

Avenue Remediation Project

Air Quality and Odour Monitoring Programme

Summary of Results: April 2010

1. Overview

1.1 Summary of Monthly Air Quality Monitoring Results

Table 1 provides an overview of the air quality measurement data for April 2010 (1st April to 5th May¹) and the evaluation of significance of the measured values in the context of target levels for each pollutant. Further details concerning the measured levels of each of the pollutants are reported in subsequent sections of this summary report.

Table 1 – Summary of Air Quality Monitoring Results Compared to Air Quality Objectives and Guideline Values for Key Pollutants

Pollutant	Averaging Period	The Avenue Target Value	The Avenue Measured Values	Evaluation (Low, Med, High)
Nitrogen Dioxide (NO ₂)	Monthly Mean	40 µg m ⁻³	0.49 – 20.77	Low
Fine Particulate Matter (PM ₁₀)	Monthly Mean	40 µg m ⁻³	11.81 – 23.15	Low
Fine Particulate Matter (PM ₁₀)	24-hr Mean	50 µg m ⁻³	5.02 – 50.62	Medium
Fine Particulate Matter (PM _{2.5})	Monthly Mean	25 µg m ⁻³	4.17 – 7.24	Low
Sulphur Dioxide (SO ₂)	2-week Mean	125 µg m ⁻³	11.89 max	Low
Metals - Lead	Monthly Mean	0.25 µg m ⁻³	0.02 max	Low
Cyanide	2-week Mean	50 µg m ⁻³	0.07 max	Low
PAHs - Coal Tar Pitch Volatiles	2-week Mean	0.48 µg m ⁻³	0.15 max	Low
PAHs - Naphthalene	2-week Mean	126 µg m ⁻³	0.001 max	Low
Phenols – Phenol	2-week Mean	48 µg m ⁻³	< 0.2	Low
Phenols – Cresols	2-week Mean	220 µg m ⁻³	< 0.2	Low
VOCs - Benzene	2-week Mean	5 µg m ⁻³	< 1.7	Low
Dust Deposition - Directional Gauge	Monthly Mean	200 mg m ⁻² day ⁻¹	41 – 288	Medium
Dust Soiling – Sticky Pad	% EAC*	5 % EAC	3.1 max	Medium
Odours	n/a	n/a	Low-Medium	Low

Notes:

Where the averaging period of the target value is for a 2-week mean, the measured value presented in the table is the maximum value measured during the month.

* %EAC refers to percentage area covered per day.

¹ Monitoring reporting periods are 4 or 5 weeks in duration and may not correspond directly to a calendar month.

In summary:

There were no air quality related complaints recorded during the month of April.

In terms of the monitoring results, there were two exceedences of the target levels for the pollutants during the month. These were the 24 hour Particulate Matter (PM₁₀) average on 10th April at Site 1 (Press Lane Farm, Old Tupton), and the dust deposition level for the month at Site B (north-east boundary of the Avenue site). Given the distance of Site 1 from The Avenue and the wind direction on 10th April, it is extremely unlikely that The Avenue was the source of the PM₁₀ particles. The higher levels of deposited dust at Site B are likely to be due to proximity of this location to vehicular activities and haul route construction (within 10 metres of the monitor).

Concentrations of particulate matter (PM₁₀) were approximately 2 µg m⁻³ higher than measurements in March 2010. Concentrations of PM_{2.5} showed a similar pattern to the previous month at Site 4, but not at Site B where PM_{2.5} concentrations were slightly lower, except for 24th April when PM_{2.5} concentrations are significantly lower at Site B than at Site 4. The wind direction on 24th April was from the south and although The Avenue could have been a contributing factor to these elevated PM_{2.5} concentrations, with Site B showing much lower levels of PM_{2.5} closer to the site, this would suggest a localised source to Site 4 was responsible for the peak in PM_{2.5} concentrations. In general there were no significant differences between the values for PM₁₀ and PM_{2.5} when compared to the previous month.

Concentrations of nitrogen dioxide (NO₂) were between 2 and 9 µg m⁻³ lower than measurements in March.

Although the magnitude of change was small, concentrations of sulphur dioxide, cyanide, metals, VOCs, naphthalene coal tar pitch volatiles (PAHs) were lower than in March. The levels of deposited dust were higher in April at most of the sites when compared to the levels for March.

The sticky pad located at Site 5, adjacent to the fixed monitoring station at Site B, showed high levels of dust soiling throughout April. This was likely to be the result of activities mentioned above.

Although there were elevated PM₁₀ and dust levels at Site B and elevated dust levels at sticky pad Site 5 due to activities in close proximity, no visual off-site nuisance was evident, recorded or reported. Both monitors are within the site boundary and are primarily situated to monitor on-site levels. The nearest receptor properties are some 500m away. Additionally no impact was observed upon the river.

1.2 Work Activity

The site remediation operations are now well established and some site-based works with the potential to adversely affect air quality have taken place during April 2010. The earthworks included the following activities:

Zone 1: River Flood Plain

- Construction of sheet pile wall continued with the piling activities nearing completion;
- A temporary bridge was being constructed over the river and the concrete haul road was continuing to be constructed up to the bridge;
- A small amount of de-silting works in the River Rother had been undertaken in order to improve flow under the footbridge to the north of the site.

Zone 2: Low Level Stocking Area (western boundary, adjacent to A61)

- The borrow-pit in the southern part of Zone 2 was being filled with material excavated from Zone 4 (former plant area).

Zone 3: High level Stocking Area and Waste Tip

- Small volumes of contaminated material from Zone 4 requiring further treatment was being stockpiled as a temporary measure in advance of the availability of the treatment process;
- Construction of the concrete stocking bays and hard standing for the waste tip processing and soil washing plant was completed.

Zone 4: Former Plant Area

- The site of the former Ruberoid plant has been provided with a new concrete pad for the Thermal Treatment Plant;

- Works associated with the gas supply line were being undertaken;
- Construction of the Thermal Treatment Plant continued;
- Excavations and concrete breakout works continued to the south of the site water treatment plant where the proposed new water treatment plant is to be constructed;
- Further investigation of the Coke Oven basement structures was undertaken;
- Breakout of structures north of the Coke Oven basements associated with old cooling tower and pumping sumps was undertaken;
- Commencement of the demolition of the large green storage tanks (hydraulic steel cutting).

Zone 5: Eastern Area

- Works associated with site surface drainage redirection and works involving the positioning of the holding pond (HP11) associated with the bioremediation area continued;
- De-silting works in the Bear Pits was undertaken. The inside westerly chambers and the largest of the easterly chambers were de-silted.

1.3 Alterations, Downtime and Technical Difficulties

A summary of alterations to the monitoring programme, alongside downtime and technical issues during the month are summarised in Table 2.

Table 2 – Summary of Alternations, Downtime and Technical Difficulties

Location	Dates	Technical Issue
Alternations to Monitoring Programme:		
Site C	30 th April onwards	Monitoring site has been decommissioned.
Downtime and Technical Difficulties:		
Sites B and C	19 th – 20 th April	Power supply interrupted resulting in loss of APM data between 08.15 on 19 th April and 09.30 on 20 th April.
Site C	30 th April onwards	Power issue to this site due to nearby haul road construction. Power has not been re-instated due to the scheduled decommissioning of this monitor.

2. Detailed Air Quality Monitoring Results

2.1 Routine Air Quality Monitoring

This section provides an overview of the measurement data for the fixed monitoring sites.

2.1.1 PM₁₀ Concentrations

Table 3 presents monthly average concentrations of PM₁₀ at the fixed monitoring sites. The highest average concentration of 23.2 µg m⁻³ at Site 7 which is located at the Nursery in Stretton, is approximately 58% of the 40 µg m⁻³ annual mean air quality objective. The second highest monthly average of 21.6 µg m⁻³ was recorded at Site 1 (Press Lane Farm, Old Tupton), whilst the additional stations within and close to The Avenue recorded levels in the 11.8–19.4 µg m⁻³ range. As there are only slight variations in monitored concentrations at sites bordering The Avenue, it could be concluded that The Avenue is having no discernable effect on concentrations of particulate matter. The sites recording the highest average concentrations are also the sites which are furthest away from The Avenue site.

Table 3 – Monthly Average Concentrations of PM₁₀ Particulate Matter (µg m⁻³)

Monitoring Site	PM₁₀ Monthly Average Concentration (µg m⁻³)
Site A: Avenue (NW)	15.3
Site B: Avenue (NE)	17.5
Site C: Avenue (SE)	15.4
Site D: Avenue (SW)	13.3
Site 1: Press Lane Farm, Old Tupton	21.6
Site 2: Hunloke Primary School	11.8
Site 4: Village Hall, Hasland	14.4
Site 5: Avenue Farm	19.4
Site 6: BT Offices (Pioneer House) Mill Lane	14.3
Site 7: Nursery at Stretton*	23.2

Notes:

* Concentration measured at Site 7 using Mini-Vol sampler. All other measurements using APM950 instrumentation

Figure 1 presents 24-hour average concentrations of PM₁₀ at the fixed continuous monitoring sites; measured concentrations in the first monitoring period were generally higher than those measured during second monitoring period.

The maximum measured concentration of 50.6 µg m⁻³ was recorded at Site 1 (Press Lane Farm, Old Tupton) on 10th April and this was also the date when the maximum concentrations were recorded at Sites D, 2, 5 and 7. On the 10th April the main wind direction after 7.30 am was from the east-north-east. This wind direction would result in Sites D, 1 and 2 being downwind of The Avenue site, whilst Sites 5 and 7 would be upwind of The Avenue site. This suggests that although The Avenue may have contributed to the PM₁₀ concentrations at the downwind sites, other sources of PM₁₀ were in the area and contributing to PM₁₀ concentrations at upwind sites. The concentrations measured at Site 1 were unusually high and as the site is distant from The Avenue the elevated concentrations are most likely to be due to very localised activities that led to emissions of fine particles.

The date of the maximum measured concentration at most of the other sites (A, 4 and 6) was 24th April. The wind came from the south-east on that date. This would potentially result in Site A being downwind of work activities taking place on The Avenue site and therefore, The Avenue may have contributed to the measured concentrations at this location. However, Sites 4 and 6 were not downwind of The Avenue when the wind is from the south-east and therefore The Avenue is unlikely to have contributed to PM₁₀ concentrations at these locations.

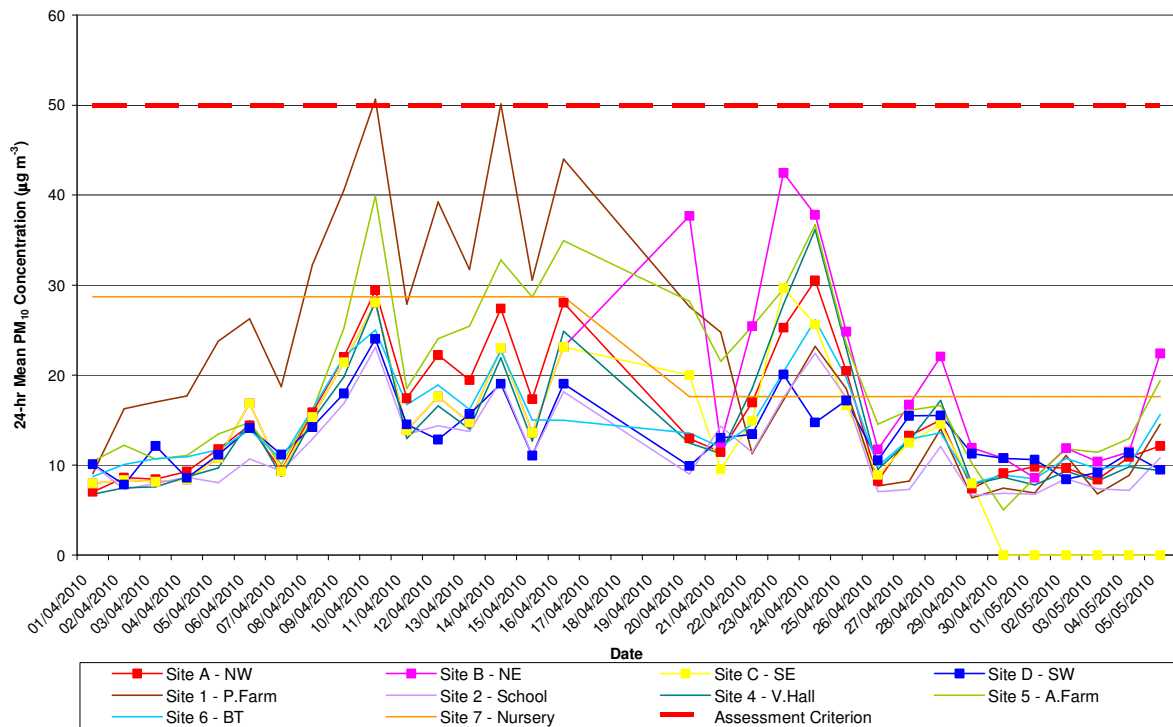
The maximum for Sites B and C occurred on 23rd April. The wind direction was from the south-west on 23rd April. Given the location of Sites B and C, the potential source of PM₁₀ on 23rd April could have been The Avenue site.

From the graph, PM₁₀ concentrations across the month show higher concentrations during the 1st period at most of the sites, with the second period showing a much lower trend in PM₁₀ concentrations at most of the monitoring locations, except Site B which shows higher concentrations in the second period of monitoring. This could be associated with haul route construction, local trafficking and / or dust blown up from local surfaces .

The zero concentrations in PM₁₀ at Site C from 30th April to 5th May are the result of a loss of power to this monitor over these 6 days. The power has not been reinstated to this monitor as this monitor has been decommissioned.

Mitigation measures in place to reduce the level of PM₁₀ concentrations onsite involve minimising trafficking upon undampened surfaces and using a water bowser to dampen haul roads around the site; this water bowser is employed continuously on the haul roads whilst the site is open, speed limits are observed onsite and daily checks for nuisance dust levels offsite are undertaken.

Figure 1 – 24-hour Average Concentrations of PM₁₀ Particulate Matter (µg m⁻³)



Notes:

* Concentration measured at Site 7 using Mini-Vol sampler. All other measurements using APM950 instrumentation

2.1.2 PM_{2.5} Concentrations

Table 4 presents monthly average concentrations of PM_{2.5} at the two fixed monitoring sites. The highest average concentration of 7.2 µg m⁻³ occurred at Site 4 (Village Hall, Hasland) located beyond the north east boundary of The Avenue site, and this was 2.1 µg m⁻³ lower than the concentration measured in March. At Site B (located on the north-eastern edge of the Avenue site), the monthly average concentration of PM_{2.5} decreased from 5.5 µg m⁻³ in March to 4.2 µg m⁻³ in April. All measured concentrations are significantly less than the 25 µg m⁻³ annual mean national air quality objective.

Table 4 – Monthly Average Concentrations of PM_{2.5} Particulate Matter (µg m⁻³)

Monitoring Site	PM _{2.5} Monthly Average Concentration (µg m ⁻³)
Site B: Avenue (NE)	4.2
Site 4 – Village Hall, Hasland	7.2

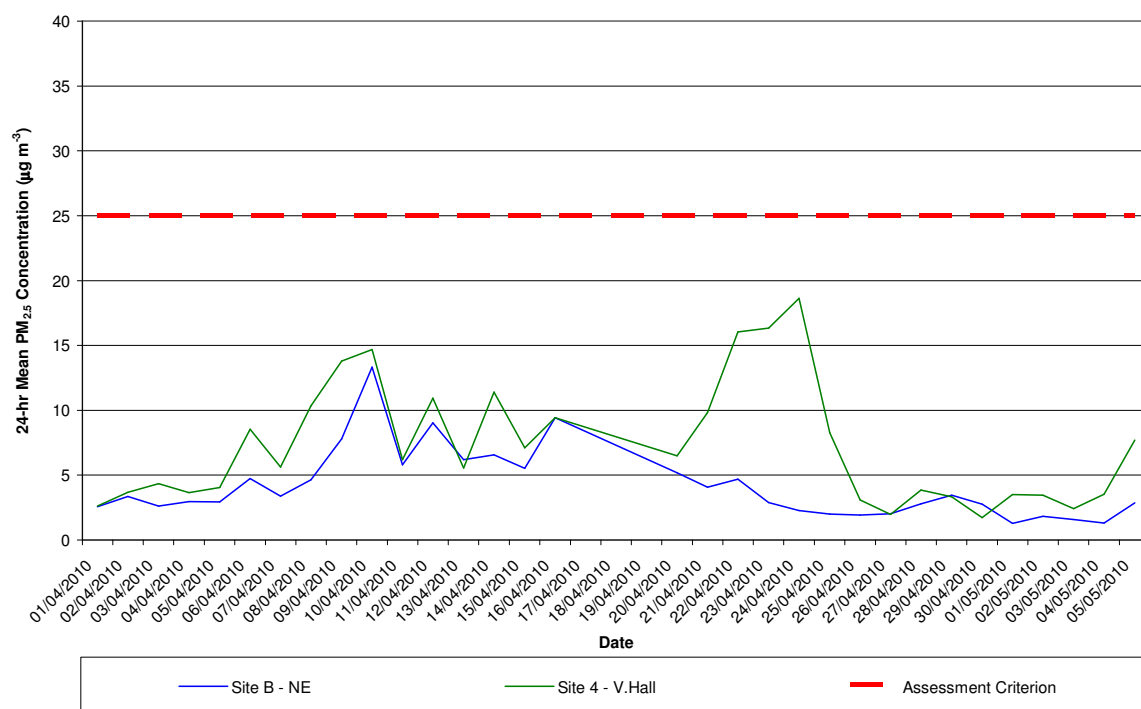
Figure 2 presents 24-hour average concentrations of PM_{2.5} at the fixed monitoring sites, to provide an indication of the monthly variation in measured values. The figure shows little variability in concentrations measured at Site B compared to Site 4 except on 6th to 10th, 14th and 20th to 26th April. From 6th to 10th April, when a peak in PM_{2.5} concentrations (8.5 to 14.7 µg m⁻³) was measured at Site 4, but not at Site B, the wind direction was from several directions (south-south-east on 6th April, north-west on 7th and 8th April, south-west on 9th April and finally north-east on 10th April). In addition, although the values at the two sites are different, the trend in concentrations is broadly similar. Given the trend and the values it is likely that a source close to Site 4 mainly contributed to the high concentrations of PM_{2.5}, rather than The Avenue site.

The peak in concentrations on 14th March at Site 4 occurred when the wind was coming from the north. This again suggests the works taking place on the Avenue site to the south-west of Site 4 were unlikely to have contributed to the increase in PM_{2.5} concentrations at Site 4.

The peak in concentrations, between 20th to 26th April at Site 4, occurred when the wind was mainly coming from the north-west, although on the 21st the wind was mainly from the north and on the 24th the wind was mainly from the south. The peak in concentrations on 24th coincides with winds from the south, which would suggest The Avenue could be a source of these PM_{2.5} concentrations, however, the PM_{2.5} concentrations at Site B are much lower on the 24th and do not reflect this trend. These results again suggest a source local to Site 4 was likely to be the main source of PM_{2.5} concentrations during these peak periods.

In any event, the 24-hour concentrations of PM_{2.5} at Site 4 and B do not exceed the assessment criterion during the period, and despite the peak in PM_{2.5} concentrations of 18.6 µg m⁻³ on 24th April at Site 4 and 13.3 µg m⁻³ on 10th April at Site B, the monthly averages of 4.2 and 7.2 µg m⁻³ are significantly less than the annual mean national air quality objective of 25 µg m⁻³.

Figure 2 – 24-hour Average Concentrations of PM_{2.5} Particulate Matter (µg m⁻³)

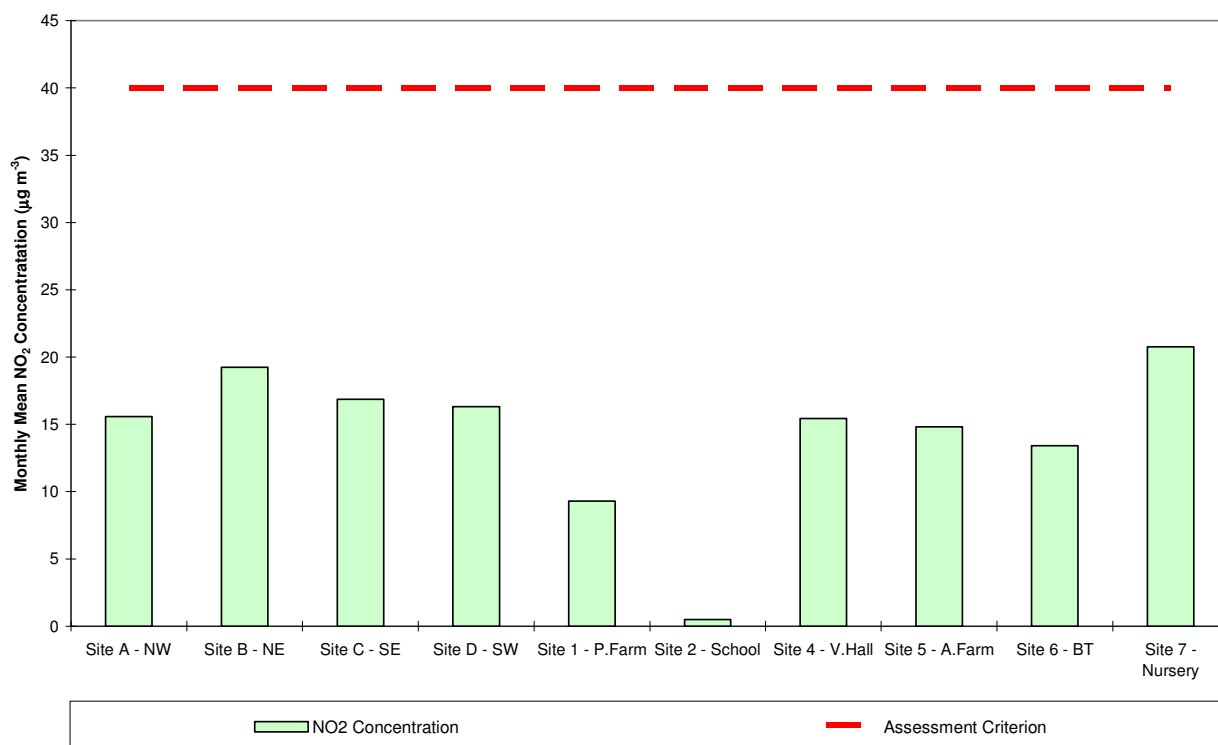


2.1.3 Nitrogen Dioxide Concentrations

Figure 3 presents monthly average concentrations of nitrogen dioxide across each of the fixed monitoring sites. At all locations, measured concentrations were below the $40 \mu\text{g m}^{-3}$ annual mean air quality objective. The maximum measured monthly average concentration was $20.77 \mu\text{g m}^{-3}$ at Site 7 (Nursery in Stretton), although several of the other sites have monthly average concentrations approaching this maximum value including Site B (monthly average concentration was $19.24 \mu\text{g m}^{-3}$). Concentrations of NO_2 in April were generally slightly lower than those measured in March, where the maximum monthly average concentration, at Site 7 was $22.86 \mu\text{g m}^{-3}$.

The monthly result for Site 2 appears to be extremely low and is on closer inspection lower than the media blank. The results for this diffusion tube are therefore unlikely to be correct.

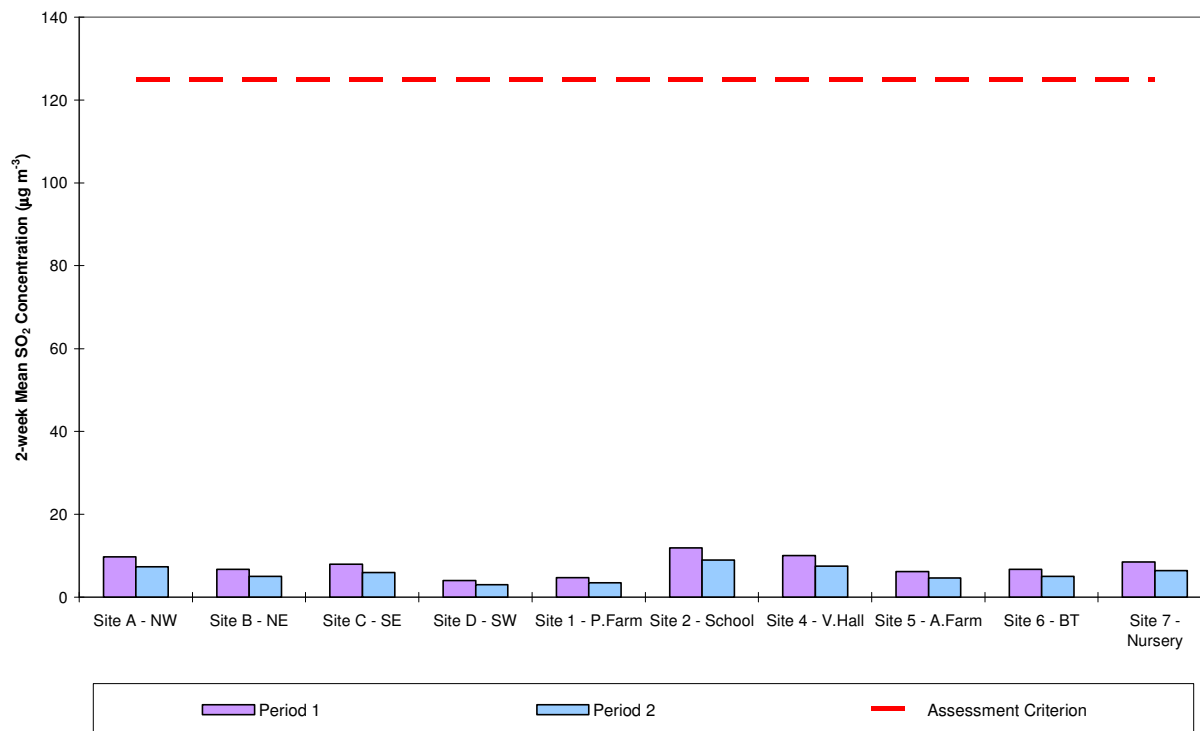
Figure 3 – Monthly Average Concentrations of Nitrogen Dioxide ($\mu\text{g m}^{-3}$)



2.1.4 Sulphur Dioxide Concentrations

Figure 4 presents 2-week average concentrations of sulphur dioxide across each of the fixed monitoring sites. At all locations, measured concentrations were significantly below the $125 \mu\text{g m}^{-3}$ target level. The maximum measured concentration was $11.89 \mu\text{g m}^{-3}$ and occurred at Site 2 (Primary School in Wingerworth) during the first monitoring period. The SO_2 concentrations recorded at the other sites are in the range of 3.04 to $9.76 \mu\text{g m}^{-3}$, with the highest value recorded at all sites during the first monitoring period. These results suggest that there is a general background level of SO_2 concentrations with no particular localised source close to any of the monitors in April.

Figure 4 – 2-week Average Concentrations of Sulphur Dioxide ($\mu\text{g m}^{-3}$)



2.1.5 Deposited Dust Levels

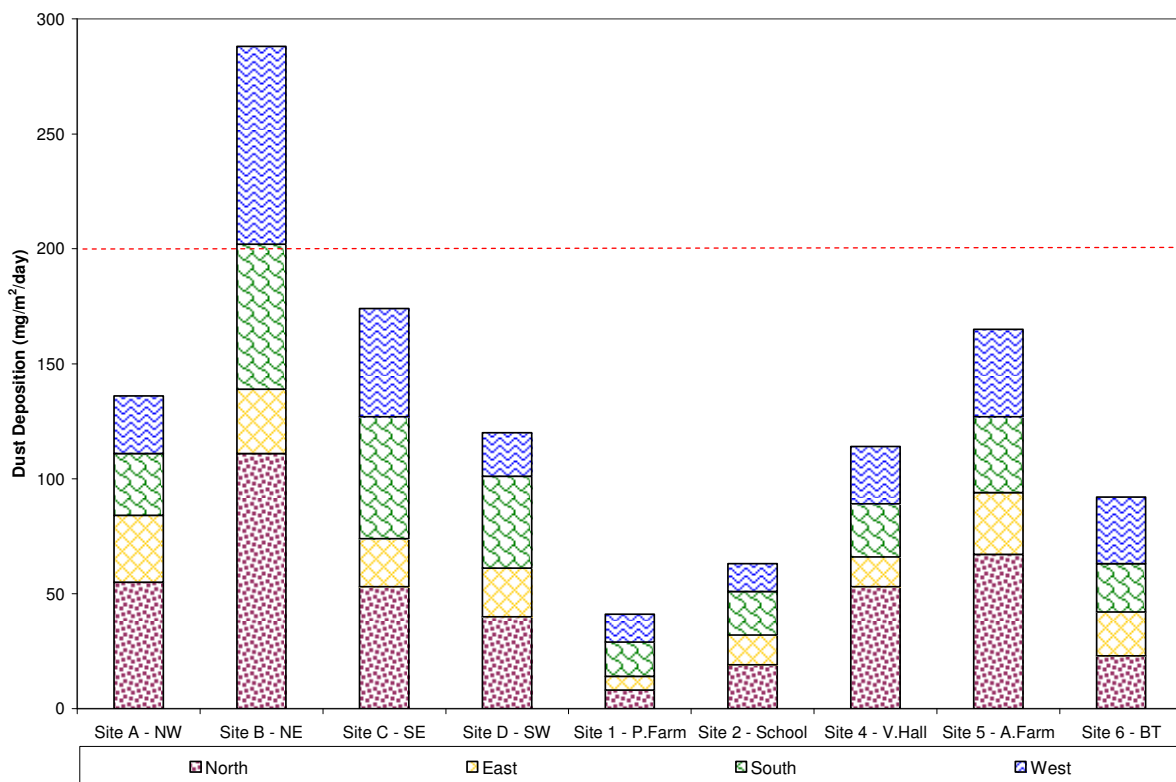
Figure 5 presents the monthly levels of deposited dust at each of the monitoring stations and the source direction.

The highest measured level of deposited dust of 288 mg/m²/day was recorded at Site B (Avenue NE) where the measured levels represent an exceedence of the target level.

At Site B, approximately a third of the deposited dust originated from the north and just less than a third was from the west. This pattern of dust deposition levels would suggest the Avenue site was a contributing element to these dust levels. During April construction of a haul route, local trafficking and dusty surfaces in the proximity of Site B are likely to be the main source of the deposited dust at this location. Mitigation measures employed onsite include the use of a water bowser which is in continuous operation around the site during working hours, speed limits are observed onsite, trafficking on undampended roads is minimised and daily checks for nuisance dust levels offsite are undertaken.

The other monitoring stations also measured deposited dust levels which were higher than those measured in March. At Sites A, C, D, 2, 4 and 5, most of the dust originated from the north. The Avenue could have contributed to the dust at Sites A, C, and D but is unlikely to be a contributing factor at Sites 2, 4 and 5, given their location, which is not downwind of The Avenue Site when the wind is from northern sectors. Site C is located near to where activity was taking place during April for the construction of the eastern haul road, and this could have contributed to dust levels at this location. At Site 1, the majority of the dust originated from the south and at Site 6 the majority of dust originated from the west; given the locations of these monitoring stations, The Avenue is unlikely to be a contributing factor to the dust deposited at Sites 1 and 6.

Figure 5 – Measured Dust Deposition Levels (mg/m²/day)



2.1.6 Dust Soiling Levels

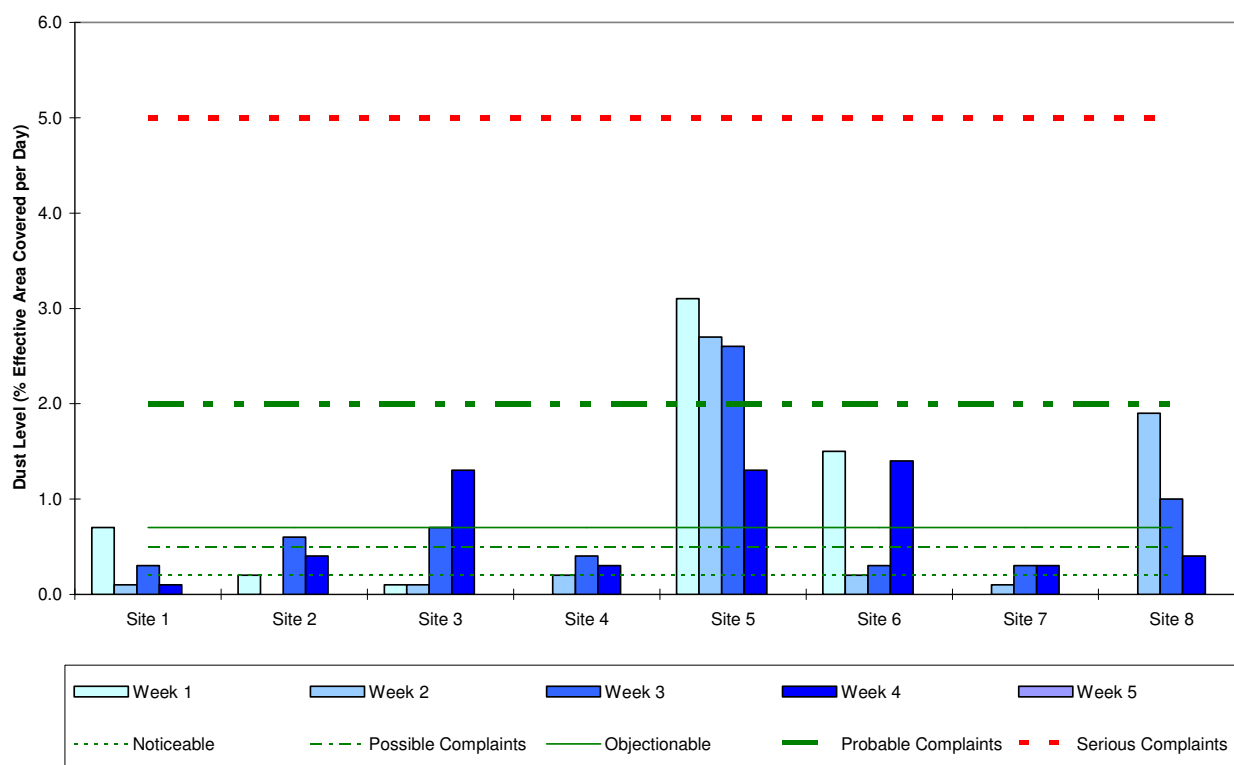
Measurements of dust soiling continue to be undertaken using sticky pads at 8 locations, over periods of approximately seven days, for comparison against target levels measured in units of effective area covered per day (% EAC).

Figure 6 shows the maximum measured weekly levels of dust from the sticky pads at each of the 8 monitoring locations. The highest level of dust of 3.3 %EAC was measured in Week 1 at Site 5 (north-east boundary of site in Zone 5). This was also the site which recorded the highest levels of coverage during April. This value was recorded for the southern side of the sticky pad suggesting that the source of dust was from the south, and therefore is unlikely to be The Avenue site.

The dust levels shown in all weeks at Site 5 for the sticky pads coincide with the elevated deposited dust levels at Site B, as these sites are located next to each other. The road construction, local trafficking and dusty surfaces in the area are the likely sources of the dust. Both these monitor are situated within the site boundary. There were no visual off-site impacts and there was no impact upon the river.

At all locations, measured levels of dust were below the target level of 5% EAC and would therefore be unlikely to lead to complaints from receptors located further from the Avenue site.

Figure 6 – Maximum Weekly Measured Dust Levels using Sticky Pad Technique (%EAC/day)



2.1.7 Volatile Organic Compounds

The assessment criteria limits for benzene and toluene are $5 \mu\text{g m}^{-3}$ and 1.9mg m^{-3} as a 2-week average, respectively.

The maximum measured concentration of benzene in period 1 was less than the limit of detection of $1.3 \mu\text{g m}^{-3}$ and in period 2 the maximum measured concentration was less than the limit of detection of $1.7 \mu\text{g m}^{-3}$. The assessment criterion for benzene has therefore been comfortably achieved at all monitoring stations.

The maximum measured concentrations of toluene in period 1 were 0.028mg m^{-3} and in period 2 the measured concentrations were 0.025mg m^{-3} . The assessment criterion for toluene has therefore been comfortably achieved at all monitoring stations.

2.1.8 Metals

The only metal with an air quality objective is lead, with a concentration of $0.25 \mu\text{g m}^{-3}$ as an annual average. The maximum measured concentration of lead was $0.02 \mu\text{g m}^{-3}$ Site A (north-west of the site) during the first monitoring period and $0.02 \mu\text{g m}^{-3}$, recorded at Site 7 (Nursery, Stretton) during the second monitoring period. The measured concentrations were therefore more than a factor of ten below the $0.25 \mu\text{g m}^{-3}$ target level for The Avenue site.

For cadmium, the maximum measured concentration was $0.01 \mu\text{g m}^{-3}$ at Site 7 in Period 1. The target value for cadmium at The Avenue site is $0.005 \mu\text{g m}^{-3}$.

Concentrations of all other metals were in most cases below limits of detection; where concentrations were above limits of detection the concentrations were significantly below target levels.

2.1.9 Cyanide

There are no air quality objectives for cyanide. The assessment criterion for The Avenue is a maximum concentration of $50 \mu\text{g m}^{-3}$ as a 2-week average. At all locations concentrations of cyanide were below limits of detection.

2.1.10 Phenol(s)

The target levels for phenol and cresol at The Avenue are $48 \mu\text{g m}^{-3}$ and $220 \mu\text{g m}^{-3}$ as a 2-week average, respectively. The reporting of these compounds is subject to a lower detection limit of $0.2 \mu\text{g m}^{-3}$ and there were no measured concentrations above this level.

2.1.11 Poly-Aromatic Hydrocarbons

The target level of Coal Tar Pitch Volatiles at The Avenue is $0.48 \mu\text{g m}^{-3}$, whilst for naphthalene the level is $126 \mu\text{g m}^{-3}$. There were no exceedences of the target level for Coal Tar Pitch Volatiles during the month and no exceedences of the target level for naphthalene.

The highest measured concentration of total Coal Tar Pitch Volatiles was $0.15 \mu\text{g m}^{-3}$ at Site 7 (Nursery, Stretton) during the first period of monitoring. The highest measured concentration of naphthalene was $0.001 \mu\text{g m}^{-3}$ at Site B (north east boundary of The Avenue site) in the second period of monitoring, and was approximately 50% higher than at the other monitoring locations.

Given the location of Site B, it is likely the source of Poly-Aromatic Hydrocarbons was The Avenue site. The activities taking place near this monitoring location during April included the stockpiling, prior to treatment, of small quantities of contaminated material from Zone 4 in Zone 3 (close to the monitoring location) and this could be the source of the higher concentrations of PAHs at this location. No explanation for the measured concentration of Coal Tar Pitch Volatiles at Site 7 has been identified, although it is extremely unlikely to be associated with The Avenue due to its distance from the site.

2.1.12 Quality Control Samples

Media Blanks

The analysis of media blanks indicated no issues with the contamination of media used for the collection of samples, although the results for the NO_2 diffusion tube at Site 2 during April, was less than the value recorded for the media blank, which would suggest that the sample from Site 2 is unlikely to be accurate.

Duplicates

Duplicate PM_{10} measurements at Site A correlated well with original data during the month. The monthly average concentration at Site A was $15.3 \mu\text{g m}^{-3}$ compared to $15.1 \mu\text{g m}^{-3}$ for the duplicate monitor.

Duplicate metals results taken at Site A produced the same results during both the first and the second monitoring periods for Arsenic, Cadmium, Chromium, Mercury, Nickel and Selenium. The only variation in measurements was for copper, manganese, lead and zinc, where concentrations in the first period differed between the duplicates by between 0.003 and $0.01 \mu\text{g m}^{-3}$.

Duplicate PAH results from Site 1 showed that the magnitude of difference in the measured concentrations of each compound were not significant.

Duplicate phenol samples were taken at Site 1. No results were reported above the limit of detection (LOD) of $0.2 \mu\text{g m}^{-3}$ during either of the two monitoring periods.

Duplicate SO₂ measurements were taken at Site B. In period 1 the measured concentrations were 6.67 µg m⁻³ and 13.8 µg m⁻³; in the second period, the measured concentrations were 5.0 µg m⁻³ and 10.35 µg m⁻³. It is therefore considered that the measurements are not in good agreement, but the differences are not significant when considering the target level of 125 µg m⁻³.

For total VOC measurements, the measured concentrations from the duplicate diffusion tubes were all below the limit of detection for the first and second monitoring periods.

The duplicate NO₂ measurements gave concentrations of 15.39 µg m⁻³ for the first diffusion tube, and 19.24 µg m⁻³ for the second tube. The diffusion tube measurements are therefore different by 3.85 µg m⁻³ or 20%, which could be considered as significant, although it should be remembered that these differences are not significant when considering the target level of 40 µg m⁻³.

2.2 Targeted Air Quality Monitoring

2.2.1 Asbestos

Reassurance air testing for asbestos was carried out on 7th, 14th, 21st and 29th April. The monitoring was undertaken downwind and at the boundary of the following works:

- Zone 4: Ruberoid downwind of hardcore moving activities – 7th, 14th and 21st April;
- Zone 4: Upwind of vegetation stripping exercise – 7th April;
- Zone 4: Downwind of vegetation stripping exercise – 7th April;
- Zone 4: Downwind of stockpiling activities – 14th April;
- Zone 4: Downwind of Zone 4, former Ruberoid Plant – 21st April;
- Zone 4: Downwind of excavation works south of the Roman Baths (Zone 4 underground liquid holding tanks) – 29th April; and
- Zone 4: Downwind of excavation works south-east of Water Treatment Works (WTP) – 29th April.

All measured concentrations of fibres were < 0.01 f ml⁻¹ (fibres per milli-litre) and are therefore comfortably within the control limit.

2.3 Odour Monitoring

2.3.1 Odour Diaries

Odour diaries for April show that there were 5 Odour Days when odour intensity was rated greater than 4.

The odour days of the 4th and 16th April had odours that were described as Smokey, with the odour on 4th having an odour intensity of 4 and on the 16th the odour was rated as having an intensity of 5.

The odours of 10th April were described as manure, the odours on 11th April were described as refuse, and the odours on 22nd were described as petroleum. All of these odour days had odours which were rated with an intensity of 4.

For the days when smokey odours were recorded, the wind direction was from the north (4th April) and south west (16th April), which could result in odours from the site being transported over the two locations where these odours were recorded, although there were no activities onsite which could have generated smokey odours. On those days when petroleum odours were recorded the wind direction was mainly from the west. However, these odours were reported by odour diarists in Wingerworth, which is located to the west of The Avenue site, and therefore these odours were unlikely to be generated by the Avenue site.

2.3.2 Sensory Field Odour Surveys

Sensory field odour surveys were carried out on 1st, 8th, 23rd and 30th April at each of the fixed monitoring stations. During each survey, the maximum odour annoyance impact level at the times when the wind was blowing from the Avenue was recorded. At all locations the maximum odour annoyance impact was 'low-medium' and, therefore, the effects of odour are not considered significant.

2.3.3 Odour Complaints

There have been no odour complaints during April 2010.