土木工程拓展署
Civil Engineering and Development Department
North Development Office

Agreement No. CE 19/2019 (CE)

Development of Kwu Tung North New Development Area, Remaining Phase – Design and Construction

Proposed Minor Relaxation of Plot Ratio and Building Height Restrictions for Permitted Private Housing Developments at Various Sites within Fanling North New Development Area and Kwu Tung North New Development Area, New Territories and Proposed Public Transport Terminus, Shop and Services and Eating Place within Permitted Private Housing Development at Site K10, Planning Area 23N, Kwu Tung North New Development Area, New Territories

Air Ventilation Assessment – Expert Evaluation for Application Sites in Kwu Tung North New Development Area

May 2026

AECOM ASIA COMPANY LIMITED

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1 INTRODUCTION

1.1 Study Background

1.1.1 As part of the measures to reduce construction costs and expedite developments, the Chief Executive (“CE”) announced in 2025 Policy Address that an enhance measure to allow full gross floor area (“GFA”) exemption for no more than two levels of aboveground carparks, while doing away with the prerequisite of constructing some of the carparks underground. Furthermore, the Government continues to encourage a wider adoption of Modular Integrated Construction (“MiC”) method to shorten construction time, expedite the overall housing supply, reduce manpower in construction industry and enhance on-site safety.

1.1.2 In 2026, CEDD commissioned a Review to assess the building height ("BH") implications of accommodating the construction of two levels of aboveground carparks and adoption of MiC method at the selected private housing sites (i.e. Application Sites) in the Remaining Phase of Fanling North New Development Area ("FLN NDA") and Kwy Tung North New Development Area ("KTN NDA"). The Study identified that the approved BHs under the previous planning approvals would be insufficient. In this regard, a Section 16 ("S16") Planning Application has been prepared to seek for Minor Relaxation of PR and BH Restrictions for the Application Sites to accommodate aboveground carparks and adoption of MiC method (the “Development Proposal”). Minor Relaxation of PR Restrictions has been included under this S16 Planning Application so as to reflect the approved plot ratio ("PR") under Application Nos. A/FLN/30 and A/KTN/93, with no change to the Approved PRs for the Application Sites. As indicated, Permission for Proposed `Public Transport Terminus', `Shop and Services' and `Eating Place' uses at the planned Private Housing Development at Site K10 in Planning Area 23N of KTN NDA is also sought to reflect the development intention of the Site as approved under the Approved S16.

1.1.3 An Air Ventilation Assessment - Expert Evaluation ("AVA-EE") that assesses the air ventilation impact arising from the Development Proposal at the Application Sites at KTN NDA is prepared to support the S16 Planning Application.

2 PURPOSE AND STRUCTURE OF THIS AVA EXPERT EVALUATION REPORT

2.1 Purpose of this Report

2.1.1 The objective of the AVA-EE is to ensure that air ventilation impacts are duly considered as one of the main criteria in the planning and design process for the increase in building heights of the Development Proposals with the Application Sites.

2.1.2 This AVA-EE will provide a qualitative assessment of the intensified development scenario (Proposed Scenario) and compare it with the approved scenario (Baseline Scenario), considering the planned and committed developments in the surrounding areas. It will identify potential air ventilation issues that warrant attention, including major breezeways, air paths, problematic areas, localized wind effects, and any significant changes in wind patterns arising from the proposed relaxation of building height restrictions across most Application Sites (except for K1 and K2). Where necessary, this report will also recommend possible design improvements and mitigation measures and advise on the need for further quantitative AVA studies.

2.1.3 This Expert Evaluation will be conducted in accordance with “Housing Planning and Lands Bureau – Technical Circular No. 1/06, Environment, Transport and Works Bureau – Technical Circular No. 1/06” issued on 19th July 2006 (the Technical Circular) and “Technical Guide for Air Ventilation Assessment for Development in Hong Kong – Annex A” (the Technical Guide).

2.2 Structure of the Expert Evaluation Report

2.2.1 Apart from the introductory section on the study background (**Section 1**) and the current section describing the purpose of this AVA Report (**Section 2**), the other sections are structured as follows:

- **Section 3** provides a brief description of the Kwu Tung North New Development Area (KTN NDA) and the Application Sites.
- **Section 4** examines the Application Sites, including adjacent existing, planned and committed developments, land uses, and surrounding topographic characteristics.
- **Section 5** identifies the prevailing wind directions by reviewing the applicability of available wind data.
- **Section 6** identifies potential wind sensitive areas and provide discussions on major breezeways.
- **Section 7** presents the Development Proposal layouts and evaluation scenarios.
- **Section 8** conducts the Expert Evaluation which qualitatively assessing the prevailing wind patterns and directions at the pedestrian level within and around the Application Sites.
- **Section 9** recommends strategies for design optimization and good air ventilation design measures for the Development Proposals.
- **Section 10** summarizes the findings and conclusions of this AVA-EE Report.

3 KTN NDA AND APPLICATION SITES

3.1 Description of the Site Environs

3.1.1 The Kwu Tung North New Development Area (KTN NDA) is located in the inland area of the North-East New Territories, immediately to the west of the Fanling North New Development Area (FLN NDA). The KTN NDA is roughly trapezoidal in shape and covers approximately 447 hectares. It encompasses the areas of Tsung Yuen, Ho Sheung Heung, Long Valley and Yin Kong in the eastern portion; Fung Kong, Tung Fong and Tong Kok in the central portion; and Kwu Tung, Shek Tsai Leng, Dills Corner Garden and Pak Shek Au in the southern portion. The northern part of the NDA includes the knoll of Fung Kong Shan. Further north lies the terrain of Crest Hill (Tai Shek Mo), while the areas to the west belong to Lok Ma Chau.

3.1.2 At present, the area is predominantly occupied by brownfield uses, including rural workshops, warehouses, and temporary structures. Scattered among these are some rural residential dwellings and vegetation. The proposed KTN NDA is bounded by Sheung Yue River to the east, the hilly terrain of Lok Ma Chau to the west, the terrain of Crest Hill to the north, and Fanling Highway to the south. The western portion of the KTN NDA under the First Phase development is currently undergoing site formation and associated construction works. The thirteen Application Sites (i.e., K1 to K3, K4a, K4b, K5 to K12), which are the major focus of the current AVA Study, are located close to one another in the central to south-western portions of the KTN NDA. The location and surrounding context of the KTN NDA and the Application Sites are illustrated in **Figure 3.1**.

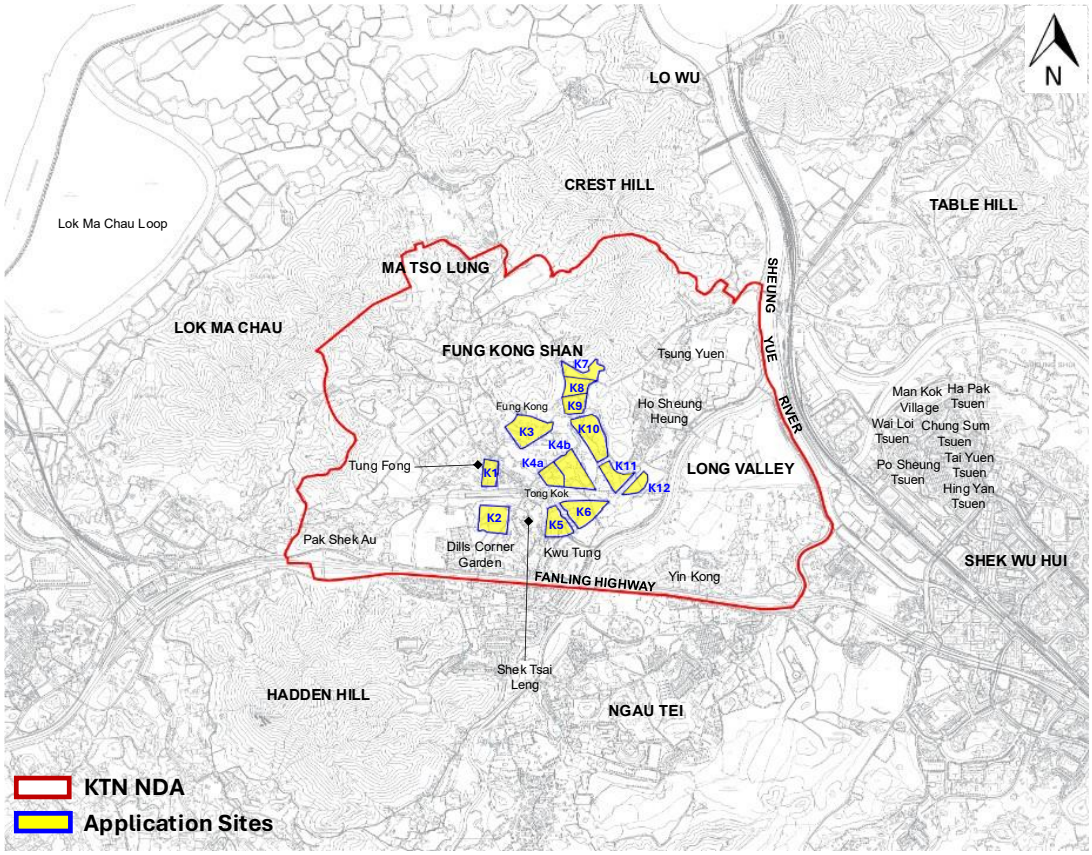


Figure 3.1 Location of the KTN NDA and Application Sites

4 LAND USE, TOPOGRAPHY AND EXISTING URBAN MORPHORLOGIES

4.1 Land Use

4.1.1 The land uses within the Kwu Tung North New Development Area (KTN NDA) are guided by the prevailing Approved Kwu Tung North Outline Zoning Plan (OZP) No. S/KTN/4. Various planned land uses are shown in **Figure 4.1**.

4.1.2 Reflecting the rural character of the area, the largest land-use zoning within the KTN NDA is "Green Belt" ("GB"), which is mainly located in the northern sector, with some "Government, Institution or Community" ("G/IC") sites intermixed. "Agriculture" ("AGR"), "Other Specified Uses" ("OU"), and "Village Type Development" ("V") zones are primarily found in the eastern sector of the NDA.

4.1.3 Among the 13 Application Sites located in the central to south-western sector of the KTN NDA, two are zoned for "Residential (Group A)" ("R(A)") developments while the remaining ten are zoned for "Residential (Group B)" ("R(B)"). The existing developments within the Application Sites mainly comprise brownfields, temporary structures, and low-rise village houses of Tung Fong, Fung Kong, Tong Kok, and Shek Tsai Leng. There are also several residential sites in the immediate vicinity of the Application Sites. Most of the areas at Dills Corner Gardens have already been zoned as "Other Specified Uses" ("OU") annotated "Business and Technology Park", "OU" annotated "Commercial/Residential Development with Public Transport Interchange", "OU" annotated "Mixed Use", and "Government, Institution or Community" uses. Minor areas between the clusters of Application Sites fall under "Open Space" zoning on the prevailing Approved KTN OZP Plan No. S/KTN/4. The northern part of the NDA is zoned "OU" annotated "Research and Development".

4.1.4 As the KTN NDA is situated in a rural part of Hong Kong, most of the surrounding areas outside the NDA boundary are zoned "Green Belt" ("GB"), "Agriculture" ("AGR"), and "Other Specified Uses" ("OU"), with scattered "Village Type Development" ("V") zones. To the west of the Application Sites (outside the NDA) are "GB" areas at Lok Ma Chau. To the north are "GB" areas at Fung Kong Shan, with "AGR" lands at Ma Tso Lung and "GB" areas at Crest Hill further north. Immediately to the east of the Application Sites are the village houses of Ho Sheung Heung, which will be retained. Further east, across Sheung Yue River, lie "OU" zones and village houses at Wai Lo Tsuen, with the Long Valley Nature Park located in the eastern lowland area beyond the river. To the south of the Application Sites, across Fanling Highway, are "Residential (Group C)" ("R(C)") zones occupied by existing low-rise residential developments, including Europa Garden, The Valais, and Casas Domingo. Immediately to the east of the low-rise residential developments belonging to The Valais, and near Yin Kong Village, an area is zoned "Comprehensive Development Area" ("CDA") intended for comprehensive low-density residential development with the provision of open space and supporting facilities.

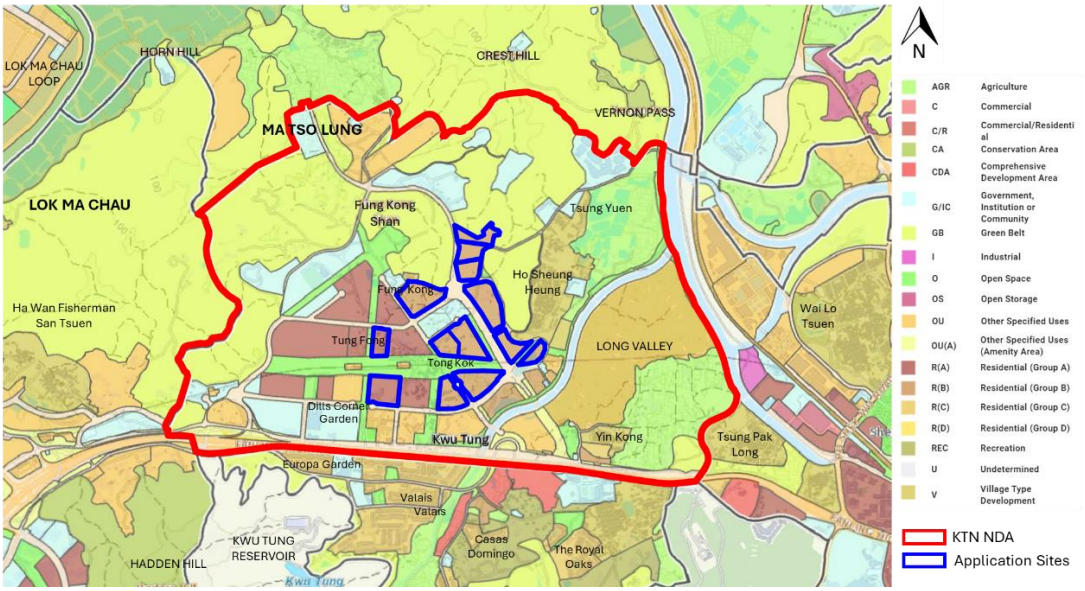


Figure 4.1 Land Use within and near the KTN NDA

4.2 Topography

4.2.1 The Kwu Tung North New Development Area (KTN NDA) is located in the north-eastern part of the New Territories. As shown in **Figure 4.2**, most of the Application Sites are situated on a relatively large flatland area, surrounded by hilly terrain of varying heights. To the north and north-east of the KTN NDA lie the hilly terrains of Crest Hill (~150mPD) and Sandy Ridge (~120mPD), both exceeding 100mPD. To the east are the flatlands of Fanling and Sheung Shui New Towns, with High Hill (~160mPD) located further east. To the west are the hilly areas of Lok Ma Chau (~100mPD and above), while the San Tin area planned with extensive future developments to the south-west is relatively flat.

4.2.2 The topography in the south-western, southern, and south-eastern portions of the KTN NDA is generally below 50mPD. Prominent hills to the south and south-west include Hadden Hill (maximum ~200mPD) and Ngau Tam Shan (maximum ~340mPD). Fuk Tsuen Shan (~50mPD), a gentler terrain, lies to the south-east, while Kei Lak Tsai (~250mPD) is located further south-east. **Figure 4.2** illustrates the surrounding topography of the KTN NDA.

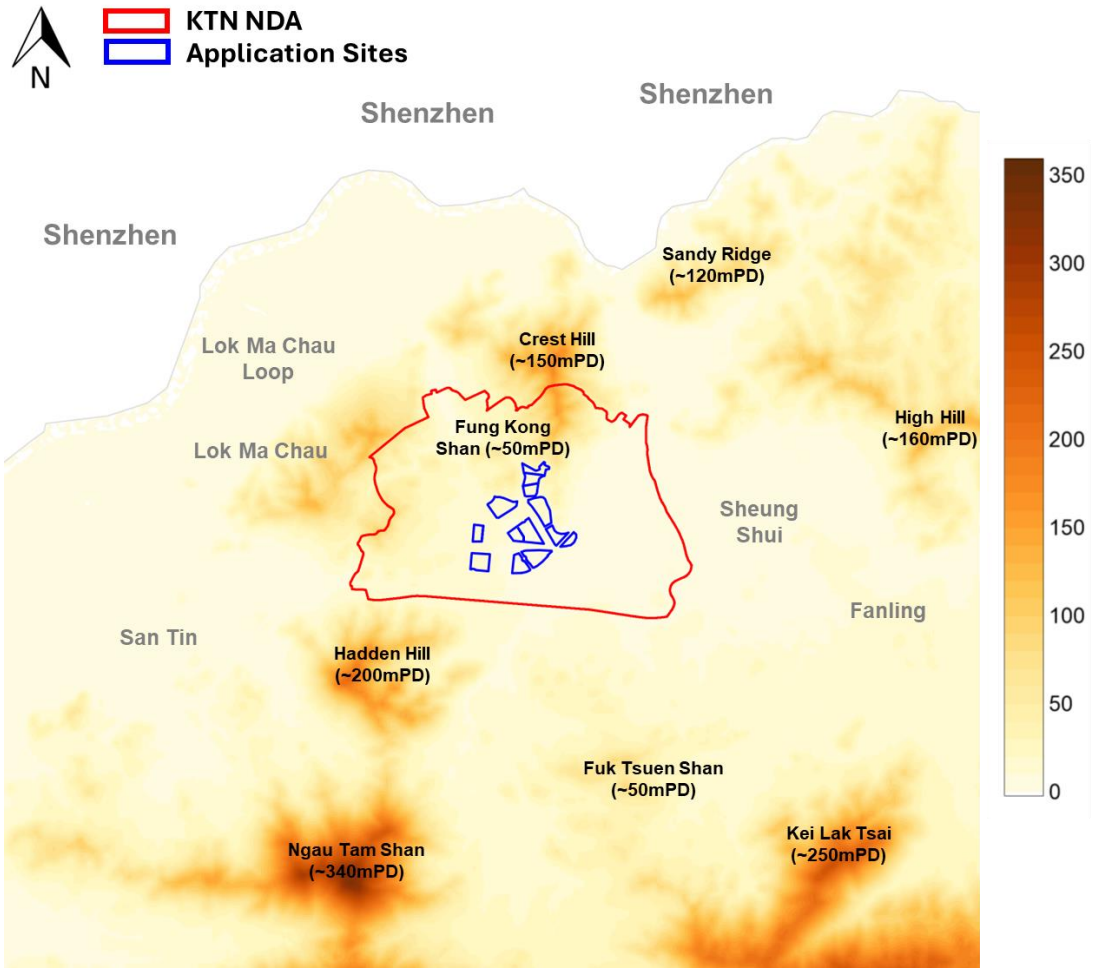


Figure 4.2 Topographical Map near the KTN NDA and Application Sites

4.3 Existing Urban Morphology

4.3.1 The Kwu Tung North New Development Area (KTN NDA) is located in the north-eastern part of the New Territories, within a relatively less developed region of Hong Kong. The area is currently characterized by rural settlements, low-rise low-density villages, open storage yards, and rural industries.

4.3.2 The KTN NDA is generally flat. Several existing village environs lie within the NDA and are largely preserved or will be redeveloped with low-rise buildings up to 3 storeys in height. These include Ho Sheung Heung, Yin Kong, and associated villages in the eastern section. The areas to the north and west of the KTN NDA remain predominantly rural, with scattered village house developments such as Ma Tso Lung San Tsuen, Chau Tau Tsuen, Pun Uk Tsuen, and San Tin Heung. To the north-west, the Lok Ma Chau Loop is planned for mid-rise development with building heights of up to approximately 54mPD.

4.3.3 To the south of the KTN NDA, east of Hadden Hill, there are several low-density private residential developments, including Europa Garden, Valais, Casas Domingo, The Royal Oaks, Goodwood Park, Regent Garden, St. Andrews Place, and Oakville. To the south-east, on both sides of Fanling Highway near Shek Wu Hui, more urbanized areas exist, featuring public housing estates such as Cheung Lung Wai Estate, Ching Ho Estate, Tai Ping Estate, Choi Yuen Estate, and Po Shek Wu Estate.

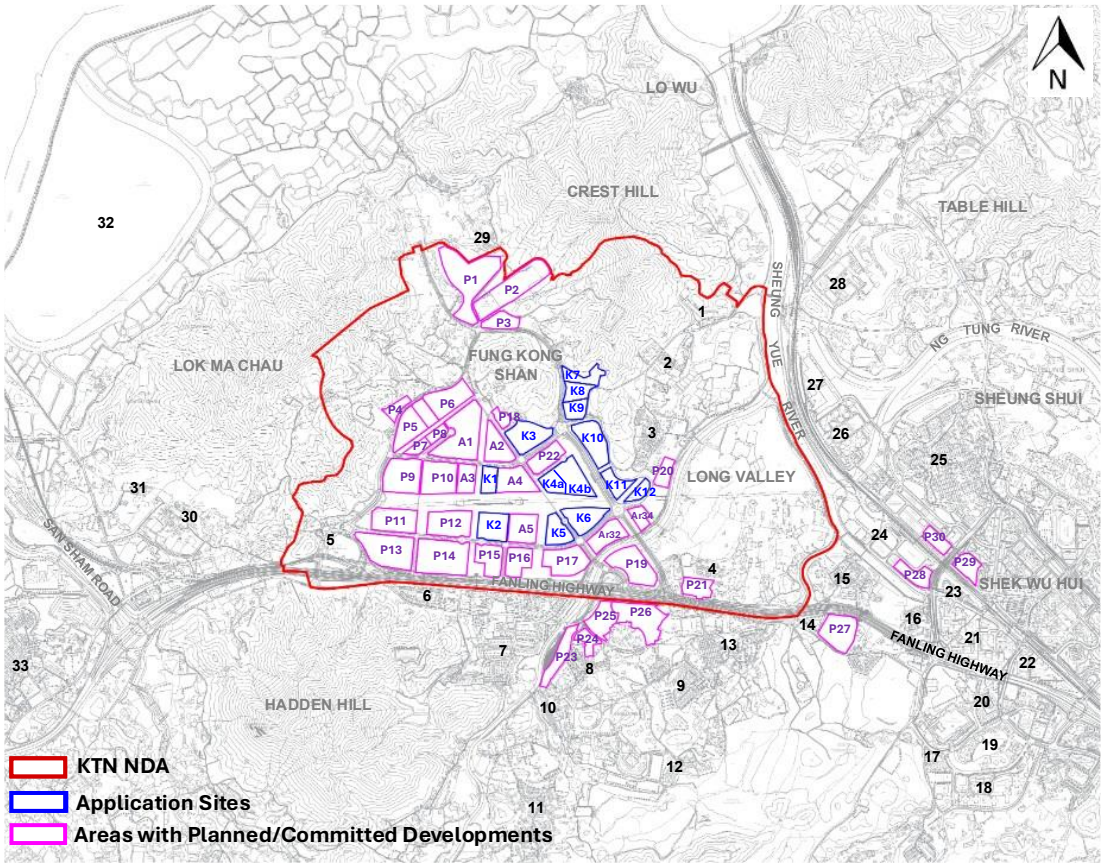
4.3.4 To the east of the KTN NDA, across the Sheung Yue River, the land is primarily used for industrial purposes, including the Hi Tech Centre, Advanced Technology Centre, and Jumbo Plaza. The Shek Wu Hui Sewage Treatment Works and Sheung Shui Sewage Treatment Works are also located on the eastern side. Further east and north of the Shek Wu Hui Sewage Treatment Works lie the Sheung Shui Slaughterhouse and Chung Sum Tsuen with its surrounding villages. The locations of these areas are indicated in **Figure 4.3**.

4.3.5 The thirteen Application Sites are located within the KTN NDA and are labelled K1 to K3, K4a, K4b, K5 to K12 in **Figure 4.3**. Within the KTN NDA, extensive areas with planned or committed developments surround the cluster of Application Sites. These areas are marked with the prefix P (i.e., P1 to P22) in **Figure 4.3**.

4.3.6 Areas P1 to P3, located in the northern portion of the KTN NDA, are primarily planned for Government, Institution or Community (GIC) and other specified uses. Areas P4 to P8 and P13 to P14, situated to the north-west and south-west of Areas A1 and A3 respectively, are also mainly designated for GIC uses. Areas P9 to P12, to the west of the Application Sites cluster, are planned for high-rise residential blocks with ancillary facilities. Other planned developments in Areas P13 to P19 include hospitals, clinics, health centers, commercial buildings, research and development facilities, and additional GIC uses such as schools. Non-Building Areas (NBAs) are incorporated within Areas P15 to P17, P19, Ar32 as well as Application Sites K4, K9 to K12. Terraced podiums, a measure to enhance air ventilation, are provided in Areas P10, P12, and P15, A1 – A5 as well as Application Sites K1 and K2.

4.3.7 In addition to the planned or committed developments within the KTN NDA (P1 to P22), several areas with planned or committed residential developments are in immediate vicinity (P23 to P30). Areas P23 to P26 (to the south) and P27 (to the south-east) are designated for residential blocks. High-rise residential blocks are also anticipated in Areas P28 to P30.

4.3.8 The illustrative figures in **Appendix A** provide an overview of the building layouts and morphologies in the areas with planned or committed developments, together with the maximum building heights and the locations of required NBAs and terraced podiums.



Description	Max. Building Height Restriction (mPD) (s.16)	Description	Max. Building Height Restriction (mPD) (s.16)
Application Sites			
K1	~130mPD	K2	~130mPD
K3	~95mPD	K4a, b	~85mPD
K5	~80mPD	K6	~80mPD
K7	~100mPD	K8	~90mPD
K9	~85mPD	K10	~110mPD
K11	~90mPD	K12	~90mPD
Planned and Committed Developments within the KTN NDA			
A1 – Residential Buildings	~180mPD	A2 – Residential Buildings	~160mPD
A3 – Residential Buildings	~145mPD	A4 – Residential Buildings	~140mPD
A5 – Residential Buildings	~135mPD	Ar32 – Residential Buildings	~75mPD
Ar34 – Residential Buildings	~70mPD	-	-
P1 – Other Specified Uses (Research and Development, Commercial)	~65mPD	P2 – Existing Firing Range	-
P3 – GIC Buildings	~65mPD	P4 – GIC Building (School)	~52mPD
P5 – GIC Buildings (District Headquarters and its Associated Married Staff Quarters, Divisional Police Station)	~130mPD	P6 – GIC Buildings (Standard Swimming Pools and Sports Centre)	~53mPD
P7 – GIC Buildings (Schools)	~44mPD	P8 – GIC Buildings (Schools)	~52mPD
P9 – Residential Buildings	~151mPD	P10 – Residential Buildings	~146mPD
P11 – Residential Buildings	~135mPD	P12 – Residential Buildings	~125mPD
P13 – GIC Buildings	~130mPD	P14 – GIC Buildings	~170mPD
P15 – Mixed Use (Residential and Commercial Buildings)	~110mPD	P16 – Other Specified Uses (Business and Technology Park)	~60mPD

Description	Max. Building Height Restriction (mPD) (s.16)	Description	Max. Building Height Restriction (mPD) (s.16)
P17 – Other Specified Uses (Business and Technology Park)	~55mPD	P18 – GIC Buildings (School)	~44mPD
P19 – Other Specified Uses (Business and Technology Park)	~55mPD	P20 – Village Houses	~16mPD
P21 – Residential Buildings	~55mPD	P22 – GIC Buildings (School)	~35mPD
Planned and Committed Developments outside and near the KTN NDA			
P23 – Residential Buildings	~70mPD	P24 – Residential Buildings	~72mPD
P25 – Residential Buildings	~75mPD	P26 – Residential Buildings	~75mPD
P27 – Residential Buildings	~130mPD	P28 – Residential Buildings	~144mPD
P29 – Residential Buildings	~149mPD	P30 – Residential Buildings	~149mPD
Existing Developments within and near the KTN NDA			
1. Lo Wu Correctional Institute	4 storeys	2. Tsung Yuen	~23mPD
3. Ho Sheung Heung	~23mPD	4. Yin Kong	~16mPD
5. Pak Shek Au/Planned Plant for district cooling system	~35mPD	6. Europa Garden	~36mPD
7. Valais	~23mPD	8. Casas Domingo	~22mPD
9. The Royal Oaks	~27mPD	10. Goodwood Park	~17mPD
11. Regent Garden	~22mPD	12. St. Andrews Place	~41mPD
13. Oakville	3-4 storeys	14. Golf Parkview	~31mPD
15. Tsung Pak Long	~17mPD	16. Tai Tau Leng	~15mPD
17. Cheung Lung Wai Estate	~143mPD	18. Ching Ho Estate	~133mPD
19. Royal Green	~136mPD	20. Tai Ping Estate	~91mPD
21. Choi Yuen Estate	~90mPD	22. Yuk Po Court	~71mPD
23. Po Shek Wu Estate	~114mPD	24. Hi Tech Centre, Advanced Technology Centre, Jumbo Plaza	~40mPD
25. Chung Sum Tsuen and surrounding villages	~20mPD	26. Shek Wu Hui Sewage Treatment Works	~25mPD
27. Sheung Shui Slaughterhouse	4 storeys	28. Sheung Shui Treatment Works and Freshwater Pumping Station	-
29. Ma Tso Lung San Tsuen	~25mPD	30. Chau Tau Tsuen	~13mPD
31. Pun Uk Tsuen	~19mPD	32. Lok Ma Chau Loop	Development Proposal of around ~54mPD
33. San Tin Heung	~19mPD		

Figure 4.3 Existing / Committed / Planned Major Developments near / within the KTN NDA

4.4 Formed Roads and Separations in between Application Sites

4.4.1 The surroundings of the Application Sites are relatively open and are currently occupied by low-rise squatters and structures. According to the latest Outline Zoning Plan (OZP), a new road network and separations are planned, as shown in **Figure 4.4**. The major roads and their respective sections are highlighted and annotated in red in **Figure 4.4** to facilitate discussion of wind flow patterns in later sections of this report. In addition, the major separations between the Application Sites and the surrounding planned or committed developments are indicated in magenta. In total, fifteen major roads (Roads D1 to D5, Roads P1 to P2, and Roads L1 to L8) and four major separations have been identified. While noise barriers are required along portions of these major roads to mitigate potential traffic noise impacts, such noise barriers, together with the elevated highways, will inevitably affect the localized pedestrian wind environment. The locations of the proposed noise barriers are shown in **Propo B** for reference.

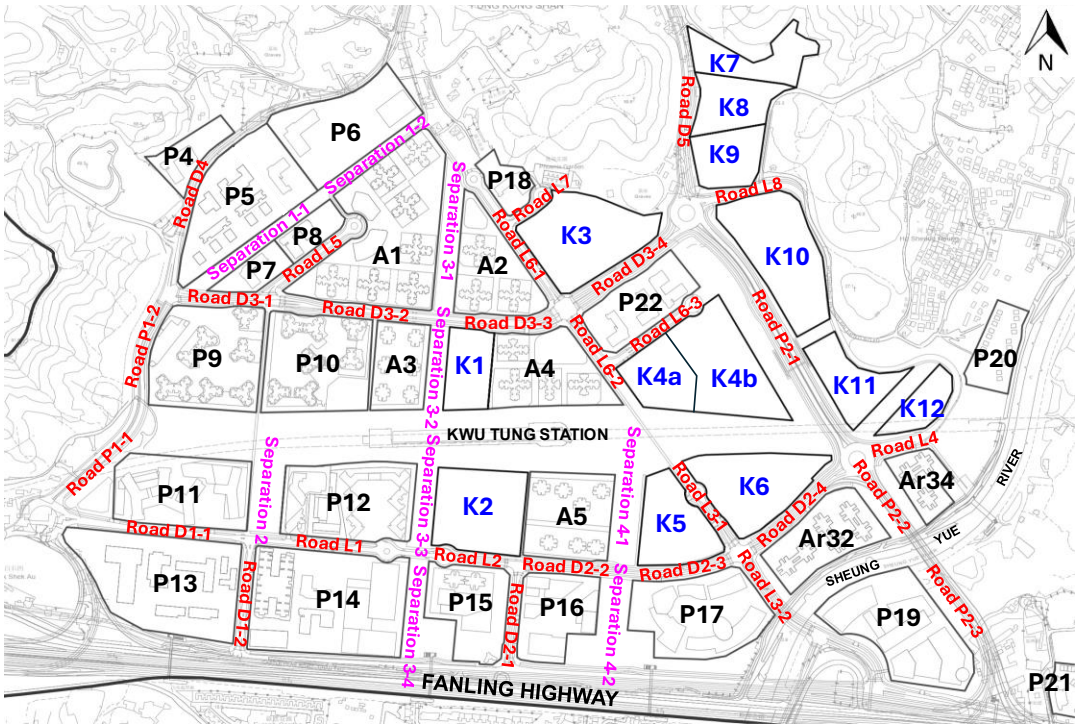


Figure 4.4 Annotation and Indication of the New Roads and Separations formed by Application Sites and the Surrounding Planned/Committed Developments

5 WIND AVAILABILITY

5.1 Planning Department RAMS Wind Data

5.1.1 Natural wind availability is critical for assessing wind ventilation performance and determining prevailing wind directions at the site. Site wind data can be obtained from three main sources: Regional Atmospheric Modelling System (RAMS) data provided by the Planning Department, experimental wind tunnel test data, and on-site measured data from the Hong Kong Observatory (HKO) weather stations.

5.1.2 This section analyses and compares computed wind data from the Regional Atmospheric Modelling System (RAMS) for the area near the KTN NDA to identify the prevailing wind directions.

5.1.3 The Hong Kong Planning Department (hereafter referred to as PlanD) has released a set of predicted wind data simulated using the RAMS model. For this study, wind data representing the predicted wind availability was extracted from four grids covering the Application Sites. The locations of these grids in relation to the KTN NDA are shown schematically in **Figure 5.1**. The annual and summer wind roses at the 200 m level for these grids are presented in **Figure 5.2**.

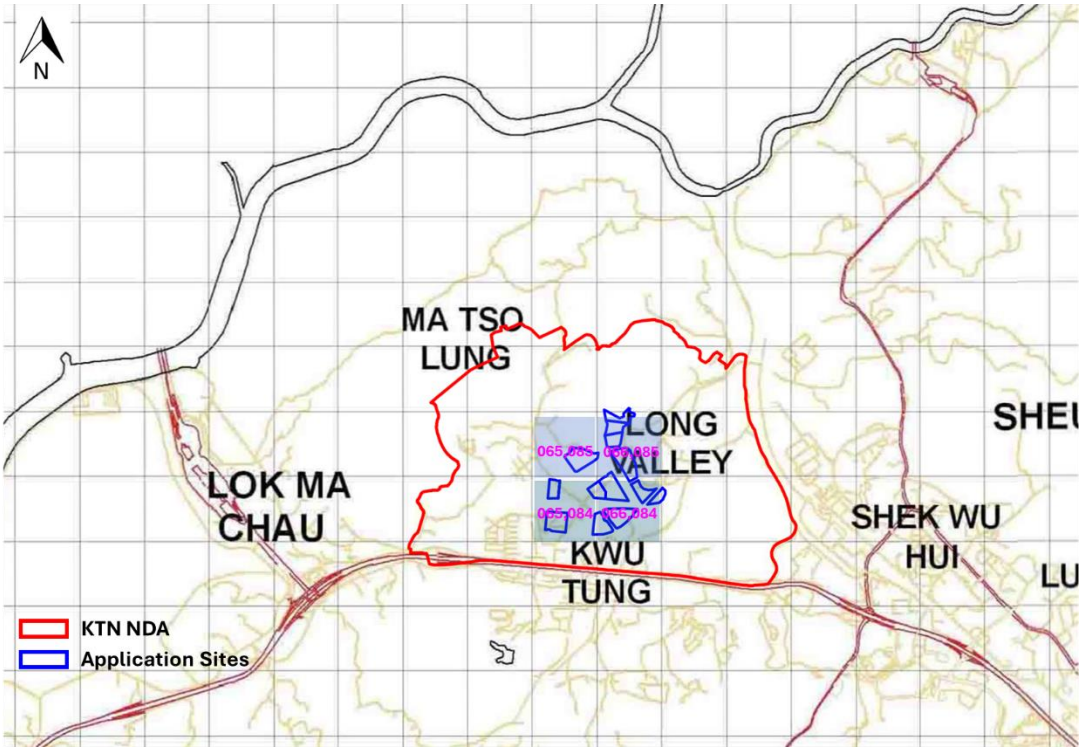


Figure 5.1 Locations of RAMS grids covering the Application Sites for Wind Data Extraction

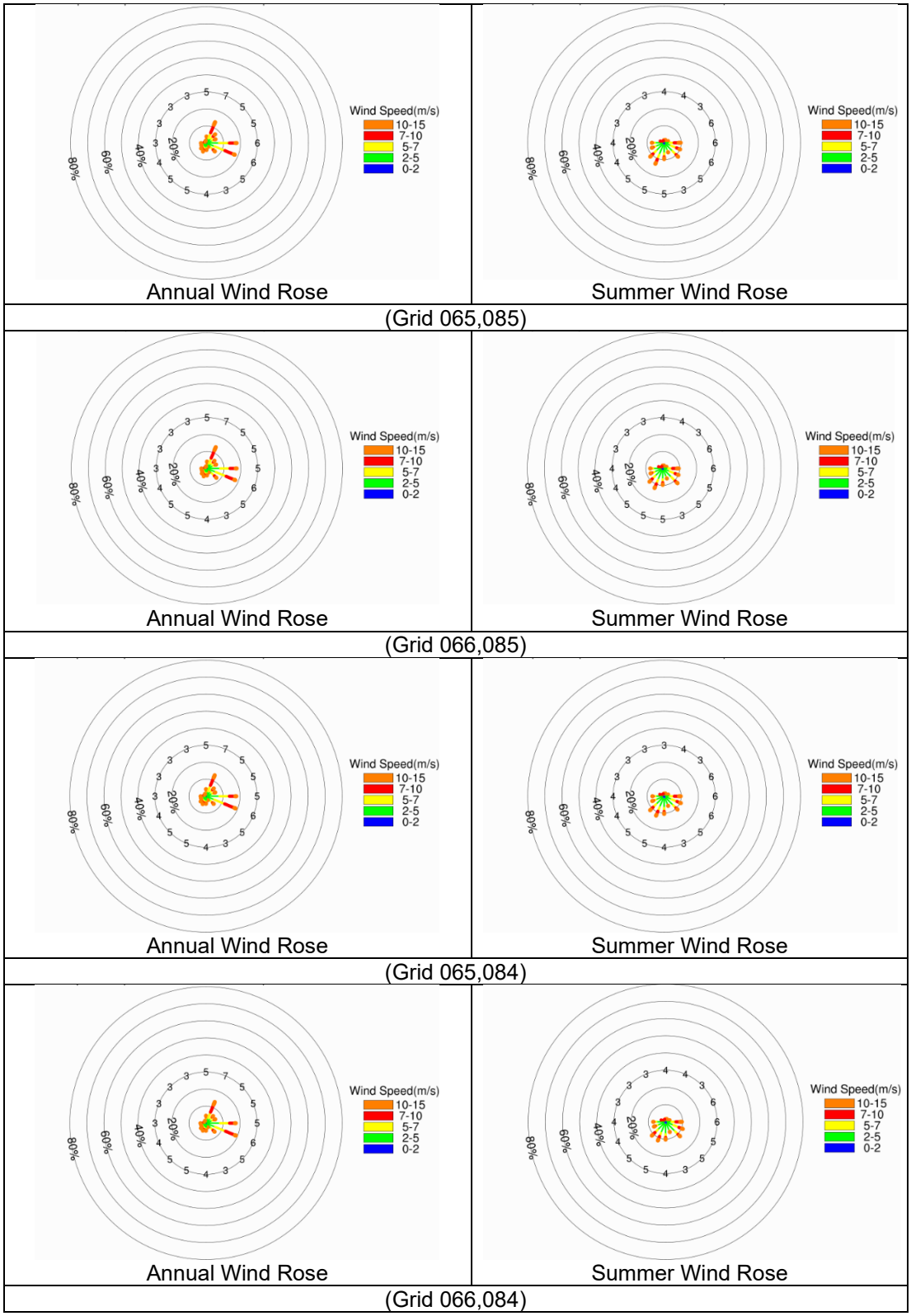


Figure 5.2 200m Annual and Summer Wind Roses of the four RAMS grids covering the Application Sites

5.1.4 The directional winds with the highest frequency of occurrence were identified for both the annual and summer seasons. The percentage occurrences for these dominant wind directions are summarized in **Table 5.1a** (annual) and **Table 5.1b** (summer). As shown in these tables, the prevailing winds at the grids covering the Application Sites are generally from the NNE, E, and ESE directions during the annual season. In contrast, during the summer season, the

prevailing winds predominantly originate from the southern quadrant, including ESE, SE, S, SSW, and SW, with an average frequency of occurrence exceeding 10% across the four identified RAMS grids.

Table 5.1a Frequencies of Annual Occurrence of Individual Wind Directions at 200mPD for KTN NDA and Application Sites

Annual, 200m				
Wind Directions	Frequency Occurrence			
	Grid (65,85)	Grid (66,85)	Grid (65,84)	Grid (66,84)
N	3.9%	4.1%	4.2%	4.3%
NNE	**13.3%**	**13.6%**	**13.3%**	**13.4%**
NE	7.2%	6.3%	6.5%	5.9%
ENE	5.8%	5.9%	5.9%	6.0%
E	**17.8%**	**17.6%**	**17.9%**	**17.6%**
ESE	**18.1%**	**18.1%**	**18.8%**	**19.1%**
SE	7.0%	7.9%	6.4%	7.1%
SSE	2.5%	2.6%	2.6%	2.7%
S	4.1%	4.2%	4.5%	4.5%
SSW	5.4%	5.1%	5.1%	4.8%
SW	4.5%	5.1%	4.4%	4.2%
WSW	3.3%	3.2%	3.2%	3.1%
W	3.2%	3.3%	3.1%	3.2%
WNW	1.4%	1.4%	1.5%	1.5%
NW	1.1%	1.0%	1.1%	1.1%
NNW	1.4%	1.4%	1.5%	1.5%

Table 5.1b Frequencies of Summer Occurrence of Individual Wind Directions at 200mPD for KTN NDA and Application Sites

Summer, 200m				
Wind Directions	Frequency Occurrence			
	Grid (65,85)	Grid (66,85)	Grid (65,84)	Grid (66,84)
N	1.6%	1.7%	1.6%	1.6%
NNE	1.8%	1.9%	1.8%	1.8%
NE	1.3%	1.2%	1.2%	1.3%
ENE	2.6%	2.6%	2.7%	2.6%
E	9.9%	9.6%	9.9%	9.6%
ESE	**10.2%**	**10.2%**	**10.7%**	**10.9%**
SE	**11.6%**	**12.4%**	**11.2%**	**11.9%**
SSE	6.1%	6.5%	6.2%	6.4%
S	**9.6%**	**9.8%**	**10.5%**	**10.4%**
SSW	**13.4%**	**12.6%**	**12.4%**	**11.8%**
SW	**11.6%**	**11.2%**	**11.7%**	**11.4%**
WSW	7.8%	7.8%	7.5%	7.3%
W	7.2%	7.4%	6.9%	7.2%
WNW	2.5%	2.6%	2.8%	2.8%
NW	1.4%	1.3%	1.5%	1.5%
NNW	1.4%	1.2%	1.4%	1.5%

5.2 Wind Tunnel Experimental Wind Data

5.2.1 Reference is made to the "Experimental Site Wind Availability Study for the North-East New Territories New Development Areas" conducted in 2010. The study was carried out using a 1:2000 scale topographical model to evaluate the effects of surrounding topography and the urban environment on mean wind speeds and turbulence intensities over the KTN NDA and FLN NDA. Although **Figure 5.3** shows the locations of both NDAs and the corresponding measurement points from the wind availability study, the present study focuses on wind data for the KTN NDA. Photographs of the 1:2000 scale topographical model of the KTN NDA in the low-speed wind tunnel test section, taken under north, east, south, and west wind directions, are presented in **Figure 5.4** for reference.

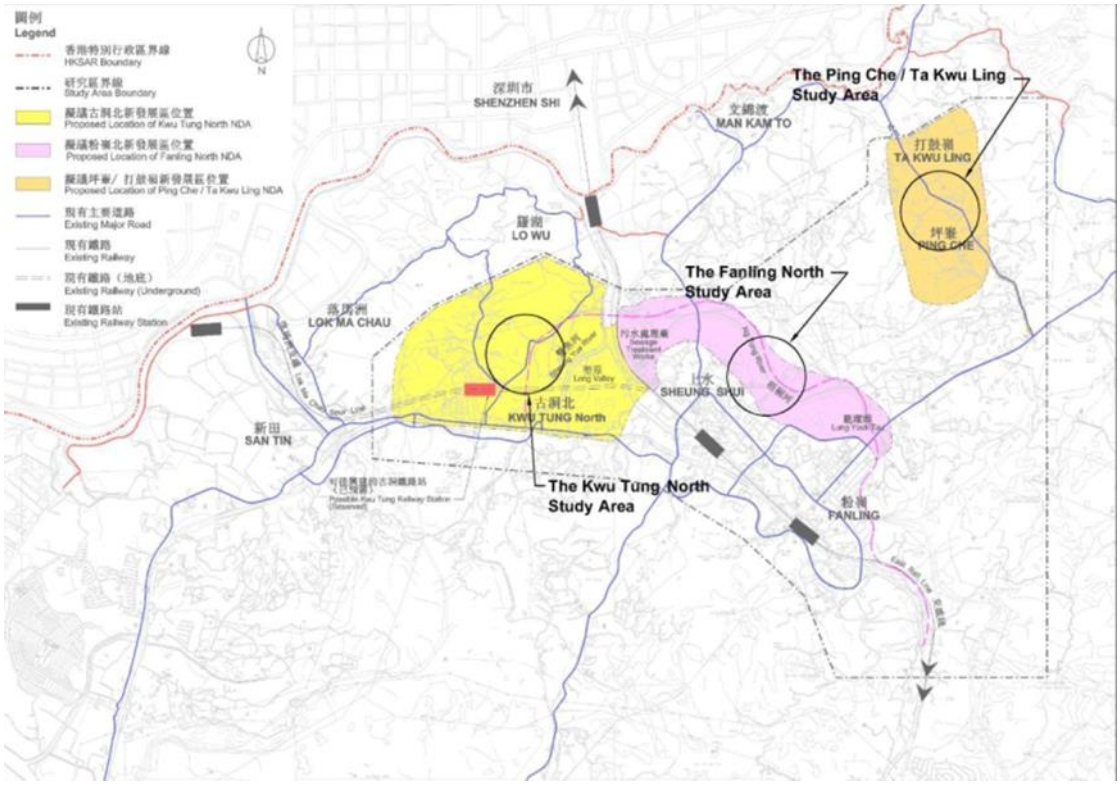


Figure 5.3 Wind Tunnel Test for KTN NDA

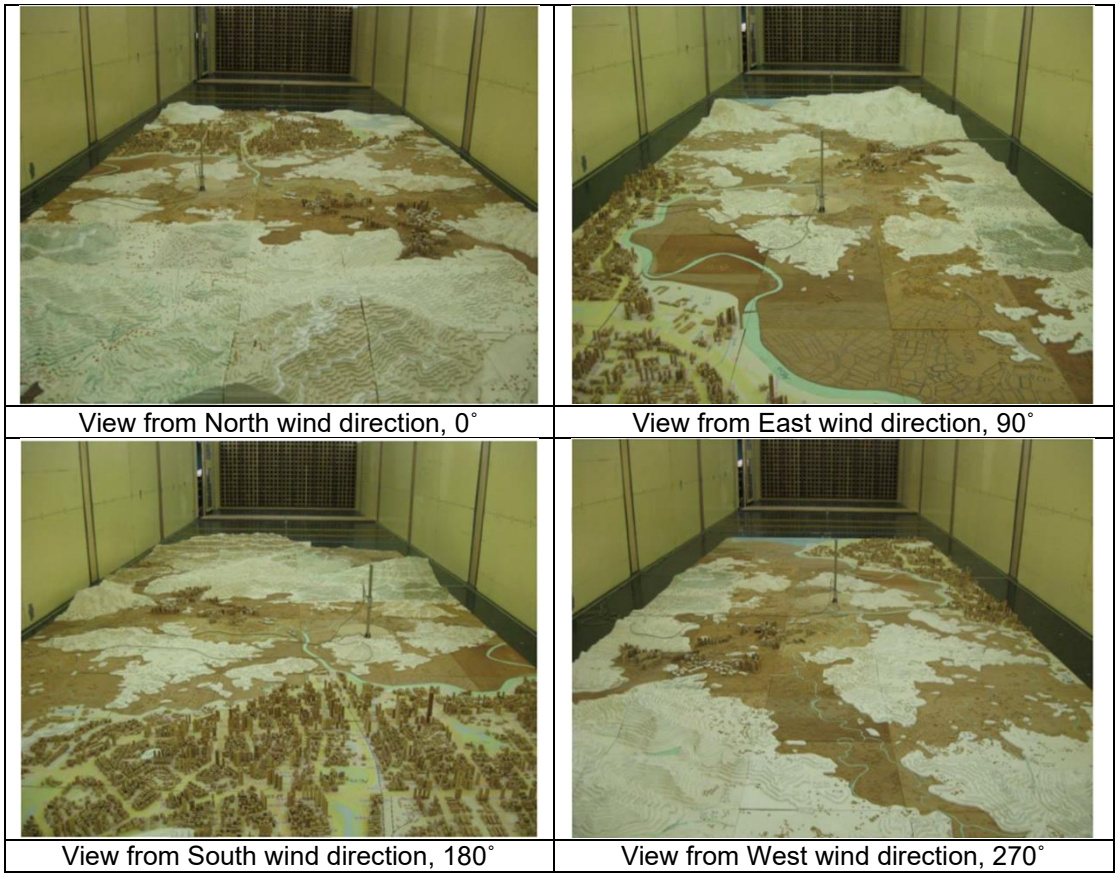


Figure 5.4 1:2000 scale topographical model of the Kwu Tung North Study Area in the low-speed test section from different views

5.2.2 The wind tunnel testing techniques employed in the site wind availability study complied with the quality assurance requirements stipulated in the Australasian Wind Engineering Society Quality Assurance Manual, AWES-QAM-1-2001 (2001), and the American Society of Civil Engineers Manual and Report on Engineering Practice No. 67 – Wind Tunnel Studies of Buildings and Structures (1999). The study was also conducted in accordance with the recommendations set out in the Planning Department's Feasibility Study for Establishment of Air Ventilation Assessment System – Final Report (2005) and the Technical Guide for Air Ventilation Assessment for Developments in Hong Kong (2006).

5.2.3 The wind tunnel test results were subsequently combined with a statistical model to derive the directional wind characteristics and wind availability for the KTN NDA. The annual and summer wind roses for the KTN NDA are presented in **Figure 5.5**. These wind roses illustrate the frequency of occurrence of each of the 16 wind directions and the corresponding wind speed distribution at 100mPD.

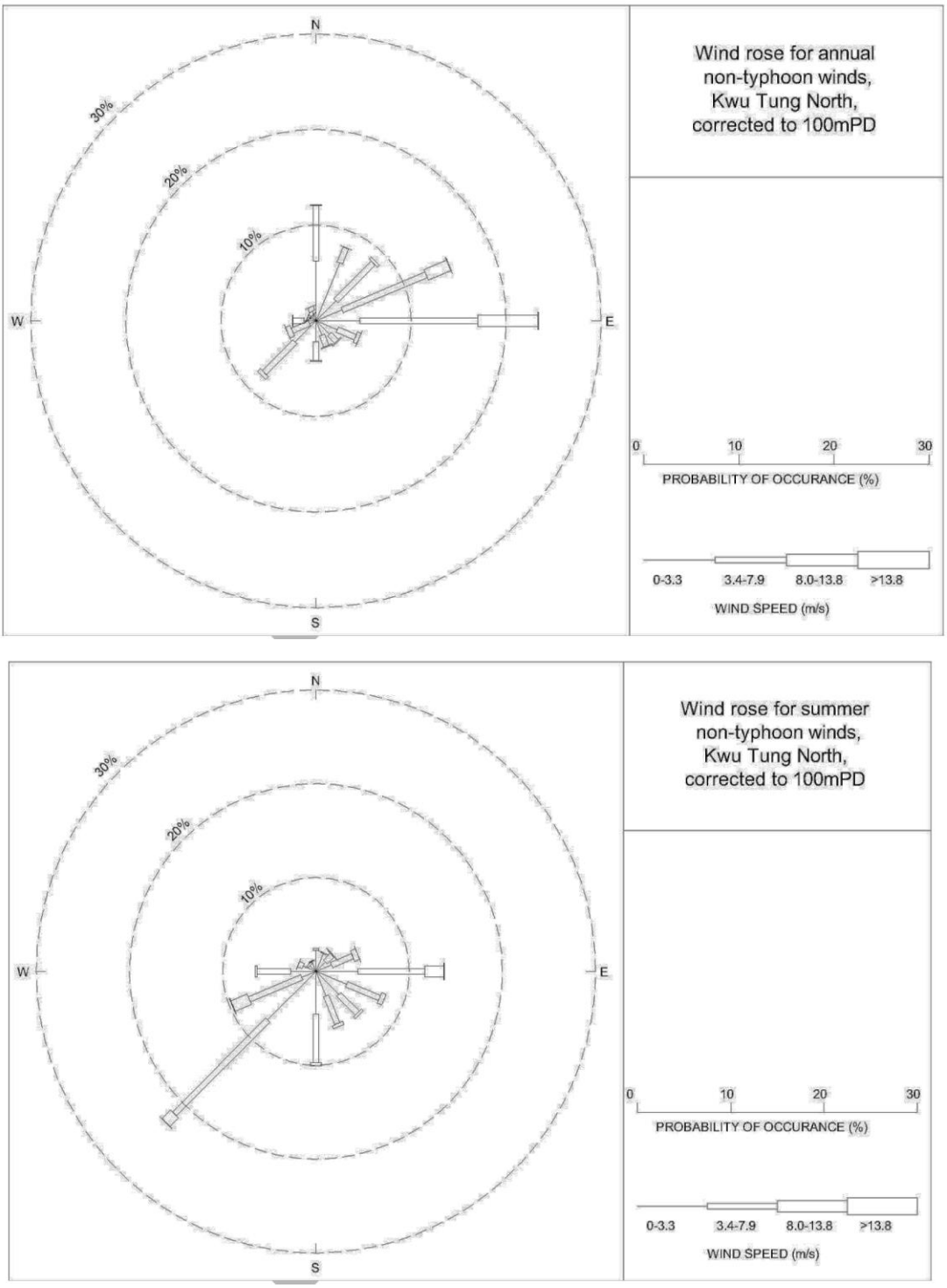


Figure 5.5 Wind Roses for annual and summer, non-typhoon winds for Kwu Tung North corrected to 100mPD

5.2.4 The wind roses from the experimental site wind availability study indicates that the annual prevailing winds at the KTN NDA are predominantly from the east (E), east-north-east (ENE), and north (N) directions. In summer, the prevailing winds mainly originate from the east (E), south (S), and south-west (SW) directions. The frequencies of occurrence of individual wind directions during the annual and summer seasons at 100mPD for the KTN NDA are summarized in **Table 5.2**.

Table 5.2 Frequencies of Annual and Summer Season Occurrence of Individual Wind Directions at 100mPD for KTN NDA

Wind Direction	% of Annual Occurrence	% of Summer Occurrence
0º (N)	**12.1%**	2.5%
22.5º (NNE)	8.3%	2.2%
45º (NE)	8.8%	2.5%
67.5º (ENE)	**15.1%**	4.8%
90º (E)	**23.4%**	**13.8%**
112.5º (ESE)	4.9%	7.9%
135º (SE)	3.1%	6.5%
157.5º (SSE)	3.0%	6.4%
180º (S)	4.3%	**10.1%**
202.5º (SSW)	0.0%	0.0%
225º (SW)	8.1%	**22.8%**
247.5º (WSW)	3.2%	9.7%
270º (W)	2.5%	6.5%
292.5º (WNW)	1.0%	2.0%
315º (NW)	0.6%	1.1%
337.5º (NNW)	1.5%	1.2%

5.3 HKO Weather Station Wind Data

5.3.1 The Lok Ma Chau and Au Tau automatic rainfall stations, located near the KTN NDA and the Application Sites, do not record wind data. The nearest operating weather stations to the Application Sites and the KTN NDA are the Tai Lung, Sheung Shui, and Beas River Automatic Weather Stations, as shown in **Figure 5.6**. However, these stations do not measure wind speed or direction and therefore cannot be used for wind data comparison in this study. The nearest weather station equipped with wind measurement instruments is the Wetland Park Weather Station. Due to its considerable distance from the KTN NDA and the Application Sites, wind data from this station is also considered unsuitable for comparative purposes.

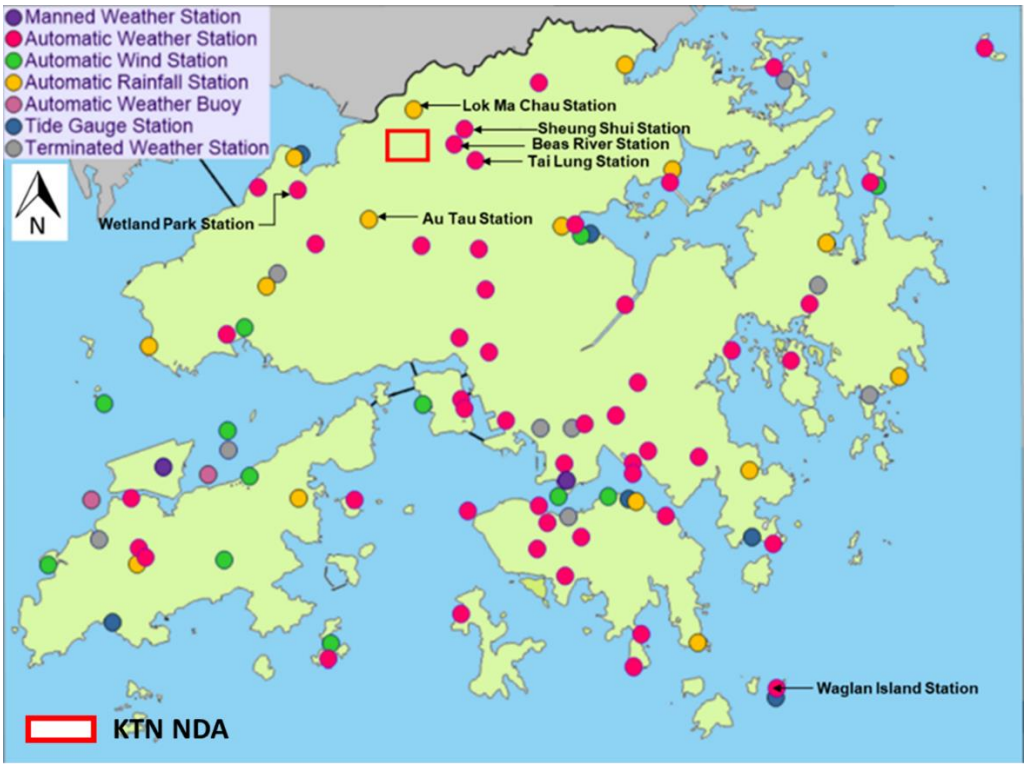


Figure 5.6 Locations of HKO Weather Stations

5.3.2 In addition to the weather stations mentioned above, the Waglan Island Weather Station is noted for its generally unobstructed exposure and is often regarded as a representative reference for the prevailing wind conditions across the Hong Kong region. However, due to its considerable distance from the KTN NDA and the Application Sites, it is not considered representative for identifying the prevailing wind directions specific to the KTN NDA. The annual and summer wind roses for the Waglan Island Weather Station are presented in **Figure 5.7** for reference. Based on the discussions in **Section 5.3.1** and the points raised above, wind data from Hong Kong Observatory (HKO) weather stations will not be used as a reference for determining the prevailing wind directions in this study.

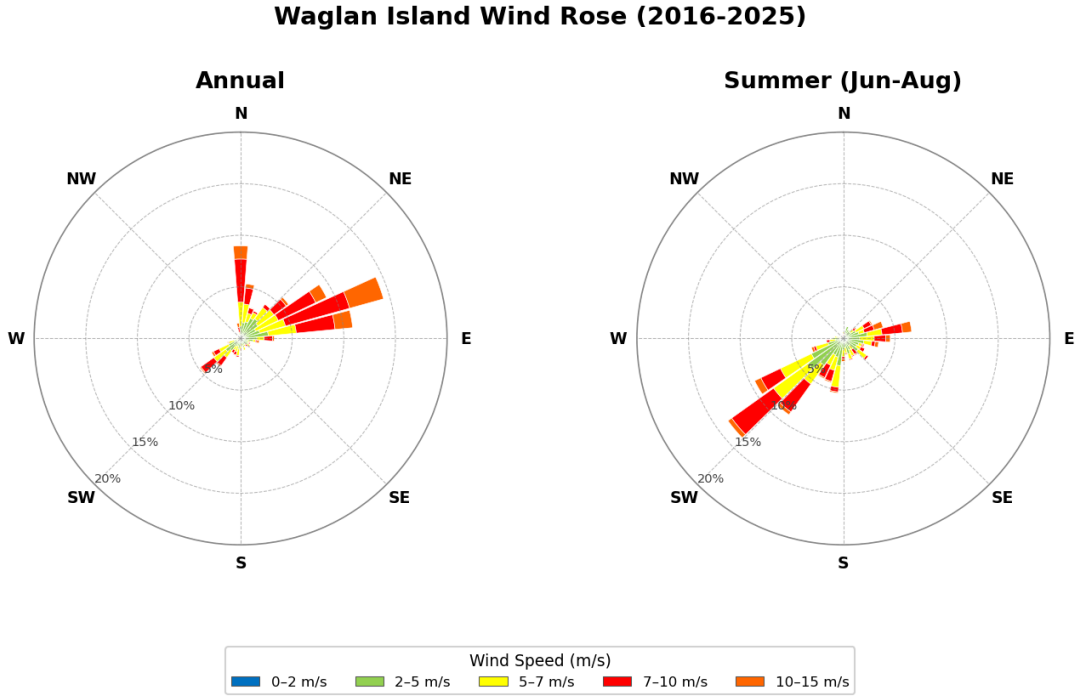


Figure 5.7 Wind Roses recorded at Waglan Island Weather Station (2016-2025)

5.4 Summary

5.4.1 As the "Experimental Site Wind Availability Study for the North-East New Territories New Development Areas" conducted in 2010 specifically focused on the site wind conditions for the KTN NDA, the wind tunnel experimental data are considered the most appropriate source for identifying the prevailing wind directions in this study. Wind data from the Hong Kong Observatory (HKO) weather stations and the RAMS model are still presented above for reference. The wind availability data from the wind tunnel experiment indicates that the annual prevailing winds towards the Application Sites are predominantly from the north (N), east-northeast (ENE), and east (E) directions. In summer, the wind environment is dominated by winds from the east (E), south (S), and south-west (SW) directions. **Figure 5.8** illustrates the prevailing wind directions towards the KTN NDA and the Application Sites.

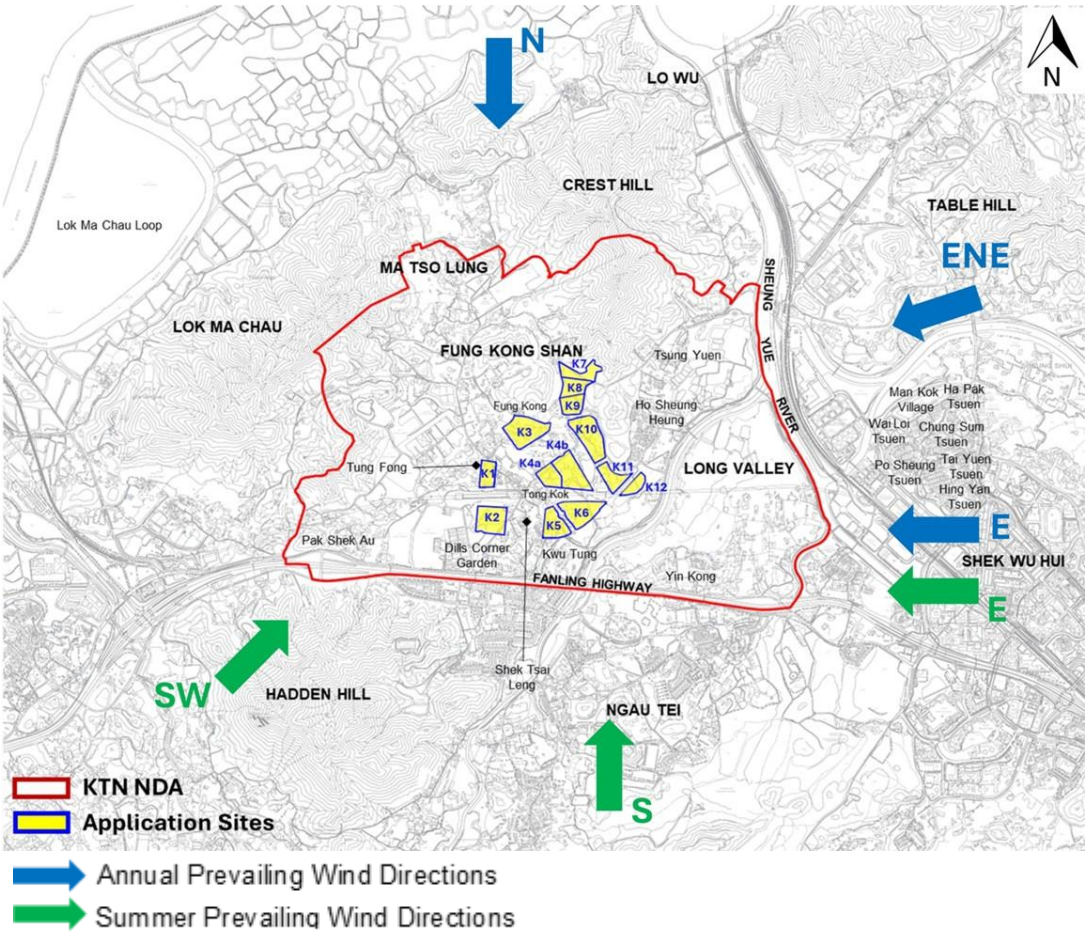


Figure 5.8 Illustration of Prevailing Wind Directions approaching the KTN NDA and Application Sites

6 WIND SENSITIVE AREAS AND IDENTIFIED BREEZEWAYS

6.1 Potential Wind Sensitive Areas

Potential Wind Sensitive Areas under the Identified Prevailing Wind Directions

6.1.1 Potential wind sensitive areas identified under northerly (N) annual prevailing wind include the areas along Kwu Tung Station immediately downstream of Application Sites K1 and K4; Area P15 located downwind of Application Site K2; Eastern portion of Area A2, Areas A4 and P22 located downwind of Application Site K3; Areas P17 and Ar32 located downwind of Application Sites K5 and K6, and Area Ar34 located downwind of Application Site K12.

6.1.2 Potential wind sensitive areas identified under east-northeast (ENE) annual wind conditions include Areas A3 and P12/P14 located immediately downstream of Application Sites K1 and K2 respectively; Area A2 located immediately downwind of Application Site K3; Areas A4 and Kwu Tung Station located downwind of Application Site K4a, K4b; Area A5 located downwind of Application Sites K5, K6, as well as Area P22 located to the downwind of Application Site K10 across Road P2-1.

6.1.3 Under the easterly (E) annual and summer prevailing wind, several potential wind sensitive areas have been identified. These include Area A3 located within Application Site K1; Area P12 situated immediately downstream of Application Site K2; Area A2 located immediately downwind of Application Site K3; Area A4 located immediately downwind of Application Site K4; Area A5 located immediately downwind of Application Sites K5 and K6, as well as Area P22 situated downstream of Application Site K10 across Road P2-1.

6.1.4 Under the southerly (S) summer prevailing wind, several potential wind sensitive areas have been identified. These include Area A2 located immediately downstream of Application Site K1 across Road D3-3. In addition, Area A4 and Kwu Tung Station, which experience frequent pedestrian access, are located downwind of Application Site K2 and are also identified as potential wind sensitive areas. Furthermore, Area P22, which contains planned schools, is situated downwind of Application Site K4 and represents another potential wind sensitive area. Finally, the wind environment at Ho Sheung Heung may be affected by wind wakes generated by the Development Proposals within Application Sites K11 and K12, which are located upwind of the area. As such, Ho Sheung Heung is also regarded as a potential wind sensitive area under southerly winds.

6.1.5 Under the southwesterly (SW) summer prevailing wind, several potential wind sensitive areas have been identified. Portions of Areas A2 and A4 are located immediately downwind of Application Site K1. In addition, Area A4 and Kwu Tung Station, which are also situated downwind of Application Site K2, are identified as potential wind sensitive areas. Furthermore, the Ho Sheung Heung region, which contains village houses and is located downwind of Application Sites K10 to K12, is another potential wind sensitive area under the southwesterly summer prevailing wind. **Figure 6.1** presents the location of identified potential wind sensitive areas.

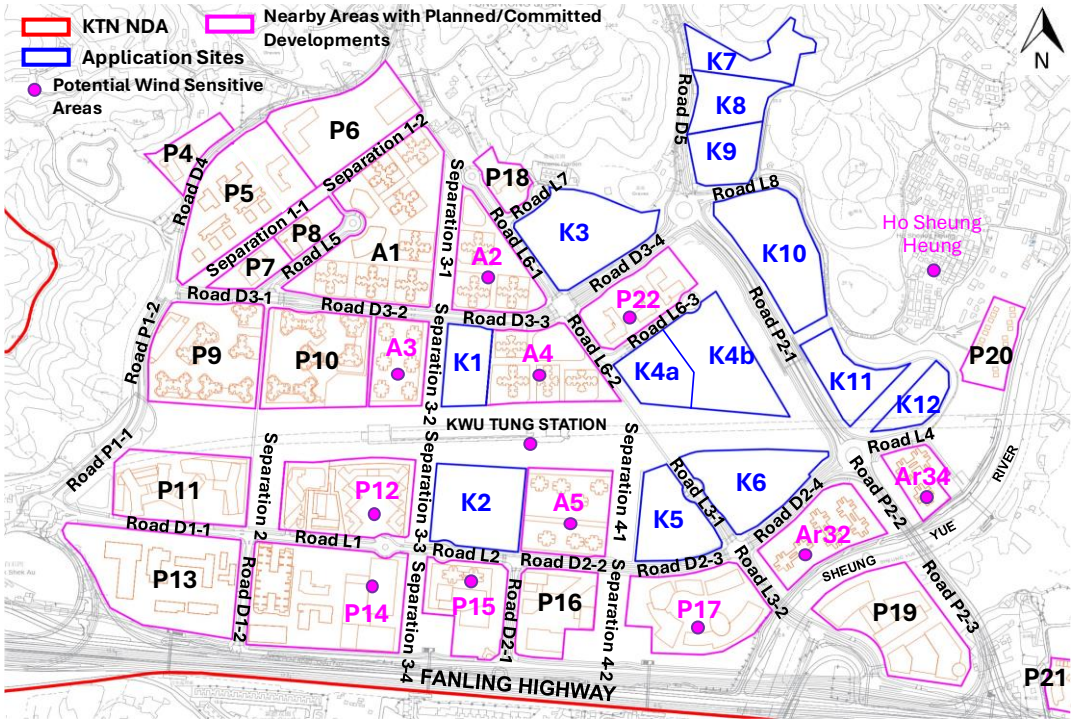


Figure 6.1 Potential Wind Sensitive Areas

6.2 Identified Major Breezeways

6.2.1 Considering the topographical features and the planned/committed built environment in the vicinity of the Application Sites, several major breezeways have been identified within the KTN NDA. These breezeways are illustrated in **Figure 6.2**.

6.2.2 Starting from the western side of the KTN NDA, a breezeway is formed between Areas P4 and P5, abutting Areas P9 and P11 (i.e., along Roads P1-1, P1-2 and D4 as annotated in **Figure 6.1**). This breezeway would facilitate the flow of northerly, southerly, east-north-easterly, and south-westerly prevailing winds, thereby helping to maintain a favorable wind environment near Areas P4, P5, P9, P11, and P13 (see Marker (1) in **Figure 6.2**).

6.2.3 In addition, a north-south oriented wind breezeway, formed by Separations 3-1 to 3-4 between Areas A1, A3, P12 and P14 on one side and Areas A2, Application Sites K1 and K2, and Area P15 on the other (refer to **Figure 6.1**), would connect Fung Kong Shan and Fanling Highway. This breezeway promotes the penetration of northerly and southerly prevailing winds into the area (see Marker (2) in **Figure 6.2**).

6.2.4 Roads D5 and P2-1 to P2-3 (refer to **Figure 6.1**) form another major breezeway that facilitates the flow of northerly and southerly prevailing winds. This breezeway abuts Areas Ar32, Ar34, P19 and P22, as well as Application Sites K3, K4 and K6 to K12. It promotes the movement of prevailing winds from Fung Kong Shan towards Fanling Highway, and vice versa, across the Sheung Yue River (see Marker (3) in **Figure 6.2**).

6.2.5 The Sheung Yue River itself serves as a major breezeway. Its branch stream directs east-north-easterly and south-westerly winds towards Areas P17, P19, P20, Ar32 and Ar34, as well as the regions near Long Valley (see Marker (4) in **Figure 6.2**).

6.2.6 A major breezeway is formed by the connection of Road L8 (between Application Sites K9 and K10) with Road D3-4 (between Area P22 and Application Site K3), as well as Roads D3-2 and D3-3 (between Areas A1–A2 and Application Site K1, and Areas A3, A4 and P10). The annotations and alignments of these roads are illustrated in **Figure 6.1**. The NBAs within Application Sites K9 and K10 help widen Road L8, thereby enhancing the effectiveness of this breezeway. In particular, it facilitates the penetration of easterly and east-north-easterly prevailing winds from Tsung Yuen towards Areas P22, A1 to A4, as well Application Sites K1 and K3 after flowing past Application Sites K9 and K10 via Road L8 (see Marker (5) in **Figure 6.2**).

6.2.7 Another major breezeway is formed by linking Ho Sheung Heung with Kwu Tung Station, facilitating the flow of easterly and east-north-easterly prevailing winds. The incorporation of Non-Building Areas (NBAs) within Application Sites K10 and K4 enhances the effectiveness of this breezeway, allowing prevailing winds from the village houses of Ho Sheung Heung to reach Kwu Tung Station (see Marker (6) in **Figure 6.2**).

6.2.8 Another major breezeway connects the lower regions of Ho Sheung Heung near Area P20 with Roads D1-1, L1, L2, and D2-2 to D2-4 (refer to **Figure 6.1** for the road annotations and Marker (7) in **Figure 6.2** for the location of the breezeway). Two strips of Non-Building Areas (NBAs) incorporated within Application Sites K11 and K12 enhance the effectiveness of this breezeway by allowing easterly (E) and east-north-easterly (ENE) prevailing winds to penetrate these sites and flow along the breezeway. In addition, the section formed by Roads D1-1, L1, L2, and D2-2 facilitates the flow of easterly prevailing winds towards the Pak Shek Au area, while the section formed by Roads D2-3 and D2-4 supports the movement of south-westerly prevailing winds towards the planned and committed residential developments within Application Sites K11 and K12.

6.2.9 Fanling Highway, which runs in an approximately east-west direction, facilitates the flow of easterly prevailing winds (see Marker (9) in **Figure 6.2**). In addition, a green corridor located in the middle portion of the KTN NDA serves as another major breezeway. This corridor extends from Long Valley, across the Sheung Yue River, and along Road L4 between Area Ar34 and Application Site K12 (refer to **Figure 6.1**), continuing towards Kwu Tung Station and the areas immediately north of Pak Shek Au. The green corridor enhances the penetration of easterly winds, allowing them to flow across the Application Sites and further westward (see Marker (8) in **Figure 6.2**).

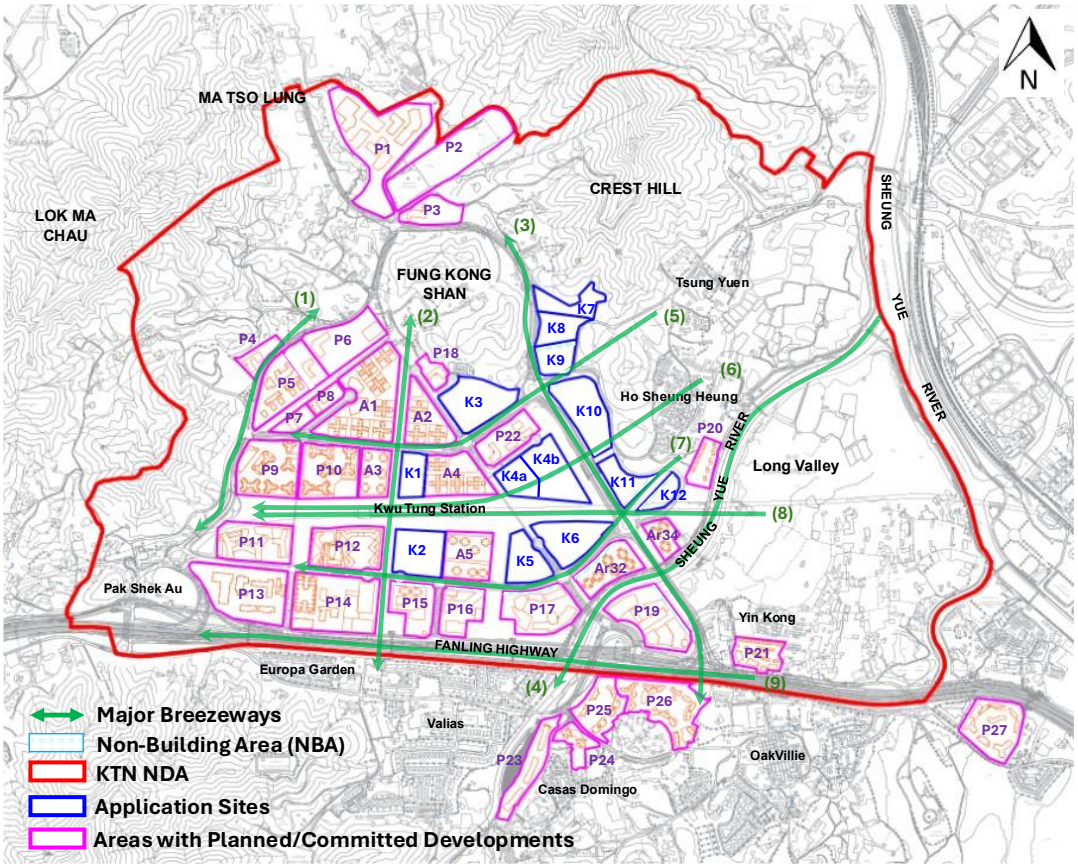


Figure 6.2 Major Breezeways near Application Sites

7 THE BASELINE SCENARIO AND PROPOSED SCENARIO

7.1 Background

7.1.1 Two development scenarios are examined in this Study: Baseline Scenario and Proposed Scenario. The Baseline Scenario was approved by the Town Planning Board under planning application No. A/KTN/93 on 23 September 2022. It incorporated minor relaxations of the Plot Ratio (PR) and Building Height Restrictions (BHR) for Planning Areas 12, 13, 14, 15, 20, 21, 22, 23, 25 and 26.

7.1.2 Compared with the Baseline Scenario, the Proposed Scenario seeks further minor relaxations of the BHR in Planning Areas 14, 15, 22, 23 and 26 (i.e., Application Sites K3, K4a, K4b, K5 – K12). These additional relaxations are required to accommodate the extra height arising from above-ground car parks and the adoption of Modular Integrated Construction (MiC). The changes in the relevant development parameters are summarized in **Table 7.1**.

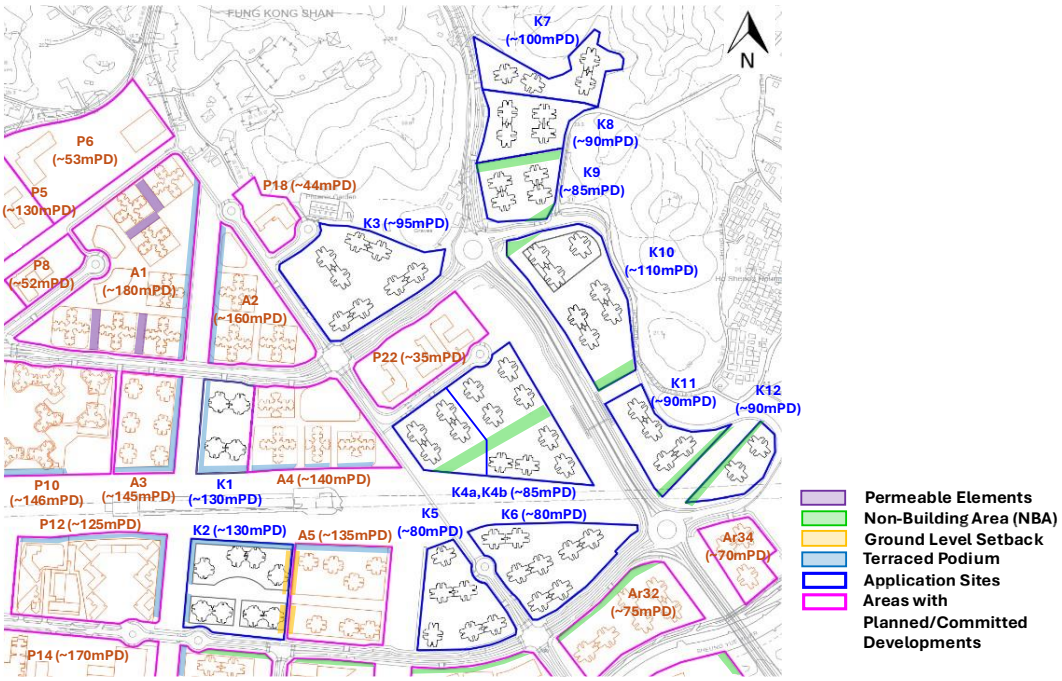
Table 7.1 Difference in Development Parameters at the Application Sites

Site No.	Planning Area	Zoning	Site Area (about) (ha) [land area in Area shown as 'Road'/"GB" (about)(ha)]	Under OZP No. S/KTN/4				Under Approved Planning Application A/KTN/93				Proposed under this Application			
				Total Max Plot Ratio	Domestic Max Plot Ratio	Non-Domestic Max Plot Ratio	Building Height Restrictions (mPD)	Total Max Plot Ratio	Domestic Max Plot Ratio	Non-Domestic Max Plot Ratio	Building Height Restrictions (mPD)	Proposed Total Max Plot Ratio	Proposed Domestic Max Plot Ratio	Proposed Non-Domestic Max Plot Ratio	Proposed Building Height Restrictions (mPD)
K1	20	R(A)1	1.13	6	5	1	115	7.2	6	1.2	130	7.2	6	1.2	130
K2	25	R(A)1	2.34	6	5	1	115	7.2	6	1.2	130	7.2	6	1.2	130
K3	14	R(B)	2.83 [0.04]	3.5	N/A	N/A	80	4.2	N/A	N/A	95	4.2	4.2	0	110
K4a	22	R(B)	1.27	3.5	N/A	N/A	75	4.2	N/A	N/A	85	4.2	4.2	0	95
K4b	22	R(B)	2.54	3.5	N/A	N/A	75	4.2	N/A	N/A	85	4.2	4.2	0	95
K5	26	R(B)	1.79	3.5	N/A	N/A	75	4.2	N/A	N/A	80	4.2	4.2	0	85
K6	26	R(B)	2.35 [0.03]	3.5	N/A	N/A	75	4.2	N/A	N/A	80	4.2	4.2	0	85
K7	15	R(B)	1.25	3.5	N/A	N/A	85/95	4.2	N/A	N/A	100	4.2	4.2	0	115
K8	15	R(B), GB and Road	1.3 [0.05]	3.5	N/A	N/A	85	4.2	N/A	N/A	90	4.2	4.2	0	105
K9	15	R(B)	1.17	3.5	N/A	N/A	80	4.2	N/A	N/A	85	4.2	4.2	0	95
K10*	23	R(B)	2.87 [0.04]	3.5	N/A	N/A	95	4.43	N/A	N/A	110	4.43	4.2	0.23	115
K11	23	R(B) and Road	1.28	3.5	N/A	N/A	90	4.2	N/A	N/A	90	4.2	4.2	0	95
K12	23	R(B) and Road	0.78	3.5	N/A	N/A	90	4.2	N/A	N/A	90	4.2	4.2	0	105

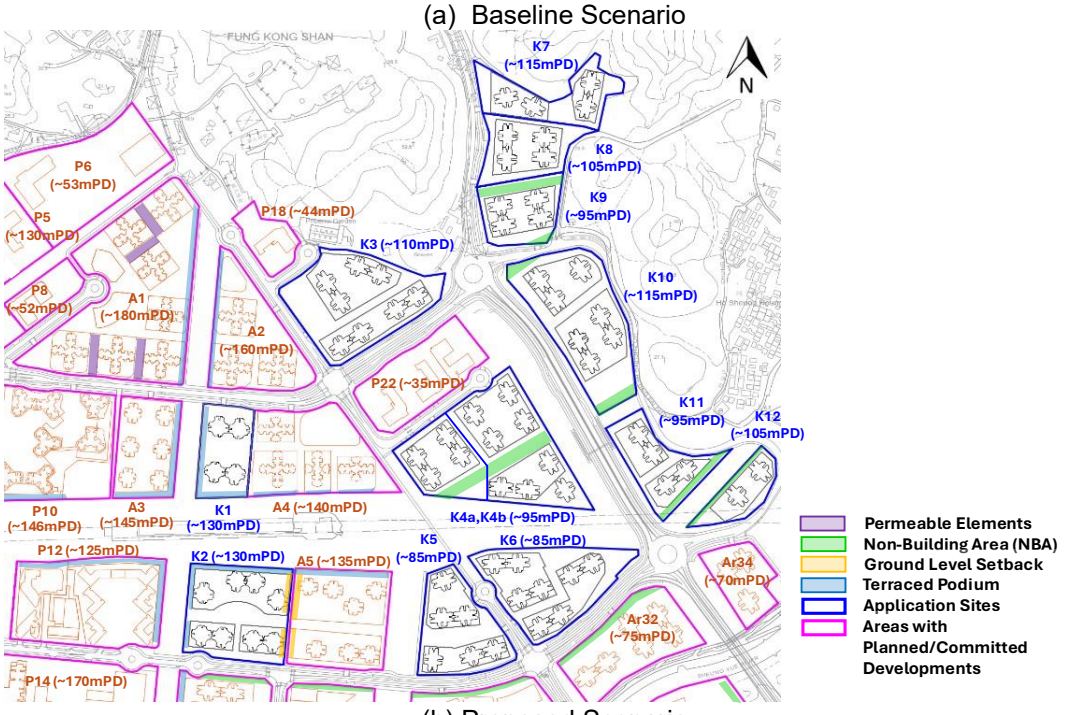
* Site area and area shown as ‘Road’/ “GB” are subject to detailed survey.
* Site K10: NDPR includes a public transport terminus/interchange of 3,500 m².

7.2 Baseline Scenario and Proposed Scenario

7.2.1 **Figure 7.1** shows the overall layout of Application Sites K1 to K12 within the KTN NDA under both the Baseline Scenario and the Proposed Scenario, together with some of the surrounding planned and committed developments. Illustrative figures showing zoomed-out views of the areas surrounding the Application Sites under the Baseline Scenario and Proposed Scenario are also provided in **Figures A4** and **A5** in **Appendix A** for reference. Brief discussions on the key differences between the Baseline Scenario and the Proposed Scenario for each of the Application Sites are provided in this subsection. It should be noted that the layouts presented are indicative only and are intended for technical assessment purposes. They may be subject to revision at future stages of the project.



(a) Baseline Scenario



(b) Proposed Scenario

Figure 7.1 Indicative Building Layouts within the Application Sites under the Baseline Scenario and Proposed Scenario

7.2.2 In general, the overall domestic building footprints within each of the Application Sites are the same under the Proposed Scenario as under the Baseline Scenario. However, instead of adopting podium-free designs, additional podiums are provided beneath the domestic blocks in most of the Application Sites (11 out of 13) under the Proposed Scenario. These include Application Sites K3 to K12. Brief descriptions for each Application Site are provided below:

Application Site K1

7.2.3 Under the Baseline Scenario, Application Site K1 comprises four domestic blocks with a Building Height Restriction of 130mPD (see **Figure A2**), situated above a massive podium of 24mPD. A terraced podium design is adopted within the site (see **Figures 7.1(a)** and **A4**).

7.2.4 Under the Proposed Scenario, while the building height restriction and footprints for Application Site K1 are identical to the Baseline Scenario, the height of the podium providing full site coverage is increased to 34mPD. (see **Figure A3**). Consistent with the Baseline Scenario, a terraced podium design is adopted within Application Site K1 (see **Figures 7.1(b)** and **A5**).

Application Site K2

7.2.5 Under the Baseline Scenario, Application Site K2 comprises eight domestic blocks, as shown in **Figure 7.1(a)**. The four domestic blocks in the northern portion of the site are situated on a larger podium adopting terraced design, while the remaining four in the southern portion are placed above two smaller podiums (two domestic blocks above per podium). All the podiums are heights of 26.5mPD. The prevailing Building Height Restriction of 130mPD applies to Application Site K2 (see **Figures A2** and **A4**). In addition, ground-level setbacks are included along the eastern boundary of Application Site K2 to widen the separation between Application Site K2 and the adjacent Area A5.

7.2.6 Under the Proposed Scenario, the building footprints of the eight domestic blocks in Application Site K2 remain largely consistent with the Baseline Scenario (see **Figure 7.1(b)**). As in the Baseline Scenario, the domestic blocks are located above three non-domestic podiums, with the relatively larger podium in the northern portion as well as the smaller podium located at the lower left adopting a terraced design. The maximum Building Height Restriction of the domestic blocks is as the same as it under the Baseline Scenario (see **Figure A3**). However, the height of the podium increased to 36.5mPD. Similar to the Baseline Scenario, ground-level setbacks are incorporated along the eastern boundary of Application Site K2 to widen the separation between Application Site K2 and the adjacent Area A5.

Application Site K3

7.2.7 Under the Baseline Scenario, Application Site K3 comprises podium-free domestic blocks with a maximum building height of 95mPD (see **Figure A2**). These domestic blocks are set back slightly from the Application Site boundary (see **Figures 7.1(a)** and **A4**).

7.2.8 Under the Proposed Scenario, the building footprints of the eight domestic blocks in Application Site K3 remain identical to those in the Baseline Scenario (see **Figure 7.1(b)** and **Figure A5**). However, the maximum Building Height Restriction is proposed to be relaxed to 110mPD (see **Figure A3**). In addition, two 2-storey podiums providing above-ground car parks are introduced beneath the domestic blocks with four domestic blocks above per podium.

Application Sites K4a, K4b

7.2.9 Under the Baseline Scenario, Application Site K4 is occupied by podium-free domestic blocks as shown in **Figure 7.1(a)** and **Figure A4**. A building height restriction of 85mPD is applied (see **Figure A2**). In addition, a 30 m-wide Non-Building Area (NBA) running in a north-east to south-west direction is reserved at the southern part of Application Site K4, in compliance with the requirement stipulated in the Outline Zoning Plan (OZP) (see **Figure 7.1(a)** and **Figure A4**).

7.2.10 Under the Proposed Scenario, three additional 2-storey podiums for above-ground car parks are introduced within Application Site K4, with the maximum building height restriction proposed to be relaxed to 95mPD (see **Figure A3**). The building footprints of the domestic blocks remain unchanged compared to the Baseline Scenario (see **Figure 7.1(b)** and **Figure A5**). The domestic block located at the southeastern tip of the site remains podium-free. The

30m-wide Non-Building Area (NBA) running in a north-east to south-west direction is retained to facilitate wind diversion and penetration (see **Figure 7.1(b)** and **Figure A5**).

Application Site K5

7.2.11 The Baseline Scenario for Application Site K5 adopts podium-free design with domestic blocks at a height of 80mPD. The blocks are arranged in a scattered layout, set back from the Application Site boundary (see **Figure A2**, **Figure 7.1(a)** and **Figure A4**).

7.2.12 In the Proposed Scenario, two podiums each of two-storey in height are introduced to provide above-ground car parking — one beneath the three northern domestic blocks and one beneath the three southern domestic blocks. The height of the domestic blocks is proposed to slightly increase from 80mPD to 85mPD. The footprint and placement of the domestic blocks remain unchanged from the Baseline Scenario (see **Figure 7.1(b)**, **Figure A3** and **Figure A5**).

Application Site K6

7.2.13 Under the Baseline Scenario, the domestic blocks within Application Site K6 have a height of 80mPD and adopt a podium-free design. Their placement is largely similar to that of Application Site K5 (see **Figure A2**, **Figure 7.1(a)** and **Figure A4**).

7.2.14 In the Proposed Scenario, the building footprints of the domestic blocks remain unchanged from the Baseline Scenario (see **Figure 7.1(b)** and **Figure A5**). Apart from a proposal to relax the maximum building height restriction to 85mPD (see **Figure A3**), two additional 2-storey podiums are introduced to provide above-ground car parking.

Application Site K7

7.2.15 Under the Baseline Scenario, Application Site 7 is subject to a building height restriction of 100mPD. The domestic blocks adopt a podium-free design and are placed in a scattered manner (see **Figure A2**, **Figure 7.1(a)** and **Figure A4**).

7.2.16 In the Proposed Scenario, the building orientations, arrangements, and footprints of the domestic blocks remain unchanged from the Baseline Scenario. Two additional 2-storey podiums are introduced beneath the eastern and western domestic blocks respectively with each podium supporting two domestic towers to provide above-ground car parking, and the maximum building height is proposed to be relaxed from 100mPD to 115mPD (see **Figure A3**, **Figure 7.1(b)** and **Figure A5**).

Application Site K8

7.2.17 Application Site K8, located immediately south of Application Site K7, is subject to a building height restriction of 90mPD under the Baseline Scenario (see **Figure A2**). The domestic blocks adopt a podium-free design (see **Figure 7.1(a)** and **Figure A4**).

7.2.18 In the Proposed Scenario, a two-storey podium is introduced beneath the domestic blocks to provide above-ground car parking. The building orientations and arrangements of the domestic blocks remain unchanged from the Baseline Scenario. However, the maximum building height is proposed to be slightly relaxed from 90mPD to 105mPD (see **Figure A3**, **Figure 7.1(b)** and **Figure A5**).

Application Site K9

7.2.19 Application Site K9, located adjacent to Application Site K8, is subject to a building height restriction of 85mPD under the Baseline Scenario (see **Figure A2**). The domestic blocks adopt a podium-free design. In addition, a strip of Non-Building Area (NBA) is imposed at the southern tip of the site, and another strip of NBA runs along the northern boundary (see **Figure 7.1(a)** and **Figure A4**).

7.2.20 In the Proposed Scenario, a 2-storey podium is introduced beneath the four domestic blocks to provide above-ground car parking. The domestic building blocks' orientations and arrangements remain unchanged from the Baseline Scenario. The maximum building height is proposed to be slightly relaxed from 85mPD to 95mPD. The strips of Non-Building Area (NBA) at the southern tip and along the northern boundary are fully retained (see **Figure A3**, **Figure 7.1(b)** and **Figure A5**).

Application Site K10

7.2.21 Under the Baseline Scenario, Application Site K10 is subject to a building height restriction of 110mPD and comprises seven domestic blocks. A podium with a height of 27mPD, accommodating a Public Transport Interchange (PTI) at ground level and car parks above, is provided beneath the three northern domestic blocks. The remaining four domestic blocks are podium-free. Strips of Non-Building Area (NBA) are incorporated at the northwestern tip and along the southern boundary of the site (see **Figure A2**, **Figure 7.1(a)** and **Figure A4**).

7.2.22 In the Proposed Scenario, the two strips of Non-Building Area (NBA) are fully retained to enhance the effectiveness of prevailing winds. The footprint and placement of the domestic blocks remain unchanged from the Baseline Scenario. In addition to the existing podium beneath the three northern domestic blocks, one additional two-storey podium is introduced beneath the four southern domestic blocks to provide above-ground car parking. The podiums in the Proposed Scenario have a reduction in height from 27mPD to 24mPD but the maximum building height is proposed to be relaxed from 110mPD to 115mPD (see **Figure A3**, **Figure 7.1(b)** and **Figure A5**).

Application Sites K11 and K12

7.2.23 Application Sites K11 and K12, located immediately to the southeast of Application Site K10, are planned for podium-free domestic housing developments with a building height restriction of 90mPD under the Baseline Scenario. Strips of Non-Building Area (NBA) are incorporated within both sites (see **Figure A2**, **Figure 7.1(a)** and **Figure A4**).

7.2.24 In the Proposed Scenario, the building footprints of the domestic blocks and the strips of Non-Building Area (NBA) remain unchanged. The maximum building height is proposed to be slightly relaxed from 90mPD to 95mPD for Application Site K11 and to 105mPD for Application Site K12. To provide above-ground car parking, two additional two-storey podiums are introduced in Application Site K11 (each supporting two domestic blocks), and one additional two-storey podium is also introduced in Application Site K12 (see **Figure A3**, **Figure 7.1(b)** and **Figure A5**).

Typologies of Podiums within Application Sites under the Proposed Scenario

7.2.25 Podiums can generally be categorized into three types:

- Typology 1 – Terraced podium with non-domestic uses and above-ground car parks, which appears in Application Sites K1 and K2.
- Typology 2 – Podiums for above-ground car parking, which appear in Application Sites K3 to K9, K10 (southern podium for ground car park), K11 and K12.
- Typology 3 – Podiums containing a ground-level Public Transport Interchange (PTI) with above-ground car parks above, which appears in Application Site K10 (northern podium).

Indicative sections of these podium typologies are shown in **Figure 7.2**.

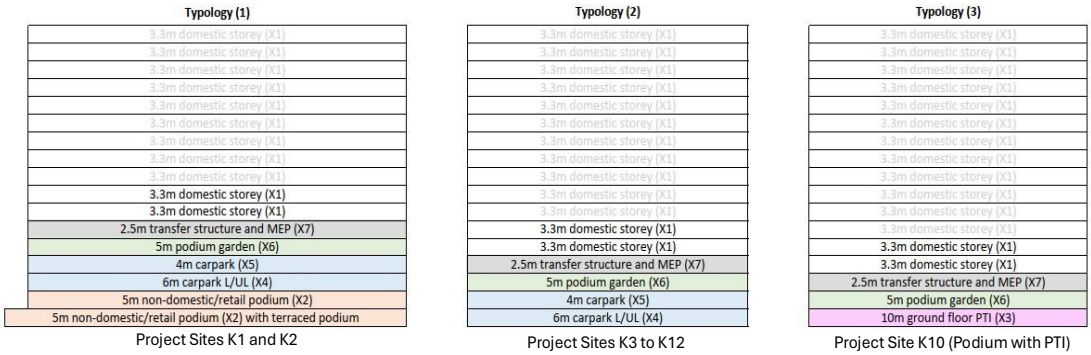


Figure 7.2 Indicative Sections of Different Types of Podiums within the Application Sites under the Proposed Scenario

8 EXPERT EVALUATION ON THE BASELINE SCENARIO AND PROPOSED SCENARIO

8.1 General

8.1.1 Several major breezeways have been identified under the prevailing wind directions. These breezeways play an important role in maintaining the wind environment within and around the Application Sites. The major breezeways have been discussed in detail in **Section 6.2** above. Most of them are aligned along major roads, with the most prominent ones including Fanling Highway, the breezeway along Kwu Tung Station, and the Sheung Yue River.

8.1.2 The indicative layouts under both the Baseline Scenario and the Proposed Scenario (as discussed in **Section 7**) demonstrate that all identified major breezeways are fully retained and remain unobstructed.

8.1.3 Non-Building Areas (NBAs) are incorporated within Areas P15 to P19 and Application Sites K4 and K9 to K12. These NBAs are retained in the same locations and with the same widths under both the Baseline Scenario and the Proposed Scenario. Although the Proposed Scenario includes building height relaxations and additional podiums in certain Application Sites to meet above-ground car parks and the adoption of Modular Integrated Construction (MiC) requirements, all designated NBAs remain unchanged in position and dimension.

8.1.4 Two-storey terraced and stepping podiums, consistent with the requirements of the current Outline Zoning Plan (OZP), have been adopted for Application Sites K1 and K2 under both the Baseline Scenario and Proposed Scenario. These podiums promote downward airflow to the pedestrian level. For the remaining Application Sites, residential tower footprints have maintained consistent across both scenarios. Additional podiums are incorporated only in certain Application Sites to satisfy design requirements (for provision of above ground car parking and Public Transport Interchange) under the Proposed Scenario.

8.1.5 Variations in building height profiles between certain Application Sites and the surrounding committed or planned developments are observed in both scenarios. These variations help promote downwash wind effects. All the above-mentioned good design measures for maintaining air ventilation performance — including building separations, terraced podium designs, and designated NBAs — that appear in the Baseline Scenario are fully retained in the Proposed Scenario.

8.1.6 Ground-level setbacks are incorporated at strategic locations within certain buildings in Application Site K2. These setbacks improve north-south connectivity and enhance the penetration of northerly and southerly prevailing winds (see **Figure 7.1, Figure A4** and **Figure A5** for the locations of the ground-level setbacks).

8.1.7 Two development scenarios are examined in this study: the Baseline Scenario and the Proposed Scenario (see **Figure 7.1**, **Figure A4** and **Figure A5**). Both scenarios fully retain all air ventilation good design measures required under the Outline Zoning Plan (OZP), including building separations, terraced podium designs, and designated Non-Building Areas (NBAs), to promote effective air ventilation performance. The evaluation focuses on potential changes in wind flow patterns, the extent of wind wake areas, building permeability, and the performance of major district breezeways and local air paths under the identified prevailing wind directions.

8.1.8 To summarize, the only differences between the Baseline Scenario and the Proposed Scenario are those within the Application Sites (K1 to K12). While the residential tower footprints remain consistent across all Application Sites, the Proposed Scenario incorporates maximum building height relaxations and additional podiums in certain sites. The layouts of surrounding planned and committed developments (i.e., Areas P1 to P30, A1 to A5, Ar32 and Ar34) are treated as background. The most up-to-date road layouts have been adopted. The expert evaluation, including directional analysis and anticipated wind flow patterns under both scenarios, is presented below.

8.2 Expert Evaluation

Under N Annual Prevailing Wind Direction

Baseline Scenario

8.2.1 Under the Baseline Scenario, northerly winds would flow along Road D4, passing between the committed school in Area P4 and the GIC blocks in Area P6. The wind would then continue along Road P1-2, located to the west of Area P9, and proceed towards the committed/planned high-rise residential blocks in Area P11 with minimal obstruction. These high-rise buildings would subsequently block the northerly wind, preventing it from reaching further downstream areas (see Marker (1) in **Figure 8.1(a)**).

8.2.2 Under the Baseline Scenario, northerly wind from Road D3-1 would skim over the planned schools in Areas P7 and P8, then flow through the separation between Areas P9 and P10. It would continue across Kwu Tung Station, proceed along the separation between Areas P11 and P12 (Separation 2 in **Figure 8.1(a)**), and flow along Road D1-2 between Areas P13 and P14, before reaching Europa Garden (see Marker (2) in **Figure 8.1(a)**).

8.2.3 The separation between Areas A1 and A3, Areas P12 and P14, and Area A2 together with Application Sites K1, K2 and Area P15 (Separations 3-1 to 3-4 in **Figure 8.1(a)**) forms a major north-south district-wide wind breezeway. This breezeway links Fung Kong Shan with Fanling Highway and helps maintain a favorable wind environment around Areas A1–A3, Application Sites K1–K2, and Areas P12, P14 and P15 (see Marker (3) in **Figure 8.1(a)**).

8.2.4 Under the Baseline Scenario, the podiums within Application Site K2 and Area A5 incorporate ground-level setbacks, which create ground level separations for formation of a wind breezeway originating from Application Site K1 and Area A4. This breezeway flows along Road D2-1 towards Fanling Highway (see Marker (4) in **Figure 8.1(a)**).

8.2.5 After skimming over the proposed schools in Area P22, the northerly wind would flow along Road L6-2 towards Kwu Tung Station. It would then continue along the separations between Area A5 / Application Site K6 and Areas P16 / P17 (Separations 4-1 and 4-2 in **Figure 8.1(a)**) before reaching Fanling Highway (see Marker (5) in **Figure 8.1(a)**).

8.2.6 Road D5, which abuts Application Sites K7 to K9, serves as a major north-south wind breezeway. It directs northerly wind from Crest Hill towards Application Site K4 (see Marker (6) in **Figure 8.1(a)**). The upwind schools in Area P22 have lower building heights than the proposed blocks in Application Site K4. As a result, vertical air movement is expected along Road L6-3 under the Baseline Scenario. Weakening of the northerly wind is anticipated after it flows past Application Sites K4, K5 and K6. However, the proposed blocks within these sites adopt podium-free designs and are arranged in a scattered layout. These design measures help maximize the availability of northerly wind towards the downwind Areas P17 and P18 under the Baseline Scenario. Another branch of northerly wind would flow along Road P2-1 towards Road P2-2, thereby maintaining a favorable wind environment near Application Sites K10 to K12 and Application Site K4.

8.2.7 The Sheung Yue River serves as another major district-wide wind breezeway. Northerly wind originating from the areas near Ho Sheung Heung would flow along the river, reaching the downwind areas near Area Ar34 and continuing towards Area P19 (see Marker (7) in **Figure 8.1(a)**).

8.2.8 Among the thirteen Application Sites (K1 to K3, K4a, K4b and K5 to K12), building separations are provided between most of the proposed domestic blocks. These separations enhance wind permeability and help reduce potential wind impacts on the surrounding areas. **Figure 8.1(a)** illustrates the anticipated northerly annual prevailing wind flow under the Baseline Scenario.

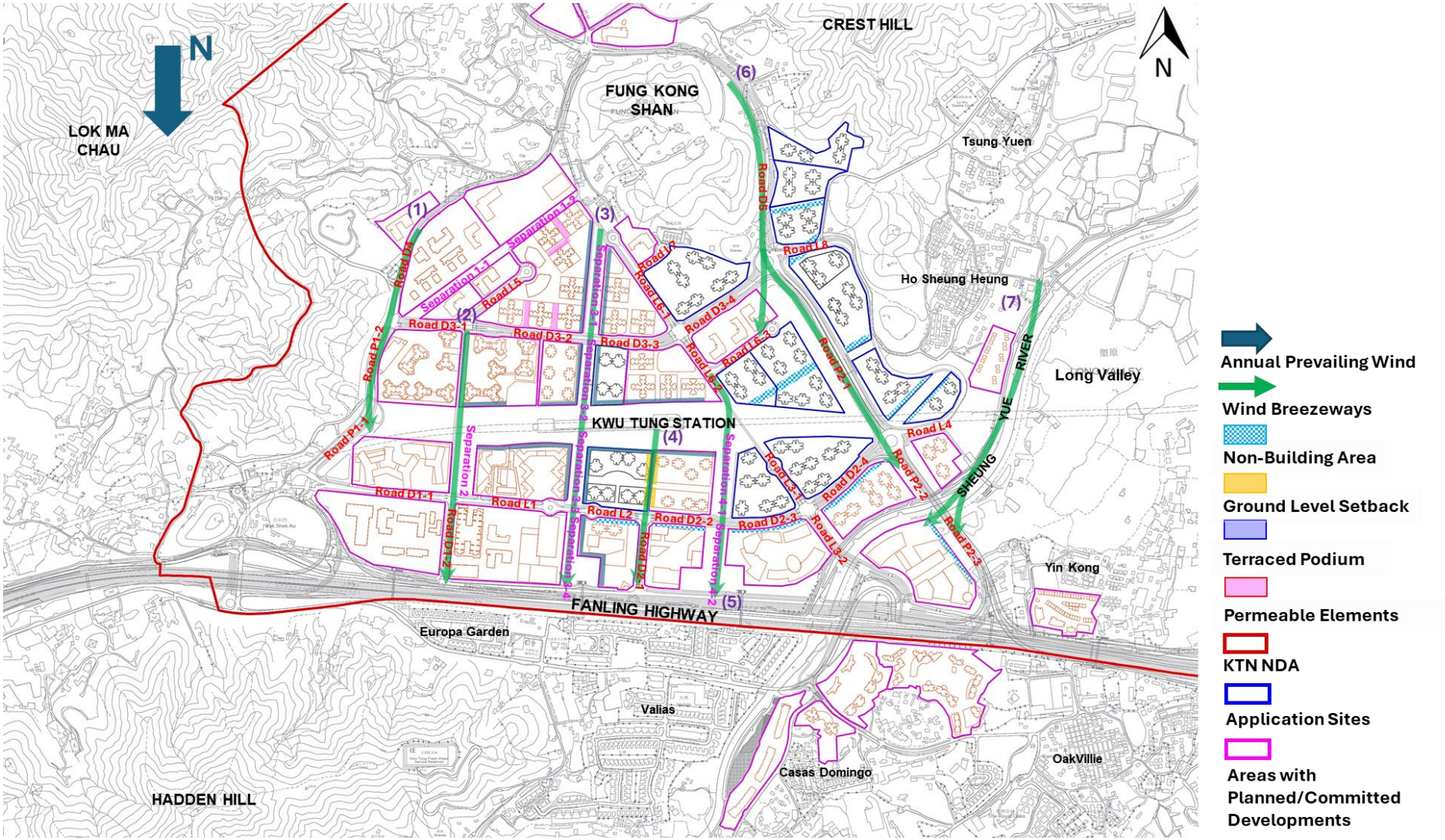


Figure 8.1(a) Wind Flow under the N Annual Prevailing Wind for the Baseline Scenario

Proposed Scenario:

General

8.2.9 The Development Proposal layout under the Proposed Scenario retains the good air ventilation design measures from the Baseline Scenario. These include terraced podiums in Application Sites K1 and K2, and Non-Building Areas (NBAs) in Application Site K4 and Application Sites K9 to K12. In addition to the retained measures, the Proposed Scenario incorporates ground-level setbacks along the eastern boundary of Application Site K2. Furthermore, the added podiums have been minimized in bulk as far as possible, with most maintaining podium separations of at least 15m. All added podiums also incorporate 5m podium gardens to enhance wind penetration.

Similarities in Pedestrian Wind Environment as compared to the Baseline Scenario

8.2.10 Under the Proposed Scenario, northerly winds would flow along Road D4 between the committed school in Area P4 and the GIC blocks in Area P6. The wind would then proceed westward along Road P1-2, located to the west of Area P9, and approach the committed and planned high-rise residential blocks in Area P11. These high-rise developments would block the wind, stopping it from advancing into further downstream areas (see Marker (1') in **Figure 8.1(b)**).

8.2.11 Owing to the consistent building morphology in the vicinity of the Application Sites, the local breezeway originating from Road D3-1 and leading to Europa Garden via the separation between Areas P9 and P10 and along Road D1-2 continues to function effectively under the Proposed Scenario, as identified in the Baseline Scenario (see Marker (2') in **Figure 8.1(b)**).

8.2.12 Under the Proposed Scenario, the separation between Areas A1, A3, P12 and P14, and Application Sites K1, K2, Area A2 and Area P15 (Separations 3-1 to 3-4 in **Figure 8.1(b)**) continues to serve as a major north-south district-wide wind breezeway, linking Fung Kong Shan with Fanling Highway. This breezeway already existed under the Baseline Scenario and remains unchanged (see Marker (3') in **Figure 8.1(b)**). In addition, terraced podiums are provided beneath the proposed domestic towers on both sides of Separations 3-1 to 3-3 and on the eastern side of Separation 3-4. These terraced podium designs, which were also incorporated under the Baseline Scenario, would facilitate the passage of northerly prevailing winds and enhance the overall effectiveness of this major breezeway.

8.2.13 The podiums in Application Site K2 and Area A5 have retained ground-level setbacks under the Proposed Scenario, creating ground-level separations that form a wind breezeway by and large the same as under the Baseline Scenario. This breezeway, which originates from Application Site K1 and Area A4, flows along Road D2-1 towards Fanling Highway and remains effective under the Proposed Scenario (see Marker (4') in **Figure 8.1(b)**).

8.2.14 Similar to the Baseline Scenario, the northerly wind path under the Proposed Scenario remains effective. After skimming over the proposed schools in Area P22, the wind flows along Road L6-2 towards Kwu Tung Station and continues through the separations between Area A5/ Application Site K6, and Areas P16/P17 (Separations 4-1 and 4-2 in **Figure 8.1(b)**), eventually reaching Fanling Highway (see Marker (5') in **Figure 8.1(b)**).

8.2.15 Under the Proposed Scenario, and similar to the Baseline Scenario, Road D5, which abuts Application Sites K7 to K9, serves as a major north-south wind breezeway. It directs northerly wind from Crest Hill towards Application Site K4 (see Marker (6') in **Figure 8.1(b)**). Another branch of northerly wind flows along Road P2-1 towards Road P2-2, thereby maintaining a favorable wind environment near Application Sites K10 to K12 and Application Site K4.

8.2.16 Under the Proposed Scenario, the Sheung Yue River continues to serve as another major district-wide wind breezeway, as it did under the Baseline Scenario. Northerly wind originating from the areas near Ho Sheung Heung flows along the river, reaching the downwind areas near Area Ar34 and continuing towards Area P19 (see Marker (7') in **Figure 8.1(b)**).

Differences in Pedestrian Wind Environment as compared to the Baseline Scenario

8.2.17 Under the Proposed Scenario, additional podiums are introduced in most Application Sites, together with a relaxation of building height restrictions of up to 15m across all Application Sites. This results in taller domestic blocks compared with the Baseline Scenario.

8.2.18 It is anticipated that the Proposed Scenario would generate wind wakes of greater extent and coverage in downstream areas. In particular, podium height in Application Site K1 would rise from 24mPD to 34mPD, while podium height in Application Site K2 increased from 26.5mPD to 36.5mPD.

8.2.19 These changes mentioned in the above paragraph are expected to induce larger wind wakes to the downstream areas. Consequently, northerly winds towards Kwu Tung Station and further downwind areas are likely to be weakened. The cumulative wind impacts on downwind Areas P17 and Ar32 from Application Sites K4, K5 and K6, as well as on Area P15 immediately downwind of Application Sites K1 and K2, are also anticipated to increase. Nevertheless, the relaxation in building height restrictions provides greater flexibility for incorporating air ventilation design measures. Appropriate design strategies should therefore be explored in future detailed developments within these Application Sites to enhance wind permeability and mitigate the induced wind wakes.

8.2.20 Under the Proposed Scenario, the wind environment at Areas A2, A4 and P22 is expected to weaken under northerly winds. This is primarily due to stronger wind wakes generated by the Development Proposals in the upwind Application Site K3, arising from the introduction of podiums and taller domestic buildings. Nevertheless, the increased building height difference between the proposed schools in Area P22 and the blocks in the adjacent Application Site K4 is expected to produce stronger downwash winds along Road L6-3 compared with the Baseline Scenario.

8.2.21 Similarly, the maximum building heights within Application Sites K7 to K12 are slightly relaxed under the Proposed Scenario, with extensive podiums also incorporated. These changes are expected to result in larger wind wake areas and greater cumulative wind impacts on the downwind Areas Ar32 and Ar34 compared with the Baseline Scenario.

8.2.22 Under the Proposed Scenario, only minor changes to the local wind flow patterns are anticipated, despite some modifications in building morphologies within the Application Sites. The building footprints, orientations, and arrangements of the domestic blocks remain largely unchanged, with adequate separations retained between tower blocks to enhance wind permeability and minimize wind impacts. In addition, most podiums maintain separations of at least 15m to further improve wind permeability. In particular, the proposed layouts in Application Sites K2 and Area A5 retain ground-level setbacks. These setbacks increase the separation distances between buildings, thereby extending the length and effectiveness of the identified wind breezeways and wind paths. Importantly, the addition of podiums and the relaxation of building height restrictions do not obstruct the major identified wind breezeways, with the requirements for Non-Building Areas (NBAs) continuing to be fully complied with. Overall, the district-wide wind flow patterns are generally maintained compared with the Baseline Scenario.

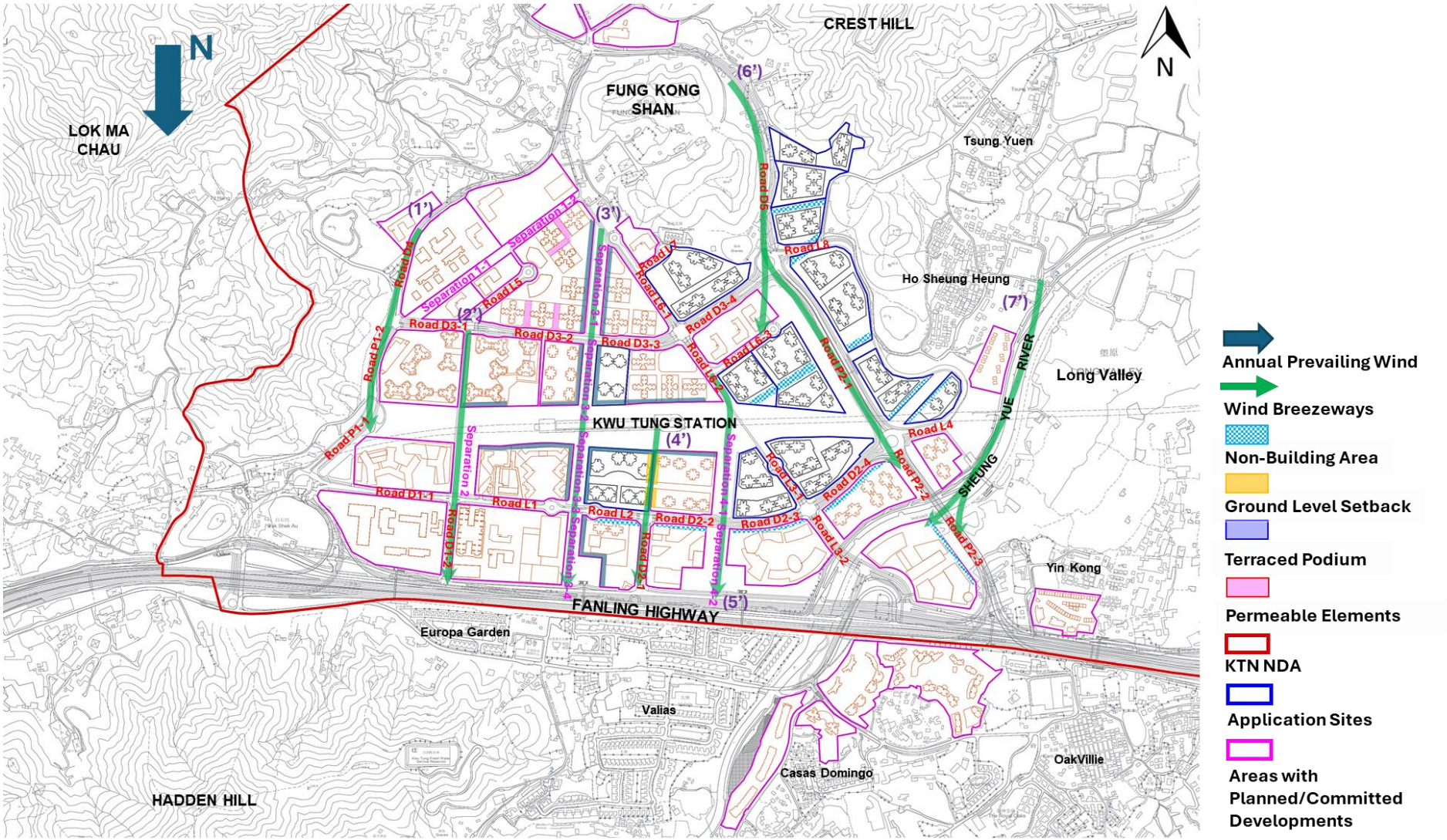


Figure 8.1(b) Wind Flow under the N Annual Prevailing Wind for the Proposed Scenario

Under ENE Annual Prevailing Wind Direction

Baseline Scenario

8.2.23 One pathway of the ENE annual prevailing wind originating from Fung Kong Shan would flow along Road D4, passing between the planned school in Area P4 and the planned GIC buildings in Area P5, before reaching the downwind areas (see Marker (1) in **Figure 8.2(a)**). Another pathway of the ENE wind would flow along the separations between Area A1, Areas P7/P8 and Areas P5/P6 (Separations 1-1 and 1-2 in **Figure 8.2(a)**), then continue towards Road P1-2 and further downwind areas (see Marker (2) in **Figure 8.2(a)**). These two ENE wind breezeways, as annotated in Markers (1) and (2), would help maintain good air ventilation performance in the vicinity of Area A1 and Areas P4 to P8.

8.2.24 The ENE wind originating from Tsung Yuen would flow along Road L8 between Application Sites K9 and K10, then continue along Road D3-4 towards Application Site K1. From there, the wind would be directed along Road D3-3 (see Marker (3) in **Figure 8.2(a)**). It should be noted that two strips of Non-Building Areas (NBAs) are incorporated at the southern boundary of Application Site K9 and the northern boundary of Application Site K10. These NBAs widen Road L8 and facilitate better flow of the ENE prevailing wind.

8.2.25 Good penetration of the ENE annual prevailing wind is observed from the village houses at Ho Sheung Heung towards the Kwu Tung Station area. The wind passes through the Non-Building Area (NBA) within Application Site K10 and the NBA within Application Site K4. This major ENE breezeway is annotated as Marker (4) in **Figure 8.2(a)**.

8.2.26 The ENE annual prevailing wind originating from the southern regions of Ho Sheung Heung would penetrate Application Sites K11 and K12 through strips of Non-Building Areas (NBAs) and the building separations between the proposed blocks. The wind would then flow across Road P2 and continue along Roads D2-4, D2-3, D2-2 and L2, passing between Area A5, Application Sites K5 and K6, and Areas P15 to P18 (see Marker (5) in **Figure 8.2(a)**). It should be noted that NBAs are provided at the northern boundaries of Areas P15 to P18. These NBAs widen Roads D2-2 to D2-4 and L2, thereby enhancing the overall effectiveness of this wind breezeway.

8.2.27 The ENE wind originating from Long Valley flows along the Sheung Yue River between Areas Ar32 and P19, then continues towards Area P17 and Fanling Highway. This forms an effective district-wide ENE wind breezeway (see Marker (6) in **Figure 8.2(a)**).

8.2.28 Under the Baseline Scenario, an analysis of building height variations between the Development Proposals within the Application Sites and the planned developments in the surrounding areas (see **Figure A2**) indicates that downwash wind is anticipated along Roads L6-1 and L6-2 near the Kwu Tung Station area under ENE prevailing winds. These downwash winds, induced by the differences in building heights, play an important role in maintaining the local wind environment near the Application Sites and their surrounding areas.

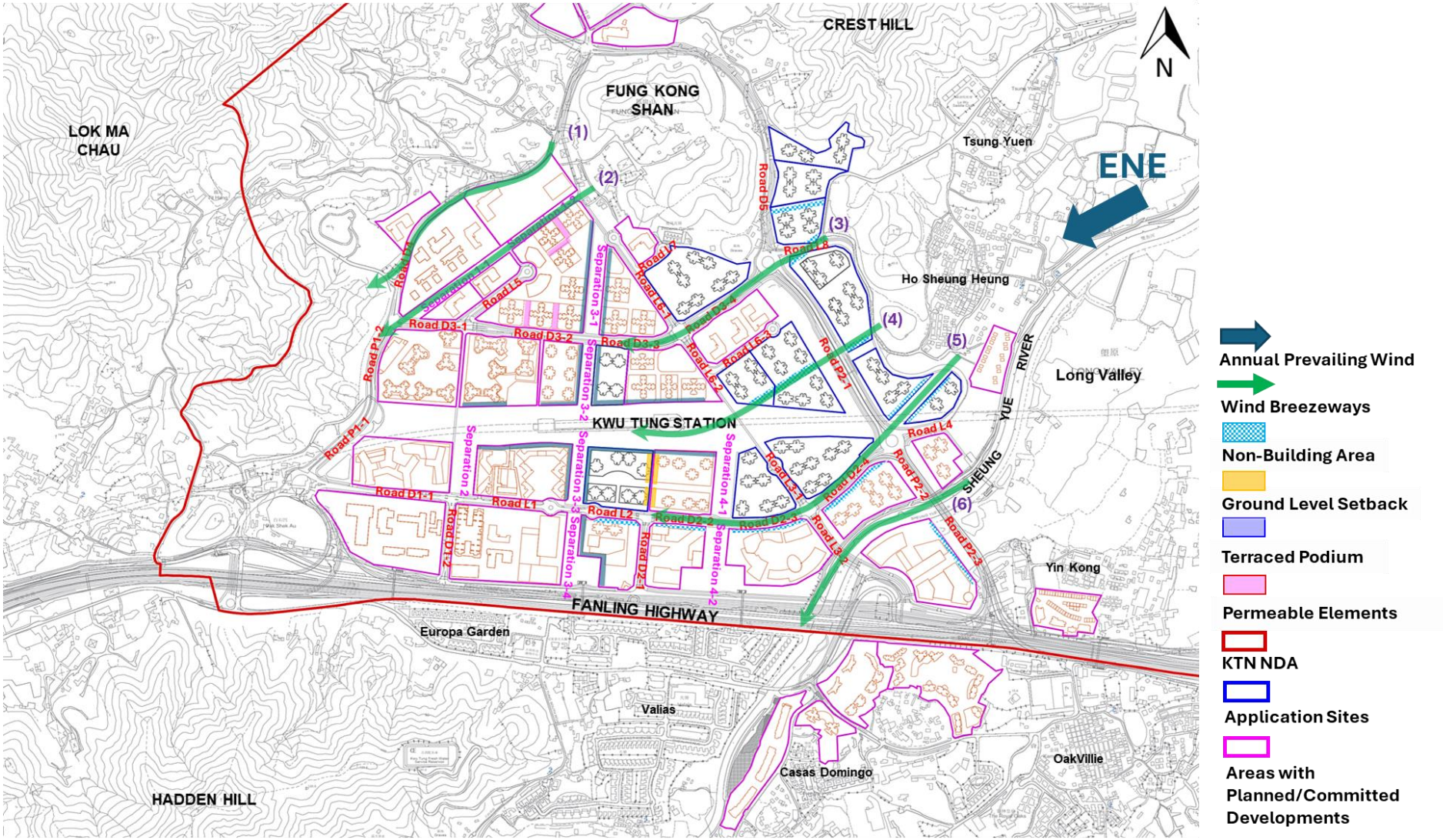


Figure 8.2(a) Wind Flow under the ENE Annual Prevailing Wind for the Baseline Scenario

Proposed Scenario

Similarities in Pedestrian Wind Environment as compared to the Baseline Scenario

8.2.29 Under the Proposed Scenario, the pathway of the ENE annual prevailing wind originating from Fung Kong Shan remains unchanged from the Baseline Scenario. The wind continues to flow along Road D4 between the planned school in Area P4 and the planned GIC buildings in Area P5 towards the downwind areas (see Marker (1') in **Figure 8.2(b)**). As there is no change in the surrounding building morphologies, another pathway of ENE wind from Fung Kong Shan flows along the separations between Area A1, Areas P7/P8 and Areas P5/P6 (Separations 1-1 and 1-2), then continues towards Road P1-2 and further downwind areas (see Marker (2') in **Figure 8.2(b)**). Similar to the Baseline Scenario, these two ENE wind breezeways (Markers (1') and (2')) help maintain good air ventilation in the vicinity of Areas P4 to P8 under the Proposed Scenario.

8.2.30 Since there is no significant change in the domestic building arrangements, orientations, or locations of the Non-Building Areas (NBAs) within the upstream Application Sites K9 to K12, the ENE wind originating from Tsung Yuen continues to flow along Road L8 between Application Sites K9 and K10, then along Road D3-4 towards Application Site K1, before being directed along Road D3-3 under the Proposed Scenario (see Marker (3') in **Figure 8.2(b)**). The two strips of NBAs at the southern boundary of Application Site K9 and the northern boundary of Application Site K10 are retained. These NBAs continue to widen Road L8 and facilitate wind flow. Although the relaxation of maximum building heights and the addition of podiums in Application Sites K9 and K10 are expected to enhance wind channeling, the overall wind flow patterns remain largely unchanged under the Proposed Scenario as compared with the Baseline Scenario.

8.2.31 Under the Proposed Scenario, good penetration of the ENE annual prevailing wind from the village houses at Ho Sheung Heung towards the Kwu Tung Station area can still be observed despite the addition of podiums and relaxation of maximum building heights in Application Sites K10 and K11. The wind continues to flow through the Non-Building Area (NBA) between the proposed blocks in Application Site K10 and the NBA within Application Site K4, with no observable change in the overall wind flow pattern. This major ENE breezeway is annotated as Marker (4') in **Figure 8.2(b)**.

8.2.32 Under the Proposed Scenario, the building arrangements and orientations of the domestic blocks within the upstream Application Sites K11 and K12 remain largely unchanged, with only additional podiums introduced that do not obstruct the major wind flow. The general placement of buildings in Application Sites K5 and K6 is also unchanged except for the addition of podiums for above-ground car parks. As a result, and similar to the Baseline Scenario, the ENE annual prevailing wind originating from the southern regions of Ho Sheung Heung continues to penetrate Application Sites K11 and K12 through strips of Non-Building Areas (NBAs). The wind then flows across Road P2 and proceeds along Roads D2-4, D2-3, D2-2 and L2, passing between Area A5, Application Sites K2, K5 and K6, and Areas P15 to P18 (see Marker (5') in **Figure 8.2(b)**). The NBAs at the northern boundaries of Areas P15 to P18 are retained under the Proposed Scenario. As in the Baseline Scenario, these NBAs widen Roads D2-4 to D2-2 and L2, thereby enhancing the effectiveness of this wind breezeway.

8.2.33 Under the Proposed Scenario, and as in the Baseline Scenario, the ENE wind originating from Long Valley flows along the Sheung Yue River between Areas Ar32 and P19, then continues towards Area P17 and Fanling Highway. This corridor still serves as an effective district-wide ENE wind breezeway, helping to maintain the local wind environment (see Marker (6') in **Figure 8.2(b)**).

Differences in Pedestrian Wind Environment as compared to the Baseline Scenario

8.2.34 Compared with the Baseline Scenario, the overall domestic building footprints within the Application Sites remain unchanged under the Proposed Scenario. However, more massive podiums for above-ground car parking have been introduced across all Application Sites, together with taller domestic blocks resulting from the relaxation of building height restrictions. As a result, the Proposed Scenario is expected to generate wind wakes of greater extent and coverage in the downwind areas (where certain potential wind sensitive areas are situated) compared with the Baseline Scenario.

8.2.35 In particular, the larger wind wakes induced by the taller podiums in Application Sites K1 and K2 would affect the wind environment at Areas A3 and P12/P14, which are located immediately downstream. In Application Site K4, the increase in maximum building height from 85mPD to 95mPD and the addition of two-storey podiums are expected to create cumulative wind wakes of greater extent, affecting Areas A4 and the Kwu Tung Station nearby areas. In addition, the relaxation of maximum building heights in Application Sites K5 and K6 from 80mPD to 85mPD, together with the addition of podiums, would further increase wind blockage and reduce wind availability at its downwind Area A5.

8.2.36 Although the building arrangements, orientations of domestic buildings as well as locations of Non-Building Areas (NBAs) within Application Sites K7 to K12 remain unchanged under the Proposed Scenario, the maximum building heights in these Application Sites have been relaxed, and podiums for above-ground car parks have been added. As a result, the Development Proposals within Application Sites K7 to K12 together with the Development Proposals within Application Site K3 are expected to generate larger wind wakes in the downstream areas — specifically Areas A2 and P22 across Road P2-1 — compared with the Baseline Scenario.

8.2.37 Under the Proposed Scenario, an analysis of building height variations between the Development Proposals within the Application Sites and the planned/committed developments in the surrounding areas (see **Figure A3**) shows that the differences in building heights are less pronounced due to the relaxation of maximum building heights. As a result, a slight reduction in the magnitude of downwash wind compared with the Baseline Scenario is anticipated along Separation 4-1 as well as along Roads L6-1 and L6-2 under ENE prevailing winds. Nevertheless, vertical air movements are still expected to occur along the previously mentioned roads and separations, which play an important role in maintaining the local wind environment near the Application Sites and surrounding areas. Apart from the above, all newly added podiums have incorporated podium gardens of 5m in height aiming to enhance wind permeability. Most importantly, the addition of podiums and the relaxation of building height restrictions under the Proposed Scenario do not obstruct the major identified ENE wind breezeways, and the requirements for Non-Building Areas (NBAs) continue to be fully complied with. In view of this, the district-wide wind flow patterns are generally maintained compared with the Baseline Scenario under the ENE prevailing wind.

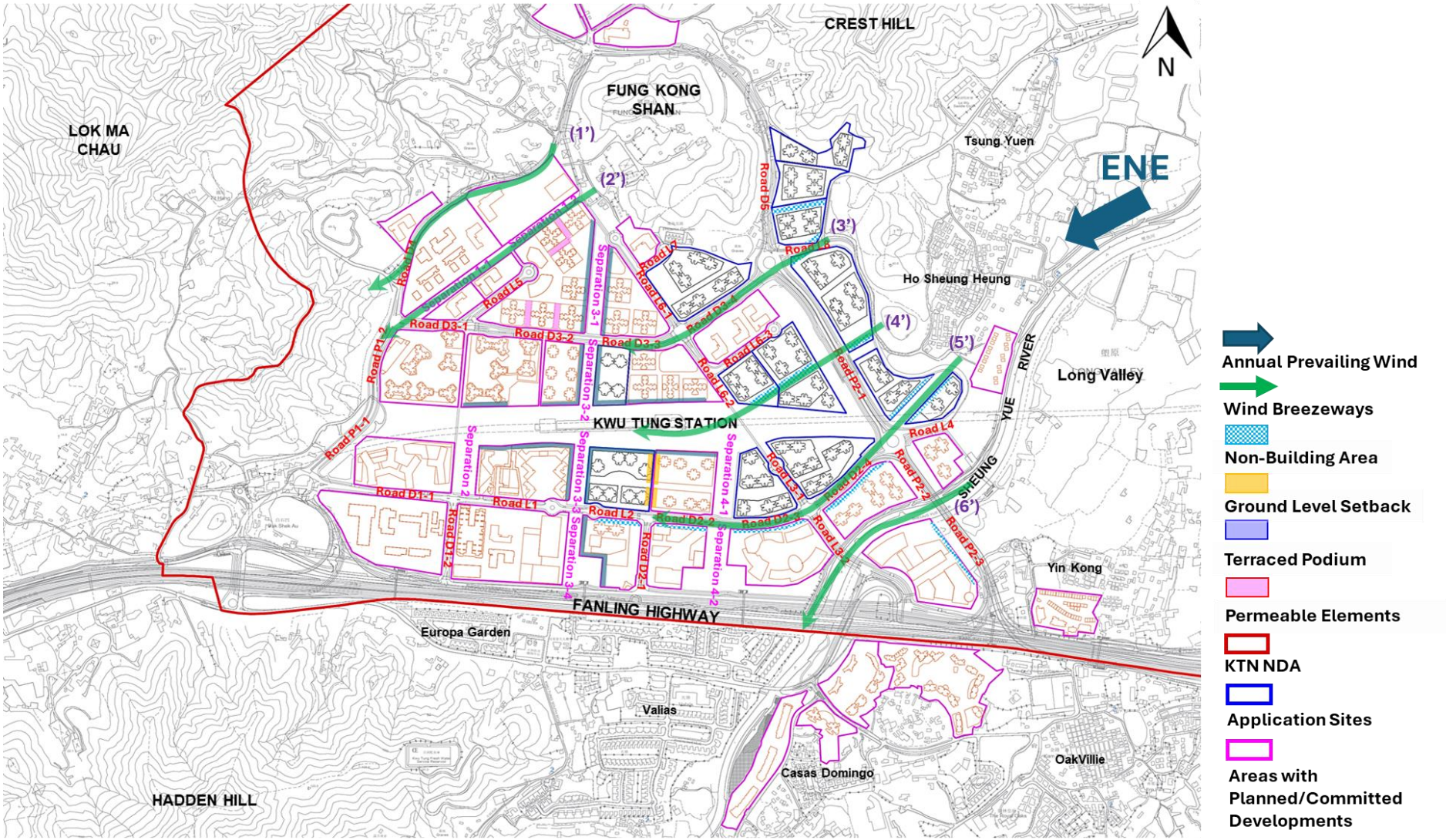


Figure 8.2(b) Wind Flow under the ENE Annual Prevailing Wind for the Proposed Scenario

Under E Annual and Summer Prevailing Wind Direction

Baseline Scenario

8.2.38 An easterly wind path originating from the village houses at Ho Sheung Heung would be divided into two streams. One stream would flow through Road L8, which is located between Application Sites K9 and K10, and then continue along Roads D3-4, D3-3 and D3-2. The other stream would flow along the western side of Application Site K3 towards the school site in Area P18. To facilitate the penetration of the prevailing easterly wind, two strips of Non-Building Areas (NBAs) are incorporated along the southern boundary of Application Site K10 and the northern boundary of Application Site K11. These NBAs would widen Road L8 and ensure unobstructed wind flow (see Marker (1) in **Figure 8.3(a)**).

8.2.39 The Non-Building Areas (NBAs) provided within Application Sites K10 and K4 would facilitate the flow of the prevailing easterly wind from Ho Sheung Heung across Road P2-1 towards Kwu Tung Station. These NBAs, which link Ho Sheung Heung and Kwu Tung Station, would form an effective wind breezeway that enhances the penetration of easterly wind (see Marker (2) in **Figure 8.3(a)**). In addition, the building morphology within Application Site K4 would divert a stream of easterly wind to flow along Road P2-1 towards Fung Kong Shan.

8.2.40 The prevailing easterly wind originating from the Sheung Yue River would penetrate the southern portion of Application Site K12 and continue across the east-west oriented wind breezeway along Kwu Tung Station towards Road P1-1 (see Marker (3) in **Figure 8.3(a)**).

8.2.41 The prevailing easterly wind from Road D2-4 will utilize Roads D1-1, L1, L2, D2-2 and D2-3 as the primary easterly wind pathway. This route facilitates wind flow between Application Sites K2, K5 and K6 and Areas A5, P15 to P17, and Ar32 (see Marker (4) in **Figure 8.3(a)**). Non-Building Areas (NBAs) are provided along the northern boundaries of Areas P15 to P17 and Ar32. These NBAs would widen Roads L2, D2-2 to D2-4 and enhance the effectiveness of this easterly wind breezeway.

8.2.42 Fanling Highway, which runs adjacent to the southern boundary of the KTN NDA, serves as one of the major easterly wind breezeways that contributes to district-wide air ventilation. The easterly wind from the area near Area P21 (see Marker (6) in **Figure 8.3(a)**) merges with the easterly wind from Long Valley, which is channeled along the section of the Sheung Yue River between Areas Ar32 and P19 (see Marker (5) in **Figure 8.3(a)**). The combined wind stream then flows along Fanling Highway.

8.2.43 Under the Baseline Scenario, the building height variations between the Development Proposals within the Application Sites and the planned developments in the surrounding areas (as shown in **Figure A2**) would induce downwash wind along Roads L6-1 and L6-2, as well as along the major separations between the Application Sites and the surrounding areas, namely Separation 3-2 and Separation 4-1, under the prevailing easterly wind. In addition, vertical air movements are anticipated along Road D2-1 and Separations 3-1, 3-4 and 4-2, which are located between the surrounding areas. These downwash winds/vertical air movements, induced by the differences in building heights, play an essential role in maintaining the local wind environment.

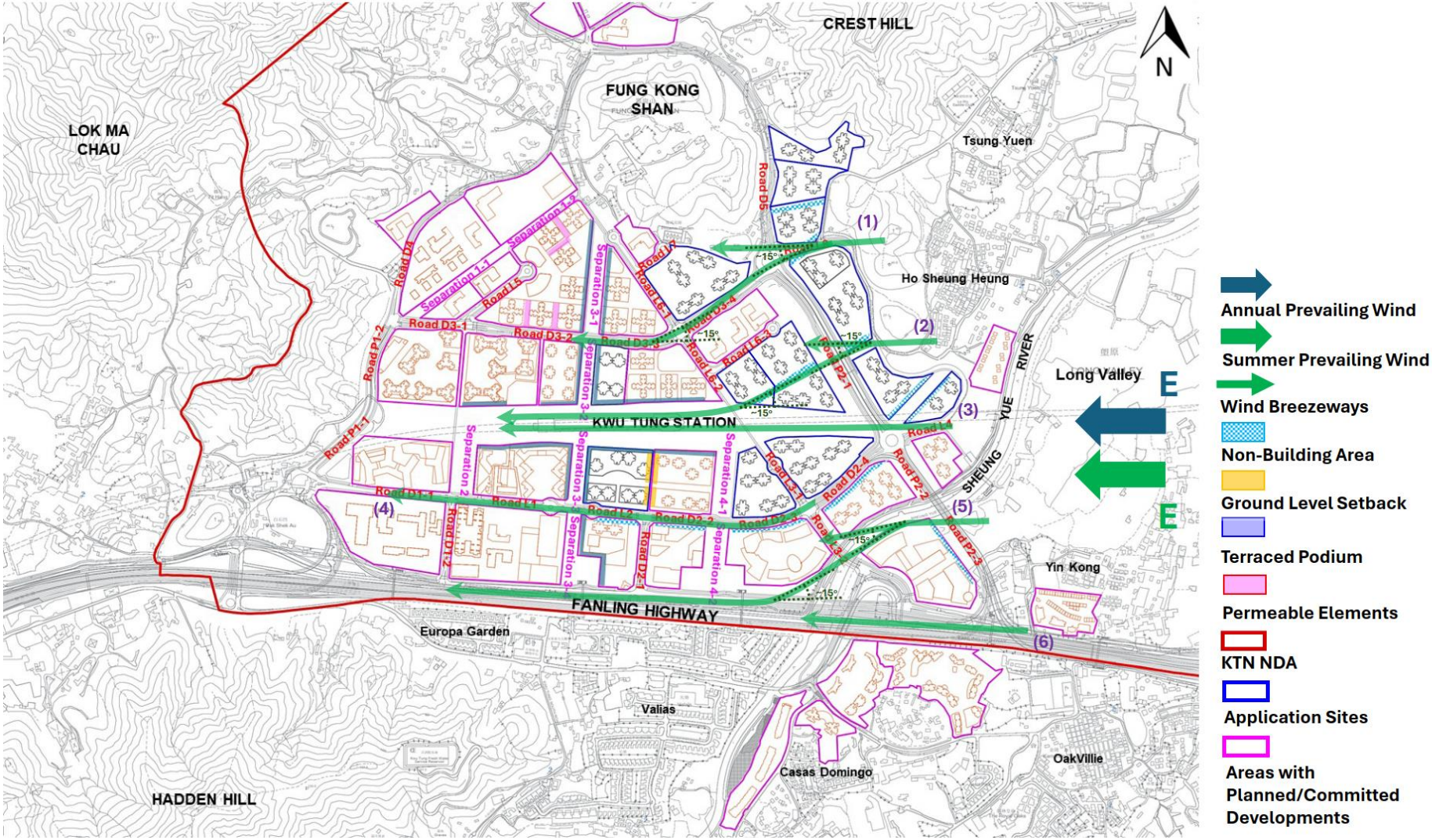


Figure 8.3(a) Wind Flow under the E Annual and Summer Prevailing Wind for the Baseline Scenario

Proposed Scenario

Similarities in Pedestrian Wind Environment as compared to the Baseline Scenario

8.2.44 As the building morphologies in the surrounding areas are identical under both the Baseline Scenario and the Proposed Scenario, the easterly wind path originating from the village houses at Ho Sheung Heung would remain unchanged. The wind would continue to flow along Road L8, which is located between Application Sites K9 and K10, and then divide into two streams. The descriptions set out in paragraph 8.2.38 for the Baseline Scenario remain valid for the Proposed Scenario. To facilitate the smooth penetration of the prevailing easterly wind, two strips of Non-Building Areas (NBAs) are incorporated along the southern boundary of Application Site K9 and the northern boundary of Application Site K10. These NBAs would widen Road L8 (see Marker (1') in **Figure 8.3(b)**).

8.2.45 The easterly wind flow patterns through the Non-Building Areas (NBAs) within Application Site K10 and Application Site K4, from Ho Sheung Heung towards Kwu Tung Station across Road P2-1, remain unchanged under the Proposed Scenario compared with the Baseline Scenario. These NBAs, which link Ho Sheung Heung and Kwu Tung Station, would continue to form an effective breezeway that enhances the penetration of the prevailing easterly wind (see Marker (2') in **Figure 8.3(b)**). As in the Baseline Scenario, the introduction of podiums within Application Site K4b under the Proposed Scenario would result in improved diversion of a stream of easterly wind along Road P2-1 towards Fung Kong Shan.

8.2.46 The two district-wide easterly breezeways identified in the Baseline Scenario remain unchanged and effective under the Proposed Scenario. The areas along Kwu Tung Station and Fanling Highway, both aligned in an east-west direction, would continue to support district-wide air ventilation performance (see Markers (3') and (6') in **Figure 8.3(b)**).

8.2.47 The stream of prevailing easterly wind from Road D2-4 that flows along Roads D2-3, D2-2, L2, L1 and D1-1 under the Baseline Scenario remains unchanged under the Proposed Scenario (see Marker (4') in **Figure 8.3(b)**). As in the Baseline Scenario, the incorporation of Non-Building Areas (NBAs) along the northern boundaries of Areas P15 to P17 and Ar32 would widen Roads L2, D2-2 to D2-4 and enhance the effectiveness of this easterly wind breezeway under the Proposed Scenario.

8.2.48 With the building morphologies in the areas adjacent to the Application Sites remaining unchanged, the easterly wind from Long Valley would continue to be channeled along the section of the Sheung Yue River lying between Areas Ar32 and P19. This stream would then merge with the easterly wind originating from the Yin Kong area near Area P21, and the combined flow would continue along Fanling Highway (see Markers (5') and (6') in **Figure 8.3(b)**).

8.2.49 By investigating the building height variations of the Development Proposals within the Application Sites and the planned developments at the surrounding areas under the Proposed Scenario in **Figure A3**, locations where downwash wind is anticipated to occur under the Proposed Scenario are generally consistent with the Baseline Scenario which are along Roads L6-1, L6-2, D2-1 as well as along the major separations: Separations 3-1, 3-2, 3-4, 4-1 and 4-2, formed in under the E prevailing wind for the Proposed Scenario.

Differences in Pedestrian Wind Environment as compared to the Baseline Scenario

8.2.50 Similar to the situation under the ENE prevailing wind, the overall building footprints, orientations and arrangements of the domestic blocks within the Application Sites remain unchanged under the Proposed Scenario compared with the Baseline Scenario. However, the domestic blocks would be taller due to the relaxation of Building Height Restrictions (BHR). In addition, higher podiums have been introduced across all Application Sites to accommodate aboveground car parks and Public Transport Interchanges (PTIs). As a result, under the prevailing easterly annual and summer winds, the Proposed Scenario is anticipated to generate wind wakes with greater extent and coverage in the downwind areas compared with the Baseline Scenario. In particular, the wind environment at the potential wind-sensitive receivers in Areas A2 to A5, P12 and P22, which are located immediately downstream of Application Sites K1 to K5 and K10, would be more significantly influenced by the larger wind wakes induced by the taller domestic buildings (within Application Sites K3 to K5 and K10) and the additional elevated podiums (within Application Sites K1 to K5 and K10) under the Proposed Scenario. However, it is worthwhile mentioning that the newly introduced podiums

maintain separations of at least 15m between them to enhance wind permeability and promote wind penetration through the Application Sites.

8.2.51 Within Application Sites K8 to K10, a slight relaxation of building heights and the adoption of podium designs (instead of podium-free designs) are proposed. Consequently, slightly stronger wind channeling effects are expected along the Non-Building Areas (NBAs) within these sites. However, larger wake zones are also anticipated under the Proposed Scenario, which may affect the downwind areas, particularly Areas P18 and P22.

8.2.52 Due to the increased building heights within the Application Sites, the differences in building height variations between the Development Proposals and the planned/committed developments in the surrounding areas are less pronounced than under the Baseline Scenario. As a result, downwash wind would still occur but would be less strengthened. Downwash wind is nevertheless anticipated along Roads L6-1 and L6-2, as well as along Separation 4-1. These induced downwash winds remain essential in maintaining the local wind environment at and near the Application Sites under the Proposed Scenario.

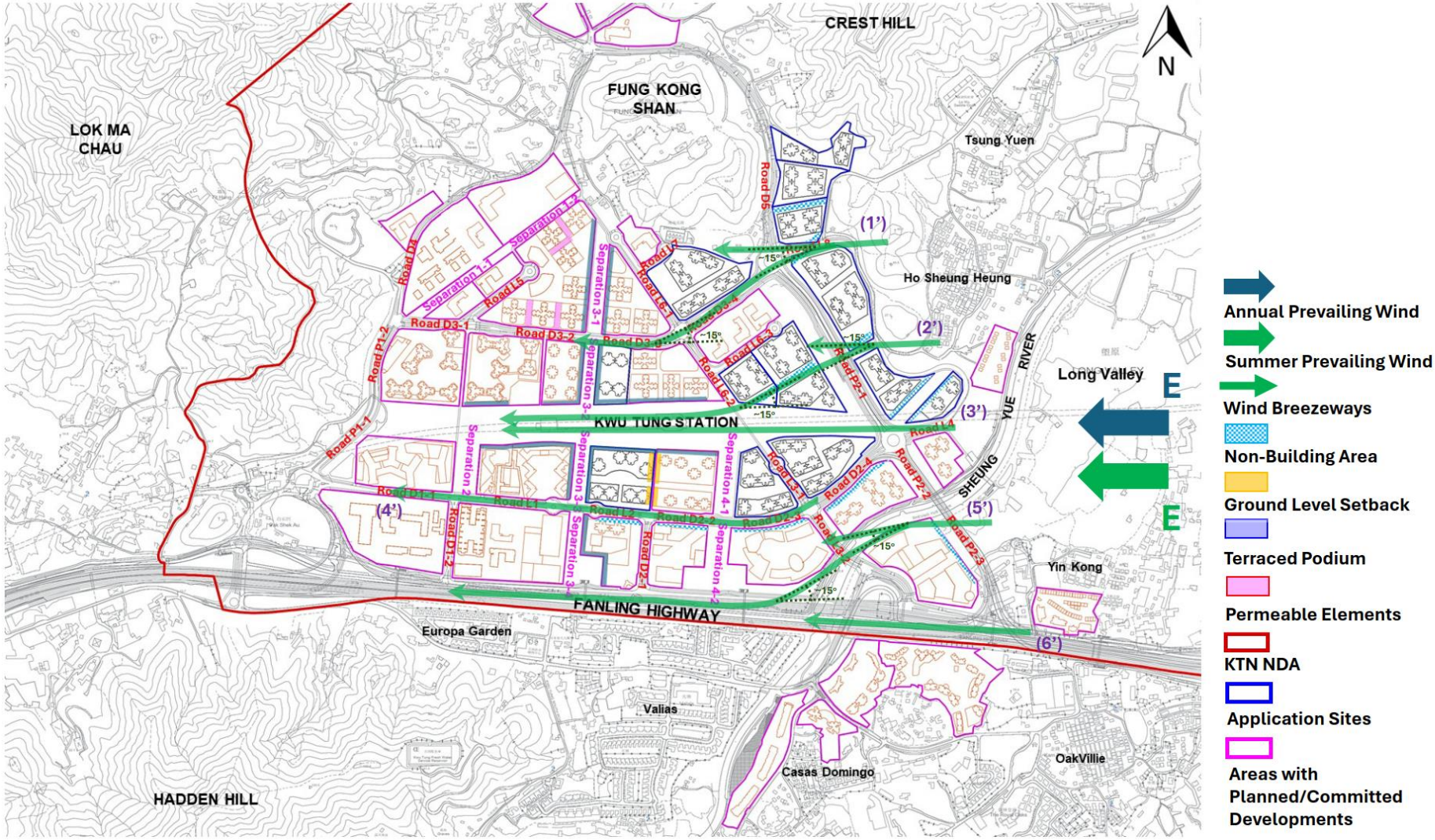


Figure 8.3(b) Wind Flow under the E Annual and Summer Prevailing Wind for the Proposed Scenario

Under S Summer Prevailing Wind Direction

Baseline Scenario

8.2.53 Under the Baseline Scenario, southerly winds are largely sheltered by the committed and planned high-rise residential blocks in Areas P11 and P13. The wind channels westward along Road P1-2, passes the western side of the committed school in Area P4, and continues northward towards Road D4 with minimal further obstruction (see Marker (1) in **Figure 8.4(a)**).

8.2.54 A local southerly wind path is identified originating from Europa Garden near the Fanling Highway and flowing towards Areas P7 and P8 (see Marker (2) in **Figure 8.4(a)**). This wind stream travels along Road D1-2 between Areas P13 and P14, as well as through the separation between Areas P11 and P12 (Separation 2), before reaching the Kwu Tung Station area. After passing the separation between Areas P9 and P10, the wind continues towards Road D3-1 and the planned schools in Areas P7 and P8.

8.2.55 The series of separations (Separations 3-1 to 3-4 in **Figure 8.4(a)**) located between Areas A1/A3/P12/P14 and Area A2/Application Sites K1 and K2/Area P15 form a major district-wide north-south wind breezeway. This breezeway links Fung Kong Shan with the Fanling Highway and helps maintain a favorable wind environment around Application Sites K1 and K2, as well as in Areas A1–A3, P12, P14, and P15 (see Marker (3) in **Figure 8.4(a)**).

8.2.56 One southerly wind stream from the Fanling Highway flows along Road D2-1 between Areas P15 and P16, then continues towards the Kwu Tung Station by passing through the space between Area A5 and Application Site K2. Ground-level setbacks have been incorporated along the eastern boundary of Application Site K2 and the western boundary of Area A5 to facilitate the penetration of this southerly wind (see Marker (4) in **Figure 8.4(a)**).

8.2.57 After flowing through the separations between Areas A5/P16 and Application Site K5/Area P17 (Separations 4-1 and 4-2 in **Figure 8.4(a)**), the southerly wind continues towards the Kwu Tung Station and is then channeled along Road L6-2 (see Marker (5) in **Figure 8.4(a)**).

8.2.58 Due to the urban grid layout and building placement within Areas P17 and P19, the southerly wind diverges into two streams. The first stream flows along Road L3-1 (between Application Sites K5 and K6) and Road L3-2 (between Areas P17 and Ar32). The second stream is directed along the portion of the Sheung Yue River sandwiched between Areas Ar32 and P19 (see Marker (6) in **Figure 8.4(a)**).

8.2.59 Some weakening of the southerly wind is expected after it passes Application Sites K4, K5, and K6. Nevertheless, the Development Proposals in these sites adopt podium-free designs and are arranged in a scattered manner with generous building separations. These design measures help maintain southerly wind availability towards the downwind Application Sites K7 to K10. In addition, Road D5, which abuts Application Sites K7 to K9, serves as a major north-south wind breezeway that helps sustain the wind environment around Application Sites K3, K7–K9, and Area P22 (see Marker (7) in **Figure 8.4(a)**).

8.2.60 The Sheung Yue River functions as another important district-wide south-north wind breezeway. Southerly winds originating from the Fanling Highway and the areas near P19 and P21 (close to Yin Kong) flow along the river corridor, reaching the downwind areas near Area P20 and to the east of Ho Sheung Heung (see Marker (8) in **Figure 8.4(a)**).

8.2.61 Under the Baseline Scenario, downwash effects associated with the southerly prevailing wind are observed at several locations, as indicated by the maximum building height distribution (see **Figure A2**). These include Roads D1-1, L2, D2-2, D2-3, and D2-4, where the planned buildings in Areas P13, P15–P17, and Ar32 are notably lower than those in Area P11, Application Site K2, Area A5, and Application Sites K5 and K6. Downwash is also anticipated along Roads D3-2 to D3-4 and in the vicinity of the Kwu Tung Station, where buildings facing the southerly wind are lower than those behind them.

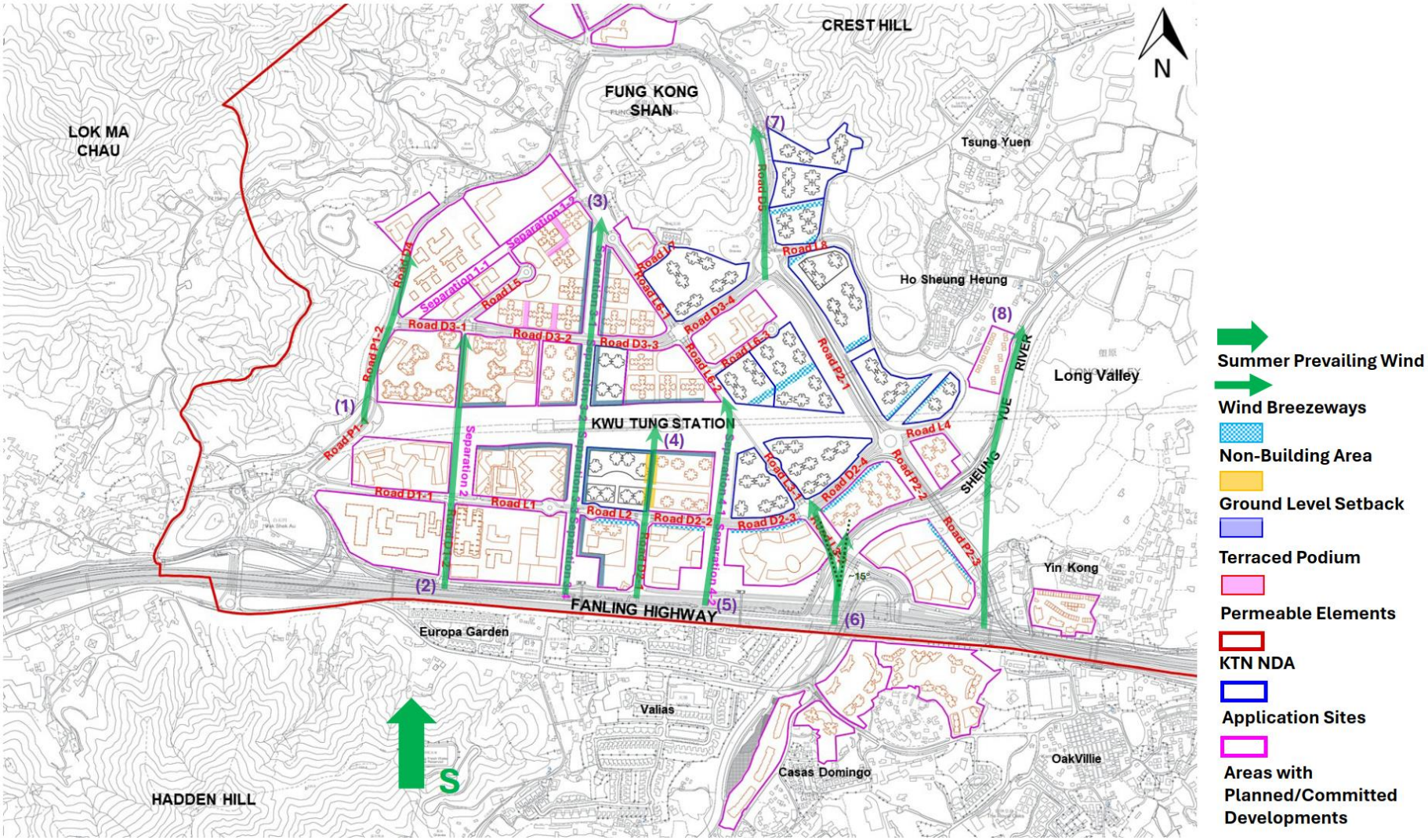


Figure 8.4(a) Wind Flow under the S Summer Prevailing Wind for the Baseline Scenario

Proposed Scenario

Similarities in Pedestrian Wind Environment as compared to the Baseline Scenario

8.2.62 Under the Proposed Scenario, the surrounding building morphologies in Areas P4 to P14, located to the west of the Application Sites, remain unchanged from the Baseline Scenario. Therefore, the wind flow patterns described in paragraphs 8.2.53 to 8.2.54 for the Baseline Scenario remain valid (see Markers (1') and (2') in **Figure 8.4(b)**).

8.2.63 The series of separations (Separations 3-1 to 3-4 in **Figure 8.4(b)**) between Areas A1 and A2, Area A3 and Application Site K1, Area P12 and Application Site K2, and Area P14 and Area P15 continue to link Fung Kong Shan with the Fanling Highway. This forms a major district-wide north-south wind breezeway under the Proposed Scenario, identical to the Baseline Scenario (see Marker (3') in **Figure 8.4(b)**). This breezeway helps maintain a favorable wind environment around Application Sites K1 and K2, as well as Areas A1–A3, P12, P14, and P15.

8.2.64 The ground-level setbacks within Application Site K2 and Area A5, which serve as a good air ventilation design measure, are retained under the Proposed Scenario. These setbacks, located along the eastern boundary of Application Site K2 and the western boundary of Area A5, provide a passage for southerly winds from the Fanling Highway to flow along Road D2-1 and reach the Kwu Tung Station area (see Marker (4') in **Figure 8.4(b)**).

8.2.65 Consistent with the Baseline Scenario, southerly winds originating from the Fanling Highway would flow along the separations between Area A5/Application Site K5 and Areas P16/P17 (Separations 4-1 and 4-2 in **Figure 8.4(b)**). The wind would continue towards Kwu Tung Station and then be channeled along Road L6-2 (see Marker (5') in **Figure 8.4(b)**).

8.2.66 As the urban grid and building placement within Areas P17, P19, and Ar32 remain unchanged under the Proposed Scenario, the southerly wind from the Fanling Highway continues to diverge into two streams. The wind flow pattern in this area is therefore similar to that under the Baseline Scenario (see Marker (6') in **Figure 8.4(b)**).

8.2.67 Similar to the Baseline Scenario, the weakened southerly wind would flow along Road D5, which abuts Application Sites K7 to K9. This road serves as a major north-south wind breezeway that helps maintain the wind environment around Application Sites K3, K7–K10, and Area P22 under the Proposed Scenario (see Marker (7') in **Figure 8.4(b)**).

8.2.68 With no observable changes in building morphologies within Areas P19 and P21 under the Proposed Scenario, southerly winds originating from the Fanling Highway would flow across Road P2-3 to the northeast of Area P19 and continue along the Sheung Yue River towards the areas near Area P20 (see Marker (8') in **Figure 8.4(b)**).

Differences in Pedestrian Wind Environment as compared to the Baseline Scenario

8.2.69 The Proposed Scenario retains the key air ventilation design measures from the Baseline Scenario, including terraced podiums in Application Sites K1 and K2, ground-level setbacks in Application Site K2, and Non-Building Areas (NBAs) in Application Sites K4 and K9 to K12. These measures help maintain good air penetration. Nevertheless, the introduction of additional podiums and increases in building heights across most Application Sites are expected to generate stronger wind wakes. These changes may reduce the wind availability at the identified potential wind-sensitive receivers, namely Areas A2 and A4, Area P22, Kwu Tung Station, and Ho Sheung Heung village.

8.2.70 Although the terraced podium designs and the maximum building height restriction in Application Sites K1 and K2 remain unchanged, the slight increase in podium height under the Proposed Scenario are anticipated to generate stronger wind wakes. This would reduce wind availability at Kwu Tung Station and in Areas A2 and A4. In addition, cumulative wind wakes induced by the developments in Application Sites K1 and K2 may create potential wind impacts on the downwind Area A2 under southerly summer prevailing winds.

8.2.71 The maximum building heights within Application Sites K4a and K4b increase from 85mPD under the Baseline Scenario to 95mPD under the Proposed Scenario. Together with the addition of three 2-storey podiums for above-ground car parking, these changes are expected to produce stronger wind wakes affecting the downwind Area P22.

8.2.72 The building footprints, orientation and arrangements of the domestic blocks and the strips of Non-Building Areas (NBAs) within Application Sites K11 and K12 remain unchanged.

However, the slight relaxation in building heights and the introduction of 2-storey podiums for car parking in both sites are expected to generate wind wakes that extend over a slightly larger area, potentially affecting the village houses in Ho Sheung Heung.

8.2.73 Despite the relaxations in maximum building heights (ranging from 0mPD to 15mPD) and the adoption of two-storey podiums across all Application Sites, which are expected to generate wind wakes of greater extent and coverage compared to the Baseline Scenario, the overall wind flow patterns under southerly summer prevailing winds are anticipated to remain largely the same. The footprints of the additional podiums have been minimized as far as practicable, while maintaining at least 15m separation between them and incorporating 5m podium gardens. The good air ventilation design measures from the Baseline Scenario have been retained. With the identified wind breezeways remaining unobstructed and enhanced channeling effects, penetration of southerly prevailing winds is promoted. In addition, due to the greater height differences between Area P17 and Application Site K5, and Area Ar32 and Application Site K6, a slight enhancement in downwash effects is anticipated along Roads D2-3 and D2-4 compared with the Baseline Scenario.

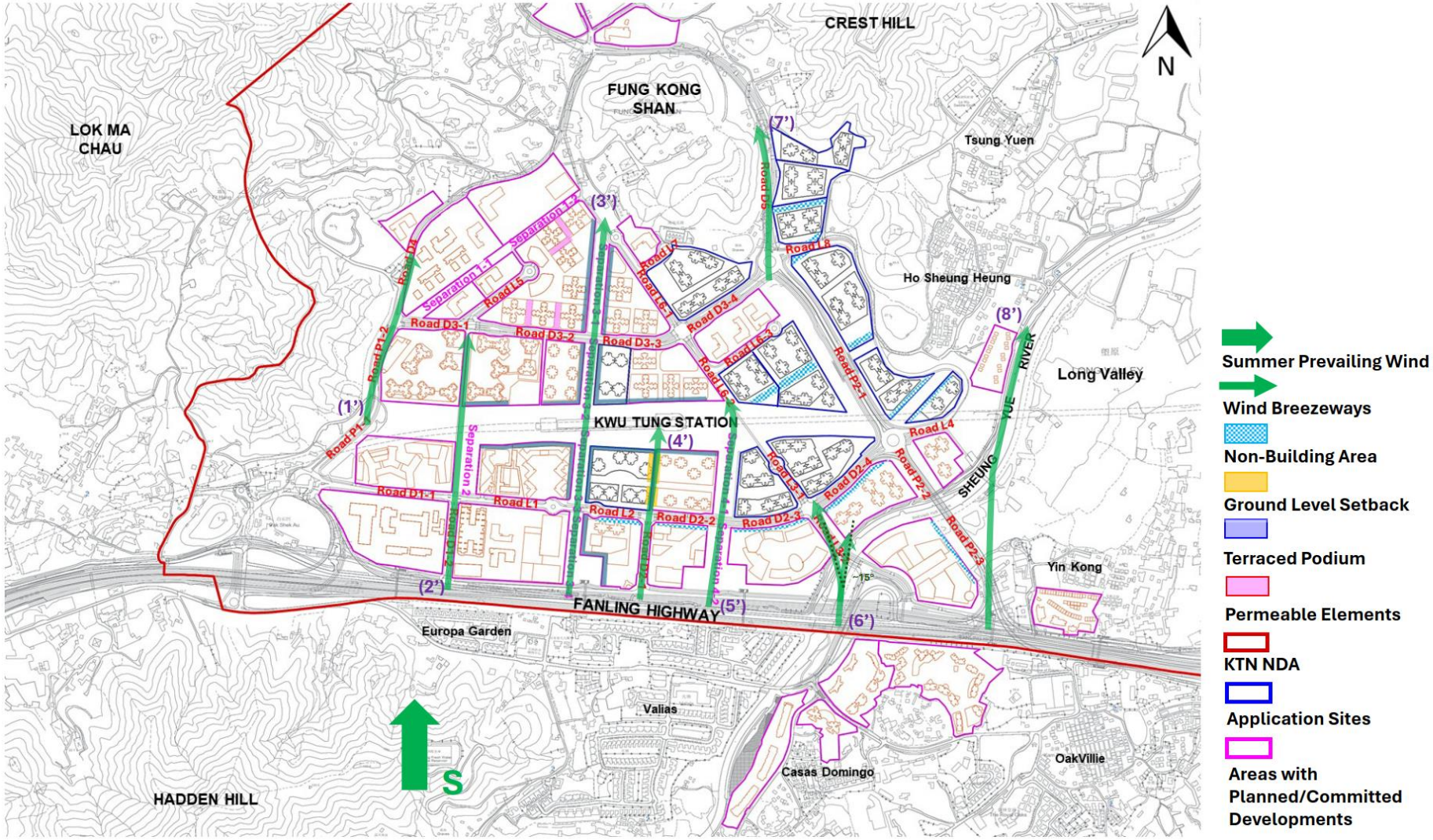


Figure 8.4(b) Wind Flow under the S Summer Prevailing Wind for the Proposed Scenario

Under SW Summer Prevailing Wind Direction

Baseline Scenario

8.2.74 Under the Baseline Scenario, the majority of the proposed buildings within the Application Sites and the planned/committed developments in the surrounding areas are not oriented in a southwest-northeast (SW-NE) direction. As a result, elongated and continuous air pathways penetrating the Application Sites are generally not observed under the southwesterly (SW) summer prevailing wind. Nevertheless, several localized wind paths can still be identified after the wind is sheltered by the Development Proposals.

8.2.75 Three major SW summer wind breezeways are identified. The first is Road D4, which flows between the planned school in Area P4 and the GIC blocks in Area P5 (see Marker (1) in **Figure 8.5(a)**). The second follows the separations (Separation 1-1 and Separation 1-2) between Areas P5/P6 and Areas P7/P8/A1, extending towards Fung Kong Shan (see Marker (2) in **Figure 8.5(a)**). The third SW wind path originates from the Fanling Highway, travels between Areas Ar32 and P19 and alongside Area Ar34, crosses the Sheung Yue River, and proceeds towards Long Valley (see Marker (9) in **Figure 8.5(a)**).

8.2.76 Dominated by the urban grid layout, SW winds flowing along the Fanling Highway diverge into several streams that enter Road D1-2, Separation 3-4, Road D2-1, and Separation 4-2. These streams help promote the wind environment in the vicinity of Areas P13 to P17 (see Marker (8) in **Figure 8.5(a)**).

8.2.77 After being sheltered by the proposed residential developments in Area A2, SW winds flow along Road L7, which abuts the southern boundary of Area P18 and the northwestern boundary of Application Site K3 (see Marker (3) in **Figure 8.5(a)**). SW winds from Road D3-3 near Application Site K1 and Area A4 continue along Road D3-4. Two strips of Non-Building Areas (NBAs) at the southeast tip of Application Site K9 and the northwest tip of Application Site K10 help widen Road L8, thereby enhancing the penetration of this SW prevailing wind (see Marker (4) in **Figure 8.5(a)**). Another SW wind path leading towards Application Site K10 is identified along Road L6-3, located between Area P22 and Application Site K4 (see Marker (5) in **Figure 8.5(a)**).

8.2.78 Two additional SW wind paths directed towards the Ho Sheung Heung area are identified. The first originates from Kwu Tung Station area and flows along the SW-NE aligned Non-Building Areas (NBAs) within Application Sites K4 and K10 before reaching the village houses of Ho Sheung Heung (see Marker (6) in **Figure 8.5(a)**). The second path starts from Road D2-3 between Area P17 and Application Site K5, enters Road D2-4, and continues along the separation between Application Sites K11 and K12 towards the Ho Sheung Heung area (see Marker (7) in **Figure 8.5(a)**).

8.2.79 Under the Baseline Scenario, downwash effects associated with the SW prevailing wind are observed at several locations based on the building height distribution (see **Figure A2**). These include Roads D1-1, L2, D2-2, D2-3, D2-4, and L4, where the planned buildings in Areas P13, P15–P17, Ar32, and Ar34 are lower than those in Areas P11 and A5 and Application Sites K2, K5, K6, and K12. Downwash is also anticipated along Roads D3-2 and D3-3, where buildings in Areas P10, A3, A4, and Application Site K1 are lower than those in Areas A1 and A2. Furthermore, downwash effects occur near the Kwu Tung Station in the vicinity of Areas P10/P12/A3 and Areas A4/A5, as well as along Road P2-1, where the proposed/planned developments in Application Sites K4 and Area P22 have lower building heights than those in Application Sites K10 and K11.

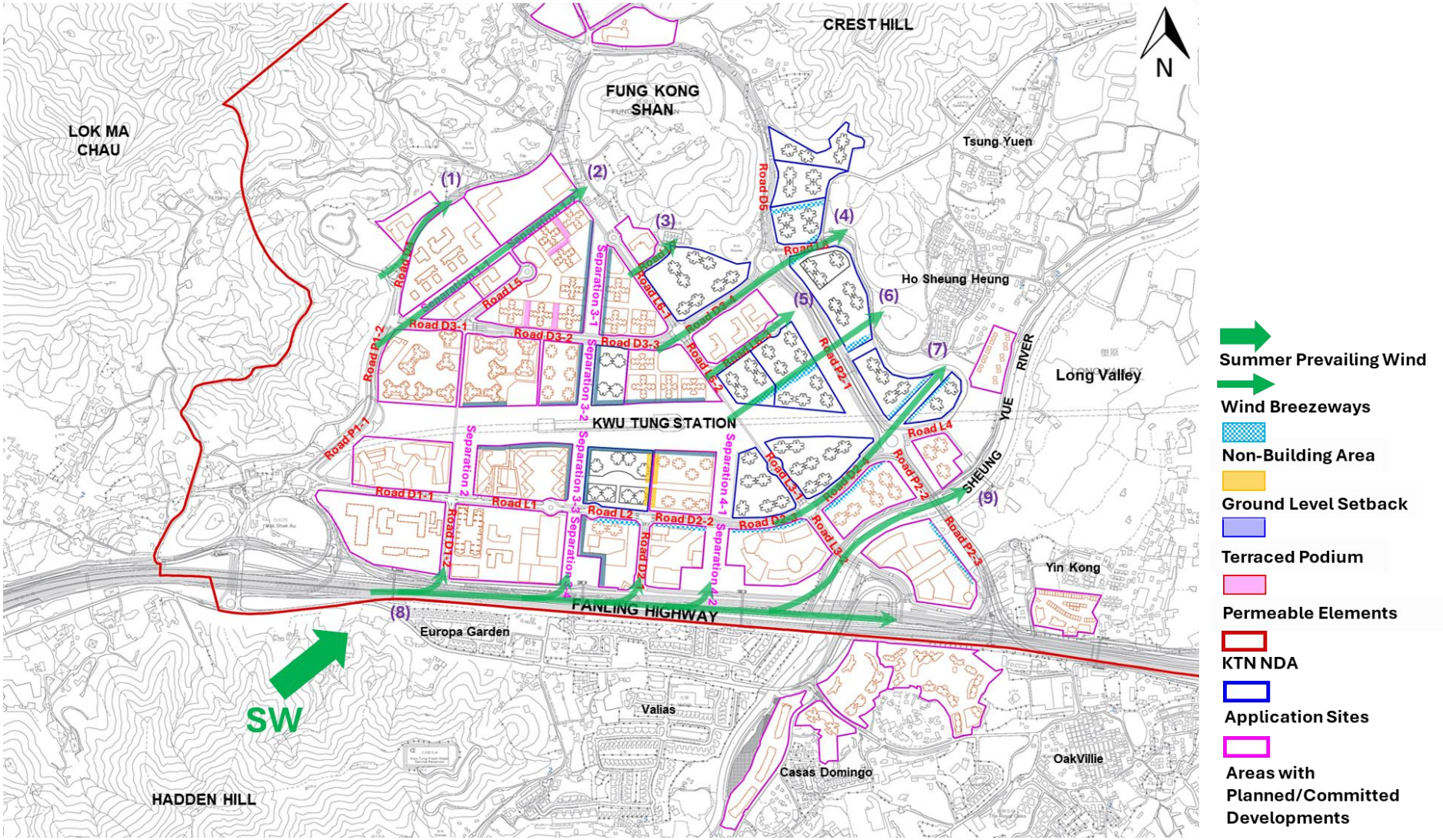


Figure 8.5(a) Wind Flow under the SW Summer Prevailing Wind for the Baseline Scenario

Proposed Scenario

Similarities in Pedestrian Wind Environment as compared to the Baseline Scenario

8.2.80 Under the Proposed Scenario, there are no changes in building morphologies within Areas P4–P8, A1, P13–P17, and P19. As a result, the three major SW summer wind breezeways identified in the Baseline Scenario remain effective (see Markers (1'), (2'), and (9') in **Figure 8.5(b)**). Similarly, the SW winds flowing along the Fanling Highway continue to diverge into several streams that enter Road D1-2, Separation 3-4, Road D2-1, and Separation 4-2 (see Marker (8') in **Figure 8.5(b)**). Therefore, the descriptions of wind flow patterns along these breezeways and the Fanling Highway provided in paragraphs 8.2.75 and 8.2.76 for the Baseline Scenario remain valid under the Proposed Scenario.

8.2.81 Consistent with the Baseline Scenario, SW prevailing wind weakened by the high-rise buildings in Area A2 would continue to flow along Road L7, which lies between Area P18 and Application Site K3 (see Marker (3') in **Figure 8.5(b)**). The two strips of Non-Building Areas (NBAs) within Application Sites K9 and K10, which widen Road L8 and enhance penetration of the SW prevailing wind, are retained under the Proposed Scenario. These features help maintain a favorable wind environment in the vicinity of Application Sites K3, K9, K10, and Area P22 (see Marker (4') in **Figure 8.5(b)**). In addition, the SW wind stream originating from Area A4, which flows across Road L6-2 along the northwestern boundary of Application Site K4 and continues along Road L6-3 towards Application Site K10, remains effective under the Proposed Scenario (see Marker (5') in **Figure 8.5(b)**).

8.2.82 The two SW wind paths directed towards the Ho Sheung Heung area under the Proposed Scenario are unchanged from the Baseline Scenario. The first path originates from the Kwu Tung Station area, flows along the SW-NE aligned Non-Building Areas (NBAs) within Application Sites K4 and K10, crosses Road P2-1, and proceeds towards the village houses of Ho Sheung Heung (see Marker (6') in **Figure 8.5(b)**). The second path is formed by Road D2-3, Road D2-4, and the separation between Application Sites K11 and K12, allowing the SW wind stream to reach the areas near Ho Sheung Heung (see Marker (7') in **Figure 8.5(b)**).

Differences in Pedestrian Wind Environment as compared to the Baseline Scenario

8.2.83 Due to the relaxation in maximum building heights and the addition of two-storey podiums for above-ground car parking in most Application Sites, the Proposed Scenario is expected to induce wind wakes of greater extent and coverage compared to the Baseline Scenario. These enhanced wind wakes would further affect the wind environment at the identified potential wind-sensitive receivers located downwind under the southwesterly (SW) prevailing wind, namely Areas A2 and A4, the Kwu Tung Station, and Ho Sheung Heung village.

8.2.84 The slight increase in podium height within Application Sites K1 and K2 would weaken the southwesterly prevailing wind reaching the downwind areas, resulting in larger wind wakes that affect Areas A2 and A4 as well as the Kwu Tung Station. Cumulative wind wakes impacting Area A4 from the combined developments in Application Sites K1 and K2 are anticipated to be more pronounced under SW summer prevailing winds.

8.2.85 Although the building arrangements, orientations of domestic blocks, and locations of Non-Building Areas (NBAs) within Application Sites K10 to K12 remain unchanged, the relaxation in building heights (ranging from 5mPD to 15mPD) and the introduction of podiums to accommodate public transport interchanges and above-ground car parking would generate wind wakes of greater extent and coverage in the downwind Ho Sheung Heung area, thereby reducing wind availability compared to the Baseline Scenario. It should be noted, however, that despite the addition of an extra podium in Application Site K10, the height of the podiums has been reduced from 27mPD to 24mPD under the Proposed Scenario. Consequently, no observable increase in impacts casted by wind wakes induced by Development Proposals from Application Site K10 on Ho Sheung Heung is expected under SW summer prevailing winds.

8.2.86 Owing to the more pronounced differences in building heights between the Application Sites and the surrounding planned/committed developments under the Proposed Scenario, the magnitude of downwash effects is expected to be slightly stronger than under the Baseline Scenario. This enhanced downwash is anticipated along Roads D2-3, D2-4, L4, and D5, where the planned buildings in Application Sites K5, K6, K12, and K7–K9 have relaxed maximum building height restrictions.

8.2.87 It should be noted that under the south westerly summer prevailing wind, the height difference between Application Sites K4 and K10 has been reduced from 25mPD to 20mPD. As a result, the magnitude of downwash wind along Road P2-1 abutting Application Site K4 is expected to weaken slightly. Nevertheless, this modification is minor and will not result in significant changes to vertical air movements, thereby maintaining air ventilation performance in the surrounding areas.

8.2.88 Despite the anticipated wind wakes of greater extent and coverage in the downwind areas due to increased building heights and the addition of two-storey podiums, the Proposed Scenario retains all the good air ventilation design measures from the Baseline Scenario. These include terraced podiums in Application Sites K1 and K2, ground-level setbacks in Application Site K2, and Non-Building Areas (NBAs) in Application Sites K4 and K9 to K12. Furthermore, the footprints of the additional podiums have been minimized as far as practicable, while maintaining at least 15m separation between them and incorporating 5m podium gardens to promote wind penetration and enhance site permeability. Most importantly, the added podiums and relaxed building heights do not obstruct the major identified SW wind breezeways. In view of the above, the district-wide wind flow patterns and the overall pedestrian wind environment around the Application Sites are expected to remain generally comparable to those under the Baseline Scenario for southwesterly prevailing winds.

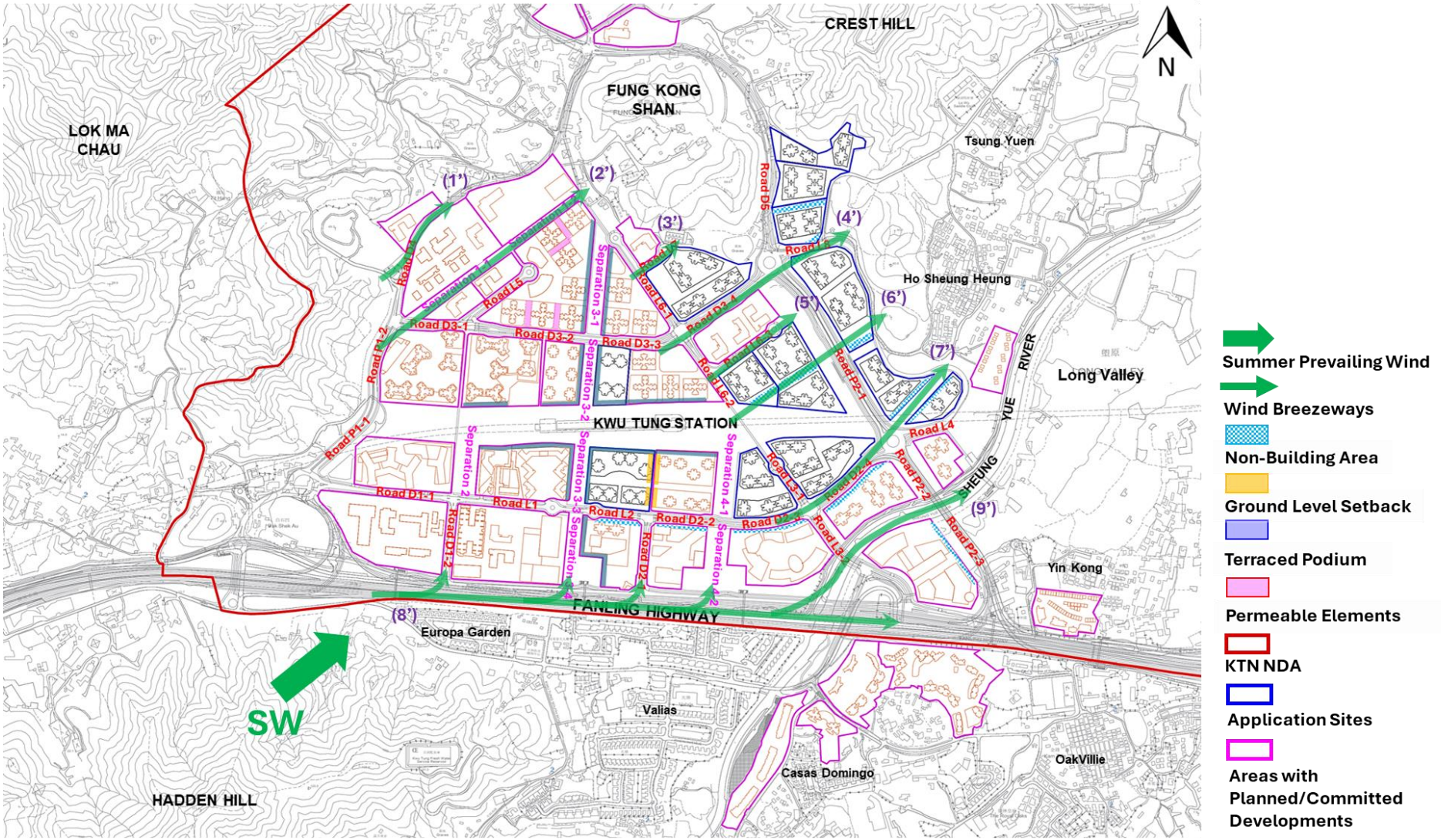


Figure 8.5(b) Wind Flow under the SW Summer Prevailing Wind for the Proposed Scenario

Summary

8.2.89 In summary, the directional wind flow analysis indicates that the overall wind flow patterns across the KTN NDA would remain largely unchanged between the Baseline Scenario and the Proposed Scenario. Although the Proposed Scenario involves slight increases in building heights and the introduction of two-storey podiums, these modifications are expected to generate somewhat larger wind wakes in the immediate downwind areas. Conversely, the greater differences in building heights at certain locations would enhance downwash effects and strengthen local wind channeling along key roads.

8.2.90 Importantly, the key air ventilation design measures from the Baseline Scenario — including terraced podiums, ground-level setbacks, Non-Building Areas (NBAs), generous building separations, podium gardens, and unobstructed district-wide breezeways (such as those along the Sheung Yue River and the separations linking Fung Kong Shan with the Fanling Highway) have been retained. The footprints of additional podiums have also been minimized as far as practicable while maintaining at least 15m separation and incorporating 5m podium gardens. These design features, together with enhanced channeling and downwash effects, would continue to promote effective penetration of prevailing winds. As a result, no significant deterioration on the district-wide pedestrian wind environment is anticipated under the Proposed Scenario.

9 FURTHER PROPOSED SCENARIO OPTIMIZATION AND GOOD AIR VENTILATION DESIGN MEASURES

9.1 Hong Kong Planning Standards and Guidelines (HKPSG) and SBDG

9.1.1 From a district-level perspective, maintaining a favorable wind environment is an important planning consideration. According to Chapter 11 of the Hong Kong Planning Standards and Guidelines (HKPSG), one of the key principles is to align breezeways and air paths with the prevailing wind directions, supplemented by perpendicular air paths (see **Figure 9.1**). This layout promotes better wind penetration through urbanized areas. Breezeways can be effectively created by linking major roads, open spaces, amenity areas, Non-Building Areas (NBAs), building setbacks, and low-rise building corridors.

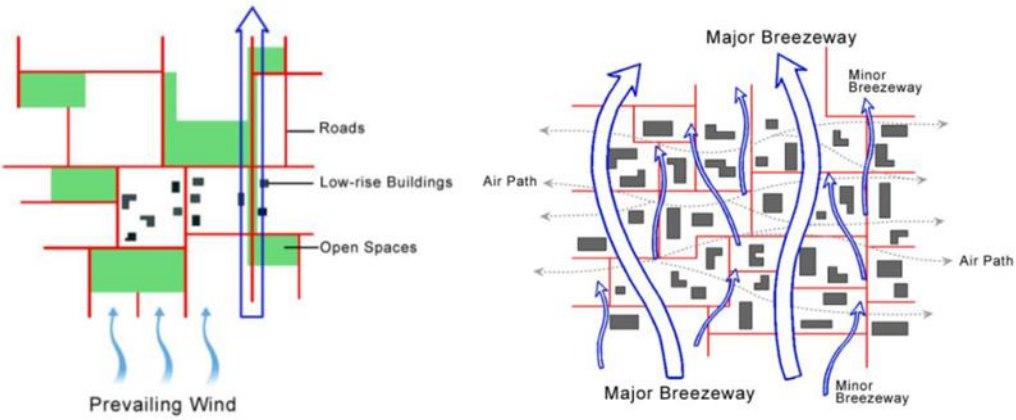


Figure 9.1 Linkage of roads / open space / low-rise buildings to form paths of air flow

9.1.2 The orientation of streets also plays a key role in maximizing the infiltration of prevailing winds into the urban grid (see **Figure 9.2**). Ideally, the main streets or wide avenues should be aligned parallel to the prevailing wind directions, or within 30 degrees of them. Long street grids that face directly into the incoming winds should be avoided, as they can create wind stagnant zones. Widening of streets and building setbacks are also regarded as merit design features that help enhance air ventilation.

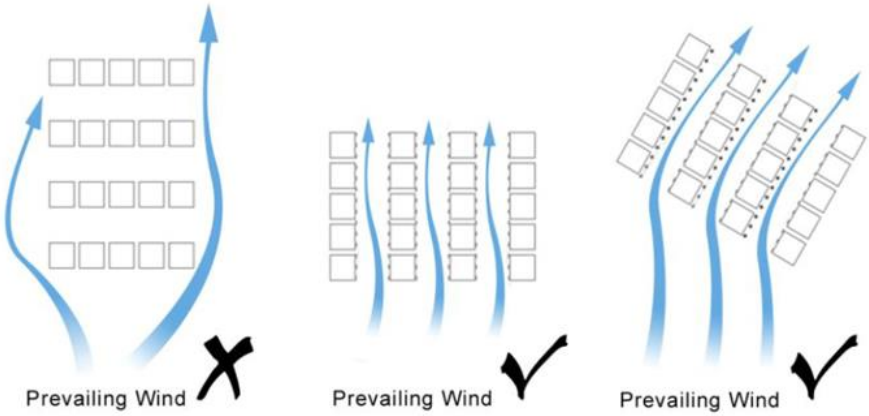


Figure 9.2 Illustration of orientation of streets

9.1.3 Building height variation also plays an important role in facilitating wind flow within the urban district (see **Figure 9.3**). In particular, a gradual decrease in building height in the direction from which the prevailing wind originates helps induce vertical air movement throughout the district. This effect is further enhanced when low-rise buildings and open spaces are widely dispersed across the area.

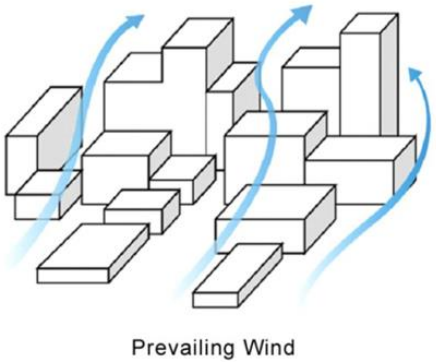


Figure 9.3 Varying building height profile

9.1.4 In addition to the HKPSG, the Sustainable Building Design Guidelines (SBDG) aim to enhance building design and permeability by avoiding screen-wall effects and promoting better air movement between developments, thereby improving dispersion and air mixing. Building setbacks are one of the key requirements under the SBDG for improving the pedestrian-level wind environment. According to the SBDG, for buildings facing streets narrower than 15m wide, no part of the building up to 15m above street level should be located within 7.5m from the centerline of the street. Adopting such building setbacks on narrow streets (currently less than 15 m wide) can significantly improve air ventilation. An illustration of this requirement is shown in **Figure 9.4**.

Figure 9.4 Building setback

9.1.5 Adequate building separation increases permeability within the urban built environment and helps mitigate the urban heat island effect caused by the screening effect of long, continuous buildings. Incorporating building porosity into the design further promotes air movement between developments and enhances the diffusion and mixing of air. Permeability at the lower levels is particularly important for improving pedestrian-level ventilation. For developments with podiums, the provision of podium gardens is recommended to allow wind to penetrate closer to the pedestrian level. In addition, a terraced podium design has been adopted (as illustrated in **Figure 9.5**) to further facilitate ventilation. This design helps direct downward airflow towards the pedestrian level.

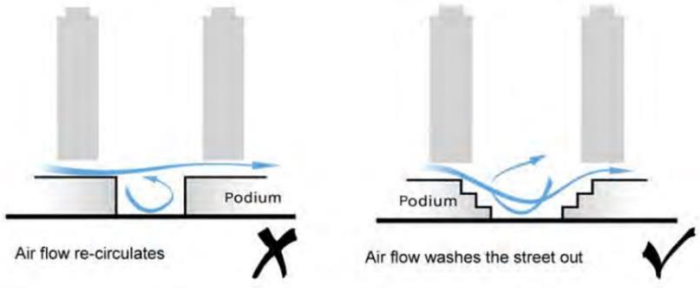


Figure 9.5 Terraced podium design

9.1.6 Some generic recommendations from the building level perspective are listed below to further enhance the wind permeability/ penetration and minimize the ventilation impacts to their surrounding areas:

- Avoid long continuous façades and face shorter frontages of proposed buildings to the prevailing wind directions
- Minimization/Break down of podium bulk with small ground coverage or adoption of podium-free design
- Adopt empty bay design on the ground floor of podium or incorporate permeable elements/podium gardens to enhance the wind permeability at pedestrian level
- Adopt terraced podium designs for podia to enhance ventilation.
- Reference to the recommendations of design measures in the Sustainable Building Design Guideline (SBDG) and Hong Kong Planning Standards and Guidelines (HKPSG)
- Ensure building permeability equivalent to 20% to 33.3% of total frontal area, with reference to PNAP APP-152
- Design the urban grids within the KTN NDA containing the Application Sites in accordance with major prevailing wind directions
- Adopt full building/podium setbacks at feasible locations, with reference to PNAP APP-152.
- Incorporate greeneries (preferably tree planting at grade) covering no less than 30% within the Application Sites

10 SUMMARY AND CONCLUSION

10.1.1 AECOM has been commissioned by the Civil Engineering and Development Department (CEDD) to conduct an Air Ventilation Assessment (AVA) for the thirteen Application Sites. The assessment supports a Section 16 planning application to relax building height restrictions from those stipulated in the previous planning application No. A/KTN/93 and the approved Outline Zoning Plan (OZP) No. S/KTN/4. The proposed relaxations aim to accommodate additional heights arising from above-ground car parks and the adoption of Modular Integrated Construction (MiC).

10.1.2 Wind data from the Planning Department's Regional Atmospheric Modelling System (PlanD RAMS), wind tunnel experiments, and Hong Kong Observatory (HKO) weather stations were reviewed. As the Site Wind Availability Study for the Kwu Tung North (KTN) New Development Area (NDA) was based on wind tunnel testing, the wind tunnel experimental data is considered most appropriate for identifying prevailing wind directions at the Application Sites. The annual prevailing wind directions are north (N), east-northeast (ENE), and east (E), while the summer prevailing wind directions are east (E), south (S), and southwest (SW).

10.1.3 The KTN NDA, which encompasses the Application Sites, is situated in a predominantly rural area of Hong Kong. The surrounding land uses mainly comprise "Green Belt", "Agriculture", "Other Specified Uses", "Government, Institution or Community" (GIC), and scattered "Village Type Development" zones. To the west of the Application Sites (outside the NDA) are Green Belt areas at Lok Ma Chau. To the north lie the Green Belt areas of Fung Kong Shan, with "Agriculture" lands at Ma Tso Lung and Green Belt areas at Crest Hill located further north. Immediately to the east of the Application Sites are existing scattered low-rise developments, which are planned for future GIC buildings and residential blocks, while the village houses at Ho Sheung Heung will be retained. Further east, across the Sheung Yue River, are "Other Specified Uses" lands and village houses at Wai Lo Tsuen. To the south of the Application Sites, across the Fanling Highway, are "Residential (Group C)" zones occupied by existing low-rise residential developments, namely Europa Garden, The Valais, and Casas Domingo.

10.1.4 The existing developments within the thirteen Application Sites (K1 to K3, K4a, K4b, and K5 to K12) consist primarily of brownfield sites, temporary structures, and low-rise village houses at Tung Fong, Fung Kong, Tong Kok, and Shek Tsai Leng. These sites are in the central to south-western sector of the KTN NDA. Two of the sites are zoned for "Residential (Group A)" development, while the remainder are zoned for "Residential (Group B)".

10.1.5 The thirteen Application Sites occupy a sizable flatland surrounded by hilly terrain of varying elevations. To the near north and north-east are the hilly areas of Fung Kong Shan / Crest Hill and Sandy Ridge. To the near east lie the flatlands of Sheung Shui and Fanling towns, with the terrain of High Hill located further east. To the near west are hilly areas of approximately 100mPD in the Lok Ma Chau area, while the lands at San Tin are relatively flat. The most prominent terrain feature to the south and south-west is Hadden Hill, which reaches a maximum elevation of approximately 200mPD.

10.1.6 Extensive planned and committed developments surround the thirteen Application Sites. These areas are intended for schools, public and private residential towers, GIC blocks, hospitals, clinics, health centers, commercial buildings, and research and development facilities. For this Expert Evaluation, the building morphologies of these surrounding planned and committed developments are assumed to remain consistent under the two assessed scenarios.

10.1.7 Two development scenarios are examined in this study: the Baseline Scenario and the Proposed Scenario. Under both scenarios, the Application Sites will comprise domestic building blocks, and non-domestic podiums. The indicative layouts show that the orientations, number, and general arrangement of the domestic building blocks remain consistent between the two scenarios. The major differences are the relaxation of building height restrictions and the addition of podiums to accommodate above-ground car parking in most Application Sites as well as Public Transport Interchange under the Proposed Scenario. For Application Sites K1 and K2, there is an increase in podium height while the building heights remain the same. For Application Site K10, the podiums accommodating the Public Transport Interchange and above-ground car parks are slightly reduced in heights, with one additional two-storey podium introduced.

10.1.8 Under the Proposed Scenario, additional two-storey podiums for above-ground car parking are introduced in most Application Sites (except K1 and K2), together with relaxation of building height restrictions of up to 15mPD across all sites. These changes will result in taller domestic blocks and additional podiums compared with the Baseline Scenario, which are expected to generate wind wakes of greater extent and coverage in the downwind areas, potentially affecting certain potential wind-sensitive areas. Nevertheless, the relaxed building height restrictions provide greater flexibility for the exploration and implementation of appropriate air ventilation design strategies at future detailed design stages to enhance wind permeability and mitigate any stronger wind wakes.

10.1.9 The building footprints of the domestic blocks within the Application Sites remain unchanged under the Proposed Scenario. All good air ventilation design measures adopted in the Baseline Scenario have been retained, including Non-Building Areas (NBAs) in Application Sites K4 and K9 to K12, a ground-level setback along the eastern boundary of Application Site K2, and terraced podium designs in Application Sites K1 and K2. The additional podiums have been minimized in bulk as far as practicable, with most maintaining at least 15m separation and all incorporating 5m podium gardens to promote wind penetration. The relaxation in building height restrictions has also increased height differences between some buildings facing the prevailing wind and those at the rear, which is expected to induce slightly stronger downwash effects in specific areas. Most importantly, the major wind breezeways identified in the Baseline Scenario remain unobstructed under the Proposed Scenario.

10.1.10 To conclude, no major alterations in wind flow patterns are anticipated between the Baseline Scenario and the Proposed Scenario. As there are no significant changes in domestic building arrangements, orientations, ground-level setbacks, or locations of non-building areas (NBAs) within the Application Sites, the identified wind breezeways under both annual and summer prevailing winds will continue to function effectively and help maintain good air ventilation in the vicinity of the Application Sites. Although the overall relaxation in building heights as well as the introduction of additional podiums under the Proposed Scenario are expected to induce larger wind wakes in the downwind areas, these will be partly offset by stronger downwash effects and enhanced local wind channeling. Consequently, the potential air ventilation impacts are expected to be minimal, with no significant district-wide deterioration in the wind environment.

Appendix A

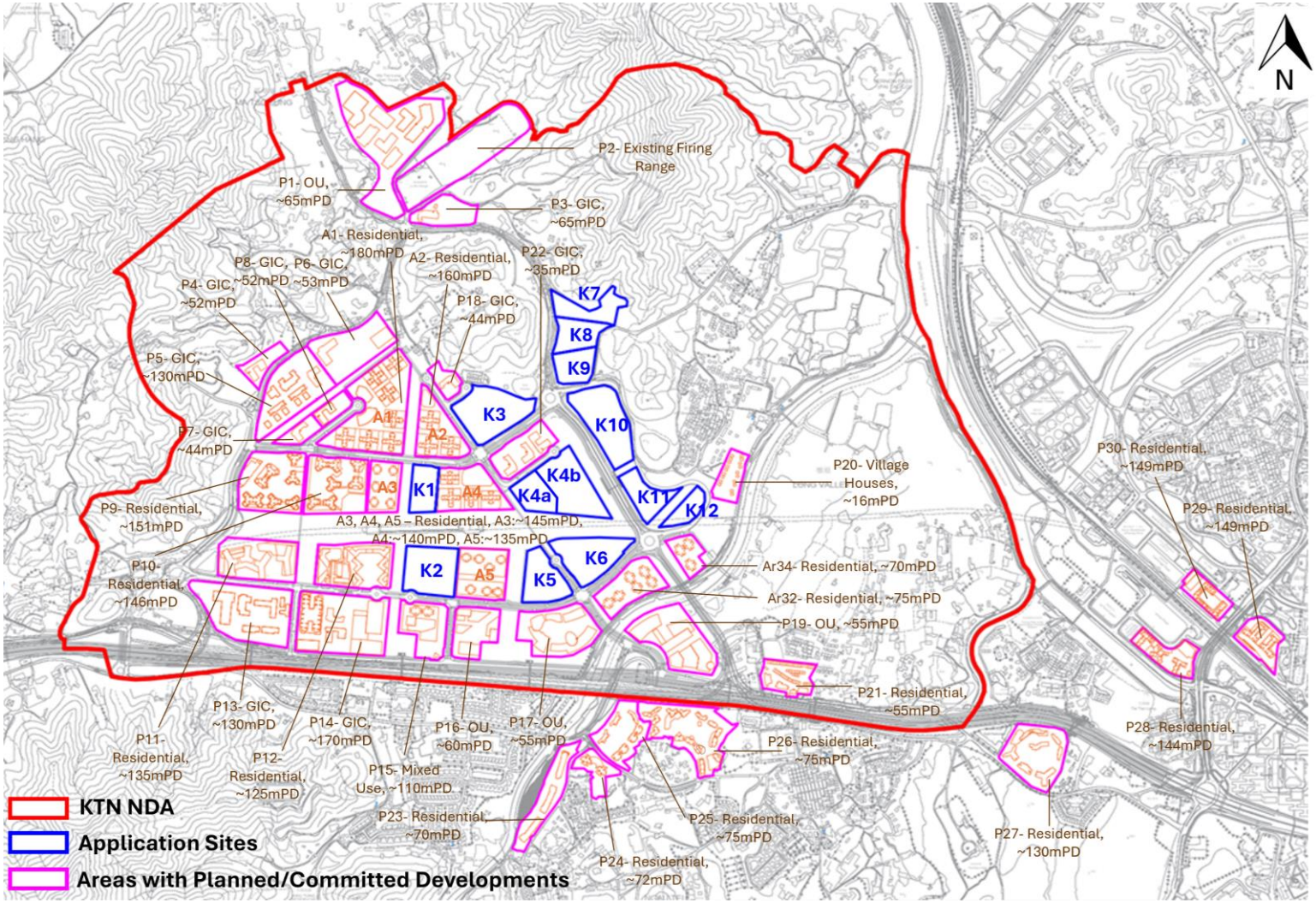


Figure A1: Land Use and Maximum Building Heights of Planned/Committed Developments near/within the KTN NDA

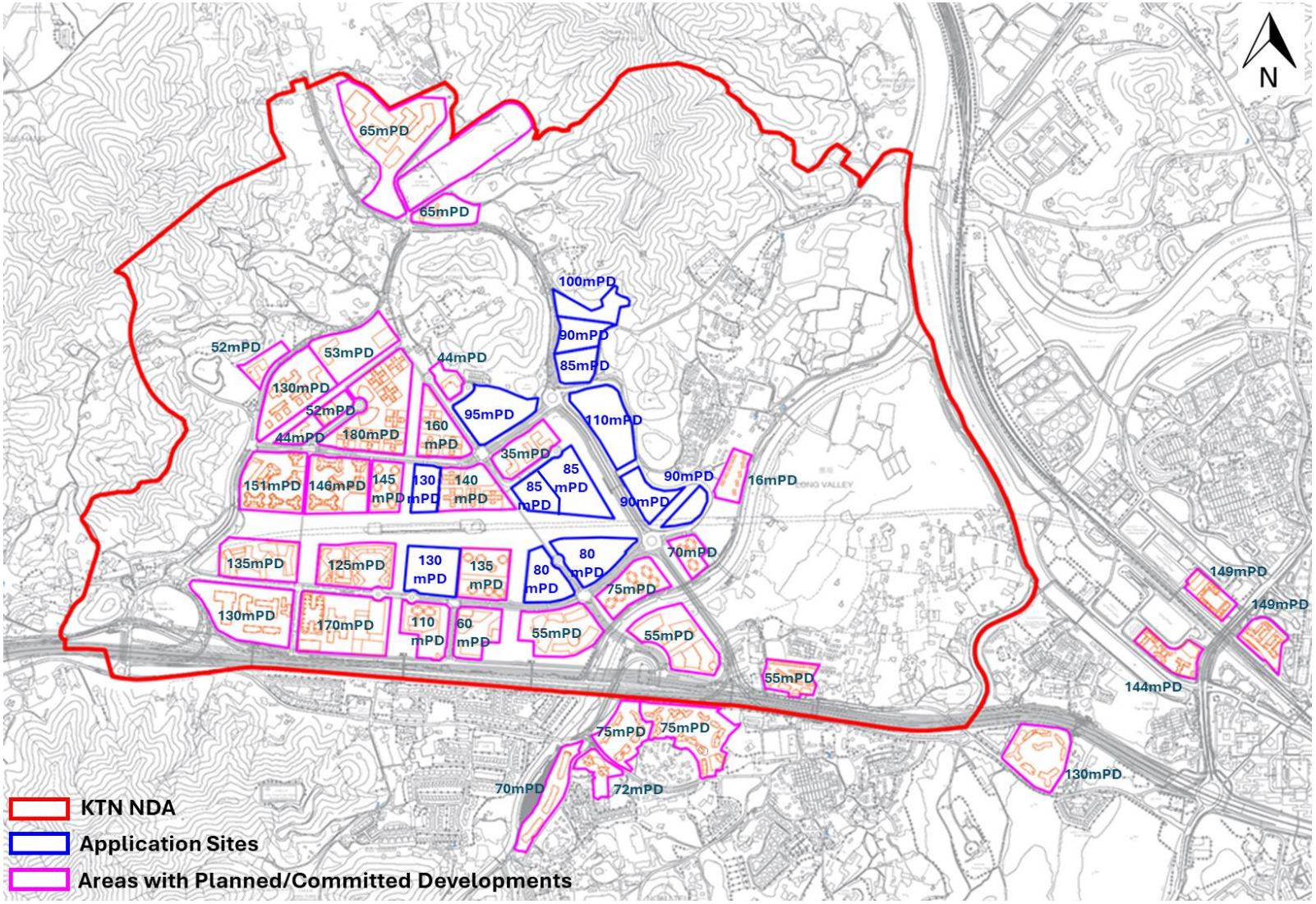


Figure A2: Maximum Proposed Building Heights within the Application Sites and Areas with Planned/Committed Developments under the Baseline Scenario

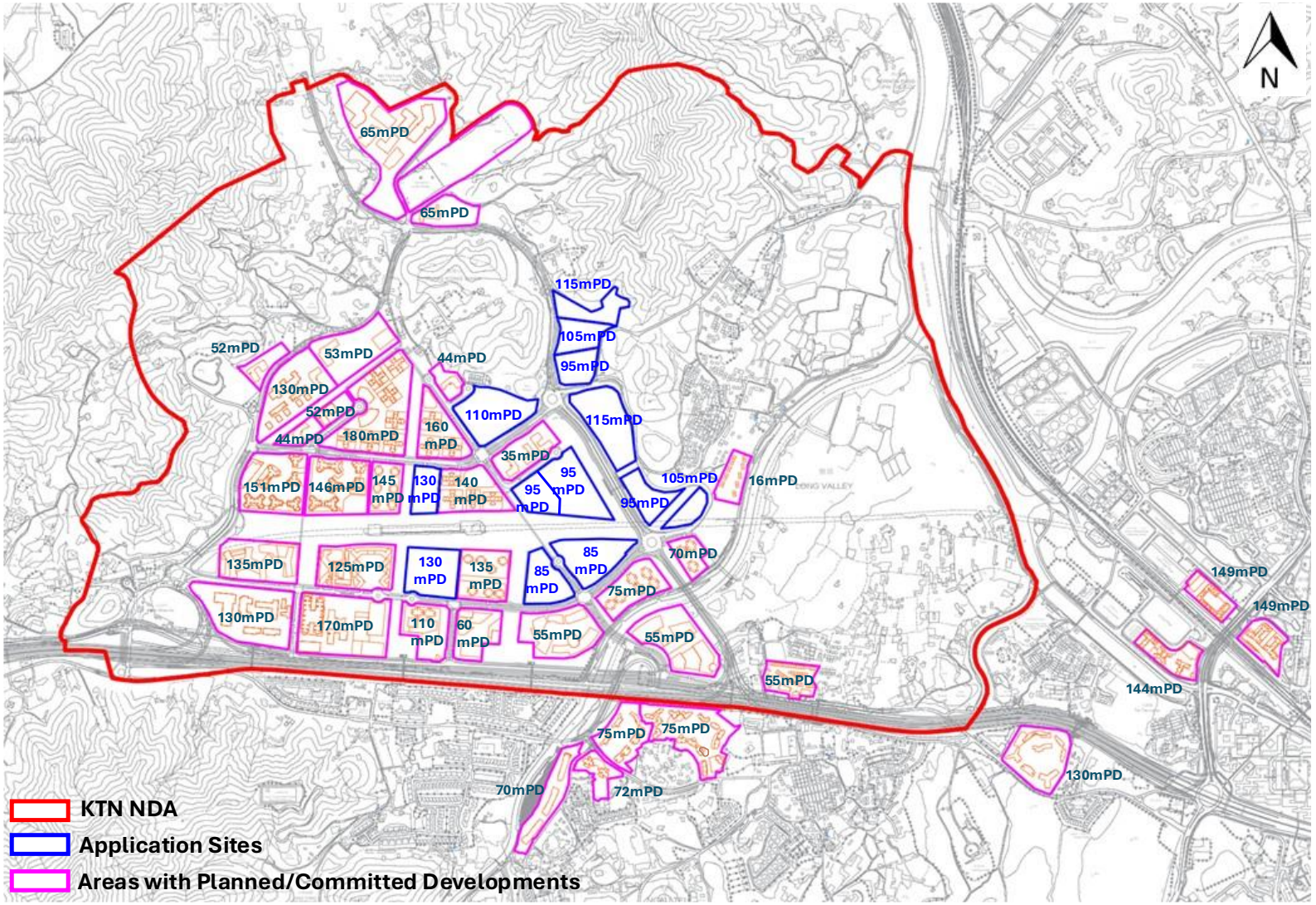


Figure A3: Maximum Proposed Building Heights within the Application Sites and Areas with Planned/Committed Developments under the Proposed Scenario

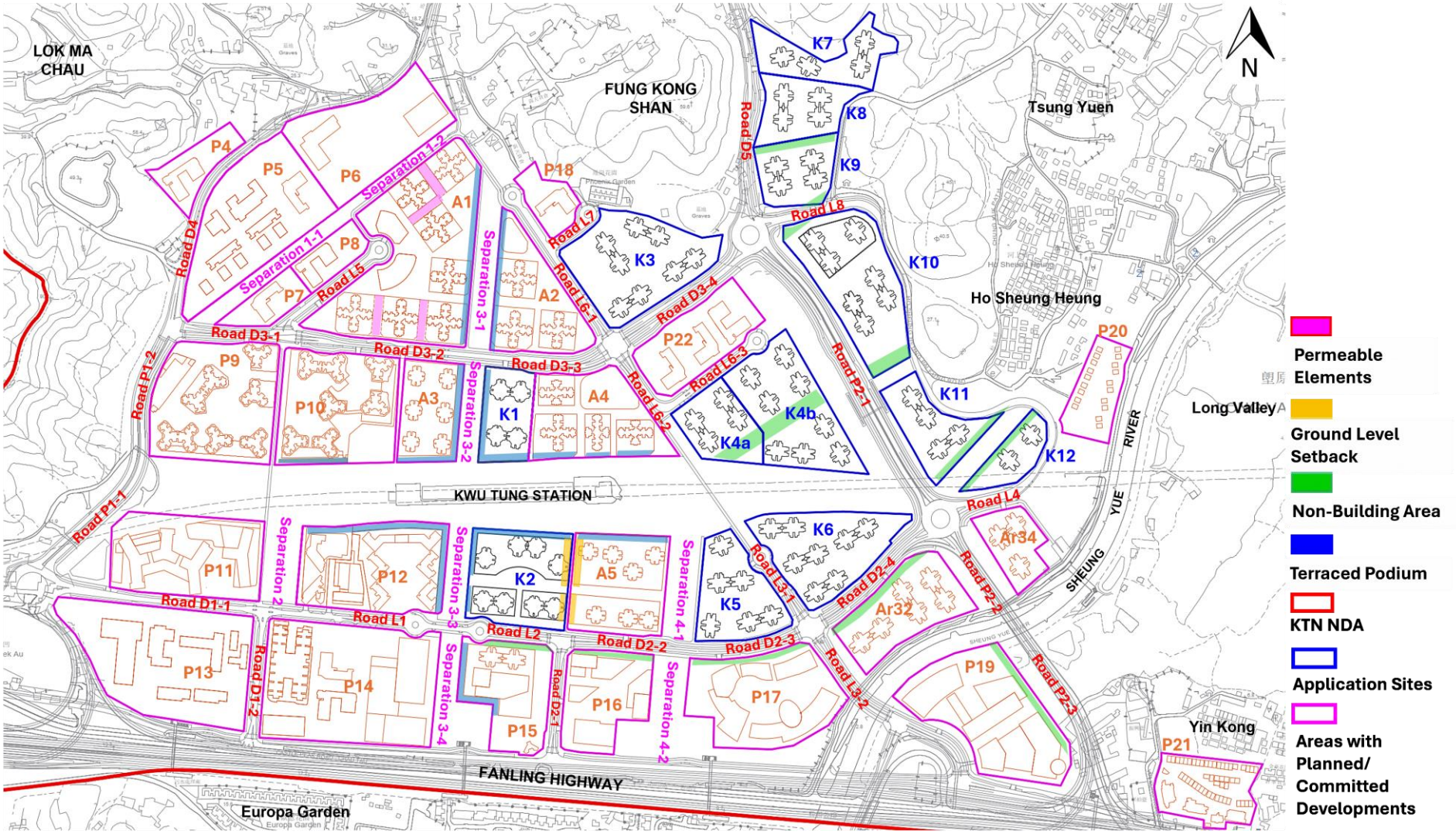


Figure A4: Locations of Non-Building Areas, Terraced Podiums and Proposed Building Blocks within the Application Sites and Surroundings under the Baseline Scenario

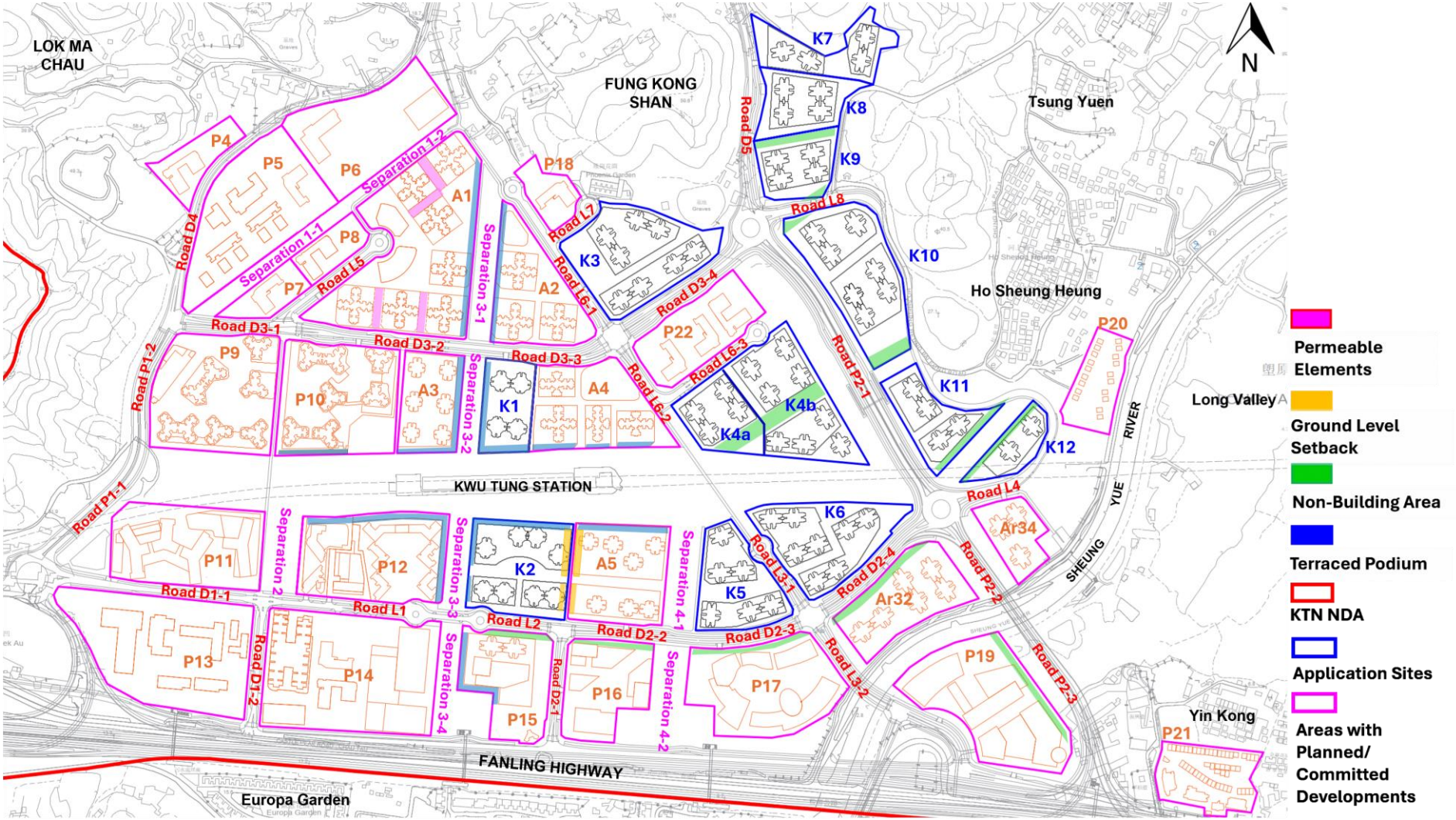
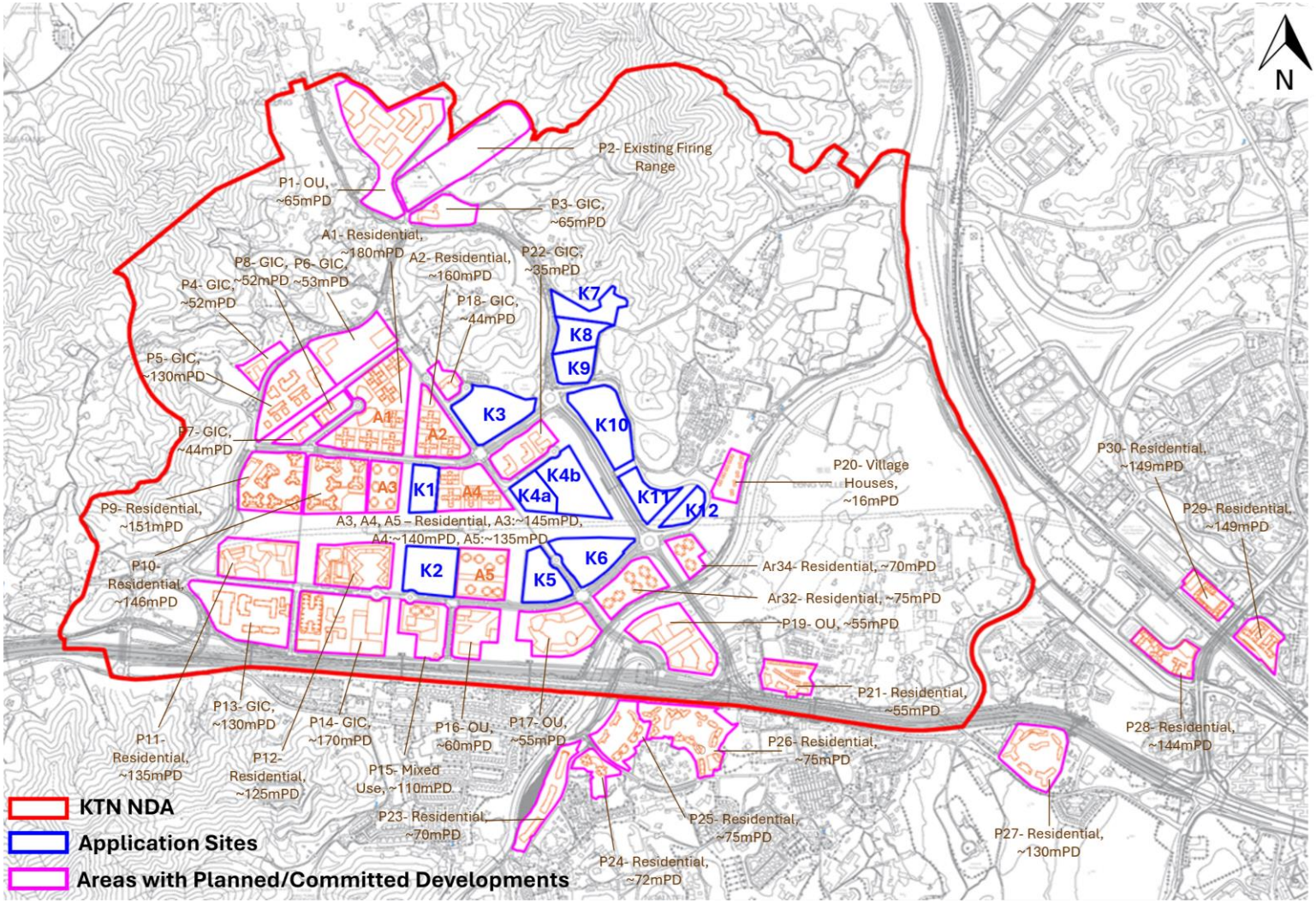


Figure A5: Locations of Non-Building Areas, Terraced Podiums, Ground Level Setback, Locations of Permeable Elements and Proposed Building Blocks within the Application Sites and Surroundings under the Proposed Scenario

Appendix A

Appendix A



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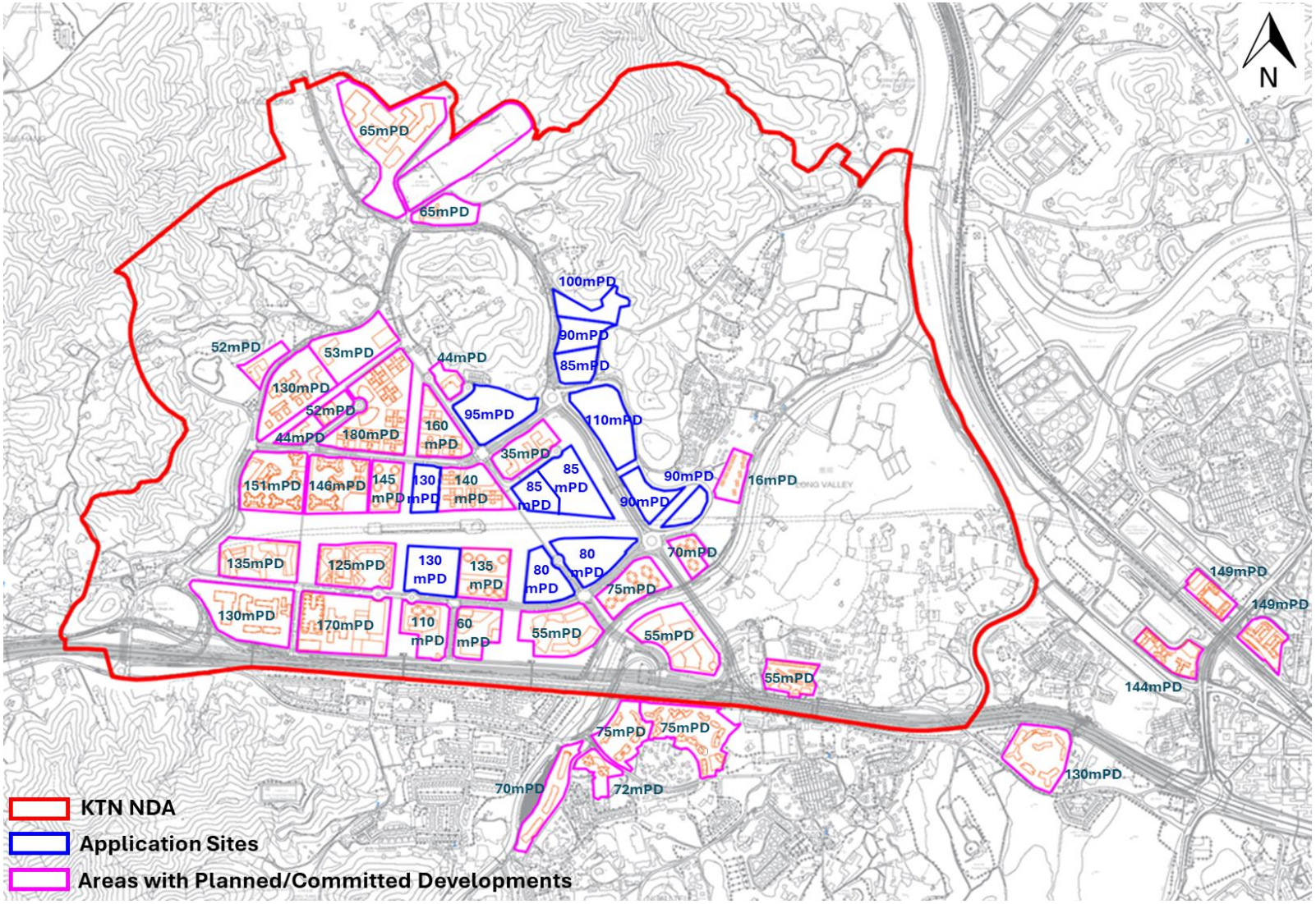

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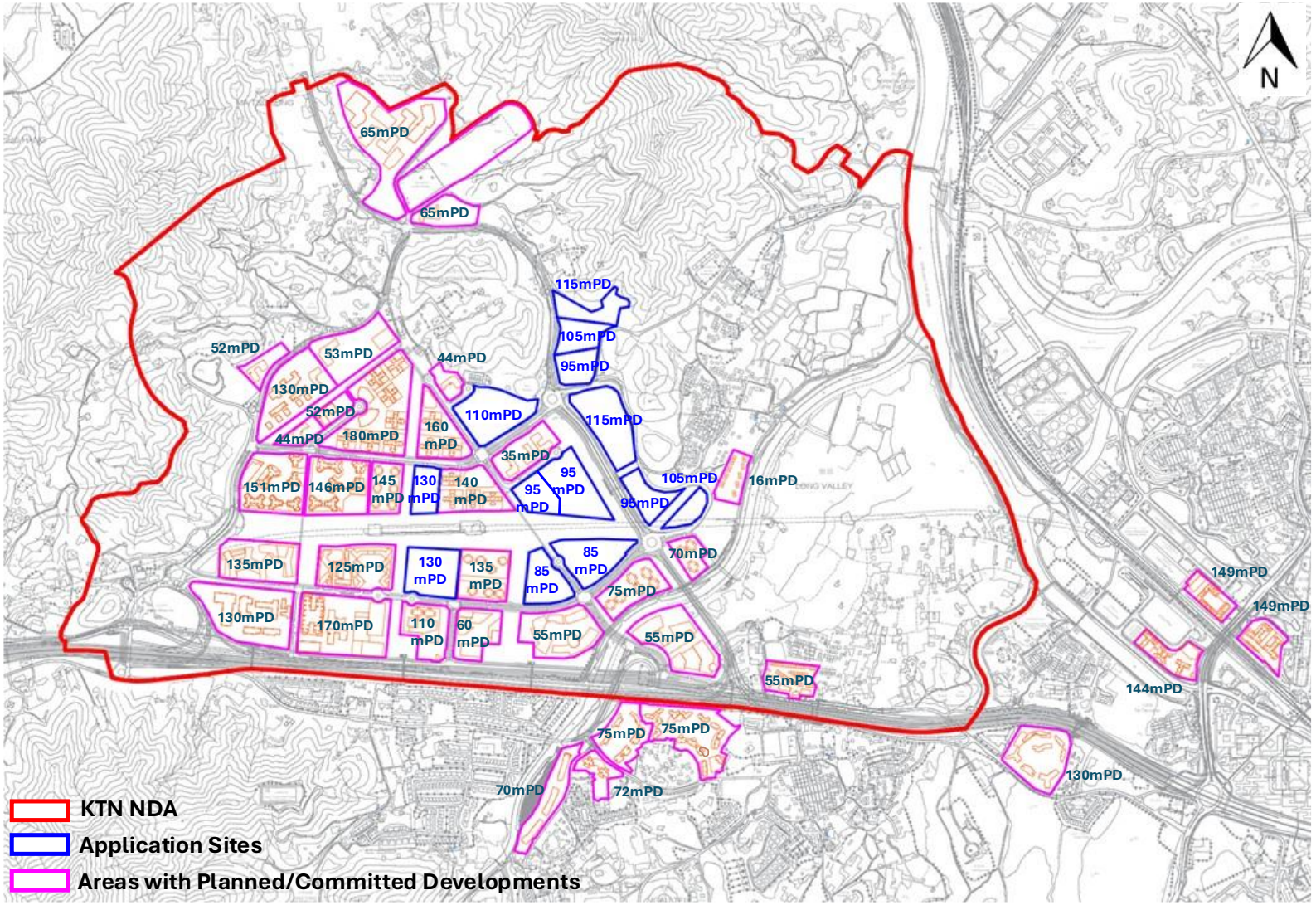
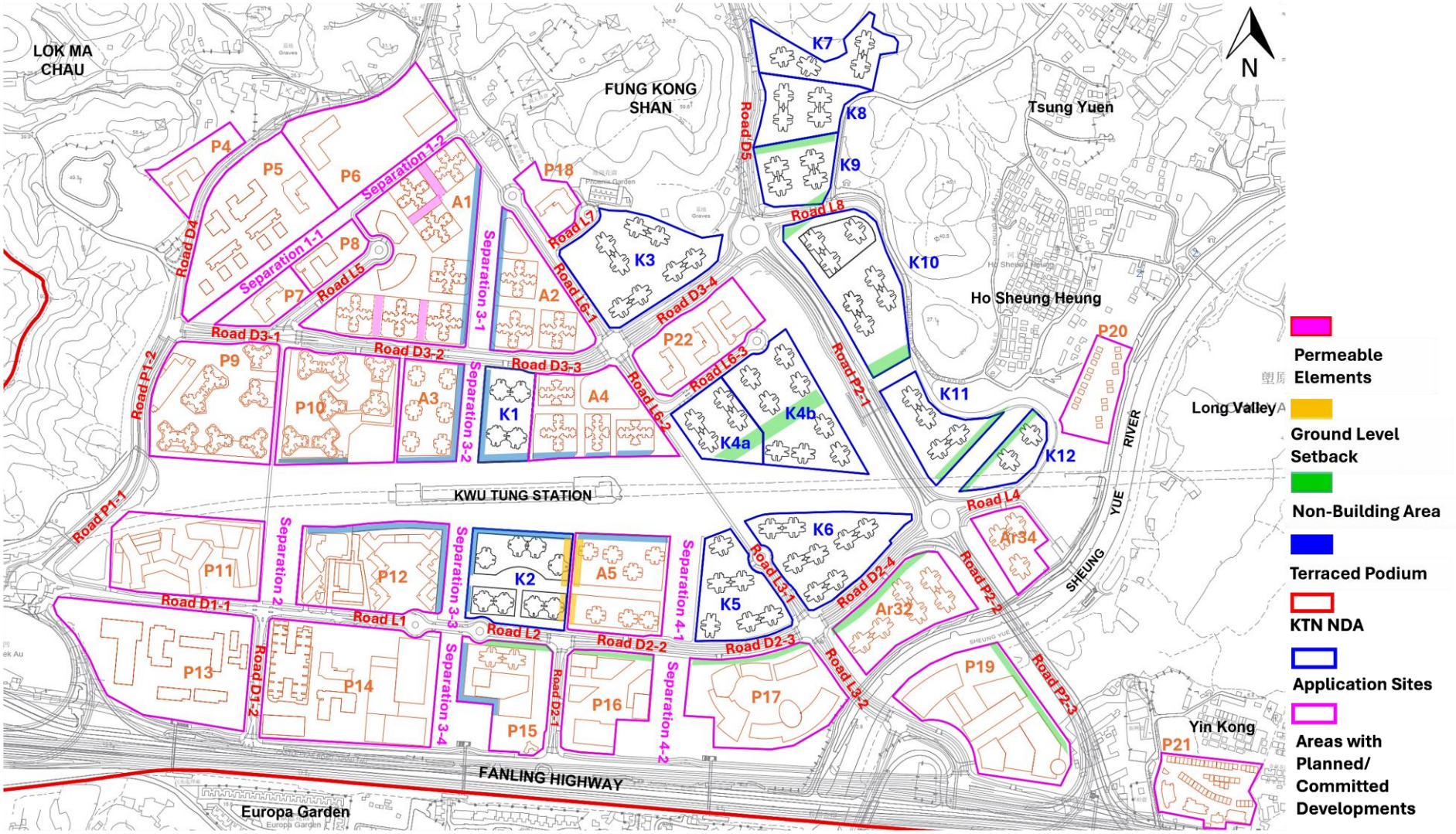


Figure A3: Maximum Proposed Building Heights within the Application Sites and Areas with Planned/Committed Developments under the Proposed Scenario



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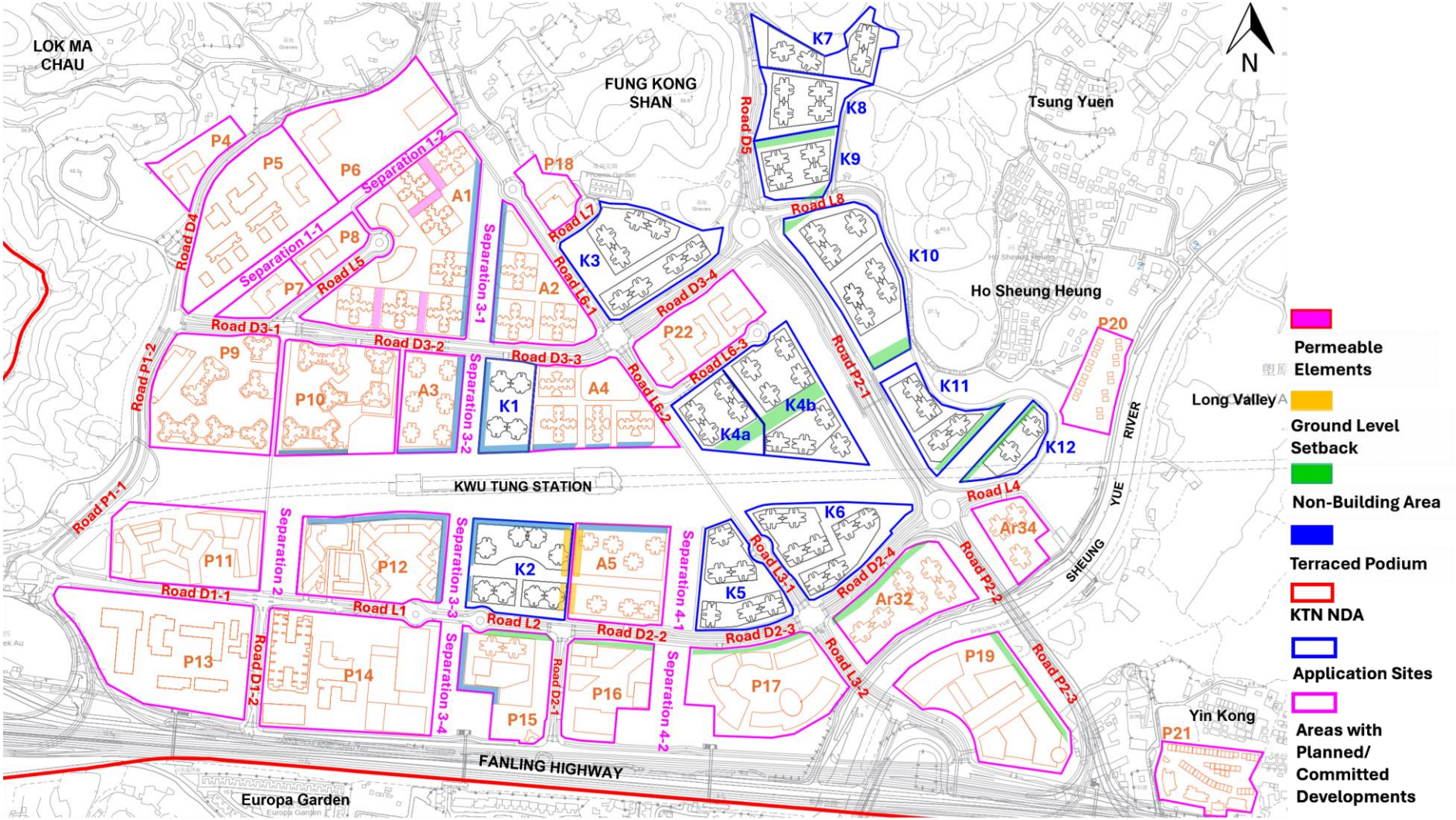

Figure A5: Locations of Non-Building Areas, Terraced Podiums, Ground Level Setback, Locations of Permeable Elements and Proposed Building Blocks within the Application Sites and Surroundings under the Proposed Scenario

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Appendix B

Proposed Noise Mitigation Measures

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Approved:

Checked:

Designer:

Project Management Initials:

827200 E

828800 E

830400 E

841600 N

840000 N

LEGEND:

KTN NDA BOUNDARY

N

LO WU

SHEUNG SHUI

60624717/TNMP/DP4/APPENDIX 1.2.1

60624717/TNMP/DP4/APPENDIX 1.2.2

60624717/TNMP/DP4/APPENDIX 1.2.3

MTRC EAST RAIL

FAN KAM ROAD

AECOM

PROJECT
項目

DEVELOPMENT OF
KWU TUNG NORTH
NEW DEVELOPMENT AREA,
REMAINING PHASE -
DESIGN & CONSTRUCTION

CLIENT
業主

CEDD 土木工程拓展署 Civil Engineering and Development Department

CONSULTANT
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階段

SCALE 比例	DIMENSION UNIT 尺寸單位
A1 1 : 8000	METRES

KEY PLAN
索引圖

PROJECT NO. 項目編號	CONTRACT NO. 合約編號
60624717	CE 19/2019 (CE)

SHEET TITLE
圖紙名稱

UPDATED TRAFFIC NOISE
MITIGATION MEASURES
PROPOSAL - KEY PLAN

SHEET NUMBER
圖紙編號

60624717/TNMP/DP4/APPENDIX 1.2

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Approved:

Checked:

Designer:

Project Management Initials:

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1. THIS DRAWING TO BE READ IN CONJUNCTION WITH DRAWING NOS. 60624717/TNMP/DP4/APPENDIX 1.2.1 TO APPENDIX 1.2.3.
2. IN VIEW OF THE SIGHTLINE CONSTRAINT OF THE ASSOCIATED ROADS, KTN-NB09 & KTN-NB10 AND KTN-NB15 & KTN-NB16 COULD NOT BE CONNECTED.

LEGEND:

- KTN NDA BOUNDARY
- PROPOSED 0.5m STRUCTURE
- PROPOSED 3m VERTICAL NOISE BARRIER (ABSORPTIVE)
- PROPOSED 5m VERTICAL NOISE BARRIER (ABSORPTIVE)
- PROPOSED 7m VERTICAL NOISE BARRIER (ABSORPTIVE)
- PROPOSED 5m + 3m CANTILEVER NOISE BARRIER (ABSORPTIVE)
- PROPOSED 7m + 3m CANTILEVER NOISE BARRIER (ABSORPTIVE)
- OPENING SIDE
- PROPOSED SEMI ENCLOSURE (WITH OPENING SIDE)
- PROPOSED FULL ENCLOSURE
- PROPOSED LOW NOISE ROAD SURFACING
- LOW NOISE ROAD SURFACING PROVISION FOR ROAD TRAFFIC SPEED HIGHER THAN 80KPH
- INDICATIVE LOCATIONS OF FACADES THAT WOULD BE PROVIDED WITH AT RECEIVER END MITIGATION MEASURES (WITHIN KTN NDA)

THE EXACT LOCATIONS OF FACADES THAT REQUIRE AT-RECEIVER END MITIGATION MEASURES ARE SUBJECT TO THE DETAILED TNIA TO BE CONDUCTED BY RELAVANT PARTIES AT LATER STAGE

827500 E

820000 E

841000 N

840500 N

MA TSO LUNG

PAK SHEK AU

CUT LINE B-B
SEE DRAWING NO.
60624717/TNMP/DP4/APPENDIX 1.2.2

CUT LINE A-A
SEE DRAWING NO.
60624717/TNMP/DP4/APPENDIX 1.2.3

KTN-NB02
KTN-LN01
KTN-NB06
KTN-NB05
KTN-NB04
KTN-LN02
KTN-LN03
KTN-NB55
KTN-LN07
KTN-LN09
KTN-LN10
KTN-NB18
KTN-NB20
KTN-NB19
KTN-NB25
KTN-NB24
KTN-NB23
KTN-NB27
KTN-NB21
KTN-NB22
KTN-NB26
KTN-SEQ1
KTN-FE01
KTN-NB29

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階段

SCALE 比例: A1 1 : 2500

DIMENSION UNIT 尺寸單位: METRES

KEY PLAN
索引圖

PROJECT NO. 項目編號: 60624717

CONTRACT NO. 合約編號: CE 19/2019 (CE)

SHEET TITLE
圖紙名稱

UPDATED TRAFFIC NOISE
MITIGATION MEASURES PROPOSAL

SHEET 1 OF 3

SHEET NUMBER
圖紙編號

60624717/TNMP/DP4/APPENDIX 1.2.1

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Approved:

Checked:

Designer:

Project Management Initials:

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2. THIS DRAWING TO BE READ IN CONJUNCTION WITH DRAWING NOS. 60624717/TNMP/DP4/APPENDIX 1.2.1 TO APPENDIX 1.2.3.

828000 E

828500 E

829000 E

842000 N

841500 N

MA TSO LUNG

MA TSO LUNG SAN TSUEN

FUNG KONG

WO SHEUNG HEUNG ROAD

KTN-NB01

KTN-NB02

KTN-NB04

KTN-NB05

KTN-NB06

KTN-NB08

KTN-NB09

KTN-NB10

KTN-NB55

KTN-LN01

KTN-LN02

KTN-LN03

KTN-LN05

KTN-LN06

CUT LINE B-B

SEE DRAWING NOS.
60624717/TNMP/DP4/APPENDIX 1.2.1 AND 1.2.3

N

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DIMENSION UNIT 尺寸單位
METRES

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60624717

CONTRACT NO. 合約編號
CE 19/2019 (CE)

SHEET TITLE
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UPDATED TRAFFIC NOISE
MITIGATION MEASURES PROPOSAL

SHEET 2 OF 3

SHEET NUMBER
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Approved:

Checked:

Designer:

Project Management Initials:

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2. THIS DRAWING TO BE READ IN CONJUNCTION WITH DRAWING NOS. 60624717/TNMP/DP4/APPENDIX 1.2.1 TO APPENDIX 1.2.3.

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828500 E

829000 E

829500 E

841000 N

840500 N

CUT LINE B-B

SEE DRAWING NO.
60624717/TNMP/DP4/APPENDIX 1.2.2

CUT LINE A-A

SEE DRAWING NO.
60624717/TNMP/DP4/APPENDIX 1.2.1

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KTN-NB54

TONG KOK

KWU TUNG

FANLING HIGHWAY

KWU TUNG ROAD

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2/8/2025

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STATUS
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SCALE 比例
A1 1 : 2500

DIMENSION UNIT 尺寸單位
METRES

KEY PLAN
索引圖

PROJECT NO. 項目編號
60624717

CONTRACT NO. 合約編號
CE 19/2019 (CE)

SHEET TITLE
圖紙名稱

UPDATED TRAFFIC NOISE
MITIGATION MEASURES PROPOSAL

SHEET 3 OF 3

SHEET NUMBER
圖紙編號

60624717/TNMP/DP4/APPENDIX 1.2.3

Annex A

E Prevailing Wind

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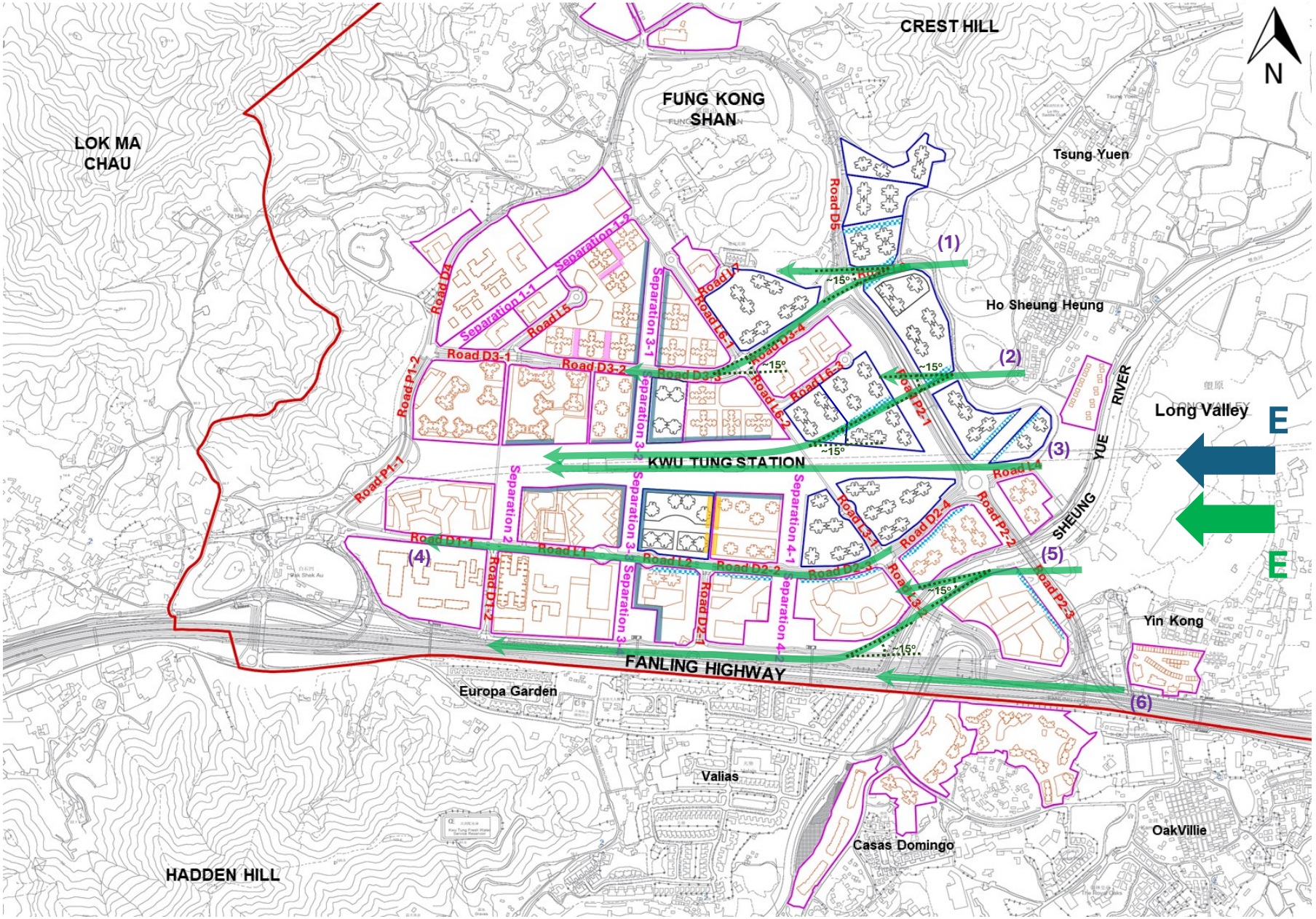

Figure 8.3(a)
Wind Flow under the E Annual and Summer Prevailing Wind for the Baseline Scenario

- Annual Prevailing Wind
- Summer Prevailing Wind
- Wind Breezeways
- Non-Building Area
- Ground Level Setback
- Terraced Podium
- Permeable Elements
- KTN NDA
- Application Sites
- Areas with Planned/Committed Developments

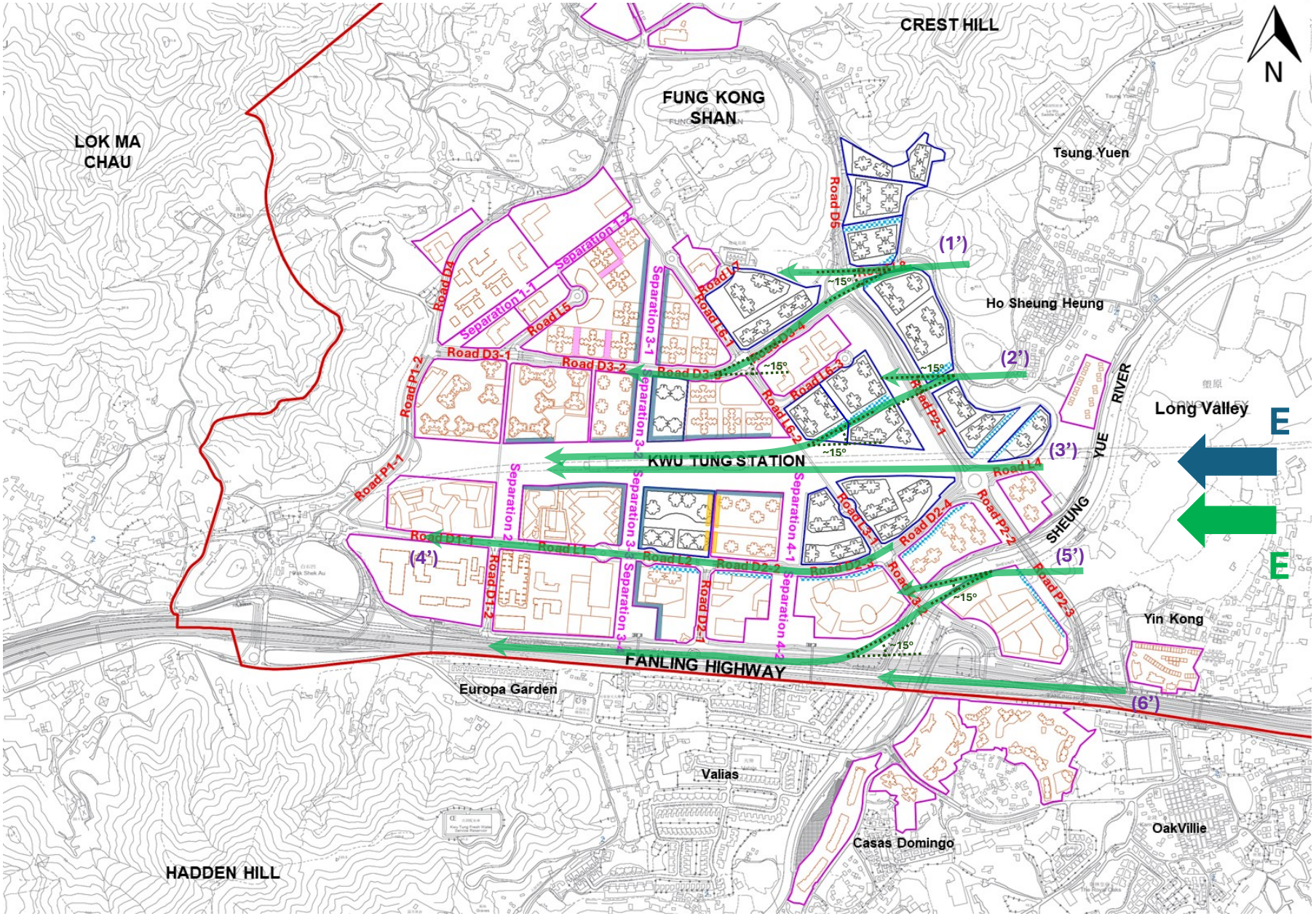

Figure 8.3(b)
Wind Flow under the E Annual and Summer Prevailing Wind for the Proposed Scenario

- Annual Prevailing Wind
- Summer Prevailing Wind
- Wind Breezeways
- Non-Building Area
- Ground Level Setback
- Terraced Podium
- Permeable Elements
- KTN NDA
- Application Sites
- Areas with Planned/Committed Developments

Annex B

S Prevailing Wind

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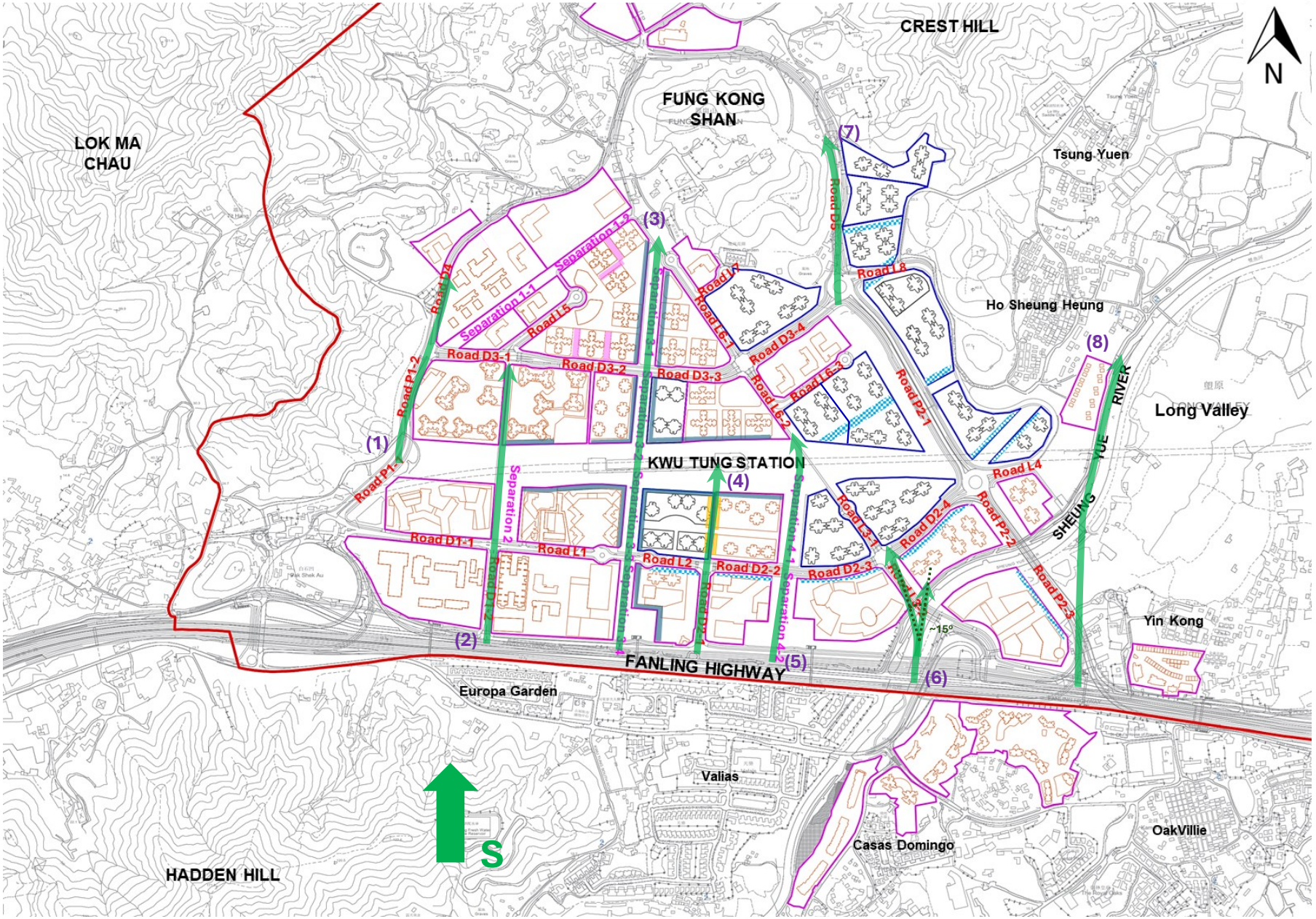

Figure 8.4(a)
Wind Flow under the S Summer Prevailing Wind for the Baseline Scenario

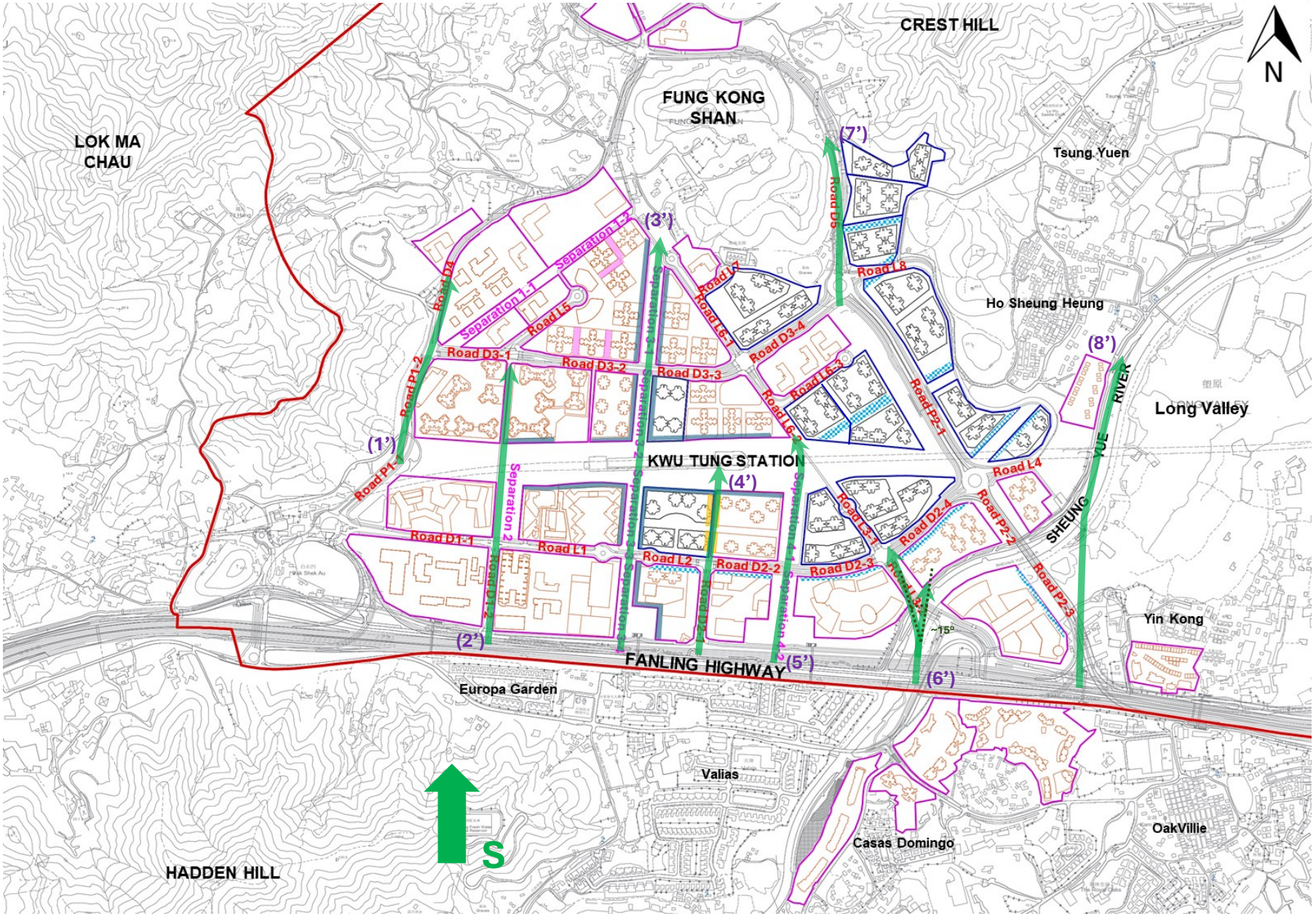

Figure 8.4(b)
Wind Flow under the S Summer Prevailing Wind for the Proposed Scenario

- Summer Prevailing Wind
- Wind Breezeways
- Non-Building Area
- Ground Level Setback
- Terraced Podium
- Permeable Elements
- KTN NDA
- Application Sites
- Areas with Planned/Committed Developments

Annex C

SW Prevailing Wind

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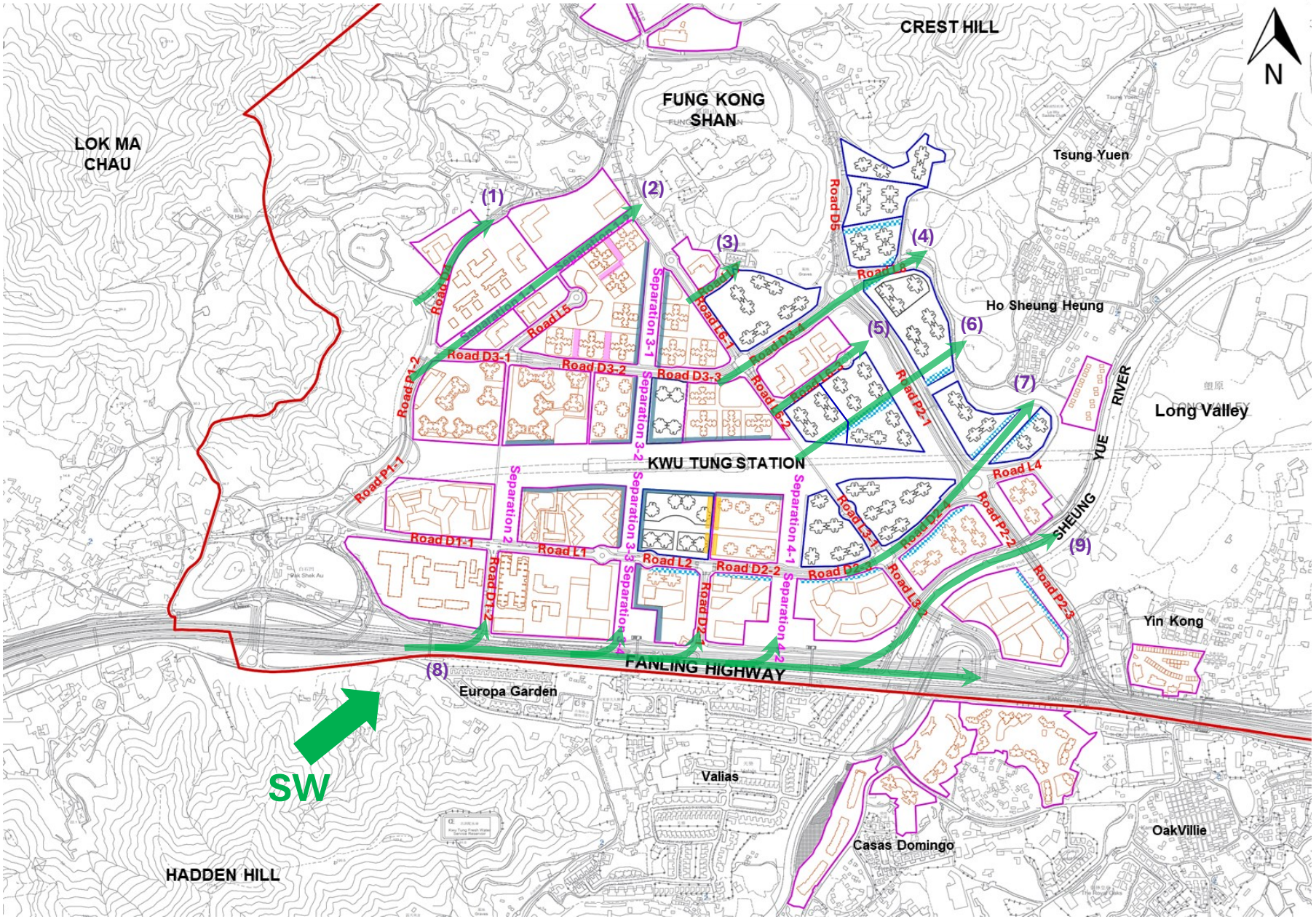

Figure 8.5(a)
Wind Flow under the SW Summer Prevailing Wind for the Baseline Scenario

- Summer Prevailing Wind
- Wind Breezeways
- Non-Building Area
- Ground Level Setback
- Terraced Podium
- Permeable Elements
- KTN NDA
- Application Sites
- Areas with Planned/Committed Developments

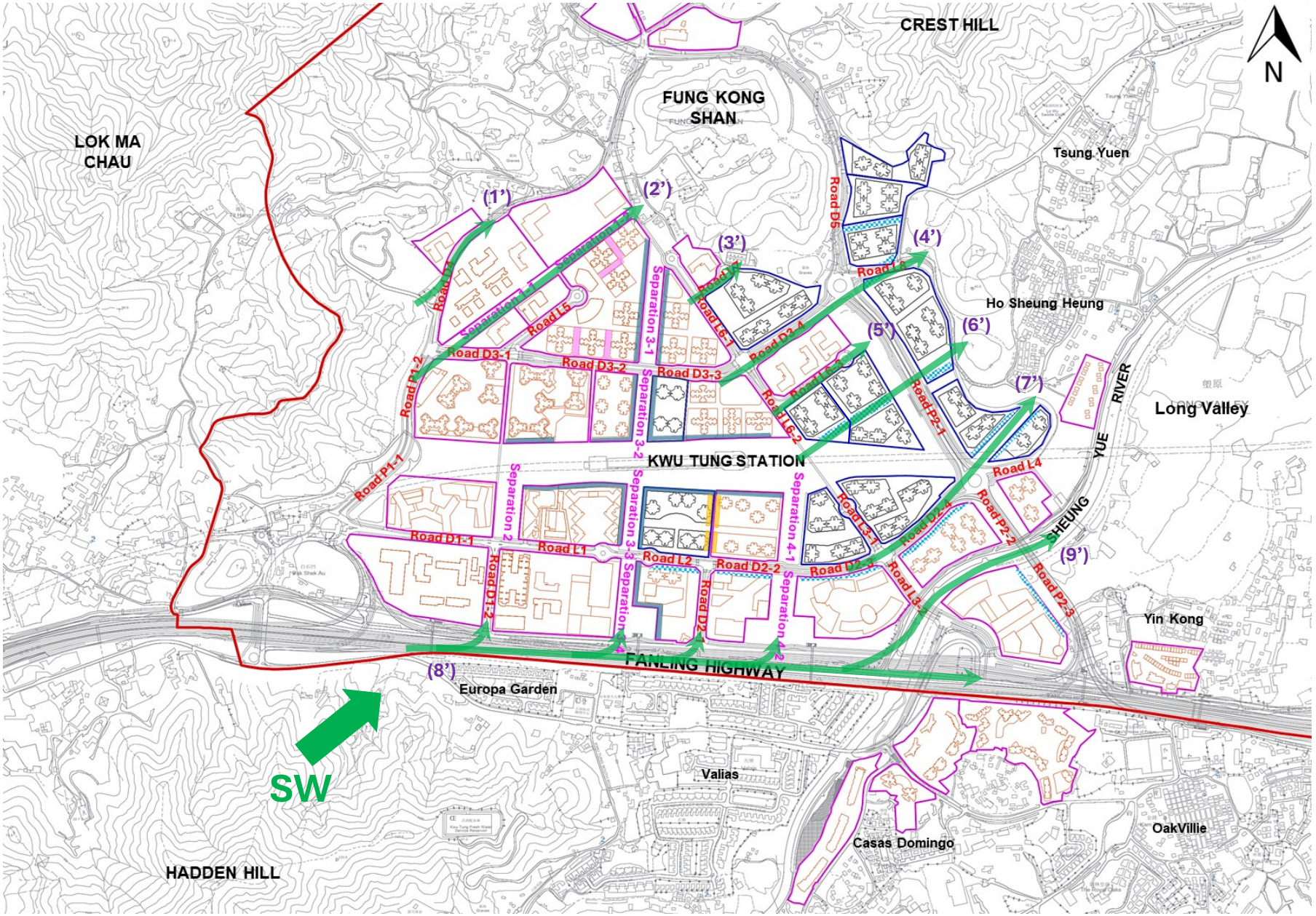

Figure 8.5(b)
Wind Flow under the SW Summer Prevailing Wind for the Proposed Scenario

- Summer Prevailing Wind
- Wind Breezeways
- Non-Building Area
- Ground Level Setback
- Terraced Podium
- Permeable Elements
- KTN NDA
- Application Sites
- Areas with Planned/Committed Developments