

RICHARDS BAY CLEAN AIR ASSOCIATION

DUSTFALL MONITORING

JUNE 2007

Sampling period: 23 May – 22 June 2007

Monthly Progress Report

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1. METHODOLOGY

This project commenced operation in June 2006. Windblown settle-able dust (fall-out) is monitored using the American Society for Testing and Materials standard method for collection and analysis of dustfall (ASTM D1739). This method employs a simple device consisting of a cylindrical 5 L container half-filled with de-ionised water exposed for one calendar month (30 \pm 3 days). The water is treated with an inorganic biocide to prevent algal growth in the buckets. The most common reagent used for this is a 5% copper sulphate solution (approximately 1 ml per 3 litres of water bucket).



Figure 1: Single bucket monitoring unit, showing sampling bucket with bird ring and security clamp

The bucket stand comprises a ring that is raised above the rim of the bucket to prevent contamination from perching birds (Fig 1). The bucket holder is connected to a 2.1 m galvanized steel pole, which is either directly attached to a fence post or can be attached to a galvanized steel base plate, which is buried to a depth of 500 mm. This allows for a variety of placement options for the fallout samplers. Exposed buckets, when returned to the AER laboratories, are rinsed with deionised water to remove residue from the sides of the bucket, and the bucket contents filtered through a coarse (>1 mm) filter to remove insects and other coarse organic detritus. The sample is then filtered through a pre-weighed paper filter to remove the insoluble fraction, or dust fallout. This residue and filter are dried, and gravimetrically analysed to determine the insoluble fraction (dust fallout).

1.1 Operational Aspects

The sampling period was from 23 May to 22 June 2007, and samples were exposed for 30 days. This period complies with the standard exposure period of 30 \pm 3 days. One monitoring site namely Site 3 (Alton South West) recorded no data as the bucket and the stand were found missing. No other operational problems encountered during the month of June and a valid sample return of 92% was achieved.

2. STANDARDS FOR DUST DEPOSITION

The Standards South Africa has published a new set of dustfall standards (SANS 1929:2005). These standards have been used to evaluate the level of dust deposition and are stated in Table 1 and Table 2 below.

2.1 Evaluation criteria for dust deposition

Dust deposition rates shall be expressed in units of $\text{mg}/\text{m}^2/\text{day}$ over a 30-days averaging period. Dust deposition is evaluated against a four-band scale as presented in Table 1. Target, action and alert thresholds indicated in and permissible frequency of exceedances are given in Table 2. Margins of tolerance are outline in Section 2.2 and allowances for exceptions in Section 2.3

Table 1: Four-band scale evaluation criteria for dust deposition (SANS 1929:2005).

| 1 | 2 | 3 | 4 |
|-------------|------------------------|-------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Band Number | Band Description Label | Dustfall rate (D) ($\text{mg}/\text{m}^2/\text{day}$, 30-day average) | Comment |
| 1 | Residential | $D < 600$ | Permissible for residential and light commercial |
| 2 | Industrial | $600 < D < 1\ 200$ | Permissible for heavy commercial and industrial |
| 3 | Action | $1\ 200 < D < 2\ 400$ | Requires investigation and remediation if two sequential months lie in this band, or more than three occur in a year. |
| 4 | Alert | $2\ 400 < D$ | Immediate action and remediation required following the first incidence of dustfall rate being exceeded. Incident report to be submitted to relevant authority. |

Table 2. New dustfall standards, target, action and alert thresholds for dust deposition (SANS 1929:2005).

| Level | Dustfall Rate ($\text{mg}/\text{m}^2/\text{day}$) | Permitted Frequency of Exceedances |
|--------------------|-----------------------------------------------------|------------------------------------------------------------------------------------------|
| Target | 300 | |
| Action residential | 600 | Three within any year, no two sequential months. |
| Action industrial | 1 200 | Three within any year not sequential months. |
| Alert threshold | 2 400 | None. First exceedance requires remediation and compulsory report to authorities. |

2.2 Margin of tolerance

An enterprise may submit a request to the authorities to operate within band 3 (action band), as specified in Table 1, for a limited period, provided that this is essential in terms of the practical operation of the enterprise (for example the final removal of a tailings deposit) and provided that an appropriate control technology is applied for the duration. No margin of tolerance will be granted for operations that result in dustfall rates which fall within band 4 (alert band) as specified in Table 1.

2.3 Exceptions

Dustfalls that exceed the specified rates but that can be shown to be the result of some extreme weather or geological event shall be discounted for the purpose of enforcement and control. Such event might typically result in excessive dustfall rates across an entire metropolitan region, and not be localized to a particular operation. Natural seasonal variations, for example, the naturally windy months each year, will not be considered extreme events for this definition.

2.4 Application of standards

Dust deposition rates recorded at RBCAA are appraised according to the standards published by the Standards South Africa (SANS 1929:2005). Dustfall rates within the RESIDENTIAL and INDUSTRIAL ranges do not result in complaints from the public. ACTION and ALERT ranges, generally result in complaints from the public, and therefore considered to be action levels, at which sources of excessive dust must be investigated (if not known) and suitable mitigation measures instituted.

3. RESULTS

3.1 Single Buckets

All the monitoring sites recorded RESIDENTIAL threshold dustfall during the monitoring month of June. Site 4 (Harbour West) recorded the highest dustfall rate of 276 mg/m²/day, while Site 10 (Felixton Village) recorded the lowest rate of 71 mg/m²/day, all within that range. Trends of the dust fallout results per site are presented in Appendix A of this report.

4. Recommendations and Actions

During the monitoring month in review, all monitoring sites recorded dustfall rates that fell within the RESIDENTIAL threshold. The results were considered satisfactory as they will not result in community complaints or nuisance.

Regards

T. Mfenqa

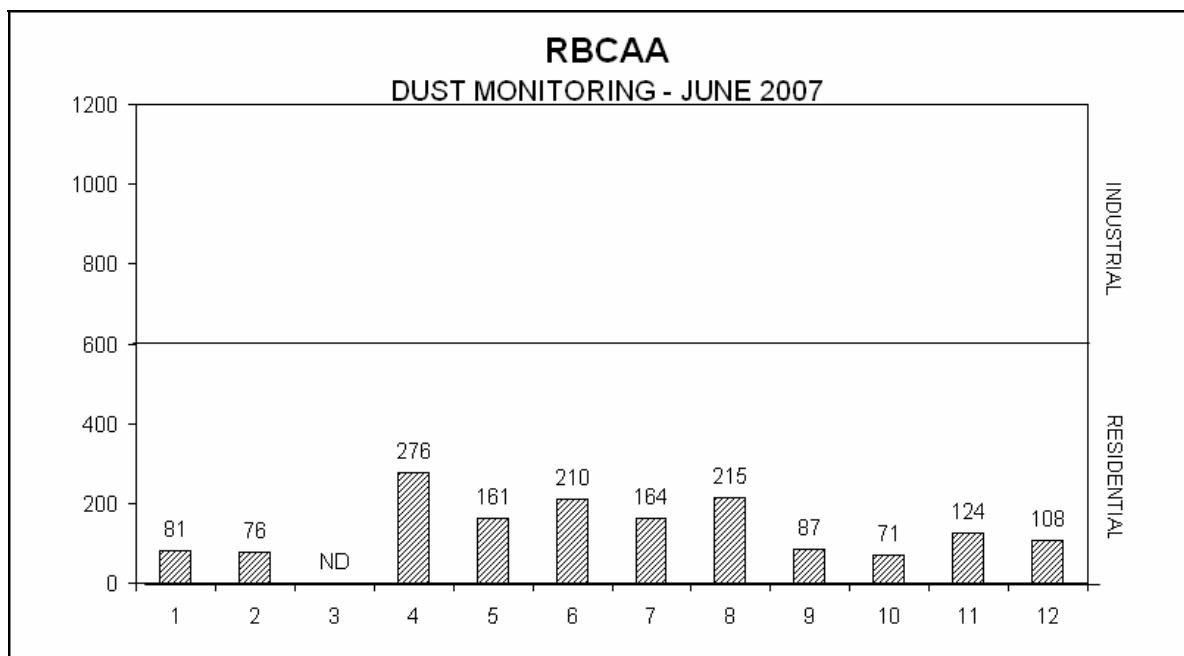
For AER (Pty) Ltd

Report compiled by H. Nuwarinda

APPENDIX A

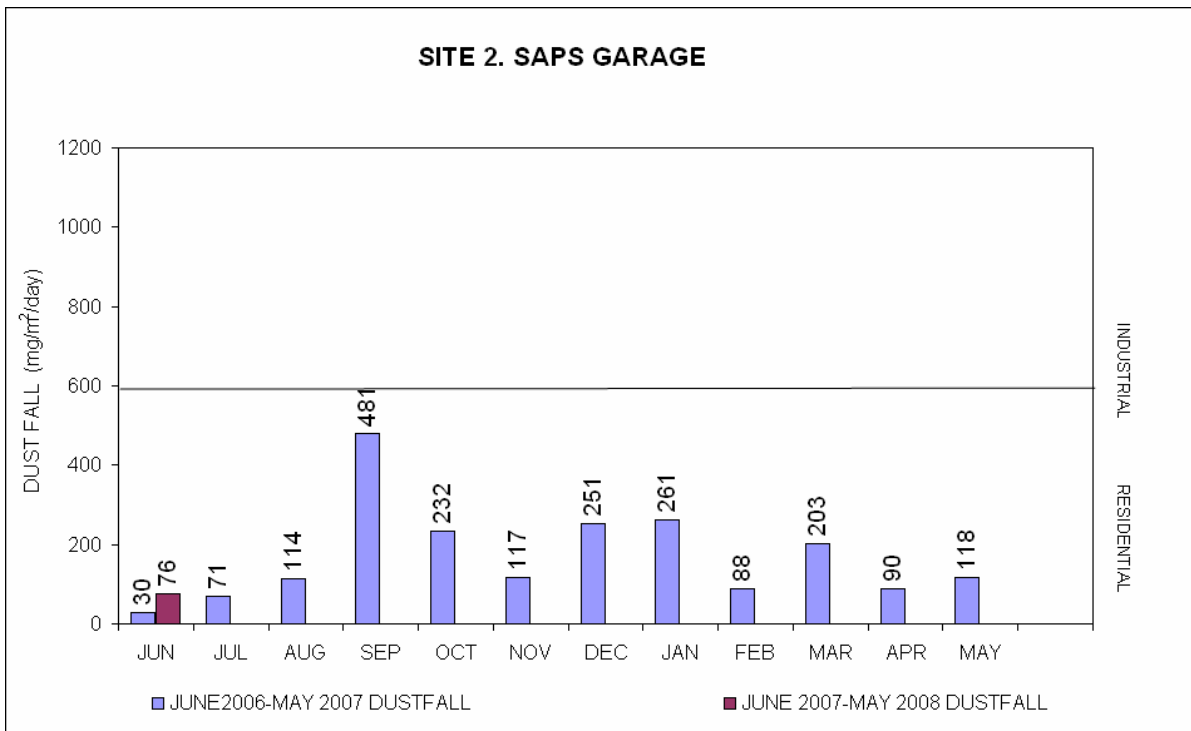
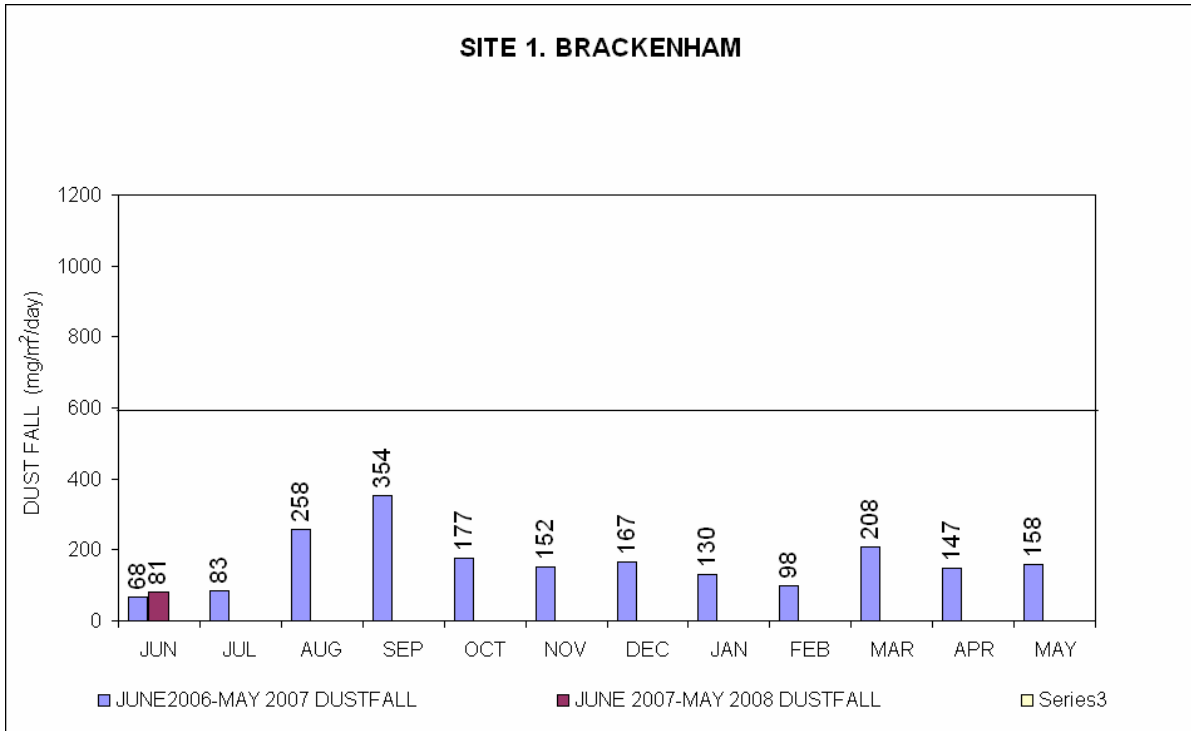
RBCAA DUST FALLOUT MONTHLY TIMEPLOTS 2006 – 2007

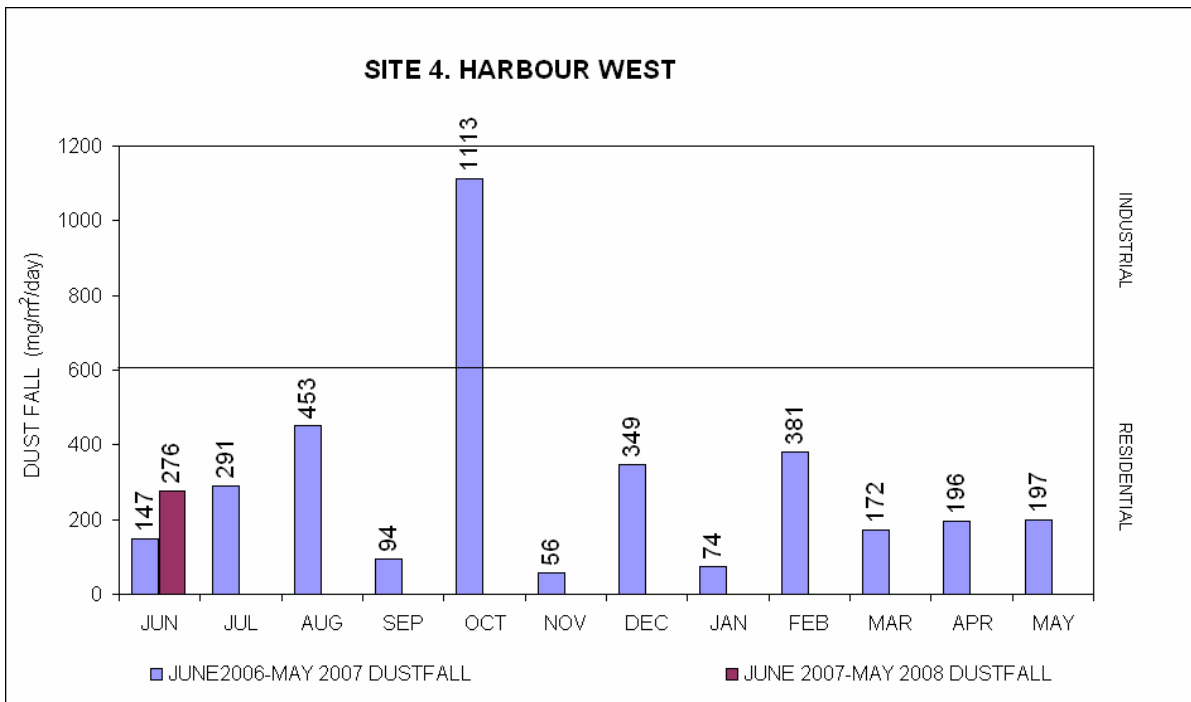
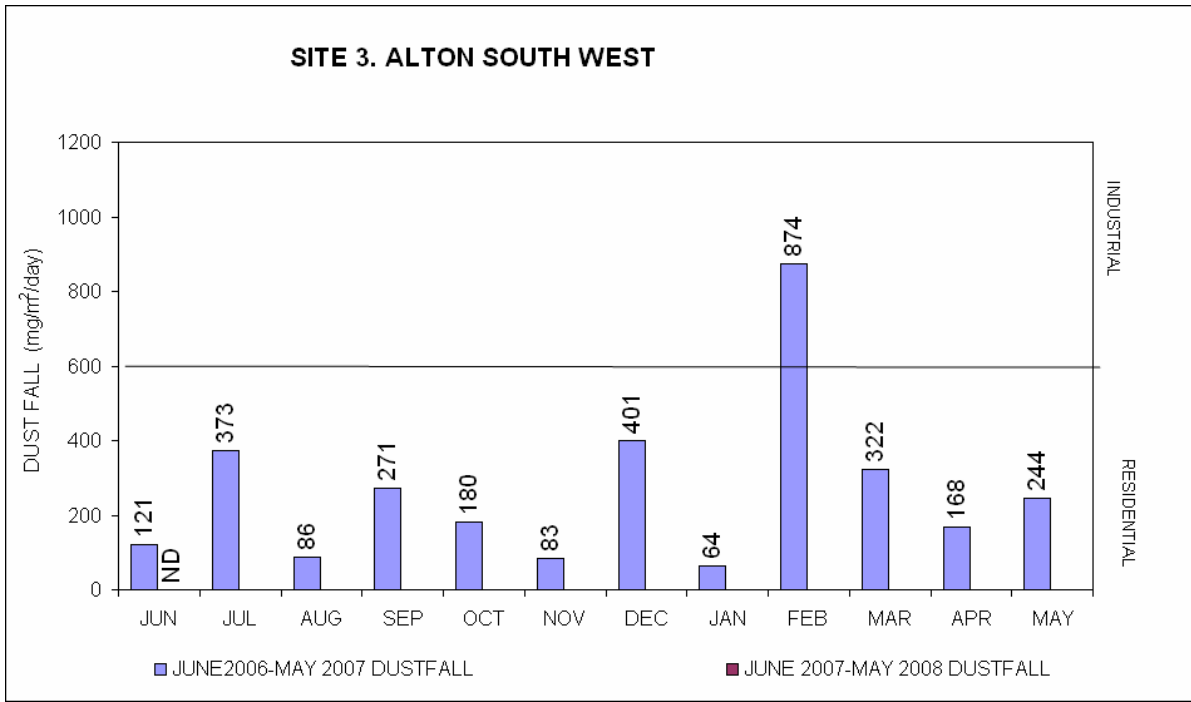
Figure 1: Graph showing results from all sites June 2007

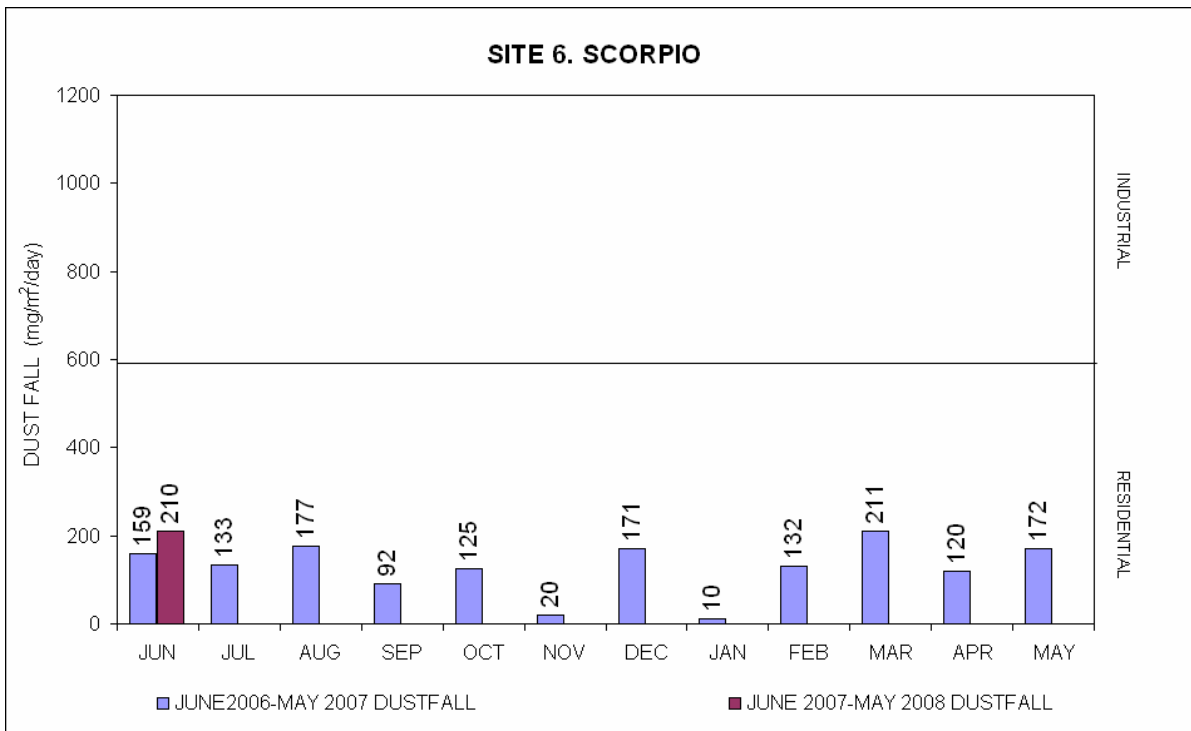
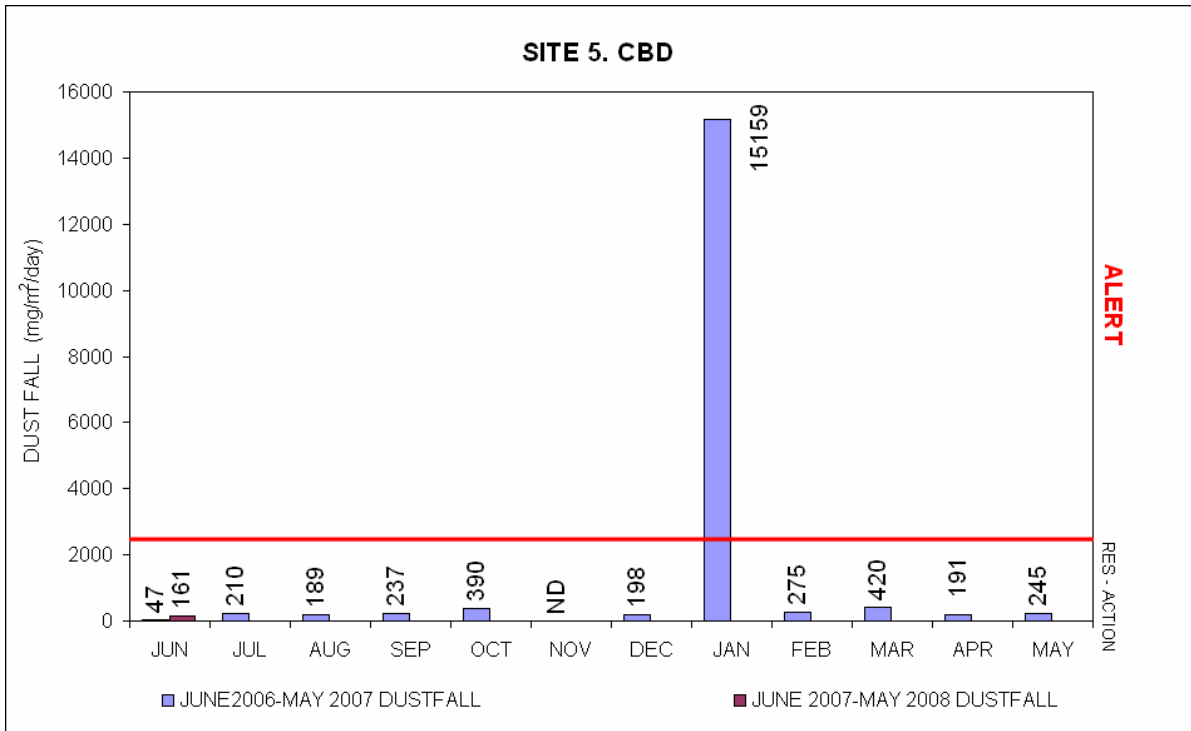


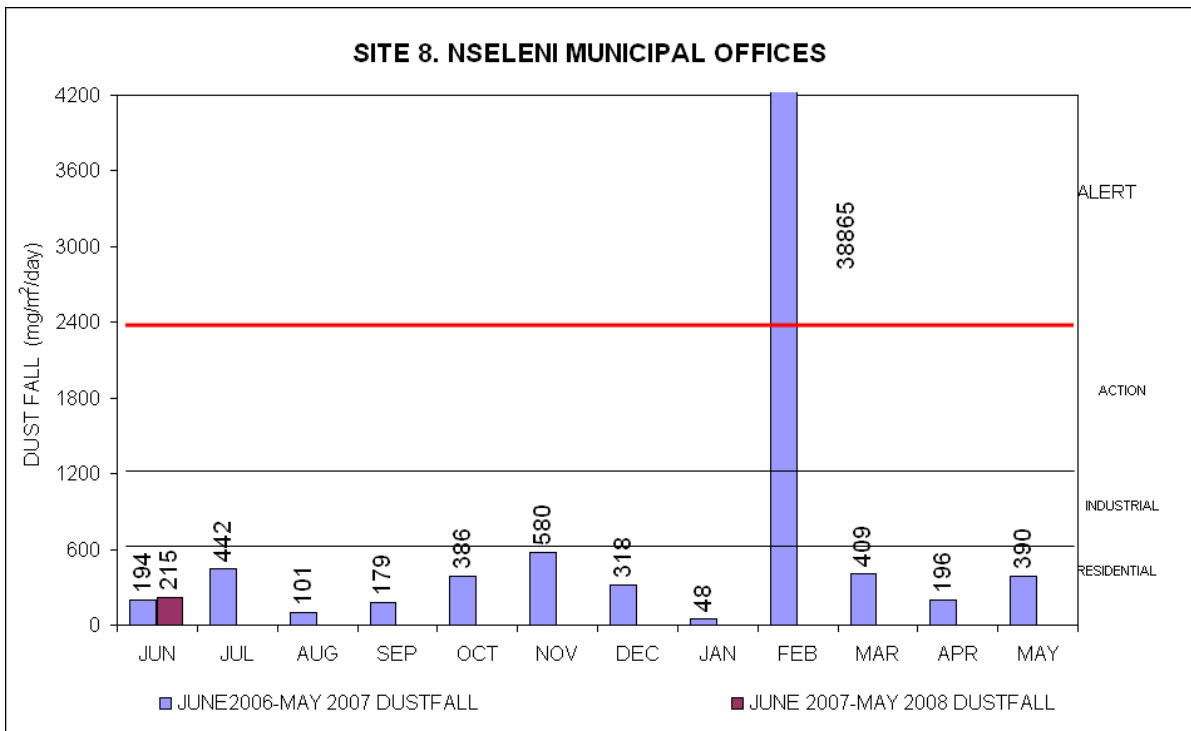
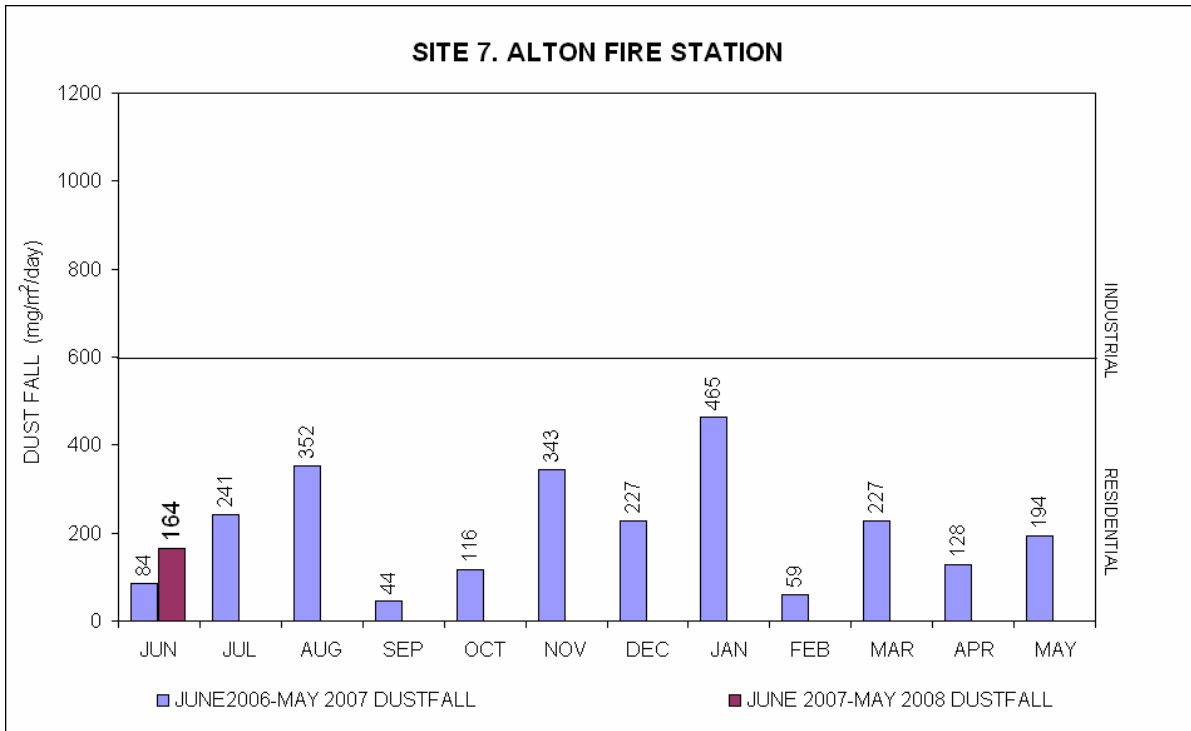
| RICHARDS BAY CLEAN AIR ASSOCIATION DUSTFALL MONITORING | | | Month: June 2007 Sampling period: 23 May– 22 June 2007 | | |
|-----------------------------------------------------------|----------|--------------|-----------------------------------------------------------|----------|---------------------------------------|
| SITE DESCRIPTION | SITE No. | FILTER CODE | NETT MASS (mg) | No. DAYS | DUST FALLOUT (mg/m ² /day) |
| Brackenham | 1 | RBCAA 07/132 | 55 | 30 | 81 |
| SAPS Garage | 2 | RBCAA 07/133 | 52 | 30 | 76 |
| Alton South West | 3 | RBCAA 07/134 | ND | ND | ND |
| Harbour West | 4 | RBCAA 07/135 | 189 | 30 | 276 |
| CBD(Municipal office) | 5 | RBCAA 07/136 | 109 | 30 | 161 |
| Scorpio | 6 | RBCAA 07/137 | 144 | 30 | 210 |
| Alton fire station | 7 | RBCAA 07/138 | 112 | 30 | 164 |
| Nseleni Municipal office | 8 | RBCAA 07/139 | 146 | 30 | 215 |
| Empangeni police station | 9 | RBCAA 07/140 | 59 | 30 | 87 |
| Felixton Village | 10 | RBCAA 07/141 | 49 | 30 | 71 |
| Arboretum | 11 | RBCAA 07/142 | 85 | 30 | 124 |
| Meerensee School | 12 | RBCAA 07/143 | 74 | 30 | 108 |

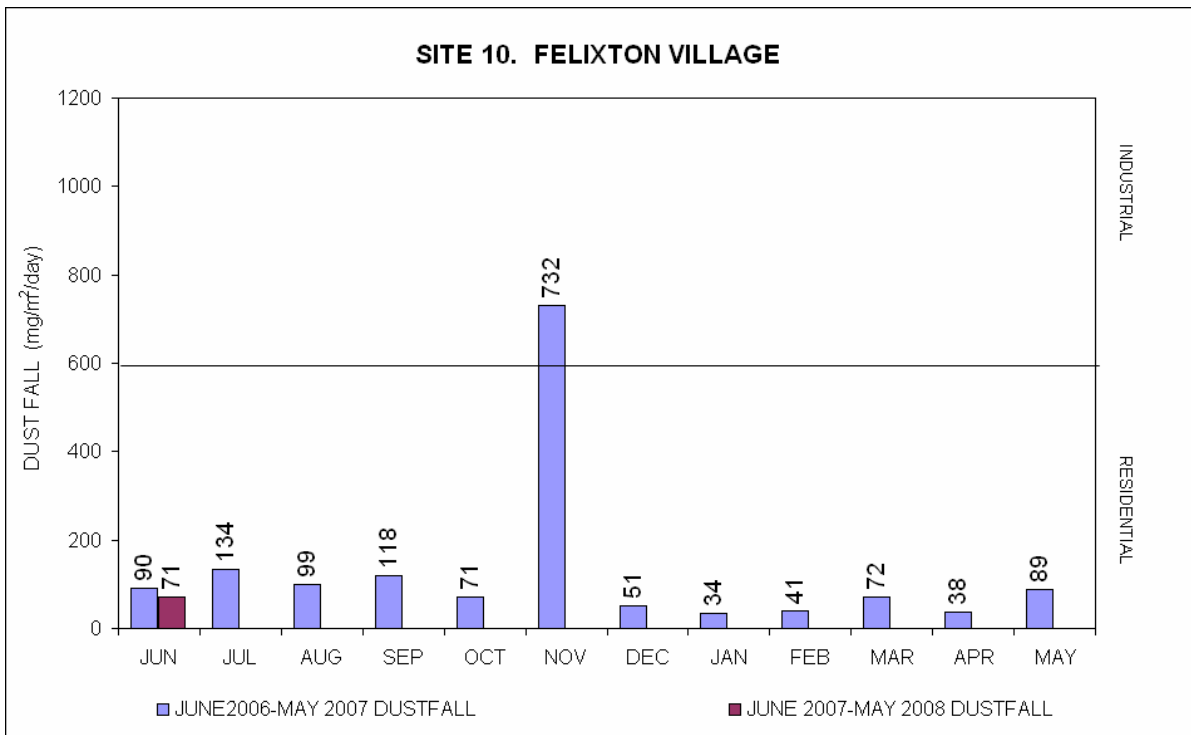
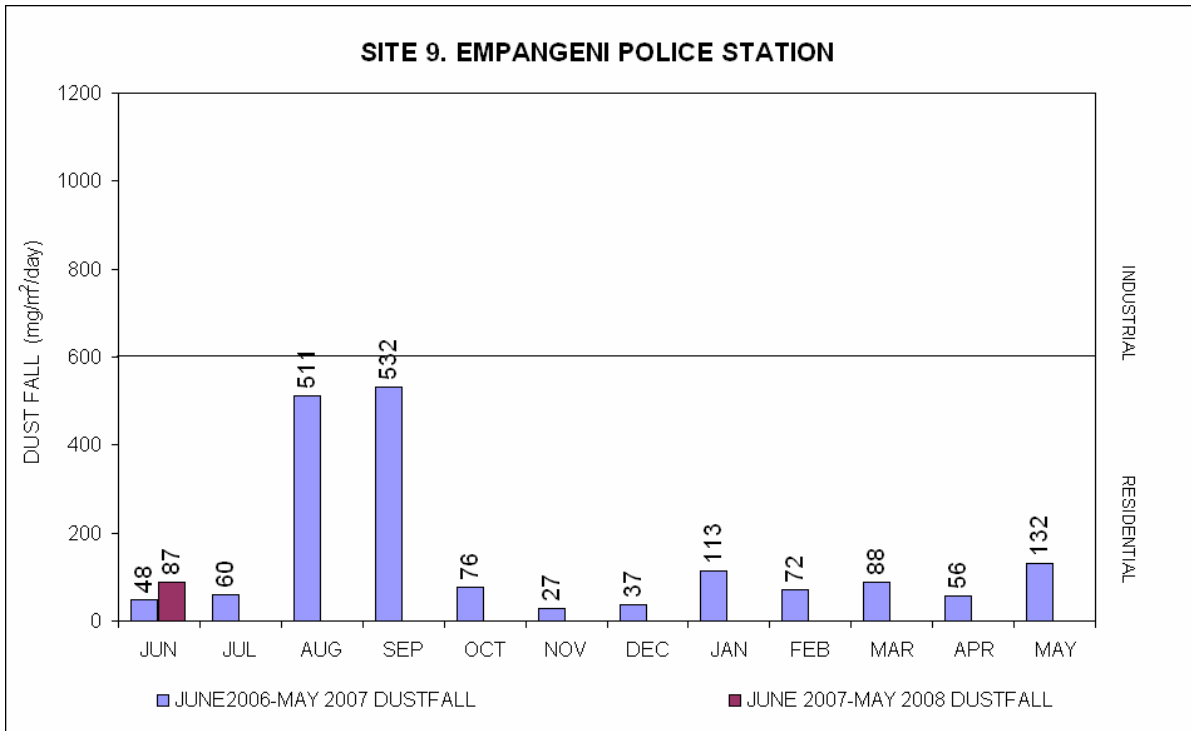
COMMENTS: ND: No Data because the bucket and the stand were missing

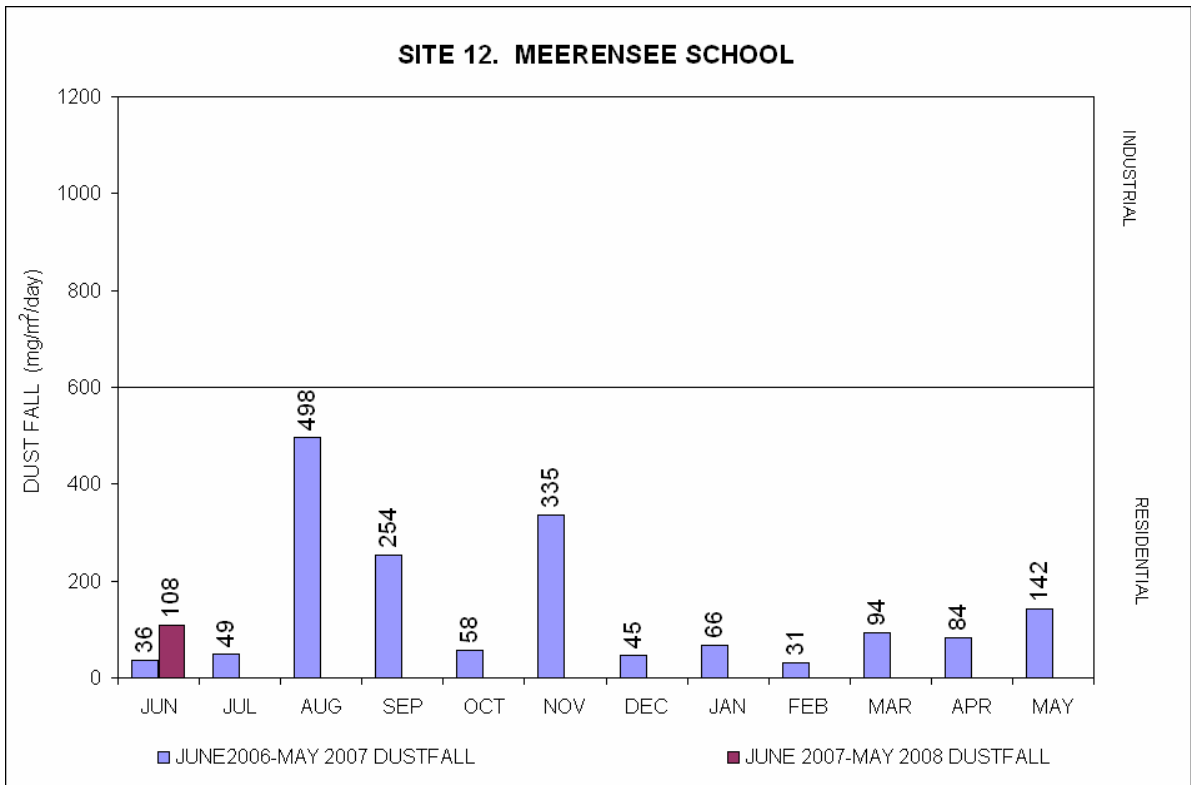
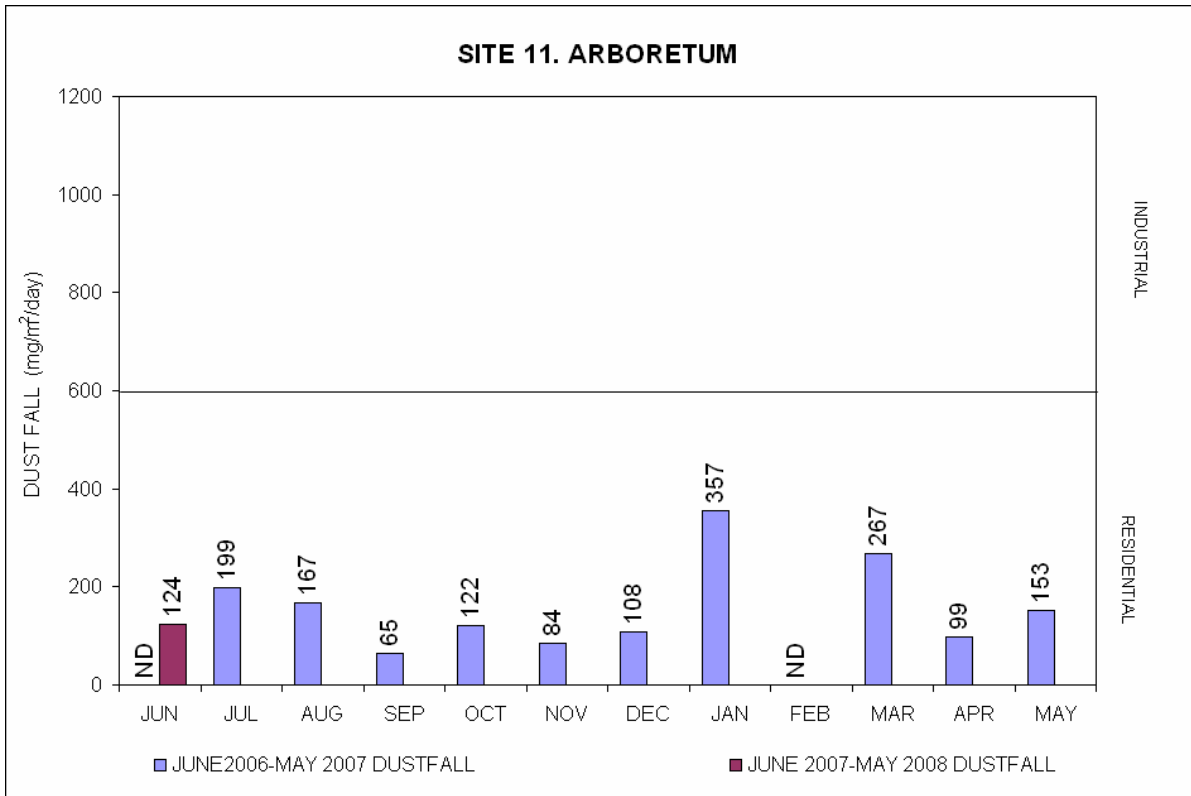












APPENDIX B

