

Hong Kong Housing Authority  
**Proposed Public Rental Housing  
Development at Hang Tai Road,  
MOS Area 86B and Home  
Ownership Scheme Development  
at Ma On Shan Road (Northern  
and Southern)**

Air Ventilation Assessment - Expert  
Evaluation

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It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.

Job number 226853

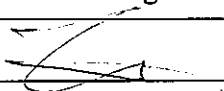
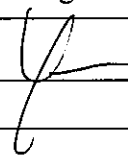
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# 1 Introduction

## 1.1 Project Background

Ove Arup & Partners Hong Kong Ltd (Arup) was commissioned by the Hong Kong Housing Authority (HKHA) to carry out an Air Ventilation Assessment (AVA) – Expert Evaluation for the Proposed Public Rental Housing Development (PRH) at Hang Tai Road, MOS Area 86B and Home Ownership Scheme (HOS) Development at Ma On Shan Road (Northern and Southern) (The Development).

## 1.2 Objective

The objective of this study is to evaluate the wind performance of the Development using the methodology of Air Ventilation Assessment, based on the “Housing Planning and Lands Bureau – Technical Circular No. 1/06, Environment, Transport and Works Bureau – Technical Circular No. 1/06” issued on 19th July 2006 (the Technical Circular) and “Technical Guide for Air Ventilation Assessment for Development in Hong Kong – Annex A” (the Technical Guide). This report presents the findings for Stage 1 AVA Study – Expert Evaluation.

## 1.3 Study Tasks

The major task of this study is to carry out an expert evaluation on the characteristics of the site wind availability data of the development area and assessment of the wind performance under existing development situation and the proposed building design in a qualitative way. The expert evaluation will cover the following tasks:

- Identify the wind condition
- Identify problematic area
- Identify good design features
- Determines if further study should be staged into Initial Study and Detail Study

## 2 Site Characteristics

The two Proposed Developments in this study are located in the Ma On Shan area. One of the Developments is the PRH at Hang Tai Road, namely **Yan On Estate Phase 2 (YOE Ph2)** Development. Hang Tai Road is proposed to be realigned in order to make the site available for the proposed housing development such that part of the existing two pieces of “G/IC” parcels and part of the Hang Yiu Street will form the realigned Hang Tai Road. Another Development is the HOS along Ma On Shan Road, namely **Ma On Shan Road Northern and Southern Portion (MOSR N&S Portion)** Development.

The eastern side of the Developments are Ma On Shan Country Park with hilly terrain and lots of greenery while the Tolo Harbour with some high rise residential clusters (i.e. Oceanaire, Ocean View, La Costa, Sausalito, Mountain Shore and Kam Tai Court) are located at the western side separating the waterfront and the Developments. In addition, the high rise public housing buildings of Hang On Estate and Kam On Court are located at the north side of the Development while the low rise cluster, such as, Tai Shui Hang Village and Chevalier garden are located at the south. A community farm, bicycle park and archery venue are currently situated on the MOSP N&S Site and at southwest of YOH Ph2 as indicated in Figure 1.

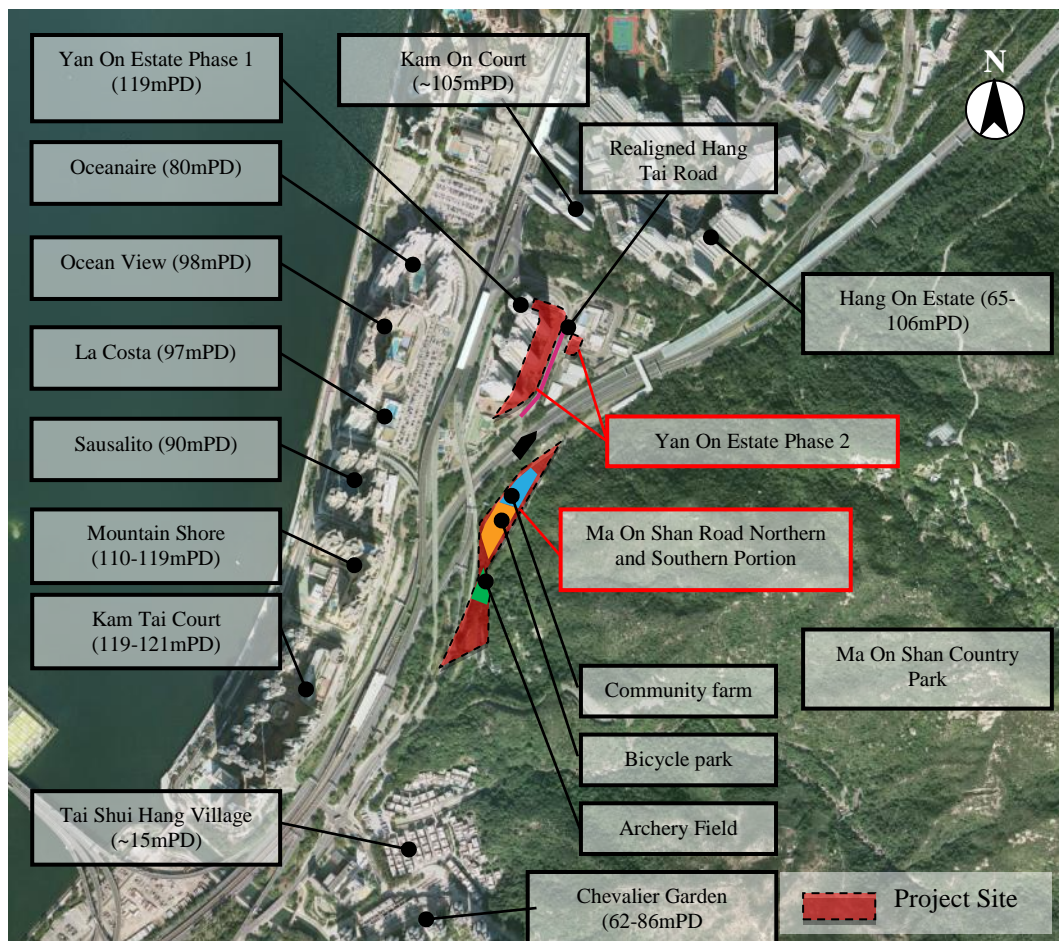


Figure 1 Location of the Project Site and its surrounding developments

A strip of open space running in the east-west direction located to the south of Hang On Estate or to the north of Yan On Estate, serves as green corridors

separating the high-density developments. Another strip of open space located to the north of Hang On Estate forms part of Ma on Shan Recreation Ground. Combining with the adjoining Ma On Shan Sport Ground, this large open piece of open space provides an extensive network of airpath for necessary air ventilation. There is an extensive greenbelt to the east of proposed HOS development at Ma On Shan Road. These open spaces and greenbelt areas are highlighted in green dotted line at Figure 2.

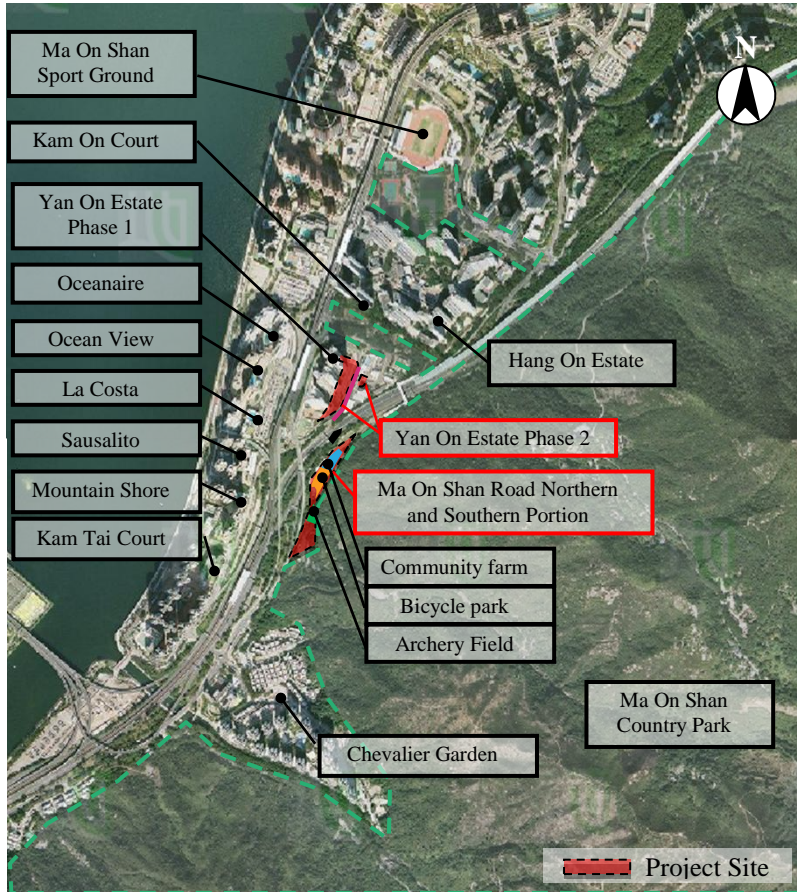


Figure 2 Open Spaces in Ma On Shan Area

### 3 Wind Condition

To investigate the wind performance of the Developments, natural wind availability characteristics is essential to the wind environment study. Site wind availability data presented in the wind rose could be used to assess the wind characteristics in terms of the magnitude and frequency of approaching wind from different wind directions. There are three sources of site wind data for this Study Area, including measured data from wind tunnel test, simulated MM5 data and the nearby Hong Kong Observatory (HKO) Station – Sha Tin weather station.

#### 3.1 Wind Tunnel Test Data

The wind tunnel data employed in the Detailed Study for the Proposed Public Housing Development in Ma On Shan Area 86B (i.e. Existing Yan On Estate)<sup>1</sup> was conducted by the CLP Power Wind/ Wave Tunnel Facility (WWTF) at HKUST. Figure 3 illustrates the study location, while Figure 4 and Figure 5 show the wind rose under annual and summer condition, respectively, from the wind tunnel experiments. The wind roses at 500m show that the annual prevailing winds are E and ENE winds while the summer prevailing winds are from E, S and SW directions.

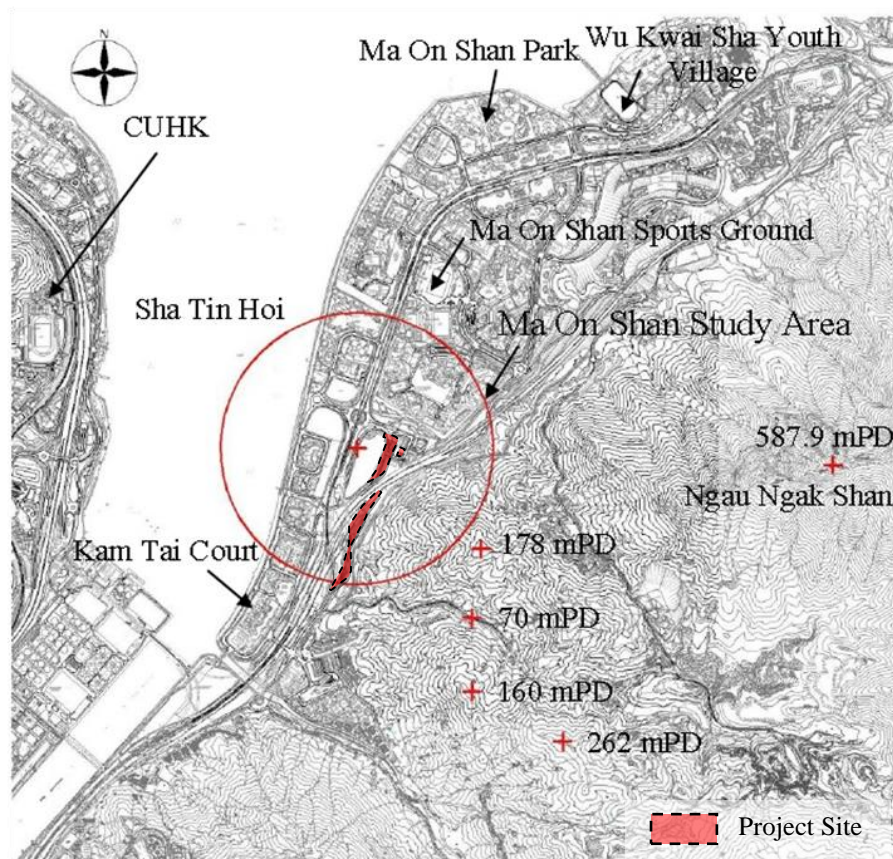
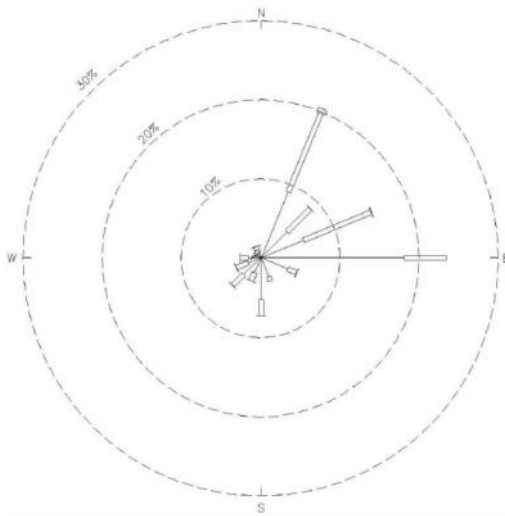


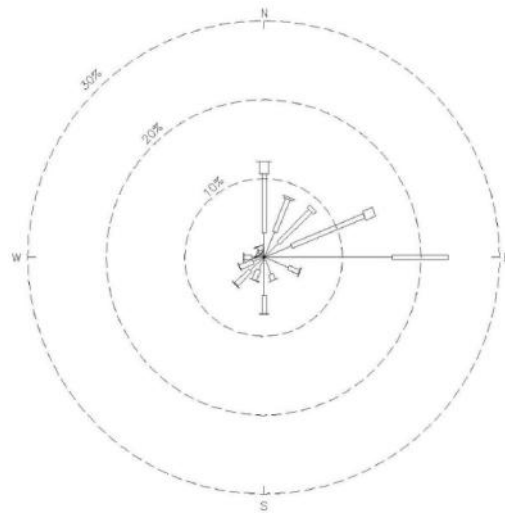
Figure 3 Study area for the site wind availability of the Ma On Shan Area 86B

<sup>1</sup> Detailed Air Ventilation Assessment for Public Housing Development Project Batch C3, [http://www.pland.gov.hk/pland/en/info\\_serv/ava\\_register/ProjInfo/AVRG19\\_AVA\\_FinalReport.pdf](http://www.pland.gov.hk/pland/en/info_serv/ava_register/ProjInfo/AVRG19_AVA_FinalReport.pdf)

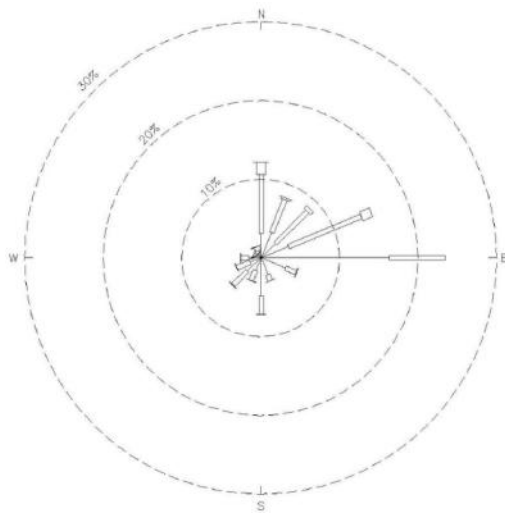




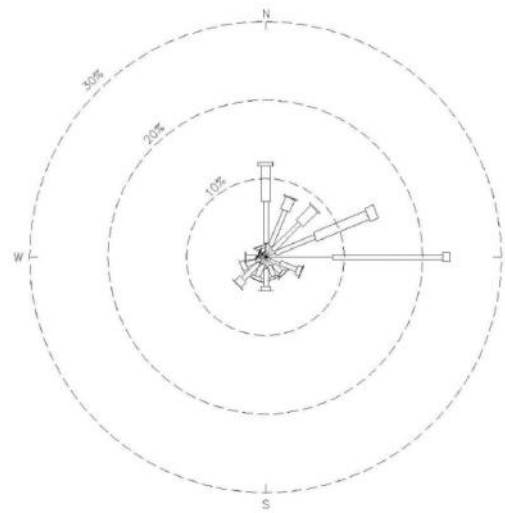
Annual Wind Rose, 50m



Annual Wind Rose, 100m



Annual Wind Rose, 200m



Annual Wind Rose, 500m

Figure 4 Wind Rose for Annual, non typhoon winds for Ma On Shan Area 86B

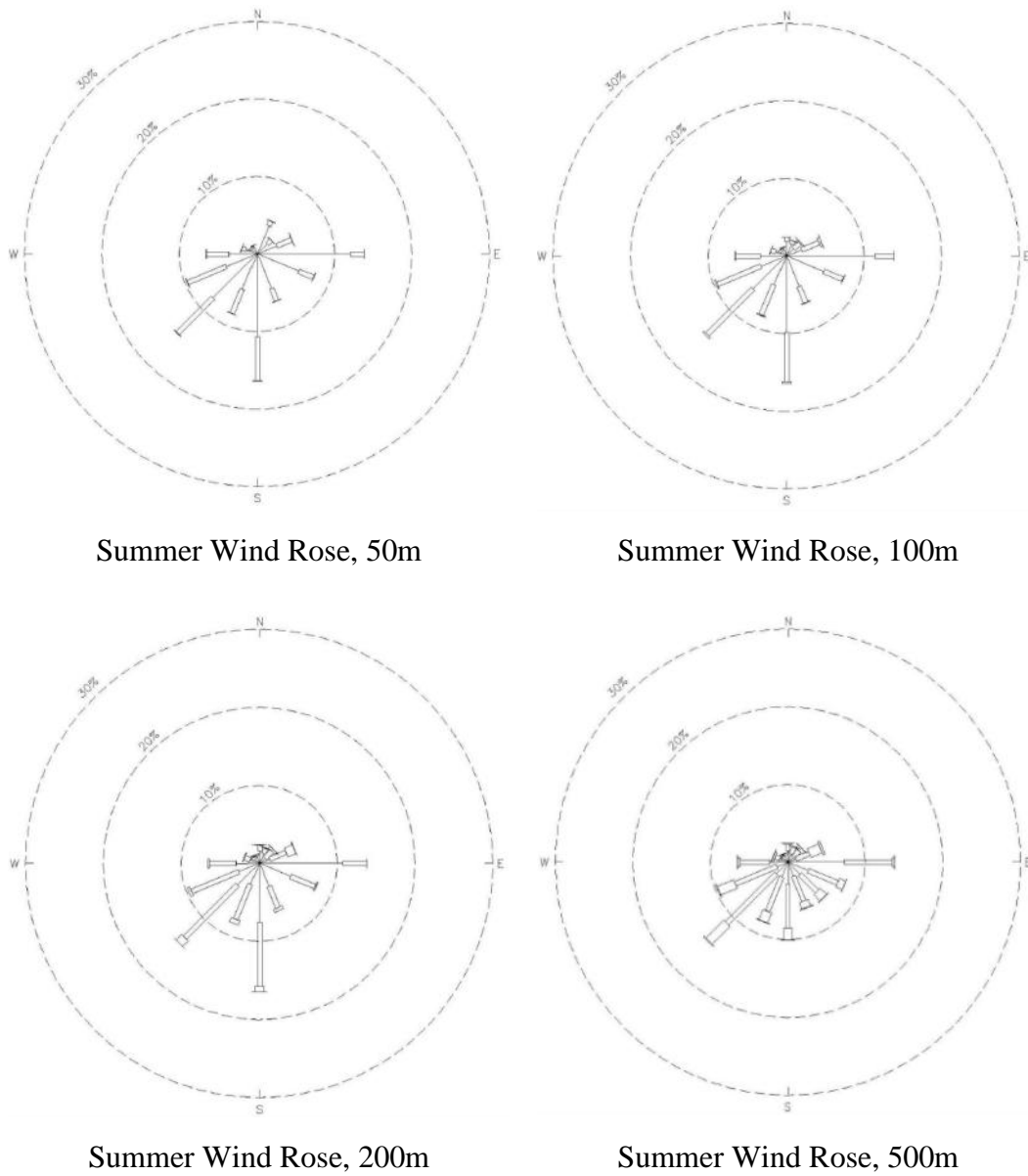


Figure 5 Wind Rose for Summer, non typhoon winds for Ma On Shan Area 86B

## 3.2 MM5 Wind Data

The MM5 data quoted in Expert Evaluation for the Ma On Shan Area<sup>2</sup> is used as the second reference. The wind roses of the location B (Figure 6) at 120m and 450m are extracted and illustrated in Figure 7. With reference to the Expert Evaluation for the Ma On Shan Area, the annual prevailing winds are NE and E winds, while the summer prevailing wind are E, SSW and SW winds.

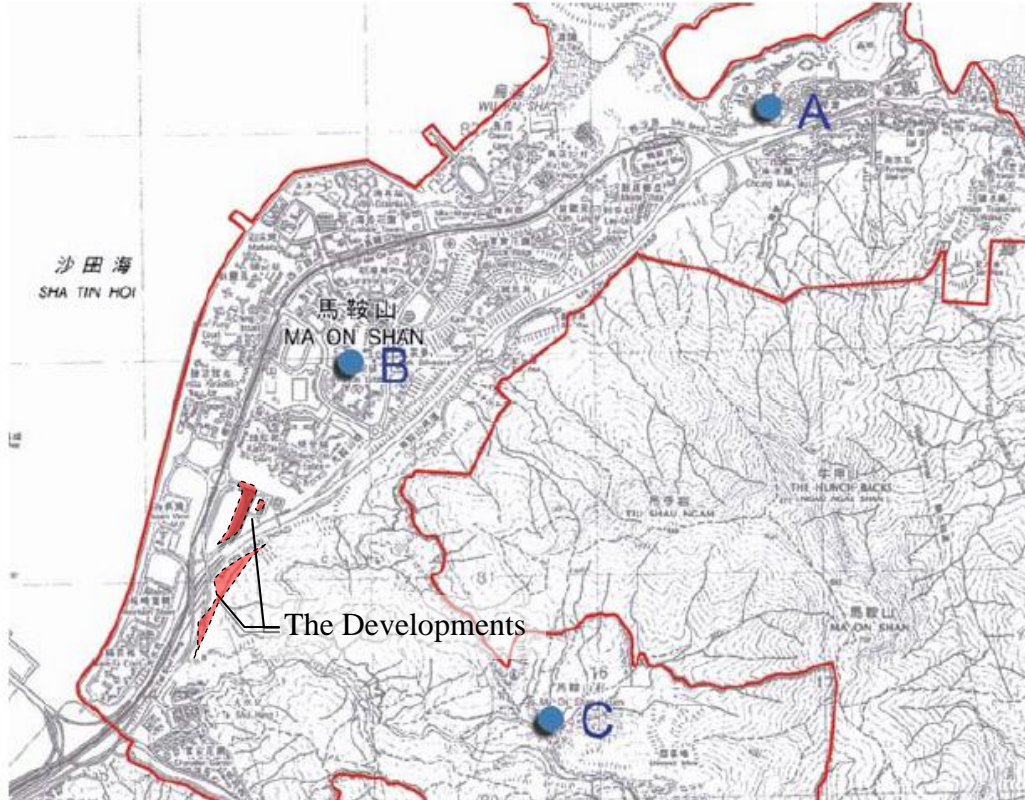


Figure 6 Location for the MM5 extracted in the Expert Evaluation of the Ma On Shan Area.

<sup>2</sup> CUHK, Term Consultancy for Expert Evaluation and Advisory Services on Air Ventilation Assessment Final report – Ma On Shan Area, February 2009 ([http://www.pland.gov.hk/pland\\_en/info\\_serv/ava\\_register/ProjInfo/AVRG37\\_AVA\\_FinalReport.pdf](http://www.pland.gov.hk/pland_en/info_serv/ava_register/ProjInfo/AVRG37_AVA_FinalReport.pdf))

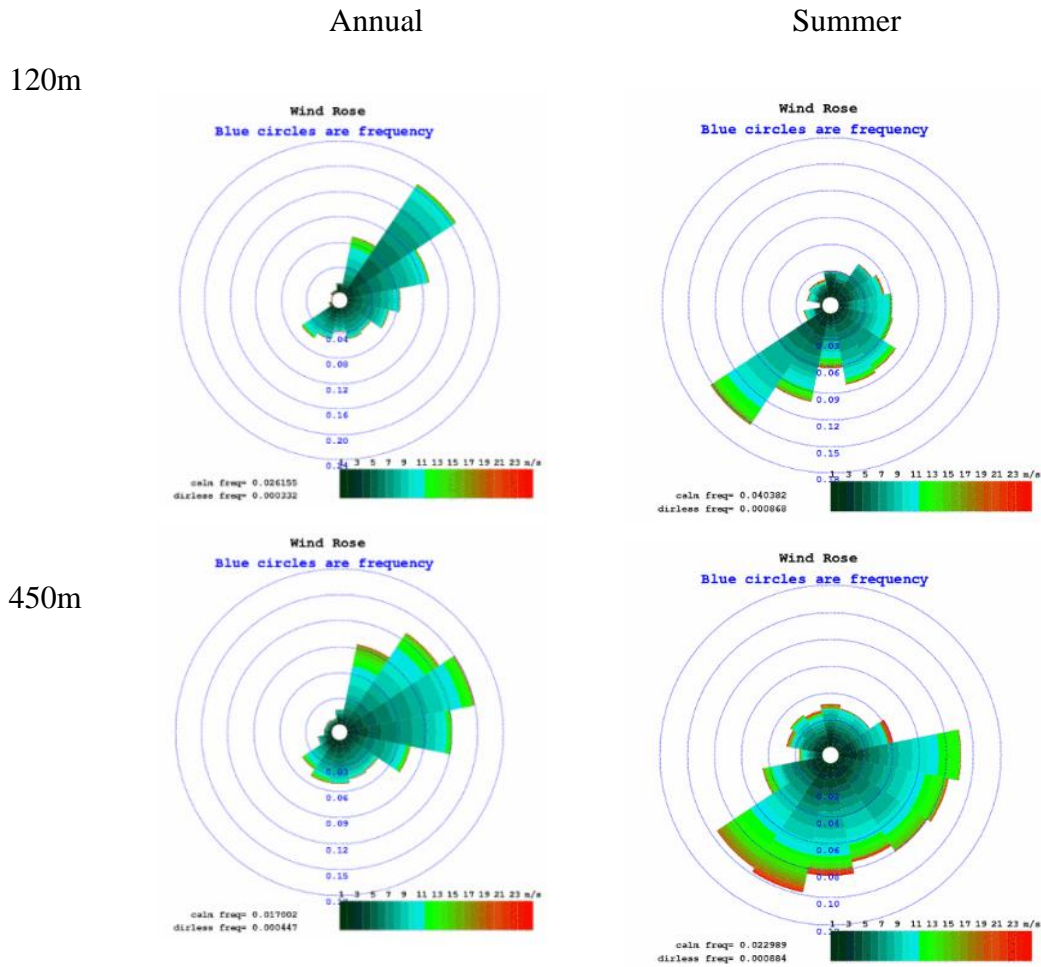


Figure 7 Wind Rose for Annual and Summer for Ma On Shan Area

Other than the annual and summer wind roses, the EE report also identified the land/ sea breezes to be SE-NW direction. Hi Tai Street, Yuk Tai Street, Sui Tai Road and Po Tai Street are the local air paths for sea and land breezes.

### 3.3 Hong Kong Observatory (HKO)

From the HKO report<sup>3</sup>, the annual and summer wind roses measured at the Shatin weather station are selected and shown in Figure 9 and Figure 10. According to the measured data, the annual prevailing wind directions are E and NE while summer prevailing winds are E and SW winds.

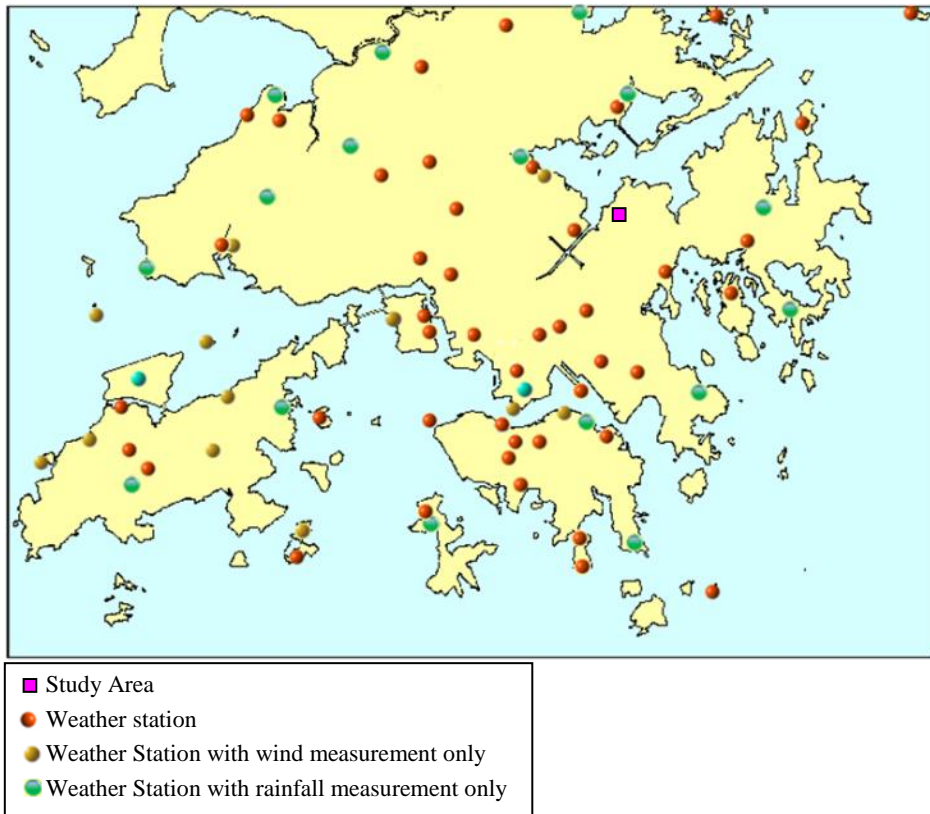


Figure 8 Weather stations in Hong Kong

#### Annual wind roses for Sha Tin, 1985-2012

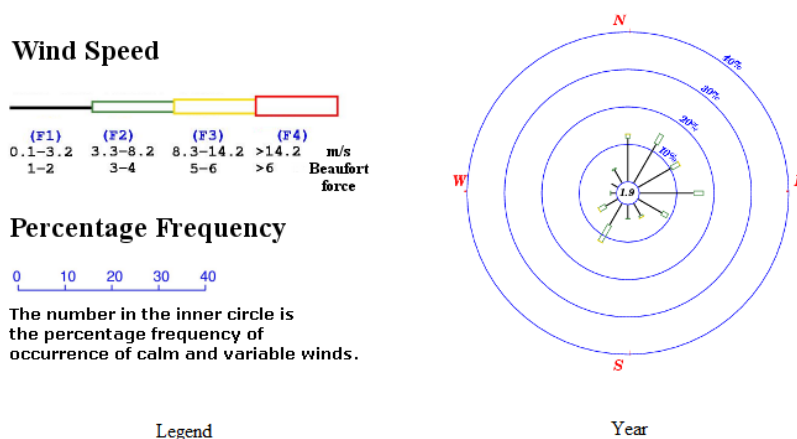


Figure 9 Annual prevailing wind recorded in the HKO Sha Tin Observatory Station

<sup>3</sup> [http://www.hko.gov.hk/cis/region\\_climat/SHA/SHA\\_windrose\\_year\\_c.htm](http://www.hko.gov.hk/cis/region_climat/SHA/SHA_windrose_year_c.htm)

**Monthly wind roses for Sha Tin from July to September ,1985-2012**

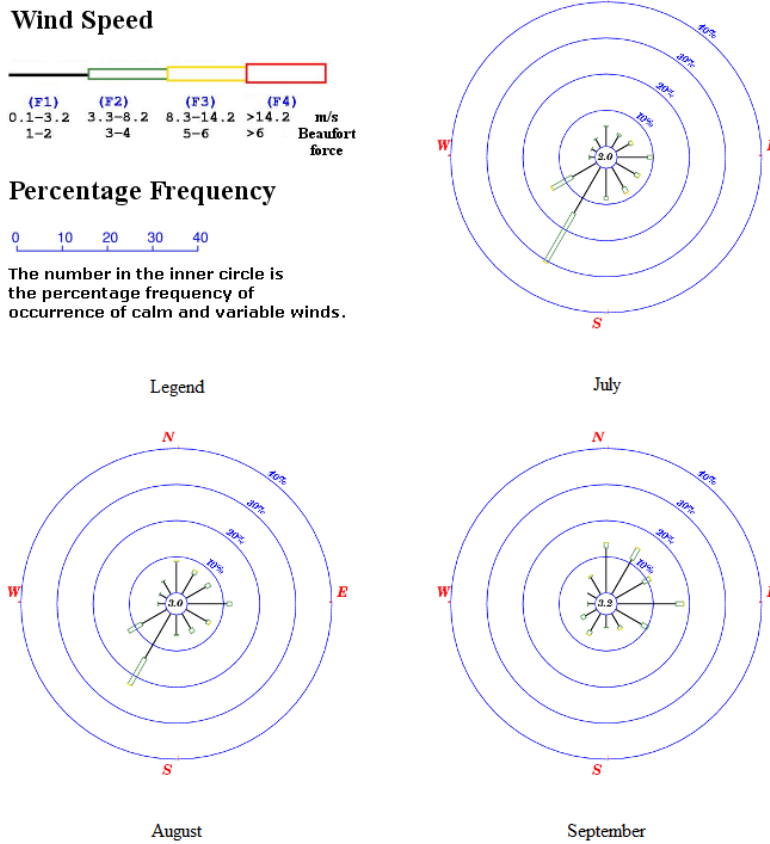


Figure 10 Summer prevailing wind recorded in the HKO Sha Tin Observatory Station

**3.4 Summary of the Site Wind Availability**

These three sets of data are tabulated in Table 1. All data basically reflects similar annual prevailing wind directions which are E and NE, whereas the summer prevailing wind directions varies from E and SW. Figure 11 illustrates the annual and summer prevailing wind of the Developments.

Table 1 Prevailing wind directions for the Study Area

Prevailing wind direction	Wind tunnel data	MM5 HKUST (EE Study of Ma On Shan Area)	HKO (Sha Tin)
Annual	E / ENE	E / NE	E / NE
Summer	E / SW	E / SW / SSW	E / SW
Land and Sea Breeze	N.A.	SE-NW direction	N.A.

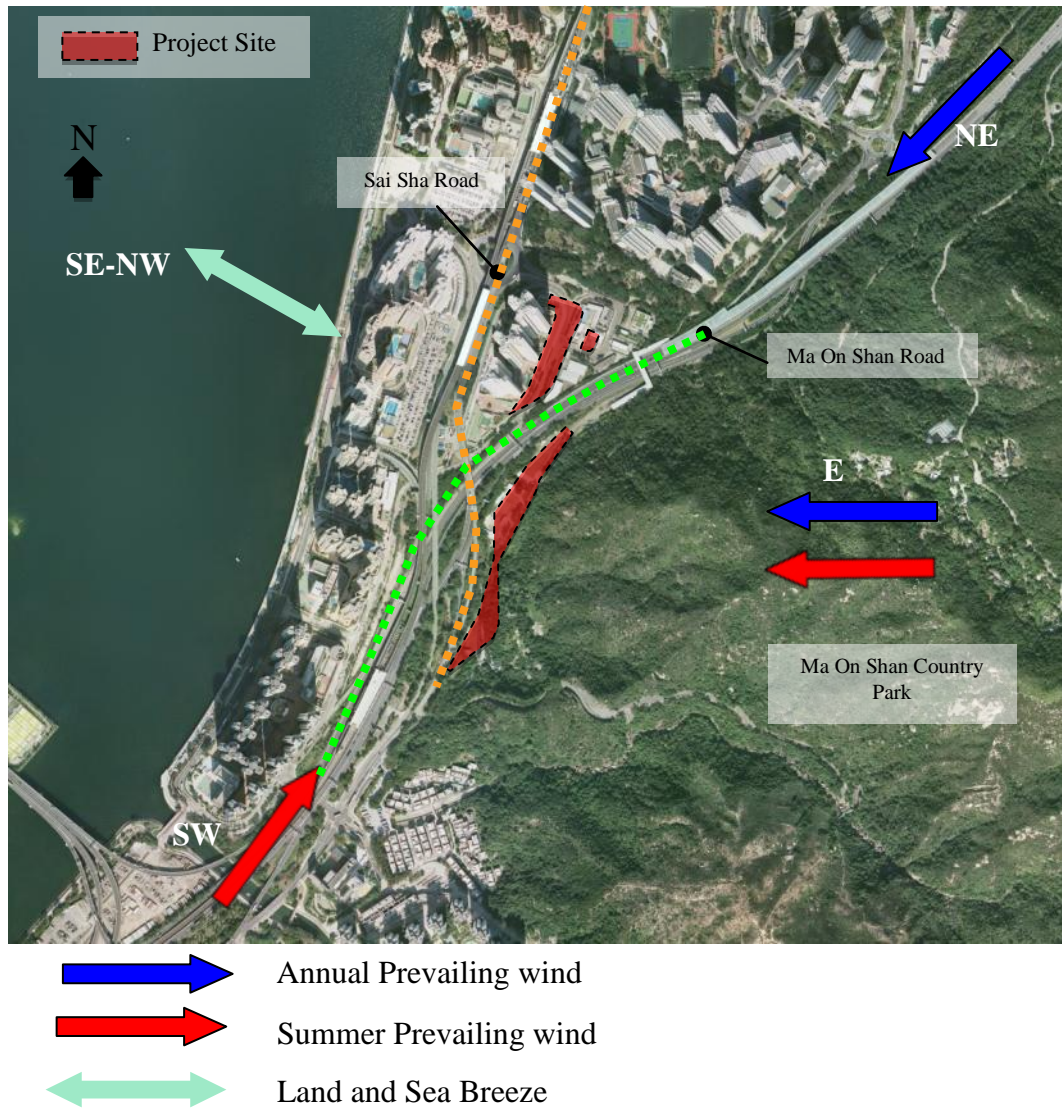


Figure 11 Annual and Summer prevailing winds of the Developments

## 4 Expert Evaluation on Existing Condition

As refer to the Expert Evaluation report for the Ma On Shan Area<sup>2</sup>, some wind corridors are identified under different prevailing wind conditions.

### 4.1 Northeast/ East-northeast prevailing wind condition

Northeast (NE) and east-north-east (ENE) directions are the annual prevailing wind directions. In the presence of Ma On Shan Country Park, these two prevailing wind would travel along the Ma On Shan Road.

As shown in Figure 12, the Ma On Shan Road and Sai Sha Road serve as the major breezeway near the Developments. There are some major high-rise residential buildings situated at the upwind direction, such as Hang On Estate and Kam On Court, and thus inducing wind shadow to the YOE Ph2 Site. Also, 5m-tall noise barrier is located along the Ma On Shan Bypass which further reduces the wind penetration to the YOE Ph2 Development. Therefore, it is expected the ventilation performance at the YOE Ph2 would be relatively calm. For MOSR N&S Portion Development, it is expected that the incoming winds could be able to enter the Development from Ma On Shan Road and penetrate through toward the southwest direction.

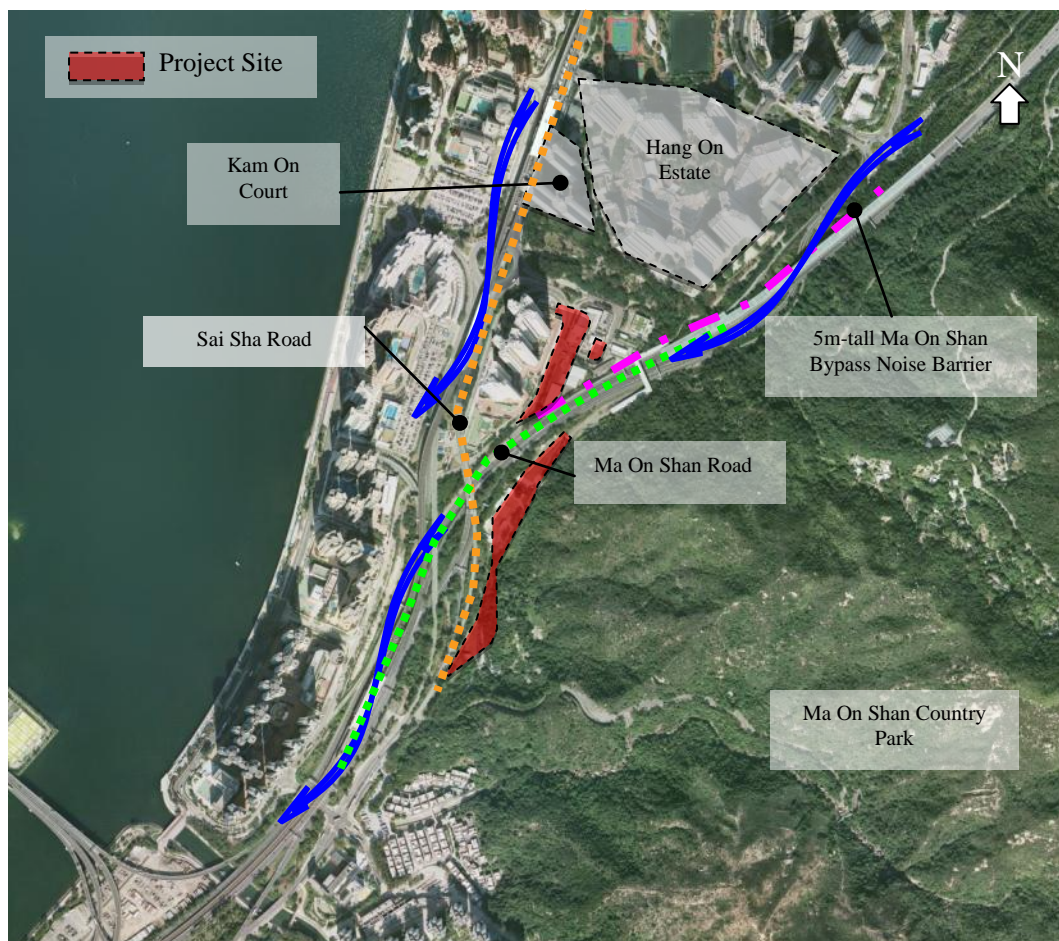


Figure 12 Existing wind environment under NE/ ENE prevailing wind condition



## 4.2 Southwest/ South-southwest prevailing wind condition

The Expert Evaluation report for the Ma On Shan Area<sup>2</sup> had indicated that Ma On Shan Road and Sai Sha Road would be the major breezeways in Ma On Shan Area. The summer prevailing wind directions (including southwest and south-southwest) would travel along Ma On Shan Road and Sai Sha Road and ventilate the Developments in both YOE Ph2 and MOSR N&S Portion). Since the upwind side of the Developments are dominated by greenery and open space, no major wind stagnant would be expected under existing condition.

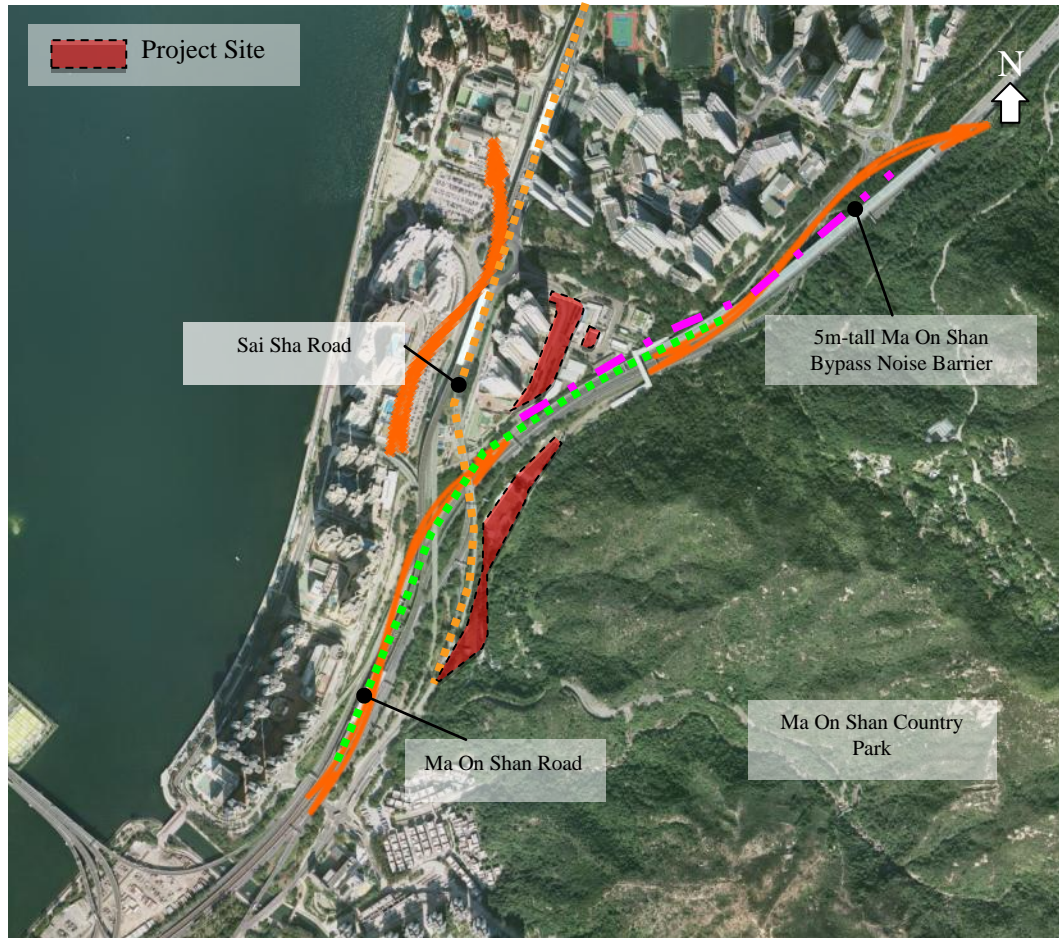


Figure 13 Existing wind environment under SW/ SSW prevailing wind conditions

### 4.3 East prevailing wind conditions and Land Breeze

The East (E) direction is both annual and summer prevailing wind direction. As Ma On Shan Country Park is situated at the upwind side of the existing clusters, the mountain would divert the prevailing wind direction to travel along the tough of the mountain. With the gradual slope of the mountain, the E wind would easily re-attach to the pedestrian level and ventilate the existing clusters.

There are some local air paths identified in the Expert Evaluation report for the Ma On Shan Area<sup>2</sup> and highlighted in Blue in Figure 14. The proposed development in YOE Ph2 would unlikely reduce the wind penetration towards those identified local air paths as the existing YOE Ph1 would have blocked the E wind reaching the southern part of the Po Tai Street; while the domestic blocks in MOSR N&S Portion Site would have larger building separation with up to approximate 140m between North and South Portions. Such building gap would allow E wind to penetrate across the MOSR N&S Portion and ventilate the existing residential clusters at its downwind side.

In the presence of localized air path, the E wind, as well as the land breeze would ventilate the existing clusters.

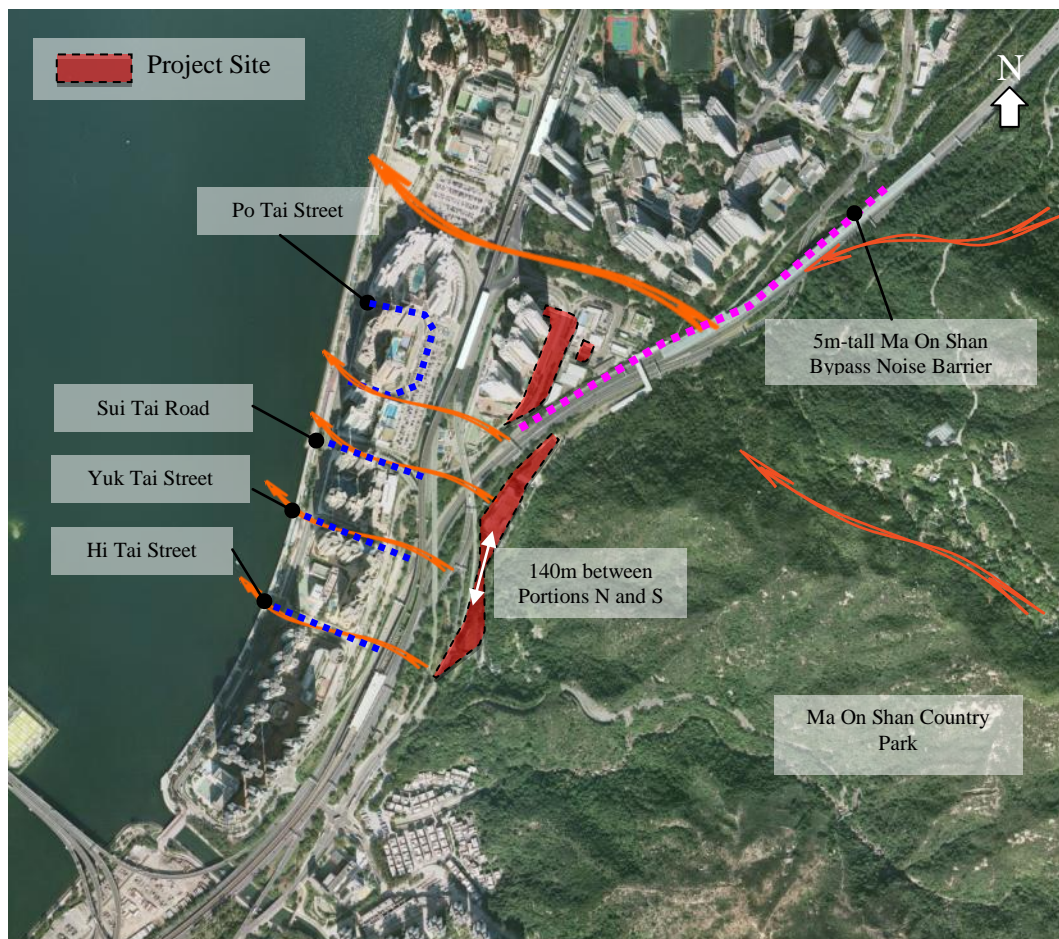


Figure 14 Existing wind environment under E prevailing winds and Land Breeze

## 4.4 Sea Breeze

The wind condition would be slightly limited for sea breeze to penetrate across the existing clusters and reach the Development Sites. Those existing high-rise residential clusters near the promenade (such as Kam Tai Court, Ocean View, La Coasta, Sausalito, Mountain Shore) would shield a portion of sea breeze.

For the MOSR N&S Portion, there are approximately 200m from the nearest existing residential cluster. Sea breeze would likely to reattach at pedestrian level after travelling such distance. Together with the identified local air path along Hi Tai Street, Yuk Tai Street, Sui Tai Road and Po Tai Street, the sea breeze would easily reach the and ventilate the MOSR N&S Portion.

However, YOE Ph2 would fall into the wind shadow casted by the existing YOE Ph1. Therefore, the sea breeze reaching the YOE Ph2 would be reduced as indicated in Figure 15.

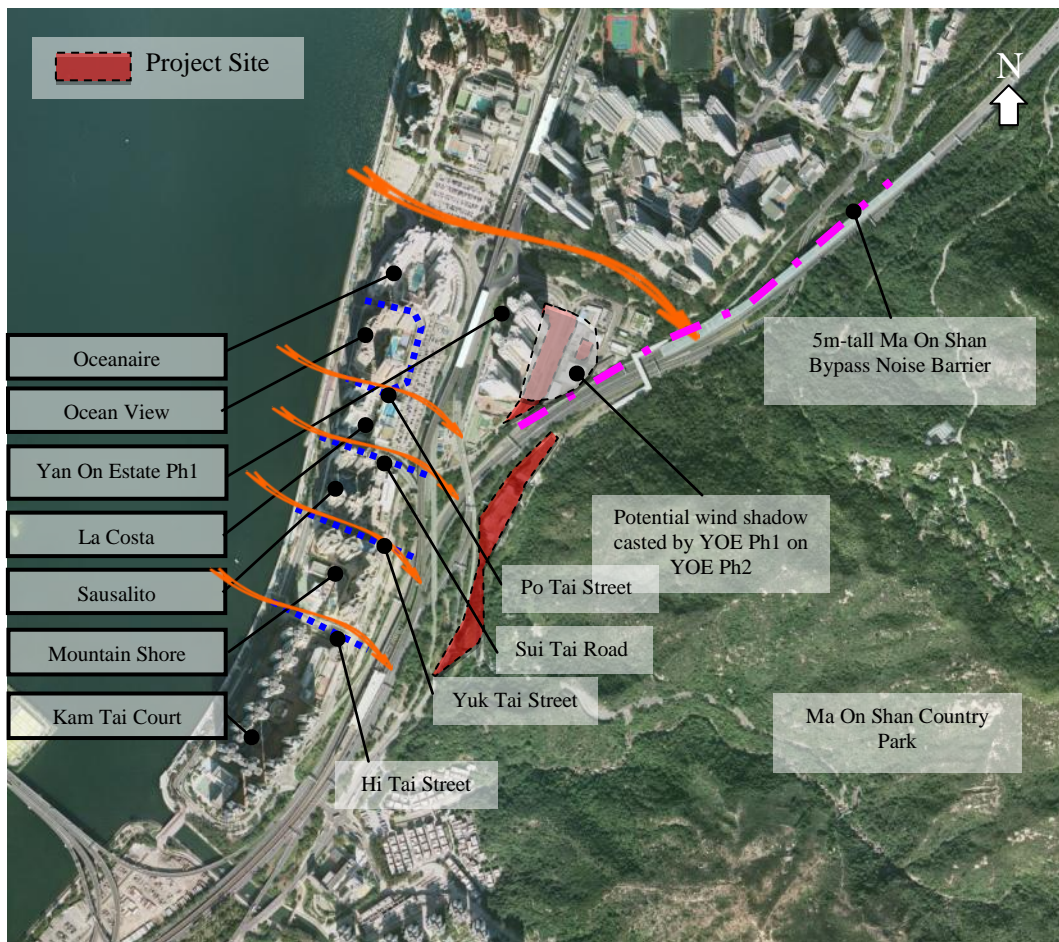


Figure 15 Existing wind environment under Sea Breeze

## 5 Proposed Development

There are 2 Developments in this study. One Development is the Proposed PRH, Yan On Estate Phase 2 (YOE Ph2) while another Development is Proposed HOS at Ma On Shan Road Northern and Southern Portion (MOSR N&S Portion).

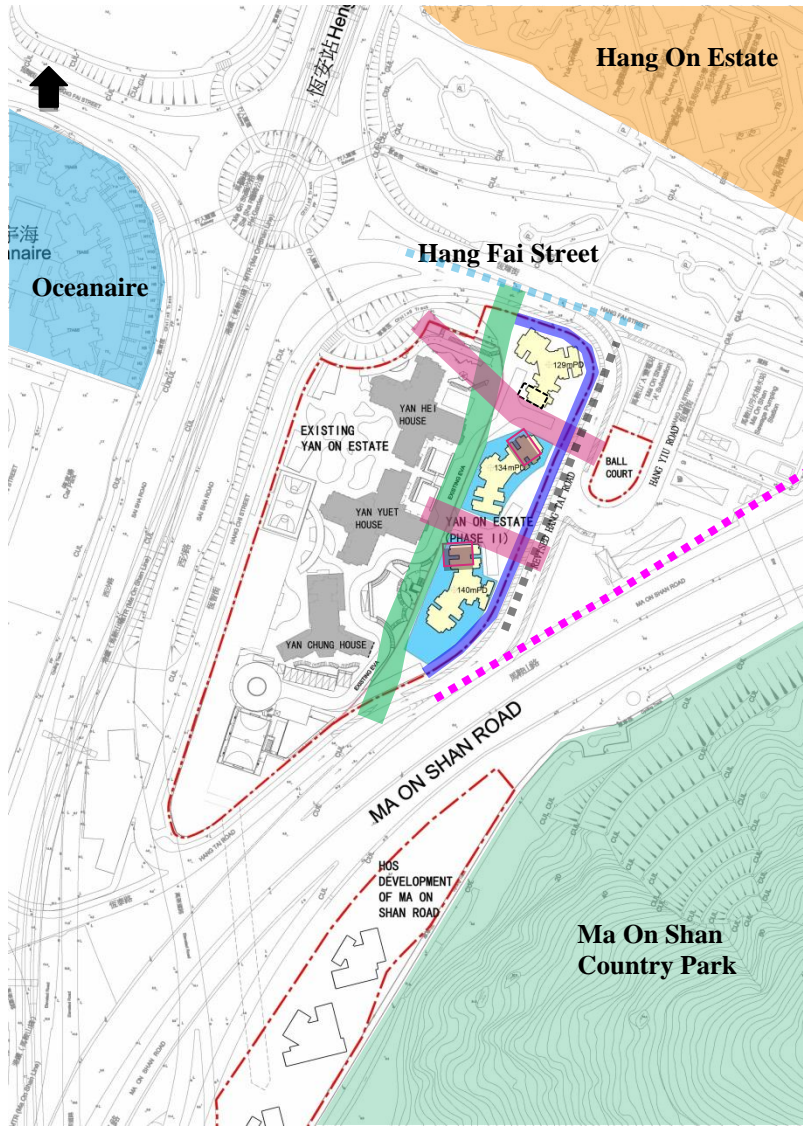
### Proposed PRH Yan On Estate Phase 2 at Hang Tai Road

It is proposed to close existing Hang Tai Road and divert it to the east for the Proposed Yan On Estate Phase 2 (YOE Ph2) Development. It consists of 3 nos. of residential blocks with building height ranged from about 130mPD to 140mPD and community facilities with 1 storey height below the residents blocks. A small piece of land located at east of YOE Ph2 is proposed to be used as ball court and shown in the plan below. In order to enhance the wind permeability and minimizing the influence to the surrounding developments, the proposed development has incorporated the followings wind enhancement features in the design:

- 15m-wide local air path;
- Podium Roof empty bays with width of 5m and floor-to-floor height of 3m. Its level will be 6m above ground;
- Empty bay on G/F with width of 5m (W) and floor-to-floor height of 5.5m;
- Building setback of 10m from realigned Hang Tai Road;

Table 2 The design details of proposed Yan On Estate Phase 2

Site Area	3.08ha (including Yan On Phase 1, Phase 2 but excluding the G/IC parcel near the CLP substation, which is proposed for a ball court)
Domestic Plot Ratio	6.0 (for both Yan On Phase 1 and Phase 2)
Domestic GFA	184,800m <sup>2</sup> for both Yan On Phases 1 & 2 (80,734m <sup>2</sup> from Phase 2)
Non-domestic Plot Ratio	0.5 (for both Yan On Phase 1 and Phase 2 and retail pedestrian link over Ma On Shan Road)
Non-domestic GFA	15,400m <sup>2</sup> for both Yan On Phases 1 & 2 (13,026m <sup>2</sup> from Phase 2 and 600 m <sup>2</sup> from retail pedestrian link)
No. of flats	4,187 (1,600 from Phase 2)



- 15m-wide Local Air Path for E and ENE Winds
- 15m-wide Local Air Path for SW and SSW Winds
- 10m setback from Realigned Hang Tai Road
- Realigned Hang Tai Road
- Hang Fai Street
- 5m-tall Ma On Shan Bypass Noise Barrier
- Podium Roof Empty Bay (5m (W) x 3m (H))
- G/F Empty Bay (5m (W) x 5.5m (H))

Figure 16 Proposed Yan On Estate Phase 2 (YOE Ph2) Development at Hang Tai Road

Proposed HOS at Ma On Shan Road

The Proposed Ma On Shan Road Northern and Southern Portion (MOSR N&S Portion) Development consists of 6 nos. of residential towers with height ranging from about 125 to 140mPD. The building height profile is proposed in respect of the Ma On Shan Ridgeline.

Table 3 The design details of proposed MOSR N&S Portion

Site Area	1.86ha
Domestic Plot Ratio	5.5
Domestic GFA	102,200m <sup>2</sup>
Non-domestic Plot Ratio	0.3
Non-domestic GFA	5,500m <sup>2</sup>
No. of flats	1,700

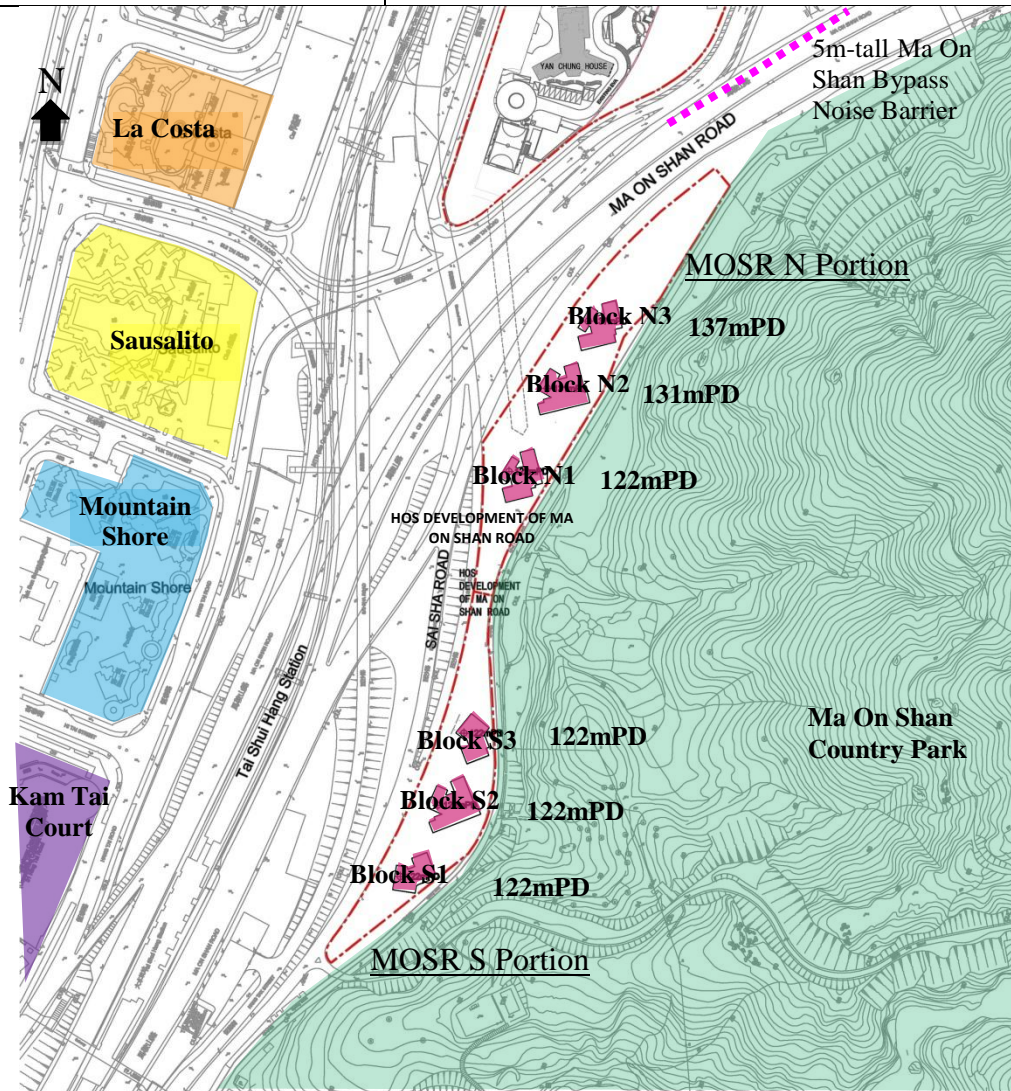


Figure 17 Proposed Ma On Shan Road Northern and Southern Portion (MOSR N&S Portion) Development at Ma On Shan Road

## 6 Expert Evaluation of the Proposed Development

### 6.1 Northeast/ East-northeast prevailing wind condition

#### **YOE Ph2 Development**

Under NE prevailing wind condition, the wind flow would be deflected by the topography and existing buildings adjacent to the Development. Wind would generally channel along the Ma On Shan Road (Blue Arrow in Figure 18), while a portion of the winds would be diverted towards west direction along Hang Fai Street (Red Arrow in Figure 18).

In general, the entire YOE Development (YOE Ph1 + Ph2) would be potentially be shielded by those existing high-rise developments at the upwind direction, including Hang On Estate and Kam On Court under the NE wind. The 5m-tall noise barriers along Ma On Shan Road to the northeast and east directions, which also shield a portion of incoming winds from penetrating into the Development. Thus, a relatively calm wind environment would be expected under the NE wind condition.

For the YOE Development, the incoming winds would be expected to enter the Development from Realigned Hang Tai Road. Since YOE Ph2 will be situated at the upwind of the Yan On Estate Phase 1 (YOE Ph1), wind shadows would be expected to cast over the existing YOE Ph1 area. In order to minimize the ventilation impact, some wind enhancement features are proposed in the YOE Ph2 Development as following:

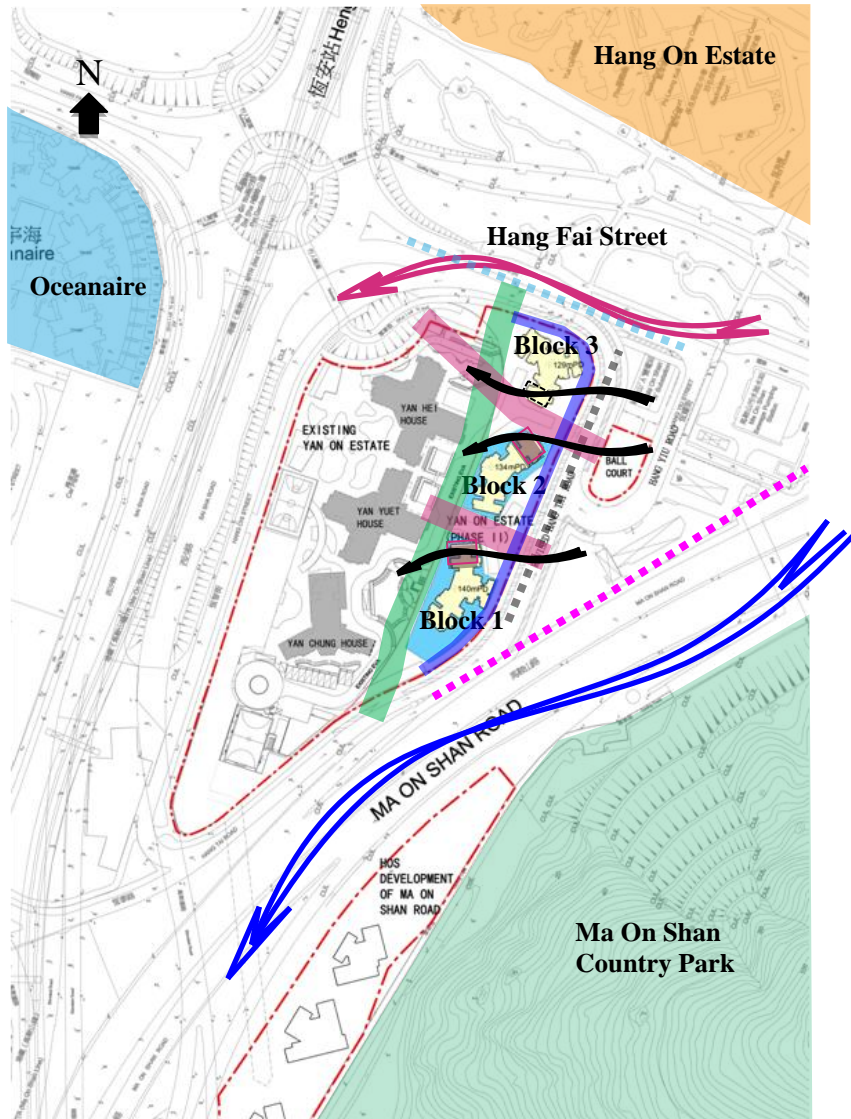
- 15m-wide local air path via the building separations between domestics Blocks 1 – 2 and domestics Blocks 2 – 3;
- Podium roof empty bays with width of 5m and floor-to-floor height of 3m;
- Empty bay on G/F with width of 5m and floor-to-floor height of 5.5m;
- Building setback of 10m from realigned Hang Tai Road;

The podium empty bay in Blocks 1 & 2 would allow incoming wind to reach YOE Ph1 as indicated in Figure 18. After passing through YOE Ph2, the incoming wind would be diverted towards pedestrian level due to downwash effect. Therefore, the ventilation of open spaces in YOE Ph1 would be improved.

Although the orientation of the G/F empty bay on Block 3 and podium roof empty bay at Block 2 is not completely in alignment with the E wind, the permeability at low zone and pedestrian level would be improved due to these empty bays. In the presence of YOE Ph1, these empty bays could allow wind to reach YOE Ph1 and thus minimize the ventilation impact to YOE Ph1 and the leeward area.

With the provision of empty bays on both G/F and podium roof, wind coming from Realigned Hang Tai Road would penetrate through the YOE Ph2 and reach the YOE Ph1 as indicated by the Black Arrows in Figure 18.

In addition, the building separation between domestic Blocks 1 – 2 and domestic Blocks 2 – 3 of the YOE Ph2 Development would allow wind to penetrate through the YOE Ph2 and therefore ventilate the YOE Ph1 and leeward area.



- 15m-wide Local Air Path for E and ENE Winds
- 15m-wide Local Air Path for SW and SSW Winds
- 10m setback from Realigned Hang Tai Road
- Realigned Hang Tai Road
- Hang Fai Road
- 5m-tall Ma On Shan Bypass Noise Barrier
- Podium Roof Empty Bay (5m (W) x 3m (H))
- G/F Empty Bay (5m (W) x 5.5m (H))

Figure 18 Air paths of the Yan On Estate Phase 2 Development under NE/ ENE wind conditions



**MOSR N&S Portion Development**

Similar to the YOE Ph2 Development, the NE prevailing wind would travel along the Ma On Shan Road (Red Arrow in Figure 19) and reach the Development.

The incoming wind could enter the Development from the open space at the north along Ma On Shan Road, while a portion of the wind would be diverted towards mountain along the eastern site boundary (Blue Arrow in Figure 19). A portion of winds would penetrate to Sai Sha Road through the building separations between the MOSR N Portion and MOSR S Portion.

The buildings disposition of the Development is quite linear and in alignment with the prevailing wind direction along the Ma On Shan Road and Sai Sha Road. It is expected that the development would cast some wind shadows at the leeward side along the Ma On Shan Road and Sai Sha Road (e.g. Sausalito and Kam Tai Court).

However, the building disposition and building separations minimizes the blockage effect and would reduce the ventilation impacts to the surrounding.

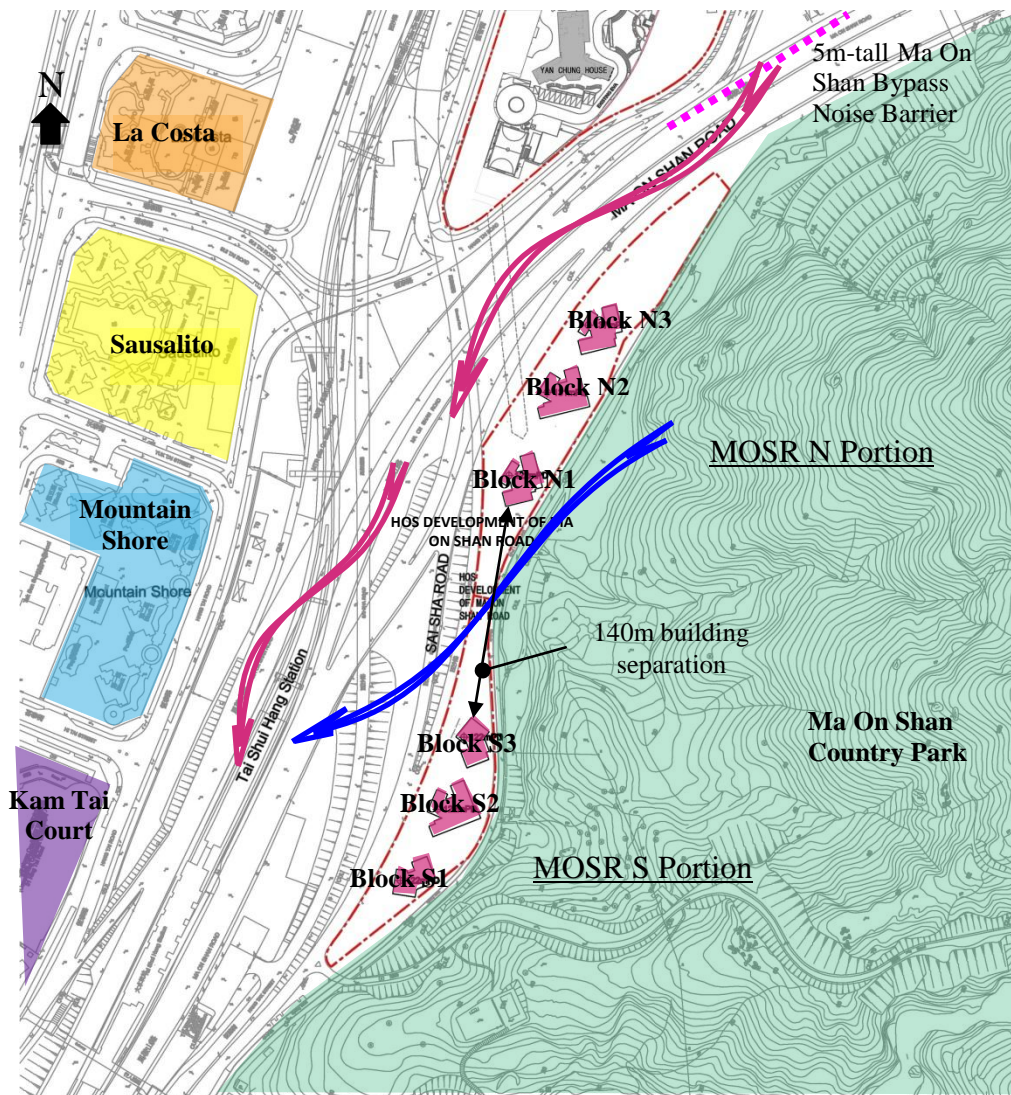


Figure 19 Air paths of the MOSR N&S Portion Development under NE/ ENE wind conditions

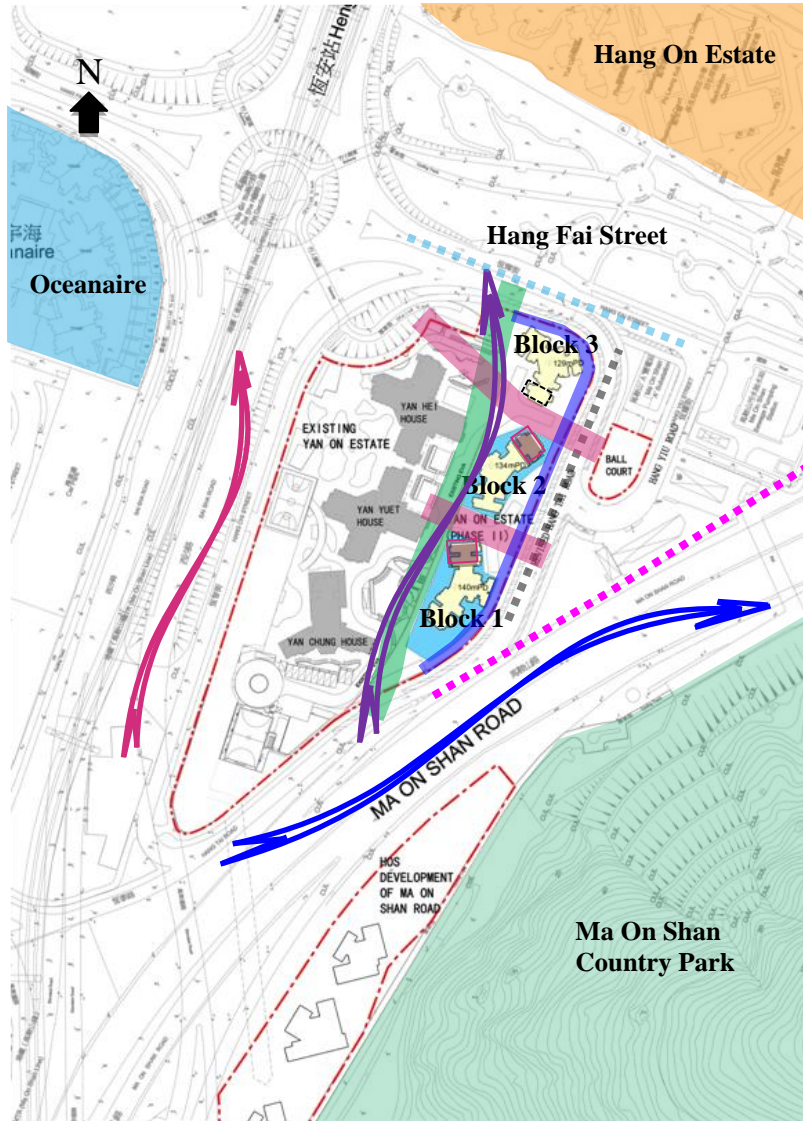
## 6.2 Southwest/ South-southwest prevailing wind conditions

### **YOE Ph2 Development**

Under SW prevailing wind condition, the incoming wind would be deflected by the topography and existing buildings around the Development. The incoming winds would travel along the Ma On Shan Road (Blue Arrow in Figure 20), while a portion of the winds would be diverted along Sai Sha Road (Red Arrow in Figure 20).

Under SW prevailing wind, the YOE Ph1 and Ph2 Development are situated at the upwind side of some high-rise residential buildings, such as Hang On Estate and Kam On Court which are to the north and northeast of the Development. Thus, the YOE Ph1 would cast wind shadow over its Ph2 and area at its downwind side, such as Hang Fai Street.

The local air path between YOE Ph2 and Ph1 would act as a ventilation channel and allow wind penetrating through the Development to reach downwind region, hence to reduce the ventilation impact to the surroundings (Purple Arrow in Figure 20).



- 15m-wide Local Air Path for E and ENE Winds
- 15m-wide Local Air Path for SW and SSW Winds
- 10m setback from Realigned Hang Tai Road
- Realigned Hang Tai Road
- Hang Fai Road
- 5m-tall Ma On Shan Bypass Noise Barrier
- Podium Roof Empty Bay (5m (W) x 3m (H))
- G/F Empty Bay (5m (W) x 5.5m (H))

Figure 20 Air paths of the YOE Ph2 Development under SW/ SSW wind conditions

**MOSR N&S Portion Development**

Under SW wind condition, the prevailing wind would travel along Sai Sha Road and Ma On Shan Road (Red Arrow in Figure 21). Hence, the approaching wind would enter the Development from Sai Sha Road and a portion of the wind would be diverted towards hilly range along the eastern site boundary (Blue Arrow in Figure 21). It is expected that some wind shadows would be casted over the mountain area.

MOSR N&S Portion Development has relatively wider building separations in compared to the entire YOE development which would enhance the overall permeability and therefore reduce the ventilation impact to the surrounding environment.

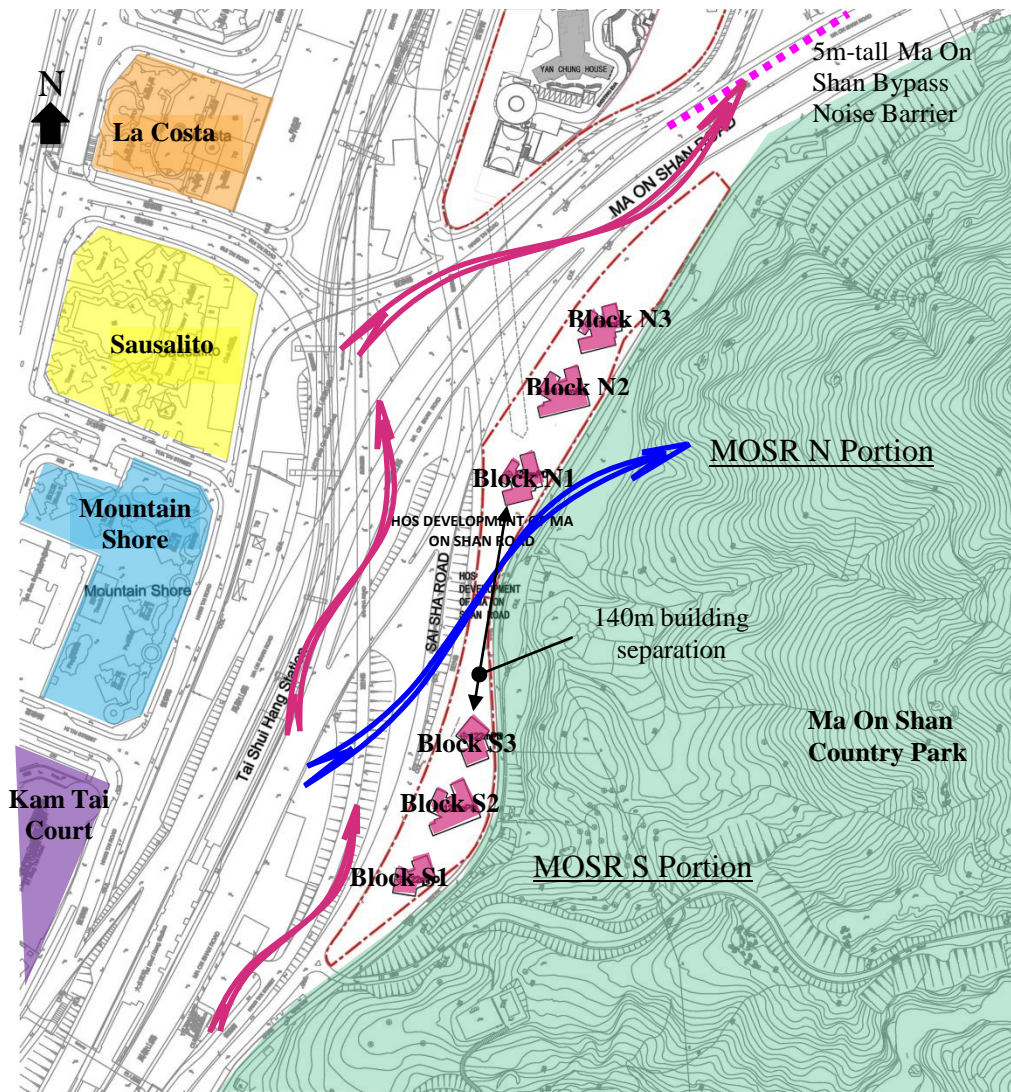


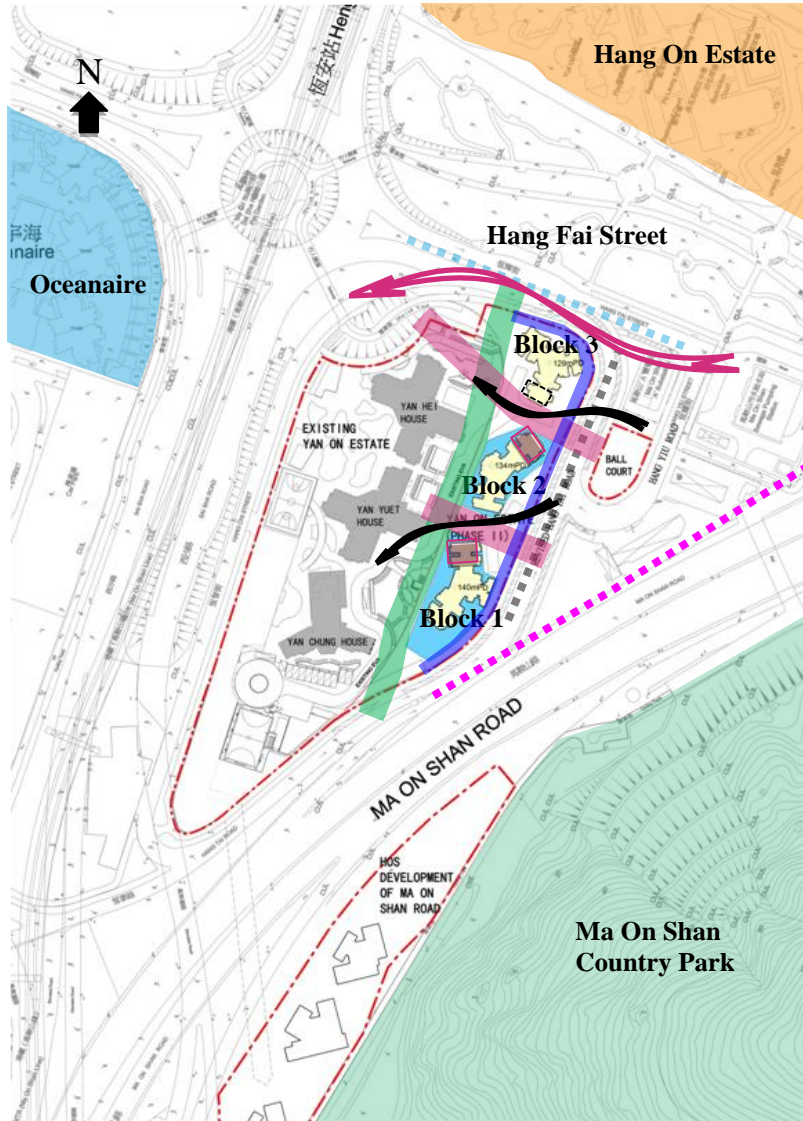
Figure 21 Air paths of the MOSR N&S Portion Development under SW/ SSW wind conditions

## 6.3 East prevailing wind conditions and Land Breeze

### YOE Ph2 Development

Under E prevailing wind condition, approaching wind mainly comes from the mountain at the east. Hang Fai Street forms the local air path and allows wind passing through to the west direction (Red Arrow in Figure 22). The 5m-tall noise barrier along Ma On Shan Road, which is located at upwind side, would shield a portion of the incoming wind toward the Development.

Since the YOE Ph2 Development is situated at the upwind side of YOE Ph1, wind shadow would be casted over the leeward area. Nevertheless, as the incoming wind enters the Development from Realigned Hang Tai Road, the building separations between domestic Blocks 1 – 2 and domestic Blocks 2 – 3 of the YOE Ph2 Development would allow wind to penetrate through the Development (black arrows in Figure 22) and ventilate the YOE Ph1. The provision of empty bay on G/F would also facilitate the penetration of E wind and Land Breeze to the leeward side of YOE Ph2.



- 15m-wide Local Air Path for E and ENE Winds
- 15m-wide Local Air Path for SW and SSW Winds
- 10m setback from Realigned Hang Tai Road
- Realigned Hang Tai Road
- Hang Fai Road
- 5m-tall Ma On Shan Bypass Noise Barrier
- Podium Roof Empty Bay (5m (W) x 3m (H))
- G/F Empty Bay (5m (W) x 5.5m (H))

Figure 22 Air paths of the YOE Ph2 Development under E wind condition and Land Breeze

**MOSR N&S Portion Development**

The approaching wind coming from prevalent east direction reaches the MOSR N&S Portion Development from the mountain at the east. The building separations at the Development would allow the approaching wind easily penetrating the Development (Blue and Red Arrows in Figure 23). Hence, it is expected that the currently proposed building layout and building separations would enhance the wind penetration and reduce the ventilation impacts to the surrounding environment.

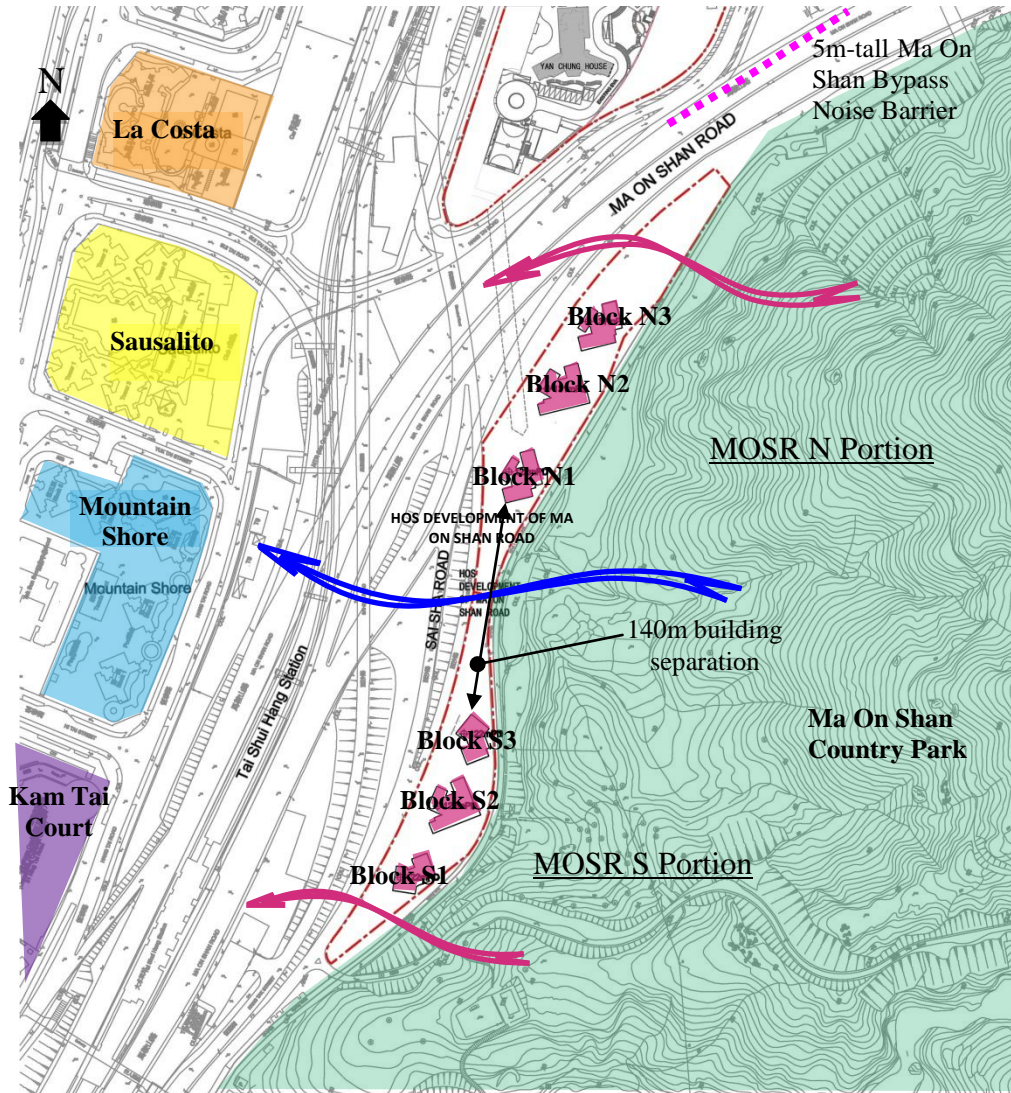


Figure 23 Air paths of the MOSR N&S Portion Development under E wind condition and Land Breeze

## 6.4 Sea Breeze

### YOE Ph2 Development

Under Sea Breeze (NW wind direction), the YOE Ph2 were at the downwind side of the existing building clusters, especially YOE Ph1. The YOE Ph2 would be under the wind shadow of YOE Ph1 as indicated in Figure 24. Since the sea breeze would likely be blocked by the existing YOE Ph1, there is no solution to enhance the penetration of sea breeze by manipulating the development scheme of YOE Ph2.

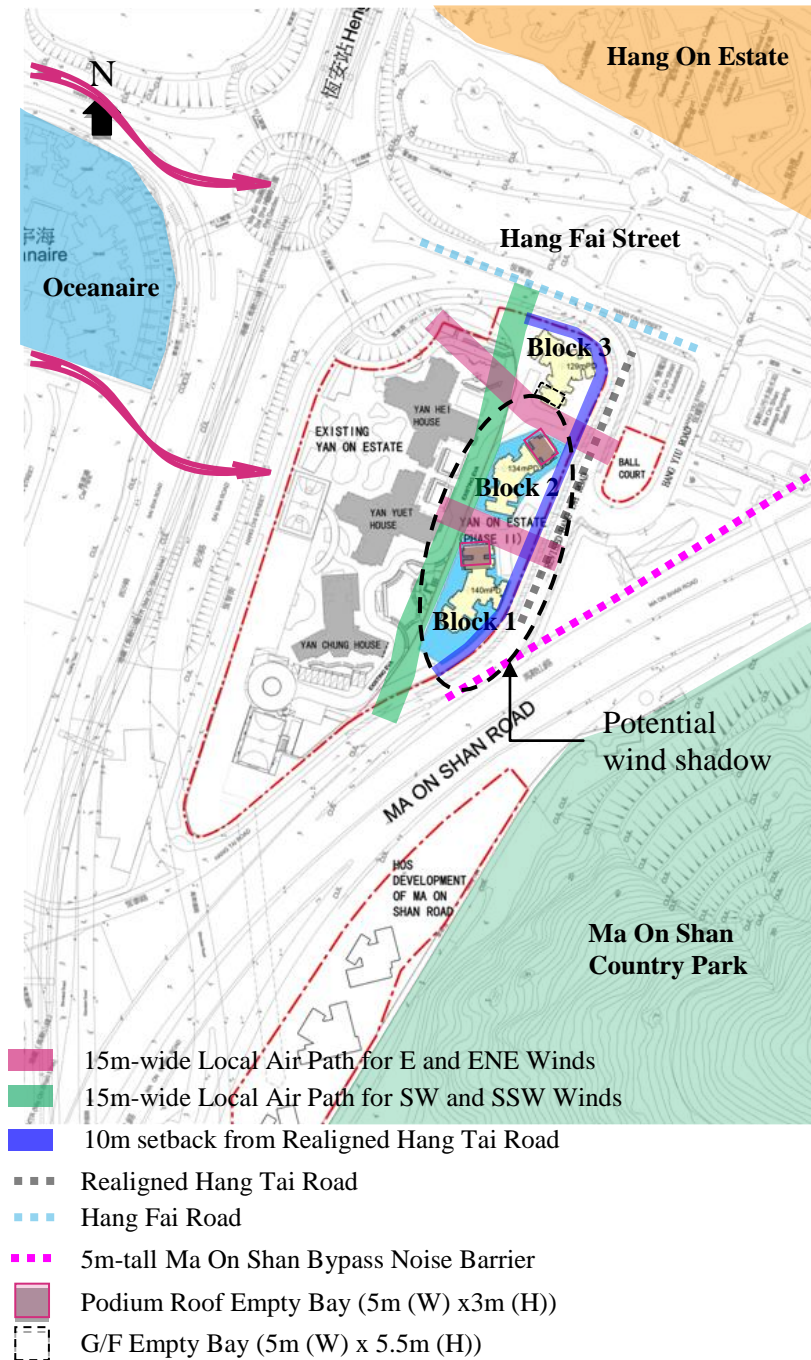


Figure 24 Air paths of the YOE Ph2 Development under Sea Breeze



**MOSR N&S Portion Development**

Under Sea Breeze (NW wind direction), the MOSR N&S Portions were at the downwind side of various high-rise existing building clusters (such as La Costa, Sausalito, Mountain Shore and Kai Tai Court). Considering the distance between those existing building clusters and the MOSR N&S Portions, the sea breeze would reach the Proposed Development via the localized air paths (such as Sui Tai Road, Yuk Tai Street, Hei Tai Street).

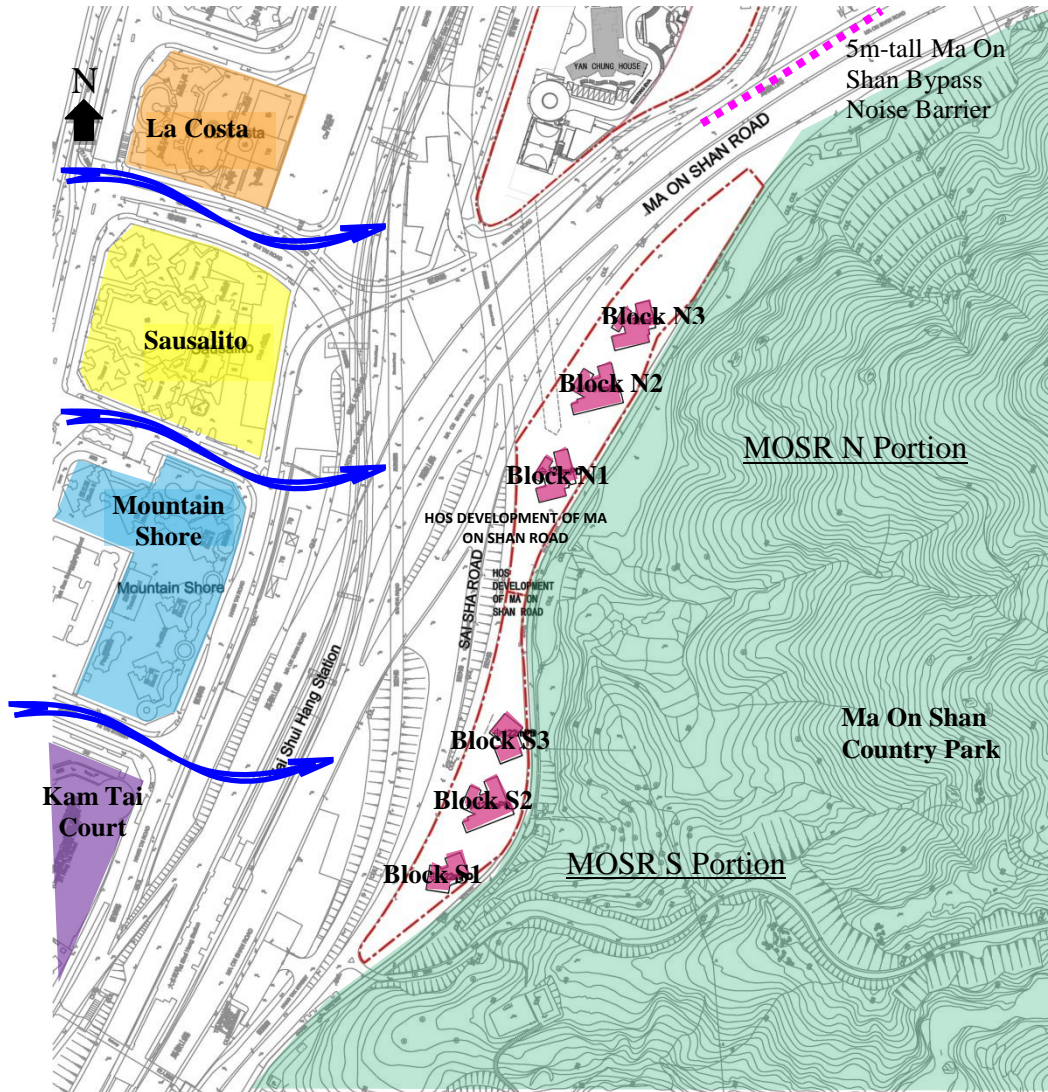


Figure 25 Air paths of the MOSR N&S Portion Development under Sea Breeze

## 7 AVA Initial Study at the Scheme Design Stage

The Expert Evaluation aims at providing qualitative identification of wind performance of the site based on different schemes. To estimate quantitatively the wind performance at the pedestrian level and determine the airflow pattern, AVA Initial Study is suggested to undertake after the rezoning in order to provide better illustration of the air ventilation performance of the Development.

According to the Technical Circular, Computational Fluid Dynamics (CFD) coupled with measured data collected from the wind tunnel is considered as the appropriate tool for AVA Initial Study to determine the Velocity Ratio (VR) at different concerned locations. The model should contain information of the surrounding buildings and site topography from Geographical Information System (GIS) platform. The airflow distribution within the studied area, being affected by the site-specific design and the nearby topography, should be visualized under the prevailing year-round wind conditions.

## 8 Conclusion

Arup was commissioned by the HKHA to carry out an AVA – Expert Evaluation for the Proposed PRH Development at Hang Tai Road, MOS Area 86B and HOS Development at Ma On Shan Road (Northern and Southern) (The Development).

Among various sources of wind data, the annual prevailing wind is NE and E directions and the summer prevailing wind is SW and E directions.

As YOE Ph1 and Ph2 are close to each other, YOE Ph2 may have potential impact to the Ph1. However, the following good design features has been incorporated to enhance the surrounding ventilation performance and minimize the impact on the ventilation performance of its surrounding area.

### **YOE Ph2 Development**

- Empty bays at the ground floor and podium roof;
- Local air path are reserved; and
- Building setback from Hang Tai Road.

On the other hand, MOSR N&S Portion Development would have minimal impact to its surrounding due to the following design features:

### **MOSR N&S Portion Development**

- Linear building block disposition and in alignment with the prevailing wind direction; and
- Building separations.

These design features are expected to minimize the impact to the wind performance of surrounding area by allowing wind penetration to the leeward side of the Development.

To assess the air ventilation performance of the Development quantitatively, AVA Initial Study using Computational Fluid Dynamics (CFD) technique is suggested after rezoning in order to provide better illustration of the air ventilation performance of the Development.