July 2011

THE AVENUE

Air Quality and Odour Monitoring Programme
Summary of Results

Site Activities

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

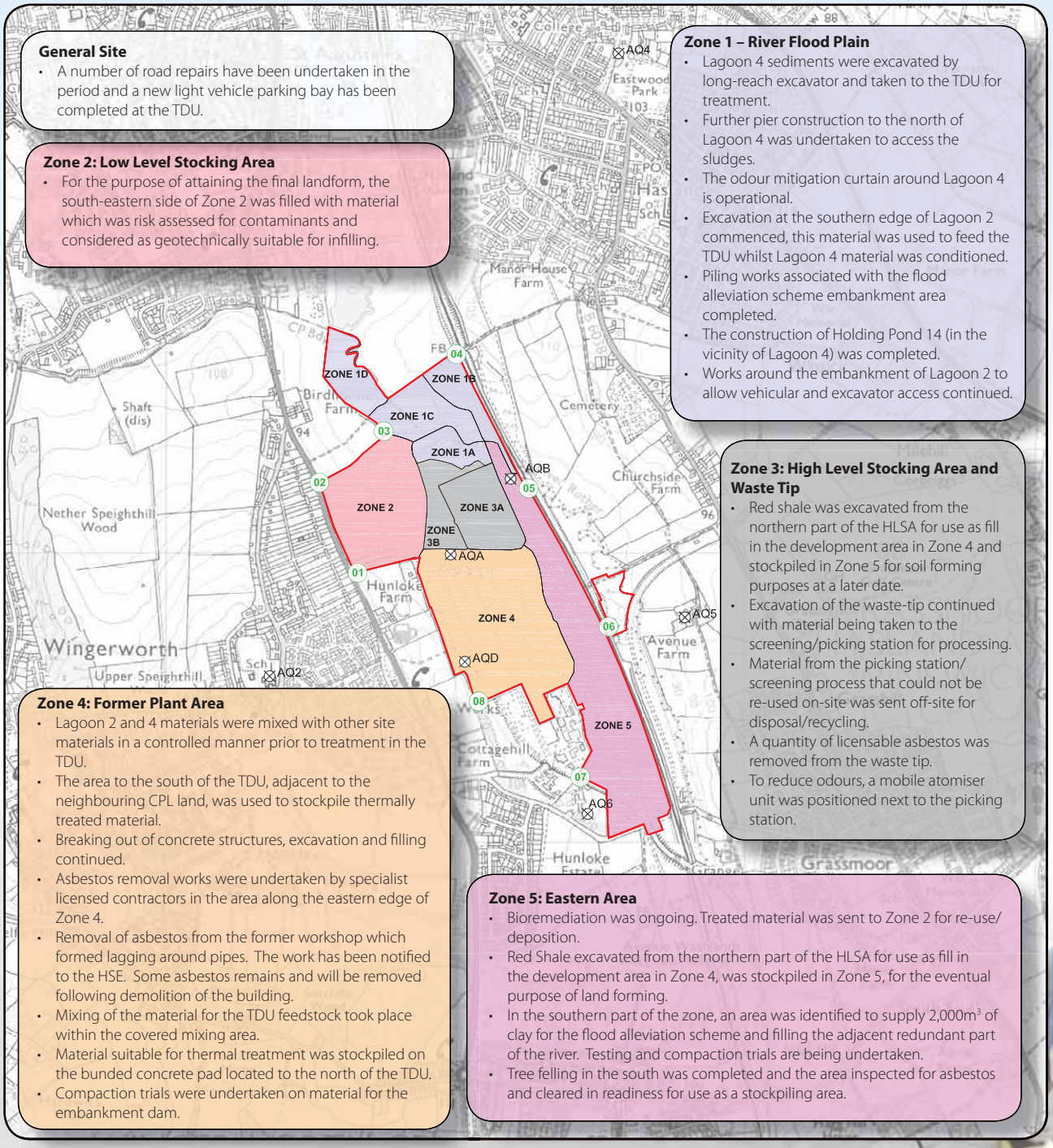

Figure 1. Site Activities Per Zone for July 2011

Homes & Communities Agency

VSD Avenue

amec

Meteorological Conditions

The Avenue site has a fixed meteorological station which measures wind direction, wind speed and rainfall. The wind speed and wind direction for Period 1 (1st to 18th July) and Period 2 (19th to 31st July) are presented in Figure 2 as two wind roses.

For Period 1, the wind rose indicates that the wind was mainly coming from the south and the west with a minor northerly component. Low wind speeds (less than 5m/s) were predominantly from south and westerly wind directions. Higher wind speeds (more than 5 m/s) are shown to be more commonly associated with wind from the south.

For Period 2, the wind rose shows that winds coming from the north-west, north and north-east are prominent. During this period the strongest wind speeds (above 10m/s) were associated with north-westerly wind directions. The amount of calm conditions is slightly elevated compared to Period 1 at a value of 17.6% of all hourly measurements. Low wind speeds (less than 5m/s) are associated with north westerly and north easterly wind directions.

The total rainfall for July 2011 at the Avenue site was 12.4 mm, which is the same as the previous month. According to the Met Office, July 2011 was wetter and slightly cooler than the average conditions for July. This was shown in unsettled periods during the second and fourth weeks in the month. The meteorological data for the Avenue site appears to broadly reflect the general trend seen across northern and western parts of England.

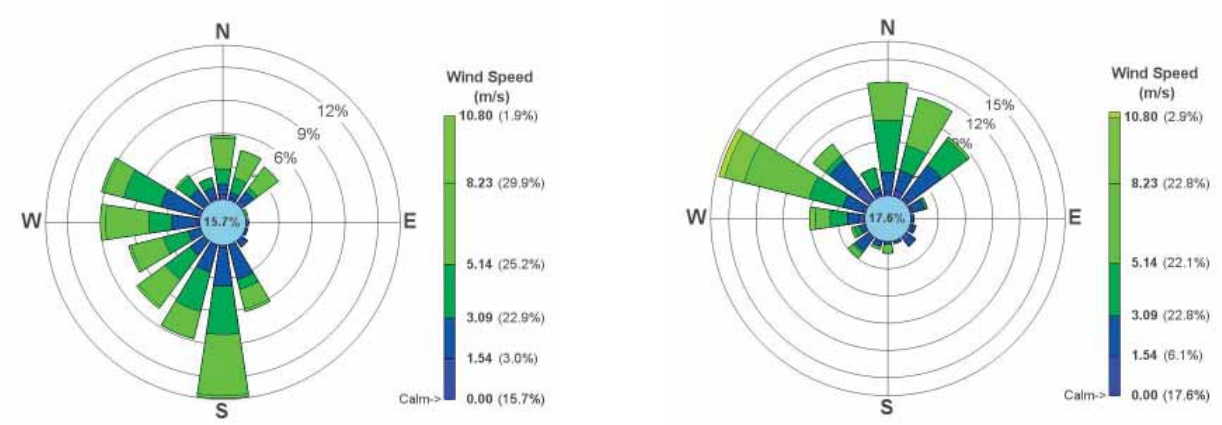

Figure 2. Wind Roses for the Site, July 2011 P1 and P2

Particulate Monitoring

At the Avenue, measurement of PM_{10} and $PM_{2.5}$ particulate matter is undertaken at all on-site and off-site monitoring locations. Monthly average concentrations of PM_{10} across all locations were in the range of 9.8–24.4 µg/m^3, with concentrations of $PM_{2.5}$ in the range of 2.2-5.0 µg/m^3. This indicates a slight increase on overall PM_{10} levels from the previous four months and a slight decrease in overall $PM_{2.5}$ levels from the previous four months.

As shown in Figure 3, only one of the monitoring locations, i.e (Site D) for two days during July, recorded concentrations of PM_{10} above the relevant 24 hour Air Quality Objective (AQO) of 50 µg/m^3. Long-term concentrations remained below the 40 µg/m^3 annual average AQO at this monitor. The first peak in concentration occurred on 4th July, when the wind was mainly from the west north-west until 2 pm, after which the wind direction changed to a southerly direction. The second peak happened on 25th July when the wind was mainly from the west north-west until 10am, before changing to a north-east direction. This would indicate an on-site source of particles as a likely reason for the elevated concentrations.

Pollutant	Target Level	Averaging Period	Max Values	Monthly Trend	Max 12 Month Rolling Average
Fine Particulate Matter (PM_{10})	40 µg/m^3	Monthly Mean	24.4	Increasing	20.4
Fine Particulate Matter (PM_{10})	50 µg/m^3	24-hr Mean	53.1	Decreasing	-
Fine Particulate Matter ($PM_{2.5}$)	25 µg/m^3	Monthly Mean	5.0	Decreasing	7.9
Dust Deposition - Directional Gauge (ON-SITE)	200 mg/m^2 day^{-1}	Monthly Mean	447	Decreasing	-
Dust Deposition - Directional Gauge (OFF-SITE)	200 mg/m^2 day^{-1}	Monthly Mean	112	Increasing	-
Dust Soiling - Sticky Pad	5% EAC day^{-1}	Weekly	4.9	-	-

No Locations Exceeded	*One Location Exceeded*	*Several Locations Exceeded*

Table 1. Particulate Matter and Dust Summary

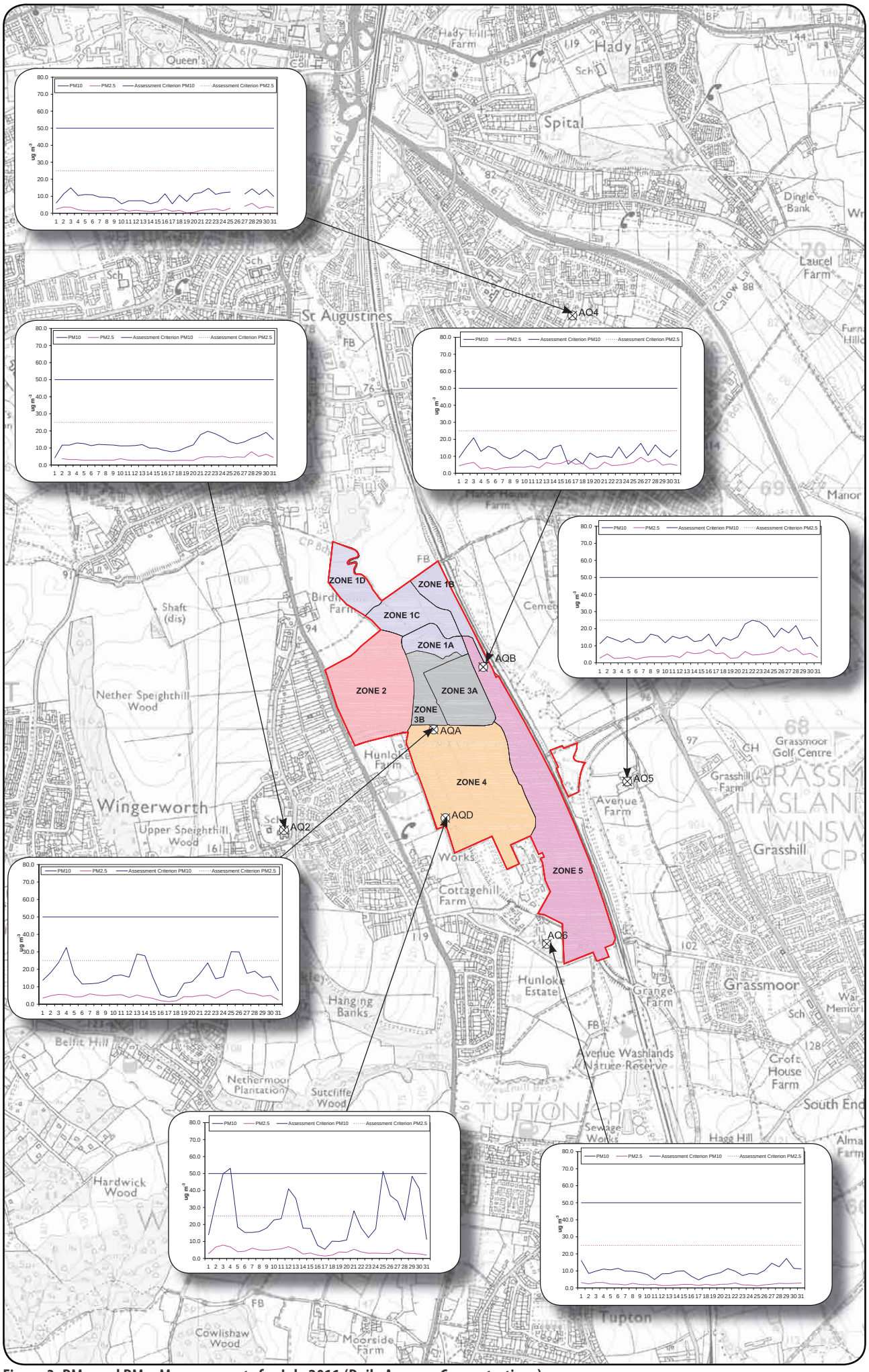

Figure 3. PM_{10} and $PM_{2.5}$ Measurements for July 2011 (Daily Average Concentrations)

From Figure 3 it can be seen that the pattern of PM_{10} concentrations is broadly the same at on-site monitors A and D. These two monitors are located close to each other and are affected by the same on-site sources, whereas Site B (located further to the east) was not affected by the same on site sources. The off-site monitoring locations show a similar pattern across July with little variation in PM_{10} concentrations suggesting that there were no local or regional factors affecting the PM_{10} concentrations.

Exceedences of the 1-hour PM_{10} target level of 100 µg/m^3 were noted at Site A and Site D, with 1 exceedence recorded at Site A on 4th July (139.9 µg/m^3) and 12 exceedences noted at Site D on 4th, 18th, 25th, 27th, 29th and 30th (101.5 – 332.7 µg/m^3). Nearly all of the exceedences were recorded between 8pm and 10pm on 25th, 27th and 29th, with the exceedences on 4th, 18th and 30th recorded in the early hours of the morning (midnight – 4am), when no earthmoving operations or vehicle movements were taking place. No explanation for these exceedences has been found.

Monthly average $PM_{2.5}$ concentrations at all of the monitoring sites were below 25 µg/m^3. There were no exceedences of the 1-hour $PM_{2.5}$ trigger level of 50 µg/m^3 at any of the monitoring sites during July 2011. Particles classified as $PM_{2.5}$ (i.e. particles <2.5 µm in diameter) are a subset of particles classified as PM_{10}, and therefore concentrations of $PM_{2.5}$ should always be lower than concentrations of PM_{10} and broadly follow the same trends. As shown in Figure 3, at the time of elevated concentrations of PM_{10}, the increase was generally driven by concentrations of coarse particles with diameters >2.5 µm and consequently there was more variability across the month in terms of concentrations of PM_{10} compared to $PM_{2.5}$.

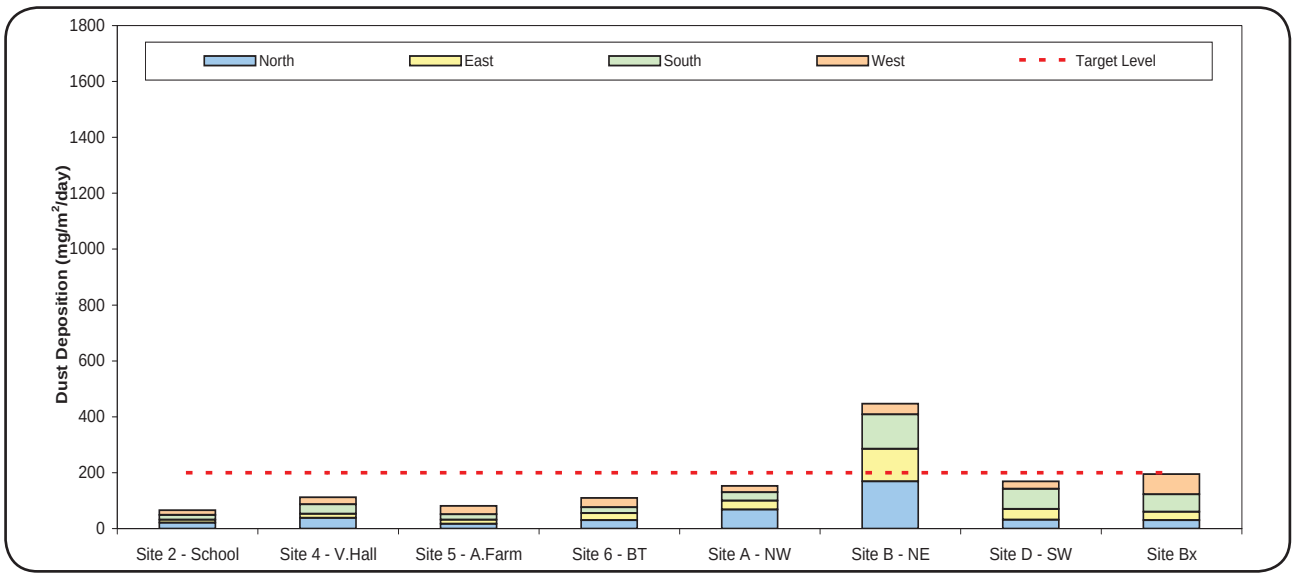

Figure 4. Measured Dust Deposition Levels (mg/m^2/day)

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 with a deposition level of 447 mg/m^2/day. Figure 2 shows that nearly half of the deposited dust at Site B came from a northerly direction. There was also a large proportion of dust from easterly and southerly directions. This suggests the dust came from a source to the north (potentially off-site) and sources to the east and south, which were likely to be on-site operations including the nearby haul road and off-site activities on the nearby arable farmland.

High deposition levels also occurred at the additional monitoring location ~40 m to the east of Site B (known as Site BX) within the Avenue boundary, with a deposition level of 195 mg/m2/day. The main source of dust at this monitoring location was from the south and west. The elevated deposited dust levels could therefore be attributed to the Avenue site and are likely to be attributed to the nearby haul road.

The highest obscuration levels were measured in Week 3 at Site 5 with a value of 4.5% EAC/day recorded for the western side of the sticky pad, indicating that the source of the dust was from the site activities to the west of the monitoring site. The haul road for the site is located to the west of Site 5 and activities on the haul road may have resulted in the elevated obscuration levels at this location. Recorded obscuration levels at this location for all of the weeks in July were also of a level where complaints would be probable (>2% EAC/day). However since the closest sensitive receptors are located a considerable distance from this monitor, dust levels at residential location are likely to be much lower and no complaints have been received.

Site 5 is located adjacent to the continuous monitor and Frisbee gauge at Site B, which is at the northern end of Zone 5. The elevated obscuration levels at Site 5 coincided with the elevated dust deposition levels at Site B, as indicated by the Frisbee gauge at this location, suggesting the source of dust at both monitors was from the nearby haul road.

Odour Monitoring

There continue 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 lagoon sediments in Zone 1 and their transportation and stockpiling on the storage pad to the north of the TDU. However, odour mitigation was also

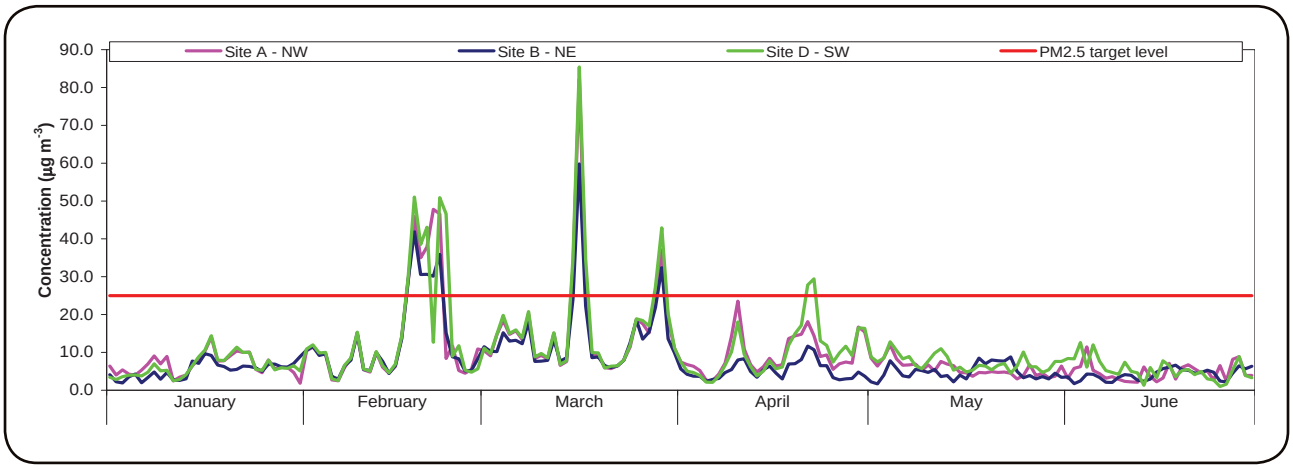

Figure 5. $PM_{2.5}$ 6 Month Measurements - On-Site (Daily Average Concentrations)

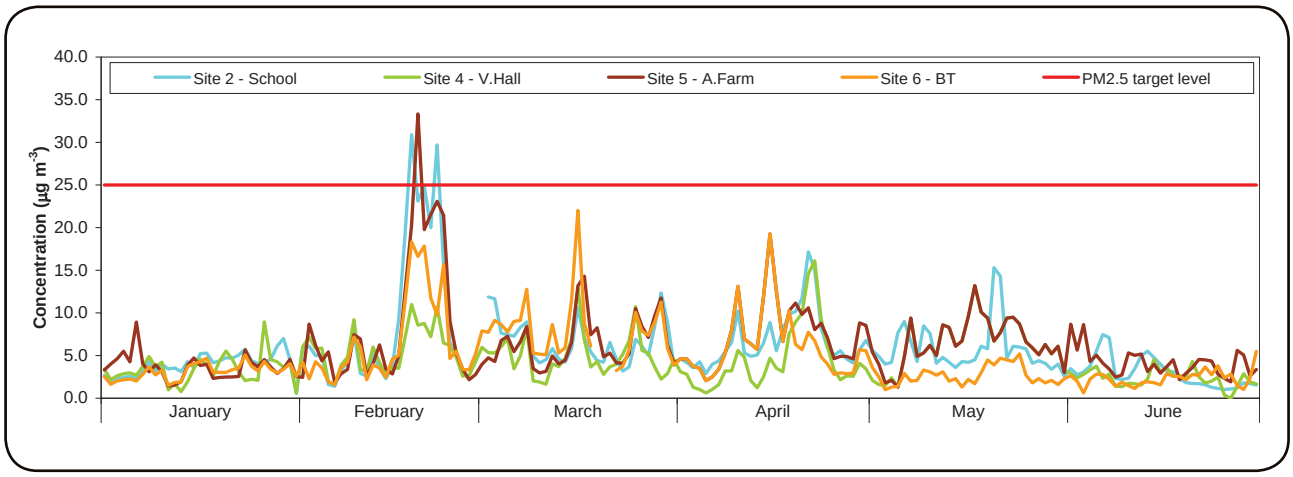

Figure 6. $PM_{2.5}$ 6 Month Measurements - Off -Site (Daily Average Concentrations)

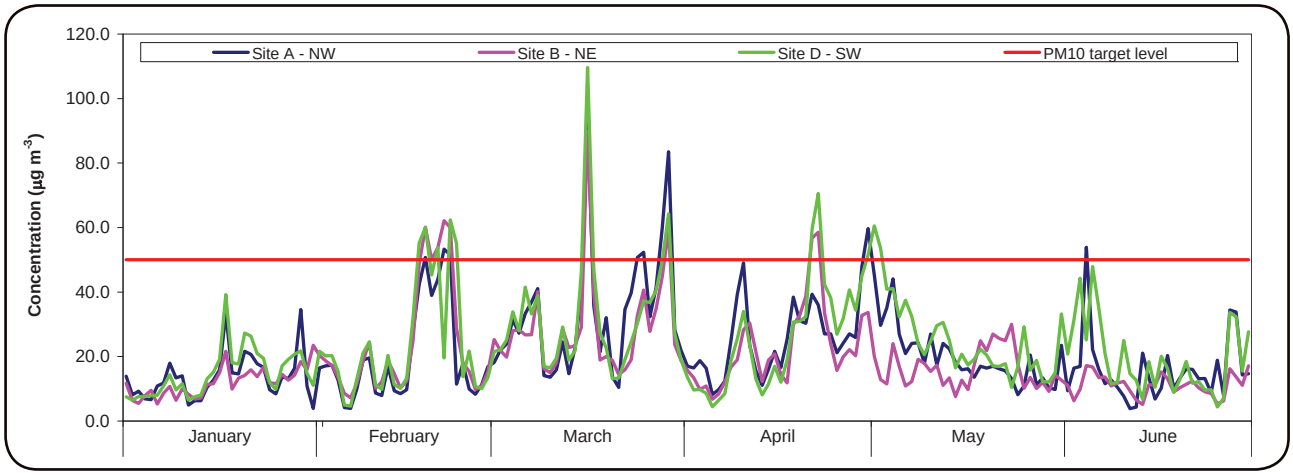

Figure 7. PM_{10} 6 Month measurements - On-Site (Daily Average Concentrations)

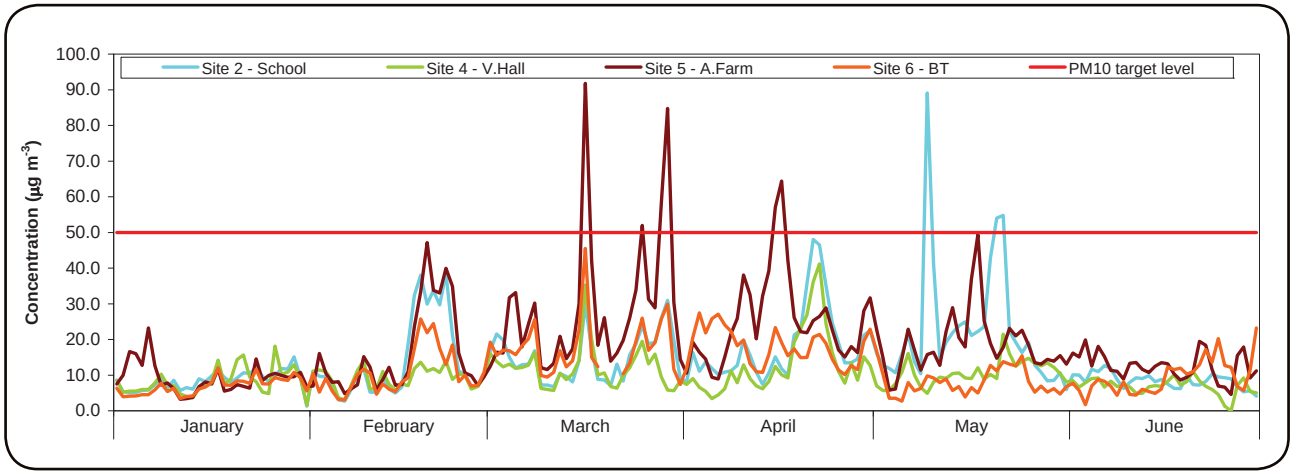

Figure 8. PM_{10} 6 Month Measurements - Off-Site (Daily Average Concentrations)

installed around Lagoon 4 (Zone 1) and Zone 3 to reduce odours from the site.

During the month there were 56 occasions over 21 days when the odour diarists recorded odour intensities exceeding Level 4 (see Figure 5). This is an increase in the number of odour incidences on the previous month when there were 31 occasions over 17 days, but only a slight increase in the number of days. This reflects the odour diarists recording two separate odour incidences on the same day on a number of occasions throughout the month. These occasions occurred throughout the month, and the odours were considered to be either chemical or tar/asphalt in nature. There were also 12 complaints relating to odour from the site during the month, these complaints were also received throughout the month and on those same days as those odours noted by the odour diarists. All complainants were contacted and where necessary additional odour surveys were undertaken. These found that maximum odour impact annoyance was considered to be medium.

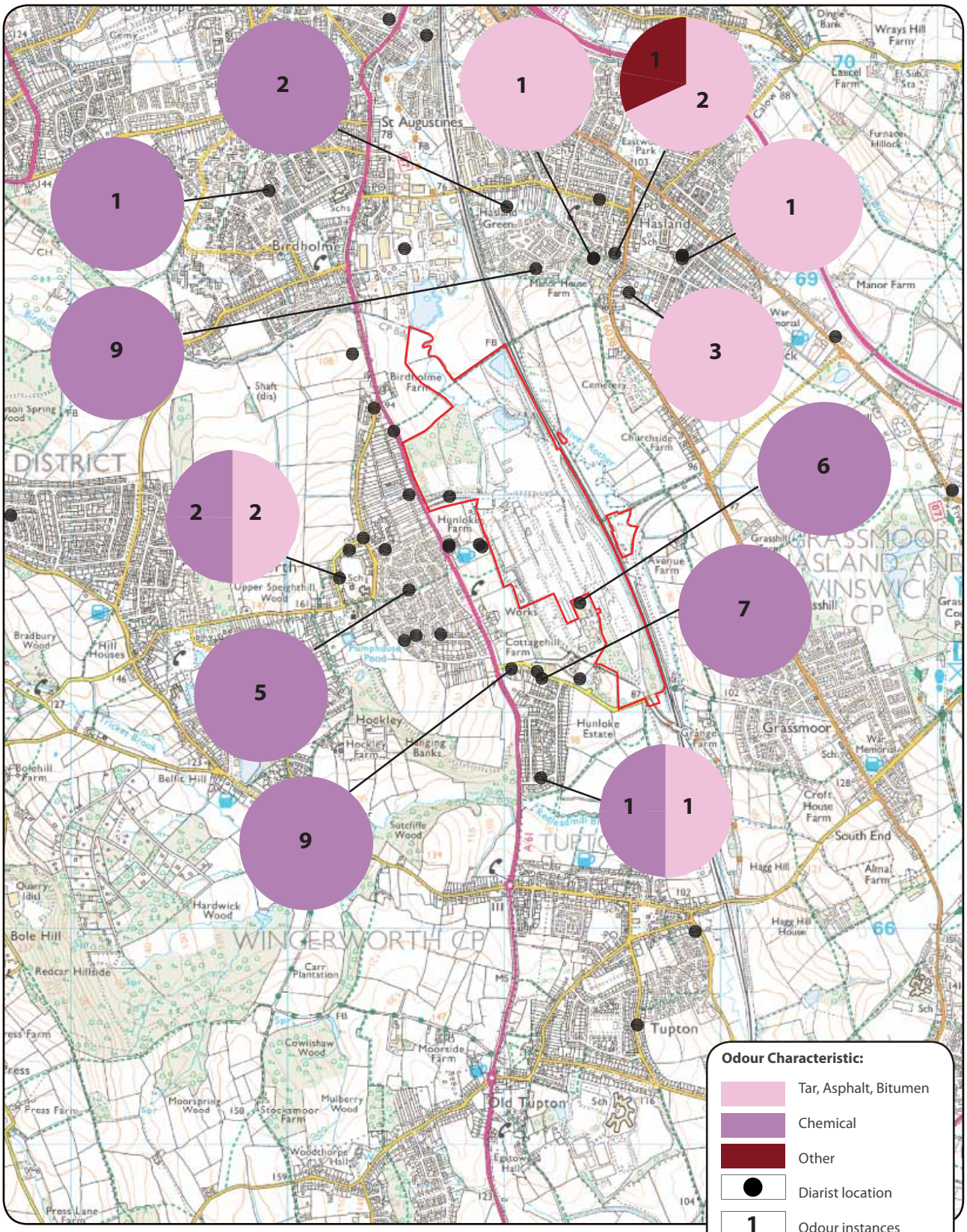

Figure 9. Odours Detected During July 2011 when Wind Blowing from The Avenue

Sensory field odour surveys were carried out on 1st, 7th, 18th and 26th July at each of the fixed monitoring stations. At all locations, the maximum odour annoyance impact was considered to be medium.

Thermal Desorption Unit

The TDU was operational on a 24hr basis throughout most of the month, although there were some limited periods of shutdown to allow for maintenance operations to be carried out, and the plant did not operate at all for a period of 45 hours between 22 and 24 July.

Other Pollutants

Pollutants monitored at the Avenue include nitrogen dioxide, metals (including cadmium), cyanide, poly-aromatic hydrocarbons (including naphthalene), phenols, volatile organic compounds (including benzene) and asbestos.

The concentrations of VOC (benzene) during the month exceeded the target level of 5 µg/m^3 at all of the on-site locations at certain times during the month. The maximum concentration was at Site D during the first period of the month with a VOC (benzene) concentration of 62 µg/m^3. The additional monitors located at Sites DX1 and DX2, on the western site boundary remained in place during July. It is important to note that these showed a considerable reduction in VOC (benzene) concentrations with distance from the main site operations, with Site DX1 recording a maximum concentration of 5.3 µg/m^3 and Site DX2 recording a maximum concentration of 4.3 µg m^{-3}. All off-site monitoring locations recorded VOC (benzene) concentrations below the target level.

A maximum concentration for PAHs (Coal Tar Pitches) 0.769 µm/m^3 was recorded during the first period of the month at Site B, although the result for the whole month was 0.47 µm/m^3 and therefore just below the target level of 0.48 µm/m^3. Concentrations at all the other site monitoring locations were below the target level for both the July monitoring periods.

All other pollutants measured at the Avenue site did not record exceedences of the relevant target levels during the month.

The target levels currently used for the other pollutants may alter as a result of ongoing discussions with the Health Protection Agency and the Environment Agency. This is part of the process of the Air Quality Management Plan which is continually updated as new practises and guidance is made available.

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	Monthly Trend	Max 12 month rolling average
Nitrogen Dioxide	40 µg/m^3	Monthly Mean	16.7	Increasing	22.6
Metals (Lead)	0.25 µg/m^3	Monthly Mean	0.01	Decreasing	0.01
Metals (Cadmium)	0.005 µg/m^3	Monthly Mean	<0.003	Same	0.004
Cyanide	50 µg/m^3	2-week Mean	<0.01	Same	0.01
PAHs (Coal Tar pitches)	0.48 µg/m^3	2-week Mean	0.769	Increasing	0.179
PAHs (Naphthalene)	126 µg/m^3	2-week Mean	0.042	Decreasing	0.021
Phenols (Phenol)	48 µg/m^3	2-week Mean	<0.2 LOD	Same	0.2
Phenols (Cresole)	220 µg/m^3	2-week Mean	<0.2 LOD	Same	0.2
VOCs (Benzene) On-Site	5 µg/m^3	2-week Mean	62	Increasing	14.4
VOCs (Benzene) Off-Site	5 µg/m^3	2-week Mean	5	Increasing	2.0
Odours	-	-	-	-	-

No Locations Exceeded | *One Location Exceeded* | *Several Locations Exceeded*

Note: *Maximum 12 month rolling average is calculated using the limit of detection value in the absence of an actual measurement. This may result in a higher 12 month rolling average value than would actually be the case.*

Further Information

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

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