

RICHARDS BAY CLEAN AIR ASSOCIATION

DUSTFALL MONITORING

AUGUST 2007

Sampling period: 24 July – 24 August 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 ± 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 24 July to 24 August 2007, and samples were exposed for 31 days. This period complies with the standard exposure period of 30 ± 3 days. There were no operational problems encountered and a valid sample return of 100% 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

During the month of August 2007, all the monitoring sites recorded RESIDENTIAL threshold dustfall rates. Site 8 (Nseleni Municipal Office) recorded the highest dustfall rate of 426 mg/m²/day, while Site 12 (Meerensee School) recorded the lowest rate of 55 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

All the 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

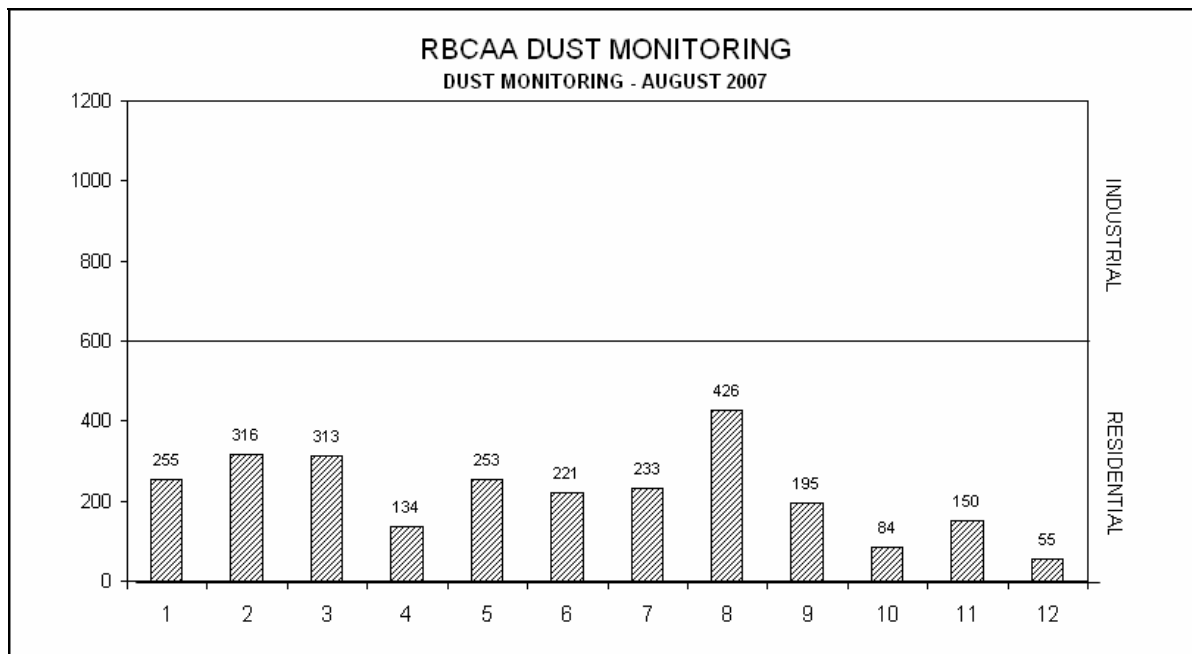
For AER (Pty) Ltd

Report compiled by H. Nuwarinda

APPENDIX A

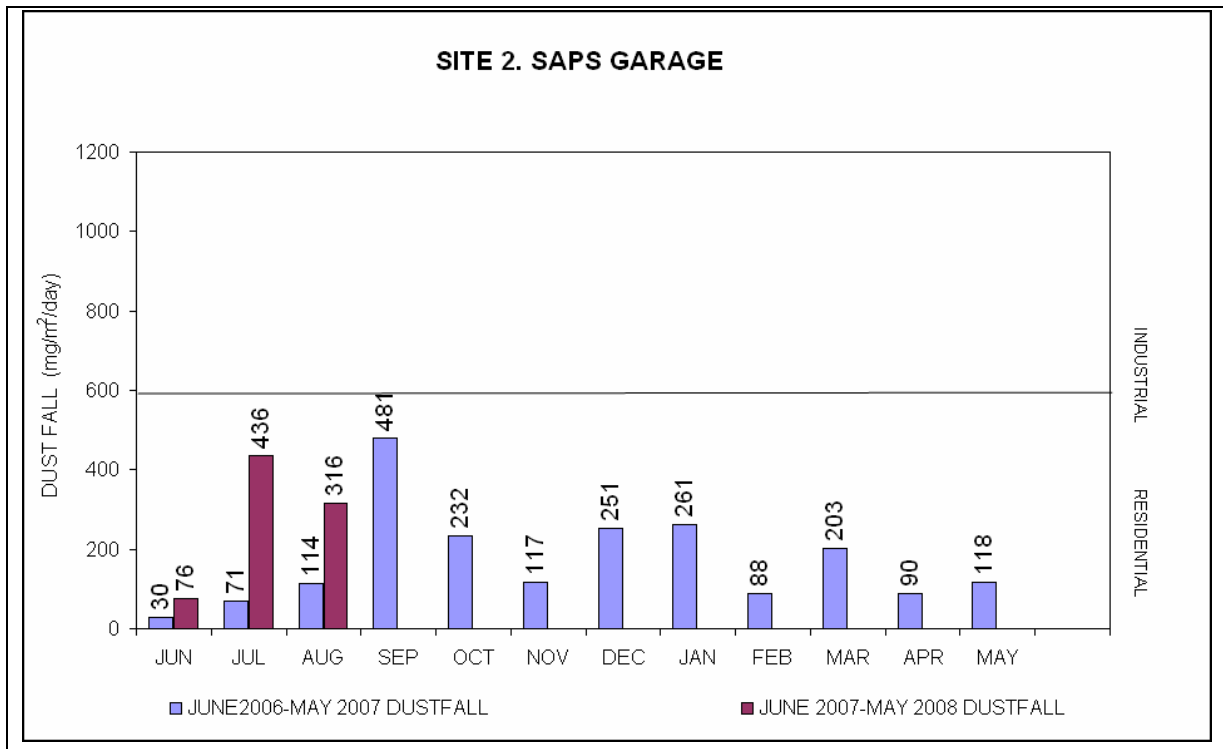
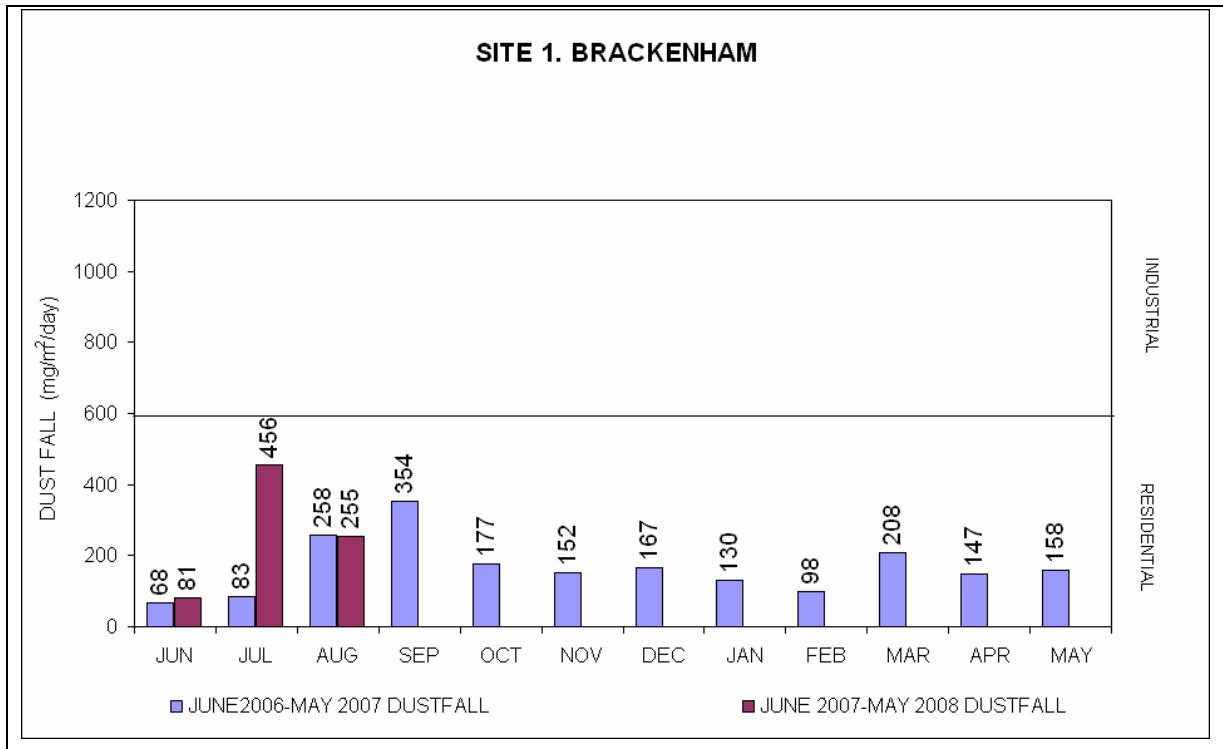
RBCAA DUST FALLOUT MONTHLY TIMEPLOTS 2006 – 2007

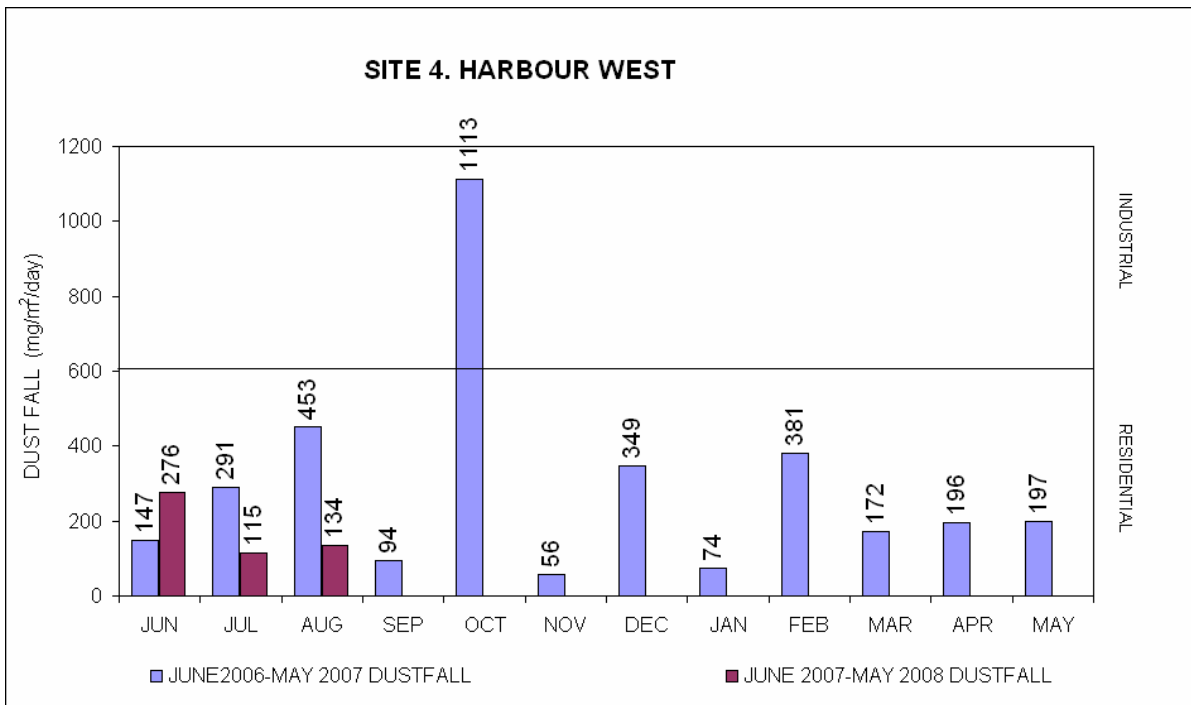
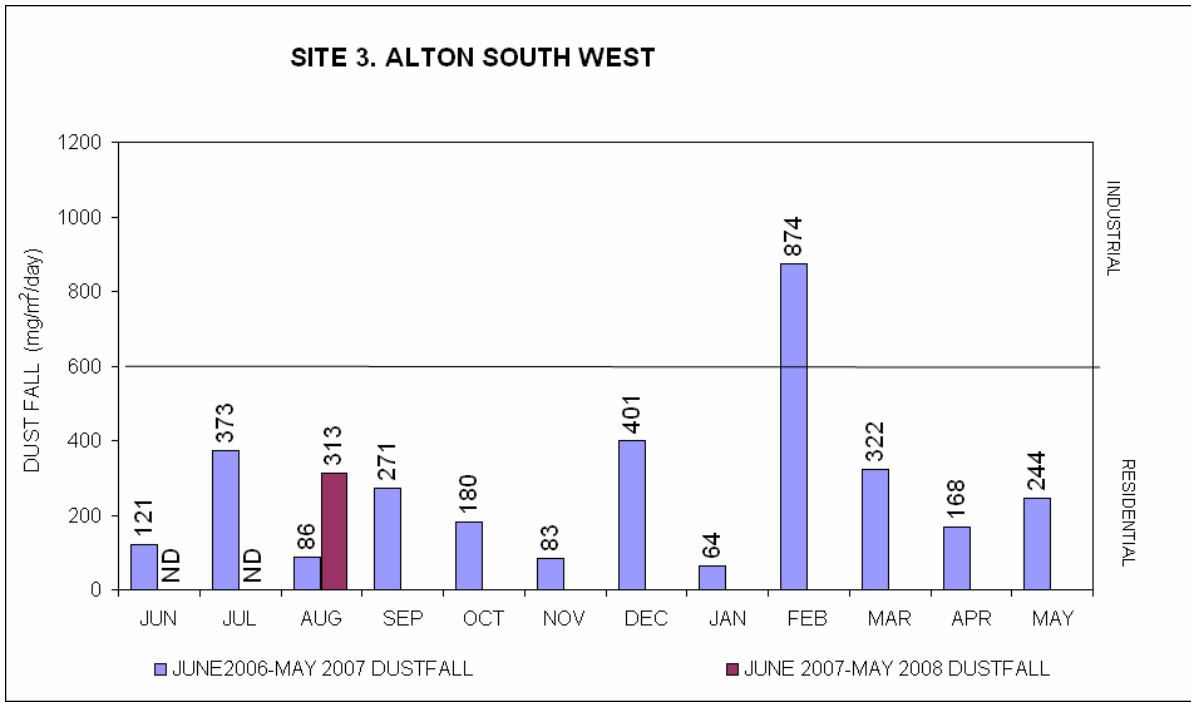
Figure 1: Graph showing results from all sites August 2007

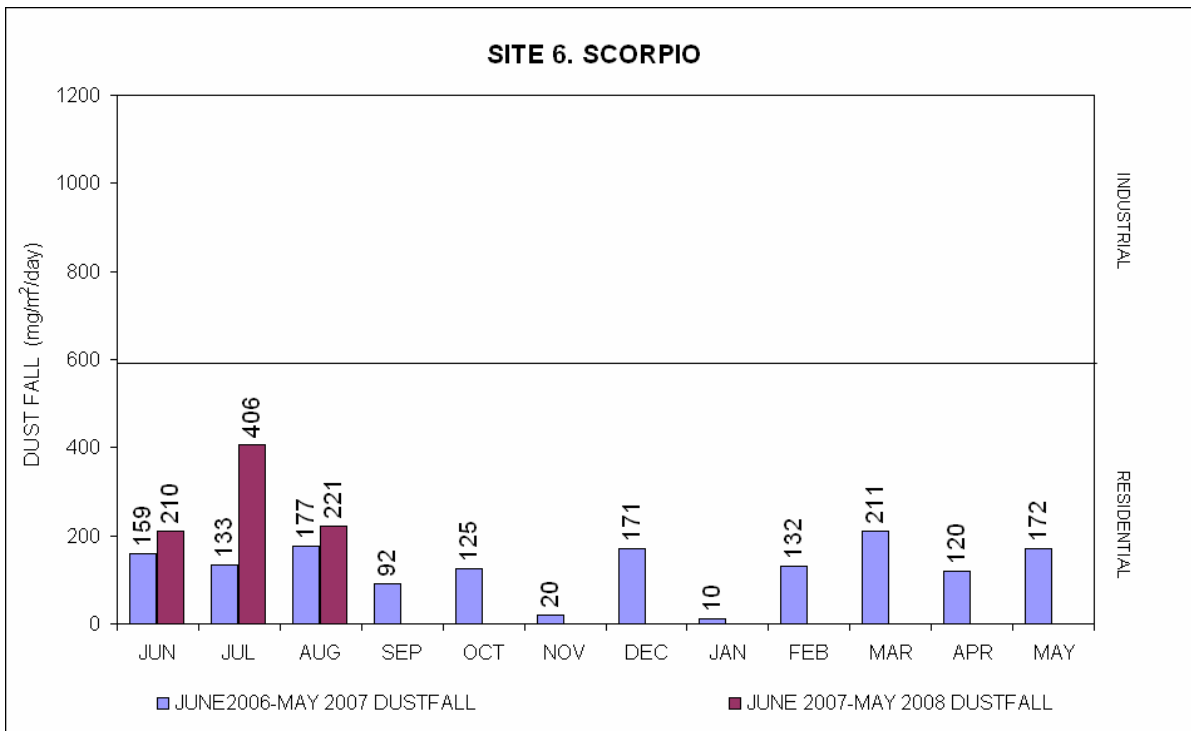
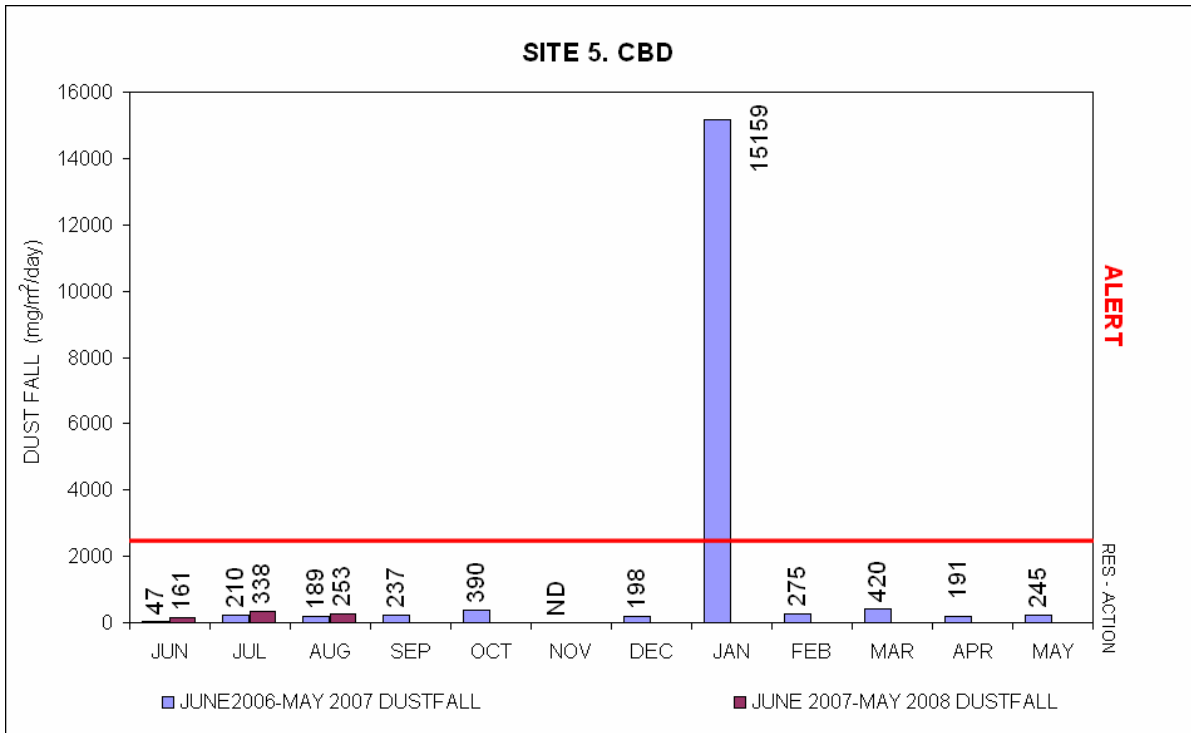


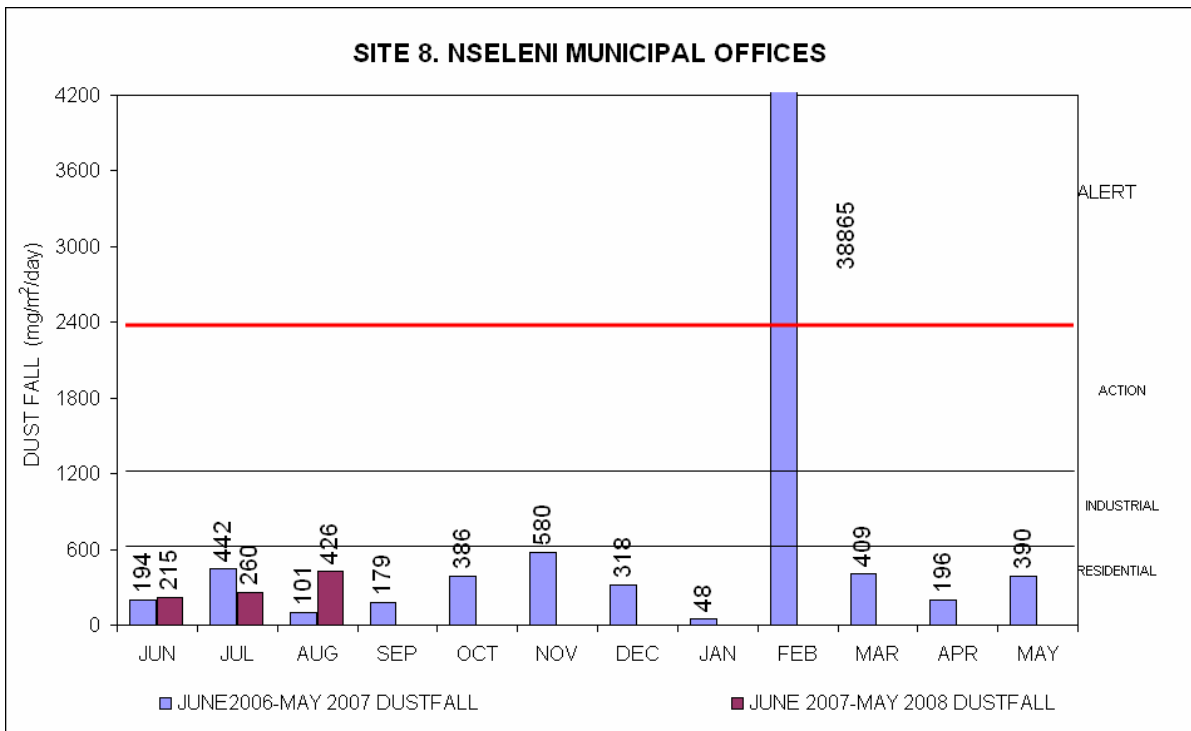
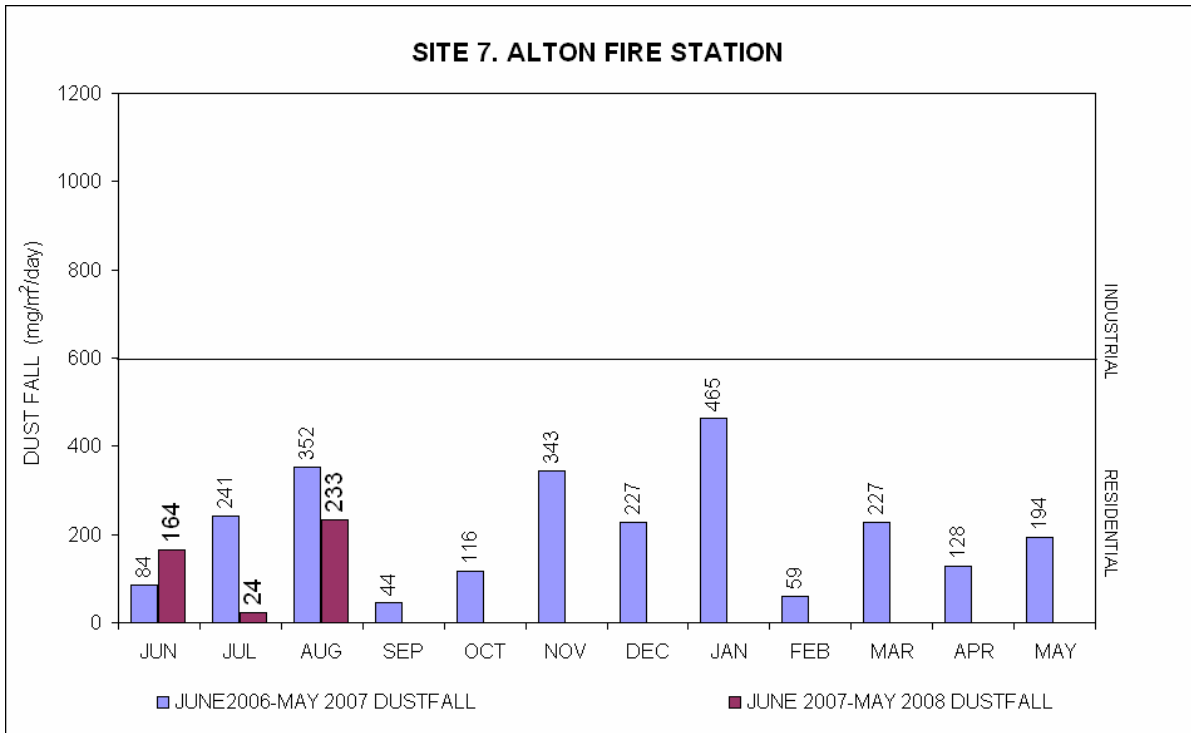
RICHARDS BAY CLEAN AIR ASSOCIATION DUSTFALL MONITORING			Month: August 2007 Sampling period: 24 July– 24 August 2007		
SITE DESCRIPTION	SITE No.	FILTER CODE	NETT MASS (mg)	No. DAYS	DUST FALLOUT (mg/m ² /day)
Brackenham	1	RBCAA 07/158	180	31	255
SAPS Garage	2	RBCAA 07/159	222	31	316
Alton South West	3	RBCAA 07/160	221	31	313
Harbour West	4	RBCAA 07/161	95	31	134
CBD(Municipal office)	5	RBCAA 07/162	179	31	253
Scorpio	6	RBCAA 07/163	155	31	221
Alton fire station	7	RBCAA 07/164	164	31	233
Nseleni Municipal office	8	RBCAA 07/165	299	31	426
Empangeni police station	9	RBCAA 07/166	137	31	195
Felixton Village	10	RBCAA 07/167	59	31	84
Arboretum	11	RBCAA 07/168	105	31	150
Meerensee School	12	RBCAA 07/169	38	31	55

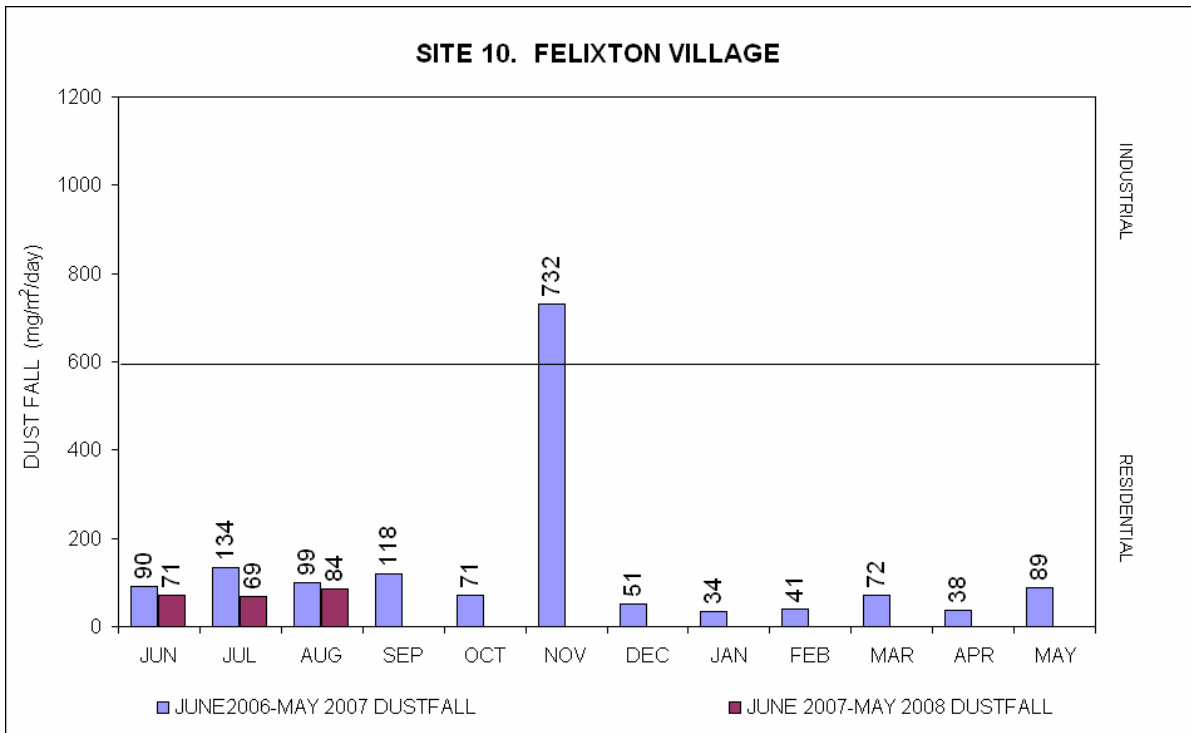
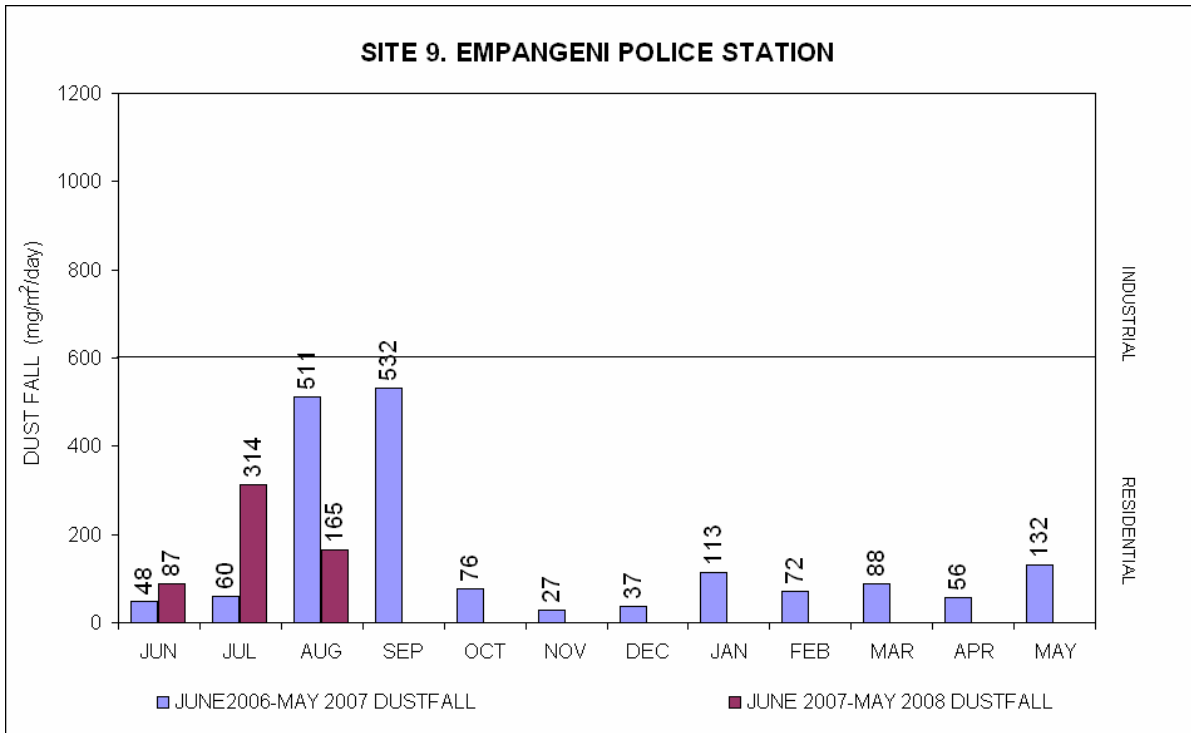
COMMENTS:

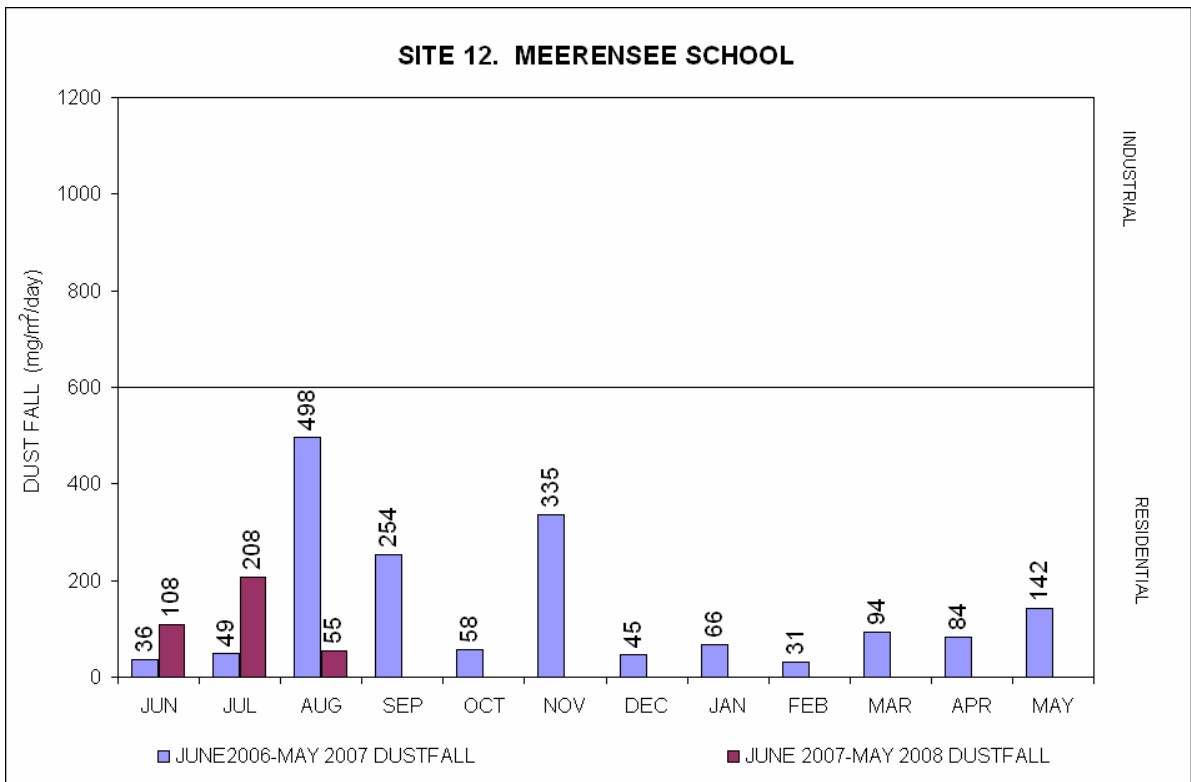
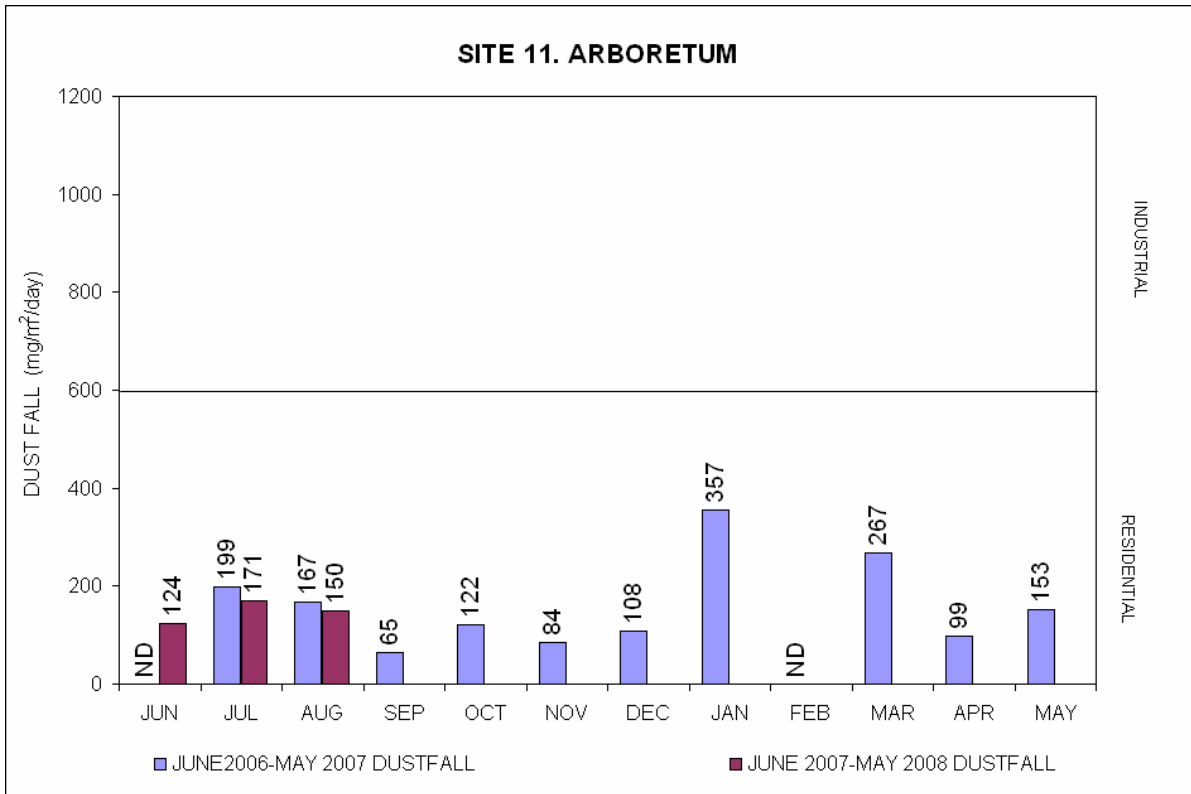












APPENDIX B

