

Attachment-7-1-3-4-Dust Emission Impact Assessment

1. Introduction

This section addresses the potential impacts of dust arising as a result of the proposed development on the surrounding environment and sensitive receptors. This document details both the receiving environment and air including dust emissions impact assessment as the dust assessment undertaken determines what the dust receptors are (receiving environment) and thus are interrelated. An assessment of air (dust) emissions was undertaken as part of the Environmental Impact Assessment Report (EIAR) from which the below assessment has been extracted.

This assessment examines the existing ambient air quality at the subject site and assesses the potential impacts the proposed development may have on air quality. It describes measures proposed to mitigate the effects of likely, significant impacts upon air quality.

2. Methodology

The method of assessing the impacts upon air quality of the project comprises the following steps:

- An assessment of existing quarry operations and associated impacts upon air quality.
- An assessment of the proposed development and associated construction phase and operational phase impacts upon air quality.
- An analysis of baseline dust monitoring results.

3. Receiving Environment

3.1 Overview

The existing site is situated in Ballinrooan, Screen, Co. Wexford ca. 1.3 km west of Screen and ca. 2 km west of the regional road R741. The site is in a rural location and is mainly surrounded by pastoral farming, namely cattle grazing. The topography of the area is undulating. Access to the site is via a private road, which intersects with the county road L-7003-1 via a priority junction.

3.2 Meteorological Conditions

The magnitude of potential impacts from the development upon air quality is significantly dependent on local meteorological conditions, in particular wind direction, wind speed and precipitation. A review of climatological conditions in the region was therefore carried out. Meteorological data used to inform this study was sourced from Met Eireann. The nearest Met Eireann weather station is situated in Johnstown Castle, Co. Wexford 16 km south-west of the subject site. Data recorded from November 2008 to September 2015 recorded at this station was assessed as part of this assessment. The prevailing wind direction in the region is between south and west. The average wind speed recorded at this station over this time period is 8.37 knots (4.3 m/s). The mean annual rainfall is 1078.5 mm.¹ Mean monthly rainfall

data, analysed using available data, is shown in the table below.

Table 1: Mean Monthly Rainfall recorded at Johnstown Castle (Nov 2008 - Sep 2015)

Month	Rainfall (mm)
January	100.6
February	75.7
March	58.5
April	55.5
May	69.9
June	74.3
July	94.7
August	89.8
September	53.8
October	153.3
November	134.5
December	94.9

As stated the nearest representative Met Eireann synoptic meteorological station is based in Johnstown Castle, Co. Wexford

As this station has only been in operation since 2008 and The World Meteorological Organization (WMO) recommends that climate averages are computed over a 30 year period of consecutive records (the period of 30 years is considered long enough to smooth out year to year variations), Rosslare met station was used instead as it has the required records. Details averages for Temperature, RH, Sunshine, Rainfall, Wind and Weather are as follows:

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Table 2: 30 Year Meteorological data - Rosslare 1978-2007 averages

Rosslare 1978-2007 averages													
TEMPERATURE (degrees Celsius)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
mean daily max	8.8	8.5	9.9	11.3	13.6	16.3	18.3	18.5	16.8	14	11.3	9.5	13.1
mean daily min	4.2	4.1	5.1	6.3	8.6	11	12.7	12.9	11.6	9.3	6.7	5.2	8.1
mean temperature	6.5	6.3	7.5	8.8	11.1	13.6	15.5	15.7	14.2	11.6	9	7.4	10.6
absolute max.	14.1	14.1	15.8	17.9	22.3	25.5	26.2	25.9	22	21.5	16.7	14	26.2
min. maximum	-1	-0.2	3.1	5.3	6.1	11.1	13.1	13	0	8.9	4.5	1.8	-1
max. minimum	10.7	11.1	10	11.9	13.8	15.6	17.6	17.6	16.6	14.8	13.5	12.1	17.6
absolute min.	-4.4	-3.7	-2.5	-0.1	-0.3	4.7	6.7	7	4	1.3	-2.5	-3	-4.4
mean num. of days with air frost	1.5	1.3	0.7	0	0	0	0	0	0	0	0.2	1.1	4.8
mean num. of days with ground frost	9.4	8.3	6	3.5	0.7	0.1	0	0	0	0.7	3.7	7.4	39.8
mean 5cm soil	4.9	4.8	6.3	9.4	13.3	16.3	17.8	17	14.4	10.6	7.5	5.9	10.7
mean 10cm soil	5.2	5.1	6.4	8.9	12.4	15.4	17	16.4	14.1	10.7	7.9	6.2	10.5
mean 20cm soil	5.8	5.8	7	9.2	12.4	15.3	17	16.7	14.7	11.5	8.7	6.8	10.9
RELATIVE HUMIDITY (%)													
mean at 0900UTC	85.7	85.4	85.1	82.1	81.4	82.1	82.6	83.6	84.3	85.3	86.3	86.4	84.2
mean at 1500UTC	80.8	79	77.8	76.1	77.2	77.7	77.2	76.9	77.1	78.7	80.2	82.2	78.4
SUNSHINE (hours)													
mean daily duration	2	2.6	3.7	5.7	6.9	6.2	6.3	6	4.8	3.4	2.4	1.8	4.3
greatest daily duration	8.2	10	11.6	13.4	15.4	15.7	15.6	14	12.6	10.5	8.6	7.2	15.7
mean num. of days with no sun	10.1	8	5.4	2.7	1.7	2	1.5	1.9	2.7	6.3	8.2	11	61.4
RAINFALL (mm)													
mean monthly total	88.4	70.8	69.1	59.1	55.7	54.9	49.9	71.6	75	109.3	100.9	100.8	905.5
greatest daily total	42.7	32	42.2	32	29.4	31.6	41.4	89.2	42.2	88.6	43.8	48.9	89.2
mean num. of days with >= 0.2mm	17	15	16	13	13	12	12	13	13	17	17	17	175
mean num. of days with >= 1.0mm	12	11	11	9	9	9	8	9	9	13	12	13	125
mean num. of days with >= 5.0mm	6	5	4	4	3	3	3	4	4	7	6	7	56
WIND (knots)													

Rosslare 1978-2007 averages													
mean monthly speed	12.4	12.2	11.9	11.2	10.9	9.7	9.5	9.4	10.6	11.5	11.4	12.2	11.1
max. gust	71	76	66	75	66	50	54	54	64	96	74	80	68.8
max. mean 10-minute speed	43	44	42	52	40	38	41	36	47	56	48	50	44.8
mean num. of days with gales	1.4	1.2	0.5	0.8	0.2	0.1	0.2	0.1	0.2	0.6	0.9	1	7.1
WEATHER (mean no. of days with..)													
snow or sleet	1.7	2.3	1	0.4	0.1	0	0	0	0	0	0	0.6	6.2
snow lying at 0900UTC	0.5	0.7	0	0	0	0	0	0	0	0	0	0	1.2
hail	1.2	1	1.9	1.3	0.8	0.2	0.1	0.1	0.1	0.4	0.7	0.9	8.7
thunder	0.2	0.1	0.2	0.2	0.7	0.9	0.8	0.6	0.4	0.6	0.3	0.3	5.2
fog	1.8	2.2	3.6	3.7	2.9	4.1	4.4	3.4	2.8	1.6	1.7	1.7	33.9

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3.3 Local Air Quality

The EPA has established an ambient air quality monitoring network in Ireland. EPA air quality data was reviewed to assess existing air quality in the locality of the site. Air quality zones have been established in Ireland by the EPA in accordance with the Clean Air for Europe Directive. The site is situated in Zone D: Rural Ireland. The nearest EPA air monitoring station is situated in Enniscorthy 13 km north-west of the site. It is deemed that air monitored at this station is representative of air quality in the wider rural region. Continuous monitoring for Carbon monoxide, Sulphur dioxide, Nitrogen oxide and PM₁₀ takes place at this station. The EPA applies an Air Quality Index to assess the overall quality of air. Results from this monitoring station show that current air quality in the area is of a good standard.

The EPA's 2015 Annual Report on Air Quality in Ireland shows that, at the Enniscorthy air monitoring station in 2015, there were no exceedances of ambient air quality limits as stipulated in the EU's CAFÉ Directive. Air quality in the region is therefore considered to be of consistently good quality.

3.4 Sensitive Receptors

One-off housing in the locality is situated at locations 280 metres south-east of the site boundary, 350 metres south-east of the site boundary and 380 metres south of the site boundary, respectively. A cluster of housing is situated 420 metres northwest of the site boundary. Agricultural land surrounds the subject site on all sides except on the north-east where the proposed site is bordered by the existing site. The site borders the Screen Hills Special Area of Conservation. Sensitive receptors are mapped in Figure 1 below.

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Figure 1: Sensitive Receptors

4. Impacts of the Proposed Development

4.1 Construction Phase Impacts

It is anticipated that airborne dust will be generated during construction activities and will be the primary, potential impact upon local air quality during the construction phase of the proposed development. Construction activities which will likely cause the generation of dust are as follows:

- The movement of construction machinery on-site
- Earth stripping operations
- Grading/levelling operations
- Ground excavation operations
- Stockpiling, internal movement and off-site transport of excavated materials

The potential impact of dust upon local air quality depends on the type of activity being conducted, in conjunction with environmental factors such as wind speed, wind direction and rainfall. The main impacts of dust generation include the soiling of roads, property, washing and vehicles, the coating of vegetation, the contamination of surface waters and damage to the respiratory systems of humans and animals. Given the subject sites rural location and its proximity to sensitive receptors, dust generated during the construction phase should not significantly impact upon surrounding land uses ambient and as such the impact is considered minor to negligible. It is noted that the nearest sensitive receptor is 280 metres from the site boundary and as such effects of airborne dust should be negligible.

Other pollutants that will arise from construction vehicle exhaust emissions include carbon monoxide, VOC's, nitrogen oxides, and PM₁₀. It is anticipated however that these pollutants will arise in negligible quantities. Due to the small amount of vehicles which will be utilized during quarry development the impact on climate during the construction phase is deemed to be negligible.

4.2 Operational Phase Impacts

There will be no significant point sources of emissions associated with the proposed development. The primary impact upon ambient air quality in the local area will be the generation of airborne dust. Quarry operations which will cause dust emissions include the following:

- Extraction of materials from the extraction pit using mechanical excavators.
- Screening of extracted material in screening equipment.
- Internal haulage of extracted and screened materials
- Stockpiling of screened materials

4.2.1 Extraction/ Backfilling Phase

It is proposed to extract sand and gravel using mechanical excavators. There is potential for dust to arise during this process due to the material extracted/ filling comprising fine, dry particles. The quantity of airborne dust generation depends upon the quantity of material being extracted, wind direction and speed and precipitation levels at the time of extraction. The likelihood of dust affecting a sensitive location depends on the specific location of extraction

within the quarry relative to sensitive receptors. There will be no blasting operations on-site for extraction.

4.2.2 Screening Phase

A Powerscreen Chieftain 1400 mobile screening machine will be situated and utilized on-site to screen extracted materials. Once extraction of material has taken place using mechanical excavators materials will be carried via excavator shovels to the screening machine where materials are tipped into a hopper. The screening process separates out material into various size fractions. Each separated size fraction is moved via conveyor belts then dropped into separate stockpiles.

The two significant dust generating activities associated with this process are (i) Dropping of extracted material into the hopper and (ii) dropping of screened material into stockpiles. Factors which influence the magnitude of dust generation associated with the screening process include the size of particles processed and drop heights. Again meteorological factors such as wind speed and direction and precipitation levels will influence the level of airborne dust generating and the potential for such dust arising to impact upon sensitive receptors. It is proposed to situate the screening equipment on-site away from sensitive receptors. The screening equipment will be situated in the extraction pit therefore it is anticipated quarry faces will impede the spread of airborne dust to a degree.

4.2.3 Haulage of Materials

The hauling of aggregate material from site and waste materials to site has the potential to generate large quantities of dust emission as a result of the movement of vehicles on unpaved surfaces within the site. It is proposed that vehicles adhere to speed limits to minimize dust generation. During periods of dry and windy conditions it is proposed spray haul routes with water to minimize dust generation.

There is potential for emissions from vehicular traffic during the operational phase of the development. Vehicles include HGV's, on-site machinery and staff cars. It is estimated that approximately 36 HGV's will be transporting material from on-site on a daily basis. There will be two mechanical excavators situated on-site. Potential pollutants from vehicle exhaust emissions include carbon monoxide, VOC's, nitrogen oxides, PM₁₀ and lead. There will be a negligible quantity of vehicle exhaust emissions released during the operational phase of the development given the scale of the operations and the amount of vehicles associated with the operations. Traffic to and from the site may also cause dust generation at the site entrance and exit and along access roads to the site.

4.2.4 Stockpiling

There is potential for dust nuisance to occur from stockpiled materials particularly during dry and/or windy conditions. It is proposed to situate stockpiles in such a manner to ensure minimum exposure to the wind and away from sensitive receptors. During periods of very dry and windy conditions stockpiles will be sprayed with water so as to minimize the potential for airborne dust generation.

4.3 Dust Monitoring

Operations at the proposed development will remain closely similar to operations at the existing site. The same equipment will be situated on-site and it is proposed that the facility throughput will be similar. The processing activity will remain the same also. As operations will remain closely similar, it is considered that dust emissions at the existing site are representative of dust emissions which will arise during the operational phase of the proposed development. For the purposes of assessing dust quality on-site baseline dust monitoring, which takes place to ensure compliance with Condition 23 of the planning permission for the existing facility (Wicklow County Council Reg. Ref. 20082323), was reviewed. Dust monitoring results from 2013 to 2015 were reviewed and are summarized in Table 9.3 below. Dust monitoring locations are situated at various locations around the site boundary as shown in Figure 9.2.

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Monitoring Point	Monitoring point Description	Units	Report 1 of 2013	Report 2 of 2013	Report 1 of 2014	Report 2 of 2014	Report 1 of 2015	Report 2 of 2015	TA Luft Limit
D1	Site boundary, north-west	mg/m ² /day	94	38	30	38	17	12	350
D2	Site boundary, north east	mg/m ² /day	12	85	44	65	8	13	350
D3	Site boundary , south-east	mg/m ² /day	23	50	161	2	- ²	44	350
D4	Site boundary, south-west	mg/m ² /day	30	68	56	131	117	52	350

Table 9.3: Dust Monitoring Results 2013-2015

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² Sample missed

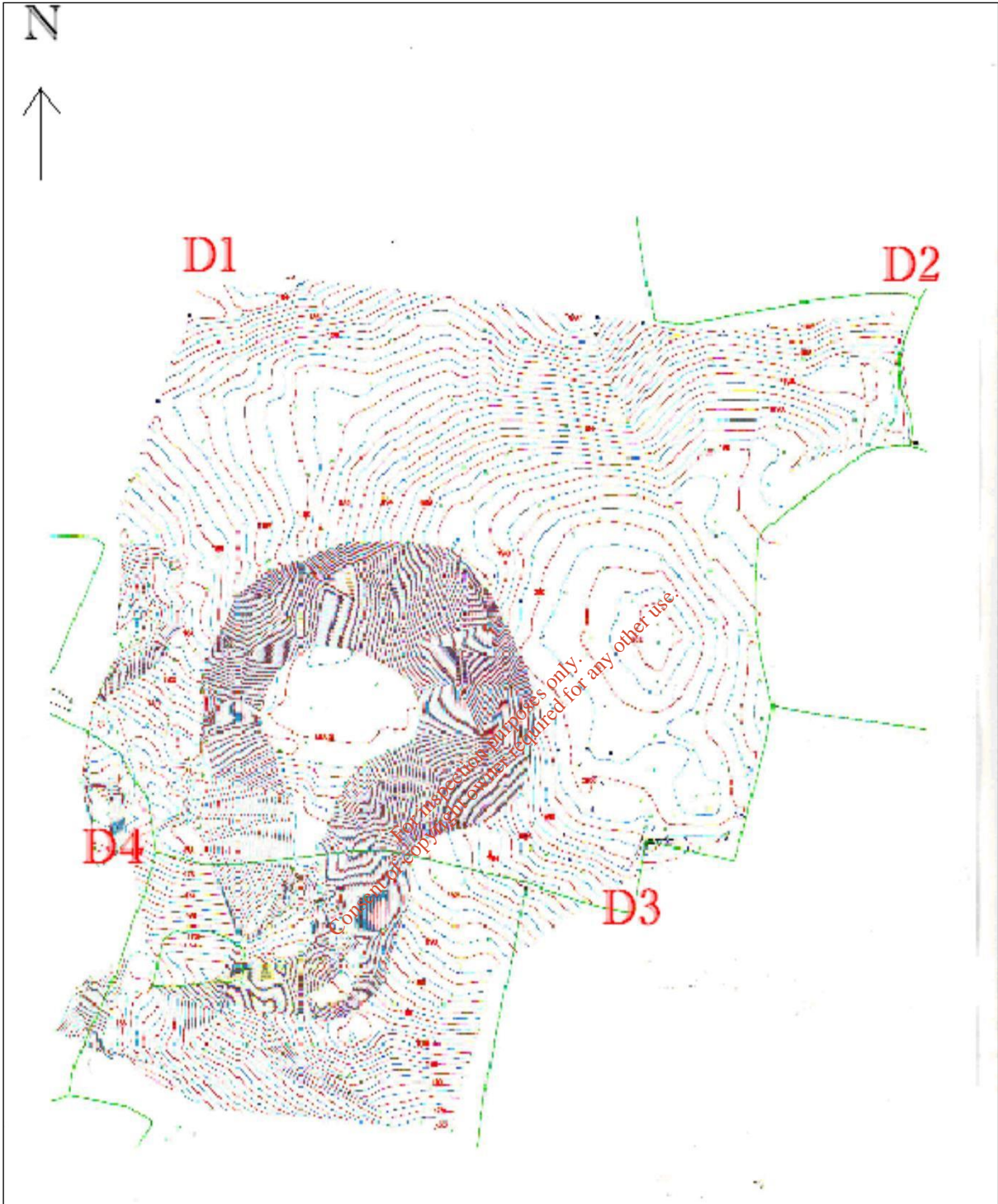


Figure 9.2: Dust Monitoring Point Map

4.4 Potential Impacts of Dust

As can be seen in Table 9.3 above no dust monitoring result recorded on-site has exceeded the TA Luft limit³ of 350 mg/m²/day and all results were significantly below this threshold. Since the initiation of dust monitoring on-site there has never been a breach of the TA Luft limit value. It is therefore considered that airborne dust associated with the operations of the proposed development, which will be closely similar to operations at the existing site, will have a negligible impact upon boundary locations and any sensitive receptors beyond the proposed extended site boundary. In addition, given that the prevailing wind is south and west it is deemed that the potential impact is not in the direction of the sensitive receptors which are north-west and south-east of the site.

4.5 Climate Impacts

There will be no discernible change in terms of impacts upon climate. The quantity and rate of throughput will remain closely similar and the traffic movement to and from the site will remain the same. Given the scale of operations it is deemed that impacts upon climate associated with quarry operations and related traffic movements will be negligible.

5. Mitigation Measures

Measures to minimize the potential for airborne dust generation on-site include the following:

- Speed limits will be enforced on-site to minimize dust generation associated with traffic movement
- The spraying of haul routes, stockpiles and equipment with water during periods of dry and windy conditions will take place to minimize dust generation.
- Visual inspections of the site, the site boundary, the site entrance/exit and haul routes will take place on a daily basis to ensure that there is no build-up of dusty material.
- A pumped water wheel and underbody washing facility will be installed at the entrance to the quarry to minimize the deposition of material at the site exit or local access roads.
- A fixed sprinkler system will be installed at the exit gate to dampen down dry loads leaving the site.
- All plant and stockpiles will be situated on the lowest level of the extraction area at time.
- Road sweeping will take place as appropriate to minimize the build-up of dust on haul routes and the potential for airborne dust generation.
- Material which leaves the site in bulk in HGV's will be covered in tarpaulin to prevent dust emissions from the back of HGV's.
- It is proposed to situate stockpiles in such a manner to ensure minimum exposure to the wind and away from sensitive receptors.

No further mitigation measures as regards dust are deemed necessary.

³ German Federal Government Technical Instructions on Air Quality Control. First General Administrative Regulation pertaining to the "Federal Pollution Control Act 2002 - TA Luft specifies an Immission value for the protection against significant nuisances or significant disadvantages due to dustfall expressed as mg/m²-day.

6. Residual Impacts

It is deemed that there will be no significant impacts upon local air quality as a result of either the construction or operational phases of the proposed development. Baseline dust monitoring has established that dust levels at the existing quarry are not significant and do not result in a significant, negative environmental impact. It is considered that, as machinery on-site and traffic levels will remain the same and as the quantity and rate of throughput will remain closely similar, there will continue to be no significant impact upon local air quality due to dust generation and dust levels at site boundaries will remain below applicable TA Luft guideline limits. In addition, stringent mitigation measures have been established to prevent dust emissions and will likely be conditional in any planning permission issues by the local authority, as is the case at the existing facility.

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