AIMS

Report

Monthly Air Quality

December 2025

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Document Approval

Action	Designation	Name	Date
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Note

This report has been finalised with the available information at the time of its compilation.

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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_2), 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 provide a comprehensive overview of the region's overall air quality performance and long-term trends. They provide stakeholders with a thorough understanding of air quality and serve as a valuable tool for informed 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 the surrounding environment.

The RBCAA monitoring network comprises eleven (11) stations (Figure 1.1 and Table 1.1).

Note: Meerensee is included as a station location in the RBCAA network; however, no continuous analysers were operational at this site during December 2025 (refer to the station parameter register).

Figure 1.1: RBCAA monitoring network.

Table 1.1: Station coordinates.

Station	Latitude	Longitude	Elevation (m)
Airport	-28.738161	32.093332	33.99
Arboretum	-28.752377	32.062791	25.20
Brackenham	-28.731325	32.039059	56.28
CBD	-28.744693	32.054851	32.26
eSikhaleni	-28.865278	31.911679	14.54
Felixton	-28.829255	31.893636	56.59
Meerensee	-28.772104	32.101308	14.89
Felixton Met	-28.836487	31.892513	27.87
Harbour West	-28.787297	32.027133	7.36
Richardia	-28.762769	32.066068	19.96
Scorpio	-28.769694	32.034282	29.39

2. METEOROLOGY

2.1. Data Availability

The percentage of valid data received from the meteorological network for December 2025 is shown in Table 2.1.

Table 2.1: Meteorological data capture.

Station	Availability (%)	Wind (%)	Temperature (%)	Relative Humidity (%)	Pressure (%)	Solar Radiation (%)	Rain (%)
Airport	100	100	100	100	100	100	-
Arboretum	98	96	98	-	-	-	-
Brackenham	100	100	100	-	-	-	-
CBD	**94**	**94**	**94**	**94**	-	-	-
CBD Rain	95	-	-	-	-	-	95
eSikhaleni	100	100	100	100	-	-	-
Felixton Met	100	100	100	100	-	-	-
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):
- *Arb - Power outage (1 day/s with <80% data capture, 18 December 2025).*
- *CBD – Power outage - function (3 day/s with <80% data capture, 1, 25-26 December 2025).*
- *CBD ES1 - Power outage - function (2 day/s with <80% data capture, 25-26 December 2025).*
- *CBD Rain - Power outage – function (2 day/s with <80% data capture, 25-26 December 2025).*

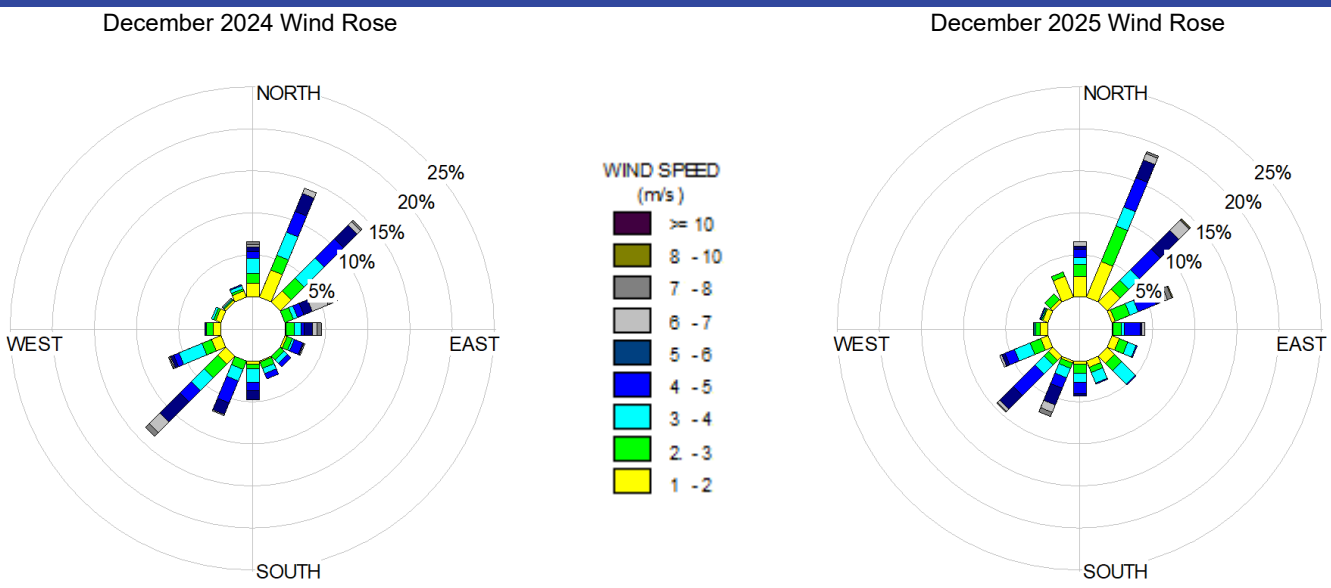
2.2. Wind Roses

Monthly wind roses for December 2024 and 2025 for Arboretum are presented in Figure 2.1. They indicate that the wind blew predominantly along the NE and SW axes. 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.

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 winds occur throughout the year and are typically associated with the arrival of coastal lows and cold fronts. Coastal lows are more frequent during the summer, which is why the slightly higher proportion of these winds is observed.

Diurnal wind roses for December 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.

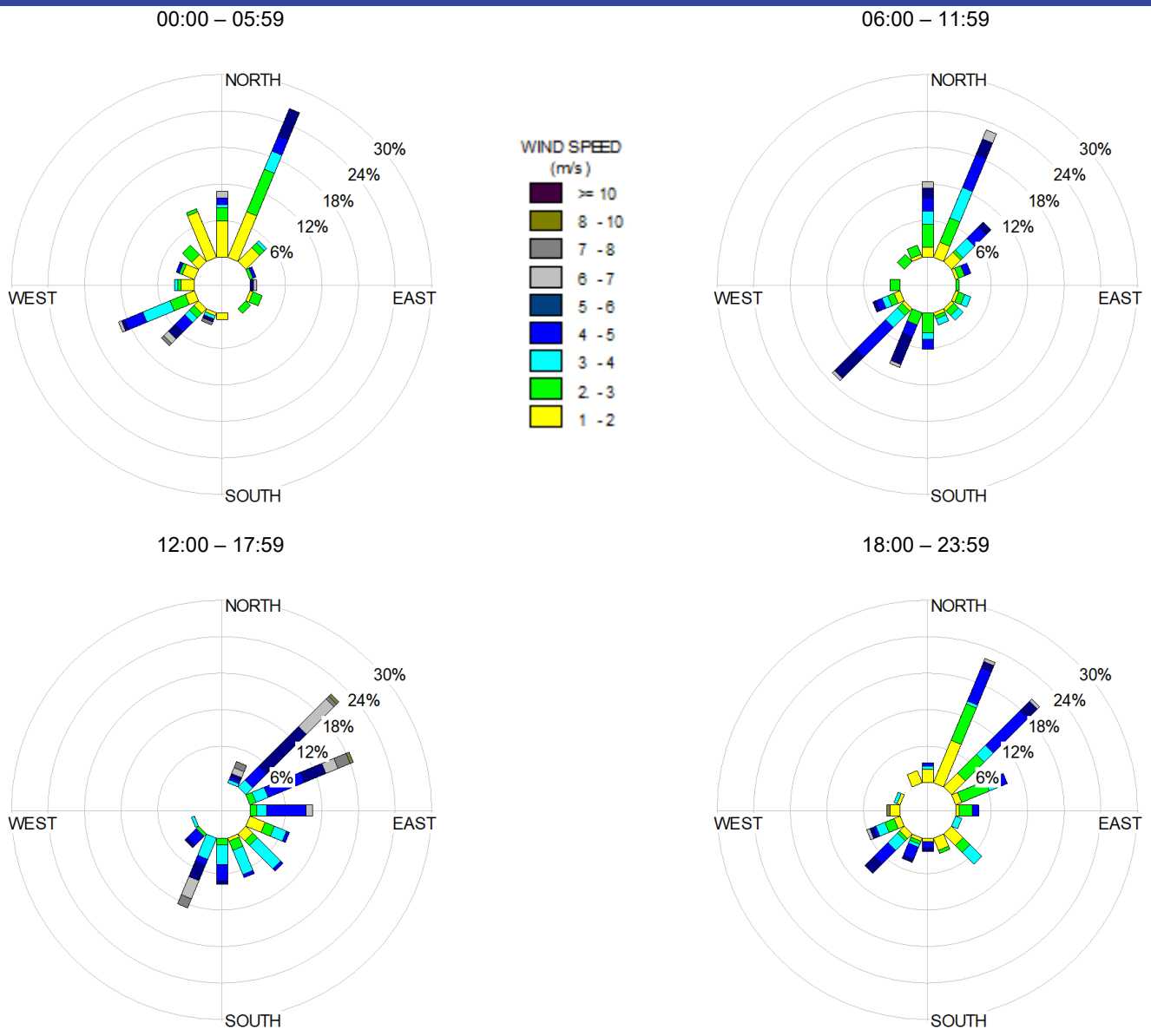
Arboretum



Period	Wind Speed	Dominant Sector 1		Dominant Sector 2		Calms	Valid Data
December 2024	3.8 m/s	N-ENE	46%	SSW-WSW	31%	0%	89%
December 2025	3.5 m/s	N-ENE	49%	SSW-WSW	24%	1%	98%

Figure 2.1: Wind roses - monthly.

Arboretum – December 2025



Period	Wind Speed	Dominant Sector 1		Dominant Sector 2		Calms	Valid Data
00:00-05:59	2.8 m/s	NNW-NNE	50%	SW-WSW	24%	4%	95%
06:00-11:59	3.6 m/s	N-NE	45%	SSW-SW	27%	1%	98%
12:00-17:59	4.5 m/s	NE-SSW	92%	-	0%	0%	100%
18:00-23:59	3.1 m/s	NNE-ENE	54%	SE & SW	17%	1%	97%

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 E for tables).

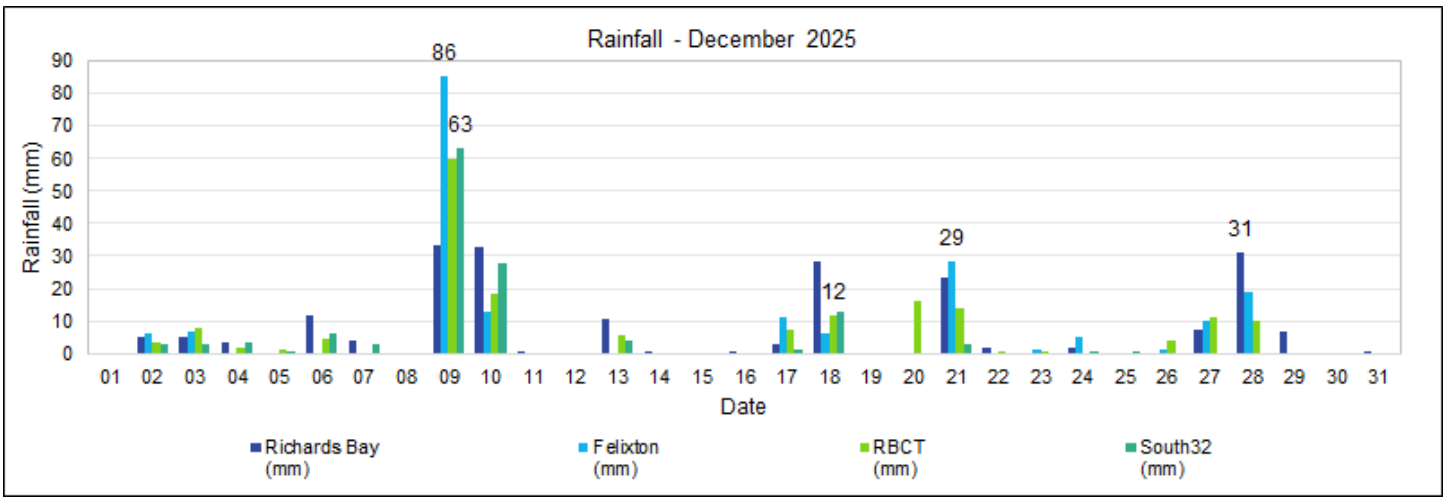


Figure 2.3: Rainfall.

Table 2.2: Rainfall -monthly averages.

Month	Richards Bay (mm)	Felixton (mm)	RBCT (mm)	South32 (mm)	Average (mm)
December 2025	211	193	178	132	178

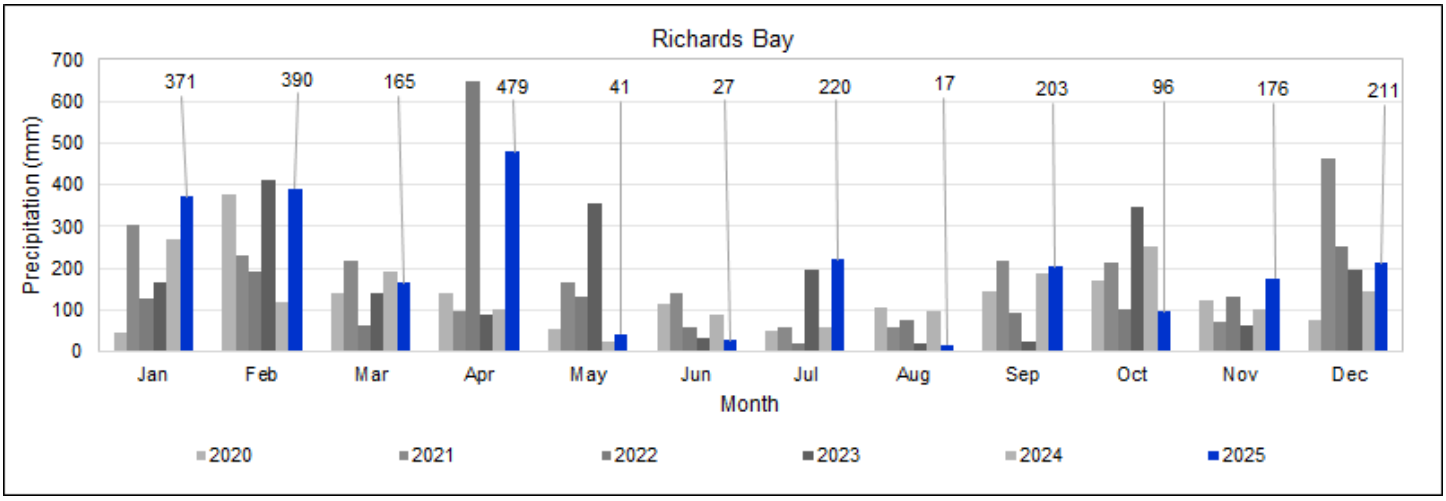


Figure 2.4: Rainfall –Richards Bay.

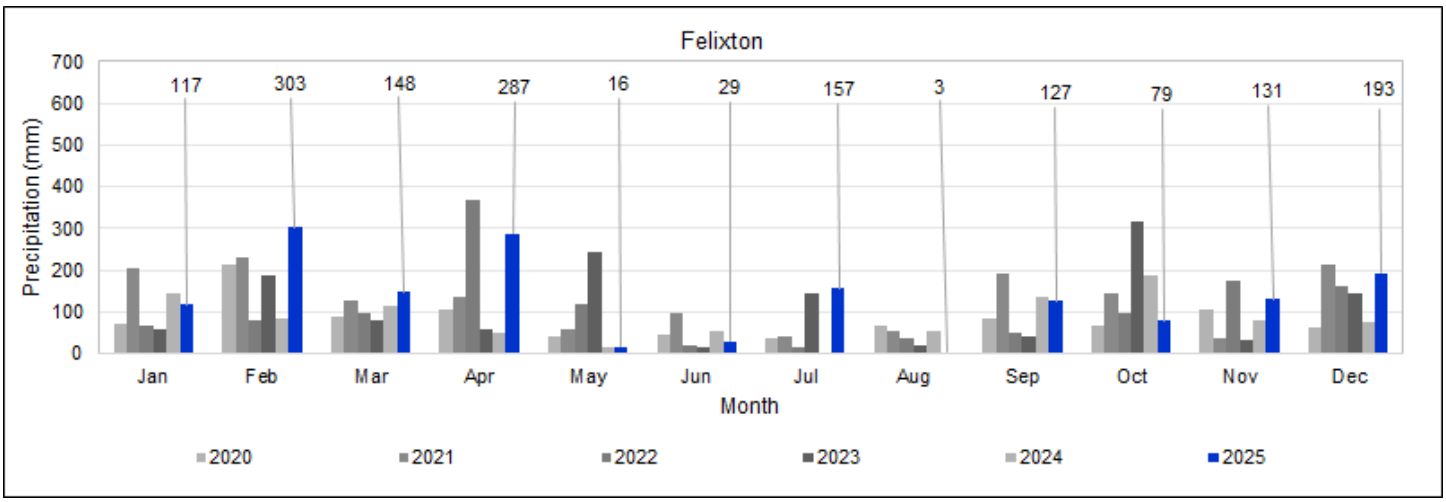


Figure 2.5: Rainfall – Felixton.

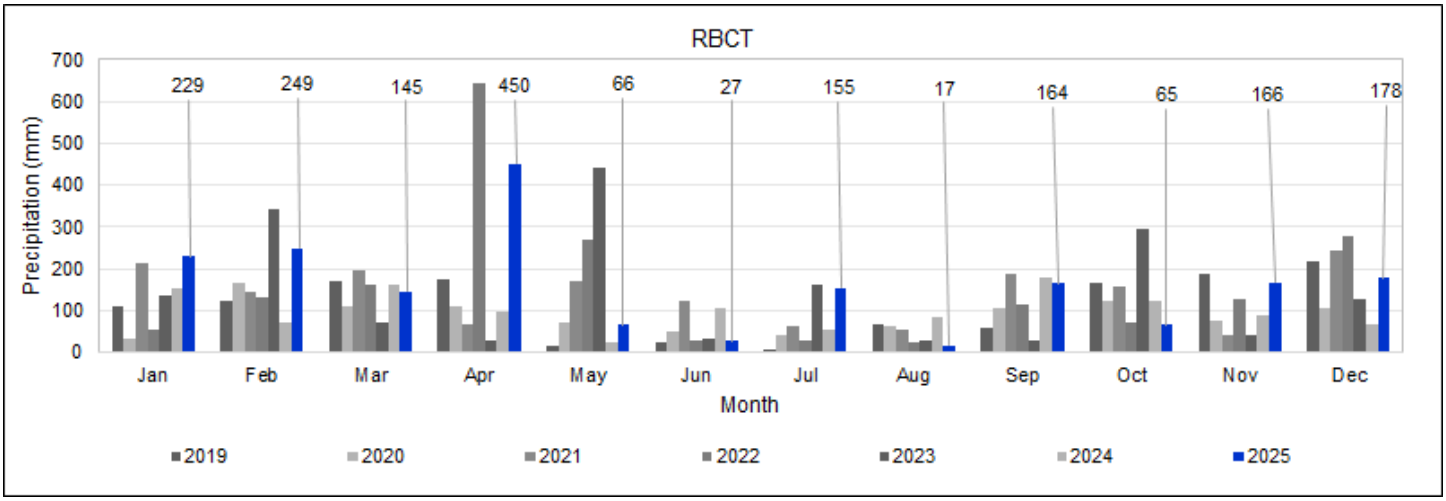


Figure 2.6: Rainfall – RBCT.

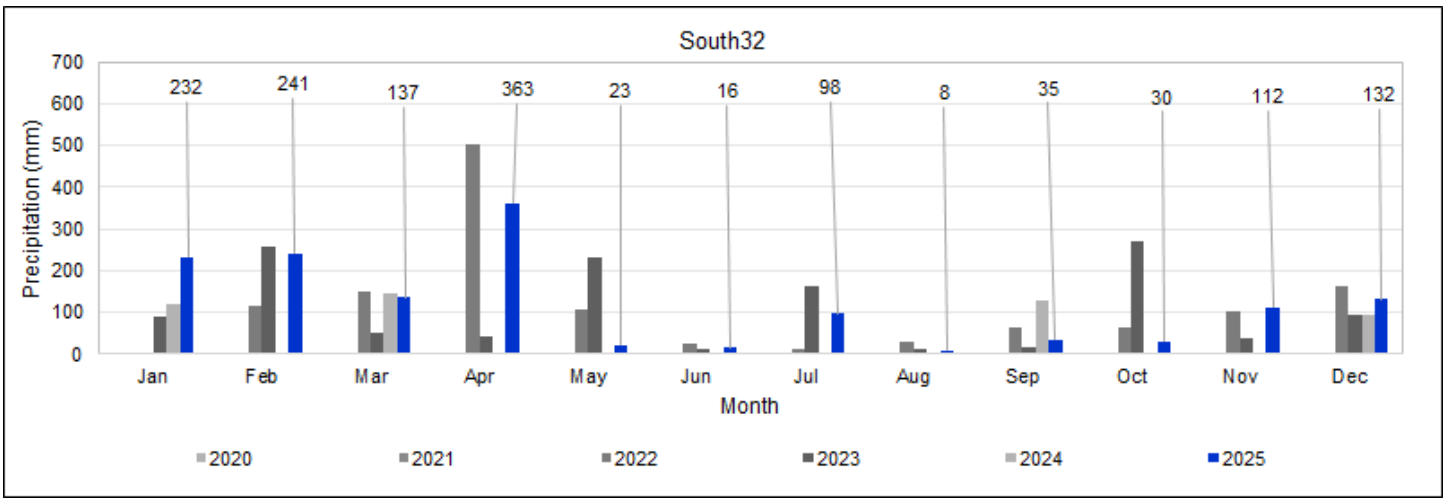


Figure 2.7: Rainfall - South32.

Note: South32 has had issues with its rain gauge in 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 December 2025. Please see APPENDIX F for the Complaints Log.

3.1. Field Observations

Ten (10) air quality complaints were received during December 2025; Ten (10) were logged in December 2024. The daily complaints and a monthly historical count are reflected below (Figure 3.1 and Figure 3.2).

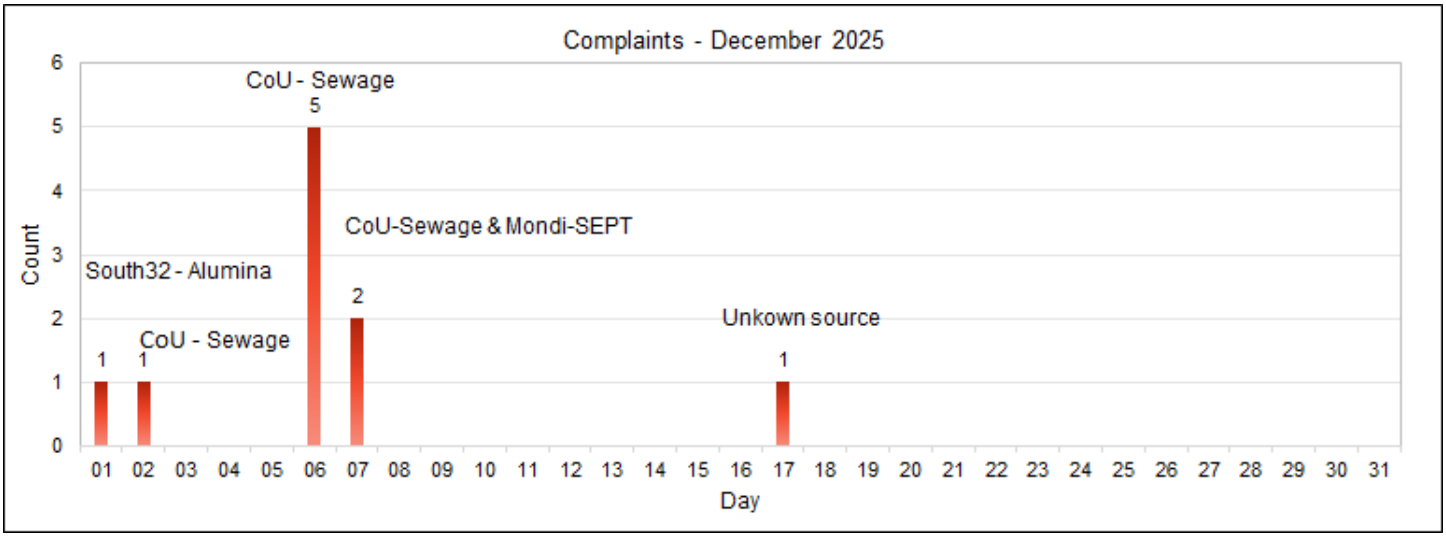


Figure 3.1: Complaints – daily.

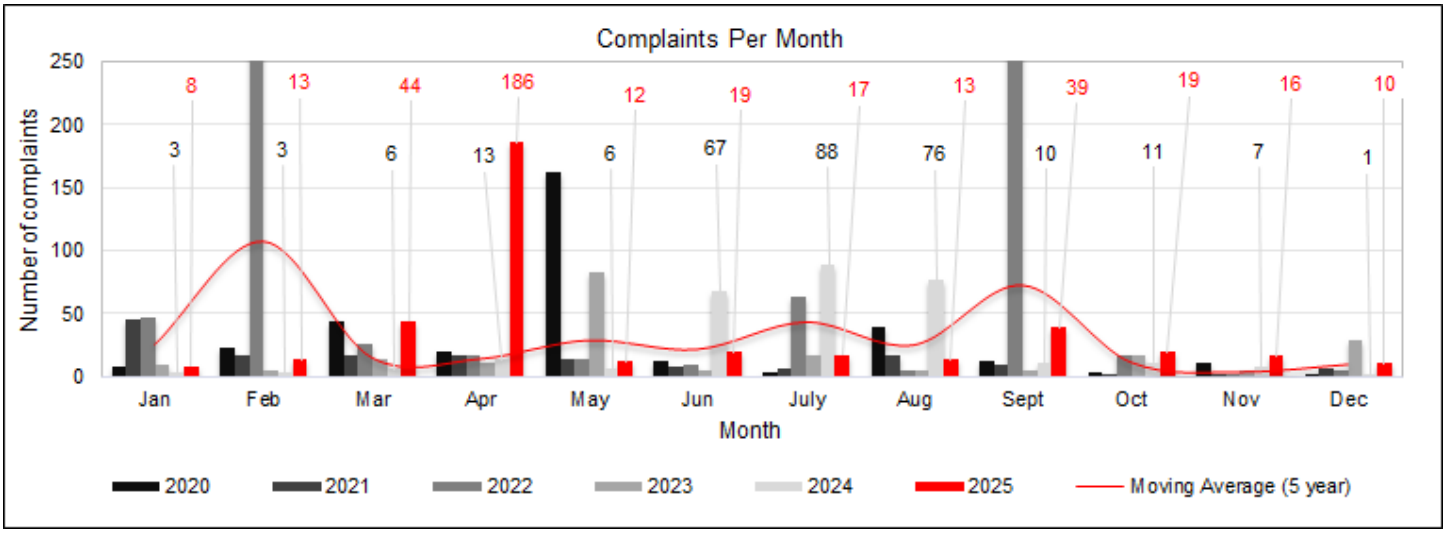


Figure 3.2: Complaints - historical monthly comparison.

3.2. Complaints Distribution

The distribution of complaints in December 2025 by region, source and type is presented in Figure 3.3, Figure 3.4, and Figure 3.5.

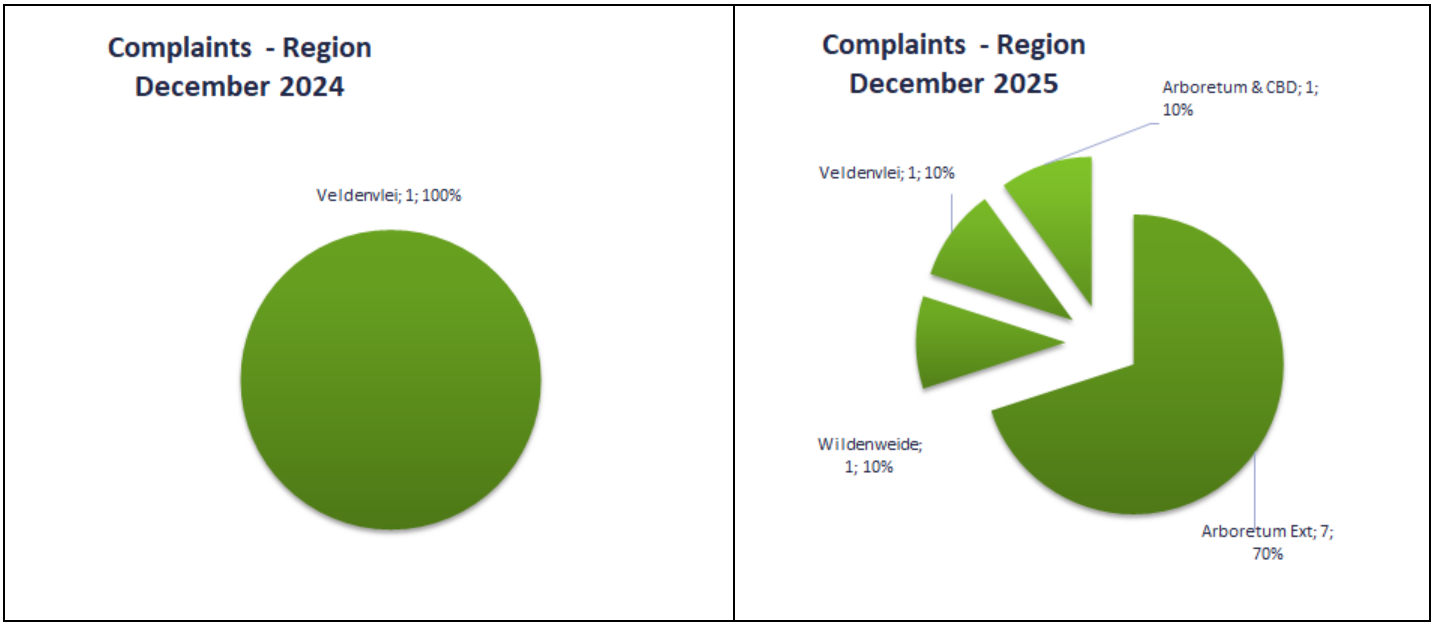


Figure 3.3: Complaints - region.

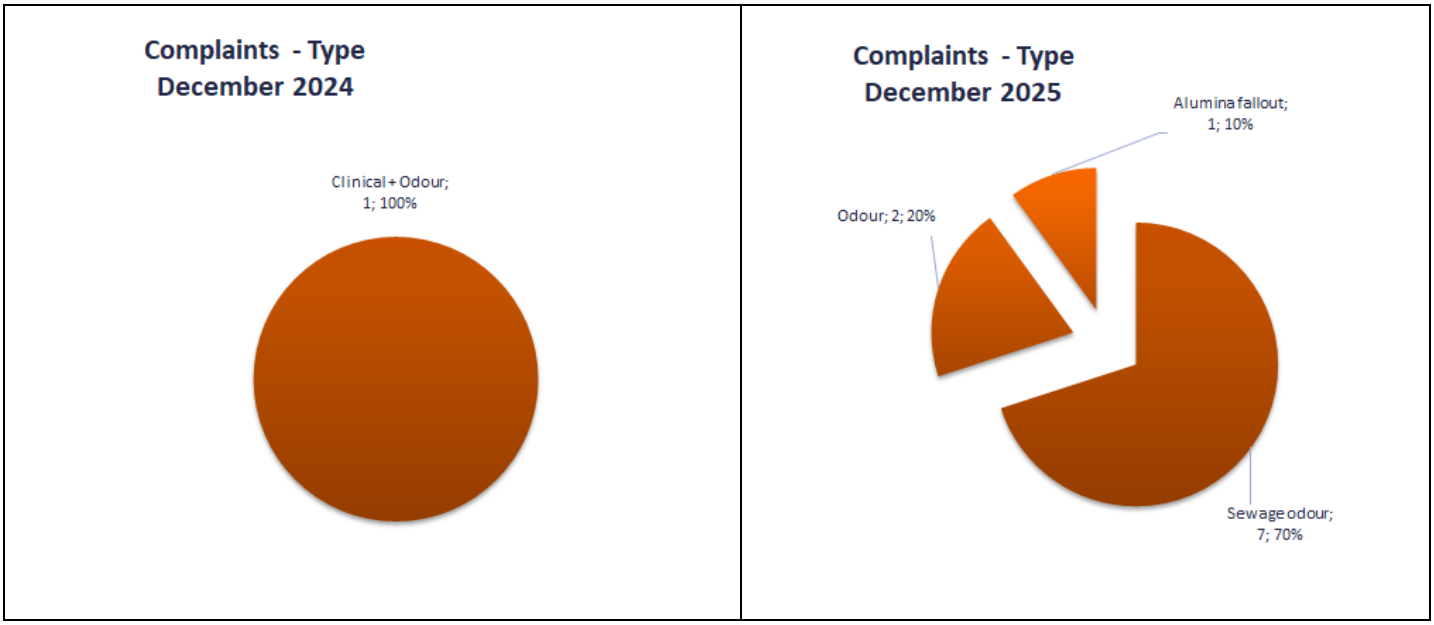


Figure 3.4: Complaints - type.

The complaints received were allocated as follows: CoU (7, 70%), Mondi (1, 10%), South32 (1, 10%), and Unknown source (1, 10%).

Table 3.1: Complaint - allocation, region, and type.

Complaint - allocation, region, and type	10
CoU	**7**
Arboretum Ext	7
Sewage odour	7
Mondi	**1**
Wildenweide	1
Odour	1
South32	**1**
Veldenvlei	1
Alumina fallout	1
Unknown source	**1**
Arboretum & CBD	1
Odour	1

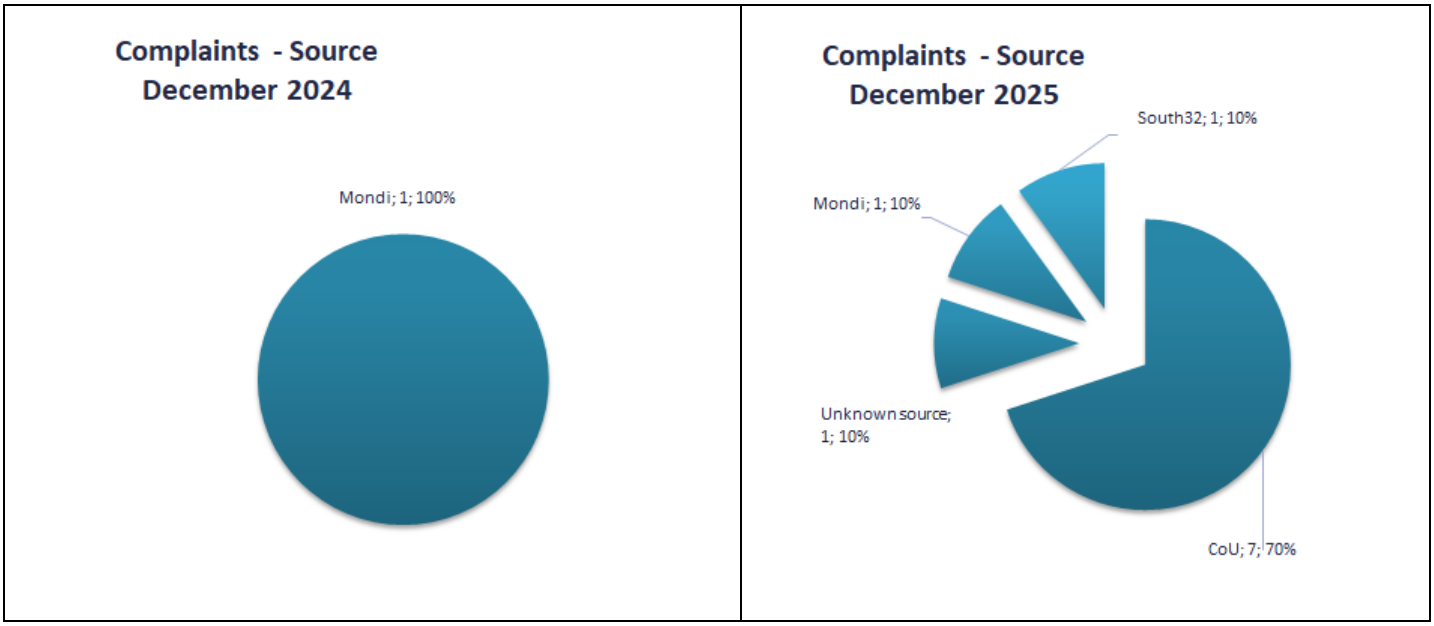


Figure 3.5: Complaints - source.

4. FINE PARTICULATE MONITORING

Particulate Matter (PM) refers to the solid particles and liquid droplets in the atmosphere. Many anthropogenic and natural sources emit PM directly or release other pollutants into the atmosphere, which then 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_{10}, and particles less than 2.5 micrometres (µm) in diameter are classified as $PM_{2.5}$.

Fine particulates can be inhaled and accumulate in the deep recesses of 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 uses 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 on it. 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_{10} Daily Average (µg/m³)	PM_{10} Annual Average (µg/m³)	$PM_{2.5}$ Daily Average (µg/m³)	$PM_{2.5}$ Annual Average (µg/m³)
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 December 2025 is shown in Table 4.2.

Table 4.2: PM data capture.

Station	Availability (%)	PM_{10} (%)	$PM_{2.5}$ (%)
Brackenham ES2	100	-	100
CBD ES1	95	95	-
eSikhaleni	100	100	-
Felixton ES1	100	100	-
Felixton ES2	99	-	99
Harbour West ES2	100	-	100
Richardia	100	100	-
Scorpio ES1	100	100	-
Scorpio ES2	100	-	100

Missing Data (PM_{10}):

- *CBD ES1 - Power outage - function (2 day/s with <80% data capture, 25-26 December 2025).*

Missing Data ($PM_{2.5}$):

- *None*

4.3. Monthly

PM_{10} 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).

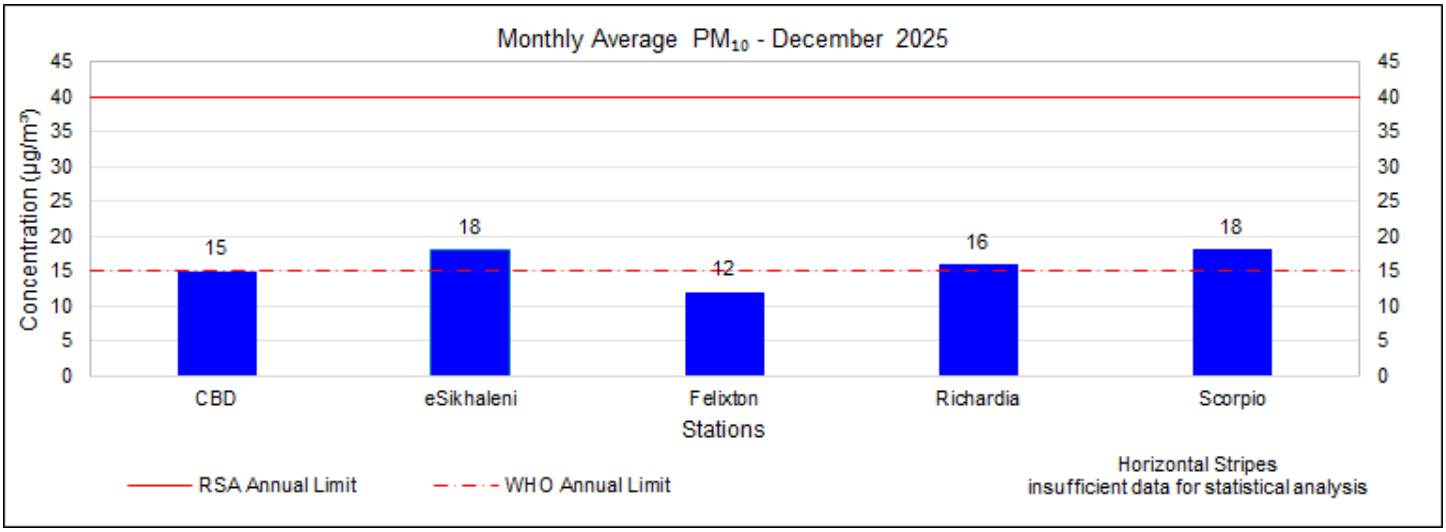


Figure 4.1: PM_{10} monthly concentrations.

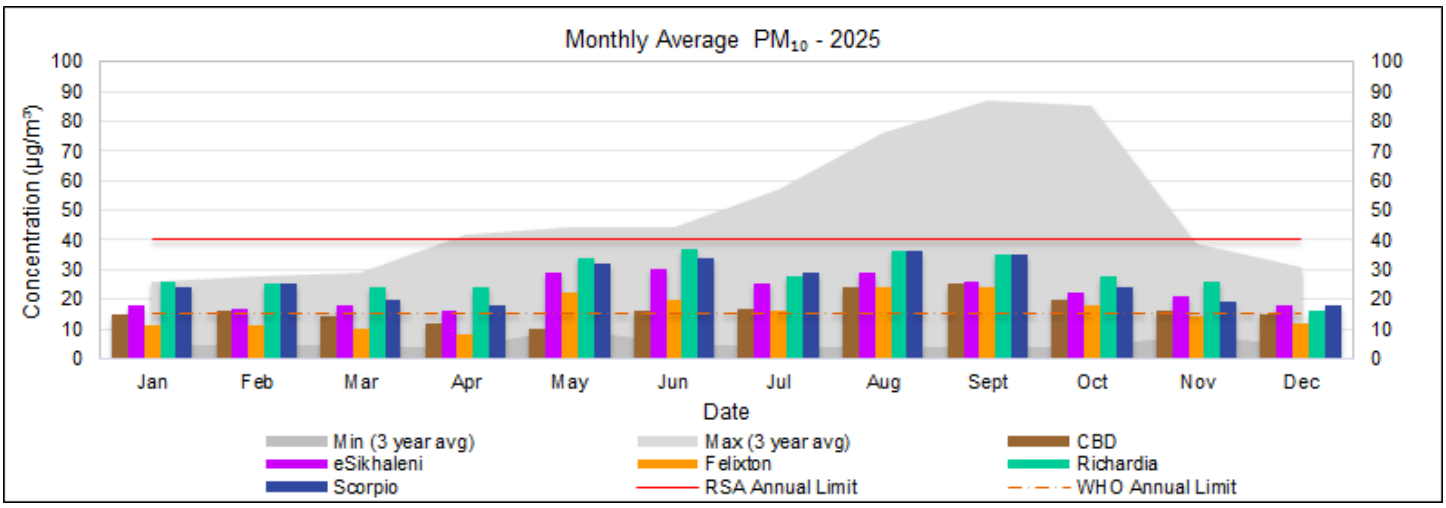


Figure 4.2: PM_{10} monthly comparison.

$PM_{2.5}$ monthly average concentrations did not exceed the RSA Annual Limit. The WHO Annual Limit was exceeded at Brackenham, Felixton, Harbour West and Scorpio - all points monitored (Figure 4.3). Comparisons to previous months are also provided (Figure 4.4).

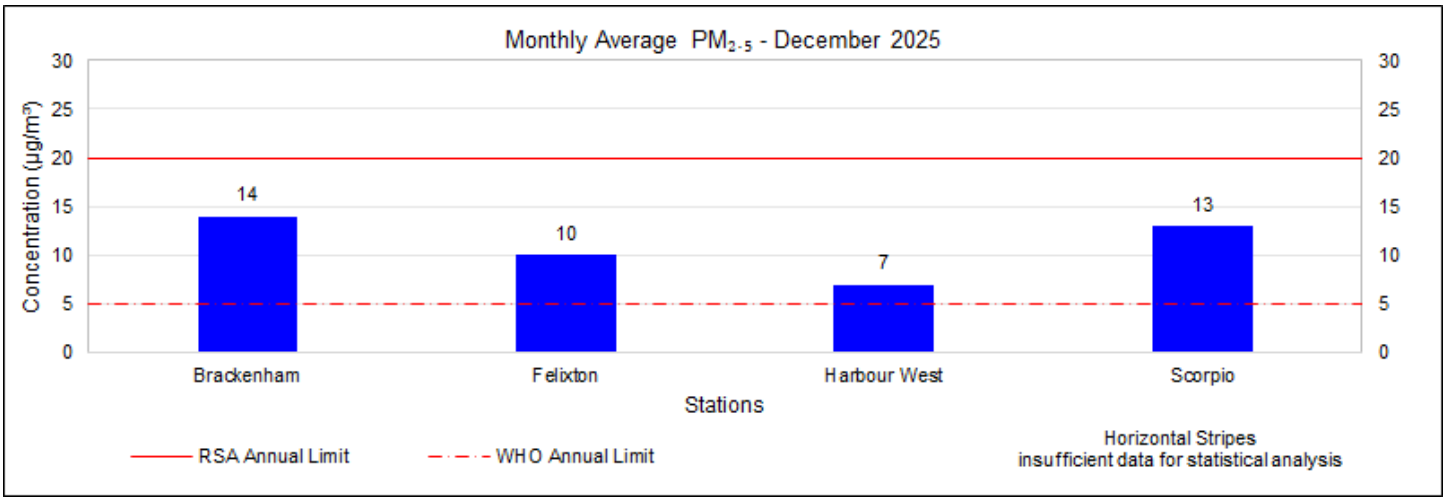


Figure 4.3: $PM_{2.5}$ monthly concentrations.

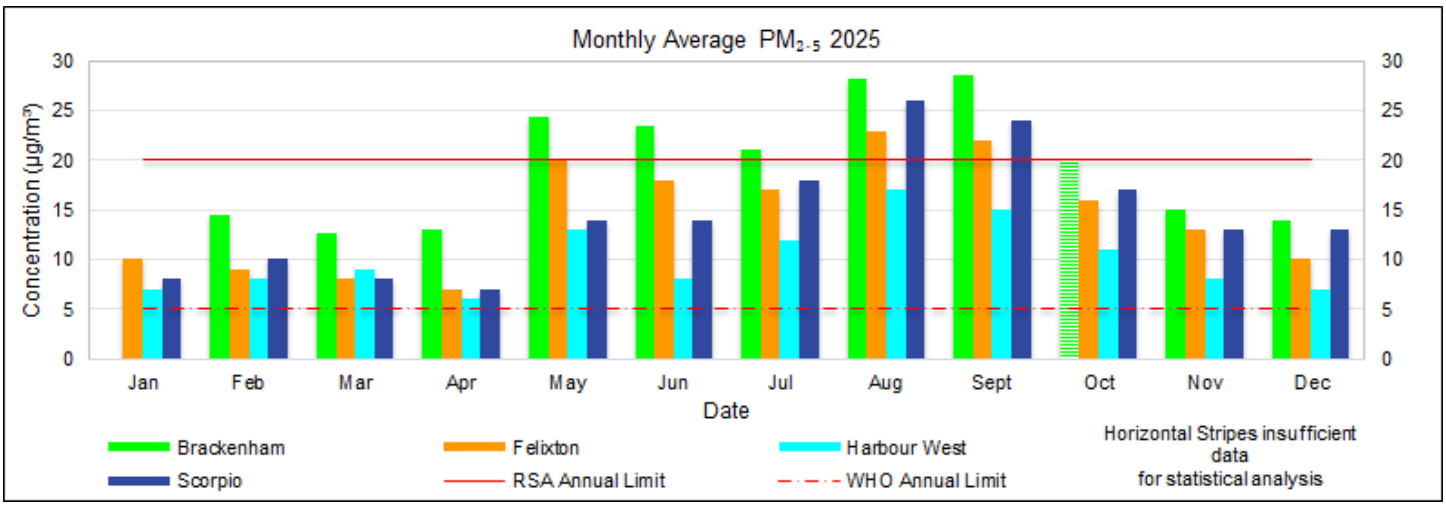


Figure 4.4: $PM_{2.5}$ monthly comparison.

4.4. Diurnal

PM diurnal concentrations are shown below (Figure 4.5 and Figure 4.6). Diurnal concentrations of PM_{10} did not exceed the RSA Daily Limit (75 µg/m³) or the WHO Daily Limit (45 µg/m³).

Diurnal concentrations of $PM_{2.5}$ did not exceed the RSA Daily Limit (40 µg/m³); the WHO Daily Limit (15 µg/m³) was exceeded at Brackenham and Scorpio.

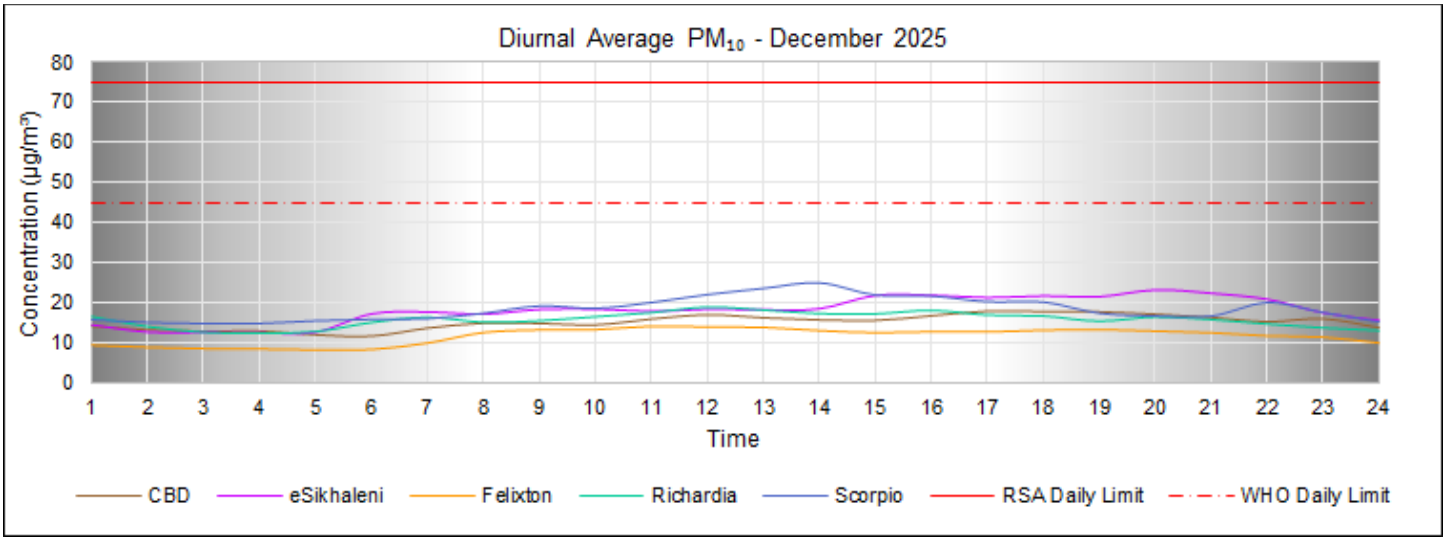


Figure 4.5: PM_{10} diurnal concentrations.

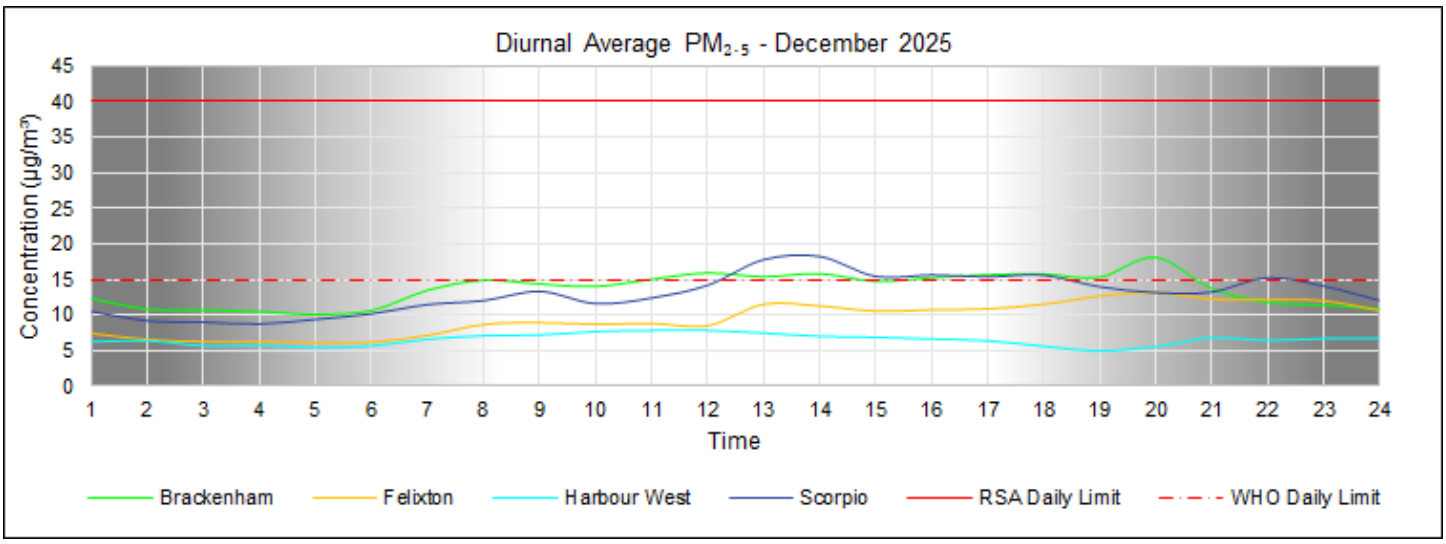


Figure 4.6: $PM_{2.5}$ diurnal concentrations.

4.5. Daily

PM_{10} daily concentrations are shown in Figure 4.7, and exceedances are in **Error! Reference source not found.**. There were:

- No (0) measured exceedances of the RSA Limit (75 µg/m³); and,
- No (0) measured exceedance of the WHO Limit (45 µg/m³).

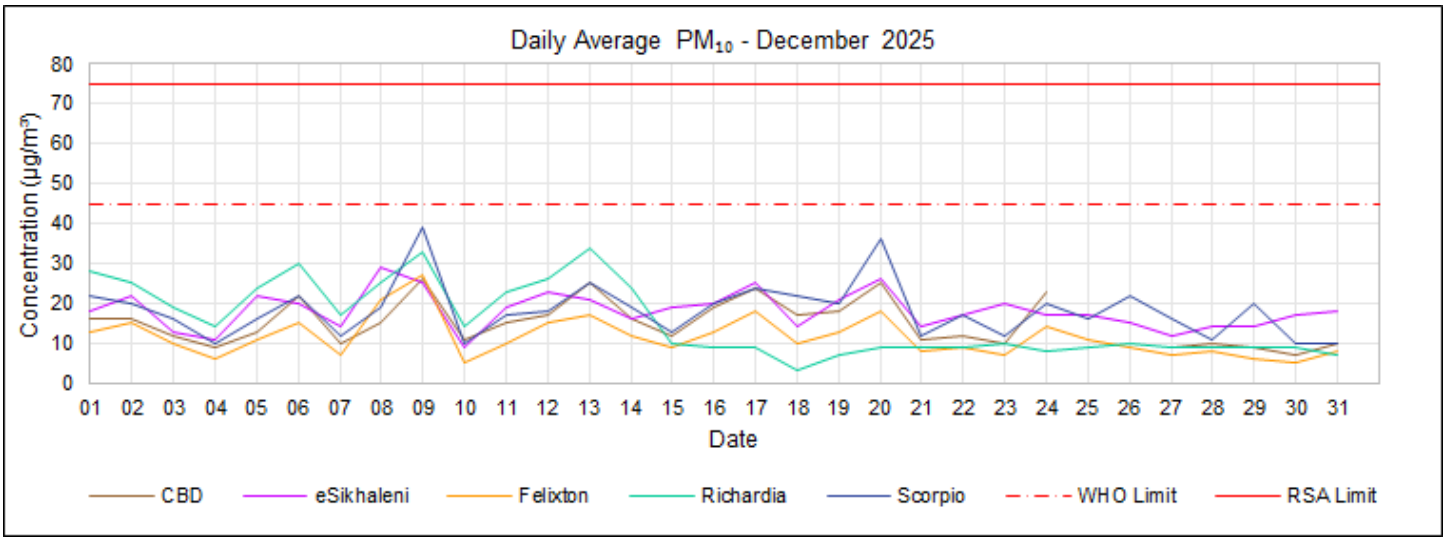


Figure 4.7: PM_{10} 24-hour average concentrations.

Missing Data (PM_{10})

- *CBD ES1 - Power outage - function (2 day/s with <80% data capture, 25-26 December 2025).*

$PM_{2.5}$ daily concentrations are shown in Figure 4.8, and exceedances are in Table 4.3. There were:

- No (0) measured exceedances of the RSA Limit (40 µg/m³); and,
- Twenty-two (22) measured exceedances of the WHO Limit (15 µg/m³).

Table 4.3: $PM_{2.5}$ 24-hour exceedances (WHO).

$PM_{2.5}$ Daily WHO Limit (15 µg/m³)	22
No response required	**22**
Brackenham	**10**
No comment	10
Felixton	**3**
No comment	3
Scorpio	**8**
No comment	8
Harbour West	**1**
No comment	1

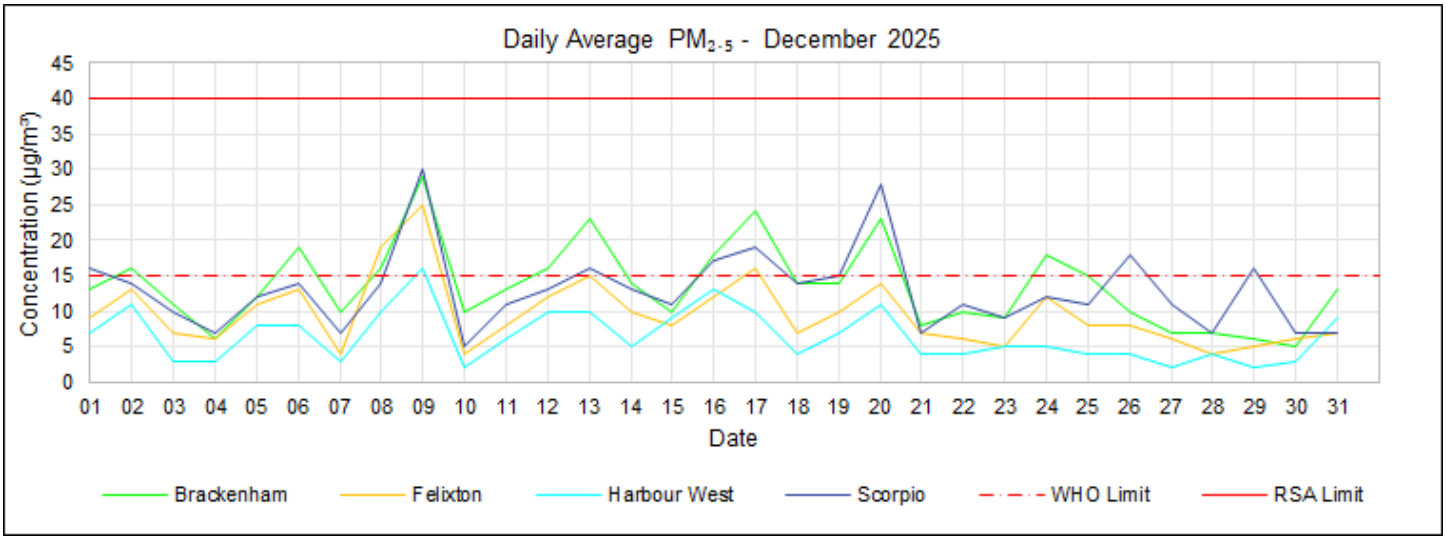


Figure 4.8: $PM_{2.5}$ daily average concentrations.

Missing Data ($PM_{2.5}$

- *None*

4.6. Exceedances

The number of days on which exceedances occurred, plus comparisons to previous months, is shown in Figure 4.9 and Figure 4.10, and a summary of PM exceedances broken down per station is presented in Table 4.4 and Table 4.5. According to the relevant Air Quality Index (AQI), the areas where no exceedances were measured may be considered good air quality concerning PM.

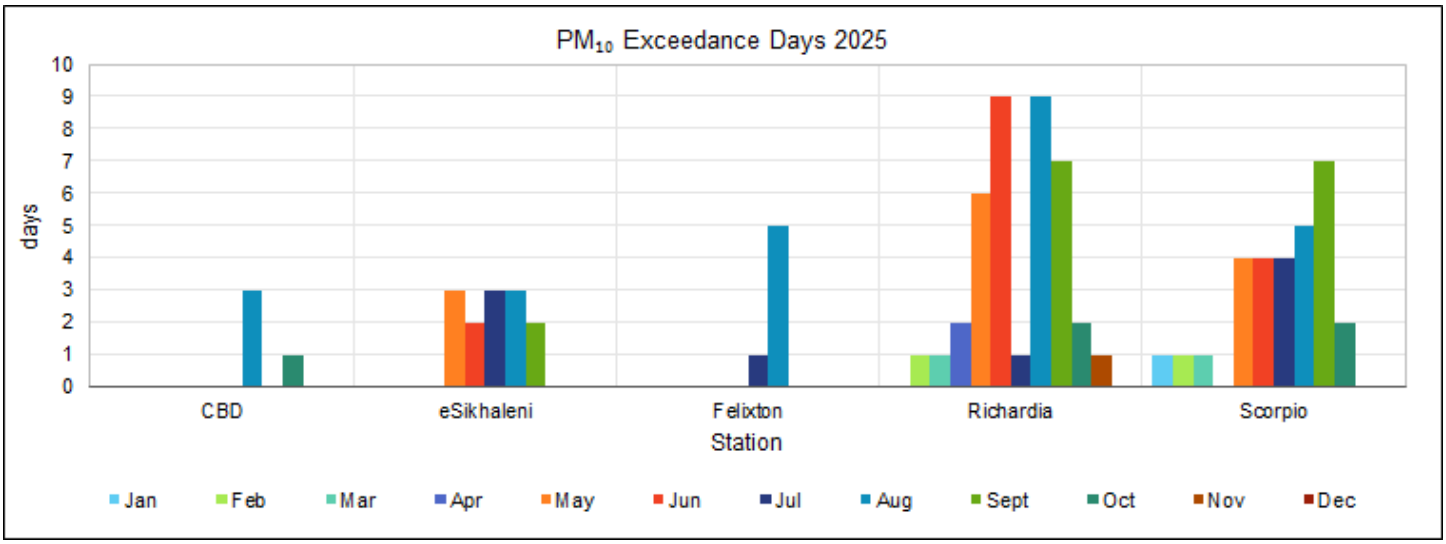


Figure 4.9: PM_{10} exceedance days.

Table 4.4: PM_{10} exceedance summary.

2025	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
PM_{10} Daily RSA Limit (75 µg/m³)													
Brackenham	-	-	-	-	-	-	-	-	-	-	-	-	0
CBD	-	-	-	-	-	-	-	-	-	-	-	-	0
eSikhaleni	-	-	-	-	-	-	-	-	-	-	-	-	0
Felixton	-	-	-	-	-	-	-	-	-	-	-	-	0
Richardia	-	-	-	-	-	1	-	-	1	-	-	-	2
Scorpio	-	-	-	-	-	-	-	1	1	-	-	-	2
PM_{10} Daily WHO Limit (45 µg/m³)													
Brackenham	-	-	-	-	-	-	-	-	-	-	-	-	0
CBD	1	-	-	-	-	-	-	3	-	1	-	-	**5**
eSikhaleni	-	-	-	-	3	2	3	3	2	-	-	-	**13**
Felixton	-	-	-	-	-	-	1	5	-	-	-	-	**6**
Richardia	-	1	1	2	6	9	1	9	7	2	1	-	**39**
Scorpio	1	1	1	-	4	5	4	5	7	2	-	-	**30**

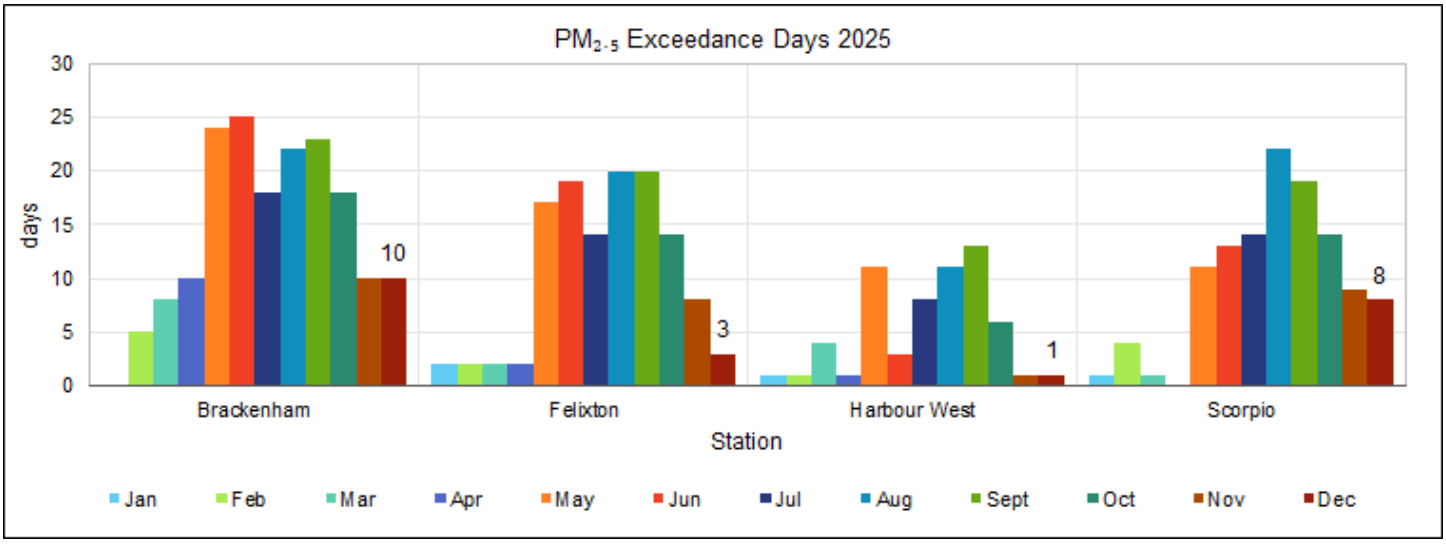


Figure 4.10: $PM_{2.5}$ exceedance days.

Table 4.5: $PM_{2.5}$ exceedance summary.

2025	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
$PM_{2.5}$ Daily RSA Limit (40 µg/m³)													
Brackenham	-	-	-	-	2	-	3	5	6	2	-	-	**18**
Felixton	-	-	-	-	-	-	1	5	-	-	-	-	**6**
Harbour West	-	-	-	-	-	-	-	3	-	-	-	-	3
Scorpio	-	-	-	-	-	-	1	5	2	-	-	-	**8**
$PM_{2.5}$ Daily WHO Limit (15 µg/m³)													
Brackenham	-	6	8	10	25	25	18	22	23	18	-	10	**165**
Felixton	2	3	2	2	18	19	14	20	20	14	8	3	**125**
Harbour West	1	2	4	1	11	3	8	11	13	6	1	1	**62**
Scorpio	1	4	1	-	11	14	14	22	19	14	9	8	**117**

Three (3) stations, Brackenham, Felixton and Scorpio do not comply with the $PM_{2.5}$ RSA Daily Standard. The standard allows for a maximum of 4 exceedances of the $PM_{2.5}$ RSA 24-hour standard (40 µg/m³).

4.7. Conclusion

4.7.1. Monthly air quality (December 2025)

- Data completeness (December 2025): PM_{10} and $PM_{2.5}$ data capture ranged from 95–100% at all reporting stations; CBD ES1 achieved 95% PM_{10} capture due to a power outage on 25–26 December 2025.
- Regulatory (RSA NAAQS): 0 exceedances of the PM_{10} 24-hour standard (75 µg/m³) and 0 exceedances of the $PM_{2.5}$ 24-hour standard (40 µg/m³).
- Health guidance (WHO): $PM_{2.5}$ recorded 22 exceedance-days of the WHO 24-hour guideline (15 µg/m³) across Brackenham (10), Felixton (3), Scorpio (8) and Harbour West (1); PM_{10} recorded 0 exceedances of the WHO 24-hour guideline (45 µg/m³).

4.7.2. Year-to-date (2025 calendar year)

- Regulatory (RSA NAAQS; max 4 exceedances/year): PM_{10} remained compliant at all reporting stations. $PM_{2.5}$ was non-compliant at Brackenham (18 exceedances), Felixton (6) and Scorpio (8), and compliant at Harbour West (3).
- Health guidance (WHO): $PM_{2.5}$ WHO 24-hour guideline exceedance-days totalled Brackenham (165), Felixton (125), Harbour West (62) and Scorpio (117). PM_{10} WHO 24-hour guideline exceedance-days totalled CBD (5), eSikhaleni (13), Felixton (6), Richardia (39) and Scorpio (30).

5. SULPHUR DIOXIDE MONITORING

Sulphur dioxide (SO_2) is one of the highly reactive gases known as "oxides of sulphur." Anthropogenic sources include fossil fuel combustion (particularly coal-burning power plants), industrial processes such as wood pulping, paper manufacturing, petroleum and metal refining, and metal smelting (particularly from sulphide-containing ores, e.g., lead, silver, and zinc ores), as well as vehicle tailpipe emissions. Natural sources of SO_2 emissions include geothermal activity (including hot springs and volcanic activity) and the natural decay of vegetation on land, in wetlands, and oceans.

SO_2 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_2 are listed below (Table 5.1).

Table 5.1: SO_2 ambient air quality limits.

Organisation	Limit	10-min Average	Hourly Average	Daily Average	Annual Average
RSA [a]	SO_2 Standard	500 µg/m³ [b]	350 µg/m³ [c]	125 µg/m³ [d]	50 µg/m³ [e]
		191ppb [b]	134 ppb [c]	48 ppb [d]	19 ppb [e]
WHO [f]	SO_2 Guideline	500 µg/m³	-	40 µg/m³	-
		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_2 analysers for December 2025 is shown in Table 5.2.

Table 5.2: SO_2 data capture.

Station	Availability (%)	SO_2 (%)
Arboretum	98	98
Brackenham	100	100
CBD	***94***	***94***
eSikhaleni	100	99
Felixton	100	99
Harbour West	100	99
Richardia	100	***90***
Scorpio	99	99

Notes:

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

Missing Data (SO_2):

- *Arb - Power outage (1 day/s with <80% data capture, 18 December 2025).*
- *CBD – Power outage - function (3 day/s with <80% data capture, 1, 25-26 December 2025).*
- *Rch – Analyser failure (5 day/s with <80% data capture, 1, 24-26, 29-30 December 2025).*

5.3. Monthly

Monthly average SO_2 concentrations did not exceed the RSA Annual Limit (Figure 5.1). Comparisons to previous months are also provided (Figure 5.2).

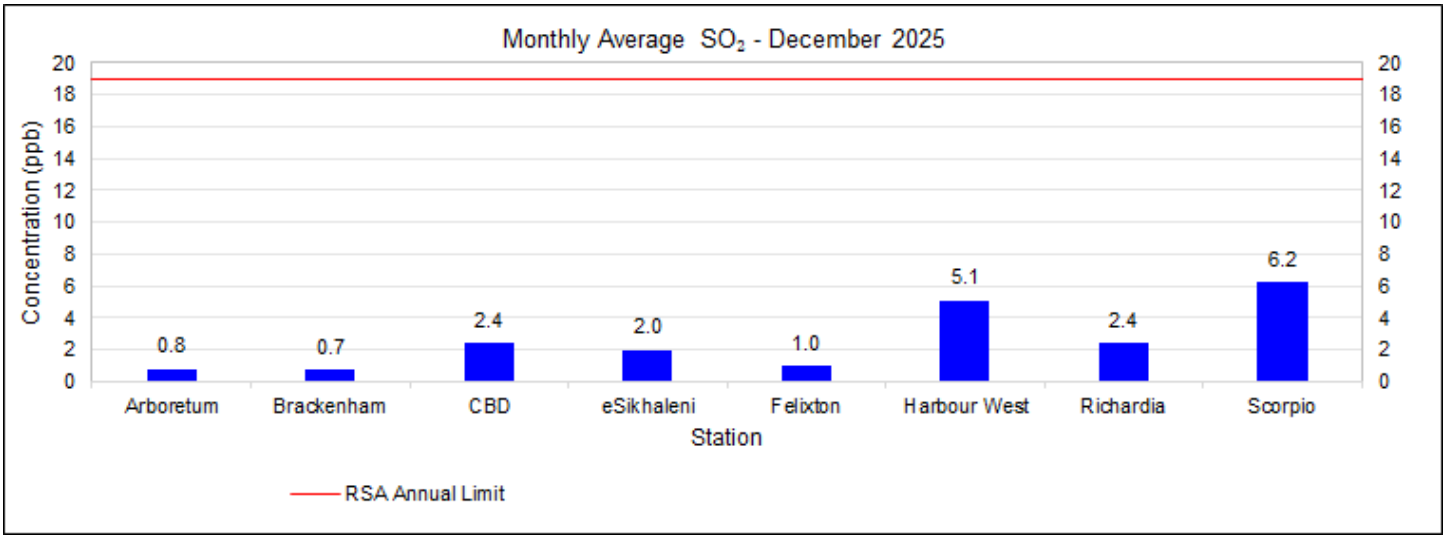


Figure 5.1: SO_2 monthly concentrations.

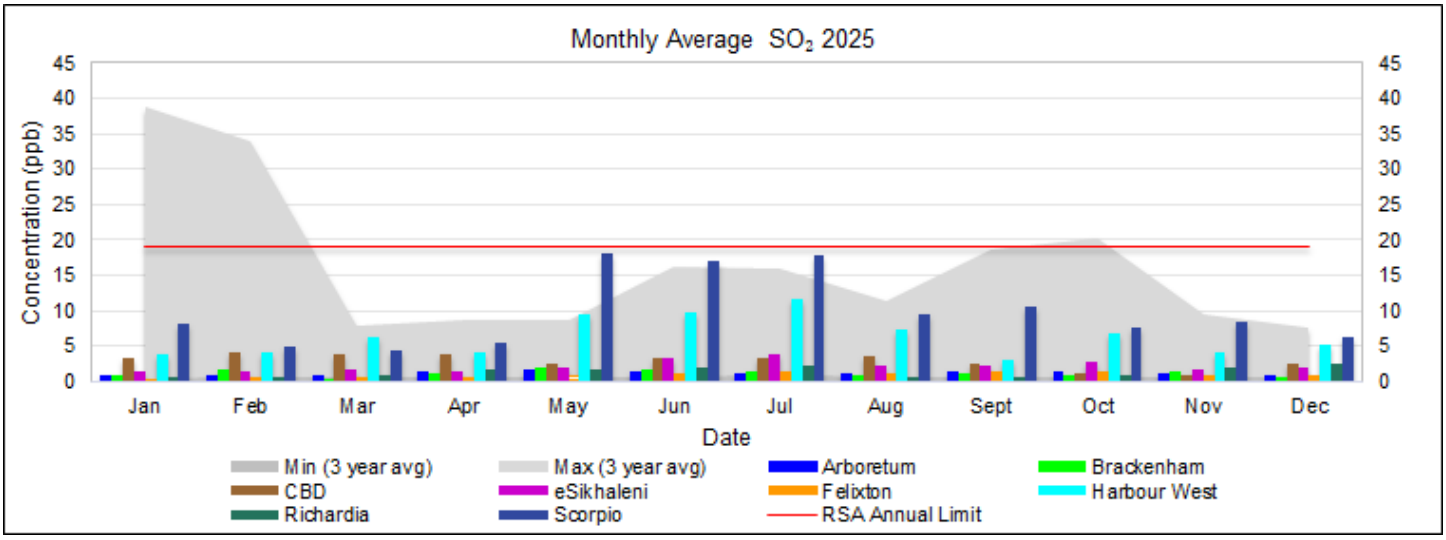


Figure 5.2: SO_2 monthly comparison.

5.4. Diurnal

Diurnal SO_2 concentrations are shown below (Figure 5.3). Diurnal concentrations of SO_2 did not exceed the RSA Daily Limit (48 ppb); the WHO Daily Limit (15 ppb) was exceeded at Harbour West.

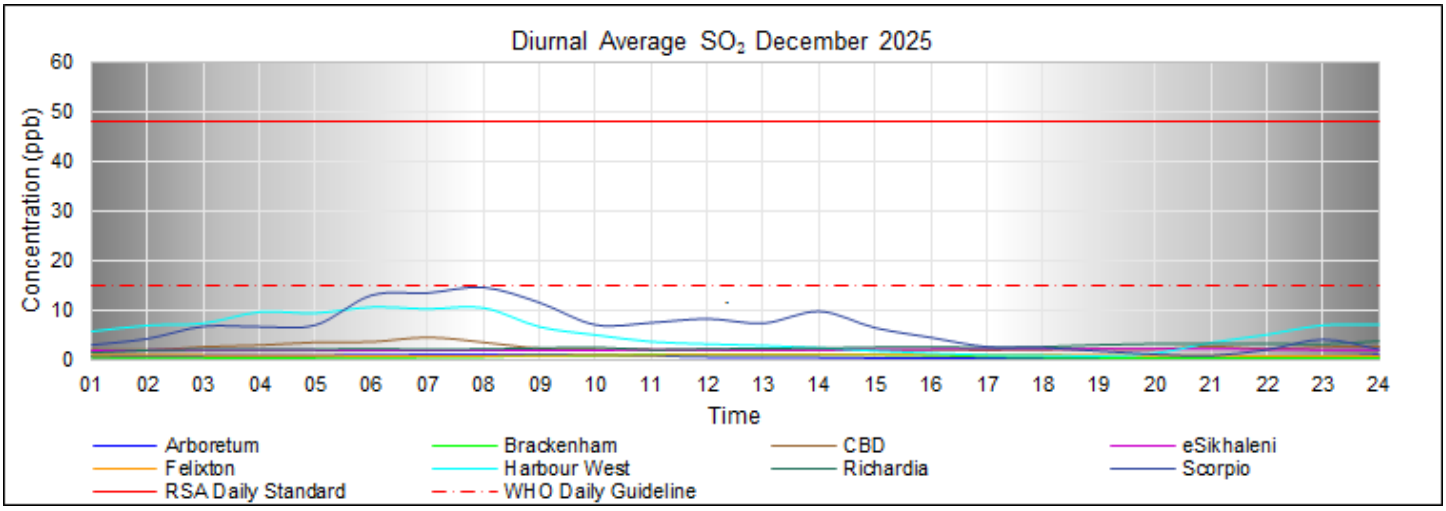


Figure 5.3: SO_2 diurnal concentrations.

5.5. Daily

SO_2 daily average concentrations are shown in Figure 5.4 and exceedances in Table 5.3: There were:

- No (0) measured exceedance of the RSA Limit (48 ppb); and,
- One (1) measured exceedance of the WHO Limit (15 ppb).

Table 5.3: SO_2 24-hour average exceedances.

SO_2 Daily WHO Limit (15 ppb)	1
No response required	**1**
Harbour West	**1**
No comment.	1

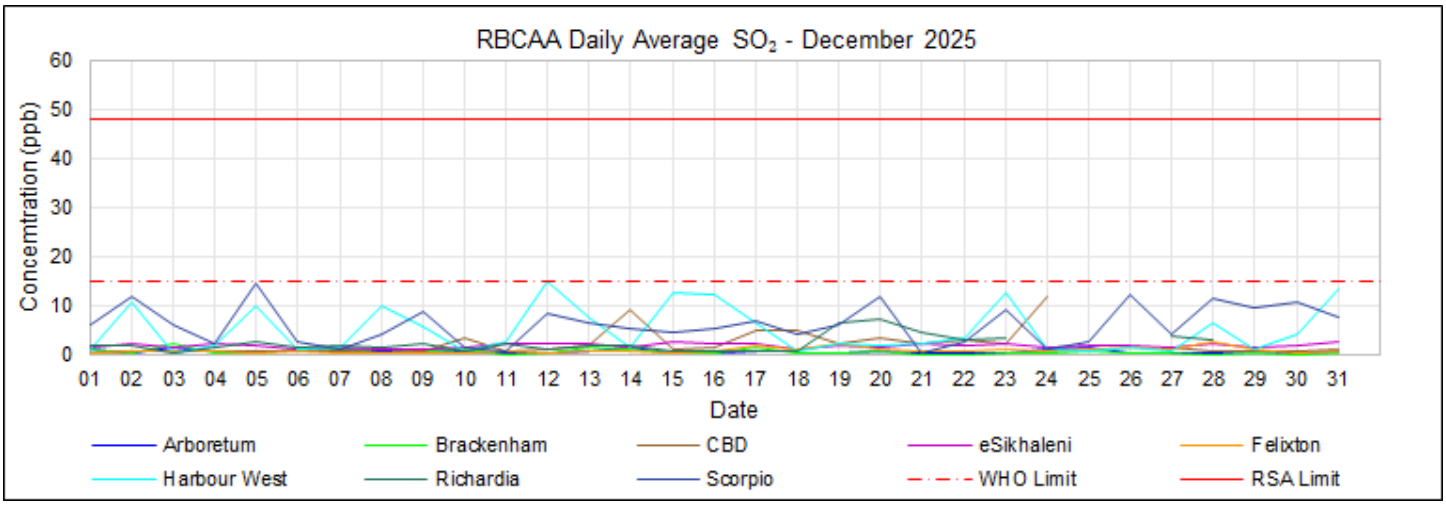


Figure 5.4: SO_2 24-hour average concentrations.

Missing Data (SO_2):

- *Arb - Power outage (1 day/s with <80% data capture, 18 December 2025).*
- *CBD – Power outage - function (3 day/s with <80% data capture, 1, 25-26 December 2025).*
- *Rch – Analyser failure (5 day/s with <80% data capture, 1, 24-26, 29-30 December 2025).*

5.6. Hourly

SO_2 hourly average concentrations are shown in Figure 5.5. None (0) measured exceedances of the RSA Limit (134 ppb) were recorded.

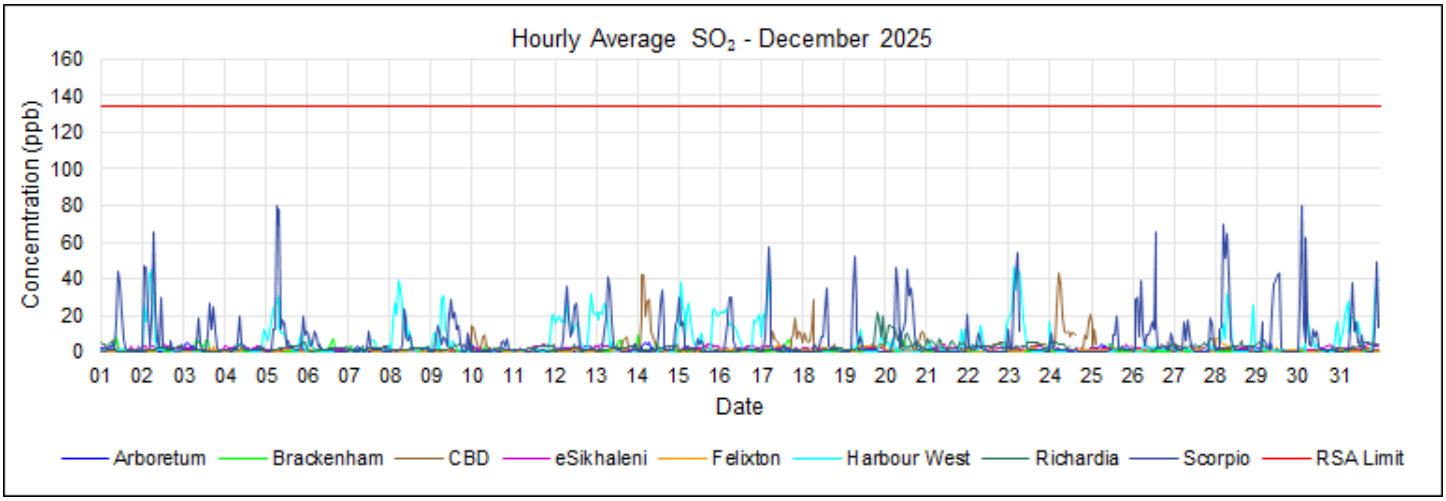


Figure 5.5: SO_2 1-hour average concentrations.

5.7. 10-minute

SO_2 10-minute average concentrations are shown in Figure 5.6. None (0) measured exceedances of the RSA and WHO Limit (191 ppb).

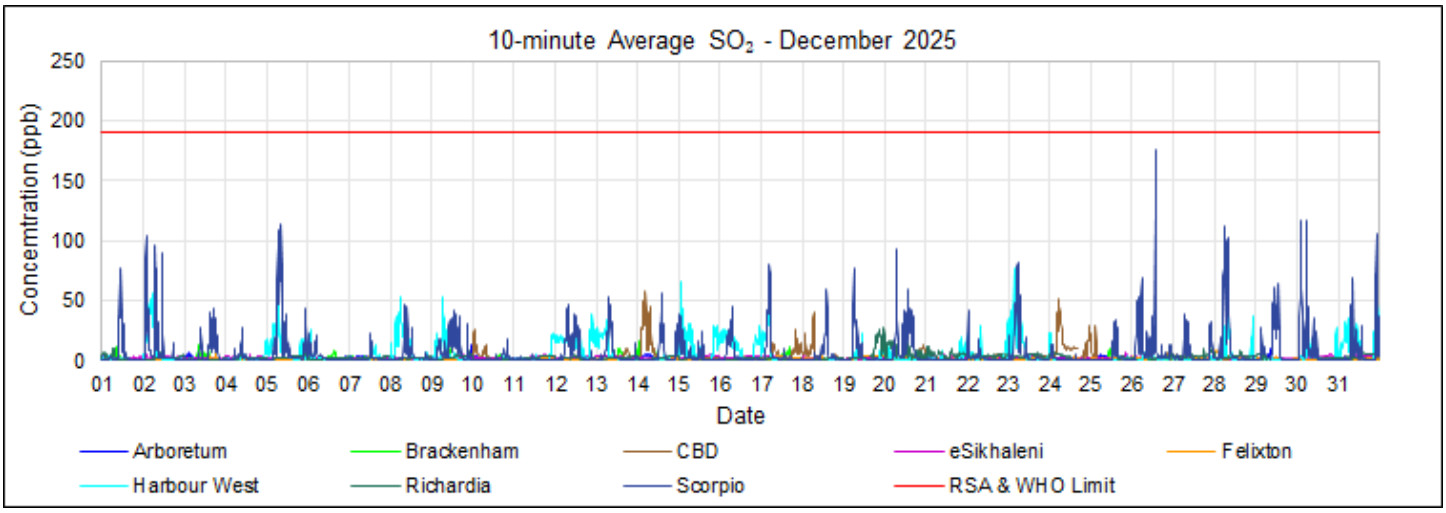


Figure 5.6: SO_2 10-minute average concentrations.

5.8. Exceedances

The number of days on which exceedances occurred, plus comparisons to previous months, is shown in Figure 5.7, and a summary of the SO_2 exceedances broken down per station is presented in Table 5.4. SO_2 exceedances can be associated with emissions resulting from process upsets (e.g., planned maintenance, plant shutdowns, or start-ups), leaks in equipment, pipelines, seals, and 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 to have good air quality regarding SO_2.

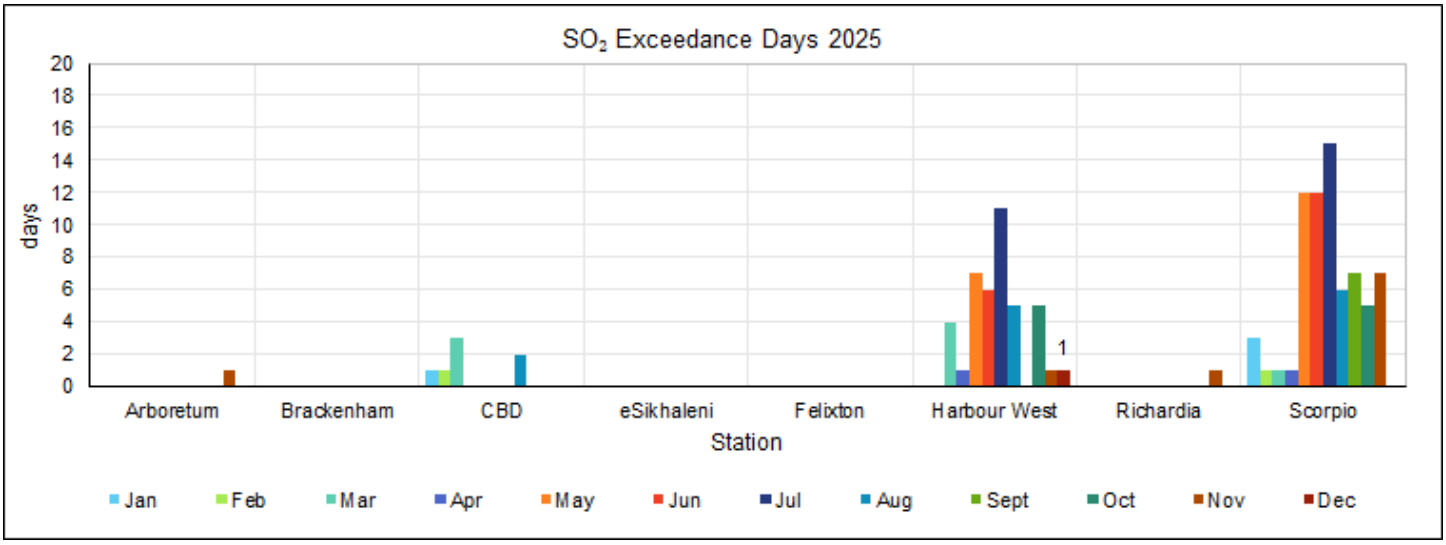


Figure 5.7: SO_2 exceedance days.

Table 5.4: SO_2 exceedance summary.

2025	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
SO_2 Daily RSA Limit (48 ppb)													
CBD	-	-	-	-	-	-	-	-	-	-	-	-	0
eSikhaleni	-	-	-	-	-	-	-	-	-	-	-	-	0
Harbour West	-	-	-	-	-	-	-	-	-	-	-	-	0
Richardia	-	-	-	-	-	-	-	-	-	-	-	-	0
Scorpio	1	-	-	-	2	2	1	-	1	1	-	-	**8**
SO_2 Daily WHO Limit (15 ppb)													
CBD	1	1	3	-	-	-	-	2	-	-	-	-	**7**
eSikhaleni	-	-	-	-	-	-	-	-	-	-	-	-	0
Harbour West	-	-	4	1	7	6	11	5	-	5	1	1	**41**
Richardia	-	-	-	-	-	-	-	-	-	-	1	-	**1**
Scorpio	3	-	1	1	12	11	15	6	7	5	6	-	**67**
SO_2 Hourly RSA Limit (134 ppb)													
CBD	-	-	-	-	-	-	-	-	-	-	-	-	0
eSikhaleni	-	-	-	-	-	-	-	-	-	-	-	-	0
Harbour West	1	-	-	-	-	-	-	-	-	-	-	-	1
Richardia	-	-	-	-	-	-	-	-	-	-	-	-	0
Scorpio	4	-	3	-	1	-	2	2	-	-	-	-	12
SO_2 10-minute RSA & WHO Limit (191 ppb)													
CBD	-	-	-	-	-	-	-	-	-	-	-	-	0
eSikhaleni	-	-	-	-	-	-	-	-	-	-	-	-	0
Harbour West	-	-	-	-	-	-	-	-	-	-	-	-	0
Richardia	-	-	-	-	-	-	-	-	-	-	8	-	8
Scorpio	18	1	-	-	-	3	3	-	-	16	4	-	45

One (1) station, Scorpio, does not comply with the SO_2 RSA Daily Standard. The standard allows for a maximum of 4 exceedances of the SO_2 RSA daily standard (48 ppb).

5.9. Conclusion

5.9.1. Monthly air quality (December 2025)

- Data completeness (December 2025): SO_2 data capture ranged from 94–100% at all stations, except Richardia at 90% due to analyser failure (1, 24–26, 29–30 December 2025).
- Regulatory (RSA NAAQS): 0 exceedances were recorded for the SO_2 10-minute (191 ppb), 1-hour (134 ppb) and 24-hour (48 ppb) standards.
- Health guidance (WHO): 1 exceedance of the WHO 24-hour guideline (15 ppb) occurred at Harbour West.

5.9.2. Year-to-date (2025 calendar year)

- Regulatory (RSA NAAQS): The 24-hour SO_2 NAAQS (max 4 exceedances/year) was non-compliant at Scorpio (8 exceedances) and compliant at all other stations. The 1-hour (max 88 exceedances/year) and 10-minute (max 526 exceedances/year) standards remained compliant at all stations.
- Health guidance (WHO): WHO 24-hour guideline exceedance-days were highest at Scorpio (67) and Harbour West (41), with additional exceedances at CBD (7) and Richardia (1).

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 own characteristics and effects.

6.1. Ambient Air Quality Standards

There are no South African standards for TRS; however, the World Health Organisation (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 µg/m³ [a]	-	-
		-	5 ppb [a]	-	-
OME	Standard (pulp and paper)	13 µg/m³ [b]	10 µg/m³ [b]	14 µg/m³ [c]	-
		9.3 ppb [b]	7.2 ppb [b]	10.1 ppb [c]	-
OME	Standard (other industries)	13 µg/m³ [b]	10 µg/m³ [b]	7 µg/m³ [b]	-
		9.3 ppb [b]	7.2 ppb [b]	5.0 ppb [b]	-

Notes:

a) *World Health Organisation recommendation to avoid substantial complaints about odour annoyance among the exposed population* (WHO, 2000).
b) *Based on odour effects* (OME, 1999).
c) *Based on the odour and health effects* (OME, 1999).
d) *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 December 2025 is shown in Table 6.2.

Table 6.2: TRS data capture.

Station	Availability (%)	TRS (%)
CBD	**94**	**94**
eSikhaleni	100	99
Felixton	100	100
Richardia	100	99

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

Missing Data (TRS):
- *CBD – Power outage - function (3 day/s with <80% data capture, 1, 25-26 December 2025).*

6.3. Monthly

Monthly average TRS concentrations are shown in Figure 6.1. Comparisons to previous months are also provided (Figure 6.2).

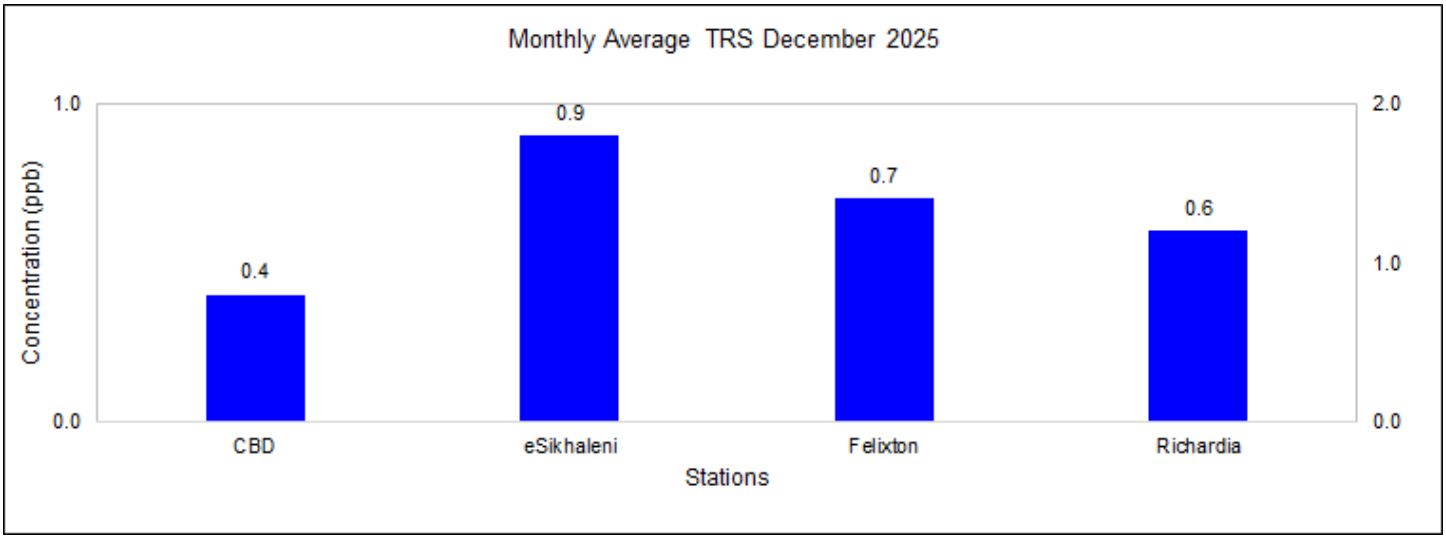


Figure 6.1: TRS monthly concentrations.

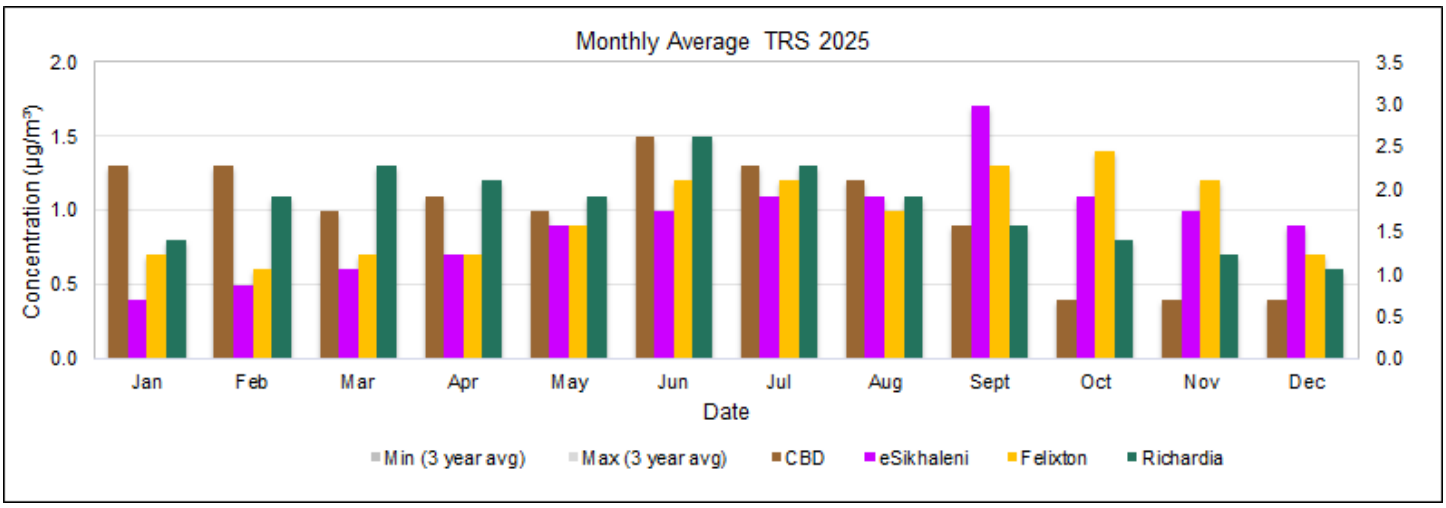


Figure 6.2: TRS monthly comparison.

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).

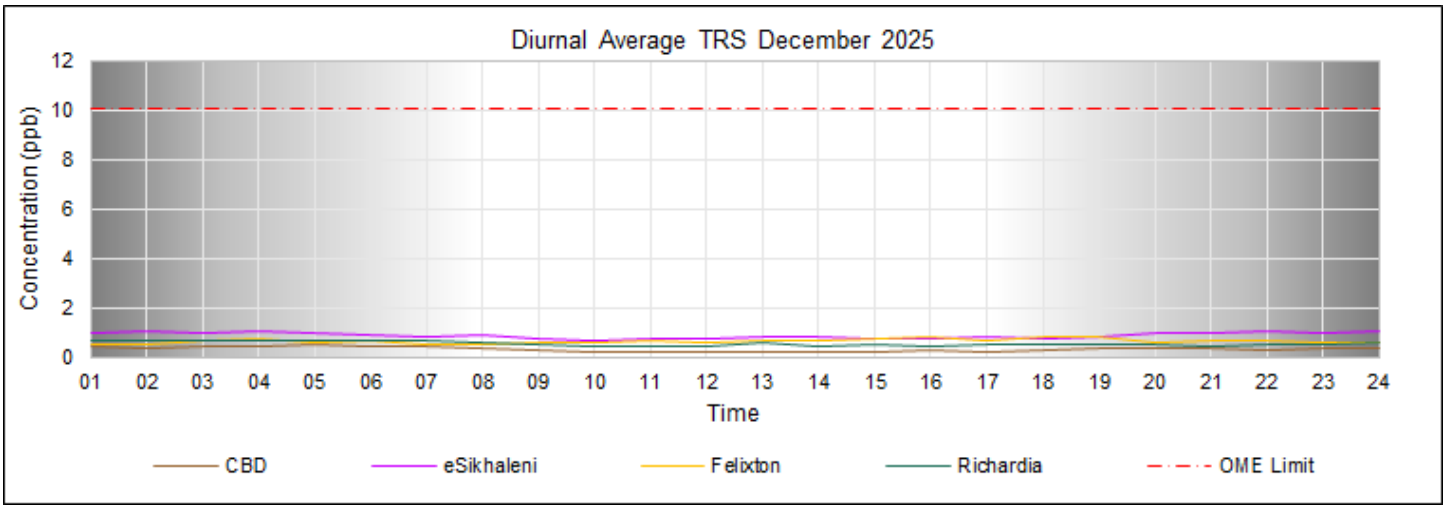


Figure 6.3: TRS diurnal concentrations.

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.

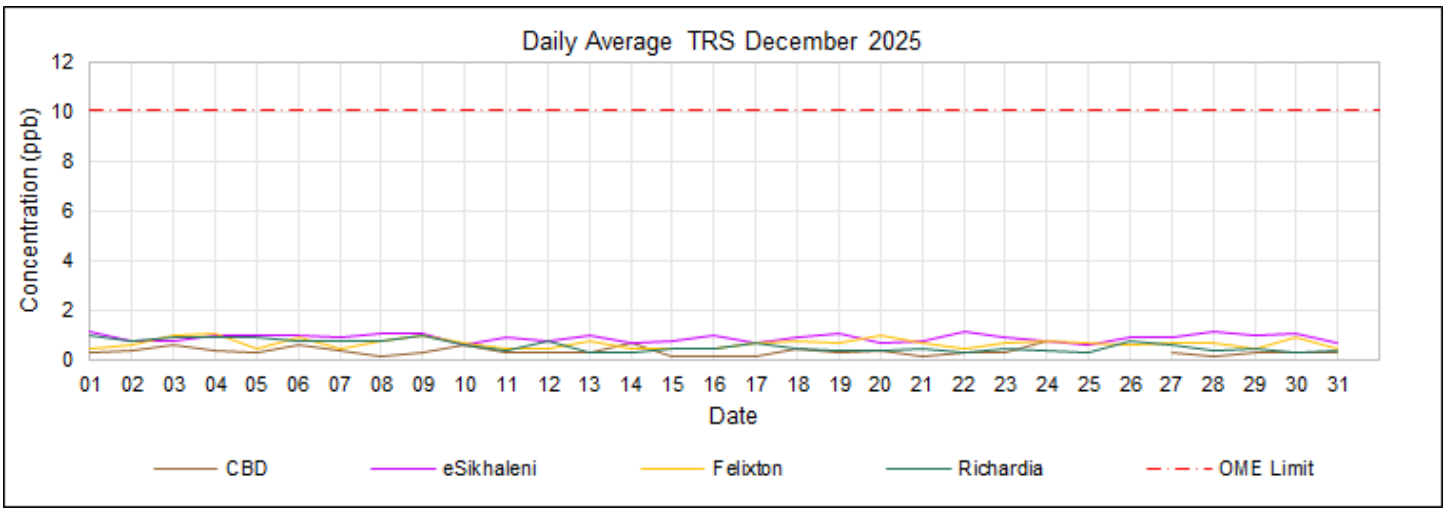


Figure 6.4: TRS daily average concentration.

Missing Data (TRS):

- *CBD – Power outage - function (3 day/s with <80% data capture, 1, 25-26 December 2025).*

6.6. 30-minute

The TRS 30-minute average concentrations are shown in Figure 6.5, and exceedances in Table 6.3. Four (4) exceedances of the WHO Limit (5.0 ppb) were measured.

Table 6.3: TRS 30-minute average exceedances (WHO).

TRS 30-minute WHO H_2S Limit (5.0 ppb)	4
Mondi	**1**
eSikhaleni	1
SETP	1
THS	**3**
Felixton	3
Boilers-coal operated	3

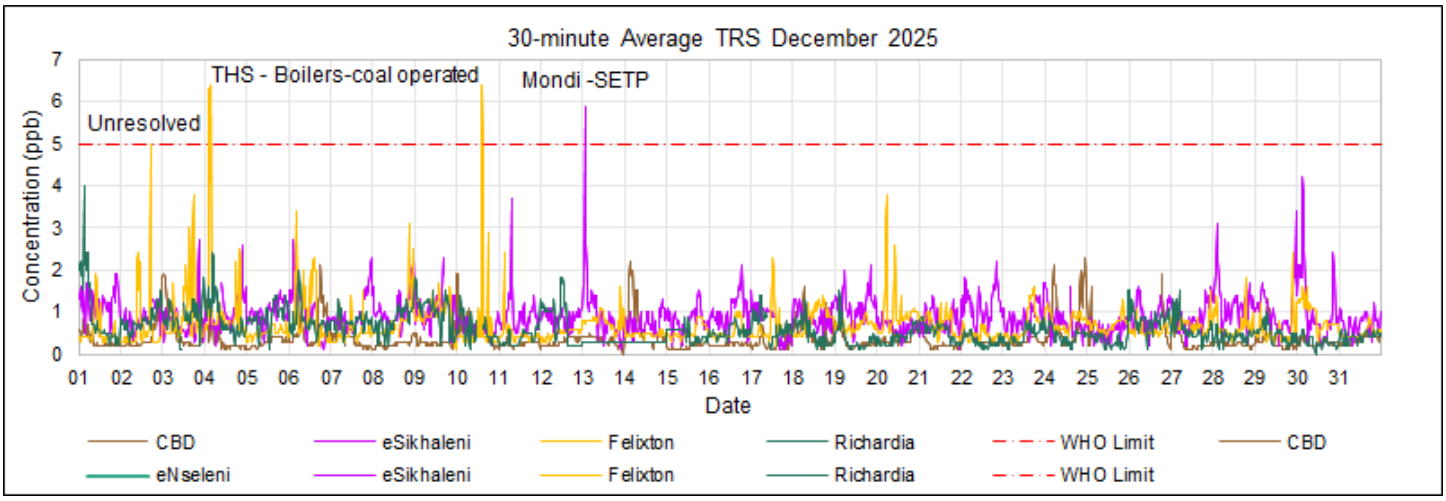


Figure 6.5: TRS 30-minute average concentration.

6.7. 10-minute

The TRS 10-minute average concentrations are shown in Figure 6.6, and exceedances in Table 6.4. Five (5) exceedances of the OME Limit (9.3 ppb) were measured.

Table 6.4: TRS 10-minute average exceedances (OME).

TRS 10-minute OME Limit (9.3 ppb)	5
THS	**4**
Felixton	4
Boilers-coal operated	4
Unresolved	**1**
Felixton	1
Responded: Mondi, THS & Mpact	1

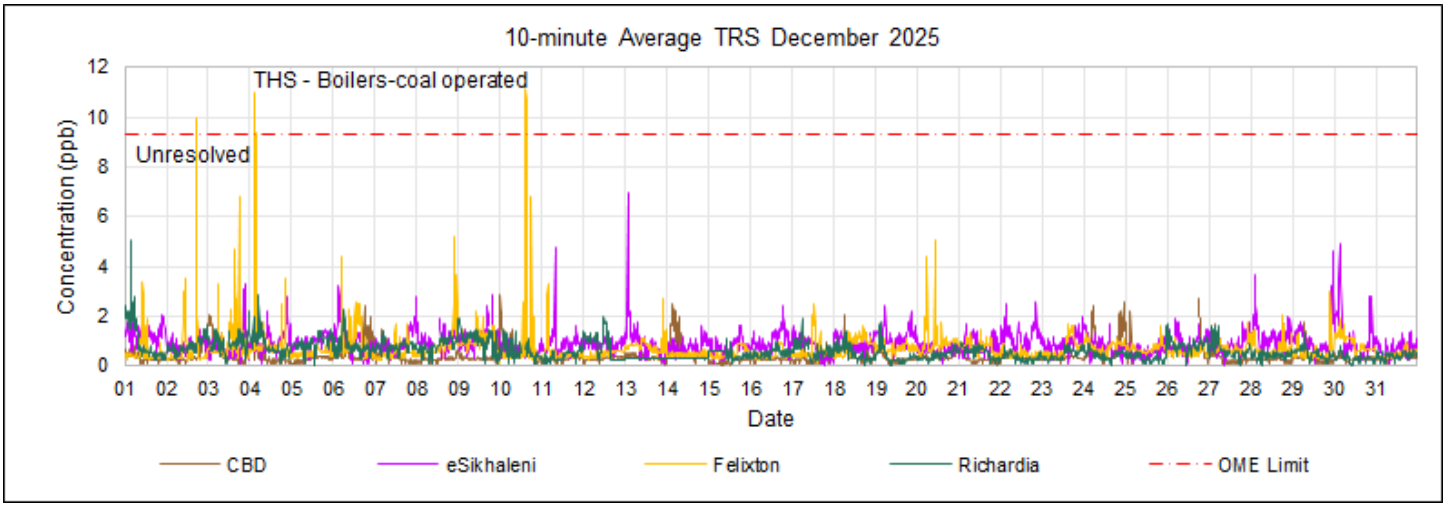


Figure 6.6: TRS 10-minute average concentrations.

6.8. Exceedances

The number of days on which exceedances occurred, plus comparisons to previous months, is shown in Figure 6.7. 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 (e.g., planned maintenance, plant shutdowns, or start-up), leaks in equipment, pipelines, seals, and 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 have good air quality.

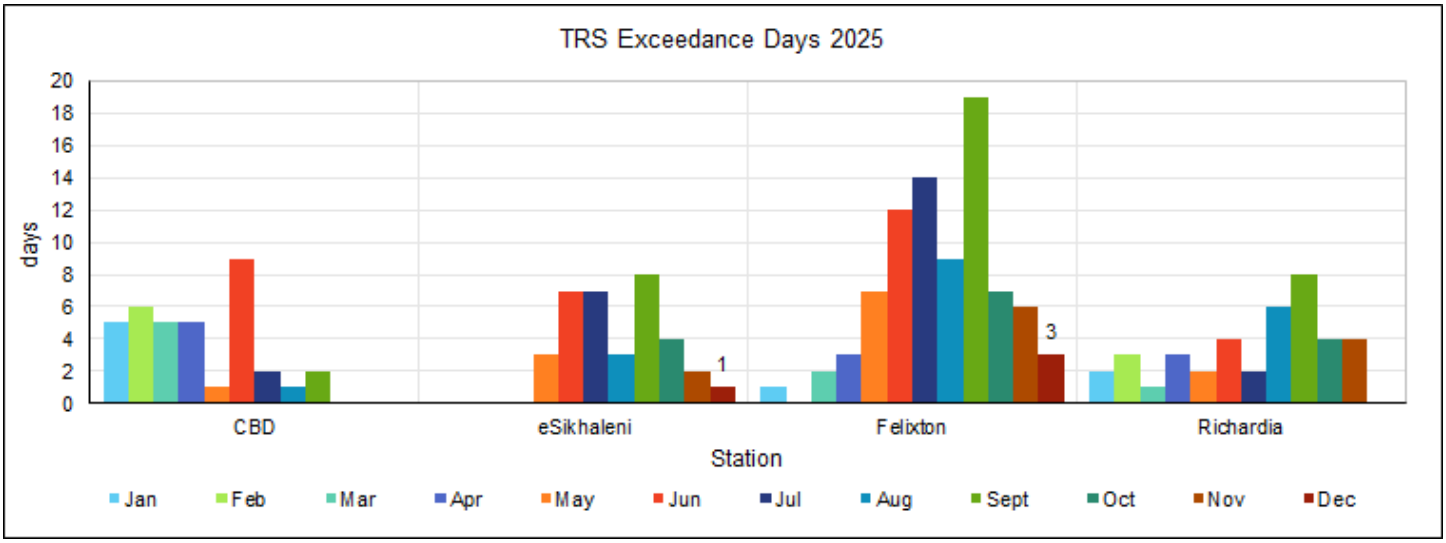


Figure 6.7: TRS exceedance days.

Table 6.5: TRS exceedance summary.

2025	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
TRS 24-hr-OME Limit (10.1 ppb)													
CBD	1	-	-	-	-	-	-	-	-	-	-	-	**1**
eSikhaleni	-	-	-	-	-	-	-	-	-	-	-	-	0
Felixton	-	-	-	-	-	-	-	-	-	-	-	-	0
Richardia	-	-	-	-	-	-	-	-	-	-	-	-	0
TRS 30-minute WHO H_2S Limit (5.0 ppb)													
CBD	34	25	15	10	2	41	3	10	3	-	-	-	**143**
eSikhaleni	-	-	-	-	4	19	11	4	29	5	2	1	**75**
Felixton	1	-	8	7	11	31	51	20	51	11	10	3	**204**
Richardia	5	7	3	7	3	16	3	9	19	9	6	-	**87**
TRS 10-minute OME Limit (9.3 ppb)													
CBD	53	10	8	7	-	27	-	-	2	-	-	-	**107**
eSikhaleni	-	-	-	-	4	11	8	1	10	5	-	-	**39**
Felixton	2	-	4	10	10	43	66	13	46	4	15	5	**218**
Richardia	3	1	-	9	-	13	-	19	24	12	8	-	**89**

6.9. Conclusion

6.9.1. Monthly air quality (December 2025)

- Data completeness (December 2025): TRS data capture ranged from 94–100%; CBD operated at 94% due to power outages (1, 25–26 December 2025). Regulatory (RSA NAAQS):
- No South African ambient air quality standard exists for TRS/H_2S; therefore, no regulatory compliance determination applies.
- Health/odour guidance (WHO + RBCAA-adopted OME criteria): 4 exceedances of the WHO 30-minute guideline (5.0 ppb) occurred at eSikhaleni (1) and Felixton (3); 5 exceedances of the OME 10-minute criterion (9.3 ppb) occurred at Felixton (5); and 0 exceedances of the OME 24-hour criterion (10.1 ppb) were recorded.

6.9.2. Year-to-date (2025 calendar year)

- Regulatory (RSA NAAQS): No South African ambient air quality standard exists for TRS/H_2S.
- Health/odour guidance (2025): WHO 30-minute exceedances totalled Felixton (204), CBD (143), Richardia (87) and eSikhaleni (75). OME 10-minute exceedances totalled Felixton (218), CBD (107), Richardia (89) and eSikhaleni (39). OME 24-hour exceedances were limited to CBD (1); all other stations recorded 0.

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 global use and have been developed to support actions that achieve air quality protection for public health in various contexts. On the other hand, air quality standards and local targets are set by each country or region to protect the public health of its 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

Regulatory assessment is based on comparison to the South African National Ambient Air Quality Standards (NAAQS). Health/odour assessment is based on WHO guidelines and RBCAA-adopted TRS/H_2S reference criteria; exceedances of these criteria do not constitute NAAQS non-compliance but indicate potential short-term exposure or odour-annoyance conditions requiring attention.

7.1.1. December 2025 – Monthly Conclusion

Regulatory (RSA NAAQS)

- No NAAQS exceedances were recorded for PM_{10} (24-hour: 75 µg/m³) or $PM_{2.5}$ (24-hour: 40 µg/m³).
- No NAAQS exceedances were recorded for SO_2 for the 24-hour (48 ppb), hourly (134 ppb) or 10-minute (191 ppb) averaging periods.
- TRS/H_2S has no South African NAAQS standard; therefore, no regulatory compliance determination applies for TRS/H_2S.

Health/odour guidance (WHO + RBCAA-adopted TRS/H_2S criteria)

- $PM_{2.5}$: 22 exceedance-days of the WHO 24-hour guideline (15 µg/m³) across Brackenham (10), Felixton (3), Scorpio (8) and Harbour West (1).
- SO_2: 1 exceedance of the WHO 24-hour guideline (15 ppb) at Harbour West.
- TRS/H_2S: 4 exceedances of the WHO 30-minute guideline (5.0 ppb) (eSikhaleni: 1; Felixton: 3); 5 exceedances of the OME 10-minute criterion (9.3 ppb) (Felixton: 5); and 0 exceedances of the OME 24-hour criterion (10.1 ppb).

7.1.2. 2025 Calendar-Year Conclusion

Regulatory (RSA NAAQS)

- PM_{10} (24-hour NAAQS; max 4 exceedances/year): compliant at all stations reporting PM_{10}.
- $PM_{2.5}$ (24-hour NAAQS; max 4 exceedances/year): non-compliant at Brackenham (18), Felixton (6) and Scorpio (8); compliant at Harbour West (3).
- SO_2 (24-hour NAAQS; max 4 exceedances/year): non-compliant at Scorpio (8); compliant at all other stations.

Health/odour guidance (WHO + RBCAA-adopted TRS/H_2S criteria)

- $PM_{2.5}$ (WHO 24-hour guideline: 15 µg/m³): exceedances were frequent during 2025 (Brackenham: 165; Felixton: 125; Harbour West: 62; Scorpio: 117).
- SO_2 (WHO 24-hour guideline: 15 ppb): exceedances during 2025 were highest at Scorpio (67) and Harbour West (41), with additional exceedances at CBD (7) and Richardia (1).
- TRS/H_2S: exceedances of RBCAA-adopted criteria were recorded across 2025 (WHO 30-minute: Felixton 204, CBD 143, Richardia 87, eSikhaleni 75; OME 10-minute: Felixton 218, CBD 107, Richardia 89, eSikhaleni 39; OME 24-hour: CBD 1, others 0).

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_{10}, $PM_{2.5}$ and PM_1) 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_x), and carbon dioxide (CO_2).

AirGradient monitors are designed to provide accessible and cost-effective solutions for air quality monitoring. 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 such as the Plantower PMS5003 for particulate matter and the SenseAir S8 for CO_2, which are dependable but may not meet the stringent accuracy levels of certified equipment. For instance, the SenseAir S8 has an accuracy of ±30 ppm ±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 informing decisions on indoor air quality management. 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 eight (8) 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.

	Brk	CBD	eSk	Flx	HW	MS	Mtz	Rch
Jan 2025	99	98	97	97	98	-	-	97
Feb 2025	**89**	**90**	**89**	**86**	**86**	-	-	**90**
Mar 2025	99	100	97	95	100	-	-	100
Apr 2025	**86**	96	**93**	**93**	96	-	-	96
May 2025	**55**	99	99	**93**	99	-	-	99
Jun 2025	96	97	96	**89**	97	-	-	**95**
Jul 2025	100	99	99	98	100	-	-	98
Aug 2025	100	100	99	96	100	**56**	-	100
Sept 2025	97	**86**	96	**92**	96	96	**69**	97
Oct 2025	100	99	97	97	100	100	98	100
Nov 2025	97	96	**93**	97	96	96	**95**	97
Dec 2025	98	95	98	99	99	100	**95**	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:

- *Brackenham*
  - *February '25 –power outages (load shedding).*
  - *April '25 – power outages.*
  - *May '25 –issue with firmware upgrade /Wi-Fi connectivity.*
- *CBD*
  - *February '25 –power outages (load shedding).*
  - *September'25 - power outage plus issue with inverter auto start.*
- *eSikhaleni*
  - *February '25 –power outages (load shedding).*
  - *April '25 – power outages.*
  - *November'25 – power outages.*
- *Felixton*
  - *February '25 –power outages (load shedding).*
  - *April '25 – power outages.*
  - *June'25 – power outages.*
  - *September'25 – power outages.*
- *Harbour West*
  - *February '25 –power outages (load shedding).*
- *Meerensee*
  - *August'25 – unit commissioned on the 14th of August.*
- *Mtunzini*
  - *September'25 – unit commissioned on the 5th of September, power outages.*
  - *November'25 – power outages.*
  - *December'25 – power outages.*
- *Richardia*
  - *February '25 –power outages (load shedding).*
  - *June'25 – power outages.*

8.2. Particulate Monitoring

8.2.1. Monthly

PM_{10}, $PM_{2.5}$ and PM_{1} 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_{10} monthly average concentrations did not exceed the RSA Annual Limit or the WHO Annual Limit.
- $PM_{2.5}$ monthly average concentrations did not exceed the RSA Annual Limit or the WHO Annual Limit.

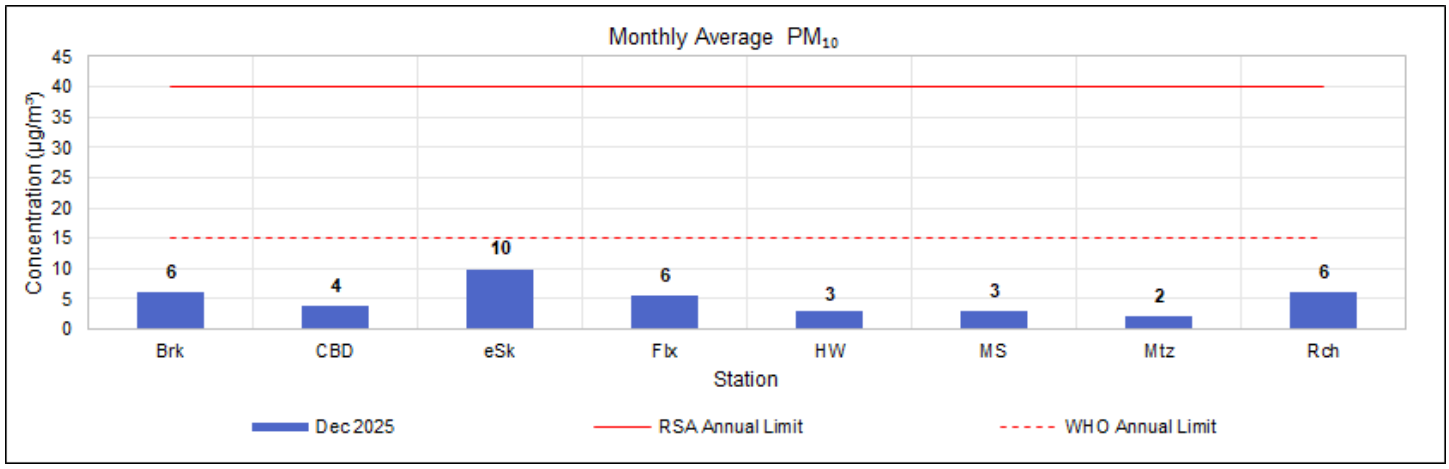


Figure 8.2: PM_{10} monthly concentration.

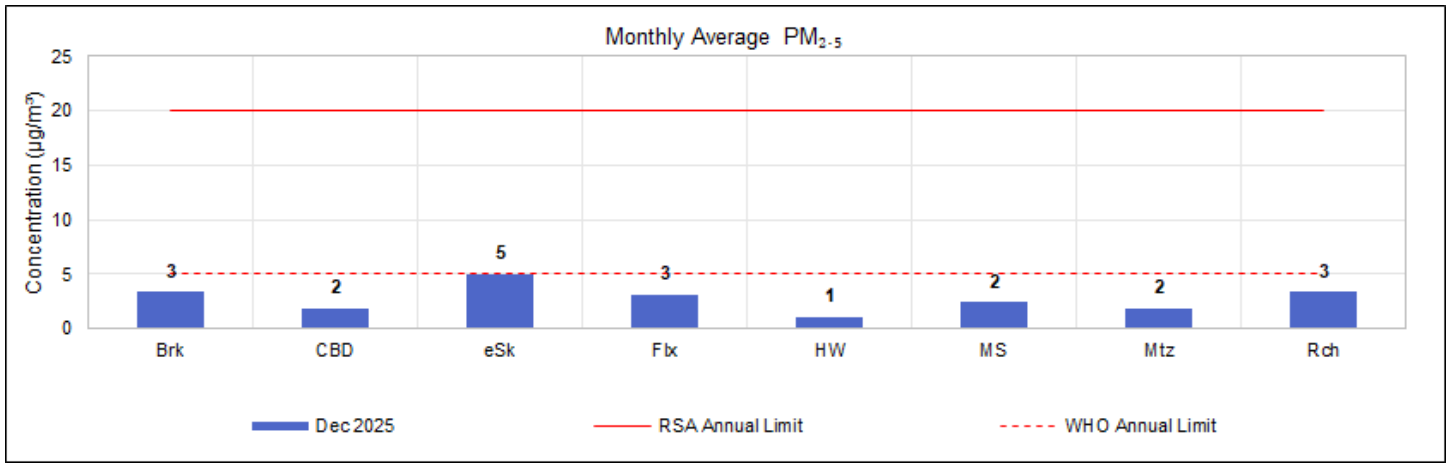


Figure 8.3: $PM_{2.5}$ monthly concentration.

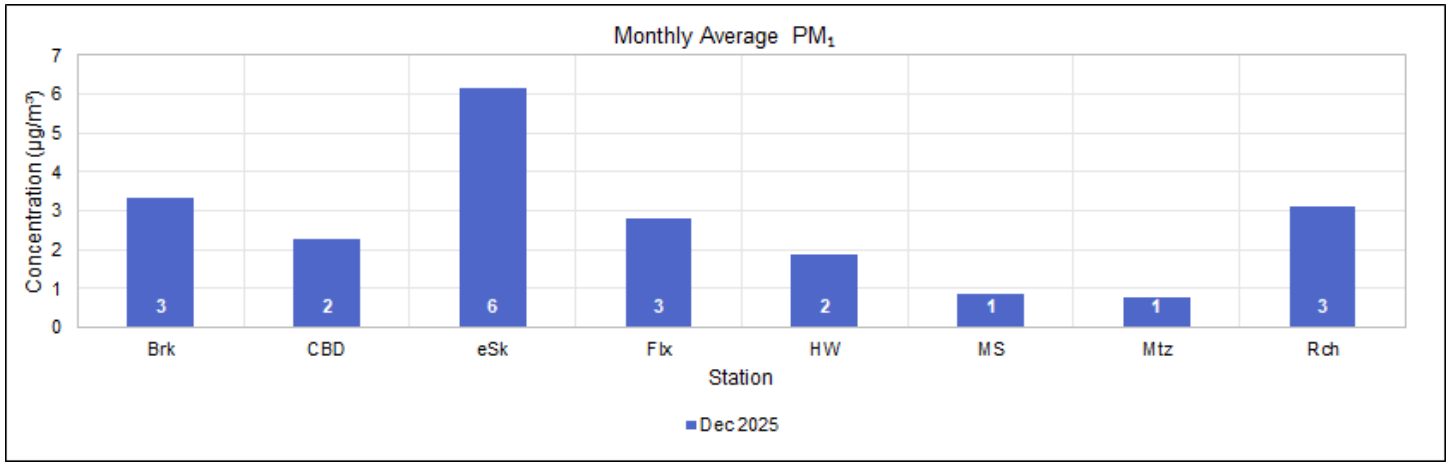


Figure 8.4: PM_{10} monthly concentration.

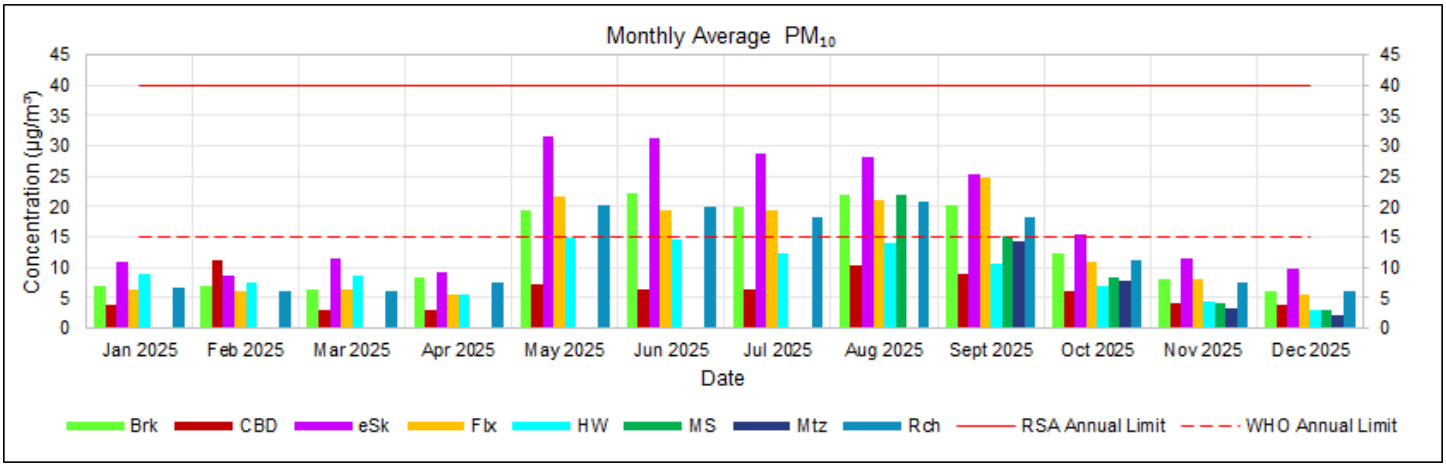


Figure 8.5: PM_{10} monthly comparison.

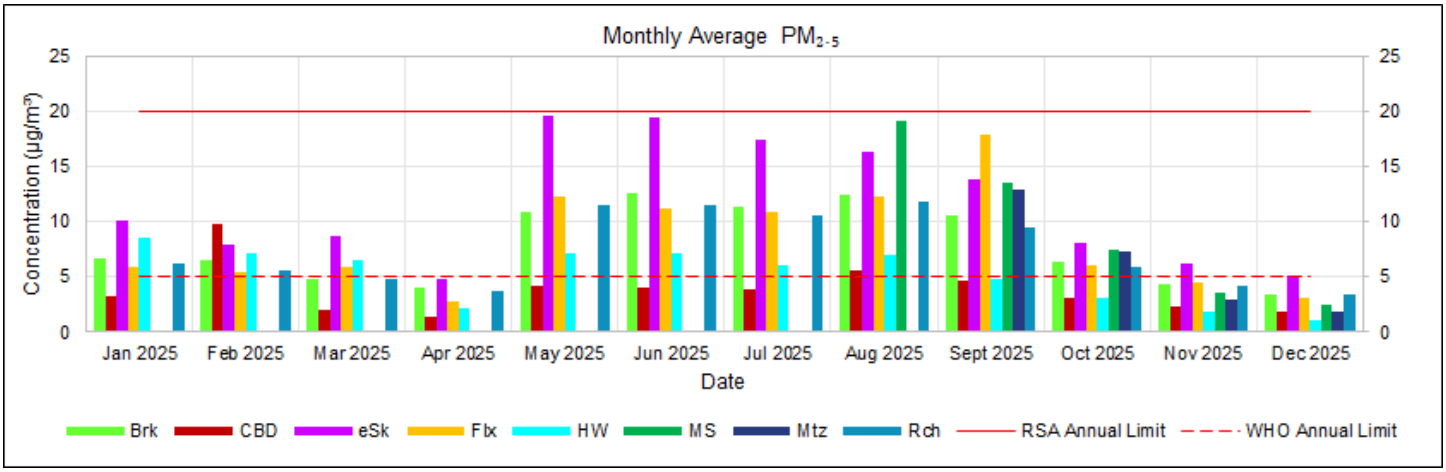


Figure 8.6: $PM_{2.5}$ monthly comparison.

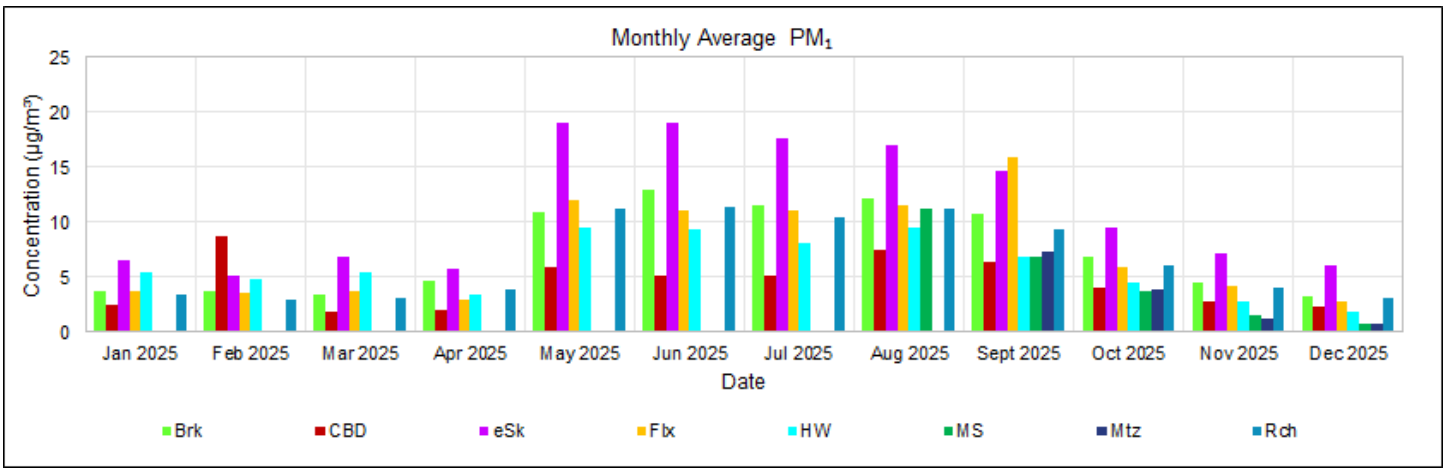


Figure 8.7: PM_1 monthly comparison.

8.2.2. Diurnal

PM diurnal concentrations are shown below (Figure 8.8, Figure 8.9, and Figure 8.10).

- PM_{10} diurnal concentrations did not exceed the RSA daily limit or the WHO daily limit.
- $PM_{2.5}$ diurnal concentrations did not exceed the RSA limit or the WHO daily limit.

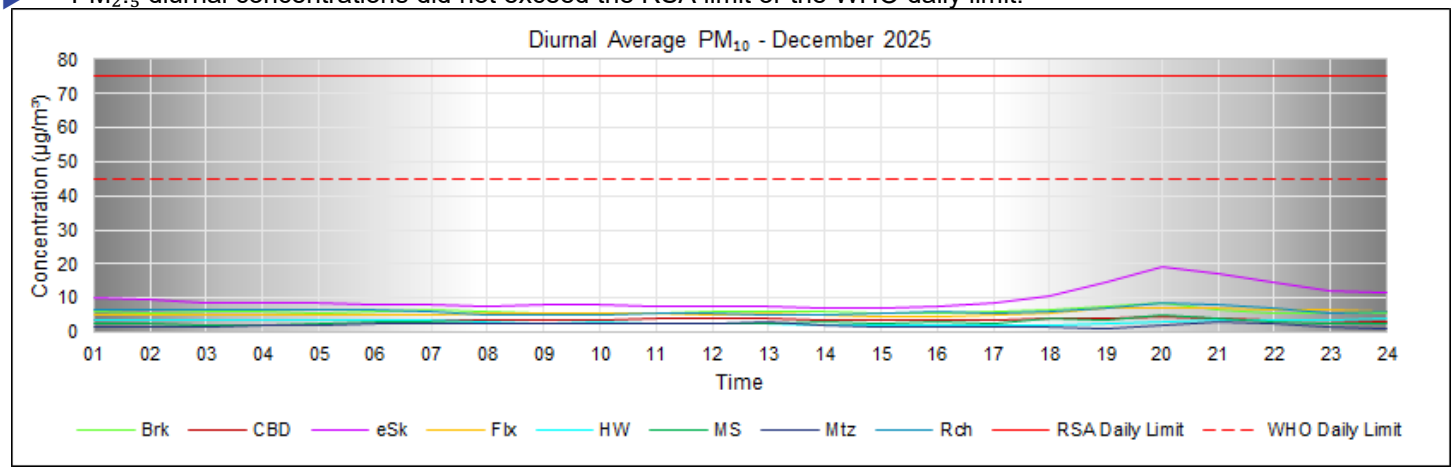


Figure 8.8: PM_{10} diurnal concentrations.

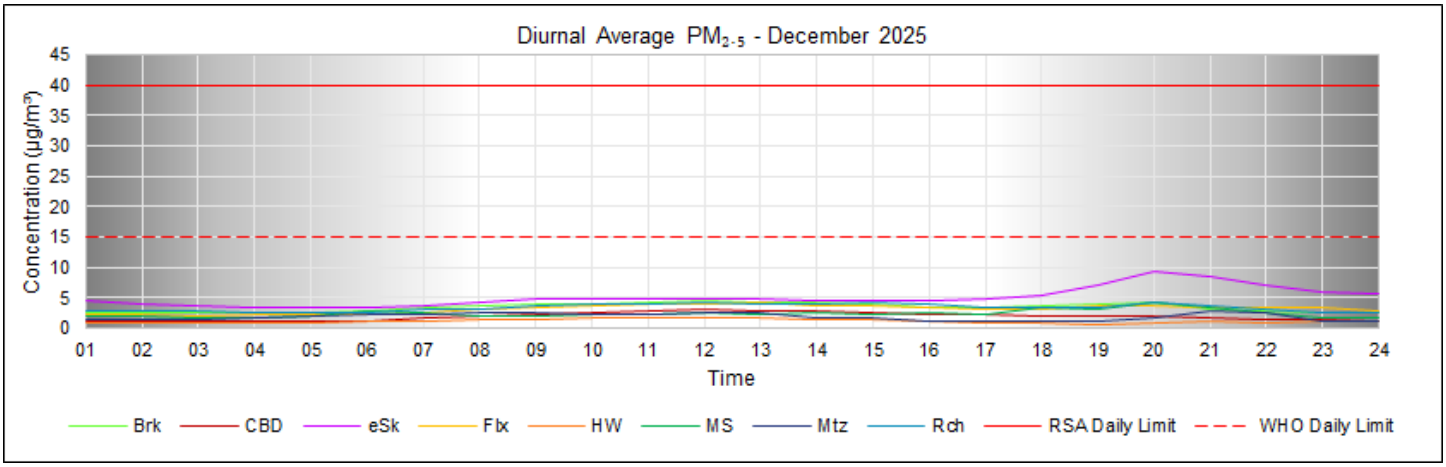


Figure 8.9: $PM_{2.5}$ diurnal concentrations.

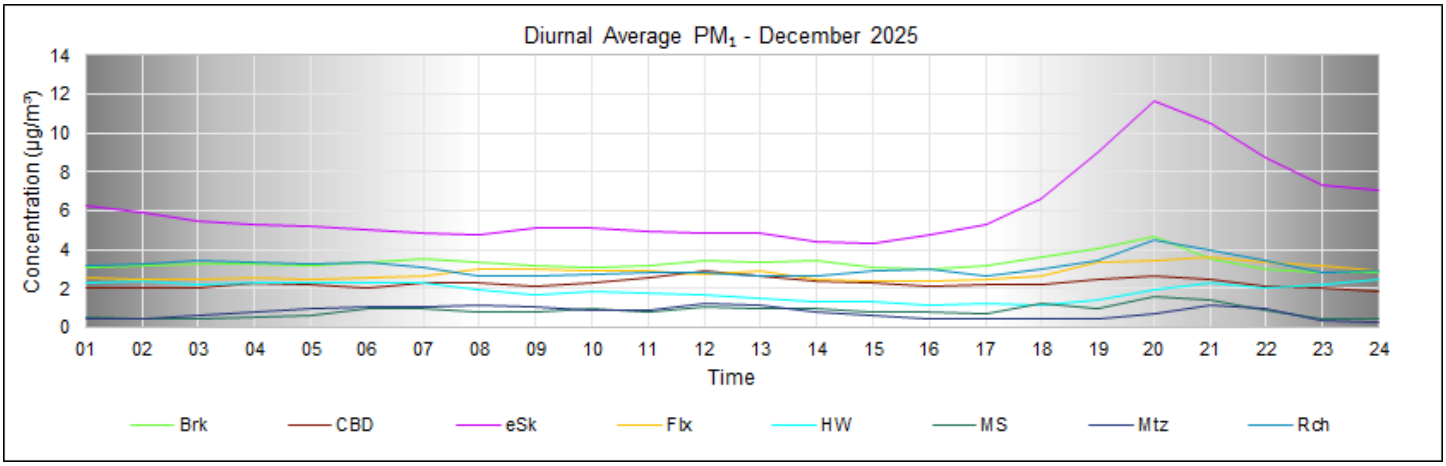


Figure 8.10: PM_1 diurnal concentrations.

8.2.3. Daily

PM daily concentrations are shown below (Figure 8.11, Figure 8.12, and Figure 8.13).

- The PM_{10} RSA daily limit and the WHO limit were not exceeded.
- The $PM_{2.5}$ RSA and the WHO limits were not exceeded.

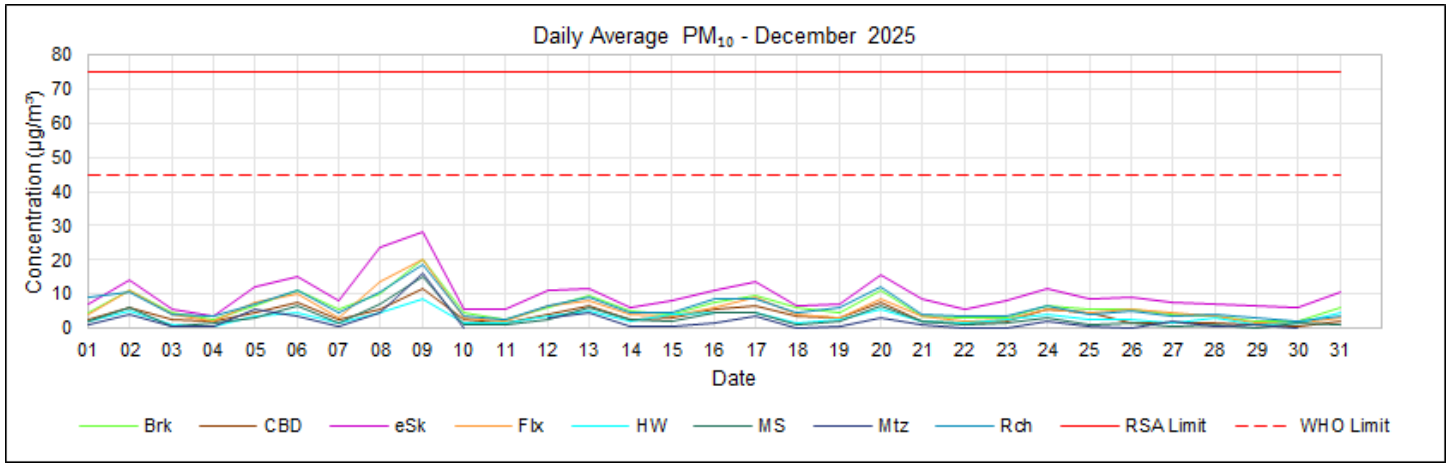


Figure 8.11: PM_{10} daily concentrations.

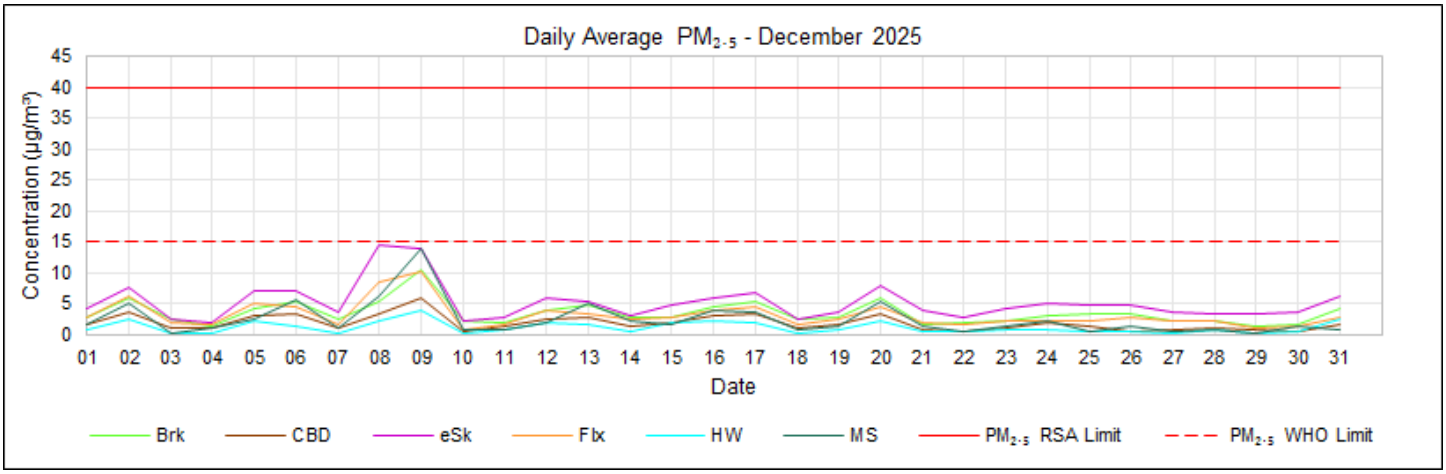


Figure 8.12: $PM_{2.5}$ daily concentrations.

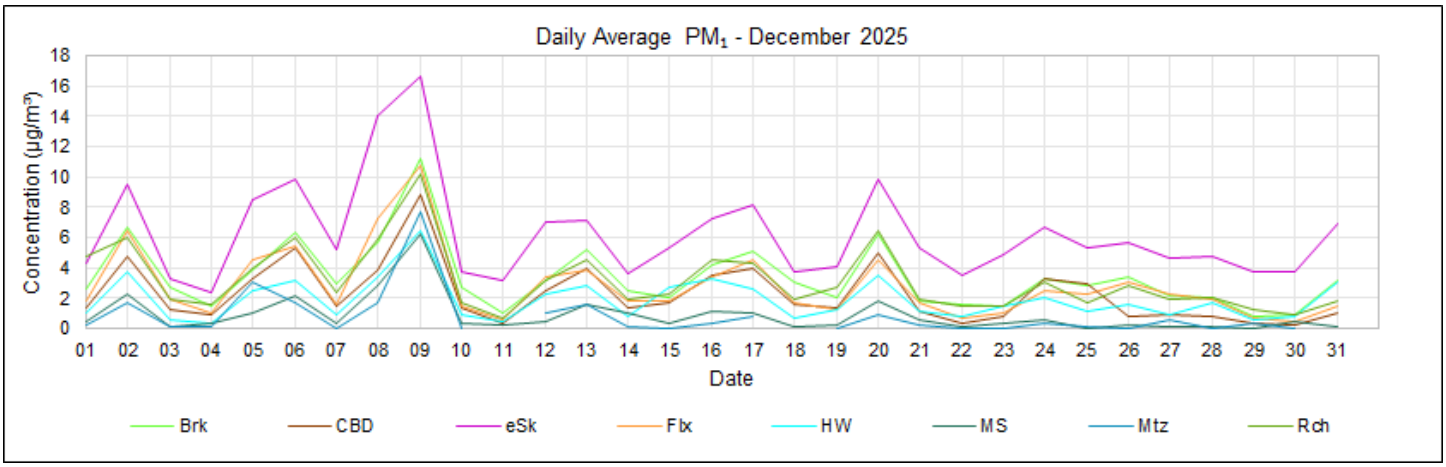


Figure 8.13: PM_1 daily concentrations.

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, harming both 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).

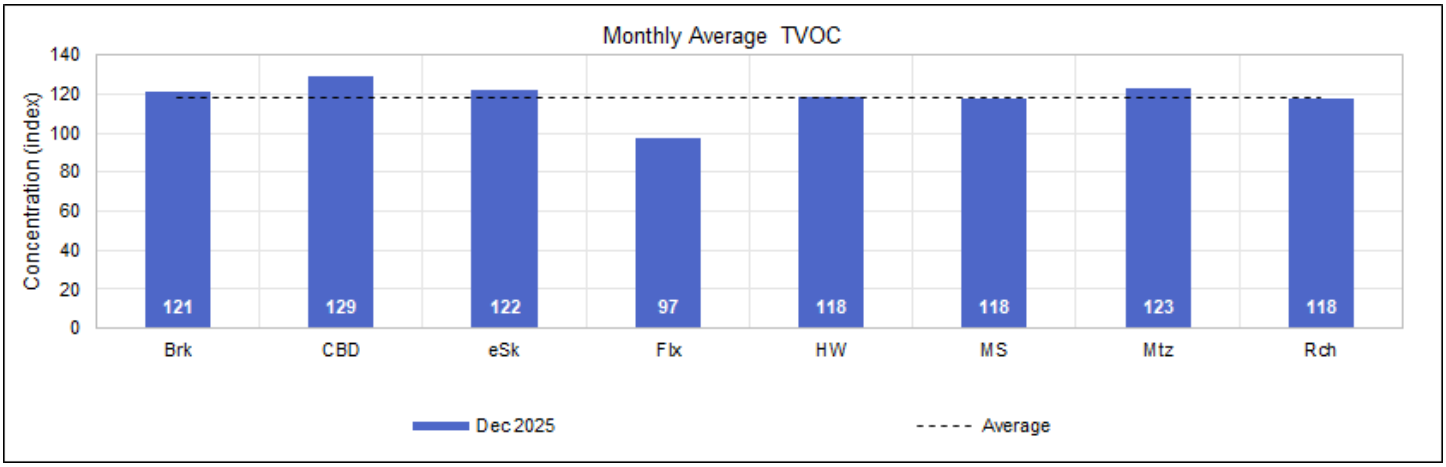


Figure 8.14: TVOC monthly concentration.

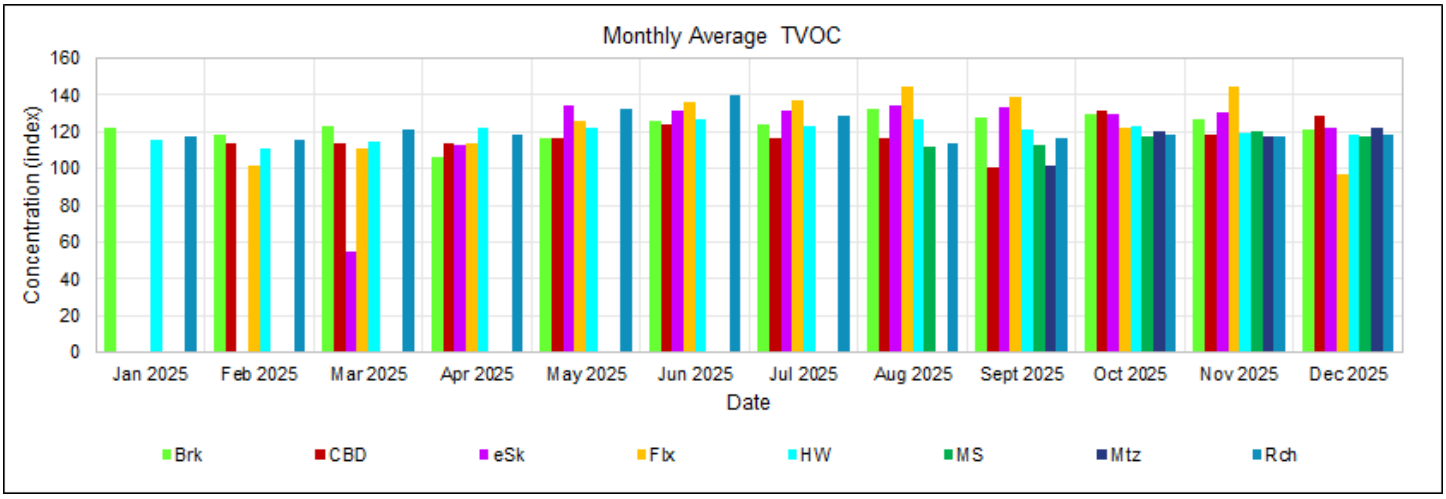


Figure 8.15: TVOC monthly comparison.

8.3.2. Diurnal

TVOC diurnal concentrations are shown below (Figure 8.16).

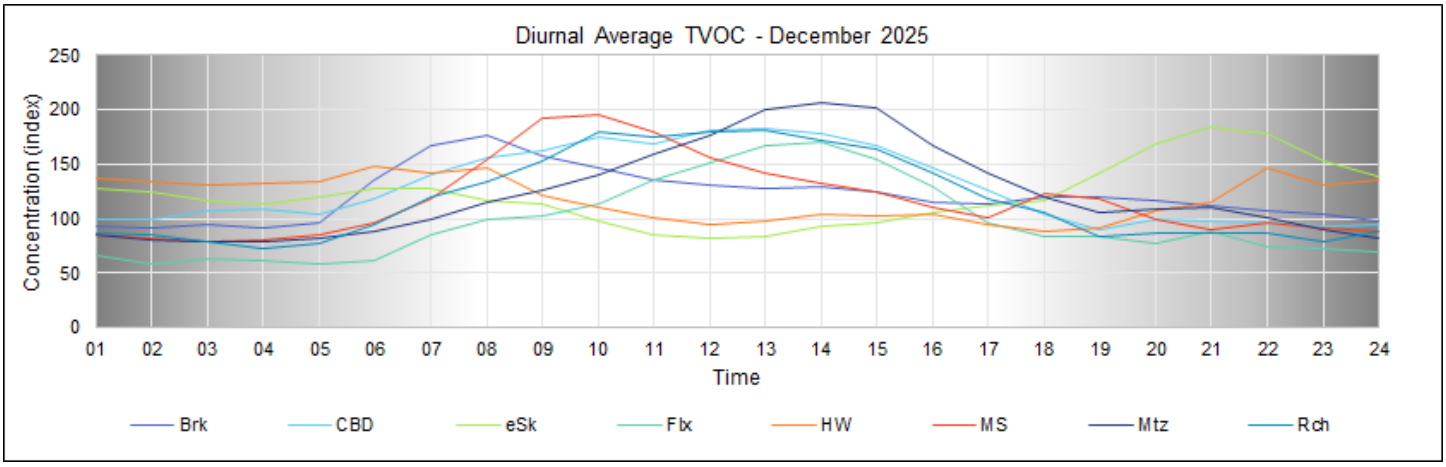


Figure 8.16: TVOC diurnal concentrations.

8.3.3. Daily

TVOC daily concentrations are shown below (Figure 8.17).

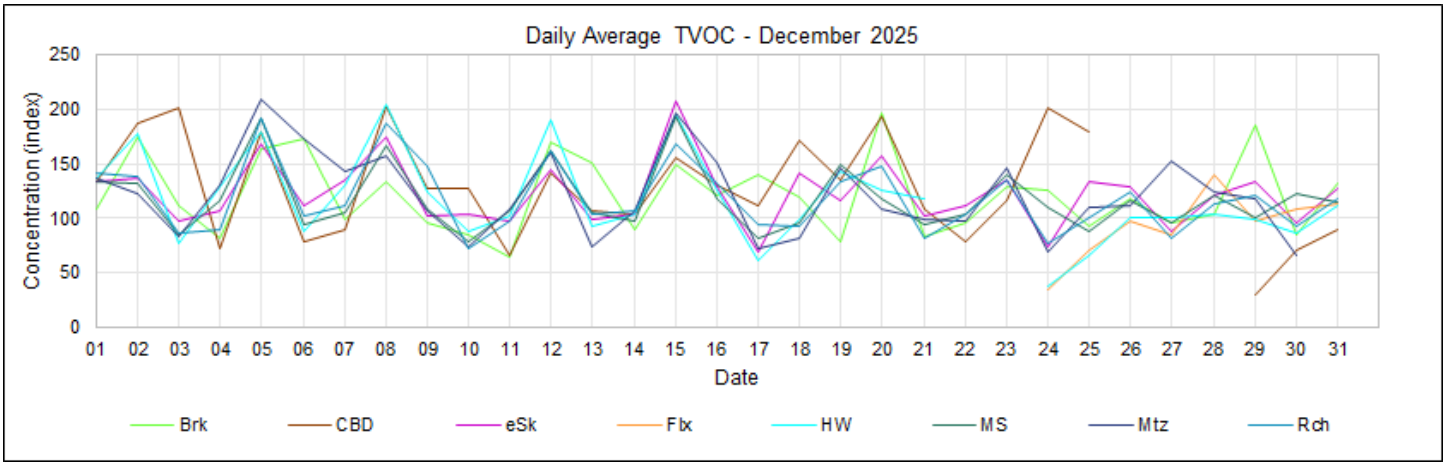


Figure 8.17: TVOC daily concentrations.

8.3.4. Hourly

TVOC hourly concentrations are shown below (Figure 8.18).

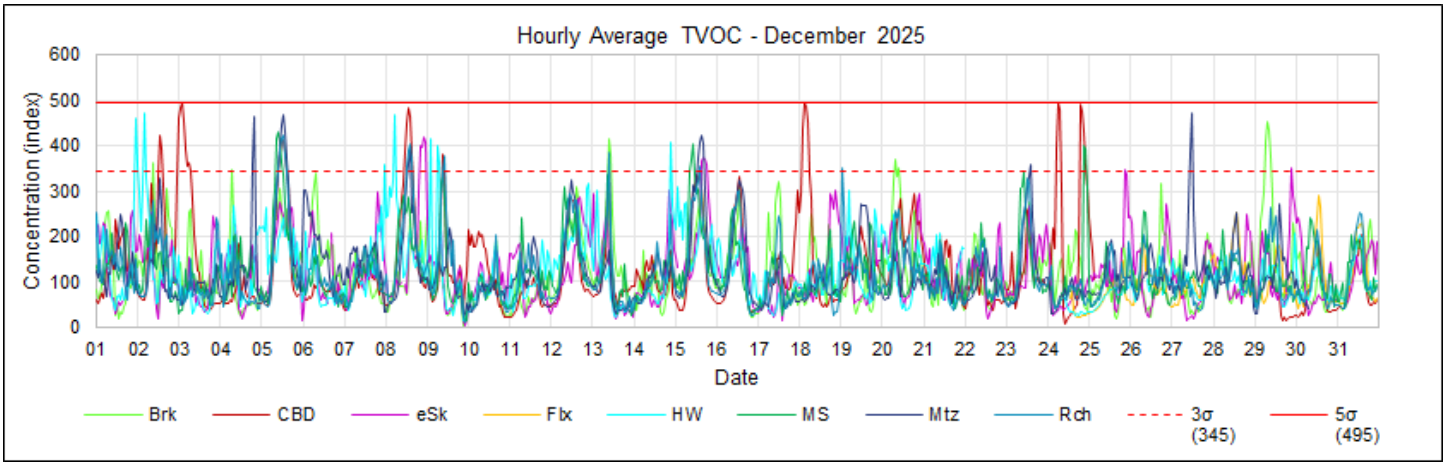


Figure 8.18: TVOC hourly concentrations.

Table 8.2: TVOC exceedances of the 3σ and 5σ limits.

Limit	Brk	CBD	eSk	Flx	HW	MS	Mtz	Rch	Total
3σ	10	31	10	0	9	8	17	13	68
5σ	0	0	0	0	0	0	0	0	0

8.4. Nitrogen Oxides Monitoring

Nitrogen oxides (NO_x) refer to a group of highly reactive gases that are primarily composed of nitrogen dioxide (NO_2) and nitric oxide (NO). These gases are produced through the combustion of fossil fuels in vehicles, power plants, and industrial facilities. NO_x emissions significantly contribute to air pollution, playing a key role in forming ground-level ozone and particulate matter, both of which are harmful to human health and the environment. Exposure to elevated levels of NO_x can lead to respiratory problems, particularly in vulnerable populations such as children, the elderly, and those with pre-existing conditions like asthma. Additionally, NO_x contributes to the formation of acid rain, which can damage ecosystems and infrastructure. Regulatory standards for NO_x vary globally, but efforts to reduce these emissions are critical for improving air quality and mitigating environmental impacts. The AirGradient NO_x 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_x monthly average concentrations are shown in Figure 8.19; comparisons to previous months are also provided (Figure 8.20).

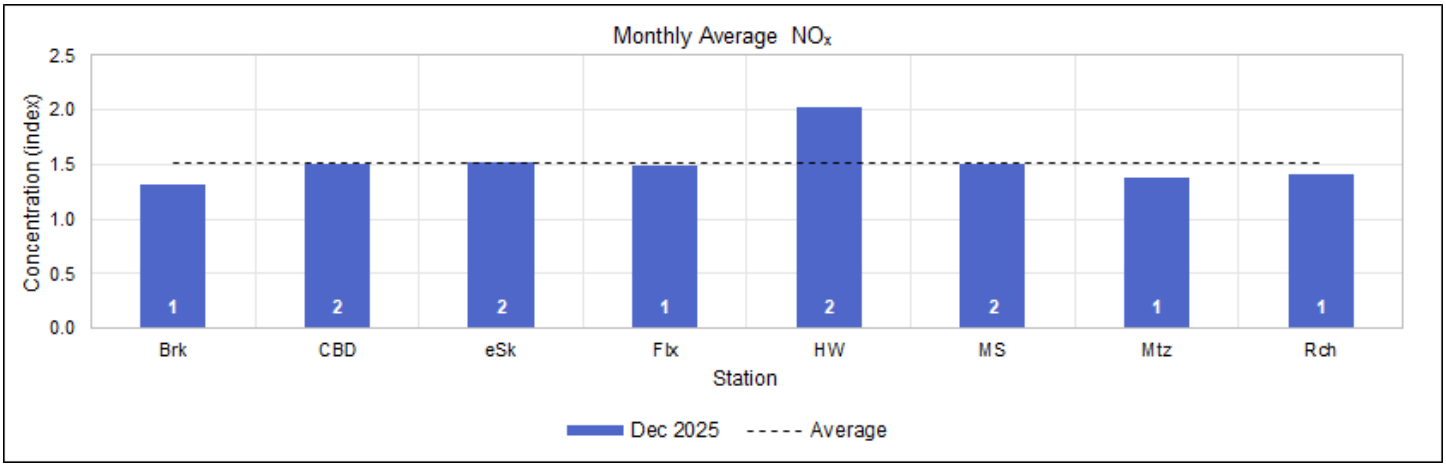


Figure 8.19: NO_x monthly concentration.

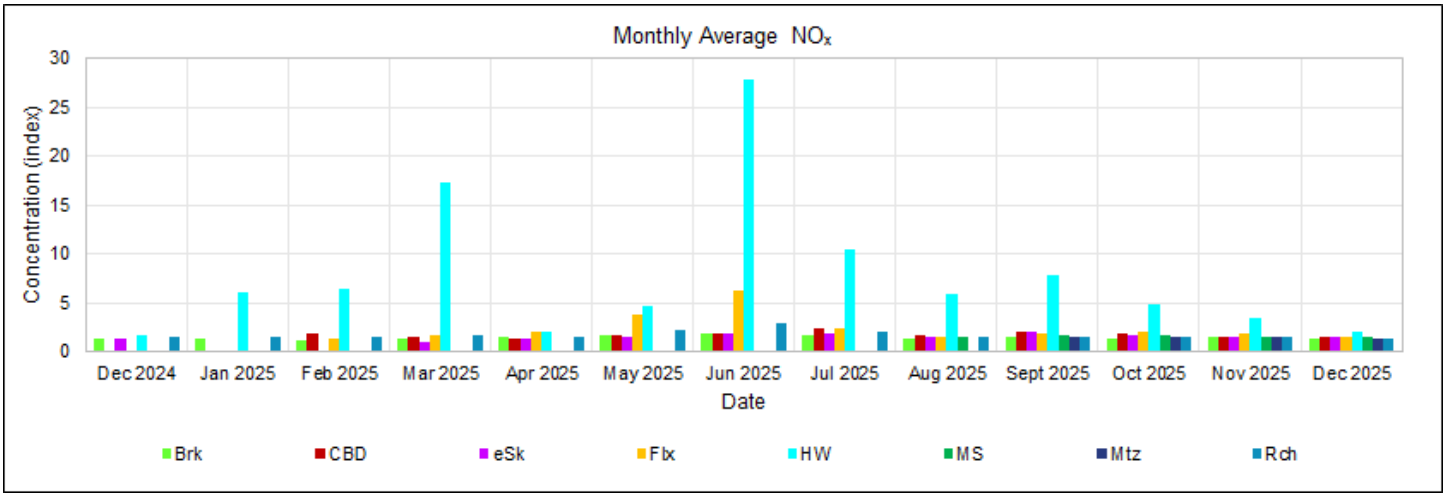


Figure 8.20: NO_x monthly comparison.

8.4.2. Diurnal

NO_x diurnal concentrations are shown below (Figure 8.21).

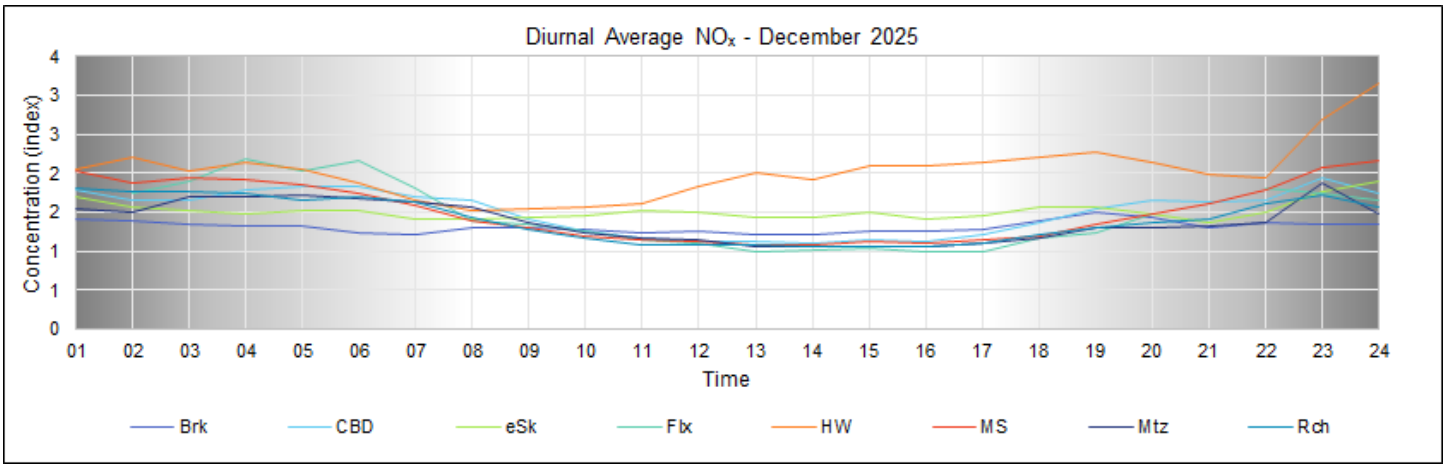


Figure 8.21: NO_x diurnal concentrations.

8.4.3. Daily

NO_x daily concentrations are shown below (Figure 8.22).

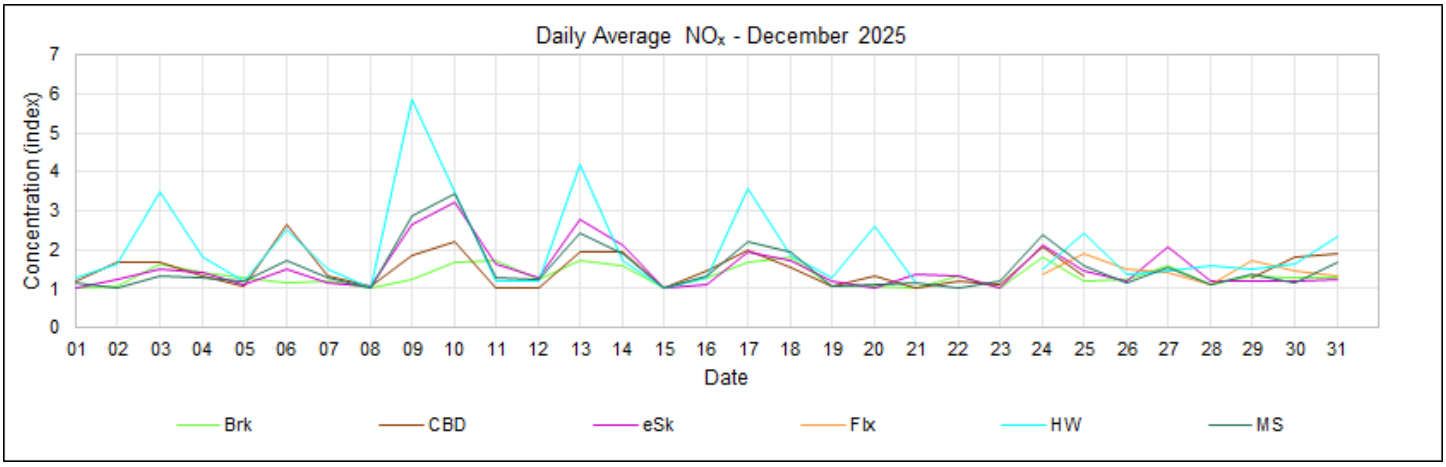


Figure 8.22: NO_x daily concentrations.

8.4.4. Hourly

NO_x hourly concentrations are shown below (Figure 8.23).

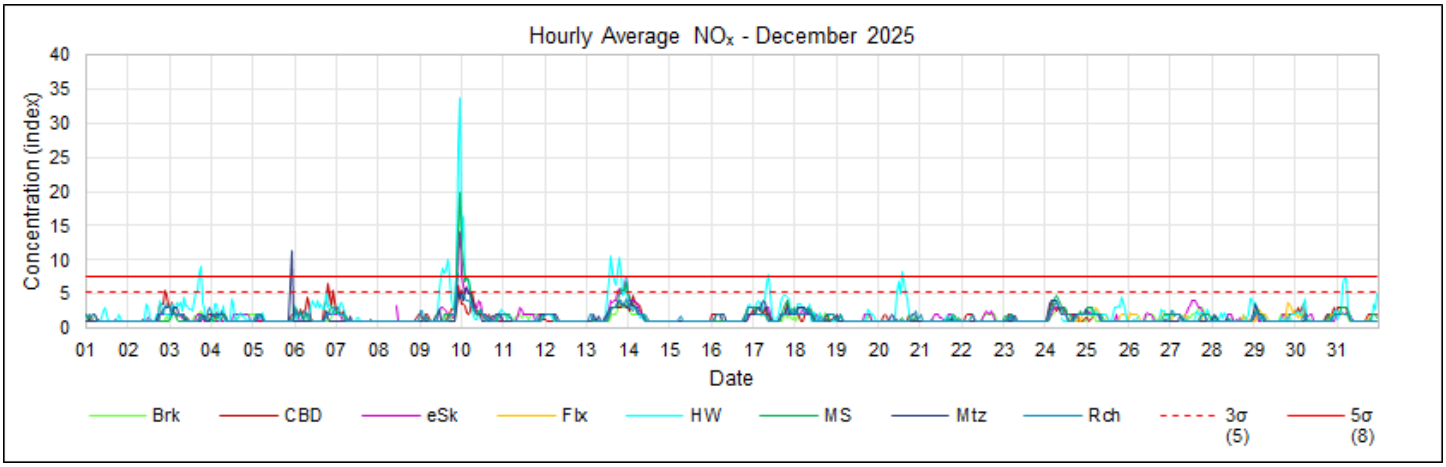


Figure 8.23: NO_x hourly concentrations.

Table 8.3 NO_x exceedances of the 3σ and 5σ limits.

Limit	Brk	CBD	eSk	Flx	HW	MS	Mtz	Rch	Total
3σ	0	5	14	0	39	14	5	2	72
5σ	0	0	2	0	13	4	1	0	19

8.5. Carbon Dioxide Monitoring

In 2000, the global background concentration of carbon dioxide (CO_2) was approximately 370 ppm, marking a significant increase from the pre-industrial level of around 280 ppm. This reflected the continued growth in CO_2 emissions from fossil fuel combustion, deforestation, and other human activities during the 20th century. The rate of increase in atmospheric CO_2 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_2 monthly average concentrations are shown in Figure 8.24; comparisons to previous months are also provided (Figure 8.25).

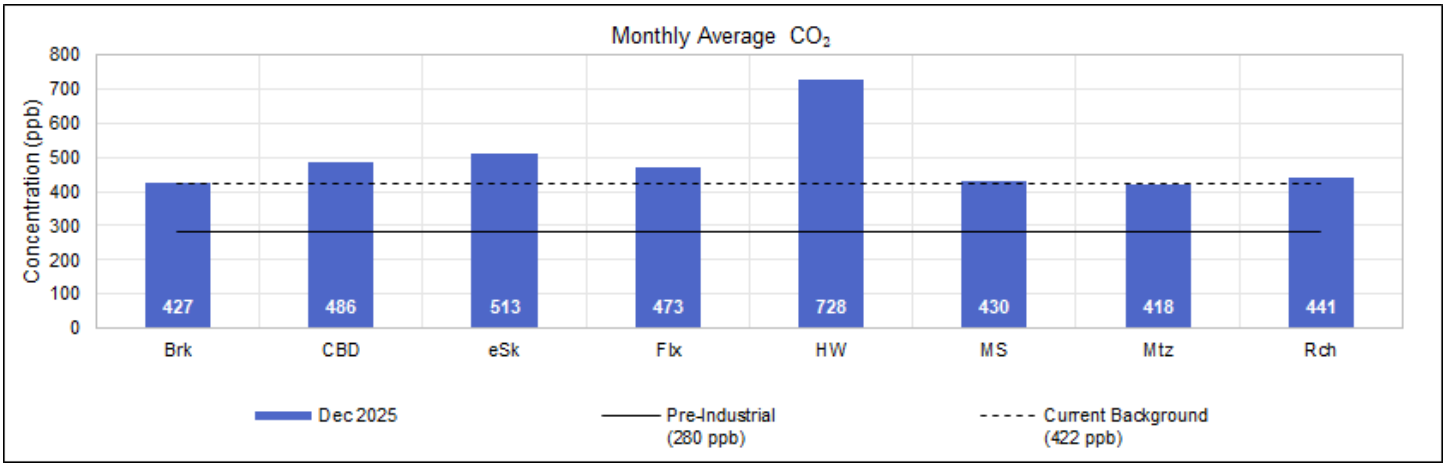


Figure 8.24: CO_2 monthly concentration.

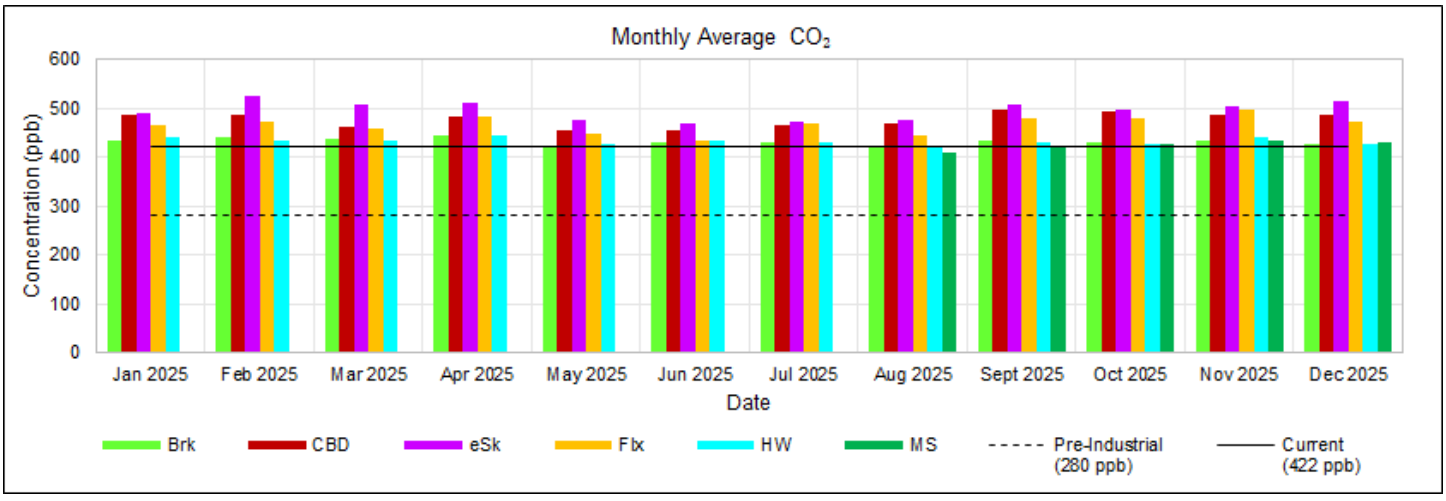


Figure 8.25: CO_2 monthly comparison.

8.5.2. Diurnal

CO_2 diurnal concentrations are shown below (Figure 8.26).

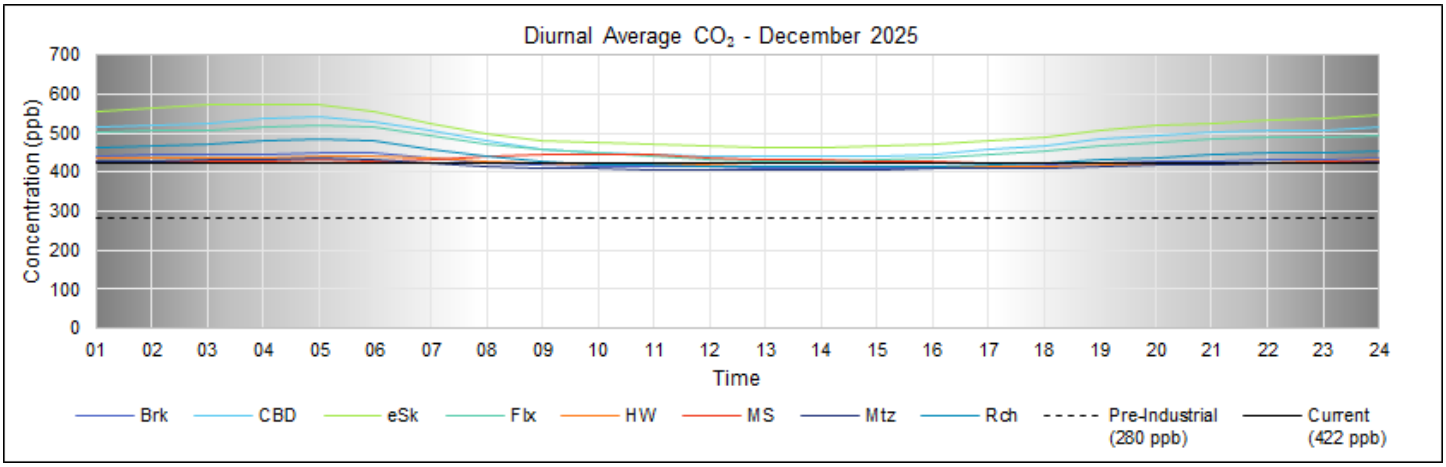


Figure 8.26: CO_2 diurnal concentrations.

8.5.3. Daily

CO_2 daily concentrations are shown below (Figure 8.27).

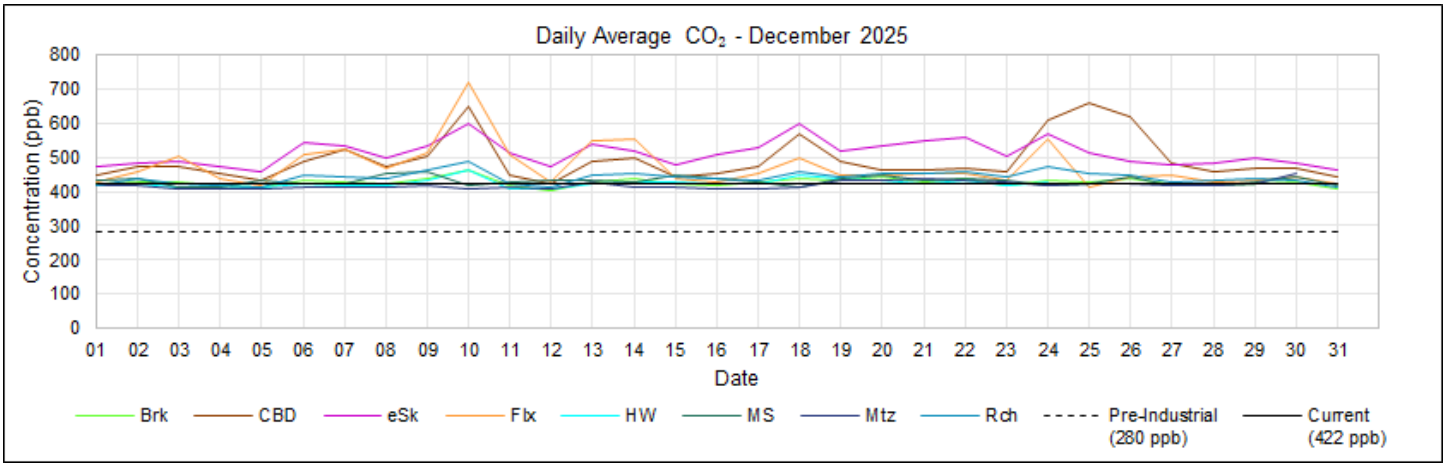


Figure 8.27: CO_2 daily concentrations.

8.5.4. Hourly

CO_2 hourly concentrations are shown below (Figure 8.28).

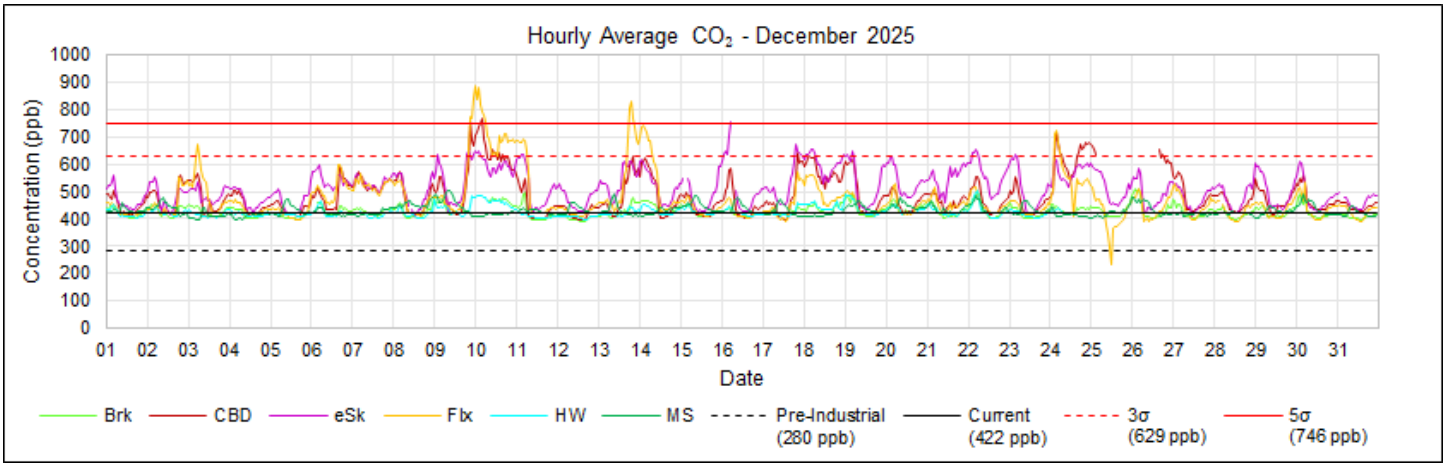


Figure 8.28: CO_2 hourly concentrations.

Table 8.4: CO_2 exceedances of the 3σ and 5σ limits.

Limit	Brk	CBD	eSk	Flx	HW	MS	Mtz	Rch	Total
3σ	0	37	35	55	0	0	0	0	127
5σ	0	3	1	13	0	0	0	0	17

9. ACKNOWLEDGEMENT

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

Signer ID: ABS1DHBUH7...

Lance Coetzee
Director

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APPENDIX A
ABBREVIATIONS AND TERMS

List of Abbreviations and Terms	
Chemical Formulae	
CH_3-S-CH_3	Dimethyl Sulphide
CH_3S-H	Methyl Mercaptan
CH_3-S-S-CH_3	Dimethyl Disulphide
CH_4	Methane
CO	Carbon Monoxide
CO_2	Carbon Dioxide
FPM	Fine Particulate Matter
H_2S	Hydrogen Sulphide
H_2SO_3	Sulphurous Acid
H_2SO_4	Sulphuric Acid
NO	Nitric Oxide
NO_2	Nitrogen Dioxide
NO_x	Oxides of Nitrogen
O_3	Ozone
PM_{10}	Particulates with an aerodynamic diameter of less than 10 µm
$PM_{2.5}$	Particulates with an aerodynamic diameter of less than 2.5 µm
SO_2	Sulphur Dioxide
SO_3	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/m³	Micrograms per cubic meter
BMC	Best Measurement Capabilities
g/s	Grams per second
K	Kelvin
km	Kilometre
km/h	Kilometres per hour
m	Metres
m/s	Metres per second
mg	Milligrams
mg/m²/day	Milligrams per meter squared per day
mg/m³	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 African 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 or reference values. 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 databases).
Precision Check	The precision check is a procedure in which a sensor is challenged with a gas of 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 measuring pollutants, meteorological conditions, or consolidating data.
System	The system represents all network components, including the procedures for marshalling and reporting data.

APPENDIX B
QUALITY ASSURANCE

The SO_2 concentrations reported are determined by the United States Environmental Protection Agency (US EPA) equivalent method, EQSA-0193-092. SO_2 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. Every effort is made to minimise the error. The minimum threshold for statistical analyses is at least 80% valid data to maintain reliability and minimise bias; the South African National Accreditation Standard requires 90%. (SANAS, 2012)

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 reset all data to zero.
	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 – 2025.

Industry	Description	SO_2 Emission 2025 (t)	SO_2 Emission 2025 (t)	SO_2 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_{10} and $PM_{2.5}$.

RBCAA: Monthly Report						
PM_{10} daily averages						
Station	*Concentration (µg/m³)*	*% of the RSA Standard (75 µg/m³)*	*% of WHO Guideline (45 µg/m³)*	*Time*	*Wind Direction (°)*	*Wind Speed (m/s)*
CBD ES1	68.0	91%	**151%**	2025/08/30 00:00	4.1	233
eSikhaleni	68.0	91%	**151%**	2025/07/11 00:00	2.2	16
Felixton ES1	69.0	92%	**153%**	2025/08/23 00:00	2.6	286
Richardia	76.0	**101%**	**169%**	2025/06/11 00:00	6.2	223
Scorpio ES1	149.0	**199%**	**331%**	2025/08/05 00:00	6.6	24
$PM_{2.5}$ daily averages						
Station	*Concentration (µg/m³)*	*% of the RSA Standard (40 µg/m³)*	*% of WHO Guideline (15 µg/m³)*	*Time*	*Wind Direction (°)*	*Wind Speed (m/s)*
Brackenham ES2	81.0	**203%**	**540%**	2025/08/30 00:00	3.8	248
Felixton ES2	62.0	**155%**	**413%**	2025/08/30 00:00	3.7	239
Harbour West ES2	48.0	**120%**	**320%**	2025/08/30 00:00	3.8	229
Scorpio ES2	141.0	**353%**	**940%**	2025/08/05 00:00	6.6	24

LEGEND
Yellow: = 50% of the guideline/standard
Red: >= 100% of the guideline/standard (i.e. exceedance)
Turquoise: = 10% of the guideline/standard

NOTES
Dates used for time intervals are the time beginning.
Wind speeds of < 1 m/s are considered calm; wind directions measured under these conditions cannot be used for incident investigations.
This report is an interim report regarding AIMS' quality system classification. The final data will be published in the system's monthly report.

STATUS
Meteorology
Airport, Arboretum, Brackenham, CBD, eSikhaleni, and Harbour West have meteorology.
Scorpio uses meteorology from Harbour West, and Felixton uses meteorology from eSikhaleni.

MISSING DATA
"Data < 80%" - data capture less than 80% (not suitable for statistical analysis)
"No Data" – no data available.

Table 2: Maximum concentrations for SO_2.

RBCAA: Monthly Report						
SO_2 10-minute averages						
Station	*Concentration (ppb)*	*% of RSA Standard & WHO Guideline (500 µg/m³ / 191 ppb)*		*Time*	*Wind Direction (°)*	*Wind Speed (m/s)*
Arboretum	193.4	**101%**		2025/11/25 18:10	1.6	222
Brackenham	70.1	37%		2025/11/25 16:30	2.2	238
CBD	96.8	51%		2025/05/13 10:00	1.1	343
eSikhaleni	37.8	20%		2025/07/11 15:20	2.2	80
Felixton	43.9	23%		2025/10/20 11:30	2.6	166
Harbour West	160.9	84%		2025/07/13 12:00	3.9	26
Richardia	788.9	**413%**		2025/11/25 18:20	1.2	249
Scorpio	845.7	**443%**		2025/01/12 18:20	1.8	143
SO_2 hourly averages						
Station	*Concentration (ppb)*	*% of the RSA Standard (350 µg/m³ / 134 ppb)*	*No WHO Guideline*	*Time*	*Wind Direction (°)*	*Wind Speed (m/s)*
Arboretum	73.3	55%	-	2025/11/25 18:00	1.3	242
Brackenham	38.4	29%	-	2025/05/13 11:00	0.7	279
CBD	70.9	53%	-	2025/05/13 10:00	0.9	-
eSikhaleni	33.4	25%	-	2025/07/11 15:00	2.4	74
Felixton	26.8	20%	-	2025/11/14 04:00	2.4	190
Harbour West	130.3	97%	-	2025/06/26 08:00	5.5	9
Richardia	500.7	**374%**	-	2025/11/25 18:00	1.3	242
Scorpio	401.5	**300%**	-	2025/01/12 21:00	0.9	161
SO_2 daily averages						
Station	*Concentration (ppb)*	*% of the RSA Standard (125 µg/m³ / 48 ppb)*	*% of WHO Guideline (40 µg/m³ / 15 ppb)*	*Time*	*Wind Direction (°)*	*Wind Speed (m/s)*
Arboretum	6.8	14%	45%	2025/11/25 00:00	2.6	227
Brackenham	11.4	24%	76%	2025/05/11 00:00	5.0	230
CBD	22.6	47%	**151%**	2025/08/06 00:00	4.6	240
eSikhaleni	12.3	26%	82%	2025/07/11 00:00	2.2	16
Felixton	5.5	11%	37%	2025/07/11 00:00	2.2	47
Harbour West	40.7	85%	**271%**	2025/07/17 00:00	4.6	13
Richardia	33.9	71%	**226%**	2025/11/25 00:00	2.6	227
Scorpio	65.2	**136%**	**435%**	2025/09/16 00:00	3.5	192

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	46.8	-	**503%**	2025/01/12 08:20	3.9	169
eSikhaleni	20.6	-	**222%**	2025/10/23 05:40	2.0	25
Felixton	76.3	-	**820%**	2025/06/01 01:50	0.8	193
Richardia	106.1	-	**1141%**	2025/09/06 18:40	1.0	194
TRS 30-minute averages						
Station	*Concentration (ppb)*	*No RSA Standard*	*% of WHO H_2S Guideline (7.0 µg/m³ / 5.0 ppb)*	*Time*	*Wind Direction (°)*	*Wind Speed (m/s)*
CBD	40.7	-	**814%**	2025/01/12 09:00	4.0	169
eSikhaleni	17.8	-	**356%**	2025/06/03 09:30	0.6	21
Felixton	65.1	-	**1302%**	2025/06/01 01:30	0.9	195
Richardia	60.3	-	**1206%**	2025/09/06 18:30	1.1	212
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	10.6	-	**105%**	2025/01/12 00:00	3.2	181
eSikhaleni	3.8	-	38%	2025/09/15 00:00	3.3	33
Felixton	3.9	-	39%	2025/06/01 00:00	1.5	205
Richardia	3.2	-	32%	2025/10/16 00:00	3.7	207

APPENDIX E
RAINFALL

Table 1: Daily Rainfall

Date	Richards Bay (mm)	Felixton (mm)	RBCT (mm)	South32 (mm)
2025/12/01	0	0	0	0
2025/12/02	5	6	3	3
2025/12/03	5	7	8	3
2025/12/04	4	0	2	3
2025/12/05	0	0	1	1
2025/12/06	12	0	5	6
2025/12/07	4	0	0	3
2025/12/08	0	0	0	0
2025/12/09	33	86	60	63
2025/12/10	33	13	19	28
2025/12/11	0	0	0	0
2025/12/12	0	0	0	0
2025/12/13	11	0	6	4
2025/12/14	1	0	0	0
2025/12/15	0	0	0	0
2025/12/16	0	0	0	0
2025/12/17	3	11	7	1
2025/12/18	28	6	12	13
2025/12/19	0	0	0	0
2025/12/20	0	0	16	0
2025/12/21	24	29	14	3
2025/12/22	2	0	1	0
2025/12/23	0	1	0	0
2025/12/24	2	5	0	1
2025/12/25	-	0	0	1
2025/12/26	-	1	4	0
2025/12/27	8	10	11	0
2025/12/28	31	19	10	0
2025/12/29	7	0	0	0
2025/12/30	0	0	0	0
2025/12/31	0	0	0	0
Total	211	193	178	132

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	479
May	311	9	53	165	130	356	22	41
Jun	70	78	114	140	60	33	89	27
Jul	20	16	48	57	20	196	57	220
Aug	100	160	107	59	77	20	97	17
Sep	85	43	144	216	93	23	186	203
Oct	213	260	171	214	101	345	250	96
Nov	119	296	122	72	131	61	103	176
Dec	156	320	77	464	253	195	145	211
Minimum	20	9	47	57	20	20	22	17
Average	150	154	128	186	158	169	136	200
Maximum	311	320	377	464	647	410	271	479
Total	1798	1850	1540	2234	1893	2034	1630	2396

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	287
May	342	9	42	57	120	245	17	16
Jun	60	53	44	98	20	14	53	29
Jul	22	17	37	39	15	146	2.5	157
Aug	83	39	67	55	37	18	54	3
Sep	53	79	84	191	51	43	137	127
Oct	201	144	67	145	98	318	187	79
Nov	84	121	106	35	174	34	78	131
Dec	111	311	64	212	163	146	74	193
Minimum	22	9	37	35	15	14	3	3
Average	113	105	82	127	107	112	83	133
Maximum	342	311	214	231	368	318	187	303
Total	1354	1261	987	1530	1288	1347	992	1590

Table 4: RBCT

Month	RBCT							
	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	450
May	175	14	69	171	268	442	23	66
Jun	59	24	52	124	30	34	104	27
Jul	21	5	39	64	30	162	56	155
Aug	35	68	64	56	25	30	86	17
Sep	41	59	104	187	115	30	177	164
Oct	80	164	121	156	71	293	121	65
Nov	70	186	77	43	129	42	89	166
Dec	104	216	104	245	279	127	65	178
Minimum	21	5	33	43	25	30	23	17
Average	84	110	87	139	161	145	100	159
Maximum	175	216	166	245	642	442	177	450
Total	1005	1317	1049	1669	1934	1740	1205	1911

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	-	363
May	-	-	-	-	106	230	-	23
Jun	-	-	-	-	25	11	-	16
Jul	-	-	-	-	12	165	-	98
Aug	-	-	-	-	30	13	-	8
Sep	-	-	-	-	64	18	129	35
Oct	-	-	-	-	64	271	-	30
Nov	-	-	-	-	101	36	-	112
Dec	-	-	-	-	163	95	92	132
Minimum	-	-	-	-	12	11	92	8
Average	-	-	-	-	121	107	121	119
Maximum	-	-	-	-	505	271	144	363
Total	-	-	-	-	1336	1280	485	1427

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	2025/12/01 08:20	Veldenvlei	Alumina fallout	South32	Alumina fallout on vehicle and windowsills. Vehicle was washed on 29 Nov.	338
2	2025/12/02 08:39	Arboretum Ext	Sewage odour	CoU	“Sewage smell unbearable again this morning”	337
3	2025/12/06 17:00	Arboretum Ext	Sewage odour	CoU	bad sewage odour.	337
4	2025/12/06 17:59	Arboretum Ext	Sewage odour	CoU	“the sewer smell is really bad and has been for some time. Please could something be done about this.”	337
5	2025/12/06 18:09	Arboretum Ext	Sewage odour	CoU	“Sewage smell. Been bad since this morning.”	337
6	2025/12/06 18:11	Arboretum Ext	Sewage odour	CoU	bad sewage odour.	337
7	2025/12/06 18:20	Arboretum Ext	Sewage odour	CoU	bad sewage odour affecting most residents in Hadeda Park because there are numerous overflowing manholes and I am sure that there is ground and water contaminated in the greenbelt.	337
8	2025/12/07 04:00	Arboretum Ext	Sewage odour	CoU	“ Terrible sewage smell this morning. This can point to airborne bacteria from the sewage. These can sometimes include things like E.Coli, Salmonella, Legionella and other harmful germs. They may cause stomach issues, breathing problems, skin infections or allergic reactions especially in kids, elderly people or anyone with a weak immune system. This needs urgent attention for everyone’s health and safety as it has been going on for over a year that we’ve experienced these exposures daily.”	337
9	2025/12/07 08:56	Wildenweide	Odour	Mondi	"extra strong rotten egg smell"	336
10	2025/12/17 08:06	Arboretum & CBD	Odour	Unknown source	“Weird sweetish smell.”	340

Table 2: Responses

No.	Industry Feedback
336	Mondi - Candice Webb responded (2025/10/20 15:53): Source of odour: Secondary treatment Plant. All point sources of emission are found to be well within specification. The hardwood and softwood gases were stable during incineration. Area operators took plant specifics odour checks and investigated any possible leaks; no deviation identified were found in the non condensable gas system. Based on the description of the odour, Mondi suspected the effluent plant may be a contributing factor and requested the Secondary Effluent Plant (SEPT) was taken offline (between 9:12 and 11:33).
337	RBCAA Allocation- Sandy Camminga (2025/12/08 21:34) RBCAA Communication - Sandy Camminga (2025/10/09 08:33)The RBCAA has formally notified the authorities (Jacqueline Lourens) of the numerous complaints.
338	South 32 -Londiwe Molebale responded (2025/12/09 09:07): On the 30th of November 2025 an abnormal stack emission occurred at Gas Treatment Centre 3 (GTC3). The emission was visibly noticeable from the stack and persisted for a period of one day. The incident resulted in elevated dust/particulate release beyond normal operating levels as five filters were emitting >90% dust consistently on the day of the occurrence. Why? High dust emissions exceeding the daily emission limit compromising the health of employees and community members. GTC 3 five filters (1,5,7,9, and 10) consistently emitting dust due to filter bag leaks. Filter bags damaged (holes identified). Investigation on the premature failure of the filter bags is still on going.

No.	Industry Feedback
340	Mondi - Candice Webb responded (2025/12/18 08:45): Source of Odour: No root cause could be identified within Mondi. 3. Metrological Conditions: RBCAA Brackenham monitoring station. Average wind direction at Brackenham station prior to the complaint =249O Average wind speed = 4.4m/s. Mondi Monitoring Stations: No exceedances recorded at the Mondi monitoring stations prior to the time of the complaint. No ambient TRS exceedances associated with Mondi were recorded at the RBCAA stations. Mondi Environmental Manager received notification of odour complaint from the RBCAA at 09:15 and an investigation was undertaken.. All point source emissions found to be well within specification. The hardwood and softwood gasses were stable during incineration. Area operators undertook plant specific odour checks and investigated any possible leaks, no deviations identified were found in the noncondensable gas system. Production engineers then undertook further verification checks with no deviations identified. The Secondary Effluent Treatment Plant (SETP) was also checked with no deviations to effluent temperature, pH control or quality of the effluent identified. Mondi did note an increase in ambient TRS at the CBD station between 06:45 and 07:35, however these levels did not exceed the WHO guideline limits for odour. No root cause could be identified within Mondi. RBCAA Allocation - Sandy Camminga (2025/12/19 07:03) : Please allocate this complaint to “unknown source”.

APPENDIX G
PM_{10} EXCEEDANCE LOG

No exceedances were measured during December 2025.

APPENDIX H
$PM_{2.5}$ EXCEEDANCE LOG

Table 1:$PM_{2.5}$ Exceedances

No	Target / Guideline / Standard	Station	Date	Value (ppb)	Wind Direction (°)	Wind Speed (m/s)	Source	Comment	Response
1	$PM_{2.5}$ Daily WHO Limit (15 µg/m³)	Brackenham	2025/12/02 00:00	16.0	1	2.2	No response required	None	2
2	$PM_{2.5}$ Daily WHO Limit (15 µg/m³)	Brackenham	2025/12/06 00:00	19.0	260	2.8	No response required	None	2
3	$PM_{2.5}$ Daily WHO Limit (15 µg/m³)	Brackenham	2025/12/08 00:00	16.0	52	2.7	No response required	None	2
4	$PM_{2.5}$ Daily WHO Limit (15 µg/m³)	Brackenham	2025/12/09 00:00	31.0	244	3.2	No response required	None	2
5	$PM_{2.5}$ Daily WHO Limit (15 µg/m³)	Brackenham	2025/12/12 00:00	16.0	37	5.4	No response required	None	2
6	$PM_{2.5}$ Daily WHO Limit (15 µg/m³)	Brackenham	2025/12/13 00:00	23.0	262	4.2	No response required	None	2
7	$PM_{2.5}$ Daily WHO Limit (15 µg/m³)	Brackenham	2025/12/16 00:00	18.0	45	4.7	No response required	None	2
8	$PM_{2.5}$ Daily WHO Limit (15 µg/m³)	Brackenham	2025/12/17 00:00	24.0	250	4.4	No response required	None	2
9	$PM_{2.5}$ Daily WHO Limit (15 µg/m³)	Brackenham	2025/12/20 00:00	23.0	269	1.8	No response required	None	2
10	$PM_{2.5}$ Daily WHO Limit (15 µg/m³)	Brackenham	2025/12/24 00:00	18.0	250	3.9	No response required	None	2
11	$PM_{2.5}$ Daily WHO Limit (15 µg/m³)	Felixton	2025/12/08 00:00	19.0	63	3.2	No response required	None	2
12	$PM_{2.5}$ Daily WHO Limit (15 µg/m³)	Felixton	2025/12/09 00:00	25.0	210	2.8	No response required	None	2
13	$PM_{2.5}$ Daily WHO Limit (15 µg/m³)	Felixton	2025/12/17 00:00	16.0	232	4.4	No response required	None	2
14	$PM_{2.5}$ Daily WHO Limit (15 µg/m³)	Harbour West	2025/12/09 00:00	16.0	194	3.2	No response required	None	2
15	$PM_{2.5}$ Daily WHO Limit (15 µg/m³)	Scorpio	2025/12/01 00:00	16.0	107	2.4	No response required	None	2
16	$PM_{2.5}$ Daily WHO Limit (15 µg/m³)	Scorpio	2025/12/09 00:00	30.0	194	3.2	No response required	None	2
17	$PM_{2.5}$ Daily WHO Limit (15 µg/m³)	Scorpio	2025/12/13 00:00	16.0	213	4.2	No response required	None	2
18	$PM_{2.5}$ Daily WHO Limit (15 µg/m³)	Scorpio	2025/12/16 00:00	17.0	29	5.9	No response required	None	2
19	$PM_{2.5}$ Daily WHO Limit (15 µg/m³)	Scorpio	2025/12/17 00:00	19.0	219	5.1	No response required	None	2
20	$PM_{2.5}$ Daily WHO Limit (15 µg/m³)	Scorpio	2025/12/20 00:00	28.0	223	2.1	No response required	None	2
21	$PM_{2.5}$ Daily WHO Limit (15 µg/m³)	Scorpio	2025/12/26 00:00	19.0	125	1.7	No response required	None	2
22	$PM_{2.5}$ Daily WHO Limit (15 µg/m³)	Scorpio	2025/12/29 00:00	16.0	96	2.8	No response required	None	2

Table 2: $PM_{2.5}$ Responses

Response	Industry Feedback
2	No response required

APPENDIX I
SO_2 EXCEEDANCE LOG

Table 1: SO_2 Exceedances.

No	Target / Guideline / Standard	Station	Date	Value (ppb)	Wind Direction (°)	Wind Speed (m/s)	Source	Comment	Response
1	SO_2 Daily WHO Limit (15 ppb)	Harbour West	2025/12/12 00:00	15.1	25	6	No response required	None	2

Table 2: SO_2 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_2S Limit (5.0 ppb)	eSikhaleni	2025/12/13 01:30	5.9	42	1.2	Mondi	SETP	866, 867
2	**TRS 10-minute OME Limit (9.3 ppb)**	**Felixton**	**2025/12/02 17:10**	**10.0**	**158**	**1.7**	**Unresolved**	**Responded: Mondi, THS & Mpact**	**858, 860, 861**
3	TRS 30-minute WHO H_2S Limit (5.0 ppb)	Felixton	2025/12/04 02:30	6.3	178	1.2	THS	Boilers-coal operated	862, 863, 868
4	TRS 10-minute OME Limit (9.3 ppb)	Felixton	2025/12/04 02:50	11.0	189	1.3	THS	Boilers-coal operated	862, 863, 868
5	TRS 10-minute OME Limit (9.3 ppb)	Felixton	2025/12/04 03:30	9.4	202	0.6	THS	Boilers-coal operated	862, 863, 868
6	TRS 30-minute WHO H_2S Limit (5.0 ppb)	Felixton	2025/12/04 03:30	6.4	226	1.0	THS	Boilers-coal operated	862, 863, 868
7	TRS 30-minute WHO H_2S Limit (5.0 ppb)	Felixton	2025/12/10 14:30	6.4	179	3.0	THS	Boilers-coal operated	864, 865, 869
8	TRS 10-minute OME Limit (9.3 ppb)	Felixton	2025/12/10 14:50	11.1	177	2.1	THS	Boilers-coal operated	864, 865, 869
9	TRS 10-minute OME Limit (9.3 ppb)	Felixton	2025/12/10 15:00	10.7	184	2.4	THS	Boilers-coal operated	864, 865, 869

Table 2: TRS Responses

No	Industry Feedback
858	Mondi - Kira Cobbold responded, (2025/12/03 14:15): Mondi has investigated the TRS exceedance at Felixton on 02/12/25 and based on the south easterly to southerly wind direction, Mondi is unlikely to be the source.
860	Tongaat Hulett - Nicolas Govender responded (2025/12/04 08:26): Kindly see comment below for exceedance on TRS. Seems like our operations were stable at this time.
861	Mpact -Traven Chetty responded, (2025/12/04 11:05): Please note, Mpact operations was on an emergency shut down on the 2nd of December 2025. There were no operations active at the paper machine and boiler house during this time period. The effluent treatment plant was still in partial operation however, no abnormal activities took place during this time that could have caused this exceedance. It is therefore unlikely that Mpact is the source of this exceedance.
862	Mondi - Kira Cobbold responded, (2025/12/05 10:39): Mondi has investigated the TRS exceedances at Felixton on 04/12 and based on the south westerly wind direction is unlikely the source.
863	Mpact -Traven Chetty responded, (2025/12/08 14:18): Mpact has investigated the exceedances at the Felixton station on the 4th of December 2025. Based on the plant process reports, all operations were stable with no abnormal activities taking place. To further this, the wind direction is also not in favour of emissions from Mpact. It is therefore unlikely that Mpact is the source of this exceedance.
864	Mondi - Kira Cobbold responded, (2025/12/17 14:58): Mondi has investigated the TRS exceedances at Felixton on 10/12 and based on wind direction and speed is unlikely the source.
865	Mpact -Traven Chetty responded, (2025/12/17 14:57): Mpact has investigated the exceedance at the Felixton station on the 10th of December 2025. Based on the plant process reports, all operations were stable with no abnormal activities taking place. To further this, the wind direction is also not in favour of emissions from Mpact. It is unlikely that Mpact is the source of this exceedance.
866	Mpact -Traven Chetty responded, (2025/12/17 15:09): Mpact has investigated this exceedance on the 13th of December 2025. We can confirm all plant process reports indicated that operations were stable and there were no abnormal conditions experienced. The wind direction is also not in favour of emissions from Mpact. Based on this, it is unlikely that Mpact is the source of these exceedance
867	Mondi - Kira Cobbold responded, (2025/12/17 15:58): Mondi has investigated the TRS exceedance at eSikhaleni and based on wind speed and direction, and elevated H2S levels recorded at the effluent stack at 12:20 am, Mondi can be considered a potential source. The mill was under normal operating conditions with gases stable for incineration in the Lime Kiln. Based on elevated drain conductivities and effluent stack H2S, the most likely release of TRS came from the SETP due to the generation of lower quality effluent from the process. By 12:54 am the H2S peak had returned to levels below 5 ppm
868	Tongaat Hulett - Nicolas Govender responded (2025/12/18 08:31): The factory was running at a slow rate which resulted in coal usage to supplement fuel to the boilers.
869	Tongaat Hulett - Nicolas Govender responded (2025/12/18 08:30): The boilers had to burn coal when boiler no.2 feeders were choking due to the poor cane preparation form worn out hammers as well as the sow crfushoing during that period.


AIMS