TERM CONSULTANCY FOR AIR VENTILATION ASSESSMENT SERVICES

Cat. A1– Term Consultancy for Expert Evaluation and Advisory Services on Air Ventilation Assessment (PLNQ 37/2007)

Final Report
Tai Po Area

August 2010

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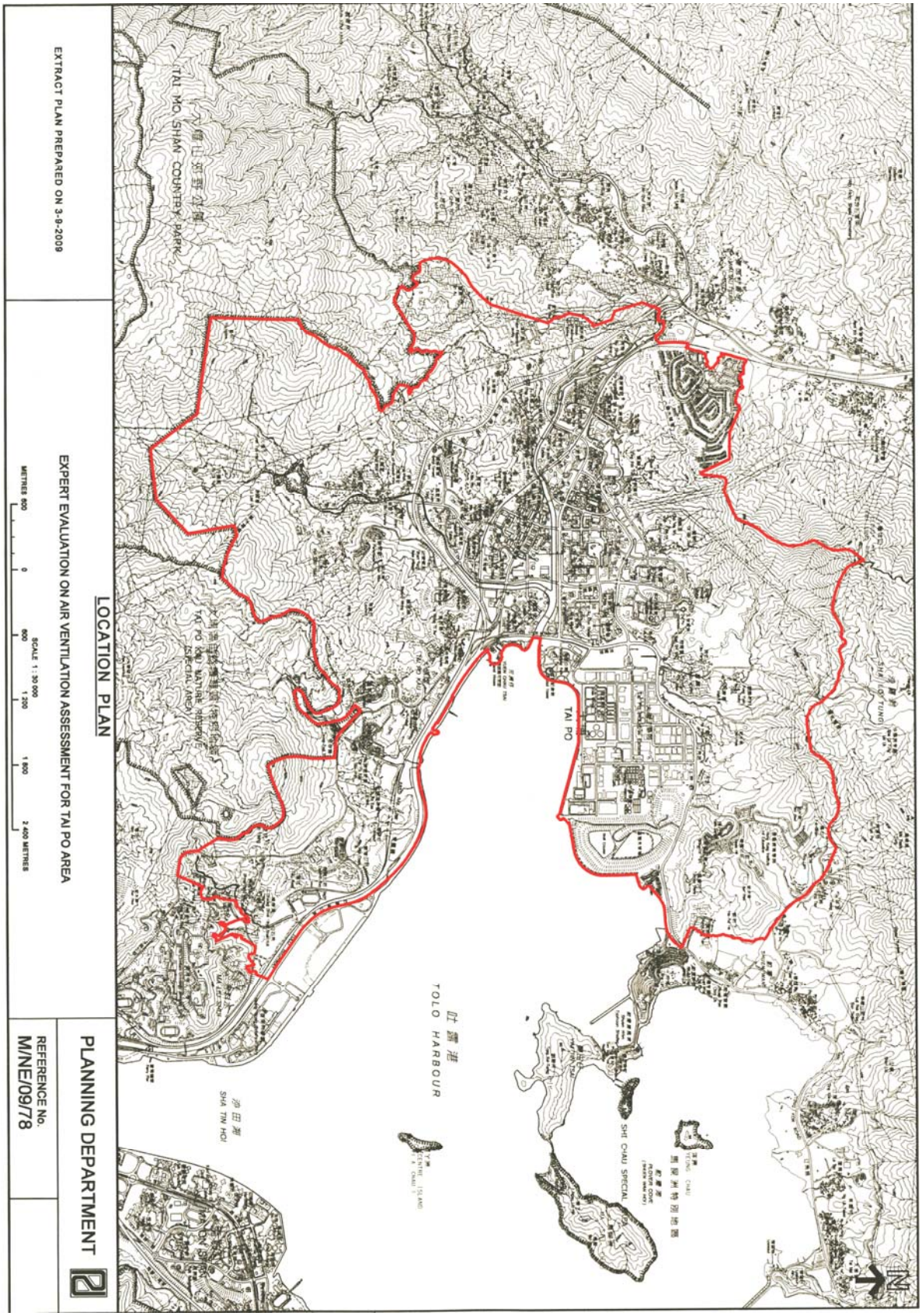


The Study Area

Expert Evaluation Report
of Tai Po Area

Executive summary

0.1 Wind Availability

(a) Based on the available wind data, the annual wind of the study area is mainly from the East and North. The summer wind is mainly coming from the East and the Southerly quarters.

(b) Most of time, the study area is dominated by the prevailing wind from the East. It is good that the study area is wide open in the east and prevailing wind will not blocked by surrounded mountains.

(c) Two valley wind systems as shown in Figure 4.1 (blue arrows) can be identified. They are important to respect and utilize. The valley wind from the south over Wilson Trail stage 7 is particularly important as it is also assisted by the prevailing summer winds. The valley wind arrives at Wan Tau Tong Estate and Tai Po Market over a number of small villages. This must be respected and not obstructed, and the valley wind path must be further vegetated so as to enhance it.

0.2 Existing conditions

(a) The study area, compared to some metro areas in Hong Kong, has quite extensive green coverage (Figure 5.2), such as green belts on the hills and also some parks inside the area.

(b) Overall, the ground coverage in the study area is low. Isolated cells of high ground coverage in the study area are normally not a cause of concern.

(c) Overall, the building volume in the study area is low. Greeneries in the surroundings will also alleviate the adverse impacts.

(d) The study area comprises of many connected “GIC”, “O” and “GB” zones. The existing open space, greenery and GIC sites should not be further developed with tall buildings or re-zoned for bulkier development.

(e) For the east prevailing wind, Tai Wo Road, the adjacent Lam Tsuen River and Tai Po Road (Tai Wo) are one of the main breezeways through the study area. They are very useful for air ventilation of the study area. This major breezeway of the study area should be maintained and further expanded if possible to enhance the air ventilation of the area.

(f) Current car park area along Po Heung Street will be developed into 84mPD-high building with a 1-storey podium. When wind is from the south quarter, streets behind it, which is as narrow as 10m, could experience canyon effects. Especially, if the

surrounded buildings were all developed up to 80mPD, the existing narrow street networks need to be widened to have a lower height-to-street ratio. The explanations of height-to-street ratio and its relationships with air flows are shown in Figure 6.2. Based on this principle, the maximum building height for Tai Po Hui area should be set as not to exceed the existing situation. A height-to-width ratio of 2 could be taken as a suitable threshold value for reference given the existing street width of about 15-20m. Taken into account the existing site level of about 5 to 10mPD, a maximum building height of about 40-50mPD is suggested.

0.3 The Initial Planning Scenario

(a) On the whole the proposed building height restrictions mainly reflect the existing situation. The proposed plot ratio restriction is more or less similar with the existing condition. With careful design and disposition of buildings on site, this should not result in adverse air ventilation issues.

(b) It is recommended the two main breezeways for east prevailing wind to be widened, together with non-building-areas as much as possible at both sides. At least, they should be kept and reinforced through greening.

(c) In the areas around Chui Lok Street and Tai Po Hui, the existing street network and urban grain must be respected. Streets and lots must not be combined with bulks development and large podium without careful consideration of air ventilation.

(d) For Tai Po Industrial Estate, it is good to keep building as low as existing conditions. It is also highly recommended to keep the current Tai Po Waterfront Park as an open entry for east prevailing wind.

(e) In the lot of Tai Wo Estate, Fu Heng Estate, Fu Shin Estate, Kwong Fuk Estate, Tai Yuen Estate and Wan Tau Tong Estate, Housing Department should conduct AVA study to ensure good air ventilation to the surroundings upon redevelopment.

(f) In the proposed amendments provided by PlanD (Figure 7.1 & 7.2), it can be seen that some major roads are extracted from R(A) zone and rezoned to ROAD. It is good to keep the roads as air paths in this statutory way. It is suggested to rezone more development area to non-building-area as well.

(g) It is suggested to extend a non-building area from Kwong Fuk Road to the northwest, thus maintaining an air path in between the whole piece of R(A) land (see the middle red bar in figure 7.4). It would be better if more east-west air paths or non-building-area can be designated, among which the two thinner red bars in Figure 7.4 are such examples.

0.4 The Revised Scenario

(a) In response to the expert evaluation of the initial planned scenario, a revised scenario is proposed by the Planning Department (Figure 8.1). A number of suggested improvements as illustrated in Figure 8.1 have been incorporated in formulating the BH restrictions and to address the air ventilation issues earlier mentioned. The revised scenario is further evaluated.

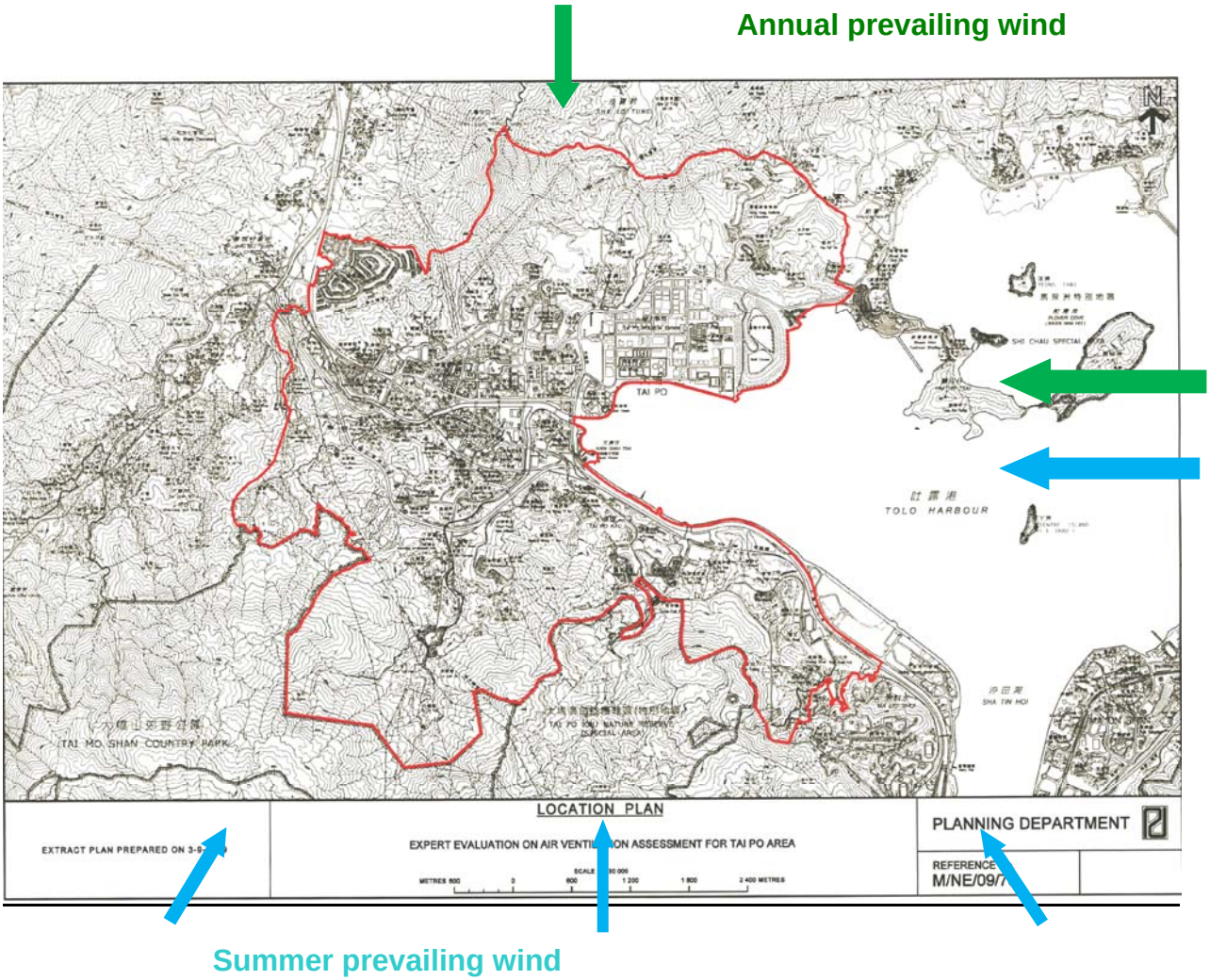


Figure 0.1 The prevailing wind in the study area

0.5 Focus Areas and Further Studies

(a) There is no focus area of concern in the study area.

(b) Based on the expert assessment, there should be no major air ventilation issues from the study area if the suggestions in section 7.0 & 8.0 can be followed. Then further study will not be necessary.

Tai Po Area

1.0 The Assignment

1.1 In order to provide better planning control on the building height and plot ratio/gross floor area (GFA) upon development/redevelopment, the draft Tai Po Outline Zoning plan (OZP) No. M/NE/09/81 (the Plan) is being reviewed with a view to incorporating appropriate development restrictions in the Notes for various development zones of the OZP to guide future development/redevelopment. It is considered necessary to conduct an expert evaluation to assess the preliminary Air Ventilation impacts of the proposed building height restrictions.

1.2 This expert evaluation report is based on the materials given by Planning Department to the Consultant on 19th October, 20th October and 23rd October, including:

- The Proposed Tai Po OZP
- Proposed building height restrictions (in mPD) for the "Residential (Group A)" ("(R(A)"), "Residential (Group B)" ("R(B)"), "Residential (Group C)" ("R(C)"), Other Specified Uses (OU)
- Proposed building height restrictions (in terms of maximum number of storeys) for the "Government, Institution or Community" ("G/IC") zone and "OU" zones on the OZP.
- Existing building heights and podium heights in shapefile
- Proposed amendments to Tai Po OZP
- Committed projects (including building height and podium height)

1.3 The consultant has studied the above mentioned materials and has conducted site inspection on 21 October 2009. During the writing of the report, the consultant has working session with Planning Department on 19 October 2009 and 26 November 2009. A working paper was submitted to Planning Department at the end of November 2009. There were further consultation meetings with Planning Department during the period of December 2009 and February 2010.

2.0 Background

2.1 Planning Department study: "Feasibility Study for Establishment of Air Ventilation Assessment System" has recommended that it is important to allow adequate air ventilation through the built environment for pedestrian comfort.

2.2 Given Hong Kong's high density urban development, the study opines that: "more air ventilation, the better" is the useful design guideline.

2.3 The study summarises 10 qualitative guidelines for planners and designers. For the OZP level of consideration, breezeways/air paths, street grids and orientations, open spaces, non-building areas, waterfront sites, scales of podium, building heights, building dispositions, and greeneries are all important strategic considerations.

2.4 The study also suggests that Air Ventilation Assessment (AVA) be conducted in 3 stages: Expert Evaluation, Initial Studies, and Detailed Studies. The suggestion have been adopted and incorporated into Housing, Planning and Lands Bureau (HPLB) and Environment, Transport and Works Bureau (ETWB) Technical Circular no. 1/06. The key purposes of Expert Evaluation are to:

(a) Identify good design features.
(b) Identify obvious problem areas and propose some mitigation measures.
(c) Define "focuses" and methodologies of the Initial and/or Detailed studies.
(d) Determine if further study should be staged into Initial Study and Detailed Study, or Detailed Study alone.

2.5 To conduct the Expert Evaluation systematically and methodologically, it is necessary to undertake the following information analyses:

(a) Analyse relevant wind data as the input conditions to understand the wind environment of the study area.
(b) Analyse the topographical features of the study area, as well as the surrounding areas.
(c) Analyse the greenery/landscape characteristics of the study area, as well as the surrounding areas.
(d) Analyse the land use and built form of the study area, as well as the surrounding areas.

Based on the analyses:

(e) Estimate the characteristics of the input wind conditions of the study area.
(f) Identify the wind paths and wind flow characteristics of the study area through slopes, open spaces, streets, gaps and non-building areas (NBAs) between buildings, and low rise buildings; also identify stagnant/problem areas, if any.
(g) Estimate the need of wind for pedestrian comfort.

Based on the analyses of the EXISTING urban conditions:

(h) Evaluate the strategic role of the area in air ventilation term.
(i) Identify problematic areas which warrant attention.
(j) Identify existing "good features" that needs to be kept or strengthened.

Based on an understanding of the EXISTING urban conditions:

(k) Compare the prima facie impact, merits or demerits of the building height restrictions as proposed by Planning Department on Air Ventilation.
(l) Highlight problem areas, if any. Recommend improvements and mitigation measures if possible.
(m) Identify focus areas or issues that may need further studies. Recommend appropriate technical methodologies for the study if needed.

3.0 The wind environment

3.1 Hong Kong Observatory (HKO) stations provide useful and reliable data of the wind environment in Hong Kong (Figure 3.1). There are some 46 stations operated by HKO in Hong Kong. Together, they allow a very good general understanding of the wind environment especially close to ground level.

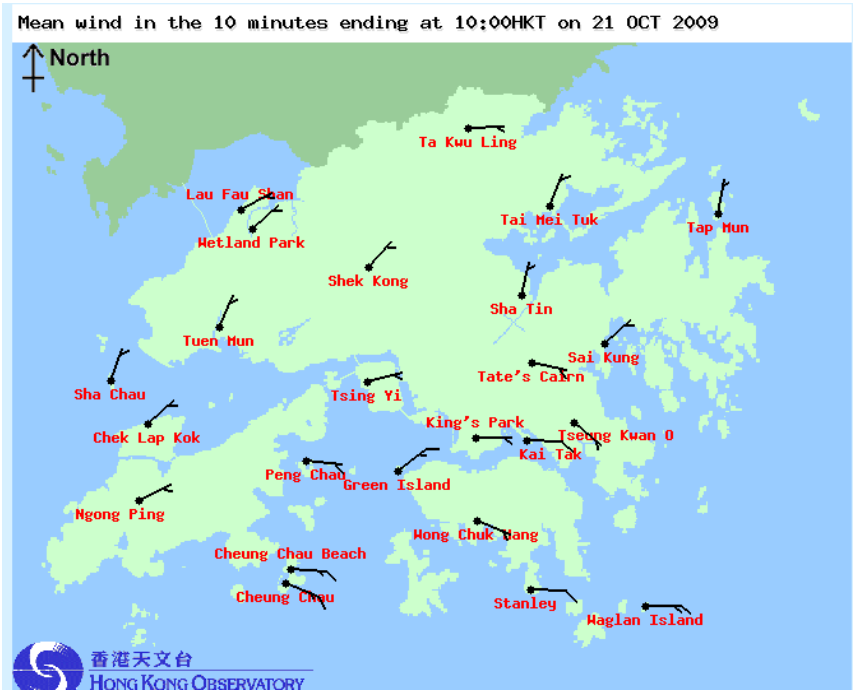


Figure 3.1 Some of the HKO stations in Hong Kong. This is a screen capture from the HKO website. The arrows show the wind directions and speeds of the time.

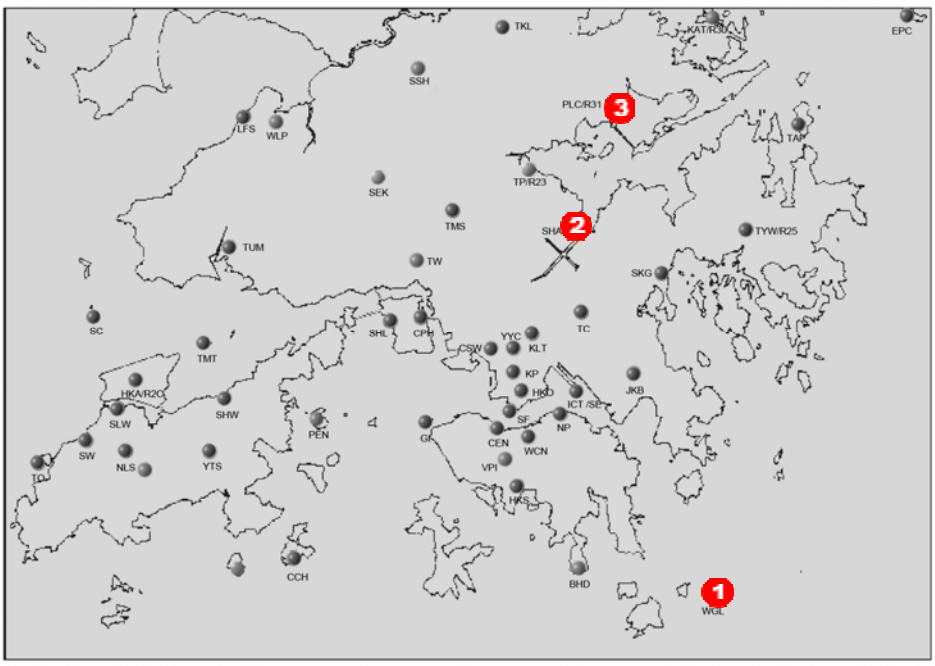


Figure 3.2 The HKO stations at 1: Waglan Island (WGL), 2: Sha Tin (SHA), and 3: Tai Mei Tuk (PLC)

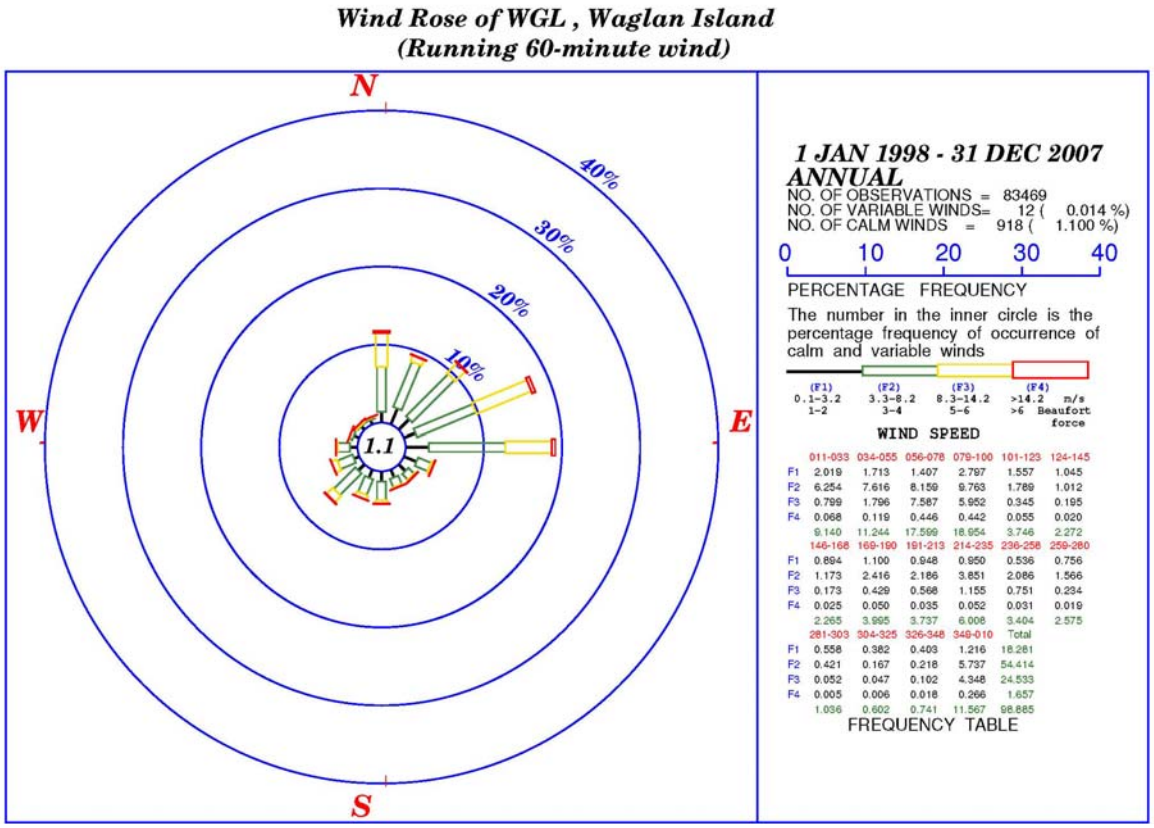


Figure 3.3 Wind rose of WGL 1998 – 2007 (annual)

3.2 The HKO station at Waglan Island (WGL) is normally regarded by wind engineers as the reference station for wind related studies (Figure 3.3). The station has a very long measuring record, and it is unaffected by Hong Kong's complex topography [unfortunately, it is known not to be able to capture the thermally induced local wind circulation like sea breezes too well]. Based on WGL wind data, studies are typically employed to estimate the site wind availability taking into account the topographical features around the site.

3.3 Examining the annual wind rose of WGL, it is apparent that the annual prevailing wind in Hong Kong is from the East. There is also a major component of wind coming from the North-East; and there is a minor, but nonetheless observable component from the South-West. Around 70% of the time, WGL has weak to moderate wind (0.1m/s to 8.2 m/s).

3.4 For the study, it is important to understand the wind environment seasonally or monthly (Figure 3.4 and 3.5). In the winter months of Hong Kong, the prevailing wind comes from the North-East. In the summer months, they come from the South-West. As far as AVA is concerned, in Hong Kong, the summer wind is very important and beneficial to thermal comfort. Hence, based on WGL data, it is very important to plan our city, on the one hand, to capture the annual wind characteristics, and on the other hand, to maximize the penetration of the summer winds (mainly from the South-West) into the urban fabric.

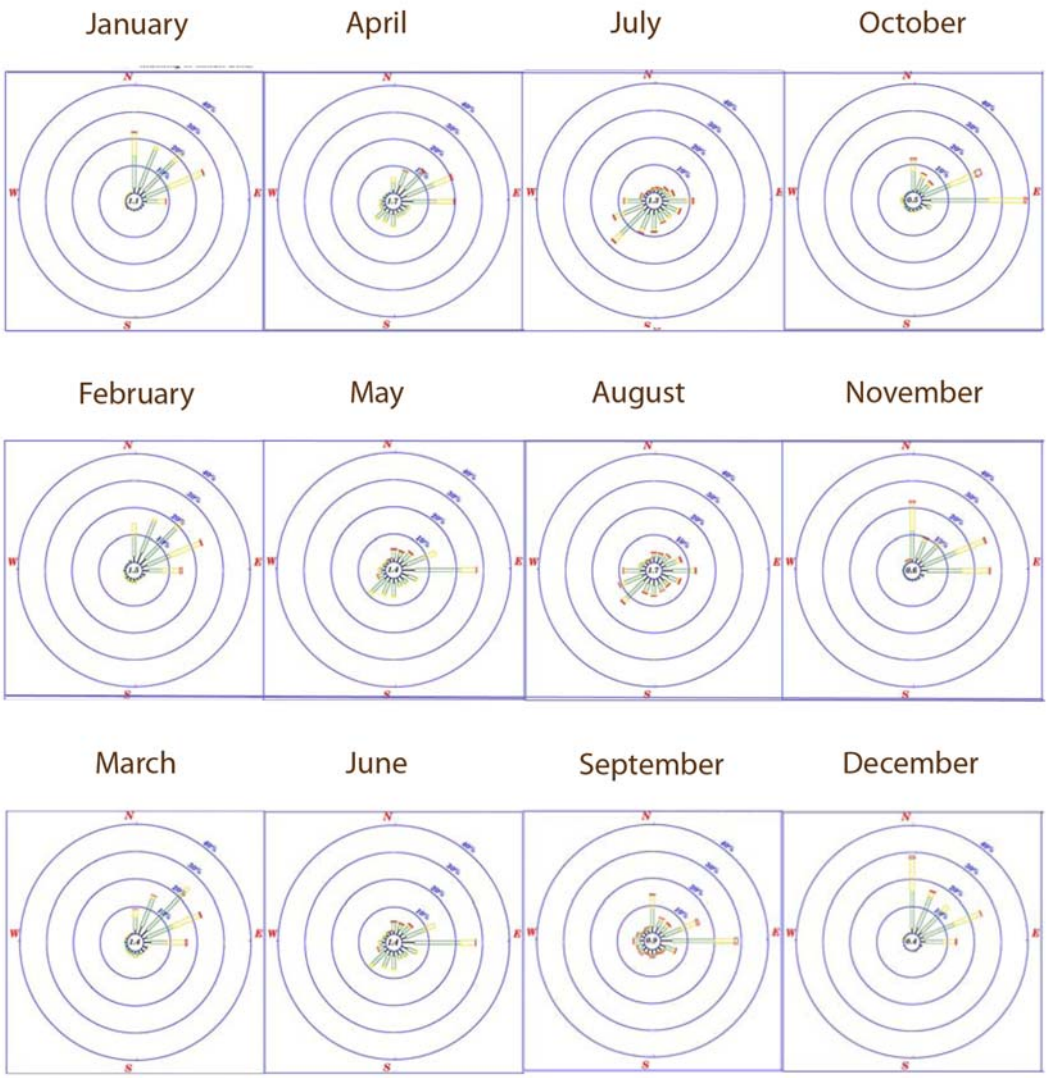


Figure 3.4 (as an example) monthly wind roses of WGL 1998 – 2007

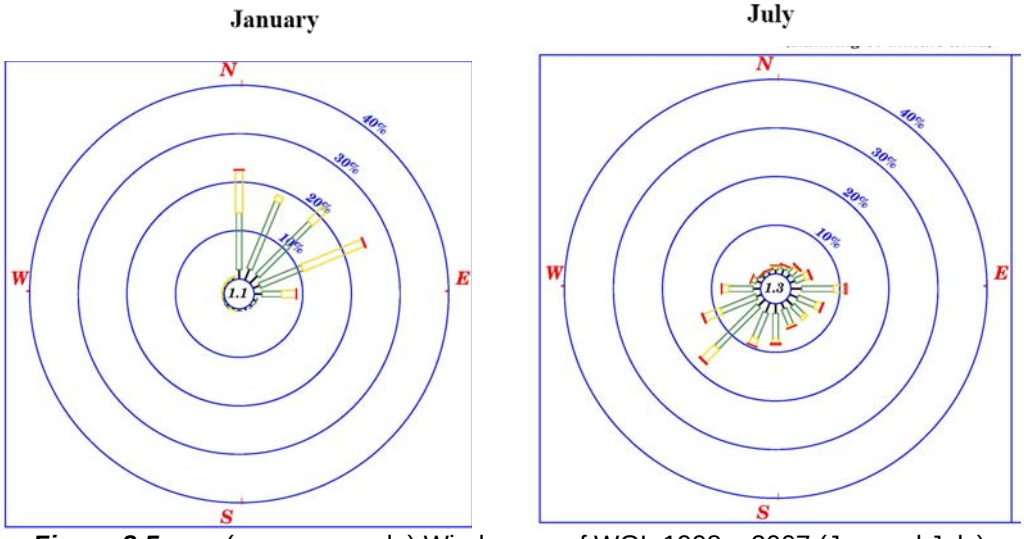


Figure 3.5 (as an example) Wind roses of WGL 1998 – 2007 (Jan and July)

3.5 Apart from WGL, wind data of Sha Tin and Tai Mei Tuk have been extracted from HKO for reference (Figure 3.6 to Figure 3.11) as the nearest stations measuring wind.

Weather station at Tai Po only measures air temperature, relative humidity and means sea level pressure, excluding wind velocity. It should thus be borne in mind that wind data from these two stations could not indicate the exact site wind for the study area due to their certain distance and variant landscape. For example, Sha Tin Station is exposed to the river in the west, thus influenced by the channeling effect of the river. Tai Mei Tuk Station is widely exposed to the sea from the northeast to the southwest, but blocked in the north. However, as they are the nearest stations, their data is still useful to investigate the surrounding wind condition of the study area.

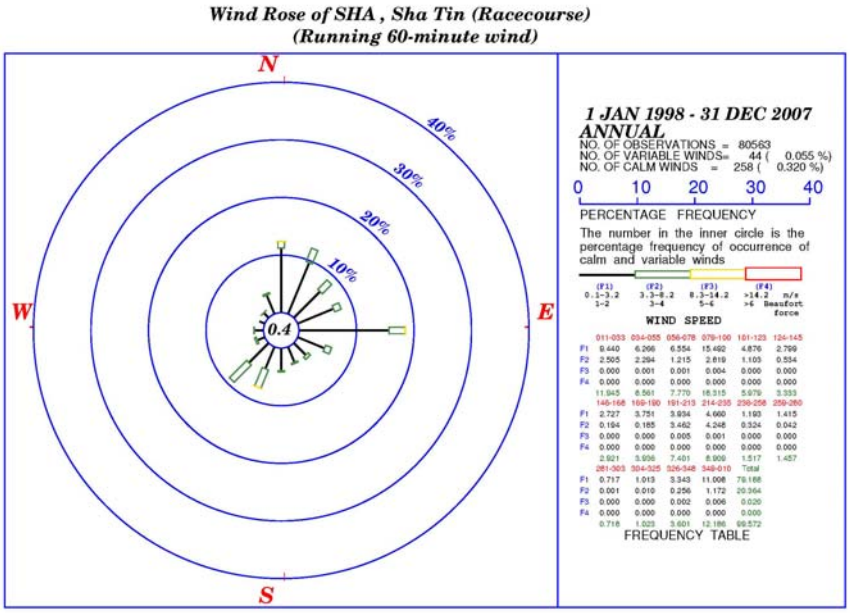


Figure 3.6 Wind rose of Sha Tin 1998-2007 (annual)

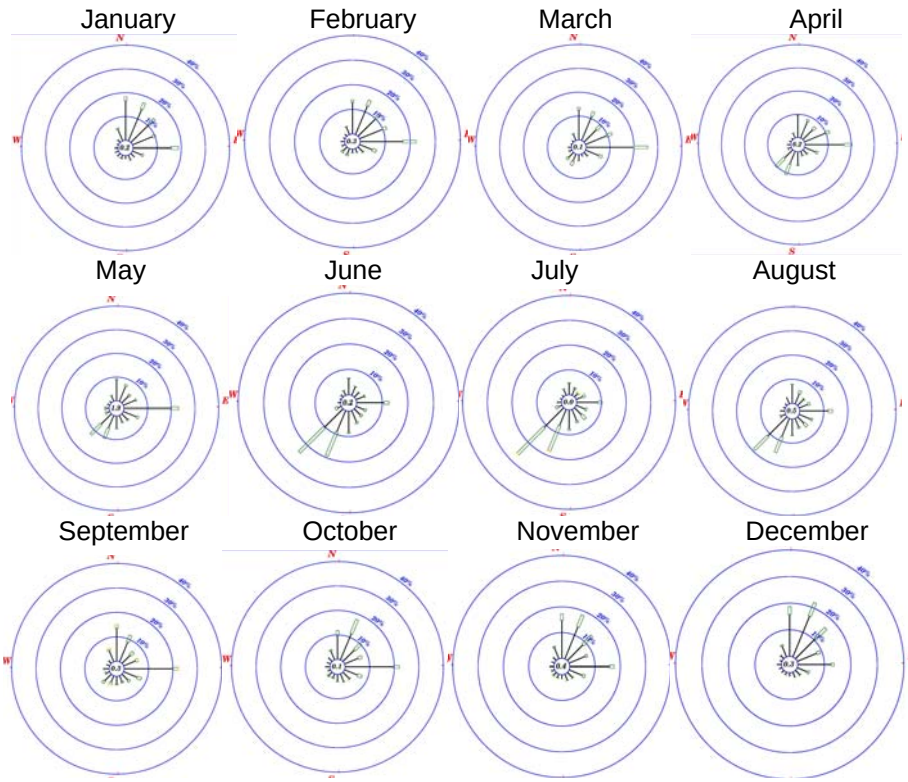


Figure 3.7 (as an example) monthly wind roses of Sha Tin 1998 – 2007

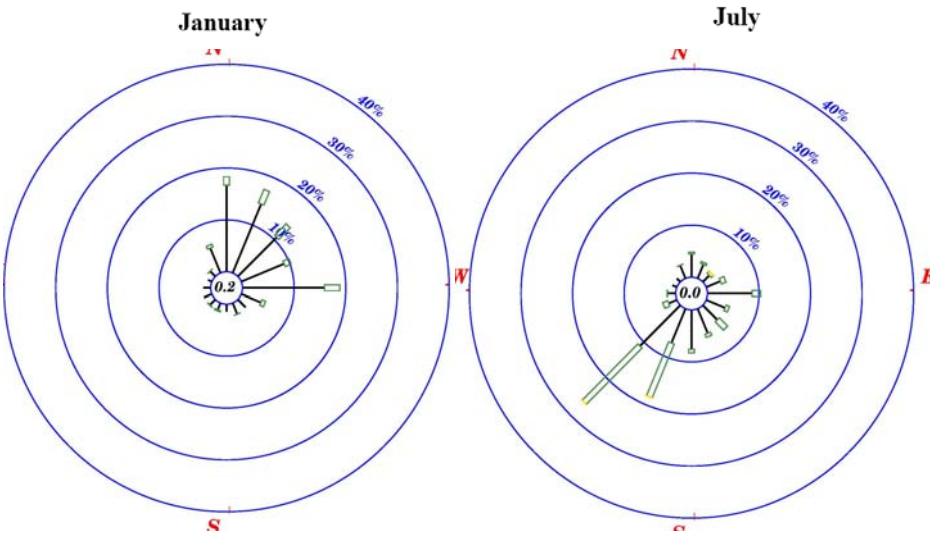


Figure 3.8 (as an example) Wind roses of Sha Tin 1998 – 2007 (Jan and July)

3.6 Sha Tin's annual wind rose shows a prevailing wind direction of North, East and South-West. It shows a strong channeling from Tolo Harbor. Sha Tin's summer wind rose shows a prevailing wind direction of South-West. It shows a strong channeling towards Tolo Harbor

3.7 Tai Mei Tuk's annual wind rose shows a prevailing wind direction of North-East and East. Tai Mei Tuk's summer wind rose shows a East-West channeling wind directions

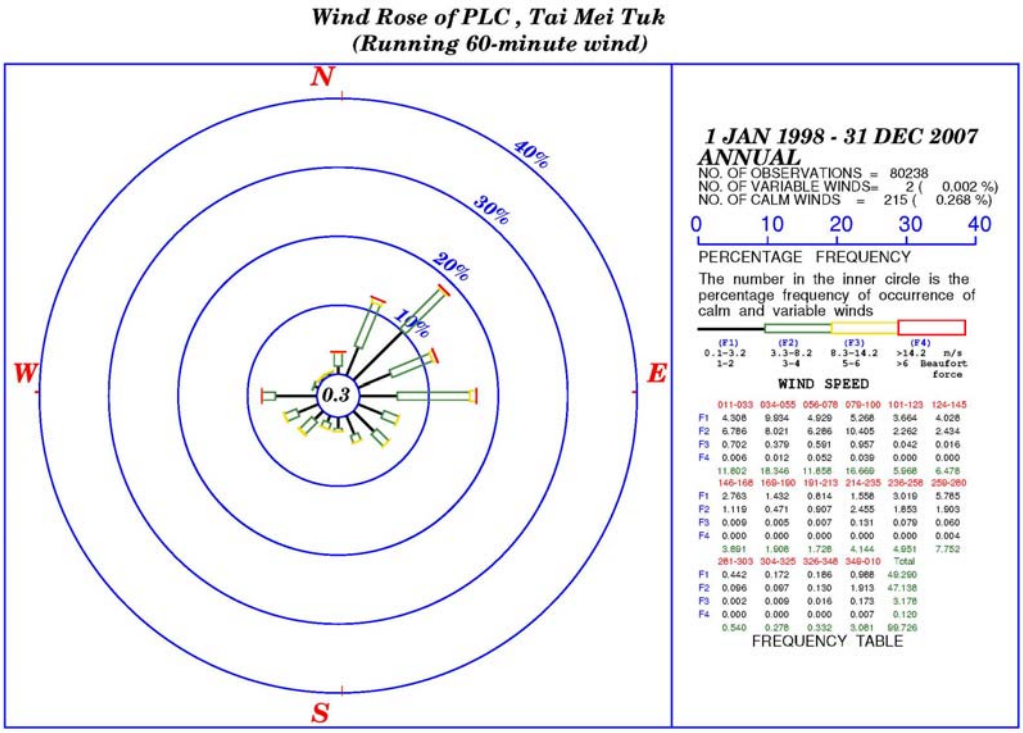


Figure 3.9 Wind rose of Tai Mei Tuk 1998-2007 (annual)

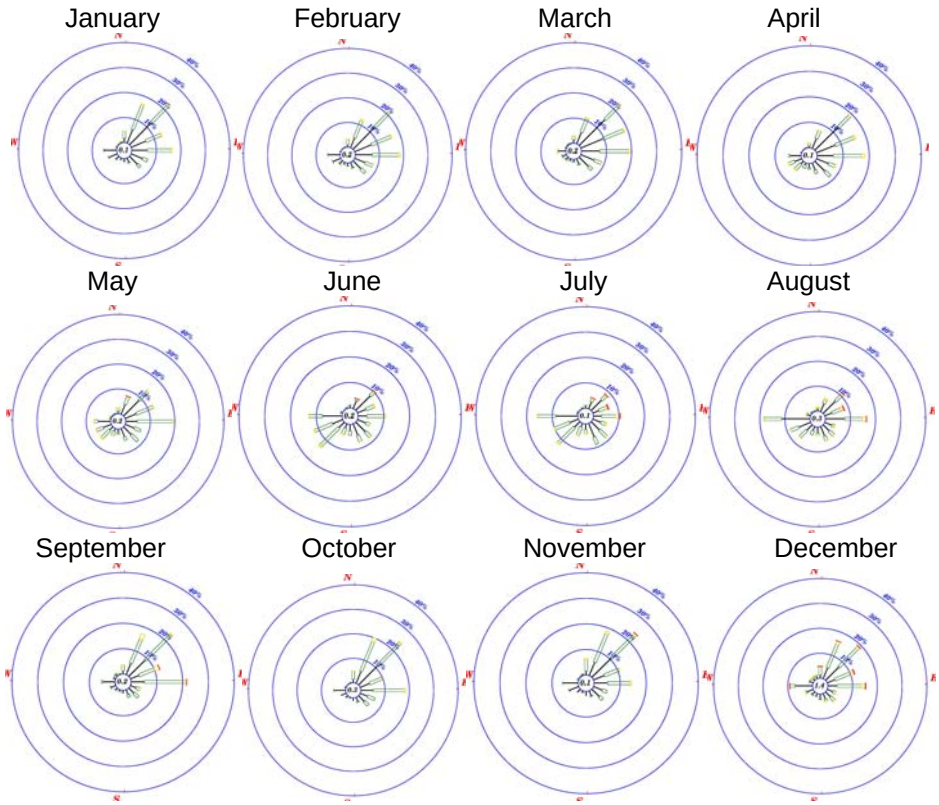


Figure 3.10 (as an example) monthly wind roses of Tai Mei Tuk 1998 – 2007

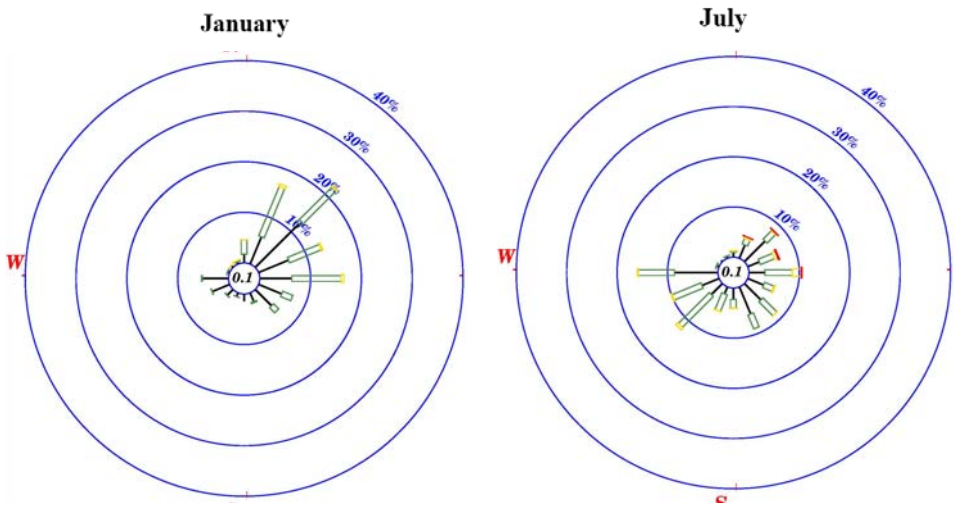


Figure 3.11 (as an example) Wind roses of Tai Mei Tuk 1998 – 2007 (Jan and July)

3.8 Researchers at Hong Kong University of Science and Technology (HKUST), Prof Alexis Lau and Prof Jimmy Fung, have simulated a set of wind data using MM5. The data period cover the whole year of 2004. Based on this dataset, 4 locations of the study area are extracted at 120m and 450m above ground (Figures 3.12 to 3.20). These 4 locations, according to the theories of MM5, are selected to reflect the general wind pattern within the study area induced by topography. The altitude of 450m can be

assumed to represent the atmospheric boundary layer (ABL) wind characteristic which gives good indication of the free wind of the area. The 120m height can represent urban canopy layer (UCL) wind characteristics and the UCL data is useful to account for topographical effects.

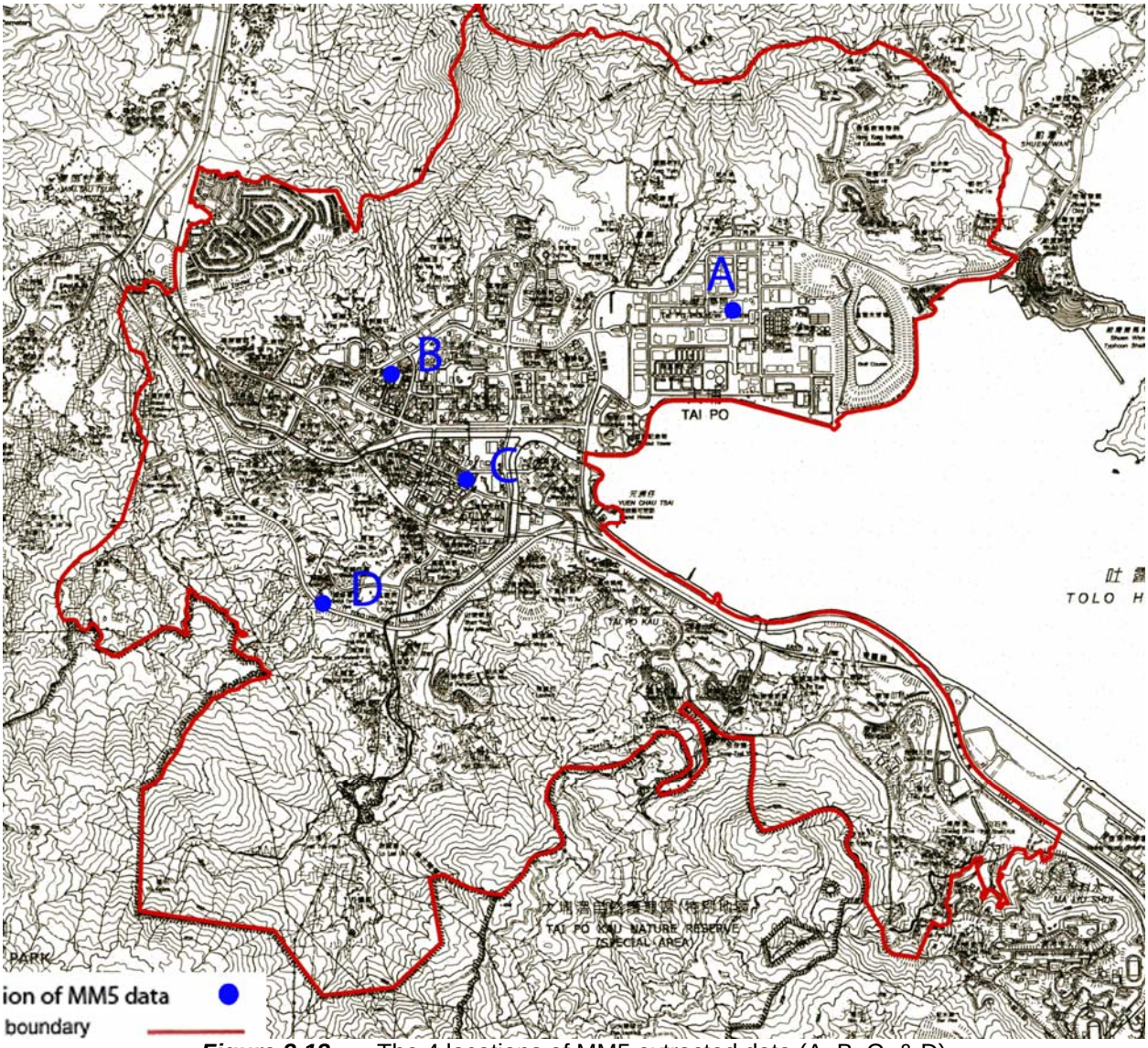


Figure 3.12 The 4 locations of MM5 extracted data (A, B, C, & D)

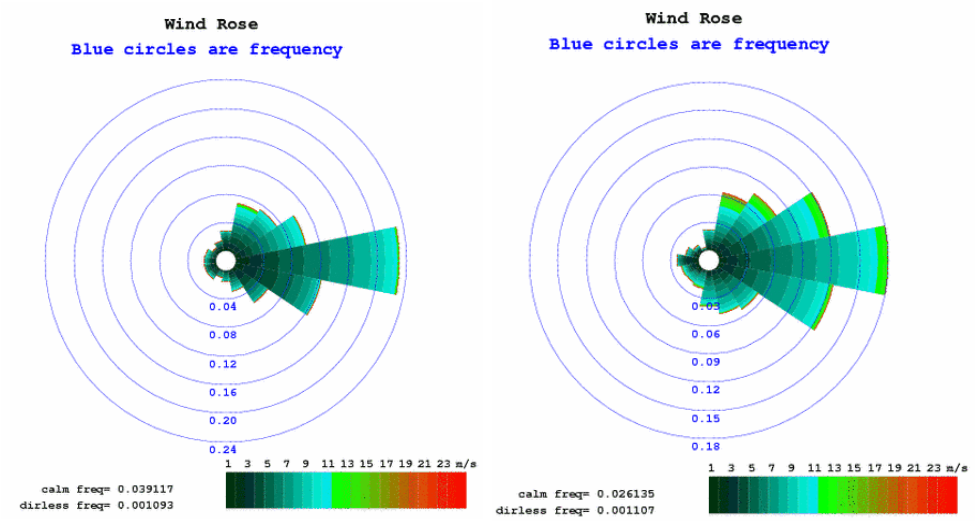


Figure 3.13 Wind roses (annual) at A (left:120m) (right:450m)

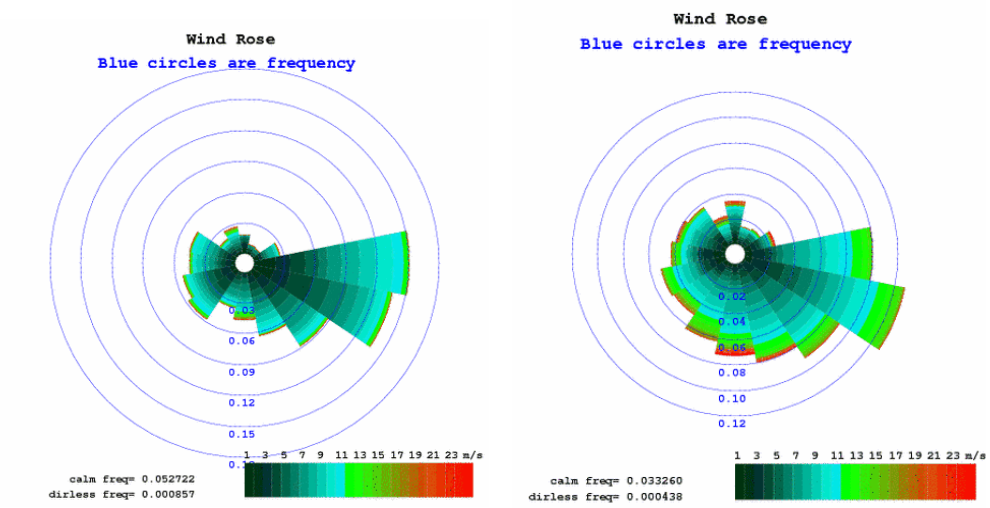


Figure 3.14 Wind roses (summer) at A (left:120m) (right:450m)

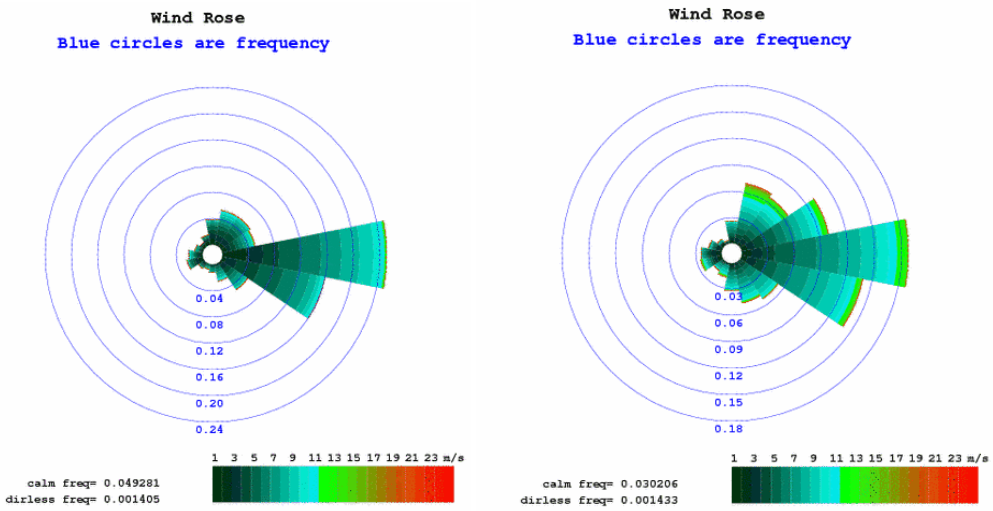


Figure 3.15 Wind roses (annual) at B (left:120m) (right:450m)

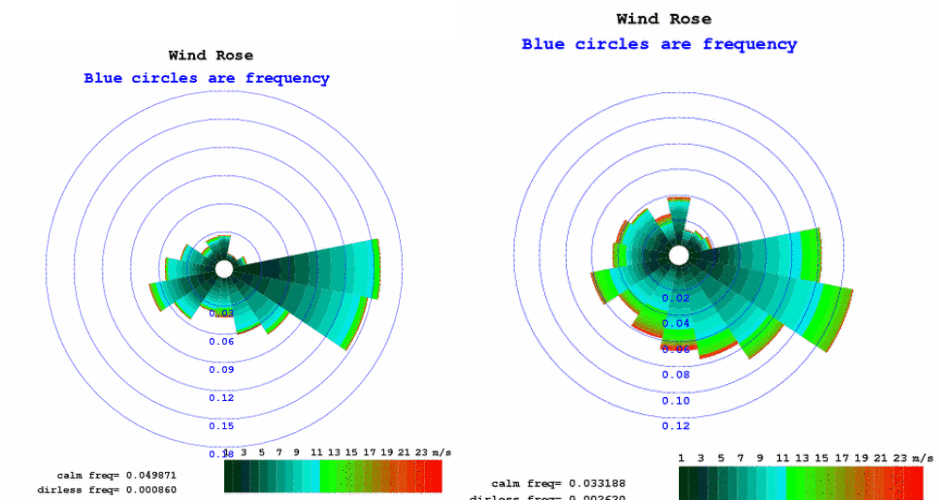


Figure 3.16 Wind roses (summer) at B (left:120m) (right:450m)

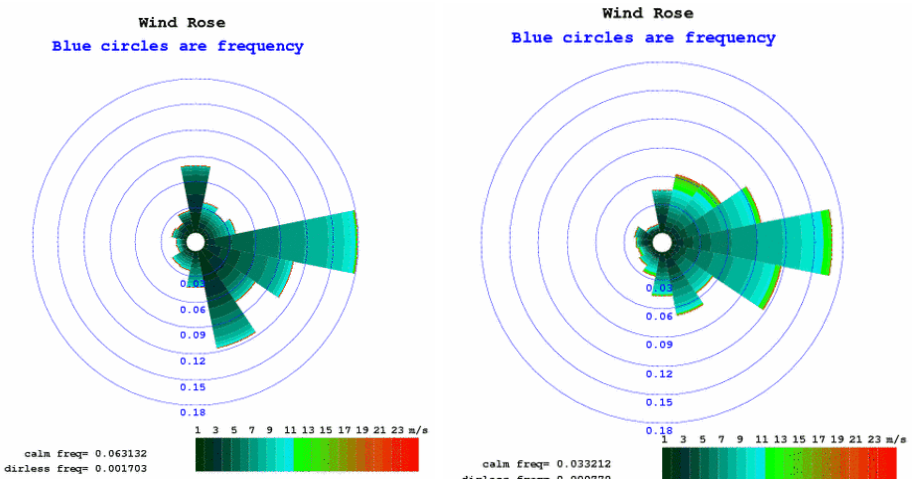


Figure 3.17 Wind roses (annual) at C (left:120m) (right:450m)

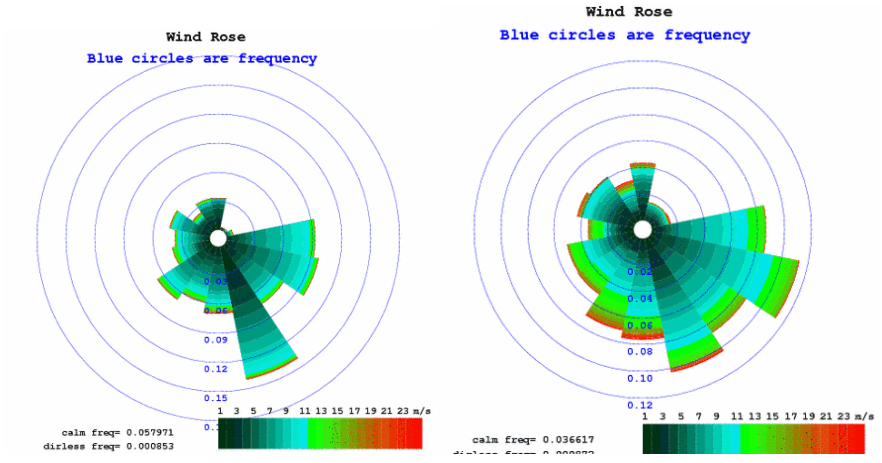


Figure 3.18 Wind roses (summer) at C (left:120m) (right:450m)

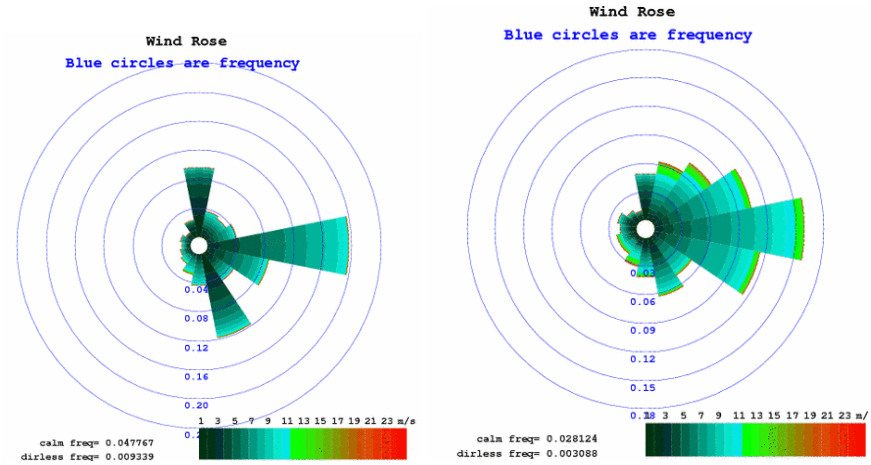


Figure 3.19 Wind roses (annual) at D (left:120m) (right:450m)

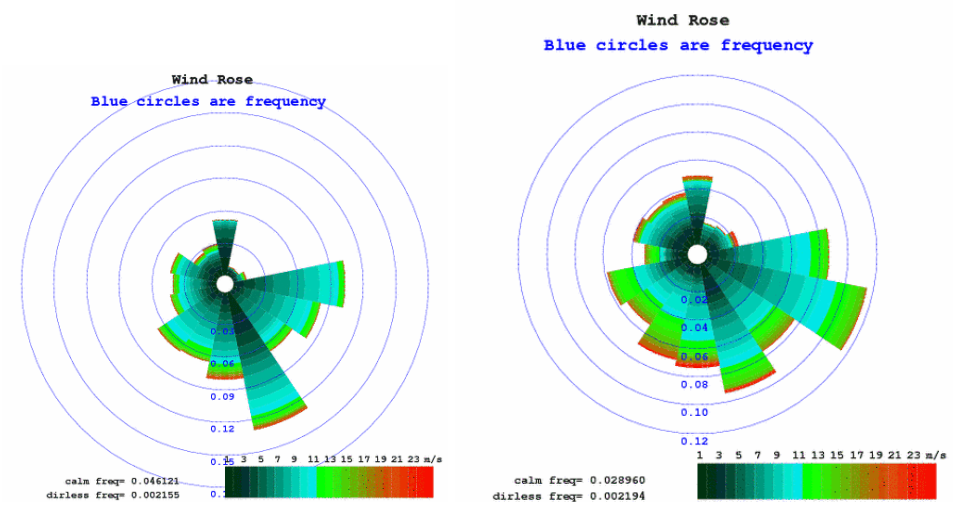


Figure 3.20 Wind roses (summer) at D (left:120m) (right:450m)

3.9 Using the simulated MM5 data, the summer and the annual prevailing wind directions of the study area and the surroundings are evaluated as in Figure 3.21 and 3.22.

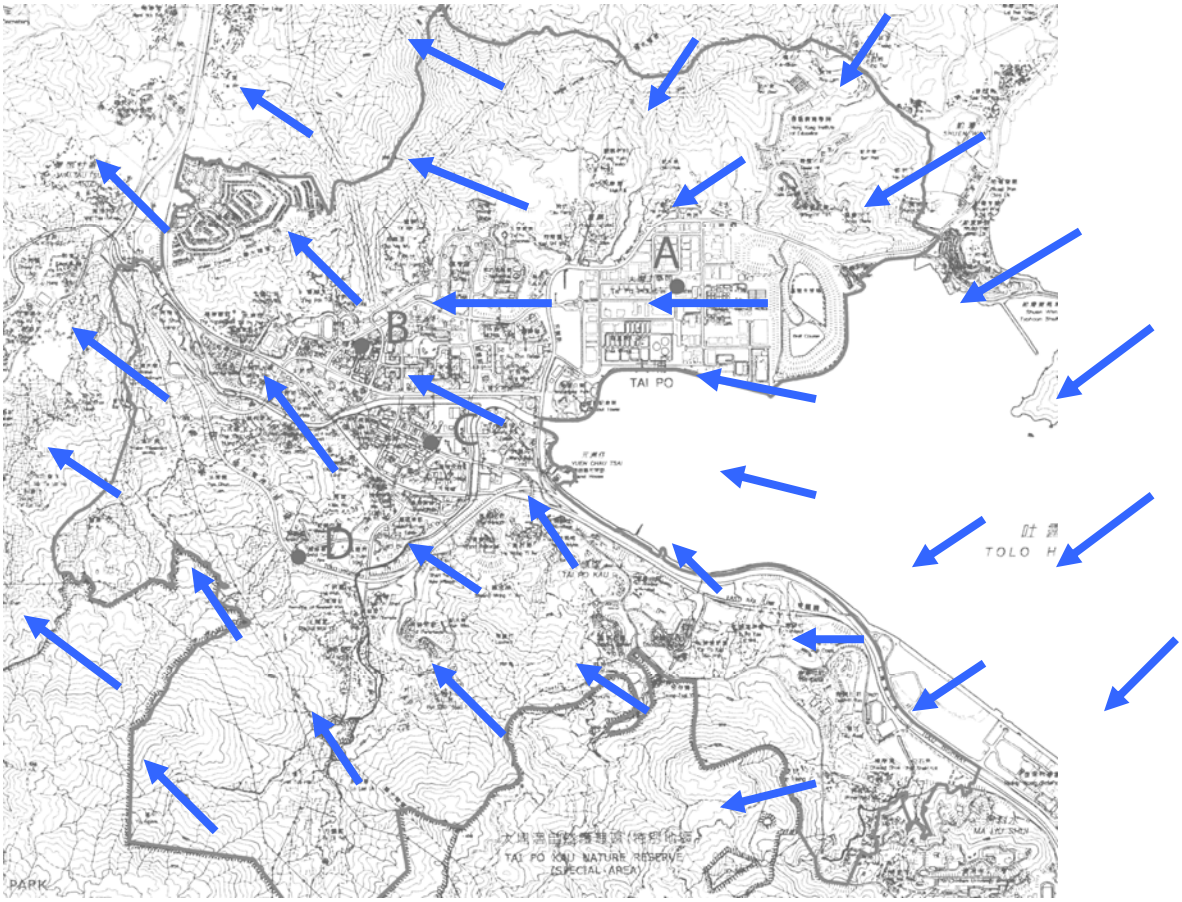


Figure 3.21 Evaluated prevailing wind directions (annual) based on MM5

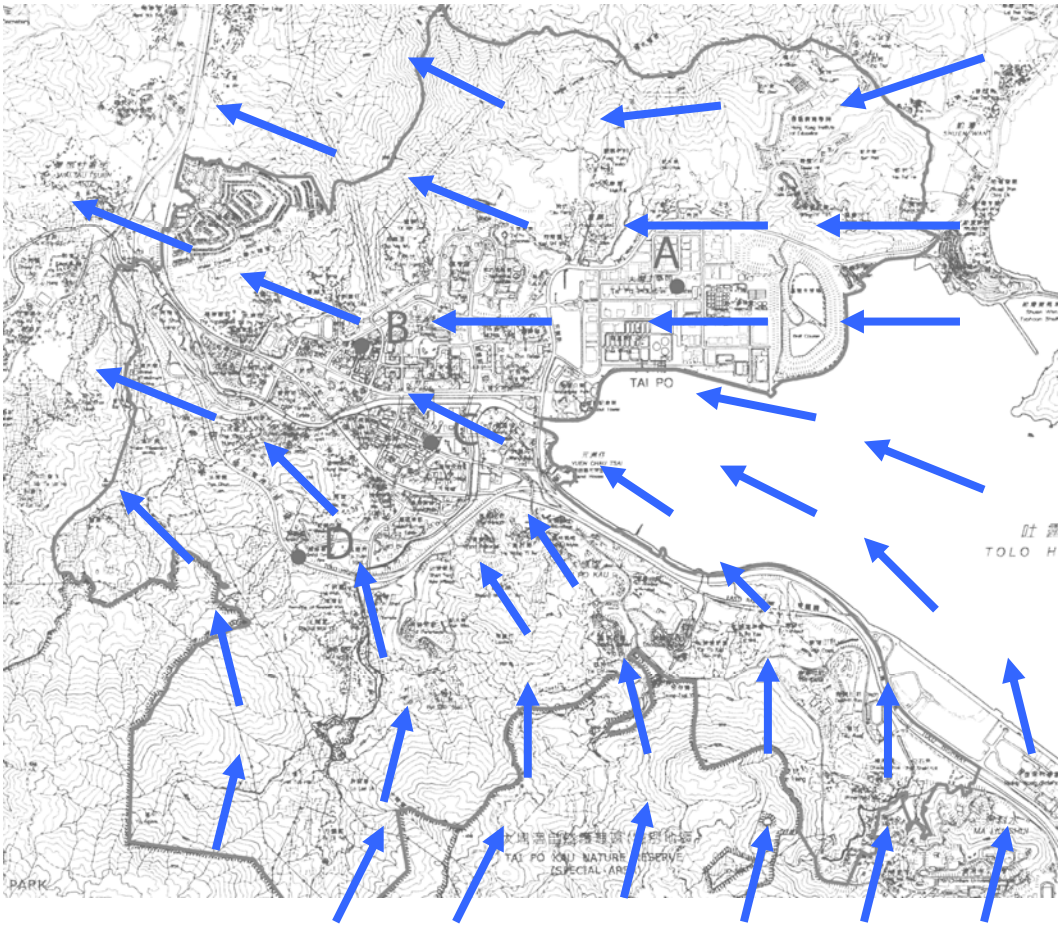


Figure 3.22 Evaluated prevailing wind directions (Jun-Aug) based on MM5

3.10 Based on the MM5 simulated wind roses of the 4 locations extracted, one can observe the differences among them (Table 1). This is due mainly to the surrounding topography of the study area.

Table 1 Evaluated prevailing directions of the 4 locations

	Annual	**Summer**
A	E	E, SE
B	E	E, SE, SW
C	E, N, SE	E, SE, SW
D	E, N, SE	E, S, SE, SW

3.11 In summary, based on the available wind data, one may conclude that the annual wind of the urban areas of the study area is mainly from the East, with a smaller component of the North. The summer wind is mainly coming from the East and the Southerly quarters (Figure 3.23). For air ventilation study, for the main built up urban areas, it is evaluated that the Easterly component should be the most important to respect.

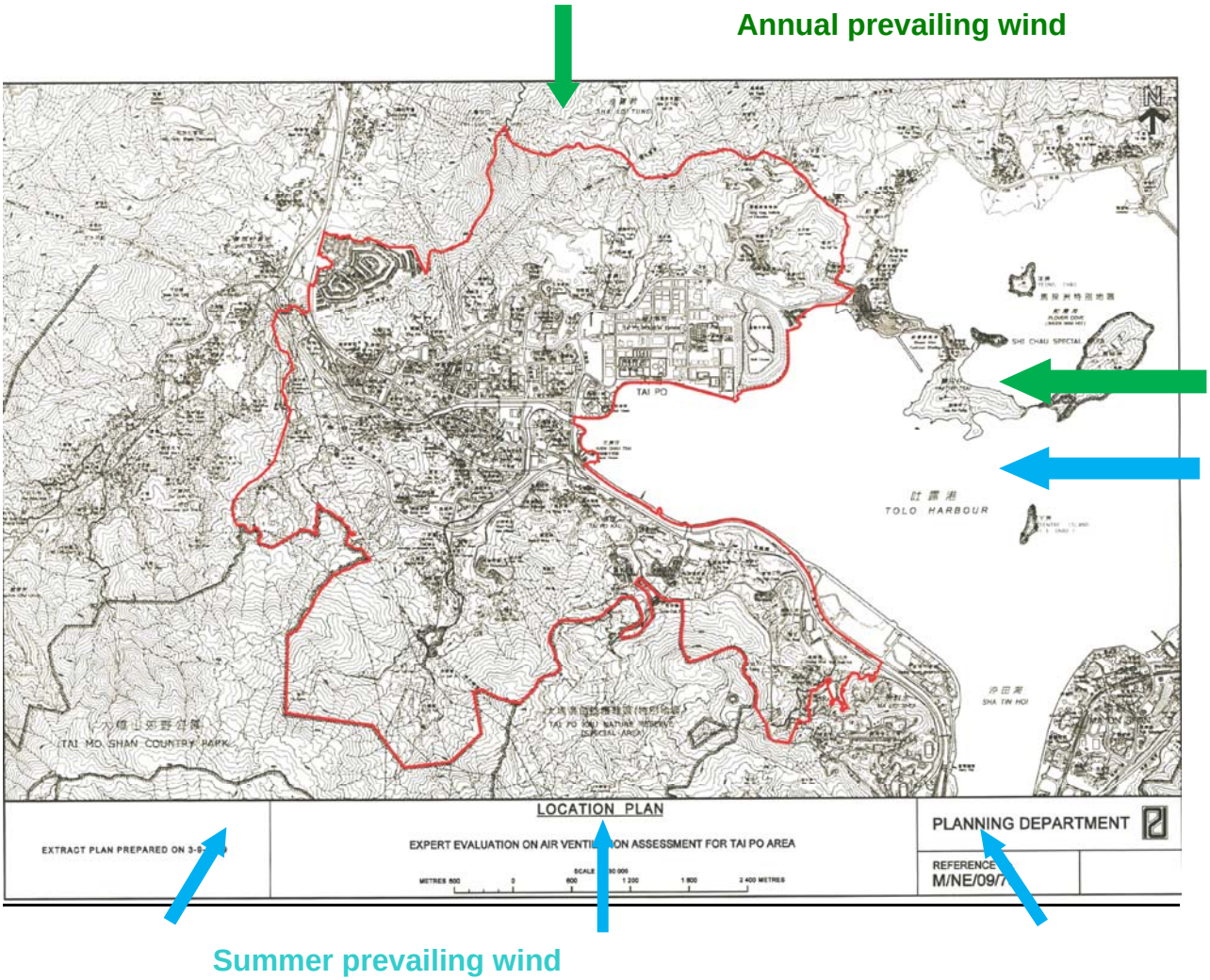


Figure 3.23 A summary of the prevailing winds of the study area

4.0 Topography and the Wind Environment

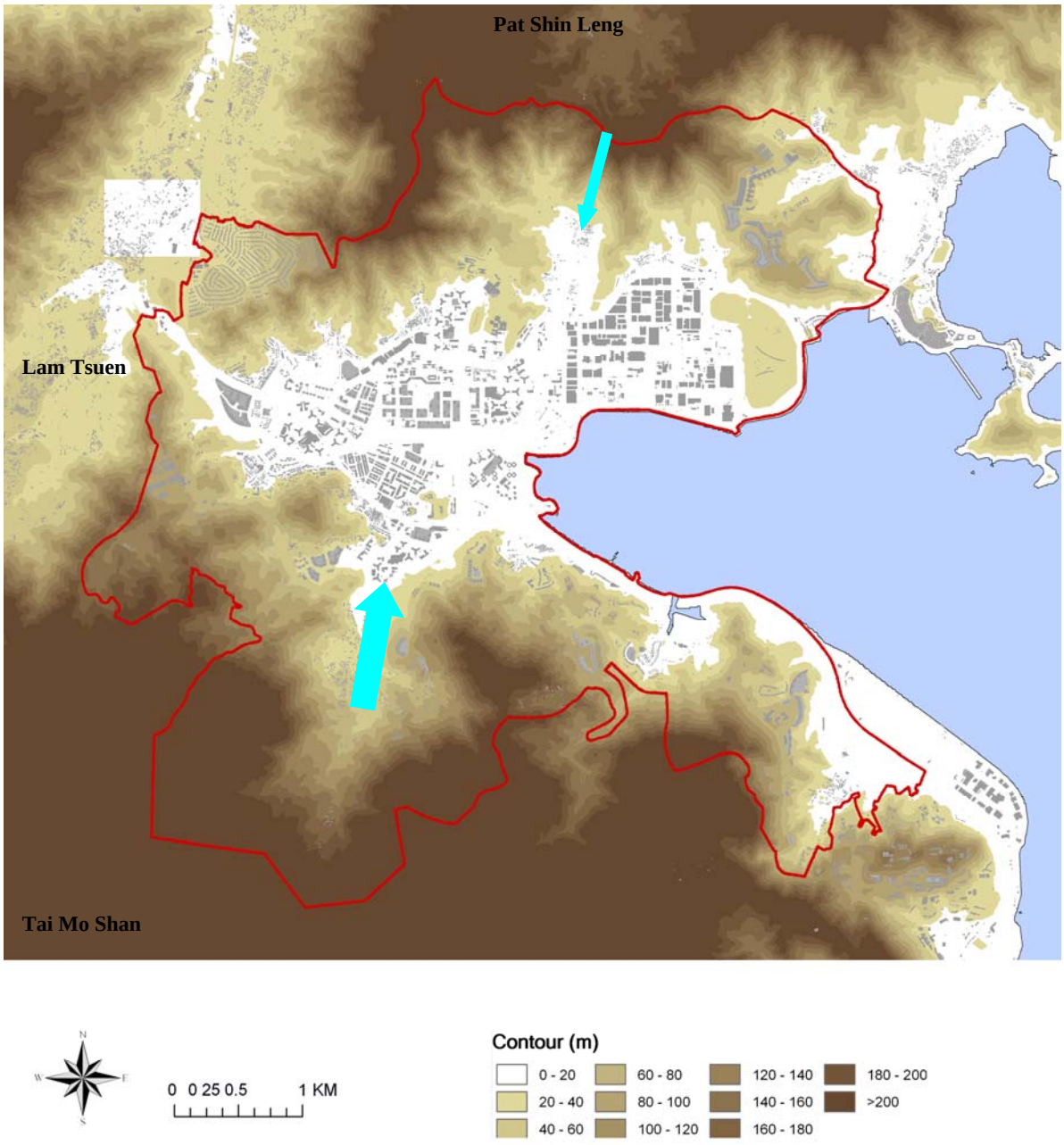


Figure 4.1 A digital elevation map of the study area (light blue arrows indicating downhill winds)

4.1 The natural topography of the Area descends from the high level at north-east (about 400 mPD) and south (about 335 mPD) towards the Tolo Harbour. The development area is a flat area surrounded by Pat Sin Leng in the north, Lam Tsuen in the west, Tai Mo Shan in the southwest and Kau To Shan in the far southeast.

4.2 As evident referring to Figure 3.21 and 3.22, the surrounding topography creates a strong east to west funneling wind through the main built up urban areas from the waterfront to Wai Tau Tseun.

4.3 For wind from the east over Tolo Harbour, it is unobstructed. The east wind provides the most important air ventilation to the study area. It must be respected and not obstructed. Breezeways like Lam Tsuen River and air paths parallel and connected to this east wind circulation must be respected and not obstructed.

4.4 For wind coming from the north/south, the wind profiles and characteristics will be affected by the hills. Turbulence and re-circulation of wind when it moves downhill towards the study area is expected. In general, wind arriving at the study area from the north and south-quarter will be slightly slowed and weakened by the shielding effects of the hills.

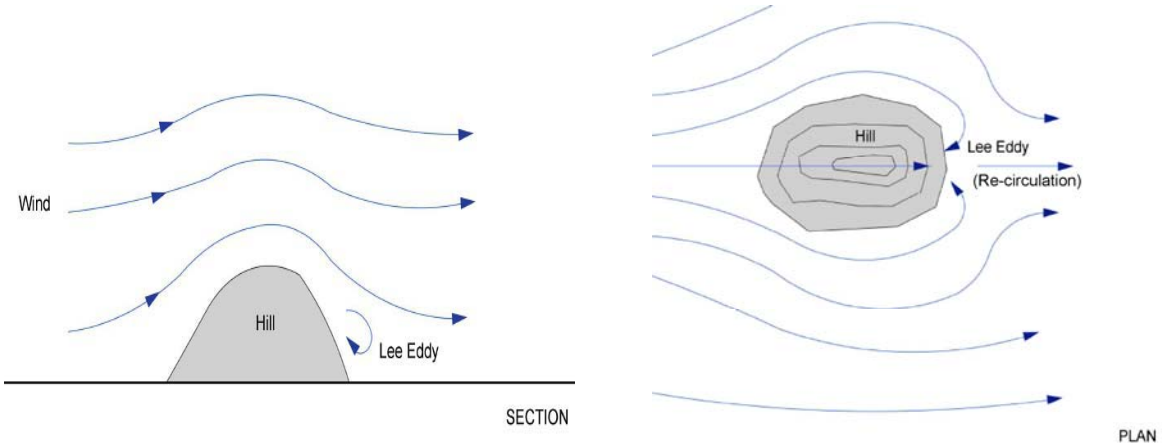


Figure 4.2 An example of wind flow across hills under moderate wind.

4.5 Katabatic (downhill) air movement can be expected from the vegetated hill slopes surrounding the study area.

4.6 Two valley wind systems as shown in Figure 4.1 blue arrows can be identified. They are important to respect and utilize. The valley wind from the south over Wilson Trail stage 7 is particularly important as it is also assisted by the prevailing summer winds. The valley wind arrives at Wan Tau Tong Estate and Tai Po Market over a number of small villages. This must be respected and not obstructed, and the areas over which the valley wind passes must be further vegetated so as to enhance it.

5.0 The Existing Conditions

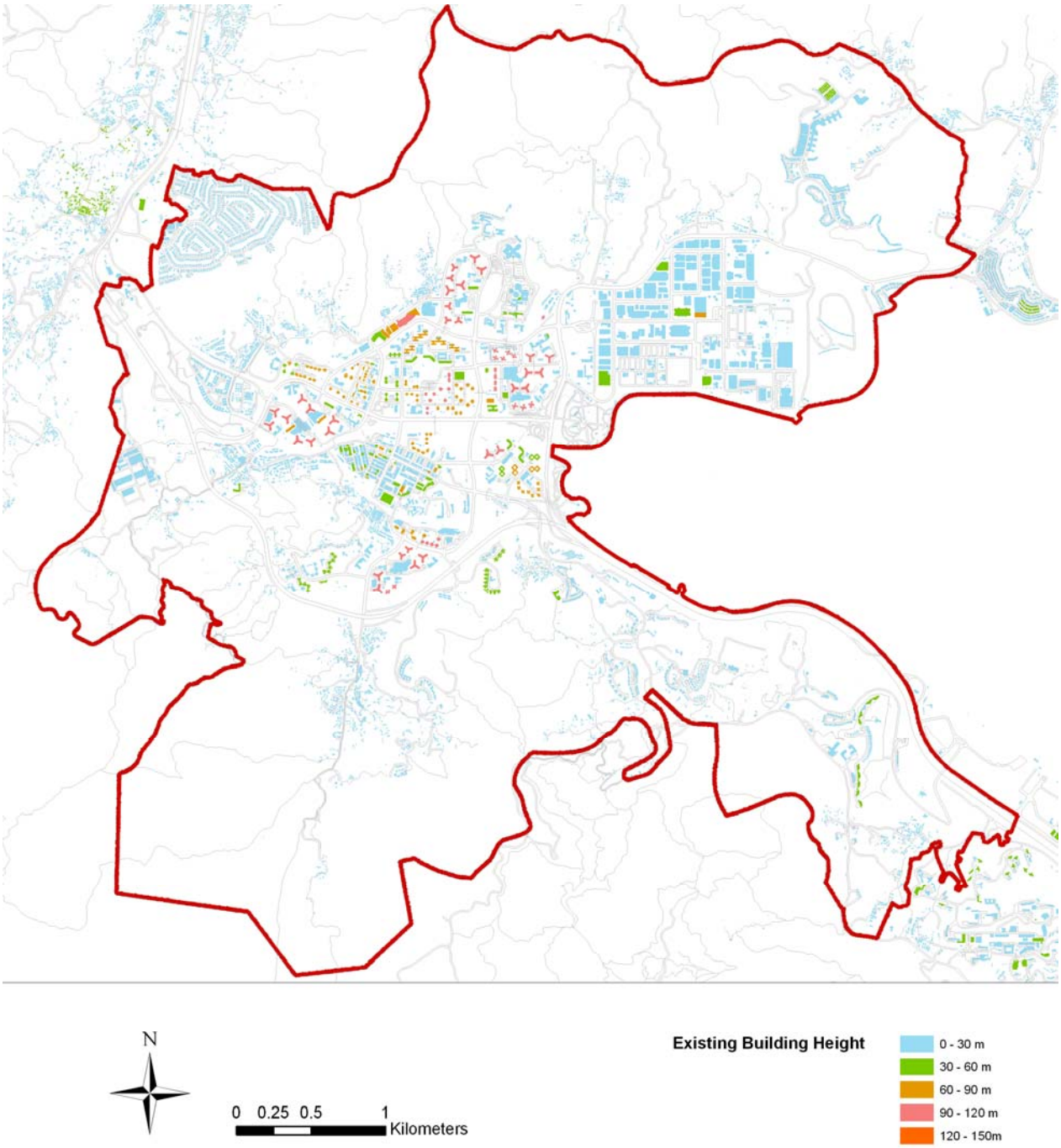


Figure 5.1 The Existing Condition of absolute building heights in the study area

5.0.1 The existing building heights in absolute building heights are as shown in Figure 5.1. Overall, buildings in the study area are not tall. Most buildings in the urban areas are lower than 90m and those buildings higher than 100m are mainly point buildings not forming walls obstructing air ventilation.

5.0.2 The industrial estate has buildings of larger footprint. They are mostly low buildings of up to 30m in the absolute height.

5.1 Greenery, Open Spaces and Landscaping

5.1.1 Based on land-use map, it has, compared to some metro areas in Hong Kong, quite extensive green coverage (Figure 5.2), such as green belts on the hills and also some parks inside the area. They are useful in terms of generating cool air and air ventilation. Utilizing the green areas appropriately for provision of air paths in this study area is recommended. The existing open space and greenery should not be further developed with tall buildings or re-zoned for bulkier development.

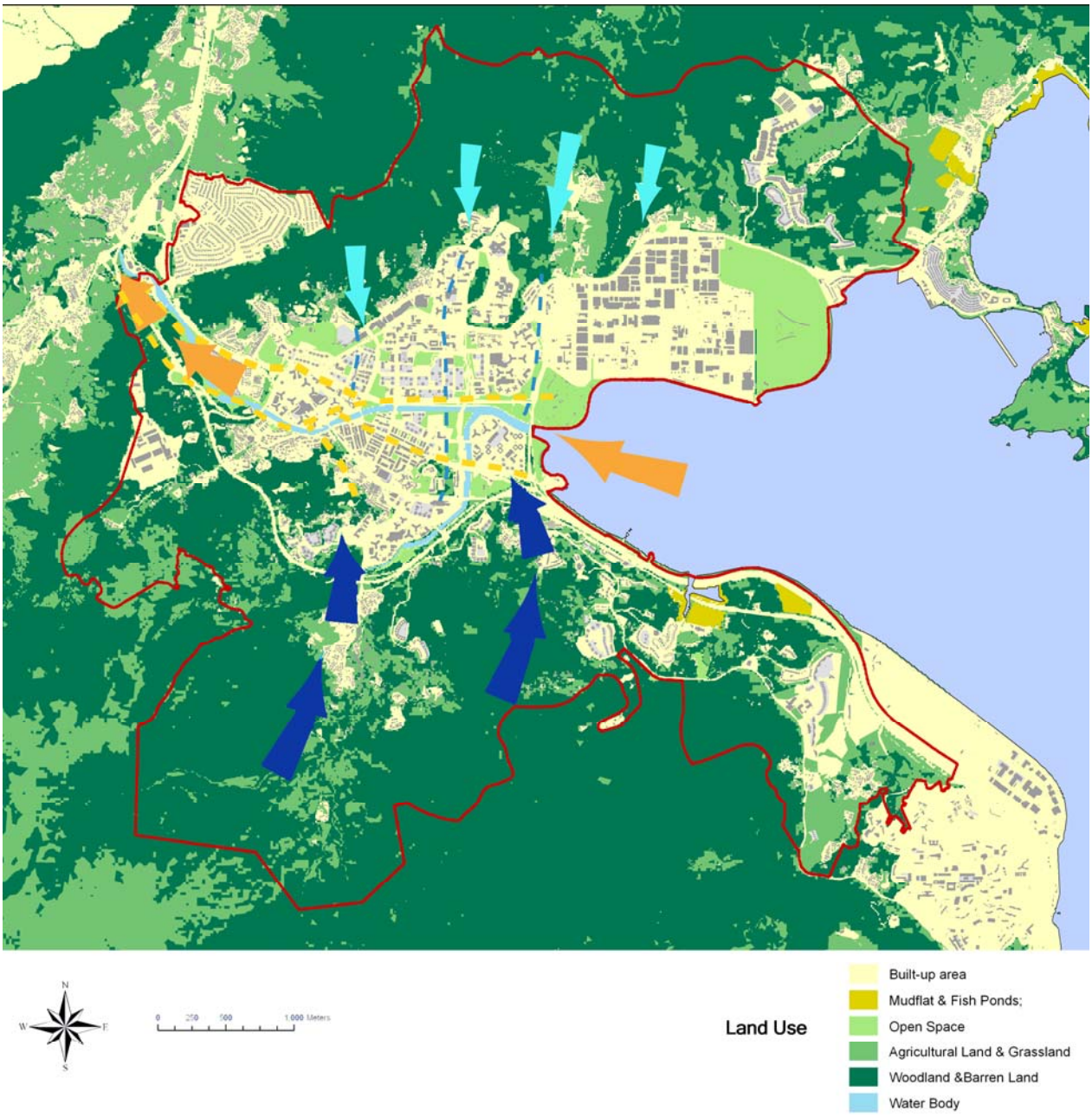


Figure 5.2 A greenery map of the study area

5.2 Land use and Urban Morphology

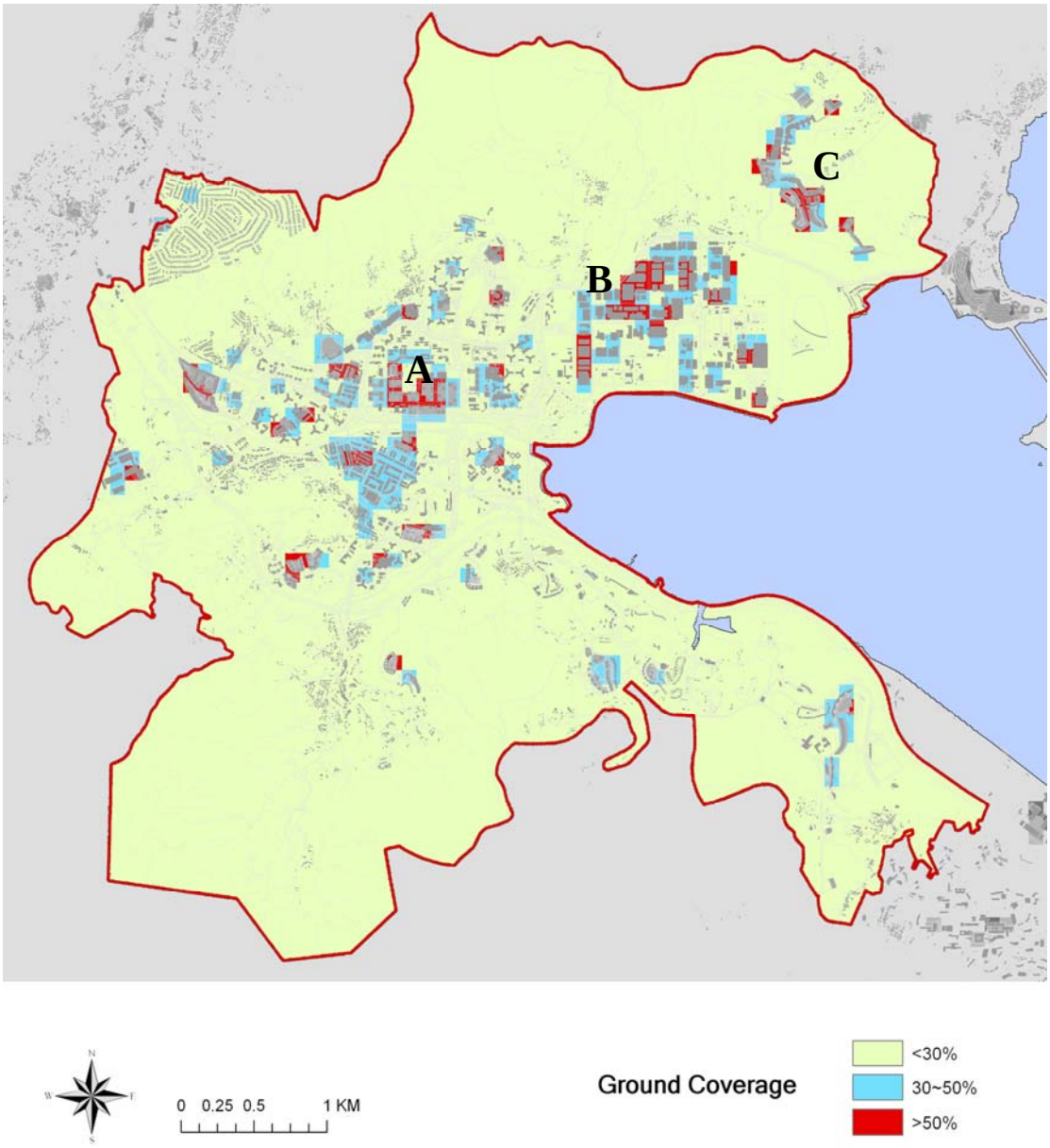


Figure 5.3 Ground Coverage Ratio map of the study area resolved to 100mx100m cell area (include roads, open spaces and ground area covered by buildings and podiums)

5.2.1 High ground coverage reduces urban porosity at the pedestrian level and thus reduces the potentials of air ventilation. With reference to section 5.1 above, due to the fact that the greenery coverage of the study area is large; the corresponding ground coverage is low (Figure 5.3). Isolated cells of high ground coverage (RED) in Figure 5.3 in the study area are normally not a cause of concern. In the study area, locations, marked A, B and C, have some high ground coverage cells. However, they are not extensive. For location A, there are large podiums. But they are detached from each other with a 10m-20m width gap and disposed along the direction of prevailing east wind. For location B & C, they are in relatively isolated locations close to foothills and away from other massive buildings. On the whole, there is little issue.

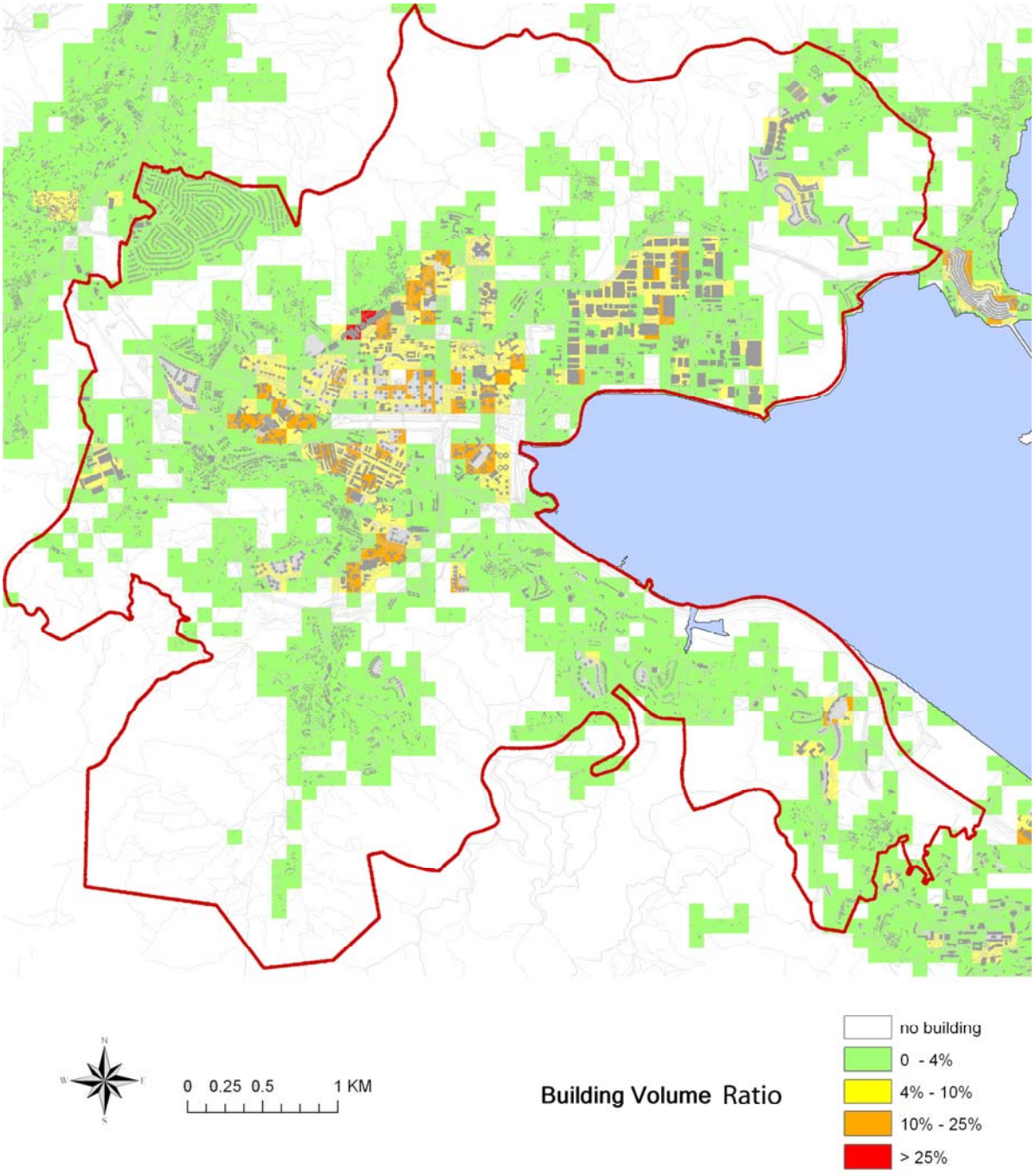


Figure 5.4 Building Volume Ratio map of the study area resolved to 100m x 100m cell. [Building Volume Ratio is the ratio between the cubic volume of buildings in a 100mx100m grid and the maximum building volume in Hong Kong – currently 1.2 million m^3.]

5.2.2 High building volume increases the thermal capability and reduces urban Sky View Factor (SVF), which reduces long wave radiation back to the sky causing urban heat island. This creates higher thermal stress in the summer months and the need for air ventilation to mitigate the negative thermal effects. Researchers at CUHK have resolved a set of understanding based on Building Volume Density (BVD) for Hong Kong. A relevant area is as shown in Figure 5.4. On the whole the BVD of the study area is low to medium.

5.3 Air Paths

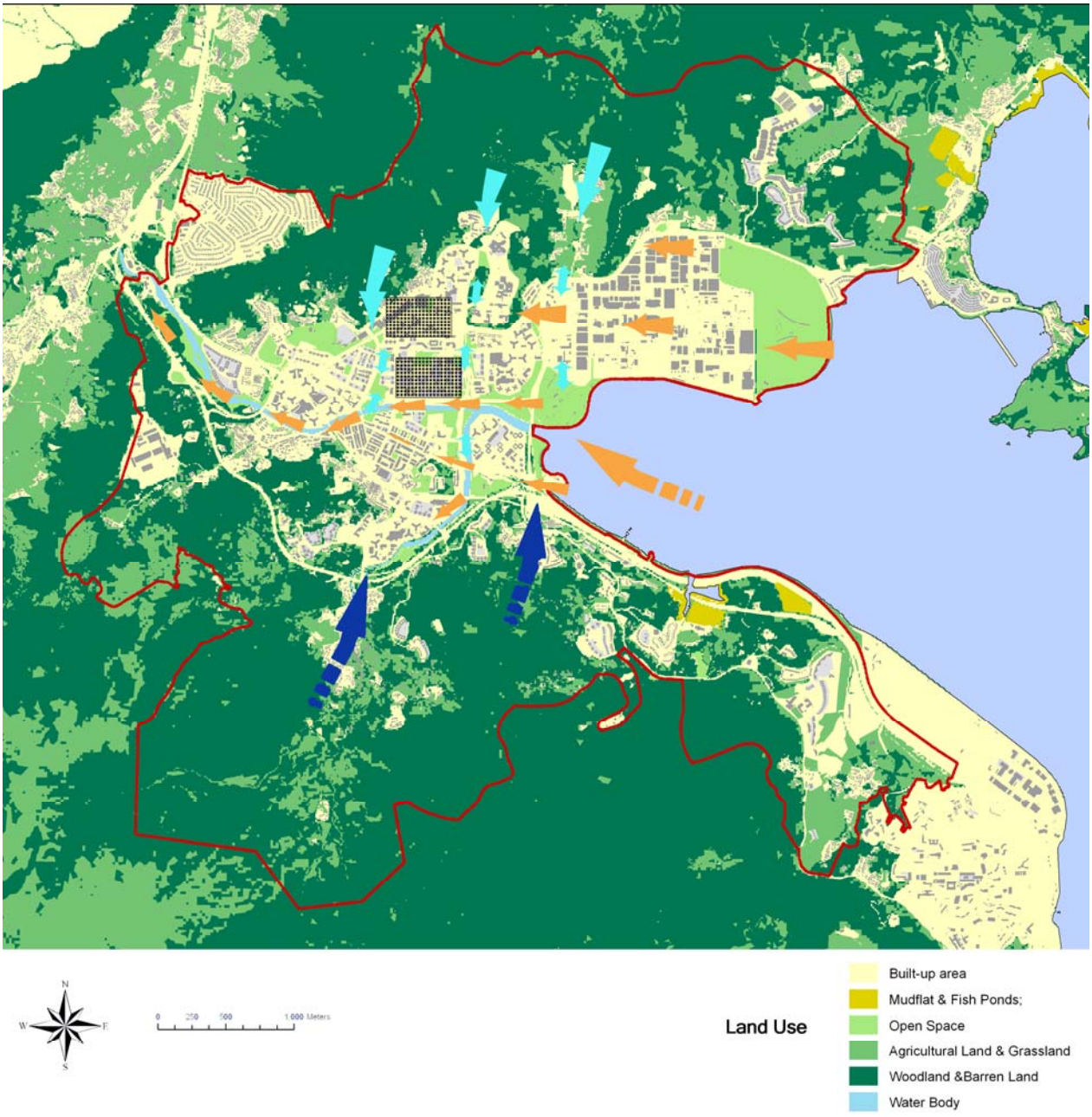


Figure 5.5 Air paths of the study area

5.3.1 Based on an understanding of the prevailing winds. The topography and the urban morphology, the air paths of the study area can be evaluated (Figure 5.5).

5.3.2 For the east prevailing wind, Tai Wo Road, the adjacent Lam Tsuen River and Tai Po Road (Tai Wo) are one of the main breezeways through the study area. As indicated in Figure 5.5, they are very useful for air ventilation of the study area. This main breezeway of the study area is recommended to be widened and greened.

5.3.3 Tai Po Road (Tai Wo) and Tai Po Tai Wo Road together forms a channeling outlet towards the west. They are indicated as orange arrows in Figure 5.2 of greenery map.

5.3.4 For the east prevailing wind, the long Ting Kok Road is also one of the main breezeway through the study area, connected to Ting Tai Road and Kowloon Canton Railway. In the east, Tai Po Industrial Estate buildings are not high. Wind from the east can pass over their roof tops and then into Ting Kok Road areas. Care should be taken to avoid tall buildings along Ting Kok Road.

5.3.5 For the southeast wind, especially in summer, Kwong Fuk Road also serve as an air path to the inner land.

5.3.6 Since the piece of land Yuen Chau Tsai lies on the east coast as an entry for prevailing east wind, it is important not to let high and large buildings obstruct the east wind into Tai Po Market.

5.3.7 Light blue arrows (Figure 5.5) indicate the air paths connecting the north wind system to the east wind system. They should be respected and not obstructed.

5.3.8 Dark blue arrows (Figure 5.5) represent the important downhill and valley wind from the south that is also assisted by the summer month prevailing wind.

5.3.9 Urban built up areas in Tai Po Hui between Tai Po River and Railway are currently benefiting from a number of air paths into and around it.

5.3.10 Two dashed rectangular (i.e. Tai Yuen Estate, Tai Po Plaza and Tai Po Centre) in Figure 5.5 are two areas which may block east wind due to large coverage of buildings or podiums.

5.3.11 Car parks and un-built areas on the west of Tai Po Industrial Estate, linked with Tai Po Waterfront Park to the south and hillside to the north, provide a wide continuous air path.

5.3.12 In general, east-west roads are important air paths. North-south roads are useful air paths. Buildings along waterfront lots must be very carefully designed and planned.

5.4 GIC, O and GB sites

5.4.1 The study area comprises of many connected “GIC”, “O” and “GB” zones. GIC sites, which contain low-rise structure/buildings such as school sites, institutional and community facilities, are spread in the study area. “O” and “GB” sites, such as Football Court, Kwong Fuk Football Ground, Wan Tau Kok Playground, and Kwong Fuk Park contains landscaping and opened area. Together properly designed and linked, these GIC sites provide useful relief and air paths to the Tai Po Market. These GIC sites also serve as the wind recovery area in the east-west direction. The existing open space, greenery and GIC sites should not be further developed with tall buildings or re-zoned for bulkier development.

6.0 The Existing Conditions with Committed Projects

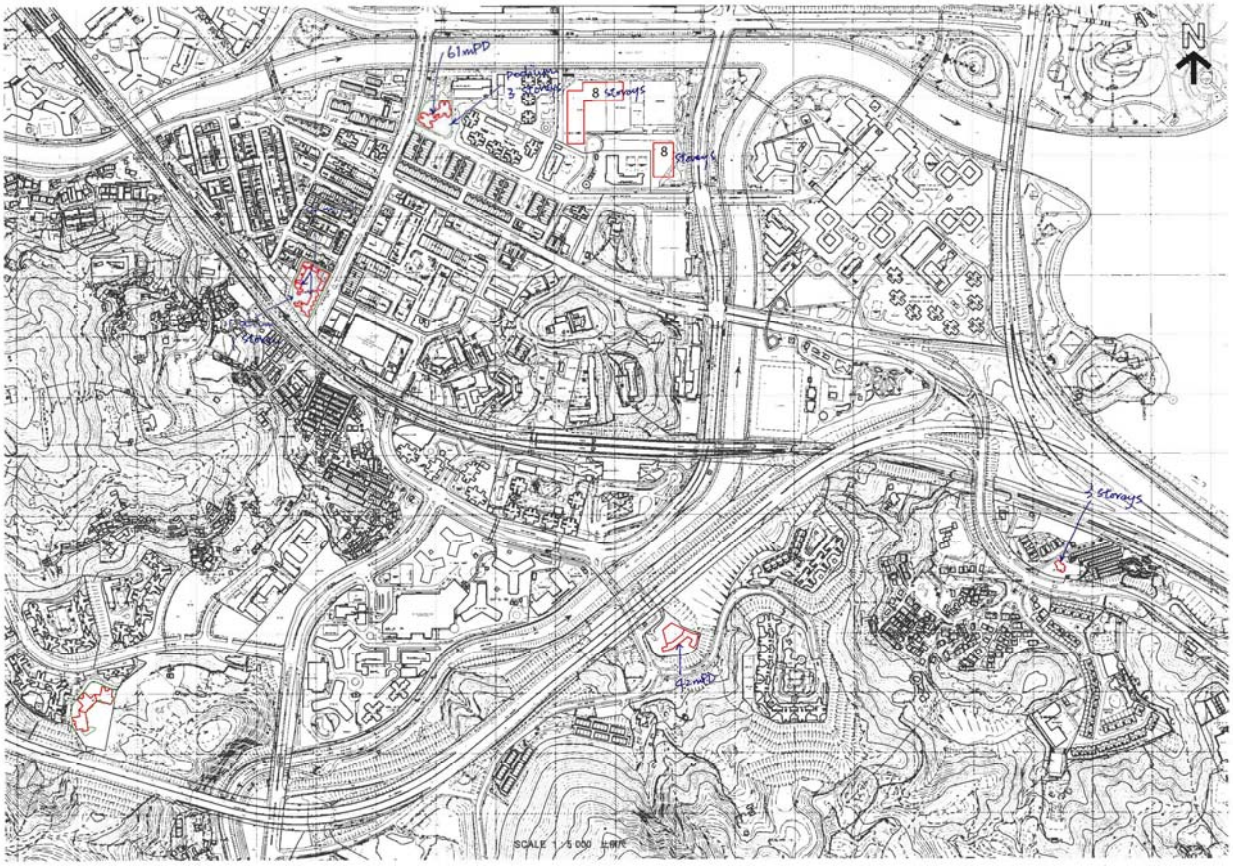


Figure 6.1 Committed Projects in the south of Tai Po River

6.1 Committed projects shown in Figure 6.1 include two GIC sites along Nan Wan Road and several lots of residential buildings. Two 8-storey GIC buildings will be built on the air path as indicated in section 5.3.2. They are still low-rise buildings, with other open spaces. The air path will not be blocked.

6.2 Current HK Government Staff Quarters (i.e. TPTL 195) along the Plover Cove Road will be redeveloped into buildings of 61mPD with a 3-storey podium (Figure 6.1). Because of its relatively small size, it will not impose adverse impacts to the leeward side.

6.3 Current car park area along the south Po Heung Street will be developed into 84mPD-high building with a 1-storey podium. As the streets in the Tai Po Hui areas are as narrow as 10m, if the buildings in this area were all developed up to 80mPD, the existing narrow street networks need to be widened to have a lower height-to-street ratio or canyon effects may occur. The explanations of height-to-street ratio and its relationships with air flows are shown in Figure 6.2. Based on this principle, the maximum building height for Tai Po Hui area should be set as not to exceed the existing situation. A height-to-width ratio of 2 could be taken as a suitable threshold value for reference given the existing street width of about 15-20m. Taken into account the existing site level of about 5 to 10mPD, a maximum building height of about 50mPD is suggested.

6.4 The vacant hillside to the southeast of Hong Kong Institute of Education Pak Shek Kok Sports Centre will be developed to a group of up-to-10-storey GIC buildings (Figure 6.3). The site is isolated and surrounded by the "GB" and "O" zones. There is no air ventilation issue.

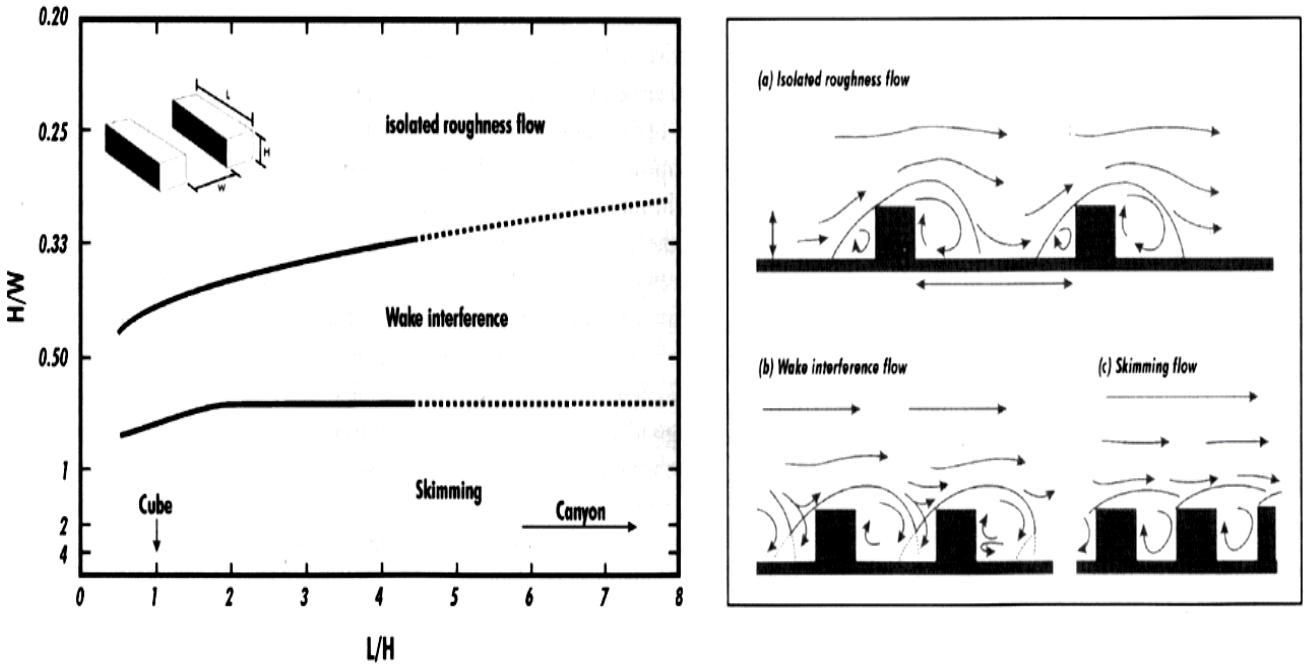


Figure 6.2 The relationship between building height and street width ratio and the possible flow regimes

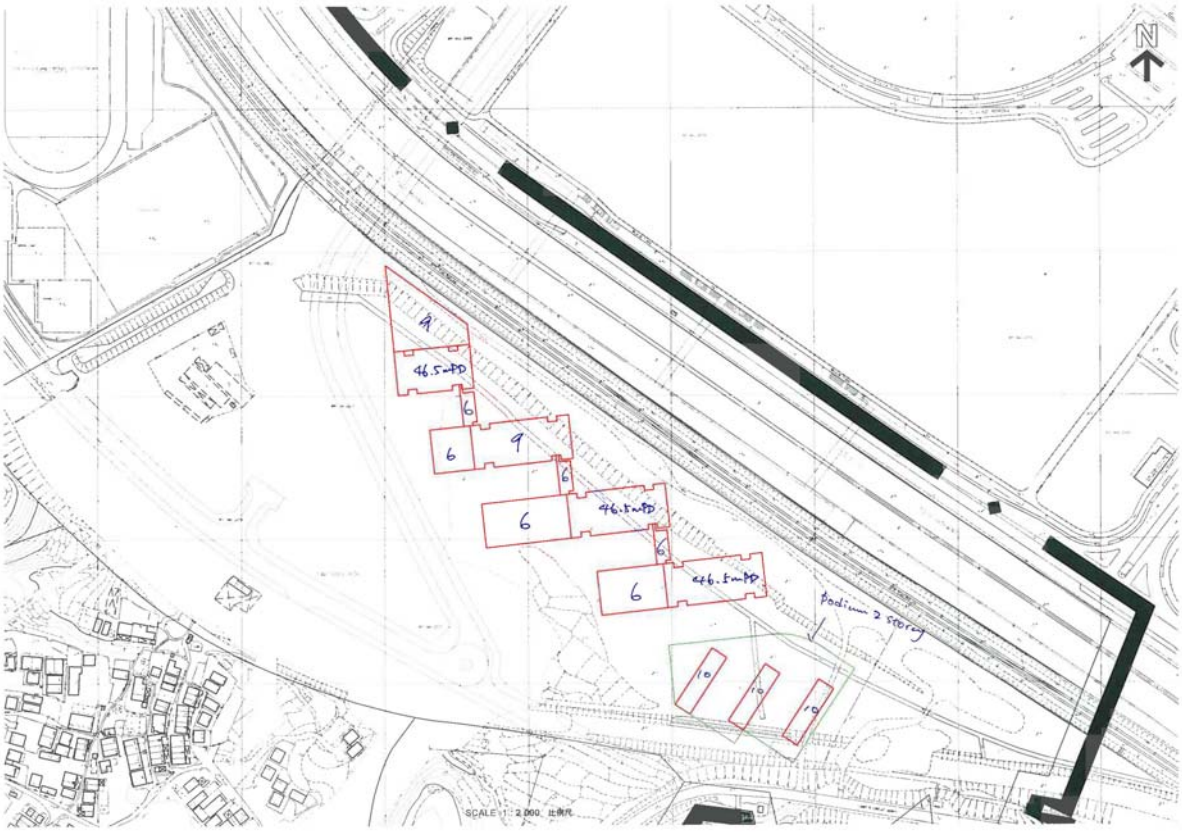


Figure 6.3 Committed Projects in GIC sites near Pak Shek Kok

6.5 Other 2 new committed developments include a 3-storey house in Tai Po Kau and a 7-storey residential development at Ma Wo. Because of their relatively small size, there are no air ventilation issues.

6.6 There will be new developments on the current green hillside (17-28 storeys) in CDA zone (Figure 6.4). They will be just on north-south connecting air path as indicated in Figure 5.2. But their linear disposition does not obstruct too much of this air circulation. Few adverse effects will be imposed by this development onto adjacent leeward sites in the east-west direction. High percentage of greening of the development site is recommended. A minimum of 30% is highly recommended to adopt and higher ratio up to 50% is preferred.

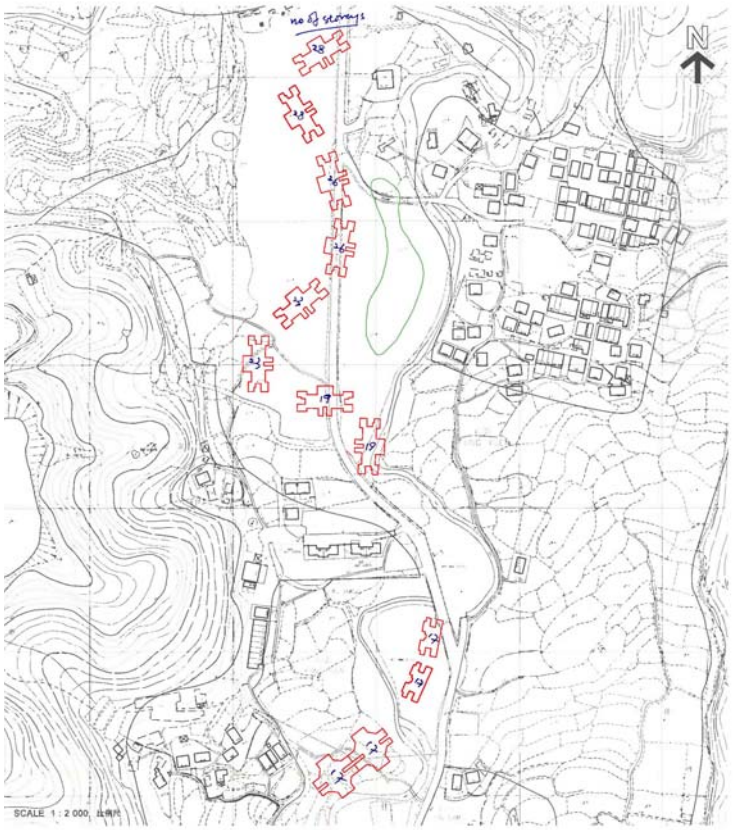


Figure 6.4 Committed Projects on the hillside to the north of Tai Po Industrial Estate

6.7 Several slots of GIC buildings up to 90mPD will also be built (Figure 6.5) on the north of Tai Po Hospital. They are separated and will not block the wind from the north. Roof greening is recommended for the larger building.

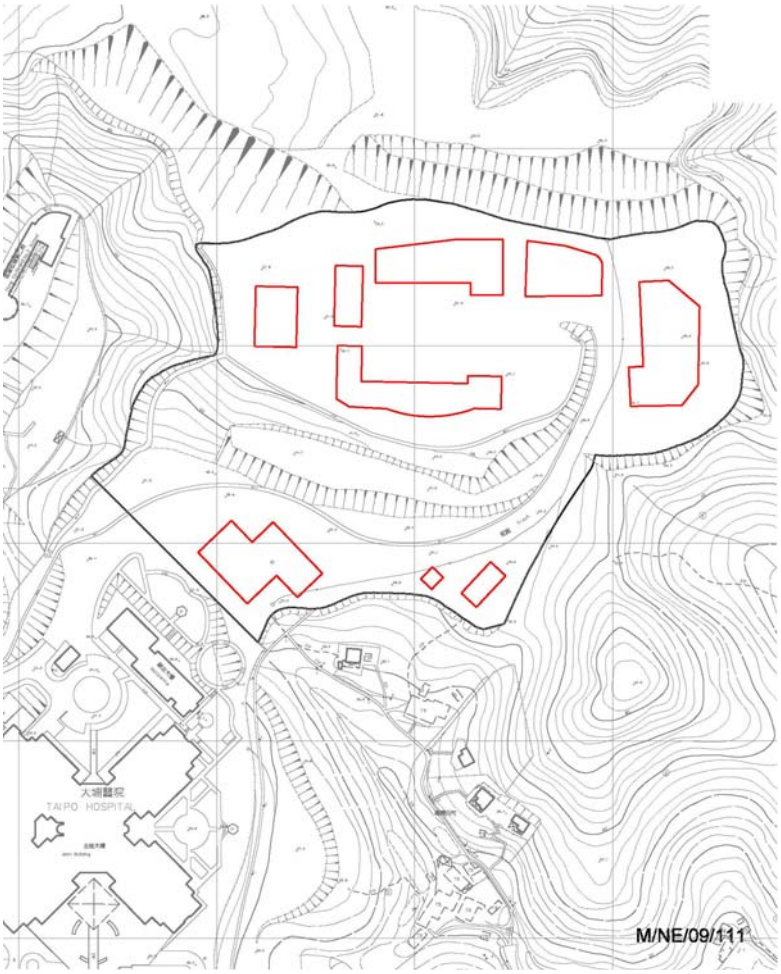


Figure 6.5 Committed Projects on the hillside to the north of Tai Po Hospital (90mPD)

7.0 Expert Evaluation and Recommendations of the Initial Planned Scenario

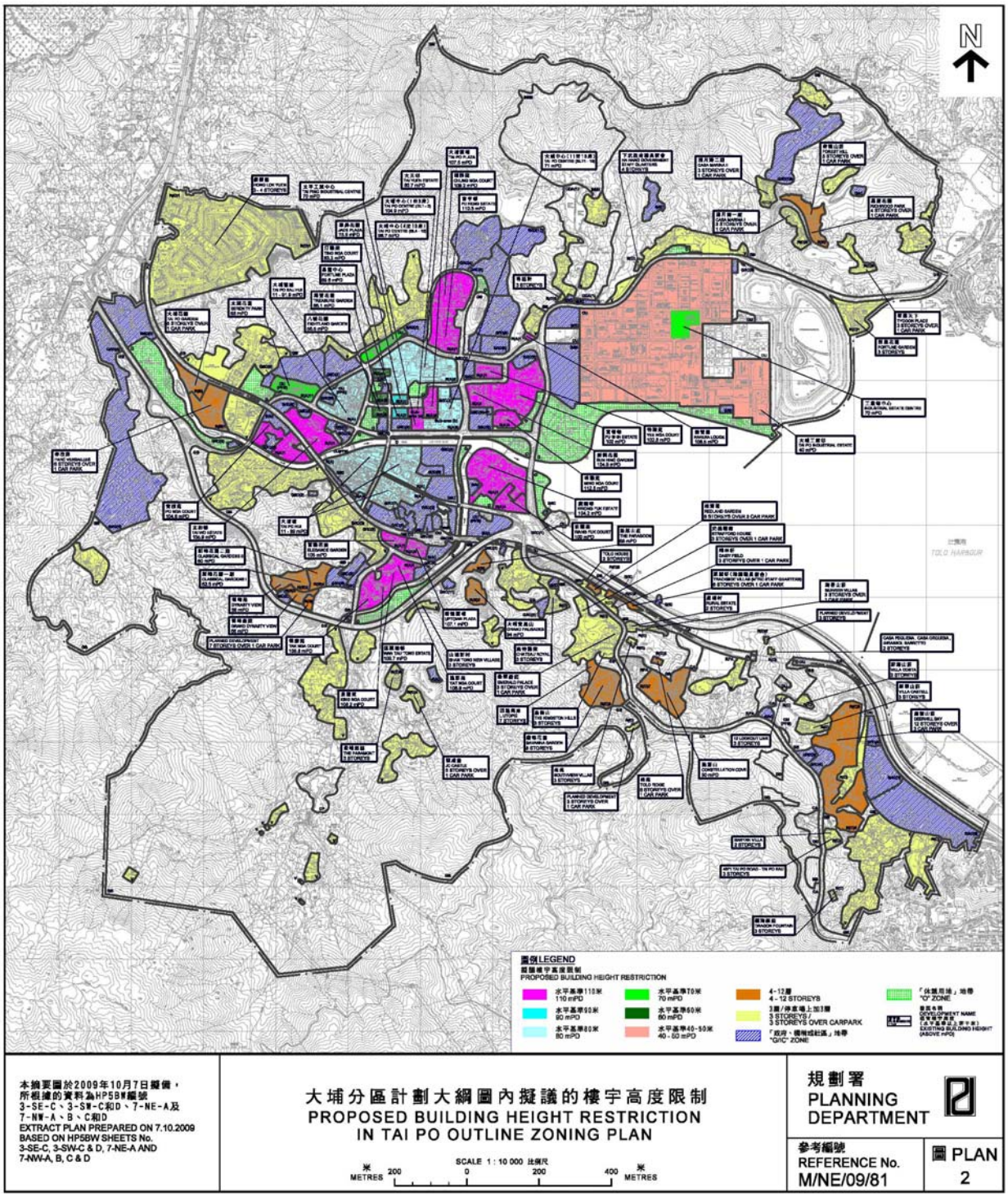


Figure 7.1 The Initial Planned Scenario of the study area (proposed building height restrictions in mPD)

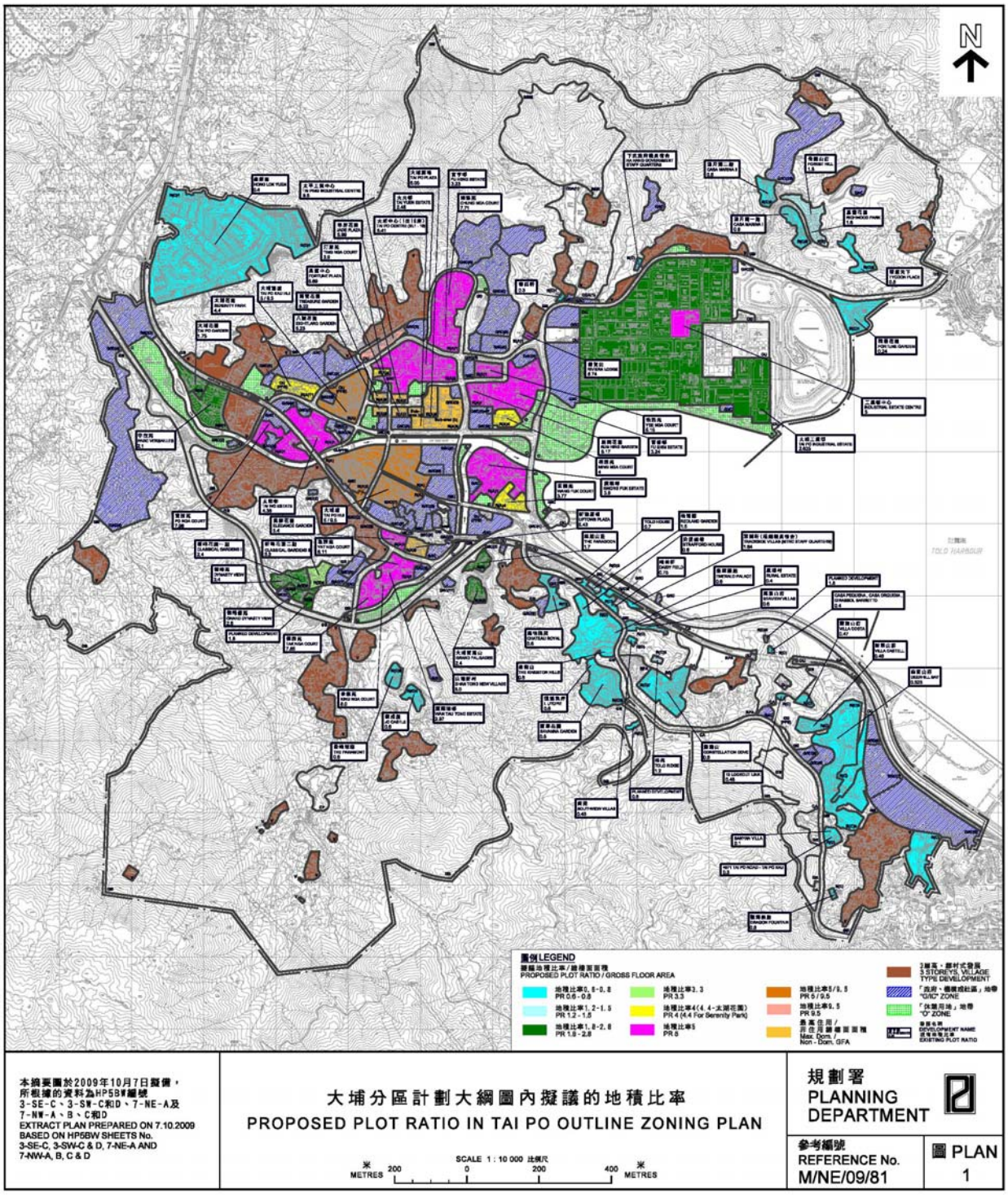


Figure 7.2 The Initial Planned Scenario of the study area (proposed plot ratio)

7.1 It must be stressed that given Hong Kong's tall building urban morphology, on the whole, building height restriction (or minor changes of building heights) is not the most effective method for maintaining and/or improving air ventilation. Breezeways, air paths, open spaces, gaps between buildings and building permeability – especially at near ground level, are more effective.

7.2 On the whole, based on Figure 7.1, the proposed building height restrictions mainly reflect the existing situation. With careful design and disposition of buildings on site, this should not result in adverse air ventilation issues.

7.3 On the whole, based on Figure 7.2, the proposed plot ratio restriction is more or less similar with the existing condition. In general, plot ratio for low and medium density is up to 5. With careful design and disposition of buildings on site, this should not result in adverse air ventilation issues.

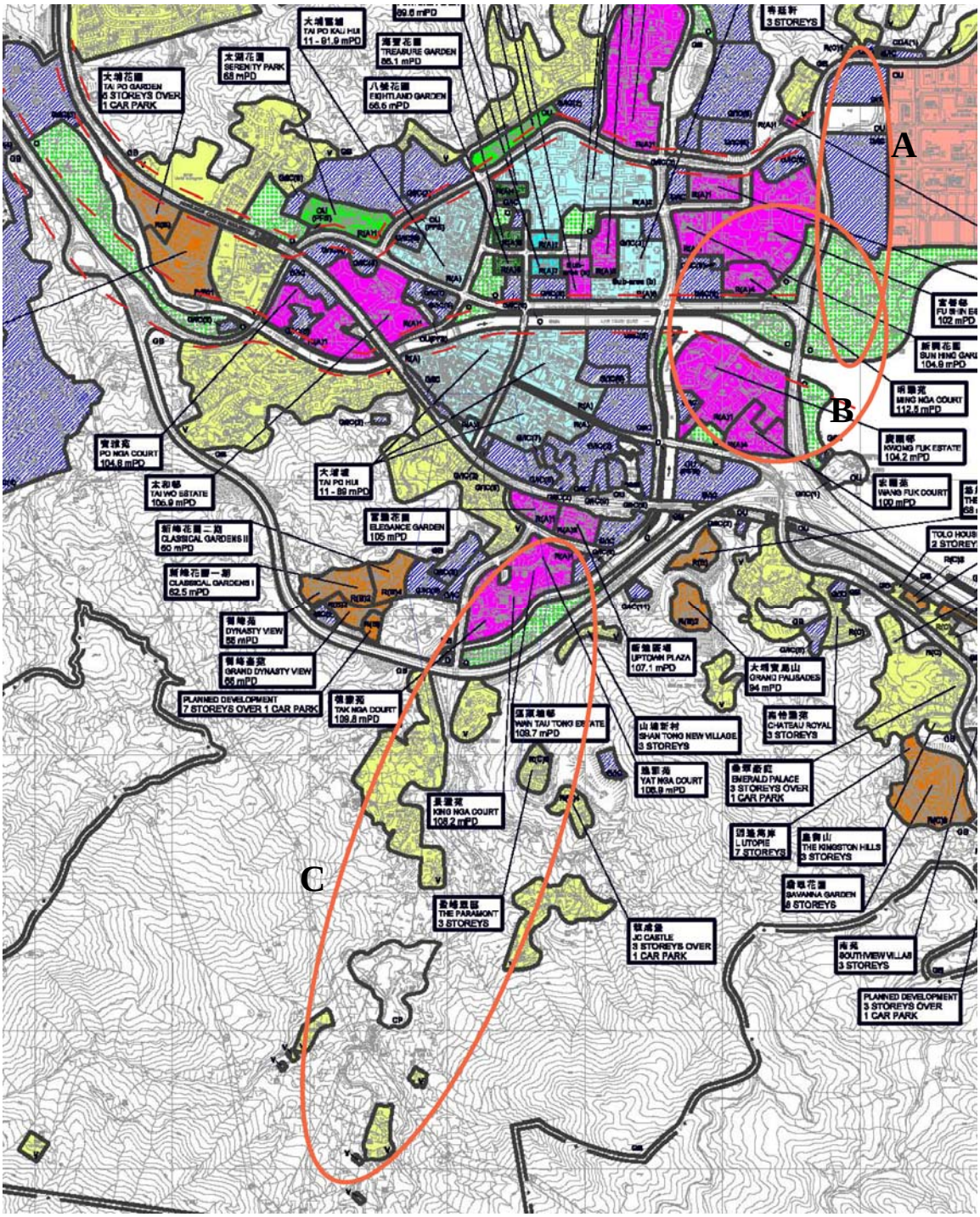


Figure 7.3 The Initial Planned Scenario of the study area (proposed building height restrictions in mPD)

7.4 Referred to section 5.3.2 – 5.3.4, it is recommended the two main breezeways (Figure 5.5) to be widened, together with non-building-areas as much as possible at both sides. See also the dotted line in Figure 7.3. At least, they should be kept and reinforced through greening.

7.5 In the areas around Chui Lok Street and Tai Po Hui, the existing street network and urban grain must be respected. Streets and lots must not be combined with bulks development and large podium without careful consideration of air ventilation.

7.6 The lots of Wan Tau Tong Estate, Tak Nga Court, King Nga Court and Yat Nga Court are at the exit of important downhill valley air ventilation (see circle C in Figure 7.3). Refer to section 5.3.8, this area should not be built with tall or wall buildings. It is not enough just to limit the building height under 110mPD. Non-building areas and greenery to ensure air ventilation are needed. Apart from limiting the building height under 110mPD, Housing Department should conduct AVA study to ensure good air ventilation to the surroundings upon redevelopment.

7.7 Refer to section 5.3.11, the continuous air path consisting of 2 car parks and un-built area on the west of Tai Po Industrial Estate, linked with Tai Po Waterfront Park should be kept without tall or wall buildings (see circle A in Figure 7.3).

7.8 The lots of Ming Nga Court, Fu Shin Estate, Sun Hing Garden and Yee Nga Court, Kwong Fuk Estate and Wang Fuk Court are at the entrance location of the important east wind (see circle B in Figure 7.3). It is not enough just to limit the building height under 110mPD. Non-building areas and further guidelines to ensure air ventilation are needed.

7.9 In the lot of Tai Wo Estate, Fu Heng Estate, Fu Shin Estate, Kwong Fuk Estate, Tai Yuen Estate and Wan Tau Tong Estate, Housing Department should conduct AVA study to ensure good air ventilation to the surroundings upon redevelopment.

7.10 For Tai Po Industrial Estate, it is good to keep building as low as existing conditions, i.e. 40mPD. It is also highly recommended to keep the current Tai Po Waterfront Park as an open entry for east prevailing wind.

7.11 In the proposed amendments provided by PlanD, it can be seen that some big roads are extracted from R(A) zone and rezoned to ROAD (Figure 7.5 & 7.6). It is good to keep all the roads as air paths in this statutory way. It is suggested to rezone more development area to non-building-area as well.

7.12 It is suggested to extend a non-building area from Kwong Fuk Road to the northwest, thus maintaining an air path in between the whole piece of R(A) land (see the middle red bar in figure 7.4). It would be better if more east-west air paths or non-building-area can be designated, among which the two thinner red bars in Figure 7.4 are such examples.

7.13 More air path networks to ensure air ventilation are recommended as illustrated in Figure 7.5 & 7.6 (see red bars). Green rectangulars are current open car parks, which are recommended to keep.

7.14 Refer to figure 7.5, the current Heung To College of Professional Studies, Home for the Aged, the churches along Wan Tau Street should be kept at least as low as existing conditions upon redevelopments.

7.15 The current Shung Tak School along On Fu Road should be kept low upon redevelopments.

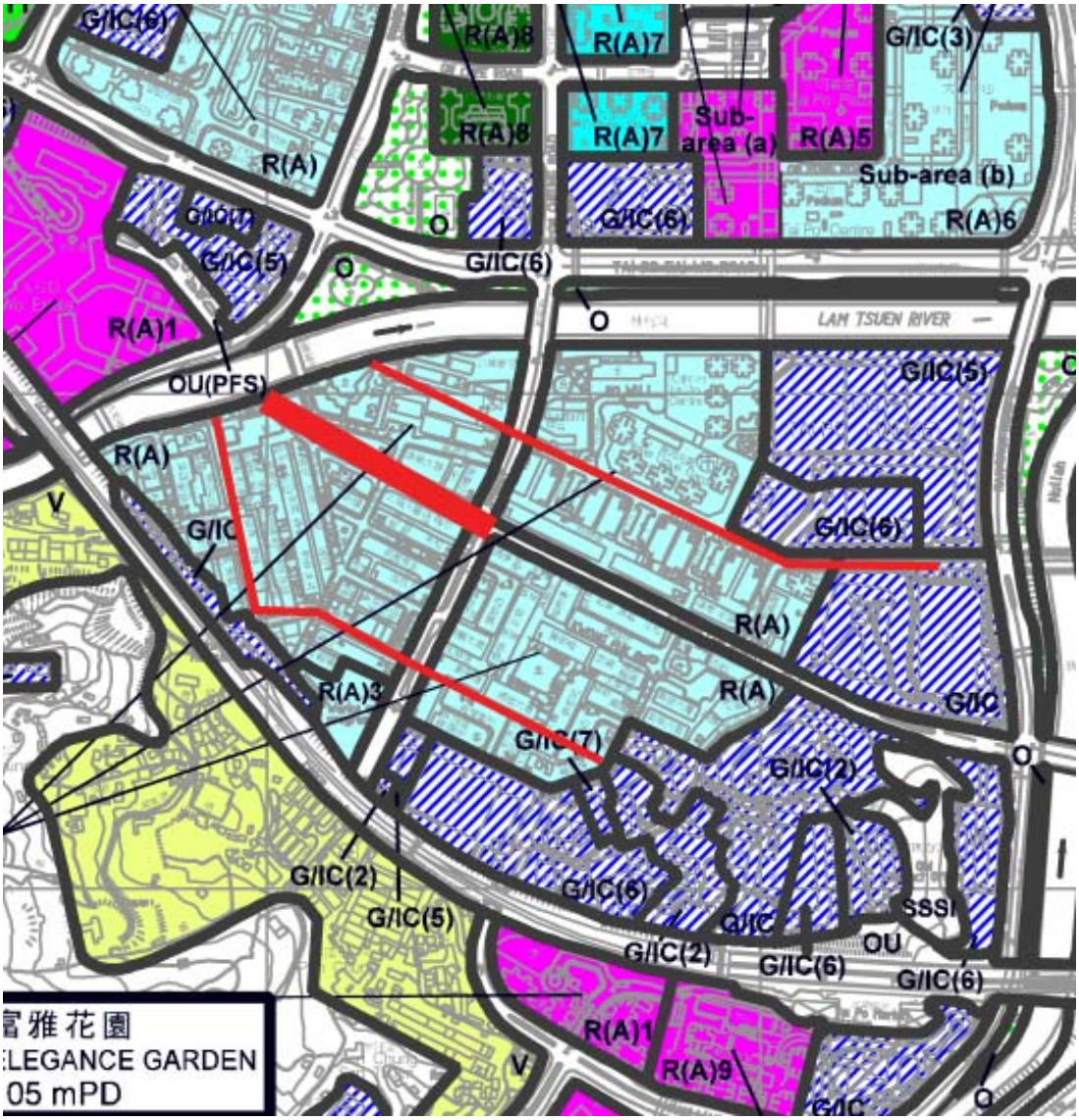


Figure 7.4 Suggested air paths around Kwong Fuk Road

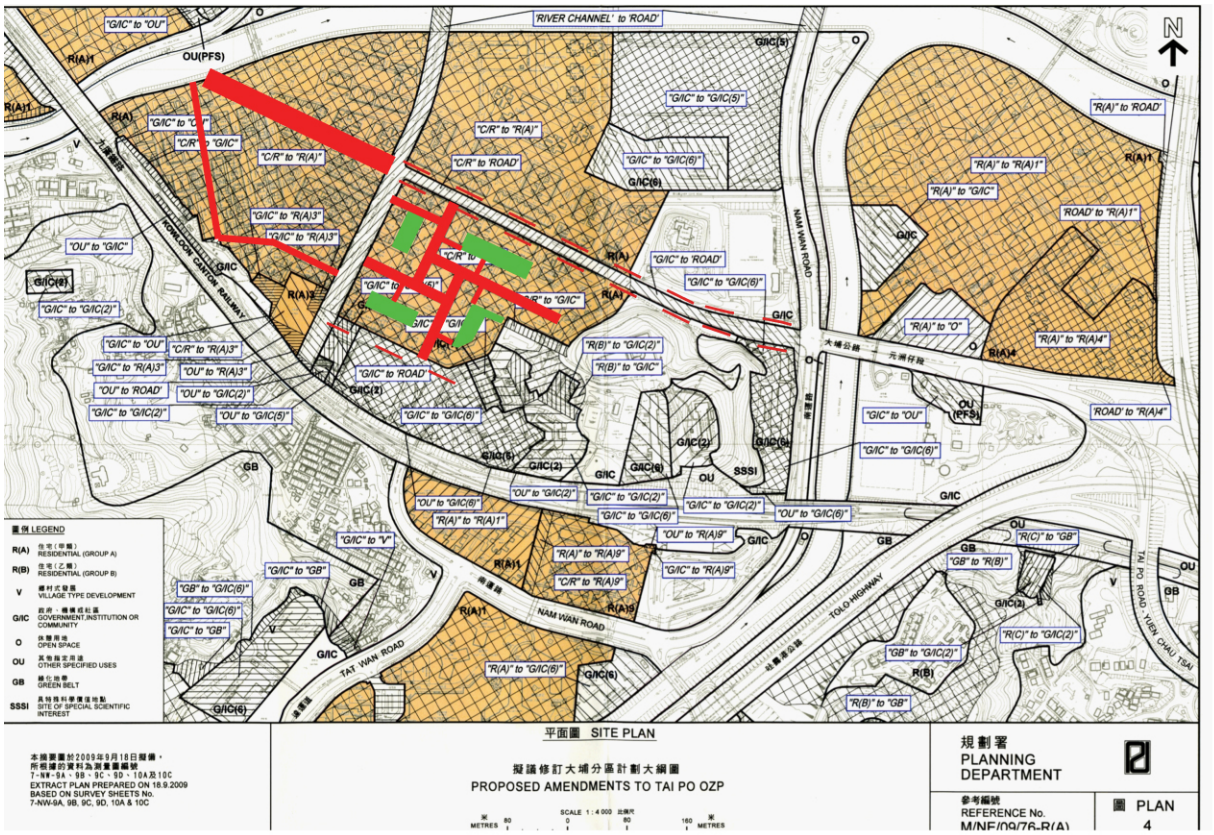


Figure 7.5 Suggested air path network in Tai Po Hui

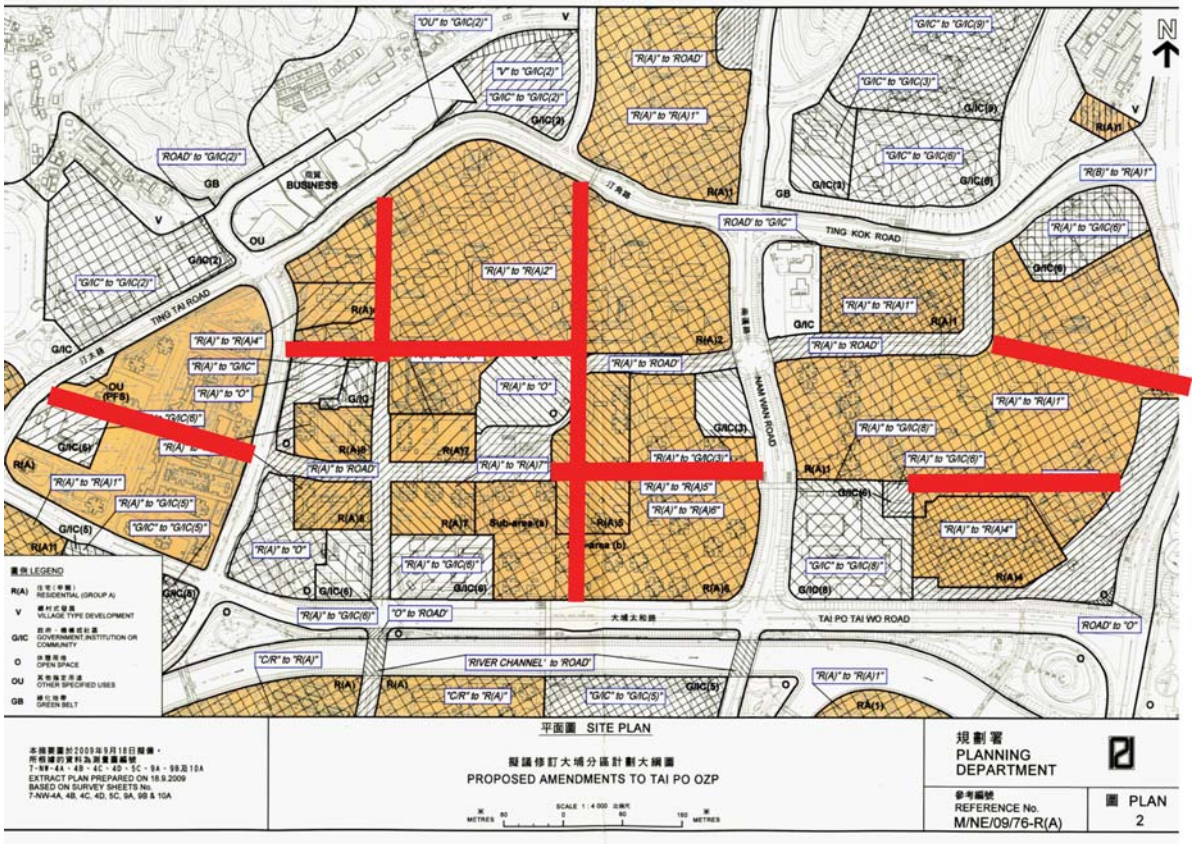


Figure 7.6 suggested air path network around Tai Po Central Town Square

8.0 The Revised Scenario

8.1 In response to the expert evaluation of the initial planned scenario in section 7.0, a revised scenario is proposed by the Planning Department (Figure 8.1). A number of suggested improvements as illustrated in Figure 8.1 have been incorporated in formulating the BH restrictions and to address the air ventilation issues earlier mentioned. The revised scenario is further evaluated below:

(1) Further to extracting some major roads from R(A) zone and rezoning to ROAD in the initial planned scenario (Figure 7.4-7.6), most roads and streets are extracted and rezoned to ROAD. It is a good practice and in accordance with the comments made in paragraph 7.11. Thus, these roads will all serve as networks of air paths within the concerned area.

(2) More areas are extracted from R and rezoned to GIC and Open space than the initial planned scenario or low-rise developments. As indicated in paragraph 5.4.1, the existing open space, greenery and GIC sites should not be further developed with tall buildings or re-zoned for bulkier development. Thus, it is better to look into smaller lands and reflect their important roles to the air ventilation at the near proximity of buildings.

(3) A non-building area of about 20m wide is designated along On Po Road within the site of Fu Shin Estate. Its alignment is in accordance with the comments made in paragraph 7.8 & 7.13 and Figure 7.6.

(4) Instead of assigning the same building height restriction around Tai Po Hui and Tai Po Centre, more building variations are introduced within smaller lands and some areas are kept lower than the initial planned scenario in Tai Po Hui. It is in accordance with the comments made in paragraph 6.3 by respecting the existing building height and not increasing height-to-width ratio too much.

(5) Besides the above measures illustrated in Figure 8.1, It is also proposed that a non-building area / low-rise building area (allow only very low-rise structures) of about 10-15m be designated across the site of Kwong Fuk Estate extending from Plover Cove Road to the east towards the waterfront. This low-rise building area will have a building height restriction of 3-storey taken into account the height of existing buildings in the area. This measure, if confirmed, is considered an accepted compromise and reasonable measure to improve the air ventilation in the leeward side. However, a single non-building area / low-rise building area (allow only very low-rise structures) of 10-15m is not enough to safeguard sufficient air ventilation within and around Kwong Fuk Estate. Housing Department should still conduct AVA study to ensure good air ventilation to the surroundings upon redevelopment.

8.2 Subject to recommendations made in paragraph 8.1 above, the revised scenario can be adopted for enhancement of air flow in Tai Po Hui and areas around the Town Square.

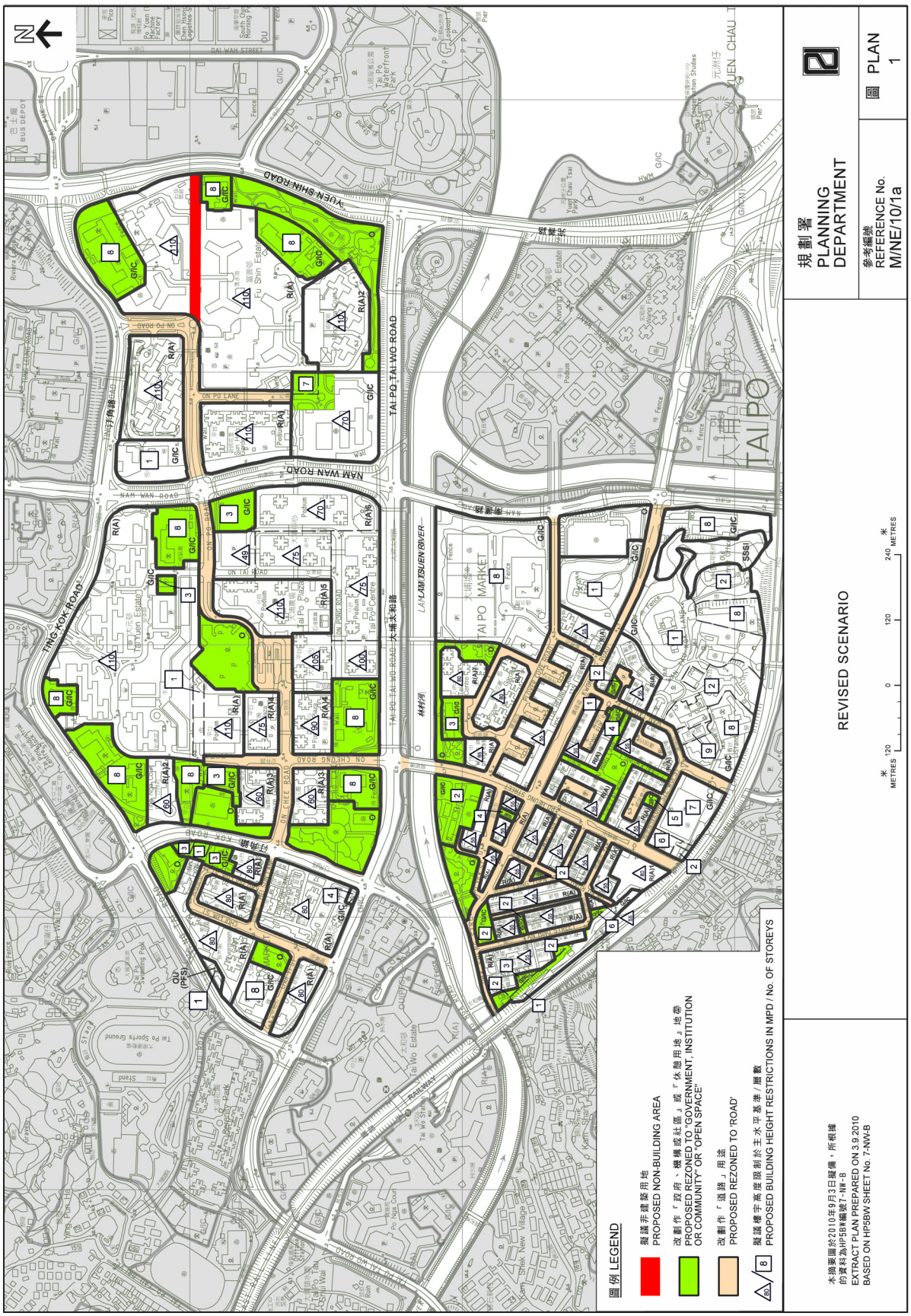
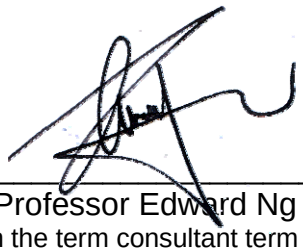


Figure 8.1 The Revised Scenario

9.0 Focus Areas and Further Studies

9.1 There is no focus area of concern in the study area.

9.2 Based on the expert assessment, there should be no major air ventilation issues from the study area if the suggestions in the report can be followed. Further study will not be necessary.



Date: 23 August 2010

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