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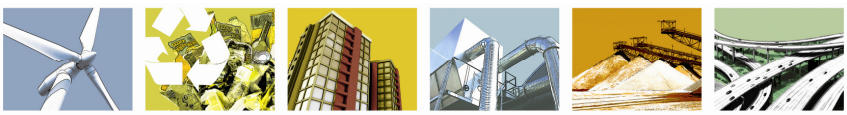

INTRODUCTION

7.1 This chapter of the Environmental Impact Statement provides supporting information to accompany a Waste Licence Application (WLA) to the Environmental Protection Agency (EPA) by Roadstone Wood Limited for the operation of a proposed inert soil recovery facility at an existing quarry void within its landholding at the Huntstown Quarry complex in north Co. Dublin.

7.2 The proposed waste recovery facility is located in the townlands of Kilshane and Huntstown, approximately 2.5km north-west of the Dublin suburb of Finglas and 2km north-west of the interchange between the N2 National Primary Road and the M50 motorway. The proposed development provides for the importation, placement, compaction and capping of approximately c.3,850,000m^3 of inert soil, stones and rock at the northern quarry, one of three within the Huntstwon Quarry complex.

7.3 The existing quarry void covers an area of approximately 11.2 hectares and lies within an overall application area of 35.9 hectares. The application site comprises a limestone quarry with perimeter screening / overburden mounds and some existing ancillary site infrastructure (offices, sheds, hardstand areas etc.) shared with existing quarrying and concrete and asphalt production businesses at the Huntstown Quarry Complex.

7.4 In essence, inert waste recovery operations will comprise

- importation of inert soil waste from external sources (construction sites)
- stockpiling, placement and compaction of inert and site-won soil
- placement of minor quantities of imported inert / recovered construction and demolition waste along temporary haul roads
- stockpiling of topsoil pending final surface restoration works

7.5 This chapter addresses the potential impacts of atmospheric emissions associated with the development of an inert soil waste recovery facility at Huntstown. The assessment of impacts on air quality has been undertaken with reference to EIA good practice, the EIA Regulations, and other guidance documents.

Relevant Air Quality Planning Policy, Legislation and Guidance

7.5 There are currently no Irish statutory standards or EPA guidelines relating specifically to dust deposition thresholds for inert mineral / aggregate dust. There are a number of methods to measure dust deposition but only the German TA Luft Air Quality Standard relates a specific method of measuring dust deposition with dust nuisance.

7.6 The EPA has adopted this standard for all licensable activities and the Department of Environment, Heritage and Local Government (DoEHLG, 2004) proposed its adoption by Local Authorities for planning applications relating to surface mineral workings. This standard measures total dust deposition i.e. both soluble and insoluble dust.

Local Authority Air Quality Management

7.7 The principal national legislation for the control of air pollution is the *Air Pollution Act, 1987* (SI No. 6 of 1987). This Act provides a comprehensive statutory framework for the control of air quality by Local Authorities, specifically through 'orders' or 'plans' produced under Part IV *Special Control Areas* and Part V *Air Quality Management Plans and Standards* to which Local Authorities must have regard to in planning. Part V of the Act also makes provision for transposing Air Quality Standards into law.

7.8 The Act also has relevance to potential nuisance emissions of dust and or odours. Section 24(2) of the Act states '*The occupier of any premises shall not cause or permit an emission from such premises in such a quantity, or in such a manner, as to be a nuisance*'.

Air Quality Standards and Regulation

7.9 In order to protect human health, vegetation and ecosystems, the European Union (EU) Air Quality Framework Directive sets down air quality standards in Member States for a wide variety of pollutants. These rules make provision for monitoring, assessment and management of ambient air quality. This is transposed into Irish law through the *Environmental Protection Agency Act 1992 (Ambient Air Quality Assessment and Management) Regulations 1999* (SI No. 33/1999).

7.10 Four "daughter" directives set limits for specific pollutants. The first two of these directives cover: sulphur dioxide, nitrogen dioxide and oxides of nitrogen, particulate matter and lead, carbon monoxide and benzene. These two directives were transposed into Irish law as the *Air Quality Standards Regulations 2002* (SI No. 271/2002).

7.11 The third and fourth daughter directives deal with ozone (3rd) and polyaromatic hydrocarbons, arsenic, nickel, cadmium and mercury in ambient air (4th). These are transposed into Irish Law in the *Ozone in Ambient Air Regulations 2004* (SI No. 53/2004) and the *Arsenic, Cadmium, Mercury, Nickel and Polycyclic Aromatic Hydrocarbons in Ambient Air Regulations 2009* (SI No. 58/2009).

7.12 Clean Air for Europe (CAFE 2008/50/EC) replaces the Air Framework Directive and the first three daughter directives.

Environmental Management Guidelines (EPA, 2006)

7.13 The *Environmental Management Guidelines for the Extractive Industry (Non-Scheduled Minerals)* present a summary of current environmental management practices for surface workings within the extractive industry. They are based on a review of current environmental management practice in Ireland, the UK and Europe.

7.14 The published guidelines are intended to provide general advice and guidance in relation to environmental issues to practitioners involved in the planning, design, development, operation and restoration of surface extractive industry developments and ancillary facilities in Ireland.

7.15 In relation to surface extractive industry developments and ancillary activities, the guidelines recommend that total dust deposition (soluble and insoluble) from activities on site shall not exceed a dust emission limit value (ELV) at site boundaries of *'350mg/m^2/day (when averaged over a 30-day period)'*

Guidelines for Planning Authorities - Quarries and Ancillary Activities (DoEHLG, 2004)

7.16 The DoEHLG Planning Guidelines on Quarries and Ancillary Activities are primarily addressed to statutory planning bodies. They provide an overview of environmental issues and best practice / possible mitigation measures associated with surface working of aggregates and associated ancillary activities. The guidelines are routinely referred to by practitioners involved in the planning, design, development, operation and restoration of surface workings and ancillary facilities in Ireland.

Fugitive Emissions

Dust

7.17 The principal air quality impact associated with the proposed quarry backfilling and restoration are fugitive dust emission during the operational phase of the project. Dust emissions during this phase are likely to arise during :

- Trafficking by heavy goods vehicles (HGVs) over unpaved surfaces,
- End-tipping of inert soil ,
- Stockpiling, handling and compaction of inert soils
- Rare or occasional separation of any non-inert construction and demolition wastes (principally metal, timber, PVc pipes and plastic) intermixed within the imported inert soil

7.18 Dust in the air is a natural occurrence. The action of wind over dry ground will carry small particles into the air. Although large emissions of dust occur naturally, man-made dust events are caused by disturbance and working of land. Road use, aggregate and mineral extraction, as well as industrial activity, all contribute further to ambient dust levels.

7.19 The extent to which dust particles can become a nuisance or a hazard will depend on the amount of the particles which become airborne and the extent to which they spread over a large area. Normally the particles will be of a wide size range. The larger particles will not remain airborne for long. In general, the smaller the particle, the greater the distance over which it might travel.

7.20 Dust is defined as particulate matter in the range 1 - 75µm. The particles of dust between 1 and 10µm are known as particulate matter <10µm (PM_{10}), or 'suspended particles' for which there are standards for the protection of health. These particles occur predominantly as a result of combustion. Particles larger than 10µm, tend to deposit close to source and impact on public perception, often creating a nuisance where settled particles show up as deposits on clean surfaces such as cars and window ledges.

7.21 Dust may be generated by the handling and storage of soils etc and by vehicles using unpaved site haul roads. For these operations involving the mechanical break up of solids, the most common concern regarding dust emissions is the potential nuisance effect from the larger fraction particulates (greater than 10µm in diameter).

7.22 There is little evidence to suggest that the larger fractions of particulates are associated with health impacts. However buffer zones are often defined by mineral planning authorities around potentially dusty activities to ensure that sufficient protection against nuisance is provided. The Guideline for Planning Authorities produced by the DoEHLG (2004) states that '*residents living in proximity to quarries can potentially be affected by dust up to 0.5km from the source, although continual or severe concerns about dust are most likely to be experienced within about 100m of the dust source'*.

Vehicle Emissions

7.23 Vehicle exhaust emissions resulting from traffic generated by the operation of the proposed inert soil recovery facility may have the potential to temporarily affect local pollution levels, both within and surrounding the application site. No combustion emissions are expected during operation of the proposed waste recovery facility.

7.24 The pollutants of greatest concern in respect of the impact on public health, which are found in the exhaust emissions of road traffic and plant, are NO_2, PM_{10}, CO and benzene. Of these pollutants, NO_2 and PM_{10} are present in the highest concentrations relative to air quality standards. Where air quality standard limits for these pollutants are complied with, other combustion pollutants are typically insignificant.

Assessment Scenarios

7.25 The air quality assessment presented herein compares the 'no development' scenario with the proposed development scenario. On the basis of the potential impacts identified above, the following issues have been considered

- Potential for dust generation, release and impact during importation of inert soils from external sources
- Impact of stockpiling, placement and compaction of inert soils; and
- Impact of vehicle exhaust emissions.

7.26 A description of the ambient receiving environment around the proposed soil recovery facility, where air quality could be adversely impacted is presented at the outset of this chapter. The potential impacts of air emissions on sensitive locations around the proposed facility are then identified, assessed and mitigation measures identified.

Author

7.27 Relevant baseline air quality (dust) studies presented in this chapter were carried out by Roadstone Wood Ltd. The subsequent impact assessment has been prepared by SLR Consulting Ireland, principally Ann McCormack BSc.(Hons) (Environmental Management).

RECEIVING ENVIRONMENT

Climate

7.33 The Irish Meteorological Service operates a network of meteorological stations around the country. That nearest to the application site at Huntstown is located at Dublin Airport, Co. Dublin. This station is located approximately 1.8km north-east of the proposed facility.

7.34 Other meteorological stations are located at Casement Aerodrome at Baldonnel, Mullingar and Clones. Given the separation distance between these locations and the application site, it is considered that climate data from Dublin Airport is the most relevant to this site.

7.35 Detailed observations are made daily at the station and "30 year average" data is compiled and published for climatological purposes. The data from Dublin Airport has been compiled for the period 1961 to 1990 inclusive and a summary of the data is outlined as follows:

Temperature

7.36 The mean annual air temperature at Dublin Airport over the period 1961 to 1990 was 9.6°C, with a range of extreme temperatures varying from -10.1°C to 28.7°C (see Table 7-1).

Table 7-1

Mean Ambient Air Temperature Dublin Airport 1961 - 1990

TEMPERATURE (degrees Celsius)	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec	Year
Mean daily max.	7.6	7.5	9.5	11.4	14.2	17.2	18.9	18.6	16.6	13.7	9.8	8.4	**12.8**
Mean daily min.	2.5	2.5	3.1	4.4	6.8	9.6	11.4	11.1	9.6	7.6	4.2	3.4	**6.4**
Mean	5.0	5.0	6.3	7.9	1.5	13.4	15.1	14.9	13.1	10.6	7.0	5.9	**9.6**
Absolute max.	16.6	15.3	21.3	20.5	23.4	25.1	27.6	28.7	23.9	21.2	18.0	16.2	**28.7**
Absolute min.	-9.4	-6.2	-6.7	-3.7	-1.0	1.5	4.8	4.1	1.7	-0.6	-3.4	-10.1	**-10.1**
Mean no. of days with air frost	6.4	4.9	3.3	1.4	0.2	0.0	0.0	0.0	0.0	0.1	3.3	4.8	**24.3**
Mean no. of days with ground frost	14.0	12.7	12.4	9.2	2.9	0.2	0.0	0.0	0.6	2.3	9.7	12.5	**76.4**

Relative Humidity

7.37 The relative humidity data at Dublin Airport is reported at 09:00hrs and at 15:00hrs daily. The range of monthly values at 15:00hrs over the period 1961 to 1990 varied from 67% to 81%, which is in line with national averages and indicates a reasonable humidity level on a year round basis (see Table 7-2).

Table 7-2

Mean Ambient Air Relative Humidity Dublin Airport 1961 - 1990

RELATIVE HUMIDITY (%)	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec	Year
Mean at 0900UTC	86	84	82	79	76	76	78	81	82	85	86	86	**82**
Mean at 1500UTC	79	75	70	68	67	68	68	70	70	75	78	81	**72**

Sunshine

7.38 The monthly sunshine hours at Dublin Airport over the period 1961 to 1990 are reported in Table 7-3.

Table 7-3

Mean Sunshine Hours Dublin Airport 1961 - 1990

SUNSHINE (hours)	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec	Year
Mean daily duration	1.8	2.5	3.6	5.2	6.1	6.0	5.4	5.1	4.3	3.1	2.4	1.7	**3.9**
Greatest daily duration	8.0	9.2	11.9	13.8	15.4	15.9	15.4	14.5	12.4	10.4	8.5	6.9	**15.9**
Mean no. of days with no sun	11	8	5	3	2	2	1	2	3	6	8	11	**61**

Rainfall

7.39 The annual rainfall amount at Dublin Airport over the period 1961 to 1990 is 732.7mm, indicating that it is one of the “drier” locations in the country. There are however 185 days with greater than 0.2mm of rain on an annual basis indicating that the rainfall is relatively evenly spread throughout the year (see Table 7-4).

Table 7-4

Mean Rainfall Dublin Airport 1961 - 1990

RAINFALL (mm)	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec	Year
Mean monthly total	69.4	50.4	53.8	50.7	55.1	56.0	49.9	70.5	66.7	69.7	64.7	75.6	**732.7**
Greatest daily total	30.3	31.3	35.7	26.2	30.0	46.6	34.8	60.2	40.9	47.5	55.1	41.7	**60.2**
Mean no. of days with ≥ 0.2mm	18	14	16	14	16	14	13	15	15	16	16	18	**185**
Mean no. of days with ≥ 1.0mm	13	10	11	10	11	10	9	11	10	11	11	12	**128**
Mean no. of days with ≥ 5.0mm	5	3	3	3	4	4	3	4	4	4	4	5	**48**

Wind speed

7.40 The mean monthly wind speed at Dublin Airport over the period 1961 to 1990 is 9.9 knots, or 5 m/s, with maximum gusts of 75 knots or 38 m/s. The average number of gale days per year is 8.2; indicating that the area is "windy", without experiencing the extreme gusts that occur on the west coast (see Table 7-5).

Table 7-5

Mean Wind Speed Dublin Airport 1961 - 1990

WIND (knots)	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec	Year
Mean monthly speed	12.2	11.7	11.6	9.7	8.7	8.0	8.1	8.0	8.9	9.9	10.8	11.8	**9.9**
Max. gust	75	73	61	60	58	55	54	56	64	73	64	71	**75**
Max. mean 10-minute speed	48	49	42	41	39	36	34	41	35	45	43	47	**49**
Mean no. of days with gales	2.1	1.1	1.2	0.3	0.3	0.1	0.0	0.3	0.2	0.5	0.7	1.4	**8.2**

General Weather

7.41 The average number of days per month with other types of weather at Dublin Airport over the period 1961 to 1990 is reported in Table 7-6. The general picture is of a higher than national average of snow or sleet (see Table 7-6).

Table 7-6

General Meteorological Conditions Dublin Airport 1961 - 1990

WEATHER (mean no. of days with)	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec	Year
Snow or sleet	6.0	5.5	4.3	1.7	0.3	0.0	0.0	0.0	0.0	0.1	0.9	2.9	**21.6**
Snow lying at 0900UTC	2.1	1.2	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.6	**4.5**
Hail	0.7	0.9	2.2	2.4	1.4	0.3	0.1	0.1	0.0	0.2	0.5	0.8	**9.5**
Thunder	0.1	0.1	0.2	0.3	0.6	0.7	0.7	0.6	0.3	0.3	0.1	0.1	**4.1**
Fog	4.8	4.3	3.9	4.5	3.6	3.1	3.6	5.3	4.9	4.7	4.0	3.9	**50.5**

Background Air Quality

Existing Land Use

7.42 The site to which this Waste Licence Application refers is located within the townlands of Huntstown and Kilshane, Co. Dublin, adjacent to the existing quarrying and concrete and asphalt production businesses of Roadstone Wood Ltd. at its Huntstown Quarry complex.

7.43 There are a small number of existing residences are located in close proximity to the application site. The nearest sensitive locations to those residences located immediately to the west along the Kilshane Road and to the east of the site along the R135 Regional Road, also known as the north Road (the former N2 National Primary Road). The locations of these residences are shown on the site map in Figure 7-1.

7.44 The land immediately south-east of the proposed backfill and restoration area is used for the processing of aggregates and manufacture of concrete and asphalt products. The lands immediately to the south of the application area are currently used, or intended to be used, for aggregate extraction, while the lands to the immediate north and north-east of the application site are primarily used for agricultural grassland.

7.45 At a greater distance, the Huntstown Power station (operated by Viridian), the North Road and the N2 Dual Carriageway all lie to the east of the application site. The M50 Motorway lies to the south, while the lands to the south-west and west have been developed as light industry and science and technology parks (Ballycoolin Business Park, Rosemount Business Park, Millennium Business Park and Northwest Business Park).

7.46 This current proposal to backfill the North Quarry with in-situ and imported inert soil and stones is part of the quarry restoration works which were previously notified and agreed with Fingal County Council in 2002 in accordance with Condition No. 17 of 1994 planning permission. These works were commenced in the 2002-2003 period, but have progressed relatively slowly since that time.

Baseline Ambient Dust Concentrations

7.47 The principal sources of existing air and dust emissions in the receiving environment around the site of the proposed waste recovery facility are those associated with:

- quarrying of limestone bedrock;
- aggregate processing activities (crushing and screening);
- readymix concrete and asphalt production plant;
- road traffic along the local road network, and the N2 Dual Carriageway and M50 Motorway in particular.

7.48 A dust deposition monitoring program was established at the site in 1996. This comprises five “Bergerhoff-Type Dust Deposit Gauges” at the locations detailed overleaf:

D1 To the east of the existing landholding, adjacent to the site entrance (refer to D1 – Figure 7-1).

D2 To the south-east of the application area (refer to D2 – Figure 7-1).

D3 To the south of the application area (refer to D3 – Figure 7-1).

D4 To the west of the application area (refer to D4 – Figure 7-1).

D5 To the south-east of the existing landholding, north of the southern quarry, (refer to D5 – Figure 7-1).

7.49 Recorded dust deposition rates are indicated in Table 7-7 at a number of monitoring locations indicated in Figure 7-1. The results of the dust deposition monitoring programme for 2009 and early 2010 are as follows:

Table 7-7

Dust Deposition Monitoring Results 2009 to 2010

Date	Deposition (mg/m^2/day)				
	D1	D2	D3	D4	D5
January 2009					
February 2009	41	42	73	309	-
March 2009	44	299	58	112	-
April 2009	116	105	41	41	-
May 2009	212	147	70	75	-
June 2009	430*	333	155	161	-
July 2009	-	-	-	-	-
August 2009	242	167	-	-	-
September 2009	177	-	-	-	-
October 2009	360*	220	65	86	-
November 2009	130	119	181	191	-
December 2009	-	-	-	-	-
January 2010	-	-	118	-	-
February 2010	61	81	37	88	-
March 2010	22	92	80	61	-
April 2010	70.5	144.4	71.1	58.3	41.1

** contaminated with organic matter*

7.50 This data indicates that total dust deposition rates along the boundary of the application site at the time quarrying and production of construction materials was underway was controlled and generally well below the TA Luft threshold limit of 350 mg/m^2/day.

7.51 Dust deposition monitoring was also carried out at the site at the time some quarry backfilling and restoration works were being undertaken previously at the northern end of the North Quarry in late 2002 and 2003. At that time, a

large volume of inert excavation spoil arising from construction of the Dublin Port Tunnel was imported to site and used to backfill the quarry void in that area.

Table 7-8

Dust Deposition Monitoring Results 2002 to 2003

Date	Deposition (mg/m^2/day)					
	D1	D2	D3	D4	D5	D6
January 2002	-	-	89	98	185	-
February 2002	88	-	106	122	202	-
March 2002	134	-	132	103	176	-
April 2002	68	-	110	68	157	-
May 2002	88	-	127	141	189	-
June 2002	94	-	134	102	167	-
July 2002	103	-	97	79	154	-
August 2002	133	-	124	133	187	-
September 2002	-	-	-	240	281	-
October 2002	-	-	160	113	191	-
November 2002	94	-	142	116	77	78
December 2002	62	-	121	67	69	65
January 2003	-	-	-	123	207	160
February 2003	-	-	-	-	100	93
March 2003	-	-	-	142	234	134
April 2003	-	-	70	98	151	156
May 2003	-	-	79	134	187	175
June 2003	-	-	67	157	161	132
July 2003	-	-	82	146	154	165
August 2003	-	-	109	121	135	197
September 2003	-	-	134	167	103	137
October 2003	-	-	116	143	122	176
November 2003	-	-	63	85	142	124
December 2003	-	-	101	132	102	142

7.52 This data indicates that total dust deposition rates along the boundary of the application site during previous site restoration and recovery activities was controlled and well below the TA Luft threshold limit of 350 mg/m^2/day.

Traffic Emissions

7.53 Traffic access to the application site is primarily obtained via the North Road and to a lesser extent from a local (county) road known locally as the Kilshane Road (Cappagh Road) to the west of the site.

7.54 Traffic movement within Roadstone Wood's landholding is initially over a paved road, up to the existing aggregate processing, concrete production and central infrastructure area. Thereafter, traffic crossing the application site generally runs over a network of unpaved haul roads.

7.55 Apart from the quarrying and processing / production activities at Huntstown, the only other significant source of air pollution in the vicinity of the application site is traffic travelling over the existing local road network. Many of the pollutants emitted by motor vehicles are also produced by a wide range of other industrial and domestic processes.

7.56 Data from the EPA (Ireland's Environment – A Millennium Report) indicates that road transport sources produced most Carbon Monoxide emissions (81%) and substantial amounts of hydrocarbons (VOC 60%), oxides of nitrogen (NO_x 50%) and Carbon Dioxide (11%). Data from the UK Department of the Environment, Transport and the Regions (Digest of Environmental Statistics No. 20) indicates that the quantity of PM_{10} emissions (i.e. particles with 10µm diameter or less) due to traffic is of the order of 28%.

AQS Pollutants

7.57 The application site and the surrounding area fall into Air Quality Zone A (Dublin Conurbation). No monitoring of Air Quality Standard pollutants is routinely undertaken at the application site. Background values for this baseline study have therefore been taken from the nearest EPA monitoring locations at Blanchardstown, 5km to the west of the application site and Winetavern Street in Dublin City Centre, 8km to the south-east.

7.58 During 2008, the pollutants monitored at Blanchardstown included nitrogen dioxide (NO_2) and particulate PM_{10}. In 2007, the nearest monitoring of these pollutants was at Winetavern Street, in Dublin City Centre. In 2007 and 2008, the nearest ambient monitoring of sulphur dioxide (SO_2) and carbon monoxide (CO) was undertaken at Winetavern Street. The annual mean values available taken from national air quality monitoring reports are presented in Table 7-9 below:

Table 7-9

Background Air Quality

Year	NO_2	PM_{10}	SO_2	CO
Annual Limit Value	**40µg/m³ ***	**40µg/m³ ***	**20µg/m³**	**10µg/m³**
2007	34µg/m³ *	18µg/m³ *	3µg/m³ *	0.2µg/m³ *
2008	29µg/m³	17µg/m³	0µg/m³ *	0.3µg/m³ *

* Recorded at Winetavern Street, Dublin City Centre

7.59 Available air quality data indicates that existing ambient air quality in the Dublin urban area is generally very good, with no exceedences of mean annual limit values for each of the principal air pollutants identified above

IMPACT OF THE PROPOSED WASTE FACILITY

Methodology

Dust

7.60 The factors which affect the potential for dust to be created during operational activities and to disperse to sensitive receptors beyond the site boundary and cause nuisance. These factors are as follows:

- The nature, scale and duration of activities undertaken on site;
- The character and land use of the area surrounding the site;
- The local climate and meteorology; and
- Dust control measures employed on the site.

7.61 The likelihood of dust nuisance to occur has been assessed by consideration of each of the factors above, and by reference to the historical operation of the existing quarry facility and baseline conditions as measured during dust deposition monitoring. The qualitative assessment examines the sensitivity of dust sensitive receptors, their location in relation to dust sources and the prevailing wind speed and direction, the distance from source, and the frequency of precipitation.

Selection of Sensitive Receptors

7.62 For the purposes of this air quality assessment the term 'sensitive receptors' includes any persons, locations or ecosystems that may be susceptible to changes arising from operation of the proposed waste recovery facility. The receptor locations considered for human exposure are those where the public may be exposed for relevant exposure periods for comparison against Air Quality Standards (e.g. 1 hour, 8 hours or 12 months).

7.63 All isolated residential properties surrounding the site have been selected, in addition to one or more of the closest residences, for assessment against long term Air Quality Standard limits.

7.64 Ecological receptors of concern are those areas designated under EU Habitats Directive (92/43/EEC) or the Birds Directive (79/409/ EEC).

Climate Impacts

7.65 The nature and scale of the proposed development is such that no significant impact is likely to be caused to the climate. Backfilling the application site using inert soil, stones and minor quantities of inert concrete and demolition waste is limited in scale and duration. In the short to medium term, there are unlikely to be any changes to the microclimate and the effect of the proposed development will, in effect, be insignificant. There will be no long-term changes to the microclimate. No mitigation measures are therefore warranted.

Dust Impacts

7.67 The principal air quality arising from handling, placement and stockpiling of inert soil will be increase in the concentration of airborne dust. Dust effects will be dependent on the scale of release, frequency of wind speeds capable of carrying airborne dust (i.e. greater than 3m/s)[1] and frequency of rainfall considered sufficient to effectively suppress wind-blown dust emissions (greater than 0.2 mm/day)[2].

7.68 There are two assessment criteria for dust emissions (a) health related effects and (b) nuisance effects. Health related effects are assessed with reference to Council Directive 1999/30/EC relating to limit values for air quality whereas dust as a nuisance is generally assessed to VDI 2119 Measurement of Particulate Precipitations (Bergerhoff Method), as referred to in the German TA Luft standard. The accepted standard for dust deposition levels is 350mg/m^2/day.

7.69 At Huntstown, the dust impacts arising from the operation of the proposed waste recovery facility are likely to be most significant at the residences located immediately beyond the boundary of the application site, approximately 170m to the west along the Kilshane Road and approximately 480m to the east along the North Road (the former N2 National Primary Road).

7.70 Due to the nature of the proposed works and the location of the facility, it is expected that the larger (coarse grained) dust particles which may be disturbed by backfilling and placement of inert materials will settle from the atmosphere within the application site. It would also be expected that the smaller (fine-grained) dust particles would have the potential to become airborne and settle some distance from the source, beyond the site boundary.

7.71 The movement of traffic along existing unpaved haul routes through the application site has the potential under adverse conditions (ie. dry, windy weather) to generate significant dust emissions. When vehicles travel over an unpaved road, the force of the wheels on the surface pulverizes the exposed surface material. Particles are lifted and dropped from rolling wheels and the road surface is exposed to strong air currents in turbulent shear with the surface. The turbulent wake behind the vehicle continues to act on the road surface after the vehicle has passed.

7.72 The quantity of dust emissions from a given segment of unpaved road varies with the volume of traffic, the weight and speed of the vehicles and the fraction of silt and fine grained particles in the road surface materials. Tests, however, show that the road silt content is normally lower than in the surrounding parent soil, because the fines are continually removed by the vehicle traffic, leaving a higher percentage of coarse particles.

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[1] K. W. Nicholson (1988) A review of particle re-suspension. Atmospheric Environment Volume 22, Issue 12, 1988, Pages 2639-2651

[2] Leeds University. Good Quarry. Available at: http://www.goodquarry.com/

7.73 The available baseline dust monitoring data was obtained at a time when rock extraction and processing activities were ongoing around the application site. These activities included rock blasting, excavation, handling and processing (crushing) of fragmented rock, transport of materials to and from storage bays and the concrete production facility etc.

7.74 The only new activity envisaged by this proposal is the end-tipping, placement and compaction of inert soils and stones within the void of the North Quarry. Such activities are similar in nature and intensity of those which took place during rock extraction. As the proposed waste recovery activities will be undertaken within a closed depression, where the sides of the existing quarry void effectively act to screen any dust emissions, it is considered unlikely that they will give rise to any significant additional dust emissions.

7.75 The available dust monitoring data from the site suggests that continuation of established activities, including movement of traffic, will not give rise to dust emissions in excess of the German TA Luft standard of 350mg/m^2/day at or beyond the site boundary.

7.76 There is a possibility that dust levels may rise for a limited duration when soil backfilling and placement works are undertaken close to existing ground level in close proximity to residences adjoining the site boundary, particularly those beyond the western boundary. Dust emissions during dry windy periods at this time could constitute a temporary minor negative impact for the nearby residents.

7.77 In the longer term however, on completion of the site restoration works and the return of the site to agricultural use, the concentration of airborne dust would be expected to be reduced slightly from present day levels as a result of covering and seeding exposed, unvegetated soil surfaces. This will most likely constitute a minor positive impact for the local environment.

7.78 On the basis of the significant buffer distance between the proposed restoration area and receptors, the location of receptors in relation to the void to be in-filled and prevailing winds and the topography of the site, the potential dust impact at all receptor locations is considered to be low.

MITIGATION MEASURES

Dust Control Measures

7.79 Mitigation measures for dust control are already in place across the Huntstown Quarry complex and are included in the existing Environmental Management System.

7.80 A number of additional mitigation measures are outlined below to further reduce the possibility of negative dust impacts arising in the course of the quarry backfilling and restoration activities at the North Quarry in Huntstown.

Dust control measures are presented in Table 7-10 and are in general accordance with best practice guidance [3].

Table 7-10

Summary of Dust Control Measures

Site Operation	Particulate Matter Control Measures	Estimate of Effectiveness
Soil Placement and Backfilling	Restrict access to restored areas	High
	Avoid soils handling during adverse weather conditions	High
	Optimise timing of operations, particularly in relation to meteorological conditions	High
	Imported soil compacted in-situ immediately after being unloaded to minimise wind blown particulate matter	High
	Soil mounds to be seeded immediately upon completion of construction	Moderate
	Drop heights to be minimised at all times	High
	Soil mound heights restricted to minimise particulate matter emissions	Moderate
Stockpiling	Stockpiling of imported soils to be minimised	Medium
	Use of water sprays on soil stockpiles, when necessary	High
	Siting of stockpiles to take advantage of shelter from wind	High
Haul Roads	Controlled use of fixed haul routes	Moderate/High
	Haul routes to be regularly maintained by grading hardcore to minimise particulate matter generation	High
	Optimise separation distances to sensitive receptors	High
	Speed controls to be implemented and enforced on all haul routes	Moderate
	Water bowsers / sprinkle system to be used as required	High
Access Road	Paved site access road	High
	Use of wheel cleaning equipment	Moderate/High
	Use of water bowsers on access road when required	High
	Use of road sweeper on paved road when required	Moderate
	Speed controls to be implemented on access road	Moderate
Monitoring	Dust deposition monitoring stations around site	Moderate

Monitoring

7.81 It is envisaged that dust monitoring will continue to be undertaken on an ongoing basis at points along the site boundary closest to sensitive receptors (specifically nearest residences), at the five locations (D1, D2, D3, D4 and D5) indicated on Figure 7-1.

[3] Environmental Management in the Extractive Industry (Non-Scheduled Minerals) (2006), Environmental Protection Agency

7.82 Environmental sampling, monitoring and testing will generally be undertaken by the Applicant's in-house environmental staff as required. Records of environmental monitoring and testing will be maintained on-site and forwarded to the EPA as required under the terms of the waste licence.

CONCLUSIONS

7.83 This air quality assessment has considered the impact of the proposed waste recovery facility on the aerial environment. The assessment has considered dust and particulates associated with site activities and HGV traffic.

7.84 The significance of impacts has been assessed against the baseline scenario considering the restoration of the void at Huntstown North Quarry.

7.85 The following conclusions can be made:

- The Proposed Application will not result in significant increases or exceedences of the 'custom and practice' limit criterion for dust nuisance at sensitive receptor locations at any stage;
- The predicted impact from deposited dust at residential receptors is considered to be negligible.

7.86 Mitigation measures for dust control are already in place at the site and included in the existing site Environmental Management Plan. The effective application of these mitigation measures will continue to be monitored.

REFERENCES

Department of Environment Heritage and Local Government (2004) *Quarries and Ancillary Activities: Guidelines for Planning Authorities*

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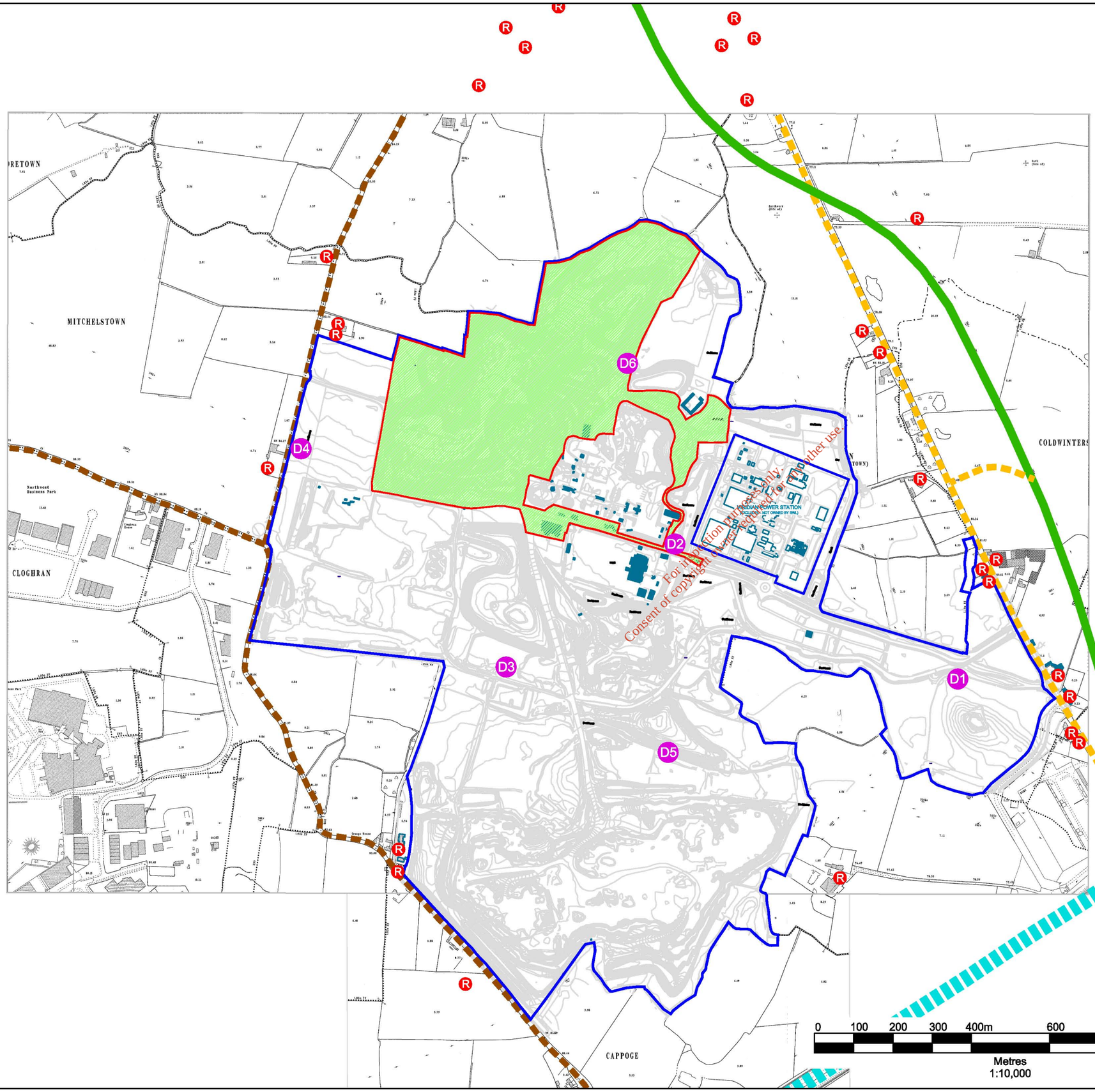
Environmental Protection Agency, (2009) *Air Quality in Ireland 2008*

Environmental Protection Agency, (2000) *Ireland's Environment: A Millennium Report*

European Union (1999) *Council Directive 1999/30/EC of 22 April 1999 relating to Limit Values for Sulphur Dioxide, Nitrogen Dioxide and Oxides Of Nitrogen, Particulate Matter and Lead in Ambient Air*

T.A Luft (1988) *Atmospheric Emissions*

FIGURES



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NOTES

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

2. ORDNANCE SURVEY IRELAND LICENCE NO. SU 0000711 (C) ORDNANCE SURVEY & GOVERNMENT OF IRELAND

3. TOPOGRAPHIC SURVEY PREPARED BY FUGRO BKS BASED ON MAY 2009 AERIAL PHOTOGRAPHY

LEGEND

- ROADSTONE WOOD LTD. LANDHOLDING (c. 201.8 ha)
- WASTE LICENCE APPLICATION AREA (c. 35.9 ha)
- N2 NATIONAL PRIMARY ROUTE (DUAL CARRIAGEWAY)
- NORTH ROAD (R135)
- LOCAL ACCESS ROAD
- M50 MOTORWAY
- R — LOCATION OF NEAREST RESIDENCES
- D4 — DUST MONITORING LOCATION

Roadstone WOOD
The RVght Choice

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ROADSTONE WOOD LTD.
ENVIRONMENTAL IMPACT STATEMENT

WASTE RECOVERY FACILITY,
HUNTSTOWN QUARRY,
NORTH ROAD, FINGLAS, DUBLIN 11

DUST MONITORING LOCATIONS

FIGURE 7-1

Scale	Date
1:10,000 @ A3	FEBRUARY 2011

00180.00015.18.7-1.R1.DUST MONITORING LOCATIONS.dwg