
Appendix 3.10

**Estimated Communities within the
Exceedance Zone of Annual NO₂**

Introduction

1. To estimate the likely size of the affected communities within the exceedance zone of annual NO₂, a survey has been conducted in April 2016.
2. The exceedance zones of annual NO₂ cover playgrounds, schools, shops and residential areas as mentioned in Table 3-13 and Table 3-17 of the main text. The exposure to NO₂ for the users of playgrounds, the students in the schools and the staff in the shops or restaurants should be limited as they will not stay continuously for 24 hours a day and 365 days a year. Hence, the actual exposure to the NO₂ shall be less than predicted. Therefore, only the number of units (shops or school), but not the population, are presented in this appendix for reference purpose. The residential regions are considered to have a long term NO₂ exposure and thus the estimation of the likely size of the affected communities within the exceedance zone of annual NO₂ is based only on the number of dwellings.
3. The likely size of affected communities within the exceedance zones of annual NO₂ would be the highest in the worst assessment year (2023) based on the Figure 3-6K to Figure 3-6P.

Assumptions

4. A number of assumptions were made in the community survey and listed as follows:
 - No change in the number of shops and residential flats over the assessment years (from Year 2016 to Year 2023);
 - Each flat consists of 1 dwelling only (no unauthorized partitioned unit is considered);
 - Based on “Population Census” issued by Census and Statistics Department for To Kwa Wan and Kowloon City districts in 2011, the average number of occupant per unit, 2.88, was adopted to calculate the affected population within the exceedance zones. Details can be found in Table 3; and
 - The growth of population within the study area was disregarded.

Results

5. The numbers of affected shops and schools/kindergartens reduced gradually from Year 2023 to Year 2036 as shown in **Table 1**.

Table 1 Numbers of Affected Shops and Schools/Kindergartens

Year	Shops	Schools/Kindergartens
2023	815	10
2026	795	10
2036	71	2

[I] The number of staff in the shops depends on the types of use of the shops and therefore it is subject to variation. Moreover, the staff in the shops have limited of exposure to NO₂. Therefore, only the number of shops or schools are presented.

6. The study area of the Project (i.e. 500m from the Project boundary) overlaps with 5 census zones and part of the Kai Tak Development Area as shown below.

- Census Zone 2.8.5 (Zone A),
- Census Zone 2.4.6 (Zone B),
- Census Zone 2.4.1 (Zone C),
- Census Zone 2.4.2 (Zone D),
- Kai Tak Development Area (Census Zones 2.4.7 and 2.8.6) (Zone E), and
- Census Zone 2.8.3 (Zone F) (No dwellings within the study area).

The locations of the census zones and study area are shown in **Figure 1**.

7. The population covered in the study area are summarized in **Table 2a** and **Table 2b**. Since the study area do not cover any dwellings in Zone F, Zone F was excluded from the calculation.

Table 2a Estimated Population within the Study Area (Census Zones)

Zone ID	Census Zone ID	Total Population ^[I]	Residential Dwellings ^[I]	Area Ratio of Study Area	Estimated Population in Study Area ^[II]
A	2.8.5	16,270	5,942	13%	2,065
B	2.4.6	17,252	5,538	19%	3,296
C	2.4.1	46,939	16,542	18%	8,607
D	2.4.2	51,030	17,662	45%	23,176
Total (Zones A - D)		131,491	45,684	-	37,144

[I] The total population and number of residential dwelling for Zones A-D are referred to "Population Census" issued by Census and Statistics Department in 2011.

[II] The population in the study area is calculated by the total population and the area ratio of the study area.

Table 2b Estimated Population within the Study Area (Total)

Zone ID	Census Zone ID	Total Population	Residential Dwellings	Area Ratio of Study Area	Estimated Population in Study Area
	Total (Zones A - D)	-	-	-	37,144
E	Kai Tak Development Area	118,009 ^[I]	41,000 ^[I]	70%	82,606 ^[III]
	Total (Zones A - E)	-	-		~120,000

[I] The number of dwelling of Zone E is based on the information of Development Bureau for the Kai Tai Development Areas (30th Sep 2015).

[II] The total population of Zone E is calculated by 41,000 dwellings times 2.88 person per unit, which is calculated by the total population and dwelling numbers of Zone A - D (2.88 = 131,491/45,684).

[III] The population in the study area is calculated by the total population and the area ratio of the study area.

8. The percentages of affected population to the total population in Years 2023, 2026 and 2036 are summarized in the **Table 3**.

Table 3 Percentages of Affected Population

Year	Affected Dwellings ^[I]	Affected Population ^[II] / Total Population	Percentage of Affected Population ^[III]
2023	1,074	3,078 / 120,000	2.6%
2026	830	2,379 / 120,000	2.0%
2036	45	129 / 120,000	0.1%

[I] The number of affected dwellings are based on survey finding.

[II] The affected population are calculated by affected dwelling multiply by 2.88 persons per unit.

[III] The percentage of affected population is calculated by dividing the affected population by the total population (120,000) in the study area.

9. Details of the shops and dwellings within the exceedance zones in Years 2023, 2026 and 2036 are shown in **Table 4** to **Table 9**.
10. Photo records of the affected areas are included in **Annex I**.

Table 4 Detailed Affected Shops on G/F within the Exceedance Zone in the Worst Assessment Year (2023)

Road	Retail	Catering	Garage	Hardware Store	Medical Centre\ Beauty Salon	School	Education Centre	Office	Logistic	Laundry Shop	Amusement Game Centre	Boxing And Fitness Centre	Warehouse	Empty
Shek Ku Lung Road	1	0	1	0	0	0	0	0	0	0	0	0	0	0
Sa Po Road	1	4	4	3	0	0	0	0	1	0	1	1	1	5
Kai Tak Road	7	6	4	8	1	0	0	1	0	0	0	0	0	5
Nga Tsin Wai Road	9	6	0	0	3	0	0	2	0	0	0	0	0	0
Tak Ku Ling Road	7	5	0	1	2	0	0	1	0	0	0	0	0	1
South Wall Road	3	10	0	0	0	0	0	0	0	1	0	0	0	0
Prince Edward Road West	3	8	0	0	1	1	0	2	0	0	0	0	0	2
Lung Kong Road	0	7	0	0	0	0	0	0	0	0	0	0	0	1
Fu Ning Street	3	1	0	0	3	0	0	0	0	0	0	0	0	1
Shing Tak Street	1	0	0	0	1	4	0	0	0	0	0	0	0	0
Ma Tau Chung Road	21	3	0	1	11	3	3	6	0	0	1	0	0	2
Tam Kung Road	11	4	1	5	5	0	6	1	0	0	0	0	0	0
Pak Tai Street	3	1	0	0	1	0	1	2	0	1	0	0	0	0
Sung Wong Toi Road	2	1	0	0	4	0	2	1	0	0	0	0	0	0
Mok Cheong Street	18	3	6	4	8	0	0	13	0	0	1	0	0	5
Building)	0	0	7	0	0	0	0	1	0	0	0	0	0	1
Pau Chung Street	28	2	1	2	2	2	4	7	0	0	0	0	0	3
Jubilant Place	1	1	0	0	0	0	0	1	0	1	0	0	0	0
San Shan Road	4	0	0	0	0	0	2	0	0	0	0	0	0	0
Kowloon City Road	4	0	14	4	0	0	0	1	0	0	0	0	0	4
Building)	1	0	7	0	0	0	0	1	0	0	0	0	0	1
Ma Tau Kok Road	10	4	0	0	3	0	0	3	0	0	0	0	0	0
Kowloon City Road (13 Streets)	4	1	7	3	1	0	0	3	0	0	0	0	0	0
Lung To Street (13 Streets)	3	1	14	11	1	0	0	1	0	0	0	0	0	5
Fung Yi Street (13 Streets)	6	2	15	8	0	0	0	2	0	0	0	0	0	5
Luk Ming Street (13 Streets)	2	1	15	6	1	0	0	1	0	0	0	0	0	9
Lun Cheung Street (13 Streets)	3	3	14	6	1	0	0	1	0	0	0	0	0	1
Ying Yeung Street (13 Streets)	1	4	14	5	0	0	0	3	0	1	0	0	0	1
Pang Ching Street (13 Streets)	3	1	17	5	1	0	0	3	0	1	0	0	0	0
Hung Wan Street (13 Streets)	3	0	20	5	0	0	0	0	0	0	0	0	0	3
Shim Luen Street (13 Streets)	6	0	14	5	0	0	0	1	0	0	0	0	0	0
Yin On Street (13 Streets)	2	3	19	3	0	0	0	0	0	0	0	0	0	2
Tsun Fat Street (13 Streets)	3	0	13	6	0	0	0	3	0	0	0	0	0	3
Hok Ling Street (13 Streets)	1	2	14	4	1	0	0	5	0	0	0	0	0	0
To Kwa Wan Road (13 Streets)	7	0	1	1	0	0	0	1	0	0	0	0	0	9
To Kwa Wan Road	4	3	3	0	2	0	0	1	1	0	0	0	0	1

Notes:

- 1) The survey was conducted in April 2016
- 2) It was assumed no change in number of shops over the years

Table 5 Detailed Affected Dwellings within the Exceedance Zone in the Worst Assessment Year (2023)

Road	No. of Dwelling		
	G/F (1.5m above ground)	1/F or above	All Level
Sa Po Road	0	66	
Kai Tak Road	0	144	
Tak Ku Ling Road	0	63	
Nga Tsin Wai Road	0	21	
South Wall Road	0	59	
Prince Edward Road West	0	27	
Lung Kong Road	0	45	
Chun Seen Mei Chuen	22	7	
Shing Tak Street	5	0	
Ma Tau Chung Road	13	31	
Kowloon City Road	0	185	
Mok Cheong Street	0	6	
Pau Chung Street	0	100	
Ma Tau Kok Road	0	32	
Jubilant Place	0	18	
Tien Hung Building	0	6	
(13 Streets) Kowloon City Road	0	13	
(13 Streets) Lung To	0	25	
(13 Streets) Fung Yi	0	23	
(13 Streets) Luk Ming	0	21	
(13 Streets) Lun Cheung	0	14	
(13 Streets) Ying Yeung	0	3	
(13 Streets) Hung Wan	0	4	
(13 Streets) Shim Luen	0	22	
(13 Streets) Yin On	0	28	
(13 Streets) Tsun Fat	0	28	
(13 Streets) Hok Ling	0	28	
(13 Streets) To Kwa Wan	0	15	
Total	40	1034	<u>1074</u>

- Notes: 1) The survey was conducted in April 2016
2) Assuming no change in number of dwelling over the years
3) Each flat consists 1 dwelling (no unauthorized partitioned unit).

Table 6 Detailed Affected Shops on G/F within the Exceedance Zone in Year 2026

Road	Retail	Catering	Garage	Hardware Store	Medical Centre\ Beauty Salon	School	Education Centre	Office	Logistic	Laundry Shop	Amusement Game Centre	Boxing And Fitness Centre	Warehouse	Empty
Shek Ku Lung Road	1	0	1	0	0	0	0	0	0	0	0	0	0	0
Sa Po Road	1	4	3	3	0	0	0	0	1	0	1	1	1	5
Kai Tak Road	7	6	3	8	1	0	0	1	0	0	0	0	0	5
Nga Tsin Wai Road	9	5	0	0	3	0	0	2	0	0	0	0	0	0
Tak Ku Ling Road	7	4	0	1	2	0	0	1	0	0	0	0	0	1
South Wall Road	3	10	0	0	0	0	0	0	0	1	0	0	0	0
Prince Edward Road West	3	7	0	0	1	1	0	2	0	0	0	0	0	2
Lung Kong Road	0	6	0	0	0	0	0	0	0	0	0	0	0	1
Fu Ning Street	3	1	0	0	3	0	0	0	0	0	0	0	0	1
Shing Tak Street	1	0	0	0	1	4	0	0	0	0	0	0	0	0
Ma Tau Chung Road	20	3	0	1	11	3	3	6	0	0	1	0	0	2
Tam Kung Road	10	3	1	5	5	0	6	1	0	0	0	0	0	0
Pak Tai Street	2	1	0	0	1	0	1	1	0	1	0	0	0	0
Sung Wong Toi Road	1	1	0	0	3	0	2	1	0	0	0	0	0	0
Mok Cheong Street	17	3	5	3	7	0	0	12	0	0	1	0	0	4
Building)	0	0	7	0	0	0	0	1	0	0	0	0	0	1
Pau Chung Street	28	2	1	2	2	2	4	7	0	0	0	0	0	3
Jubilant Place	1	1	0	0	0	0	0	1	0	1	0	0	0	0
San Shan Road	4	0	0	0	0	0	2	0	0	0	0	0	0	0
Kowloon City Road	4	0	14	4	0	0	0	1	0	0	0	0	0	4
Building)	1	0	7	0	0	0	0	1	0	0	0	0	0	1
Ma Tau Kok Road	9	4	0	0	3	0	0	3	0	0	0	0	0	0
Kowloon City Road (13 Streets)	4	1	7	3	1	0	0	3	0	0	0	0	0	0
Lung To Street (13 Streets)	3	1	14	11	1	0	0	1	0	0	0	0	0	5
Fung Yi Street (13 Streets)	6	2	15	8	0	0	0	2	0	0	0	0	0	5
Luk Ming Street (13 Streets)	2	1	15	6	1	0	0	1	0	0	0	0	0	9
Lun Cheung Street (13 Streets)	3	3	14	6	1	0	0	1	0	0	0	0	0	1
Ying Yeung Street (13 Streets)	1	4	14	5	0	0	0	3	0	1	0	0	0	1
Pang Ching Street (13 Streets)	3	1	17	5	1	0	0	3	0	1	0	0	0	0
Hung Wan Street (13 Streets)	3	0	20	5	0	0	0	0	0	0	0	0	0	3
Shim Luen Street (13 Streets)	6	0	14	5	0	0	0	1	0	0	0	0	0	0
Yin On Street (13 Streets)	2	3	19	3	0	0	0	0	0	0	0	0	0	2
Tsun Fat Street (13 Streets)	3	0	13	6	0	0	0	3	0	0	0	0	0	3
Hok Ling Street (13 Streets)	1	2	14	4	1	0	0	5	0	0	0	0	0	0
To Kwa Wan Road (13 Streets)	7	0	1	1	0	0	0	1	0	0	0	0	0	9
To Kwa Wan Road	4	3	3	0	2	0	0	1	1	0	0	0	0	1

Notes:

- 1) The survey was conducted in April 2016
- 2) It was assumed no change in number of shops over the years

Table 7 Detailed Affected Dwellings within the Exceedance Zone in Year 2026

Road	No. of Dwelling		
	G/F (1.5m above ground)	1/F or above	All Level
Sa Po Road	0	54	
Kai Tak Road	0	108	
Tak Ku Ling Road	0	42	
Nga Tsin Wai Road	0	12	
South Wall Road	0	50	
Prince Edward Road West	0	18	
Lung Kong Road	0	33	
Chun Seen Mei Chuen	19	0	
Shing Tak Street	2	0	
Ma Tau Chung Road	10	0	
Kowloon City Road	0	96	
Mok Cheong Street	0	35	
Pau Chung Street	0	0	
Ma Tau Kok Road	0	180	
Jubilant Place	0	12	
Tien Hung Building	0	6	
(13 Streets) Kowloon City Road	0	10	
(13 Streets) Lung To	0	20	
(13 Streets) Fung Yi	0	13	
(13 Streets) Luk Ming	0	10	
(13 Streets) Lun Cheung	0	2	
(13 Streets) Ying Yeung	0	0	
(13 Streets) Hung Wan	0	0	
(13 Streets) Shim Luen	0	4	
(13 Streets) Yin On	0	23	
(13 Streets) Tsun Fat	0	28	
(13 Streets) Hok Ling	0	28	
(13 Streets) To Kwa Wan	0	15	
Total	31	799	<u>830</u>

- Notes: 1) The survey was conducted in April 2016
2) Assuming no change in number of dwelling over the years
3) Each flat consists 1 dwelling (no unauthorized partitioned unit).

Table 8 Detailed Affected Shops on G/F within the Exceedance Zone in Year 2036

Road	Retail	Catering	Garage	Hardware Store	Medical Centre\ Beauty Salon	School	Education Centre	Office	Logistic	Laundry Shop	Amusement Game Centre	Boxing And Fitness Centre	Warehouse	Empty
Prince Edward Road West	3	9	0	0	1	0	0	1	0	0	0	0	0	0
Fu Ning Street	3	1	0	0	3	0	0	0	0	0	0	0	0	1
Ma Tau Chung Road	4	1	0	0	1	0	0	0	0	0	0	0	0	0
Sung Wong Toi Road	2	0	0	0	0	0	0	0	0	0	0	0	0	0
Pau Chung Street	8	1	1	1	1	2	2	3	0	0	0	0	0	0
Kowloon City Road	1	0	9	1	0	0	0	1	0	0	0	0	0	0
Ma Tau Kok Road	2	1	0	0	1	0	0	1	0	0	0	0	0	0
Kowloon City Road (13 Streets)	1	1	0	1	0	0	0	0	0	0	0	0	0	0
To Kwa Wan Road (13 Streets)	0	0	1	1	0	0	0	1	0	0	0	0	0	1

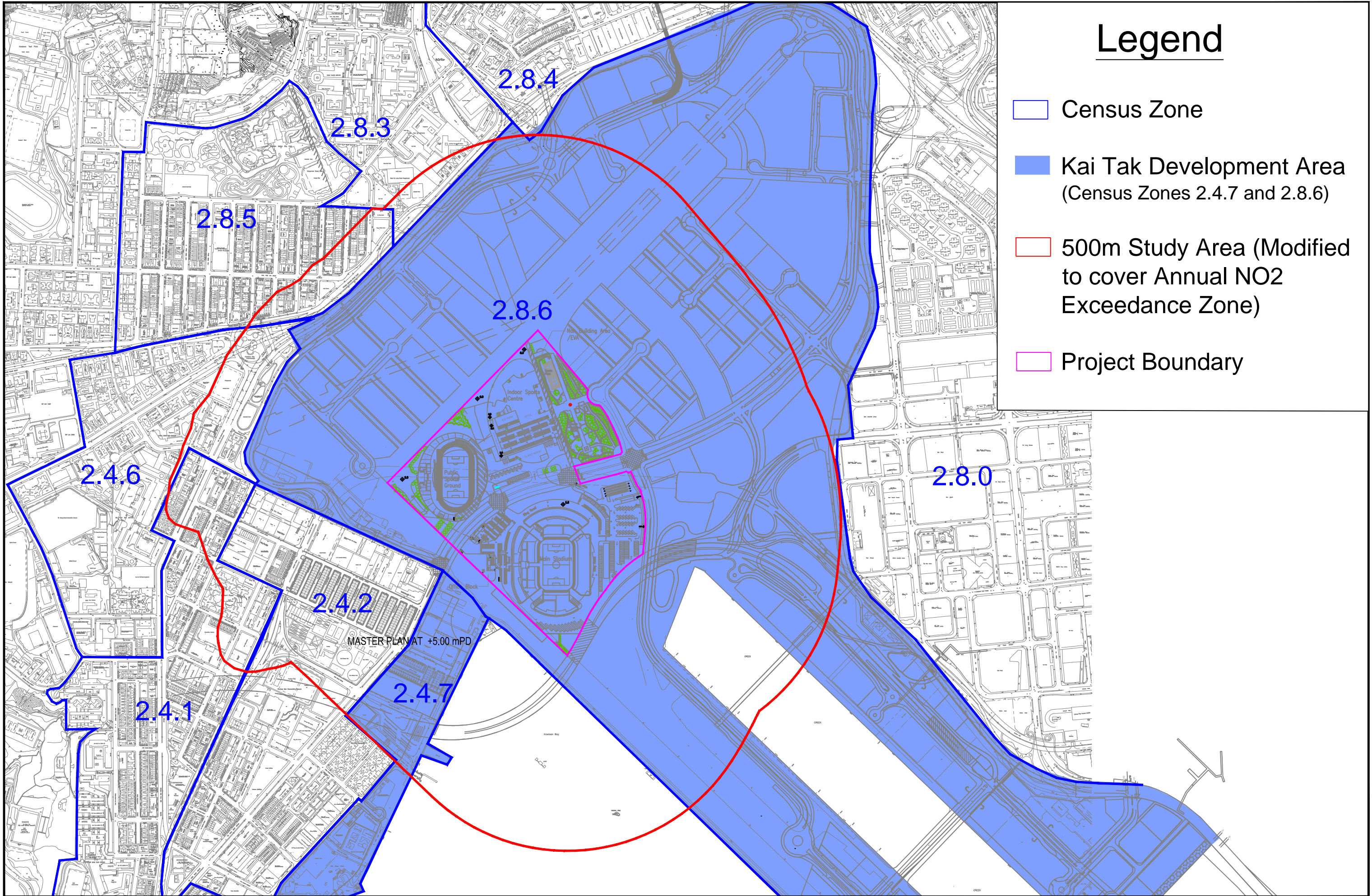
Notes:

- 1) The survey was conducted in April 2016
- 2) It was assumed no change in number of shops over the years

Table 9 Detailed Affected Dwellings within the Exceedance Zone in Year 2036

Road	No. of Dwelling		
	G/F (1.5m above ground)	1/F or above	All Level
Sa Po Road	0	0	
Kai Tak Road	0	0	
Tak Ku Ling Road	0	0	
Nga Tsin Wai Road	0	0	
South Wall Road	0	0	
Prince Edward Road West	0	0	
Lung Kong Road	0	0	
Chun Seen Mei Chuen	0	0	
Shing Tak Street	0	0	
Ma Tau Chung Road	0	0	
Kowloon City Road	0	12	
Mok Cheong Street	0	0	
Pau Chung Street	0	25	
Ma Tau Kok Road	0	8	
Jubilant Place	0	0	
Tien Hung Building	0	0	
(13 Streets) Kowloon City Road	0	0	
(13 Streets) Lung To	0	0	
(13 Streets) Fung Yi	0	0	
(13 Streets) Luk Ming	0	0	
(13 Streets) Lun Cheung	0	0	
(13 Streets) Ying Yeung	0	0	
(13 Streets) Hung Wan	0	0	
(13 Streets) Shim Luen	0	0	
(13 Streets) Yin On	0	0	
(13 Streets) Tsun Fat	0	0	
(13 Streets) Hok Ling	0	0	
(13 Streets) To Kwa Wan	0	0	
Total	0	45	<u>45</u>

- Notes: 1) The survey was conducted in April 2016
2) Assuming no change in number of dwelling over the years
3) Each flat consists 1 dwelling (no unauthorized partitioned unit).



Legend

- Census Zone
- Kai Tak Development Area (Census Zones 2.4.7 and 2.8.6)
- 500m Study Area (Modified to cover Annual NO2 Exceedance Zone)
- Project Boundary

ARCHITECTURAL SERVICES DEPARTMENT

The joint venture of

Cinotech Consultants Ltd. and Maurice Lee & Associates Ltd.

Sub-Consultant

MVA SYSTRA GROUP

Drafting by	QL	03/16
Designed by	QL	06/16
Checked by	KS	06/16
Approved by	KS	03/16

SCALE: N.T.S @ A3 SIZE

PROJECT: Kai Tak Multi-purpose Sports Complex	
TITLE: Study Area for Annual NO2 Exceedance Zone	
DRAWING NO:	REV:
Appendix 3.10	0

Annex I

Photo Records of Exceedance Zones

Prince Edward Road East



Kai Tak Road



Lung Kong Road



Prince Edward Road East (Chek Ku Lung Road Playground)



Prince Edward Road East



Tak Ku Ling Road



Sa Po Road

Mau Tau Chung Road



Ma Tau Chung Road



Ma Tau Chung Road



Pak Tai Street



Shing Tak Street



Tam Kung Road



Tam Kung Road

Ma Tau Kok Area/ Kowloon City Road (Kai Tak Tunnel West Portal)



Kowloon City Road (Exit of Kai Tak Tunnel)



Kowloon City Road (Sun Shing Centre)



Mok Cheong Street (Sky Tower)



Mok Cheong Street



Pau Chung Street



Pau Chung Street (Jubilant Place)

To Kwa Wan Area



Hok Ling Street



Lung To Street



Mok Cheong Street



Mok Cheong Street



To Kwa Wan Road



Mok Cheong Street