Dust Assessment

Greetham Quarry

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Redmore environmental

Executive Summary

Redmore Environmental Ltd was commissioned by Mick George Ltd to undertake a Dust Assessment in support of the extension of Greetham Quarry, Rutland.

The proposals have the potential to cause adverse impacts as a result of fugitive dust emissions associated with operations at the quarry. As such, a Dust Assessment was undertaken in order to determine baseline conditions and assess potential effects as a result of the scheme.

There is the potential for fugitive dust emissions from the development to cause disamenity impacts and increases to particulate matter concentrations at human health receptors. These were assessed through consideration of receptor location and sensitivity, the activities to be undertaken on site, proposed mitigation measures and prevailing meteorological conditions. The results indicated impacts were not predicted to be significant at any sensitive position in the vicinity of the proposals.

Based on the assessment results, air quality factors are not considered a constraint to planning consent for the development, subject to the inclusion of the specified mitigation.

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1.0 INTRODUCTION

1.1 Background

1.1.1 Redmore Environmental Ltd was commissioned by Mick George Ltd to undertake a Dust Assessment in support of the extension of Greetham Quarry, Rutland.

1.1.2 The proposals have the potential to cause adverse impacts as a result of fugitive dust emissions associated with operations at the quarry. As such, a Dust Assessment was undertaken in order to determine baseline conditions and assess potential effects as a result of the scheme.

1.2 Site Location and Context

1.2.1 Greetham Quarry is located on land north of Stretton Road, Greetham, at National Grid Reference (NGR): 492942, 315098. Reference should be made to Figure 1 for a map of the site and surrounding area.

1.2.2 The proposals include an extension to the existing quarry in order to extract 3 million tonnes of limestone over the course of circa 20 years. Reference should be made to Figure 2 for a site layout plan.

1.2.3 A planning application for the extension of Greetham Quarry was submitted to Rutland County Council (RCC) (ref: 2020/0297/MIN). Subsequent to submission, RCC have raised concerns over the potential for the site to cause adverse impacts as a result of fugitive dust emissions associated with the extraction, processing, re-contouring and transfer of materials. A Dust Assessment was therefore requested in order to determine baseline conditions and consider potential effects as a result of the proposals. This is detailed in the following report.

2.0 LEGISLATION AND POLICY

2.1 Legislation

2.1.1 The Air Quality Standards Regulations (2010) came into force on 11th June 2010 and include Air Quality Limit Values (AQLVs) for the following pollutants:

- Nitrogen dioxide;
- Sulphur dioxide;
- Lead;
- Particulate matter with an aerodynamic diameter of less than 10µm (PM_{10});
- Particulate matter with an aerodynamic diameter of less than 2.5µm;
- Benzene; and,
- Carbon monoxide.

2.1.2 Target Values were also provided for an additional 5 pollutants. These include:

- Ozone;
- Arsenic;
- Cadmium;
- Nickel; and,
- Benzo(a)pyrene.

2.1.3 Part IV of the Environment Act (1995) requires UK government to produce a national Air Quality Strategy (AQS) which contains standards, objectives and measures for improving ambient air quality. The most recent AQS was produced by the Department for Environment, Food and Rural Affairs (DEFRA) and published in July 2007[1]. The AQS sets out Air Quality Objectives (AQOs) that are maximum ambient pollutant concentrations that are not to be exceeded either without exception or with a permitted number of exceedences over a specified timescale. These are generally in line with the AQLVs, although the requirements for the determination of compliance vary.

2.1.4 Table 1 presents the AQOs for pollutants considered within this assessment.

[1] The AQS for England, Scotland, Wales and Northern Ireland, DEFRA, 2007.

Table 1 Air Quality Objectives

Pollutant	Air Quality Objective	
	Concentration (μg/m³)	Averaging Period
PM_{10}	40	Annual mean
	50	24-hour mean, not to be exceeded on more than 35 occasions per annum

2.1.5 Table 2 summarises the advice provided in DEFRA guidance[2] on where the AQOs for pollutants considered within this report apply.

Table 2 Examples of Where the Air Quality Objectives Apply

Averaging Period	Objective Should Apply At	Objective Should Not Apply At
Annual mean	All locations where members of the public might be regularly exposed Building façades of residential properties, schools, hospitals, care homes etc.	Building façades of offices or other places of work where members of the public do not have regular access Hotels, unless people live there as their permanent residence Gardens of residential properties Kerbside sites (as opposed to locations at the building façade), or any other location where public exposure is expected to be short term
24-hour mean	All locations where the annual mean objective would apply, together with hotels Gardens of residential properties	Kerbside sites (as opposed to locations at the building façade), or any other location where public exposure is expected to be short term

2.2 Local Air Quality Management

2.2.1 Under Section 82 of the Environment Act (1995) (Part IV) Local Authorities (LAs) are required to periodically review and assess air quality within their area of jurisdiction under the system of Local Air Quality Management (LAQM). This review and assessment of air quality involves comparing present and likely future pollutant concentrations against the AQOs. If it is predicted that levels at locations of relevant exposure, as summarised in Table 2, are likely to be exceeded, the Local Authority is required to declare an Air

2 Local Air Quality Management Technical Guidance (TG16), DEFRA, 2018.

Quality Management Area (AQMA). For each AQMA the LA is required to produce an Air Quality Action Plan (AQAP), the objective of which is to reduce pollutant concentrations in pursuit of the AQOs.

2.3 National Planning Policy

2.3.1 The revised National Planning Policy Framework[3] (NPPF) was published in February 2019 and sets out the Government's planning policies for England and how these are expected to be applied.

2.3.2 Section 17 of the NPPF provides detailed advice for facilitating the sustainable use of minerals. This has been considered throughout the assessment.

2.4 National Planning Practice Guidance

2.4.1 The National Planning Practice Guidance (NPPG) web-based resource was launched by the Department for Communities and Local Government on 6th March 2014 and updated on 1st November 2019 to support the NPPF and make it more accessible.

2.4.2 Where dust emissions are likely to arise, mineral operators are expected to prepare a Dust Assessment, which should be undertaken by a competent person/organisation with acknowledged experience of undertaking this type of work.

2.4.3 There are five key stages to a dust assessment study:

- Establish baseline conditions of the existing dust climate around the site of the proposed operations;
- Identify site activities that could lead to dust emissions without mitigation;
- Identify site parameters which may increase potential impacts from dust;
- Recommend mitigation measures, including modification of site design; and,
- Make proposals to monitor and report dust emissions to ensure compliance with appropriate environmental standards and to enable an effective response to complaints.

3 NPPF, Ministry of Housing, Communities and Local Government, 2019.

2.4.4 These stages were reviewed and the relevant guidance considered as necessary throughout the undertaking of this assessment.

2.5 Local Planning Policy

2.5.1 RCC adopted the Minerals Core Strategy and Development Control Policies DPD[4] on 11th October 2010. The document sets out the Council's policies and proposals on a range of key issues that are likely to influence the strategy for minerals planning in Rutland over the planning period up to 2026.

2.5.2 The document contains a number of key policies regarding mineral developments within Rutland. These were considered as necessary throughout the assessment.

[4] Minerals Core Strategy and Development Control Policies, RCC, 2010.

3.0 METHODOLOGY

3.1 Introduction

3.1.1 The proposed development has the potential to cause impacts as a result of fugitive dust emissions from extraction, processing, re-contouring and transfer of materials. These have been assessed in accordance with the methodology outlined within the Institute of Air Quality Management (IAQM) document 'Guidance on the Assessment of Mineral Dust Impacts for Planning V1.1'[5].

3.2 Risk Assessment Overview

3.2.1 The Source-Pathway-Receptor concept presents the hypothetical relationship between the source of the pollutant, the pathway by which exposure might occur, and the receptor that could be adversely affected. The dust impact at relevant receptors was assessed using this concept.

3.2.2 The following two potential impacts may occur as a result of fugitive dust emissions:

- Disamenity impacts - Caused by larger particles that may be visible to the naked eye but are not thought to cause health effects. They may cause disamenity through soiling and staining when deposition occurs on window ledges, cars and laundry; and,
- Health impacts - Caused by PM_{10} which can remain suspended in air for long periods of time. Particles of this size are fine enough to be inhaled and therefore have the potential to cause health effects.

3.2.3 The methodology used for the assessment of disamenity and health impacts is detailed below.

[5] Guidance on the Assessment of Mineral Dust Impacts for Planning V1.1, IAQM, 2016.

Screening

3.2.4 The IAQM guidance[6] suggests the assessment procedure should be tailored according to the type of rock to be extracted from a minerals site. Should any human or ecological receptors be identified within 250m (soft rock) or 400m (hard rock) of dust generating activities, then a disamenity dust impact assessment is necessary. Additionally, if receptors are located within 1km of dust generating activities then assessment of PM_{10} concentrations, and therefore health impacts, should also be undertaken.

3.2.5 If sensitive receptors are not present within 1km of dust generating activities, then **negligible** impacts would be expected and further assessment is not necessary.

Site Characteristics and Baseline Conditions

3.2.6 The proposed development and surrounding area is described by taking into account the following factors:

- Extent of the site including boundary;
- Existing site operations, including currently consented workings;
- Scale and duration of operations, including phasing;
- Type and location of processing activities, including secondary processing (e.g. concrete batching);
- Mineral type and characteristics;
- Method of materials handling;
- Location of storage areas and stockpiles; and,
- Location and number of access routes and haul roads.

3.2.7 The assessment should also take into account the principal existing dust sources such as dust from existing mineral operations, agricultural activities and construction works.

6 Guidance on the Assessment of Mineral Dust Impacts for Planning V1.1, IAQM, 2016.

Disamenity Dust Assessment

3.2.8 The potential for disamenity from fugitive dust emissions is assessed by first allocating the site risk category based on two factors:

- The potential for residual source emissions; and,
- The source-pathway effectiveness.

3.2.9 These are outlined further below.

Estimation of Residual Source Emissions

3.2.10 The scale and nature of the works taking place at a development determines the level of residual dust emissions from fugitive sources. The following activities on mineral extraction sites are likely to have the greatest potential for dust emissions:

- Site preparation/restoration (including soil and overburden handling);
- Mineral extraction (including blasting);
- Material handling;
- On-site transportation;
- Mineral processing;
- Stockpiling/exposed surfaces; and,
- Off-site transportation.

3.2.11 Table 3 outlines the criteria used to categorise the residual source emissions for these activities.

Table 3 Magnitude of Residual Source Emissions

Magnitude	Activity	Criteria
Large	Site Preparation/ Restoration	• Working area greater than 10ha • Bunds greater than 8m in height and un-seeded • More than 100,000m^3 material movement • More than 10 heavy plant simultaneously active • Fine grained and friable material

Magnitude	Activity	Criteria
	Mineral Extraction	• Working area greater than 100ha • Drilling and blasting frequently used • Dusty mineral of small particle size and/or low moisture content • 1,000,000 tonnes per annum (tpa) extraction rate
	Materials Handling	• More than 10 loading plant within 50m of a site boundary • Transferring material of a high dust potential and/or low moisture content on dry, poorly surfaced ground
	On-Site Transportation	• More than 250 movements in any one day on unpaved surfaces of potentially dusty material
	Mineral Processing	• A mobile crusher and screener with a concrete batching plant on-site • Processing more than 1,000,000tpa of material with a high dust potential and/or low moisture content e.g. hard rock
	Stockpiles/ Exposed Surfaces	• Total exposed area more than 10ha in an area exposed to high wind speeds located less than 50m from the site boundary • Daily transfer of material with a high dust potential and/or low moisture content • Stockpile duration more than 12-months and quarry production more than 1,000,000tpa
	Off-Site Transportation	• More than 200 Heavy Duty Vehicle (HDV) movements in any one day on unsurfaced site access road less than 20m in length with no HDV cleaning facilities • No road sweeper available
Medium	Site Preparation/ Restoration	• Site working area between 2.5ha and 10ha • Bunds between 4m and 8m in height • Between 20,000m^3 and 100,000m^3 of material movement • Between 5 and 10 heavy plant simultaneously active
	Mineral Extraction	• Working area between 20ha and 100ha • Extraction rate between 200,000tpa and 1,000,000tpa
	Materials Handling	• 5 to 10 loading plant between 50m and 100m from the site boundary
	On-Site Transportation	• Between 100 and 250 movements in any one day
	Mineral Processing	• Processing between 200,000tpa and 1,000,000tpa of material

Magnitude	Activity	Criteria
	Stockpiles/ Exposed Surfaces	• Stockpiles with a total exposed area between 2.5ha and 10ha located 50m to 100m from the site boundary • Stockpile duration between 1-month and 12-months • Processing between 200,000tpa and 1,000,000tpa of material
	Off-Site Transportation	• Between 25 and 200 HDV movements in any one day
Small	Site Preparation/ Restoration	• Site working area less than 2.5ha • Bunds less than 4m in height and seeded • Less than 20,000m^3 material movement • Less than 5 heavy plant simultaneously active • Material with a high moisture content
	Mineral Extraction	• Working area less than 20ha • Hydraulic excavator • Coarse material and/or high moisture content • Less than 200,000tpa extraction rate
	Materials Handling	• Less than 5 plant items, more than 100m from a site boundary, within the quarry void or clean hardstanding, transferring material of low dust potential and/or high moisture content
	On-Site Transportation	• Covered conveyors for the majority of the on-site transportation of material • Less than 100 vehicle movements per day • Surface materials of compacted aggregate • Transport route less than 500m in length • Maximum speed of 15mph
	Mineral Processing	• Fixed screening plant with effective design in dust control • Processing less than 200,000tpa of material with a low dust potential and/or high moisture content e.g. wet sand and gravel
	Stockpiles/ Exposed Surfaces	• Stockpile duration of less than 1-month with a total area less than 2.5ha in an area of low wind speeds • Located more than 100m from the site boundary • Weekly transfers of material with a low dust potential and/or high moisture content • Quarry production less than 200,000tpa

Magnitude	Activity	Criteria
	Off-Site Transportation	• Less than 25 HDV movements per day • Paved surfaced site access road more than 50m in length • Effective HDV cleaning facilities and procedures • Road sweeper

3.2.12 The guidance recommends the consideration of the following additional factors when determining the source emission magnitude:

- The likely effectiveness of the dust control measures incorporated into the design of the submitted development scheme;
- Other mitigation measures applied to reduce or eliminate dust; and,
- The meteorological conditions that can promote or inhibit the raising of dust at source.

3.2.13 These factors were considered in the undertaking of the assessment.

Estimation of Pathway Effectiveness

3.2.14 The primary factor influencing the pathway effectiveness is the distance between the sensitive receptor and the dust sources. However, other factors can cause a higher or a lower category to be assigned. These factors include:

- Location of receptors relative to the site and prevailing wind direction; and,
- Topography, terrain and physical features.

3.2.15 Table 4 provides the criteria for determining the frequency of potentially dusty winds, based on twelve 30° wind direction sectors.

Table 4 Categorisation of Frequency of Potentially Dusty Winds

Frequency Category	Criteria
Infrequent	• Frequency of winds (>5m/s) from the direction of the dust source on dry days are less than 5%
Moderately Frequent	• Frequency of winds (>5m/s) from the direction of the dust source on dry days are between 5% and 12%

Frequency Category	Criteria
Frequent	• Frequency of winds (>5m/s) from the direction of the dust source on dry days are between 12% and 20%
Very Frequent	• Frequency of winds (>5m/s) from the direction of the dust source on dry days are greater than 20%

3.2.16 The criteria used to categorise the distance from each receptor to the source is provided in Table 5.

Table 5 Categorisation of Receptor Distance from Source

Category	Criteria	
	Hard Rock	Soft Rock
Distant	• Receptor is between 200m and 400m from the dust source	• Receptor is between 125m and 250m from the dust source
Intermediate	• Receptor is between 100m and 200m from the dust source	• Receptor is between 60m and 125m from the dust source
Close	• Receptor is less than 100m from the dust source	• Receptor is less than 60m from the dust source

3.2.17 The pathway effectiveness can be classified using the frequency of potentially dusty winds from Table 4 and the receptor distance from source from Table 5, as shown in Table 6.

Table 6 Pathway Effectiveness

Receptor Distance Category	Frequency of Potentially Dusty Winds			
	Infrequent	Moderately Frequent	Frequent	Very Frequent
Close	Ineffective	Moderately Effective	Highly Effective	Highly Effective
Intermediate	Ineffective	Moderately Effective	Moderately Effective	Highly Effective
Distant	Ineffective	Ineffective	Moderately Effective	Moderately Effective

Estimation of Dust Impact Risk

3.2.18 The residual source emission and source-pathway effectiveness were combined to predict the dust impact risk at individual receptor locations, as shown in Table 7.

Table 7 Estimation of Dust Impact Risk

Pathway Effectiveness	Residual Source Emissions		
	Small	Medium	Large
Highly Effective Pathway	Low	Medium	High
Moderately Effective Pathway	Negligible	Low	Medium
Ineffective Pathway	Negligible	Negligible	Low

3.2.19 The predicted dust impact risk was considered with the sensitivity of the receptor to provide the likely magnitude of effect. Table 8 outlines the criteria for determining sensitivity to dust soiling effects.

Table 8 Sensitivities of People to Dust Soiling Effects

Receptor Sensitivity	Criteria
High	• Users can reasonably expect enjoyment of a high level of amenity; or, • The appearance, aesthetics or value of their property would be diminished by soiling; and the people or property would reasonably be expected to be present continuously, or at least regularly for extended periods, as part of the normal pattern of use of the land • Indicative examples include dwellings, medium and long term car parks and showrooms
Medium	• Users would expect to enjoy a reasonable level of amenity, but would not be reasonably expect to enjoy the same level of amenity as their home; or, • The appearance, aesthetics or value of their property could be diminished by soiling; or, • The people or property wouldn't reasonably be expected to be present here continuously or regularly for extended periods as part of the normal pattern of use of the land • Indicative examples include parks, and places of work

Receptor Sensitivity	Criteria
Low	• The enjoyment of amenity would not reasonably be expected; or, • There is property that would not reasonably be expected to be diminished in appearance, aesthetics or value by soiling; or, • There is transient exposure, where the people or property would reasonably be expected to be present only for limited periods of time as part of the normal pattern of use of the land • Indicative examples include playing fields, farmland (unless commercially-sensitive horticultural), footpaths, short term car parks and roads

3.2.20 Table 9 outlines the criteria for determining the sensitivity of ecological receptors.

Table 9 Sensitivities of Receptors to Ecological Effects

Receptor Sensitivity	Criteria
High	• Locations with an international designation and the designated features may be affected by dust soiling • Locations where there is a community of a particularly dust sensitive species • Indicative examples include a Special Area of Conservation designed for acid heathlands adjacent to a minerals development releasing alkaline dusts
Medium	• Locations where there is a particularly important plant species, where its dust sensitivity is uncertain or unknown • Indicative examples include Sites of Special Scientific Interest or a local wildlife site with very specific sensitivities
Low	• Locations with a local designation where the features may be affected by dust deposition • Indicative examples include a Local Nature Reserve with dust sensitive features

3.2.21 The likely effect at each receptor was determined from the dust impact risk in Table 7 and the receptor sensitivity in Table 8 and Table 9, as shown in Table 10.

Table 10 Descriptors for Magnitude of Dust Effects

Risk	Receptor Sensitivity		
	Low	Medium	High
High	Slight	Moderate	Substantial
Medium	Negligible	Slight	Moderate

Risk	Receptor Sensitivity		
	Low	Medium	High
Low	Negligible	Negligible	Slight
Negligible	Negligible	Negligible	Negligible

3.2.22 An estimation of the overall effect from dust deposition on the surrounding area, taking into account the magnitude of effects at different receptors and the number that experience the different effects, is the last step in the assessment.

Human Health Receptor Assessment

3.2.23 If human health receptors are identified within 1km of the development, then consideration of potential impacts on PM_{10} concentrations should be provided. Table 11 outlines the criteria for determining receptor sensitivity.

Table 11 Sensitivities of Human Receptors to Changes in PM_{10} Concentrations

Receptor Sensitivity	Criteria
High	• Locations where members of the public are exposed over a long time period relevant to the AQO for PM_{10} • Indicative examples include residential properties, hospitals, schools and residential care homes
Medium	• Locations where people are occupationally exposed over a full working day • Indicative examples include offices, warehouses and industrial units
Low	• Locations where human exposure is transient • Indicative examples include public footpaths, playing fields, parks and shopping streets

3.2.24 Initial assessment should determine the existing background ambient concentration of PM_{10} in the vicinity of the site. If the annual mean concentration is less than 17μg/m^3, then the IAQM guidance[7] states that emissions from the development are unlikely to lead to exceedences of the relevant AQOs. As such, impacts are considered **negligible** and further assessment is not considered necessary.

7 Guidance on the assessment of Mineral Dust Impacts for Planning V1.1, IAQM, 2016.

3.2.25 Should screening of the relevant data indicate that existing background PM_{10} concentrations are higher than 17μg/m^3, a detailed assessment of potential changes in PM_{10} concentrations should be undertaken.

Overall Significance of Fugitive Dust Emission Effects

3.2.26 Subsequent to separately determining the significance of disamenity dust effects and effects on PM_{10} concentrations at human health receptors, the IAQM guidance[8] states that an assessment must reach a conclusion on the likely significance of the overall effect from fugitive dust emissions.

3.2.27 Where the overall effect is **moderate** or **substantial**, the effect is likely to be considered **significant**, whilst if the effect is **slight** or **negligible**, the impact is likely to be considered **not significant**. It should be noted that this is a binary judgement of either it is **significant** or it is **not significant**. This has been considered to determine the overall significance of potential dust effects associated with the facility.

3.2.28 The IAQM guidance recognises that assessment of dust requires some degree of professional judgement[9]. Methodologies such as those utilised within this report provide guidance for assessing potential impacts. However, professional judgement should be exercised in order to take account of the specific details which are unique to each development. This has been considered as necessary throughout the assessment. The IAQM also suggest that the assessor's qualifications and experience are detailed within a Dust Assessment. These are provided in Appendix 2.

8 Guidance on the Assessment of Mineral Dust Impacts for Planning V1.1, IAQM, 2016.

9 Guidance on the assessment of Mineral Dust Impacts for Planning V1.1, IAQM, 2016.

4.0 BASELINE

4.1 Introduction

4.1.1 Existing air quality conditions in the vicinity of the proposed development site were identified in order to provide a baseline for assessment. These are detailed in the following Sections.

4.2 Local Air Quality Management

4.2.1 As required by the Environment Act (1995), RCC has undertaken Review and Assessment of air quality within their area of jurisdiction. This process has indicated that concentrations of all pollutants considered within the AQS are currently below the relevant AQOs. As such, no AQMAs have been designated within RCC's administrative extents.

4.3 Air Quality Monitoring

4.3.1 Monitoring of PM_{10} concentrations is not undertaken within RCC's administrative extents. As such, this source of data was not considered further as part of the assessment.

4.4 Background Pollutant Concentrations

4.4.1 Predictions of background pollutant concentrations on a 1km by 1km grid basis have been produced by DEFRA for the entire of the UK to assist LAs in their Review and Assessment of air quality. The proposed development site is located in four grid squares. Data for these locations was downloaded from the DEFRA website[10] for the purpose of the assessment and is summarised in Table 12.

Table 12 Background PM_{10} Pollutant Concentration Predictions

NGR (m)	Predicted 2020 Background PM_{10} Pollutant Concentration (μg/m^3)
492500, 315500	15.57
492500, 314500	14.36

10 http://uk-air.defra.gov.uk/data/laqm-background-maps?year=2017.

NGR (m)	Predicted 2020 Background PM_{10} Pollutant Concentration (µg/m^3)
493500, 315500	14.58
493500, 314500	15.12

4.4.2 As shown in Table 12, predicted background PM_{10} concentrations are below the relevant AQO at the development site.

4.5 Site Characteristics

4.5.1 The characteristics of the proposed development and site location are summarised in Table 13.

Table 13 Site and Development Characteristics

Characteristics	Details
Site Extent	The quarry is located in a semi-rural setting to the north of the village of Greetham The proposed extension is located immediately west of the existing quarry void. Green Lane borders the site to the east with Thistleton Lane to the north. A residential property known as The White House lies adjacent to the north-eastern corner of the extension with further dwellings to the south-west within Greetham Agricultural land lies further afield of Great Lane and Thistleton Lane Access to the site will be established off Thistleton Lane, to the north of the site
Existing Site Operations	The current land use is agricultural fields
Scale and Duration	Based on the magnitude of the mineral reference and the anticipated annual output, the site will require up to 20 years of mineral extraction. Restoration works may take up to 5 years to complete. As such, the site is likely to be operational for up to 25 years, allowing time to establish site infrastructure and subsequent removal There will be five phases of excavation and restoration. Works will commence in Phase 1 along the eastern boundary of the site, move in an anti-clockwise direction and finish in the same location as part of Phase 5. Reference should be made to Figure 2 for a broad sequence of working
Type and Location of Processing Activities	All mineral processing operations will take place below the rim of the quarry The mineral will be processed using a mobile crusher and screens similar to those previously utilised at the adjacent quarry. The plant will be located on the quarry pavement and repositioned as workings progress at the site No processing will take place within the confines of Phase 4 or anywhere within 300m of Greetham Village. This material will be excavated and transported to the processing plant via dump trucks

Characteristics	Details
Mineral Type and Characteristics	The mineral to be extracted is limestone, classed as 'hard rock' within the IAQM guidance[11]
Production Rate	The mineral production rate will be circa 150,000tpa
Method of Working	The mineral will be extracted by a 360-degree tracked excavator which will load directly into the mobile crusher or dump trucks. Extraction will be phased to allow topsoil from each area to be placed in several stockpiles within the site. Reference should be made to Figure 3 for a map of the site features A rubber type loading shovel will be used to load processed limestone into road-borne Heavy Goods Vehicles (HGVs) before being removed from site
Methods of Material Handling	During site preparation and restoration, soil will only be handled when in a suitable condition, as determined by the 'worm test'. The soil will be extracted using a Dozer and HGV and loaded into dumper trucks to transport the material for use in the construction and development of environmental bunds throughout the site A 360-degree tracked excavator will be used to acquire the mineral and load directly into the mobile crusher or dump trucks
Location of Storage Areas and Stockpiles	Stockpiling will occur to the south and along the eastern and western boundaries, as shown in Figure 3
Location and Number of Access Routes and Haul Roads	It is proposed to establish a new site access onto Thistleton Lane, as shown in Figure 3 HGVs will pass through a wheel cleaning unit prior to leaving the site It is anticipated that 64 HGV movements will be generated daily when the site is operational (32 in and 32 out)
Reclamation and Restoration	Progressive restoration of the site will take place throughout the operation of the site. Material will be deposited at the site at a typical rate of 30,000tpa to 35,000tpa. This will be strictly inert

4.6 Meteorology

4.6.1 Unlike many other atmospheric pollutants, the generation and dispersion of fugitive dust is particularly dependent upon weather conditions. The prevailing meteorological conditions at any site will be dependent upon many factors including its location in relation to macroclimatic conditions as well as more site specific, microclimate conditions.

[11] Guidance on the Assessment of Mineral Dust Impacts for Planning V1.1, IAQM, 2016.

4.6.2 In order to consider prevailing conditions at the site, review of potential sources of meteorological data was undertaken. This indicated that three observation stations are located in the vicinity of the proposed scheme. These are summarised in Table 14, along with the relevant distance and direction from Greetham Quarry.

Table 14 Meteorological Stations

Station Name	Approximate Distance from Greetham Quarry (km)	Direction from Greetham Quarry
RAF Wittering	16.6	South-east
Cranwell	34.7	North-east
East Midlands Airport	48.2	North-west

4.6.3 Based on the distance between RAF Wittering and Greetham Quarry, it was considered that meteorological conditions were likely to be reasonably similar at the two locations and more representative than the other two potential data sources. As such, it was selected for use throughout the assessment. This approach was discussed and agreed with Andrew Woodhouse, Environmental Protection Officer at RCC, in June 2020[12].

4.6.4 Meteorological data from RAF Wittering over the period 1st January 2015 to 31st December 2019 (inclusive) was reviewed. The frequency of wind from the 12 sectors which best describe the directions which may cause impacts in the vicinity of the site is shown in Table 15. Reference should be made to Figure 4 for a proportional wind rose of the meteorological data.

Table 15 Wind Frequency Data

Wind Direction (°)	Total Frequency of Wind (%)	Total Frequency of Potentially Dusty Winds (%)[a]
345 - 15	5.3	1.4
15 - 45	6.7	2.4
45 - 75	5.7	2.2
75 - 105	2.6	0.5
105 - 135	3.9	0.5

12 Email correspondence with Andrew Woodhouse at RCC, 2020.

Wind Direction (°)	Total Frequency of Wind (%)	Total Frequency of Potentially Dusty Winds (%)[a]
135 - 165	5.6	0.9
165 - 195	8.5	3.2
195 - 225	13.8	8.1
225 - 255	16.3	10.1
255 - 285	12.7	5.8
285 - 315	8.7	3.6
315 - 345	5.8	1.5
Sub-Total	95.5	40.2
Calms	0.8	56.2
Missing/Incomplete	3.7	3.6

Note: (a) Winds with speed greater than 5m/s on days with no precipitation.

4.6.5 As shown in Table 15, the prevailing wind direction at the site is from the south-west.

4.6.6 All meteorological data used in the assessment was provided by Atmospheric Dispersion Modelling Ltd, which is an established distributor of meteorological data within the UK.

4.7 Sensitive Receptors

4.7.1 A sensitive receptor is defined as any location which may be affected by disamenity impacts and increases to particulate matter concentrations as a result of the operation of the quarry. These are detailed in the following Sections.

Dust Disamenity Sensitive Receptors

4.7.2 Positions sensitive to potential dust disamenity impacts were identified from a desk-top study of the area up to 400m from the dust generating activities. These are shown in Table 16.

Table 16 Fugitive Dust Disamenity Sensitive Receptors

Receptor		NGR (m)		Distance from Boundary (m)	Direction from Boundary	Sensitivity
		X	Y			
R1	48 Great Lane	492746.5	314708.0	90	South-west	High
R2	Greetham Community Centre	492759.7	314748.5	45	South-west	Low
R3	Sports Pitches, Great Lane	492763.4	314811.3	20	West	Low
R4	Rutland Caravan and Camping	492490.0	314965.8	300	West	High
R5	White House, Thistleton Lane	493225.3	315147.9	40	North-east	High
R6	24 Stretton Road	493114.9	314444.6	180	South-east	High
R7	Fir Tree Cottage, Stretton Road	493016.8	314448.4	330	South-east	High
R8	56 - 58 Main Street	492912.7	314418.0	340	South	High
R9	Manor Farm Poultry Units	492891.4	314691.2	75	South	Medium
R10	Holly Cottage Farm	492834.6	314566.1	205	South	High
R11	Shepherds Cottage	492514.4	314778.1	270	West	High

4.7.3 As shown in Table 16, there are several receptors in the vicinity of the site boundary. These are mainly located to the south-west within Greetham. Reference should be made to Figure 5 for a graphical representation of dust disamenity receptors.

4.7.4 There are no ecological receptors sensitive to dust deposition within 400m of the potential dust generating activities. As such, ecological impacts were not considered further in the context of the assessment.

Human Health Sensitive Receptors

4.7.5 The IAQM guidance[13] states that if the long term background PM_{10} concentration is less than 17µg/m^3 there is little risk that emissions from a minerals site would lead to exceedences of the relevant AQOs at locations of relevant exposure. As shown in Table 12, the maximum predicted background PM_{10} concentration in the vicinity of the site is 15.57µg/m^3 during 2020. This is below the relevant value. As such, the potential for emissions from the development to affect PM_{10} concentrations at human health receptors is predicted to be **negligible**, in accordance with the IAQM guidance[14]. Individual receptor locations have therefore not been considered further.

13 Guidance on the Assessment of Mineral Dust Impacts for Planning V1.1, IAQM, 2016.

14 Guidance on the Assessment of Mineral Dust Impacts for Planning V1.1, IAQM, 2016.

5.0 INHERENT MITIGATION

5.1.1 In order to control potential dust emissions to acceptable levels a number of mitigation measures are proposed for the development. Dust control has been considered by the applicant through good process and site design, as well as identification of good housekeeping procedures. The control methods to be employed at the proposed quarry extension are based on:

- Good operating and management practices to avoid emissions arising from extraction activities;
- Good process design to minimise emissions;
- Abatement or control to reduce dust emissions; and,
- Disrupting the emission pathway to sensitive receptors.

5.1.2 These can be summarised as follows:

- All departing road transport will be inspected for cleanliness prior to leaving the site;
- A wheel cleaning unit will be provided at the site entrance;
- Site access road will be inspected on a daily basis;
- A water bowser and road sweeper will be made available to spray the paved site access road and clean any deposits from the road as and when necessary;
- Existing hedgerows along the north-eastern and western boundaries will be subject to a management plan involving the planting up of any gaps and the introduction of hedgerow trees;
- A species rich hedgerow will be planted along the southern boundary of the site, along with a narrow strip of broadleaf trees during the first available planting season;
- No mineral processing will take place within the confines of Phase 4 or within 300m of Greetham village;
- Topsoils will only be stored in temporary stockpiles/mounds to a maximum height of 3m;
- Subsoil and soil-forming material storage mounds will be limited to 5m in height;
- Where topsoils will be stored for at least one growing season the storage mounds will be sown with grass in order to minimise the effects of wind blow;
- Stripped areas will be minimised as far as practicable and will be smoothed and compacted to seal the surface;

- During dry conditions, water will be applied as necessary to stabilise any loose bare surfaces;
- Daily inspections will be undertaken with an observation log completed to record any occurrences of dust or the onset of potential dust generating conditions;
- Drop heights of material from excavators to dump trucks and loading shovels will be minimised;
- Site staff will receive training on the potential dust sources and how to prevent emissions;
- All vehicles loaded with imported fill materials or processed mineral will be sheeted in order to minimise spillages or wind whipping of loose material; and,
- A fine spray mister or 'Dust Buster' will be employed during the mineral processing operations. These units spray a fine mist up to 30m and can be targeted to the working area.

5.1.3 During critical conditions, additional measures will also be taken by the site manager or other nominated person. These include the following:

- Additional speed limits on internal haul roads;
- Site activities will be moved to an alternative location until suitable weather conditions return;
- Additional bowsers will be used to dampen materials and road surfaces; and
- Cessation of operations causing dust generation.

5.1.4 Detailed control measures will be formalised within a Dust Management Plan (DMP) prior to any operations commencing. This will also detail dust monitoring proposals and can be secured by planning condition if required.

6.0 ASSESSMENT

6.1 Introduction

6.1.1 The proposed development has the potential to cause fugitive dust emissions associated with the extraction, processing, re-contouring and transfer of materials. Potential effects were determined using the assessment stages outlined below.

6.2 Screening

Dust Disamenity Sensitive Receptors

6.2.1 The desk-study undertaken to inform the baseline identified several dust disamenity sensitive receptors within 400m of the potential dust generating activities. As such, a detailed assessment of potential dust disamenity impacts was required. This is provided in Section 6.3.

Human Health Sensitive Receptors

6.2.2 As outlined in Section 4.7, potential effects of emissions from the development on PM_{10} concentrations at human health receptors are predicted to be **negligible**.

6.3 Risk Assessment

Estimation of Residual Source Emissions

6.3.1 Residual dust source emissions from the main operational activities were classified based on the criteria provided in Table 3. The results are summarised in Table 17. It should be noted that the residual source emissions for Site Preparation and Restoration activities have been split for each Phase to provide a representative assessment of impacts throughout the operation of the quarry.

Table 17 Residual Dust Source Emissions Classification

Activity		Residual Source Emission	Justification
Site Preparation and Restoration	Phase 1	Small	Site working area less than 2.5ha Only upper layer of material removed Less than 5 heavy plant simultaneously active
	Phase 2	Medium	Site working area between 2.5ha and 10ha Less than 5 heavy plant simultaneously active Existing hedgerows along the western boundaries will be planted to reduce any gaps
	Phase 3	Medium	Site working area between 2.5ha and 10ha Less than 5 heavy plant simultaneously active Existing hedgerows along the western boundaries will be planted to reduce any gaps
	Phase 4	Medium	Site working area between 2.5ha and 10ha Less than 5 heavy plant simultaneously active Existing hedgerows along the western boundaries will be planted to reduce any gaps A species rich hedgerow will be planted along the southern boundary of the site
	Phase 5	Small	Site working area less than 2.5ha Less than 5 heavy plant simultaneously active
Mineral Extraction		Small	Working area less than 20ha Production rate less than 200,000tpa
Materials Handling		Medium	Loading plant less than 50m from the site boundary Less than 5 plant items
On-site Transportation		Small	Maximum speed limits to be imposed Less than 100 HDV movements in any one day Transport route less than 500m in length
Mineral Processing		Small	No processing will take place within 300m of Greetham Village Processing less than 200,000tpa
Stockpiles and Exposed Surfaces		Small	Quarry production less than 200,000tpa Stockpiles located within 50m of site boundary Where topsoils are stored for at least one growing season, storage mounds will be sown with grass

Activity	Residual Source Emission	Justification
Off-site Transportation	Medium	Between 25 and 200 HDV movements in any one day Site access road less than 50m in length The access track into the site will be maintained throughout the life of the development Effective HDV cleaning facilities and procedures Road sweeper, if required

6.3.2 An assessment of each operational activity was undertaken in order to determine the significance of fugitive dust emission impacts at nearby sensitive receptors. The results are outlined in the following Sections. It should be noted that the potential impact as a result of operations was based on the distance between each receptor and the closest relevant source.

Site Preparation and Restoration

Estimation of Pathway Effectiveness

6.3.3 The pathway effectiveness at each sensitive receptor identified during the desk-top study was identified based on criteria provided in Table 4, Table 5 and Table 6. These are summarised in Table 18.

Table 18 Site Preparation and Restoration - Sensitive Receptor Pathway Effectiveness

Receptor	Closest Source	Frequency of Potentially Dusty Winds		Distance from Source		Pathway Effectiveness
		Proportion of Time Downwind of Source (%)	Category	Distance from Source (m)	Category	
R1	Phase 4	4.57	Infrequent	115	Intermediate	Ineffective
R2	Phase 4	4.57	Infrequent	75	Close	Ineffective
R3	Phase 4	5.11	Moderately Frequent	30	Close	Moderately Effective
R4	Phase 4	1.06	Infrequent	310	Distant	Ineffective
R5	Phase 1/5	15.85	Frequent	65	Close	Highly Effective

Receptor	Closest Source	Frequency of Potentially Dusty Winds		Distance from Source		Pathway Effectiveness
		Proportion of Time Downwind of Source (%)	Category	Distance from Source (m)	Category	
R6	Phase 4	5.16	Moderately Frequent	395	Distant	Ineffective
R7	Phase 4	1.54	Infrequent	350	Distant	Ineffective
R8	Phase 4	2.95	Infrequent	370	Distant	Ineffective
R9	Phase 4	2.95	Infrequent	90	Close	Ineffective
R10	Phase 4	1.41	Infrequent	230	Distant	Ineffective
R11	Phase 4	4.57	Infrequent	285	Distant	Ineffective

6.3.4 As shown in Table 18, the pathway effectiveness was determined to be **highly effective** at one position, **moderately effective** at one receptor and **ineffective** at nine locations.

Estimation of Disamenity Dust Impact Risk

6.3.5 The residual source emissions for the Phase closest to each receptor and the pathway effectiveness, shown in Table 18, were combined to predict the disamenity dust impact risk using the criteria provided in Table 7. These are summarised in Table 19.

Table 19 Site Preparation and Restoration - Disamenity Dust Impact Risk

Receptor		Residual Source Emission	Pathway Effectiveness	Dust Impact Risk
R1	48 Great Lane	Medium	Ineffective	Negligible
R2	Greetham Community Centre	Medium	Ineffective	Negligible
R3	Sports Pitches, Great Lane	Medium	Moderately Effective	Low
R4	Rutland Caravan and Camping	Medium	Ineffective	Negligible
R5	White House, Thistleton Lane	Small	Highly Effective	Low
R6	24 Stretton Road	Medium	Ineffective	Negligible

Receptor		Residual Source Emission	Pathway Effectiveness	Dust Impact Risk
R7	Fir Tree Cottage, Stretton Road	Medium	Ineffective	Negligible
R8	56 - 58 Main Street	Medium	Ineffective	Negligible
R9	Manor Farm Poultry Units	Medium	Ineffective	Negligible
R10	Holly Cottage Farm	Medium	Ineffective	Negligible
R11	Shepherds Cottage	Medium	Ineffective	Negligible

6.3.6 As shown in Table 19, the disamenity dust impact risk was determined as **low** at two locations and **negligible** at nine positions.

6.3.7 The disamenity dust impact risk was considered with the sensitivity of the receptor to predict the magnitude of effect. These are summarised in Table 20.

Table 20 Site Preparation and Restoration - Prediction of Disamenity Dust Effects at Sensitive Receptors

Receptor		Dust Impact Risk	Receptor Sensitivity	Magnitude of Dust Effect
R1	48 Great Lane	Negligible	High	Negligible
R2	Greetham Community Centre	Negligible	Low	Negligible
R3	Sports Pitches, Great Lane	Low	Low	Negligible
R4	Rutland Caravan and Camping	Negligible	High	Negligible
R5	White House, Thistleton Lane	Low	High	Slight
R6	24 Stretton Road	Negligible	High	Negligible
R7	Fir Tree Cottage, Stretton Road	Negligible	High	Negligible
R8	56 - 58 Main Street	Negligible	High	Negligible
R9	Manor Farm Poultry Units	Negligible	Medium	Negligible
R10	Holly Cottage Farm	Negligible	High	Negligible
R11	Shepherds Cottage	Negligible	High	Negligible

6.3.8 As shown in Table 20, the magnitude of disamenity dust effects was predicted to be **slight** at one position and **negligible** at ten locations.

Mineral Extraction

Estimation of Pathway Effectiveness

6.3.9 The pathway effectiveness at each sensitive receptor identified during the desk-top study was identified based on criteria provided in Table 4, Table 5 and Table 6. These are summarised in Table 21.

Table 21 Mineral Extraction - Sensitive Receptor Pathway Effectiveness

Receptor	Source	Frequency of Potentially Dusty Winds		Distance from Source		Pathway Effectiveness
		Proportion of Time Downwind of Source (%)	Category	Distance from Source (m)	Category	
R1	Phase 4	4.57	Infrequent	115	Intermediate	Ineffective
R2	Phase 4	4.57	Infrequent	75	Close	Ineffective
R3	Phase 4	5.11	Moderately Frequent	30	Close	Moderately Effective
R4	Phase 4	1.06	Infrequent	310	Distant	Ineffective
R5	Phase 1/5	15.85	Frequent	65	Close	Highly Effective
R6	Phase 4	5.16	Moderately Frequent	395	Distant	Ineffective
R7	Phase 4	1.54	Infrequent	350	Distant	Ineffective
R8	Phase 4	2.95	Infrequent	370	Distant	Ineffective
R9	Phase 4	2.95	Infrequent	90	Close	Ineffective
R10	Phase 4	1.41	Infrequent	230	Distant	Ineffective
R11	Phase 4	4.57	Infrequent	285	Distant	Ineffective

6.3.10 As shown in Table 21, the pathway effectiveness was determined to be **ineffective** at nine locations, **moderately effective** at one receptor and **highly effective** at one position.

Estimation of Disamenity Dust Impact Risk

6.3.11 The residual source emissions, shown in Table 17, and the pathway effectiveness, shown in Table 21, were combined to predict the disamenity dust impact risk using the criteria provided in Table 7. These are summarised in Table 22.

Table 22 Mineral Extraction - Disamenity Dust Impact Risk

Receptor		Residual Source Emission	Pathway Effectiveness	Dust Impact Risk
R1	48 Great Lane	Small	Ineffective	Negligible
R2	Greetham Community Centre	Small	Ineffective	Negligible
R3	Sports Pitches, Great Lane	Small	Moderately Effective	Negligible
R4	Rutland Caravan and Camping	Small	Ineffective	Negligible
R5	White House, Thistleton Lane	Small	Highly Effective	Low
R6	24 Stretton Road	Small	Ineffective	Negligible
R7	Fir Tree Cottage, Stretton Road	Small	Ineffective	Negligible
R8	56 - 58 Main Street	Small	Ineffective	Negligible
R9	Manor Farm Poultry Units	Small	Ineffective	Negligible
R10	Holly Cottage Farm	Small	Ineffective	Negligible
R11	Shepherds Cottage	Small	Ineffective	Negligible

6.3.12 As shown in Table 22, the disamenity dust impact risk was determined as **low** at one location and **negligible** at ten positions.

6.3.13 The disamenity dust impact risk was considered with the sensitivity of the receptor to predict the magnitude of effect. These are summarised in Table 23.

Table 23 Mineral Extraction - Prediction of Disamenity Dust Effects at Sensitive Receptors

Receptor		Dust Impact Risk	Receptor Sensitivity	Magnitude of Dust Effect
R1	48 Great Lane	Negligible	High	Negligible
R2	Greetham Community Centre	Negligible	Low	Negligible
R3	Sports Pitches, Great Lane	Negligible	Low	Negligible
R4	Rutland Caravan and Camping	Negligible	High	Negligible
R5	White House, Thistleton Lane	Low	High	Slight
R6	24 Stretton Road	Negligible	High	Negligible
R7	Fir Tree Cottage, Stretton Road	Negligible	High	Negligible
R8	56 - 58 Main Street	Negligible	High	Negligible
R9	Manor Farm Poultry Units	Negligible	Medium	Negligible
R10	Holly Cottage Farm	Negligible	High	Negligible
R11	Shepherds Cottage	Negligible	High	Negligible

6.3.14 As shown in Table 23, the magnitude of disamenity dust effects was predicted to be **slight** at one position and **negligible** at ten locations.

Material Handling

<u>Estimation of Pathway Effectiveness</u>

6.3.15 The pathway effectiveness at each sensitive receptor identified during the desk-top study was identified based on criteria provided in Table 4, Table 5 and Table 6. These are summarised in Table 24.

Table 24 Material Handling - Sensitive Receptor Pathway Effectiveness

Receptor	Source	Frequency of Potentially Dusty Winds		Distance from Source		Pathway Effectiveness
		Proportion of Time Downwind of Source (%)	Category	Distance from Source (m)	Category	
R1	Phase 4	4.57	Infrequent	115	Intermediate	Ineffective
R2	Phase 4	4.57	Infrequent	75	Close	Ineffective
R3	Phase 4	5.11	Moderately Frequent	30	Close	Moderately Effective
R4	Phase 4	1.06	Infrequent	310	Distant	Ineffective
R5	Phase 1/5	15.85	Frequent	65	Close	Highly Effective
R6	Phase 4	5.16	Infrequent	395	Distant	Ineffective
R7	Phase 4	1.54	Infrequent	350	Distant	Ineffective
R8	Phase 4	2.95	Infrequent	370	Distant	Ineffective
R9	Phase 4	2.95	Infrequent	90	Close	Ineffective
R10	Phase 4	1.41	Infrequent	230	Distant	Ineffective
R11	Phase 4	4.57	Moderate	285	Distant	Ineffective

6.3.16 As shown in Table 24, the pathway effectiveness was determined to be **ineffective** at nine locations, **moderately effective** at one receptor and **highly effective** at one position.

Estimation of Disamenity Dust Impact Risk

6.3.17 The residual source emissions, shown in Table 17, and the pathway effectiveness, shown in Table 24, were combined to predict the disamenity dust impact risk using the criteria provided in Table 7. These are summarised in Table 25.

Table 25 Material Handling - Disamenity Dust Impact Risk

Receptor		Maximum Residual Source Emission	Pathway Effectiveness	Dust Impact Risk
R1	48 Great Lane	Medium	Ineffective	Negligible
R2	Greetham Community Centre	Medium	Ineffective	Negligible
R3	Sports Pitches, Great Lane	Medium	Moderately Effective	Low
R4	Rutland Caravan and Camping	Medium	Ineffective	Negligible
R5	White House, Thistleton Lane	Medium	Highly Effective	Medium
R6	24 Stretton Road	Medium	Ineffective	Negligible
R7	Fir Tree Cottage, Stretton Road	Medium	Ineffective	Negligible
R8	56 - 58 Main Street	Medium	Ineffective	Negligible
R9	Manor Farm Poultry Units	Medium	Ineffective	Negligible
R10	Holly Cottage Farm	Medium	Ineffective	Negligible
R11	Shepherds Cottage	Medium	Ineffective	Negligible

6.3.18 As shown in Table 25, the disamenity dust impact risk was determined as **medium** at one receptor, **low** at one location and **negligible** at nine positions.

6.3.19 The disamenity dust impact risk was considered with the sensitivity of the receptor to predict the magnitude of effect. These are summarised in Table 26.

Table 26 Material Handling - Prediction of Disamenity Dust Effects at Sensitive Receptors

Receptor		Dust Impact Risk	Receptor Sensitivity	Magnitude of Dust Effect
R1	48 Great Lane	Negligible	High	Negligible
R2	Greetham Community Centre	Negligible	Low	Negligible
R3	Sports Pitches, Great Lane	Low	Low	Negligible

Receptor		Dust Impact Risk	Receptor Sensitivity	Magnitude of Dust Effect
R4	Rutland Caravan and Camping	Negligible	High	Negligible
R5	White House, Thistleton Lane	Medium	High	Moderate
R6	24 Stretton Road	Negligible	High	Negligible
R7	Fir Tree Cottage, Stretton Road	Negligible	High	Negligible
R8	56 - 58 Main Street	Negligible	High	Negligible
R9	Manor Farm Poultry Units	Negligible	Medium	Negligible
R10	Holly Cottage Farm	Negligible	High	Negligible
R11	Shepherds Cottage	Negligible	High	Negligible

6.3.20 As shown in Table 26, the magnitude of disamenity dust effects was predicted to be **moderate** at one position and **negligible** at ten locations.

On-Site Transportation

Estimation of Pathway Effectiveness

6.3.21 The pathway effectiveness at each sensitive receptor identified during the desk-top study was identified based on criteria provided in Table 4, Table 5 and Table 6. These are summarised in Table 27.

Table 27 On-Site Transportation - Sensitive Receptor Pathway Effectiveness

Receptor	Source	Frequency of Potentially Dusty Winds		Distance from Source		Pathway Effectiveness
		Proportion of Time Downwind of Source (%)	Category	Distance from Source (m)	Category	
R1	Phase 4	4.57	Infrequent	115	Intermediate	Ineffective
R2	Phase 4	4.57	Infrequent	75	Close	Ineffective

Receptor	Source	Frequency of Potentially Dusty Winds		Distance from Source		Pathway Effectiveness
		Proportion of Time Downwind of Source (%)	Category	Distance from Source (m)	Category	
R3	Phase 4	5.11	Moderately Frequent	30	Close	Moderately Effective
R4	Phase 4	1.06	Infrequent	310	Distant	Ineffective
R5	Phase 1/5	15.85	Frequent	65	Close	Highly Effective
R6	Phase 4	5.16	Infrequent	395	Distant	Ineffective
R7	Phase 4	1.54	Infrequent	350	Distant	Ineffective
R8	Phase 4	2.95	Infrequent	370	Distant	Ineffective
R9	Phase 4	2.95	Infrequent	90	Close	Ineffective
R10	Phase 4	1.41	Infrequent	230	Distant	Ineffective
R11	Phase 4	4.57	Moderate	285	Distant	Ineffective

6.3.22 As shown in Table 27, the pathway effectiveness was determined to be **ineffective** at nine locations, **moderately effective** at one receptor and **highly effective** at one position.

Estimation of Disamenity Dust Impact Risk

6.3.23 The residual source emissions, shown in Table 17, and the pathway effectiveness, shown in Table 27, were combined to predict the disamenity dust impact risk using the criteria provided in Table 7. These are summarised in Table 28.

Table 28 On-Site Transportation - Disamenity Dust Impact Risk

Receptor		Residual Source Emission	Pathway Effectiveness	Dust Impact Risk
R1	48 Great Lane	Small	Ineffective	Negligible
R2	Greetham Community Centre	Small	Ineffective	Negligible
R3	Sports Pitches, Great Lane	Small	Moderately Effective	Negligible

Receptor		Residual Source Emission	Pathway Effectiveness	Dust Impact Risk
R4	Rutland Caravan and Camping	Small	Ineffective	Negligible
R5	White House, Thistleton Lane	Small	Highly Effective	Low
R6	24 Stretton Road	Small	Ineffective	Negligible
R7	Fir Tree Cottage, Stretton Road	Small	Ineffective	Negligible
R8	56 - 58 Main Street	Small	Ineffective	Negligible
R9	Manor Farm Poultry Units	Small	Ineffective	Negligible
R10	Holly Cottage Farm	Small	Ineffective	Negligible
R11	Shepherds Cottage	Small	Ineffective	Negligible

6.3.24 As shown in Table 28, the disamenity dust impact risk was determined as **low** at one location and **negligible** at ten positions.

6.3.25 The disamenity dust impact risk was considered with the sensitivity of the receptor to predict the magnitude of effect. These are summarised in Table 29.

Table 29 On-Site Transportation - Prediction of Disamenity Dust Effects at Sensitive Receptors

Receptor		Dust Impact Risk	Receptor Sensitivity	Magnitude of Dust Effect
R1	48 Great Lane	Negligible	High	Negligible
R2	Greetham Community Centre	Negligible	Low	Negligible
R3	Sports Pitches, Great Lane	Negligible	Low	Negligible
R4	Rutland Caravan and Camping	Negligible	High	Negligible
R5	White House, Thistleton Lane	Low	High	Slight
R6	24 Stretton Road	Negligible	High	Negligible
R7	Fir Tree Cottage, Stretton Road	Negligible	High	Negligible

Receptor		Dust Impact Risk	Receptor Sensitivity	Magnitude of Dust Effect
R8	56 - 58 Main Street	Negligible	High	Negligible
R9	Manor Farm Poultry Units	Negligible	Medium	Negligible
R10	Holly Cottage Farm	Negligible	High	Negligible
R11	Shepherds Cottage	Negligible	High	Negligible

6.3.26 As shown in Table 29, the magnitude of disamenity dust effects was predicted to be **slight** at one position and **negligible** at ten locations.

Mineral Processing

Estimation of Pathway Effectiveness

6.3.27 The pathway effectiveness at each sensitive receptor identified during the desk-top study was identified based on criteria provided in Table 4, Table 5 and Table 6. These are summarised in Table 30. As discussed in Section 4.5, mineral processing activities will not take place with 300m of Greetham Village. As such, all sensitive receptors located within Greetham Village have been assessed at a distance of 300m.

Table 30 Mineral Processing - Sensitive Receptor Pathway Effectiveness

Receptor	Source	Frequency of Potentially Dusty Winds		Distance from Source		Pathway Effectiveness
		Proportion of Time Downwind of Source (%)	Category	Distance from Source (m)	Category	
R1	N/A	4.57	Infrequent	300	Distant	Ineffective
R2	N/A	4.57	Infrequent	300	Distant	Ineffective
R3	N/A	5.11	Moderately Frequent	300	Distant	Ineffective
R4	Phase 3	4.57	Infrequent	330	Distant	Ineffective
R5	Phase 1/5	15.85	Frequent	65	Close	Highly Effective
R6	N/A	5.16	Infrequent	300	Distant	Ineffective

Receptor	Source	Frequency of Potentially Dusty Winds		Distance from Source		Pathway Effectiveness
		Proportion of Time Downwind of Source (%)	Category	Distance from Source (m)	Category	
R7	N/A	1.54	Infrequent	300	Distant	Ineffective
R8	N/A	2.95	Infrequent	300	Distant	Ineffective
R9	N/A	2.95	Infrequent	300	Distant	Ineffective
R10	N/A	1.41	Infrequent	300	Distant	Ineffective
R11	N/A	4.57	Moderate	300	Distant	Ineffective

6.3.28 As shown in Table 30, the pathway effectiveness was determined to be **ineffective** at ten locations and **highly effective** at one position.

Estimation of Disamenity Dust Impact Risk

6.3.29 The residual source emissions, shown in Table 17, and the pathway effectiveness, shown in Table 30, were combined to predict the disamenity dust impact risk using the criteria provided in Table 7. These are summarised in Table 31.

Table 31 Mineral Processing - Disamenity Dust Impact Risk

Receptor		Residual Source Emission	Pathway Effectiveness	Dust Impact Risk
R1	48 Great Lane	Small	Ineffective	Negligible
R2	Greetham Community Centre	Small	Ineffective	Negligible
R3	Sports Pitches, Great Lane	Small	Ineffective	Negligible
R4	Rutland Caravan and Camping	Small	Ineffective	Negligible
R5	White House, Thistleton Lane	Small	Highly Effective	Low
R6	24 Stretton Road	Small	Ineffective	Negligible
R7	Fir Tree Cottage, Stretton Road	Small	Ineffective	Negligible

Receptor		Residual Source Emission	Pathway Effectiveness	Dust Impact Risk
R8	56 - 58 Main Street	Small	Ineffective	Negligible
R9	Manor Farm Poultry Units	Small	Ineffective	Negligible
R10	Holly Cottage Farm	Small	Ineffective	Negligible
R11	Shepherds Cottage	Small	Ineffective	Negligible

6.3.30 As shown in Table 31, the disamenity dust impact risk was determined as **low** at one location and **negligible** at ten positions.

6.3.31 The disamenity dust impact risk was considered with the sensitivity of the receptor to predict the magnitude of effect. These are summarised in Table 32.

Table 32 Mineral Processing - Prediction of Disamenity Dust Effects at Sensitive Receptors

Receptor		Dust Impact Risk	Receptor Sensitivity	Magnitude of Dust Effect
R1	48 Great Lane	Negligible	High	Negligible
R2	Greetham Community Centre	Negligible	Low	Negligible
R3	Sports Pitches, Great Lane	Negligible	Low	Negligible
R4	Rutland Caravan and Camping	Negligible	High	Negligible
R5	White House, Thistleton Lane	Low	High	Slight
R6	24 Stretton Road	Negligible	High	Negligible
R7	Fir Tree Cottage, Stretton Road	Negligible	High	Negligible
R8	56 - 58 Main Street	Negligible	High	Negligible
R9	Manor Farm Poultry Units	Negligible	Medium	Negligible
R10	Holly Cottage Farm	Negligible	High	Negligible
R11	Shepherds Cottage	Negligible	High	Negligible

6.3.32 As shown in Table 32, the magnitude of disamenity dust effects was predicted to be **slight** at one position and **negligible** at ten locations.

Stockpiles/Exposed Surfaces

Estimation of Pathway Effectiveness

6.3.33 The pathway effectiveness at each sensitive receptor identified during the desk-top study was identified based on criteria provided in Table 4, Table 5 and Table 6. These are summarised in Table 33.

Table 33 Stockpiles/Exposed Surfaces - Sensitive Receptor Pathway Effectiveness

Receptor	Source	Frequency of Potentially Dusty Winds		Distance from Source		Pathway Effectiveness
		Proportion of Time Downwind of Source (%)	Category	Distance from Source (m)	Category	
R1	T2	4.57	Infrequent	100	Intermediate	Ineffective
R2	T2	4.57	Infrequent	60	Close	Ineffective
R3	T2	5.98	Moderately Frequent	20	Close	Moderately Effective
R4	T2	3.27	Infrequent	300	Distant	Ineffective
R5	S2	18.16	Frequent	65	Close	Highly Effective
R6	T2	1.54	Infrequent	395	Distant	Ineffective
R7	T2	1.54	Infrequent	350	Distant	Ineffective
R8	T2	2.95	Infrequent	370	Distant	Ineffective
R9	T2	2.95	Infrequent	90	Close	Ineffective
R10	T2	1.41	Infrequent	75	Close	Ineffective
R11	T2	5.11	Moderate	210	Distant	Ineffective

6.3.34 As shown in Table 33, the pathway effectiveness was determined to be **ineffective** at nine locations, **moderately effective** at one receptor and **highly effective** at one position.

Estimation of Disamenity Dust Impact Risk

6.3.35 The residual source emissions, shown in Table 17, and the pathway effectiveness, shown in Table 33, were combined to predict the disamenity dust impact risk using the criteria provided in Table 7. These are summarised in Table 34.

Table 34 Stockpiles/Exposed Surfaces - Disamenity Dust Impact Risk

Receptor		Residual Source Emission	Pathway Effectiveness	Dust Impact Risk
R1	48 Great Lane	Small	Ineffective	Negligible
R2	Greetham Community Centre	Small	Ineffective	Negligible
R3	Sports Pitches, Great Lane	Small	Moderately Effective	Negligible
R4	Rutland Caravan and Camping	Small	Ineffective	Negligible
R5	White House, Thistleton Lane	Small	Highly Effective	Low
R6	24 Stretton Road	Small	Ineffective	Negligible
R7	Fir Tree Cottage, Stretton Road	Small	Ineffective	Negligible
R8	56 - 58 Main Street	Small	Ineffective	Negligible
R9	Manor Farm Poultry Units	Small	Ineffective	Negligible
R10	Holly Cottage Farm	Small	Ineffective	Negligible
R11	Shepherds Cottage	Small	Ineffective	Negligible

6.3.36 As shown in Table 34, the disamenity dust impact risk was determined as **low** at one location and **negligible** at ten positions.

6.3.37 The disamenity dust impact risk was considered with the sensitivity of the receptor to predict the magnitude of effect. These are summarised in Table 35.

Table 35 Stockpiles/Exposed Surfaces - Prediction of Disamenity Dust Effects at Sensitive Receptors

Receptor		Dust Impact Risk	Receptor Sensitivity	Magnitude of Dust Effect
R1	48 Great Lane	Negligible	High	Negligible
R2	Greetham Community Centre	Negligible	Low	Negligible
R3	Sports Pitches, Great Lane	Negligible	Low	Negligible
R4	Rutland Caravan and Camping	Negligible	High	Negligible
R5	White House, Thistleton Lane	Low	High	Slight
R6	24 Stretton Road	Negligible	High	Negligible
R7	Fir Tree Cottage, Stretton Road	Negligible	High	Negligible
R8	56 - 58 Main Street	Negligible	High	Negligible
R9	Manor Farm Poultry Units	Negligible	Medium	Negligible
R10	Holly Cottage Farm	Negligible	High	Negligible
R11	Shepherds Cottage	Negligible	High	Negligible

6.3.38 As shown in Table 35, the magnitude of disamenity dust effects was predicted to be **slight** at one position and **negligible** at ten locations.

Off-Site Transportation

Estimation of Pathway Effectiveness

6.3.39 The pathway effectiveness at each sensitive receptor identified during the desk-top study was identified based on criteria provided in Table 4, Table 5 and Table 6. These are summarised in Table 36.

Table 36 Off-Site Transportation - Sensitive Receptor Pathway Effectiveness

Receptor	Source	Frequency of Potentially Dusty Winds		Distance from Source		Pathway Effectiveness
		Proportion of Time Downwind of Source (%)	Category	Distance from Source (m)	Category	
R1	Phase 4	4.57	Infrequent	120	Intermediate	Ineffective
R2	Phase 4	4.57	Infrequent	85	Close	Ineffective
R3	Phase 4	5.98	Moderately Frequent	40	Close	Moderately Effective
R4	Phase 4	3.27	Infrequent	310	Distant	Ineffective
R5	Site Access	9.38	Moderate	110	Intermediate	Moderately Effective
R6	Phase 4	1.54	Infrequent	395	Distant	Ineffective
R7	Phase 4	1.54	Infrequent	355	Distant	Ineffective
R8	Phase 4	2.95	Infrequent	370	Distant	Ineffective
R9	Phase 4	2.95	Infrequent	95	Close	Ineffective
R10	Phase 4	1.41	Infrequent	230	Distant	Ineffective
R11	Phase 4	5.11	Moderate	290	Distant	Ineffective

6.3.40 As shown in Table 36, the pathway effectiveness was determined to be **ineffective** at nine locations and **moderately effective** at two positions.

Estimation of Disamenity Dust Impact Risk

6.3.41 The residual source emissions, shown in Table 17, and the pathway effectiveness, shown in Table 36, were combined to predict the disamenity dust impact risk using the criteria provided in Table 7. These are summarised in Table 37.

Table 37 Off-Site Transportation - Disamenity Dust Impact Risk

Receptor		Residual Source Emission	Pathway Effectiveness	Dust Impact Risk
R1	48 Great Lane	Medium	Ineffective	Negligible

Receptor		Residual Source Emission	Pathway Effectiveness	Dust Impact Risk
R2	Greetham Community Centre	Medium	Ineffective	Negligible
R3	Sports Pitches, Great Lane	Medium	Moderately Effective	Low
R4	Rutland Caravan and Camping	Medium	Ineffective	Negligible
R5	White House, Thistleton Lane	Medium	Moderately Effective	Low
R6	24 Stretton Road	Medium	Ineffective	Negligible
R7	Fir Tree Cottage, Stretton Road	Medium	Ineffective	Negligible
R8	56 - 58 Main Street	Medium	Ineffective	Negligible
R9	Manor Farm Poultry Units	Medium	Ineffective	Negligible
R10	Holly Cottage Farm	Medium	Ineffective	Negligible
R11	Shepherds Cottage	Medium	Ineffective	Negligible

6.3.42 As shown in Table 37, the disamenity dust impact risk was determined as **low** at two locations and **negligible** at nine positions.

6.3.43 The disamenity dust impact risk was considered with the sensitivity of the receptor to predict the magnitude of effect. These are summarised in Table 38.

Table 38 Off-Site Transportation - Prediction of Disamenity Dust Effects at Sensitive Receptors

Receptor		Dust Impact Risk	Receptor Sensitivity	Magnitude of Dust Effect
R1	48 Great Lane	Negligible	High	Negligible
R2	Greetham Community Centre	Negligible	Low	Negligible
R3	Sports Pitches, Great Lane	Low	Low	Negligible
R4	Rutland Caravan and Camping	Negligible	High	Negligible
R5	White House, Thistleton Lane	Low	High	Slight

Receptor		Dust Impact Risk	Receptor Sensitivity	Magnitude of Dust Effect
R6	24 Stretton Road	Negligible	High	Negligible
R7	Fir Tree Cottage, Stretton Road	Negligible	High	Negligible
R8	56 - 58 Main Street	Negligible	High	Negligible
R9	Manor Farm Poultry Units	Negligible	Medium	Negligible
R10	Holly Cottage Farm	Negligible	High	Negligible
R11	Shepherds Cottage	Negligible	High	Negligible

6.3.44 As shown in Table 38, the magnitude of disamenity dust effects was predicted to be **slight** at one position and **negligible** at ten locations.

Summary of Fugitive Dust Emissions Disamenity Effects

6.3.45 Predicted disamenity dust impacts as a result of operational activities range between **moderate** and **negligible** at the identified receptor locations. These are summarised in Table 39.

Table 39 Magnitude of Disamenity Dust Effect Summary

Receptor	Magnitude of Disamenity Dust Effect						
	Site Prep.	Mineral Extraction	Material Handling	On-site Transport	Mineral Processing	Stockpiles	Off-Site Transport
R1	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible
R2	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible
R3	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible
R4	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible
R5	**Slight**	**Slight**	**Moderate**	**Slight**	**Slight**	**Slight**	**Slight**
R6	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible
R7	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible
R8	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible
R9	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible

Receptor	Magnitude of Disamenity Dust Effect						
	Site Prep.	Mineral Extraction	Material Handling	On-site Transport	Mineral Processing	Stockpiles	Off-Site Transport
R10	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible
R11	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible

6.3.46 As shown in Table 39, impacts were only predicted at receptor R5. As such, additional mitigation techniques have been provided in Section 7.0 to ensure that operational works do not cause unacceptable disamenity effects at this location.

7.0 MITIGATION AND RESIDUAL EFFECTS

7.1 Mitigation

7.1.1 Disamenity dust impacts were predicted to be **moderate** at the R5 - White House, Thistleton Lane receptor as a result of material handling activities during Phase 1 and 5. As such, the following mitigation measures will be incorporated into the development to ensure that operational works will not cause any unacceptable impacts at this location:

- Solid fencing to be constructed along the north-east border of the site, adjacent to White House; and,
- Phased mitigation during specific meteorological conditions when material handling takes place within 110m of the site boundary during Phase 1 and 5. This is discussed further below.

7.1.2 The IAQM guidance[15] states that where extracted minerals are classed as hard rock (limestone), a receptor located between 100m and 200m from a dust source will be classed as 'intermediate' in terms of distance from the potential emission. Receptor R5 is located 65m from Phase 1 and 5, as shown in Table 24, and as such is classed as 'close'. However, operational works during Phase 1 and 5 will only take place for a limited amount of time within 100m of the receptor. A large portion of the land allocated for Phase 1 and 5 is over 100m south-west of R5 - White House, thereby changing the IAQM distance classification of the receptor to intermediate and lowering the impact to **slight**. It is therefore recommended that a 110m control zone be provided in the north-east corner of the site where Phase 1 and 5 of the development will take place. An additional 10m has been included to ensure sufficient distance between the relevant receptor and any potential dust source.

7.1.3 Should strong north-easterly winds (above 5m/s) arise during Phase 1 and 5 works, sequential mitigation should take place within the 110m control zone. This should comprise of initial visual inspection by the site manager to determine the intensity of any emissions, should this indicate significant releases then dampening using a water bowser should be undertaken to reduce dust. If this process is not sufficient, operations should cease until suitable meteorological conditions return.

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15 Guidance on the Assessment of Mineral Dust Impacts for Planning V1.1, IAQM, 2016.

7.1.4 Reference should be made to Figure 6 for a map showing the location of both the fence and control zone during Phase 1 and 5. The implementation of these measures should reduce any potential impacts to **slight** and provide suitable mitigation against operational works at this sensitive location.

7.2 Residual Effects

7.2.1 The predicted annual mean background PM_{10} concentrations was less than 17µg/m^3 at the proposed site during 2020. As such, potential effects of fugitive dust emissions from the development on PM_{10} levels at human health receptors were predicted to be **negligible**.

7.2.2 Initial assessment indicated that predicted dust disamenity impacts ranged between **moderate** and **negligible** at sensitive locations within the vicinity of the site. As such, additional mitigation was specified for inclusion within the proposed scheme. Following implementation of the relevant measures, residual impacts were predicted to range between **slight** and **negligible**. The overall dust disamenity effect is therefore considered to be **slight**, as a worst-case.

7.2.3 The IAQM guidance[16] states that only if the impact is **moderate** or **substantial**, the effect is considered **significant**. Given that potential effects on PM_{10} levels at human health receptors were predicted to be **negligible** and the overall dust disamenity effect was predicted to be **slight**, the overall effect of fugitive dust emissions from the proposals is considered to be **not significant**.

[16] Guidance on the Assessment of Mineral Dust Impacts for Planning V1.1, IAQM, 2016.

8.0 CONCLUSION

8.1.1 Redmore Environmental Ltd was commissioned by Mick George Ltd to undertake a Dust Assessment in support of the extension of Greetham Quarry, Rutland.

8.1.2 The proposals have the potential to cause adverse impacts at sensitive locations as a result of fugitive dust emissions associated with operations at the quarry. As such, a Dust Assessment was undertaken in accordance with the IAQM 'Guidance on the Assessment of Mineral Dust Impacts for Planning V1.1'[17] in order to determine baseline conditions and assess potential effects as a result of the scheme.

8.1.3 Potential impacts on PM_{10} concentrations at human health receptors associated with fugitive dust emissions from the site were assessed against the criteria provided within the IAQM[18] guidance document. This indicated the impact was predicted to be **negligible.**

8.1.4 Potential dust disamenity impacts were assessed in accordance with the IAQM methodology and considered receptor location and sensitivity, the activities to be undertaken on site, proposed mitigation measures and prevailing meteorological conditions. The disamenity dust impact risk was determined as **moderate** at one location and **negligible** at the remaining positions. As such, additional mitigation measures were specified for inclusion as part of the proposed scheme. This reduced the predicted dust impact risk to **slight** at the relevant receptor. The overall dust disamenity effect is therefore considered to be **slight**, as a worst-case.

8.1.5 Following consideration of the relevant issues, air quality impacts as a result of fugitive dust emissions from the development were predicted to be **not significant**, in accordance with the IAQM guidance, subject to the inclusion of the specified mitigation.

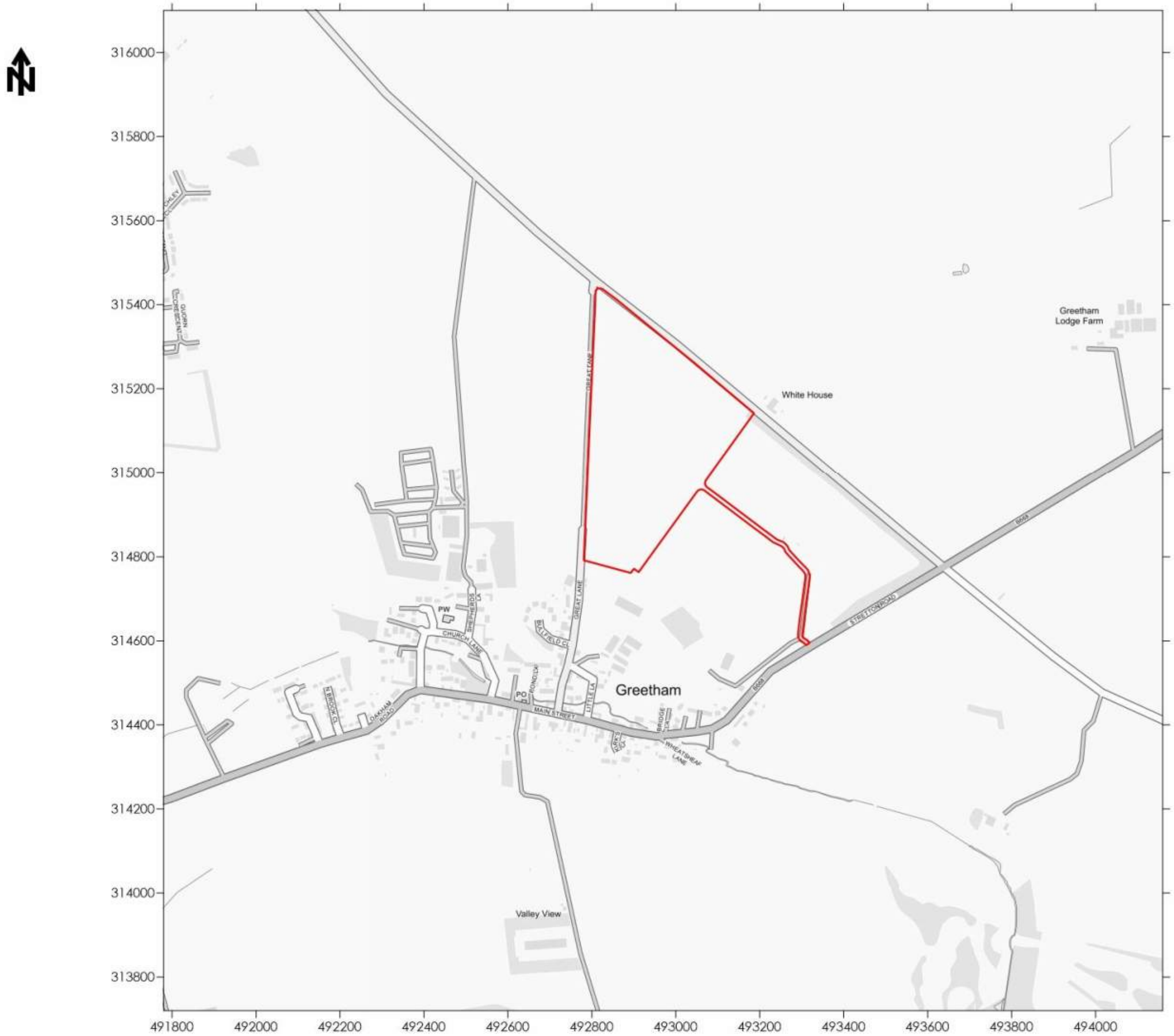
17 Guidance on the Assessment of Mineral Dust Impacts for Planning V1.1, IAQM, 2016.

18 Guidance on the Assessment of Mineral Dust Impacts for Planning V1.1, IAQM, 2016.

9.0 ABBREVIATIONS

AQAP	Air Quality Action Plan
AQLV	Air Quality Limit Value
AQMA	Air Quality Management Area
AQO	Air Quality Objective
AQS	Air Quality Strategy
DEFRA	Department for Environment, Food and Rural Affairs
DMP	Dust Management Plan
HDV	Heavy Duty Vehicle
HGV	Heavy Goods Vehicles
IAQM	Institute of Air Quality Management
LA	Local Authority
LAQM	Local Air Quality Management
NGR	National Grid Reference
PM_{10}	Particulate matter with an aerodynamic diameter of less than 10µm
RCC	Rutland County Council
tpa	Tonnes per annum

Figures



Legend

Site Boundary

Title

Figure 1 - Site Location

Project

Dust Assessment
Greetham Quarry

Project Reference

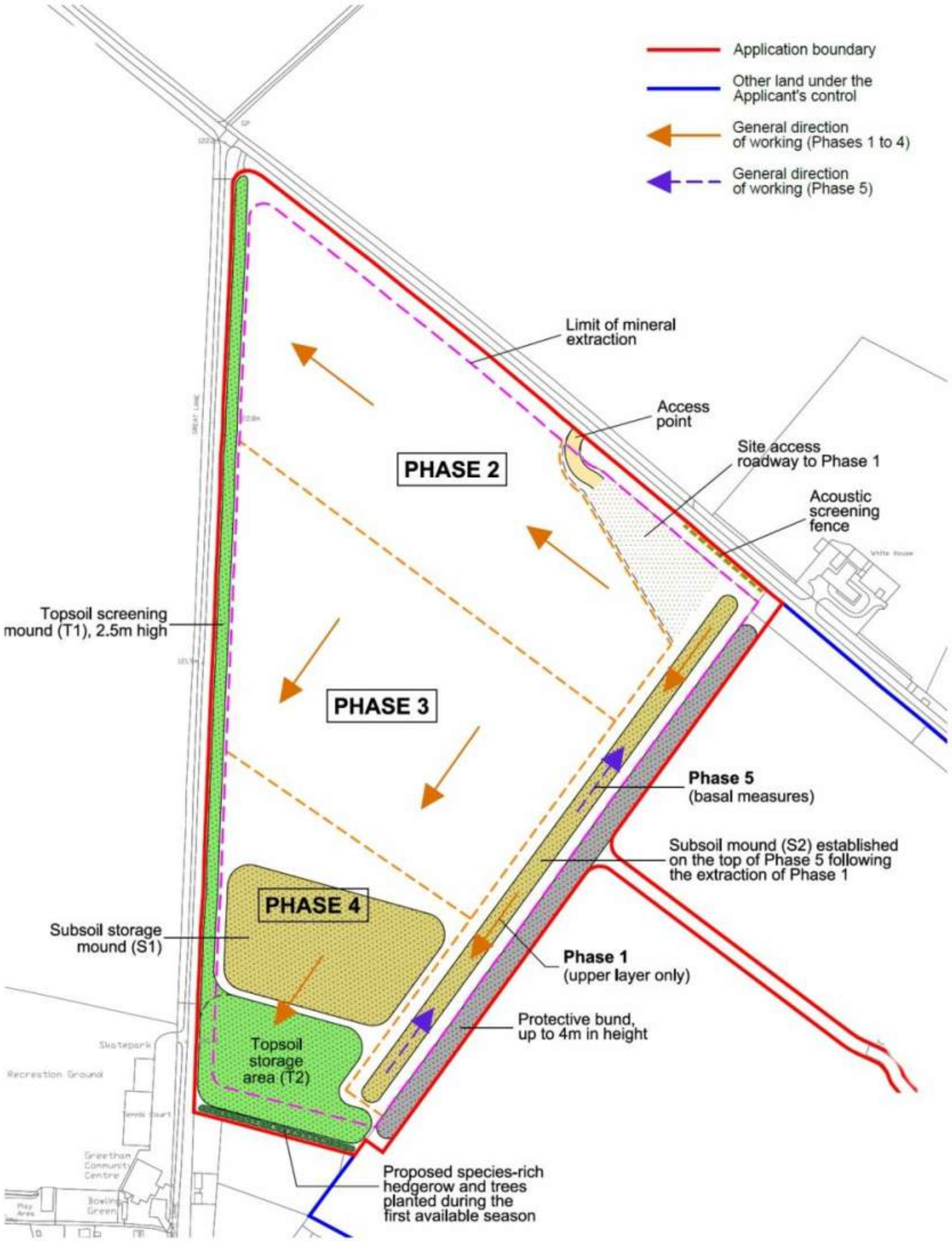
3682

Client

Mick George Ltd

Redmore environmental

www.red-env.co.uk | 0161 7060075



Legend

Title
Figure 2 - Site Layout Plan

Project
Dust Assessment
Greetham Quarry

Project Reference
3682

Client
Mick George Ltd

Redmore environmental

www.red-env.co.uk | 0161 7060075

Legend

Site Boundary

Working Area

Subsoil/Topsoil Storage Mounds

Site Access

Bund

Title

Figure 3 - Site Features

Project

Dust Assessment
Greetham Quarry

Project Reference

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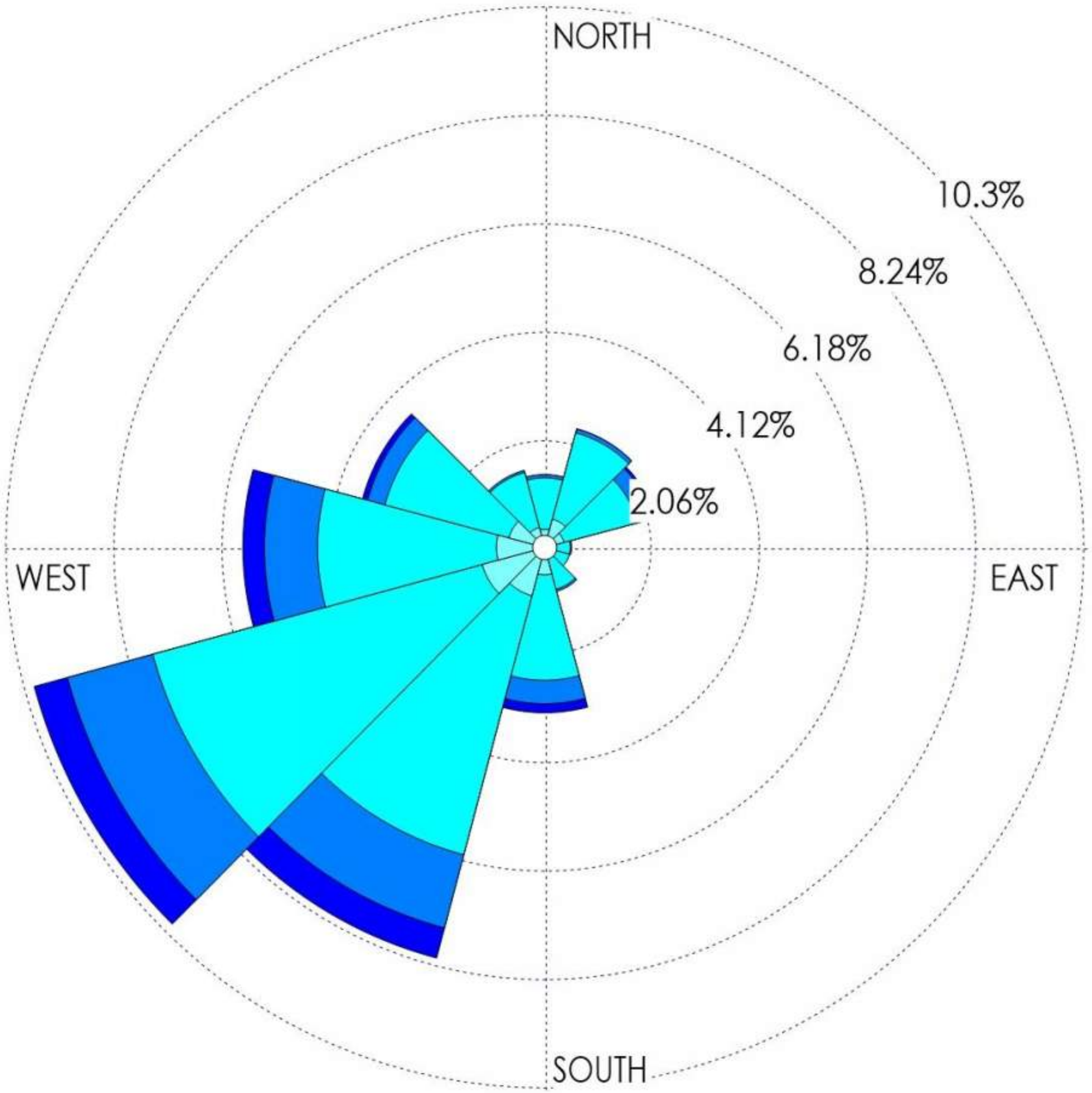

Legend

WIND SPEED (m/s)

- >= 11.10
- 8.80 - 11.10
- 5.70 - 8.80
- 5.00 - 5.70

Calms: 56.22%

Title

Figure 4 - Proportional Wind Rose of 2015-2019 RAF Wittering Meteorological Data

Project

Dust Assessment
Greetham Quarry

Project Reference

3682

Client

Mick George Ltd

Redmore environmental

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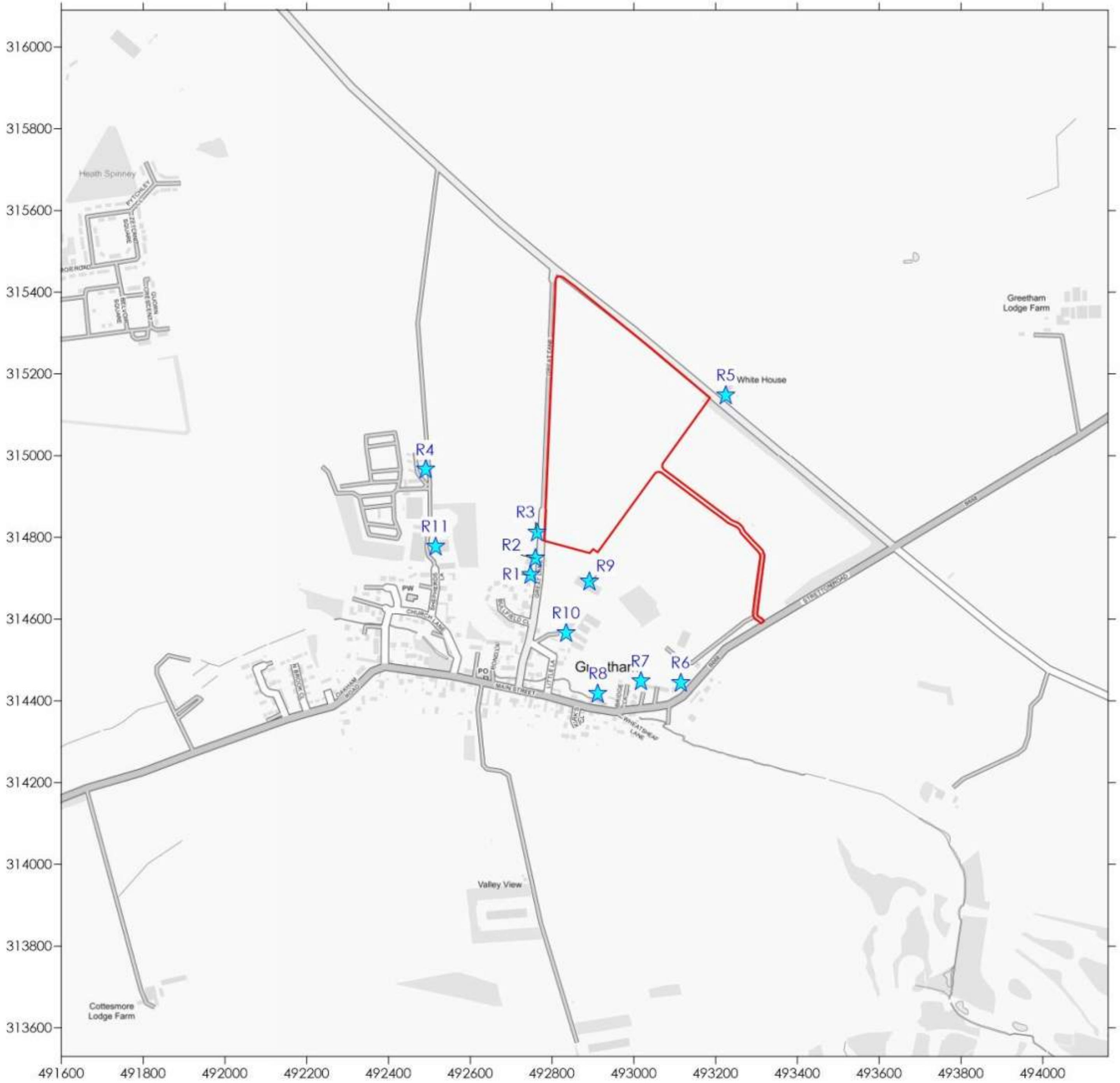

Legend

Site Boundary

Receptor

Title

Figure 5 - Fugitive Dust Disamenity Sensitive Receptor Locations

Project

Dust Assessment
Greetham Quarry

Project Reference

3682

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Title

Figure 6 - Mitigation Features and Dust Disamenity Sensitive Receptor

Project

Dust Assessment
Greetham Quarry

Project Reference

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Appendix 1 - Curricula Vitae

JETHRO REDMORE

Director

BEng (Hons), MSc, MIAQM, MIEnvSc, PIEMA, CEnv

KEY EXPERIENCE:

Jethro is a Chartered Environmentalist and Director of Redmore Environmental with specialist experience in the air quality and odour sectors. His key capabilities include:

- Production and management of Air Quality, Dust and Odour Assessments for a wide-range of clients from the retail, residential, infrastructure, commercial and industrial sectors.
- Production and co-ordination of Environmental Permit applications for a variety of industrial sectors.
- Detailed dispersion modelling of road vehicle and industrial emissions using ADMS-Roads, ADMS-5, AERMOD-PRIME and BREEZE-ROADS. Studies have included impact assessment of ground level pollutant and odour concentrations and assessment of suitability of development sites for proposed end-use.
- Project management and co-ordination of Environmental Impact Assessments and scoping reports for developments throughout the UK.
- Provision of expert witness services at Planning Inquiries.
- Design and project management of pollutant monitoring campaigns.
- Co-ordination and management of large-scale multi-disciplinary projects and submissions.
- Provision of expert advice to local government and international environmental bodies, as well as involvement in production of industry guidance.

SELECT PROJECTS SUMMARY:

Industrial

Shanks Waste Management - Odour Assessments of two waste management facilities to support Environmental Permit Applications.

Tatweer Petroleum - dispersion modelling of Bahrain oil field.

Doha South Sewage Treatment Works - AQA for works extension in Qatar.

IRIS Environmental Appraisal Report Reviews, Isle of Man Government - odour assessment reviews.

Lankem, Greater Manchester - Environmental Permit Application for chemical manufacturing plant.

Newport Docks Bulk Drying, Pelleting and CHP Facility - air quality EIA for gas CHP.

Springshades, Leicester - Environmental Permit Variation Application for textile manufacturing plant.

Valspar, Chester - Odour Assessment and production of Odour Management Plan for a paint manufacturing plant in response to neighbour complaints.

Agrivert - dispersion modelling of odour and CHP emissions from numerous AD plants.

James Cropper Paper Mill, Cumbria - air quality EIA, Environmental Permit Variation and Human Health Risk Assessment for new biomass boiler adjacent to SSSI.

Rigg Approach, Leyton - Air Quality Assessment in support of waste transfer site.

Lynchford Lane Waste Transfer Station - biomass facility energy recovery plant.

Barnes Wallis Heat and Power, Cobham - biomass facility adjacent to AQMA.

Residential

Wood St Mill, Bury - residential development adjacent to scrap metal yard.

Hyams Lane, Holbrook - Odour Assessment to support residential development adjacent to sewage works.

North Wharf Gardens, London - peer review of EIA undertaken for large residential development.

Loxford Road, Alford - Air Quality EIA for residential development, included consideration of impacts from associated package sewage works

Elephant and Castle Leisure Centre - baseline AQA for redevelopment.

Carr Lodge, Doncaster - EIA for large residential development.

Queensland Road, Highbury - residential scheme including CHP.

Bicester Ecotown - dispersion modelling of energy centre.

Castleford Growth Delivery Plan - baseline air quality constraints assessment for town redevelopment.

York St, Bury - residential development adjacent to AQMA.

Temple Point Leeds - residential development adjacent to M1.

Commercial and Retail

Etihad Stadium - Air Quality EIA for the extension to the capacity of the Etihad Stadium, Manchester.

Wakefield College - redevelopment of city centre campus in AQMA.

Manchester Airport Cargo Shed - commercial development.

Manchester Airport Apron Extension - EIA including aircraft emission modelling.

National Youth Theatre, Islington - redevelopment to provide new arts space and accommodation.

EMILY PEARS-RYDING

Senior Air Quality Consultant

BSc (Hons), MIAQM AMIEnvSc

Tel: 0161 706 0075 | Email: emily.pears-ryding@red-env.co.uk

KEY EXPERIENCE:

Emily is a Senior Environmental Consultant with specialist experience in the air quality sector. Her key capabilities include:

- Production of Air Quality Assessments in accordance with Department for Environment, Food and Rural Affairs (DEFRA) methodologies for a range of residential, commercial and industrial sectors.
- Detailed dispersion modelling of road vehicle exhaust emissions using ADMS-Roads. Studies have included assessment of road traffic exhaust emissions on sensitive receptors and exposure of new residents to poor air quality.
- Assessment of construction dust impacts from a range of development sizes.
- Assessment of fugitive dust impacts from a range of mineral extraction developments.
- Assessment of petrol stations to address benzene concentrations and their impact on adjacent developments.
- Production of air quality mitigation strategies specifically tailored to address issues at individual sites.
- Definition of baseline air quality and identification of sensitive areas across the UK.
- Odour surveys to assess amenity and suitability of sites for potential future development for residential use.

SELECT PROJECTS SUMMARY:

Station Road, West Drayton

Air Quality Assessment for a change of use from office units to a hotel in an Air Quality Management Area (AQMA). Concerns were raised regarding the exposure of future occupants to poor air quality due to road traffic emissions and an adjacent petrol station. Detailed dispersion modelling was undertaken using ADMS-roads to assess PM_{10} and NO_2 concentrations across the site. Results revealed that pollution levels were below the air quality standards across the development. A qualitative assessment of benzene emissions took place to assess the potential effects of the petrol station. A screening process indicated that due to the change of use of the existing building into a hotel, future occupants would not be exposed for periods long enough to affect human health.

Holloway Lane, Harmondsworth

Air Quality Assessment in support of a mineral extraction site located within an AQMA. The proposals involved a processing and concrete plant which had the potential to cause air quality impacts as a result of fugitive dust emissions. An assessment was undertaken and revealed that the use of good practice control measures would provide suitable mitigation for the development.

Dulcote Quarry, Wells

Air Quality Assessment for the redevelopment of Dulcote Quarry to provide a Food Manufacturing Campus. An assessment of road traffic emissions, fugitive dust emissions and odour was undertaken. Impacts of road traffic emissions and fugitive dust on sensitive receptors were negligible at all locations. The risk of potential odour effects was also determined to be negligible.

Queens Road, London

Air Quality and Odour Assessments in support of residential development in an AQMA. Dispersion modelling took place at several different heights reflective of residential units within the development. Predicted concentrations of NO_2 were found to exceed air quality criteria from ground to second floor level. As such, mitigation was specified for the affected units to ensure future residents would not be exposed to poor air quality.

Anerley Road, Penge

Air Quality Assessment for a residential scheme located in an AQMA. Due to the location of the site at the foot of a hill, detailed calculations took place to take account of the gradient which would increase the amount of emissions produced by road traffic. Results revealed that NO_2 concentrations exceeded air quality criteria across part of the development fronting Anerley Road. Mechanical ventilation was specified in the appropriate units within the development as a form of mitigation.

The Crescent, Salford

Air Quality Assessment for the redevelopment of the former Salford Police Headquarters to residential properties. Using sensitive receptors, located in areas where increased road traffic may affect NO_2 concentrations, a comparison was made between overall concentrations with and without the development in place. Results revealed pollutant concentrations were below the relevant standards across the site and impacts associated with the development were not significant.