

# **Monthly Air Quality**

## **Richards Bay March 2025**

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## Note

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# 1. INTRODUCTION

This monthly air quality report provided by the Richards Bay Clean Air Association (RBCAA) offers a comprehensive overview of air quality monitoring data for the specific month under review. It aims to provide a detailed analysis of meteorology, sulphur dioxide (SO<sub>2</sub>), total reduced sulphur (TRS), and particulate matter (PM) levels measured by the RBCAAs monitoring network. Each monthly report focuses on a single calendar month, highlighting any notable incidents or exceedances of the applicable ambient air quality standards during that period. By analysing the monthly data, trends and patterns in air quality can be identified, helping to assess potential environmental impacts and mitigate any adverse effects.

In addition to the monthly reports, RBCAA publishes annual air quality reports summarising the key findings and trends observed over a complete calendar year. These annual reports offer a broader perspective on the region's overall air quality performance and long-term patterns. They provide stakeholders with a comprehensive understanding of the air quality and serve as a valuable tool for decision-making, policy development, and environmental management. By consistently monitoring and reporting air quality data, the RBCAA aims to promote transparency, facilitate ongoing environmental assessments, and ensure the well-being of the local community and surrounding environment.

The RBCAA monitoring network comprises ten (10) stations (Figure 1-1 and Table 1-1).



Figure 1-1: RBCAA monitoring network.

Table 1-1: Station coordinates.

Station	Latitude	Longitude	Elevation (m)
Airport	-28.738138	32.093333	34
Arboretum	-28.752385	32.062738	30
Brackenham	-28.731301	32.039016	51
CBD	-28.744719	32.054805	32
eSikhaleni	-28.865244	31.911679	13
Felixton	-28.829229	31.893536	51
Felixton Met	-28.836487	31.892513	30
Harbour West	-28.787286	32.027065	6
Richardia	-28.762776	32.066072	20
Scorpio	-28.769692	32.034228	31

## 2. METEOROLOGY

### 2.1. Data Availability

The percentage of valid data received from the meteorological network for February 2025 is shown in Table 2-1.

Table 2-1: Meteorological data capture.

Station	Availability (%)	Wind (%)	Temperature (%)	Relative Humidity (%)	Pressure (%)	Solar Radiation (%)	Rain (%)
Airport	97	97	97	97	97	97	-
Arboretum	97	96	97	-	-	-	-
Brackenham	99	99	99	-	-	-	-
CBD	100	100	100	-	100	-	-
CBD Rain	99	-	-	-	-	-	99
eSikhaleni	100	100	100	-	100	-	-
Felixton Met	98	98	98	-	98	-	-
Harbour West	100	100	100	-	-	-	-

**Notes:**

1. Red - Not acceptable for statistical purposes (<80%),
2. Orange – Does not meet SANAS data capture requirements (<90%),
3. Yellow – RBCAA reporting requirement (<=95%)

**Missing Data (Station and meteorology):**

- Airport – power outages (1 day with <80% data capture 16 February 2025).
- Arboretum - power outages (1 day with <80% data capture 13 February 2025).
- Brackenham - power outages (1 day with <80% data capture 26 February 2025).
- Felixton Met – power outages (1 day with <80% data capture 22 February 2025).

## 2.2. Wind Roses

Monthly wind roses for March 2024 and 2025 for Arboretum are presented in Figure 2-1. They indicate that the wind blew predominantly along the NE and SW axis. NE wind is generally associated with fair weather, while SW wind is usually associated with the passage of coastal lows, cold fronts, and inclement weather.

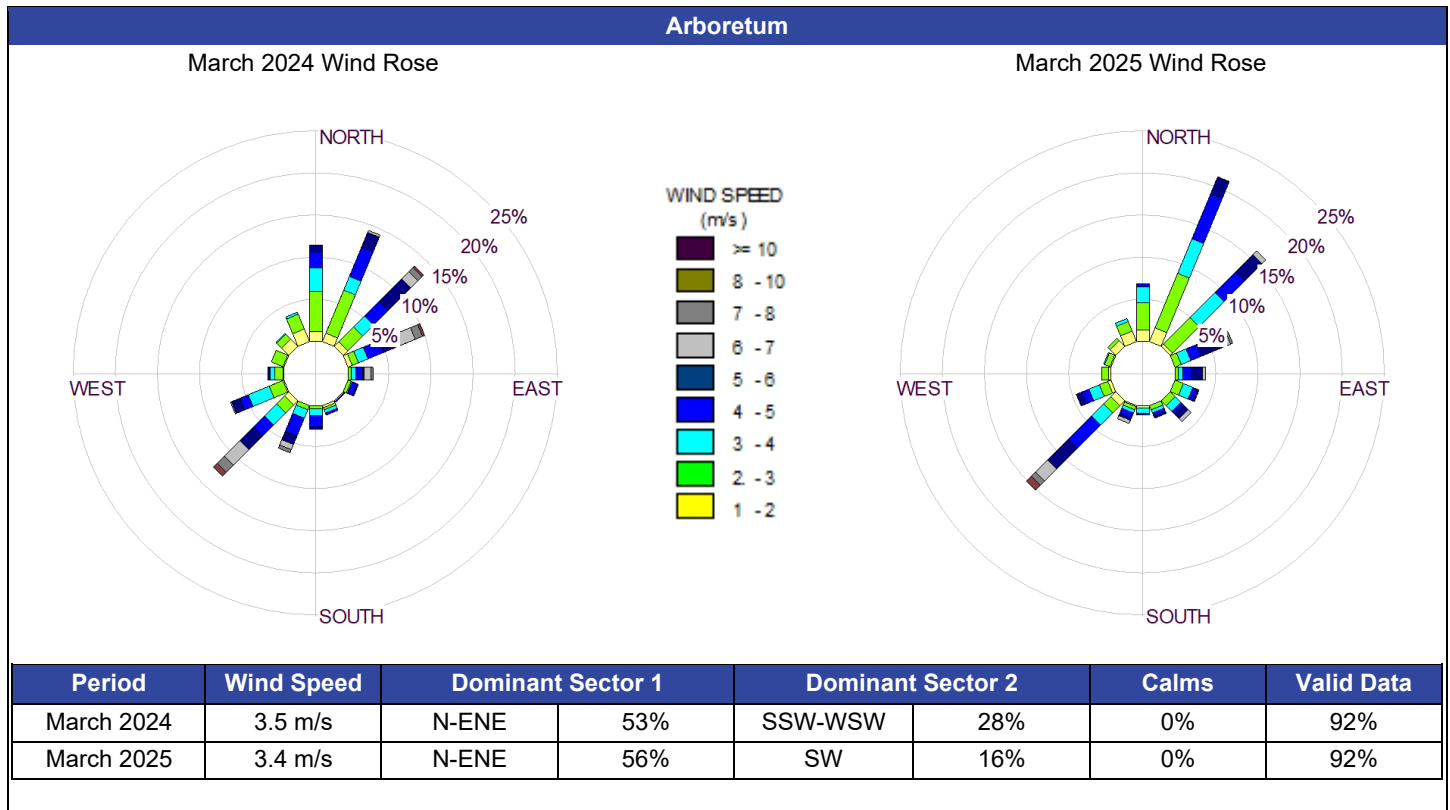


Figure 2-1: Wind roses - monthly.

Typically, there is an increase in light (1 to 3 m/s) to moderate (3 to 6 m/s) wind from the NNW during periods that include autumn and winter conditions and the seasonal increase in fresh (6 to 8 m/s) to strong (> 8 m/s) N to NE wind during periods that include spring and early summer. Strong southerly to SSW wind occurs throughout the year and is typically associated with the arrival of coastal lows and cold fronts. Coastal lows are more frequent during the summer, hence the slightly higher proportion of these winds).

Diurnal wind roses for March 2025 are shown in Figure 2-2. ESE to SSE wind primarily consists of sea breezes during the day and early evening, particularly during the warmer spring and summer months. In contrast, WNW to NNW wind is mainly in the form of land breezes at night and early morning, particularly during the colder and more stable autumn and winter months.

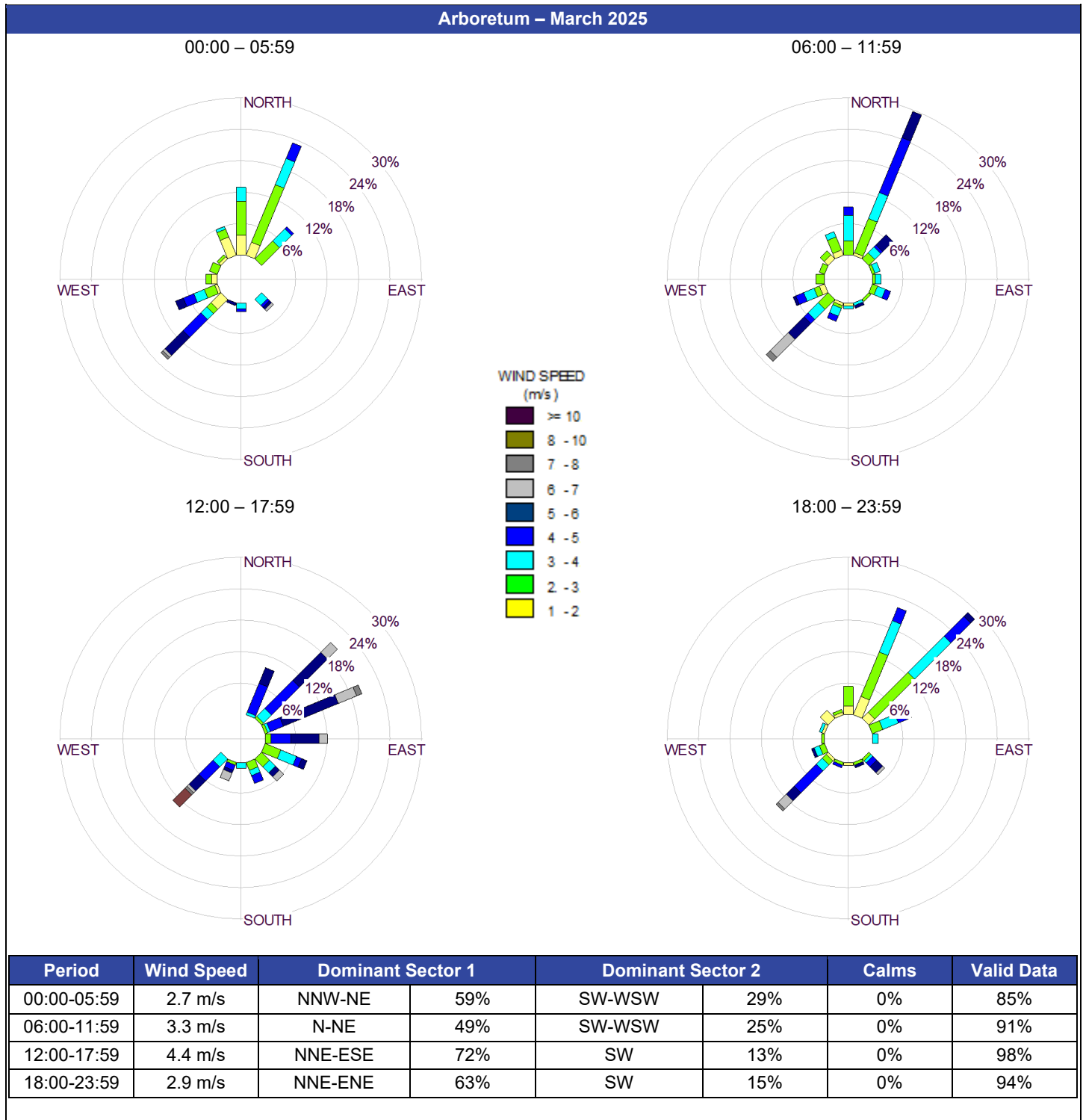


Figure 2-2: Wind roses - diurnal.

### 2.3. Rainfall

Rainfall measured at various locations is presented in Figure 2-3, Figure 2-4, Figure 2-5 and Figure 2-6 (See APPENDIX F for tables).

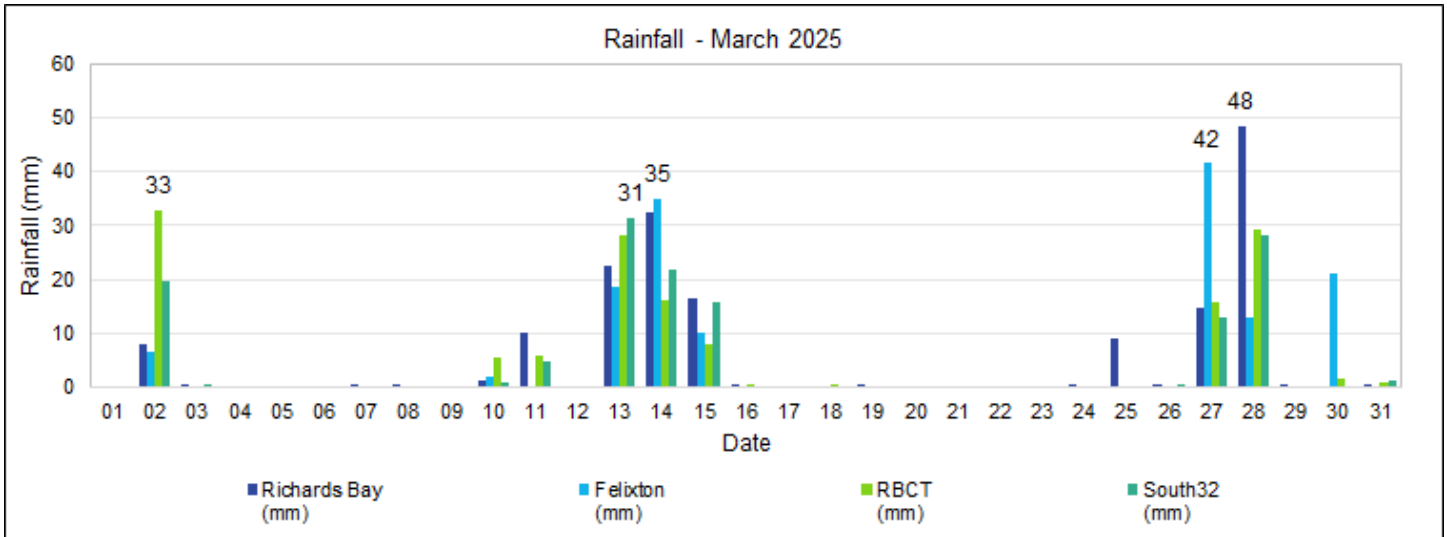


Figure 2-3: Rainfall.

Table 2-2: Rainfall -monthly averages.

Month	Richards Bay (mm)	Felixton (mm)	RBCT (mm)	South 32 (mm)
March 2025	165	148	145	137

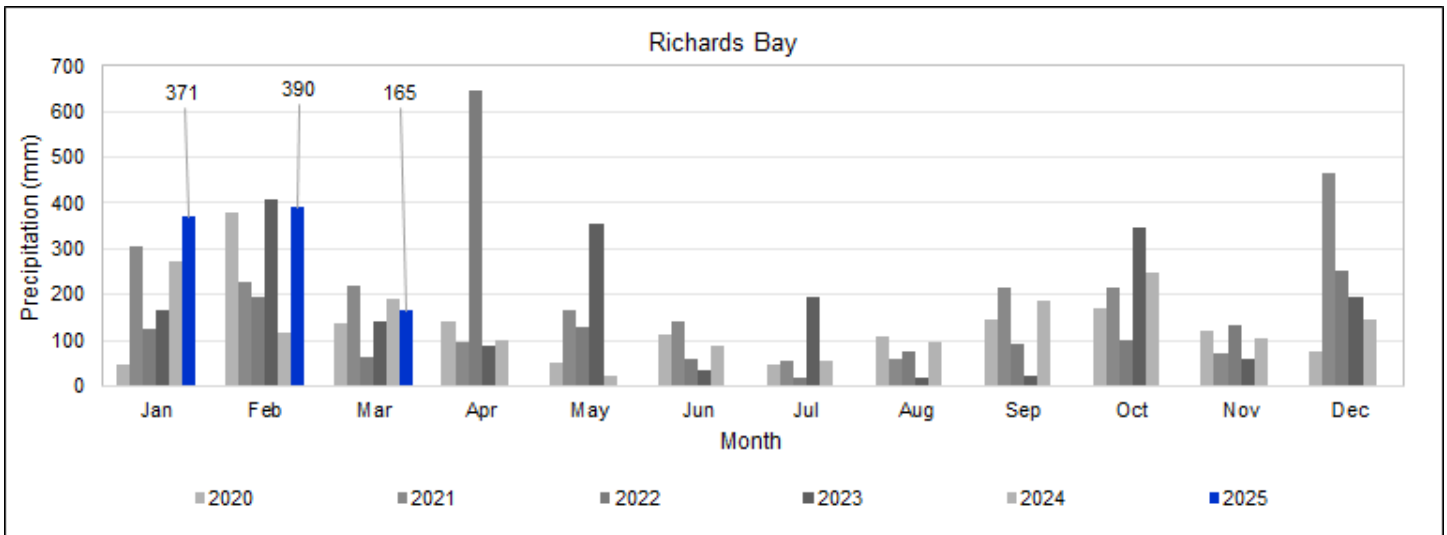


Figure 2-4: Rainfall –Richards Bay.

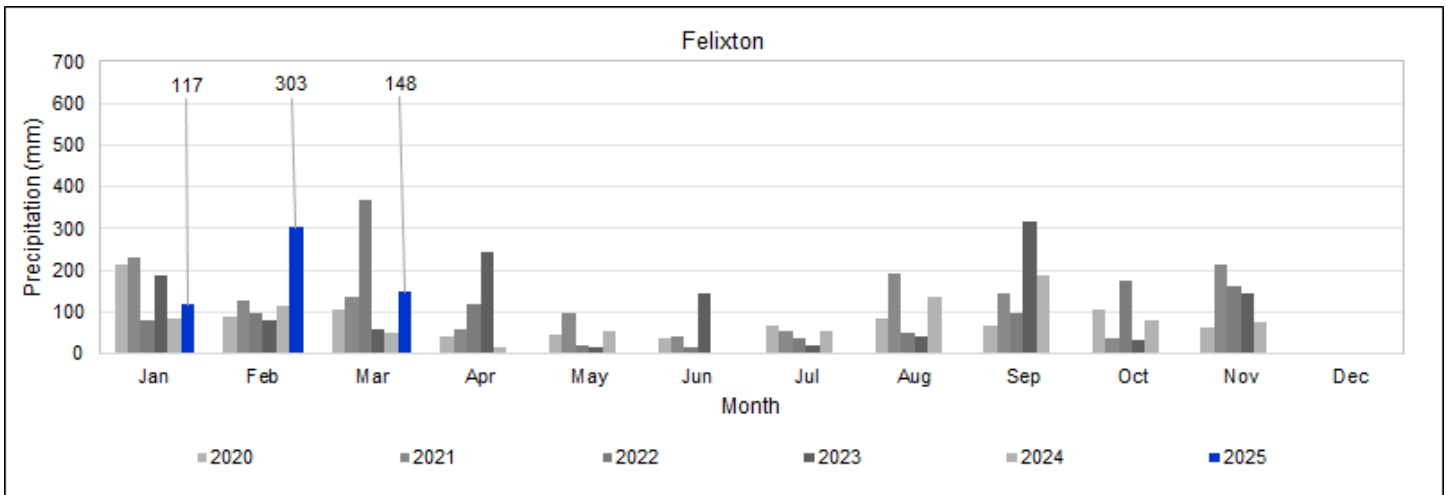


Figure 2-5: Rainfall – Felixton.

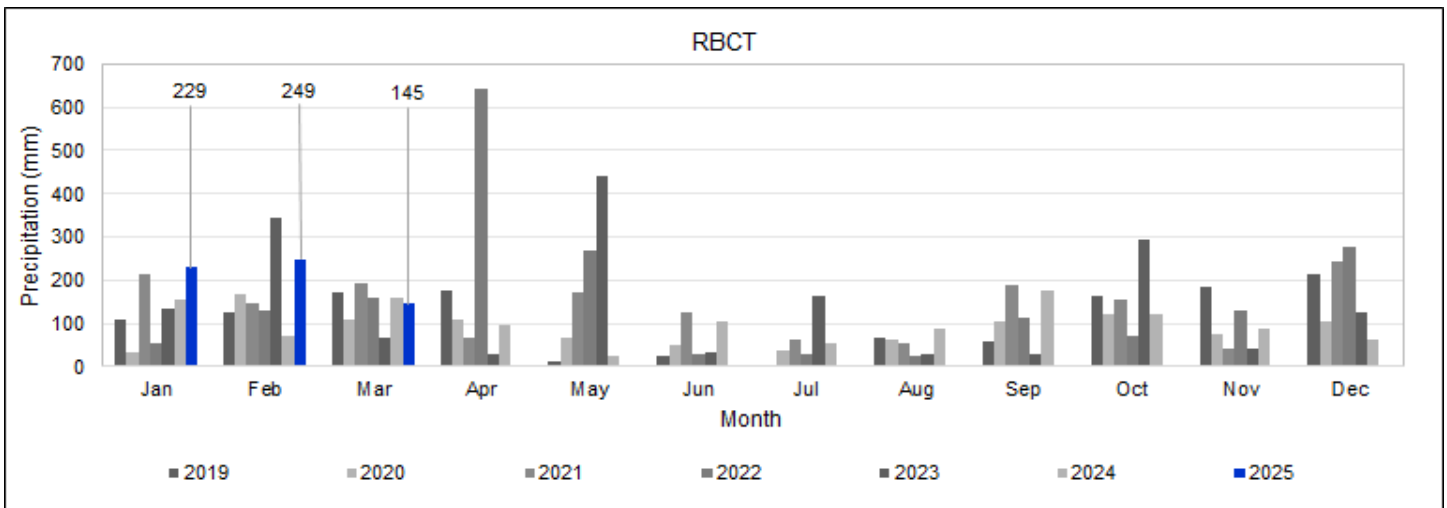


Figure 2-6: Rainfall – RBCT.

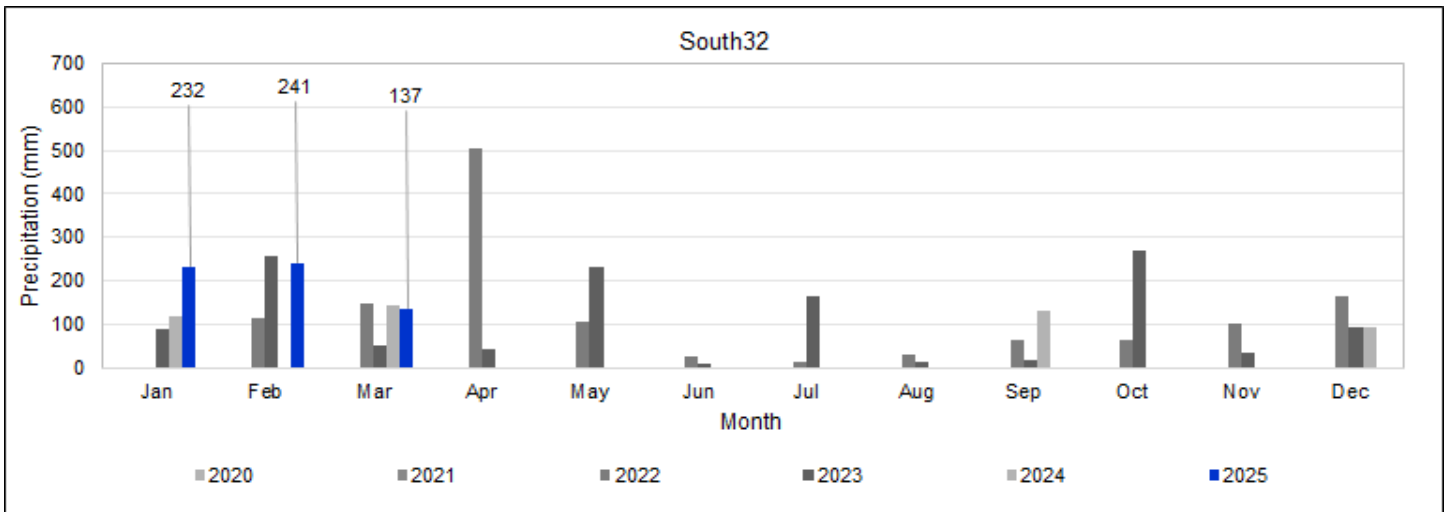


Figure 2-7: Rainfall - South32.  
Note: South32 has had issues with its rain gauge during 2024.

### 3. AIR QUALITY COMPLAINTS

Detailed complaint records are maintained, updated, and distributed weekly to the RBCAA's complaints mailing list. The following sections summarise and analyse the complaints received during February 2025. Please see APPENDIX F for the Complaints Log.

#### 3.1. Field Observations

Forty-four (44) air quality complaints were received during March 2025; Six (6) were logged in March 2024. The daily complaints and a monthly historical count are reflected below (Figure 3-1 and Figure 3-2).

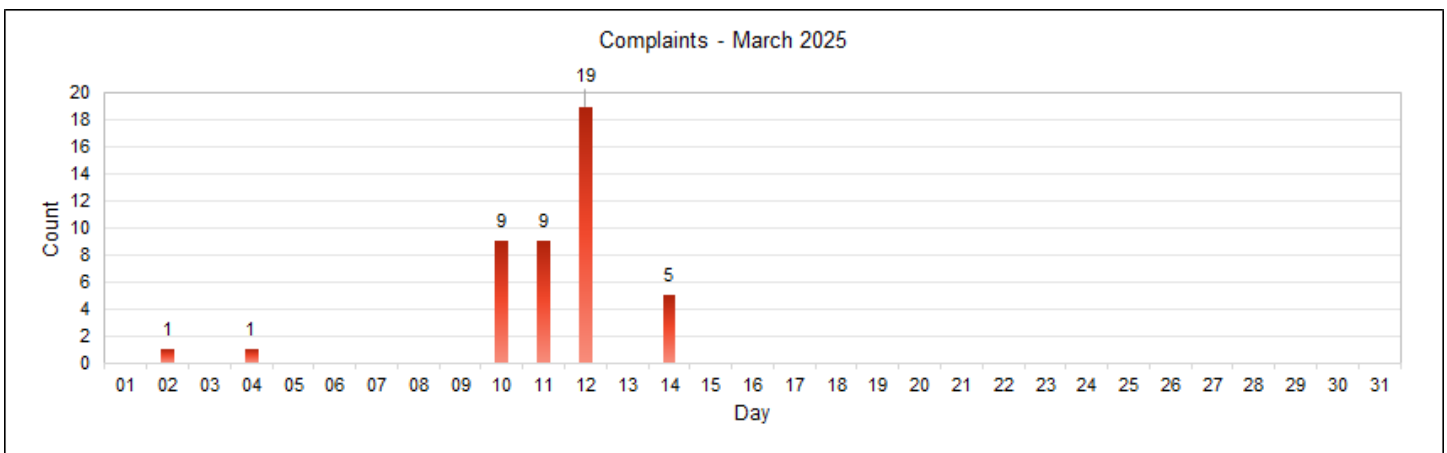


Figure 3-1: Complaints – daily.

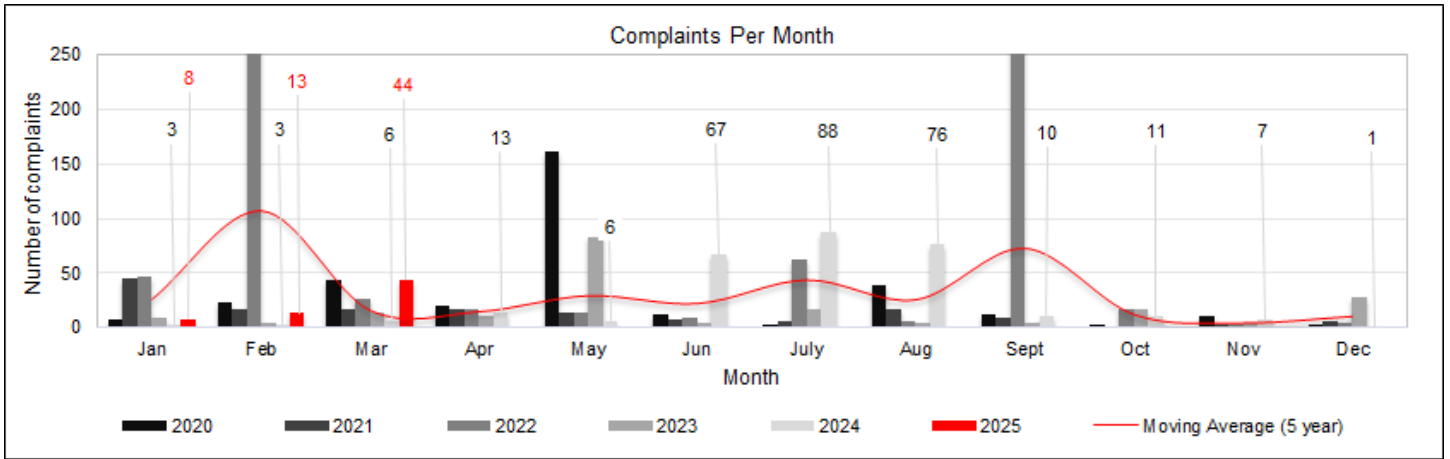


Figure 3-2: Complaints - historical monthly comparison.

### 3.2. Complaints Distribution

The distribution of complaints in March 2025 by region, source and type is presented in Figure 3-3, Figure 3-4, and Figure 3-5.

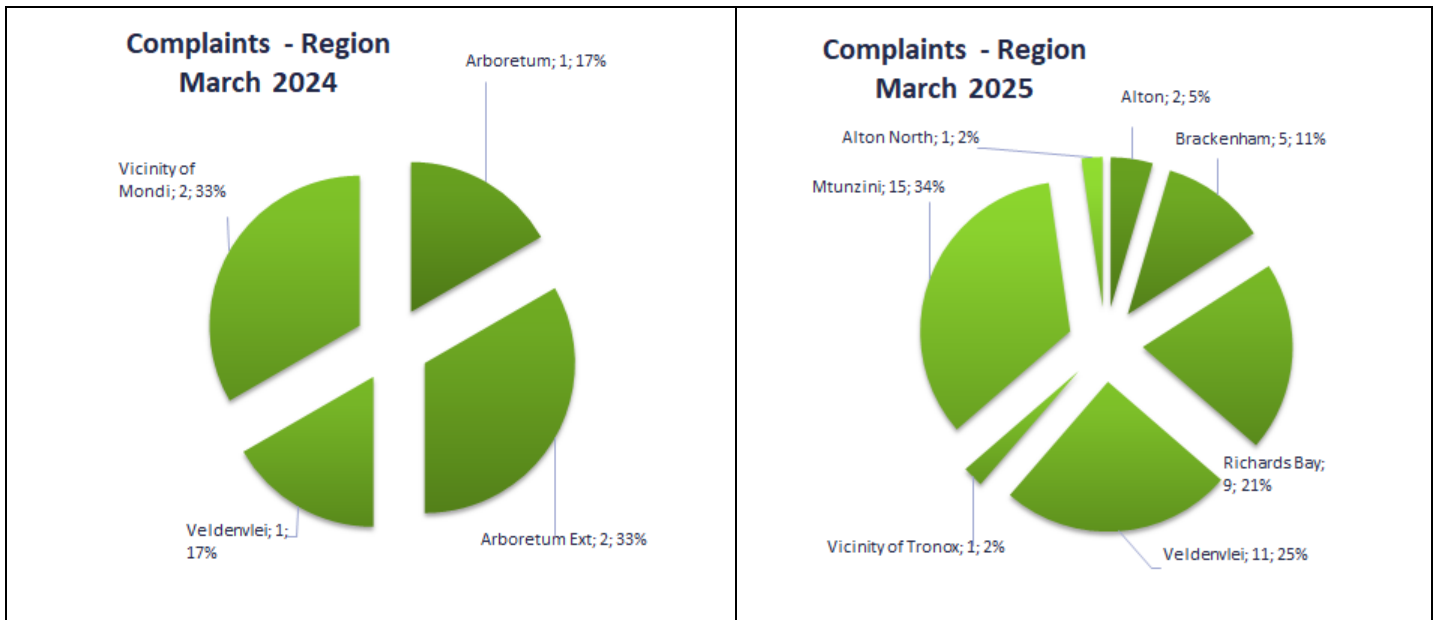


Figure 3-3: Complaints - region.

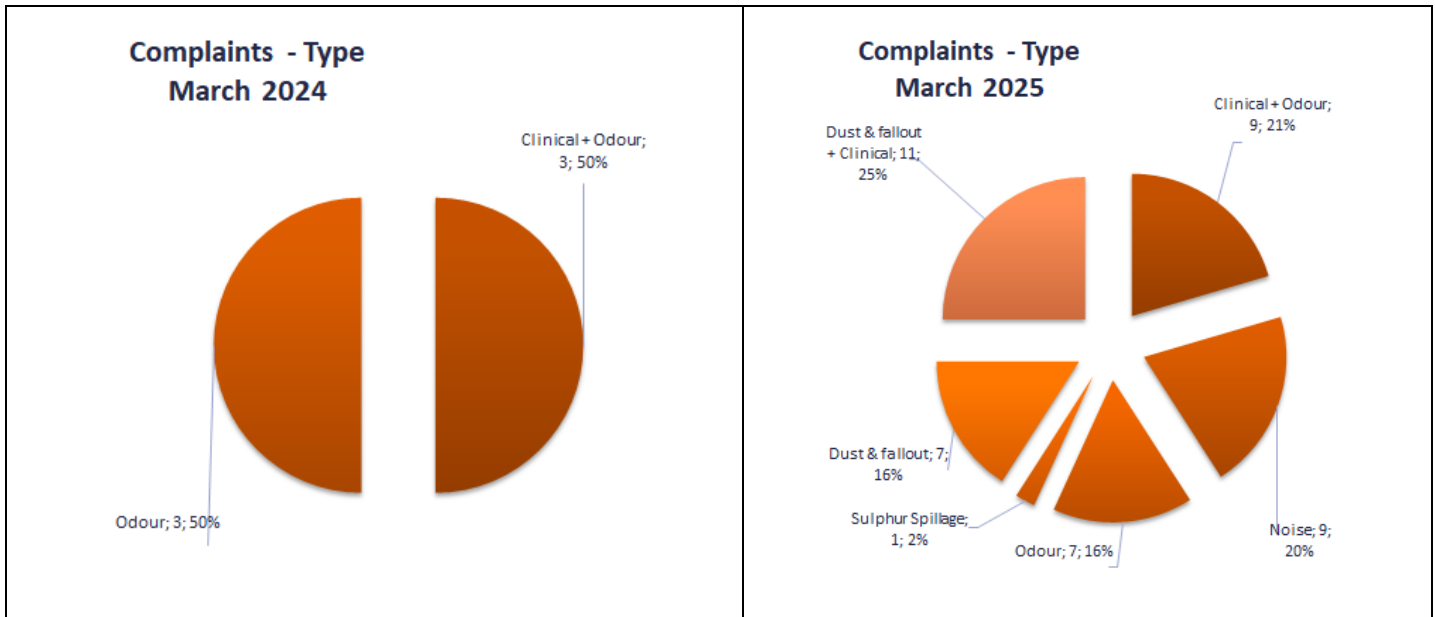


Figure 3-4: Complaints - type.

Table 3-1: Complaint - allocation, region, and type.

March: Complaint - allocation, region, and type		44
<b>Authority response required</b>		<b>17</b>
Alton North	Dust & fallout	1
Mtunzini	Dust & fallout	15
	Dust & fallout + Clinical	5
Vicinity of Tronox	Dust & fallout	10
	Dust & fallout	1
<b>Foskor</b>		<b>9</b>
Richards Bay	Noise	9
<b>Grindrod</b>		<b>1</b>
Alton	Sulphur Spillage	1
<b>Mondi</b>		<b>16</b>
Brackenham	Clinical + Odour	5
	Odour	3
Veldenvlei	Clinical + Odour	2
	Odour	11
	Clinical + Odour	6
	Odour	5
<b>NIDA</b>		<b>1</b>
Alton	Dust & fallout + Clinical	1

The complaints received were allocated as follows: CoU (17, 38.6%), Mondri (16, 36.4%), Foskor (9, 20.5%), Grindrod (1, 2.3%) and NIDA (1, 2.3%).

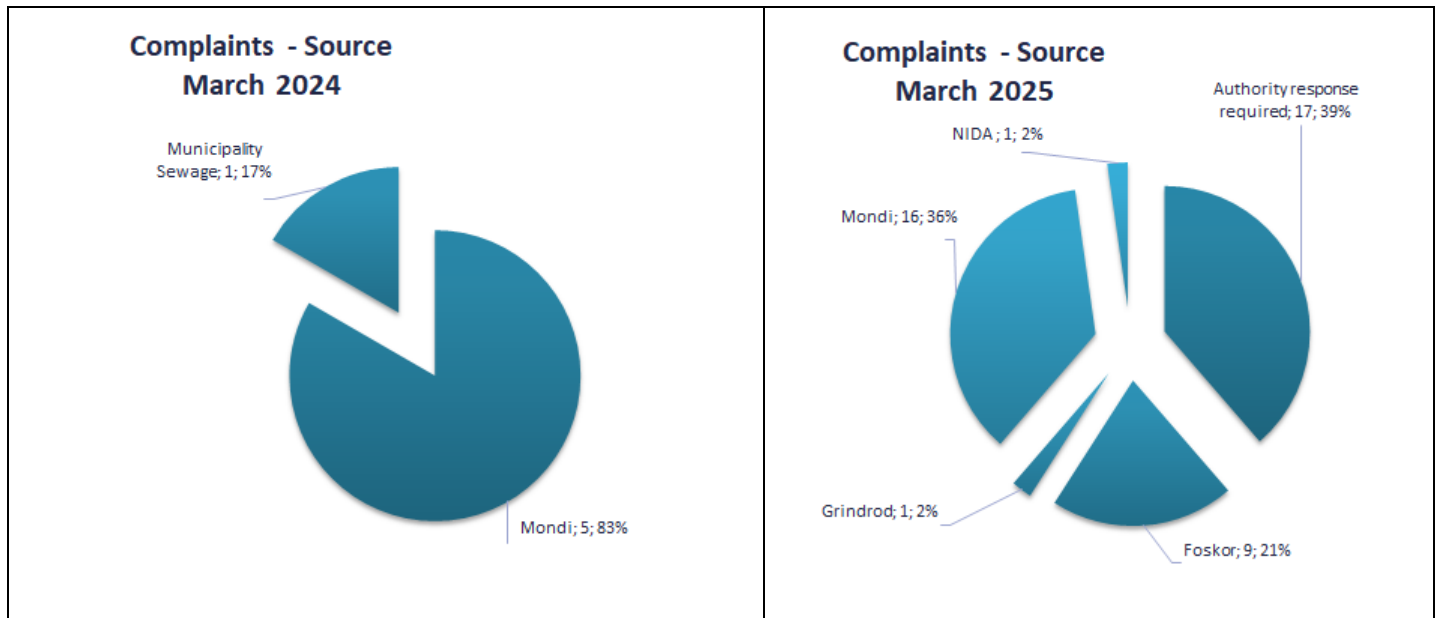


Figure 3-5: Complaints - source.

## 4. FINE PARTICULATE MONITORING

Particulate Matter (PM) refers to the atmosphere's solid particles and liquid droplets. Many anthropogenic and natural sources emit PM directly or other pollutants into the atmosphere to form PM. These solid and liquid particles can vary in size. For example, particles less than 10 micrometres (µm) in diameter are classified as PM<sub>10</sub> and particles less than 2.5 micrometres (µm) in diameter as PM<sub>2.5</sub>.

Fine particulates can be inhaled and accumulate deep within the respiratory system. Therefore, exposure to sustained high concentrations may result in the following:

- ▶ Reduced lung development in children
- ▶ Allergy-related inflammatory reactions of the airway
- ▶ Asthma, nasal congestion, and sinus problems
- ▶ Increase in symptoms associated with the lower respiratory tract.
- ▶ In severe cases, a reduction in life expectancy

Particulate matter (PM) monitoring at eSikhaleni and Richardia utilises Tapered Element Oscillating Microbalance (TEOM) devices, which are U.S. EPA-approved for continuous PM measurement. These instruments determine particle mass by detecting frequency changes in a vibrating element as particles accumulate. In contrast, Brackenham, CBD, Felixton, Scorpio, and Harbour West employ E-Samplers, which combine real-time light scattering with filter-based sampling to measure particulate concentrations. The E-Sampler is certified under the UK's Monitoring Certification Scheme (MCERTS) for indicative ambient particulate monitoring.

### 4.1. Ambient Air Quality Standards

Ambient air quality standards for particulates are listed below (Table 4-1).

Table 4-1: Particulate ambient air quality limits.

Organisation	Limit	PM <sub>10</sub> Daily Average (µg/m <sup>3</sup> )	PM <sub>10</sub> Annual Average (µg/m <sup>3</sup> )	PM <sub>2.5</sub> Daily Average (µg/m <sup>3</sup> )	PM <sub>2.5</sub> Annual Average (µg/m <sup>3</sup> )
RSA [a, d]	Standard	75 [b]	40 [c]	40 [b]	20 [c]
WHO [e]	Guideline	45 [c]	15 [c]	15 [c]	5 [c]

Notes:

- a) Government Gazette 32816 (24 December 2009) in terms of the National Environmental Management: Air Quality Act No. 39 of 2004, effective from 2015 (RSA-NEMAQA, 2009)
- b) Not to be exceeded more than four (4) times in one year
- c) Not to be exceeded
- d) Government Gazette 35463 (29 June 2009) in terms of the National Environmental Management: Air Quality Act No. 39 of 2004, effective from 2015 (RSA-NEMAQA, 2012)
- e) World Health Organisation (WHO, 2021)

## 4.2. Data Availability

The percentage of valid data received from the PM analysers for March 2025 is shown in Table 4-2.

Table 4-2: PM data capture.

Station	Availability (%)	PM <sub>10</sub> (%)	PM <sub>2.5</sub> (%)
Brackenham ES2	100	-	100
CBD ES1	100	100	-
eSikhaleni	99	98	-
Felixton ES1	96	96	-
Felixton ES2	95	-	95
Harbour West ES2	100	-	100
Richardia	100	100	-
Scorpio ES1	100	100	-
Scorpio ES2	100	-	100

**Missing Data (PM<sub>10</sub>):**

- eSikhaleni - power outages, data invalidation (1 day with <80% data capture 28 March 2025).
- Felixton ES1 - power outages, data invalidation (1 day with <80% data capture 12 March 2025).

**Missing Data (PM<sub>2.5</sub>):**

- Felixton ES2 - power outages (2 days with <80% data capture 11-12 March 2025).

### 4.3. Monthly

PM<sub>10</sub> monthly average concentrations did not exceed the RSA Annual Limit; the WHO Annual Limit was exceeded at eSikhaleni, Richardia and Scorpio (Figure 4-1). Comparisons to previous months are also provided (Figure 4-2).

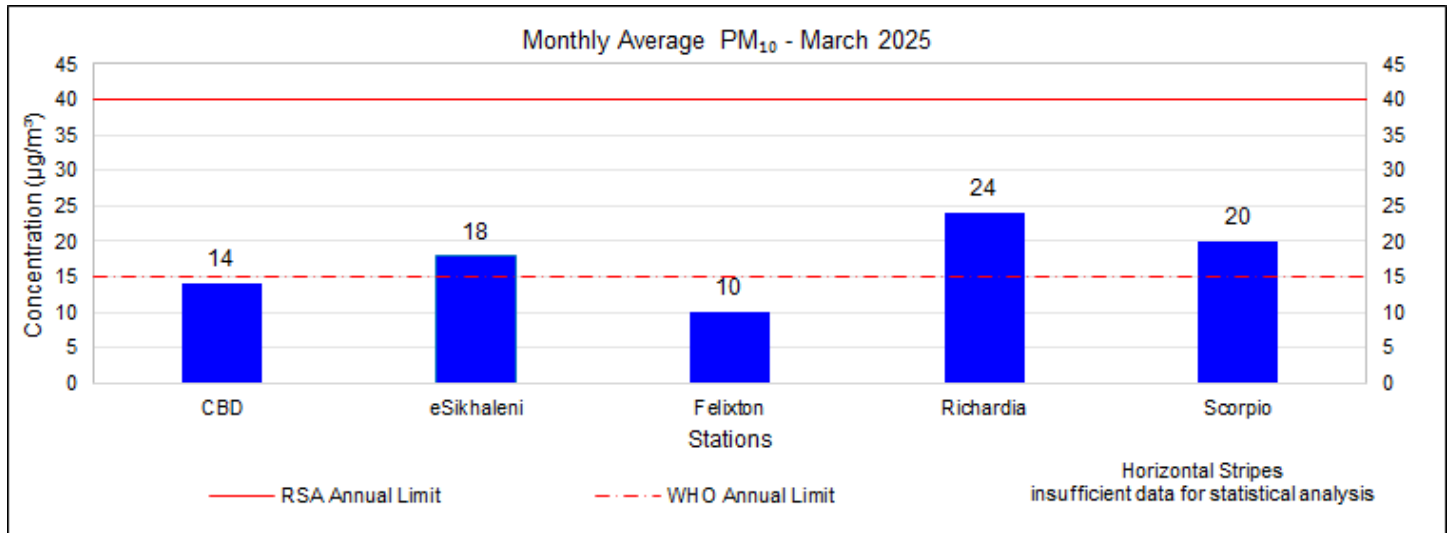


Figure 4-1: PM<sub>10</sub> monthly concentrations.

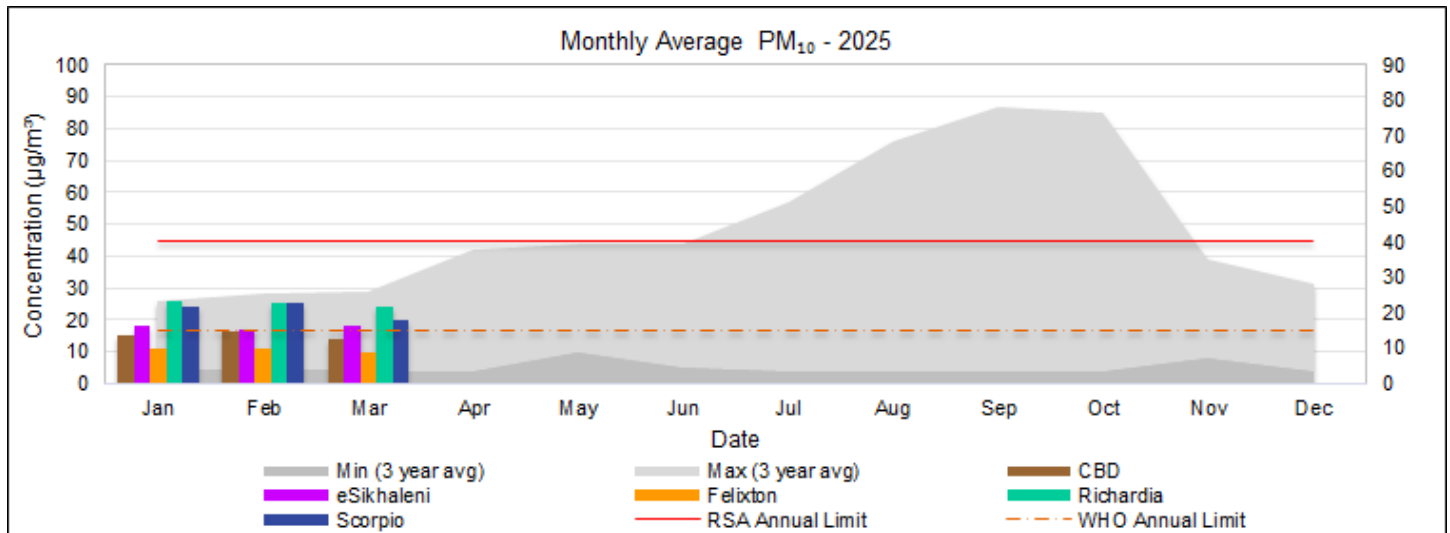


Figure 4-2: PM<sub>10</sub> monthly comparison.

PM<sub>2.5</sub> monthly average concentrations did not exceed the RSA Annual Limit. The WHO Annual Limit was exceeded at Brackenham, Felixton, Harbour West and Scorpio (Figure 4-3). Comparisons to previous months are also provided (Figure 4-4).

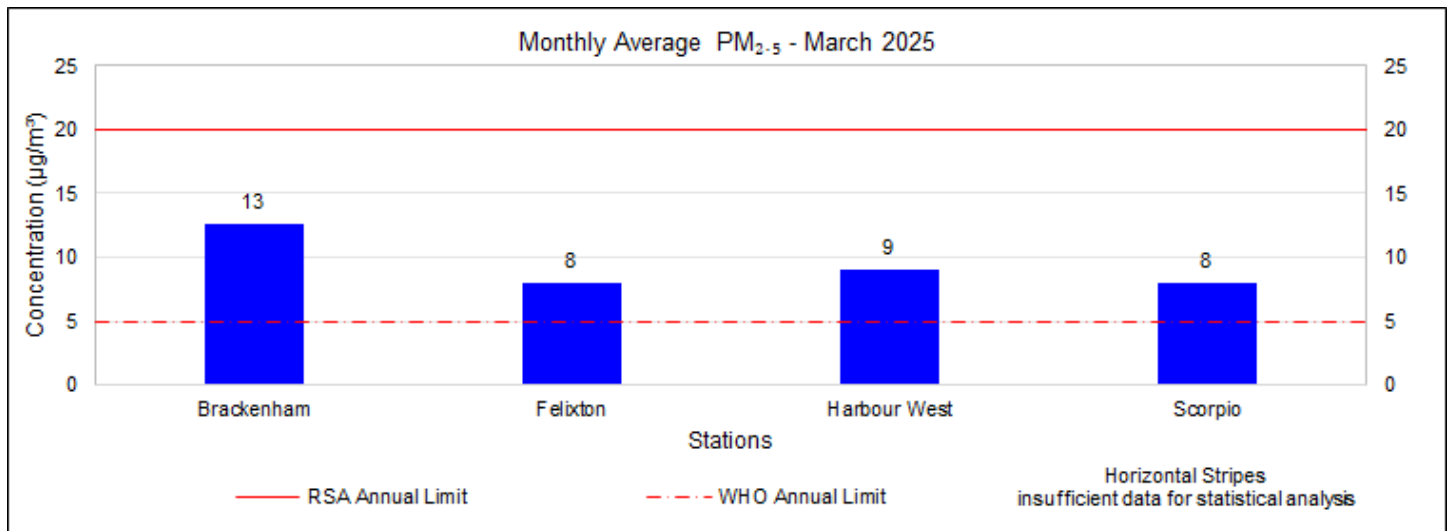


Figure 4-3: PM<sub>2.5</sub> monthly concentrations.

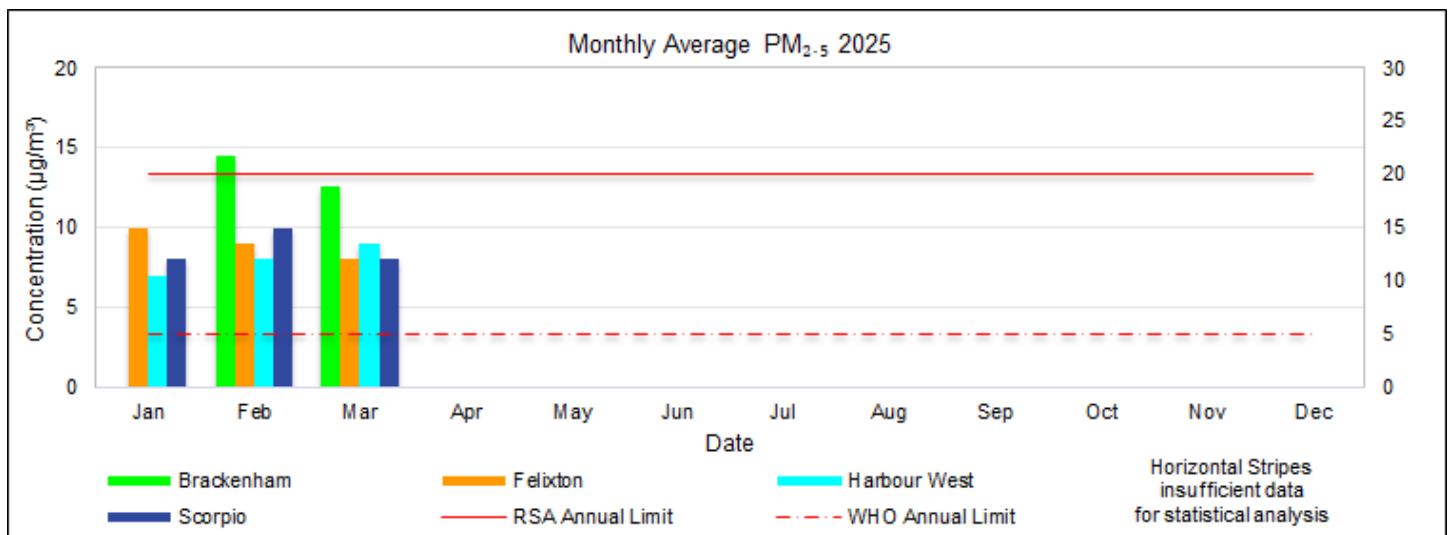


Figure 4-4: PM<sub>2.5</sub> monthly comparison.

### 4.4. Diurnal

PM diurnal concentrations are shown below (Figure 4-5 and Figure 4-6). Diurnal concentrations of PM<sub>10</sub> did not exceed the RSA Daily Limit (75 µg/m<sup>3</sup>) nor the WHO Daily Limit (45 µg/m<sup>3</sup>). Diurnal concentrations of PM<sub>2.5</sub> did not exceed the RSA Daily Limit (40 µg/m<sup>3</sup>) or the WHO Daily Limit (15 µg/m<sup>3</sup>).

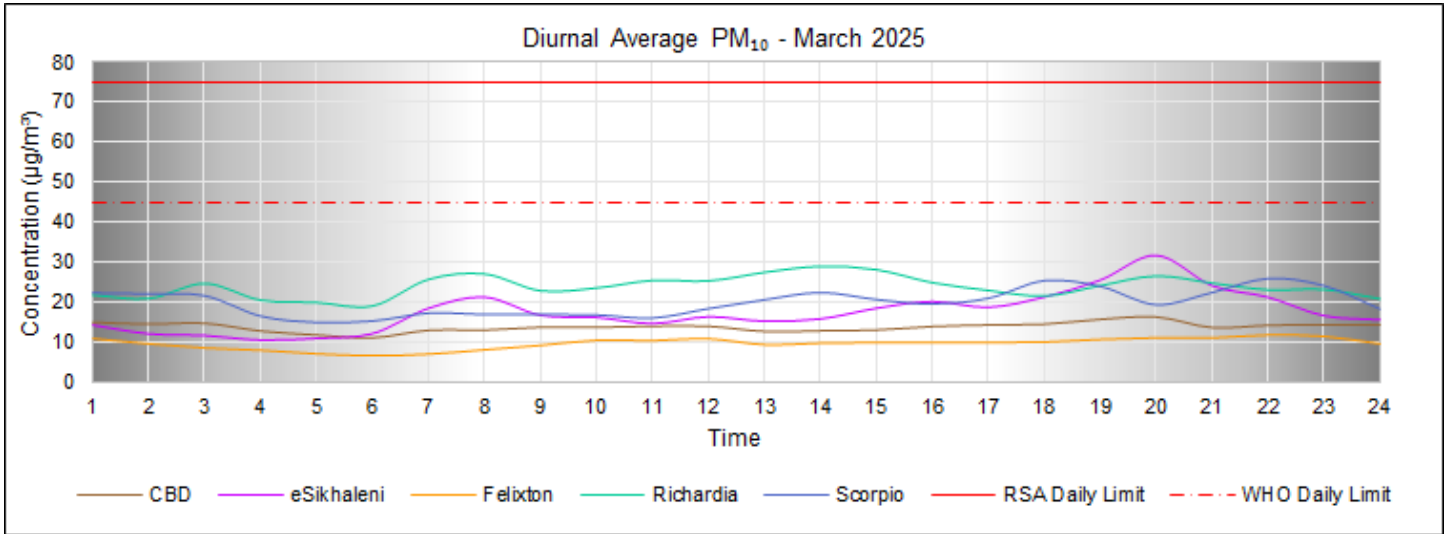


Figure 4-5: PM<sub>10</sub> diurnal concentrations.

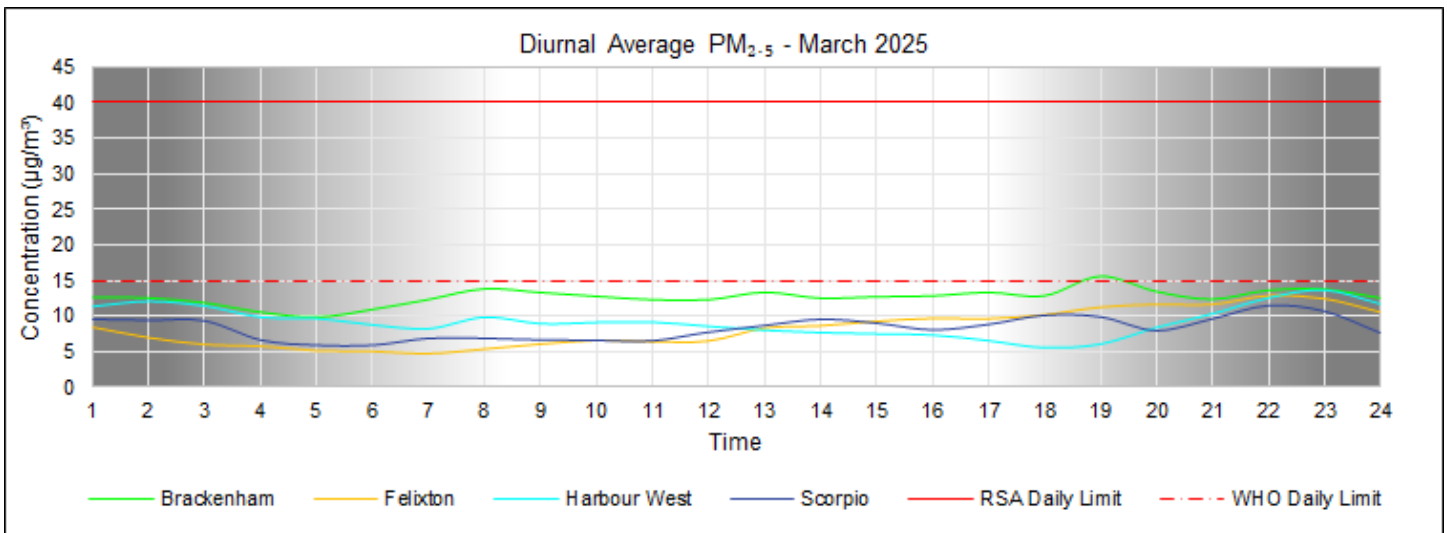


Figure 4-6: PM<sub>2.5</sub> diurnal concentrations.

### 4.5. Daily

PM<sub>10</sub> daily concentrations are shown in Figure 4-7, and exceedances are in Table 4-3. There were:

- ▶ No (0) measured exceedance of the RSA Limit (75 µg/m<sup>3</sup>); and,
- ▶ Two (2) measured exceedances of the WHO Limit (45 µg/m<sup>3</sup>).

Table 4-3: PM<sub>10</sub> 24-hour exceedances (WHO).

March: PM <sub>10</sub> Daily WHO Limit (45 µg/m <sup>3</sup> )	2
<b>No response required</b>	<b>2</b>
Richardia	1
No comment	1
Scorpio	1
No comment	1

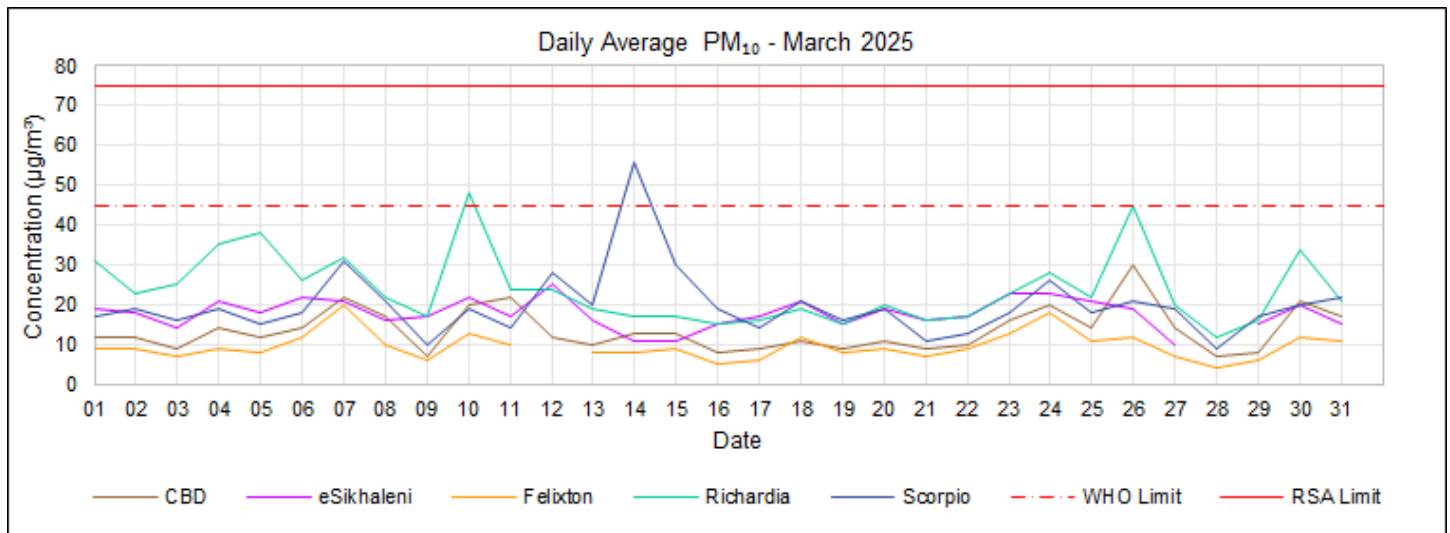


Figure 4-7: PM<sub>10</sub> 24-hour average concentrations.

**Missing Data (PM<sub>10</sub>)**

- eSikhaleni - power outages, data invalidation (1 day with <80% data capture 28 March 2025).
- Felixton ES1 - power outages, data invalidation (1 day with <80% data capture 12 March 2025).

PM<sub>2.5</sub> daily concentrations are shown in Figure 4-8, and exceedances are in Table 4-4. There were:

- ▶ No (0) measured exceedances of the RSA Limit (40 µg/m<sup>3</sup>); and,
- ▶ Fifteen (15) measured exceedances of the WHO Limit (15 µg/m<sup>3</sup>).

Table 4-4: PM<sub>2.5</sub> 24-hour exceedances (WHO)

March: PM <sub>2.5</sub> Daily WHO Limit (15 µg/m <sup>3</sup> )	15
<b>No response required</b>	<b>15</b>
Brackenham	8
No comment	8
Felixton	2
No comment	2
Scorpio	1
No comment	1
Harbour West	4
No comment	4

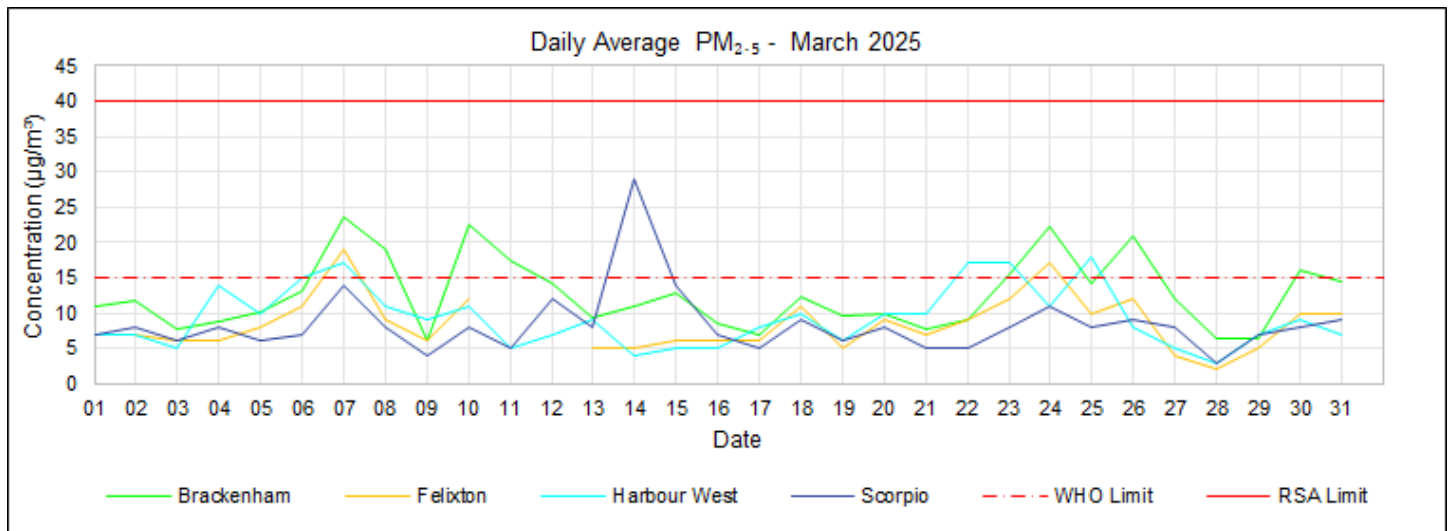


Figure 4-8: PM<sub>2.5</sub> daily average concentrations.

Missing Data (PM<sub>2.5</sub>):

Felixton ES2 - power outages (2 days with <80% data capture 11-12 March 2025).

### 4.6. Exceedances

The number of days on which exceedances occurred, plus comparisons to previous months, are shown in Figure 4-9 and Figure 4-10, and a summary of PM exceedances broken down per station is presented in Table 4-5 and Table 4-6. According to the relevant Air Quality Index (AQI), the areas where no exceedances were measured may be considered good air quality concerning PM.

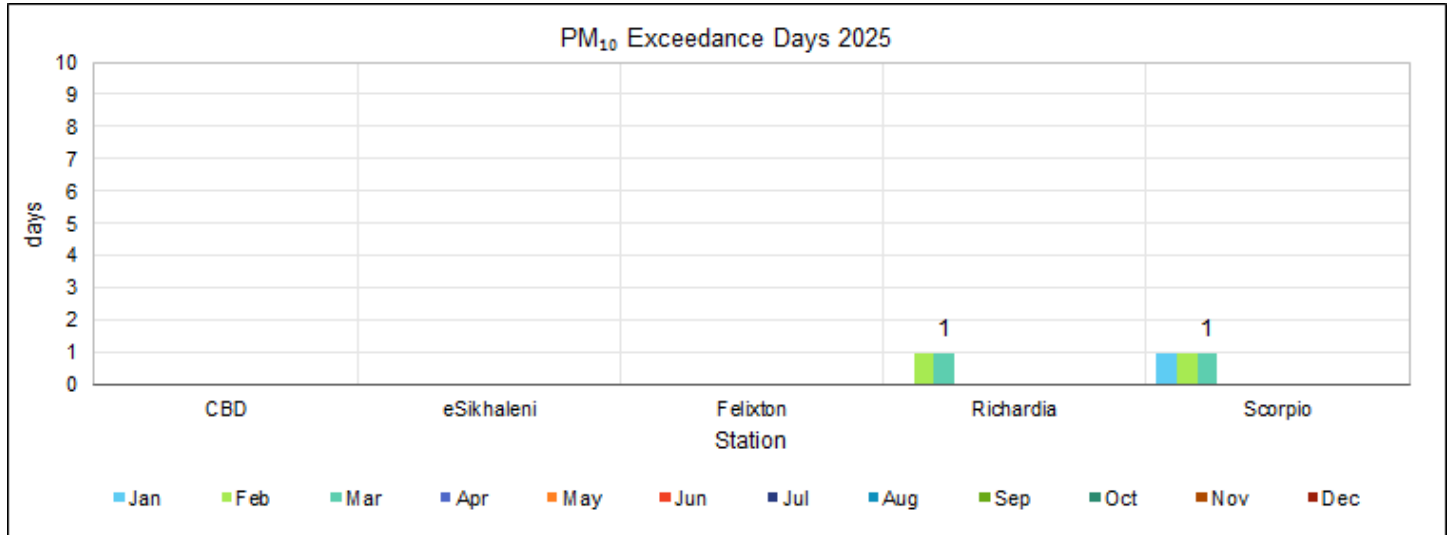


Figure 4-9: PM<sub>10</sub> exceedance days.

Table 4-5: PM<sub>10</sub> exceedance summary.

2025	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
<b>PM<sub>10</sub> Daily RSA Limit (75 µg/m³)</b>													
Brackenham	-	-	-	-	-	-	-	-	-	-	-	-	0
CBD	-	-	-	-	-	-	-	-	-	-	-	-	0
eSikhaleni	-	-	-	-	-	-	-	-	-	-	-	-	0
Felixton	-	-	-	-	-	-	-	-	-	-	-	-	0
Richardia	-	-	-	-	-	-	-	-	-	-	-	-	0
Scorpio	-	-	-	-	-	-	-	-	-	-	-	-	0
<b>PM<sub>10</sub> Daily WHO Limit (45 µg/m³)</b>													
Brackenham	-	-	-	-	-	-	-	-	-	-	-	-	0
CBD	-	-	-	-	-	-	-	-	-	-	-	-	0
eSikhaleni	-	-	-	-	-	-	-	-	-	-	-	-	0
Felixton	-	-	-	-	-	-	-	-	-	-	-	-	0
Richardia	-	1	1	-	-	-	-	-	-	-	-	-	2
Scorpio	1	1	1	-	-	-	-	-	-	-	-	-	3

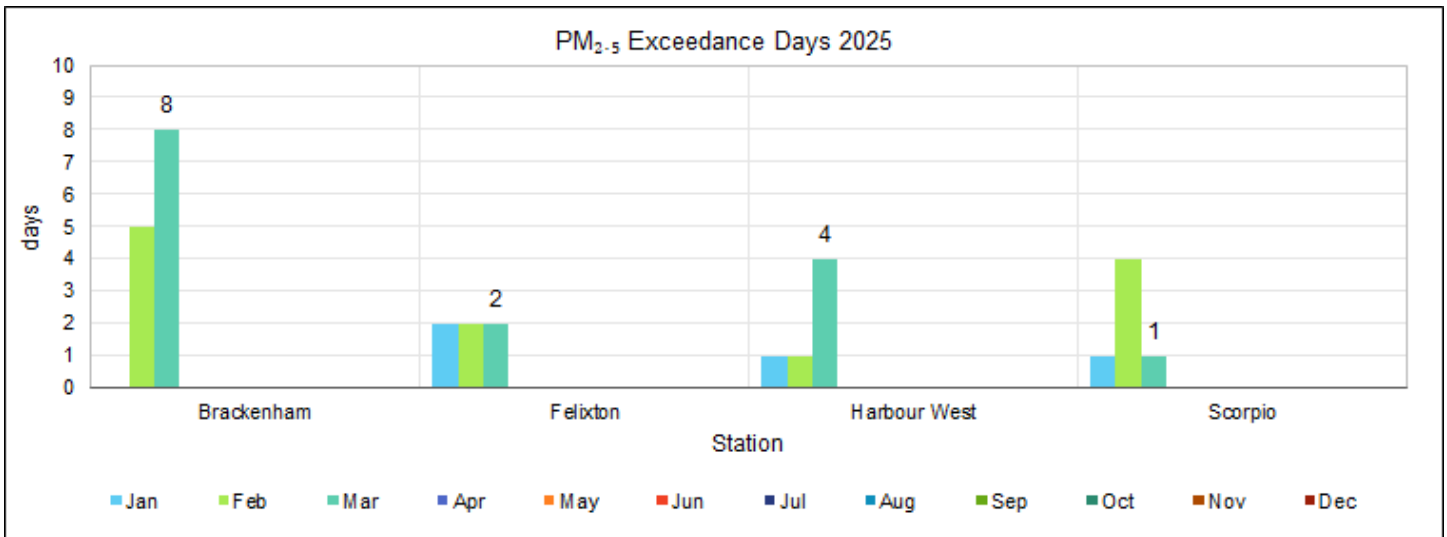


Figure 4-10: PM<sub>2.5</sub> exceedance days.

Table 4-6: PM<sub>2.5</sub> exceedance summary.

2025	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
<b>PM<sub>2.5</sub> Daily RSA Limit (40 µg/m<sup>3</sup>)</b>													
Brackenham	-	-	-	-	-	-	-	-	-	-	-	-	-
Felixton	-	-	-	-	-	-	-	-	-	-	-	-	-
Harbour West	-	-	-	-	-	-	-	-	-	-	-	-	-
Scorpio	-	-	-	-	-	-	-	-	-	-	-	-	-
<b>PM<sub>2.5</sub> Daily WHO Limit (15 µg/m<sup>3</sup>)</b>													
Brackenham	-	5	8	-	-	-	-	-	-	-	-	-	<b>13</b>
Felixton	2	2	2	-	-	-	-	-	-	-	-	-	<b>6</b>
Harbour West	1	1	4	-	-	-	-	-	-	-	-	-	<b>6</b>
Scorpio	1	4	1	-	-	-	-	-	-	-	-	-	<b>6</b>

## 5. SULPHUR DIOXIDE MONITORING

Sulphur dioxide (SO<sub>2</sub>) is one gas of highly reactive gasses known as "oxides of sulphur." Anthropogenic sources include fossil fuel combustion (particularly coal-burning power plants), industrial processes such as wood pulping, paper manufacture, petroleum and metal refining, and metal smelting (particularly from sulphide-containing ores, e.g., lead, silver, and zinc ores) and vehicle tailpipe emissions. Natural sources of SO<sub>2</sub> emissions include geothermal activity (including hot springs and volcanic activity) and the natural decay of vegetation on land in wetlands and oceans.

SO<sub>2</sub> is linked with several adverse effects on the respiratory system as it is highly soluble and thus readily absorbed by the mucous membranes of the nose and upper respiratory tract. Exposure to high concentrations may result in the following:

- ▶ Reduction in lung function (especially in asthmatics and children)
- ▶ Wheezing and coughing
- ▶ In severe cases, a decrease in life expectancy

### 5.1. Ambient Air Quality Standards

South African ambient air quality standards for SO<sub>2</sub> are listed below (Table 5-1).

Table 5-1: SO<sub>2</sub> ambient air quality limits.

Organisation	Limit	10-min Average	Hourly Average	Daily Average	Annual Average
RSA <sup>[a]</sup>	SO <sub>2</sub> Standard	500 µg/m <sup>3</sup> <sup>[b]</sup>	350 µg/m <sup>3</sup> <sup>[c]</sup>	125 µg/m <sup>3</sup> <sup>[d]</sup>	50 µg/m <sup>3</sup> <sup>[e]</sup>
		191ppb <sup>[b]</sup>	134 ppb <sup>[c]</sup>	48 ppb <sup>[d]</sup>	19 ppb <sup>[e]</sup>
WHO <sup>[f]</sup>	SO <sub>2</sub> Guideline	500 µg/m <sup>3</sup>	-	40 µg/m <sup>3</sup>	-
		191ppb	-	15 ppb	-

**Notes:**

- a) SA Government Gazette 32816 (published 24 December 2009) in terms of the National Environmental Management: Air Quality Act 39 of 2004 (RSA-NEMAQA, 2009)
- b) Not to be exceeded more than five hundred and twenty-six (526) times in one year.
- c) Not to be exceeded more than eighty-eight (88) times in one year
- d) Not to be exceeded more than four (4) times in one year
- e) Not to be exceeded
- f) World Health Organisation (WHO, 2021)

## 5.2. Data Availability

The percentage of valid data received from the SO<sub>2</sub> analysers for March 2025 is shown in Table 5-2.

Table 5-2: SO<sub>2</sub> data capture.

Station	Availability (%)	SO <sub>2</sub> (%)
Arboretum	99	97
Brackenham	100	100
CBD	100	96
eSikhaleni	99	98
Felixton	95	95
Harbour West	100	100
Richardia	100	<b>90</b>
Scorpio	100	100

**Notes:**

1. Red - Not acceptable for statistical purposes (<80%)
2. Orange – Does not meet SANAS data capture requirements (<90%)
3. Yellow – RBCAA reporting requirement (<=95%)

**Missing Data (SO<sub>2</sub>):**

- Arboretum - power outages, data invalidation (1 day with <80% data capture 7 March 2025).
- CBD - power outages, data invalidation (2 days with <80% data capture 19-20 March 2025).
- eSikhaleni - power outages, data invalidation (1 day with <80% data capture 28 March 2025).
- Felixton - power outages, data invalidation (1 day with <80% data capture 12 March 2025).
- Richardia - power outages, unstable power supply, data invalidation (5 days with <80% data capture 1-3, 6, 19 March 2025).

## 5.3. Monthly

Monthly average SO<sub>2</sub> concentrations did not exceed the RSA Annual Limit nor the WHO Annual Limit (Figure 5-1). Comparisons to previous months are also provided (Figure 5-2).

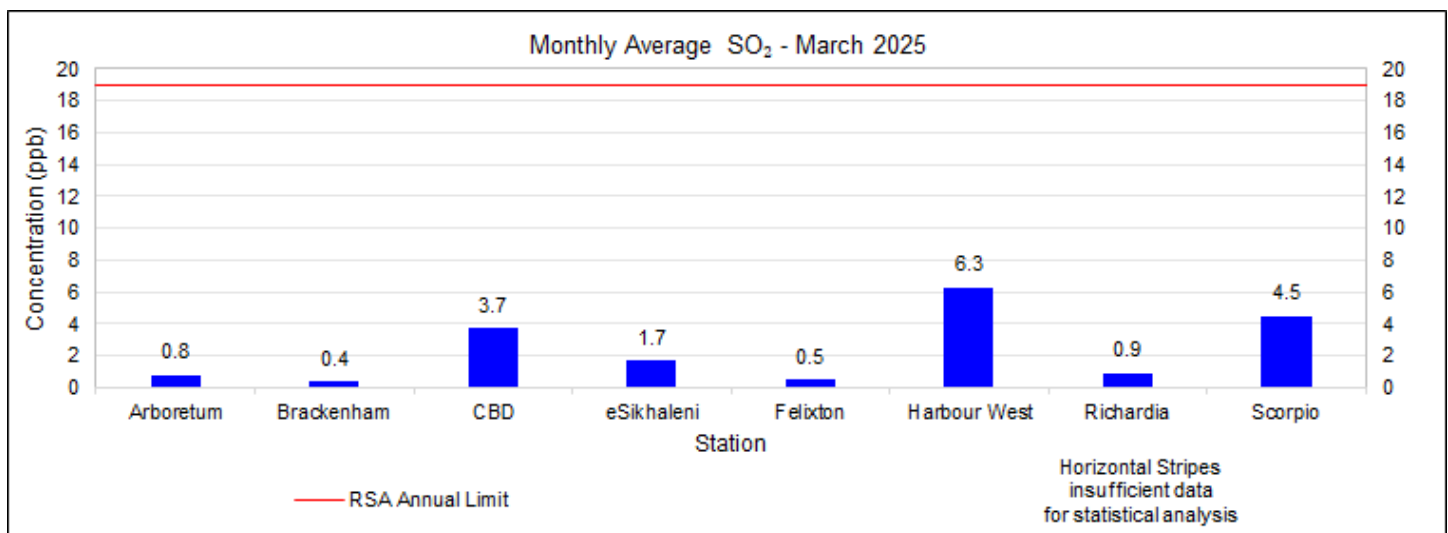


Figure 5-1: SO<sub>2</sub> monthly concentrations.

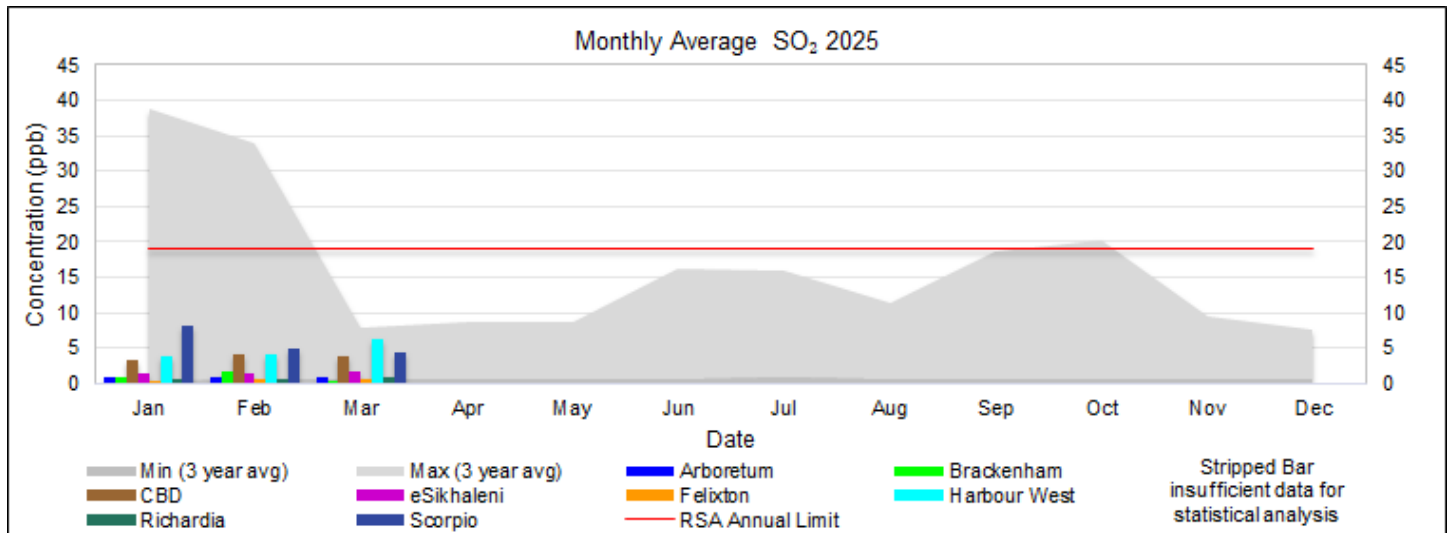


Figure 5-2: SO<sub>2</sub> monthly comparison.

### 5.4. Diurnal

Diurnal SO<sub>2</sub> concentrations are shown below (Figure 5-3). Diurnal concentrations of SO<sub>2</sub> did not exceed the RSA Daily Limit (48 ppb) or the WHO Daily Limit (15 ppb).

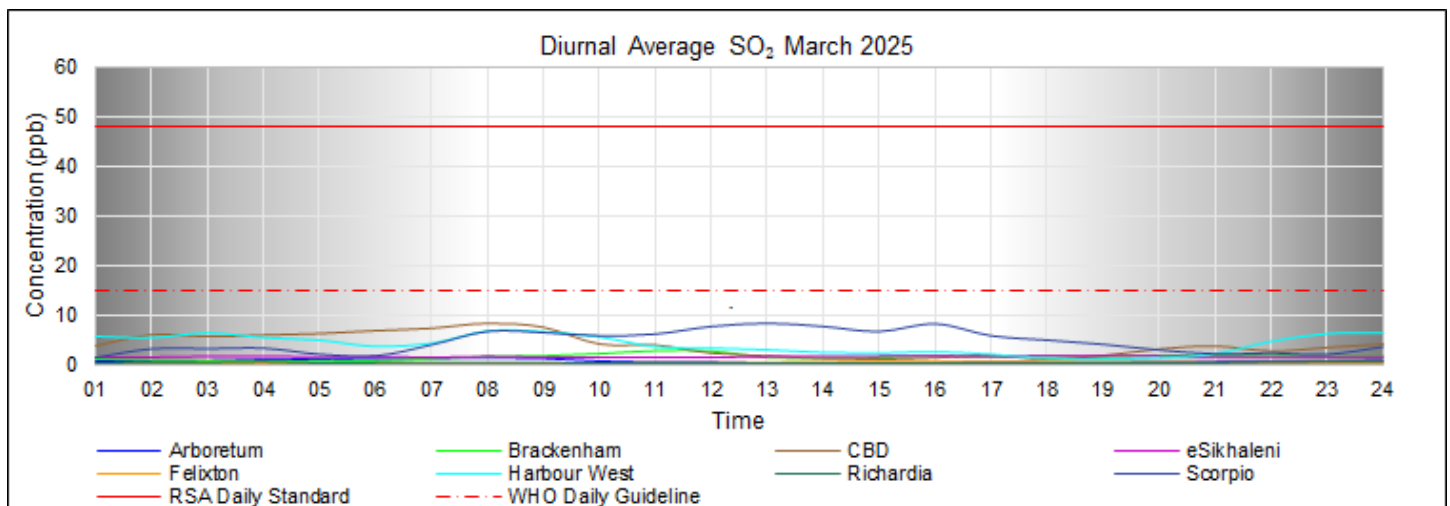


Figure 5-3: SO<sub>2</sub> diurnal concentrations.

### 5.5. Daily

SO<sub>2</sub> daily average concentrations are shown in Figure 5-4 and exceedances in **Error! Reference source not found**. Table 5-3: There were:

- ▶ No (0) measured exceedance of the RSA Limit (48 ppb); and,
- ▶ Eight (8) measured exceedance of the WHO Limit (15 ppb).

Table 5-3: SO<sub>2</sub> 24-hour average exceedance (WHO).

March: SO <sub>2</sub> Daily WHO Limit (15 ppb)	8
<b>No response required</b>	<b>8</b>
CBD	3
No comment	3
Harbour West	4
No comment	4
Scorpio	1
No comment	1

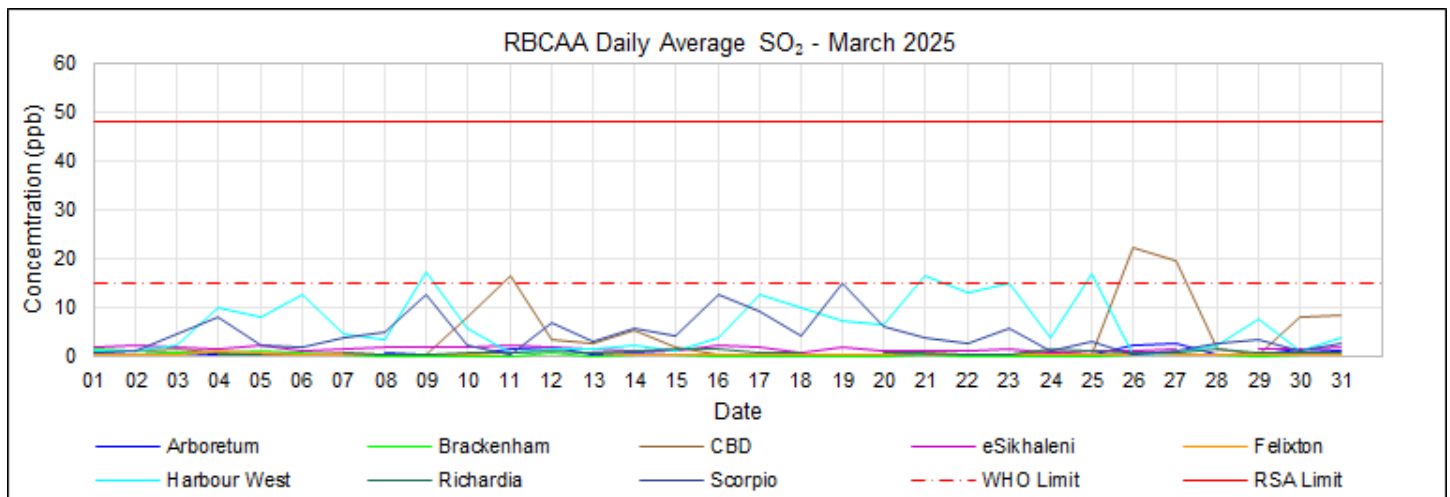


Figure 5-4: SO<sub>2</sub> 24-hour average concentrations.

Missing Data (SO<sub>2</sub>):

- Arboretum - power outages, data invalidation (1 day with <80% data capture 7 March 2025).
- CBD - power outages, data invalidation (2 days with <80% data capture 19-20 March 2025).
- eSikhaleni - power outages, data invalidation (1 day with <80% data capture 28 March 2025).
- Felixton - power outages, data invalidation (1 day with <80% data capture 12 March 2025).
- Richardia - power outages, unstable power supply, data invalidation (5 days with <80% data capture 1-3, 6, 19 March 2025)

### 5.6. Hourly

SO<sub>2</sub> hourly average concentrations are shown in Figure 5-5. There were no (0) measured exceedances of the RSA Limit (134 ppb).

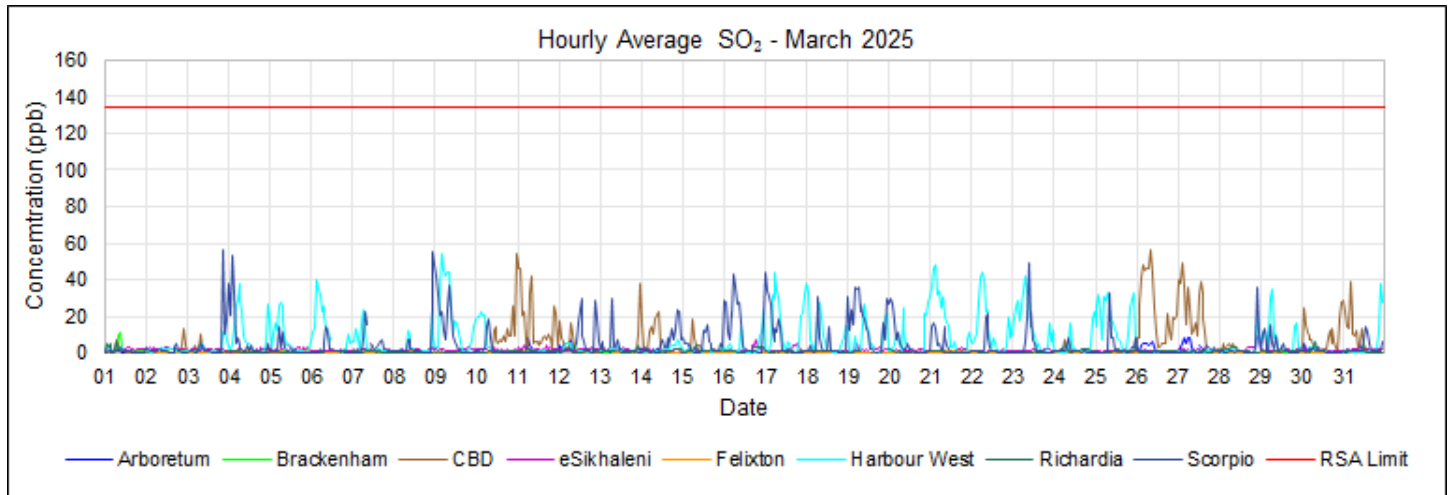


Figure 5-5: SO<sub>2</sub> 1-hour average concentrations.

### 5.7. 10-minute

SO<sub>2</sub> 10-minute average concentrations are shown in Figure 5-6. There were no (0) measured exceedances of the RSA and WHO Limit (191 ppb).

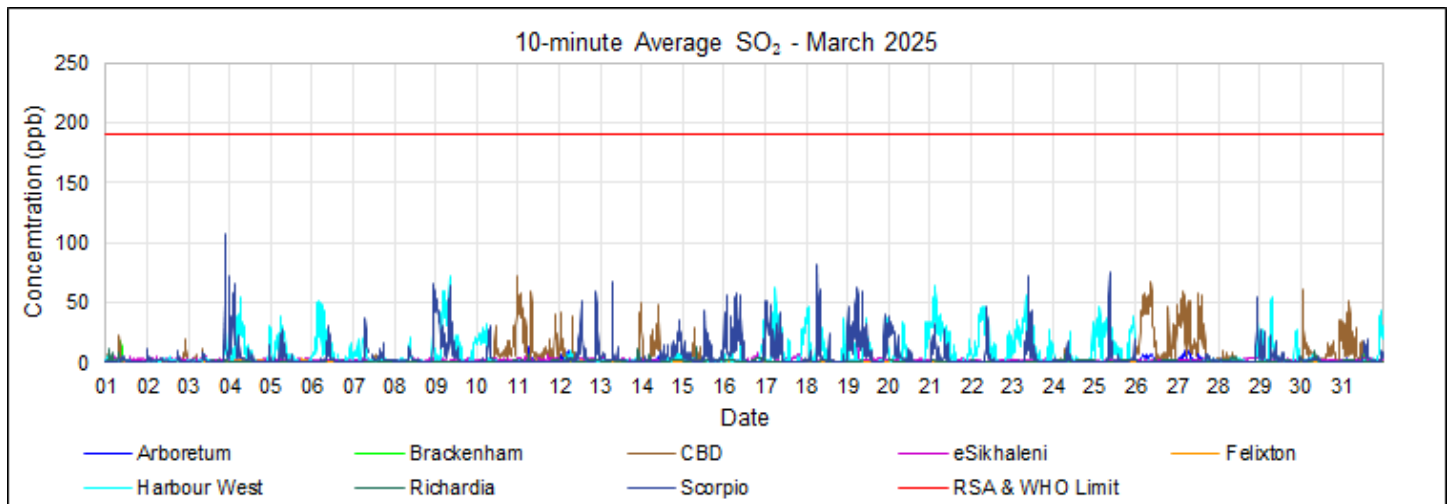


Figure 5-6: SO<sub>2</sub> 10-minute average concentrations.

### 5.8. Exceedances

The number of days on which exceedances occurred, plus comparisons to previous months, are shown in Figure 5-7, and a summary of the SO<sub>2</sub> exceedances broken down per station is presented in Table 5-4. SO<sub>2</sub> exceedances can be associated with emissions because of process upsets (i.e., planned maintenance, plant shutdowns or start-up), leaks in equipment, pipelines, seals, valves (fugitive emissions) or an event (e.g., fires or emergency shutdowns). According to the relevant Air Quality Index (AQI), the areas where no exceedances were measured may be considered good air quality concerning SO<sub>2</sub>.

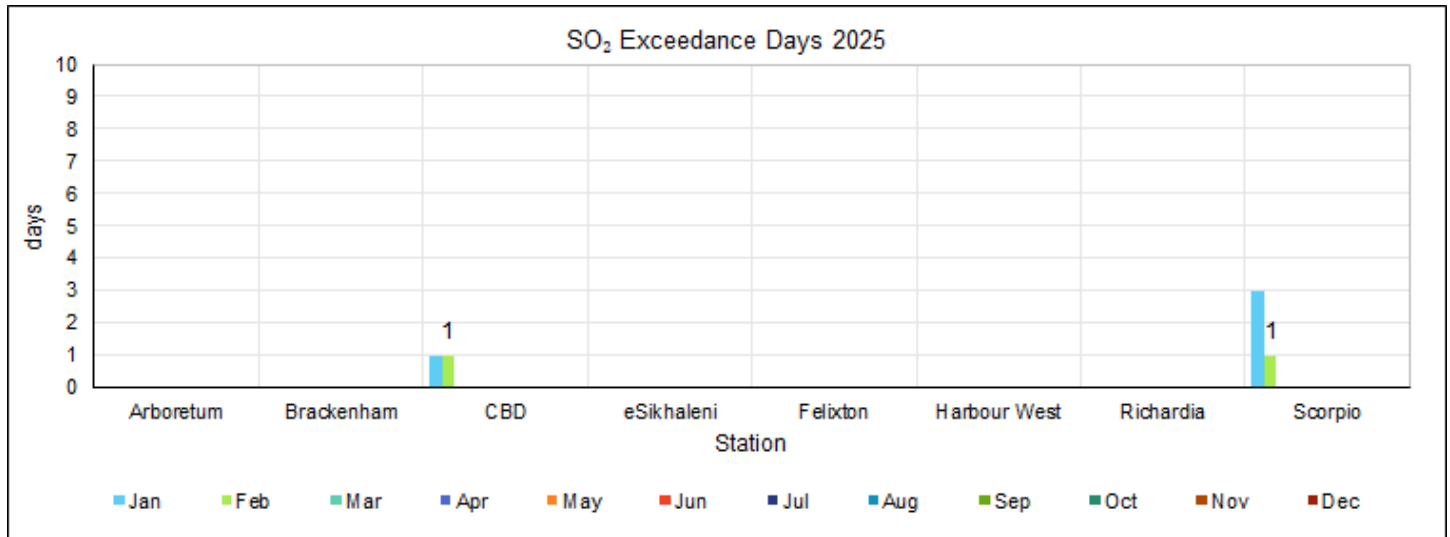


Figure 5-7: SO<sub>2</sub> exceedance days.

Table 5-4: SO<sub>2</sub> exceedance summary.

2025	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
<b>SO<sub>2</sub> Daily WHO Limit (15 ppb)</b>													
CBD	1	1	3	-	-	-	-	-	-	-	-	-	5
eSikhaleni	-	-	-	-	-	-	-	-	-	-	-	-	0
Harbour West	-	-	4	-	-	-	-	-	-	-	-	-	4
Richardia	-	-	-	-	-	-	-	-	-	-	-	-	0
Scorpio	3	-	1	-	-	-	-	-	-	-	-	-	4
<b>SO<sub>2</sub> Hourly RSA Limit (134 ppb)</b>													
CBD	-	-	-	-	-	-	-	-	-	-	-	-	0
eSikhaleni	-	-	-	-	-	-	-	-	-	-	-	-	0
Harbour West	-	-	-	-	-	-	-	-	-	-	-	-	0
Richardia	-	-	-	-	-	-	-	-	-	-	-	-	0
Scorpio	4	-	-	-	-	-	-	-	-	-	-	-	4
<b>SO<sub>2</sub> 10-minute RSA &amp; WHO Limit (191 ppb)</b>													
CBD	-	-	-	-	-	-	-	-	-	-	-	-	0
eSikhaleni	-	-	-	-	-	-	-	-	-	-	-	-	0
Harbour West	-	-	-	-	-	-	-	-	-	-	-	-	0
Richardia	-	-	-	-	-	-	-	-	-	-	-	-	0
Scorpio	18	1	-	-	-	-	-	-	-	-	-	-	19

## 6. TOTAL REDUCED SULPHUR MONITORING

Total reduced sulphur compounds (TRS), often associated with rotten egg or cooked cabbage odour, refer to a gaseous mixture of compounds consisting mainly of hydrogen sulphide ( $H_2S$ ), methyl mercaptan ( $CH_3S-H$ ), dimethyl sulphide ( $CH_3-S-CH_3$ ) and dimethyl disulphide ( $CH_3-S-S-CH_3$ ). While there are other ambient TRS compounds, these four are the most common, abundant, and generally referred to in TRS discussions. Once released into the atmosphere, oxidation products of TRS compounds, such as sulphuric acid, contribute to the environment's acidity. The most often reported health concerns related to TRS substances are nausea and headaches, although each component has its characteristics and effects.

### 6.1. Ambient Air Quality Standards

There are no South African standards for TRS; however, the World Health Organization (WHO) and the Ontario Ministry for the Environment (OME) have derived guidelines.

Table 6-1: TRS ambient air quality limits.

Organisation	Limit	10-min Average	30-minute Average	24-hour Average	Annual Average
WHO	Guideline	-	7 $\mu\text{g}/\text{m}^3$ <sup>[a]</sup>	-	-
		-	5 ppb <sup>[a]</sup>	-	-
OME	Standard (pulp and paper)	13 $\mu\text{g}/\text{m}^3$ <sup>[b]</sup>	10 $\mu\text{g}/\text{m}^3$ <sup>[b]</sup>	14 $\mu\text{g}/\text{m}^3$ <sup>[c]</sup>	-
		9.3 ppb <sup>[b]</sup>	7.2 ppb <sup>[b]</sup>	10.1 ppb <sup>[c]</sup>	-
OME	Standard (other industries)	13 $\mu\text{g}/\text{m}^3$ <sup>[b]</sup>	10 $\mu\text{g}/\text{m}^3$ <sup>[b]</sup>	7 $\mu\text{g}/\text{m}^3$ <sup>[b]</sup>	-
		9.3 ppb <sup>[b]</sup>	7.2 ppb <sup>[b]</sup>	5.0 ppb <sup>[b]</sup>	-

**Notes:**

- World Health Organization recommendation to avoid substantial complaints about odour annoyance among the exposed population (WHO, 2000).
- Based on odour effects (OME, 1999).
- Based on the odour and health effects (OME, 1999).
- Based on the adverse effects on the respiratory system (nasal lesions) (OME, 1999).

The RBCAA has decided to implement the following:

- ▶ 30-minute WHO  $H_2S$  Guideline; and the
- ▶ Daily and 10-minute OME standards for the Pulp and Paper sector.

## 6.2. Data Availability

The percentage of valid data received from the TRS analysers for March 2025 is shown in Table 6-2.

Table 6-2: TRS data capture.

Station	Availability (%)	TRS (%)
CBD	100	99
eSikhaleni	99	98
Felixton	95	95
Richardia	100	<b>86</b>

Notes:

1. Red - Not acceptable for statistical purposes (<80%)
2. Orange – Does not meet SANAS data capture requirements (<90%)
3. Yellow – RBCAA reporting requirement (<=95%)

Missing Data (TRS):

- eSikhaleni - power outages, data invalidation (1 day with <80% data capture 28 March 2025).
- Felixton - power outages, data invalidation (1 day with <80% data capture 12 March 2025).
- Richardia – power outages, unstable power supply, data invalidation (5 days with <80% data capture 6, 27-31 March 2025).

## 6.3. Monthly

Monthly average TRS concentrations are shown in Figure 6-1. Comparisons to previous months are also provided (Figure 6-2).

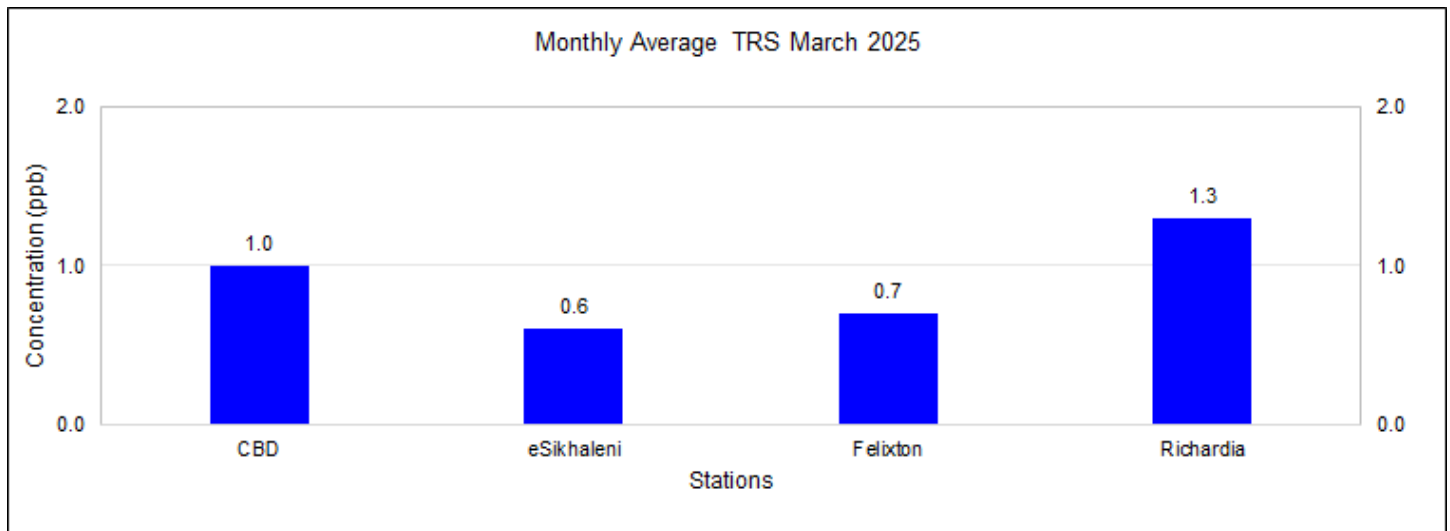


Figure 6-1: TRS monthly concentrations.

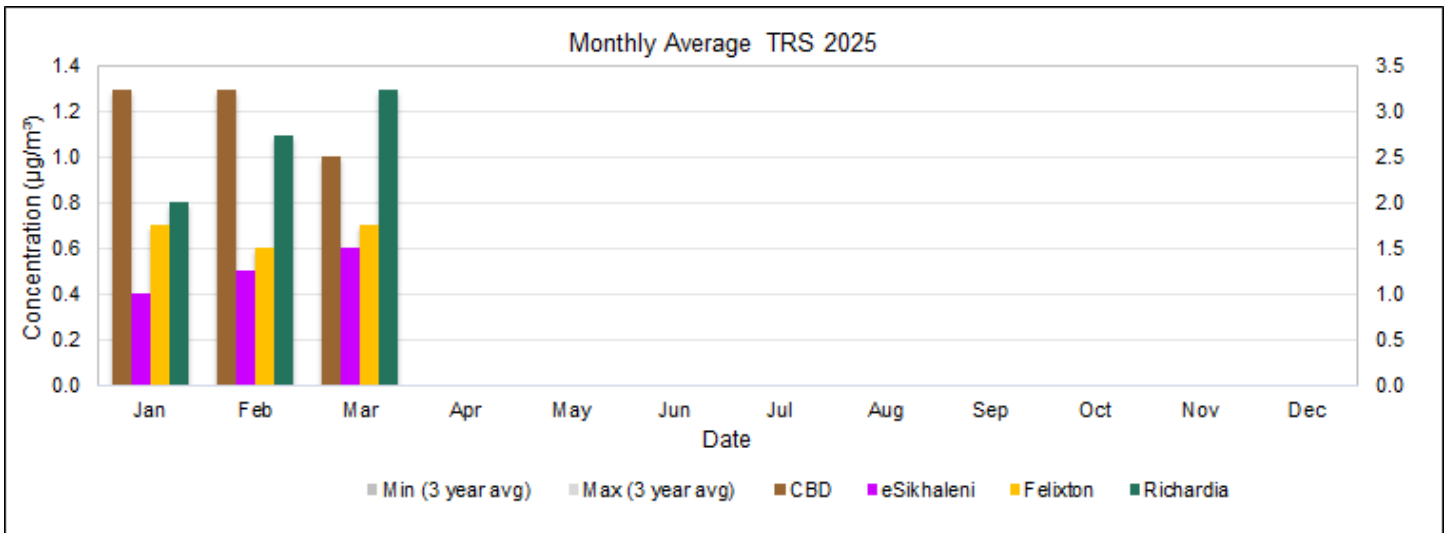


Figure 6-2: TRS monthly comparison.

### 6.4. Diurnal

The diurnal TRS concentrations are shown below (Figure 6-3). Diurnal concentrations of TRS did not exceed the OME Daily Limit (10.1 ppb).

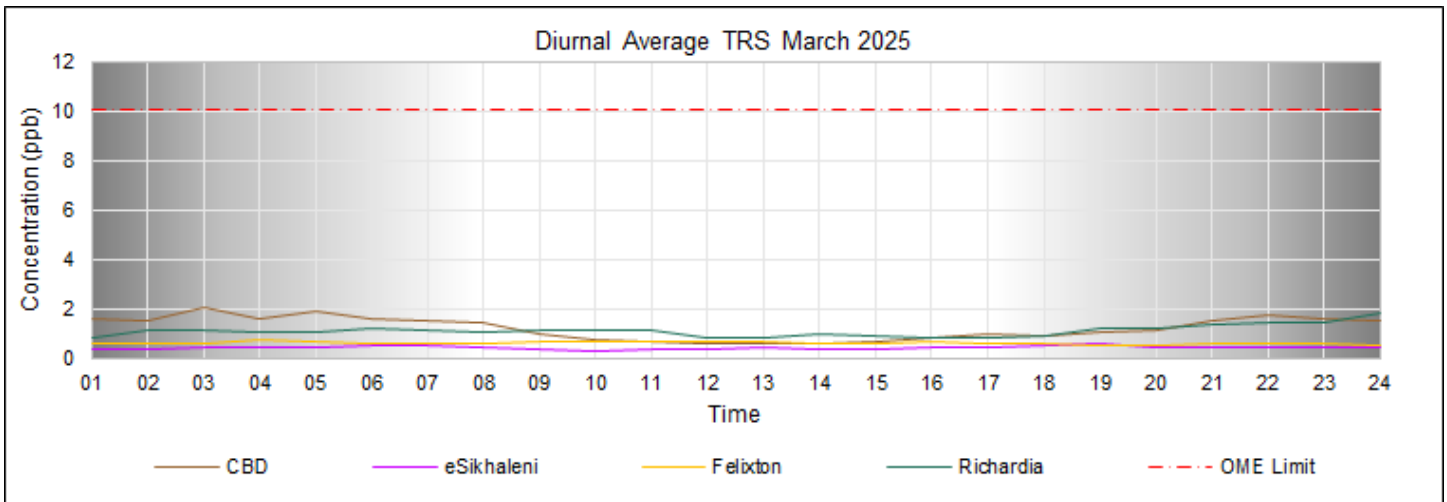


Figure 6-3: TRS diurnal concentrations.

### 6.5. Daily

The daily average concentrations of TRS are shown in Figure 6-4. No (0) exceedances of the OME Limit (10.1 ppb) were measured.

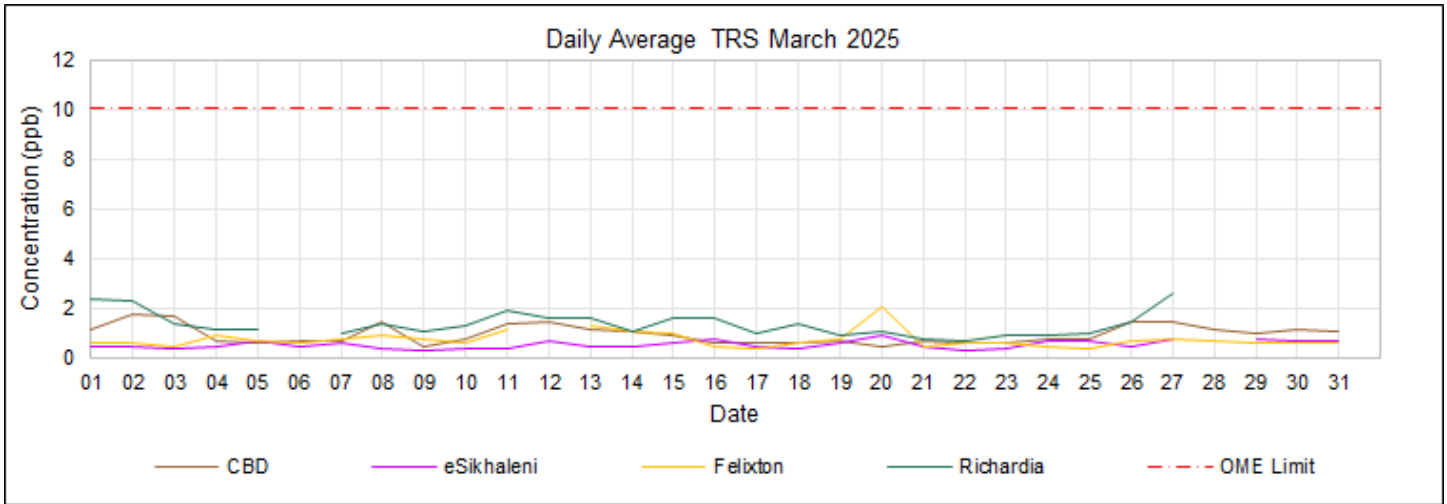


Figure 6-4: TRS daily average concentration.

Missing Data (TRS):

- eSikhaleni - power outages, data invalidation (1 day with <80% data capture 28 March 2025).
- Felixton - power outages, data invalidation (1 day with <80% data capture 12 March 2025).
- Richardia – power outages, unstable power supply, data invalidation (5 days with <80% data capture 6, 27-31 March 2025).

### 6.6. 30-minute

TRS 30-minute average concentrations are shown in Figure 6-5, and exceedances in Table 6-3. Twenty-six (26) exceedances of the WHO Limit (5.0 ppb) were measured.

Table 6-3: TRS 30-minute average exceedances (WHO).

March: TRS 30-minute WHO H <sub>2</sub> S Limit (5.0 ppb)		26
<b>Mondi</b>		<b>18</b>
CBD		15
Over-pressurisation of the CPX tank		2
Poor effluent quality		3
Root cause not identified		8
Softwood (SW) blowdowns		2
Richardia		3
Softwood (SW) blowdowns		3
<b>RBCAA allocation</b>		<b>8</b>
Felixton		8
Local Source - unknown		8

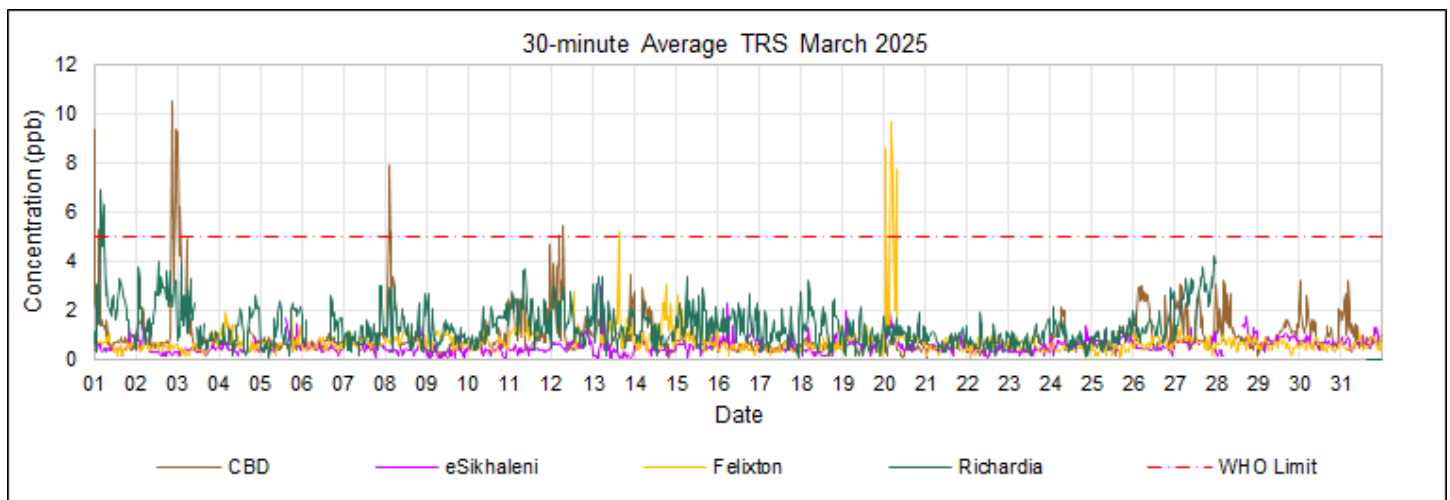


Figure 6-5: TRS 30-minute average concentration.

### 6.7. 10-minute

TRS 10-minute average concentrations are shown in Figure 6-6 and exceedances in Table 6-4. Twelve (12) exceedances of the OME Limit (9.3 ppb) were measured.

Table 6-4: TRS 10-minute average exceedances (OME).

March: TRS 10-minute OME Limit (9.3 ppb)	12
<b>Mondi</b>	<b>8</b>
CBD	8
Poor effluent quality	1
Root cause not identified	6
Softwood (SW) blowdowns	1
<b>RBCAA allocation</b>	<b>4</b>
Felixton	4
Local Source - unknown	4

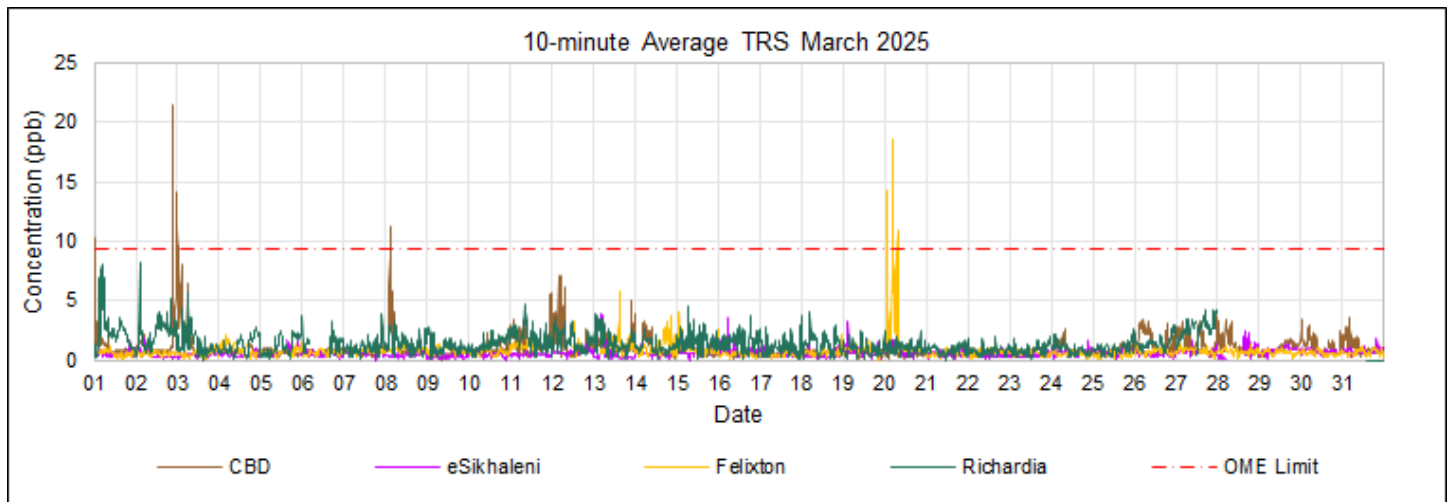


Figure 6-6: TRS 10-minute average concentrations.

### 6.8. Exceedances

The number of days on which exceedances occurred, plus comparisons to previous months, are shown in Figure 6-7, and a summary of the TRS exceedances broken down per station is presented in Table 6-5. TRS exceedances can be associated with emissions because of process upsets (i.e., planned maintenance, plant shutdowns or start-up), leaks in equipment, pipelines, seals, valves (fugitive emissions) or an event (e.g., fires or emergency shutdowns). According to the relevant Air Quality Index (AQI), the areas where no exceedances were measured may be considered good air quality.

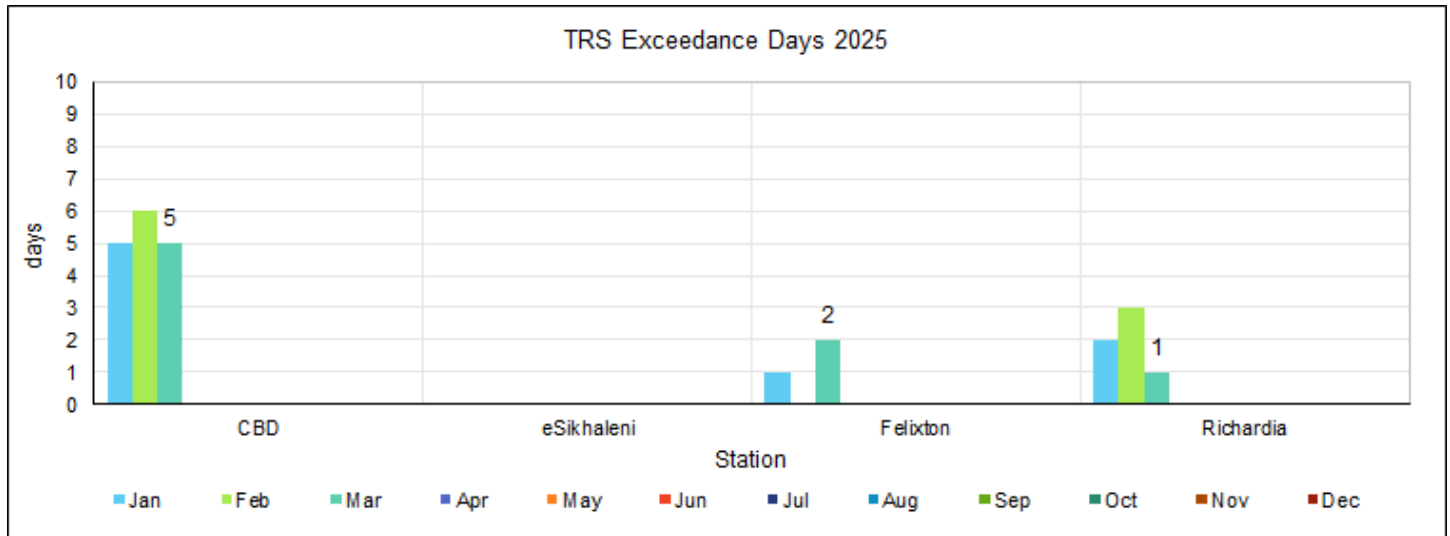


Figure 6-7: TRS exceedance days.

Table 6-5: TRS exceedance summary.

2025	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
<b>TRS 24-hr-OME Limit (10.1 ppb)</b>													
CBD	1	-	-	-	-	-	-	-	-	-	-	-	1
eSikhaleni	-	-	-	-	-	-	-	-	-	-	-	-	0
Felixton	-	-	-	-	-	-	-	-	-	-	-	-	0
Richardia	-	-	-	-	-	-	-	-	-	-	-	-	0
<b>TRS 30-minute WHO H<sub>2</sub>S Limit (5.0 ppb)</b>													
CBD	34	25	15	-	-	-	-	-	-	-	-	-	74
eSikhaleni	-	-	-	-	-	-	-	-	-	-	-	-	0
Felixton	1	-	8	-	-	-	-	-	-	-	-	-	9
Richardia	5	7	3	-	-	-	-	-	-	-	-	-	15
<b>TRS 10-minute OME Limit (9.3 ppb)</b>													
CBD	53	10	8	-	-	-	-	-	-	-	-	-	71
eSikhaleni	-	-	-	-	-	-	-	-	-	-	-	-	0
Felixton	2	-	4	-	-	-	-	-	-	-	-	-	6
Richardia	3	1	-	-	-	-	-	-	-	-	-	-	4

## 7. MONTHLY AIR QUALITY

Where possible, the RBCAA assesses data collected by its network against National Standards, International Guidelines, and Local Targets. The WHO air quality guidelines (AQGs) are intended for worldwide use and have been developed to support actions to achieve air quality that protects public health in different contexts. On the other hand, air quality standards and local targets are set by each country or region to protect the public health of their citizens and, as such, are an essential component of national risk management and environmental policies. National standards and local targets vary according to the approach adopted for balancing health risks, technological feasibility, economic considerations, and other political and social factors. These factors, in turn, depend on, among other things, the level of development and national capability in air quality management (WHO, 2005).

### 7.1. Conclusion

Determining air quality concerning pollutants measured and impacts simulated is based on comparison to and exceedances of short-term (10-minute, 30-minute, 1-hour and 24-hour averages) and long-term (monthly and annual averages) targets, guidelines, and standards.

AIMS concludes that during March 2025, based on the following:

- ▶ Measured long-term average concentrations (chronic exposure) and WHO health guidelines of concern are:
  - PM<sub>10</sub> at eSikhaleni, Richardia and Scorpio;
  - PM<sub>2.5</sub> at Brackenham, Felixton, Harbour West and Scorpio (all points monitored).
  
- ▶ Measured short-term average concentrations (acute exposure) and WHO health guidelines ambient air quality was compromised by:
  - PM<sub>10</sub> Richardia and Scorpio;
  - PM<sub>2.5</sub> at Brackenham, Felixton, Harbour West and Scorpio (all points monitored); and
  - TRS at CBD, Felixton and Richardia.

## 8. AIRGRADIENT MONITORING NETWORK

The AirGradient network was established towards the end of 2023 as a co-location study to verify the accuracy of its particulate measurements. It was later expanded in response to an RBCAA objective, adding monitoring capabilities for additional pollutants. Initially, there were only two sites, Harbour West and Richardia and only particulates (PM<sub>10</sub>, PM<sub>2.5</sub> and PM<sub>1</sub>) were monitored. The network was expanded to Brackenham, CBD, eSikhaleni and Felixton in July 2024, and all the monitors were upgraded to measure volatile organic compounds (TVOC), nitrogen oxides (NO<sub>x</sub>), and carbon dioxide (CO<sub>2</sub>).

AirGradient monitors are designed to provide accessible and cost-effective air quality monitoring solutions. While they offer valuable insights into environmental conditions, there are notable differences when compared to analysers approved by organisations such as the U.S. Environmental Protection Agency (EPA):

- **Accuracy and Precision:** Approved analysers are subjected to rigorous testing to ensure high accuracy and precision in measuring specific pollutants. AirGradient monitors utilise sensors like the Plantower PMS5003 for particulate matter and the SenseAir S8 for CO<sub>2</sub>, which are dependable but may not match the stringent accuracy levels of certified equipment. For instance, the SenseAir S8 has an accuracy of  $\pm 30 \text{ ppm} \pm 3\%$  of the reading, which is suitable for general monitoring but may not meet standards for regulatory compliance.
- **Calibration and Certification:** Approved devices undergo regular calibration and certification processes to maintain compliance with federal standards. AirGradient monitors, particularly the DIY kits, may not come with such certifications, and their accuracy can be influenced by factors like sensor placement and environmental conditions. However, AirGradient offers fully assembled monitors certified for CE, FCC, RoHS, and REACH, providing a higher level of assurance in their performance.
- **Data Application:** AirGradient monitors are well-suited for educational purposes, personal use, and preliminary air quality assessments. They are beneficial for raising awareness and guiding indoor air quality management decisions. In contrast, Approved analysers are employed for regulatory monitoring, research, and enforcement of air quality standards, where data accuracy and reliability are paramount.
- **Cost and Accessibility:** AirGradient monitors are more affordable and accessible, making them ideal for widespread use in homes, schools, and communities. Approved analysers are significantly more expensive and are typically used by governmental agencies and research institutions.

In summary, while AirGradient monitors provide valuable air quality data for non-regulatory applications, they do not replace the precision and certification of approved analysers required for compliance and enforcement purposes.

The RBCAA AirGradient monitoring network comprises six (6) stations (Figure 8-1).



Figure 8-1: RBCAA monitoring network.

## 8.1. Data Availability

The percentage of valid data received from the AirGradient network for 2025 is shown in Table 8-1.

Table 8-1: AirGradient network data availability.

Date	Brackenham	CBD	eSikhaleni	Felixton	Harbour West	Richardia
99	98	97	97	98	97	99
<b>89</b>	<b>90</b>	<b>89</b>	<b>86</b>	<b>86</b>	<b>90</b>	<b>89</b>
99	100	97	95	100	100	99

**Notes:**

1. Red - Not acceptable for statistical purposes (<80%),
2. Orange – Does not meet SANAS data capture requirements (<90%),
3. Yellow – RBCAA reporting requirement (<=95%)

**Missing Data:**

- **Brackenham**
  - February '25 – communication was down during power outages (load shedding).
- **CBD**
  - February '25 – communication was down during power outages (load shedding).
- **eSikhaleni**
  - February '25 – communication was down during power outages (load shedding).
- **Felixton**
  - February '25 – communication was down during power outages (load shedding).
- **Harbour West**
  - February '25 – communication was down during power outages (load shedding).
- **Richardia**
  - February '25 – communication was down during power outages (load shedding).

## 8.2. Particulate Monitoring

### 8.2.1. Monthly

PM<sub>10</sub>, PM<sub>2.5</sub> and PM<sub>1</sub> monthly average concentrations are shown in Figure 8-2, Figure 8-3, and Figure 8-4, comparisons to previous months are also provided (Figure 8-5, Figure 8-6, and Figure 8-7). There are similar seasonal trends, with elevated concentrations during winter.

- ▶ PM<sub>10</sub> monthly average concentrations did not exceed the RSA Annual Limit or the WHO Annual Limit.
- ▶ PM<sub>2.5</sub> monthly average concentrations did not exceed the RSA Annual Limit; the WHO Annual Limit was exceeded at Brackenham, eSikhaleni, Felixton, Harbour West and Richardia.

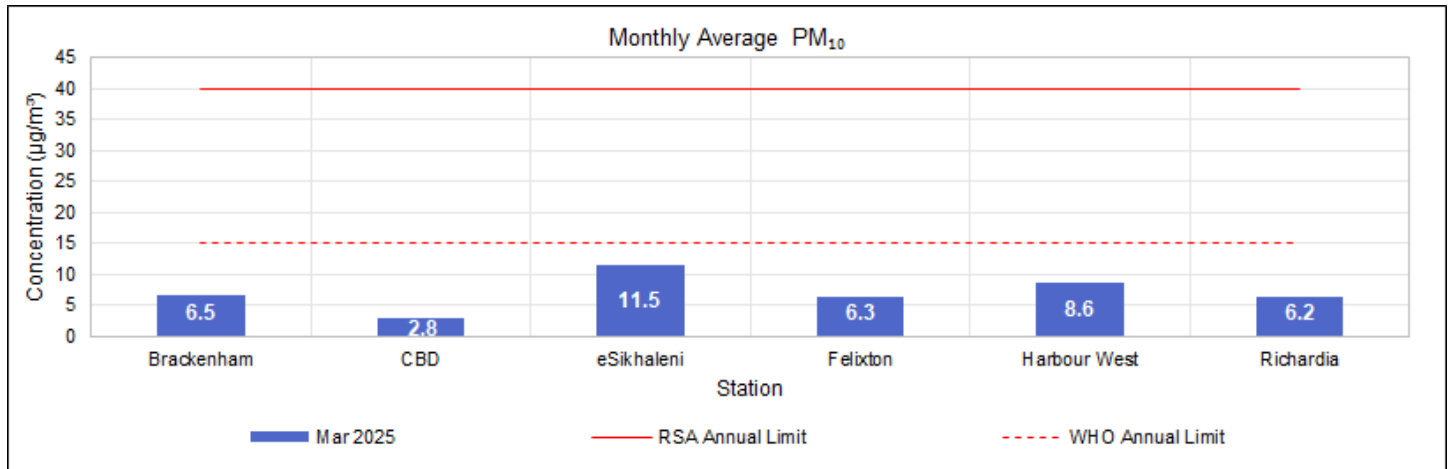


Figure 8-2: PM<sub>10</sub> monthly concentration.

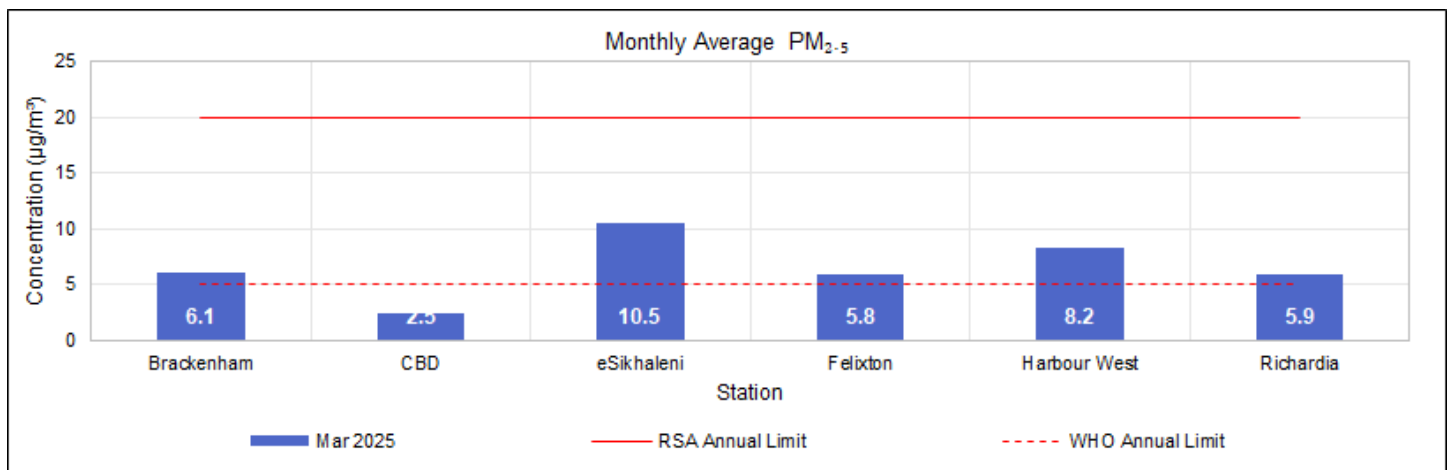


Figure 8-3: PM<sub>2.5</sub> monthly concentration.

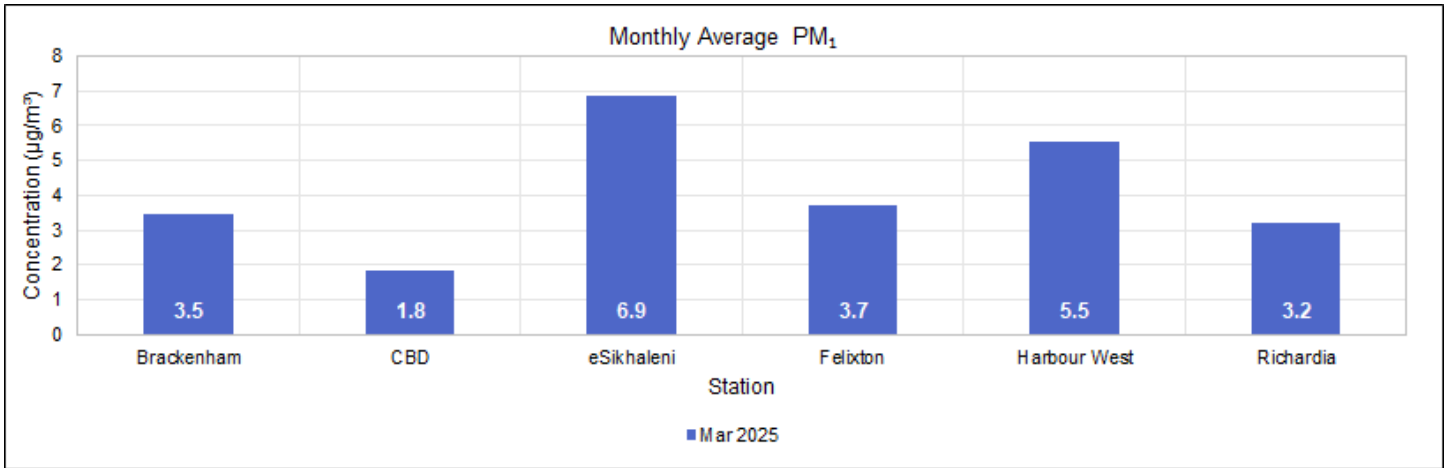


Figure 8-4: PM<sub>10</sub> monthly concentration.

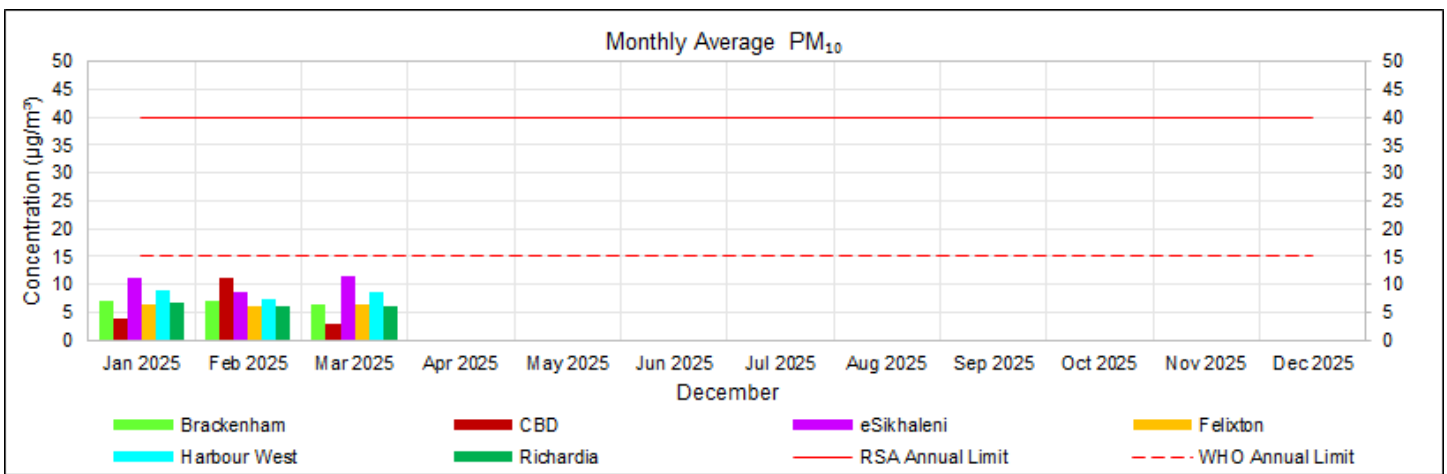


Figure 8-5: PM<sub>10</sub> monthly comparison.

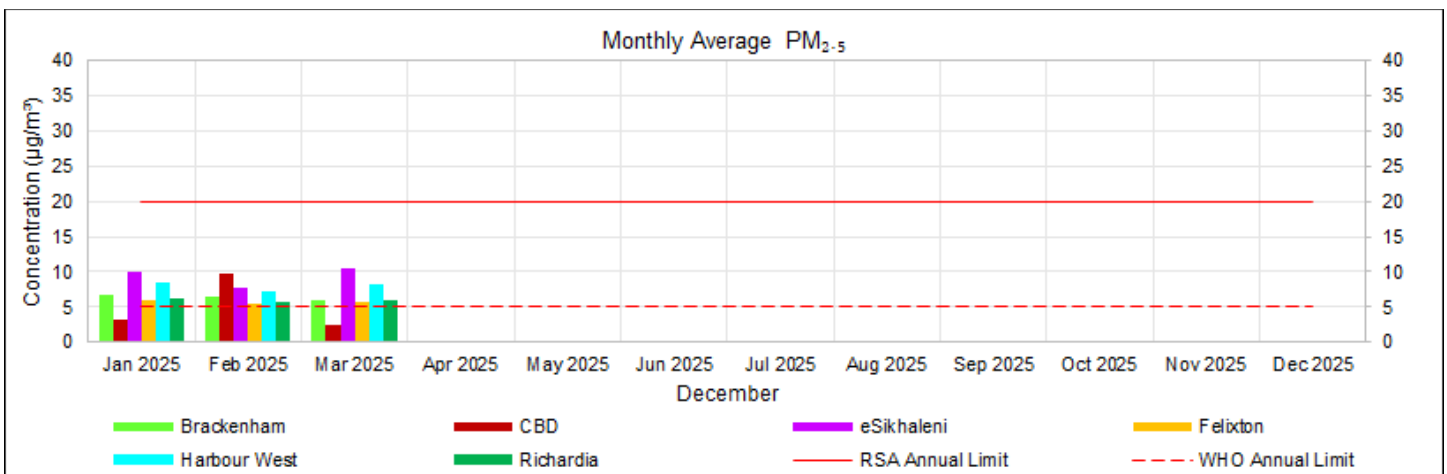


Figure 8-6: PM<sub>2.5</sub> monthly comparison.

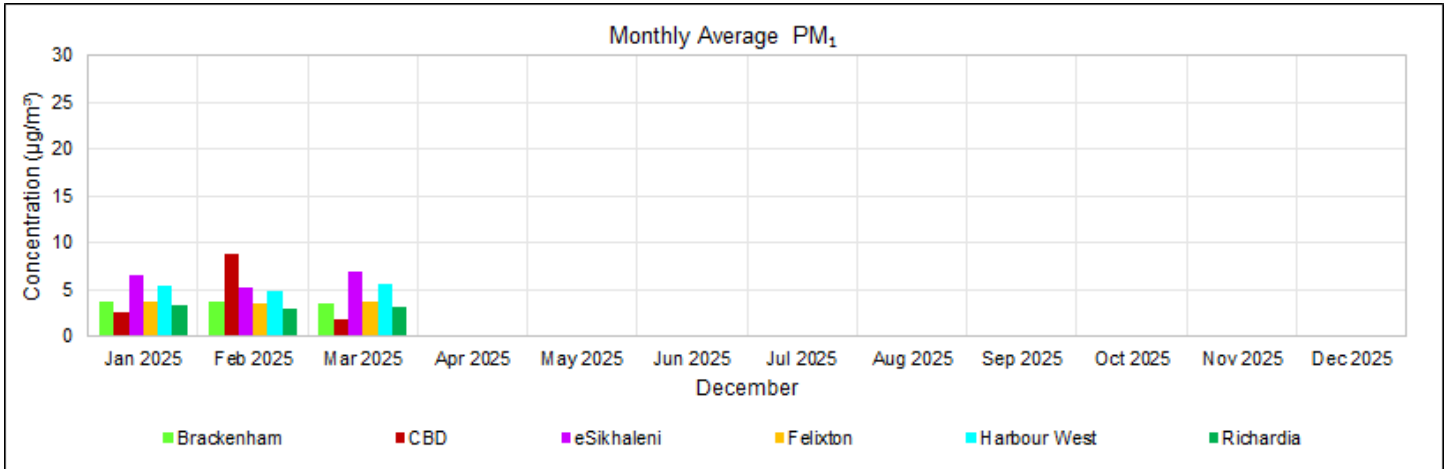


Figure 8-7: PM<sub>1</sub> monthly comparison.

### 8.2.2. Diurnal

PM diurnal concentrations are shown below (Figure 8-8, Figure 8-9, and Figure 8-10).

- ▶ RSA daily limits for PM<sub>10</sub> and PM<sub>2.5</sub> were not exceeded, and,
- ▶ WHO daily limits for PM<sub>2.5</sub> were exceeded at eSikhaleni.

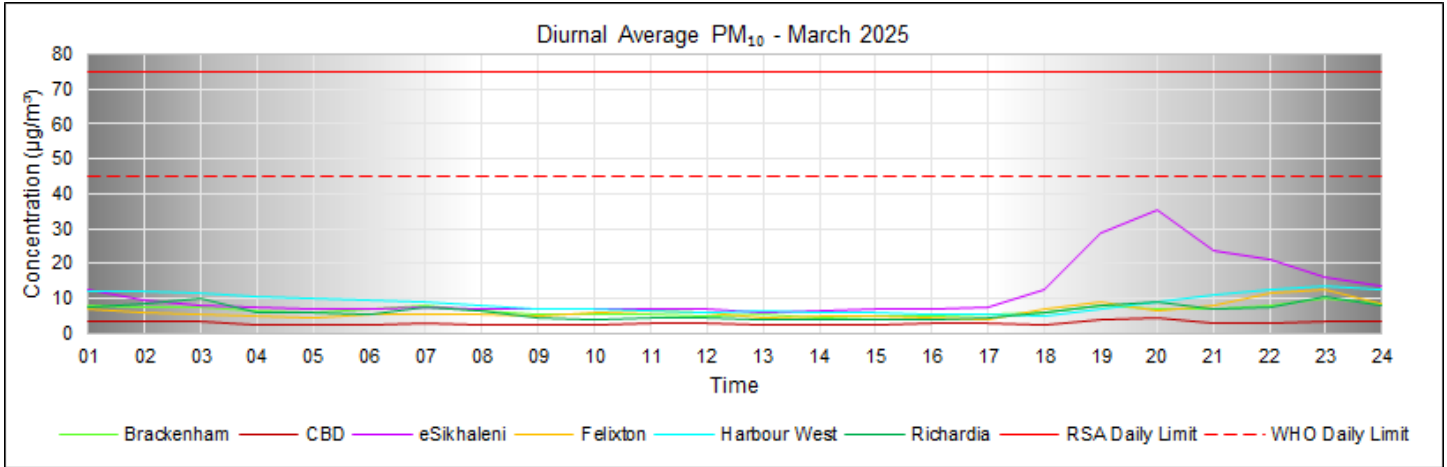


Figure 8-8: PM<sub>10</sub> diurnal concentrations.

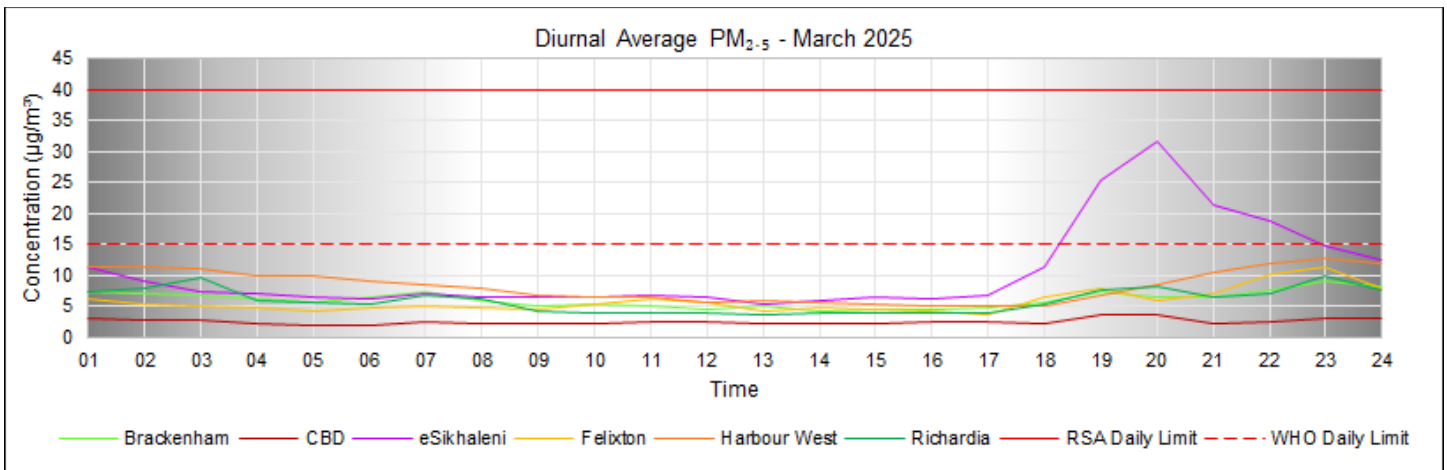


Figure 8-9: PM<sub>2.5</sub> diurnal concentrations.

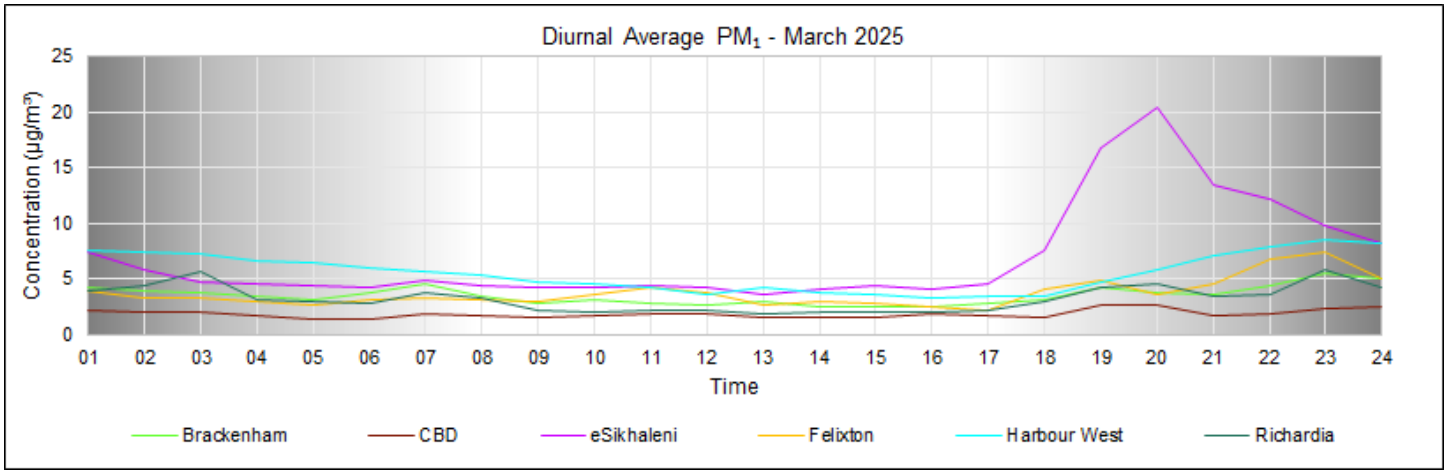


Figure 8-10: PM<sub>1</sub> diurnal concentrations.

### 8.2.3. Daily

PM daily concentrations are shown below (Figure 8-11, Figure 8-12, and Figure 8-13).

- ▶ The RSA and WHO limits for PM<sub>10</sub> were not exceeded;
- ▶ The RSA limit for PM<sub>2.5</sub> was not exceeded, the WHO limit for PM<sub>2.5</sub> was exceeded at CBD, eSikhaleni and Harbour West.

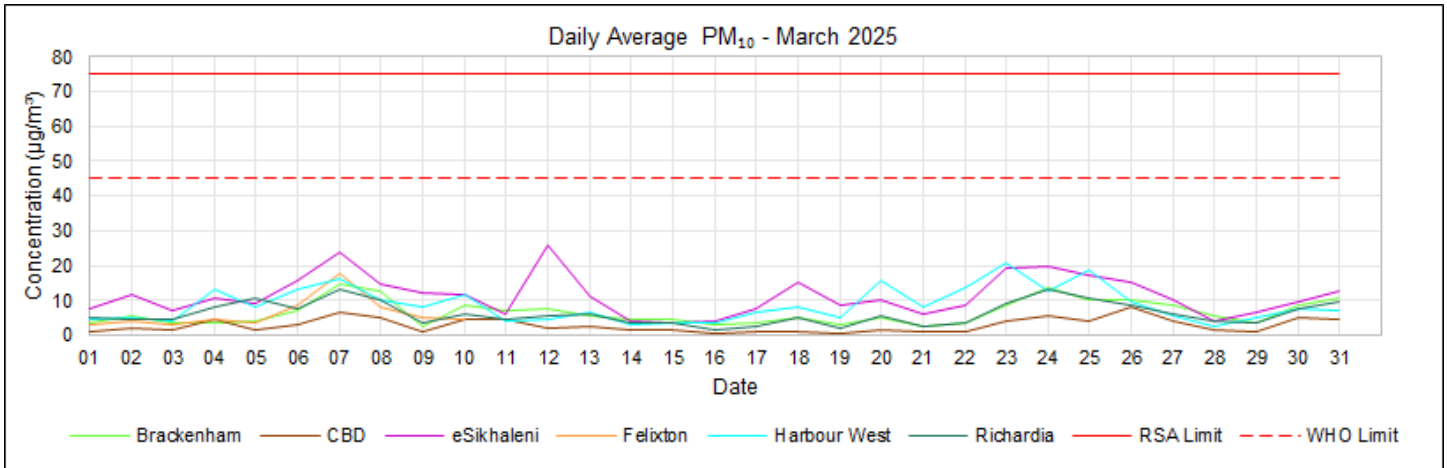


Figure 8-11: PM<sub>10</sub> daily concentrations.

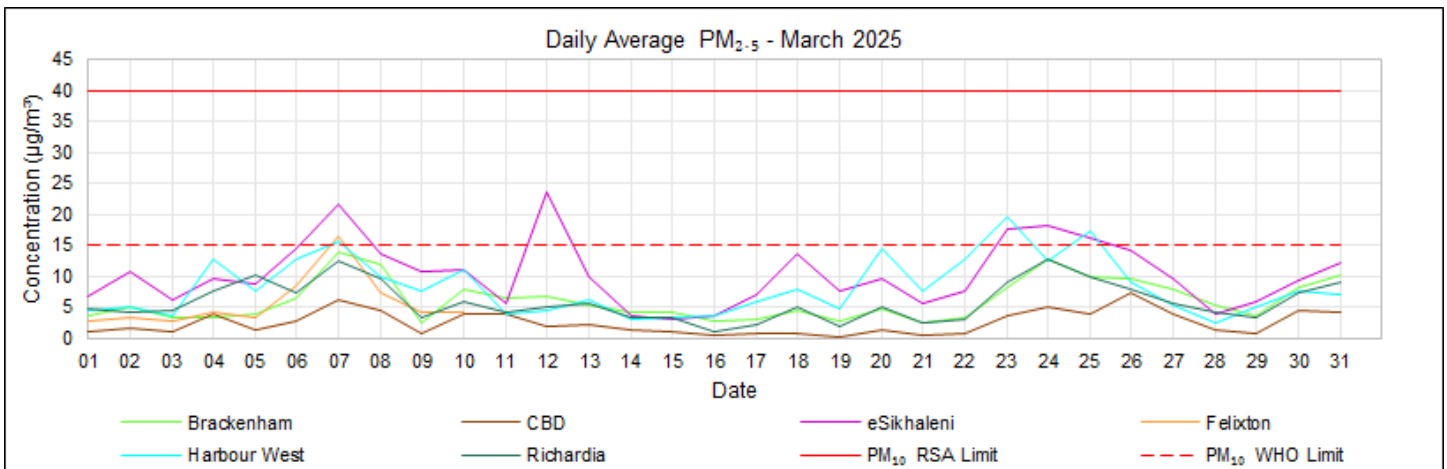


Figure 8-12: PM<sub>2.5</sub> daily concentrations.

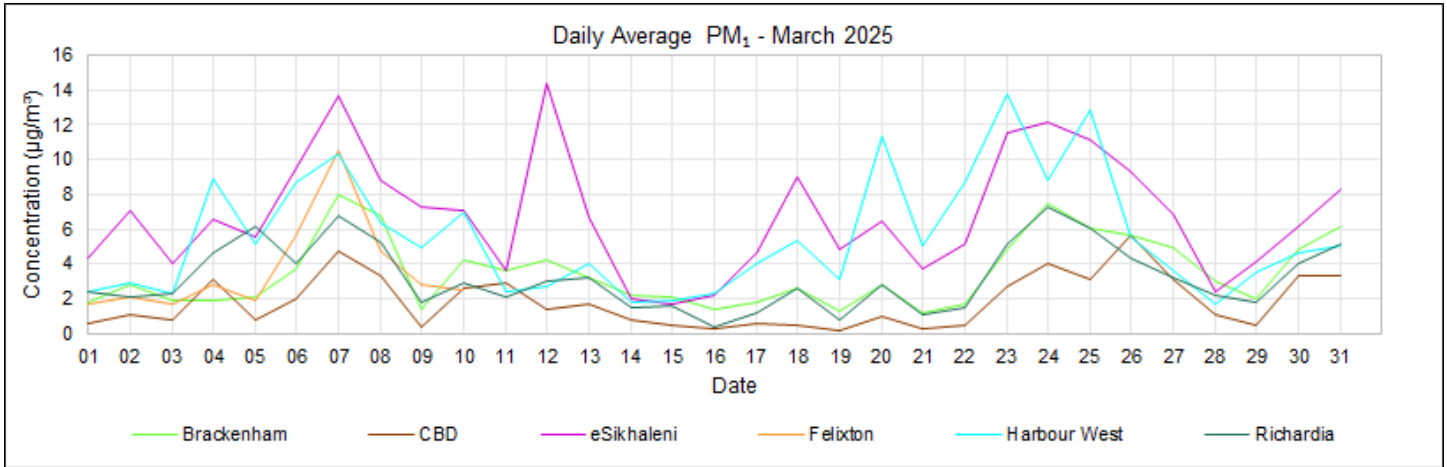


Figure 8-13: PM<sub>1</sub> daily concentrations.

### 8.3. Total Volatile Organic Compounds Monitoring

Total Volatile Organic Compounds (VOCs) refer to organic chemicals that easily evaporate at ambient temperatures. They are commonly present in outdoor air due to sources like industrial emissions, vehicle exhaust, and the use of chemical products. These compounds can significantly contribute to air pollution and negatively impact human health and the environment. Exposure to high concentrations of TVOCs can cause short-term symptoms such as irritation of the eyes, nose, and throat, as well as headaches and dizziness. Prolonged exposure may lead to more severe health issues, including damage to the liver, kidneys, and central nervous system. The AirGradient TVOC sensors cannot distinguish between harmful and harmless substances and don't measure absolute levels but changes in the concentration (index); this can help identify (and avoid) emission events such as rush hours.

#### 8.3.1. Monthly

TVOC monthly average concentrations are shown in Figure 8-14. Comparisons to previous months are also provided (Figure 8-15).

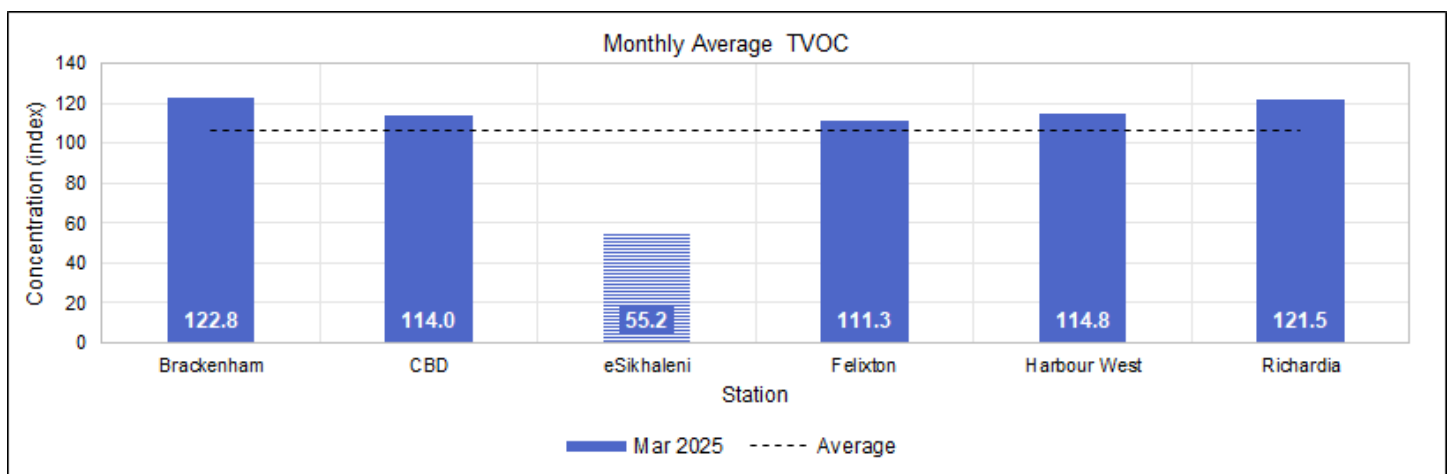


Figure 8-14: TVOC monthly concentration.  
eSikhaleni - sensor failure

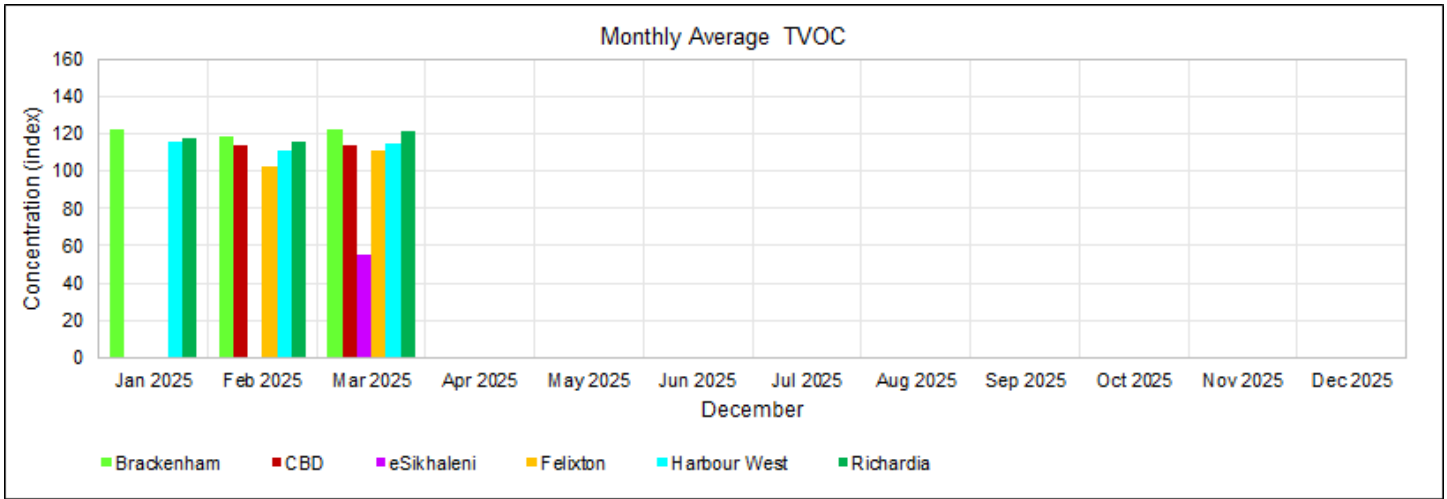


Figure 8-15: TVOC monthly comparison.  
eSikhaleni - sensor failure

### 8.3.2. Diurnal

TVOC diurnal concentrations are shown below (Figure 8-8, Figure 8-9, and Figure 8-10).

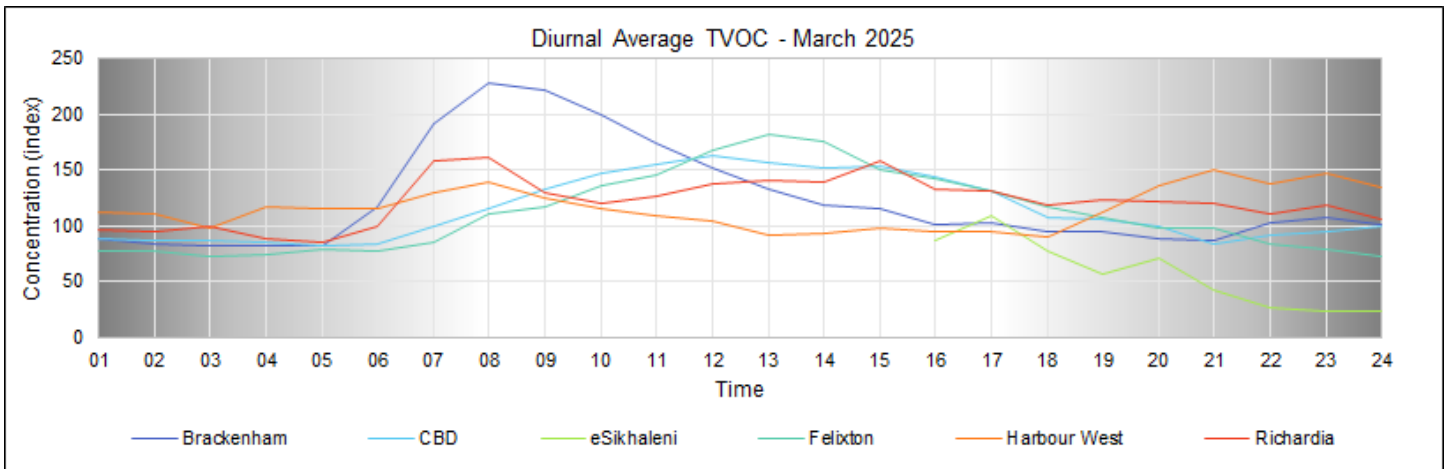


Figure 8-16: TVOC diurnal concentrations.  
eSikhaleni - sensor failure

### 8.3.3. Daily

TVOC daily concentrations are shown below (Figure 8-17).

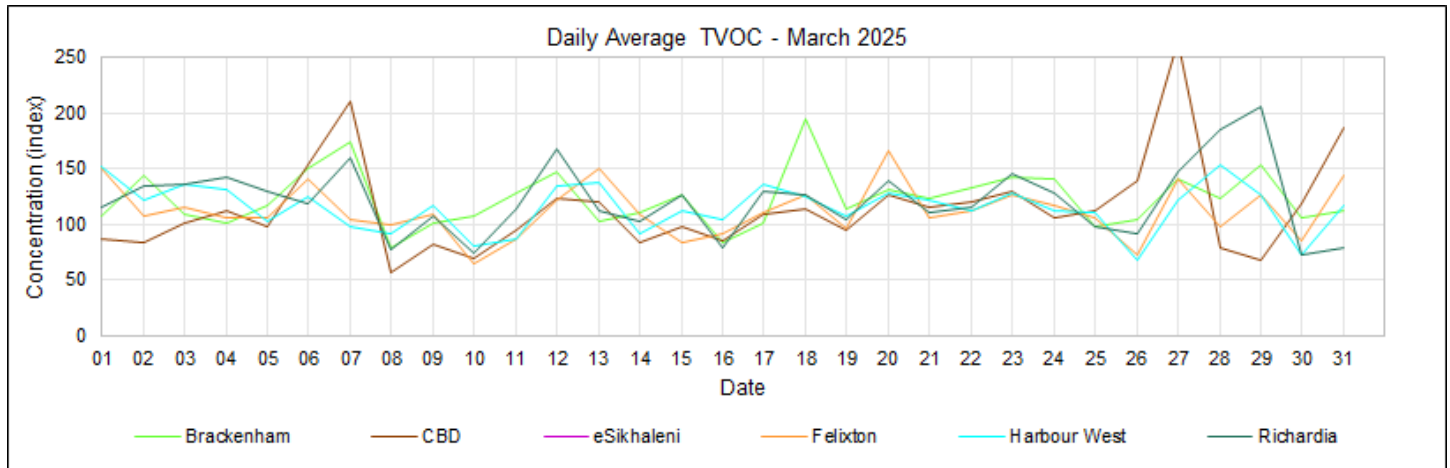


Figure 8-17: TVOC daily concentrations.  
eSikhaleni - sensor failure

### 8.3.4. Hourly

TVOC hourly concentrations are shown below (Figure 8-18).

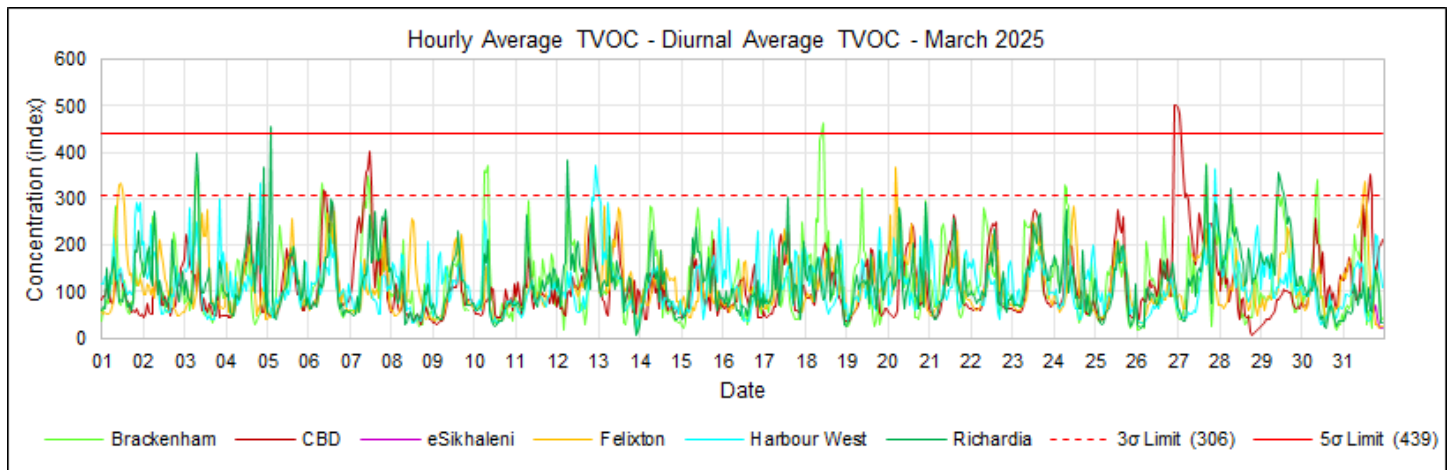


Figure 8-18: TVOC hourly concentrations.  
eSikhaleni - sensor failure

### 8.4. Nitrogen Oxides Monitoring

Nitrogen oxides (NO<sub>x</sub>) refer to a group of highly reactive gases that are primarily composed of nitrogen dioxide (NO<sub>2</sub>) and nitric oxide (NO). These gases are produced through the combustion of fossil fuels in vehicles, power plants, and industrial facilities. NO<sub>x</sub> emissions significantly contribute to air pollution, playing a key role in forming ground-level ozone and particulate matter, both harmful to human health and the environment. Exposure to elevated levels of NO<sub>x</sub> can lead to respiratory problems, particularly in vulnerable populations such as children, the elderly, and those with pre-existing conditions like asthma. Additionally, NO<sub>x</sub> contributes to the formation of acid rain, which can damage ecosystems and infrastructure. Regulatory standards for NO<sub>x</sub> vary globally, but efforts to reduce these emissions are critical for improving air quality and mitigating environmental impacts. The AirGradient NO<sub>x</sub> sensors don't measure absolute levels but changes in the concentration (index); this can help identify (and avoid) emission events such as rush hours.

#### 8.4.1. Monthly

NO<sub>x</sub> monthly average concentrations are shown in Figure 8-19; comparisons to previous months are also provided (Figure 8-20).

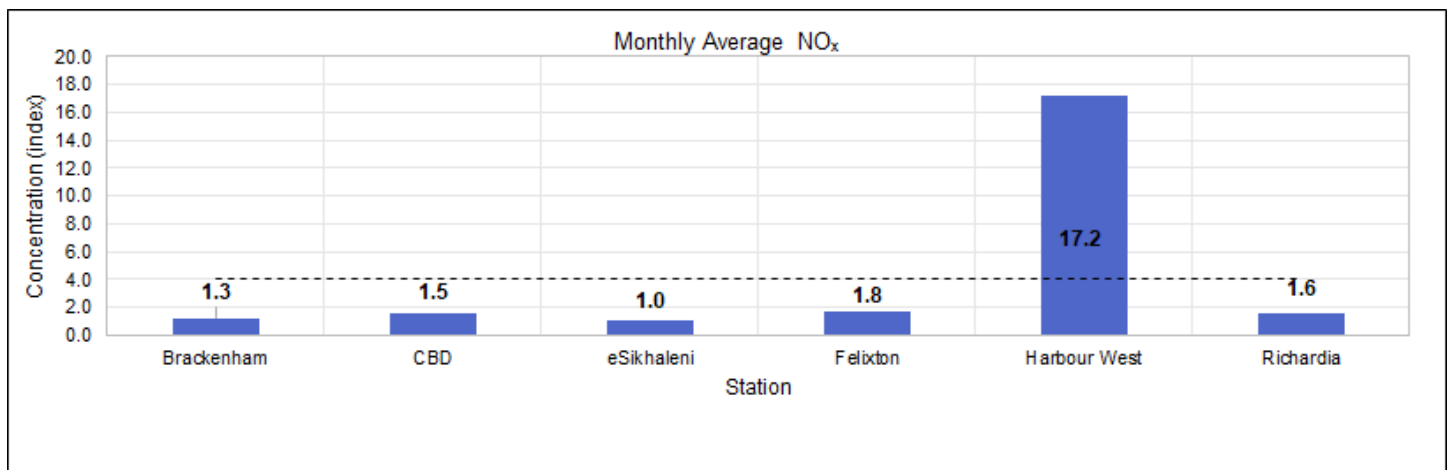


Figure 8-19: NO<sub>x</sub> monthly concentration.  
 eSikhaleni - sensor failure

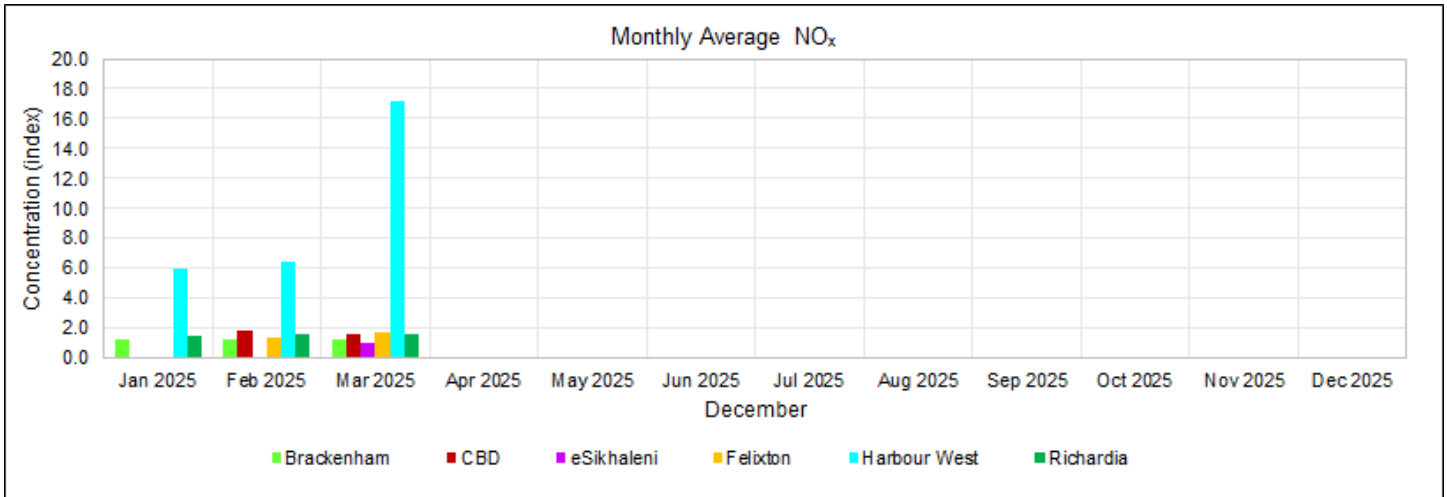


Figure 8-20: NO<sub>x</sub> monthly comparison.  
eSikhaleni - sensor failure

### 8.4.2. Diurnal

NO<sub>x</sub> diurnal concentrations are shown below (Figure 8-21).

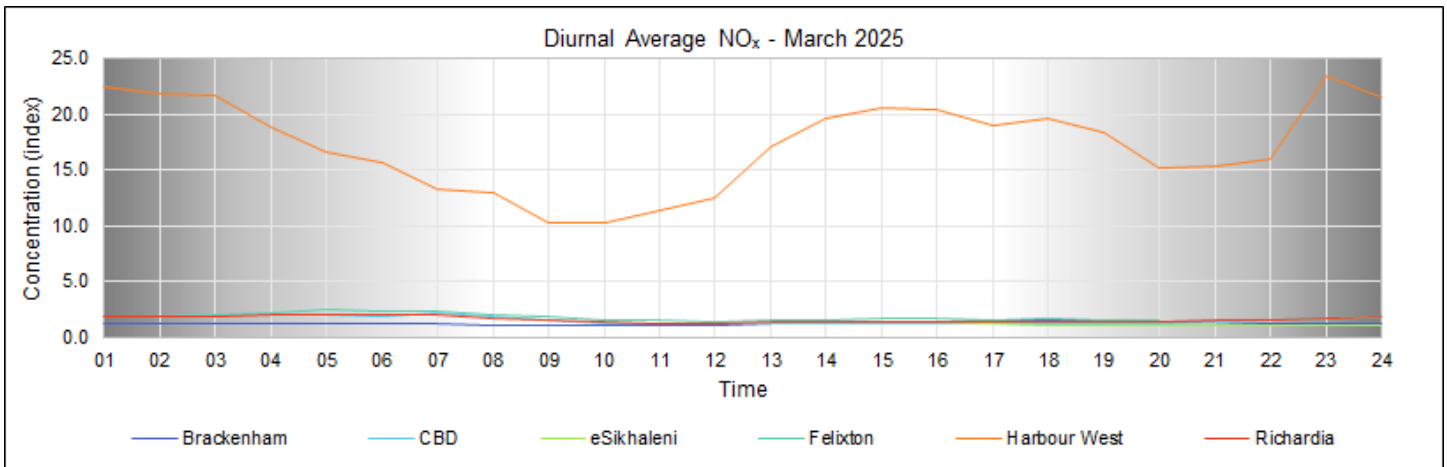


Figure 8-21: NO<sub>x</sub> diurnal concentrations.  
eSikhaleni - sensor failure

### 8.4.3. Daily

NO<sub>x</sub> daily concentrations are shown below (Figure 8-22).

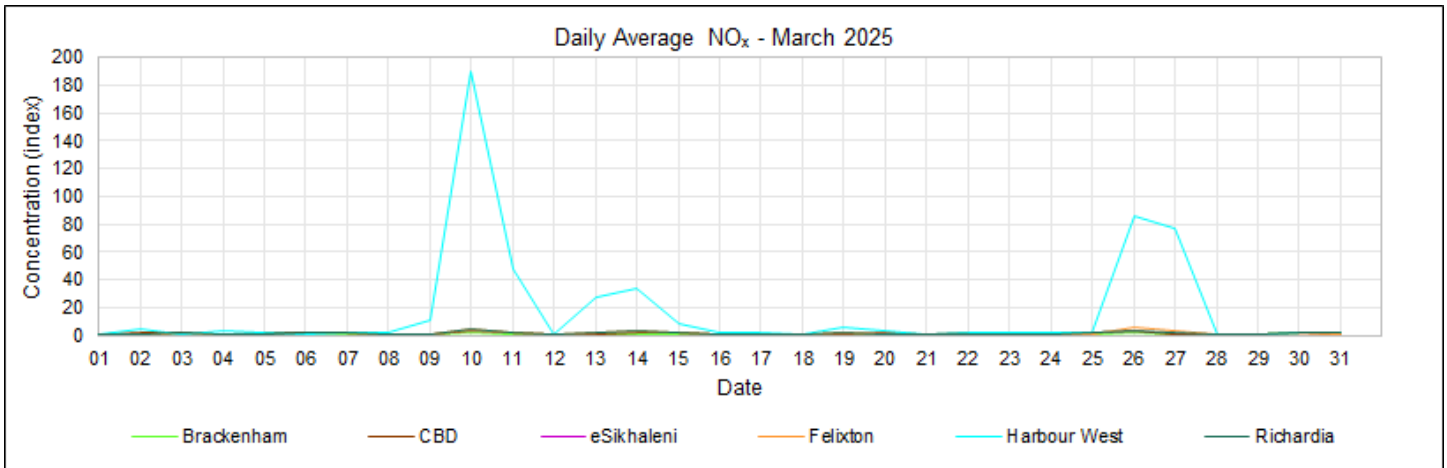


Figure 8-22: NO<sub>x</sub> daily concentrations.  
eSikhaleni - sensor failure

### 8.4.4. Hourly

NO<sub>x</sub> hourly concentrations are shown below (Figure 8-23).

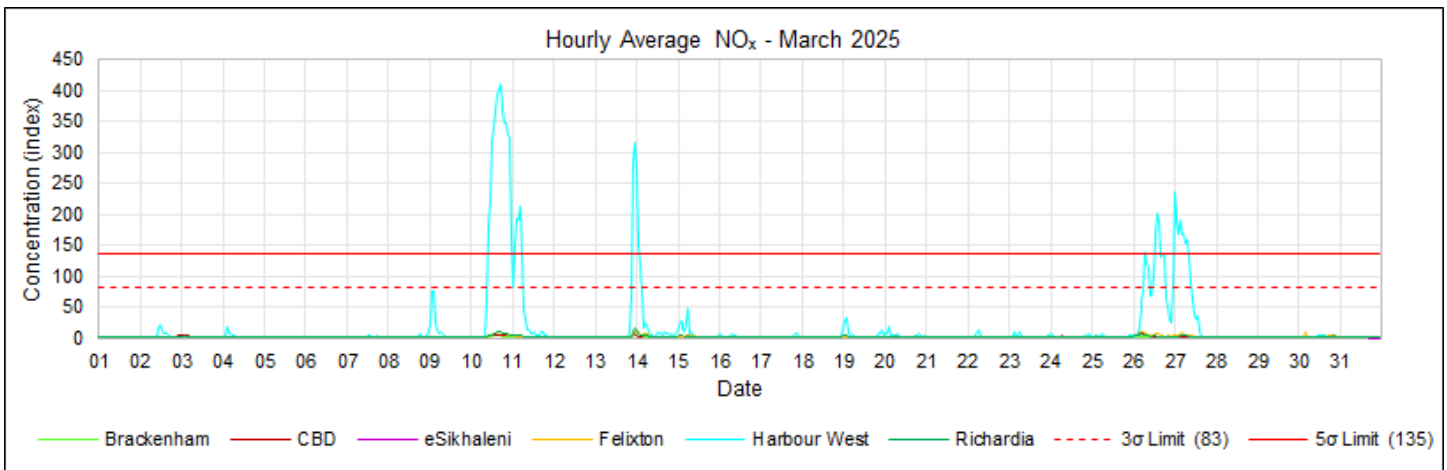


Figure 8-23: NO<sub>x</sub> hourly concentrations.  
eSikhaleni - sensor failure

## 8.5. Carbon Dioxide Monitoring

In the year 2000, the global background concentration of carbon dioxide (CO<sub>2</sub>) was approximately 370 ppm; this marked a significant increase from the pre-industrial level of around 280 ppm and reflected the continued growth in CO<sub>2</sub> emissions from fossil fuel combustion, deforestation, and other human activities during the 20th century. The rate of increase in atmospheric CO<sub>2</sub> had accelerated during the latter half of the century, with an average rise of about 1.5 to 2 ppm per year by the early 2000s.

### 8.5.1. Monthly

CO<sub>2</sub> monthly average concentrations are shown in Figure 8-24; comparisons to previous months are also provided (Figure 8-25).

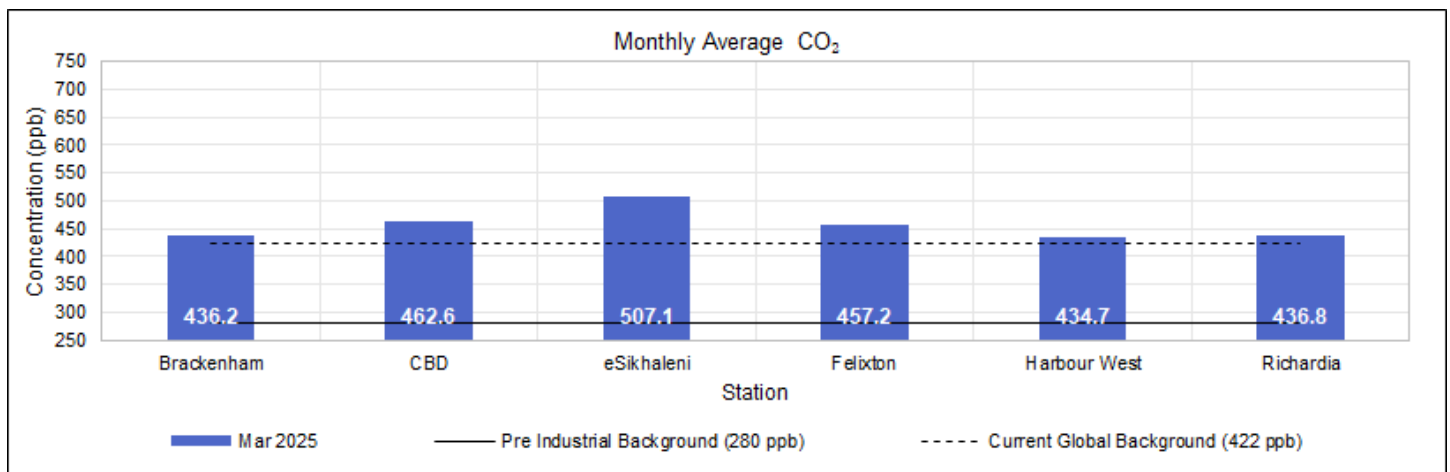


Figure 8-24: CO<sub>2</sub> monthly concentration.

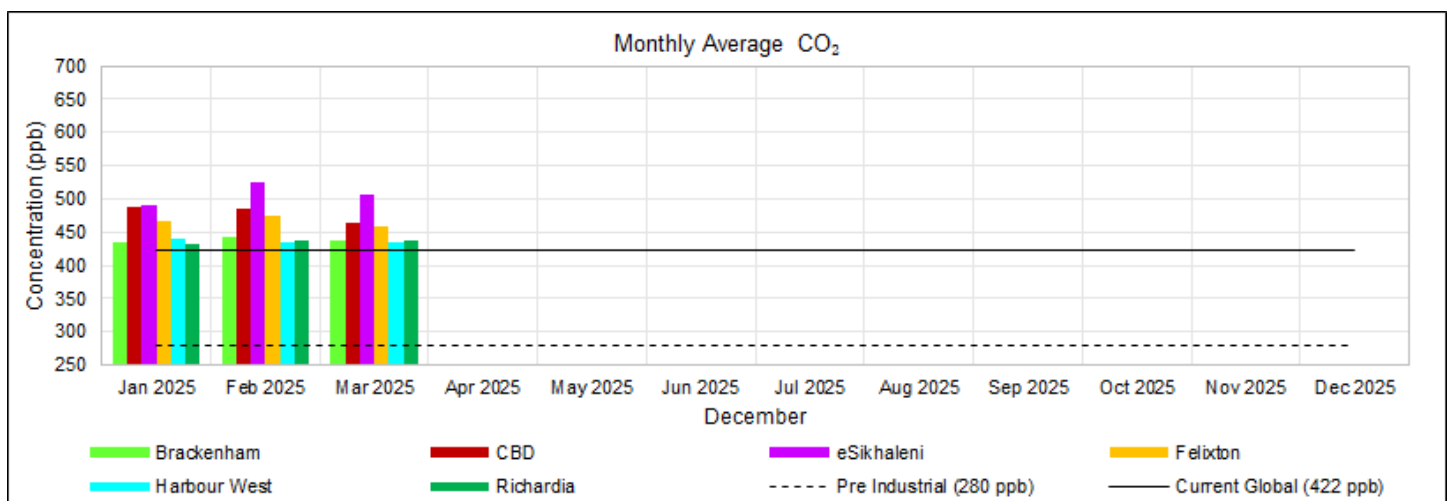


Figure 8-25: CO<sub>2</sub> monthly comparison.

### 8.5.2. Diurnal

CO<sub>2</sub> diurnal concentrations are shown below (Figure 8-26).

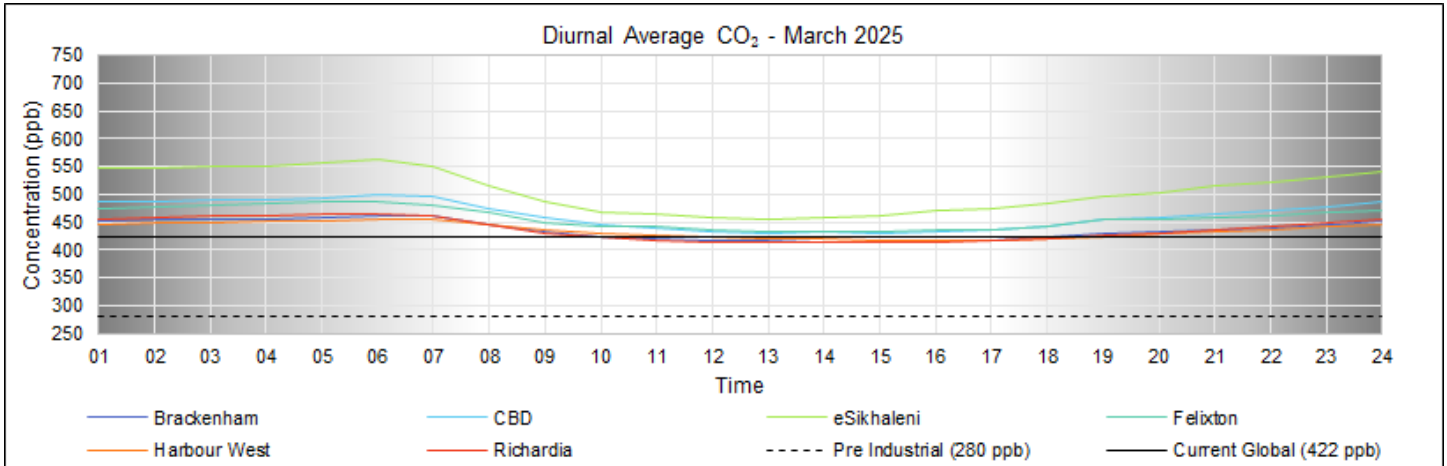


Figure 8-26: CO<sub>2</sub> diurnal concentrations.

### 8.5.3. Daily

CO<sub>2</sub> daily concentrations are shown below (Figure 8-27).

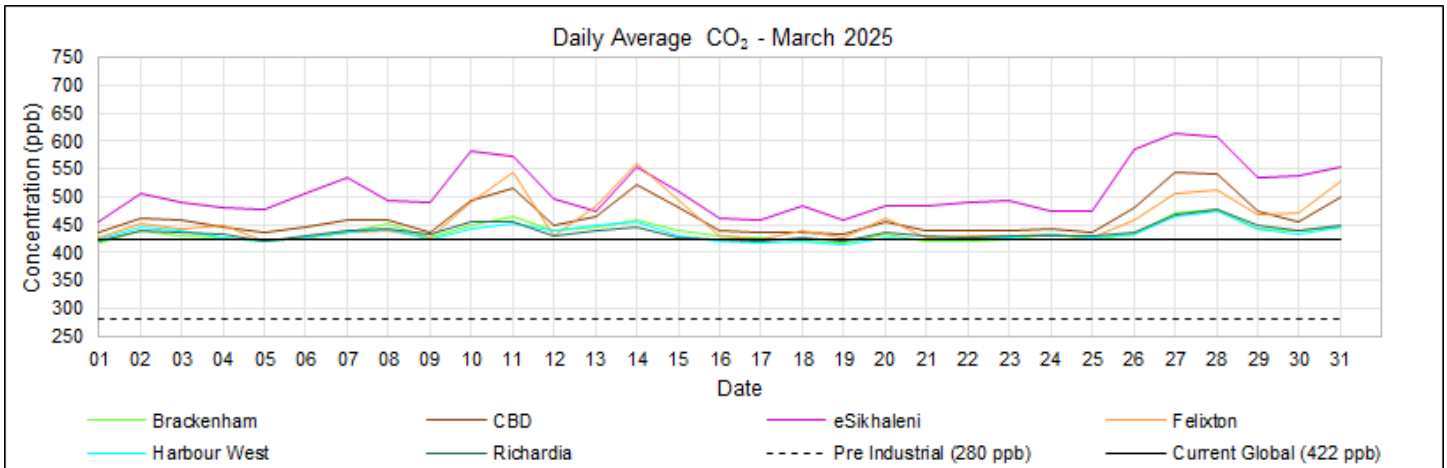


Figure 8-27: CO<sub>2</sub> daily concentrations.

### 8.5.4. Hourly

CO<sub>2</sub> hourly concentrations are shown below (Figure 8-28).

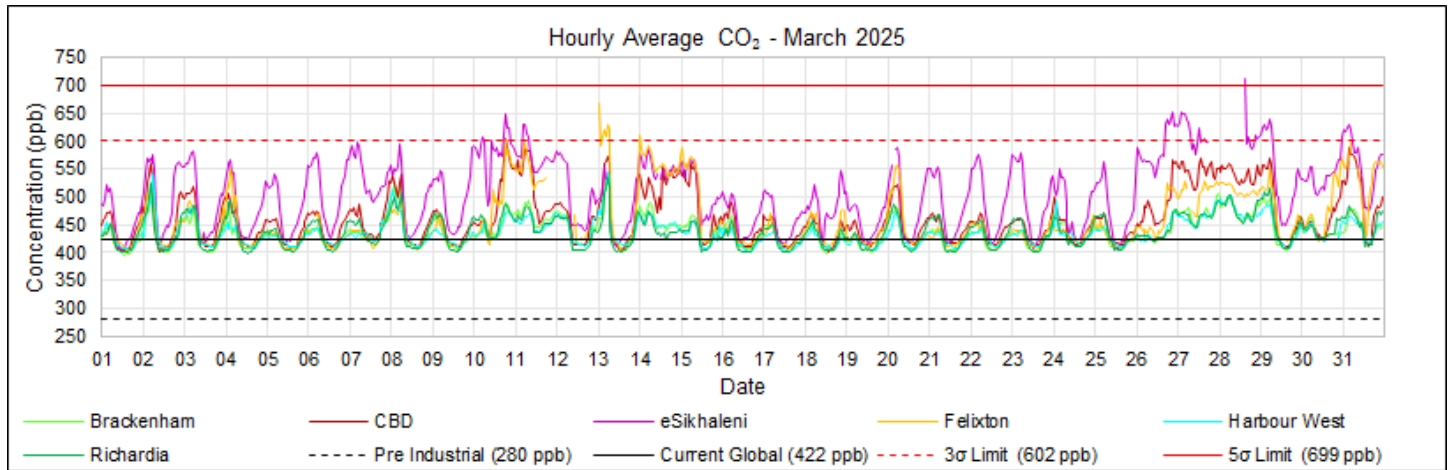


Figure 8-28: CO<sub>2</sub> hourly concentrations.

## 9. ACKNOWLEDGEMENT

Air Impact Measurement Specialists compiled this report for the Richards Bay Clean Air Association; contributors include Alicia Garnica and François Nel.

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Lance Coetzee  
Director

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## APPENDIX A

### ABBREVIATIONS AND TERMS

List of Abbreviations and Terms	
Chemical Formulae	
CH <sub>3</sub> -S-CH <sub>3</sub>	Dimethyl Sulphide
CH <sub>3</sub> S-H	Methyl Mercaptan
CH <sub>3</sub> -S-S-CH <sub>3</sub>	Dimethyl Disulphide
CH <sub>4</sub>	Methane
CO	Carbon Monoxide
CO <sub>2</sub>	Carbon Dioxide
FPM	Fine Particulate Matter
H <sub>2</sub> S	Hydrogen Sulphide
H <sub>2</sub> SO <sub>3</sub>	Sulphurous Acid
H <sub>2</sub> SO <sub>4</sub>	Sulphuric Acid
NO	Nitric Oxide
NO <sub>2</sub>	Nitrogen Dioxide
NO <sub>x</sub>	Oxides of Nitrogen
O <sub>3</sub>	Ozone
PM <sub>10</sub>	Particulates with an aerodynamic diameter of less than 10 µm
PM <sub>2.5</sub>	Particulates with an aerodynamic diameter of less than 2.5 µm
SO <sub>2</sub>	Sulphur Dioxide
SO <sub>3</sub>	Sulphur Trioxide
TRS	Total Reduced Sulphur
TSP	Total Suspended Particulates
TVOCs	Total Volatile Organic Compounds

List of Abbreviations and Terms	
Countries	
EU	European Union
RSA	Republic of South Africa
UK	United Kingdom
US	United States

List of Abbreviations and Terms	
Direction	
N	North
NNE	North-North-East
NE	North-East
ENE	East-North-East
E	East
ESE	East-South-East
SE	South-East
SSE	South-South-East
S	South
SSW	South-South-West
SW	South-West
WSW	West-South-West
W	West
WNW	West-North-West
NW	North-West
NNW	North-North-West

List of Abbreviations and Terms	
Measurement	
°	Degrees
°C	Degrees Celsius
µg	Microgram
µg/m <sup>3</sup>	Micrograms per cubic meter
BMC	Best Measurement Capabilities
g/s	Grams per second
K	Kelvin
km	Kilometre
km/h	Kilometre per hour
m	Metres
m/s	Metres per second
mg	Milligrams
mg/m <sup>2</sup> /day	Milligrams per meter squared per day
mg/m <sup>3</sup>	Milligrams per cubic meter
ppb	Parts per billion
ppm	Parts per million
t/day	Tons per day
t/hr	Tons per hour
tpa	Tons per annum

List of Abbreviations and Terms	
Organisations	
AIMS	Air Impact Measurement Specialists
CASCO	Conformity Assessment Committee
DEFF	Department of Environment Forestry and Fisheries
EA-NPI	Environment Australia - National Pollutant Inventory
EC	European Commission
EU-EA	European Union - Environmental Agency
IEC	International Electrotechnical Commission
IFC	International Finance Corporation
ISO	International Standard Organisation
RBCAA	Richards Bay Clean Air Association
SANAS	South African National Accreditation System
SANS	South Africa National Standard
UK-EA	United Kingdom - Environmental Agency
US-EPA	United States - Environmental Protection Agency
WHO	World Health Organisation

List of Abbreviations and Terms	
Terms	
Analyser	A mechanical-electrical-optical device used to measure the concentration of trace gas pollutants or particulate concentrations.
Calibration	Calibration is a procedure that compares sensor responses to known standards. Deviations between the expected and known concentrations are corrected and reported.
Database	The data structures and attendant software that organise, store, and allow users access to data.
Environment	The organisation's surroundings include air, water, land, natural resources, flora, fauna, humans, and their interactions and relations.
Meteorological Station	A monitoring station capable of monitoring wind speed, direction, and temperature.
Model	The model implements dispersion modelling mathematics software that calculates ambient pollution concentrations based on emission figures and meteorological data.
Network	The network comprises hardware (sensors, data loggers, telemetry, and computers) and software (data handling, storage programs, models, and database).
Precision Check	The precision check is a procedure where a sensor is challenged with a gas of a known concentration within the operating range of the measurement.
Source	A point, line or area from which pollution would be released
Station	A station is a data capture point used for pollutant measurement, meteorological measurement, or data consolidation.
System	The system represents all network components, including the procedures for marshalling and reporting data.

## APPENDIX B QUALITY ASSURANCE

The SO<sub>2</sub> concentrations reported are determined by the United States Environmental Protection Agency (US EPA) equivalent method, EQSA-0193-092. SO<sub>2</sub> and TRS measurements allow a maximum precision error of 10% of the reported value. A tolerance around the zero-point of plus or minus 5 ppb is permitted. All effort is made to reduce the error to a minimum. The minimum threshold for statistical analyses is at least 80% valid data to maintain reliability and minimize bias; the South African National Accreditation (SANAS, 2012) requires 90%

*Table 1: Quality Assurance*

Test	Range	Action
Zero	Zero 0 to 2 ppb	Leave it as is.
	Zero value -2 to 0 ppb	Set to zero.
	Zero value -5 to -2 ppb and 2 to 5 ppb	Adjust the data set to re-zero all data.
	Zero value outside the above limits, invalidate and recalibrate.	Data can be adjusted if a specific reason for the deviation can be identified.
Span	Span value plus or minus a 3% deviation.	Leave it as is.
	Span value -10 to -3% and 3 to 10% deviation.	Scale the data set by the opposite, corresponding percentage.
	Span value outside the above limits, invalidate and recalibrate.	Data can be adjusted if a specific reason for the deviation can be identified.

**APPENDIX C  
EMISSION INVENTORY**

Table 1: Emission Inventory – 2024.

Industry	Description	SO <sub>2</sub> Emission 2023 (t)	SO <sub>2</sub> Emission 2023 (t)	SO <sub>2</sub> Contribution (%)
Foskor	Acid Plant	2390	2401	13%
	Boiler	11		
Tongaat Hulett	Boiler	185	185	1%
Mondi	Flume 1	1417	3080	17%
	Flume 2	836		
	Power Boiler	795		
	Incinerator	8		
	Bleach Plant	24		
Mpact	Babcock	281	805	5%
	JT Boiler	524		
	Oil Burner	0		
RBM	Char Plant	468	542	3%
	Miscellaneous	34		
	MSP (Drier)	38		
	Smokers	1		
South32	FTC	1885	10561	59%
	GTC 1	1955		
	GTC 2	1680		
	GTC 3	1579		
	GTC 4	1579		
	GTC 5	1630		
	Potrooms	254		
Tronox	Tank 1	251	251	1%
Total		17825	17825	100%

Note: Tongaat Hullet shut down during the year's 1st quarter and last month.

**APPENDIX D  
OPERATIONAL REPORT**

Table 1: Maximum concentrations for PM<sub>10</sub> and PM<sub>2.5</sub>.

RBCAA: Monthly Report						
PM <sub>10</sub> daily averages						
Station	Concentration (µg/m <sup>3</sup> )	% of RSA Standard (75 µg/m <sup>3</sup> )	% of WHO Guideline (45 µg/m <sup>3</sup> )	Time	Wind Direction (°)	Wind Speed (m/s)
CBD ES1	30.0	40%	67%	2025/03/26 00:00	4.8	229
eSikhaleni	25.0	33%	56%	2025/03/12 00:00	1.0	202
Felixton ES1	20.0	27%	44%	2025/03/07 00:00	2.0	296
Richardia	48.0	64%	107%	2025/03/10 00:00	5.3	248
Scorpio ES1	56.0	75%	124%	2025/03/14 00:00	3.3	170
PM <sub>2.5</sub> daily averages						
Station	Concentration (µg/m <sup>3</sup> )	% of RSA Standard (40 µg/m <sup>3</sup> )	% of WHO Guideline (15 µg/m <sup>3</sup> )	Time	Wind Direction (°)	Wind Speed (m/s)
Brackenhams ES2	23.6	59%	157%	2025/03/07 00:00	2.1	6
Felixton ES2	19.0	48%	127%	2025/03/07 00:00	2.0	296
Harbour West ES2	18.0	45%	120%	2025/03/25 00:00	3.8	29
Scorpio ES2	29.0	73%	193%	2025/03/14 00:00	3.3	170
<b>LEGEND</b>						
Yellow: = 50% of the guideline/standard						
Red: >= 100% of the guideline/standard (i.e. exceedance)						
Turquoise: = 10% of the guideline/standard						
<b>NOTES</b>						
Dates used for time intervals are time beginning.						
Wind speeds of < 1 m/s are considered calms; wind directions measured under these conditions cannot be used for incident investigations.						
This report is an interim report in terms of AIMS' quality system classification. Final data will be published in the monthly report for the system.						
<b>STATUS</b>						
Meteorology						
Airport, Arboretum, Brackenhams, CBD, eSikhaleni, and Harbour West have meteorology.						
Scorpio uses meteorology from Harbour West, and Felixton uses meteorology from eSikhaleni.						
<b>MISSING DATA</b>						
"Data < 80%" - data capture less than 80% (not suitable for statistical analysis)						
"No Data" – no data available.						

Table 2: Maximum concentrations for SO<sub>2</sub>.

RBCAA: Monthly Report						
SO <sub>2</sub> 10-minute averages						
Station	Concentration (ppb)	% of RSA Standard & WHO Guideline (500 µg/m <sup>3</sup> / 191 ppb)		Time	Wind Direction (°)	Wind Speed (m/s)
Arboretum	12.4	6%		2025/03/11 06:30	5.9	249
Brackenham	17.9	9%		2025/03/01 08:50	0.6	301
CBD	72.2	38%		2025/03/10 23:20	4.5	236
eSikhaleni	22.8	12%		2025/03/19 05:50	0.9	202
Felixton	3.8	2%		2025/03/05 17:40	3.3	52
Harbour West	72.4	38%		2025/03/09 08:10	2.1	3
Richardia	12.8	7%		2025/03/15 08:00	3.3	256
Scorpio	108.1	57%		2025/03/03 21:40	0.6	6
SO <sub>2</sub> hourly averages						
Station	Concentration (ppb)	% of RSA Standard (350 µg/m <sup>3</sup> / 134 ppb)	No WHO Guideline	Time	Wind Direction (°)	Wind Speed (m/s)
Arboretum	8.2	6%	-	2025/03/27 07:00	5.4	233
Brackenham	11.3	8%	-	2025/03/01 09:00	1.3	163
CBD	56.7	42%	-	2025/03/26 08:00	6.0	239
eSikhaleni	9.5	7%	-	2025/03/28 22:00	1.0	30
Felixton	2.7	2%	-	2025/03/05 18:00	3.3	55
Harbour West	54.6	41%	-	2025/03/09 04:00	1.8	10
Richardia	6.8	5%	-	2025/03/01 07:00	0.6	-
Scorpio	56.8	42%	-	2025/03/03 21:00	0.7	358
SO <sub>2</sub> daily averages						
Station	Concentration (ppb)	% of RSA Standard (125 µg/m <sup>3</sup> / 48 ppb)	% of WHO Guideline (40 µg/m <sup>3</sup> / 15 ppb)	Time	Wind Direction (°)	Wind Speed (m/s)
Arboretum	2.7	6%	18%	2025/03/27 00:00	4.1	216
Brackenham	1.7	4%	11%	2025/03/01 00:00	1.7	54
CBD	22.4	47%	149%	2025/03/26 00:00	4.8	229
eSikhaleni	2.5	5%	17%	2025/03/11 00:00	2.9	202
Felixton	1.1	2%	7%	2025/03/04 00:00	2.3	47
Harbour West	17.5	36%	117%	2025/03/09 00:00	3.8	22
Richardia	1.6	3%	11%	2025/03/15 00:00	2.5	140
Scorpio	15.2	32%	101%	2025/03/19 00:00	2.1	8

Table 3: Maximum concentrations for TRS.

RBCAA: Monthly Report						
TRS 10-minute averages						
Station	Concentration (ppb)	No RSA Standard	% of OME TRS Guideline (13.0 µg/m³ / 9.3 ppb)	Time	Wind Direction (°)	Wind Speed (m/s)
CBD	21.5	-	231%	2025/03/02 21:30	2.0	255
eSikhaleni	3.9	-	42%	2025/03/13 04:50	0.6	202
Felixton	18.6	-	200%	2025/03/20 04:20	0.2	6
Richardia	8.2	-	88%	2025/03/02 02:20	0.1	-
TRS 30-minute averages						
Station	Concentration (ppb)	No RSA Standard	% of WHO H <sub>2</sub> S Guideline (7.0 µg/m³ / 5.0 ppb)	Time	Wind Direction (°)	Wind Speed (m/s)
CBD	10.5	-	210%	2025/03/02 21:00	2.2	267
eSikhaleni	3.0	-	60%	2025/03/13 04:30	1.0	202
Felixton	9.7	-	194%	2025/03/20 04:00	0.2	17
Richardia	6.9	-	138%	2025/03/01 04:00	0.6	-
TRS daily averages						
Station	Concentration (ppb)	No RSA Standard	% of OME TRS Guideline (14.0 µg/m³ / 10.1 ppb)	Time	Wind Direction (°)	Wind Speed (m/s)
CBD	1.8	-	18%	2025/03/02 00:00	1.7	127
eSikhaleni	0.9	-	9%	2025/03/20 00:00	2.4	203
Felixton	2.1	-	21%	2025/03/20 00:00	2.3	41
Richardia	2.6	-	26%	2025/03/27 00:00	4.1	216

**APPENDIX E  
 RAINFALL**

Table 1: Daily Rainfall

Date	Richards Bay (mm)	Felixton (mm)	RBCT (mm)	South32 (mm)
2025/03/01	0	0	0	0
2025/03/02	8	7	33	20
2025/03/03	0	0	0	0
2025/03/04	0	0	0	0
2025/03/05	0	0	0	0
2025/03/06	0	0	0	0
2025/03/07	0	0	0	0
2025/03/08	0	0	0	0
2025/03/09	0	0	0	0
2025/03/10	1	2	5	1
2025/03/11	10	0	6	5
2025/03/12	0	0	0	0
2025/03/13	23	19	28	31
2025/03/14	33	35	16	22
2025/03/15	17	10	8	16
2025/03/16	0	0	1	0
2025/03/17	0	0	0	0
2025/03/18	0	0	1	0
2025/03/19	0	0	0	0
2025/03/20	0	0	0	0
2025/03/21	0	0	0	0
2025/03/22	0	0	0	0
2025/03/23	0	0	0	0
2025/03/24	0	0	0	0
2025/03/25	9	0	0	0
2025/03/26	1	0	0	0
2025/03/27	15	42	16	13
2025/03/28	48	13	29	28
2025/03/29	0	0	0	0
2025/03/30	0	21	2	0

Date	Richards Bay (mm)	Felixton (mm)	RBCT (mm)	South32 (mm)
2025/03/31	0	0	1	1
Total	165	148	145	137

Table 2: Monthly Rainfall Richards Bay

Month	Richards Bay							
	2018	2019	2020	2021	2022	2023	2024	2025
Jan	94	182	47	305	127	167	271	371
Feb	232	195	377	229	193	410	118	390
Mar	139	78	139	217	62	141	192	165
Apr	261	214	141	96	647	87	101	
May	311	9	53	165	130	356	22	
Jun	70	78	114	140	60	33	89	
Jul	20	16	48	57	20	196	57	
Aug	100	160	107	59	77	20	97	
Sep	85	43	144	216	93	23	186	
Oct	213	260	171	214	101	345	250	
Nov	119	296	122	72	131	61	103	
Dec	156	320	77	464	253	195	145	
<b>Minimum</b>	20	9	47	57	20	20	22	165
<b>Average</b>	150	154	128	186	158	169	136	309
<b>Maximum</b>	311	320	377	464	647	410	271	390
<b>Total</b>	1798	1850	1540	2234	1893	2034	1630	926

Table 3: Monthly Felixton

Month	Felixton							
	2018	2019	2020	2021	2022	2023	2024	225
Jan	43	138	71	207	68	57	146	117
Feb	129	138	214	231	78	188	82	303
Mar	89	70	89	126	95	80	113	148
Apr	138	143	106	135	368	58	49	
May	342	9	42	57	120	245	17	
Jun	60	53	44	98	20	14	53	
Jul	22	17	37	39	15	146	2.5	
Aug	83	39	67	55	37	18	54	
Sep	53	79	84	191	51	43	137	
Oct	201	144	67	145	98	318	187	
Nov	84	121	106	35	174	34	78	
Dec	111	311	64	212	163	146	74	
<b>Minimum</b>	22	9	37	35	15	14	3	117
<b>Average</b>	113	105	82	127	107	112	83	189
<b>Maximum</b>	342	311	214	231	368	318	187	303
<b>Total</b>	1354	1261	987	1530	1288	1347	992	568

Table 4: RBCT

Month	2018	2019	2020	2021	2022	2023	2024	2025
Jan	42	110	33	215	54	136	154	229
Feb	137	124	166	146	131	344	72	249
Mar	78	172	109	194	161	69	161	145
Apr	161	174	111	69	642	30	98	
May	175	14	69	171	268	442	23	
Jun	59	24	52	124	30	34	104	
Jul	21	5	39	64	30	162	56	
Aug	35	68	64	56	25	30	86	
Sep	41	59	104	187	115	30	177	
Oct	80	164	121	156	71	293	121	
Nov	70	186	77	43	129	42	89	
Dec	104	216	104	245	279	127	65	
<b>Minimum</b>	21	5	33	43	25	30	23	145
<b>Average</b>	84	110	87	139	161	145	100	208
<b>Maximum</b>	175	216	166	245	642	442	177	249
<b>Total</b>	1005	1317	1049	1669	1934	1740	1205	623

Table 5: South32

Month	South32 (mm)							
	2018	2019	2020	2021	2022	2023	2024	2025
Jan	-	-	-	-	-	91	120	232
Feb	-	-	-	-	115	256	-	241
Mar	-	-	-	-	149	51	144	137
Apr	-	-	-	-	505	43	-	
May	-	-	-	-	106	230	-	
Jun	-	-	-	-	25	11	-	
Jul	-	-	-	-	12	165	-	
Aug	-	-	-	-	30	13	-	
Sep	-	-	-	-	64	18	129	
Oct	-	-	-	-	64	271	-	
Nov	-	-	-	-	101	36	-	
Dec	-	-	-	-	163	95	92	
<b>Minimum</b>	-	-	-	-	12	11	92	137
<b>Average</b>	-	-	-	-	121	107	121	203
<b>Maximum</b>	-	-	-	-	505	271	144	241
<b>Total</b>	-	-	-	-	1336	1280	485	610

Please note that the South32 missing rain data for 2024 was due to a faulty rain gauge.

## APPENDIX F COMPLAINTS LOG

Table 1: Complaints.

No	Date	Region	Type	Source	Description	Response
1	2025/03/02 21:35	Veldenvlei	Clinical + Odour	Mondi	Strong “cat urine” odour.	254
2	2025/03/04 21:35	Alton	Sulphur Spillage	Grindrod	“Major sulphur spillage Kraft Link intersection” (Reported via Alton WhatsApp Group)	253
3	2025/03/10 00:00	Mtunzini	Dust & fallout + Clinical	Authority response required	10 March and prior, Red dust from Tronox, “over the past almost year there is a major problem with red dust from our neighbour Tronox. As residents our white linen is red brown, cars covered daily ongoing wind or no wind, in red sand, outdoor furniture has to be washed before use daily. Coughing and wheezing and sinus issues are ongoing.”	1, 258
4	2025/03/10 00:00	Mtunzini	Dust & fallout + Clinical	Authority response required	“Severe dust in house and swimming pool from Tronox Mine . Severe coughing with all the dust. This is totally unacceptable; It’s a health risk.”	1, 260
5	2025/03/10 00:00	Mtunzini	Dust & fallout	Authority response required	“Continual sand in my property. Cars, house and pool covered in sand.”	1, 260
6	2025/03/10 13:00	Vicinity of Tronox	Dust & fallout	Authority response required	Clouds of red dust emanating from the Tronox site.	1, 258
7	2025/03/10 15:51	Alton North	Dust & fallout	Authority response required	Land cleared by IDZ is causing major dust problems in Alton North. (photos attached)	1, 259
8	2025/03/10 16:30	Mtunzini	Dust & fallout + Clinical	Authority response required	“Thick red dust in the air. Driving you can hear the sand hit the car. Getting out eyes fill up with dust. I have asthma which flared up.”	1, 258
9	2025/03/10 17:30	Mtunzini	Dust & fallout + Clinical	Authority response required	“Red dust from Tronox mine causing itchy eyes and sneezing. Domestic left my house spotless at 16h40 and an hour later the house, car and pool were covered in red dust.”	1, 258
10	2025/03/10 17:30	Mtunzini	Dust & fallout + Clinical	Authority response required	“Red dust everywhere. Daughter’s allergies have worsened, and they have a cough and tight chest for no reason. Wife’s asthma is much worse, and she gets chest infections more often.”	1, 258
11	2025/03/10 17:45	Mtunzini	Dust & fallout + Clinical	Authority response required	“Red dust from Tronox mine. It is very bad this time. I cleaned my pool yesterday.”	1, 258
12	2025/03/11 07:27	Mtunzini	Dust & fallout	Authority response required	Red dust from Tronox mine. Complaints fall on deaf ears.	1, 258

No	Date	Region	Type	Source	Description	Response
13	2025/03/11 08:00	Mtunzini	Dust & fallout + Clinical	Authority response required	Red dust from Tronox mine affecting health and causing sinus problems.	1, 258
14	2025/03/11 08:26	Mtunzini	Dust & fallout	Authority response required	“Covered in red dust, the entire home internal and external. This situation was predicted on the weather app 7 days ago, yet Tronox blundered on without being proactive at all.”	1, 258
15	2025/03/11 10:26	Mtunzini	Dust & fallout	Authority response required	“As per photo Dust everywhere especially on our front entrance. This a regular occurrence when the South Wester Blows !!! “	1, 258
16	2025/03/11 10:26	Mtunzini	Dust & fallout	Authority response required	“As per photo Dust everywhere especially on our front entrance. This a regular occurrence when the South Wester Blows !!! “	1, 258
17	2025/03/11 11:04	Mtunzini	Dust & fallout + Clinical	Authority response required	“We are writing to you as concerned Mtunzini residents from Waterbessie that are negatively impacted by the dust that is constantly blown over from the opencast operations adjacent to the village and more especially over our street. We hope by doing this that there will be a way to stop this dust affecting our health before we end up having bigger health threats as we now only show the bare minimum of symptoms like coughing and sneezing, vomiting. Please note: " Dust pollution, especially fine particulate matter (PM2.5 and PM10), can significantly impact health, causing respiratory problems, cardiovascular issues, and potentially increasing the risk of lung cancer and other diseases. Our family's medical history over the previous 2 years will demonstrate the impact that this dust has on our health as a young family, as will the constant coughing, sneezing, vomiting, and doctor visits.”	1, 258
18	2025/03/11 11:04	Mtunzini	Dust & fallout + Clinical	Authority response required	“We are writing to you as concerned Mtunzini residents from Waterbessie that are negatively impacted by the dust that is constantly blown over from the opencast operations adjacent to the village and more especially over our street. We hope by doing this that there will be a way to stop this dust affecting our health before we end up having bigger health threats as we now only show the bare minimum of symptoms like coughing and sneezing, vomiting. Please note: " Dust pollution, especially fine particulate matter (PM2.5 and PM10), can significantly impact health, causing respiratory problems, cardiovascular issues, and potentially increasing the risk of lung cancer and other diseases. Our family's medical history over the previous 2 years will demonstrate the impact that this dust has on our health as a young family, as will the constant coughing, sneezing, vomiting, and doctor visits.”	1, 258
19	2025/03/11 11:04	Mtunzini	Dust & fallout + Clinical	Authority response required	“We are writing to you as concerned Mtunzini residents from Waterbessie that are negatively impacted by the dust that is constantly blown over from the opencast operations adjacent to the village and more especially over our street. We hope by doing this that there will be a way to stop this dust affecting our health before we end up having bigger health threats as we now only show the	1, 259

No	Date	Region	Type	Source	Description	Response
					bare minimum of symptoms like coughing and sneezing, vomiting. Please note: " Dust pollution, especially fine particulate matter (PM2.5 and PM10), can significantly impact health, causing respiratory problems, cardiovascular issues, and potentially increasing the risk of lung cancer and other diseases. Our family's medical history over the previous 2 years will demonstrate the impact that this dust has on our health as a young family, as will the constant coughing, sneezing, vomiting, and doctor visits."	
20	2025/03/11 23:02	Veldenvlei	Odour	Mondi	Very strong smell in Veldenvlei. Entire flat smells even with fans on full."	263
21	2025/03/12 00:00	Veldenvlei	Clinical + Odour	Mondi	during the night, "I woke up from that smell during the night and have a bad headache this morning."	263
22	2025/03/12 04:35	Veldenvlei	Odour	Mondi	"Smell is still overwhelming"	263
23	2025/03/12 05:30	Veldenvlei	Clinical + Odour	Mondi	"Nauseating guava odour."	263
24	2025/03/12 05:36	Veldenvlei	Odour	Mondi	"Bad smell since last night."	263
25	2025/03/12 06:18	Veldenvlei	Odour	Mondi	"Strong odour in Veldenvlei this morning."	263
26	2025/03/12 06:18	Veldenvlei	Odour	Mondi	"terribly strong smell this morning. Smells like Mondi. So bad it woke me up."	263
27	2025/03/12 06:30	Veldenvlei	Clinical + Odour	Mondi	Bad smell causing burning nose.	263
28	2025/03/12 07:00	Veldenvlei	Clinical + Odour	Mondi	" bad smell in Veldenvlei causing bad migraine."	263
29	2025/03/12 07:00	Veldenvlei	Clinical + Odour	Mondi	"Pungent Mondi odour causing nausea and headache."	263
30	2025/03/12 14:04	Alton	Dust & fallout + Clinical	NIDA	Excessive dust emanating from the adjacent NIDA facility, impacting on owners building, customer vehicles and employee health. "My employee's eyes are badly affected, and we suffered with blocked sinuses." Complainant highlighted that this issue has been ongoing for years with no mitigation measures implemented by NIDA despite ongoing complaints from neighbouring businesses.	261
31	2025/03/12 17:00	Richards Bay	Noise	Foskor	From around 17h00 residents of Arboretum, Veldenvlei and Wildenweide started reporting on social media their extreme concern regarding loud abnormal noises. Residents of Arboretum Extension confirmed that it was emanating from the Foskor facility. Residents described it as sounding as if the facility was about to explode, another saying that in their 35 years of living in Arboretum extension they had never experienced anything like this. In Veldenvlei the rumbling was heard earlier and sounded like thunder.	262, 265

No	Date	Region	Type	Source	Description	Response
32	2025/03/12 17:00	Richards Bay	Noise	Foskor	From around 17h00 residents of Arboretum, Veldenvlei and Wildenweide started reporting on social media their extreme concern regarding loud abnormal noises. Residents of Arboretum Extension confirmed that it was emanating from the Foskor facility. Residents described it as sounding as if the facility was about to explode, another saying that in their 35 years of living in Arboretum extension they had never experienced anything like this. In Veldenvlei the rumbling was heard earlier and sounded like thunder.	262, 265
33	2025/03/12 17:00	Richards Bay	Noise	Foskor	From around 17h00 residents of Arboretum, Veldenvlei and Wildenweide started reporting on social media their extreme concern regarding loud abnormal noises. Residents of Arboretum Extension confirmed that it was emanating from the Foskor facility. Residents described it as sounding as if the facility was about to explode, another saying that in their 35 years of living in Arboretum extension they had never experienced anything like this. In Veldenvlei the rumbling was heard earlier and sounded like thunder.	262, 265
34	2025/03/12 17:00	Richards Bay	Noise	Foskor	From around 17h00 residents of Arboretum, Veldenvlei and Wildenweide started reporting on social media their extreme concern regarding loud abnormal noises. Residents of Arboretum Extension confirmed that it was emanating from the Foskor facility. Residents described it as sounding as if the facility was about to explode, another saying that in their 35 years of living in Arboretum extension they had never experienced anything like this. In Veldenvlei the rumbling was heard earlier and sounded like thunder.	262, 265
35	2025/03/12 17:00	Richards Bay	Noise	Foskor	From around 17h00 residents of Arboretum, Veldenvlei and Wildenweide started reporting on social media their extreme concern regarding loud abnormal noises. Residents of Arboretum Extension confirmed that it was emanating from the Foskor facility. Residents described it as sounding as if the facility was about to explode, another saying that in their 35 years of living in Arboretum extension they had never experienced anything like this. In Veldenvlei the rumbling was heard earlier and sounded like thunder.	262, 265
36	2025/03/12 17:00	Richards Bay	Noise	Foskor	From around 17h00 residents of Arboretum, Veldenvlei and Wildenweide started reporting on social media their extreme concern regarding loud abnormal noises. Residents of Arboretum Extension confirmed that it was emanating from the Foskor facility. Residents described it as sounding as if the facility was about to explode, another saying that in their 35 years of living in Arboretum extension they had never experienced anything like this. In Veldenvlei the rumbling was heard earlier and sounded like thunder.	262, 265
37	2025/03/12 17:00	Richards Bay	Noise	Foskor	From around 17h00 residents of Arboretum, Veldenvlei and Wildenweide started reporting on social media their extreme concern regarding loud abnormal noises. Residents of Arboretum Extension confirmed that it was emanating from the Foskor facility. Residents described it as sounding as if the facility was about to explode, another saying that in their 35 years of living in Arboretum extension they had never experienced anything like this. In Veldenvlei the rumbling was heard earlier and sounded like thunder.	262, 265

No	Date	Region	Type	Source	Description	Response
38	2025/03/12 17:00	Richards Bay	Noise	Foskor	From around 17h00 residents of Arboretum, Veldenvlei and Wildenweide started reporting on social media their extreme concern regarding loud abnormal noises. Residents of Arboretum Extension confirmed that it was emanating from the Foskor facility. Residents described it as sounding as if the facility was about to explode, another saying that in their 35 years of living in Arboretum extension they had never experienced anything like this. In Veldenvlei the rumbling was heard earlier and sounded like thunder.	262, 265
39	2025/03/12 17:00	Richards Bay	Noise	Foskor	From around 17h00 residents of Arboretum, Veldenvlei and Wildenweide started reporting on social media their extreme concern regarding loud abnormal noises. Residents of Arboretum Extension confirmed that it was emanating from the Foskor facility. Residents described it as sounding as if the facility was about to explode, another saying that in their 35 years of living in Arboretum extension they had never experienced anything like this. In Veldenvlei the rumbling was heard earlier and sounded like thunder.	262, 265
40	2025/03/14 06:00	Brackenham	Odour	Mondi	(Complaint received at 07h22), "Very strong H2S odour from 06h00, much stronger now on way to Veldenvlei. Throat irritation."	264
41	2025/03/14 07:00	Brackenham	Clinical + Odour	Mondi	"Bad odour in Brackenham. Smells like Mondi. Affecting my asthma and throat."	264
42	2025/03/14 07:30	Brackenham	Clinical + Odour	Mondi	"This morning 14th March after dropping of my grandchild at school and i was on my way home { 7.30 am) when i reached home and got off my car there was a bad chemical smell in the air. It was very bad and my throat was tightening. My daughter experienced the same (smell) and her chest was tight. ( She lives in Frondosa Brackenham) Her cupboard is smelling and their clothes.	264
43	2025/03/14 07:30	Brackenham	Clinical + Odour	Mondi	"This morning 14th March after dropping of my grandchild at school and i was on my way home { 7.30 am) when i reached home and got off my car there was a bad chemical smell in the air. It was very bad and my throat was tightening. My daughter experienced the same (smell) and her chest was tight. ( She lives in Frondosa Brackenham) Her cupboard is smelling and their clothes.	264
44	2025/03/14 11:30	Brackenham	Odour	Mondi	Mondi odour still present. "Mondi should be shut down".	264

Table 2: Responses.

Response	Industry Feedback
1	Unresolved / No Response
253	Grindrod- Silungile Msane responded (2025/03/04 16:09): Grindrod responded on the group at 16h09 stating; "That is from vessel to our facility. We have cleaners along the road maintain the cleaning on entire route and are on the way. Grindrod- Sibahle Dladla responded (2025/03/13 11:34): The root was re-investigated. The findings reflected that no monitoring of trucks is done especially (i.e condition of vehicle, and movement) during vessel loading.
254	Mondi - Candice Webb responded (2025/03/06 09:45): Non-Condensable gas system.
258	RBCAA - Sandy Camminga (2025/03/11 21:54): Residents say that this is not an isolated incident, and has been an issue since 2022\2023. The RBCAA will forward the complaints to the relevant Authorities.
259	RBCAA - Sandy Camminga (2025/03/11 23:16): The IDZ was notified and responded as follows; "We believe that this sand originates from the recent site clearing activities at 1F (Nyanza site). The contractor moved off site last month (contract end). We are looking into appointing a dust suppression contractor to proactively address the issues experienced yesterday"
260	RBCAA - Sandy Camminga (2025/03/12 09:52): The above complaint will be referred to the relevant Authorities.
261	RBCAA - Sandy Camminga (2025/03/12 14:04): The RBCAA notified the Authorities. CoU Air Quality section immediately undertook a site visit and provided feedback to the RBCAA. Activities at the NIDA facility were found to be unacceptable. CoU will follow internal processes to address this issue.
262	RBCAA - Sandy Camminga (2025/03/12 14:04): The RBCAA contacted Foskor. Their preliminary response stated that the noise was related to increased steam pressure on the line resulting in the opening of the relief valve. Foskor's final report is awaited.
263	Mondi - Candice Webb responded (2025/03/13 14:58): Source of Odour: Over pressurisation of the CPX tank.
264	Mondi - Candice Webb responded (2025/03/13 14:58): Source of Odour: The investigation confirmed that non-condensable gases had tripped out of the Recovery Flare and into the Recuast Flare for incineration. The Recauast Flare was unable to efficiently incinerate the noncondensable gases and elevated TRS was recorded on the analyser. Gases were redirected back to the Recovery Flare within five minutes and stabilised.
265	Foskor- Silungile Msane responded (2025/03/18 13:13): The cause of the activation of the pressure relief valve is that the A & B Sulphur section that uses a lowpressure system of 29 bar got a higher steam pressure of approximately 45 bar. Because there was a demand for additional steam for Phosphoric Acid there was simultaneous increase of the plant rates (B and C Plants). Increased plant rates resulted in an increase of steam production and thus increased pressure in the pipeline.

**APPENDIX G**  
**PM<sub>10</sub> EXCEEDANCE LOG**

Table 1: PM<sub>10</sub> exceedances.

No	Target / Guideline / Standard	Station	Date	Value (ppb)	Wind Direction (°)	Wind Speed (m/s)	Source	Comment	Response
1	PM <sub>10</sub> Daily WHO Limit (45 µg/m <sup>3</sup> )	Richardia	2025/03/10 0:00	48.0	247	5.3	No response required	None	2
2	PM <sub>10</sub> Daily WHO Limit (45 µg/m <sup>3</sup> )	Scorpio	2025/03/14 0:00	56.0	170	3.3	No response required	None	2

Table 2: PM<sub>10</sub> responses.

Response	Industry Feedback
2	No response required

## APPENDIX H PM<sub>2.5</sub> EXCEEDANCE LOG

Table 1: PM<sub>2.5</sub> Exceedances

No	Target / Guideline / Standard	Station	Date	Value (ppb)	Wind Direction (°)	Wind Speed (m/s)	Source	Comment	Response
1	PM <sub>2.5</sub> Daily WHO Limit (15 µg/m <sup>3</sup> )	Brackenham	2025/03/07 00:00	23.6	4	2.1	No response required	None	2
2	PM <sub>2.5</sub> Daily WHO Limit (15 µg/m <sup>3</sup> )	Brackenham	2025/03/08 00:00	18.9	44	1.9	No response required	None	2
3	PM <sub>2.5</sub> Daily WHO Limit (15 µg/m <sup>3</sup> )	Brackenham	2025/03/10 00:00	22.6	270	3.7	No response required	None	2
4	PM <sub>2.5</sub> Daily WHO Limit (15 µg/m <sup>3</sup> )	Brackenham	2025/03/11 00:00	17.3	250	3	No response required	None	2
5	PM <sub>2.5</sub> Daily WHO Limit (15 µg/m <sup>3</sup> )	Brackenham	2025/03/23 00:00	15.4	52	2.8	No response required	None	2
6	PM <sub>2.5</sub> Daily WHO Limit (15 µg/m <sup>3</sup> )	Brackenham	2025/03/24 00:00	22.2	60	1.7	No response required	None	2
7	PM <sub>2.5</sub> Daily WHO Limit (15 µg/m <sup>3</sup> )	Brackenham	2025/03/26 00:00	21.0	225	3.5	No response required	None	2
8	PM <sub>2.5</sub> Daily WHO Limit (15 µg/m <sup>3</sup> )	Brackenham	2025/03/30 00:00	16.1	230	1.9	No response required	None	2
9	PM <sub>2.5</sub> Daily WHO Limit (15 µg/m <sup>3</sup> )	Felixton	2025/03/07 00:00	18.0	294	2	No response required	None	2
10	PM <sub>2.5</sub> Daily WHO Limit (15 µg/m <sup>3</sup> )	Felixton	2025/03/24 00:00	17.0	46	1.8	No response required	None	2
11	PM <sub>2.5</sub> Daily WHO Limit (15 µg/m <sup>3</sup> )	Harbour West	2025/03/07 00:00	17.0	216	1.8	No response required	None	2
12	PM <sub>2.5</sub> Daily WHO Limit (15 µg/m <sup>3</sup> )	Harbour West	2025/03/22 00:00	17.0	35	3.2	No response required	None	2
13	PM <sub>2.5</sub> Daily WHO Limit (15 µg/m <sup>3</sup> )	Harbour West	2025/03/23 00:00	17.0	34	2.7	No response required	None	2
14	PM <sub>2.5</sub> Daily WHO Limit (15 µg/m <sup>3</sup> )	Harbour West	2025/03/25 00:00	18.0	28	3.8	No response required	None	2
15	PM <sub>2.5</sub> Daily WHO Limit (15 µg/m <sup>3</sup> )	Scorpio	2025/03/14 00:00	29.0	170	3.3	No response required	None	2

*Table 1: PM<sub>2.5</sub> Responses*

Response	Industry Feedback
2	No response required

## APPENDIX I SO<sub>2</sub> EXCEEDANCE LOG

Table 1: SO<sub>2</sub> Exceedances.

No	Target / Guideline / Standard	Station	Date	Value (ppb)	Wind Direction (°)	Wind Speed (m/s)	Source	Comment	Response
1	SO <sub>2</sub> Daily WHO Limit (15 ppb)	CBD	2025/03/11 00:00	16.6	234	4.4	No response required	None	2
2	SO <sub>2</sub> Daily WHO Limit (15 ppb)	CBD	2025/03/26 00:00	22.4	229	4.8	No response required	None	2
3	SO <sub>2</sub> Daily WHO Limit (15 ppb)	CBD	2025/03/27 00:00	19.5	222	3.5	No response required	None	2
4	SO <sub>2</sub> Daily WHO Limit (15 ppb)	Harbour West	2025/03/09 00:00	17.5	22	3.8	No response required	None	2
5	SO <sub>2</sub> Daily WHO Limit (15 ppb)	Harbour West	2025/03/21 00:00	16.4	32	3.6	No response required	None	2
6	SO <sub>2</sub> Daily WHO Limit (15 ppb)	Harbour West	2025/03/23 00:00	15.2	34	2.7	No response required	None	2
7	SO <sub>2</sub> Daily WHO Limit (15 ppb)	Harbour West	2025/03/25 00:00	16.9	28	3.8	No response required	None	2
8	SO <sub>2</sub> Daily WHO Limit (15 ppb)	Scorpio	2025/03/19 00:00	15.2	8	2.1	No response required	None	2

Table 2: SO<sub>2</sub> Responses.

Response	Industry Feedback
2	No response required

**APPENDIX J**  
**TRS EXCEEDANCE LOG**

Table 1: TRS Exceedances

No	Target / Guideline / Standard	Station	Date	Value (ppb)	Wind Direction (°)	Wind Speed (m/s)	Source	Comment	Response
1	TRS 30-minute WHO H <sub>2</sub> S Limit (5.0 ppb)	CBD	2025/03/01 00:00	9.4	257	2.9	Mondi	Softwood (SW) blowdowns	618
2	TRS 10-minute OME Limit (9.3 ppb)	CBD	2025/03/01 00:10	10.3	256	2.9	Mondi	Softwood (SW) blowdowns	618
3	TRS 30-minute WHO H <sub>2</sub> S Limit (5.0 ppb)	CBD	2025/03/01 03:00	5.3	298	1.1	Mondi	Softwood (SW) blowdowns	618
4	TRS 30-minute WHO H <sub>2</sub> S Limit (5.0 ppb)	CBD	2025/03/02 21:00	10.5	267	2.2	Mondi	Root cause no identified	619
5	TRS 10-minute OME Limit (9.3 ppb)	CBD	2025/03/02 21:20	21.4	256	1.6	Mondi	Root cause no identified	619
6	TRS 10-minute OME Limit (9.3 ppb)	CBD	2025/03/02 21:30	21.5	255	2.0	Mondi	Root cause no identified	619
7	TRS 30-minute WHO H <sub>2</sub> S Limit (5.0 ppb)	CBD	2025/03/02 21:30	10.3	247	2.3	Mondi	Root cause no identified	619
8	TRS 30-minute WHO H <sub>2</sub> S Limit (5.0 ppb)	CBD	2025/03/02 23:00	6.7	273	1.4	Mondi	Root cause no identified	619
9	TRS 10-minute OME Limit (9.3 ppb)	CBD	2025/03/02 23:30	14.1	243	1.9	Mondi	Root cause no identified	619
10	TRS 30-minute WHO H <sub>2</sub> S Limit (5.0 ppb)	CBD	2025/03/02 23:30	9.4	255	1.8	Mondi	Root cause no identified	619
11	TRS 10-minute OME Limit (9.3 ppb)	CBD	2025/03/03 00:00	11.1	259	1.6	Mondi	Root cause no identified	620
12	TRS 30-minute WHO H <sub>2</sub> S Limit (5.0 ppb)	CBD	2025/03/03 00:00	9.2	263	1.7	Mondi	Root cause no identified	620
13	TRS 10-minute OME Limit (9.3 ppb)	CBD	2025/03/03 00:30	9.7	274	1.2	Mondi	Root cause no identified	620
14	TRS 30-minute WHO H <sub>2</sub> S Limit (5.0 ppb)	CBD	2025/03/03 00:30	8.4	276	1.5	Mondi	Root cause no identified	620
15	TRS 10-minute OME Limit (9.3 ppb)	CBD	2025/03/03 00:40	9.5	292	1.5	Mondi	Root cause no identified	620

No	Target / Guideline / Standard	Station	Date	Value (ppb)	Wind Direction (°)	Wind Speed (m/s)	Source	Comment	Response
16	TRS 30-minute WHO H <sub>2</sub> S Limit (5.0 ppb)	CBD	2025/03/03 01:30	5.7	286	1.3	Mondi	Root cause no identified	620
17	TRS 30-minute WHO H <sub>2</sub> S Limit (5.0 ppb)	CBD	2025/03/03 02:00	6.2	259	1.0	Mondi	Root cause no identified	620
18	TRS 30-minute WHO H <sub>2</sub> S Limit (5.0 ppb)	CBD	2025/03/08 02:00	5.8	No data	0.7	Mondi	Poor effluent quality	621
19	TRS 30-minute WHO H <sub>2</sub> S Limit (5.0 ppb)	CBD	2025/03/08 02:30	7.9	237	1.0	Mondi	Poor effluent quality	621
20	TRS 10-minute OME Limit (9.3 ppb)	CBD	2025/03/08 02:40	11.2	234	1.0	Mondi	Poor effluent quality	621
21	TRS 30-minute WHO H <sub>2</sub> S Limit (5.0 ppb)	CBD	2025/03/08 03:30	5.2	263	1.5	Mondi	Poor effluent quality	621
22	TRS 30-minute WHO H <sub>2</sub> S Limit (5.0 ppb)	CBD	2025/03/12 04:30	5.1	269	3.8	Mondi	Over-pressurisation of the CPX tank	622
23	TRS 30-minute WHO H <sub>2</sub> S Limit (5.0 ppb)	CBD	2025/03/12 07:00	5.5	261	2.6	Mondi	Over-pressurisation of the CPX tank	622
24	TRS 30-minute WHO H <sub>2</sub> S Limit (5.0 ppb)	Felixton	2025/03/13 15:00	5.2	97	3.2	Local Source - unknown	RBCAA allocation	623, 624, 626, 630
25	TRS 30-minute WHO H <sub>2</sub> S Limit (5.0 ppb)	Felixton	2025/03/20 01:00	8.6	17	0.3	Local Source - unknown	RBCAA allocation	624, 625, 626, 630
26	TRS 10-minute OME Limit (9.3 ppb)	Felixton	2025/03/20 01:20	14.3	11	0.2	Local Source - unknown	RBCAA allocation	624, 625, 626, 630
27	TRS 30-minute WHO H <sub>2</sub> S Limit (5.0 ppb)	Felixton	2025/03/20 01:30	5.7	354	0.3	Local Source - unknown	RBCAA allocation	624, 625, 626, 630
28	TRS 30-minute WHO H <sub>2</sub> S Limit (5.0 ppb)	Felixton	2025/03/20 04:00	9.7	17	0.2	Local Source - unknown	RBCAA allocation	624, 625, 626, 630
29	TRS 10-minute OME Limit (9.3 ppb)	Felixton	2025/03/20 04:20	18.6	6	0.2	Local Source - unknown	RBCAA allocation	624, 625, 626, 630
30	TRS 30-minute WHO H <sub>2</sub> S Limit (5.0 ppb)	Felixton	2025/03/20 04:30	9.2	12	0.2	Local Source - unknown	RBCAA allocation	624, 625, 626, 630
31	TRS 10-minute OME Limit (9.3 ppb)	Felixton	2025/03/20 04:40	14.2	7	0.2	Local Source - unknown	RBCAA allocation	624, 625, 626, 630
32	TRS 30-minute WHO H <sub>2</sub> S Limit (5.0 ppb)	Felixton	2025/03/20 05:00	7.4	353	0.5	Local Source - unknown	RBCAA allocation	624, 625, 626, 630
33	TRS 30-minute WHO H <sub>2</sub> S Limit (5.0 ppb)	Felixton	2025/03/20 05:30	5.7	317	0.5	Local Source - unknown	RBCAA allocation	624, 625, 626, 630

No	Target / Guideline / Standard	Station	Date	Value (ppb)	Wind Direction (°)	Wind Speed (m/s)	Source	Comment	Response
34	TRS 30-minute WHO H <sub>2</sub> S Limit (5.0 ppb)	Felixton	2025/03/20 07:00	7.8	72	1.1	Local Source - unknown	RBCAA allocation	624, 625, 626, 630
35	TRS 10-minute OME Limit (9.3 ppb)	Felixton	2025/03/20 07:20	10.9	63	1.5	Local Source - unknown	RBCAA allocation	624, 625, 626, 630
36	TRS 30-minute WHO H <sub>2</sub> S Limit (5.0 ppb)	Richardia	2025/03/01 04:00	6.9	No data	0.6	Mondi	Softwood (SW) blowdowns	618
37	TRS 30-minute WHO H <sub>2</sub> S Limit (5.0 ppb)	Richardia	2025/03/01 04:30	5.1	No data	0.4	Mondi	Softwood (SW) blowdowns	618
38	TRS 30-minute WHO H <sub>2</sub> S Limit (5.0 ppb)	Richardia	2025/03/01 05:30	6.3	No data	0.1	Mondi	Softwood (SW) blowdowns	618

Table 2: TRS Responses

Response	Industry Feedback
1	Unresolved / No Response
618	Mondi - Kira Cobbold responded, (2025/03/05 08:28): Based on wind direction, wind speed, and elevated TRS levels recorded at Mondi’s portable and Alton monitoring stations, we confirm that Mondi was the source of the exceedances on 01/03/2025 (10&30min avgs.). These exceedances are a continuation of the softwood (SW) blowdowns from the previous day. Given the very low wind speeds recorded, it is likely that the odour plume lingered in the area, contributing to the exceedances. Our odour abatement team remains focused on addressing these events to minimize future occurrences.
619	Mondi - Kira Cobbold responded, (2025/03/05 10:46): Based on wind direction, wind speed, and elevated TRS levels recorded at the CBD monitoring station, Mondi is the likely source of the exceedances on 02/03/2025. At this stage, the root cause of these exceedances has not been identified. However, investigations are ongoing to determine potential contributing factors.
620	Mondi - Kira Cobbold responded, (2025/03/05 10:46): Based on wind direction and speed, as well as elevated TRS levels at the CBD and Hytec monitoring stations, Mondi is the likely source of the exceedances recorded in the early hours of 03/03/2025. These exceedances appear to be linked to those of the previous evening (02/03); however, the specific root cause has not yet been identified. Investigations are ongoing to determine potential contributing factors.
621	Mondi - Kira Cobbold responded, (2025/03/11 10:16): Based on wind direction and speed, as well as increased TRS levels recorded at Mondi’s monitoring stations and the effluent stack, we have identified the root cause of the exceedances recorded on 08/03/2025 as poor effluent quality. It is possible that TRS was released into the atmosphere when the effluent reached the Secondary Effluent Treatment Plant (SETP), contributing to the observed exceedances. Our odour abatement task team continues to focus on improving effluent quality to mitigate such occurrences.
622	Mondi - Kira Cobbold responded, (2025/03/13 11:24): The TRS exceedances recorded at the CBD station on 12/03/2025 are attributed to over-pressurisation of the CPX tank. This likely resulted in some gases venting to the atmosphere or CPX entering the effluent system, correlating with the spike observed at the effluent H <sub>2</sub> S stack. Corrective action has been implemented, and the task team is working on preventative measures to mitigate similar incidents in the future. More detail will be provided in the complaint feedback report once the final investigation has been completed.
623	Mondi - Kira Cobbold responded, (2025/03/14 13:21): The TRS exceedance recorded at the Felixton station on 13/03/2025 is unlikely to have originated from Mondi. This conclusion is based on the wind speed and direction at the time, stable operating conditions at the mill, and consistently low TRS levels at all Mondi monitoring stations prior to the exceedance.
624	Mpact - Maggie Odayar responded, (2025/03/25 10:23): Mpact has investigated the below TRS exceedance, and based on shift reports and plant conditions, there were no process conditions that could be the source of these exceedances.
625	Mondi - Kira Cobbold responded, (2025/03/26 09:08): The TRS exceedances recorded at the Felixton station on 20/03/2025 are unlikely to have originated from Mondi. Wind speeds were extremely low during the exceedance period, and all Mondi TRS monitoring stations recorded low levels.
626	Tongaat Hulett - Nicolas Govender responded (2025/03/31 16:02): TH is shut since December 2024 and factory cleaning was concluded in December. Effluent plant was stable with no abnormal activities conducted at the time. Wind direction was NNW to NNE as well, therefore it is unlikely to have been caused by TH.
630	RBCAA allocation 2025-04-15

