ARUP

Appendix E Air Ventilation Assessment

ARUP

S16 Planning Application for Proposed Minor Relaxation of Plot Ratio (PR), Site Coverage (SC) and Building Height (BH) Restrictions for Permitted/Proposed Commercial Development, Public Transport Station and Underground Vehicle Tunnel at Kai Tak Area 4C Sites 4 and 5 and Adjoining Road Portion of Shing King Street; and Minor Relaxation of PR and BH Restrictions for Permitted Private Housing Development with Proposed Eating Place, Shop and Services and Social Welfare Facilities at Kai Tak Area 3E Sites 1 and 2

Air Ventilation Assessment - Initial Study

| March 2025

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Appendices

1. Introduction

Ove Arup & Partners Hong Kong Limited (Arup) was instructed to conduct an Air Ventilation Assessment (AVA) for the Application Under Section 16 of the Town Planning Ordinance (Cap. 131) for Proposed Minor Relaxation of Plot Ratio (PR), Site Coverage (SC) and Building Height (BH) Restrictions for Permitted/Proposed Commercial Development, Public Transport Station and Underground Vehicle Tunnel at Kai Tak Area 4C Sites 4 and 5 and Adjoining Road Portion of Shing King Street; and Minor Relaxation of PR and BH Restrictions for Permitted Private Housing Development with Proposed Eating Place, Shop and Services and Social Welfare Facilities at Kai Tak Area 3E Sites 1 and 2 (Application Site).

The *Technical Guide for Air Ventilation Assessment for the Developments in Hong Kong (Annex A of Technical Circular No.1/06 for Air Ventilation Assessments)* [1] *(termed as AVA Technical Circular hereafter)* dated 19 July 2006 lay down the foundation of this method statement.

1.1 Objective of the Study

The Applicant proposes amendments to the S16 Planning Application for Proposed Minor Relaxation of Plot Ratio (PR), Site Coverage (SC) and Building Height (BH) Restrictions for Permitted/Proposed Commercial Development, Public Transport Station and Underground Vehicle Tunnel at Kai Tak Area 4C Sites 4 and 5 and Adjoining Road Portion of Shing King Street; and Minor Relaxation of PR and BH Restrictions for Permitted Private Housing Development with Proposed Eating Place, Shop and Services and Social Welfare Facilities at Kai Tak Area 3E Sites 1 and 2. This document is to support the Section 16 application.

An AVA Initial Study was conducted by using Computational Fluid Dynamic (CFD) techniques. It aims to achieve the following tasks:

- Initially assess the characteristics of the wind availability of the site;
- Give a general pattern and a rough quantitative estimation of the wind performance at the pedestrian level reported using Velocity Ratio (VR);
- Identify the air paths within the site and ascertain their effectiveness; and
- Identify good design features and problem areas, if any, and recommend mitigation measures.

2. Application Site

2.1 Characteristic of Application Site and its Surrounding Area

The Application Site consist of four sites. Sites 3E1 and 3E2 are adjacent to each other, located near Kwun Tong Typhoon Shelter bounded by Cheung Yip Street, Lam Chak Street and Kai Hing Road. Sites 4C4, 4C5 and area shown as 'road' are located near Kowloon Bay on the south-western side of Shing Fung Road.

Application Site is generally located in a flat topography. Sites 3E1 and 3E2 are surrounded by mid- to high-rise developments such as Hong Kong Children's Hospital (63mPD), Harbourside HQ (137mPD) and Planned Development of A/K22/31 (100mPD) to the north-western, northern and northeastern sides. To the south-eastern and south-western sides are Kwun Tong typhoon Shelter.

Sites 4C4, 4C5 and area shown as 'road' are surrounded by high-rise developments (ranging from 95mPD to 110mPD) on the Kai Tak runway from north-western to north-eastern sides. To the south-eastern side is low-rise development of Kai Tak Cruise Terminal. To the south-western side is open water of Kowloon Bay.

The detailed surrounding building context are shown in Figure 1.

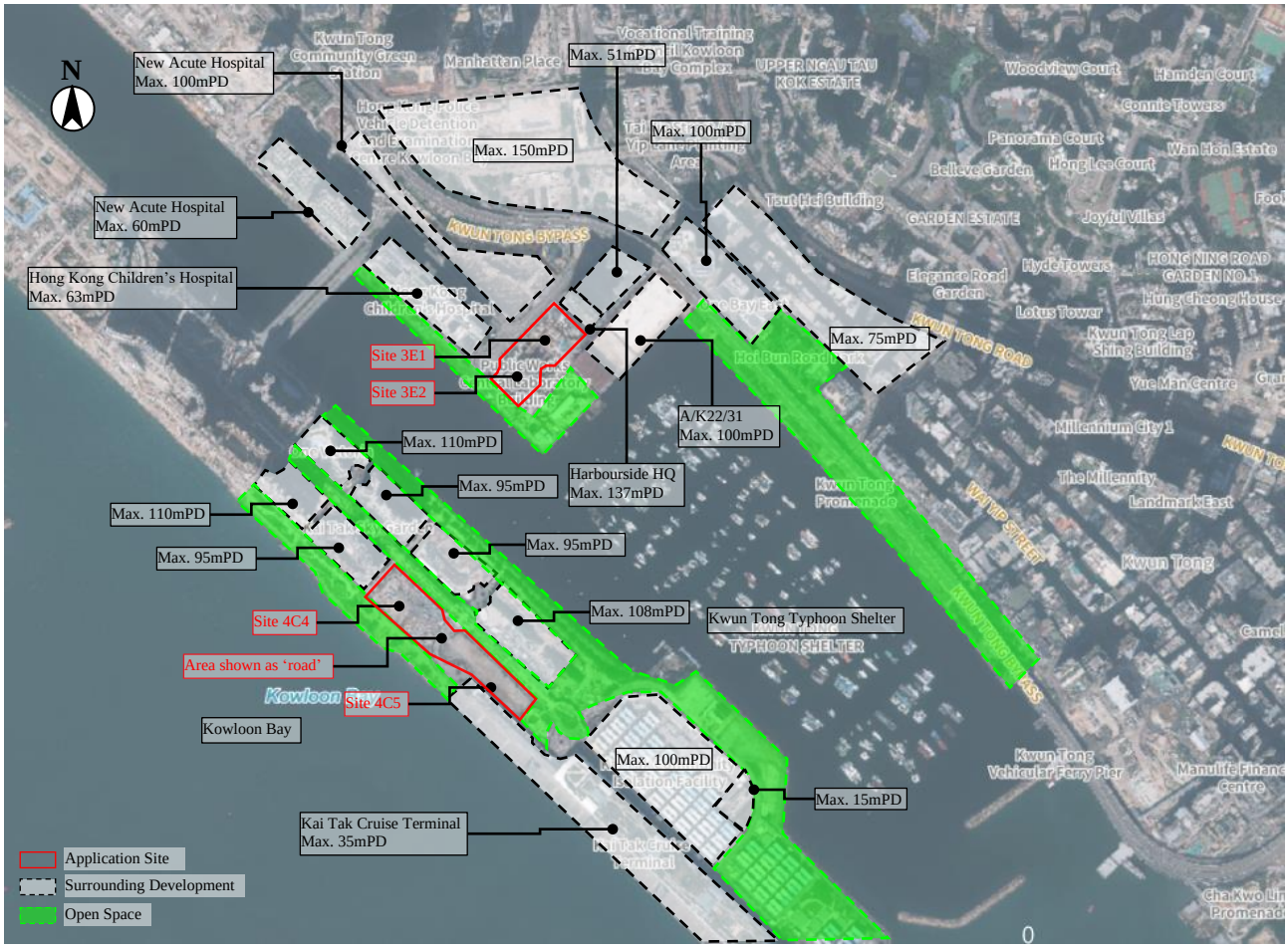


Figure 1 Site location and existing surrounding developments near Sites 3E1, 3E2, 4C4, 4C5 and area shown as 'road'

3. Planned/Work-in-Progress (WIP) Developments, Major Noise Barrier and Major Elevated Structure

3.1 Planned/WIP Developments

The following planned or WIP development are identified in vicinity as shown in Figure 2.

1. High-rise commercial development of Planning Application No. A/K14/822 (Planned)
2. High-rise commercial development of Planning Application No. Y/K14S/4 (Planned)
3. High-rise commercial development of Kai Tak C(2) Site near Kwun Tong Typhoon Shelter (Planned)
    - The layout of the development is obtained from Kai Tak OZP S/K22/8
    - The building height extracted from Statutory Planning Portal
4. High-rise commercial development of Planning Application No. A/K22/31 (Planned)
5. High-rise development of Kai Tak R(B)8 Site in former runway (Planned)
    - The layout and building height are extracted from Baseline Scheme of the same site in MPC Paper No. 9/21.
6. Mid to high-rise development of Kai Tak OU Site in former runway (Planned)
    - The layout and building height are extracted from Development Brief for the "Other Specified Uses" annotated "Tourism Related Uses to include Commercial, Hotel and Entertainment" Zone on the Kai Tak Outline Zoning Plan
7. Mid to high-rise development of Kowloon Bay Action Area (Planned)
    - The layout and building height are extracted from Agreement No. CE 4/2014(TP) Planning and Engineering Study for the Development at Kowloon Bay Action Area of Kowloon East – Feasibility Study dated June 2023
8. High-rise residential development of The Pavilia Forest (WIP)
    - The layout and building height are extracted from the sales brochure.
9. High-rise residential development of Cullinan Harbour (WIP)
    - The layout and building height are extracted from the sales brochure.
10. High-rise residential development of The Knightsbridge (WIP)
    - The layout and building height are extracted from the sales brochure.
11. High-rise residential development of Pano Harbour (WIP)
    - The layout and building height are extracted from the sales brochure.
12. High-rise residential development of Double Coast I (WIP)
    - The layout and building height are extracted from the sales brochure
13. Mid to high-rise development of New Acute Hospital (WIP)

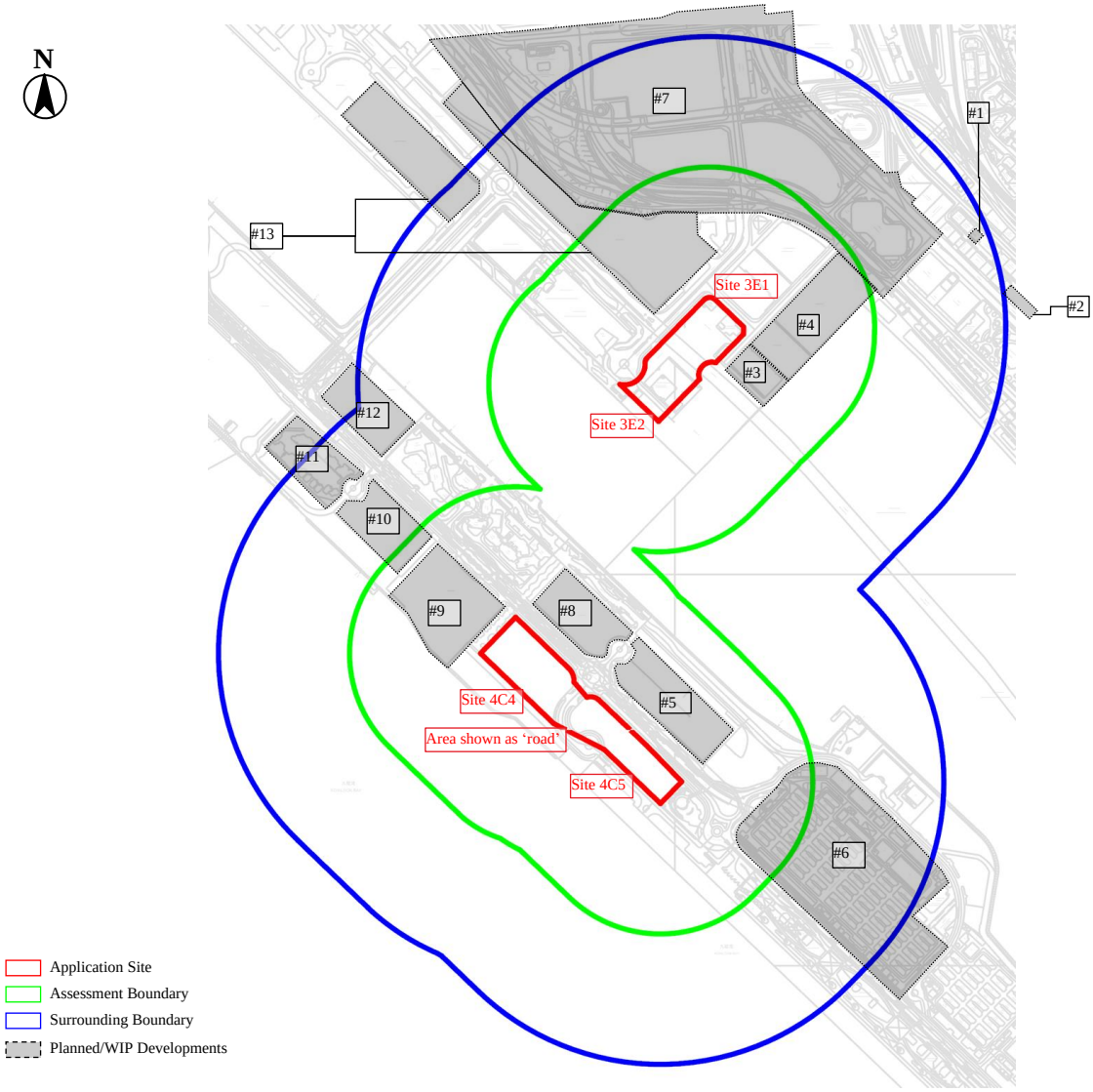


Figure 2 Planned/WIP developments around Sites 3E1, 3E2, 4C4, 4C5 and area shown as 'road'.

3.2 Major Noise Barriers and Major Elevated Structures

Major noise barriers and Major elevated structure are identified in vicinity as shown in Figure 3.

3.2.1.1 Major Noise Barriers

1. Noise Barriers along Shing Fung Road and part of Kai Tak Bridge Road

3.2.1.2 Major Elevated Structures

2. Elevated Road of Kwun Tong Bypass
3. Elevated Road of Kai Fuk Road
4. Elevated Road of Kai Tak Bridge Road
5. Elevated Walkway across Wai Yip Street
6. Elevated Walkway of Kowloon Bay Action Area (Planned)
    - Annotation is provided in Figure 4
7. Elevated Walkway of Hong Kong Children's Hospital
8. Elevated Walkway of New Acute Hospital and Link Bridge (Planned)
    - Annotation is provided in Figure 5 and Figure 6
9. Elevated Walkway of Kai Tak OU Site in former runway (Planned)
10. Elevated Walkway of The Knightsbridge (Planned)
11. Elevated Walkway of Cullinan Harbour (Planned)
12. Elevated Walkway of Site 4C4 (Planned)
13. Elevated Walkway of Site 4C5 (Planned)
14. Elevated Walkway of Site 4B5 (Planned)
15. Kai Tak Sky Garden on Shing Fung Road

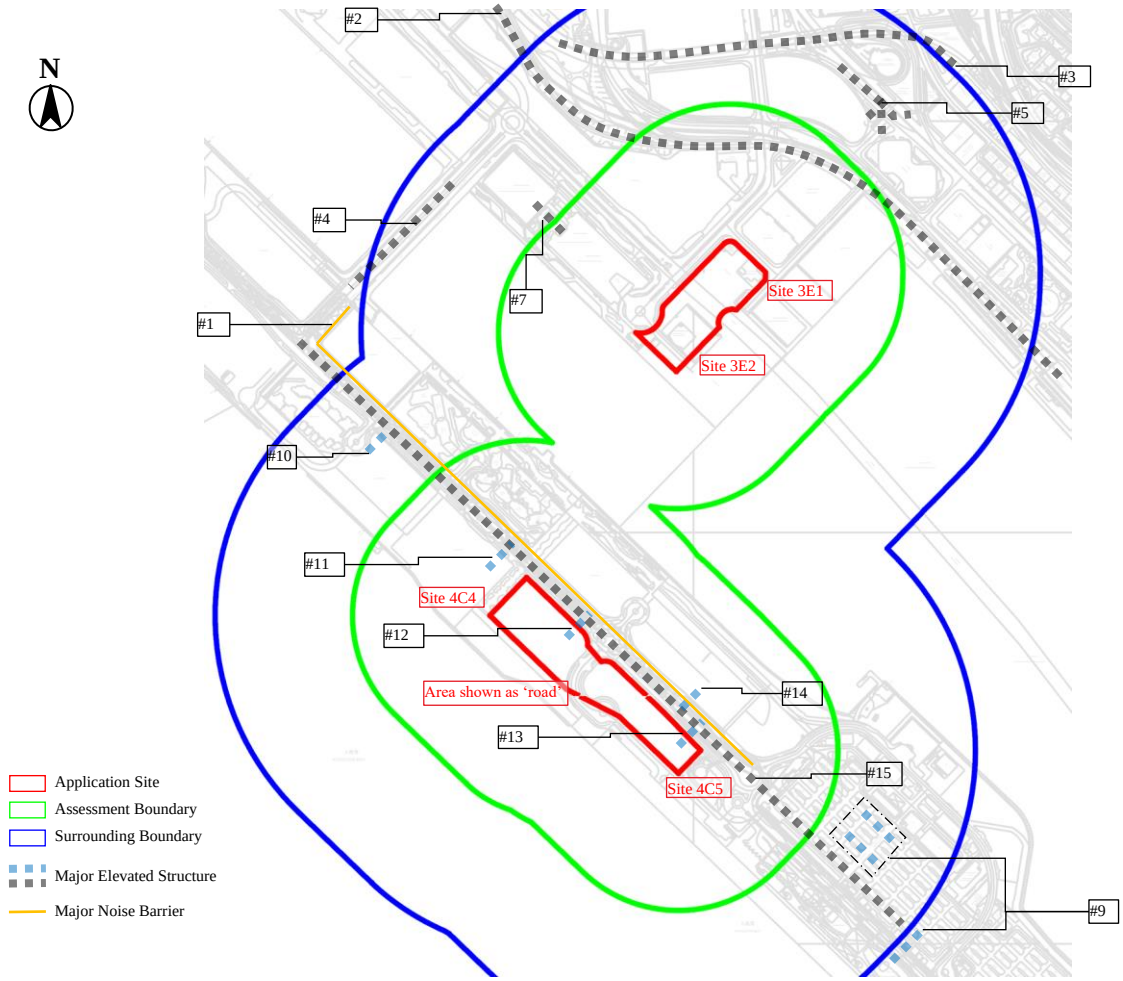


Figure 3 Elevated Structure around Sites 3E1, 3E2, 4C4, 4C5 and area shown as 'road'

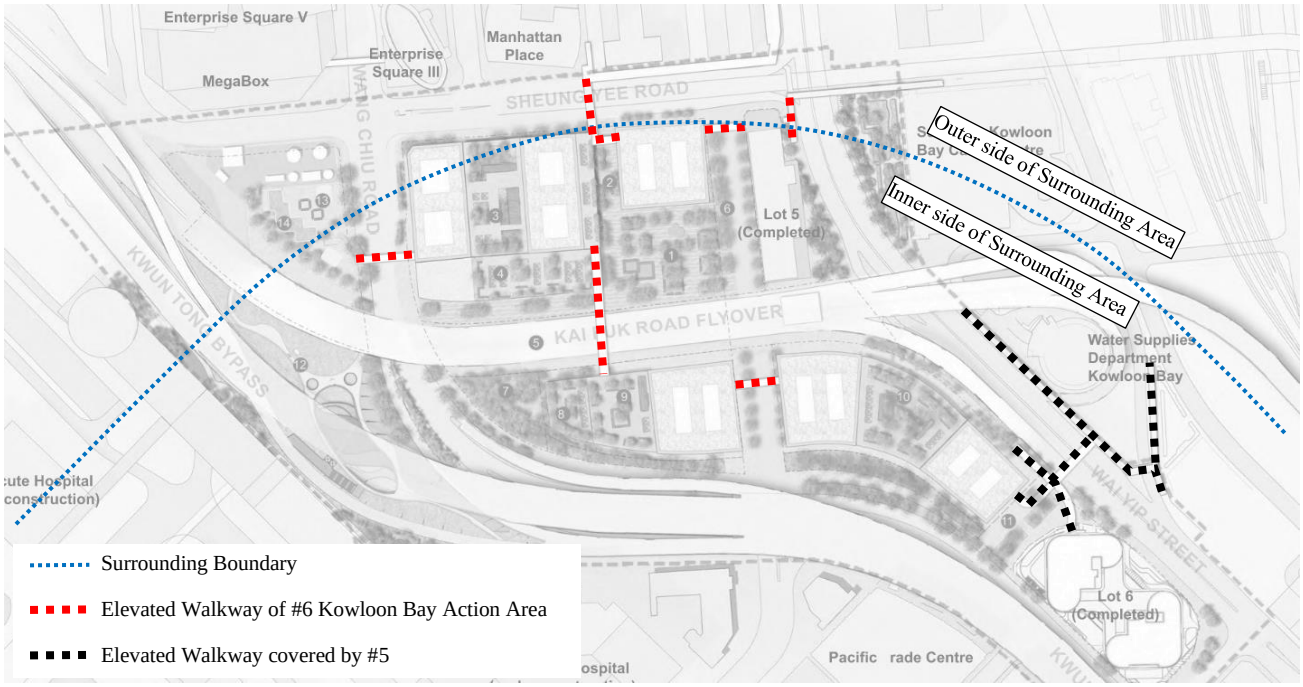


Figure 4 Elevated Structure of #10 Kowloon Bay Action Area

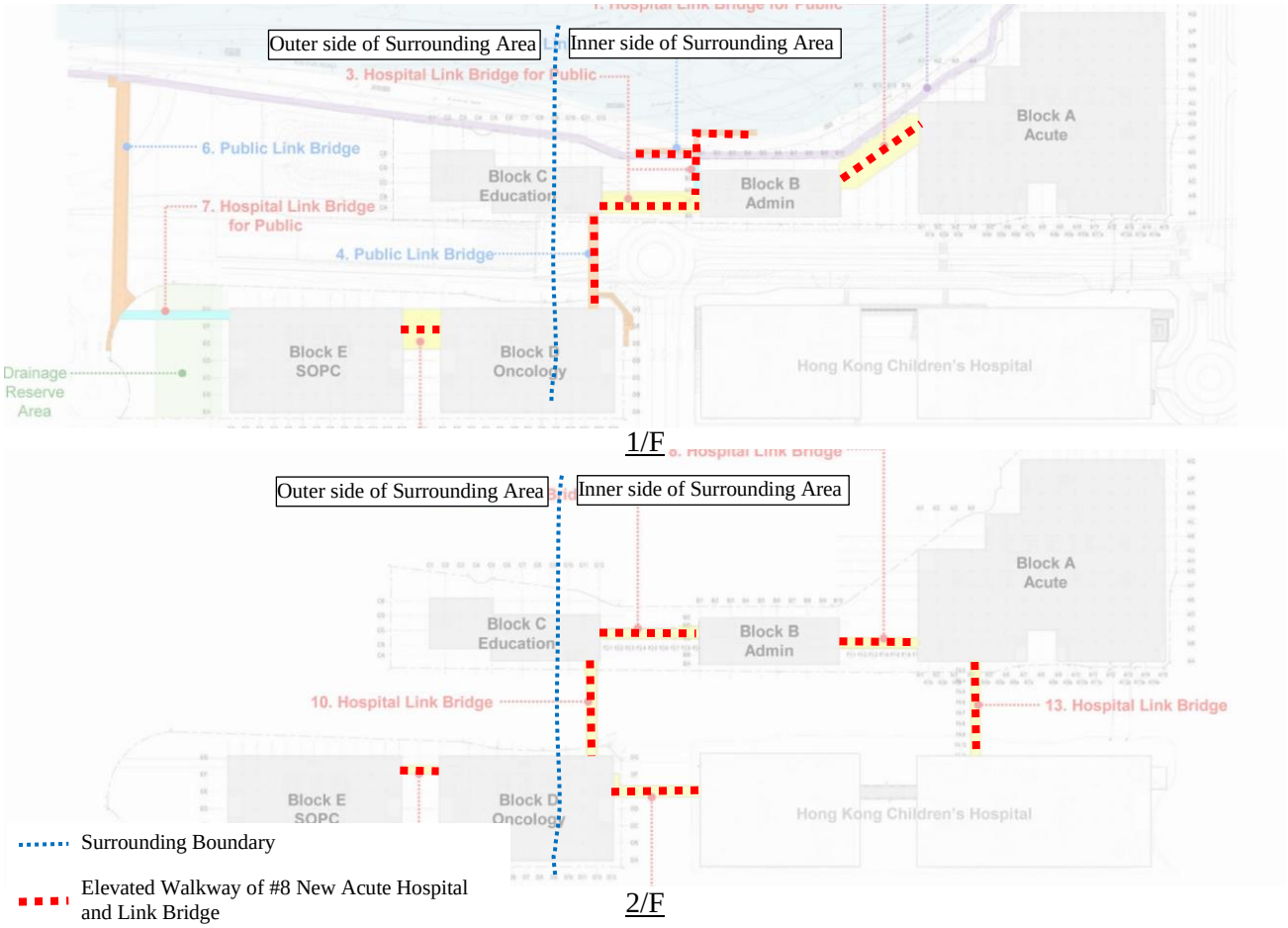


Figure 5 Elevated Structure of #8 New Acute Hospital and Link Bridge

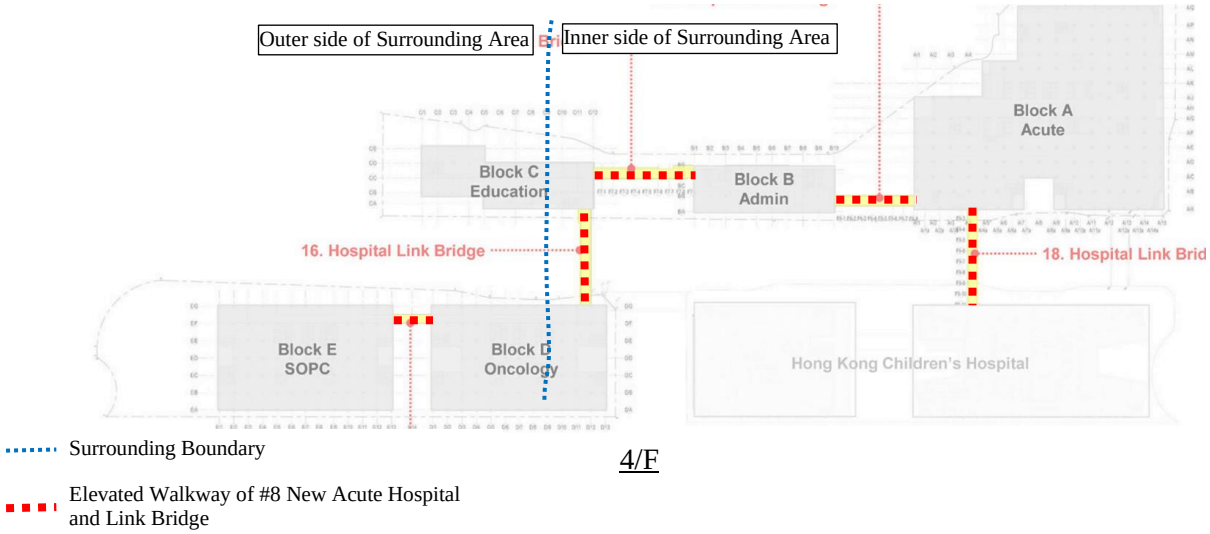


Figure 6 Elevated Structure of #8 New Acute Hospital and Link Bridge (cont.)

4. Proposed Methodology

Sites 3E1, 3E2, 4C4, 4C5 and area shown as 'road' are high-rise development near waterfront area. The Application Site would influence the surrounding ventilation performance. Thus, an **Air Ventilation Assessment – Initial Study** (AVA-IS) would be conducted to assess the ventilation performance of these four sites.

4.1 AVA Initial Study

An Initial Study will be conducted by using Computational Fluid Dynamics (CFD) techniques. It aims to achieve the following tasks:

- Initially assesses the characteristics of the wind availability of the site;
- Gives a general pattern and a rough quantitative estimate of the wind performance at the pedestrian level using Velocity VR;
- Identify the air paths within the site ascertain their effectiveness; and
- Identify good design features and problem areas if any and recommend mitigation measures.

4.2 Baseline Scheme

Baseline Scheme of the sites 3E1 and 3E2 are constructed based on the Approved Kai Tak Outline Zoning Plan (OZP) no. S/K22/8, with building massing extracted from the Landscape Plan and building height assumed to reach the height restriction.

Baseline Scheme for the sites 4C4, 4C5 and area shown as 'road' are constructed based on the MPC Paper 9/21, with building massing and height restriction extracted from the Baseline Scheme of the abovementioned MPC Paper.

Sites 3E1 and 3E2 are zoned as "R(B)2". Each site consists of 3 towers with height restriction of 100mPD and 80mPD for Site 3E1 and 3E2 respectively.

Sites 4C4 and 4C5 are zoned as "C(7)" and "C(5)" respectively. Site 4C4 consists of 2 towers with height restriction of 95mPD. Site 4C5 consists of 2 towers with height restriction of 95mPD.

The development parameters are summarized in Table 1. The layout plan of Baseline Scheme is shown in Figure 7 and Figure 8 with details in Appendix A. The 3D model of the Baseline Scheme was constructed as shown in Figure 9 to Figure 12.

To facilitate a clear discussion in Section 5, each block is given a tag as shown in Figure 7 and Figure 8.

The following wind enhancement features are identified in the Baseline Scheme

Site 3E1

1. 20m building setback

Site 3E2

2. 20m building setback
3. 15m building separation

Site 4C4

4. 10m NBA

Site 4C5

5. 10m NBA including Townscape Setback (TSS)
6. 55m building separation

Table 1 Development parameter of Baseline Scheme

Baseline Scheme	Parameters	
3E1	Maximum Plot Ratio	4.5
	Maximum GFA	31,788 m^2
	Building Height Restriction	100mPD
3E2	Maximum Plot Ratio	4.5
	Maximum GFA	34,587 m^2
	Building Height Restriction	80mPD
4C4	Maximum Plot Ratio	7.5
	Maximum GFA	80,205 m^2
	Building Height Restriction	95mPD
4C5	Maximum Plot Ratio	6.0
	Maximum GFA	56,880 m^2
	Building Height Restriction	95mPD

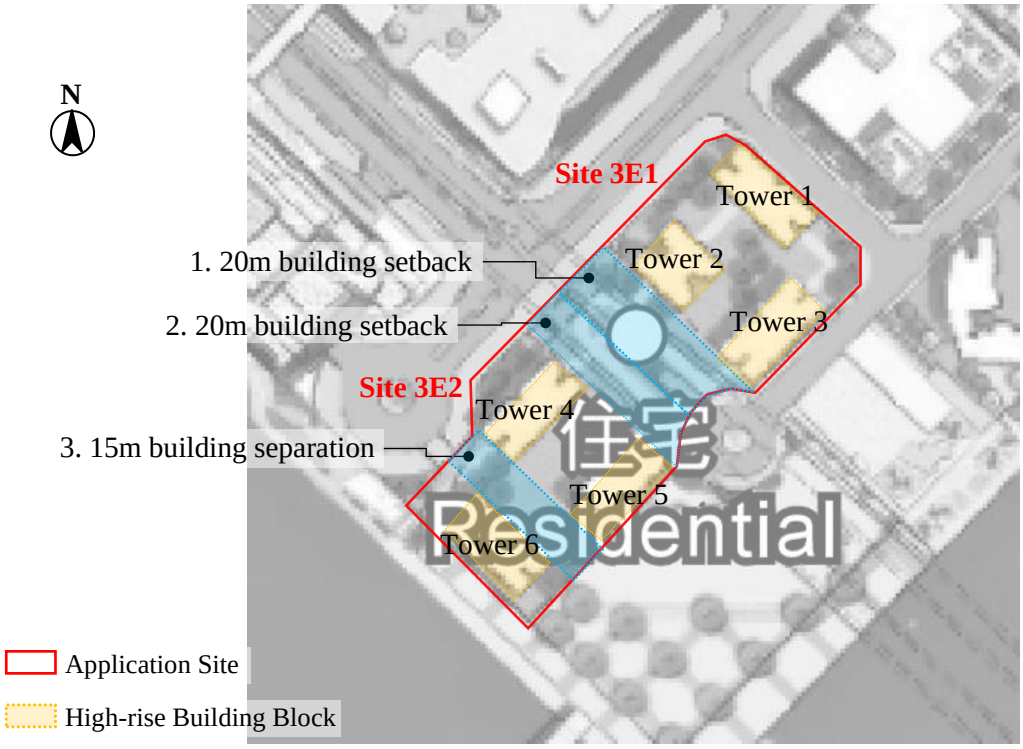


Figure 7 Layout plan of Sites 3E1 and 3E2 of Baseline Scheme

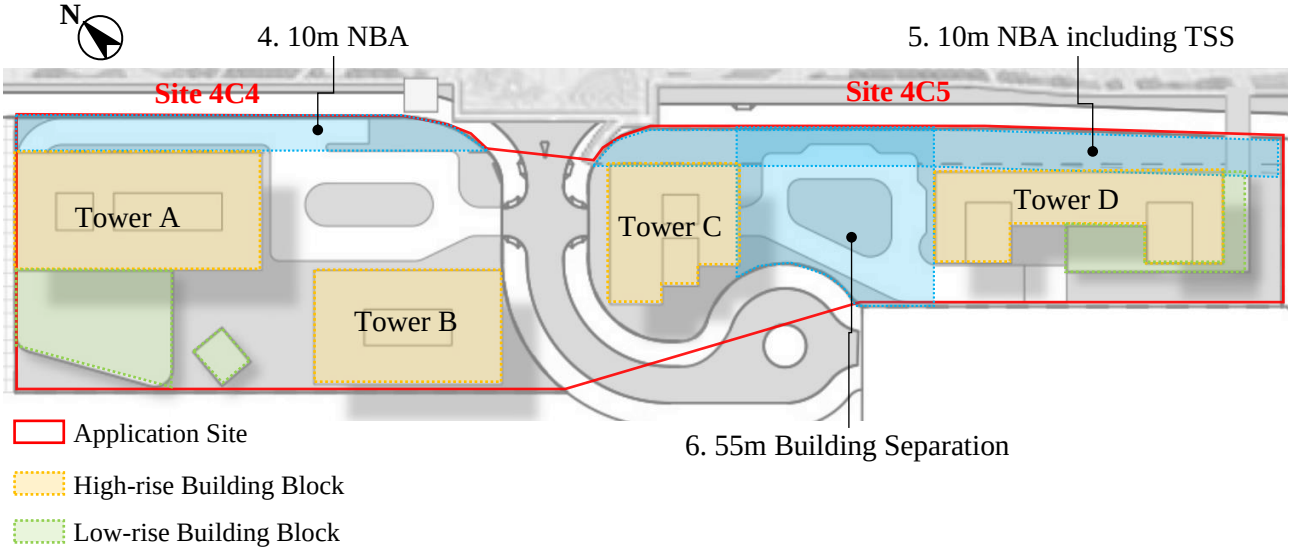


Figure 8 Layout plan of Site 4C4, 4C5 and area shown as 'road' of Baseline Scheme

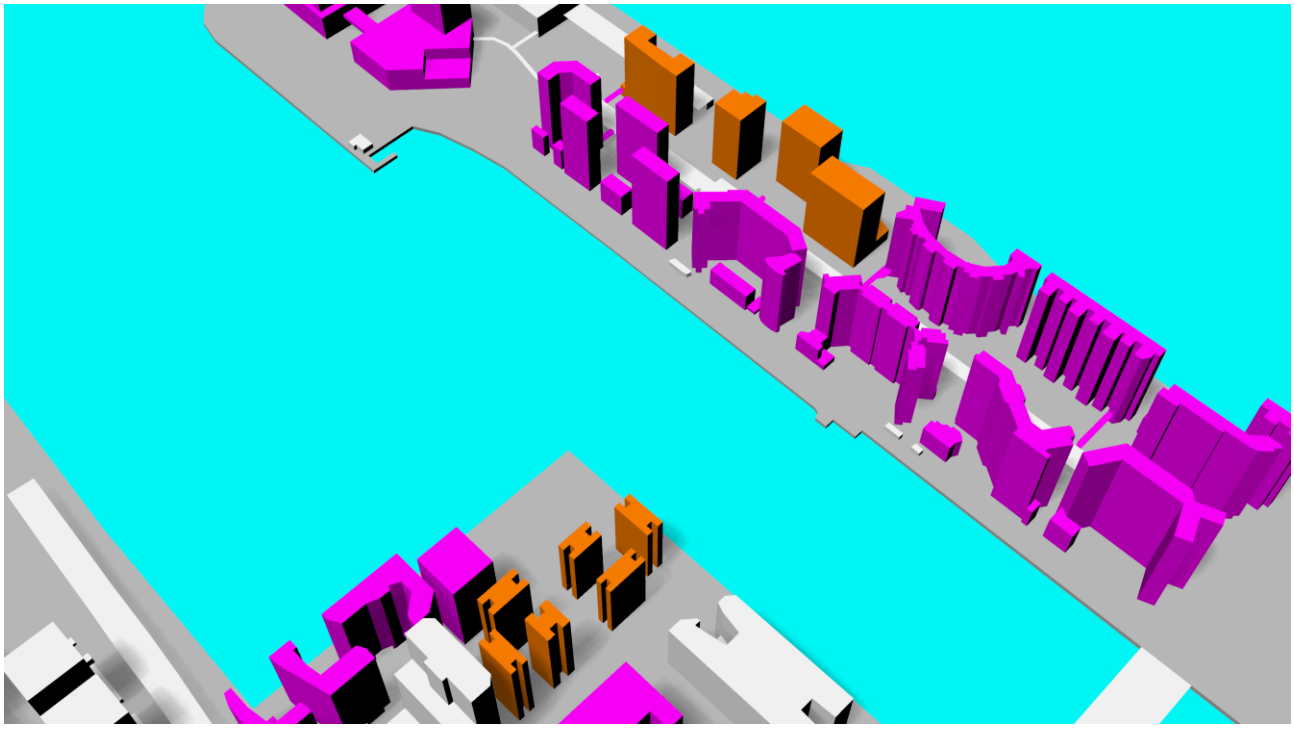


Figure 9 Northly view of Baseline Scheme

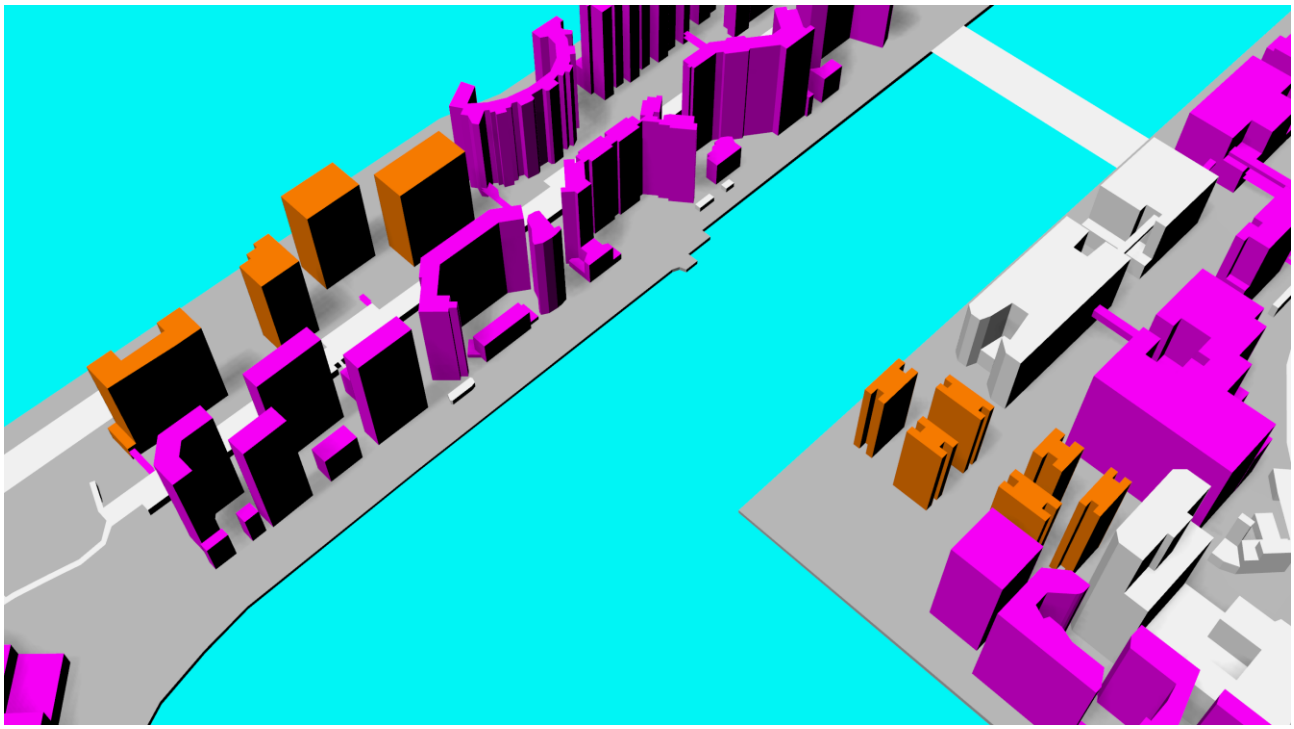


Figure 10 Eastly view of Baseline Scheme

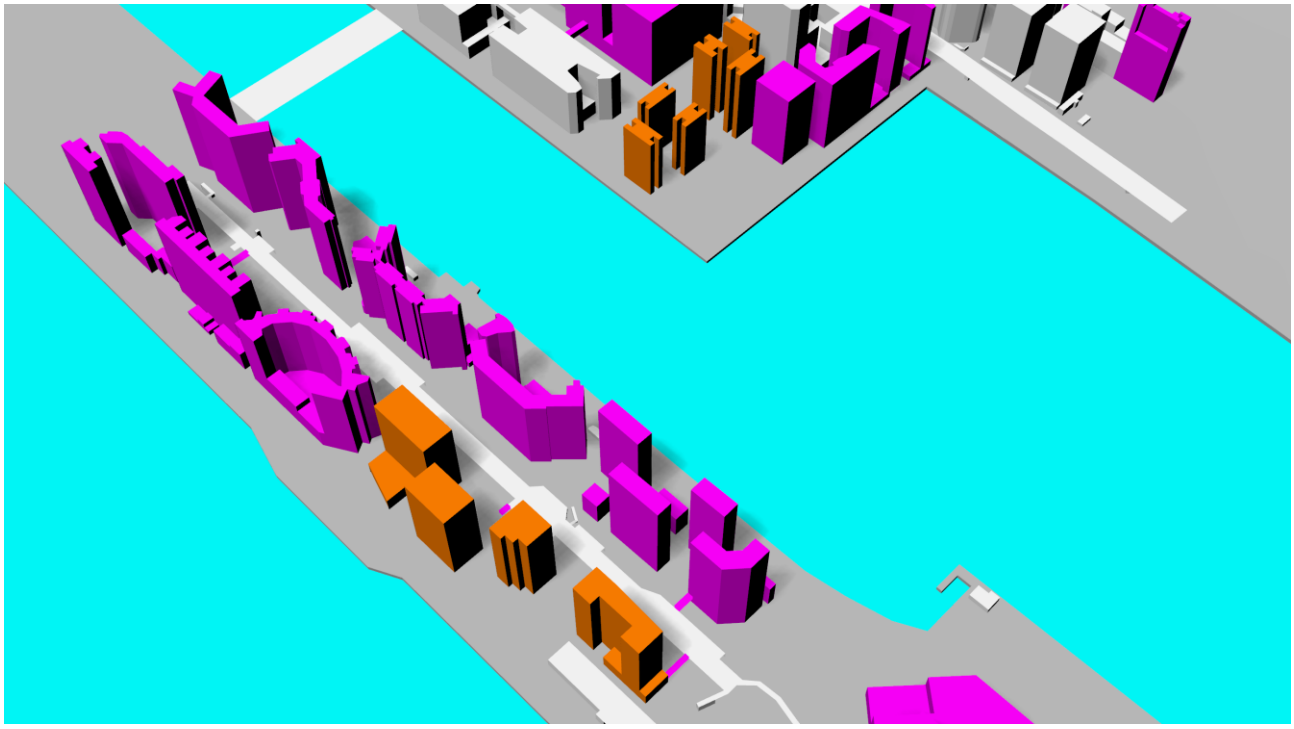


Figure 11 Southly view of Baseline Scheme

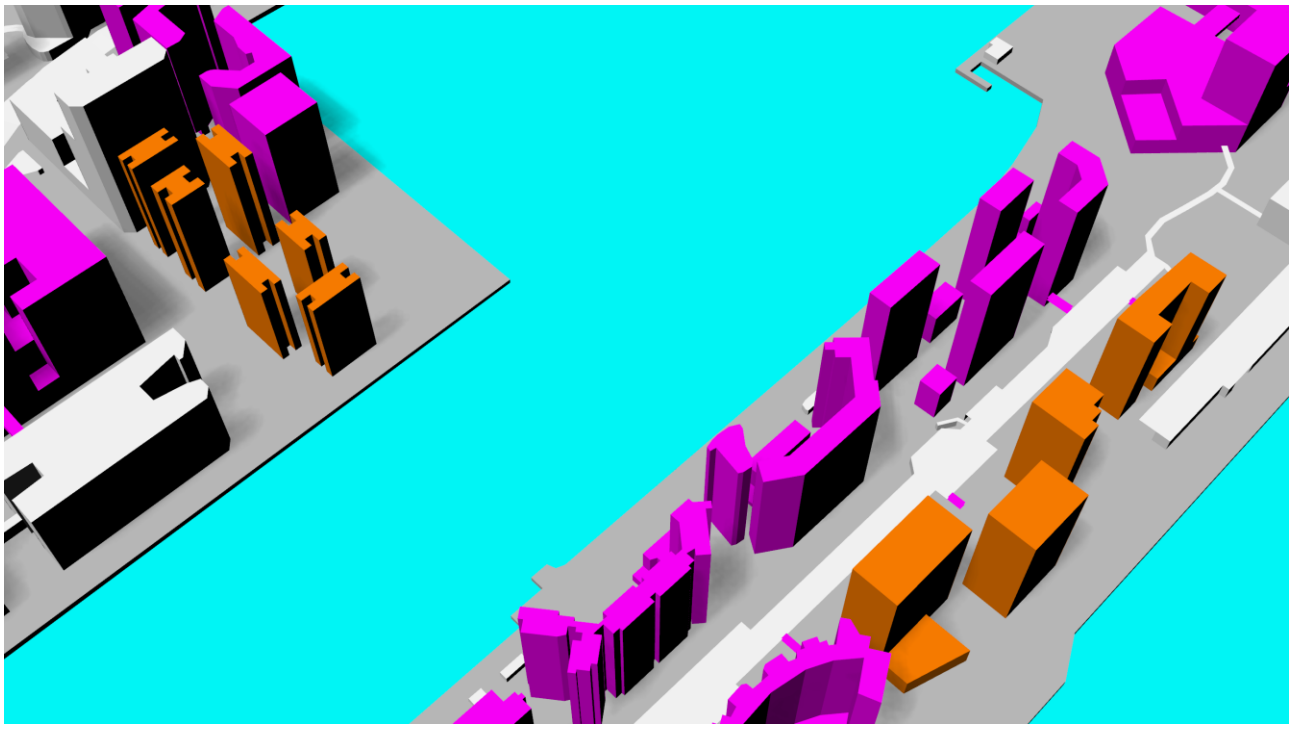


Figure 12 Westly view of Baseline scheme

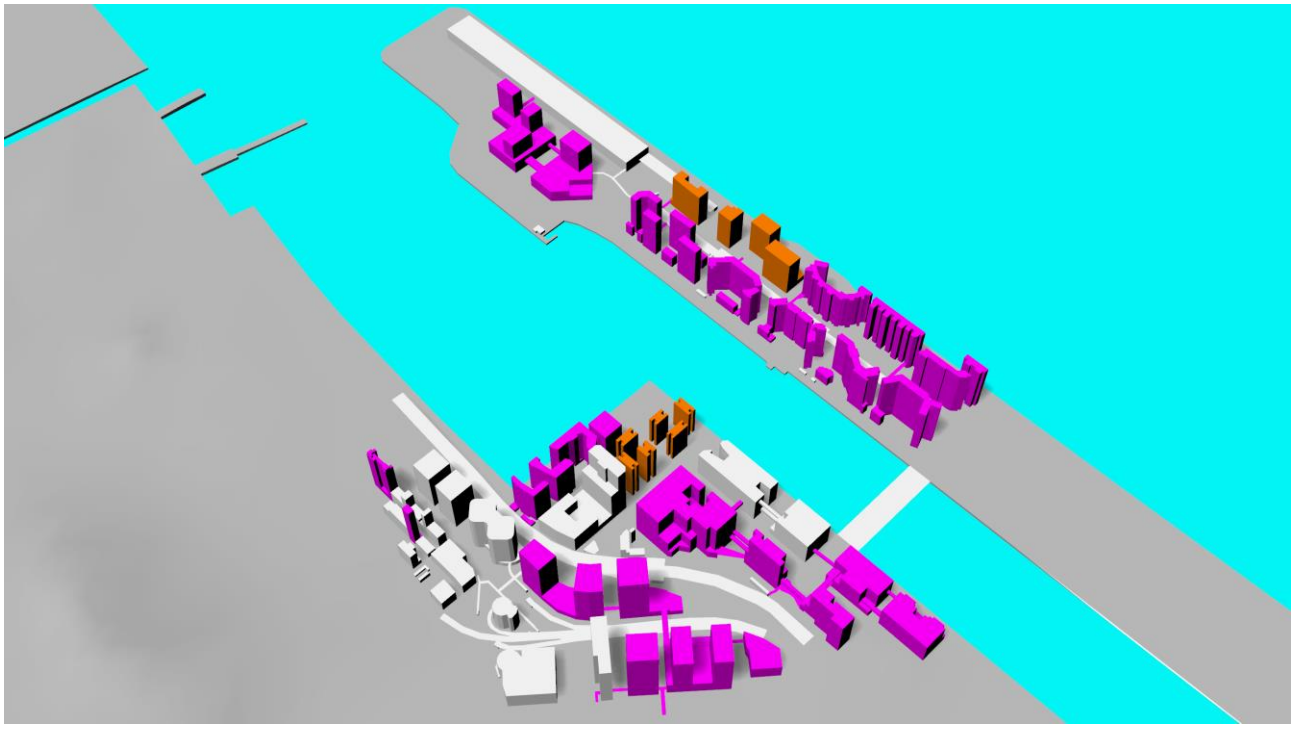


Figure 13 Northly view of Surrounding Building under Baseline Scheme

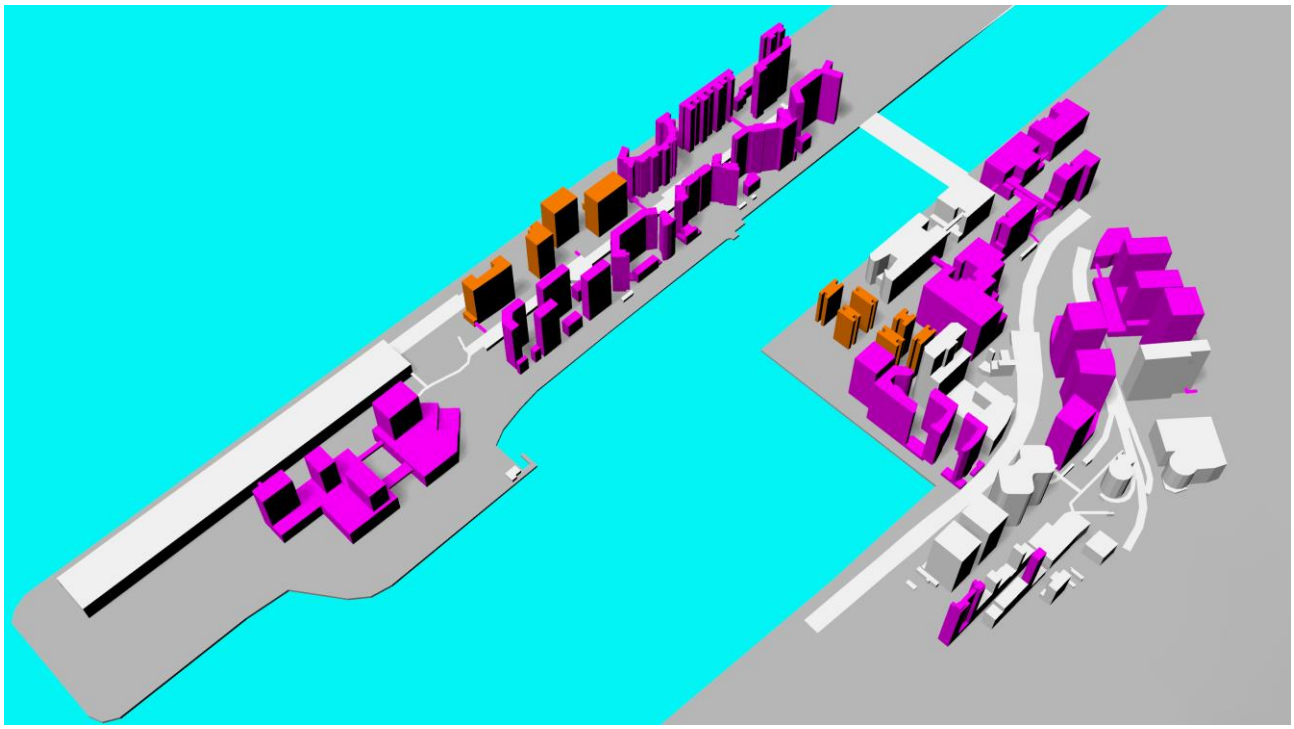


Figure 14 Eastly view of Surrounding Building under Baseline Scheme

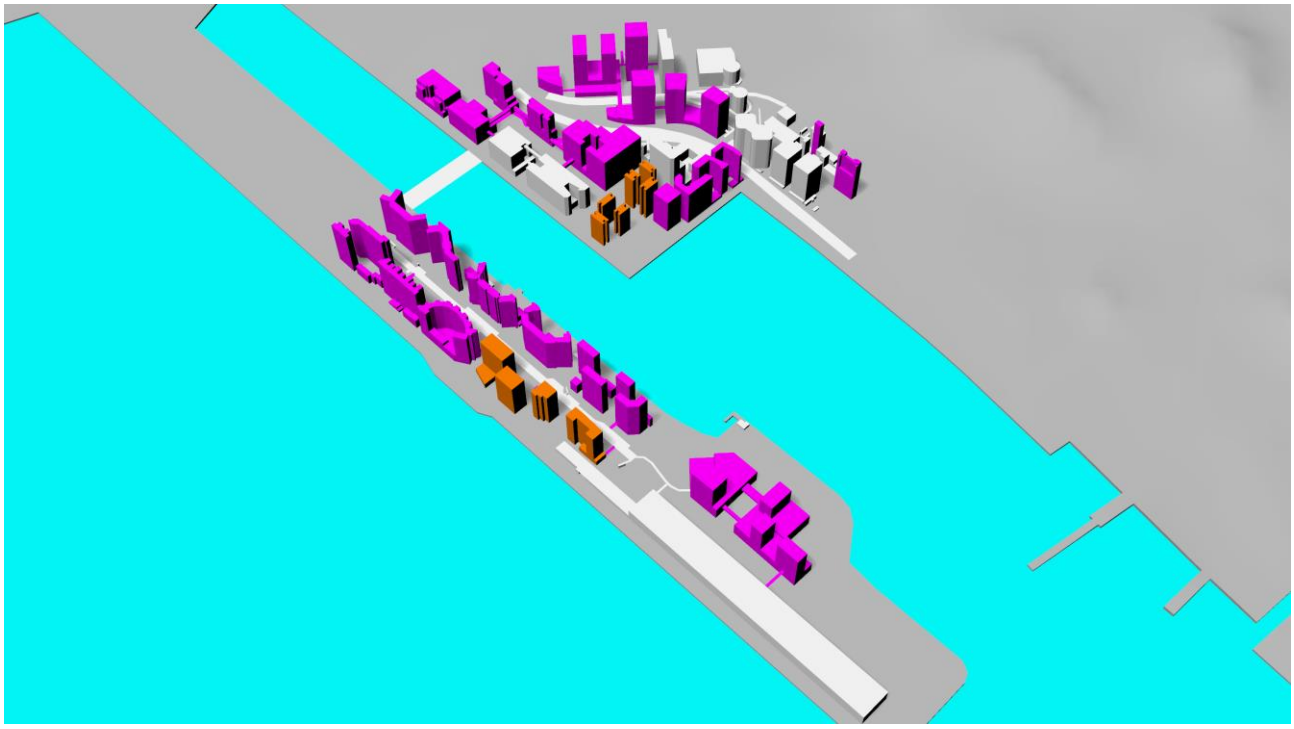


Figure 15 Southly view of Surrounding Building under Baseline Scheme

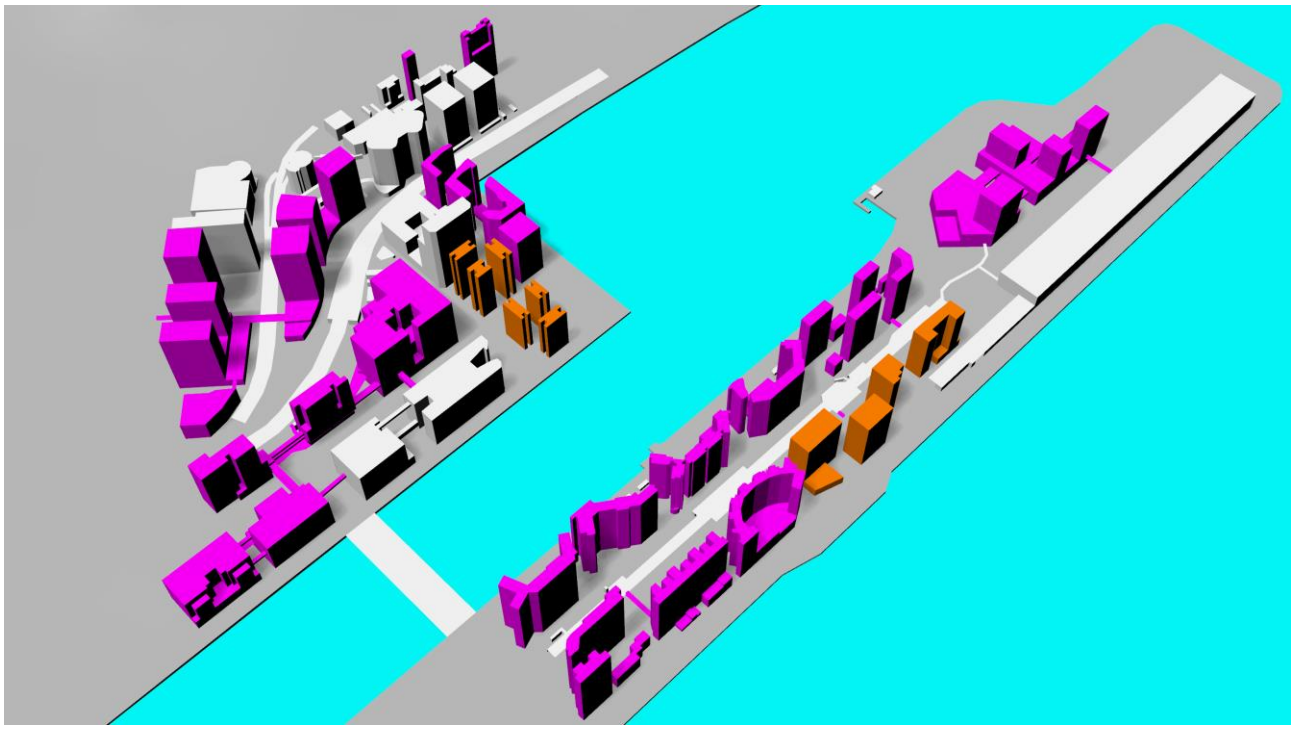


Figure 16 Westly view of Surrounding Building under Baseline Scheme

4.3 Proposed Scheme

The Proposed Scheme is the intended development scheme.

Site 3E1 consists of two 27-storeys residential towers including clubhouse, retail and social welfare facilities. The site is proposed to increase the plot ratio from 4.5 to 7 and increase the height restriction from 100mPD to 101mPD (including roof top structure).

Site 3E2 consist of two 29-storeys residential towers with a 2-storeys retail and a 1 storey clubhouse. The site is proposed to increase the height restriction from 80mPD to 107mPD (including roof top structure) and plot ratio from 4.5 to 7.

Site 4C4 consist of a 18-storeys office tower and a 20-storeys hotel tower atop of a 4-storeys composite podium. The podium is formed by hotel, office, retail and transportation uses. The site is proposed to increase the height restriction from 95mPD to 115mPD (including roof top structure) and plot ratio from 7.5 to 9.56.

Site 4C5 consist of two 12-storeys office towers and a 16-storeys hotel tower atop of a 3/4-storeys composite podium. The podium is formed by hotel, office, retail and transportation uses. The site is proposed to increase the plot ratio from 6.0 to 8.37.

A Public Transport Station (PTS) has been integrated into the podium design of the Proposed Scheme in Sites 4C4 and 4C5 spanning across Shing King Street.

The development parameters are summarized in Table 2. The layout plan of Proposed Scheme is shown in Figure 17 and Figure 18 with details in Appendix A. The 3D model of the Baseline Scheme was constructed as shown in Figure 19 to Figure 22.

Wind enhancement features have been provided to alleviate the ventilation impact created by the Proposed Scheme. These features are listed below:

Site 3E1

1. 28m building setback on podium level

Site 3E2

2. 16m building setback

Site 4C4

3. 10m NBA

Site 4C5

4. 10m NBA including Townscape Setback (TSS)

Table 2 Development parameter of Proposed Scheme

Proposed Scheme	Parameters	
3E1 & 3E2	Maximum Plot Ratio	7
	Maximum GFA	103,250 m^2
	Proposed Building Height (at main roof level)	100mPD (Site 3E1) 80mPD (Site 3E2)
	Proposed Building Height (including rooftop structure(s))	101mPD (Site 3E1) 107mPD (Site 3E2)
4C4 &4C5 & Area shown as 'Road'	Maximum Plot Ratio	9.56 (Site 4C4) 8.37 (Site 4C5)
	Maximum GFA	183,942 m^2
	Proposed Building Height (at main roof level)	111mPD (Site 4C4) 95mPD (Site 4C5)
	Proposed Building Height (including rooftop structure(s))	115mPD (Site 4C4) 99mPD (Site 4C5)

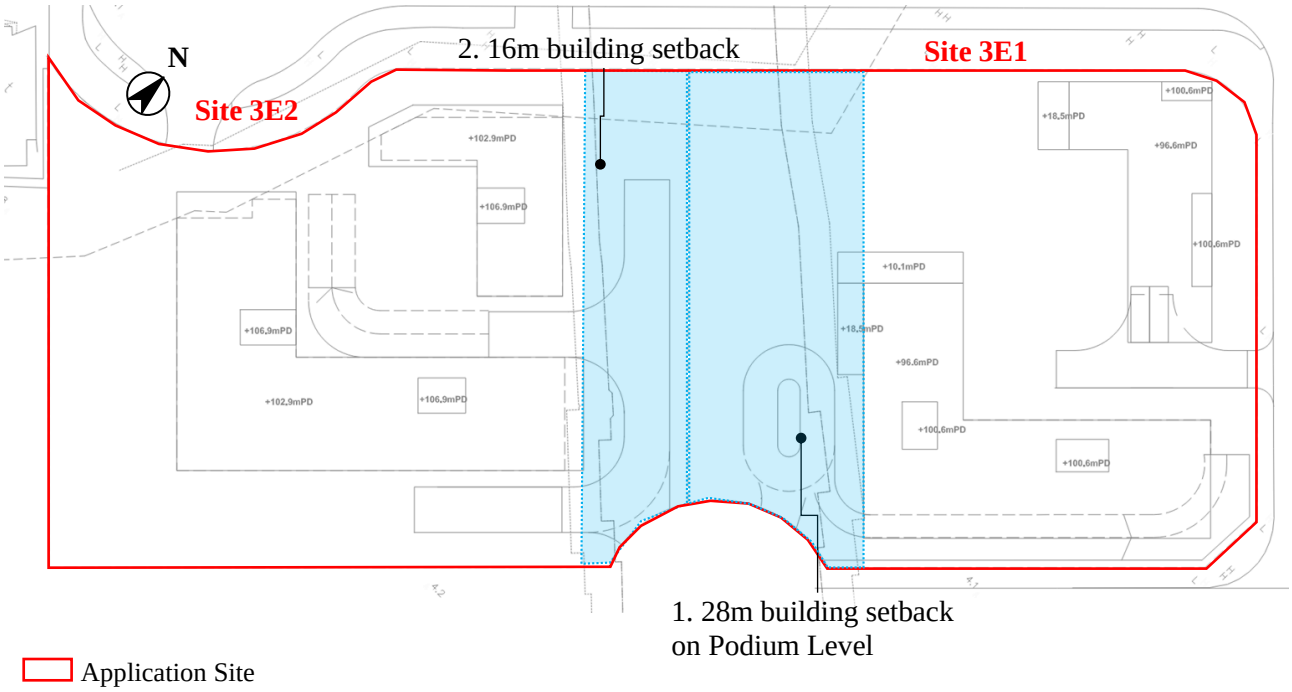


Figure 17 Layout plan of Site 3E1 and 3E2 of Proposed Scheme

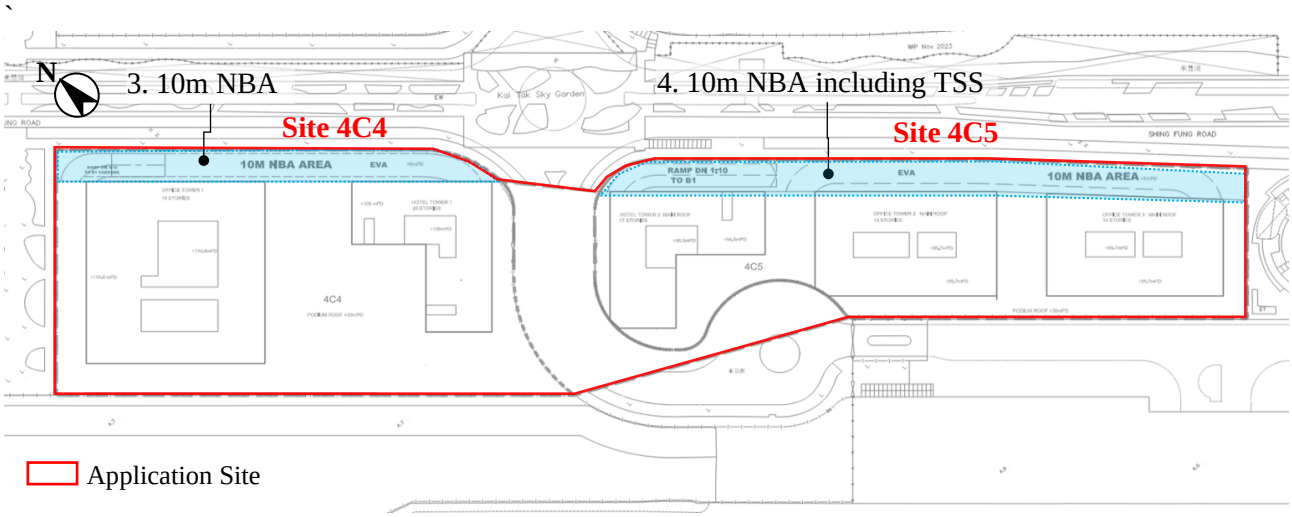


Figure 18 Layout plan of Sites 4C4, 4C5 and area shown as 'road' of Proposed Scheme

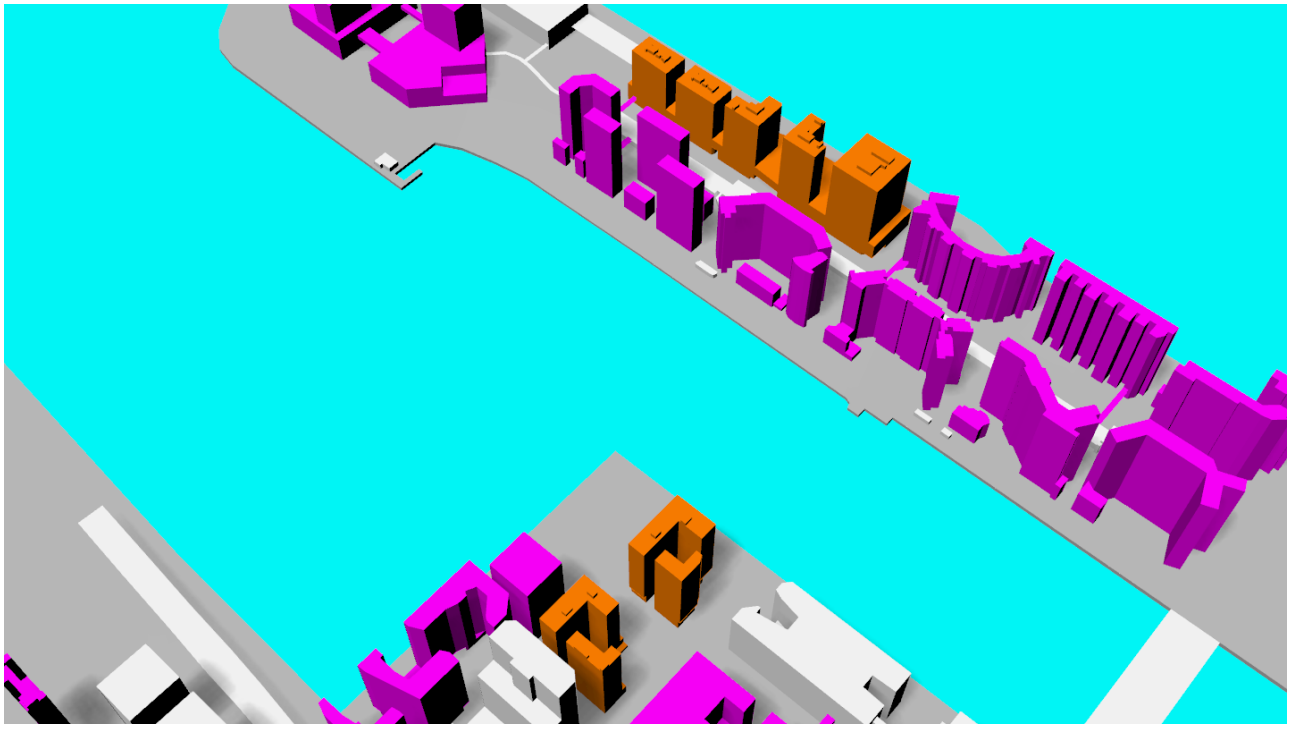


Figure 19 Northly view of Proposed Scheme

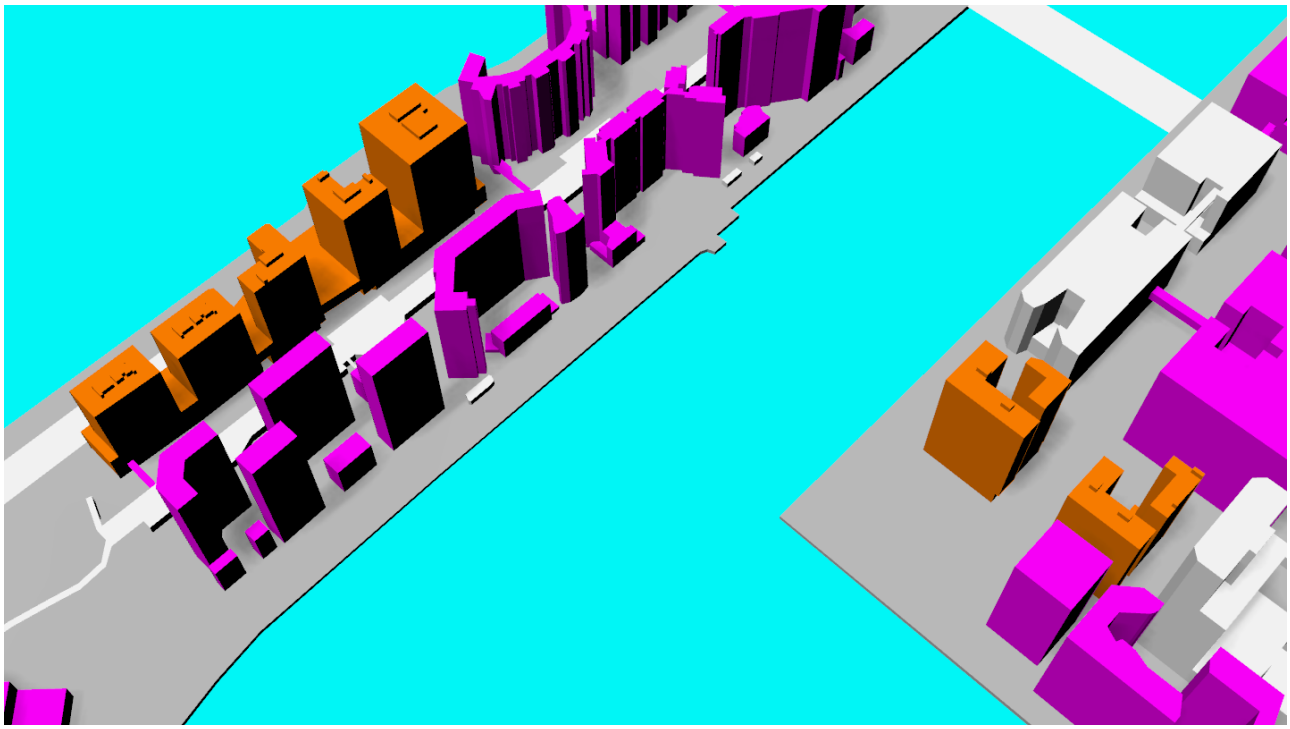


Figure 20 Eastly view of Proposed Scheme

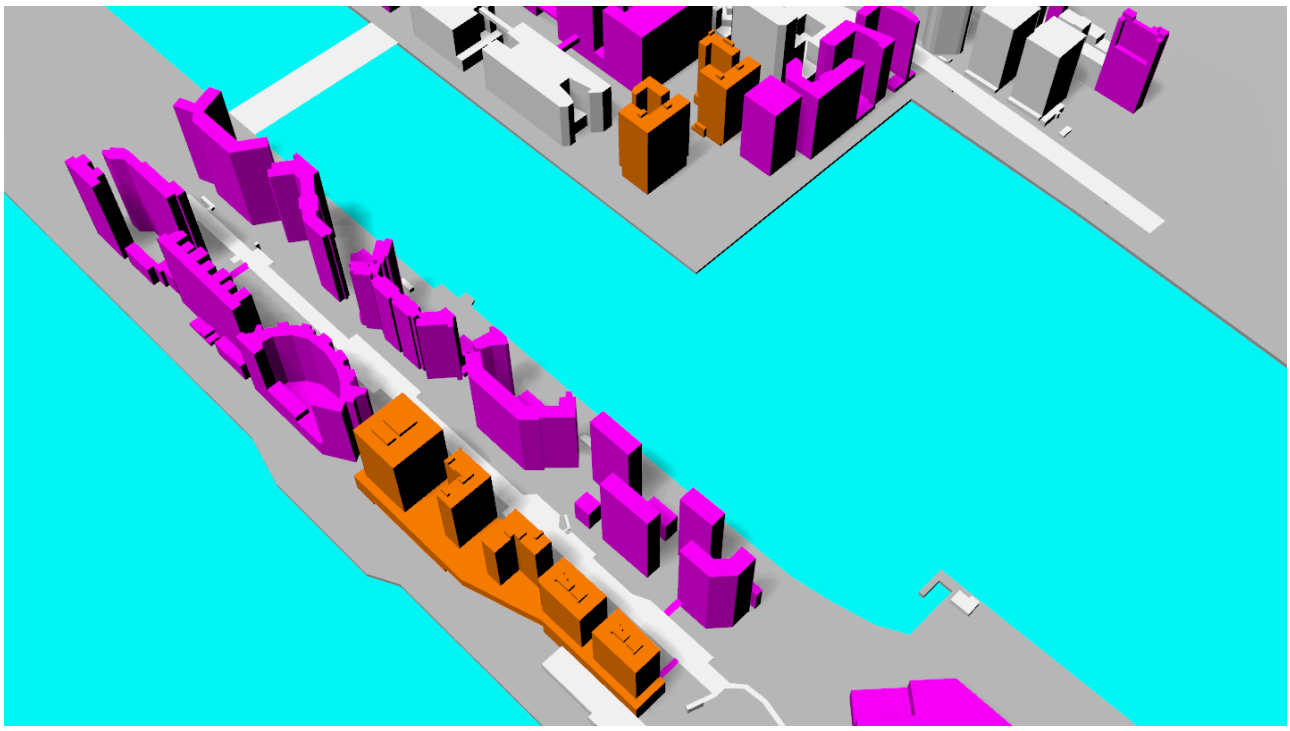


Figure 21 Southerly view of Proposed Scheme

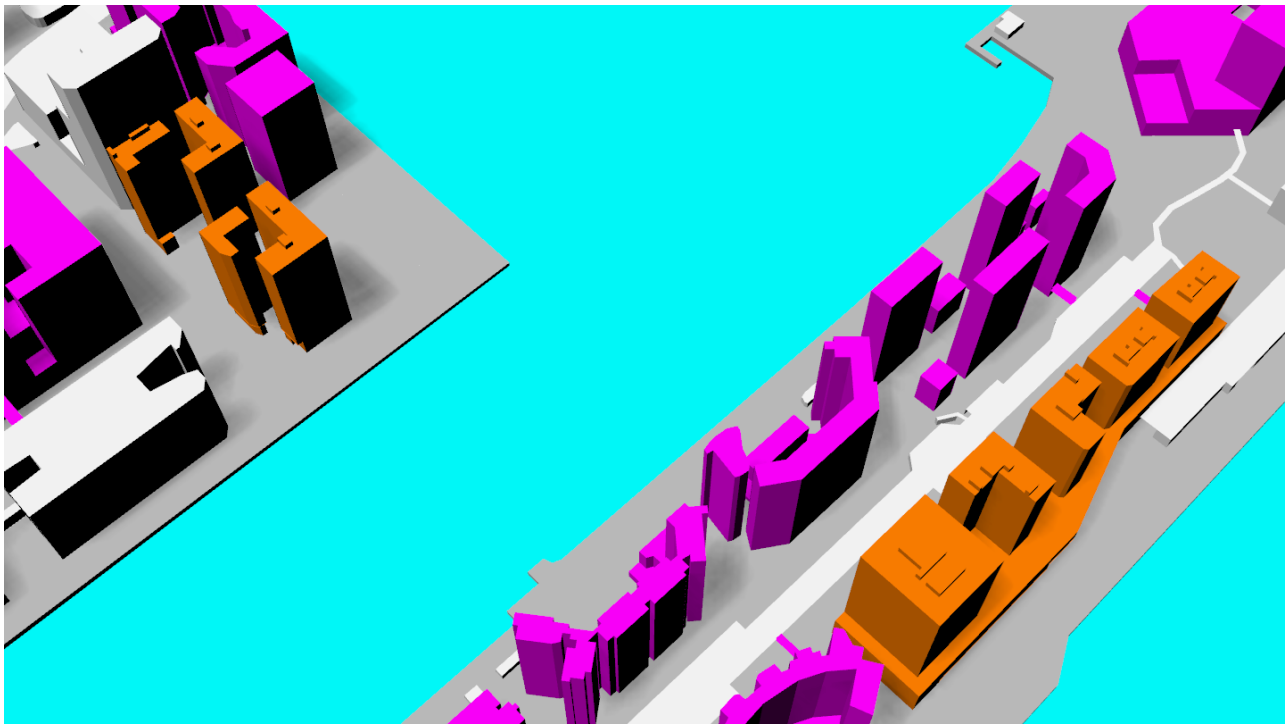


Figure 22 Westerly view of Proposed Scheme

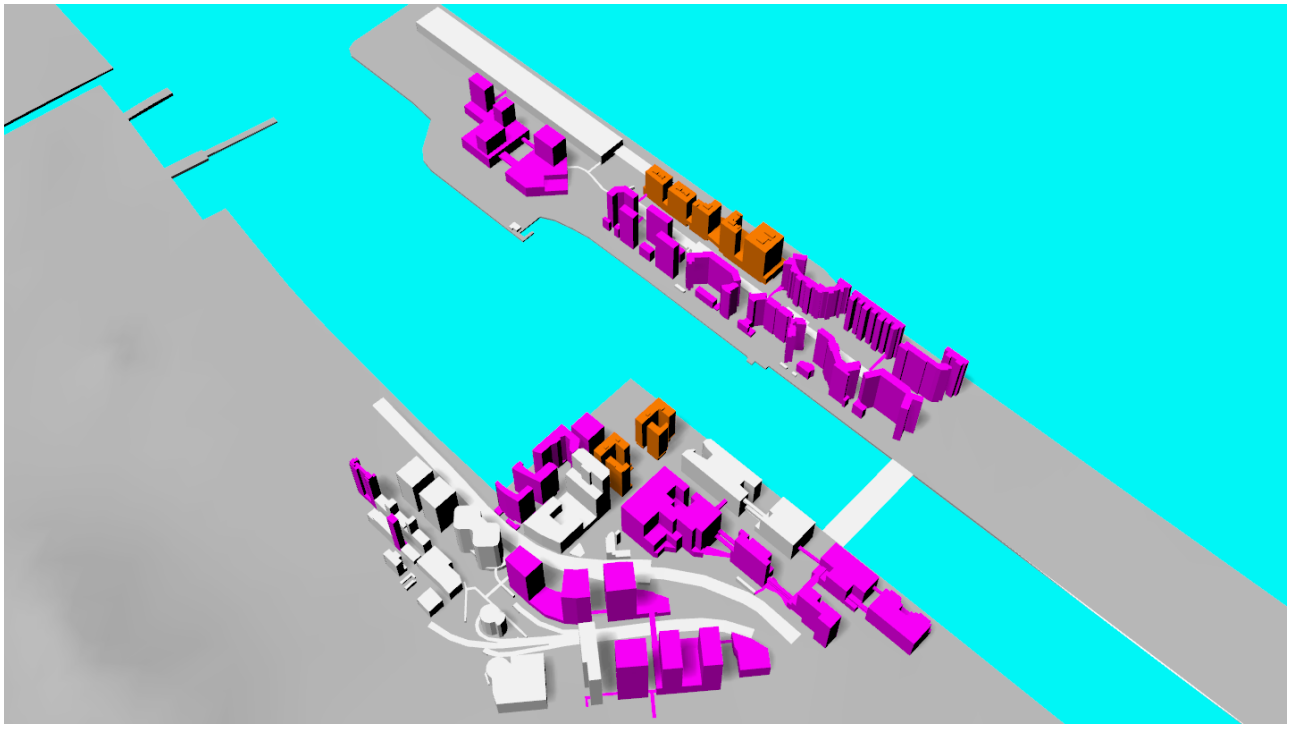


Figure 23 Northly view of Surrounding Building under Proposed Scheme

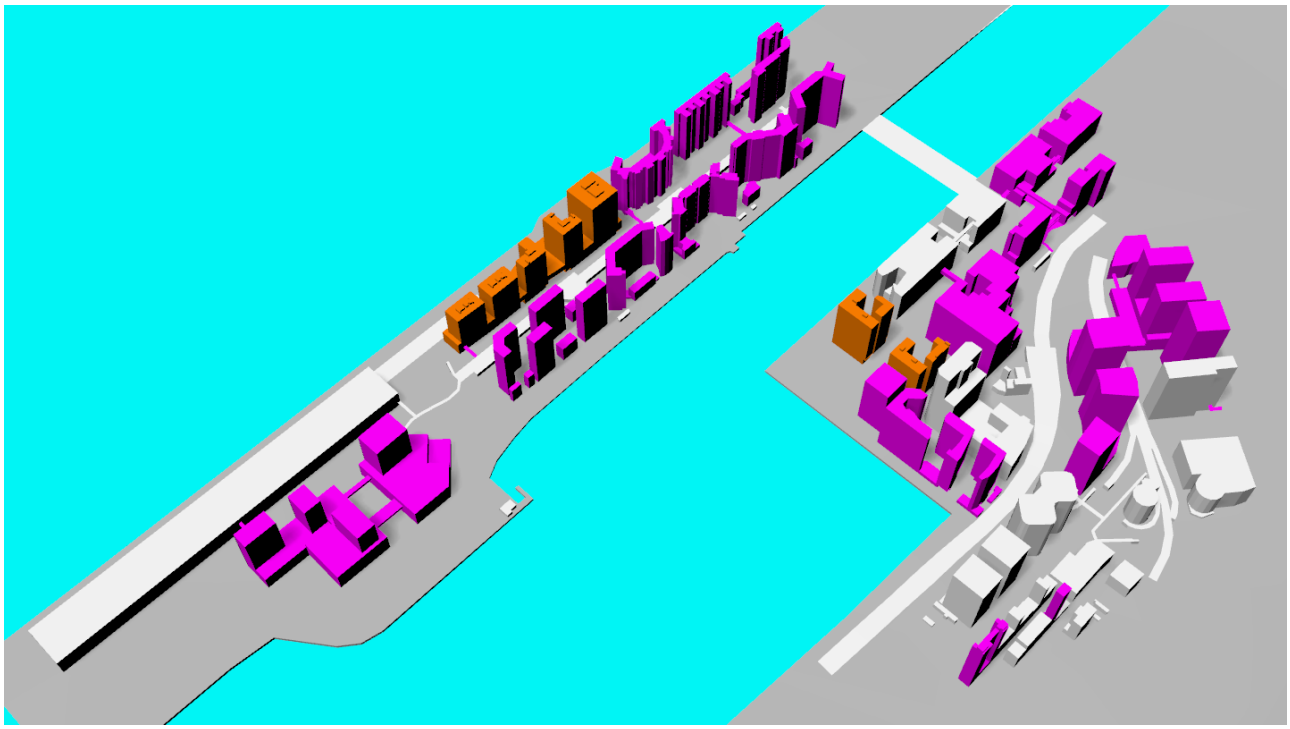


Figure 24 Eastly view of Surrounding Building under Proposed Scheme

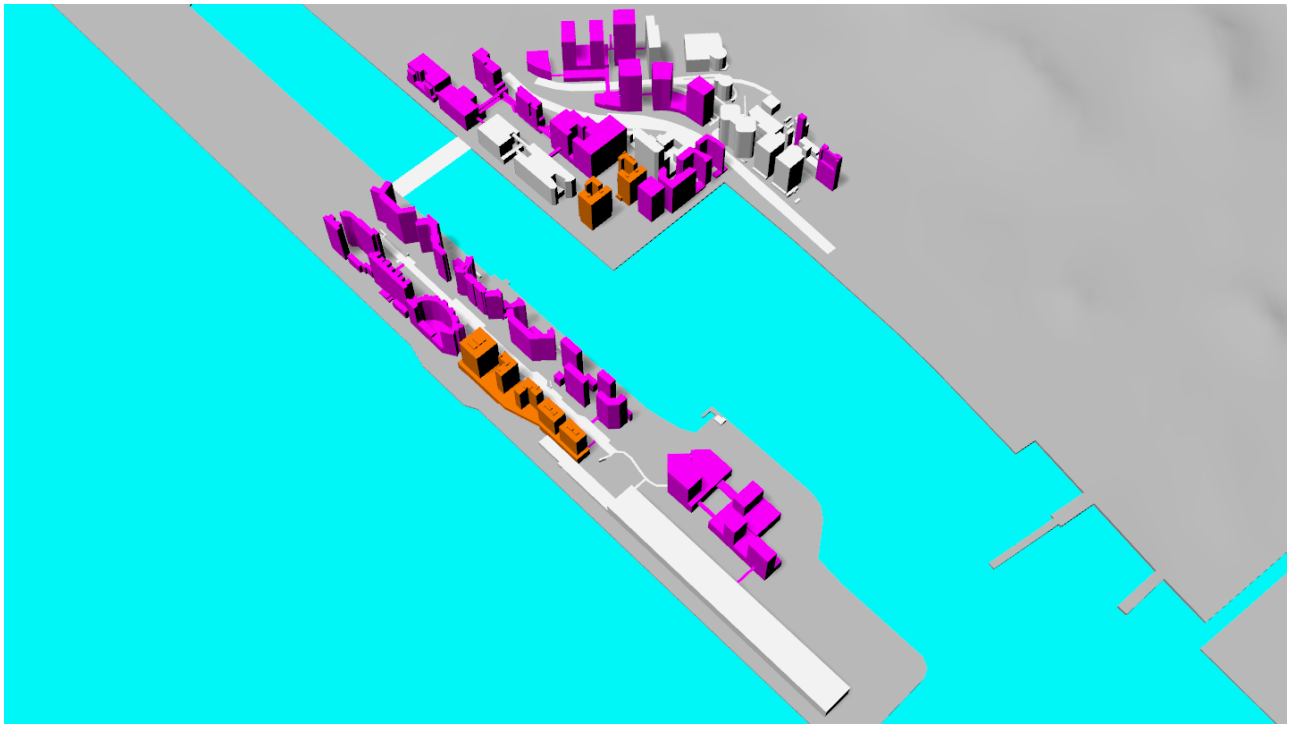


Figure 25 Southerly view of Surrounding Building under Proposed Scheme

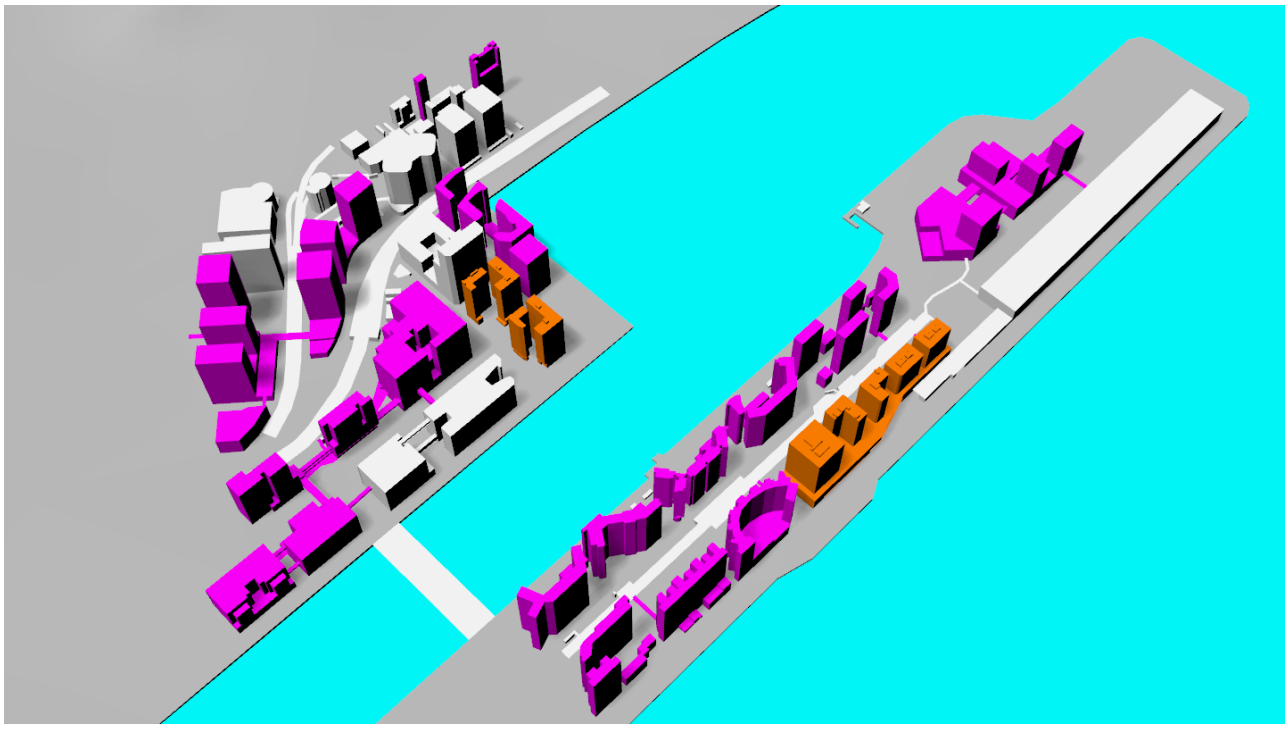


Figure 26 Westerly view of Surrounding Building under Proposed Scheme

4.4 Wind Data

As per the *AVA Technical Circular* [1], at least 75% of the time in a typical reference year (frequency of occurrence) would be studied under both annual and summer wind condition in the Initial Study when using a Computational Fluid Dynamics (CFD) modelling technique.

The site wind availability of the Application Site and its surrounding is an essential parameter for AVA. As stipulated in the *AVA Technical Circular* [1], the site wind availability would be presented by using appropriate mathematical models. Planning Department (PlanD) has set up a set of simulated meso-scale data of Regional Atmospheric Modelling System (RAMS) of the territory for AVA study, which could be downloaded at Planning Department Website [2]. Simulated meso-scale data of Regional Atmospheric Modelling System (RAMS) from PlanD will therefore be adopted in this AVA Study.

Four Sites cover total two grids in RAMS data, (x:087,y:040) and (x:088,y:041). Since grid (x:087,y:040) would be closer to waterfront and less disturbed but urban environment, it is selected for the simulation, as indicated in Figure 27. The 500m wind rose is illustrated in Figure 28 and Figure 29.

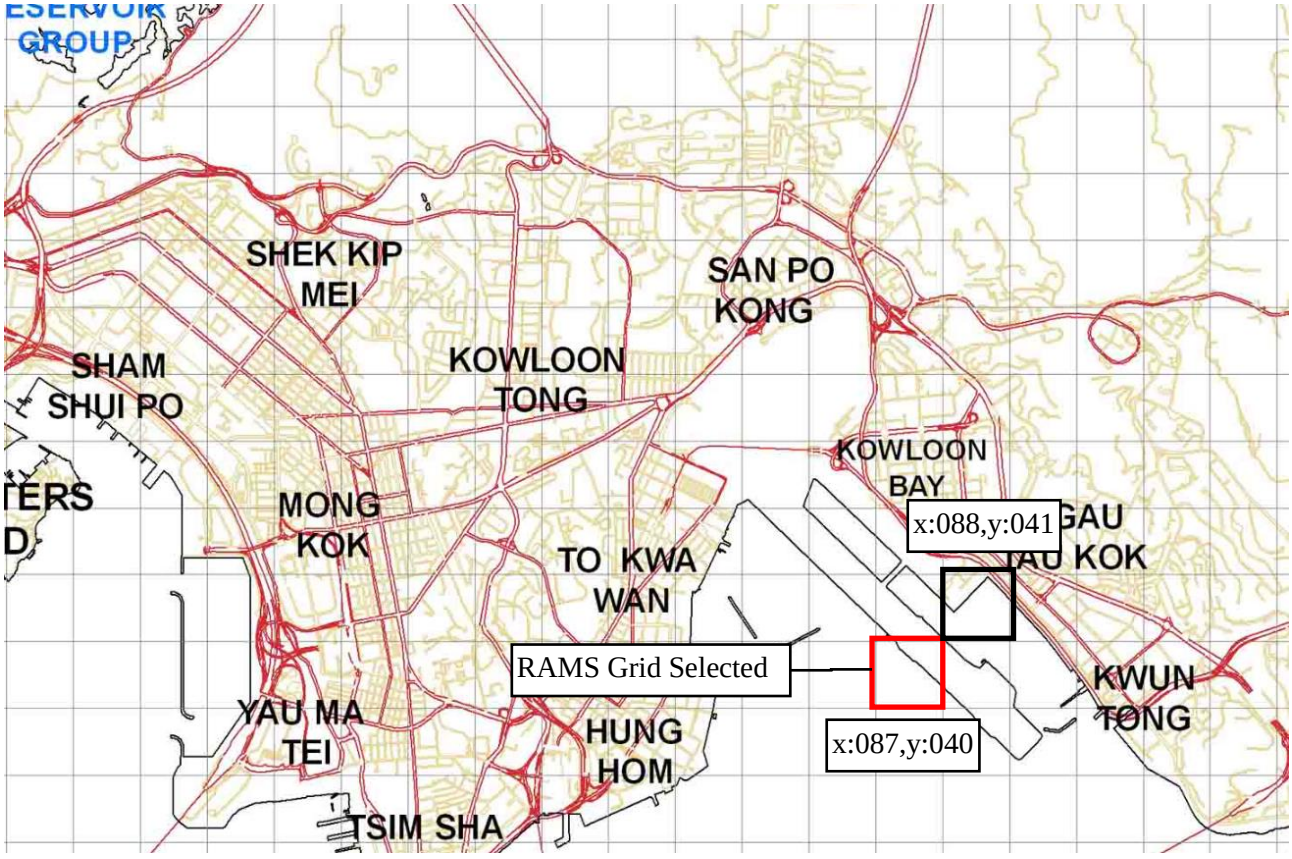


Figure 27 RAMS grid and the Application Site location

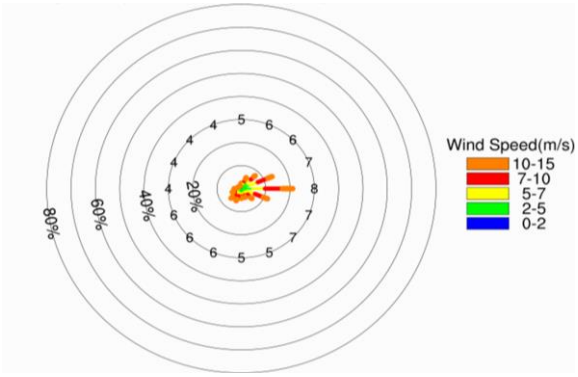


Figure 28 RAMS annual wind rose at 500mPD

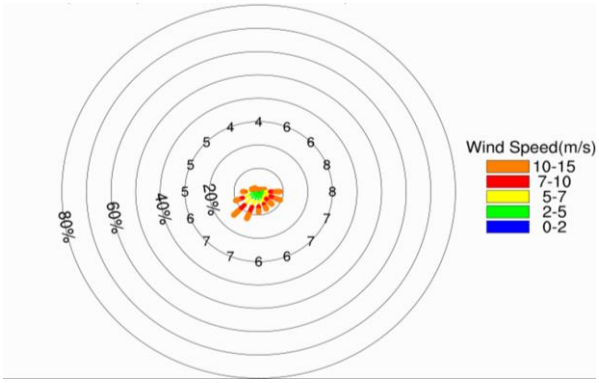


Figure 29 RAMS summer wind rose at 500mPD

4.4.1 Wind Directions

4.4.1.1 Annual Prevailing Wind

Eight prevailing wind directions (highlighted in bold in Table 3) are considered in this AVA Study which covers 78.2% of the total annual wind frequency. They are north-north-easterly (5.2%), north-easterly (8.1%), east-north-easterly (13.9%), easterly (21.5%), east-south-easterly (11.7%), south-easterly (6.1%), south-south-westerly (5.7%) and south-westerly (6.0%).

Table 3 Annual wind frequency

Wind Direction	N	**NNE**	**NE**	**ENE**	**E**	**ESE**	**SE**	SSE	
Frequency	2.4%	**5.2%**	**8.1%**	**13.9%**	**21.5%**	**11.7%**	**6.1%**	4.1%	
Wind Direction	S	**SSW**	**SW**	WSW	W	WNW	NW	NNW	**Sum**
Frequency	4.3%	**5.7%**	**6.0%**	4.0%	2.9%	1.5%	1.2%	1.3%	**78.2%**

** The wind frequency showing in **Bold** represents the selected winds for the CFD simulation.*

4.4.1.2 Summer Prevailing Wind

Eight prevailing wind directions (highlighted in bold in Table 4) are considered in this AVA Study which covers 81.0% of the total annual wind frequency. They are easterly (9.1%), easter-south-easterly (9.8%), south-easterly (7.8%), south-south-easterly (8.1%), southerly (9.0%), south-south-westerly (12.6%), south-westerly (14.5%) and west-south-westerly (10.1%).

Table 4 Summer wind frequency

Wind Direction	N	NNE	NE	ENE	**E**	**ESE**	**SE**	**SSE**	
Frequency	0.8%	0.9%	1.4%	2.8%	**9.1%**	**9.8%**	**7.8%**	**8.1%**	
Wind Direction	**S**	**SSW**	**SW**	**WSW**	W	WNW	NW	NNW	**Sum**
Frequency	**9.0%**	**12.6%**	**14.5%**	**10.1%**	6.4%	3.0%	2.3%	1.1%	**81.0%**

** The wind frequency showing in **Bold** represents the selected winds for the CFD simulation.*

4.4.2 Wind Profiles

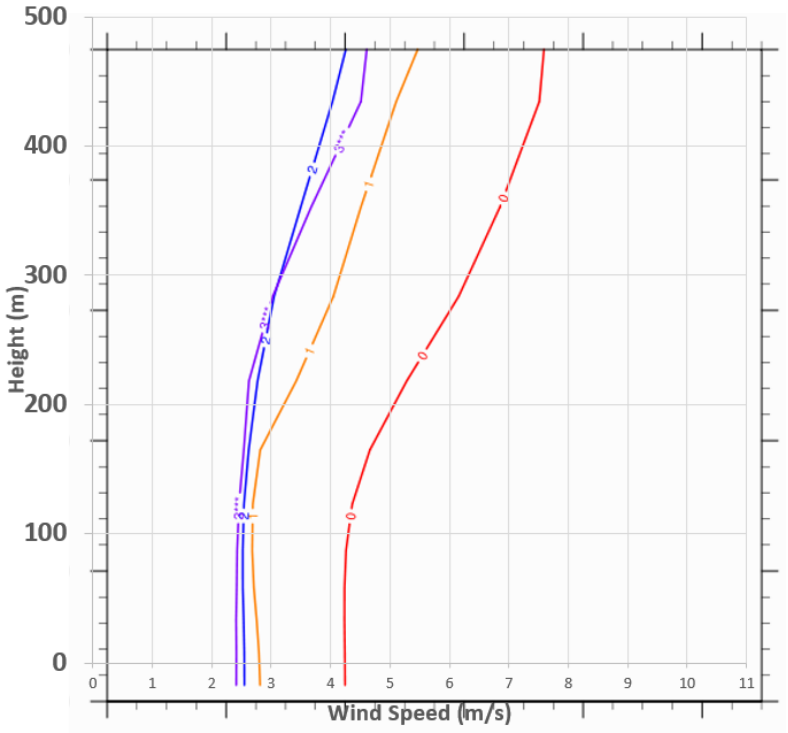


Figure 30 Normalised mean wind speed profile measured in 16 directions

The RAMS wind data is to be adopted in the AVA Initial study. It is recommended to extract the RAMS wind profile data directly as it can reflect the exact wind data. For wind data above 500m height, the velocity is assumed the same as the data at 500m. These wind data will be the input parameters in the CFD simulation.

4.5 Assessment and Surrounding Areas

With reference to the AVA Technical Circular [1], the Assessment Area and the Surrounding Area are extended beyond 1H and 2H from the boundary. However, due to the openness of Kwun Tong Typhoon Shelter and Kowloon Bay the surrounding, the Assessment Area and Surrounding Area are extended to 2H and 4H. With the tallest building within the Application Site is about 100m, the 2H and 4H are set as 200m and 400m respectively, as shown in Figure 31.

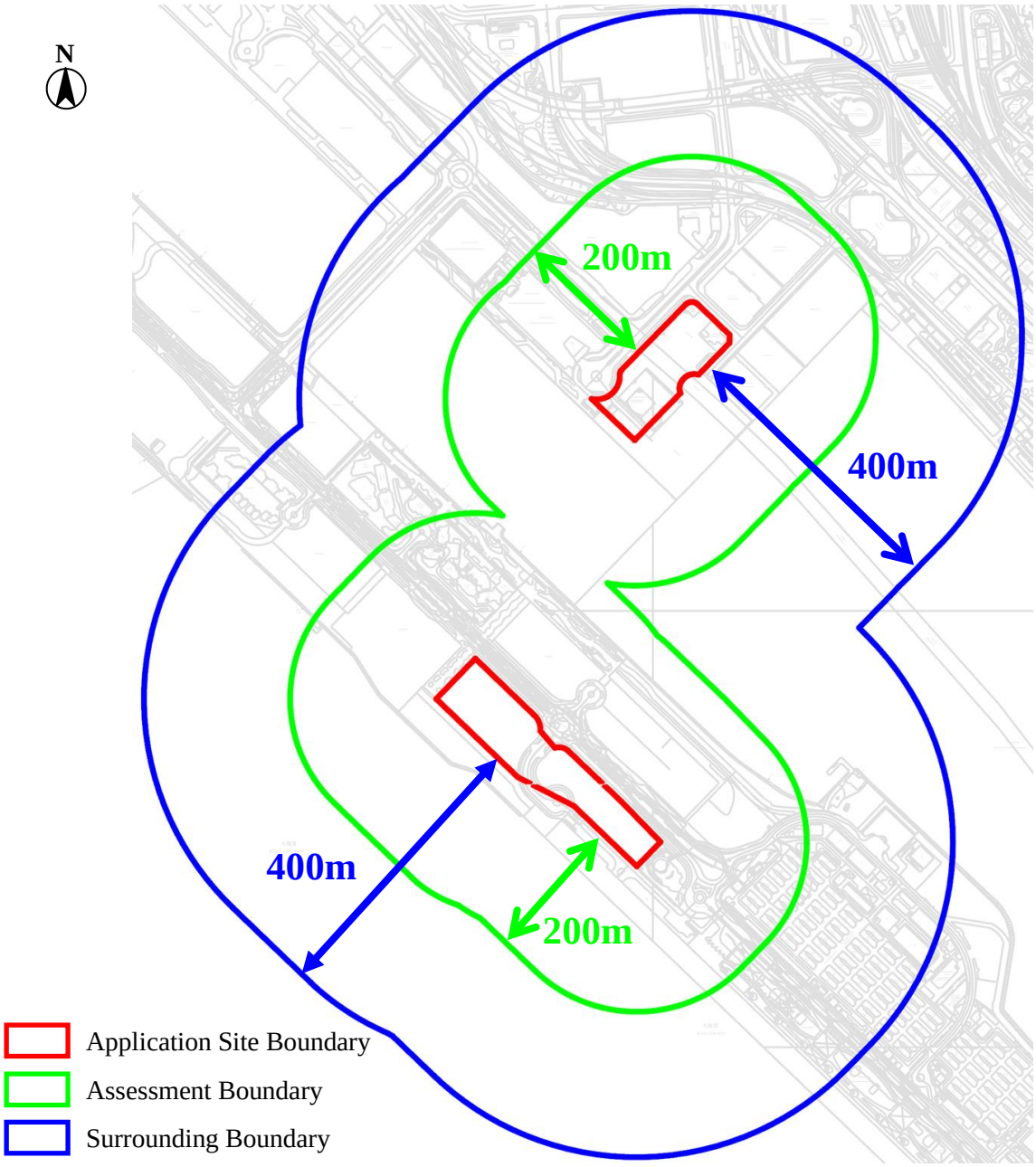


Figure 31 Site boundary (red), assessment area (green), and surrounding area (blue)

4.6 Technical Details for CFD Simulation

Since there is no internationally recognized guideline or standard on using CFD for outdoor urban scale studies, reference was made to other CFD guidelines on different wind flow aspects to suggest a study approach for current study. The detail parameters are summarized in Table 5. The computational domain will be about 4700m (L) x 3600m (W) x 2500m (H), as shown in Figure 32. The surrounding model is shown in Figure 33 to Figure 36.

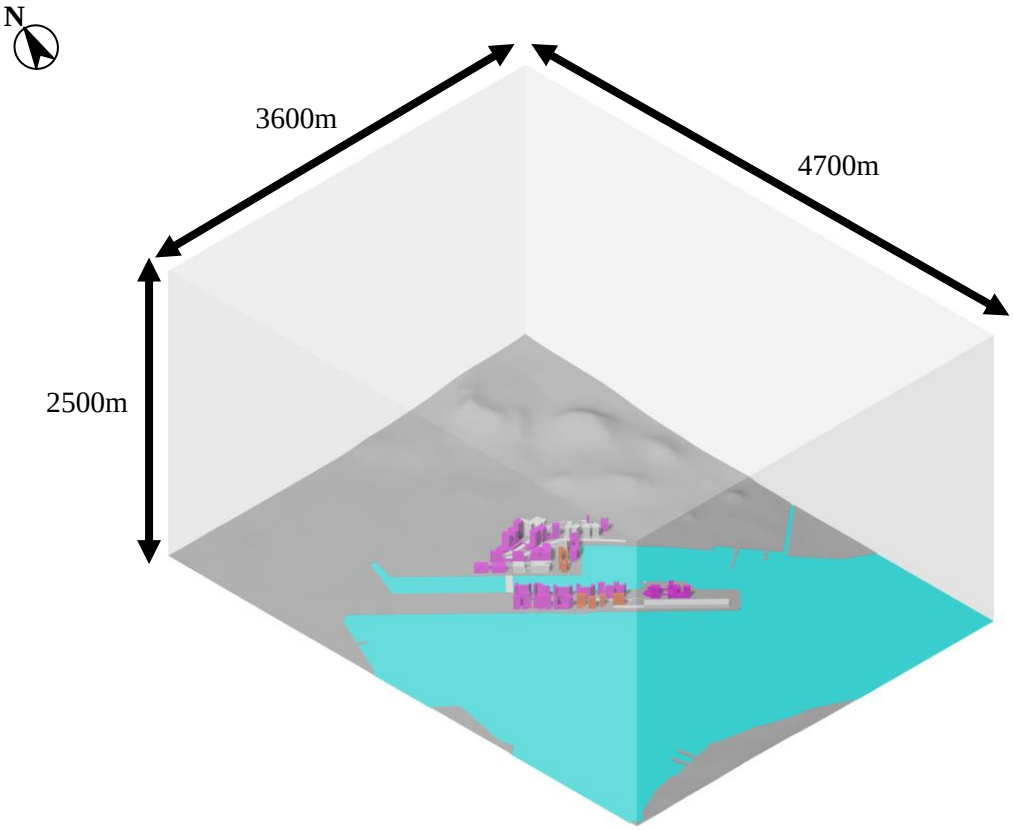


Figure 32 3D view of the domain

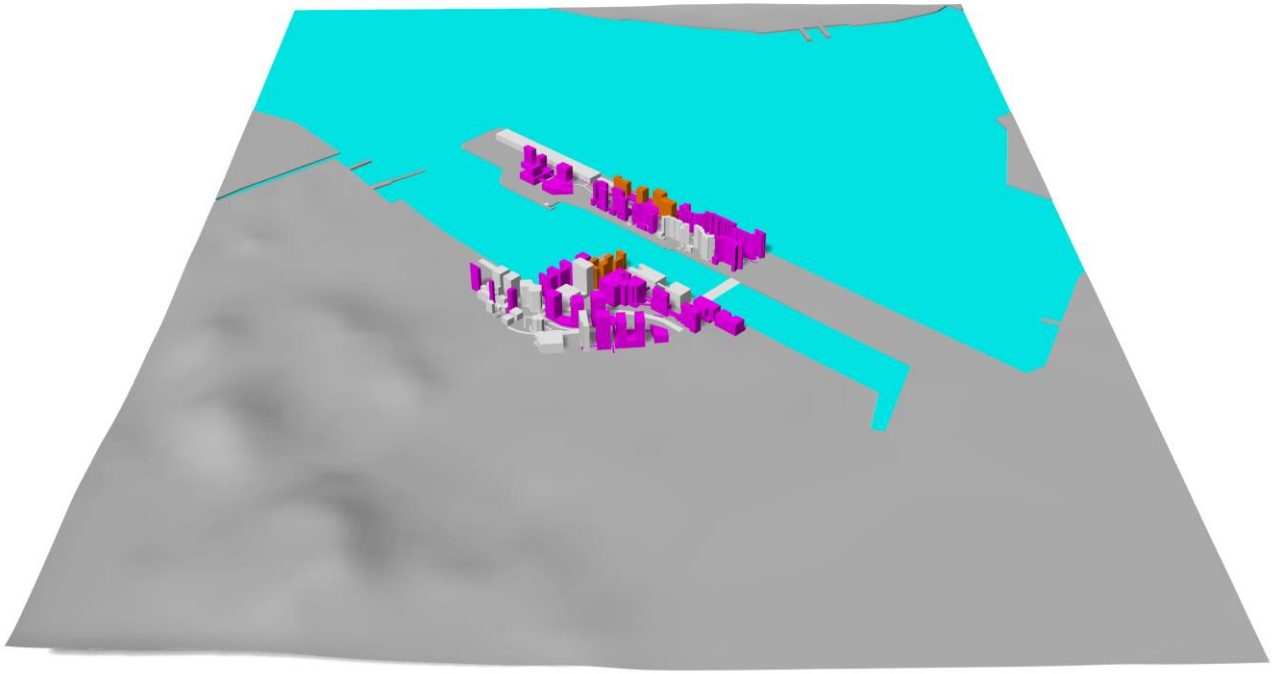


Figure 33 Northly view of the Computational Domain

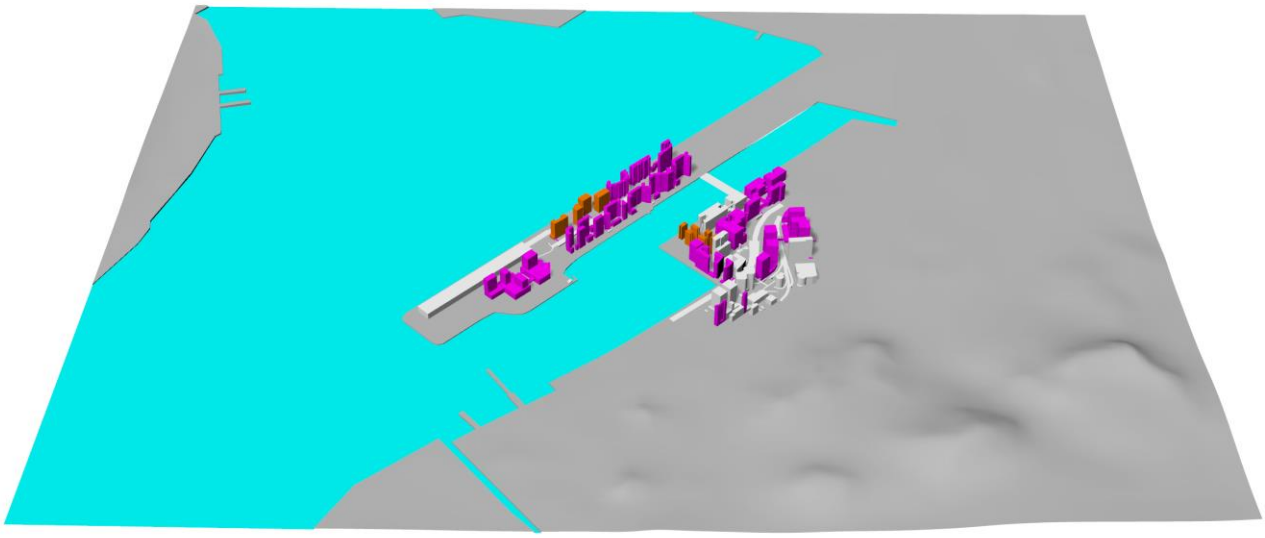


Figure 34 Eastly view of the Computational Domain

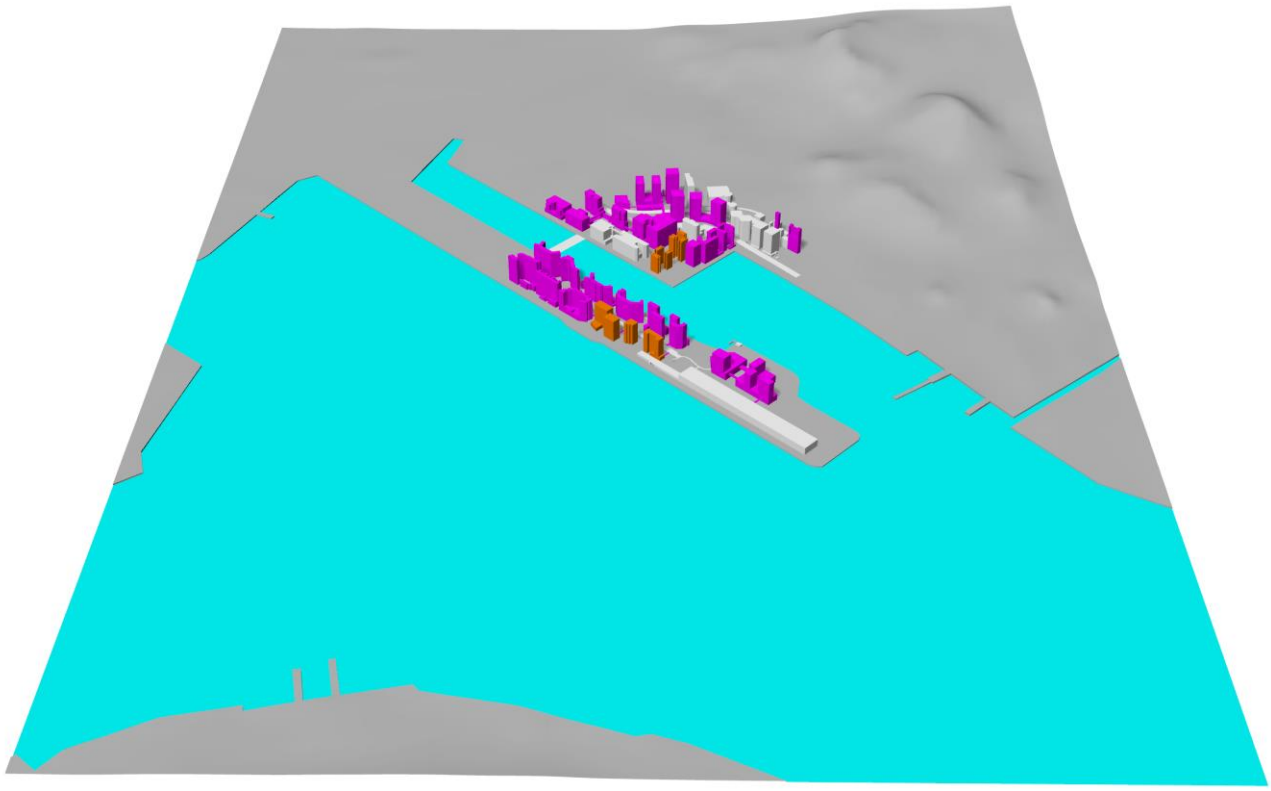


Figure 35 Southly view of the Computational Domain

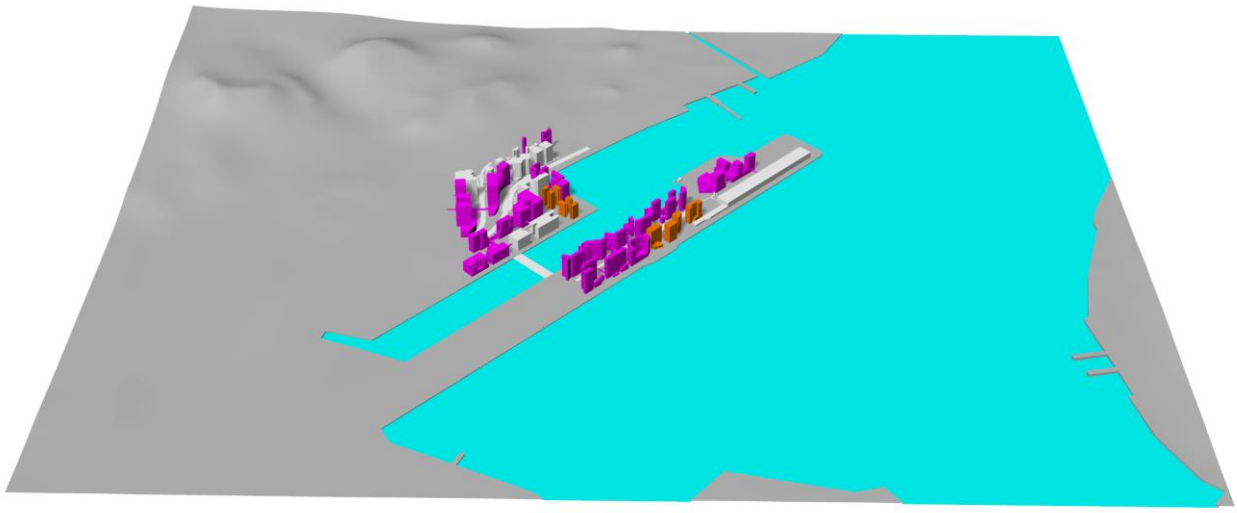


Figure 36 Westly view of the Computational Domain

4.7 Technical Details for CFD Simulation

4.7.1 Assessment Tool

Computational Fluid Dynamics (CFD) technique is adopted for the AVA Initial Study. A well-recognised commercial CFD package ANSYS ICEM-CFD and Ansys-Fluent are used. Both software are widely used in the industry for AVA studies. With the use of three-dimensional CFD method, the local airflow distribution can be visualised in detail. The air velocity distribution within the flow domain, being affected by the site-specific design and the surrounding buildings, is simulated under the prevailing wind condition in a year.

4.7.2 Mesh Setup

Body-fitted unstructured grid technique is used to fit the geometry to reflect the complexity of the Application Site geometry. Prism layers of 3m above ground (totally 6 layers and each layer is 0.5m) are incorporated in the meshing to better capture the approaching wind as shown in Figure 37. The expansion ratio is 1.2 while the maximum blockage ratio is 3%. Finer grid system is applied to the most concerned area based on preliminary judgement, while coarse grid system is applied to the area of surrounding buildings for better computational performance while maintaining satisfactory result. The mesh for the computational model is shown in Figure 38.

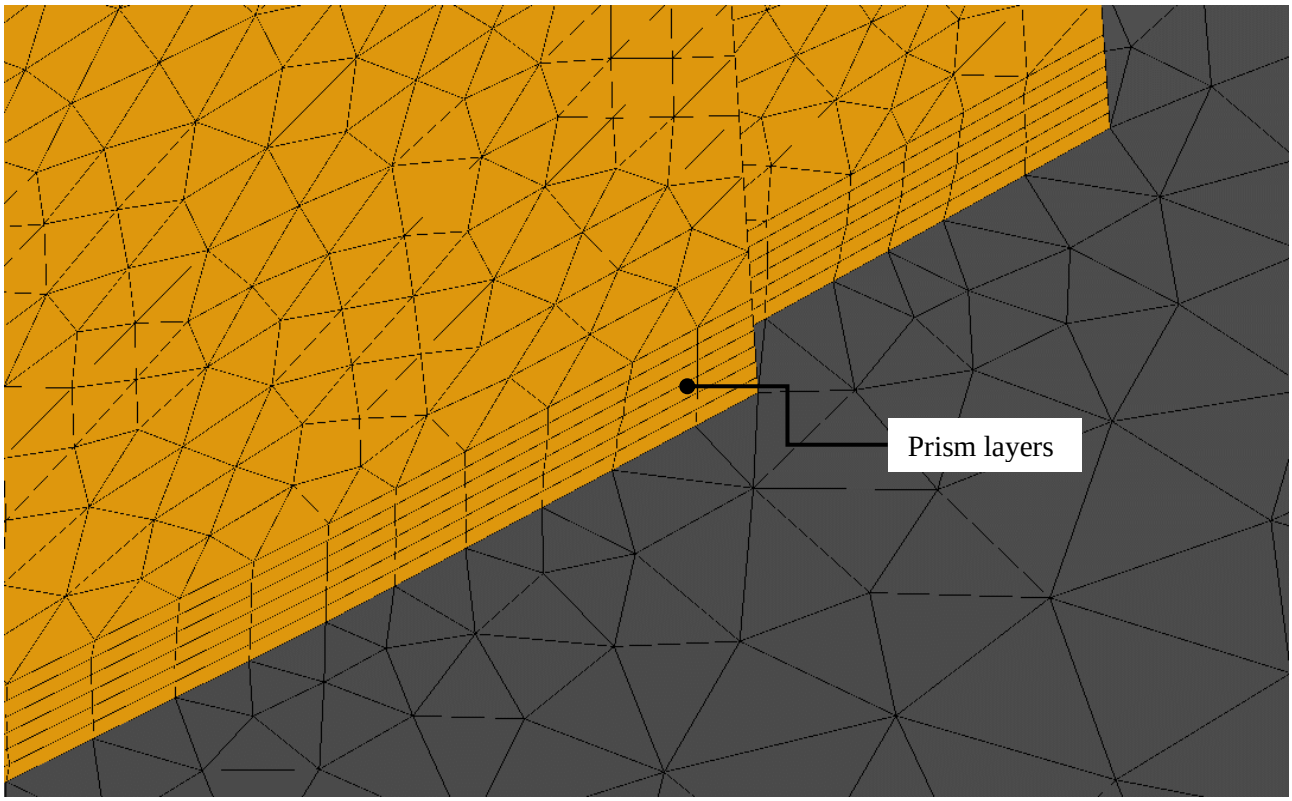


Figure 37 Prism Layers Near Pedestrian Level

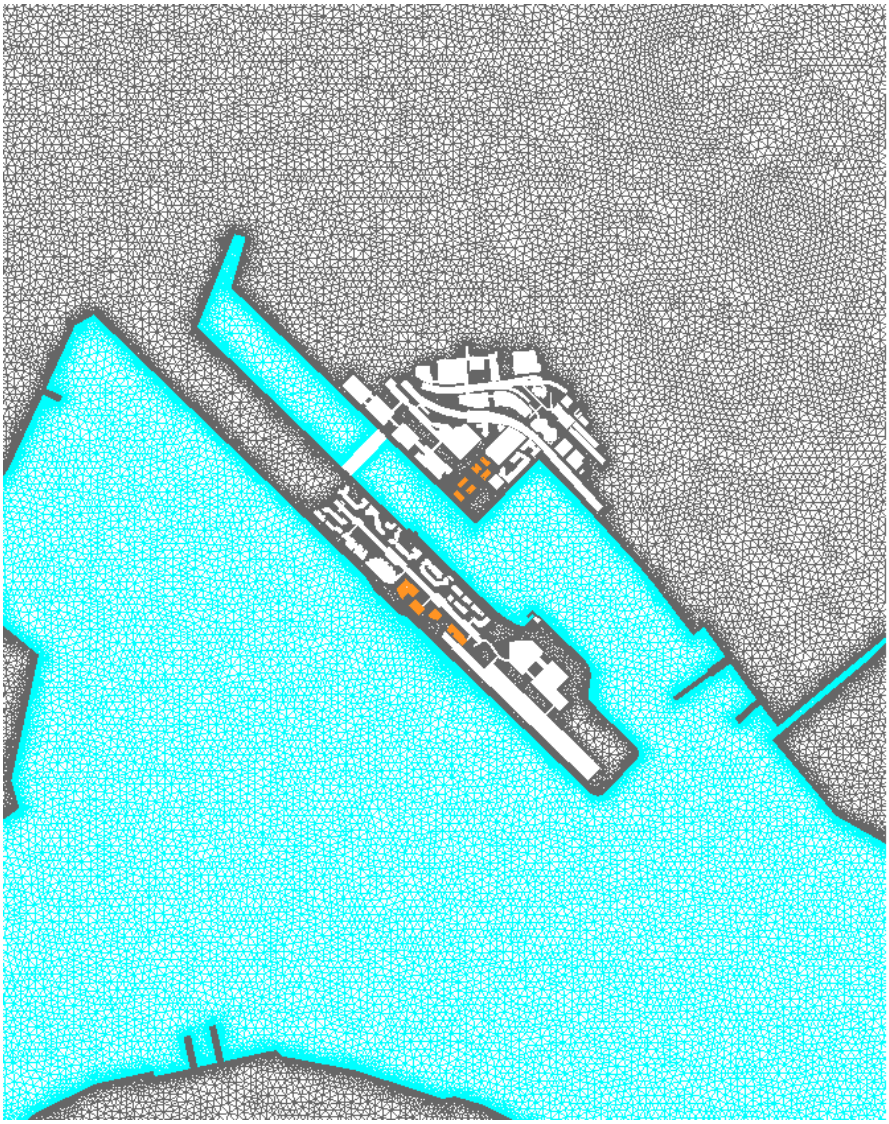


Figure 38 Mesh of the Computational Model

4.7.3 Turbulence Model

As highlighted in the recent academic and industrial research literatures by CFD practitioners, the widely used Standard k - ε turbulence model technique may not adequately model the effects of large-scale turbulences around buildings and ignored the wind gusts leading to the relatively poor prediction in their circulation regions around buildings. Therefore, in this CFD simulation, realizable k – ε turbulence modelling method is applied. This technique provides more accurate representation of the levels of turbulence that can be expected in an urban environment.

4.7.4 Calculation Method

The Segregated Flow model solves the flow equations in a segregated manner. The linkage between the momentum and continuity equations is based on the predictor-corrector approach. A collocated variable arrangement and a Rhie-and-Chow-type pressure-velocity coupling combined with a SIMPLE-type algorithm is adopted. A higher order differencing scheme is applied to discretize the governing equations. The convergence criterion is set to 0.0001 on mass conservation. The calculation repeat until the solution satisfies this convergence criterion. The prevailing wind directions are set to inlet boundaries of the model with wind profile as detailed in Section 4.4. The downwind boundaries are set to pressure with value of atmospheric pressure. The top and side boundaries are set to symmetry. In addition, to eliminate the boundary effects, the computational domain is built beyond the Surrounding Area as required in the Technical Circular.

Table 5 Development parameter of Baseline Scheme

CFD Model	
Model Scale	1:1 to real environment
Model Details	Only include Topography, building blocks, streets/highways. No landscape feature are included.
Domain	4500m(length) x 3600m(width) x 2500m(height)
Assessment Area	200m from site boundary of Application Site
Surrounding Area	400m from site boundary of Application Site
Grid Expansion Ratio	The grid should satisfy the grid resolution requirement with maximum expansion ratio = 1.2
Prismatic Layer	6 layers of prismatic layers and 0.5m each (i.e. total 3m above ground)
Inflow Boundary Condition	Incoming wind profiles from RAMS
Outflow Boundary Condition	Pressure boundary condition with dynamic pressure equal to zero
Wall Boundary Condition	Logarithmic law boundary
Solving Algorithms	Rhie and Chow SIMPLE for momentum equation Hybrid model for all other equations Realizable k-ε turbulence model
Blockage Ratio	< 3%
Convergence Criteria	Below $1x10^{-4}$

4.8 AVA Indicators

The wind Velocity Ratio (VR) as defined in *AVA Technical Circular [1]* was employed to assess the ventilation performance of the proposed Scheme and surrounding area. The calculation of VR is given by the following formula:

$$VR = \frac{V_p}{V_\infty}$$

where V_p is the wind speed at the pedestrian height (2m above ground) and

V_∞ is the wind speed at the top of the boundary layer (defined as the height where wind is unaffected by urban roughness and determined by the topographical studies)

Higher VR implies that less impact due to proposed Scheme on ventilation performance. The average VR is defined as the weighted average VR with respect to the percentage of occurrence of all considered wind directions, which gives a general idea of the ventilation performance at the considered location under both annual and summer wind conditions. Site spatial average velocity ratio (SVR) and Local spatial average velocity ratio (LVR) are determined as show in Table 6

Table 6 Terminology of the AVA Initial Study

Terminology	Description
Velocity Ratio (VR)	The velocity ratio (VR) represents the ratio of the air speed at the measurement position to the value at the reference points.
Site spatial average velocity ratio (SVR)	The SVR represent the average VR of all perimeter test points at the site boundary which identified in the report.
Local spatial average velocity ratio (LVR)	The LVR represent the average VR of all points, i.e. perimeter and overall test points at the site boundary which identified in the report.

4.9 Locations of Test Points

As per the technical circular, three types of test points – perimeter test points, overall test points and special test points will be adopted to assess the wind performance. The allocation of these test points will be distributed evenly as per the requirement stated in *the AVA Technical Circular* [1].

4.9.1 Perimeter Test Points

A total number of 47 perimeter test points (**Brown spots**), namely P points, are positioned at intervals of around 30m along the Application Site boundary at 2m above ground level. The locations of the perimeter test points are shown in Figure 39

4.9.2 Overall Test Points

A total number of 217 overall test points (**Blue spots**), namely O points, are evenly distributed in open areas at 2m above ground level within the assessment area where pedestrian frequently access, in which 20 of them are located at Kai Tak Sky Garden, and their location are shown in Figure 40 and Figure 41.

4.9.3 Special Test Points

A total number of 40 and 33 special test points (**Pink spots**) for Baseline Scheme and Proposed Scheme respectively, namely S points, are evenly distributed in open areas at 2m above ground level within the Application Site. Their locations are shown in Figure 42 and Figure 43 .

Figure 39 Location of Perimeter Test Points

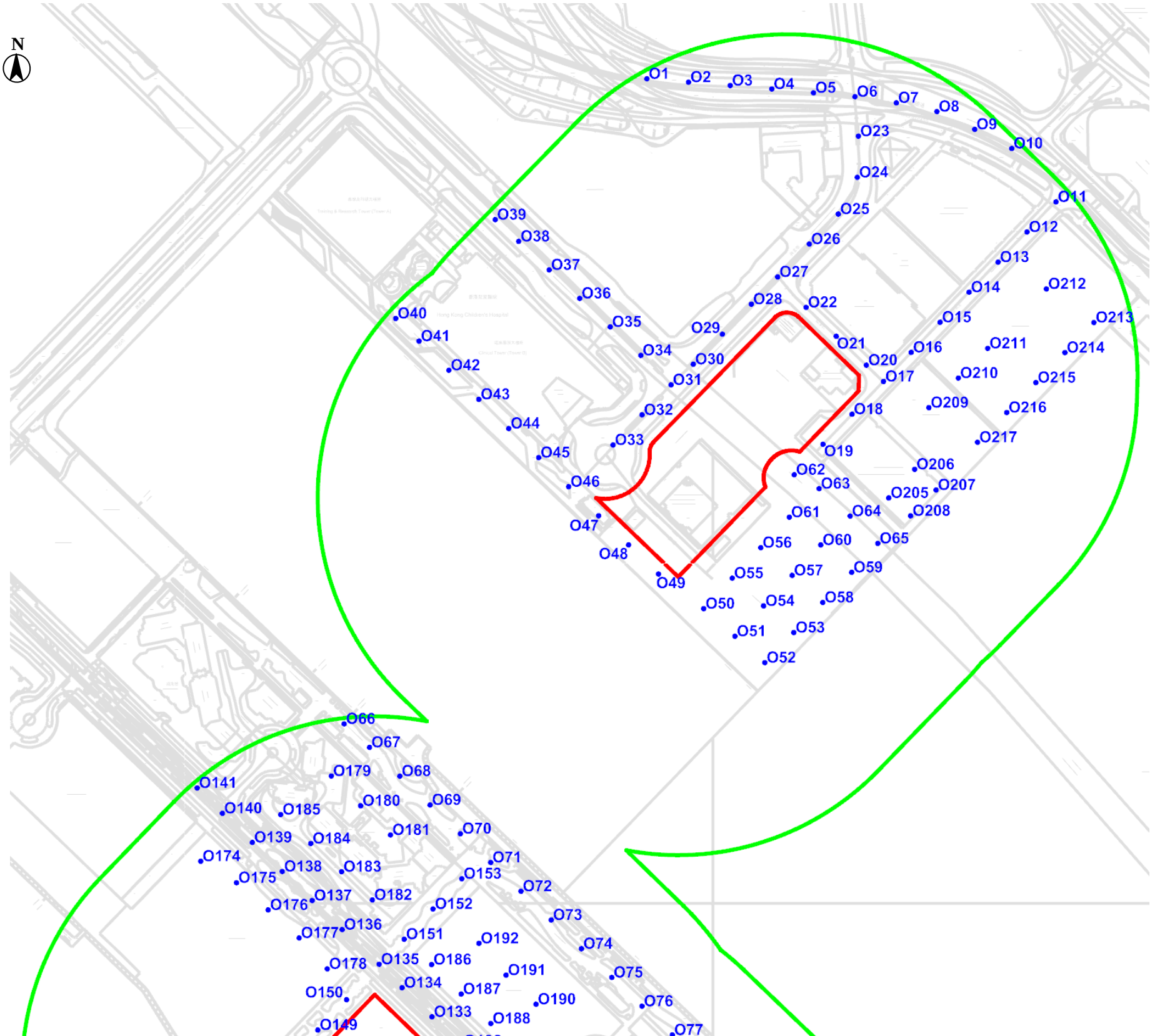


Figure 40 Location of Overall Test Points 1 of 2

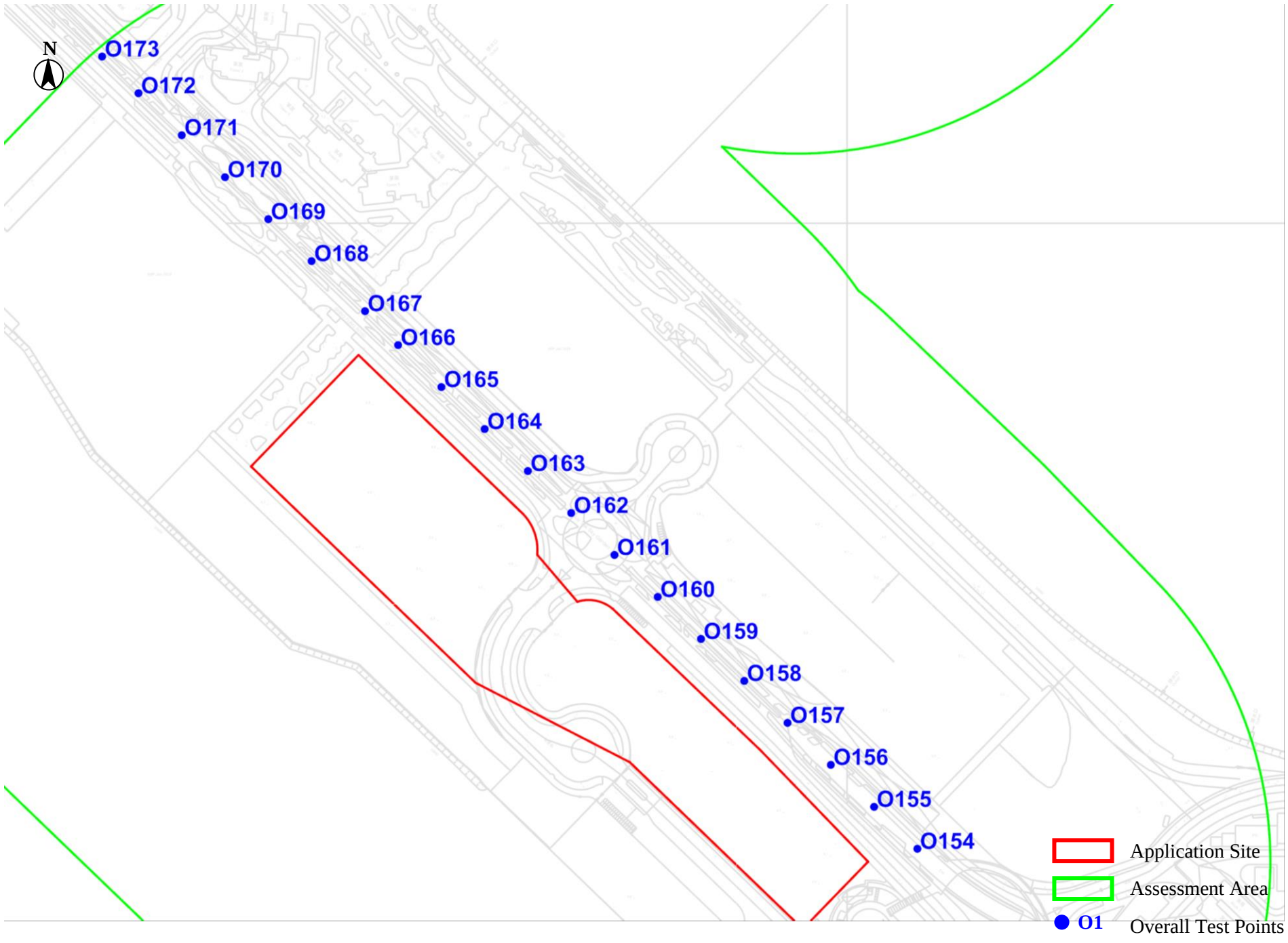


Figure 41 Location of Overall Test Points 2 of 2 – Located at Kai Tak Sky Garden

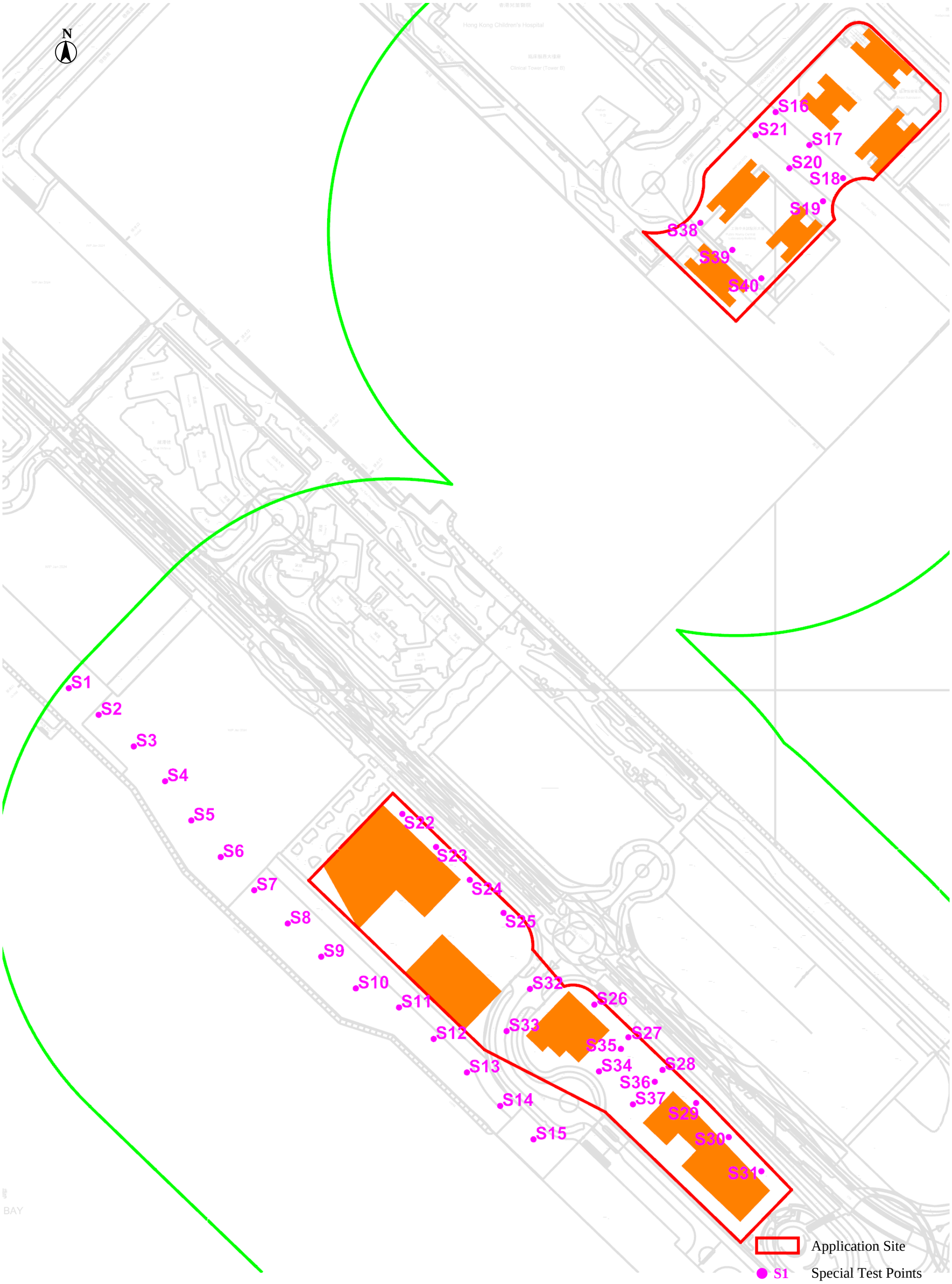


Figure 42 Location of Special Test Points for Baseline Scheme

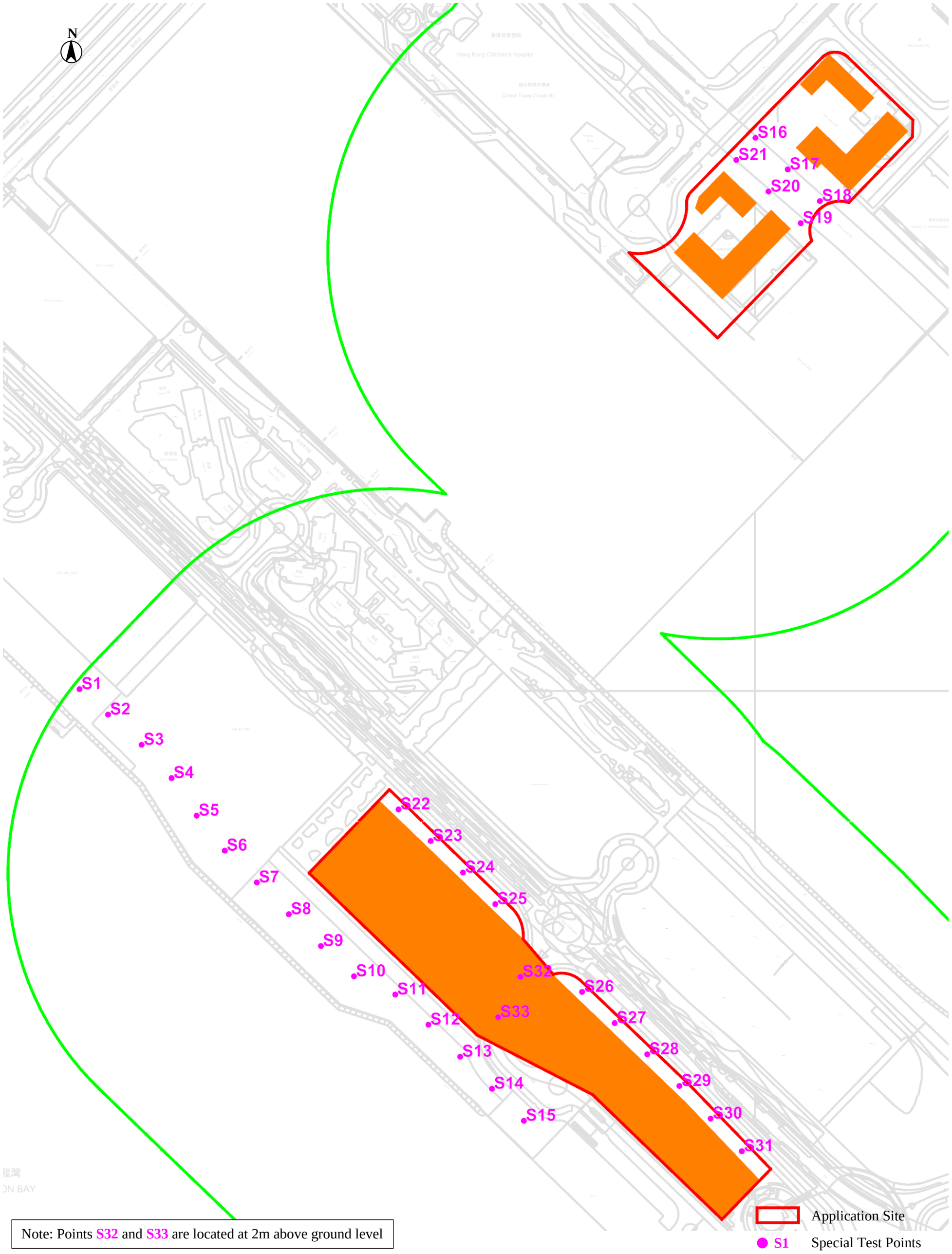


Figure 43 Location of Special Test Points for Proposed Scheme

5. Result and Discussion – Initial Study

The detailed contour and vector plots for each wind directions are shown in Appendix C and Appendix D respectively.

5.1 Overall Pattern of Ventilation Performance under Annual Wind Condition

The overall wind performance of Baseline Scheme and Proposed Scheme under annual wind conditions are presented in Figure 44 and Figure 45 respectively. The SVR and LVR are summarized in Table 7.

Table 7 Annual SVR and LVR for Baseline and Proposed Schemes

	Baseline Scheme	Proposed Scheme
SVR	0.19	0.20
LVR	0.20	0.20

The slightly higher SVR under Proposed Scheme is due to the more prominent downwash effect which slightly enhanced ventilation performance along the site boundary. The similar SVR between Baseline and Proposed Schemes indicates the ventilation performance are similar within the Assessment Area.

The annual prevailing wind are mostly from E quadrant ranging from NNE direction to SE direction, and some are from SSW and SW directions. Application Sites are mostly located at the leeward side of high-rise development which dominate the wind environment. For Sites 3E1 and 3E2, incoming wind travels along the streets from Cheung Yip Street and downwash wind from Planning Application No. A/K22/31 would reach the Application Site from Kai Hing Road and Kai Tak Promenade near Kai Tak Hospital. For Sites 4C4, 4C5 and area shown as 'road', incoming wind would mostly reach from Access Road near Kai Tak Promenade, with some additional wind availability from incoming wind penetrating building separation of upwind development in former runway. The incoming wind direction are illustrated by **Black Arrows** in Figure 44 and Figure 45 respectively.

For Sites 3E1 and 3E2, incoming wind from Kai Hing Road would be diverted to reach Kai Tak Promenade near Kai Tak Hospital and to Lam Chak Street to merge with the air stream from Cheung Yip Street. Under Proposed Scheme, Block B1 setback from northeastern boundary and Block A1 setback from southeastern boundary allow more incoming wind to travel along Lam Chak Street and Kai Hing Road respectively, enhancing the ventilation performance along the street, illustrated by **Red Arrows** in Figure 45. However, the continuous facades along northeastern and southeastern boundaries would shield the area within Site 3E1.

Incoming wind from Kai Tak Promenade near Kai Tak Hospital would penetrate the building separation to ventilate the area within Application Site. Under Baseline Scheme, incoming wind would penetrate building separation in Site 3E2 and merger with the air stream from Cheung Yip Street to ventilate Kai Tak Promenade near Kai Tak Hospital, illustrated by **Red Arrow** in Figure 44.

Under Proposed Scheme, the continuous façade of Block A2 along southeastern boundary would shield the area within Site 3E2, while it would divert more wind to northeastern and southwestern boundaries, enhancing the ventilation performance within Site 3C1 and 3C2 and Kai Tak Promenade near Kai Tak Hospital, illustrated by **Pink Arrows** in Figure 45. However, the taller building height would also shield the high-level incoming wind from far leeward side of Shing Cheong Road, illustrated by **Pink Circle** in Figure 45

For Site 4C4, 4C5 and area shown as 'road', incoming wind from Access Road near Kai Tak Promenade would continue to travel along Shing Fung Road to ventilate the leeward side. Under Proposed Scheme, due to larger podium footprint, incoming wind would be restricted to penetrate Sites 4C4, 4C5 and area shown as 'road', confining the air stream to travel along Shing Fund Road and Kai Tak Sky Garden, where slightly higher VR

would be observed (**Blue Arrow** in Figure 45). While slightly lower VR along southwestern boundary would be observed (**Blue Circles** in Figure 45).

Also, during SSW and SW prevailing winds, downwashed wind from Site 4C5 would ventilate southeastern side of Site 4C5. Under Proposed Scheme, Officer Tower 3 is recessed from the podium on southwestern boundary, incoming wind is unable to reach pedestrian level, resulting in slightly lower VR, illustrated by **Red Circle** in Figure 45.

In addition, downwashed wind from Site 4C4 would flow against incoming wind. Under Baseline Scheme, downwashed wind from Site 4C4 would reach pedestrian level freely, flowing against the incoming wind and result in slightly lower VR, illustrated by **Red Circle** in Figure 44.

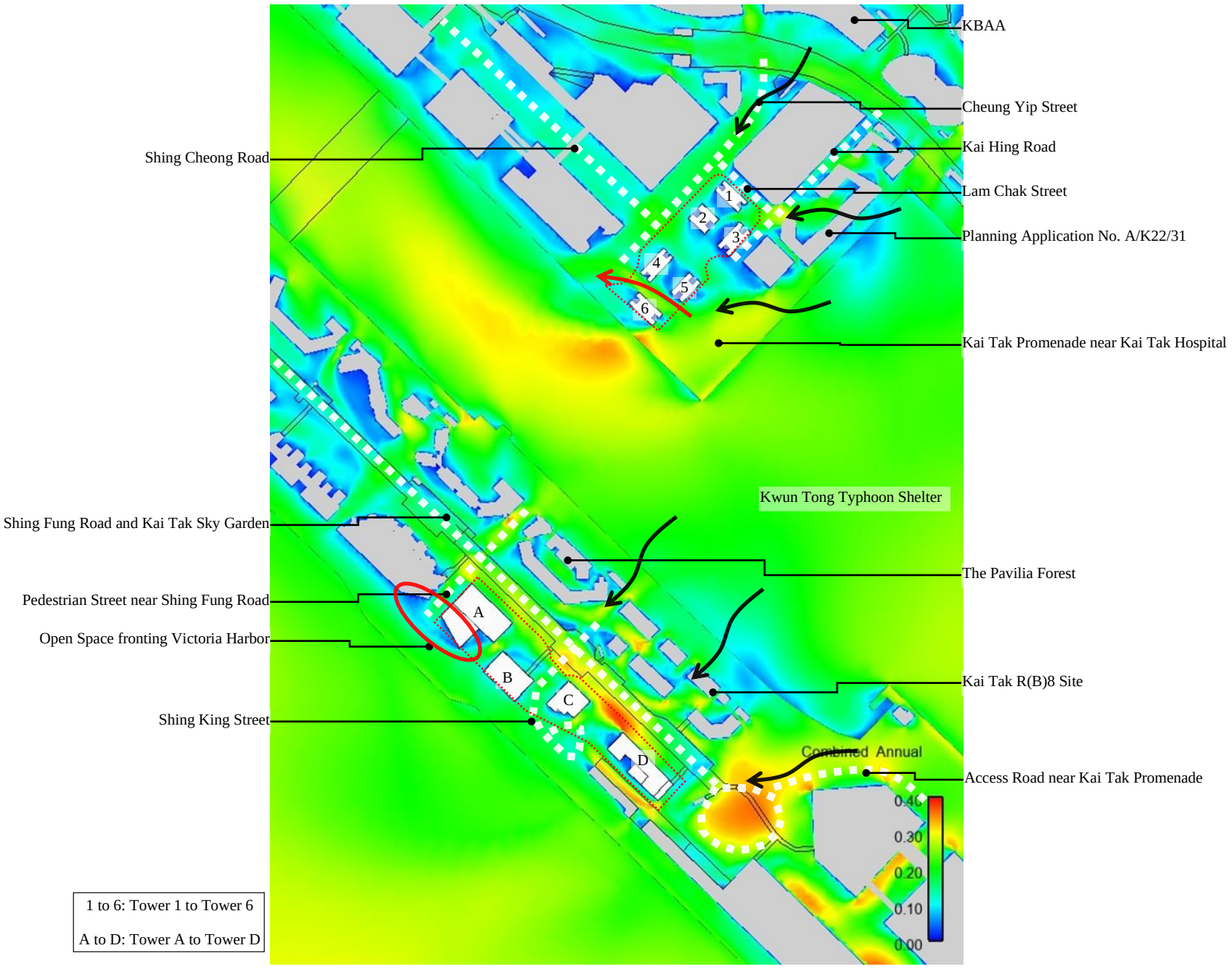


Figure 44 Contour Plot of Baseline Scheme under Annual Prevailing Wind

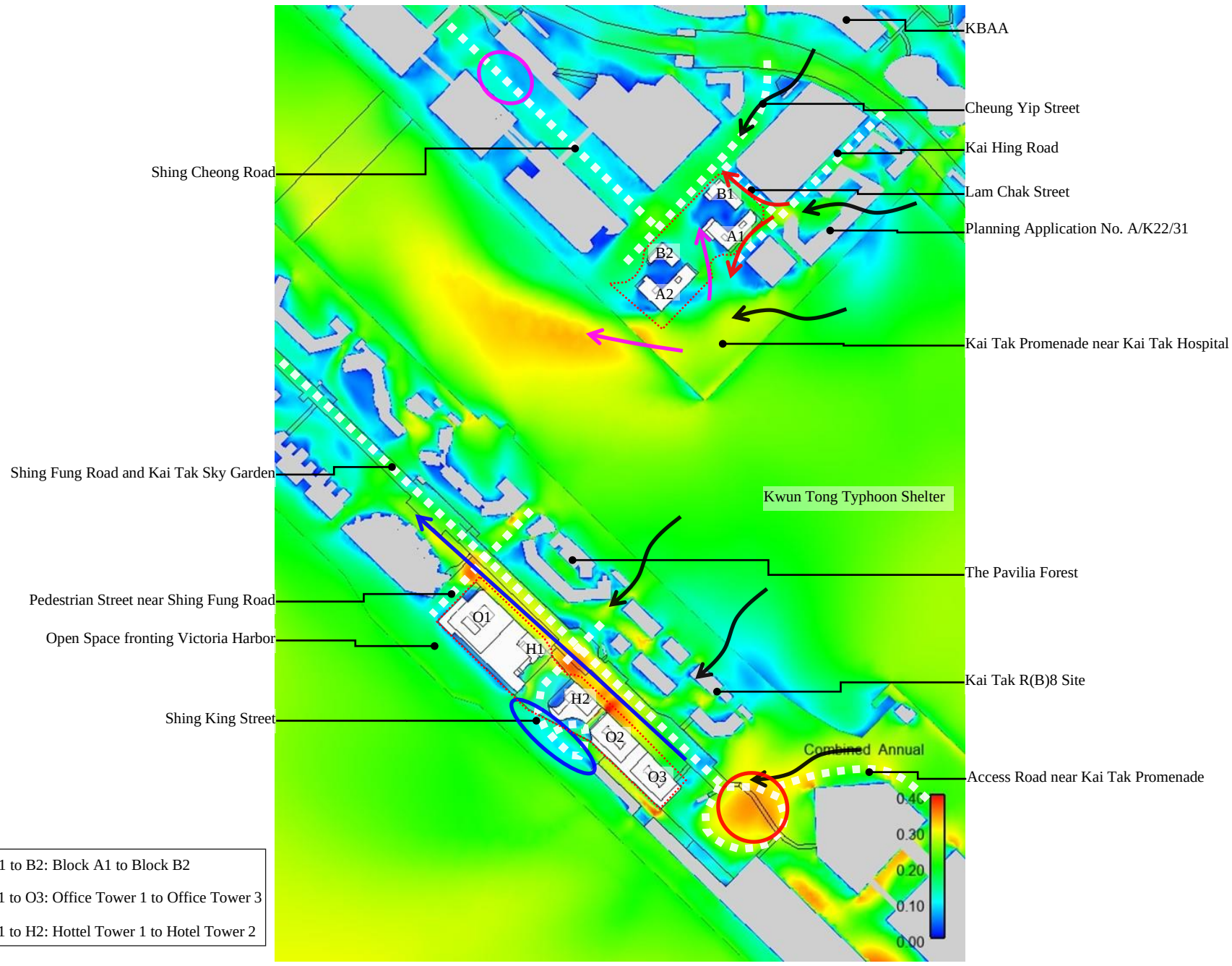


Figure 45 Contour Plot of Proposed Scheme under Annual Prevailing Wind

5.2 Overall Pattern of Ventilation Performance under Summer Wind Condition

The overall wind performance of Baseline and Proposed Scheme under summer wind conditions are presented in Figure 46 and Figure 47, respectively. The SVR and LVR are summarized in Table 8.

Table 8 Summer SVR and LVR for Baseline and Proposed Schemes

	Baseline Scheme	Proposed Scheme
SVR	0.19	0.19
LVR	0.20	0.19

The similar SVR between Baseline and Proposed Schemes indicates that he ventilation performance are similar along Application Site boundary. The slightly lower LVR indicates that the ventilation performance is slightly reduced within Assessment Area mainly due to the larger podium of Sites 4C4, 4C5 and area shown as 'road'.

The summer prevailing wind are mostly from SW quadrant ranging from E direction to WSW direction. Sites 4C4, 4C5 and area shown as 'road' are located at the leeward side of Victoria Harbor, with some wind shield on southeastern side of Site 4C5 by low-rise development in Kai Tak Cruise Terminal. Sites 3E1 and 3E2 are located at the leeward side of high-rise development in former runway with separation of Kwun Tong Typhoon Shelter, wind availability would be relatively limited. For Sites 4C4, 4C5 and area shown as 'road', incoming wind would reach the Application Site from prevailing wind direction. Downwash effect from Site 4C5 provided low-level wind availability on southeastern side of Site 4C5. For Sites 3E1 and 3E2, incoming wind would be diverted by up wind development in former runway to reach the Application Site via Shing Cheong Road from the northwestern side, and via Kai Tak Promenade near Kai Tak Hospital from eastern side. Additional wind availability would be provided by downwashed wind from KBAA, Harbourside HQ, Planning Application No. A/K22/31 and Kai Tai C(2) Site via Cheung Yip Street, Kai Hing Road and Kai Tak Promenade near Kai Tak Hospital. The incoming wind direction are illustrated by **Black Arrows** in Figure 46 and Figure 47 respectively.

For Sites 4C4, 4C5 and area shown as 'road', the downwash wind on the southeastern side of Site 4C5 provides low-level wind availability and continues to travel across the Kwun Tong Typhoon Shelter to supply wind to Sites 3E1 and 3E2. Under Baseline Scheme, this downwashed wind from Site 4C5 freely reaches pedestrian level, resulting in slightly higher VR, illustrated by the **Blue Arrow** in Figure 46. Under the Proposed Scheme, although the larger southwestern frontal area would induce more downwashed wind, Office Towers 2 and 3, recessed from the podium on the southwestern boundary, would cause the downwashed wind to travel on mid-level to reach Kai Tak OU Site, then be diverted by the development at the Kai Tak OU Site to reach pedestrian level, illustrated by **Blue Circle** in Figure 47.

Also, downwashed wind induced by the Application Site would flow against the incoming wind, reducing the ventilation performance one southwestern boundary and Open Space fronting Victoria Harbour. Under Baseline Scheme, downwashed wind from Towers A and B would reach pedestrian level freely, flowing against incoming wind, where slightly lower VR would be observed, illustrated by **Red Circle** in Figure 46. Under Proposed Scheme, due to the concave shaped podium at the roundabout of Shing King Road, incoming wind would be accumulated, together with downwashed wind from Site 4C5 which flow against incoming wind, slightly lower VR would be observed, illustrated by **Red Circle** in Figure 47.

In addition, incoming wind would penetrate the Application Site to ventilate Shing Fung Road and development along former runway fronting Kwun Tong Typhoon Shelter. Under Baseline Scheme, smaller podium footprint provides better wind permeability, together with building height profile between Site 4C4 and Cullinan Harbour which induce more downwashed wind on Cullinan Harbour, more incoming wind would penetrate the Application Site such as building separation on Site 4C5 and Shing King Street to ventilate the leeward side including Shing Fung Road, Kai Tak R(B)8 Site, The Pavaila Forest, Miami Quay, One Victoria and Double Coast I, illustrated by **Purple Arrows** in Figure 46.

Under Proposed Scheme, larger podium would shield the leeward side including NBA, Shing Fung Road, Kai Tak R(B)8 Site, The Pavilia Forest, Miami Quay and Kai Tak Promenade near Runway. However, larger southwestern frontal area and taller building height induces more prominent downwash effect. Downwashed wind would utilize Shing King Street, podium separation between Hotel Tower 2 and Office Tower 2 and Pedestrian Walkway near Shing Fung Road to ventilate the leeward side of Shing Fung Road and alleviate some ventilation impact, illustrated by **Blue Arrows** in Figure 47.

For Sites 3E1 and 3E2, high-level incoming wind skimming over development in former runway would reach the development to the north of Sites 3E1 and 3E2, inducing downwash effect to ventilate nearby locations. Under Baseline Scheme, lower building height of Sites 3E2 and 4C4 allows more high-level incoming wind to skim over, reaching KBAA, and induce more prominent downwash effect. The downwashed wind would travel to ventilate Cheung Yip Street, illustrated by **Red Arrow** in Figure 46. Also, building height profile between Sites 3E1 and 3E2 allows Site 3E2 to induce more prominent downwashed wind, ventilating the Application Site and Kai Tak Promenade near Kai Tak Hospital, illustrated by **Orange Arrow** in Figure 46.

Downwashed wind from Planning Application No. A/K22/31 reaching Site 3E1 via Kai Hing Road would be diverted by the Application Site to ventilate along Kai Hing Road and Lam Chak Street. Under Proposed Scheme, Block B1 setback from northeastern boundary and Block A1 setback from southeastern boundary allow more incoming wind to travel along Kai Hing Road and Lam Chak Street respectively, enhancing the ventilation performance along the street, illustrated by **Red Arrows** in Figure 47. However, the continuous facades along northeastern and southeastern boundaries would shield the area within Site 3E1.

Under Baseline Scheme, incoming wind from Kai Tak Promenade near Kai Tak Hospital would penetrate the building separation within Site 3E2 to ventilate the leeward side of Kai Tak Promenade near Kai Tak Hospital, illustrated by **Pink Arrow** in Figure 46. Under Proposed Scheme, larger southeastern frontal area of Block A2 would divert more prominent downwashed wind, ventilate northeastern and southwestern boundaries of Site 3E2, illustrated by **Pink Arrows** in Figure 47. However, the more prominent downwashed wind would restrict the downwashed wind from Planning Application No. A/K22/31 and Kai Tak C(2) Site, where slightly lower VR would be observed, illustrated by **Pink Circle** in Figure 47.

Under Proposed Scheme, Sites 4C4, 4C5 and area shown as ‘road’would divert more incoming wind towards The Quayside, inducing more prominent downwashed wind to ventilate southeastern side of Planning Application No. A/K22/31 and Kwun Tong Typhoon Shelter, illustrated by **Purple Arrow** in Figure 47.

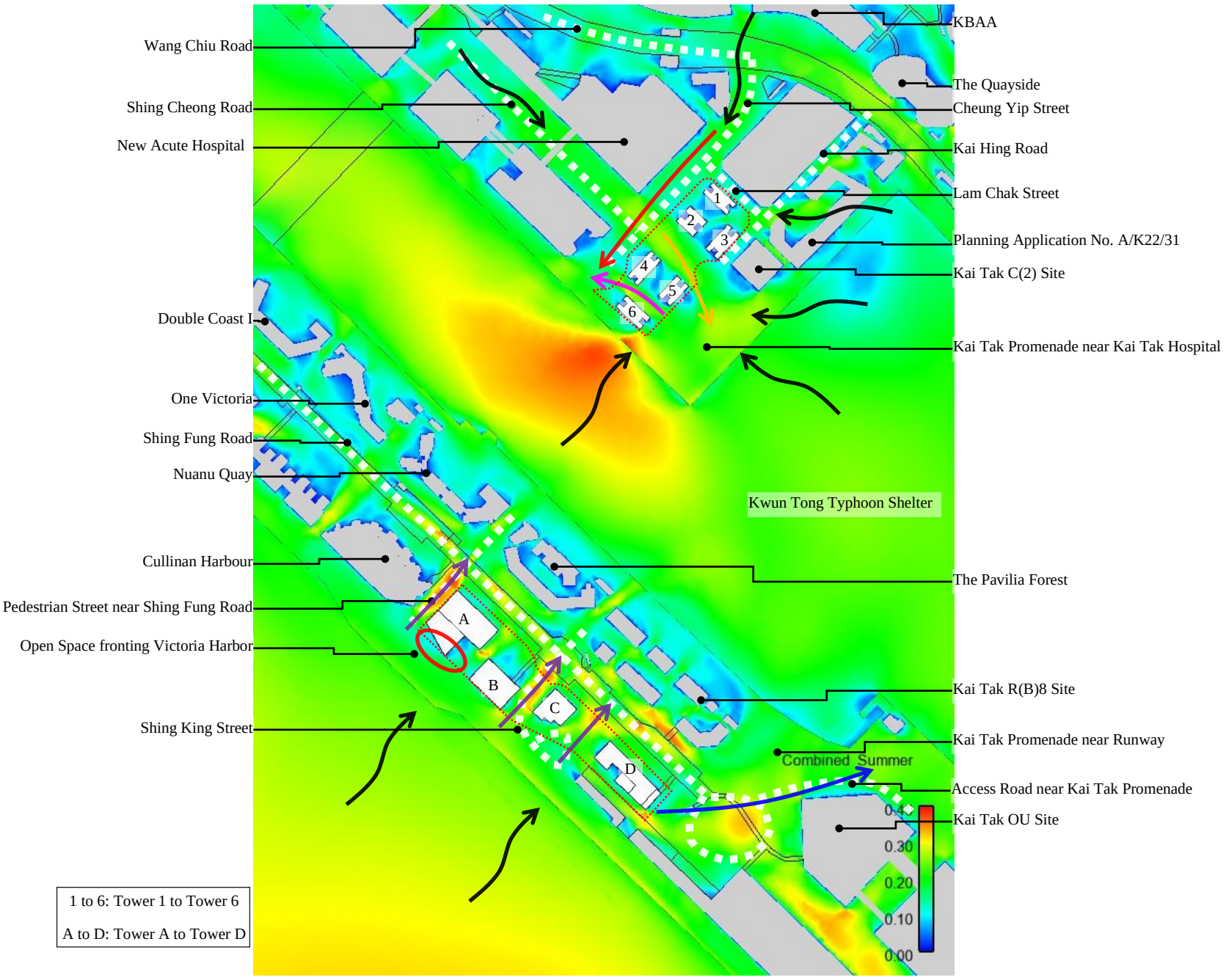


Figure 46 Contour Plot of Baseline Scheme under Summer Prevailing Wind

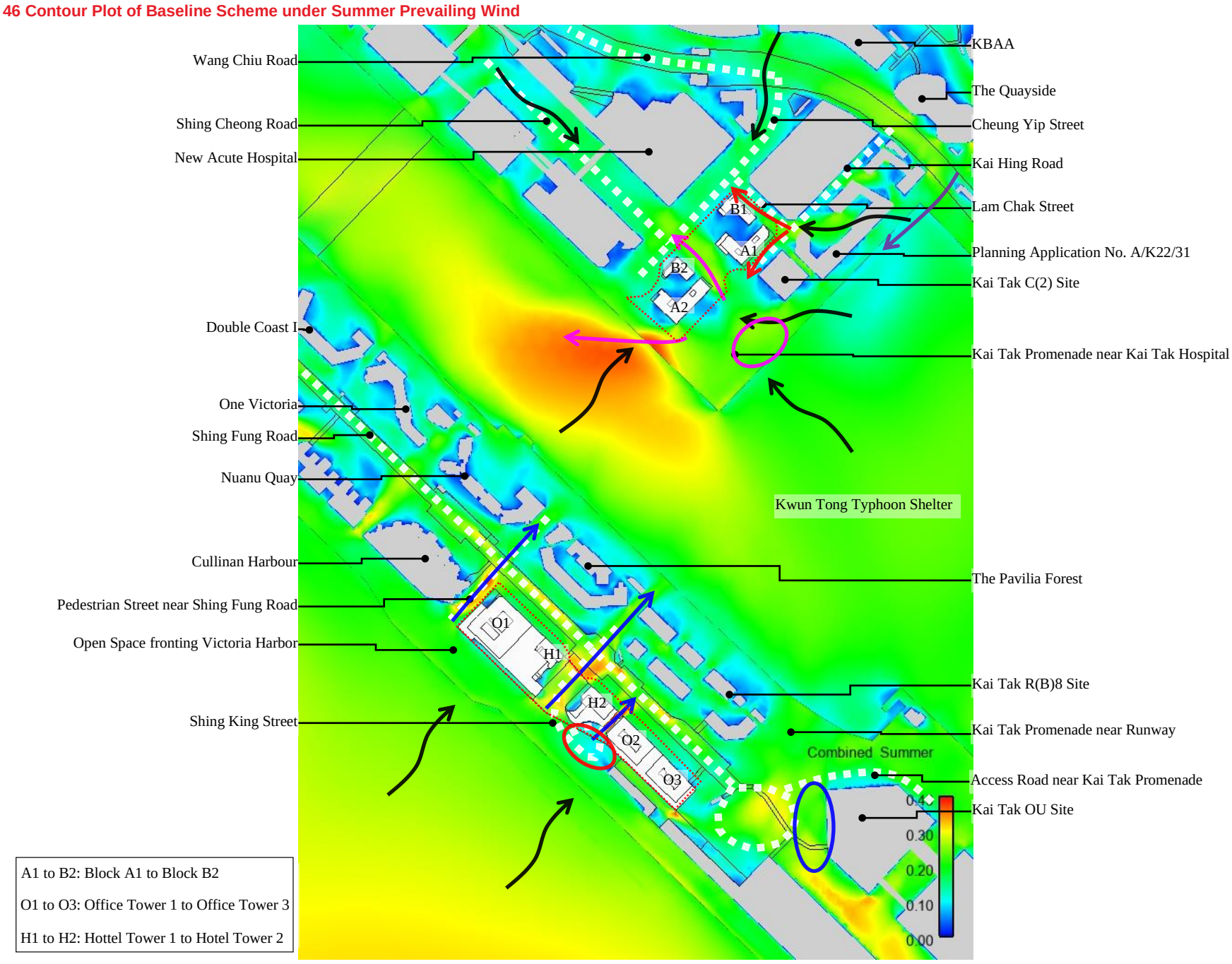


Figure 47 Contour Plot of Proposed Scheme under Summer Prevailing Wind

5.2.1 NNE Wind

The overall wind performance of Baseline and Proposed Schemes under NNE wind is presented in Figure 48 and Figure 49 respectively.

Application Sites are located at the leeward side of high-rise development which dominate the wind environment. Wind availability would be limited for the Application Sites. For Sites 3E1 and 3E2, incoming wind travels along the streets from Kai Hing Road and Cheung Yip Street. For Sites 4C4, 4C5 and area shown as 'road', low-levels incoming wind comes crosses Kwun Tong Typhoon Shelter would reach the Application Sites from the southeastern side via Open Space near Shing Fung Road and from the northwestern side via Shing Fung Road, while high-level incoming wind would passthrough building separation of upwind development to reach the Application Sites. The incoming wind direction are illustrated by **Black Arrows** in Figure 48 and Figure 49 respectively.

For Sites 3E1 and 3E2, incoming wind from Kai Hing Road would continue to travel along the street, reaching Site 3E1 and Kai Tak Promenade near Kai Tak Hospital. Under Proposed Scheme, Block A1 setback from southeastern boundary widens the wind passage, more incoming wind from Kai Hing Road would passthrough and reach Kai Tak Promenade near Kai Tak Hospital, illustrated by **Red Arrow** in Figure 49. Yet, the continuous façade of Block A1 along southeastern boundary would shield the open space within Site 3E1, resulting in slightly lower ventilation performance.

Incoming wind from Cheung Yip Street would continue to travel along the same street, reaching Sites 3E1, 3E2 and Kai Tak Promenade near Kai Tak Hospital. Under Proposed Scheme, Block B1 setback from northeastern boundary widened the wind entrance, portion of this air stream would enter to ventilate the Lam Chak Street, illustrated by **Blue Arrow** in Figure 49. Also, Block B2 with larger northeastern façade area and building height divert more wind towards Site 3E2, which this air stream would exit from southeastern boundary to ventilate Kai Tak Promenade near Kai Tak Hospital, enhancing the ventilation performance illustrated by **Purple Arrow** in Figure 49. Yet, the larger façade of Block B1 and B2 would shield the open space within Site 3E1 and 3E2 respectively, resulting in slightly lower ventilation performance.

In addition, under Proposed Scheme, taller building height limits the high-level wind from crossing Kwun Tong Typhoon Shelter. Reduced high-level wind availability on The Pavilia Forest and Kai Tak R(B)8 Site result in slightly less prominent downwash effect to ventilate pedestrian level, illustrated by **Black Circles** in Figure 49. However, most of the area are in unoccupied Kwun Tong Typhoon Shelter, ventilation impact to pedestrian level is minor.

For Sites 4C4, 4C5 and area shown as 'road', high-level incomging wind penereating building separation of Kai Tak R(B)8 Site would reach Site 4C5, inducing downwash effect. Under Proposed Scheme, the air stream would penetrate building separation between Office Towers 2 and 3, together with lower wind availability mentioned in above paragraphs, less prominent downwash effect would be observed with slightly lower VR on Shing Fun Road, illustrated by **Pink Circle** in Figure 49.

Incoming wind from Access Road near Kai Tak Promenade would continue to travel along southwestern boundary of Site 4C5 to reach Shing King Street, some would be diverted by the empty bay of Kai Tak Cruise Terminal to ventilate the promenade. Under Proposed Scheme, larger podium in Site 4C5 limited the wind permeability, where slightly lower VR would be observed, illustrated by **Red Circle** in Figure 49. The same air steam after reaching Shing King Street would be confined by podium to travel along Shing King Street on pedestrian level. And some would be diverted by the podium of Site 4C4 towards Open Space fronting Vitoria Harbour, illustrated by **Orange Arrows** in Figure 49.

Incoming wind from northwestern side along Shing Fung Road would reach Site 4C4, merged with downwashed wind from Site 4C4, and be diverted by the podium of 4C4 towards Open Space fronting Victoria Harbor via Pedestrian Street near Shing Fung Road. Under Proposed Scheme, taller building height of Office Tower 1 induced more downwash effect, downwash wind would reach the pedestrian level on the northeastern façade, improving the ventilation performance at Pedestrian Street near Shing Fung Road, illustrated by **Purple**

Circle in Figure 49. However, northwestern façade is recessed from podium, downwashed wind would not be able to reach pedestrian level freely, resulting in slightly lower VR at the downwind side of the air stream, illustrated by **Orange Circle** in Figure 49.

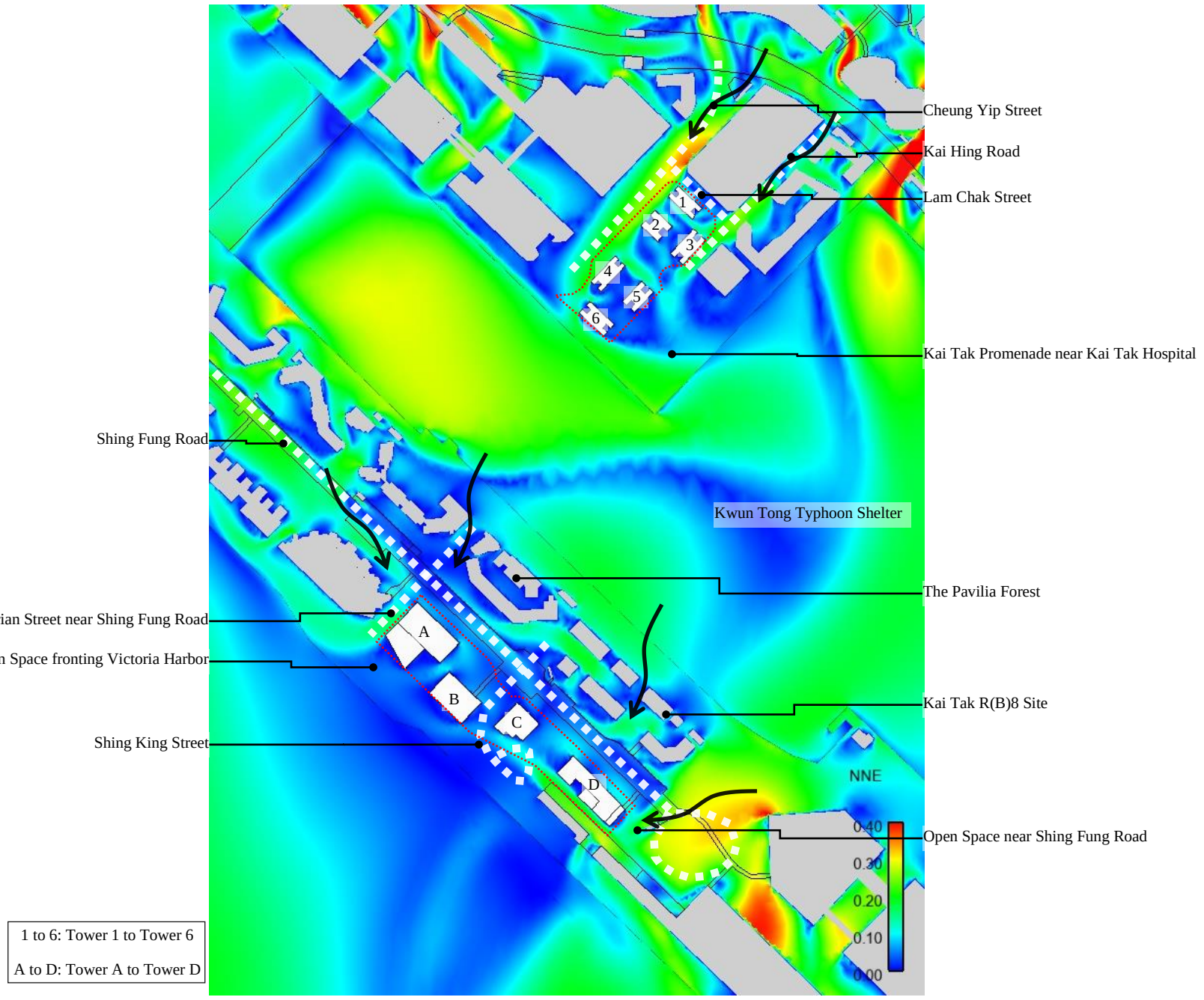


Figure 48 Contour Plot of Baseline Scheme under NNE Wind

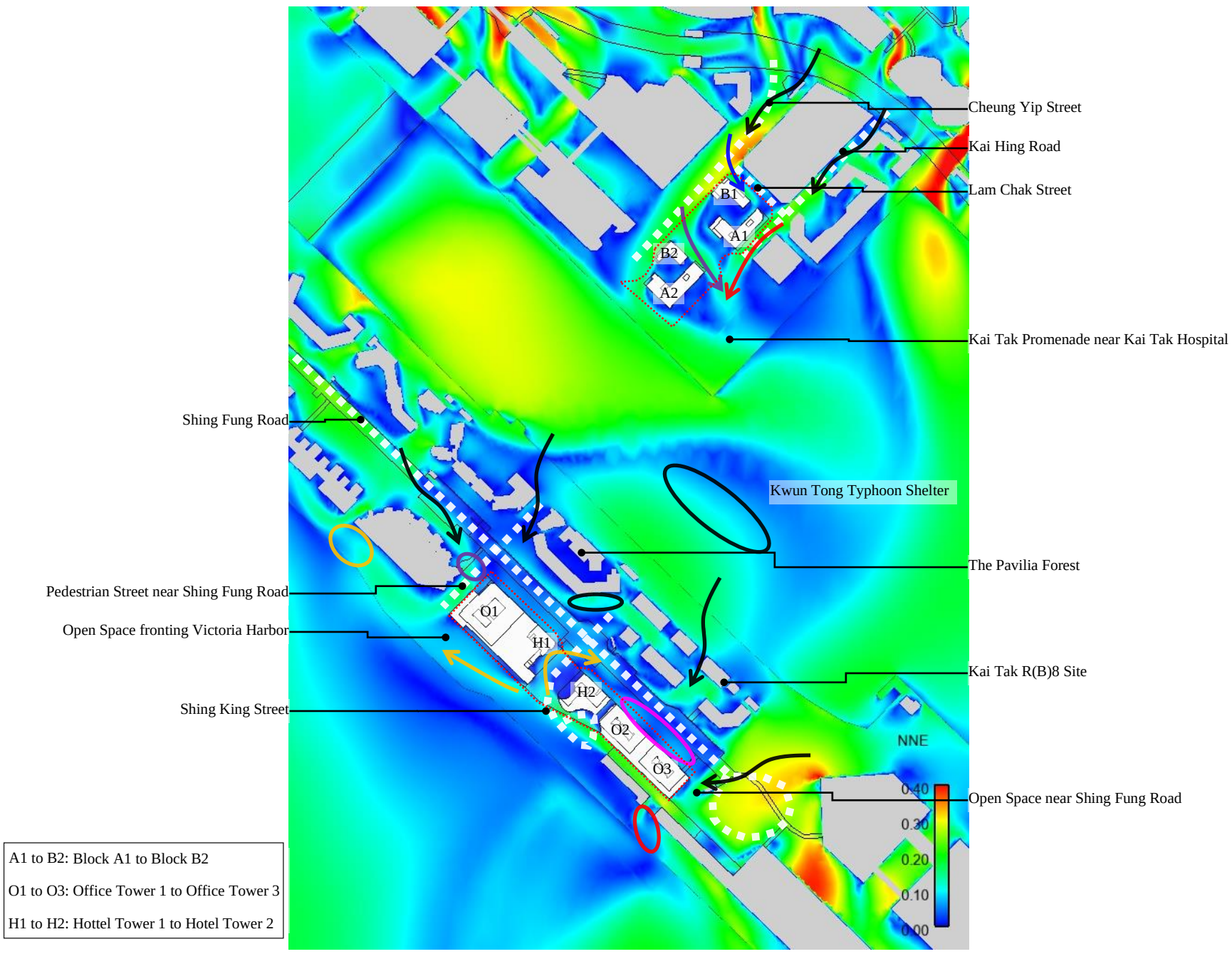


Figure 49 Contour Plot of Proposed Scheme under NNE Wind

5.2.2 NE Wind

The overall wind performance of Baseline and Proposed Schemes under NE wind is presented in Figure 50 and Figure 51 respectively.

Application Sites are located at the leeward side of high-rise development which dominate the wind environment. Wind availability would be limited for the Application Sites. For Sites 3E1 and 3E2, incoming wind travels along the streets from Cheung Yip Street. Additional wind availability is provided from Kai Tak Promenade near Kai Tak Hospital by downwashed wind from the high-rise development in former runway. For Sites 4C4, 4C5 and area shown as 'road', mid- and high-levels incoming wind would penetrate building separation of upwind development in former runway, inducing downwash effect to provide low-level wind availability nearby. The incoming wind direction are illustrated by **Black Arrows** in Figure 50 and Figure 51 respectively.

For Site 3E1 and 3E2, incoming wind from Cheung Yip Street would continue to travel along the street, reaching Sites 3E1, 3E2 and Kai Tak Promenade near Kai Tak Hospital. Under Proposed Scheme, Block B1 setback from northeastern boundary widened the wind entrance, portion of this air stream would enter to ventilate Lam Chak Street, illustrated by **Blue Arrow** in Figure 51.

Incoming wind from Kai Tak Promenade near Kai Tak Hospital would enter Sites 3E1 and 3E2 via building separation. Under Both Scheme, building setback between Sites 3C1 and 3C2 allows incoming wind to ventilate Site 3E1 and 3E2, illustrated by **Pink Arrows** in Figure 50 and Figure 51 respectively. Also, under Baseline scheme, building separation on Site 3E2 allows more incoming wind to ventilate Site 3E2 (Red Arrow in Figure 50), while under Proposed Scheme, continuous façade of Blocks A1 and A2 would shield the area within Site 3E2.

For Sites 4C4, 4C5 and area shown as 'road', under Proposed Scheme, larger northeastern frontal area and taller building height induced more downashed wind to ventilate the pedestrian level, where slightly higher VR along NBA and Shing Fung Road would be observed, illustrated by **Black Circles** in Figure 51.

However, larger podium restricted the downashed wind from penetrating Sites 4C4, 4C5 and area shown as 'road', resulting in lower ventilation performance along the southwestern boundaries and Open Space fronting Vitoria Habour, illustrated by **Red Circle** in Figure 51. While some wind would utilize Shing King Road and building separation between Site 4C5 and Kai Tak Cruise Terminal to alleviate some ventilation impact, illustrated by **Red Arrows** in Figure 51.

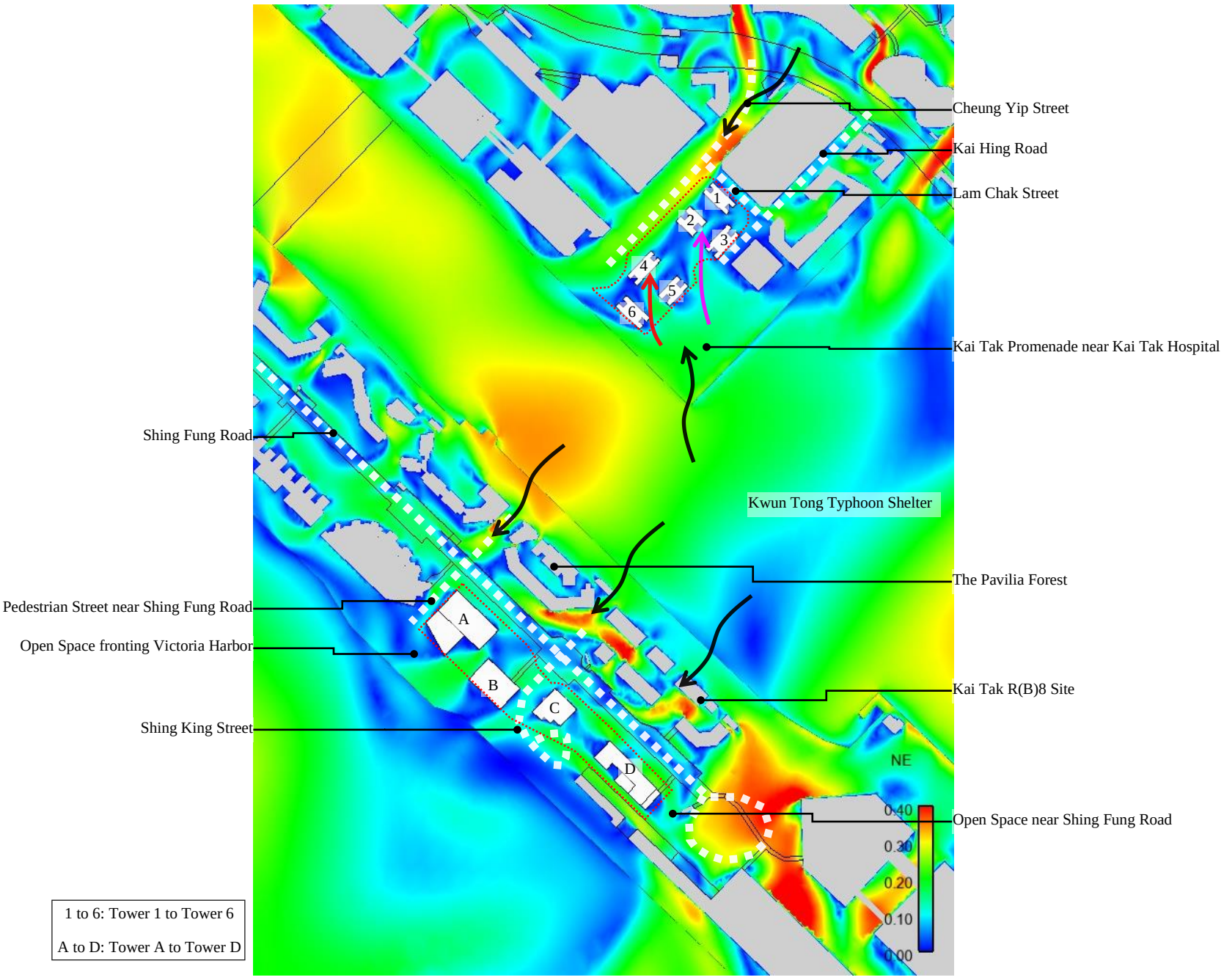


Figure 50 Contour Plot of Baseline Scheme under NE Wind

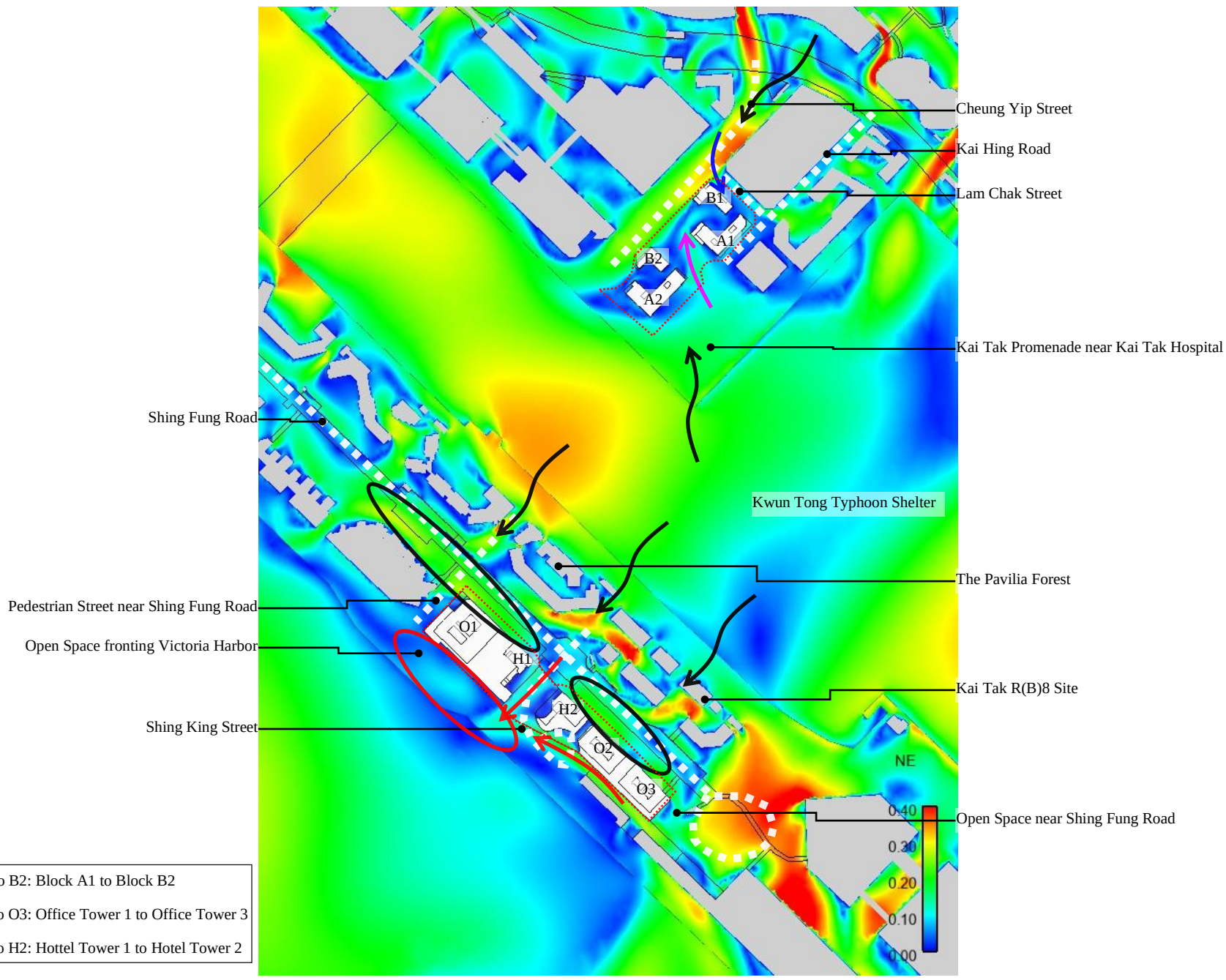


Figure 51 Contour Plot of Proposed Scheme under NE Wind

5.2.3 ENE Wind

The overall wind performance of Baseline and Proposed Schemes under ENE wind is presented in Figure 52 and Figure 53 respectively.

Application Sites are mostly located at the leeward side of high-rise development which dominate the wind environment. For Sites 3E1 and 3E2, incoming wind travels along the streets from Cheung Yip Street and downwash wind from Planning Application No. A/K22/31 would reach the Application Sites from Kai Hing Road. Additional wind availability is provided from Kai Tak Promenade near Kai Tak Hospital by downwashed wind from the development in former runway. For Sites 4C4, 4C5 and area shown as 'road', mid- and high-levels incoming wind would reach from building separation of upwind development in former runway. Low-level incoming wind would mostly provide by downwash effect from Application Site. Additional low-level wind would reach from Access Road near Kai Tak Promenade. The incoming wind direction are illustrated by **Black Arrows** in Figure 52 and Figure 53 respectively.

For Sites 3E1 and 3E2, incoming wind from Kai Hing Road would be diverted to travel along Kai Hing Road to reach Kai Tak Promenade near Kai Tak Hospital and along Lam Chak Street to merge with the air stream from Cheung Yip Street. Under Proposed Scheme, Block B1 setback from northeastern boundary and Block A1 setback from southeastern boundary allow more incoming wind to travel along Lam Chak Street and Kai Hing Road respectively, enhancing the ventilation performance along the street and subsequent location, illustrated by **Red Arrows** in Figure 53. However, the continuous facades along northeastern and southeastern boundaries would shield the area within Site 3E1.

Incoming wind from Kai Tak Promenade near Kai Tak Hospital would penetrate the building separation to ventilate the area within Application Site. Under Baseline Scheme, incoming wind would utilize building separation in Site 3E2 to penetrate Site 3E2 and merger with the air stream from Cheung Yip Street to ventilate Kai Tak Promenade near Kai Tak Hospital, illustrated by **Red Arrow** in Figure 52. Under Proposed Scheme, the continuous façade of Block A2 along southeastern boundary would shield the area within Site 3E2, while it would divert more wind to both side of the building, enhancing the ventilation performance within Site 3C1 and 3C2 and Kai Tak Promenade near Kai Tak Hospital, illustrated by **Pink Arrows** in Figure 53.

For Sites 4C4, 4C5 and area shown as 'road', low-level incoming wind from Access Road near Kai Tak Promenade would travel along southwestern boundary of Site 4C5, some would be diverted by the empty bay of Kai Tak Cruise Terminal to ventilate the promenade. Under Proposed Scheme, larger podium would limit the wind permeability, where slightly lower VR would be observed, illustrated by **Pink Circles** in Figure 53.

Under Proposed Scheme, larger northeastern frontal area and taller building height induce more promenade downwashed wind to ventilate the pedestrian level, where slightly higher VR along NBA and Shing Fung Road would be observed, illustrated by **Black Circle** in Figure 53. The downwashed wind would further passthrough Shing King Road to ventilate the promenade, illustrated by **Blue Arrow** in Figure 53.

Although the larger podium would restrict the wind permeability towards the southwestern boundary, the more prominent downwahsed wind would utilizes Shing King Road, as mentioned in above paragraph, and Pedestrian Walkway near Shing Fung Road to alleviate the ventilation impact, alleviating the ventilation impact on the Open Space fronting Victoria Harbour and southwestern boundary along Site 4C4.

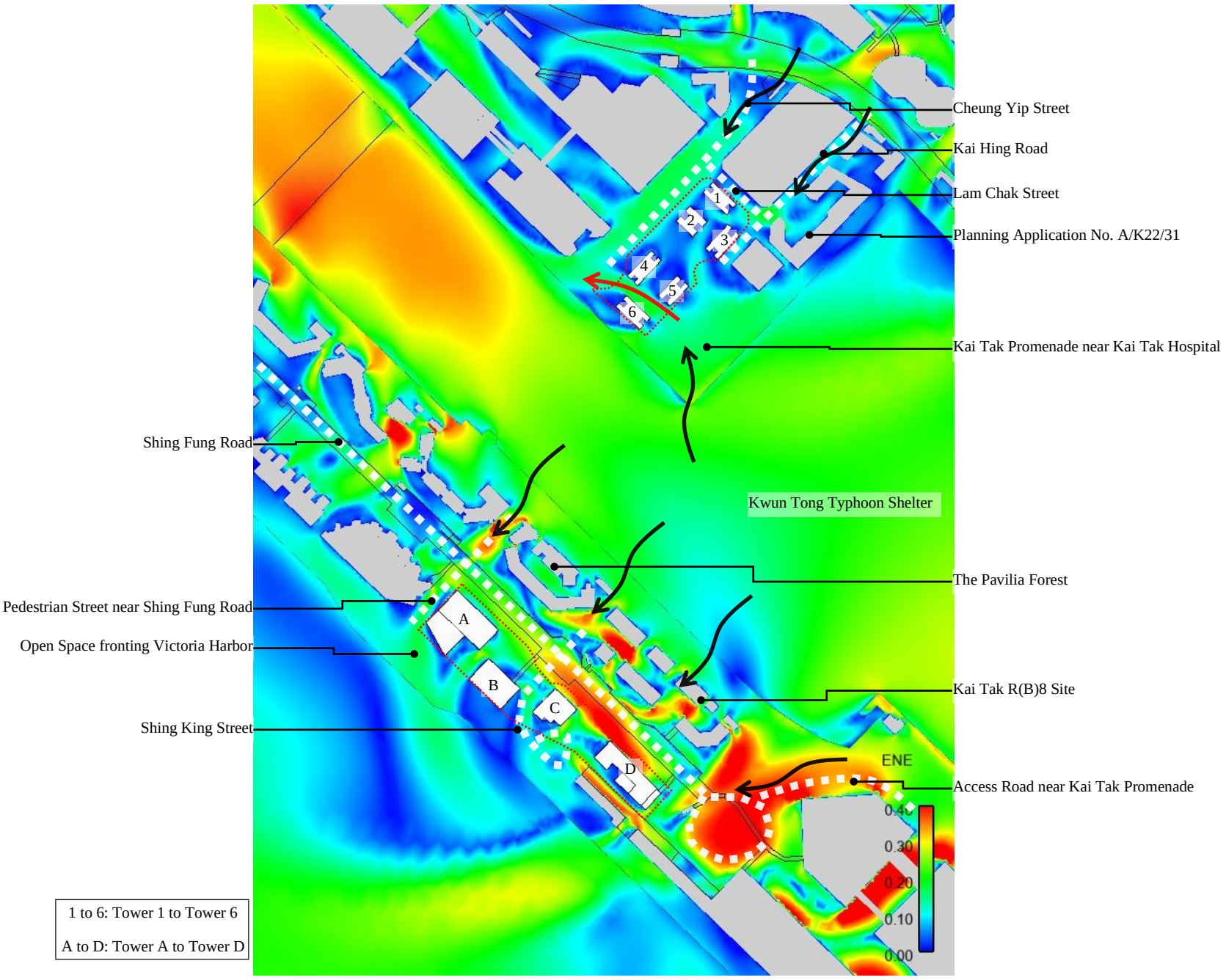


Figure 52 Contour Plot of Baseline Scheme under ENE Wind

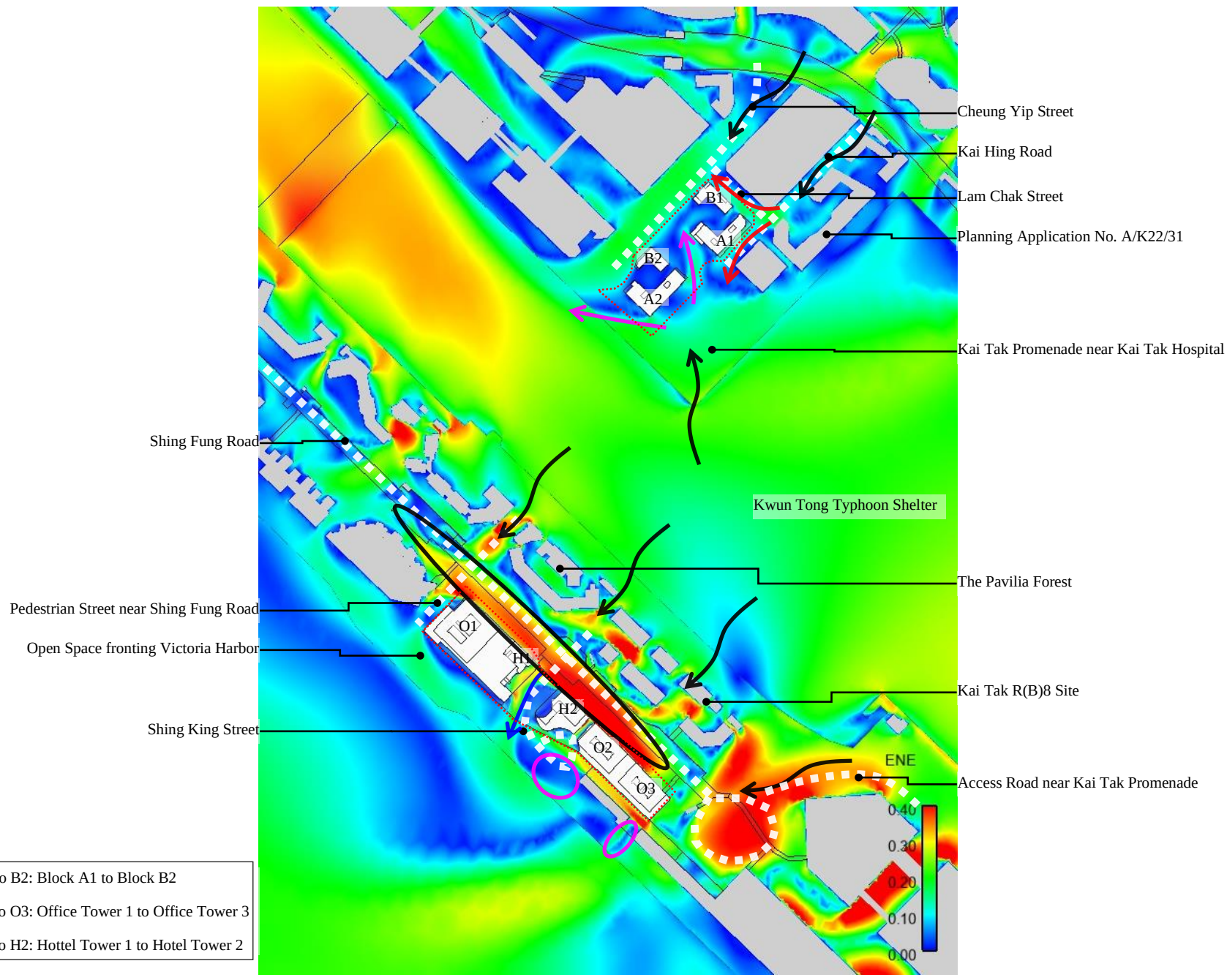


Figure 53 Contour Plot of Proposed Scheme under ENE Wind

5.2.4 E Wind

The overall wind performance of Baseline and Proposed Schemes under ENE/E winds are presented in Figure 54 and Figure 55 respectively.

Application Sites are mostly located at the leeward side of high-rise development which dominate the wind environment. For Sites 3E1 and 3E2, incoming wind travels along the streets from Cheung Yip Street and downwash wind from Planning Application No. A/K22/31 would reach the Application Site from Kai Hing Road and Kai Tak Promenade near Kai Tak Hospital. For Sites 4C4, 4C5 and area shown as 'road', incoming wind would mostly reach from Access Road near Kai Tak Promenade, with some additional wind availability from incoming wind penetrating building separation of upwind development in former runway. The incoming wind direction are illustrated by **Black Arrows** in Figure 54 and Figure 55 respectively.

For Sites 3E1 and 3E2, incoming wind from Kai Hing Road would be diverted to travel along Kai Hing Road to reach Kai Tak Promenade near Kai Tak Hospital and along Lam Chak Street to merge with the air stream from Cheung Yip Street. Under Proposed Scheme, Block B1 setback from northeastern boundary and Block A1 setback from southeastern boundary allow more incoming wind to travel along Lam Chak Street and Kai Hing Road respectively, enhancing the ventilation performance along the street and subsequent location, illustrated by **Red Arrows** in Figure 55 However, the continuous facades along northeastern and southeastern boundaries would shield the area within Site 3E1.

Incoming wind from Kai Tak Promenade near Kai Tak Hospital would penetrate the building separation to ventilate the area within Application Site. Under Baseline Scheme, incoming wind would utilize building separation in Site 3E2 to penetrate the Site 3E2 and merger with the air stream from Cheung Yip Street to ventilate Kai Tak Promenade near Kai Tak Hospital, illustrated by **Red Arrow** in Figure 54. Under Proposed Scheme, the continuous façade of Block A2 along southeastern boundary would shield the area within Site 3E2, while it would divert more wind to northeastern and southwestern boundaries, enhancing the ventilation performance within Site 3C1 and 3C2 and Kai Tak Promenade near Kai Tak Hospital, illustrated by **Pink Arrows** in Figure 55

For Sites 4C4, 4C5 and area shown as 'road', incoming wind from Access Road near Kai Tak Promenade would continue to travel along Shing Fung Road to ventilate the leeward side. Under Proposed Scheme, due to larger podium footprint, incoming wind would be restricted to penetrate Sites 4C4, 4C5 and area shown as 'road', confining the air stream to travel along Shing Fund Road and Kai Tak Sky Garden, where slightly higher VR would be observed (**Blue Arrow** in Figure 55). While slightly lower VR along southwestern boundary and Open Space fronting Victoria Harbour (**Blue Circles** in Figure 55) would be observed.

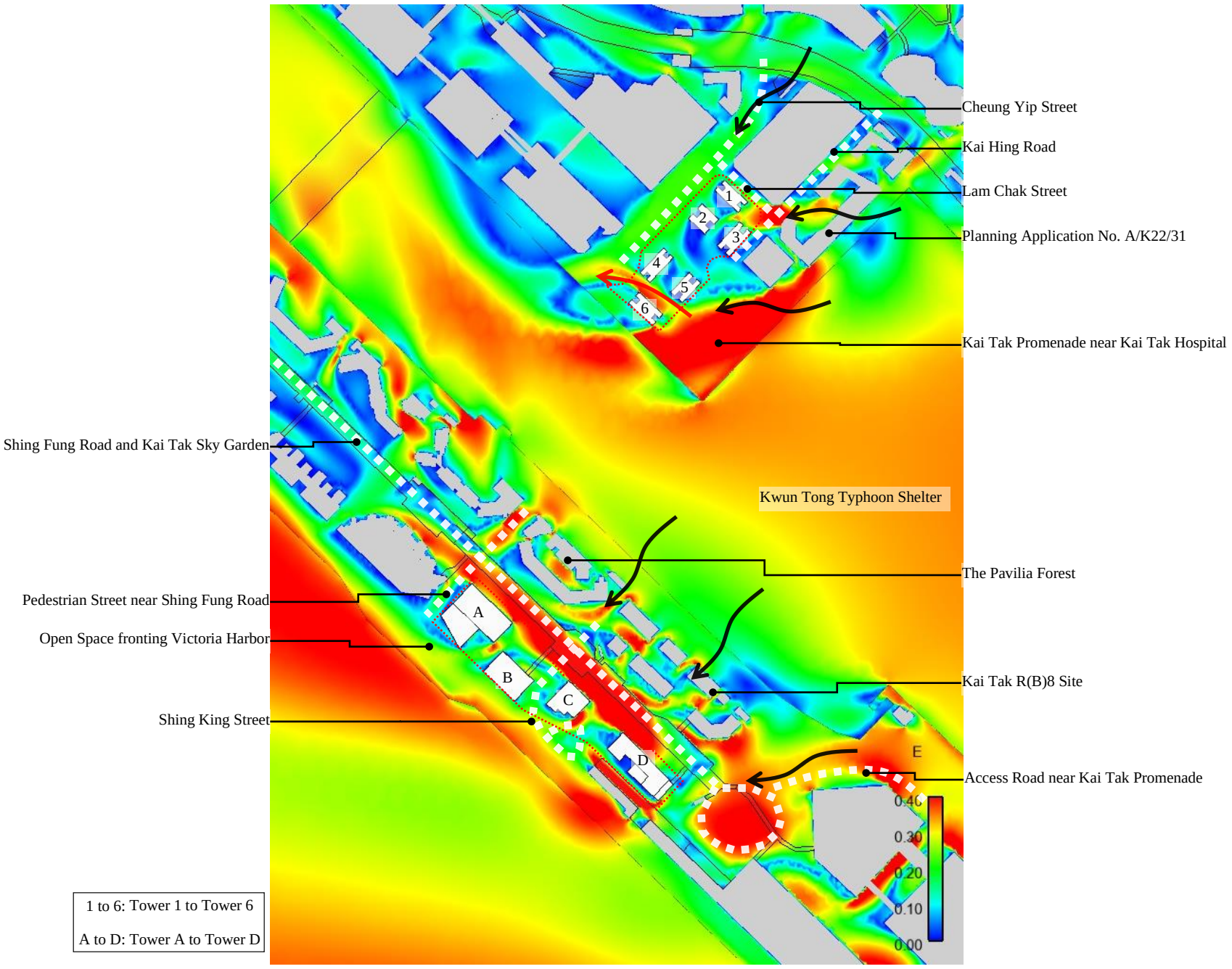


Figure 54 Contour Plot of Baseline Scheme under E Wind

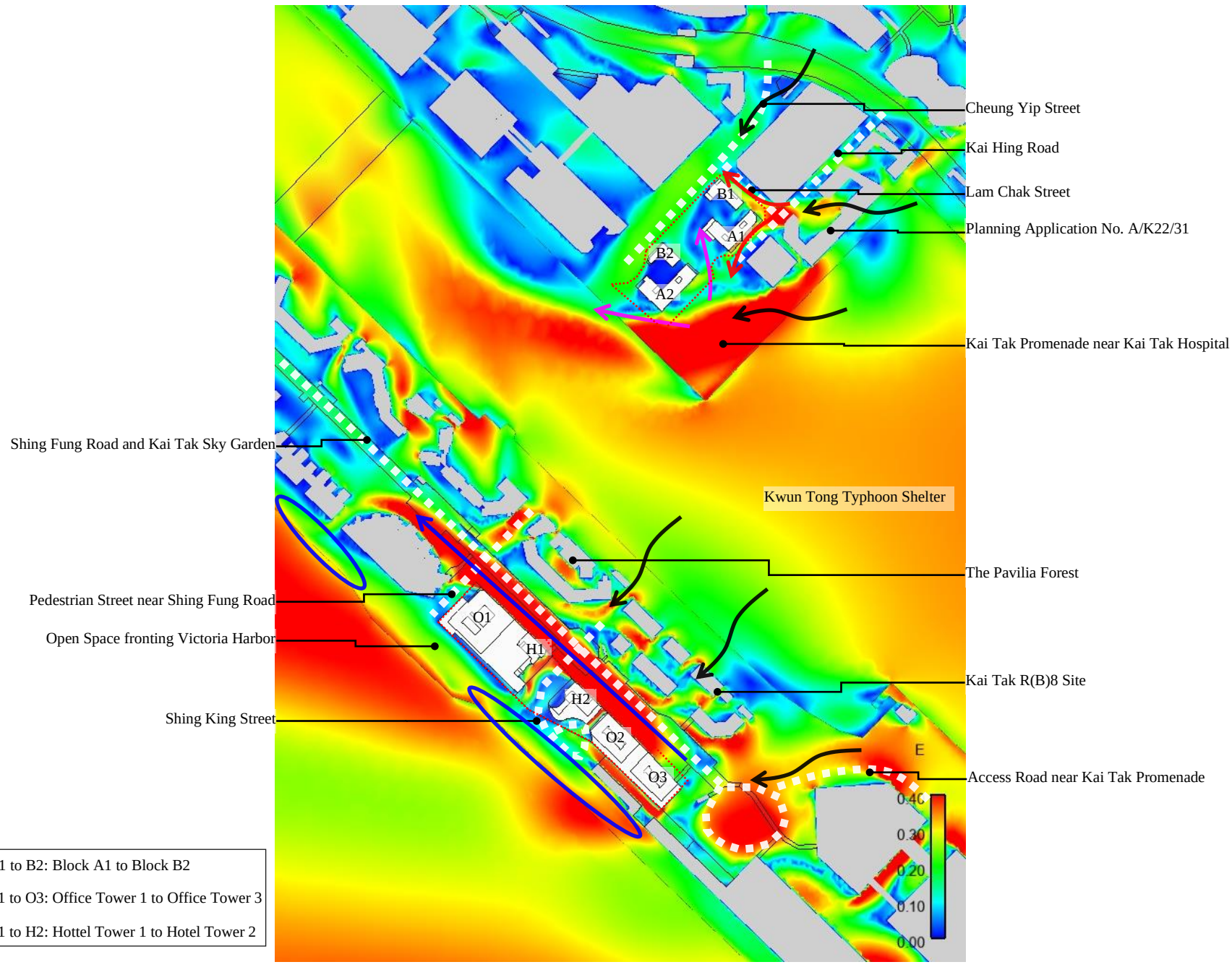


Figure 55 Contour Plot of Proposed Scheme under E Wind

5.2.5 ESE Wind

The overall wind performance of Baseline and Proposed Schemes under ESE winds are presented in Figure 56 and Figure 57 respectively.

Site 3E1, 3E2, 4C4, 4C5 and area shown as ‘road’ are mostly located at the leeward side of high-rise development, open space, mid-rise development and high-rise development respectively. For Sites 3E1 and 3E2, incoming wind would reach the prevailing direction via Kai Tak Promenade near Kai Tai Hospital. Additional wind availability would be provided from downwashed wind of Planning Application No. A/K22/31, Kai Tak C(2) Site and Site 3E2. For Sites 4C4, 4C5 and area shown as ‘road’, low and mid-level incoming wind would be diverted by the Kai Tak OU Site to reach the Application Site from Access Road near Kai Tak Promenade. High-level wind would skim over the mid-rise development to reach the Application Site from prevailing wind directions. The incoming wind direction are illustrated by **Black Arrows** in Figure 56 and Figure 57 respectively.

For Sites 3E1 and 3E2, downwash wind from Planning Application No. A/K22/31 would reach Site 3E1 via Kai Hing Road. Under Proposed Scheme, Block B1 setback from northeastern boundary and Block A1 setback from southeastern boundary allow more incoming wind to travel along Lam Chak Street and Kai Hing Road respectively, enhancing the ventilation performance along the street and subsequent location including Cheung Yip Street and Kai Tak Promenade near Kai Tak Hospital, illustrated by **Red Arrows** in Figure 57. However, the continuous facades along northeastern and southeastern boundaries would shield the area within Site 3E1.

Downwashed wind from Planning Application No. A/K22/31, Kai Tak C(2) Site and Block A2 would merge together to provide wind availability of the Application Site and leeward areas. Under Baseline Scheme, incoming wind would utilize building separation in Site 3E2 to penetrate Site 3E2 and ventilate Kai Tak Promenade near Kai Tak Hospital, illustrated by **Red Arrow** in Figure 56.

Under Proposed Scheme, larger southeastern frontal area with taller building height of Block A2 would induce more promenade downwash effect to ventilate northeastern and southwestern boundaries, illustrated by **Blue Arrows** in Figure 57. However, the same air stream would flow against the downwashed wind from Planning Application No. A/K22/31, Kai Tak C(2) Site, reducing the ventilation performance on Kai Tak Promenade near Kai Tak Hospital (**Black Circle** in Figure 57), while enhancing ventilation performance in open water which has minor ventilation enhancement to pedestrian.

On the other hand, taller building height of Block A2 would shield more high-level incoming from reaching the far leeward side on Shing Cheong Road, illustrated by **Red Circle** in Figure 57

Similar to E wind, for Sites 4C4, 4C5 and area shown as ‘road’, incoming wind from Access Road near Kai Tak Promenade would continue to travel along Shing Fung Road to ventilate the leeward side. Under Proposed Scheme, due to larger podium footprint, incoming wind would be more restricted to penetrate Sites 4C4, 4C5 and area shown as ‘road’ to reach the southwestern boundary and Open Space fronting Victoria Harbour, confining the air stream to travel along Shing Fung Road and Kai Tak Sky Garden, where slightly higher VR would be observed (**Blue Arrow** in Figure 57). While slightly lower VR along southwestern boundary and Open Space fronting Victoria Harbour (**Blue Circles** in Figure 57) would be observed.

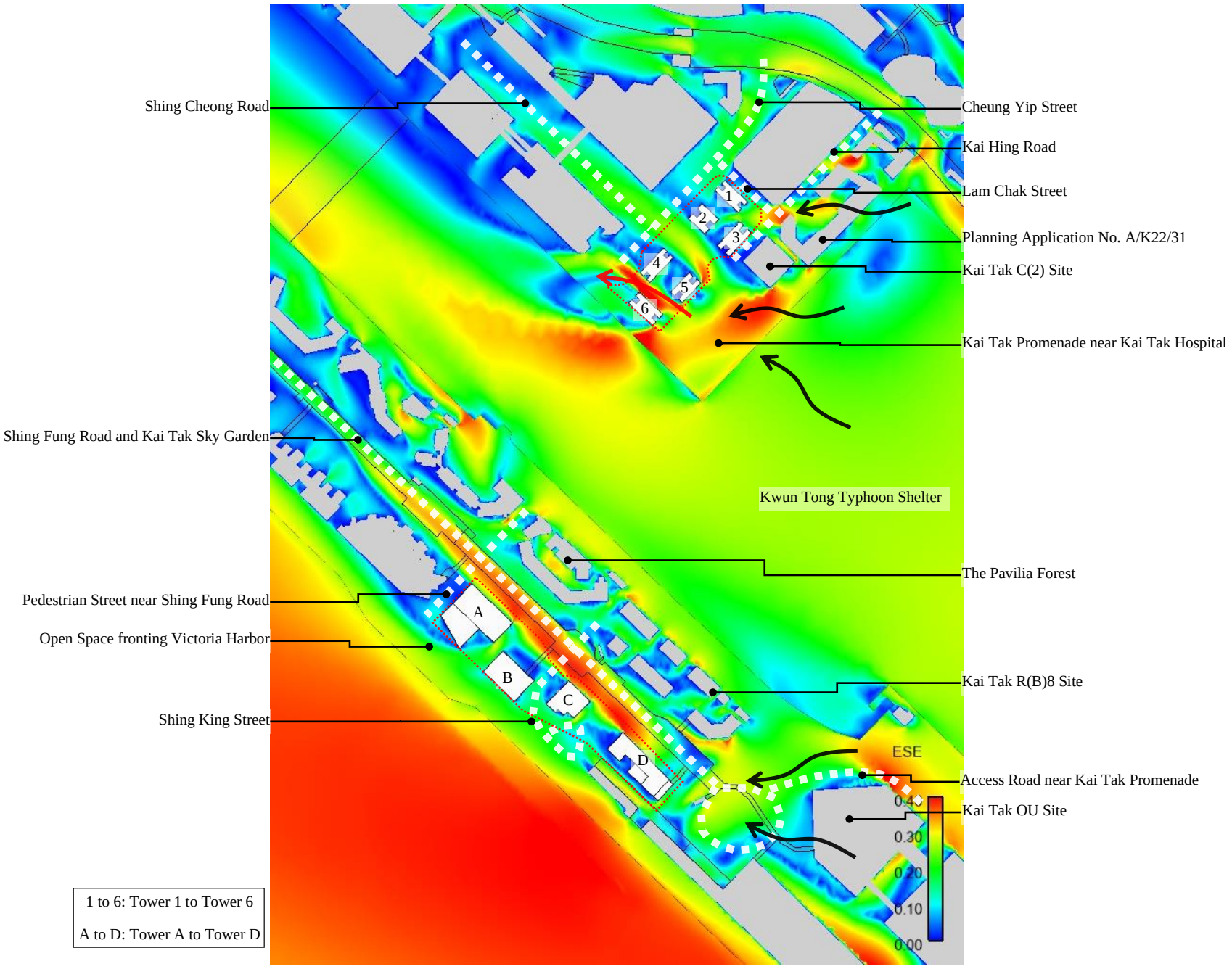


Figure 56 Contour Plot of Baseline Scheme under ESE Wind

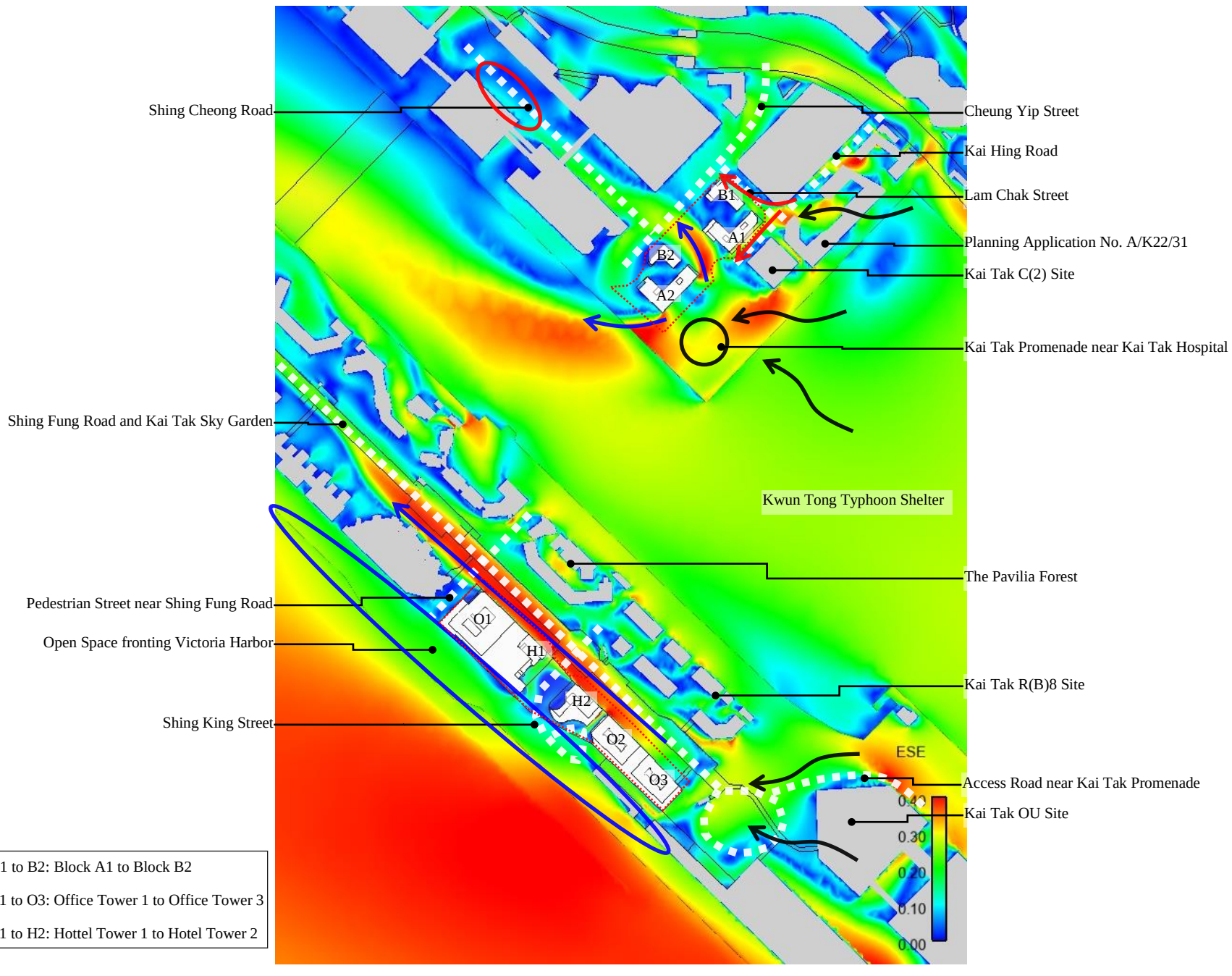


Figure 57 Contour Plot of Proposed Scheme under ESE Wind

5.2.6 SE Wind

The overall wind performance of Baseline and Proposed Schemes under SE winds are presented in Figure 58 and Figure 59 respectively.

Site 3E1, 3E2, are located at the leeward side of high-rise development and open space respectively. Site 4C4 are self-shaded by Site 4C and Site 4C is located at the leeward side of mid-rise development. For Sites 3E1 and 3E2, incoming wind would reach the prevailing direction via Kai Tak Promenade near Kai Tai Hospital. Additional wind availability would be provided from downwashed wind of Planning Application No. A/K22/31, Kai Tak C(2) Site and Site 3E2. For Sites 4C4, 4C5 and area shown as 'road', low and mid-level incoming wind would be diverted by the Kai Tak OU Site and Kai Tai Cruise Terminal to reach the Application Site from Access Road near Kai Tak Cruise Terminal. High-level wind would skim over the upwind development to reach the Application Site from prevailing wind directions. The incoming wind direction are illustrated by **Black Arrows** in Figure 58 and Figure 59 respectively.

Similar to ESE wind, for Sites 3E1 and 3E2, downwash wind from Planning Application No. A/K22/31 would reach Site 3E1 via Kai Hing Road. Under Proposed Scheme, Block B1 setback from northeastern boundary and Block A1 setback from southeastern boundary allow more incoming wind to travel along Lam Chak Street and Kai Hing Road respectively, enhancing the ventilation performance along the street and subsequent location including Cheung Yip Street, illustrated by **Red Arrows** in Figure 59. However, the continuous facades along northeastern and southeastern boundaries would shield the area within Site 3E1.

Downwashed wind from Planning Application No. A/K22/31, Kai Tak C(2) Site and Block A2 would merge together to provide wind availability of the Application Site and leeward areas. Under Baseline Scheme, incoming wind would utilize building separation in Site 3E2 to penetrate the Site 3E2 to ventilate Kai Tak Promenade near Kai Tak Hospital, illustrated by **Red Arrow** in Figure 58.

Under Proposed Scheme, larger southeastern frontal area with taller building height of Block A2 would induce more promenade downwash effect to ventilate northeastern and southwestern boundaries, illustrated by **Blue Arrows** in Figure 59. However, the same air stream would flow against the downwashed wind from Planning Application No. A/K22/31, Kai Tak C(2) Site, reducing the ventilation performance on Kai Tak Promenade near Kai Tak Hospital (**Black Circle** in Figure 59).

For Sites 4C4, 4C5 and area shown as 'road', incoming wind would continue to travel along Shing Fung Road and Open Space fronting Victoria Harbour to ventilate the leeward side. Under Proposed Scheme, larger southeastern frontal area of Office Tower 3 induced more prominent downwash effect. The downwashed wind would travel along Shing Fung Road, Kai Tak Sky Garden and Open Space fronting Victoria harbour, merging with incoming wind to ventilate the leeward side, where slightly higher VR would be observed, illustrated by **Pink Arrows** in Figure 59.

On the other hand, larger podium reduced permeability along southwestern boundary of Site 4C5, where slightly lower VR on Shing King Road would be observed, illustrated by **Pink Circle** in Figure 59.

Also, under Baseline Scheme, lower building height create stepping building height profile between Application Site and Cullinan Harbour. Southeastern façade of Cullinan Harbour would induce some downashed wind to ventilate the Pedestrian Walkway near Shing Fung Road, illustrated by **Pink Circ**le in Figure 58.

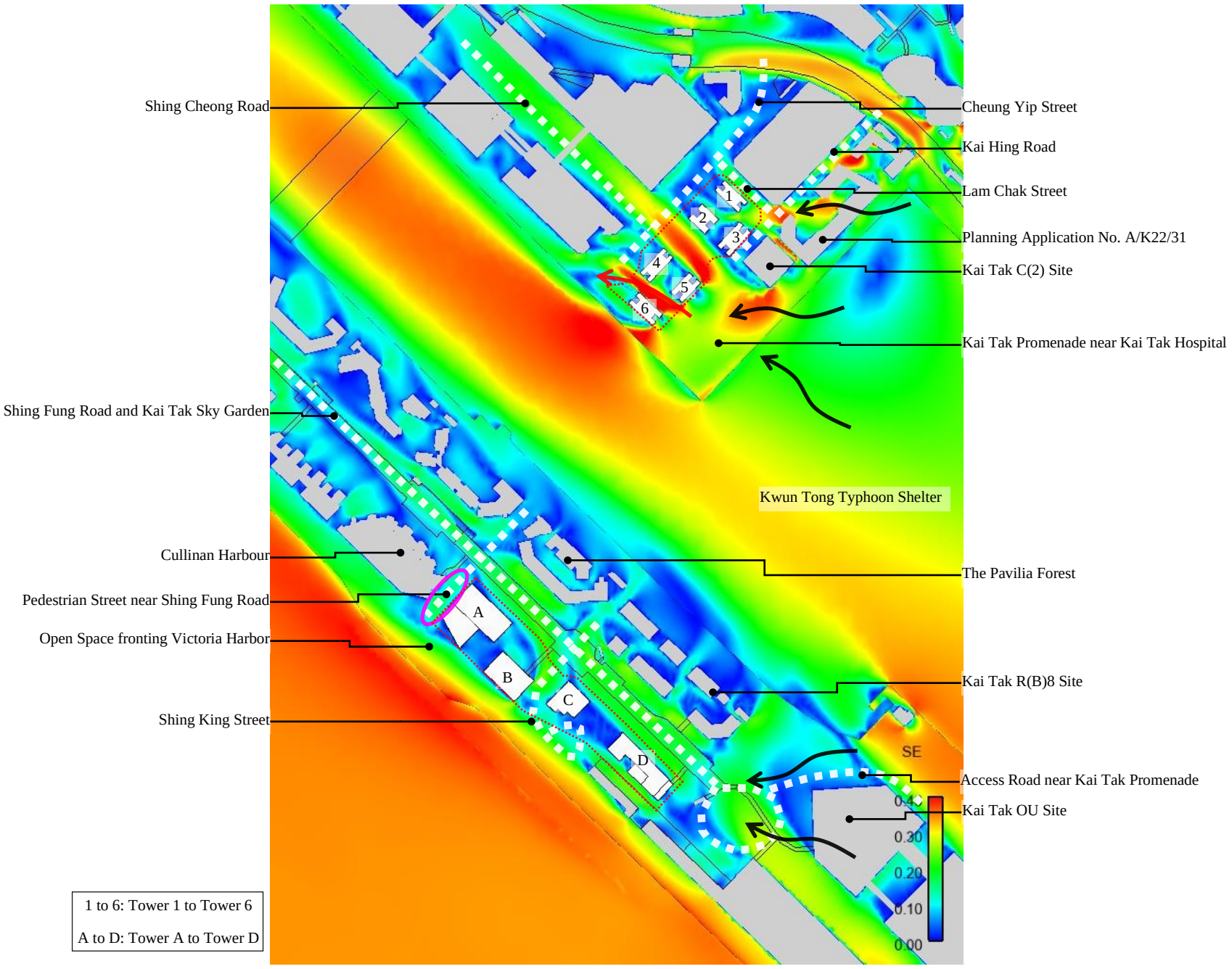


Figure 58 Contour Plot of Baseline Scheme under SE Wind

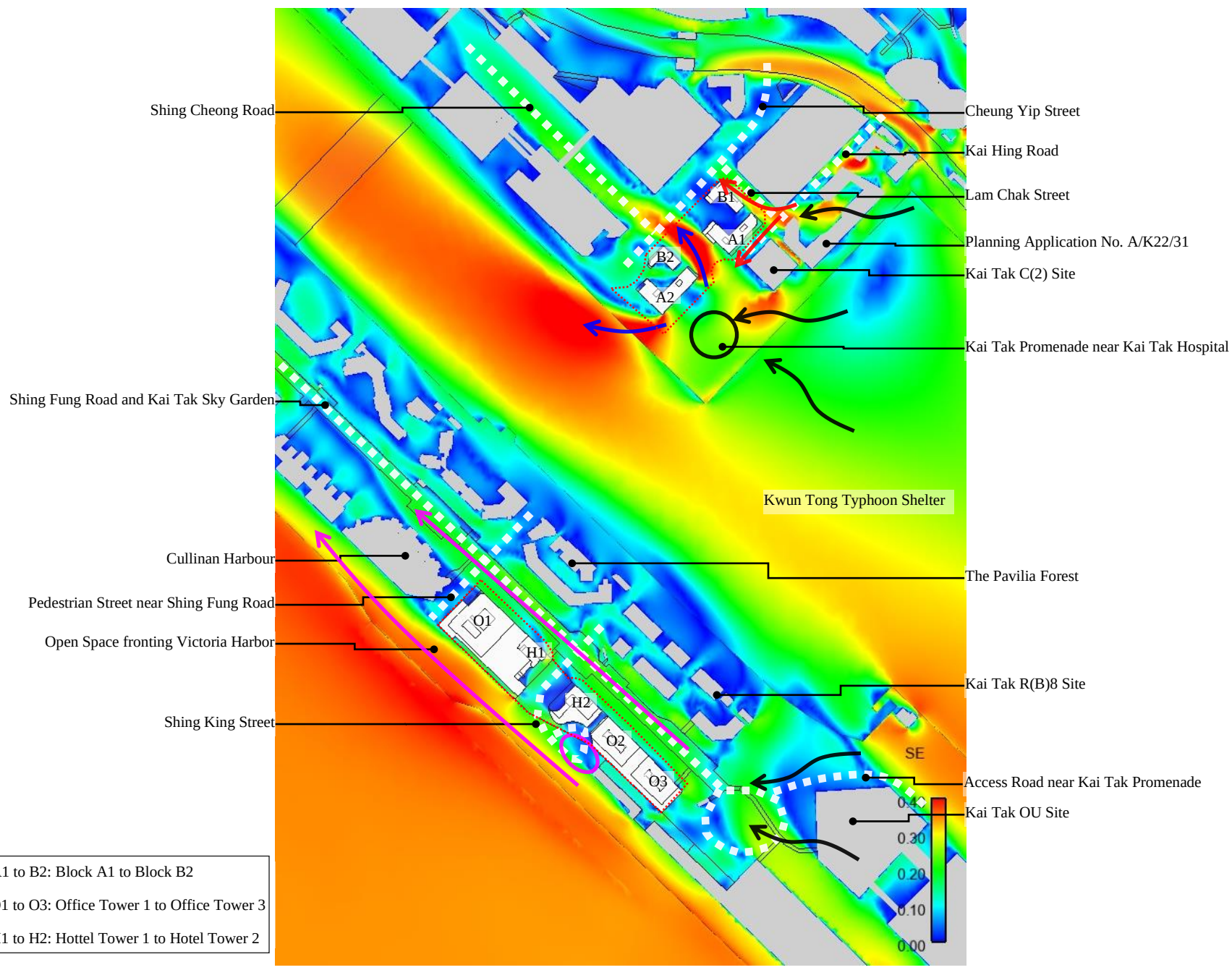


Figure 59 Contour Plot of Proposed Scheme under SE Wind

5.2.7 SSE Wind

The overall wind performance of Baseline and Proposed Schemes under SSE winds are presented in Figure 60 and Figure 61 respectively.

Sites Sites 4C4, 4C5 and area shown as ‘road’ are located at the leeward side of Victoria Harbor with some wind shield on southeastern side of Site 4C5 by low-rise development in Kai Tak Cruise Terminal. Sites 3E1 and 3E2 are located at the leeward side of high-rise development in former runway with separation of Kwun Tong Typhoon Shelter. For Sites 4C4, 4C5 and area shown as ‘road’, incoming wind would reach the Application Site from prevailing wind direction. Downwash effect from Site 4C5 provided low-level wind availability on southeastern side of Site 4C5. For Sites 3E1 and 3E2, incoming wind would cross Kwun Tong Typhoon Shelter to reach the Application Site from Kai Tak Promenade near Kai Tak Hospital. Downwash effect from Planning Application No. A/K22/31, Kai Tak C(2) Site and Site 3E2 provides additional low-level wind availability. The incoming wind direction are illustrated by **Black Arrows** in Figure 60 and Figure 61 respectively.

For Sites 4C4, 4C5 and area shown as ‘road’, downwash wind on southeastern side of Site 4C5 provided low-level wind availability. Under Proposed Scheme, Office Tower 3 with larger southeastern frontal area induced more prominent downwash effect, ventilating Shing Fung Road, where slightly higher VR would be observed, illustrated by **Red Arrow** in Figure 61. However, Office Tower 3 is recessed from podium on southwestern boundary, downwashed wind is unable to reach pedestrian level freely, resulting in slightly lower VR, illustrated by **Red Circle** in Figure 61.

Under Baseline Scheme, building separation on Site 4C5 facilitate incoming wind penetration. Furthermore, Tower C setback from southwestern boundary allows more prominent downwash effect induced by Tower B. In addition, the height profile between the Application Site and Cullinan Harbour enhanced the downwash effect on Cullinan Harbour. These three phenomena combined result in greater wind flow towards Shing Fung Road, illustrated by **Red Arrows** in Figure 60.

Under Proposed Scheme, larger podium limits the incoming wind penetration towards Shing Fung Road, incoming wind would be confined to ventilate along southwestern boundary and Open Space fronting Victoria Harbour, illustrated by **Blue Arrows** in Figure 61.

In addition, Hotel Tower 1 setback from southwestern boundary allows more prominent downwash effect induced by Office Tower 1. The downwahsed wind would travel on podium, skimming over Kai Tak Sky Garden on mid-level to reach The Pavilia Forest, then be diverted to pedestrian level, where slightly higher VR would be observed, illustrated by **Blue Circle** in Figure 61.

For Sites 3E1 and 3E2, downwashed wind from Planning Application No. A/K22/31 and Kai Tak C(2) Site would reach Site 3E1 from Kai Hing Road. Under Proposed Scheme, larger southeastern façade of Tower A1 divert the downwashed wind toward Lam Chak Street. The narrower wind passage increased the velocity, where slightly higher VR would be observed, illustrated by **Pink Arrows** in Figure 61. However, the continuous facades along northeastern and southeastern boundaries would shield the area within Site 3E1

Downwashed wind from Planning Application No. A/K22/31, Kai Tak C(2) Site and Block A2 would merge together to provide wind availability of the Application Site and leeward areas. Under Baseline Scheme, incoming wind would utilize building separation in Site 3E2 to penetrate the Site 3E2 to ventilate Kai Tak Promenade near Kai Tak Hospital, illustrated by **Purple Arrow** in Figure 60. Also, lower building height allows high-level wind to skim over the Application Site, reaching New Acute Hospital to induce downashed wind and ventilate Shing Cheong Road, illustrated by **Blue Arrow** in Figure 60

Under Proposed Scheme, larger southeastern frontal area with taller building height of Block A2 would induce more promenade downwash effect to ventilate northeastern and southwestern boundaries, illustrated by **Purple Arrows** in Figure 61. However, part of downwashed wind travel along southwestern boundary would reach the waters of Kwun Tong Typhoon Shelter, which has minimal influence to pedestrian level.

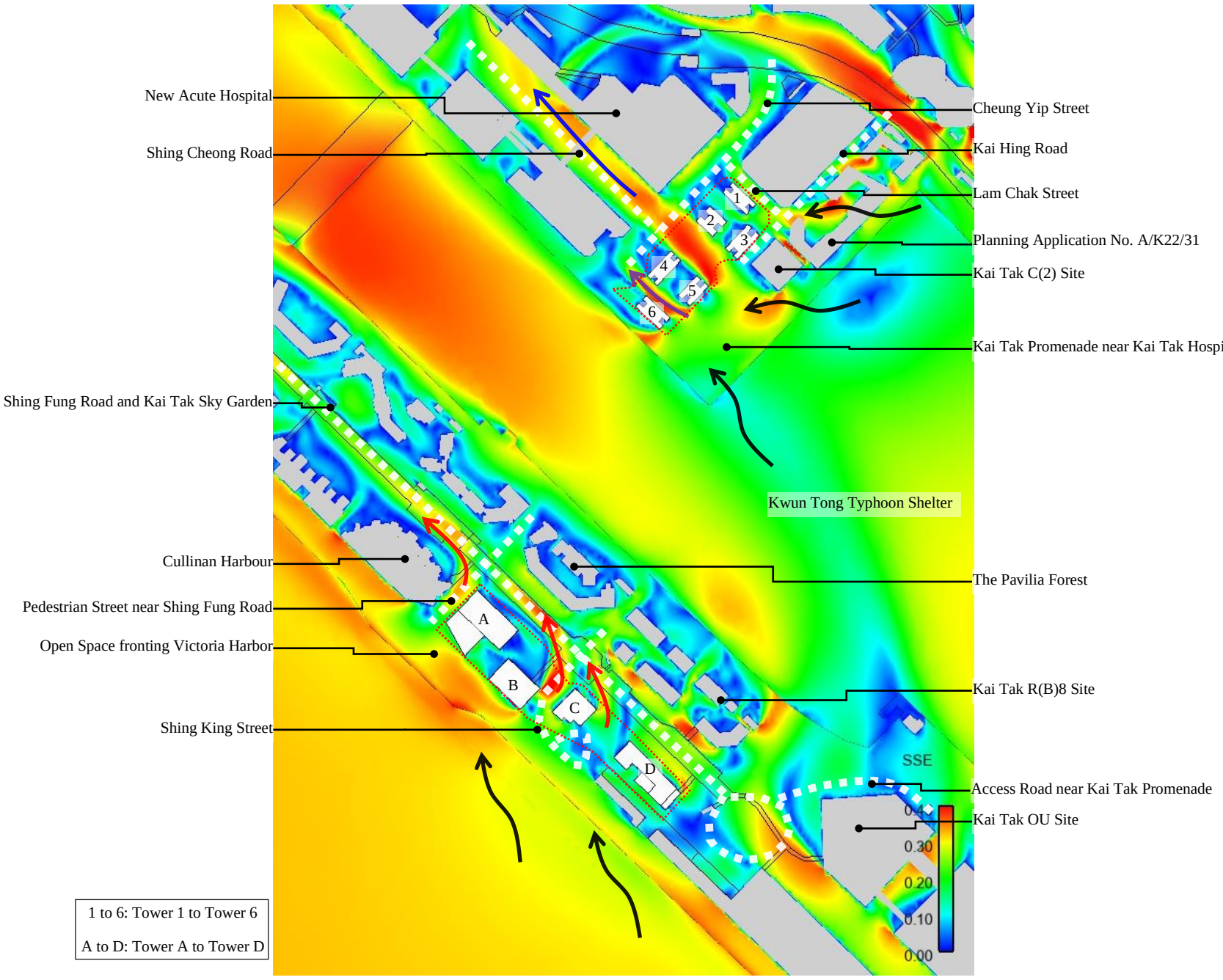


Figure 60 Contour Plot of Baseline Scheme under SSE Wind

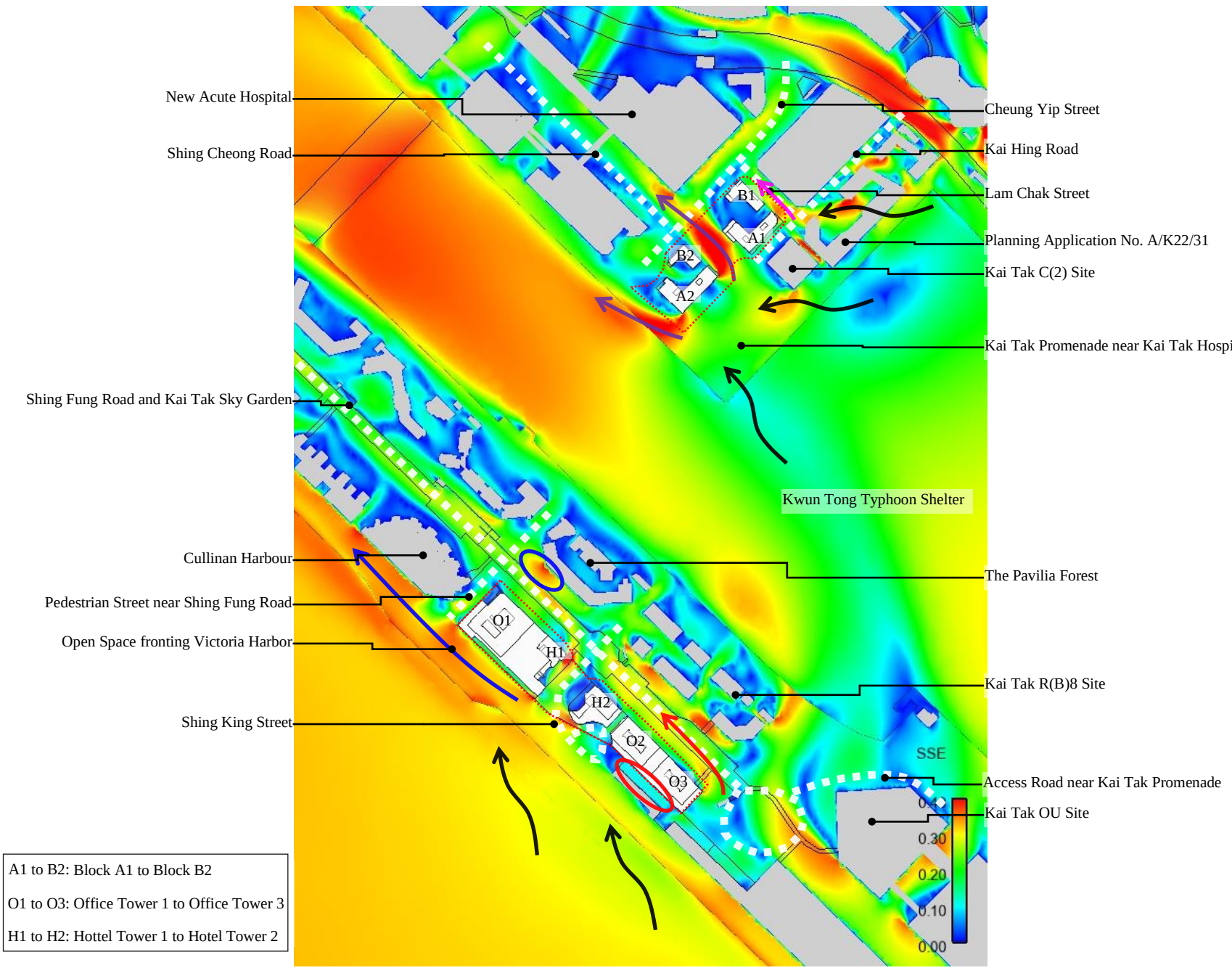


Figure 61 Contour Plot of Proposed Scheme under SSE Wind

5.2.8 S Wind

The overall wind performance of Baseline and Proposed Schemes under S winds are presented in Figure 62 and Figure 63 respectively.

Sites 4C4, 4C5 and area shown as 'road' are located at the leeward side of Victoria Harbor with some wind shield on southeastern side of Site 4C5 by low-rise development in Kai Tak Cruise Terminal. Sites 3E1 and 3E2 are located at the leeward side of high-rise development in former runway with separation of Kwun Tong Typhoon Shelter. For Sites 4C4, 4C5 and area shown as 'road', incoming wind would reach the Application Site from prevailing wind direction. Downwash effect from Site 4C5 provided low-level wind availability on southeastern side of Site 4C5. For Sites 3E1 and 3E2, incoming wind would cross Kwun Tong Typhoon Shelter to reach the Application Site from Kai Tak Promenade near Kai Tak Hospital. Downwash effect from Planning Application No. A/K22/31, Kai Tak C(2) Site and Site 3E2 provides additional low-level wind availability. The incoming wind direction are illustrated by **Black Arrows** in Figure 62 and Figure 63 respectively.

For Sites 4C4, 4C5 and area shown as 'road', downwashed wind on southeastern side of Site 4C5 provided low-level wind availability. Under Proposed Scheme, Office Tower 3 with larger southeastern frontal area induced more prominent downwash effect, ventilating Shing Fung Road, where slightly higher VR would be observed, illustrated by **Red Arrow** in Figure 63. However, Office Tower 3 is recessed from podium on southwestern boundary, downwashed wind is unable to reach pedestrian level along southwestern boundary, resulting in slightly lower VR, illustrated by **Red Circle** in Figure 63.

Under Baseline Scheme, building separation on Site 4C5 facilitate incoming wind penetration. Furthermore, Tower C setback from southwestern boundary allows more prominent downwash effect induced by Tower B. In addition, the height profile between the Application Site and Cullinan Harbour enhanced the downwash effect on Cullinan Harbour. These three phenomena combined result in greater wind flow towards Shing Fung Road, illustrated by **Red Arrows** in Figure 62.

These air steams would pass through Pedestrian Walkway near Shing Fung Road and other openings of the noise barrier to reach the development in former runway fronting Kwun Tong Typhoon Shelter, including Miami Quay, One Victoria and Double Coast I, where slightly higher VR would be observed, illustrated by **Red Circles** in Figure 62.

Under Proposed Scheme, although larger podium limit incoming wind permeability towards Shing Fung Road, larger frontal area of southeastern and southwestern façade with taller building height generally induces more prominent downwash effect. The downwashed wind would utilize Shing King Street, podium separation between Hotel Tower 2 and Office Tower 2 to alleviate the ventilation impact on Shing Fung Road, illustrated by **Blue Arrows** in Figure 63.

For Sites 3E1 and 3E2, downwashed wind from Planning Application No. A/K22/31 and Kai Tak C(2) Site would reach Site 3E1 from Kai Hing Road. Under Proposed Scheme, larger southeastern façade of Tower A1 divert the downwashed wind towards Lam Chak Street. The narrower wind passage increased the velocity, where slightly higher VR would be observed, illustrated by **Pink Arrows** in Figure 63. However, the continuous facades along northeastern and southeastern boundaries would shield the area within Site 3E1

Downwashed wind from Planning Application No. A/K22/31, Kai Tak C(2) Site and Block A2 would merge together to provide wind availability of the Application Site and leeward areas. Under Baseline Scheme, incoming wind would penetrate building separation in Site 3E2 to ventilate Kai Tak Promenade near Kai Tak Hospital, illustrated by **Purple Arrow** in Figure 62. Also, lower building height allows high-level wind to skim over the Application Site, reaching New Acute Hospital to induce downashed wind and ventilate Shing Cheong Road, illustrated by **Blue Arrow** in Figure 62.

Under Proposed Scheme, larger southeastern frontal area with taller building height of Block A2 would induce more promenade downwash effect to ventilate northeastern and southwestern boundaries, illustrated by **Purple Arrows** in Figure 63. However, most of downwashed wind travel along southwestern boundary would reach the waters of Kwun Tong Typhoon Shelter, which has minimal influence on pedestrian level.

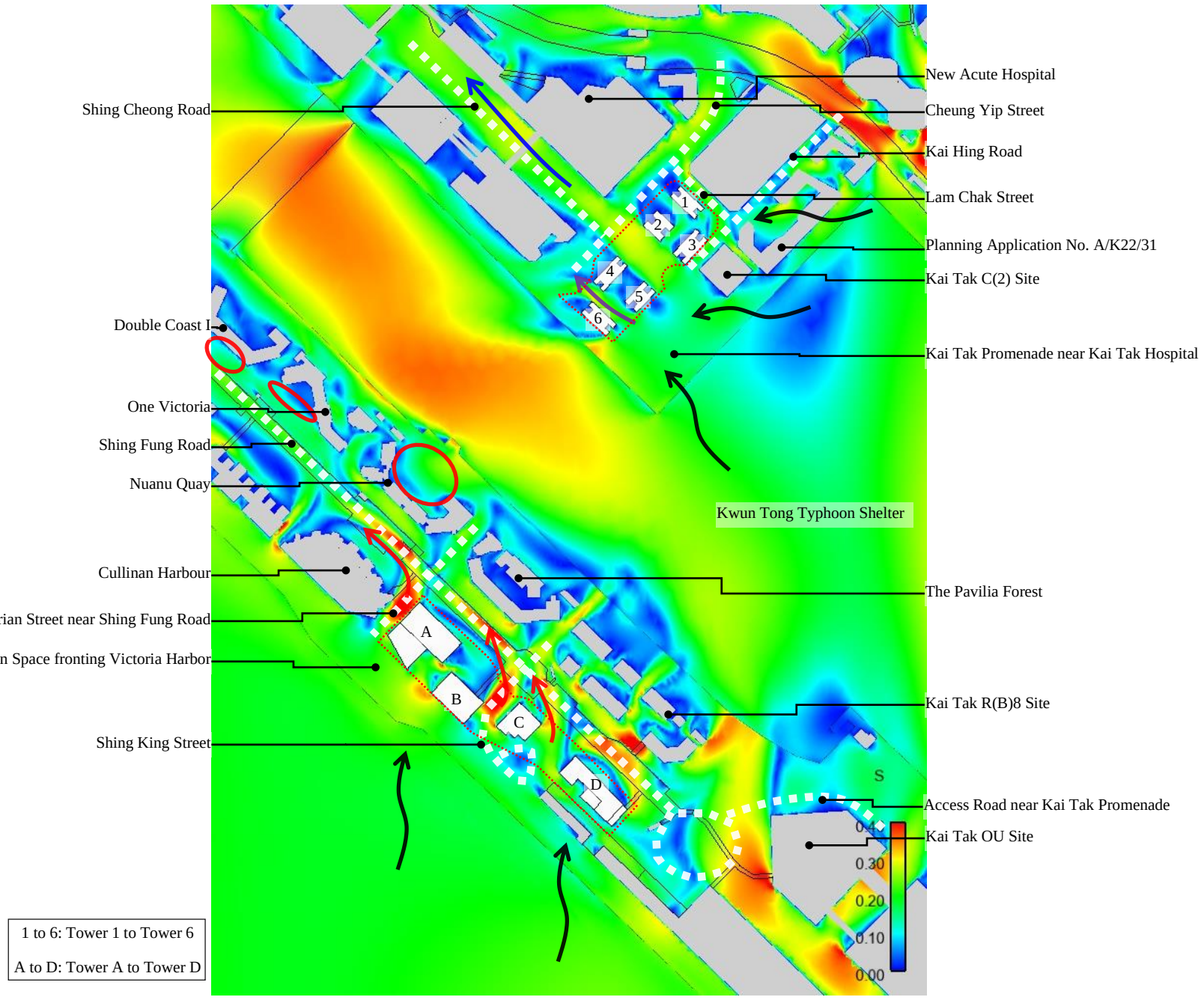


Figure 62 Contour Plot of Baseline Scheme under S Wind

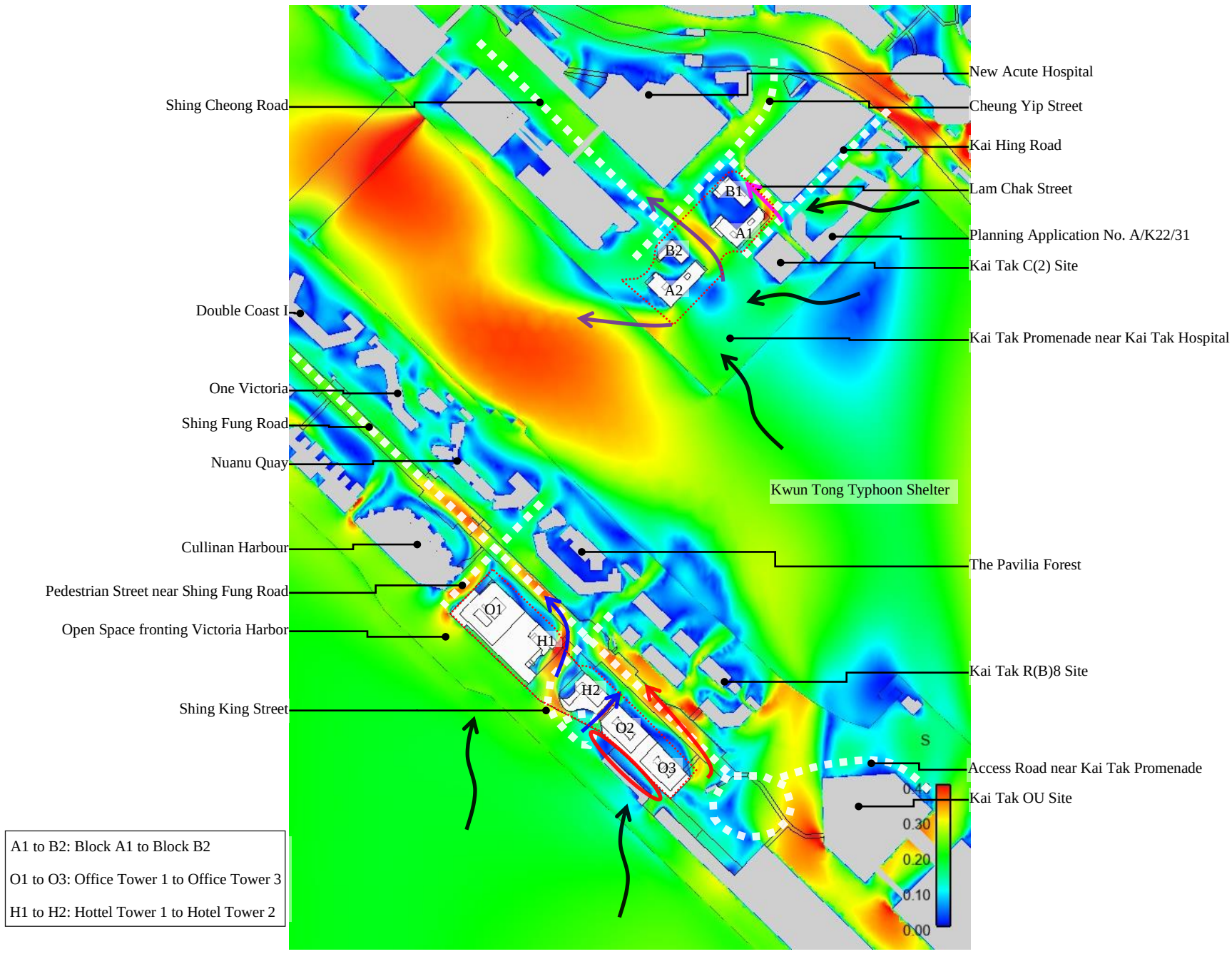


Figure 63 Contour Plot of Proposed Scheme under S Wind

5.2.9 SSW Wind

The overall wind performance of Baseline and Proposed Schemes under SSW winds are presented in Figure 64 and Figure 65 respectively.

Sites 4C4, 4C5 and area shown as 'road' are located at the leeward side of Victoria Harbor, with some wind shield on southeastern side of Site 4C5 by low-rise development in Kai Tak Cruise Terminal. Sites 3E1 and 3E2 are located at the leeward side of high-rise development in former runway with separation of Kwun Tong Typhoon Shelter, wind availability would be relatively limited. For Sites 4C4, 4C5 and area shown as 'road', incoming wind would reach the Application Site from prevailing wind direction. Downwash effect from Site 4C5 provided low-level wind availability on southeastern side of Site 4C5. For Sites 3E1 and 3E2, incoming wind be diverted by Site 4C5, crossing Kwun Tong Typhoon Shelter and recirculate to the Application Site from the northeastern direction via Cheung Yip Street, Kai Hing Road and Kai Tak Promenade near Kai Tak Hospital. The incoming wind direction are illustrated by **Black Arrows** in Figure 64 and Figure 65 respectively.

For Sites 4C4, 4C5 and area shown as 'road', the downwashed wind on the southeastern side of Site 4C5 provides low-level wind availability and continues to travel across the Kwun Tong Typhoon Shelter to supply wind to Sites 3E1 and 3E2. Under Baseline Scheme, this downwashed wind from Site 4C5 freely reaches pedestrian level, resulting in slightly higher VR, illustrated by the **Blue Arrow** in Figure 64. The air stream then travel across Kwun Tong Typhoon Shelter, delivering relatively more low-level wind compared to the Proposed Scheme, ventilating Kai Tak Promenade near Kai Tak Hospital and Sites, 3E1 and 3E2 (**Red Arrow** in Figure 64).

Under the Proposed Scheme, although the larger southwestern frontal area would induce more downwashed wind, Office Towers 2 and 3 are recessed from the podium on the southwestern boundary, causing the downwashed wind to travel on mid-level to reach Kai Tak OU Site, then be diverted by the development at the Kai Tak OU Site to reach pedestrian level, illustrated by **Blue Circle** in Figure 65. The larger frontal area would also divert more mid and high-level incoming wind across the Kwun Tong Typhoon Shelter, reaching The Quayside and Wang Chiu Road (**Red Arrow** in Figure 65), and recirculate to provide wind availability for Sites 3E1 and 3E2.

In addition, incoming wind would penetrate the Application Site to ventilate Shing Fung Road and development along former runway fronting Kwun Tong Typhoon Shelter. Under Baseline Scheme, smaller podium footprint provides better wind permeability, more incoming wind would penetrate the Application Site such as building separation on Site 4C5 and Shing King Street to ventilate the leeward side including Shing Fung Road, Kai Tak R(B)8 Site, The Pavilia Forest and Miami Quay, illustrated by **Purple Arrows** in Figure 64.

Under Proposed Scheme, larger podium would shield the leeward side including NBA, Shing Fung Road, Kai Tak R(B)8 Site, The Pavilia Forest, Miami Quay and Kai Tak Promenade near Runway. However, larger southwestern frontal area and taller building height induces more prominent downwash effect. Downwashed wind would utilize Shing King Street, podium separation between Hotel Tower 2 and Office Tower 2 and Pedestrian Walkway near Shing Fung Road to ventilate the leeward side of Shing Fung Road and alleviate some ventilation impact, illustrated by **Blue Arrows** in Figure 65.

For Sites 3E1 and 3E2, the difference in incoming wind patterns approaching the Application Site results in varied wind patterns around the area. Under the Baseline Scheme, the wind tends to travel from the southeastern side to the northwestern side towards the Application Site. The incoming wind would pass through the building setback between Sites 3E1 and 3E2 to reach Shing Cheong Road (**Orange Arrow** in Figure 64), and Lam Chak Street to reach Cheung Yip Street (**Pink Arrow** in Figure 64)

Under the Proposed Scheme, since the incoming wind crossing the Kwun Tong Typhoon Shelter reaches further north, the wind pattern tends to travel from the northeastern side to the southwestern side towards the Application Site. The incoming wind would travel along Cheung Yip Street to ventilate the Kai Tak Promenade near Kai Tak Hospital (**Orange Arrow** in Figure 65), and Kai Hing Road to ventilate the area between Sites 3E1 and 3E2 (**Pink Arrow** in Figure 65).

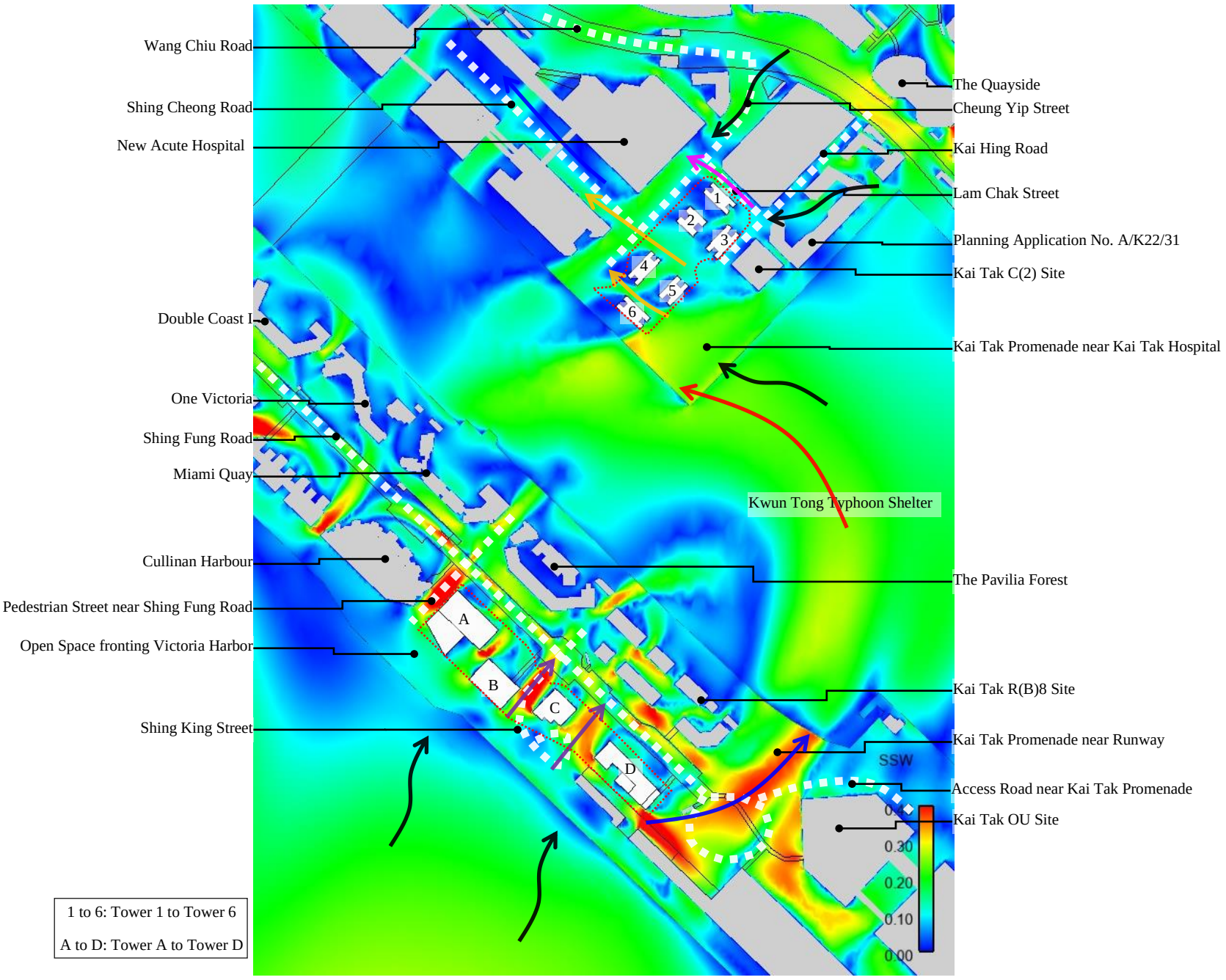


Figure 64 Contour Plot of Baseline Scheme under SSW Wind

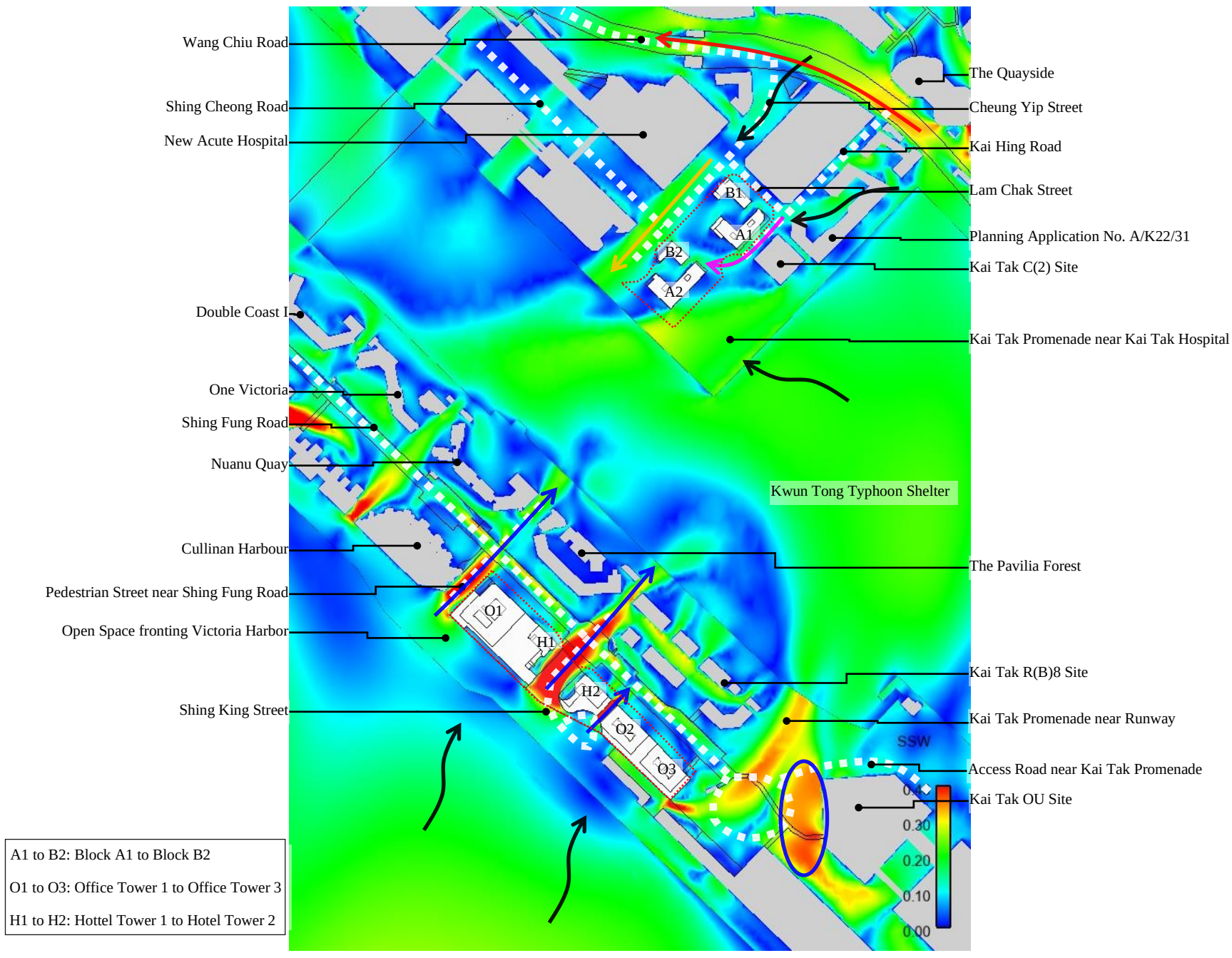


Figure 65 Contour Plot of Proposed Scheme under SSW Wind

5.2.10 SW Wind

The overall wind performance of Baseline and Proposed Schemes under SW winds are presented in Figure 66 and Figure 67 respectively.

Sites 4C4, 4C5 and area shown as 'road' are located at the leeward side of Victoria Harbor, with some wind shield on southeastern side of Site 4C5 by low-rise development in Kai Tak Cruise Terminal. Sites 3E1 and 3E2 are located at the leeward side of high-rise development in former runway with separation of Kwun Tong Typhoon Shelter, wind availability would be relatively limited. For Sites 4C4, 4C5 and area shown as 'road', incoming wind would reach the Application Site from prevailing wind direction. Downwash effect from Site 4C5 provided low-level wind availability on southeastern side of Site 4C5. For Sites 3E1 and 3E2, incoming wind would be diverted by up wind development in former runway to reach the Application Site via Shing Cheong Road from the northwestern side. Additional wind availability would be provided by downwashed wind from KBAA, and Harbourside HQ via Cheung Yip Street and Kai Hing Road. The incoming wind direction are illustrated by **Black Arrows** in Figure 66 and Figure 67 respectively.

For Sites 4C4, 4C5 and area shown as 'road', the downwash wind on the southeastern side of Site 4C5 provides low-level wind availability and continues to travel across the Kwun Tong Typhoon Shelter to supply wind to Sites 3E1 and 3E2. Under Baseline Scheme, this downwashed wind from Site 4C5 freely reaches pedestrian level, resulting in slightly higher VR, illustrated by the **Blue Arrow** in Figure 66. Under the Proposed Scheme, although the larger southwestern frontal area would induce more downwashed wind, Office Towers 2 and 3, recessed from the podium on the southwestern boundary, would cause the downwashed wind to travel on mid-level to reach Kai Tak OU Site, then be diverted by the development at the Kai Tak OU Site to reach pedestrian level, illustrated by **Blue Circle** in Figure 67.

Also, downwashed wind induced by the Application Site would flow against the incoming wind, reducing the ventilation performance one southwestern boundary and Open Space fronting Victoria Harbour. Under Baseline Scheme, downwashed wind from Towers A and B would reach pedestrian level freely, flowing against incoming wind, where slightly lower VR would be observed, illustrated by **Red Circle** in Figure 66. Under Proposed Scheme, due to the concave shaped podium at the roundabout of Shing King Road, incoming wind would be accumulated, together with downwashed wind from Site 4C5 which flow against incoming wind, slightly lower VR would be observed, illustrated by **Red Circle** in Figure 67.

In addition, incoming wind would penetrate the Application Site to ventilate Shing Fung Road and development along former runway fronting Kwun Tong Typhoon Shelter. Under Baseline Scheme, smaller podium footprint provides better wind permeability, more incoming wind would penetrate the Application Site such as building separation on Site 4C5 and Shing King Street to ventilate the leeward side including Shing Fung Road, Kai Tak R(B)8 Site, The Pavaila Forest, Miami Quay, One Victoria and Double Coast I, illustrated by **Purple Arrows** in Figure 66.

Under Proposed Scheme, larger podium would shield the leeward side including NBA, Shing Fung Road, Kai Tak R(B)8 Site, The Pavilia Forest, Miami Quay and Kai Tak Promenade near Runway. However, larger southwestern frontal area and taller building height induces more prominent downwash effect. Downwashed wind would utilize Shing King Street, podium separation between Hotel Tower 2 and Office Tower 2 and Pedestrian Walkway near Shing Fung Road to ventilate the leeward side of Shing Fung Road and alleviate some ventilation impact, illustrated by **Blue Arrows** in Figure 67.

For Sites 3E1 and 3E2, high-level incoming wind skimming over development in former runway would reach the development to the north of Sites 3E1 and 3E2, inducing downwash effect to ventilate nearby locations. Under Baseline Scheme, lower building height of Sites 3E2 and 4C4 allows more high-level incoming wind to skim over, reaching KBAA, and induce more prominent downwash effect. The downwashed wind would travel to ventilate Hoi Bun Road and Cheung Yip Street, illustrated by **Red Arrow** in Figure 66. The air stream traveling along Cheung Yip Street would merge with the air stream from Shing Cheong Road to ventilate the Application Site and Kai Tak Promenade near Kai Tak Hospital, illustrated by **Orange Arrow** in Figure 66.

Under Proposed Scheme, Sites 4C4, 4C5 and area shown as ‘road’ would divert more incoming wind toward Harbourside HQ and The Quayside, inducing more prominent downwash effect. Downwashed wind from Harbourside HQ would travel along Kai Hing Road to ventilate Site 3E1 along southeastern boundary, illustrated by **Red Arrow** in Figure 67. Yet, continuous façade of tower in Sites 3E1 shield the area within the Application Site.

In addition, downwashed wind from The Quayside would ventilate southeastern side of Planning Application No. A/K22/31 and Kwun Tong Typhoon Shelter, illustrated by **Purple Arrow** in Figure 67.

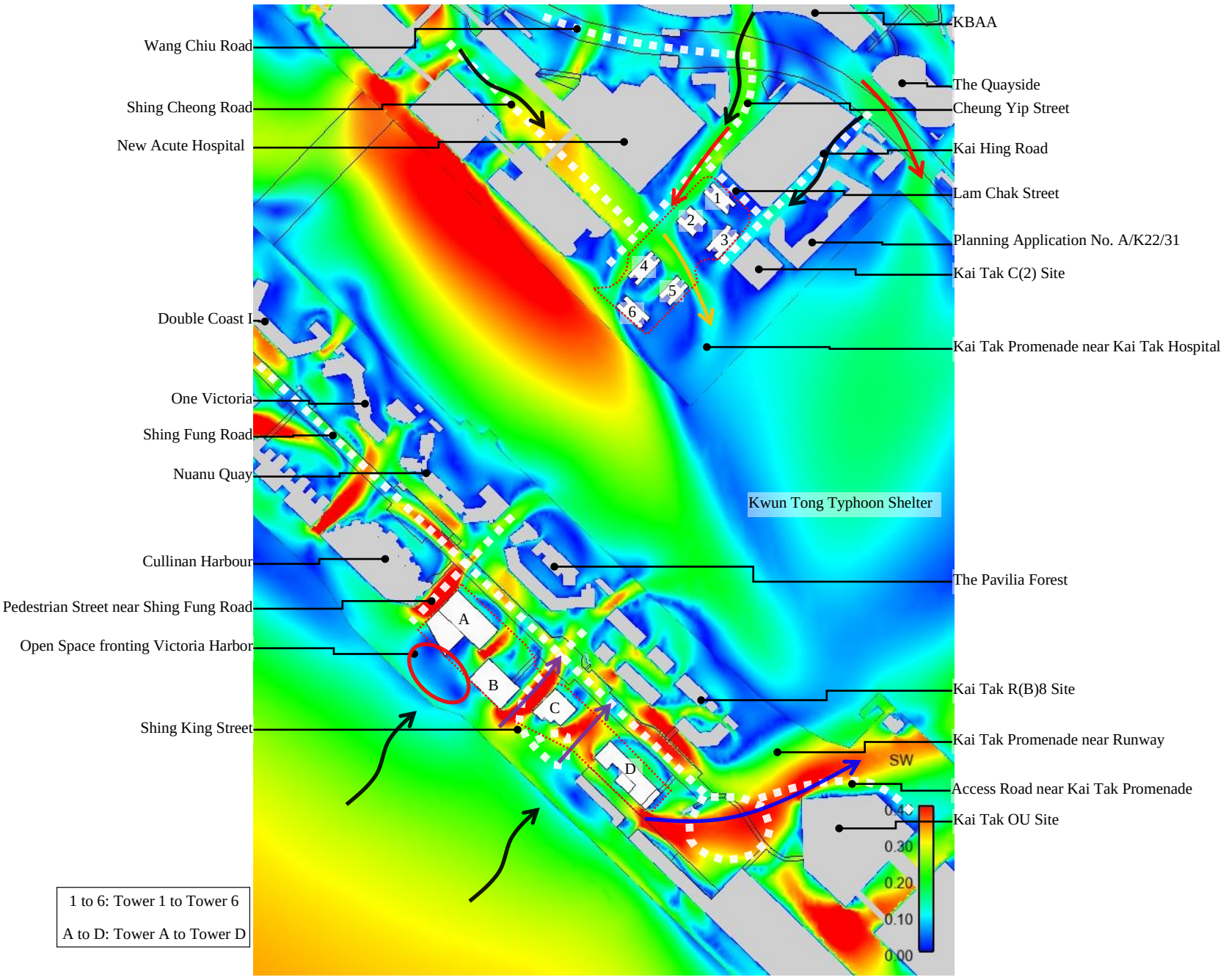


Figure 66 Contour Plot of Baseline Scheme under SW Wind

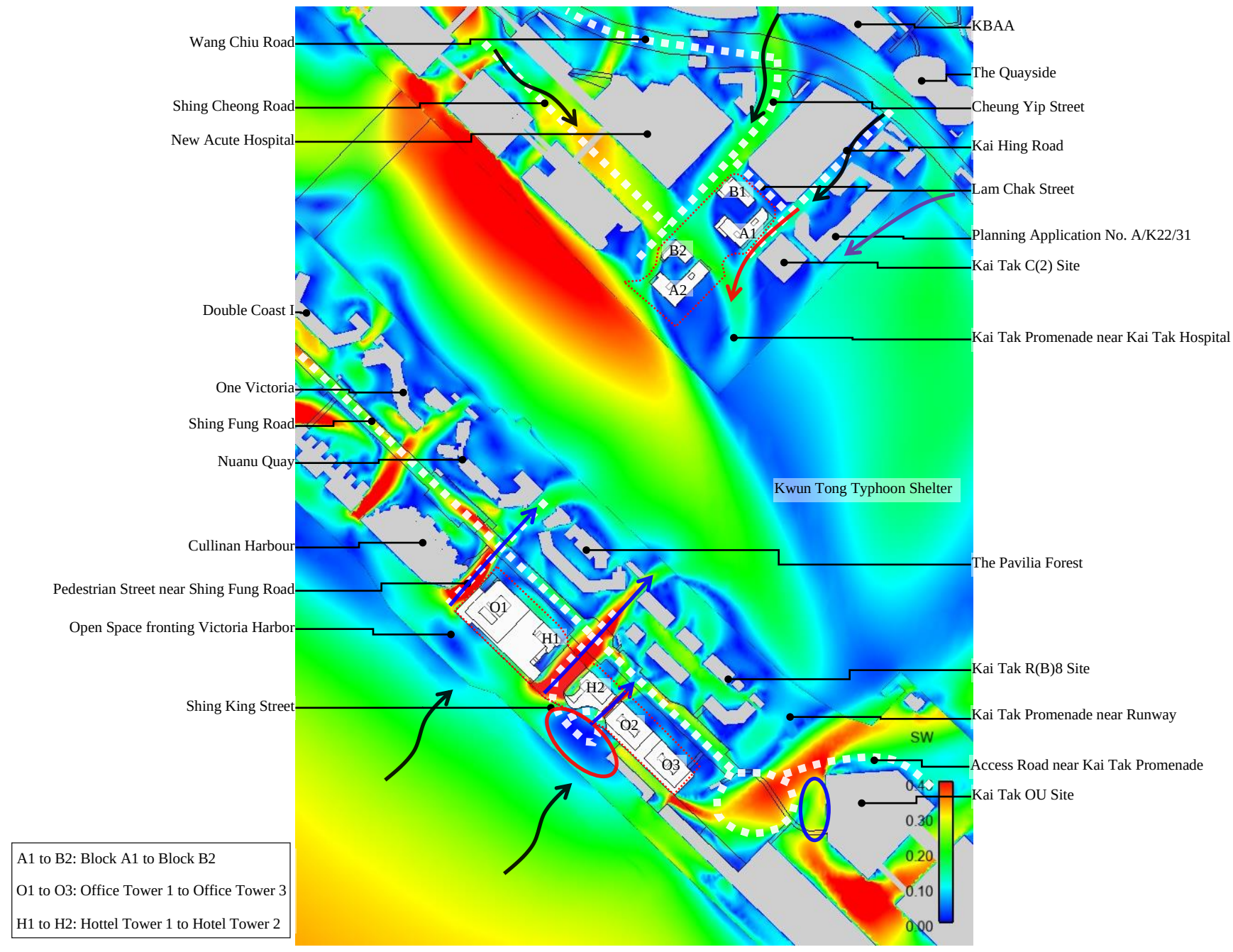


Figure 67 Contour Plot of Proposed Scheme under SW Wind

5.2.11 WSW Wind

The overall wind performance of Baseline and Proposed Schemes under WSW winds are presented in Figure 68 and Figure 69 respectively.

Sites 4C4, 4C5 and area shown as 'road' are located at the leeward side of Victoria Harbor, with some wind shield on southeastern side of Site 4C5 by low-rise development in Kai Tak Cruise Terminal. Sites 3E1 and 3E2 are located at the leeward side of high-rise development in former runway with separation of Kwun Tong Typhoon Shelter. For Sites 4C4, 4C5 and area shown as 'road', incoming wind would reach the Application Site from prevailing wind direction. Downwash effect from Site 4C5 provided low-level wind availability on southeastern side of Site 4C5. For Sites 3E1 and 3E2, high-level incoming wind would be diverted to reach the Application Site from the west. Low and mid-levels wind availability would be provided by downwashed wind from New Acute Hospital, Harbourside HQ, Kai Tak C(2) Site and Sites 3E1 and 3E2. The incoming wind direction are illustrated by **Black Arrows** in Figure 68 and Figure 69 respectively.

For Sites 4C4, 4C5 and area shown as 'road', the downwash wind on the southeastern side of Site 4C5 provides low-level wind availability and continues to travel across the Kwun Tong Typhoon Shelter to supply wind to Sites 3E1 and 3E2. Under Baseline Scheme, this downwashed wind from Site 4C5 freely reaches pedestrian level, resulting in slightly higher VR, illustrated by the **Blue Arrow** in Figure 68. Under the Proposed Scheme, although the larger southwestern frontal area would induce more downwashed wind, Office Towers 2 and 3, recessed from the podium on the southwestern boundary, would cause the downwashed wind to travel on mid-level to reach Kai Tak OU Site, then be diverted by the development at the Kai Tak OU Site to reach pedestrian level, illustrated by **Blue Circle** in Figure 69.

Also, downwashed wind induced by the Application Site would flow against the incoming wind, reducing the ventilation performance one southwestern boundary and Open Space fronting Victoria Harbour. Under Proposed Scheme, due to the concave shaped podium at the roundabout of Shing King Road, incoming wind would be accumulated, together with downwashed wind from Site 4C5 which flow against incoming wind, slightly lower VR would be observed, illustrated by **Red Circle** in Figure 69.

In addition, incoming wind would penetrate the Application Site to ventilate Shing Fung Road and development along former runway fronting Kwun Tong Typhoon Shelter. Under Baseline Scheme, smaller podium footprint provides better wind permeability, more incoming wind would penetrate the Application Site such as building separation on Site 4C5 and Shing King Street to ventilate the leeward side including Shing Fung Road, Kai Tak R(B)8 Site, The Pavaila Forest, Miami Quay, One Victoria and Double Coast I, illustrated by **Purple Arrows** in Figure 68.

Under Proposed Scheme, larger podium would shield the leeward side including NBA, Shing Fung Road, Kai Tak R(B)8 Site, The Pavilia Forest, Miami Quay and Kai Tak Promenade near Runway. However, larger southwestern frontal area and taller building height induces more prominent downwash effect. Downwashed wind would utilize Shing King Street, podium separation between Hotel Tower 2 and Office Tower 2 and Pedestrian Walkway near Shing Fung Road to ventilate the leeward side of Shing Fung Road and alleviate some ventilation impact, illustrated by **Blue Arrows** in Figure 69.

Also, podium setback of Site 4C4 at northern corner allows more incoming wind from Pedestrian Walkway near Shing Fung Road to ventilate Shing Fung Road, illustrated by **Blue Circle** in Figure 69.

For Sites 3E1 and 3E2, donwashed wind induced from the Application Site and Kai Tak C(2) Site would ventilate the Application Site, Kai Tai Promenade near Kai Tak Hospital, Cheung Yip Street and Kai Hing Road. Under Baseline Scheme, building height profile between Site 3E1 and 3E2, and between Site 3E1 and Kai Tak C(2) Site, would induce more prominent downwash effect. Downwashed wind would ventilate the Application Site, Cheung Yip Street, Kai Hing Road and Kai Tak Promenade near Kai Tai Hospital, illustrated by **Pink Arrows** in Figure 68. The air stream traveling on Cheung Yip Street would further ventilate KBA and The Quayside in the far leeward side.

Under Proposed Scheme, larger southwestern frontal area and taller building height of Site 3E2 would induce more prominent downwash effect. Downwashed wind to ventilate Kai Tak Promenade near Kai Tak Hospital,

illustrated by **Purple Arrow** in Figure 69. The air stream would push the incoming wind traveling along Kwun Tong Typhoon Shelter towards Kai Tak Promenade near Runway, illustrated by **White Arrows** in Figure 69.

Also, building separation of Block A1 and B1 is aligned with high-level incoming wind direction, incoming wind would enter the Application Site and exit from northeastern boundary, providing more high-level wind availability toward The Quayside. More prominent downwashed wind would be induced to ventilate Kai Hing Road and Planning Application No. A/K22/31, illustrated by **Pink Arrows** in Figure 69.

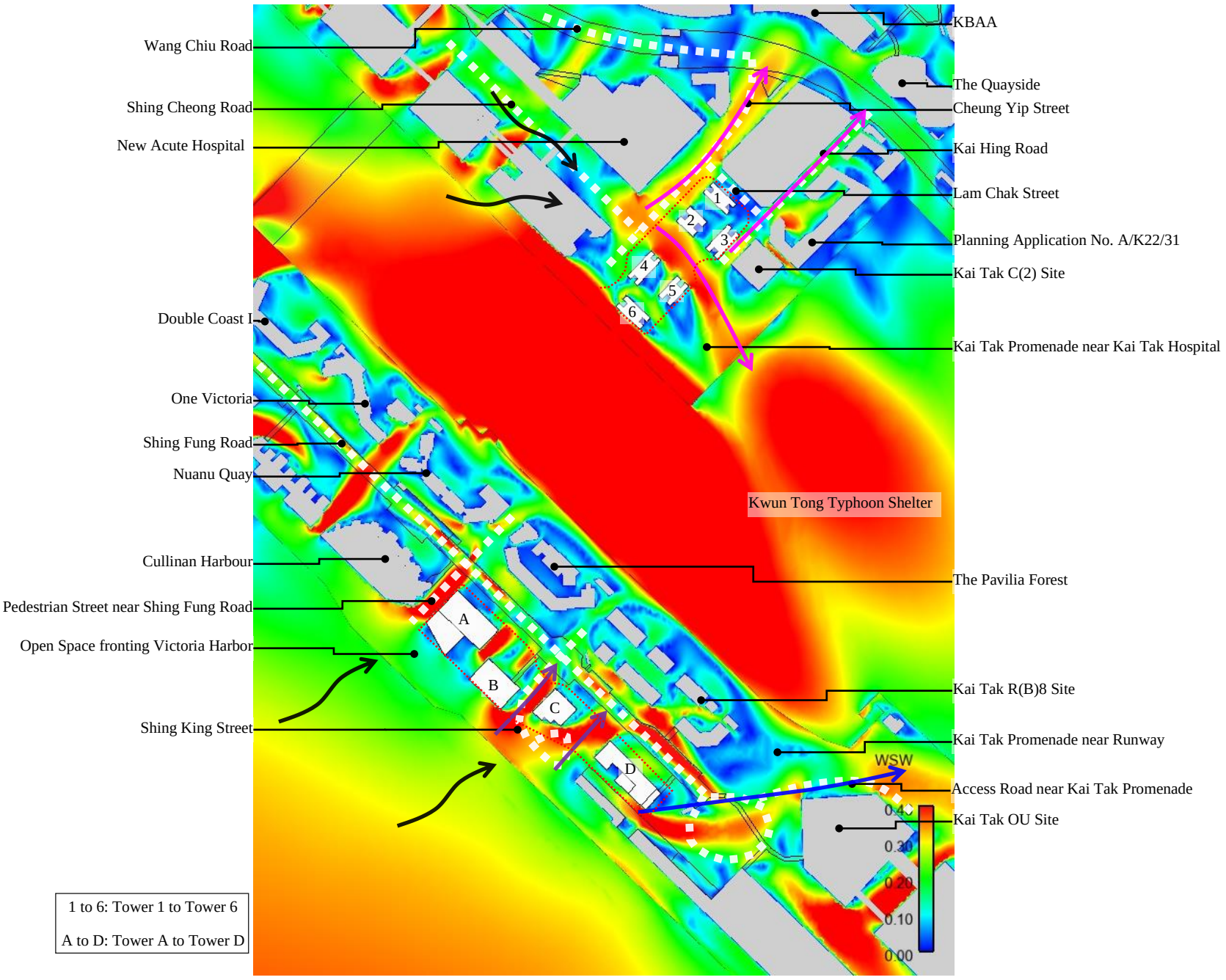


Figure 68 Contour Plot of Baseline Scheme under WSW Wind

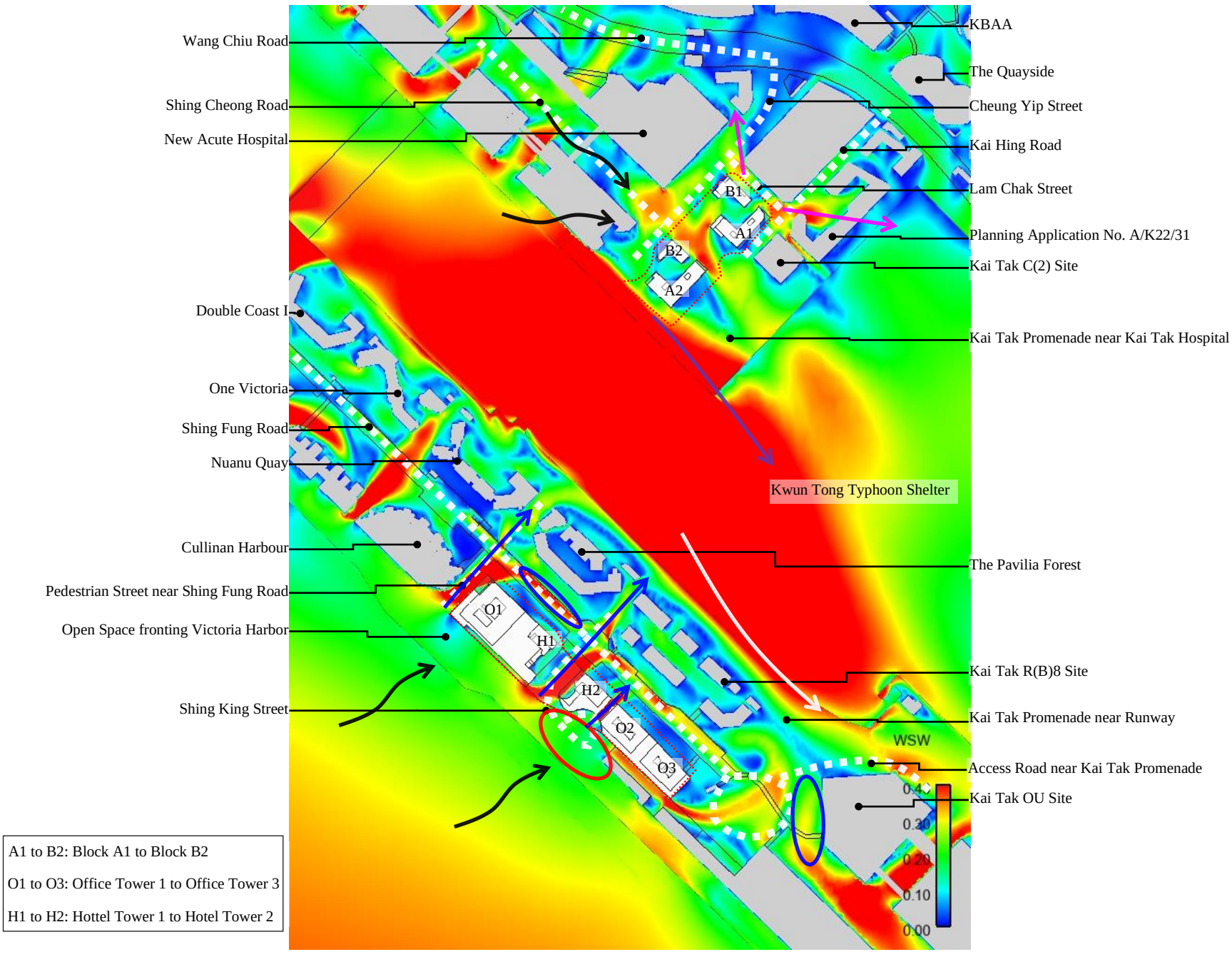


Figure 69 Contour Plot of Proposed Scheme under WSW Wind

5.3 Focus Areas

The average Velocity Ratio of all test points are determined and extracted. The results of all test points are presented in Appendix E. A total of 30 focus areas within Assessment Area, 6 focus areas within Baseline Scheme Site Boundary and 4 focus areas within Proposed Scheme Site Boundary are proposed. The associated test points and averaged VR for focus areas are tabulated in Table 9 and Table 10 respectively. The location of each focus area is shown in Figure 70 to Figure 73. Higher VR has been highlighted in bold for reference.

Table 9 Focus Areas and Corresponding Test Points

	Focus Areas	Test Points
1	Wang Chiu Road	O1 – O6
2	Cheung Yip Street	O6, O23 – O33
3	Shing Cheong Road	O31, O34 – O39
4	Kai Tak Promenade near Kai Tak Hospital	O40 – O65
5	Kai Tak C(2) Site	O205 – O208
6	Lam Chak Street	O17, O20 – O22, O27
7	Kai Hing Road	O11 – O19, O62
8	Planning Application No. A/K22/31	O209 – O217
9	Hoi Bun Road	O6 – O10
10	Kai Tak Promenade near Runway	O66 – O92
11	Miami Quay	O179 – O185
12	Cullinan Harbour	O174 – O178
13	Open Space fronting Victoria Harbour	S1 – S15
14	Pedestrian Street near Shing Fung Road	O135, O148 – O153
15	Open Space near Shing Fung Road	O111 – O114
16	Access Road near Kai Tak Cruise Terminal	O102 – O104
17	Kai Tak Cruise Terminal Park	O105 – O110
18	Kai Tak OU Site	O98 – O101
19	Access Road near Kai Tak Promenade	O93 – O97
20	Shing Fung Road	O115 – O141
21	Kai Tak R(B)8 Site	O193 – O204
22	Shing King Street	O142 – O147, S32-S33
23	The Pavilia Forest	O186 – O192
24	Kai Tak Sky Garden	O154 – O173
25	Building Setback on Site 3E1	S16 – S18
26	Building Setback on Site 3E2	S19 – S21
27	Building Separation on Site 3E2 (Baseline Only)	S38 – S40 (Baseline Only)
28	NBA on Site 4C4	S22 – S25
29	NBA on Site 4C5	S26 – S31
30	Building Separation on Site 4C5 (Baseline Only)	S27 – S28, S34 – S37 (Baseline Only)

Table 10 Focus Areas and Corresponding VR

	Focus Areas	Annual Average VR		Summer Average VR	
		Baseline	Proposed	Baseline	Proposed
1	Wang Chiu Road	0.19	0.19	0.16	0.16
2	Cheung Yip Street	0.18	0.18	**0.19**	0.18
3	Shing Cheong Road	**0.14**	0.13	**0.21**	0.18
4	Kai Tak Promenade near Kai Tak Hospital	**0.20**	0.19	0.21	0.21
5	Kai Tak C(2) Site	0.18	0.18	**0.17**	0.16
6	Lam Chak Street	**0.17**	0.16	0.16	**0.18**
7	Kai Hing Road	0.15	0.15	0.16	0.16
8	Planning Application No. A/.K22/31	0.14	0.14	0.14	0.14
9	Hoi Bun Road	0.19	**0.20**	0.21	0.21
10	Kai Tak Promenade near Runway	0.21	0.21	0.16	0.16
11	Miami Quay	**0.14**	0.13	**0.16**	0.12
12	Cullinan Harbour	0.17	**0.25**	0.12	**0.16**
13	Open Space fronting Victoria Harbour	**0.17**	0.16	0.20	0.20
14	Pedestrian Street near Shing Fung Road	0.22	**0.23**	0.25	0.25
15	Open Space near Shing Fung Road	**0.23**	0.20	**0.24**	0.19
16	Access Road near Kai Tak Cruise Terminal	0.26	0.26	0.24	**0.25**
17	Kai Tak Cruise Terminal Park	0.21	0.21	0.24	0.24
18	Kai Tak OU Site	0.23	0.23	0.24	**0.26**
19	Access Road near Kai Tak Promenade	0.30	0.30	**0.25**	0.24
20	Shing Fung Road	0.24	**0.25**	**0.24**	0.23
21	Kai Tak R(B)8 Site	**0.20**	0.18	**0.22**	0.17
22	Shing King Street	0.19	0.19	0.24	0.24
23	The Pavilia Forest	**0.16**	0.15	**0.16**	0.13
24	Kai Tak Sky Garden	0.20	**0.21**	0.20	**0.21**
25	Building Setback on Site 3E1	0.14	**0.16**	0.21	**0.22**
26	Building Setback on Site 3E2	0.17	**0.18**	**0.25**	0.24
27	Building Separation on Site 3E2 (Baseline Only)	0.40	-	0.40	-
28	NBA on Site 4C4	0.22	**0.29**	0.18	0.18
29	NBA on Site 4C5	0.27	**0.28**	**0.21**	0.16
30	Building Separation on Site 4C5 (Baseline Only)	0.24	-	0.26	-

Annual Condition

Annual prevailing wind are mostly from E quadrant.

Under both Scheme, the difference in ventilation pattern from Sites 4C4 and 4C influenced incoming wind crossing Kwun Tong Typhoon Shelter, and further impact the ventilation pattern around Sites 3E1 and 3E2, resulting in slightly higher VR along **#3 Shing Cheong Road** and **#6 Lam Chak Street** under Baseline Scheme, and slightly higher VR along **#9 Hoi Bun Road** under Proposed Scheme, as discussed in Section 5.2.9.

Under Baseline Scheme, incoming wind would penetrate building separation in Site 3E2 to ventilate **#4 Kai Tak Promenade near Kai Tak Hospital**, as discussed in Sections 5.1 and 5.2.3 to 5.2.6.

Under Proposed Scheme, larger podium structure of Sites 4C4, 4C5 and area shown as 'road' generally reduced the wind permeability, shielding the leeward side of **#11 Miami Quay**, **#13 Open Space fronting Victoria Harbour**, **#15 Open Space near Shing Fung Road**, **#21 Kai Tak R(B)8 Site** and **# 23 The Pavilia Forest** as discussed in Section 5.2.9 and 5.2.10.

Under Proposed Scheme, incoming wind would be restricted by larger podium of Sites 4C4, 4C5 and area shown as 'road' to ventilate along **#20 Shing Fung Road** and **#24 Kai Tak Sky Garden**, reaching **#12 Cullinan Harbour**, **#14 Pedestrian Street near Shing Fung Road**, **#28 NBA on Site 4C4** and **#29 NBA on Site 4C5**, as discussed in Sections 5.1 and 5.2.4 to 5.2.6.

Under Proposed Scheme, downwashed wind from Site 4C5 would not reach pedestrian level freely due to the recessed Office Tower 3 from podium on southwestern boundary, the downashed wind would be diverted towards Kai Tak OU site and reaching pedestrian level, ventilating **#16 Access Road near Kai Tak Cruise Terminal**, as discussed in Section 5.2.9 and 5.2.10.

Under Proposed Scheme, larger frontal area of Block A2 in Site 3E2 would divert more incoming wind to ventilate the **#25 Building Setback on Site 3E1** and **#26 Building Setback on Site 3E2** as discussed in Sections 5.1 and 5.2.3 to 5.2.6.

Summer Condition

Summer Prevailing wind are mostly from SW quadrant.

Under Baseline Scheme, building height profile between Sites 3E1 and 3E2 allows more prominent downashed wind on Site 3E1 which ventilate **#2 Cheung Yip Street**, **#26 Building Setback on Site 3E2** and **#5 Kai Tak C(2) Site**, as discussed in Section 5.2.11.

Under both Scheme, the difference in ventilation pattern from Sites 4C4 and 4C influenced incoming wind crossing Kwun Tong Typhoon Shelter, and further impact the ventilation pattern around Sites 3E1 and 3E2, resulting in slightly higher VR along **#3 Shing Cheong Road** under Baseline Scheme, as discussed in Section 5.2.9.

Under Proposed Scheme, building setback of Block B1 in Site 3E1 allows more incoming wind to ventilate **#6 Lam Chak Street**, as discussed in Sections 5.2.4 to 5.2.6. And larger frontal area with taller building height of Block A2 in Site 3E2 divert more wind to ventilate the **#25 Building Setback on Site 3E1**, as discussed in Section 5.1 and 5.2.4 to 5.2.6.

Under Proposed Scheme, larger podium would shield the leeward side including **#11 Miami Quay**, **#15 Open Space near Shing Fung Road**, **#19 Access Road near Kai Tak Promenade**, **#20 Shing Fung Road**, **#21 Kai Tak R(B)8 Site**, **#23 The Pavilia Forest** and **#29 NBA on Site 4C5**. Yet, downwashed wind from Office Tower 3 in Site 4C5 would reach the Kai Tak OU Site and ventilate the pedestrian level including **#16 Access Road near Kai Tak Cruise Terminal** and **#18 Kai Tak OU Site**, as discussed in Sections 5.2 and 5.2.9 to 5.2.11.

Under Proposed Scheme, larger podium restrict the incoming wind from Access Road near Kai Tak promenade along Shing Fung Road and ventilate the leeward side including **#12 Cullinan Harbour and #24 Kai Tak Sky Garden**, as discussed in Sections 5.2.4 to 5.2.6.

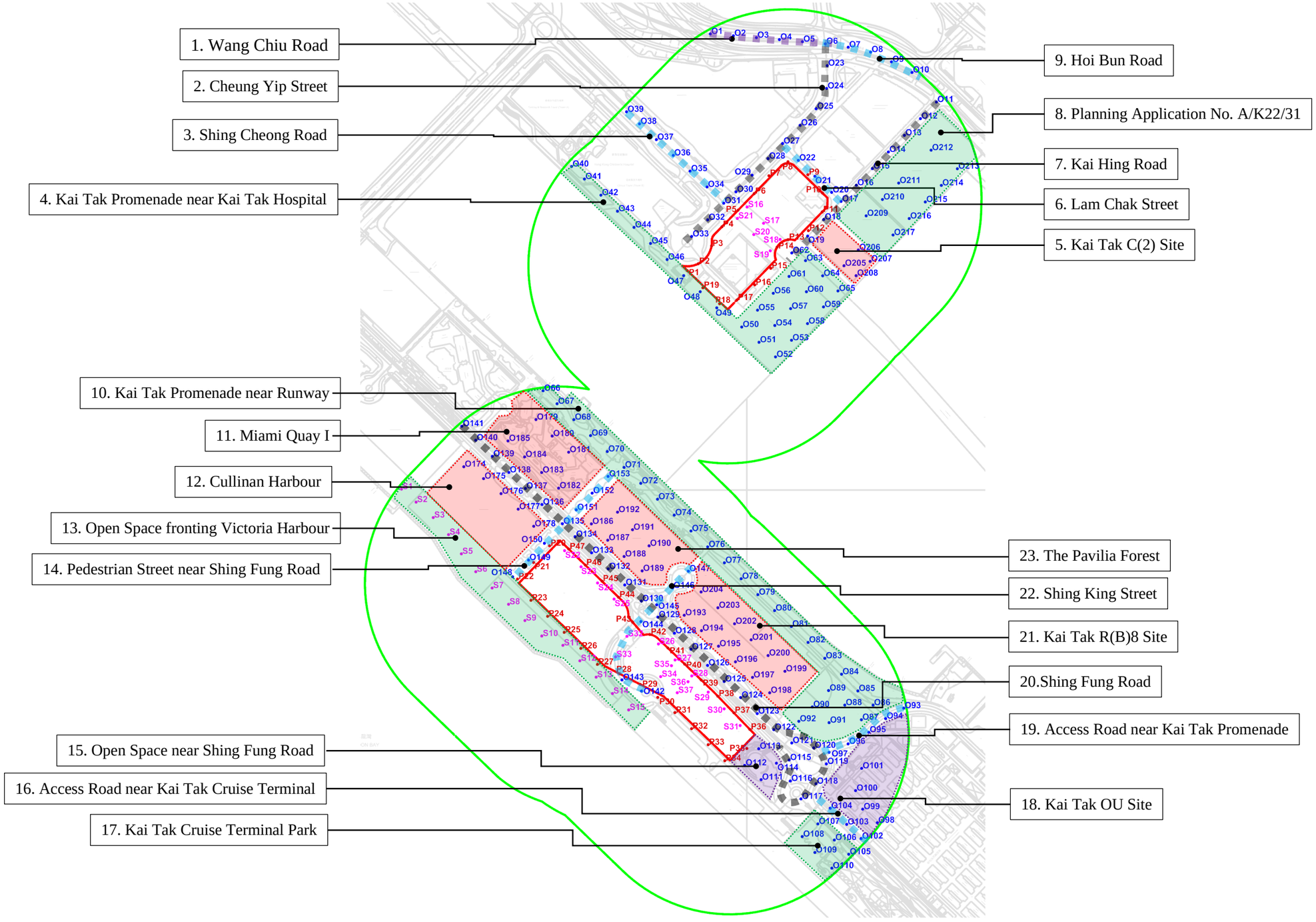


Figure 70 Location of Focus Areas 1 of 2

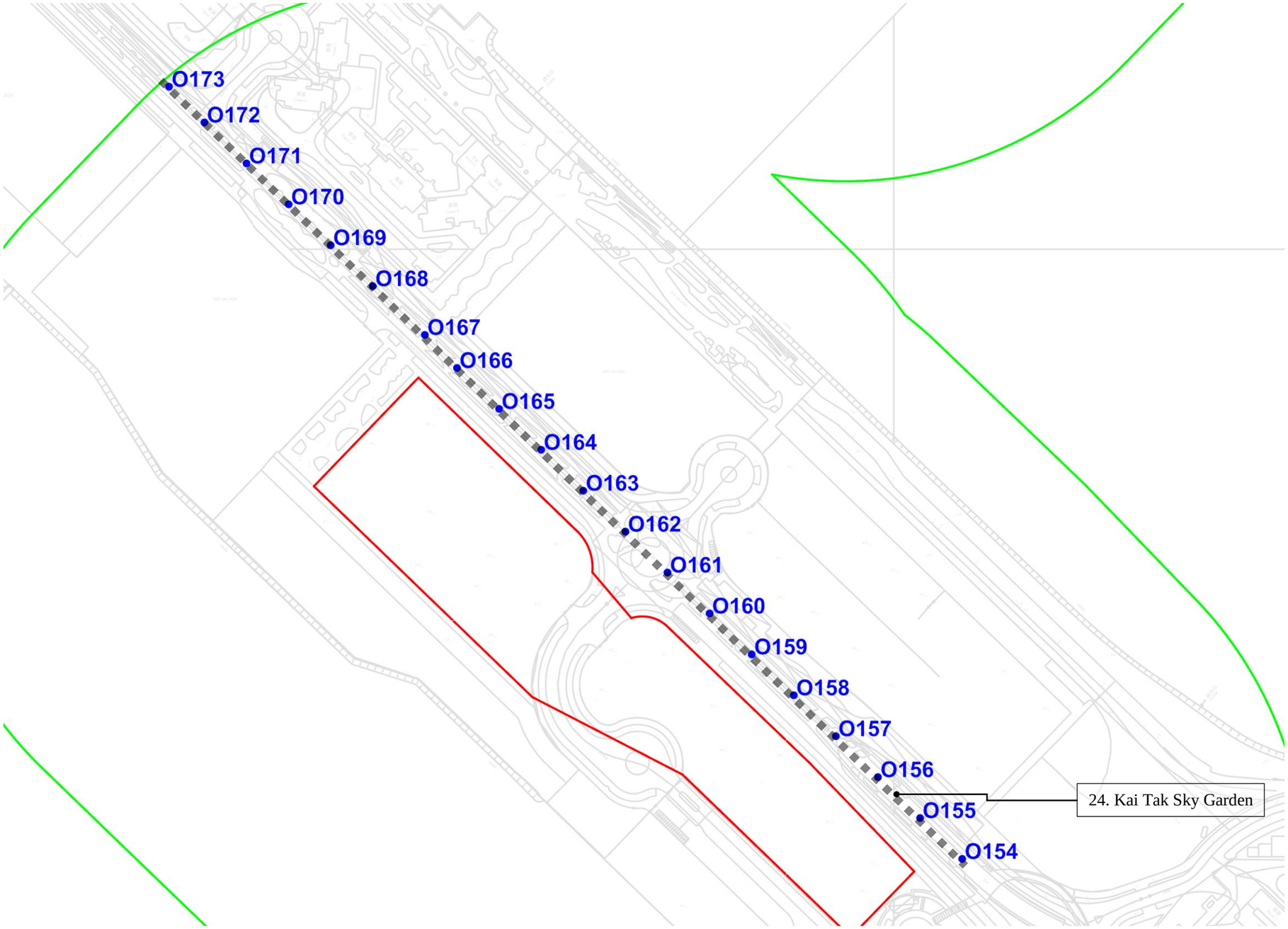
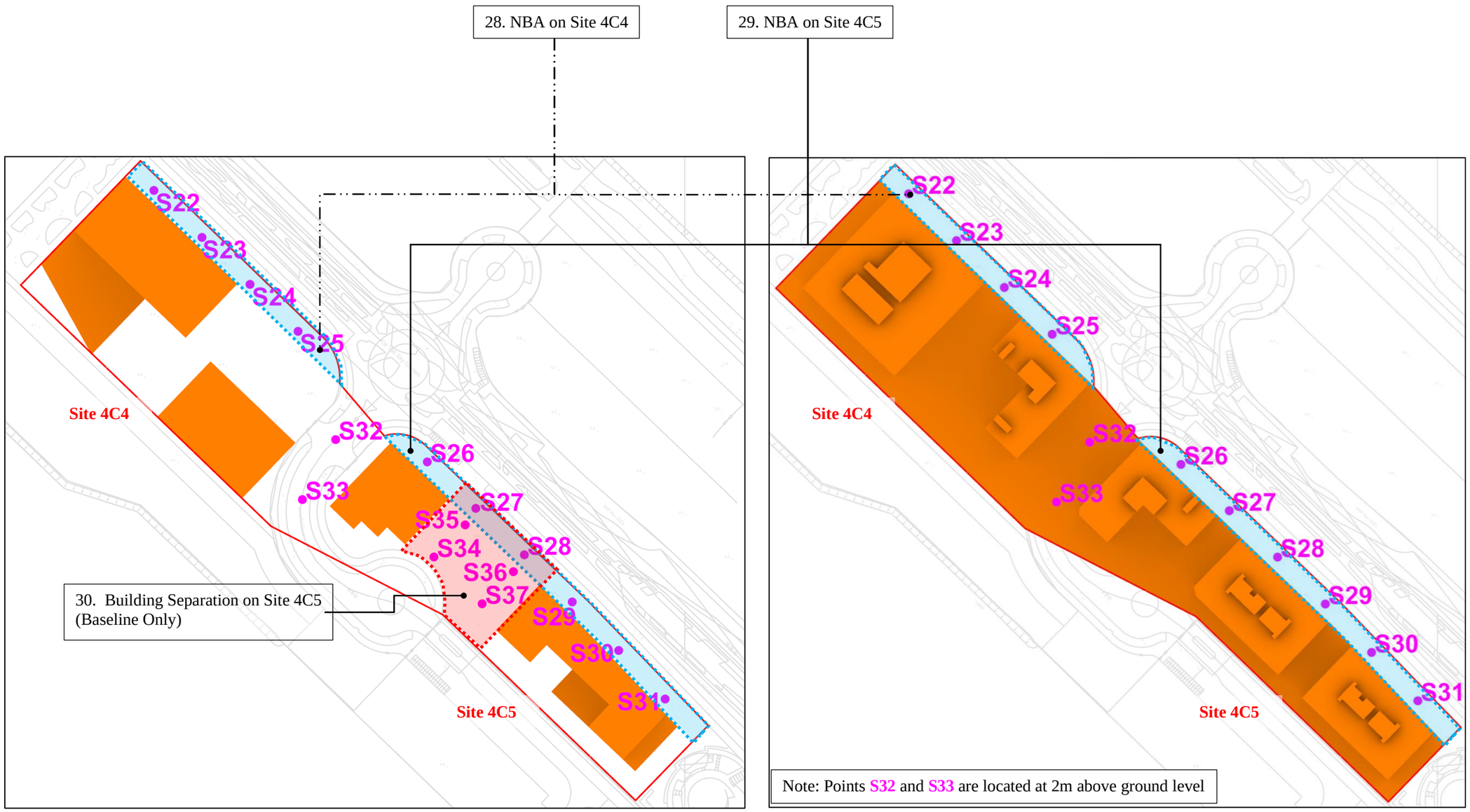


Figure 71 Location of Focus Areas 2 of 2 – Located at Kai Tak Sky Garden

Baseline Scheme

Proposed Scheme

Figure 72 Location of Focus Areas within Sites 3E1 and 3E2



Baseline Scheme

Proposed Scheme

Figure 73 Location of Focus Areas within Sites 4C4, 4C5 and area shown as 'road'

6. Conclusion

6.1 Overview

An Air Ventilation Assessment was conducted to assess the ventilation performance of Baseline Scheme and Proposed Scheme in accordance to the AVA Technical Circular [1]. Total 4 Sites, including Sites 3E1, 3E2, 4C4, 4C5 and area shown as 'road', were considered. Quantitative analysis in form of Air Ventilation Assessment – Initial Study (AVA-IS) was conducted.

Baseline and Proposed Schemes were assessed using Computational Fluid Dynamics (CFD) techniques. A series of CFD simulation using Realizable k-ε turbulence model were performed under annual and summer wind conditions with reference to the AVA Technical Circular [1]. For annual wind condition, NNE, NE, ENE, E, ESE, SE, SSW and SW were selected which gives total wind frequency of 78.2% over a year while E, ESE, SE, SSE, S, SSW, SW and WSW were selected for summer condition, which gives total wind frequency of 81.0%.

Regarding the Smart and Green Mass Transit System in Kai Tak (KTGTS) as announced in the 2023 Policy Address, there would be an elevated corridor (in the form of viaduct/track system) design running adjacent to the Kai Tak Sky Garden. One of the stations is located within the Surrounding Area of the AVA study near Pano Harbour.

Given that the elevated corridor is not fully enclosed, and the station is located at the edge of the Surrounding Area, it is anticipated to have insignificant obstruction to the incoming wind. The prevailing wind conditions are primarily influenced by the high-rise developments along the waterfront of Victoria Harbour and Kwun Tong Typhoon Shelter.

Consequently, the addition of the elevated corridor and station are expected to have an insignificant effect on the ventilation performance and patterns in the area. Therefore, the analysis and conclusions in the AVA-IS remains valid despite the introduction of these new structures.

6.2 Results

The results showed that:

- Under Annual Condition, Proposed Scheme achieved slightly higher SVR (0.19 vs 0.20) indicating the ventilation performance of Proposed Scheme is slightly enhanced along the Application Site boundary, mainly due to the more prominent downwash effect; and similar LVR (0.20 vs 0.20), indicating the similar ventilation performance within Assessment Area.
- Under Summer Condition, Proposed Scheme achieved similar SVR (0.19 vs 0.19), indicating the similar ventilation performance along Application Site boundary; and slightly lower LVR (0.20 vs 0.19) indicating the slightly reduced ventilation performance within Assessment Area.
- For Sites 3E1 and 3E2, building setback of both site provide better wind permeability, allowing incoming wind from Kai Tak Promenade near Kai Tak Hospital to penetrate and ventilate the leeward side. Building setback of Block A1 and B1 from Application Site boundary also allows incoming wind to ventilate along the Lam Chak Street and Kai Hing Road. However, the continuous façade of both sites would create self-shading for the area between the building blocks.
- For Sites 4C4, 4C5 and area shown as 'road', larger podium would shield the leeward side. However, it would also confine the wind to travel along one side of the Application Site, such as along Shing Fung Road, enhancing the ventilation performance. In addition, more prominent downwashed wind would alleviate some ventilation impact from the larger podium.

7. Reference

[1] Annex A of Technical Circular No. 1/06 issued by the Housing, Planning and Lands Bureau pertaining specifically to Air Ventilation Assessments, 19th July, 2006

(https://www.devb.gov.hk/filemanager/en/content_679/hplb-etwb-tc-01-06.pdf)

[2] Planning Department RAMS Data

(http://www.pland.gov.hk/pland_en/info_serv/site_wind/site_wind/)

Appendix A Layout Plans of Baseline and Proposed Schemes

Figure A 1 Layout of Sites 3E1 and 3E2 of Baseline Scheme

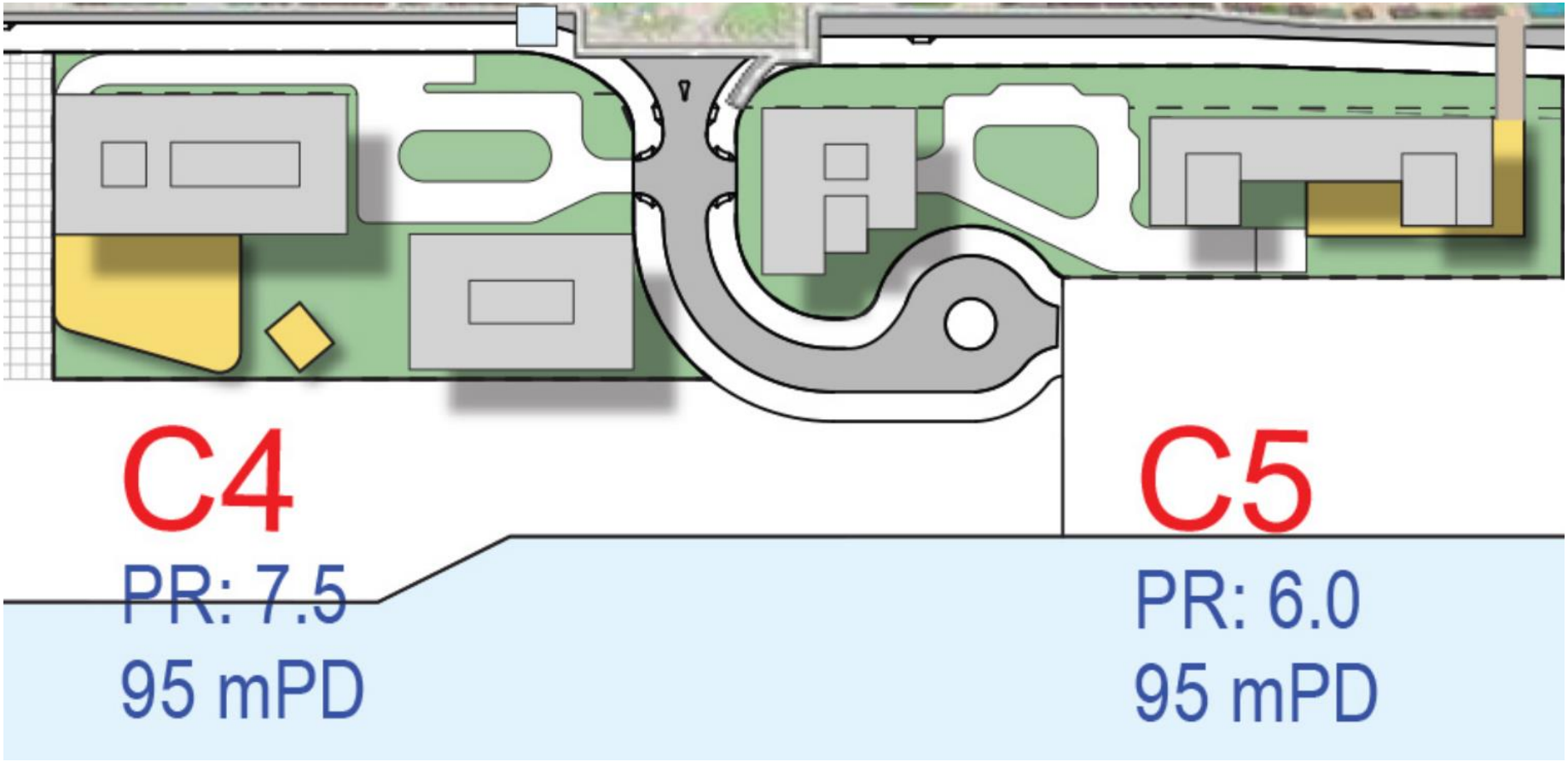
* Approved Kai Tak Outline Zoning Plan No. S/K22/8 Landscape Plan

Landscape Plan

Appendix A Layout Plans of Baseline and Proposed Schemes

Figure A 2 Layout of Sites 4C4 and 4C5 of Baseline Scheme

* Baseline Scheme of MPC Paper 9/21

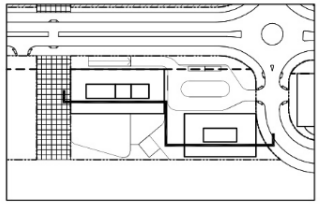


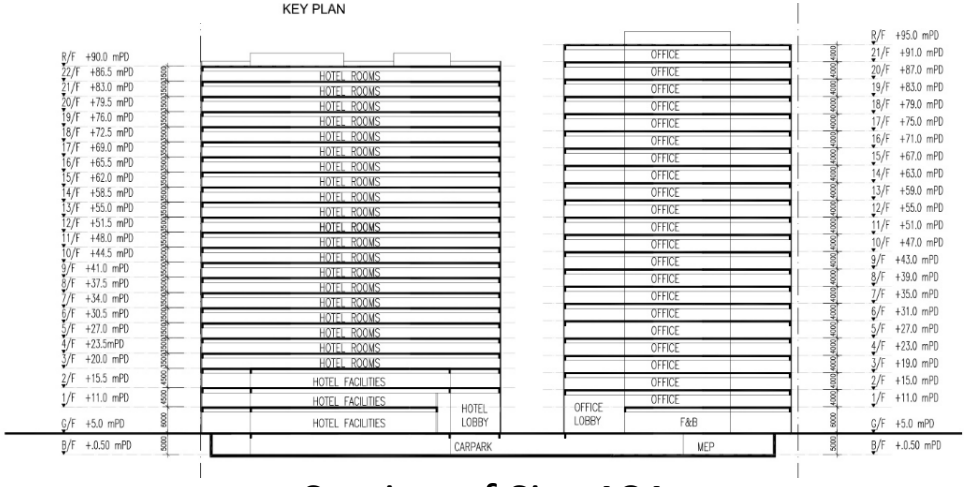
Layout Plan

Appendix A Layout Plans of Baseline and Proposed Schemes

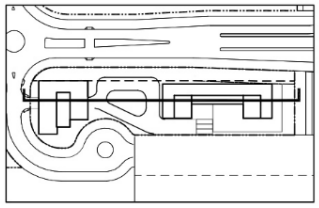
Figure A 2 Layout of Sites 4C4 and 4C5 of Baseline Scheme

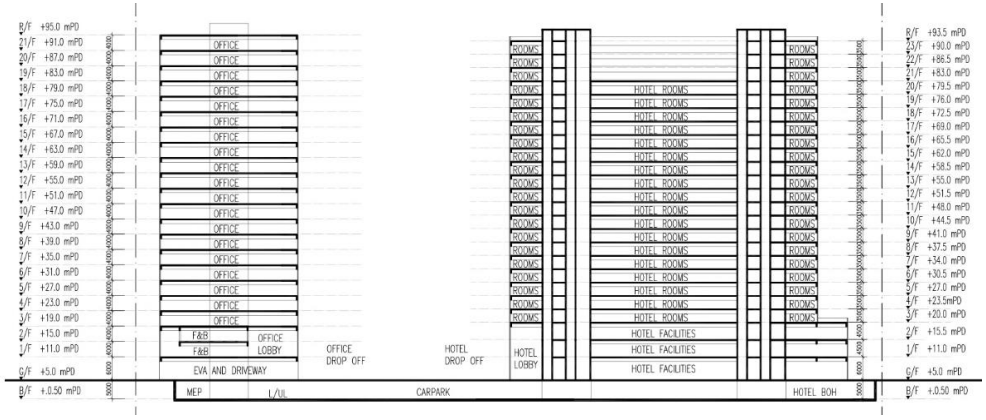
* Baseline Scheme of MPC Paper 9/21





Section of Site 4C4

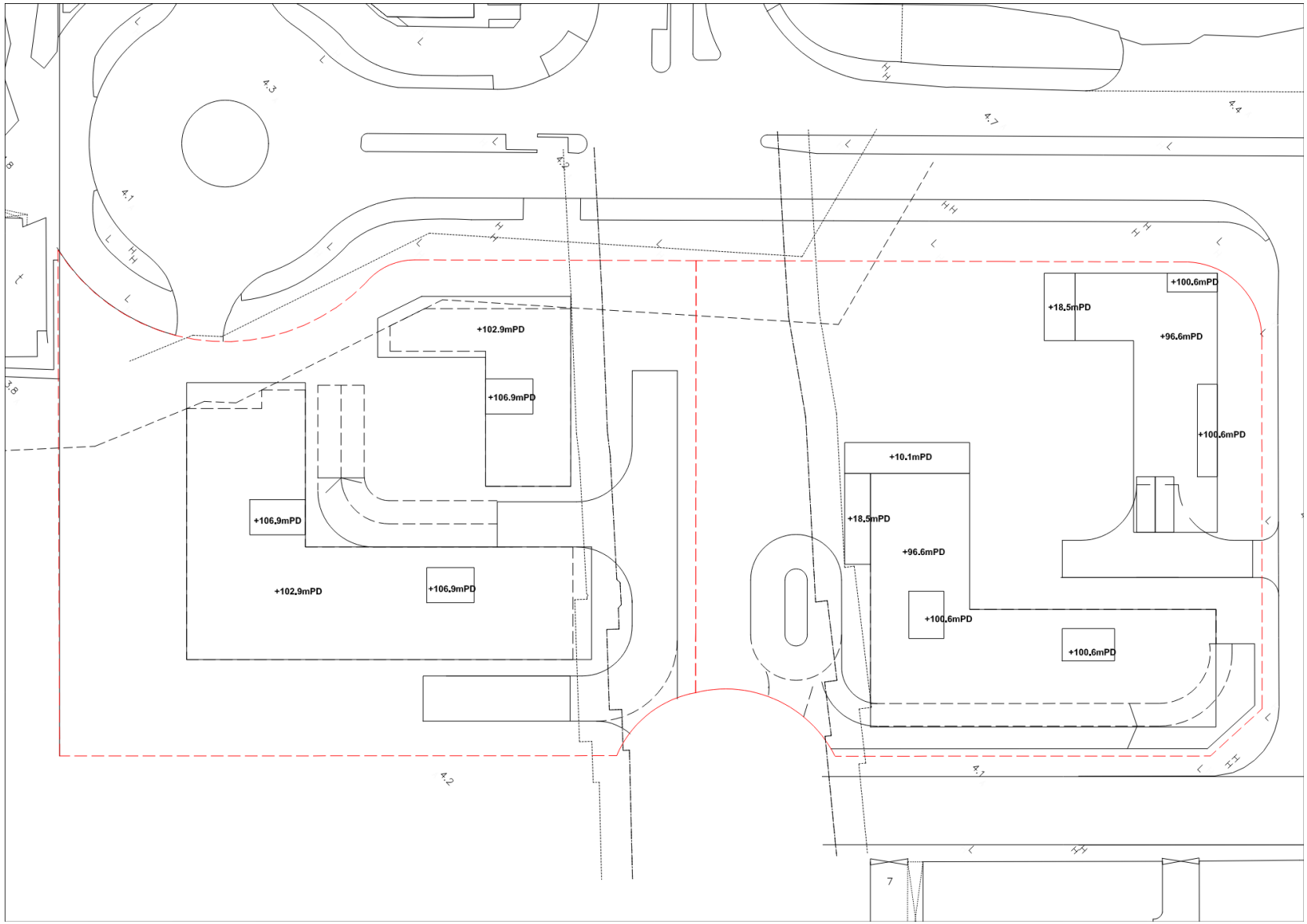




Section of Site 4C5

Appendix A Layout Plans of Baseline and Proposed Schemes

Figure A 3 Layout of Sites 3E1 and 3E2 of Proposed Scheme



Layout Plan

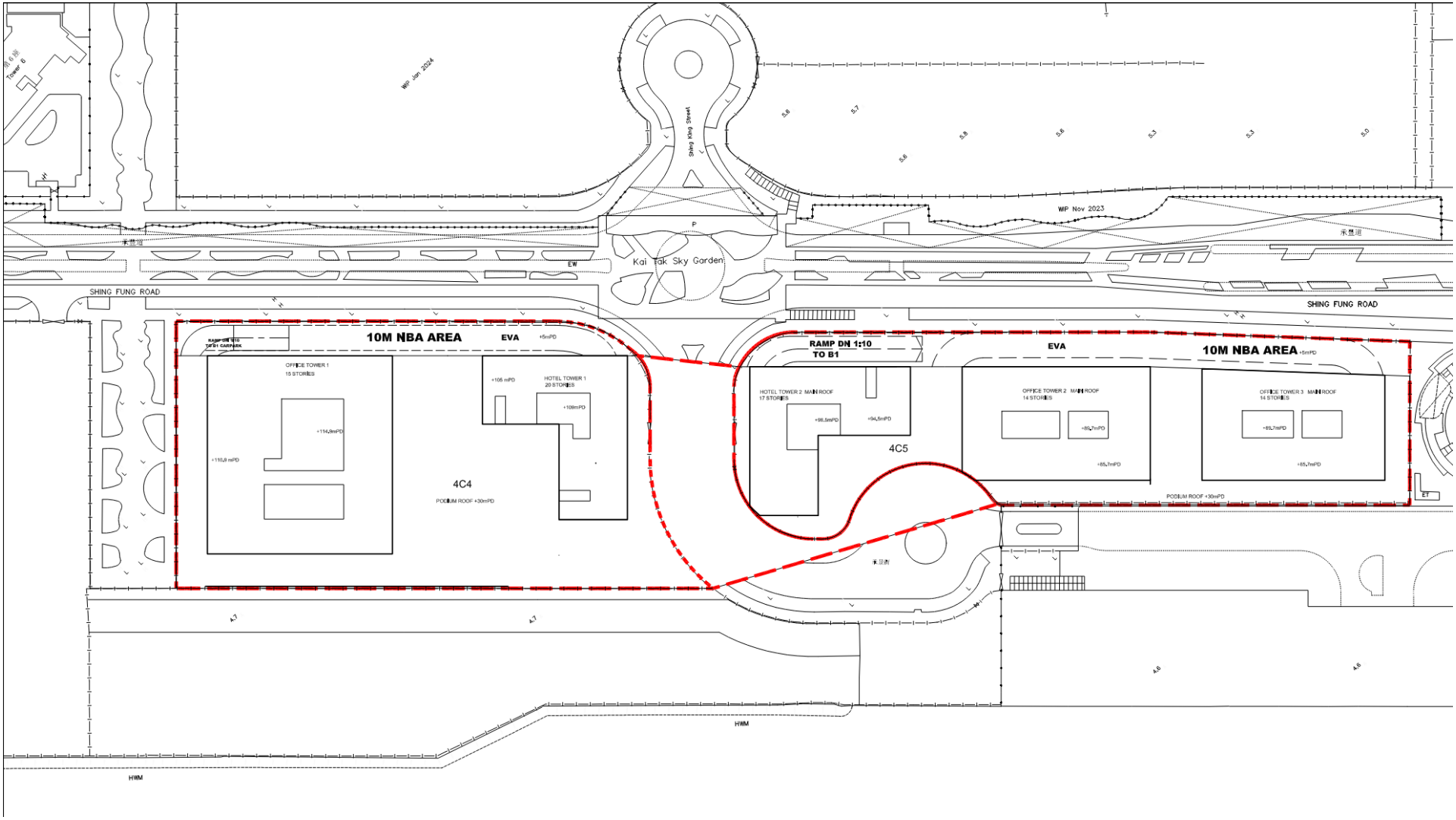
Appendix A Layout Plans of Baseline and Proposed Schemes

Figure A 3 Layout of Sites 3E1 and 3E2 of Proposed Scheme

Section

Appendix A Layout Plans of Baseline and Proposed Schemes

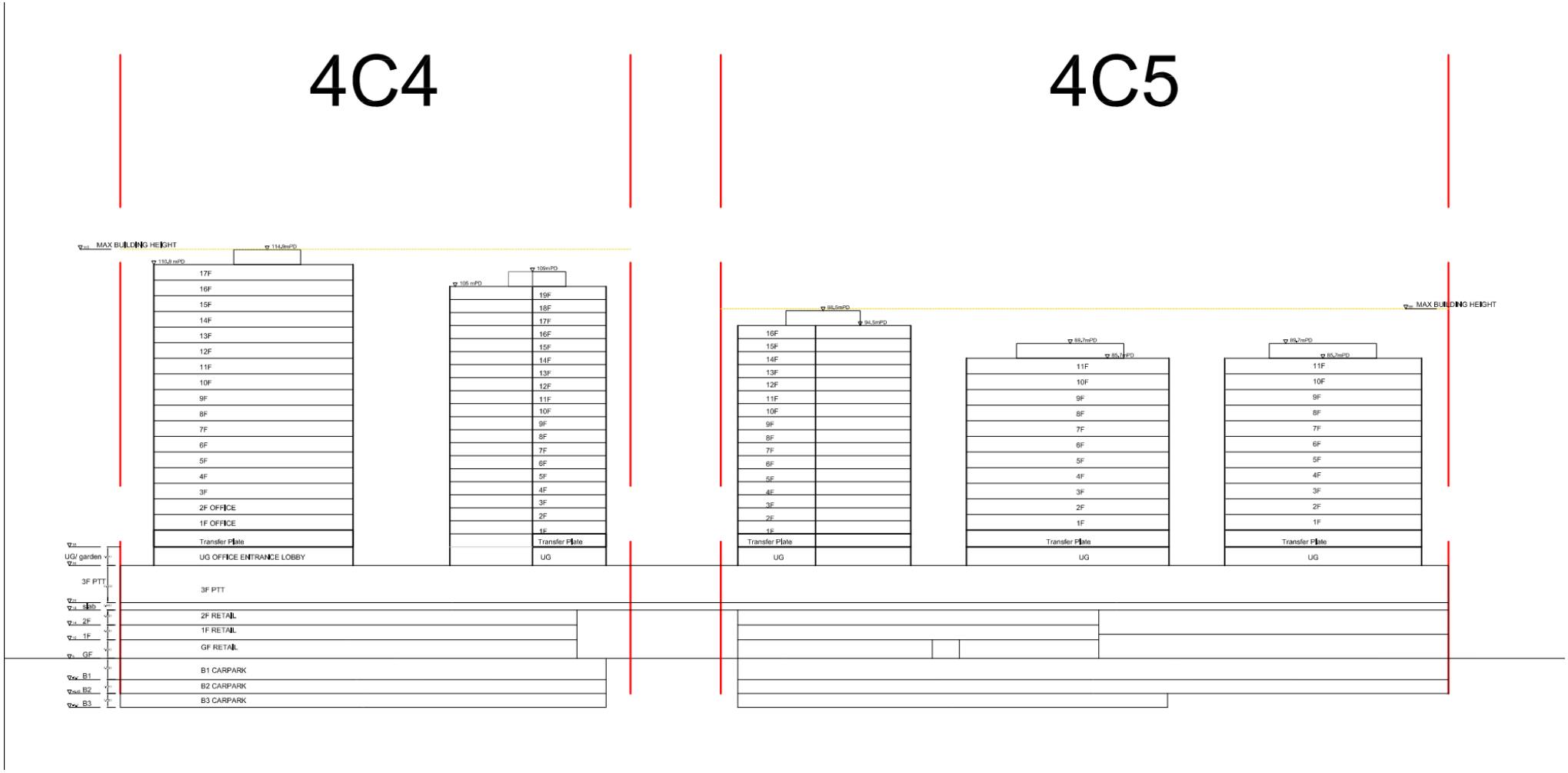
Figure A 4 Layout of Sites 4C4 and 4C5 of Proposed Scheme



Layout Plan

Appendix A Layout Plans of Baseline and Proposed Schemes

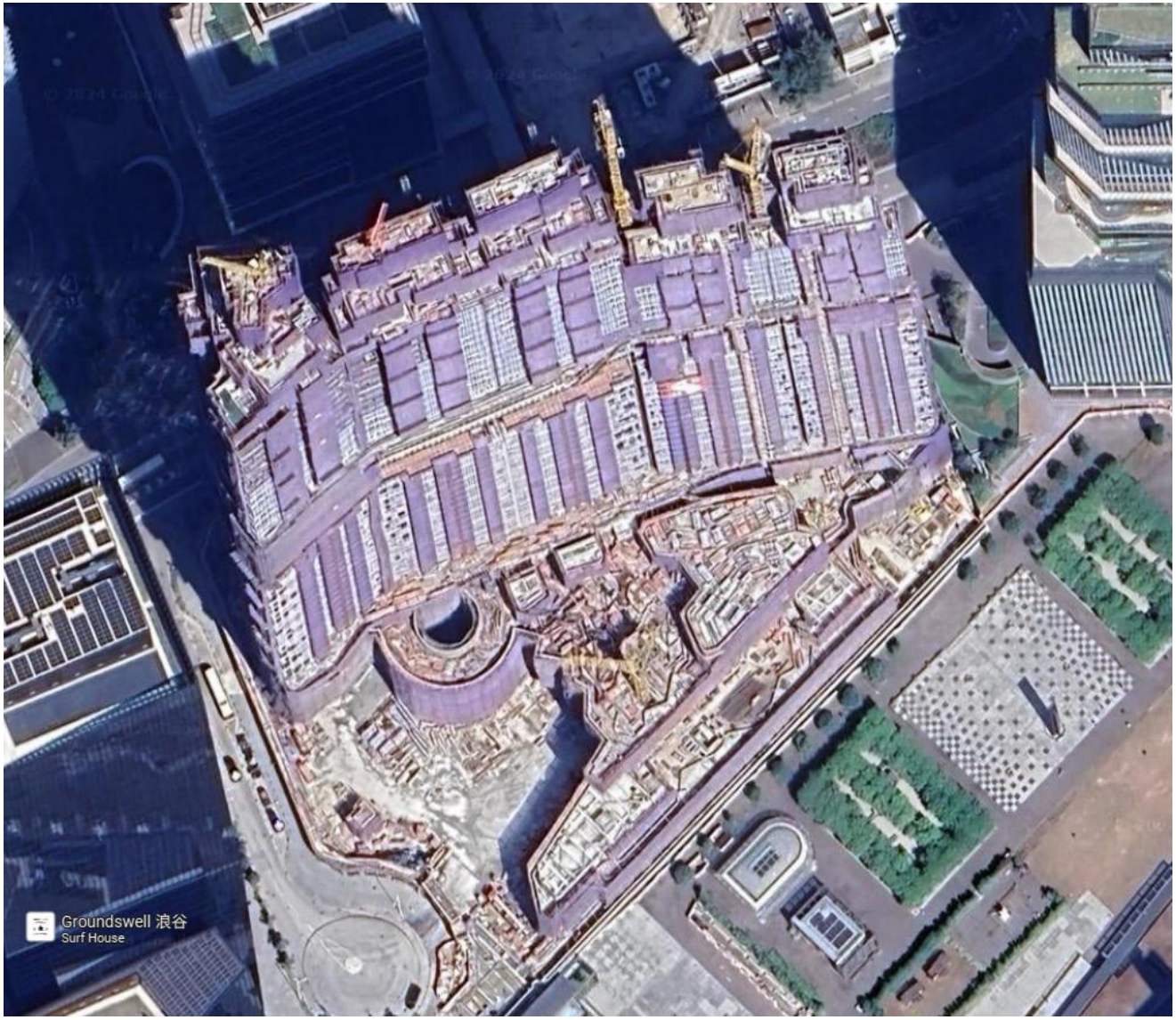
Figure A 4 Layout of Sites 4C4 and 4C5 of Proposed Scheme



Section

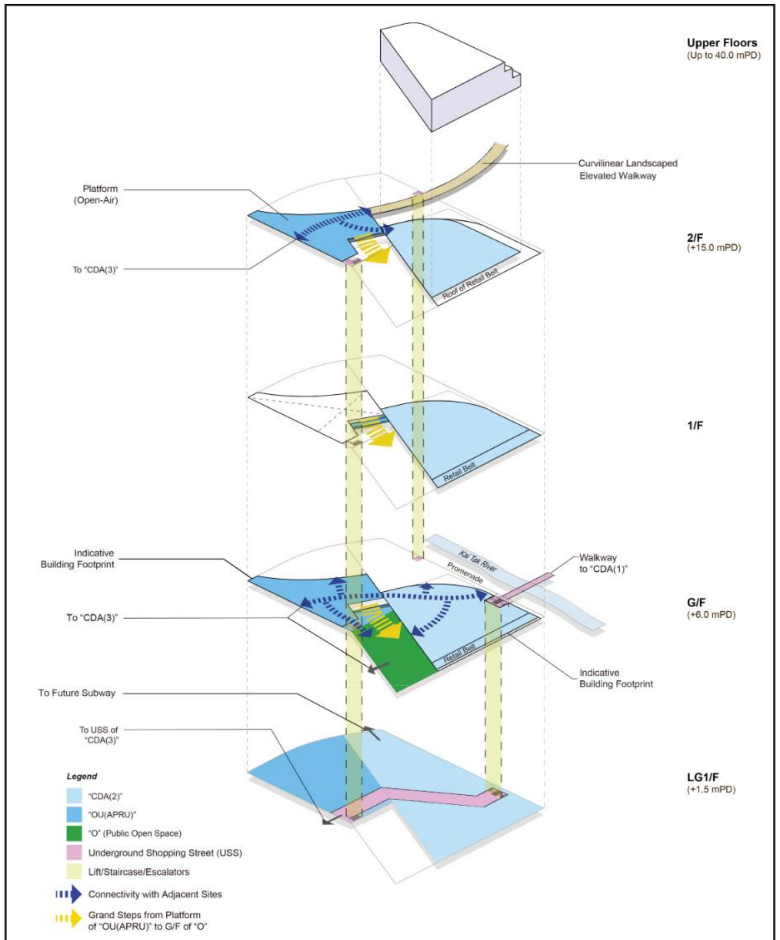
Appendix B Layout Plan of Planned/WIP Developments

Figure B 1 Layout of #1 High-rise Residential Development of Cullinan Sky



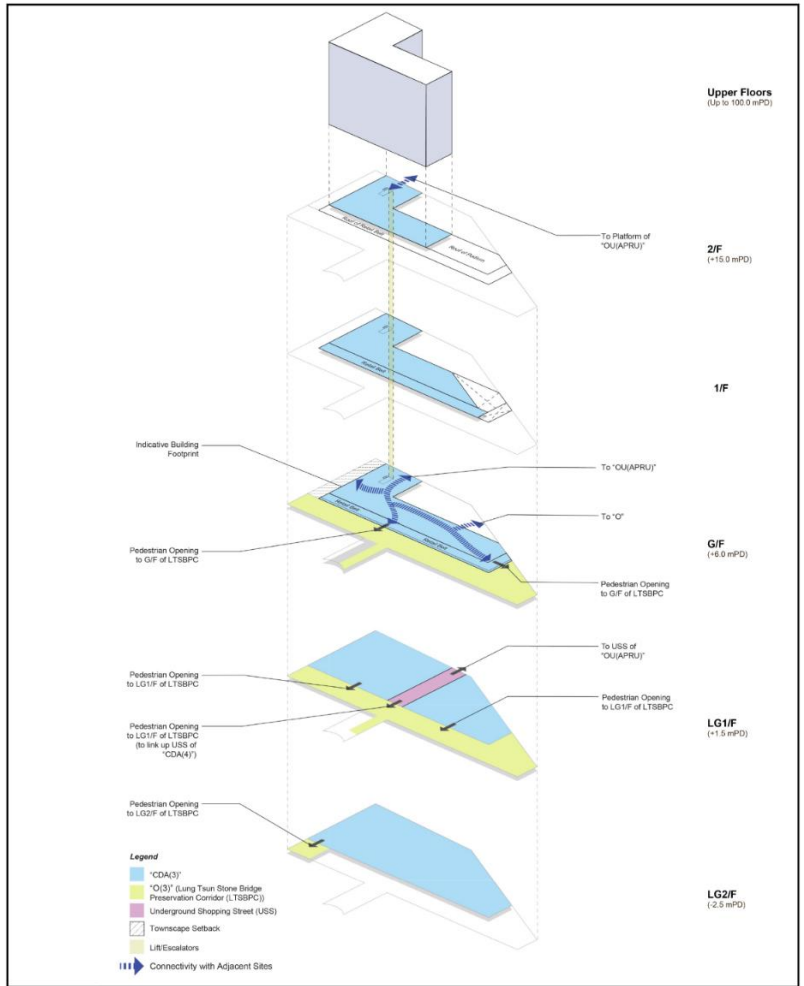
Appendix B Layout Plan of Planned/WIP Developments

Figure B 2 Layout of #2 Low to Mid-rise development of Kia Tak CDA (2), OU and O Site near Kai Tak Station Square



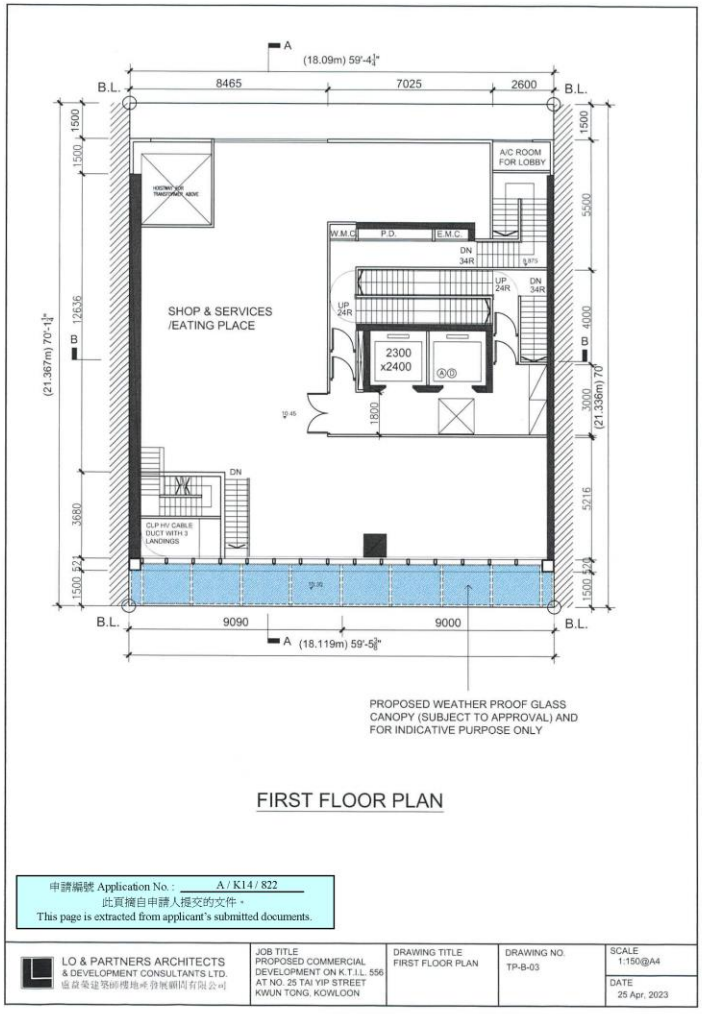
Appendix B Layout Plan of Planned/WIP Developments

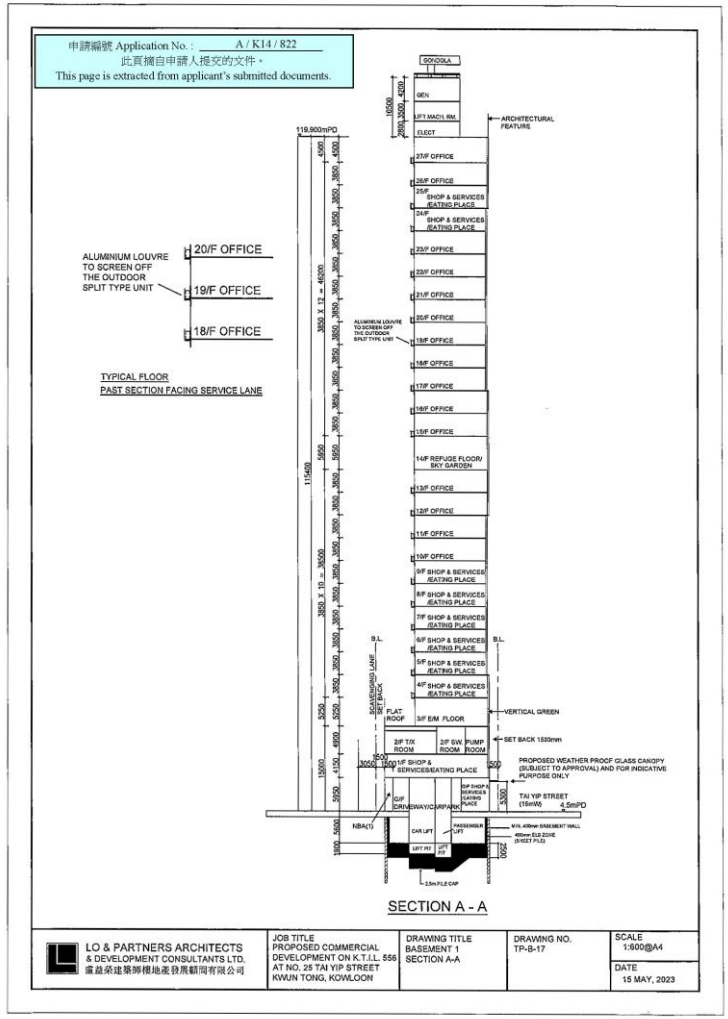
Figure B 3 Layout of #3 High-rise development of Kai Tak CDA (3) Site near Kai Tak Station Square



Appendix B Layout Plan of Planned/WIP Developments

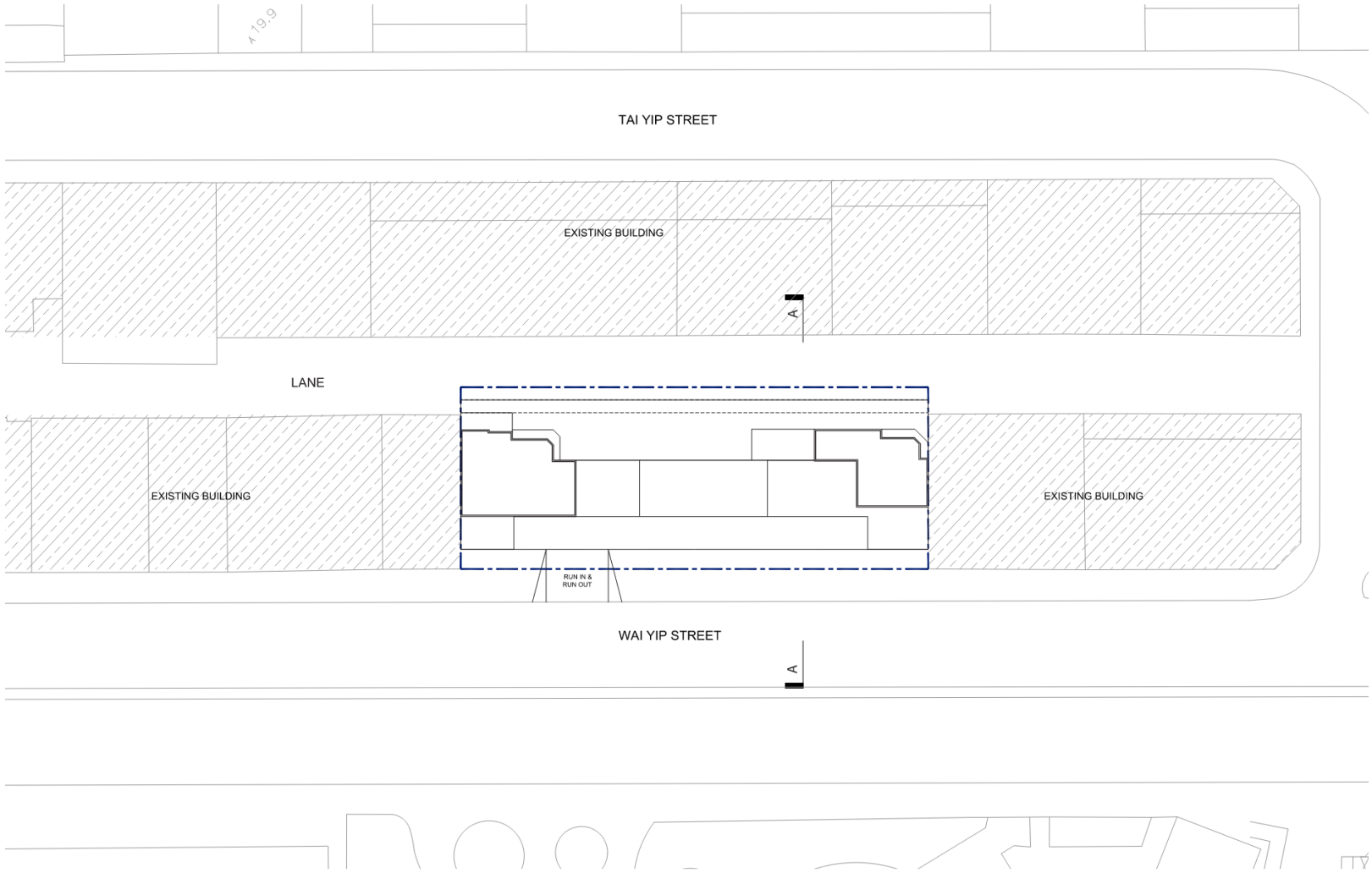
Figure B 6 Layout of #1 High-rise Commercial Development of Planning Application No. A/K14/822





Appendix B Layout Plan of Planned/WIP Developments

Figure B 7 Layout of #2 High-rise Commercial Development of Planning Application No. Y/K14S/4



BLOCK PLAN SK-1 19 MARCH 2024

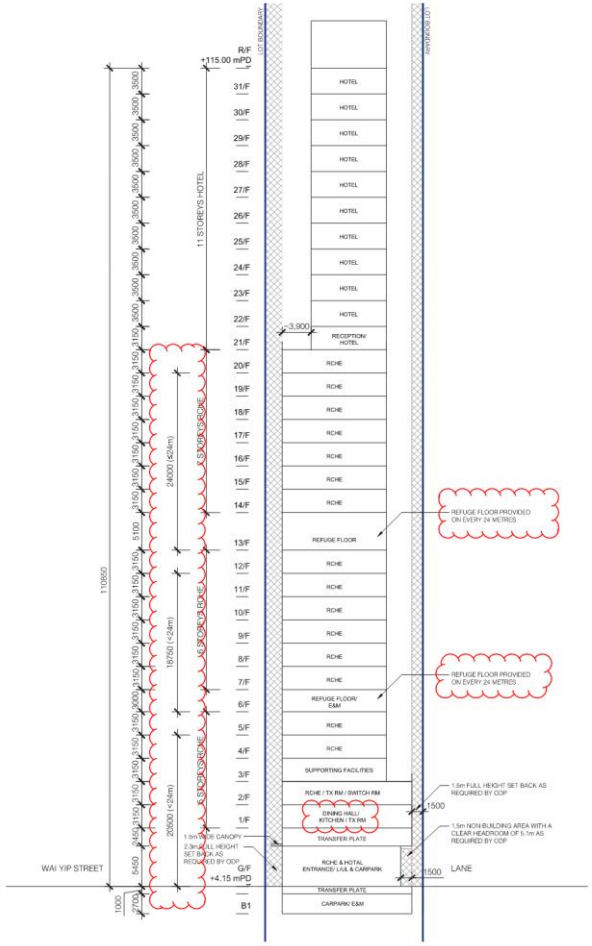
PROPOSED HOTEL DEVELOPMENT AND SOCIAL WELFARE FACILITIES AT
107 - 109 WAI YIP STREET, KWUN TONG, KOWLOON

0 4 8 20m

Singular Studio

Appendix B Layout Plan of Planned/WIP Developments

Figure B 7 Layout of #2 High-rise Commercial Development of Planning Application No. Y/K14S/4



SECTION A SK-14 13 NOVEMBER 2024

PROPOSED HOTEL DEVELOPMENT AND SOCIAL WELFARE FACILITIES AT 107 - 109 WAI YIP STREET, KWUN TONG, KOWLOON

0 4 8 20m

Singular Studio

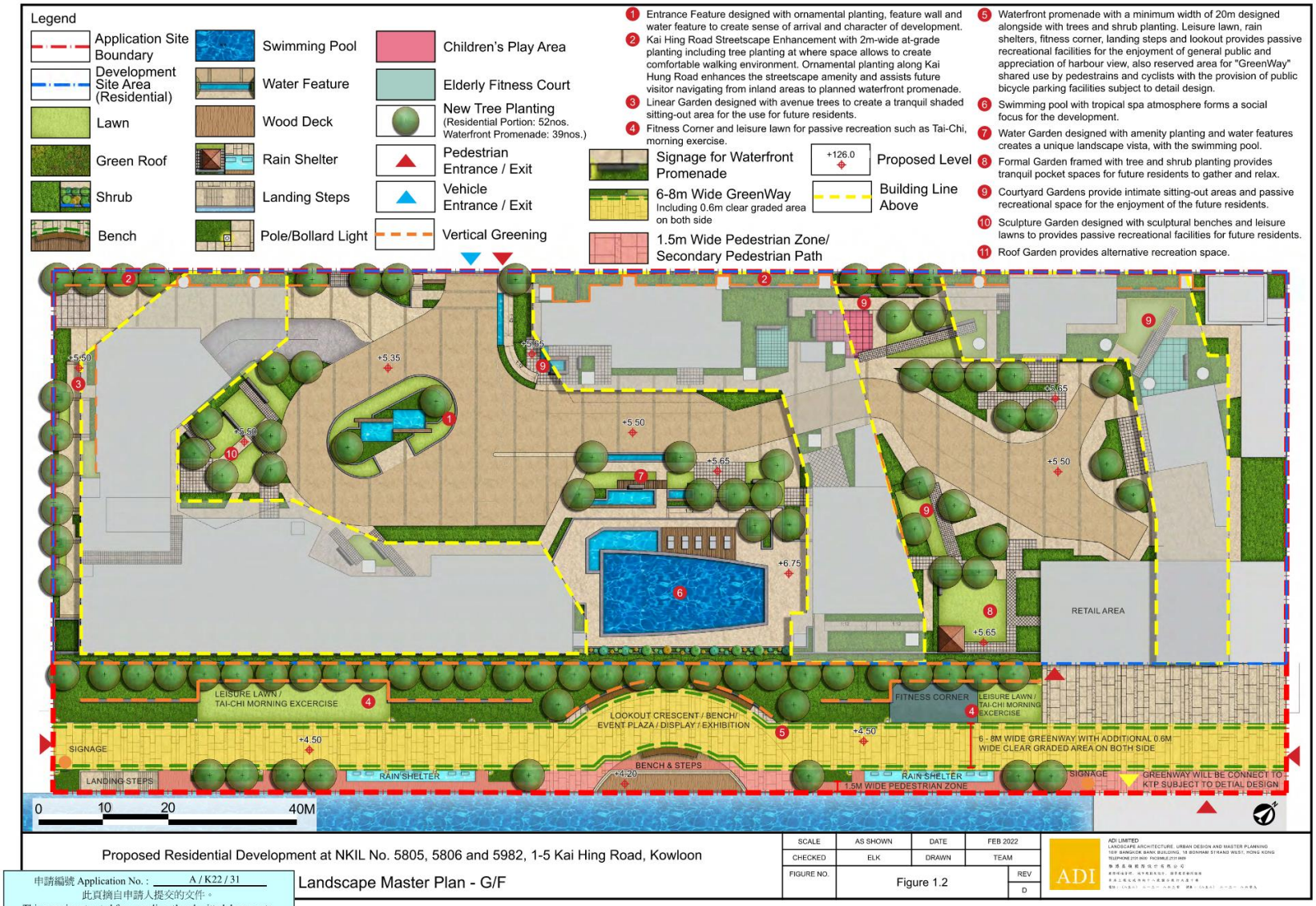
Appendix B Layout Plan of Planned/WIP Developments

Figure B 8 Layout of #3 High-rise Commercial Development of Kai Tak C(2) Site near Kwun Tong Typhoon Shelter

Appendix B Layout Plan of Planned/WIP Developments

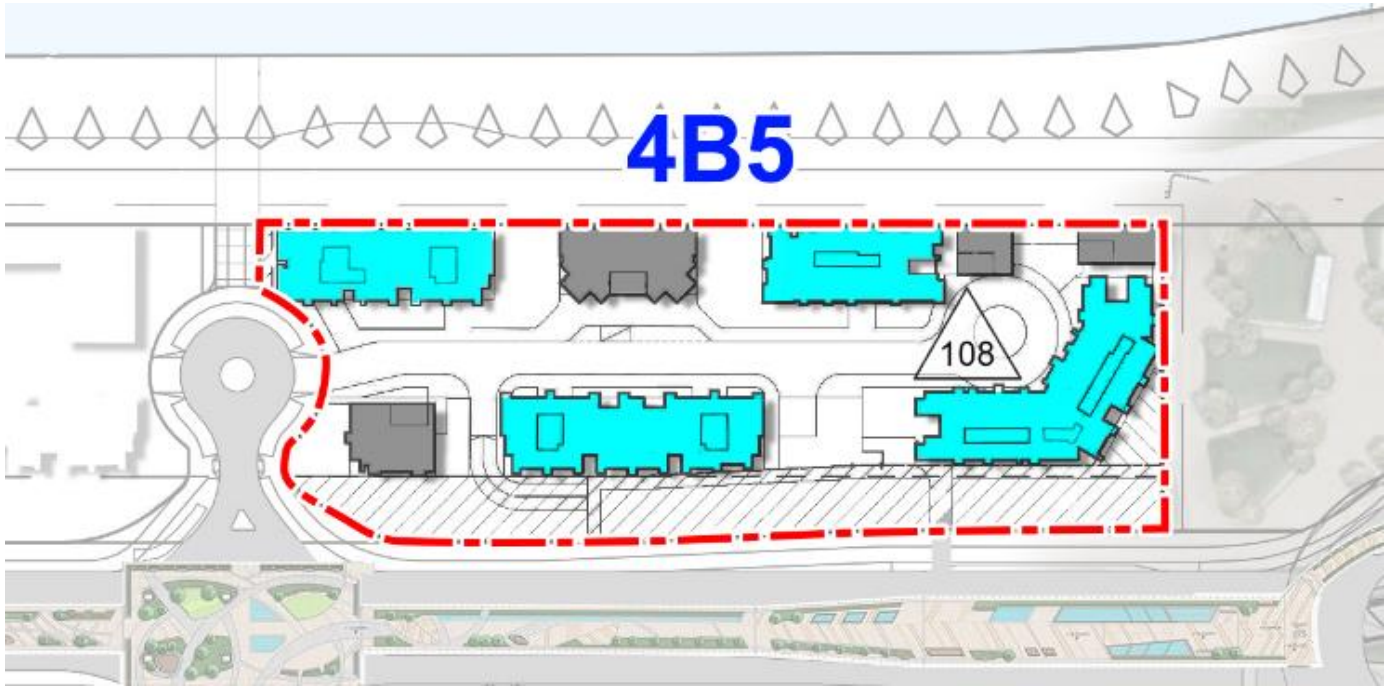
Figure B 9 Layout of #4 High-rise commercial development of Planning Application No. A/K22/31

Annex 2



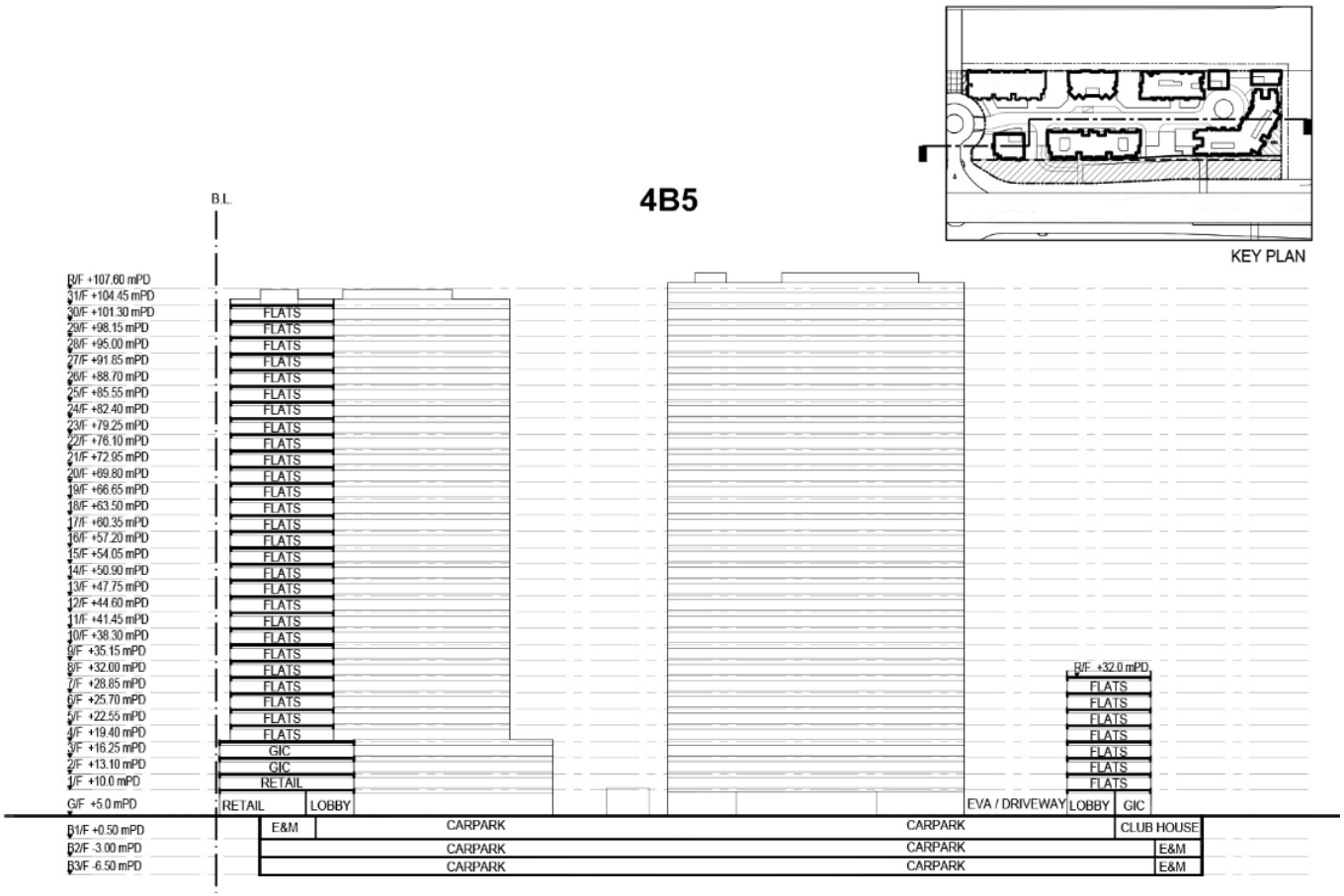
Appendix B Layout Plan of Planned/WIP Developments

Figure B 10 Layout of #5 High-rise development of Kai Tak OZP R(B)8 Site in former runway



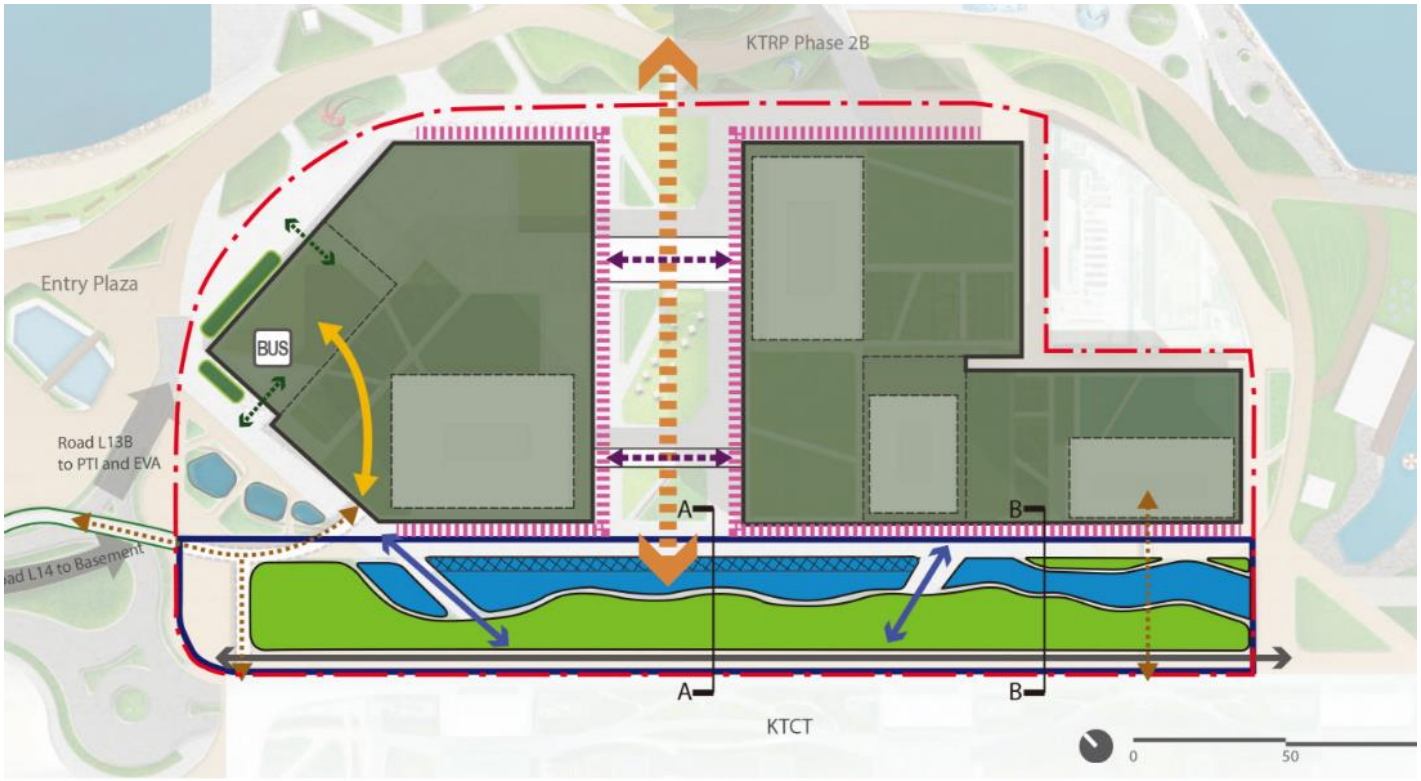
Appendix B Layout Plan of Planned/WIP Developments

Figure B 10 Layout of #5 High-rise development of Kai Tak OZP R(B)8 Site in former runway



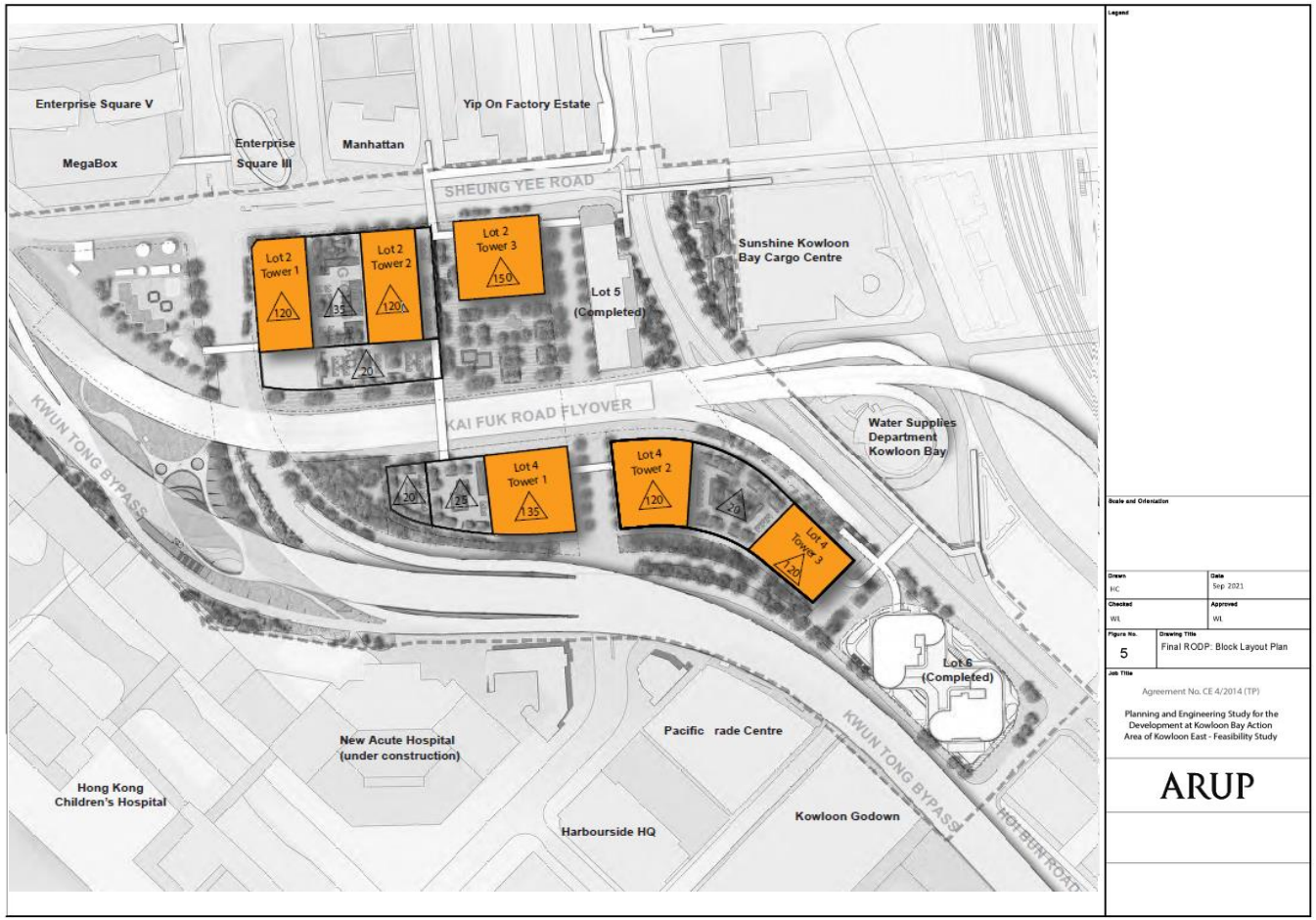
Appendix B Layout Plan of Planned/WIP Developments

Figure B 11 Layout of #6 Mid to high-rise development of Kai Tak OU Site in former runway



Appendix B Layout Plan of Planned/WIP Developments

Figure B 12 Layout of #7 Mid to High-rise Development of Kowloon Bay Action Area



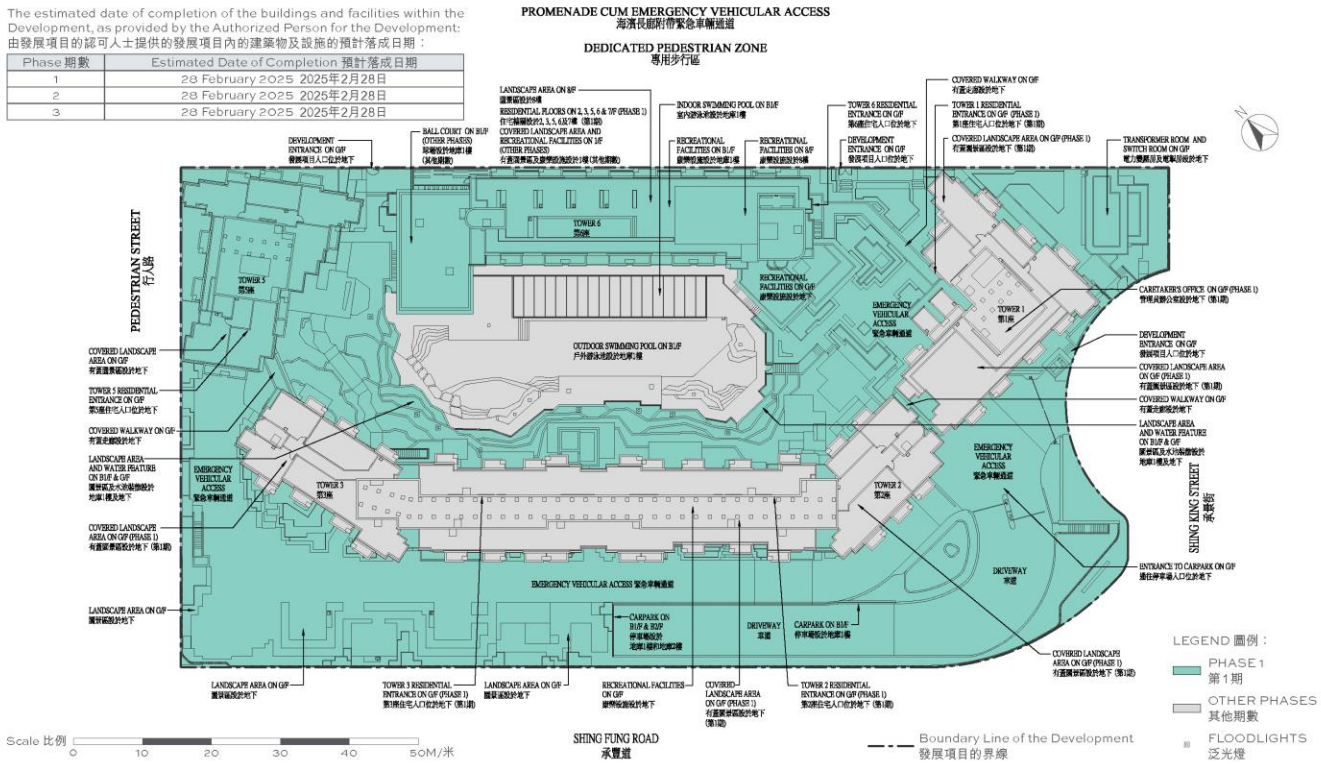
Appendix B Layout Plan of Planned/WIP Developments

Figure B 13 Layout of #8 High-rise Residential Development of The Pavilia Forest

Layout plan of the development
發展項目的布局圖

The estimated date of completion of the buildings and facilities within the Development, as provided by the Authorized Person for the Development:
由發展項目的認可人士提供的發展項目內的建築物及設施的預計落成日期：

Phase 期數	Estimated Date of Completion 預計落成日期
1	28 February 2025 2025年2月28日
2	28 February 2025 2025年2月28日
3	28 February 2025 2025年2月28日



Remarks:
1. Floodlights will be provided for lighting of the outdoor swimming pool area on B1/F of the Development in the evening. Prospective purchasers please note the impact (if any) of the illumination of such lighting system on individual residential property.
2. Water features may emit sounds and affect the enjoyment to the residential properties.

備註：
1. 發展項目之地庫1樓戶外游泳池區會裝設泛光燈以供戶外游泳池區的晚間照明。準買家請注意該等照明系統的照明對個別住宅物業造成的影響（如有）。
2. 水池裝飾可能釋放聲音及對享用住宅物業造成影響。

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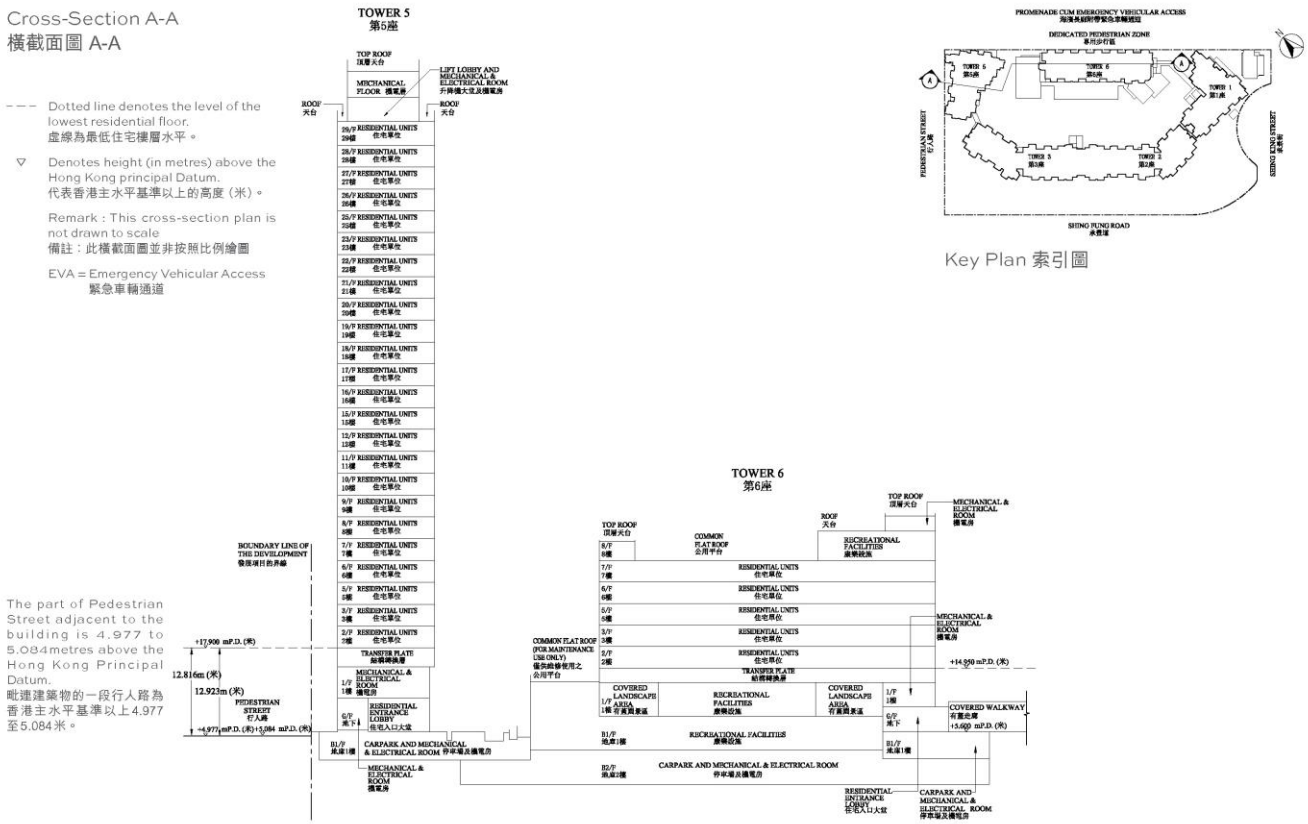
Appendix B Layout Plan of Planned/WIP Developments

Figure B 13 Layout of #8 High-rise Residential Development of The Pavilia Forest

Cross-section plan of building in the phase
期數中的建築物的橫截面圖

Cross-Section A-A
橫截面圖 A-A



Dotted line denotes the level of the lowest residential floor.
虛線為最低住宅樓層水平。

▽ Denotes height (in metres) above the Hong Kong principal Datum.
代表香港主水平基準以上的高度（米）。

Remark : This cross-section plan is not drawn to scale
備註：此橫截面圖並非按照比例繪圖

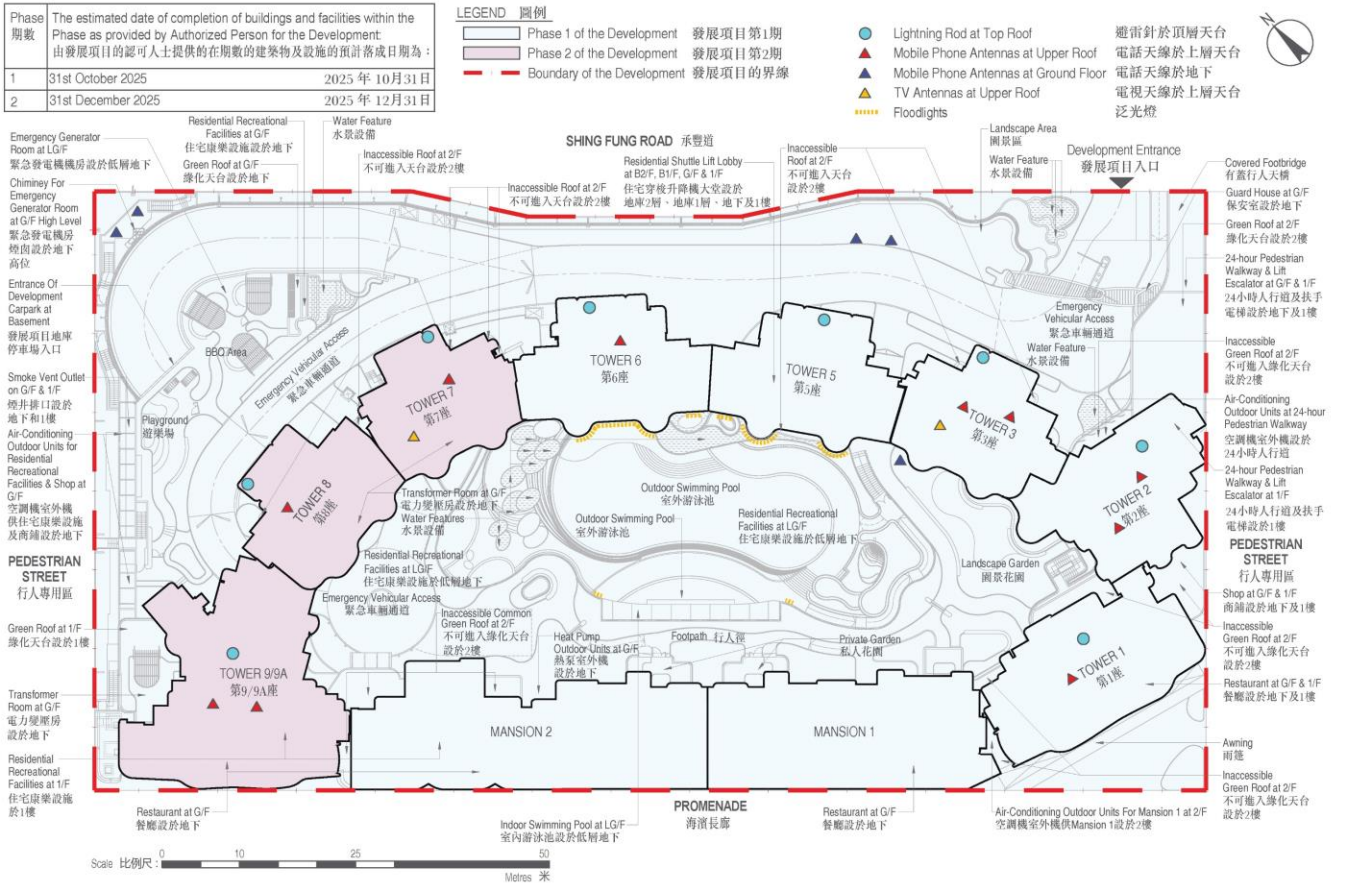
EVA = Emergency Vehicular Access
緊急車輛通道

The part of Pedestrian Street adjacent to the building is 4.977 to 5.084metres above the Hong Kong Principal Datum.
毗連建築物的一段行人路為香港主水平基準以上4.977至5.084米。

Key Plan 索引圖

Appendix B Layout Plan of Planned/WIP Developments

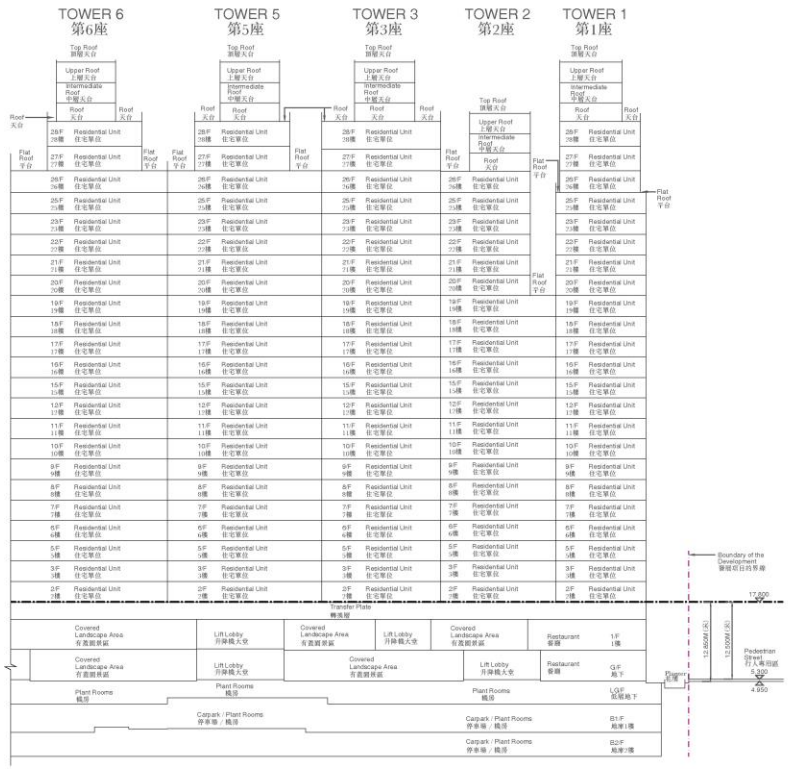
Figure B 14 Layout of #9 High-rise Residential Development of Cullinan Harbour



Appendix B Layout Plan of Planned/WIP Developments

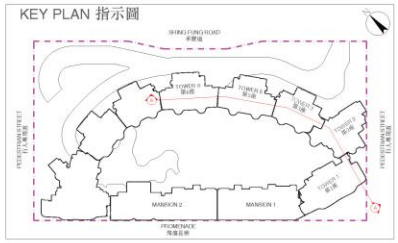
Figure B 14 Layout of #9 High-rise Residential Development of Cullinan Harbour

CROSS-SECTION PLAN A-A
橫截面圖 A-A



AT01

KEY PLAN 指示圖



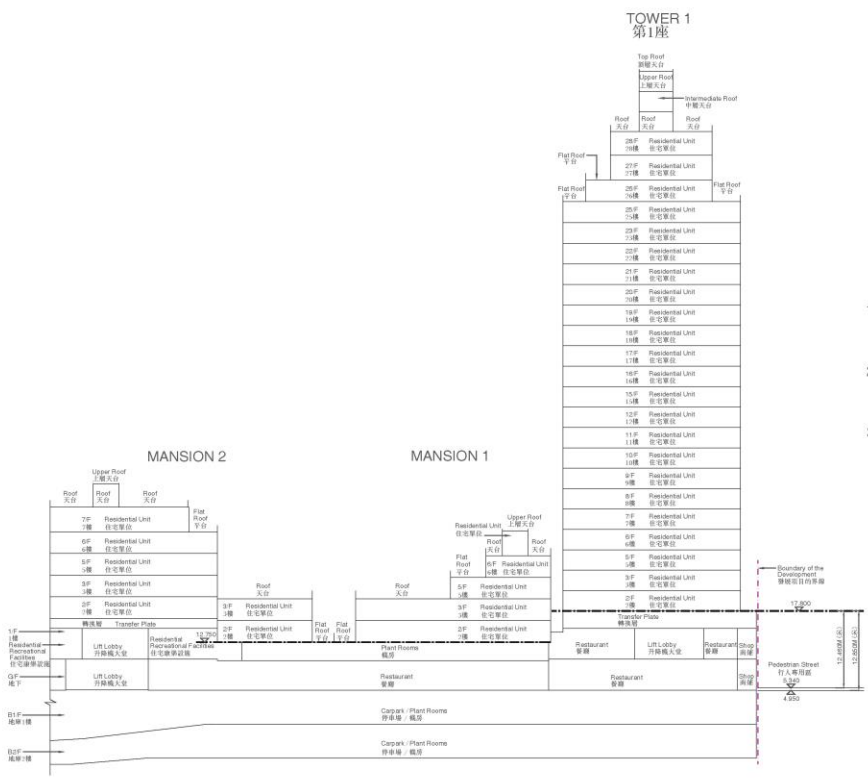
Boundary of the Development
發展項目的界線

1. --- Dotted line denotes the level of the lowest residential floor of the building in the Phase.
   --- 虛線代表期數中建築物之最低住宅樓層水平。
2. ▽or△ Denotes height (in metres) above the Hong Kong Principal Datum.
   ▽或△ 代表香港主水平基準以上的高度(米)。
3. The part of Pedestrian Street adjacent to the building is 4.950 metres to 5.300 metres above the Hong Kong Principal Datum.
   毗連建築物的一段行人專用區為香港主水平基準以上4.950米至5.300米。

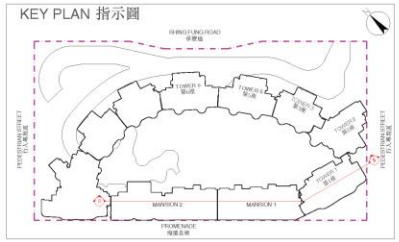
Appendix B Layout Plan of Planned/WIP Developments

Figure B 14 Layout of #9 High-rise Residential Development of Cullinan Harbour

CROSS-SECTION PLAN B-B
橫截面圖 B-B



KEY PLAN 指示圖



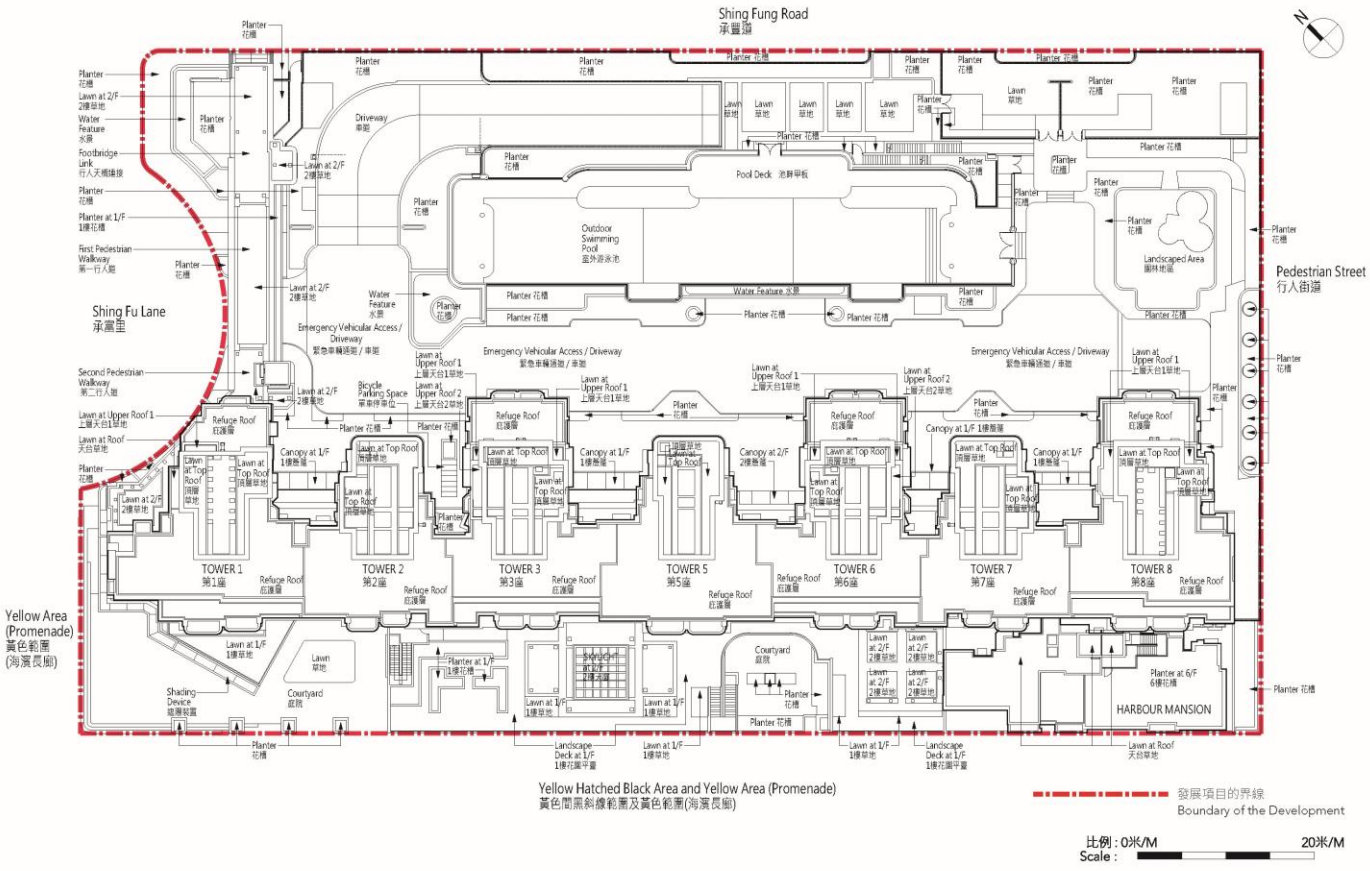
-- Boundary of the Development
發展項目的界線

1. -·- Dotted line denotes the level of the lowest residential floor of the building in the Phase.
   -·- 虛線代表期數中建築物之最低住宅樓層水平。
2. ▽or△ Denotes height (in metres) above the Hong Kong Principal Datum.
   ▽或△ 代表香港主水平基準以上的高度(米)。
3. The part of Pedestrian Street adjacent to the building is 4.950 metres to 5.340 metres above the Hong Kong Principal Datum.
   毗連建築物的一段行人專用區為香港主水平基準以上4.950米至5.340米。

AT02

Appendix B Layout Plan of Planned/WIP Developments

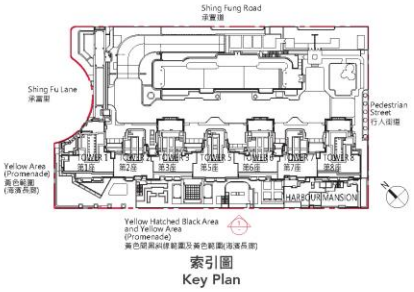
Figure B 15 Layout of #10 High-rise Residential Development of The Knightsbridge



Appendix B Layout Plan of Planned/WIP Developments

Figure B 15 Layout of #10 High-rise Residential Development of The Knightsbridge

立面圖 1
Elevation 1



索引圖
Key Plan

發展項目的認可人士證明本立面圖所顯示的立面：
1. 以2024年2月27日的情況為準的本項目的經批准的建築圖則為基礎擬備；及
2. 大致上與本項目的外觀一致。

Authorized Person for the development certified that the elevations shown on these elevation plans:
1. are prepared on the basis of the approved building plans for the development as of 27 February 2024; and
2. are in general accordance with the outward appearance of the development.

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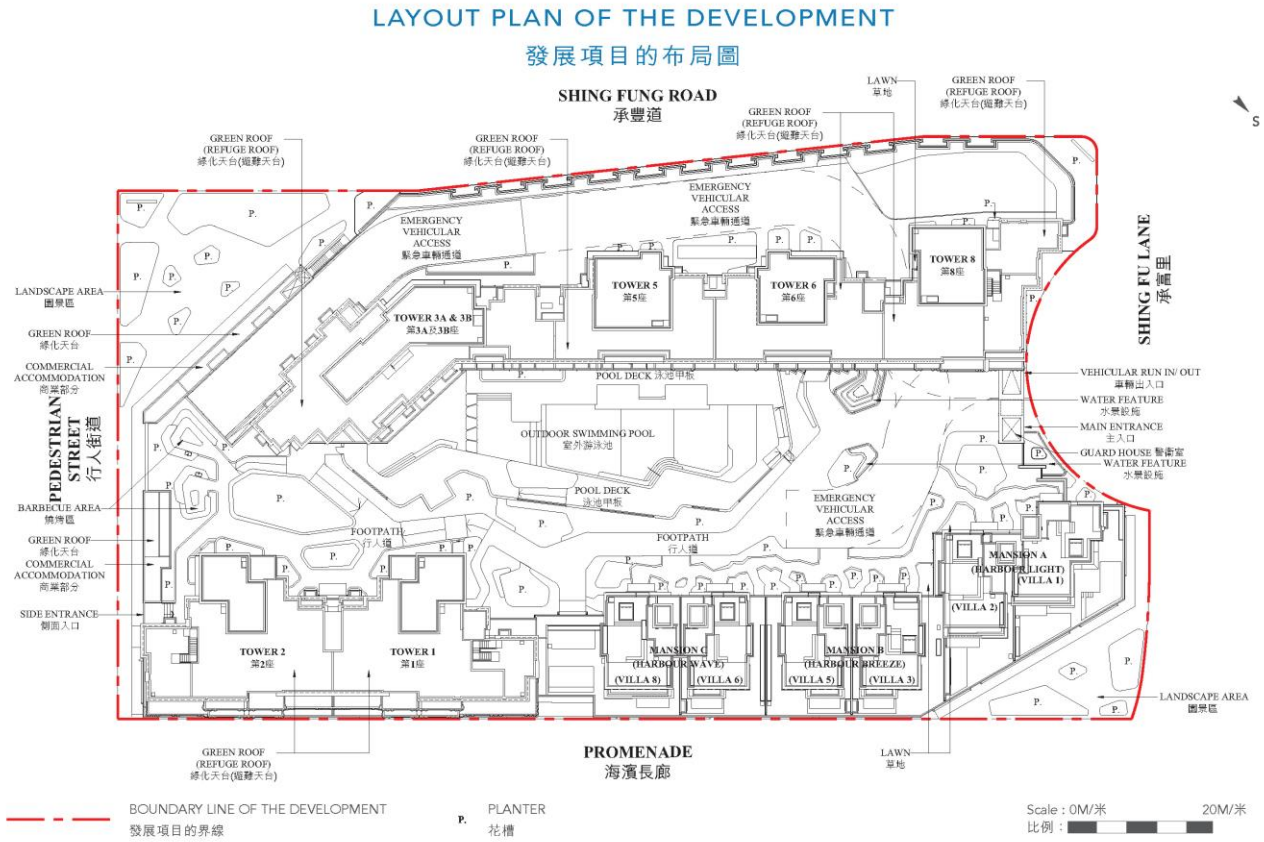
Appendix B Layout Plan of Planned/WIP Developments

Figure B 16 Layout of #10 High-rise Residential Development of Pano harbour



The estimated date of completion of the buildings and facilities, as provided by the Authorized Person for the Development is 30 September 2024.
由發展項目的認可人士提供的建築物及設施的預計落成日期為2024年9月30日。

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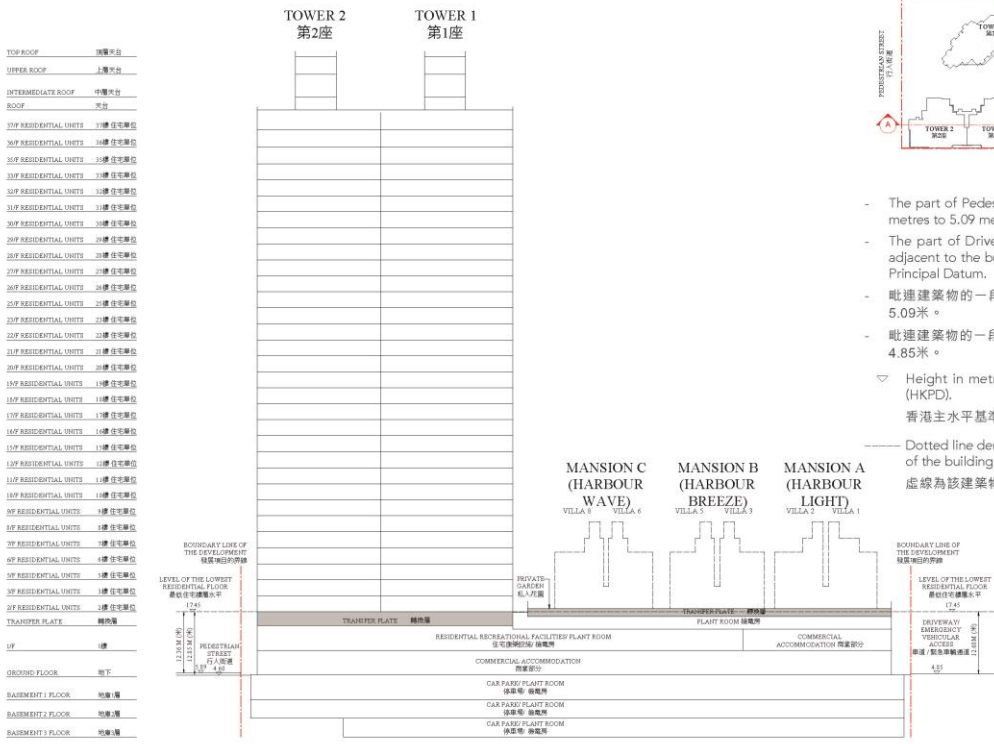
Appendix B Layout Plan of Planned/WIP Developments

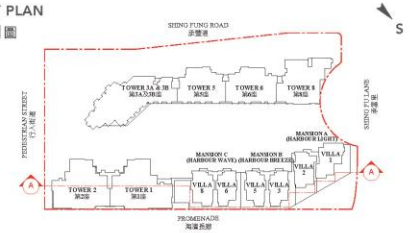
Figure B 16 Layout of #11 High-rise Residential Development of Pano harbour

CROSS-SECTION PLAN OF BUILDING IN THE DEVELOPMENT
發展項目中的建築物的橫截面圖

CROSS-SECTION PLAN A - A
橫截面圖 A - A



KEY PLAN
索引圖



- The part of Pedestrian Street adjacent to the building is 4.60 metres to 5.09 metres above the Hong Kong Principal Datum.
- The part of Driveway/ Emergency Vehicular Access (E.V.A.) adjacent to the building is 4.85 metres above the Hong Kong Principal Datum.
- 毗連建築物的一段行人街道為香港主水平基準以上4.60米至5.09米。
- 毗連建築物的一段車道/緊急車輛通道為香港主水平基準以上4.85米。

▽ Height in metres above the Hong Kong Principal Datum (HKPD).
香港主水平基準以上高度(米)。

—— Dotted line denotes the level of the lowest residential floor of the building.
虛線為該建築物最低住宅樓層水平。

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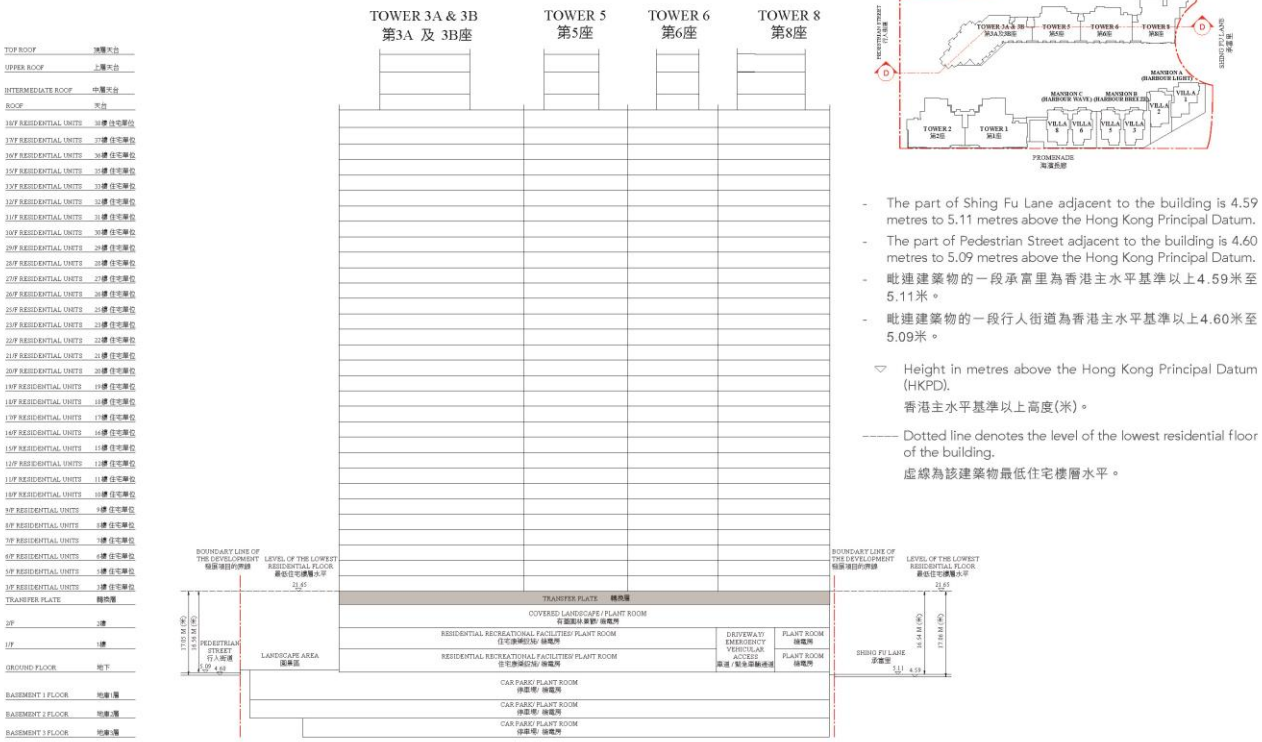
Appendix B Layout Plan of Planned/WIP Developments

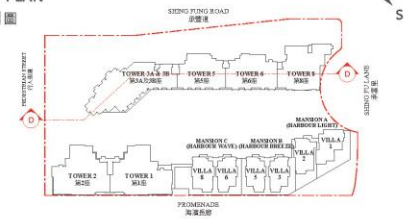
Figure B 16 Layout of #11 High-rise Residential Development of Pano harbour

CROSS-SECTION PLAN OF BUILDING IN THE DEVELOPMENT
發展項目中的建築物的橫截面圖

CROSS-SECTION PLAN D - D
橫截面圖 D - D



KEY PLAN
索引圖



- The part of Shing Fu Lane adjacent to the building is 4.59 metres to 5.11 metres above the Hong Kong Principal Datum.
- The part of Pedestrian Street adjacent to the building is 4.60 metres to 5.09 metres above the Hong Kong Principal Datum.
- 毗連建築物的一段承富里為香港主水平基準以上4.59米至5.11米。
- 毗連建築物的一段行人街道為香港主水平基準以上4.60米至5.09米。

▽ Height in metres above the Hong Kong Principal Datum (HKPD).
香港主水平基準以上高度(米)。

------ Dotted line denotes the level of the lowest residential floor of the building.
虛線為該建築物最低住宅樓層水平。

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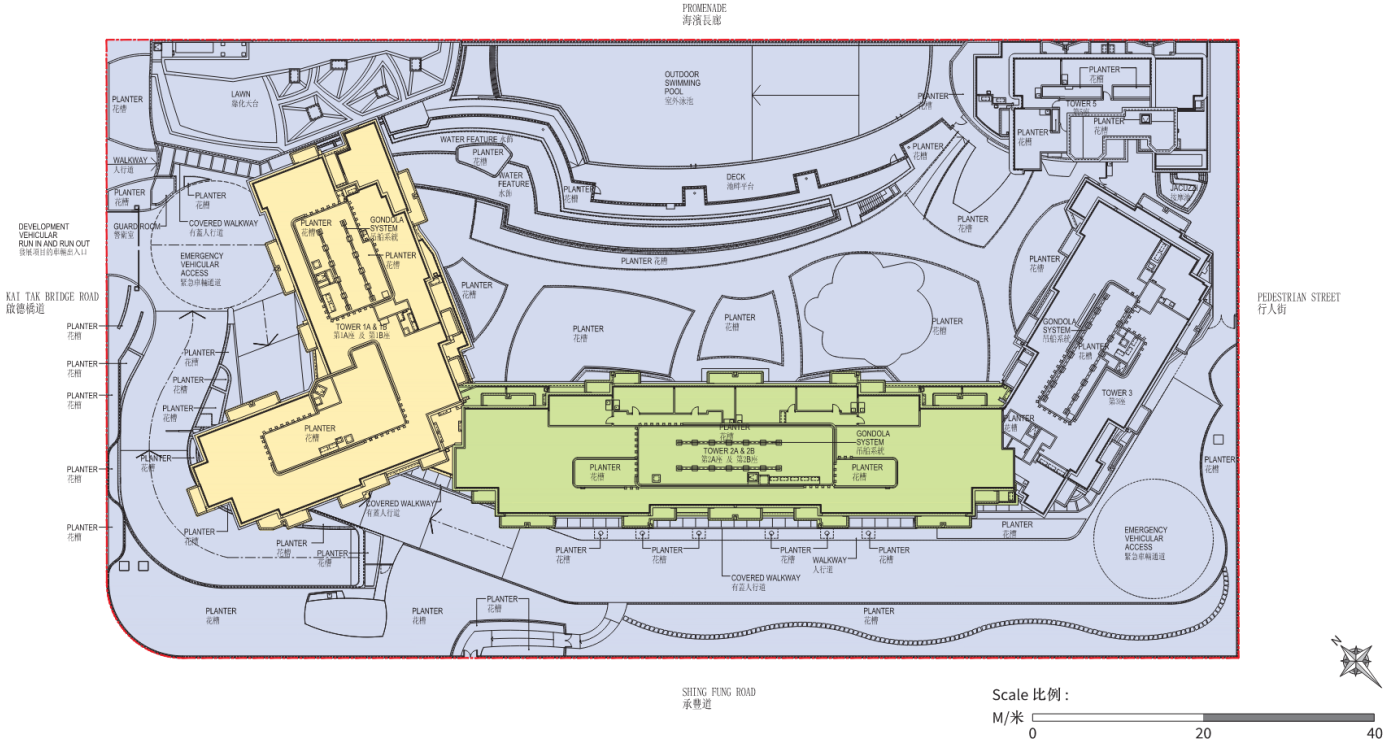
Appendix B Layout Plan of Planned/WIP Developments

Figure B 17 Layout of #12 High-rise residential development of Double Coast I



LEGEND 圖例

- Boundary line of the Development 發展項目的界線
- Phase 1 of the Development 發展項目第1期
- Phase 2 of the Development 發展項目第2期
- Phase 3 of the Development 發展項目第3期

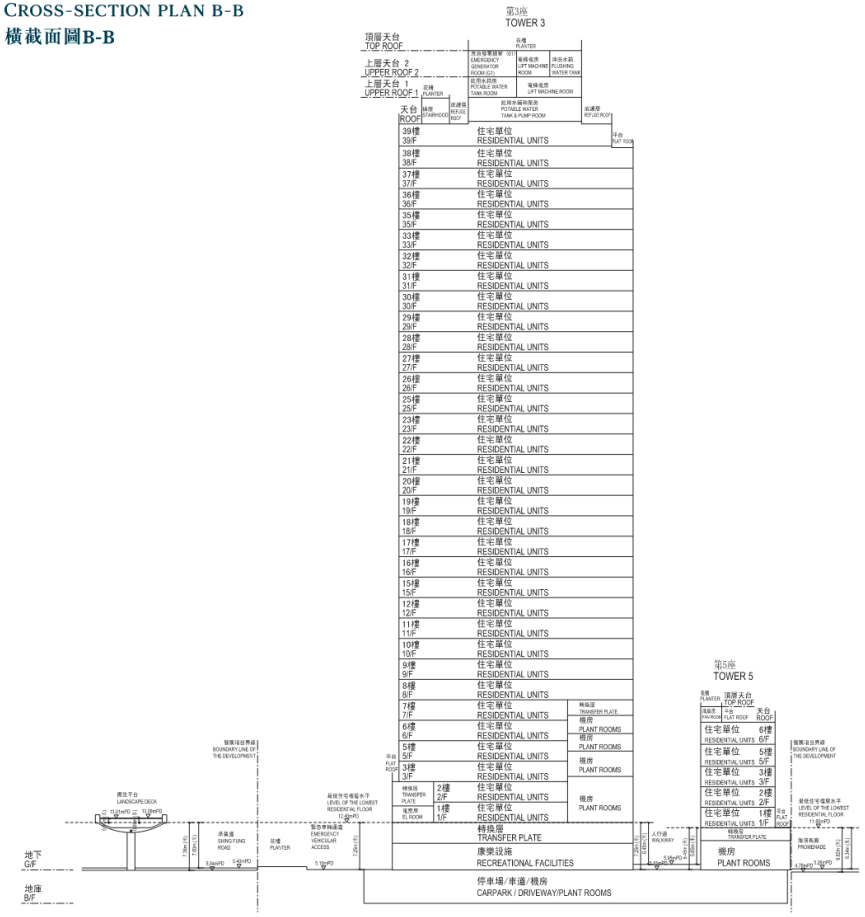
Notes: This plan shows the layout of the Development from an aerial view only. The boundaries and areas of the phases on different floors could be different from those shown here.

備註：本圖僅顯示從上空鳥瞰可見之發展項目布局。各期數於不同樓層上的邊界和範圍可能與本圖所示者不同。

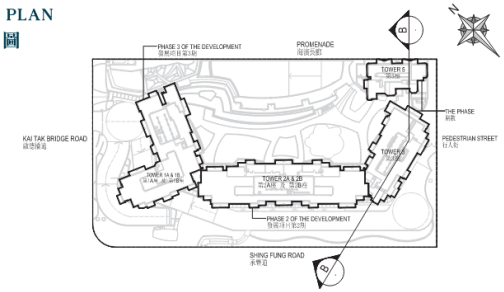
Appendix B Layout Plan of Planned/WIP Developments

Figure B 17 Layout of #12 High-rise residential development of Double Coast I

CROSS-SECTION PLAN B-B
橫截面圖B-B



KEY PLAN
索引圖



Legend 圖例

▽ Height in metres above the Hong Kong Principal Datum (HKPD).
香港主水平基準以上高度(米)。

--- Dotted line denotes the level of the lowest residential floor of the building.
虛線為該建築物最低住宅樓層水平。

Remark : This cross-section plan is not drawn to scale.
備註：此橫截面圖並非按照比例繪畫。

The part of Landscape Deck adjacent to Tower 3 is 13.01 metres to 13.09 metres above the Hong Kong Principal Datum.
毗連第3座的一段園景平台為香港主水平基準以上13.01米至13.09米。

The part of Shing Fung Road adjacent to Tower 3 is 5.04 metres to 5.40 metres above the Hong Kong Principal Datum.
毗連第3座的一段承豐道為香港主水平基準以上5.04米至5.40米。

The part of Emergency Vehicular Access adjacent to Tower 3 is 5.15 metres above the Hong Kong Principal Datum.
毗連第3座的一段緊急車輛通道為香港主水平基準以上5.15米。

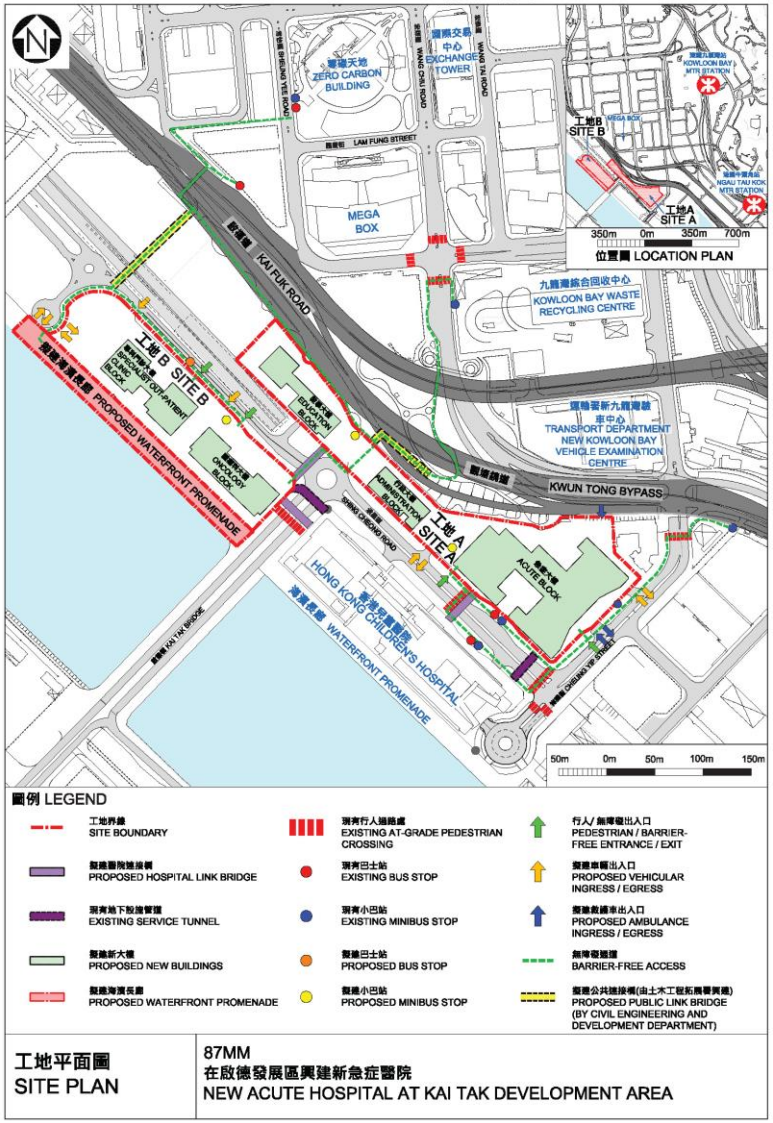
The part of Promenade adjacent to Tower 5 is 4.78 metres to 5.26 metres above the Hong Kong Principal Datum.
毗連第5座的一段海濱長廊為香港主水平基準以上4.78米至5.26米。

The part of walkway adjacent to Tower 3 and Tower 5 is 5.15 metres to 5.95 metres above the Hong Kong Principal Datum.
毗連第3座及第5座的一段人行道為香港主水平基準以上5.15米至5.95米。

Appendix B Layout Plan of Planned/WIP Developments

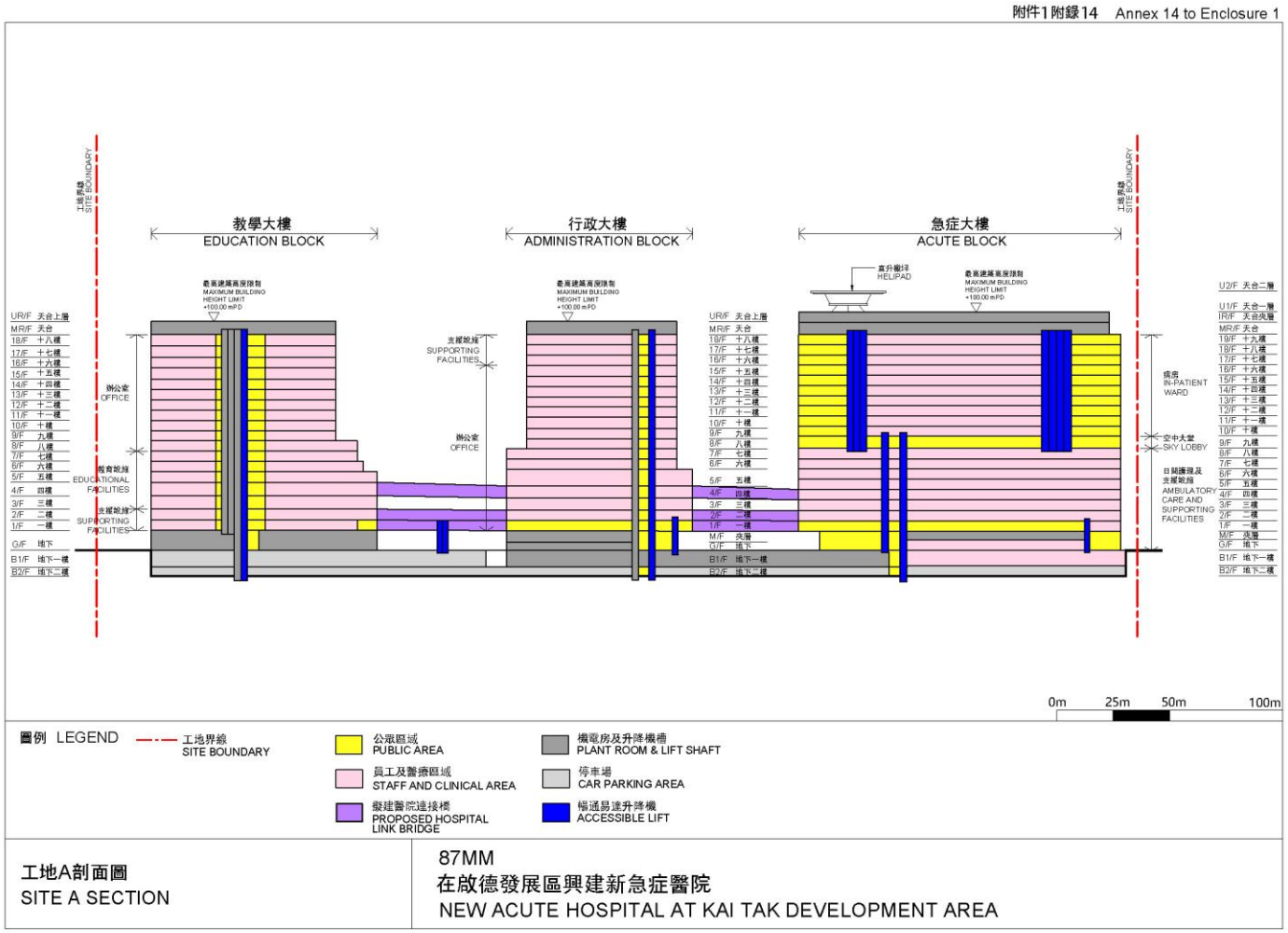
Figure B 18 Layout of #13 Mid to High-rise Development of New Acute Hospital

附件1 附錄1 Annex 1 to Enclosure 1



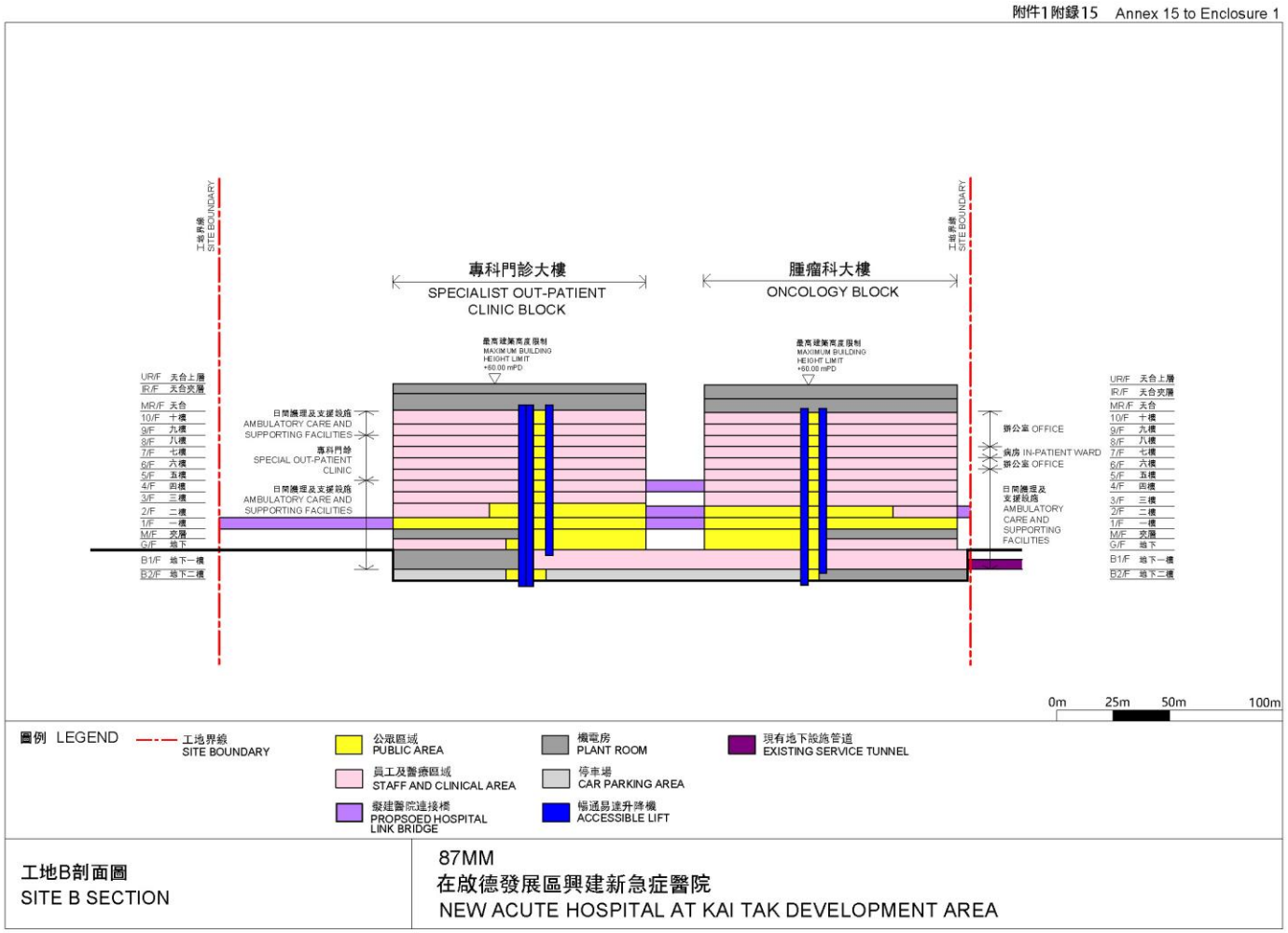
Appendix B Layout Plan of Planned/WIP Developments

Figure B 18 Layout of #13 Mid to High-rise Development of New Acute Hospital



Appendix B Layout Plan of Planned/WIP Developments

Figure B 18 Layout of #13 Mid to High-rise Development of New Acute Hospital



Appendix C

Contour Plot of Velocity Ratio (VR)

C.1 Baseline Scheme

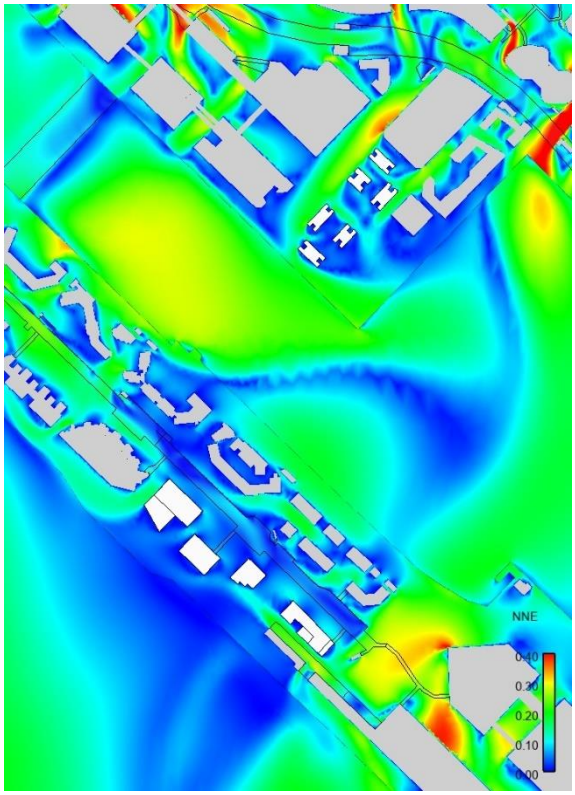


Figure B 1 Contour Plot of Baseline Scheme under NNE Wind

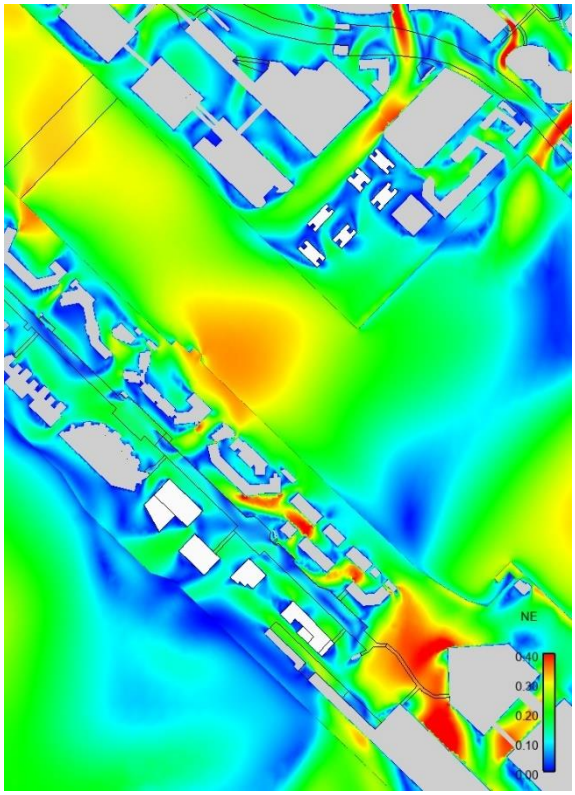


Figure B 2 Contour Plot of Baseline Scheme under NE Wind

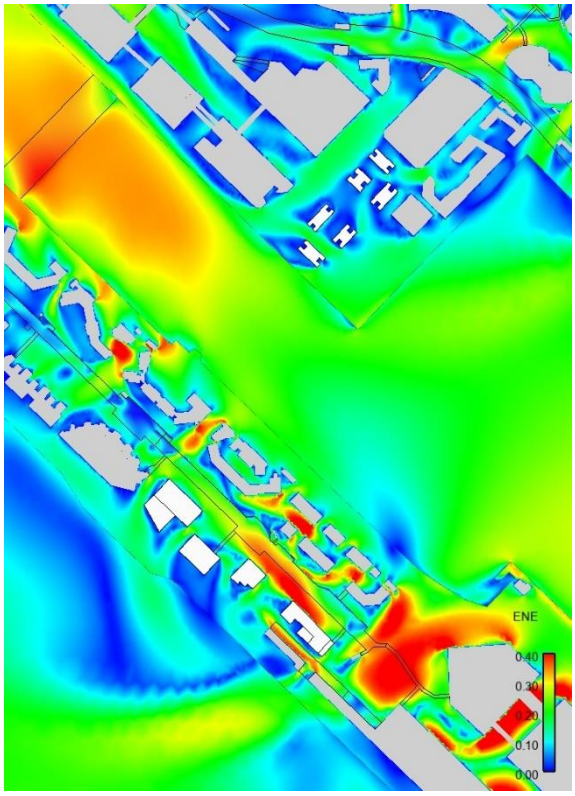


Figure B 3 Contour Plot of Baseline Scheme under ENE Wind

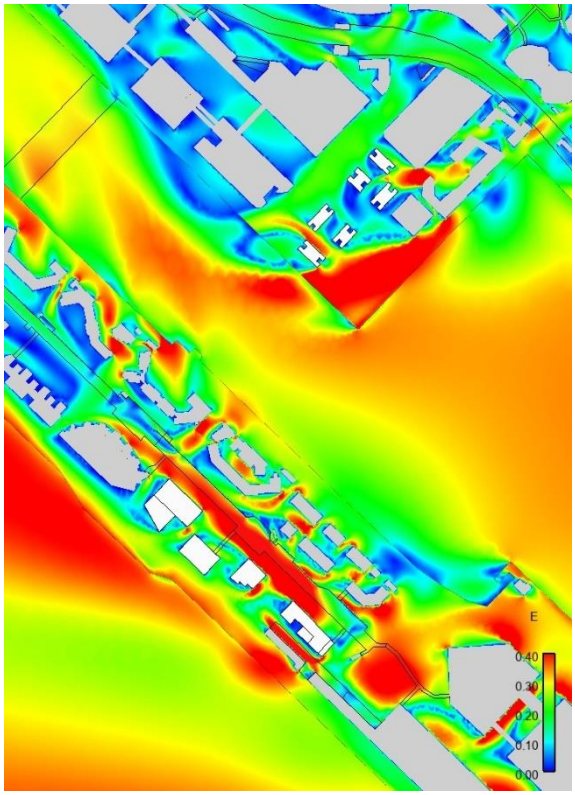


Figure B 4 Contour Plot of Baseline Scheme under E Wind

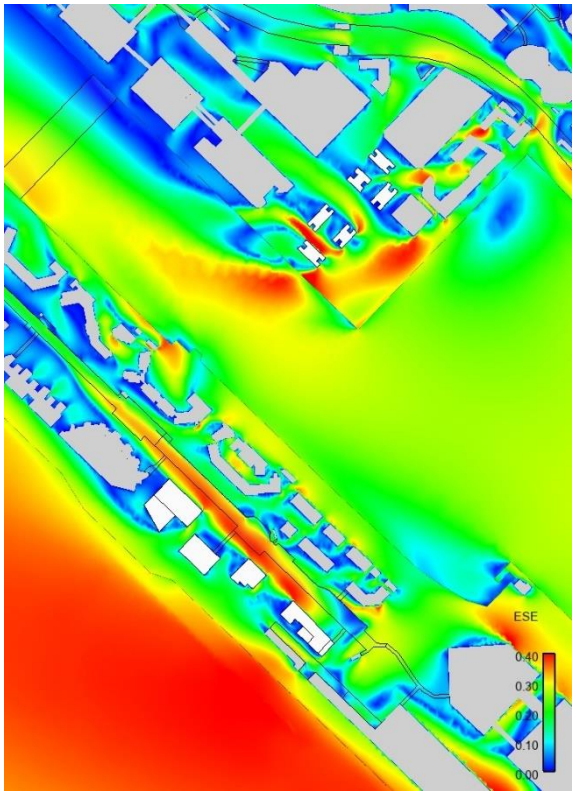


Figure B 5 Contour Plot of Baseline Scheme under ESE Wind

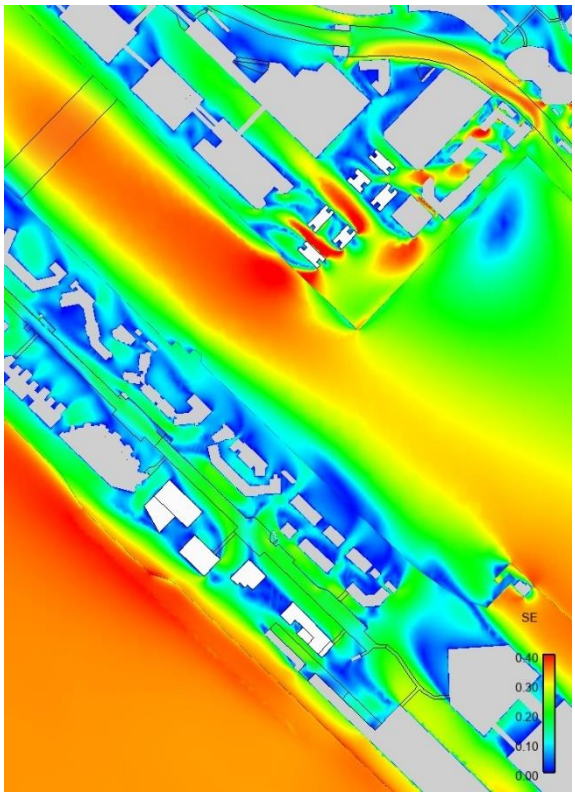


Figure B 6 Contour Plot of Baseline Scheme under SE Wind

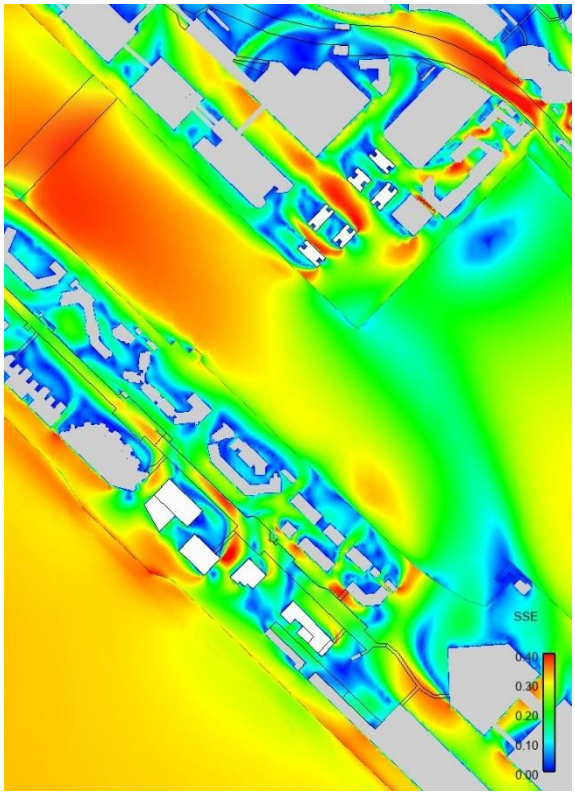


Figure B 7 Contour Plot of Baseline Scheme under SSE Wind

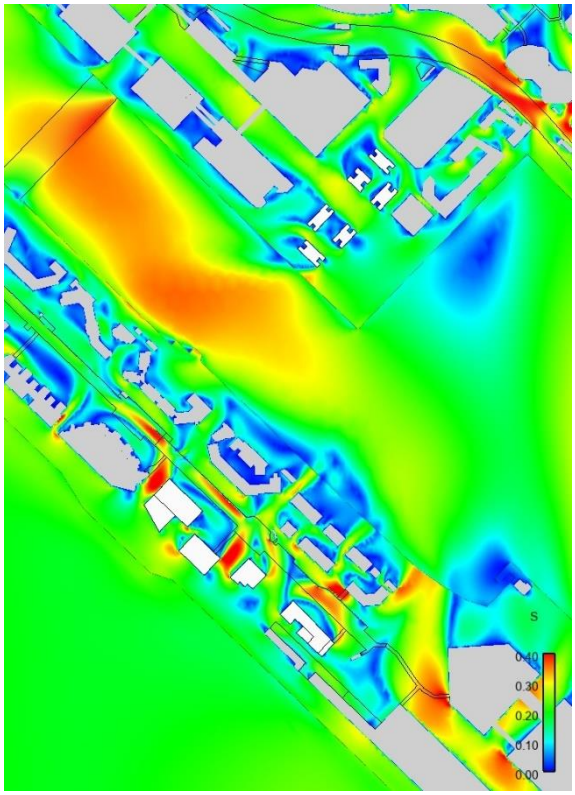


Figure B 8 Contour Plot of Baseline Scheme under S Wind

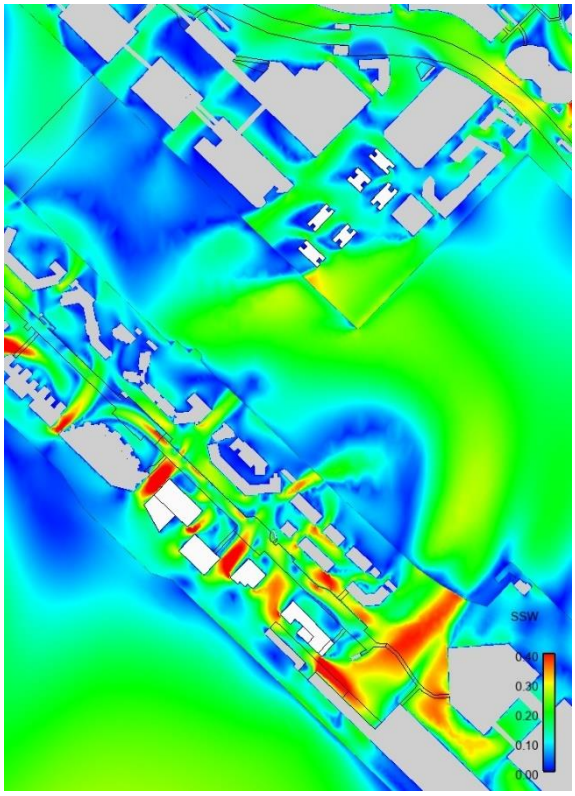


Figure B 9 Contour Plot of Baseline Scheme under SSW Wind

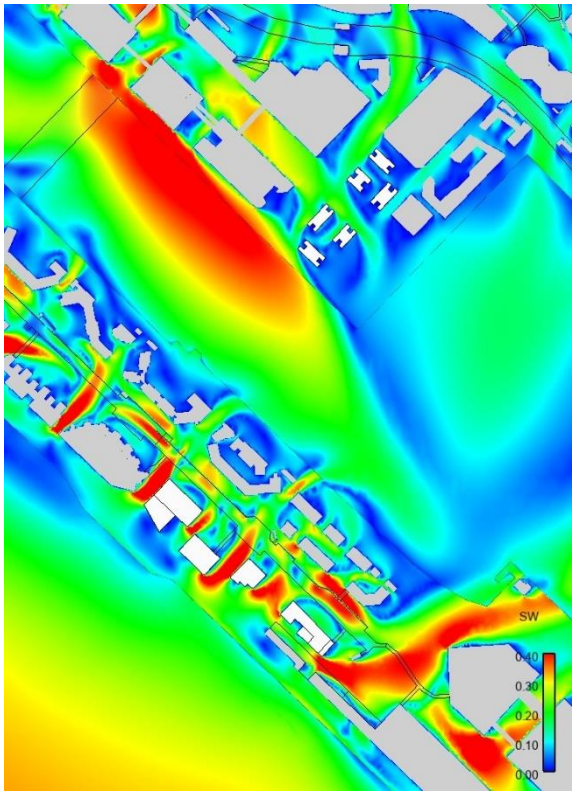


Figure B 10 Contour Plot of Baseline Scheme under SW Wind

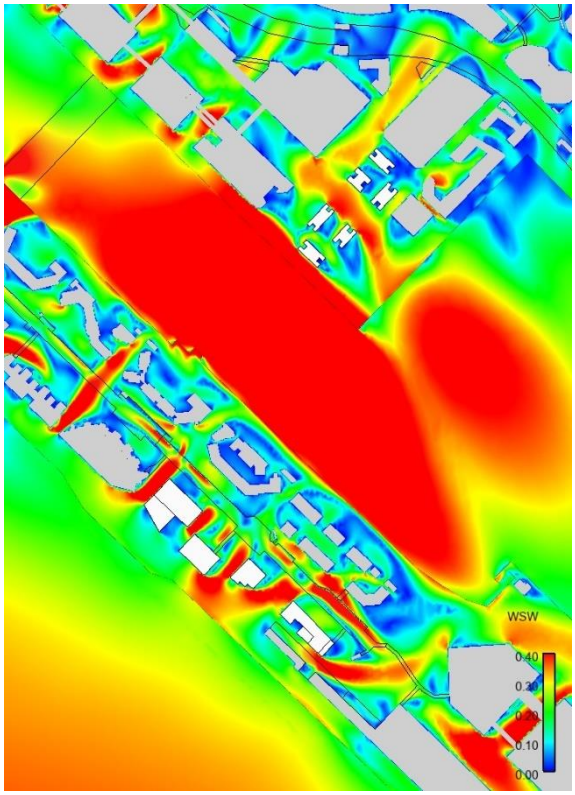


Figure B 11 Contour Plot of Baseline Scheme under WSW Wind

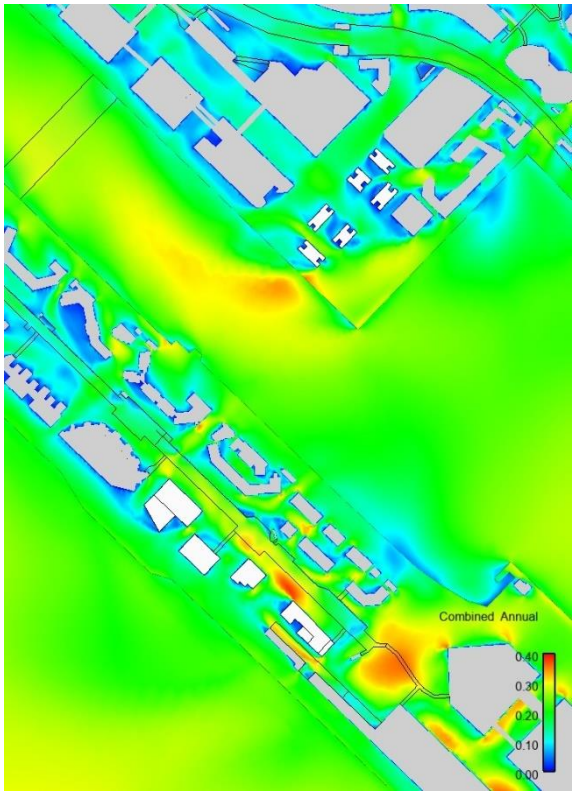


Figure B 12 Contour Plot of Baseline Scheme under Annual Condition

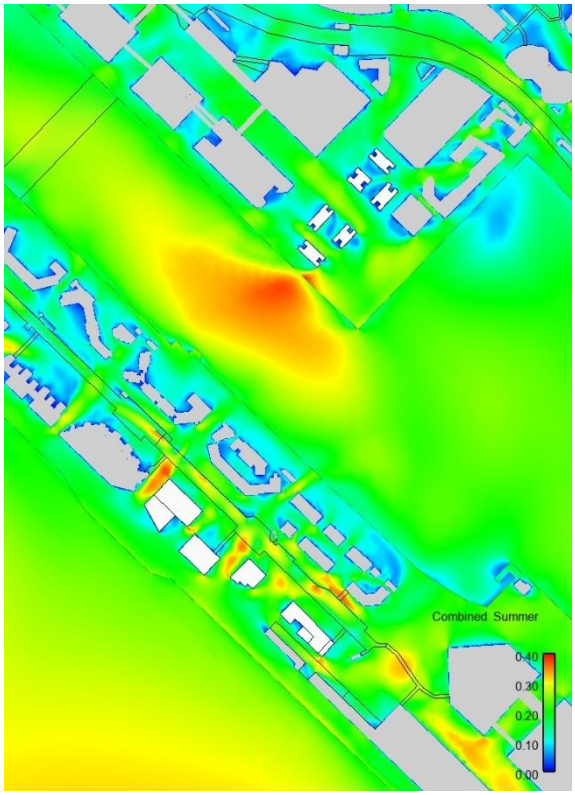


Figure B 13 Contour Plot of Baseline Scheme under Summer Condition

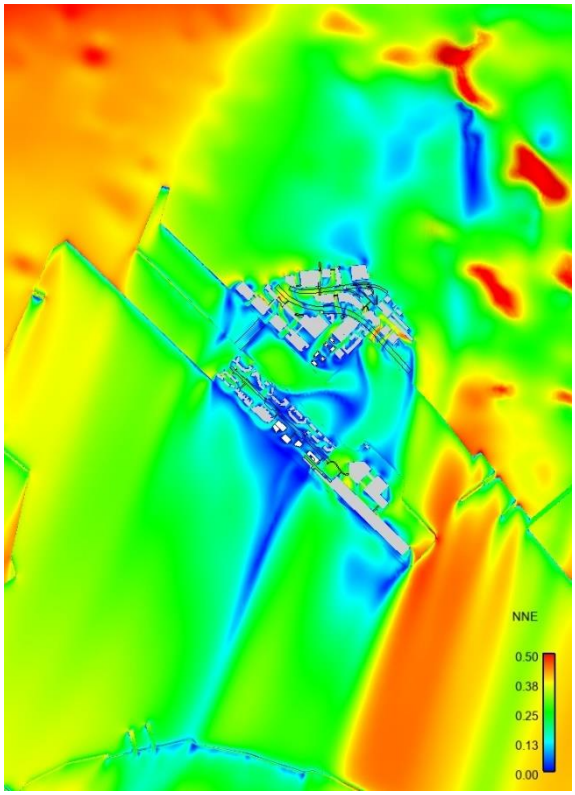


Figure B 14 Domain Contour Plot of Baseline Scheme under NNE Wind

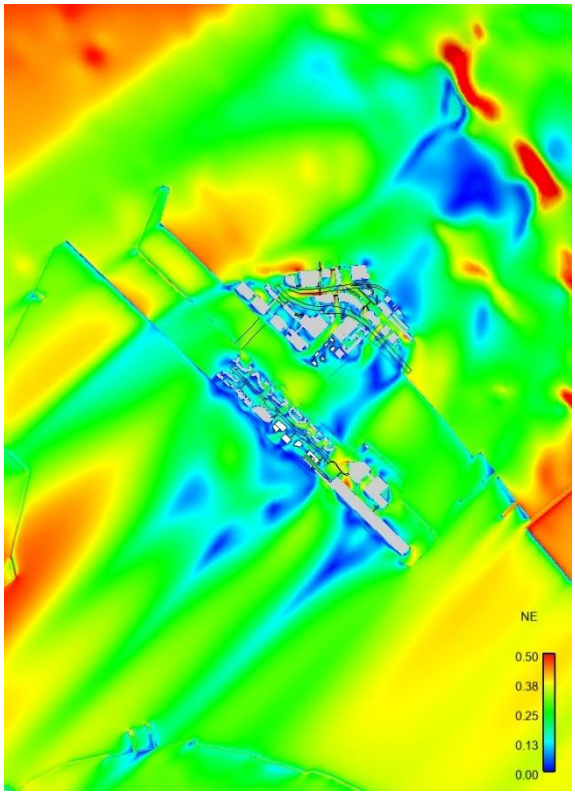


Figure B 15 Domain Contour Plot of Baseline Scheme under NE Wind

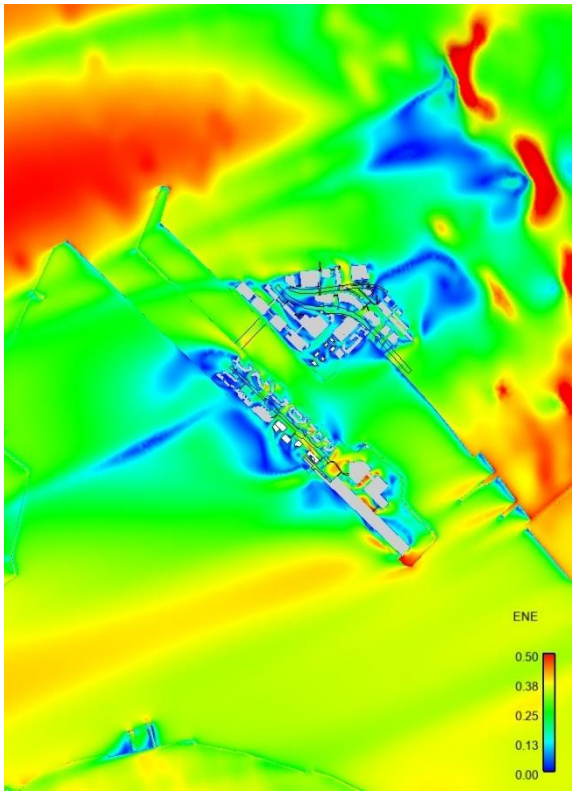


Figure B 16 Domain Contour Plot of Baseline Scheme under ENE Wind

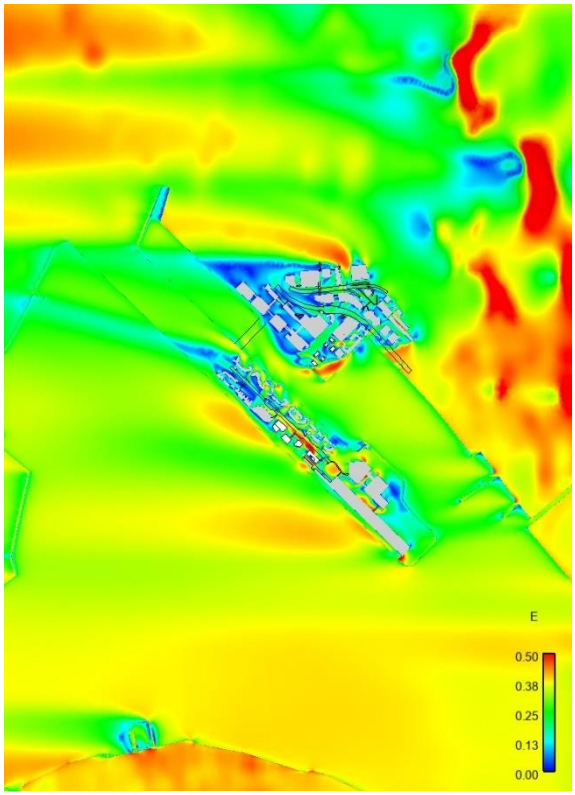


Figure B 17 Domain Contour Plot of Baseline Scheme under E Wind

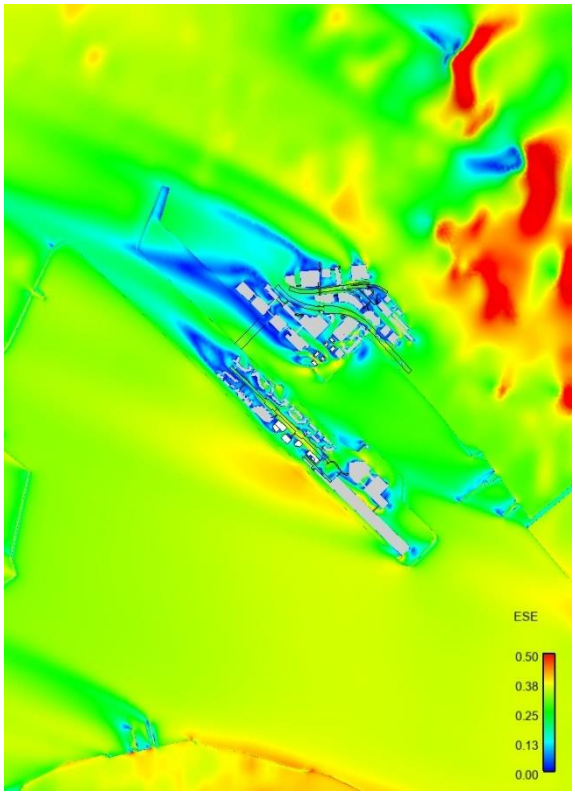


Figure B 18 Domain Contour Plot of Baseline Scheme under ESE Wind

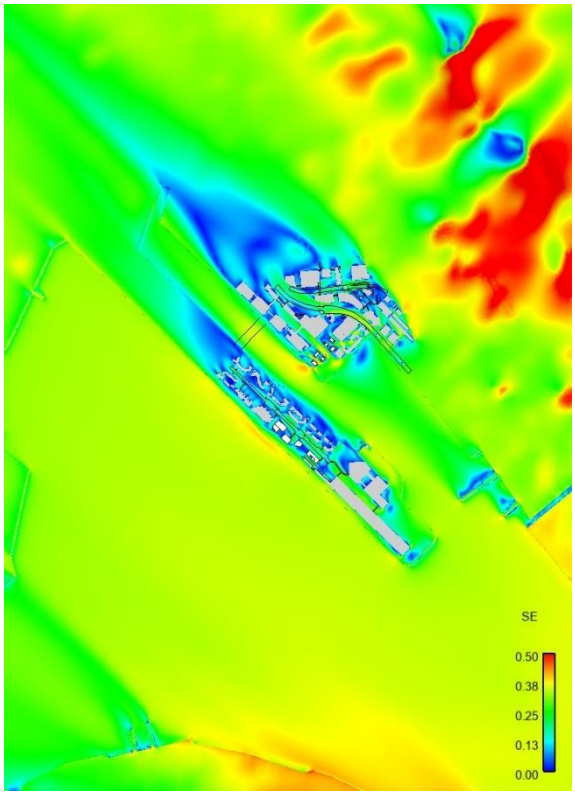


Figure B 19 Domain Contour Plot of Baseline Scheme under SE Wind

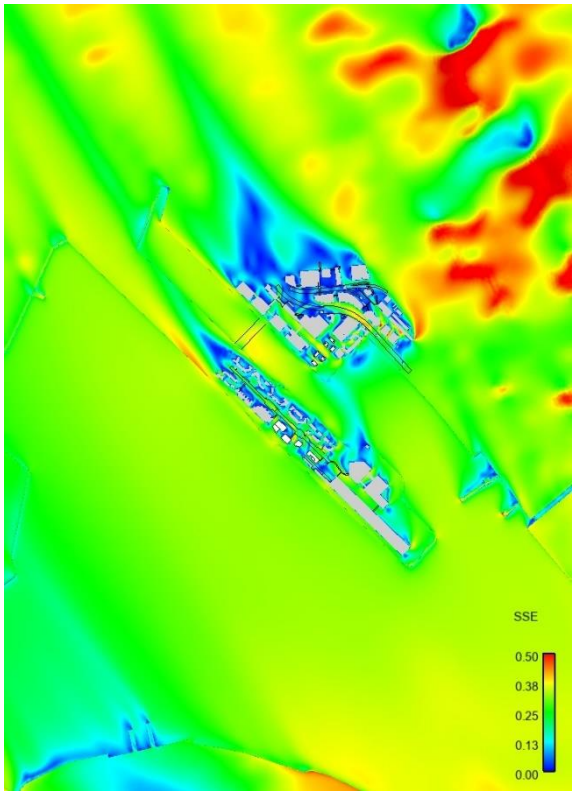


Figure B 20 Domain Contour Plot of Baseline Scheme under SSE Wind

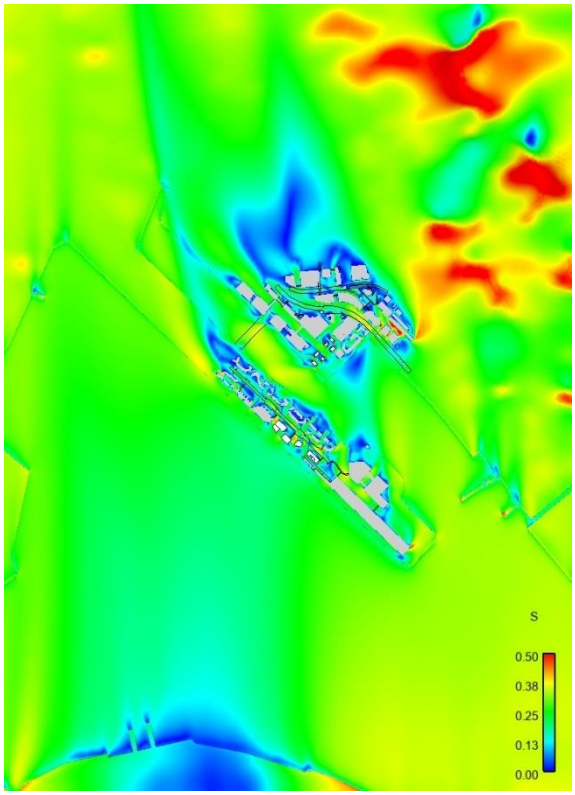


Figure B 21 Domain Contour Plot of Baseline Scheme under S Wind

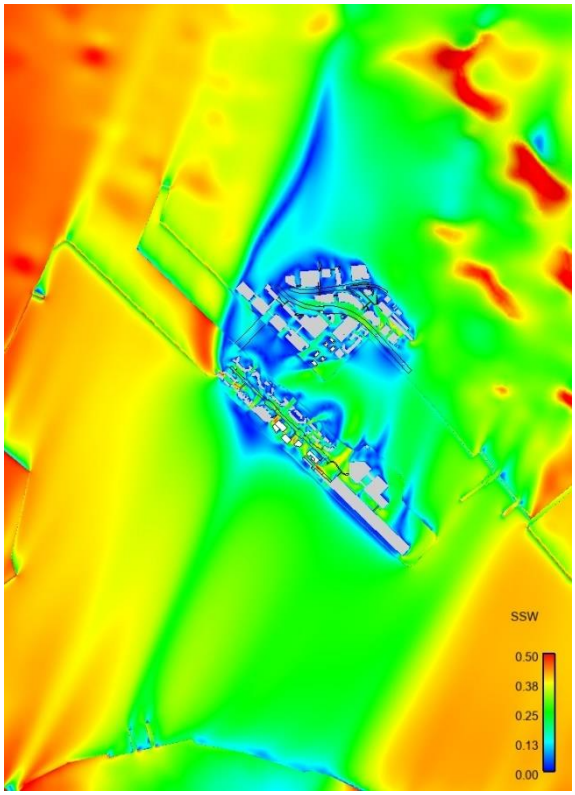


Figure B 22 Domain Contour Plot of Baseline Scheme under SSW Wind

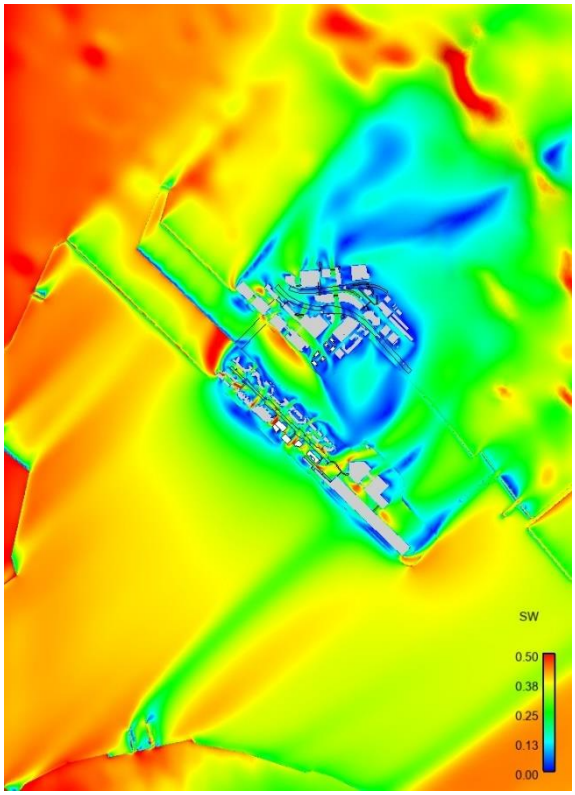


Figure B 23 Domain Contour Plot of Baseline Scheme under SW Wind

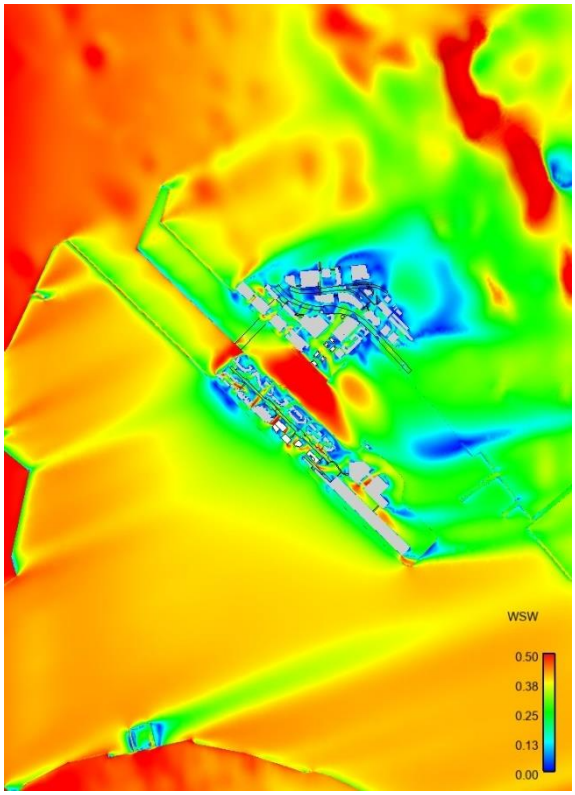


Figure B 24 Domain Contour Plot of Baseline Scheme under WSW Wind

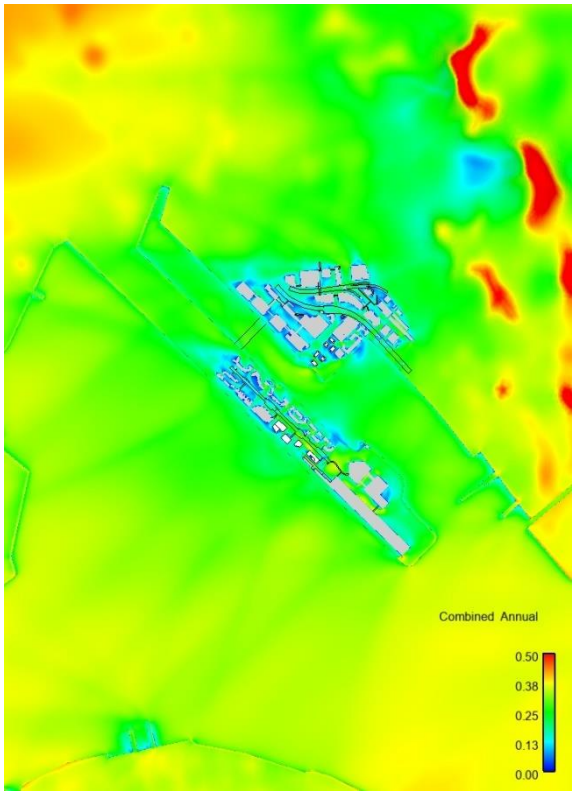


Figure B 25 Domain Contour Plot of Baseline Scheme under Annual Condition

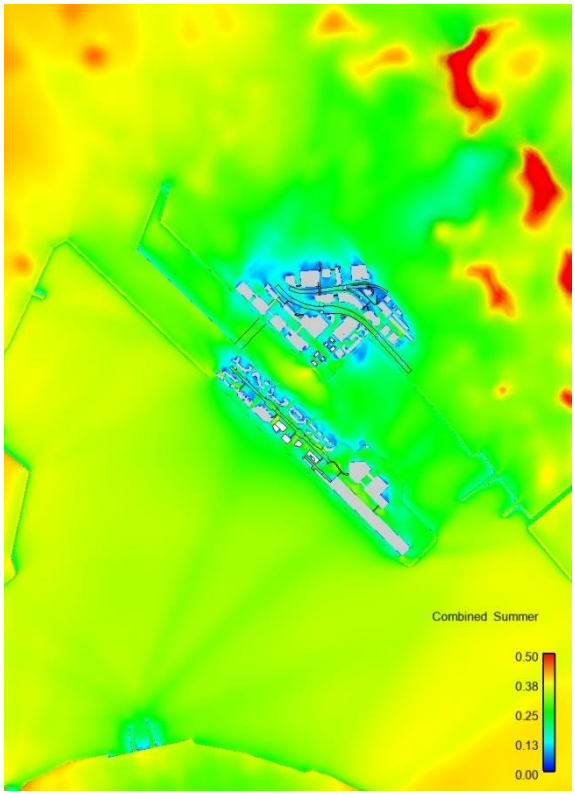


Figure B 26 Domain Contour Plot of Baseline Scheme under Summer Condition

C.2 Proposed Scheme

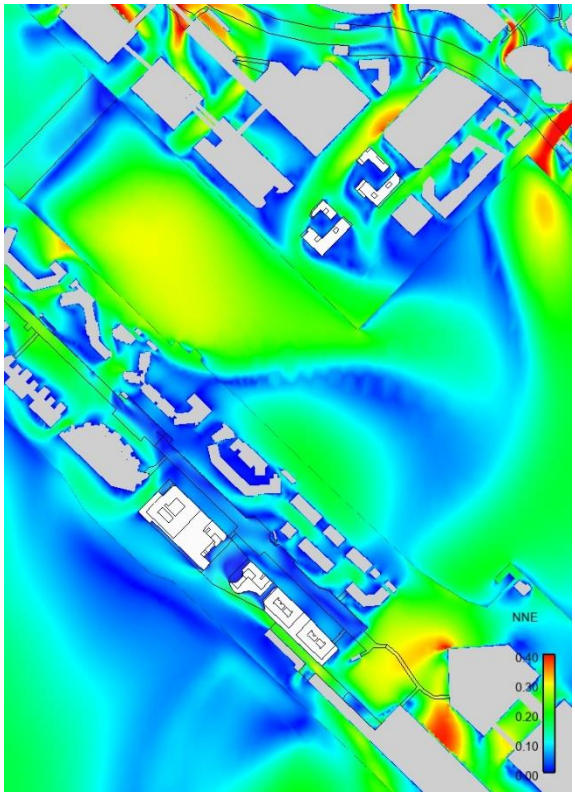


Figure B 27 Contour Plot of Proposed Scheme under NNE Wind

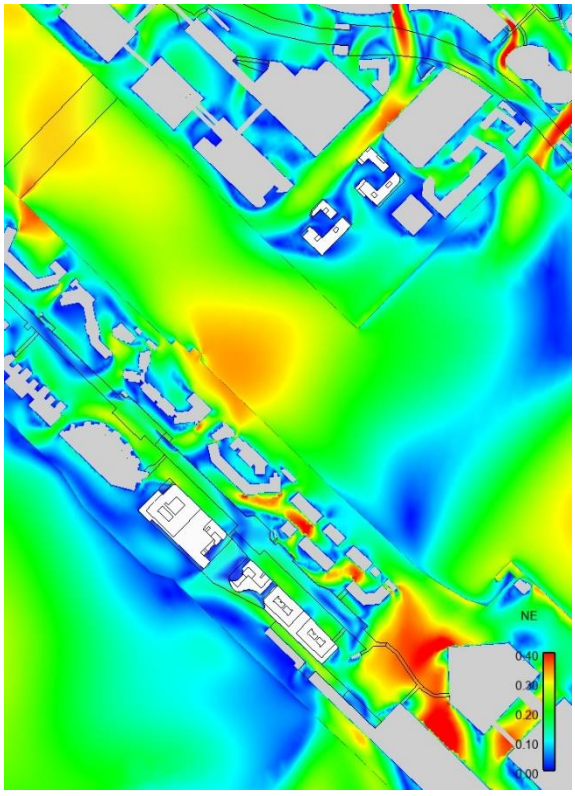


Figure B 28 Contour Plot of Proposed Scheme under NE Wind

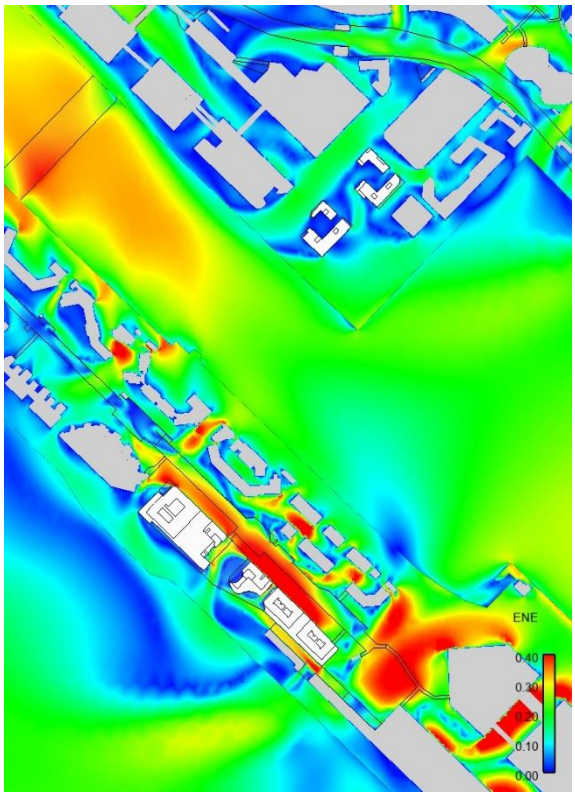


Figure B 29 Contour Plot of Proposed Scheme under ENE Wind

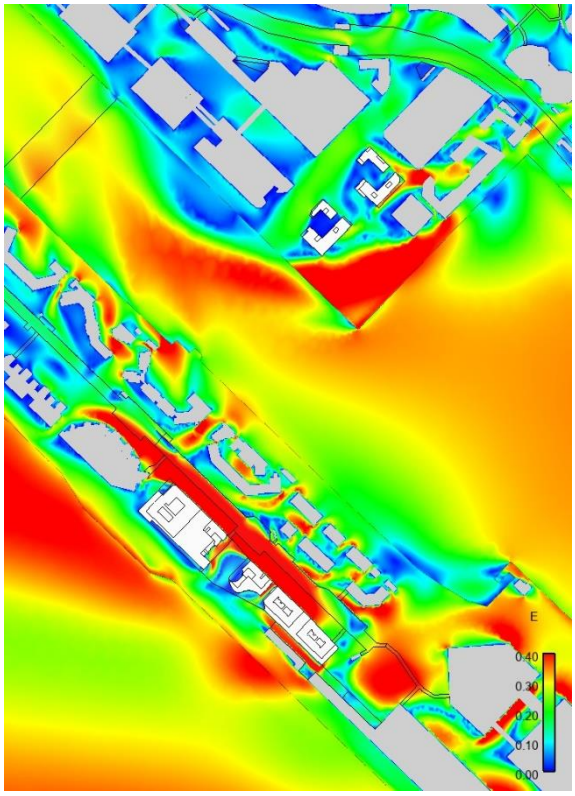


Figure B 30 Contour Plot of Proposed Scheme under E Wind

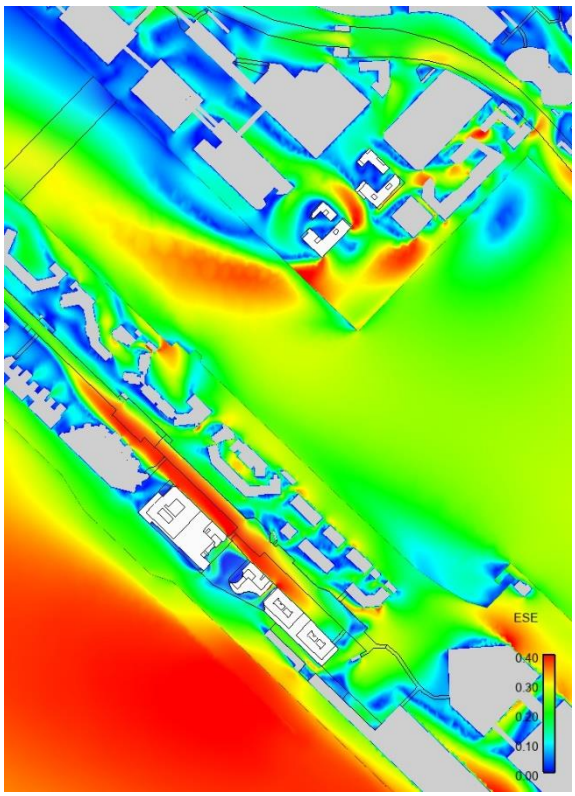


Figure B 31 Contour Plot of Proposed Scheme under ESE Wind

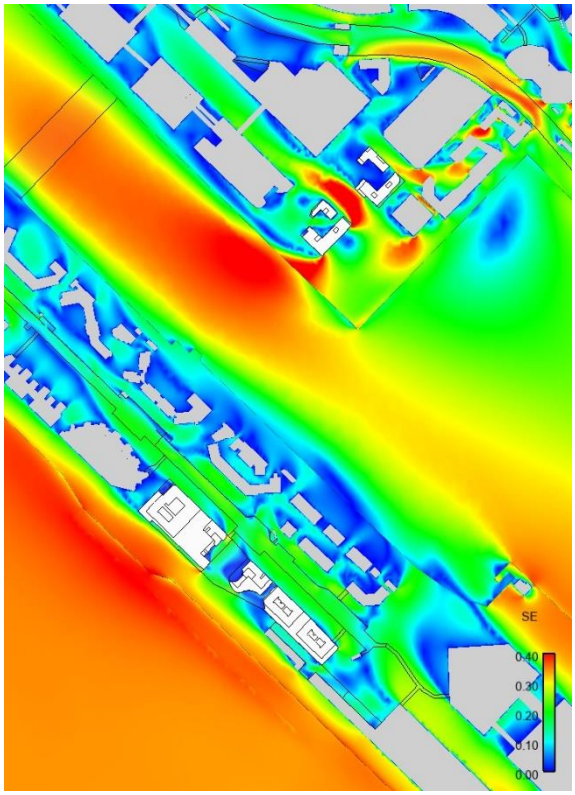


Figure B 32 Contour Plot of Proposed Scheme under SE Wind

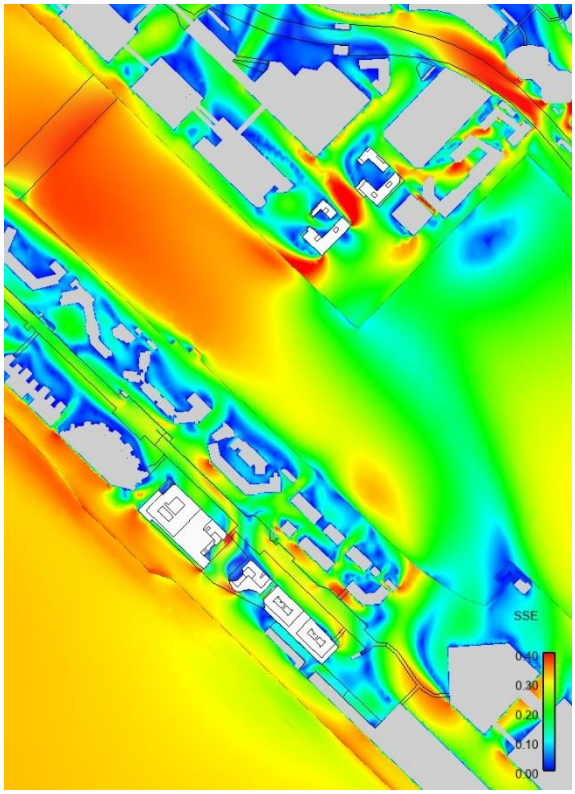


Figure B 33 Contour Plot of Proposed Scheme under SSE Wind

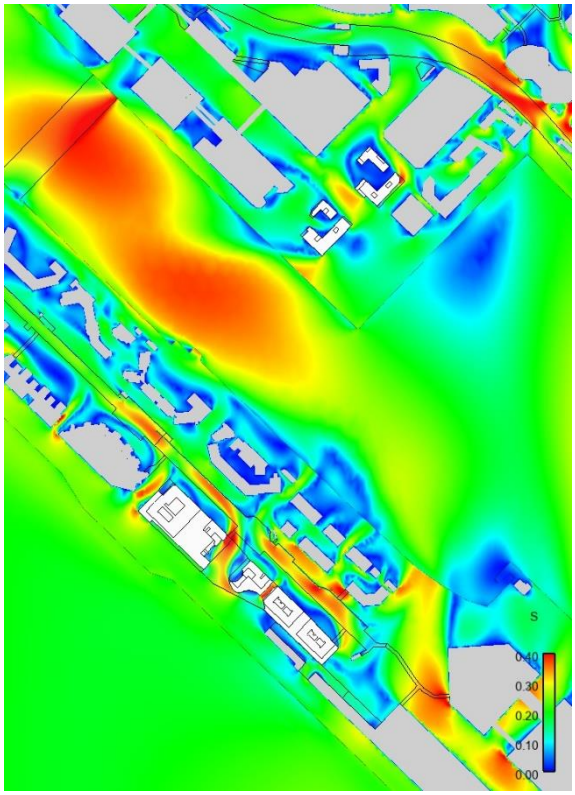


Figure B 34 Contour Plot of Proposed Scheme under S Wind

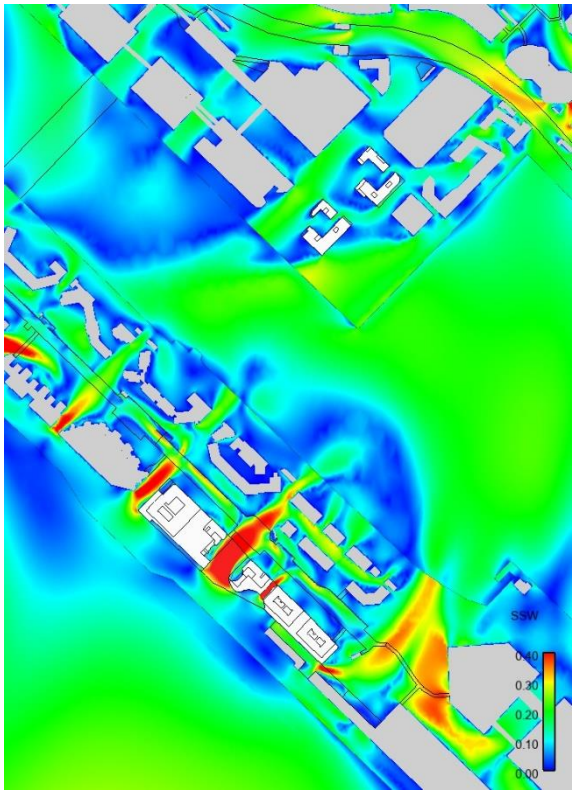


Figure B 35 Contour Plot of Proposed Scheme under SSW Wind

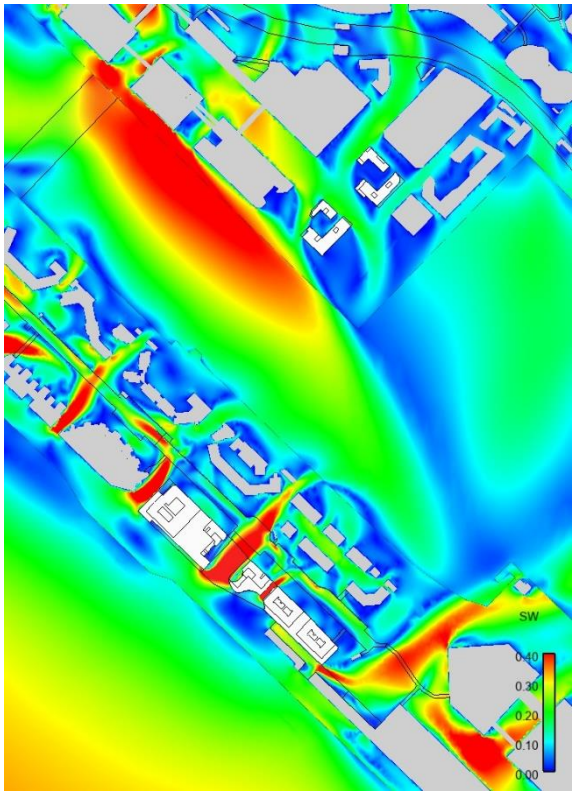


Figure B 36 Contour Plot of Proposed Scheme under SW Wind

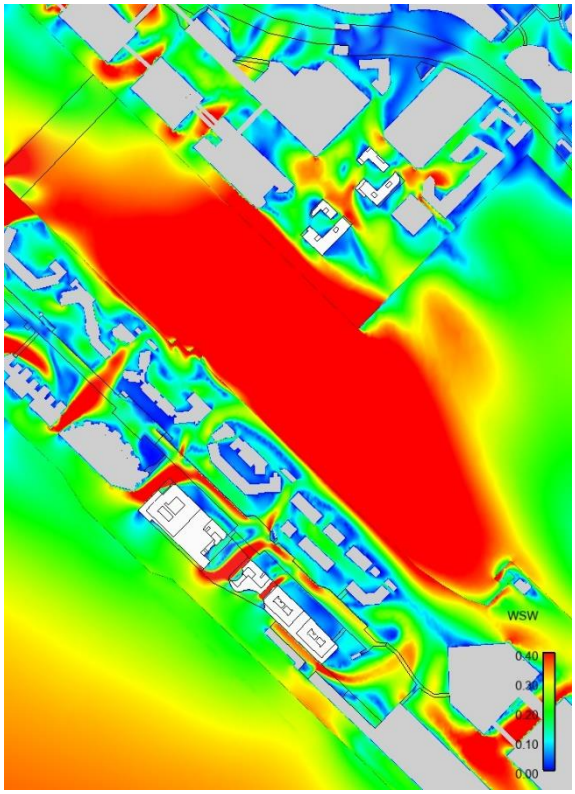


Figure B 37 Contour Plot of Proposed Scheme under WSW Wind

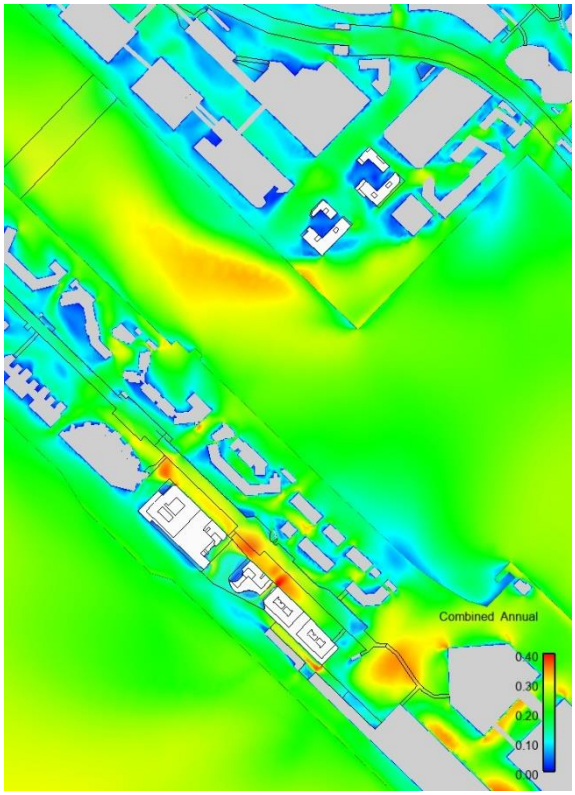


Figure B 38 Contour Plot of Proposed Scheme under Annual Condition

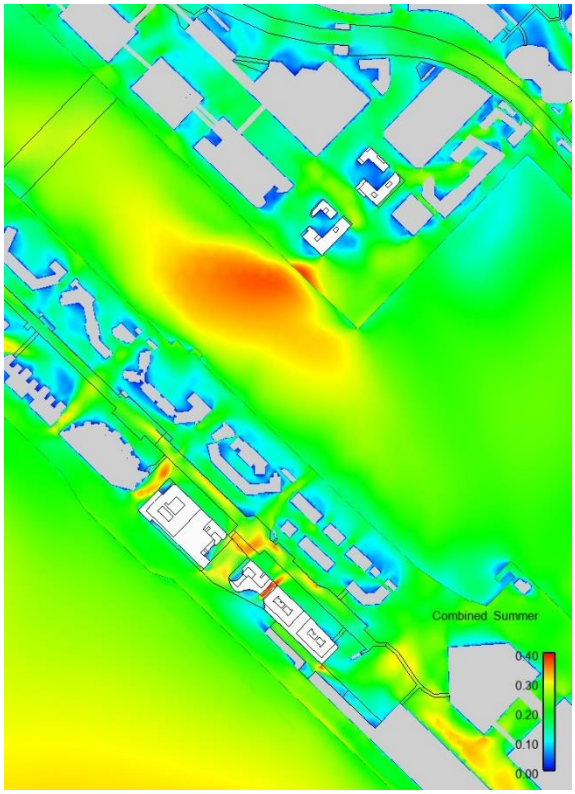


Figure B 39 Contour Plot of Proposed Scheme under Summer Condition

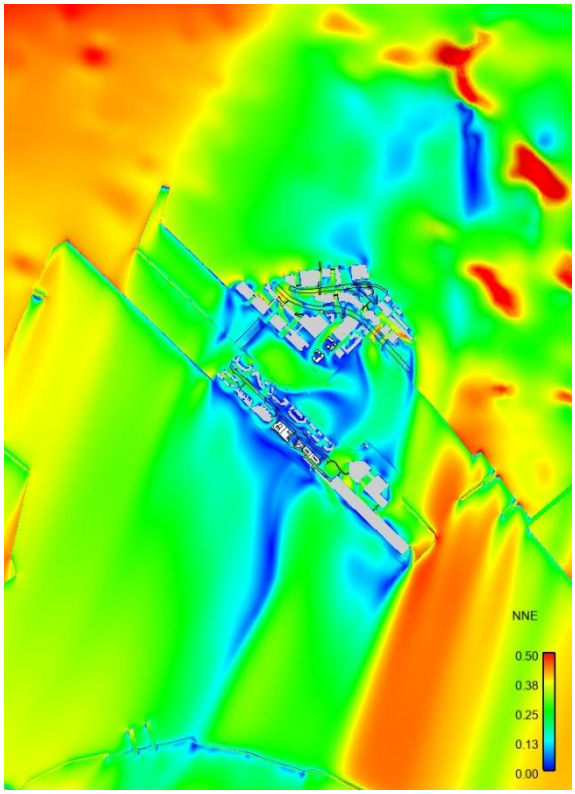


Figure B 40 Domain Contour Plot of Proposed Scheme under NNE Wind

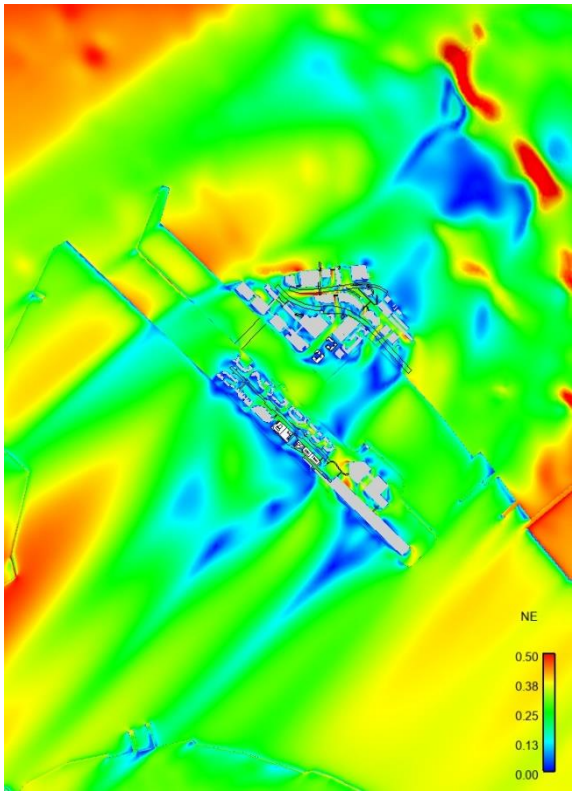


Figure B 41 Domain Contour Plot of Proposed Scheme under NE Wind

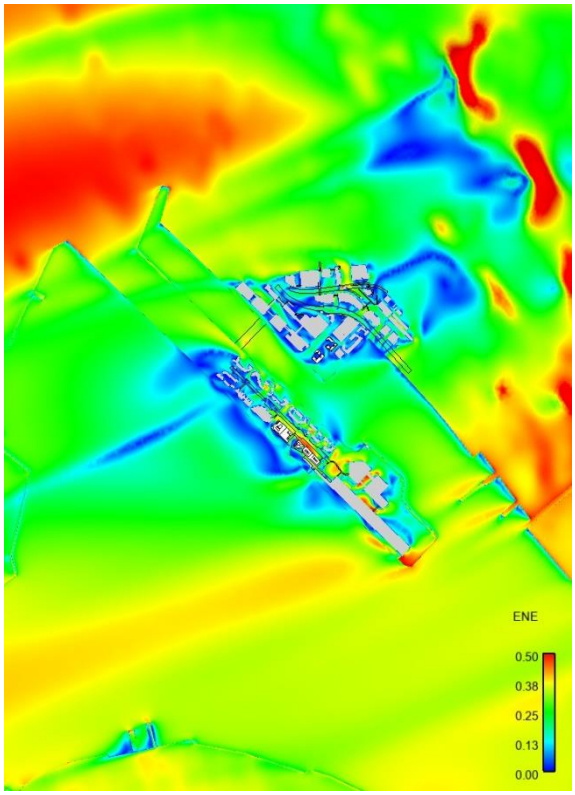


Figure B 42 Domain Contour Plot of Proposed Scheme under ENE Wind

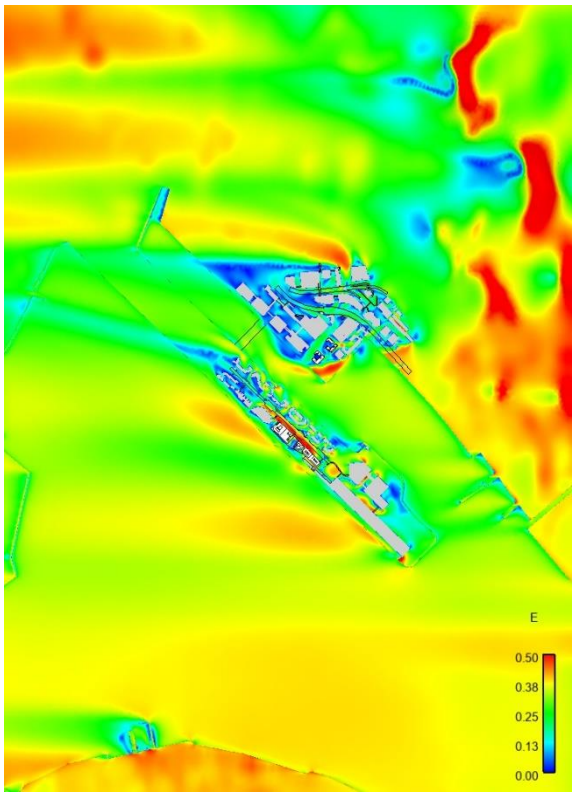


Figure B 43 Domain Contour Plot of Proposed Scheme under E Wind

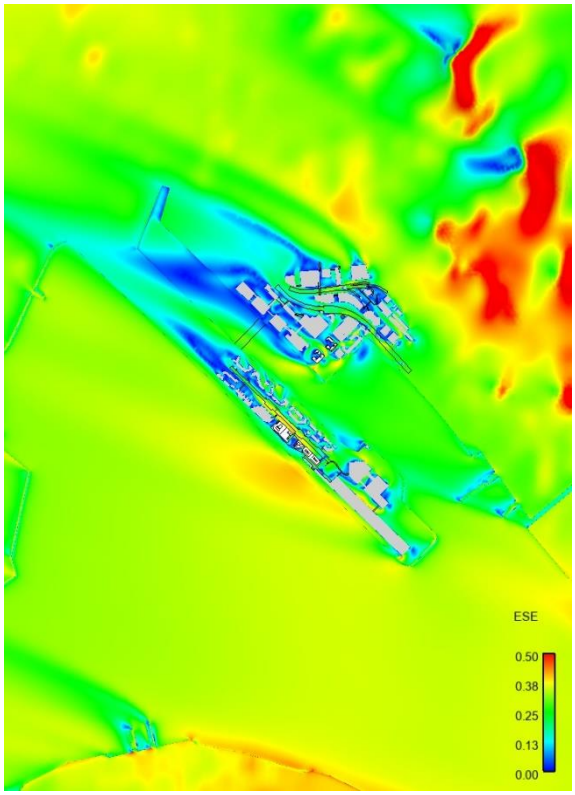


Figure B 44 Domain Contour Plot of Proposed Scheme under ESE Wind

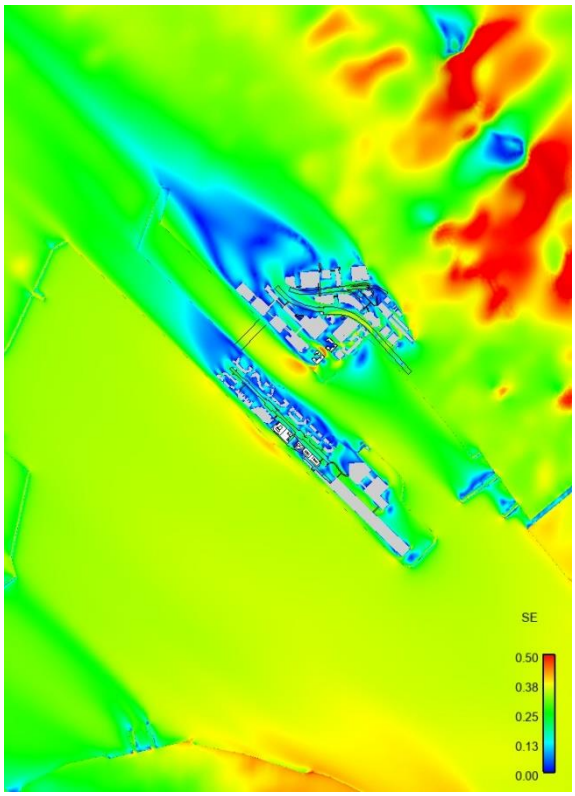


Figure B 45 Domain Contour Plot of Proposed Scheme under SE Wind

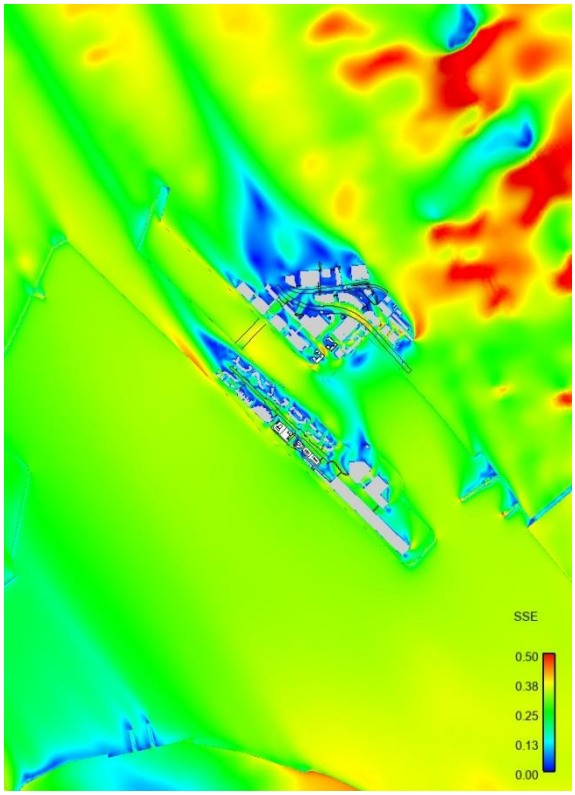


Figure B 46 Domain Contour Plot of Proposed Scheme under SSE Wind

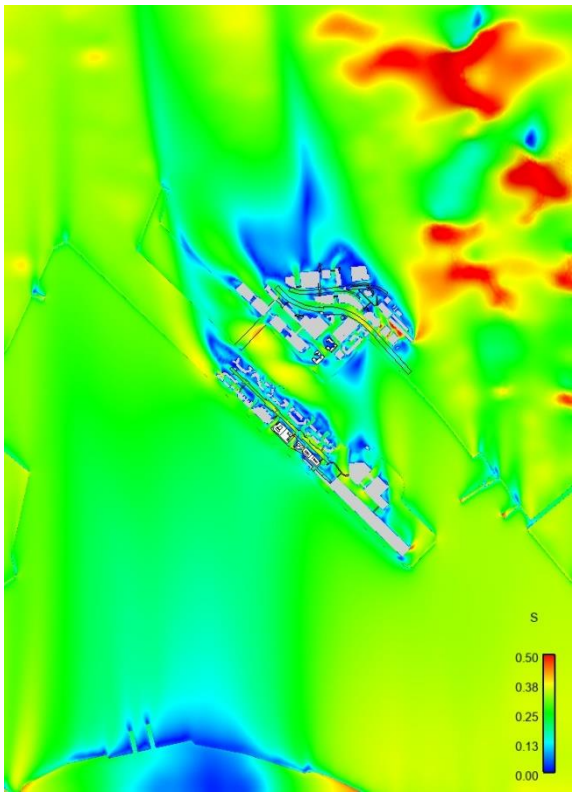


Figure B 47 Domain Contour Plot of Proposed Scheme under S Wind

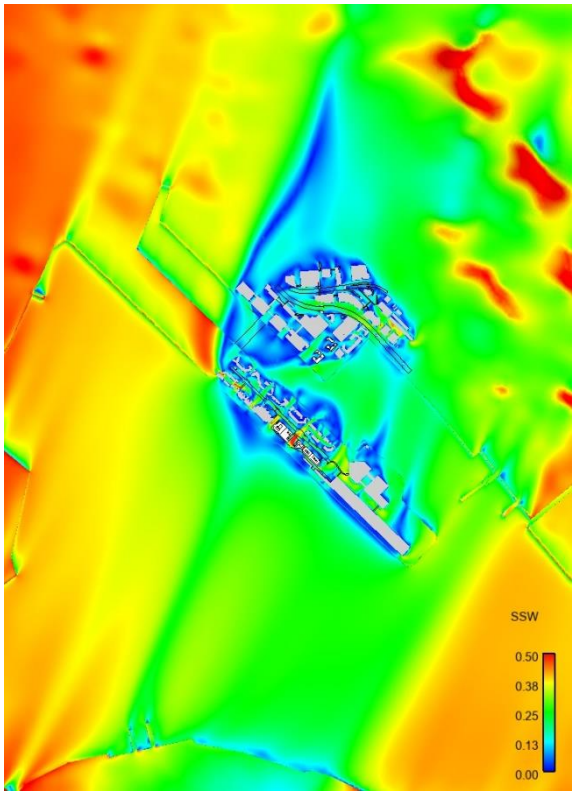


Figure B 48 Domain Contour Plot of Proposed Scheme under SSW Wind

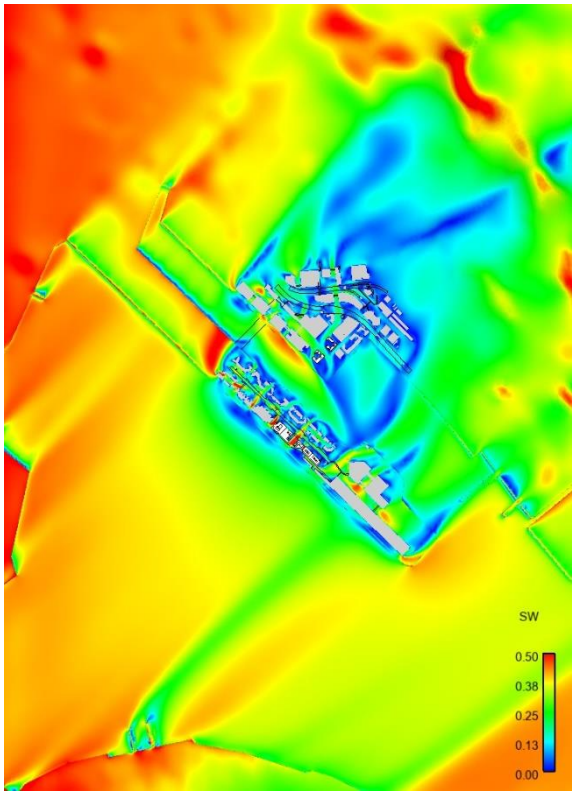


Figure B 49 Domain Contour Plot of Proposed Scheme under SW Wind

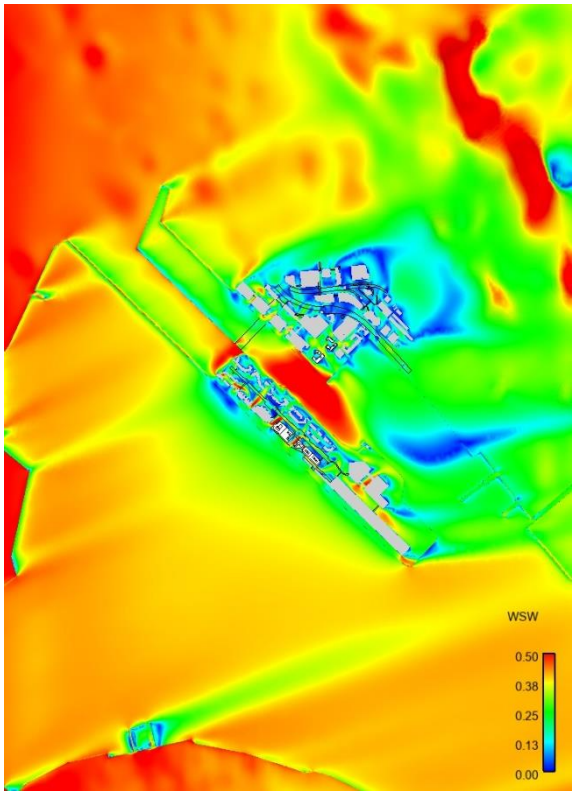


Figure B 50 Domain Contour Plot of Proposed Scheme under WSW Wind

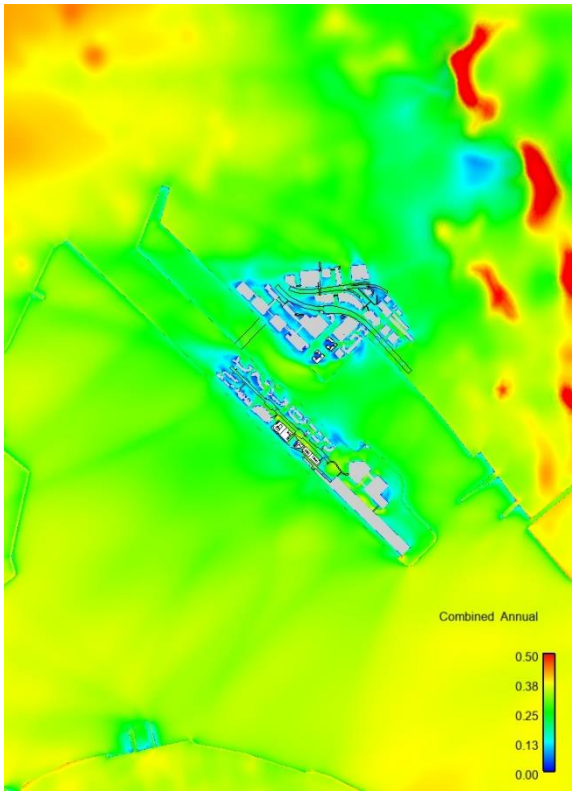


Figure B 51 Domain Contour Plot of Proposed Scheme under Annual Condition

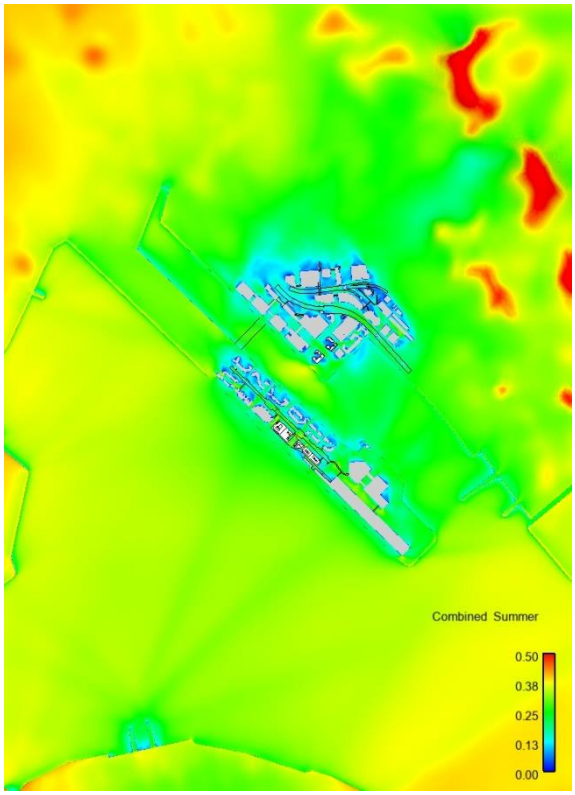


Figure B 52 Domain Contour Plot of Proposed Scheme under Summer Condition

Appendix D

Vector Plot of Velocity Ratio (VR)

D.1 Baseline Scheme

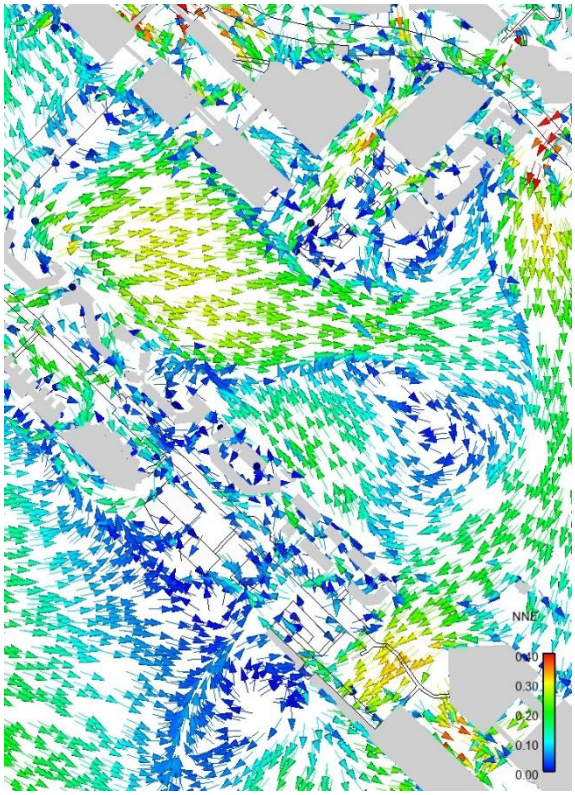


Figure C 1 Vector Plot of Baseline Scheme under NNE Wind

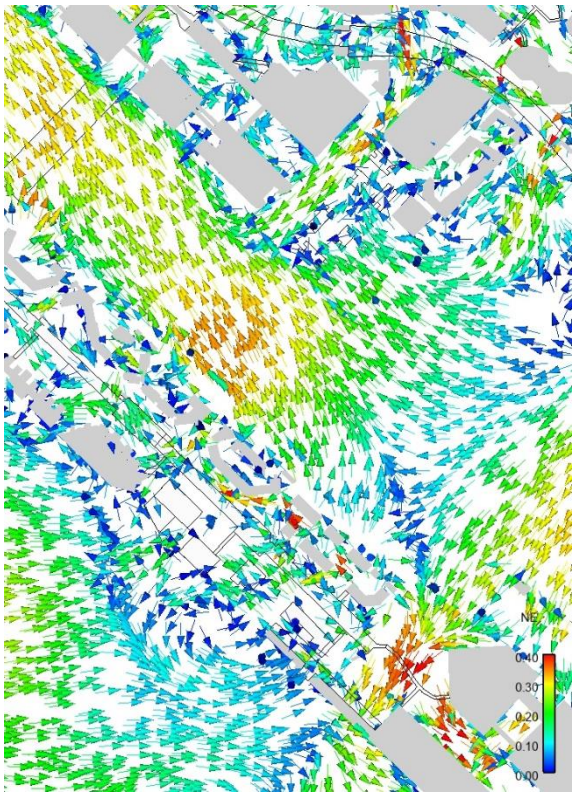


Figure C 2 Vector Plot of Baseline Scheme under NE Wind

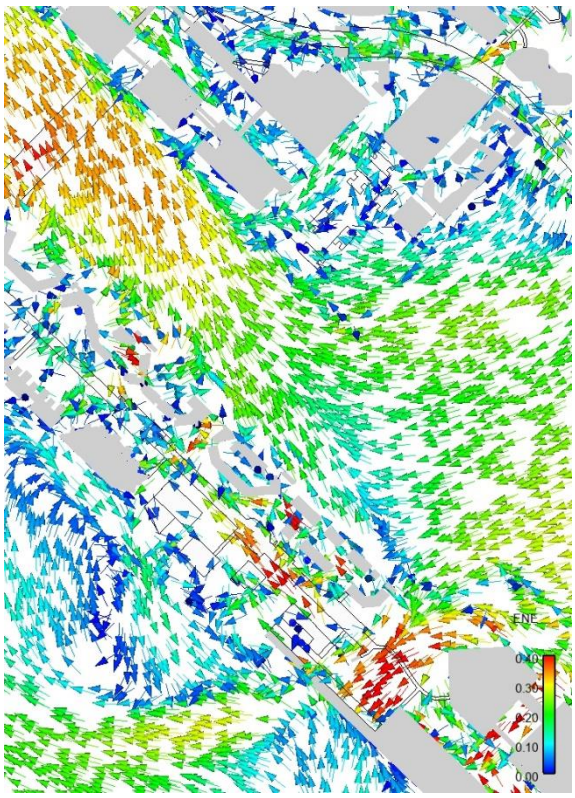


Figure C 3 Vector Plot of Baseline Scheme under ENE Wind

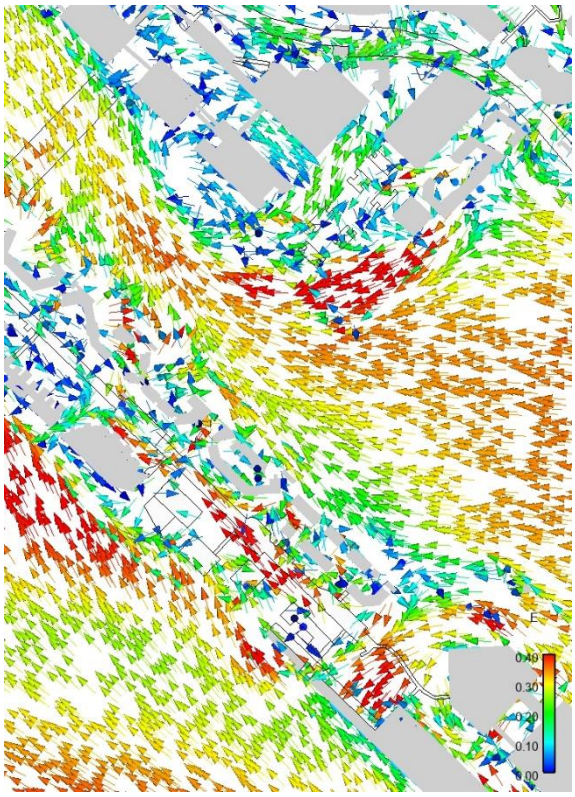


Figure C 4 Vector Plot of Baseline Scheme under E Wind

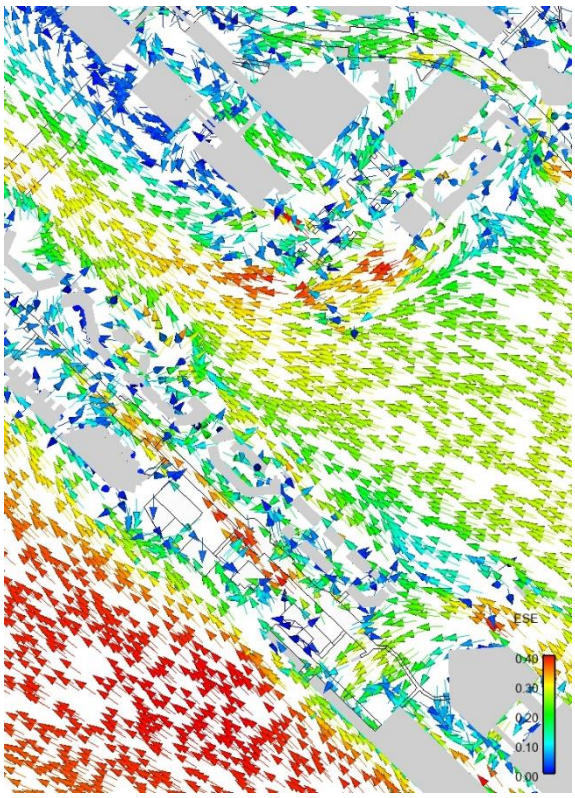


Figure C 5 Vector Plot of Baseline Scheme under ESE Wind

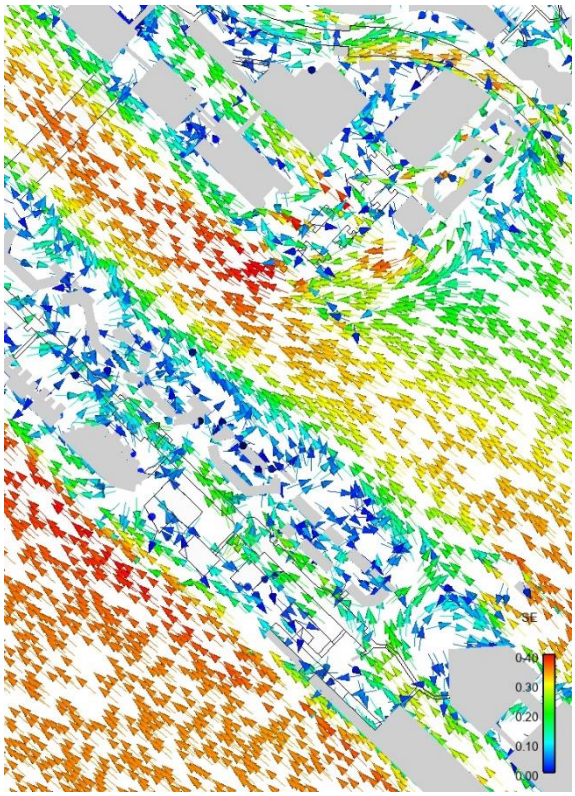


Figure C 6 Vector Plot of Baseline Scheme under SE Wind

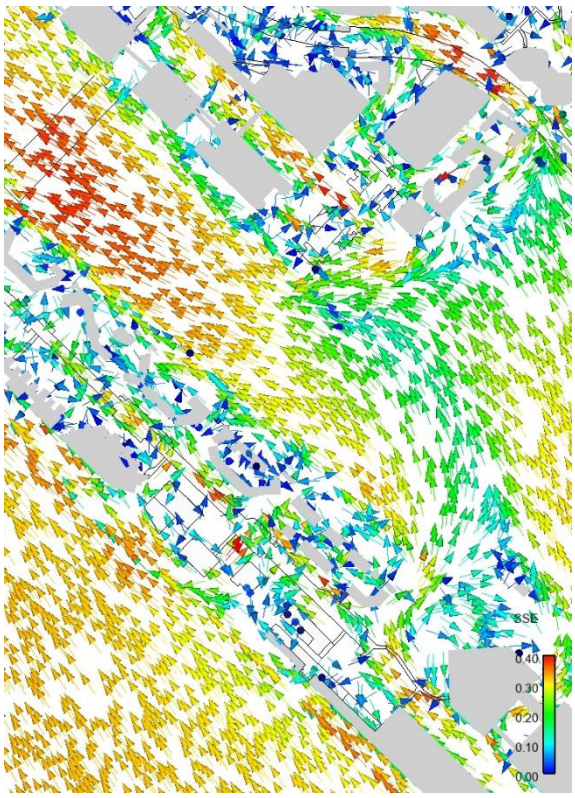


Figure C 7 Vector Plot of Baseline Scheme under SSE Wind

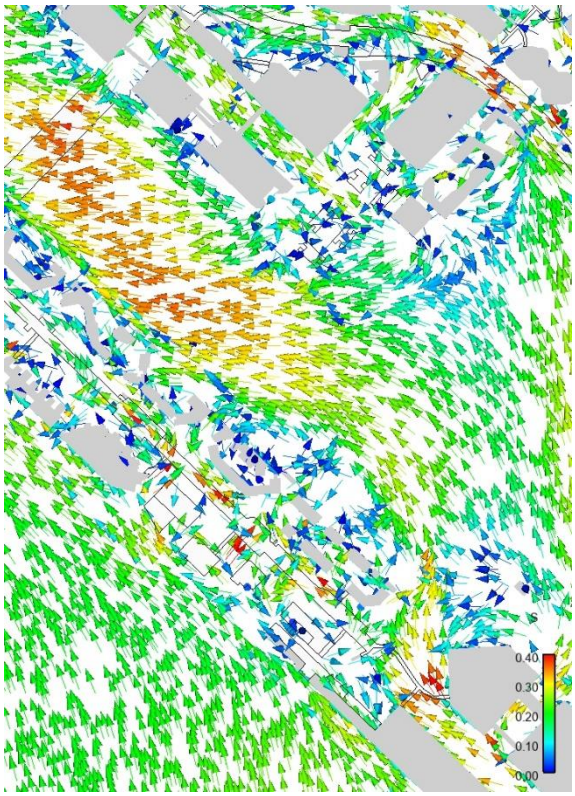


Figure C 8 Vector Plot of Baseline Scheme under S Wind

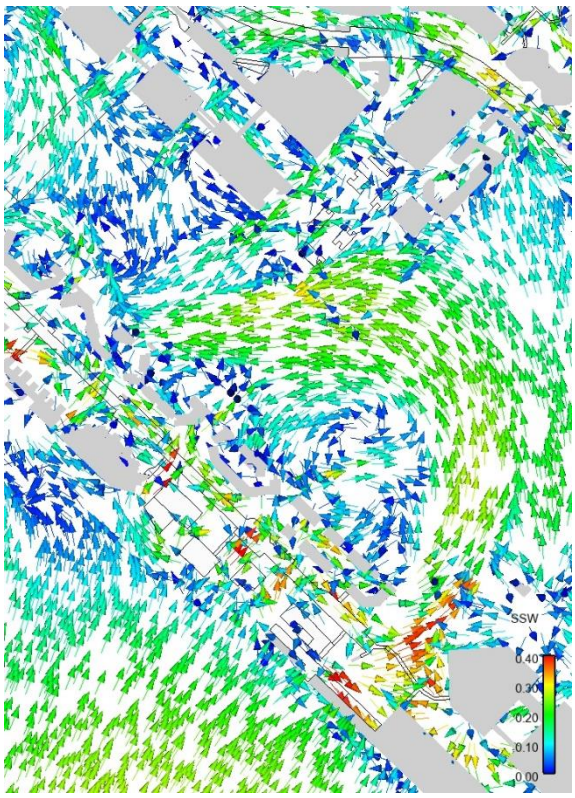


Figure C 9 Vector Plot of Baseline Scheme under SSW Wind

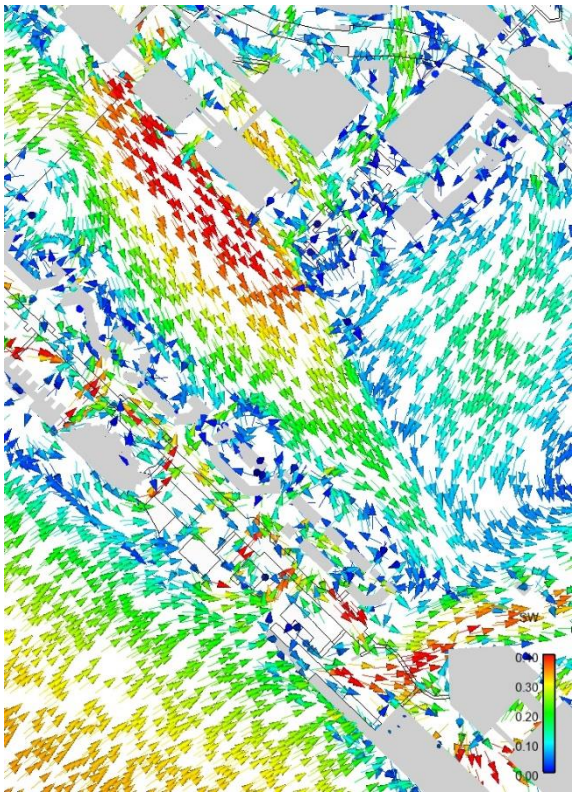


Figure C 10 Vector Plot of Baseline Scheme under SW Wind

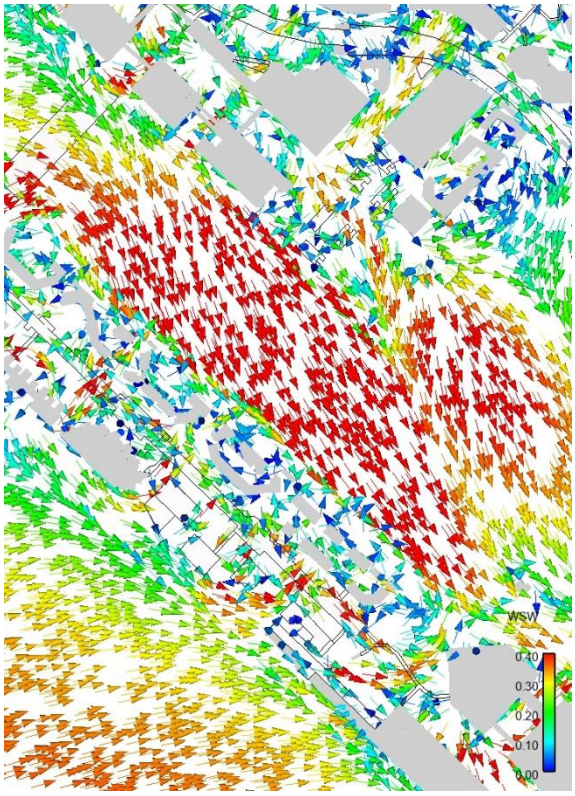


Figure C 11 Vector Plot of Baseline Scheme under WSW Wind

D.2 Proposed Scheme

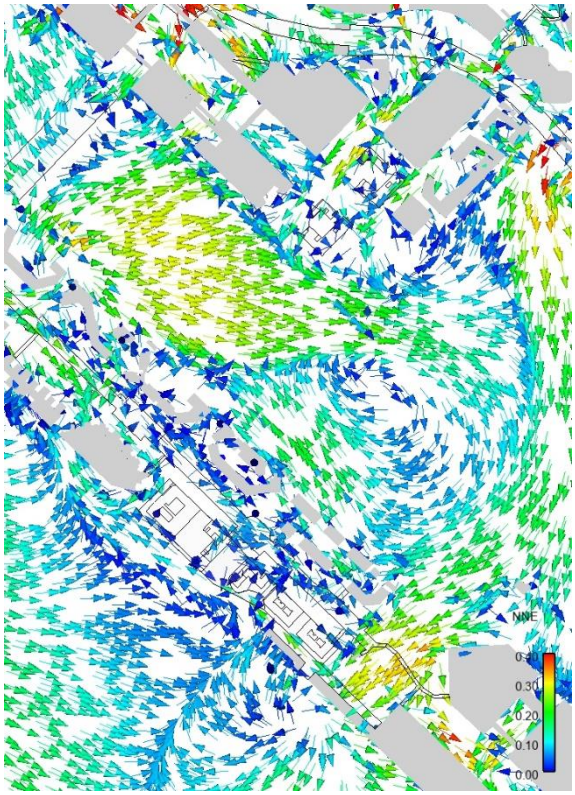


Figure C 12 Vector Plot of Proposed Scheme under NNE Wind

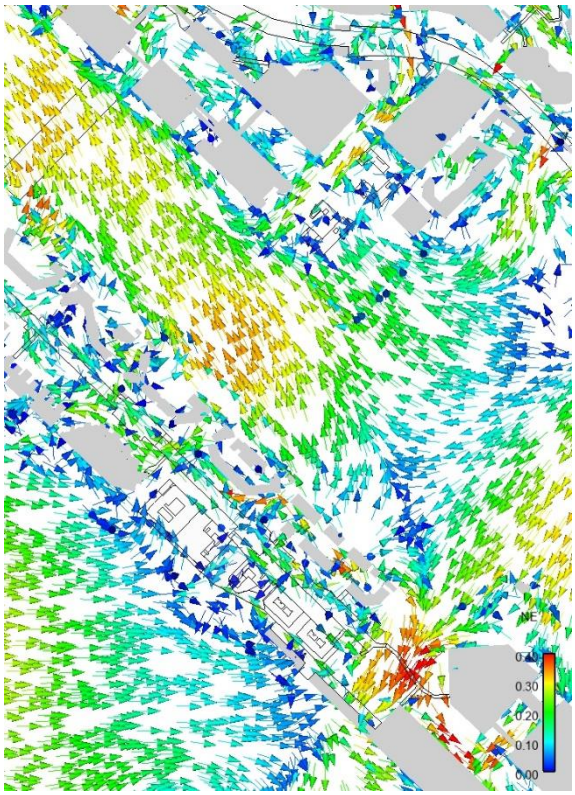


Figure C 13 Vector Plot of Proposed Scheme under NE Wind

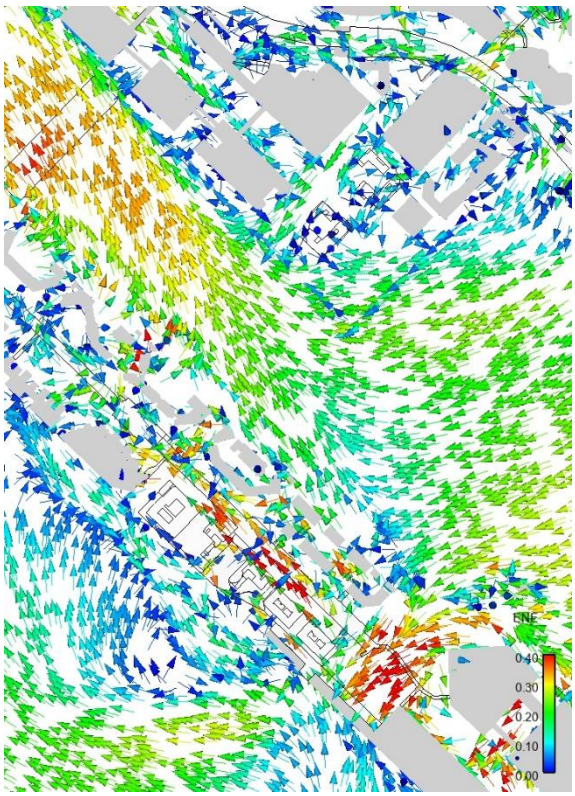


Figure C 14 Vector Plot of Proposed Scheme under ENE Wind

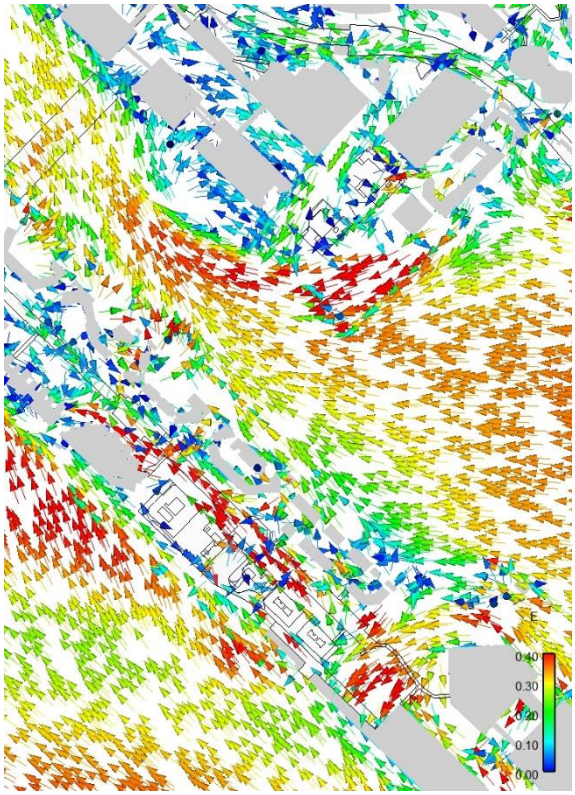


Figure C 15 Vector Plot of Proposed Scheme under E Wind

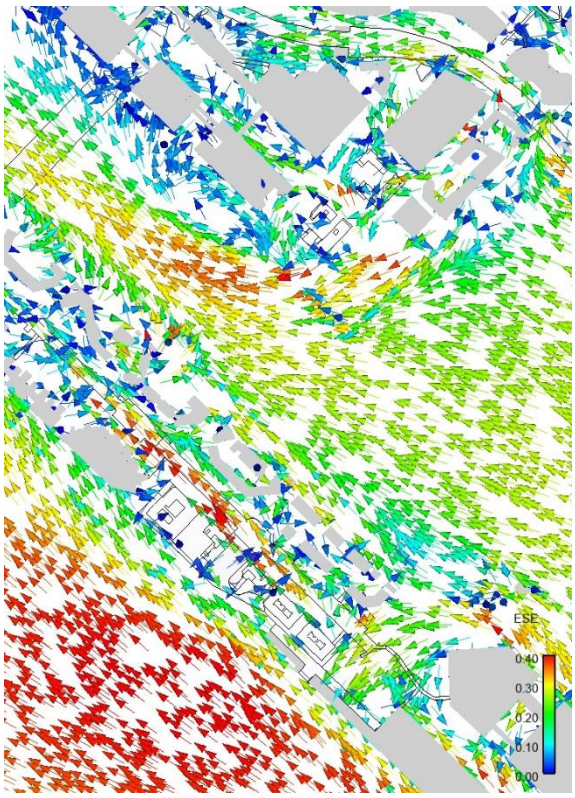


Figure C 16 Vector Plot of Proposed Scheme under ESE Wind

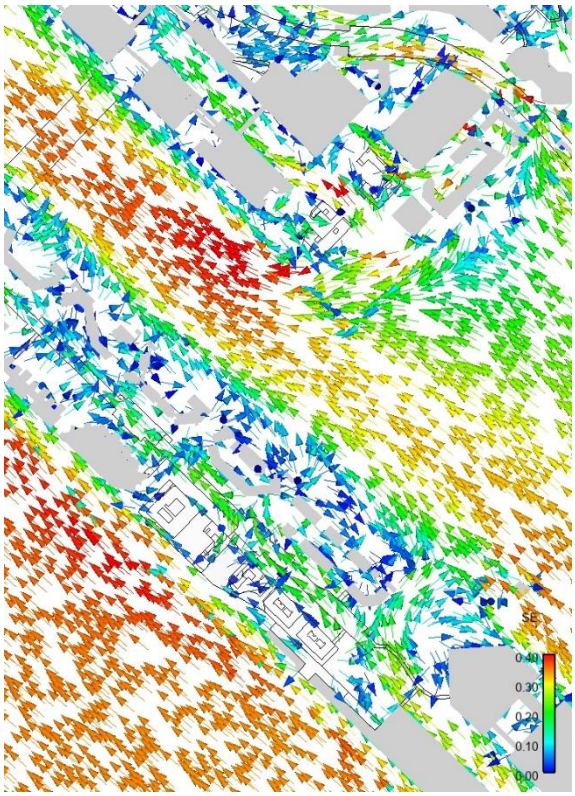


Figure C 17 Vector Plot of Proposed Scheme under SE Wind

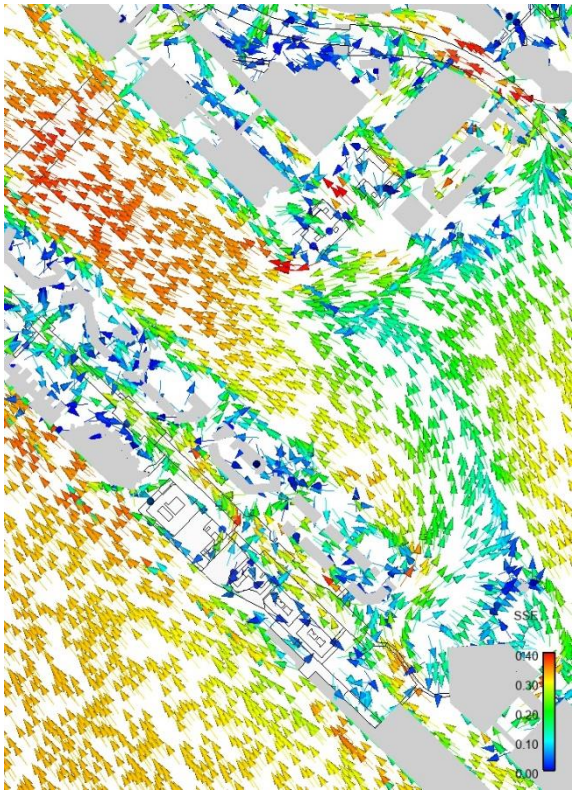


Figure C 18 Vector Plot of Proposed Scheme under SSE Wind

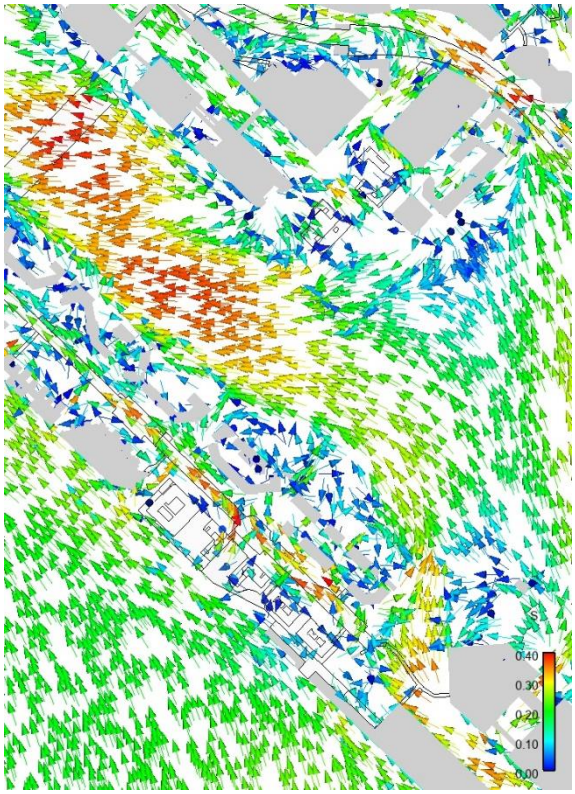


Figure C 19 Vector Plot of Proposed Scheme under S Wind

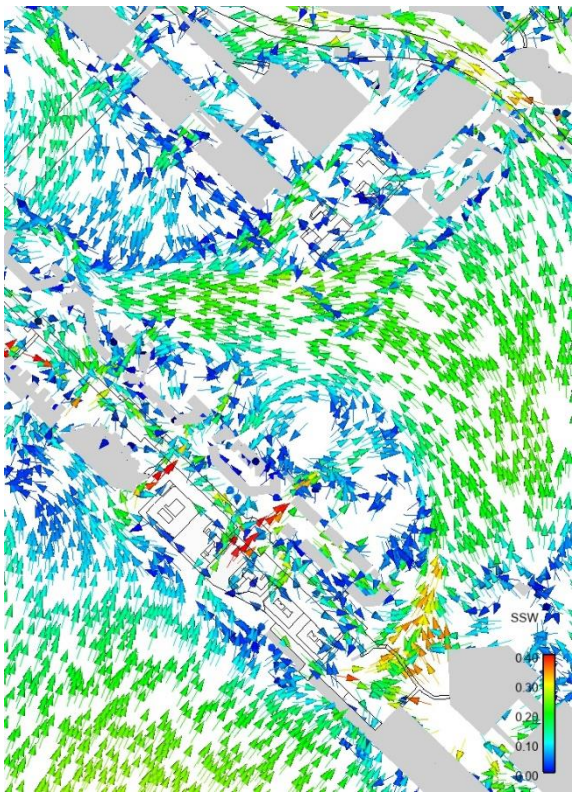


Figure C 20 Vector Plot of Proposed Scheme under SSW Wind

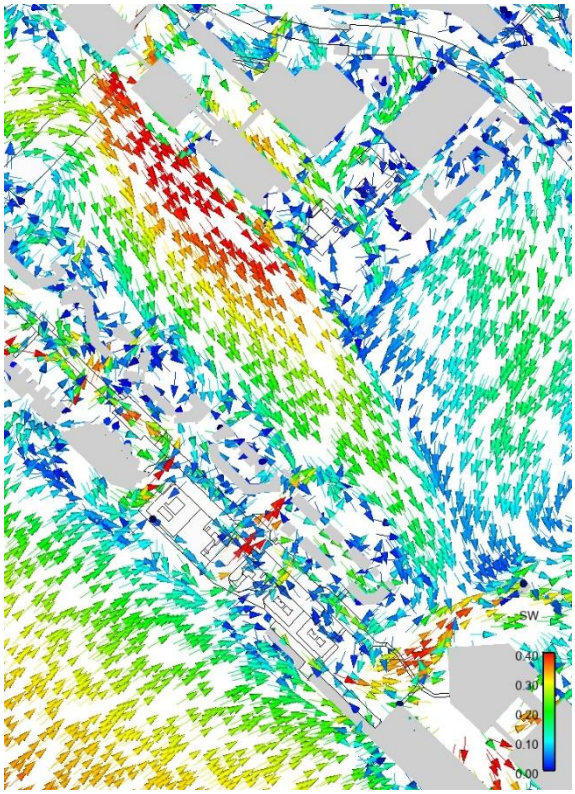


Figure C 21 Vector Plot of Proposed Scheme under SW Wind

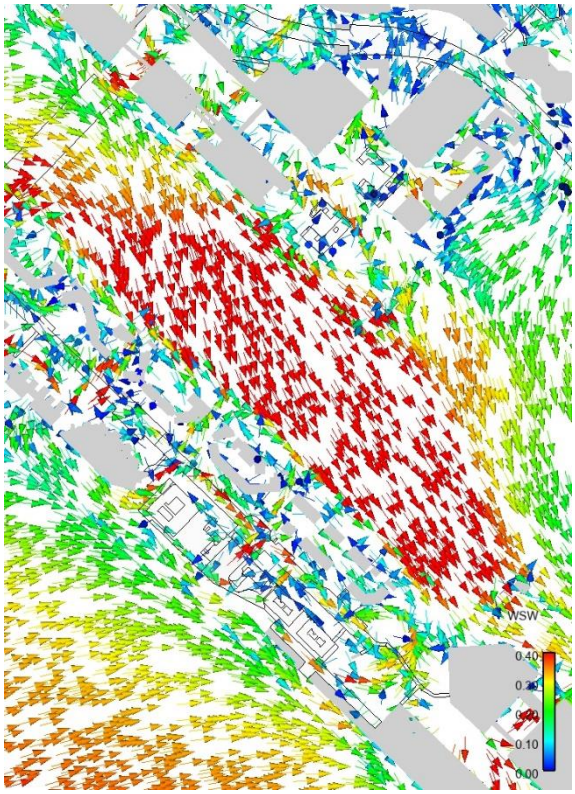


Figure C 22 Vector Plot of Proposed Scheme under WSW Wind

Appendix E

Velocity Ratio (VR) at Test Points

E.1 Baseline Scheme

Table D 1 Perimeter Test Points of Baseline Scheme

Points	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW
P1	0.09	0.09	0.06	0.16	0.17	0.20	0.14	0.10	0.09	0.20	0.42
P2	0.14	0.11	0.13	0.17	0.14	0.15	0.10	0.18	0.15	0.16	0.15
P3	0.20	0.15	0.03	0.09	0.06	0.08	0.06	0.07	0.02	0.23	0.21
P4	0.19	0.21	0.09	0.19	0.07	0.10	0.07	0.08	0.15	0.19	0.20
P5	0.23	0.23	0.12	0.21	0.25	0.35	0.37	0.28	0.12	0.18	0.34
P6	0.25	0.24	0.12	0.20	0.06	0.07	0.15	0.14	0.06	0.14	0.23
P7	0.27	0.28	0.13	0.21	0.11	0.04	0.11	0.07	0.05	0.19	0.33
P8	0.26	0.26	0.12	0.17	0.17	0.09	0.10	0.03	0.12	0.20	0.30
P9	0.07	0.06	0.08	0.21	0.09	0.20	0.25	0.17	0.12	0.02	0.08
P10	0.07	0.07	0.13	0.33	0.23	0.26	0.25	0.18	0.10	0.02	0.03
P11	0.18	0.07	0.07	0.27	0.21	0.16	0.17	0.22	0.09	0.08	0.19
P12	0.18	0.06	0.08	0.05	0.07	0.06	0.14	0.20	0.08	0.11	0.27
P13	0.05	0.10	0.05	0.09	0.10	0.17	0.24	0.22	0.10	0.03	0.25
P14	0.06	0.13	0.13	0.08	0.31	0.37	0.36	0.24	0.12	0.08	0.35
P15	0.04	0.09	0.08	0.14	0.16	0.16	0.14	0.07	0.03	0.06	0.13
P16	0.03	0.13	0.14	0.25	0.32	0.35	0.31	0.21	0.19	0.04	0.05
P17	0.04	0.09	0.07	0.18	0.18	0.14	0.18	0.12	0.21	0.04	0.08
P18	0.12	0.11	0.12	0.20	0.18	0.22	0.20	0.15	0.11	0.06	0.42
P19	0.11	0.08	0.05	0.13	0.17	0.18	0.14	0.12	0.04	0.10	0.48
P20	0.06	0.11	0.14	0.15	0.07	0.12	0.29	0.37	0.43	0.50	0.55
P21	0.16	0.09	0.09	0.07	0.04	0.12	0.26	0.34	0.38	0.52	0.56
P22	0.13	0.09	0.17	0.11	0.11	0.14	0.21	0.20	0.18	0.17	0.21
P23	0.03	0.04	0.11	0.09	0.07	0.09	0.28	0.23	0.14	0.02	0.11
P24	0.05	0.18	0.06	0.22	0.19	0.12	0.27	0.27	0.16	0.08	0.15

Points	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW
P25	0.01	0.08	0.04	0.21	0.12	0.10	0.26	0.33	0.27	0.11	0.10
P26	0.02	0.02	0.05	0.24	0.18	0.13	0.18	0.20	0.08	0.18	0.28
P27	0.06	0.12	0.05	0.23	0.17	0.17	0.23	0.11	0.21	0.44	0.50
P28	0.05	0.11	0.11	0.27	0.19	0.15	0.24	0.18	0.09	0.22	0.32
P29	0.08	0.17	0.17	0.24	0.13	0.10	0.11	0.07	0.11	0.25	0.36
P30	0.12	0.18	0.18	0.22	0.13	0.12	0.07	0.13	0.20	0.22	0.29
P31	0.21	0.22	0.31	0.40	0.22	0.18	0.12	0.23	0.30	0.26	0.15
P32	0.23	0.22	0.30	0.41	0.24	0.22	0.17	0.18	0.16	0.21	0.23
P33	0.25	0.24	0.31	0.44	0.27	0.24	0.18	0.15	0.19	0.24	0.32
P34	0.27	0.27	0.32	0.33	0.19	0.17	0.13	0.24	0.39	0.37	0.38
P35	0.13	0.09	0.18	0.18	0.16	0.10	0.11	0.16	0.10	0.18	0.07
P36	0.09	0.20	0.13	0.08	0.14	0.23	0.31	0.33	0.12	0.18	0.11
P37	0.09	0.20	0.31	0.27	0.18	0.18	0.27	0.05	0.07	0.17	0.25
P38	0.04	0.08	0.38	0.44	0.31	0.18	0.25	0.11	0.15	0.14	0.22
P39	0.10	0.21	0.43	0.56	0.38	0.18	0.18	0.21	0.07	0.26	0.38
P40	0.08	0.19	0.41	0.52	0.37	0.16	0.15	0.20	0.33	0.36	0.38
P41	0.02	0.16	0.38	0.47	0.36	0.16	0.23	0.14	0.10	0.06	0.11
P42	0.02	0.09	0.32	0.45	0.37	0.04	0.12	0.13	0.16	0.17	0.12
P43	0.03	0.14	0.25	0.34	0.28	0.19	0.36	0.40	0.38	0.30	0.26
P44	0.04	0.05	0.26	0.43	0.37	0.21	0.06	0.10	0.15	0.20	0.20
P45	0.07	0.13	0.24	0.39	0.34	0.16	0.12	0.14	0.22	0.30	0.37
P46	0.05	0.12	0.21	0.38	0.34	0.14	0.04	0.06	0.22	0.06	0.05
P47	0.06	0.14	0.18	0.35	0.31	0.10	0.08	0.09	0.04	0.16	0.06

Table D 2 Overall Test Points of Baseline Scheme

Points	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW
O1	0.16	0.11	0.17	0.19	0.21	0.18	0.03	0.16	0.15	0.08	0.07
O2	0.18	0.18	0.18	0.23	0.25	0.23	0.04	0.20	0.15	0.11	0.16
O3	0.18	0.03	0.21	0.26	0.28	0.26	0.09	0.26	0.21	0.02	0.06
O4	0.16	0.17	0.20	0.20	0.19	0.19	0.10	0.19	0.09	0.07	0.05
O5	0.09	0.08	0.21	0.24	0.20	0.24	0.17	0.20	0.12	0.12	0.04
O6	0.24	0.37	0.10	0.13	0.21	0.28	0.21	0.15	0.12	0.25	0.17
O7	0.04	0.07	0.17	0.17	0.25	0.30	0.29	0.18	0.15	0.03	0.31
O8	0.20	0.19	0.09	0.18	0.28	0.32	0.34	0.28	0.22	0.04	0.23
O9	0.22	0.13	0.18	0.20	0.28	0.34	0.36	0.33	0.24	0.03	0.06
O10	0.24	0.11	0.21	0.20	0.27	0.32	0.38	0.35	0.26	0.10	0.08
O11	0.16	0.20	0.20	0.13	0.12	0.32	0.40	0.39	0.30	0.16	0.10
O12	0.08	0.17	0.09	0.05	0.09	0.09	0.08	0.07	0.06	0.04	0.20
O13	0.09	0.07	0.11	0.14	0.20	0.22	0.19	0.17	0.12	0.06	0.19
O14	0.04	0.08	0.10	0.22	0.29	0.26	0.26	0.13	0.08	0.07	0.23
O15	0.21	0.16	0.11	0.08	0.11	0.10	0.12	0.13	0.11	0.11	0.16
O16	0.24	0.11	0.11	0.15	0.13	0.13	0.14	0.09	0.04	0.13	0.21
O17	0.25	0.06	0.17	0.44	0.35	0.35	0.30	0.07	0.09	0.13	0.11
O18	0.19	0.04	0.09	0.06	0.08	0.06	0.12	0.18	0.06	0.11	0.28
O19	0.17	0.04	0.08	0.05	0.03	0.09	0.11	0.17	0.08	0.11	0.28
O20	0.09	0.08	0.15	0.37	0.25	0.28	0.26	0.17	0.08	0.03	0.04
O21	0.04	0.10	0.09	0.18	0.08	0.19	0.26	0.23	0.11	0.03	0.05
O22	0.06	0.06	0.04	0.08	0.05	0.17	0.24	0.22	0.17	0.05	0.16
O23	0.16	0.31	0.07	0.19	0.20	0.23	0.15	0.18	0.14	0.24	0.29
O24	0.17	0.26	0.05	0.09	0.19	0.03	0.19	0.24	0.18	0.22	0.33
O25	0.24	0.30	0.11	0.19	0.23	0.08	0.17	0.25	0.17	0.22	0.32

Points	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW
O26	0.29	0.33	0.14	0.21	0.20	0.08	0.20	0.24	0.11	0.21	0.31
O27	0.28	0.30	0.15	0.20	0.16	0.09	0.13	0.14	0.10	0.20	0.29
O28	0.24	0.27	0.16	0.22	0.13	0.06	0.12	0.11	0.12	0.16	0.30
O29	0.21	0.25	0.17	0.22	0.08	0.04	0.12	0.12	0.14	0.10	0.32
O30	0.19	0.25	0.16	0.23	0.17	0.24	0.30	0.25	0.14	0.12	0.32
O31	0.17	0.24	0.17	0.23	0.24	0.30	0.33	0.25	0.16	0.22	0.34
O32	0.13	0.24	0.15	0.22	0.09	0.15	0.09	0.12	0.20	0.20	0.27
O33	0.10	0.23	0.12	0.21	0.18	0.17	0.19	0.13	0.17	0.07	0.12
O34	0.06	0.11	0.10	0.08	0.23	0.28	0.34	0.24	0.13	0.25	0.32
O35	0.09	0.05	0.05	0.09	0.22	0.24	0.32	0.23	0.06	0.28	0.15
O36	0.09	0.06	0.08	0.11	0.19	0.21	0.30	0.23	0.05	0.30	0.11
O37	0.06	0.09	0.08	0.14	0.16	0.20	0.30	0.25	0.06	0.33	0.09
O38	0.05	0.06	0.08	0.13	0.14	0.22	0.32	0.28	0.07	0.32	0.09
O39	0.23	0.12	0.08	0.10	0.10	0.20	0.30	0.27	0.05	0.30	0.25
O40	0.16	0.18	0.06	0.07	0.04	0.12	0.23	0.18	0.09	0.40	0.26
O41	0.05	0.17	0.05	0.07	0.05	0.11	0.20	0.15	0.01	0.38	0.24
O42	0.05	0.13	0.02	0.10	0.07	0.12	0.18	0.12	0.02	0.32	0.33
O43	0.04	0.06	0.04	0.10	0.07	0.13	0.16	0.11	0.02	0.32	0.39
O44	0.05	0.05	0.10	0.06	0.04	0.17	0.16	0.14	0.03	0.32	0.45
O45	0.05	0.18	0.18	0.20	0.25	0.18	0.16	0.17	0.14	0.33	0.50
O46	0.03	0.15	0.13	0.21	0.08	0.08	0.04	0.17	0.16	0.31	0.49
O47	0.07	0.06	0.06	0.19	0.19	0.17	0.08	0.10	0.05	0.27	0.49
O48	0.18	0.04	0.06	0.13	0.15	0.13	0.08	0.13	0.05	0.22	0.57
O49	0.18	0.18	0.20	0.35	0.32	0.38	0.34	0.26	0.19	0.03	0.52
O50	0.20	0.20	0.18	0.44	0.33	0.28	0.23	0.23	0.28	0.05	0.42
O51	0.20	0.20	0.20	0.40	0.29	0.25	0.17	0.22	0.25	0.05	0.41

Points	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW
O52	0.20	0.20	0.21	0.34	0.27	0.26	0.15	0.21	0.23	0.07	0.40
O53	0.19	0.19	0.20	0.37	0.28	0.25	0.19	0.18	0.23	0.08	0.25
O54	0.14	0.19	0.17	0.44	0.31	0.26	0.21	0.18	0.24	0.07	0.14
O55	0.06	0.17	0.15	0.41	0.30	0.27	0.24	0.18	0.25	0.04	0.12
O56	0.05	0.13	0.13	0.37	0.26	0.25	0.23	0.13	0.22	0.05	0.08
O57	0.07	0.17	0.16	0.47	0.34	0.30	0.26	0.16	0.23	0.10	0.31
O58	0.11	0.17	0.18	0.42	0.31	0.26	0.23	0.15	0.22	0.08	0.35
O59	0.07	0.16	0.17	0.46	0.35	0.31	0.27	0.15	0.21	0.08	0.33
O60	0.05	0.15	0.17	0.46	0.37	0.35	0.31	0.17	0.23	0.05	0.30
O61	0.10	0.12	0.12	0.19	0.25	0.27	0.26	0.13	0.13	0.14	0.39
O62	0.11	0.12	0.05	0.14	0.16	0.25	0.27	0.18	0.12	0.08	0.32
O63	0.03	0.11	0.05	0.12	0.11	0.20	0.23	0.15	0.10	0.03	0.17
O64	0.04	0.13	0.16	0.37	0.36	0.37	0.35	0.19	0.20	0.03	0.16
O65	0.03	0.13	0.16	0.45	0.36	0.34	0.30	0.17	0.19	0.09	0.27
O66	0.18	0.24	0.30	0.35	0.28	0.11	0.24	0.17	0.07	0.07	0.18
O67	0.16	0.20	0.30	0.39	0.33	0.11	0.23	0.17	0.10	0.09	0.23
O68	0.08	0.27	0.20	0.27	0.25	0.12	0.26	0.25	0.06	0.10	0.23
O69	0.03	0.30	0.13	0.16	0.12	0.10	0.24	0.23	0.03	0.07	0.07
O70	0.05	0.30	0.16	0.24	0.22	0.07	0.20	0.15	0.05	0.05	0.13
O71	0.09	0.31	0.24	0.34	0.29	0.06	0.13	0.06	0.19	0.20	0.22
O72	0.12	0.30	0.24	0.33	0.28	0.04	0.12	0.09	0.08	0.05	0.09
O73	0.14	0.22	0.19	0.26	0.29	0.05	0.10	0.06	0.07	0.03	0.05
O74	0.15	0.21	0.19	0.27	0.28	0.08	0.07	0.06	0.07	0.04	0.06
O75	0.17	0.18	0.16	0.27	0.28	0.04	0.08	0.08	0.05	0.07	0.07
O76	0.17	0.21	0.20	0.26	0.27	0.12	0.21	0.28	0.28	0.28	0.10
O77	0.17	0.16	0.17	0.24	0.27	0.05	0.10	0.05	0.10	0.08	0.07

Points	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW
O78	0.16	0.09	0.13	0.18	0.25	0.04	0.10	0.05	0.18	0.12	0.15
O79	0.15	0.10	0.17	0.20	0.26	0.03	0.09	0.06	0.07	0.14	0.03
O80	0.13	0.13	0.19	0.22	0.26	0.09	0.18	0.23	0.05	0.09	0.08
O81	0.06	0.15	0.13	0.12	0.23	0.04	0.07	0.09	0.06	0.08	0.11
O82	0.06	0.19	0.09	0.03	0.19	0.03	0.09	0.08	0.03	0.07	0.09
O83	0.10	0.23	0.15	0.10	0.16	0.12	0.29	0.25	0.14	0.05	0.05
O84	0.18	0.26	0.24	0.15	0.18	0.17	0.27	0.30	0.19	0.03	0.12
O85	0.23	0.26	0.22	0.23	0.24	0.11	0.13	0.29	0.32	0.18	0.11
O86	0.25	0.26	0.32	0.31	0.24	0.10	0.14	0.15	0.34	0.31	0.15
O87	0.29	0.33	0.37	0.32	0.22	0.07	0.12	0.26	0.35	0.35	0.23
O88	0.26	0.33	0.30	0.28	0.23	0.10	0.13	0.29	0.34	0.22	0.09
O89	0.23	0.34	0.36	0.26	0.18	0.17	0.26	0.27	0.16	0.04	0.07
O90	0.27	0.30	0.42	0.35	0.25	0.16	0.20	0.18	0.19	0.11	0.05
O91	0.29	0.36	0.36	0.34	0.25	0.10	0.18	0.25	0.38	0.28	0.10
O92	0.27	0.29	0.39	0.34	0.28	0.17	0.17	0.15	0.28	0.24	0.06
O93	0.20	0.22	0.33	0.35	0.28	0.11	0.16	0.14	0.09	0.39	0.16
O94	0.26	0.29	0.35	0.31	0.19	0.09	0.17	0.11	0.11	0.41	0.17
O95	0.34	0.41	0.41	0.32	0.20	0.06	0.14	0.22	0.29	0.42	0.34
O96	0.32	0.40	0.39	0.31	0.21	0.02	0.06	0.30	0.28	0.38	0.28
O97	0.32	0.37	0.41	0.37	0.24	0.18	0.27	0.27	0.35	0.40	0.29
O98	0.35	0.39	0.16	0.20	0.08	0.26	0.32	0.31	0.28	0.29	0.28
O99	0.33	0.39	0.17	0.13	0.06	0.27	0.35	0.35	0.35	0.32	0.27
O100	0.28	0.36	0.26	0.28	0.08	0.24	0.35	0.36	0.35	0.11	0.08
O101	0.28	0.35	0.28	0.32	0.10	0.04	0.10	0.33	0.33	0.26	0.14
O102	0.38	0.46	0.38	0.35	0.26	0.28	0.28	0.31	0.21	0.20	0.20
O103	0.29	0.38	0.25	0.28	0.23	0.28	0.30	0.33	0.27	0.20	0.18

Points	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW
O104	0.08	0.11	0.20	0.12	0.18	0.28	0.28	0.29	0.23	0.14	0.14
O105	0.31	0.33	0.24	0.24	0.11	0.42	0.40	0.29	0.08	0.15	0.31
O106	0.35	0.37	0.16	0.14	0.10	0.42	0.40	0.29	0.07	0.20	0.37
O107	0.34	0.39	0.13	0.14	0.07	0.41	0.40	0.28	0.17	0.35	0.40
O108	0.39	0.46	0.14	0.07	0.12	0.43	0.39	0.25	0.13	0.31	0.43
O109	0.37	0.40	0.16	0.13	0.14	0.42	0.40	0.28	0.12	0.16	0.32
O110	0.36	0.36	0.25	0.25	0.14	0.42	0.40	0.28	0.14	0.15	0.27
O111	0.18	0.15	0.21	0.22	0.20	0.05	0.05	0.12	0.37	0.41	0.33
O112	0.15	0.11	0.10	0.11	0.08	0.04	0.03	0.16	0.40	0.47	0.45
O113	0.22	0.15	0.28	0.25	0.27	0.10	0.10	0.18	0.19	0.26	0.16
O114	0.29	0.27	0.34	0.38	0.28	0.06	0.06	0.09	0.32	0.38	0.35
O115	0.29	0.32	0.38	0.39	0.27	0.16	0.16	0.04	0.33	0.37	0.29
O116	0.28	0.29	0.39	0.41	0.21	0.10	0.10	0.08	0.26	0.34	0.30
O117	0.26	0.29	0.36	0.37	0.04	0.09	0.08	0.07	0.21	0.27	0.11
O118	0.27	0.31	0.40	0.41	0.11	0.27	0.29	0.25	0.25	0.35	0.28
O119	0.31	0.36	0.43	0.42	0.22	0.24	0.33	0.27	0.31	0.40	0.35
O120	0.30	0.35	0.40	0.39	0.27	0.22	0.29	0.20	0.37	0.35	0.26
O121	0.28	0.30	0.35	0.35	0.28	0.18	0.20	0.05	0.28	0.15	0.28
O122	0.17	0.07	0.27	0.24	0.25	0.10	0.12	0.18	0.12	0.12	0.16
O123	0.04	0.07	0.17	0.21	0.08	0.15	0.22	0.27	0.14	0.25	0.16
O124	0.03	0.07	0.20	0.25	0.18	0.18	0.25	0.33	0.08	0.21	0.15
O125	0.04	0.06	0.25	0.36	0.26	0.19	0.24	0.36	0.17	0.31	0.26
O126	0.06	0.10	0.33	0.44	0.31	0.20	0.18	0.23	0.20	0.18	0.18
O127	0.04	0.03	0.34	0.41	0.31	0.19	0.07	0.09	0.15	0.19	0.27
O128	0.02	0.13	0.33	0.40	0.32	0.20	0.28	0.31	0.27	0.23	0.28
O129	0.06	0.08	0.33	0.42	0.35	0.18	0.17	0.11	0.09	0.14	0.15

Points	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW
O130	0.07	0.05	0.27	0.39	0.33	0.12	0.23	0.28	0.25	0.24	0.10
O131	0.08	0.06	0.26	0.39	0.35	0.20	0.34	0.27	0.21	0.19	0.21
O132	0.08	0.08	0.25	0.38	0.35	0.21	0.33	0.28	0.18	0.23	0.11
O133	0.05	0.12	0.23	0.38	0.36	0.20	0.29	0.26	0.21	0.30	0.23
O134	0.01	0.11	0.19	0.35	0.35	0.17	0.23	0.21	0.16	0.23	0.15
O135	0.02	0.13	0.22	0.32	0.34	0.16	0.14	0.14	0.27	0.32	0.36
O136	0.06	0.08	0.13	0.08	0.34	0.16	0.30	0.34	0.23	0.31	0.23
O137	0.07	0.15	0.06	0.08	0.33	0.15	0.33	0.33	0.26	0.34	0.26
O138	0.04	0.15	0.03	0.06	0.31	0.15	0.30	0.30	0.26	0.33	0.27
O139	0.03	0.13	0.04	0.04	0.30	0.17	0.30	0.24	0.04	0.10	0.15
O140	0.15	0.18	0.26	0.18	0.25	0.16	0.27	0.14	0.15	0.28	0.36
O141	0.11	0.04	0.12	0.08	0.22	0.13	0.25	0.15	0.20	0.22	0.27
O142	0.06	0.15	0.14	0.18	0.13	0.13	0.10	0.07	0.11	0.23	0.34
O143	0.04	0.11	0.09	0.27	0.20	0.17	0.22	0.16	0.06	0.20	0.32
O144	0.02	0.12	0.32	0.46	0.37	0.12	0.26	0.32	0.37	0.40	0.32
O145	0.05	0.06	0.26	0.34	0.28	0.18	0.18	0.18	0.18	0.28	0.16
O146	0.04	0.12	0.11	0.16	0.05	0.16	0.22	0.28	0.16	0.20	0.20
O147	0.13	0.21	0.22	0.23	0.12	0.12	0.23	0.26	0.18	0.22	0.15
O148	0.14	0.06	0.13	0.11	0.09	0.12	0.17	0.16	0.14	0.20	0.27
O149	0.15	0.12	0.19	0.19	0.06	0.16	0.29	0.34	0.39	0.52	0.56
O150	0.07	0.16	0.20	0.19	0.04	0.13	0.32	0.41	0.45	0.51	0.53
O151	0.01	0.23	0.34	0.35	0.12	0.06	0.15	0.21	0.24	0.24	0.23
O152	0.05	0.28	0.37	0.41	0.18	0.10	0.15	0.21	0.23	0.19	0.20
O153	0.08	0.23	0.28	0.31	0.25	0.07	0.09	0.20	0.27	0.24	0.28
O154	0.21	0.13	0.43	0.38	0.32	0.23	0.18	0.19	0.29	0.12	0.08
O155	0.04	0.07	0.26	0.31	0.28	0.22	0.22	0.33	0.20	0.18	0.23

Points	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW
O156	0.10	0.17	0.08	0.36	0.29	0.26	0.30	0.24	0.13	0.15	0.05
O157	0.11	0.24	0.08	0.40	0.32	0.27	0.31	0.10	0.13	0.06	0.07
O158	0.08	0.11	0.27	0.44	0.34	0.26	0.27	0.08	0.23	0.38	0.49
O159	0.03	0.11	0.25	0.35	0.30	0.27	0.26	0.05	0.34	0.37	0.15
O160	0.02	0.10	0.15	0.23	0.28	0.28	0.29	0.34	0.09	0.04	0.10
O161	0.01	0.03	0.08	0.04	0.27	0.28	0.22	0.07	0.22	0.29	0.18
O162	0.02	0.14	0.13	0.18	0.27	0.27	0.26	0.37	0.18	0.10	0.25
O163	0.07	0.19	0.15	0.21	0.27	0.25	0.28	0.02	0.08	0.15	0.07
O164	0.05	0.22	0.15	0.21	0.29	0.25	0.12	0.04	0.20	0.28	0.26
O165	0.03	0.19	0.17	0.22	0.32	0.23	0.03	0.04	0.22	0.03	0.04
O166	0.08	0.17	0.07	0.19	0.32	0.19	0.05	0.05	0.13	0.11	0.14
O167	0.10	0.15	0.30	0.17	0.32	0.18	0.06	0.11	0.35	0.39	0.50
O168	0.13	0.18	0.06	0.12	0.34	0.20	0.29	0.26	0.03	0.04	0.04
O169	0.15	0.19	0.10	0.11	0.35	0.19	0.28	0.10	0.04	0.08	0.13
O170	0.16	0.19	0.18	0.09	0.35	0.18	0.25	0.13	0.06	0.06	0.22
O171	0.17	0.15	0.12	0.06	0.34	0.18	0.24	0.13	0.11	0.12	0.11
O172	0.12	0.15	0.21	0.12	0.33	0.19	0.24	0.07	0.09	0.19	0.26
O173	0.16	0.12	0.08	0.08	0.33	0.19	0.23	0.15	0.21	0.12	0.19
O174	0.11	0.18	0.08	0.17	0.06	0.10	0.04	0.10	0.09	0.23	0.29
O175	0.12	0.19	0.14	0.30	0.06	0.02	0.02	0.08	0.04	0.05	0.05
O176	0.14	0.18	0.11	0.37	0.14	0.08	0.03	0.14	0.13	0.11	0.07
O177	0.10	0.15	0.16	0.37	0.13	0.09	0.11	0.15	0.13	0.12	0.17
O178	0.08	0.06	0.19	0.30	0.11	0.09	0.10	0.07	0.05	0.05	0.07
O179	0.09	0.14	0.19	0.22	0.18	0.07	0.08	0.07	0.10	0.06	0.10
O180	0.06	0.12	0.17	0.25	0.24	0.09	0.08	0.12	0.10	0.03	0.06
O181	0.05	0.15	0.16	0.23	0.20	0.07	0.04	0.09	0.09	0.05	0.07

Points	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW
O182	0.04	0.05	0.13	0.12	0.21	0.18	0.16	0.18	0.24	0.27	0.34
O183	0.06	0.06	0.08	0.13	0.13	0.17	0.17	0.26	0.26	0.33	0.20
O184	0.04	0.07	0.02	0.08	0.09	0.15	0.16	0.26	0.21	0.27	0.15
O185	0.11	0.04	0.08	0.15	0.05	0.15	0.15	0.24	0.14	0.20	0.12
O186	0.04	0.04	0.05	0.07	0.14	0.16	0.24	0.22	0.23	0.25	0.22
O187	0.02	0.15	0.09	0.11	0.16	0.22	0.27	0.26	0.26	0.31	0.28
O188	0.04	0.24	0.08	0.19	0.16	0.21	0.26	0.28	0.22	0.21	0.17
O189	0.13	0.35	0.25	0.31	0.16	0.14	0.19	0.25	0.24	0.21	0.09
O190	0.03	0.10	0.17	0.30	0.22	0.10	0.08	0.01	0.03	0.05	0.05
O191	0.04	0.11	0.19	0.35	0.31	0.12	0.09	0.04	0.02	0.06	0.05
O192	0.02	0.05	0.06	0.11	0.17	0.06	0.03	0.04	0.02	0.03	0.03
O193	0.02	0.07	0.07	0.10	0.07	0.18	0.28	0.22	0.18	0.25	0.27
O194	0.04	0.12	0.18	0.16	0.07	0.24	0.34	0.30	0.28	0.33	0.36
O195	0.02	0.10	0.09	0.14	0.12	0.21	0.28	0.27	0.24	0.20	0.20
O196	0.16	0.31	0.35	0.32	0.15	0.19	0.26	0.29	0.40	0.42	0.43
O197	0.09	0.12	0.14	0.27	0.17	0.25	0.39	0.43	0.30	0.46	0.40
O198	0.04	0.09	0.14	0.34	0.29	0.20	0.32	0.16	0.31	0.38	0.24
O199	0.04	0.14	0.13	0.11	0.16	0.02	0.03	0.05	0.11	0.10	0.11
O200	0.16	0.38	0.41	0.38	0.21	0.05	0.12	0.12	0.17	0.23	0.28
O201	0.06	0.14	0.13	0.10	0.05	0.13	0.27	0.29	0.21	0.13	0.12
O202	0.08	0.13	0.13	0.12	0.07	0.03	0.09	0.09	0.27	0.21	0.17
O203	0.17	0.36	0.39	0.33	0.18	0.09	0.18	0.20	0.33	0.29	0.18
O204	0.19	0.38	0.41	0.37	0.19	0.05	0.20	0.12	0.13	0.14	0.11
O205	0.04	0.04	0.11	0.32	0.29	0.28	0.26	0.15	0.15	0.04	0.18
O206	0.02	0.05	0.05	0.18	0.13	0.10	0.08	0.09	0.06	0.04	0.12
O207	0.04	0.05	0.11	0.41	0.29	0.24	0.17	0.12	0.11	0.09	0.17

Points	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW
O208	0.03	0.09	0.12	0.40	0.30	0.27	0.21	0.15	0.13	0.10	0.25
O209	0.05	0.13	0.09	0.14	0.13	0.12	0.13	0.07	0.04	0.02	0.12
O210	0.03	0.20	0.09	0.31	0.29	0.31	0.31	0.19	0.11	0.03	0.24
O211	0.03	0.22	0.09	0.23	0.22	0.26	0.30	0.22	0.15	0.02	0.22
O212	0.09	0.21	0.05	0.14	0.16	0.19	0.20	0.15	0.13	0.03	0.14
O213	0.25	0.10	0.07	0.25	0.21	0.20	0.27	0.17	0.10	0.04	0.03
O214	0.11	0.09	0.05	0.17	0.13	0.17	0.27	0.23	0.13	0.05	0.06
O215	0.04	0.07	0.07	0.17	0.20	0.22	0.27	0.23	0.11	0.03	0.06
O216	0.06	0.12	0.04	0.10	0.11	0.14	0.20	0.18	0.07	0.04	0.04
O217	0.04	0.13	0.02	0.24	0.16	0.12	0.11	0.11	0.02	0.06	0.03

Table D 3 Special Test Points of Baseline Scheme

Points	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW
S1	0.15	0.14	0.10	0.24	0.25	0.17	0.33	0.23	0.12	0.13	0.23
S2	0.11	0.11	0.12	0.14	0.23	0.16	0.34	0.27	0.09	0.08	0.19
S3	0.12	0.09	0.13	0.13	0.20	0.16	0.34	0.26	0.07	0.08	0.17
S4	0.13	0.06	0.13	0.16	0.19	0.18	0.33	0.24	0.07	0.11	0.22
S5	0.14	0.04	0.14	0.22	0.21	0.19	0.32	0.24	0.07	0.12	0.24
S6	0.14	0.07	0.12	0.24	0.21	0.18	0.27	0.21	0.06	0.13	0.27
S7	0.11	0.05	0.11	0.24	0.22	0.19	0.25	0.18	0.07	0.14	0.25
S8	0.04	0.04	0.15	0.27	0.24	0.24	0.29	0.21	0.10	0.09	0.18
S9	0.05	0.15	0.15	0.28	0.25	0.26	0.33	0.24	0.12	0.06	0.15
S10	0.04	0.18	0.11	0.26	0.23	0.27	0.34	0.27	0.15	0.05	0.15
S11	0.03	0.07	0.03	0.28	0.20	0.24	0.32	0.26	0.16	0.07	0.18
S12	0.06	0.03	0.05	0.29	0.22	0.28	0.33	0.18	0.09	0.23	0.32
S13	0.02	0.14	0.04	0.32	0.22	0.26	0.23	0.14	0.12	0.29	0.39
S14	0.01	0.04	0.07	0.33	0.23	0.28	0.22	0.15	0.08	0.22	0.34
S15	0.03	0.02	0.12	0.32	0.23	0.29	0.24	0.16	0.10	0.16	0.28
S16	0.23	0.20	0.09	0.21	0.23	0.31	0.36	0.29	0.10	0.15	0.33
S17	0.03	0.05	0.05	0.03	0.26	0.32	0.34	0.27	0.13	0.08	0.35
S18	0.08	0.13	0.11	0.08	0.21	0.29	0.32	0.24	0.11	0.03	0.31
S19	0.11	0.08	0.09	0.09	0.34	0.43	0.40	0.25	0.13	0.17	0.36
S20	0.12	0.07	0.04	0.11	0.23	0.36	0.36	0.25	0.14	0.23	0.39
S21	0.20	0.19	0.09	0.19	0.24	0.34	0.37	0.27	0.17	0.20	0.34
S22	0.07	0.15	0.15	0.34	0.28	0.03	0.08	0.10	0.03	0.13	0.05
S23	0.05	0.11	0.14	0.32	0.27	0.10	0.05	0.10	0.19	0.11	0.10
S24	0.09	0.13	0.21	0.36	0.29	0.10	0.16	0.17	0.25	0.29	0.42
S25	0.04	0.06	0.23	0.40	0.33	0.15	0.10	0.11	0.13	0.18	0.13

Points	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW
S26	0.04	0.16	0.32	0.44	0.34	0.11	0.12	0.18	0.14	0.12	0.11
S27	0.06	0.16	0.35	0.43	0.32	0.12	0.25	0.29	0.33	0.32	0.15
S28	0.10	0.21	0.41	0.55	0.37	0.14	0.06	0.12	0.24	0.30	0.42
S29	0.05	0.12	0.41	0.50	0.34	0.16	0.20	0.10	0.15	0.10	0.16
S30	0.07	0.16	0.37	0.35	0.24	0.14	0.21	0.11	0.12	0.19	0.27
S31	0.11	0.24	0.15	0.12	0.08	0.14	0.17	0.03	0.10	0.14	0.12
S32	0.05	0.13	0.12	0.21	0.09	0.21	0.39	0.42	0.43	0.43	0.34
S33	0.05	0.13	0.11	0.17	0.16	0.09	0.21	0.25	0.31	0.45	0.39
S34	0.06	0.08	0.14	0.27	0.12	0.03	0.12	0.15	0.31	0.43	0.43
S35	0.06	0.12	0.26	0.35	0.24	0.04	0.22	0.26	0.34	0.37	0.24
S36	0.09	0.13	0.21	0.29	0.18	0.05	0.09	0.11	0.25	0.31	0.40
S37	0.05	0.08	0.09	0.12	0.05	0.04	0.14	0.25	0.36	0.37	0.32
S38	0.19	0.07	0.17	0.35	0.41	0.40	0.35	0.23	0.07	0.16	0.14
S39	0.05	0.04	0.18	0.36	0.39	0.41	0.35	0.23	0.10	0.08	0.22
S40	0.05	0.16	0.15	0.27	0.29	0.33	0.31	0.19	0.19	0.05	0.26

E.2 Proposed Scheme

Table D 4 Perimeter Test Points of Proposed Scheme

Points	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW
P1	0.10	0.04	0.09	0.19	0.14	0.08	0.12	0.10	0.12	0.21	0.39
P2	0.15	0.06	0.10	0.21	0.11	0.13	0.04	0.13	0.11	0.13	0.20
P3	0.16	0.14	0.11	0.22	0.04	0.15	0.19	0.17	0.08	0.25	0.13
P4	0.19	0.22	0.15	0.21	0.03	0.10	0.07	0.11	0.16	0.16	0.05
P5	0.19	0.20	0.12	0.20	0.28	0.40	0.34	0.25	0.11	0.16	0.32
P6	0.22	0.20	0.10	0.17	0.11	0.09	0.20	0.17	0.09	0.14	0.17
P7	0.29	0.29	0.13	0.13	0.09	0.02	0.12	0.09	0.02	0.20	0.15
P8	0.21	0.21	0.08	0.19	0.11	0.21	0.16	0.03	0.12	0.14	0.28
P9	0.08	0.07	0.11	0.19	0.12	0.24	0.25	0.21	0.06	0.05	0.19
P10	0.03	0.07	0.15	0.32	0.23	0.32	0.35	0.33	0.11	0.03	0.33
P11	0.21	0.07	0.12	0.31	0.27	0.16	0.11	0.21	0.12	0.13	0.11
P12	0.19	0.05	0.09	0.10	0.12	0.12	0.12	0.17	0.13	0.13	0.09
P13	0.09	0.08	0.07	0.18	0.16	0.25	0.22	0.20	0.16	0.04	0.12
P14	0.08	0.13	0.11	0.17	0.34	0.37	0.33	0.22	0.13	0.15	0.24
P15	0.09	0.09	0.08	0.14	0.16	0.15	0.16	0.07	0.06	0.11	0.20
P16	0.04	0.07	0.06	0.18	0.13	0.13	0.15	0.10	0.14	0.04	0.07
P17	0.10	0.12	0.15	0.34	0.32	0.32	0.31	0.24	0.24	0.03	0.32
P18	0.17	0.15	0.20	0.40	0.38	0.41	0.39	0.31	0.26	0.05	0.39
P19	0.17	0.08	0.08	0.09	0.09	0.19	0.25	0.12	0.03	0.20	0.40
P20	0.04	0.25	0.40	0.47	0.16	0.08	0.11	0.28	0.37	0.37	0.55
P21	0.15	0.07	0.09	0.14	0.06	0.08	0.24	0.31	0.34	0.53	0.56
P22	0.12	0.03	0.08	0.05	0.07	0.08	0.20	0.24	0.32	0.33	0.25
P23	0.06	0.04	0.04	0.11	0.14	0.26	0.31	0.26	0.15	0.07	0.12
P24	0.07	0.05	0.02	0.10	0.13	0.30	0.29	0.22	0.07	0.11	0.20

Points	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW
P25	0.06	0.06	0.06	0.06	0.09	0.30	0.30	0.22	0.06	0.16	0.25
P26	0.09	0.03	0.06	0.08	0.09	0.32	0.34	0.22	0.03	0.21	0.30
P27	0.08	0.12	0.14	0.11	0.09	0.24	0.28	0.22	0.21	0.29	0.34
P28	0.14	0.14	0.13	0.03	0.09	0.23	0.35	0.32	0.29	0.18	0.17
P29	0.15	0.17	0.20	0.17	0.12	0.10	0.15	0.14	0.08	0.06	0.22
P30	0.19	0.22	0.27	0.27	0.17	0.04	0.05	0.12	0.12	0.05	0.12
P31	0.22	0.23	0.31	0.37	0.23	0.12	0.09	0.06	0.21	0.24	0.32
P32	0.22	0.24	0.31	0.37	0.23	0.13	0.11	0.09	0.21	0.27	0.36
P33	0.23	0.25	0.33	0.38	0.24	0.12	0.12	0.13	0.18	0.25	0.35
P34	0.28	0.27	0.41	0.47	0.27	0.14	0.12	0.19	0.29	0.33	0.41
P35	0.05	0.06	0.22	0.22	0.21	0.13	0.17	0.17	0.09	0.07	0.05
P36	0.06	0.18	0.16	0.16	0.09	0.22	0.30	0.16	0.11	0.03	0.08
P37	0.07	0.20	0.33	0.28	0.18	0.15	0.21	0.06	0.09	0.05	0.06
P38	0.04	0.09	0.42	0.43	0.29	0.17	0.24	0.04	0.08	0.06	0.04
P39	0.06	0.19	0.45	0.50	0.34	0.18	0.26	0.09	0.08	0.06	0.08
P40	0.07	0.22	0.48	0.53	0.37	0.18	0.22	0.14	0.31	0.36	0.36
P41	0.04	0.21	0.45	0.50	0.37	0.19	0.22	0.09	0.05	0.05	0.06
P42	0.04	0.12	0.44	0.53	0.39	0.13	0.07	0.12	0.18	0.31	0.44
P43	0.08	0.09	0.36	0.45	0.33	0.12	0.24	0.32	0.48	0.42	0.09
P44	0.07	0.11	0.38	0.50	0.41	0.10	0.08	0.08	0.15	0.08	0.06
P45	0.06	0.19	0.36	0.48	0.39	0.11	0.17	0.07	0.10	0.14	0.05
P46	0.06	0.22	0.34	0.46	0.38	0.17	0.25	0.06	0.07	0.11	0.05
P47	0.04	0.24	0.34	0.47	0.38	0.18	0.18	0.06	0.06	0.03	0.37

Table D 5 Overall Test Points of Proposed Scheme

Points	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW
O1	0.16	0.11	0.18	0.21	0.22	0.13	0.04	0.15	0.17	0.11	0.08
O2	0.18	0.18	0.19	0.24	0.25	0.20	0.10	0.18	0.20	0.12	0.15
O3	0.17	0.03	0.21	0.28	0.28	0.23	0.12	0.23	0.29	0.02	0.04
O4	0.16	0.17	0.22	0.21	0.20	0.17	0.09	0.14	0.14	0.05	0.06
O5	0.09	0.06	0.21	0.23	0.20	0.23	0.15	0.15	0.11	0.10	0.04
O6	0.25	0.37	0.12	0.14	0.21	0.28	0.19	0.17	0.15	0.22	0.05
O7	0.05	0.07	0.18	0.18	0.26	0.31	0.27	0.18	0.22	0.09	0.04
O8	0.18	0.20	0.10	0.19	0.28	0.32	0.33	0.27	0.25	0.03	0.01
O9	0.23	0.10	0.19	0.21	0.28	0.34	0.36	0.32	0.26	0.06	0.11
O10	0.16	0.09	0.21	0.21	0.27	0.33	0.39	0.35	0.28	0.10	0.13
O11	0.07	0.19	0.20	0.13	0.12	0.33	0.40	0.39	0.33	0.13	0.15
O12	0.05	0.18	0.09	0.05	0.09	0.09	0.08	0.07	0.05	0.03	0.08
O13	0.12	0.08	0.11	0.14	0.20	0.22	0.19	0.16	0.11	0.04	0.13
O14	0.04	0.08	0.10	0.22	0.29	0.26	0.26	0.14	0.13	0.06	0.20
O15	0.21	0.16	0.10	0.08	0.10	0.10	0.12	0.14	0.07	0.11	0.18
O16	0.22	0.11	0.11	0.15	0.13	0.13	0.14	0.09	0.06	0.12	0.22
O17	0.23	0.03	0.17	0.43	0.34	0.35	0.30	0.07	0.13	0.14	0.32
O18	0.21	0.05	0.07	0.10	0.11	0.07	0.07	0.12	0.09	0.14	0.20
O19	0.17	0.03	0.07	0.04	0.06	0.05	0.10	0.15	0.11	0.13	0.10
O20	0.05	0.10	0.16	0.35	0.24	0.33	0.33	0.22	0.10	0.02	0.36
O21	0.07	0.09	0.09	0.13	0.07	0.22	0.24	0.28	0.04	0.03	0.12
O22	0.09	0.08	0.04	0.07	0.05	0.20	0.22	0.21	0.09	0.05	0.32
O23	0.17	0.31	0.04	0.18	0.21	0.25	0.17	0.17	0.08	0.20	0.05
O24	0.17	0.25	0.04	0.09	0.19	0.02	0.24	0.23	0.12	0.19	0.04
O25	0.24	0.30	0.10	0.18	0.23	0.09	0.24	0.25	0.12	0.19	0.04

Points	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW
O26	0.30	0.33	0.12	0.19	0.20	0.10	0.24	0.25	0.09	0.19	0.09
O27	0.28	0.30	0.14	0.17	0.13	0.13	0.16	0.17	0.05	0.18	0.26
O28	0.25	0.28	0.18	0.23	0.13	0.06	0.14	0.12	0.14	0.16	0.19
O29	0.24	0.27	0.17	0.23	0.09	0.08	0.17	0.14	0.16	0.12	0.27
O30	0.20	0.26	0.17	0.23	0.22	0.21	0.32	0.24	0.17	0.12	0.30
O31	0.17	0.26	0.18	0.23	0.26	0.35	0.22	0.17	0.19	0.20	0.33
O32	0.13	0.26	0.19	0.23	0.19	0.10	0.15	0.18	0.23	0.23	0.24
O33	0.09	0.23	0.18	0.20	0.20	0.16	0.22	0.18	0.23	0.08	0.20
O34	0.06	0.11	0.10	0.09	0.22	0.28	0.22	0.18	0.09	0.25	0.33
O35	0.08	0.06	0.05	0.07	0.15	0.19	0.18	0.16	0.05	0.27	0.20
O36	0.09	0.09	0.07	0.10	0.11	0.17	0.14	0.16	0.05	0.30	0.08
O37	0.06	0.05	0.07	0.14	0.09	0.17	0.13	0.19	0.08	0.33	0.09
O38	0.05	0.07	0.06	0.14	0.07	0.19	0.15	0.23	0.10	0.32	0.08
O39	0.23	0.11	0.06	0.11	0.07	0.18	0.14	0.22	0.08	0.30	0.26
O40	0.16	0.19	0.03	0.07	0.07	0.07	0.28	0.26	0.12	0.40	0.24
O41	0.05	0.18	0.01	0.05	0.10	0.05	0.25	0.24	0.01	0.38	0.21
O42	0.04	0.15	0.01	0.08	0.11	0.03	0.23	0.22	0.04	0.33	0.30
O43	0.05	0.10	0.03	0.09	0.12	0.03	0.21	0.18	0.04	0.32	0.37
O44	0.06	0.05	0.04	0.09	0.12	0.05	0.19	0.15	0.03	0.32	0.42
O45	0.07	0.14	0.12	0.07	0.09	0.08	0.15	0.17	0.05	0.32	0.47
O46	0.04	0.14	0.14	0.14	0.10	0.03	0.20	0.13	0.21	0.30	0.47
O47	0.09	0.02	0.06	0.17	0.12	0.06	0.23	0.08	0.12	0.27	0.49
O48	0.17	0.12	0.13	0.11	0.09	0.30	0.35	0.19	0.03	0.24	0.50
O49	0.19	0.16	0.20	0.43	0.40	0.42	0.39	0.31	0.28	0.11	0.47
O50	0.19	0.20	0.18	0.46	0.32	0.28	0.25	0.23	0.24	0.05	0.43
O51	0.19	0.20	0.20	0.41	0.28	0.24	0.19	0.21	0.21	0.05	0.46

Points	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW
O52	0.20	0.20	0.21	0.34	0.26	0.25	0.15	0.20	0.19	0.08	0.49
O53	0.18	0.18	0.20	0.38	0.27	0.23	0.19	0.17	0.20	0.09	0.38
O54	0.15	0.18	0.17	0.45	0.29	0.23	0.21	0.17	0.21	0.05	0.32
O55	0.11	0.16	0.15	0.43	0.28	0.24	0.24	0.17	0.23	0.04	0.28
O56	0.06	0.13	0.12	0.37	0.23	0.20	0.21	0.10	0.20	0.06	0.13
O57	0.08	0.16	0.15	0.48	0.33	0.26	0.25	0.14	0.21	0.13	0.17
O58	0.11	0.16	0.17	0.43	0.29	0.24	0.22	0.14	0.20	0.05	0.25
O59	0.05	0.15	0.16	0.46	0.33	0.29	0.26	0.14	0.20	0.04	0.29
O60	0.04	0.14	0.16	0.47	0.36	0.33	0.30	0.16	0.22	0.07	0.27
O61	0.12	0.12	0.11	0.23	0.24	0.25	0.24	0.12	0.14	0.16	0.28
O62	0.13	0.10	0.05	0.16	0.13	0.27	0.24	0.16	0.10	0.11	0.25
O63	0.03	0.09	0.05	0.09	0.11	0.24	0.20	0.14	0.06	0.06	0.26
O64	0.04	0.12	0.15	0.38	0.35	0.37	0.33	0.18	0.20	0.03	0.17
O65	0.03	0.12	0.15	0.45	0.35	0.32	0.29	0.16	0.19	0.05	0.20
O66	0.17	0.23	0.30	0.35	0.28	0.14	0.18	0.18	0.11	0.03	0.19
O67	0.16	0.20	0.30	0.38	0.33	0.12	0.17	0.19	0.11	0.05	0.27
O68	0.08	0.27	0.20	0.26	0.22	0.11	0.17	0.19	0.03	0.07	0.22
O69	0.03	0.30	0.13	0.16	0.13	0.09	0.14	0.13	0.06	0.07	0.13
O70	0.05	0.29	0.16	0.24	0.22	0.06	0.16	0.10	0.06	0.05	0.15
O71	0.09	0.31	0.24	0.34	0.28	0.04	0.07	0.11	0.16	0.17	0.24
O72	0.12	0.30	0.24	0.32	0.28	0.04	0.07	0.10	0.05	0.06	0.12
O73	0.14	0.23	0.19	0.26	0.28	0.05	0.06	0.07	0.04	0.06	0.06
O74	0.15	0.21	0.20	0.27	0.28	0.08	0.05	0.06	0.05	0.09	0.08
O75	0.16	0.18	0.17	0.27	0.28	0.04	0.03	0.04	0.06	0.07	0.05
O76	0.16	0.21	0.20	0.26	0.27	0.11	0.24	0.26	0.23	0.24	0.12
O77	0.17	0.16	0.17	0.24	0.27	0.05	0.09	0.06	0.05	0.04	0.16

Points	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW
O78	0.17	0.09	0.14	0.18	0.25	0.05	0.10	0.03	0.14	0.12	0.10
O79	0.16	0.10	0.17	0.20	0.25	0.04	0.09	0.06	0.11	0.14	0.08
O80	0.13	0.13	0.19	0.21	0.26	0.07	0.18	0.23	0.18	0.09	0.11
O81	0.07	0.15	0.13	0.12	0.23	0.03	0.08	0.09	0.06	0.04	0.18
O82	0.06	0.19	0.09	0.04	0.19	0.03	0.09	0.08	0.05	0.04	0.20
O83	0.09	0.23	0.15	0.10	0.16	0.13	0.29	0.25	0.03	0.06	0.25
O84	0.18	0.26	0.23	0.15	0.18	0.18	0.26	0.30	0.28	0.09	0.26
O85	0.22	0.26	0.21	0.22	0.23	0.11	0.12	0.30	0.29	0.06	0.23
O86	0.24	0.26	0.31	0.31	0.23	0.10	0.14	0.15	0.16	0.32	0.19
O87	0.29	0.33	0.36	0.31	0.22	0.07	0.11	0.26	0.29	0.36	0.10
O88	0.26	0.33	0.29	0.28	0.23	0.10	0.14	0.30	0.31	0.11	0.12
O89	0.23	0.34	0.35	0.26	0.18	0.18	0.26	0.26	0.24	0.11	0.12
O90	0.26	0.31	0.41	0.35	0.25	0.17	0.19	0.16	0.19	0.13	0.22
O91	0.29	0.37	0.35	0.33	0.25	0.12	0.19	0.26	0.34	0.12	0.28
O92	0.26	0.30	0.37	0.33	0.28	0.16	0.14	0.10	0.19	0.11	0.07
O93	0.20	0.22	0.33	0.35	0.27	0.11	0.16	0.14	0.15	0.31	0.26
O94	0.25	0.29	0.35	0.31	0.19	0.09	0.16	0.11	0.14	0.32	0.15
O95	0.34	0.41	0.41	0.32	0.20	0.05	0.14	0.22	0.34	0.40	0.10
O96	0.32	0.41	0.38	0.31	0.21	0.02	0.06	0.30	0.31	0.37	0.20
O97	0.31	0.37	0.41	0.37	0.24	0.20	0.28	0.27	0.19	0.39	0.34
O98	0.35	0.38	0.12	0.19	0.07	0.26	0.32	0.31	0.29	0.30	0.29
O99	0.33	0.39	0.16	0.14	0.07	0.26	0.34	0.35	0.36	0.33	0.32
O100	0.27	0.36	0.26	0.28	0.08	0.24	0.35	0.36	0.36	0.26	0.30
O101	0.28	0.35	0.28	0.32	0.10	0.04	0.10	0.33	0.33	0.24	0.27
O102	0.38	0.46	0.38	0.35	0.26	0.27	0.27	0.31	0.22	0.22	0.22
O103	0.29	0.38	0.23	0.27	0.23	0.28	0.29	0.33	0.29	0.25	0.24

Points	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW
O104	0.08	0.11	0.22	0.14	0.18	0.27	0.27	0.30	0.26	0.17	0.19
O105	0.31	0.32	0.24	0.23	0.10	0.42	0.40	0.29	0.09	0.15	0.32
O106	0.35	0.37	0.16	0.13	0.09	0.42	0.40	0.29	0.06	0.22	0.39
O107	0.34	0.39	0.12	0.15	0.06	0.41	0.39	0.28	0.17	0.37	0.39
O108	0.39	0.46	0.14	0.07	0.11	0.42	0.39	0.25	0.15	0.33	0.43
O109	0.37	0.40	0.16	0.12	0.13	0.42	0.39	0.28	0.12	0.17	0.33
O110	0.35	0.36	0.25	0.24	0.14	0.42	0.39	0.28	0.12	0.14	0.28
O111	0.18	0.15	0.16	0.20	0.15	0.04	0.07	0.11	0.20	0.35	0.36
O112	0.13	0.14	0.10	0.13	0.15	0.09	0.10	0.11	0.33	0.19	0.15
O113	0.19	0.14	0.21	0.21	0.26	0.20	0.20	0.22	0.19	0.08	0.09
O114	0.28	0.28	0.31	0.35	0.28	0.05	0.07	0.10	0.28	0.22	0.22
O115	0.29	0.32	0.35	0.37	0.26	0.11	0.11	0.06	0.31	0.30	0.27
O116	0.28	0.29	0.37	0.40	0.20	0.09	0.09	0.08	0.18	0.31	0.26
O117	0.26	0.29	0.36	0.37	0.04	0.08	0.08	0.05	0.09	0.20	0.14
O118	0.27	0.32	0.40	0.41	0.10	0.26	0.28	0.25	0.10	0.32	0.27
O119	0.31	0.36	0.42	0.42	0.21	0.24	0.32	0.26	0.15	0.38	0.30
O120	0.30	0.35	0.39	0.38	0.27	0.22	0.28	0.21	0.31	0.35	0.27
O121	0.27	0.31	0.33	0.33	0.28	0.14	0.14	0.11	0.30	0.07	0.17
O122	0.15	0.09	0.22	0.23	0.26	0.12	0.14	0.19	0.07	0.13	0.17
O123	0.03	0.06	0.18	0.19	0.16	0.18	0.27	0.31	0.09	0.07	0.16
O124	0.03	0.07	0.27	0.28	0.19	0.19	0.28	0.32	0.03	0.04	0.17
O125	0.01	0.06	0.30	0.35	0.23	0.20	0.28	0.34	0.08	0.09	0.24
O126	0.03	0.13	0.36	0.41	0.28	0.21	0.29	0.34	0.11	0.12	0.30
O127	0.02	0.14	0.38	0.42	0.30	0.20	0.29	0.31	0.07	0.09	0.15
O128	0.08	0.14	0.37	0.42	0.32	0.21	0.30	0.34	0.19	0.12	0.18
O129	0.07	0.09	0.36	0.43	0.34	0.21	0.25	0.26	0.32	0.42	0.32

Points	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW
O130	0.06	0.05	0.31	0.39	0.33	0.16	0.13	0.12	0.32	0.23	0.17
O131	0.07	0.08	0.34	0.43	0.37	0.21	0.29	0.34	0.18	0.06	0.29
O132	0.05	0.13	0.34	0.43	0.37	0.22	0.28	0.33	0.18	0.09	0.27
O133	0.03	0.17	0.32	0.42	0.37	0.21	0.27	0.31	0.16	0.09	0.29
O134	0.03	0.18	0.27	0.40	0.37	0.20	0.23	0.27	0.15	0.05	0.34
O135	0.04	0.18	0.26	0.38	0.36	0.21	0.23	0.20	0.27	0.16	0.27
O136	0.03	0.17	0.06	0.28	0.36	0.20	0.27	0.34	0.15	0.29	0.12
O137	0.06	0.18	0.08	0.27	0.35	0.19	0.27	0.34	0.13	0.37	0.13
O138	0.04	0.17	0.03	0.21	0.33	0.18	0.26	0.32	0.13	0.26	0.12
O139	0.03	0.14	0.03	0.09	0.33	0.17	0.29	0.30	0.05	0.23	0.14
O140	0.15	0.18	0.22	0.16	0.28	0.16	0.23	0.23	0.25	0.18	0.39
O141	0.11	0.04	0.18	0.06	0.24	0.14	0.23	0.22	0.13	0.26	0.21
O142	0.14	0.16	0.19	0.22	0.14	0.10	0.14	0.14	0.08	0.03	0.20
O143	0.13	0.15	0.15	0.08	0.11	0.22	0.32	0.28	0.21	0.08	0.20
O144	0.07	0.05	0.40	0.49	0.38	0.09	0.07	0.09	0.46	0.48	0.21
O145	0.06	0.09	0.29	0.34	0.28	0.19	0.22	0.24	0.38	0.39	0.14
O146	0.02	0.12	0.10	0.14	0.06	0.15	0.18	0.14	0.38	0.42	0.33
O147	0.12	0.20	0.21	0.22	0.12	0.11	0.22	0.15	0.32	0.31	0.26
O148	0.13	0.06	0.09	0.10	0.13	0.10	0.30	0.31	0.31	0.29	0.26
O149	0.17	0.05	0.08	0.10	0.07	0.07	0.27	0.36	0.43	0.56	0.53
O150	0.08	0.23	0.37	0.45	0.16	0.06	0.13	0.31	0.41	0.50	0.45
O151	0.04	0.20	0.33	0.32	0.13	0.08	0.24	0.18	0.20	0.13	0.16
O152	0.02	0.25	0.37	0.40	0.18	0.10	0.15	0.15	0.14	0.17	0.23
O153	0.07	0.23	0.28	0.31	0.25	0.06	0.18	0.18	0.23	0.19	0.27
O154	0.19	0.14	0.39	0.35	0.30	0.20	0.13	0.24	0.07	0.09	0.08
O155	0.05	0.07	0.27	0.30	0.27	0.20	0.21	0.36	0.08	0.09	0.09

Points	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW
O156	0.08	0.18	0.17	0.36	0.29	0.24	0.29	0.25	0.15	0.17	0.10
O157	0.09	0.25	0.12	0.40	0.32	0.26	0.31	0.24	0.15	0.16	0.14
O158	0.05	0.09	0.27	0.45	0.34	0.27	0.32	0.19	0.10	0.14	0.03
O159	0.03	0.11	0.27	0.41	0.34	0.28	0.33	0.17	0.11	0.14	0.12
O160	0.02	0.10	0.18	0.33	0.32	0.29	0.34	0.22	0.10	0.15	0.16
O161	0.06	0.07	0.10	0.16	0.32	0.29	0.32	0.19	0.34	0.40	0.41
O162	0.02	0.08	0.15	0.16	0.33	0.31	0.30	0.19	0.14	0.11	0.06
O163	0.04	0.16	0.21	0.24	0.35	0.31	0.31	0.25	0.05	0.03	0.20
O164	0.04	0.20	0.21	0.25	0.35	0.32	0.32	0.24	0.05	0.10	0.18
O165	0.02	0.20	0.20	0.23	0.36	0.32	0.36	0.27	0.10	0.14	0.05
O166	0.05	0.19	0.11	0.21	0.35	0.31	0.31	0.18	0.11	0.10	0.08
O167	0.10	0.17	0.25	0.18	0.35	0.30	0.27	0.15	0.39	0.41	0.38
O168	0.13	0.18	0.07	0.23	0.36	0.30	0.25	0.24	0.04	0.11	0.07
O169	0.14	0.20	0.10	0.18	0.37	0.29	0.23	0.05	0.14	0.11	0.09
O170	0.16	0.20	0.10	0.06	0.38	0.28	0.19	0.08	0.06	0.10	0.13
O171	0.17	0.15	0.15	0.05	0.37	0.27	0.19	0.12	0.08	0.04	0.16
O172	0.12	0.16	0.14	0.14	0.37	0.26	0.21	0.08	0.19	0.20	0.20
O173	0.16	0.11	0.22	0.04	0.37	0.26	0.24	0.15	0.04	0.30	0.09
O174	0.11	0.24	0.13	0.33	0.15	0.07	0.03	0.10	0.20	0.13	0.37
O175	0.11	0.26	0.13	0.44	0.31	0.08	0.02	0.07	0.12	0.03	0.13
O176	0.14	0.23	0.16	0.45	0.36	0.15	0.02	0.13	0.05	0.14	0.11
O177	0.12	0.24	0.32	0.43	0.33	0.15	0.04	0.14	0.07	0.18	0.09
O178	0.11	0.19	0.27	0.37	0.31	0.15	0.18	0.05	0.07	0.04	0.01
O179	0.08	0.14	0.19	0.22	0.18	0.03	0.07	0.10	0.05	0.07	0.15
O180	0.06	0.12	0.17	0.25	0.24	0.06	0.05	0.05	0.10	0.06	0.14
O181	0.05	0.15	0.16	0.23	0.19	0.05	0.04	0.06	0.06	0.04	0.11

Points	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW
O182	0.04	0.06	0.17	0.08	0.22	0.17	0.27	0.17	0.21	0.28	0.09
O183	0.06	0.07	0.17	0.09	0.13	0.15	0.21	0.13	0.08	0.15	0.02
O184	0.05	0.07	0.10	0.09	0.10	0.13	0.18	0.14	0.06	0.04	0.03
O185	0.10	0.04	0.10	0.15	0.07	0.13	0.15	0.15	0.03	0.06	0.03
O186	0.06	0.04	0.04	0.07	0.15	0.14	0.32	0.22	0.09	0.08	0.19
O187	0.04	0.13	0.05	0.14	0.18	0.21	0.32	0.22	0.12	0.06	0.20
O188	0.06	0.22	0.10	0.22	0.18	0.20	0.26	0.17	0.14	0.11	0.16
O189	0.12	0.32	0.24	0.31	0.17	0.14	0.20	0.13	0.10	0.06	0.14
O190	0.01	0.10	0.17	0.30	0.23	0.10	0.07	0.02	0.01	0.07	0.05
O191	0.01	0.11	0.19	0.35	0.32	0.11	0.08	0.03	0.02	0.08	0.06
O192	0.02	0.05	0.06	0.11	0.16	0.06	0.02	0.04	0.04	0.04	0.03
O193	0.02	0.07	0.07	0.11	0.08	0.18	0.28	0.27	0.15	0.09	0.12
O194	0.04	0.12	0.19	0.12	0.07	0.24	0.35	0.35	0.13	0.06	0.11
O195	0.03	0.09	0.09	0.18	0.12	0.21	0.30	0.33	0.07	0.07	0.12
O196	0.14	0.31	0.35	0.30	0.14	0.20	0.27	0.28	0.05	0.08	0.09
O197	0.08	0.13	0.14	0.30	0.19	0.24	0.38	0.40	0.08	0.18	0.12
O198	0.04	0.10	0.16	0.37	0.29	0.20	0.31	0.17	0.06	0.02	0.04
O199	0.05	0.14	0.13	0.11	0.16	0.02	0.04	0.06	0.08	0.11	0.08
O200	0.17	0.38	0.40	0.37	0.21	0.06	0.12	0.15	0.21	0.18	0.14
O201	0.09	0.14	0.13	0.10	0.05	0.11	0.26	0.27	0.24	0.24	0.17
O202	0.07	0.13	0.12	0.12	0.07	0.07	0.11	0.12	0.27	0.24	0.20
O203	0.15	0.36	0.38	0.31	0.18	0.11	0.20	0.18	0.25	0.23	0.22
O204	0.16	0.37	0.40	0.36	0.19	0.08	0.20	0.11	0.20	0.17	0.12
O205	0.02	0.04	0.10	0.32	0.29	0.28	0.25	0.14	0.15	0.02	0.11
O206	0.02	0.05	0.05	0.18	0.13	0.10	0.08	0.09	0.07	0.02	0.08
O207	0.03	0.05	0.10	0.40	0.28	0.23	0.17	0.11	0.13	0.11	0.08

Points	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW
O208	0.03	0.08	0.12	0.40	0.29	0.26	0.20	0.14	0.14	0.09	0.14
O209	0.07	0.13	0.08	0.14	0.13	0.12	0.13	0.07	0.05	0.03	0.10
O210	0.04	0.20	0.08	0.31	0.29	0.30	0.31	0.19	0.14	0.04	0.27
O211	0.02	0.22	0.08	0.22	0.22	0.26	0.30	0.22	0.16	0.02	0.20
O212	0.08	0.21	0.05	0.14	0.16	0.19	0.20	0.15	0.13	0.04	0.10
O213	0.25	0.10	0.08	0.25	0.21	0.20	0.27	0.16	0.07	0.05	0.02
O214	0.16	0.09	0.06	0.17	0.13	0.17	0.27	0.23	0.10	0.07	0.07
O215	0.02	0.07	0.07	0.17	0.20	0.22	0.27	0.23	0.09	0.08	0.10
O216	0.05	0.12	0.05	0.10	0.11	0.14	0.20	0.18	0.06	0.10	0.05
O217	0.05	0.13	0.02	0.24	0.15	0.11	0.11	0.11	0.02	0.11	0.03

Table D 6 Special Test Points of Proposed Scheme

Points	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW
S1	0.14	0.12	0.09	0.22	0.23	0.27	0.33	0.23	0.11	0.13	0.22
S2	0.10	0.14	0.12	0.13	0.22	0.26	0.35	0.27	0.07	0.08	0.18
S3	0.11	0.09	0.10	0.12	0.20	0.26	0.35	0.26	0.09	0.08	0.16
S4	0.13	0.07	0.11	0.19	0.20	0.28	0.34	0.25	0.09	0.11	0.20
S5	0.14	0.05	0.13	0.25	0.21	0.32	0.34	0.25	0.08	0.12	0.22
S6	0.14	0.05	0.12	0.27	0.20	0.32	0.31	0.23	0.09	0.14	0.24
S7	0.11	0.03	0.10	0.26	0.20	0.33	0.32	0.24	0.14	0.12	0.21
S8	0.08	0.05	0.15	0.25	0.21	0.35	0.35	0.26	0.16	0.05	0.13
S9	0.08	0.09	0.15	0.27	0.21	0.36	0.34	0.24	0.11	0.04	0.16
S10	0.09	0.09	0.13	0.29	0.21	0.36	0.32	0.22	0.06	0.09	0.20
S11	0.10	0.08	0.11	0.25	0.19	0.34	0.32	0.22	0.04	0.15	0.24
S12	0.09	0.07	0.07	0.23	0.18	0.31	0.32	0.21	0.05	0.20	0.29
S13	0.07	0.11	0.15	0.16	0.15	0.28	0.30	0.22	0.14	0.16	0.27
S14	0.05	0.03	0.03	0.19	0.17	0.28	0.29	0.22	0.12	0.05	0.23
S15	0.04	0.01	0.02	0.19	0.21	0.29	0.27	0.19	0.08	0.04	0.20
S16	0.20	0.15	0.09	0.17	0.31	0.39	0.39	0.30	0.09	0.14	0.28
S17	0.04	0.11	0.08	0.08	0.36	0.44	0.41	0.33	0.05	0.14	0.34
S18	0.06	0.12	0.09	0.11	0.28	0.33	0.30	0.24	0.10	0.09	0.13
S19	0.14	0.14	0.15	0.20	0.39	0.42	0.38	0.25	0.12	0.20	0.36
S20	0.16	0.04	0.04	0.12	0.23	0.34	0.37	0.25	0.10	0.20	0.35
S21	0.15	0.15	0.09	0.17	0.23	0.34	0.27	0.18	0.09	0.19	0.34
S22	0.03	0.26	0.38	0.51	0.38	0.20	0.14	0.09	0.07	0.03	0.38
S23	0.06	0.22	0.33	0.45	0.36	0.19	0.24	0.04	0.06	0.10	0.06
S24	0.06	0.19	0.34	0.45	0.36	0.14	0.19	0.06	0.07	0.15	0.05
S25	0.08	0.11	0.35	0.46	0.36	0.05	0.08	0.07	0.11	0.09	0.16

Points	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW
S26	0.06	0.17	0.44	0.51	0.38	0.15	0.07	0.16	0.10	0.10	0.08
S27	0.06	0.22	0.45	0.48	0.35	0.18	0.23	0.08	0.10	0.10	0.09
S28	0.08	0.22	0.47	0.52	0.36	0.16	0.22	0.05	0.12	0.08	0.09
S29	0.04	0.12	0.44	0.47	0.31	0.15	0.22	0.03	0.03	0.02	0.06
S30	0.06	0.15	0.40	0.36	0.23	0.10	0.14	0.06	0.12	0.09	0.06
S31	0.07	0.22	0.21	0.21	0.11	0.12	0.11	0.07	0.05	0.07	0.03
S32	0.03	0.11	0.03	0.04	0.02	0.09	0.15	0.26	0.52	0.54	0.32
S33	0.10	0.04	0.05	0.09	0.04	0.10	0.26	0.32	0.49	0.51	0.45