CONTENTS

INTRODUCTION

Background

8.1 This chapter of the Environmental Impact Assessment Report (EIAR), prepared by SLR Consulting Ireland, provides supporting information to accompany a planning application to Meath County Council by Kilsaran Concrete Unlimited Company (Kilsaran). It primarily addresses potential air quality related impacts from the proposed continuation of use and extension at Rathcore Quarry, Enfield, County Meath.

8.2 The development will consist of:

- Permission for continued use of the previously permitted developments under P. Reg. Ref. No's. 01/1018 (PL17.127391); 95/1416 (PL17.099325) and 91/970 (PL17.089787) to include the existing quarry, drilling, blasting, crushing and screening of rock and related ancillary buildings and facilities;
- Permission for continued use of the previously permitted developments under P. Reg. Ref. No. TA/120923 consisting of a discharge water treatment facility comprising two lagoons (30m x 13m), an oil interceptor, a reed bed (27m x 10m) and a concrete canal with "V" notch weir;
- Permission for a small lateral extension of c.0.9 hectares from the existing quarry area of c.9.7 hectares as permitted under P. Ref. 01/1018 (PL17.127391) to give an overall extraction footprint of c.10.6 hectares;
- Permission for the deepening of the overall extraction area (c.10.6 hectares) by 2 no. 15m benches to a final depth of c.45m AOD from the current quarry floor level of c.75m AOD as permitted under P. Ref. P. Ref. 01/1018 (PL17.127391);
- Permission for a proposed new rock milling plant to be enclosed within a steel-clad building (c.575m^2 with roof height of 22.5m and exhaust stack height of 28.2m);
- Replacement of existing septic tank with a new wastewater treatment system and constructed percolation area;
- Restoration of the site to a beneficial ecological after-use;
- All associated site works within an overall application area of 31.1 hectares. The proposed operational period is for 20 years plus 2 years to complete restoration (total duration sought 22 years).

8.3 Further information on the site infrastructure, operations, environmental management systems, and controls at the proposed quarry site is provided in chapter 2 of this EIAR.

8.4 The proposed development could have the potential to generate additional fugitive dust emissions and particulates (PM_{10}), which may result in impacts on local air quality.

8.5 Combustion emissions (primary PM_{10}, and oxides of nitrogen) from vehicle exhaust emissions associated with the extraction and transportation of aggregates will also have the potential to impact on local air pollution.

8.6 The proposed development provides for extraction of up to 350,000 tonnes of rock per year. The quarry will use the existing established access and traffic routes. Based on a 250 working days per year, and with an average payload of 22 tonnes per vehicle[1] will result in c. 64 HGV trips per day.

Scope of Work

8.7 The focus of this assessment is the potential impact on local amenity from increased fugitive dust emissions and particulate matter by the proposed continuation of use of the existing quarry and ancillary processing activities, the proposed quarry extension and the proposed new rock milling plant.

8.8 The principal air quality impact associated with the proposed development through deposition on land is fugitive dust emission. Dust emissions are likely to arise during the following activities:

- trafficking by onsite machinery and heavy goods vehicles (HGVs) over paved / unpaved surfaces;
- end-tipping, handling, and processing of material;
- lime processing plant facilities;
- stockpiling of aggregates;
- soils/overburden stripping; and
- landscaping and final restoration activities.

8.9 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.

8.10 This EIAR chapter describes and assesses the existing air quality baseline characteristics of the area at and around Rathcore Quarry based on site specific surveys and EPA data. Air emissions arising from the 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 these impacts insofar as practical.

8.11 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 proposed development on air quality at sensitive receptors;
- baseline conditions pertaining to the measured (or estimated) existing air quality levels around the site;
- assessment of the impacts;
- description of mitigation measures that are incorporated into the construction, design and operation of the proposed development to eliminate or reduce the potential for increased air quality impacts (if required);
- summary of any residual impacts and reinstatement;

[1] Refer to EIAR Chapter 14

- summary of cumulative impacts; and
- monitoring proposals.

Consultations / Consultees

8.12 A formal pre-planning consultation (ref. P.P. 8123) was held via Teams between planning, environment and transport staff of Meath County Council and representatives of Kilsaran, SLR Consulting and Hydro Environmental on 15 September 2023.

8.13 Following a review of published development plans and the site survey, it was considered that there was no requirement for a separate formal consultation to be carried out regarding the potential air quality impacts of the proposed development.

Contributors / Author(s)

8.14 SLR Consulting Ireland undertook the impact assessment presented in this chapter on behalf of Kilsaran. The lead consultant for the study was Aldona Binchy MSc. Eng PIEMA Environmental Engineering and Conor Hughes MSc. Energy Science.

Limitations / Difficulties Encountered

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

REGULATORY BACKGROUND

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

Legislation

Air Quality Standards

8.17 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).

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

8.19 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).

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

- nitrogen oxides;

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

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

8.22 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. As was recommended in the 2011 Review of the Environmental Protection Agency, map-based assessments are 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 0	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 3	1 hour alert	500 µg/m^3 Exceeded for 3 consecutive hours	
Particulate matter with aerodynamic diameter of less than 10 µm (PM_{10})	Day Year	50 µg/m^3 40 µg/m^3	35 0			
Particulate matter with aerodynamic diameter of less than 2.5 µm ($PM_{2.5}$)	Year	25 µg/m^3 20 µg/m^3 (ECO)				0 8.5 to 18 µg/m^3

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

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

Planning Policy and Development Control

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

8.23 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 industries are recognised as important for the supply of aggregates and construction materials to variety of sectors. It emphases that the planning process will play a key role in realising the potential of the extractive industries and protecting reserves of aggregates and minerals. Aggregates and minerals extraction will continue to be enabled where this is compatible with protection of the environment.

8.24 There are no specific policies in relation to air emissions in the NPF for construction aggregates. The general objective is to facilitate the development while at the same time protect the environment.

Local Planning Policy – Meath County Development Plan 2021 – 2027

8.25 The current Meath County Development Plan (CDP) took effect from 3rd November 2021. The planning and development controls pertaining to the development site are still those outlined in the current Meath County Development Plan (2021 – 2027).

8.26 The development plan sets out policy in relation to management of air pollution:

"The Council's role in relation to air is to promote a reduction in air pollution, through the implementation of relevant legislation and through the provision of advice and guidance on best practice."

8.27 The policy **PC POL 1** states:

"To seek to preserve and maintain air and noise quality in the county in accordance with good practice and relevant legislation."

8.28 The Meath CDP 2021 – 2027 has the following objectives in Chapter 6 *Infrastructure Strategy*:

- **INF OBJ 71** *"To continue to monitor air and noise quality results submitted from selected locations throughout the County in co-operation with the Health Service Executive and the Environmental Protection Agency".*
- **INF OBJ 72** *"To support the collation or air quality and greenhouse gas monitoring data in support of a regional air quality and greenhouse gas emission inventory".*

Guidelines Extractive Industry Emissions Limit Values

8.29 In 1996, the Irish Concrete Federation (ICF), the trade body representing the interests of quarry operators and producers of construction materials, published the ICF Environmental Code which provided guidance for its members on best practice in the environmental management of quarries. The document was subsequently updated in 2005.

8.30 Section 261 of the Planning and Development Act 2000 (as amended), which regulates a significant proportion of established pit development, came into effect in April 2004. The Department of Environment planning guidelines for the extractive industry 'Quarries and Ancillary Activities – Guidelines for Planning Authorities' (DoEHLG 2004) were published around the same time.

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

Guidance Relating to Dust

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

8.33 A range of monitoring techniques exist for dust deposition rates (i.e. Bergerhoff and Frisbee gauges). Extractive industry standard criteria levels for the gravimetric assessment of dust deposition which are generally used across extractive industry in Ireland include the DoEHLG (2004) planning guidelines for the extractive industry[2], the ICF Guidelines (2005) and EPA (2006) Environmental Management Guidelines.[3]

8.34 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.

8.35 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.

8.36 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 and by vehicles using paved and unpaved haul roads.

8.37 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

8.38 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."

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

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

8.39 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 1,000 mg/m^2/day are likely to affect sensitive ecological receptors. This level of dust deposition is approximately five times greater than the level at which most dust deposition may start to cause a perceptible nuisance to humans. It states that most species appear to be unaffected until dust deposition rates are at levels considerably higher than this.

A Guide to the Assessment of Air Quality Impacts on Designated Nature Conservation Area

8.40 Guidance on the assessment of the air quality impacts of development on designated nature conservation sites prepared by the Institute of Air Quality Management (IAQM, 2019). This guidance is also useful to evaluate the effects of air pollution on habitats and species using air quality assessment.

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 2021*[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. There are monitored exceedances of the WHO guideline values for ozone, PM_{10} and $PM_{2.5}$ at several sites, though there are no current exceedances of the lower (less protective) EU standards at the existing monitoring locations in Ireland. The reports also 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.

8.43 Exceedances of European air quality standards in Member States have resulted in infringement proceedings, and this has placed a renewed focus at EU level on the need for full implementation of existing legislation and for further action to reduce air pollution. The renewed focus also raises the issue of the comparability, consistency, and representativeness of the assessment and measurement of air quality across all EU Member States. A summary of relevant Air Quality limit values in relation to human health was presented previously in **Table 8-1**.

Site Specific Emission Limits

8.44 Condition No. 7 of the Section 261 quarry registration QY/53 states that:

"The total dust deposition (soluble and insoluble) arising from the onsite operations associated with the development shall not exceed 350 milligrams per square metre per day averaged over a continuous period of 30 days. No stripping of topsoil or overburden shall be carried out in periods of dry and windy weather. "

8.45 On site monitoring of dust uses the Bergerhoff Method to align to the nationally recommended approach. Current dust deposition monitoring carried out at the site boundaries indicates that the

[4] Environmental Protection Agency, Air Quality in Ireland 2021 - Key Indicators of Ambient Air Quality. Available at: Monitoring & Assessment: Air Publications | Environmental Protection Agency (epa.ie)

[5] Environmental Protection Agency, Ireland's Environment, An Assessment 2020. Available at: State of the Environment | Environmental Protection Agency (epa.ie)

current quarry operations have complied with the recommended dust deposition emission limit value of 350 mg/m^2/day (averaged over 30 days).

RECEIVING ENVIRONMENT

Study Area

8.46 The application site is located about 3 km northwest of Enfield and about c. 13 km south of Trim. Entrance to the existing quarry is from a local road to the south of Rathcore village; refer to EIAR **Figure 1-1**.

8.47 The quarry site is surrounded by agricultural lands. The external site boundary and remaining internal field boundaries consist of a combination of mature hedgerows with sporadic mature trees and fence lines.

8.48 Residences within the general area are confined to the public roads. The public road which fronts onto the western landholding boundary runs in a northeast – southwest direction. There are two residences located along this road directly north of the quarry. There is one residence directly opposite the site entrance while there is a cluster of houses located to the southwest of the site at the intersection of the local county roads.

8.49 The quarry development is adjoined by agricultural fields on all sides, both under pasture and arable. St. Gorman's Well, an artesian thermal spring, lies c. 1.6 km to the west of the site.

8.50 The wider landscape is dominated by a mixture of pasture and arable fields, bound by mostly dense tree lined hedgerows. Field sizes range from small to large, with the smaller fields typically being under pasture and the larger ones used for growing crops. Apart from a number of small blocks of woodland, there are no wooded areas within the surrounding area. Other elements in the landscape include a network of local and regional roads, with associated dispersed residential development, as well as scattered farmsteads.

8.51 The nearest dwellings to the landholding site boundary are identified on **Figure 8-1**.

Baseline Study Methodology

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

8.53 A representative air quality monitoring location, and in a similar Zone D rural area to the application site, is located at Kilkitt, Co. Monaghan. As such, it is considered an appropriate datasets available for assessment of air quality baseline concentrations in the study area around the Rathcore Quarry.

8.54 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 1500 mm 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.

Sources of Information

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

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

Background Air Quality

8.57 A similar air quality monitoring location to the quarry, and in a similar Zone D area, is located at Kilkitt, Co. Monaghan.

8.58 The monitoring station continuously monitor concentrations of particulate matter with an aerodynamic diameter of less than 10 µm (PM_{10}). Recent annual mean concentrations monitored at Kilkitt (published on the EPA website[6]) are presented in **Table 8-3** below.

Table 8-3
Background PM_{10} Concentrations

Year	Annual Mean (µg/m^3)	Number of Days >50 µg/m^3
2014	9	2
2015	9	1
2016	8.1	0
2017	7.8	0
2018	9	0
2019	7	1
2020	8.0	0
2021	7.8	0

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

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

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

Field Survey / Monitoring / Inspection Works

8.61 Dust deposition surveys were undertaken at and around the application site for the period between December 2016 and March 2020; 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.

8.62 The locations of the baseline dust deposition monitors are shown on **Figure 8-1**:

- Location **D1** - to the north of the application area;
- Location **D2** - to the southwest of the application area; and
- Location **D3** - to the north of the application area.

Dust Deposition Monitoring

8.63 The results of the dust deposition monitoring are presented in **Table 8-4** below.

Table 8-4
Site Baseline Dust Deposition Monitoring Results

Monitoring Period	D1 (mg/m^2/day)	D2 (mg/m^2/day)	D3 (mg/m^2/day)
02/12/16 to 09/01/17	50.6	40.3	
09/01/17 to 09/02/17	10.7	32.2	
09/02/17 to 08/03/17	<7.2	21.8	
08/03/17 to 03/04/17	26.4	244.8	
03/04/17 to 05/05/17	18.5	VOID	103.7
05/05/17 to 08/06/17	VOID	95.9	221.2
08/06/17 to 06/07/17	9.5	137.0	176.7
06/07/17 to 08/08/17	21.6	70.0	263.8
08/08/17 to 05/09/17	31.3	139.5	141.4
05/09/17 to 05/10/17	48.8	132.8	280.0
05/10/17 to 07/11/17	114.1	57.3	85.2
07/11/17 to 05/12/17	21.2	19.5	48.0
05/12/17 to 08/01/18	20.2	47.4	61.7
08/01/18 to 07/02/18	13.1	20.3	118.3
07/02/18 to 07/03/18	6.7	96.7	73.7
07/03/18 to 10/04/18	20.4	23.8	14.3
10/04/18 to 04/05/18	306.3	59.4	99.4
04/05/18 to 11/06/18	VOID	15.3	29.7
11/06/18 to 05/07/18	100.8	83.5	225.6
05/07/18 to 08/08/18	32.4	57.3	28.0
08/08/18 to 10/09/18	120.0	104.8	341.4
10/09/18 to 10/10/18	62.1	139.3	VOID
10/10/18 to 06/11/18	<5	44.5	97.4
06/11/18 to 03/12/18	30.2	<12.1	17.6

Monitoring Period	D1 (mg/m²/day)	D2 (mg/m²/day)	D3 (mg/m²/day)
03/12/18 to 10/01/19	38.2	25.2	16.1
10/01/19 to 07/02/19	29.0	48.5	87.6
07/02/19 to 08/03/19	47.4	<7.8	10.2
08/03/19 to 03/04/19	26.8	26.9	17.3
03/04/19 to 01/05/19	24.7	30.1	9.5
01/05/19 to 08/06/19	11.2	6.3	3.0
08/06/19 to 02/07/19	27.3	10.4	7.0
02/07/19 to 07/08/19	15.2	22.6	83.5
07/08/19 to 04/09/19	31.8	23.4	95.8
04/09/19 to 02/10/19	37.1	44.6	76.8
02/10/19 to 06/11/19	18.5	25.1	<8.9
06/11/19 to 04/12/19	23.1	12.6	VOID
04/12/19 to 10/01/20	58.6	00.0	15.0
07/01/20 to 07/02/20	49.7	65.3	124.4
07/02/20 to 06/03/20	>12.2	>12.2	25.9
06/03/20 to 26/05/20	71.0	162.0	148.0
26/05/20 to 19/06/20	274.0	88.0	186.0
19/06/20 to 15/07/20	139.0	161.0	*
15/07/20 to 10/08/20	232.0	297.0	281.0
10/08/20 to 08/09/20	130.0	193.0	*
08/09/20 to 08/10/20	89.0	92.0	337.0
08/10/20 to 10/11/20	87.0	127.0	**
10/11/20 to 07/12/20	116.0	39.0	**
07/12/20 to 14/01/21	59.0	71.0	**
14/01/21 to 08/02/21	203.0	102.0	188.0
08/02/21 to 04/03/21	81.0	54.0	141.0
04/03/21 to 09/04/21	80.0	145.0	239.0
09/04/21 to 06/05/21	40.0	78.0	111.0
06/05/21 to 03/06/21	115.0	121.0	247.0
03/06/21 to 09/07/21	163.0	89.0	322.0
09/07/21 to 06/08/21	347.0	137.0	284.0
06/08/21 to 06/09/21	28.0	62.0	131.0
06/09/21 to 07/10/21	106.0	40.0	273.0
07/10/21 to 08/11/21	86.0	143.0	219.0
08/11/21 to 02/12/21	42.0	208.0	117.0
02/12/21 to 10/01/22	84.0	83.0	141.0
10/01/22 to 03/02/22	44.0	33.0	126.0
03/02/22 to 07/03/22	89.0	99.0	345.0

Monitoring Period	D1 (mg/m²/day)	D2 (mg/m²/day)	D3 (mg/m²/day)
07/03/22 to 06/04/22	71.0	172.0	107.0
06/04/22 to 05/05/22	81.0	108.0	147.0
05/05/22 to 08/06/22	74.0	148.0	173.0
08/06/22 to 13/07/22	181.0	94.0	312.0
13/07/22 to 08/08/22	156.0	37.0	96.0
08/08/22 to 07/09/22	133.0	152.0	308.0
07/09/22 to 06/10/22	89.0	282.0	171.0
06/10/22 to 07/11/22	91.0	**	289.0
07/11/22 to 07/12/22	61.0	310.0	232.0
07/12/22 to 12/01/23	125.0	61.0	134.0
12/01/23 to 09/02/23	96.0	64.0	151.0
09/02/23 to 09/03/23	60.0	181.0	65.0
09/03/23 to 06/04/23	61.0	51.0	295.0
06/04/23 to 08/05/23	66.0	295.0	88.0
08/05/23 to 06/06/23	18.0	51.0	59.0
06/06/23 to 06/07/23	152.0	140.0	340.0
06/07/23 to 09/08/23	129.0	94.0	112.0
09/08/23 to 11/09/23	69.0	58.0	119.0
* Sample contaminated			
** Dust jar smashed/missing			

8.64 As is noted from **Table 8-4**, the recorded baseline dust deposition rates at Rathcore quarry are below 350 mg/m²/day.

Meteorology: Dispersion of Emissions

8.65 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.

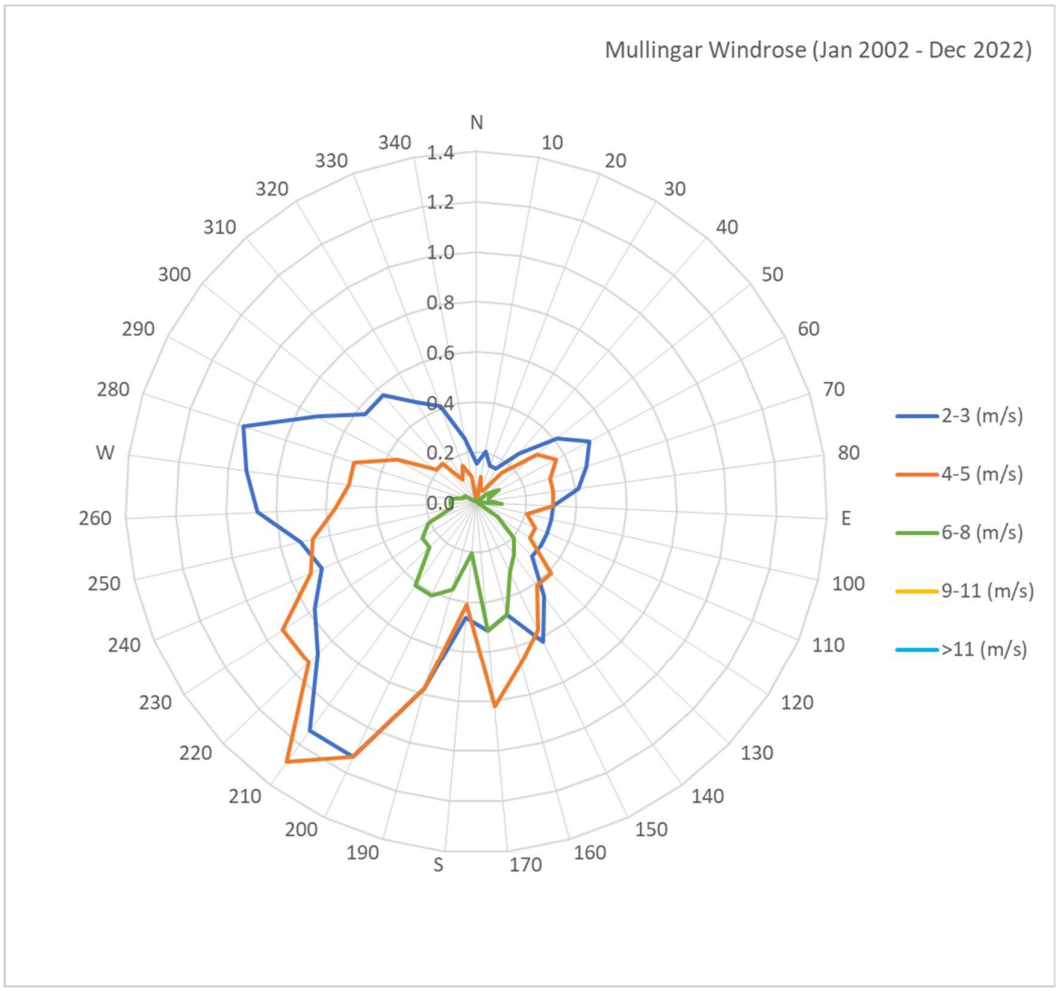
8.66 Rainfall is also an important climatological parameter in the generation of dust; enough rainfall can suppress dust at the source and eliminate the pathway to the receptor. According to Arup (1995) rainfall greater than 0.2 mm per day is sufficient to suppress dust emissions.

Local Wind Speed and Direction Data

8.67 The closest weather station with sufficient records of wind direction and wind speed considered representative of conditions experienced at the application site is Mullingar Meteorological Station, c. 35 km west of the proposed development.

8.68 A windrose for the average conditions recorded at Mullingar over a twenty-year period from 2002 to 2022 is presented in **Plate 8-1** below. The predominant wind direction is from the south-western quadrant. Moderate to high-speed winds (>2 m/s) occur for approximately 77.3% of the time.

Plate 8-1
Windrose for Mullingar Meteorology Station



Rainfall Data

8.69 Relevant rainfall data applicable to the site has been obtained from the Irish Meteorological Service website for the Mullingar station (1979 – 2008). The annual average days with rainfall greater than 0.2 mm are 209 days per year. Natural dust suppression (from rainfall) is therefore considered to be effective for 57% of the year.

Sensitive Receptors

Ecological Receptors

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

8.71 Based on the nature, size, and scale of the planned development, it is considered that the maximum distance for which the project should be evaluated in terms of Natura 2000 and designated sites is up to a maximum radius of 2 km from the application site unless there are any potential source-pathway-receptor links between the proposed development at Rathcore and any Natura 2000 and designated site(s) beyond this distance.

8.72 At a distance greater than 2 km, and in the absence of any potential source-pathway-receptor link, it is considered that no Natura 2000 and designated sites would be affected by any direct loss of habitat or impacted upon by the effects of dust.

8.73 The nearest ecological receptor is the Royal Canal pNHA [002103], located 2.6 km south of the site.

Human Receptors

8.74 Sensitive locations are those where people may be exposed to dust from existing or planned activities. Locations with a high sensitivity to dust include hospitals and clinics, hi-tech industries, painting and furnishing and food processing. Locations classed as being moderately sensitive include schools, residential areas, and food retailers.

8.75 Receptors have been identified within a 1 km distance of the application site boundary at Rathcore. The receptors within 1 km of the application site are listed in **Table 8-5** and their locations are shown in **Figure 8-1**. As residences are clustered in some areas, receptors have been identified at the nearest location to the application site boundary.

8.76 There are 23 sensitive receptors (residence) identified within 500 m of the application area, see **Table 8-5**. In addition, there is a residence currently under construction (R101 on **Figure 8-1**) to the south of the application site adjacent to residence R9.

Table 8-5
Sensitive Receptors within the 1 km of the Application Area

Receptor Reference	Receptor	Dust Sensitivity	Distance / Direction from Site Boundary (m) (approx.)
R1	Residential	Medium	215 (SW)
R2	Residential	Medium	175 (SW)
R3	Residential	Medium	135 (SW)
R4	Residential/Commercial	Medium	35 (W)
R5	Residential	Medium	25 (N)
R6	Residential/Commercial	Medium	75 (N)
R7	Residential	Medium	220 (S)
R8	Residential/Commercial	Medium	170 (S)
R9	Residential	Medium	155 (S)
R10	Residential/Commercial	Medium	465 (S)

Receptor Reference	Receptor	Dust Sensitivity	Distance / Direction from Site Boundary (m) (approx.)
R11	Residential	Medium	370 (S)
R12	Residential	Medium	340 (S)
R13	Residential	Medium	300 (S)
R14	Residential	Medium	300 (S)
R15	Residential	Medium	260 (SW)
R16	Residential	Medium	260 (SW)
R17	Residential	Medium	295 (SW)
R18	Residential	Medium	385 (SW)
R19	Residential	Medium	410 (SW)
R20	Residential	Medium	290 (SW)
R21	Residential	Medium	395 (N)
R22	Residential/Commercial	Medium	500 (N)
R23	Residential/Commercial	Medium	415 (NE)
R24	Residential	Medium	630 (S)
R25	Residential	Medium	705 (S)
R26	Residential	Medium	660 (S)
R27	Residential/Commercial	Medium	680 (S)
R28	Residential	Medium	715 (S)
R29	Residential	Medium	750 (S)
R30	Residential	Medium	715 (S)
R31	Residential	Medium	680 (S)
R32	Residential	Medium	650 (S)
R33	Residential	Medium	620 (S)
R34	Residential	Medium	705 (SW)
R35	Residential/Commercial	Medium	675 (SW)
R36	Residential	Medium	750 (N)
R37	Residential	Medium	730 (N)
R38	Residential	Medium	685 (N)
R39	Residential/Commercial	Medium	680 (N)
R40	Residential/Commercial	Medium	615 (NE)
R41	Residential	Medium	660 (NE)
R42	Residential	Medium	700 (NE)
R43	Residential	Medium	740 (NE)

Receptor Reference	Receptor	Dust Sensitivity	Distance / Direction from Site Boundary (m) (approx.)
R44	Residential	Medium	750 NE)
R45	Residential	Medium	820 (NE)
R46	Residential	Medium	840 (NE)
R47	Residential	Medium	875 (NE)
R48	Residential	Medium	900 (NE)
R49	Residential/Commercial	Medium	920 (NE)
R50	Residential	Medium	945 (NE)
R51	Residential	Medium	925 (NE)
R52	Residential	Medium	905 (NE)
R53	Residential	Medium	880 (NE)
R54	Residential/Commercial	Medium	870 (NE)
R55	Residential	Medium	900 (N)
R56	Residential/Commercial	Medium	885 (N)
R57	Residential	Medium	890 (N)
R58	Residential	Medium	905 (N)
R59	Residential	Medium	880 (N)
R60	Residential/Commercial	Medium	805 (N)
R61	Residential	Medium	780 (N)
R62	Residential	Medium	810 (N)
R63	Residential	Medium	830 (N)
R64	Residential	Medium	895 (N)
R65	Residential	Medium	915 (N)
R66	Residential	Medium	850 (SW)
R67	Residential/Commercial	Medium	830 (SW)
R68	Residential	Medium	790 (S)
R69	Residential	Medium	780 (S)
R70	Residential	Medium	810 (S)
R71	Residential	Medium	925 (S)
R72	Residential	Medium	970 (S)
R73	Residential	Medium	795 (S)
R74	Residential	Medium	825 (S)
R75	Residential	Medium	860 (S)
R76	Residential	Medium	890 (S)

Receptor Reference	Receptor	Dust Sensitivity	Distance / Direction from Site Boundary (m) (approx.)
R77	Residential	Medium	1000 (E)
R78	Residential	Medium	1000 (E)
R79	Residential	Medium	975 (E)
R80	Residential/Commercial	Medium	845 (E)
R81	Residential	Medium	810 NE)
R82	Commercial (Golf Club)	Medium	915 (NE)
R83	Residential	Medium	830 (NE)
R84	Residential	Medium	855 (NE)
R85	Residential	Medium	895 (NE)
R86 – R97 (Cluster)	Residential	Medium	950 (NE)
R98	Commercial (Pub)	Medium	845 (NE)
R99	Residential	Medium	900 (NE)
R100	Church	Medium	970 (NE)
R101	Residence (Under Construction)	Medium	115 (S)
Grey shading	= receptors within 500m		
No shading	= receptors from 500m to 1KM		

IMPACT ASSESSMENT - METHODOLOGY

Evaluation Methodology

8.77 Fugitive dust emissions and 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.

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

8.79 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.

8.80 The impact assessment is based upon a comparison of the baseline (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.

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

- emission from soils stripping (earthworks and trackout);

- emissions from new rock milling plant construction, preparatory works;
- emission from rock extraction and ancillary activities (primary crushing, screening; rock milling from existing and proposed plants);
- emission from material stockpiling, placement, and restoration;
- PM_{10} contribution from operational activities; and
- traffic exhaust emissions.

8.82 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.

8.83 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

8.84 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.

8.85 To determine the significance of particulate matter effects associated with the development, an evaluation of the sensitivity of the surrounding area is required. Receptors can demonstrate different sensitivities to changes in environment and are classified as per **Table 8-6** below (and IAQM Construction Dust Guidance[7]).

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 20 m Local annual mean PM_{10} concentrations exceed the Objective. Works continuing in one area of the site for more than 1-year	European Designated sites
High	Densely populated area. 10-100 dwellings within 20 m of site. Local annual mean PM_{10} concentrations close to the Objective (36 – 40 µg/m^3)	Nationally Designated sites
Medium	Suburban or edge of town Less than 10 receptors within 20 m Local annual mean PM_{10} concentrations below the Objective (30 – 36 µg/m^3)	Locally designated sites
Low	Rural area; industrial area	No designations

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

Sensitivity of Area	Examples	
	Human Receptors	Ecological Receptors[(a)]
	No receptors within 20 m Local annual mean PM_{10} concentrations well below the Objective (<30 µg/m^3) Wooded area between site and receptors	
Notes: (a)-Only applicable if ecological habitats are present which may be sensitive to dust effects.		

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

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

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

Construction, Soils Stripping, Placement and Restoration - Methodology

8.87 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 effects arising from site works is divided into the following potential activities:

- earthworks;
- HGV traffic egress (trackout);
- construction.

8.88 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.

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

Table 8-8
Determination of Risk Category from Earthworks Activities

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

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

Table 8-9
Determination of Risk Category from Trackout Movements

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

8.91 **Table 8-10** illustrates how the interaction of distance to the nearest receptor and the dust emission class results in the determination of risk category from *construction activities*.

Table 8-10
Determination of Risk Category from Construction Activities

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

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

Rock Extraction Deposited Dust - Methodology

8.93 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 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.

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

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

8.96 A semi-quantitative assessment of fugitive dust emissions from the proposed development 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.

8.97 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 1 km of the study area.

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

8.99 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).

8.100 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.

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

8.102 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**.

PM_{10} Contribution from Extraction Activities - Methodology

8.103 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 site operations.

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

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

Traffic Emissions - Methodology

8.106 Atmospheric emissions related to site proposals are primarily associated with the exhaust emissions from heavy duty vehicles (HDVs). The decision as to whether an assessment of potential impact is required is based upon the criteria set out in the DMRB (Design Manual for Roads and Bridges).

8.107 The criterion for assessment of air quality contained within the latest DMRB guidance (207/07) focuses on roads with relatively high changes in flows or high proportion of HDV / HGV traffic. Affected roads are defined as those that meet any of the following criteria:

- road alignment will change by 5 m or more; or
- daily traffic flows will change by 1,000 Annual Average Daily Traffic (AADT) movements or more; or
- HDV / HGV flows will change by 200 AADT or more; or
- daily average speed will change by 10 km/hr or more; or
- peak hour speed will change by 20 km/hr or more.

ASSESSMENT OF IMPACTS

Soils Stripping, Placement and Restoration - Assessment

8.108 An overview of the sources and processes associated with the site preparatory works, installation of infrastructure (new rock milling plant) at the site, and their respective potential for dust deposition (both dust and smaller particles) is presented below in **Table 8-11**.

Table 8-11
Site Activities: Sources of Dust Emissions

Activity	Source	Emission Potential	Comments
Construction & Extraction works	Excavators / Dozers / HGV	High - dry or fine materials during strong windy weather Low – coarse or wet materials during conditions of low wind speed	Temporary, variable from day to day depending on prevailing meteorological conditions, level, and location of activity.
Temporary stripping & placement work & restoration works	Excavators / HGV	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 storage area or in progressive works.

8.109 During site preparatory works, earthworks, materials transfer, restoration works, and trackout will be largely confined within the application area and given the proximity to receptors the dust risk category is 'low risk' to 'negligible'.

8.110 During the remaining small scale site stripping and restoration phases, given the limited number of vehicle movements and the limited length of off-road routes, the trackout dust risk category is considered to be 'negligible'.

8.111 A summary of the determined risk category for proposed operation identified is presented within **Table 8-12**.

Table 8-12
Site Activities: Risk of Dust Emissions

Source	Risk of Dust Soiling and PM_{10} Effects	Ecological Effects
Earthworks	Low Risk to Negligible	Negligible
Construction	Low Risk to Negligible	Negligible
Trackout	Negligible	Negligible

8.112 While the overall risk category has been assessed as 'negligible, if the soils stripping 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 the proposed activities.

Rock Extraction & Processing - Assessment

8.113 An overview of the sources and processes associated with the extraction and processing activities, and their respective potential for dust deposition, is presented below in **Table 8-13**.

Table 8-13
Sources of Particulate Emissions

Activity	Source	Emission Potential	Comments
Rock transfer to processing area	Onsite vehicle, dry loose material.	High when dry material being handled during strong windy weather	Emissions due to prevailing meteorological conditions and amount of dry loose material. Emissions due to re-suspension of loose material on surfaces.
Processing of rock	Processing plant, dry loose material	High when dry material being processed during strong windy weather	Emissions due to prevailing meteorological conditions (high winds).
Existing lime plant activities	Processing plant, dry loose material	High when dry material being handled during strong windy weather if unconfined	Emissions due to prevailing meteorological conditions and amount of dry loose material. Emissions due to re-suspension of loose material on surfaces.
Proposed lime plant activities (from new rock milling plant)	Processing plant, dry loose material	High when dry material being handled during strong windy weather if unconfined	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 Loading to HGV	Onsite vehicle, dry loose material	High when dry material being handled during strong windy weather	Emissions due to prevailing meteorological conditions and amount of dry loose material. Emissions due to re-suspension of loose material on surfaces.
Transfer to the site & traffic off site	HGV / Road vehicles	Low - on paved road surfaces	Dependant on the amount of loose material on road surface available for re-suspension and track out.
Blasting holes	Drilling Rig	Low if dust filters and collection system fitted on the drilling rig.	Dependant on dust filters effectiveness.

Human Receptors

8.114 There were c. 23 sensitive receptors identified within the c. 500 m study area around the application site. In addition, there is a residence currently under construction (R101) to the south of the application site adjacent to residence R9 which has also been included in the assessment.

8.115 Using the tiered assessment methodology, all receptors located within 500 m have progressed onto a Tier 2 assessment as they are considered to have a greater risk of dust impact. Each receptor identified in **Table 8-5** 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**.

8.116 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.

8.117 A wind-rose for the site is presented in **Plate 8-1** for Mullingar 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[8].

8.118 A wind rose showing the frequency of winds at wind speeds of greater than 2 m/s is presented in **Plate 8-1** 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.

8.119 A summary of the risk assessment of dust impacts from sources within the proposed development is presented in **Table 8-14** below.

Table 8-14
Dust Risk Assessment Screening (Without Mitigation Measures)

Receptor	Distance from Operations (m)	Relevant. Wind Direction (A)	Potential Exposure Duration (B)	Relative Wind / Distance Rank (C)	Risk Evaluation
R1	215	20 - 90	1.9	1 / 4	Insignificant
R2	175	40 - 100	2.0	1 / 5	Insignificant
R3	135	40 - 100	2.0	1 / 5	Insignificant
R4	35	60 - 160	4.0	1 / 8	Acceptable
R5	25	70 - 230	9.7	4 / 8	Moderate Adverse
R6	75	100 - 200	5.3	2 / 8	Slight Adverse
R7	220	330 - 30	1.0	1 / 4	Insignificant
R8	170	340 - 30	0.7	1 / 5	Insignificant
R9	155	340 - 50	1.0	1 / 5	Insignificant
R10	465	330 - 10	0.8	1 / 2	Insignificant
R11	370	340 - 20	0.7	1 / 3	Insignificant
R12	340	340 - 30	0.7	1 / 3	Insignificant
R13	300	340 -30	0.7	1 / 3	Insignificant
R14	300	350 - 50	0.8	1 / 3	Insignificant
R15	260	20 - 80	1.6	1 / 4	Insignificant
R16	260	30 - 80	1.5	1 / 4	Insignificant
R17	295	30 - 80	1.5	1 / 4	Insignificant
R18	385	40 - 80	1.4	1 / 3	Insignificant
R19	410	40 - 90	1.7	1 / 2	Insignificant
R20	290	40 - 90	1.7	1 / 4	Insignificant
R21	395	180 - 220	4.4	2 / 3	Insignificant
R22	500	180 - 220	4.4	2 / 1	Insignificant

[8] 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	Distance from Operations (m)	Relevant. Wind Direction (A)	Potential Exposure Duration (B)	Relative Wind / Distance Rank (C)	Risk Evaluation
R23	415	220 - 260	4.2	2 / 2	Insignificant
R101	105	350 – 80	0.8	1 / 5	Insignificant

Table Note:

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

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

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

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

8.120 It can be seen from **Table 8-14** that the risk of impact associated with dust deposition at receptors is highest at receptors located to the north of the application area. Dust receptor R6 was evaluated to be slight adverse while a moderate adverse impact was evaluated for receptor R5. All other receptors evaluated in this assessment are expected to have either an acceptable or insignificant of deposited dust impacts.

8.121 The assessment does not take into account the mitigating effects of dust control measures implemented during the operations or the effective barrier created by the vegetation along the local hedgerows (which will be retained) and any retained perimeter planting. The effectiveness of the existing perimeter screening berms and vegetation belt as both a windbreak in reducing the momentum of the incident wind and as a surface for the capture of airborne particles is considered to significantly reduce the generation of airborne dust beyond the site development boundary.

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

Ecological Receptors

8.123 The application site is not subject to any statutory nature conservation designation. The nearest ecological designated site is the Royal Canal pNHA [002103], located c. 2.6 km south of the site.

8.124 Fugitive dust from quarry sites is typically deposited within 100 to 200 m of the source; the greatest proportion of which, comprising larger particles (greater than 30 microns) is deposited within 100 m. Where large amounts of dust are deposited on vegetation over a long time-scale (a full growing season for example) there may be some adverse effects upon plants restricting photosynthesis, respiration, and transpiration.

8.125 The EPA environmental management guidelines for the sector recommend a limit of 350 mg/m^2/day (averaged over a thirty-day period) for dust deposition at the quarry boundary. A programme of dust deposition monitoring at Rathcore Quarry indicates that the levels of dust generated from quarrying operations are below the recommended limit levels and well below the level of 1000 mg/m^2/day, where it is considered that dust could be likely to have a significant effect on sensitive ecosystems.

8.126 Based on the above, it is concluded that operations at Rathcore Quarry have had and will have insignificant dust deposition impact on ecological receptors.

Traffic Emissions - Assessment

8.127 No additional traffic movements over and above that associated with the existing quarry development are predicted and there will be no changes to road alignment or speed.

8.128 Therefore, as none of the roads in the surrounding local road network meet any of the traffic / alignment criteria set out in HA 207/07, then the impact of the scheme can be considered to be 'negligible' in terms of local air quality and no further air quality assessment is deemed necessary.

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

PM_{10} Contribution from Quarry Activities - Assessment

8.130 In terms of PM_{10}, the maximum annual mean measured baseline background concentration was 9 µg/m³ in 2014, 2015, and 2018 at Kilkitt, Co. Monaghan monitoring station.

8.131 Given the limited magnitude of change in the extent and scale of planned activities at the quarry, the available monitoring data are taken to be representative of ambient PM_{10} concentrations likely to arise over the life of the proposed development. As set out earlier, to provide a robust assessment of potential PM_{10} impacts, if an upper limit of 5 µg/m³ to represent potential future development contribution to annual concentrations, the PM_{10} levels would still be well below the annual mean Air Quality Standards (AQS) of 40µg/m³. As such, any potential future impact in relation to increased ambient PM_{10} concentrations is classified as 'negligible'.

Unplanned Events (i.e. Accidents)

8.132 Accidents, malfunctions and unplanned events refers to events or upset conditions that are not part of any activity or normal operation of the proposed extraction as has been planned by Kilsaran. Even with the best planning and the implementation of preventative measures, the potential exists for accidents, malfunctions or unplanned events to occur during rock extraction activities.

8.133 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.

8.134 Considering the rock extraction activities, there is no need to use any warning sirens or warning sounds in relation to unplanned events.

8.135 In terms of air quality impacts 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;
- accidental material spillages during transport.

8.136 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 PM10 concentration immediately surrounding the quarry and access road. However, these are not considered to be significant given the limited duration of such meteorological conditions and the limited scale of activities.

Cumulative / Synergistic Impacts

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

8.138 This air quality impact assessment herein indicates that the planned development activities will not contribute to a significant increase in local air pollution by way of excessive air / dust emissions.

8.139 The proposed activities will not have the potential to impact the existing ambient air quality in the vicinity of quarry.

8.140 A search of the myplan.ie and An Bord Pleanála online planning portal searches was carried out to determine if there were any other planned developments in the vicinity (c. 1km radius) of the application site that have recently been granted permission or are currently under consideration and which have the potential to have a significant adverse cumulative impacts on the local environment.

8.141 Since the time of the last planning application at Rathcore Quarry (planning ref. TA/161227 (ABP-PL.249132, Progressive Genetics has secured planning permission (planning ref. TA/180007 for partial change of use of the nearby Rathcore golf club-house for use as offices and a call centre and will have up to 20 staff.

8.142 Progressive Genetics traffic will use the L6225-18 road whilst the quarry's main traffic route is the L6226, and this coupled with the relatively small workforce associated with the call centre.

8.143 It is considered, in light of the available assessments that the proposed development will not have any significant adverse cumulative effect on air quality.

Interaction with Other Impacts

8.144 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 4 Population and Human Health and Chapter 5 Biodiversity.

MITIGATION MEASURES

8.145 A range of mitigation measures are recommended for implementation at the Rathcore Quarry site.

Soil Stripping, Construction & Restoration Activities

8.146 Specific mitigation measures are listed in **Table 8-15**.

Table 8-15
Soil Stripping & Restoration Activities – Particulate Emission Mitigation Measures

Source	Emission Potential	Recommended Mitigation Measures	Effectiveness
Excavator/HGV	High – dry or fine silty material during strong windy weather	Minimise drop heights when handling material. Materials placed directly into screening storage area 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

Rock Extraction Processing

8.147 Kilsaran will implement the mitigation measures outlined in **Table 8-16** to reduce particulate matter emissions during rock extraction and processing.

Table 8-16
Rock Extraction and Processing – Particulate Emission Mitigation Measures

Source	Emission Potential	Recommended Mitigation Measures	Effectiveness
Loader/ Processing Plant	High – dry material during strong windy weather	Processing of rock carried out on quarry floor.	High
	High – dry material during strong windy weather	Minimise drop heights when handling material. Water sprays to moisten handled material.	High
	Low – wet material 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	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 topsoil.	High
		Limit mechanical disturbance.	High
Existing lime plant processing	High when dry or fine material being stored or handled during strong windy weather	Enclose plant to limit emissions caused during high winds	High
Proposed new Lime Rock milling plant	High when dry or fine material being stored or handled during strong windy weather if unconfined	New rock milling plant will be enclosed within a steel-clad building, plant will be fitted with a bag filter and milled lime will be stored in enclosed silos, discharging by enclosed chute directly to haulage tankers eliminating exposure to wind.	High
Drilling Rig Dust Emissions	High – during dry and strong windy weather if filter and collection system on rig not working	Avoid working in adverse weather conditions and faulty dust filters	High
Acceptable Risk Receptors	High – during dry and strong windy weather	Retention of hedgerows	High
		Proposed perimeter berms	High

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

RESIDUAL IMPACT ASSESSMENT

Soil Stripping, Construction and Restoration Activities

8.148 In the absence of mitigation measures, the assessment of risk identified that the risk of impact at receptors during stripping, overburden storage construction and restoration activities would be negligible. With the provision of mitigation measures set out above this risk would reduce even further.

Rock Extraction and Processing (Crushing, Screening & Rock Milling)

8.149 With the range of mitigation measures to be implemented and design measures to be incorporated into the working scheme and the proposed new rock milling plant, it is considered that the risk of dust impact at receptors evaluated to be at acceptable risk from the proposed activities will reduce from acceptable (without mitigation measures in place) to insignificant.

8.150 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 dust impact at receptors evaluated to be slight adverse risk from the proposed development reduces from slight adverse (without mitigation measures in place) to acceptable.

8.151 Based on the assessment presented above, it is concluded that the proposed development, with the range of mitigation measures to be implemented and design measures incorporated into the working scheme and the proposed new rock milling plant, will not have a dust deposition impact on assessed receptors.

8.152 Condition No. 4 of PL 17.111632 sets out the recommended dust deposition emission limit value of 130 mg/m^2/day (averaged over 30 days). Condition 4 was imposed back in 1999 prior to the guidance documents from both the EPA and the DoE which recommended adopting the TA Luft Standard and the Bergerhoff Method with its associated ELV of 350 mg/m^2/day.

8.153 On site monitoring of dust uses the Bergerhoff Method to align to the nationally recommend approach. Current dust deposition monitoring carried out at the site boundaries indicates that the current quarry operations have complied with the recommended dust deposition emission limit value of 350 mg/m^2/day (averaged over 30 days).

8.154 After an assessment of potential adverse effects produced by the development it was concluded that there would be no significant adverse air quality effects. Overall, the effects of the proposed development on air quality have been considered to be insignificant to acceptable.

8.155 A summary of the residual dust risk impact assessment is provided in **Table 8-17**.

Table 8-17
Residual Dust Risk Assessment (With Mitigation Measures)

Receptor Reference	Risk Evaluation without Mitigation Measures	Risk Evaluation with Mitigation Measures
R1	Insignificant	Insignificant
R2	Insignificant	Insignificant
R3	Insignificant	Insignificant
R4	Acceptable	Insignificant
R5	Moderate Adverse	Acceptable
R6	Slight Adverse	Acceptable
R7	Insignificant	Insignificant
R8	Insignificant	Insignificant
R9	Insignificant	Insignificant
R10	Insignificant	Insignificant
R11	Insignificant	Insignificant
R12	Insignificant	Insignificant
R13	Insignificant	Insignificant
R14	Insignificant	Insignificant
R15	Insignificant	Insignificant
R16	Insignificant	Insignificant
R17	Insignificant	Insignificant
R18	Insignificant	Insignificant
R19	Insignificant	Insignificant
R20	Insignificant	Insignificant
R21	Insignificant	Insignificant
R22	Insignificant	Insignificant
R23	Insignificant	Insignificant
R101	Insignificant	Insignificant

8.156 Based on the assessment presented above, it is concluded that the proposed development, with the range of mitigation measures to be implemented and design measures incorporated into the working scheme, will not have a dust deposition impact on any assessed receptors.

MONITORING

8.157 Dust deposition monitoring will continue to be undertaken at the application site. Three monitoring locations were included in the baseline survey and will continue to be monitoring for the duration of the development – refer to **Figure 8-1** for locations.

8.158 Dust monitoring locations shall be reviewed and revised where and as/when necessary. The results of the dust monitoring shall be submitted to Meath County Council on a regular basis for review and record purposes.

APPENDICES

Appendix 8-A
Dust 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 proposed mitigation being put in place).

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

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

Frequency of Exposure Criterion

The potential for any site to emit dust is greatly influenced by weather. Increased wind speed increases the potential for the generation of airborne dust due to the suspension and entrainment of particles in airflow. A worst-case situation would be strong, warm, drying winds which increase the rate at which dust is lifted from an untreated surface and emitted into the air. Wind can also have the effect of spreading dust over a large area. Conversely, rainfall decreases dust emissions, due to both surface wetting and increasing the rate at which airborne dust is removed from air. An article on dust generation from quarry/pit operations[9] suggests that rainfall of greater than 0.2 mm per day is considered sufficient to effectively suppress windblown dust emissions.

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

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

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 mm would be provided for each month and calculated over the year to provide an average.

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

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

To allow for this effect of distance, buffer zones are often defined by mineral planning authorities around potentially dusty activities to ensure that sufficient protection is provided. They have not been established in any rigorous scientific way, but usually range from 50 m to 200 m. The 1995 UK DoE Guidance on dust from surface mineral working's, however, recommends a stand-off distance of 100 to 200 m from significant dust sources (excluding short-term sources), although it is recognised that these distances can be reduced if effective mitigation measures are identified and implemented. In terms of identifying sensitive locations therefore, and to represent an extreme worst-case scenario, consideration only needs to be given to sensitive receptors within 500 m of the site boundary. Receptors at a distance greater than 500 m have therefore been screened out in Tier 1 of the assessment.

The criteria for classifying the distance from receptor to source and thus assigning a rank value has therefore been based on the various references to dust behaviour described above. The rank classifications are presented below in **Table 8 A-2**. A risk category is maintained for receptors more than 500 m for circumstances where although a receptor is beyond 500 m from the dust source, its sensitivity for example is 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 500 m from the dust source
2	Receptor is between 400 m and 500 m from the dust source
3	Receptor is between 300 m and 400 m from the dust source
4	Receptor is between 200 m and 300 m from the dust source
5	Receptor is between 100 m and 200 m from the dust source
8	Receptor is less than 100 m from the dust source

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[10] 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 impact is considered to be significantly lower than for medium and high sensitive receptors. Therefore, a factor of 0.5 would be applied to the final risk evaluation ranking.

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

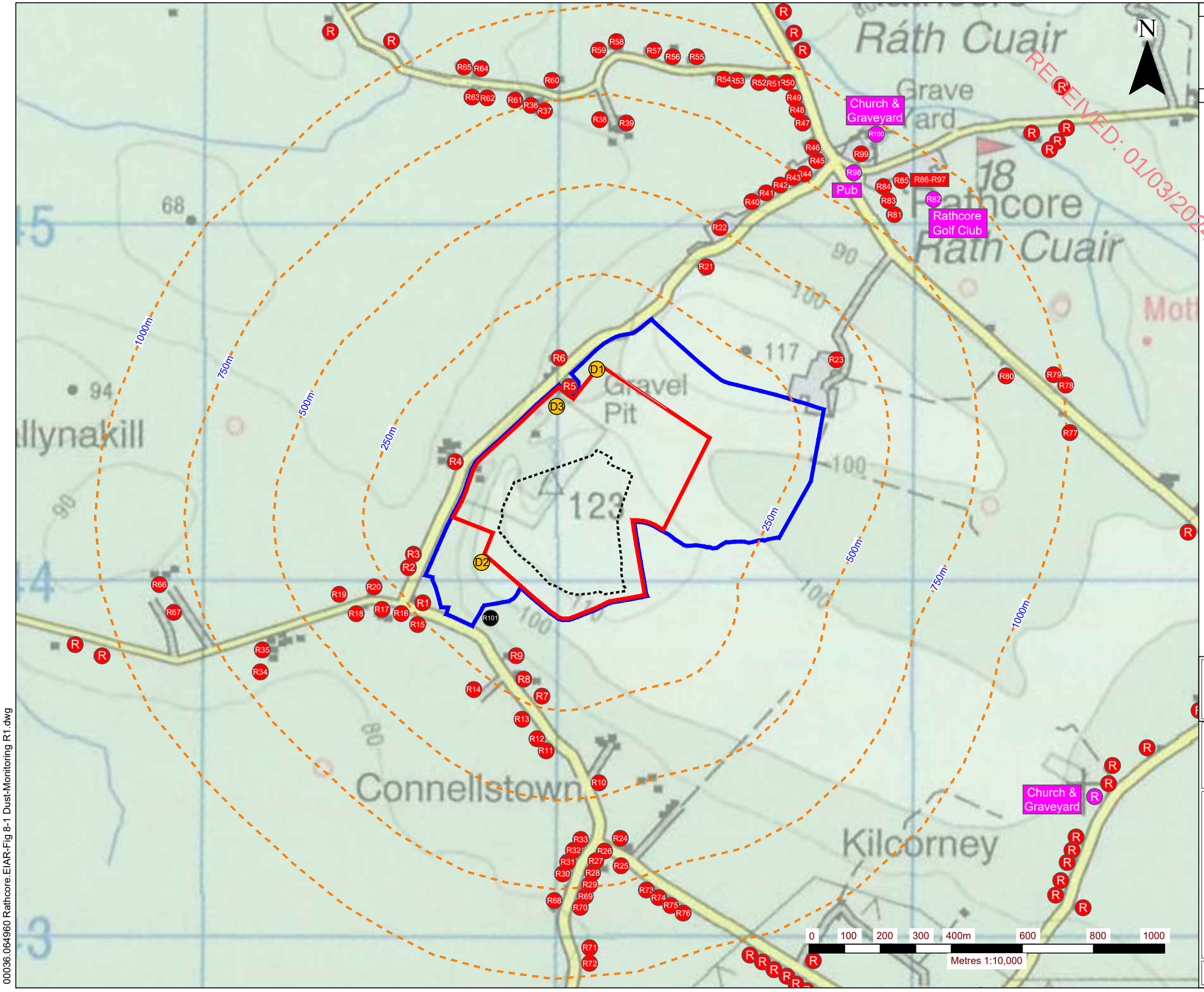
[10] **Ireland M. (1992)** "Dust: Does the EPA go far enough?", Quarry Management, pp23-24.

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

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

FIGURES

Figure 8-1
Receptor and Dust Monitoring Locations



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NOTES

Extract from Ordnance Survey Discovery Series Mapping 42 & 49

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LEGEND

- LANDHOLDING BOUNDARY (c.53.8 HA.)
- APPLICATION AREA (c.31.1 HA.)
- EXTENT OF EXCAVATION (c.10.6 HA.)
- DISTANCE OFF-SET FROM PLANNING APPLICATION BOUNDARY
- R99 — RESIDENCE RECEPTOR LOCATIONS WITHIN 1KM OF APPLICATION SITE BOUNDARY
- R82 — NON-RESIDENCE RECEPTOR LOCATIONS WITHIN 1KM OF APPLICATION SITE BOUNDARY
- R — RESIDENCE RECEPTOR LOCATIONS >1KM FROM APPLICATION SITE BOUNDARY
- R101 — RESIDENCE CURRENTLY UNDER CONSTRUCTION
- D1 — BASELINE DUST MONITORING LOCATIONS (D1 / D2 / D3)

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SLR
global environmental solutions

SLR CONSULTING IRELAND
7 DUNDRUM BUSINESS PARK
WINDY ARBOUR
DUBLIN 14
T: +353-1-2964667
F: +353-1-2964676
www.slrconsulting.com

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EXISTING ENVIRONMENTAL DUST MONITORING & RECEPTOR LOCATIONS

FIGURE 8-1

Scale: 1:10,000 @ A3
Date: FEBRUARY 2024

00036.064960 Rathcore.EIAR-Fig 8-1 Dust-Monitoring R1.dwg