

Air Quality and Odour Monitoring Programme Summary of Results

Site Activities

Site Activities which took place in February at the Avenue Site and their location on-site are shown in Figure 1.

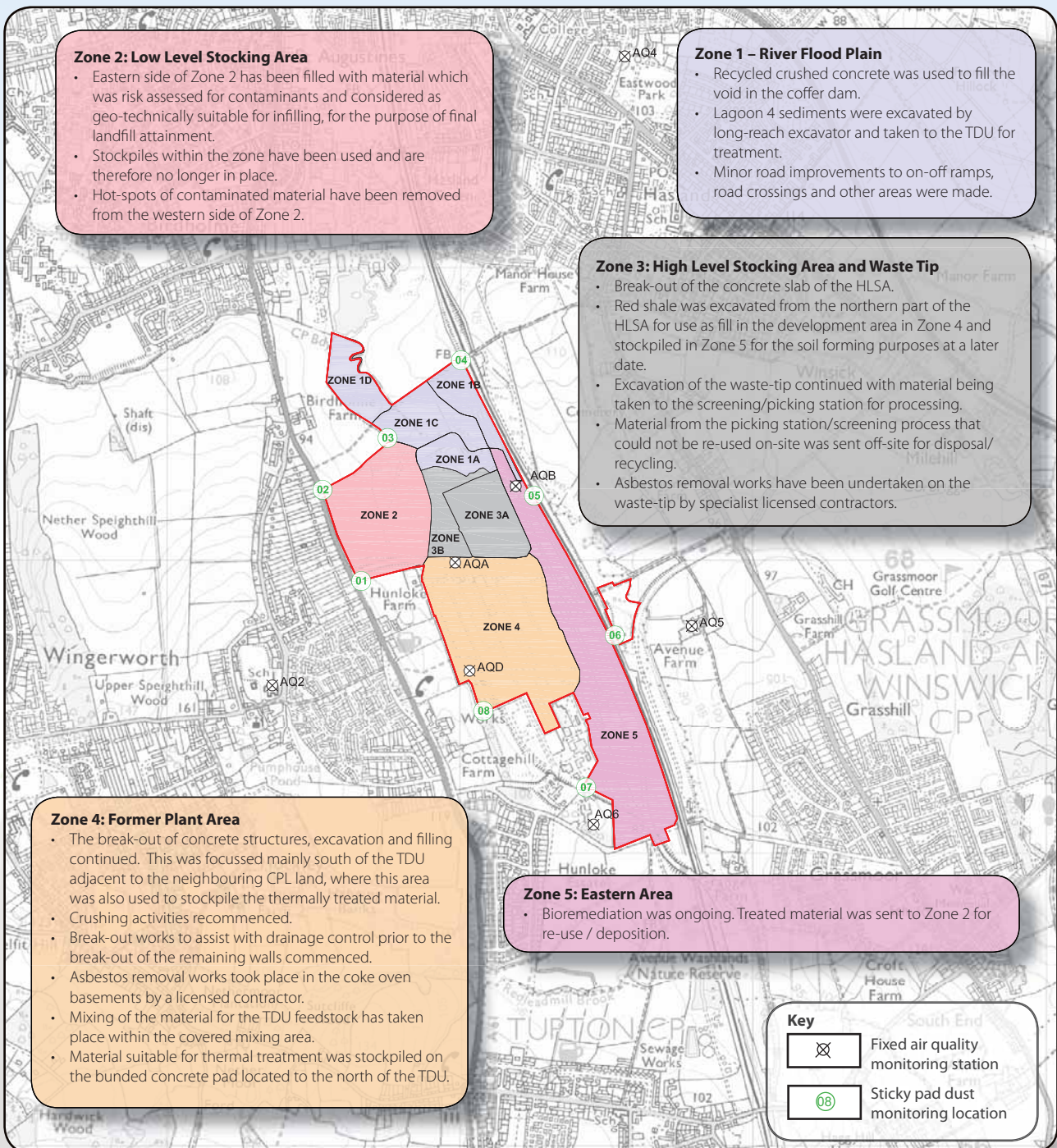


Figure 1. Site Activities per zone for February 2011

Pollutant	Target Level	Averaging Period	Max Values	Previous Month	Yearly
Fine Particulate Matter (PM ₁₀)	40 µg m ⁻³	Monthly Mean	23.5	Higher	Higher
Fine Particulate Matter (PM ₁₀)	50 µg m ⁻³	24-hr Mean	62.4	Higher	Higher
Fine Particulate Matter (PM _{2.5})	25 µg m ⁻³	Monthly Mean	15.0	Higher	Higher
Dust Deposition - Directional Gauge (ON-SITE)	200 mg m ⁻² day ⁻¹	Monthly Mean	588	Higher	Higher
Dust Deposition - Directional Gauge (OFF-SITE)	200 mg m ⁻² day ⁻¹	Monthly Mean	95	Higher	Lower
Dust Soiling - Sticky Pad	5% EAC day ⁻¹	Weekly	3.4	Higher	Higher

No Locations Exceeded	One Location Exceeded	Several Locations Exceeded
-----------------------	-----------------------	----------------------------

Table 1. Particulate Matter and Dust Summary

Particulate Monitoring

At the Avenue, measurement of PM₁₀ and PM_{2.5} particulate matter is undertaken at all on-site and off-site monitoring locations. Monthly average concentrations of PM₁₀ across all locations were in the range of 9.3 – 23.5 µg m⁻³, with concentrations of PM_{2.5} in the range of 5.3 – 15 µg m⁻³.

As shown in Figure 3, three of the monitoring locations recorded measured concentrations of PM₁₀ above the relevant 24 hour Air Quality Objective (AQO) of 50 µg m⁻³ during February 2011. Long-term concentrations remained below the 40 µg m⁻³ annual average AQO. The peaks in concentrations which resulted in the exceedences of the PM₁₀ 24-hour Objective were observed at the three on-site continuous monitoring locations between 17th and 23rd February. Smaller peaks were also observed at the off-site monitoring stations during this period. The wind direction between 17th and 23rd February was mainly from the south-east, with 19th and 20th experiencing winds from the east-south-east. By 23rd February the wind was beginning to come from a southerly and south-westerly direction. Only monitoring location 4 did not show the trend in PM₁₀ concentrations. This suggests that these peaks in concentrations may be related to higher than

average background PM₁₀ concentrations in the regional area, which has resulted in an increase in the normal PM₁₀ concentrations at the on-site monitors and in turn, has led to exceedences of the 24-hour mean objective for PM₁₀ at the on-site monitoring locations.

Exceedences of the 1-hour PM₁₀ target level were noted at Site D and B on Saturday 19th February at 5am (112.6 and 106.3 µg m⁻³ respectively). These peaks coincided with the days which showed exceedences of the 24-hour mean AQO for PM₁₀ at these monitoring locations and as the site was not operational at this time, also suggests that PM₁₀ background concentrations in the area were higher on these days, rather than the high concentrations being attributable to site activities.

The measured PM_{2.5} concentrations also followed the same trend across the month as those of the PM₁₀ concentrations, with peaks in PM_{2.5} concentrations in the period between 17th and 23rd February at all monitoring locations, except site 4. At sites 5 and B there was a marked difference in PM₁₀ and PM_{2.5} concentrations in the period from 17th to 23rd February suggesting that the PM₁₀ particulate fraction was larger during this period than was observed for the rest of the month. This suggests there was a source of PM₁₀ particles

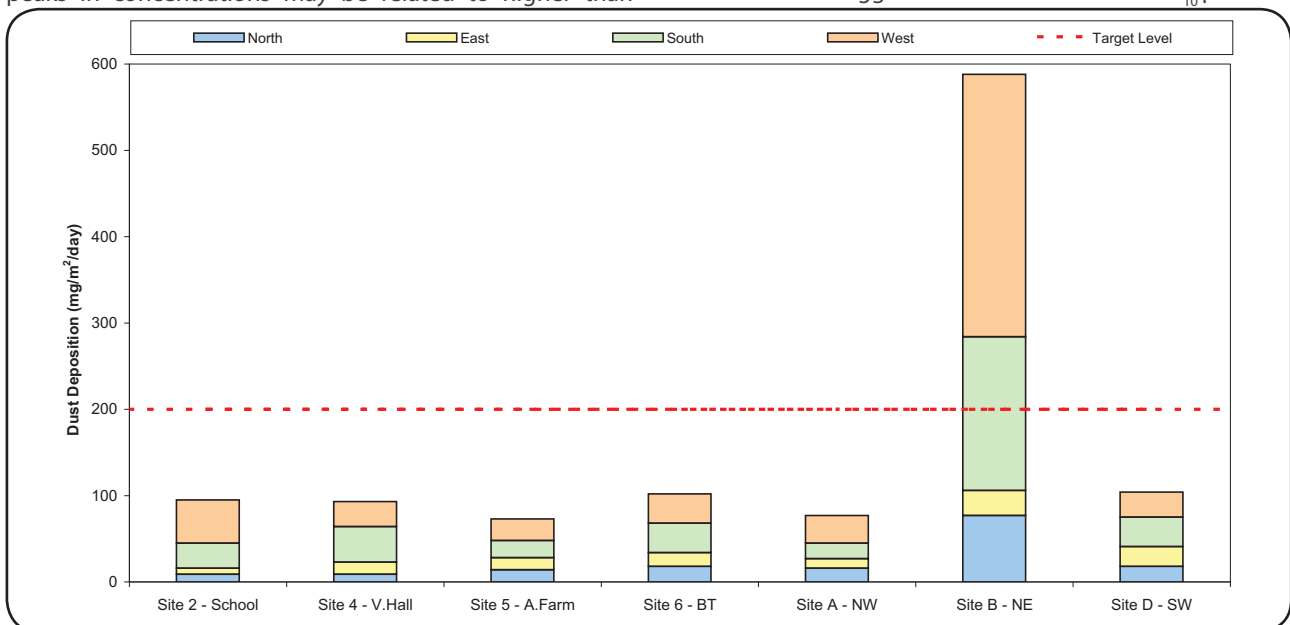


Figure 2. Measured Dust Deposition Levels (mg/m²/day)

in the area. The peaks in $PM_{2.5}$ concentrations resulted in 24-hour average $PM_{2.5}$ concentrations of more than $25 \mu g m^{-3}$ during February 2011, at all of the monitoring locations except Sites 4, 5 and 6 between 17th and 23rd February as a 24 hour average. However, the monthly average for all of the monitoring sites was below $25 \mu g m^{-3}$. There were exceedences of the 1-hour $PM_{2.5}$ trigger level of $50 \mu g m^{-3}$ at monitoring locations A and D during the period between 17th and 23rd February. These results again suggest an increase in regional background $PM_{2.5}$ concentrations.

Dust Monitoring

During the month, there was one exceedence of the Avenue target deposition level of $200 mg/m^2/day$. This occurred at Site B, where the deposition level was $588 mg/m^2/day$. Figure 2 shows that approximately half of the deposited dust at Site B came from a westerly direction, a quarter from a southerly

direction and the remaining quarter equally sourced from northerly and easterly directions. This suggests that there was a localised source of dust to the west of Site B. This is likely to have been site operations, as Site B is located close to a haul road. All other monitoring sites recorded dust deposition levels between 73 and $104 mg/m^2/day$, which are well below the target level.

The highest level of dust soiling of 3.4% EAC was measured in Week 2 at Site 5 (northern tip of Zone 5, close to continuous monitor Site B). This value was recorded for the northern side of the sticky pad, indicating that the source of the dust was from the north. Closer inspection of the sticky pad has shown these elevated levels were the result of mud-splashes associated with weather conditions and the close proximity of the internal haul road.

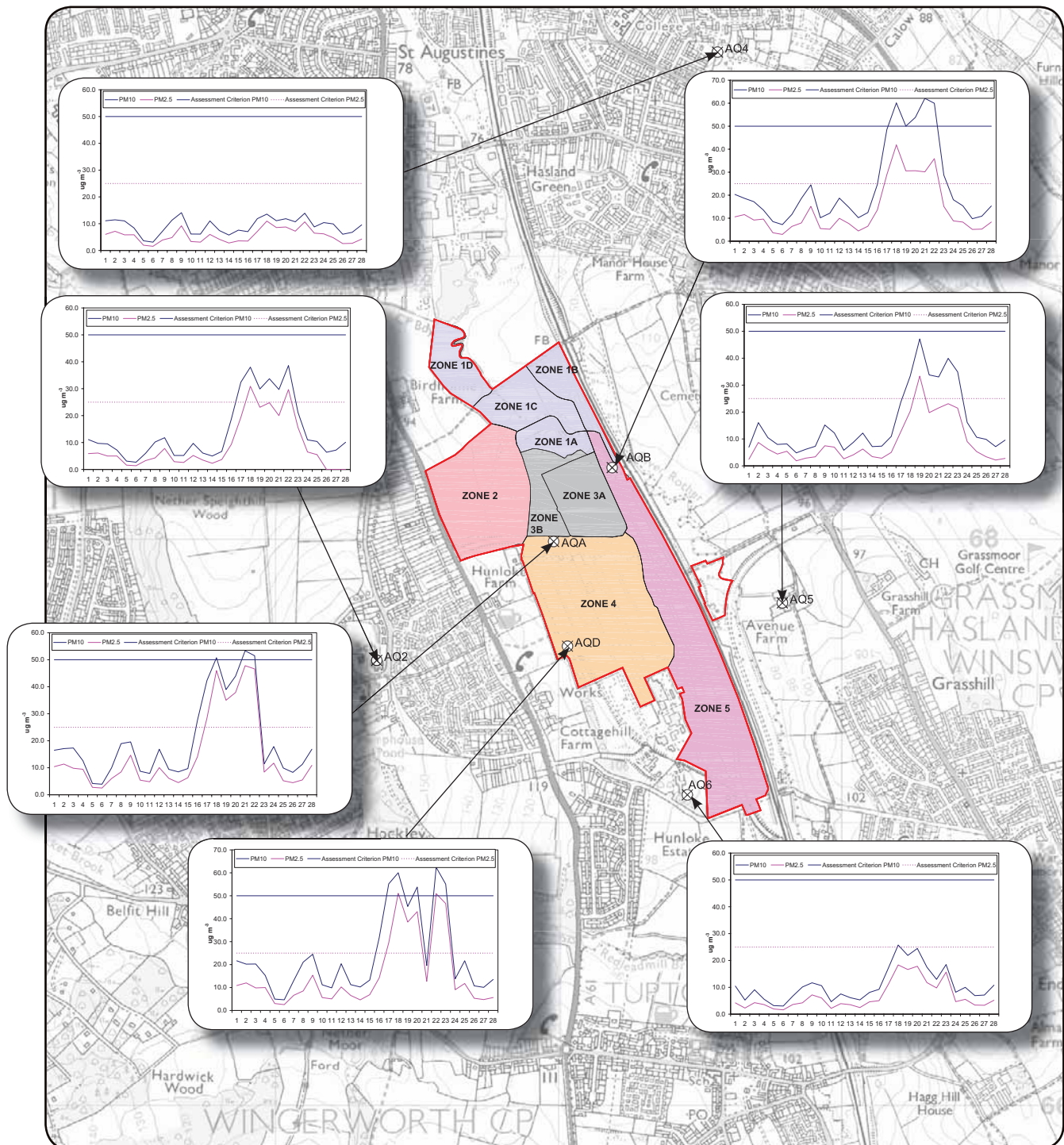


Figure 3. PM_{10} and $PM_{2.5}$ Measurements for February 2011 (Daily Average Concentrations)

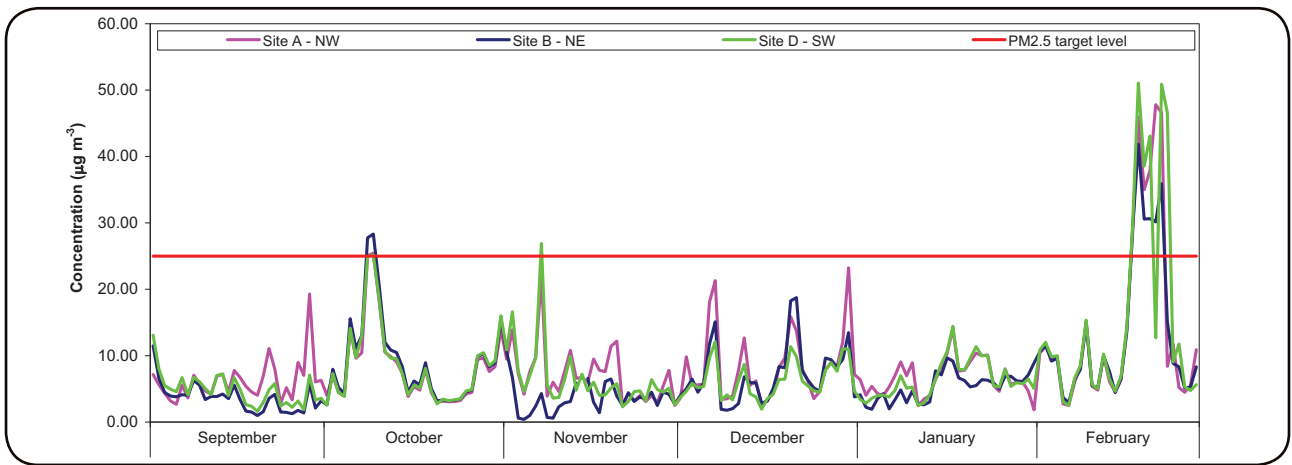


Figure 4. PM_{2.5} 6 Month measurements - On-Site (Daily Average Concentrations)

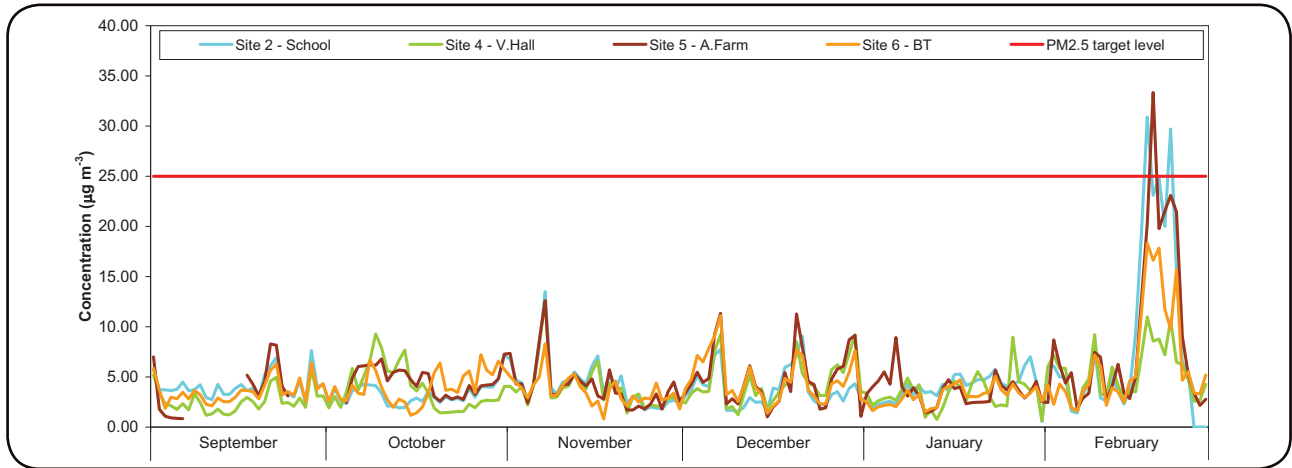


Figure 5. PM_{2.5} 6 Month measurements - Off-Site (Daily Average Concentrations)

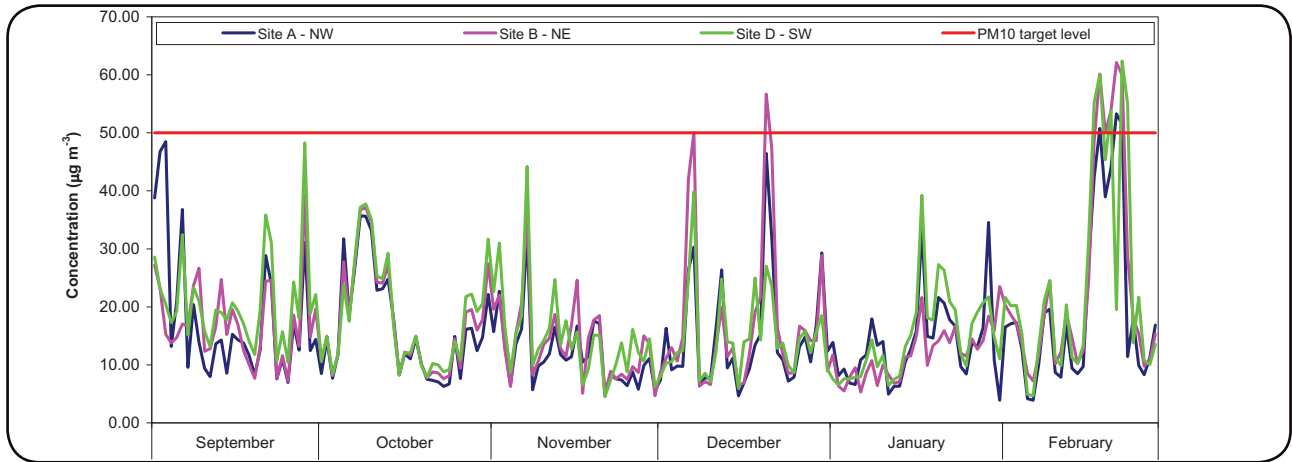


Figure 6. PM₁₀ 6 Month measurements - On-Site (Daily Average Concentrations)

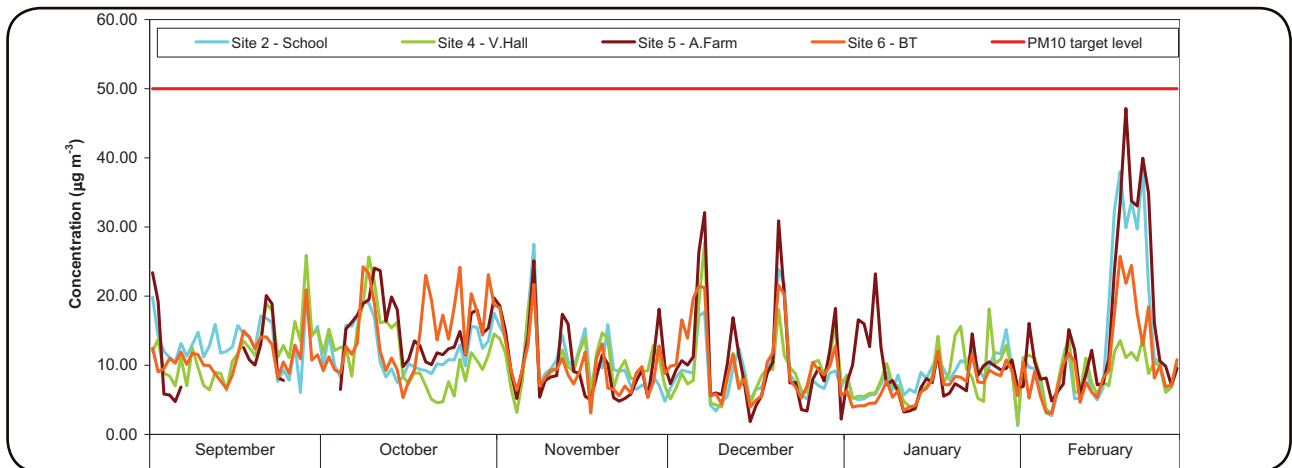


Figure 7. PM₁₀ 6 Month measurements - Off-Site (Daily Average Concentrations)

Odour Monitoring

There continues to be a number of separate operations that are taking place at the Avenue that have the potential to generate malodours of various types and magnitude. These include the excavation and processing of waste tip materials in Zone 3 and their transportation and stockpiling at various locations within the site.

During the month there were 19 occasions over 15 days when the odour diarists recorded odour intensities exceeding Level 4 when winds were blowing from the Avenue site. The odours most likely to be attributed to Avenue operations fall under the 'chemical' or 'tar' categories.

Tar and chemical odours were noted near Mill Lane to the south of the site, and Wingerworth to the west of the site on the following dates; 10th February, when the wind was blowing from the north-east; 20th February when the wind was blowing from the east-south-east; and on 28th, with four of the six odour occasions occurring on this date, when the

wind was blowing from the north-north-east. Odour diarists to the north and east of the site recorded tar and chemical odours on the following dates: 1st to 12th February when the wind was blowing mainly from the south-west; and 21st and 23rd February when the wind was mainly blowing from the south-east and south. Given the wind direction on these dates and the nature of these odours, it is likely that these odours are attributable to the Avenue site.

There were four odour complaints during the month, received by the Avenue site on 1st, 10th, 11th and 22nd February. These complaints noted odours to the west of the Avenue site on Derby Road. Upon investigation by Avenue staff the odours on 10th and 11th were found to be from the Avenue site; deodorisers were employed on-site following the complaint on 10th February. The odours on 1st and 22nd could have potentially come from an old gas facility near West Bars Island (north-west of the site) and not from the Avenue site; further investigations to discover the source of these odours is ongoing. Following discussion with the

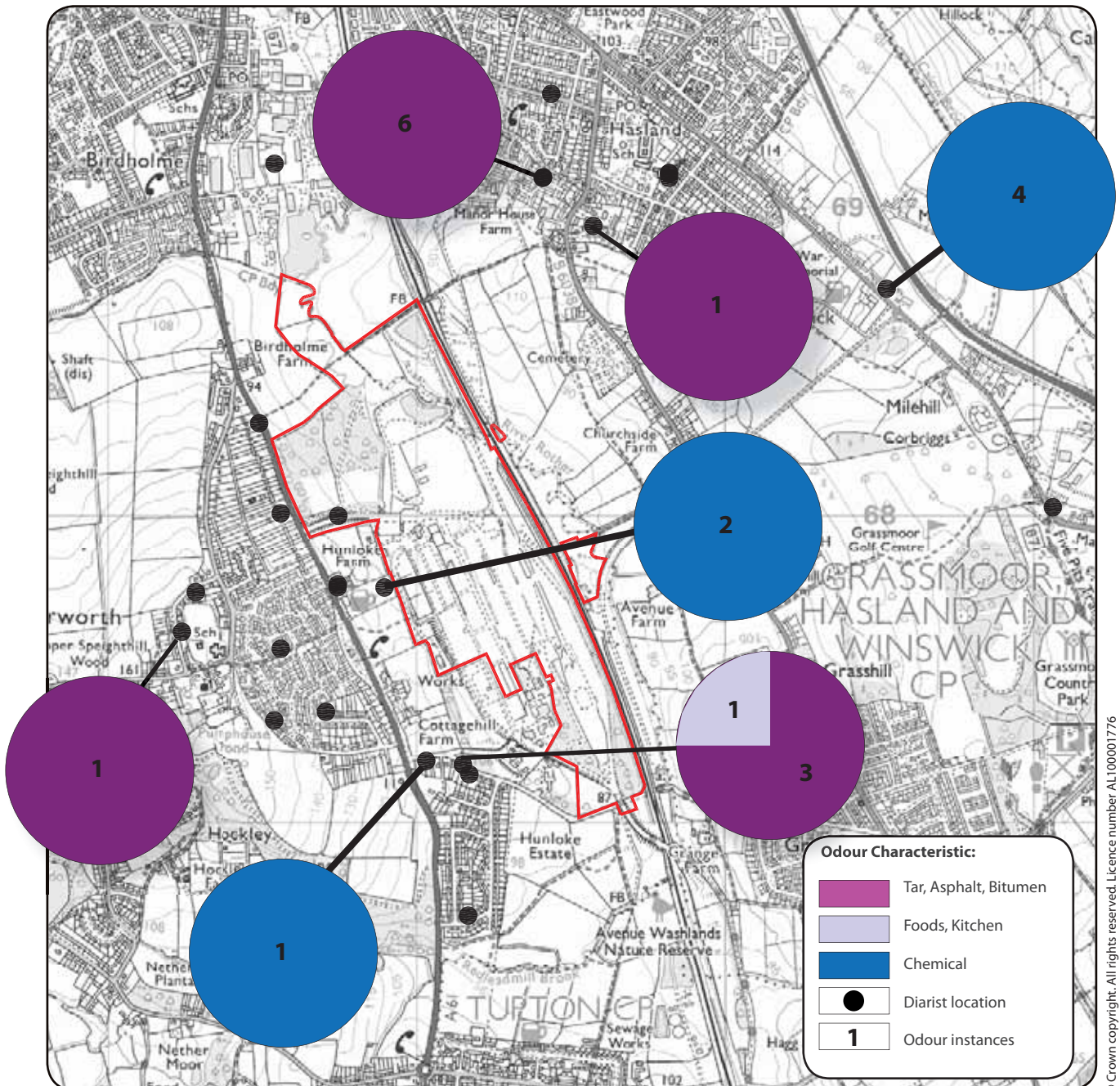


Figure 8. Odours detected during February 2011 when wind blowing from The Avenue

Avenue site staff and the local authority the complainants reporting the odours on the 12th and 22nd were asked to become odour diarists.

Sensory field odour surveys were carried out on 1st, 9th, 15th and 24th February at each of the fixed monitoring stations. At all locations, the maximum odour annoyance impact was considered to be low-medium.

Thermal Desorption Unit

At the beginning of February the TDU experienced a breakdown as a result of a blockage in the kiln output, resulting in the cyclones overheating. The overheating occurred on 1st of February and as can be seen from the monitoring results, did not result in any exceedences of the trigger levels for PM₁₀ or PM_{2.5} at any of the off-site or on-site monitoring locations. The TDU became operational again on 21st February following the completion of essential repairs.

Other Pollutants

Pollutants measured at the Avenue include nitrogen dioxide, metals (including cadmium), cyanide, poly-aromatic hydrocarbons (including naphthalene), phenols, volatile organic compounds (including benzene) and asbestos. There were exceedences of the target levels at the Avenue site for VOCs (benzene) and nitrogen dioxide. For VOCs, two exceedences of the target level of 5 µg m⁻³ for the Avenue site were noted at one of the on-site monitoring locations (Site D), during the first and second periods of the month (6.0 and 9.1 µg m⁻³). Site D is located to the west of Zone 4 and similar levels of the VOCs (benzene) were also recorded at this monitoring location in the previous month. However,

off-site monitoring locations recorded concentrations of VOCs (benzene) well below the target level with concentrations ranging from <1.7 to <1.8 µg m⁻³. Further investigation into the exceedences of the VOC target level at this site are continuing as site operations in this area are the same as in previous months. The Environment Agency is also assisting with these ongoing investigations into the VOC concentrations at this location. For nitrogen dioxide the exceedence of the target level of 40 µg m⁻³ occurred at Site A, with a concentration of 40.8 µg m⁻³. Site A is located close to the main car park near to the offices for the Avenue site and it is likely that the elevated concentration at this site were the result of vehicle movements in the car park rather than any site activities. With respect to metals (cadmium), the results for Site A in the second part of the month recorded a concentrations of <0.007 µg m⁻³. Since the limit of detection is above the target level for cadmium (i.e. 0.005 µg m⁻³), it appears that the monitor at this location did not take a sample of air of sufficient volume in order to achieve the level of accuracy required. This is being investigated to ensure a sufficient sample volume of air is collected by the monitor for future analysis.

All other pollutants measured at the Avenue site did not record exceedences of the relevant target levels during the month. Additional ambient asbestos monitoring was undertaken during the month at the waste tip and picking operation locations; all measurements were below the 0.01 f/ml target value.

Pollutant	Target Level	Averaging Period	Max Values	Previous Month	Yearly
Nitrogen Dioxide	40 µg m ⁻³	Monthly Mean	40.8	Higher	Higher
Metals (Lead)	0.25 µg m ⁻³	Monthly Mean	0.01	Lower	Lower
Metals (Cadmium)	0.005 µg m ⁻³	Monthly Mean	<0.007	Higher	Lower
Cyanide	50 µg m ⁻³	2-week Mean	0.02	Same	Lower
PAHs (Coal Tar pitches)	0.48 µg m ⁻³	2-week Mean	0.199	Higher	Lower
PAHs (Naphthalene)	126 µg m ⁻³	2-week Mean	0.043	Higher	Higher
Phenols (Phenol)	48 µg m ⁻³	2-week Mean	<0.2 LOD	Same	Same
Phenols (Cresole)	220 µg m ⁻³	2-week Mean	<0.2 LOD	Same	Same
VOCs (Benzene)	5 µg m ⁻³	2-week Mean	9.1	Lower	Lower
Odours	-	-	-	-	-

No Locations Exceeded	One Location Exceeded	Several Locations Exceeded
-----------------------	-----------------------	----------------------------

Table 2. Other Pollutants Summary

Further Information

Should you require any further information regarding any of the data in this report please contact:

Wendy Reeks

Customer Services

The Avenue

Derby Road

Chesterfield, Derbyshire S42 6NB

Tel: 01246-554580 - Email: wendyreeks@avenuecw.co.uk

