Dust and Air Quality Innovation and Expertise

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Quarterly non-technical summary: Mountsorrel Quarry particulate matter, dust and weather monitoring

Date range: **Quarter 1 2025 (20 November 2024 – 27 March 2025)**

Date Report Issued: **15 May 2025**

Introduction

Every month, the results of dust and particulate matter monitoring at Mountsorrel Quarry are compiled and summarised in 'compliance' reports, which are then shared with Charnwood Borough Council (CBC), Leicestershire County Council (LCC) and the Environment Agency. The monitoring results are discussed in more detail during Technical Liaison meetings held with CBC and LCC on a quarterly basis.

Once the quarterly liaison meetings are held, we prepare a cover letter to provide a non-technical overview of the most recent three months of finalised reports. This letter covers the period from 20 November 2024 – 27 March 2025.

An explanation of how and why dust and air quality are measured at Mountsorrel Quarry is available here.

Changes to reporting

Following consultation with CBC and LCC, the format and focus of the compliance reports have been revised. In addition to typically presenting PM_{10} and $PM_{2.5}$ data from both on-site monitors, an increased emphasis is being placed on the frequency of short-term PM_{10} alerts sent to quarry management, the investigations triggered by the alerts and the changes to on-site processes to minimise dust.

The general air quality of the surrounding area is now assessed by comparing the particulate matter concentrations recorded by CBC at the southern end of Hawcliffe Road against the relevant Air Quality Objectives (AQOs). Data from a Defra Automatic Urban and Rural Network (AURN) monitoring station at Leicester University are also presented for reference.

Weather summary

December was generally mixed, with generally cold - mild temperatures and typical levels of rainfall, with a slight increase in temperatures towards the end of December. Temperatures dropped at the start of January with several freezing temperatures observed as well as high levels of rainfall. The temperature picked up in mid-January, before dropping again in February. February was generally wet, with temperatures increasing in late February and into March. March was generally dry, with little precipitation recorded at the beginning of the month.

During December, February and March, winds were predominantly blowing from the south, meaning that there may have been the potential for dust to propagate in a northernly direction. However, during January winds were predominantly coming from the southwest, meaning that dust may have blown to the northeast during this period.

Deposited dust

During this period, deposited dust levels were below the site-specific threshold level at all locations. This is likely due to the cool and wet weather experienced through the winter months.

The frequency of threshold level exceedances over the previous quarter is shown for each monitoring location in Figure 1 using pie charts.

Figure 1: Frequency of high dust levels, Quarter 1 2025

Particulate Matter

On-site $PM_{2.5}$

$PM_{2.5}$ concentrations at Quorn house had a period average of 5.3 µg/m^3, with the $PM_{2.5}$ concentrations at Hawcliffe Road being higher with a period average of 8.2 µg/m^3 (Figure 2).

Figure 2: $PM_{2.5}$ monitoring summary, Quarter 1 2025

Off-site $PM_{2.5}$

As shown in Figure 3, the period average $PM_{2.5}$ concentrations recorded at the CBC monitoring station at the southern end of Hawcliffe Road was 11.3 µg/m^3 or 94% of the AQO (12 µg/m^3 as an annual average). The period average concentration at the Leicester University AURN monitoring station was similar, at 11.0 µg/m^3 or 91% of AQO.

The broad similarity of period average $PM_{2.5}$ concentrations recorded at the three locations show that the site was not a significant source of $PM_{2.5}$ during this period.

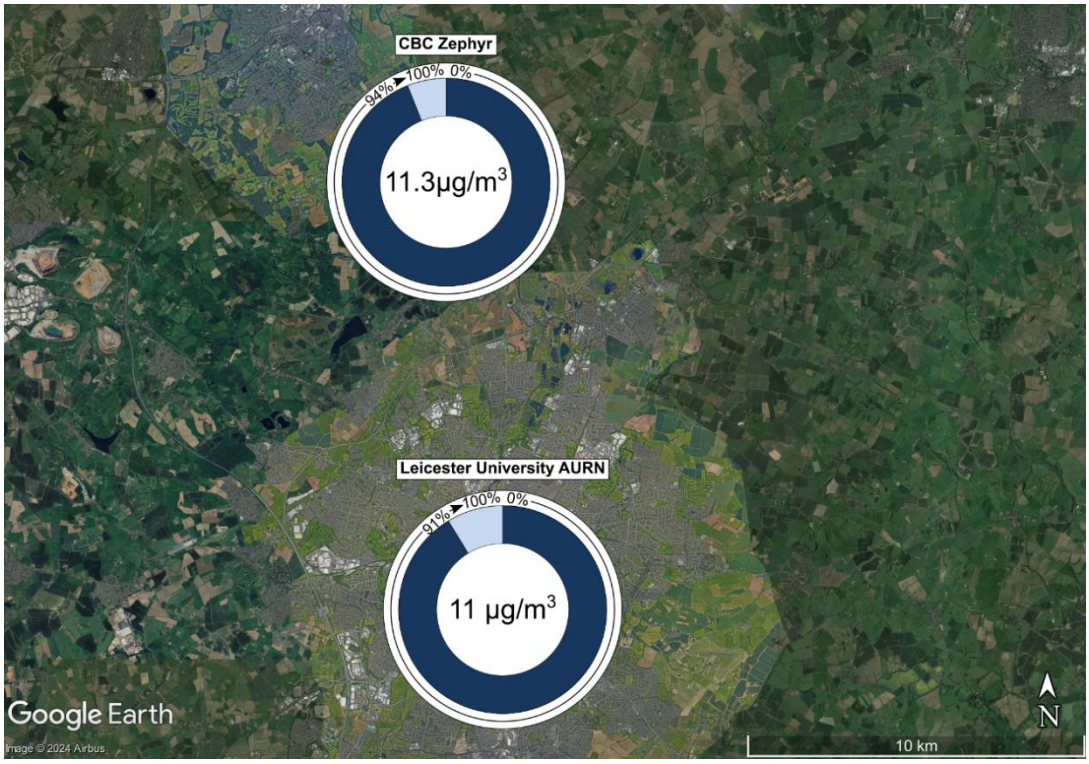

Figure 3: $PM_{2.5}$ monitoring summary, CBC and AURN monitoring stations, Quarter 1 2025

On-site PM_{10}

PM_{10} concentrations recorded at Quorn House had a period average of 6.3 µg/m^3 for this period, with the period average being 13.3 µg/m^3 at Hawcliffe Road.

The short-term PM_{10} trigger level (125 µg/m^3 over a 15-minute period) was exceeded on several occasions during this quarter; details of the resulting investigations can be found in the attached reports.

Figure 4: PM_{10} monitoring summary, Quarter 1 2025

Off-site PM_{10}

As shown in Figure 5, PM_{10} concentrations recorded at the CBC monitoring station at the southern end of Hawcliffe Road was 18.1 µg/m^3 or 45% of the AQO (40 µg/m^3). Concentrations at the Leicester University AURN monitoring station was similar, at 15.1 µg/m^3 or 38% of the AQO.

Three days with an average PM_{10} concentration above 50 µg/m^3 were recorded from the CBC Zephyr and one daily exceedance from the AURN monitoring station were recorded during this quarter.

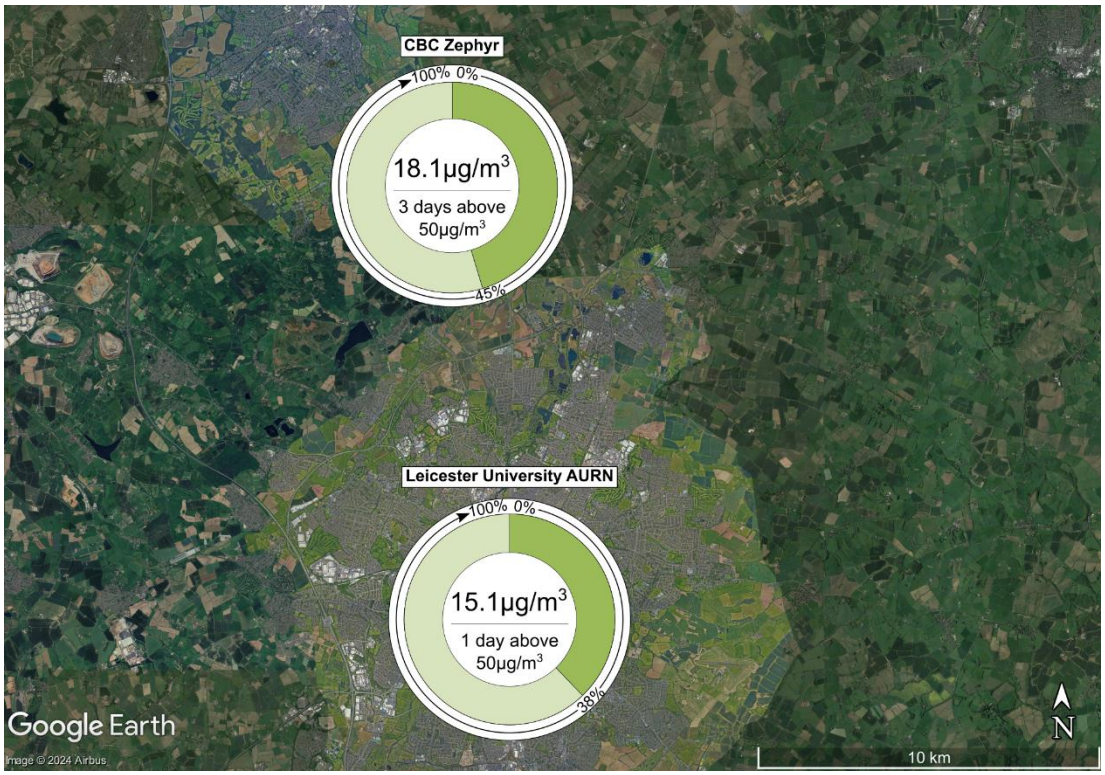

Figure 5: PM_{10} monitoring summary, CBC and AURN monitoring stations, Quarter 1 2025

Complaints

Between 20 November 2024 and 27 March 2025, a total of four dust complaints were received by the quarry.

DustScanAQ
May 2025

Dust, Particulate Matter and Weather Monitoring Report: December 2024

Mountsorrel Quarry

February, 2025

Tarmac

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Document Control Sheet

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This report may include data obtained from trusted third-party consultants/laboratories that have been supplied to us in good faith. Whilst we do everything we can to ensure the quality of all the data we use, we cannot be held responsible for the accuracy or integrity of third-party data.

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1 Introduction

Mountsorrel Quarry has a comprehensive Dust Management and Monitoring Plan (DMMP). The DMMP was developed in 2011 and is subject to regular review and revision, in consultation between Tarmac and the local regulators (Leicestershire County Council (LCC) and Charnwood Borough Council (CBC)).

The DMMP is enacted through the quarry Site Improvement Plan (SIP). The SIP sets out a programme of actions to reduce the environmental impact of specific areas of the site operation, and is updated regularly by quarry management, with support from DustScanAQ through regular site visits and quarterly reviews with LCC and CBC.

Section 7.5 of the DMMP requires that a monthly summary and review of dust and particulate matter monitoring is prepared and circulated with LCC, CBC and the Environment Agency.

This report details the results of dust, particulate matter and weather monitoring around Mountsorrel Quarry during the period 20 November – 17 December 2024.

1.1 Report scope

The intention of this report is to summarise dust and particulate matter monitoring results for the given period and compare them against site-specific alert limits and thresholds. This report also details the results of any investigation carried out into elevated dust or particulate matter levels, as prompted by an exceedance of alert limits or thresholds.

1.2 Dust definitions

'Dust' is generally regarded as particulate matter up to 75 µm (micron) diameter and can be considered in two categories. Fine dust, essentially particles up to 10 µm, is commonly referred to as PM_{10} and is measured to agreed standards and forms part of the national Air Quality Objectives (AQO). The AQO for PM_{10} is currently 50 µg/m^3 for the 24-hour mean, not to be exceeded 35 times per year and 40 µg/m^3 for the annual mean. Particles up to 2.5 µm in diameter are referred to as $PM_{2.5}$. The interim AQO for $PM_{2.5}$ is 12 µg/m^3 for the annual mean (to be achieved by 2028), whilst the legal AQO for $PM_{2.5}$ is 10 µg/m^3 for the annual mean (to be achieved by 2040) as per The Environmental Targets (Fine Particulate Matter) (England) Regulations 2023[1].

It may be noted that the above Regulations relate to average particle concentrations in Local Authority districts thus do not apply to any specific industrial or other operation, such as Mountsorrel Quarry, and are included for reference.

Coarser dust (essentially particles greater than 10 µm) is generally regarded as 'nuisance dust' and can be associated with annoyance, although there are no official standards (such as AQO) for dust annoyance.

[1] Statutory Instrument. (2023), 'The Environmental Targets (Fine Particulate Matter) (England) Regulations', No. 96. King's Printer of Acts of Parliament

2 Sampler locations

As shown in Figure 2.1 and Table 2.1, dust, particulate matter and weather conditions are measured at a number of locations around site and the surrounding area:

- Directional and depositional dust: currently monitored at 13 locations;
- Particulate matter: currently monitored at two locations;
- Weather conditions: currently monitored at one location.

The majority of the dust samplers around Mountsorrel Quarry comprise the 'Frisbee-type' deposition gauge combined with an adhesive 'sticky pad' directional gauge. These samplers are used to monitoring 'nuisance' dust and samples from these instruments are collected on a monthly basis.

For particulate matter, Turnkey Osiris samplers are located at Stn 9 (Hawcliffe Road) and at Stn 13 (Quorn House). These recognised and certificated 'indicative' real-time devices are connected to their own wind vane and anemometer and provide near-instantaneous directional PM_{10}, $PM_{2.5}$ and PM_1 data directly to the quarry management team.

A weather station is located at the site offices off Wood Lane and collects a range of weather parameters over fifteen-minute intervals. Data from the weather station are available to the quarry management by means of a dedicated modem connection to the internet.

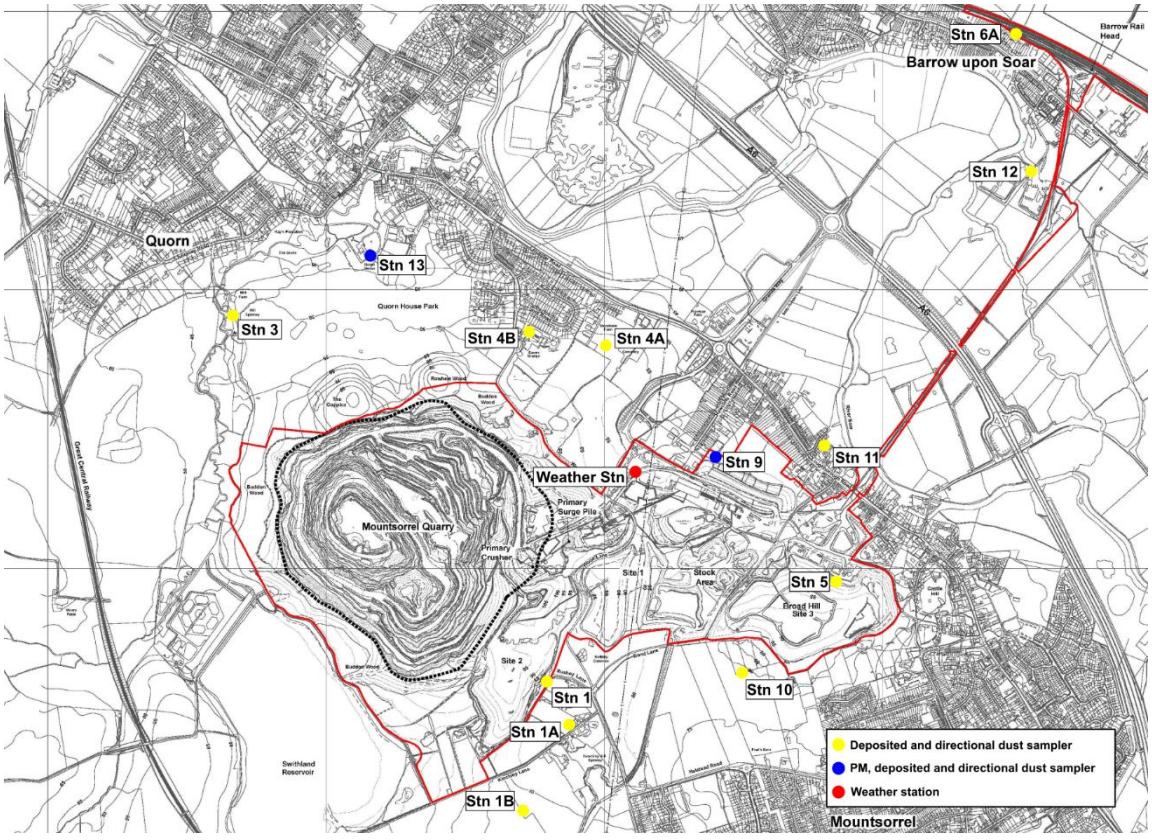

Figure 2.1: Particulate matter, dust and weather monitoring locations, Mountsorrel Quarry

Table 2.1: Weather, particulate matter and dust monitoring locations, Mountsorrel Quarry

Sampler reference	Easting	Northing	Locality monitored
Stn 1	456781	314577	Swithland Lane; Rushey Lane; Kinchley Lane
Stn 1A	456891	314436	Swithland Lane; Rushey Lane; Kinchley Lane
Stn 1B	456715	314109	Swithland Lane; Rushey Lane; Kinchley Lane
Stn 3	455681	315847	Mill Farm; Quorn House
Stn 4A	457000	315805	Woodside Farm; Leicester Road
Stn 4B	456733	315778	Quorn Grange, Unitt Road, Northage Close, Quorn Park
Stn 5	457789	314941	Bond Lane; Crown Lane
Stn 6A	458660	316786	Sileby Road; Huston Close; Sileby Road (commercial)
Stn 9 (inc. PM)	457374	315398	Hawcliffe Road
Stn 10	457487	314626	Glebe Close; Halstead Road (south); Halstead Road (north)
Stn 11	457791	315458	Loughborough Road; River Soar (marina / caravan park)
Stn 12	458575	315459	Meadow Farm Marina and Caravan Park
Stn 13 (incl. PM)	456158	316090	Northage Close, Meeting Street
Weather Station	457126	315376	Wood Lane Site Offices

Charnwood Borough Council (CBC) is responsible for the monitoring of air quality within the borough and prepares Air Quality Annual Status Reports (ASRs) for submission to Defra. It operates a Zephyr air quality monitor which is located within the Leicestershire County Council (LCC) depot at the southern end of Hawcliffe Road, in close proximity to the Osiris device at Stn 9. This device measures a number of pollutants including PM_{10} and $PM_{2.5}$, allowing CBC to compare concentrations against the relevant AQOs for these pollutants.

For additional context, the latest PM_{10} and $PM_{2.5}$ monitoring data from CBC are summarised in Appendix A and Appendix B.

2.1 Alert thresholds and response procedures

To help the site reduce its impact on the surrounding area, a number of alert thresholds have been calculated, as outlined in Table 2.2.

Table 2.2: Alert thresholds

Pollutant	Threshold	Averaging period	Applies to
PM_{10}	125 µg/m^3	15 minutes	Stn 9 (Hawcliffe Road), Stn 13 (Quorn House)
Deposited dust	125 mg/m^2/day	1 month	All deposited dust monitoring locations

For particulate matter (PM_{10}) an alert threshold of 125 µg/m^3 for the 15-minute average has been in use for several years.

Many years of monitoring and research have shown that the quarry is not a significant source of fine particulate matter ($PM_{2.5}$) hence no alert threshold for this size fraction is required.

PM_{10} and $PM_{2.5}$ concentrations recorded by CBC at the southern end of Hawcliffe Road and by Defra through the Automatic Urban and Rural Network (AURN) at Leicester University are presented in Appendix A and Appendix B respectively. Data from both locations have been compared against relevant Air Quality Objectives (AQOs) for PM_{10} and $PM_{2.5}$.

For deposited dust, the DMMP sets out a site-wide deposited dust threshold of 125 mg/m^2/day 'undissolved solids' as a trigger limit for investigation to identify the potential dust source/s, taking account of the directional data.

3 Results

3.1 Weather monitoring

Weather conditions can have a significant effect on the potential for dust propagation from a mineral site. Of particular importance are wind speeds, wind direction, and precipitation. Dust can be carried from a source towards receptors (such as nearby homes and other businesses) according to the strength and direction of wind. Precipitation is recognised to suppress dust and 0.2 mm antecedent rainfall is considered sufficient to suppress windblown dust for a number of hours.

The key weather data which might affect dust propagation (wind speed, wind direction, total daily precipitation and average daily temperature) for this reporting period are summarised in Figure 3.1 and Figure 3.2.

The monitoring period was characterised by generally mild temperatures, with some periods of decreased temperatures observed in late November and early December. The maximum daily temperature was 13.7 °C recorded on 24 November and the minimum daily temperature was -0.1 °C recorded on 21 November. Overall, the monitoring period was reasonably mixed, with precipitation recorded on 57% of total days, however, 3-day dry periods were recorded at the end of November and in mid-December. Whilst rainfall levels would have likely suppressed dust generation, the three-day dry periods may have resulted in an increased potential for dust propagation. Additionally, the freezing conditions recorded on 21 November will have adversely affected the ability of the site to use water as a dust suppressant.

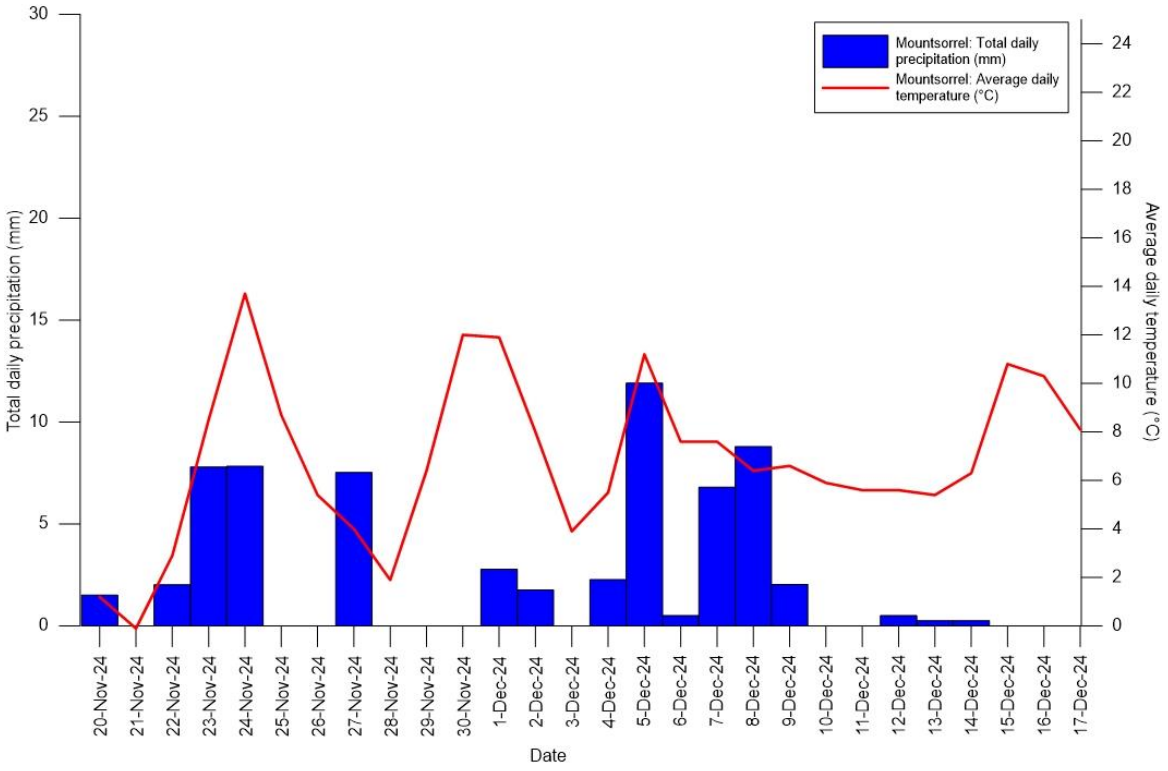

Figure 3.1: Total daily precipitation and average daily temperature, Mountsorrel Quarry, 20 November – 17 December 2024

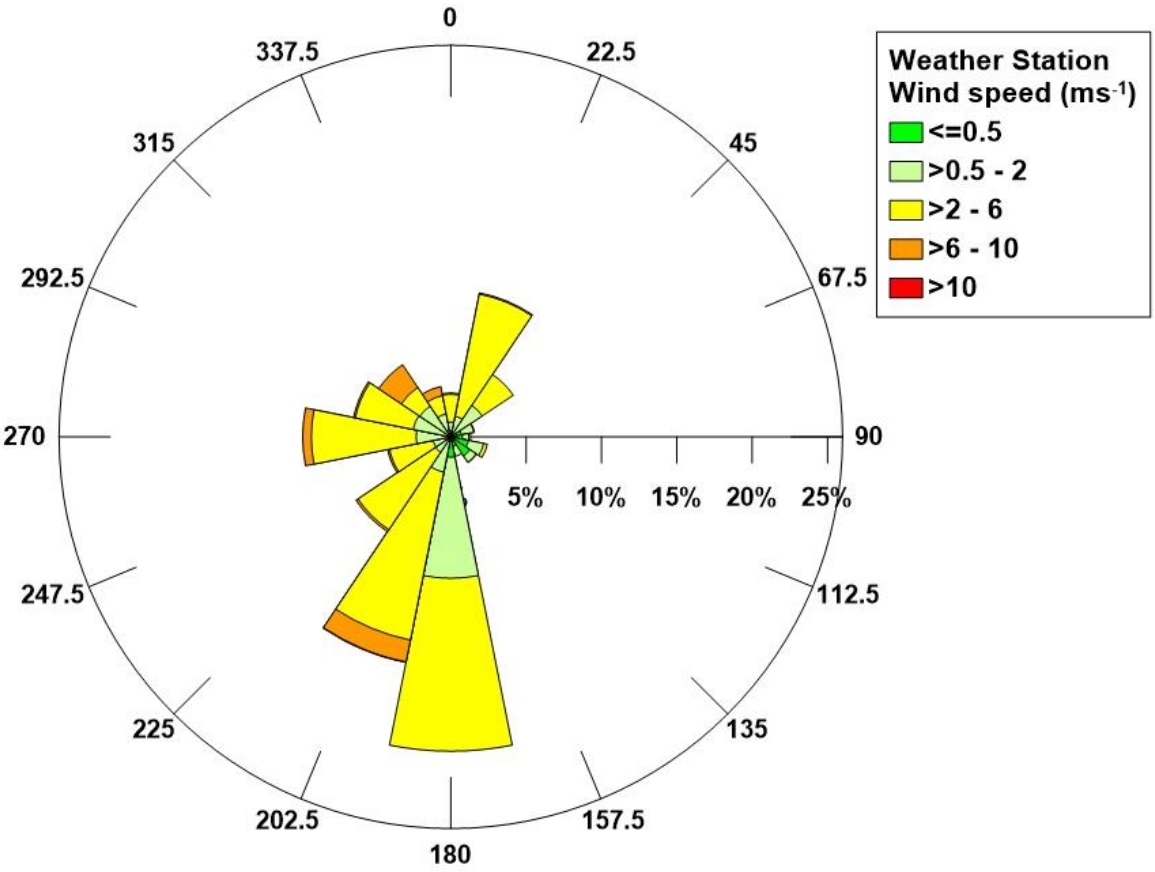

Figure 3.2: Wind rose, Mountsorrel Quarry, Mountsorrel, 20 November – 17 December 2024

As seen in Figure 3.2, winds for this monitoring period were predominantly calm to moderate in speed (>0.5 – 6 m/s) for the majority of the monitoring period from the south and south-southwest, with less frequent westerly and north-northeasterly winds. However, there were some occasional high wind speeds (6 – 10 m/s) recorded from the south-southwest to the north during this period. Consequently, there may have been slight potential for dust propagation generally towards the south and southwest throughout the monitoring period.

3.2 Particulate matter

3.2.1 PM_{10}

The available 15-minute data from the period of review are presented for both monitoring locations in Figure 3.4 and Figure 3.4. The red line denotes the site trigger level (125 µg/m^3 over the 15-minute average), whilst the dashed black line denotes the average concentration recorded over this period.

Additional PM_{10} monitoring data (collected by CBC and the Defra AURN monitoring network) are provided in Appendix A.

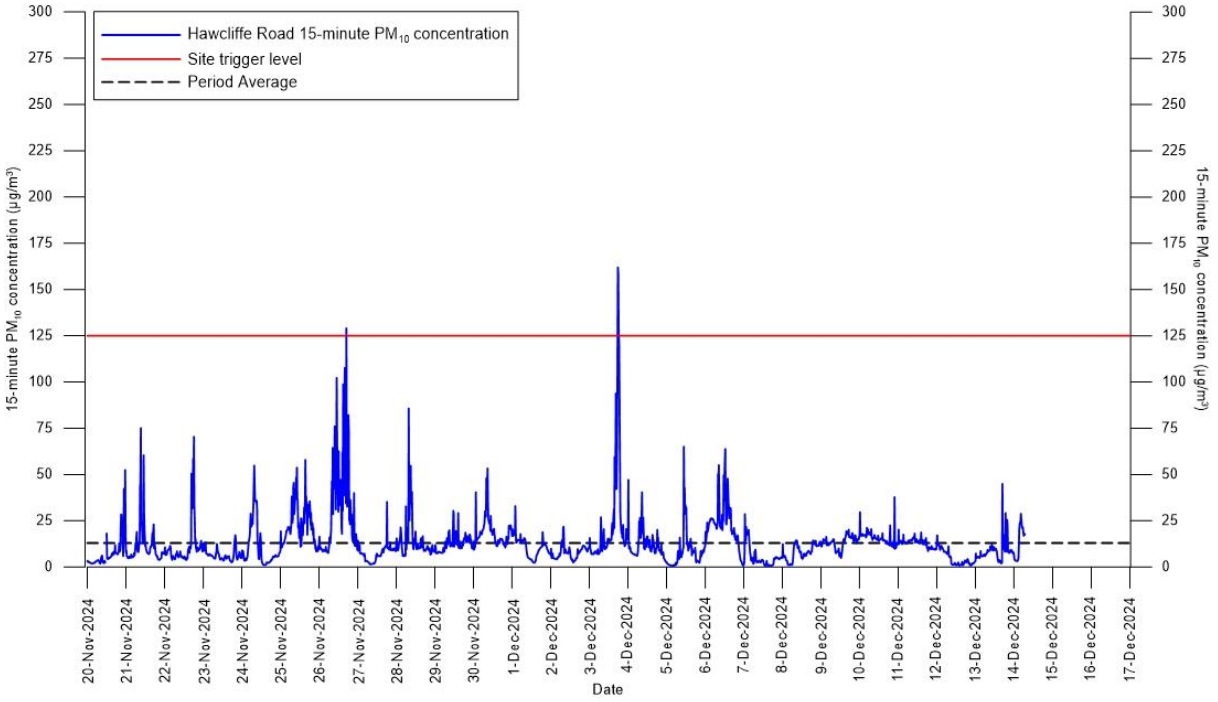

Figure 3.3: 15-minute mean PM_{10} concentration, Hawcliffe Road, 20 November – 17 December 2024

Figure 3.3 indicates that the overall average concentration for this period was 12.96 µg/m³, with the alert threshold being exceeded on two days; detailed of these exceedances are provided in Table 3.1. Additionally, no data was recorded during the 14 – 17 December due to the Osiris monitor being offline, which was caused by an on-site power cut.

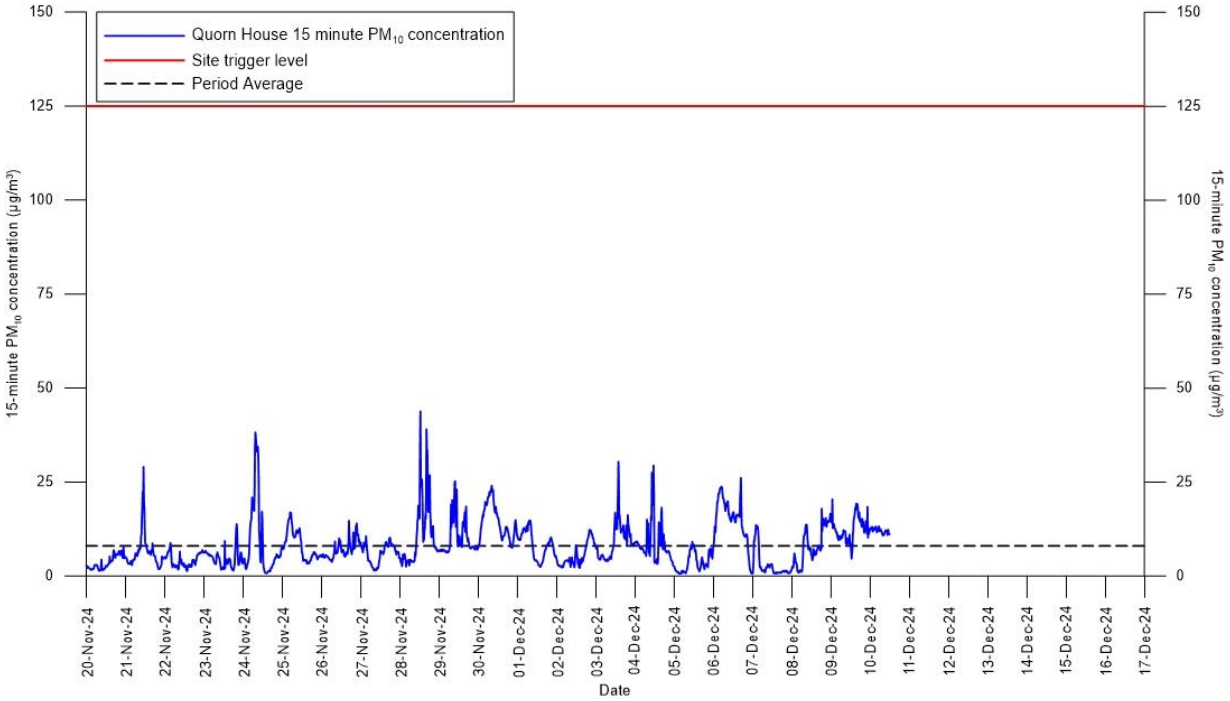

Figure 3.4: 15-minute mean PM_{10} concentration, Quorn House, 20 November – 17 December 2024

At Quorn house there were no exceedances of the PM_{10} site trigger, and the overall average for this period was 8 µg/m^3. Due to a technical issue with the Osiris monitor at Quorn House, data from 10 – 17 December are not available.

During this review period, trigger emails alerting staff to high PM_{10} levels from the direction of site operations were sent out on two days from the Hawcliffe Road Osiris. Details of the corresponding causes and investigations are provided in Table 3.1.

Table 3.1: Email alert responses, between 20 November – 17 December 2024 (using the trigger threshold, 125 µg/m^3 for the 15-minute average)

Date of alert	Monitor	Details	Possible cause and investigation
26/11/2024	TNO3838 (Hawcliffe Road)	Exceedance recorded from the south-southwest in the evening.	Full investigation carried out at time of alert and no issue found.
03/12/2024	TNO3838 (Hawcliffe Road)	Exceedance recorded from the east-southeast in the evening.	Full investigation carried out at time of alert and no issue found. Not from onsite direction.

3.2.2 $PM_{2.5}$

The results of $PM_{2.5}$ monitoring at Hawcliffe Road and Quorn House are presented in Figure 3.5 and Figure 3.6. The dashed black line denotes the average concentration recorded over this period.

Additional $PM_{2.5}$ monitoring data (collected by CBC and the Defra AURN monitoring network) are provided in Appendix B.

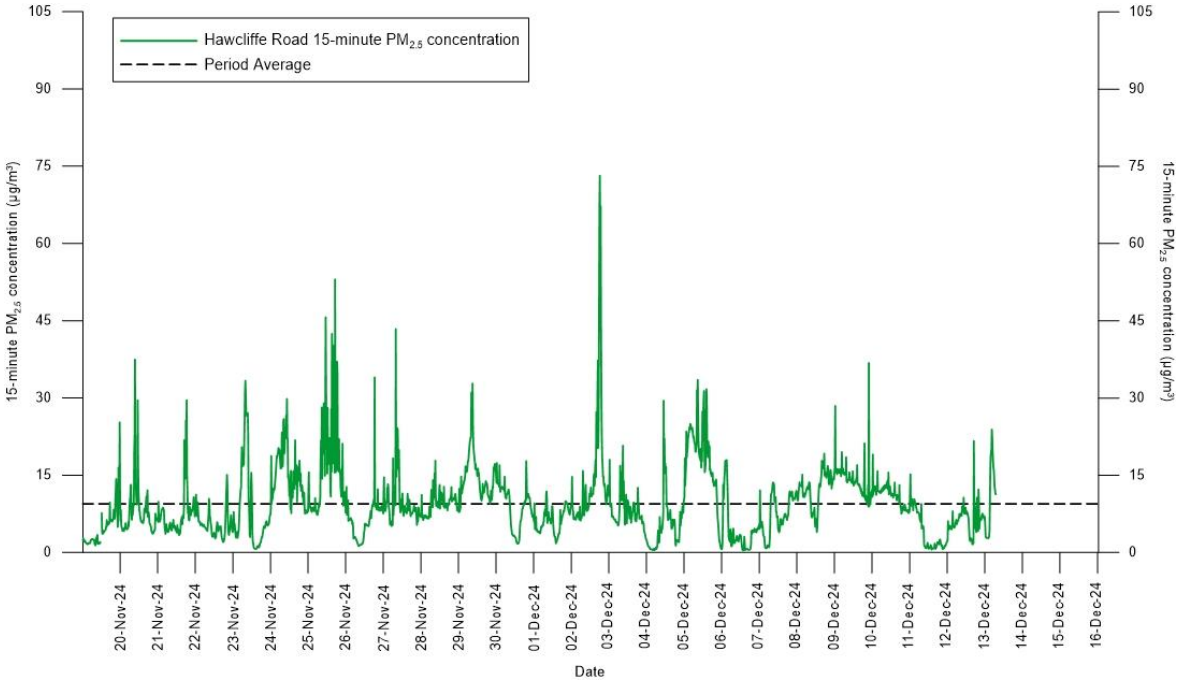

Figure 3.5: 15-minute mean $PM_{2.5}$ concentration, Hawcliffe Road, 20 November – 17 December 2024

At Hawcliffe Road, the overall average concentration for this period was 9.43 µg/m^3, whilst at Quorn House, the overall average was 5.95 µg/m^3. In general, the overall pattern of $PM_{2.5}$ concentrations at both locations is similar, although concentrations tend to be slightly higher at Hawcliffe Road.

For this period, 73% of PM_{10} recorded at Hawcliffe Road comprised $PM_{2.5}$, whilst it made up 74% at Quorn House.

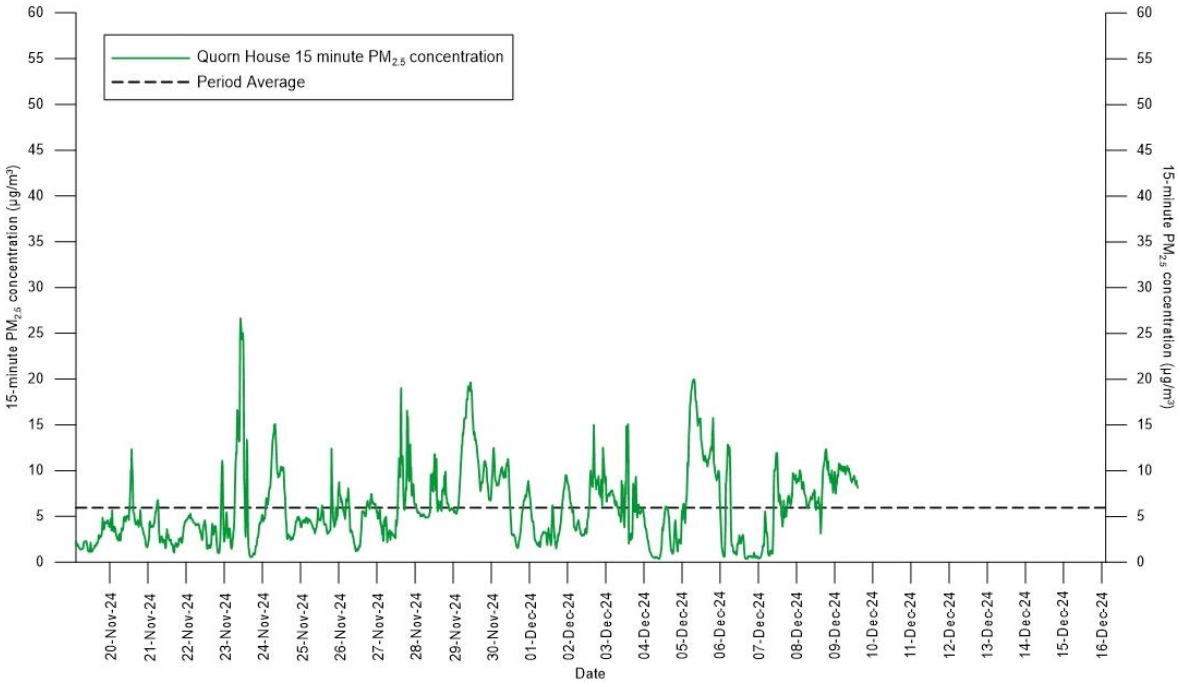

Figure 3.6: 15-minute mean $PM_{2.5}$ concentration, Quorn House, 20 November – 17 December 2024

3.3 Visible dust

3.3.1 Deposited dust monitoring summary

The deposited dust data for 20 November – 17 December 2024 are summarised in Table 3.2. As outlined earlier, there is a site-wide threshold for investigation to identify the potential dust source/s, taking account of the directional data. Table 3.2 shows that, for the available data, deposited dust levels during 20 November – 17 December 2024 were all within the site-specific threshold for all stations, with Stn 9 experiencing slightly elevated levels during this period.

Table 3.2: Summary of deposited dust (undissolved solids), 20 November – 17 December 2024

Undissolved solids (mg/m^2/day)				
This month report start date:		20-Nov-24		
This month report end date:		17-Dec-24		
Receptor location	**Nearest / appropriate dust monitoring point**	**Reported value**	**Trigger: ≥ 125[a]**	**Magnitude[b]**
Swithland Lane; Rushey Lane; Kinchley Lane	Stn 1	46	No	**Very Low**
Swithland Lane; Rushey Lane; Kinchley Lane	Stn 1A	21	No	**Very Low**
Swithland Lane; Rushey Lane; Kinchley Lane	Stn 1B	15	No	**Very Low**
Mill Farm; Quorn House	Stn 3	22	No	**Very Low**
Woodside Farm, Leicester Road	Stn 4A	42	No	**Very Low**
Quorn Grange, Unitt Road, Northage Close, Quorn Park	Stn 4B	53	No	**Low**
Bond Lane; Crown Lane	Stn 5	11	No	**Very Low**
Sileby Road; Huston Close; Sileby Road (commercial)	Stn 6A	24	No	**Very Low**
Hawcliffe Road	Stn 9	98	No	**Slightly Elevated**
Glebe Close; Halstead Road (south); Halstead Road (north)	Stn 10	17	No	**Very Low**
Loughborough Road; River Soar (marina / caravan park)	Stn 11	22	No	**Very Low**
Meadow Farm Marina and Caravan Park	Stn 12	20	No	**Very Low**
Quorn House Park	Stn 13	15	No	**Very Low**

[a] Trigger mass deposition and Effective Area Coverage rates as in Section 7.3, ZLFMS-AG008 Dust Management and Monitoring Plan (Updated), 2015

[b] Magnitude of mass deposition rate assessed against typical rate for semi-rural areas (30 - 80 mg/m^2/day)

Regarding dust deposition over time, the rates across the sampling area have varied considerably. Trends in dust deposition rates (as undissolved solids) for the previous 12 months, together with the site-wide dust threshold are illustrated in Figure 3.7.

In general, as would be expected, dust deposition rates are typically lower in winter months than in summer months. This trend is clearly seen for most monitoring points in Figure 3.7, with some exceptions. Dust deposition rates have been consistently below the 'trigger limit' at all sampling locations except at Stn 9.

In general, as shown in Figure 3.7, higher rates of dust deposition have been recorded near industrial settings (*i.e.* Stn 9) than in more residential areas (*e.g.* Stn 1, Kinchley Lane).

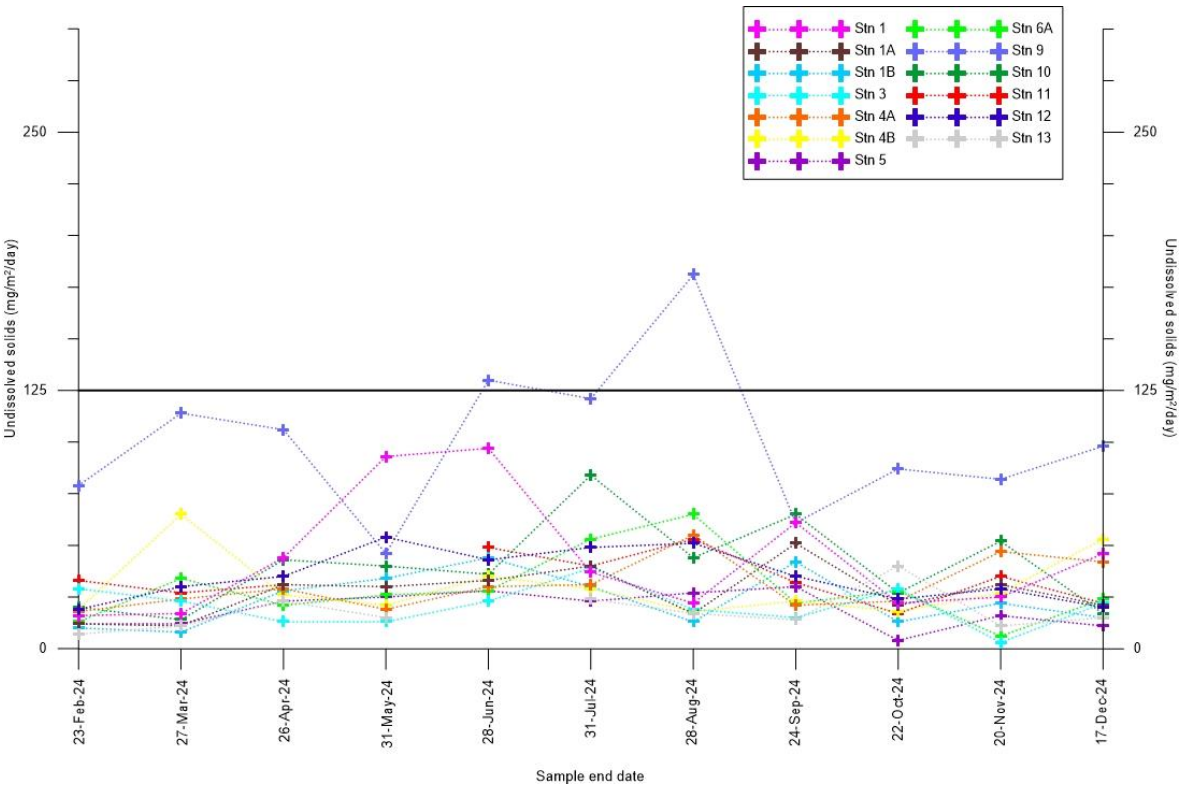

Figure 3.7: Dust deposition rates per sampling location over time (past 12 months)

3.3.2 Directional dust monitoring summary

The directional dust data for 20 November – 17 December 2024 are summarised in Table 3.3, and are presented graphically in Figure 3.8. As with deposited dust, the DMMP sets out a site-wide directional dust threshold. For directional dust soiling, 0.5 % Effective Area Coverage (EAC) per day is a trigger limit for investigation to identify the likely dust source/s, again taking account of the direction.

Table 3.3 and Figure 3.8 show that during 20 November – 17 December 2024, all stations recorded Very Low to Low dust levels from all directions.

Table 3.3: Summary of directional dust soiling, 20 November – 17 December 2024

Directional dust soiling (%EAC/day) by direction (°)									
This month report start date:		20-Nov-24							
This month report end date:		17-Dec-24							
Receptor location	Nearest / appropriate dust monitoring point		Direction (°)							
			0	45	90	135	180	225	270	315
Swithland Lane; Rushey Lane; Kinchley Lane	Stn 1	Reported value	0.1	0.1	0.1	0	0	0.1	0.1	0.1
		Trigger: ≥ 0.5[a]	No	No	No	No	No	No	No	No
		Magnitude[b]	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Swithland Lane; Rushey Lane; Kinchley Lane	Stn 1A	Reported value	0.1	0.1	0	0	0	0.1	0.1	0.1
		Trigger: ≥ 0.5[a]	No	No	No	No	No	No	No	No
		Magnitude[b]	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Swithland Lane; Rushey Lane; Kinchley Lane	Stn 1B	Reported value	0.1	0	0	0	0	0.1	0.1	0.1
		Trigger: ≥ 0.5[a]	No	No	No	No	No	No	No	No
		Magnitude[b]	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Mill Farm; Quorn House	Stn 3	Reported value	0.1	0.1	0.1	0.1	0.2	0.2	0.1	0.1
		Trigger: ≥ 0.5[a]	No	No	No	No	No	No	No	No
		Magnitude[b]	Very Low	Very Low	Very Low	Very Low	Low	Low	Very Low	Very Low
Woodside Farm, Leicester Road	Stn 4A	Reported value	0.1	0.1	0	0	0	0.1	0.2	0.1
		Trigger: ≥ 0.5[a]	No	No	No	No	No	No	No	No
		Magnitude[b]	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Low	Very Low
Quorn Grange, Unitt Road, Northage Close, Quorn Park	Stn 4B	Reported value	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		Trigger: ≥ 0.5[a]	No	No	No	No	No	No	No	No
		Magnitude[b]	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Bond Lane; Crown Lane	Stn 5	Reported value	0.1	0.1	0	0	0.1	0.1	0.1	0.1
		Trigger: ≥ 0.5[a]	No	No	No	No	No	No	No	No
		Magnitude[b]	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Sileby Road; Huston Close; Sileby Road (commercial)	Stn 6A	Reported value	0.1	0.1	0.1	0.1	0	0.1	0.1	0.1
		Trigger: ≥ 0.5[a]	No	No	No	No	No	No	No	No
		Magnitude[b]	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Hawcliffe Road	Stn 9	Reported value	0.1	0.1	0.1	0.1	0	0.2	0.2	0.1
		Trigger: ≥ 0.5[a]	No	No	No	No	No	No	No	No
		Magnitude[b]	Very Low	Very Low	Very Low	Very Low	Very Low	Low	Low	Very Low
Glebe Close; Halstead Road (south); Halstead Road (north)	Stn 10	Reported value	0.1	0	0	0	0.1	0.1	0.1	0.1
		Trigger: ≥ 0.5[a]	No	No	No	No	No	No	No	No
		Magnitude[b]	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Loughborough Road; River Soar (marina / caravan park)	Stn 11	Reported value	0.1	0.1	0	0.1	0.1	0.1	0.1	0.1
		Trigger: ≥ 0.5[a]	No	No	No	No	No	No	No	No
		Magnitude[b]	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Meadow Farm Marina and Caravan Park	Stn 12	Reported value	0.1	0	0	0	0	0.1	0.1	0.1
		Trigger: ≥ 0.5[a]	No	No	No	No	No	No	No	No
		Magnitude[b]	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Quorn House Park	Stn 13	Reported value	0	0	0	0	0	0.1	0	0.1
		Trigger: ≥ 0.5[a]	No	No	No	No	No	No	No	No
		Magnitude[b]	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low

[a] Trigger mass deposition and Effective Area Coverage rates as in Section 7.3, ZLFMS-AG008 Dust Management and Monitoring Plan (Updated), 2015

[b] Magnitude of directional dust soiling derived from Beaman and Kingsbury, 1981

[c] Direction/s not determined for daily EAC below 0.1%/day (very low soiling)

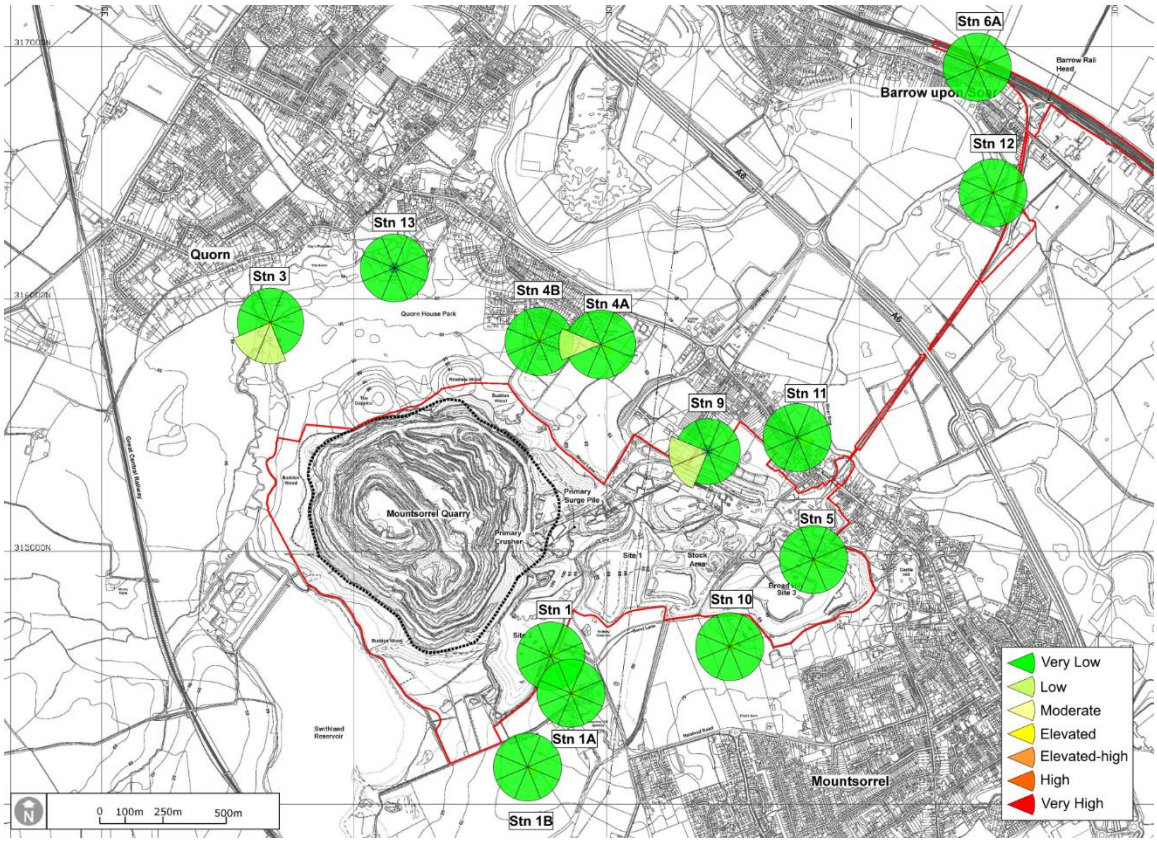

Figure 3.8: Directional dust soiling rose diagrams, 20 November – 17 December 2024

Table 3.4 shows that the average directional soiling rates have been at Very Low levels at most monitoring locations, for most directions, over the past year. At Stn 9, the annual average soiling rate to date was 0.2 % EAC/day from the southwest and west resulting in 'Low' magnitudes being recorded. The cause or causes of these consistently, but marginally elevated dust soiling rates at this monitoring point are under review, as they may be related to site activities such as operations at the PSV yard, Granite Way and/or the toast rack.

Table 3.4: Running average directional dust soiling (past 12 months)

Receptor location	Nearest / appropriate dust monitoring point		Direction (°)							
			0	45	90	135	180	225	270	315
Swithland Lane; Rushey Lane; Kinchley Lane	Stn 1	Average value	0.1	0	0	0	0	0.1	0.1	0.1
		Magnitude[b]	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Swithland Lane; Rushey Lane; Kinchley Lane	Stn 1A	Average value	0	0	0	0	0	0.1	0.1	0.1
		Magnitude[b]	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Swithland Lane; Rushey Lane; Kinchley Lane	Stn 1B	Average value	0.1	0	0	0	0.1	0.1	0.1	0.1
		Magnitude[b]	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Mill Farm; Quorn House	Stn 3	Average value	0	0	0	0	0.1	0	0	0
		Magnitude[b]	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Woodside Farm, Leicester Road	Stn 4A	Average value	0	0	0	0	0	0	0.1	0
		Magnitude[b]	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Quorn Grange, Unitt Road, Northage Close, Quorn Park	Stn 4B	Average value	0	0	0	0	0.1	0	0	0
		Magnitude[b]	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Bond Lane; Crown Lane	Stn 5	Average value	0	0	0	0	0.1	0.1	0.1	0.1
		Magnitude[b]	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Sileby Road; Huston Close; Sileby Road (commercial)	Stn 6A	Average value	0	0.1	0.1	0	0	0.1	0.1	0
		Magnitude[b]	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Hawcliffe Road	Stn 9	Average value	0.1	0.1	0.1	0.1	0	0.2	0.2	0.1
		Magnitude[b]	Very Low	Very Low	Very Low	Very Low	Very Low	Low	Low	Very Low
Glebe Close; Halstead Road (south); Halstead Road (north)	Stn 10	Average value	0.1	0	0	0	0.1	0.1	0	0.1
		Magnitude[b]	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Loughborough Road; River Soar (marina / caravan park)	Stn 11	Average value	0.1	0.1	0	0	0.1	0.1	0.1	0.1
		Magnitude[b]	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Meadow Farm Marina and Caravan Park	Stn 12	Average value	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		Magnitude[b]	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Quorn House Park	Stn 13	Average value	0	0	0	0	0	0	0	0
		Magnitude[b]	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low

[a] Trigger mass deposition and Effective Area Coverage rates as in Section 7.3, ZLFMS-AG008 Dust Management and Monitoring Plan (Updated), 2015

[b] Magnitude of directional dust soiling derived from Beaman and Kingsbury, 1981

[c] Direction/s not determined for daily EAC below 0.1%/day (very low soiling)

4 Complaints

During 20 November – 17 December 2024 no complaints relating to dust were received by the site.

Appendix A: Off-site PM_{10} monitoring (CBC and AURN)

The daily average PM_{10} concentrations recorded by the CBC Zephyr are presented below in Figure A.1, alongside similar data from the Defra Automatic Urban and Rural Network (AURN) station in Leicester University[2].

For the 12 months leading up to 17 December 2024, there were 362 daily PM_{10} readings taken by the CBC Zephyr, and 365 daily readings taken by the Leicester AURN, representing a ~99 % data collection rate at each respective location.

From the available data the annual average daily PM_{10} concentration for the 12 months to date at CBC Zephyr was 10.76 µg/m^3, which is approximately 26.9 % of the annual average PM_{10} concentration objective (40 µg/m^3). At the Leicester AURN the annual average daily PM_{10} concentration for the 12 months to date was 10.77 µg/m^3 which is approximately 26.9 % of the annual average PM_{10} concentration objective.

For the 12 months up to 20 November 2024 there were no recorded instances where the daily average PM_{10} concentrations exceeded 50 µg/m^3 at either location. In summary, for the 12 months up to 17 December 2024 neither the annual nor daily AQO were exceeded.

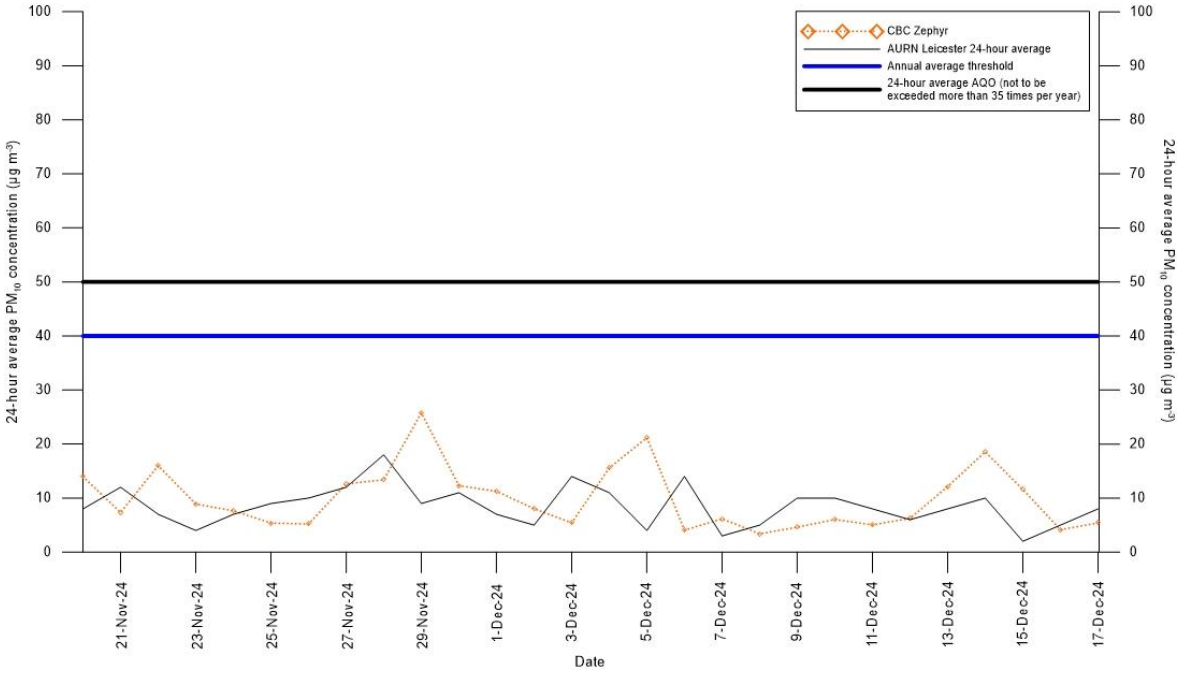

Figure A.1: Daily average PM_{10} concentration, CBC Zephyr and Leicester AURN, 20 November – 17 December 2024

[2] http://uk-air.defra.gov.uk/networks/network-info?view=aurn

Appendix B: Off-site $PM_{2.5}$ monitoring (CBC and AURN)

The daily average $PM_{2.5}$ concentrations recorded by the CBC Zephyr are presented below in Figure B.1, alongside similar data from the Defra Automatic Urban and Rural Network (AURN) station in Leicester University.

For the 12 months leading up to 17 December 2024, there were 362 daily $PM_{2.5}$ readings taken by the CBC Zephyr, and 365 readings taken by the Leicester AURN, representing a ~99 % data collection rate respectively. From the available data the annual average daily $PM_{2.5}$ concentration for the 12 months at the CBC Zephyr was 6.8 µg/m^3, which is approximately 57 % of the interim annual average $PM_{2.5}$ concentration objective (12 µg/m^3) applicable from 31 January 2023. At the Leicester AURN the annual average daily concentration was 6.78 µg/m^3, which is approximately 56 % of the interim annual average $PM_{2.5}$ concentration objective.

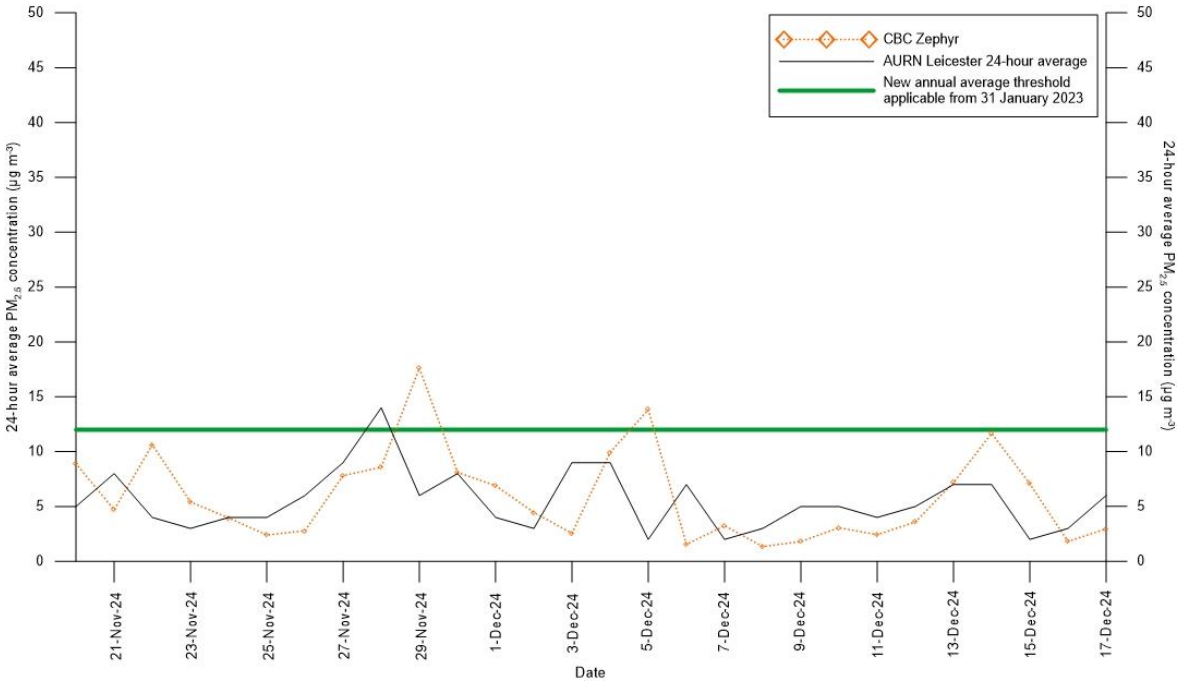

Figure B.1: Daily average $PM_{2.5}$ concentrations, CBC Zephyr and Leicester AURN, 20 November – 17 December 2024

Dust, Particulate Matter and Weather Monitoring Report: January 2025

Mountsorrel Quarry

March, 2025

Tarmac

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Document Control Sheet

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This report may include data obtained from trusted third-party consultants/laboratories that have been supplied to us in good faith. Whilst we do everything we can to ensure the quality of all the data we use, we cannot be held responsible for the accuracy or integrity of third-party data.

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1 Introduction

Mountsorrel Quarry has a comprehensive Dust Management and Monitoring Plan (DMMP). The DMMP was developed in 2011 and is subject to regular review and revision, in consultation between Tarmac and the local regulators (Leicestershire County Council (LCC) and Charnwood Borough Council (CBC)).

The DMMP is enacted through the quarry Site Improvement Plan (SIP). The SIP sets out a programme of actions to reduce the environmental impact of specific areas of the site operation, and is updated regularly by quarry management, with support from DustScanAQ through regular site visits and quarterly reviews with LCC and CBC.

Section 7.5 of the DMMP requires that a monthly summary and review of dust and particulate matter monitoring is prepared and circulated with LCC, CBC and the Environment Agency.

This report details the results of dust, particulate matter and weather monitoring around Mountsorrel Quarry during the period 17 December 2024 – 30 January 2025.

1.1 Report scope

The intention of this report is to summarise dust and particulate matter monitoring results for the given period and compare them against site-specific alert limits and thresholds. This report also details the results of any investigation carried out into elevated dust or particulate matter levels, as prompted by an exceedance of alert limits or thresholds.

1.2 Dust definitions

'Dust' is generally regarded as particulate matter up to 75 µm (micron) diameter and can be considered in two categories. Fine dust, essentially particles up to 10 µm, is commonly referred to as PM_{10} and is measured to agreed standards and forms part of the national Air Quality Objectives (AQO). The AQO for PM_{10} is currently 50 µg/m^3 for the 24-hour mean, not to be exceeded 35 times per year and 40 µg/m^3 for the annual mean. Particles up to 2.5 µm in diameter are referred to as $PM_{2.5}$. The interim AQO for $PM_{2.5}$ is 12 µg/m^3 for the annual mean (to be achieved by 2028), whilst the legal AQO for $PM_{2.5}$ is 10 µg/m^3 for the annual mean (to be achieved by 2040) as per The Environmental Targets (Fine Particulate Matter) (England) Regulations 2023[1].

It may be noted that the above Regulations relate to average particle concentrations in Local Authority districts thus do not apply to any specific industrial or other operation, such as Mountsorrel Quarry, and are included for reference. Coarser dust (essentially particles greater than 10 µm) is generally regarded as 'nuisance dust' and can be associated with annoyance, although there are no official standards (such as AQO) for dust annoyance.

[1] Statutory Instrument. (2023), 'The Environmental Targets (Fine Particulate Matter) (England) Regulations', No. 96. King's Printer of Acts of Parliament

2 Sampler locations

As shown in Figure 2.1 and Table 2.1, dust, particulate matter and weather conditions are measured at a number of locations around site and the surrounding area:

- Directional and depositional dust: currently monitored at 13 locations;
- Particulate matter: currently monitored at two locations;
- Weather conditions: currently monitored at one location.

The majority of the dust samplers around Mountsorrel Quarry comprise the 'Frisbee-type' deposition gauge combined with an adhesive 'sticky pad' directional gauge. These samplers are used to monitor 'nuisance' dust and samples from these instruments are collected on a monthly basis.

For particulate matter, Turnkey Osiris samplers are located at Stn 9 (Hawcliffe Road) and at Stn 13 (Quorn House). These recognised and certificated 'indicative' real-time devices are connected to their own wind vane and anemometer and provide near-instantaneous directional PM_{10}, $PM_{2.5}$ and PM_1 data directly to the quarry management team.

A weather station is located at the site offices off Wood Lane and collects a range of weather parameters over fifteen-minute intervals. Data from the weather station are available to the quarry management by means of a dedicated modem connection to the internet.

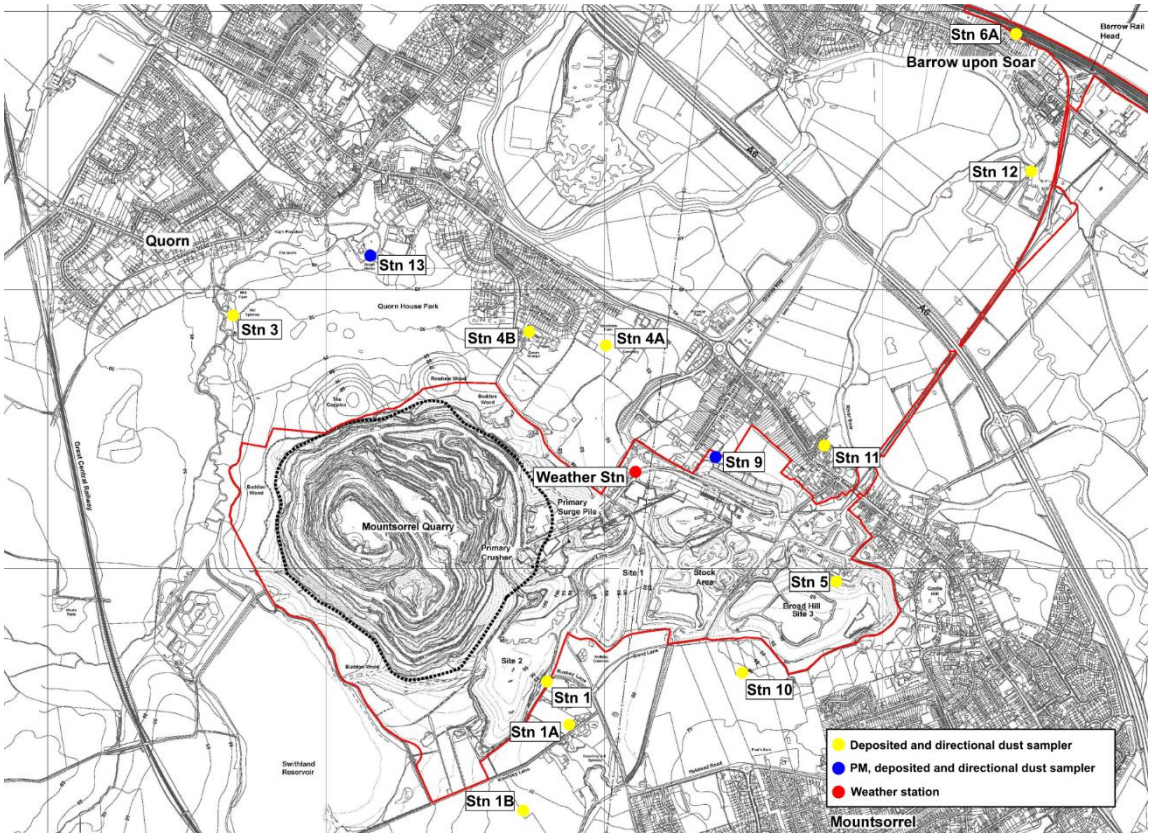

Figure 2.1: Particulate matter, dust and weather monitoring locations, Mountsorrel Quarry

Table 2.1: Weather, particulate matter and dust monitoring locations, Mountsorrel Quarry

Sampler reference	Easting	Northing	Locality monitored
Stn 1	456781	314577	Swithland Lane; Rushey Lane; Kinchley Lane
Stn 1A	456891	314436	Swithland Lane; Rushey Lane; Kinchley Lane
Stn 1B	456715	314109	Swithland Lane; Rushey Lane; Kinchley Lane
Stn 3	455681	315847	Mill Farm; Quorn House
Stn 4A	457000	315805	Woodside Farm; Leicester Road
Stn 4B	456733	315778	Quorn Grange, Unitt Road, Northage Close, Quorn Park
Stn 5	457789	314941	Bond Lane; Crown Lane
Stn 6A	458660	316786	Sileby Road; Huston Close; Sileby Road (commercial)
Stn 9 (inc. PM)	457374	315398	Hawcliffe Road
Stn 10	457487	314626	Glebe Close; Halstead Road (south); Halstead Road (north)
Stn 11	457791	315458	Loughborough Road; River Soar (marina / caravan park)
Stn 12	458575	315459	Meadow Farm Marina and Caravan Park
Stn 13 (incl. PM)	456158	316090	Northage Close, Meeting Street
Weather Station	457126	315376	Wood Lane Site Offices

Charnwood Borough Council (CBC) is responsible for the monitoring of air quality within the borough and prepares Air Quality Annual Status Reports (ASRs) for submission to Defra. It operates a Zephyr air quality monitor which is located within the Leicestershire County Council (LCC) depot at the southern end of Hawcliffe Road, in close proximity to the Osiris device at Stn 9. This device measures a number of pollutants including PM_{10} and $PM_{2.5}$, allowing CBC to compare concentrations against the relevant AQOs for these pollutants.

For additional context, the latest PM_{10} and $PM_{2.5}$ monitoring data from CBC are summarised in Appendix A and Appendix B.

2.1 Alert thresholds and response procedures

To help the site reduce its impact on the surrounding area, a number of alert thresholds have been calculated, as outlined in Table 2.2.

Table 2.2: Alert thresholds

Pollutant	Threshold	Averaging period	Applies to
PM_{10}	125 µg/m^3	15 minutes	Stn 9 (Hawcliffe Road), Stn 13 (Quorn House)
Deposited dust	125 mg/m^2/day	1 month	All deposited dust monitoring locations

For particulate matter (PM_{10}) an alert threshold of 125 µg/m^3 for the 15-minute average has been in use for several years.

Many years of monitoring and research have shown that the quarry is not a significant source of fine particulate matter ($PM_{2.5}$) hence no alert threshold for this size fraction is required.

PM_{10} and $PM_{2.5}$ concentrations recorded by CBC at the southern end of Hawcliffe Road and by Defra through the Automatic Urban and Rural Network (AURN) at Leicester University are presented in Appendix A and Appendix B respectively. Data from both locations have been compared against relevant Air Quality Objectives (AQOs) for PM_{10} and $PM_{2.5}$.

For deposited dust, the DMMP sets out a site-wide deposited dust threshold of 125 mg/m^2/day 'undissolved solids' as a trigger limit for investigation to identify the potential dust source/s, taking account of the directional data.

3 Results

3.1 Weather monitoring

Weather conditions can have a significant effect on the potential for dust propagation from a mineral site. Of particular importance are wind speeds, wind direction, and precipitation. Dust can be carried from a source towards receptors (such as nearby homes and other businesses) according to the strength and direction of wind. Precipitation is recognised to suppress dust and 0.2 mm antecedent rainfall is considered sufficient to suppress windblown dust for a number of hours.

The key weather data which might affect dust propagation (wind speed, wind direction, total daily precipitation and average daily temperature) for this reporting period are summarised in Figure 3.1 and Figure 3.2.

The monitoring period was characterised by generally mild temperatures, with some periods of low temperatures observed in early to mid-January. The maximum daily temperature was 11.8 °C, recorded on 18 December 2024 and the minimum daily temperature was -3.3°C, recorded on 11 January 2025. Overall, the monitoring period was reasonably mixed with precipitation recorded on 42% of days, however, an 8-day dry period was recorded in January. Whilst rainfall levels would have likely suppressed dust generation, the 8-day dry period may have resulted in increased potential for dust propagation. Additionally, the freezing conditions recorded during this dry period will have adversely affected the ability of the site to use water as a dust suppressant.

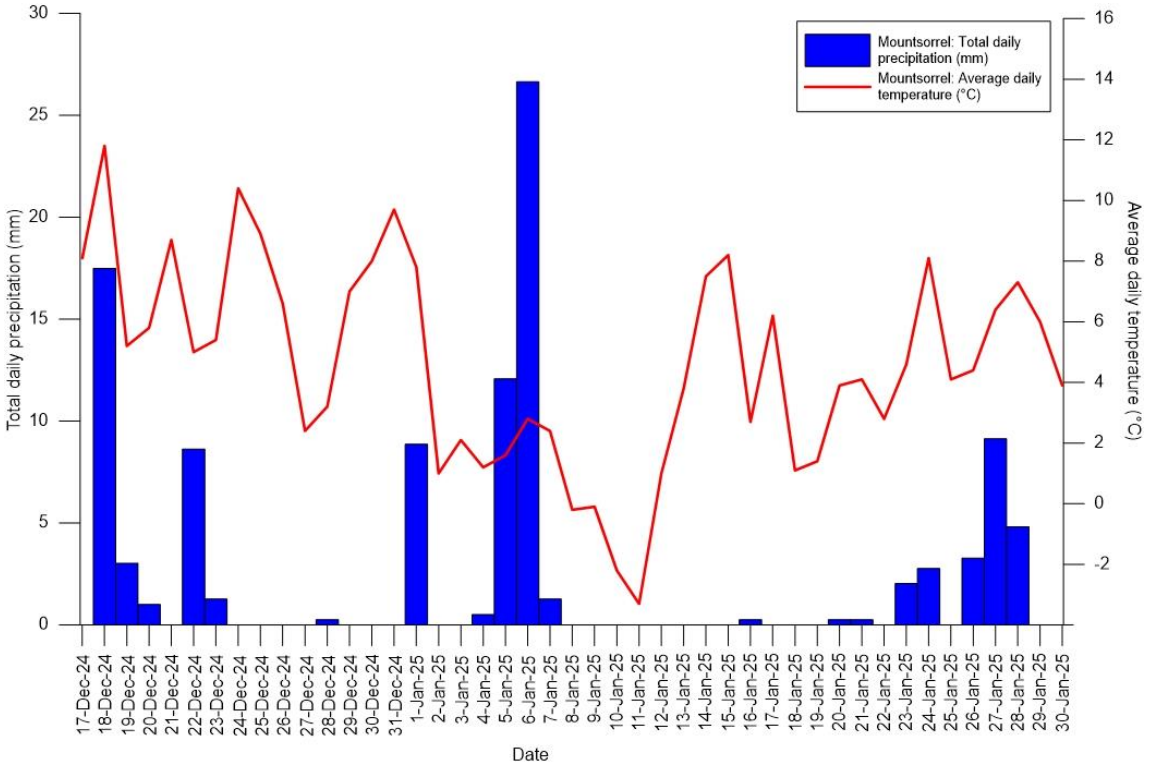

Figure 3.1: Total daily precipitation and average daily temperature, Mountsorrel Quarry, 17 December 2024 – 30 January 2025

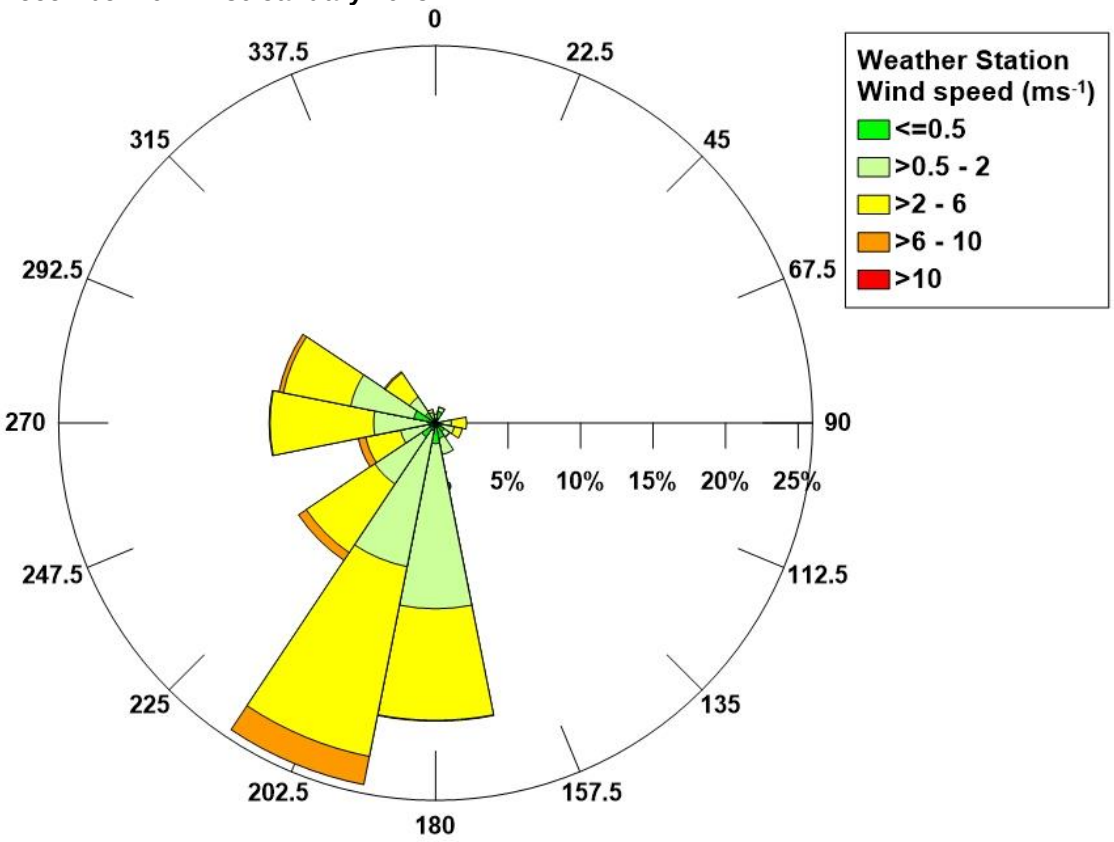

Figure 3.2: Wind rose, Mountsorrel Quarry, Mountsorrel, 17 December 2024 – 30 January 2025

As seen in Figure 3.2, winds were predominantly calm to moderate in speed (>0.5 – 6 m/s) for the majority of the monitoring period from the south-southwest south, with less frequent westerly winds. However, there were some occasional high wind speeds (6 – 10 m/s) recorded from the south-southwest through to the northwest during this period. Consequently, there may have been slight potential for dust propagation generally towards the north and northeast throughout the monitoring period.

3.2 Particulate matter

3.2.1 PM_{10}

The available 15-minute data from the period of review are presented for both monitoring locations in Figure 3.4 and Figure 3.4. The red line denotes the site trigger level (125 µg/m^3 over the 15-minute average), whilst the dashed black line denotes the average concentration recorded over this period.

Additional PM_{10} monitoring data (collected by CBC and the Defra AURN monitoring network) are provided in Appendix A.

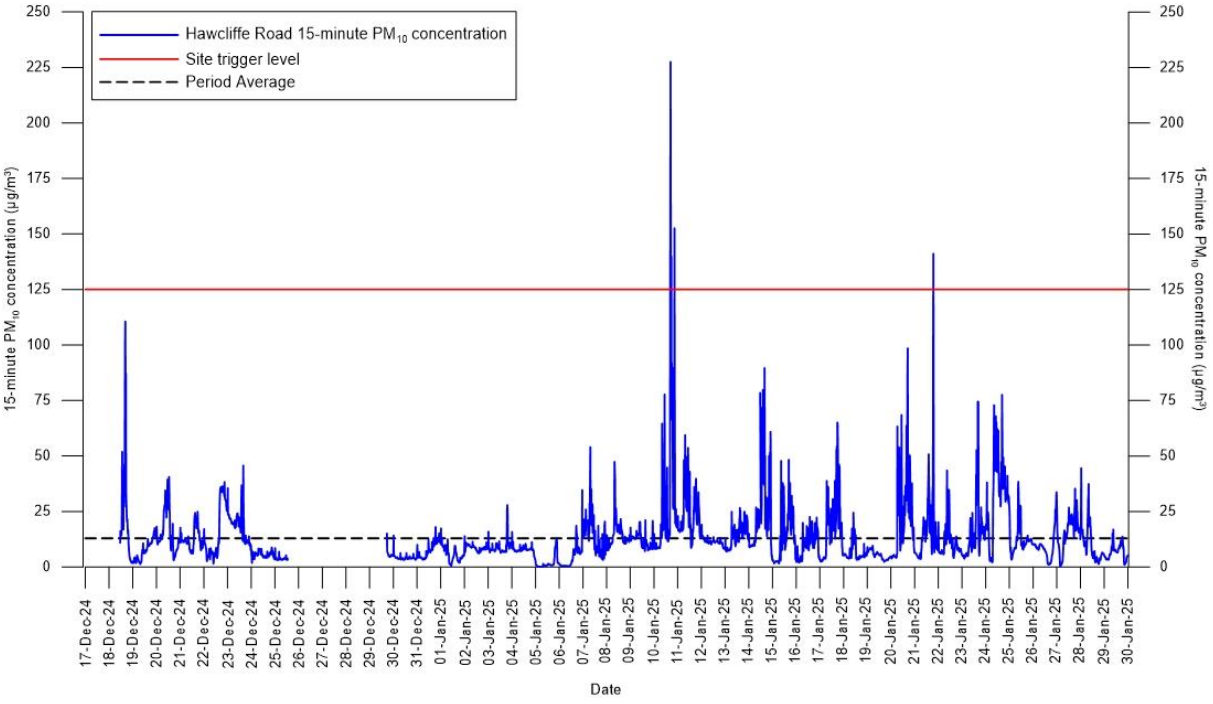

Figure 3.3: 15-minute mean PM_{10} concentration, Hawcliffe Road, 17 December 2024 – 30 January 2025

Figure 3.3 indicates that the overall average concentration for this period was 12.93 µg/m^3, with the alert threshold being exceeded on two days; detailed of these exceedances are provided in Table 3.1. Additionally, no data was recorded during the 26 – 29 December, as there was a power issue on site.

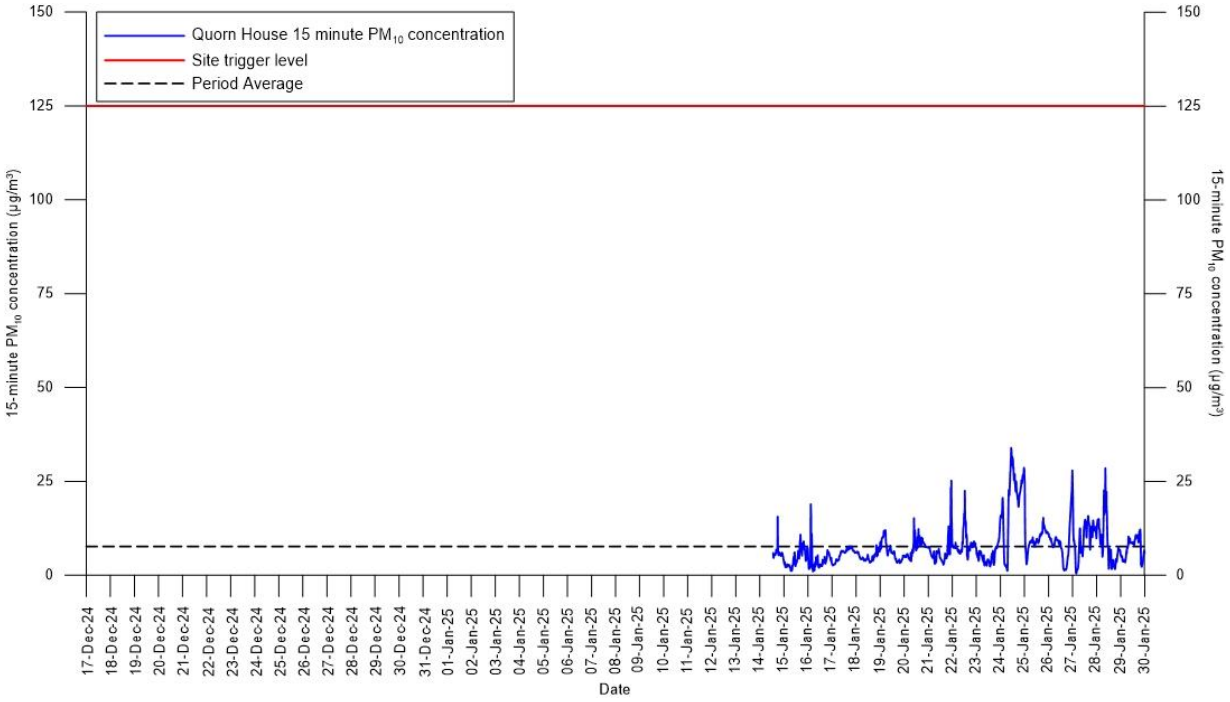

Figure 3.4: 15-minute mean PM_{10} concentration, Quorn House, 17 December 2024 – 30 January 2025

At Quorn house there were no exceedances of the PM_{10} site trigger, and the overall average for this period was 7.65 µg/m^3. Due to a technical issue with the Osiris monitor at Quorn House, data from 17 December – 14 January are not available.

During this review period, trigger emails alerting staff to high PM_{10} levels from the direction of site operations were sent out on two days from the Hawcliffe Road Osiris. Details of the corresponding causes and investigations are provided in Table 3.1.

Table 3.1: Email alert responses, between 17 December 2024 – 30 January 2025 (using the trigger threshold, 125 µg/m^3 for the 15-minute average)

Date of alert	Monitor	Details	Possible cause and investigation
10/01/2025	TNO3838 (Hawcliffe Road)	Exceedance recorded from the southwest in the evening.	Investigation revealed some dust suppression was frozen due to cold weather.
21/01/2025	TNO3838 (Hawcliffe Road)	Exceedance recorded from the west-northwest in the evening.	Investigation concluded alert was unlikely to be related to on-site activities.

3.2.2 $PM_{2.5}$

The results of $PM_{2.5}$ monitoring at Hawcliffe Road and Quorn House are presented in Figure 3.5 and Figure 3.6. The dashed black line denotes the average concentration recorded over this period.

Additional $PM_{2.5}$ monitoring data (collected by CBC and the Defra AURN monitoring network) are provided in Appendix B.

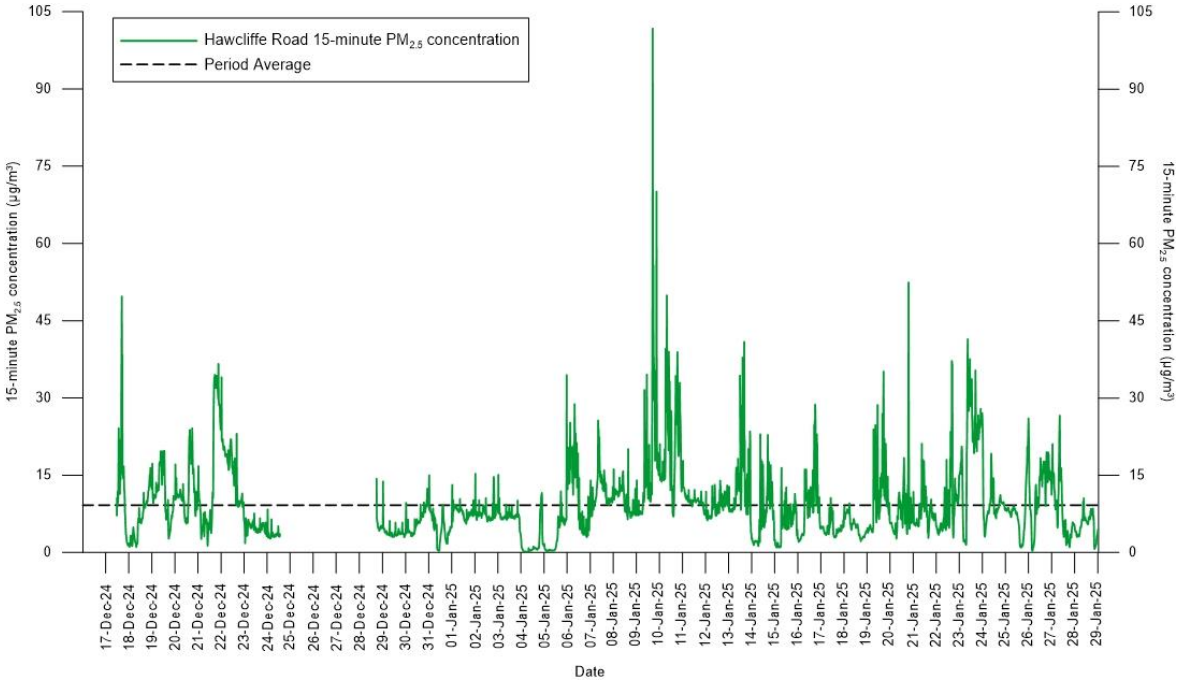

Figure 3.5: 15-minute mean $PM_{2.5}$ concentration, Hawcliffe Road, 17 December 2024 – 30 January 2025

At Hawcliffe Road, the overall average concentration for this period was 9.17 µg/m^3, whilst at Quorn House, the overall average was 6.5 µg/m^3. However, it should be stressed that limited data could be collected at Quorn House during this monitoring period, so the average may not reflect conditions throughout the period. In general, the overall pattern of $PM_{2.5}$ concentrations at both locations is similar for the data that is available during this monitoring period, although concentrations tend to be slightly higher at Hawcliffe Road.

For this period, 71% of PM_{10} recorded at Hawcliffe Road comprised $PM_{2.5}$, whilst it made up 85% at Quorn House.

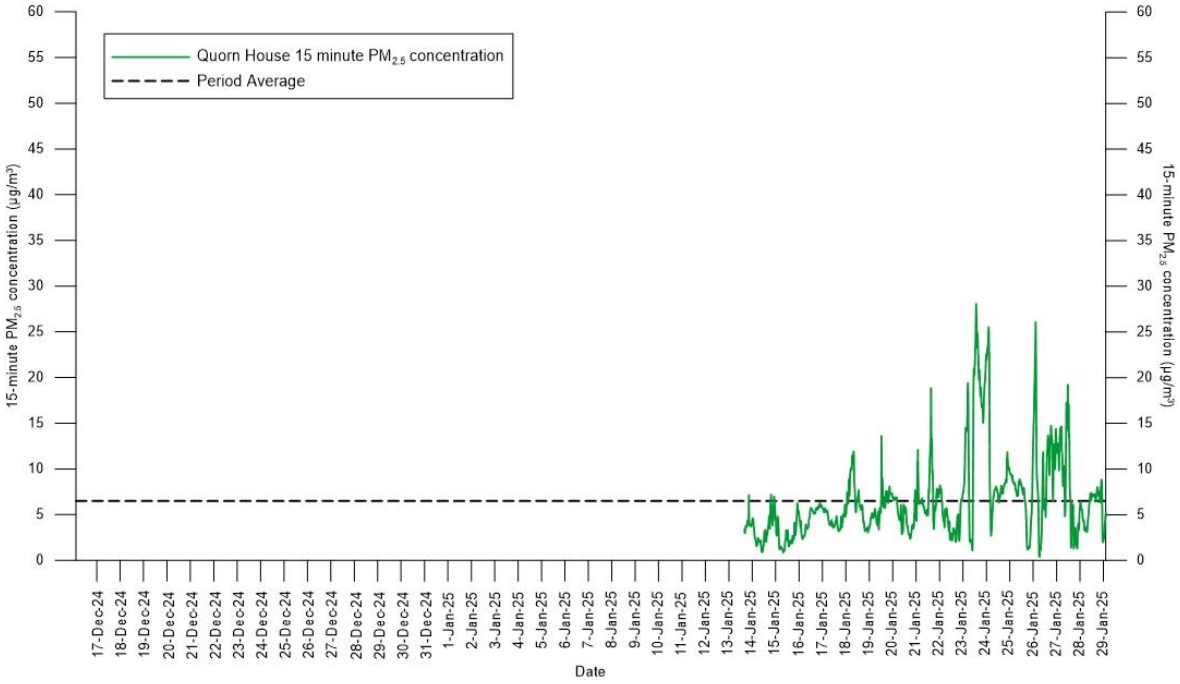

Figure 3.6: 15-minute mean $PM_{2.5}$ concentration, Quorn House, 17 December 2024 – 30 January 2025

3.3 Visible dust

3.3.1 Deposited dust monitoring summary

The deposited dust data for 17 December 2024 – 30 January 2025 are summarised in Table 3.2. As outlined earlier, there is a site-wide threshold for investigation to identify the potential dust source/s, taking account of the directional data. Table 3.2 shows that, for the available data, deposited dust levels during 17 December 2024 – 30 January 2025 were all within the site-specific threshold for all stations, with Stn 9 experiencing elevated levels during this period. Additionally, there were no data available for Stn 4B during this monitoring period due to the Frisbee bottle being displaced.

Table 3.2: Summary of deposited dust (undissolved solids), 17/12/24 – 30/01/25

Undissolved solids (mg/m^2/day)				
This month report start date:		17-Dec-24		
This month report end date:		30-Jan-25		
Receptor location	**Nearest / appropriate dust monitoring point**	**Reported value**	**Trigger: ≥ 125[a]**	**Magnitude[b]**
Swithland Lane; Rushey Lane; Kinchley Lane	Stn 1	15	No	**Very Low**
Swithland Lane; Rushey Lane; Kinchley Lane	Stn 1A	6	No	**Very Low**
Swithland Lane; Rushey Lane; Kinchley Lane	Stn 1B	8	No	**Very Low**
Mill Farm; Quorn House	Stn 3	8	No	**Very Low**
Woodside Farm, Leicester Road	Stn 4A	30	No	**Very Low**
Quorn Grange, Unitt Road, Northage Close, Quorn Park	Stn 4B	No data	No data	**N/A**
Bond Lane; Crown Lane	Stn 5	14	No	**Very Low**
Sileby Road; Huston Close; Sileby Road (commercial)	Stn 6A	13	No	**Very Low**
Hawcliffe Road	Stn 9	121	No	**Elevated**
Glebe Close; Halstead Road (south); Halstead Road (north)	Stn 10	18	No	**Very Low**
Loughborough Road; River Soar (marina / caravan park)	Stn 11	32	No	**Very Low**
Meadow Farm Marina and Caravan Park	Stn 12	23	No	**Very Low**
Quorn House Park	Stn 13	15	No	**Very Low**

[a] Trigger mass deposition and Effective Area Coverage rates as in Section 7.3, ZLFMS-AG008 Dust Management and Monitoring Plan (Updated), 2015

[b] Magnitude of mass deposition rate assessed against typical rate for semi-rural areas (30 - 80 mg/m^2/day)

Regarding dust deposition over time, the rates across the sampling area have varied considerably. Trends in dust deposition rates (as undissolved solids) for the previous 12 months, together with the site-wide dust threshold are illustrated in Figure 3.7.

In general, as would be expected, dust deposition rates are typically lower in winter months than in summer months. This trend is clearly seen for most monitoring points in Figure 3.7, with some exceptions. Dust deposition rates have been consistently below the 'trigger limit' at all sampling locations except at Stn 9.

In general, as shown in Figure 3.7, higher rates of dust deposition have been recorded near industrial settings (*i.e.* Stn 9) than in more residential areas (*e.g.* Stn 1, Kinchley Lane).

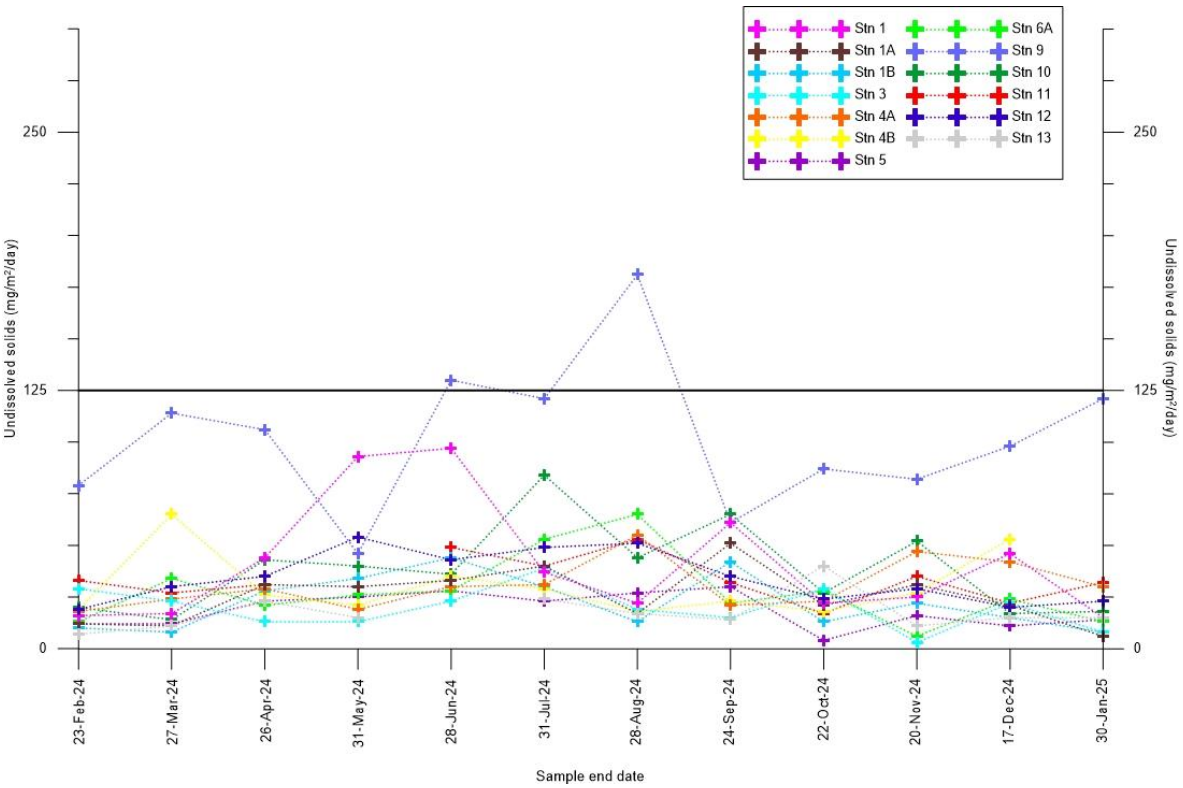

Figure 3.7: Dust deposition rates per sampling location over time (past 12 months)

3.3.2 Directional dust monitoring summary

The directional dust data for 17 December 2024 – 30 January 2025 are summarised in Table 3.3, and are presented graphically in Figure 3.8. As with deposited dust, the DMMP sets out a site-wide directional dust threshold. For directional dust soiling, 0.5 % Effective Area Coverage (EAC) per day is a trigger limit for investigation to identify the likely dust source/s, again taking account of the direction.

Table 3.3 and Figure 3.8 show that during 17 December 2024 – 30 January 2025, all stations recorded Very Low to Low dust levels from all directions.

Table 3.3: Summary of directional dust soiling, 17 December 2024 – 30 January 2025

Directional dust soiling (%EAC/day) by direction (°)										
This month report start date:		17-Dec-24								
This month report end date:		30-Jan-25								
Receptor location	Nearest / appropriate dust monitoring point		Direction (°)							
			0	45	90	135	180	225	270	315
Swithland Lane; Rushey Lane; Kinchley Lane	Stn 1	Reported value	0	0	0	0	0	0.1	0	0
		Trigger: ≥ 0.5[a]	No	No	No	No	No	No	No	No
		Magnitude[b]	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Swithland Lane; Rushey Lane; Kinchley Lane	Stn 1A	Reported value	0	0	0	0	0	0.1	0.1	0.1
		Trigger: ≥ 0.5[a]	No	No	No	No	No	No	No	No
		Magnitude[b]	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Swithland Lane; Rushey Lane; Kinchley Lane	Stn 1B	Reported value	0	0	0	0	0	0.1	0	0
		Trigger: ≥ 0.5[a]	No	No	No	No	No	No	No	No
		Magnitude[b]	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Mill Farm; Quorn House	Stn 3	Reported value	0	0.1	0	0.1	0.1	0.1	0	0
		Trigger: ≥ 0.5[a]	No	No	No	No	No	No	No	No
		Magnitude[b]	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Woodside Farm, Leicester Road	Stn 4A	Reported value	0	0	0	0	0	0.1	0.1	0
		Trigger: ≥ 0.5[a]	No	No	No	No	No	No	No	No
		Magnitude[b]	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Quorn Grange, Unitt Road, Northage Close, Quorn Park	Stn 4B	Reported value	0	0	0.1	0.1	0.1	0	0	0
		Trigger: ≥ 0.5[a]	No	No	No	No	No	No	No	No
		Magnitude[b]	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Bond Lane; Crown Lane	Stn 5	Reported value	0	0	0	0	0	0.1	0.1	0.1
		Trigger: ≥ 0.5[a]	No	No	No	No	No	No	No	No
		Magnitude[b]	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Sileby Road; Huston Close; Sileby Road (commercial)	Stn 6A	Reported value	0	0	0	0	0	0.1	0.1	0
		Trigger: ≥ 0.5[a]	No	No	No	No	No	No	No	No
		Magnitude[b]	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Hawcliffe Road	Stn 9	Reported value	0	0.1	0.1	0	0.1	0.2	0.2	0
		Trigger: ≥ 0.5[a]	No	No	No	No	No	No	No	No
		Magnitude[b]	Very Low	Very Low	Very Low	Very Low	Very Low	Low	Low	Very Low
Glebe Close; Halstead Road (south); Halstead Road (north)	Stn 10	Reported value	0.1	0.1	0	0	0.1	0	0	0
		Trigger: ≥ 0.5[a]	No	No	No	No	No	No	No	No
		Magnitude[b]	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Loughborough Road; River Soar (marina / caravan park)	Stn 11	Reported value	0	0	0	0	0.1	0.1	0.1	0.1
		Trigger: ≥ 0.5[a]	No	No	No	No	No	No	No	No
		Magnitude[b]	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Meadow Farm Marina and Caravan Park	Stn 12	Reported value	0	0	0	0	0.1	0	0.1	0.1
		Trigger: ≥ 0.5[a]	No	No	No	No	No	No	No	No
		Magnitude[b]	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Quorn House Park	Stn 13	Reported value	0	0	0.1	0	0.1	0	0	0
		Trigger: ≥ 0.5[a]	No	No	No	No	No	No	No	No
		Magnitude[b]	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low

[a] Trigger mass deposition and Effective Area Coverage rates as in Section 7.3, ZLFMS-AG008 Dust Management and Monitoring Plan (Updated), 2015

[b] Magnitude of directional dust soiling derived from Beaman and Kingsbury, 1981

[c] Direction/s not determined for daily EAC below 0.1%/day (very low soiling)

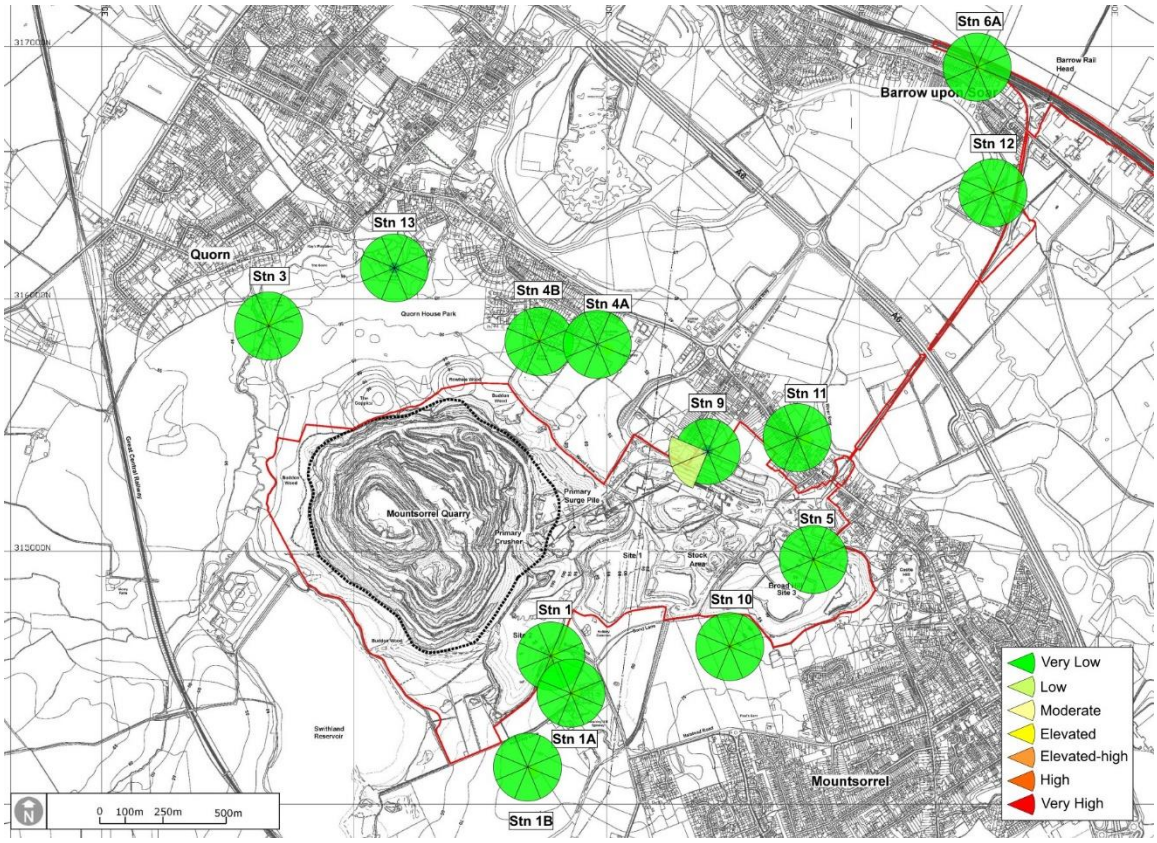

Figure 3.8: Directional dust soiling rose diagrams, 17 December 2024 – 30 January 2025

Figure 3.8 shows that the average directional soiling rates have been at Very Low levels at most monitoring locations, for most directions, over the past year. At Stn 9, the annual average soiling rate to date was 0.2 % EAC/day from the southwest and west resulting in 'Low' magnitudes being recorded. The cause or causes of these consistently, but marginally elevated dust soiling rates at this monitoring point are under review, as they may be related to site activities such as operations at the PSV yard, Granite Way and/or the toast rack.

Table 3.4: Running average directional dust soiling (past 12 months)

Receptor location	Nearest / appropriate dust monitoring point		Direction (°)							
			0	45	90	135	180	225	270	315
Swithland Lane; Rushey Lane; Kinchley Lane	Stn 1	Average value	0.1	0	0	0	0	0.1	0.1	0.1
		Magnitude[b]	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Swithland Lane; Rushey Lane; Kinchley Lane	Stn 1A	Average value	0	0	0	0	0	0.1	0.1	0.1
		Magnitude[b]	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Swithland Lane; Rushey Lane; Kinchley Lane	Stn 1B	Average value	0.1	0	0	0	0.1	0.1	0	0.1
		Magnitude[b]	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Mill Farm; Quorn House	Stn 3	Average value	0	0	0	0	0.1	0	0	0
		Magnitude[b]	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Woodside Farm, Leicester Road	Stn 4A	Average value	0	0	0	0	0	0	0.1	0
		Magnitude[b]	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Quorn Grange, Unitt Road, Northage Close, Quorn Park	Stn 4B	Average value	0	0	0.1	0.1	0.1	0	0	0
		Magnitude[b]	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Bond Lane; Crown Lane	Stn 5	Average value	0	0	0	0	0.1	0.1	0.1	0.1
		Magnitude[b]	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Sileby Road; Huston Close; Sileby Road (commercial)	Stn 6A	Average value	0	0.1	0.1	0	0	0.1	0.1	0
		Magnitude[b]	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Hawcliffe Road	Stn 9	Average value	0.1	0.1	0.1	0.1	0	0.2	0.2	0.1
		Magnitude[b]	Very Low	Very Low	Very Low	Very Low	Very Low	Low	Low	Very Low
Glebe Close; Halstead Road (south); Halstead Road (north)	Stn 10	Average value	0.1	0	0	0	0.1	0.1	0	0.1
		Magnitude[b]	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Loughborough Road; River Soar (marina / caravan park)	Stn 11	Average value	0.1	0.1	0	0	0.1	0.1	0.1	0.1
		Magnitude[b]	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Meadow Farm Marina and Caravan Park	Stn 12	Average value	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		Magnitude[b]	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Quorn House Park	Stn 13	Average value	0	0	0	0	0	0	0	0
		Magnitude[b]	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low

[a] Trigger mass deposition and Effective Area Coverage rates as in Section 7.3, ZLFMS-AG008 Dust Management and Monitoring Plan (Updated), 2015

[b] Magnitude of directional dust soiling derived from Beaman and Kingsbury, 1981

[c] Direction/s not determined for daily EAC below 0.1%/day (very low soiling)

4 Complaints

During 17 December 2024 – 30 January 2025, it is understood that no complaints were received by the quarry.

Appendix A: Off-site PM_{10} monitoring (CBC and AURN)

The daily average PM_{10} concentrations recorded by the CBC Zephyr are presented below in Figure A.1, alongside similar data from the Defra Automatic Urban and Rural Network (AURN) station in Leicester University[2].

For the 12 months leading up to 30 January 2025, there were 362 daily PM_{10} readings taken by the CBC Zephyr, and 365 daily readings taken by the Leicester AURN, representing a ~99 % data collection rate at each respective location.

From the available data the annual average daily PM_{10} concentration for the 12 months to date at CBC Zephyr was 11.61 µg/m^3, which is approximately 29 % of the annual average PM_{10} concentration objective (40 µg/m^3). At the Leicester AURN the annual average daily PM_{10} concentration for the 12 months to date was 11.02 µg/m^3 which is approximately 27.6 % of the annual average PM_{10} concentration objective.

For the 12 months up to 30 January 2025 there was one recorded instance where the daily average PM_{10} concentrations exceeded 50 µg/m^3 at the CBC Zephyr. In summary, for the 12 months up to 30 January 2025 both the annual and daily AQO were exceeded during January.

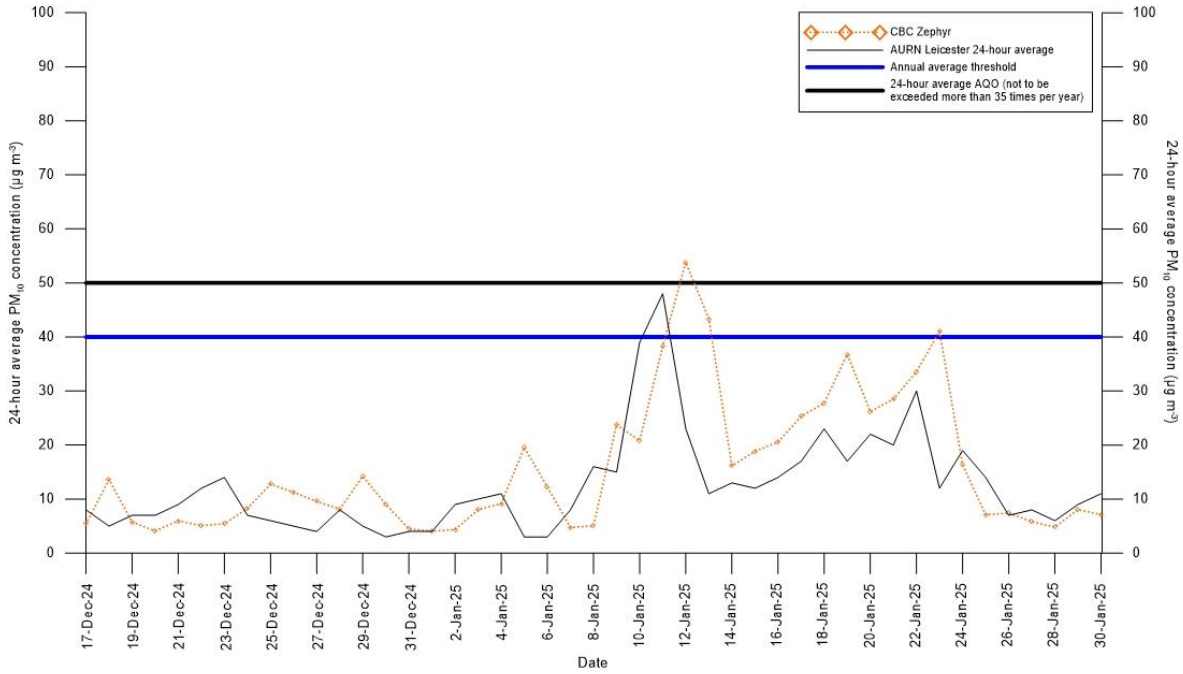

Figure A.1: Daily average PM_{10} concentration, CBC Zephyr and Leicester AURN, December 2024 – 30 January 2025

[2] http://uk-air.defra.gov.uk/networks/network-info?view=aurn

Appendix B: Off-site $PM_{2.5}$ monitoring (CBC and AURN)

The daily average $PM_{2.5}$ concentrations recorded by the CBC Zephyr are presented below in Figure B.1, alongside similar data from the Defra Automatic Urban and Rural Network (AURN) station in Leicester University.

For the 12 months leading up to 30 January 2025, there were 362 daily $PM_{2.5}$ readings taken by the CBC Zephyr, and 365 readings taken by the Leicester AURN, representing a ~99 % data collection rate respectively. From the available data the annual average daily $PM_{2.5}$ concentration for the 12 months at the CBC Zephyr was 7.4 µg/m^3, which is approximately 62 % of the interim annual average $PM_{2.5}$ concentration objective (12 µg/m^3) applicable from 31 January 2023. At the Leicester AURN the annual average daily concentration was 7.2 µg/m^3, which is approximately 60 % of the interim annual average $PM_{2.5}$ concentration objective.

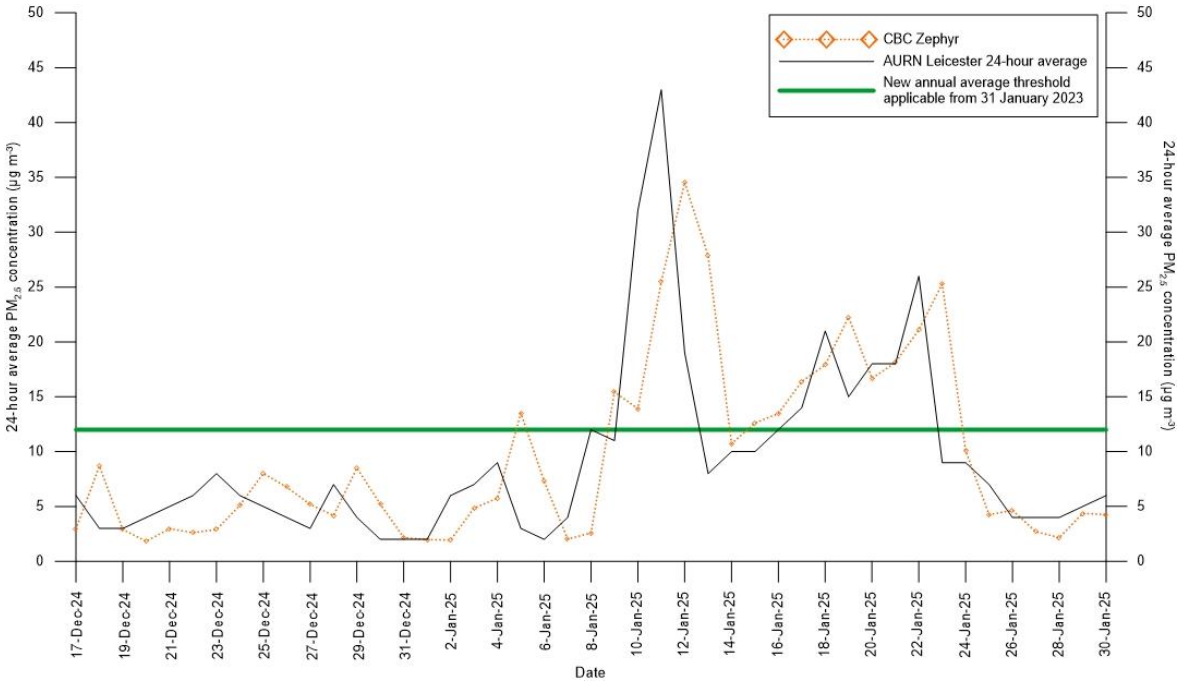

Figure B.1: Daily average $PM_{2.5}$ concentrations, CBC Zephyr and Leicester AURN, 17 December 2024 – 30 January 2025

Dust, Particulate Matter and Weather Monitoring Report: February 2025

Mountsorrel Quarry

April, 2025

Tarmac

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Document Control Sheet

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This report may include data obtained from trusted third-party consultants/laboratories that have been supplied to us in good faith. Whilst we do everything we can to ensure the quality of all the data we use, we cannot be held responsible for the accuracy or integrity of third-party data.

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1 Introduction

Mountsorrel Quarry has a comprehensive Dust Management and Monitoring Plan (DMMP). The DMMP was developed in 2011 and is subject to regular review and revision, in consultation between Tarmac and the local regulators (Leicestershire County Council (LCC) and Charnwood Borough Council (CBC)).

The DMMP is enacted through the quarry Site Improvement Plan (SIP). The SIP sets out a programme of actions to reduce the environmental impact of specific areas of the site operation, and is updated regularly by quarry management, with support from DustScanAQ through regular site visits and quarterly reviews with LCC and CBC.

Section 7.5 of the DMMP requires that a monthly summary and review of dust and particulate matter monitoring is prepared and circulated with LCC, CBC and the Environment Agency.

This report details the results of dust, particulate matter and weather monitoring around Mountsorrel Quarry during the period 30 January – 26 February 2025.

1.1 Report scope

The intention of this report is to summarise dust and particulate matter monitoring results for the given period and compare them against site-specific alert limits and thresholds. This report also details the results of any investigation carried out into elevated dust or particulate matter levels, as prompted by an exceedance of alert limits or thresholds.

1.2 Dust definitions

'Dust' is generally regarded as particulate matter up to 75 µm (micron) diameter and can be considered in two categories. Fine dust, essentially particles up to 10 µm, is commonly referred to as PM_{10} and is measured to agreed standards and forms part of the national Air Quality Objectives (AQO). The AQO for PM_{10} is currently 50 µg/m^3 for the 24-hour mean, not to be exceeded 35 times per year and 40 µg/m^3 for the annual mean. Particles up to 2.5 µm in diameter are referred to as $PM_{2.5}$. The interim AQO for $PM_{2.5}$ is 12 µg/m^3 for the annual mean (to be achieved by 2028), whilst the legal AQO for $PM_{2.5}$ is 10 µg/m^3 for the annual mean (to be achieved by 2040) as per The Environmental Targets (Fine Particulate Matter) (England) Regulations 2023[1].

It may be noted that the above Regulations relate to average particle concentrations in Local Authority districts thus do not apply to any specific industrial or other operation, such as Mountsorrel Quarry, and are included for reference.

[1] Statutory Instrument. (2023), 'The Environmental Targets (Fine Particulate Matter) (England) Regulations', No. 96. King's Printer of Acts of Parliament

Coarser dust (essentially particles greater than 10 µm) is generally regarded as ‘nuisance dust’ and can be associated with annoyance, although there are no official standards (such as AQO) for dust annoyance.

2 Sampler locations

As shown in Figure 2.1 and Table 2.1, dust, particulate matter and weather conditions are measured at a number of locations around site and the surrounding area:

- Directional and depositional dust: currently monitored at 13 locations;
- Particulate matter: currently monitored at two locations;
- Weather conditions: currently monitored at one location.

The majority of the dust samplers around Mountsorrel Quarry comprise the 'Frisbee-type' deposition gauge combined with an adhesive 'sticky pad' directional gauge. These samplers are used to monitor 'nuisance' dust and samples from these instruments are collected on a monthly basis.

For particulate matter, Turnkey Osiris samplers are located at Stn 9 (Hawcliffe Road) and at Stn 13 (Quorn House). These recognised and certificated 'indicative' real-time devices are connected to their own wind vane and anemometer and provide near-instantaneous directional PM_{10}, $PM_{2.5}$ and PM_1 data directly to the quarry management team.

A weather station is located at the site offices off Wood Lane and collects a range of weather parameters over fifteen-minute intervals. Data from the weather station are available to the quarry management by means of a dedicated modem connection to the internet.

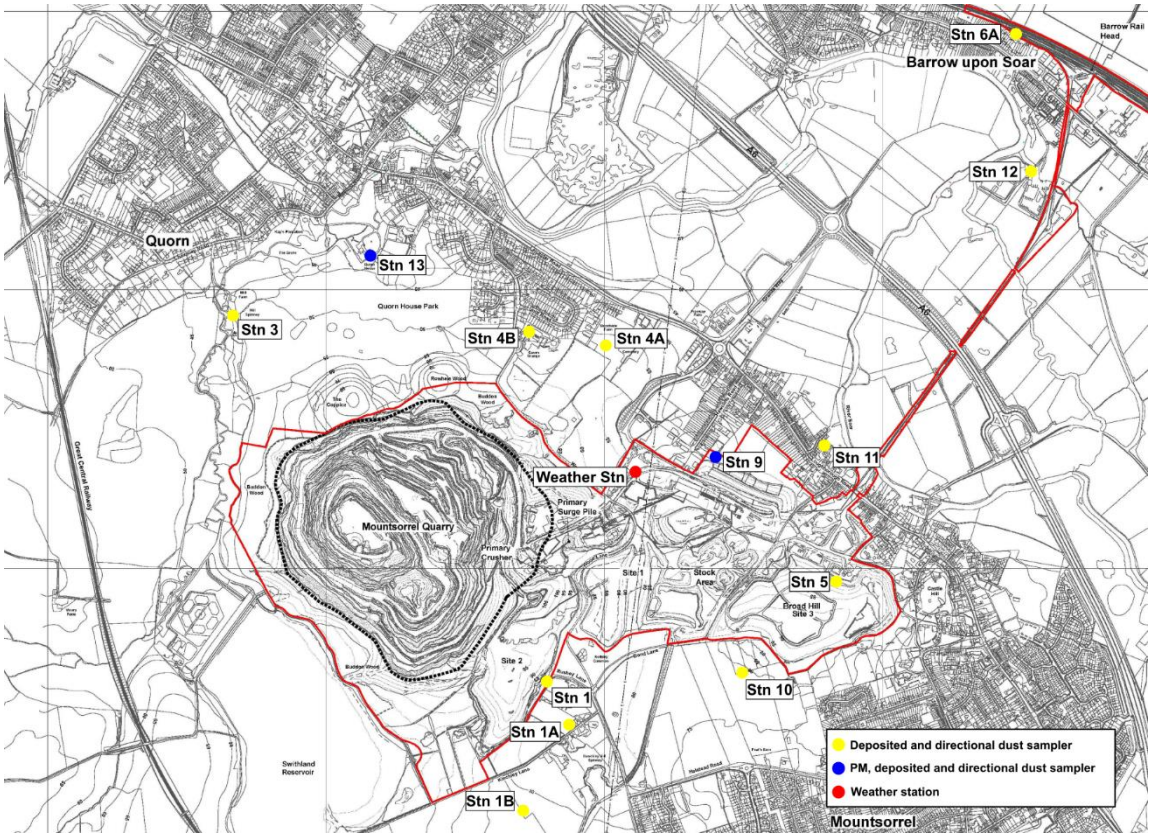

Figure 2.1: Particulate matter, dust and weather monitoring locations, Mountsorrel Quarry

Table 2.1: Weather, particulate matter and dust monitoring locations, Mountsorrel Quarry

Sampler reference	Easting	Northing	Locality monitored
Stn 1	456781	314577	Swithland Lane; Rushey Lane; Kinchley Lane
Stn 1A	456891	314436	Swithland Lane; Rushey Lane; Kinchley Lane
Stn 1B	456715	314109	Swithland Lane; Rushey Lane; Kinchley Lane
Stn 3	455681	315847	Mill Farm; Quorn House
Stn 4A	457000	315805	Woodside Farm; Leicester Road
Stn 4B	456733	315778	Quorn Grange, Unitt Road, Northage Close, Quorn Park
Stn 5	457789	314941	Bond Lane; Crown Lane
Stn 6A	458660	316786	Sileby Road; Huston Close; Sileby Road (commercial)
Stn 9 (inc. PM)	457374	315398	Hawcliffe Road
Stn 10	457487	314626	Glebe Close; Halstead Road (south); Halstead Road (north)
Stn 11	457791	315458	Loughborough Road; River Soar (marina / caravan park)
Stn 12	458575	315459	Meadow Farm Marina and Caravan Park
Stn 13 (incl. PM)	456158	316090	Northage Close, Meeting Street
Weather Station	457126	315376	Wood Lane Site Offices

Charnwood Borough Council (CBC) is responsible for the monitoring of air quality within the borough and prepares Air Quality Annual Status Reports (ASRs) for submission to Defra. It operates a Zephyr air quality monitor which is located within the Leicestershire County Council (LCC) depot at the southern end of Hawcliffe Road, in close proximity to the Osiris device at Stn 9. This device measures a number of pollutants including PM_{10} and $PM_{2.5}$, allowing CBC to compare concentrations against the relevant AQOs for these pollutants.

For additional context, the latest PM_{10} and $PM_{2.5}$ monitoring data from CBC are summarised in Appendix A and Appendix B.

2.1 Alert thresholds and response procedures

To help the site reduce its impact on the surrounding area, a number of alert thresholds have been calculated, as outlined in Table 2.2.

Table 2.2: Alert thresholds

Pollutant	Threshold	Averaging period	Applies to
PM_{10}	125 µg/m^3	15 minutes	Stn 9 (Hawcliffe Road), Stn 13 (Quorn House)
Deposited dust	125 mg/m^2/day	1 month	All deposited dust monitoring locations

For particulate matter (PM_{10}) an alert threshold of 125 µg/m^3 for the 15-minute average has been in use for several years.

Many years of monitoring and research have shown that the quarry is not a significant source of fine particulate matter ($PM_{2.5}$) hence no alert threshold for this size fraction is required.

PM_{10} and $PM_{2.5}$ concentrations recorded by CBC at the southern end of Hawcliffe Road and by Defra through the Automatic Urban and Rural Network (AURN) at Leicester University are presented in Appendix A and Appendix B respectively. Data from both locations have been compared against relevant Air Quality Objectives (AQOs) for PM_{10} and $PM_{2.5}$.

For deposited dust, the DMMP sets out a site-wide deposited dust threshold of 125 mg/m^2/day 'undissolved solids' as a trigger limit for investigation to identify the potential dust source/s, taking account of the directional data.

3 Results

3.1 Weather monitoring

Weather conditions can have a significant effect on the potential for dust propagation from a mineral site. Of particular importance are wind speeds, wind direction, and precipitation. Dust can be carried from a source towards receptors (such as nearby homes and other businesses) according to the strength and direction of wind. Precipitation is recognised to suppress dust and 0.2 mm antecedent rainfall is considered sufficient to suppress windblown dust for a number of hours.

The key weather data which might affect dust propagation (wind speed, wind direction, total daily precipitation and average daily temperature) for this reporting period are summarised in Figure 3.1 and Figure 3.2.

The monitoring period was characterised by generally cool temperatures, with mild temperatures observed in late February. The maximum daily temperature was 12.9 °C, recorded on 21 February 2025 and the minimum daily temperature was 0.7 °C, recorded on 06 February 2025. Overall, the monitoring period was reasonably wet with precipitation recorded on 61% of days.

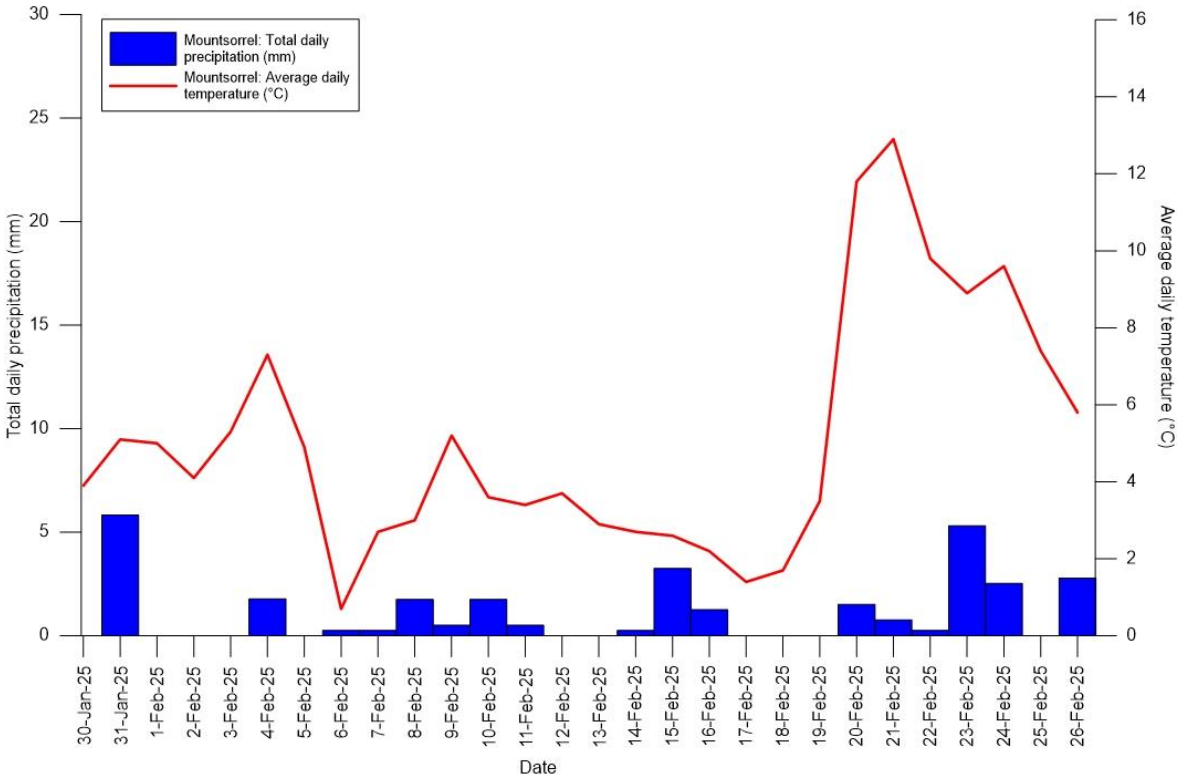

Figure 3.1: Total daily precipitation and average daily temperature, Mountsorrel Quarry, 30 January – 26 February 2025

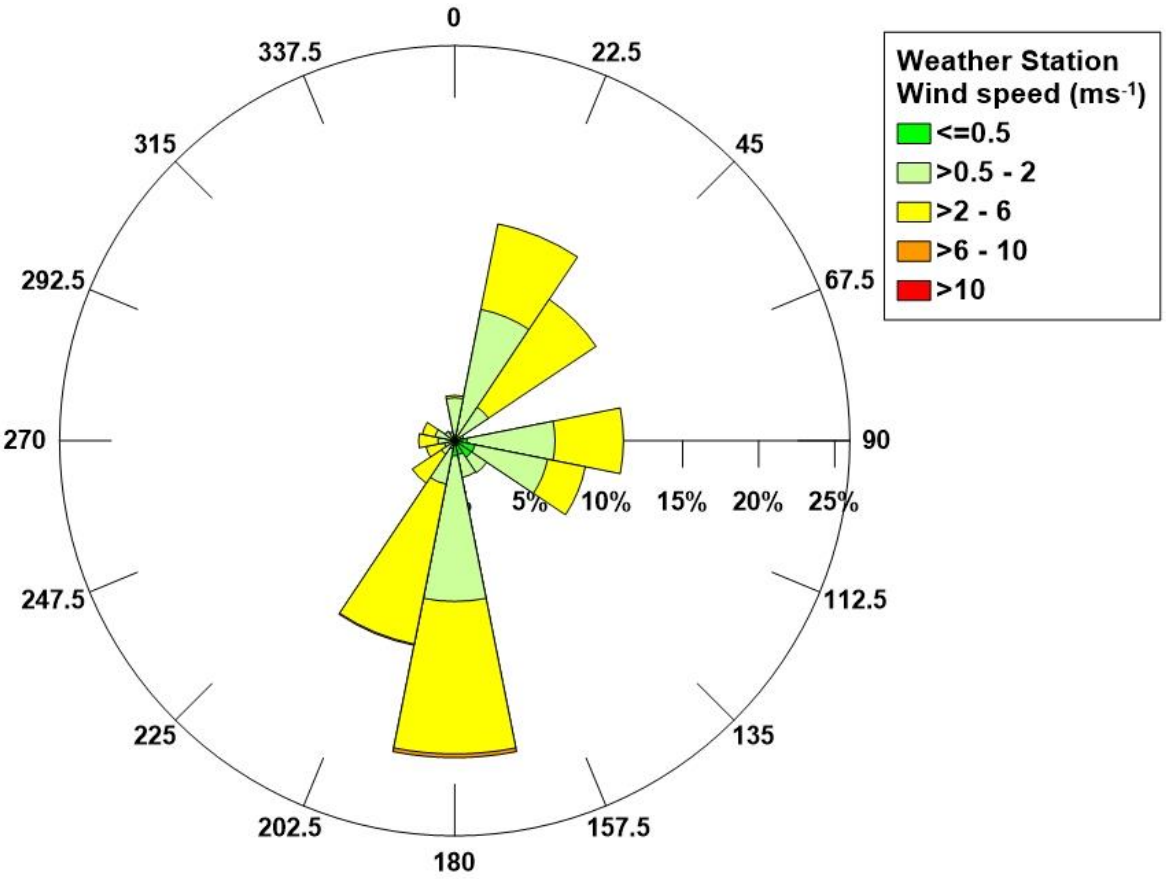

Figure 3.2: Wind rose, Mountsorrel Quarry, Mountsorrel, 30 January – 26 February 2025

As seen in Figure 3.2, winds were predominantly calm to moderate in speed (>0.5 – 6 m/s) for the majority of the monitoring period from the south and northeast, with less frequent easterly winds. However, there were some occasional high wind speeds (6 – 10 m/s) recorded from the south during this period. consequently, there may have been slight potential for dust propagation generally towards the north, southwest and west throughout the monitoring period.

3.2 Particulate matter

3.2.1 PM_{10}

The available 15-minute data from the period of review are presented for both monitoring locations in Figure 3.4 and Figure 3.4. The red line denotes the site trigger level (125 µg/m^3 over the 15-minute average), whilst the dashed black line denotes the average concentration recorded over this period.

Additional PM_{10} monitoring data (collected by CBC and the Defra AURN monitoring network) are provided in Appendix A.

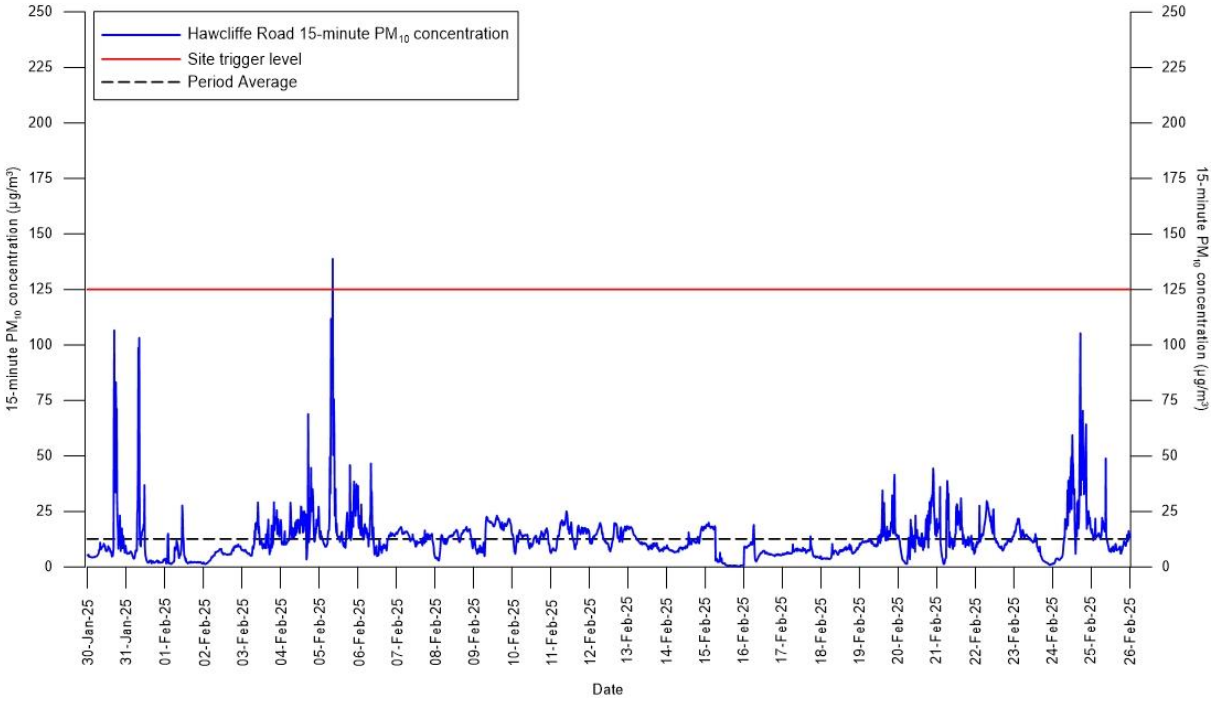

Figure 3.3: 15-minute mean PM_{10} concentration, Hawcliffe Road, 30 January – 26 February 2025

Figure 3.3 indicates that the overall average concentration for this period was 12.65 µg/m^3, with the alert threshold being exceeded on one day; details of this exceedance are provided in Table 3.1.

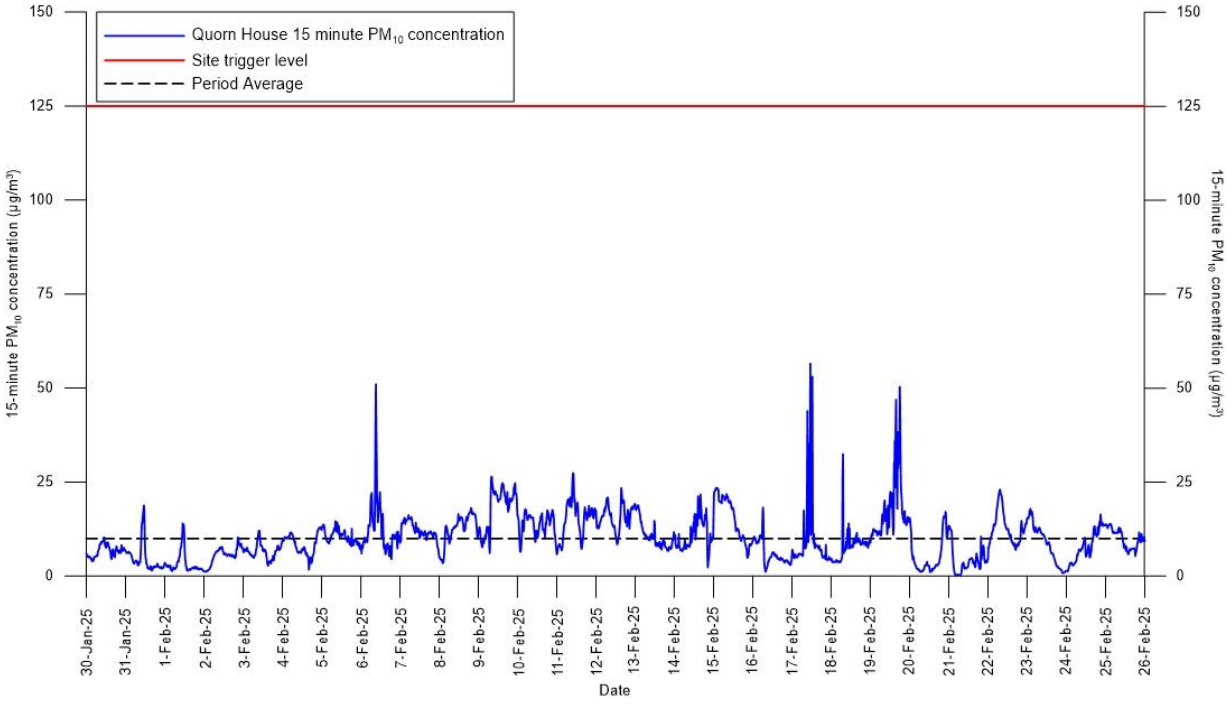

Figure 3.4: 15-minute mean PM_{10} concentration, Quorn House, 30 January – 26 February 2025

At Quorn house there were no exceedances of the PM_{10} site trigger, and the overall average for this period was 9.97 µg/m^3.

During this review period, trigger emails alerting staff to high PM_{10} levels from the direction of site operations were sent out on one occasion from the Hawcliffe Road Osiris. Details of the corresponding causes and investigations are provided in Table 3.1.

Table 3.1: Email alert responses, between 30 January – 26 February 2025 (using the trigger threshold, 125 µg/m³ for the 15-minute average)

Date of alert	Monitor	Details	Possible cause and investigation
05/02/2025	TNO3838 (Hawcliffe Road)	Exceedance recorded from the southwest in the morning.	Full site investigation at the time of the alert. Every section reported that all dust suppression was working, no visible dust, all stack monitoring within permitted levels. No issues identified.

3.2.2 $PM_{2.5}$

The results of $PM_{2.5}$ monitoring at Hawcliffe Road and Quorn House are presented in Figure 3.5 and Figure 3.6. The dashed black line denotes the average concentration recorded over this period.

Additional $PM_{2.5}$ monitoring data (collected by CBC and the Defra AURN monitoring network) are provided in Appendix B.

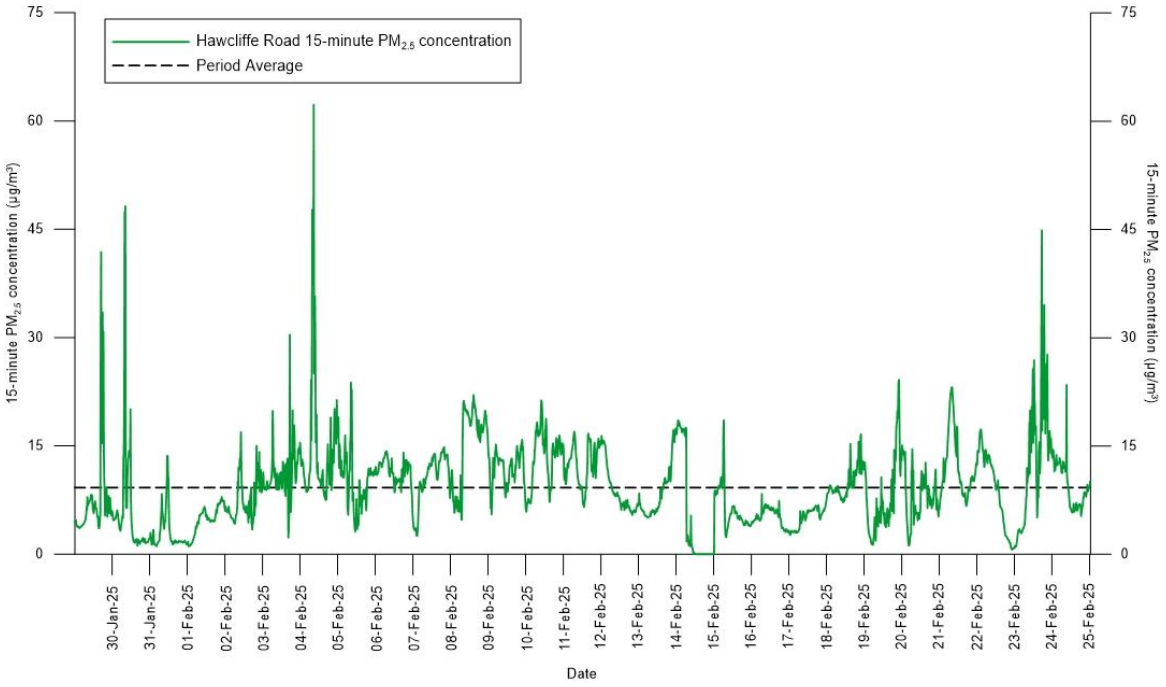

Figure 3.5: 15-minute mean $PM_{2.5}$ concentration, Hawcliffe Road, 30 January – 26 February 2025

At Hawcliffe Road, the overall average concentration for this period was 9.22 µg/m³, whilst at Quorn House, the overall average was 8.38 µg/m³. In general, the overall pattern of $PM_{2.5}$ concentrations at both locations is similar for the data that is available during this monitoring period, although concentrations tend to be slightly higher at Hawcliffe Road.

For this period, 73% of PM_{10} recorded at Hawcliffe Road comprised $PM_{2.5}$, whilst it made up 85% at Quorn House.

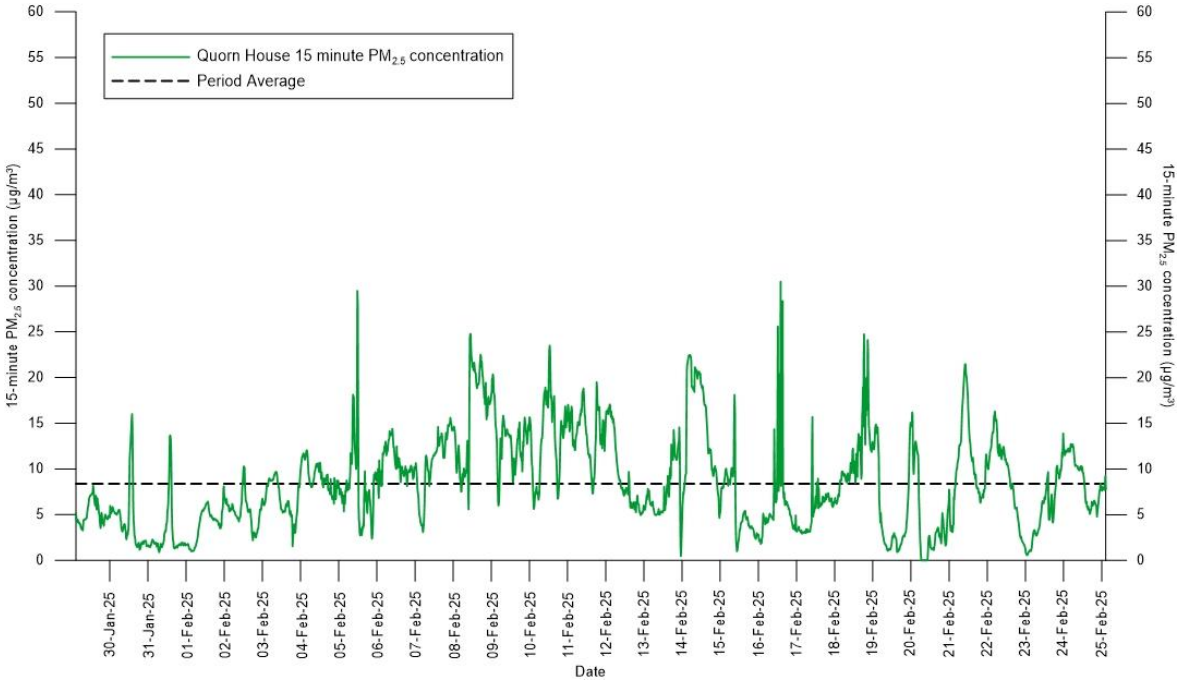

Figure 3.6: 15-minute mean $PM_{2.5}$ concentration, Quorn House, 30 January – 26 February 2025

3.3 Visible dust

3.3.1 Deposited dust monitoring summary

The deposited dust data for 30 January – 26 February 2025 are summarised in Table 3.2. As outlined earlier, there is a site-wide threshold for investigation to identify the potential dust source/s, taking account of the directional data. Table 3.2 shows that, for the available data, deposited dust levels during 30 January – 26 February 2025 were all within the site-specific threshold for all stations, with Stn 9 experiencing slightly elevated levels during this period.

Table 3.2: Summary of deposited dust (undissolved solids), 30/01/25 – 26/02/25

Undissolved solids (mg/m^2/day)				
This month report start date:		**30-Jan-25**		
This month report end date:		**26-Feb-25**		
Receptor location	**Nearest / appropriate dust monitoring point**	**Reported value**	**Trigger: ≥ 125[a]**	**Magnitude[b]**
Swithland Lane; Rushey Lane; Kinchley Lane	Stn 1	49	No	**Very Low**
Swithland Lane; Rushey Lane; Kinchley Lane	Stn 1A	44	No	**Very Low**
Swithland Lane; Rushey Lane; Kinchley Lane	Stn 1B	29	No	**Very Low**
Mill Farm; Quorn House	Stn 3	18	No	**Very Low**
Woodside Farm, Leicester Road	Stn 4A	34	No	**Very Low**
Quorn Grange, Unitt Road, Northage Close, Quorn Park	Stn 4B	14	No	**Very Low**
Bond Lane; Crown Lane	Stn 5	18	No	**Very Low**
Sileby Road; Huston Close; Sileby Road (commercial)	Stn 6A	45	No	**Very Low**
Hawcliffe Road	Stn 9	95	No	**Slightly Elevated**
Glebe Close; Halstead Road (south); Halstead Road (north)	Stn 10	28	No	**Very Low**
Loughborough Road; River Soar (marina / caravan park)	Stn 11	47	No	**Very Low**
Meadow Farm Marina and Caravan Park	Stn 12	45	No	**Very Low**
Quorn House Park	Stn 13	14	No	**Very Low**

[a] Trigger mass deposition and Effective Area Coverage rates as in Section 7.3, ZLFMS-AG008 Dust Management and Monitoring Plan (Updated), 2015

[b] Magnitude of mass deposition rate assessed against typical rate for semi-rural areas (30 - 80 mg/m^2/day)

Regarding dust deposition over time, the rates across the sampling area have varied considerably. Trends in dust deposition rates (as undissolved solids) for the previous 12 months, together with the site-wide dust threshold are illustrated in Figure 3.7.

In general, as would be expected, dust deposition rates are typically lower in winter months than in summer months. This trend is clearly seen for most monitoring points in Figure 3.7, with some exceptions. Dust deposition rates have been consistently below the 'trigger limit' at all sampling locations except at Stn 9.

In general, as shown in Figure 3.7, higher rates of dust deposition have been recorded near industrial settings (*i.e.* Stn 9) than in more residential areas (*e.g.* Stn 1, Kinchley Lane).

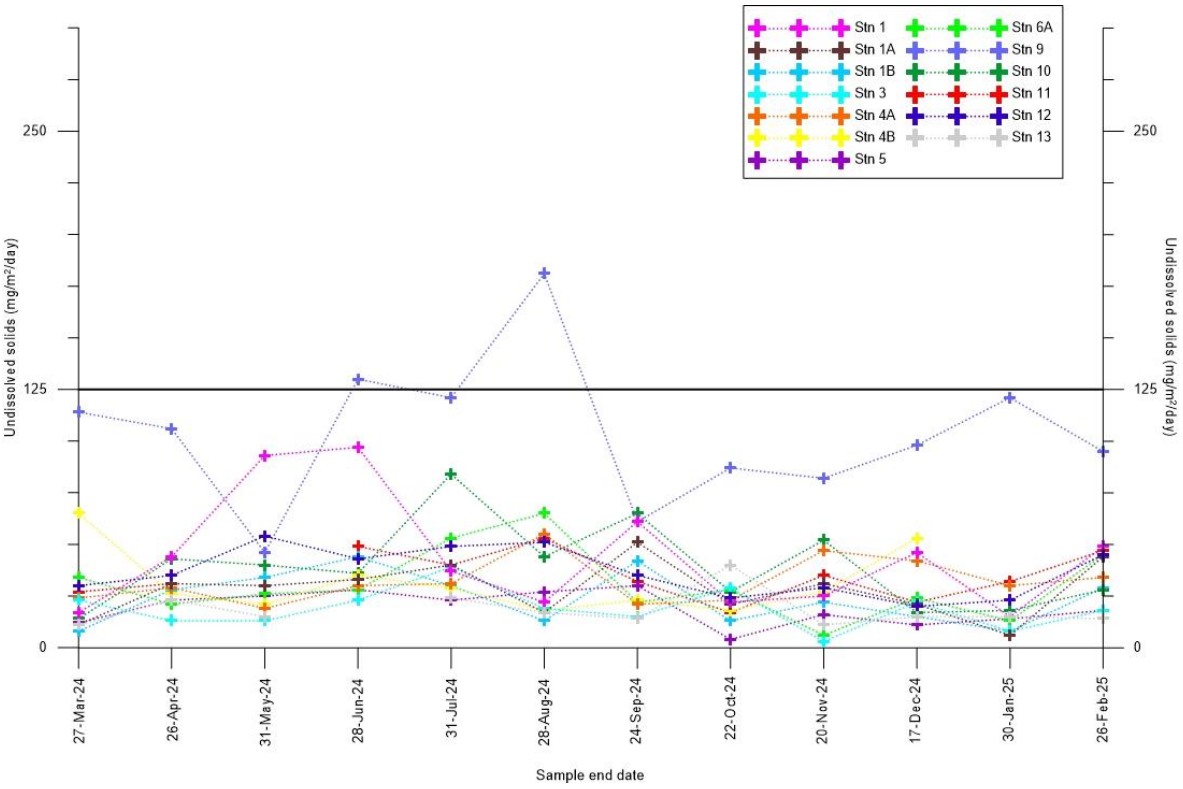

Figure 3.7: Dust deposition rates per sampling location over time (past 12 months)

3.3.2 Directional dust monitoring summary

The directional dust data for 30 January – 26 February 2025 are summarised in Table 3.3, and are presented graphically in Figure 3.8. As with deposited dust, the DMMP sets out a site-wide directional dust threshold. For directional dust soiling, 0.5 % Effective Area Coverage (EAC) per day is a trigger limit for investigation to identify the likely dust source/s, again taking account of the direction.

Table 3.3 and Figure 3.8 show that during 30 January – 26 February 2025, most stations recorded Very Low to Low dust levels from all directions, with moderate dust levels observed at Stn 1A, Stn 6A, Stn 9 and Stn 11, all from offsite directions. Stn 11 exceeded the trigger level of 0.5 % EAC, however, this was not coming from the direction of site operations. The increase in dust propagation from offsite directions during this monitoring interval may be due to few south-westerly winds and relatively increased northeasterly

winds observed. During the periods dominated by northeasterly winds, cold temperatures (up to 6 °C) and little to no rainfall was recorded, which would explain the strong northeast signal during this monitoring period.

Table 3.3: Summary of directional dust soiling, 30 January – 26 February 2025

Directional dust soiling (%EAC/day) by direction (°)										
This month report start date:		30-Jan-25								
This month report end date:		26-Feb-25								
Receptor location	Nearest / appropriate dust monitoring point		Direction (°)							
			0	45	90	135	180	225	270	315
Swithland Lane; Rushey Lane; Kinchley Lane	Stn 1	Reported value	0.1	0.2	0.2	0.1	0.1	0.1	0.1	0.1
		Trigger: ≥ 0.5[a]	No	No	No	No	No	No	No	No
		Magnitude[b]	Very Low	Low	Low	Very Low	Very Low	Very Low	Very Low	Very Low
Swithland Lane; Rushey Lane; Kinchley Lane	Stn 1A	Reported value	0.2	0.4	0.3	0.1	0.1	0.1	0.1	0.1
		Trigger: ≥ 0.5[a]	No	No	No	No	No	No	No	No
		Magnitude[b]	Low	Moderate	Low	Very Low	Very Low	Very Low	Very Low	Very Low
Swithland Lane; Rushey Lane; Kinchley Lane	Stn 1B	Reported value	0.3	0.2	0.1	0.1	0.1	0.1	0.1	0.2
		Trigger: ≥ 0.5[a]	No	No	No	No	No	No	No	No
		Magnitude[b]	Low	Low	Very Low	Very Low	Very Low	Very Low	Very Low	Low
Mill Farm; Quorn House	Stn 3	Reported value	0.2	0.3	0.2	0.1	0.1	0.1	0.1	0.1
		Trigger: ≥ 0.5[a]	No	No	No	No	No	No	No	No
		Magnitude[b]	Low	Low	Low	Very Low	Very Low	Very Low	Very Low	Very Low
Woodside Farm, Leicester Road	Stn 4A	Reported value	0.2	0.3	0.3	0.1	0.1	0.1	0.1	0.1
		Trigger: ≥ 0.5[a]	No	No	No	No	No	No	No	No
		Magnitude[b]	Low	Low	Low	Very Low	Very Low	Very Low	Very Low	Very Low
Quorn Grange, Unitt Road, Northage Close, Quorn Park	Stn 4B	Reported value	0	0.1	0.1	0.1	0.1	0.1	0	0.1
		Trigger: ≥ 0.5[a]	No	No	No	No	No	No	No	No
		Magnitude[b]	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Bond Lane; Crown Lane	Stn 5	Reported value	0.3	0.3	0.2	0.2	0.2	0.1	0.1	0.2
		Trigger: ≥ 0.5[a]	No	No	No	No	No	No	No	No
		Magnitude[b]	Low	Low	Low	Low	Low	Very Low	Very Low	Low
Sileby Road; Huston Close; Sileby Road (commercial)	Stn 6A	Reported value	0.2	0.4	0.4	0.3	0.1	0.1	0	0.1
		Trigger: ≥ 0.5[a]	No	No	No	No	No	No	No	No
		Magnitude[b]	Low	Moderate	Moderate	Low	Very Low	Very Low	Very Low	Very Low
Hawcliffe Road	Stn 9	Reported value	0.2	0.4	0.4	0.3	0.1	0.2	0.2	0.1
		Trigger: ≥ 0.5[a]	No	No	No	No	No	No	No	No
		Magnitude[b]	Low	Moderate	Moderate	Low	Very Low	Low	Low	Very Low
Glebe Close; Halstead Road (south); Halstead Road (north)	Stn 10	Reported value	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1
		Trigger: ≥ 0.5[a]	No	No	No	No	No	No	No	No
		Magnitude[b]	Very Low	Very Low	Very Low	Very Low	Low	Very Low	Very Low	Very Low
Loughborough Road; River Soar (marina / caravan park)	Stn 11	Reported value	0.3	0.5	0.4	0.2	0.2	0.1	0.1	0.1
		Trigger: ≥ 0.5[a]	No	**Yes**	No	No	No	No	No	No
		Magnitude[b]	Low	Moderate	Moderate	Low	Low	Very Low	Very Low	Very Low
Meadow Farm Marina and Caravan Park	Stn 12	Reported value	0.3	0.3	0.2	0.1	0.1	0.1	0.1	0.1
		Trigger: ≥ 0.5[a]	No	No	No	No	No	No	No	No
		Magnitude[b]	Low	Low	Low	Very Low	Very Low	Very Low	Very Low	Very Low
Quorn House Park	Stn 13	Reported value	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		Trigger: ≥ 0.5[a]	No	No	No	No	No	No	No	No
		Magnitude[b]	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low

[a] Trigger mass deposition and Effective Area Coverage rates as in Section 7.3, ZLFMS-AG008 Dust Management and Monitoring Plan (Updated), 2015

[b] Magnitude of directional dust soiling derived from Beaman and Kingsbury, 1981

[c] Direction/s not determined for daily EAC below 0.1%/day (very low soiling)

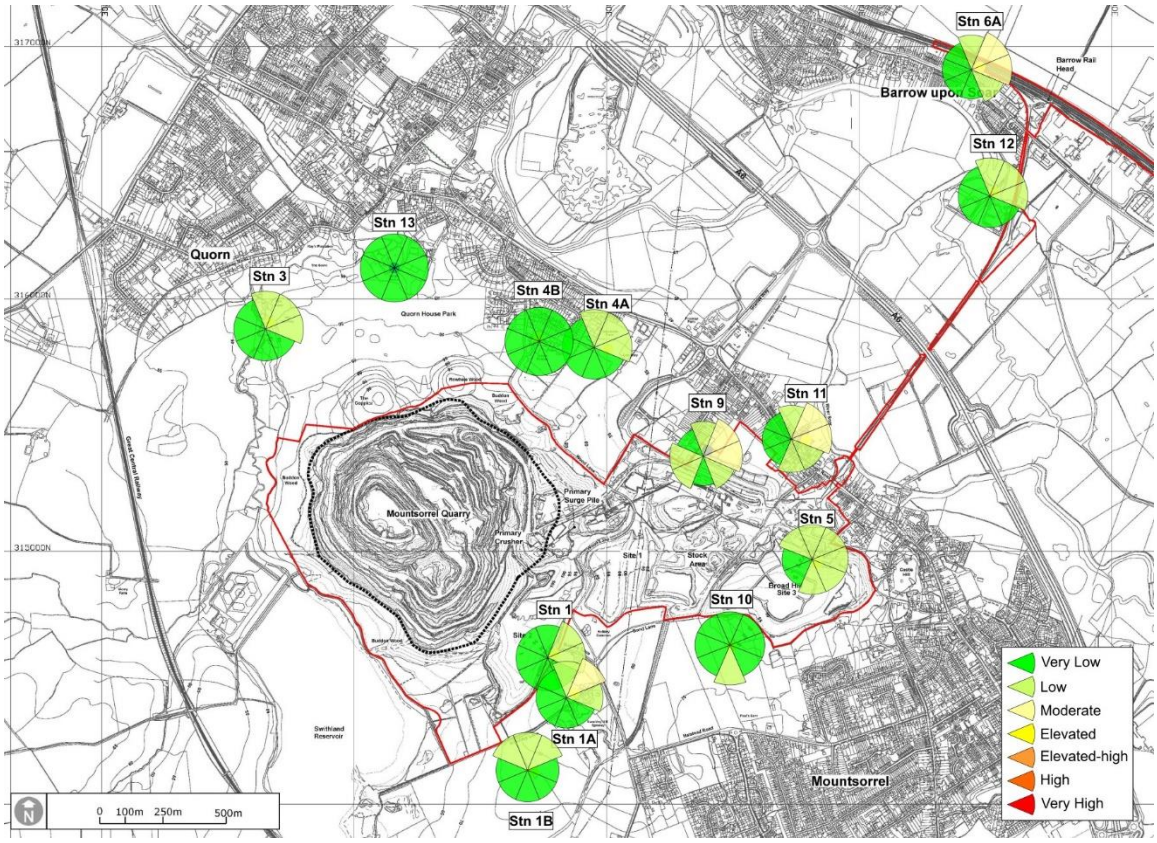

Figure 3.8: Directional dust soiling rose diagrams, 30 January – 26 February 2025

Table 3.4 shows that the average directional soiling rates have been at Very Low levels at most monitoring locations, for most directions, over the past year. At Stn 9, the annual average soiling rate to date was 0.2 % EAC/day from the southwest and west resulting in 'Low' magnitudes being recorded. The cause or causes of these consistently, but marginally elevated dust soiling rates at this monitoring point are under review, as they may be related to site activities such as operations at the PSV yard, Granite Way and/or the toast rack.

Table 3.4: Running average directional dust soiling (past 12 months)

Receptor location	Nearest / appropriate dust monitoring point		Direction (°)							
			0	45	90	135	180	225	270	315
Swithland Lane; Rushey Lane; Kinchley Lane	Stn 1	Average value	0.1	0	0	0	0	0.1	0.1	0.1
		Magnitude[b]	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Swithland Lane; Rushey Lane; Kinchley Lane	Stn 1A	Average value	0.1	0.1	0.1	0	0	0.1	0.1	0.1
		Magnitude[b]	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Swithland Lane; Rushey Lane; Kinchley Lane	Stn 1B	Average value	0.1	0	0	0	0.1	0.1	0.1	0.1
		Magnitude[b]	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Mill Farm; Quorn House	Stn 3	Average value	0	0.1	0.1	0	0.1	0.1	0	0
		Magnitude[b]	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Woodside Farm, Leicester Road	Stn 4A	Average value	0	0.1	0.1	0	0	0.1	0.1	0
		Magnitude[b]	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Quorn Grange, Unitt Road, Northage Close, Quorn Park	Stn 4B	Average value	0	0	0.1	0.1	0.1	0	0	0
		Magnitude[b]	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Bond Lane; Crown Lane	Stn 5	Average value	0.1	0.1	0	0	0.1	0.1	0.1	0.1
		Magnitude[b]	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Sileby Road; Huston Close; Sileby Road (commercial)	Stn 6A	Average value	0	0.1	0.1	0.1	0	0.1	0.1	0.1
		Magnitude[b]	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Hawcliffe Road	Stn 9	Average value	0.1	0.1	0.1	0.1	0	0.2	0.2	0.1
		Magnitude[b]	Very Low	Very Low	Very Low	Very Low	Very Low	Low	Low	Very Low
Glebe Close; Halstead Road (south); Halstead Road (north)	Stn 10	Average value	0.1	0	0	0	0.1	0.1	0	0.1
		Magnitude[b]	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Loughborough Road; River Soar (marina / caravan park)	Stn 11	Average value	0.1	0.1	0.1	0	0.1	0.1	0.1	0.1
		Magnitude[b]	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Meadow Farm Marina and Caravan Park	Stn 12	Average value	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		Magnitude[b]	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Quorn House Park	Stn 13	Average value	0	0	0	0	0	0	0	0
		Magnitude[b]	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low

[a] Trigger mass deposition and Effective Area Coverage rates as in Section 7.3, ZLFMS-AG008 Dust Management and Monitoring Plan (Updated), 2015

[b] Magnitude of directional dust soiling derived from Beaman and Kingsbury, 1981

[c] Direction/s not determined for daily EAC below 0.1%/day (very low soiling)

4 Complaints

During 30 January – 26 February 2025, it is understood that one complaint was received by the quarry. This was investigated in accordance with the procedure outlined in the DMMP.

Appendix A: Off-site PM_{10} monitoring (CBC and AURN)

The daily average PM_{10} concentrations recorded by the CBC Zephyr are presented below in Figure A.1, alongside similar data from the Defra Automatic Urban and Rural Network (AURN) station in Leicester University[2].

For the 12 months leading up to 26 February 2025, there were 363 daily PM_{10} readings taken by the CBC Zephyr, and 365 daily readings taken by the Leicester AURN, representing a ~99 % data collection rate at each respective location.

From the available data the annual average daily PM_{10} concentration for the 12 months to date at CBC Zephyr was 12.78 µg/m^3, which is approximately 32 % of the annual average PM_{10} concentration objective (40 µg/m^3). At the Leicester AURN the annual average daily PM_{10} concentration for the 12 months to date was 11.71 µg/m^3 which is approximately 29.3 % of the annual average PM_{10} concentration objective.

For the 12 months up to 26 February 2025 there was one recorded instance where the daily average PM_{10} concentrations exceeded 50 µg/m^3 at the CBC Zephyr. In summary, for the 12 months up to 26 February 2025 neither the annual nor daily AQO have been exceeded.

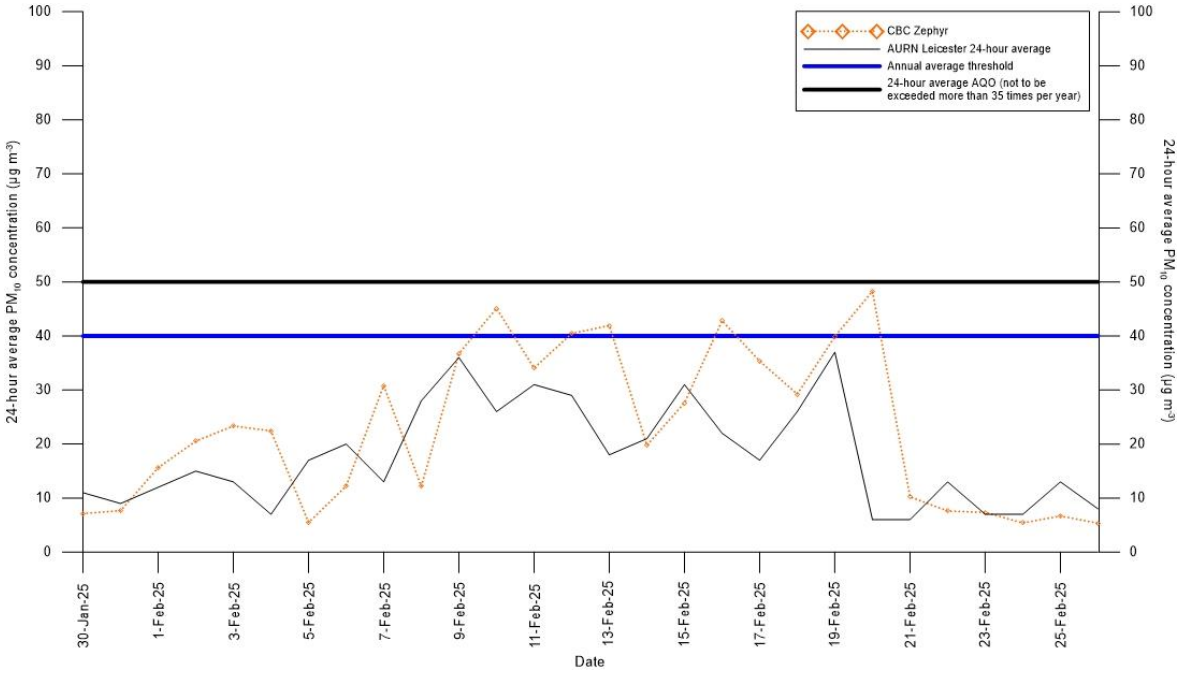

Figure A.1: Daily average PM_{10} concentration, CBC Zephyr and Leicester AURN, 30 January – 26 February 2025

[2] http://uk-air.defra.gov.uk/networks/network-info?view=aurn

Appendix B: Off-site $PM_{2.5}$ monitoring (CBC and AURN)

The daily average $PM_{2.5}$ concentrations recorded by the CBC Zephyr are presented below in Figure B.1, alongside similar data from the Defra Automatic Urban and Rural Network (AURN) station in Leicester University.

For the 12 months leading up to 26 February 2025, there were 363 daily $PM_{2.5}$ readings taken by the CBC Zephyr, and 365 readings taken by the Leicester AURN, representing a ~99 % data collection rate respectively. From the available data the annual average daily $PM_{2.5}$ concentration for the 12 months at the CBC Zephyr was 8.2 µg/m^3, which is approximately 68 % of the interim annual average $PM_{2.5}$ concentration objective (12 µg/m^3) applicable from 31 January 2023. At the Leicester AURN the annual average daily concentration was 7.8 µg/m^3, which is approximately 65 % of the interim annual average $PM_{2.5}$ concentration objective.

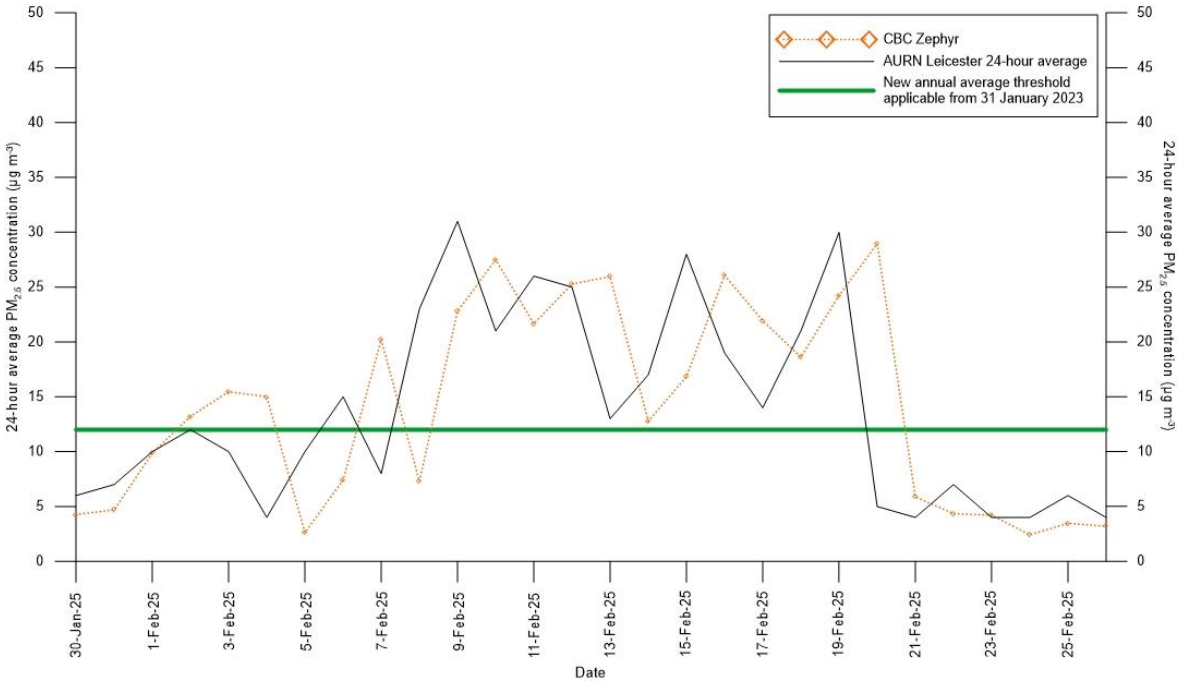

Figure B.1: Daily average $PM_{2.5}$ concentrations, CBC Zephyr and Leicester AURN, 30 January – 26 February 2025

Dust, Particulate Matter and Weather Monitoring Report: March 2025

Mountsorrel Quarry

May, 2025

Tarmac

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Document Control Sheet

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1 Introduction

Mountsorrel Quarry has a comprehensive Dust Management and Monitoring Plan (DMMP). The DMMP was developed in 2011 and is subject to regular review and revision, in consultation between Tarmac and the local regulators (Leicestershire County Council (LCC) and Charnwood Borough Council (CBC)).

The DMMP is enacted through the quarry Site Improvement Plan (SIP). The SIP sets out a programme of actions to reduce the environmental impact of specific areas of the site operation, and is updated regularly by quarry management, with support from DustScanAQ through regular site visits and quarterly reviews with LCC and CBC.

Section 7.5 of the DMMP requires that a monthly summary and review of dust and particulate matter monitoring is prepared and circulated with LCC, CBC and the Environment Agency.

This report details the results of dust, particulate matter and weather monitoring around Mountsorrel Quarry during the period 26 February – 27 March 2025.

1.1 Report scope

The intention of this report is to summarise dust and particulate matter monitoring results for the given period and compare them against site-specific alert limits and thresholds. This report also details the results of any investigation carried out into elevated dust or particulate matter levels, as prompted by an exceedance of alert limits or thresholds.

1.2 Dust definitions

'Dust' is generally regarded as particulate matter up to 75 µm (micron) diameter and can be considered in two categories. Fine dust, essentially particles up to 10 µm, is commonly referred to as PM_{10} and is measured to agreed standards and forms part of the national Air Quality Objectives (AQO). The AQO for PM_{10} is currently 50 µg/m^3 for the 24-hour mean, not to be exceeded 35 times per year and 40 µg/m^3 for the annual mean. Particles up to 2.5 µm in diameter are referred to as $PM_{2.5}$. The interim AQO for $PM_{2.5}$ is 12 µg/m^3 for the annual mean (to be achieved by 2028), whilst the legal AQO for $PM_{2.5}$ is 10 µg/m^3 for the annual mean (to be achieved by 2040) as per The Environmental Targets (Fine Particulate Matter) (England) Regulations 2023[1].

It may be noted that the above Regulations relate to average particle concentrations in Local Authority districts thus do not apply to any specific industrial or other operation, such as Mountsorrel Quarry, and are included for reference.

[1] Statutory Instrument. (2023), 'The Environmental Targets (Fine Particulate Matter) (England) Regulations', No. 96. King's Printer of Acts of Parliament

Coarser dust (essentially particles greater than 10 µm) is generally regarded as ‘nuisance dust’ and can be associated with annoyance, although there are no official standards (such as AQO) for dust annoyance.

2 Sampler locations

As shown in Figure 2.1 and Table 2.1, dust, particulate matter and weather conditions are measured at a number of locations around site and the surrounding area:

- Directional and depositional dust: currently monitored at 13 locations;
- Particulate matter: currently monitored at two locations;
- Weather conditions: currently monitored at one location.

The majority of the dust samplers around Mountsorrel Quarry comprise the 'Frisbee-type' deposition gauge combined with an adhesive 'sticky pad' directional gauge. These samplers are used to monitor 'nuisance' dust and samples from these instruments are collected on a monthly basis.

For particulate matter, Turnkey Osiris samplers are located at Stn 9 (Hawcliffe Road) and at Stn 13 (Quorn House). These recognised and certificated 'indicative' real-time devices are connected to their own wind vane and anemometer and provide near-instantaneous directional PM_{10}, $PM_{2.5}$ and PM_1 data directly to the quarry management team.

A weather station is located at the site offices off Wood Lane and collects a range of weather parameters over fifteen-minute intervals. Data from the weather station are available to the quarry management by means of a dedicated modem connection to the internet.

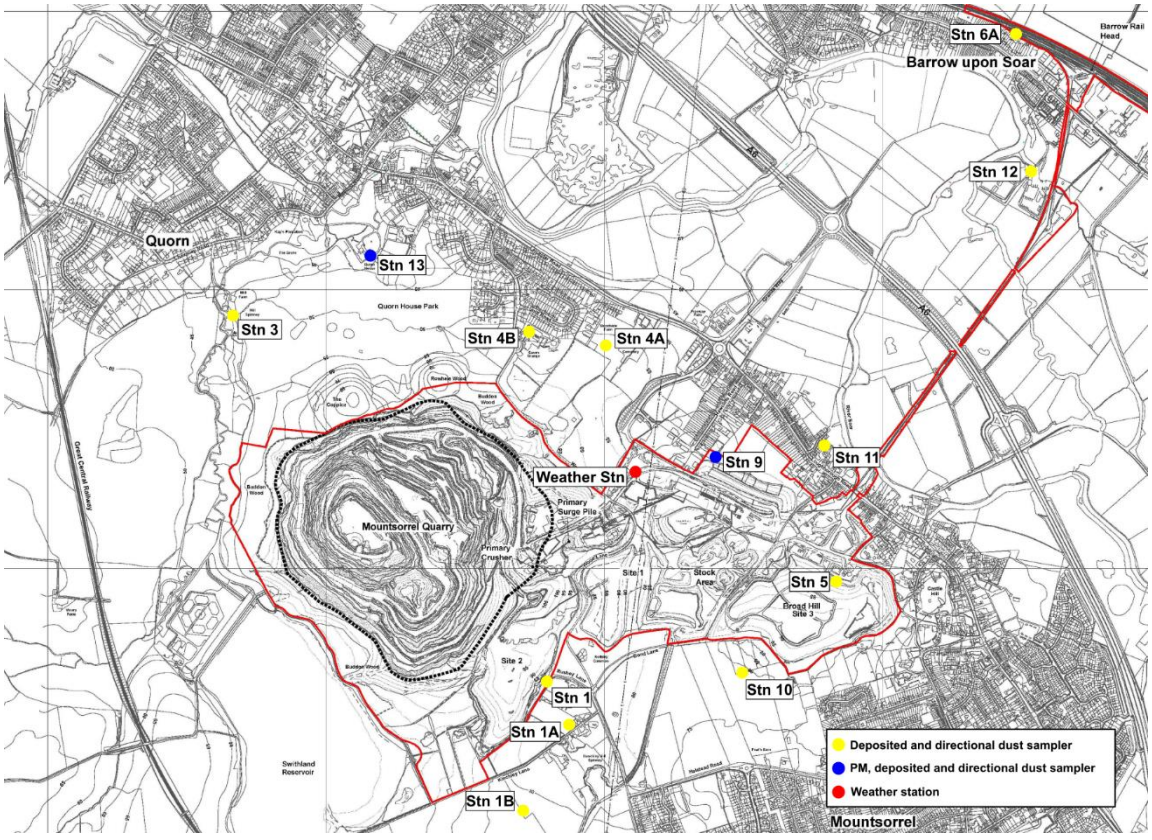

Figure 2.1: Particulate matter, dust and weather monitoring locations, Mountsorrel Quarry

Table 2.1: Weather, particulate matter and dust monitoring locations, Mountsorrel Quarry

Sampler reference	Easting	Northing	Locality monitored
Stn 1	456781	314577	Swithland Lane; Rushey Lane; Kinchley Lane
Stn 1A	456891	314436	Swithland Lane; Rushey Lane; Kinchley Lane
Stn 1B	456715	314109	Swithland Lane; Rushey Lane; Kinchley Lane
Stn 3	455681	315847	Mill Farm; Quorn House
Stn 4A	457000	315805	Woodside Farm; Leicester Road
Stn 4B	456733	315778	Quorn Grange, Unitt Road, Northage Close, Quorn Park
Stn 5	457789	314941	Bond Lane; Crown Lane
Stn 6A	458660	316786	Sileby Road; Huston Close; Sileby Road (commercial)
Stn 9 (inc. PM)	457374	315398	Hawcliffe Road
Stn 10	457487	314626	Glebe Close; Halstead Road (south); Halstead Road (north)
Stn 11	457791	315458	Loughborough Road; River Soar (marina / caravan park)
Stn 12	458575	315459	Meadow Farm Marina and Caravan Park
Stn 13 (incl. PM)	456158	316090	Northage Close, Meeting Street
Weather Station	457126	315376	Wood Lane Site Offices

Charnwood Borough Council (CBC) is responsible for the monitoring of air quality within the borough and prepares Air Quality Annual Status Reports (ASRs) for submission to Defra. It operates a Zephyr air quality monitor which is located within the Leicestershire County Council (LCC) depot at the southern end of Hawcliffe Road, in close proximity to the Osiris device at Stn 9. This device measures a number of pollutants including PM_{10} and $PM_{2.5}$, allowing CBC to compare concentrations against the relevant AQOs for these pollutants.

For additional context, the latest PM_{10} and $PM_{2.5}$ monitoring data from CBC are summarised in Appendix A and Appendix B.

2.1 Alert thresholds and response procedures

To help the site reduce its impact on the surrounding area, a number of alert thresholds have been calculated, as outlined in Table 2.2.

Table 2.2: Alert thresholds

Pollutant	Threshold	Averaging period	Applies to
PM_{10}	125 µg/m^3	15 minutes	Stn 9 (Hawcliffe Road), Stn 13 (Quorn House)
Deposited dust	125 mg/m^2/day	1 month	All deposited dust monitoring locations

For particulate matter (PM_{10}) an alert threshold of 125 µg/m^3 for the 15-minute average has been in use for several years.

Many years of monitoring and research have shown that the quarry is not a significant source of fine particulate matter ($PM_{2.5}$) hence no alert threshold for this size fraction is required.

PM_{10} and $PM_{2.5}$ concentrations recorded by CBC at the southern end of Hawcliffe Road and by Defra through the Automatic Urban and Rural Network (AURN) at Leicester University are presented in Appendix A and Appendix B respectively. Data from both locations have been compared against relevant Air Quality Objectives (AQOs) for PM_{10} and $PM_{2.5}$.

For deposited dust, the DMMP sets out a site-wide deposited dust threshold of 125 mg/m^2/day 'undissolved solids' as a trigger limit for investigation to identify the potential dust source/s, taking account of the directional data.

3 Results

3.1 Weather monitoring

Weather conditions can have a significant effect on the potential for dust propagation from a mineral site. Of particular importance are wind speeds, wind direction, and precipitation. Dust can be carried from a source towards receptors (such as nearby homes and other businesses) according to the strength and direction of wind. Precipitation is recognised to suppress dust and 0.2 mm antecedent rainfall is considered sufficient to suppress windblown dust for a number of hours.

The key weather data which might affect dust propagation (wind speed, wind direction, total daily precipitation and average daily temperature) for this reporting period are summarised in Figure 3.1 and Figure 3.2.

The monitoring period was characterised by generally cool temperatures in late February and mid-March, with milder temperatures in early and late March. The maximum daily average temperature was 12.1 °C, recorded on 07 March 2025 and the minimum daily average temperature was 3.6 °C, recorded on 28 February 2025. Whilst precipitation was recorded on 30 % of days, an extended dry period between late February and mid-March may have resulted in an increased potential for dust generation and propagation. A shorter dry spell in late March was also recorded.

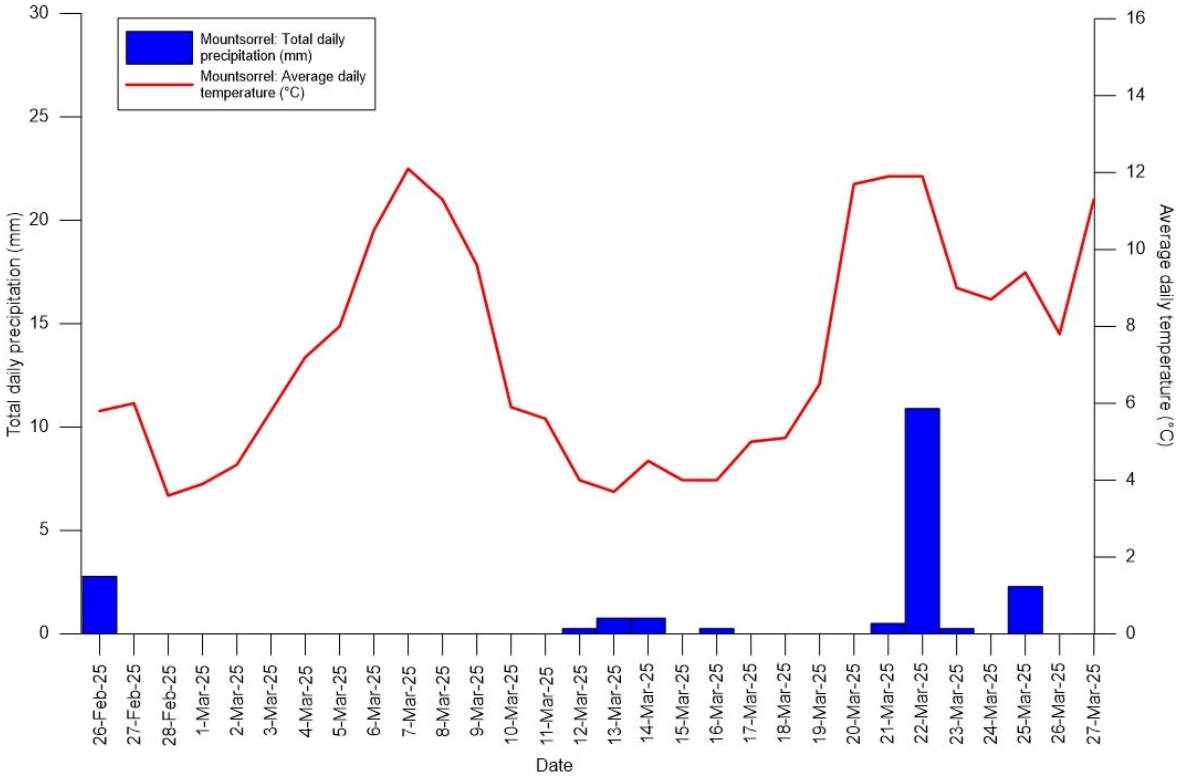

Figure 3.1: Total daily precipitation and average daily temperature, Mountsorrel Quarry, 26 February – 27 March 2025

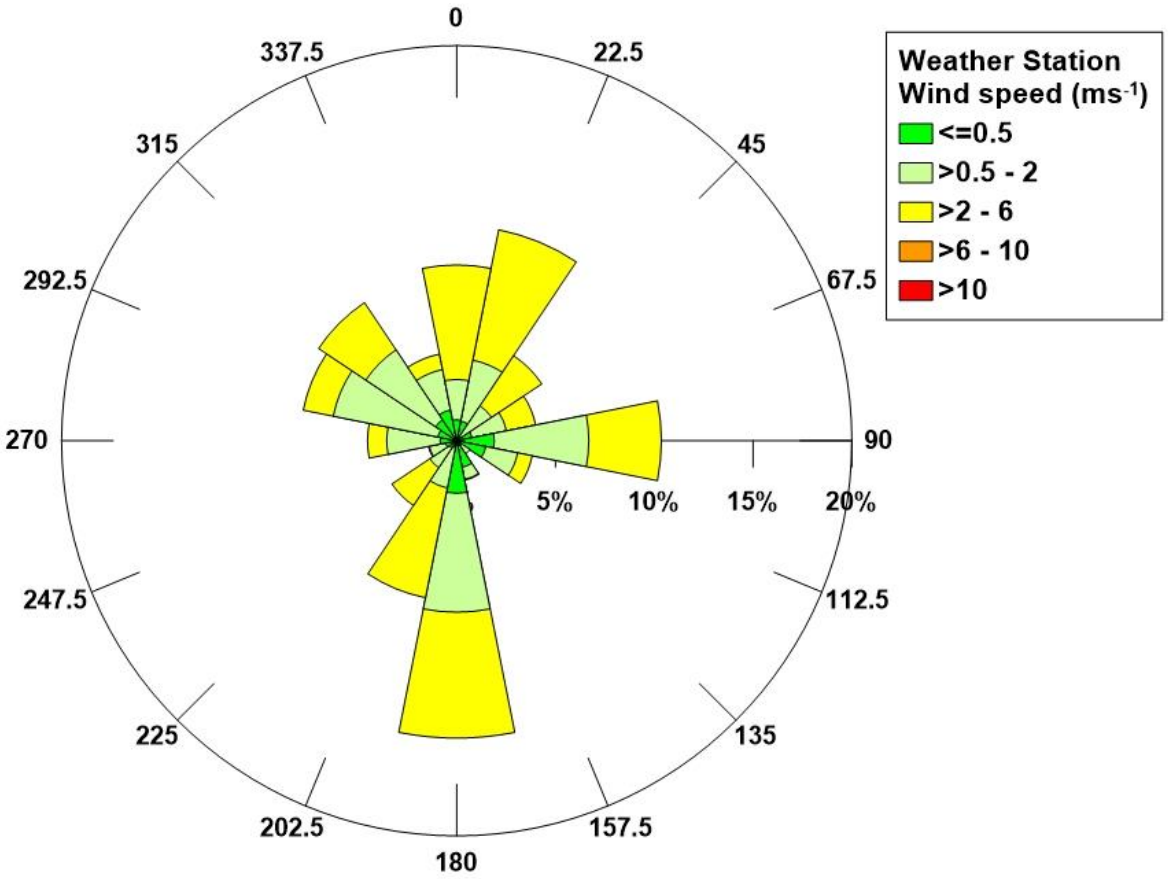

Figure 3.2: Wind rose, Mountsorrel Quarry, Mountsorrel, 26 February – 27 March 2025

As seen in Figure 3.2, winds were predominantly calm to moderate in speed (>0.5 – 6 m/s) for all of the monitoring period from the north-northeast, east and south with less frequent north-easterly winds. Consequently, combined with the generally dry weather conditions there will have been an increased potential for dust propagation generally towards the north, east and northeast throughout the monitoring period. This will have been especially pronounced with reduced vegetative screening over the winter months, and not yet re-appearing in early spring.

3.2 Particulate matter

3.2.1 PM_{10}

The available 15-minute data from the period of review are presented for both monitoring locations in Figure 3.4 and Figure 3.4. The red line denotes the site trigger level (125 µg/m^3 over the 15-minute average), whilst the dashed black line denotes the average concentration recorded over this period.

Additional PM_{10} monitoring data (collected by CBC and the Defra AURN monitoring network) are provided in Appendix A.

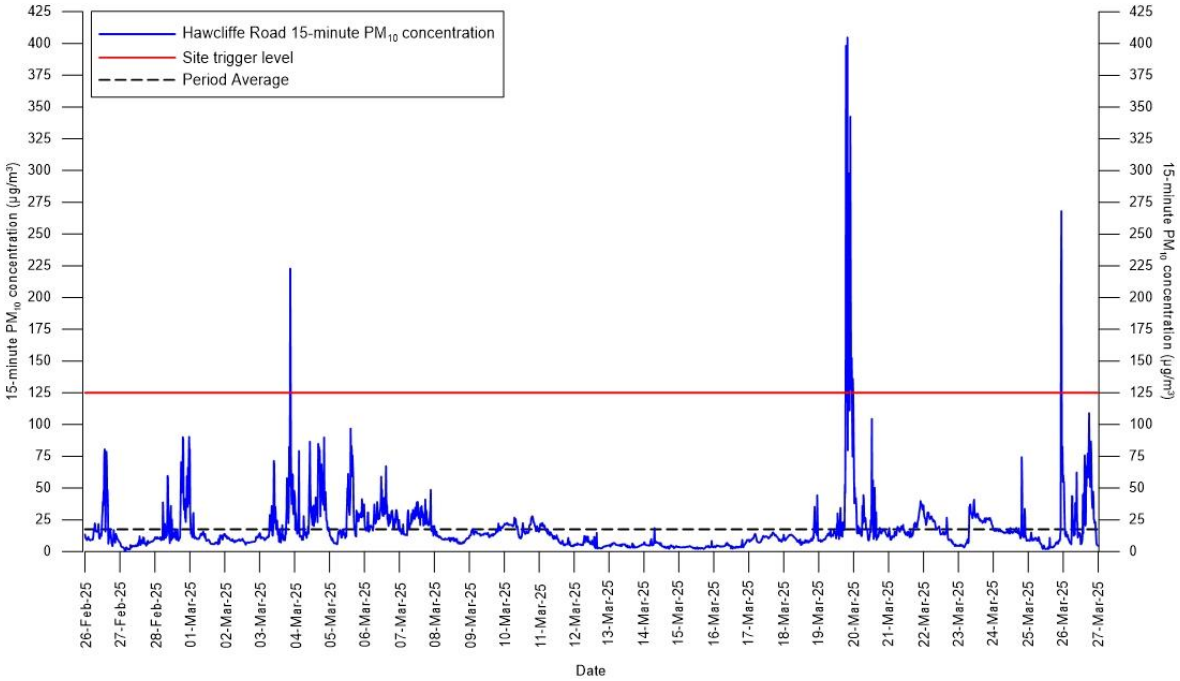

Figure 3.3: 15-minute mean PM_{10} concentration, Hawcliffe Road, 26 February – 27 March 2025

Figure 3.3 indicates that the overall average concentration for this period was 17.54 µg/m^3, with the alert threshold being exceeded on three days; details of these exceedances are provided in Table 3.1.

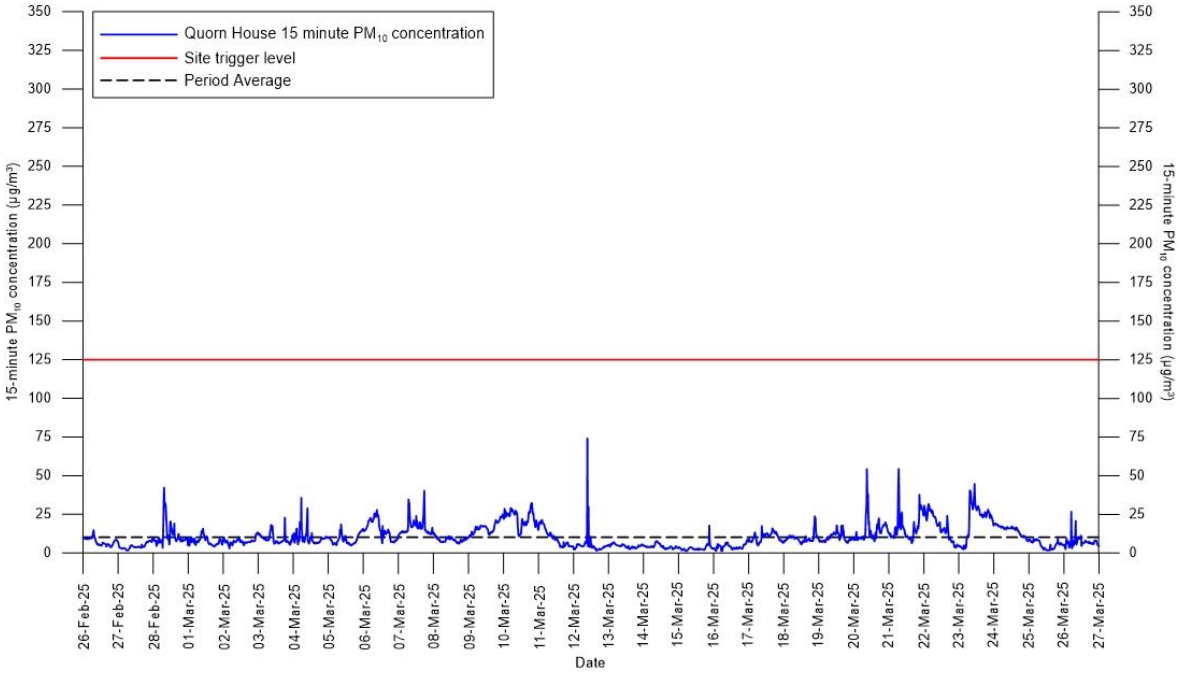

Figure 3.4: 15-minute mean PM_{10} concentration, Quorn House, 26 February – 27 March 2025

At Quorn house there were no exceedances of the PM_{10} site trigger, and the overall average for this period was 10.11 µg/m^3.

During this review period, trigger emails alerting staff to high PM_{10} levels from the direction of site operations were sent out on three occasions from the Hawcliffe Road Osiris. Details of the corresponding causes and investigations are provided in Table 3.1.

Table 3.1: Email alert responses, between 26 February – 27 March 2025 (using the trigger threshold, 125 µg/m^3 for the 15-minute average)

Date of alert	Monitor	Details	Possible cause and investigation
19/03/2025	Hawcliffe Road	Exceedance recorded from the south and south-southeast in the evening.	Production was stopped and full investigation carried out. No significant issues identified.
25/03/2025	Hawcliffe Road	Exceedance recorded from the west-southwest in the evening.	Full investigation carried out. At the time of the alerts production from main processing plant had finished, although both asphalt plants were operational. Ongoing investigations into the possibility of dust arising from materials handling within the loadout area that evening.
27/03/2025	Hawcliffe Road	Exceedance recorded from the southwest in the evening.	Site investigation at the time of the alert but no known issues identified and all dust suppression working.

3.2.2 $PM_{2.5}$

The results of $PM_{2.5}$ monitoring at Hawcliffe Road and Quorn House are presented in Figure 3.5 and Figure 3.6. The dashed black line denotes the average concentration recorded over this period.

Additional $PM_{2.5}$ monitoring data (collected by CBC and the Defra AURN monitoring network) are provided in Appendix B.

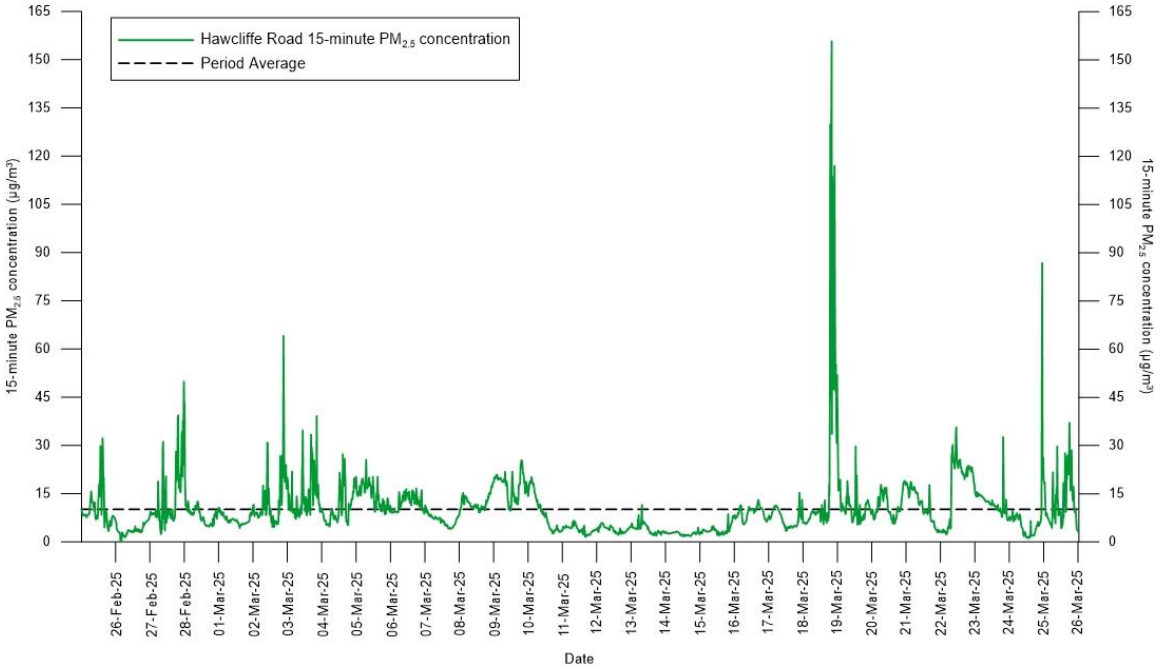

Figure 3.5: 15-minute mean $PM_{2.5}$ concentration, Hawcliffe Road, 26 February – 27 March 2025

At Hawcliffe Road, the overall average concentration for this period was 10.11 µg/m^3, whilst at Quorn House, the overall average was 7.55 µg/m^3. It would appear that $PM_{2.5}$ concentrations recorded at both locations were broadly similar for most of this period, with the exception of some spikes at Hawcliffe Road in early, mid- and late March that were not recorded at Quorn House. These spikes coincide with high PM_{10} alerts at Hawcliffe Road.

For this period, 58% of PM_{10} recorded at Hawcliffe Road comprised $PM_{2.5}$, whilst it made up 75% at Quorn House.

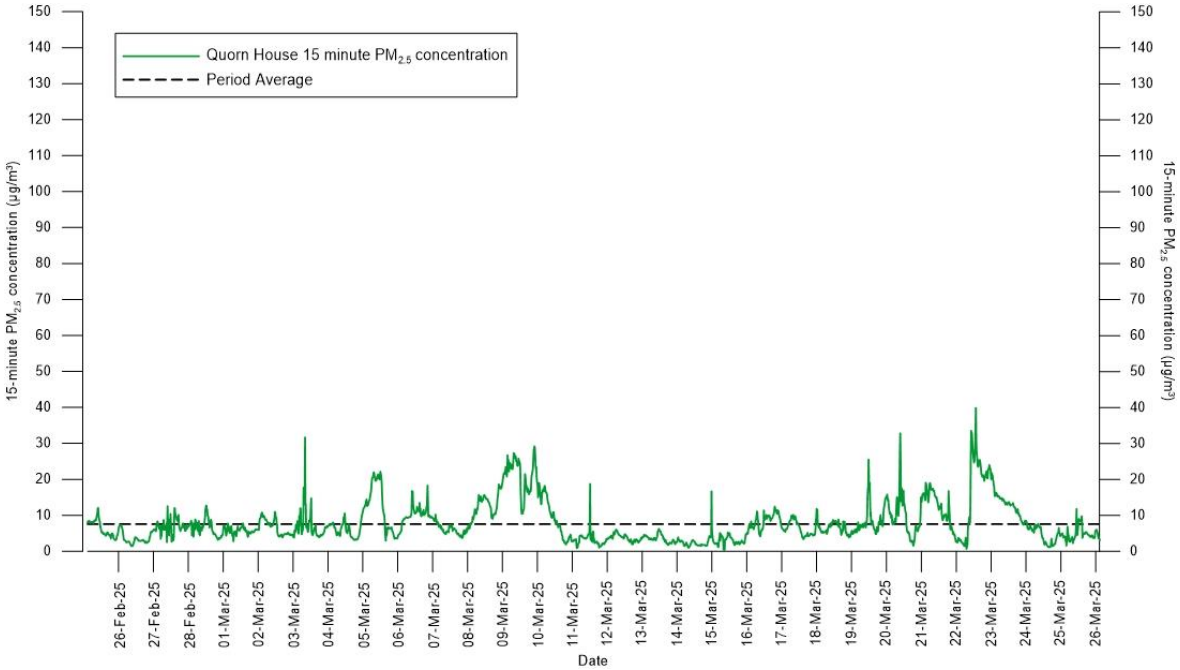

Figure 3.6: 15-minute mean $PM_{2.5}$ concentration, Quorn House, 26 February – 27 March 2025

3.3 Visible dust

3.3.1 Deposited dust monitoring summary

The deposited dust data for 26 February – 27 March 2025 are summarised in Table 3.2. As outlined earlier, there is a site-wide threshold for investigation to identify the potential dust source/s, taking account of the directional data. Table 3.2 shows that, for the available data, deposited dust levels during 26 February – 27 March 2025 were all within the site-specific threshold for all stations, with Stn 6A and Stn 9 experiencing slightly elevated levels during this period.

Table 3.2: Summary of deposited dust (undissolved solids), 26/02/25 – 27/03/25

Undissolved solids (mg/m^2/day)				
This month report start date:		**26-Feb-25**		
This month report end date:		**27-Mar-25**		
Receptor location	**Nearest / appropriate dust monitoring point**	**Reported value**	**Trigger: ≥ 125[a]**	**Magnitude[b]**
Swithland Lane; Rushey Lane; Kinchley Lane	Stn 1	59	No	**Low**
Swithland Lane; Rushey Lane; Kinchley Lane	Stn 1A	57	No	**Low**
Swithland Lane; Rushey Lane; Kinchley Lane	Stn 1B	42	No	**Very Low**
Mill Farm; Quorn House	Stn 3	23	No	**Very Low**
Woodside Farm, Leicester Road	Stn 4A	39	No	**Very Low**
Quorn Grange, Unitt Road, Northage Close, Quorn Park	Stn 4B	42	No	**Very Low**
Bond Lane; Crown Lane	Stn 5	56	No	**Low**
Sileby Road; Huston Close; Sileby Road (commercial)	Stn 6A	84	No	**Slightly Elevated**
Hawcliffe Road	Stn 9	87	No	**Slightly Elevated**
Glebe Close; Halstead Road (south); Halstead Road (north)	Stn 10	74	No	**Low**
Loughborough Road; River Soar (marina / caravan park)	Stn 11	41	No	**Very Low**
Meadow Farm Marina and Caravan Park	Stn 12	49	No	**Very Low**
Quorn House Park	Stn 13	24	No	**Very Low**

[a] Trigger mass deposition and Effective Area Coverage rates as in Section 7.3, ZLFMS-AG008 Dust Management and Monitoring Plan (Updated), 2015

[b] Magnitude of mass deposition rate assessed against typical rate for semi-rural areas (30 - 80 mg/m^2/day)

Regarding dust deposition over time, the rates across the sampling area have varied considerably. Trends in dust deposition rates (as undissolved solids) for the previous 12 months, together with the site-wide dust threshold are illustrated in Figure 3.7.

In general, as would be expected, dust deposition rates are typically lower in winter months than in summer months. This trend is clearly seen for most monitoring points in Figure 3.7, with some exceptions. Dust deposition rates have been consistently below the 'trigger limit' at all sampling locations except at Stn 9, where it has exceeded twice in the last 12 months.

In general, as shown in Figure 3.7, higher rates of dust deposition have been recorded near industrial settings (*i.e.* Stn 9) than in more residential areas (*e.g.* Stn 1, Kinchley Lane).

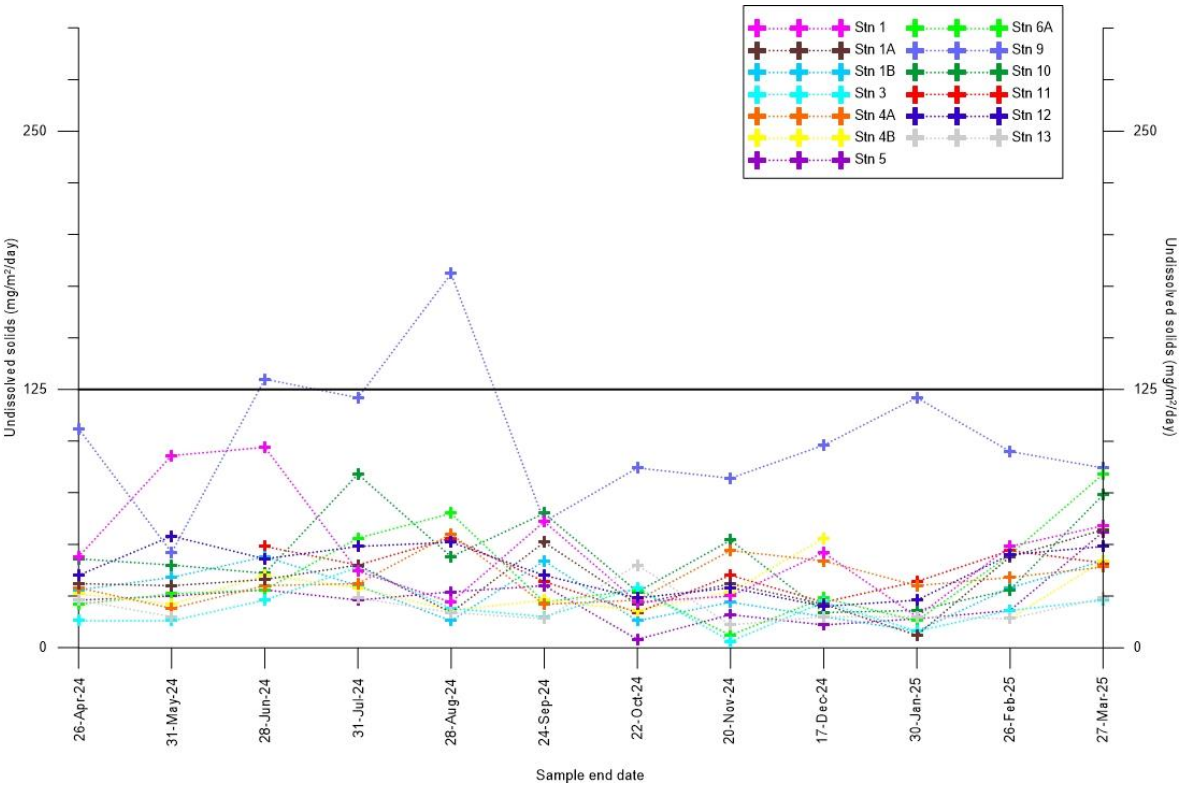

Figure 3.7: Dust deposition rates per sampling location over time (past 12 months)

3.3.2 Directional dust monitoring summary

The directional dust data for 26 February – 27 March 2025 are summarised in Table 3.3, and are presented graphically in Figure 3.8. As with deposited dust, the DMMP sets out a site-wide directional dust threshold. For directional dust soiling, 0.5 % Effective Area Coverage (EAC) per day is a trigger limit for investigation to identify the likely dust source/s, again taking account of the direction.

Table 3.3 and Figure 3.8 show that during 26 February – 27 March 2025, all stations recorded Very Low to Low dust levels from all directions.

Table 3.3: Summary of directional dust soiling, 26 February – 27 March 2025

Directional dust soiling (%EAC/day) by direction (°)										
This month report start date:		**26-Feb-25**								
This month report end date:		**27-Mar-25**								
Receptor location	**Nearest / appropriate dust monitoring point**		**Direction (°)**							
			0	**45**	**90**	**135**	**180**	**225**	**270**	**315**
Swithland Lane; Rushey Lane; Kinchley Lane	Stn 1	Reported value	0	0	0	0	0	0	0.1	0.1
		Trigger: ≥ 0.5[a]	No	No	No	No	No	No	No	No
		Magnitude[b]	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Swithland Lane; Rushey Lane; Kinchley Lane	Stn 1A	Reported value	0	0.1	0	0	0	0	0	0
		Trigger: ≥ 0.5[a]	No	No	No	No	No	No	No	No
		Magnitude[b]	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Swithland Lane; Rushey Lane; Kinchley Lane	Stn 1B	Reported value	0	0	0	0	0	0	0.1	0.1
		Trigger: ≥ 0.5[a]	No	No	No	No	No	No	No	No
		Magnitude[b]	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Mill Farm; Quorn House	Stn 3	Reported value	0	0	0	0	0	0	0	0
		Trigger: ≥ 0.5[a]	No	No	No	No	No	No	No	No
		Magnitude[b]	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Woodside Farm, Leicester Road	Stn 4A	Reported value	0	0	0	0	0	0	0	0
		Trigger: ≥ 0.5[a]	No	No	No	No	No	No	No	No
		Magnitude[b]	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Quorn Grange, Unitt Road, Northage Close, Quorn Park	Stn 4B	Reported value	0	0	0	0	0	0	0	0
		Trigger: ≥ 0.5[a]	No	No	No	No	No	No	No	No
		Magnitude[b]	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Bond Lane; Crown Lane	Stn 5	Reported value	0	0	0	0.1	0	0	0.1	0
		Trigger: ≥ 0.5[a]	No	No	No	No	No	No	No	No
		Magnitude[b]	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Sileby Road; Huston Close; Sileby Road (commercial)	Stn 6A	Reported value	0	0.1	0.2	0.1	0	0	0	0
		Trigger: ≥ 0.5[a]	No	No	No	No	No	No	No	No
		Magnitude[b]	Very Low	Very Low	Low	Very Low	Very Low	Very Low	Very Low	Very Low
Hawcliffe Road	Stn 9	Reported value	0	0	0	0	0	0	0	0
		Trigger: ≥ 0.5[a]	No	No	No	No	No	No	No	No
		Magnitude[b]	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Glebe Close; Halstead Road (south); Halstead Road (north)	Stn 10	Reported value	0	0	0	0.1	0	0	0	0.1
		Trigger: ≥ 0.5[a]	No	No	No	No	No	No	No	No
		Magnitude[b]	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Loughborough Road; River Soar (marina / caravan park)	Stn 11	Reported value	0	0	0	0.1	0	0	0	0
		Trigger: ≥ 0.5[a]	No	No	No	No	No	No	No	No
		Magnitude[b]	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Meadow Farm Marina and Caravan Park	Stn 12	Reported value	0.1	0.1	0.1	0	0.1	0.1	0.1	0.1
		Trigger: ≥ 0.5[a]	No	No	No	No	No	No	No	No
		Magnitude[b]	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Quorn House Park	Stn 13	Reported value	0	0	0	0	0	0	0	0
		Trigger: ≥ 0.5[a]	No	No	No	No	No	No	No	No
		Magnitude[b]	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low

[a] Trigger mass deposition and Effective Area Coverage rates as in Section 7.3, ZLFMS-AG008 Dust Management and Monitoring Plan (Updated), 2015

[b] Magnitude of directional dust soiling derived from Beaman and Kingsbury, 1981

[c] Direction/s not determined for daily EAC below 0.1%/day (very low soiling)

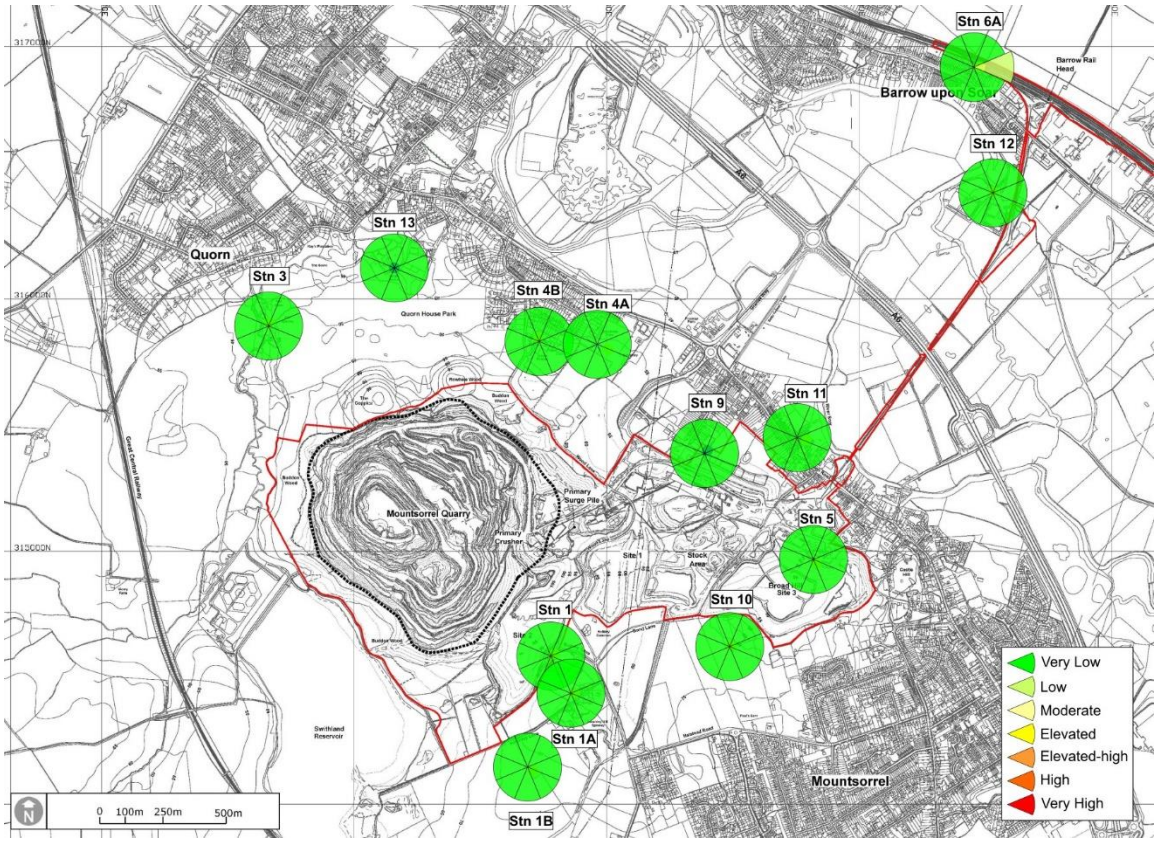

Figure 3.8: Directional dust soiling rose diagrams, 26 February – 27 March 2025

Table 3.4 shows that the average directional soiling rates have been at Very Low levels at most monitoring locations, for most directions, over the past year. At Stn 9, the annual average soiling rate to date was 0.2 % EAC/day from the southwest and west resulting in 'Low' magnitudes being recorded. The cause or causes of these consistently, but marginally elevated dust soiling rates at this monitoring point are under review, as they may be related to site activities such as operations at the PSV yard, Granite Way and/or the toast rack.

Table 3.4: Running average directional dust soiling (past 12 months)

Receptor location	Nearest / appropriate dust monitoring point		Direction (°)							
			0	45	90	135	180	225	270	315
Swithland Lane; Rushey Lane; Kinchley Lane	Stn 1	Average value	0.1	0	0	0	0	0.1	0.1	0.1
		Magnitude[b]	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Swithland Lane; Rushey Lane; Kinchley Lane	Stn 1A	Average value	0	0.1	0	0	0	0.1	0.1	0.1
		Magnitude[b]	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Swithland Lane; Rushey Lane; Kinchley Lane	Stn 1B	Average value	0.1	0	0	0	0.1	0.1	0.1	0.1
		Magnitude[b]	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Mill Farm; Quorn House	Stn 3	Average value	0	0.1	0	0	0.1	0	0	0
		Magnitude[b]	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Woodside Farm, Leicester Road	Stn 4A	Average value	0	0.1	0.1	0	0	0.1	0.1	0
		Magnitude[b]	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Quorn Grange, Unitt Road, Northage Close, Quorn Park	Stn 4B	Average value	0	0	0.1	0.1	0.1	0	0	0
		Magnitude[b]	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Bond Lane; Crown Lane	Stn 5	Average value	0.1	0	0	0.1	0.1	0.1	0.1	0.1
		Magnitude[b]	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Sileby Road; Huston Close; Sileby Road (commercial)	Stn 6A	Average value	0	0.1	0.1	0.1	0	0.1	0.1	0.1
		Magnitude[b]	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Hawcliffe Road	Stn 9	Average value	0.1	0.1	0.1	0.1	0	0.2	0.2	0.1
		Magnitude[b]	Very Low	Very Low	Very Low	Very Low	Very Low	Low	Low	Very Low
Glebe Close; Halstead Road (south); Halstead Road (north)	Stn 10	Average value	0.1	0	0	0	0.1	0.1	0	0.1
		Magnitude[b]	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Loughborough Road; River Soar (marina / caravan park)	Stn 11	Average value	0.1	0.1	0.1	0	0.1	0.1	0.1	0.1
		Magnitude[b]	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Meadow Farm Marina and Caravan Park	Stn 12	Average value	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		Magnitude[b]	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Quorn House Park	Stn 13	Average value	0	0	0	0	0	0	0	0
		Magnitude[b]	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low

[a] Trigger mass deposition and Effective Area Coverage rates as in Section 7.3, ZLFMS-AG008 Dust Management and Monitoring Plan (Updated), 2015

[b] Magnitude of directional dust soiling derived from Beaman and Kingsbury, 1981

[c] Direction/s not determined for daily EAC below 0.1%/day (very low soiling)

4 Complaints

Three dust complaints had been received by the quarry during this period and investigations have been undertaken in accordance with the procedure outlined in the DMMP. Full details of these investigations will be provided in due course.

Appendix A: Off-site PM_{10} monitoring (CBC and AURN)

The daily average PM_{10} concentrations recorded by the CBC Zephyr are presented below in Figure A.1, alongside similar data from the Defra Automatic Urban and Rural Network (AURN) station in Leicester University[2].

For the 12 months leading up to 27 March 2025, there were 364 daily PM_{10} readings taken by the CBC Zephyr, and 365 daily readings taken by the Leicester AURN, representing a ~99 % data collection rate at each respective location.

From the available data the annual average daily PM_{10} concentration for the 12 months to date at CBC Zephyr was 13.55 µg/m^3, which is approximately 33.8 % of the annual average PM_{10} concentration objective (40 µg/m^3). At the Leicester AURN the annual average daily PM_{10} concentration for the 12 months to date was 12.51 µg/m^3 which is approximately 31.3 % of the annual average PM_{10} concentration objective.

For the 12 months up to 27 March 2025 there were three recorded instance where the daily average PM_{10} concentrations exceeded 50 µg/m^3 at the CBC Zephyr. In summary, for the 12 months up to 26 February 2025 neither the annual nor daily AQO have been exceeded.

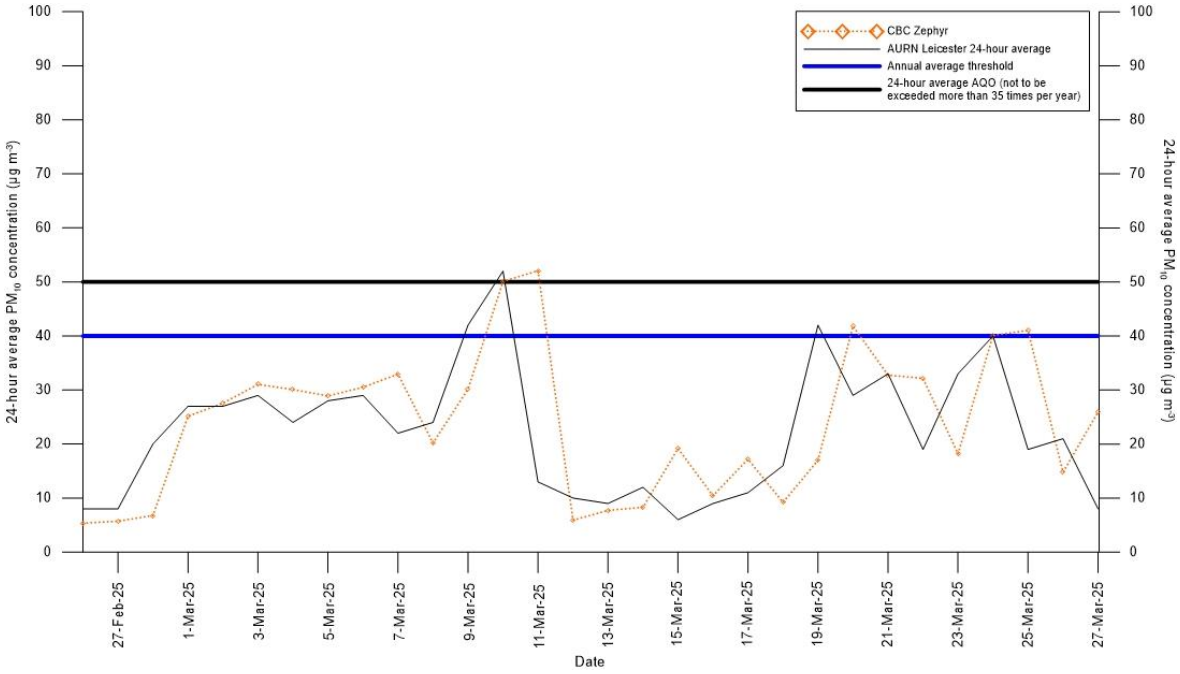

Figure A.1: Daily average PM_{10} concentration, CBC Zephyr and Leicester AURN, 26 February – 27 March 2025

[2] http://uk-air.defra.gov.uk/networks/network-info?view=aurn

Appendix B: Off-site $PM_{2.5}$ monitoring (CBC and AURN)

The daily average $PM_{2.5}$ concentrations recorded by the CBC Zephyr are presented below in Figure B.1, alongside similar data from the Defra Automatic Urban and Rural Network (AURN) station in Leicester University.

For the 12 months leading up to 27 March 2025, there were 364 daily $PM_{2.5}$ readings taken by the CBC Zephyr, and 365 readings taken by the Leicester AURN, representing a ~99 % data collection rate respectively. From the available data the annual average daily $PM_{2.5}$ concentration for the 12 months at the CBC Zephyr was 8.7 µg/m^3, which is approximately 72 % of the interim annual average $PM_{2.5}$ concentration objective (12 µg/m^3) applicable from 31 January 2023. At the Leicester AURN the annual average daily concentration was 8.3 µg/m^3, which is approximately 69 % of the interim annual average $PM_{2.5}$ concentration objective.

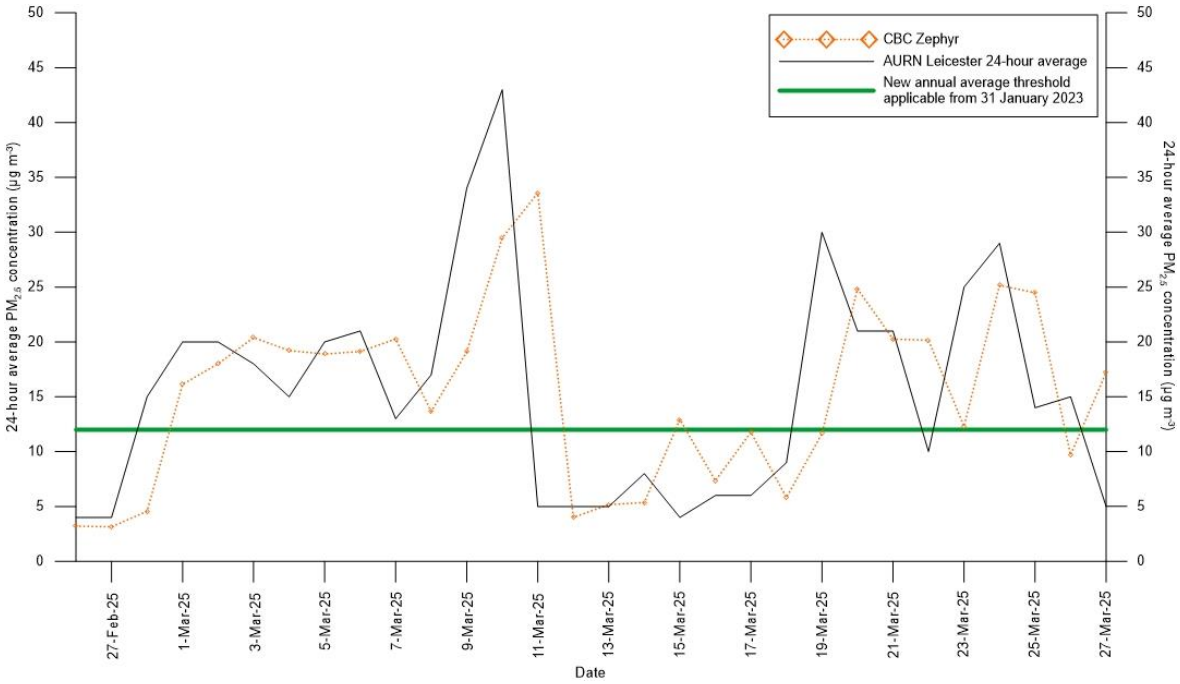

Figure B.1: Daily average $PM_{2.5}$ concentrations, CBC Zephyr and Leicester AURN, 26 February – 27 March 2025