AIMS

Report

Monthly AirGradient Monitoring

August 2026

Submitted to: Candice Webb / Sandy Camminga

Richards Bay Clean Air Association (RBCAA)

Suite 18 Calypso Centre, 2 Kruger Rand Grove, Richards Bay, KwaZulu-Natal, 3900

P O Box 10299, Meerensee, 3901

Submitted by: Lance Coetzee

Air Impact Measurement Specialists

Suite 18 Calypso Centre, 2 Kruger Rand Grove, Richards Bay, KwaZulu-Natal, 3900

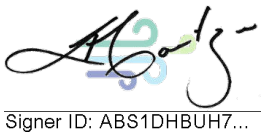
PO Box 10491, Meerensee, KwaZulu-Natal, 3901

Project 2026001 Report 023

September 2026

Document Approval

Action	Designation	Name	Date
Prepared	Assistant Consultant	Alicia Garnica	2026-09-10
Reviewed	Senior Consultant	Lance Coetzee	2026-09-20
Reviewed	Senior Consultant	Lance Coetzee	2026-09-30


Signer ID: ABS1DHBUH7...

Lance Coetzee
Director

Record of Revisions

Revision	Comments	Author	Date
0	Draft	Lance Coetzee	2026-09-20
1	Final	Lance Coetzee	2026-09-20

Note

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

Disclaimer and Use of Information

The AirGradient screening data contained in this report have undergone the routine quality-control and data-validation procedures applied to the RBCAA secondary screening network. This report, together with the original compilation, presentation and analysis of the data, is the intellectual property of the RBCAA (a non-profit association). It is made available to the public for informational purposes and to relevant authorities for regulatory tracking and compliance. Although this information is accessible, no part of this report or its data compilations may be reproduced, extracted, republished, distributed or incorporated into external works for commercial purposes, private consultancy or financial gain without the prior written consent of the RBCAA. The RBCAA accepts no responsibility or liability for any reliance placed on this information, or for any unauthorised use, misuse, misinterpretation or alteration of the data by third parties.

Acknowledgement

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

Table of Contents

1. Introduction 6
2. AirGradient Monitoring Network 8
3. Particulate Monitoring 10
3.1. Data Completeness 10
3.2. Monthly Concentrations 10
3.3. Diurnal Concentrations 12
3.4. 24-hour Concentrations 13
3.5. Conclusion 15
4. Total Volatile Organic Compounds Monitoring 17
4.1. Data Completeness 17
4.2. Monthly Index Values 17
4.3. Diurnal Index Values 19
4.4. 24-hour Index Values 19
4.5. 1-hour Index Values 20
4.6. Conclusion 20
5. Nitrogen Oxides Monitoring 21
5.1. Data Completeness 21
5.2. Monthly Index Values 23
5.3. Diurnal Index Values 24
5.4. 24-hour Index Values 24
5.5. 1-hour Index Values 25
5.6. Conclusion 25
6. Carbon Dioxide Monitoring 26
6.1. Data Completeness 26
6.2. Monthly Concentrations 26
6.3. Diurnal Concentrations 28
6.4. 24-hour Concentrations 28
6.5. 1-hour Concentrations 29
6.6. Conclusion 29
7. Consolidated AirGradient Monitoring Conclusion 30
8. References 31

List of Tables

Table 1.1: Primary monitoring network station coordinates. 7
Table 1.2: Secondary screening network coordinates (AirGradient monitors). 7
Table 3.1: Particulate data completeness (%) based on valid 10-minute records. 10
Table 4.1: TVOC data completeness (%) based on valid 10-minute records. 17
Table 4.2: TVOC hourly observations above the 3σ and 5σ screening thresholds. 20
Table 5.1: NO_x data completeness (%) based on valid 10-minute records. 21
Table 5.2: NO_x hourly observations above the 3σ and 5σ screening thresholds. 25
Table 6.1: CO_2 data completeness (%) based on valid 10-minute records. 26
Table 6.2: CO_2 hourly observations above the 3σ and 5σ screening thresholds. 29

List of Figures

Figure 1.1: RBCAA monitoring network. 6
Figure 3.1: PM_{10} monthly concentration. 11
Figure 3.2: $PM_{2.5}$ monthly concentration. 11
Figure 3.3: PM_{10} monthly comparison. 12
Figure 3.4: $PM_{2.5}$ monthly comparison. 12
Figure 3.5: PM_{10} diurnal concentrations. 13
Figure 3.6: $PM_{2.5}$ diurnal concentrations. 13
Figure 3.7: PM_{10} daily concentrations. 14
Figure 3.8: $PM_{2.5}$ daily concentrations. 14
Figure 4.1: TVOC monthly index values. 18
Figure 4.2: TVOC monthly index comparison. 18
Figure 4.3: TVOC diurnal index values. 19
Figure 4.4: TVOC daily index values. 19
Figure 4.5: TVOC hourly index values. 20
Figure 5.1: NO_x monthly index values. 23
Figure 5.2: NO_x monthly comparison. 23
Figure 5.3: NO_x diurnal index values. 24
Figure 5.4: NO_x daily index values. 24
Figure 5.5: NO_x hourly index values. 25
Figure 6.1: CO_2 monthly concentration. 27
Figure 6.2: CO_2 monthly comparison. 27
Figure 6.3: CO_2 diurnal concentrations. 28
Figure 6.4: CO_2 daily concentrations. 28

Figure 6.5: CO_2 hourly concentrations. 29

1. INTRODUCTION

This monthly air quality report, prepared for the Richards Bay Clean Air Association (RBCAA), summarises AirGradient monitoring data for August 2026. It assesses particulate matter (PM), total volatile organic compound (TVOC) index values, nitrogen oxides (NO_x) index values and carbon dioxide (CO_2) concentrations measured by the RBCAA AirGradient screening network. The report highlights notable incidents, elevated short-term events and data-quality issues observed during the month. These monthly summaries support the identification of spatial and temporal patterns and help prioritise follow-up investigation where warranted.

RBCAA also publishes annual air quality reports summarising findings and longer-term trends over a complete calendar year. The annual reports provide stakeholders with an integrated view of regional air quality performance and support informed decision-making, policy development and environmental management: consistent monitoring and reporting support transparency, ongoing environmental assessment and community awareness.

The RBCAA monitoring network comprises eleven (11) primary monitoring stations (Figure 1.1 and Table 1.1). Airport and Felixton Met are meteorological stations, and Meerensee is a rain-gauge site; none of the three operates continuous air-quality analysers. The network also includes a secondary screening network comprising eleven (11) AirGradient monitors (Table 1.2), the eleventh of which was commissioned at Scorpio on 18 August 2026.



Figure 1.1: RBCAA monitoring network.

Table 1.1: Primary monitoring network 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

Table 1.2: Secondary screening network coordinates (AirGradient monitors).

Site	Latitude (°)	Longitude (°)	Elevation (m)
Airport	-28.738161	32.093332	33.99
Brackenham	-28.731325	32.039059	56.28
CBD	-28.744693	32.054851	32.26
Empangeni	-28.734970	31.896245	109.85
eSikhaleni	-28.865278	31.911679	14.54
Felixton	-28.829255	31.893636	56.59
Harbour West	-28.787297	32.027133	7.36
Meerensee	-28.772104	32.101308	14.89
Mtunzini	-28.959335	31.743905	84.00
Richardia	-28.762769	32.066068	19.96
Scorpio	-28.769694	32.034282	29.39

2. AIRGRADIENT MONITORING NETWORK

The AirGradient network was established in late 2023 as a co-location study to evaluate the comparability of particulate measurements against the primary monitoring network. It was subsequently expanded in support of an RBCAA objective to screen additional air-quality parameters. Initially, the network comprised two sites, Harbour West and Richardia, and monitored only particulates (PM_{10}, $PM_{2.5}$ and PM_1). In July 2024, the network was expanded to include Brackenham, CBD, eSikhaleni and Felixton, and all monitors were upgraded to measure total volatile organic compound (TVOC) index, nitrogen oxides (NO_x) index and carbon dioxide (CO_2). A further expansion initiated in August 2025 added Airport, Empangeni, Meerensee and Mtunzini progressively: Meerensee and Mtunzini produced data during 2025, while Airport and Empangeni commenced reporting in 2026. A further monitor was commissioned at Scorpio on 18 August 2026, following co-location at Richardia from 6 to 18 August 2026. The network now comprises eleven (11) monitors across multiple sites.

AirGradient monitors are designed as accessible, lower-cost air-quality screening instruments. Their data are useful for identifying spatial patterns, short-term events and locations that may warrant follow-up. Still, they are not equivalent to reference-grade or regulatory-equivalent analysers and should be evaluated against a documented monitoring objective, performance basis and QA/QC process (Clements et al., 2022).

- Accuracy and precision: Regulatory reference or equivalent analysers are subject to method approval, routine calibration and quality-assurance requirements for specific pollutants. AirGradient monitors use compact sensors, including optical particle counters for PM and non-dispersive infrared sensors for CO_2. These sensors are useful for indicative screening but are more sensitive to siting, environmental conditions, sensor drift and calibration uncertainty than reference instruments.
- Calibration and certification: Product certifications such as CE, FCC, RoHS and REACH relate primarily to product conformity and market access; they should not be interpreted as certification of equivalence to regulatory reference methods. Where AirGradient data are used for technical assessment, co-location, calibration checks and documented QA/QC procedures are required to define their uncertainty and fitness for use.
- Data application: The AirGradient network is therefore treated as a secondary screening network. The TVOC and NO_x outputs are reported as dimensionless index values (Sensirion, 2022a; Sensirion, 2022b) and are interpreted as relative indicators of short-term changes rather than pollutant-specific regulatory concentrations.
- Cost and accessibility: Because the monitors are lower-cost and easier to deploy than reference analysers, they can improve spatial coverage and help identify potential localised events, provided the limitations above are clearly recognised.

In summary, AirGradient monitors provide useful indicative information for non-regulatory screening. Still, the data should not be used as a substitute for approved reference or equivalent-method analyser data when assessing statutory compliance.

Station abbreviations used in figures and tables are Air = Airport, Brk = Brackenham, CBD = CBD, Emp = Empangeni, eSk = eSikhaleni, Flx = Felixton, HW = Harbour West, MS = Meerensee, Mtz = Mtunzini, Rch = Richardia and Scr = Scorpio.

Comparison basis: The comments below compare the AirGradient screening results with the August 2026 Monthly Air Quality report (Project 2026001 Report 022) for the RBCAA primary monitoring network. The comparison is qualitative and event/station-based, not a formal method comparison, because instruments, parameters and co-location coverage differ, and the AirGradient TVOC and NO_x outputs are dimensionless indices. The 3σ and 5σ screening thresholds are fixed from pooled valid hourly observations across operational AirGradient stations for calendar year 2025, calculated as the pooled mean plus three or five population standard deviations. Calculations use unrounded thresholds; figures display rounded values. These are statistical screening thresholds, not regulatory or health limits. The thresholds were independently re-derived for this issue from the 2025 pooled hourly datasets and reproduce the published values exactly

(TVOC 3σ = 355.6, 5σ = 511.2; NO_x 3σ = 45.1, 5σ = 73.4; CO_2 3σ = 605.2 ppm, 5σ = 706.5 ppm). All August 2026 TVOC, NO_x and CO_2 event counts were recalculated from the source hourly datasets (2026-08_Aug_AirGradient-TVOC / -NOX / -CO2.xlsx, 9 September 2026 issue, as restated for Scorpio on 19 September 2026). Tables 4.2, 5.2 and 6.2 have been rebuilt for this issue: each now carries a column for all eleven monitors and a network total. The Table 5.2 5σ row published at v00 was computed against the pooled standard deviation alone rather than the mean plus five standard deviations and has been recomputed. Unless otherwise stated, data completeness is calculated as the number of valid 10-minute records divided by the number of scheduled 10-minute records for the reporting month. Exactly-zero 10-minute PM_{10} and $PM_{2.5}$ readings are retained in all concentration and completeness statistics. They occur when ambient particulate concentrations fall to the resolution floor of the optical particle counter: in August 2026, the network median PM_{10} at the times any monitor read zero was 2 to 3 µg/m³, and the readings immediately adjacent to a zero were typically 0.1 µg/m³. Zero readings are therefore treated as left-censored measurements rather than as instrument faults. Excluding them would remove only the lowest observations and bias the monthly means upward, by up to 4 µg/m³ at Airport, Empangeni and Mtunzini. Concentration statistics, completeness and the plotted series are accordingly on a single common basis.

Aggregation and validity: hourly and daily statistics are formed only from intervals that meet a minimum valid-record count.

Diurnal profiles: the hour-of-day profiles in Sections 3.3, 4.3, 5.3 and 6.3 are unweighted means of station means over the reporting month. Scorpio is excluded from every network diurnal profile because its record is part-month, and Harbour West is excluded from the CO_2 profile because its channel is withheld.

Screening-threshold tables: in Tables 4.2, 5.2 and 6.2, the 5σ count is a subset of the 3σ count and not an additional set of observations, because an observation above 5σ is necessarily also above 3σ. Scorpio event counts are included in those tables and in the network totals, although their monthly mean values are withheld, because an event count does not require a representative calendar month; the withheld Harbour West CO_2 counts are excluded on data-quality rather than completeness grounds and are reported separately in Section 6.6.

Index parameters: the TVOC and NO_x outputs are Sensirion index values referenced to an adaptive baseline learned from each sensor's own recent history, so an index value expresses a deviation from that monitor's recent local conditions rather than an absolute burden (Sensirion, 2022a; Sensirion, 2022b). Monthly mean index values are therefore centred near 100 by construction, and the station comparisons in Sections 4 and 5 are indicative of the relative frequency and size of local excursions only. They are not comparisons of ambient VOC or NO_x concentration, and the station ranking by monthly mean index must not be read as a ranking of pollutant burden.

Carbon dioxide: the CO_2 sensors are non-dispersive infrared units. Where automatic baseline correction (ABC) is enabled, such sensors periodically re-anchor the lowest concentration observed over a rolling window to an assumed clean-air value, so the monthly mean is referenced to that assumed value rather than to an independent calibration.

3. PARTICULATE MONITORING

3.1. Data Completeness

The August 2026 particulate data completeness results are summarised in Table 3.1.

Table 3.1: Particulate data completeness (%) based on valid 10-minute records.

Month	Air	Brk	CBD	Emp	eSk	Flx	HW	MS	Mtz	Rch	Scr
Jan 2026	-	99	***85***	-	97	100	100	100	***90***	100	-
Feb 2026	***85***	***93***	***85***	***65***	96	98	100	100	98	99	-
Mar 2026	96	97	99	***90***	***94***	99	99	98	***91***	99	-
Apr 2026	100	***94***	100	96	96	99	100	100	***90***	100	-
May 2026	98	99	100	99	***94***	100	100	99	99	100	-
Jun 2026	99	97	100	99	95	100	100	100	98	99	-
Jul 2026	100	98	***89***	***94***	***91***	100	100	100	99	100	-
Aug 2026	99	98	99	95	***94***	99	99	100	98	99	43
Sept 2026	-	-	-	-	-	-	-	-	-	-	-
Oct 2026	-	-	-	-	-	-	-	-	-	-	-
Nov 2026	-	-	-	-	-	-	-	-	-	-	-
Dec 2026	-	-	-	-	-	-	-	-	-	-	-

Missing Data (Particulates)

- *Particulate data completeness ranged from 43.3% to 100% in August 2026. Meerensee recorded 100%, and Richardia (99.4%), Airport (98.9%), CBD (98.7%), Harbour West (98.7%), Felixton (98.6%), Brackenham (97.8%), Mtunzini (97.5%) and Empangeni (95.4%) met the RBCAA 95% operational target. eSikhaleni (93.7%) met the 90% minimum data capture specified in SANS 1929:2011 (Annex C, Table C.1) but not the 95% target, from a recurring night-time loss on twelve nights and the power failure of 31 August 2026 (Report 024, section 2.2). Scorpio (43.3%) is a part-month record: the monitor was installed at Scorpio on 18 August 2026 at 08:00 and returned 98.2% of the records scheduled from installation, so its August monthly particulate values are withheld under the 80% completeness threshold. No other monthly particulate value is withheld. Seven monitors additionally lost records from 05:10 on 31 August 2026 in a platform-side interruption (Report 024, section 2.2); remaining gaps were intermittent and short.*

3.2. Monthly Concentrations

PM_{10} and $PM_{2.5}$ monthly average concentrations are shown in Figures 3.1 and 3.2. Comparisons to previous months are provided in Figures 3.3 and 3.4.

Regulatory/health-limit interpretation: for PM_{10} and $PM_{2.5}$, the RSA ambient standards are the applicable regulatory reference values, while the WHO air quality guidelines are used as health-based contextual benchmarks. Because these AirGradient measurements are screening-network data, the comparisons identify potential concern and follow-up priorities only; they do not constitute reference-method compliance findings.

- Monthly PM_{10} averages (7.8–19.9 µg/m³) were below the RSA annual standard value of 40 µg/m³ at all ten reporting stations. The WHO annual guideline value of 15 µg/m³ was exceeded at five stations — eSikhaleni (19.9 µg/m³), Harbour West (18.1 µg/m³), Brackenham (17.4 µg/m³), Felixton (16.1 µg/m³) and Richardia (15.8 µg/m³) — and not at Meerensee (12.5 µg/m³), Empangeni (11.2 µg/m³), Mtunzini (11.2 µg/m³), Airport (10.3 µg/m³) or CBD (7.8 µg/m³, the lowest in the network). Annual compliance cannot be assessed from a single monthly average, and AirGradient data remain screening data rather than regulatory-equivalent measurements.

- Monthly $PM_{2.5}$ averages (8.3–13.5 µg/m³) were below the RSA annual standard value of 20 µg/m³ at all ten reporting stations. All ten stations were above the WHO annual guideline value of 5 µg/m³, shown for context. This is a contextual comparison of screening data only and is not a formal annual exceedance or compliance assessment.
- Station-specific monthly benchmark status: no station exceeded the RSA PM_{10} or $PM_{2.5}$ annual standard value in the August 2026 screening comparison. The WHO annual guideline comparison, used as a health-based contextual benchmark only, was exceeded for PM_{10} at five of the ten reporting stations and for $PM_{2.5}$ at all ten. Scorpio is excluded from every monthly comparison in this report: its 43.3% calendar-month capture is below the 80% completeness threshold.

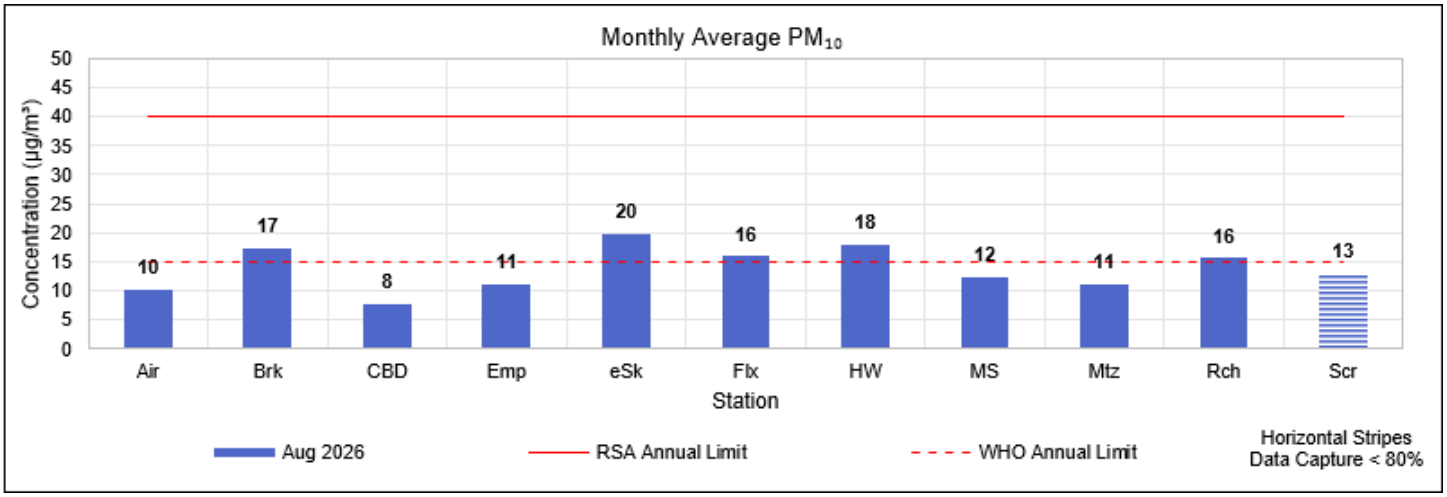


Figure 3.1: PM_{10} monthly concentration.

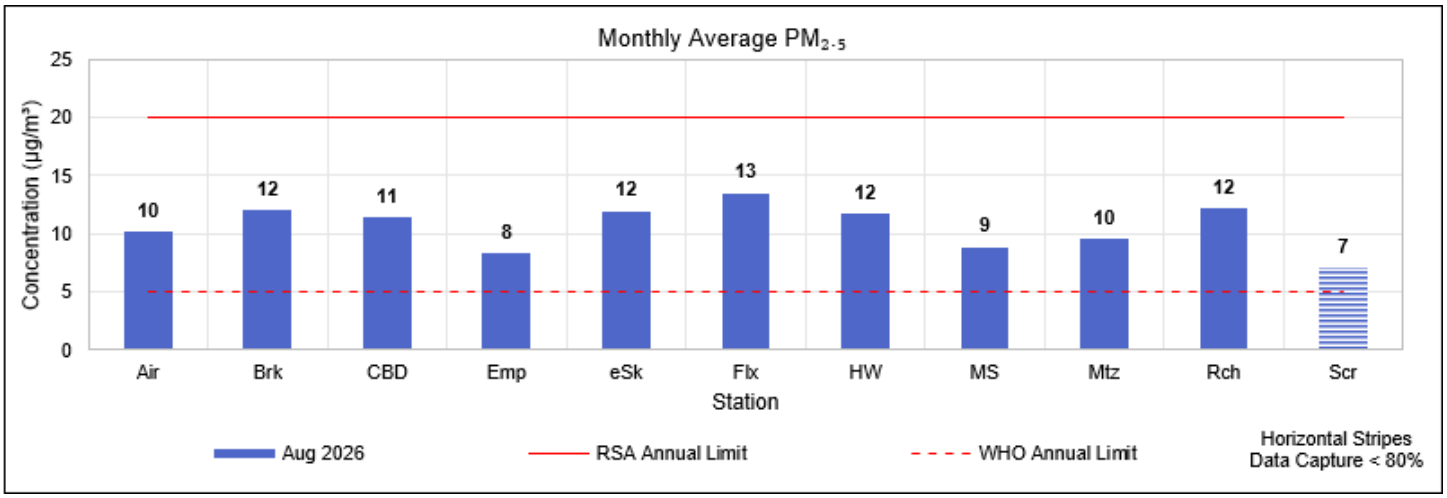


Figure 3.2: $PM_{2.5}$ monthly concentration.

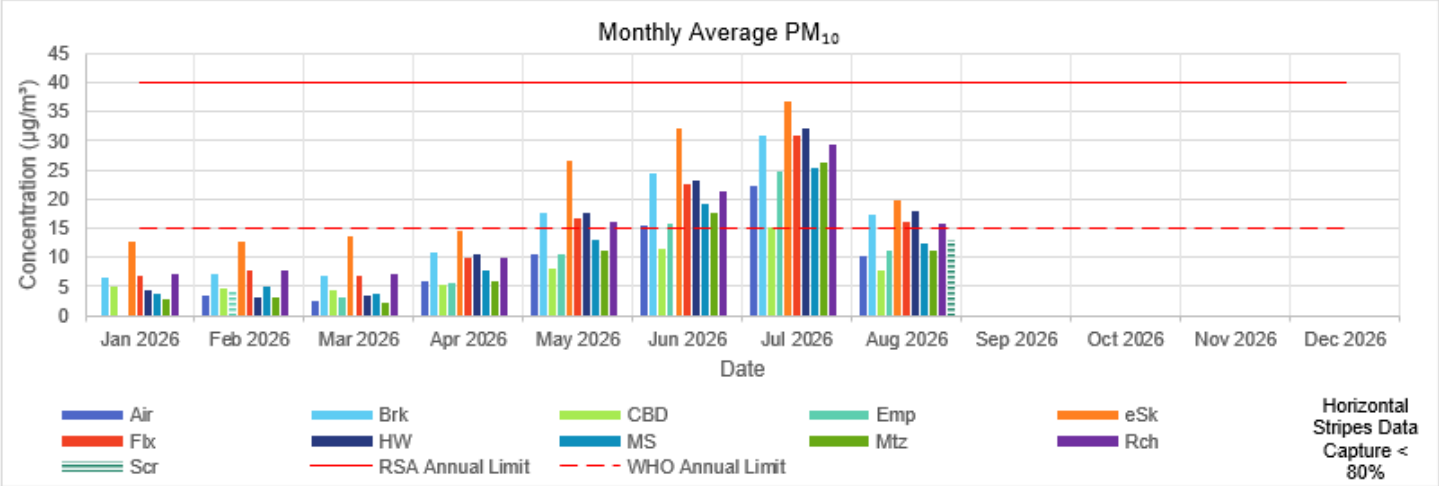


Figure 3.3: PM_{10} monthly comparison.

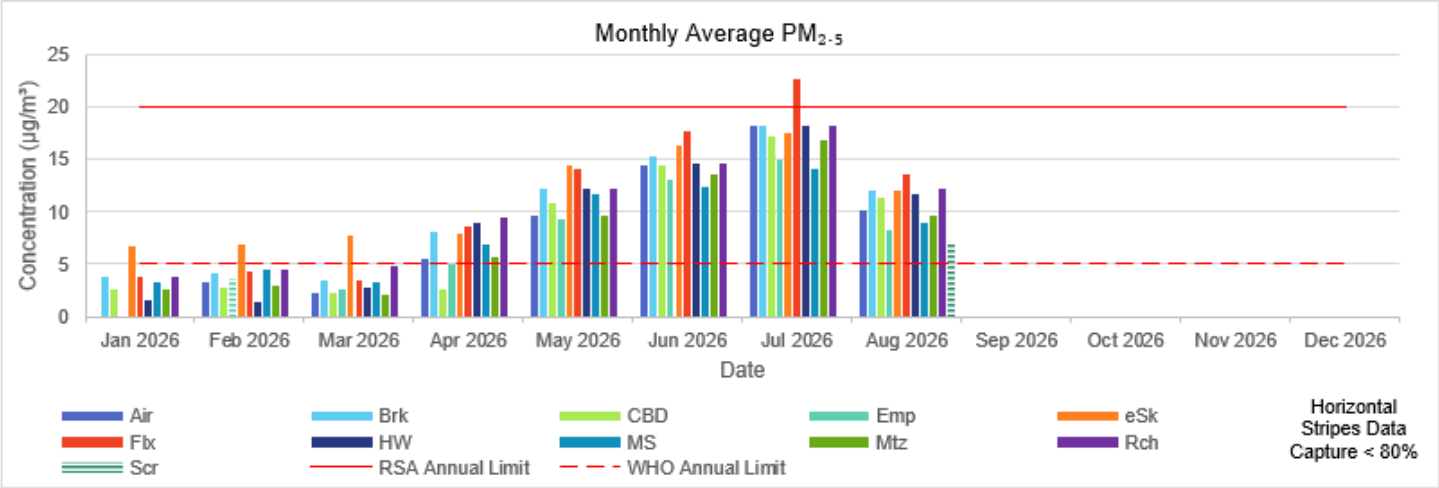


Figure 3.4: $PM_{2.5}$ monthly comparison.

3.3. Diurnal Concentrations

PM diurnal concentrations are shown in Figures 3.5 and 3.6.

- Diurnal PM_{10} and $PM_{2.5}$ averages are presented for temporal-pattern screening only. The August 2026 network-mean diurnal profile peaks at 18:00 (PM_{10} 17.8 µg/m³; $PM_{2.5}$ 12.5 µg/m³) and is lowest at 03:00 (PM_{10} 11.9 µg/m³; $PM_{2.5}$ 10.0 µg/m³, with an equal $PM_{2.5}$ minimum at 15:00), a pattern consistent with evening domestic combustion under a contracting nocturnal boundary layer rather than with a single continuous industrial source.
- The RSA and WHO particulate criteria used in this report are calendar-day (24-hour) values and should not be applied to hour-of-day averages.
- Benchmark interpretation is therefore based on the calendar-day results in Section 3.4.

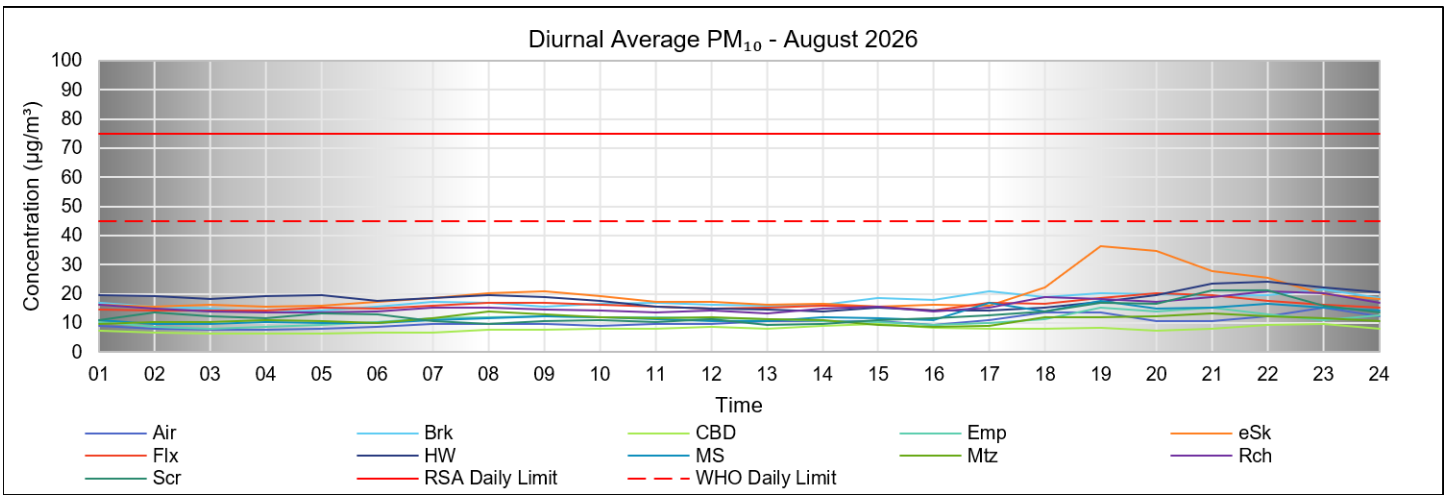


Figure 3.5: PM_{10} diurnal concentrations.

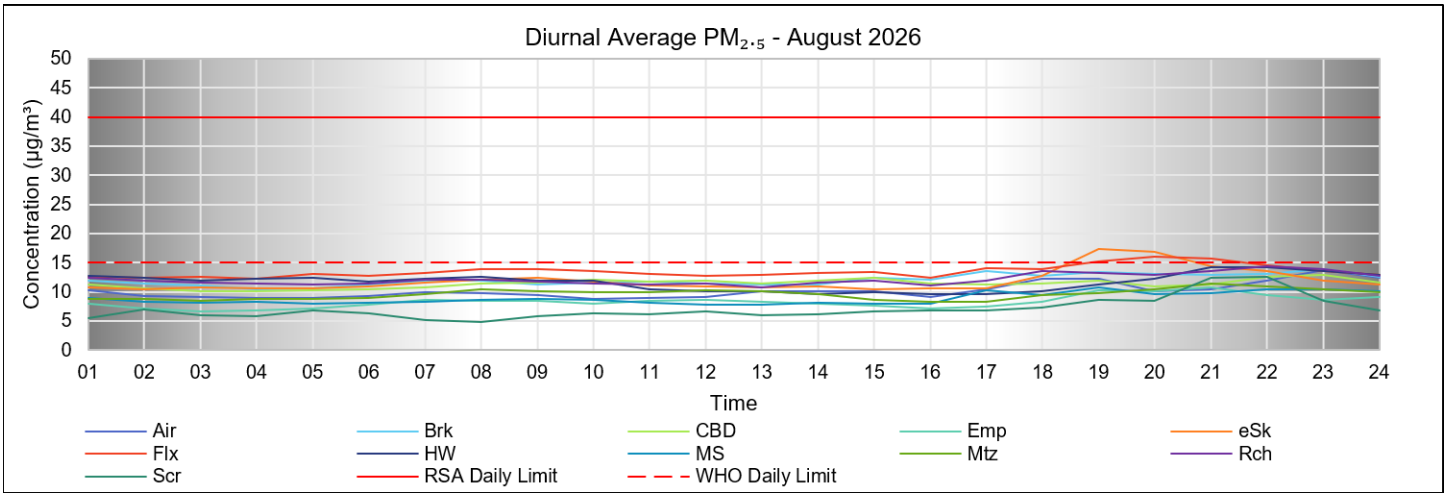


Figure 3.6: $PM_{2.5}$ diurnal concentrations.

3.4. 24-hour Concentrations

PM daily concentrations are shown in Figures 3.7 and 3.8.

- No daily average PM_{10} value exceeded the RSA 24-hour standard value of 75 µg/m³ at any station in August 2026; the highest daily value in the network was 51.8 µg/m³ at Felixton on 6 August. The WHO 24-hour guideline value of 45 µg/m³, shown for context, was exceeded on five station-days, all on 6 August: Felixton (51.8 µg/m³), Harbour West (50.5 µg/m³), eSikhaleni (49.8 µg/m³), Brackenham (47.1 µg/m³) and Mtunzini (45.4 µg/m³).
- No daily average $PM_{2.5}$ value exceeded the RSA 24-hour standard value of 40 µg/m³ at any station in August 2026; the highest daily value in the network was 34.3 µg/m³ at Felixton on 6 August.
- The WHO 24-hour guideline value of 15 µg/m³ for $PM_{2.5}$ was exceeded at all ten reporting stations, on 84 station-days in total and on 4 to 12 days per station, with the highest count at Felixton (12 days), followed by Richardia (11) and Brackenham (10) and the lowest at Meerensee (4). The exceedances cluster on 4–9 August and on 22 and 25 August, indicating regional episodes rather than localised sources.

- These are screening-network results and should not be interpreted as reference-method compliance findings.
- Station-specific daily benchmark status: no station exceeded the RSA PM_{10} or $PM_{2.5}$ 24-hour standard value in August 2026. On a screening basis, the 2026 year-to-date RSA 24-hour exceedance counts are therefore unchanged from July (PM_{10}: eSikhaleni 2, Felixton 1, Mtunzini 1; $PM_{2.5}$: Felixton 3, Airport 2, Empangeni 2), and no AirGradient station has reached the four exceedances per calendar year permitted by the RSA 24-hour standards. Felixton nevertheless remains at three of the four permitted $PM_{2.5}$ exceedances, with four months of the calendar year outstanding, and should be treated as a watch item. This is not a compliance determination. The AirGradient counts carry the station-specific bias discussed in Section 3.5, and, because most co-located units underread their reference analysers, they are a lower bound: at Brackenham, where the AirGradient unit underreads $PM_{2.5}$ by a little over a factor of two, the reference analyser recorded three RSA 24-hour $PM_{2.5}$ exceedances in August 2026 alone, while the co-located AirGradient unit recorded none. The AirGradient year-to-date counts must therefore not be used as a proxy for regulatory exceedance status at any station, and the Felixton watch item is a screening observation only.

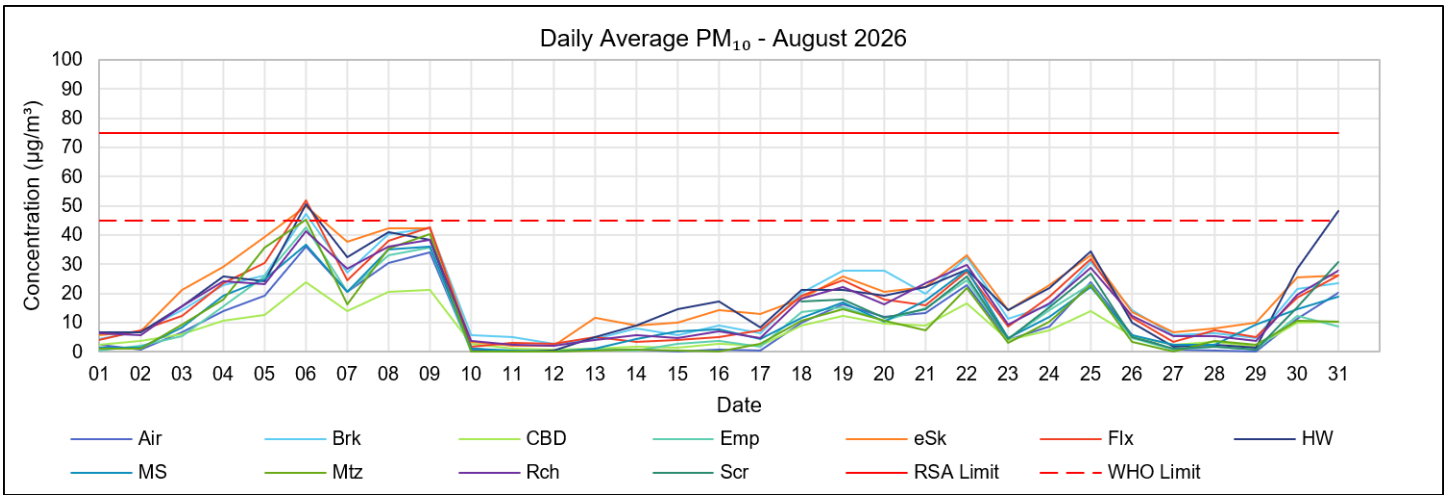


Figure 3.7: PM_{10} daily concentrations.

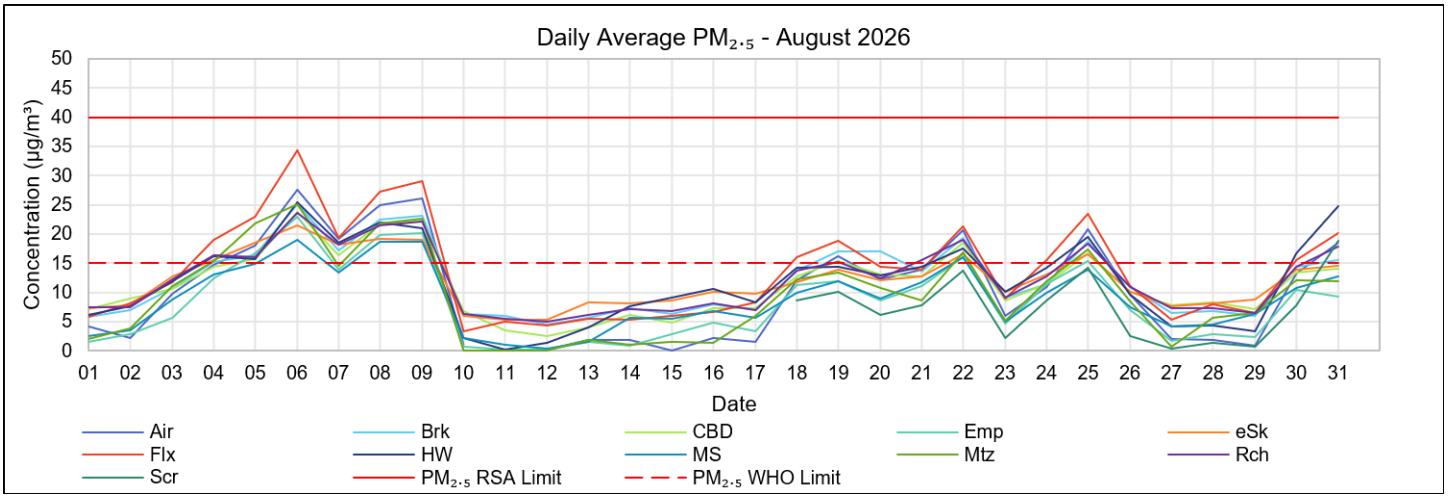


Figure 3.8: $PM_{2.5}$ daily concentrations.

Missing Data (Particulates)

- *August 2026 particulate data capture ranged from 93.7% (eSikhaleni) to 100% (Meerensee) at the ten full-month monitors; all ten exceeded the 90% minimum data capture specified in SANS 1929:2011 (Annex C, Table C.1) and the 80% statistical-robustness threshold, and only eSikhaleni fell below the RBCAA 95% operational target. Scorpio (43.3%) is a part-month record commissioned on 18 August 2026.*

3.5. Conclusion

Particulate concentrations across the AirGradient network decreased at every station between July and August 2026 (Figures 3.3 and 3.4), reversing the June–July rise and consistent with the end of the seasonal winter maximum. Concentrations were low to moderate in absolute terms, and no station recorded an exceedance of either the RSA 24-hour standard value. A single regional episode on 6 August accounted for all five WHO PM_{10} 24-hour exceedance-days.

Monthly PM_{10} averages ranged from 7.8 to 19.9 µg/m³, with the highest value at eSikhaleni (19.9 µg/m³), followed by Harbour West (18.1 µg/m³) and Brackenham (17.4 µg/m³), and the lowest at CBD (7.8 µg/m³); the network mean fell from 27.4 µg/m³ in July to 14.0 µg/m³ in August. Monthly $PM_{2.5}$ averages ranged from 8.3 to 13.5 µg/m³, with the highest value at Felixton (13.5 µg/m³), followed by Richardia (12.2 µg/m³) and Brackenham (12.1 µg/m³), and the lowest at Empangeni (8.3 µg/m³); the network mean fell from 17.6 to 11.0 µg/m³. Monthly PM_{10} averages were below the RSA annual standard value at all reporting sites; the WHO annual guideline value, shown for context, was exceeded at five of the ten.

Monthly $PM_{2.5}$ averages were below the RSA annual standard value at all reporting sites, and all sites were above the WHO annual guideline value shown for context. These are contextual comparisons of screening data only; annual compliance cannot be concluded from one month of screening data. No daily average PM_{10} or $PM_{2.5}$ value exceeded the corresponding RSA 24-hour standard value. The WHO 24-hour guideline value was exceeded for PM_{10} on five station-days, all on 6 August, at Felixton, Harbour West, eSikhaleni, Brackenham and Mtunzini, and for $PM_{2.5}$ at all ten reporting stations on 84 station-days in total.

Regulatory-limit comment: no AirGradient PM_{10} or $PM_{2.5}$ daily average exceeded the corresponding RSA 24-hour standard value during August 2026, so the screening results give no indication of non-compliance for the month; annual regulatory status cannot, in any event, be concluded from a single month of screening data. Health-limit comment: the WHO guideline comparisons are more conservative and continue to indicate health-relevant particulate levels across the network, particularly for $PM_{2.5}$, which exceeded the WHO 24-hour guideline value at every reporting station on between four and twelve days.

Station-specific conclusion: the August 2026 AirGradient particulate results indicate no RSA daily standard exceedance at any station. The health-based WHO daily guideline comparison identified PM_{10} exceedances at Brackenham, eSikhaleni, Felixton, Harbour West and Mtunzini, all on 6 August, and $PM_{2.5}$ exceedances at all ten reporting stations.

These are screening-network results and should not be interpreted as reference-method compliance findings. August particulate data completeness at the ten full-month monitors ranged from 93.7% to 100%: nine stations met the RBCAA 95% operational target, and all ten met both the 90% minimum data capture specified in SANS 1929:2011 (Annex C, Table C.1) and the 80% statistical-robustness threshold. eSikhaleni (93.7%) fell below the 95% target on a recurring night-time data loss and should be prioritised for the router and timer check recorded in Report 024 (Table 4.1, item 19). Scorpio (43.3%) is a part-month record, and its monthly values are withheld.

Correlation with the August 2026 technical report: temporal agreement between the two networks remains strong, and magnitude agreement remains station-specific. Across the paired calendar days of August 2026, the Pearson correlation between the AirGradient daily average and the co-located reference analyser is 0.86 to 0.94 at every co-located pair, confirming that the screening units continue to track the same day-to-day variation. Means quoted in this paragraph are

over the paired days only and therefore differ slightly from the calendar-month means in Section 3.2. The mean daily bias ranges from −12.3 µg/m³ (CBD, PM_{10}, n = 30) and −9.6 µg/m³ (Brackenham, $PM_{2.5}$, n = 30) to +6.3 µg/m³ (eSikhaleni, PM_{10}, n = 27), excluding the Scorpio pair, which is co-located only from 18 August and over its 12 paired days underread the reference analyser by 7.4 µg/m³ (PM_{10}, r = 0.87) and 14.5 µg/m³ ($PM_{2.5}$, r = 0.90) — an indicative first result to be assessed on a full month, while Felixton (−0.7 µg/m³ PM_{10}; −0.7 µg/m³ $PM_{2.5}$), Richardia (+0.7 µg/m³ $PM_{2.5}$) and Harbour West (+0.9 µg/m³ $PM_{2.5}$) agree to within about 1.5 µg/m³. The sign and approximate magnitude of the bias at each station are unchanged from July 2026, which is the behaviour expected of a stable uncorrected sensor offset rather than of random error. The practical consequences follow directly. At Brackenham, the reference analyser recorded three $PM_{2.5}$ RSA 24-hour exceedances and a monthly mean of 21.6 µg/m³, whereas the co-located AirGradient unit returned a monthly mean of 12.0 µg/m³, a daily maximum of 25.1 µg/m³ and no exceedance — the same underread, by a little over a factor of two, that was reported in July. At CBD, the reference analyser recorded a PM_{10} monthly mean of 20.1 µg/m³ against the AirGradient unit's 7.8 µg/m³. At eSikhaleni, the direction reverses: the AirGradient unit returned 20.3 µg/m³ against the reference analyser's 14.0 µg/m³ and produced a WHO PM_{10} exceedance-day that the reference analyser did not. Because the correlation is high and the bias is stable and station-specific, the divergences remain consistent with uncorrected sensor bias rather than random error, and are in principle correctable by site-specific calibration factors derived from co-location. Until such factors are derived and documented, AirGradient exceedance counts must not be reported as, or compared directly with, reference-method results.

4. TOTAL VOLATILE ORGANIC COMPOUNDS MONITORING

Volatile organic compounds (VOCs) are organic chemicals that can evaporate at ambient temperatures. Outdoor VOCs may originate from industrial activities, combustion sources, vehicle exhaust and the use or storage of solvents and other chemical products. Health and environmental relevance depend strongly on the individual compound, concentration and exposure duration; therefore, a total VOC index should not be interpreted as a compound-specific health-risk metric. The AirGradient TVOC sensor does not identify individual compounds and reports a relative, dimensionless index rather than an absolute concentration (Sensirion, 2022b). In this report, TVOC index data are used only as screening information to identify temporal changes and potential short-term events requiring follow-up.

4.1. Data Completeness

The August 2026 TVOC data completeness results are summarised in Table 4.1.

Table 4.1: TVOC data completeness (%) based on valid 10-minute records.

Month	Air	Brk	CBD	Emp	eSk	Flx	HW	MS	Mtz	Rch	Scr
Jan 2026	-	99	***84***	-	97	100	100	100	***90***	100	-
Feb 2026	***85***	***93***	***83***	***65***	96	98	100	100	98	99	-
Mar 2026	96	97	99	***90***	***94***	***92***	99	98	***91***	99	-
Apr 2026	100	***91***	97	96	96	99	100	100	***90***	100	-
May 2026	98	99	99	99	***94***	100	100	99	99	100	-
Jun 2026	99	97	100	99	***76***	100	100	100	98	99	-
Jul 2026	100	98	***88***	***94***	***91***	***69***	99	100	99	100	-
Aug 2026	99	98	96	95	***94***	99	99	100	98	99	43
Sept 2026	-	-	-	-	-	-	-	-	-	-	-
Oct 2026	-	-	-	-	-	-	-	-	-	-	-
Nov 2026	-	-	-	-	-	-	-	-	-	-	-
Dec 2026	-	-	-	-	-	-	-	-	-	-	-

Missing Data (TVOC)

- *CBD – the TVOC/NO_x channel stalled from 27 August 2026 12:40 to 28 August 2026 10:10 (130 ten-minute records) and the sensor was replaced on 28 August 2026, giving August monthly TVOC data completeness of 95.6% (Report 024, section 2). No CBD monthly value is withheld. eSikhaleni (93.7%) recorded reduced but usable capture, from a recurring night-time loss on twelve nights and the power failure of 31 August 2026; Empangeni (95.4%) and Mtunzini (97.5%) recorded short outages on 15 August and on 13 and 29 August respectively. All remaining full-month monitors were at or above 97.8%. Scorpio (43.3%) is a part-month record from 18 August 2026, and its monthly TVOC value is withheld. The Felixton TVOC/NO_x sensor failure of 12 to 21 July 2026 was resolved, and Felixton returned 98.6% capture in August 2026.*

4.2. Monthly Index Values

TVOC monthly average index values are shown in Figure 4.1. Comparisons to previous months are also provided in Figure 4.2.

Regulatory/health-limit applicability: No South African ambient regulatory limit or generally applicable health-based limit is applied to the AirGradient TVOC index because it is a dimensionless relative index rather than a compound-specific concentration. Elevated TVOC index values are therefore evaluated only as screening indicators using temporal patterns and the 3σ/5σ event flags in Table 4.2.

Station-specific limit/standard status: No AirGradient TVOC station is recorded as exceeding a regulatory or health-based limit or standard in August 2026. All eleven monitors recorded one or more 3σ screening flags; Richardia (47) and Brackenham (26) recorded the most, and Scorpio (2), Airport (3) and Harbour West (5) the fewest. No station recorded a 5σ flag. These are screening-event flags only.

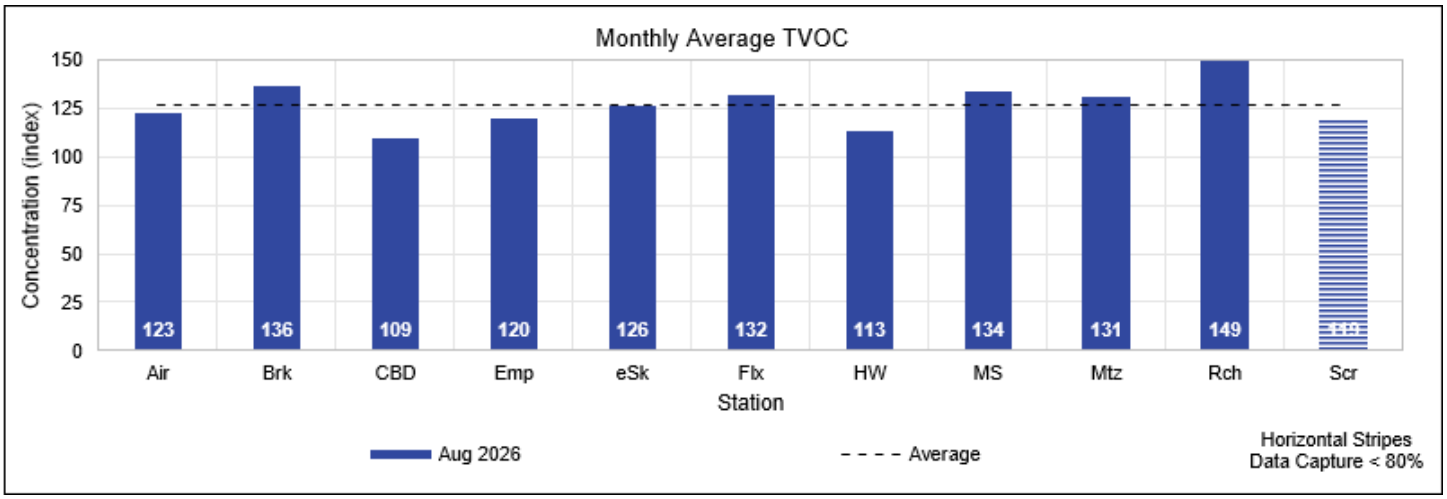


Figure 4.1: TVOC monthly index values.

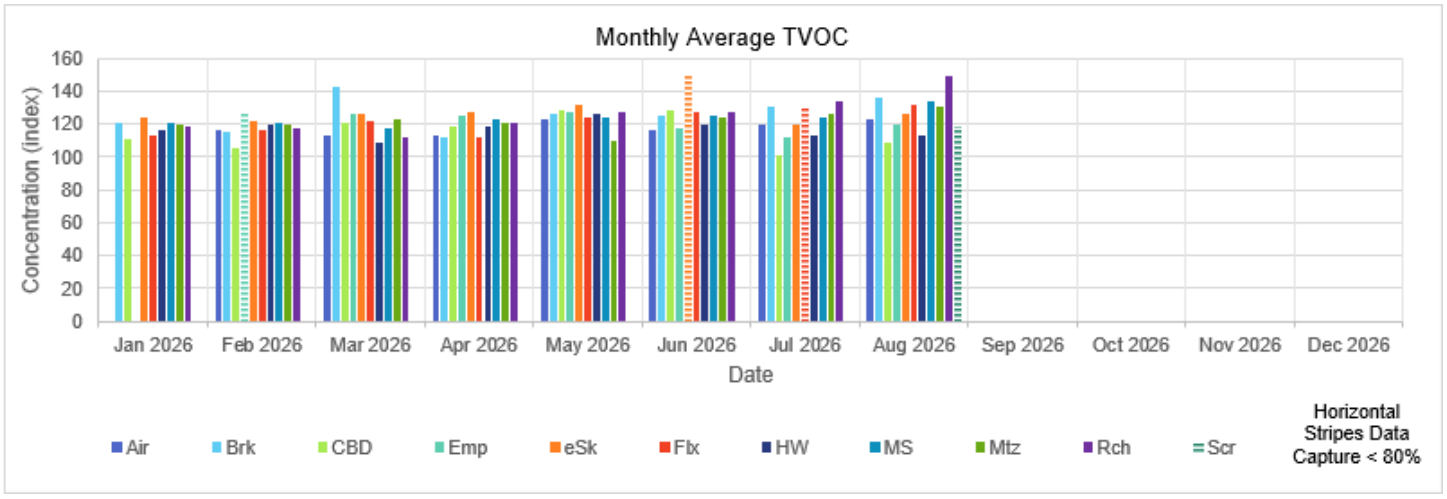


Figure 4.2: TVOC monthly index comparison.

4.3. Diurnal Index Values

TVOC diurnal index values are shown below (Figure 4.3).

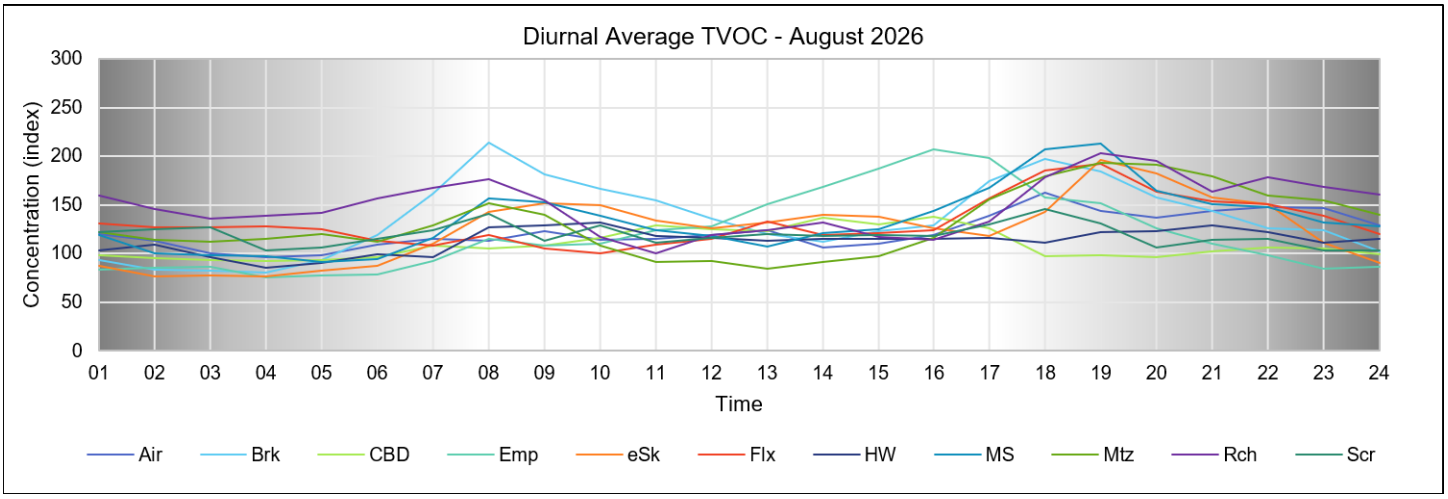


Figure 4.3: TVOC diurnal index values.

4.4. 24-hour Index Values

TVOC daily index values are shown below (Figure 4.4).

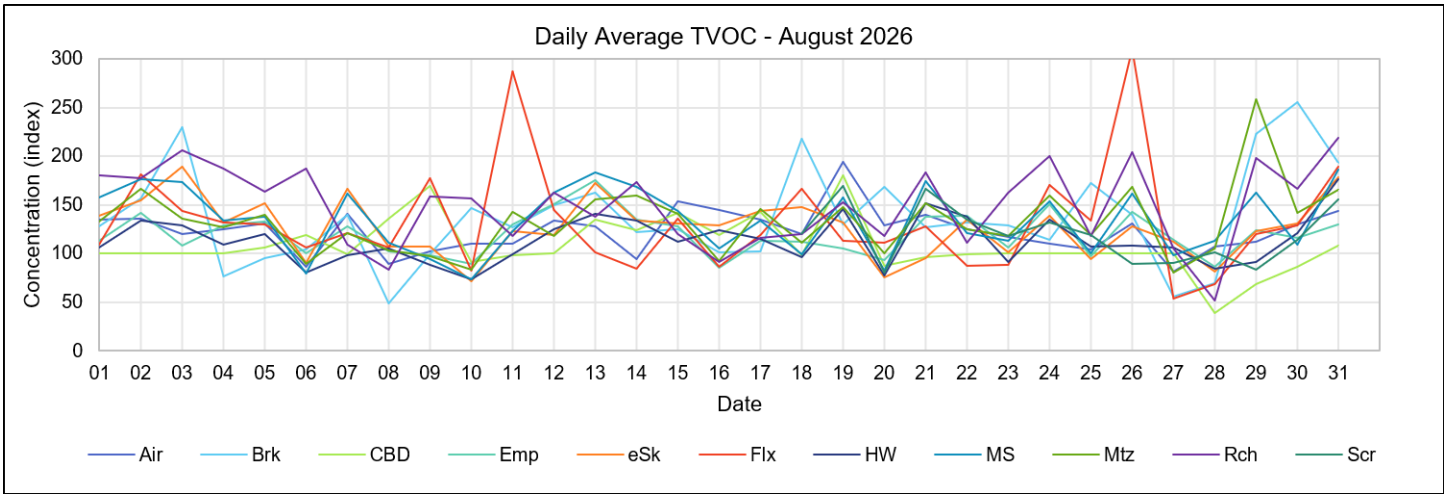


Figure 4.4: TVOC daily index values.

Missing Data (TVOC)

- *CBD – the TVOC channel stalled from 27 to 28 August 2026 (95.6% capture; monthly value retained); Scorpio is a part-month record from 18 August 2026 (43.3% capture; monthly value withheld); other stations recorded only intermittent short gaps.*

4.5. 1-hour Index Values

TVOC hourly index values are shown below (Figure 4.5).

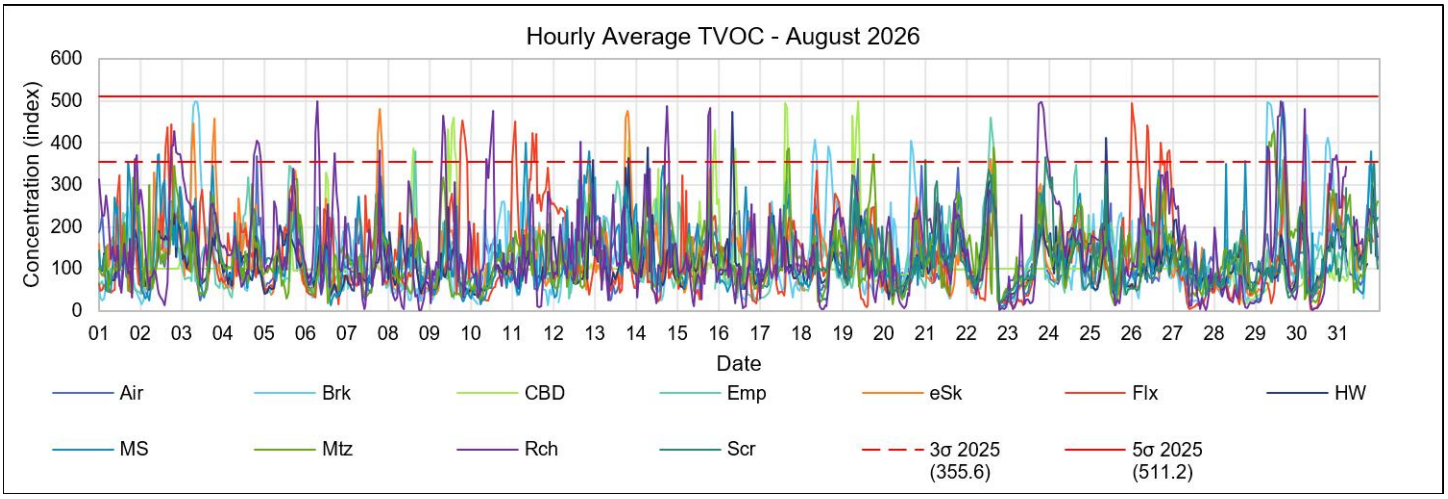


Figure 4.5: TVOC hourly index values.

TVOC hourly observations above the 3σ and 5σ screening thresholds are summarised in Table 4.2.

Table 4.2: TVOC hourly observations above the 3σ and 5σ screening thresholds.

Limit	Air	Brk	CBD	Emp	eSk	Flx	HW	MS	Mtz	Rch	Scr	Total
3σ	3	**26**	**14**	6	**12**	**24**	5	9	8	**47**	2	156
5σ	0	0	0	0	0	0	0	0	0	0	0	0

4.6. Conclusion

August 2026 TVOC monthly average index values ranged from 109.1 to 149.3 at the ten full-month monitors. Richardia recorded the highest monthly average index value (149.3), followed by Brackenham (136.0), Meerensee (134.0), Felixton (132.0) and Mtunzini (131.2); CBD recorded the lowest (109.1). The Scorpio monthly value is withheld because its 43.3% calendar-month completeness is below the 80% threshold; its part-month mean was 118.9. Diurnal and hourly data indicate intermittent short-term elevated index events rather than persistently elevated conditions, with a network-wide diurnal maximum at 18:00 and a minimum at 03:00. Using the exact unrounded hourly thresholds (3σ = 355.6; 5σ = 511.2), 156 hourly observations were above 3σ, and none were above 5σ. Richardia (47), Brackenham (26) and Felixton (24) recorded the most 3σ flags in absolute terms. The ranking is unchanged when expressed as a rate of valid hours: Richardia recorded the highest event frequency of the network (47 flags in 739 valid hours, 6.4%), ahead of Brackenham (26 in 726 hours, 3.6%) and Felixton (24 in 732 hours, 3.3%). Two monitors, CBD and Richardia, recorded hourly maxima of exactly 500 index units, which is the top of the sensor's reporting range; values at that ceiling should be treated as right-censored rather than as measurements, so the CBD and Richardia monthly means and 3σ counts are lower bounds. This is the treatment applied to the exactly-zero particulate readings in Section 2, applied at the opposite end of the sensor range. Overall, the results indicate a relatively consistent baseline with isolated short-term events that warrant local-source follow-up only where they coincide with odour observations, complaints or relevant meteorological conditions. Nine of the eleven monitors met the RBCAA 95% operational target for TVOC capture; eSikhaleni (93.7%) and Scorpio (43.3%, part-month) did not.

Regulatory and health-limit conclusion: the TVOC findings cannot be assessed against an ambient compliance limit or a health-based concentration threshold in this report. The reported events should be treated as screening triggers for source-pattern review, targeted field observations or compound-specific monitoring where persistent or recurrent elevations are observed.

Station-specific conclusion: no TVOC station exceeded an applicable regulatory or health limit or standard; all named TVOC stations with 3σ flags should therefore be described as screening-event locations rather than exceedance locations.

Correlation with the August 2026 technical report: There is no direct TVOC comparator, and the only overlap is contextual. Sixty-eight air quality complaints were logged in August 2026 (August 2025: 13), of which 66 were recorded against Mondi in the RBCAA complaints register (Report 022). That is the allocation recorded when each complaint was logged; it is not a verified source attribution and is reproduced here only as context. Over the same month, the reference network recorded TRS exceedances of the WHO 30-minute H_2S guideline at Felixton (35), eSikhaleni (13), Brackenham (5), CBD (2) and Richardia (1), and of the OME 10-minute criterion at Felixton (27), eSikhaleni (8), CBD (2) and Brackenham (1). TVOC 3σ flags were recorded at all eleven monitors, with the highest counts at Richardia, Brackenham and Felixton. The co-occurrence at Felixton and Brackenham is a follow-up trigger only, not attribution; the TVOC index responds to a broad and unspecified range of compounds and cannot be equated with reduced sulphur species. Richardia, which recorded the most TVOC flags in the network, recorded only one TRS exceedance, which further cautions against reading the index as a sulphur indicator.

5. NITROGEN OXIDES MONITORING

Nitrogen oxides (NO_x) are a group of reactive gases that primarily include nitric oxide (NO) and nitrogen dioxide (NO_2), generated mainly by high-temperature combustion from vehicles, power generation and industrial activities. NO_x contributes to the formation of ozone and secondary particulate matter and can affect respiratory health, particularly in susceptible populations. The AirGradient NO_x sensor reports a relative, dimensionless index rather than pollutant-specific NO or NO_2 concentrations (Sensirion, 2022a). In this report, NO_x index data are used as screening information to identify short-term changes and potential events, not to assess compliance with ambient NO_2 standards.

5.1. Data Completeness

The August 2026 NO_x data completeness results are summarised in Table 5.1.

Table 5.1: NO_x data completeness (%) based on valid 10-minute records.

Month	Air	Brk	CBD	Emp	eSk	Flx	HW	MS	Mtz	Rch	Scr
Jan 2026	-	99	***84***	-	97	100	100	100	***90***	100	-
Feb 2026	***85***	***93***	***83***	***65***	96	98	100	100	98	99	-
Mar 2026	96	97	99	***90***	***94***	***92***	99	98	***91***	99	-
Apr 2026	100	***91***	97	96	96	99	100	100	***90***	100	-
May 2026	98	99	99	99	***94***	100	100	99	99	100	-
Jun 2026	99	97	100	99	***76***	100	100	100	98	99	-
Jul 2026	100	98	***88***	***94***	***91***	***69***	99	100	99	100	-
Aug 2026	99	98	96	95	***94***	99	99	100	98	99	43
Sept 2026	-	-	-	-	-	-	-	-	-	-	-
Oct 2026	-	-	-	-	-	-	-	-	-	-	-
Nov 2026	-	-	-	-	-	-	-	-	-	-	-
Dec 2026	-	-	-	-	-	-	-	-	-	-	-

Missing Data (NO_x)

- *CBD – the TVOC/NO_x channel stalled from 27 August 2026 12:40 to 28 August 2026 10:10 (130 ten-minute records) and the sensor was replaced on 28 August 2026, giving August monthly NO_x data completeness of 95.6% (Report 024, section 2). The failure was parameter-specific: CBD particulate and CO_2 capture was 98.7% over the same month. No CBD monthly value is withheld. eSikhaleni (93.7%) and Scorpio (43.3%, a part-month record from 18 August 2026, monthly value withheld) were the only monitors below the RBCAA 95% operational target.*

5.2. Monthly Index Values

NO_x monthly average index values are shown in Figure 5.1; comparisons to previous months are also provided in Figure 5.2.

Regulatory/health-limit applicability: the AirGradient NO_x output is reported as a dimensionless index and is not equivalent to an NO_2 or NO_x concentration in µg/m³. South African NO_2 ambient standards and WHO NO_2 health-based guidelines are therefore not applied to these index data; interpretation is limited to relative screening and 3σ/5σ event identification.

Station-specific limit/standard status: no AirGradient NO_x station is recorded as exceeding a regulatory or health-based limit or standard in August 2026, because the NO_x output is an index and not an NO_2 concentration. Four monitors recorded screening flags: eSikhaleni (21 hourly observations above the 3σ threshold, of which 19 were also above 5σ; maximum hourly index 353.2), Felixton (16 and 13; maximum 110.8), Richardia (12 and 4; maximum 175.5) and Meerensee (3 above 3σ and none above 5σ; maximum 49.8). These are screening flags only and not regulatory or health-standard exceedances.

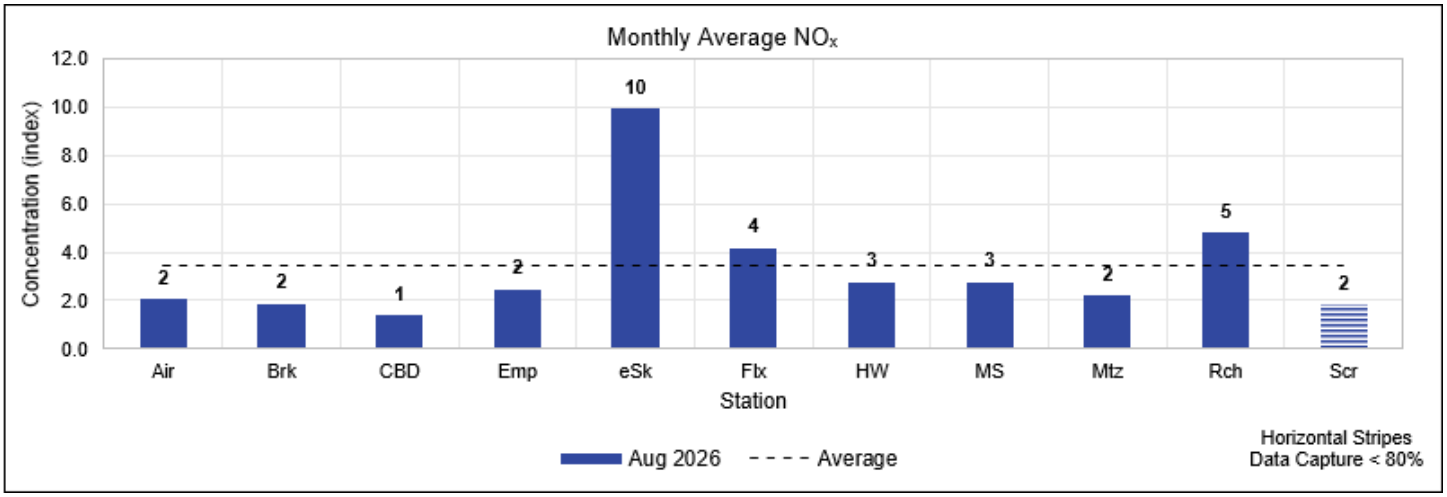


Figure 5.1: NO_x monthly index values.

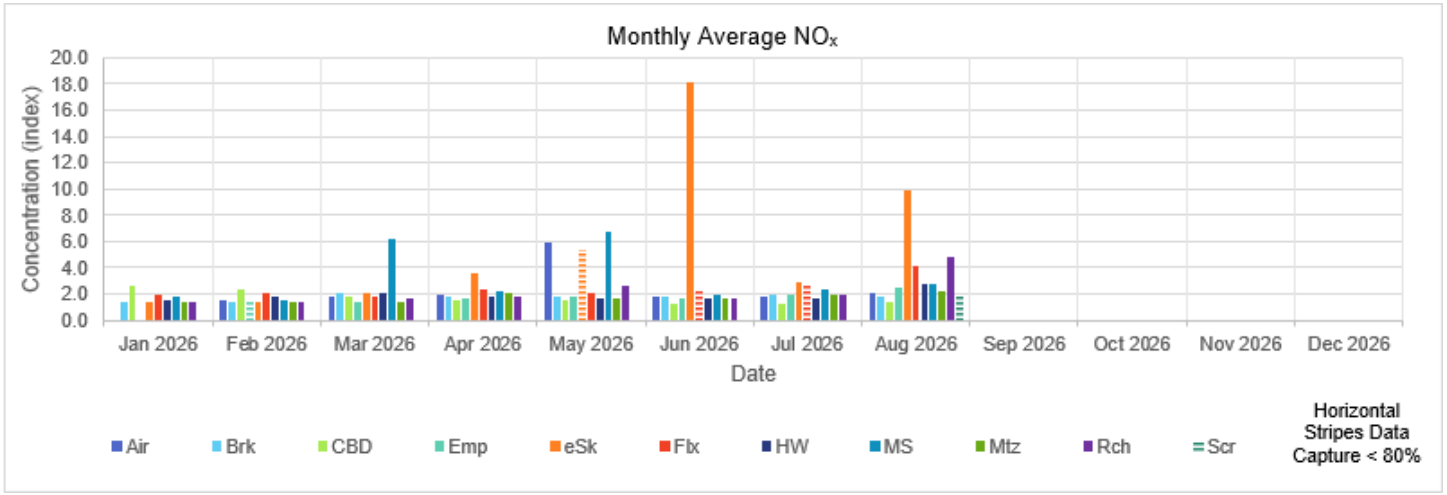


Figure 5.2: NO_x monthly comparison.

5.3. Diurnal Index Values

NO_x diurnal index values are shown below (Figure 5.3).

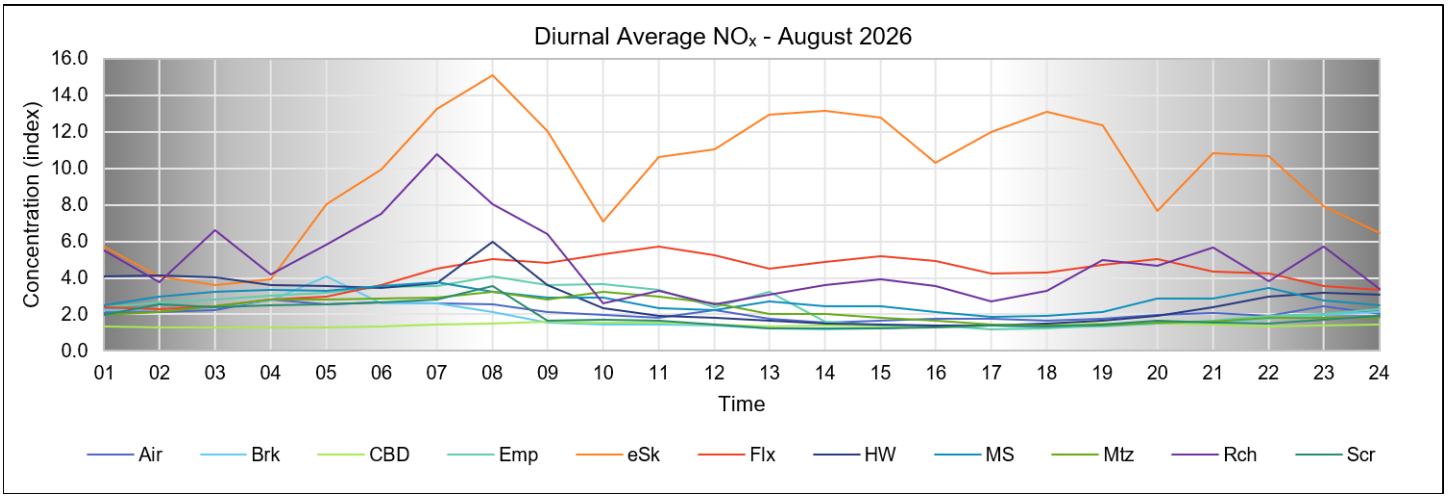


Figure 5.3: NO_x diurnal index values.

5.4. 24-hour Index Values

NO_x daily index values are shown below (Figure 5.4).

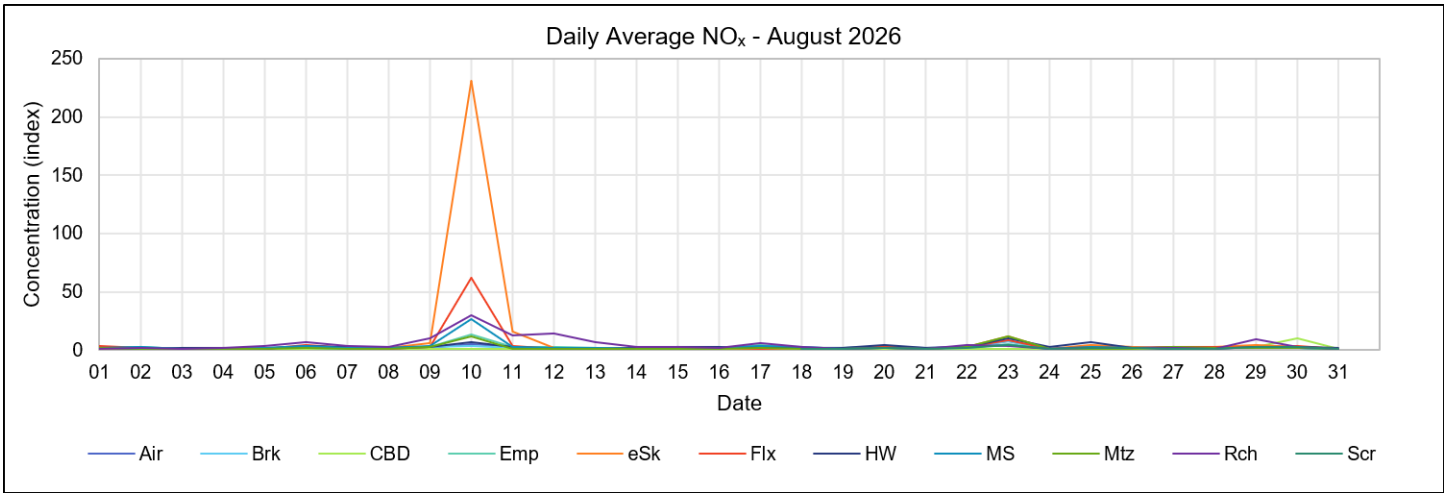


Figure 5.4: NO_x daily index values.

Missing Data (NO_x)

- *CBD – the NO_x channel stalled from 27 to 28 August 2026 (95.6% capture; monthly value retained); Scorpio is a part-month record from 18 August 2026 (43.3% capture; monthly value withheld); other stations recorded only intermittent short gaps.*

5.5. 1-hour Index Values

NO_x hourly index values are shown below (Figure 5.5).

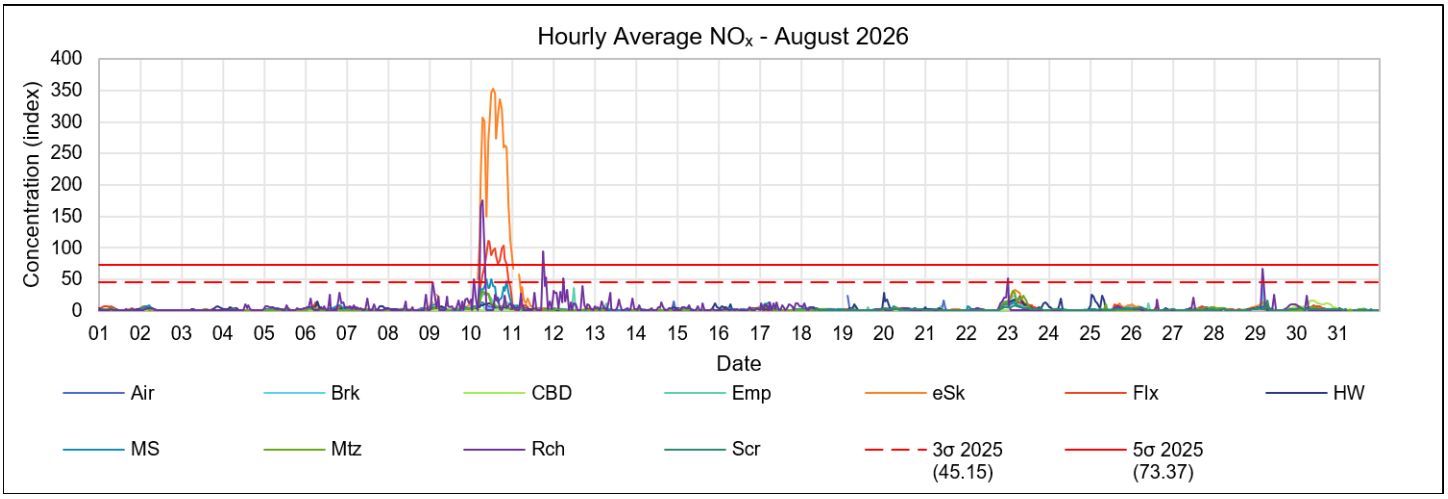


Figure 5.5: NO_x hourly index values.

NO_x hourly observations above the 3σ and 5σ screening thresholds are summarised in Table 5.2.

Table 5.2: NO_x hourly observations above the 3σ and 5σ screening thresholds.

Limit	Air	Brk	CBD	Emp	eSk	Flx	HW	MS	Mtz	Rch	Scr	Total
3σ	0	0	0	0	**21**	**16**	0	3	0	**12**	0	52
5σ	0	0	0	0	**19**	**13**	**0**	**0**	**0**	**4**	0	**36**

5.6. Conclusion

August 2026 NO_x monthly average index values remained low at most sites, ranging from 1.4 to 9.9 at the ten full-month monitors. eSikhaleni recorded the highest monthly average index value (9.9), followed by Richardia (4.8) and Felixton (4.2); CBD recorded the lowest (1.4). The Scorpio monthly value is withheld because its 43.3% calendar-month completeness is below the 80% threshold; its part-month mean was 1.8. Using the exact unrounded hourly thresholds (3σ = 45.1; 5σ = 73.4), 52 hourly observations were above 3σ, and 36 were above 5σ, at four stations: eSikhaleni (21 and 19), Felixton (16 and 13), Richardia (12 and 4) and Meerensee (3 and none). This is a marked increase from July 2026, when eSikhaleni recorded three observations above 3σ and none above 5σ, and it returns eSikhaleni towards the elevated-index pattern recorded in June 2026. The eSikhaleni hourly maximum of 353.2 index units is by a wide margin the highest in the network. The network diurnal profile peaks between 06:00 and 07:00 and is lowest at 19:00, consistent with overnight accumulation under stable conditions rather than with a specific source. Because the AirGradient NO_x output is a dimensionless index rather than a pollutant-specific NO or NO_2 concentration, the results are screening indicators only and do not demonstrate compliance or non-compliance with ambient NO_2 standards.

Regulatory and health-limit conclusion: no regulatory or health-limit exceedance is concluded from the NO_x index results. Recurrent elevated index events should be treated as screening evidence requiring corroboration with reference/equivalent NO_2 or NO_x measurements before any compliance or health-risk interpretation is made.

Station-specific conclusion: no NO_x station exceeded an applicable regulatory or health limit or standard. eSikhaleni recorded the majority of both the 3σ and the 5σ screening flags and should be noted as a recurrent screening-event location; Felixton and Richardia recorded lower but non-trivial counts and should be kept under review.

Correlation with the August 2026 technical report: there is no direct NO_2 or NO_x comparator, because the RBCAA primary network measures PM_{10}, $PM_{2.5}$, SO_2 and TRS only. The stations with elevated NO_x index flags — eSikhaleni, Felixton and Richardia — are also stations at which the reference network recorded TRS exceedances in August 2026: eSikhaleni 13 above the WHO 30-minute H_2S guideline and 8 above the OME 10-minute criterion, Felixton 35 and 27, and Richardia 1 and none. This overlap is contextual only and cannot establish pollutant equivalence, compliance status or source attribution without reference or equivalent NO_2/NO_x measurements.

6. CARBON DIOXIDE MONITORING

Carbon dioxide (CO_2) is reported in parts per million (ppm). In this report, CO_2 data are used as indicative local concentration measurements to identify relative build-up events and spatial differences across the AirGradient network. Because outdoor CO_2 varies with local sources, vegetation, atmospheric mixing, and sensor accuracy, small differences around the background reference line should not be over-interpreted.

6.1. Data Completeness

The August 2026 CO_2 data completeness results are summarised in Table 6.1.

Table 6.1: CO_2 data completeness (%) based on valid 10-minute records.

Month	Air	Brk	CBD	Emp	eSk	Flx	HW	MS	Mtz	Rch	Scr
Jan 2026	-	99	***85***	-	97	100	-	100	***90***	100	-
Feb 2026	***85***	***93***	***85***	***65***	96	98	100	100	98	99	-
Mar 2026	96	97	99	***90***	***94***	99	99	98	***91***	99	-
Apr 2026	100	***94***	100	96	96	99	100	100	***90***	100	-
May 2026	98	99	100	99	***94***	100	100	99	99	100	-
Jun 2026	99	97	100	99	95	100	100	100	98	99	-
Jul 2026	100	98	***89***	***94***	***91***	100	100	100	99	100	-
Aug 2026	99	98	99	95	***94***	99	99	100	98	99	43
Sept 2026	-	-	-	-	-	-	-	-	-	-	-
Oct 2026	-	-	-	-	-	-	-	-	-	-	-
Nov 2026	-	-	-	-	-	-	-	-	-	-	-
Dec 2026	-	-	-	-	-	-	-	-	-	-	-

Missing Data (CO_2)

- *CO_2 data completeness ranged from 43.3% to 100% in August 2026. eSikhaleni (93.7%) fell below the RBCAA 95% operational target but met the 90% minimum data capture specified in SANS 1929:2011 (Annex C, Table C.1); all ten full-month monitors met the 80% statistical-robustness threshold, so no full-month monthly value is withheld on completeness grounds. Scorpio (43.3%) is a part-month record from 18 August 2026, and its monthly value is withheld. Harbour West CO_2 capture was 98.7%, but the Harbour West CO_2 channel has read high since the sensor was replaced on 6 August 2026, and its monthly value and event counts are withheld on data-quality grounds (Report 024, section 2 and Table 4.1, item 10). Remaining gaps were intermittent and short.*

6.2. Monthly Concentrations

CO_2 monthly average concentrations are shown in Figure 6.1; comparisons to previous months are also provided (Figure 6.2).

Regulatory/health-limit applicability: no South African ambient regulatory limit or WHO ambient health-based guideline is applied to outdoor CO_2 in this report. Occupational exposure limits and indoor ventilation thresholds are not appropriate

ambient-air compliance criteria; CO_2 is used here only as an indicative tracer for local accumulation, mixing and possible combustion or respiration influences.

Station-specific limit/standard status: no AirGradient CO_2 station is recorded as exceeding an ambient regulatory or health-based limit or standard in August 2026. Excluding Harbour West, whose CO_2 channel is reading high and is withheld, Felixton (47), eSikhaleni (31), CBD (19) and Empangeni (1) recorded 3σ screening flags; of these, Felixton (26) and eSikhaleni (7) also recorded 5σ flags. No other station recorded a flag. These are local accumulation indicators only.

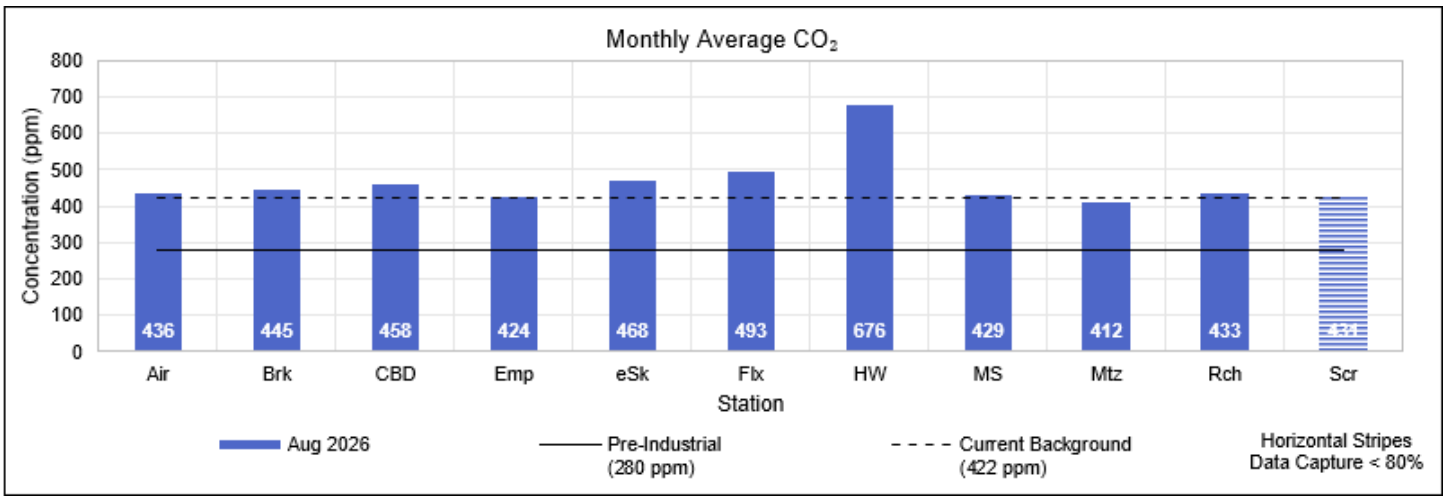


Figure 6.1: CO_2 monthly concentration.

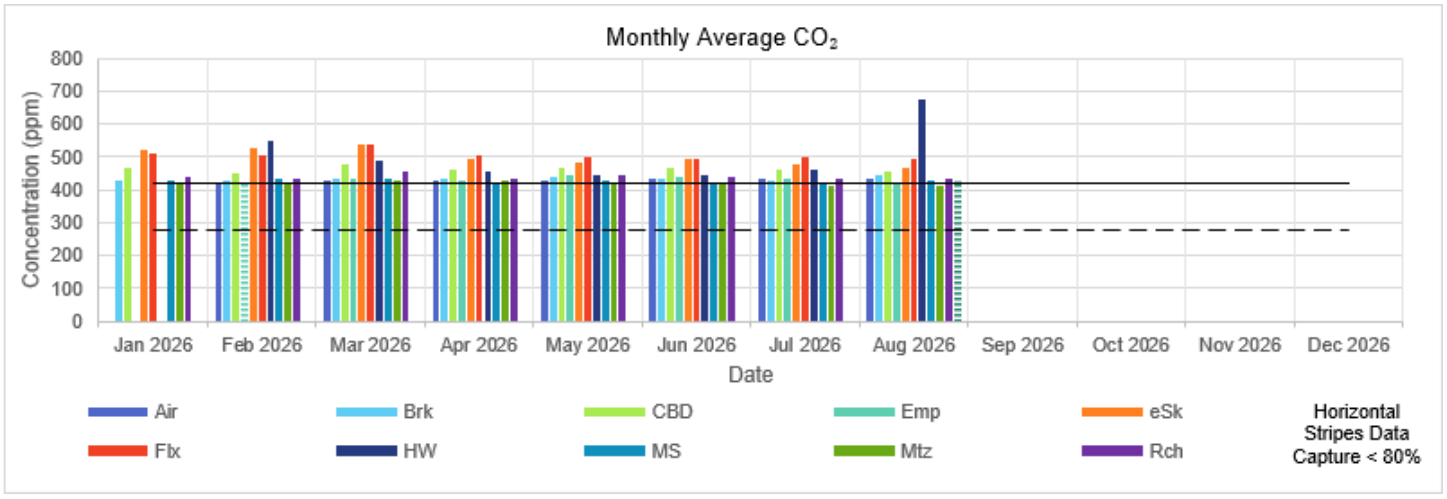


Figure 6.2: CO_2 monthly comparison.

6.3. Diurnal Concentrations

CO_2 diurnal concentrations are shown below (Figure 6.3).

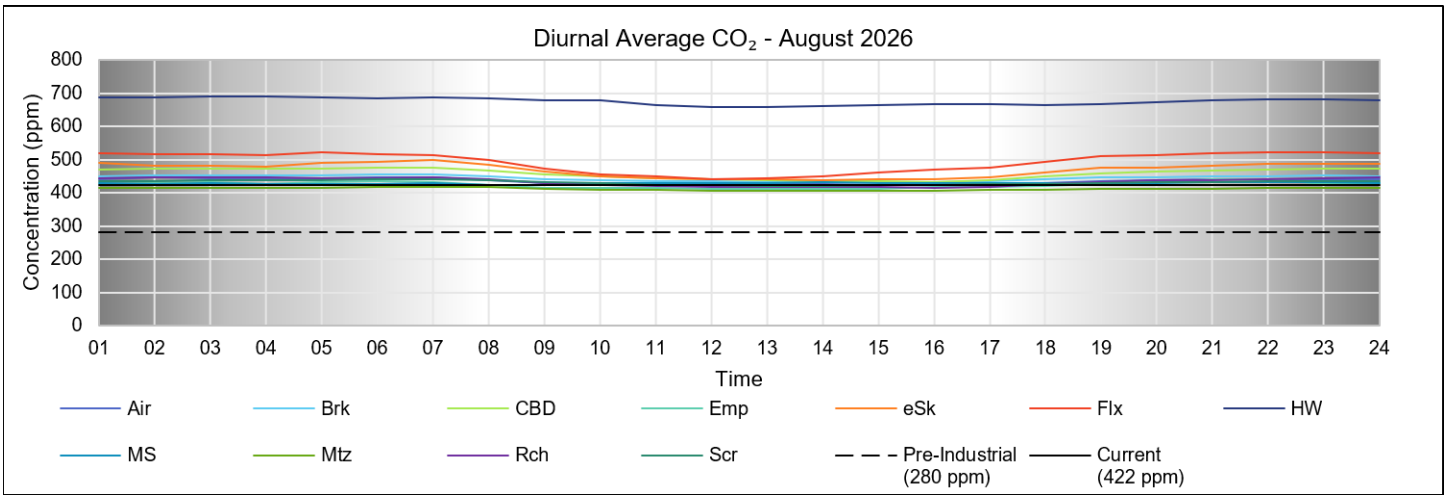


Figure 6.3: CO_2 diurnal concentrations.

6.4. 24-hour Concentrations

CO_2 daily concentrations are shown below (Figure 6.4).

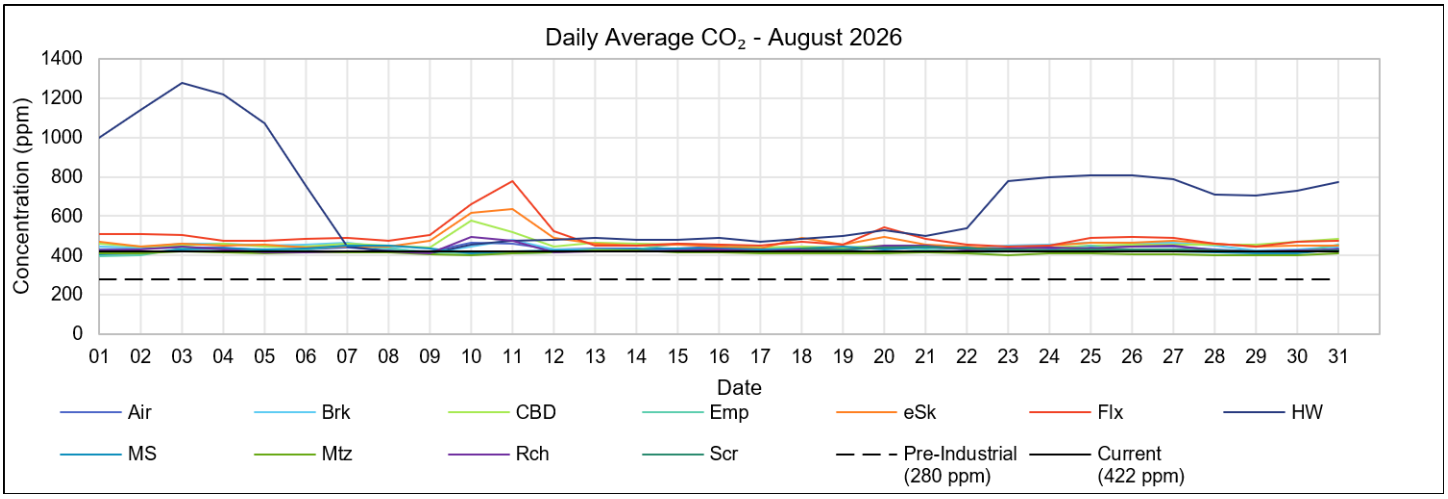


Figure 6.4: CO_2 daily concentrations.

Missing Data (CO_2)

- *Intermittent short communication gaps only. August 2026 CO_2 data capture ranged from 93.7% (eSikhaleni) to 100% (Meerensee) at the ten full-month monitors, all of which exceeded the 80% statistical-robustness threshold. Scorpio (43.3%) is a part-month record from 18 August 2026. Harbour West returned 98.7% capture, but its monthly value and event counts are withheld on data-quality grounds (Section 6.1).*

6.5. 1-hour Concentrations

CO_2 hourly concentrations are shown below (Figure 6.5).

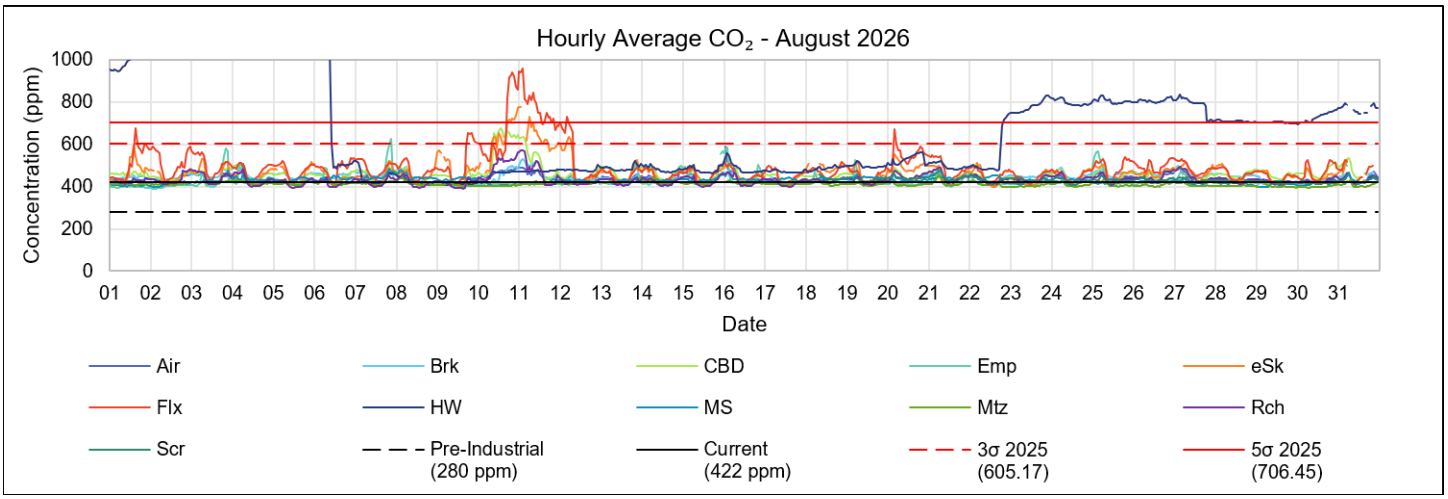


Figure 6.5: CO_2 hourly concentrations.

CO_2 hourly observations above the 3σ and 5σ screening thresholds are summarised in Table 6.2.

Table 6.2: CO_2 hourly observations above the 3σ and 5σ screening thresholds.

Limit	Air	Brk	CBD	Emp	eSk	Flx	HW	MS	Mtz	Rch	Scr	Total
3σ	0	0	19	1	31	47	–	0	0	0	0	98
5σ	0	0	0	0	7	26	–	0	0	0	0	33

Note: Harbour West CO_2 event counts are withheld on data-quality grounds (Section 6.1). The channel has read high since its sensor was replaced on 6 August 2026 and is carried as an open item in Report 024 (Table 4.1, item 10).

6.6. Conclusion

August 2026 CO_2 monthly average concentrations ranged from 411.9 to 493.3 ppm across the nine full-month monitors reported. Felixton recorded the highest monthly average (493.3 ppm), followed by eSikhaleni (468.2 ppm), CBD (458.5 ppm) and Brackenham (444.7 ppm). Airport (435.6 ppm), Richardia (433.5 ppm), Meerensee (428.8 ppm) and Empangeni (424.4 ppm) were closer to the 422 ppm background reference line shown in the monthly plot, with Mtunzini (411.9 ppm) below it; small differences around this line should be interpreted in the context of sensor uncertainty and of the baseline-correction behaviour described in Section 2. The Harbour West monthly average of 676.1 ppm is withheld: the Harbour West CO_2 channel has read high since the sensor was replaced on 6 August 2026, with a median of 519 ppm and an upper quartile of 802 ppm against monthly means of 412 to 493 ppm across the rest of the network, and the fault is carried as an open item in Report 024 (Table 4.1, item 10). The Scorpio monthly value is withheld because its 43.3% calendar-month completeness is below the 80% threshold; its part-month mean was 431.2 ppm. Using the exact unrounded hourly thresholds (3σ = 605.2 ppm; 5σ = 706.5 ppm) and excluding Harbour West, 98 hourly observations were above 3σ and 33 were above 5σ. Felixton dominated the events (47 above 3σ, of which 26 were above 5σ), followed by eSikhaleni (31 and 7), CBD (19 and none) and Empangeni (1 and none); no other reported station recorded a flag. Including Harbour West, the counts would be 438 and 342, of which Harbour West alone accounts for 340 and 309 — a further indication that the channel is faulty rather than that the site is exceptional. The network diurnal profile, excluding Harbour West, peaks at 06:00 (456.6 ppm) and is lowest at 13:00 (427.7 ppm), consistent with boundary-layer

control rather than with a continuous local source. The results are indicative screening information for local accumulation and mixing conditions, not a regulatory compliance metric.

Regulatory and health-limit conclusion: the CO_2 results do not represent regulatory or health-limit exceedances. The elevated short-term flags, particularly at Felixton, identify local accumulation events for follow-up but should not be interpreted as ambient health-limit breaches.

Station-specific conclusion: no CO_2 station exceeded an applicable ambient regulatory or health limit or standard. Felixton and eSikhaleni should be highlighted only as the dominant short-term CO_2 accumulation locations, not as health-standard exceedance locations. Harbour West is excluded from this month's ranking pending replacement and verification of its CO_2 sensor.

Correlation with the August 2026 technical report: Felixton is the principal overlap within the reporting period. It recorded the strongest reported AirGradient CO_2 screening activity (47 hours above 3σ, of which 26 were above 5σ). In contrast, the reference network recorded 35 Felixton TRS exceedances of the WHO 30-minute H_2S guideline and 27 of the OME 10-minute criterion, the highest counts in the network for both. Sixty-eight air quality complaints were logged across the RBCAA area in August 2026. This is a month-level co-occurrence only; it establishes neither temporal correlation nor source attribution, and CO_2 is not a marker for the reduced sulphur species that drive the Felixton TRS record.

7. CONSOLIDATED AIRGRADIENT MONITORING CONCLUSION

Overall, the August 2026 AirGradient monitoring results indicate that the secondary screening network provided useful spatial and short-term event context. Still, the data remain indicative and are not equivalent to reference or regulatory-equivalent analyser data. No AirGradient result should be interpreted as a statutory compliance finding. The only parameter for which regulatory and health-based benchmark comparisons were applied was particulate matter. Across the AirGradient particulate dataset, no PM_{10} or $PM_{2.5}$ daily average exceeded the corresponding RSA 24-hour standard value, and no monthly average exceeded the applicable RSA annual standard value at any reporting station; annual compliance cannot, in any event, be concluded from one month of screening data. The WHO health-based guideline comparisons were more conservative, flagging PM_{10} on five station-days, all on 6 August, and $PM_{2.5}$ at all ten reporting stations on 84 station-days in total, and indicate health-relevant particulate levels for follow-up.

TVOC and NO_x outputs are dimensionless index values, and CO_2 is used as an ambient screening or tracer parameter; no applicable ambient regulatory or health-based exceedance is concluded for these parameters. TVOC recorded 156 hourly observations above 3σ and none above 5σ, distributed across all eleven monitors, with Richardia (47) and Brackenham (26) the most frequent. NO_x screening flags occurred at four stations — eSikhaleni (21 above 3σ, of which 19 were above 5σ), Felixton (16 and 13), Richardia (12 and 4) and Meerensee (3 and none) — a marked increase from July 2026 and a return towards the June 2026 pattern at eSikhaleni. CO_2, excluding the faulty Harbour West channel, recorded 98 observations above 3σ and 33 above 5σ, concentrated at Felixton (47 and 26) and eSikhaleni (31 and 7). These findings are local screening triggers, not compliance or health-limit breaches.

Correlation with the August 2026 technical report is event-based rather than quantitative. Both networks agree that August 2026 was a low-exceedance month for particulates: the reference network recorded no PM_{10} exceedance of either the RSA standard or the WHO guideline, and the AirGradient network recorded no RSA exceedance of either PM standard. Agreement is not general. For $PM_{2.5}$, the reference network recorded five RSA 24-hour exceedances at Brackenham and Scorpio. The Brackenham AirGradient unit recorded none; it underreads its co-located reference analyser by 9.6 µg/m³ on the monthly mean, which accounts for the difference. The Scorpio AirGradient unit had no valid daily value on either date: on 6 August, the unit was still co-located at Richardia and had not been installed at Scorpio, and on 31 August, the platform-side interruption left the day below the daily validity threshold. Conversely, at eSikhaleni, the AirGradient unit overreads PM_{10} by 6.3 µg/m³ and produced a WHO PM_{10} exceedance-day that the reference analyser did not. Other overlaps at Felixton (CO_2 and TVOC screening activity alongside the network's highest reference TRS exceedance counts) and eSikhaleni (NO_x index flags alongside TRS exceedances) indicate follow-up priorities only. These are month-

level associations; co-location, reference or equivalent measurements and meteorological and source analysis are required before concluding equivalence or attribution.

August 2026 data completeness at the ten full-month monitors ranged from 93.7% to 100% for every parameter. All ten met the 90% minimum data capture specified in SANS 1929:2011 (Annex C, Table C.1) and the 80% statistical-robustness threshold, and only eSikhaleni (93.7%) fell below the RBCAA 95% operational target, from a recurring night-time loss ending at a fixed 03:50 on twelve nights that is carried as an open item in Report 024 (Table 4.1, item 19). The eleventh monitor, Scorpio, was installed on 18 August 2026 and returned 43.3% of the calendar month and 98.2% of the records scheduled from installation; its August monthly values are withheld for all five parameters. The CBD TVOC and NO_x channels stalled from 27 to 28 August 2026, and the sensor was replaced on 28 August 2026 (95.6% capture). This is the third consecutive month in which an AirGradient gas sensor has failed in isolation from the co-located PM and CO_2 channels — eSikhaleni 23 to 29 June 2026, Felixton 12 to 21 July 2026 and CBD 27 to 28 August 2026 — which indicates a recurring fault mode in the gas-sensor module that should be raised with the supplier. Separately, the Harbour West CO_2 channel has read high since its sensor was replaced on 6 August 2026, and its August CO_2 statistics are withheld.

8. REFERENCES

Clements, A., Duvall, R., Greene, D. and Dye, T., 2022. The Enhanced Air Sensor Guidebook. EPA/600/R-22/213. Washington, DC: United States Environmental Protection Agency. Available at: https://cfpub.epa.gov/si/si_public_record_Report.cfm?dirEntryId=356426

Republic of South Africa, 2009. National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004) — National Ambient Air Quality Standards. Government Notice No. 1210, Government Gazette No. 32816, 24 December 2009. Available at: https://lawlibrary.org.za/akn/za/act/gn/2009/1210/eng@2009-12-24

Republic of South Africa, 2012. National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004) — National Ambient Air Quality Standard for Particulate Matter with Aerodynamic Diameter Less than 2.5 Micrometres ($PM_{2.5}$). Government Notice No. 486, Government Gazette No. 35463, 29 June 2012. Available at: https://www.gov.za/sites/default/files/gcis_document/201409/35463gon486.pdf

SABS, 2011. SANS 1929:2011 (Edition 2), Ambient air quality — Limits for common pollutants. Pretoria: South African Bureau of Standards.

Sensirion AG, 2022a. NO_x Index for Indoor Air Applications (SGP41). Application note. Stäfa: Sensirion AG.

Sensirion AG, 2022b. VOC Index for Indoor Air Applications (SGP40/SGP41). Application note. Stäfa: Sensirion AG.

World Health Organization, 2021. WHO Global Air Quality Guidelines: Particulate Matter ($PM_{2.5}$ and PM_{10}), Ozone, Nitrogen Dioxide, Sulfur Dioxide and Carbon Monoxide. Geneva: World Health Organization. ISBN 978-92-4-003422-8. Available at: https://iris.who.int/handle/10665/345329