Agreement No. PLN AVA 2021

Term Consultancy Category A For an Instructed Project for Shek Mun and Siu Lek Yuen, Shatin

Air Ventilation Assessment – Expert Evaluation

August 2023

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1 INTRODUCTION

1.1 Study Background

1.1.1 Hong Kong Planning Department (PlanD) is currently reviewing the land uses and development intensity of the Siu Lek Yuen Industrial Area (SLYIA) and some sites within the nearby Shek Mun Business Area (SMBA) with a view to optimizing the development potential of valuable land resources and facilitating redevelopment as well as transformation of the area.

1.1.2 Considering the findings of the Area Assessments of Industrial Land in the Territory conducted in the years 2014 and 2020, a total of 6 Project Sites zoned as "Industrial (I)" ("I(1)"), "Government, Institution or Community" ("G/IC") and "Open Space" ("O") with two of the Project Sites located in the SLYIA and four in the SMBA may have potential rezoning to residential or commercial uses for more gainful use.

1.1.3 The proposed Rezoning exercise would impose restrictions on the plot ratio and the maximum building heights of the six identified Project Sites to ensure compatibility with the surrounding areas. Given the area wide imposition of development constraints, it is considered that an Air Ventilation Assessment (AVA) in the form of Expert Evaluation (EE) is necessary to assess the potential air ventilation impacts due to the Rezoning and Development Proposal.

1.1.4 AECOM has been commissioned by Hong Kong Planning Department (PlanD) to carry out the AVA – EE to support the Rezoning Application of the 6 Project Sites on top of the approved Sha Tin Outline Zoning Plan (OZP) No. S/ST/36.

1.1.5 As the proposed changes are only related to land uses, plot ratios and building heights with no major changes in the road layouts as well as the urban grid, by carrying out a qualitative AVA in the form of Expert Evaluation is considered appropriate to support the Rezoning Application by presenting a study of the potential air ventilation impacts associated with the proposed changes to confirm the suitability of the amendments in plot ratio and building heights for identified Project Sites from the perspective of air ventilation.

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 rezoning process for the imposition of development restrictions in plot ratios and building heights of the proposed developments with the Project Sites.

2.1.2 This AVA-EE would provide a qualitative assessment to the design and/or design options (including the planned/committed development(s) within areas near the Project Site) and identification of potential air ventilation problems and issues that would need warrant attention, followed by first reviewing the existing wind environment. The assessment would also identify major breezeway(s), air-path(s), problematic area(s), localized wind effects and possible change in wind patterns due to the changes in land zoning and development parameters within the 6 Project Sites. Possible design improvements and mitigation measures would be proposed if required in this report as well as recommendations on the necessity of further quantitative AVA Studies will also be provided.

2.1.3 This AVA-EE 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** on the brief description on the identified Project Sites.
- **Section 4** discusses the Project Sites with examination of adjacent existing, planned and committed developments, land usage and the surrounding topographic characteristics.
- **Section 5** identifies the prevailing wind directions via analysing the applicability of relevant available wind data.
- **Section 6** details the proposed development layouts and scenarios for evaluation.
- **Section 7** carries out the EE by reviewing and referencing to previous related AVA study reports, identifying the major wind corridors/airpaths and assess qualitatively the likely prevailing wind patterns and directions at the pedestrian level at/near the Project Sites and its surroundings.
- **Section 8** further recommends potential strategies for further design optimization and recommends good air ventilation design measures to the proposed developments within the Project Sites.
- **Section 9** summarizes and concludes the AVA EE Report.

3 THE PROJECT SITES

3.1 Description of the Site Environs

3.1.1 The Project Sites are located in the Shek Mun and Siu Lek Yuen regions within the Sha Tin District. The six Project Sites having a total area of approximately 2.75ha are situated to the south-east directions of the Shing Mun River. Two of the Project Sites (Project Site 1 and Project Site 2) are located to the immediate north of SMBA. The two identified Project Sites are located at the junction of Tai Chung Kiu Road and On Sum Street near the northern fringe of SMBA, mainly bounded by residential developments of Garden Vista and Pictorial Garden to the north-west, the business zone belonging to the SMBA to the south and Tate's Cairn Highway to the east.

3.1.2 The rest of the four Project Sites area located to the south of the SMBA across the river nullah where the SLYIA is located. The four Project Sites are bounded by Chap Wai Kon Street, Siu Lek Yuen Road, Sha Tin Wai Road, and Ngau Pei Sha Street. These Project Sites are surrounded by residential developments near City One MTR Station to the north-west, Yu Chui Court to the south-west and villages houses of Ngau Pei Sha to the south-east. The location and the environs of the six identified Project Sites are illustrated in **Figure 3.1**.

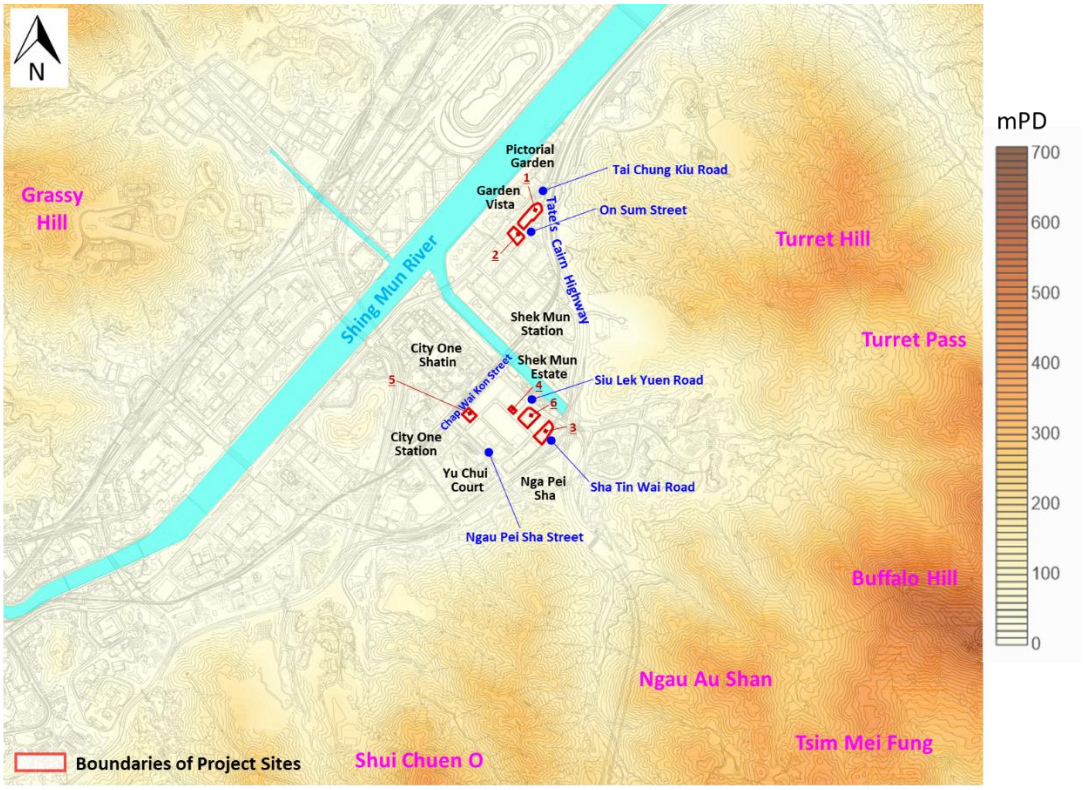


Figure 3.1 Location of the Project Sites

4 LAND USES, TOPOGRAPHY AND EXISTING URBAN MORPHORLOGIES

4.1 Land Uses

4.1.1 On the OZP, there are various types of planned land uses near the Project Sites as shown on **Figure 4.1**. The land uses of the Project Sites of Shek Mun and Siu Lek Yuen as well as their surroundings are governed by the approved Sha Tin OZP No. S/ST/36.

4.1.2 Project Site 1 and Project Site 2 within the SMBA are currently zoned for “G/IC” and “O” respectively. Project Sites 3, 4, 5, and 6 are located within the SLYIA with Project Site 3 currently zoned “O”, Project Sites 4 and 5 zoned “G/IC”, while the remaining Project Site 6 is zoned “I(1)”.

4.1.3 To the south direction of Project Sites 1 and 2 (SMBA Project Sites) is the SMBA with lands mainly zoned “Other Specified Uses” annotated “Business” (“OU(B)”). To the near north-west of the two Project Sites are “Residential (Group B)” (“R(B)”) lands belonging to the Ravana Garden, Garden Vista, and Pictorial Garden. Separated by Shing Mun River, the Hong Kong Sports Institute with “G/IC” land use and the Penfold Park with “Other Specified Uses” annotated “Sewage Treatment Works”” annotated “Race Course” (“OU(Race Course)”) are located to the further north-west directions of the Project Sites 1 and 2. Another “Residential (Group A)” (“R(A)”) zone belonging to the Shek Mun Estate can be found to the south-east direction of the Project Sites 1, 2 and SMBA across On Ming Street. In addition, there are also small pieces of “G/IC”, “O”, “Commercial” (“C”) lands located to the near vicinity of the Project Sites 1 and 2.

4.1.4 There is large area near the Tate’s Cairn Highway that is zoned “Green Belt” (“GB”), mainly located to the eastern and north-eastern directions of the Project Sites with certain areas zoned “Other Specified Uses” annotated “Sewage Treatment Works”, “Railway Depot Comprehensive Development Area”, “Kowloon-Canton Railway” (“OU(Sewage Treatment Works)”), (“OU(Railway Depot Comprehensive Development Area)”) and (“OU(Kowloon-Canton Railway)”) and “OU(Race Course)”. To the south of the observable “GB” areas exist “R(B)” land zone belonging to the Castello, “R(A)” land zone belonging to Kwong Yuen Estate, Village type land use “Village Type Development (“V”) of Siu Lek Yuen and “G/IC” land zoning belonging to the Hang Seng University of Hong Kong. To the west of the Hang Seng University of Hong Kong and to the south of the Sha Tin Wai Road is another “V” zone belonging to the villages of Chap Wai Kon and Ngau Pei Sha, while to the east of the Hang Seng University of Hong Kong exist a piece of land zoned “O”.

4.1.5 There are observable lands zoned “R(A)” near the vicinity of the Project Sites 3 to 6 (SLYIA Project Sites) within the SLYIA. These “Residential Group A (R(A))” lands include but not limited to those belonging to the City One Shatin located to the north-west of the SLYIA Project Sites across the Chap Wai Kon Road, the Belair Gardens located to the further west of the City One Shatin across the Sha Tin Road and the Yu Chui Court located to the south-west of the SLYIA Project Sites.

4.1.6 Across Ngan Shing Road, to the further south-west directions of the SLYIA Project Sites is a piece of “G/IC” land belonging to the Prince of Wales Hospital. In addition, there are “O” located at the surroundings of the SLYIA Project Sites as well as along the riverbanks of the Shing Mun River. The major open spaces include Yuen Chau Kok Park, Ngau Pei Sha Street Playground, Shek Mun Riverside Garden, and Siu Lek Yuen Road Playground etc.

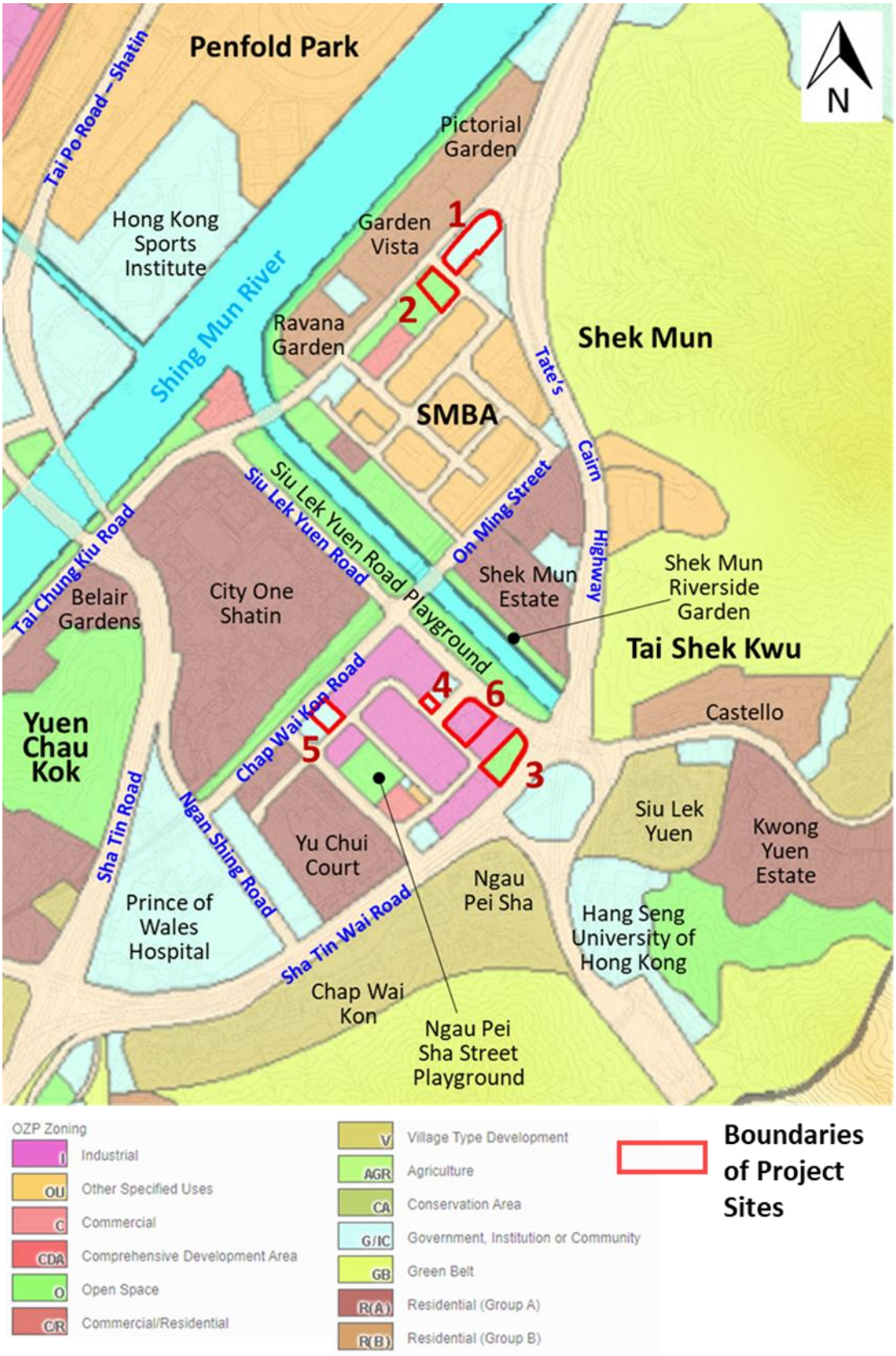


Figure 4.1 Land Use within and near the Project Sites

4.2 Topography

4.2.1 The Project Sites in the Shek Mun and Siu Lek Yuen regions (i.e., SMBA Project Sites and SLYIA Project Sites) are located within the Sha Tin District, to the south-east of the Shing Mun River Channel. As revealed from the topographical map in **Figure 4.2**, the terrains within the Project Sites are relatively flat. The Project Sites are surrounded by terrains to their north-east to the south directions. To the east direction of the Project Sites 1 and 2 and to the north-east direction of the Project Sites 3 to 6 exist the terrains of Turret Hill and Turret Pass of approximately 399mPD and 250mPD in height respectively. Terrains of Buffalo Hill (~500mPD), Ngau Au Shan (~370mPD) and Tsim Mei Fung (~390mPD) are located to the south easterly directions of the Project Sites. Apart from the above, the terrains of Shui Cheun O of approximately 350mPD are located to the further south of the Project Sites. In view of the above, the wind from the north-eastern, eastern, south-eastern, and southern quadrants reaching the Project Sites would be weakened by the topographies of the terrains.

4.2.2 Apart from the above, across a tributary of Shing Mun River, to the further westerly direction of the Project Sites 1, 2 and to the further northwesterly direction of Project Sites 3 to 6 locates another terrain belonging to the hill foot of the Grassy Hill with approximate height of 250mPD. To the near west of the Project Sites 3 to 6 exist a small knoll of 60mPD belonging to Yuen Chau Kok Park. The topographies to the north, west and south-west directions of the Project Sites are comparatively flat with limited elevation. **Figure 4.2** illustrates the topographical map at and near the Project Sites.

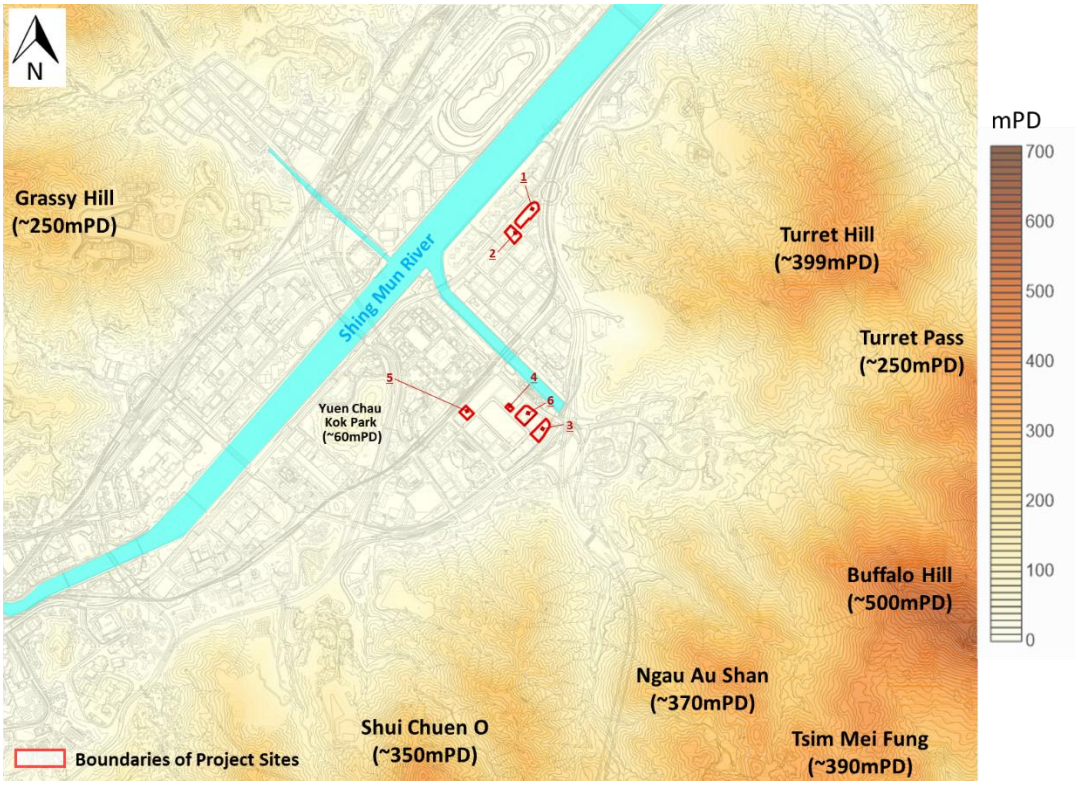


Figure 4.2 Topographical Map near the Project Sites

4.3 Existing Urban Morphology

4.3.1 The Project Sites are located between Shing Mun River channel and Sha Tin Wai Road - Tate's Cairn Highway. The lands of Project Sites are currently zoned "O", "G/IC" and "I(1)" which consist of carparks, playgrounds, and open storages as well as industrial buildings. Meanwhile, the regions in vicinity of the Project Sites are occupied mainly by industrial buildings, residential/commercial buildings, village houses and hospital.

4.3.2 There are two Project Sites (Project Site 1 and Project Site 2) located at the SMBA, with Project Site 1 located within an existing open carpark close to the junction of Tate's Cairn Highway and Tai Chung Kiu Road, while Project Site 2 immediately north to Shek Mun Playground is currently used for open storage and plant nursery. There exists continuously distributed mid to high-rise residential blocks to the northwest of the two Project Sites belonging to Pictorial Garden, Garden Vista, and Ravana Garden. While the buildings located to the vicinity south and southeast of the Project Sites are mainly hotels, industrial buildings, office buildings and commercial buildings, including the Courtyard by Marriott HK Sha Tin, New Trade Plaza, CLP Power HK Limited – Shatin Centre, and Grandtech Centre etc.

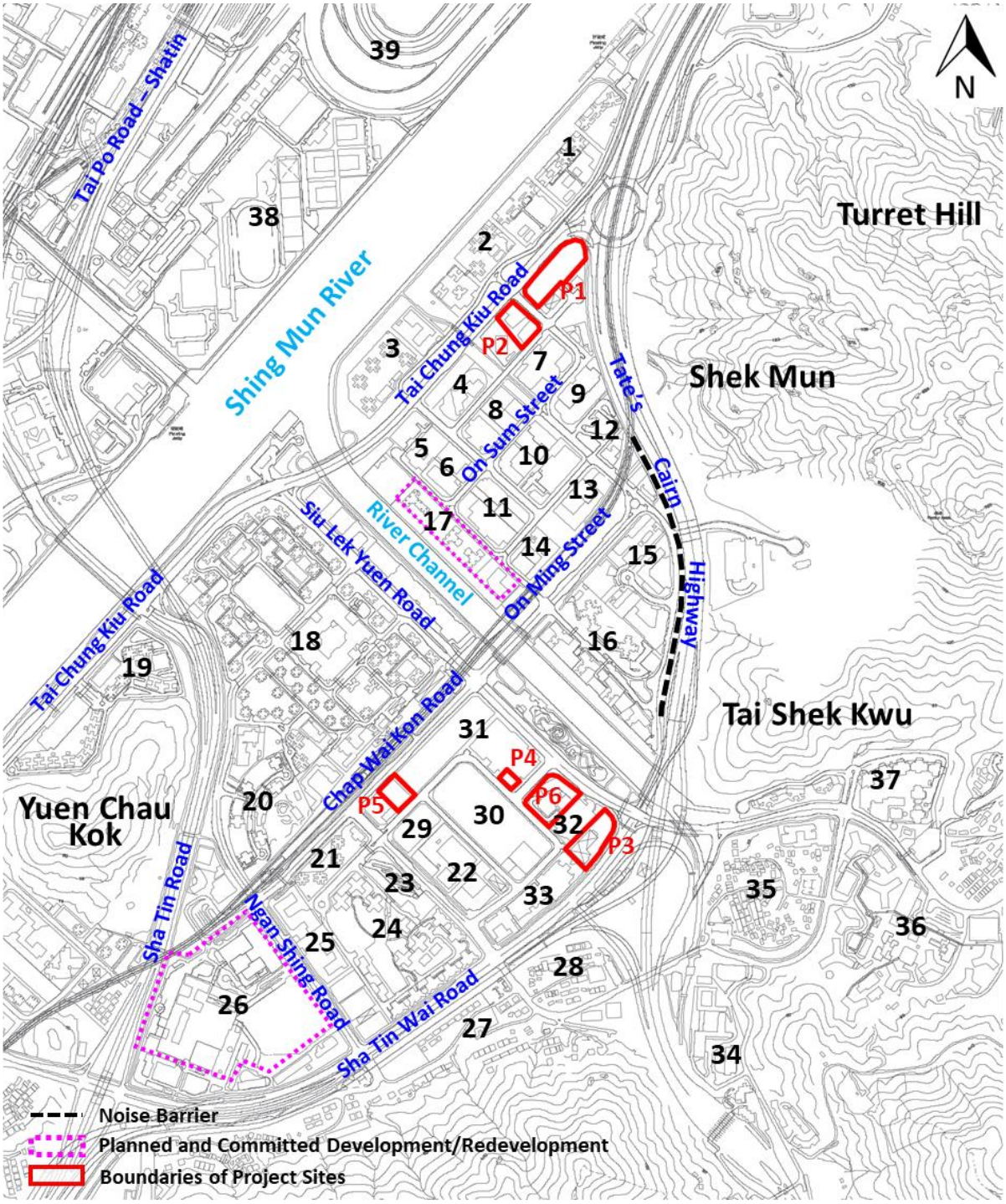
4.3.3 The areas to the further northwest of the two Project Sites across Shing Mun River are areas belonging to the Penfold Park and Hong Kong Sports Institute. Meanwhile, the regions to the southwest of the Project Sites (Project Sites 1 and 2) are the carpark of Courtyard by Marriott Hong Kong Sha Tin, open spaces of On Muk Street Garden, and the current Jockey Club Kitchee Centre. The current Jockey Club Kitchee Centre is planned to be relocated and the land to be released for Public Housing Development at On Muk Street. The areas southeast to On Sum Street are occupied by mid-rise industrial / commercial buildings including the Topsail Plaza, Metropole Square, Ever Gain Centre and New Commerce Centre, etc. There are also residential developments namely the Shek Mun Estate located to the north riverbank of the River Channel.

4.3.4 The remaining nine Project Sites namely Project Sites 3, 4, 5 and 6 are located south to the River Channel within the SLYIA. Project Sites 3, 4 and 5 are currently carparks or occupied by temporary structures, while Project Site 6 is currently occupied by a high-rise hotel named ALVA Hotel by Royal.

4.3.5 There are high-rise residential developments to the west and south directions of the SLYIA Project Sites, with the most significant ones being those belonging to City One Sha Tin, which occupies an extensive area between the Shing Mun River and Chap Wai Kon Road. To the near west of the City One Shatin across Shatin Road locates the residential developments of Belair Gardens. Other major high-rise residential developments in the vicinity of the Project Sites within the SLYIA also include Yu Chui Court located to the south as well as Prima Villa and Yu Tin Court sandwiching Chap Wai Kon Street.

4.3.6 Located to the south-west of Lam Tai Fai College and St. Rose of Lima's College across Ngan Shing Road is the Prince of Wales Hospital. A Concept Plan for the redevelopment of Prince Wales Hospital has been developed by the Hospital Authority, which aims to position the hospital as a major acute hospital and a hub for the New Territories East Cluster academic health sciences network.

4.3.7 Apart from the above, there are several villages across Sha Tin Wai Road to the east and south-east directions of the SLYIA Project Sites. The main villages include Chap Wai Kon, Ngau Pei Sha, and Siu Lek Yuen. To the south of Siu Lek Yuen is the Hang Seng University of Hong Kong, while to its east and north-east are the public housing developments of Kwong Yuen Estate and the Castello respectively. The major existing, planned and committed developments/redevelopments near the Project Sites are indicated in **Figure 4.3**.



Description	Approximate Max. Building Heights (mPD)	Description	Approximate Max. Building Heights (mPD)
Project Sites (Current Maximum Heights)			
P1 (Open Carpark)	-	P2 (Open Storage and Plant Nursery)	-
P3 (Vacant Land with Low-Rise Temporary Structure)	-	P4 (Vacant Land)	-
P5 (Open Carpark)	-	P6 (ALVA Hotel by Royal)	~102mPD
Existing, Planned and Committed Developments near the Project Sites			
1. Pictorial Garden	~96mPD	2. Garden Vista	~87mPD

Description	Approximate Max. Building Heights (mPD)	Description	Approximate Max. Building Heights (mPD)
3. Ravana Garden	~105mPD	4. Courtyard by Marriott HK Shatin	~105mPD
5. Heung Yee Kuk Building	~37mPD	6. CLP Power HK Limited – Shatin Centre	~122mPD
7. Grandtech Centre	~112mPD	8. New Trade Plaza	~95mPD
9. Topsail Plaza	~78mPD	10. Metropole Square, Corporation Park, HSBC Shek Mun Building	~110mPD
11. Ever Gain Centre, Technology Park, New Commerce Centre	~112mPD	12. Delta House	~109mPD
13. King's Wing Plaza 2	~115mPD	14. King's Wing Plaza 1	~98mPD
15. HKBU Shek Mun Campus, HKBU Affiliated School Wong Kam Fai Secondary and Primary School	~23 – 81mPD	16. Shek Mun Estate	~120mPD
17. Public Housing Development at On Muk Street	~110mPD	18. City One Shatin	~108mPD
19. Belair Gardens	~89mPD	20. Yue Tin Court	~106mPD
21. Prima Villa	~114mPD	22. Citimark and Ngau Pei Sha Street Playground	~79mPD
23. Yu Chui Shopping Centre	~34mPD	24. Yu Chui Court	~121mPD
25. Lam Tai Fai College and St. Rose of Lima's College	~21 – 38mPD	26. Prince of Wales Hospital (Current)	~55mPD
27. Chap Wai Kon Village	~40mPD	28. Nga Pei Sha Village	~24mPD
29. Koon Wah Building	~27mPD	30. Bus Depot, Town Health Technology Centre, Crown Worldwide Building	~21 – 41mPD
31. Shatin Industrial Centre, Chiaphua Centre	~36 – 50mPD	32. Goldlion Holdings Centre	~40mPD
33. Ever Gain Building, Swire Coca Cola HK	~52 – 142mPD	34. The Hang Seng University of Hong Kong	~30 – 80mPD
35. Siu Lek Yuen	~32mPD	36. Kwong Yuen Estate	~137mPD
37. Castello	~149mPD	38. Hong Kong Sports Institute	~13 – 39mPD
39. Penfold Park	-		

Figure 4.3 Existing / Committed / Planned Major Developments near the Project Sites

5 WIND AVAILABILITY

5.1 Wind Availability

5.1.1 The local wind availability is crucial for identification of prevailing wind directions in the assessment of air ventilation performance for any given location. In the current study, the Project Sites of Shek Mun and Siu Lek Yuen are in the Sha Tin District, to the south-east of the Shing Mun River Channel as described in the sections above. There are typically three sources of site wind data – RAMS data from Planning Department, Experimental Wind Tunnel data and measured data from weather stations (from Hong Kong Observatory, HKO). The wind availability data at the regions near the Project Sites are discussed below.

5.2 Planning Department RAMS Wind Data

5.2.1 PlanD released a set of computed wind data from the simulations via Regional Atmospheric Modelling System (RAMS) model. The wind data representing the predicted wind availability is extracted from four grids on the coverage of the Project Sites to identify the prevailing wind directions. The relevant data from grids (087, 056) and (087, 057) are used for the analysis in wind availability of nine Project Sites in SLYIA, while the data from grids (087, 058) and (087, 059) are adopted for analysis of the wind availability of the two remaining Project Sites in SMBA.

5.2.2 The identified grids with respect to the Project Sites are schematically shown in **Figure 5.1**. The annual and summer wind roses at 200m level at the four identified grids are presented in **Figure 5.2** below.

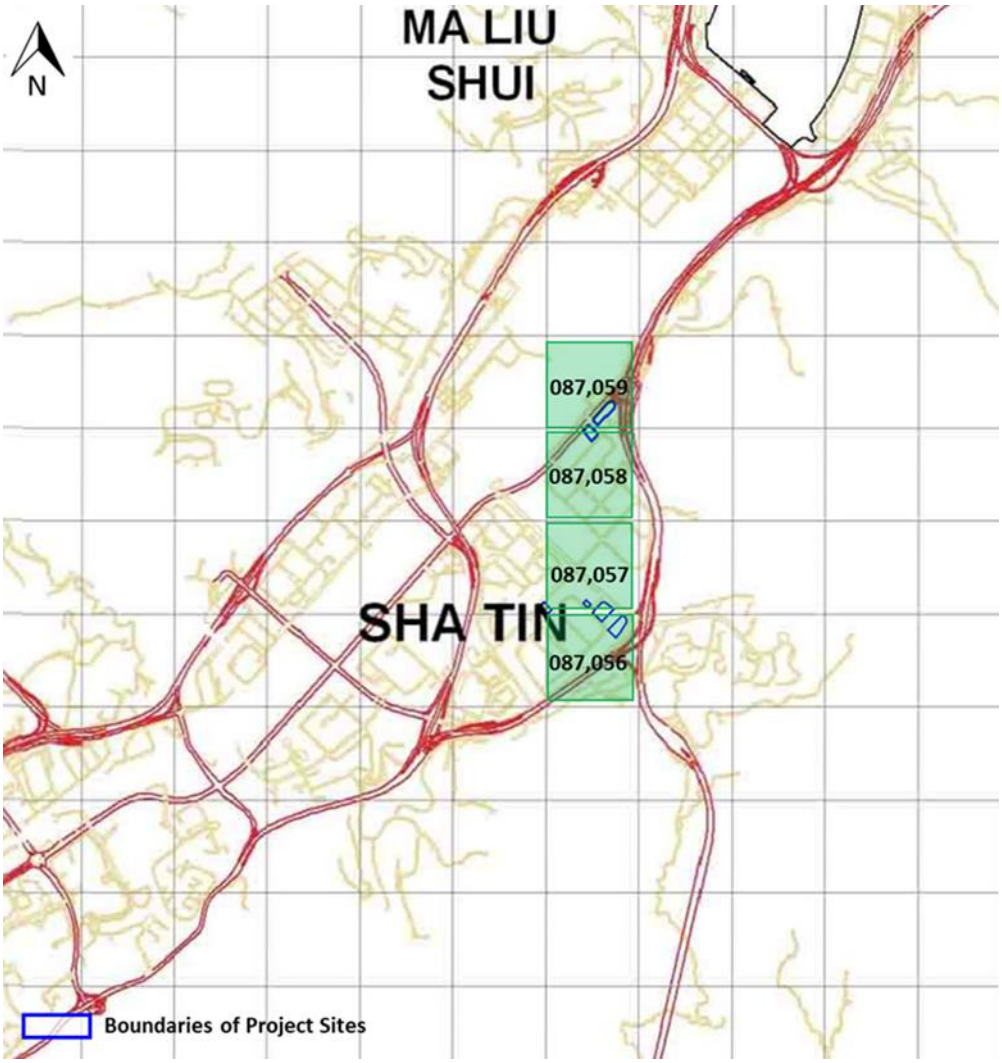


Figure 5.1 Locations of RAMS grids covering the Project Sites for Wind Data Extraction

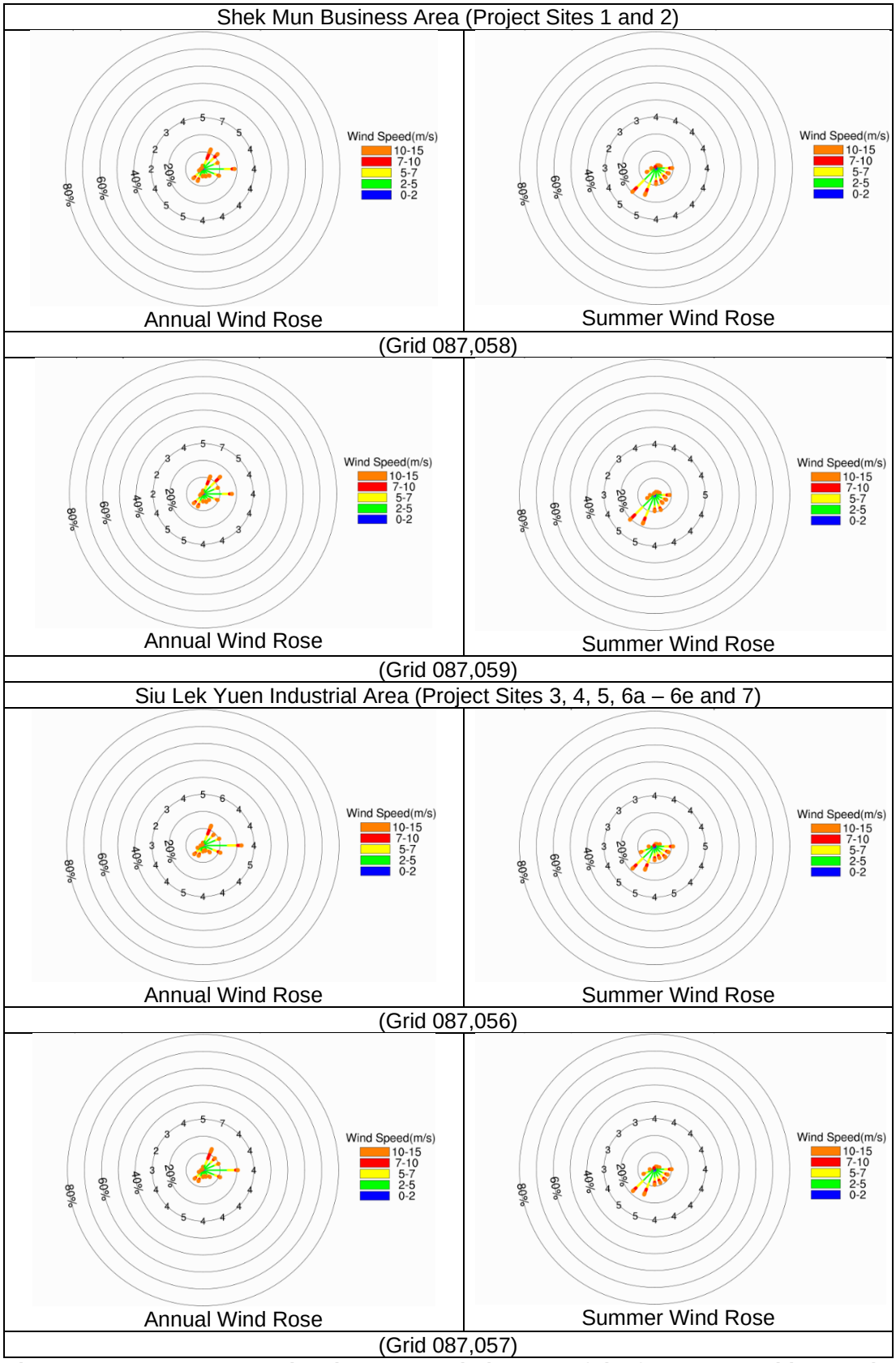


Figure 5.2 200m Annual and Summer Wind Roses of the four RAMS grids covering the Project Sites

5.2.3 Directional wind with the highest percentage of occurrences is identified for both annual and summer seasons with the percentage occurrences for the wind directions tabulated in **Table 5.1(a)** and **Table 5.1(b)**.

5.2.4 As observed from **Table 5.1(a)**, the occurrences of wind from NNE, NE, and E directions, which are the wind directions with the highest frequency occurrences over a year in SMBA, which are thus identified as the major annual prevailing wind directions. During the summer seasons, the wind from E, S, SSW and SW directions become dominant at the SMBA in which these four wind directions have the highest frequency occurrence in summer as compared to other wind directions.

5.2.5 Wind Data from grids covering the Project Sites within the SLYIA reveals that the prevailing wind from NNE, E and ESE would generally dominate the wind availability for annual season. During summer seasons, the prevailing wind mostly originate from the south-western quadrant, including SSW and SW. The easterly wind is also considered as one of the prevailing wind directions in summer, together with the SSW and SW wind.

Table 5.1(a) Frequencies of Annual Occurrence of Individual Wind Directions at 200mPD for the Project Sites

	Annual, 200m			
Wind Directions	Frequency Occurrence			
	Shek Mun Business Area		Siu Lek Yuen Industrial Area	
	Grid (87,58)	Grid (87,59)	Grid (87,56)	Grid (87,57)
N	2.0%	2.1%	1.7%	2.0%
NNE	**12.4%**	**11.3%**	**12.6%**	**13.4%**
NE	**12.3%**	**14.5%**	9.0%	9.9%
ENE	9.5%	9.6%	10.4%	9.9%
E	**18.6%**	**17.3%**	**22.7%**	**20.6%**
ESE	10.3%	9.4%	**11.2%**	**10.9%**
SE	5.6%	5.1%	5.7%	5.7%
SSE	4.7%	5.2%	3.4%	4.2%
S	4.3%	4.6%	3.5%	4.1%
SSW	7.5%	8.2%	6.5%	7.0%
SW	7.6%	7.9%	7.2%	7.0%
WSW	2.3%	1.9%	3.4%	2.7%
W	1.2%	1.2%	1.4%	1.2%
WNW	0.4%	0.5%	0.3%	0.3%
NW	0.5%	0.5%	0.3%	0.4%
NNW	0.8%	0.9%	0.5%	0.7%

Table 5.1(b) Frequencies of Summer Occurrence of Individual Wind Directions at 200mPD for the Project Sites

	Summer, 200m			
Wind Directions	Frequency Occurrence			
	Shek Mun Business Area		Siu Lek Yuen Industrial Area	
	Grid (87,58)	Grid (87,59)	Grid (87,56)	Grid (87,57)
N	0.9%	0.8%	0.8%	0.9%
NNE	1.8%	2.0%	1.5%	1.7%
NE	2.4%	2.5%	2.0%	2.2%
ENE	3.0%	3.2%	3.3%	3.1%
E	**9.5%**	9.0%	**11.0%**	**10.1%**

ESE	8.1%	7.5%	8.9%	8.4%
SE	7.9%	6.6%	9.0%	8.9%
SSE	9.1%	9.6%	7.5%	8.7%
S	9.4%	**9.6%**	8.1%	9.2%
SSW	**17.0%**	**18.3%**	**14.9%**	**16.2%**
SW	**19.7%**	**20.7%**	**18.6%**	**18.2%**
WSW	5.9%	4.8%	8.9%	7.2%
W	2.8%	2.8%	3.5%	2.9%
WNW	0.7%	0.8%	0.7%	0.7%
NW	0.9%	0.9%	0.7%	0.7%
NNW	0.9%	1.0%	0.6%	0.9%

5.3 Wind Tunnel Experimental Wind Data

5.3.1 With reference to the "Experimental Site Wind Availability Study for Sha Tin, Hong Kong" which was conducted in 2009. The site wind availability study was conducted using a 1:2000 scale topographical model to determine the effects of surrounding topography and urban environment on mean wind speeds and turbulence intensities above the regions of Shatin District centered close to City One Plaza. **Figure 5.3** shows the corresponding location of the measurement in the site wind availability study. Photographs of the 1:2000 scale topographical model in the low-speed test section under north, east, south, and west directions are shown in **Figure 5.4** for reference.

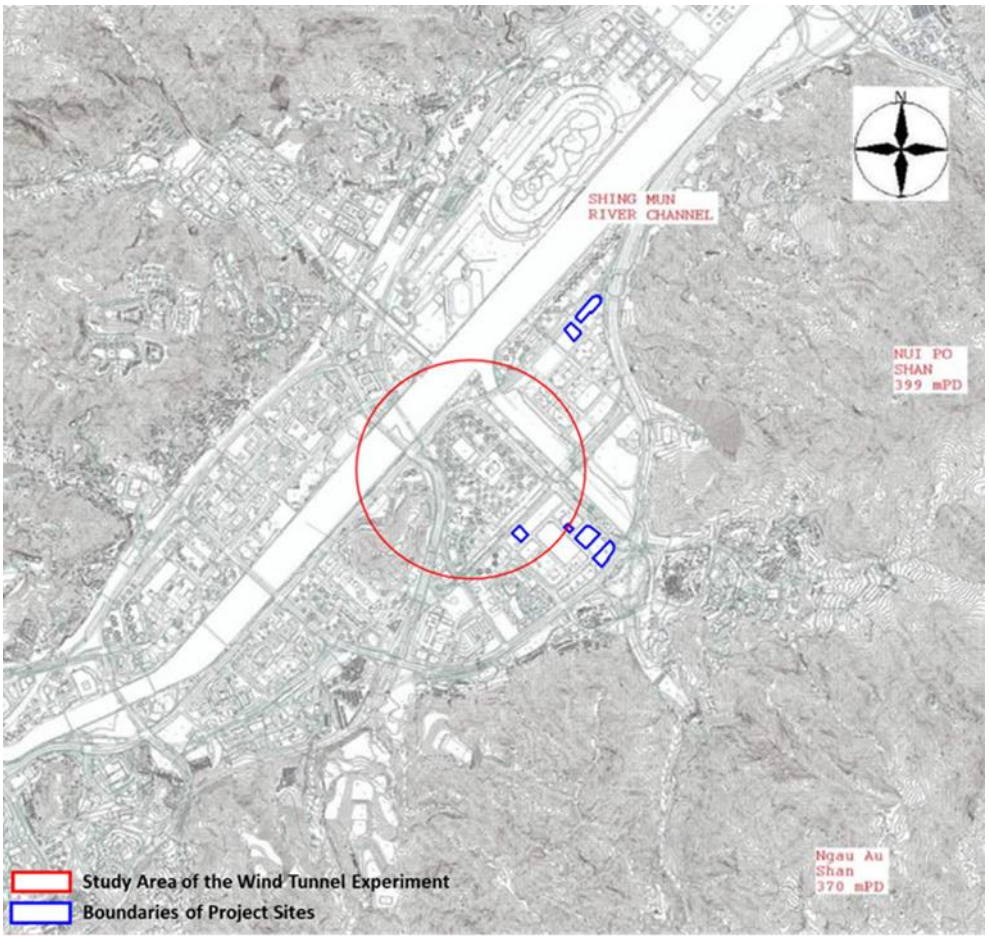


Figure 5.3 Wind Tunnel Test for the region near the Project Sites within Shatin District

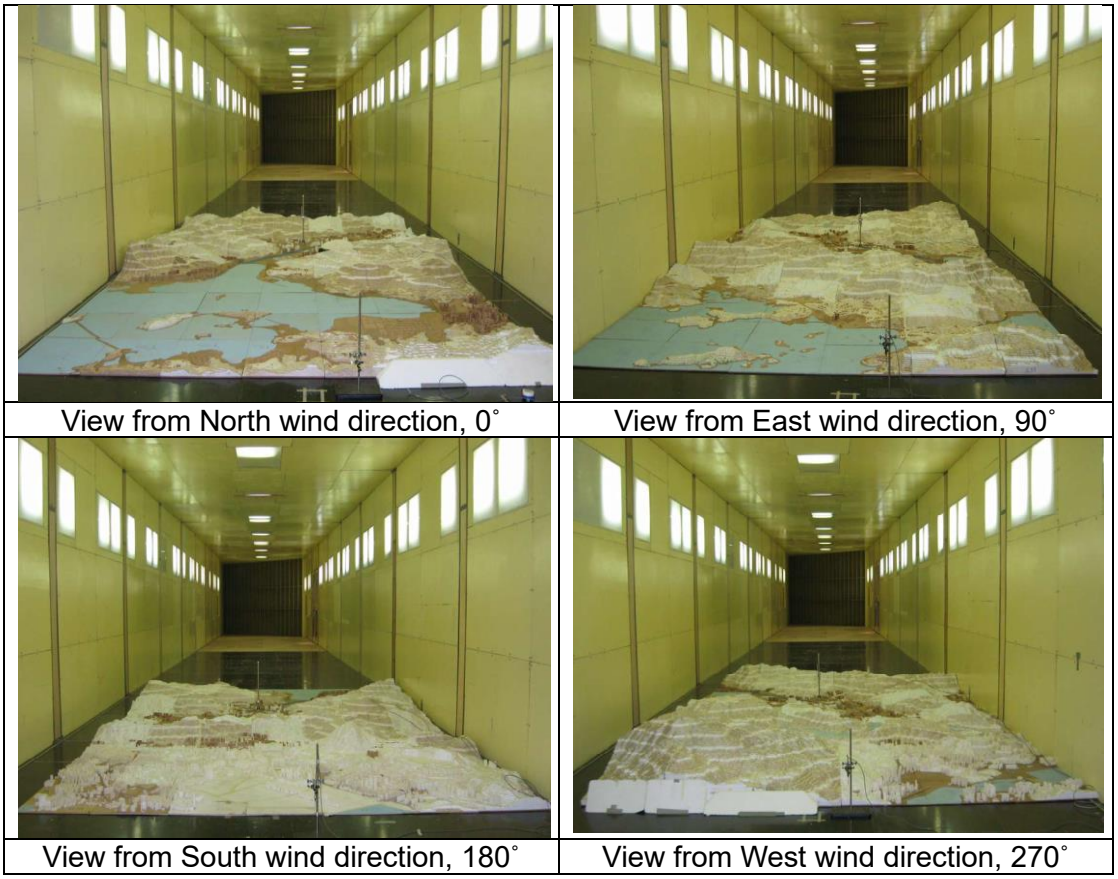


Figure 5.4 1:2000 scale topographical model of the Shatin Study Area in the low-speed test section from different views

5.3.2 The wind tunnel testing techniques used for the site wind availability study satisfied 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 for Wind Tunnel Studies of Buildings and Structures (1999). The site wind availability study was also conducted in accordance with the recommendations of Planning Department's Feasibility Study for Establishment of Air Ventilation Assessment System – Final Report (2005) and Technical Guide for Air Ventilation Assessment for Developments in Hong Kong (2006).

5.3.3 The wind tunnel testing results were subsequently combined with a statistical model to determine directional wind characteristics and availability for the regions near the Project Sites within the Shatin District. The annual and summer wind roses at the regions near the Project Sites are shown in **Figure 5.5**. The wind rose result indicated the dominance of each of the 16 wind directions and the distribution of the wind speed at 200mPD.

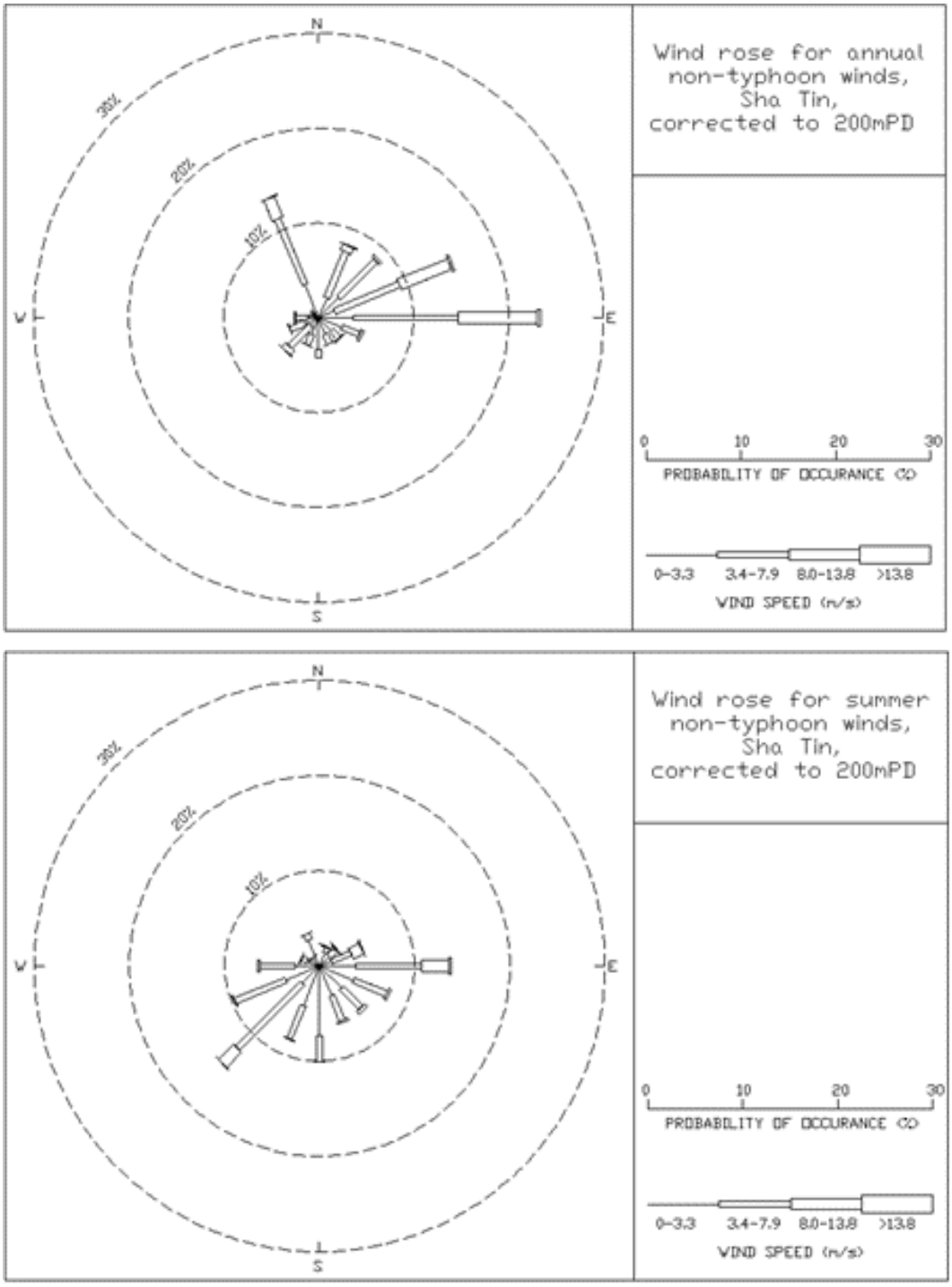


Figure 5.5 Wind Roses for Annual and Summer, non-typhoon winds for regions near the Project Sites within Shatin corrected to 200mPD

5.3.4 The wind roses from the experimental site wind availability study indicate that the annual prevailing wind towards the Project Sites are mainly coming from E, ENE, NNW directions, while most of the summer wind are from the E, S and SW directions. In addition, the frequencies of annual and summer season occurrence of individual wind directions at 200mPD for the region near the Project Sites are shown in **Table 5.2**.

Table 5.2 Frequencies of Annual and Summer Season Occurrence of Individual Wind Directions at 200mPD near the Project Sites

Wind Direction	% of Annual Occurrence	% of Summer Occurrence
0º (N)	0.0%	0.0%
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)	3.1%	8.3%
225º (SW)	4.9%	**14.5%**
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)	**13.7%**	3.7%

5.3.5 Considering that the Study Area of the Wind Tunnel Experiment covers only Project Site 4 and Project Site 5 in this AVA Study. The wind data from the RAMS is considered more representative to identify the prevailing wind directions, therefore, the wind data from the Wind Tunnel Experiment is presented and adopted as a reference only.

5.4 HKO Weather Station Wind Data

5.4.1 Closest Hong Kong Observatory (HKO from hereafter) weather station to the Project Sites is the Shatin Weather Station, located at 6mPD height and is more than 2km away from the Project Sites. The related locations of the Project Sites and the weather station are shown in **Figure 5.6** below.

5.4.2 Since the Shatin Weather Station is relative far (more than 2 km) from the Project Sites of Shek Mun and Siu Lek Yuen and located at 6mPD height, the wind measured might deviate from those in the regions of Shek Mun and Siu Lek Yuen under the effect of topographies. In view of this, the wind data obtained from the HKO Shatin weather station is presented but adopted as a reference only. The wind roses for annual wind and the summer wind averaged over the year 1985 to 2021 are shown in **Figure 5.7.**

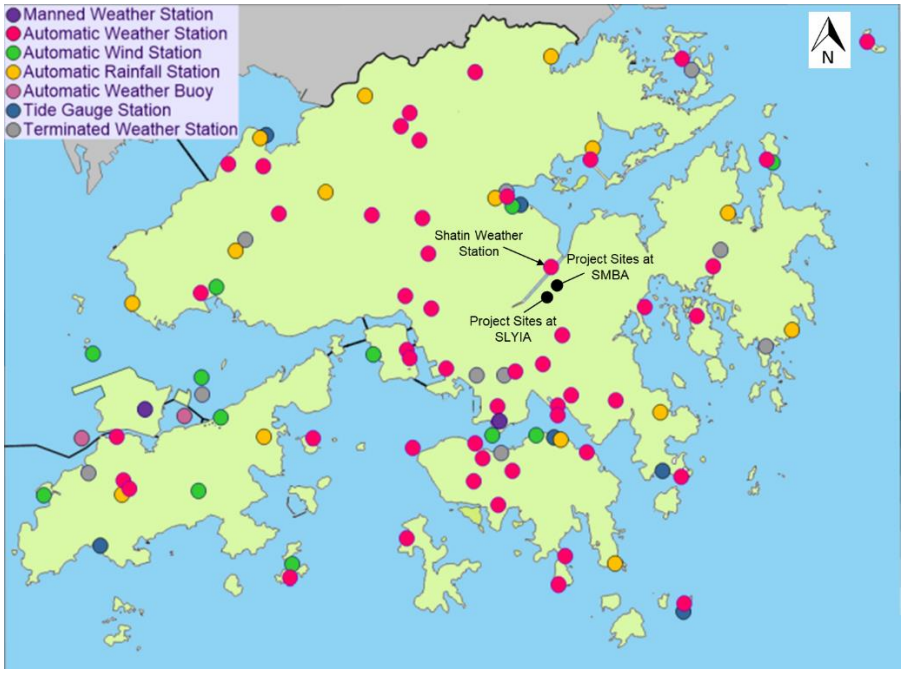
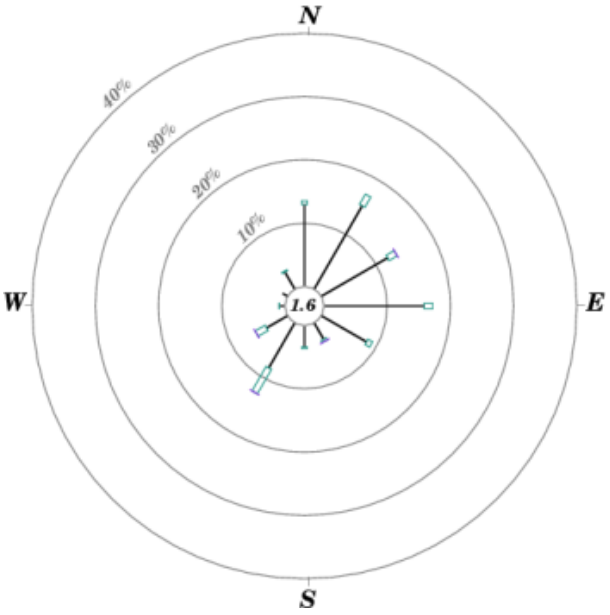
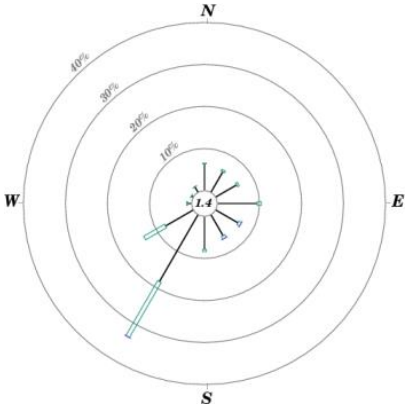


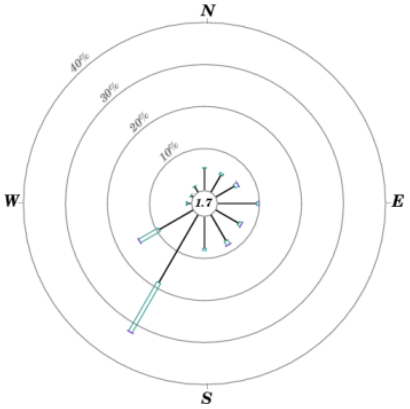
Figure 5.6 Locations of the HKO Shatin Weather Station and the Project Sites



Annual



June



July

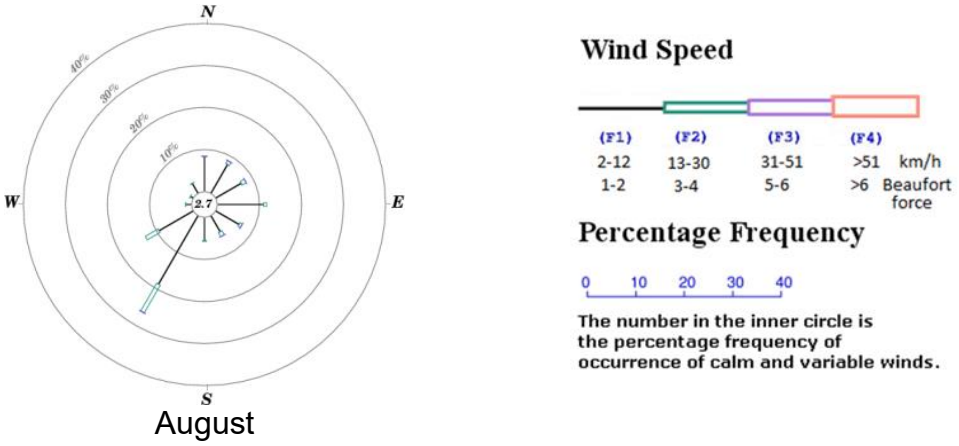


Figure 5.7 Annual Wind Rose and Wind Rose for Summer Months from HKO Shatin Weather Station

5.4.3 Based on the wind roses at HKO Shatin Weather Station, the annual prevailing wind at the Shatin District mainly come from the north-eastern, eastern quadrant and from the south westerly direction, while in summer, the prevailing wind are coming from south westerly and easterly directions.

5.5 Summary

5.5.1 As the four identified RAMS grids cover the Project Sites in Shek Mun and Siu Lek Yuen, it is determined that the RAMS wind data from the identified grids are relevant for identification of prevailing wind directions in this Study. The Experimental Site Wind Availability Study for Sha Tin, Hong Kong conducted in 2009 focused on the site wind for the regions near the Project Sites, but the Study Area of the wind tunnel experiment only covers Project Sites 4 and 5 within the SLYIA in this AVA Study. The HKO Shatin weather station is located away from the Project Site with a relatively low station elevation, in which the wind data would be under the effect of topographies. However, the wind roses from the Shatin HKO weather station and Wind Tunnel Experiment are still presented but only adopted as a reference. **Table 5.3** summarizes the prevailing wind identified from the wind data of the RAMS model, Wind Tunnel Experiment and HKO Shatin Weather Station.

5.5.2 The wind availability data from the RAMS suggest that the annual prevailing wind towards the SMBA Project Sites (Project Sites 1 and 2) is coming from NNE, NE, E directions, while in summer, the wind environment would heavily rely on the E, S, SSW and SW wind. For the SLYIA Project Sites (Project Sites 3, 4, 5 and 6), the annual prevailing wind is from the NNE, E, and ESE directions, while the summer prevailing wind is from the E, SSW and SW directions. **Figure 5.8(a)** and **Figure 5.8(b)** illustrates the prevailing wind directions toward the SMBA Project Sites (Project Sites 1 and 2) and SLYIA Project Sites (Project Sites 3, 4, 5 and 6) respectively.

Table 5.3 Summary of Prevailing Wind Directions towards the Project Sites from Difference Sources

	RAMS model		Wind Tunnel Experiment	HKO Shatin Weather Station
	SMBA	SLYIA		
Annual Wind	NNE, NE, E	NNE, E, ESE	ENE, E, NNW	NNE, N, E
Summer Wind	E, S, SSW, SW	E, SSW, SW	E, S, SW	WSW, SSW, E

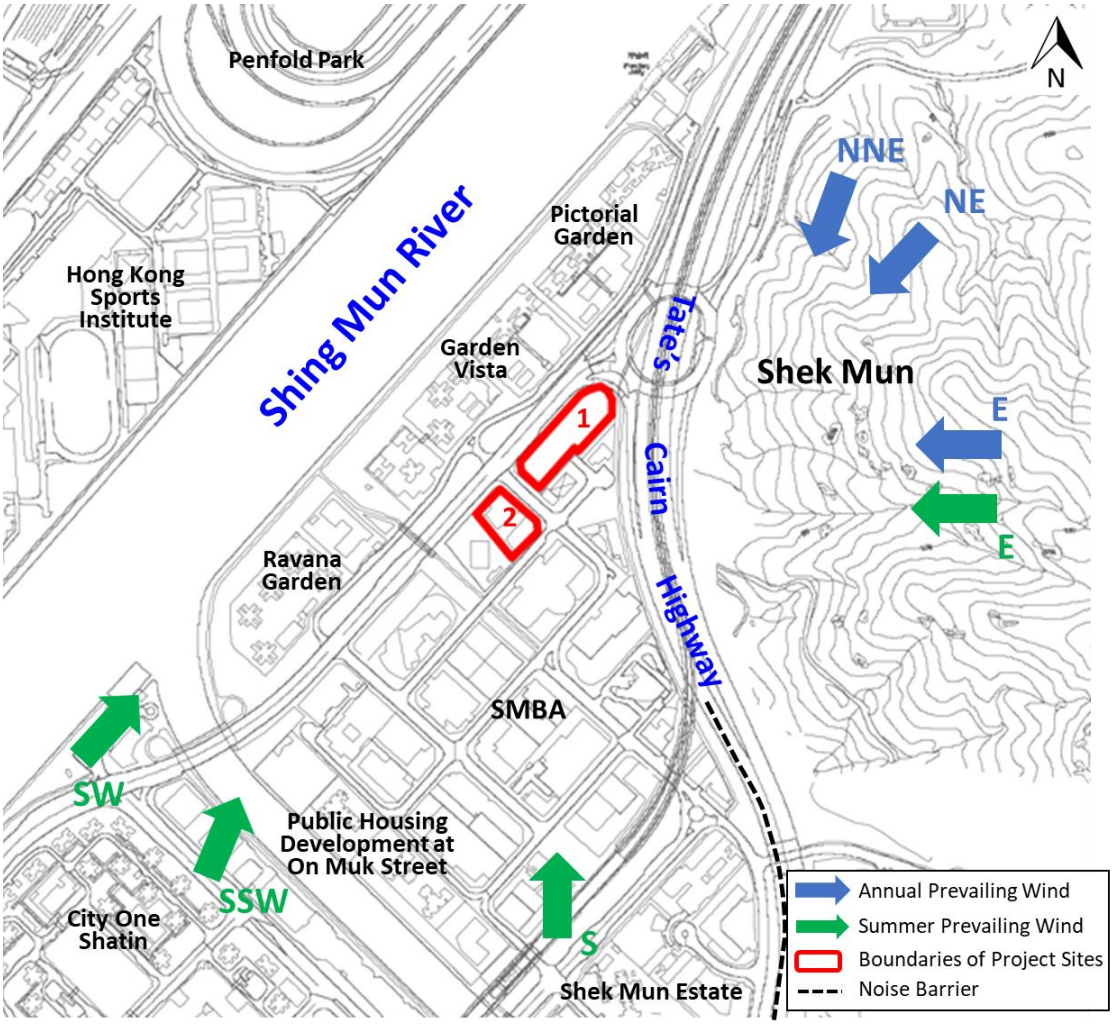


Figure 5.8(a) Illustration of Prevailing Wind Directions approaching the SMBA Project Sites

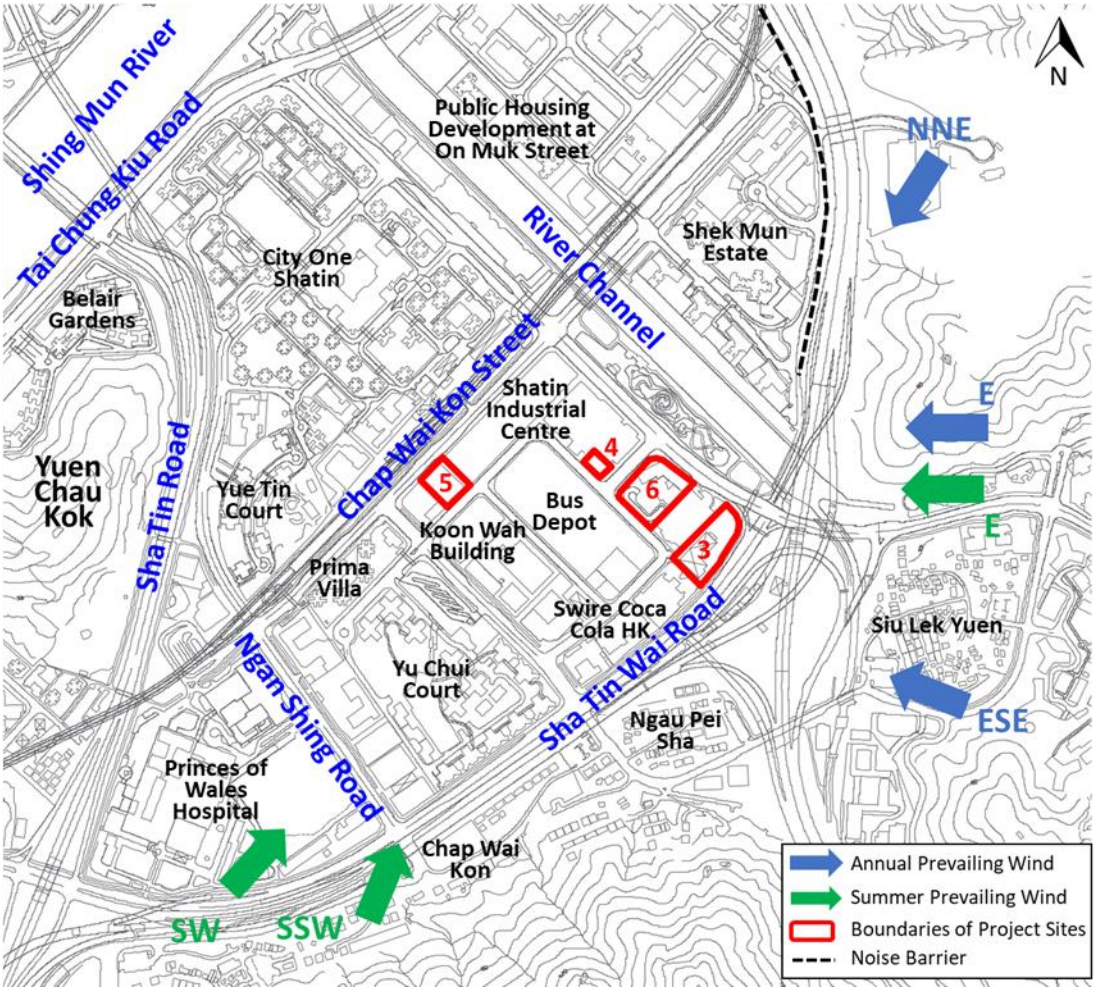


Figure 5.8(b) Illustration of Prevailing Wind Directions approaching SLYIA Project Sites

6 THE BASELINE AND PROPOSED SCENARIOS

6.1 Baseline Scenario

6.1.1 Two Scenarios are examined in this AVA Study, namely the Baseline Scenario and Proposed Scenario. The Baseline Scenario would assume that the Project Sites maintain the current conditions. Project Site 1 zoned "G/IC" and Project Site 2 zoned "O" within the SMBA are currently open ground carparks and open storage and plant nursery respectively. The Project Site 3 within the SLYIA zoned "O" is currently occupied by low-rise temporarily structures; Project Site 4 next to the PCCW Telephone Exchange Block zoned "G/IC" is currently vacant land while Project Site 5 next to the Siu Lek Yuen Fire Station also zoned "G/IC" is currently an open ground carpark.

6.2 Proposed Scenario

6.2.1 Under the Proposed Scenario, Project Sites 1 and 2 within the SMBA currently are open ground carparks and vacant land would be rezoned for "C" and "G/IC" usage with Building Height Restriction (BHR) of 130mPD.

6.2.2 Project Sites 3 and 5 within the SLYIA are proposed to be rezoned for residential use, while Project Site 4 is proposed to be rezoned for commercial use. Despite that BHR of 110mPD and 120mPD are proposed to be imposed for Project Site 3 and Project Sites 4, 5 respectively, the building heights of the proposed developments within the Project Sites under the given indicative development layout have not reached the BHR and the EE would be carried out based on the indicative building layouts which are described in detail below.

6.2.3 Apart from the above, there is a high-rise hotel named ALVA Hotel by Royal with building height of 102mPD currently located within Project Site 6. The Baseline and Proposed Scenario for Project Site 6 would be the same, and the Expert Evaluation would be carried out adopting the existing building which reflect the current situation.

SMBA

Project Site 1

6.2.4 Project Site 1 is currently zoned "G/IC" and is occupied by open air carparks. This Project Site with a total site area of approximately 0.74ha is proposed to be rezoned for "C" with a non-domestic Plot ratio of 9.5. The mean street level of the Project Site is approximately 8mPD and there would be a proposed Building Height Restriction of 130mPD to be imposed. According to the indicative layout, there would be two proposed commercial blocks both having a building height of approximately 117mPD (slightly lower than the proposed BHR) situated on ancillary vehicle parking structures of approximately 13mPD in height. There also exist a block for government, institution and community (GIC) facilities of 33mPD underneath proposed Tower T1. The proposed developments would occupy around 80% of the total Project Site with the remaining lands reserved for open grounds. It can be seen from **Figure 6.1(a)**, presenting the proposed indicative building layout within Project Site 1, the podiums beneath the proposed commercial towers are placed approximately 13m and 7m away from the northeastern and southwestern Project Site boundaries respectively with a separation of approximately 15m in between.

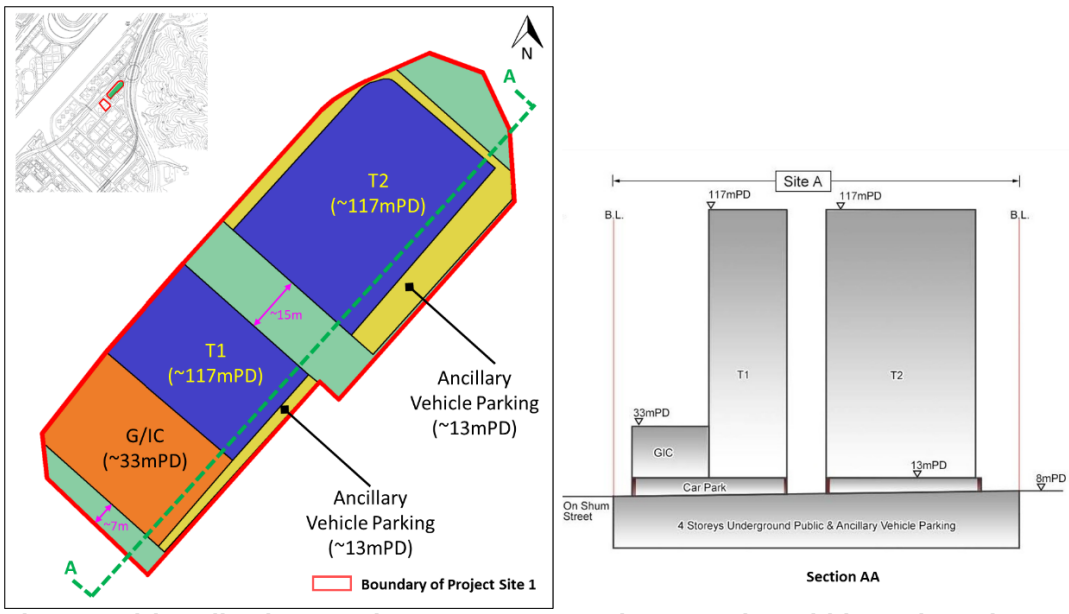


Figure 6.1(a) Indicative Development Layout and Cut Section within Project Site 1

Project Site 2

6.2.5 Project Site 2 is currently zoned "O" and is currently open storage and plant nursery. This Project Site with a total site area of approximately 0.41ha is proposed to be rezoned for "C" with a non-domestic Plot ratio of 9.5. The mean street level of the Project Site is approximately 5.8mPD and there would be a proposed BHR of 130mPD to be imposed. According to the indicative layout, there would be a proposed commercial block having a building height of approximately 111mPD (slightly lower than the proposed BHR) situated on a pickup/drop off bay of approximately 11mPD in height. There would be an empty bay of around 7m in width and 5m in height incorporated to facilitate wind penetration. The proposed commercial block would occupy around 52% of the total Project Site with the pickup/dropping off bays occupying the entire ground level of the Project Site. It can be seen from **Figure 6.1(b)**, presenting the proposed indicative building layout within Project Site 2, the proposed commercial tower is placed approximately 10m and 17m away from the northwestern and southeastern Project Site boundaries respectively.

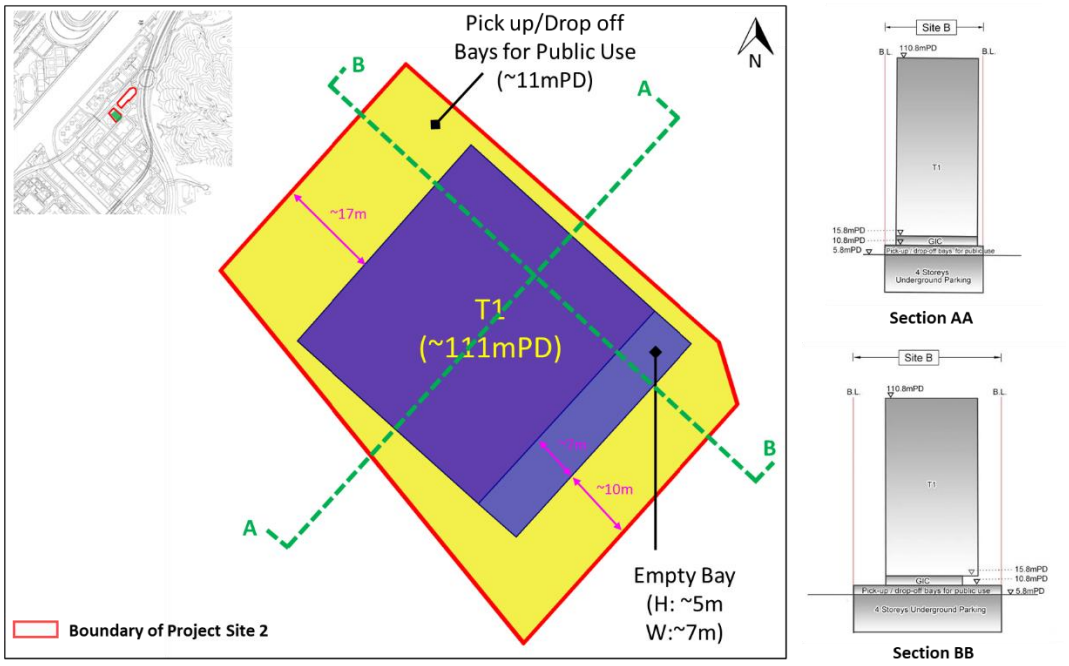


Figure 6.1(b) Indicative Development Layout and Cut Section within Project Site 2

SLYIA

Project Site 3

6.2.6 Project Site 3 is currently zoned "O" and occupied by low-rise temporary structures. This Project Site with a total site area of approximately 0.56ha is proposed to be rezoned for residential land use with a total Plot ratio of 5. The mean street level of the Project Site is approximately 6mPD and there would be a proposed BHR of 110mPD to be imposed. According to the indicative layout, the two proposed residential blocks would have a height of approximately 99mPD and 109mPD respectively (slightly lower than the proposed BHR), with Tower 1 has a lower building height than Tower 2. Tower 1 is situated on a low-rise podium of around 11mPD in height while Tower 2 is situated on terraced podiums of 16mPD and 21mPD in height, where there would be ancillary facilities such as carparks and club houses to be placed at the podiums. The towers and podiums occupy 42% of the Project Site with the remaining lands reserved as buffer zones, drainage reserve, vehicle access, and open grounds. It can be seen from **Figure 6.1(c)**, presenting the proposed indicative building layout within Project Site 3, that the proposed building T1 are placed approximately 18m away from the southwestern Project Site boundary and the podium underneath with approximately 9m setback from the Project Site boundary. In addition, there is approximately 15m separation distance in between the podiums of the two proposed residential towers.

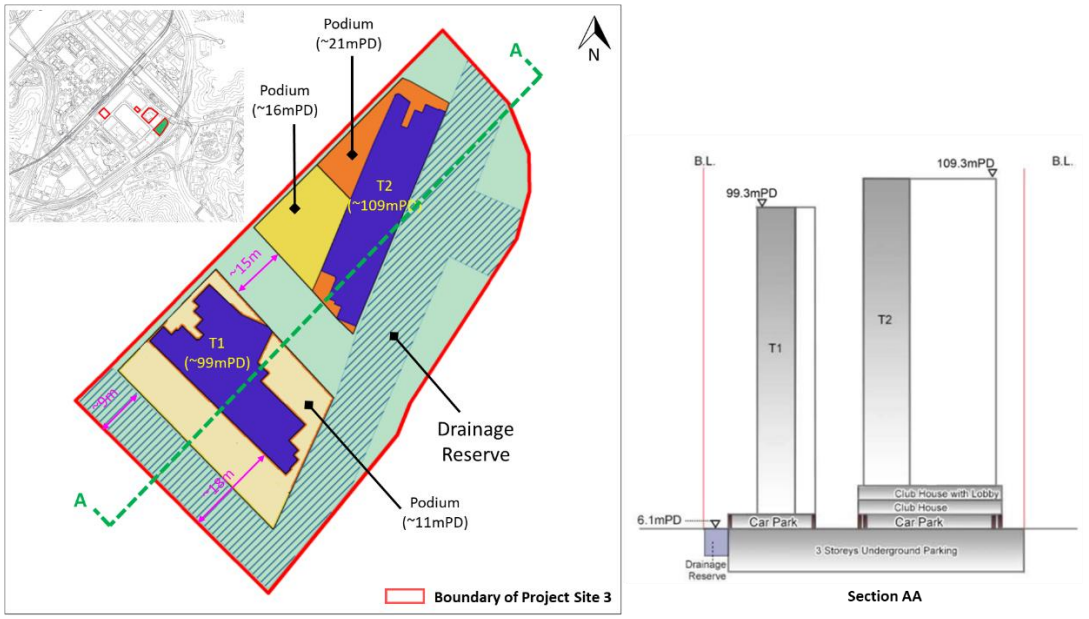


Figure 6.1(c) Indicative Development Layout and Cut Section within Project Site 3

Project Site 4

6.2.7 Project Site 4 is currently zoned "G/IC" and is vacant at its status. This Project Site with a total site area of approximately 0.11ha is proposed to be rezoned for commercial land use with a non-domestic Plot ratio of 9.5. The mean street level of the Project Site is approximately 6mPD and there would be a proposed BHR of 120mPD to be imposed. According to the indicative layout, there would be one single proposed commercial block having a building height of approximately 101mPD (lower than the proposed BHR) situated on a low-rise podium of around 11mPD, where there would be vehicle parks. The remaining lands excluding the proposed development would be preserved for open grounds. It can be seen from **Figure 6.1(d)**, presenting the proposed indicative building layout within Project Site 4, that the proposed building and its podium incorporated approximately 3m buffer distance from the northwestern Project Site boundary.

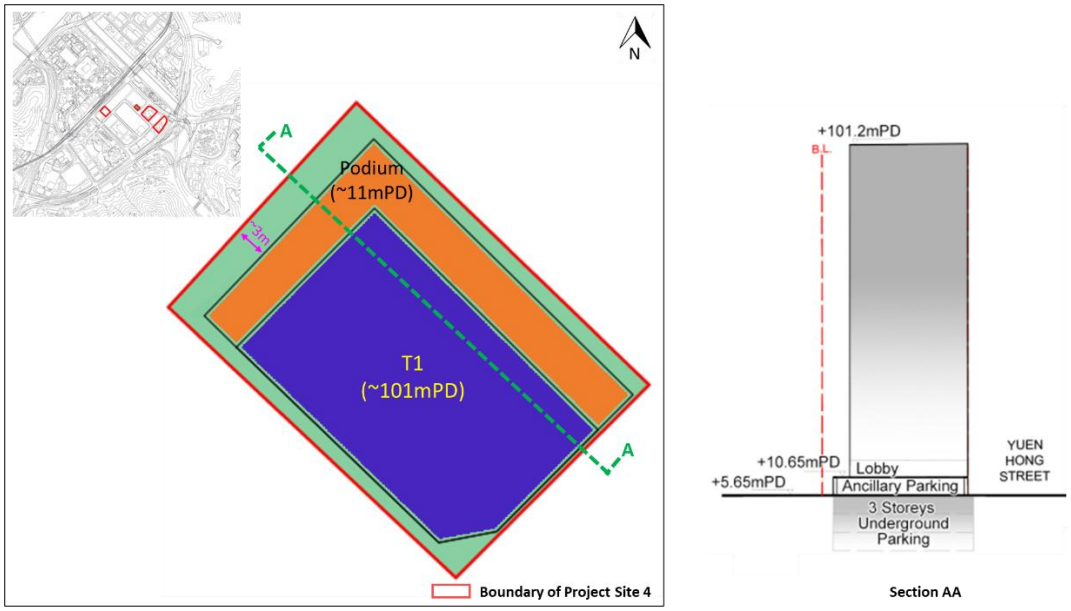


Figure 6.1(d) Indicative Development Layout and Cut Section within Project Site 4

Project Site 5

6.2.8 Project Site 5 is currently zoned "G/IC" land is occupied by open air carparks. This Project Site with a total site area of approximately 0.23ha is proposed to be rezoned for residential land use with a total Plot ratio of 6. The mean street level of the Project Site is approximately 5.5mPD and there would be a proposed BHR of 120mPD to be imposed. According to the indicative layout, there would be two proposed residential blocks anticipated to provide around a total of 276 flats both having a building height of approximately 93mPD (lower than the proposed BHR) situated on low-rise podiums of approximately 16mPD in height, with ancillary facilities such as Carparks, Club Houses and GIC facilities. The proposed development would occupy 62% of the total Project Site with the remaining lands reserved for emergency vehicular access (EVA) and Open Grounds. It can be seen from **Figure 6.1(e),** presenting the proposed indicative building layout within Project Site 5, the podium beneath the proposed residential towers is placed approximately 9m away from the northeastern Project Site boundary with an EVA incorporated in between and there are around 19m separation in between the two residential towers.

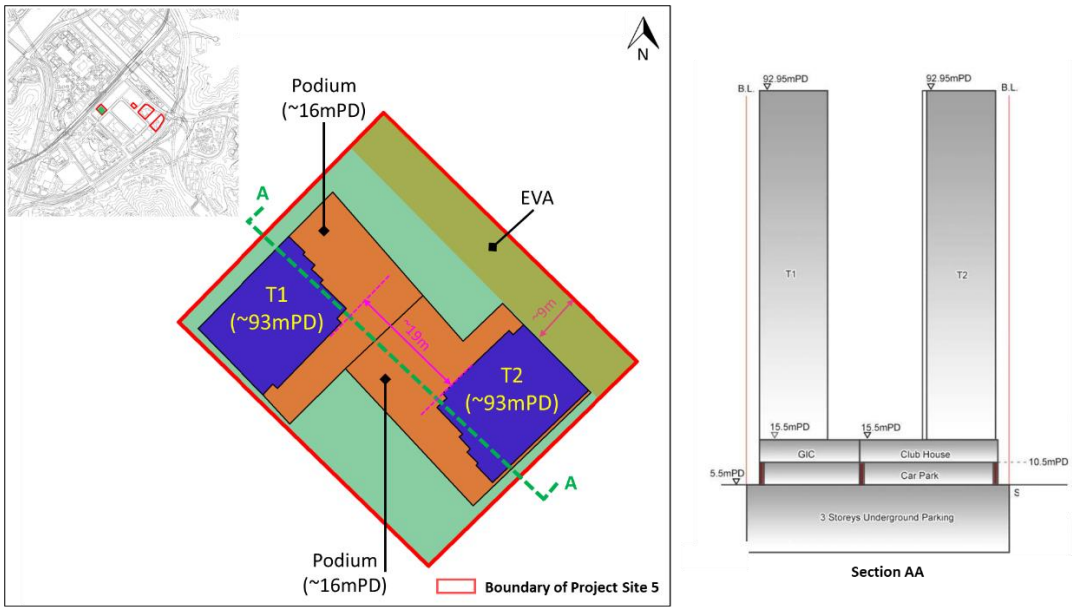


Figure 6.1(e) Indicative Development Layout and Cut Section within Project Site 5

6.2.9 Under the Proposed Scenario, both domestic residential blocks, commercial buildings, non-domestic podiums, and ancillary buildings are to appear within the various Project Sites at the SMBA and the SLYIA. Air ventilation good design measures have been considered in the building designs of the indicative building layouts within the Project Sites under the Proposed Scenario, which include but not limited to the incorporation of separations in between the proposed buildings, setback from the boundaries of the Project Sites, adopt low-rise podium designs, terraced podium designs, retain open grounds within the Project Site etc. The good air ventilation design measures incorporated all target for better wind permeability and elongation of airpaths to facilitate the flow of prevailing wind. In addition, the proposed developments have not designed to have full site coverage which is advantageous in maintaining the wind environment. This clearly shows that air ventilation has been taken as an important factor to concern during the development process and stages. The major Development Parameters for each of the Project Sites are summarized in **Table 6.1**.

6.3 Project Site 6 occupied by the ALVA Hotel by Royal

6.3.1 Project Site 6 with a site area of approximately 0.64ha, currently zoned "I(1)", is proposed to be rezoned for "C". The Project Site is currently occupied by a high-rise hotel named ALVA Hotel by Royal which has a building height of 102mPD and a podium height of 21mPD. A BHR of 120mPD is proposed to be imposed for Project Site 6. Currently there is no BHR for this Project Site. Both the Baseline Scenario and the Proposed Scenario undergo evaluation would assume Project Site 6 to be the current condition occupied by ALVA Hotel by Royal. **Figure 6.1(f)** presents the building layout of ALVA Hotel by Royal within Project Site 6.

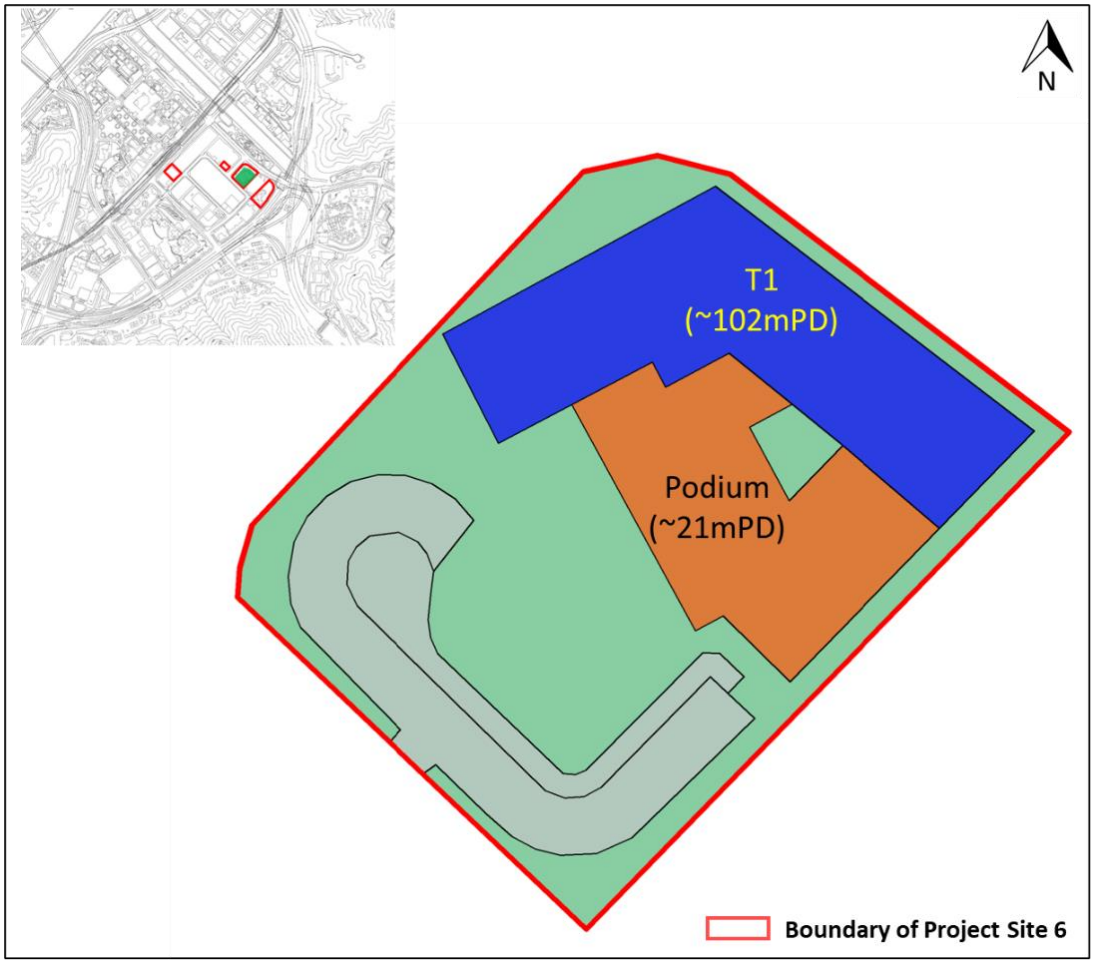


Figure 6.1(f) Building Layout of the ALVA Hotel by Royal within Project Site 6

6.3.2 The overview of the indicative layouts within the Project Sites at SMBA and SLYIA are shown in **Figure 6.2** below.

(a) (b)

Figure 6.2 Overview of the Indicative Layouts within SMBA and SLYIA Project Sites

Table 6.1 Difference in Development Parameters for the Project Sites

Project Site	Current Zoning	Approximate Site Area (ha)	Proposed Zoning	Proposed Total PR and Total PR of Indicative Schemes	Proposed BHR (mPD)	Approximate Building Heights of the Indicative Schemes (mPD)
SMBA						
1	G/IC	0.74	Commercial	9.5	130	117
2	Open Space	0.41	Commercial	9.5	130	111
SLYIA						
3	Open Space	0.56	Residential	5	110	99 – 109
4	G/IC	0.11	Commercial	9.5	120	101
5	G/IC	0.23	Residential	6	120	93
6	Industrial	0.64	Commercial	N/A*	120	102

* Development in Project Site 6 will be restricted to a maximum non-domestic gross floor area (GFA) of 32,000m^2.
N/A = Not Applicable

6.4 Planned and Committed Developments/Redevelopments near the Project Sites

Public Housing Development at On Muk Street

6.4.1 There would be planned and committed high-rise public housing developments near On Muk Street adjacent to the On Muk Street Garden located in between the SMBA Project Sites and the SLYIA Project Sites. By reviewing the "AVA EE Report for Proposed Public Housing Development at On Muk Street, Shek Mun" and "AVA Initial Study Report on Consultancy for Environmental Design Studies for Subsidized Sale Flats Development at On Muk Street Phase 1, Shek Mun, Shatin" completed in 2015 and 2020 respectively, it is understood that the proposed public housing development has a plot ratio of 6 and consists of three domestic blocks sitting at grade with a maximum building height of 116mPD and a primary school (approximate 35mPD) to the east of the Phase 2 Housing Site. Block 1 makes up Phase 1 of the development, while Blocks 2 and 3 are under the Phase 2 development. The preliminary disposition of the building blocks provides separation gaps of approximately 57m between Blocks 1 and 2, 15m between Blocks 2 and 3, 26m between Block 3 and the primary school. **Figure 6.3** illustrates both the Phase 1 and Phase 2 proposed housing development layouts near On Muk Street.

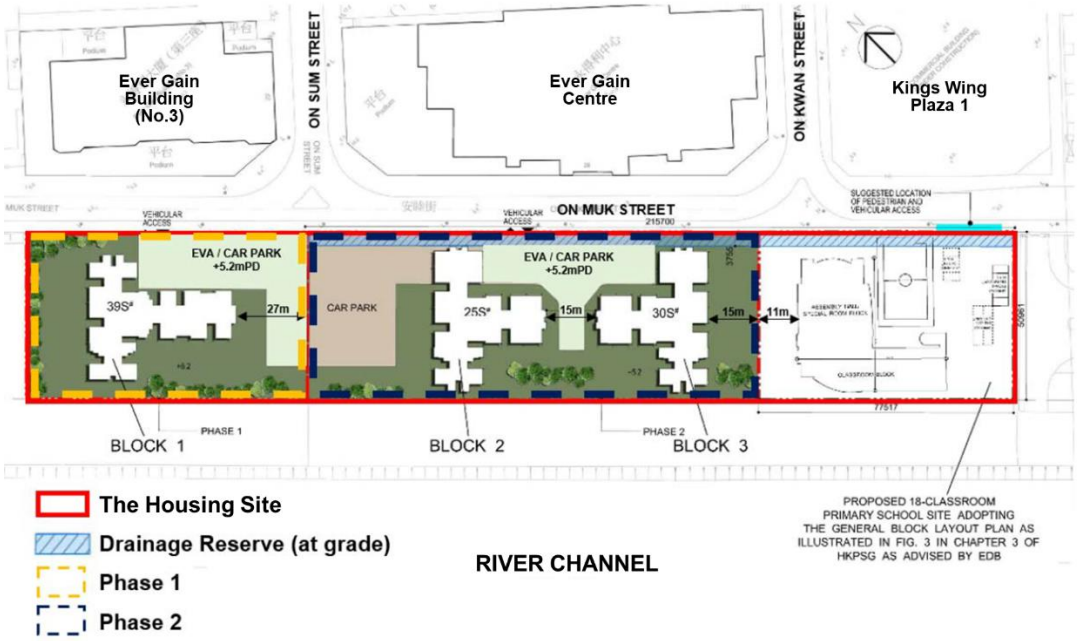


Figure 6.3 Proposed Public Housing Layouts (Phase 1 and Phase 2) at On Muk Street

6.4.2 As mentioned in the "AVA EE Report for Proposed Public Housing Development at On Muk Street, Shek Mun", to response the public concerns, rezoning of the land occupied by the current Jockey Club Kitchee Centre (i.e., Phase 2 and Primary School) would be postponed until the relocation arrangements for the football training centre are settled. In view of the above, Housing Department has prepared a revised layout plan by adding new structures (i.e., Car park, Roof Garden, and Recreation Area) at the southern half of the Phase 1 Housing Site. The following up "AVA Initial Study on Consultancy for Environmental Design Studies for Subsidized Sale Flats Development at On Muk Street Phase 1, Shek Mun, Shatin" further refined the proposed block for the Phase 1 development by incorporating building void at the podium floor to improve air ventilation with very similar building layout. The refined 32 storey proposed block for the Phase 1 development has a maximum height of approximately 101mPD with 1-storey car park of about 7.7mPD. The indicative layout and section plane being illustrated in **Figure 6.4**.

6.4.3 Despite the Phase 2 development of the On Muk Street Public Housing would be postponed, the CFD simulations carried out in the "AVA Initial Study on Consultancy for Environmental Design Studies for Subsidized Sale Flats Development at On Muk Street Phase 1, Shek Mun, Shatin" assumed the two proposed housing towers under Phase 2 development and the

proposed school are in place. Therefore, in the current assessment, the two proposed housing blocks under Phase 2 development and the primary school would be assumed to be appeared at the current football fields belonging to the current Jockey Club Kitchee Centre.

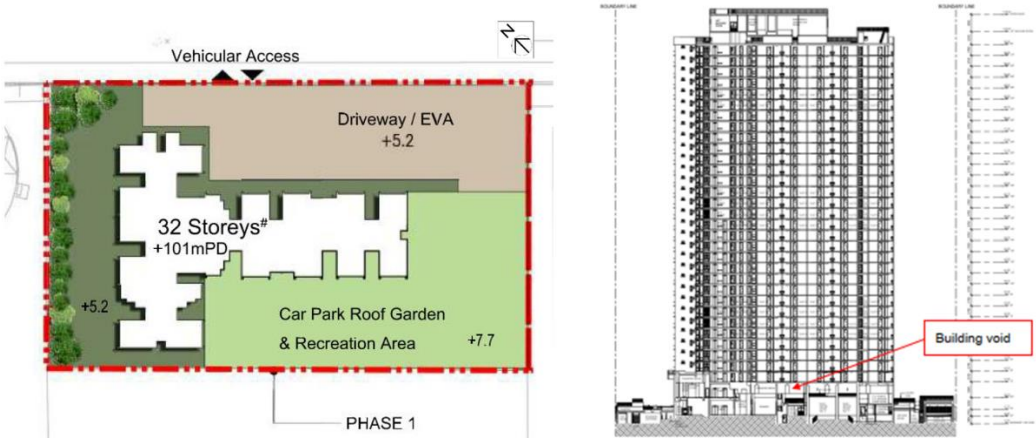


Figure 6.4 Refined Layout and Section Plane for Public Housing Development (Phase 1) at On Muk Street

Redevelopment of Prince of Wales Hospital

6.4.4 Another major redevelopment spotted near the SLYIA Project Sites (Project Sites 3, 4, 5, 6a to 6e and 7) is the Prince of Wales Hospital located to their south-west directions. Prince of Wales Hospital is a major acute hospital in the New Territories East Cluster belonging to the Hospital Authority (HA). It provides a comprehensive range of secondary and tertiary services for the residents within the Shatin District. It is also the teaching hospital for the Faculty of Medicine of the Chinese University of Hong Kong.

6.4.5 Designed and built in the 1970s, the Prince of Wales Hospital commenced operation in 1984. Notwithstanding the completion of Main Clinical Block and Trauma Centre (MCBTC) in 2010 under the phase 1 redevelopment of Prince of Wales Hospital, which aimed at presenting the hospital with the opportunities to overcome the severe constraints on its ability to meet service and teaching demands at that time, many clinical services in Prince of Wales Hospital remain scattered in the old buildings under sub-optimal conditions. Regarding this, HA has formulated a Clinical Services Plan to facilitate and guide the redevelopment of the Prince of Wales Hospital.

6.4.6 Following the completion of Phase 1 redevelopment in 2010, the Phase 2 redevelopments of the Prince of Wales Hospital will be carried out in two stages, with the first stage involves renovation works at existing buildings and construction of an off-site decanting building at Shatin Hospital for decanting the facilities in the existing buildings of Prince of Wales Hospital to be demolished; demolition of Staff Quarters Blocks and the Lecture Theatre Building for the construction of a new In-patient Extension Block; and refurbishment, alteration and addition to the existing MCBTC.

6.4.7 Stage 2 mainly involves demolition of the hospital old buildings group including the Day Treatment Block, Special Block, Lui Che Woo Clinical Sciences Building, Podium Block, Eye Centre, and Li Ka Shing Specialist Clinics (North Wing), and the construction of a new Ambulatory Care Centre and Cancer Centre.

6.4.8 The preparatory works of the redevelopment of Prince of Wales Hospital, the redevelopment Phase 2 (Stage 1) project has commenced in 2017 and anticipated to complete by 2028. Demolition and foundation works have commenced since December 2019 and are currently in progress. **Figure 6.5(a)** shows the current redevelopment condition under the Phase 2 redevelopment (Stage 1) of the Prince of Wales Hospital and **Figure 6.5(b)** shows the anticipated conceptual building layout after redevelopments.

Figure 6.5(a) Current Redevelopment Condition under the Phase 2 Redevelopment (Stage 1) of the Prince of Wales Hospital

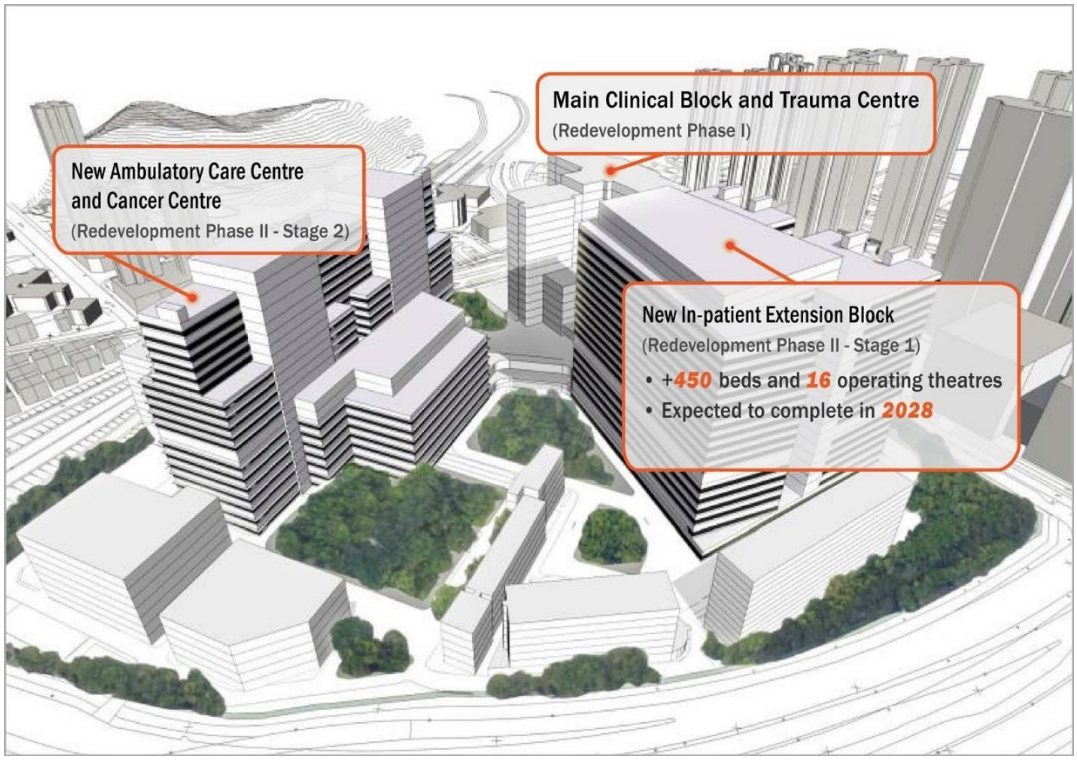


Figure 6.5(b) Anticipated Image after the Redevelopment of the Prince of Wales Hospital

7 EXPERT EVALUATION ON THE BASELINE AND PROPOSED SCENARIOS

7.1 General

7.1.1 The Shek Mun and Siu Lek Yuen Areas containing the Project Sites are located within the Shatin District of Hong Kong, the majority land parcels surrounding the Project Sites include “GB”, “O”, “ “OU”, “R(A)”, “R(B)”, “G/IC” as well as scattered areas of “V” zone.

7.1.2 Among the six Projects Sites (Project Sites 1, 2, 3, 4, 5 and 6) located at the Shek Mun and Siu Lek Yuen Areas within the Shatin District, two of the Project Sites (Project Sites 1 and 2) are located within the SMBA, with one of them being currently zoned “G/IC” while the other is currently zoned “O”. The rest four Project Sites are located within the SLYIA with one of these Project Sites zoned for “I(1)”, while the rest three are zoned for “O” and “G/IC” use. The Project Sites are currently occupied by open ground carparks, temporary structures and hotel.

7.1.3 To the near north-west of the Project Sites 1 and 2 at Shek Mun are the residential developments of Pictorial Garden, Garden Vista, and Ravana Garden. To the further north-west across Shing Mun River locate the Hong Kong Sports Institute and Penfold Park. Located to the south of the two Project Sites are the existing developments of the SMBA while to the east across Tate Cairn’s Highway are extensive “GB” Areas. To the near southwest of the SMBA is the site planned for public housing developments at On Muk Street.

7.1.4 Across the river channel is Siu Lek Yuen Road Playground and the Project Sites 3, 4, 5 and 6 at SLYIA. To the northwest of the SLYIA Project Sites is a piece of observable “R(A)” land belonging to the City One Shatin, while to the southeast direction exist the Yu Chui Court which is another residential area. There are also some GIC blocks belonging to the Princes of Wales Hospital and Hang Seng University of Hong Kong across Sha Tin Wai Road, with villages of Siu Lek Yuen, Chap Wai Kon and Ngau Pei Sha found near the university. Apart from the above, some open spaces including but not limited to Yuen Chau Kok Park, Siu Lek Yuen Road Playground, Ngau Pei Sha Street Playground, Shek Mun Riverside Garden and On Muk Street Garden, serving as breathing spaces in the surroundings of the Project Sites.

7.1.5 The six Project Sites are located at a sizable flatland surrounded by hilly terrains with varying heights to their north-eastern, eastern, south-eastern, southern directions and to the further north westerly direction across Shing Mun River. The terrains to the eastern and north-eastern directions of the Project Sites are the hilly terrains belonging to Turret Hill and Turret Pass. Terrains with relatively high elevations of Buffalo Hill, Ngau Au Shan and Tsim Mei Fung can be found to the south-easterly directions of the Project Sites. There are also hilly terrains belonging to Shui Cheun O and Grassy Hill located to the southerly and north westerly directions of the Project Sites respectively, while the lands located to the south-west and north of the Project Sites are relatively flat.

7.1.6 Owing to the relatively far separation between Project Sites 1 and 2 and Project Sites 3, 4, 5, and 6, separated by the existing developments within the SMBA, the planned/committed public housing development at On Muk Street, the Shek Mun Estate, Siu Lek Yuen Road Playground and the river channel of Shing Mun River, the developments within the two clusters of Project Sites are not expected to give rise to observable cumulative wind impacts. The flow and penetration of the prevailing wind toward the Project Sites and their surroundings are anticipated to be guided and dominated by the nearby local road networks and urban grids as well as the existing building morphologies to their near vicinities.

7.1.7 Two Development Scenarios would be examined in this Study, namely Baseline Scenario and the Proposed Scenario (described in **Section 6**). The changes in the building parameters and building morphologies in the Proposed Scenario would inevitably result in slight change in localized pedestrian wind environment near the Project Sites when compared with the Baseline Scenario. However, it is anticipated that the overall wind environment and wind flow patterns around the Project Sites would not be significantly affected under the Proposed Scenario as compared to the Baseline Scenario due to the unchanged local road networks and urban grids.

7.1.8 The EE of the two Scenarios in the following sections would be based on the potential change in anticipated wind flow patterns, the potential induced wind wake areas, building permeability, identification of wind sensitive and potential areas as well as major district wind corridors/local wind breezeways under identified prevailing wind directions.

7.2 Expert Evaluation on the Project Sites within SMBA

General

7.2.1 There are two Project Sites within the SMBA. Project Site 1 is currently occupied by open space carparks, while the Project Site 2, currently free of developments, is separated by On Sum Street with Project Site 1 and having Shek Mun Playground located adjacent to it. This section would conduct wind directional analysis and identify the corresponding potential wind sensitive areas near the SMBA Project Sites under the identified prevailing wind directions.

Under NNE and NE Annual Prevailing Wind Directions

Baseline Scenario

7.2.2 Shing Mun River serves as a major wind corridor which facilities the flow of the NNE/NE prevailing wind at the northwestern surroundings of the SMBA Project Sites as shown by Marker (1) in **Figure 7.1(a)**.

7.2.3 The NNE/NE prevailing wind from the Tate's Cairn Highway would flow along Tai Chung Kiu Road located in between Garden Vista and the Project Sites. This northeasterly wind breezeway would maintain the wind environment near Pictorial Garden, Garden Vista, Ravana Garden, a hotel namely Courtyard by Marriott HK Shatin as well as the northwestern peripheral of the Project Sites. The NNE/NE prevailing wind stream would also be capable to penetrate the open carparks within Project Site 1 as well as the vacant land within Project Site 2 under the current condition towards Shek Mun Playground and Courtyard by Marriott HK Shatin located to the further downwind (see Marker (2) in **Figure 7.1(a)**).

7.2.4 The wind environment along the southeastern peripheral of the Project Sites would be maintained by another NNE/NE wind breezeway, which is along On Ping Street. This NNE wind breezeway also benefits the wind environment near Grandtech Centre, New Trade Plaza and Courtyard by Marriott HK Shatin. The NNE/NE prevailing wind would further skim over the low-rise Heung Yee Kuk Building (around 37mPD) and penetrate On Muk Street Garden before reaching further downwind regions such as Siu Lek Yuen Road Playground and City One Shatin across the River Channel (see Marker (3) in **Figure 7.1(a)**).

7.2.5 Although separated by Grandtech Centre from the Project Sites, another two NNE/NE wind breezeways benefiting the wind environment near the SMBA Project Sites are On Sum Street and On Kwan Street parallel to On Ping Street. The weakened NNE/NE prevailing wind by the terrains of Turret Hill would flow across Tate's Cairn Highway via the permeable spaces underneath this highway to enter On Sum Street. The NNE/NE prevailing wind would flow along this wind breezeway to reach On Muk Street and further downwind areas of Siu Lek Yuen Road Playground (see Marker (4) in **Figure 7.1(a)**). Another stream of NNE wind weakened by Delta House and WLUXE would flow across On Yiu Street to enter On Kwan Street to approach Siu Lek Yuen Road Playground located on the opposite side of the River Channel (see Marker (5) in **Figure 7.1(a)**).

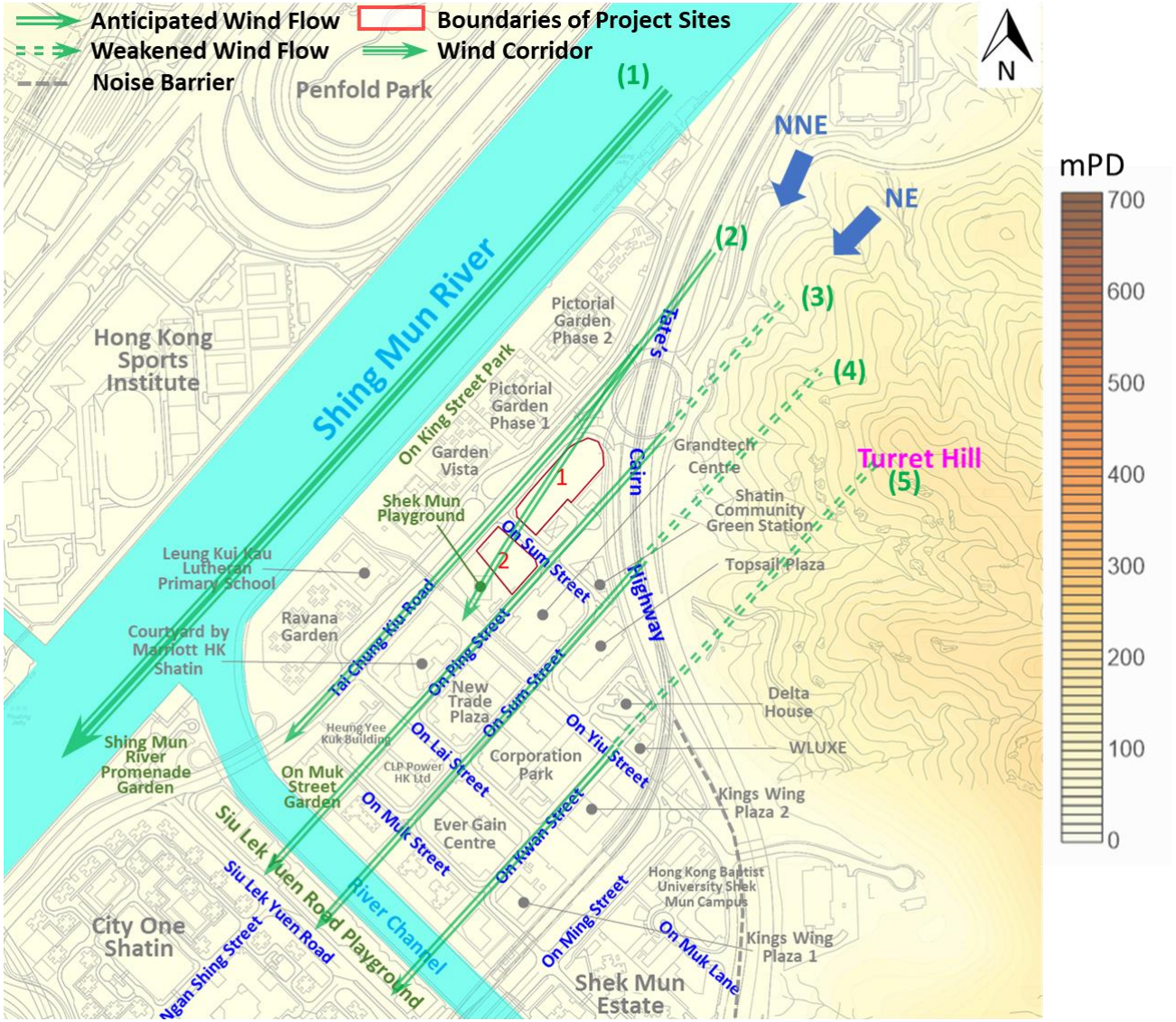


Figure 7.1(a) **Wind Flow near the SMBA Project Sites under the NNE/NE Prevailing Wind for the Baseline Scenario**

Proposed Scenario

7.2.6 With the proposed developments in place, Shing Mun River would still serve as an effective NNE/NE wind corridor which facilities the flow of the northeastern quadrant wind at the surroundings of the Project Sites as shown by Marker (1) in **Figure 7.1(b)**.

7.2.7 The NNE prevailing wind from Tate's Cairn Highway would flow along Tai Chung Kiu Road located in between Garden Vista and Project Sites. As the proposed developments within the Project Sites do not step in the wind breezeway along Tai Chung Kiu Road, this NNE/NE wind breezeway serves the purpose to maintain the wind environment near Pictorial Garden, Garden Vista, Ravana Garden, Courtyard by Marriott HK Shatin as well as the northwestern peripheral of the Project Sites under the Proposed Scenario as the Baseline Scenario (see Marker (2) in **Figure 7.1(b)**).

7.2.8 With the proposed developments in place within the Project Sites, the NNE/NE prevailing wind stream would not be able to penetrate the Project Site under the Baseline Scenario towards Shek Mun Playground and Courtyard by Marriott HK under the Proposed Scenario. The section of On Sum Street in between and near the Project Sites 1 and 2, the portion of On Ping Street near New Trade Plaza and Grandtech Centre, the section of On Yiu Street in between Grandtech Centre/Shatin Community Green Station and New Trade Plaza/Corporation Park, together with Shek Mun Playground are anticipated to be under the influence of wind wakes induced by the proposed developments within the SMBA Project Sites. It is anticipated that the mentioned local streets and areas will experience potential impacts under the NNE/NE prevailing wind, when compared to the Baseline Scenario, in which the wind environment at these places would need warrant attention.

7.2.9 The wind environment along the southeastern peripheral of the Project Sites under the Proposed Scenario would be maintained by On Ping Street. This NNE/NE wind breezeway also benefits the wind environment near Grandtech Centre, New Trade Plaza and Courtyard by Marriott HK Shatin. Same as the Baseline Scenario, the NNE/NE prevailing wind could skim over the low-rise Heung Yee Kuk Building and penetrate On Muk Street Garden to reach Siu Lek Yuen Road Playground and City One Shatin across the River Channel (see Marker (3) in **Figure 7.1(b)**). In addition, by adopting a low-rise pick up/drop off bays of 11mPD, a tower setback of 10m and 17m from the southeastern and northwestern Project Site boundaries as well as by including a 5m empty bay above the pick-up/drop-off bays, the designs of the proposed developments within Project Site 2 under the Proposed Scenario have attempted to increase the northeastern quadrant prevailing wind availability towards the Shek Mun Playground.

7.2.10 Another two NNE/NE wind breezeways benefiting the region wise wind environment near the SMBA Project Sites under the Proposed Scenario are On Sum Street and On Kwan Street parallel to On Ping Street, as annotated by Markers (4) and (5) in **Figure 7.1(b)**, in which the discussions on the wind flow paths in paragraph 7.2.5 for the Baseline Scenario are valid for the Proposed Scenario.

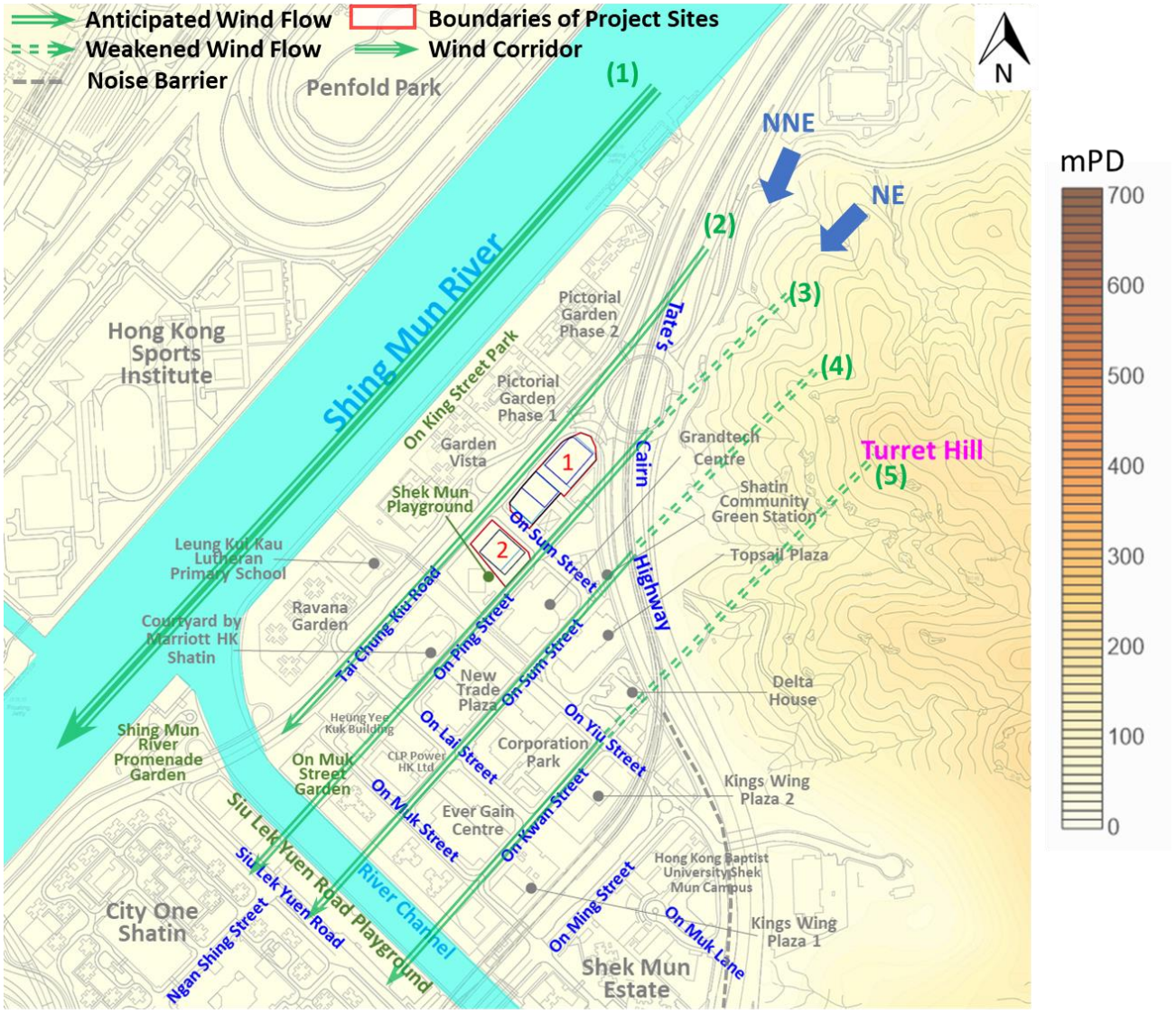


Figure 7.1(b) **Wind Flow near the SMBA Project Sites under the NNE/NE Prevailing Wind for the Proposed Scenario**

Under E Annual and Summer Prevailing Wind Direction

Baseline Scenario

7.2.11 Under the current condition, the weakened easterly wind from Turret Hill would flow across Tate's Cairn Highway to approach and penetrate the Project Site 1 to reach On King Street and the regions near Garden Vista (see Marker (1) in **Figure 7.2(a)**).

7.2.12 Another stream of easterly wind from Turret Hill would be weakened by Tate's Cairn Highway before flowing across On Sum Street and reach Project Site 2. The easterly wind would penetrate Project Site 2 and reach Shing Mun River by flowing through the open space located at the southwest of Garden Vista and by skimming over the low-rise Leung Kui Kau Lutheran Primary School (see Marker (2) in **Figure 7.2(a)**).

7.2.13 As the existing street orientations and the urban grids are not aligned in favor of the flow and penetration of the easterly wind. The easterly wind after weakened by Turret Hill and the elevated Tate's Cairn Highway could reach On Sum Street but would be prevented by Grandtech Centre from reaching further downwind (Marker (3) in **Figure 7.2(a)**).

7.2.14 The stream of easterly wind located further away from the Project Sites after weakened by the 5m tall noise barrier along Tate's Cairn Highway would reach Kings Wing Plaza 2. The easterly wind would then be diverted by Kings Wing Plaza 2 to flow along On Yiu Street with a portion of the easterly wind to enter Tate's Cairn Highway abutting On Ming Street as illustrated by Marker (4) in **Figure 7.2(a)**.

7.2.15 There would be another easterly wind stream further away from the Project Sites that would first be weaken by the noise barrier located on the elevated Tate's Cairn Highway and then by the structures of the Hong Kong Baptist University Shek Mun Campus before the main easterly wind stream would enter and flow along On Lai Street via the separation between Kings Wing Plaza 1 and Kings Wing Plaza 2. A small portion of the weakened easterly wind would also be directed to flow along On Ming Street (see Marker (5) in **Figure 7.2(a)**).

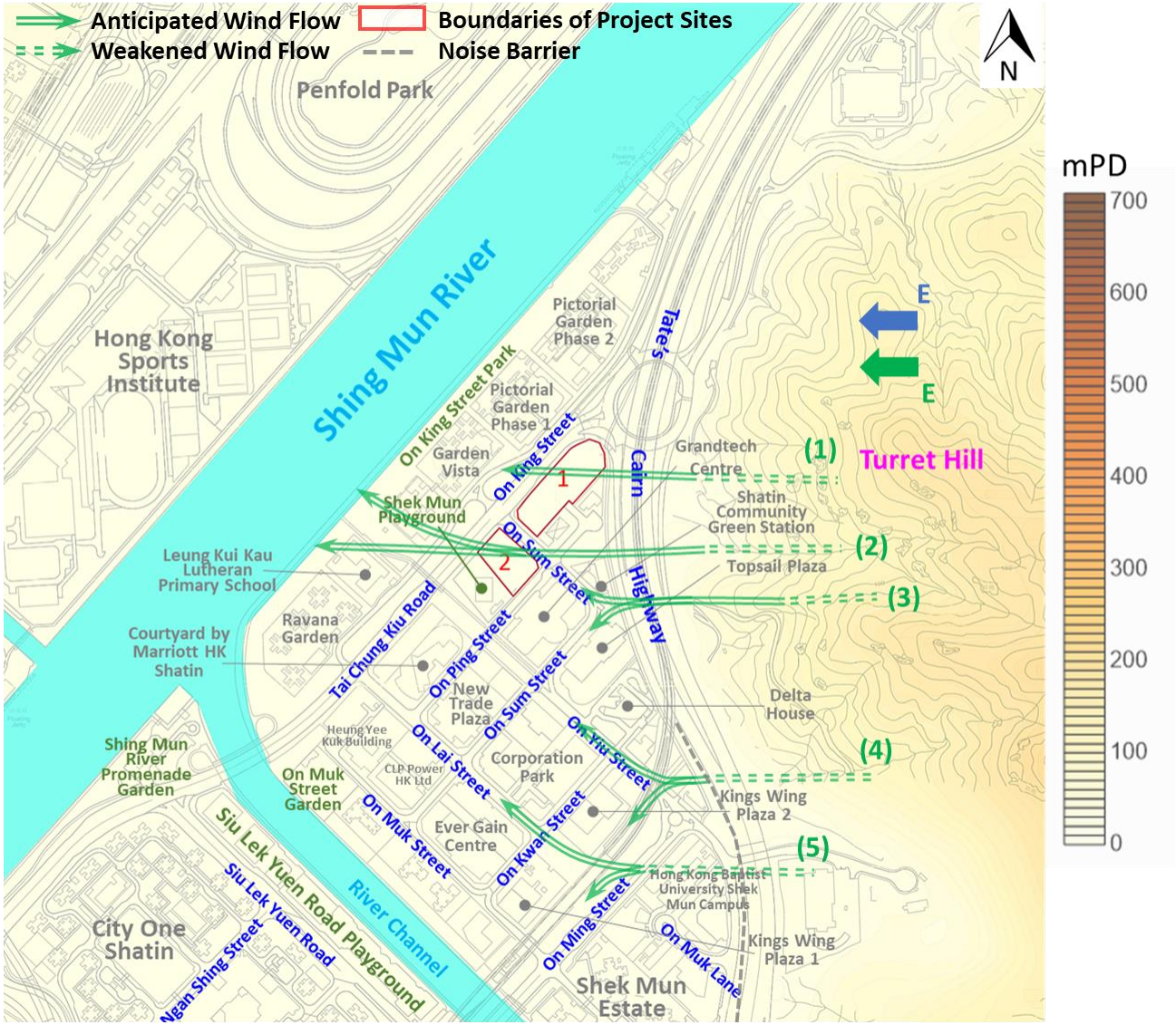


Figure 7.2(a) **Wind Flow near the SMBA Project Sites under the E Prevailing Wind for the Baseline Scenario**

Proposed Scenario

7.2.16 The weakened easterly wind from Turret Hill would flow across Tate's Cairn Highway via the permeable elements underneath to approach Project Site 1. As the separation between the proposed towers T1/T2 within Project Site 1 are not aligned in benefit to the penetration of the easterly wind, with the proposed developments within Project Site 1 in place, the easterly wind would be prevented from reaching the regions near On King Steet, Garden Vista, Pictorial Garden Phase 1, Leung Kui Kau Lutheran Primary School and On King Street Park. These downwind regions would be covered by the induced wind wakes from the proposed developments in which the wind environment at these mentioned potential wind sensitive areas is anticipated to be slightly declined under the Proposed Scenario as compared to the Baseline Scenario (see Marker (1) in **Figure 7.2(b)**).

7.2.17 Another stream of easterly wind from Turret Hill would weaken by Tate's Cairn Highway before flowing across On Sum Street and reach Project Site 2 without any difficulties under the Proposed Scenario. The easterly wind would be hindered by the proposed tower within Project Site 2 and reduced easterly wind availability is anticipated at the downwind open space located between Garden Vista and Leung Kui Kau Lutheran Primary School. However, a stream of easterly wind can skim over the relatively low-rise podium (around 33mPD) underneath the proposed Tower T1 within the Project Site 1 to reach On King Street and the existing residential developments at Garden Vista (see Marker (2) in **Figure 7.2(b)**). In addition, the low-rise podium is also setback around 7m from the southwestern boundary of Project Site 1, which would indirectly widen On Sum Street between Project Sites 1 and 2. This would also benefit the flow of easterly wind to reach the downwind potential wind sensitive areas at On King Street, Garden Vista and adjacent open space as well as On King Street Park.

7.2.18 Similar to the Baseline Scenario, the existing street orientations and the urban grids are not aligned in favor of the flow and penetration of the easterly wind. The easterly wind after weakened by Turret Hill and the elevated Tate's Cairn Highway could reach On Sum Street but would be prevented by Grandtech Centre from reaching further downwind under the Proposed Scenario (Marker (3) in **Figure 7.2(b)**).

7.2.19 Compared to the Baseline Scenario, it is anticipated there would be localized impact to the immediate downstream area under easterly wind flow. The two easterly wind pathways discussed in paragraphs 7.2.14 and 7.2.15 for the Baseline Scenario are also valid for the Proposed Scenario (see Markers (4) and (5) in **Figure 7.2(b)**).

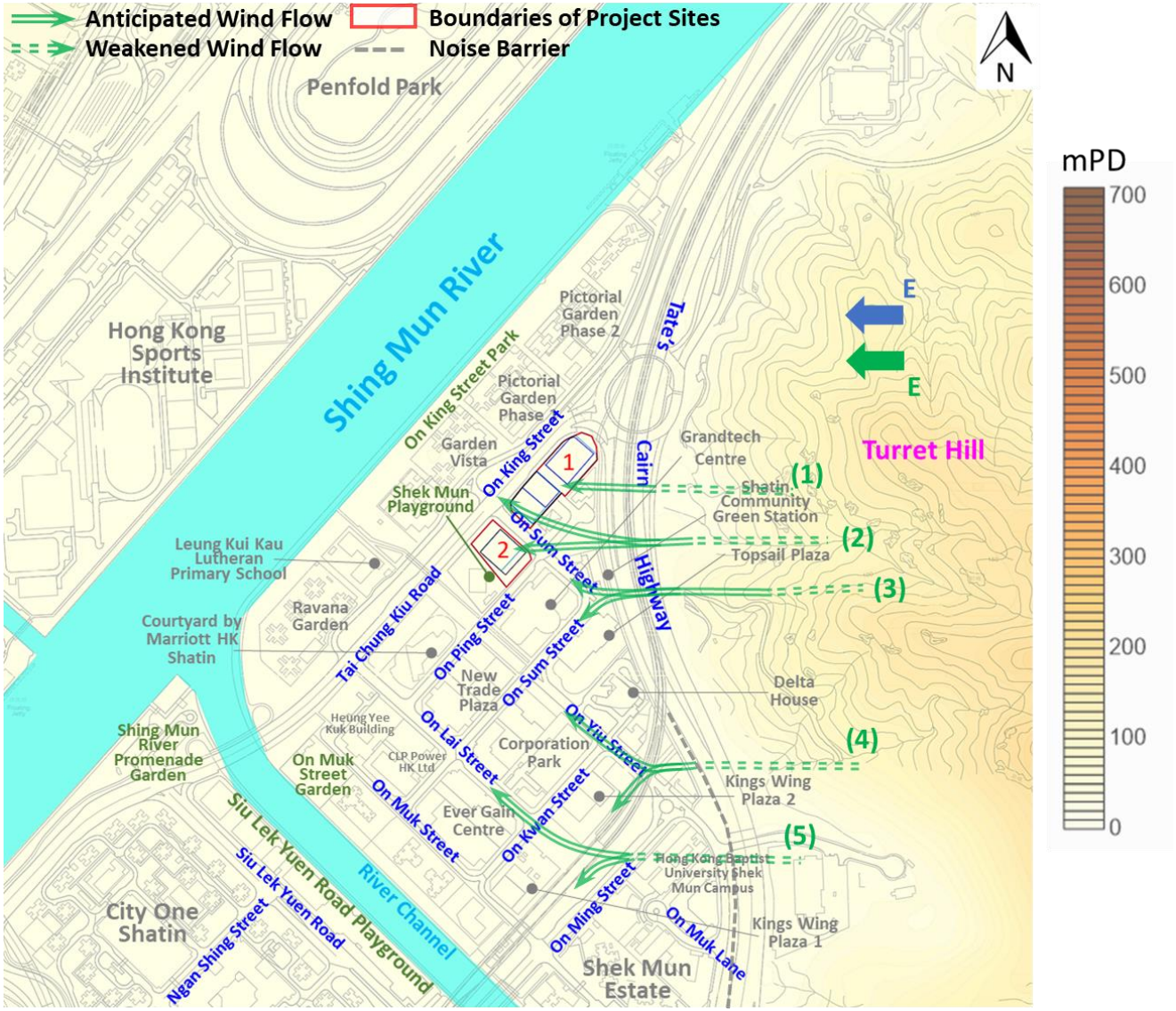


Figure 7.2(b) **Wind Flow near the SMBA Project Sites under the E Prevailing Wind for the Proposed Scenario**

Under S Summer Prevailing Wind Direction

Baseline Scenario

7.2.20 Under the current condition, the southerly wind would already be weakened by the existing developments of City One Shatin. The weakened southerly wind would flow across the river channel to penetrate On Muk Street Garden and flow along Tai Chung Kiu Road to approach the residential buildings of Garden Vista, while another southerly wind stream would skim over Leung Kui Kau Lutheran Primary School to reach Shing Mun River after penetrating the open space in between the primary school and Garden Vista (see Marker (1) in **Figure 7.3(a)**).

7.2.21 The street orientations and urban grids within the SMBA region are not favorable for the flow and penetration of the southerly prevailing wind. The southerly wind from Siu Lek Yuen Road Playground after flowing across the river channel would enter the section of On Sum Street between the CLP Power HK Limited - Shatin Centre and Ever Gain Centre via the separations in between the proposed public housing developments near On Muk Street (see Marker (2) in **Figure 7.3(a)**). Another stream of southerly wind from Siu Lek Yuen Road Playground would enter On Kwan Street between Ever Gain Centre and Kings Wing Plaza 1 (see Marker (3) in **Figure 7.3(a)**).

7.2.22 The weakened southerly wind by the Hong Kong Baptist University Shek Mun Campus would flow across On Yiu Street and enter Tate's Cairn Highway via the eastern side of Delta House. The southerly wind flowing along Tate's Cairn Highway would form a wind breezeway that helps to maintain the wind environment at the eastern vicinity of Project Site 1 and Pictorial Garden Phase 2 near Shek Mun Interchange (see Marker (4) in **Figure 7.3(a)**).

7.2.23 In general, the southerly wind availability towards the SMBA Project Sites and its downwind areas where On King Street, Garden Vista, Pictorial Garden and On King Street Park are located is anticipated to be relatively weak. The southerly wind would be weakened by the existing developments within City One Shatin and further sheltered by the upwind developments including New Trade Plaza, Courtyard by Marriott HK Shatin, and Grantech Centre etc.

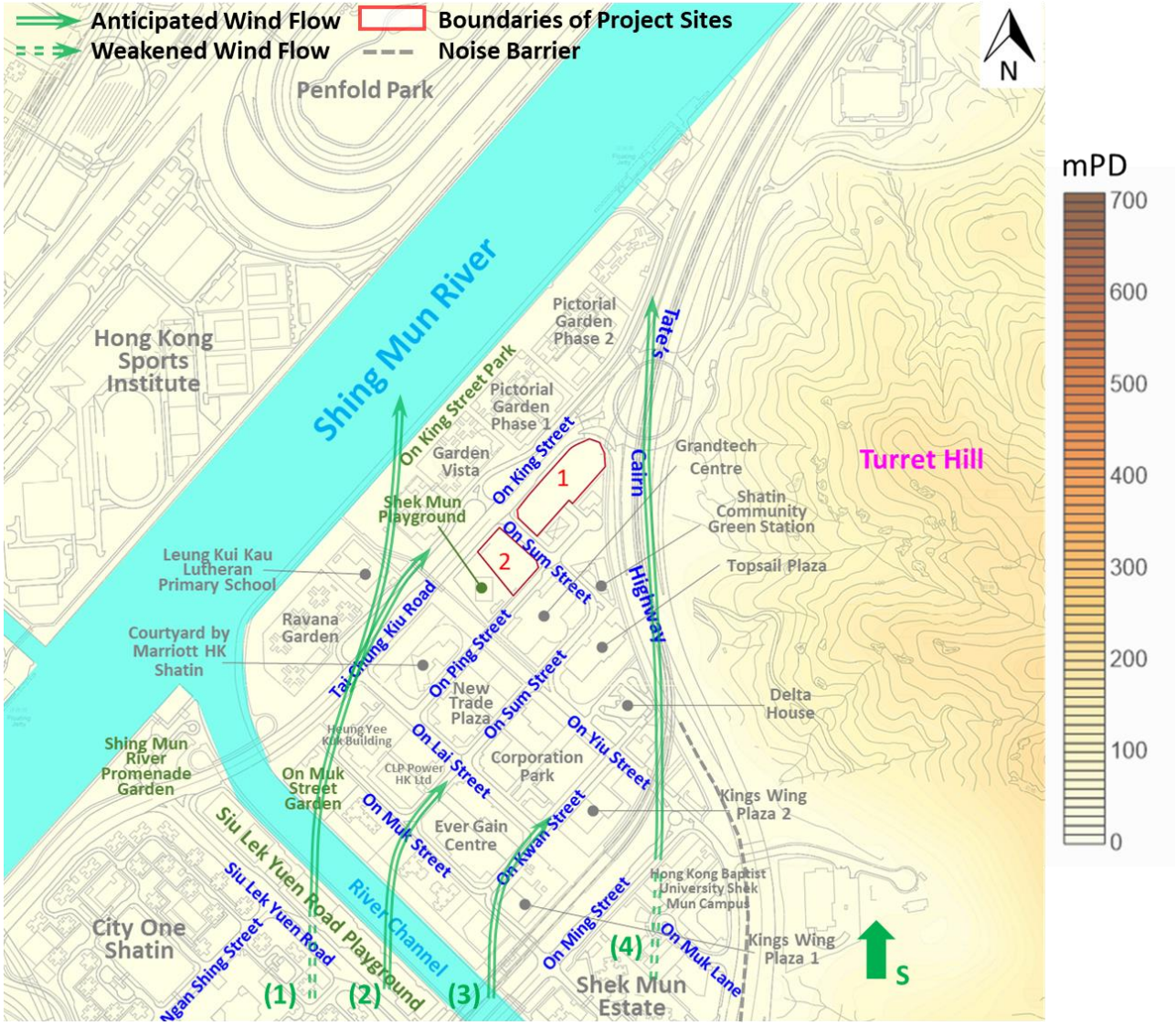


Figure 7.3(a) **Wind Flow near the SMBA Project Sites under the S Prevailing Wind for the Baseline Scenario**

Proposed Scenario

7.2.24 The southerly wind reaching the SMBA Project Sites would be weakened by the existing developments within City One Shatin and further sheltered by the upwind developments. Therefore, it is expected that the southerly wind availability towards the SMBA Project Sites is anticipated to be relatively weak. In addition, with the proposed developments in place, the southerly wind availability at the downwind identified potential wind sensitive areas along On King Steet, at Garden Vista and Pictorial Garden as well as On King Street Park would be affected by the wind wakes induced by the proposed developments within the Project Sites and would be further reduced under the Proposed Scenario as compared to the Baseline Scenario.

7.2.25 There is broadly no observable difference in the southerly wind flow patterns under the Proposed Scenario as compared to the Baseline Scenario. The weakened southerly wind by City One Shatin flowing across the river channel would penetrate On Muk Street Garden and flow along Tai Chung Kiu Road to approach the residential buildings of Garden Vista, while another southerly wind stream would skim over Leung Kui Kau Lutheran Primary School to reach Shing Mun River (see Marker (1) in **Figure 7.3(b)**).

7.2.26 Under the Proposed Scenario, the flow of southerly wind across the river channel entering On Sum Street and On Kwan Street would be consistent with the Baseline Scenario (see Markers (2) and (3) in **Figure 7.3(b)**). In addition, the Tate's Cairn Highway is an effective southerly wind breezeway that helps to maintain the wind environment at the eastern vicinity of Project Site 1 and Pictorial Garden Phase 2 near Shek Mun Interchange under the Proposed Scenario (see Marker (4) in **Figure 7.3(b)**). The discussions in paragraphs 7.2.21 to 7.2.23 for the Baseline Scenario can be applied to the Proposed Scenario.

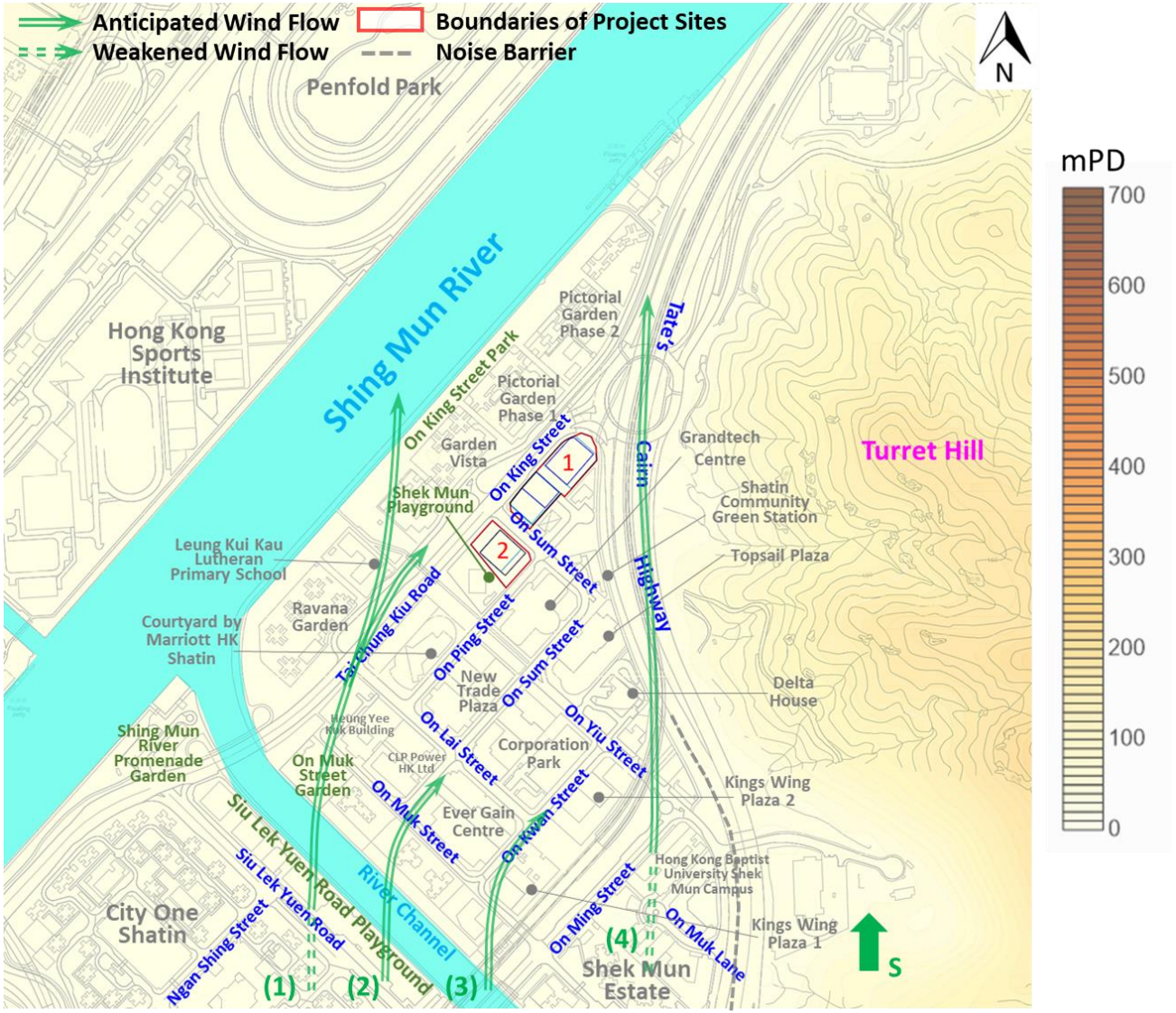


Figure 7.3(b) **Wind Flow near the SMBA Project Sites under the S Prevailing Wind for the Proposed Scenario**

Under SSW and SW Summer Prevailing Wind Directions

Baseline Scenario

7.2.27 Shing Mun River as annotated by Marker (1) in **Figure 7.4(a)** serves as a major wind corridor under the SSW/SW prevailing wind which helps to maintain the wind environment at the northwestern regions of the SMBA Project Sites.

7.2.28 The SSW/SW wind from Siu Lek Yuen Road Playground would flow across the river channel to enter Tai Chung Kiu Road. The main SSW/SW wind stream would flow along Tai Chung Kiu Road which is one of the SSW wind breezeways to maintain the wind environment at the peripherals of the Project Sites. A small portion of the SSW/SW wind would be directed into the open space located to the near northeast of Leung Kui Kau Lutheran Primary School to reach Garden Vista and On King Street Park as indicated by Marker (2) in **Figure 7.4(a)**.

7.2.29 The SSW/SW prevailing wind from Siu Lek Yuen Road would penetrate Siu Lek Yuen Road Playground and On Muk Street Garden across the river channel to approach Heung Yee Kuk Building. The SSW/SW prevailing wind would skim over the low-rise Heung Yee Kuk Building to flow along On Ping Street towards Tate's Cairn Highway after flowing across the section of On Sum Street in between Project Site 1 and Project Site 2. The southwestern quadrant prevailing wind would be able to penetrate the Project Sites free of developments under the current condition to reach On King Street, Garden Vista and Pictorial Garden as illustrated by Marker (3) in **Figure 7.4(a)**.

7.2.30 Although located further away from the Project Sites, On Sum Street and On Kwan Street in parallel to On Ping Street also facilitates the penetration of the SSW/SW prevailing wind from Siu Lek Yuen Road Playground towards Tate's Cairn Highway. These two local roads serve as wind breezeways under the SSW/SW prevailing wind to maintain the wind environment at the SMBA (see Marker (4) and Marker (5) in **Figure 7.4(a)**).

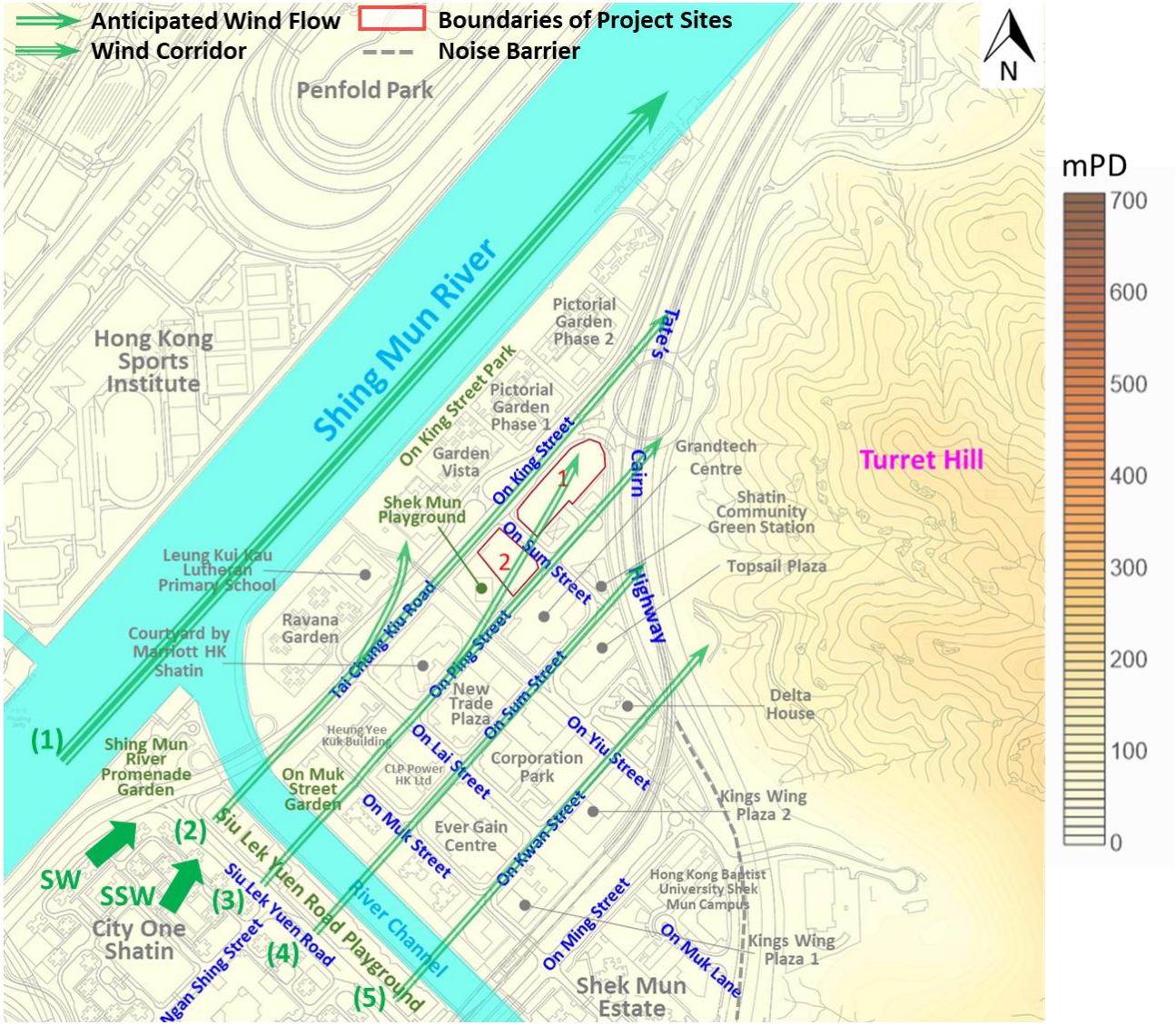


Figure 7.4(a) **Wind Flow near the SMBA Project Sites under the SSW/SW Prevailing Wind for the Baseline Scenario**

Proposed Scenario

7.2.31 The Shing Mun River as annotated by Marker (1) in **Figure 7.4(b)** remains its role as a major wind corridor under the SSW/SW summer prevailing wind which helps to maintain the wind environment at the northwestern regions of the SMBA Project Sites under the Proposed Scenario.

7.2.32 The urban grids and alignments near the SMBA Project Sites are favorable for the flow and penetration of the southwestern quadrant summer prevailing wind, and the proposed developments within the Project Sites do not step in the local wind breezeways and airpaths. There is no observable change in the SSW/SW wind flow patterns near the SMBA Project Sites under the Proposed Scenario as compared to the Baseline Scenario. The SSW/SW wind from Siu Lek Yuen Road Playground would flow across the river channel to enter Tai Chung Kiu Road. The main SSW/SW wind stream would flow along Tai Chung Kiu Road with a diversion of wind stream directed into the open space located to the near northeast of Leung Kui Kau Lutheran Primary School to reach Garden Vista and On King Street Park as indicated by Marker (2) in **Figure 7.4(b)**.

7.2.33 The SSW/SW prevailing wind from Siu Lek Yuen Road would penetrate Siu Lek Yuen Road Playground and On Muk Street Garden across the river channel to approach Heung Yee Kuk Building. By skimming over the low-rise Heung Yee Kuk Building, the SSW/SW prevailing wind would continue to flow along On Ping Street to approach Tate's Cairn Highway. As it is observed there is 10m building setback and an empty bay of 7m width above the pick-up/drop-off bay at near pedestrian level incorporated in the design of the proposed development within Project Site 2, the diversion stream of SSW wind along On Ping Street is anticipated to flow via the empty bay to reach the proposed developments at Project Site 1 under the Proposed Scenario (see Marker (3) in **Figure 7.4(b)**).

7.2.34 Nevertheless, upon the developments of the proposed buildings within the SMBA Project Sites, wind wakes influencing the wind environment at the downwind areas of the Project Sites are anticipated to appear. The places where the wind environment is expected to be affected include the section of On Sum Street between Project Sites 1 and 2, On King Street abutting the northwestern boundaries of the Project Site, the existing residential buildings of Garden Vista and Pictorial Garden, On King Street Park as well as Shek Mun Interchange. However, Shek Mun Interchange has limited pedestrian access, therefore it can be disregarded as one of the potential wind sensitive areas under the SSW/SW prevailing wind.

7.2.35 Apart from the above discussions, On Sum Street and On Kwan Street parallel to On Ping Street would facilitate the penetration of the SSW prevailing wind from Siu Lek Yuen Road Playground towards Tate's Cairn Highway. These two roads are identified as wind breezeways under the SSW prevailing wind to maintain the wind environment at the SMBA under the Proposed Scenario (see Marker (4) and Marker (5) in **Figure 7.4(b)**).

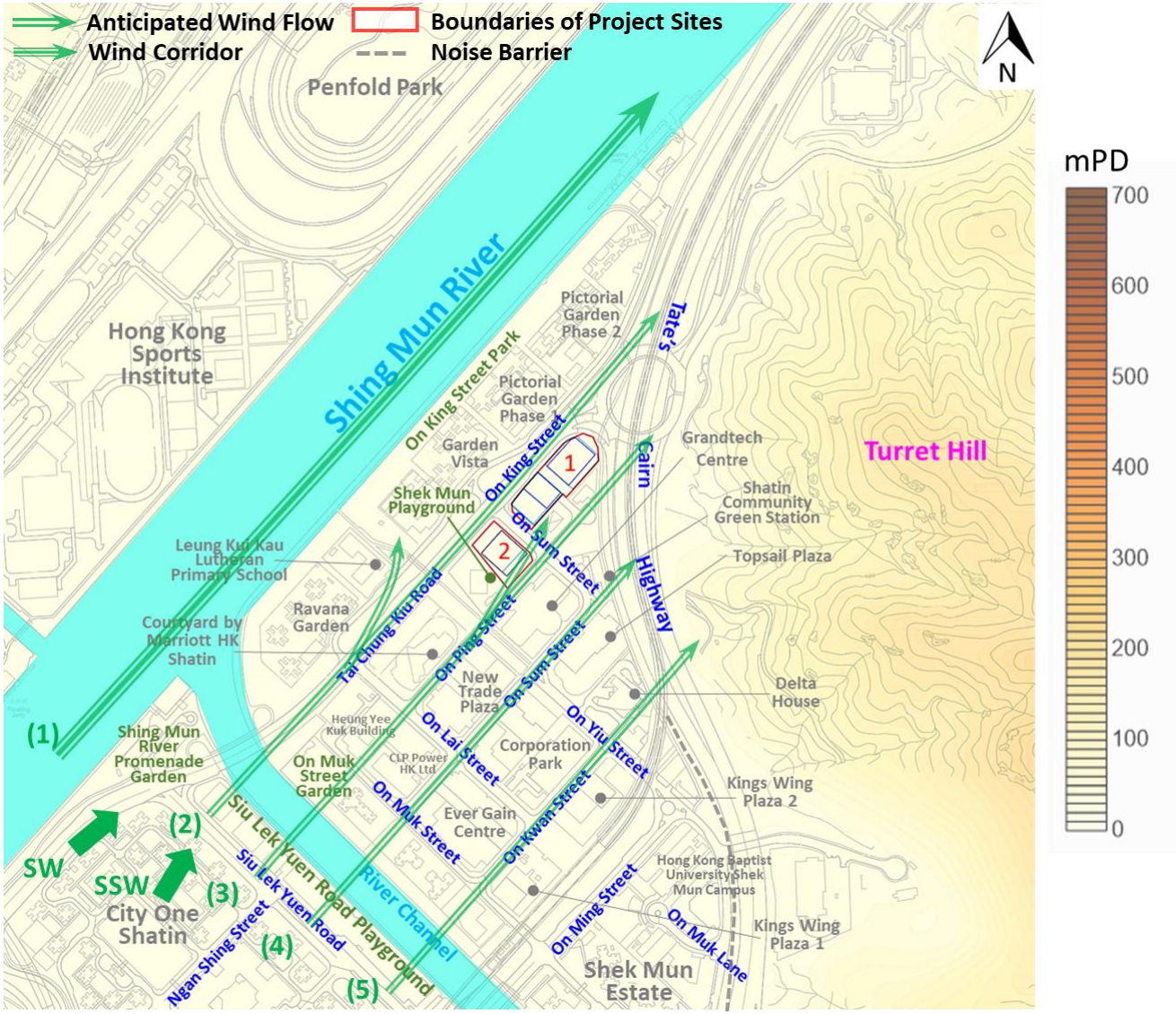


Figure 7.4(b) **Wind Flow near the SMBA Project Sites under the SSW/SW Prevailing Wind for the Proposed Scenario**

7.3 Expert Evaluation on the Project Sites within the SLYIA

General

7.3.1 To recap, there are four Project Sites within the SLYIA. There is currently a temporary structure of about 10mPD within Project Site 3, while Project Sites 4 and 5 are currently free of permanent structures. Project Site 6 is occupied by ALVA Hotel by Royal of 102mPD. It should be noted that the building geometry and height of the ALVA Hotel by Royal within Project Site 6 would be the same under the Baseline Scenario and the Proposed Scenario. This section would conduct wind directional analysis under the prevailing wind directions and identify the corresponding potential wind sensitive areas.

Under NNE Annual Prevailing Wind Direction

Baseline Scenario

7.3.2 The NNE prevailing wind would flow along On Ming Steet across the river channel and continue to flow along Chap Wai Kon Street. This wind breezeway would help to maintain the wind environment at the vicinity of City One Shatin and the northwest boundaries of Projects Sites 5 and 6a. The NNE wind is expected to continue to flow along Chap Wai Kon Street to reach the surroundings of Yue Tin Court, Prima Villa and Prince of Wales Hospital without obstruction which would maintain the wind environment at the mentioned places and their nearby regions under the current condition (see Marker (1) in **Figure 7.5(a)**).

7.3.3 The NNE prevailing wind from Shek Mun Estate would first approach Shek Mun Riverside Garden, flow across the river channel to enter the Yuen Hong Street between Project Sites 4 and 7 after penetrating Siu Lek Yuen Road Playground. As the bus depot is a relatively low-rise structure of approximately 21mPD, the NNE wind from Yuen Hong Street would skim over the bus depot to reach Yuen On Street and Ngau Pei Sha Street Playground. The stream of NNE prevailing wind would further skim over Yu Chui Shopping Centre to reach St. Rose of Lima's College and Ngan Shing Street (see Marker (2) in **Figure 7.5(a)**).

7.3.4 The NNE prevailing wind from Tate's Cairn Highway would be directed to flow along Sha Tin Wai Road/Sha Lek Highway, which serves as an NNE wind breezeway which would help to maintain the wind environment to the south-eastern regions of Project Site 3 and Project Site 6e where the village houses of Ngau Pei Sha and Chap Wai Hon are located. The wind breezeway would also benefit the wind environment at the south-eastern vicinity of Yu Chui Court as well as the Prince of Wales Hospital. In view of the low-rise temporary structure of approximately 10mPD in height within Project Site 3 under the Baseline Scenario, the NNE wind stream from Tate's Cairn Highway would be diverted to skim over this existing structure to reach Yuen Shun Circuit (see Marker (3) in **Figure 7.5(a)**). **Figure 7.5(a)** presents the predicted wind flow under the NNE prevailing wind direction near the SLYIA Project Sites for the current condition.

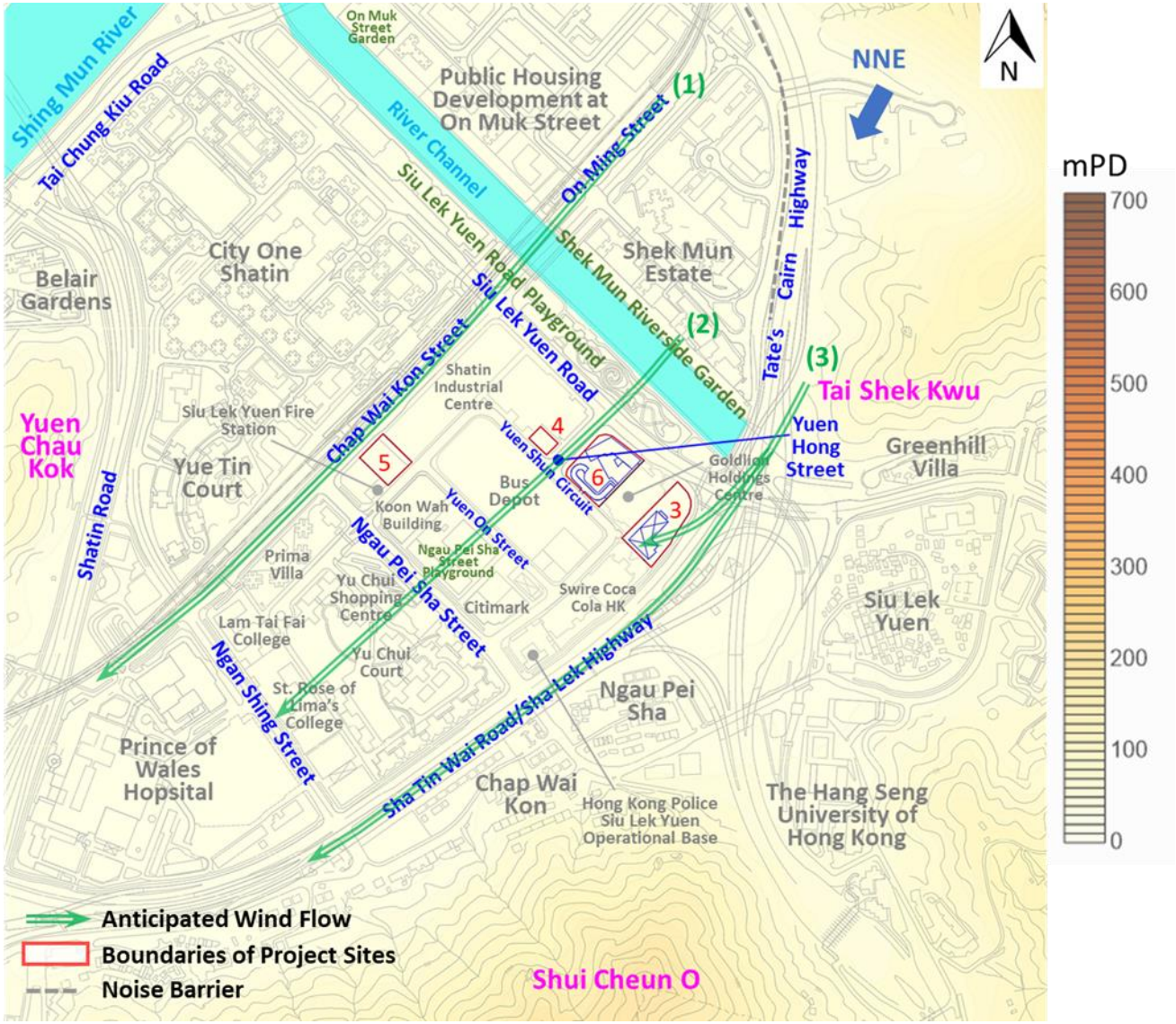


Figure 7.5(a) **Wind Flow near the SLYIA Project Sites under the NNE Prevailing Wind for the Baseline Scenario**

Proposed Scenario

7.3.5 Based on the proposed developments within the SLYIA Project Sites under the indicative layout, it is anticipated that wind wakes would be induced by the proposed buildings and would likely reach Yuen Shun Circuit, Yuen On Street as well as Ngau Pei Sha Street. In addition, the cycling track and pedestrian walkway abutting Sha Tin Wai Road/Sha Lek Highway is anticipated to be affected by the wind wakes induced by the proposed developments within its upwind Project Site 3 under the NNE prevailing wind.

7.3.6 Apart from the local streets, the villages of Ngau Pei Sha would also be affected by the wind wakes induced by the proposed developments within Project Site 3. The existing residential buildings of Prima Villa and Yu Chui Shopping Centre as well as Ngau Pei Sha Street are anticipated to be under the influence of the proposed developments within the Project Site 5 under the NNE prevailing wind. In addition, Siu Lek Yuen Fire Station located to the near downwind of Project Site 5 would be within the wind shadows of the proposed developments within it. The wind environment at the mentioned air ventilation sensitive receivers mentioned in this and previous paragraph are anticipated to be weakened in the Proposed Scenario as compared to the Baseline Scenario under the NNE prevailing wind.

7.3.7 It is anticipated that the proposed developments within the SLYIA Project Sites would not affect the NNE wind flow along Chap Wai Kon Street. Same as the Baseline Scenario, the NNE prevailing wind would flow along On Ming Steet across the river channel and continue to flow along Chap Wai Kon Street under the Proposed Scenario. This wind breezeway is conducive in maintaining the wind environment at the vicinity of City One Shatin and the northwest boundaries of Projects Sites 5 and 6a. The continuation flow of the NNE wind under the Proposed Scenario would be beneficial to the wind environment at the surroundings of Prima Villa, Yue Tin Court, and Prince of Wales Hospital (see Marker (1) in **Figure 7.5(b)**).

7.3.8 The proposed developments within Project Sites 4 and 6 would not affect the NNE wind breezeway along Yuen Hong Street after penetrating Siu Lek Yuen Road Playground. The existing bus depot is a relatively low-rise structure of approximately 21mPD, the NNE wind from Yuen Hong Street would skim over the bus depot to reach Yuen On Street and Ngau Pei Sha Street Playground. Same as in the Baseline Scenario, the stream of NNE prevailing wind would further skim over Yu Chui Shopping Centre to reach St. Rose of Lima's College and Ngan Shing Street under the Proposed Scenario (see Marker (2) in **Figure 7.5(b)**).

7.3.9 The NNE wind breezeway along Sha Tin Wai Road/Sha Lek Highway, which would help to maintain the wind environment at the vicinity of Project Site 3 and the high-rise Swire Coca-Cola HK building as well as the village houses of Ngau Pei Sha and Chap Wai Hon, would remain effective. With the elimination of the low-rise temporary structure and replaced by a high-rise residential Tower 1 within the Project Site 3, the diverted NNE prevailing wind stream would be prevented by the proposed residential building to reach Yuen Shun Circuit and bus depot. It is therefore anticipated that the wind availability at Yuen Shun Circuit near the southeastern section of bus depot where Town Health Technology Centre and Crown Worldwide Building would be reduced under the Proposed Scenario as compared to the Baseline Scenario (see Marker (3) in **Figure 7.5(b)**).

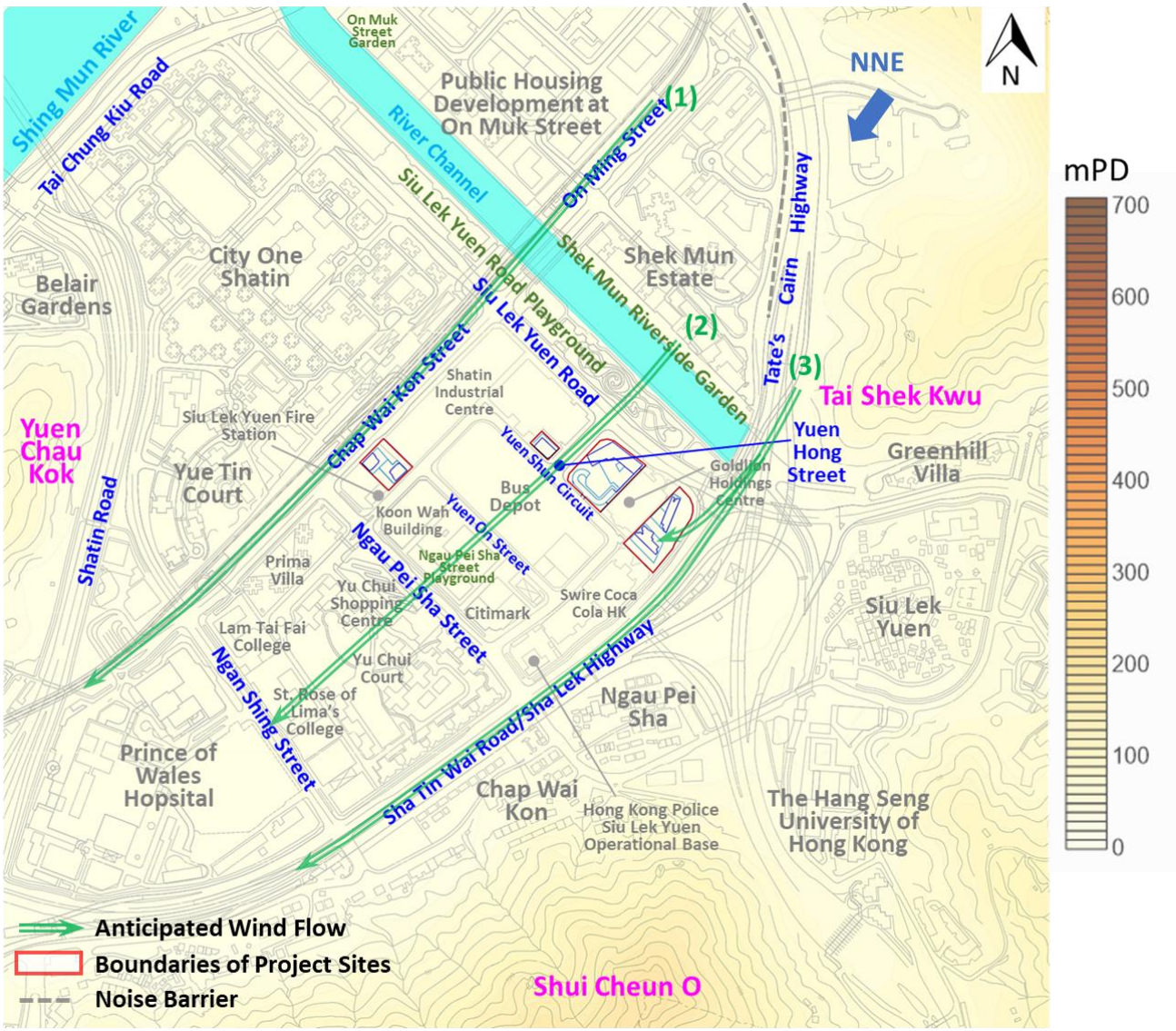


Figure 7.5(b) **Wind Flow near the SLYIA Project Sites under the NNE Prevailing Wind for the Proposed Scenario**

Under E Annual and Summer Prevailing Wind Direction

Baseline Scenario

7.3.10 Under the Baseline Scenario, the easterly wind originated from section of Siu Lek Yuen Road located to the south of Greenhill Villa would flow across Tate's Cairn Highway via the permeable spaces under the branches of the elevated Tate's Cairn Highway. The easterly wind is anticipated to be slightly reduced by the elevated highway and then governed by the building morphologies within Project Site 6, Goldlion Holdings Centre and Chiaphua Centre/Chiaphua Industries Building to continue its flow along the section of Siu Lek Yuen Road abutting the northeastern boundaries of these buildings as well as Siu Lek Yuen Road Playground. In addition, a small portion of the easterly wind along Siu Lek Yuen Road would be diverted into Yuen Hong Street between Project Sites 4 and 6 as annotated by Marker (1) in **Figure 7.6(a)**.

7.3.11 The easterly wind after skimming over the low-rise village houses of Siu Lek Yuen would approach Project Site 3 and Swire Coca-Cola HK building. A stream of easterly wind would skim over the existing low-rise structure to enter Yuen Shun Circuit sandwiched between Project Site 6 and bus depot, while another stream would be diverted to flow along Sha Tin Wai Road/Sha Lek Highway after approaching Swire Coca Cola HK building as annotated by Marker (2) in **Figure 7.6(a)**.

7.3.12 The easterly wind originated from the regions between Siu Lek Yuen and the Hang Seng University of Hong Kong would skim over the village houses of Ngai Pei Sha to directly approach the Sha Tin Wai Road/Sha Lek Highway. By flowing past Sha Tin Wai Road/Sha Lek Highway via the permeable elements beneath the highway, the easterly wind would reach the existing residential blocks belonging to Yu Chiu Court, maintaining the wind environment at the surroundings of this existing residential estate. In addition, a portion of easterly wind would also be directed to the entry location of Ngau Pei Sha Street as indicated by Marker (3) in **Figure 7.6(a)**. **Figure 7.6(a)** presents the predicted wind flow under the E prevailing wind direction near the SLYIA Project Sites.

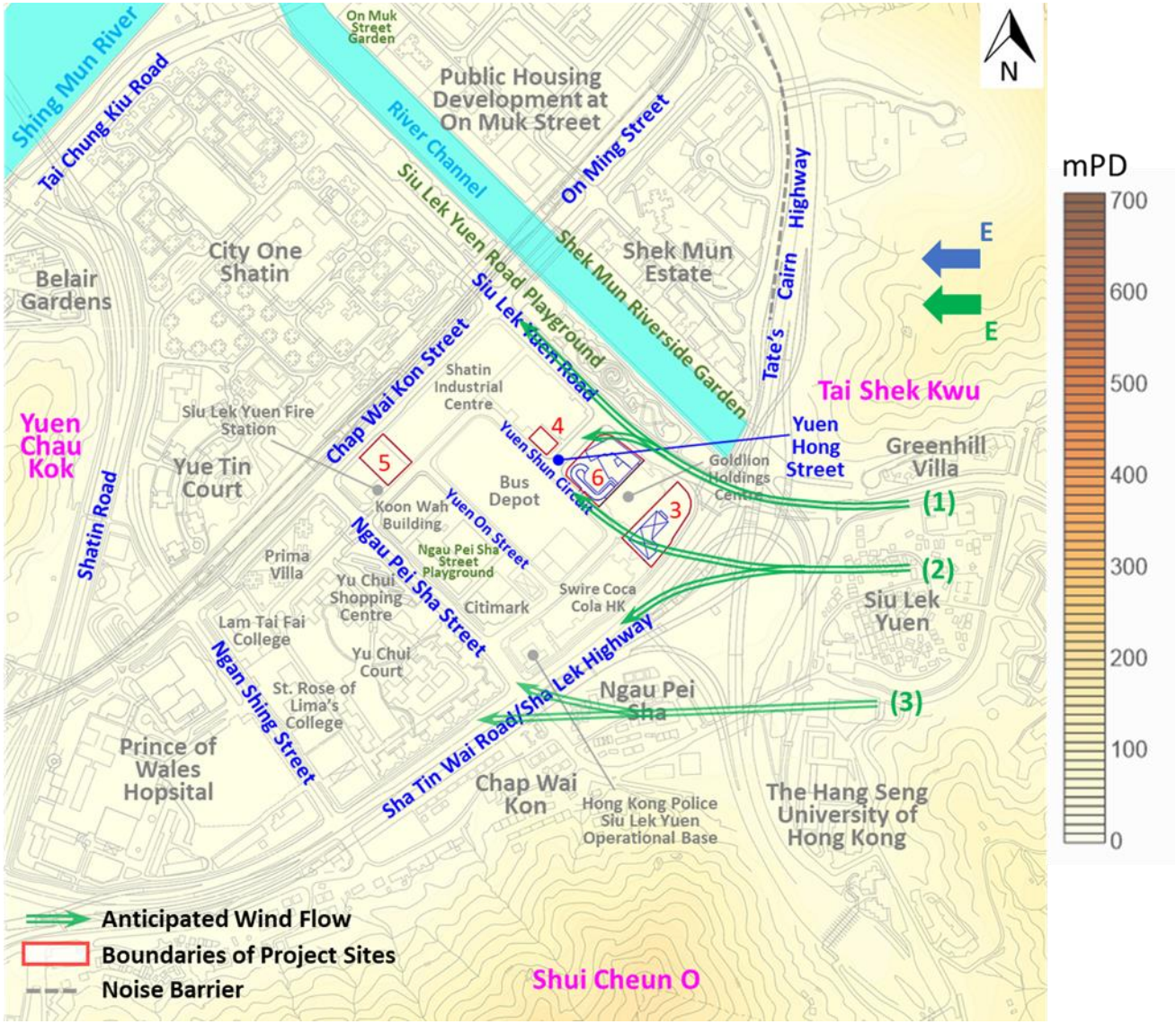


Figure 7.6(a) Wind Flow near the SLYIA Project Sites under the E Prevailing Wind for the Baseline Scenario

Proposed Scenario

7.3.13 With taller building heights of the proposed buildings within the SLYIA Project Sites, it is anticipated that more observable wind wakes would very likely be induced under the Proposed Scenario as compared to the Baseline Scenario, affecting the wind environment at affecting the wind environment at Yuen Shun Circuit, Yuen On Street, Chap Wan Kon Street as well as the portion of City One Shatin across Chap Wai Kon Street, located to the near downwind areas of these Project Sites under the easterly wind. Although the proposed buildings have taller building heights, long continuous frontages in the designs of the proposed indicative building layouts are avoided to enhance wind permeability and allow a higher amount of easterly wind to reach the identified potential wind sensitive areas.

7.3.14 The broad wind paths under the easterly wind remain by and large similar in the Proposed Scenario as compared to the Baseline Scenario, in which the easterly wind originated from the section of Siu Lek Yuen Road located to the south of Greenhill Villa would flow across Tate's Cairn Highway via the permeable spaces beneath the relatively complex branches of the elevated Highway, and governed by the building morphologies within Goldlion Holdings Centre, ALVA Hotel by Royal within Project Site 6 and Chiaphua Centre/Chiaphua Industries Building to continue its flow along Siu Lek Yuen Road. A small portion of the easterly wind along Siu Lek Yuen Road would also be diverted to the entry point of Yuen Hong Street in between Project Sites 4 and 6 as annotated by Marker (1) in **Figure 7.6(b)**.

7.3.15 According to the indicative scheme, the low-rise podium underneath the proposed Tower T1 within are setback from the southwest boundary. In addition, the podium under Swire Coca Cola HK is also low-rise in nature, facilitating the stream of easterly wind to skim over the low-rise podiums to enter Yuen Shun Circuit sandwiched between Project Sites 6 and bus depot. Another easterly wind stream, same as under the Baseline Scenario would be diverted to flow along Sha Tin Wai Road/Sha Lek Highway after approaching Swire Coca Cola HK building as annotated by Marker (2) in **Figure 7.6(b)**.

7.3.16 The easterly wind originated from the regions between Siu Lek Yuen and the Hang Seng University of Hong Kong reaching Sha Tin Wai Road/Sha Lek Highway would not be affected by the proposed developments within the Project Sites and would remain unchanged in the Proposed Scenario as compared to the Baseline Scenario. The easterly wind would skim over the village houses of Ngai Pei Sha to approach Sha Tin Wai Road/Sha Lek Highway. The easterly wind would reach the existing residential blocks belonging to Yu Chiu Court and partially being directed to the entry location of Ngau Pei Sha Street after flowing past Sha Tin Wai Road/Sha Lek Highway via the permeable elements beneath the highway (see Marker (3) in **Figure 7.6(b)**).

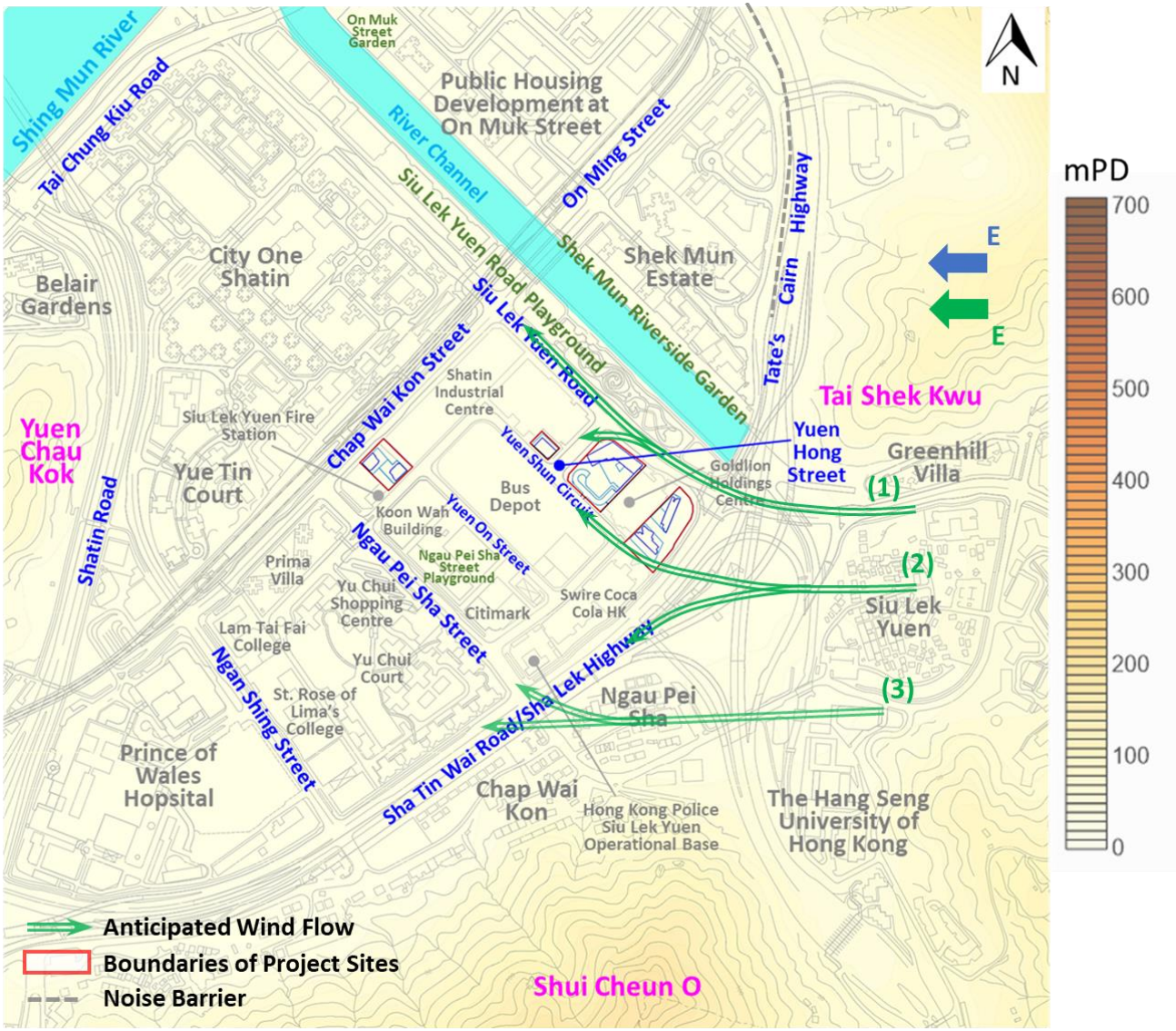


Figure 7.6(b) **Wind Flow near the SLYIA Project Sites under the E Prevailing Wind for the Proposed Scenario**

Under ESE Annual Prevailing Wind Direction

Baseline Scenario

7.3.17 The river channel of Shing Mun River acts as an effective wind corridor under the ESE prevailing wind direction which helps to maintain the wind environment near the SLYIA Project Sites, City One Shatin, public housing development at On Muk Street and Shek Mun Estate (see Marker (1) in **Figure 7.7(a)**).

7.3.18 The ESE prevailing wind after skimming over the village houses of Siu Lek Yuen Village would be weakened by the compact structures belonging to Tate's Cairn Highway, which is an elevated highway. However, there are permeable elements beneath the highway which would allow the ESE prevailing wind to flow through and continue its journey along Siu Lek Yuen Road towards the direction of Tai Chung Kiu Road and Shing Mun River (see Marker (2) in **Figure 7.7(a)**). This wind breezeway would create benefits to the wind environment at regions near the north-east boundaries of Chiaphua Centre/Chiaphua Industries Building, Goldlion Holdings Centre and ALVA Hotel by Royal within Project Site 6 as well as the north-east vicinity regions of the City One Shatin.

7.3.19 The alignments of the SLYIA Project Sites are aligned in favor of the flow of the ESE prevailing wind. The ESE prevailing wind originated from the regions between Siu Lek Yuen and the Hang Seng University of Hong Kong would flow across Sha Tin Wai Highway/Sha Lek Highway through the permeable spaces underneath, and to skim over the low-rise temporary structure within Project Site 3 located aside of Swire Coca Cola HK building to enter Yuen Shun Circuit sandwiched in between Goldlion Holdings Centre/ALVA Hotel by Royal within Project Site 6 and the bus depot. However, part of the ESE wind along the Yuen Shun Circuit would be prevented by Shatin Industrial Centre Block from reaching further downwind towards Chap Wai Kon Street and City One Shatin under the Baseline Scenario (see Marker (3) in **Figure 7.7(a)**).

7.3.20 The ESE wind stream originated between Ngau Pei Sha Village and Chap Wai Kon Village would be slightly weakened and flow across Sha Tin Wai Road/Sha Lek Highway to continue to flow along Ngau Pei Sha Street towards Chap Wai Kon Street and Yue Tin Court. Ngau Pei Sha Street serves as an ESE wind breezeway that helps to maintain the wind environment at the surroundings of Yu Chiu Shopping Centre, Yu Chiu Court, Prima Villa, Citimark and Koon Wah Building. A portion of ESE wind along Ngau Pei Sha Street would enter and penetrate Ngau Pei Sha Street Playground towards Yuen On Street and the bus depot as well as Koon Wah Building (see Marker (3) in **Figure 7.7(a)**). **Figure 7.7(a)** presents the predicted wind flow under the ESE prevailing wind direction near the SLYIA Project Sites.

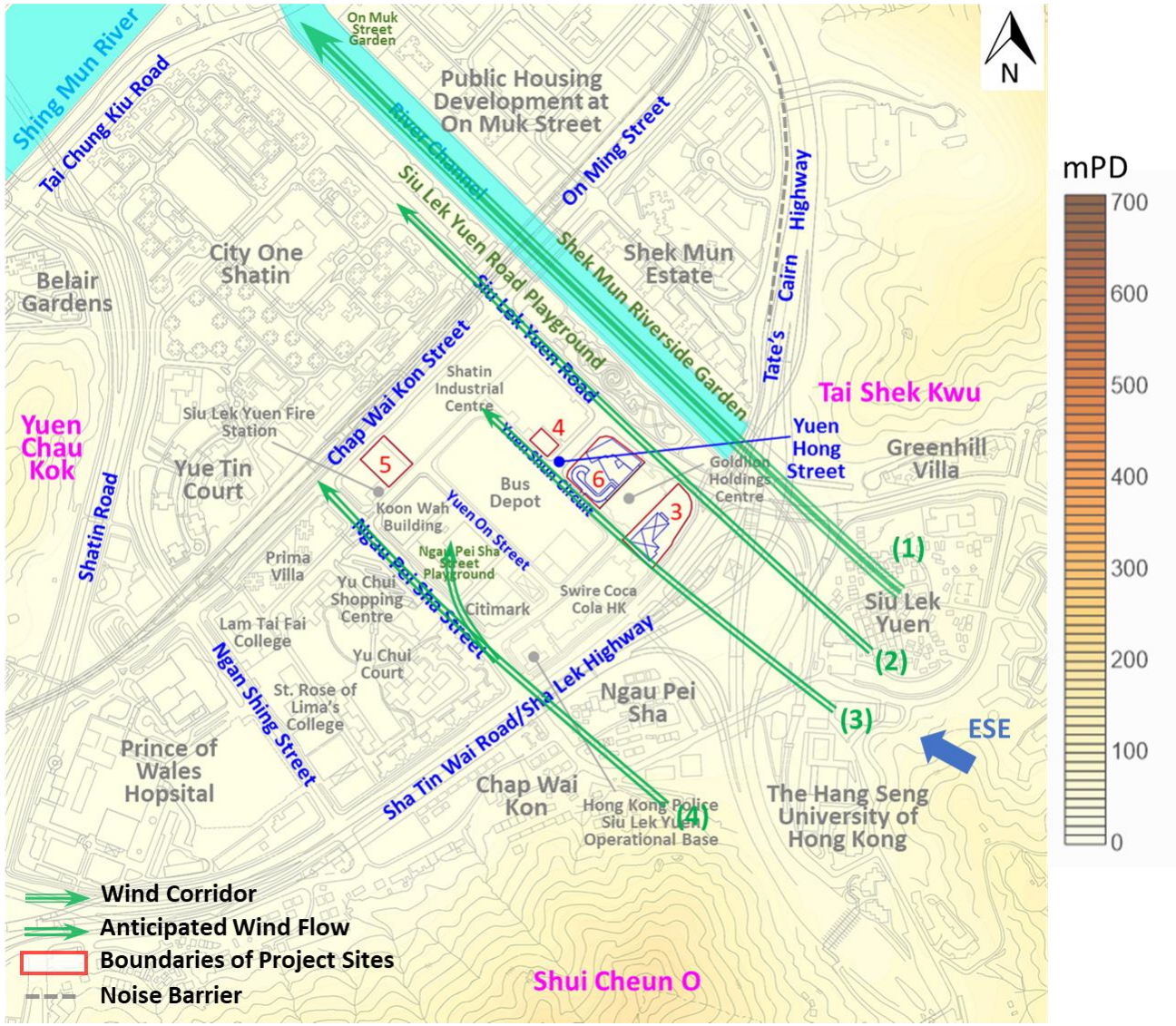


Figure 7.7(a) **Wind Flow near the SLYIA Project Sites under the ESE Annual Prevailing Wind for the Baseline Scenario**

Proposed Scenario

7.3.21 Same as the Baseline Scenario, the river channel of Shing Mun River still serves as an effective wind corridor under the ESE prevailing wind direction which would help to maintain the wind environment near the SLYIA Project Sites, City One Shatin, public housing development at On Muk Street and Shek Mun Estate under the Proposed Scenario (see Marker (1) in **Figure 7.7(b)**).

7.3.22 The ESE prevailing wind after skimming over the village houses of Siu Lek Yuen despite anticipated to be weakened by the compact structures belonging to Tate's Cairn Highway, the ESE wind would be able to flow via the permeable elements beneath the highway and allow the continuation flow of ESE prevailing wind along Siu Lek Yuen Road towards the direction of Tai Chung Kiu Road and Shing Mun River, creating benefits to the wind environment at regions near the north-east boundaries of Chiaphua Centre/Chiaphua Industries Building, Goldlion Holdings Centre and ALVA Hotel by Royal within Project Site 6 as well as the north-east vicinity regions of the City One Shatin (see Marker (2) in **Figure 7.7(b)**).

7.3.23 The appearance of the proposed buildings within Project Site 5 may induce wind wakes that would influence the wind environment along Chap Wai Kon Street and the portion of City One Shatin across the street under the Proposed Scenario as compared to the Baseline Scenario. However, the proposed developments within Project Site 5 have included building separations to retain site permeability attempting to minimize the wind impacts.

7.3.24 The urban grid and alignments of the SLYIA Project Sites are in favor of the penetration and flow of the ESE prevailing wind. Taking advantage of this, the proposed developments within the Project Sites under the indicative scheme are mostly orientated and arranged to match with the alignment of the local road networks. The ESE wind would be able to enter Yuen Shun Circuit via skimming over the low-rise podium beneath Tower T1 and by flowing through the buffer area formed by setting back the podium from the southwest Project Site boundary of Project Site 3. However, the ESE prevailing wind would be prevented by Shatin Industrial Centre Block from reaching further downwind towards Chap Wai Kon Street and City One Shatin under the Proposed Scenario (see Marker (3) in **Figure 7.7(b)**).

7.3.25 The ESE wind stream originated in between Ngau Pei Sha Village and Chap Wai Kon Village as indicated by Marker (4) in **Figure 7.7(b)** would remain comparable in the Proposed Scenario and the Baseline Scenario. The ESE prevailing wind would flow along Ngau Pei Sha Street, which would act as an ESE wind breezeway that helps in maintaining the wind environment at the surroundings of Siu Lek Yuen Fire Station, Yu Chui Shopping Centre, Yu Chiu Court, Prima Villa and Citimark. A portion of ESE wind flowing along the Ngau Pei Sha Street would enter and penetrate the Ngau Pei Sha Street Playground towards Yuen On Street, the bus depot and Koon Wah Building.

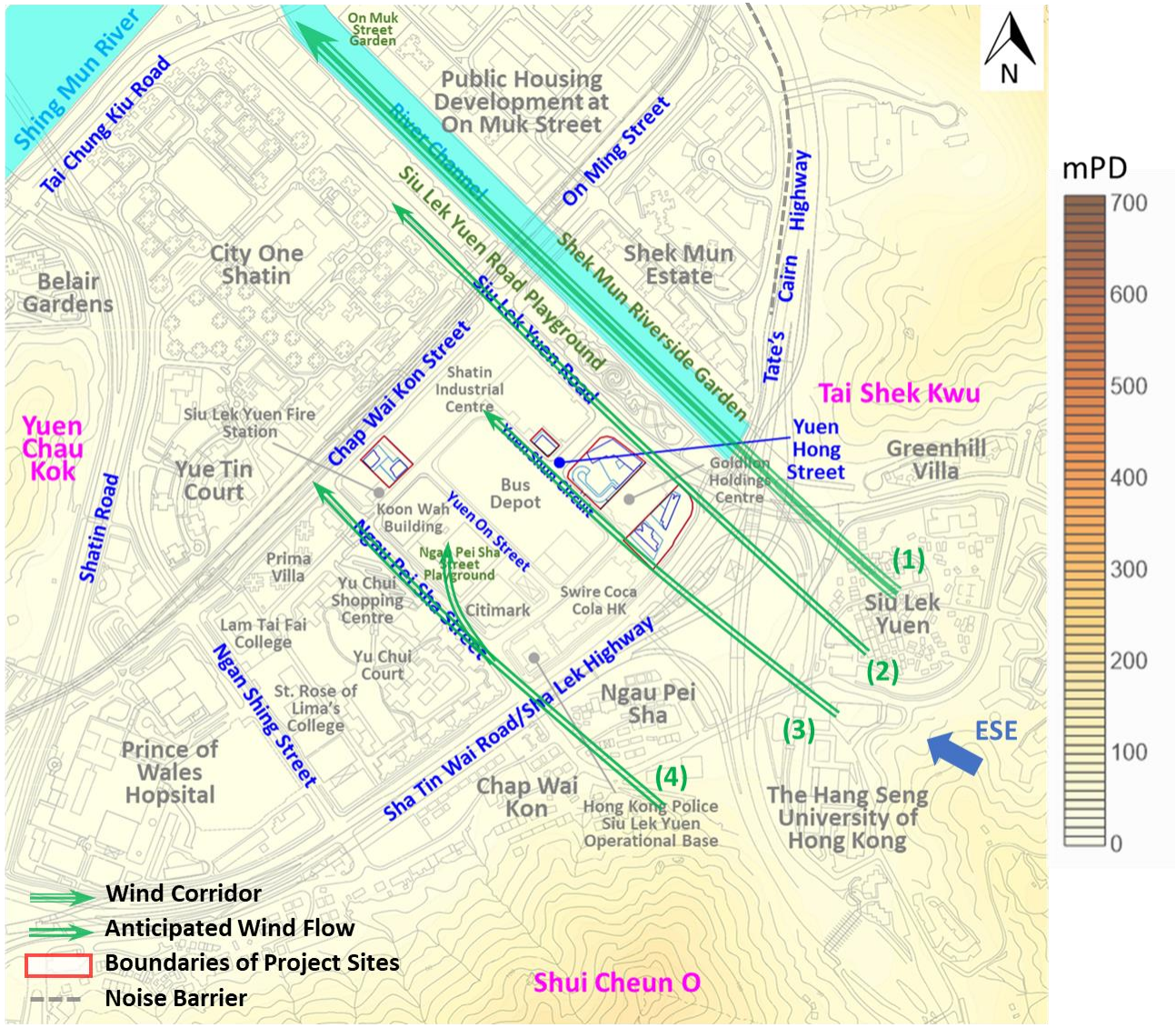


Figure 7.7(b) **Wind Flow near the SLYIA Project Sites under the ESE Prevailing Wind for the Proposed Scenario**

Under SSW and SW Summer Prevailing Wind Directions

Baseline Scenario

7.3.26 Chap Wai Kon Street connecting On Ming Street is one of the southwesterly wind breezeways that helps to maintain the wind environment at the northwest peripheral regions of the SLYIA Project Sites including City One Shatin. This wind breezeway also facilitates the wind environment during summer seasons near Prima Villa, Yue Tin Court (see Marker (1) in **Figure 7.8(a)**).

7.3.27 The SSW/SW summer prevailing wind reaching Ngan Shing Steet would be weakened by existing and redeveloped building blocks of the Prince of Wales Hospital. The weakened SSW/SW wind would skim over Lam Tai Fat College and flow along Chui Yan Street between Prima Villa and Yu Chui Court towards Ngau Pei Sha Street and then along Yuen Shun Circuit in between the Project Site 5 and Koon Wah Building under the current conditions. As Project Site 5 is currently free of developments, the SSW/SW wind from Ngau Pei Street would also skim over the low-rise Siu Lek Yuen Fire Station and penetrate the Project Site 5 to reach Chap Wai Kon Street and City One Shatin (see Marker (2) in **Figure 7.8(a)**).

7.3.28 Another stream of weakened SSW/SW prevailing wind by the Prince of Wales Hospital would penetrate Ngau Shing Street Garden and skim over St. Rose of Lima's College to penetrate the playground within Yu Chui Court and reach Yu Chui Shopping Centre. The SSW/SW wind would skim over the shopping centre block before approaching Ngau Pei Sha Street and Ngau Pei Sha Street Playground. By further skimming over the low-rise bus depot within Project Site 6c, the SSW/SW wind would flow along Yuen Hong Street to flow across Siu Lek Yuen Road and penetrate Siu Lek Yuen Playground as well as Shek Mun Riverside Garden towards Shek Mun Estate under the current condition (see Marker (3) in **Figure 7.8(a)**).

7.3.29 The main SSW/SW wind stream flowing along Sha Tin Wai Road/Sha Lek Highway connecting Tate's Cairn Highway, which acts as a wind breezeway benefiting the wind environment at the regions to the near southeast directions of Project Site 3 and Swire Coca-Cola HK Building (see Marker (4) in **Figure 7.8(a)**). **Figure 7.8(a)** illustrates the anticipated wind flow for the current situation near the SLYIA Project Sites under the SSW/SW summer prevailing wind.

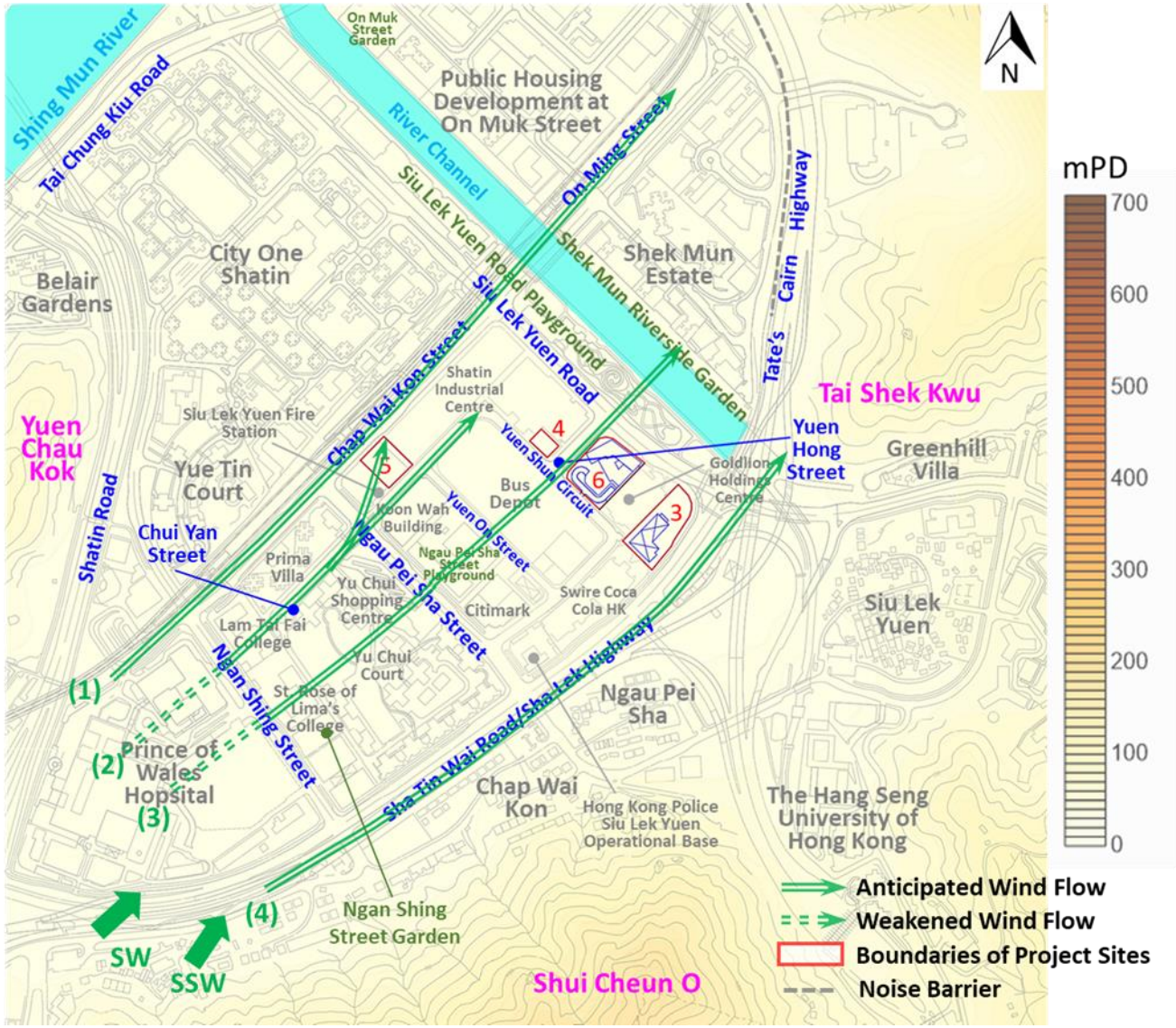


Figure 7.8(a) **Wind Flow near the SLYIA Project Sites under the SSW/SW Prevailing Wind for the Baseline Scenario**

Proposed Scenario

7.3.30 With taller building heights of the proposed buildings within the SLYIA Project Sites, it is anticipated that more observable wind wakes would very likely be induced under the Proposed Scenario as compared to the Baseline Scenario, affecting the wind environment along Siu Lek Yuen Road as well as the Siu Lek Yuen Road Playground, Shek Mun Riverside Garden, and Shek Mun Estate under the SSW/SW prevailing wind.

7.3.31 Chap Wai Kon Street connecting On Ming Street remains as one of the southwesterly wind breezeways that helps to maintain the wind environment at the northwest peripheral regions of the SLYIA Project Sites cluster (see Marker (1) in **Figure 7.8(b)**).

7.3.32 Before reaching the Project Site cluster of the SLYIA, the SSW/SW summer prevailing wind reaching Ngan Shing Steet would be weakened by existing and redeveloped building blocks of the Prince of Wales Hospital. Same as under the Baseline Scenario, the weakened SSW wind would skim over Lam Tai Fat College and flow along Chui Yan Street and continue its flow along Yuen Shun Circuit between Project Site 5 and Koon Wah Building/bus depot. However, the SSW/SW wind along Yuen Shun Circuit would be prevented from flowing further downwind by Chiaphua Centre/Chiaphua Industries Building. The proposed building geometries within Project Site 5 consist of two proposed Towers T1 and T2 with separations in between would promote the SSW/SW wind from Ngau Pei Street to skim over the low-rise Siu Lek Yuen Fire Station and flow via the building separation to reach Chap Wai Kon Street and City One Shatin (see Marker (2) in **Figure 7.8(b)**).

7.3.33 The stream of weakened SSW/SW prevailing wind by the Prince of Wales Hospital would penetrate Ngau Shing Street Garden and skim over St. Rose of Lima's College to penetrate the playground within Yu Chui Court would further skim over Yu Chui Shopping Centre before approaching Ngau Pei Sha Street and Ngau Pei Sha Street Playground. The SSW/SW wind would further skim over the low-rise bus depot to flow along Yuen Hong Street before flowing across Siu Lek Yuen Road and penetrate Siu Lek Yuen Playground as well as Shek Mun Riverside Garden towards Shek Mun Estate under the Proposed Scenario (see Marker (3) in **Figure 7.8(b)**). It is therefore anticipated that the wind environment at Siu Lek Yuen Road Playground and the further downstream regions can be maintained under the Proposed Scenario.

7.3.34 The main SSW/SW wind stream flowing along Sha Tin Wai Road/Sha Lek Highway connecting Tate's Cairn Highway, which acts as a wind breezeway benefiting the wind environment at the regions to the near southeast directions of Project Sites 3 and Swire Coca-Cola HK Building under the Baseline Scenario would remain unaltered in the Proposed Scenario (see Marker (4) in **Figure 7.8(b)**).

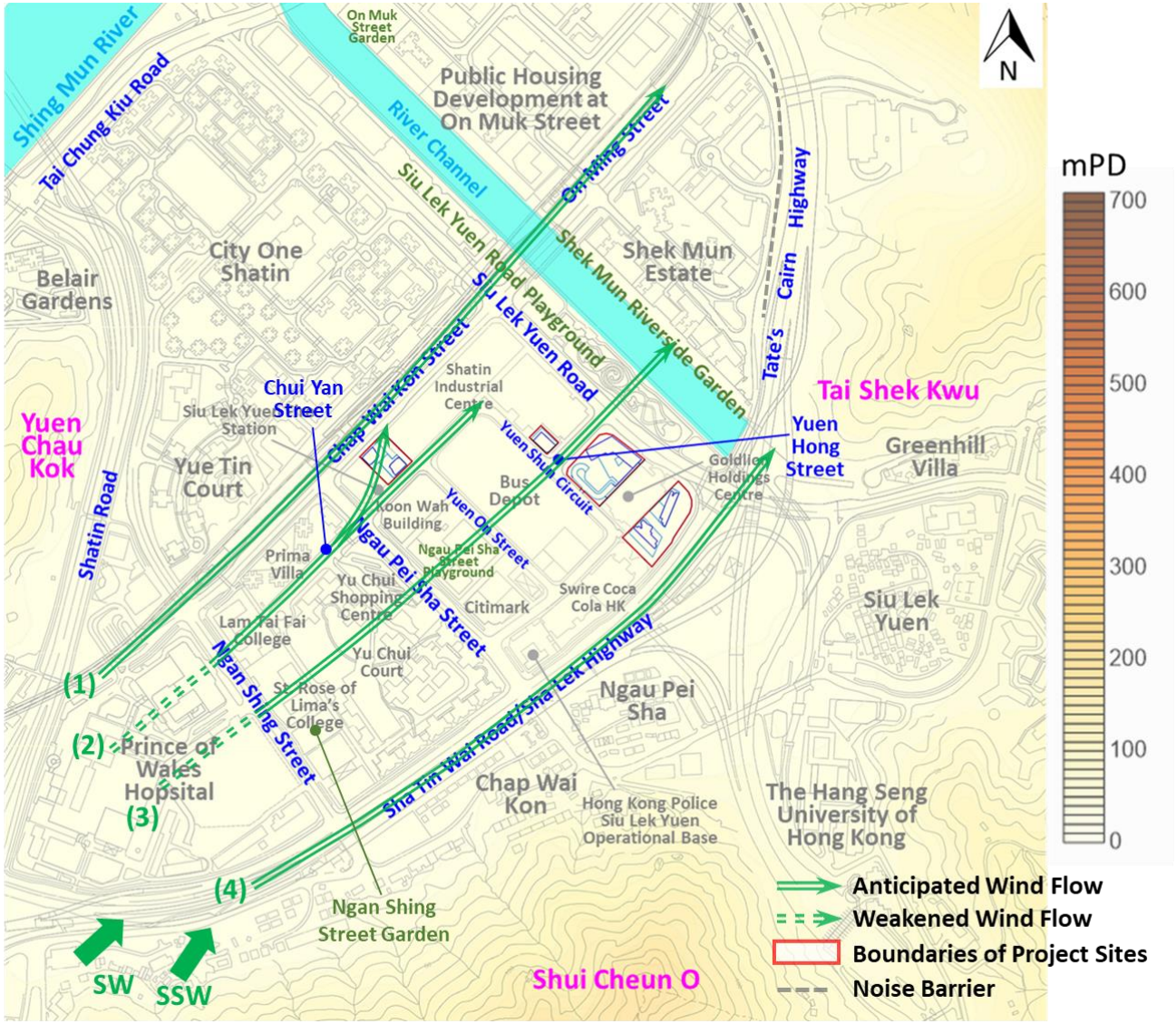


Figure 7.8(b) **Wind Flow near the SLYIA Project Sites under the SSW/SW Prevailing Wind for the Proposed Scenario**

7.4 Identified Good Air Ventilation Features near the Project Sites

7.4.1 Green elements such as playgrounds, parks, sitting out areas and riverside gardens can be found near the surroundings of the Project Sites. These open spaces would take up the role as breathing spaces for the Shek Mun and Siu Lek Yuen areas and are regarded as good features in the aspect of air ventilation. Retaining of these features would help in maintaining the wind environment after the proposed developments near and within the Project Sites under both the Baseline and Proposed Scenarios. The major green elements near the Project Sites include Yuen Chau Kok Park, Ngan Shing Street Garden, Ngau Pei Sha Street Playground, Siu Lek Yuen Road Playground, Shek Mun Riverside Garden, On Muk Street Garden, Shing Mun River Promenade and Shek Mun Playground.

7.4.2 Several major wind corridors/breezeways have been identified under the identified prevailing wind directions. These identified wind corridors are useful in maintaining the wind environment within and at the surroundings of the Project Sites. The identified wind breezeways under the prevailing wind directions have been discussed in detail in directional analysis above, most of them are along major local roads, and the most observable wind corridors identified are Shing Mun River and the river channel perpendicular to the main river.

7.5 Summary of Good Design Features under the Indicative Building Layout

SMBA Project Sites (Project Sites 1 and 2)

7.5.1 The proposed developments under the indicative schemes within the SMBA Project Sites under the Proposed Scenario would not obstruct the major wind breezeways that help to maintain the wind environment at the vicinity of the Project Sites and the identified potential wind sensitive areas. The proposed building designs within the Project Sites are formulated to minimize blockage effects and attempt to maintain the wind availability at the potential wind sensitive areas upon the proposed developments. From the directional analysis, it is anticipated there are no big changes in the wind flow patterns in between the Baseline Scenario and Proposed Scenario.

7.5.2 The identified potential wind sensitive areas near the SMBA Project Sites (Project Site 1 and Project Site 2) are summarized according to identified prevailing wind directions.

- NNE and NE Prevailing Wind: Section of On Sum Street in between and near Project Sites 1 and 2; Section of On Ping Street near the New Trade Plaza and Grandtech Centre; Section of On Yiu Street in between Grandtech Centre/Shatin Community Green Station and New Trade Plaza/Corporation Park; and Shek Mun Playground
- E Prevailing Wind: On King Steet; Leung Kui Kau Lutheran Primary School; Garden Vista; Pictorial Garden Phase 1 and On King Street Park
- S Prevailing Wind: On King Steet; Garden Vista; Pictorial Garden and On King Street Park
- SSW and SW Prevailing Wind: On Sum Street in between Project Sites 1 and 2; On King Street; Garden Vista; Pictorial Garden and On King Street Park

7.5.3 The proposed building designs within Project Sites 1 and 2 have incorporated some good air ventilation design measures to enhance wind permeability and alleviate the potential wind impacts upon the proposed developments within the SMBA Project Sites. The key good design measures useful in maintaining the wind environment are marked in **Figure 7.9(a)** and summarized below.

- The 15m building separation in between proposed Towers T1 and T2 within Project Site 1 would enhance site permeability
- The low-rise podium underneath the proposed Tower T1 would minimize the blockage and allow prevailing wind to skim over the low-rise structure to reach downwind areas
- The low-rise podium underneath the proposed Tower T1 is setback 7m from the southwestern boundary which would widen On Sum Street and promote flow of prevailing wind

- The approximate 10m tower setback together with the 5m height and 7m width empty bay near pedestrian level would facilitate the flow of north easterly and southwesterly prevailing wind.

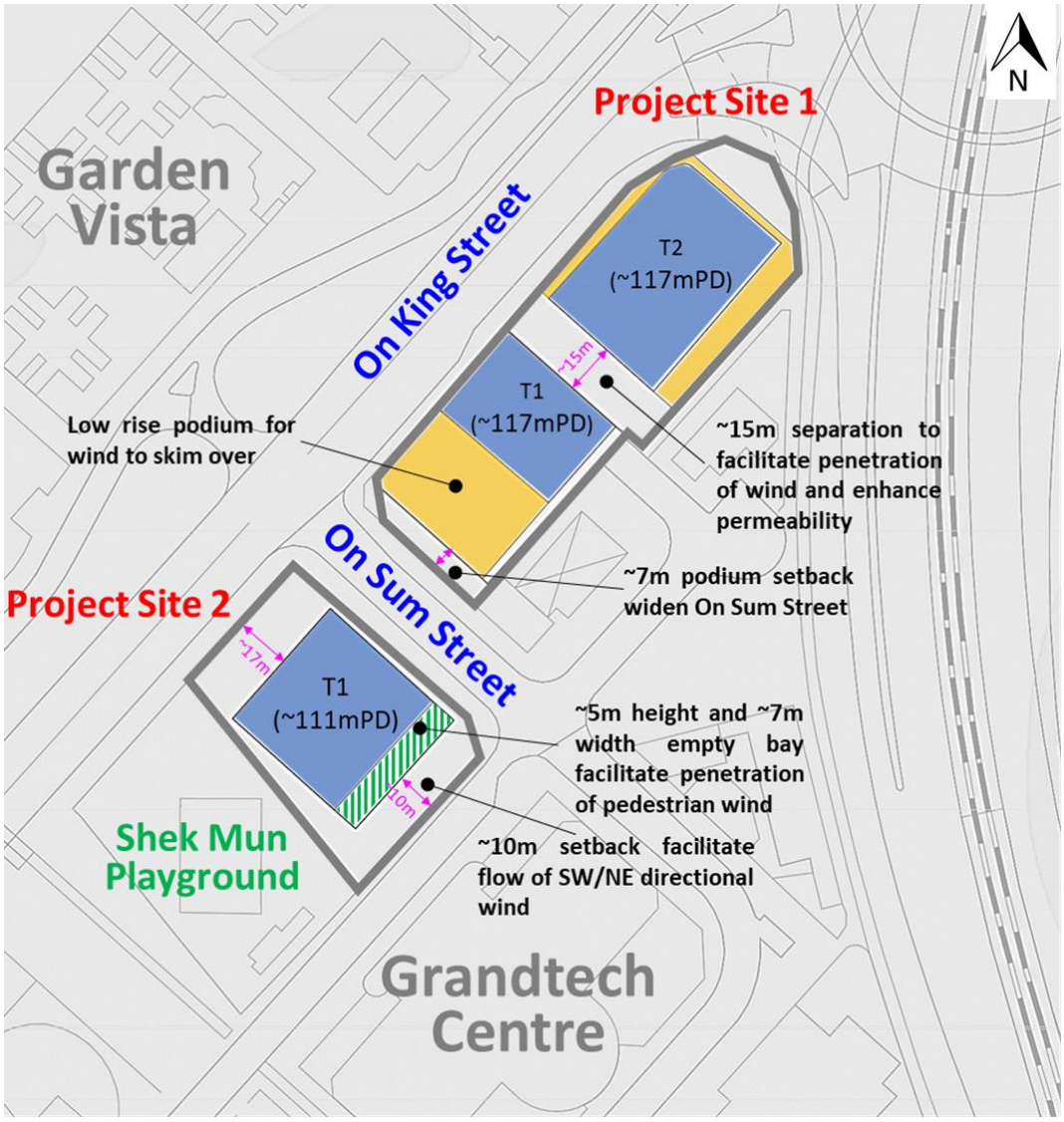


Figure 7.9(a) Key Good Air Ventilation Design Measures for the Indicative Layouts within the SMBA Project Sites

SLYIA Project Sites (Project Sites 3 to 6)

7.5.4 The proposed developments under the indicative schemes within the SLYIA Project Sites under the Proposed Scenario would not obstruct the major wind breezeways that help to maintain the wind environment at the vicinity of the Project Sites and the identified potential wind sensitive areas. The proposed building designs within the Project Sites are formulated to minimize blockage effects by incorporating building separation, building permeable elements as well as adapting low-rise podiums, which these good air ventilation design measures all attempt to maintain the wind availability at the potential wind sensitive areas upon the proposed developments. From the directional analysis, it is anticipated there are no big changes in the wind flow patterns in between the Baseline Scenario and Proposed Scenario.

7.5.5 The identified potential wind sensitive areas near the SLYIA Project Sites (Project Sites 3 to 6) are summarized according to identified prevailing wind directions as below.

- ❖ NNE Prevailing Wind: Yuen Shun Circuit; Yuen On Street; Ngau Pei Sha Street; cycling track and pedestrian walkway abutting the Sha Tin Wai Road/Sha Lek Highway; Siu Lek Yuen Fire Station; Prima Villa; Yu Chui Shopping Centre; villages of Ngau Pei Sha
- ❖ E Prevailing Wind: Yuen On Street, Yuen Shun Circuit; Chap Wai Kon Street; portion of City One Shatin across Chap Wai Kon Street
- ❖ ESE Prevailing Wind: Chap Wai Kon Street; portion of City One Shatin across Chap Wai Kon Street
- ❖ SSW and SW Prevailing Wind: Siu Lek Yuen Road; Siu Lek Yuen Road Playground; Shek Mun Riverside Garden and Shek Mun Estate

7.5.6 The proposed building designs within Project Sites 3 to 6 have considered a few good air ventilation design measures to enhance wind permeability and elongate the current wind breezeways, attempting to alleviate the potential wind impacts on the surrounding air ventilation sensitive receivers upon the proposed developments within the SLYIA Project Sites. The key good design measures useful in maintaining the wind environment are marked in **Figure 7.9(b)** and summarized below.

- ❖ The low-rise podium underneath the proposed Tower T1 within Project Site 3 as well as its setback of approximately 18m from the southwestern boundary of Project Site 3 together with the low-rise podium underneath Swire Coca Cola HK would facilitate the skim over of ESE wind over these low-rise structures and promote the entry and flow of this directional prevailing wind into and along Yuen Shun Circuit towards Shatin Industrial Centre
- ❖ The 19m building separation in between proposed Towers T1 and T2 within Project Site 5 would facilitate south westerly prevailing wind along Yuen Shun Circuit to penetration through the site

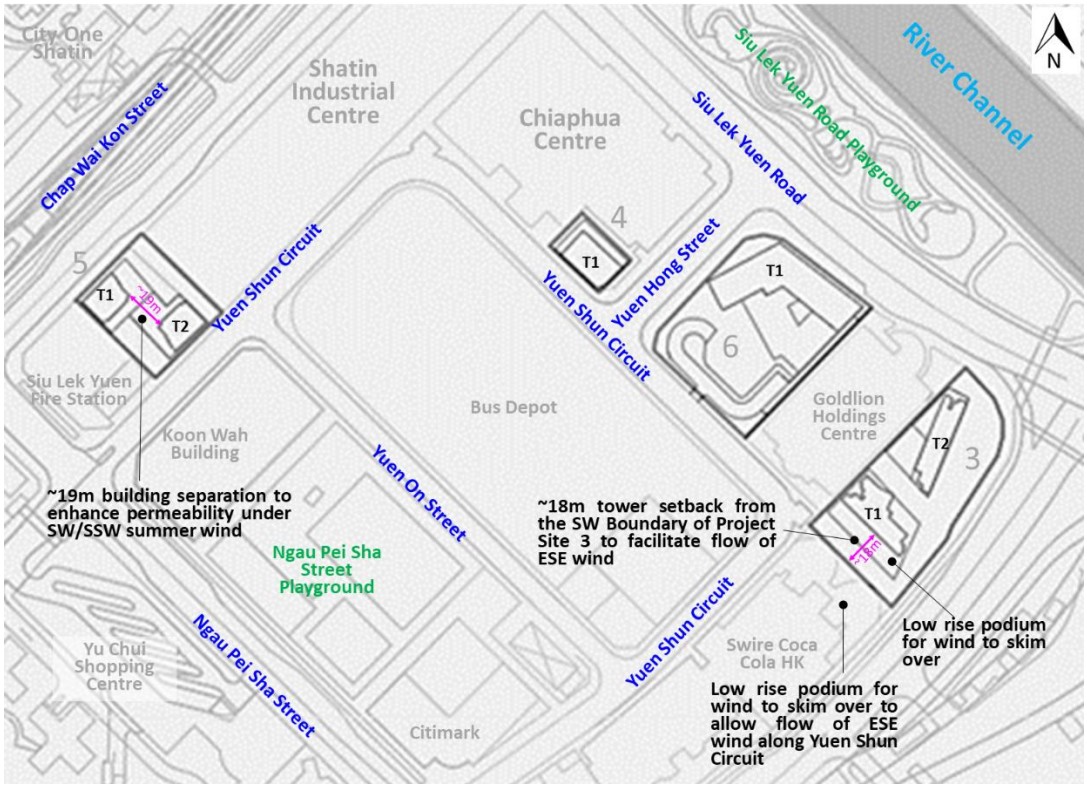


Figure 7.9(b) **Key Good Air Ventilation Design Measures for the Indicative Layouts within the SLYIA Project Sites**

8 FURTHER OPTIMIZATION AND GOOD AIR VENTILATION DESIGN STRATEGIES

8.1 General

8.1.1 Comparing to the existing situation (Baseline Scenario), the proposed developments within the Project Sites with taller proposed buildings would induce wind wakes and inevitably result in changes in the local wind flow patterns and wind availability near the Project Sites. However, the Project Sites are aligned with the current urban grids and the proposed building layouts within the Project Site have practiced good design strategies and have taken air ventilation as an important factor of concern. These air ventilation good design measures include but are not limited to the incorporation of separations between the proposed buildings, setback from the boundaries of the Project Sites, adopt low-rise podium designs, terraced podium designs and retain open grounds within the Project Site. The good air ventilation design measures incorporated not only target for better wind permeability to minimize the potential wind impacts but also create elongation to wind breezeways and airpaths to facilitate the flow of prevailing wind towards the identified potential wind sensitive areas.

8.1.2 Several major wind corridors/breezeways have been identified under the identified prevailing wind directions in the previous sections of this report. These identified wind corridors are useful in maintaining the wind environment within and at the surroundings of the Project Sites. Most importantly, it is observed and understood that these identified major wind corridors/breezeways under the current layouts in the Baseline Scenario are retained and remained non-obstructed upon the developments of the proposed developments under the Proposed Scenario, resulting in a by and large similar wind flow patterns between the Baseline and Proposed Scenarios.

8.1.3 Proposed podiums within the Project Sites are designed to have lower heights which are conducive from the aspect of improving air ventilation. Podium and tower setbacks from the Project Site boundaries can be seen within some of the Project Sites which are all good air ventilation features.

8.1.4 It is worthwhile to mention that the indicative development layouts/existing building layout of the ALVA hotel have not reached the proposed BHR, and there would still be rooms for incorporation of good air ventilation design measures such as empty bays at grade or building permeable elements. The future finetuned and confirmed building development designs are recommended to meet the requirements in the Sustainable Building Design Guidelines (SBDG) as well as refer to the Hong Kong Planning Standard and Guidelines (HKPSG) discussed below.

8.1.5 In view of the above, it is anticipated there is no great alteration in wind flow patterns between the Baseline Scenario and the Proposed Scenario. Although the increase in proposed building heights under the Proposed Scenario may induce larger wakes at the downstream area when compared with the Baseline Scenario, the good air ventilation measures incorporated should be able to alleviate the potential wind impacts induced. Therefore, a region wise decline in wind environment is not expected upon the proposed developments under the Proposed Scenario.

8.2 Hong Kong Planning Standards and Guidelines and Sustainable Building Design Guidelines

8.2.1 In terms of maintaining the wind environment from the district level perspective, several principles for planning have been listed out in the Chapter 11 of the HKPSG and one of the most important principles is the alignments of breezeways and / or air paths in prevailing wind directions, accompanied by perpendicular insertion of air paths (see **Figure 8.1**). This would promote wind penetration through urbanized areas. Breezeways could be achieved by connecting major roads, open spaces, amenity areas, non-building areas (NBAs), building setbacks and low-rise building corridors.

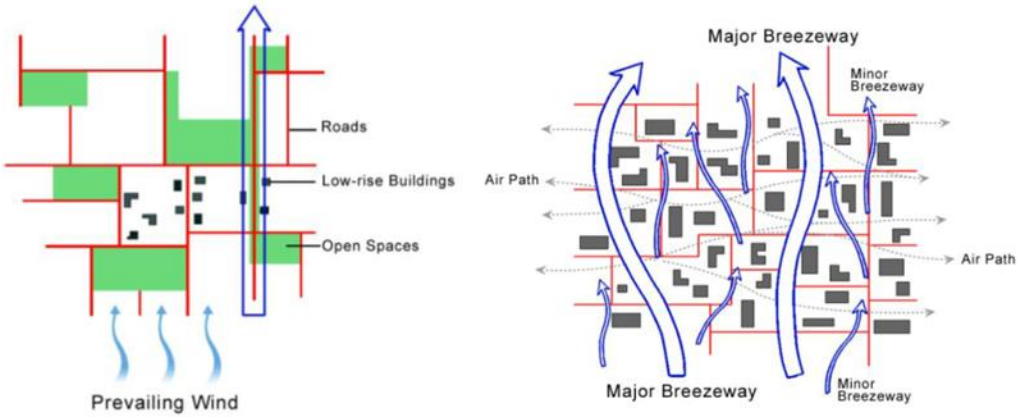


Figure 8.1 Linkage of roads / open space / low-rise buildings to form paths of air flow

8.2.2 Orientations of streets (see **Figure 8.2**) are also important for maximize the infiltration of prevailing winds into grid-patterned streets. The orientation of arrays of main streets/wide main avenues should best stay parallel to the prevailing wind directions, or with less than 30 degrees, being acceptable. Long street grid facing incoming winds should be avoided to minimize wind stagnant zones. Widening of streets/ building setbacks are also considered as a merit design feature.

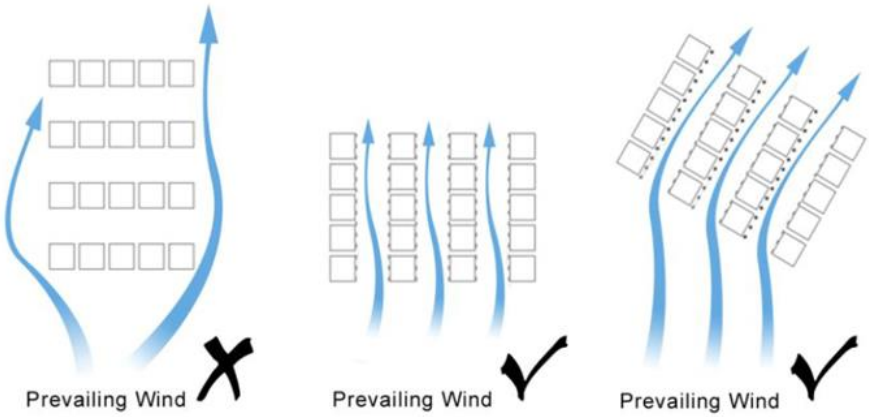


Figure 8.2 Illustration of orientation of streets

8.2.3 Height variation for buildings (see **Figure 8.3**) also has its role in facilitating the wind flows in urban district, especially in the form of height decreases towards the direction where prevailing wind originates, as this feature instigates the wind flowing in vertical directions throughout the district. With low-rise buildings and open spaces widely dispersed around, the effect would be intensified.

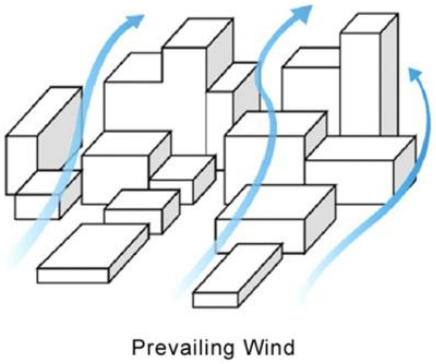


Figure 8.3 Varying building height profile

8.2.4 Further to the HKPSG, SBDG aims to enhance building designs and permeability in avoiding screen wall effect and to promote air movements amongst developments to enhance better dispersion and air mixing. Building setback is one of the requirements under SBDG which can improve the wind environment at pedestrian level. According to the SBDG, buildings fronting a street of less than 15m wide should be set back so that no part of the building up to a level of 15m above the street level should be within 7.5m from the centerline of the street. The potential improvement on air ventilation caused by sites adopting building setback could be quite significant for those streets which are currently less than 15m wide. The illustration is shown in **Figure 8.4**.

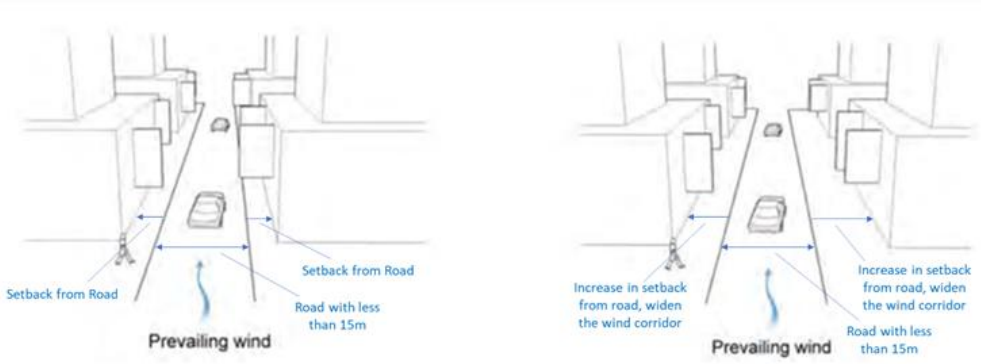


Figure 8.4 Building setback

8.2.5 Building separation increases permeability within the urban built environment to mitigate heat island effects arising from the undesirable screening effect of long buildings. Incorporating building porosity into building design promotes air movements amongst developments and enhances the diffusion and mixing of air. Permeability in the low zone is particularly important for improving air ventilation at pedestrian level. For those developments with podia, podium garden is recommended that allows wind to penetrate nearer to the pedestrian level. In addition, to further facilitate ventilation for those areas with podia, the podia have adopted terraced podium design as illustrated in **Figure 8.5**. Such design would direct downward airflow to the pedestrian level.

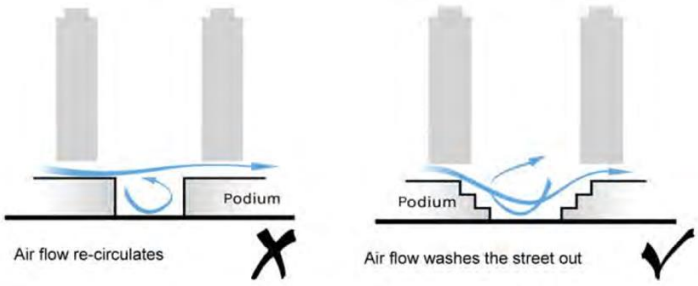


Figure 8.5 Terraced podium design

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

- Avoid long continuous façades and face shorter frontages of proposed buildings to the prevailing wind directions
- Increase building separations and maximize building/site permeability as far as practical
- Minimization/Break down of podium bulks with small ground coverage
- Adopt further 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.
- Adopt full building/podium setbacks at feasible locations, with reference to PNAP APP-152.
- Reference to the recommendations of design measures in the SBDG and HKPSG

9 SUMMARY AND CONCLUSION

9.1.1 AECOM has been commissioned by PlanD to provide an AVA-EE on a total of 6 Project Sites (2 at the SMBA and 4 at the SLYIA) to support the review of the land uses and development intensity of the SLYIA and some sites within the nearby SMBA to optimize the development potential of valuable land resources and facilitating redevelopment as well as transformation of the area.

9.1.2 From comparing the wind data from various sources, it is considered that the PlanD RAMS wind data is most relevant for identification of prevailing wind directions in this Study. The annual prevailing wind directions identified toward the SMBA Project Sites are NNE, NE, and E while the summer prevailing wind directions are E, S, SSW and SW. On the other hand, the summer prevailing wind directions toward the SLYIA Project Sites are from the E, SSW and SW directions, while the annual prevailing wind directions toward the SLYIA are from NNE, E and ESE.

9.1.3 The SMBA Project Sites 1 and 2 are currently zoned “G/IC” and “O” respectively and occupied by open ground carparks and open storage/plant nursery. The Project Site 3 within the SLYIA zoned “O” is currently occupied by low-rise temporarily structures; Project Site 4 next to PCCW Telephone Exchange Block zoned “G/IC” is currently vacant land while Project Site 5 next to Siu Lek Yuen Fire Station also zoned “G/IC” is currently an open ground carpark. The remaining Project Site within SLYIA (Project Site 6) is currently zoned as “I(1)”, occupied by ALVA Hotel by Royal.

9.1.4 The Project Sites are surrounded by terrains to their north-east to the south directions. To the east direction of the SMBA Project Sites and to the north-east direction of the SLYIA Project Sites exist the terrains of Turret Hill and Turret Pass. Terrains of Buffalo Hill, Ngau Au Shan and Tsim Mei Fung are located to the south easterly directions of the Project Sites. Apart from the above, the terrains of Shui Cheun O are located to the further south of the Project Sites. The terrains within the Project Sites are relatively flat with limited elevation.

9.1.5 Two Scenarios have been examined in this Study, namely Baseline Scenario and the Proposed Scenario. The Baseline Scenario would be investigated assuming that the Project Sites maintain the current conditions. The Proposed Scenario would be assumed the Project Sites 1 and 2 within the SMBA currently are open ground carparks and open storage/plant nursery would be rezoned for “C” and “G/IC” with BHRs of 130mPD, while the Project Sites within the SLYIA are proposed to be rezoned for residential usages except for Project Site 4, which is proposed to be rezoned for commercial usages. The Expert Evaluation would assume Project Site 6 would remain as its current condition occupied by ALVA Hotel by Royal but rezoned from “I(1)” to “C”. BHRs of 110mPD, 120mPD and 120mPD are proposed to be imposed for Project Site 3, Project Sites 4 to 5, and Project Site 6 respectively.

9.1.6 The Project Sites are in alignment with the current urban grids and the proposed building layouts within the Project Site have made effort in maintaining the wind environment and retaining the wind breezeways by retaining the good designs measures including but not limited to the incorporation of separations in between the proposed buildings, setback from the boundaries of the Project Sites, adopt low-rise podium designs, terraced podium designs and retain open grounds within the Project Sites. The good air ventilation design measures incorporated not only target for better wind permeability to minimize the potential wind impacts but also create elongation to wind breezeways and airpaths to facilitate the flow of prevailing wind towards the identified potential wind sensitive areas.

9.1.7 In view of the above, it is anticipated there is no great alteration in wind flow patterns between the Baseline Scenario and the Proposed Scenario. Instead, due to the overall increase in building heights under the Proposed Scenario as compared to the Baseline Scenario, it appears that the Proposed Scenario may induce larger wakes in the downstream area when compared with the Baseline Scenario. However, strengthened local wind channeling effects is anticipated to appear under the Proposed Scenario as compared to the Baseline Scenario. Therefore, a region wise decline in wind environment is not expected upon the proposed developments under the Proposed Scenario.

9.1.8 The studied indicative building layouts/existing building layout of the ALVA Hotel have not reached the proposed BHR, and there would still be rooms for incorporation of good air ventilation design measures such as empty bays at grade or building permeable elements. The future finetuned building development designs are recommended to follow the suggested general recommendations in accordance with the SBDG and the HKPSG.

9.1.9 As such, the future applicant/project proponent for future developments at the Project Sites should take account of the findings and major mitigation/good design measures as recommended in the AVA report as far as practicable.