AIR QUALITY
IN HONG KONG 2022

Air Science and Modelling Group

Environmental Protection Department

The Government of the Hong Kong Special Administrative Region

A Report on the Results from the Air Quality Monitoring Network (2022)

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Security Classification	:	Unrestricted

Summary

This report summarises the 2022 air quality monitoring data collected by the Environmental Protection Department's monitoring network comprising 15 general stations and 3 roadside stations.

The air quality in Hong Kong has shown a discernible improvement since the return to the motherland. The Hong Kong Special Administrative Region (HKSAR) Government has implemented a wide range of measures targeting different local emission sources including motor vehicles, power plants and vessels. On the regional front, the HKSAR Government has worked closely with the Guangdong Provincial Government and the Macao Special Administrative Region Government in cutting emissions in the Guangdong-Hong Kong-Macao Greater Bay Area (GBA).

As a result of the numerous emission control measures implemented over the years, the concentrations of major air pollutants including respirable suspended particulates (RSP), fine suspended particulates (FSP), nitrogen dioxide (NO_2) and sulphur dioxide (SO_2) both at the roadside and in ambient air have declined steadily since 1999 by 35% to 85%.

While we have seen evident improvement in the overall air quality of Hong Kong, there remain challenges ahead. Roadside NO_2 levels still exceed the Hong Kong Air Quality Objectives (AQOs), despite falling 48% from its peak in 2011. Meanwhile, ambient ozone (O_3), which is mainly influenced by the regional photochemical smog problem, is still on a rise. The HKSAR Government will strengthen its collaboration with Guangdong to further reduce emissions in the region to alleviate the regional photochemical smog and O_3 problems, and take forward additional measures to reduce local emissions.

As in previous years, concentrations of carbon monoxide and lead in 2022 remain at low levels well below their respective AQO limits.

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1. Introduction

1.1 Air Quality Monitoring Network

The Environmental Protection Department (EPD) operates a network of air quality monitoring stations (AQMSs) for measuring the concentrations of major air pollutants in Hong Kong. The AQMSs network comprises 18 monitoring stations, including 15 general stations and 3 roadside stations monitoring ambient air quality and roadside air quality respectively. Details of these monitoring stations are set out in Table B1 of Appendix B.

Facilities specifically designed for monitoring Toxic Air Pollutants (TAPs) have been installed at the Central/Western and Tsuen Wan general air quality monitoring stations since 1997.

The monitoring network operated smoothly in 2022. The average monthly data capture rate for the six air pollutants, namely sulphur dioxide (SO_2), nitrogen dioxide (NO_2), carbon monoxide (CO), ozone (O_3), respirable suspended particulates (RSP or PM_{10}) and fine suspended particulates (FSP or $PM_{2.5}$) measured at all monitoring stations was above 96%.

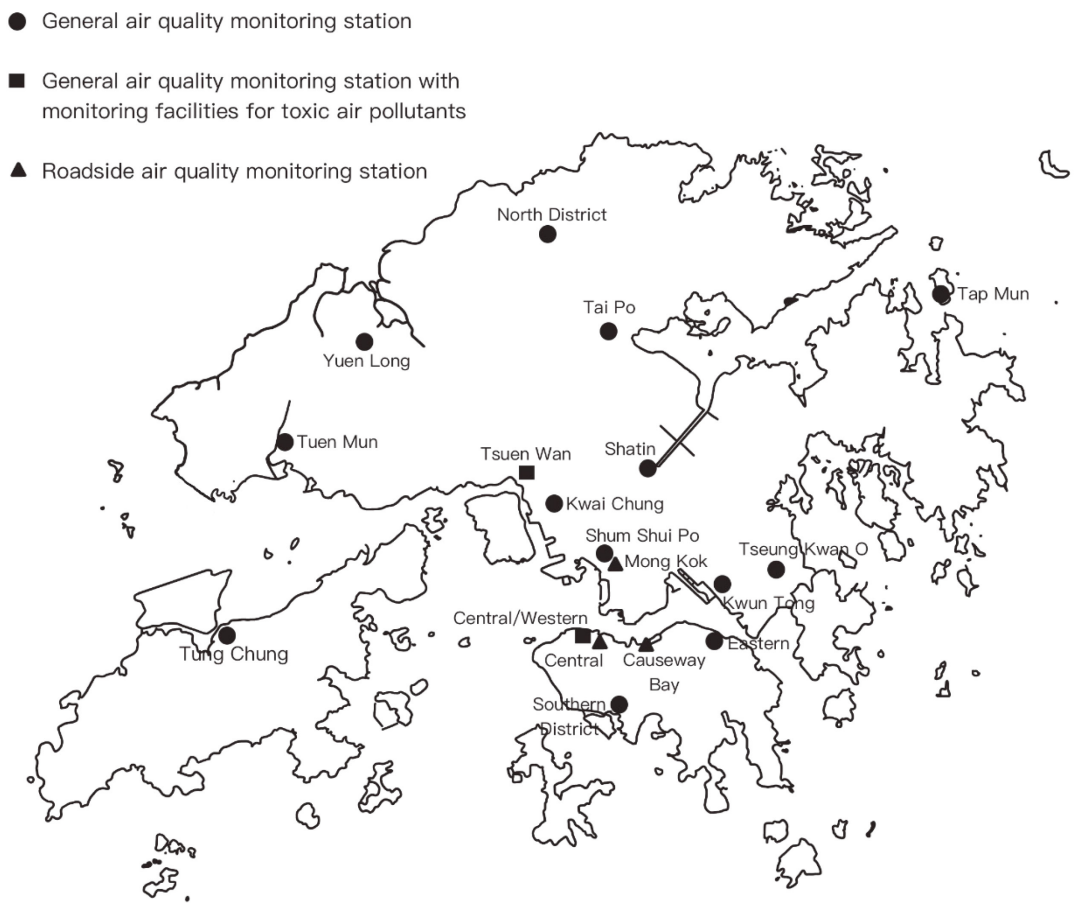


Figure 1: Locations of EPD's Air Quality Monitoring Stations (2022)

Apart from EPD's network, the Hongkong Electric Co. Ltd. (HEC) and the CLP Power Hong Kong Limited (CLP) also operate a number of monitoring stations to assess the ambient levels of SO_2 and NO_2 in the vicinity of their power generating stations. The locations of these monitoring stations and the relevant monitoring results can be found on the power companies' web sites below:

HEC:
https://www.hkelectric.com/en/sustainability/sharing-our-planet/climate-action-and-clean-air/air-quality-data

CLP:
https://www.clp.com.hk/en/about-clp/power-generation/cleaner-generation

1.2 Quality Control (QC) and Quality Assurance (QA)

To ensure that the air quality data from the monitoring stations are accurate and reliable, a quality management system has been established in accordance with the criteria of the Hong Kong Laboratory Accreditation Scheme (HOKLAS) and ISO/IEC 17025. Quality control and quality assurance work was carried out in accordance with EPD's quality manuals and with reference to international requirements. Performance audits and precision checks were conducted to check if the accuracy and precision of the network could attain our performance goals. The details are set out at section B.3 of Appendix B.

1.3 Statistical Analysis of Pollutant Concentrations

In this Report, the concentrations of gaseous air pollutants are adjusted to a reference temperature of 293K and a reference pressure of 101.325 kPa. The concentrations of particulate matters are measured at real-time temperature and atmospheric pressure during monitoring.

2. Gaseous Pollutants

2.1 Sulphur Dioxide (SO_2)

SO_2 is formed primarily from the combustion of sulphur-containing fossil fuels. In Hong Kong, emissions from power stations and marine vessels are the major sources of SO_2, followed by fuel combustion equipment and motor vehicles.

Exposure to high levels of SO_2 may cause impairment of respiratory function and aggravate existing respiratory and cardiac illnesses. Even at lower levels, prolonged exposure may also increase the risk of developing chronic respiratory diseases.

Figure 2a: Sulphur Dioxide Monitoring 2022
(10-Minute Average Statistics)

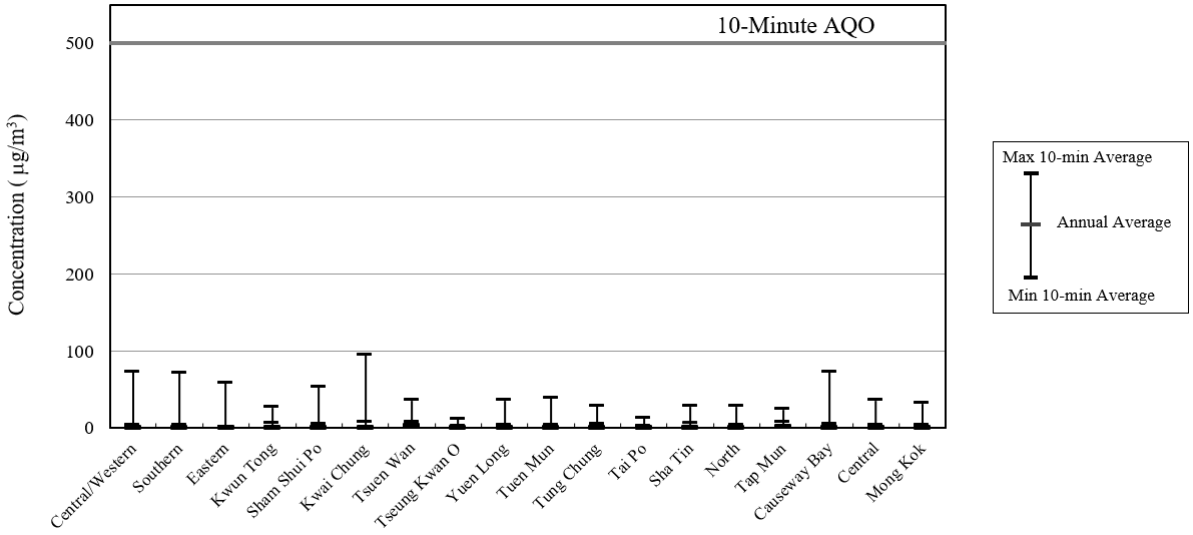
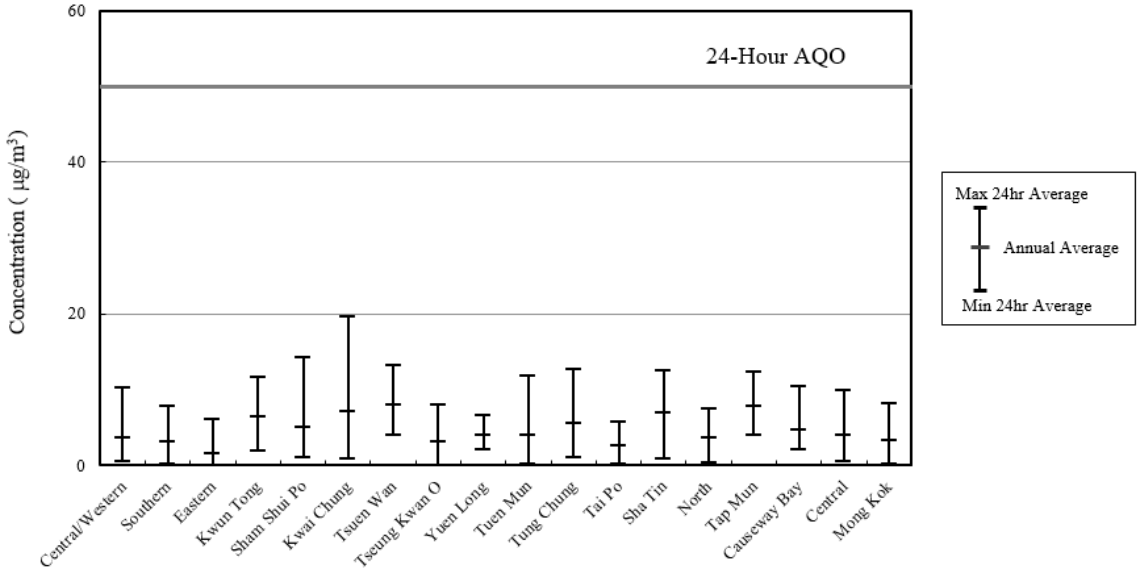


Figure 2b: Sulphur Dioxide Monitoring 2022
(24-Hour Average Statistics)



SO_2 was measured at all the 18 monitoring stations in 2022. As in previous years, SO_2 concentrations remained low throughout the territory. All general and roadside stations complied with the Hong Kong Air Quality Objectives[1] (AQOs) for SO_2. The highest 10-minute average (95 μg/m^3) and 24-hour average (20 μg/m^3) were both recorded at Kwai Chung general station. Both were well below the AQO limits.

2.2 Nitrogen Oxides (NOx) and Nitrogen Dioxide (NO_2)

The various chemical species of the oxides of nitrogen are collectively termed nitrogen oxides (NOx). From an air pollution standpoint, the most important constituents of NOx are nitric oxide (NO) and NO_2, which are often mentioned as NOx collectively. They are usually produced in combustion processes and emitted to the atmosphere. Power stations,

[1] Details of the Hong Kong Air Quality Objectives can be found in Appendix A.

marine vessels and motor vehicles are the major emission sources of NOx in Hong Kong. NOx emissions from motor vehicles have greater impact on roadside air quality.

NO_2 is mainly formed from the oxidation of NO emitted from fuel combustion. Long-term exposure to NO_2 can lower a person's resistance to respiratory infections and aggravate existing chronic respiratory diseases.

NO_2 was measured at all the 18 monitoring stations in 2022. The highest 1-hour average (290 $\mu g/m^3$) and the highest annual average (65 $\mu g/m^3$) were recorded at Central and Causeway Bay roadside stations respectively. All general stations complied with the 1-hour AQO (200 $\mu g/m^3$ with allowance of 18 exceedances of AQO limit per year), of which 12 general stations also complied with the annual AQO (40 $\mu g/m^3$). Non-compliance with the 1-hour and annual AQOs for NO_2 were recorded at all the 3 roadside stations.

Figure 3a: Nitrogen Dioxide Monitoring 2022
(1-Hour Average Statistics)

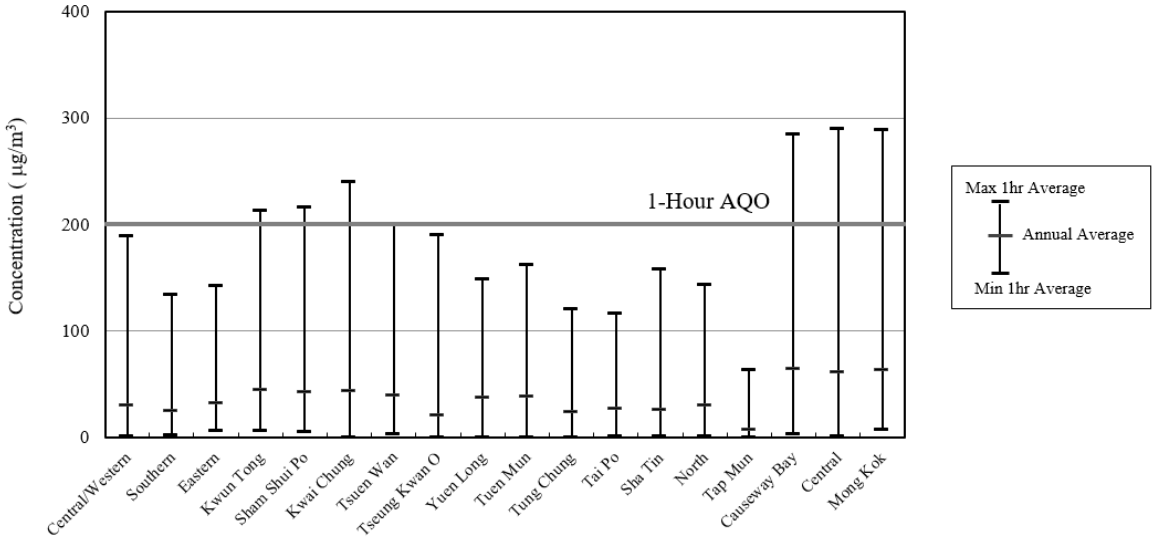
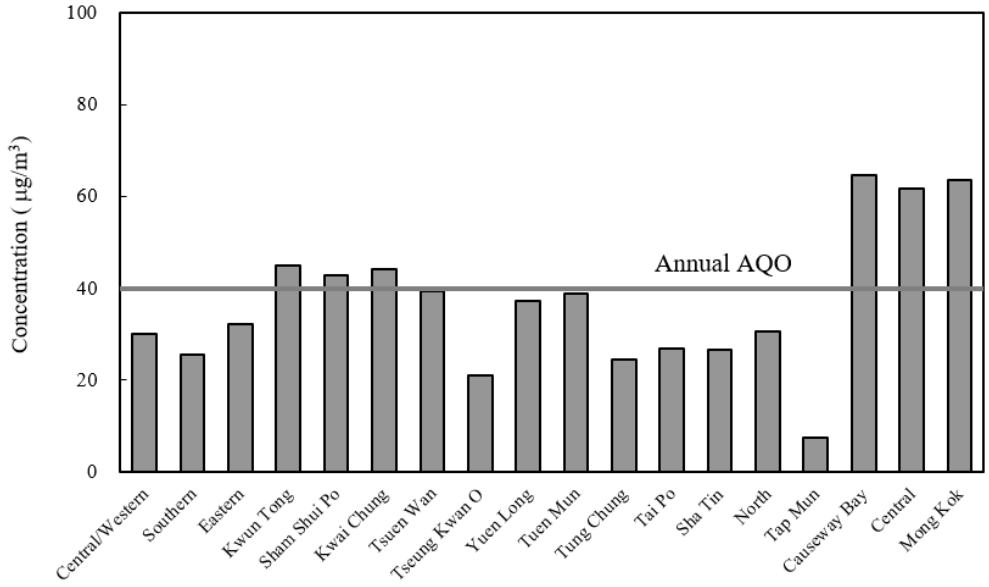


Figure 3b: Nitrogen Dioxide Monitoring 2022
(Annual Average)



2.3 Ozone (O_3)

O_3 is a major constituent of photochemical smog. It is not a pollutant directly emitted from pollution sources but formed by photochemical reactions between NOx and volatile organic compounds (VOCs) under sunlight. As it takes several hours for these photochemical reactions to take place, O_3 recorded in one place could be attributed to NOx and VOCs emissions from places afar. Hence, O_3 is more a regional air pollution problem.

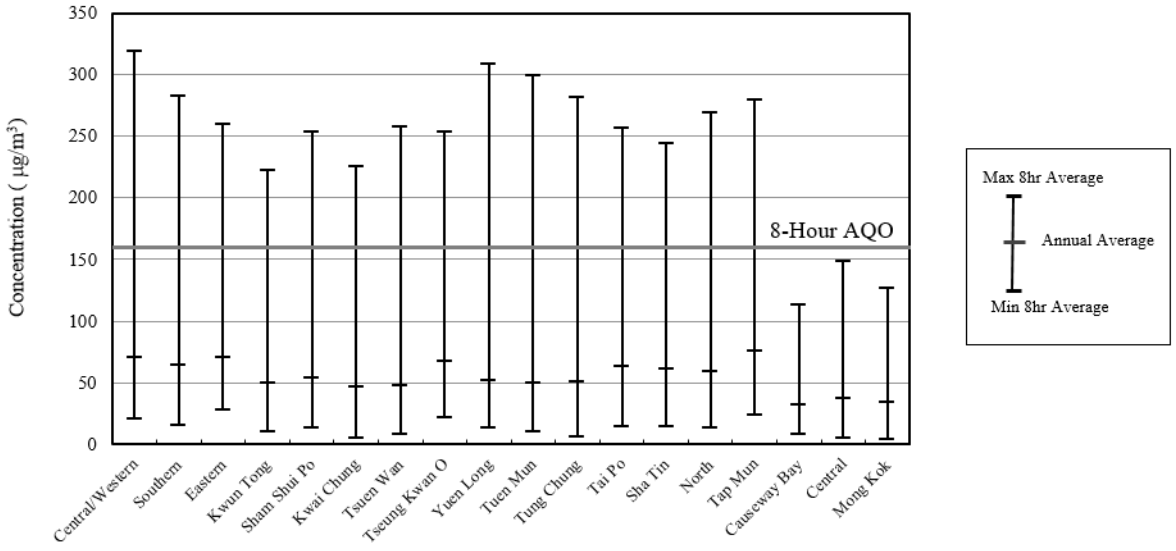
Being a strong oxidant, O_3 can cause irritation to the eyes, nose and throat even at low concentrations. At elevated levels, it can increase a person's susceptibility to respiratory infections and aggravate pre-existing respiratory illnesses such as asthma.

O_3 was monitored at all general and roadside stations in 2022. 3 general stations complied with the 8-hour AQO (160 μg/m^3 with allowance of 9 exceedances of AQO limit per year). The highest 8-hour average (319 μg/m^3) was recorded at Central/Western general station.

All the 3 roadside stations complied with the 8-hour AQO in the year. At the roadside, the NO emitted from motor vehicles readily reacts with O_3 to form NO_2, thereby removing O_3. Because of such O_3 scavenging effect, the O_3 concentrations at the roadside stations are significantly lower than those at the general stations.

In Hong Kong, O_3 episode days are mostly associated with hot, fine and calm weather conditions in the Guangdong-Hong Kong-Macao Greater Bay Area (GBA), which favour the formation and accumulation of O_3 via photochemical reactions. Such weather conditions mostly occur in summer and autumn, especially when Hong Kong and the GBA are under the influence of outer subsiding air induced by tropical cyclones located near Taiwan or the Philippines.

Figure 4: Ozone Monitoring 2022
(Maximum 8-Hour Average Statistics)

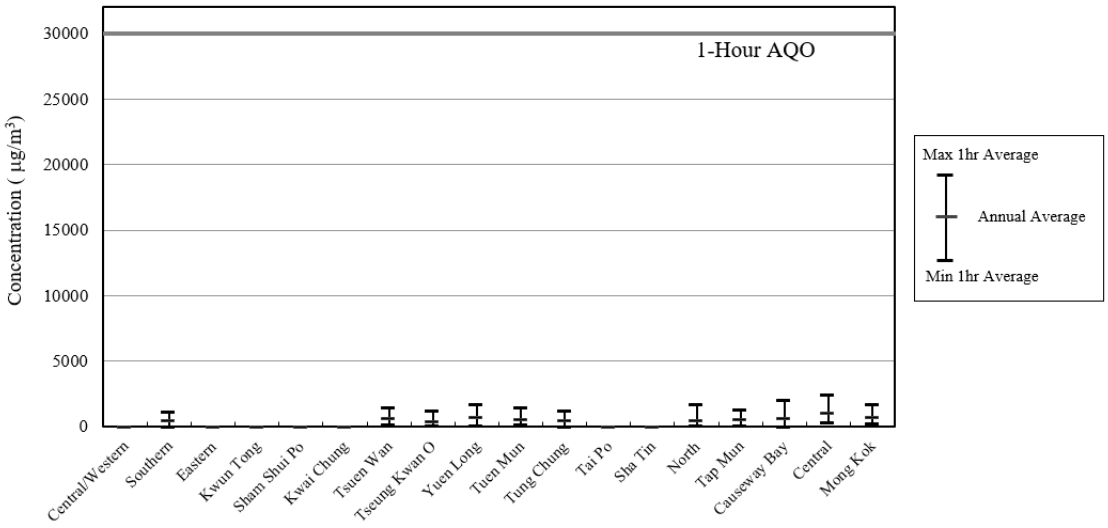


2.4 Carbon Monoxide (CO)

CO comes mainly from vehicular emissions although a small amount of it may also come from flue gases of factories and power stations. When CO enters the bloodstream, it can reduce oxygen delivery to the body's organs and tissues. Typical symptoms of CO poisoning include shortness of breath, chest pain, headache, and loss of co-ordination. The health threat from CO is more severe for those who suffer from heart diseases.

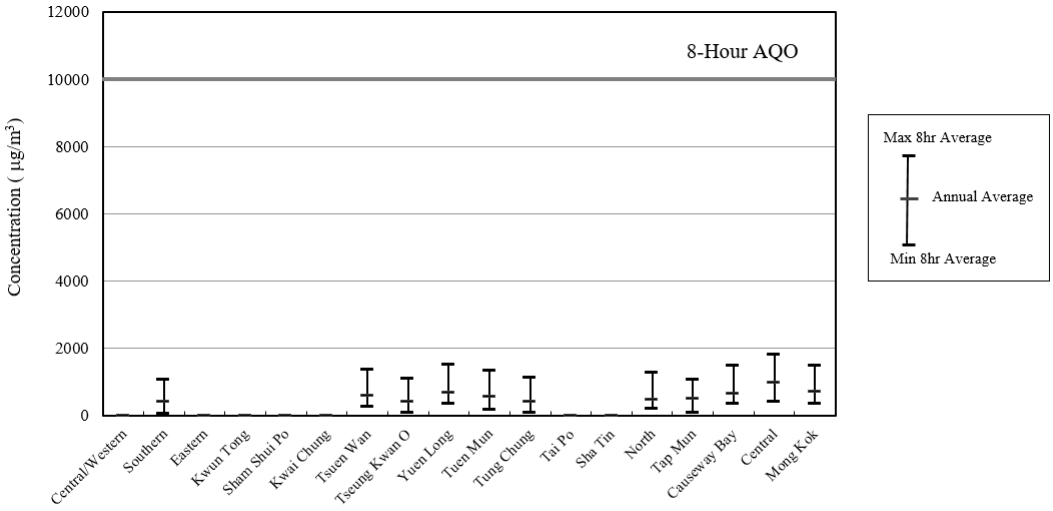
CO was monitored at 11 stations, including 8 general stations and 3 roadside stations in 2022. Similar to previous years, both ambient and roadside CO concentrations remained very low throughout the year. All the monitoring stations complied with the 1-hour (30,000 μg/m^3) and 8-hour (10,000 μg/m^3) AQOs for CO. The highest 1-hour average (2,390 μg/m^3) and 8-hour average (1,839 μg/m^3) were both recorded at Central roadside station, both being well below the respective AQO limits.

Figure 5a: Carbon Monoxide Monitoring 2022
(1-Hour Average Statistics)



Note: CO was monitored at Southern, Tsuen Wan, Tseung Kwan O, Yuen Long, Tuen Mun, Tung Chung, North and Tap Mun general stations and Causeway Bay, Central and Mong Kok roadside stations.

Figure 5b: Carbon Monoxide Monitoring 2022
(8-Hour Average Statistics)



Note: CO was monitored at Southern, Tsuen Wan, Tseung Kwan O, Yuen Long, Tuen Mun, Tung Chung, North and Tap Mun general stations and Causeway Bay, Central and Mong Kok roadside stations.

3. Suspended Particulates

3.1 Respirable Suspended Particulates (RSP)

RSP refers to those suspended particulates with nominal aerodynamic diameters of 10 micrometres or less. Combustion sources, in particular marine vessels, diesel vehicles and power plants, are the major regional and local sources of ambient RSP. Besides, RSP can also be formed by photochemical reactions of NOx and VOCs as well as atmospheric oxidation of gaseous pollutants, such as SO_2 and NOx. To a lesser extent, crustal derived dust and marine aerosols are also sources of RSP. In Hong Kong, RSP is contributed mainly by the regional sources.

RSP at high levels may cause chronic and acute effects on human health, particularly the pulmonary function, as RSP can penetrate deep into the lungs and cause respiratory problems. These effects are uplifted if high RSP levels are associated with higher levels of other pollutants, such as SO_2.

RSP was measured at all 18 monitoring stations in 2022. 10 of these stations were also equipped with high-volume samplers to collect particulate samples for chemical analysis.

In 2022, all general and roadside stations complied with the 24-hour AQO (100 μg/m^3 with allowance of 9 exceedances of AQO limit per year) and the annual AQO (50 μg/m^3) for RSP. The highest 24-hour average (90 μg/m^3) was recorded at Tuen Mun general station, while the highest annual average (34 μg/m^3) was recorded at Causeway Bay roadside station.

Figure 6a: RSP Monitoring 2022
(24-Hour Average Statistics)

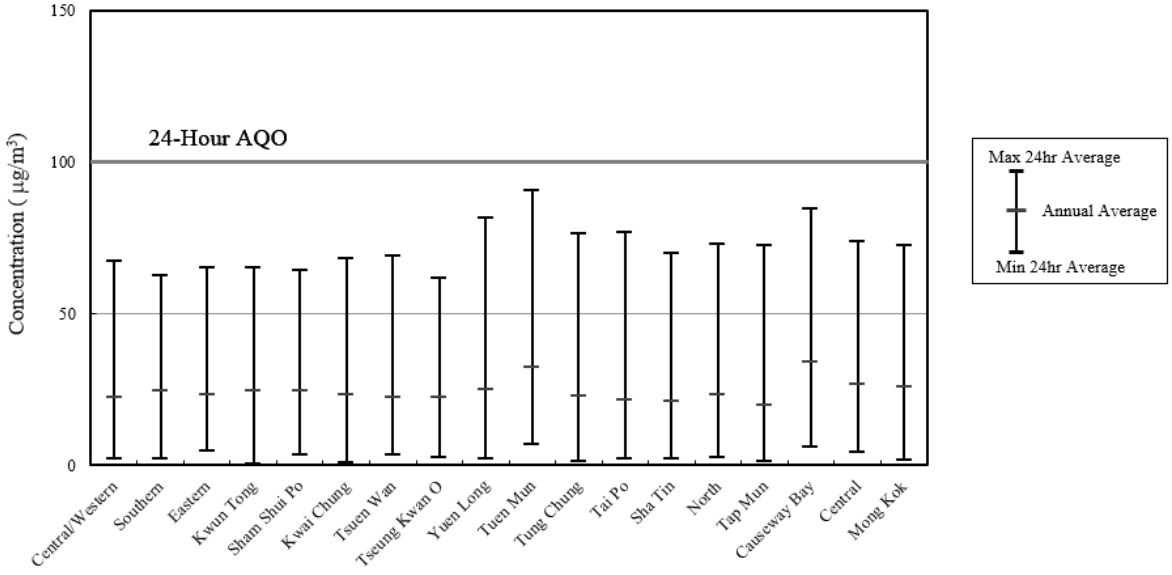
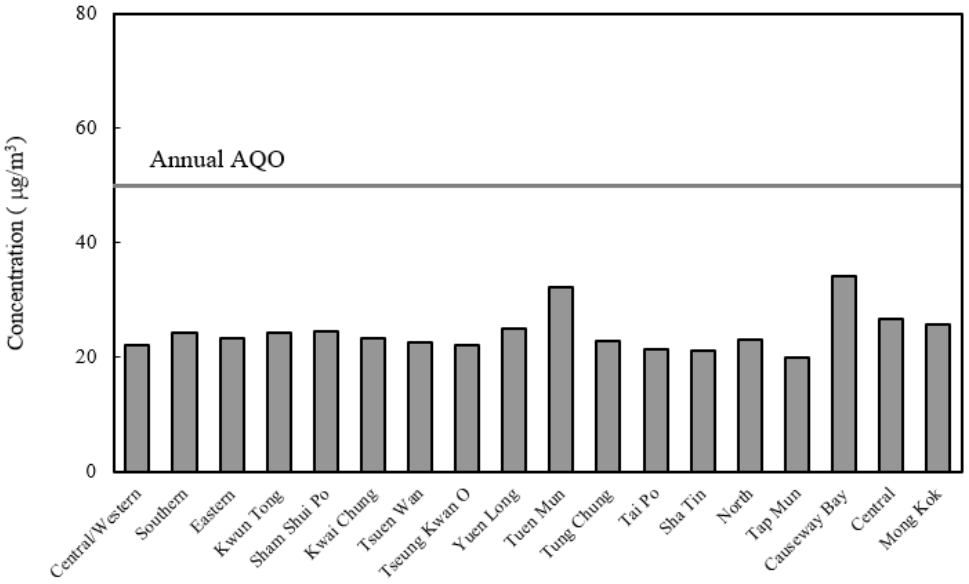


Figure 6b: RSP Monitoring 2022
(Annual Average)



3.2 Fine Suspended Particulates (FSP)

FSP refers to those suspended particulates with nominal aerodynamic diameters of 2.5 micrometres or less, which is the finer component of RSP. FSP has the same emission sources as RSP, which is also mainly contributed by regional sources. FSP is able to penetrate to the deepest parts of the lungs because of its small size, hence posing a higher risk to health. Besides, FSP also causes visibility impairment in air.

In 2022, all general and roadside stations complied with both the 24-hour AQO (50 μg/m^3 with allowance of 35 exceedances of AQO limit per year) and the annual AQO (25 μg/m^3) for FSP. The highest 24-hour average (64 μg/m^3) was recorded at Yuen Long and Tung Chung general stations while the highest annual average (21 μg/m^3) was recorded at Causeway Bay roadside station.

Figure 7a: FSP Monitoring 2022
(24-Hour Average Statistics)

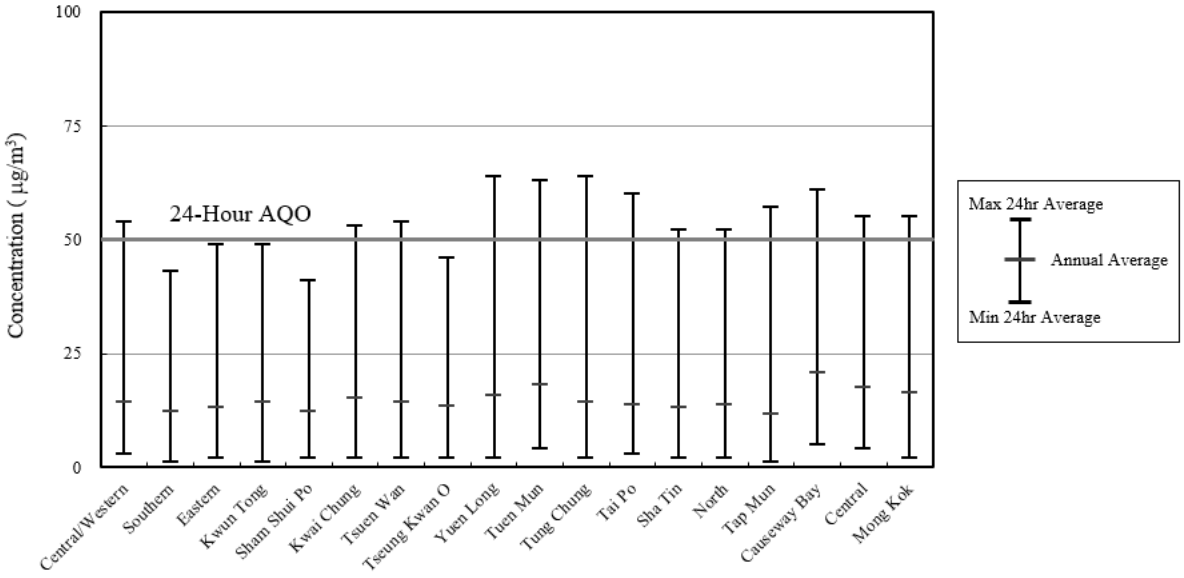
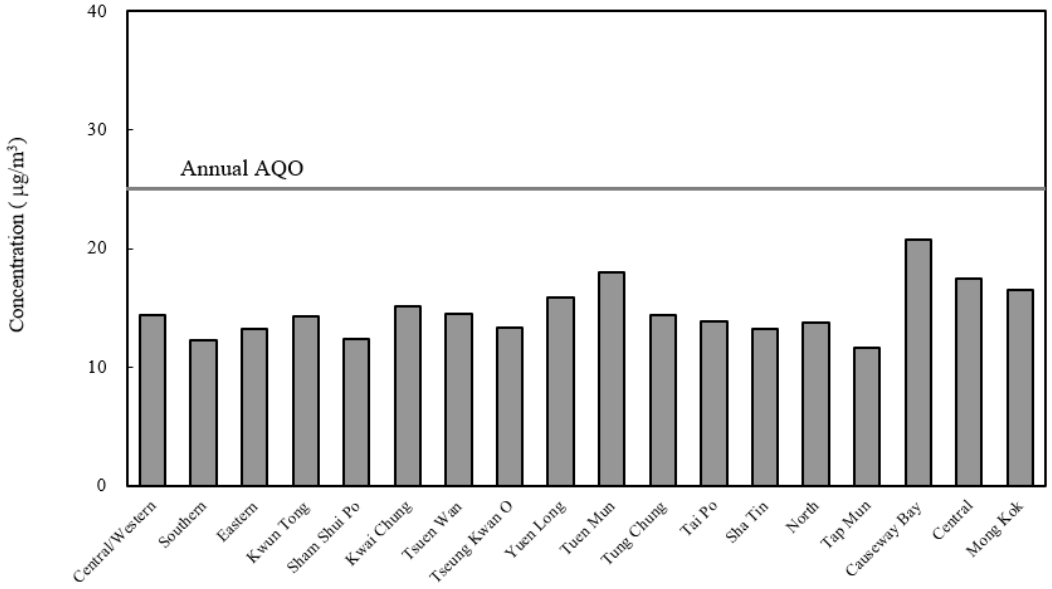


Figure 7b: FSP Monitoring 2022
(Annual Average)



3.3 Lead (Pb)

Lead (Pb) is the only criteria pollutant included in the AQOs that is also a TAP. In Hong Kong, the sale and supply of leaded petrol, which is a known major source of lead, was banned from 1 April 1999. Pb was measured at 9 general stations and 1 roadside station in 2022[2]. As in previous years, the Pb concentrations at the roadside and in ambient air continued to linger at very low levels during 2022. The annual averages, ranging from 6 ng/m^3 (at all stations except Yuen Long and Tuen Mun) to 8 ng/m^3 (at Yuen Long and Tuen Mun), were well below the respective annual AQO limit of 500 ng/m^3.

4. Toxic Air Pollutants (TAPs)

Two groups of TAPs, namely heavy metals and organic substances, have been regularly monitored at Central/Western and Tsuen Wan stations since mid of 1997. Among the various TAPs monitored, 8 of them are considered more important in terms of their health impacts and their annual averages in 2022 are summarised in Table C6. Detailed description of the TAPs monitoring operation is given in Appendix B4.

5. Variation of Air Pollution Levels over Time

The concentrations of air pollutants in the atmosphere can change over a day, over the months of a year and in the period of several years.

[2] Lead was measured at Central/Western, Kwun Tong, Sham Shui Po, Kwai Chung, Tsuen Wan, Tung Chung, Yuen Long, Tuen Mun and Tseung Kwan O general stations and Mong Kok roadside station.

5.1 Over a Day

The concentrations of most air pollutants generally follow the diurnal pattern of human activities and traffic. For instance, higher levels of NO_2, RSP and FSP are usually observed in the morning and the evening rush hours when there are more traffic and human activities. Likewise, the lowest concentrations often occur from midnight to dawn when the traffic is at its minimum. This type of traffic induced diurnal pattern is much more distinct for pollutant levels at the roadside.

Figure 8: 2022 Diurnal Variations of NO_2

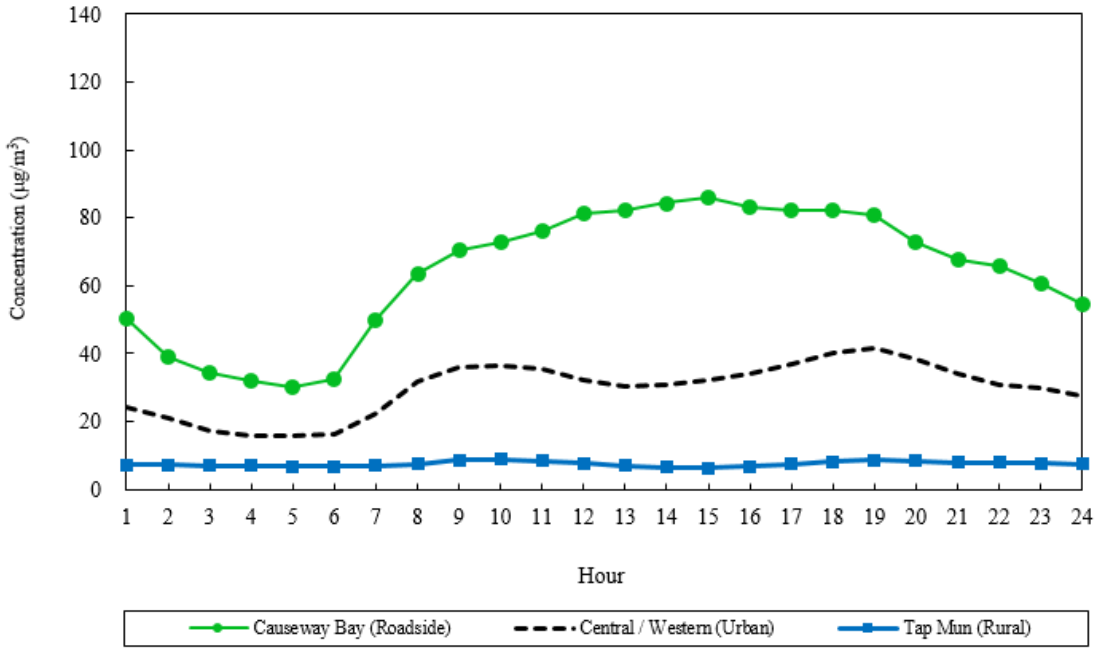


Figure 9: 2022 Diurnal Variations of RSP

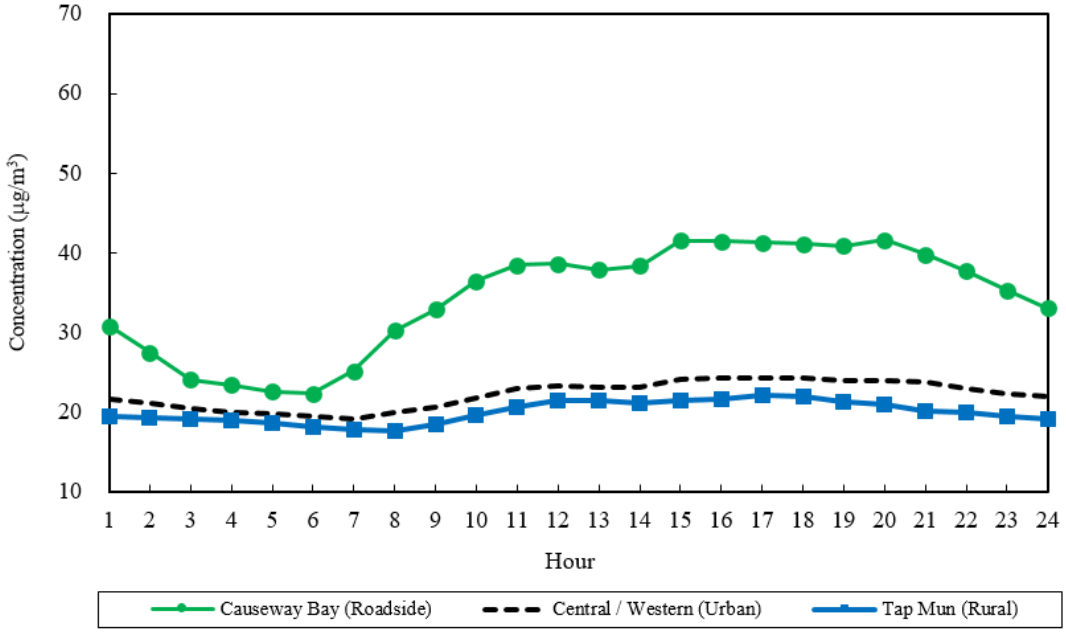
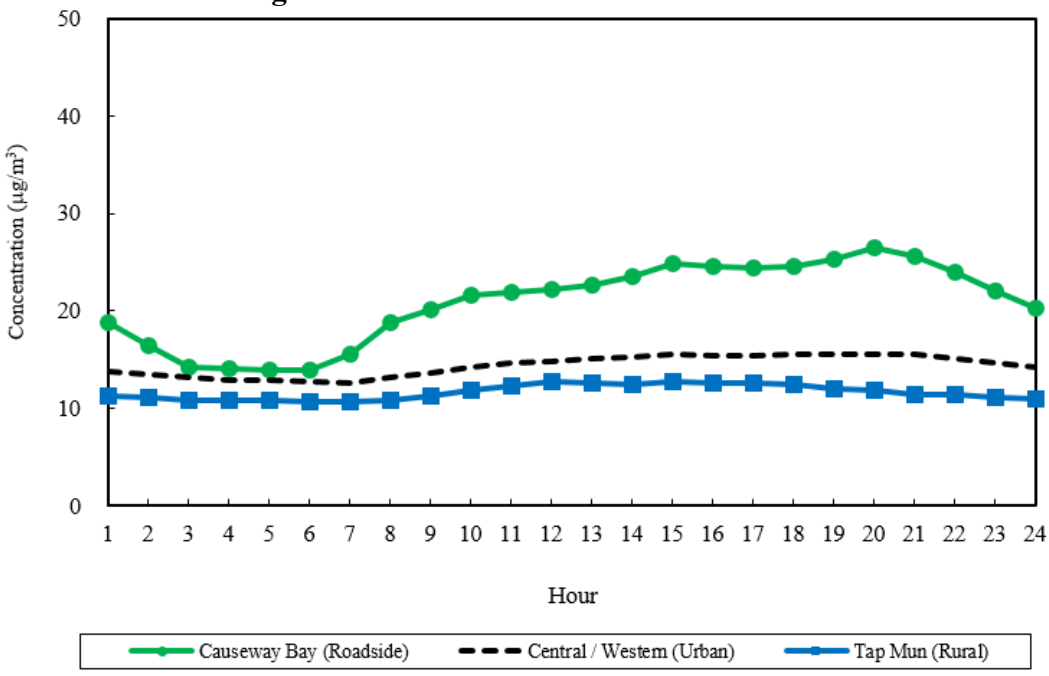
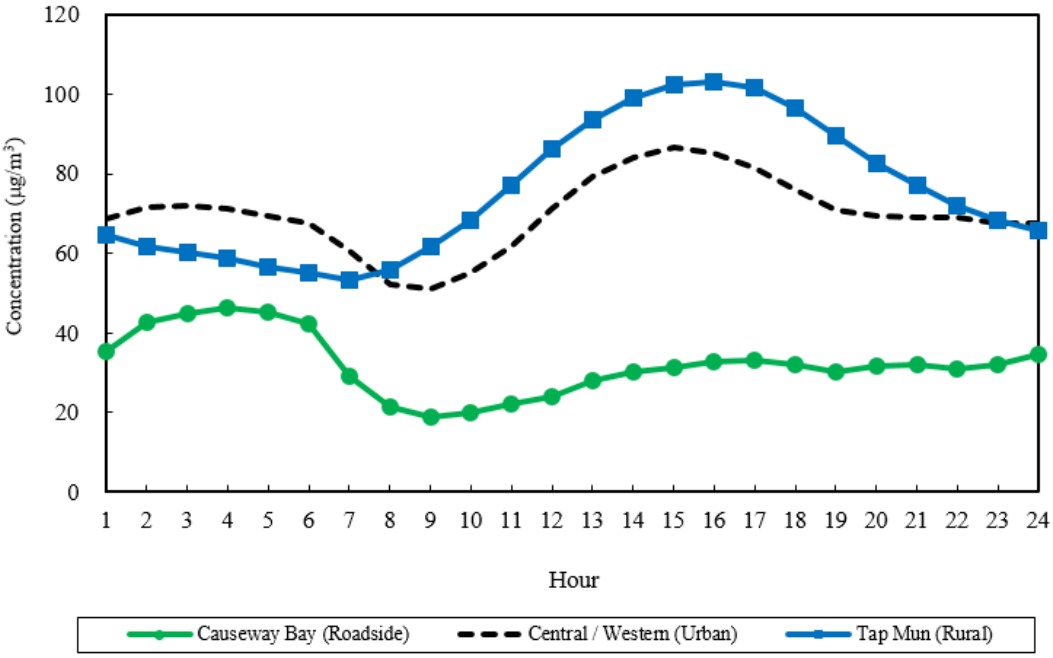


Figure 10: 2022 Diurnal Variations of FSP



The diurnal pattern of O_3 is different from those of NO_2, RSP and FSP. O_3 is formed by photochemical reactions of its precursor pollutants such as NOx and VOCs under sunlight. Outside urban centres, the ambient O_3 levels start to build up before noon and peak in the afternoon, when precursor pollutants are accumulated and sunlight is strong. In urban areas and at the roadside, the lowest O_3 concentrations are often observed during rush hours. This is because a large amount of NO from rush-hour traffic acts as an efficient scavenger of O_3. At the roadside, O_3 levels are significantly lower than those at general stations due to the scavenging effect of NO emissions from vehicles.

Figure 11: 2022 Diurnal Variations of O_3

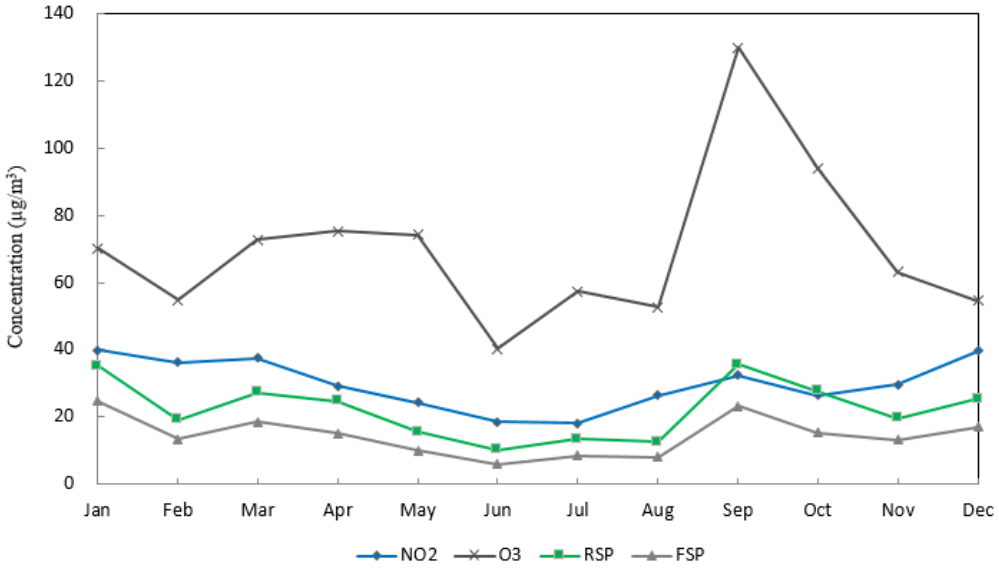


5.2 Over a Year

The concentrations of NO_2, RSP and FSP are in general lower in summer for a number of reasons. The higher temperatures in summer months induce larger mixing heights, which favour the dispersion of pollutants. The rain in summer helps to wash out pollutants more frequently. The south-westerly monsoon in summer also helps to replenish the region with cleaner oceanic air.

As regards O_3, the highest monthly concentrations usually occur in autumn with more favourable weather conditions (such as strong solar radiation, less rainfall, favourable wind direction etc.) for O_3 formation via photochemical reactions.

Figure 12: Monthly Variations of NO_2, O_3, RSP and FSP at Central/Western Station in 2022



5.3 Long Term Trends

Air quality is affected by both emissions and meteorology. Over a short period, for instance a few months to a year, air quality is more subject to variations in weather conditions even though the emission levels are more or less the same, e.g. stronger solar radiation will promote photochemical smog formation, more rainfall will help scrub pollutants from the air, etc. In the long run, however, air quality is primarily affected by emissions. Therefore, a scientific way to assess air quality changes and the effectiveness of emission control measures is to examine the trend of annual average pollutant concentrations over the years.

The long-term trends for air pollutants presented in this section are based on their annual average concentrations recorded from the relevant air quality monitoring stations categorised into 4 groups of land use types, namely Urban, New Town, Rural and Roadside as defined in Table 1.

Table 1: Classification of Air Quality Monitoring Stations by Land Use Types

Land Use Type	Land Use Characteristics	Air Quality Monitoring Stations
Urban	Densely populated residential areas mixed with some commercial and/or industrial areas	Central/Western, Southern, Eastern, Kwun Tong, Sham Shui Po, Kwai Chung, Tsuen Wan and Tseung Kwan O
New Town	Mainly residential areas	Yuen Long, Tuen Mun, Tung Chung, Tai Po, Sha Tin and North
Rural	Rural areas	Tap Mun (background station)
Roadside	Urban roadside in mixed residential/ commercial areas with heavy traffic and surrounded by many tall buildings	Causeway Bay, Central and Mong Kok

5.3.1 Sulphur Dioxide (SO_2)

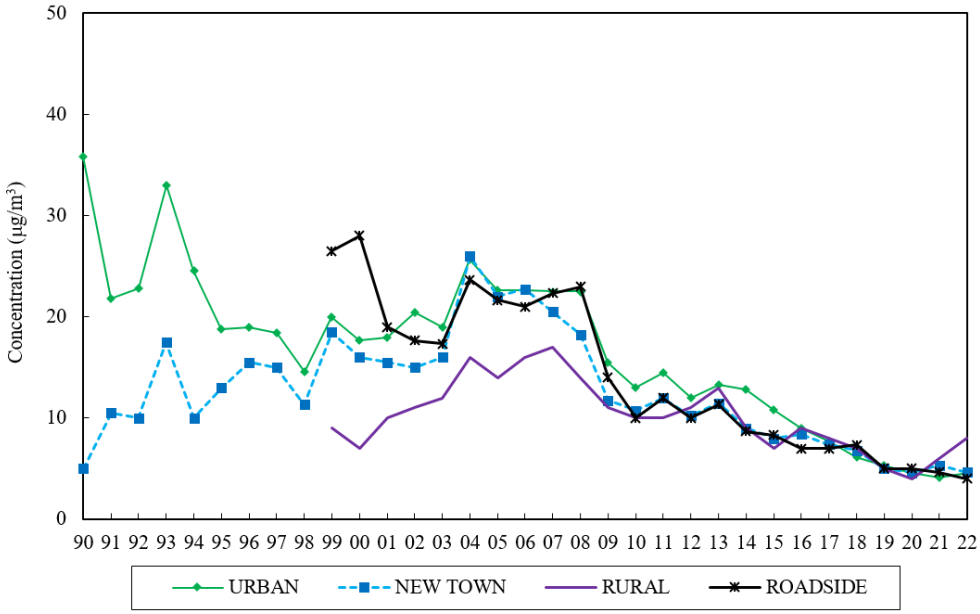
SO_2 concentrations in Hong Kong have shown a continuous declining trend as a result of the implementation of various fuel control measures. For instance, the implementation of the Air Pollution Control (Fuel Restriction) Regulations in 1990 regulated the sulphur contents of fuels for commercial and industrial use; the implementation of the Air Pollution Control (Motor Vehicle Fuel) Regulation in 1995 for controlling motor vehicle fuel quality, the introduction of ultra-low sulphur diesel for vehicle fleet in July 2000 and the introduction of Euro V motor diesel in December 2007 effectively reduced SO_2 emissions.

For marine vessels, the Government has all along been controlling the sulphur content of marine fuel to reduce their emissions. The Air Pollution Control (Marine Light Diesel) Regulation was introduced in April 2014 to cap the sulphur content of locally supplied marine light diesel at 0.05%. The Air Pollution Control (Ocean Going Vessels) (Fuel at Berth) Regulation was put in force on 1 July 2015 requiring ocean going vessels (OGVs) to switch to fuel with sulphur content not exceeding 0.5% (i.e. low sulphur fuel) while at berth. To dovetail with the implementation of coastal marine emission control areas in Mainland waters, the Air Pollution Control (Fuel for Vessels) Regulation took effect on 1 January 2019, requiring all vessels (including OGVs) to use compliant fuel (including low sulphur fuel or liquefied natural gas) within Hong Kong waters, irrespective of whether they are sailing or berthing.

On the regional front, the Governments of Guangdong Province and Hong Kong have been working together to introduce a wide range of control measures, such as retrofitting power plants with flue gas desulphurization devices, phasing out highly polluting industrial plants in the GBA, introducing fuels with a lower sulphur content, etc., to reduce SO_2 emissions in the Region.

As revealed in Figure 13, the SO_2 concentrations at both rural and other types of monitoring stations in 2022 were all at a very low level, in the range of 4 to 8 $\mu g/m^3$.

Figure 13: SO_2 Long Term Trend

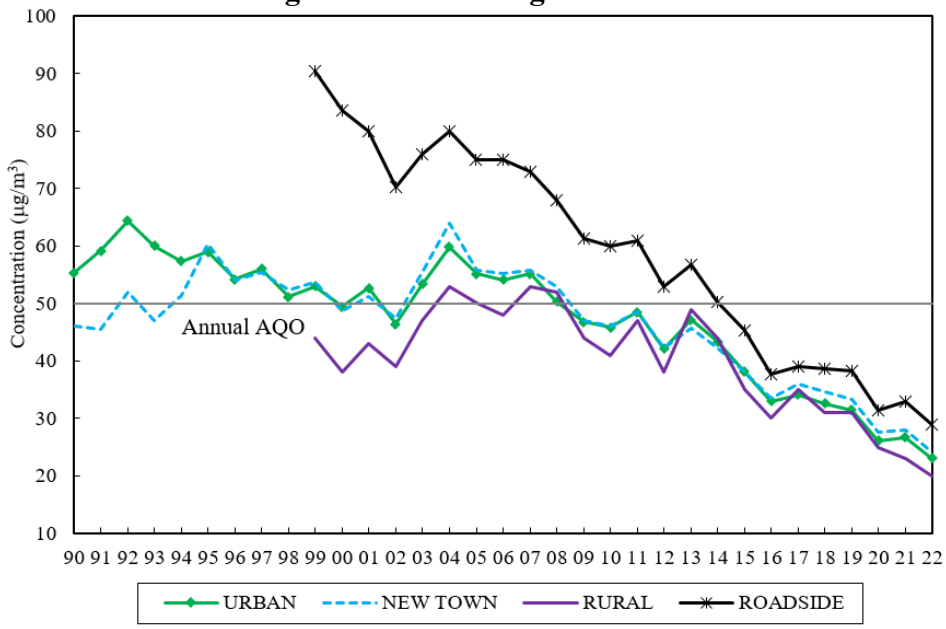


5.3.2 Respirable Suspended Particulates (RSP)

The ambient concentrations of RSP in the territory showed a primarily downward trend between 1995 and 2002, followed by a rebound that peaked in 2004 due to the increase in regional background RSP levels. The ambient RSP concentrations then continuously dropped to a level below the annual AQO limit from 2009 onwards, reflecting a reduction in regional background RSP levels over the last ten years.

As a result of the implementation of various vehicle emission control measures in the last two decades, the annual average of RSP concentration at the roadside in 2022 was significantly reduced by 68% when compared with the 1999[3] level and has remained below the annual AQO limit since 2014.

Figure 14: RSP Long Term Trend



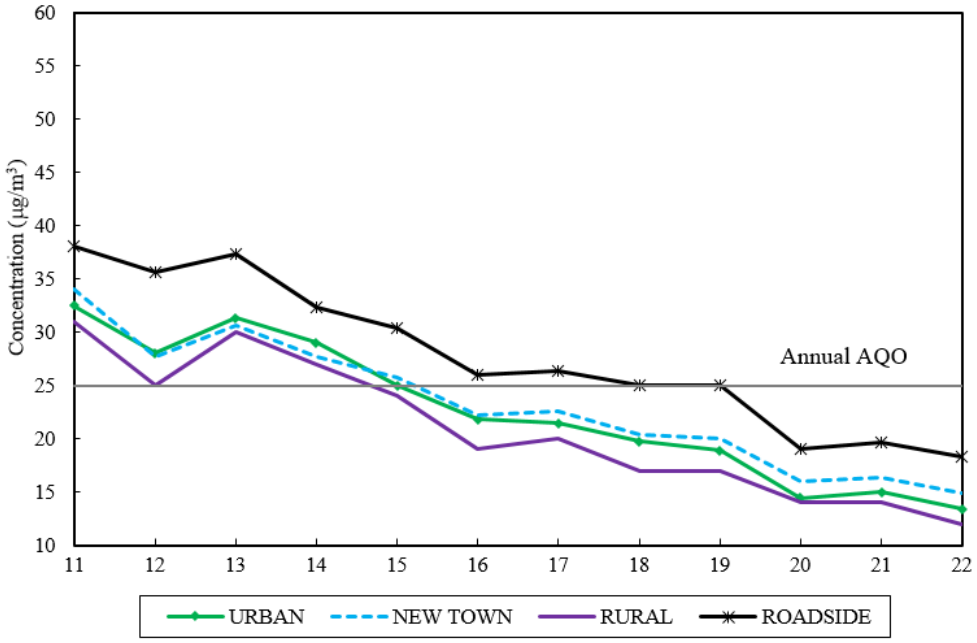
[3] 1999 is selected for comparison as this was the year when the Government started to implement a list of measures to cut vehicular emissions.

5.3.3 Fine Suspended Particulates (FSP)

We started to monitor FSP at all our monitoring stations in 2011[4]. Same as RSP, the ambient concentrations of FSP in the territory showed an overall downward trend between 2011 and 2022, reflecting a continuous reduction in regional background FSP levels.

The roadside FSP levels have also shown a discernible improvement in recent years and have complied with the prevailing annual AQO since 2014. The annual AQO was tightened in 2022 from 35 µg/m^3 to 25 µg/m^3. The roadside FSP levels have still met the new annual AQO (25 µg/m^3) since 2018. When compared with 2011, the annual average FSP concentration at the roadside in 2022 had reduced by 53% .

Figure 15: FSP Long Term Trend



[4] FSP were only monitored at four to five air quality monitoring stations between 1999 and 2010.

5.3.4 Ozone (O_3)

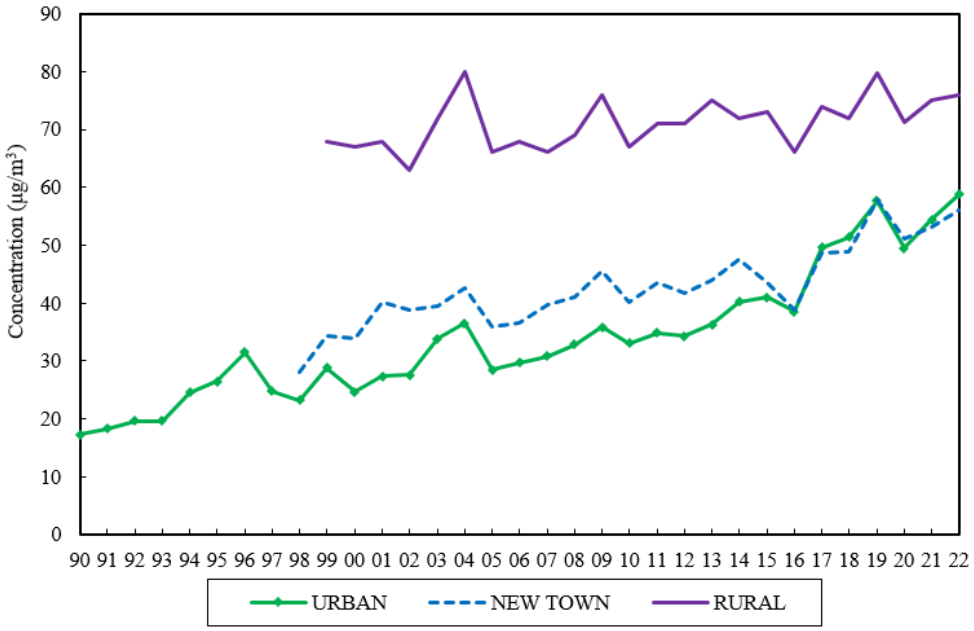
O_3 is a complex regional air pollution issue. It is formed when precursors such as NOx and VOCs undergo complicated photochemical reactions under sunlight. O_3 can travel long distances and affect areas downwind. On the other hand, O_3 can react with some pollutants like NO emitted from combustion sources (such as motor vehicles) and be scavenged. Hence the O_3 concentrations measured at a particular location would depend on the regional O_3 background level, its local formation as well as the scavenging effect.

As NO emissions from motor vehicles can react with and remove O_3 in the air, areas with heavy traffic normally have lower O_3 levels than areas with light traffic. Tap Mun station started monitoring O_3 in 1998. As Tap Mun station is located in a remote rural area with virtually no local emission, the O_3 concentrations recorded could represent the regional background O_3 levels. This station has consistently recorded higher O_3 levels than those recorded in urban areas, but the gap has been narrowing steadily from over 100% in the early 2000s to about 40% in recent years.

The rural O_3 concentrations showed a moderate upward trend from the early 2000s whereas the O_3 levels in new towns and urban areas have exhibited relatively more distinct rising trends. The rising trend of O_3 levels in Hong Kong, especially those in new towns and urban areas, could be attributed to the moderate increase in regional O_3 background as well as the reduction in local vehicle emissions, the latter leading to less NO in the air for reaction with O_3.

The Hong Kong Special Administrative Region Government and Guangdong Provincial Government have been implementing a regional air quality management plan to, among others, alleviate the photochemical smog and O_3 problem by reducing O_3 precursors levels in the GBA.

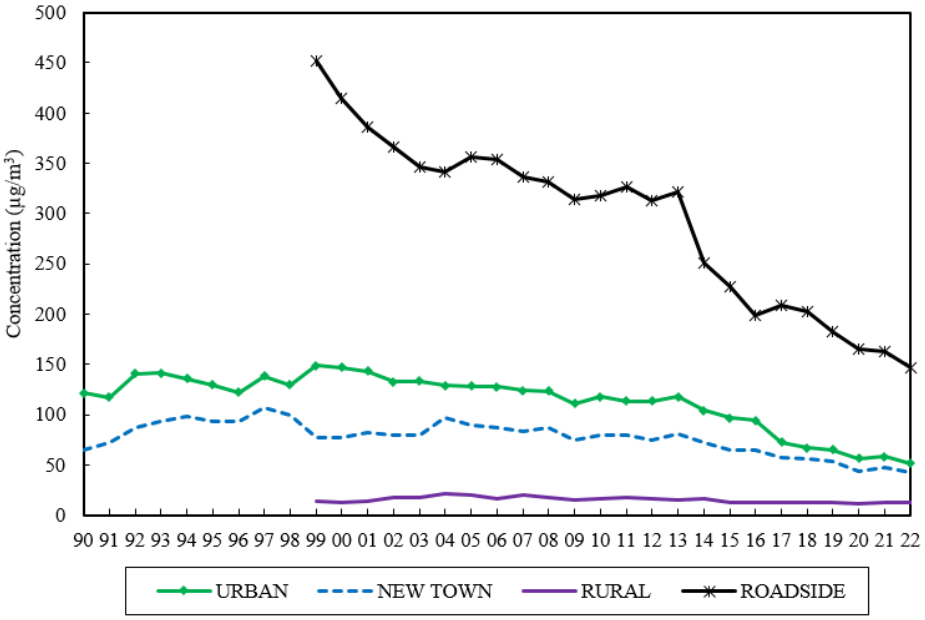
Figure 16: O_3 Long Term Trend



5.3.5 Nitrogen Oxides (NOx) and Nitrogen Dioxide (NO_2)

While the background NOx concentrations (i.e. rural area in Tap Mun) remained flat, the annual averages of ambient NOx in urban areas and new towns exhibited moderate declining trends between 1999 and 2022. During the same period, the roadside NOx concentration showed a more distinct descending trend, reflecting the effectiveness of various vehicle emission control measures implemented over the past decades. The roadside NOx concentration in 2022 was 67% lower than that in 1999[5].

Figure 17: NOx Long Term Trend



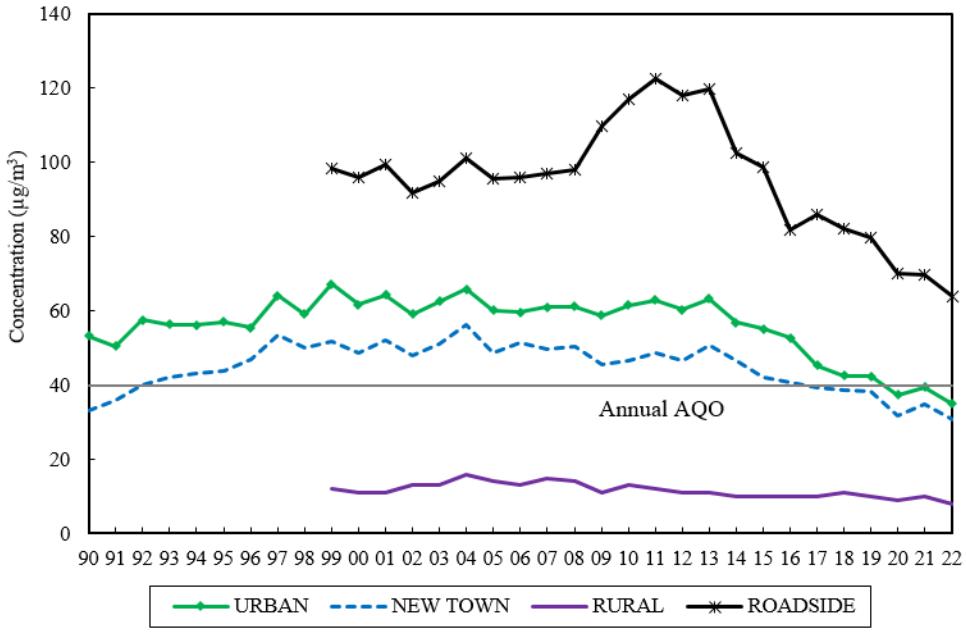
NO_2, a major component of NO_x, is mainly formed from the oxidation of NO. The oxidation can be promoted by the presence of a large amount of O_3 and VOCs in ambient air. The ambient NO_2 levels exhibited a slow ascending trend between 1990 and 2004, but the trend levelled off from 2005 to 2012 and has started to decline progressively since 2013.

Roadside NO_2 levels have been more difficult to reduce. However, the increasing trend of its concentrations once recorded in the past, which could be caused by a combination of the ageing of motor vehicles, increase in direct NO_2 emissions from motor vehicles and rise in regional background O_3 concentration promoting the conversion of NO emitted from motor vehicles to NO_2, was reversed and started to drop from its peak in 2011. The annual NO_2 concentration at the roadside recorded in 2022 had reduced by 35% when compared with the 1999 level.

To address the problem of the elevated roadside NO_2 pollution, the Government has put forward enhanced measures including supporting the transport trades to test green vehicles, stepping up the control on emissions from petrol and liquefied petroleum gas vehicles, providing incentives to accelerate the phasing out of old and polluting diesel commercial vehicles, as well as tightening the emission standards for newly registered motor vehicles.

[5] 1999 is selected for comparison as this was the year when the Government started to implement a list of measures to cut vehicular emissions.

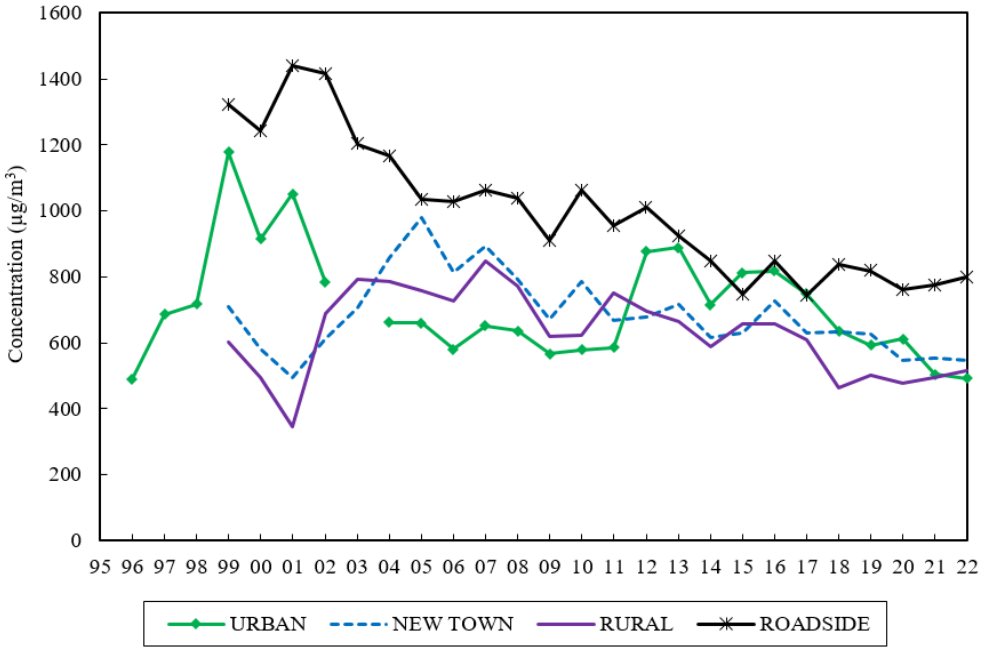
Figure 18: NO_2 Long Term Trend



5.3.6 Carbon Monoxide (CO)

The ambient concentration of CO in the territory remained at a very low level while the CO concentration at the roadside had dropped to a level close to the ambient one in recent years.

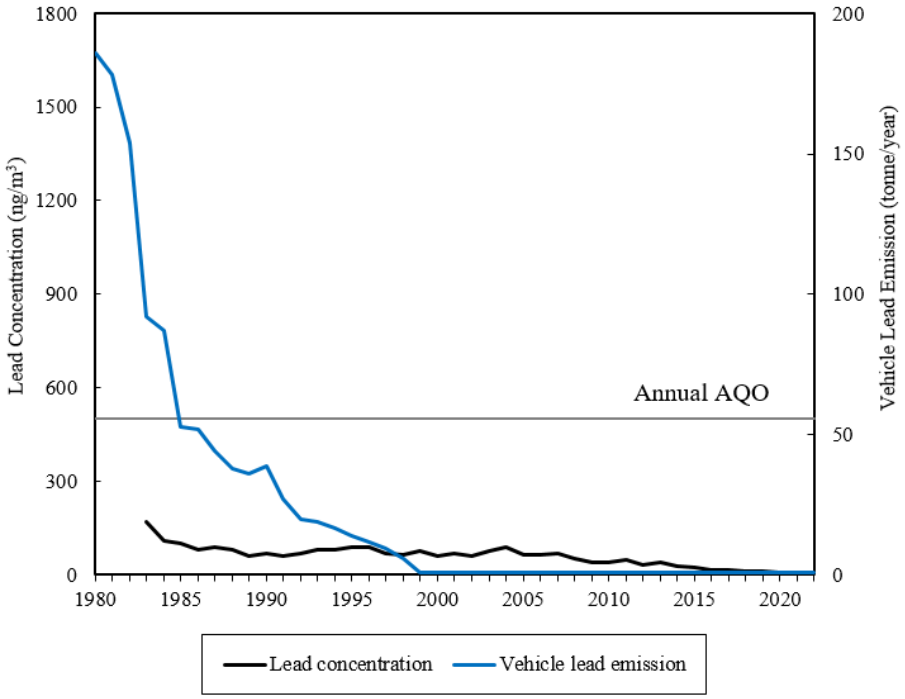
Figure 19: CO Long Term Trend



5.3.7 Lead (Pb)

The Pb concentrations at the roadside and in ambient air have been lingering at very low levels over the years since the oil companies took voluntary action in reducing the Pb content of petrol in the eighties. Pb emissions from motor vehicles were further reduced as a result of the introduction of unleaded petrol in April 1992 and completely eliminated when the sale and supply of leaded petrol were banned in April 1999.

Figure 20: Vehicle Lead Emission and Lead Concentration



Appendix A

Air Quality Objectives and their Compliance Status

Hong Kong Air Quality Objectives (AQOs) for 7 major air pollutants were set at levels to protect public health in 1987 and were reviewed at least once every five years to continuously improve air quality and safeguard public health. A tightened set of AQOs has taken effect from 1 January 2022, which is given in Table A1. The compliance status of the new AQOs has been used as the indicator of air quality in different districts in Hong Kong.

Table A1: Hong Kong Air Quality Objectives (AQOs)

Pollutant	Averaging time	Concentration limit [i] ($\mu g/m^3$)	Number of exceedances of limit allowed
Sulphur dioxide	10-minute	500	3
	24-hour	50	3
Respirable suspended particulates (PM_{10}) [ii]	24-hour	100	9
	Annual	50	Not applicable
Fine suspended particulates ($PM_{2.5}$)[iii]	24-hour	50	35
	Annual	25	Not applicable
Nitrogen dioxide	1-hour	200	18
	Annual	40	Not applicable
Ozone	8-hour	160	9
Carbon monoxide	1-hour	30,000	0
	8-hour	10,000	0
Lead	Annual	0.5	Not applicable

Notes:

[i] All measurements of the concentration of gaseous air pollutants, i.e. sulphur dioxide, nitrogen dioxide, ozone and carbon monoxide, are adjusted to a reference temperature of 293 Kelvin and a reference pressure of 101.325 kPa.

[ii] "Respirable suspended particulates" means suspended particles in air with a nominal aerodynamic diameter of 10 µm or less.

[iii] "Fine suspended particulates" means suspended particles in air with a nominal aerodynamic diameter of 2.5 µm or less.

Compliance with the short-term AQOs

Table A2 shows the compliance status with the short-term AQOs (i.e. 10-min, 1-hour, 8-hour and 24-hour AQOs) recorded at each monitoring station in 2022. 3 general stations and all 3 roadside stations complied with the 8 hour AQO for O_3 and all general stations complied with the 1-hour AQO for NO_2. For other criteria pollutants including RSP, FSP, SO_2 and CO, all general and roadside stations complied with their respective short-term AQOs.

Table A2: Compliance Status of Short-Term Air Quality Objectives in 2022

Station		O_3	NO_2	RSP	FSP	SO_2		CO	
		8-hr	1-hr	24-hr	24-hr	10-min	24-hr	1-hr	8-hr
General Station	Central/Western	×	✓	✓	✓	✓	✓	--	--
	Southern	×	✓	✓	✓	✓	✓	✓	✓
	Eastern	×	✓	✓	✓	✓	✓	--	--
	Kwun Tong	✓	✓	✓	✓	✓	✓	--	--
	Sham Shui Po	×	✓	✓	✓	✓	✓	--	--
	Kwai Chung	✓	✓	✓	✓	✓	✓	--	--
	Tsuen Wan	✓	✓	✓	✓	✓	✓	✓	✓
	Tseung Kwan O	×	✓	✓	✓	✓	✓	✓	✓
	Yuen Long	×	✓	✓	✓	✓	✓	✓	✓
	Tuen Mun	×	✓	✓	✓	✓	✓	✓	✓
	Tung Chung	×	✓	✓	✓	✓	✓	✓	✓
	Tai Po	×	✓	✓	✓	✓	✓	--	--
	Sha Tin	×	✓	✓	✓	✓	✓	--	--
	North	×	✓	✓	✓	✓	✓	✓	✓
	Tap Mun	×	✓	✓	✓	✓	✓	✓	✓
Roadside Station	Causeway Bay	✓	×	✓	✓	✓	✓	✓	✓
	Central	✓	×	✓	✓	✓	✓	✓	✓
	Mong Kok	✓	×	✓	✓	✓	✓	✓	✓

Notes: "✓" *Complied with the AQO* "×" *Violated the AQO* "--" *Not measured*

Compliance with the long-term AQOs

Table A3 shows the compliance status of the long-term (annual) AQOs for all monitoring stations. All stations complied with the annual AQOs for RSP and FSP whereas 3 general and 3 roadside stations could not comply with the annual AQO for NO_2. For lead, all 10 monitoring stations achieved full compliance with the long-term AQO.

Table A3: Compliance Status of Long-Term (Annual) Air Quality Objectives in 2022

Station		Annual			
		NO_2	**RSP**	**FSP**	**Lead**
General Station	Central/Western	✓	✓	✓	✓
	Southern	✓	✓	✓	--
	Eastern	✓	✓	✓	--
	Kwun Tong	×	✓	✓	✓
	Sham Shui Po	×	✓	✓	✓
	Kwai Chung	×	✓	✓	✓
	Tsuen Wan	✓	✓	✓	✓
	Tseung Kwan O	✓	✓	✓	✓
	Yuen Long	✓	✓	✓	✓
	Tuen Mun	✓	✓	✓	✓
	Tung Chung	✓	✓	✓	✓
	Tai Po	✓	✓	✓	--
	Sha Tin	✓	✓	✓	--
	North	✓	✓	✓	--
	Tap Mun	✓	✓	✓	--
Roadside Station	Causeway Bay	×	✓	✓	--
	Central	×	✓	✓	--
	Mong Kok	×	✓	✓	✓

Notes: "✓" *Complied with the AQO* "×" *Violated the AQO* "--" *Not measured*

Appendix B

Air Quality Monitoring Operation

B.1 Network Operation

The Air Science and Modelling Group of the Environmental Protection Department operates the Air Quality Monitoring Network with 18 monitoring stations in 2022. Table B1 shows the station site information. The measurement of respirable suspended particulates (RSP), sulphur dioxide (SO_2), nitrogen dioxide (NO_2), ozone (O_3) and carbon monoxide (CO) concentrations have been accredited under the Hong Kong Laboratory Accreditation Scheme (HOKLAS) since August 1995. In addition, the measurement of fine suspended particulates (FSP) concentration has been accredited under HOKLAS since August 2016.

In order to provide good representation of the air quality in areas of high population density, the locations of the 18 monitoring stations were carefully chosen by referencing to the United States Environmental Protection Agency's (USEPA) guidelines with practical consideration of the unique congested high-rise development of Hong Kong.

The details of the parameters monitored at each monitoring station and a list of equipment employed for measuring the air pollutants are summarised in Tables B2 and B3 respectively. In general, the concentrations of gaseous pollutants, RSP and FSP are measured continuously by automatic analysers. Manually operated high volume samplers using gravimetric methods are also used regularly to measure RSP concentrations. The concentrations of lead are measured in the subsequent elemental analysis of the RSP samples by Government Laboratory using Inductively Coupled Plasma Optical Emission Spectroscopy. In addition, meteorological parameters, including temperature, solar radiation, wind speed and wind direction, are also recorded continuously at each station as appropriate.

Wet and dry deposition samples are collected at 3 stations, namely Central/Western, Kwun Tong and Yuen Long. The parameters measured for all wet and dry samples include conductivity, pH, Na^+, K^+, NH_4^+, NO_3^-, SO_4^{2-}, Cl^-, F^-, Ca^{2+}, Mg^{2+}, formate and acetate in the filtrate.

B.2 Data Processing and Dissemination

At each monitoring station, signals from the continuous analysers and the meteorological instruments are first stored in a data logger and then sent back to the Data Processing Unit of the Air Science and Modelling Group via dedicated broadband data lines for further processing. After careful checking and validation, the monitoring data are disseminated to the public in the following manner:

- Hourly Air Quality Health Index[6] (AQHI) reporting for individual station
- Monthly release of the AQHI summary for all monitoring stations

[6] *The Air Pollution Index (API) was replaced by the Air Quality Health Index (AQHI) on 30 December 2013.*

- Monthly updating of the data in the Environmental Protection Interactive Centre (EPIC) for the public to download air quality monitoring data (https://www.epd.gov.hk/epd/epic/english/epichome.html)
- Reporting of monitoring data in the annual reports "*Air Quality in Hong Kong"* and "*Environment Hong Kong"*
- Ad hoc provision of air quality data to the public, academics and environmental consultants upon request for the purposes of research and air quality assessment

The reporting and forecast of AQHI will help the public (particularly susceptible groups such as the elderly, children and people with heart or respiratory illness) to decide on taking precautionary measures when necessary. The monitoring results are also regularly used to assist the formulation of air quality management plans and the evaluation of the effectiveness of the current air pollution control programmes.

B.3 Quality Control and Assurance

The quality policy of the AQMSs network is to ensure that ambient air quality monitoring results from the monitoring stations attain a high degree of accuracy and precision. It is attained primarily by the carrying out of a set of quality control and quality assurance activities detailed in the QA/QC manuals prepared in accordance with the criteria of HOKLAS and ISO/IEC 17025. Accuracy is a measure of deviation from the true value. Precision is a measure of repeatability or how close repeated measurements are to each other.

The accuracy of the monitoring network is assessed by performance audits. Performance goal of ±15% and ±20% are adopted for suspended particulates (RSP and FSP) and gaseous pollutants respectively. In 2022, 417audit checks were carried out on the stations' analysers and samplers. Based on the 95% probability limits, the accuracy varied from -8.6% to 8.6% for gases, and from -7.7% to 8.0% for particulates. All parameters were well within the corresponding performance goal as shown in Figure B1.

The precision of the monitoring network is assessed from the results of precision checks. In 2022, 3387 precision checks were carried out on the analysers and samplers. As shown in Figure B2 and based on the 95% probability limits, the precision of the network varied between -5.1% and 4.3%, which was again within the performance goal of ±15% as shown in Figure B2.

In addition to the above operation, a system audit to review the quality management system and to identify areas of risks is carried out on an annual basis covering all operations at laboratories and AQMSs.

B.4 Toxic Air Pollutants Monitoring Operation

Additional monitoring facilities at Tsuen Wan and Central/Western stations have been installed in July 1997 to measure the levels of Toxic Air Pollutants (TAPs) in Hong Kong regularly. The TAPs being monitored can be broadly classified as volatile organic compounds (e.g. benzene, perchloroethylene and 1,3-butadiene), dioxins (polychlorinated dibenzo-*p*-dioxins (PCDDs) and polychlorinated dibenzofurans (PCDFs)), carbonyl compounds (e.g. formaldehyde), polycyclic aromatic hydrocarbons (e.g. benzo(a)pyrene), and hexavalent chromium. Five distinct methods were used to analyse

the collected samples for the target TAPs (please refer to Table B4 for details). All these methods have stringent QA/QC criteria to ensure data quality. Sampling media used include stainless steel canisters, Sep-Pak cartridges, polyurethane foams and bicarbonate impregnated filters, etc. TAP samples are analysed by the Government Laboratory.

Table B1: Fixed Network Monitoring Stations: Site Information

Monitoring Station	Address	Area Type	Sampling Height		Date Start Operation
			Above P.D.H.K.	Above Ground	
Central/Western (Sai Ying Pun Community Complex)	2 High Street, Sai Ying Pun	Urban: Mixed residential/ commercial	82m	16m (5 floors)	Nov 1983[1]
Southern (Aberdeen Tennis and Squash Centre)	1 Aberdeen Praya Road, Hong Kong	Urban: Mixed residential/ commercial/industrial	22m	18m (2 floors)	Jul 2020
Eastern (Sai Wan Ho Fire Station)	20 Wai Hang Street, Sai Wan Ho	Urban: Residential	28m	15m (4 floors)	Jan 1999
Kwun Tong (Kwun Tong Police Station)	9 Lei Yue Mun Road, Kwun Tong, Kowloon	Urban: Mixed residential/ commercial/industrial	23m	14.7m (2 floors)	Jul 1983[2]
Sham Shui Po (Sham Shui Po Police Station)	37A Yen Chow Street, Sham Shui Po	Urban: Mixed residential/ commercial	21m	17m (4 floors)	Jul 1984
Kwai Chung (Kwai Chung Police Station)	999 Kwai Chung Road, Kwai Chung	Urban: Mixed residential/ commercial/industrial	19m	13m (2 floors)	Jul 1988[3]
Tsuen Wan (Princess Alexandra Community Centre)	60 Tai Ho Road, Tsuen Wan	Urban: Mixed residential/ commercial/industrial	21m	17m (4 floors)	Aug 1988
Tseung Kwan O (Tseung Kwan O Sports Centre)	9 Wan Lung Road, Tseung Kwan O, Sai Kung	Urban: Residential	23m	16m (2 floors)	Mar 2016
Yuen Long (Yuen Long District Office Bldg.)	269 Castle Peak Road, Yuen Long	New Town: Residential	31m	25m (6 floors)	Jul 1995
Tuen Mun (Tuen Mun Public Library)	1 Tuen Hi Road, Tuen Mun	New Town: Residential	31m	27m (4 floors)	Dec 2013
Tung Chung (Tung Chung Health Centre)	6 Fu Tung Street, Tung Chung	New Town: Residential	34.5m	27.5m (4 floors)	Apr 1999
Tai Po (Tai Po Govt. Offices Bldg.)	1 Ting Kok Road, Tai Po	New Town: Residential	31m	28m (6 floors)	Feb 1990[4]
Sha Tin (Sha Tin Govt. Secondary School)	11-17 Man Lai Road, Tai Wai, Sha Tin	New Town: Residential	31m	25m (6 floors)	Jul 1991

Table B1 (Cont.): Fixed Network Monitoring Stations: Site Information

Monitoring Station	Address	Area Type	Sampling Height		Date Start Operation
			Above P.D.H.K.	Above Ground	
Tap Mun	Tap Mun Police Post	Background: Rural	26m	11m (3 floors)	Apr 1998
North (Po Wing Road Sports Centre)	Po Wing Road Sports Centre, 19 Pak Wo Road, Sheung Shui	New Town: Residential	33m	22m (3 floors)	Jul 2020
Causeway Bay	1 Yee Woo Street, Causeway Bay	Urban Roadside: Mixed commercial/ residential area surrounded by tall buildings	6.5m[5] / 7m[6]	3m[5] / 3.5m[6]	Jan 1998
Central	Junction of Des Voeux Road Central and Chater Road, Central	Urban Roadside: Busy commercial/ financial area surrounded by tall buildings	8.5m	4.5m	Oct 1998
Mong Kok	Junction of Nathan Road and Lai Chi Kok Road, Mong Kok	Urban Roadside: Mixed commercial/ residential area surrounded by tall buildings	8.5m[5] / 10.9m[6]	3m[5] / 5.4m[6]	Apr 1991[7]

Notes: P.D. = Principal Datum

[1] Central/Western station was relocated to the current address in October 2009.

[2] Kwun Tong station was relocated to the current address in March 2020.

[3] Kwai Chung station was relocated to the current address in January 1999.

[4] Tai Po station was relocated to the current address in February 2006.

[5] Sampling height for gaseous pollutants.

[6] Sampling height for suspended particulates.

[7] Mong Kok station was relocated to the current address in January 2001.

Table B2: Summary of the Parameters Monitored in the Network (2022)

Monitoring Station	SO_2	NO_x	NO	NO_2	CO	O_3	FSP	RSP		MET [3]
								Cont [1]	Hi-Vol [2]	
Central/ Western	✓	✓	✓	✓		✓	✓	✓	✓	✓
Southern	✓	✓	✓	✓	✓	✓	✓	✓	✓[4]	✓
Eastern	✓			✓		✓	✓	✓		✓
Kwun Tong	✓	✓	✓	✓		✓	✓	✓	✓	✓
Sham Shui Po	✓	✓	✓	✓		✓	✓	✓	✓	✓
Kwai Chung	✓	✓	✓	✓		✓	✓	✓	✓	✓
Tsuen Wan	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Tseung Kwan O	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Yuen Long	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Tuen Mun	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Tung Chung	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Tai Po	✓	✓	✓	✓		✓	✓	✓		✓
Sha Tin	✓	✓	✓	✓		✓	✓	✓		✓
North	✓	✓	✓	✓	✓	✓	✓	✓		✓
Tap Mun	✓	✓	✓	✓	✓	✓	✓	✓		✓
Causeway Bay	✓	✓	✓	✓	✓	✓	✓	✓		
Central	✓	✓	✓	✓	✓	✓	✓	✓		✓
Mong Kok	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Notes:
[1] "Cont" denotes continuous monitoring.
[2] "Hi-Vol" denotes high-volume sampling.
[3] "MET" denotes meteorological parameters such as temperature, wind speed, wind direction, etc.
[4] Weighing only, no chemical analysis.

Table B3: List of Equipment Used in Measuring Air Pollutant Concentration

Pollutants	**Measurement Principle**	**Commercial Instrument**
SO_2	UV fluorescence	API T100, API T100U, TECO 43i
NO, NO_2, NO_x	Chemiluminescence	API 200A, API T200
O_3	UV absorption	API 400A, API T400
SO_2, NO_2, O_3	Differential Optical Absorption Spectroscopy	Opsis AR 500 System
CO	Non-dispersive infra-red absorption with gas filter correlation	API T300, API T300U
RSP (PM_{10})	a) Gravimetric b) Oscillating microbalance c) Beta Attenuation	Tisch PM10+, Thermo Scientific TEOM 1405-DF, Met One BAM 1020, T-API 602 Beta Plus
FSP ($PM_{2.5}$)	a) Oscillating microbalance b) Beta Attenuation	Thermo Scientific TEOM 1405-DF, Met One BAM1020, T-API 602 Beta Plus

Table B4: Sampling and Analysis Methods Used in Measuring Toxic Air Pollutants

Toxic Air Pollutants	Sampling and Analysis method	Sampling Instrument	Sampling Media	Sampling Schedule	Sampling Period
Benzene	USEPA Method TO-14A	Xontech 910A / RM 910A / ATEC 2200	Canister	Twice per month	24 hours
Perchloro-ethylene	USEPA Method TO-14A	Xontech 910A / RM 910A / ATEC 2200	Canister	Twice per month	24 hours
1,3-Butadiene	USEPA Method TO-14A	Xontech 910A / RM 910A / ATEC 2200	Canister	Twice per month	24 hours
Formaldehyde	USEPA Method TO-11A	Xontech 925/ RM 925 / ATEC 2200	DNPH coated Sep-Pak cartridge	Once per month	24 hours
Benzo(a)pyrene	USEPA Method TO-13	Tisch TE-1000	Quartz fibre filter and polyurethane foam with XAD-2 resin	Once per month	24 hours
Dioxin	USEPA Method TO-9A	Tisch TE-1000	Quartz fibre filter and polyurethane foam	Once per month	24 hours
Hexavalent chromium	CARB SOP MLD 039	Xontech 924	Bicarbonate impregnated filter	Once per month	24 hours

Figure B1: Accuracy of Air Quality Monitoring Network, 2022

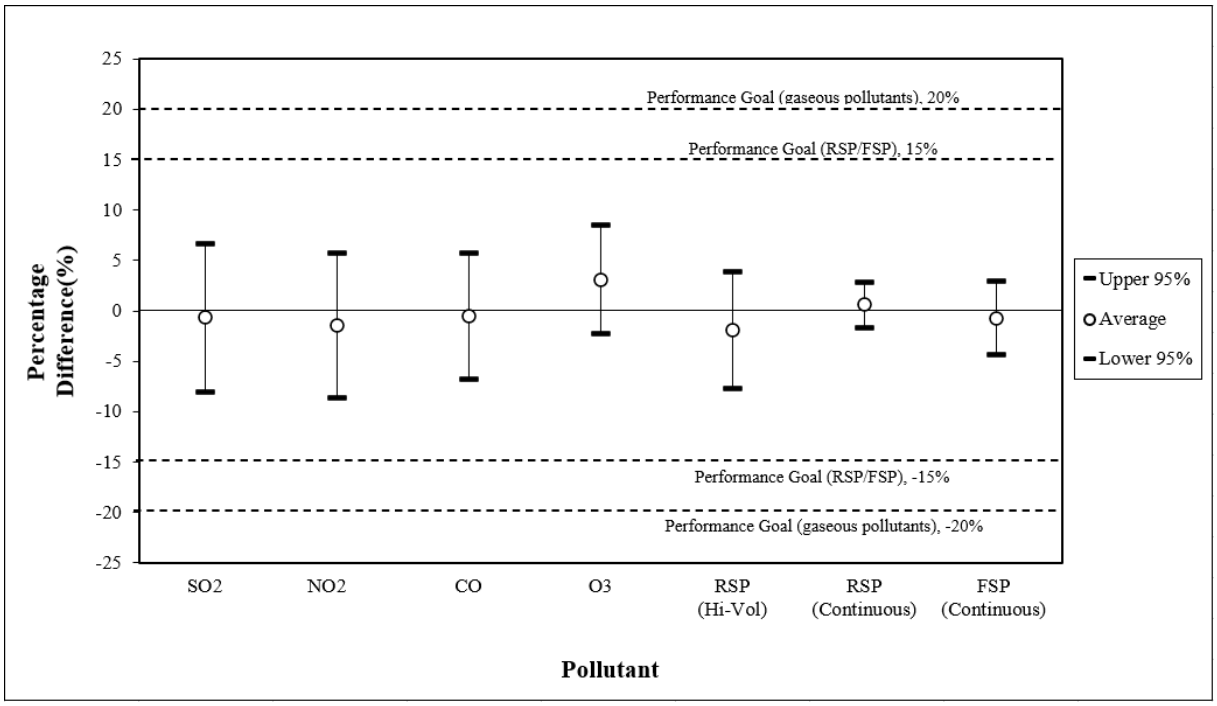
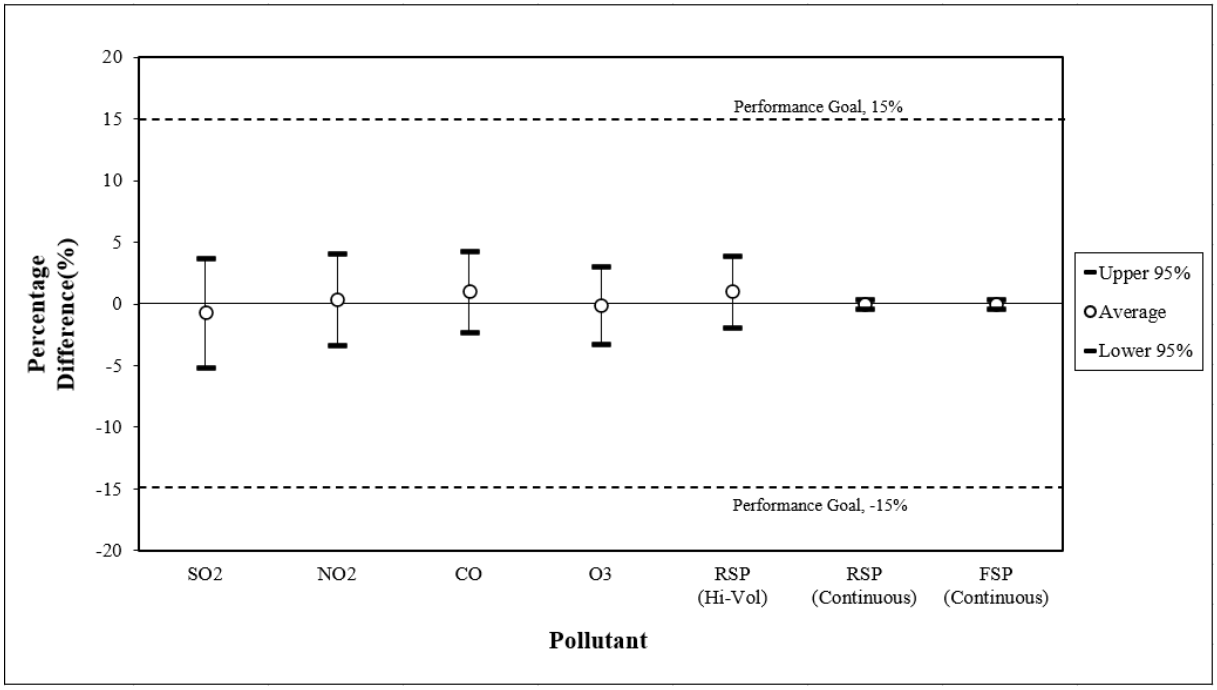


Figure B2: Precision of Air Quality Monitoring Network, 2022



Appendix C

Tables of Air Quality Data

Table C1: 2022 Exceedance of Short-Term Limits of Air Quality Objectives

Pollutant: Sulphur Dioxide

(10-minute limit value = 500 μg/m^3 ; allowable no. of exceedance of limit value = 3)

Station	No. of exceedance of limit vaue	1st High	2nd High	3rd High	4th High
Central/Western	0	73	70	62	62
Southern	0	71	55	41	40
Eastern	0	58	56	45	35
Kwun Tong	0	27	27	22	19
Sham Shui Po	0	53	50	48	48
Kwai Chung	0	95	66	64	59
Tsuen Wan	0	36	36	33	32
Tseung Kwan O	0	12	12	12	12
Yuen Long	0	36	30	24	21
Tuen Mun	0	39	34	32	29
Tung Chung	0	29	29	29	26
Tai Po	0	13	13	13	12
Sha Tin	0	28	27	25	23
North	0	28	28	27	27
Tap Mun	0	24	20	19	19
Causeway Bay	0	73	61	51	43
Central	0	36	31	27	26
Mong Kok	0	32	31	28	28

Pollutant: Carbon Monoxide

(1-hour limit value = 30,000 μg/m^3 ; allowable no. of exceedance of limit value = 0)

Station	No. of exceedance of limit vaue	1st High
Southern	0	1140
Tsuen Wan	0	1430
Tseung Kwan O	0	1210
Yuen Long	0	1700
Tuen Mun	0	1480
Tung Chung	0	1170
North	0	1710
Tap Mun	0	1280
Causeway Bay	0	2020
Central	0	2390
Mong Kok	0	1670

Pollutant: Sulphur Dioxide

(24-hour limit value = 50 μg/m^3 ; allowable no. of exceedance of limit value = 3)

Station	No. of exceedance of limit vaue	1st High	2nd High	3rd High	4th High
Central/Western	0	10	8	8	7
Southern*	0	8	7	7	6
Eastern	0	6	6	6	5
Kwun Tong	0	12	12	11	11
Sham Shui Po	0	14	14	14	13
Kwai Chung	0	20	18	17	17
Tsuen Wan	0	13	13	12	12
Tseung Kwan O	0	8	8	8	7
Yuen Long	0	7	7	7	7
Tuen Mun	0	12	12	11	11
Tung Chung	0	13	11	11	11
Tai Po	0	6	5	5	5
Sha Tin	0	12	12	11	11
North*	0	7	7	7	7
Tap Mun	0	12	12	12	12
Causeway Bay	0	10	10	10	10
Central	0	10	9	9	9
Mong Kok	0	8	7	7	7

Pollutant: Carbon Monoxide

(8-hour limit value = 10,000 μg/m^3 ; allowable no. of exceedance of limit value = 0)

Station	No. of exceedance of limit vaue	1st High
Southern	0	1073
Tsuen Wan	0	1390
Tseung Kwan O	0	1105
Yuen Long	0	1519
Tuen Mun	0	1345
Tung Chung	0	1151
North	0	1304
Tap Mun	0	1073
Causeway Bay	0	1509
Central	0	1839
Mong Kok	0	1493

Pollutant: Nitrogen Dioxide (1-hour limit value = 200 μg/m^3 ; allowable no. of exceedance of limit value = 18)

Station	No. of exceedance of limit vaue	1st High	2nd High	3rd High	4th High	5th High	6th High	7th High	8th High	9th High	10th High	11th High	12th High	13th High	14th High	15th High	16th High	17th High	18th High	19th High
Central/Western	0	189	185	169	165	162	162	156	156	155	155	153	152	151	149	148	147	145	143	142
Southern	0	134	125	122	119	116	114	114	112	112	110	108	108	108	107	106	106	106	105	105
Eastern	0	143	126	125	124	118	117	115	114	113	111	111	109	105	103	103	102	101	100	99
Kwun Tong	2	213	204	181	180	175	173	172	171	170	162	157	156	156	150	148	147	147	146	145
Sham Shui Po	4	216	209	207	206	195	192	191	185	184	182	179	175	170	169	165	163	160	160	158
Kwai Chung	5	240	237	221	218	209	197	189	187	187	186	182	181	180	178	177	171	169	168	168
Tsuen Wan	1	201	195	173	165	157	154	154	153	152	152	152	149	149	148	143	143	141	140	140
Tseung Kwan O	0	190	167	155	150	146	144	142	135	130	121	117	116	115	114	114	114	113	111	110
Yuen Long	0	149	147	137	136	136	135	135	133	130	129	128	127	127	126	124	123	122	122	122
Tuen Mun	0	162	161	158	155	152	149	146	143	142	142	140	138	137	137	134	133	131	131	128
Tung Chung	0	121	120	119	116	114	113	113	113	109	106	105	102	100	98	95	95	95	95	94
Tai Po	0	117	116	113	112	111	106	105	105	103	101	100	98	98	98	98	97	95	93	93
Sha Tin	0	158	145	142	137	131	129	128	127	127	126	124	122	121	120	115	114	114	113	112
North	0	144	134	134	129	128	123	123	121	119	119	119	118	117	117	117	117	117	116	115
Tap Mun	0	64	58	56	51	47	44	44	44	43	42	41	41	41	41	41	40	39	39	39
Causeway Bay	56	285	283	282	282	276	275	271	262	262	262	261	260	260	260	260	260	254	251	249
Central	42	290	285	281	273	265	264	260	249	247	245	245	244	242	240	239	239	235	232	224
Mong Kok	46	289	289	266	264	261	255	240	240	239	238	235	234	234	233	232	231	226	225	224

Table C1 (Cont.): 2022 Exceedance of Short-Term Limits of Air Quality Objectives

Pollutant: Ozone (Daily maximum 8-hour limit value = 160 μg/m^3 ; allowable no. of exceedance of limit value = 9)

Station	No. of exceedance of limit value	1st High	2nd High	3rd High	4th High	5th High	6th High	7th High	8th High	9th High	10th High
Central/Western	21	319	295	269	264	263	262	243	242	199	197
Southern	14	283	278	244	236	226	195	178	177	177	174
Eastern	15	260	239	228	220	218	213	209	199	187	185
Kwun Tong	6	222	202	181	175	163	162	153	149	148	148
Sham Shui Po	10	253	237	235	221	219	186	179	176	166	162
Kwai Chung	5	225	199	195	194	169	160	147	145	140	139
Tsuen Wan	7	258	240	231	225	208	170	167	158	156	152
Tseung Kwan O	12	254	225	216	208	198	188	186	181	170	167
Yuen Long	22	309	255	246	230	225	212	206	203	195	194
Tuen Mun	23	299	257	247	239	238	237	233	201	199	195
Tung Chung	17	282	243	238	228	214	212	194	177	176	171
Tai Po	24	257	238	235	213	212	209	195	195	193	188
Sha Tin	23	244	241	241	240	218	209	192	184	183	177
North	26	269	258	230	224	220	213	210	201	198	197
Tap Mun	32	280	231	228	218	217	212	206	205	203	198
Causeway Bay	0	113	108	107	107	106	104	103	103	102	100
Central	0	148	132	126	125	125	125	125	122	116	115
Mong Kok	0	127	113	109	108	105	105	104	103	102	101

Pollutant: Respirable Suspended Particulates (PM_{10}) (24-hour limit value = 100 μg/m^3 ; allowable no. of exceedance of limit value = 9)

Station	No. of exceedance of limit value	1st High	2nd High	3rd High	4th High	5th High	6th High	7th High	8th High	9th High	10th High
Central/Western	0	67	65	64	61	60	58	57	57	56	52
Southern	0	63	62	62	61	56	53	50	50	49	48
Eastern	0	65	65	64	56	53	53	51	51	50	49
Kwun Tong	0	65	62	55	52	52	52	51	50	50	49
Sham Shui Po	0	64	63	59	58	57	56	53	53	50	49
Kwai Chung	0	68	66	64	63	57	55	54	53	53	53
Tsuen Wan	0	69	68	64	63	60	55	55	55	53	52
Tseung Kwan O	0	62	55	55	55	53	52	50	47	47	46
Yuen Long	0	81	80	76	70	70	61	61	57	57	56
Tuen Mun	0	90	87	80	78	75	68	67	66	66	65
Tung Chung	0	76	70	68	68	66	58	58	57	57	57
Tai Po	0	77	62	58	57	57	53	49	48	48	48
Sha Tin	0	70	61	60	58	53	52	49	48	47	46
North	0	73	60	59	58	54	53	53	52	51	50
Tap Mun	0	72	60	58	50	49	47	47	46	46	45
Causeway Bay	0	84	76	76	75	74	74	70	70	68	66
Central	0	74	67	64	64	62	61	60	60	59	56
Mong Kok	0	72	70	68	66	64	63	63	61	58	56

Pollutant: Fine Suspended Particulates ($PM_{2.5}$) (24-hour limit value = 50 μg/m^3 ; allowable no. of exceedance of limit value = 35)

Station	No. of exceedance of limit value	1st High	2nd High	3rd High	4th High	5th High	6th High	7th High	8th High	9th High	10th High
Central/Western	1	54	47	46	46	43	42	41	41	41	40
Southern	0	43	43	42	37	36	35	33	32	30	30
Eastern	0	49	41	40	38	38	38	36	34	33	32
Kwun Tong	0	49	41	38	37	37	36	36	36	36	35
Sham Shui Po	0	41	40	38	35	35	34	33	32	31	30
Kwai Chung	1	53	49	47	47	45	43	40	40	39	38
Tsuen Wan	2	54	54	50	47	42	42	40	40	39	37
Tseung Kwan O	0	46	43	42	41	40	36	35	35	34	33
Yuen Long	5	64	59	58	56	51	43	42	42	41	41
Tuen Mun	4	63	61	52	52	49	45	45	43	43	43
Tung Chung	2	64	53	50	49	49	46	44	44	44	43
Tai Po	1	60	46	45	42	40	39	39	37	36	35
Sha Tin	1	52	46	42	40	40	39	35	35	34	34
North	1	52	42	40	39	37	36	36	35	35	35
Tap Mun	1	57	41	40	38	38	37	35	34	34	34
Causeway Bay	5	61	56	54	53	52	49	47	47	46	46
Central	1	55	50	48	47	45	45	43	43	43	42
Mong Kok	1	55	48	48	47	45	45	44	44	42	41

Notes:

1. All concentration units are in microgram per cubic metre (μg/m^3).
2. Shaded no. of exceedance of limit value respresents exceedance of the respective air quality objective.
3. Shaded concentration is higher than the limit value of the respective air quality objective.

Table C2: 2022 Monthly and Annual Averages of Air Pollutants Concentrations

Pollutant: Sulphur Dioxide

Station	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Central/Western	3	2	3	3	4	4	4	4	4	3	5	3	4
Southern	2	1	3	3	4	2	3	3	4	4	4	5	3
Eastern	1	1	1	1	1	1	2	1	3	2	1	2	1
Kwun Tong	6	6	8	9	7	5	8	5	5	5	5	7	6
Sham Shui Po	4	4	6	6	5	6	7	8	3	3	3	4	5
Kwai Chung	6	6	9	8	7	13	13	11	4	3	2	3	7
Tsuen Wan	5	5	7	7	7	9	9	9	10	10	9	9	8
Tseung Kwan O	4	3	5	3	2	3	3	2	3	3	2	3	3
Yuen Long	4	4	4	5	3	3	4	4	4	4	4	5	4
Tuen Mun	3	2	3	3	2	4	4	6	7	5	4	3	4
Tung Chung	6	8	9	5	2	3	4	5	6	6	6	8	6
Tai Po	4	3	3	3	2	2	4	1	2	2	2	3	3
Sha Tin	5	5	6	7	7	8	9	9	6	6	6	7	7
North	4	2	4	4	4	5	6	5	2	3	2	3	4
Tap Mun	8	7	7	7	7	7	8	9	10	10	7	6	8
Causeway Bay	5	5	5	4	4	5	4	5	6	4	3	6	5
Central	4	4	5	2	2	2	5	6	5	4	3	5	4
Mong Kok	4	3	3	3	3	5	3	4	3	5	1	3	3

Pollutant: Nitrogen Oxides

Station	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Central/Western	49	48	54	37	29	26	24	35	35	30	37	51	38
Southern	41	40	41	31	28	33	28	32	31	24	28	50	34
Kwun Tong	68	69	76	64	68	78	69	73	71	53	50	77	68
Sham Shui Po	76	58	74	59	56	53	52	70	61	51	62	61	61
Kwai Chung	72	64	86	74	72	109	85	80	69	52	55	68	74
Tsuen Wan	66	53	69	61	55	65	53	53	46	42	48	58	56
Tseung Kwan O	27	19	32	25	23	37	32	37	37	22	23	33	29
Yuen Long	74	50	55	50	47	44	44	45	41	42	59	78	52
Tuen Mun	80	53	68	49	46	41	38	43	43	43	59	66	53
Tung Chung	52	40	39	32	26	19	20	28	30	28	34	54	34
Tai Po	46	31	34	32	33	34	33	36	35	31	34	50	36
Sha Tin	42	31	37	31	29	35	31	36	33	25	32	48	34
North	57	37	38	36	38	35	34	41	46	37	42	64	42
Tap Mun	14	11	14	12	10	10	12	12	13	12	14	19	13
Causeway Bay	174	177	158	142	144	180	175	204	214	163	150	252	178
Central	140	139	133	112	114	125	123	149	144	118	110	182	132
Mong Kok	128	106	119	114	137	166	157	166	161	95	108	116	131

Pollutant: Nitrogen Dioxide (Annual limit value = 40 μg/m^3)

Station	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Central/Western	40	36	37	29	24	19	18	26	32	26	30	40	30
Southern	32	28	29	24	22	24	21	21	27	20	22	36	25
Eastern	41	36	39	31	30	22	22	29	34	29	33	38	32
Kwun Tong	50	43	48	45	44	40	42	43	59	42	37	48	45
Sham Shui Po	56	40	48	43	41	32	34	42	52	40	44	45	43
Kwai Chung	48	39	47	44	43	49	48	41	55	39	35	42	44
Tsuen Wan	49	37	44	42	39	39	34	34	39	34	36	43	39
Tseung Kwan O	22	15	21	19	16	22	21	22	31	18	18	26	21
Yuen Long	52	36	39	38	35	27	29	25	33	33	42	57	37
Tuen Mun	56	38	48	39	35	28	28	29	37	36	42	47	39
Tung Chung	39	28	27	26	20	12	14	17	25	24	25	37	25
Tai Po	33	22	24	23	24	23	24	25	31	27	26	37	27
Sha Tin	32	24	28	25	22	23	24	25	29	22	24	37	26
North	42	28	29	28	28	22	23	27	37	31	31	42	31
Tap Mun	11	7	9	7	5	4	6	6	8	7	8	13	8
Causeway Bay	71	61	62	59	58	47	52	59	99	72	56	79	65
Central	69	59	63	56	55	44	48	57	91	68	56	74	62
Mong Kok	70	56	64	62	61	49	55	61	98	62	62	62	64

Pollutant: Carbon Monoxide

Station	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Southern	663	511	563	546	594	341	192	147	367	298	429	630	440
Tsuen Wan	902	652	686	531	487	553	545	524	726	500	595	651	613
Tseung Kwan O	603	562	551	238	299	373	460	471	591	295	280	355	422
Yuen Long	899	898	863	499	657	547	573	642	774	656	626	590	684
Tuen Mun	805	551	558	566	653	405	398	389	615	539	695	767	579
Tung Chung	663	616	596	489	285	196	250	420	588	460	349	382	440
North	742	518	486	535	575	377	335	380	491	464	332	530	481
Tap Mun	624	444	480	530	588	260	578	516	784	379	405	548	514
Causeway Bay	912	888	845	794	729	478	592	547	606	452	466	705	667
Central	1008	1024	1143	941	953	932	1011	1103	1131	929	1030	814	1002
Mong Kok	866	769	688	604	659	671	786	1029	924	669	514	553	726

Table C2 (Cont.): 2022 Monthly and Annual Averages of Air Pollutants Concentrations

Pollutant: Ozone

Station	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Central/Western	70	55	73	75	74	40	57	53	130	94	63	55	70
Southern	72	56	69	73	68	29	43	43	110	92	68	54	65
Eastern	68	56	71	76	72	42	55	54	119	96	71	60	70
Kwun Tong	56	43	57	57	52	19	30	29	87	73	52	39	50
Sham Shui Po	51	46	55	60	56	27	38	33	101	81	52	48	54
Kwai Chung	50	40	51	54	53	11	24	28	83	71	47	42	46
Tsuen Wan	42	40	49	48	50	17	32	29	99	74	45	38	47
Tseung Kwan O	78	65	78	78	76	32	45	42	104	88	70	58	68
Yuen Long	40	39	49	57	54	27	39	36	106	86	46	40	52
Tuen Mun	37	36	43	54	52	24	36	40	111	85	45	40	50
Tung Chung	40	37	50	58	55	34	42	38	98	77	49	32	51
Tai Po	62	55	77	77	70	32	48	44	105	85	60	42	63
Sha Tin	63	53	66	69	68	29	43	40	107	90	61	45	61
North	54	49	67	69	64	31	49	41	99	83	54	40	59
Tap Mun	82	68	81	83	83	42	55	57	121	101	71	63	76
Causeway Bay	33	28	37	38	36	14	24	21	49	45	37	22	32
Central	40	31	44	48	45	16	23	19	59	52	40	23	37
Mong Kok	30	30	38	40	23	9	14	18	53	67	42	40	34

Pollutant: Respirable Suspended Particulates (PM_{10}) (Annual limit value = 50 $\mu g/m^3$)

Station	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Central/Western	35	19	27	25	16	10	13	13	36	28	20	25	22
Southern	32	18	24	25	18	16	17	17	38	34	22	32	24
Eastern	35	21	28	27	19	13	16	14	33	27	20	27	23
Kwun Tong	34	20	29	28	20	16	18	15	34	29	20	28	24
Sham Shui Po	34	21	29	28	19	14	17	16	36	30	22	28	25
Kwai Chung	34	19	26	25	18	15	16	14	36	28	19	29	23
Tsuen Wan	31	20	23	23	18	15	15	14	35	28	19	28	22
Tseung Kwan O	28	15	24	24	17	13	16	15	36	30	20	27	22
Yuen Long	40	22	25	27	17	11	17	14	37	31	22	35	25
Tuen Mun	45	27	34	35	23	18	22	17	48	41	28	47	32
Tung Chung	39	21	23	24	15	9	14	13	36	31	19	31	23
Tai Po	32	17	22	22	15	10	14	14	33	28	19	30	21
Sha Tin	31	17	23	23	17	12	14	13	34	26	17	27	21
North	32	18	22	22	17	11	16	14	36	32	21	34	23
Tap Mun	30	15	21	20	14	9	12	13	32	29	18	27	20
Causeway Bay	46	28	38	35	27	22	26	27	49	40	31	41	34
Central	40	23	31	29	20	13	18	18	39	31	24	33	27
Mong Kok	39	20	30	28	20	14	17	17	39	31	24	31	26

Pollutant: Fine Suspended Particulates ($PM_{2.5}$) (Annual limit value = 25 $\mu g/m^3$)

Station	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Central/Western	25	13	18	15	10	6	8	8	23	15	13	17	14
Southern	19	10	13	13	9	6	8	7	21	13	11	16	12
Eastern	22	12	16	14	10	5	8	7	21	14	13	17	13
Kwun Tong	23	12	18	16	12	9	10	8	20	13	12	17	14
Sham Shui Po	21	12	15	13	9	6	9	8	18	12	10	16	12
Kwai Chung	25	14	18	15	11	8	10	9	24	15	13	19	15
Tsuen Wan	22	14	14	10	12	8	7	9	25	17	15	20	14
Tseung Kwan O	19	10	15	14	9	6	9	8	23	17	14	18	13
Yuen Long	28	16	17	16	12	6	9	9	24	15	15	23	16
Tuen Mun	30	19	20	18	13	8	11	9	27	19	15	25	18
Tung Chung	30	15	15	14	10	5	9	9	23	15	12	19	14
Tai Po	23	13	15	14	10	6	10	8	22	15	13	20	14
Sha Tin	22	12	15	14	10	6	9	7	22	14	10	17	13
North	21	12	14	10	9	6	9	7	22	17	15	21	14
Tap Mun	20	10	13	12	7	4	7	6	20	14	11	17	12
Causeway Bay	30	18	24	19	16	13	15	16	31	22	20	25	21
Central	27	15	20	18	13	9	12	12	26	18	16	21	18
Mong Kok	26	13	20	17	13	8	10	10	25	18	17	20	16

Notes:

1. All concentration units are in microgram per cubic metre ($\mu g/m^3$).
2. Shaded annual average represents exceedance of the respective air quality objective.

Table C3: 2022 Hourly Statistics of Air Pollutants Concentrations

Pollutant: Sulphur Dioxide

Station	No. of hourly data	Data capture rate (%)	<----------Percentiles----------> 10	25	50	75	90	95	97.5	99	99.8	Arithmetic mean	Highest 1-hour
Central/Western	8507	97.1	1	2	3	4	6	7	9	11	18	4	59
Southern	8643	98.7	1	2	3	4	5	6	8	10	16	3	29
Eastern	8625	98.5	0	1	1	2	3	4	5	7	9	1	40
Kwun Tong	8498	97.0	4	5	6	8	9	10	11	11	13	6	19
Sham Shui Po	8461	96.6	2	3	5	6	8	10	13	17	24	5	43
Kwai Chung	8491	96.9	2	3	6	10	15	17	19	22	30	7	49
Tsuen Wan	8441	96.4	5	6	8	9	11	12	13	15	19	8	30
Tseung Kwan O	8587	98.0	1	2	3	4	5	6	7	8	9	3	11
Yuen Long	8419	96.1	3	3	3	5	6	6	7	8	10	4	22
Tuen Mun	8563	97.8	1	2	4	5	7	9	10	12	15	4	28
Tung Chung	8468	96.7	2	4	5	7	9	10	11	13	16	6	20
Tai Po	8434	96.3	1	1	2	4	4	5	5	6	7	3	11
Sha Tin	8417	96.1	4	5	7	8	10	10	12	13	16	7	22
North	8710	99.4	1	2	4	5	6	6	7	8	11	4	17
Tap Mun	8444	96.4	6	7	7	9	10	11	12	13	14	8	16
Causeway Bay	8501	97.0	2	3	4	6	8	9	10	12	16	5	38
Central	8523	97.3	2	2	4	5	7	8	10	12	16	4	24
Mong Kok	8384	95.7	1	2	3	4	6	7	8	9	13	3	25

Pollutant: Nitrogen Oxides

Station	No. of hourly data	Data capture rate (%)	<----------Percentiles----------> 10	25	50	75	90	95	97.5	99	99.8	Arithmetic mean	Highest 1-hour
Central/Western	8512	97.2	11	17	30	47	71	93	120	184	282	38	392
Southern	8646	98.7	12	18	27	40	63	85	106	130	186	34	471
Kwun Tong	8451	96.5	23	37	59	88	120	148	181	219	302	68	444
Sham Shui Po	8444	96.4	21	33	55	78	103	126	157	212	323	61	431
Kwai Chung	8446	96.4	19	34	62	99	144	174	204	256	342	74	533
Tsuen Wan	8465	96.6	19	34	49	69	96	121	146	187	248	56	372
Tseung Kwan O	8576	97.9	10	14	20	33	60	84	106	136	184	29	256
Yuen Long	8419	96.1	20	31	46	66	91	113	138	175	224	52	333
Tuen Mun	8376	95.6	17	28	45	69	97	122	146	175	250	53	405
Tung Chung	8444	96.4	9	15	26	46	69	84	100	121	155	34	225
Tai Po	8420	96.1	14	21	31	45	63	78	93	119	158	36	234
Sha Tin	8411	96.0	11	16	26	43	68	88	108	137	183	34	263
North	8649	98.7	14	21	33	52	78	105	134	167	229	42	428
Tap Mun	8414	96.1	7	9	11	15	20	24	28	34	54	13	86
Causeway Bay	8476	96.8	49	88	154	243	343	405	455	509	590	178	839
Central	8466	96.6	39	67	113	178	252	299	349	422	549	132	933
Mong Kok	8421	96.1	39	71	124	177	230	263	289	332	401	131	661

Pollutant: Nitrogen Dioxide (1-hour limit value = 200 μg/m^3; allowable no. of exceedance of limit value = 18
Annual limit value = 40 μg/m^3)

Station	No. of hourly data	Data capture rate (%)	<----------Percentiles----------> 10	25	50	75	90	95	97.5	99	99.8	Arithmetic mean	Highest 1-hour	No. of exceedance of limit value
Central/Western	8512	97.2	9	15	26	39	54	66	81	104	143	30	189	0
Southern	8646	98.7	10	15	22	31	45	56	67	83	105	25	134	0
Eastern	8624	98.4	14	19	29	42	54	61	69	79	100	32	143	0
Kwun Tong	8451	96.5	20	29	42	57	72	84	100	121	146	45	213	2
Sham Shui Po	8444	96.4	18	26	39	54	71	86	101	124	160	43	216	4
Kwai Chung	8446	96.4	14	25	40	56	76	98	116	138	168	44	240	5
Tsuen Wan	8465	96.6	15	26	36	48	65	78	94	109	140	39	201	1
Tseung Kwan O	8576	97.9	7	10	16	25	42	57	72	89	111	21	190	0
Yuen Long	8419	96.1	16	23	34	48	64	77	89	103	122	37	149	0
Tuen Mun	8376	95.6	15	23	34	50	69	83	95	110	131	39	162	0
Tung Chung	8444	96.4	7	11	20	34	48	56	65	77	95	25	121	0
Tai Po	8420	96.1	11	16	24	34	46	55	65	76	93	27	117	0
Sha Tin	8411	96.0	9	13	22	34	50	63	76	94	113	26	158	0
North	8649	98.7	12	18	27	39	53	64	78	92	116	31	144	0
Tap Mun	8414	96.1	2	4	6	10	14	17	21	25	39	8	64	0
Causeway Bay	8476	96.8	28	41	59	81	106	127	150	179	251	65	285	56
Central	8466	96.6	25	39	56	78	105	125	146	176	232	62	290	42
Mong Kok	8421	96.1	27	41	59	80	105	122	141	178	225	64	289	46

Pollutant: Carbon Monoxide (1-hour limit value = 30,000 μg/m^3 ; allowable no. of exceedance of limit value = 0)

Station	No. of hourly data	Data capture rate (%)	<----------Percentiles----------> 10	25	50	75	90	95	97.5	99	99.8	Arithmetic mean	Highest 1-hour	No. of exceedance of limit value
Southern	8688	99.2	150	280	450	590	700	780	830	900	1026	440	1140	0
Tsuen Wan	8469	96.7	340	460	600	750	900	980	1040	1140	1250	613	1430	0
Tseung Kwan O	8583	98.0	220	310	410	540	640	710	790	890	1068	422	1210	0
Yuen Long	8457	96.5	450	550	670	810	940	1030	1090	1170	1350	684	1700	0
Tuen Mun	8651	98.8	370	440	570	690	820	890	950	1050	1197	579	1480	0
Tung Chung	8454	96.5	180	280	420	580	710	770	830	940	1050	440	1170	0
North	8701	99.3	250	350	460	580	740	850	940	1060	1280	481	1710	0
Tap Mun	8402	95.9	280	400	500	640	750	800	880	1000	1070	514	1280	0
Causeway Bay	8501	97.0	340	470	650	830	1020	1140	1240	1380	1570	667	2020	0
Central	8513	97.2	770	880	990	1120	1250	1350	1430	1570	1850	1002	2390	0
Mong Kok	8437	96.3	480	580	690	830	1030	1150	1240	1346	1480	726	1670	0

Table C3 (Cont.): 2022 Hourly Statistics of Air Pollutants Concentrations

Pollutant: Ozone

Station	No. of hourly data	Data capture rate (%)	<----------Percentiles---------->									Arithmetic mean	Highest 1-hour
			10	25	50	75	90	95	97.5	99	99.8		
Central/Western	8677	99.1	24	41	60	96	120	140	160	204	302	70	342
Southern	8660	98.9	19	33	58	93	115	130	145	173	250	65	350
Eastern	8624	98.4	30	41	63	95	115	131	146	175	235	70	320
Kwun Tong	8433	96.3	10	20	41	75	98	112	126	145	196	50	277
Sham Shui Po	8411	96.0	15	26	46	77	101	117	135	166	236	54	325
Kwai Chung	8400	95.9	5	16	39	72	95	108	121	138	203	46	277
Tsuen Wan	8474	96.7	9	18	39	69	93	109	128	158	243	47	299
Tseung Kwan O	8618	98.4	21	36	60	96	122	137	151	170	230	68	313
Yuen Long	8413	96.0	9	20	41	74	105	130	160	193	269	52	363
Tuen Mun	8535	97.4	9	19	39	70	103	127	158	204	274	50	357
Tung Chung	8443	96.4	9	22	41	71	102	123	148	188	264	51	331
Tai Po	8576	97.9	15	30	53	93	120	139	159	188	240	63	300
Sha Tin	8388	95.8	10	27	51	92	119	137	156	183	247	61	284
North	8702	99.3	9	24	49	87	115	136	164	200	254	59	357
Tap Mun	8452	96.5	29	44	66	102	132	150	168	195	234	76	314
Causeway Bay	8666	98.9	7	13	24	47	68	80	89	103	125	32	200
Central	8662	98.9	6	12	27	57	81	93	105	120	140	37	217
Mong Kok	8430	96.2	6	12	28	51	72	84	95	106	123	34	145

Pollutant: Respirable Suspended Particulates (PM_{10}) (Annual limit value = 50 µg/m3)

Station	No. of hourly data	Data capture rate (%)	<----------Percentiles---------->									Arithmetic mean	Highest 1-hour
			10	25	50	75	90	95	97.5	99	99.8		
Central/Western	8637	98.6	6	10	19	30	42	50	58	70	87	22	115
Southern	8462	96.6	9	14	22	32	43	50	57	64	82	24	94
Eastern	8323	95.0	8	13	21	31	41	48	55	65	77	23	93
Kwun Tong	8335	95.1	9	14	23	32	42	50	56	63	75	24	94
Sham Shui Po	8192	93.5	8	14	22	33	43	51	58	66	82	25	111
Kwai Chung	8512	97.2	8	13	20	31	42	50	58	67	89	23	112
Tsuen Wan	8466	96.6	7	12	20	30	42	50	57	68	91	22	132
Tseung Kwan O	8579	97.9	8	13	20	29	39	45	51	60	71	22	85
Yuen Long	8607	98.3	7	12	21	34	48	57	66	81	101	25	120
Tuen Mun	8483	96.8	11	17	28	44	59	68	76	90	107	32	135
Tung Chung	8611	98.3	6	10	18	32	45	54	64	75	97	23	150
Tai Po	8365	95.5	7	11	18	29	40	47	53	61	78	21	94
Sha Tin	8398	95.9	7	11	18	29	39	46	54	61	76	21	90
North	8184	93.4	8	12	20	32	44	51	57	64	82	23	99
Tap Mun	8644	98.7	5	10	17	28	38	45	51	59	74	20	122
Causeway Bay	8465	96.6	14	22	31	45	58	67	75	87	106	34	140
Central	8427	96.2	10	15	24	35	47	56	64	73	90	27	129
Mong Kok	8593	98.1	9	14	23	35	46	54	63	72	90	26	125

Pollutant: Fine Suspended Particulates ($PM_{2.5}$) (Annual limit value = 25 µg/m3)

Station	No. of hourly data	Data capture rate (%)	<----------Percentiles---------->									Arithmetic mean	Highest 1-hour
			10	25	50	75	90	95	97.5	99	99.8		
Central/Western	8637	98.6	4	7	12	19	28	35	42	51	65	14	97
Southern	8443	96.4	3	6	11	16	24	29	35	42	54	12	72
Eastern	8322	95.0	3	7	11	18	25	31	36	44	56	13	69
Kwun Tong	8469	96.7	5	8	13	18	26	32	37	43	54	14	74
Sham Shui Po	8122	92.7	3	6	11	16	24	30	35	41	53	12	78
Kwai Chung	8512	97.2	5	8	12	19	29	35	41	51	64	15	93
Tsuen Wan	8466	96.6	4	7	12	19	28	35	42	50	69	14	95
Tseung Kwan O	8581	98.0	4	7	12	18	25	31	36	43	54	13	62
Yuen Long	8607	98.3	5	7	13	21	32	39	46	57	77	16	99
Tuen Mun	8527	97.3	6	9	15	24	34	40	46	58	74	18	101
Tung Chung	8611	98.3	3	6	11	19	31	38	46	55	70	14	110
Tai Po	8367	95.5	4	7	12	19	26	33	38	44	59	14	71
Sha Tin	8398	95.9	4	6	11	17	26	32	38	44	56	13	68
North	8153	93.1	3	6	12	19	27	33	38	45	56	14	72
Tap Mun	8644	98.7	3	5	10	16	23	30	35	42	55	12	95
Causeway Bay	8466	96.6	8	13	18	26	37	44	50	60	73	21	118
Central	8427	96.2	7	10	15	22	32	39	45	54	66	18	111
Mong Kok	8593	98.1	5	9	14	22	31	38	44	52	66	16	104

Notes:

1. All concentration units are in microgram per cubic metre ($\mu g/m^3$).
2. Shaded arithmetic mean represents exceedance of the respective air quality objective.
3. Shaded no. of exceedance of limit value represents exceedance of the respective air quality objective.

Table C4: 2022 Diurnal Variations of Air Pollutants Concentrations

Pollutant: Sulphur Dioxide

Station	Hr01	Hr02	Hr03	Hr04	Hr05	Hr06	Hr07	Hr08	Hr09	Hr10	Hr11	Hr12	Hr13	Hr14	Hr15	Hr16	Hr17	Hr18	Hr19	Hr20	Hr21	Hr22	Hr23	Hr24
Central/Western	3	4	4	3	3	3	3	4	4	4	4	4	4	4	4	4	4	4	4	3	3	3	3	3
Southern	3	3	3	3	3	3	3	3	3	4	4	4	4	3	4	4	4	4	3	3	3	3	3	3
Eastern	1	2	1	2	2	2	1	1	1	1	1	2	2	2	2	1	1	1	2	2	2	1	1	1
Kwun Tong	6	6	6	6	6	6	6	7	7	7	7	7	7	7	7	7	7	7	6	6	6	6	6	6
Sham Shui Po	4	4	4	5	5	5	5	6	6	6	6	5	5	5	5	5	5	5	5	5	5	5	5	5
Kwai Chung	7	6	6	6	6	6	6	7	7	8	8	8	7	8	8	8	8	8	8	8	7	7	7	7
Tsuen Wan	8	8	8	7	7	7	7	8	8	8	8	8	8	8	8	9	9	8	8	8	8	8	8	8
Tseung Kwan O	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Yuen Long	4	4	4	4	3	3	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
Tuen Mun	4	3	3	3	3	3	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
Tung Chung	5	5	5	5	5	5	5	5	6	6	6	6	6	6	6	6	6	6	6	5	5	5	5	5
Tai Po	2	2	2	2	2	2	2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	2	2
Sha Tin	6	6	6	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	6	7	7
North	3	3	3	3	3	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	3	3
Tap Mun	8	9	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	7	8
Causeway Bay	4	3	3	3	3	3	4	5	6	6	6	6	6	6	6	5	5	5	5	5	5	5	4	4
Central	3	3	3	3	3	3	3	4	5	5	5	4	4	4	4	5	5	5	5	4	4	4	4	3
Mong Kok	3	2	2	2	2	2	3	3	4	4	4	4	4	4	4	4	4	4	4	4	3	3	3	3

Pollutant: Nitrogen Oxides

Station	Hr01	Hr02	Hr03	Hr04	Hr05	Hr06	Hr07	Hr08	Hr09	Hr10	Hr11	Hr12	Hr13	Hr14	Hr15	Hr16	Hr17	Hr18	Hr19	Hr20	Hr21	Hr22	Hr23	Hr24
Central/Western	29	28	21	20	20	20	27	44	52	54	51	44	41	40	41	43	44	46	47	44	40	37	36	33
Southern	26	21	18	16	17	23	33	44	49	52	49	44	38	37	36	37	40	42	40	36	32	29	28	28
Kwun Tong	51	41	32	28	28	37	67	90	94	92	86	81	78	81	79	79	79	77	78	78	68	63	64	59
Sham Shui Po	44	36	32	34	30	34	51	68	78	79	72	70	67	70	73	75	80	83	79	72	63	57	53	51
Kwai Chung	50	40	34	30	33	41	63	93	107	104	93	82	80	82	84	87	92	97	102	87	75	67	63	59
Tsuen Wan	43	30	25	23	24	28	45	63	73	75	71	66	62	63	64	66	69	73	76	71	61	56	53	49
Tseung Kwan O	30	25	21	19	28	31	42	39	31	26	24	23	22	24	23	23	28	31	34	36	34	33	34	33
Yuen Long	46	37	33	31	30	37	62	79	69	57	51	46	46	50	48	51	56	62	68	67	61	59	57	52
Tuen Mun	41	36	33	29	30	35	51	80	77	69	61	55	48	48	49	53	57	63	69	67	59	54	51	47
Tung Chung	27	22	19	18	18	20	27	39	45	46	45	41	39	40	40	39	39	39	38	36	34	32	31	28
Tai Po	29	25	22	20	20	24	40	60	53	41	36	33	32	32	32	33	37	41	47	46	42	38	36	33
Sha Tin	32	28	24	21	22	26	40	51	45	36	31	28	26	26	28	30	33	38	43	43	41	40	40	37
Tap Mun	35	28	25	24	25	36	59	76	61	47	41	37	34	36	37	39	42	46	52	50	47	46	44	40
North	12	12	12	12	12	12	12	13	15	16	15	14	13	12	12	12	13	13	13	13	13	13	12	12
Causeway Bay	115	78	65	59	56	62	130	204	254	245	238	249	242	243	235	219	222	226	227	195	176	180	161	133
Central	87	68	61	53	52	58	91	141	206	179	164	161	150	141	161	169	173	197	196	161	138	123	114	105
Mong Kok	93	57	46	44	46	51	90	120	154	159	158	159	159	167	174	180	187	192	188	161	138	133	129	115

Pollutant: Nitrogen Dioxide

Station	Hr01	Hr02	Hr03	Hr04	Hr05	Hr06	Hr07	Hr08	Hr09	Hr10	Hr11	Hr12	Hr13	Hr14	Hr15	Hr16	Hr17	Hr18	Hr19	Hr20	Hr21	Hr22	Hr23	Hr24
Central/Western	24	21	17	16	16	16	22	32	36	36	35	32	30	31	32	34	37	40	41	38	34	31	30	27
Southern	21	18	15	14	14	17	22	28	31	33	32	30	27	27	27	29	31	35	33	30	26	24	23	22
Eastern	24	20	18	16	17	19	28	36	41	39	37	36	34	37	38	40	43	44	43	38	34	31	30	28
Kwun Tong	37	31	25	22	22	28	41	50	50	51	50	50	49	52	53	54	55	55	56	55	49	46	45	41
Sham Shui Po	34	27	24	25	23	26	36	44	47	46	44	44	44	47	50	52	57	60	60	56	49	44	41	39
Kwai Chung	33	27	23	20	22	25	35	46	50	49	48	47	48	50	53	56	59	62	63	55	49	44	41	38
Tsuen Wan	32	23	20	18	19	22	33	41	43	43	42	42	41	44	45	48	51	56	58	53	46	42	40	37
Tseung Kwan O	22	19	16	15	17	20	25	24	20	17	16	16	15	17	17	18	21	25	28	30	28	26	26	25
Yuen Long	35	30	26	25	24	27	37	42	39	35	33	31	32	35	35	38	43	48	53	51	47	44	42	39
Tuen Mun	33	30	27	24	25	28	35	44	43	41	39	37	35	35	37	41	45	50	55	53	48	43	40	37
Tung Chung	20	17	15	14	14	15	19	24	27	28	29	28	28	29	30	30	30	32	31	29	27	25	24	22
Tai Po	24	21	19	17	17	20	27	35	32	26	24	23	22	23	24	25	29	33	38	37	34	31	30	27
Sha Tin	26	23	20	18	19	21	28	32	30	25	22	21	20	20	22	24	27	32	37	36	34	33	32	30
North	27	23	20	19	20	24	33	39	36	31	29	27	26	27	28	31	34	38	42	40	36	35	33	31
Tap Mun	7	7	7	7	7	7	7	7	9	9	8	8	7	6	6	7	7	8	9	8	8	8	8	7
Causeway Bay	50	39	34	32	30	32	50	63	70	73	76	81	82	84	86	83	82	82	81	73	68	66	60	55
Central	46	39	35	32	31	34	45	59	72	70	70	70	70	71	78	81	82	86	84	75	68	61	58	53
Mong Kok	50	36	31	29	30	32	46	56	64	66	68	72	75	80	84	87	89	90	88	79	71	66	64	58

Pollutant: Carbon Monoxide

Station	Hr01	Hr02	Hr03	Hr04	Hr05	Hr06	Hr07	Hr08	Hr09	Hr10	Hr11	Hr12	Hr13	Hr14	Hr15	Hr16	Hr17	Hr18	Hr19	Hr20	Hr21	Hr22	Hr23	Hr24
Southern	419	407	402	406	400	411	429	456	468	464	453	449	447	442	447	441	450	465	469	460	452	443	440	434
Tsuen Wan	579	550	536	531	535	555	608	650	656	647	636	620	613	620	618	617	621	635	662	671	658	643	624	598
Tseung Kwan O	437	417	407	399	390	397	435	440	425	412	407	400	398	399	399	400	406	424	443	461	459	457	459	453
Yuen Long	685	664	652	641	636	649	691	725	702	679	674	666	664	668	660	661	672	692	721	741	737	730	715	695
Tuen Mun	550	537	530	516	552	568	581	633	615	595	595	587	580	579	573	572	568	581	609	620	608	593	582	567
Tung Chung	438	430	425	424	418	423	433	442	451	447	441	436	443	450	446	443	435	439	450	451	452	452	450	445
North	484	473	458	455	451	465	523	545	497	460	452	442	439	432	431	438	445	476	525	527	549	535	533	496
Tap Mun	518	513	513	514	515	516	520	525	527	526	525	523	518	515	512	508	506	505	505	505	504	506	508	510
Causeway Bay	590	559	529	535	521	521	552	609	671	741	716	705	718	720	716	752	747	775	786	796	755	698	615	607
Central	938	914	897	884	867	897	919	971	1009	1019	1030	1025	1043	1040	1038	1044	1032	1074	1095	1104	1105	1062	1010	972
Mong Kok	679	649	625	626	624	634	652	690	725	752	748	740	741	750	760	765	776	789	826	823	798	756	737	712

Table C4 (Cont.): 2022 Diurnal Variations of Air Pollutants Concentrations

Pollutant: Ozone

Station	Hr01	Hr02	Hr03	Hr04	Hr05	Hr06	Hr07	Hr08	Hr09	Hr10	Hr11	Hr12	Hr13	Hr14	Hr15	Hr16	Hr17	Hr18	Hr19	Hr20	Hr21	Hr22	Hr23	Hr24
Central/Western	69	71	72	71	69	67	60	52	51	55	62	71	79	84	87	85	82	76	71	69	69	69	67	68
Southern	60	62	62	62	60	55	50	48	50	53	61	68	76	81	84	84	81	75	69	65	63	62	61	60
Eastern	71	73	74	73	71	68	59	52	51	56	64	71	78	80	82	82	78	75	72	72	72	71	70	70
Kwun Tong	50	53	55	55	54	47	36	31	33	37	45	51	57	59	61	61	59	57	53	49	49	48	47	48
Sham Shui Po	56	60	61	59	58	53	44	37	38	43	50	58	64	67	67	66	60	54	50	49	51	53	52	52
Kwai Chung	48	51	53	52	51	46	37	30	30	35	42	49	54	58	59	57	53	47	42	43	44	44	44	44
Tsuen Wan	45	50	52	51	49	45	36	31	33	38	45	51	59	62	64	62	57	51	43	40	41	41	41	42
Tseung Kwan O	58	60	60	59	56	52	48	49	57	64	72	79	85	88	91	91	88	82	75	68	65	62	60	58
Yuen Long	42	44	45	44	42	37	29	27	35	46	57	68	75	79	81	81	74	63	53	46	45	43	41	41
Tuen Mun	45	47	47	46	45	40	32	26	31	38	47	58	68	75	79	77	71	60	48	43	44	45	45	44
Tung Chung	43	45	46	45	43	40	35	31	36	42	50	58	66	72	78	78	74	64	52	47	44	43	43	43
Tai Po	55	55	55	54	52	47	39	36	45	57	67	77	85	90	92	90	86	77	67	62	59	57	55	54
Sha Tin	52	52	53	53	51	46	39	38	45	56	66	75	83	88	89	87	82	74	65	60	57	53	51	50
North	50	51	51	50	47	41	33	30	38	50	62	73	82	86	88	87	82	74	64	59	56	52	50	50
Tap Mun	65	62	60	59	57	55	53	56	62	68	77	86	94	99	102	103	102	96	89	82	77	72	68	66
Causeway Bay	35	43	45	46	45	42	29	22	19	20	22	24	28	30	31	33	33	32	30	32	32	31	32	35
Central	41	47	49	49	48	44	34	26	20	24	29	33	39	43	41	39	37	32	30	32	34	36	36	37
Mong Kok	38	46	48	48	46	43	32	26	24	26	28	32	35	35	35	33	31	28	27	29	31	32	32	33

Pollutant: Respirable Suspended Particulates (PM_{10})

Station	Hr01	Hr02	Hr03	Hr04	Hr05	Hr06	Hr07	Hr08	Hr09	Hr10	Hr11	Hr12	Hr13	Hr14	Hr15	Hr16	Hr17	Hr18	Hr19	Hr20	Hr21	Hr22	Hr23	Hr24
Central/Western	22	21	21	20	20	19	19	20	21	22	23	23	23	23	24	24	24	24	24	24	24	23	22	22
Southern	24	24	24	23	23	22	22	21	22	22	24	24	25	25	25	26	26	27	28	27	26	25	24	24
Eastern	23	23	23	22	22	21	21	21	22	23	24	24	25	24	24	25	26	25	25	25	25	24	24	23
Kwun Tong	24	23	22	21	22	21	21	22	24	24	25	26	25	25	26	27	27	27	27	27	26	26	24	24
Sham Shui Po	24	24	23	22	21	21	21	22	22	22	23	23	24	25	26	27	28	28	28	29	28	27	26	24
Kwai Chung	22	22	21	21	20	20	20	21	22	23	23	24	24	25	26	26	26	26	26	26	25	24	23	23
Tsuen Wan	21	20	20	19	19	19	19	19	20	21	23	23	24	25	26	26	26	26	26	26	26	24	23	22
Tseung Kwan O	22	22	21	21	21	20	20	20	20	20	21	22	23	23	23	25	25	25	24	24	24	23	23	22
Yuen Long	24	24	23	22	21	21	21	22	24	24	25	26	26	27	27	27	28	28	28	28	27	26	25	25
Tuen Mun	31	30	29	28	28	27	27	28	29	31	33	34	34	34	35	37	37	37	36	35	35	34	32	32
Tung Chung	21	20	20	19	19	19	19	19	20	22	24	25	26	26	28	29	28	27	25	23	22	22	21	21
Tai Po	21	21	20	20	20	19	19	20	21	21	22	22	22	22	22	22	22	22	23	23	23	22	22	21
Sha Tin	21	21	20	20	20	19	19	20	20	20	21	21	21	22	22	22	23	23	23	23	22	22	21	21
North	23	23	22	22	21	20	20	20	21	21	22	23	24	24	24	24	25	26	26	26	25	24	24	23
Tap Mun	19	19	19	19	19	18	18	18	18	20	21	21	21	21	21	22	22	22	21	21	20	20	19	19
Causeway Bay	31	27	24	23	23	22	25	30	33	36	38	39	38	38	42	41	41	41	41	42	40	38	35	33
Central	25	24	23	22	22	22	23	25	26	28	27	27	28	29	30	30	29	30	29	30	30	29	27	26
Mong Kok	24	23	22	21	20	20	20	22	24	26	27	27	28	28	30	30	29	29	30	31	31	28	26	25

Pollutant: Fine Suspended Particulates ($PM_{2.5}$)

Station	Hr01	Hr02	Hr03	Hr04	Hr05	Hr06	Hr07	Hr08	Hr09	Hr10	Hr11	Hr12	Hr13	Hr14	Hr15	Hr16	Hr17	Hr18	Hr19	Hr20	Hr21	Hr22	Hr23	Hr24
Central/Western	14	13	13	13	13	13	13	13	14	14	15	15	15	15	16	15	15	16	16	16	16	15	15	14
Southern	12	12	12	12	11	11	11	12	12	12	12	12	12	12	12	12	13	13	13	14	13	13	13	12
Eastern	13	13	13	12	12	12	12	13	13	13	14	14	14	14	14	14	14	14	14	15	14	14	13	13
Kwun Tong	14	13	13	13	13	12	12	13	14	14	14	15	15	15	15	15	15	15	15	16	16	15	15	14
Sham Shui Po	12	12	12	12	11	11	11	11	11	11	11	11	11	12	13	13	14	14	14	14	15	14	14	13
Kwai Chung	15	14	14	13	13	13	13	14	15	15	15	15	16	16	16	17	17	17	17	17	16	16	15	15
Tsuen Wan	14	13	13	12	12	12	12	13	13	14	14	14	15	16	16	16	16	16	16	17	17	16	15	14
Tseung Kwan O	14	14	13	13	12	12	12	13	13	13	13	13	14	13	13	14	14	14	14	14	15	15	14	14
Yuen Long	16	15	15	15	14	14	14	15	16	16	15	16	16	16	17	17	17	17	17	17	17	17	16	16
Tuen Mun	18	17	17	16	16	16	16	17	17	18	18	18	17	18	18	19	19	20	20	20	21	20	19	18
Tung Chung	13	13	13	13	12	12	12	13	13	14	15	15	16	16	17	18	17	17	15	15	15	14	14	14
Tai Po	14	13	13	13	13	13	13	13	14	14	14	14	14	14	14	14	14	14	15	15	15	15	14	14
Sha Tin	13	13	13	12	12	12	12	13	13	13	13	13	13	13	14	14	14	14	14	14	14	14	13	13
North	14	14	13	13	12	12	12	12	13	13	13	14	14	14	14	14	14	15	15	15	15	15	14	14
Tap Mun	11	11	11	11	11	11	11	11	11	12	12	13	13	13	13	13	13	12	12	12	11	11	11	11
Causeway Bay	19	16	14	14	14	14	16	19	20	22	22	22	23	24	25	25	24	25	25	26	26	24	22	20
Central	16	16	15	15	15	15	15	16	17	18	18	17	18	19	20	19	19	19	19	20	20	20	18	17
Mong Kok	15	14	13	13	13	13	13	14	15	16	17	17	18	19	19	19	18	18	19	21	21	18	17	16

Note:

1. All concentration units are in microgram per cubic metre ($\mu g/m^3$).

Table C5: 2022 Total Wet and Dry Deposition

(a) Wet Deposition

	Monitoring Station	Central/Western	Kwun Tong	Yuen Long
	Wet Deposition (tonne/ha)	23881	21998	21056
	Weighted Mean pH (based on volume-weighted mean hydrogen ion concentrations ($[H^+]$)	5.14	5.09	5.15
	Weighted Mean pH (based on volume-weighted mean pH)	5.39	5.37	5.40
	Number of Samples	107	122	110
Filtrate (kg/Ha)	**NH_4^+**	5.86	5.93	9.81
	NO_3^-	17.85	19.75	20.70
	SO_4^{2-}	13.93	13.64	10.52
	Cl^-	26.59	27.15	11.64
	F^-	0.94	0.92	1.24
	Na^+	15.63	17.77	8.62
	K^+	5.98	5.48	5.21
	Formate	4.57	4.29	4.85
	Acetate	4.42	3.80	4.77
	Ca^{2+}	3.47	4.14	3.04
	Mg^{2+}	1.88	2.11	1.05

** Note:* *The weighted mean pH is calculated from the pH values measured by the Government Laboratory.*

(b) Dry Deposition

	Monitoring Station	Central/Western	Kwun Tong	Yuen Long
	Number of Samples	26	25	26
Filtrate (kg/Ha)	**NH_4^+**	0.31	0.25	0.15
	NO_3^-	9.89	8.81	8.84
	SO_4^{2-}	2.99	3.12	2.55
	Cl^-	8.58	8.97	4.87
	F^-	0.026	0.051	0.033
	Na^+	5.16	5.20	3.22
	K^+	0.52	0.47	0.40
	Formate	0.17	0.19	0.18
	Acetate	0.16	0.27	0.16
	Ca^{2+}	3.41	4.37	4.16
	Mg^{2+}	0.66	0.67	0.46

Table C6: 2022 Ambient levels of Toxic Air Pollutants (TAPs)

Toxic Air Pollutants	Concentration Unit	Annual Averages [1]	
		Tsuen Wan	Central/Western
Heavy Metals			
Hexavalent chromium[2]	ng/m^3	0.11	0.11
Lead [3]	ng/m^3	6	6
Organic Substances			
Benzene[2]	μg/m^3	0.50	0.70
Benzo[a]pyrene[2]	ng/m^3	0.03	0.04
1,3-Butadiene[2]	μg/m^3	0.03	0.03
Formaldehyde [2]	μg/m^3	4.47	0.62
Perchloroethylene[2]	μg/m^3	0.49	0.27
Dioxins [2] [4]	pg I-TEQ/m^3	0.011	0.009

Notes:

[1] For TAP concentrations that are lower than the method detection limit (MDL), one half of the MDL is used in calculating the annual averages.

[2] No sample was collected at Tsuen Wan Station in December 2022 due to renovation works at Princess Alexandra Community Centre.

[3] For lead, the reported figures are the respective 2022 annual average concentrations in the elemental analysis of respirable suspended particulates.

[4] The ambient level of dioxins is expressed here as toxic equivalent (I-TEQ) concentration of 2,3,7,8-tetrachlorodibenzodioxin (TCDD) based on the International Toxic Equivalency Factors (I-TEF) of the North Atlantic Treaty Organisation (NATO/CCMS). Dioxins include polychlorinated dibenzo-p-dioxins and polychlorinated dibenzofurans