Appendix J

Air Ventilation Assessment

ARUP

Application for Amendment of Plan Under Section 12A of the Town Planning Ordinance (Cap. 131) for Proposed Innovation and Technology Hub at Various Lots in D.D. 82 and D.D. 86 and Adjoining Government Land, Man Kam To, New Territories

Air Ventilation Assessment - Initial Study

| 07 August 2023

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Appendices

1. Introduction

Ove Arup & Partners Hong Kong Limited (Arup) was instructed to conduct an Air Ventilation Assessment (AVA) – Initial Study for the Application for Amendment of Plan Under Section 12A of the Town Planning Ordinance (Cap. 131) for Proposed Innovation and Technology Hub at Various Lots in D.D. 82 and D.D. 86 and Adjoining Government Land, Man Kam To, New Territories (the Development).

The study was carried out in accordance with 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.

1.1 Objective of the Study

The Applicant proposes amendments to the Approved Man Kam To Outline Zoning Plan No. S/NE-MKT/4 (“the OZP”) by rezoning the Application Site from “Agriculture” (“AGR”), “Green Belt” (“GB”) and “Government, Institution or Community” (“G/IC”) to a tailor-made “Other Specified Uses” (“OU”) annotated “Innovation and Technology Hub” to facilitate the development of the proposed Innovation and Technology (I&T) Hub. This document is to support the Section 12A 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 Development is near the border of Hong Kong and Shenzhen Shi. It is located to the south of Lin Ma Hang Road and west of Ping Yuen River. The Ta Ku Ling Ling Ying Public School at about +15~+27mPD and a Fung Shui Woodland are bounded by the Development.

To the north, east and west of the Development are generally surrounded by flat and open area at about +5~10mPD. To the west of the Development are continuous hilly terrain of Lo Shue Ling at about +65mPD.

Several villages with low-rise building at about +10~20mPD are located to the east of the Development including Ta Kwu Ling Village, Fung Wong Wu, Chow Tin Tsuen and Lei Uk. Beyond the Lo Shue Ling is another low-rise village Muk Wu Nga Yiu also at about +10~20mPD. The location of major building blocks are indicated in Figure 1.

Figure 1 Site location and existing surrounding developments

2.2 Studied Schemes

Two schemes, namely Baseline Scheme and Indicative Scheme, were studied under the AVA Initial Study. Each Scheme will be briefly descried in the following sub-sections.

2.2.1 Baseline Scheme

Baseline Scheme is based on the existing condition of the Development area extracted from Goble Information System (GIS). The layout of Baseline Scheme is mostly farmland with one single story structure near the Ta Ku Ling Ling Ying Public School and summarized in Table 1. The 3D model of Baseline Scheme was constructed as shown in Figure 3 to Figure 6.

Table 1 Development parameter of Baseline Scheme

Existing Baseline Building	Building Height
1 low rise building	15.7 mPD

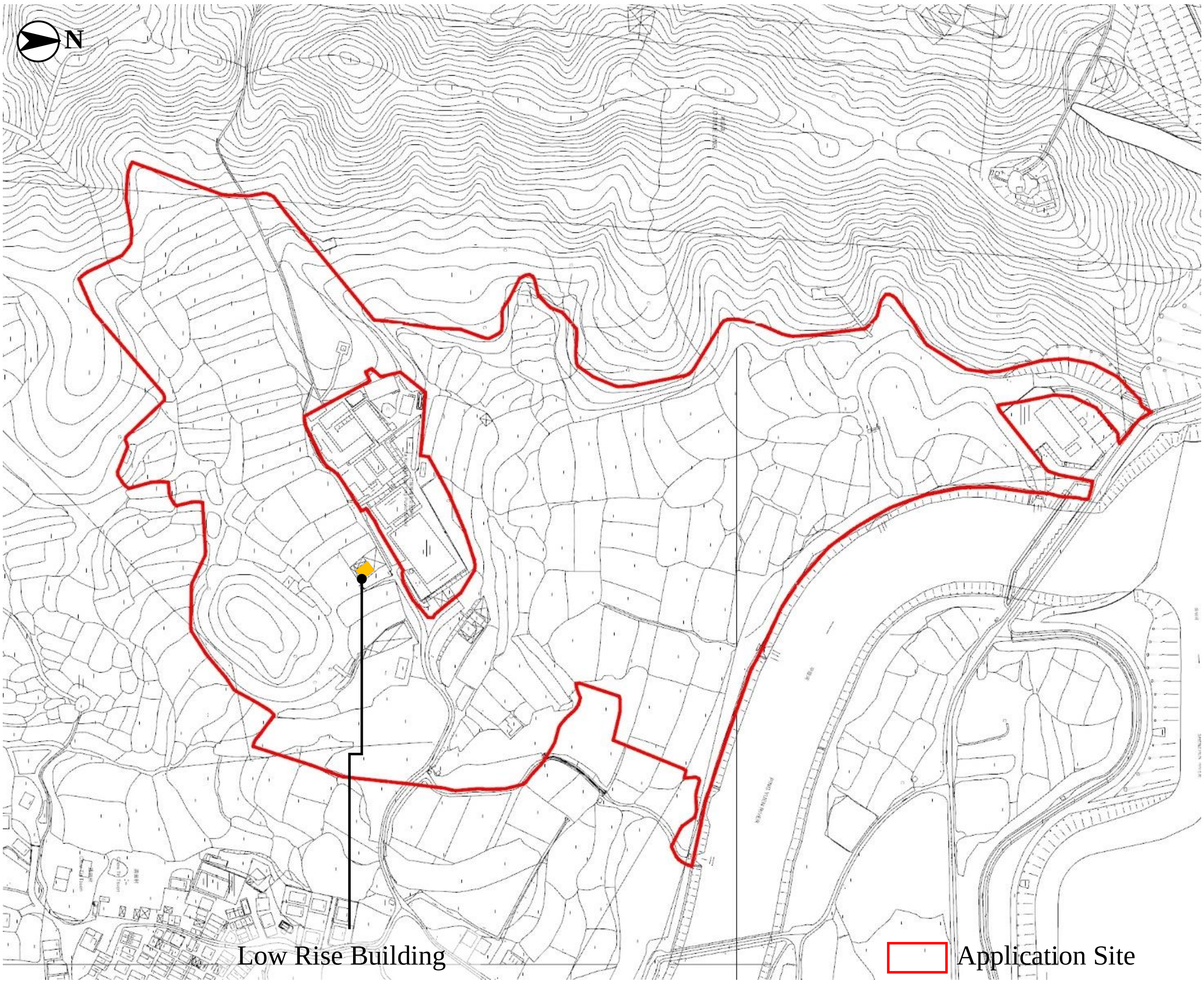


Figure 2 Layout plan of Baseline Scheme

Figure 3 Northly view of Baseline Scheme

Figure 4 Eastly view of Baseline Scheme

Figure 5 Southly view of Baseline Scheme

Figure 6 Westly view of Baseline Scheme

2.2.2 Indicative Scheme

The Indicative Scheme consist with 3 R&D Centers, 1 Commercial building, 3 Data Centers, 3 Ancillary Dormitories, 5 Residential Towers, 1 Clubhouse, 1 kindergarten, 1 reserved site for a primary school and 1 Sewerage Treatment Plant (STP). The development parameters are summarized in Table 2. The layout plan of Indicative Scheme is shown in Figure 7 with details in Appendix A. The 3D model of the Indicative Scheme was constructed as shown in Figure 9 to Figure 12.

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

1. One 30m breezeway aligned in ESE-WNW at podium level
2. One 30m breezeway aligned in E-W
3. One 30m breezeway aligned in ESE-WNW
4. One 30m breezeway aligned in NNE-SSW with 15° turn
5. One non-building area as open space in the south-eastern part of site
6. Two 15m air paths aligned in SSE-NNW
7. One 15m air path aligned in ENE-WSW
8. Four 18m width by 10.8m high empty bays under AD1 and R5.

Table 2 Development parameter of Indicative Scheme

Indicative Building	Building Height
3 R&D Centers (R&D)	90mPD
1 Commercial Center (C)	37mPD
3 Data Centers (DC)	80mPD
3 Ancillary Dormitories (AD)	110mPD
5 Residential Towers (R)	120mPD
1 Club House (CH)	34.7mPD
1 Kindergarten	15.5mPD
1 Sewerage Treatment Plant (STP)	17mPD
1 Reserved Site for a Primary School (PS)	49mPD
Site Coverage	33.39%
- Non-Domestic Portion	30.08%
- Domestic Portion	3.31%

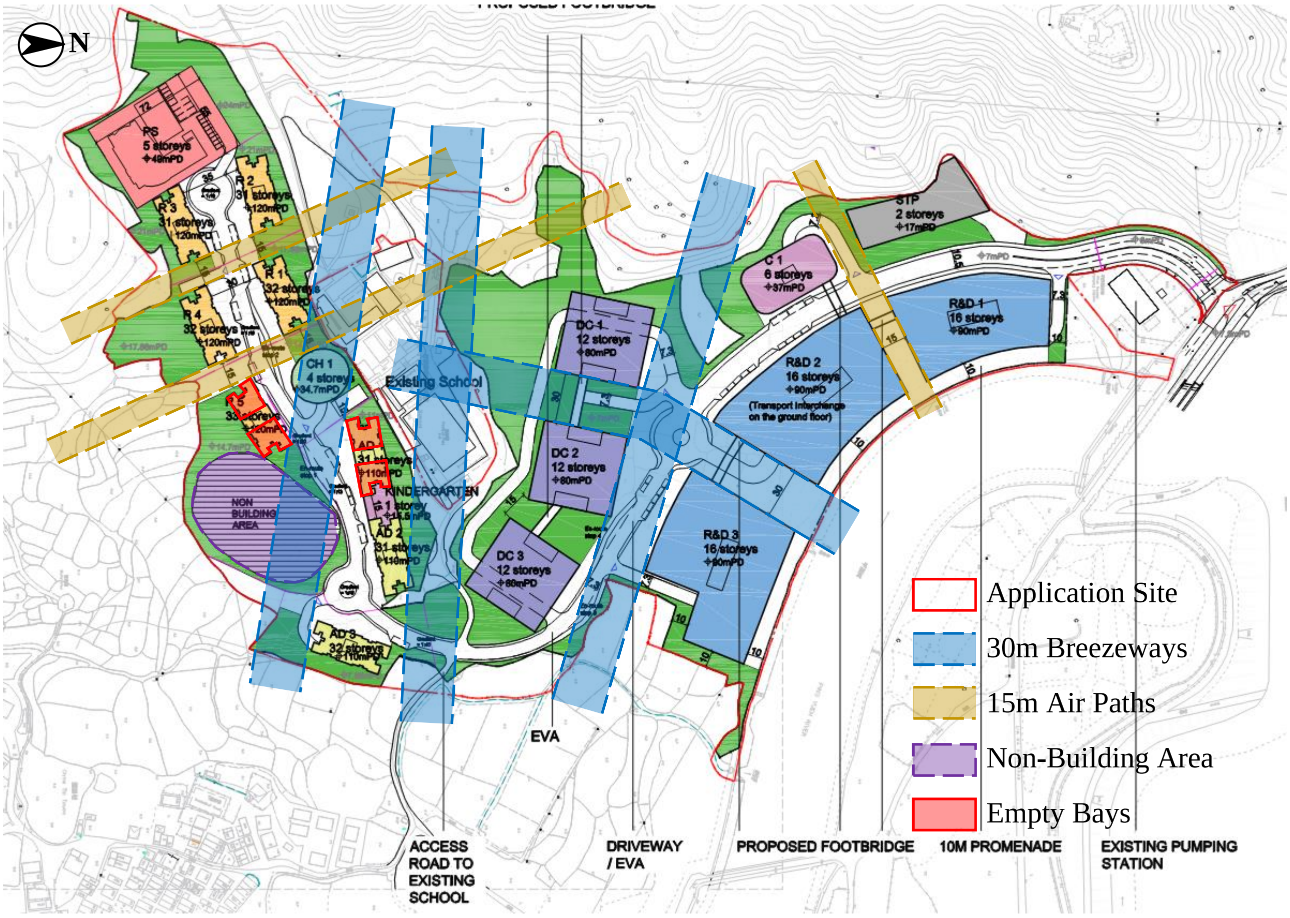


Figure 7 Layout plan of Indicative Scheme

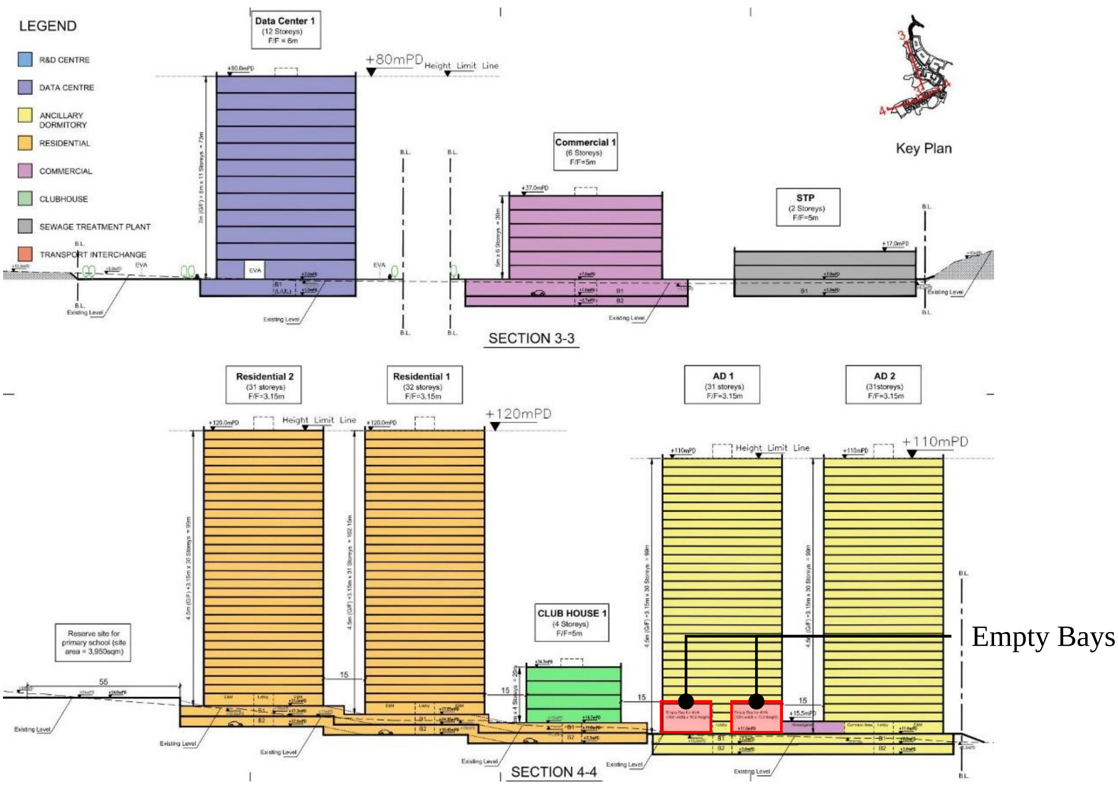


Figure 8 Section of Indicative Scheme

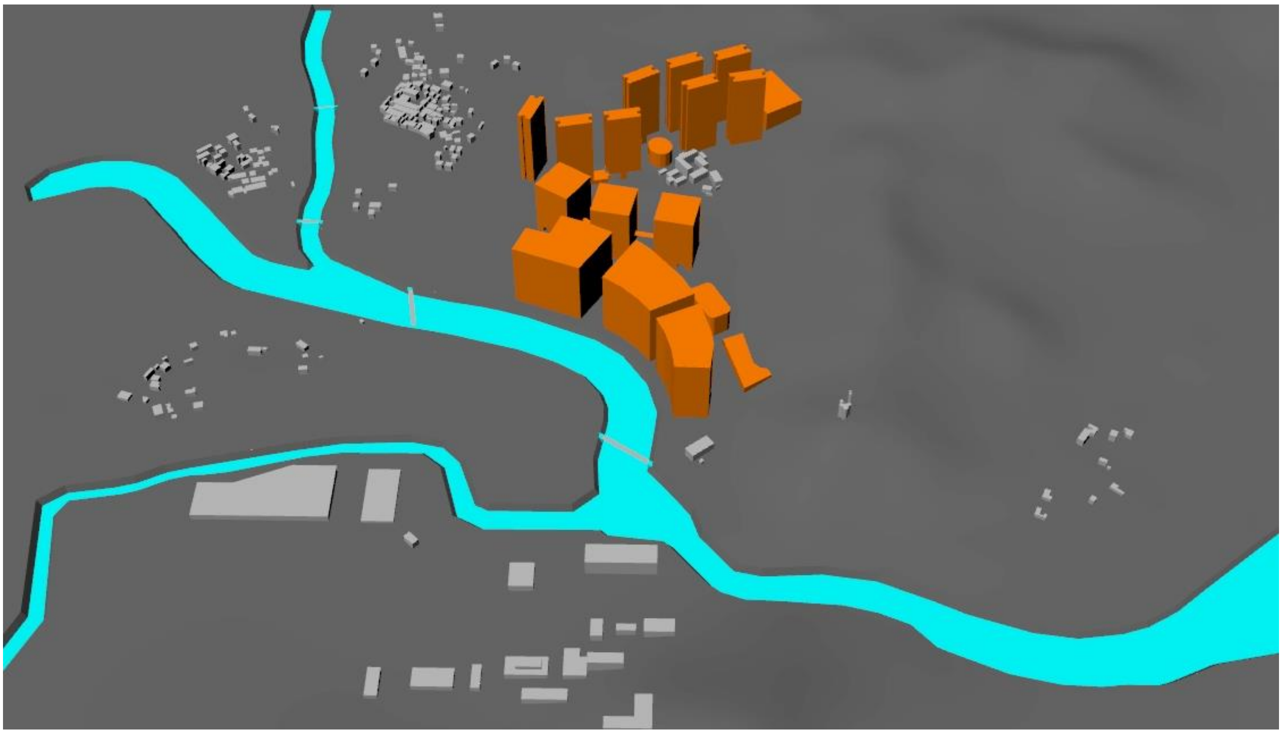


Figure 9 Northly view of Indicative Scheme

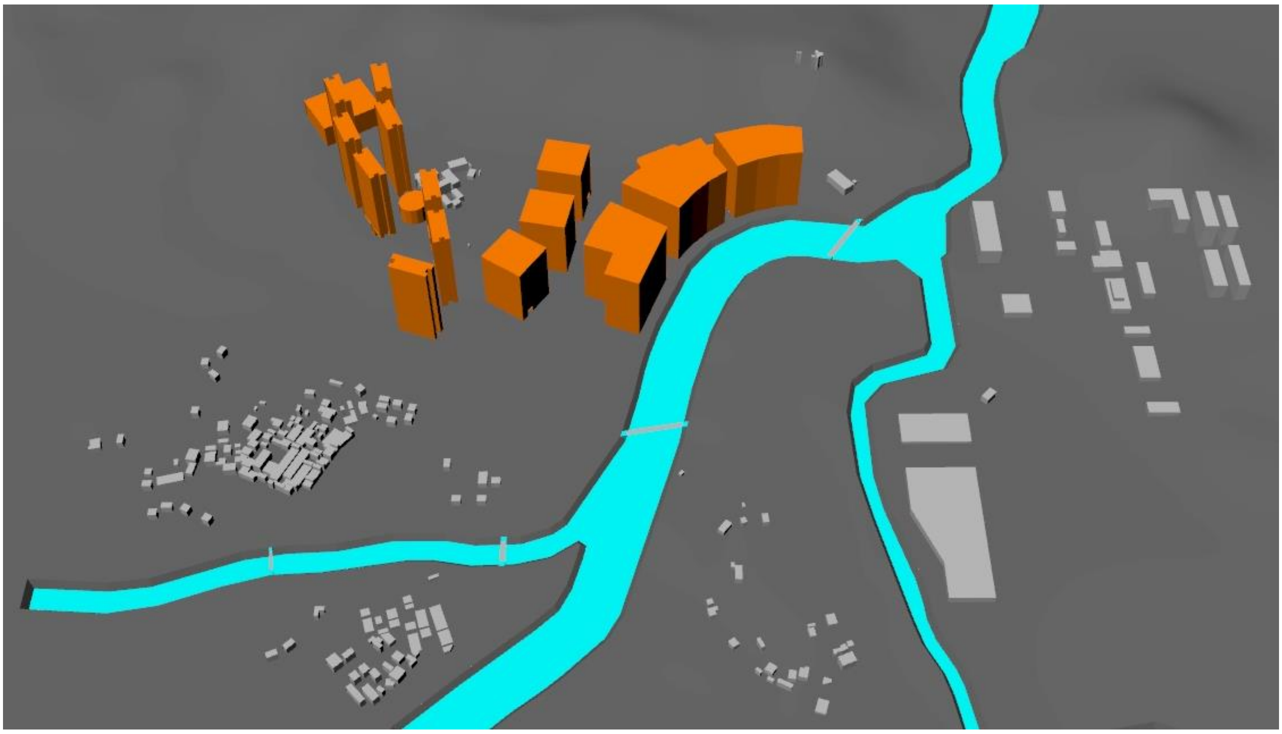


Figure 10 Eastly view of Indicative Scheme

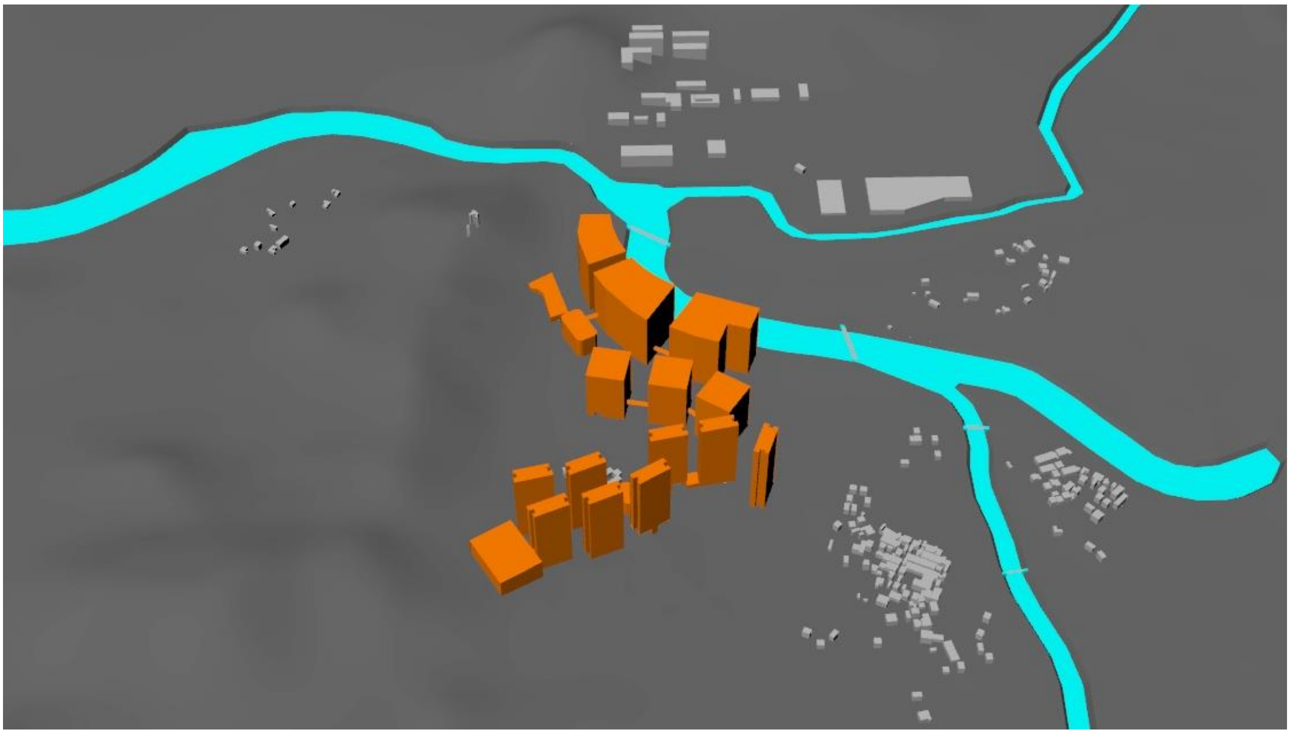


Figure 11 Southly view of Indicative Scheme

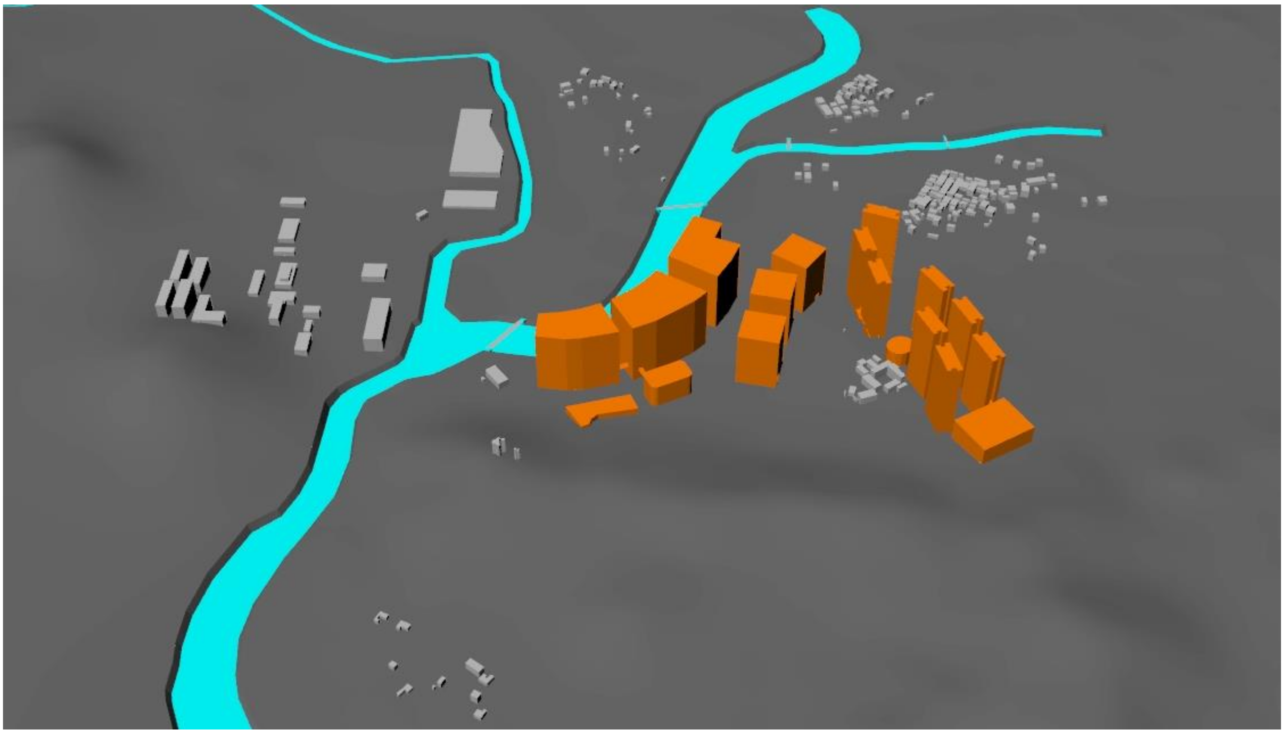


Figure 12 Westly view of Indicative Scheme

2.2.3 Revised Indicative Scheme

According to the comments received from the Education Bureau dated 16 May 2023, reserving a school site for new school development in the Application Site is considered not required in view of the structural decline in student population in the coming years and adequate school sites reserved in the New Territories North (NTN) development. Thus, a Revised Indicative Scheme was formed.

The Revised Indicative Scheme is amended from Indicative Scheme with excluded Fung Shui Woodland from site boundary and removed Primary School building from Reserved Site for a Primary School. The Revised Indicative Scheme consist with 3 R&D Centers, 1 Commercial building, 3 Data Centers, 3 Ancillary Dormitories, 5 Residential Towers, 1 Clubhouse, 1 kindergarten and 1 Sewerage Treatment Plant (STP). The development parameters are summarized in Table 3. The layout plan of Revised Indicative Scheme is shown in Figure 13 with details in Appendix A.

All wind enhancement features have been maintained from Indicative Scheme including the following:

1. One 30m breezeway aligned in ESE-WNW at podium level
2. One 30m breezeway aligned in E-W
3. One 30m breezeway aligned in ESE-WNW
4. One 30m breezeway aligned in NNE-SSW with 15^o turn
5. One non-building area as open space in the south-eastern part of site
6. Two 15m air paths aligned in SSE-NNW
7. One 15m air path aligned in ENE-WSW
8. Four 18m width by 10.8m high empty bays under AD1 and R5.

The Revised Indicative Scheme would be expected to achieve better ventilation performance than Indicative Scheme due to the following reasons:

1. All claimed wind enhancement features and development parameters are maintained in the Revised Indicative Scheme
2. The exclusion of Fung Shui Woodland would have no influence on the simulation result as it is NBA in the Indicative Scheme.
3. Removing Primary School building allow enlarged the entrance to access road between Residential Towers. Enhanced wind permeability across the Application Site especially under SW quadrant prevailing winds would be expected.

Therefore, the AVA using Indicative Scheme would be considered as worst-case scenario and qualitative analysis on Revised Indicative Scheme would be provided on annual, summer and directional analysis.

Table 3 Development parameter of Revised Indicative Scheme

Revised Indicative Building	Building Height
3 R&D Centers (R&D)	90mPD
1 Commercial Center (C)	37mPD
3 Data Centers (DC)	80mPD
3 Ancillary Dormitories (AD)	110mPD
5 Residential Towers (R)	120mPD
1 Club House (CH)	34.7mPD
1 Kindergarten	15.5mPD
1 Sewerage Treatment Plant (STP)	17mPD
Site Coverage - Non-Domestic Portion - Domestic Portion	31.77% 26.23% 5.54%

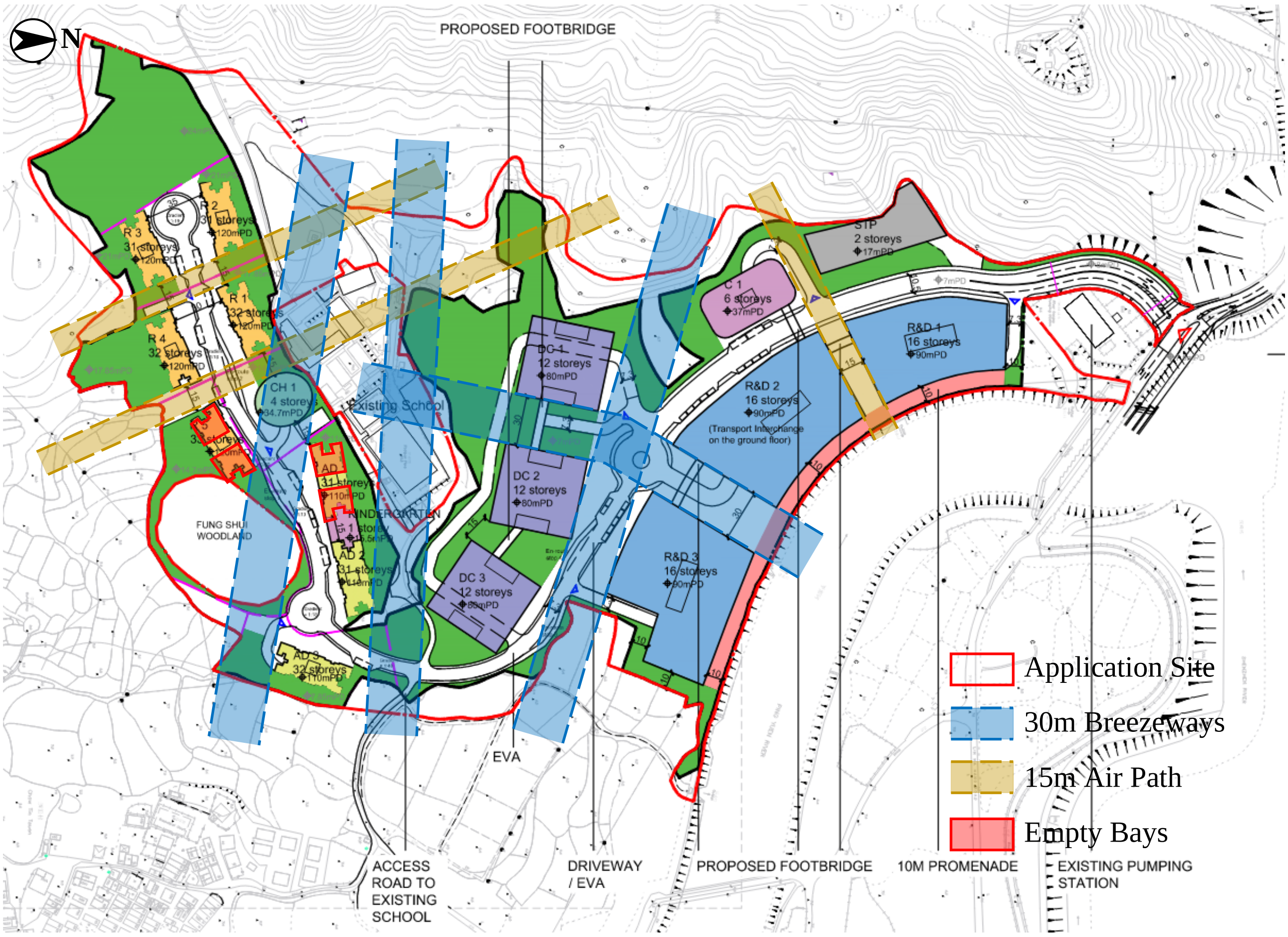


Figure 13 Layout Plan of Revised Indicative Scheme

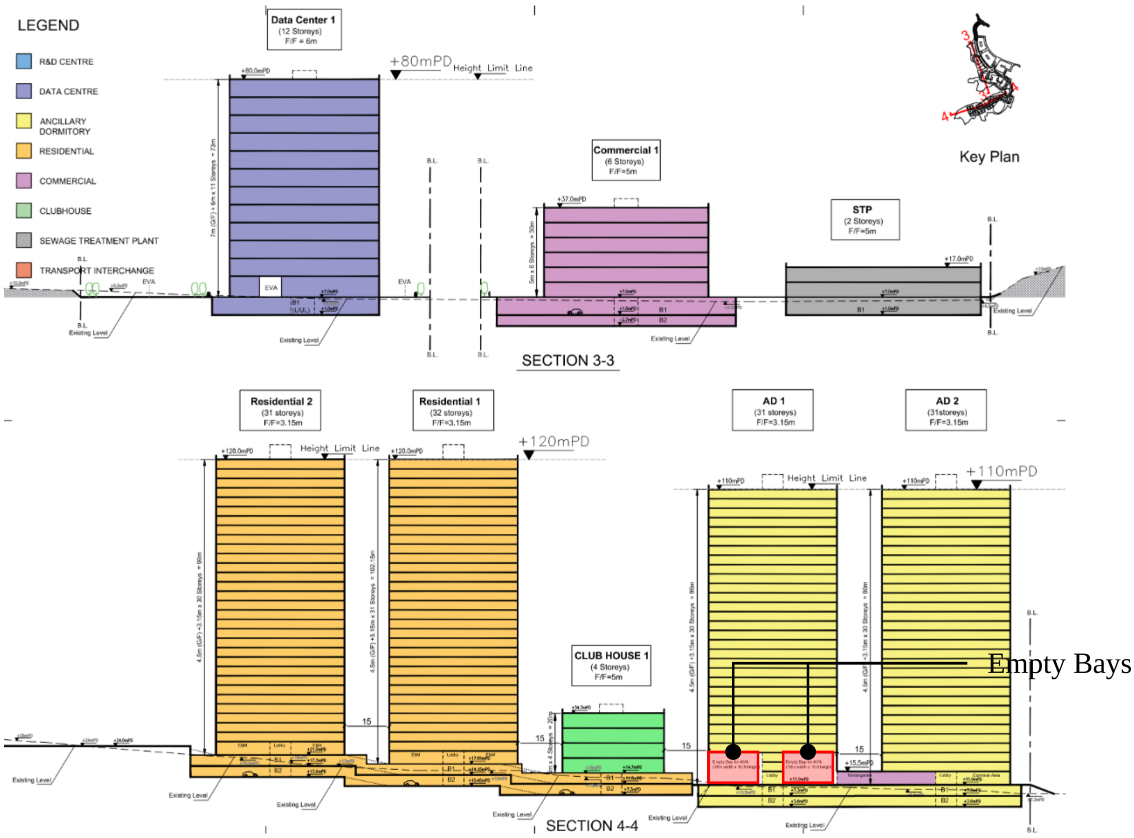


Figure 14 Section of Revised Indicative Scheme

3. Methodology

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 conditions in the AVA Initial Study by using a Computational Fluid Dynamics (CFD) modelling technique. Since the CFD approach was adopted for the AVA Initial Study, the criterion together with the following selected wind data were applied as the methodology.

3.1 Wind Availability Data

The site wind availability of the Development 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. The location of the Development falls within the location grid (x: 073, y:091) in the RAMS database as indicated in Figure 15

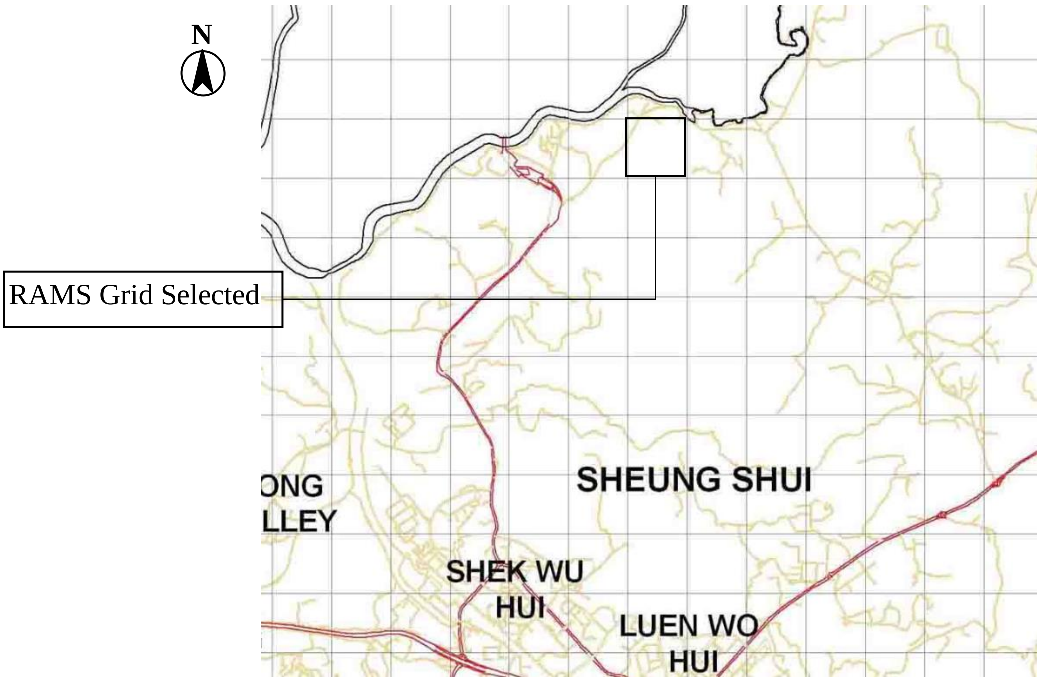


Figure 15 RAMS Grid

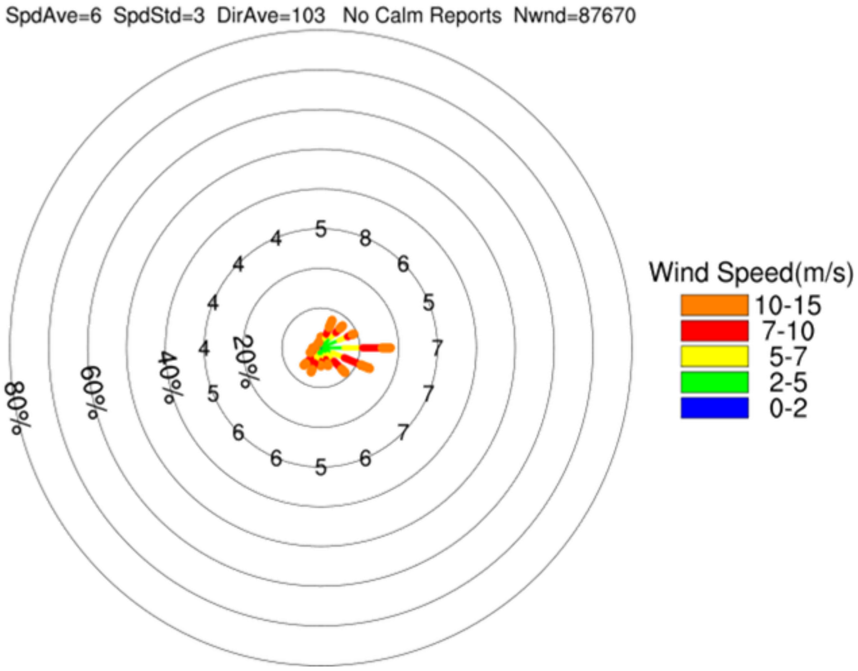


Figure 16 RAMS Annual Wind Rose at 500mPD

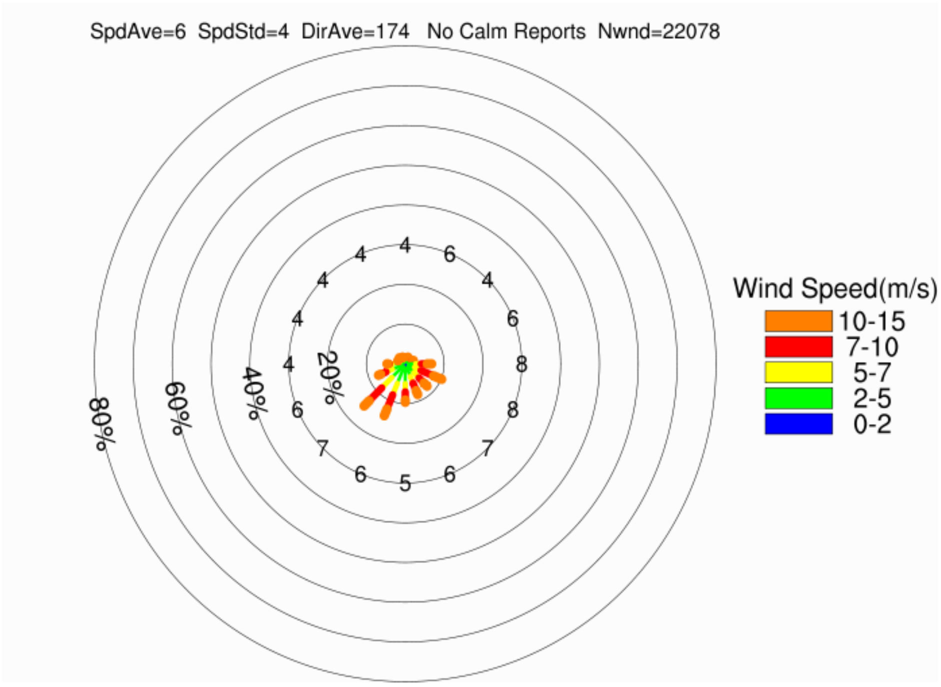


Figure 17 RAMS Summer Wind Rose at 500mPD

3.1.1 Wind Directions

3.1.1.1 Annual Prevailing Wind

Eight prevailing wind directions (highlighted in bold in Table 4) are considered in this AVA Study which covers 78.7% of the total annual wind frequency. They are north-north-eastly (7.9%), north-easterly (7.9%), east-north-easterly (9.3%), easterly (18.2%), east-south-easterly (13.7%), south-easterly (8.9%), south-south-westerly (6.6%) and south-westerly (6.2%).

Table 4 Annual Wind Frequency

Wind Direction	N	**NNE**	**NE**	**ENE**	**E**	**ESE**	**SE**	SSE	
Frequency	2.8%	**7.9%**	**7.9%**	**9.3%**	**18.2%**	**13.7%**	**8.9%**	4.9%	
Wind Direction	S	**SSW**	**SW**	WSW	W	WNW	NW	NNW	**Sum**
Frequency	4.6%	**6.6%**	**6.2%**	3.0%	2.1%	1.1%	1.2%	1.5%	**78.7%**

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

3.1.1.2 Summer Prevailing Wind

Eight prevailing wind directions (highlighted in bold in Table 5) are considered in this AVA Study which covers 81.6% of the total annual wind frequency. They are easterly (7.4%), east-north-easterly (10.6%), south-easterly (8.2%), south-south-easterly (8.5%), southerly (9.8%), south-south-westerly (14.3%), south-westerly (15.2%) and west-south-westerly (7.6%).

Table 5 Summer Wind Frequency

Wind Direction	N	NNE	NE	ENE	**E**	**ESE**	**SE**	**SSE**	
Frequency	1.6%	1.9%	1.5%	2.5%	**7.4%**	**10.6%**	**8.2%**	**8.5%**	
Wind Direction	**S**	**SSW**	**SW**	**WSW**	W	WNW	NW	NNW	**Sum**
Frequency	**9.8%**	**14.3%**	**15.2%**	**7.6%**	4.7%	2.1%	2.2%	1.8%	**81.6%**

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

3.1.2 Wind Profiles

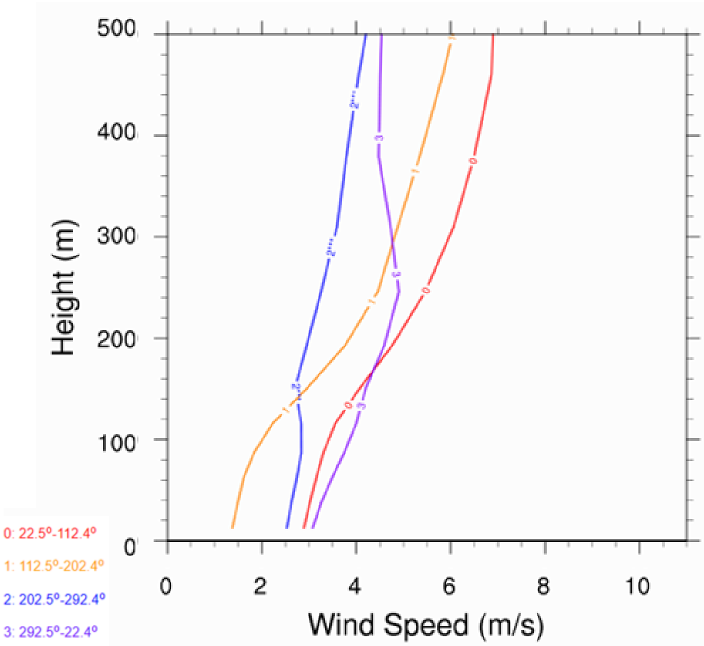


Figure 18 Normalised Mean Wind Speed Profile Measured in 16 Directions

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, the velocity is assumed the same as the data at 500m. These wind data will be the input parameters in the CFD simulation

3.2 Assessment and Surrounding Areas

With reference to *the AVA Technical Circular [1]*, the assessment should include all areas within the Application Site, as well as a belt up to 1H, where H is the height the tallest building within the Application Site, around the site boundary.

However, due to the relatively low-dense development in the surrounding, the Assessment and Surrounding Areas are extended to 2H and 4H respectively. With the tallest building within the Application Site is about 100m of Residential Tower, the 2H and 4H are set as 200m and 400m respectively, as shown in Figure 20.

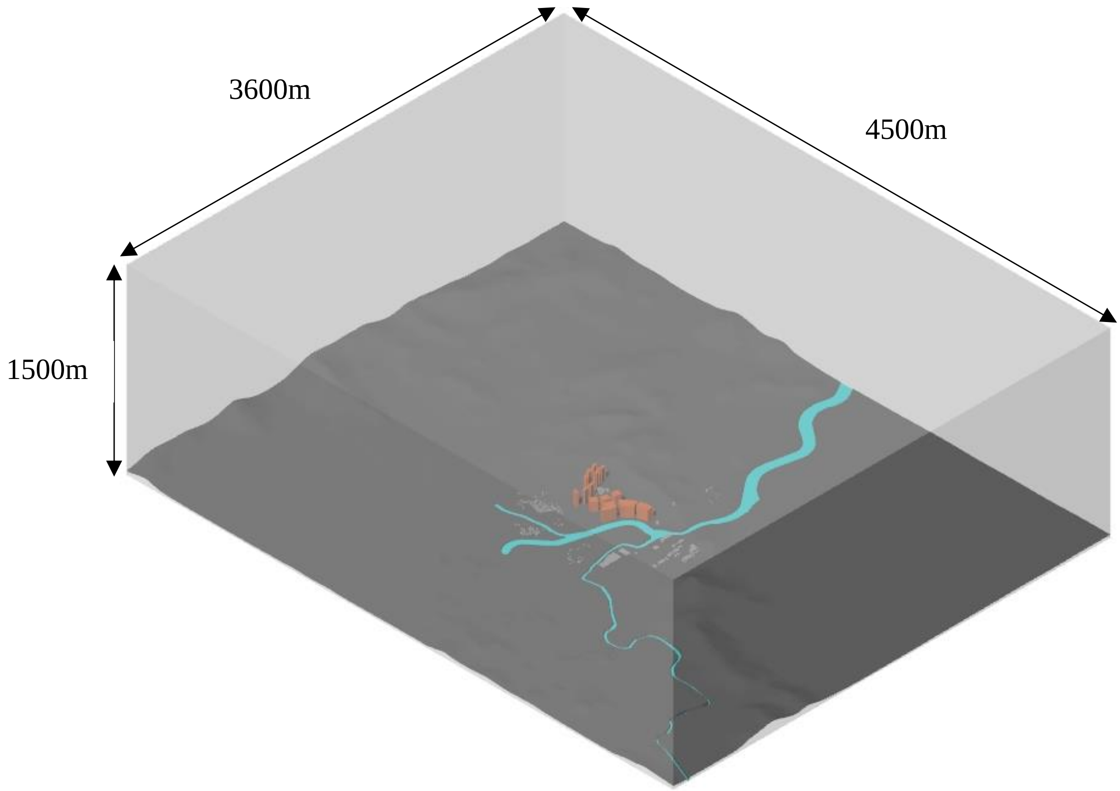


Figure 19 3D View of the Domain

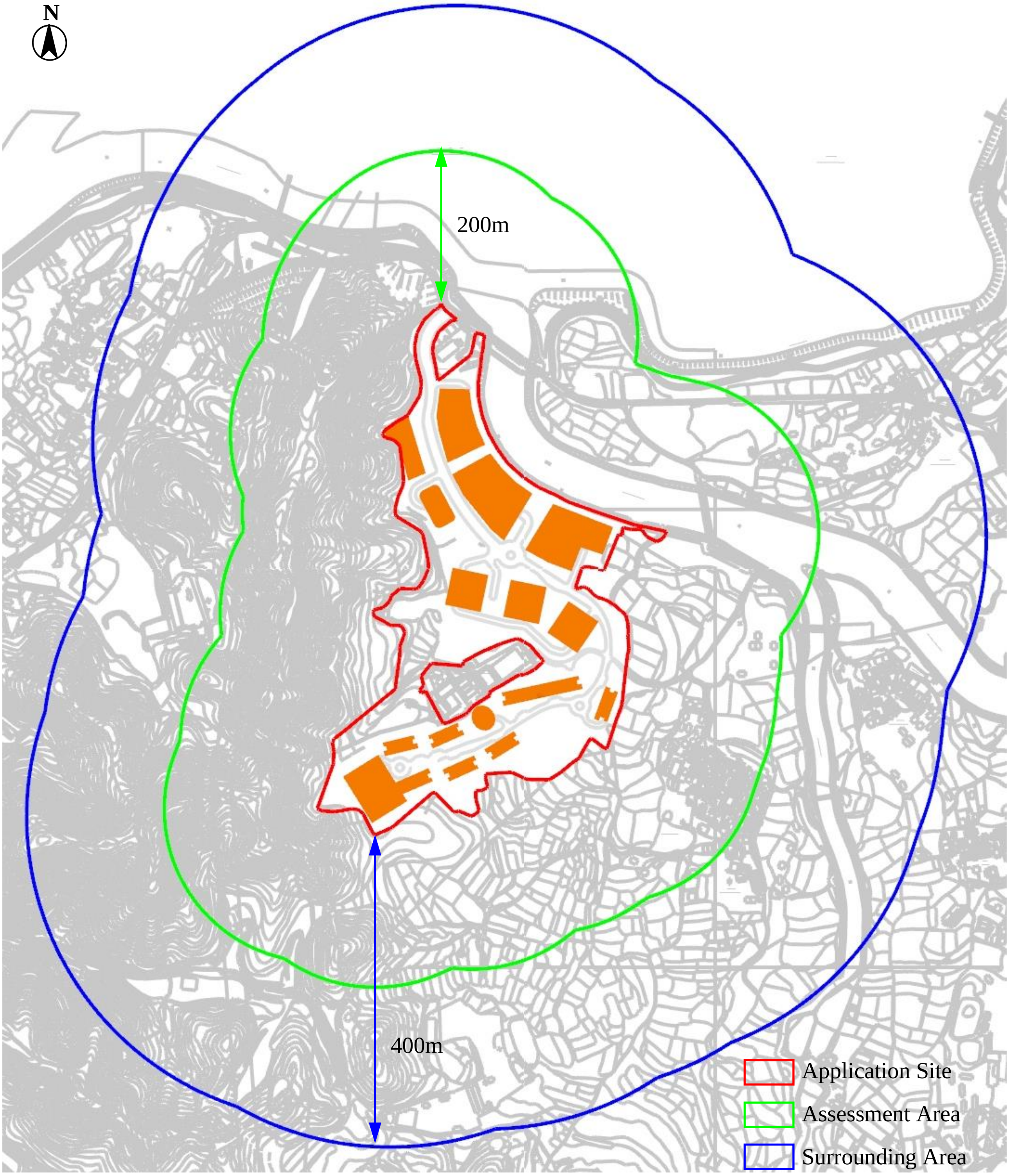


Figure 20 Application Site (Red), Assessment Area (Green), and Surrounding Area (Blue).

3.3 Views on the 3D Models

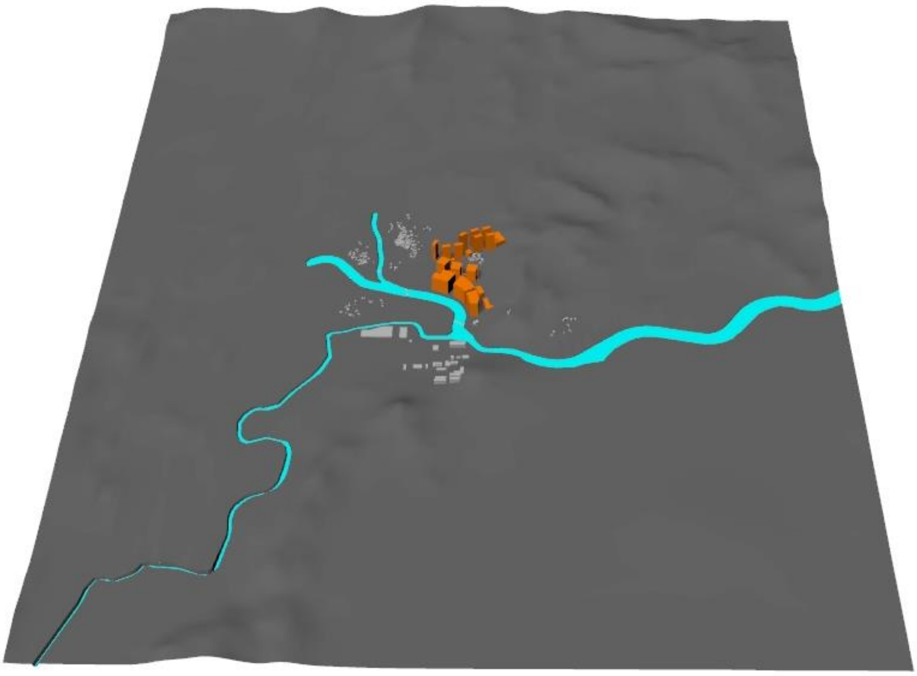


Figure 21 Northly view of 3D Model

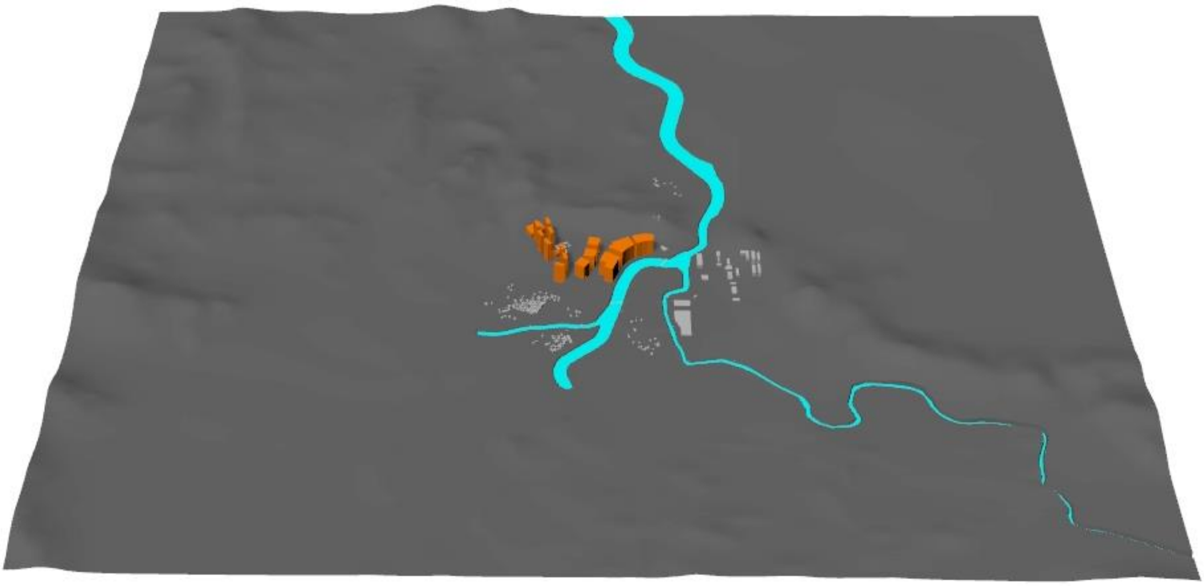


Figure 22 Eastly view of 3D Model

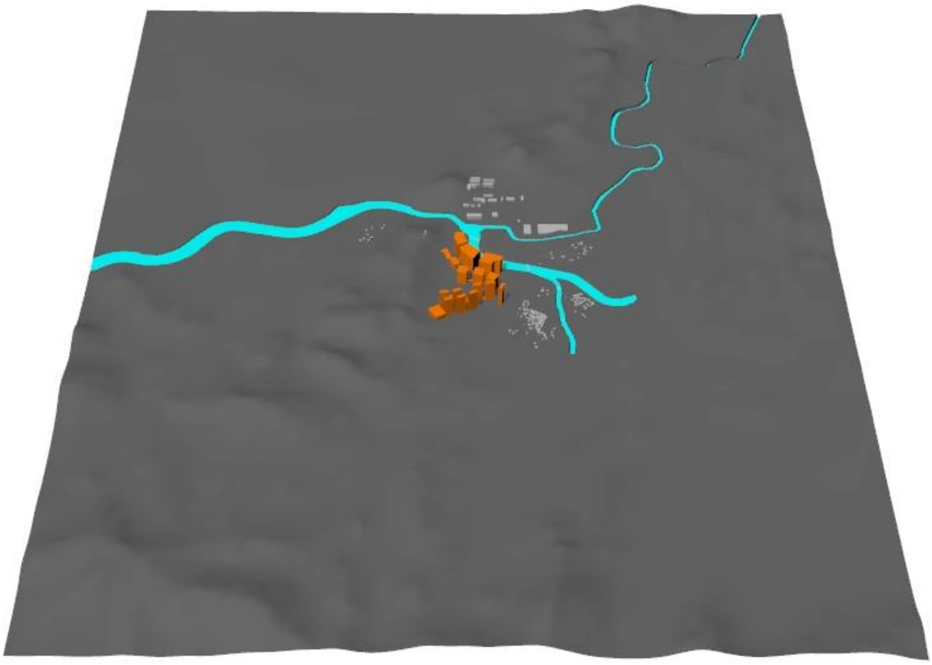


Figure 23 Southly view of 3D Model

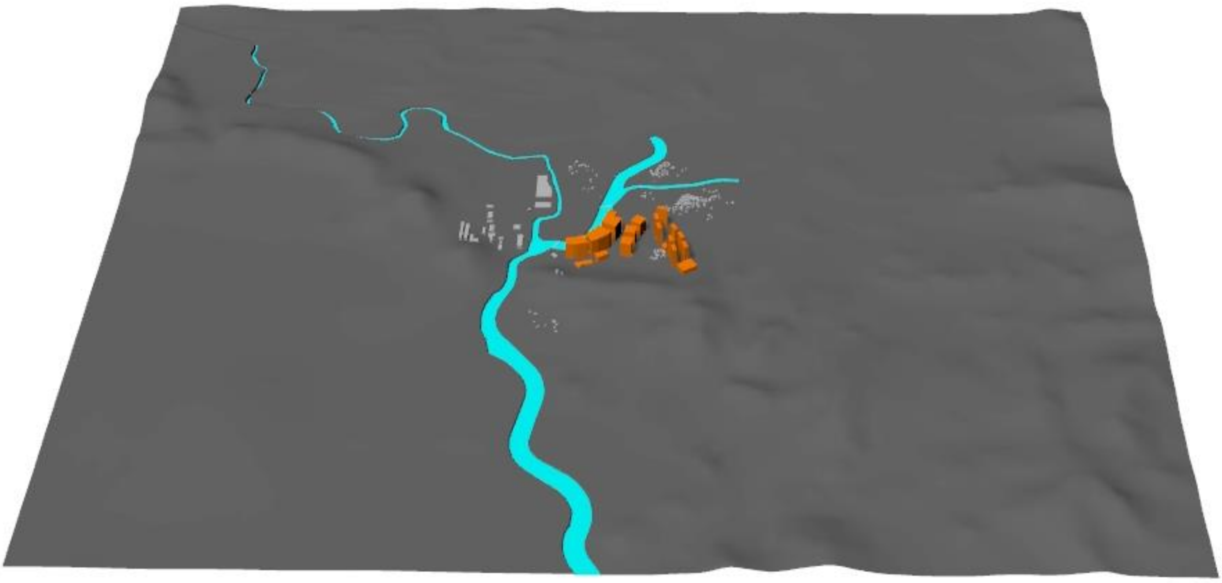


Figure 24 Westly view of 3D Model

3.4 Technical Details for CFD Simulation

3.4.1 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.

3.4.2 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 25. 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 26.

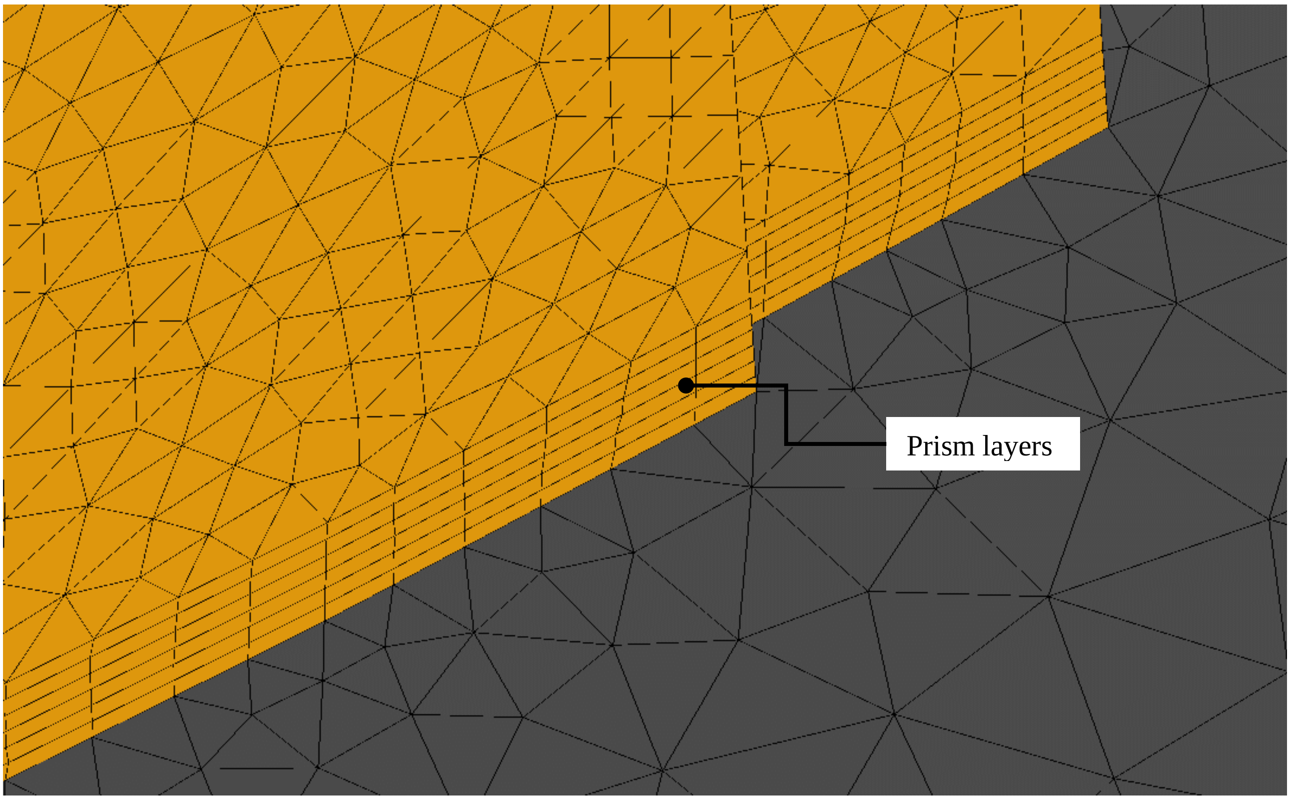


Figure 25 Prism Layers Near Pedestrian Level

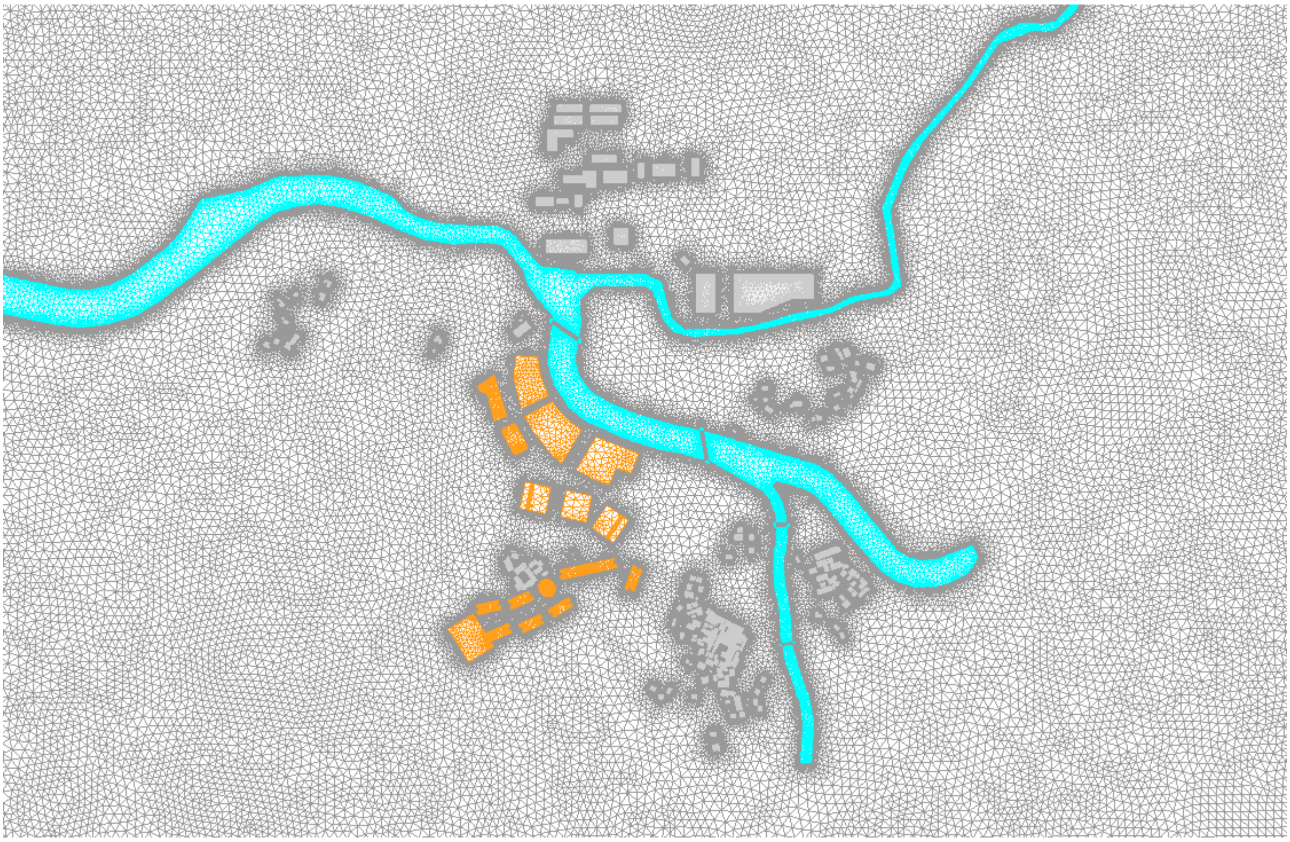


Figure 26 Mesh of the Computational Model

3.4.3 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.

3.4.4 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 3.1.2. 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.

3.4.5 Summary

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 6.

Table 6 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 1500m(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 $1x10^{-4}$

3.5 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 7

Table 7 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.

3.6 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]*.

3.6.1 Perimeter Test Points

A total number of 78 perimeter test points (**Brown spots**), namely P points, are positioned at intervals of around 20m along the Application Site boundary at 2m above ground level. The locations of the perimeter test points are shown in Figure 27

3.6.2 Overall Test Points

A total number of 149 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, and their location are shown in Figure 28.

3.6.3 Special Test Points

A total number of 63 special test points (**Pink spots**), namely S points, are evenly distributed in open areas at 2m above ground level within the Application Site. Their locations are shown in Figure 29.

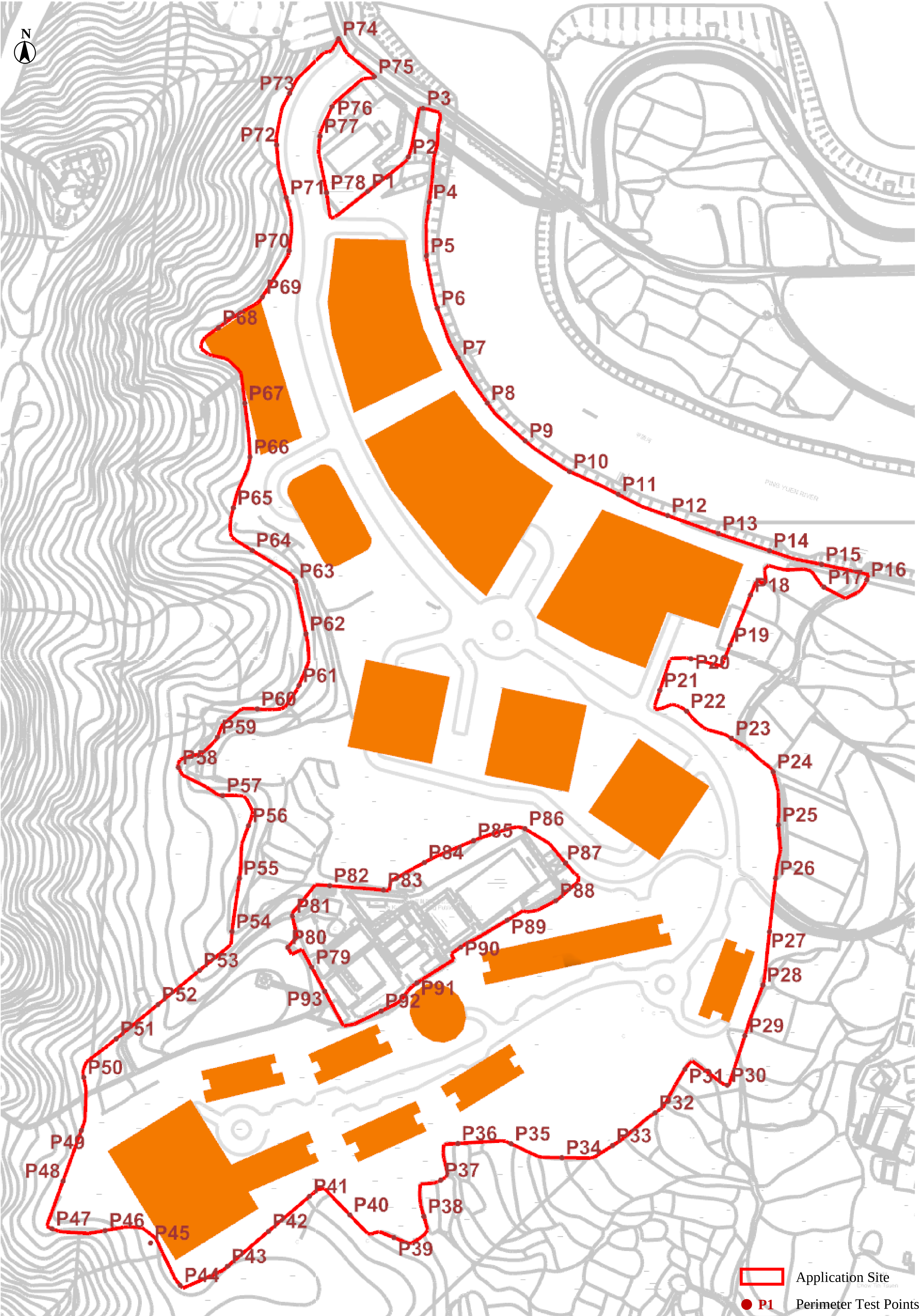


Figure 27 Location of Perimeter Test Points

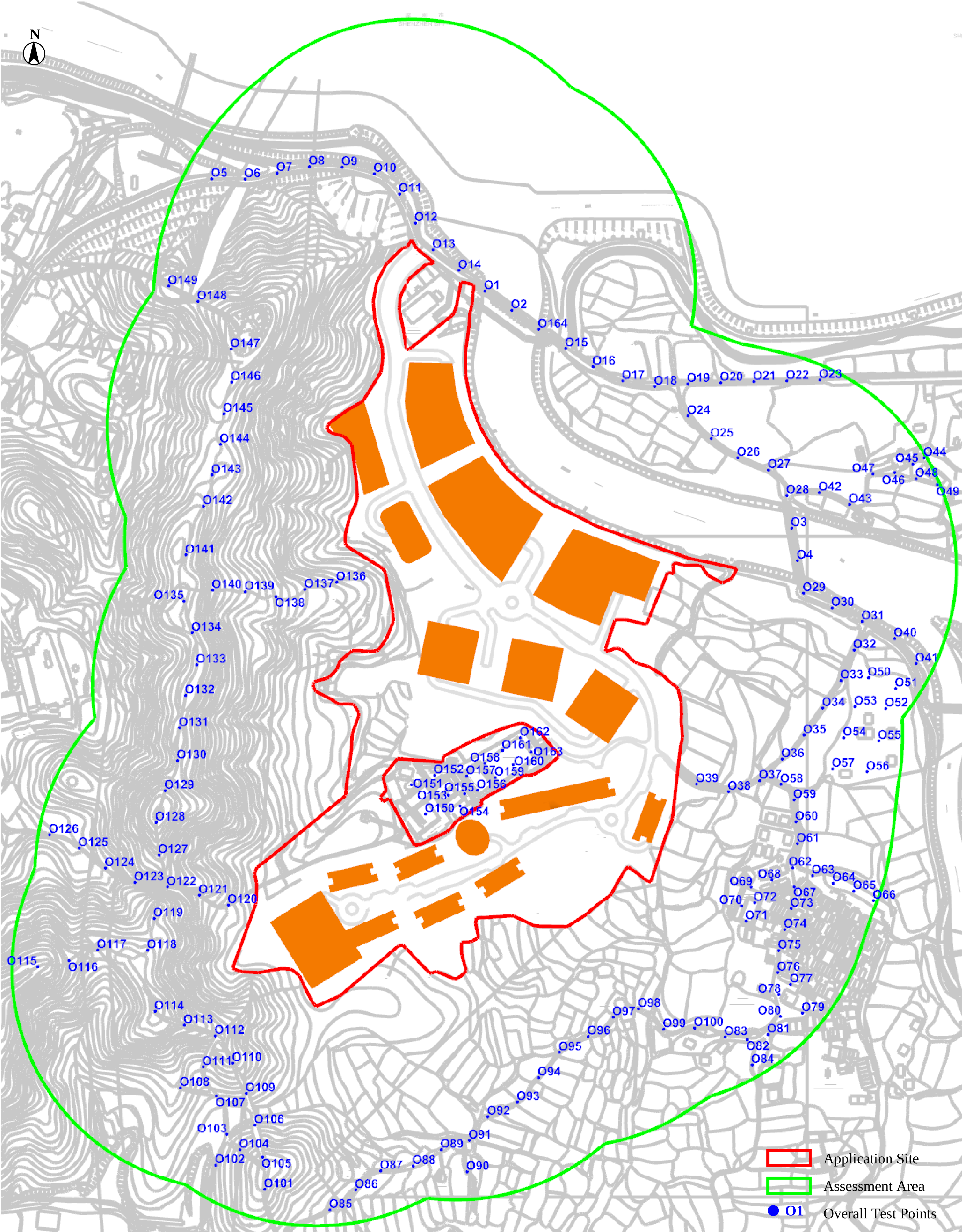


Figure 28 Location of Overall Test Points

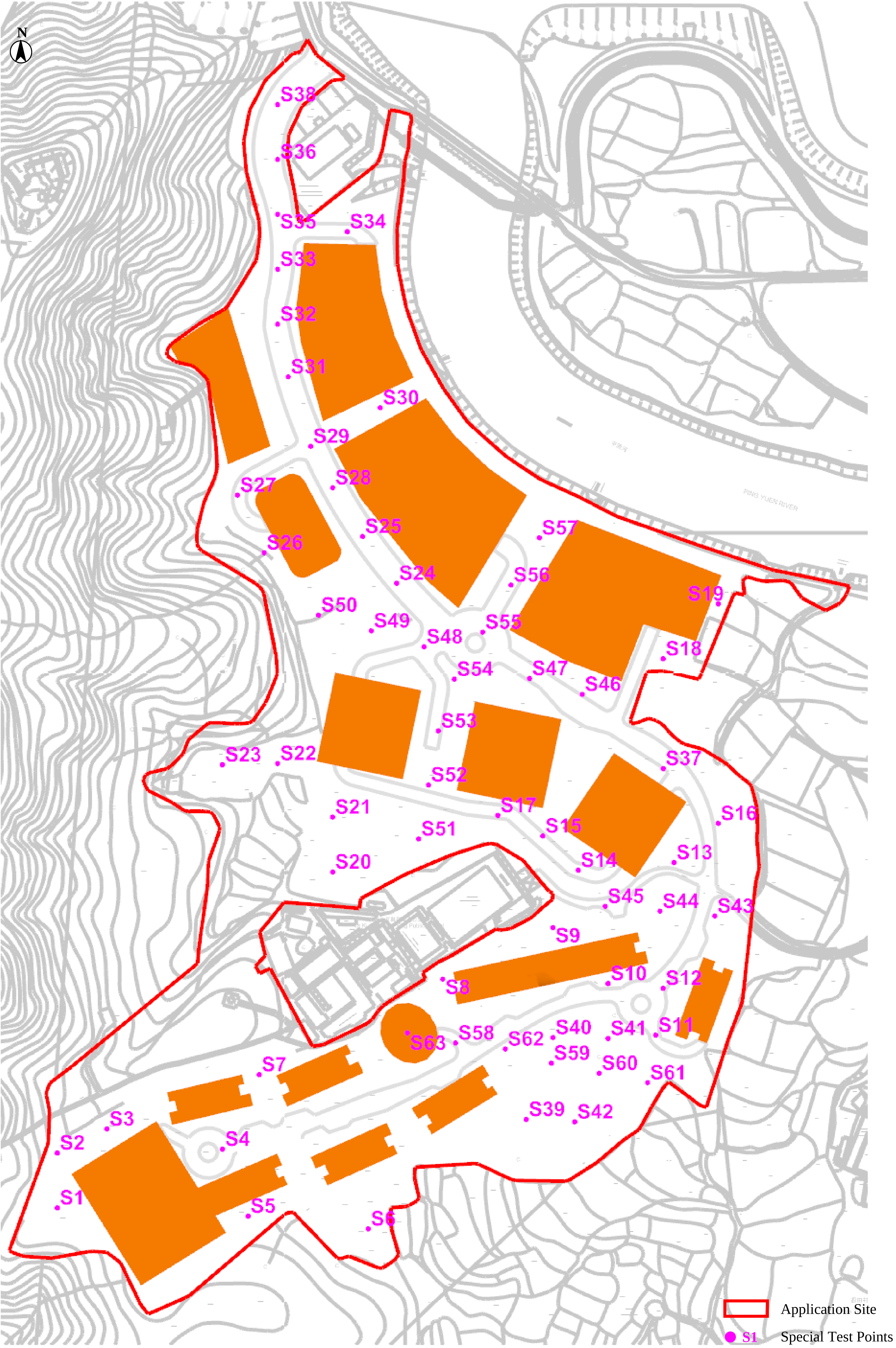


Figure 29 Location of Special Test Points

4. Result and Discussion

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

4.1 Overall Pattern of Ventilation Performance under Annual Wind Condition

The overall wind performance of Baseline Scheme and Indicative Scheme under annual wind conditions are presented in Figure 30 and Figure 31 respectively. The SVR and LVR are summarized in Table 8.

Table 8 Annual SVR and LVR for Baseline and Indicative Schemes

	Baseline Scheme	Indicative Scheme
SVR	0.24	0.18
LVR	0.25	0.20

The SVR and LVR under Baseline Scheme are higher than that of Indicative Scheme, which indicates that the Baseline Scheme would achieve better ventilation performance along the site boundary and in the assessment area under annual condition.

The prevailing wind under annual condition mostly come from E quadrant. The Application Site is in the leeward side of low-rise village buildings in Ta Kwu Ling Village, Chow Tin Tsuen and mid-rise buildings in Shenzhen Shi. The incoming winds are able to reach the Application Site from the prevailing wind directions with relatively low obstruction.

Under Baseline Scheme, due to the absence of structures except a single storey building, the incoming winds are able to travel along prevailing wind directions to ventilate the leeward side such as Lo Shue Ling and Muk Wu Nga Yiu.

Under Indicative Scheme, the incoming wind would be diverted by the front tier buildings such as R&Ds, DC3 and R1 to R3, through proposed air paths, breezeways and both sides of the Application Site, to ventilate the leeward side. A slightly higher VR on these enhancement features and both side of the Application Site can be observed, illustrated by black arrows in Figure 31.

Some locations in the leeward side such as Chow Tin Tsuen and Muk Wu Nga Yiu would be benefit from these features and enhanced the ventilation performance, where slightly higher VR can be observed, illustrated by black circles in Figure 31. However, wind shadow would.be casted at leeward side such as Lo Shue Ling.

Under Revised Indicative Scheme, low-level wind traveling along access road between Residential Towers would flow across Primary School Site and ventilate the road to the south of the Application Site. Slight enhancement in VR at the road to the south of the Application Site would be expected.

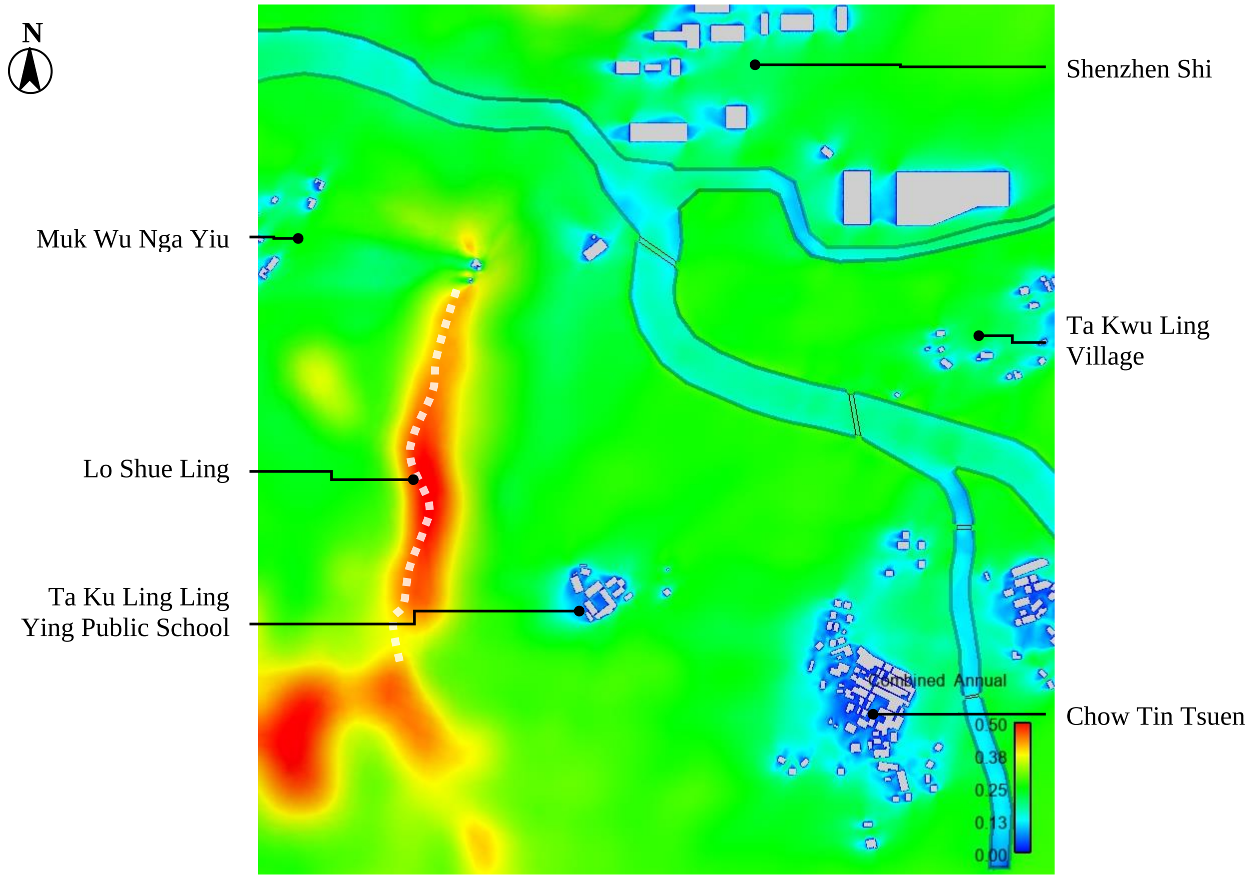


Figure 30 Contour Plot of Annual Weighted VR under Baseline Scheme

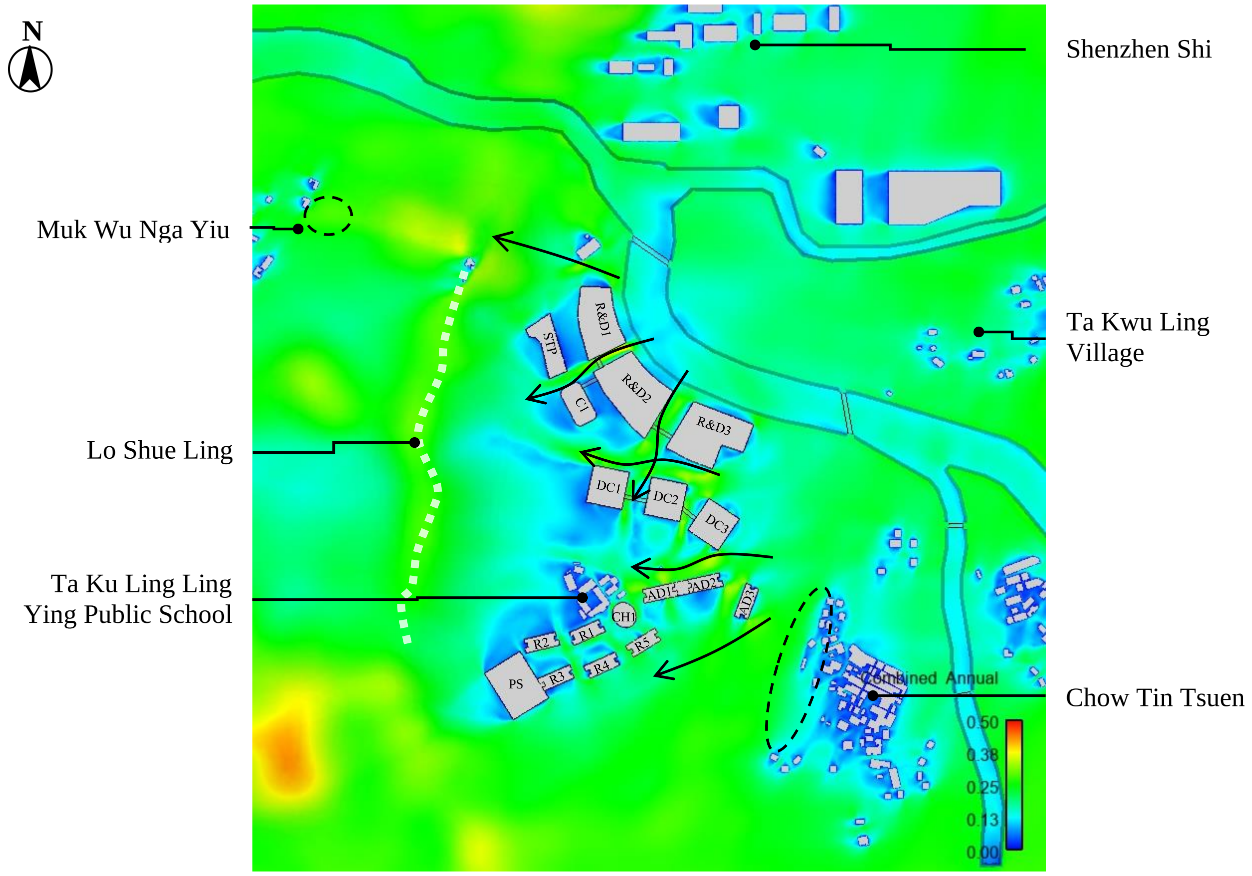


Figure 31 Contour Plot of Annual Weighted VR under Indicative Scheme

4.2 Overall Pattern of Ventilation Performance under Summer Wind Condition

The overall wind performance of Baseline and Indicative Scheme under summer wind conditions are presented in Figure 32 and Figure 33 respectively. The SVR and LVR are summarized in Table 9.

Table 9 Summer SVR and LVR for Baseline and Indicative Schemes

	Baseline Scheme	Indicative Scheme
SVR	0.29	0.19
LVR	0.29	0.23

The SVR and LVR under Baseline Scheme are higher than that of Indicative Scheme indicate that the Baseline Scheme would achieve better ventilation performance along the site boundary and in the assessment area under summer condition.

The prevailing wind under summer condition mostly come from SW and E quadrants. The Application Site is in the leeward side of open farmland and Lo Shue Ling. The incoming winds are able to reach the Application Site from the prevailing wind directions with relatively low obstruction.

Under Baseline Scheme, due to the absence of structures except a single storey building, the incoming winds are able to travel along prevailing wind directions to ventilate the leeward side such as Lin Ma Hang Road, Shenzhen Shi and Ta Kwu Ling Village.

Under Indicative Scheme, the incoming wind would be diverted by the front tier buildings, such as PS, R3 to R5, ADs and both sides of the Application Site, to ventilate the leeward side. A slightly higher VR on these enhancement features and both side of the Application Site can be observed, illustrated by black arrows in Figure 33.

Some locations in the leeward side such as Ta Ku Ling Ling Ying Public School and Chow Tin Tsuen would be benefit from the enhancement features and enhanced the ventilation performance, where slightly higher VR can be observed, illustrated by black circles in Figure 33. However, the increased building height also shield some incoming wind at upwind location such as Lo Shue Ling, where lower VR would be observed.

Under Revised Indicative Scheme, removal of Primary School enlarged wind entrance to the access road between Residential Towers. Prevailing winds from SW quadrant would enter to penetrate the Application Site. The winds would continue to ventilate Ta Ku Ling Ling Ying Public School through building separations between CH1, R1 and R2. Enhancement in VR along the access road between Residential Towers and at the Ta Ku Ling Ling Ying Public School would be expected.

Prevailing winds from E quadrant would be similar to annual conditions, slight enhancement in VR at the road to the south of the Application Site would be expected.

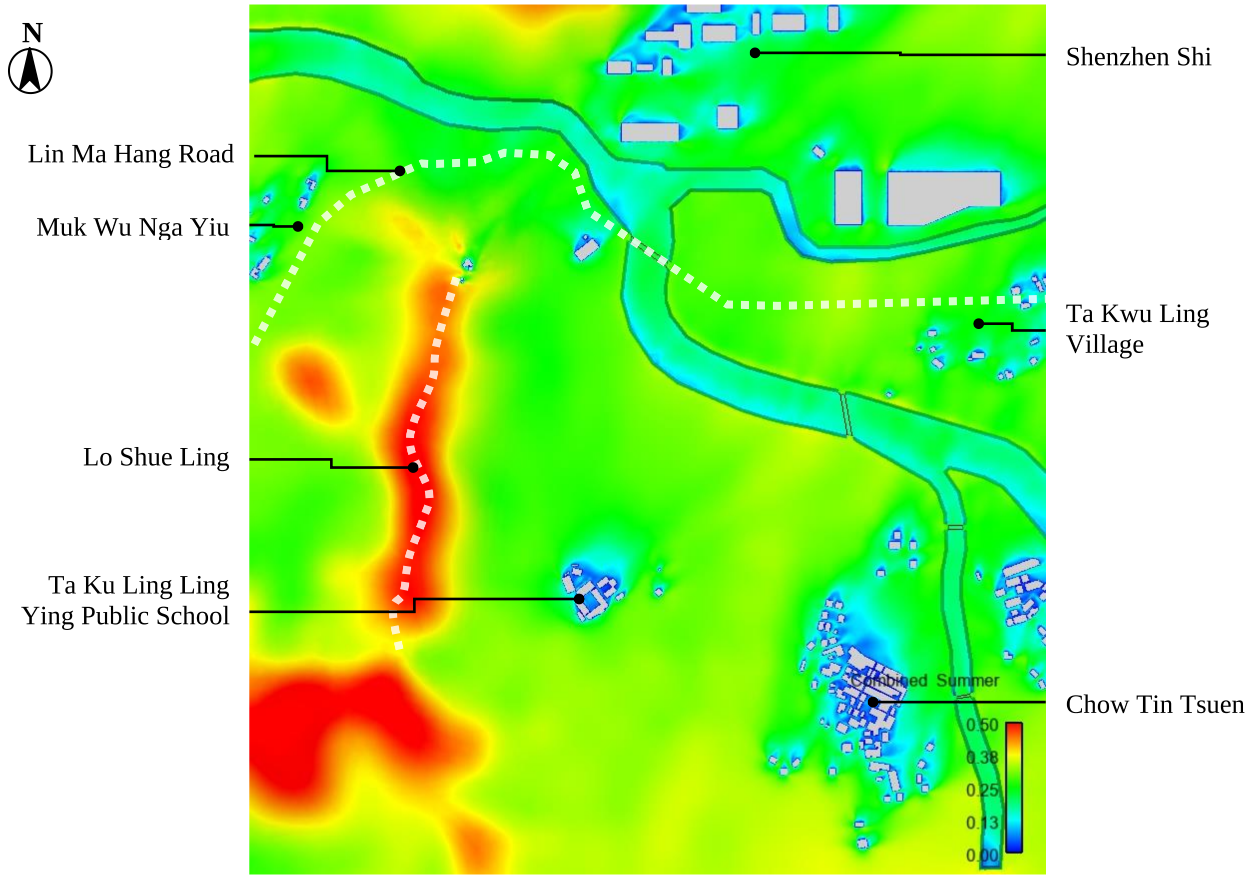


Figure 32 Contour Plot of Summer Weighted VR under Baseline Scheme

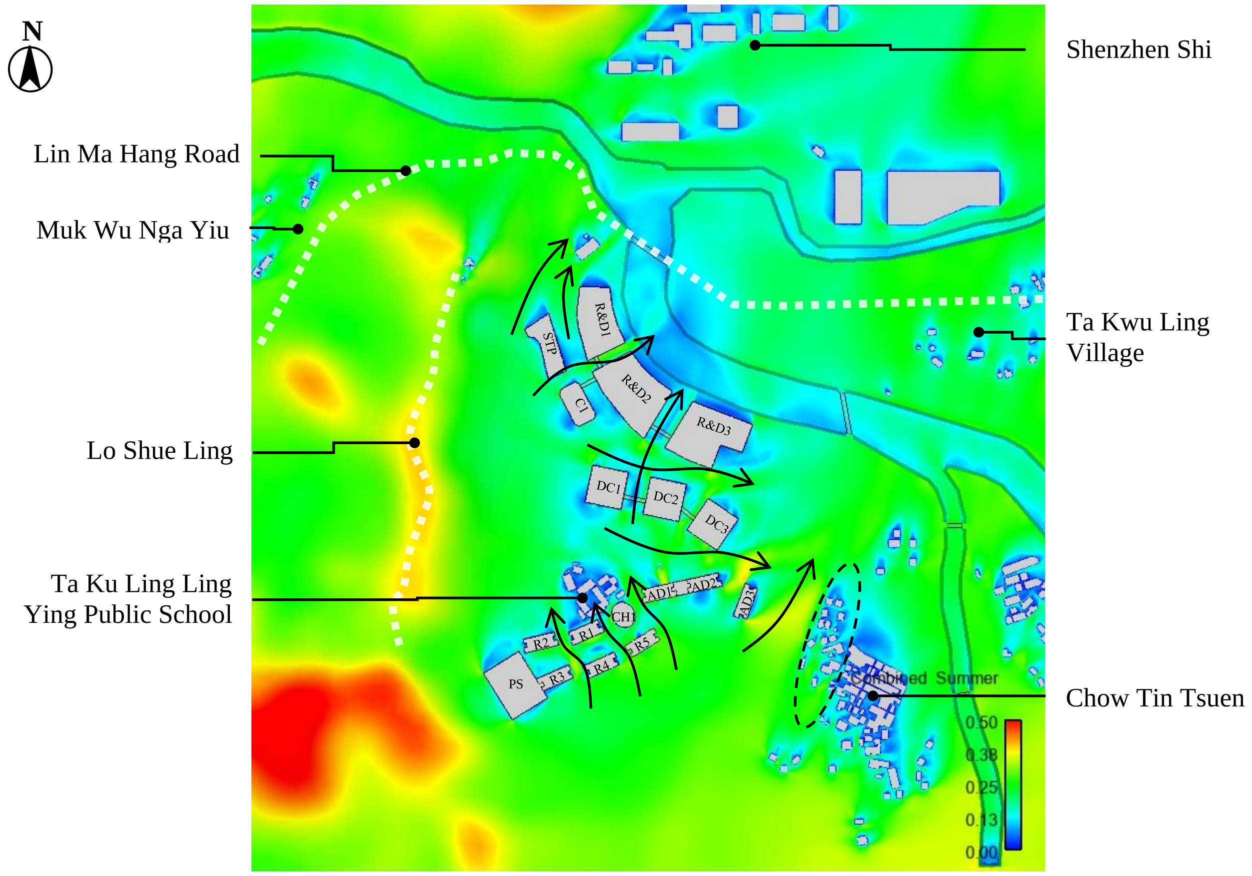


Figure 33 Contour Plot of Summer Weighted VR under Indicative Scheme

4.3 Directional Analysis

4.3.1 NNE/NE Winds

The overall wind performance of Baseline and Indicative Schemes under NNE/NE winds are similar and presented in Figure 34/Figure 36 and Figure 35/Figure 37 respectively.

The Application Site located in the leeward side of Shenzhen Shi with small hills (~100mPD) and low- to mid-rise buildings (max. ~30mPD). The incoming winds would reach the Application Site from the incoming wind directions with relatively less obstruction. The incoming wind directions are illustrated by black arrows in Figure 34 to Figure 37 respectively.

Under Baseline Scheme, due to the absence of structures except a single storey building, the incoming wind would flow along the incoming wind directions to ventilate the leeward side such as Chow Tin Tsuen and Ta Ku Ling Ling Ying Public School.

Under Indicative Scheme, the north-eastern facade of R&Ds in both NNE/NE winds and DC3 in NE wind would capture and divert the incoming winds to ventilate the leeward side, such as Chow Tin Tsuen, Ta Ku Ling Ling Ying Public School and Road to the south of the Application Site, from NNE-SSW aligned breezeway, ENE-WSW aligned airpath and both sides of the R&Ds. Slightly higher VR can be observed, illustrated by red arrows in Figure 35 and Figure 37 for NNE and NE winds respectively.

The E-W aligned breezeway under both NNE/NE winds and ESE-WNW aligned breezeway under NE wind would allow for more wind to re-enter into the Application Site from the east, illustrated by red arrows in Figure 35 and Figure 37 for NNE and NE winds respectively.

The incoming wind diverted to travel in west by R&Ds would drive the incoming wind on the north-west of the Application Site to travel in the west while limiting it to reach the Lo Shue Ling, where slightly higher VR on Maclntosh Forts while lower VR on Trail on Lo Shue Ling can be observed, illustrated by black circles in Figure 35 and Figure 37 for NNE and NE winds respectively.

The incoming wind diverted to travel in south by R&Ds would further ventilate the Chow Tin Tsuen where slightly higher VR can be observed, illustrated by blue circle in Figure 35 and Figure 37 for NNE and NE winds respectively.

Under Indicative Scheme, the R&Ds would capture the mid- and high-level incoming winds to induce downwash effect. Due to the openness of the upwind environment, the donwwashed winds would travel in opposite direction to the incoming winds and limit the low-level incoming wind, where slightly lower VR can be observed, illustrated by white arrow in Figure 35 and Figure 37 for NNE and NE winds respectively.

In addition, under NE wind, the concave arrangement of R&Ds are aligned to incoming wind direction. Similar portion of the downwashed wind from R&D1 and R&D3 would converge at R&D2. The incoming wind reaching R&D2 would be diverted up to skim over the building and leaving a relatively calm wind environmental on the pedestrian level, illustrated by black circle in the section vector plot in Figure 38.

Under Revised Indicative Scheme, NNE wind traveling along western side of Application Site would flow across Primary School Site to ventilate road to the south of the Application Site. Also, under NE wind condition, wind traveling along access road between Residential Towers would flow across Primary School Site to ventilate road to the south of the Application Site. Slight enhancement in VR along access road between Residential Towers and at the road to the south of the Application Site would be expected.

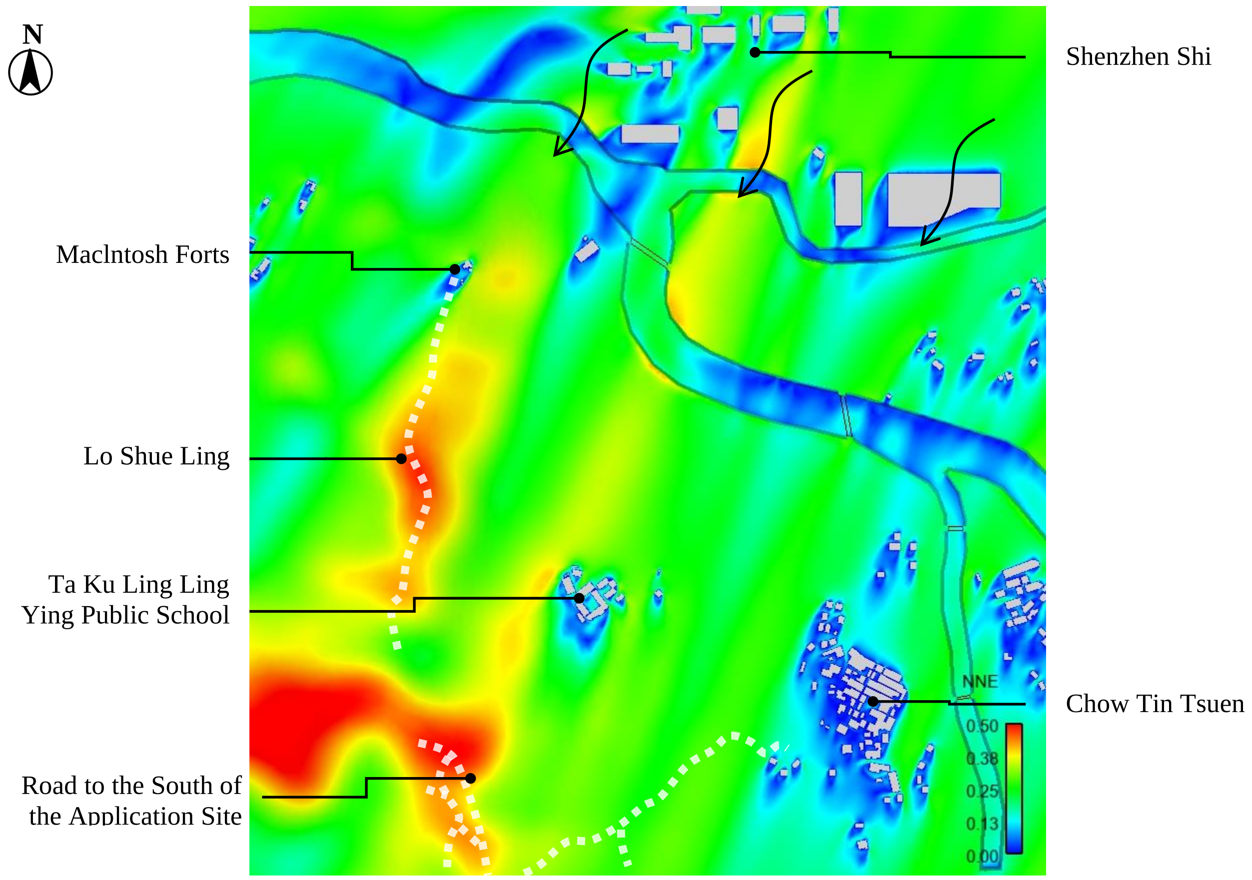


Figure 34 Contour Plot of Baseline Scheme under NNE Wind

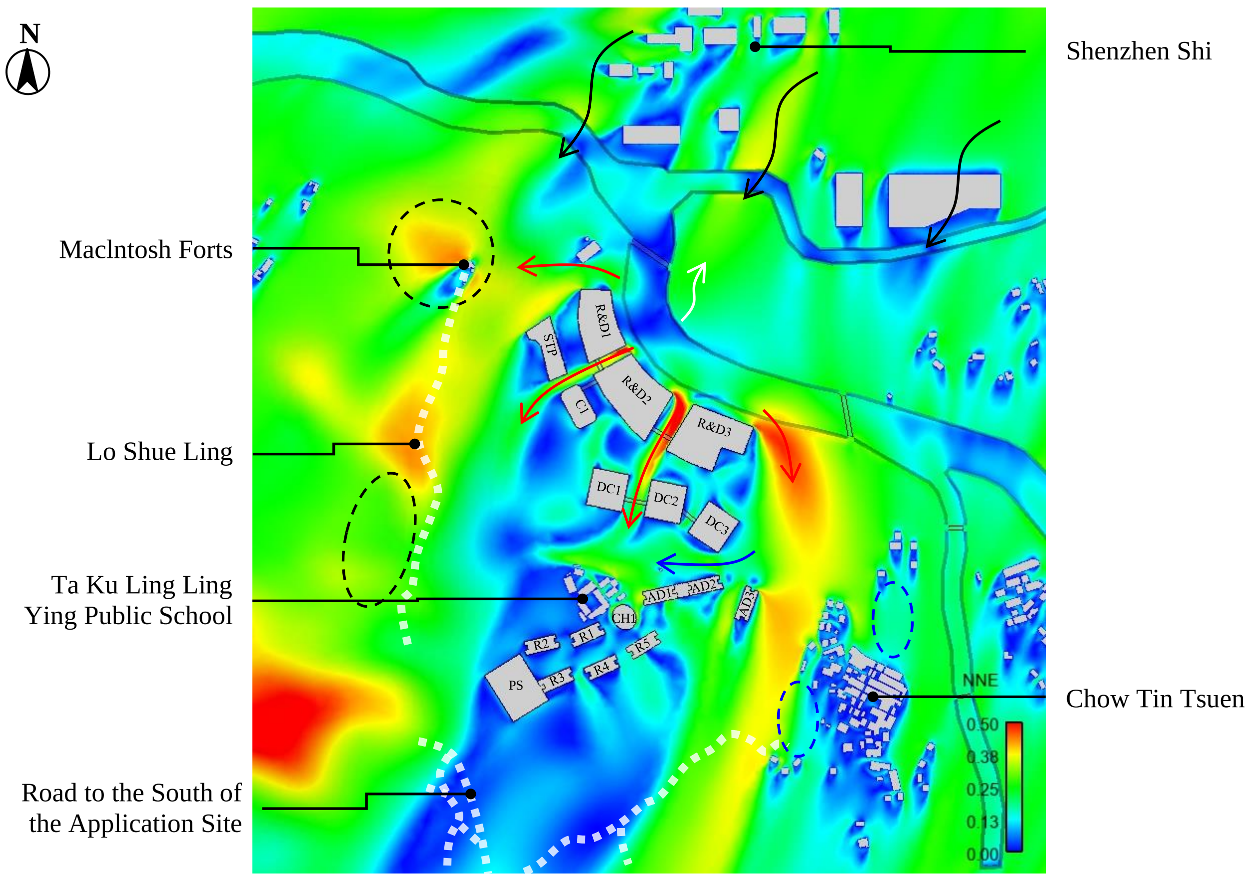


Figure 35 Contour Plot of Indicative Scheme under NNE Wind

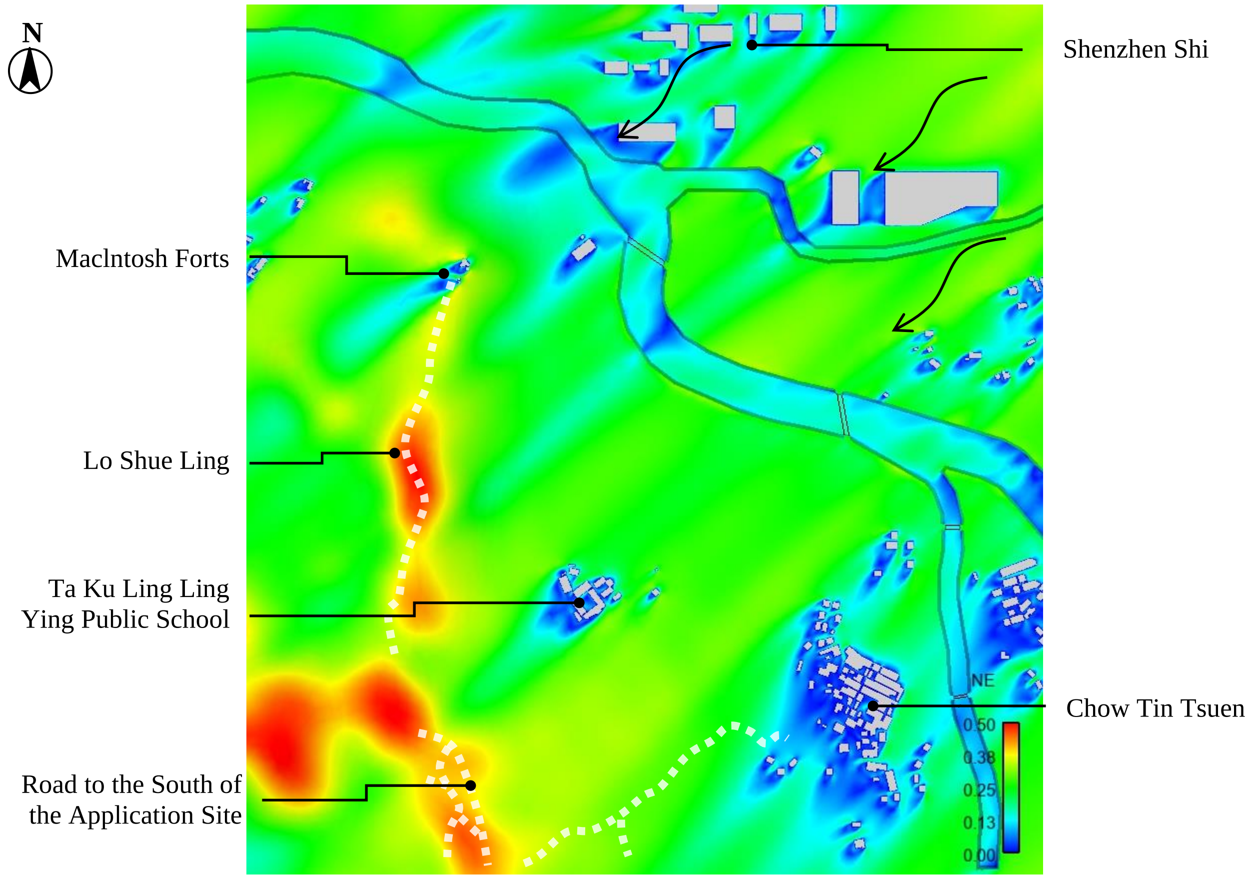


Figure 36 Contour Plot of Baseline Scheme under NE Wind

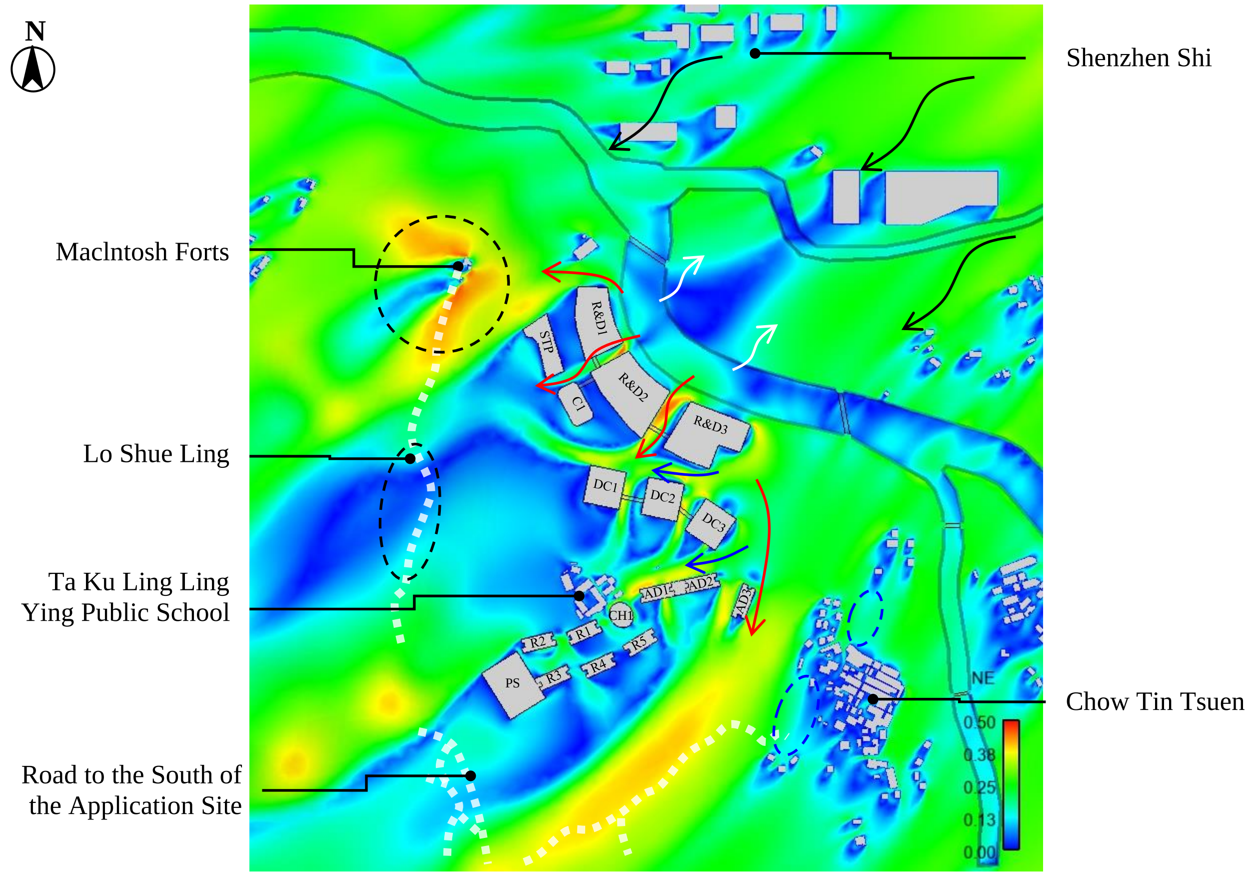


Figure 37 Contour Plot of Indicative Scheme under NE Wind

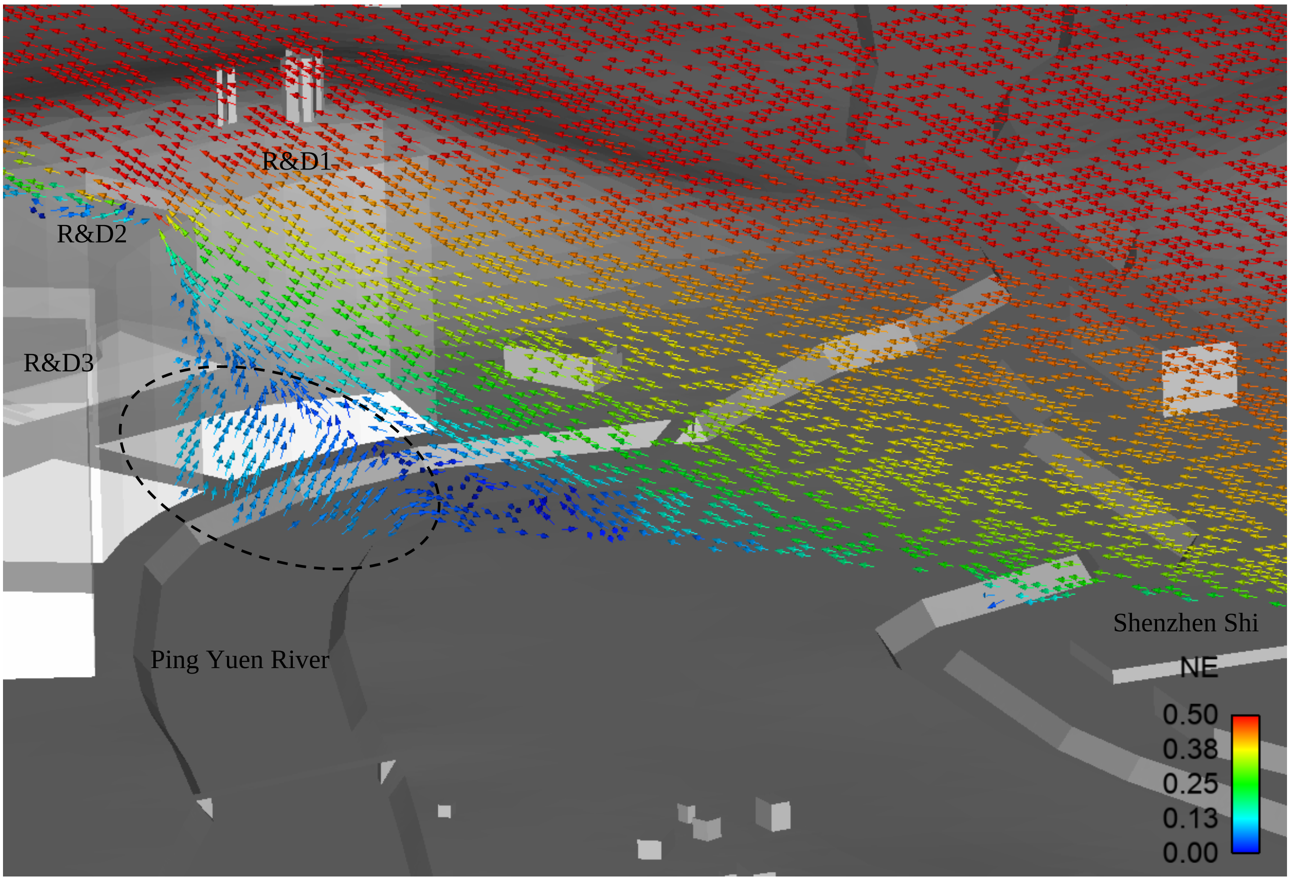


Figure 38 Vector Section Plot of Indicative Scheme towards R&D2 along the NE-SW Direction under NE Wind

4.3.2 ENE/E Wind

The overall wind performance of Baseline and Indicative Schemes under ENE/E winds are presented in Figure 39/Figure 41 and Figure 40/Figure 42 respectively.

The Application Site located in the leeward side of Ta Kwu Ling Village, Phoenix Lake Village and Chow Tin Tsuen low-rise buildings (max. ~20mPD). The incoming winds would reach the Application Site from the incoming wind directions with relatively less obstruction. The incoming wind directions are illustrated by black arrows in Figure 39 to Figure 42 respectively.

Under Baseline Scheme, due to the absence of structures except a single storey building, the incoming wind would flow along the incoming wind directions to ventilate the leeward side such as Trail on Lo Shue Ling.

Under Indicative Scheme, R&Ds, DC3 and AD3 would capture and divert some incoming winds to ventilate the leeward side, such as Ta Ku Ling Ling Ying Public School and Road to the South of the Application Site, from ENE-WSW aligned air path, ESE-WNW/E-W/NNE-SSW aligned breezeways and both side of the Application Site, where slightly higher VR can be observed, illustrated by red arrows in Figure 40 and Figure 42 for ENE and E wind respectively.

The incoming wind diverted to the west of the Application Site would further ventilate to the Maclntosh Forts and Muk Wu Nga Yiu. While incoming wind diverted to the south of the Application Site would enhance the ventilation on Chow Tin Tsuen and Road to the South of the Application Site. Slightly higher VR can be observed at these allocations, illustrated by black circles in Figure 40 and Figure 42 for ENE and E winds respectively.

In addition, the R&D3, DC3 and AD3 would capture mid- and high-level winds to induce downwash effect. Similar to NNE/NE wind, due to the relatively open upwind condition, the downwashed wind would travel against the low-level incoming wind and create relatively calm wind environment, illustrated by blue circles in Figure 40 and Figure 42 for ENE and E winds respectively.

Under Revised Indicative Scheme, for ENE wind, wind environment around Primary School Site is shaded by upwind high-rise buildings the Application Site, removal of Primary School would have insignificant influence on overall ventilation performance. Similar ventilation performance would be expected.

For E wind, incoming wind traveling along southern site boundary would recover some of the wind shadow on south-western site boundary casted by Residential Towers. Slight enhancement in VR at the south-western site boundary would be expected.

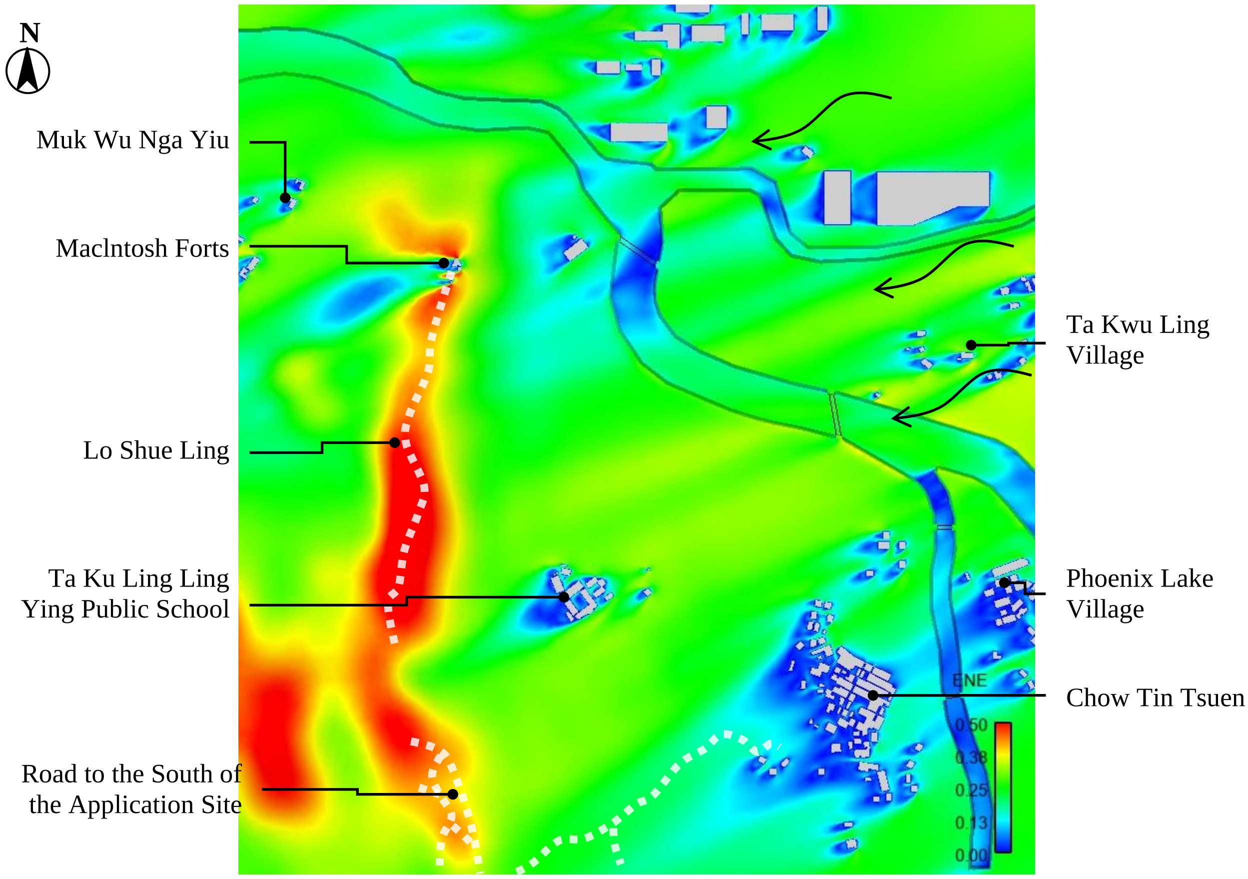


Figure 39 Contour Plot of Baseline Scheme under ENE Wind

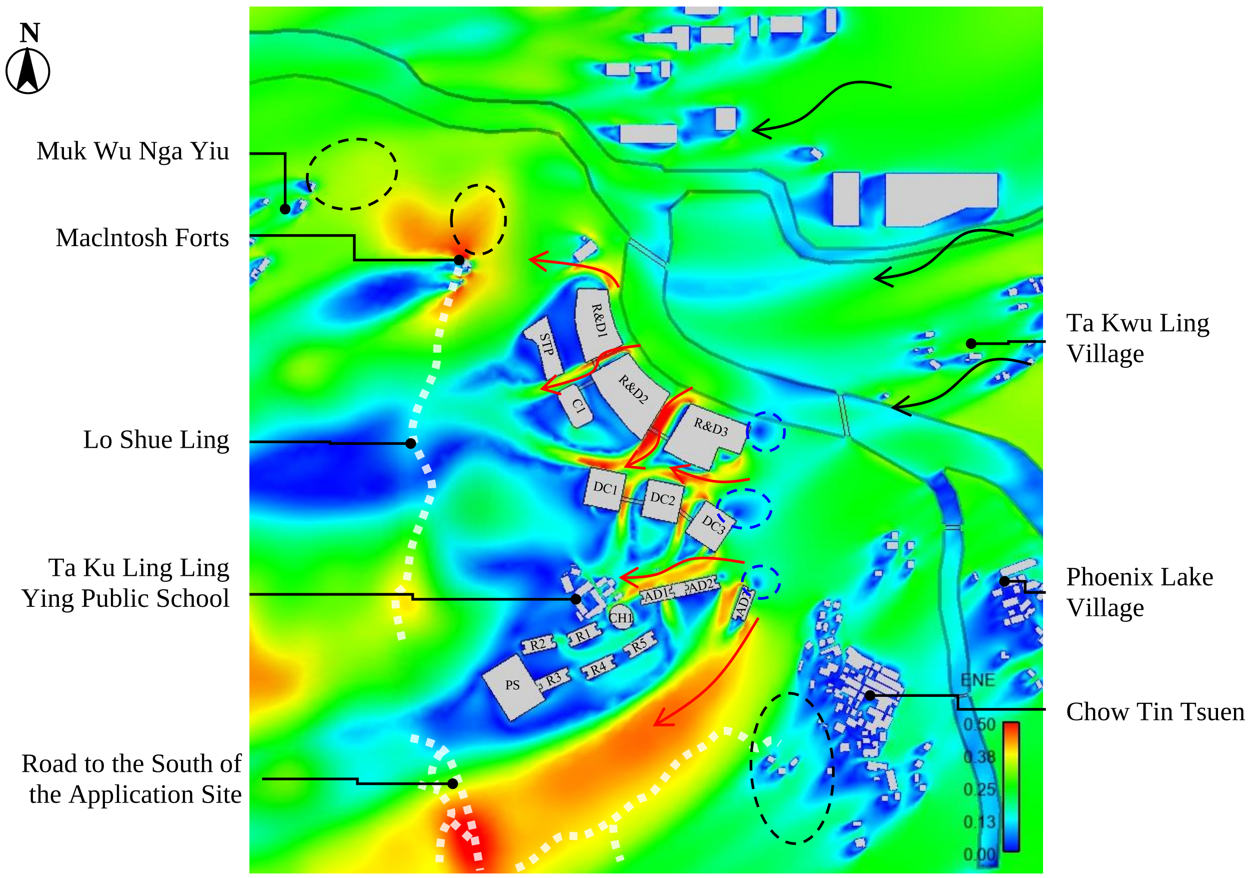


Figure 40 Contour Plot of Indicative Scheme under ENE Wind

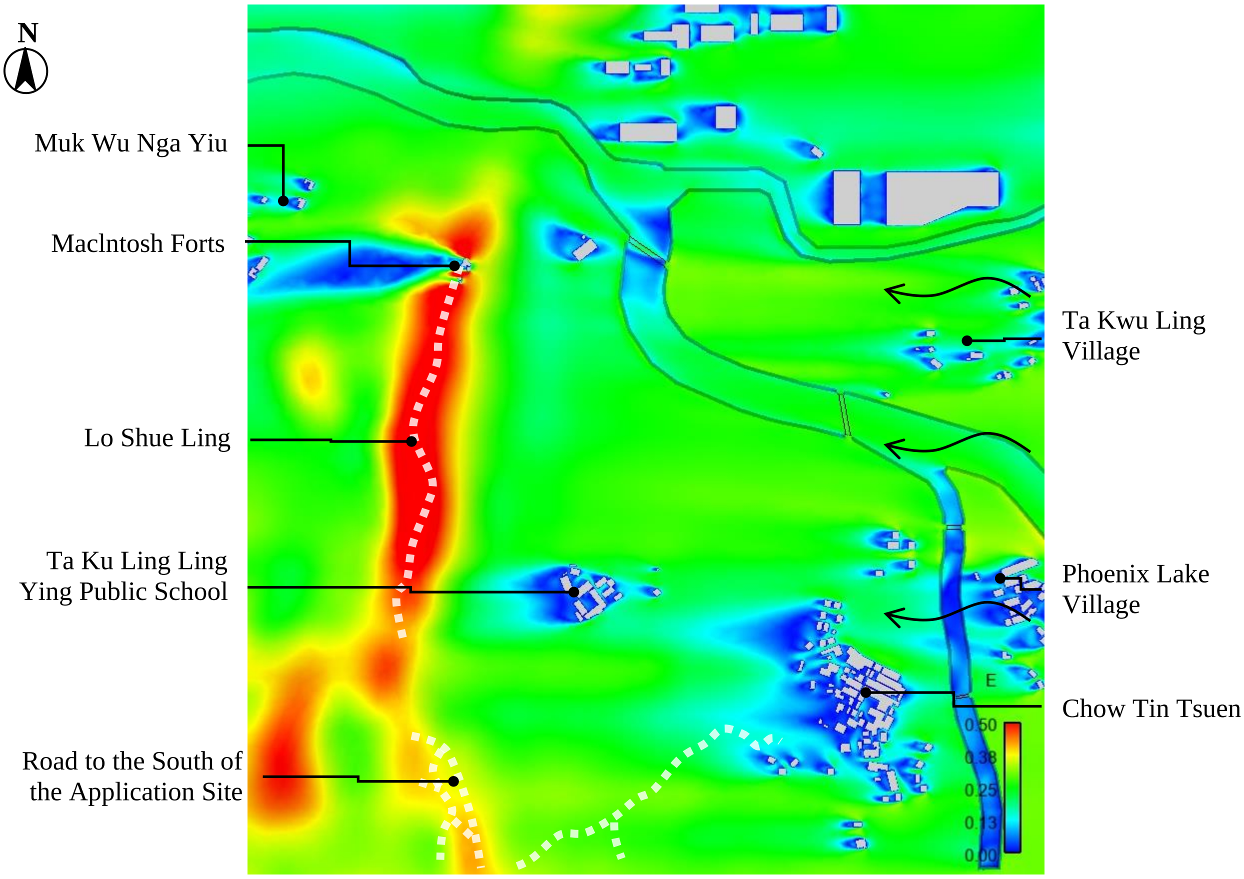


Figure 41 Contour Plot of Baseline Scheme under E Wind

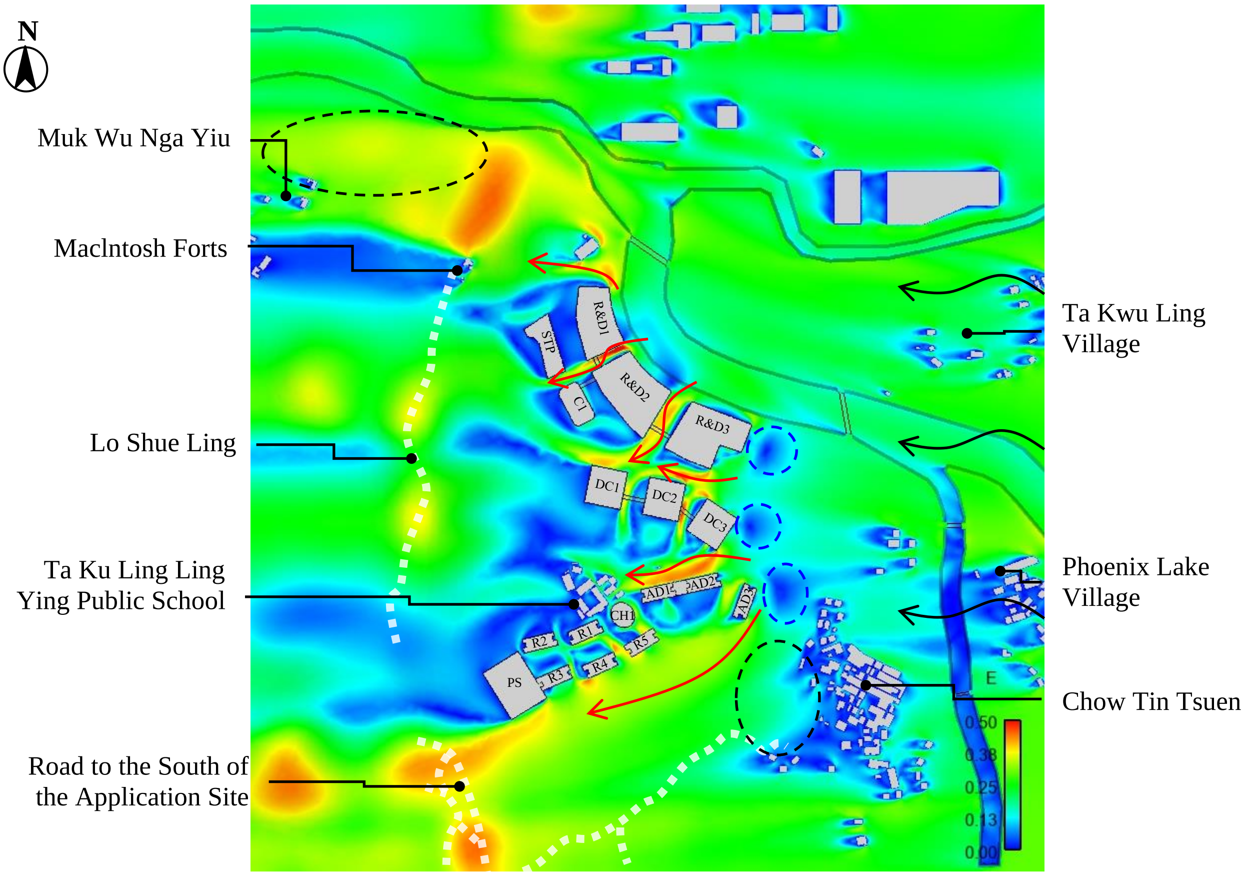


Figure 42 Contour Plot of Indicative Scheme under E Wind

4.3.3 ESE Wind

The overall wind performance of Baseline and Indicative Schemes under ESE wind is presented in Figure 43 and Figure 44 respectively.

The Application Site located in the leeward side of Phoenix Lake Village and Chow Tin Tsuen low-rise buildings (max. ~20mPD). The incoming winds would reach the Application Site from the incoming wind directions with relatively less obstruction. The incoming wind directions are illustrated by black arrows in in Figure 43 and Figure 44 respectively.

Under Baseline Scheme, due to the absence of structures except a single storey building, the incoming wind would flow along the incoming wind directions to ventilate the leeward side such as Trail on Lo Shue Ling and Lin Ma Hang Road while under Indicative Scheme, the increased building height would shield the incoming wind and create some wind shadow at these areas at leeward side.

Under Indicative Scheme, the R&D3, DC3 and AD3 would capture and divert some mid- and high-level incoming winds to ventilate the leeward side such as Ta Ku Ling Ling Ying Public School and Trail on Lo Shue Ling, through ESE-WNW/E-W breezeways, ESE-WNW-breezeway on podium level and both sides of the Application Site, where slightly higher VR can be observed, illustrated by red arrows in Figure 44. The empty bays design under AD1 and R5 allows for incoming wind and diverted wind from AD3 to penetrate and further ventilation to the Ta Ku Ling Ling Ying Public School, illustrated by orange arrow in Figure 44.

Some of the diverted wind would re-enter into the Application Site through ENE-WSW/SSE-NNW air paths and NNE-SSW breezeway to enhance the ventilation performance on the Ta Ku Ling Ling Ying Public School, illustrated by blue arrows in Figure 44.

In addition, the R&D3, DC3, AD3 and R5 would capture and divert some mid- and high-level incoming winds to induce downwash effect. Similar to ENE/E winds, due to the relatively openness of the upwind area, the downwashed wind would travel in opposite direction to the low-level incoming wind and create relatively calm wind environment in front of the buildings, where slightly lower VR can be observed, illustrated by white arrows in Figure 44.

Under Revised Indicative Scheme, low-level incoming wind would flow across Primary School Site and ventilate the leeward side. However, as it is unoccupied slope, ventilation performance enhancement on pedestrian area would be minor. Similar ventilation performance on pedestrian area would be expected.

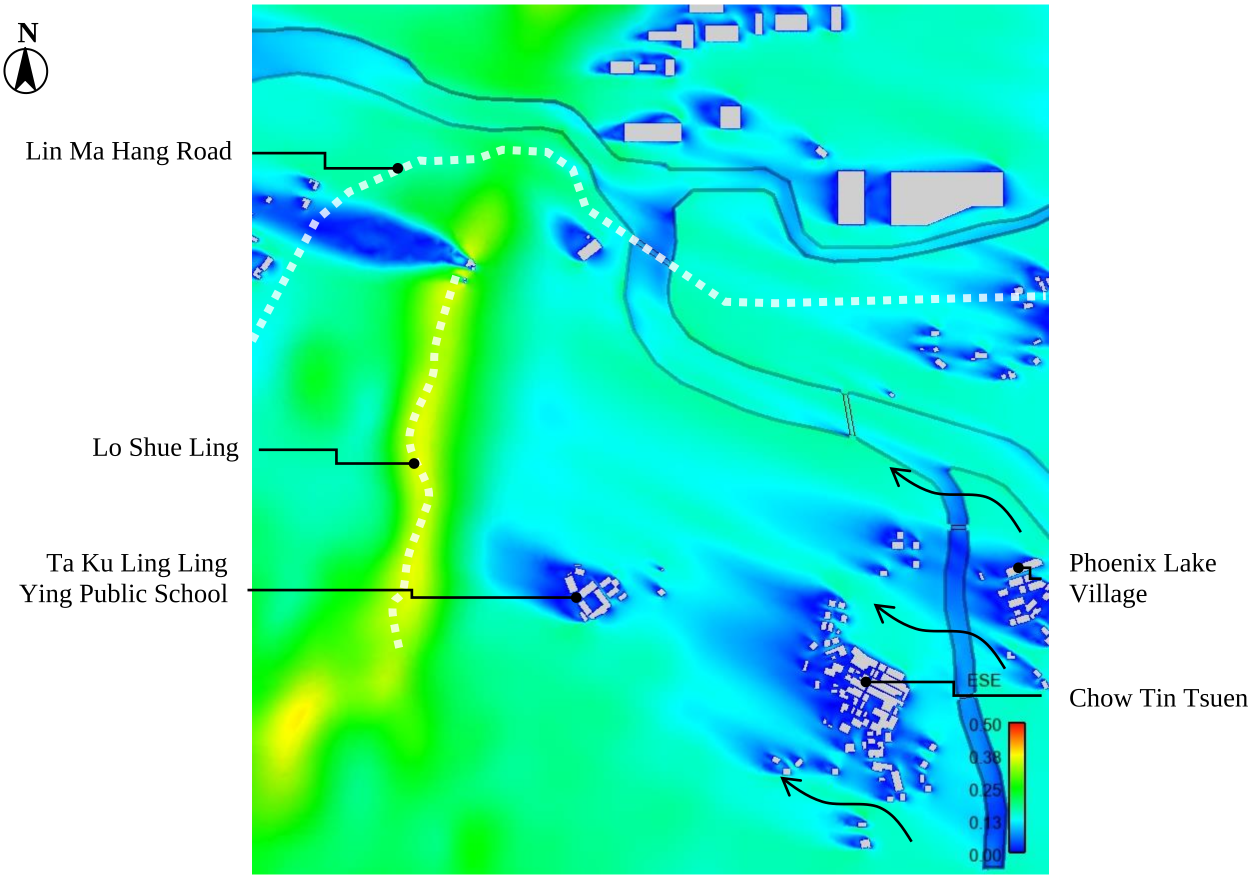


Figure 43 Contour Plot of Baseline Scheme under ESE Wind

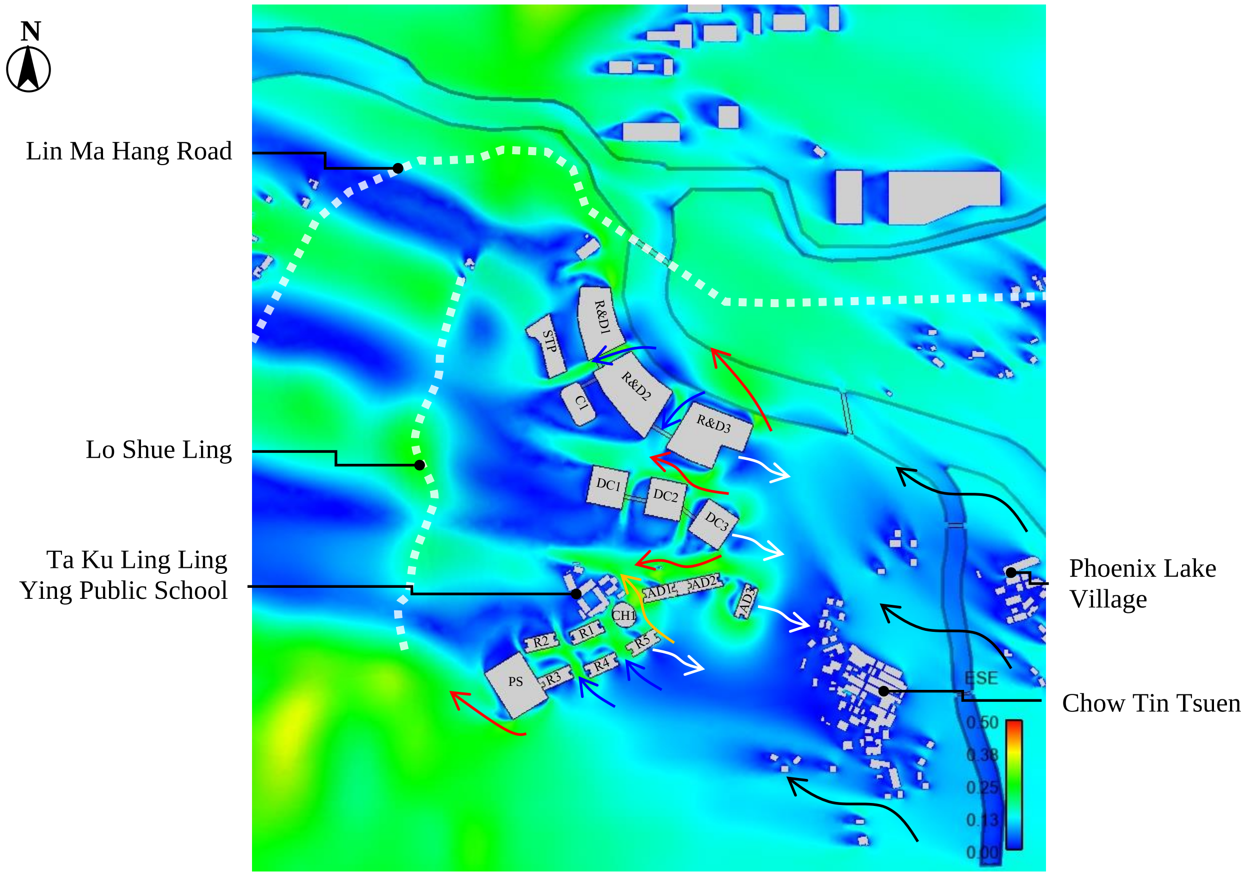


Figure 44 Contour Plot of Indicative Scheme under ESE Wind

4.3.4 SE/SSE Winds

The overall wind performance of Baseline and Indicative Schemes under SE/SSE winds are similar and presented in Figure 45/Figure 47 and Figure 46/Figure 48 respectively.

The Application Site located in the leeward side of Phoenix Lake Village and Chow Tin Tsuen low-rise buildings (max. ~20mPD). The incoming winds would reach the Application Site from the incoming wind directions with relatively less obstruction. The incoming wind directions are illustrated by black arrows in Figure 45 to Figure 48 respectively.

Under Baseline Scheme, due to the absence of structures except a single storey building, the incoming wind would flow along the incoming wind directions to ventilate the leeward side such as Trail on Lo Shue Ling and Lin Ma Hang Road.

Under Indicative Scheme, the front tier buildings including R3 to R5, AD1 to AD3, DC3, R&D3 and PS would capture and divert the mid- and high-level incoming winds to ventilation the leeward side such as Ta Ku Ling Ling Ying Public School, Trial on Lo Shue Ling and Lin Ma Hang Road, through SSE-NNW air paths, ESE-WNW/E-W breezeways, ESE-WNW breezeway on podium level and both sides of the Application Site, where slightly higher VR can be observed, illustrated by red arrows in Figure 46 and Figure 48 for SE and SSE winds respectively. In addition, the empty bays design under AD1 and R5 allows for more incoming wind to penetrate and further ventilate the leeward side such as Ta Ku Ling Ling Ying Public School, illustrated by orange arrow in Figure 46 and Figure 48 for SE and SSE winds respectively.

The wind diverted to travel to north would continue to ventilation the mid-rise buildings on Shenzhen Shi, where slightly higher VR can be observed, illustrated by black circle in Figure 46 and Figure 48 for SE and SSE winds respectively.

Similar to the incoming winds discussed above, some buildings including R3 to R5, AD1 to AD3 for SE/SSE winds and DC3, R&D3 for SE wind would capture and induce downwash effect to ventilate the pedestrian level. The downwashed wind would also work against the low-level incoming wind and reduce the wind speed, where slightly lower VR can be observed, illustrated by blue arrows in Figure 46 and Figure 48 for SE and SSE winds respectively.

Under Revised Indicative Scheme, for SE wind, incoming wind would flow across the Primary School Site to ventilate the unoccupied slope on the leeward side. Similar ventilation performance on pedestrian area would be expected.

For SSE wind, incoming wind would flow across Primary School Site and recirculate around R2 to recover portion of wind shadow on Ta Ku Ling Ling Ying Public School. Slight enhancement in VR at Ta Ku Ling Ling Ying Public School would be expected.

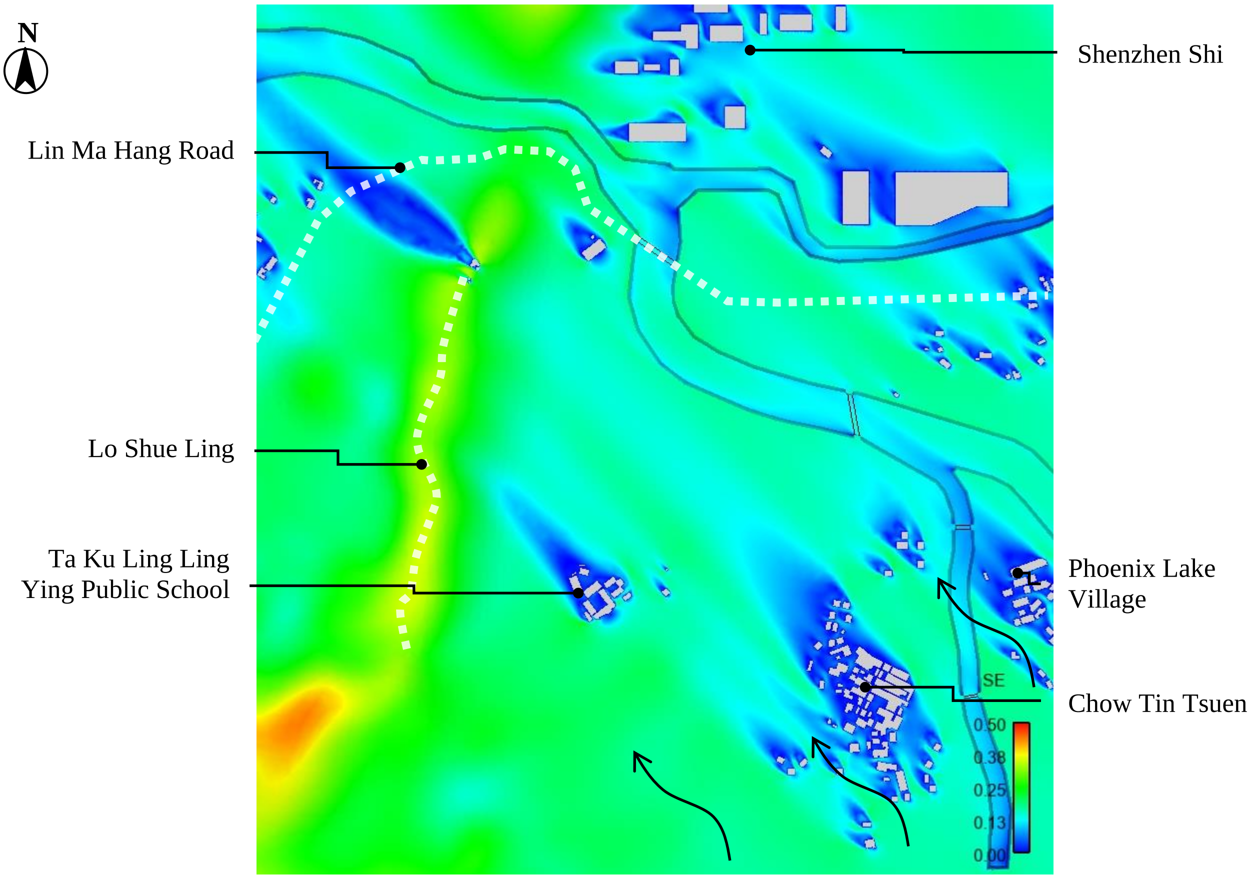


Figure 45 Contour Plot of Baseline Scheme under SE Wind

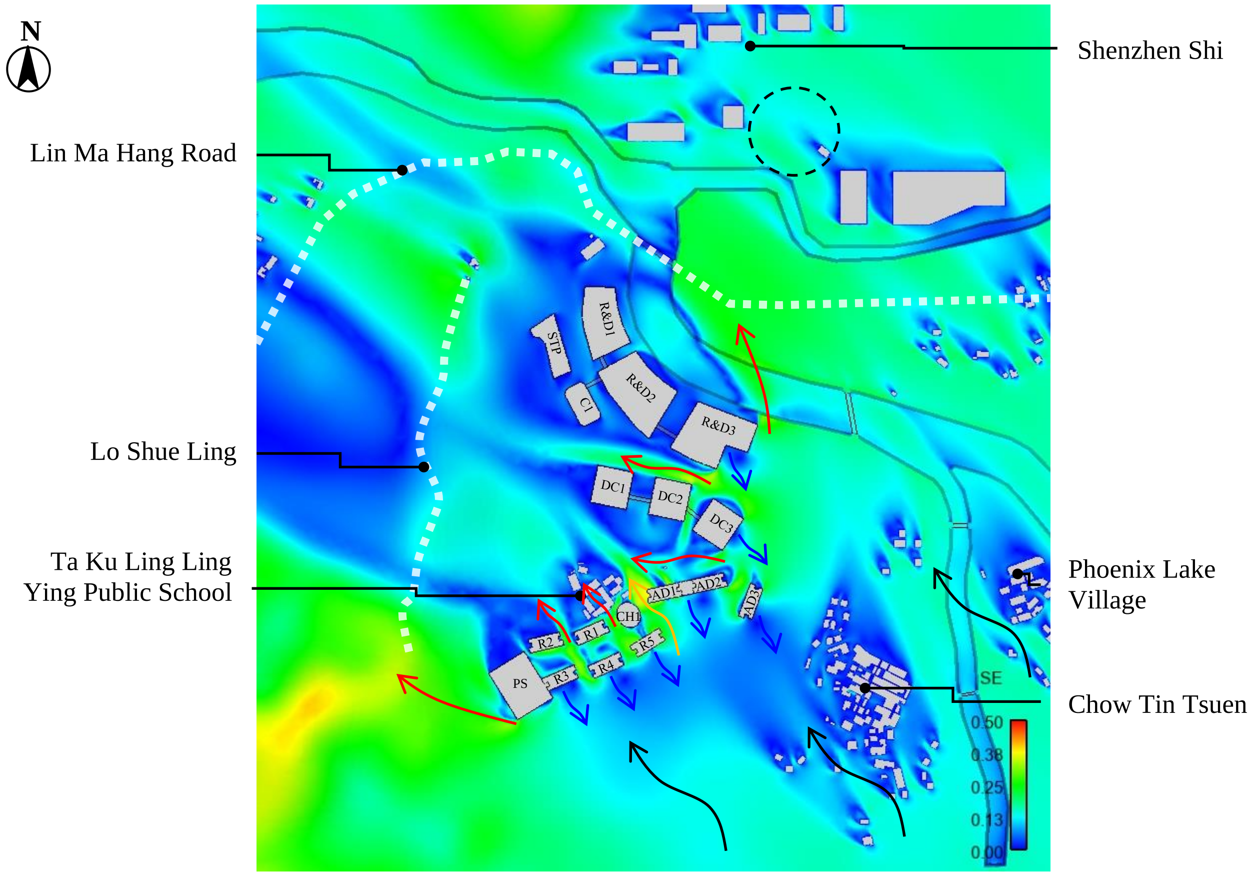


Figure 46 Contour Plot of Indicative Scheme under SE Wind

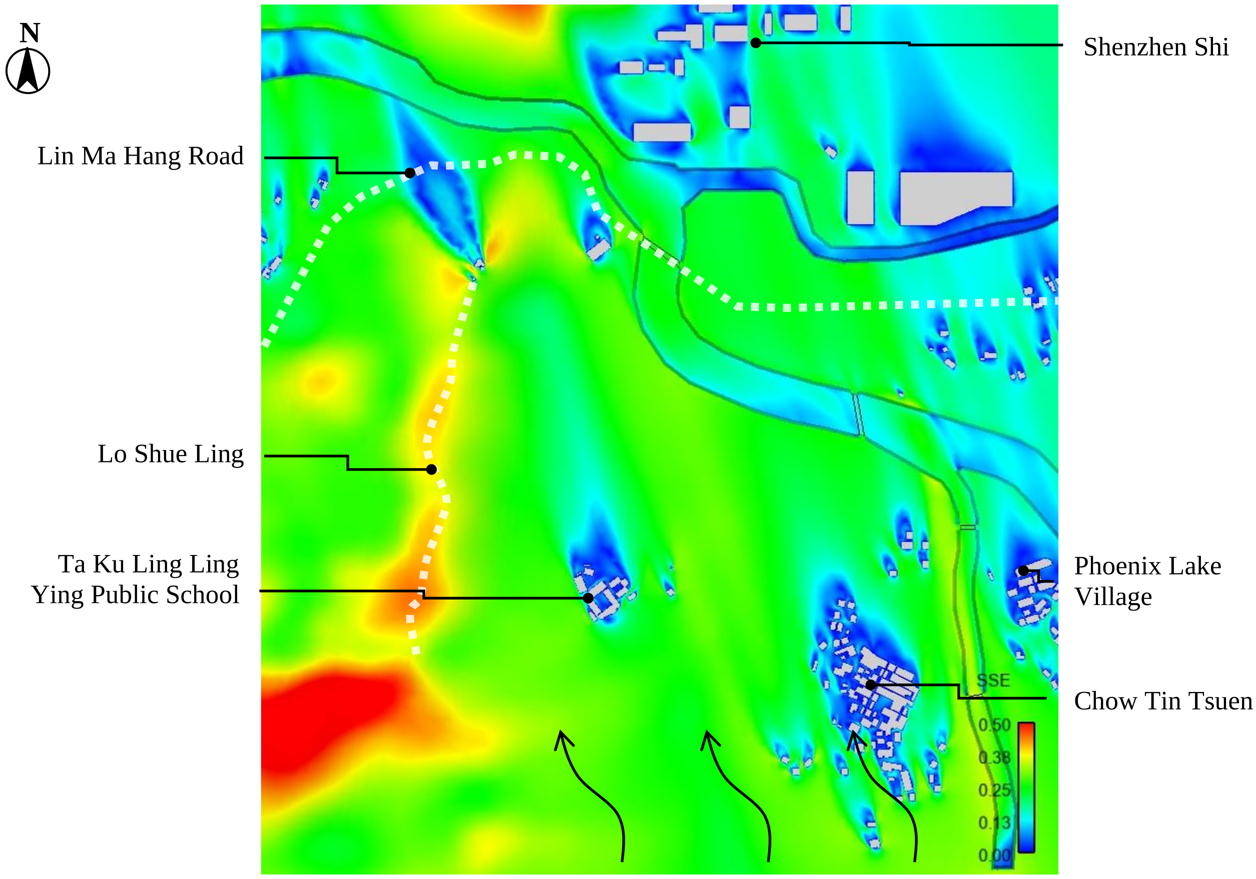


Figure 47 Contour Plot of Baseline Scheme under SSE Wind

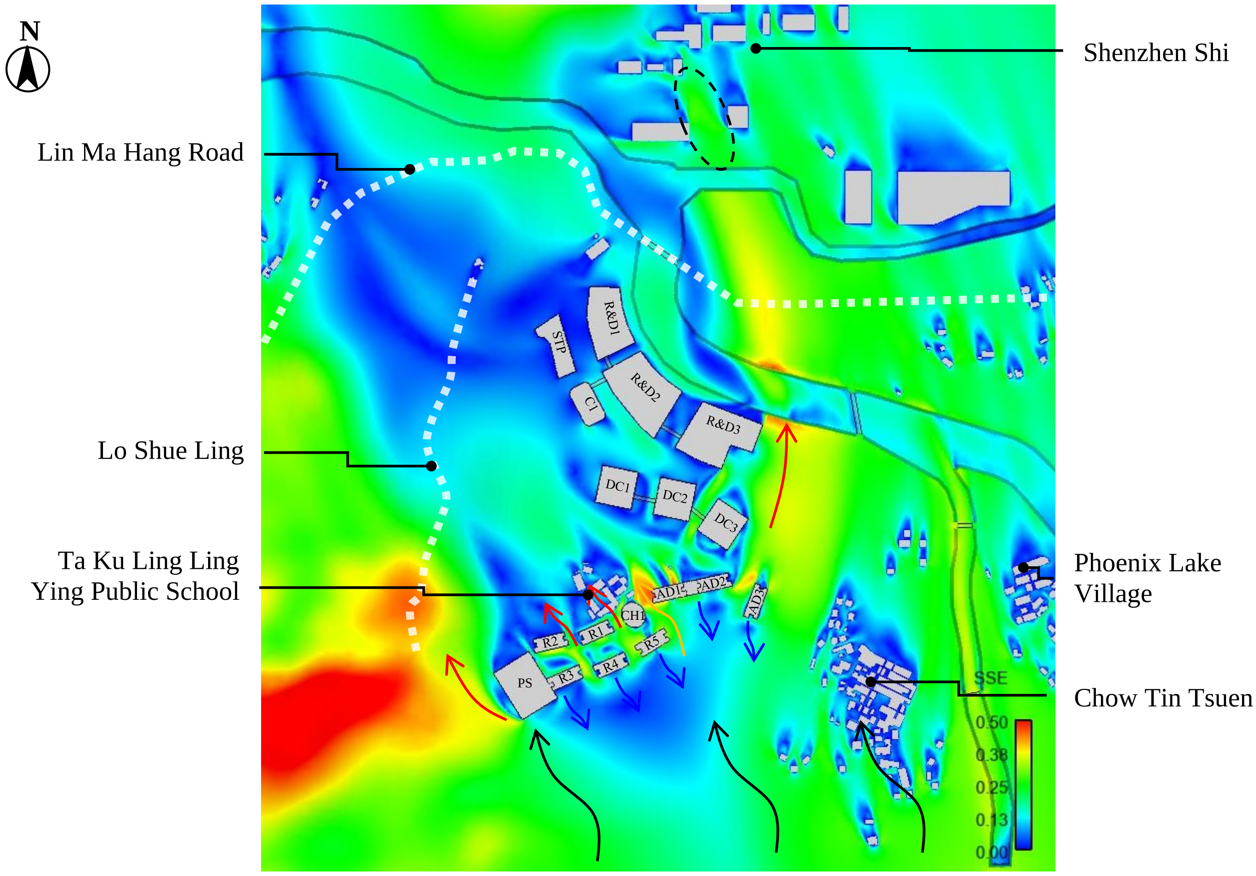


Figure 48 Contour Plot of Indicative Scheme under SSE Wind

4.3.5 S Wind

The overall wind performance of Baseline and Indicative Schemes under S winds are presented in Figure 49 and Figure 50 respectively.

The Application Site located in the leeward side of open farmland. The incoming winds would reach the Application Site from the incoming wind directions with relatively less obstruction. The incoming wind direction is illustrated by black arrows in Figure 49 and Figure 50 respectively.

Under Baseline Scheme, due to the absence of structures except a single storey building, the incoming wind would flow along the incoming wind directions to ventilate the leeward side such as Lin Ma Hang Road and Shenzhen Shi.

Similar to the previous discussed incoming winds, the front tier buildings including R3 to R5, AD1 to AD3 and PS would capture and divert the incoming wind, through SSE-NNW air paths and ESE-WNW breezeway on podium, to ventilate the Ta Ku Ling Ling Ying Public School and Lin Ma Hang Road, illustrated by red arrows in Figure 50. Also, the empty bays design under AD1 and R5 allows for more incoming wind to penetrate and further ventilate the leeward side such as Ta Ku Ling Ling Ying Public School, illustrated by orange arrow in Figure 50.

The diverted wind on the eastern side of the Application Site would enhance the ventilation performance on the Road to the East of the Application Site and Chow Tin Tsuen, where slightly higher VR can be observed, illustrated by black circle in Figure 50.

Due to the openness of farmland in the windward side, the low-level incoming wind is relatively unobstructed compared to the other incoming winds discussed above. Downwash effect on the front tier buildings is less prominent. Instead, the incoming wind will be diverted to the top and both sides to flow over the buildings and create a relatively calm zone in front of the buildings, a slightly lower VR can be observed, illustrated by blue circle in Figure 50.

Under Revised Indicative Scheme, S incoming wind would flow across Primary School Site and recirculate around R2 to recover portion of wind shadow on Ta Ku Ling Ling Ying Public School. Slight enhancement in VR at Ta Ku Ling Ling Ying Public School would be expected.

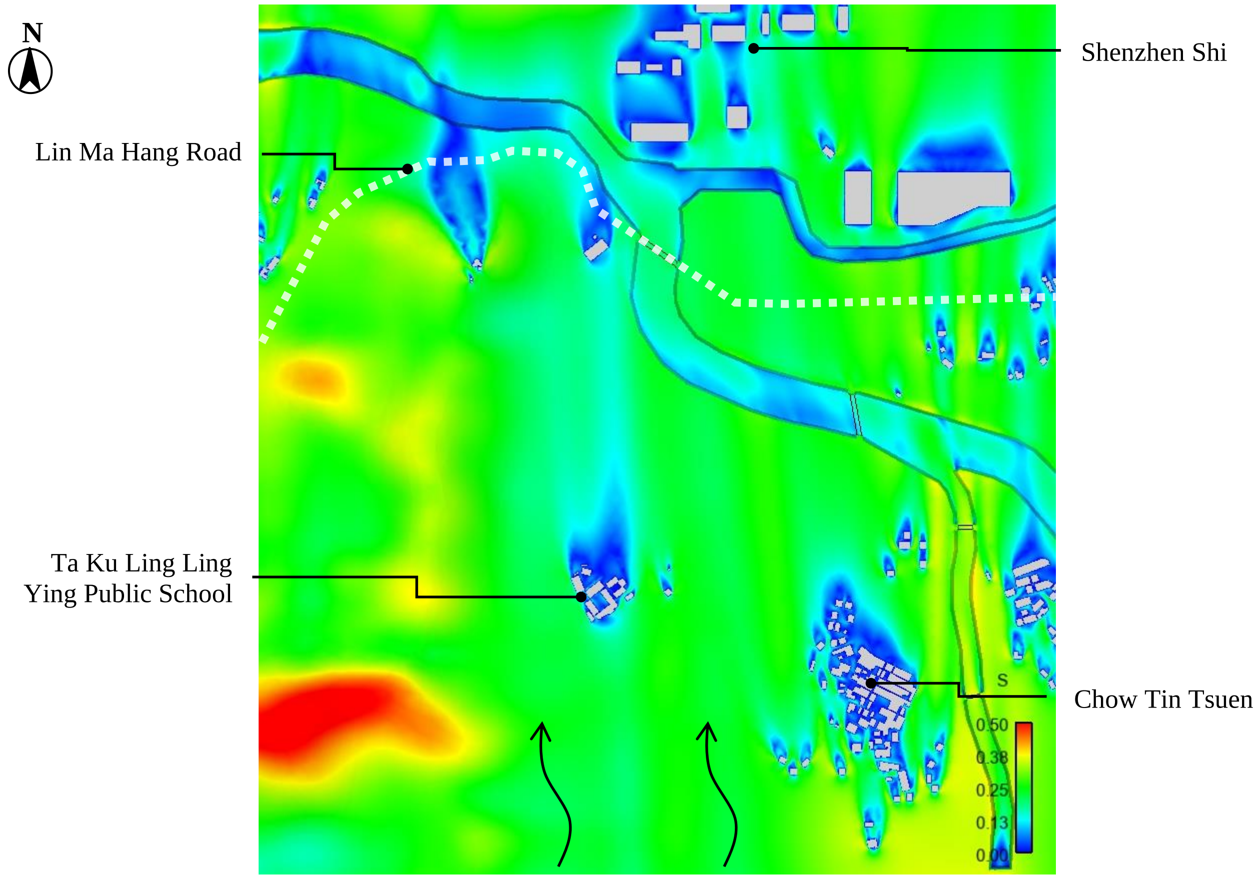


Figure 49 Contour Plot of Baseline Scheme under S Wind

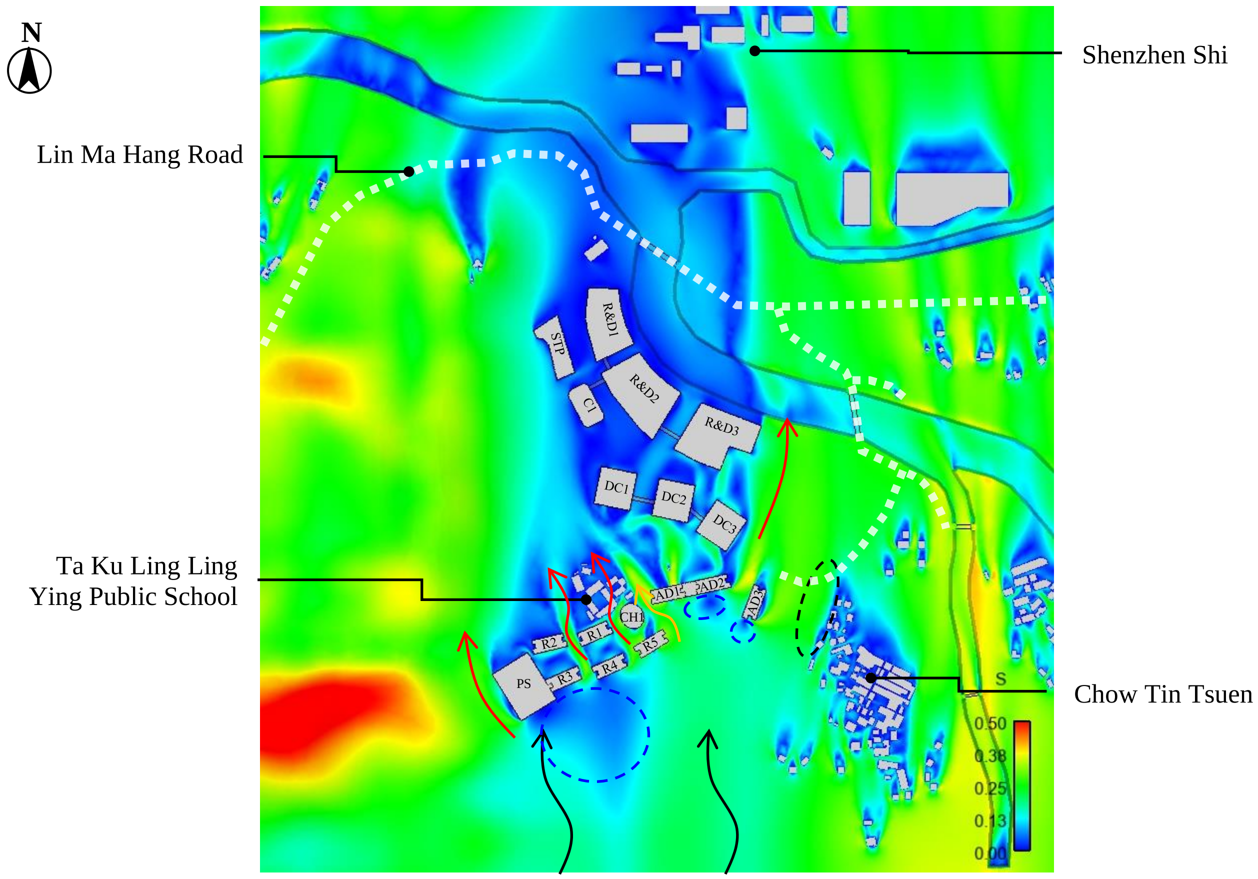


Figure 50 Contour Plot of Indicative Scheme under S Wind

4.3.6 SSW Wind

The overall wind performance of Baseline and Indicative Schemes under S winds are presented in Figure 51 and Figure 52 respectively.

The Application Site located in the leeward side of open farmland and hilly terrain (max. ~50mPD). The incoming winds would reach the Application Site from the incoming wind directions with relatively less obstruction. Due to the relatively small difference between wind speeds at pedestrian height and the top of the boundary layer indicated in Figure 18, the VR is relatively high compared to other wind profiles. The incoming wind direction is illustrated by black arrows in Figure 51 and Figure 52 respectively.

Under Baseline Scheme, due to the absence of structures except a single storey building, the incoming wind would flow along the incoming wind directions to ventilate the leeward side such as Lin Ma Hang Road and Shenzhen Shi.

The front tier buildings including PS, R3 to R5, AD2 and AD3 would divert the incoming wind, through SSE-NNW air paths and both sides of the Application Site, to ventilate the leeward side such as Chow Tin Tsuen, Ta Kwu Ling Village, Lin Ma Hang Road and Ta Ku Ling Ling Ying Public School, illustrated by blue arrows in Figure 52. The empty bays design under AD1 and R5 allows for more incoming wind to penetrate and further ventilate the leeward side such as Ta Ku Ling Ling Ying Public School, illustrated by orange arrow in Figure 52.

Due to the stepping height profile from STP, C1, DC to R&Ds, downwash effect are induced by the R&Ds to ventilate the pedestrian level and travel to further ventilate the leeward side, illustrated by white arrows in Figure 52.

The diverted wind on the eastern side of the Application Site would enhance the ventilation performance on the Chow Tin Tsuen and Ta Kwu Ling Village, where slightly higher VR can be observed, illustrated by black circles in Figure 52.

Similar to S wind, the downwash effect is less prominent due to the relatively fast low-level incoming wind. The wind would divert to both sides and over the top of buildings and create a relatively calm zone in front, illustrated by blue circle in Figure 52.

Under Revised Indicative Scheme, SSW incoming wind would flow across Primary School Site and recirculate around R2 to recover portion of wind shadow on Ta Ku Ling Lin Ying Public School.

In addition, removal of Primary School enlarged the wind entrance to access road between Residential Towers. Some incoming wind would enter the access road between Residential Tower, and pass through building separations between CH1, R1 and R2 to ventilate Ta Ku Ling Ling Ying Public School. Enhancement in VR along access road between Residential Towers and at the Ta Ku Ling Ling Ying Public School would be expected.

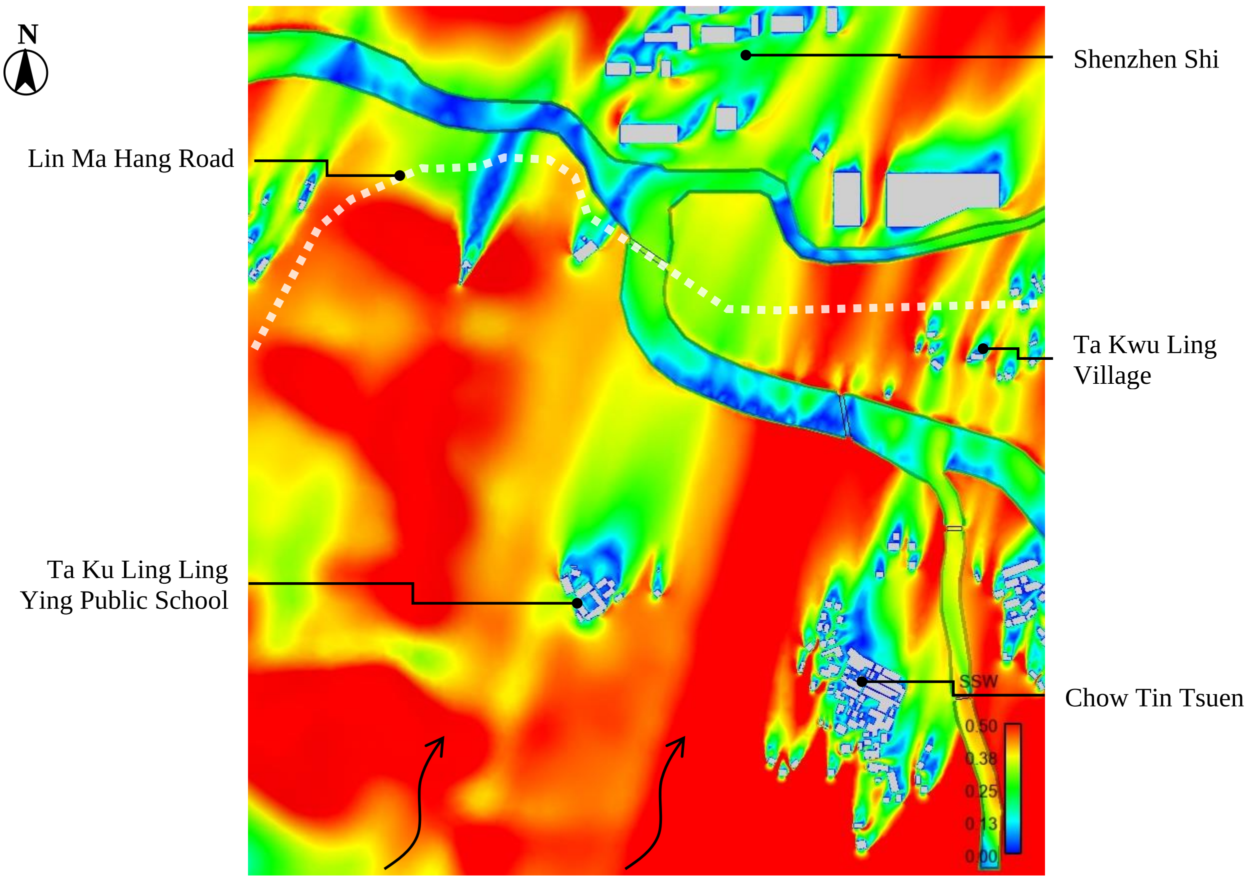


Figure 51 Contour Plot of Baseline Scheme under SSW Wind

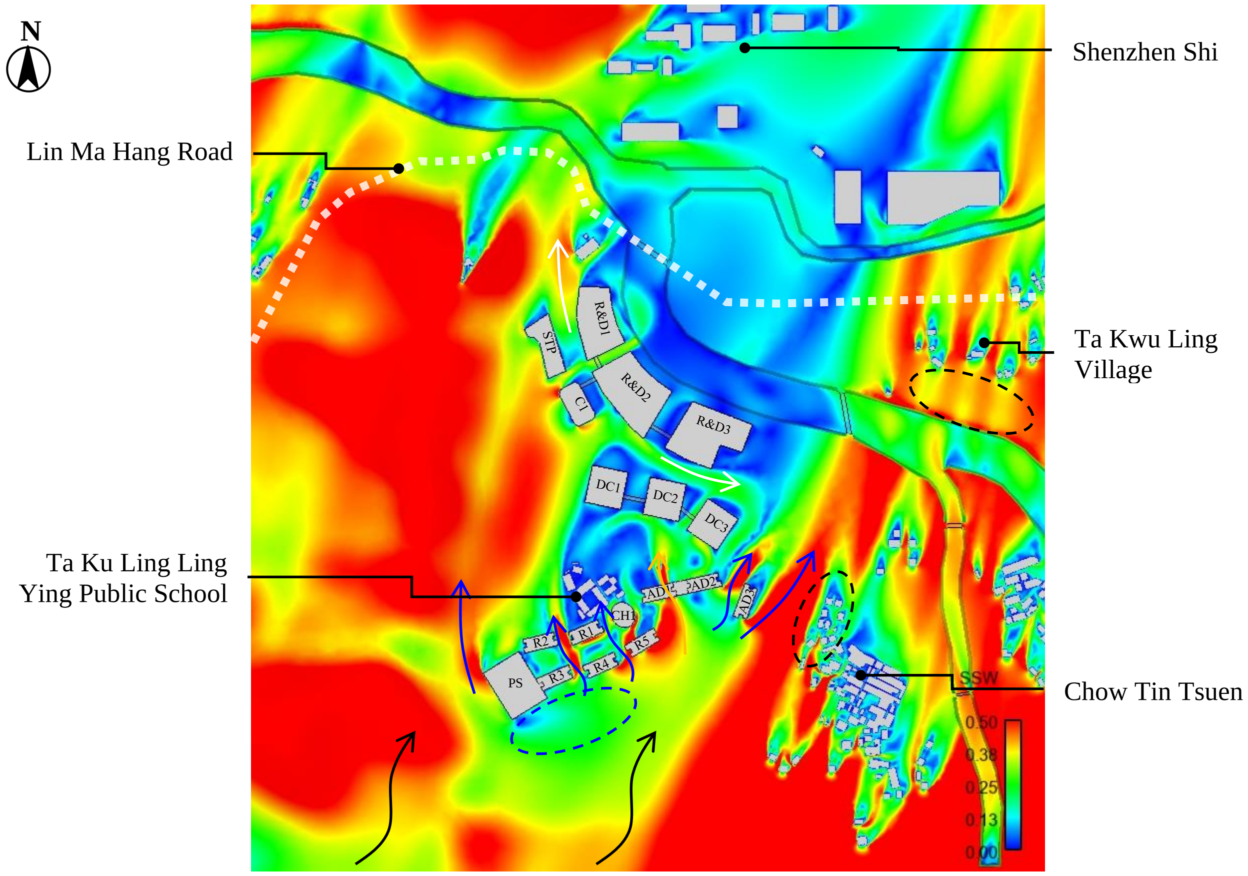


Figure 52 Contour Plot of Indicative Scheme under SSW Wind

4.3.7 SW/WSW Winds

The overall wind performance of Baseline and Indicative Schemes under SW/WSW winds are presented in Figure 53/Figure 55 and Figure 54/Figure 56 respectively.

The Application Site located in the leeward side of open farmland and Lo Shue Ling (~65mPD). The incoming winds would reach the Application Site from the incoming wind directions with relatively less obstruction. Due to the relatively small difference between wind speeds at pedestrian height and the top of the boundary layer indicated in Figure 18, the VR is relatively high compared to other wind profiles. The incoming wind direction is illustrated by black arrows in Figure 53 to Figure 56 respectively.

Under Baseline Scheme, due to the absence of structures except a single storey building, the incoming wind would flow along the incoming wind directions to ventilate the leeward side such as Lin Ma Hang Road, Ta Kwu Ling Village and Shenzhen Shi.

The front tier buildings including PS, STP, C1 and DC1 would divert the incoming wind, through E-W/ESE-WNW/NNE-SSW breezeways, ENE-WSW air path and both sides of the Application Site, to ventilate leeward side such as Ta Ku Ling Ling Ying Public School, Shenzhen Shi, Chow Tin Tsuen, Lin Ma Hang Road and Ta Kwu Ling Village, illustrated by blue arrows in Figure 54 and Figure 56 for SW and WSW winds respectively.

Due to the stepping height profile from STP, C1, DCs to R&Ds, downwash effect is induced by R&Ds to ventilate the pedestrian level and travel to further ventilate the leeward side, illustrated by white arrows in Figure 54 and Figure 56 for SW and WSW winds respectively.

The diverted wind on the northern side of the Application Site would enhance the ventilation performance on Shenzhen Shi. While that on the eastern side would enhance the ventilation performance on Chow Tin Tsuen, where slightly higher VR can be observed, illustrated by black circle in Figure 54 and Figure 56 for SW and WSW winds respectively. Wind shadow would be observed at further distance to the leeward side in part of Shenzhen City and Ta Kwu Ling Village.

Similar to the S incoming wind, the downwash effect is limited by the relatively fast low-level incoming wind. The wind would divert to both sides and over the top of buildings and create a relatively calm zone in front of buildings, illustrated by blue circle in Figure 54 and Figure 56 for SW and WSW winds respectively.

Under Revised Indicative Scheme, removal of Primary School enlarged the wind entrance to the access road between Residential Towers. SW and WSW incoming winds would enter the access road between Residential Towers and further penetrate the building separations between CH1, R1 and R2 to ventilate Ta Ku Ling Ling Ying Public School. Enhancement in VR along access road between Residential Towers and at the Ta Ku Ling Ling Ying Public School would be expected.

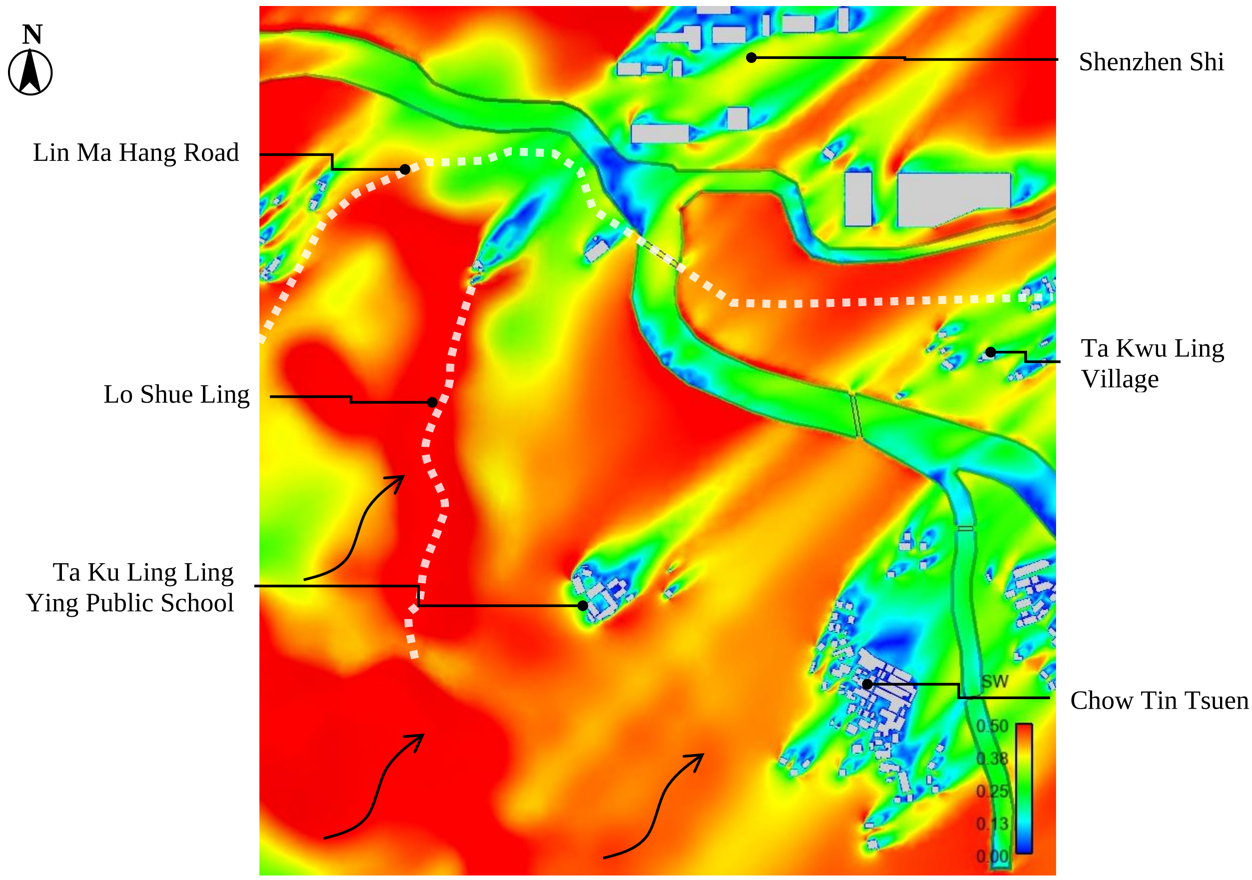


Figure 53 Contour Plot of Baseline Scheme under SW Wind

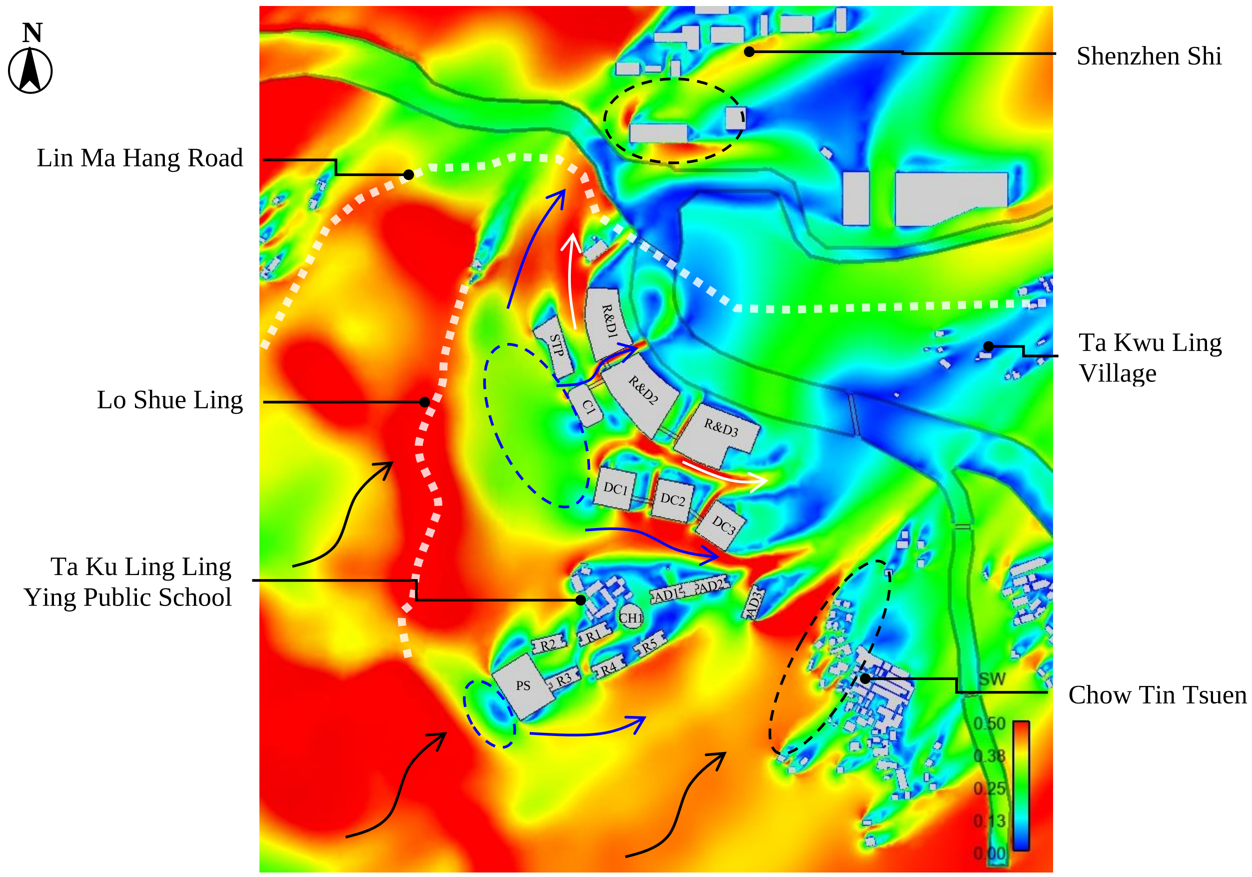


Figure 54 Contour Plot of Indicative Scheme under SW Wind

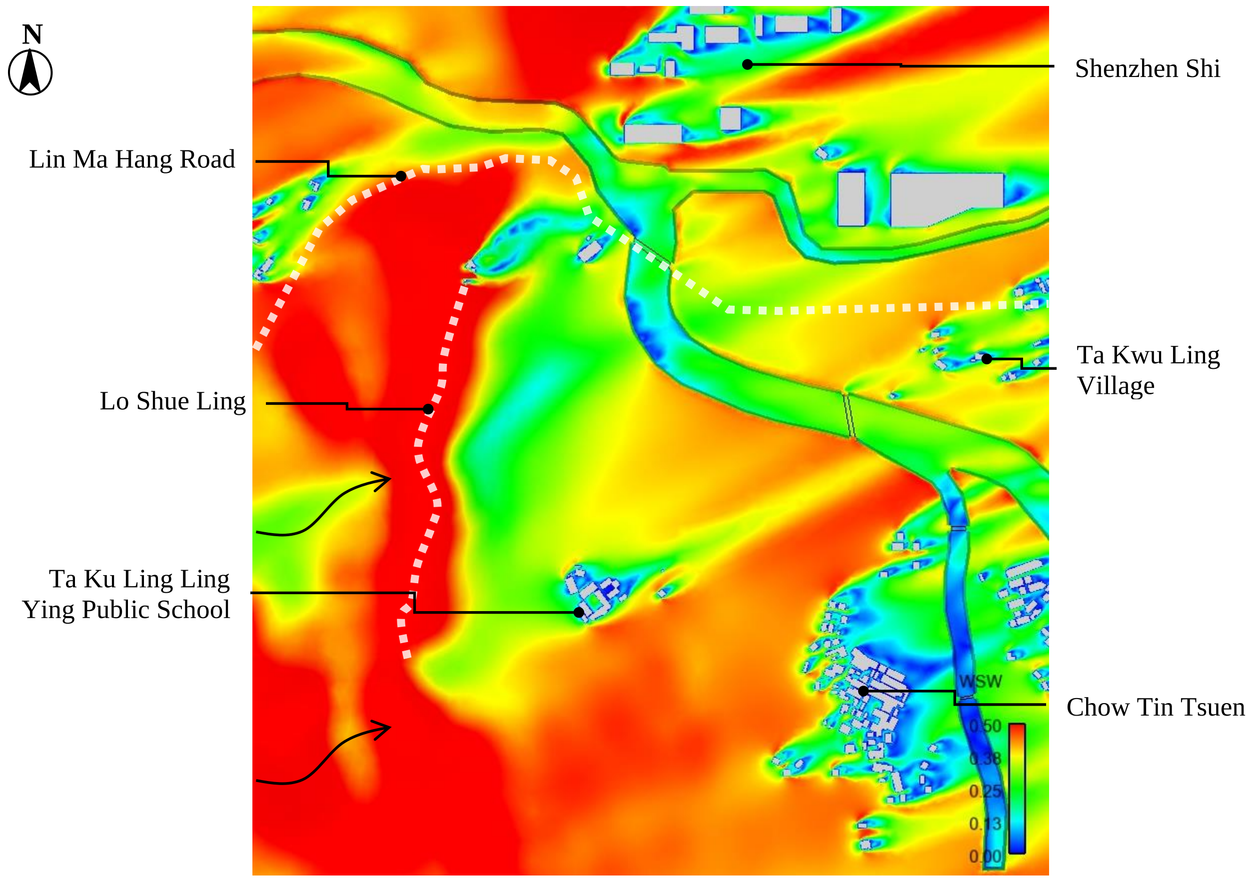


Figure 55 Contour Plot of Baseline Scheme under WSW Wind

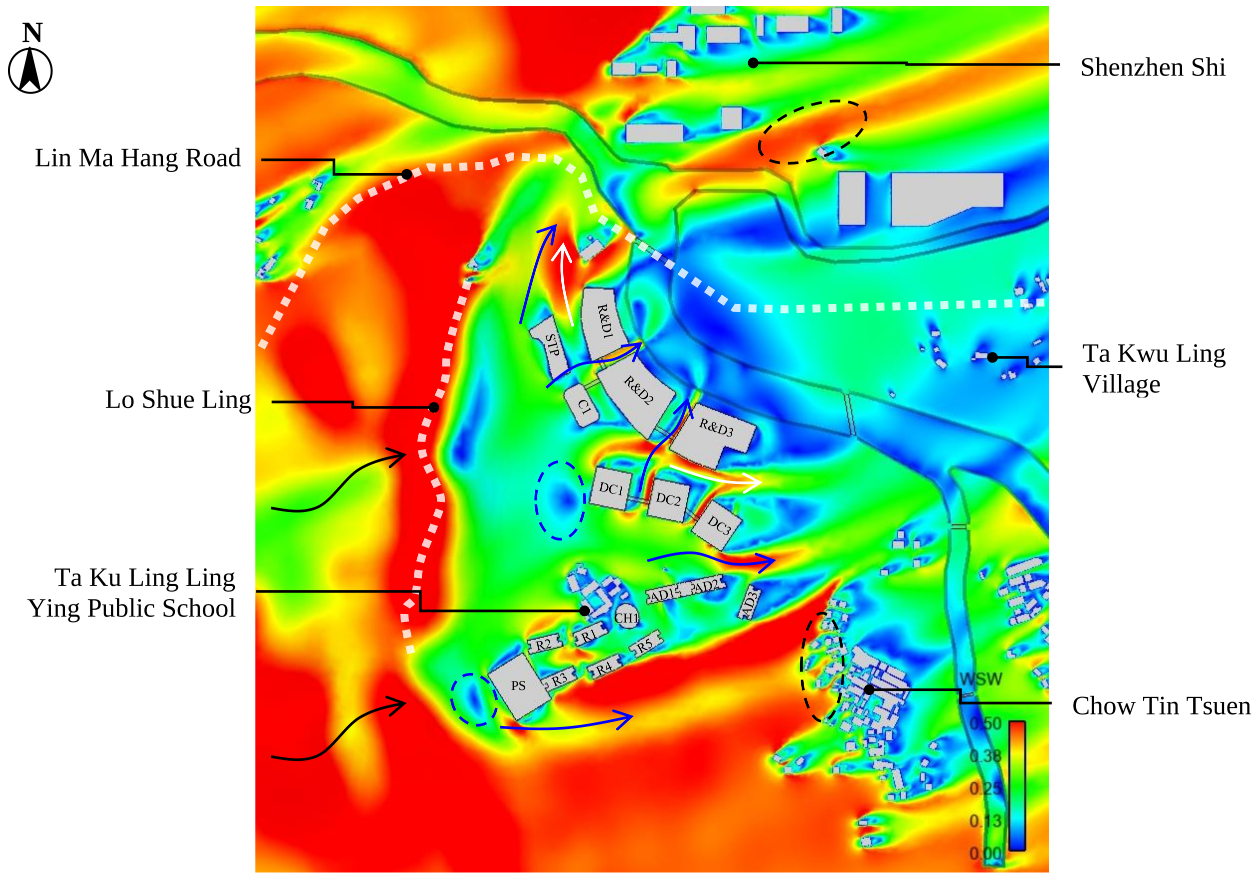


Figure 56 Contour Plot of Indicative Scheme under WSW Wind

4.4 Focus Areas

The average Velocity Ratio of all test points are determined and extracted. The results of all test points are presented in Appendix D.

The proposed Assessment Area and Application Site are presented in Figure 20. A total of 13 focus areas are proposed. The associated test points and averaged VR for focus areas are tabulated in Table 10 and Table 11 respectively. The location of each focus area is shown in Figure 57. Higher VR has been highlighted in bold for reference.

Table 10 Focus Areas and Corresponding Test Points

	Focus Areas	Test Points
1	Lin Ma Hang Road	O1-O23, O164
2	Road to the East of the Application Site	O3-O4, O24-O43
3	Ta Kwu Ling Village	O44-O49
4	Chow Tin Tsuen	O50-O84
5	Ta Ku Ling Ling Ying Public School	O150-O163
6	Road to the South of the Application Site	O85-O114
7	Trail on Lo Shue Ling	O115-O149
8	Open Area within the Application Site	S1-S63
9	Non-Building Area	S39-S42, S59-S60
10	Breezeway 1	P30-P31, P91-P92, S11, S40-S41, S58-63
11	Breezeway 2	P26-P27, P87-P88, S9, S43-S45
12	Breezeway 3	P21-P24, P62-P64, S46-S50, S54
13	Breezeway 4	P10-P11, P84-P85, S51-S57

Table 11 Focus Areas and Corresponding VR

	Focus Areas	Annual Average VR		Summer Average VR	
		Baseline	Indicative	Baseline	Indicative
1	Lin Ma Hang Road	**0.24**	0.22	**0.27**	0.20
2	Road to the East of the Application Site	**0.25**	0.21	**0.30**	0.23
3	Ta Kwu Ling Village	**0.19**	0.17	**0.25**	0.19
4	Chow Tin Tsuen	**0.14**	0.13	0.17	0.17
5	Ta Ku Ling Ling Ying Public School	**0.17**	0.15	**0.16**	0.15
6	Road to the South of the Application Site	**0.32**	0.28	**0.37**	0.34
7	Trail on Lo Shue Ling	**0.39**	0.25	**0.42**	0.34
8	Open Area within the Application Site	**0.25**	0.17	**0.30**	0.19
9	Non-Building Area	-	0.19	-	0.22
10	Breezeway 1	-	0.19	-	0.19
11	Breezeway 2	-	0.24	-	0.24
12	Breezeway 3	-	0.20	-	0.20
13	Breezeway 4	-	0.18	-	0.14

Annual Condition

Under annual condition, prevailing winds are mostly from E quadrant. Due to the relatively open upwind surrounding, the incoming wind would reach the Application Site from the prevailing wind directions with low obstruction.

Due to the absence of structure except one low-rise building under Baseline Scheme, the ventilation performances are generally better than Indicative Scheme in ***all focus areas***.

However, the mitigation measures under Indicative Scheme have demonstrated benefit to the ventilation performance. All mitigation measures including ***Non-Building Area*** and ***all Breezeways*** result in VR similar or higher than the SVR of Indicative Scheme. Also, the ***Breezeway 2*** has VR higher than the LVR of Indicative Scheme.

The effectiveness of the mitigation measures can be further demonstrated by the alleviated ventilation performance on the leeward side of the Application Site. Under Indicative Scheme, some focus areas on the leeward side of the Application Site have demonstrated a lower drop or higher enhancement in VR from the LVR (i.e. VR of focus area minus LVR) compared to the Baseline Scheme such as ***Road to the South of the Development***.

In addition, ***Ta Ku Ling Ling Ying Public School*** and ***Chow Tin Tsuen*** achieved similar ventilation performance between both schemes due to the diverted winds by the buildings and wind enhancement features under the Indicative Scheme.

Summer Condition

Under summer condition, prevailing winds are mostly from SW and E quadrants. Due to the relatively open upwind surrounding, the incoming wind would reach the Application Site from the prevailing wind directions with low obstruction.

Due to the absence of structure except one low-rise building under Baseline Scheme, the ventilation performances are generally better than Indicative Scheme in ***most focus areas*** except ***Chow Tin Tsuen.***

However, some mitigation measures under Indicative Scheme have demonstrated positive influence to the ventilation performance. Mitigation measures including ***Non-Building Area***, ***Breezeways 2*** and ***3*** achieved in VR similar or higher than the SVR of Indicative Scheme. And the ***Breezeway 2*** has achieved VR higher than the LVR of the Indicative Scheme.

Similarly, the effectiveness of the mitigation measures can be further demonstrated by the alleviated ventilation performance on the leeward side of the Application Site. Under Indicative Scheme, some focus areas on the leeward side of the Application Site have demonstrated a lower drop or higher enhancement in VR from the LVR (i.e. VR of focus area minus LVR) compared to the Baseline Scheme such as ***Lin Ma Hang Road***, ***Ta Kwu Ling Village***.

In addition, ***Ta Ku Ling Ling Ying Public School*** and ***Chow Tin Tsuen*** achieved similar ventilation performance between both schemes due to the diverted winds by the buildings and wind enhancement features under the Indicative Scheme.

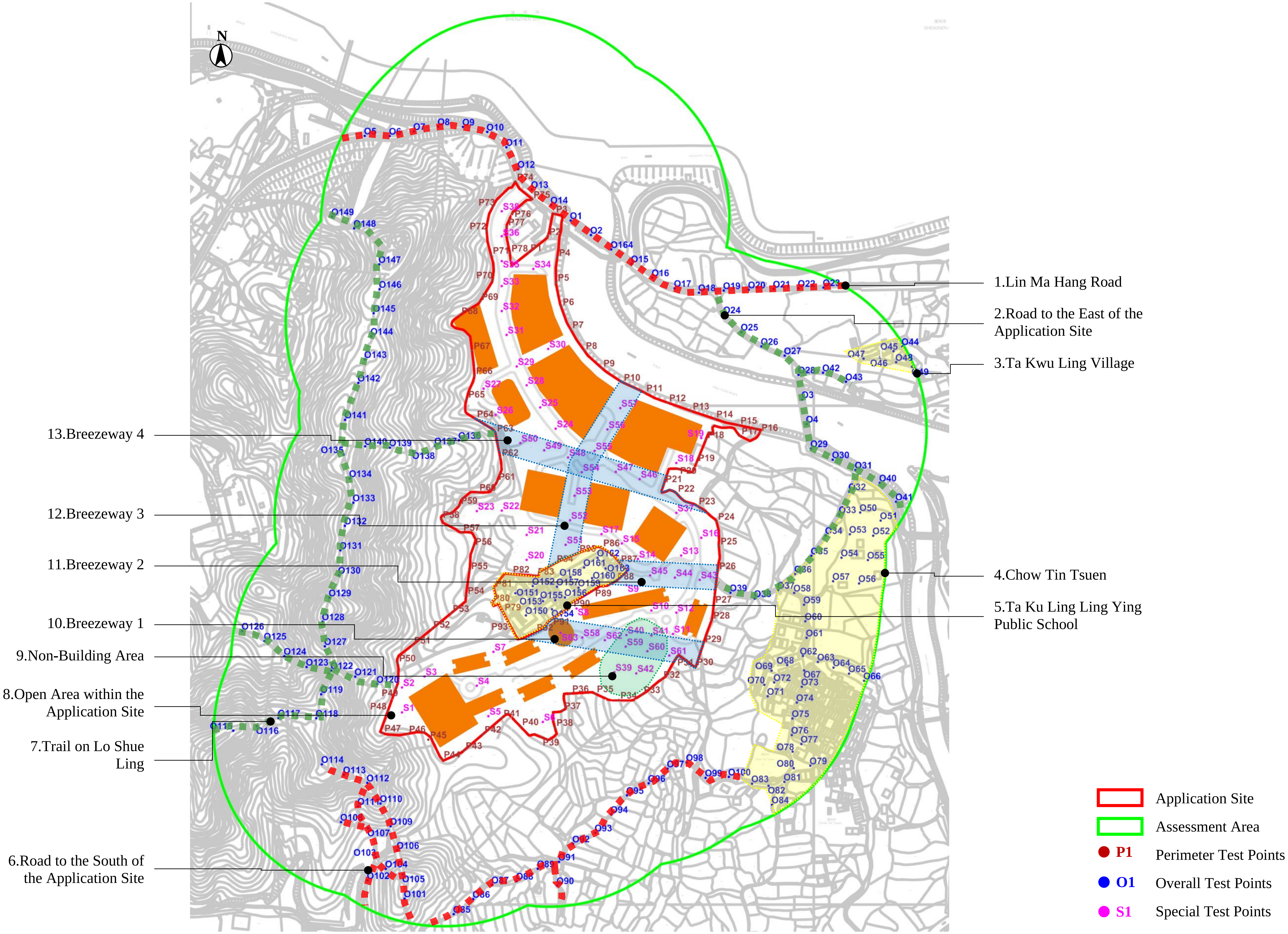


Figure 57 Location of Focus Areas

5. Conclusion

5.1 Overview

An Air Ventilation Assessment – Initial Study (AVA-IS) was conducted to assess the ventilation performance of Baseline Scheme and Indicative Scheme in accordance to *the AVA Technical Circular [1]*. Due to the comment received from the Education Bureau dated 16 May 2023, reserving a school site for new school development in the Application Site is considered not required. Thus, Revised Indicative Scheme was formed, and additional qualitative analysis was conducted to assess the ventilation performance.

Baseline and Indicative Schemes were assessed using Computational Fluid Dynamics (CFD) techniques. A series 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 78.7% over a year while E, ESE, SE, SSE, S, SSW, SW and WSW were selected for summer condition, which gives total wind frequency of 81.6%. Revised Indicative Scheme was assessed using qualitative approach. Qualitative discussions were provided on annual, summer and directional analysis.

The Velocity Ratio (VR) as proposed by *the AVA Technical Circular [1]* was employed to assess the ventilation performance under different schemes and its impact to the surroundings. With reference to *the AVA Technical Circular [1]*, 78 perimeter test points, 149 overall test points and 63 special test points were allocated to assess the overall ventilation performance in the Assessment Area.

5.2 Results

The results showed that:

- Under annual condition, the Baseline Scheme achieved a better LVR (0.25 vs 0.20) and SVR (0.24 vs 0.18) compared to the Indicative Scheme. It is because the absence of structure except a low-rise building in Baseline Scheme.
- Similarly, under summer condition, the Baseline Scheme achieved a better LVR (0.29 vs 0.19) and SVR (0.29 vs 0.23) compared to Indicative Scheme due to the absence of structure except a low-rise building in Baseline Scheme.
- The surrounding environment is generally open with some low- to mid-rise buildings and a hilly terrain on the west of the Application Site. The incoming winds would reach the Application Site from the prevailing wind directions with relatively low obstruction.
- For Indicative Scheme, due to the increased building height, some wind shadow would be casted at the leeward side such as Ta Kwu Ling Village and Lin Ma Hang Road under summer condition, and Trail on Lo Shue Ling under annual and summer conditions. On the other hand, other focus area such as Ta Ku Ling Ling Ying Public School and Chow Tin Tsuen has achieved similar VR under annual and summer conditions.
- Wind enhancement features under Indicative Scheme including 4 nos. breezeways, 3 nos. air paths,1 no. open space provided by NBA as well as the empty bays under AD1 and R5, mostly achieved slightly higher VR as compared with SVR, which indicate effective wind penetration across the Application Site.
- For the Revised Indicative Scheme, the wind enhancement features provided are the same as Indicative Scheme, similar effectiveness would be expected. Also, the removal of Primary School would enlarge the wind entrance to the Application Site, similar ventilation performance as Indicative Scheme, with slight improvement at access road between Residential Towers, Ta Ku Ling Ling Ying Public School, and Road to the South of the Application Site under both annual and summer conditions would be expected.

6. 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)

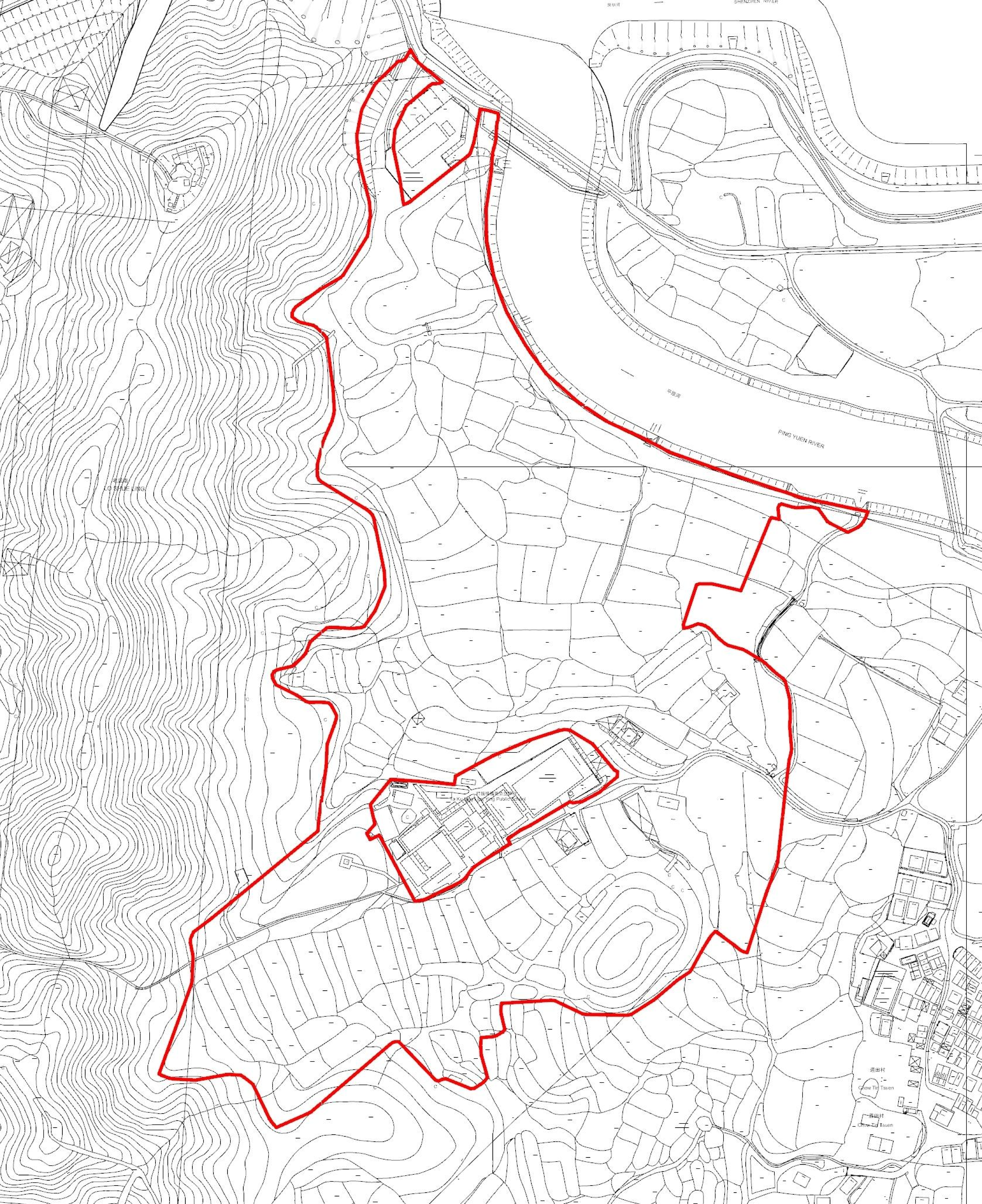
[2] Planning Department RAMS Data

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

Appendix A

Layout Plans of Baseline Scheme, Indicative Scheme and Revised Indicative Scheme

A.1 Layout Plan of Baseline Scheme

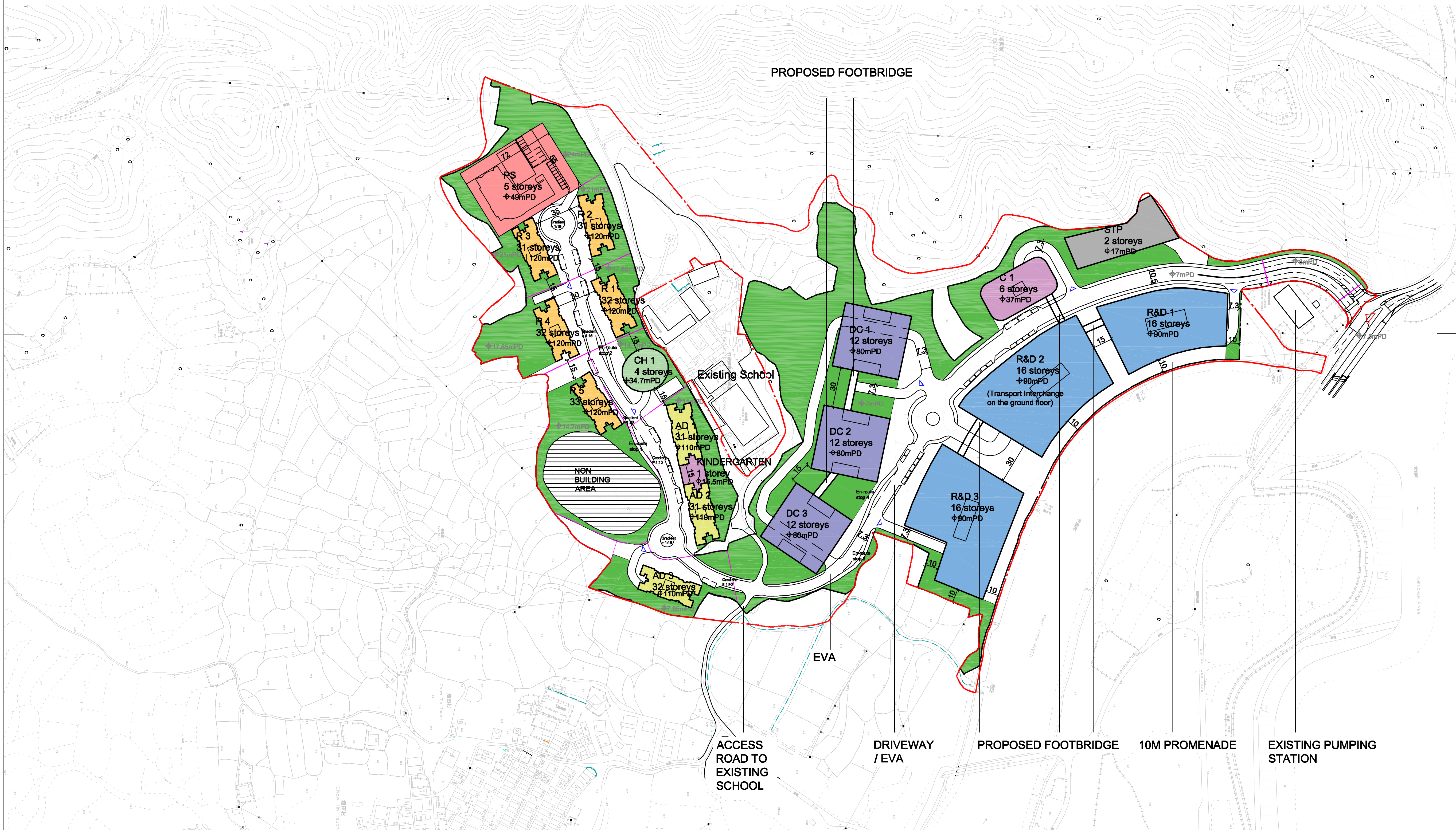

SHENZHEN RIVER
PING YUEN RIVER
LO SHUE LING
Chow Tin Tsuen
Chow Tin Tsuen

A.2 Layout Plan of Indicative Scheme

LEGEND

- APPLICATION SITE BOUNDARY
- DEVELOPMENT SITE BOUNDARY
- SITE FORMATION LEVEL
- SITE RUN-IN/OUT
- ACCESS TO BASEMENT CARPARK
- R&D CENTRE
- DATA CENTRE
- RESIDENTIAL
- COMMERCIAL
- ANCILLARY DORMITORIES
- CLUBHOUSE
- PRIMARY SCHOOL
- LANDSCAPE AREA
- SEWAGE TREATMENT PLANT

N



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Rev. | Date | Description

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2. Verify dimensions in field. Notify WCWP of discrepancies.
3. Dimensions in mm unless otherwise noted.
4. Not for construction unless expressly certified.

Key Plan

Client
Hong Kong International Innovation Tech Hub

Consultants

Issue
Planning Application

BD Ref: BD 2/9188/10 (PT. II)
FSD Ref: FP 8/9584/VII <131>

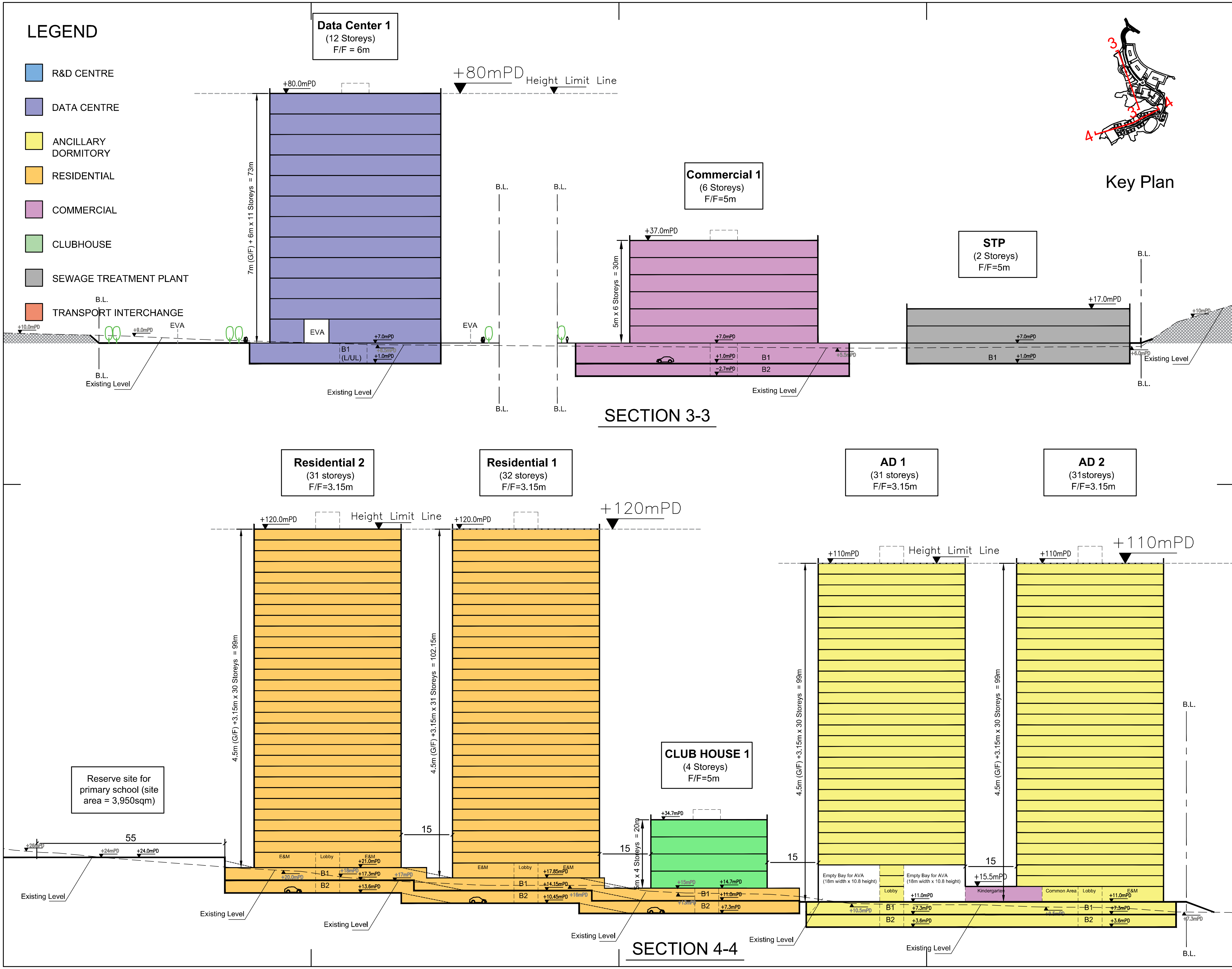
Authorized Person

Project
The Nexus

Project Number	Date
20027	20221202
Scale	Drawn/Approved
1:3000 at A3	CL/TL

Title
Master Layout Plan
Primary School Layout

Number	Revision
MLP-010	-



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Authorized Person

Project
The Nexus

Project Number	Date
20027	20230224
Scale	**Drawn/Approved**
1:1000 at A3	CL/TL

Title
Section 3-3, 4-4

Number	Revision
S-006	-

A.3 Layout Plan of Revised Indicative Scheme

LEGEND

- APPLICATION SITE BOUNDARY
- DEVELOPMENT SITE BOUNDARY
- SITE FORMATION LEVEL
- SITE RUN-IN/OUT
- ACCESS TO BASEMENT CARPARK
- R&D CENTRE
- DATA CENTRE
- RESIDENTIAL
- COMMERCIAL
- ANCILLARY DORMITORIES
- CLUBHOUSE
- LANDSCAPE AREA
- SEWAGE TREATMENT PLANT
- PROMENADE

N

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Issue
Planning Application

BD Ref: BD 2/9188/10 (PT. II)
FSD Ref: FP 8/9584/VII <131>

Authorized Person

Project
The Nexus

Project Number	Date
20027	20230629
Scale	**Drawn/Approved**
1:3000 at A3	CL/TL

Title
Master Layout Plan

Number	Revision
MLP-001	-

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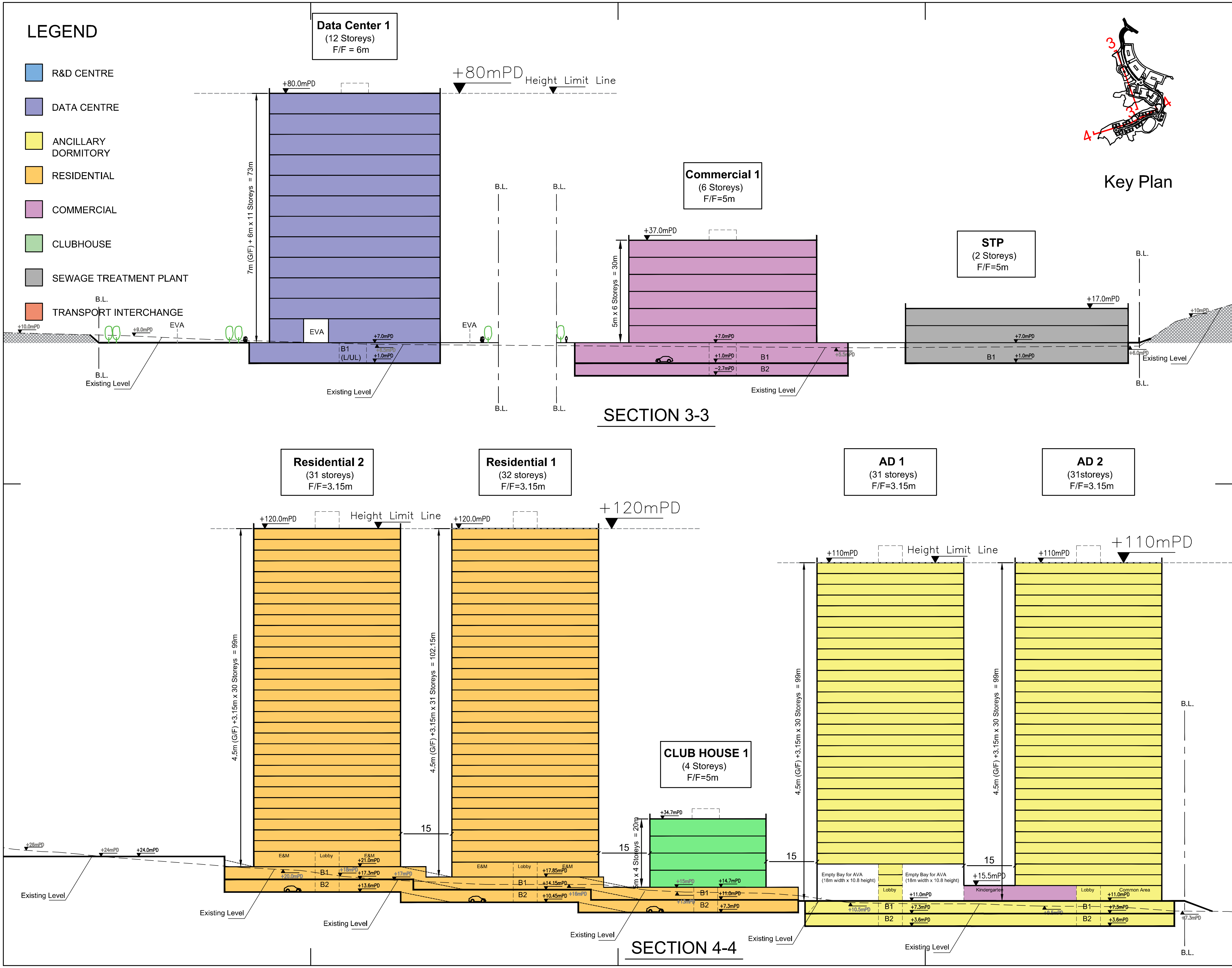

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Key Plan

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Issue
Planning Application

BD Ref: BD 2/9188/10 (PT. II)
FSD Ref: FP 8/9584/VII <131>

Authorized Person

Project
The Nexus

Project Number	Date
20027	20230629
Scale	**Drawn/Approved**
1:1000 at A3	CL/TL

Title
Section 3-3, 4-4

Number	Revision
S-006	-

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Appendix B

Contour Plot of Velocity Ratio (VR)

B.1 Baseline Scheme

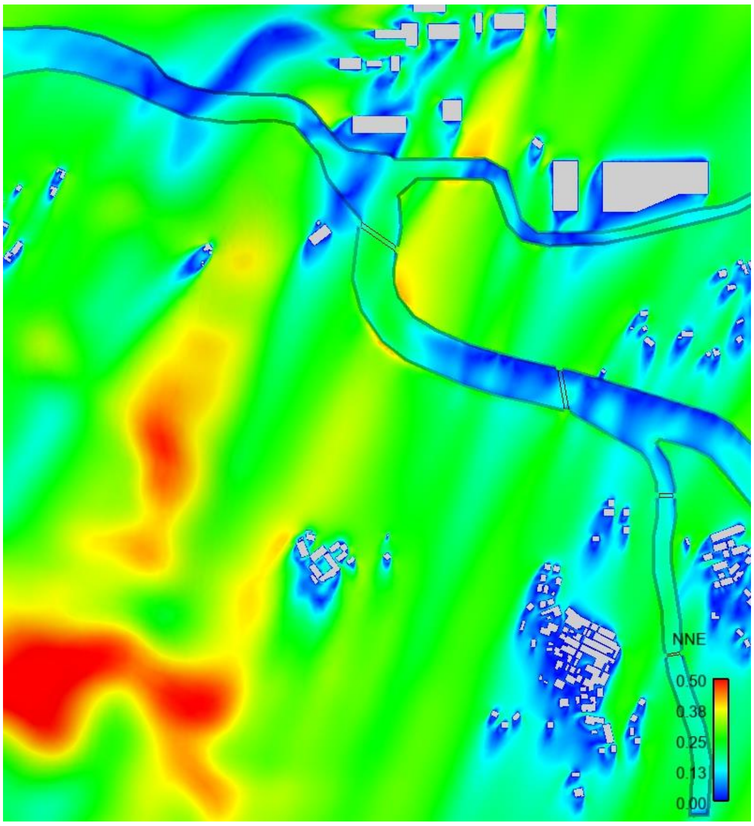

Figure B 1 Contour Plot of Baseline Scheme under NNE Wind

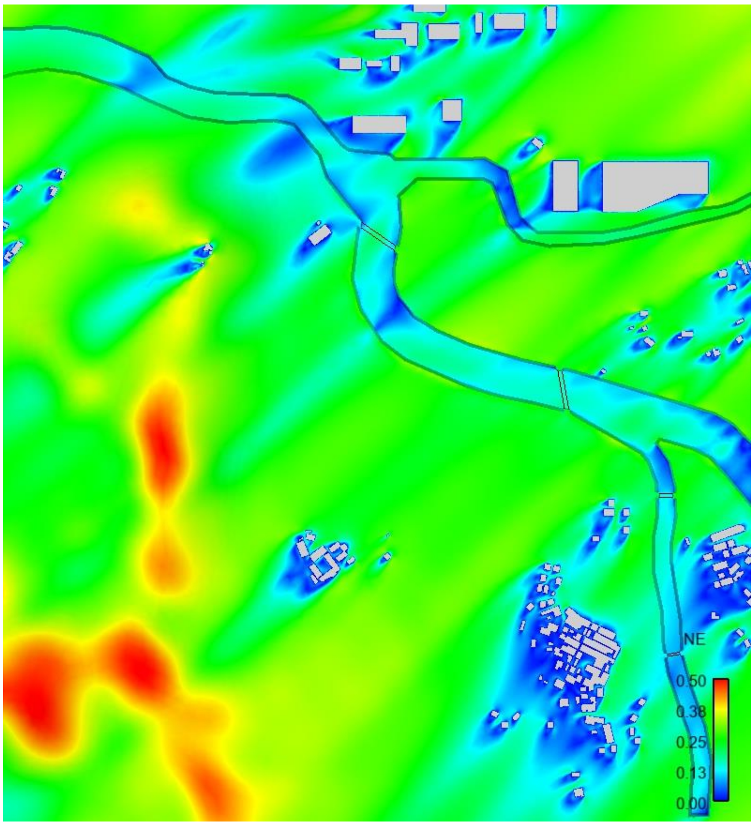

Figure B 2 Contour Plot of Baseline Scheme under NE Wind

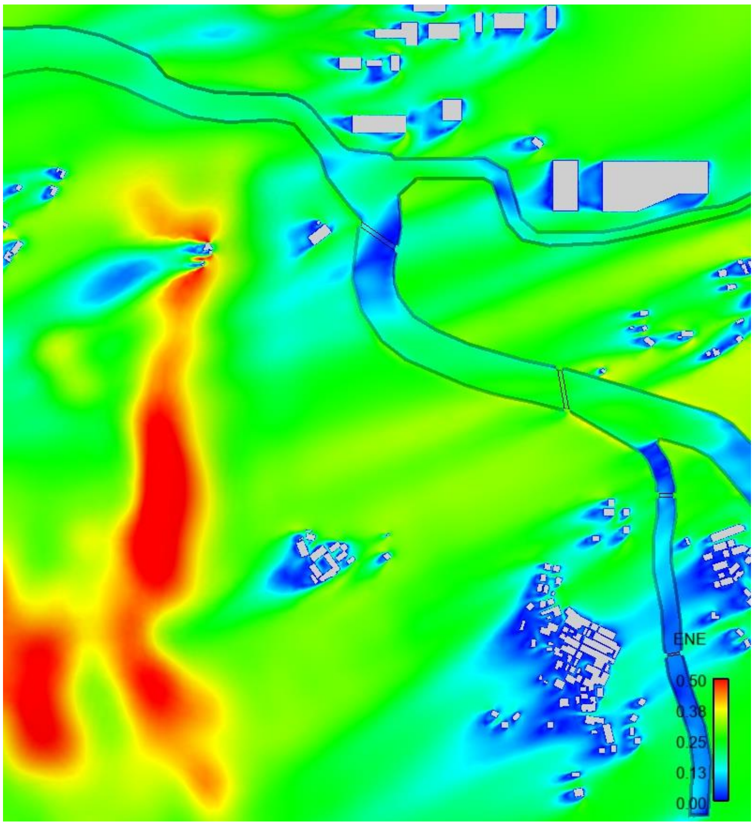

Figure B 3 Contour Plot of Baseline Scheme under ENE Wind

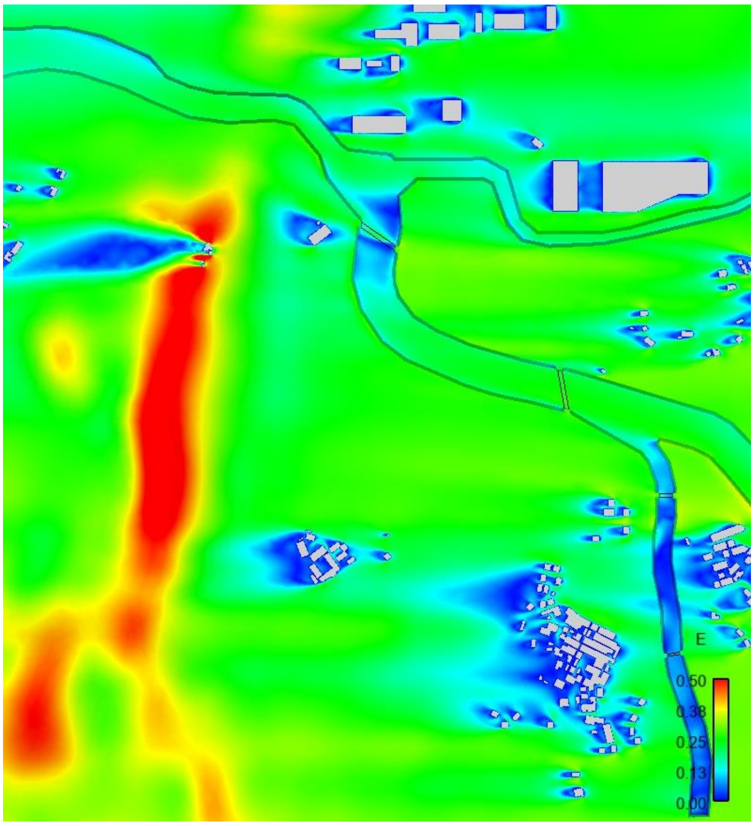

Figure B 4 Contour Plot of Baseline Scheme under E Wind

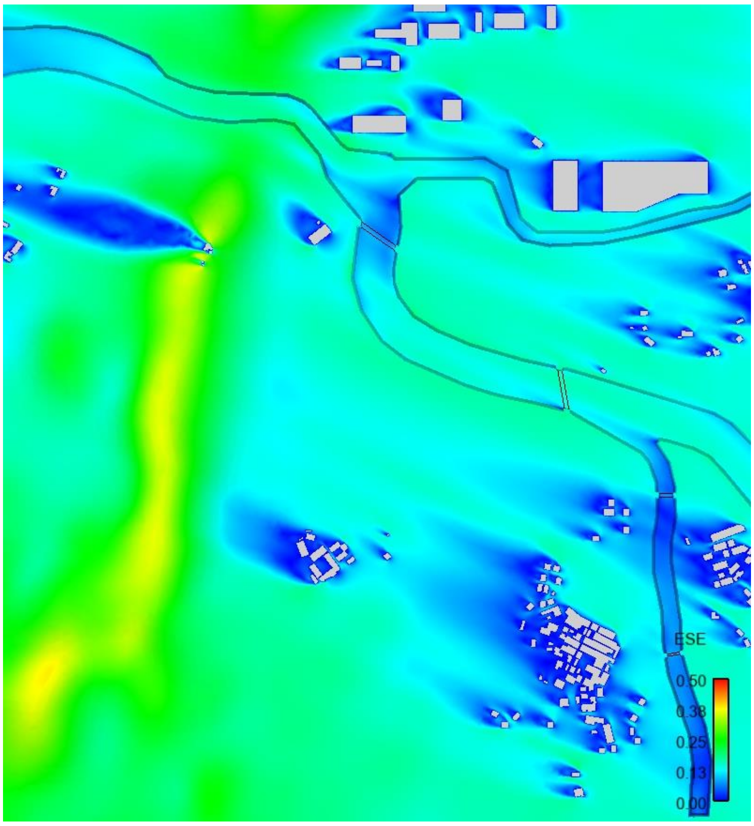

Figure B 5 Contour Plot of Baseline Scheme under ESE Wind

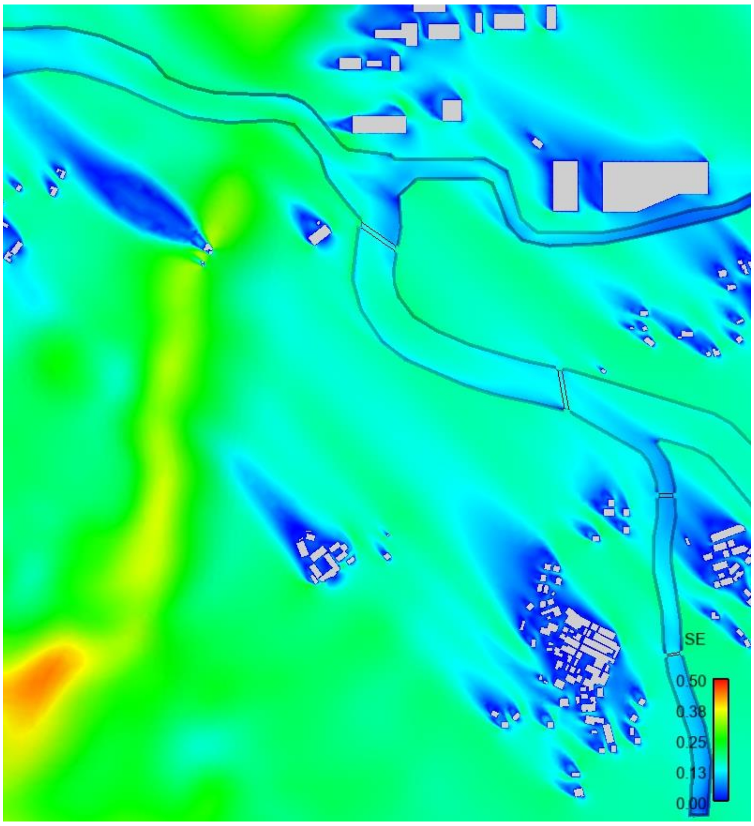

Figure B 6 Contour Plot of Baseline Scheme under SE Wind

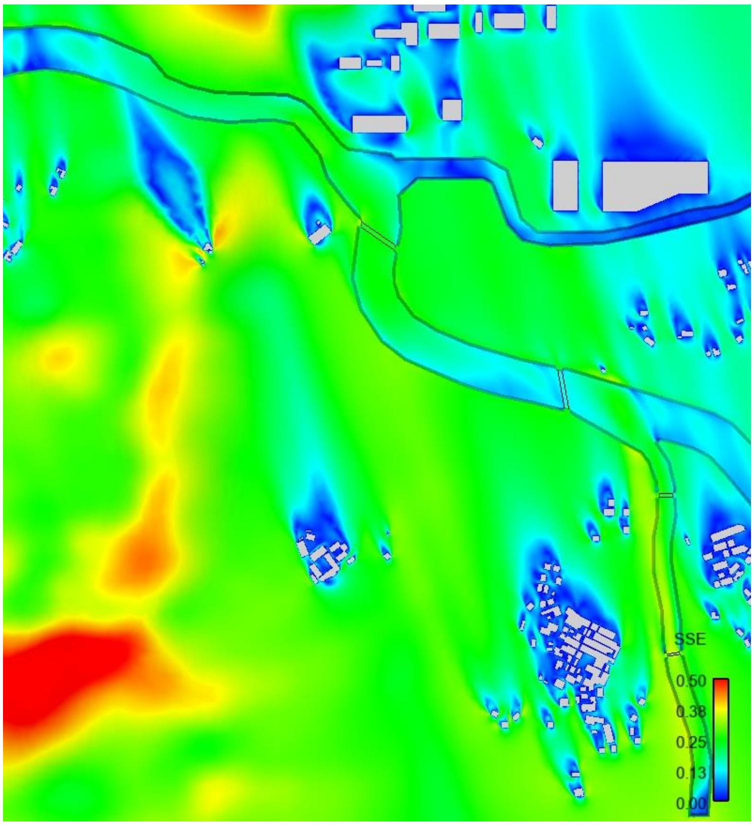

Figure B 7 Contour Plot of Baseline Scheme under SSE Wind

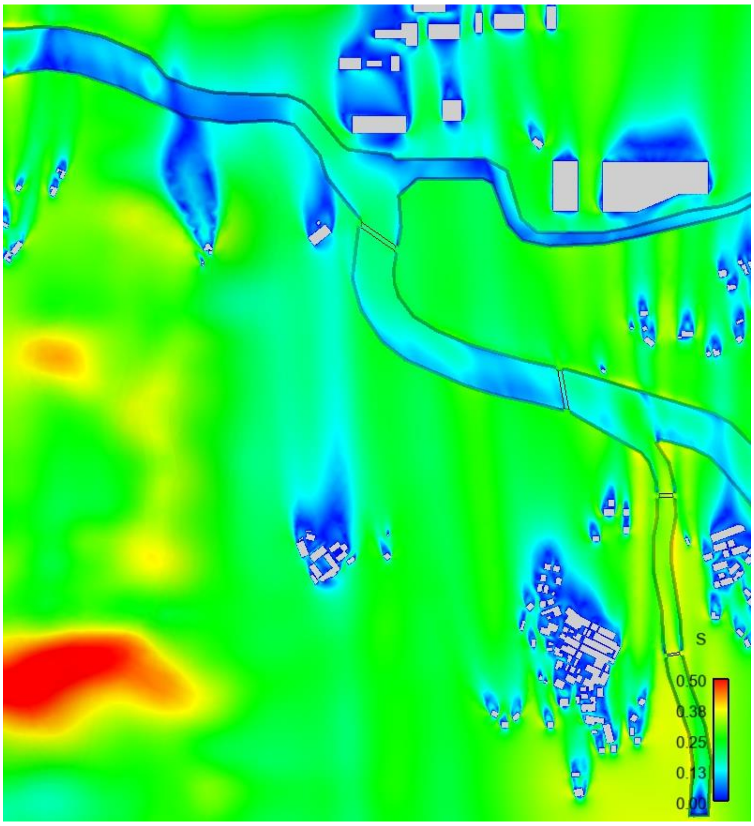

Figure B 8 Contour Plot of Baseline Scheme under S Wind

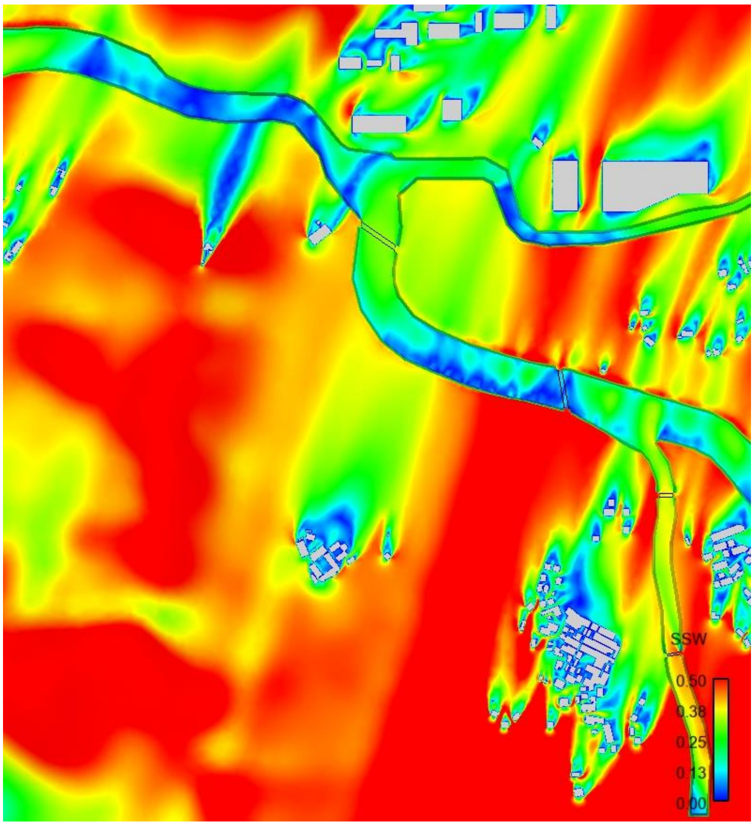

Figure B 9 Contour Plot of Baseline Scheme under SSW Wind

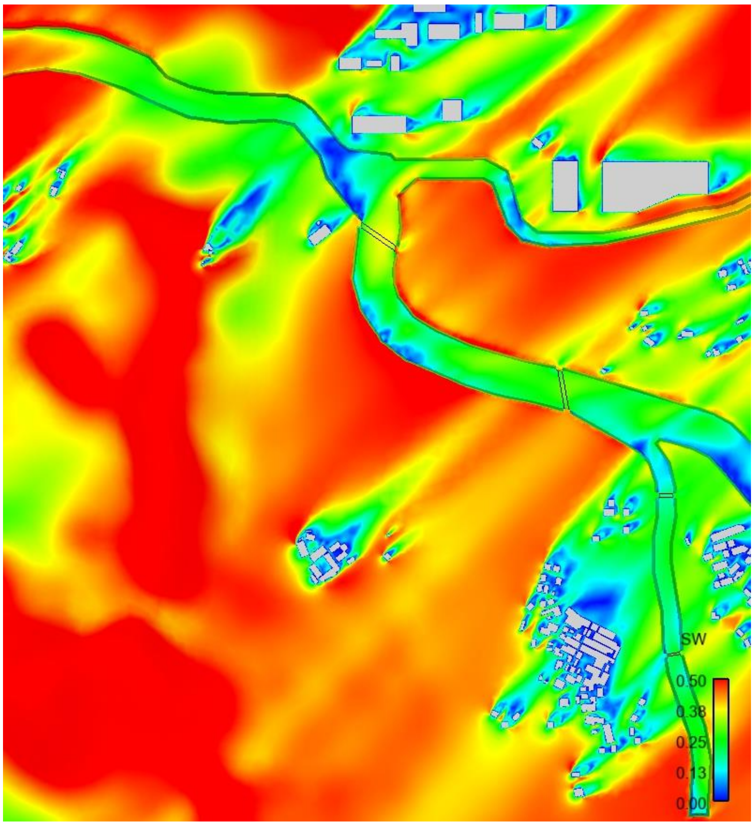

Figure B 10 Contour Plot of Baseline Scheme under SW Wind

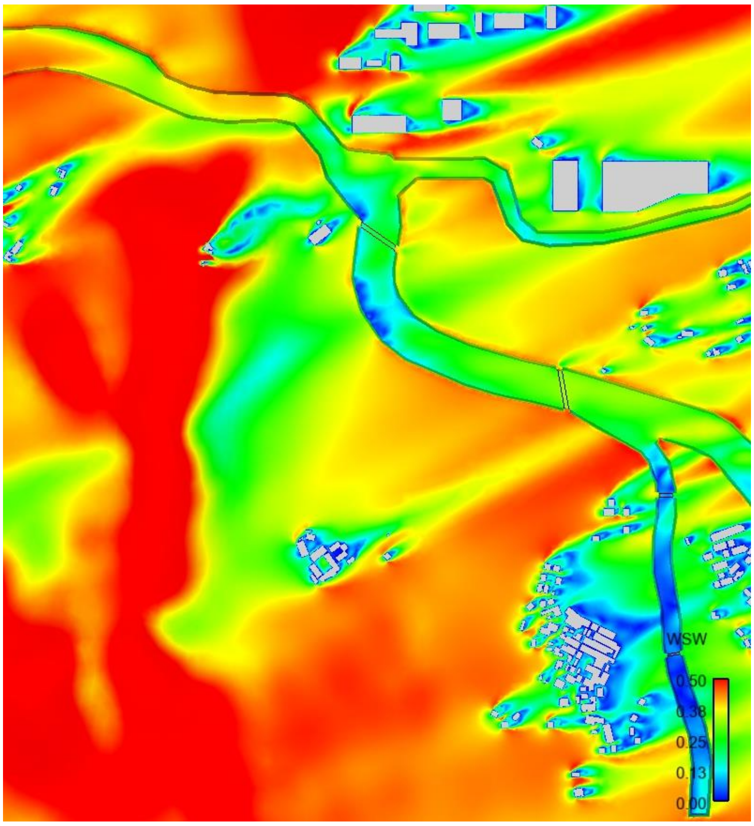

Figure B 11 Contour Plot of Baseline Scheme under WSW Wind

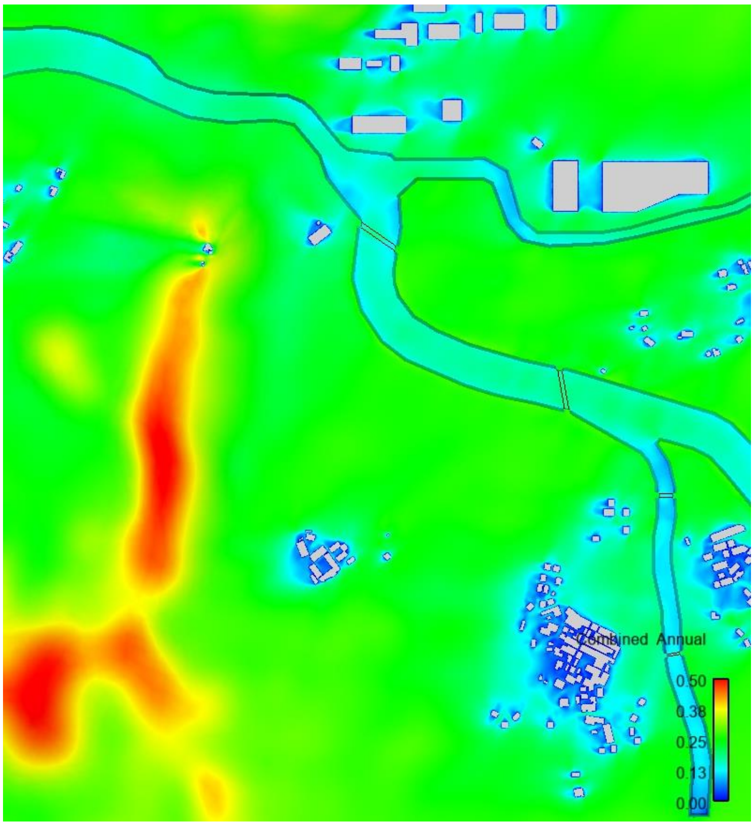

Figure B 12 Contour Plot of Baseline Scheme under Annual Condition

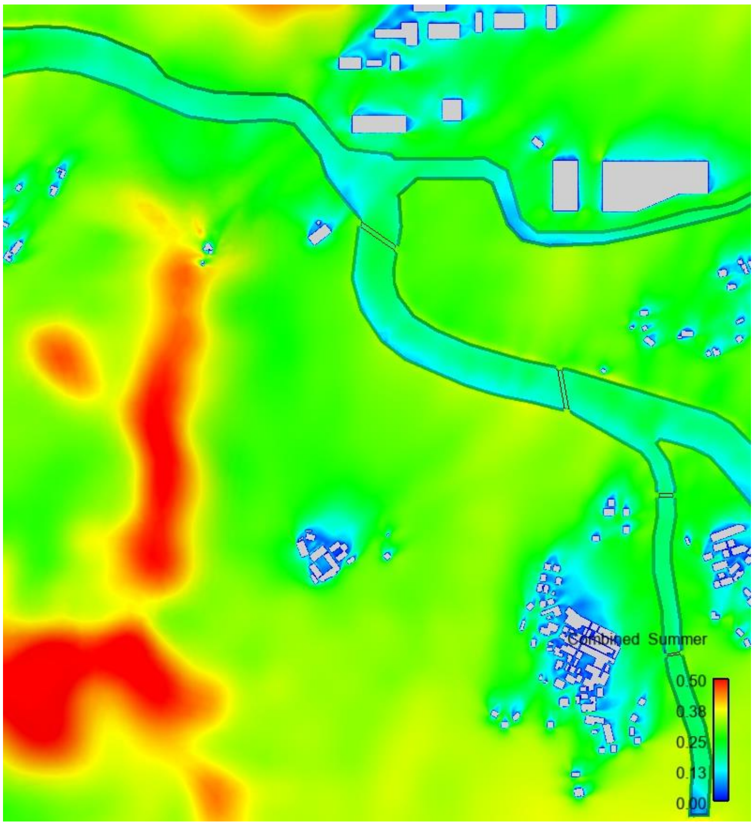

Figure B 13 Contour Plot of Baseline Scheme under Summer Condition

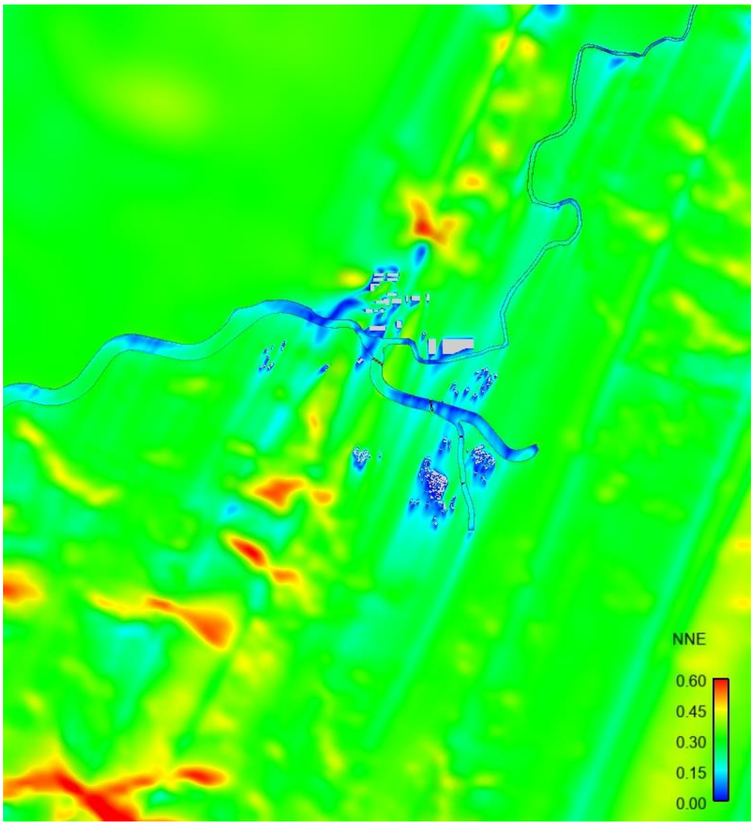

Figure B 14 Domain Contour Plot of Baseline Scheme under NNE Wind

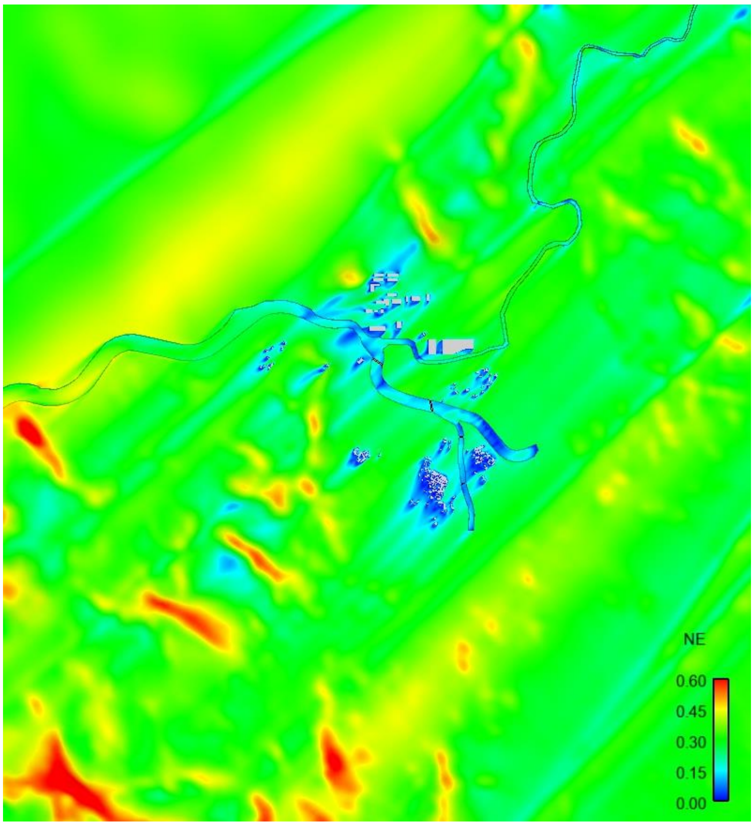

Figure B 15 Domain Contour Plot of Baseline Scheme under NE Wind

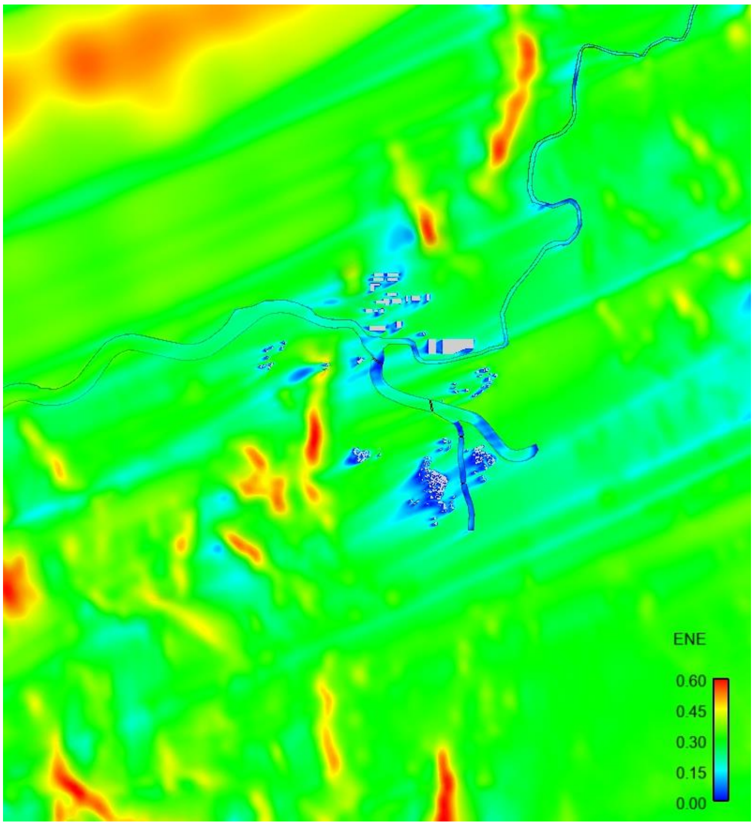

Figure B 16 Domain Contour Plot of Baseline Scheme under ENE Wind

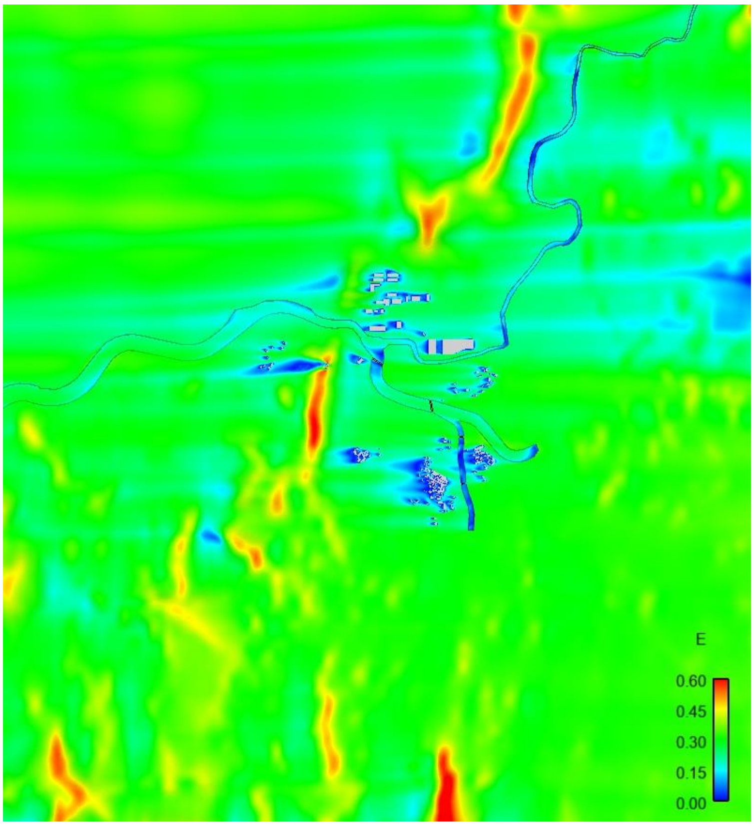

Figure B 17 Domain Contour Plot of Baseline Scheme under E Wind

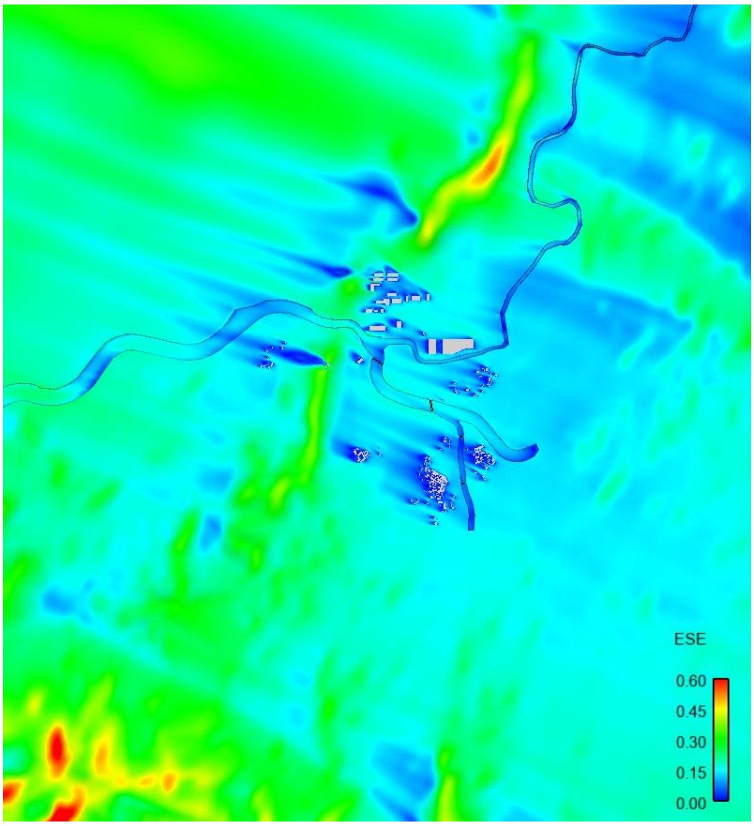

Figure B 18 Domain Contour Plot of Baseline Scheme under ESE Wind

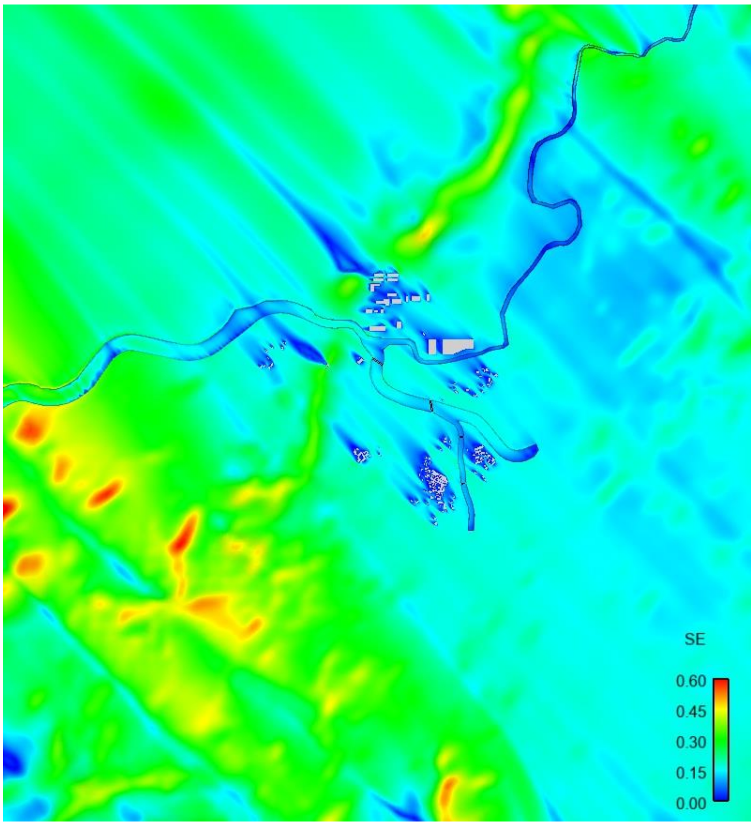

Figure B 19 Domain Contour Plot of Baseline Scheme under SE Wind

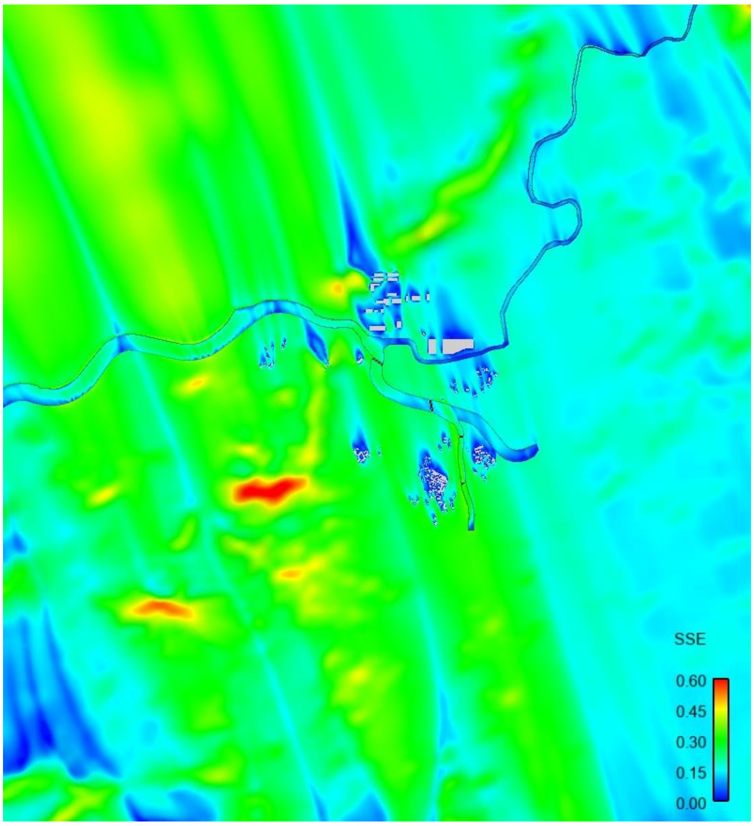

Figure B 20 Domain Contour Plot of Baseline Scheme under SSE Wind

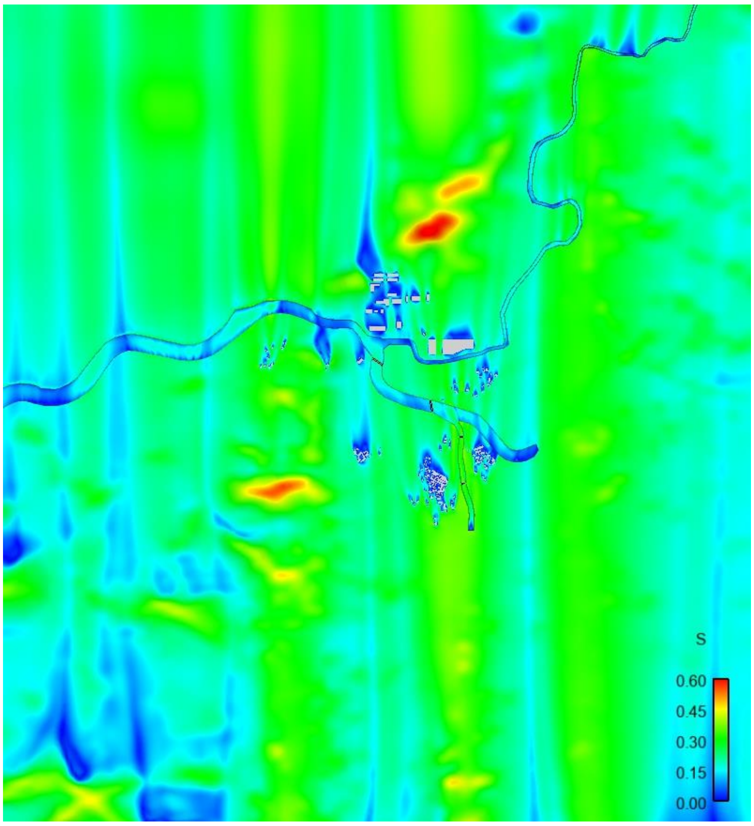

Figure B 21 Domain Contour Plot of Baseline Scheme under S Wind

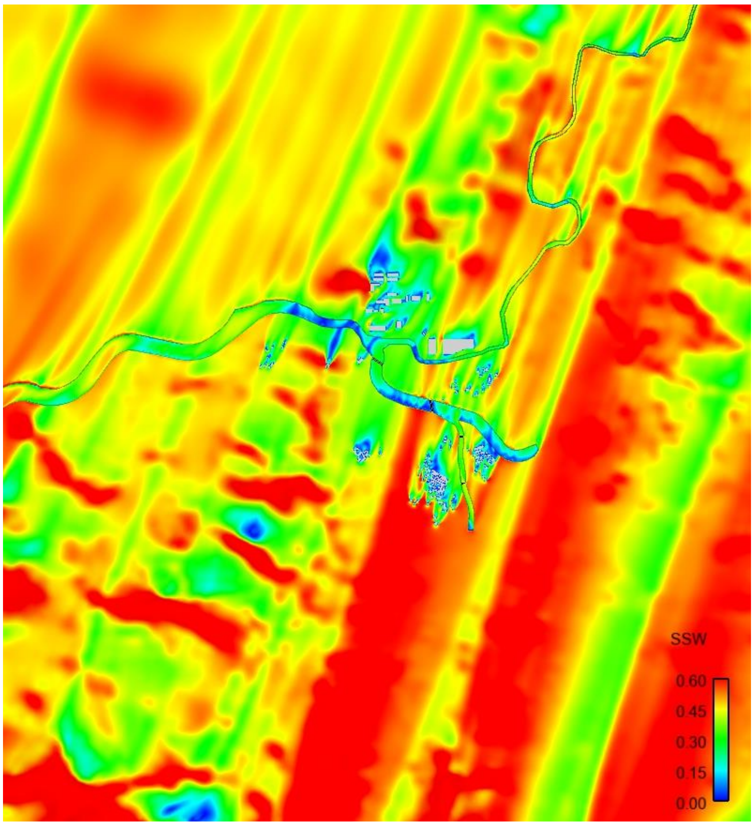

Figure B 22 Domain Contour Plot of Baseline Scheme under SSW Wind

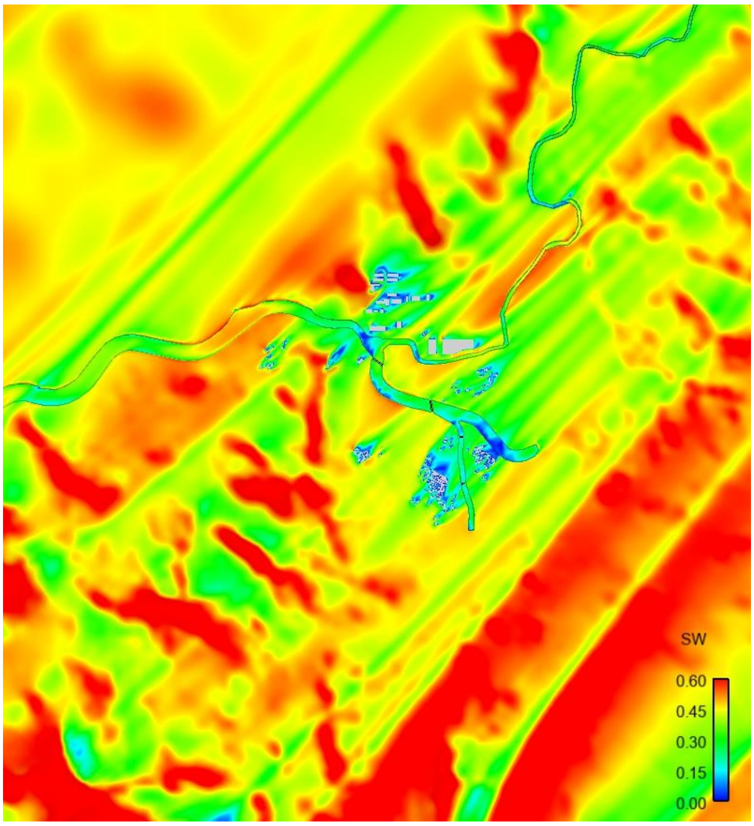

Figure B 23 Domain Contour Plot of Baseline Scheme under SW Wind

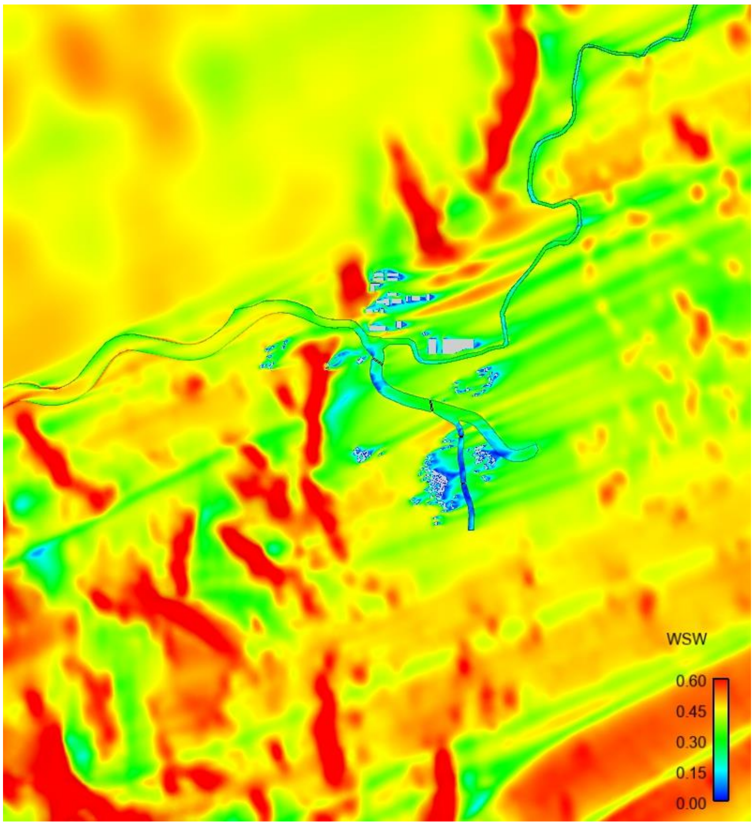

Figure B 24 Domain Contour Plot of Baseline Scheme under WSW Wind

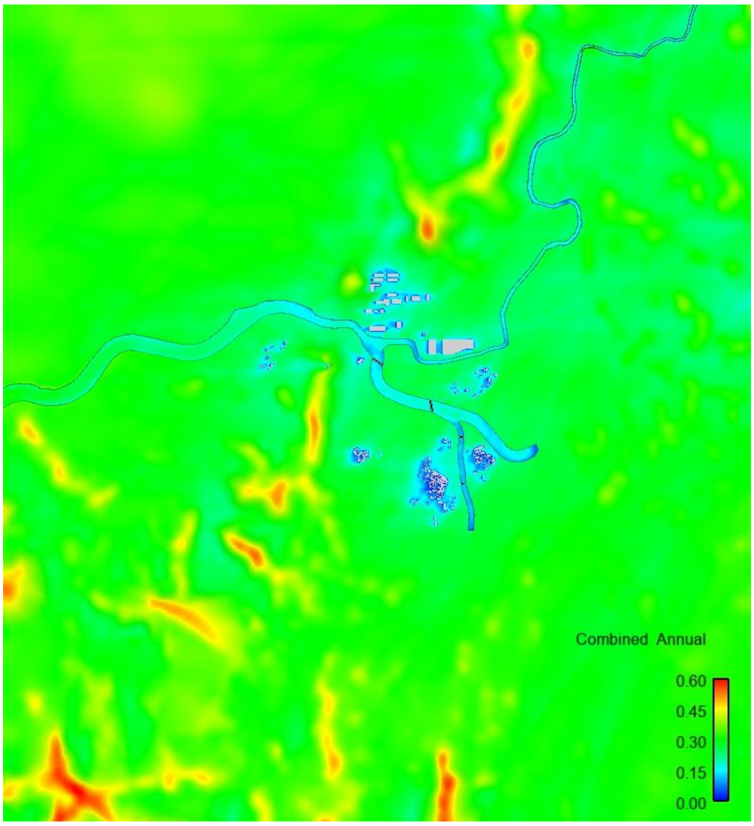

Figure B 25 Domain Contour Plot of Baseline Scheme under Annual Condition

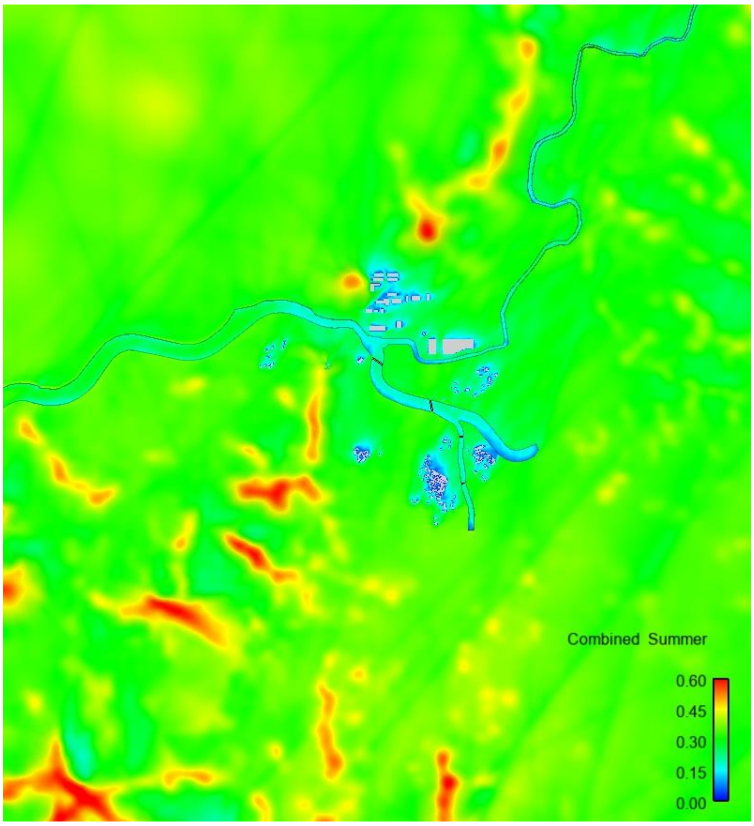

Figure B 26 Domain Contour Plot of Baseline Scheme under Summer Condition

B.2 Indicative Scheme

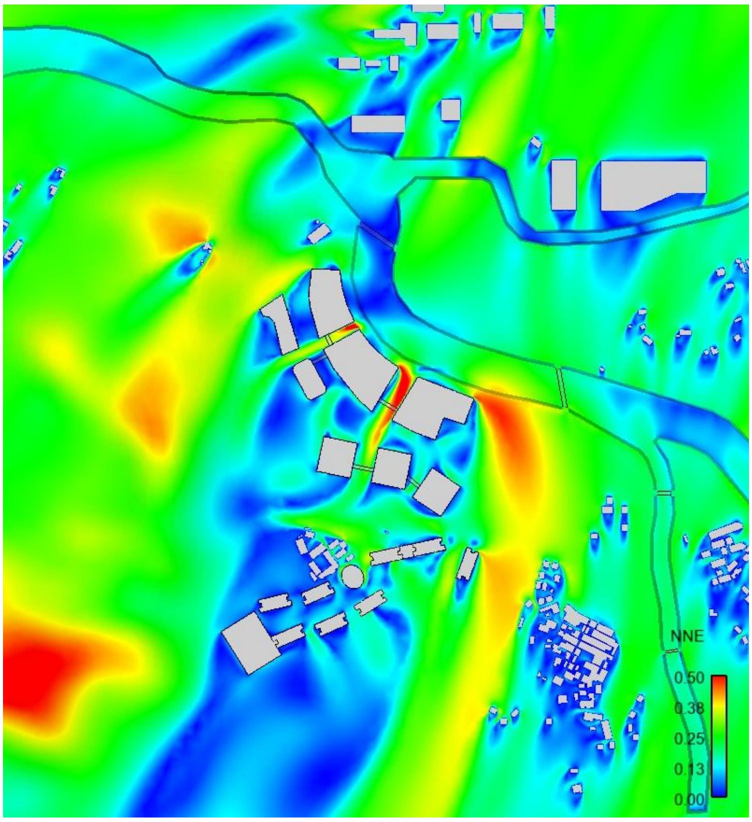

Figure B 27 Contour Plot of Indicative Scheme under NNE Wind

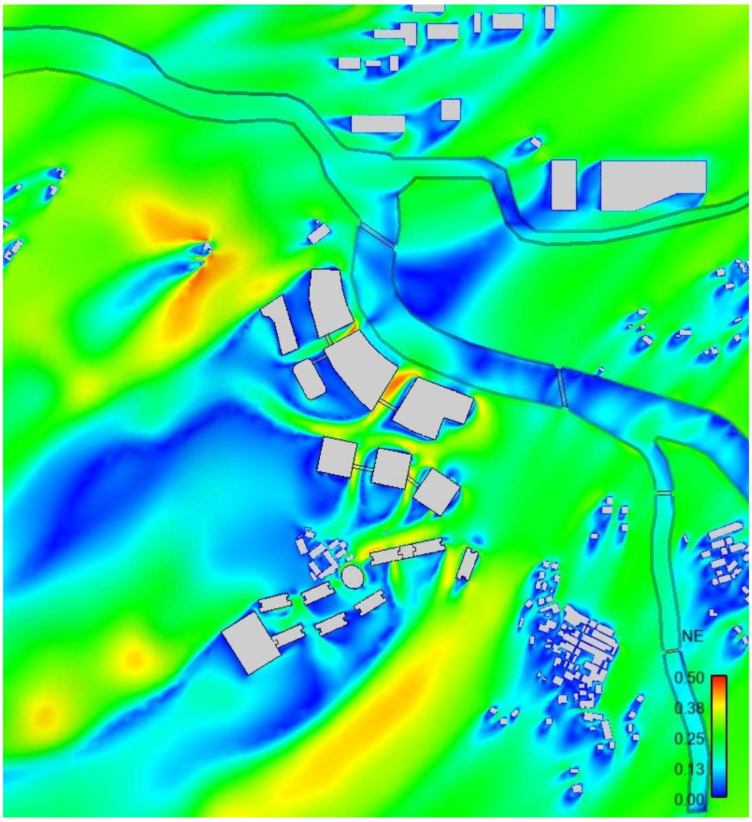

Figure B 28 Contour Plot of Indicative Scheme under NE Wind

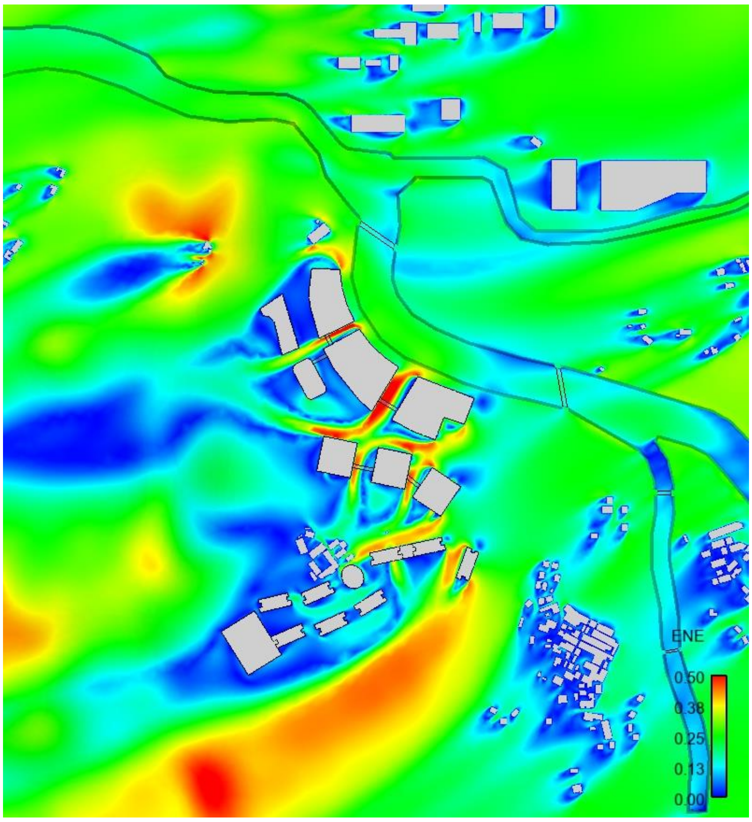

Figure B 29 Contour Plot of Indicative Scheme under ENE Wind

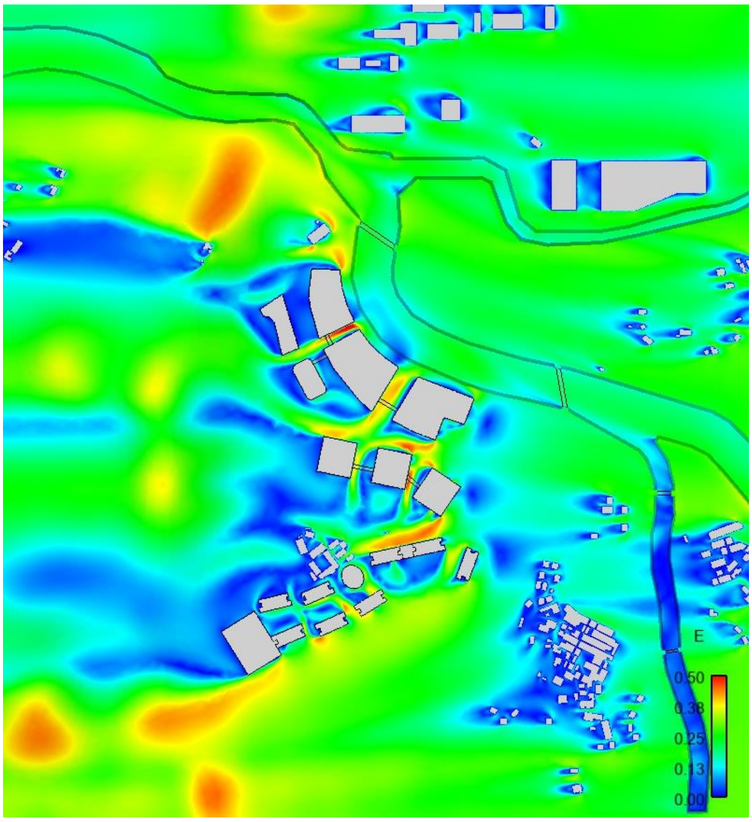

Figure B 30 Contour Plot of Indicative Scheme under E Wind

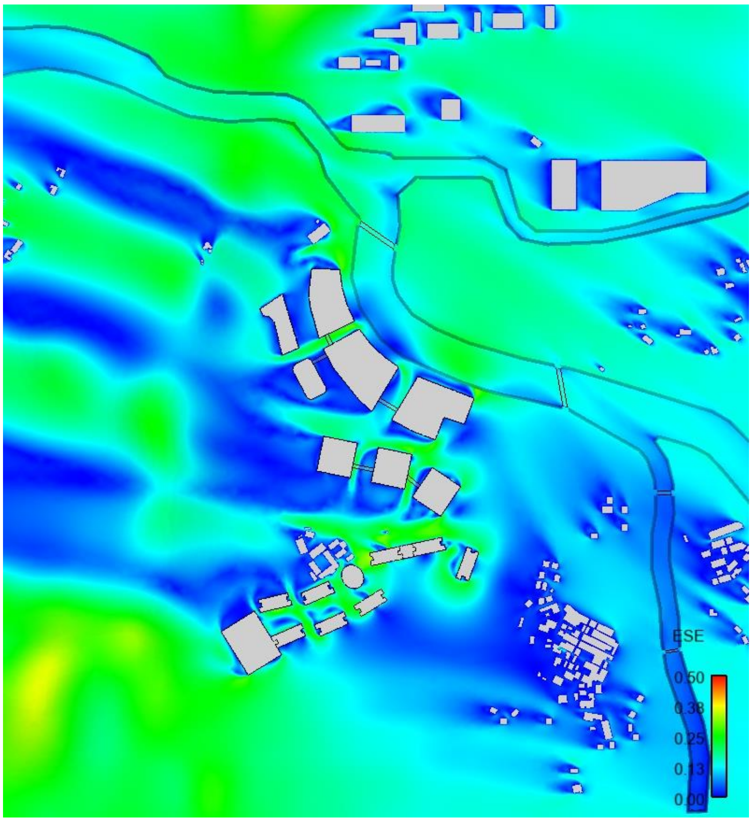

Figure B 31 Contour Plot of Indicative Scheme under ESE Wind

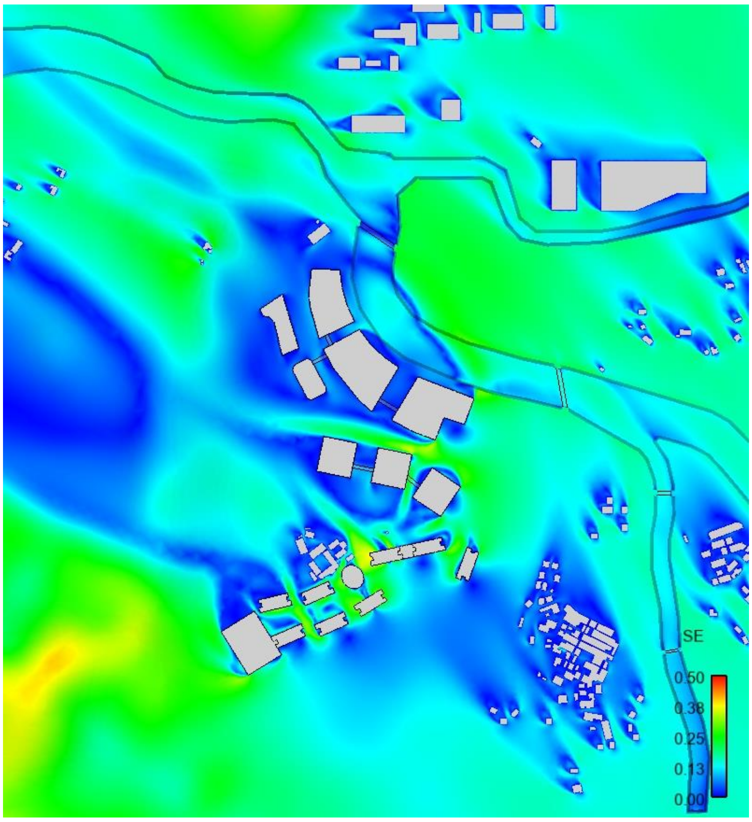

Figure B 32 Contour Plot of Indicative Scheme under SE Wind

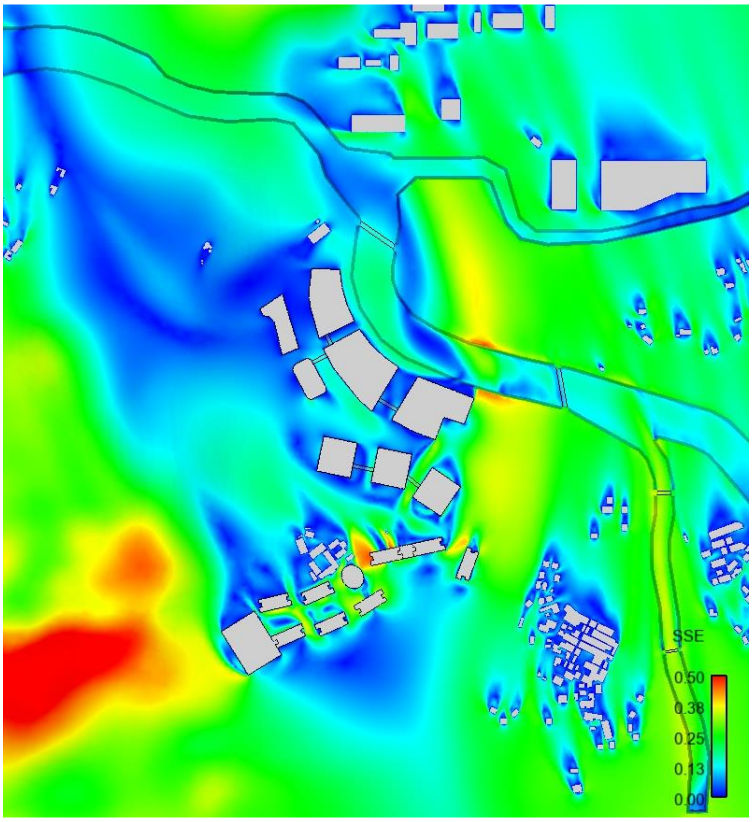

Figure B 33 Contour Plot of Indicative Scheme under SSE Wind

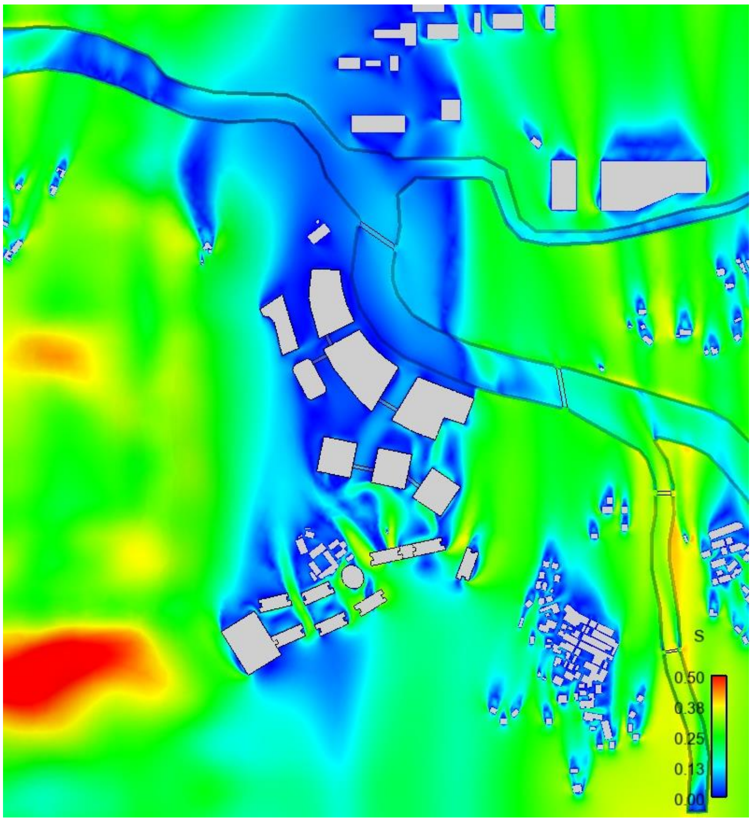

Figure B 34 Contour Plot of Indicative Scheme under S Wind

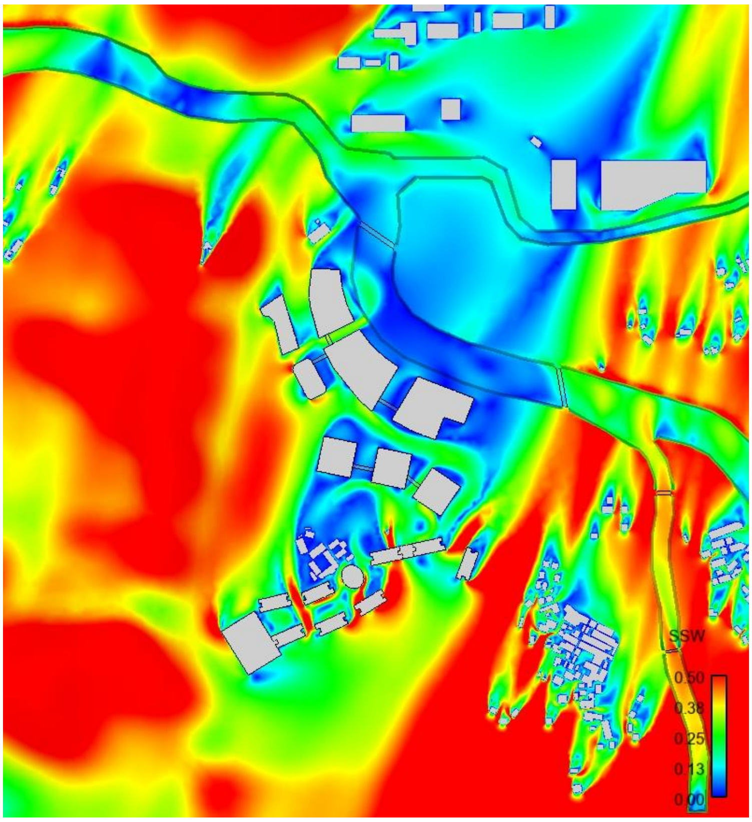

Figure B 35 Contour Plot of Indicative Scheme under SSW Wind

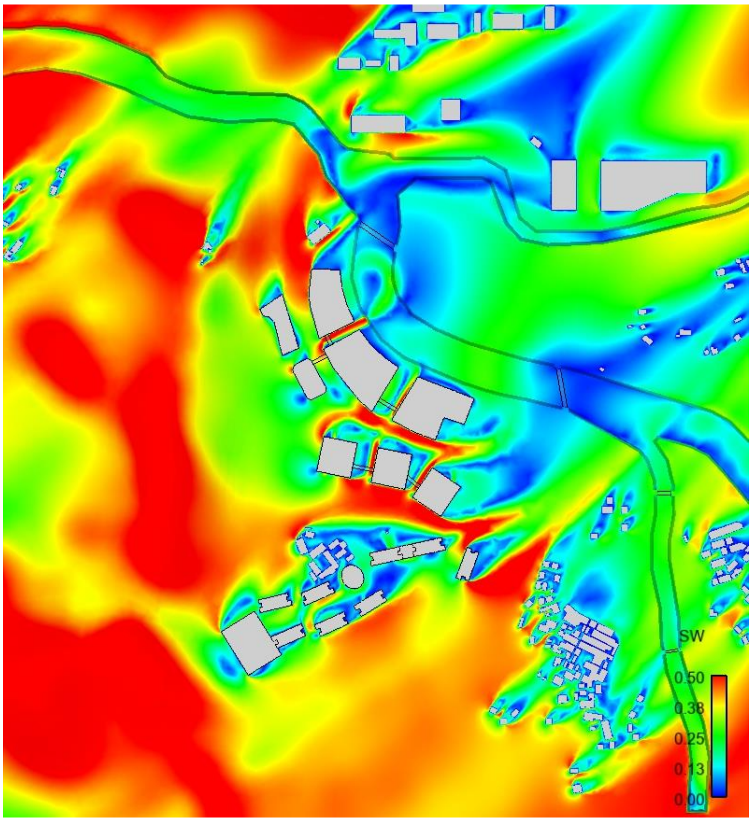

Figure B 36 Contour Plot of Indicative Scheme under SW Wind

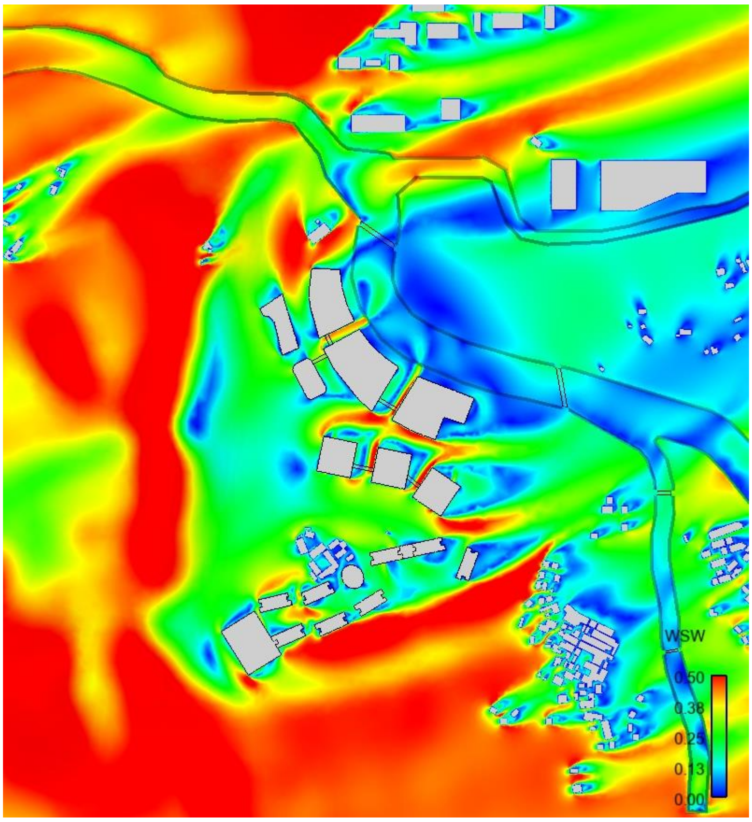

Figure B 37 Contour Plot of Indicative Scheme under WSW Wind

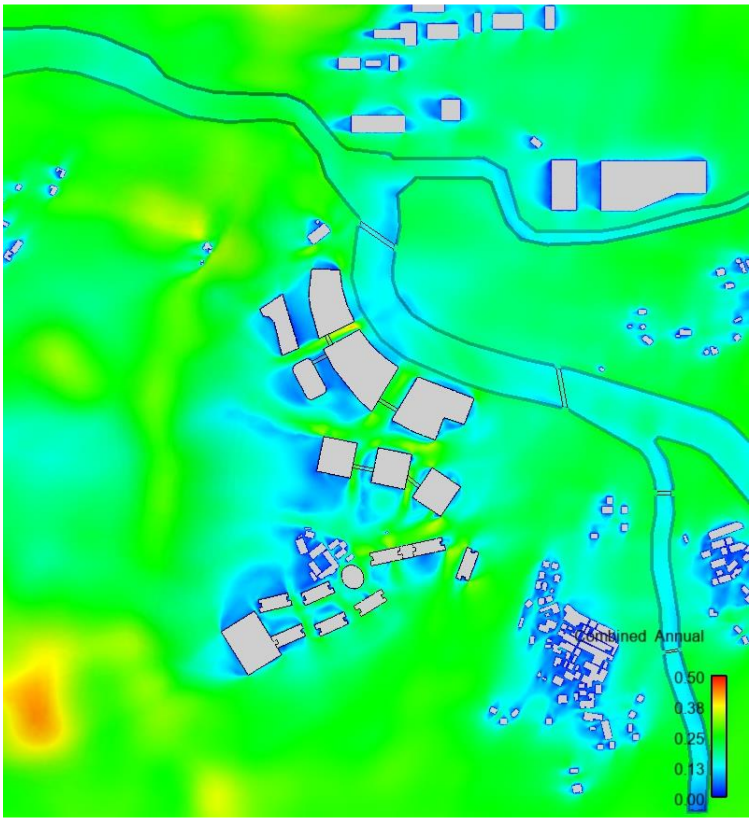

Figure B 38 Contour Plot of Indicative Scheme under Annual Condition

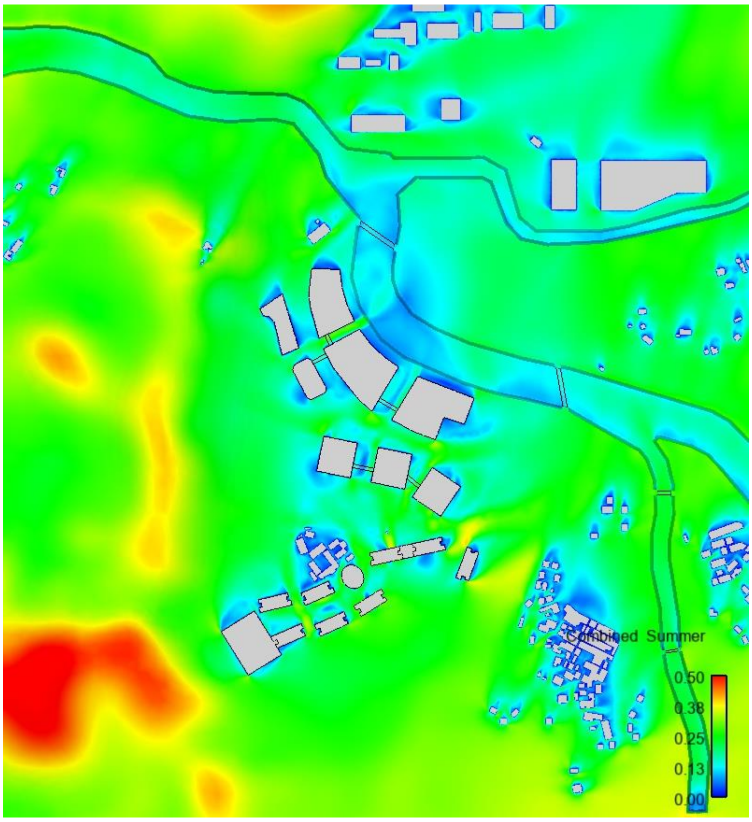

Figure B 39 Contour Plot of Indicative Scheme under Summer Condition

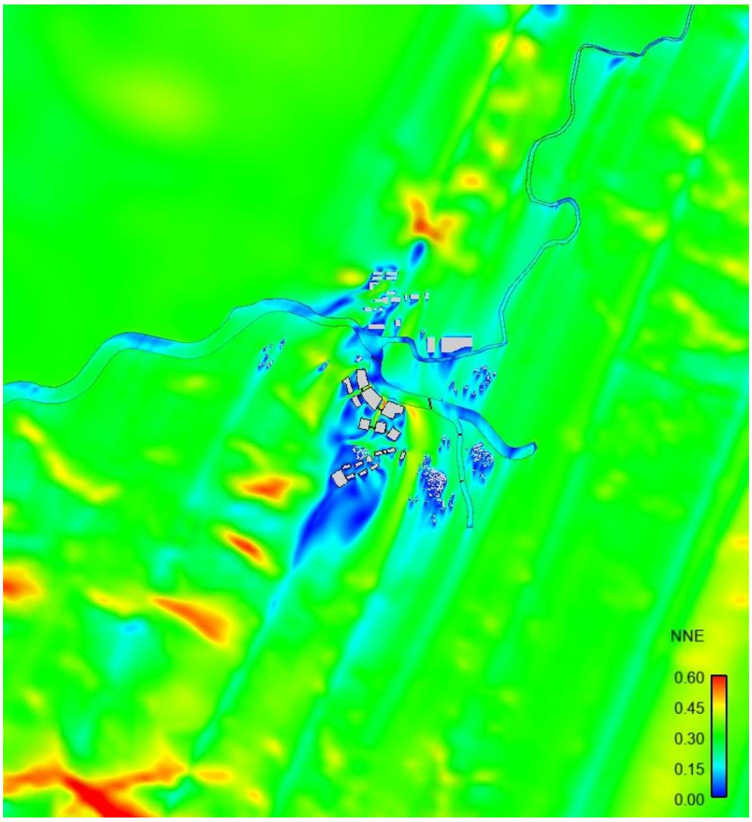

Figure B 40 Domain Contour Plot of Indicative Scheme under NNE Wind

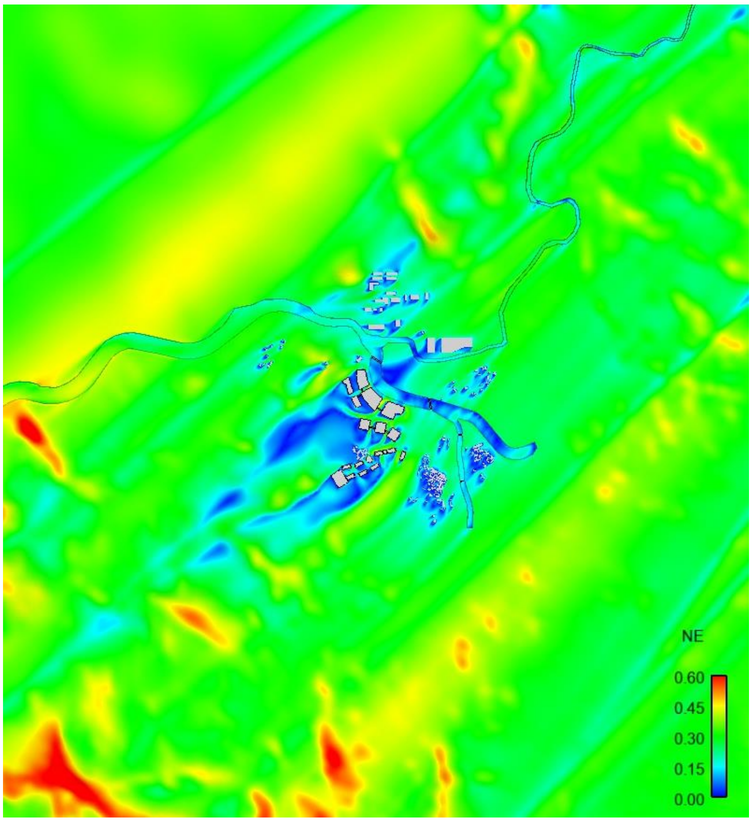

Figure B 41 Domain Contour Plot of Indicative Scheme under NE Wind

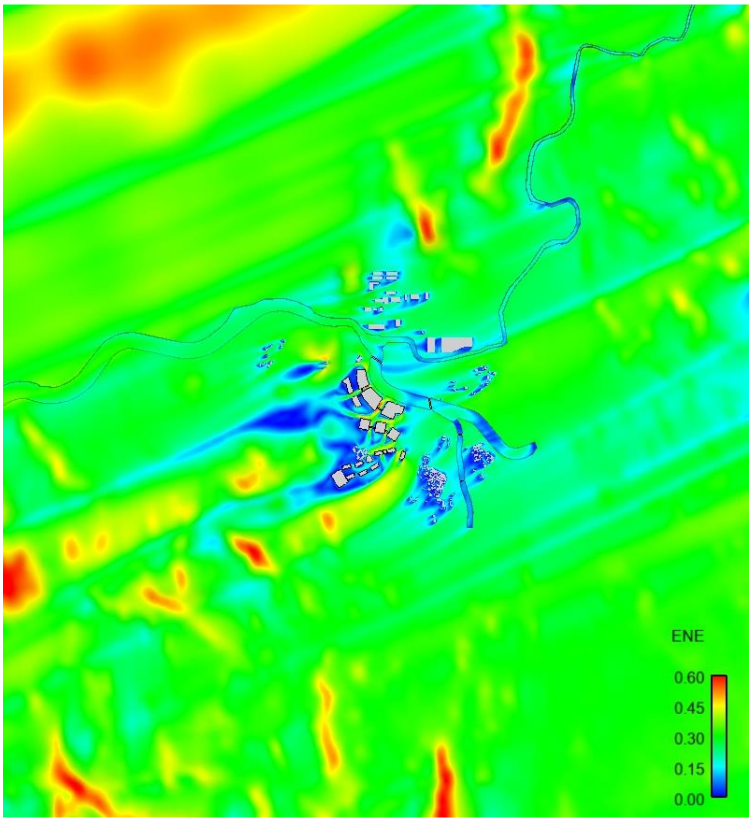

Figure B 42 Domain Contour Plot of Indicative Scheme under ENE Wind

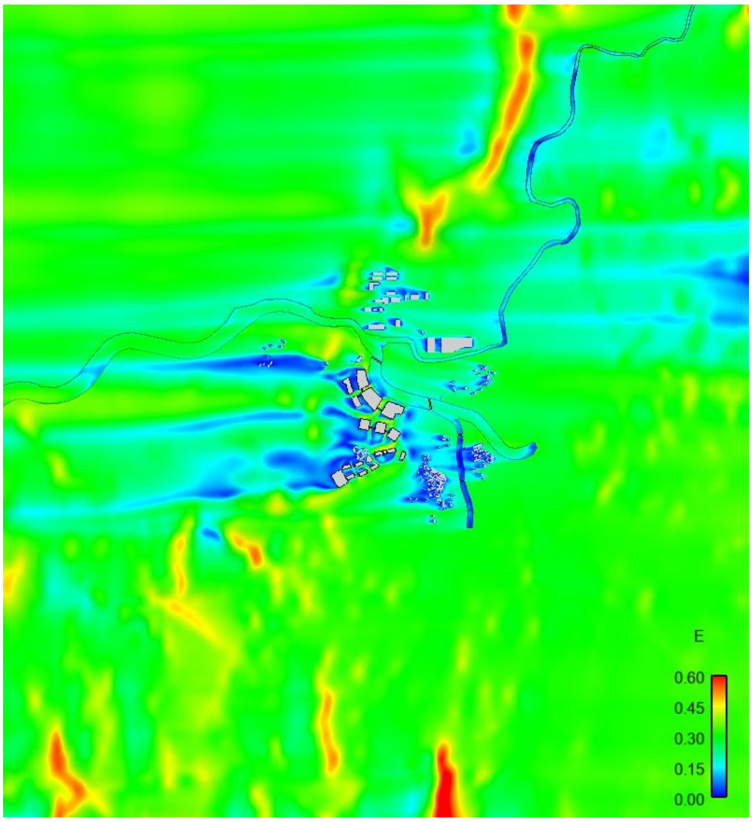

Figure B 43 Domain Contour Plot of Indicative Scheme under E Wind

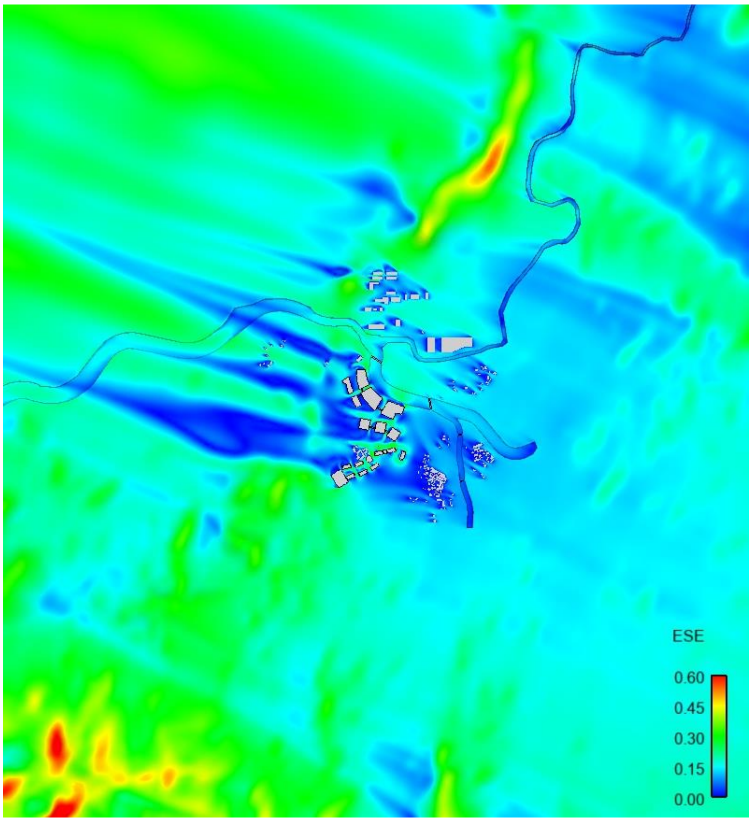

Figure B 44 Domain Contour Plot of Indicative Scheme under ESE Wind

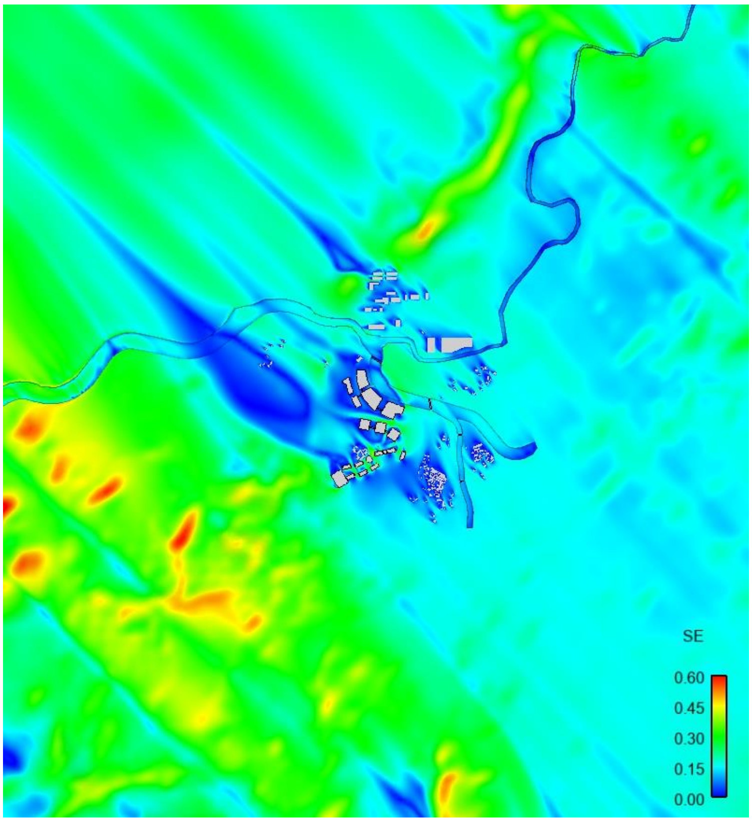

Figure B 45 Domain Contour Plot of Indicative Scheme under SE Wind

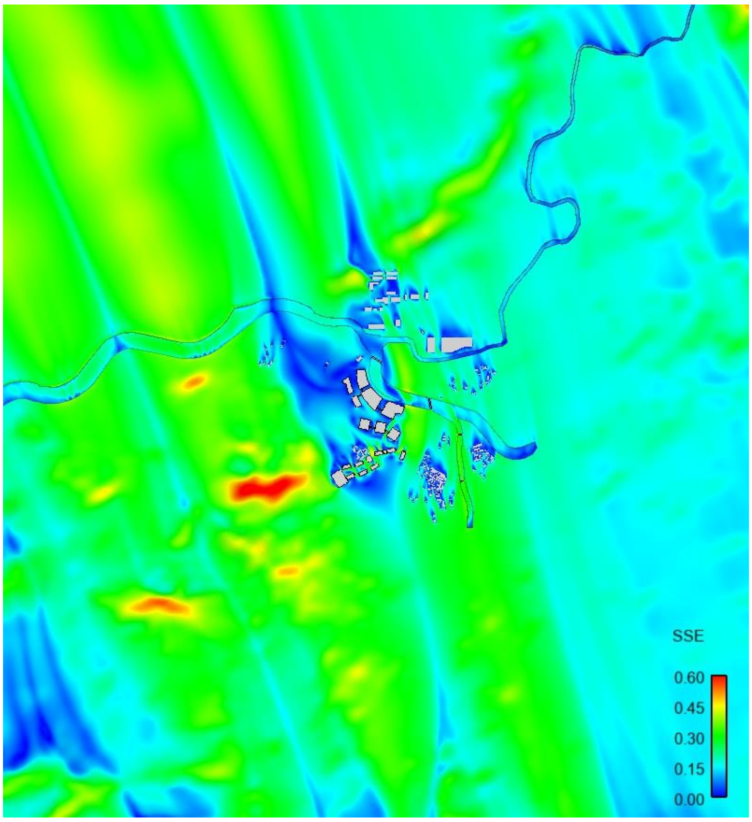

Figure B 46 Domain Contour Plot of Indicative Scheme under SSE Wind

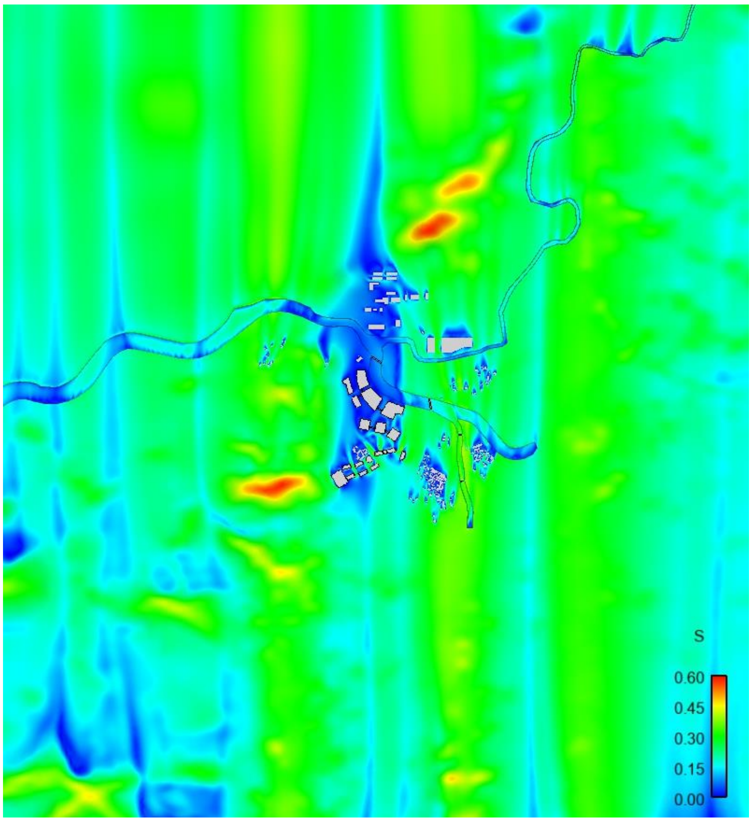

Figure B 47 Domain Contour Plot of Indicative Scheme under S Wind

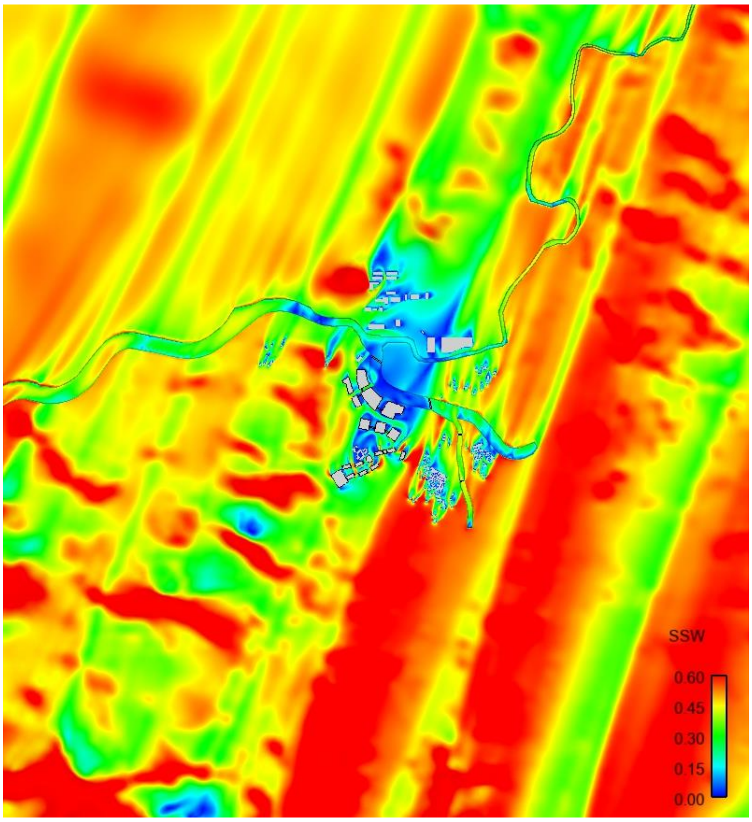

Figure B 48 Domain Contour Plot of Indicative Scheme under SSW Wind

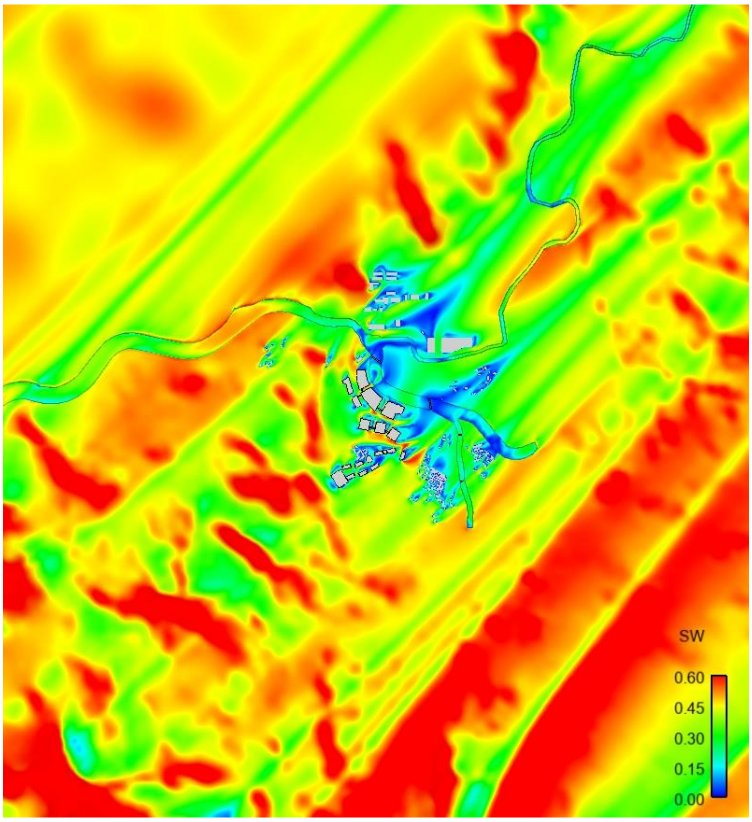

Figure B 49 Domain Contour Plot of Indicative Scheme under SW Wind

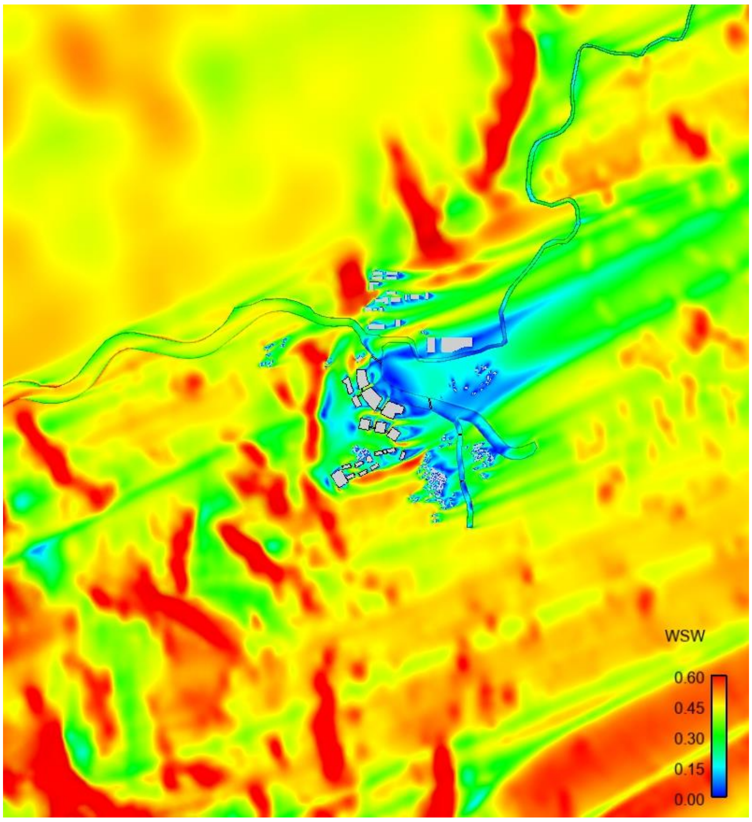

Figure B 50 Domain Contour Plot of Indicative Scheme under WSW Wind

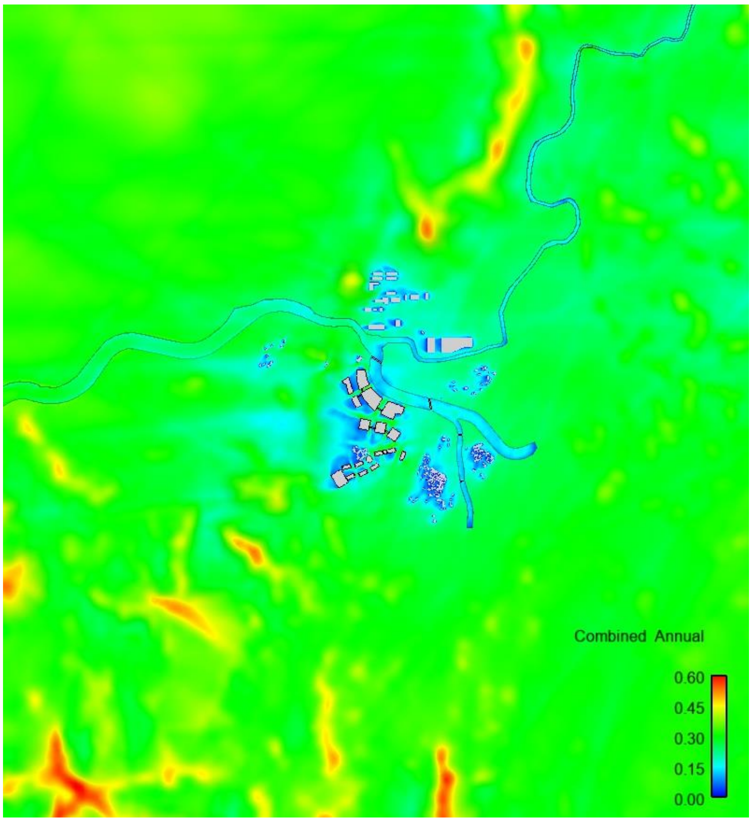

Figure B 51 Domain Contour Plot of Indicative Scheme under Annual Condition

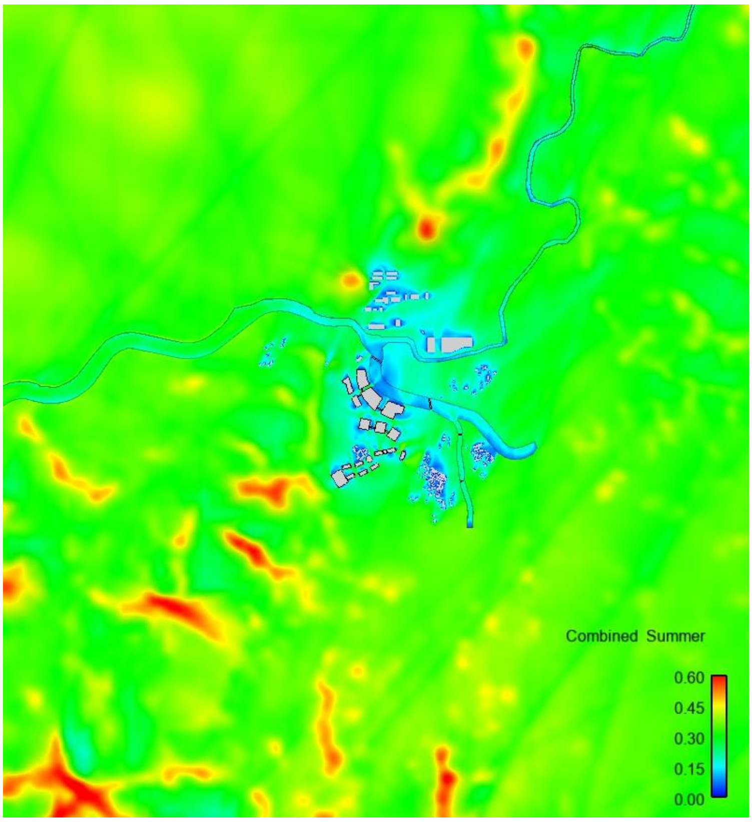

Figure B 52 Domain Contour Plot of Indicative Scheme under Summer Condition

Appendix C

Vector Plot of Velocity Ratio (VR)

C.1 Baseline Scheme

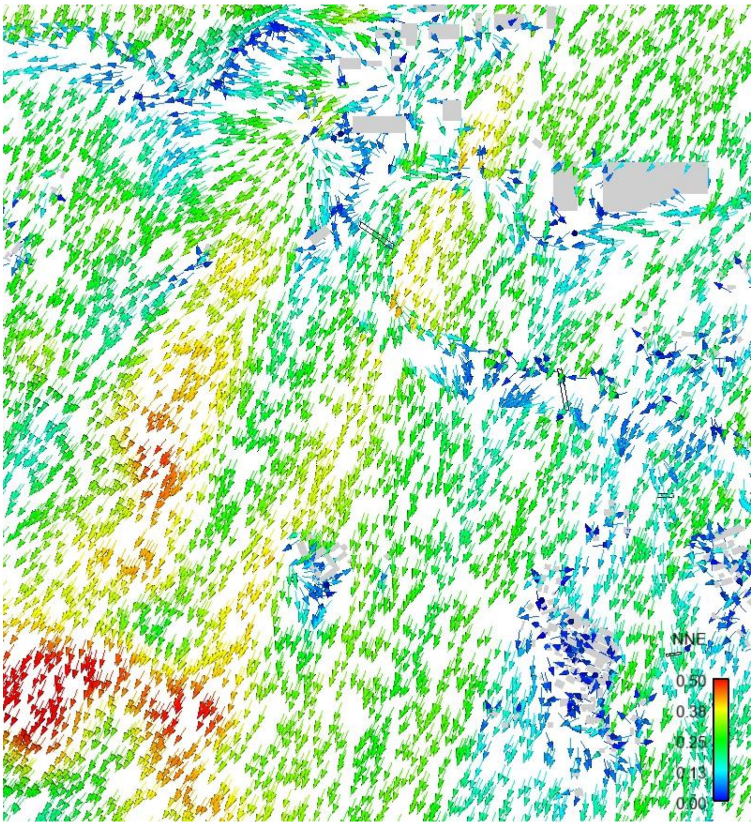

Figure C 1 Vector Plot of Baseline Scheme under NNE Wind

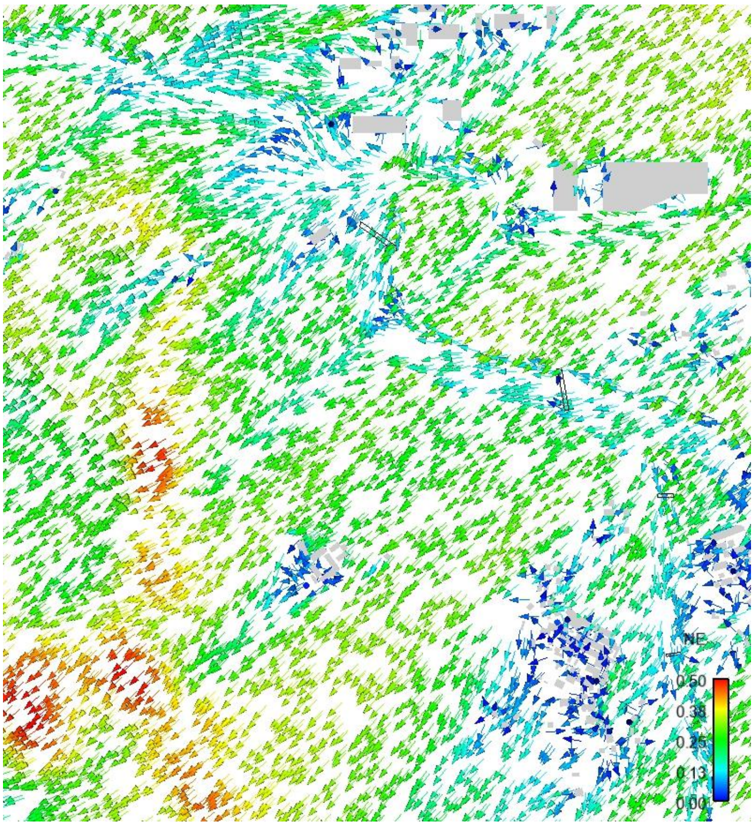

Figure C 2 Vector Plot of Baseline Scheme under NE Wind

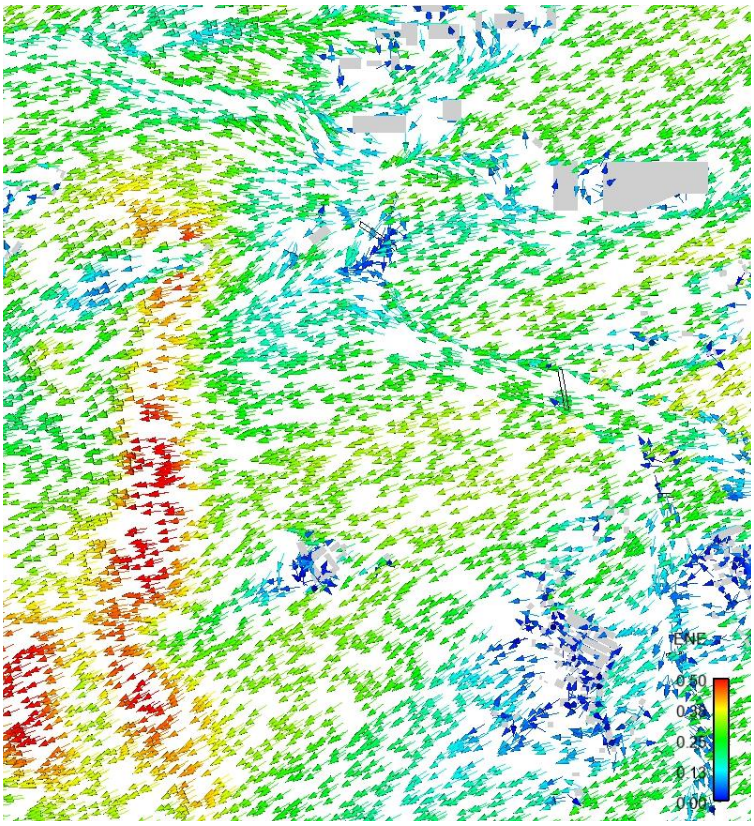

Figure C 3 Vector Plot of Baseline Scheme under ENE Wind

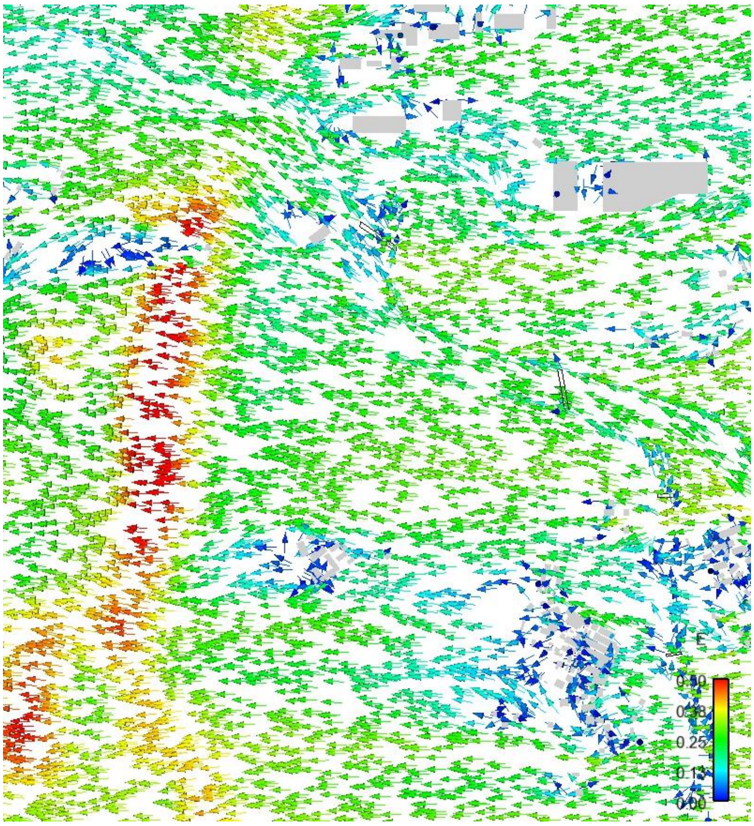

Figure C 4 Vector Plot of Baseline Scheme under E Wind

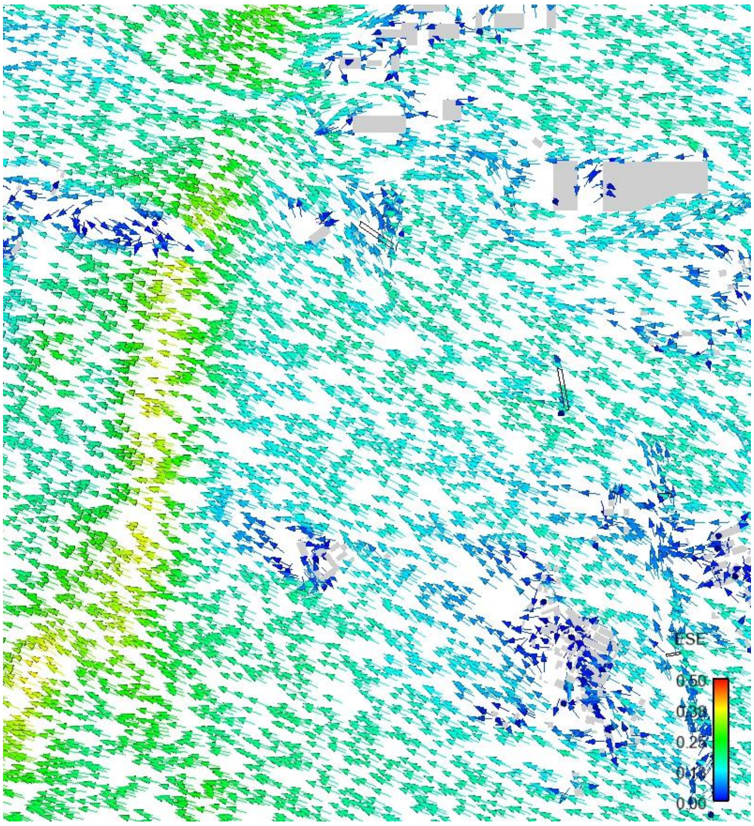

Figure C 5 Vector Plot of Baseline Scheme under ESE Wind

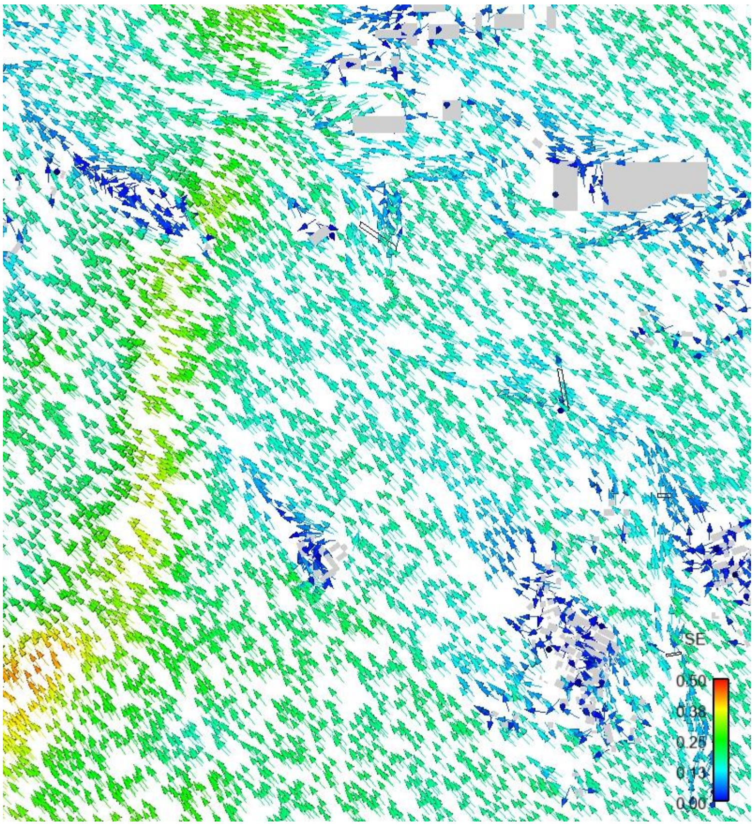

Figure C 6 Vector Plot of Baseline Scheme under SE Wind

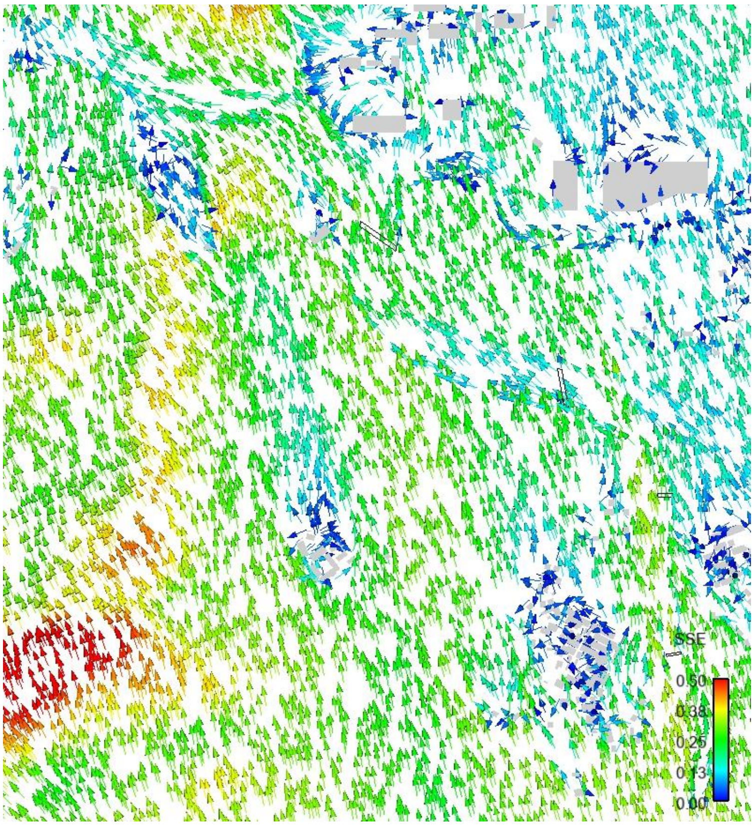

Figure C 7 Vector Plot of Baseline Scheme under SSE Wind

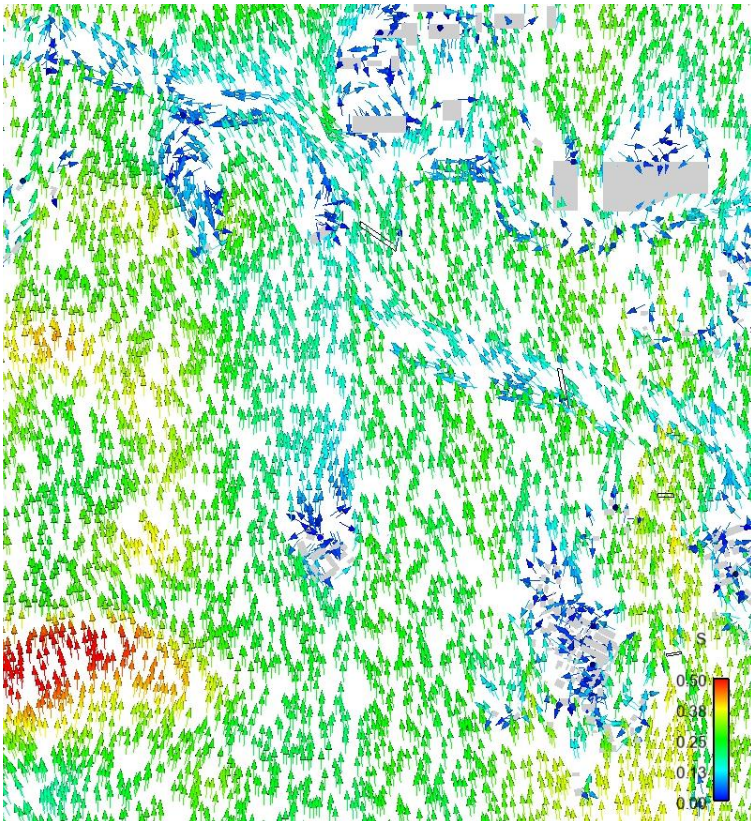

Figure C 8 Vector Plot of Baseline Scheme under S Wind

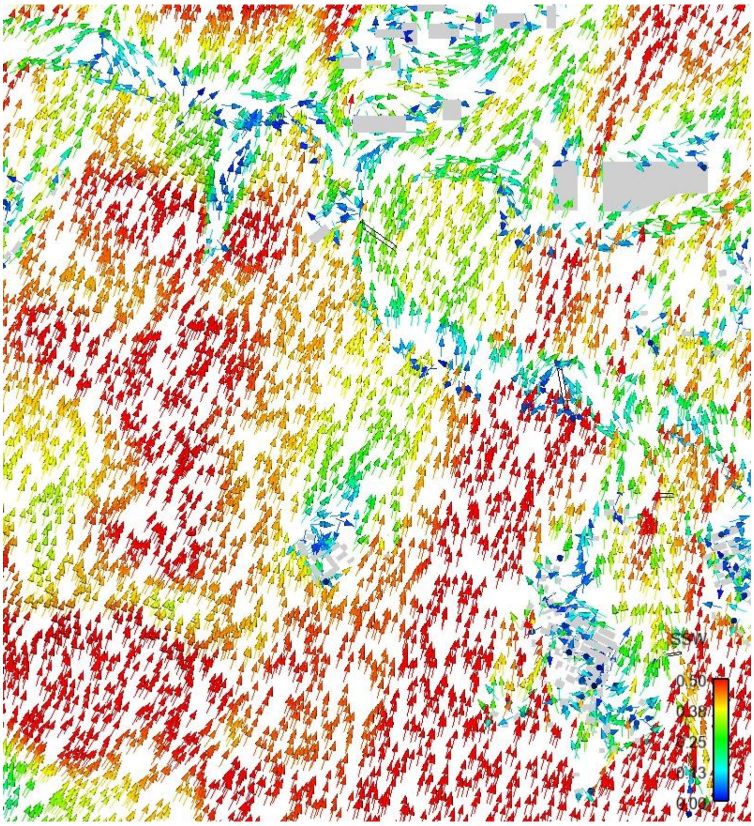

Figure C 9 Vector Plot of Baseline Scheme under SSW Wind

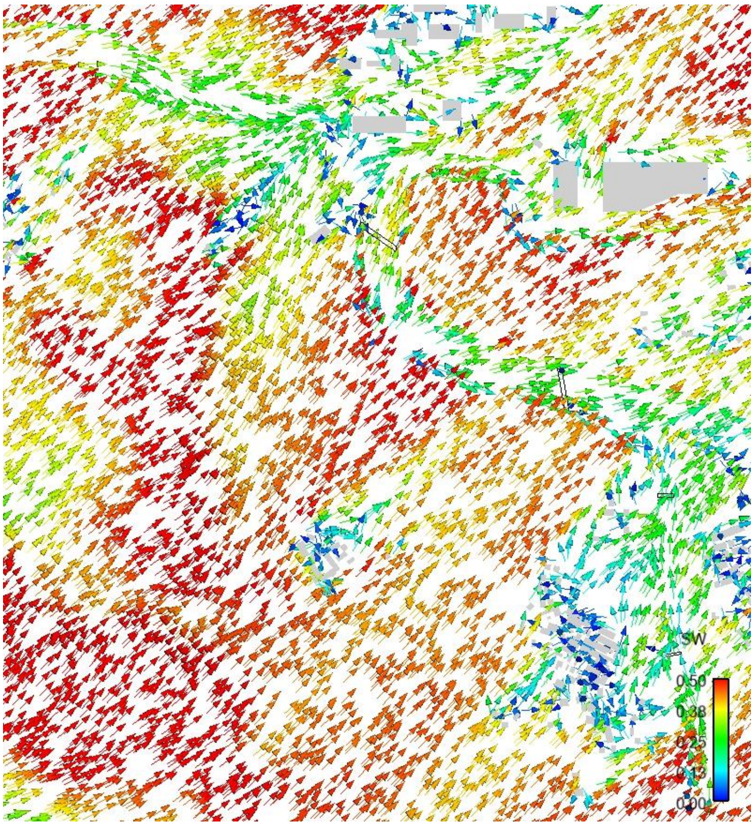

Figure C 10 Vector Plot of Baseline Scheme under SW Wind

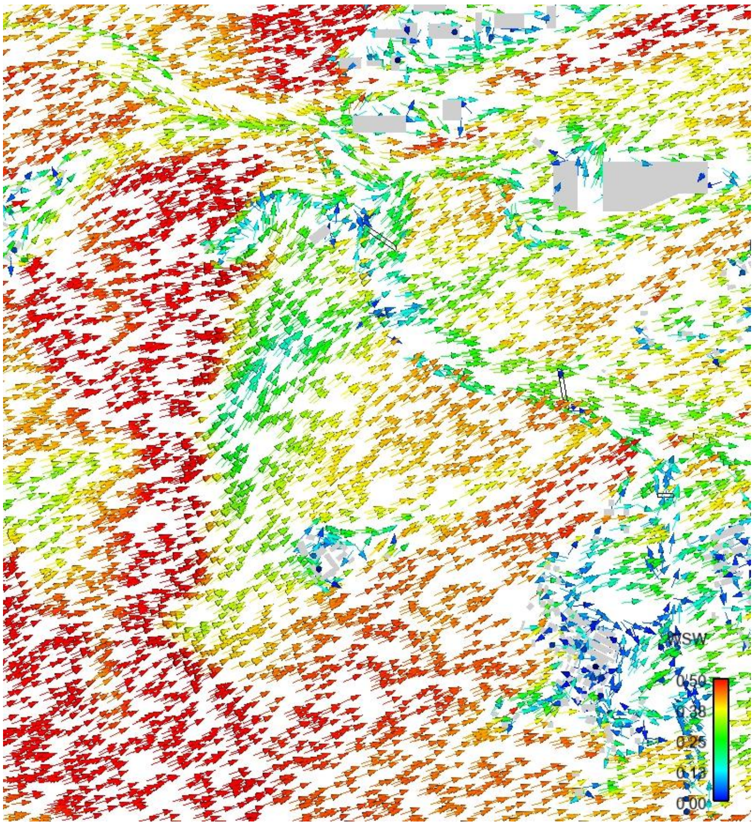

Figure C 11 Vector Plot of Baseline Scheme under WSW Wind

C.2 Indicative Scheme

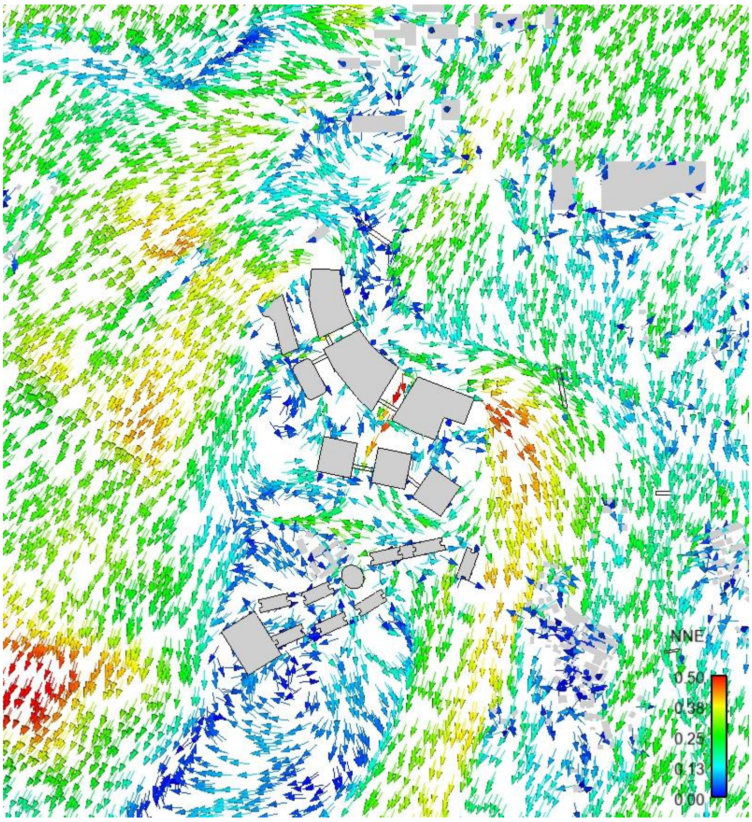

Figure C 12 Vector Plot of Indicative Scheme under NNE Wind

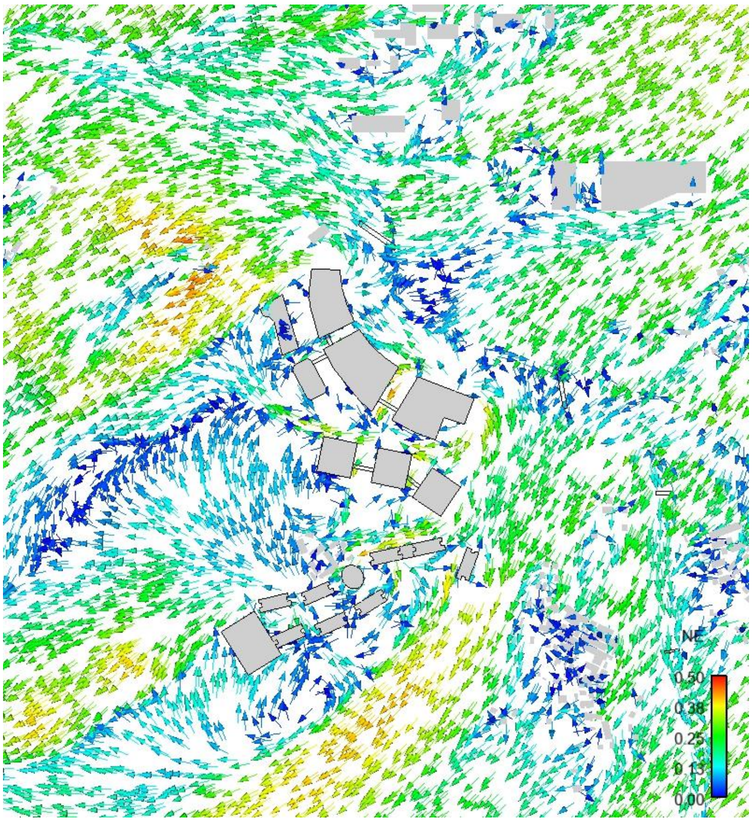

Figure C 13 Vector Plot of Indicative Scheme under NE Wind

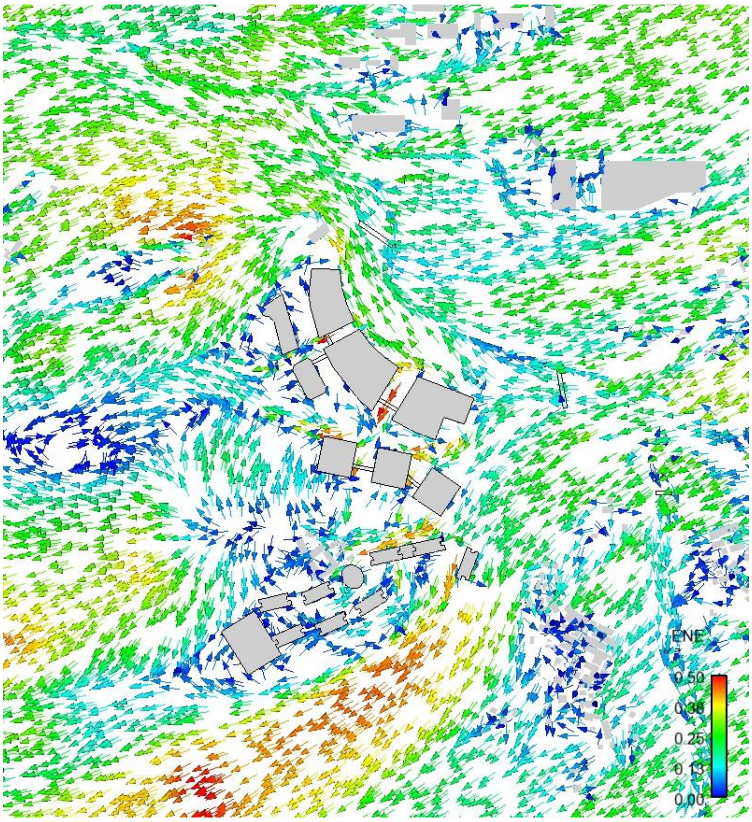

Figure C 14 Vector Plot of Indicative Scheme under ENE Wind

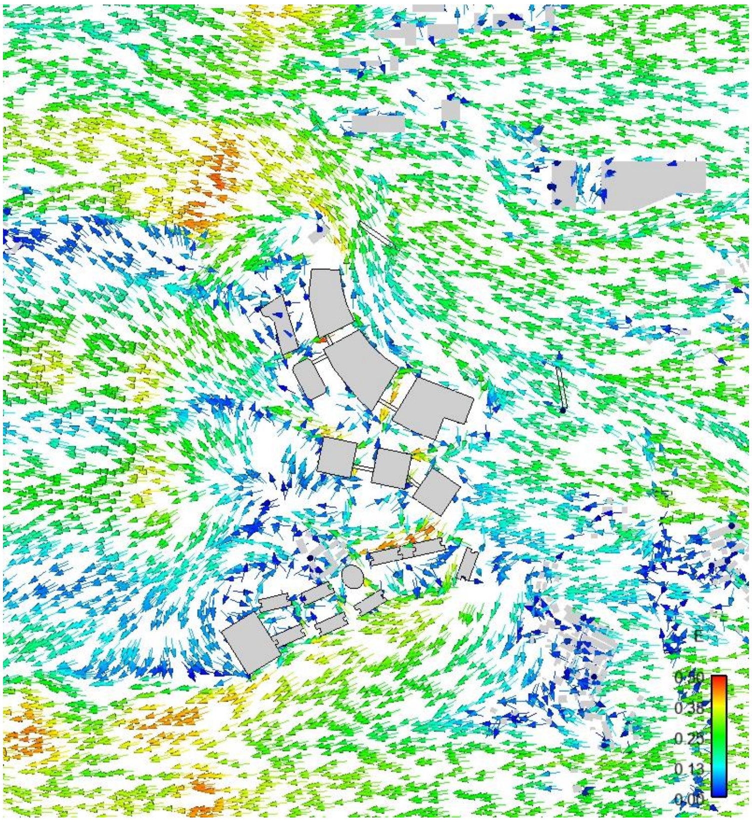

Figure C 15 Vector Plot of Indicative Scheme under E Wind

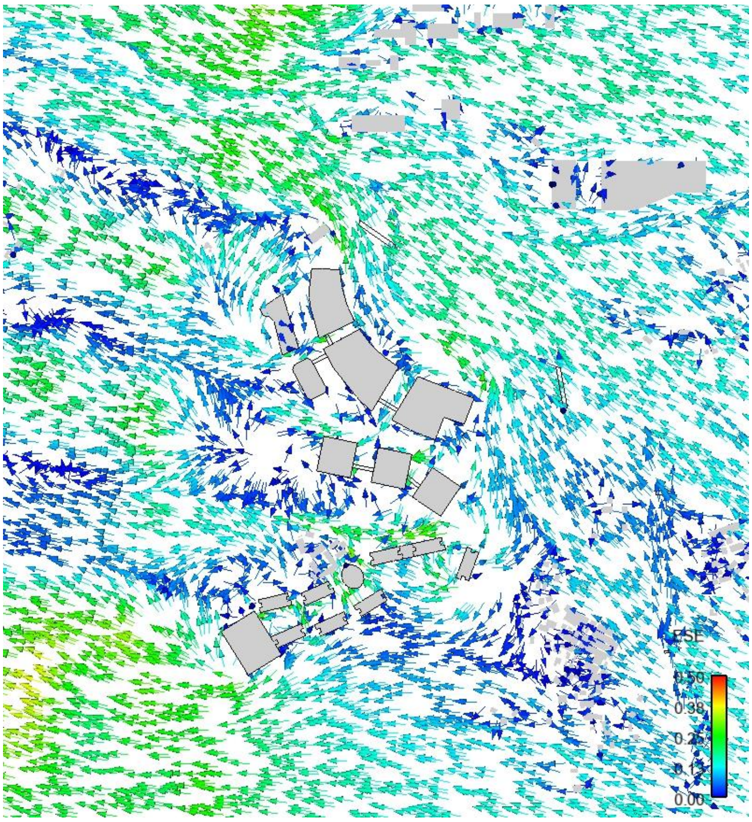

Figure C 16 Vector Plot of Indicative Scheme under ESE Wind

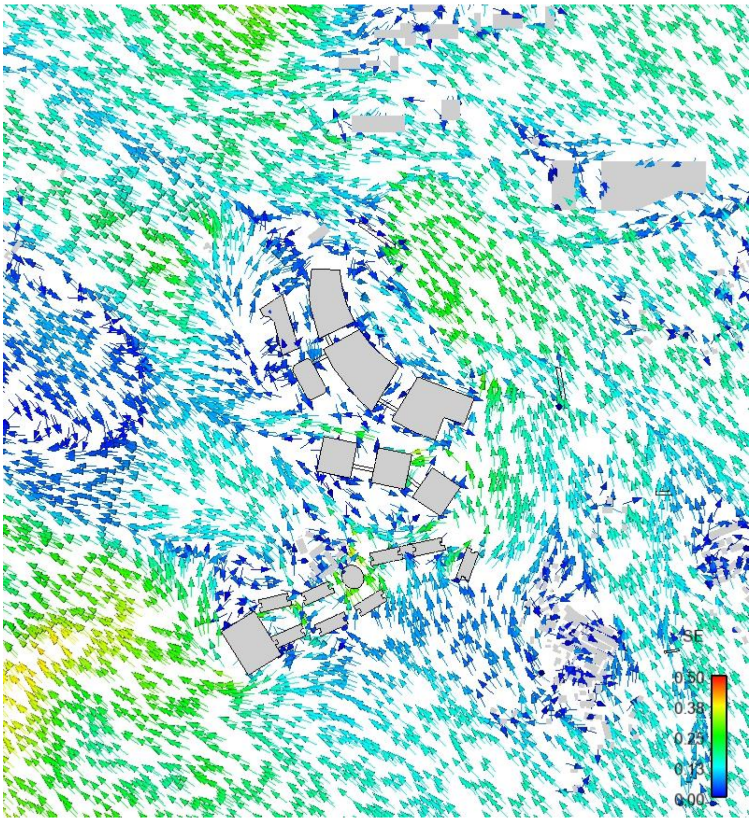

Figure C 17 Vector Plot of Indicative Scheme under SE Wind

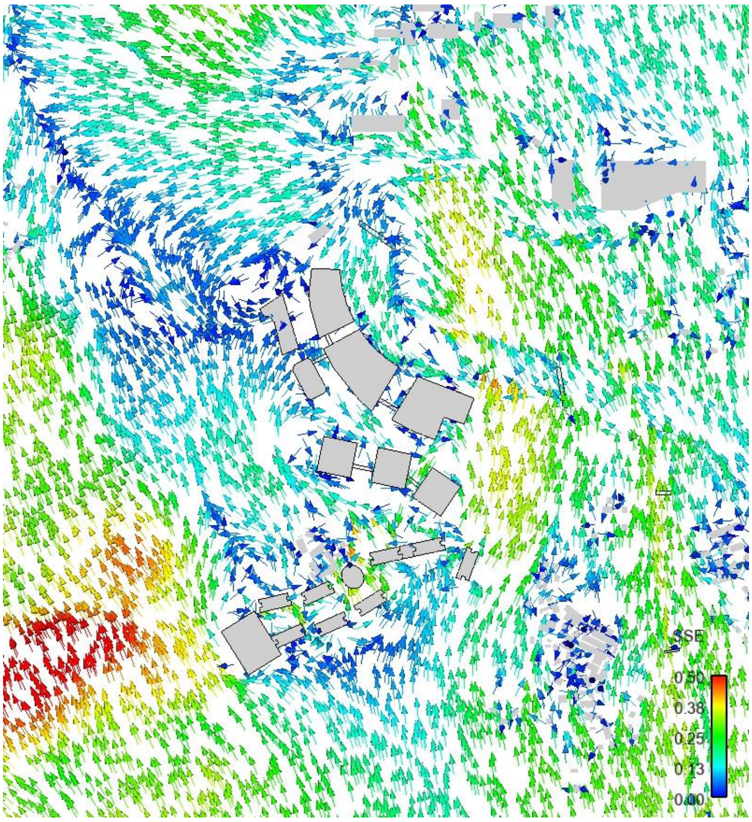

Figure C 18 Vector Plot of Indicative Scheme under SSE Wind

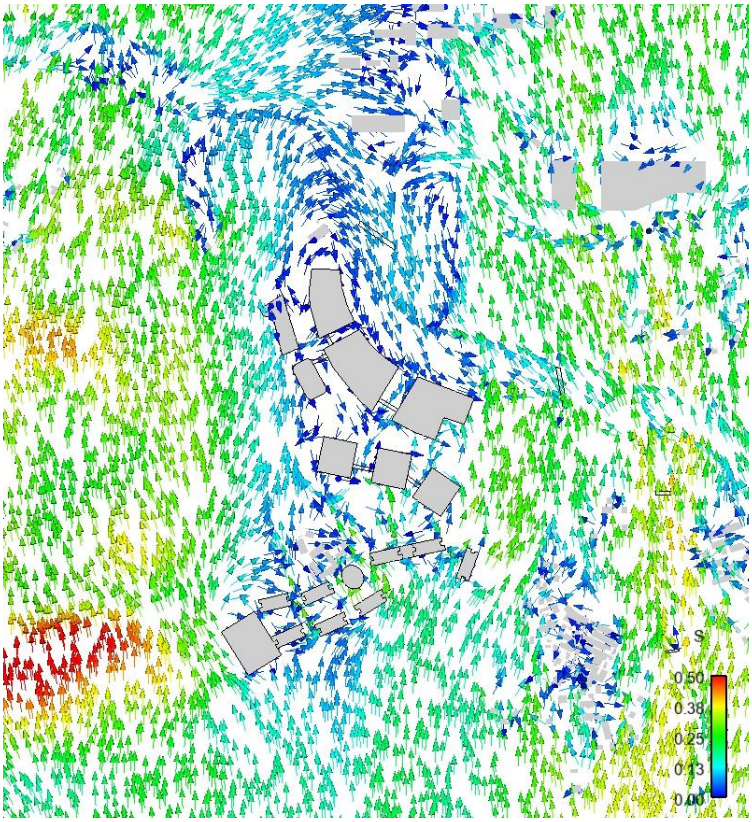

Figure C 19 Vector Plot of Indicative Scheme under S Wind

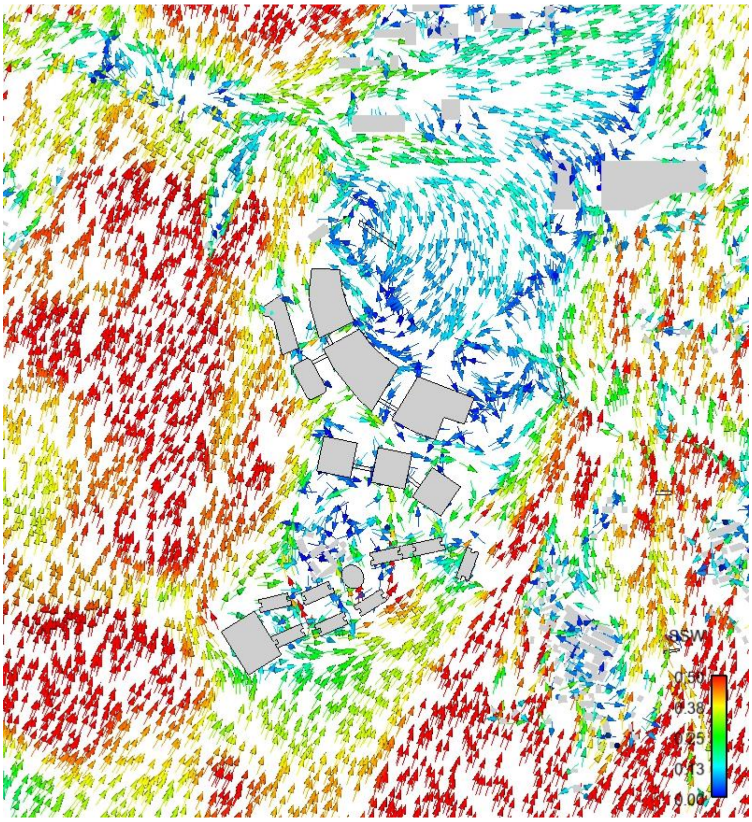

Figure C 20 Vector Plot of Indicative Scheme under SSW Wind

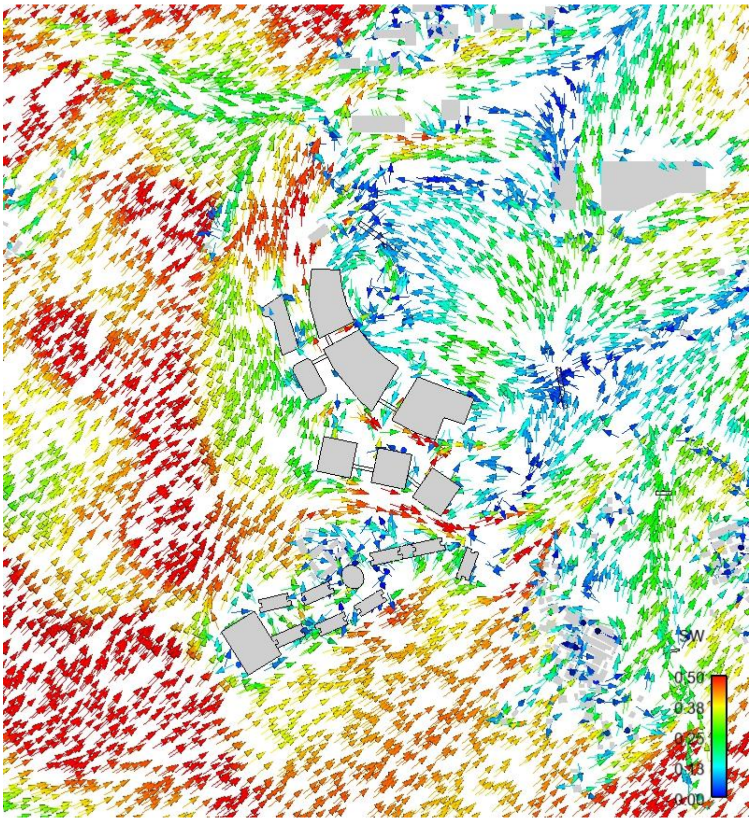

Figure C 21 Vector Plot of Indicative Scheme under SW Wind

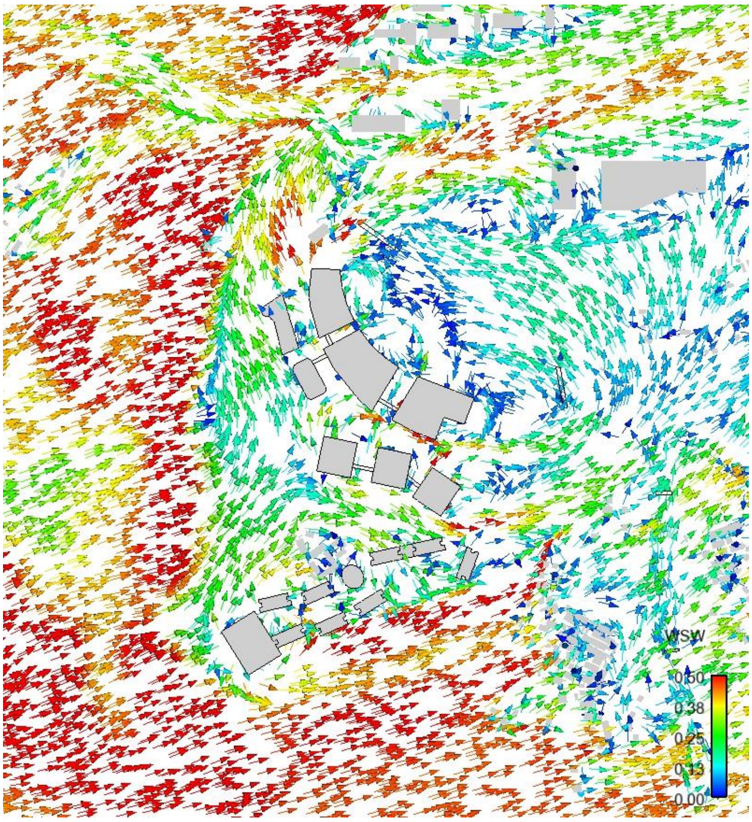

Figure C 22 Vector Plot of Indicative Scheme under WSW Wind

Appendix D

Vlocity Ratio (VR) at Test Points

D.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	0.12	0.15	0.21	0.21	0.12	0.13	0.23	0.13	0.37	0.39	0.37
P2	0.14	0.13	0.21	0.12	0.12	0.15	0.23	0.17	0.40	0.40	0.33
P3	0.09	0.12	0.20	0.23	0.13	0.16	0.30	0.19	0.41	0.24	0.22
P4	0.20	0.25	0.15	0.25	0.16	0.17	0.25	0.15	0.41	0.44	0.37
P5	0.24	0.26	0.16	0.25	0.18	0.18	0.22	0.18	0.40	0.46	0.39
P6	0.28	0.25	0.20	0.26	0.16	0.16	0.27	0.21	0.40	0.50	0.36
P7	0.30	0.27	0.21	0.26	0.16	0.15	0.30	0.23	0.39	0.51	0.31
P8	0.38	0.19	0.26	0.27	0.17	0.14	0.30	0.24	0.40	0.54	0.36
P9	0.39	0.26	0.29	0.25	0.16	0.16	0.31	0.24	0.39	0.54	0.42
P10	0.34	0.31	0.28	0.26	0.16	0.17	0.31	0.23	0.39	0.52	0.42
P11	0.27	0.30	0.27	0.26	0.17	0.17	0.29	0.22	0.36	0.54	0.43
P12	0.25	0.31	0.28	0.26	0.17	0.17	0.28	0.25	0.42	0.56	0.45
P13	0.21	0.26	0.29	0.26	0.17	0.17	0.25	0.27	0.44	0.50	0.42
P14	0.24	0.24	0.31	0.26	0.17	0.16	0.24	0.25	0.49	0.42	0.42
P15	0.17	0.24	0.33	0.26	0.17	0.17	0.24	0.23	0.57	0.42	0.43
P16	0.17	0.25	0.31	0.26	0.17	0.17	0.25	0.25	0.63	0.47	0.44
P17	0.15	0.22	0.31	0.26	0.17	0.17	0.24	0.23	0.59	0.44	0.42
P18	0.22	0.23	0.33	0.27	0.16	0.17	0.24	0.27	0.50	0.41	0.42
P19	0.23	0.24	0.31	0.28	0.14	0.17	0.25	0.27	0.48	0.40	0.41
P20	0.23	0.24	0.31	0.28	0.14	0.16	0.27	0.25	0.44	0.39	0.41
P21	0.23	0.24	0.31	0.29	0.13	0.14	0.28	0.22	0.42	0.39	0.41
P22	0.24	0.25	0.30	0.29	0.13	0.14	0.27	0.24	0.45	0.41	0.42
P23	0.20	0.27	0.32	0.30	0.12	0.14	0.26	0.26	0.52	0.44	0.41
P24	0.19	0.27	0.33	0.28	0.12	0.14	0.24	0.27	0.58	0.41	0.37
P25	0.21	0.27	0.32	0.27	0.14	0.12	0.24	0.27	0.59	0.41	0.43

Points	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW
P26	0.24	0.28	0.31	0.26	0.13	0.11	0.24	0.27	0.60	0.41	0.46
P27	0.26	0.29	0.27	0.22	0.09	0.11	0.25	0.27	0.61	0.43	0.45
P28	0.27	0.31	0.26	0.17	0.10	0.12	0.26	0.27	0.61	0.44	0.44
P29	0.27	0.30	0.23	0.09	0.09	0.16	0.27	0.25	0.61	0.44	0.43
P30	0.28	0.29	0.23	0.13	0.08	0.15	0.28	0.23	0.61	0.44	0.44
P31	0.25	0.31	0.24	0.12	0.09	0.14	0.27	0.23	0.59	0.43	0.43
P32	0.24	0.31	0.24	0.20	0.11	0.15	0.28	0.23	0.57	0.43	0.43
P33	0.23	0.30	0.25	0.22	0.13	0.15	0.28	0.23	0.52	0.42	0.43
P34	0.26	0.32	0.27	0.24	0.14	0.18	0.26	0.26	0.47	0.44	0.45
P35	0.29	0.32	0.29	0.27	0.16	0.20	0.26	0.27	0.46	0.43	0.47
P36	0.29	0.32	0.30	0.27	0.16	0.21	0.27	0.24	0.46	0.41	0.46
P37	0.30	0.32	0.30	0.26	0.16	0.21	0.28	0.23	0.47	0.41	0.47
P38	0.31	0.33	0.30	0.23	0.17	0.20	0.29	0.22	0.47	0.42	0.48
P39	0.32	0.33	0.31	0.23	0.18	0.20	0.29	0.22	0.48	0.43	0.48
P40	0.29	0.33	0.31	0.24	0.18	0.21	0.30	0.24	0.48	0.43	0.47
P41	0.26	0.32	0.31	0.26	0.18	0.20	0.30	0.23	0.47	0.44	0.44
P42	0.29	0.33	0.31	0.24	0.18	0.21	0.32	0.24	0.48	0.45	0.45
P43	0.31	0.33	0.31	0.24	0.18	0.22	0.33	0.25	0.49	0.45	0.45
P44	0.36	0.33	0.31	0.25	0.19	0.22	0.34	0.27	0.45	0.46	0.44
P45	0.39	0.29	0.31	0.24	0.19	0.22	0.34	0.27	0.42	0.46	0.41
P46	0.40	0.26	0.32	0.25	0.20	0.23	0.34	0.29	0.46	0.48	0.41
P47	0.40	0.28	0.34	0.27	0.21	0.23	0.35	0.32	0.48	0.51	0.43
P48	0.35	0.27	0.29	0.29	0.20	0.22	0.33	0.28	0.42	0.46	0.38
P49	0.34	0.29	0.25	0.30	0.19	0.21	0.31	0.26	0.41	0.46	0.35
P50	0.33	0.32	0.28	0.26	0.18	0.20	0.30	0.26	0.42	0.48	0.34
P51	0.35	0.33	0.29	0.19	0.17	0.19	0.30	0.26	0.45	0.49	0.34
P52	0.37	0.31	0.27	0.17	0.16	0.19	0.30	0.24	0.45	0.48	0.33
P53	0.37	0.29	0.25	0.13	0.11	0.19	0.29	0.22	0.42	0.46	0.31

Points	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW
P54	0.38	0.29	0.25	0.07	0.06	0.17	0.28	0.21	0.40	0.46	0.30
P55	0.36	0.31	0.30	0.22	0.06	0.09	0.27	0.21	0.41	0.47	0.34
P56	0.33	0.30	0.30	0.26	0.12	0.07	0.24	0.20	0.41	0.46	0.35
P57	0.30	0.30	0.31	0.26	0.13	0.09	0.26	0.20	0.42	0.44	0.34
P58	0.26	0.27	0.29	0.24	0.13	0.11	0.26	0.20	0.40	0.42	0.28
P59	0.27	0.27	0.30	0.25	0.14	0.14	0.24	0.19	0.41	0.43	0.31
P60	0.28	0.27	0.30	0.25	0.13	0.15	0.20	0.17	0.40	0.43	0.32
P61	0.30	0.27	0.30	0.26	0.13	0.15	0.17	0.16	0.39	0.44	0.34
P62	0.29	0.24	0.27	0.25	0.14	0.16	0.17	0.18	0.40	0.45	0.34
P63	0.26	0.18	0.25	0.22	0.13	0.17	0.18	0.18	0.41	0.44	0.32
P64	0.23	0.22	0.23	0.21	0.13	0.16	0.20	0.18	0.41	0.42	0.26
P65	0.22	0.24	0.21	0.21	0.13	0.17	0.22	0.19	0.42	0.40	0.18
P66	0.21	0.23	0.17	0.21	0.14	0.16	0.20	0.18	0.42	0.40	0.15
P67	0.22	0.24	0.16	0.20	0.15	0.15	0.20	0.18	0.42	0.38	0.22
P68	0.30	0.18	0.16	0.21	0.16	0.15	0.20	0.18	0.43	0.34	0.27
P69	0.23	0.17	0.14	0.19	0.15	0.15	0.22	0.18	0.43	0.36	0.28
P70	0.19	0.14	0.18	0.20	0.14	0.16	0.27	0.19	0.44	0.36	0.29
P71	0.26	0.12	0.11	0.21	0.15	0.17	0.30	0.20	0.44	0.33	0.28
P72	0.30	0.19	0.12	0.09	0.13	0.18	0.32	0.22	0.46	0.32	0.31
P73	0.27	0.18	0.19	0.11	0.07	0.09	0.25	0.19	0.45	0.31	0.17
P74	0.20	0.16	0.19	0.21	0.17	0.19	0.15	0.10	0.38	0.32	0.32
P75	0.10	0.15	0.20	0.23	0.15	0.18	0.18	0.04	0.26	0.29	0.25
P76	0.20	0.18	0.21	0.09	0.03	0.03	0.07	0.05	0.27	0.35	0.25
P77	0.21	0.14	0.07	0.09	0.06	0.04	0.10	0.10	0.36	0.34	0.35
P78	0.06	0.07	0.21	0.25	0.16	0.18	0.29	0.17	0.35	0.31	0.27
P79	0.06	0.06	0.07	0.04	0.03	0.03	0.20	0.16	0.29	0.28	0.20
P80	0.11	0.04	0.06	0.04	0.02	0.07	0.27	0.21	0.35	0.29	0.16
P81	0.19	0.10	0.06	0.04	0.03	0.02	0.14	0.13	0.32	0.43	0.34

Points	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW
P82	0.20	0.20	0.30	0.24	0.10	0.04	0.03	0.02	0.07	0.08	0.20
P83	0.28	0.23	0.30	0.24	0.13	0.11	0.05	0.04	0.12	0.20	0.26
P84	0.30	0.24	0.31	0.27	0.14	0.17	0.18	0.09	0.07	0.24	0.35
P85	0.29	0.25	0.31	0.28	0.15	0.16	0.24	0.21	0.24	0.21	0.37
P86	0.27	0.25	0.32	0.28	0.14	0.18	0.29	0.23	0.33	0.29	0.39
P87	0.25	0.27	0.32	0.27	0.14	0.19	0.31	0.25	0.40	0.42	0.29
P88	0.26	0.28	0.31	0.24	0.14	0.17	0.31	0.25	0.39	0.42	0.39
P89	0.25	0.24	0.31	0.24	0.14	0.14	0.14	0.11	0.40	0.45	0.36
P90	0.30	0.24	0.26	0.13	0.12	0.17	0.27	0.24	0.40	0.35	0.28
P91	0.17	0.12	0.12	0.12	0.11	0.16	0.24	0.19	0.45	0.36	0.23
P92	0.11	0.05	0.20	0.18	0.08	0.05	0.08	0.08	0.28	0.29	0.21
P93	0.07	0.07	0.04	0.05	0.04	0.05	0.10	0.10	0.27	0.21	0.12

Table D 2 Overall Test Points of Baseline Scheme

Points	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW
O1	0.18	0.15	0.25	0.24	0.14	0.18	0.33	0.24	0.42	0.40	0.37
O2	0.28	0.27	0.13	0.26	0.13	0.16	0.29	0.23	0.40	0.45	0.37
O3	0.23	0.25	0.32	0.30	0.18	0.15	0.22	0.23	0.45	0.45	0.45
O4	0.24	0.21	0.31	0.30	0.16	0.15	0.23	0.24	0.46	0.41	0.43
O5	0.10	0.27	0.30	0.28	0.17	0.17	0.15	0.04	0.29	0.34	0.39
O6	0.14	0.25	0.31	0.29	0.19	0.18	0.23	0.10	0.28	0.29	0.43
O7	0.20	0.22	0.31	0.30	0.22	0.21	0.27	0.16	0.16	0.27	0.45
O8	0.24	0.17	0.30	0.29	0.22	0.24	0.29	0.17	0.06	0.23	0.42
O9	0.28	0.09	0.27	0.27	0.19	0.23	0.26	0.18	0.31	0.23	0.40
O10	0.29	0.04	0.26	0.24	0.16	0.20	0.24	0.15	0.39	0.28	0.42
O11	0.25	0.11	0.20	0.22	0.14	0.19	0.25	0.13	0.41	0.26	0.43
O12	0.19	0.15	0.17	0.19	0.17	0.20	0.23	0.09	0.39	0.32	0.37
O13	0.10	0.15	0.21	0.20	0.16	0.18	0.23	0.04	0.32	0.33	0.24
O14	0.06	0.15	0.22	0.21	0.14	0.17	0.29	0.19	0.11	0.18	0.27
O15	0.37	0.27	0.21	0.31	0.15	0.16	0.24	0.22	0.33	0.43	0.35
O16	0.35	0.23	0.25	0.30	0.16	0.16	0.24	0.23	0.34	0.43	0.34
O17	0.32	0.20	0.24	0.29	0.16	0.16	0.23	0.24	0.32	0.44	0.31
O18	0.28	0.24	0.22	0.29	0.15	0.16	0.23	0.22	0.32	0.44	0.31
O19	0.23	0.27	0.21	0.29	0.14	0.17	0.24	0.21	0.36	0.44	0.32
O20	0.25	0.30	0.22	0.29	0.14	0.17	0.24	0.23	0.40	0.46	0.35
O21	0.21	0.31	0.25	0.29	0.14	0.18	0.22	0.25	0.47	0.48	0.37
O22	0.16	0.31	0.27	0.28	0.14	0.17	0.24	0.27	0.52	0.49	0.39
O23	0.15	0.29	0.30	0.27	0.14	0.14	0.24	0.29	0.47	0.49	0.40
O24	0.24	0.31	0.26	0.28	0.16	0.16	0.24	0.21	0.36	0.45	0.36
O25	0.27	0.32	0.30	0.25	0.16	0.15	0.24	0.21	0.41	0.46	0.38
O26	0.20	0.31	0.29	0.24	0.15	0.15	0.22	0.23	0.44	0.46	0.39
O27	0.18	0.29	0.26	0.27	0.15	0.16	0.22	0.23	0.50	0.42	0.40

Points	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW
O28	0.22	0.28	0.23	0.26	0.16	0.15	0.22	0.26	0.39	0.35	0.40
O29	0.22	0.22	0.32	0.26	0.17	0.15	0.24	0.26	0.51	0.42	0.44
O30	0.20	0.23	0.33	0.25	0.16	0.15	0.21	0.29	0.54	0.44	0.39
O31	0.20	0.29	0.33	0.25	0.16	0.14	0.22	0.27	0.52	0.47	0.44
O32	0.17	0.27	0.30	0.28	0.15	0.13	0.18	0.26	0.46	0.46	0.48
O33	0.18	0.27	0.30	0.30	0.12	0.11	0.17	0.25	0.46	0.45	0.48
O34	0.20	0.28	0.30	0.22	0.08	0.11	0.22	0.24	0.47	0.43	0.46
O35	0.22	0.27	0.23	0.23	0.10	0.14	0.23	0.22	0.43	0.43	0.46
O36	0.22	0.26	0.22	0.23	0.12	0.17	0.19	0.17	0.39	0.43	0.47
O37	0.22	0.26	0.25	0.21	0.16	0.09	0.10	0.12	0.44	0.46	0.47
O38	0.25	0.30	0.27	0.22	0.09	0.07	0.15	0.18	0.49	0.45	0.45
O39	0.27	0.30	0.27	0.22	0.09	0.09	0.23	0.26	0.60	0.44	0.45
O40	0.16	0.27	0.31	0.27	0.15	0.13	0.32	0.29	0.29	0.43	0.50
O41	0.17	0.24	0.26	0.26	0.14	0.13	0.32	0.35	0.42	0.30	0.45
O42	0.25	0.24	0.23	0.26	0.14	0.16	0.23	0.27	0.36	0.38	0.35
O43	0.26	0.24	0.32	0.26	0.14	0.14	0.16	0.17	0.41	0.40	0.40
O44	0.18	0.24	0.29	0.16	0.09	0.11	0.08	0.10	0.27	0.42	0.43
O45	0.09	0.19	0.17	0.07	0.03	0.07	0.12	0.24	0.43	0.35	0.33
O46	0.14	0.17	0.13	0.19	0.14	0.18	0.19	0.29	0.47	0.38	0.36
O47	0.23	0.22	0.17	0.24	0.16	0.18	0.19	0.28	0.44	0.41	0.37
O48	0.12	0.07	0.12	0.14	0.12	0.18	0.18	0.20	0.31	0.26	0.31
O49	0.13	0.24	0.30	0.25	0.13	0.16	0.15	0.24	0.31	0.37	0.40
O50	0.13	0.24	0.28	0.29	0.14	0.12	0.16	0.18	0.26	0.38	0.48
O51	0.16	0.24	0.28	0.28	0.14	0.14	0.26	0.24	0.27	0.25	0.28
O52	0.15	0.21	0.24	0.28	0.11	0.08	0.14	0.20	0.31	0.25	0.19
O53	0.14	0.27	0.31	0.27	0.05	0.05	0.06	0.19	0.27	0.33	0.44
O54	0.12	0.12	0.06	0.15	0.08	0.17	0.23	0.23	0.21	0.28	0.39
O55	0.16	0.18	0.20	0.14	0.09	0.09	0.17	0.28	0.40	0.36	0.46

Points	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW
O56	0.09	0.15	0.11	0.15	0.11	0.18	0.25	0.28	0.36	0.21	0.13
O57	0.13	0.15	0.19	0.11	0.03	0.08	0.16	0.21	0.21	0.31	0.33
O58	0.21	0.22	0.24	0.20	0.16	0.17	0.14	0.11	0.24	0.33	0.47
O59	0.18	0.19	0.16	0.22	0.16	0.18	0.17	0.12	0.26	0.11	0.15
O60	0.19	0.16	0.13	0.16	0.11	0.13	0.12	0.09	0.26	0.11	0.12
O61	0.18	0.17	0.19	0.14	0.09	0.07	0.07	0.07	0.15	0.10	0.09
O62	0.15	0.18	0.22	0.23	0.12	0.04	0.04	0.06	0.17	0.16	0.13
O63	0.09	0.15	0.17	0.23	0.14	0.04	0.04	0.04	0.04	0.05	0.10
O64	0.12	0.18	0.17	0.24	0.14	0.07	0.04	0.04	0.08	0.05	0.07
O65	0.14	0.17	0.16	0.25	0.15	0.14	0.07	0.07	0.15	0.07	0.06
O66	0.17	0.16	0.12	0.25	0.15	0.18	0.11	0.16	0.27	0.12	0.06
O67	0.15	0.18	0.16	0.07	0.06	0.03	0.10	0.09	0.10	0.12	0.17
O68	0.06	0.07	0.06	0.19	0.10	0.05	0.02	0.07	0.22	0.28	0.25
O69	0.11	0.10	0.05	0.11	0.05	0.02	0.08	0.14	0.43	0.30	0.36
O70	0.08	0.08	0.02	0.10	0.02	0.04	0.13	0.16	0.61	0.24	0.15
O71	0.07	0.04	0.02	0.06	0.04	0.05	0.05	0.07	0.43	0.38	0.43
O72	0.05	0.03	0.03	0.12	0.03	0.03	0.08	0.12	0.29	0.34	0.36
O73	0.04	0.05	0.07	0.11	0.02	0.07	0.10	0.09	0.14	0.09	0.10
O74	0.02	0.03	0.04	0.08	0.01	0.01	0.03	0.05	0.09	0.08	0.10
O75	0.03	0.06	0.09	0.07	0.02	0.02	0.05	0.10	0.17	0.20	0.26
O76	0.03	0.02	0.02	0.02	0.01	0.02	0.03	0.15	0.25	0.13	0.16
O77	0.02	0.05	0.05	0.04	0.01	0.03	0.05	0.06	0.12	0.10	0.25
O78	0.06	0.06	0.06	0.03	0.03	0.03	0.02	0.15	0.22	0.33	0.23
O79	0.01	0.03	0.03	0.04	0.09	0.11	0.21	0.11	0.28	0.10	0.17
O80	0.04	0.08	0.05	0.05	0.03	0.07	0.08	0.23	0.34	0.30	0.19
O81	0.09	0.09	0.04	0.13	0.13	0.11	0.11	0.10	0.49	0.38	0.26
O82	0.12	0.12	0.08	0.08	0.06	0.11	0.27	0.32	0.63	0.34	0.17
O83	0.10	0.09	0.11	0.13	0.10	0.08	0.12	0.12	0.21	0.12	0.20

Points	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW
O84	0.14	0.15	0.05	0.17	0.12	0.16	0.27	0.32	0.60	0.36	0.40
O85	0.33	0.36	0.27	0.34	0.20	0.20	0.32	0.23	0.47	0.49	0.49
O86	0.34	0.35	0.26	0.32	0.20	0.19	0.32	0.23	0.47	0.48	0.47
O87	0.33	0.34	0.25	0.30	0.19	0.20	0.32	0.23	0.49	0.47	0.46
O88	0.31	0.33	0.24	0.29	0.18	0.21	0.31	0.23	0.49	0.47	0.45
O89	0.30	0.32	0.24	0.28	0.18	0.21	0.30	0.22	0.48	0.47	0.45
O90	0.27	0.31	0.22	0.28	0.18	0.21	0.30	0.21	0.49	0.47	0.46
O91	0.27	0.30	0.22	0.28	0.18	0.20	0.29	0.21	0.47	0.46	0.44
O92	0.26	0.30	0.22	0.29	0.18	0.20	0.28	0.22	0.47	0.45	0.44
O93	0.26	0.29	0.21	0.31	0.18	0.19	0.27	0.25	0.53	0.46	0.45
O94	0.27	0.29	0.21	0.29	0.17	0.19	0.26	0.26	0.56	0.46	0.46
O95	0.28	0.29	0.20	0.25	0.16	0.19	0.25	0.26	0.59	0.46	0.47
O96	0.29	0.28	0.18	0.21	0.15	0.20	0.26	0.24	0.62	0.46	0.47
O97	0.29	0.26	0.16	0.17	0.12	0.19	0.29	0.24	0.61	0.44	0.46
O98	0.28	0.24	0.16	0.15	0.10	0.15	0.30	0.26	0.62	0.44	0.45
O99	0.24	0.18	0.17	0.11	0.07	0.11	0.29	0.27	0.65	0.43	0.43
O100	0.15	0.10	0.13	0.11	0.08	0.06	0.17	0.13	0.22	0.22	0.44
O101	0.41	0.45	0.38	0.42	0.25	0.25	0.36	0.29	0.56	0.59	0.64
O102	0.39	0.38	0.36	0.33	0.21	0.23	0.32	0.28	0.44	0.51	0.56
O103	0.43	0.44	0.42	0.38	0.22	0.20	0.31	0.29	0.50	0.58	0.64
O104	0.43	0.45	0.43	0.40	0.24	0.23	0.35	0.31	0.51	0.59	0.67
O105	0.42	0.45	0.41	0.41	0.25	0.25	0.37	0.31	0.55	0.58	0.67
O106	0.39	0.42	0.41	0.39	0.22	0.20	0.31	0.27	0.46	0.55	0.63
O107	0.43	0.41	0.41	0.38	0.21	0.17	0.27	0.27	0.50	0.57	0.61
O108	0.41	0.38	0.42	0.39	0.22	0.21	0.30	0.30	0.50	0.59	0.62
O109	0.39	0.40	0.39	0.37	0.20	0.16	0.26	0.24	0.43	0.53	0.58
O110	0.46	0.40	0.41	0.36	0.21	0.18	0.31	0.30	0.53	0.58	0.59
O111	0.45	0.40	0.43	0.38	0.22	0.19	0.32	0.32	0.54	0.62	0.62

Points	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW
O112	0.50	0.41	0.45	0.36	0.22	0.22	0.38	0.38	0.62	0.66	0.62
O113	0.48	0.42	0.49	0.39	0.25	0.24	0.40	0.41	0.64	0.73	0.68
O114	0.44	0.46	0.50	0.39	0.27	0.26	0.42	0.42	0.66	0.73	0.67
O115	0.53	0.43	0.41	0.39	0.34	0.40	0.60	0.55	0.73	0.63	0.53
O116	0.51	0.41	0.36	0.34	0.31	0.36	0.56	0.53	0.71	0.60	0.45
O117	0.49	0.45	0.41	0.39	0.31	0.34	0.53	0.51	0.71	0.65	0.53
O118	0.42	0.48	0.46	0.42	0.30	0.29	0.45	0.43	0.67	0.71	0.62
O119	0.32	0.39	0.41	0.43	0.31	0.31	0.41	0.34	0.51	0.57	0.51
O120	0.30	0.31	0.27	0.31	0.20	0.22	0.30	0.26	0.38	0.44	0.33
O121	0.25	0.32	0.33	0.34	0.23	0.23	0.29	0.24	0.34	0.43	0.35
O122	0.24	0.33	0.41	0.41	0.29	0.28	0.33	0.24	0.34	0.43	0.45
O123	0.29	0.35	0.45	0.44	0.33	0.31	0.37	0.25	0.38	0.45	0.52
O124	0.33	0.32	0.42	0.40	0.31	0.31	0.38	0.27	0.40	0.44	0.49
O125	0.36	0.27	0.38	0.34	0.29	0.29	0.38	0.29	0.42	0.43	0.45
O126	0.35	0.23	0.35	0.31	0.26	0.27	0.35	0.28	0.41	0.41	0.42
O127	0.31	0.37	0.48	0.42	0.33	0.32	0.39	0.30	0.44	0.51	0.56
O128	0.39	0.40	0.53	0.46	0.36	0.35	0.44	0.36	0.54	0.59	0.62
O129	0.41	0.40	0.57	0.48	0.36	0.35	0.43	0.37	0.57	0.64	0.67
O130	0.39	0.39	0.59	0.53	0.36	0.35	0.41	0.34	0.53	0.63	0.67
O131	0.41	0.39	0.61	0.59	0.35	0.35	0.40	0.33	0.54	0.64	0.70
O132	0.44	0.44	0.60	0.60	0.34	0.34	0.39	0.34	0.58	0.67	0.71
O133	0.45	0.46	0.56	0.57	0.33	0.32	0.37	0.33	0.58	0.66	0.67
O134	0.47	0.47	0.54	0.57	0.34	0.32	0.37	0.33	0.60	0.67	0.64
O135	0.46	0.46	0.51	0.57	0.35	0.31	0.38	0.34	0.60	0.64	0.67
O136	0.23	0.22	0.24	0.22	0.14	0.15	0.23	0.20	0.42	0.43	0.27
O137	0.26	0.26	0.26	0.25	0.15	0.17	0.27	0.21	0.44	0.41	0.22
O138	0.32	0.28	0.29	0.29	0.17	0.18	0.29	0.24	0.46	0.40	0.19
O139	0.37	0.32	0.34	0.36	0.22	0.21	0.31	0.27	0.48	0.42	0.24

Points	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW
O140	0.41	0.38	0.42	0.47	0.29	0.26	0.35	0.30	0.51	0.51	0.48
O141	0.42	0.41	0.45	0.55	0.36	0.32	0.40	0.35	0.58	0.59	0.71
O142	0.39	0.34	0.41	0.52	0.34	0.33	0.38	0.31	0.52	0.52	0.65
O143	0.38	0.34	0.40	0.52	0.33	0.32	0.38	0.31	0.52	0.54	0.66
O144	0.37	0.35	0.39	0.50	0.33	0.31	0.35	0.28	0.50	0.54	0.67
O145	0.34	0.36	0.42	0.49	0.33	0.30	0.33	0.25	0.47	0.52	0.67
O146	0.30	0.36	0.46	0.51	0.33	0.30	0.34	0.26	0.47	0.52	0.65
O147	0.07	0.15	0.31	0.29	0.21	0.21	0.33	0.30	0.52	0.44	0.51
O148	0.28	0.35	0.43	0.31	0.03	0.04	0.23	0.34	0.62	0.61	0.66
O149	0.26	0.37	0.41	0.37	0.04	0.04	0.32	0.34	0.60	0.58	0.66
O150	0.13	0.04	0.02	0.04	0.04	0.03	0.05	0.06	0.10	0.10	0.27
O151	0.26	0.23	0.24	0.10	0.04	0.04	0.04	0.06	0.16	0.20	0.09
O152	0.24	0.23	0.26	0.10	0.05	0.04	0.05	0.03	0.11	0.07	0.18
O153	0.15	0.06	0.12	0.12	0.03	0.04	0.02	0.01	0.05	0.02	0.01
O154	0.14	0.13	0.09	0.06	0.06	0.12	0.22	0.17	0.34	0.19	0.08
O155	0.13	0.14	0.09	0.04	0.03	0.08	0.07	0.06	0.07	0.04	0.05
O156	0.29	0.22	0.20	0.13	0.12	0.17	0.20	0.15	0.29	0.22	0.05
O157	0.24	0.18	0.23	0.20	0.14	0.13	0.16	0.08	0.04	0.07	0.17
O158	0.29	0.24	0.30	0.22	0.13	0.17	0.25	0.20	0.26	0.17	0.24
O159	0.29	0.26	0.27	0.22	0.11	0.16	0.28	0.26	0.38	0.34	0.14
O160	0.28	0.27	0.31	0.19	0.11	0.16	0.22	0.17	0.44	0.40	0.18
O161	0.28	0.25	0.32	0.26	0.14	0.15	0.23	0.21	0.32	0.25	0.31
O162	0.27	0.26	0.32	0.28	0.15	0.18	0.26	0.21	0.37	0.32	0.36
O163	0.26	0.27	0.32	0.27	0.15	0.18	0.30	0.22	0.27	0.42	0.25
O164	0.31	0.27	0.16	0.29	0.14	0.16	0.25	0.21	0.36	0.46	0.40

Table D 3 Special Test Points of Baseline Scheme

Points	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW
S1	0.37	0.23	0.29	0.27	0.19	0.22	0.32	0.27	0.43	0.46	0.38
S2	0.35	0.28	0.25	0.30	0.19	0.21	0.31	0.26	0.42	0.46	0.35
S3	0.38	0.24	0.23	0.28	0.18	0.20	0.31	0.25	0.43	0.48	0.36
S4	0.27	0.25	0.30	0.28	0.17	0.20	0.30	0.23	0.43	0.47	0.43
S5	0.27	0.32	0.31	0.26	0.18	0.20	0.30	0.23	0.47	0.45	0.43
S6	0.31	0.33	0.31	0.25	0.17	0.21	0.29	0.22	0.47	0.42	0.47
S7	0.14	0.13	0.18	0.22	0.18	0.21	0.30	0.23	0.42	0.45	0.38
S8	0.30	0.26	0.26	0.15	0.12	0.17	0.26	0.25	0.45	0.45	0.38
S9	0.26	0.28	0.31	0.24	0.14	0.17	0.30	0.24	0.44	0.34	0.37
S10	0.24	0.28	0.29	0.21	0.12	0.17	0.29	0.23	0.48	0.40	0.43
S11	0.23	0.30	0.26	0.14	0.10	0.16	0.28	0.23	0.57	0.42	0.43
S12	0.22	0.28	0.27	0.20	0.12	0.17	0.29	0.22	0.56	0.40	0.43
S13	0.21	0.27	0.32	0.27	0.14	0.13	0.28	0.24	0.52	0.40	0.39
S14	0.25	0.27	0.32	0.27	0.13	0.18	0.30	0.23	0.42	0.41	0.32
S15	0.25	0.26	0.32	0.28	0.13	0.18	0.30	0.24	0.38	0.38	0.38
S16	0.19	0.27	0.32	0.27	0.14	0.12	0.26	0.27	0.56	0.41	0.37
S17	0.27	0.25	0.31	0.28	0.14	0.18	0.29	0.23	0.32	0.31	0.39
S18	0.22	0.24	0.32	0.28	0.14	0.16	0.27	0.24	0.43	0.41	0.41
S19	0.22	0.23	0.33	0.27	0.16	0.17	0.24	0.27	0.48	0.42	0.42
S20	0.33	0.25	0.30	0.27	0.13	0.14	0.03	0.06	0.13	0.32	0.36
S21	0.35	0.28	0.30	0.28	0.14	0.16	0.08	0.10	0.26	0.46	0.38
S22	0.33	0.29	0.32	0.26	0.14	0.15	0.15	0.15	0.35	0.46	0.36
S23	0.29	0.28	0.31	0.25	0.13	0.15	0.20	0.18	0.40	0.44	0.34
S24	0.34	0.26	0.27	0.25	0.14	0.15	0.28	0.17	0.36	0.47	0.38
S25	0.30	0.20	0.26	0.25	0.14	0.15	0.27	0.15	0.37	0.47	0.36
S26	0.25	0.19	0.24	0.22	0.13	0.17	0.18	0.18	0.41	0.44	0.30
S27	0.22	0.23	0.20	0.21	0.13	0.16	0.19	0.18	0.41	0.41	0.20

Points	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW
S28	0.27	0.19	0.23	0.24	0.15	0.15	0.26	0.16	0.41	0.46	0.31
S29	0.25	0.24	0.19	0.23	0.16	0.15	0.25	0.18	0.42	0.45	0.24
S30	0.26	0.22	0.18	0.22	0.16	0.16	0.29	0.17	0.40	0.47	0.28
S31	0.20	0.24	0.17	0.21	0.16	0.15	0.25	0.19	0.41	0.43	0.26
S32	0.18	0.24	0.15	0.20	0.15	0.15	0.26	0.19	0.41	0.40	0.29
S33	0.15	0.18	0.14	0.21	0.14	0.16	0.27	0.19	0.42	0.39	0.30
S34	0.16	0.21	0.15	0.20	0.14	0.15	0.28	0.15	0.40	0.42	0.34
S35	0.11	0.08	0.19	0.21	0.15	0.17	0.29	0.19	0.41	0.35	0.28
S36	0.25	0.13	0.11	0.10	0.05	0.14	0.34	0.21	0.43	0.32	0.28
S37	0.24	0.27	0.32	0.29	0.13	0.14	0.28	0.24	0.47	0.44	0.41
S38	0.25	0.18	0.20	0.08	0.03	0.03	0.14	0.14	0.45	0.34	0.21
S39	0.29	0.31	0.29	0.26	0.15	0.19	0.26	0.26	0.45	0.42	0.46
S40	0.27	0.29	0.29	0.17	0.12	0.16	0.30	0.25	0.45	0.41	0.44
S41	0.23	0.29	0.27	0.15	0.10	0.15	0.29	0.24	0.52	0.41	0.43
S42	0.25	0.30	0.26	0.23	0.14	0.16	0.27	0.25	0.47	0.42	0.44
S43	0.22	0.27	0.30	0.24	0.11	0.12	0.26	0.26	0.58	0.41	0.45
S44	0.21	0.27	0.31	0.24	0.11	0.14	0.29	0.23	0.52	0.40	0.43
S45	0.24	0.28	0.31	0.24	0.12	0.17	0.29	0.23	0.45	0.39	0.39
S46	0.24	0.25	0.32	0.29	0.13	0.14	0.30	0.22	0.39	0.43	0.40
S47	0.27	0.26	0.33	0.28	0.13	0.14	0.29	0.23	0.32	0.48	0.41
S48	0.34	0.29	0.31	0.27	0.14	0.16	0.28	0.19	0.34	0.48	0.39
S49	0.35	0.28	0.29	0.26	0.14	0.17	0.24	0.14	0.35	0.47	0.38
S50	0.31	0.25	0.27	0.25	0.14	0.17	0.20	0.17	0.38	0.46	0.36
S51	0.30	0.25	0.30	0.28	0.14	0.16	0.22	0.16	0.17	0.35	0.37
S52	0.31	0.26	0.30	0.28	0.14	0.17	0.24	0.18	0.23	0.44	0.38
S53	0.32	0.27	0.32	0.29	0.15	0.17	0.26	0.20	0.28	0.47	0.39
S54	0.32	0.28	0.33	0.28	0.14	0.16	0.28	0.22	0.31	0.49	0.40
S55	0.31	0.28	0.31	0.27	0.14	0.14	0.29	0.23	0.33	0.49	0.41

Points	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW
S56	0.29	0.28	0.28	0.26	0.15	0.15	0.30	0.23	0.34	0.50	0.41
S57	0.27	0.27	0.26	0.26	0.16	0.16	0.30	0.23	0.35	0.51	0.41
S58	0.28	0.28	0.30	0.18	0.13	0.17	0.25	0.25	0.45	0.45	0.45
S59	0.27	0.29	0.28	0.16	0.12	0.17	0.29	0.25	0.45	0.40	0.44
S60	0.24	0.30	0.27	0.14	0.11	0.15	0.30	0.24	0.52	0.42	0.43
S61	0.24	0.31	0.25	0.12	0.09	0.14	0.27	0.23	0.58	0.43	0.43
S62	0.26	0.30	0.30	0.18	0.13	0.17	0.27	0.26	0.44	0.42	0.45
S63	0.44	0.41	0.44	0.30	0.19	0.24	0.32	0.26	0.60	0.59	0.58

D.2 Indicative Scheme

Table D 4 Perimeter Test Points of Indicative Scheme

Points	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW
P1	0.23	0.24	0.39	0.36	0.22	0.05	0.12	0.03	0.08	0.17	0.46
P2	0.15	0.17	0.29	0.32	0.22	0.09	0.13	0.05	0.05	0.15	0.46
P3	0.12	0.22	0.25	0.29	0.19	0.15	0.09	0.06	0.18	0.30	0.39
P4	0.22	0.17	0.36	0.34	0.23	0.03	0.14	0.05	0.11	0.15	0.21
P5	0.14	0.15	0.30	0.26	0.19	0.07	0.16	0.01	0.11	0.17	0.15
P6	0.05	0.15	0.23	0.13	0.11	0.09	0.15	0.01	0.06	0.18	0.17
P7	0.09	0.20	0.22	0.11	0.04	0.10	0.15	0.02	0.15	0.14	0.14
P8	0.12	0.13	0.28	0.20	0.10	0.03	0.16	0.01	0.05	0.08	0.06
P9	0.17	0.12	0.23	0.12	0.04	0.03	0.18	0.02	0.05	0.11	0.07
P10	0.30	0.19	0.24	0.11	0.13	0.05	0.19	0.06	0.06	0.16	0.08
P11	0.11	0.27	0.36	0.25	0.08	0.08	0.18	0.03	0.07	0.08	0.05
P12	0.19	0.15	0.28	0.17	0.08	0.08	0.05	0.04	0.01	0.12	0.04
P13	0.30	0.11	0.19	0.22	0.05	0.03	0.01	0.04	0.06	0.19	0.07
P14	0.41	0.23	0.10	0.22	0.24	0.29	0.42	0.25	0.07	0.23	0.10
P15	0.41	0.25	0.16	0.15	0.17	0.21	0.38	0.27	0.06	0.19	0.04
P16	0.39	0.21	0.21	0.16	0.14	0.18	0.37	0.28	0.12	0.14	0.06
P17	0.45	0.23	0.17	0.12	0.15	0.20	0.37	0.28	0.07	0.17	0.04
P18	0.13	0.26	0.12	0.13	0.13	0.19	0.27	0.18	0.04	0.14	0.05
P19	0.10	0.32	0.33	0.18	0.03	0.10	0.17	0.15	0.06	0.11	0.10
P20	0.13	0.29	0.38	0.23	0.08	0.06	0.15	0.08	0.06	0.17	0.15
P21	0.13	0.32	0.36	0.28	0.16	0.24	0.24	0.14	0.25	0.45	0.37
P22	0.09	0.23	0.24	0.21	0.13	0.23	0.12	0.03	0.26	0.39	0.39
P23	0.13	0.18	0.11	0.15	0.15	0.25	0.30	0.21	0.22	0.14	0.14
P24	0.30	0.20	0.14	0.11	0.12	0.22	0.35	0.26	0.13	0.16	0.16
P25	0.30	0.20	0.18	0.10	0.10	0.21	0.34	0.26	0.31	0.14	0.12

Points	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW
P26	0.27	0.18	0.18	0.14	0.13	0.20	0.32	0.22	0.36	0.56	0.48
P27	0.24	0.14	0.11	0.14	0.18	0.21	0.34	0.21	0.07	0.07	0.06
P28	0.35	0.28	0.25	0.15	0.11	0.12	0.25	0.22	0.33	0.05	0.09
P29	0.26	0.35	0.39	0.29	0.18	0.02	0.20	0.27	0.54	0.56	0.47
P30	0.22	0.34	0.39	0.28	0.12	0.06	0.16	0.17	0.35	0.39	0.55
P31	0.25	0.23	0.28	0.32	0.15	0.08	0.12	0.14	0.24	0.33	0.47
P32	0.28	0.32	0.39	0.33	0.09	0.07	0.12	0.17	0.31	0.37	0.51
P33	0.22	0.30	0.40	0.32	0.05	0.08	0.10	0.19	0.34	0.38	0.49
P34	0.08	0.19	0.34	0.33	0.04	0.08	0.08	0.19	0.36	0.42	0.52
P35	0.14	0.09	0.10	0.33	0.04	0.07	0.06	0.16	0.38	0.46	0.55
P36	0.14	0.07	0.14	0.31	0.07	0.09	0.10	0.14	0.41	0.46	0.52
P37	0.12	0.07	0.11	0.32	0.06	0.04	0.06	0.09	0.34	0.44	0.54
P38	0.09	0.10	0.13	0.33	0.09	0.07	0.03	0.07	0.30	0.42	0.50
P39	0.11	0.12	0.13	0.33	0.12	0.10	0.04	0.06	0.26	0.41	0.46
P40	0.13	0.12	0.03	0.34	0.12	0.11	0.07	0.07	0.24	0.35	0.51
P41	0.05	0.06	0.07	0.25	0.08	0.05	0.03	0.09	0.24	0.28	0.49
P42	0.06	0.10	0.05	0.36	0.19	0.16	0.12	0.04	0.17	0.27	0.38
P43	0.06	0.11	0.03	0.38	0.21	0.19	0.12	0.05	0.11	0.32	0.30
P44	0.09	0.12	0.03	0.39	0.24	0.24	0.23	0.15	0.17	0.33	0.49
P45	0.04	0.05	0.03	0.06	0.08	0.11	0.10	0.12	0.30	0.12	0.34
P46	0.03	0.09	0.06	0.08	0.17	0.19	0.34	0.27	0.33	0.13	0.20
P47	0.18	0.11	0.05	0.07	0.20	0.25	0.37	0.28	0.38	0.33	0.19
P48	0.17	0.21	0.09	0.09	0.18	0.23	0.36	0.28	0.37	0.27	0.13
P49	0.14	0.25	0.13	0.07	0.11	0.23	0.24	0.27	0.53	0.41	0.24
P50	0.16	0.20	0.19	0.07	0.06	0.15	0.23	0.21	0.43	0.45	0.26
P51	0.14	0.15	0.17	0.05	0.05	0.05	0.12	0.16	0.36	0.45	0.27
P52	0.08	0.12	0.13	0.06	0.05	0.06	0.06	0.11	0.36	0.41	0.29
P53	0.04	0.09	0.08	0.13	0.08	0.08	0.08	0.07	0.34	0.40	0.30

Points	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW
P54	0.03	0.08	0.04	0.13	0.13	0.13	0.12	0.08	0.31	0.42	0.27
P55	0.11	0.09	0.04	0.03	0.12	0.14	0.15	0.10	0.36	0.42	0.22
P56	0.10	0.11	0.12	0.03	0.05	0.15	0.19	0.11	0.38	0.36	0.17
P57	0.11	0.11	0.15	0.06	0.03	0.15	0.19	0.11	0.46	0.35	0.18
P58	0.10	0.11	0.18	0.11	0.04	0.14	0.18	0.15	0.49	0.35	0.18
P59	0.11	0.10	0.14	0.13	0.02	0.12	0.18	0.12	0.49	0.32	0.16
P60	0.11	0.08	0.10	0.12	0.03	0.07	0.15	0.11	0.44	0.27	0.12
P61	0.10	0.06	0.08	0.09	0.06	0.03	0.05	0.08	0.36	0.26	0.16
P62	0.08	0.23	0.30	0.22	0.12	0.15	0.08	0.05	0.37	0.27	0.21
P63	0.06	0.05	0.10	0.15	0.08	0.06	0.09	0.06	0.31	0.14	0.13
P64	0.06	0.09	0.04	0.14	0.04	0.03	0.08	0.11	0.39	0.23	0.20
P65	0.23	0.07	0.09	0.10	0.03	0.03	0.08	0.12	0.42	0.29	0.25
P66	0.09	0.13	0.11	0.18	0.14	0.04	0.04	0.09	0.38	0.33	0.30
P67	0.06	0.05	0.05	0.05	0.04	0.04	0.02	0.08	0.37	0.24	0.15
P68	0.31	0.22	0.07	0.06	0.08	0.05	0.04	0.04	0.08	0.11	0.18
P69	0.26	0.17	0.05	0.13	0.12	0.07	0.02	0.02	0.22	0.30	0.33
P70	0.35	0.30	0.07	0.08	0.09	0.05	0.03	0.03	0.38	0.47	0.47
P71	0.24	0.22	0.22	0.30	0.08	0.04	0.02	0.05	0.41	0.50	0.51
P72	0.20	0.22	0.23	0.16	0.04	0.02	0.11	0.08	0.40	0.50	0.49
P73	0.18	0.24	0.27	0.26	0.11	0.09	0.15	0.07	0.40	0.50	0.44
P74	0.14	0.21	0.28	0.35	0.23	0.15	0.14	0.05	0.35	0.44	0.32
P75	0.15	0.24	0.30	0.35	0.22	0.16	0.12	0.04	0.22	0.37	0.31
P76	0.19	0.25	0.27	0.23	0.07	0.07	0.15	0.03	0.20	0.30	0.25
P77	0.13	0.16	0.20	0.17	0.05	0.02	0.10	0.03	0.30	0.39	0.29
P78	0.26	0.28	0.41	0.38	0.23	0.06	0.02	0.02	0.37	0.46	0.43
P79	0.04	0.07	0.08	0.08	0.02	0.03	0.03	0.03	0.04	0.38	0.26
P80	0.06	0.07	0.04	0.12	0.10	0.07	0.08	0.05	0.24	0.29	0.17
P81	0.04	0.07	0.05	0.03	0.02	0.06	0.08	0.06	0.14	0.45	0.33

Points	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW
P82	0.29	0.13	0.09	0.20	0.23	0.02	0.02	0.03	0.06	0.21	0.23
P83	0.29	0.16	0.15	0.21	0.22	0.05	0.04	0.05	0.05	0.16	0.29
P84	0.21	0.14	0.16	0.11	0.12	0.14	0.20	0.14	0.07	0.37	0.27
P85	0.13	0.08	0.11	0.09	0.03	0.07	0.16	0.09	0.06	0.48	0.27
P86	0.17	0.09	0.13	0.14	0.07	0.07	0.07	0.22	0.30	0.50	0.30
P87	0.22	0.19	0.24	0.21	0.10	0.12	0.17	0.16	0.27	0.44	0.27
P88	0.15	0.27	0.34	0.36	0.25	0.10	0.08	0.14	0.22	0.09	0.23
P89	0.21	0.31	0.36	0.37	0.30	0.16	0.05	0.02	0.04	0.06	0.31
P90	0.26	0.34	0.40	0.35	0.27	0.35	0.42	0.34	0.11	0.16	0.24
P91	0.23	0.26	0.25	0.16	0.09	0.22	0.25	0.25	0.26	0.13	0.07
P92	0.07	0.17	0.11	0.05	0.09	0.09	0.11	0.09	0.13	0.10	0.05
P93	0.05	0.07	0.05	0.02	0.03	0.06	0.06	0.05	0.06	0.18	0.21

Table D 5 Overall Test Points of Indicative Scheme

Points	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW
O1	0.09	0.21	0.24	0.30	0.21	0.17	0.11	0.08	0.04	0.06	0.36
O2	0.06	0.17	0.18	0.24	0.18	0.20	0.12	0.09	0.09	0.10	0.07
O3	0.22	0.21	0.23	0.20	0.15	0.18	0.24	0.23	0.19	0.04	0.15
O4	0.24	0.19	0.26	0.23	0.15	0.17	0.25	0.23	0.33	0.05	0.09
O5	0.29	0.24	0.31	0.35	0.18	0.14	0.15	0.10	0.32	0.27	0.43
O6	0.32	0.23	0.31	0.37	0.20	0.16	0.16	0.04	0.35	0.27	0.46
O7	0.34	0.23	0.32	0.40	0.24	0.18	0.18	0.10	0.29	0.30	0.48
O8	0.33	0.21	0.31	0.40	0.25	0.19	0.20	0.10	0.14	0.30	0.46
O9	0.29	0.20	0.28	0.35	0.23	0.17	0.19	0.08	0.25	0.30	0.43
O10	0.21	0.21	0.25	0.32	0.19	0.15	0.17	0.07	0.32	0.39	0.35
O11	0.06	0.19	0.21	0.33	0.20	0.13	0.13	0.05	0.33	0.46	0.33
O12	0.12	0.19	0.26	0.36	0.23	0.13	0.12	0.05	0.37	0.47	0.32
O13	0.14	0.22	0.28	0.35	0.23	0.15	0.10	0.04	0.30	0.45	0.36
O14	0.13	0.23	0.26	0.32	0.21	0.15	0.09	0.06	0.12	0.14	0.31
O15	0.26	0.08	0.12	0.22	0.17	0.24	0.06	0.10	0.09	0.07	0.06
O16	0.23	0.02	0.11	0.21	0.17	0.24	0.16	0.09	0.08	0.08	0.06
O17	0.20	0.02	0.13	0.21	0.18	0.23	0.29	0.05	0.08	0.12	0.08
O18	0.19	0.07	0.16	0.22	0.18	0.23	0.38	0.16	0.10	0.16	0.11
O19	0.17	0.14	0.17	0.23	0.19	0.23	0.35	0.24	0.11	0.21	0.14
O20	0.15	0.19	0.20	0.25	0.18	0.22	0.31	0.23	0.10	0.24	0.16
O21	0.21	0.23	0.22	0.25	0.17	0.20	0.27	0.23	0.06	0.26	0.17
O22	0.18	0.24	0.25	0.25	0.15	0.19	0.26	0.25	0.07	0.27	0.18
O23	0.16	0.25	0.26	0.24	0.13	0.18	0.26	0.28	0.21	0.27	0.18
O24	0.16	0.18	0.22	0.22	0.18	0.22	0.36	0.23	0.12	0.23	0.12
O25	0.15	0.21	0.21	0.23	0.18	0.22	0.32	0.23	0.07	0.26	0.13
O26	0.19	0.23	0.18	0.22	0.17	0.20	0.29	0.21	0.08	0.25	0.15
O27	0.22	0.23	0.17	0.22	0.16	0.20	0.26	0.22	0.13	0.18	0.17

Points	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW
O28	0.23	0.21	0.15	0.20	0.14	0.17	0.25	0.24	0.19	0.08	0.17
O29	0.27	0.18	0.21	0.19	0.12	0.17	0.26	0.26	0.44	0.10	0.15
O30	0.27	0.22	0.28	0.20	0.12	0.16	0.26	0.26	0.52	0.15	0.20
O31	0.24	0.21	0.29	0.21	0.12	0.15	0.24	0.27	0.60	0.23	0.19
O32	0.24	0.20	0.25	0.23	0.10	0.13	0.22	0.25	0.54	0.27	0.21
O33	0.26	0.22	0.25	0.25	0.07	0.12	0.22	0.23	0.53	0.31	0.26
O34	0.29	0.24	0.25	0.15	0.08	0.13	0.23	0.23	0.53	0.33	0.30
O35	0.32	0.24	0.23	0.16	0.09	0.13	0.21	0.22	0.43	0.36	0.28
O36	0.35	0.24	0.22	0.15	0.11	0.10	0.20	0.17	0.33	0.39	0.23
O37	0.36	0.24	0.21	0.11	0.04	0.12	0.27	0.23	0.52	0.44	0.13
O38	0.38	0.26	0.22	0.07	0.06	0.15	0.32	0.28	0.59	0.31	0.06
O39	0.34	0.22	0.18	0.06	0.13	0.18	0.32	0.30	0.40	0.14	0.11
O40	0.22	0.28	0.28	0.23	0.12	0.18	0.25	0.29	0.36	0.33	0.23
O41	0.21	0.22	0.24	0.23	0.11	0.16	0.28	0.35	0.48	0.20	0.25
O42	0.20	0.22	0.17	0.20	0.15	0.18	0.24	0.25	0.33	0.09	0.18
O43	0.17	0.21	0.26	0.23	0.13	0.11	0.14	0.17	0.28	0.05	0.13
O44	0.13	0.25	0.26	0.15	0.11	0.08	0.10	0.09	0.21	0.14	0.04
O45	0.10	0.19	0.15	0.07	0.05	0.10	0.17	0.22	0.42	0.11	0.12
O46	0.11	0.16	0.11	0.19	0.16	0.18	0.22	0.30	0.45	0.11	0.15
O47	0.17	0.18	0.14	0.22	0.16	0.18	0.25	0.30	0.45	0.13	0.16
O48	0.16	0.07	0.11	0.14	0.16	0.18	0.23	0.23	0.33	0.05	0.11
O49	0.12	0.25	0.26	0.22	0.13	0.16	0.20	0.26	0.38	0.07	0.09
O50	0.22	0.25	0.24	0.25	0.08	0.11	0.17	0.20	0.35	0.34	0.27
O51	0.21	0.22	0.24	0.25	0.09	0.16	0.21	0.24	0.33	0.19	0.21
O52	0.20	0.20	0.21	0.24	0.06	0.09	0.19	0.23	0.36	0.21	0.10
O53	0.24	0.27	0.27	0.20	0.03	0.05	0.17	0.19	0.35	0.36	0.29
O54	0.27	0.14	0.12	0.10	0.09	0.16	0.16	0.20	0.30	0.18	0.24
O55	0.20	0.22	0.19	0.06	0.04	0.07	0.25	0.31	0.46	0.25	0.29

Points	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW
O56	0.13	0.16	0.15	0.12	0.09	0.15	0.23	0.28	0.40	0.26	0.19
O57	0.28	0.21	0.14	0.08	0.04	0.09	0.21	0.21	0.32	0.22	0.20
O58	0.33	0.25	0.21	0.11	0.09	0.08	0.11	0.10	0.15	0.37	0.41
O59	0.30	0.23	0.17	0.14	0.10	0.07	0.12	0.13	0.28	0.12	0.13
O60	0.28	0.24	0.15	0.10	0.07	0.07	0.12	0.11	0.26	0.09	0.12
O61	0.10	0.26	0.17	0.12	0.06	0.06	0.07	0.06	0.23	0.16	0.09
O62	0.13	0.24	0.18	0.14	0.07	0.04	0.07	0.08	0.28	0.18	0.13
O63	0.23	0.14	0.17	0.11	0.09	0.02	0.06	0.04	0.04	0.07	0.05
O64	0.17	0.14	0.18	0.13	0.10	0.02	0.05	0.04	0.12	0.08	0.05
O65	0.14	0.19	0.18	0.17	0.12	0.02	0.03	0.07	0.20	0.10	0.05
O66	0.16	0.20	0.16	0.19	0.12	0.08	0.09	0.15	0.25	0.16	0.07
O67	0.23	0.23	0.22	0.08	0.05	0.05	0.07	0.09	0.10	0.17	0.18
O68	0.12	0.10	0.07	0.05	0.05	0.05	0.13	0.13	0.19	0.28	0.25
O69	0.14	0.16	0.08	0.05	0.03	0.07	0.18	0.20	0.41	0.33	0.37
O70	0.17	0.13	0.09	0.03	0.03	0.08	0.20	0.23	0.54	0.25	0.16
O71	0.10	0.08	0.07	0.06	0.02	0.05	0.12	0.17	0.40	0.46	0.46
O72	0.10	0.06	0.07	0.03	0.02	0.06	0.16	0.17	0.32	0.43	0.37
O73	0.10	0.06	0.04	0.10	0.02	0.04	0.06	0.06	0.14	0.10	0.10
O74	0.03	0.05	0.02	0.13	0.02	0.02	0.03	0.05	0.06	0.06	0.09
O75	0.05	0.07	0.08	0.10	0.03	0.03	0.09	0.12	0.26	0.25	0.28
O76	0.05	0.10	0.09	0.07	0.01	0.04	0.13	0.16	0.25	0.13	0.12
O77	0.02	0.04	0.05	0.02	0.02	0.02	0.04	0.09	0.04	0.14	0.25
O78	0.10	0.04	0.07	0.06	0.02	0.03	0.12	0.13	0.33	0.28	0.27
O79	0.03	0.05	0.03	0.07	0.02	0.07	0.07	0.10	0.23	0.14	0.18
O80	0.05	0.11	0.08	0.04	0.02	0.04	0.16	0.25	0.28	0.31	0.22
O81	0.12	0.14	0.11	0.08	0.09	0.06	0.10	0.11	0.53	0.38	0.29
O82	0.16	0.13	0.13	0.05	0.07	0.09	0.27	0.27	0.61	0.30	0.19
O83	0.11	0.12	0.14	0.08	0.07	0.04	0.10	0.10	0.25	0.05	0.26

Points	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW
O84	0.17	0.15	0.14	0.10	0.07	0.11	0.26	0.27	0.59	0.38	0.41
O85	0.10	0.37	0.39	0.34	0.21	0.19	0.28	0.18	0.42	0.46	0.49
O86	0.07	0.37	0.39	0.33	0.20	0.20	0.27	0.18	0.40	0.45	0.47
O87	0.04	0.39	0.39	0.33	0.19	0.19	0.26	0.18	0.40	0.44	0.47
O88	0.01	0.39	0.38	0.32	0.18	0.18	0.24	0.17	0.41	0.44	0.47
O89	0.01	0.39	0.38	0.32	0.17	0.16	0.21	0.14	0.40	0.44	0.48
O90	0.12	0.34	0.34	0.31	0.17	0.17	0.22	0.16	0.41	0.45	0.46
O91	0.04	0.37	0.37	0.31	0.16	0.15	0.19	0.15	0.39	0.43	0.47
O92	0.06	0.38	0.37	0.28	0.15	0.13	0.17	0.17	0.37	0.42	0.48
O93	0.16	0.37	0.37	0.26	0.14	0.13	0.14	0.19	0.40	0.43	0.49
O94	0.22	0.37	0.38	0.21	0.13	0.13	0.12	0.20	0.42	0.43	0.50
O95	0.28	0.38	0.39	0.22	0.11	0.13	0.11	0.20	0.44	0.44	0.51
O96	0.29	0.36	0.38	0.22	0.10	0.13	0.13	0.20	0.51	0.44	0.51
O97	0.30	0.35	0.37	0.23	0.09	0.12	0.16	0.18	0.53	0.43	0.49
O98	0.35	0.33	0.35	0.22	0.09	0.10	0.19	0.17	0.56	0.43	0.49
O99	0.37	0.28	0.26	0.14	0.06	0.07	0.23	0.20	0.60	0.44	0.47
O100	0.30	0.18	0.14	0.09	0.07	0.02	0.08	0.08	0.18	0.28	0.48
O101	0.11	0.33	0.50	0.44	0.26	0.22	0.33	0.22	0.51	0.54	0.63
O102	0.03	0.15	0.44	0.36	0.22	0.19	0.30	0.23	0.39	0.48	0.55
O103	0.03	0.11	0.48	0.37	0.24	0.21	0.28	0.23	0.41	0.55	0.61
O104	0.04	0.16	0.51	0.41	0.25	0.22	0.32	0.24	0.46	0.54	0.64
O105	0.08	0.23	0.51	0.43	0.26	0.24	0.34	0.23	0.50	0.53	0.65
O106	0.05	0.12	0.47	0.37	0.25	0.22	0.28	0.20	0.40	0.51	0.61
O107	0.03	0.11	0.37	0.38	0.24	0.21	0.25	0.22	0.39	0.52	0.58
O108	0.13	0.13	0.29	0.39	0.25	0.23	0.30	0.26	0.44	0.53	0.58
O109	0.04	0.10	0.40	0.37	0.23	0.21	0.24	0.18	0.32	0.48	0.54
O110	0.04	0.13	0.26	0.41	0.24	0.22	0.29	0.23	0.40	0.50	0.54
O111	0.12	0.13	0.24	0.42	0.25	0.23	0.30	0.26	0.45	0.55	0.57

Points	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW
O112	0.17	0.14	0.13	0.39	0.25	0.25	0.36	0.31	0.50	0.57	0.54
O113	0.26	0.08	0.12	0.34	0.28	0.28	0.39	0.36	0.56	0.65	0.61
O114	0.32	0.27	0.14	0.27	0.28	0.29	0.41	0.40	0.60	0.67	0.61
O115	0.48	0.29	0.28	0.12	0.31	0.38	0.60	0.56	0.73	0.61	0.49
O116	0.44	0.30	0.23	0.10	0.27	0.35	0.56	0.53	0.71	0.58	0.40
O117	0.41	0.33	0.23	0.11	0.29	0.35	0.53	0.50	0.69	0.63	0.48
O118	0.36	0.38	0.22	0.09	0.30	0.32	0.46	0.43	0.61	0.66	0.54
O119	0.28	0.29	0.26	0.10	0.28	0.33	0.44	0.36	0.46	0.51	0.42
O120	0.19	0.24	0.19	0.09	0.13	0.23	0.32	0.27	0.39	0.37	0.21
O121	0.20	0.22	0.24	0.09	0.15	0.25	0.34	0.24	0.33	0.37	0.23
O122	0.21	0.24	0.27	0.08	0.18	0.29	0.38	0.27	0.30	0.38	0.35
O123	0.23	0.25	0.31	0.08	0.20	0.32	0.40	0.29	0.36	0.42	0.45
O124	0.26	0.21	0.33	0.09	0.17	0.31	0.40	0.30	0.40	0.40	0.44
O125	0.30	0.16	0.32	0.07	0.12	0.29	0.40	0.31	0.43	0.39	0.41
O126	0.31	0.13	0.31	0.06	0.10	0.28	0.37	0.29	0.42	0.39	0.39
O127	0.23	0.23	0.34	0.09	0.09	0.26	0.42	0.32	0.41	0.46	0.49
O128	0.28	0.20	0.39	0.13	0.09	0.18	0.45	0.37	0.53	0.55	0.56
O129	0.28	0.17	0.37	0.20	0.14	0.08	0.41	0.36	0.56	0.59	0.59
O130	0.25	0.15	0.31	0.26	0.17	0.12	0.33	0.31	0.51	0.57	0.59
O131	0.26	0.12	0.27	0.34	0.17	0.14	0.25	0.30	0.52	0.59	0.62
O132	0.30	0.08	0.18	0.37	0.13	0.14	0.18	0.31	0.57	0.63	0.62
O133	0.33	0.06	0.11	0.32	0.18	0.12	0.14	0.31	0.58	0.61	0.57
O134	0.38	0.03	0.04	0.27	0.21	0.10	0.12	0.31	0.60	0.61	0.52
O135	0.41	0.13	0.08	0.24	0.23	0.09	0.11	0.32	0.61	0.60	0.52
O136	0.09	0.14	0.18	0.15	0.08	0.10	0.12	0.14	0.46	0.29	0.20
O137	0.23	0.04	0.08	0.05	0.03	0.10	0.13	0.18	0.44	0.31	0.21
O138	0.20	0.05	0.08	0.07	0.06	0.08	0.14	0.23	0.41	0.32	0.19
O139	0.27	0.04	0.06	0.09	0.09	0.10	0.13	0.28	0.47	0.36	0.08

Points	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW
O140	0.35	0.10	0.04	0.17	0.14	0.10	0.12	0.32	0.52	0.45	0.23
O141	0.40	0.18	0.13	0.33	0.18	0.08	0.10	0.33	0.60	0.55	0.58
O142	0.37	0.28	0.15	0.31	0.09	0.13	0.07	0.33	0.54	0.45	0.52
O143	0.37	0.37	0.21	0.28	0.10	0.16	0.03	0.32	0.55	0.46	0.51
O144	0.37	0.40	0.27	0.23	0.12	0.19	0.06	0.28	0.52	0.44	0.50
O145	0.36	0.41	0.35	0.16	0.14	0.20	0.07	0.26	0.50	0.43	0.51
O146	0.36	0.44	0.42	0.16	0.16	0.21	0.05	0.26	0.51	0.44	0.53
O147	0.13	0.22	0.27	0.09	0.16	0.18	0.04	0.29	0.57	0.44	0.46
O148	0.41	0.41	0.44	0.28	0.07	0.15	0.05	0.35	0.71	0.62	0.63
O149	0.39	0.41	0.43	0.33	0.06	0.16	0.05	0.33	0.67	0.62	0.65
O150	0.07	0.04	0.03	0.09	0.08	0.08	0.09	0.06	0.03	0.04	0.16
O151	0.10	0.07	0.07	0.10	0.09	0.08	0.10	0.06	0.02	0.13	0.07
O152	0.10	0.15	0.18	0.12	0.15	0.04	0.06	0.04	0.04	0.05	0.23
O153	0.14	0.06	0.07	0.12	0.04	0.03	0.03	0.02	0.03	0.03	0.02
O154	0.21	0.22	0.25	0.30	0.06	0.14	0.16	0.14	0.08	0.05	0.10
O155	0.09	0.10	0.11	0.12	0.05	0.08	0.10	0.08	0.02	0.06	0.02
O156	0.25	0.24	0.27	0.30	0.24	0.33	0.41	0.33	0.18	0.15	0.27
O157	0.30	0.13	0.13	0.20	0.23	0.23	0.22	0.30	0.07	0.10	0.34
O158	0.26	0.11	0.11	0.12	0.20	0.15	0.22	0.09	0.11	0.14	0.32
O159	0.26	0.24	0.24	0.25	0.20	0.18	0.27	0.10	0.03	0.05	0.33
O160	0.19	0.25	0.23	0.21	0.22	0.15	0.28	0.09	0.11	0.08	0.29
O161	0.21	0.07	0.09	0.09	0.15	0.08	0.22	0.07	0.09	0.33	0.26
O162	0.20	0.08	0.09	0.10	0.07	0.05	0.18	0.20	0.28	0.47	0.27
O163	0.20	0.24	0.21	0.14	0.18	0.11	0.19	0.30	0.41	0.33	0.25
O164	0.19	0.13	0.15	0.22	0.17	0.21	0.10	0.11	0.10	0.09	0.07

Table D 6 Special Test Points of Indicative Scheme

Points	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW
S1	0.06	0.04	0.04	0.07	0.18	0.24	0.21	0.26	0.41	0.21	0.20
S2	0.11	0.24	0.10	0.06	0.12	0.19	0.21	0.24	0.55	0.45	0.28
S3	0.08	0.22	0.05	0.06	0.01	0.01	0.04	0.06	0.30	0.12	0.14
S4	0.09	0.18	0.04	0.03	0.03	0.06	0.04	0.04	0.20	0.29	0.25
S5	0.02	0.07	0.08	0.19	0.07	0.06	0.07	0.05	0.20	0.17	0.37
S6	0.07	0.14	0.07	0.35	0.10	0.08	0.06	0.06	0.28	0.41	0.53
S7	0.03	0.06	0.10	0.06	0.08	0.17	0.14	0.26	0.51	0.25	0.21
S8	0.32	0.39	0.36	0.11	0.31	0.36	0.44	0.35	0.13	0.18	0.20
S9	0.14	0.35	0.40	0.41	0.25	0.10	0.07	0.08	0.20	0.07	0.18
S10	0.12	0.09	0.03	0.07	0.06	0.07	0.11	0.07	0.15	0.08	0.08
S11	0.34	0.38	0.41	0.25	0.22	0.18	0.17	0.14	0.14	0.21	0.15
S12	0.31	0.36	0.42	0.36	0.14	0.23	0.26	0.22	0.32	0.29	0.16
S13	0.13	0.20	0.21	0.22	0.05	0.09	0.12	0.12	0.25	0.13	0.10
S14	0.15	0.08	0.13	0.13	0.08	0.08	0.10	0.14	0.22	0.52	0.32
S15	0.14	0.32	0.39	0.32	0.21	0.20	0.29	0.11	0.18	0.47	0.30
S16	0.20	0.25	0.14	0.04	0.12	0.21	0.30	0.28	0.21	0.18	0.17
S17	0.10	0.06	0.11	0.11	0.07	0.06	0.08	0.18	0.23	0.52	0.33
S18	0.07	0.21	0.21	0.19	0.09	0.04	0.12	0.11	0.06	0.14	0.10
S19	0.05	0.07	0.14	0.11	0.13	0.18	0.25	0.16	0.02	0.13	0.05
S20	0.24	0.05	0.06	0.09	0.11	0.12	0.08	0.06	0.11	0.43	0.24
S21	0.07	0.04	0.09	0.10	0.05	0.09	0.16	0.09	0.07	0.32	0.24
S22	0.15	0.05	0.08	0.10	0.03	0.09	0.14	0.10	0.30	0.18	0.06
S23	0.14	0.10	0.12	0.10	0.02	0.10	0.16	0.11	0.42	0.28	0.12
S24	0.04	0.05	0.08	0.13	0.04	0.05	0.16	0.04	0.22	0.23	0.18
S25	0.08	0.05	0.08	0.07	0.02	0.07	0.15	0.04	0.11	0.19	0.20
S26	0.10	0.09	0.06	0.03	0.05	0.04	0.04	0.04	0.20	0.17	0.17
S27	0.18	0.05	0.16	0.05	0.03	0.04	0.06	0.09	0.45	0.35	0.27

Points	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW
S28	0.02	0.03	0.05	0.06	0.02	0.06	0.14	0.02	0.05	0.34	0.26
S29	0.35	0.21	0.33	0.33	0.22	0.08	0.09	0.03	0.17	0.37	0.26
S30	0.39	0.23	0.41	0.43	0.26	0.05	0.06	0.03	0.30	0.46	0.40
S31	0.02	0.07	0.02	0.06	0.06	0.07	0.03	0.01	0.16	0.33	0.19
S32	0.11	0.05	0.04	0.02	0.05	0.06	0.02	0.01	0.31	0.43	0.30
S33	0.10	0.06	0.03	0.07	0.08	0.05	0.03	0.01	0.37	0.47	0.40
S34	0.11	0.16	0.12	0.06	0.03	0.03	0.06	0.01	0.03	0.06	0.20
S35	0.30	0.29	0.26	0.24	0.12	0.04	0.03	0.03	0.41	0.50	0.49
S36	0.14	0.17	0.21	0.16	0.07	0.01	0.08	0.03	0.44	0.54	0.55
S37	0.19	0.04	0.07	0.15	0.11	0.04	0.09	0.10	0.04	0.17	0.11
S38	0.18	0.24	0.26	0.25	0.09	0.07	0.15	0.05	0.41	0.50	0.40
S39	0.05	0.07	0.09	0.32	0.02	0.08	0.10	0.18	0.41	0.46	0.52
S40	0.24	0.14	0.14	0.09	0.10	0.11	0.12	0.16	0.38	0.21	0.17
S41	0.15	0.10	0.17	0.13	0.14	0.09	0.08	0.11	0.19	0.32	0.21
S42	0.13	0.17	0.25	0.33	0.05	0.09	0.10	0.19	0.37	0.41	0.51
S43	0.19	0.16	0.19	0.17	0.17	0.16	0.29	0.28	0.58	0.56	0.46
S44	0.18	0.23	0.23	0.26	0.23	0.15	0.09	0.10	0.13	0.46	0.47
S45	0.25	0.30	0.41	0.43	0.28	0.20	0.17	0.12	0.21	0.40	0.32
S46	0.12	0.33	0.43	0.39	0.19	0.25	0.07	0.08	0.23	0.41	0.31
S47	0.09	0.32	0.33	0.32	0.13	0.19	0.09	0.02	0.25	0.32	0.29
S48	0.08	0.31	0.34	0.34	0.15	0.15	0.14	0.03	0.08	0.19	0.31
S49	0.05	0.09	0.08	0.16	0.17	0.12	0.13	0.03	0.10	0.39	0.43
S50	0.16	0.09	0.13	0.17	0.14	0.08	0.12	0.01	0.33	0.29	0.25
S51	0.16	0.16	0.23	0.19	0.04	0.06	0.12	0.09	0.04	0.48	0.29
S52	0.23	0.13	0.15	0.08	0.04	0.08	0.03	0.07	0.13	0.49	0.41
S53	0.27	0.18	0.26	0.11	0.04	0.03	0.02	0.08	0.10	0.07	0.06
S54	0.34	0.29	0.29	0.27	0.16	0.23	0.12	0.09	0.07	0.19	0.19
S55	0.39	0.16	0.34	0.30	0.12	0.03	0.12	0.08	0.23	0.48	0.48

Points	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW
S56	0.44	0.24	0.39	0.35	0.11	0.03	0.05	0.08	0.02	0.11	0.09
S57	0.55	0.34	0.37	0.37	0.16	0.05	0.05	0.09	0.03	0.08	0.08
S58	0.09	0.08	0.09	0.24	0.14	0.20	0.22	0.09	0.11	0.13	0.18
S59	0.22	0.17	0.18	0.16	0.10	0.12	0.13	0.19	0.42	0.33	0.13
S60	0.23	0.17	0.23	0.27	0.12	0.10	0.10	0.16	0.28	0.38	0.22
S61	0.31	0.29	0.31	0.32	0.15	0.09	0.11	0.14	0.23	0.33	0.39
S62	0.09	0.15	0.09	0.11	0.13	0.19	0.22	0.24	0.55	0.02	0.24
S63	0.09	0.05	0.07	0.06	0.16	0.15	0.15	0.07	0.19	0.21	0.10