

Agreement No. CE 18/2019 (CE)
Development of Fanling 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 Fanling North New Development Area

June 2026

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1. INTRODUCTION

1.1 Background

- 1.1.1 On 24 December 2019, Civil Engineering and Development Department (hereinafter called “CEDD”) of the Government of the Hong Kong Special Administrative Region appointed Atkins China Limited (hereinafter called “Atkins”) to undertake the Agreement No. CE 18/2019 (CE) - Development of Fanling North New Development Area, Remaining Phase – Design and Construction (hereinafter called “the Assignment”).
- 1.1.2 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.
- 1.1.3 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 Kwu 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.
- 1.1.4 An Air Ventilation Assessment - Expert Evaluation (“AVE-EE”) that assesses the air ventilation impact arising from the Development Proposal at the Application Sites at FLN NDA is prepared to support the S16 Planning Application. Table 1.1 overleaf summarises the changes in PR and BH against the restrictions under the Draft Fanling North Outline Zoning Plan No. S/FLN/5 (“Draft OZP”) and the previous planning approvals.
- 1.1.5 As there are no individual sites over 2 hectares and with an overall plot ratio of 5 or above and no individual sites with total Gross Floor Area exceeding 100,000 m², a qualitative AVA in the form of Expert Evaluation is considered appropriate to support the Application to review the potential ventilation impacts associated with the proposed changes within the Application Sites.

1.2 Purpose of Report and Report Structure

- 1.2.1 The objective of the Air Ventilation Assessment Review in the form of Expert Evaluation (AVA-EE) is to ensure that ventilation impacts are duly considered as one of the main criteria in the Planning and Engineering Review for minor relaxation of building height restriction to enable aboveground carparks
- 1.2.2 This AVA-EE is conducted according to methodology outlined in the Technical Guide for AVA for Developments in Hong Kong (Technical Guide) annexed in HPLB and ETWB TC No. 1/06.
- 1.2.3 The structure of this AVA-EE report is described below.
- Section 1 – Describe the project background, the objective of the report and report structure;
- Section 2 – Provide brief description on Fanling North New Development Area (FLN NDA) and the Application Sites, and review the site environment including adjacent existing, planned and committed developments and the surrounding topography;
- Section 3 – Identify the prevailing wind directions based on available wind data;
- Section 4 – Discuss the baseline and proposed layouts and scenarios;
- Section 5 – Conduct the Expert Evaluation and qualitatively assess the wind environment at the pedestrian level at or near the Application Sites and its surroundings;
- Section 6 – Provide further recommendations on air ventilation perspectives; and
- Section 7 – Summarize and conclude the AVA Report.

Table 1.1 Development Parameters of the Application Sites

Site	Planning Area	Zoning	Site Area	Permitted PR* (Approved PR)	Proposed PR [^]	% Increase from Permissible PR	% Increase from Approved PR	Permitted BH* (Approved BH [^])	Proposed BH	% Increase from Permissible BH*	% Increase from Approved BH [^]
F1	10NW	"OU(CRDPTI(2))"	0.99 ha	TPR: 3.05 (3.66) DPR: 2.18 (2.62) NDPR: 0.87 (1.04)	TPR: 3.66 DPR: 2.62 NDPR: 1.04	20.00%	No changes	80mPD (80mPD)	85mPD	6.25%	6.25%
F2	13E	"R(B)"	2.22 ha	DPR: 3.50 (4.20)	DPR: 4.20	20.00%		75mPD (80mPD)	95mPD	26.67%	18.75%
F3	14W	"R(A)3"	1.05 ha	DPR: 5.00 (6.00)	DPR: 6.00	20.00%		110mPD (120mPD)	135mPD	22.73%	12.50%
F4	14S	"R(A)1"	1.44 ha	TPR: 6.00 (7.20) DPR: 5.00 (6.00) NDPR: 1.00 (1.20)	TPR: 7.20 DPR: 6.00 NDPR: 1.20	20.00%		115mPD (144.14mPD)	155mPD	34.78%	7.53%
F5	16NW	"R(A)1"	0.93 ha	TPR: 6.00 (7.20) DPR: 5.00 (6.00) NDPR: 1.00 (1.20)	TPR: 7.20 DPR: 6.00 NDPR: 1.20	20.00%		110mPD (120mPD)	135mPD	22.73%	12.50%
F6	16NE	"R(A)1"	1.25 ha	TPR: 6.00 (7.20) DPR: 5.00 (6.00) NDPR: 1.00 (1.20)	TPR: 7.20 DPR: 6.00 NDPR: 1.20	20.00%		110mPD (120mPD)	135mPD	22.73%	12.50%
F7	16SW	"R(A)1"	1.24 ha	TPR: 6.00 (7.20) DPR: 5.00 (6.00) NDPR: 1.00 (1.20)	TPR: 7.20 DPR: 6.00 NDPR: 1.20	20.00%		110mPD (120mPD)	135mPD	22.73%	12.50%
F8	16SE	"R(A)1"	1.16 ha	TPR: 6.00 (7.20) DPR: 5.00 (6.00) NDPR: 1.00 (1.20)	TPR: 7.20 DPR: 6.00 NDPR: 1.20	20.00%		110mPD (120mPD)	135mPD	22.73%	12.50%

Remarks:

* As stipulated on the Draft FLN OZP

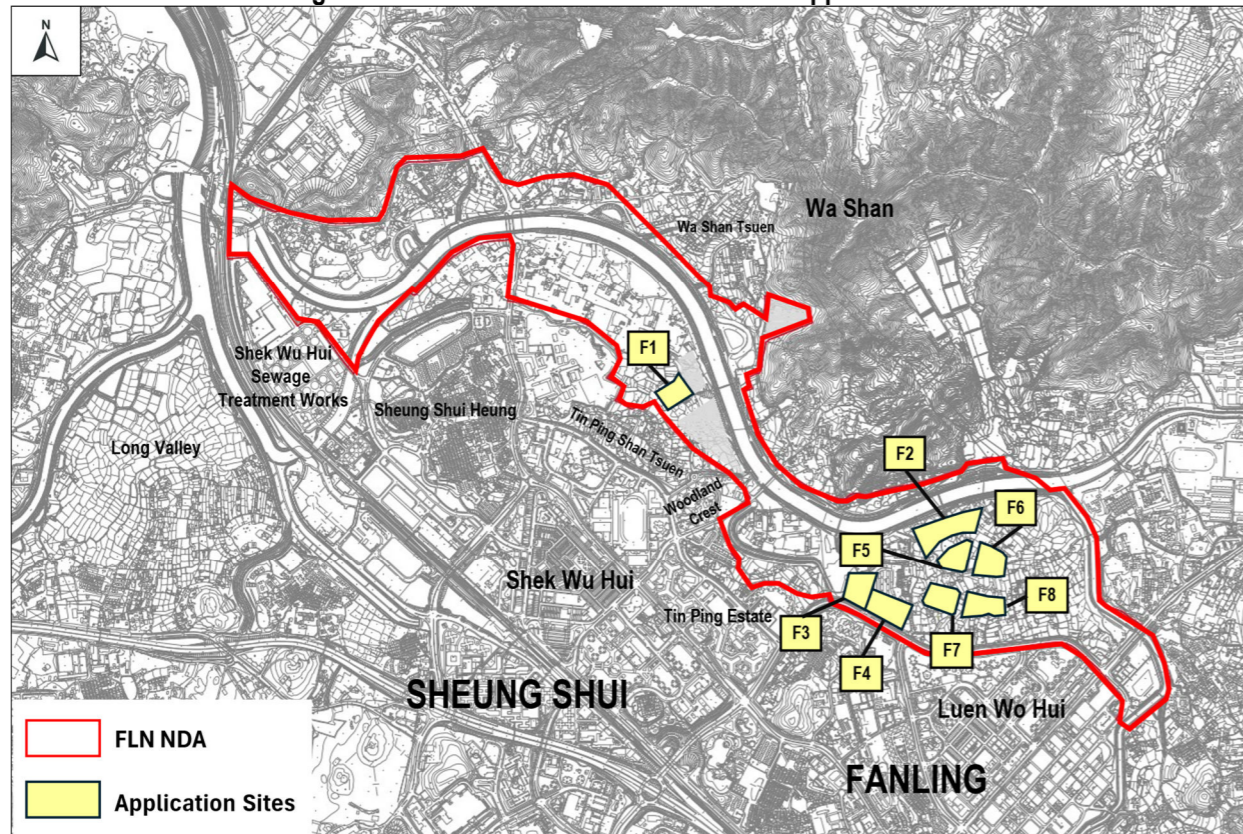
[^] According to the Application Nos. A/FLN/30 and A/FLN/32, whichever is greater

2. STUDY AREA AND SITE CHARACTERISTICS

2.1 FLN NDA and Application Sites

- 2.1.1 The FLN NDA is located at the inland area of North East New Territories, adjoining Fanling / Sheung Shui New Town. The FLN NDA is around 165 ha in total coverage. The FLN NDA is located at a sizable flatland with hilly terrains to the north. The topographical height for FLN Area and the Application Sites are generally less than 50mPD with hilly terrains (maximum height of approximately 160 mPD in height) of High Hill, Lamb Hill and Wa Shan to the north direction of the FLN NDA.
- 2.1.2 The majority areas of the FLN NDA are currently being occupied by low-rise village type developments, agricultural land, construction sites and open spaces. The proposed FLN NDA covers areas at both sides of the Ng Tung River in which the NDA elongates starting from the Shek Wu Hui Sewage Treatment Works all the way towards the southeast direction and ends near Luen Wo Hui.
- 2.1.3 A total of eight (8) planned private housing sites (the “Application Sites”), namely Sites F1, F2, F3, F4, F5, F6, F7 and F8, form the primary focus of this AVA review. Site F1 is located at the centre of the FLN NDA, while Sites F2, F3, F4, F5, F6, F7 and F8 are in close proximity to one another in the south-eastern portion of the FLN NDA. Figure 2.1 shows the locations and environs of the FLN NDA and the Application Sites.

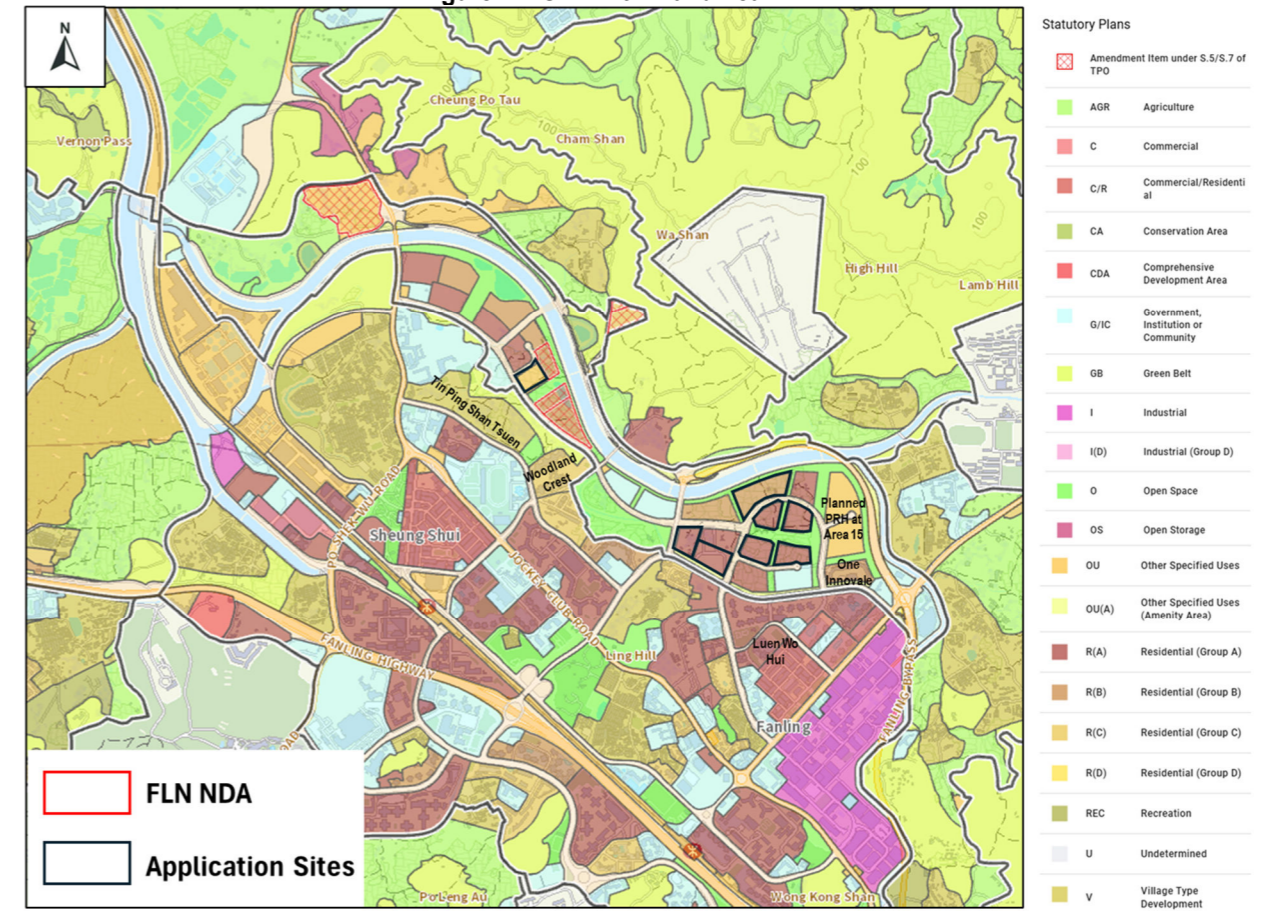
Figure 2.1 Location of the FLN NDA and the Application Sites



2.2 Land Use

- 2.2.1 The Outline Zoning Plan of FLN NDA and existing Fanling / Sheung Shui New Town is shown on Figure 2.2. The lands within the FLN NDA are planned to be zoned for various uses which mainly include Government, Institution or Community (G/IC) land use, Open Spaces and Residential land uses. There are also some Agricultural lands and lands zoned for Other Specified Uses.
- 2.2.2 The eight (8) Application Sites area are currently zoned as “Residential (Group A)1” (“R(A)1”), “R(A)3”, “Residential (Group B)” (“R(B)”), or “Other Specified Uses (Commercial/Residential Development with Public Transport Interchange (2))” (“OU(CRDPTI(2))”) on the prevailing Draft FLN OZP (Plan No. S/FLN/5).
- 2.2.3 Planned “Residential (Group A)” and “Residential (Group B)” lands within FLN NDA are located immediately northwest to northeast of Application Site F1, while existing village-type development (Tin Ping Shan Tsuen) and the residential development (Woodland Crest) within Sheung Shui New Town are located to the southwest to south of the site.
- 2.2.4 For the remaining seven Application Sites, they are bounded by the Ng Tung River to the north, planned public housing development in Area 15 and One Innovale to the east, and are surrounded by other planned “Residential (Group A)” and “Residential (Group B)” lands within FLN NDA. Existing Fanling New Town (Luen Wo Hui) is situated to the south of these sites.

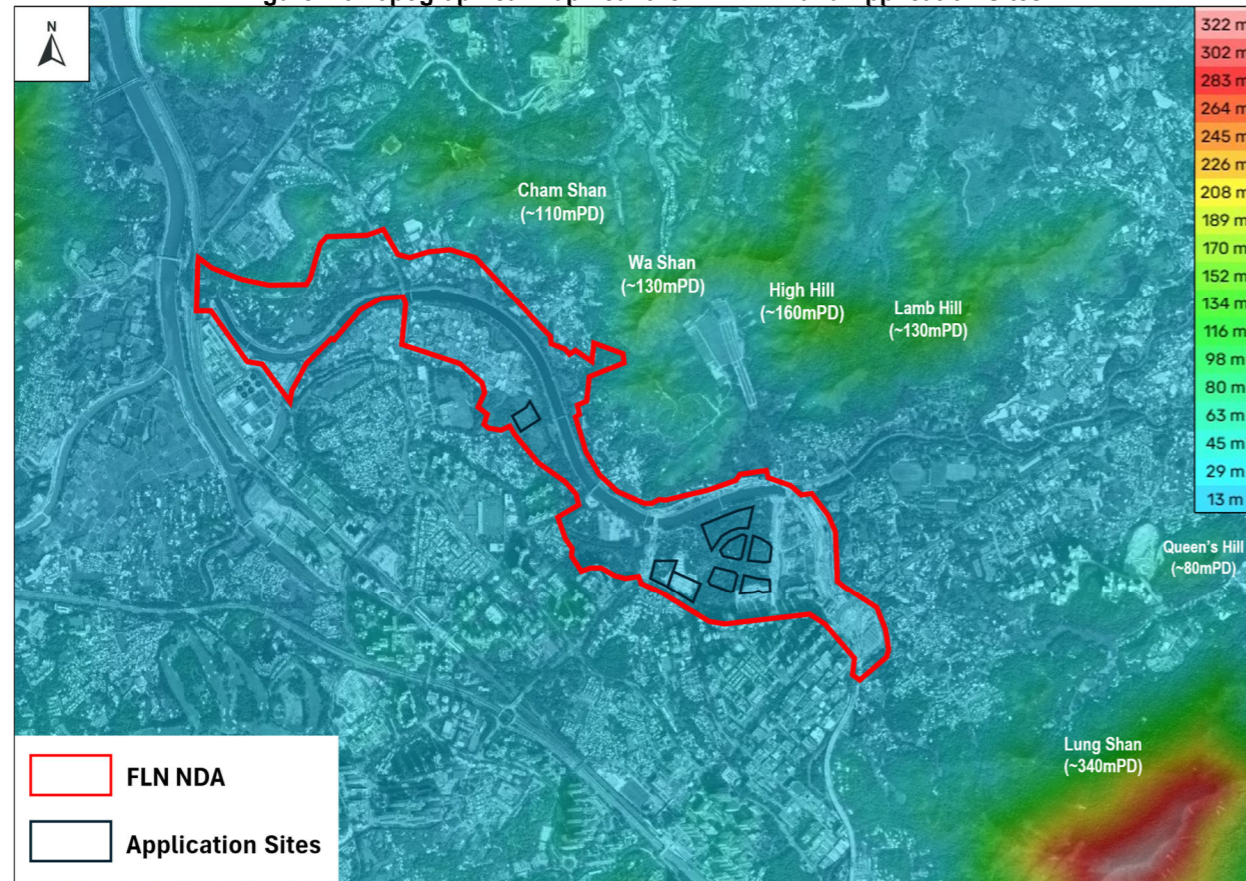
Figure 2.2 OZP within and near FLN NDA



2.3 Existing Topography

- 2.3.1 The FLN NDA is exposed to a relatively flat sub-urban area and surround by hilly terrains situated at the northern and eastern quadrant of the NDA. High Hill is the highest terrain among all with 160mPD while Queen's Hill is the smoothest terrain with 80mPD. The distance between the Queen's Hill and Application Sites is more than 2km whilst all other hilly terrains are around 1km from the Application Sites. The height and distance of those hilly terrains are illustrated in the figure below.
- 2.3.2 According to topography of the existing natural environment, the northerly wind flow will be weakened by hilly terrains before entering the FLN NDA at the pedestrian level while easterly can freely pass through the open flat area and then entering to FLN NDA site. For southern and south-westerly prevailing winds, the wind would penetrate through the existing Fanling/Sheung Shui New Town Area before penetrating through FLN NDA.

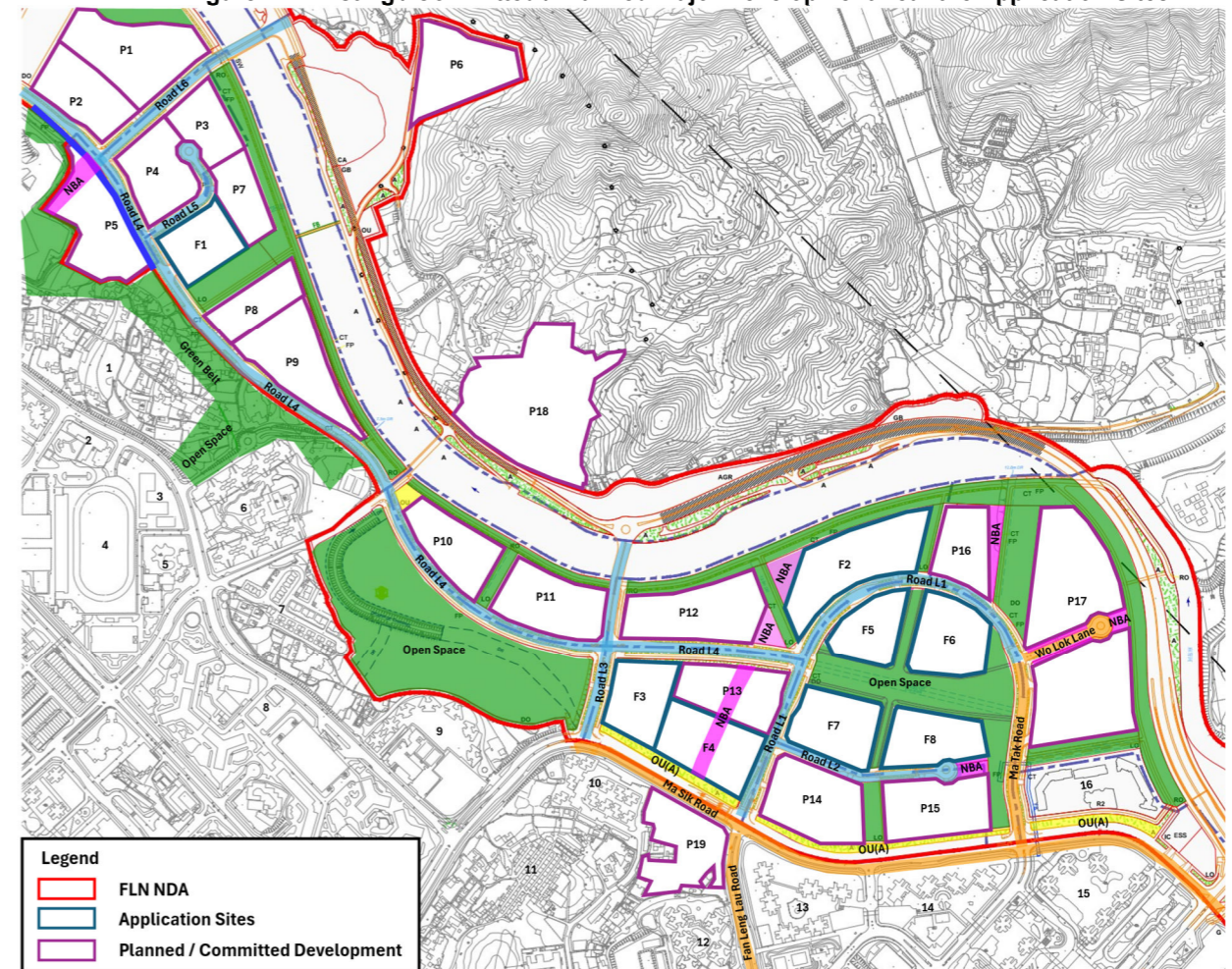
Figure 2.3 Topographical Map near the FLN NDA and Application Sites



2.4 Existing Urban Morphology

- 2.4.1 The FLN NDA is situated at the north of existing Fanling / Sheung Shui New Town area. It is currently covered being occupied by low-rise village type developments, agricultural land, construction sites, open spaces as well as open storage yards.
- 2.4.2 For the following discussion, it will be focusing on the surrounding areas near the Eight Application Sites.
- 2.4.3 The existing built environment, planned development within FLN NDA and committed developments adjacent to the Application Sites are illustrated in the figure below. The building layouts and morphologies are provided in Appendix A and B.

Figure 2.4 Existing / Committed / Planned Major Development near the Application Sites



Description	Maximum Building Heights (mPD)	Description	Maximum Building Heights (mPD)
Application Sites (A/FLN/30 and A/FLN/32)			
F1	80	F2	80
F3	120	F4	144.14
F5	120	F6	120
F7	120	F8	120
Planned and Committed Developments within the FLN NDA near the Application Sites (reference to S/FLN/5 ("Draft OZP"), A/FLN/28 and A/FLN/30)			
P1 – Residential R(A)	95-110	P2 – Residential R(A)	130
P3 – Residential R(B)	100	P4 – Residential R(A)	125
P5 – GIC Buildings	8 storeys	P6 – Residential R(C)	80
P7 – Residential R(B)	110	P8 – Residential R(B)	110
P9 – Residential R(B)	110	P10 – GIC Buildings	8 storeys
P11 – GIC Buildings	8 storeys	P12 – Residential R(B)	97.5
P13 – Residential R(A)	135	P14 – Residential R(A)	135
P15 – GIC Buildings	8 storeys	P16 – Residential R(A)	115
P17 – "OU(CRDPTI(1))"	128-137		
Planned and Committed Developments outside the FLN NDA and near the Application Sites (reference to S/NE-FTA/18 and A/FSS/294)			
P18 – Residential R(A)	170	P19 – Residential R(A)	132
Existing Development near the Application Sites			
1. Tin Ping Shan Tsuen	below 20	2. Fung Kai Centre and Attention Home for the Elderly	35
3. Lee Chi Tat Memorial School	18	4. North District Sports Ground	-
5. Sheung Shui Swimming Pool	-	6. Woodland Crest	54
7. On Kwok Villa	23	8. Tin Ping Estate	67-108
9. Noble Hill	81-92	10. Good View New Village	21-25
11. Ling Shan Tsuen	19-22	12. Fan Garden	106-108
13. Wing Fok Centre	90-92	14. Wing Fai Centre	106-109
15. Belair Monte	115	16. One Innovale	60-75

2.4.4 Planned sites P1–P17 are located within the FLN NDA. Sites P1–P9 comprise planned residential developments with maximum building heights ranging from 95 mPD to 130 mPD (except P5, which is a GIC site with buildings up to 8 storeys), and are in the vicinity of Application Site F1. Sites P12–P17 comprise planned residential developments with maximum building heights ranging from 97.5 mPD to 137 mPD (except P15, which is a GIC site with buildings up to 8 storeys), and are near Application Sites F2, F3, F4, F5, F6, F7 and F8.

2.4.5 Outside the planned P1–P17 developments within the FLN NDA, Sites P18 and P19 are committed residential sites in the vicinity. Site P18 lies north of GIC Sites P10 and P11 with a proposed maximum height of 170 mPD under the Approved Fu Tei Au & Sha Ling OZP S/NE-

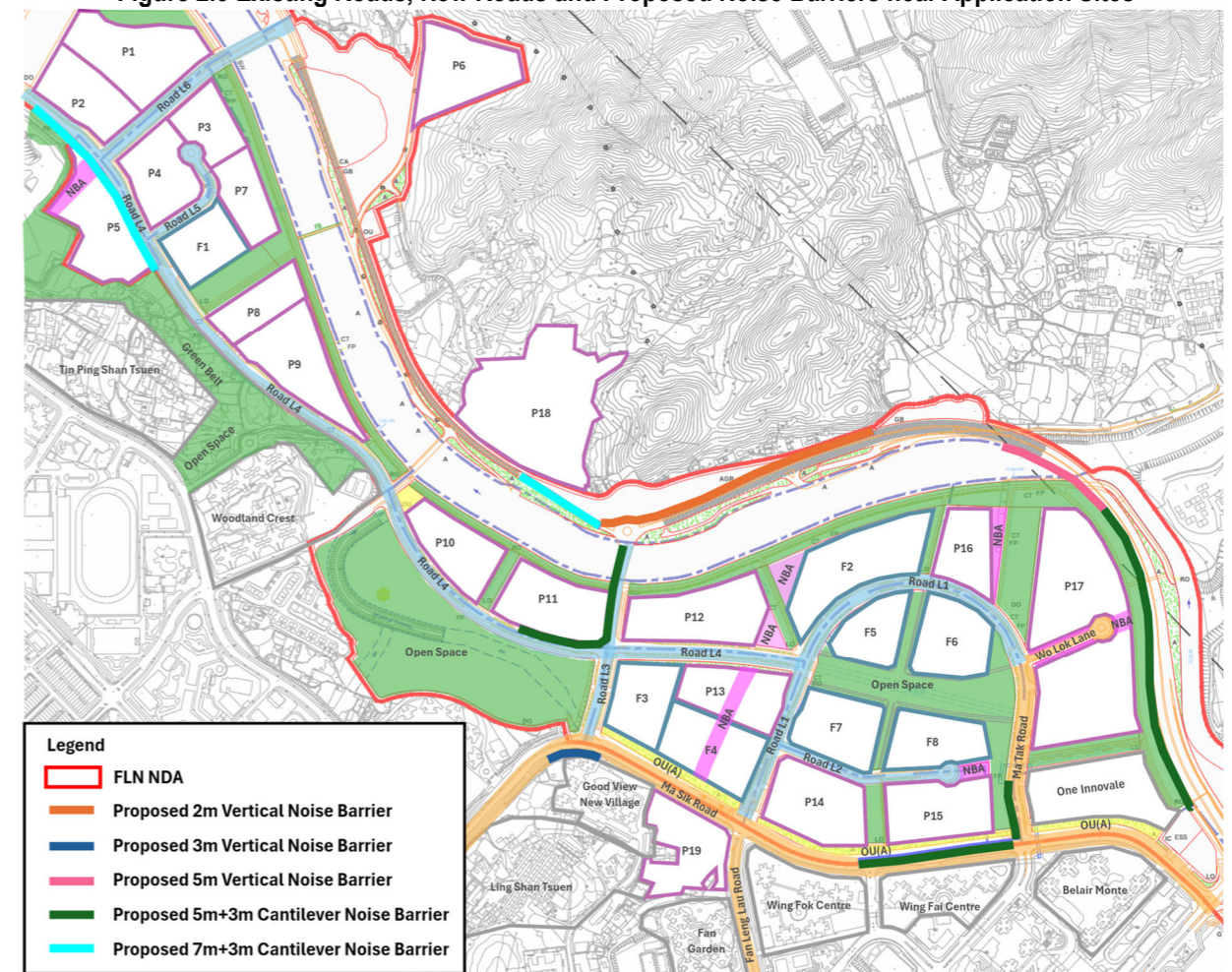
FTA/18. Site P19 lies south of Application Site F4 with a proposed maximum height of 132 mPD under planning application no. A/FSS/294.

2.4.6 Tin Ping Shan Tsuen (village-type) and Woodland Crest (residential) lie immediately to the south-west of Application Site F1. One Innovale lies at the south-eastern corner of the FLN NDA. Ling Sha Tsuen (village-type) and the residential developments Good View New Village, Wing Fok Centre, Wing Fai Centre, Fan Garden and Belair Monte are to the south of Application Sites F2, F3, F4, F5, F6, F7 and F8.

2.5 Existing and Formed Roads

2.5.1 For the existing road network at Fanling / Sheung Shui New Town Area next to the FLN NDA, Lung Sum Avenue, Tin Ping Road, Fung Nam Road and Jockey Club Road are the main roads in the vicinity of Application Sites. According to the current OZP, road networks and separations are anticipated to be formed as shown in Figure 2.5. While noise barriers are required to be incorporated along part of the major roads for mitigating the potential traffic noise impacts, such noise barriers would inevitably affect the localised pedestrian wind environment. The locations of the proposed noise barriers are also indicated in Figure 2.5.

Figure 2.5 Existing Roads, New Roads and Proposed Noise Barriers near Application Sites



3. SITE WIND AVAILABILITY

3.1 Wind Data from Hong Kong Observatory

3.1.1 Natural wind availability is the key element for the AVA study, this section will state the closest wind data to the Application Sites at Fanling North NDA measured by Hong Kong Observatory (HKO), Ta Kwu Ling automatic weather station.

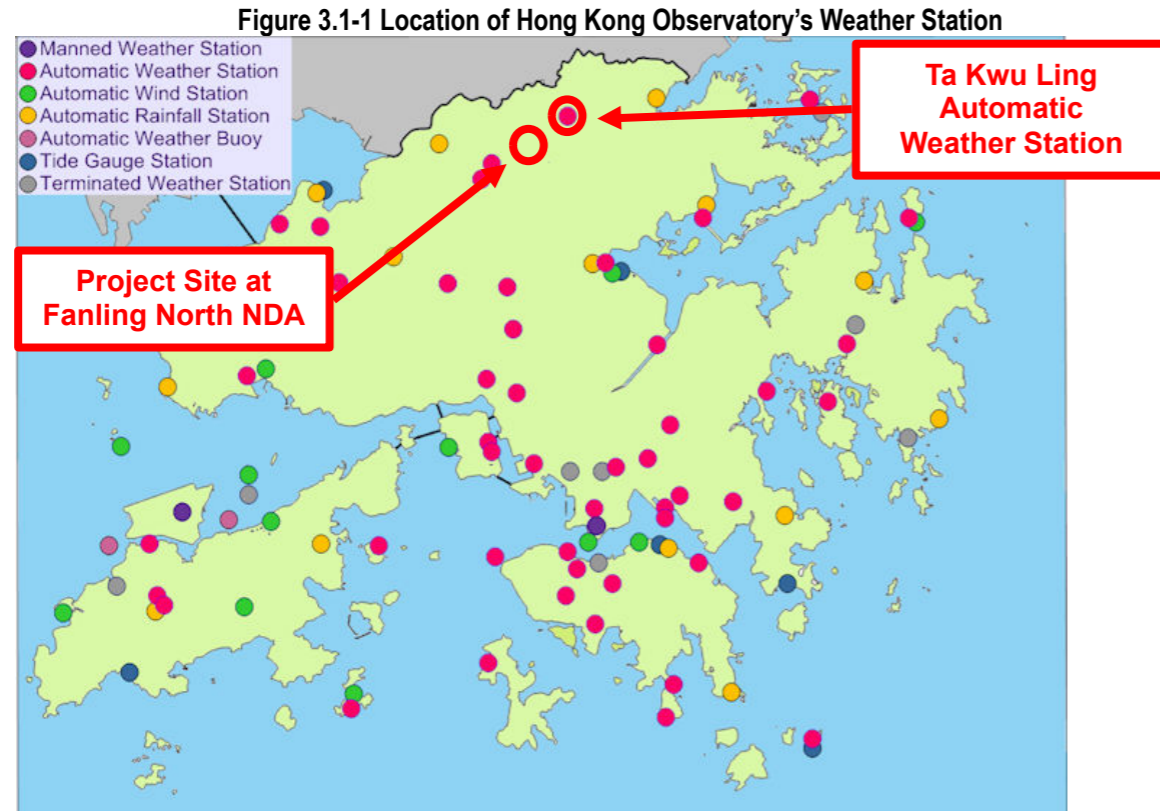


Figure 3.1-1 Location of Hong Kong Observatory's Weather Station

Figure 3.1-2 Annual Wind Rose from Ta Kwu Ling Weather Station (1986 – 2024)

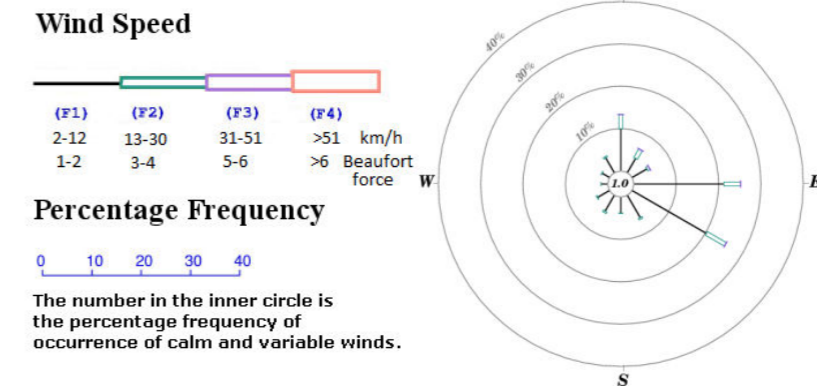
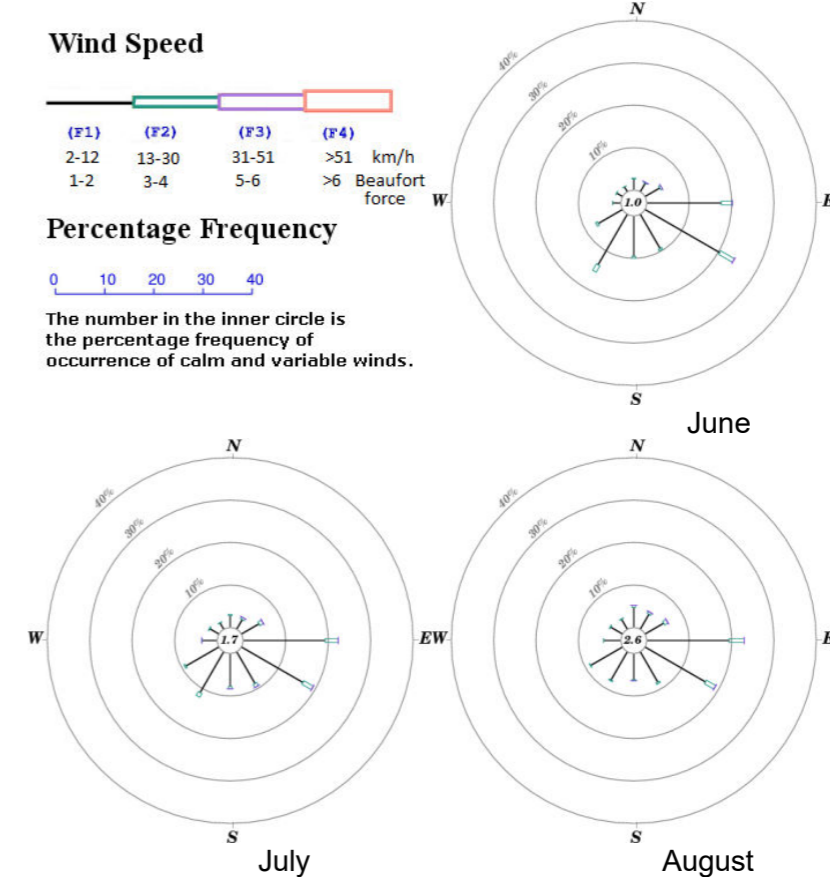


Figure 3.1-3 Summer Wind Rose from Ta Kwu Ling Weather Station Jun – Aug (1986 – 2024)



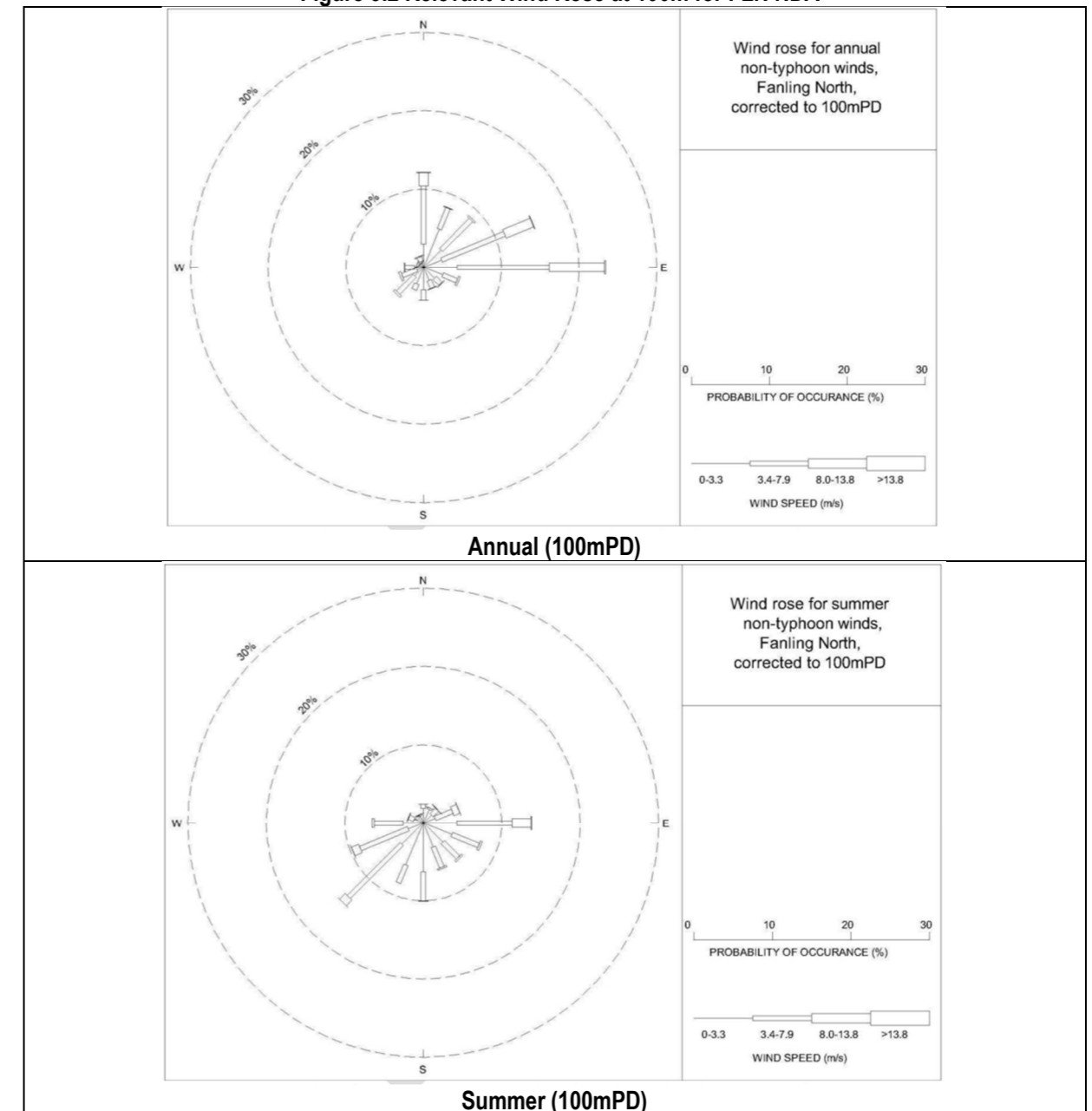
3.1.2 As shown in above figure, Ta Kwu Ling automatic weather station is the closest station to the site which collects wind data from the surrounding environment. With reference to figures overleaf, both annual and summer prevailing winds are mainly from the SE quadrant.

3.1.3 However, the Ta Kwu Ling weather station is located at the north-eastern part of North District for which the location of this weather station is around 3 km distant away from the Application Sites at Fanling North NDA. Also, the nearby terrain may lead to differences of the weather data between this weather station and that of the Application Sites. Therefore, data from other sources are obtained for more precise wind data compilation.

3.2 Wind Data from Experimental Site Wind Availability Study

- 3.2.1 Apart from HKO wind data, “Experimental Site Wind Availability Study for the North-East New Territories New Development Areas” (WWTF018-2010) was conducted in 2010 by the CLP Power Wind/Wave Tunnel Facility (WWTF) at The Hong Kong University of Science and Technology to determine the site wind availability and characteristics for three nominated Study Areas as part of the North East New Territories New Development Areas Planning and Engineering Study commissioned by the Civil Engineering and Development Department and the Planning Department of the Hong Kong Special Administrative Region. The three nominated Study Areas are: the Fanling North Study Area, the Kwu Tung North Study Area and the Ping Che/Ta Kwu Ling Study Area).
- 3.2.2 1:2000 scale topography studies were undertaken to determine the effects of the surrounding topography and built environment on mean wind direction, mean wind speed and turbulence intensity at the Fanling North, Kwu Tung North and Ping Che/Ta Kwu Ling Study Areas.
- 3.2.3 As with wind data, wind roses and prevailing wind directions (for both summer and annual periods) information can be obtained from the special tailor made wind tunnel experiment. Wind roses indicating dominance of each of the 16 wind directions and distribution of wind speed at the height below of 100mPD can be extracted. Wind conditions (including prevailing directions and velocity) at the height of 100m is used because this set of data is closest to pedestrian levels and thus will be the most suitable data (for qualitative analysis) to represent the actual conditions of the at the Fanling North New Development Area.
- 3.2.4 Figures below demonstrate the wind rose and prevailing wind directions (for both summer and annual) at the height of 100mPD extracted from the Experimental Site Wind Availability Study for Fanling North New Development Area.

Figure 3.2 Relevant Wind Rose at 100m for FLN NDA



- 3.2.5 Referring to the experimental data, E, ENE and N are the most dominant prevailing winds with 23.4%, 15.1% and 12.1% of the annual wind frequency, respectively for the Application Sites. For the summer periods, SW, E and S, WSW are the most dominant prevailing winds with 14.5%, 13.8%, 10.1% and 9.7% of the wind frequency, respectively for the Application Sites.

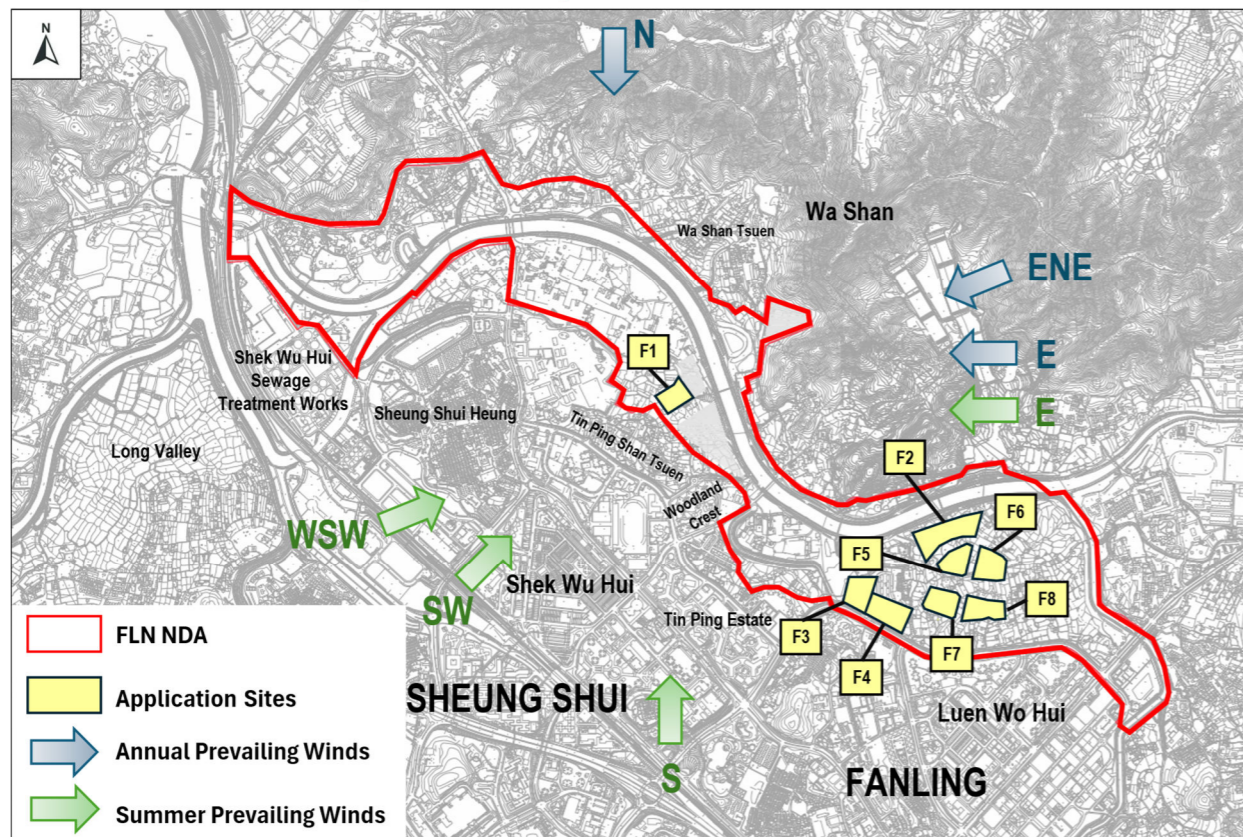
Table 3.2 Wind Directions from Experimental Site Wind Data

Prevailing Wind	Annual			Summer			
	E	ENE	N	SW	E	S	WSW
Wind Frequency	23.4%	15.1%	12.1%	14.5%	13.8%	10.1%	9.7%

3.3 Wind Data Summary

- 3.3.1 By comparing the wind data, the prevailing wind directions are summarised as below for FLN NDA. For annual prevailing winds of the Application Sites at FLN are mainly from the north-eastern quadrant whilst summer prevailing winds to the Application Sites are dominated by the south-western quadrant. However, Ta Kwu Ling automatic weather station are located at low height levels. The wind data will be affected by surrounding developments or topography and hence cannot be adopted directly to the Application Sites for AVA purposes. Therefore, experimental site wind data is chosen for analysis, as the wind data were evaluated at the FLN NDA study area.
- 3.3.2 From the Experimental Site Wind Availability Data, a conclusion can be made that the annual prevailing wind of the Application Sites are coming from E, ENE and N directions, whilst summer prevailing winds are coming from SW, E, S and WSW directions.

Figure 3.3 Prevailing Wind Directions of the FLN NDA



4. BASELINE AND PROPOSED SCENARIOS

4.1 Background

- 4.1.1 Two Development Scenarios are reviewed in this Study, Baseline Scenario and Proposed Scenario. The Baseline Scenario reflects the development restrictions in the Fanling North Outline Zoning Plan (S/FLN/5 ("Draft OZP")) with updates to incorporate the scheme in the approved Section 16 applications A/FLN/30 and A/FLN/32. Under these planning permissions, minor relaxation in Plot Ratios (PR) and/or Building Height Restrictions (BHR) was approved in Application Sites.
- 4.1.2 As compared with the Baseline Scenario, relaxation in BHR to enable aboveground carparks in Remaining Phase including Planning Areas 10, 13, 14 and 16 (i.e., Application Sites F1, F2, F3, F4, F5, F6, F7 and F8) are proposed. Table 4.1 shows the change in relevant development parameters.

Table 4.1 Difference in Development Parameters at the Application Sites

Site No.	Planning Area	Site Area	Zoning	Permitted PR* (Approved PR [^])	Permitted BH* (Approved BH [^])	Proposed BH
F1	10NW	0.99 ha	"OU(CRDPTI(2))"	TPR: 3.05 (3.66) DPR: 2.18 (2.62) NDPR: 0.87 (1.04)	80mPD (80mPD)	85mPD
F2	13E	2.22 ha	"R(B)"	DPR: 3.50 (4.20)	75mPD (80mPD)	95mPD
F3	14W	1.05 ha	"R(A)3"	DPR: 5.00 (6.00)	110mPD (120mPD)	135mPD
F4	14S	1.44 ha	"R(A)1"	TPR: 6.00 (7.20) DPR: 5.00 (6.00) NDPR: 1.00 (1.20)	115mPD (144.14mPD)	155mPD
F5	16NW	0.93 ha	"R(A)1"	TPR: 6.00 (7.20) DPR: 5.00 (6.00) NDPR: 1.00 (1.20)	110mPD (120mPD)	135mPD
F6	16NE	1.25 ha	"R(A)1"	TPR: 6.00 (7.20) DPR: 5.00 (6.00) NDPR: 1.00 (1.20)	110mPD (120mPD)	135mPD
F7	16SW	1.24 ha	"R(A)1"	TPR: 6.00 (7.20) DPR: 5.00 (6.00) NDPR: 1.00 (1.20)	110mPD (120mPD)	135mPD
F8	16SE	1.16 ha	"R(A)1"	TPR: 6.00 (7.20) DPR: 5.00 (6.00) NDPR: 1.00 (1.20)	110mPD (120mPD)	135mPD

Remarks:

* As stipulated on the Draft FLN OZP

[^] According to the Application Nos. A/FLN/30 and A/FLN/32, whichever is greater

4.2 Baseline and Proposed Scenarios

4.2.1 Following figures shows the overall layout of Application Sites F1, F2, F3, F4, F5, F6, F7 and F8 within the FLN NDA Remaining Phase under the Baseline Scenario and the Proposed Scenario as well as the planned/committed developments and existing built environment that surround the Application Sites. Illustrational figures for zoomed out areas from the Application Sites under the Baseline and Proposed Scenarios are also provided in Appendix A and B for reference. Brief discussions on the differences between the Baseline Scenario and Proposed Scenario for each of the Application Sites are also provided in this subsection. The layouts are indicative for technical assessment purposes only and is subject to change at detailed design stage by the future developers.

Figure 4.2-1 Building Layouts within the Application Sites under the Baseline Scenario

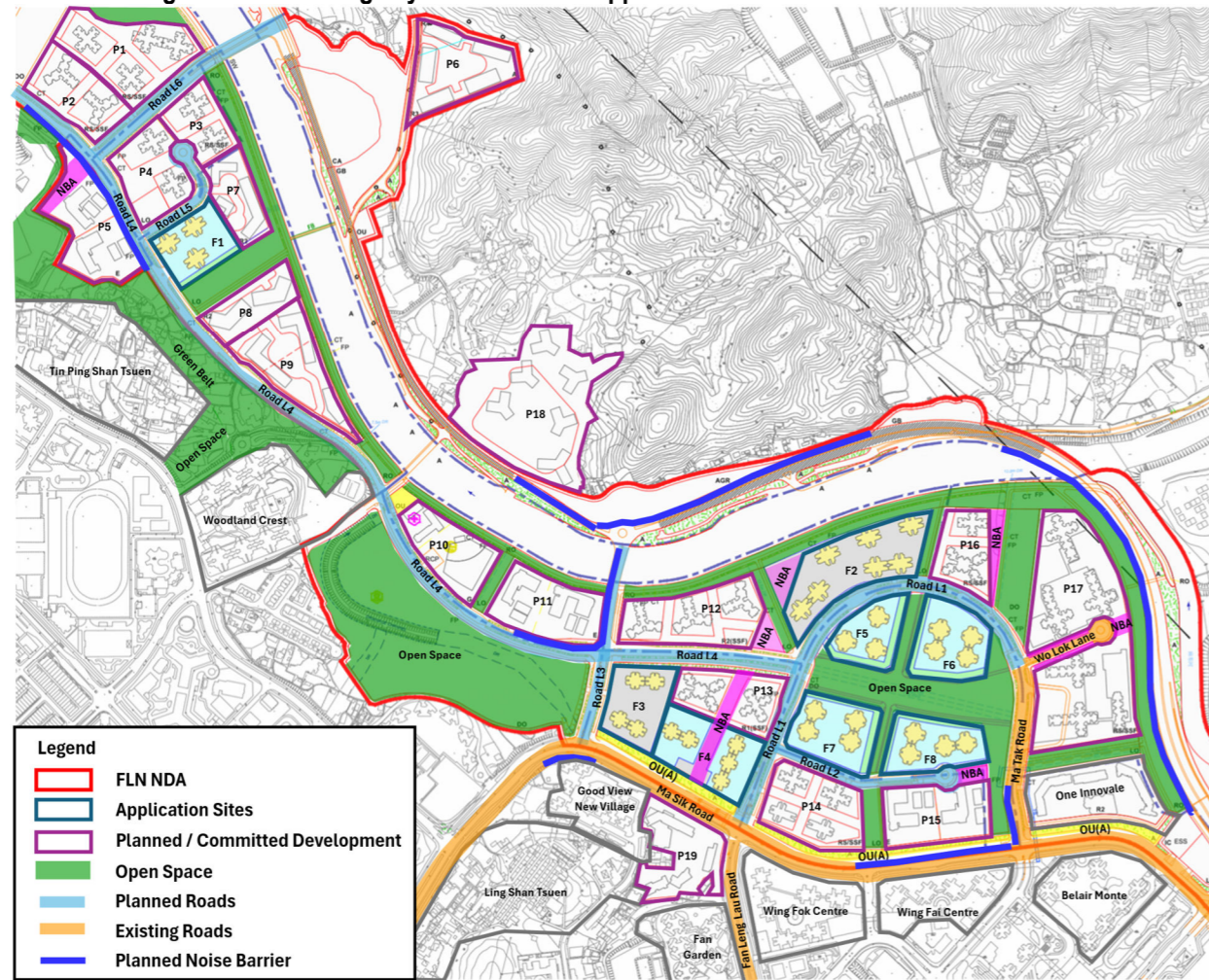


Figure 4.2-2 Building Layouts within the Application Sites under the Proposed Scenario

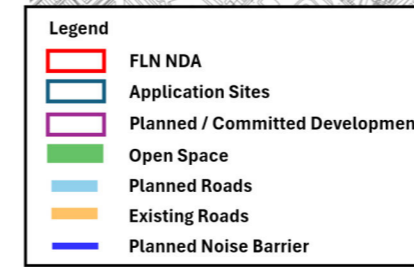
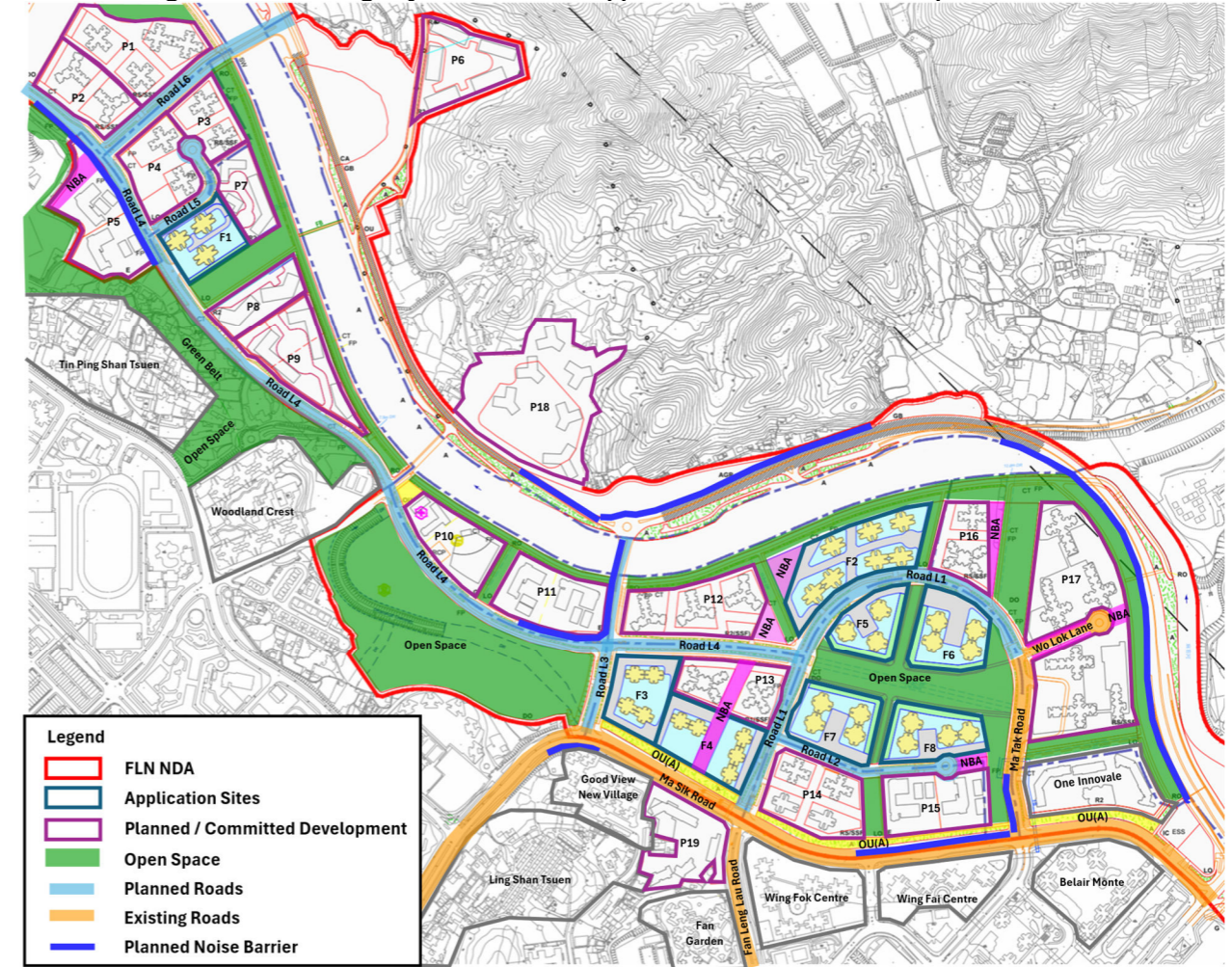


Figure 4.2-3 Indicative Sections Drawing of Application Sites under the Proposed Scenario

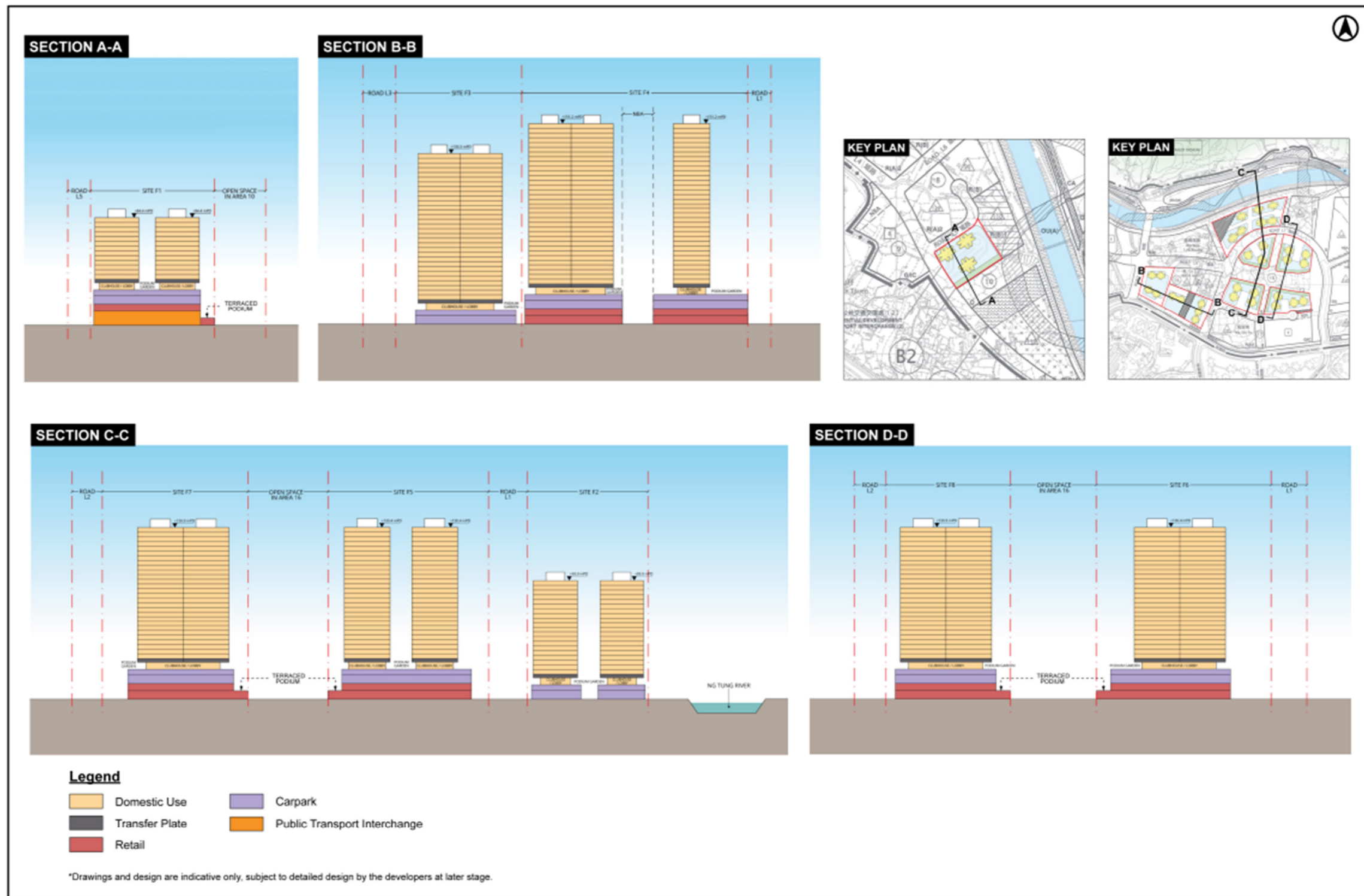


FIGURE 3.2 INDICATIVE SECTIONS OF APPLICATION SITES IN FLN NDA

OU (Commercial/Residential Development with Public Transport Interchange(2)) - Site F1

- 4.2.2 Site F1 is zoned “OU (Commercial/Residential Development with Public Transport Interchange(2))”. Under the Baseline Scenario, Site F1 comprises a two-storey aboveground podium for non-domestic uses including a ground floor public transport interchange with three residential towers above, with an overall maximum building height of 80 mPD. In addition, a terraced podium with a 10 m-wide setback at first-floor is provided along the southeastern boundary abutting the open space in Planning Area 10.
- 4.2.3 Under the Proposed Scenario, two additional storeys of above-ground car park are proposed above the podium for non-domestic uses and the adoption MiC method also increased the height of the residential tower. The BHR is proposed to be relaxed to 85 mPD. As in the Baseline Scenario, the podium block retains a terraced podium design.

Residential (Group A)1 (“R(A)1”) - Sites F4, F5, F6, F7, F8

- 4.2.4 Site F4 is proposed to be developed into five private domestic blocks above a two-storey podium and a podium garden. The building height is assumed to be 144.14 mPD (A/FLN/32 refers). A Non-Building Area (NBA) in northeast-southwest direction is stipulated at the centre of the site.
- 4.2.5 Under the Proposed Scenario, the NBA is retained within the site. Similar to Site F1, two additional storeys of above-ground car park are proposed above the podium for non-domestic uses and the adoption MiC method also increased the height of the residential tower. The BHR is proposed to be relaxed to 155 mPD. No change to the building footprint is proposed under the Proposed Scenario, as the plot ratio remains unchanged.
- 4.2.6 Similar to Site F1, Application Sites F5, F6, F7 and F8 comprise two-storey terraced podiums for non-domestic uses along the site boundaries abutting the open space under the Baseline Scenario. BHs of 120mPD were approved for these sites under A/FLN/30.
- 4.2.7 Under the Proposed Scenario, two additional storeys of above-ground car park are proposed above the podiums for non-domestic uses and the adoption MiC method also increased the height of the residential tower. The terraced podium design is retained. The BHRs are proposed to relax to 135 mPD for these Application Sites.

Residential (Group A)3 (“R(A)3”) - Sites F3

- 4.2.8 Site F3 is planned to be developed into podium-free residential blocks. A BH of 120 mPD was approved under A/FLN/30 under the Baseline Scenario.
- 4.2.9 Under the Proposed Scenario, an above-ground car-park podium is introduced and the adoption MiC method also increased the height of the residential tower. The BHR is proposed to be relaxed to 135 mPD. A podium garden will be provided below the lowest residential floor to enhance air-ventilation performance.

Residential (Group B) (“R(B)”) - Sites F2

- 4.2.10 Similar to Site F3, the podium-free domestic blocks under the Baseline Scenario at Site F2 was approved with BH of 80mPD under A/FLN/30.

- 4.2.11 Under the Proposed Scenario, an above-ground car-park podium is introduced, with a proposed relaxation of the BHR to 95mPD. A podium garden will be provided below the lowest residential floor to enhance air-ventilation performance.

Summary

- 4.2.12 In general, the proposed increases in BH from Baseline Scenario for the Application Sites are about 6%–19%, to facilitate the adoption of the MiC method and construction of above-ground car parks. There is no change to the PR proposed under the Baseline Scenario. The use of permeable design for podium car parks is encouraged to minimise ventilation impacts. The detailed ventilation implications of these changes are discussed in the subsequent expert evaluation.

5. EXPERT EVALUATION ON THE BASELINE AND PROPOSED SCENARIOS

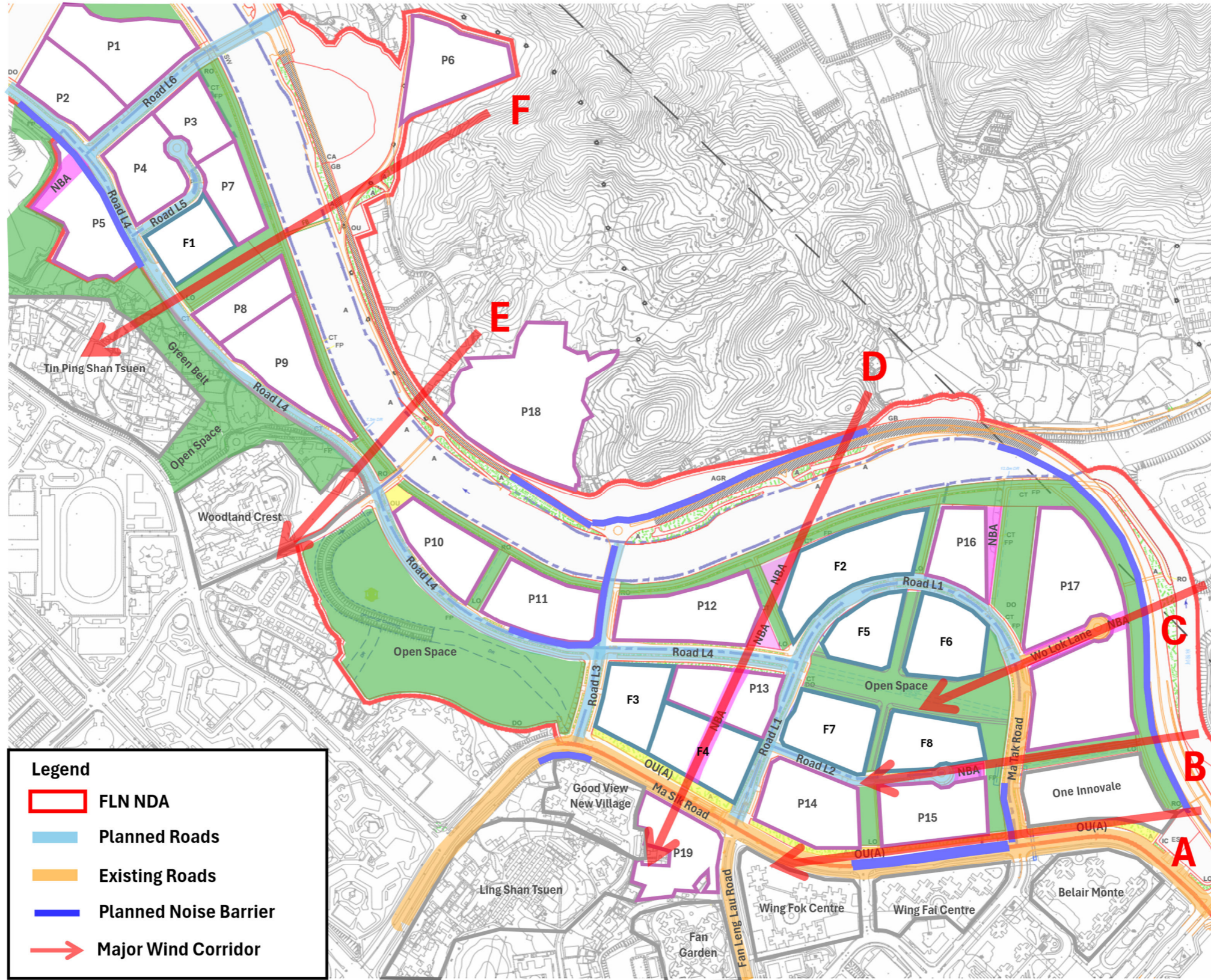
5.1 General

- 5.1.1 The FLN NDA Remaining Phase containing the Application Sites is located at the rural areas of Hong Kong, the majority lands surrounding the FLN NDA and the Application Sites are zoned “Green Belt”, “Agriculture”, “Other Specified Uses”, “Government, Institution or Community” as well as scattered areas of “Village Type Development”. To the north-eastern boundary of the FLN NDA Remaining Phase and the Application Sites across the Ng Tung River are “Green Belt” areas of Fu Tei Au and Sha Ling. To the south-eastern and south-western boundary of the FLN NDA are existing developments at Fanling and Sheung Shui New Town area.
- 5.1.2 Site F1 is bounded to the east by planned residential developments and the Ng Tung River, to the south by planned residential developments and open space, to the west by planned Road L4, and to the north by planned Road L5. The other Application Sites, F2, F3, F4, F5, F6, F7 and F8, are generally bounded to the north by the Ng Tung River, to the east by planned public housing developments, to the west by planned GIC buildings and open space, and to the south by existing residential development in the Fanling New Town area. The most prominent terrain feature to the north of the Application Sites is High Hill, with a maximum elevation of approximately 160 mPD.
- 5.1.3 Owing to the current rural nature of the Application Sites within the FLN NDA Remaining Phase, the wind flows driven by the prevailing wind can freely penetrate the Application Sites under the current conditions. After the proposed developments within the Application Sites as well as their surroundings in the future, road networks and separations are anticipated to be formed to facilitate the penetration of the prevailing wind.
- 5.1.4 Two Development Scenarios would be examined in this Study, namely Baseline Scenario and the Proposed Scenario (see Figure 4.2). Under the Baseline Scenario and Proposed Scenario, as discussed in Section 4 above, both domestic residential blocks and podium structures are to be appeared within the Application Sites. Both Baseline and Proposed Scenarios would maintain all air ventilation good design measures (i.e., wind corridors) as required under the OZP to promote the air ventilation performance. All major wind corridors under the Proposed Scenario would be remained and without affecting its effectiveness for facilitating wind penetration through the Application Sites when compared with Baseline Scenario.
- 5.1.5 In view of the discussion in paragraph 5.1.4, the changes in the building height restriction and addition of aboveground carpark in the Proposed Scenario would inevitably result in change of localized pedestrian wind environment around the Application Sites when compared with the Baseline Scenario. However, it is anticipated the overall wind environment around the Application Sites would not be significantly affected under the Proposed Scenario due to the keeping of all major wind corridors.

5.2 Major Wind Corridors

- 5.2.1 By considering the topographical features and the planned/committed built environment, a number of major wind corridors are adopted in the existing OZP and identified in the vicinity of the Project Sites of the FLN NDA as shown in Figure 5.2-1.
- 5.2.2 The major wind corridors include designation of various open space areas in the FLN NDA. The local roads connect with the open spaces strategically align with north-east/south-west and east/west directions to from these major wind corridors which allow the annual and summer prevailing winds to penetrate the FLN NDA built environment as well as existing Fanling / Sheung Shui New Town area. For ease of reference and description, the major wind corridors are denoted as “A” to “F” in Figure 5.2-1.
- 5.2.3 **Wind Corridor A** is a major breezeway running in east to west direction along the amenity areas in the southern edge of Planning Areas 14, 17 and 18 abutting Mak Sik Road.
- 5.2.4 **Wind Corridor B** is arranged broadly in an east to west direction, it is defined by the open space between Planned Site P17 in Planning Area 15 and One Innovale in Planning Area 18. The corridor generally directs flow along this open space towards the NBA between Application Site F8 in Planning Area 16 and Planned Site P15 in Planning Area 17, before reaching Road L2.
- 5.2.5 **Wind Corridor C** is an east-north-east to west-south-west oriented corridor through Wo Lok Lane and the NBA located at Planned Site P17 in Planning Area 15 towards the open space between the site separation of Application Site F6 and F8 in Planning Area 16.
- 5.2.6 **Wind Corridor D** is the corridor running north-east to south-west along the designated NBA within Application Site F2 and Planned Site P12 in Planning Area 13, and through the NBA within the Planned Site P13 and Application Site F4 in Planning Area 14.
- 5.2.7 **Wind Corridor E** is along road between Planned Site P9 in Planning Area 10 and Planned Site P10 in Planning Area 11 serves as a major breezeway running in north-east to south-west direction to existing Fanling / Sheung Shui New Town Area.
- 5.2.8 **Wind Corridor F** is a 50m-wide open space separation running in north-east to south-west direction between Application Site F1, Planned Site P7 and Planned Site P8 in Planning Area 10.
- 5.2.9 Taken together, Wind Corridors A to F form the principal air paths within the FLN NDA. Their combined function is to preserve permeability through the planned urban fabric, enhance wind penetration into the interior development areas, and maintain connectivity between the open edges, open spaces and road network of the Study Area.
- 5.2.10 Wind Corridor A, B and C act as an important cross-ventilation path feeding air from the eastern frontage into the internal development area of FLN NDA. Wind Corridor D provides a key penetration route for air movement from the northern open edge into the inland areas of Planning Areas 13 and 14. Wind Corridor E and F benefits from the relatively open setting between the northwestern topographical edge and the Planning Areas 10, 11 and 12. It functions as an important diagonal breezeway linking the upper and lower parts of the FLN NDA.

Figure 5.2-1 Major Wind Corridors near Application Sites

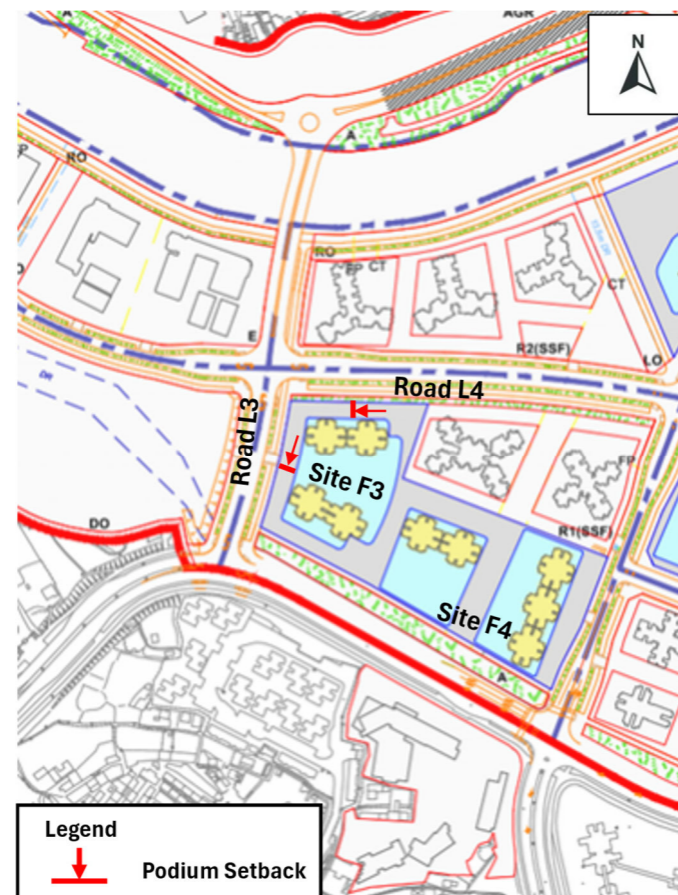


5.3 Good Air Ventilation Features to be Retained in the Proposed Scenario

- 5.3.1 Major wind corridors have been identified under the prevailing wind directions. These identified wind corridors are useful in maintaining the wind environment within and at the surroundings of the Application Sites. The identified wind corridors under each prevailing wind directions have been discussed in detail in Section 5.2 above in which the most are along roads and open spaces.
- 5.3.2 From the discussion of indicative proposed building layouts under the Baseline Scenario and Proposed Scenarios in Section 4, it is observed that these identified major wind corridors are retained and remained non-obstructed under the proposed layouts of the Baseline Scenario as well as after the proposed developments of the Proposed Scenario.
- 5.3.3 For Sites F1, F5, F6, F7 and F8, terraced podium is retained to direct downward airflow to the pedestrian level of the adjacent open spaces. For Sites F2 and F3, a podium garden will be provided below the lowest residential floor to complement the introduction of an aboveground carpark podium. In addition, it is recommended to incorporate podium setback from Road L3 and Road L4 in Site F3 to maximize the separation of identified wind corridor and local road network. Besides, the use of permeable design for podium car parks is encouraged to enhance the overall permeability and minimize the air ventilation impact.

5.3.4 The evaluation of the two Scenarios is based on potential variations in anticipated wind flow patterns, changes in the extent of wind wake zones, building permeability, and the identification of wind sensitive and potential wind-affected areas, as well as major district wind corridors and local air paths under the prevailing wind directions. The directional analysis and anticipated wind flow patterns under the Baseline and Proposed Scenarios are discussed below.

Figure 5.3-1 Podium Setback of Application Site F3



5.4 Expert Evaluation

Under E Annual and Summer Prevailing Wind Direction

Baseline Scenario

- 5.4.1 Under the Baseline Scenario, the prevailing easterly wind approaches the FLN NDA from the east after skimming over the existing low-rise developments and open areas at the eastern side of the Study Area. Owing to the relatively open nature of the eastern frontage and the presence of east-west oriented road corridors and open spaces within the NDA, the easterly wind is expected to remain generally available for penetration into the FLN NDA.
- 5.4.2 On the northern end of the Study Area, the relatively open frontage adjoining the Ng Tung River also allows part of the prevailing easterly wind to pass westward along the northern edge of the FLN NDA. Although the easterly wind is not fully align with the orientation of major wind corridor formed by 50m-wide open space separation between Application Site F1, Planned Sites P7 and P8 (denoted as “F” in Figure 5.2-1), portion of approaching airflow is expected to be captured and channelled into the corridor and provide supplementary ventilation to the downwind area in Sheung Shui New Town, including the vicinity of Application Site F1.
- 5.4.3 At the northern side of Application Site F2, Planned Sites P16 and P17, the open space alongside Ng Tung River forms an open frontage that allows the prevailing easterly wind to channel westward along the northern edge of the FLN NDA. This prevailing easterly wind is expected to flow along Ng Tung River and arrive western side of FLN NDA.
- 5.4.4 The major wind corridor formed by the NBA within Planned Site P17 and along Wo Lok Lane (denoted as “C” in Figure 5.2-1) is generally aligned with the prevailing easterly wind. Subject to the generally unobstructed upwind condition at the eastern side, this corridor is expected to serve as an effective ventilation path, allowing the easterly airflow to be channelled into the cross-shaped open space in Planning Area 16. Thereby improving air movement around Application Sites F5, F6, F7 and F8.
- 5.4.5 The major wind corridors formed by open space between Planned Site P17 and One Innovale and along Road L2 and Ma Sik Road (denoted as “A” & “B” in Figure 5.2-1) are well aligned with the prevailing easterly wind direction. These corridors effectively bring in the easterly wind to the downwind areas including the Application Sites F8, F7, Planned Sites P15 and P14, and existing developments Wing Fai Centre and Wing Fok Centre in the Fanling New Town.
- 5.4.6 Overall, under the Baseline Scenario, the prevailing easterly wind is expected to enter the FLN NDA mainly through the relatively open eastern frontage and then propagate westward along both the northern riverside edge and the internal east-west ventilation paths within the NDA. These wind paths collectively contribute to ventilation penetration towards the central and western parts of the FLN NDA.
- 5.4.7 Figure 5.4-1 illustrates the anticipated easterly annual and summer prevailing wind flow for the Baseline Scenario.

Proposed Scenario

- 5.4.8 For Application Site F1, although the Proposed Scenario introduces increased podium and building tower heights, the terraced podium footprint and the 10m setback on the first floor remain the same as those under the Baseline Scenario. As the site is located at the more western and north-western part of the FLN NDA, where only part of the prevailing easterly wind is expected to reach from wind corridor F, the proposed changes are not expected to materially alter the wind environment at pedestrian level.
- 5.4.9 For Application Site F2, the Proposed Scenario introduces a new 2-storey podium structure together with an increase in tower height. As the upwind developments of Planned Sites P16 and P17 are anticipated to block a major portion of the easterly wind reaching Application Site F2, the pedestrian wind environment is relatively weak in the Baseline Scenario, and the Proposed Scenario generally maintains the same case.
- 5.4.10 For Application Site F3, the Proposed Scenario introduces a new 2-storey podium structure and an increase in tower height, while Application Site F4 introduces increased podium and building tower height. As these sites are located further downwind within the internal part of the FLN NDA under easterly wind conditions, the proposed changes may result in some localised reduction in wind permeability at the site and its immediate western side. Nevertheless, the site does not encroach upon the major east-west wind paths identified within the Study Area, and the surrounding road and open space network would remain largely unchanged. The overall wind penetration effect towards the downwind areas is therefore expected to be broadly comparable to that under the Baseline Scenario.
- 5.4.11 For Application Sites F5, F6, F7 and F8, the Proposed Scenario introduces increased podium and tower heights while maintaining the same terraced podium footprint as the Baseline Scenario. Since the 10m setback on the first floor of the terraced podium will be retained, the permeability of the pedestrian level through the cross-shaped open space in Planning Area 16 is expected to remain generally effective under easterly wind conditions. The proposed changes are therefore not expected to materially affect the ventilation performance of this open space network or the associated wind penetration towards the more inland parts of the Study Area.
- 5.4.12 Figure 5.4-2 illustrates the anticipated easterly annual and summer prevailing wind flow for the Proposed Scenario.

Figure 5.4-1 Wind Flow under the E Annual and Summer Prevailing Wind for the Baseline Scenario

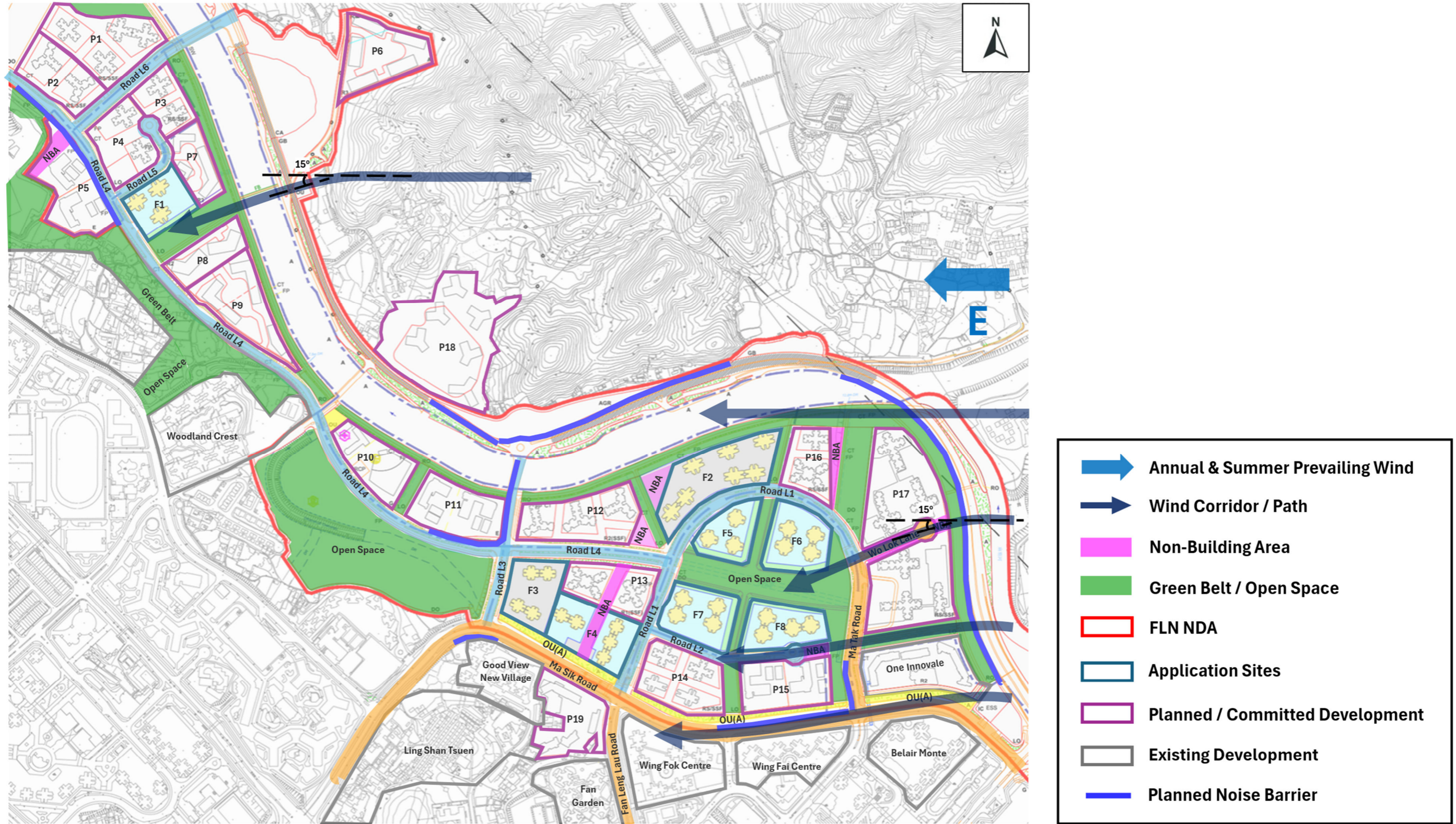
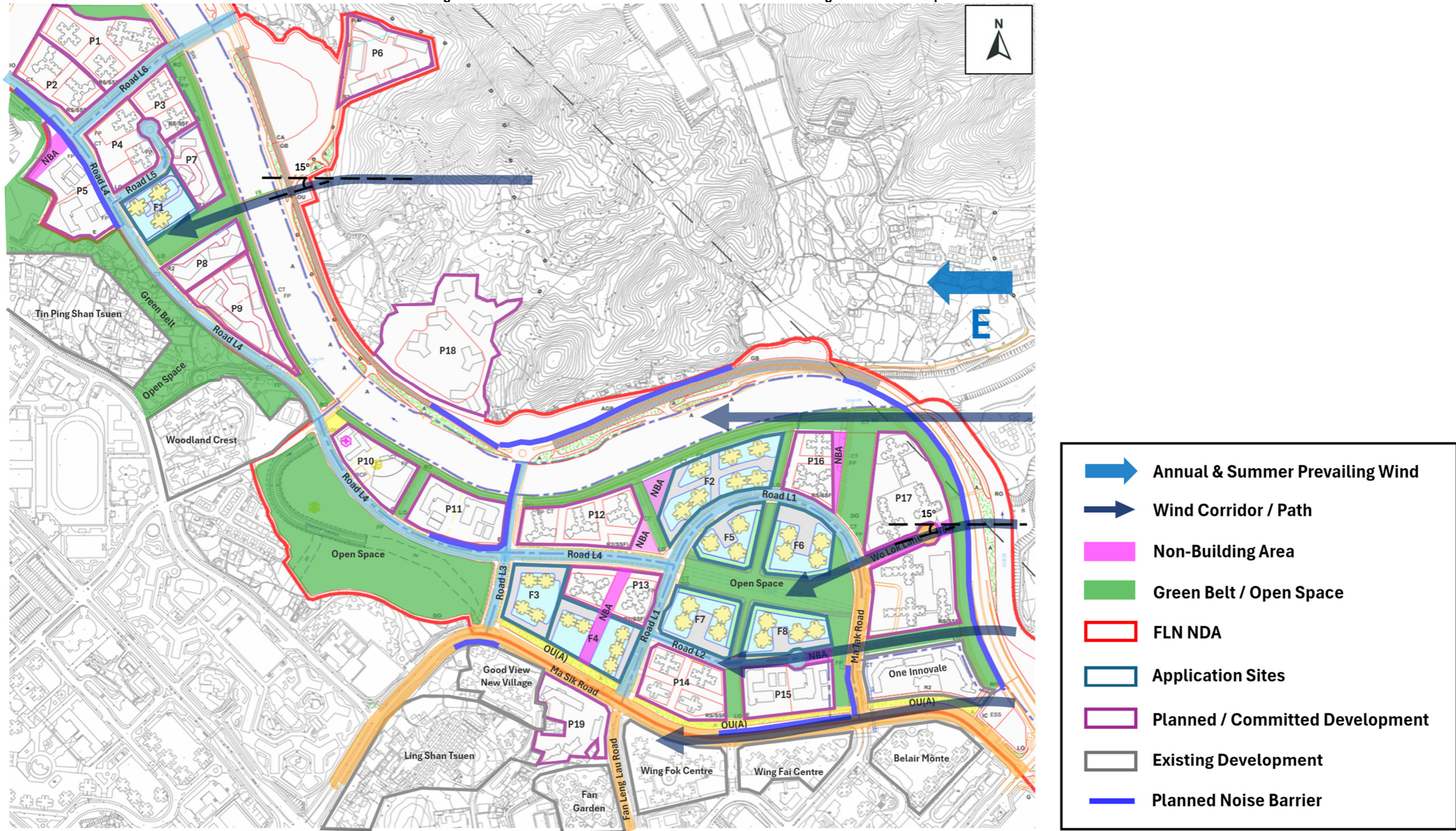


Figure 5.4-2 Wind Flow under the E Annual and Summer Prevailing Wind for the Proposed Scenario



Under ENE Annual Prevailing Wind Direction

Baseline Scenario

- 5.4.13 Under the Baseline Scenario, the prevailing north-easterly wind approaching the FLN NDA is expected to follow a broadly similar overall pattern to that under the easterly condition, after passing over the existing low-rise developments and open areas at the eastern side of the FLN NDA. Given the relatively open character of the eastern frontage and the presence of a number of east-west road corridors and open spaces within the NDA, the north-easterly wind is expected to remain generally available for penetration into the FLN NDA.
- 5.4.14 Part of the prevailing north-easterly wind is expected to pass over the area of Sheung Shui Wa Shan and across the Ng Tung River towards Planning Areas 7 and 10. With limited major obstruction along this approach, part of the airflow is expected to be captured by the 50m-wide major wind corridor F, thereby facilitating ventilation to Planned Sites P7 and P8, Application Site F1 and the further downwind areas in Sheung Shui New Town, including the adjoining green belt and Tin Ping Shan Tsuen.
- 5.4.15 Along the northern side of the FLN NDA, the open frontage adjoining the Ng Tung River in the vicinity of Planning Areas 13 and 15 is also expected to allow part of the prevailing north-easterly wind to extend westward along the river edge. This open river corridor would help convey airflow towards the northern riverfront developments within the FLN NDA, including Planned Sites P16 and P12 as well as Application Site F2.
- 5.4.16 The major wind corridor formed by the NBA within Planned Site P17 and along Wo Lok Lane (denoted as “C” in Figure 5.2-1) is expected to remain favourable for capturing part of the prevailing north-easterly wind. Given the generally open upwind condition to the east of the FLN NDA, this corridor is expected to continue functioning as an effective ventilation path, allowing airflow to be directed into the cross-shaped open space in Planning Area 16, thereby enhancing air movement around Application Sites F5, F6, F7 and F8.
- 5.4.17 The major wind corridors formed by the open space between Planned Site P17 and One Innovale and along Road L2 (denoted as “B” in Figure 5.2-1), and Ma Sik Road (denoted as “A” in Figure 5.2-1) are also expected to support further penetration of the prevailing north-easterly wind into the downwind areas, including Application Sites F8 and F7, Planned Site P15, and the existing developments such as Wing Fai Centre in Fanling New Town.
- 5.4.18 By contrast, Application Sites F3 and F4 are located within the more internal downwind part of the FLN NDA, where the penetration of the prevailing north-easterly wind is constrained by other mixed-use and high-rise developments, including Application Sites F5, F6, F7 and F8, as well as Planned Sites P12 and P13.
- 5.4.19 Figure 5.4-3 illustrates the anticipated north-easterly annual prevailing wind flow for the Baseline Scenario.

Proposed Scenario

- 5.4.20 For Application Site F1, although the Proposed Scenario introduces increased podium and tower heights, the terraced podium footprint and the 10m setback at the first floor would remain the same as those under the Baseline Scenario. As the width and general permeable area of wind corridor F would be maintained, the proposed changes are not expected to materially alter the wind environment in the adjacent and further downwind areas.
- 5.4.21 For Application Site F2, the introduction of the new podium may reduce the immediate permeability of the site to the approaching airflow and may locally weaken wind availability in the immediate downwind areas to the west and south-west. Nevertheless, as the adjoining NBA and the surrounding road and open space connections would remain unchanged, the overall ventilation function of the nearby internal wind paths is expected to remain generally effective.
- 5.4.22 For Application Sites F3 and F4, the Proposed Scenario introduces a new 2-storey podium and increased tower height for Application Site F3, together with increased podium and tower height for Application Site F4. As these sites are already located within the more internal downwind part of the FLN NDA, where the availability of the prevailing north-easterly wind is relatively limited under the Baseline Scenario, the proposed changes are not expected to materially affect the wind environment under this wind condition.
- 5.4.23 For Application Sites F5, F6, F7 and F8, the 10m setback at the first floor of the terraced podium would be retained under the Proposed Scenario. Together with the continued presence of the cross-shaped open space in Planning Area 16, which remains open to airflow brought in via wind corridor C, the overall ventilation performance under the prevailing north-easterly wind is expected to remain broadly comparable to that under the Baseline Scenario. As for the wind corridor between Planned Site P17 and One Innovale (wind corridor B), the corridor is expected to remain generally effective in conveying part of the prevailing north-easterly wind towards the internal road/open space network. While the increased podium and tower height at Application Site F8 may cause some localised shielding near the site, these effects are expected to be confined to the immediate vicinity and not materially affect the corridor-scale airflow performance.
- 5.4.24 Figure 5.4-4 illustrates the anticipated north-easterly annual prevailing wind flow for the Proposed Scenario.

Figure 5.4-3 Wind Flow under the ENE Annual Prevailing Wind for the Baseline Scenario

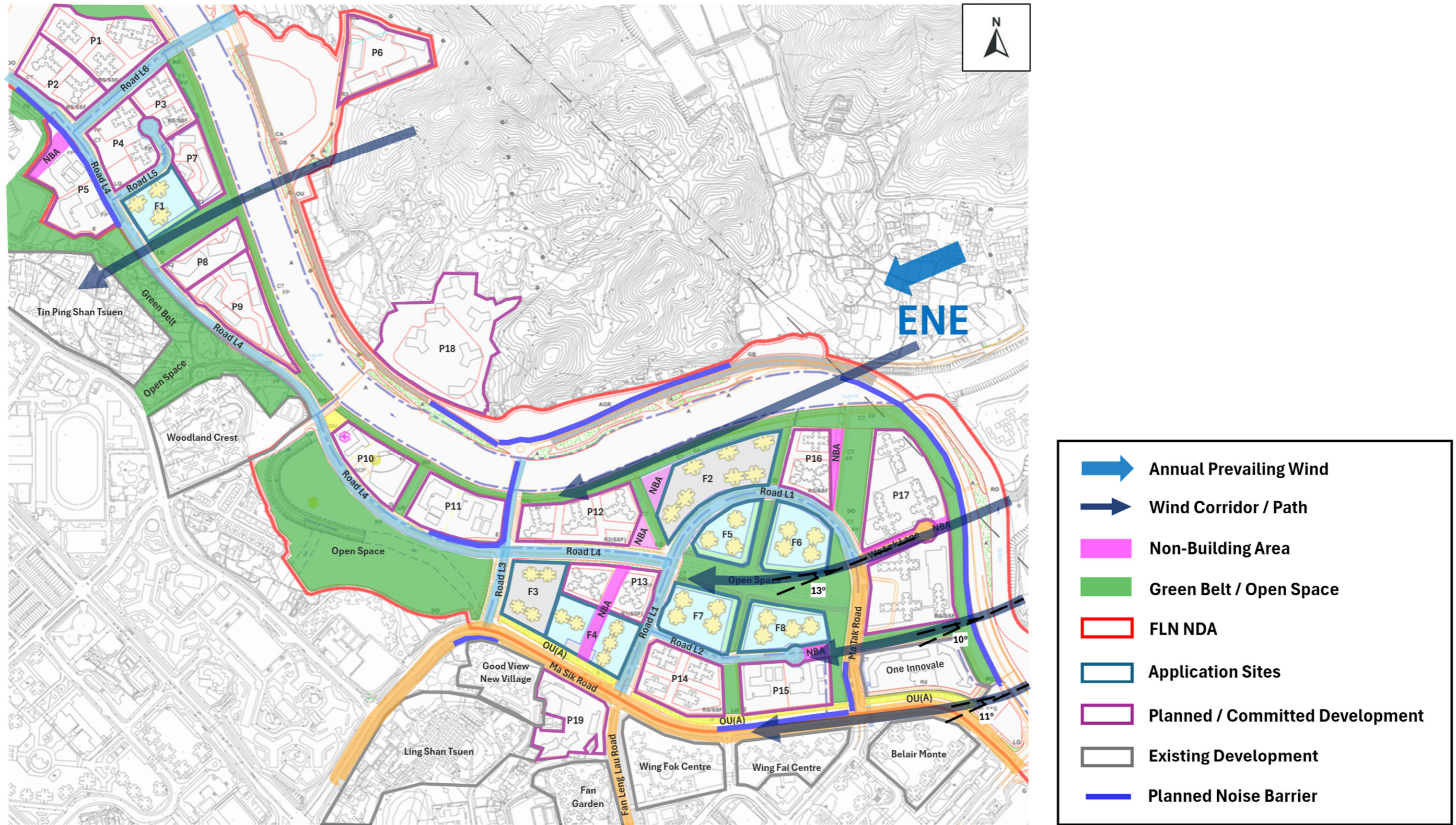
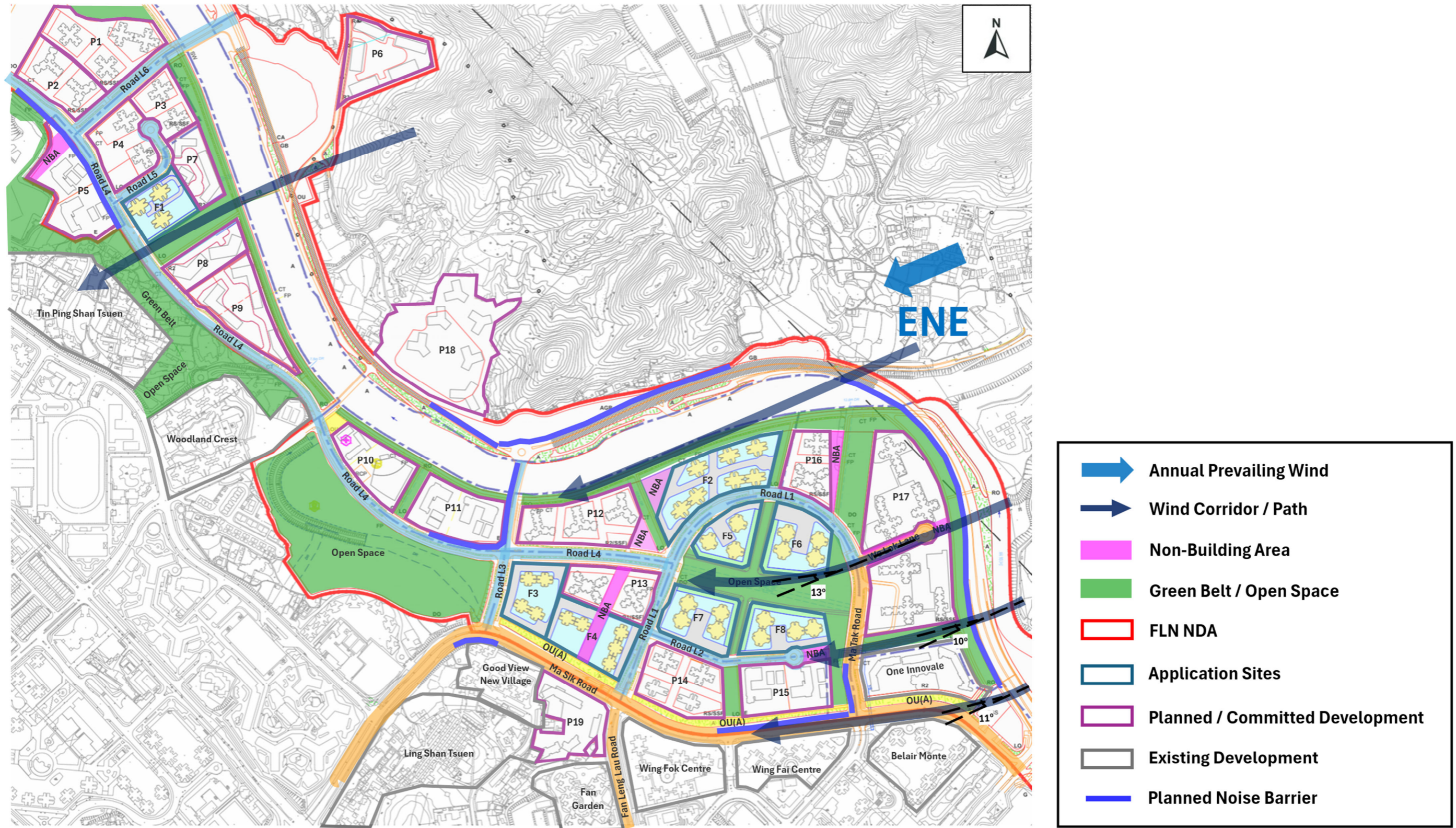


Figure 5.4-4 Wind Flow under the ENE Annual Prevailing Wind for the Proposed Scenario



Under N Annual Prevailing Wind Direction

Baseline Scenario

- 5.4.25 Under the Baseline Scenario, the annual prevailing northerly wind approaches the FLN NDA after skimming over the elevated terrain of Wa Shan, High Hill, as well as the low-rise village building clusters of Wa Shan Tsuen and Siu Hang San Tsuen. Owing to the generally open character of the upstream hillside and low-rise developments, the northerly wind is expected to remain generally available for penetration into the FLN NDA.
- 5.4.26 Along the wind corridor formed by the 50m-wide open space between Planned Sites P7 and P8 (denoted as “F” in Figure 5.2-1), the approaching northerly wind is expected to reach the corridor entrance near the Ng Tung River without significant upstream obstruction. However, as this wind corridor is aligned generally in a north-east to south-west direction, which is not fully consistent with the prevailing northerly wind direction, only part of the approaching airflow is expected to be captured and channelled into the corridor. As a result, the wind penetration effect along this corridor towards Application Site F1 and the further downwind areas within Sheung Shui New Town is expected to be moderate.
- 5.4.27 Road L3 is favourably aligned with the annual prevailing northerly wind and therefore serves as an effective wind path. The northerly airflow is expected to be channelled southward through the spaces between Planned Sites P11 and P12 and further through Application Site F3, thereby facilitating air penetration towards the downwind areas of Fanling New Town.
- 5.4.28 The 20m-wide wind corridor formed by the NBAs adjacent to Planned Site P12 and Application Site F2, and continuing southward through Planned Site P13 and Application Site F4 (denoted as “D” in Figure 5.2-1), is generally aligned in an NNE-to-SSW direction, which is broadly compatible with the annual prevailing northerly wind. Subject to the generally unobstructed upwind condition, this corridor is expected to provide an effective ventilation path towards the downwind areas, including Planned Site P19.
- 5.4.29 Similarly, the 15m-wide open space between Application Site F2 and Planned Site P16 also functions as a local ventilation path under northerly wind conditions. The airflow is expected to be guided through the cross-shaped open space in Planning Area 16, thereby improving air movement around Application Sites F5, F6, F7 and F8.
- 5.4.30 Along Ma Tak Road, a major wind path of approximately 50m in width is formed by the NBA and open space between Planned Sites P16 and P17, together with the adjoining open space within Planning Area 16. This wind path is expected to facilitate further southward wind penetration towards the downwind areas of Fanling New Town.
- 5.4.31 Figure 5.4-5 illustrates the anticipated northerly annual prevailing wind flow for the Baseline Scenario.

Proposed Scenario

- 5.4.32 For Application Site F1, although the Proposed Scenario introduces increased podium and building tower heights, the terraced podium footprint and the 10m setback on the first floor remain the same as those under the Baseline Scenario. It is therefore anticipated that the wind environment at pedestrian level would not be materially affected by the proposed height increase.
- 5.4.33 For Application Site F2, the Proposed Scenario introduces a new 2-storey podium structure together with an increase in tower height. As Application Site F2 is located at the northern part of the FLN NDA, it lies within the upwind region of the remaining developments in the NDA as well as the existing Fanling New Town area under the annual prevailing northerly wind. The introduction of the new podium would inevitably weaken the prevailing wind reaching the immediate downwind area to the south, including Application Sites F5, F6, F7 and F8, as well as Planned Sites P14 and P15. Nevertheless, as the proposed changes would not obstruct the NBA to the west of the site, the ventilation effectiveness of the 20m-wide Wind Corridor D is expected to be maintained.
- 5.4.34 Similarly, for Application Site F3, the Proposed Scenario introduces a new 2-storey podium structure and an increase in tower height. The footprint of the new podium would maintain the same setback distance from the western site boundary as the original tower setback under the Baseline Scenario. The proposed changes are therefore not expected to adversely affect the ventilation effectiveness of the local wind path along Road L3. A similar extent of the prevailing northerly wind is expected to continue to be channelled towards the downwind areas of Fanling New Town.
- 5.4.35 For Application Site F4, the Proposed Scenario introduces increased podium and building tower heights. Nevertheless, the width of the NBA along Wind Corridor D would be maintained. While the proposed building height relaxation would inevitably reduce wind availability in the immediate downwind area, including Planned Site P19, the overall function of Wind Corridor D as a ventilation path is expected to remain.
- 5.4.36 For Application Sites F5, F6, F7 and F8, the Proposed Scenario introduces increased podium and tower heights while maintaining the same terraced podium footprint and the 10m setback on the first floor as those under the Baseline Scenario. Along the local ventilation path through the cross-shaped open space in Planning Area 16, the ventilation effectiveness and the anticipated wind availability at the downwind areas are expected to be generally maintained.
- 5.4.37 Figure 5.4-6 illustrates the anticipated northerly annual prevailing wind flow for the Proposed Scenario.

Figure 5.4-5 Wind Flow under the N Annual Prevailing Wind for the Baseline Scenario

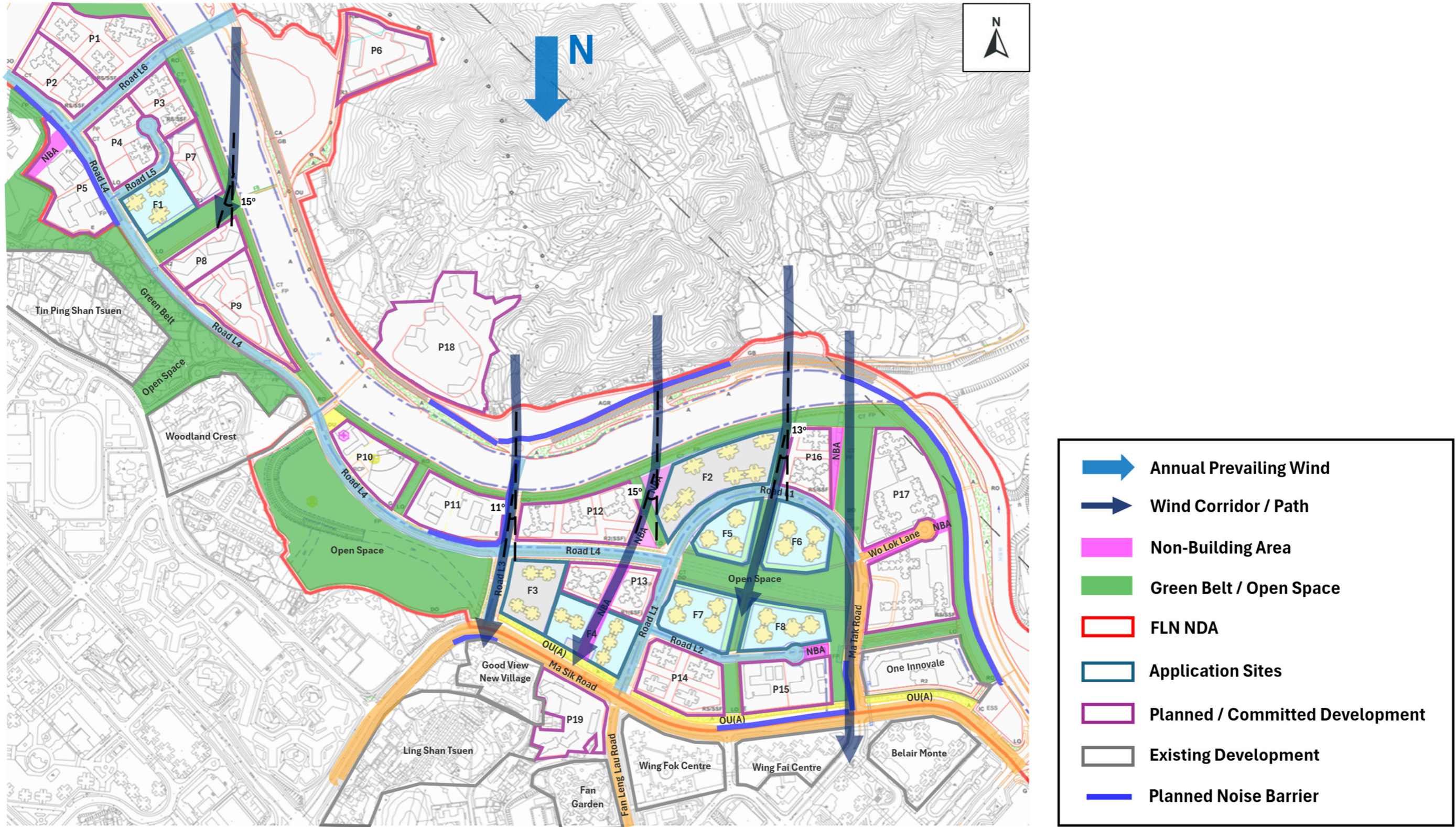
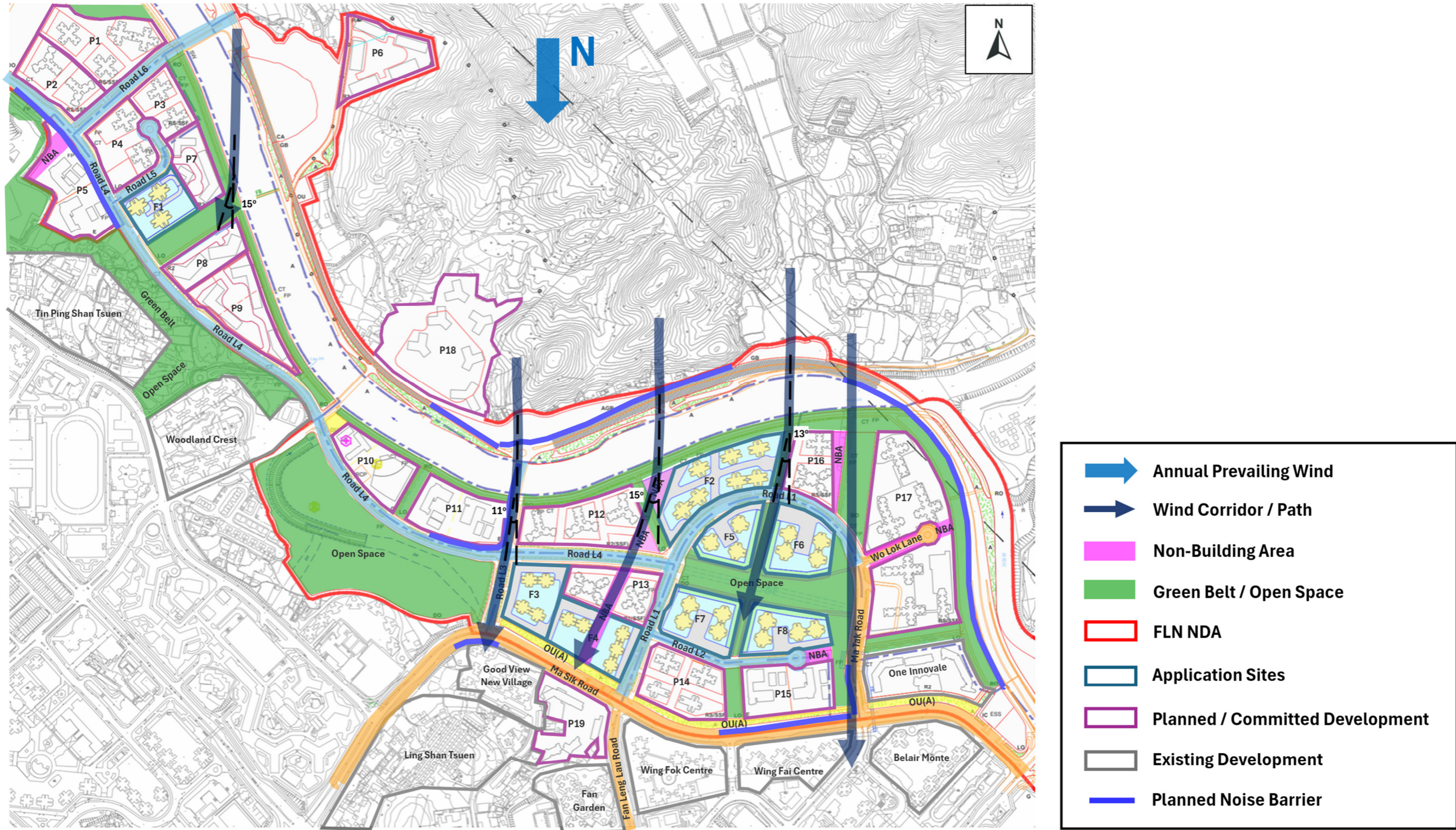


Figure 5.4-6 Wind Flow under the N Annual Prevailing Wind for the Proposed Scenario



Under SW Summer Prevailing Wind Direction

Baseline Scenario

- 5.4.38 Under the Baseline Scenario, the prevailing south-westerly wind approaches the FLN NDA after passing over the existing urban developments and open areas in the adjoining Fanling / Sheung Shui New Town area. Owing to the relatively open character of the upwind development and the presence of a number of local road corridors and open spaces within the NDA, the south-westerly wind is expected to remain generally available for penetration into Planning Area 7 to 12 in the FLN NDA. However, since the existing high-rise developments in Fanling New Town area act as the major ventilation obstruction to the Planning Areas 13 to 18 at the southeastern part of the FLN NDA.
- 5.4.39 The immediate area on the southwest of Planning Area 9 and 10 in the FLN DNA is a cluster of low-rise buildings of Tin Ping Shan Tsuen and a wide green belt area. The summer south-westerly wind is expected to pass through these open areas without major obstruction and reaching Application Site F1. As the 50m-wide wind corridor F, formed by the open space in Planning Area 10, is well aligned in the south-west to north-east direction, the prevailing south-westerly wind is expected to penetrate effectively into the corridor and reach the further downwind areas in the vicinity of Planned Site P7 and P6.
- 5.4.40 A major portion of the prevailing south-westerly wind is expected to enter the FLN NDA through the south-western opening along the western part of Ma Sik Road, in the vicinity of Ling Shan Tsuen and Good View New Village. This local opening is broadly aligned with the approaching wind direction and is expected to facilitate north-eastward wind penetration into the central part of the FLN NDA, reaching the eastern part of the open space in Planning Area 12, Application Site F3 and further channel to the downwind regions of Planned Sites P11 and P12 along Road L3.
- 5.4.41 On the side of Fanling New Town, the existing mixed developments serve as major blockages that hinder the penetration of the prevailing summer south-westerly wind. Although the major wind corridor formed by the NBAs within Application Site F4 and Planned Site P13, together with the NBAs adjacent to Planned Site P12 and Application Site F2 (denoted as “D” in Figure 5.2-1), is generally aligned with the summer southerly wind direction, major blockage from the upwind developments, including Fan Garden and Planned Site P19 in Fanling New Town, is anticipated. In view of these upstream obstructions, no significant southerly ventilation effect is expected along wind corridor D.
- 5.4.42 Similarly, the high-rise building blocks in Wing Fok Centre and Wing Fai Centre of Fanling New Town together with Planned Sites P14 and P15 in the southern part of the FLN NDA, would pose blockages to the south-westerly wind, thereby limiting its penetration into the more inland developments, including Application Site F7, F8, F5, F6 and F2.
- 5.4.43 Figure 5.4-7 illustrates the anticipated south-westerly summer prevailing wind flow for the Baseline Scenario.

Proposed Scenario

- 5.4.44 For Application Site F1, the proposed increase in podium height may inevitably weaken wind availability at pedestrian level in the immediate downwind area of Planned Site P7 to some extent. Nevertheless, as the podium footprint and the 10m setback on the first podium floor are maintained the same as those under the Baseline Scenario, the overall permeability to the south-westerly along wind corridor F is expected to be retained without significant impact.
- 5.4.45 For Application Site F3, the proposed new podium structure and increase in tower height may reduce wind permeability and hence affect the immediate downwind developments, including Planned Sites P12 and P13, to some extent. However, the new podium structure would retain the same setback distance from the western site boundary as the original tower setbacks under the Baseline Scenario. With this setback retained, the permeable area of the local wind path along Road L3 is expected to be maintained, and the associated ventilation effectiveness towards the downwind areas, including Planned Sites P11 and P12, is therefore not expected to be materially affected.
- 5.4.46 For Application Site F2, F4, F5, F6, F7 and F8, these sites are located within the more internal downwind region of the FLN NDA, where the availability of the prevailing summer south-westerly wind is already relatively limited under the Baseline Scenario. Although various increases in building height and, in some cases, additional podium structures are introduced under the Proposed Scenario, such changes are not expected to give rise to any direct impact on prevailing the south-westerly wind environment in the vicinity of these sites.
- 5.4.47 Figure 5.4-8 illustrates the anticipated south-westerly summer prevailing wind flow for the Proposed Scenario.

Figure 5.4-7 Wind Flow under the SW Summer Prevailing Wind for the Baseline Scenario

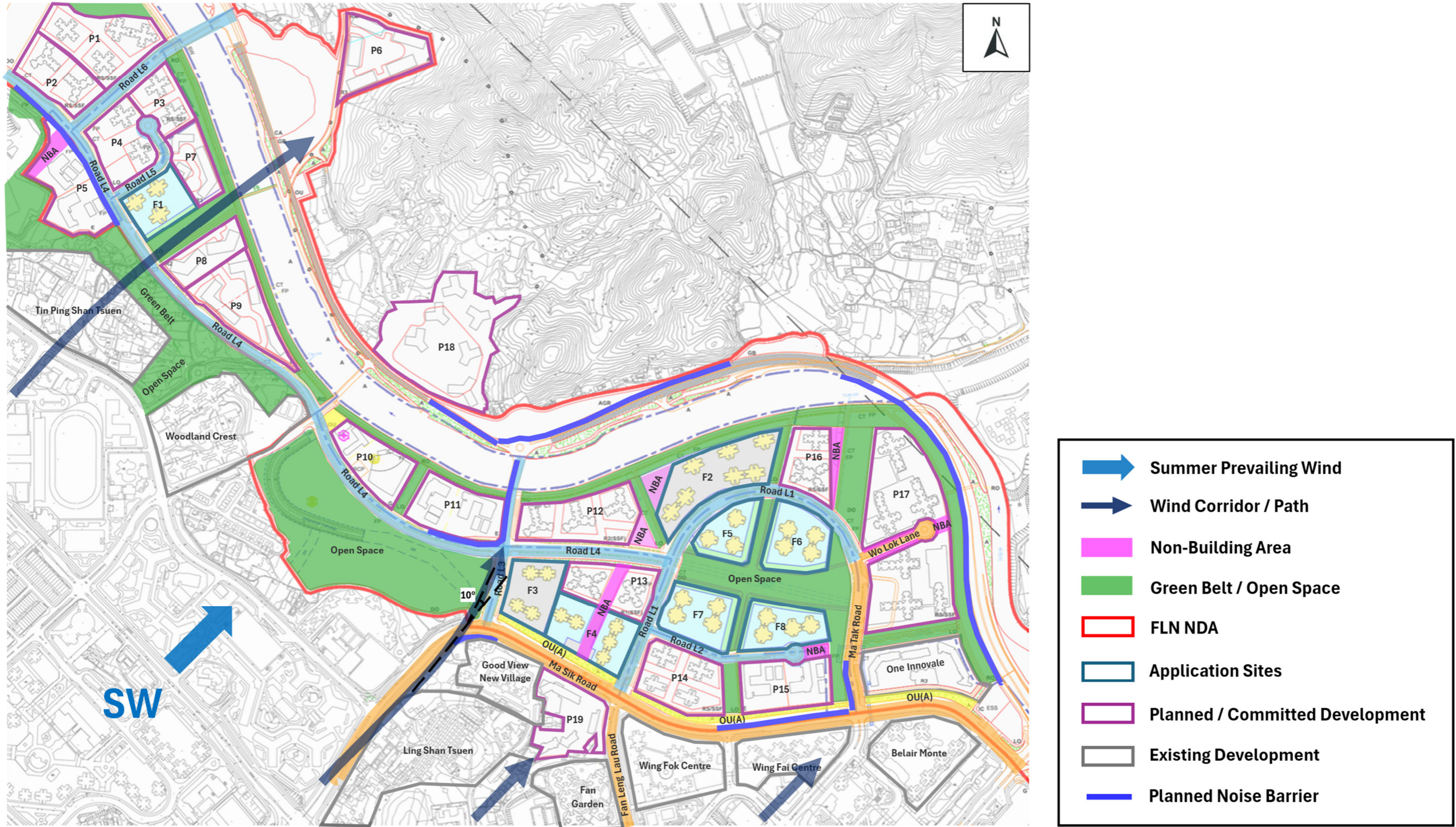
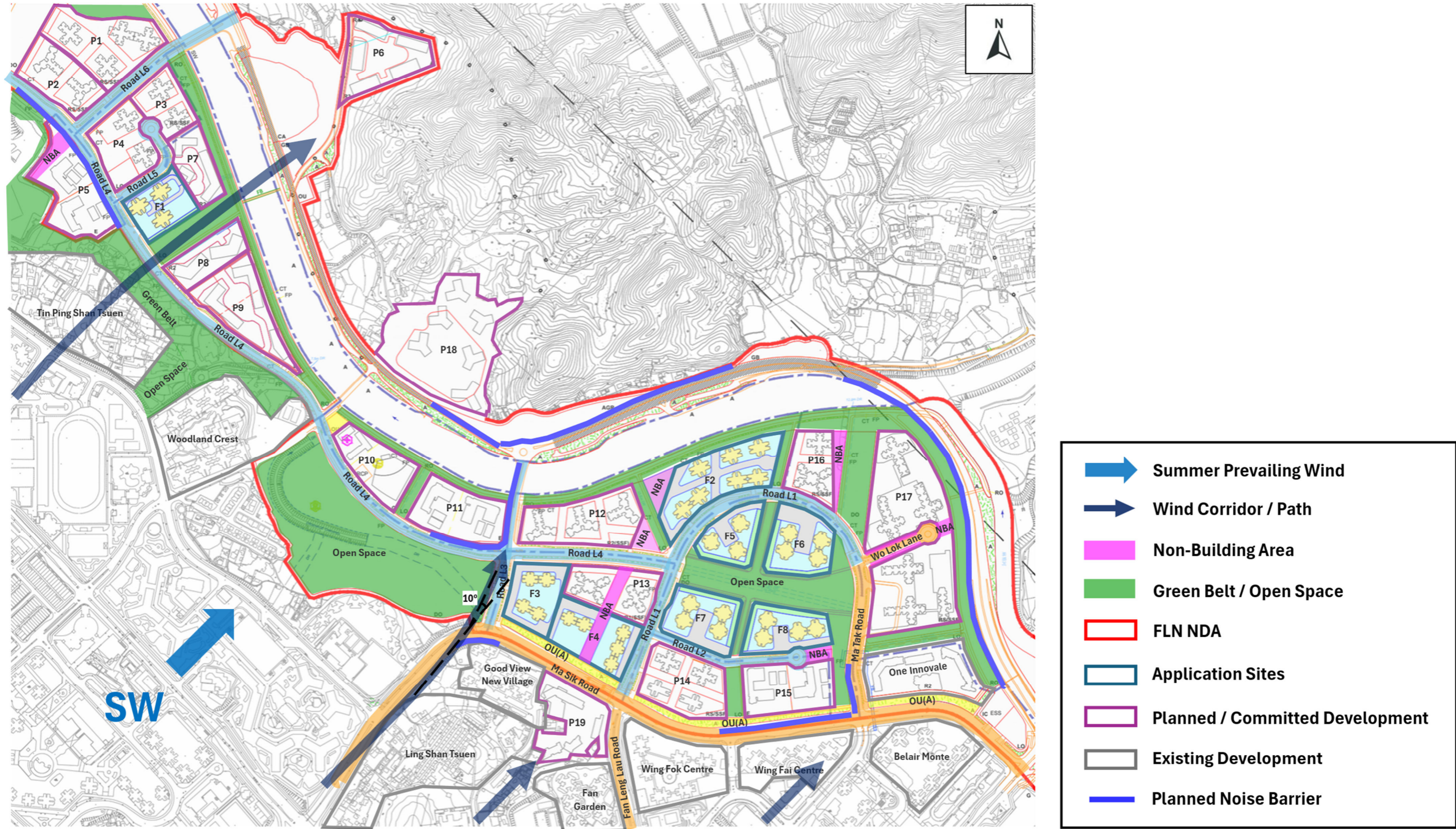


Figure 5.4-8 Wind Flow under the SW Summer Prevailing Wind for the Proposed Scenario



Under WSW Summer Prevailing Wind Direction

Baseline Scenario

- 5.4.48 Under the Baseline Scenario, the summer west-south-westerly wind approaching the FLN NDA is expected to follow a broadly similar pattern to that under the south-westerly condition, after passing over the existing built-up areas and open land in the adjoining Fanling / Sheung Shui New Town area. Given the relatively open character of the upwind setting and the presence of local road corridors and open spaces within the NDA, the prevailing west-south-westerly wind is expected to remain generally available for penetration into Planning Areas 7 to 12 of the FLN NDA. In contrast, the existing high-rise developments in Fanling New Town would continue to form the major ventilation barriers to Planning Areas 13 to 18 in the southern part of the FLN NDA.
- 5.4.49 For Planning Areas 9 and 10, the west-south-westerly wind is expected to pass over the low-rise cluster of Tin Ping Shan Tsuen and the adjoining green belt area without major obstruction before reaching Application Site F1. Although wind corridor F is not as directly aligned as under the west-south-westerly condition, it is still expected to provide a relatively open route for further wind penetration towards the downwind areas in the vicinity of Planned Sites P7 and P6.
- 5.4.50 In the area immediately southwest of Planning Area 12, the low-rise developments in Sheung Shui New Town are expected to allow the west-south-westerly wind to pass with limited obstruction, enabling it to enter the large open space within Planning Area 12 and Application Site F3. Part of the airflow is then expected to be channelled eastward along Road L4, which serves as a local breezeway conveying the prevailing wind towards the more internal parts of the FLN NDA, including Planned Sites P12 and P13 as well as Application Sites F5 and F7.
- 5.4.51 In the vicinity of Ma Sik Road, the low-rise clusters at Ling Shan Tsuen and Good View New Village are also expected to permit partial passage of the west-south-westerly wind, thereby contributing local airflow towards the vicinity of Application Sites F3 and F4.
- 5.4.52 However, Application Site F2 is located within the downwind wake of Planned Site P12 under the west-south-westerly condition, and wind availability in its immediate vicinity is therefore expected to be limited. Likewise, Application Sites F6 and F8 are screened by a series of mixed-use and high-rise developments, including Fan Garden, Wing Fok Centre and Planned Site P19 in Fanling New Town, as well as Application Site F4 and Planned Site P14 in the FLN NDA. As a result, the availability of the prevailing west-south-westerly wind at these locations is expected to remain relatively low.
- 5.4.53 Figure 5.4-9 illustrates the anticipated west-south-westerly summer prevailing wind flow for the Baseline Scenario.

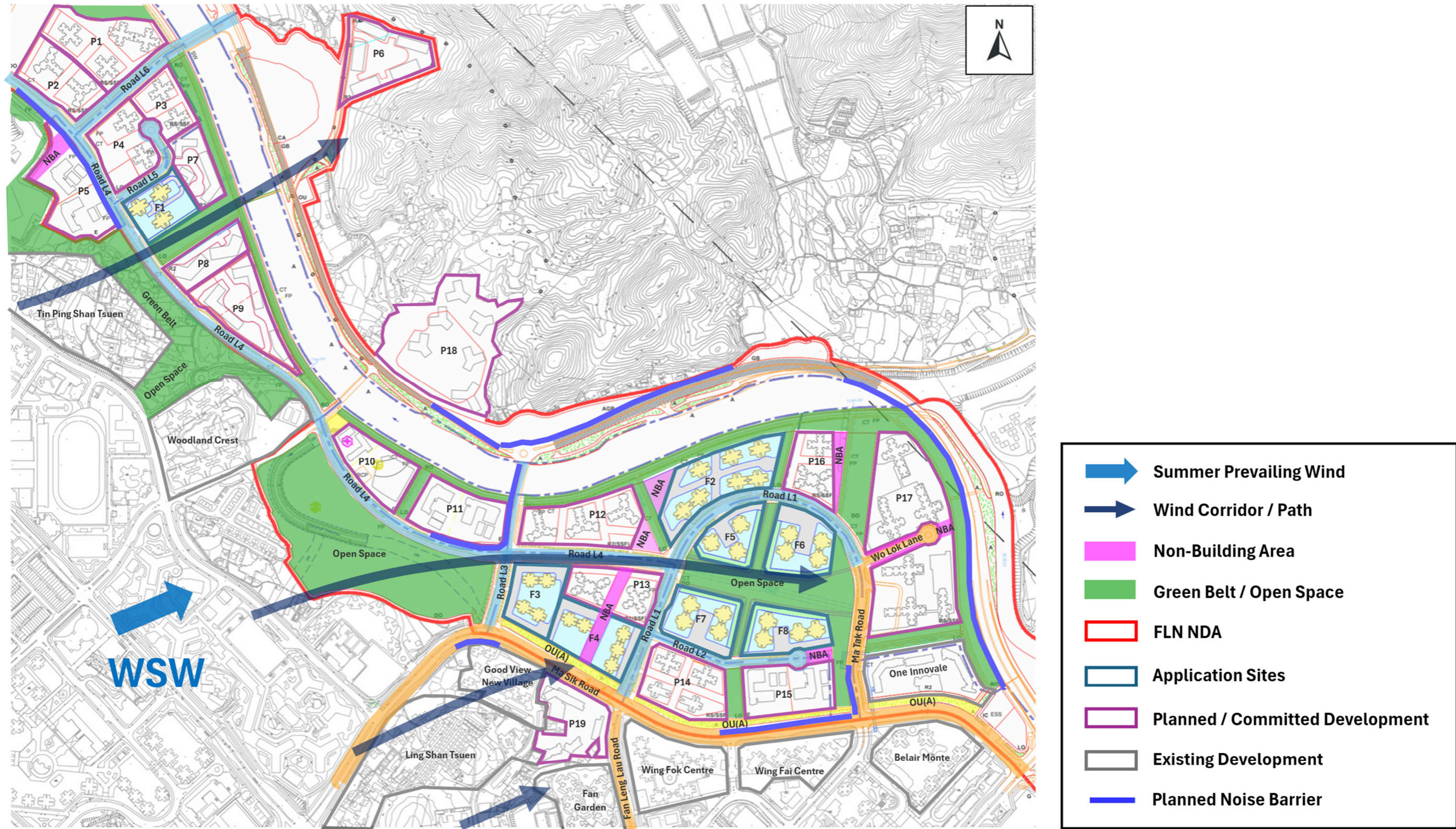
Proposed Scenario

- 5.4.54 For Application Site F1, the proposed increase in podium height may lead to some reduction in pedestrian-level wind availability in the immediate downwind area, particularly in the vicinity of Planned Site P7. Nevertheless, as the podium footprint and the 10m setback at the first podium level would remain unchanged from the Baseline Scenario, the overall permeability to the west-south-westerly flow along wind corridor F is expected to be broadly retained, with no significant impact anticipated.
- 5.4.55 For Application Site F3, the proposed new podium structure and increase in tower height may reduce local wind permeability and hence affect the immediate downwind developments to some extent. However, the new podium would retain the same setback from the northern site boundary as the original tower setback under the Baseline Scenario. With this setback preserved, the permeable area of the local wind path along Road L4 is expected to be maintained, and the associated ventilation performance towards Planned Sites P12 and P13, as well as the adjoining part of Planning Area 16, is therefore not expected to be materially affected.
- 5.4.56 For Application Site F4, the proposed increases in podium and tower height may intercept part of the west-south-westerly airflow and cause some reduction in wind reaching the immediate downwind areas, including Application Site F7 and Planned Site P14. Nevertheless, having regard to the already constrained wind availability in this internal part of the NDA under the Baseline Scenario, the effect is expected to remain localized.
- 5.4.57 For Application Sites F2, F5, F6, F7 and F8, these sites are situated within the more internal downwind part of the FLN NDA, where the availability of the prevailing summer west-south-westerly wind is already limited under the Baseline Scenario. Although various increases in building height and, for some sites, additional podium structures are introduced under the Proposed Scenario, such changes are not expected to result in any material change to the broader west-south-westerly wind environment in the vicinity of these sites.
- 5.4.58 Figure 5.4-10 illustrates the anticipated west-south-westerly summer prevailing wind flow for the Proposed Scenario.

Figure 5.4-9 Wind Flow under the WSW Summer Prevailing Wind for the Baseline Scenario



Figure 5.4-10 Wind Flow under the WSW Summer Prevailing Wind for the Proposed Scenario



Under S Summer Prevailing Wind Direction

Baseline Scenario

- 5.4.59 Under the Baseline Scenario, the prevailing southerly wind approaches the FLN NDA after passing through the developed upwind areas of Sheung Shui and Fanling New Town. These upwind areas comprise a mix of high-rise towers and low-rise building clusters, which inherently obstruct a portion of the wind at the pedestrian level before it reaches the Application Sites and further downwind areas.
- 5.4.60 The prevailing southerly wind is expected to reach Application Site F1 after skimming over the low-rise developments of Tin Ping Shan Tsuen in Sheung Shui New Town. However, due to the misalignment between the southerly wind direction and the 50m-wide major wind corridor F along the open space between Application Site F1 and Planned Site P6, only a very limited portion of the approaching airflow is expected to be channelled further into the corridor after reaching its entrance.
- 5.4.61 On the side of Fanling New Town, the existing mixed developments serve as major blockages that hinder the penetration of the prevailing summer southerly wind. Ling Shan Tsuen and Good View New Village comprise low-rise building clusters, which the southerly wind is expected to skim over before being channelled through Planned Road L3, which is favourably aligned with the prevailing southerly wind direction. This wind path is expected to facilitate air penetration towards the further downwind areas in the vicinity of Application Site F3, Planned Site P11 and Planned Site P12.
- 5.4.62 Although the major wind corridor formed by the NBAs within Application Site F4 and Planned Site P13, together with the NBAs adjacent to Planned Site P12 and Application Site F2 (denoted as “D” in Figure 5.2-1), is generally aligned with the summer southerly wind direction, major blockage from the upwind developments, including Fan Garden and Planned Site P19 in Fanling New Town, is anticipated. In view of these upstream obstructions, no significant southerly ventilation effect is expected along wind corridor D.
- 5.4.63 Along Fan Leng Lau Road and Road L1, a wind path of approximately 25m in width serves as an air channel facilitating the passage of the southerly wind from Fanling New Town into the FLN NDA, reaching the eastern boundary of Application Site F4 and the western boundary of Planned Site P14.
- 5.4.64 Similarly, the 15m-wide open space between Application Site F2 and Planned Site P16 also functions as a local ventilation path under southerly wind conditions. The airflow is expected to be guided through the separation between Wing Fok Centre and Wing Fai Centre, via the open space between Planned Sites P14 and P15, and then through the cross-shaped open space in Planning Area 16, thereby improving air movement around Application Sites F5, F6, F7 and F8.
- 5.4.65 Between Wing Fai Centre and Belair Monte in Fanling New Town, a major wind path of approximately 50m in width is formed along Ma Tak Road and continues through the adjoining open space within Planning Area 16 adjacent to Application Sites F8 and F6, as well as Planned Sites P15, P16 and P17. This wind path is expected to facilitate further northward wind penetration towards the downwind areas across the Ng Tung River.
- 5.4.66 Figure 5.4-11 illustrates the anticipated southerly summer prevailing wind flow for the Baseline

Scenario.

Proposed Scenario

- 5.4.67 For Application Site F1, the Proposed Scenario retains the same podium footprint and general built form while applying building height relaxation to both the podium and towers. As the site is located away from the principal southerly wind entry paths and receives airflow only after redistribution across Tin Ping Shan Tsuen, the proposed changes are not expected to materially alter the wind environment at pedestrian level and at the entrance of major wind corridor F.
- 5.4.68 For Application Site F2, the site is located within the development cluster along the northern boundary of the FLN NDA and lies in a further downwind region under southerly wind conditions. The proposed new podium structure at Application Site F2 may locally weaken wind availability at the immediate downwind open space to the north. Nevertheless, the impact is considered minimal, as this area is anticipated to receive only a very limited portion of the prevailing summer southerly wind due to the major blockages posed by the developments in the existing Fanling New Town and the upwind developments within the FLN NDA.
- 5.4.69 For Application Site F3, the Proposed Scenario introduces a new 2-storey podium structure and an increase in tower height, while for Application Site F4, the Proposed Scenario introduces increased podium and building tower heights. As these sites are located along the wind penetration paths associated with Road L3 and Road L1, the proposed changes may reduce wind permeability at the sites to some extent. Nevertheless, the footprints of the proposed podium structures would maintain the same setback distances from the site boundaries as the original tower setbacks under the Baseline Scenario. The proposed changes are therefore not expected to materially affect the ventilation effectiveness of these local wind paths.
- 5.4.70 For Application Sites F5, F6, F7 and F8, as the Proposed Scenario maintains the same terraced podium footprint and the 10m setback on the first floor, the pedestrian-level permeability of the cross-shaped open space in Planning Area 16 would be retained. The local ventilation path through this area is therefore expected to remain generally effective under southerly wind conditions. The proposed changes are not expected to materially affect the associated wind penetration through this part of the Study Area.
- 5.4.71 Figure 5.4-12 illustrates the anticipated southerly summer prevailing wind flow for the Proposed Scenario.

Figure 5.4-11 Wind Flow under the S Summer Prevailing Wind for the Baseline Scenario

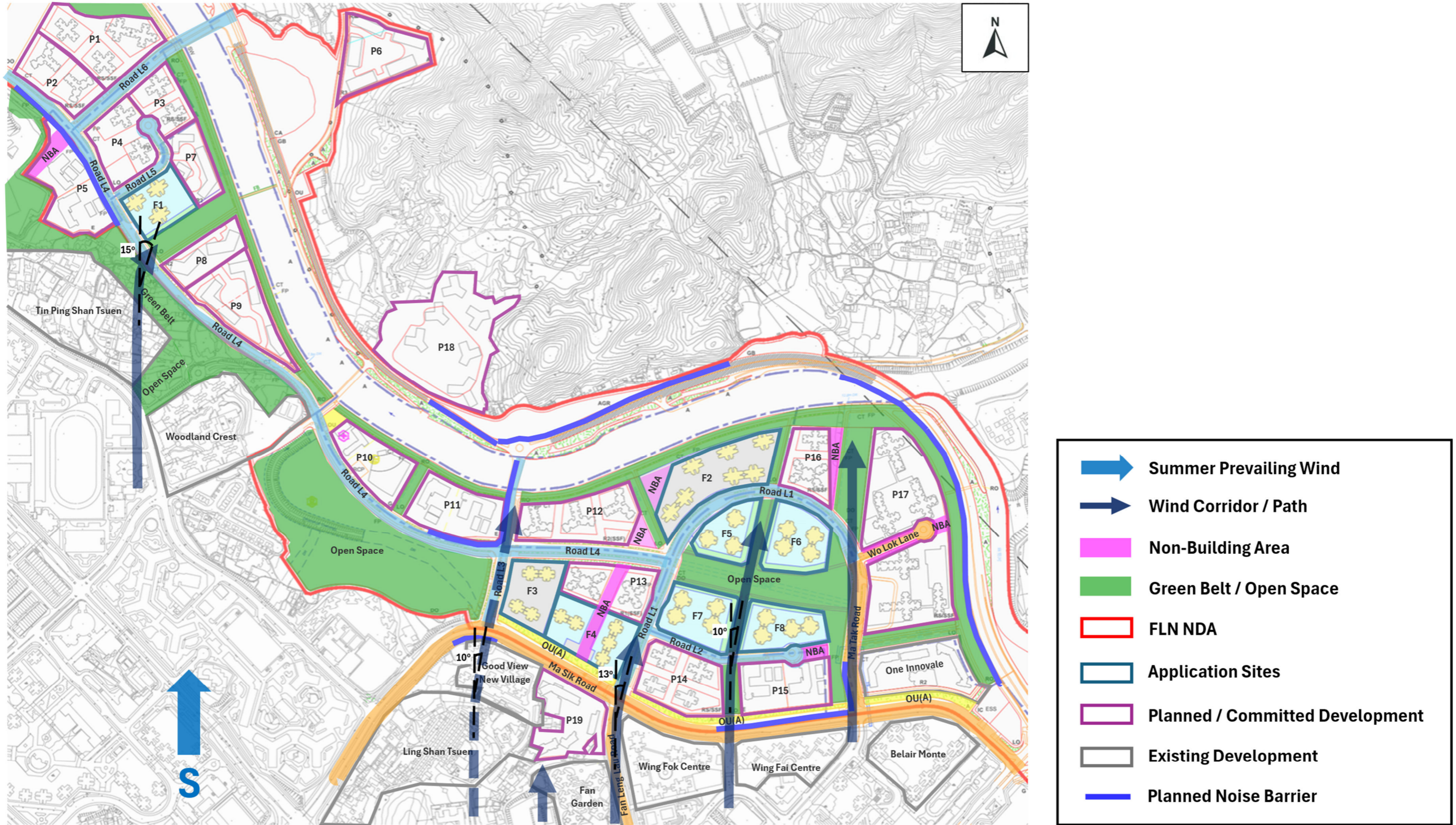
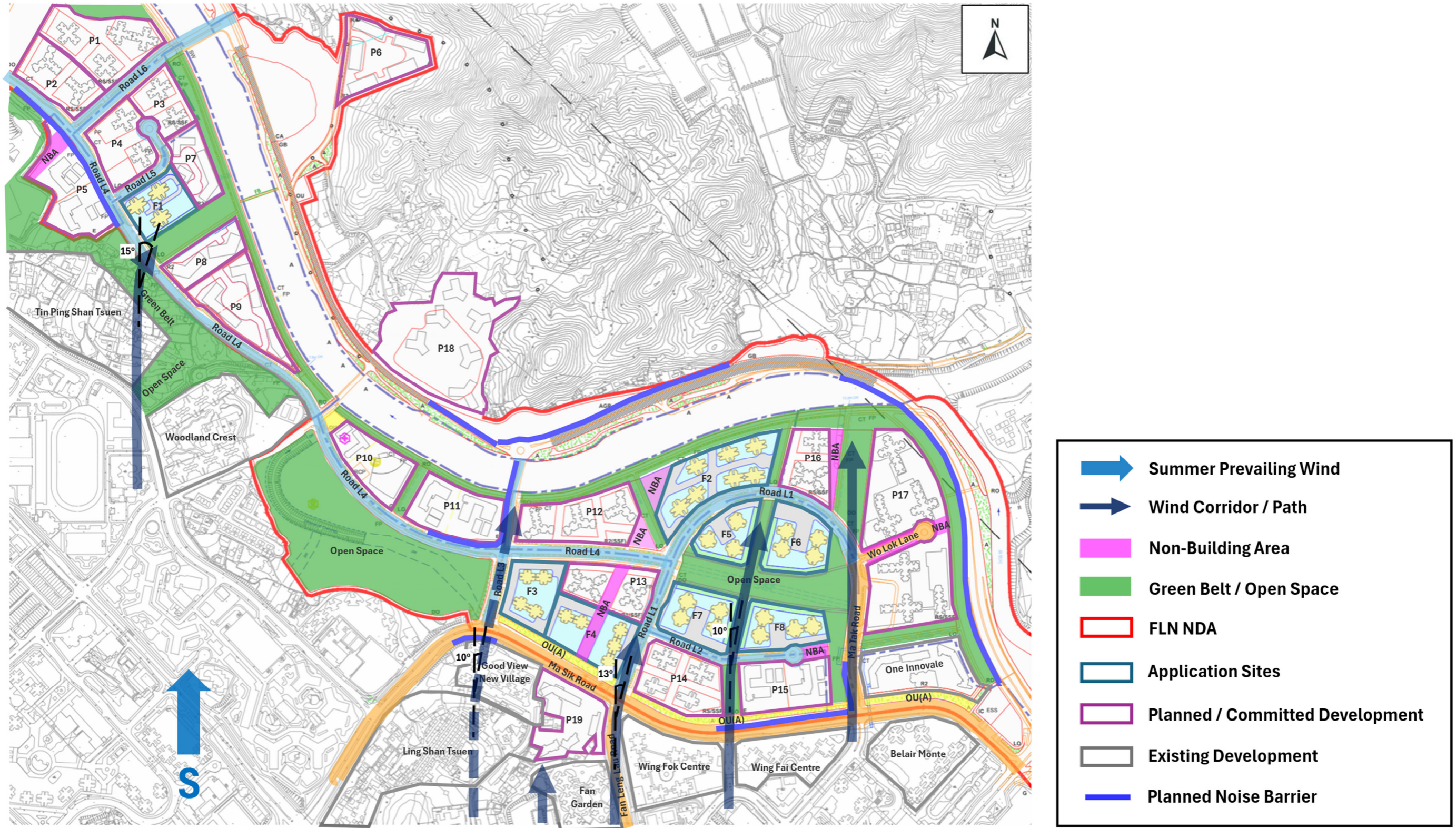


Figure 5.4-12 Wind Flow under the S Summer Prevailing Wind for the Proposed Scenario

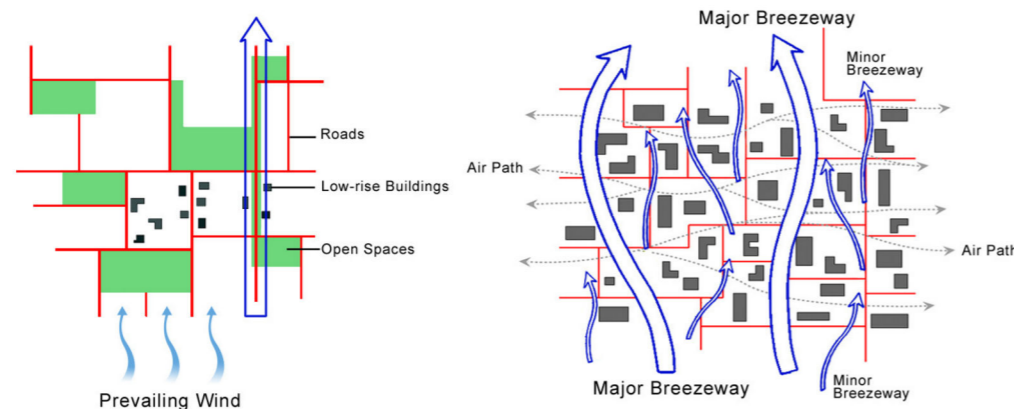


6. FURTHER RECOMMENDATION

6.1 Hong Kong Planning Standards and Guidelines (HKPSG)

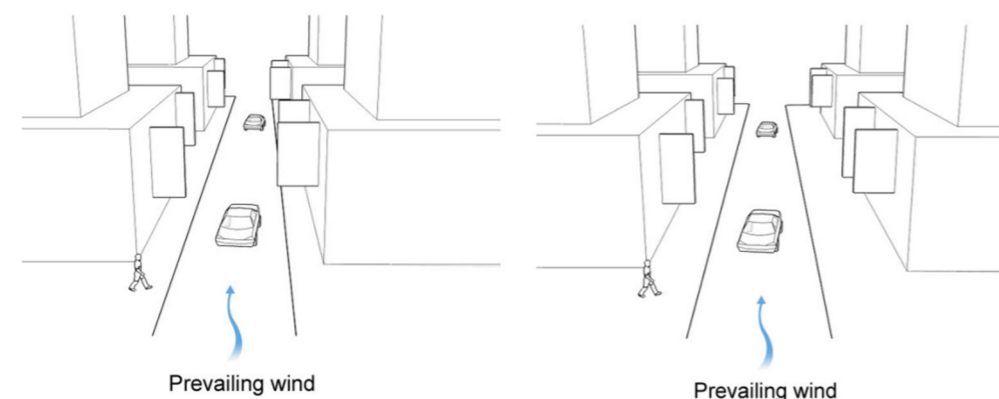
6.1.1 From a district-level perspective, maintaining a favourable wind environment involves adhering to key planning principles outlined in Chapter 11 of the Hong Kong Planning Standards and Guidelines (HKPSG). One of the most important principles is the alignment of breezeways and air paths with prevailing wind directions, complemented by perpendicular air paths to enhance cross-ventilation (see Figure 6.1-1). This configuration promotes effective wind penetration through urbanised areas. Breezeways can be established by linking major roads, open spaces, amenity areas, non-building areas (NBAs), building setbacks, and corridors formed by low-rise developments.

Figure 6.1-1 Linkage of Roads / Open Space / Low-rise Buildings to form Paths of Air Flow



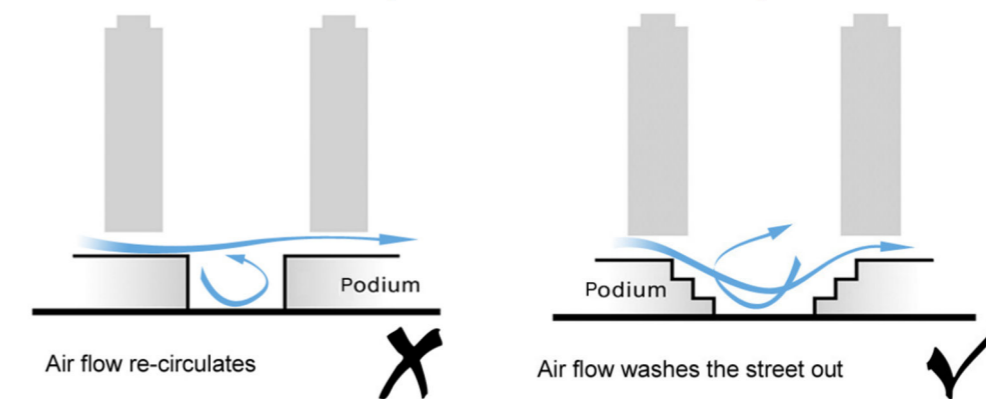
6.1.2 In addition to the HKPSG, the Sustainable Building Design Guidelines (SBDG) aim to improve building permeability and mitigate the screen wall effect, thereby enhancing air movement and mixing between developments. One of the key requirements under the SBDG is building setback, which significantly improves wind conditions at the pedestrian level. According to the guidelines, for streets narrower than 15 metres, buildings should be set back such that no part of the structure up to 15 metres in height encroaches within 7.5 metres from the street centreline. This setback requirement can lead to substantial improvements in air ventilation, particularly along narrow streets. An illustration is provided in Figure 6.1-2.

Figure 6.1-2 Building Setback



6.1.3 Building separation is another important strategy for increasing permeability within the urban fabric, helping to mitigate the urban heat island effect arising from the undesirable screening effect of long buildings. Introducing porosity into building design facilitates air movement between structures and enhances air diffusion and mixing. Permeability at the lower levels is especially crucial for improving ventilation at the pedestrian zone. For developments incorporating podia, the inclusion of podium gardens is recommended to allow wind to penetrate closer to ground level. Additionally, terraced podium designs (see Figure 6.1-3) can further enhance ventilation by directing downward airflow toward the pedestrian level.

Figure 6.1-3 Terraced Podium Design



6.2 Additional Recommendations

6.2.1 From a building-level perspective, several general recommendations can be adopted to enhance wind permeability and penetration, while minimising adverse ventilation impacts on surrounding areas:

- Avoid long, continuous façades and orient shorter building frontages toward prevailing wind directions to facilitate airflow;
- Minimize podium bulk by reducing ground coverage or adopting podium-free designs where feasible;
- Incorporate permeable elements at the ground floor of podium, such as empty bays or podium gardens, to improve wind permeability at pedestrian level;
- Adopt terraced podium designs to help direct airflow downward and enhance ventilation near ground level;
- Refer to design strategies outlined in the Sustainable Building Design Guidelines (SBDG) and the Hong Kong Planning Standards and Guidelines (HKPSG);
- Ensure building permeability equivalent to 20% to 33.3% of the total frontal area, in accordance with Practice Note for Authorized Persons (PNAP) APP-152; and
- Implement full building or podium setbacks at suitable locations, also with reference to PNAP APP-152.

7. CONCLUSION

7.1 Summary

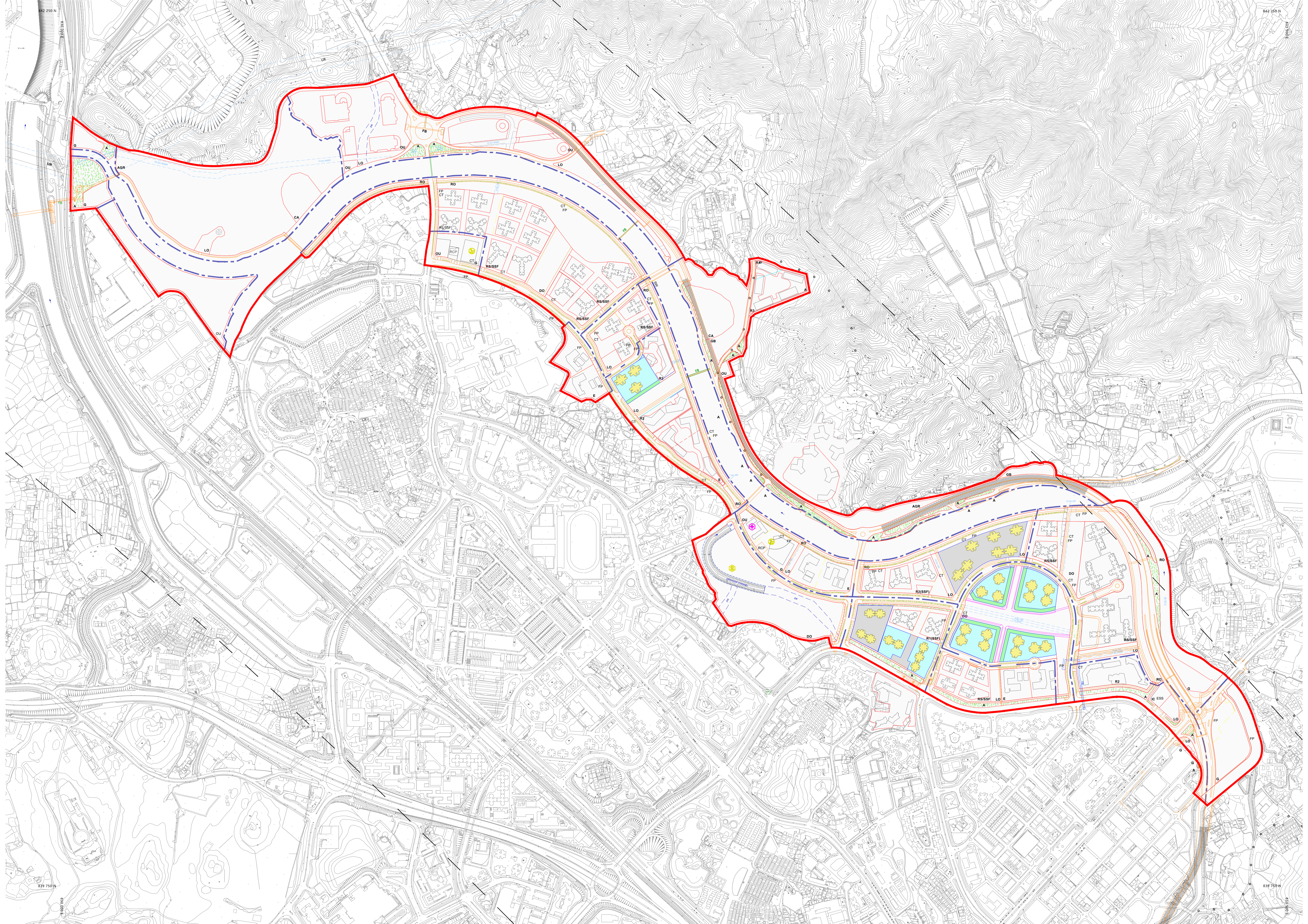
- 7.1.1 Qualitative air ventilation assessment (AVA) is prepared to support the S16 Planning Application for minor relaxation of the BH restrictions for Application Sites F1, F2, F3, F4, F5, F6, F7 and F8.
- 7.1.2 From comparing the wind data from HKO weather stations and “Experimental Site Wind Availability Study for the North-East New Territories New Development Areas” (WWTF018-2010). As the Site Wind data by wind tunnel approach focused on the site wind for the FLN NDA, it is considered more appropriate to adopt the wind tunnel experimental data to identify the prevailing wind directions. Referring to the wind data, E, ENE and N are the most dominant prevailing winds with 23.4%, 15.1% and 12.1% of the annual wind frequency, respectively for the Application Site. For the summer periods, SW, E and S, WSW are the most dominant prevailing winds with 14.5%, 13.8%, 10.1% and 9.7% of the wind frequency, respectively for the Application Sites.
- 7.1.3 The FLN NDA Remaining Phase containing the Application Sites is located at the rural areas of Hong Kong, the majority lands surrounding the FLN NDA and the Application Sites are “Green Belt”, “Agriculture”, “Other Specified Uses”, “Government, Institution or Community”, “Residential” as well as scattered areas of “Village Type Development”.
- 7.1.4 Surround the eight Application Sites exist extensive areas with planned/committed developments. These surrounding areas are planned to be developed into public and private residential towers, schools, G/IC blocks as well as other specified usage buildings. The planned/committed building morphologies within these surrounding planned/committed areas near the Application Sites are assumed to be consistent under both the Baseline Scenario and Proposed Scenario for the Expert Evaluation.
- 7.1.5 Site F1 is bounded to the east by planned residential developments and the Ng Tung River, to the south by planned residential developments and open space, to the west by planned Road L4, and to the north by planned Road L5. The other Application Sites, F2, F3, F4, F5, F6, F7 and F8, are generally bounded to the north by the Ng Tung River, to the east by planned public housing developments, to the west by planned GIC buildings and open space, and to the south by existing residential development in the Fanling New Town area.
- 7.1.6 Two Development Scenarios are examined in this Study, Baseline Scenario and the Proposed Scenario. The Baseline Scenario reflects the development restrictions in the Fanling North Outline Zoning Plan (S/FLN/5 (“Draft OZP”)) with updates to incorporate the scheme in the approved Section 16 applications A/FLN/30 and A/FLN/32. For the Proposed Scenario, relaxation in BHR to enable aboveground car parks in the Application Sites are proposed.
- 7.1.7 The building layouts under Proposed Scenario of the Application Sites have paid the very best efforts in maintaining the wind environment by retaining the established major wind corridors under major prevailing wind directions. It is anticipated there is no great alteration in wind flow patterns between the Baseline Scenario and the Proposed Scenario in district wise wind environment. Nevertheless, due to the overall relaxation in building heights and incorporation of new carpark podium structure under the Proposed Scenario as compared to the Baseline Scenario, it appears that the Proposed Scenario may induce larger wakes in the immediate downstream area when compared with the Baseline Scenario.

- 7.1.8 In conclusion, it is expected that no significant impact or alternation in the ventilation environment would arise under the Proposed Scenario when compared with the Baseline Scenario. It is proposed to retain the terraced podium design at Application Sites F1, F5, F6, F7 and F8 to facilitate downward airflow to the pedestrian level. It is also recommended to incorporate podium and tower setback of Application Site F3 to maximize the wind penetration. In addition, general recommendations in accordance with the Sustainable Building Design Guidelines and the Hong Kong Planning Standards and Guidelines have been suggested for incorporation ant the advanced design stage, attempting to further enhance the local wind availability.



APPENDIX A

INDICATIVE LAYOUT OF BASELINE SCENARIO





APPENDIX B

INDICATIVE LAYOUT OF PROPOSED SCENARIO

