness
Excavators/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 works. 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
Onsite Vehicles	High when travelling over un-surfaced and dry site roads.	Minimise distances of onsite haul routes.	High
		Use of water sprays / tractor & 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 offsite)	Low / Moderate on paved road surfaces	All HGVs exiting the facility to be routed through the existing wheelwash facility	High
		Use of road sweeper to reduce the amount of available material for re-suspension.	Moderate / High
		Pave the access road.	High
Stockpiles	High when dry or fine material being stored or handled during strong windy weather	Seed surfaces of completed mounds / bunds of top soil.	High
		Limit mechanical disturbance.	High
Acceptable Risk Receptors	High – during dry and strong windy weather	Retention of hedgerows	High
		Proposed perimeter berms	High
		Proposed planting	High
		Avoid working in adverse weather conditions	High
Slight Adverse Risk Receptors	High – during dry and strong windy weather	Retention of hedgerows	High
		Proposed perimeter berms	High
		Proposed planting	High
		Avoid working in adverse weather conditions	High

Source	Emission Potential	Recommended Mitigation Measures	Effectiveness
Moderate Adverse Risk Receptors	High – during dry and strong windy weather	Retention of hedgerows	High
		Proposed perimeter berms	High
		Proposed planting	High
		Avoid working in adverse weather conditions	High

Good Practice Mitigation Measures

8.103 When adverse conditions apply (dry, windy weather), water from a bowser should be sprayed on dry unpaved haul road surfaces in order to minimize dust rise. Bowsers should also be used to dampen down particulate materials from operations or stockpiles, as and when required, principally in windy periods during extended dry spells.

8.104 Backfilled excavations and topsoil capping should be grassed as soon as practicable after completion of soil placement. Stockpiling of imported soils should be minimized. Soils should ideally be placed and compacted in-situ immediately after being unloaded. If and when temporary stockpiling of soils is required, they should be placed against quarry faces, as far as possible from nearby residences.

8.105 In order to reduce the potential for dust emissions, the area of bare or exposed soil should, insofar as practicable, be kept to a minimum. In the unlikely event that future monitoring indicates that dust emissions are excessive or problematic, consideration could be given to establishing vegetation cover over temporary slopes and stockpiles pending final backfilling and restoration to original ground level.

Trackout

8.106 In order to minimise dust emissions from traffic along unpaved haul roads through the application site, it is recommended that they be constructed of imported aggregate. These materials should have a very low silt content (similar to that of Class 6F1 or Clause 804 material as per the NRA Specification for Road Works) and should be adequately compacted in order to minimise dust rise. The haul roads should have a minimum compacted thickness of 150mm of granular material.

8.107 When adverse conditions apply (dry, windy weather), water from a bowser should be sprayed on dry unpaved road surfaces in order to minimize dust rise. Paved road surfaces around the site infrastructure area and the access road leading out of the site should also be sprayed as required. In the unlikely event, that future monitoring indicates that dust emissions are excessive or problematic, consideration could be given to installing an automated sprinkler system along internal haul roads to systematically dampen any lying dust.

8.108 All heavy goods vehicles leaving the application site should be routed through the existing 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

8.109 With the range of mitigation measures to be implemented and design measures to be incorporated into the working scheme, it is considered that the risk of dust impact at receptors from the proposed development reduces further. A summary of the residual dust risk impact assessment is provided in Table 8-12.

Table 8-12
Residual Dust Risk Assessment (With Mitigation Measures)

Receptor Reference	Risk Evaluation
8	Slight Adverse
9	Insignificant
10	Insignificant
11	Insignificant
22	Insignificant
23	Insignificant
25	Insignificant
28	Insignificant
29	Acceptable
30	Slight Adverse
31	Acceptable
32	Insignificant
33	Acceptable
34	Insignificant
35	Acceptable

8.110 On the basis of 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, will not have a dust deposition impact on assessed receptors.

CUMULATIVE IMPACT

8.111 There no other significant sources of (dust) emissions to air within close proximity of the application and therefore no potential for significant cumulative impacts has been identified.

INTERACTION WITH OTHER IMPACTS

8.112 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 Chapter 3 Human Beings and Chapter 4 Ecology.

MONITORING REQUIREMENTS

8.113 It is envisaged that dust deposition monitoring will continue to be undertaken at the application site and across the wider quarry complex at Huntstown for the duration of soil waste recovery activities on-site using the standard dust monitoring method (involving the Bergerhoff Instrument). Dust monitoring locations (currently D1 to D6, shown in Figure 8-1) will be reviewed and modified as and when necessary. Results of the dust monitoring shall be submitted to the EPA and Fingal County Council on a regular basis for review and record purposes.

APPENDICES

APPENDIX 8-A

DUST RISK SCREENING ASSESSMENT METHODOLOGY

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 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. An article on dust generation from quarry operations[5] suggests that rainfall of greater than 0.2mm per day is considered sufficient to effectively suppress wind blown 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 assessment is considered to be conservative.

For the screening assessment, a value of 1mm 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 1.0mm 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 8A-1 with the respective rank value assigned.

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

Table 8A- 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 only needs to be given to sensitive receptors within 500m of the site boundary. Receptors at a distance greater than 500m 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 8A-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 is sufficient for it to be taken onto a Tier 2 assessment.

Table 8A- 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 8A-3 below[6] shows examples of dust sensitive facilities.

Table 8A- 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 impact are 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 8A-4 it falls into. This final evaluation represents the risk of dust impacts prior to control and mitigation measures being employed on site.

Table 8A- 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

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

APPENDIX 8B
DUST RISK SCREENING RESULTS
(RECEPTORS WITHIN 500M OF SOURCE)

DUST RISK SCREENING RESULTS (RECEPTORS WITHIN 500M OF DUST SOURCE)

Receptor Reference	Receptor	Sensitivity	Distance from site activities (approx.)	Relevant Wind Direction	Potential Exposure Duration (adjusted for dry days only)[a]	Relative Wind/ Distance Rank	Multiplied Rank	Risk Evaluation (Without Mitigations)
8	Commercial	Medium	195(E)	230-300	19.2	6/5	30	Moderate Adverse
M	Residential	Medium	411(E)	220-340	24.4	6/2	12	Acceptable
10	Residential	Medium	405(E)	220-330	24	6/2	12	Acceptable
11	Commercial	Medium	403(E)	210-330	21.6	5/2	10	Acceptable
22	Residential	Medium	439(N)	130-230	14.8	5/2	10	Acceptable
23	Residential	Medium	441(N)	130-230	14.8	5/2	10	Acceptable
25	Commercial	Medium	485(N)	80-210	13.3	5/2	10	Acceptable
28	Commercial	Medium	462(NW)	70-200	12.5	5/2	10	Acceptable
29	Commercial	Medium	306(NW)	70-200	12.5	5/3	15	Slight Adverse
30	Residential	Medium	134(W)	50-210	15.0	5/5	25	Moderate Adverse
31	Commercial	Medium	230(W)	50-200	13.6	5/4	20	Slight Adverse
32	Commercial	Medium	300(W)	40-150	10.3	4/3	12	Acceptable
33	Commercial	Medium	150(W)	40-160	10.9	4/5	20	Slight Adverse
34	Commercial	Medium	300(W)	40-120	5.9	2/3	6	Insignificant
35	Commercial	Medium	40(SW)	0-80	4.8	2/8	16	Slight Adverse

[a] Based on the frequency of moderate to high winds (≥2 m/s) which would cause dust emissions to travel in the direction of the receptor. Adjusted for natural suppression due to 191 days with rainfall over 0.2mm (Factor = 0.48)

Note: This assessment does not take into account proposed mitigation measures that include provision of perimeter screening berms, dust suppression measures etc., refer to Mitigation Measures section

FIGURES

Figure 8-1
Dust Monitoring / Receptor Locations

NOTES

1. EXTRACT FROM 1:50,000 O.S DISCOVERY MAP **NO. 50**

2. ORDNANCE SURVEY IRELAND LICENCE NO. **SU 0000716 (C)** ORDNANCE SURVEY & GOVERNMENT OF IRELAND

LEGEND

- ROADSTONE LIMITED LAND INTEREST **(c. 200.3 ha)**
- APPLICATION AREA **(c. 48.65 ha)**
- N5 — DUST MONITORING LOCATIONS
- R5 — DUST RECEPTOR LOCATIONS
- 500m RADIUS
- 1000m RADIUS
- LINK 1: 1.2km

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ROADSTONE LIMITED

ENVIRONMENTAL IMPACT STATEMENT

HUNTSTOWN WASTE RECOVERY FACILITY

NORTH ROAD, FINGLAS, DUBLIN 11

DUST MONITORING LOCATIONS

FIGURE 8-1

Scale: 1:12,500 @ A3

Date: AUGUST 2016

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