Appendix 5

Air Ventilation Assessment (AVA) Expert Evaluation (EE)

Prepared by

Ramboll Hong Kong Limited

PROPOSED COMPOSITE REDEVELOPMENT WITH TRADE MART/EXHIBITION AND COMMERCIAL, RESIDENTIAL, SOCIAL WELFARE FACILITIES AND SCHOOL USES AND MINOR RELAXATION OF BUILDING HEIGHT RESTRICTION, NEW KOWLOON INLAND LOT NO. 6032, 1 TRADEMART DRIVE, KOWLOON BAY, KOWLOON

AIR VENTILATION ASSESSMENT (EXPERT EVALUATION)

Date	**January 2025**
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CHAPTERS

TABLES

FIGURES

APPENDIX

1. INTRODUCTION

1.1 Project Background

1.1.1 The background in relation to the project and this Section 16 planning application is included in the planning statement.

1.1.2 Ramboll Hong Kong Limited has been commissioned by the Applicant to prepare the Air Ventilation Assessment – Expert Evaluation (AVA-EE report) for Proposed Development. The AVA-EE report will assess the air ventilation issues of the Application Site and the surrounding area.

1.2 Objective

1.2.1 This AVA-EE report has been prepared to identify opportunity and good design features that can be practicably adopted in the Proposed Scheme from air ventilation standpoint and evaluate if there would be any impact on the overall air ventilation performance of the assessment area by comparing the Proposed Scheme with the OZP Compliant Scheme.

1.3 Application Site and its Environs

1.3.1 The Application Site is located in Kowloon Bay area with surrounding context described under Section 2.1.1 of the planning statement. Kai Fuk Road is connected to the existing Kai Tak Tunnel with tunnel portal located on west side of the Application Site. The planned Central Kowloon Route would have the future alignment running along and to the further southwest.

1.3.2 The Application Site is currently occupied by KITEC. The building of KITEC is 14 storeys high and has building height of about +52.4mPD.

1.3.3 The Application Site is located in a well-established area with commercial and industrial development, Government, Institution or Community ("G/IC") facilitates. The Application Site is at the western periphery of Kowloon Bay Business Area ("KBBA") and separated by Trademart Drive. The KBBA is consist of medium to high-rise commercial and industrial buildings ranging from +120mPD to +170mPD. Kai Tak Residential Cluster is on the opposite side of Shing Kai Road to the north and northwest of the Application Site consist of high-rise residential buildings ranging from +100mPD to +120mPD.

1.3.4 The Application Site also falls within the "South Apron Corner" of Kai Tak Development ("KTD") area which mainly consist of mid- and high-rise commercial developments and government uses.

1.3.5 **Figure 1** shows the location of the Application Site and its environs. **Figure 1** indicates either the building height of the existing development, the proposed building height of planned developments (referring to approved planning applications), or building height restriction of lot area not occupied yet as stipulated in the latest Approved OZP.

1.4 OZP Compliant Scheme

1.4.1 The OZP Compliant Scheme consist of a large podium (+20mPD) covering the entire Application Site and 4 nos. of office towers with 23-storeys atop it. The plot ratio of the OZP Compliant Scheme is about 12 and the building height of all office towers are +100mPD. The disposition of the office towers would be closely positioned to each other with narrow/small building gap between towers. It would create a continuous

façade facing east/west and pose unfavourable impacts to the surrounding area in the air ventilation standpoint.

1.4.2 The Indicative Block Plan of the OZP Compliant Scheme is shown in **Appendix 1**.

1.5 Proposed Scheme

1.5.1 The Proposed Scheme is divided into two portions for residential use at the western half and commercial use at the eastern half of the Application Site. It comprises four 34-36 storeys residential towers (Tower 1 to Tower 5, Tower 4 omitted) elevated at 133.7mPD or 140mPD (measured at main roof), one office tower elevated at 140mPD and one mixed block (with commercial use at G/F to 10/F and hotel use at 11/F and above) elevated at 140mPD. The office tower and mixed block are atop of a connected 3-level podium elevated at 26.5mPD mainly for exhibition/ commercial/ showrooms uses. The residential towers are atop of a 4-storey podium for Residential Care Home for the Elderly (RCHE)/ Day Care Centre for the Elderly (DCCE)/ office base of social work service for Pre-Primary Institutions (SWSPPI)/ kindergarten/ commercial uses/ residential clubhouse (including a mezzanine floor underneath the portion below Tower 1 and 2). The elevations (including transfer plate) range from 10.9 to 25.9mPD. All carparking spaces/ loading and unloading bays and part of the E&M facilities will be provided at the two levels of basement.

1.5.2 The residential towers are divided into 2 groups on north and south sides, and separated by a gap of not less than 15m (above the transfer plate elevated at 25.9mPD). The building height (BH) for the proposed residential towers has adopted a stepped BH profile descending from 140mPD (north) to 133.7mPD (south), while the proposed office tower and mixed block both with BH of 140mPD are proposed along the eastern half of the Site facing Trademart Drive.

1.5.3 Varying and stepped building height design is adopted for the podium. The podium of residential portion has elevation stepped at 10.9mPD, 15.8/16.8mPD, 22.8mPD and 25.9mPD. Building structure at 2/F of the podium garden has been minimised to allow for a permeable podium garden of about 6m height (especially between Tower 2 and Tower 3).

1.5.4 Both the office tower and mixed block are located on eastern side of the Application Site. The office tower is next to Tower 1 on south side. The mixed block is next to Tower 5 on north side. The podium for commercial portion consists of 3 storeys (+23mPD/+26.5mPD).

1.5.5 Beside the buildings within site, there is an Existing Kai Cheung Road Footbridge Connection provided outside site associated with the proposed development. It will connect the proposed development at the Application Site and northward crossing Kai Cheung Road and Shing Kai Road with proposed northern footbridge extension. The design of the footbridge is subjected to detailed design including to address government's comment. Tentatively, the footbridge is elevated not less than 5.5m aboveground. It is a single storey structure with about 5m width, and with opening and permeable railing on both sides. While there is a proposed southern link bridge, this is to connect with the existing Kai Fuk Road footbridge to the South Apron Corner of Kai Tak Development and will project less than 5m to connect to the existing government footbridge. Tentatively, permeable design (with opening and permeable railing on both sides) will be adopted as well.

1.5.6 Design and measures have been adopted to enhance air ventilation performance of the Proposed Scheme. (1) For the residential portion, there is a building separation with

width of not less than 15m between Tower 2 & Tower 3 (at +25.9mPD and above) which could serve as air path and promoting wind penetration at high level across the Application Site; (2) There are at least 15m setbacks of residential towers (at +25.9mPD and above) away from site boundaries, and there is at least 15m building setback of building structure of the proposed development (except ramp road and footbridge) away from the southern boundary to promote E/W wind penetration. All building setbacks can enhance the wind flow along the surrounding road bounding the site. (3) Podium garden of about 6m height is provided at podium underneath residential towers. (4) Stepped podium design at the residential podium is provided to facilitate wind flow over the podium and reach pedestrian level easer then. (5) Moreover, there is an urban window of about 6.5m (height) x 20m (width) at pedestrian level below the central exhibition multi-purpose hall, which is designed to facilitate E wind entry at pedestrian level into the open plaza at the middle of the project development. It would improve the air ventilation performance locally within the Application Site.

1.5.7 In addition, while the proposed building height of the Proposed Scheme is higher than that of the OZP Compliant Scheme (140mPD vs 100mPD) and would impose more blockage at higher level, it could also generate relatively more downwash wind, which would benefit the air ventilation performance of the area in-between the residential towers and in close vicinity.

1.5.8 The Indicative Block Plan and the section drawings of the Proposed Scheme are shown in **Appendix 2**. The key development parameters of the OZP Compliant Scheme and Proposed Scheme are summarized in **Table 1.1**.

Table 1.1 Key Development Parameters

Development Parameters	OZP Compliant Scheme	Proposed Scheme
Total Site Area (approx.)	22,280 m^2	
Total Plot Ratio (Max.) • Domestic (Max.) • Non-domestic (Max.) #	12 - 12	7.4 2.96 4.44
Total GFA (approx.) • Domestic (approx.) • Non-domestic (approx.)*	267,360 m^2 0 m^2 267,360 m^2	164,872 m^2 65,949 m^2 98,923 m^2
No. of Blocks	4 Office Towers	4 Residential Towers + 2 non-Domestic blocks for Office, Hotel, Retail and GIC
Site Coverage - Podium (Below 15m) # - Tower (Above 15m) • Domestic • Non-domestic	 100% Not more than 65% - Not more than 65%	 About 75% 48% 19% 29%
Maximum No. Storeys (excluding basement carpark) • Residential • Office • Mixed	 - 23 storeys -	 36 storeys 27 storeys 28 storeys
Maximum Building Height (at main roof level) • Residential • Office • Mixed	 - 100mPD -	 140 mPD 140 mPD 140 mPD

Note:

* Including GFA of office 35,600m^2; Showroom/Exhibition 11,285m^2; Shops and Eating Place: 13,403m^2 (i.e. excluding GFA of proposed southern of footbridge link and the proposed opening with associated bridge linkage).

\# Excluded proposed southern footbridge link and the proposed opening with associated bridge linkage.

1.5.9 The proposed development with a site area of over 2 hectares, an overall PR of 5 or above as well as a total GFA exceeding 100,000m^2 has fallen under the criteria set out in the Joint HPLB-ETWB Technical Circular on AVA No. 1/06.

2. SITE WIND AVAILABILITY DATA

2.1 Site Wind Availability Data From RAMS

2.1.1 According to the Planning Department's website, a meso-scale Regional Atmospheric Modelling System (RAMS) was used to produce a simulated 10-year wind climate at the horizontal resolution of 0.5 km x 0.5 km covering the whole territory of Hong Kong. The simulated wind data represents the annual, winter and summer wind condition at various levels, i.e. 200 m, 300 m, and 500 m above terrain.

2.1.2 The RAMS data of the grid (X: 086, Y:043) and (X: 086, Y:044) have been extracted from the Site Wind Availability Data of Planning Department's website as the Application Site falls into both grids.

2.1.3 Among the wind roses with respect to different heights (200, 300 or 500m) available, the 200 m site wind availability data represents wind data that takes into account the topographical effect around the Application Site. Therefore, a lower level of wind roses at 200 m height is selected to study the prevailing wind condition as it represents the incoming wind to the Application Site and considers the influence on the prevailing winds by the surrounding topography.

2.1.4 According to the wind roses at 200 m altitude, annual prevailing wind directions for the Application Site are ENE, E, ESE whereas summer prevailing wind directions are E, ESE, SE, SSW, SW, and WSW. **Figure 2a** shows the relevant wind roses diagrams representing the frequency and wind speed distribution at 200m height in annual and summer conditions. The wind frequency data is provided in **Table 2.1** below.

Table 2.1 Summary of RAMS Data and Wind Direction at 200m

	(X: 086, Y: 043)		(X: 086, Y: 044)	
Wind Direction	**Probability for Annual Condition (%)**	**Probability for Summer Condition (%)**	**Probability for Annual Condition (%)**	**Probability for Summer Condition (%)**
N	3.9%	1.1%	4.0%	1.2%
NNE	7.3%	1.1%	8.3%	1.2%
NE	6.2%	1.1%	5.9%	1.1%
ENE	**13.1%**	3.5%	**12.3%**	3.2%
E	**28.3%**	**11.7%**	**28.5%**	**12.0%**
ESE	**9.3%**	**10.3%**	**9.5%**	**10.5%**
SE	4.6%	**8.6%**	5.0%	**9.5%**
SSE	2.5%	5.4%	2.6%	5.6%
S	3.0%	7.0%	2.9%	6.8%
SSW	4.4%	**10.3%**	4.7%	**11.0%**
SW	5.8%	**15.4%**	5.2%	**14.1%**
WSW	4.1%	**11.1%**	4.0%	**10.9%**
W	3.0%	7.1%	2.9%	6.8%
WNW	1.6%	2.9%	1.6%	2.8%
NW	1.2%	1.8%	1.2%	1.9%
NNW	1.6%	1.4%	1.5%	1.4%

Note: Bolded characters highlighted in grey represent the selected prevailing wind directions for evaluation.

2.2 Wind Data from HKO Station

2.2.1 According to wind data of Kai Tak Hong Kong Observatory Wind Station which is nearest weather station to the Application Sites. The annual prevailing winds are mainly from E, ESE, SSE and the annual wind rose for Kai Tak Wind Station (1999 – 2019) is shown in **Figure 2b**. The summer (Jun-August) prevailing wind direction is extracted from the monthly data of Kai Tak Wind Station, and they are generally from ESE and SW. **Table 2.2** shows the monthly prevailing wind direction in degrees extract from the Monthly Data of the Kai Tak Wind Station.

Table 2.2 Prevailing Wind Direction in degrees Extracted from Monthly Data of the Kai Tak Wind Station

Month	Prevailing Wind Direction (degrees)
01	100
02	100
03	110
04	130
05	110
06	**230**
07	**120**
08	**120**
09	100
10	100
11	130
12	320

Note: Bolded characters highlighted in grey represent the summer prevailing wind directions for evaluation.

2.3 Wind Data from Previous Studies

2.3.1 There are several air ventilation assessments in Kowloon East area, and some of them can be considered as reference. The Application Site falls into the Study Area B of "Agreement No. CE35/2006 (CE) Kai Tak Development Engineering Study cum Design and Construction of Advance Works – Investigation, Design and Construction" (ref. AVA/G/76). The Application Site also located to the west of the concerned area in "Term Consultancy for Expert Evaluation on Air Ventilation Assessment for an Instructed Project for Ngau Tau Kok and Kowloon Bay – Expert Evaluation Report" (ref. AVA/G/133).

2.3.2 According to ref. AVA/G/76, the wind availability at 150m was adopted. ESE (19.2%), E (17.5%), and SE (13.9%) prevailing wind were selected for annual prevailing wind direction, while the summer prevailing wind were SE (19.0%), WSW (12.7%), and ESE (11.4%).

2.3.3 According to ref. AVA/G/133, various wind data were referenced for the Ngau Tau Kok and Kowloon Bay Study Area. It is concluded that wind data provided by PlanD is likely to be more representative to reflect the wind availability of the concern area. The annual prevailing wind direction adopted in the study were N, NNE, NE, ENE, E, ESE

and SE, while the summer prevailing wind direction were E, ESE, SE, S, SSW, SW and WSW.

2.3.4 Based on all sets of wind data, it is considered that RAMS data and the wind data from previous AVA study ref. AVA/G/76 are the most relevant reference for this study (Kai Tak Hong Kong Observatory Wind Station, which is located at the apron area of old Kai Tak Airport and it is about 1.9 km away from the Application Site to the southeast. The HKO wind data is considered least relevant due to its localities and the impacts on the topography. On the other hand, the Application Site does not fall into the concern area of AVA study ref. AVA/G/133 so that it is less relevant as well.). Thus, the annual prevailing winds come from ENE, E, ESE and SE directions. While in summer condition, the prevailing winds mainly come from E, ESE, SE, SSW, SW, and WSW directions.

2.4 Topography

2.4.1 The Application Site is located in the west of KBBA. The topography of the Application Site and surrounding is mainly flat. It is expected that wind availability is more influenced by building morphology rather than topography.

2.5 Building Morphology

2.5.1 All major noise barriers, elevated structures, planned and committed development, if any in the surrounding, are considered in this report. After checking by the site visit for existing developments and the published information in Statutory Planning Portal under the Town Planning Board regarding planned / committed developments in the model area, the Application Site is mainly surrounded by medium-rise development in the immediate vicinity, e.g. HSBC Building Kowloon Bay Main Treasury (+36mPD) to the east, Central Mail Centre (+40mPD) to the southeast, EMSD Headquarters (+59mPD) to the north. There is an existing footbridge across Kai Cheung Road that connects the Application Site with the EMSD Headquarters in its north.

2.5.2 The building density of the surrounding is considered medium. The surrounding area covers an area of at least by the height of the highest building within the assessment area (+140mPD) from the Application Site boundary. The surrounding areas are mainly development including scatter of industrial development in the KBBA. The surrounding areas also consist of residential development in the Kai Tak Development (KTD) area and some of the government, commercial and mixed-use development in the Kai Tak Promenade Area and to the further east which are of higher building heights.

2.5.3 The east side of the Application Site is KBBA. It consists of development including Wing On Godown Building (+30mPD), Jing Hin Industrial Building (+30mPD), Kinetic Industrial Centre (+33mPD), Megacube (+32mPD), and YHC Tower (+140mPD), etc. Remaining areas are either open area or mixed building uses development. Potential building blockage effect due to the surrounding existing developments (to the east) are considered minor.

2.5.4 Northwest and north of the Application Site is Kai Tak City Centre of KTD Area. It mainly consists of high-rise residential development. According to Approved Kai Tak OZP (S22/K/8), the area is zoned as "Residential (Group B)" and "Residential (Group A)" further north. Private residential development within the area includes Vibe Centro (+119.5mPD), K.City (+120.3mPD), Victoria Skye (+120.2mPD), Oasis Kai Tak (+110mPD), One Kai Tak (+110mPD), Upper Riverbank (+130mPD), K.Summit (+130mPD), The Henley (+130mPD), Tak Long Estate (+119mPD), and Kai Tai Development Site 1L1 to 1L3 (Planning Application No. A/K22/16, +120mPD), etc. Northerly and westerly wind are not the major prevailing wind neither annual nor

summer wind condition. Therefore, the prevailing wind blockage by the residential building in Kai Tak City Centre of KTD area is not a concern.

2.5.5 The southwest of the Application Site is Kai Tak Promenade Area separated by Kai Fuk Road, which belongs to South Apron Corner of KTD area. There is commercial development zoned as "C(8)" and "C(1)" with building height restriction of +100mPD and +80mPD respectively.

2.5.6 The further south of the Application Site is the Kat Tak Runway and mainly consist of residential development, commercial/hotel and the Metro Park for leisure use. The residential development includes One Victoria (+110 mPD), and other planned residential development (S22/K/8), ranging from +95mPD to +120mPD. Wind from southwest will be blocked by the high-rise residential development, however, the Metro Park on southwest side as open space would promote south-westerly wind towards the Application Site. Therefore, SW wind is generally not affected.

2.5.7 Kwun Tong Bypass is the major road within the surrounding area. The road will likely facilitate air flow above it across the Kowloon Bay area. As this is an elevated road, it will likely reduce some wind availability underneath the road.

2.6 Summary of Existing Site Wind Availability

2.6.1 According to the wind availability data from RAMS, HKO weather station, and previous AVA study ref. AVA/G/76, the summarised annual wind directions of the Application Site include ENE, E, ESE and SE directions. While in summer wind condition, the prevailing winds mainly come from E, ESE, SE, SSW, SW and WSW directions.

2.6.2 The wind probability from the E direction is likely the most dominant if both simulated and measurement data are considered. Other than E wind, ENE wind is considered to be important as well. The wind probability from the SW is the most dominant summer winds direction for the area. E wind is also relatively dominant when compared to other summer wind directions.

2.6.3 It is anticipated that the surrounding traffic network would be the main air paths under the annual and summer condition. For instance, Kai Cheung Road is aligned along prevailing ENE and E wind direction under annual wind condition. Even Lam Hing Street and Lam Wah Street are facilitating prevailing ENE and E wind flow in certain extent. Kai Fuk Road is aligned along annual and summer prevailing SE wind direction. On the other hand, Kai Cheung Road is also parallel with summer prevailing SSW and SW wind flow.

2.6.4 **Figure 3** and **Figure 4** show the identified major air paths under the annual and summer wind conditions.

3. EXPERT EVALUATION OF AIR VENTIALTION PERFORMACE OF THE PROPOSED DEVELOPMENT

3.1 Important Pedestrian Areas

3.1.1 Important surrounding areas that the public would often access have been identified as the following:

- Roads surrounding the Application Site (Trademart Drive, Kai Cheung Road and Kai Fuk Road, and roads further away);
- Open space; and
- Nearby residential and commercial developments.

3.2 Evaluation of Merit/Demerit of Design Features of the Proposed Development

3.2.1 Under the Proposed Scheme, various good design features are beneficial to air ventilation such as large building separation advantageous to prevailing wind penetration, separation of building from site boundary and permeable open plaza and podium garden are incorporated.

- A large building separation is provided between Tower 2 and Tower 3 (not less than 15m, at +25.9mPD and above) oriented to east/west direction and allow annual and summer prevailing ENE, E, ESE and WSW wind to penetrate through. This separation facilitates wind penetration to benefit its downstream areas.
- There are setbacks of building mass from site boundaries. All major building structures should have at least 15m setback from southern site boundary; and all residential towers (at +25.9mPD and above) should have at least 15m setback from site boundaries (southwest, northwest and north). The building setback would minimise obstruction to wind flow around the buildings under annual and summer prevailing wind.
- Residential podium garden with about 6m in height (+16.8mPD to +22.8mPD) is provided at the second floor. The podium garden below Tower 2 & Tower 3 would facilitate prevailing ENE, E, ESE and WSW wind to penetrate through. The podium garden below Tower 1 would facilitate prevailing SSW, SW, WSW wind towards and across the Application Site.
- Stepped podium height design is adopted to facilitate wind flow from above podium to pedestrian level. For example, E wind can flow over the podium on east side (26.5mPD) and over podium on west side between Tower 2 and Tower 3 (16.8mPD and then 10.9mPD) to pedestrian level in the surrounding (5mPD).
- Open plaza is provided at ground level at the middle of the Site and surrounded by the podium buildings. The urban window on east side (about 6.5m x 20m) below the central exhibition multi-purpose hall will welcome prevailing E, ENE, and ESE wind to reach the open plaza and wind availability among the open plaza is enhanced.

3.2.2 Further discussion of the scheme based on the good design features above is included below.

Air paths

3.2.3 **Figure 3** and **Figure 4** illustrate the prevailing winds from annual and summer wind directions for the Baseline Scheme. **Figure 5** and **Figure 6** illustrate the prevailing winds from annual and summer wind directions for the Proposed Scheme.

3.2.4 Major air paths nearby the Application Site are along Kai Cheung Road, Kai Fuk Road, Trademart Drive and Kwun Tong Bypass. Also, there are secondary air paths that could ventilation from KBBA towards the Application Site, for instance, Lam Hing Street, Lam Wah Street, and Sheung Yuet Road all along E/W axis. The open space to the immediate south outside the Application Site can also serve as secondary air path (about 15m wide). These secondary air paths mainly promote easterly wind to flow towards or around the Application Site. These air paths are outside the Application Site so that they would be the same under the OZP Compliant Scheme and Proposed Scheme.

3.2.5 Under the Proposed Scheme, the air paths along Lam Hing Street would be able to connect to the open plaza through the urban window and could enable wind flow to reach the open plaza (+5mPD). Moreover, the annual and summer prevailing E wind could flow atop the central exhibition multi-purpose hall (+26.5mPD) and through the building separation of not less than 15m between Tower 2 & Tower 3 above the podium to its downwind area. There are at least 15m proposed setbacks of residential tower from the northern, southern, southwestern and northwestern boundaries of the Application Site (at +25.9mPD and above). These building setbacks would effectively widen the major or secondary air paths immediate to the Application Site and allow more wind penetration along the air path at Kai Cheung Road and Kai Fuk Road. The development would also enable E wind penetration along the proposed building setback (at least 15m) from southern site boundary.

Building Disposition and Development Permeability

3.2.6 Under the OZP Compliant Scheme, there is a massive podium with full site coverage. The buildings atop the podium have one building gap between (facing NNW/SSE) and create a continuous frontage blocking wind from east/west directions. The long impermeable façade is unfavourable for prevailing wind penetration. Under the annual and summer wind conditions, prevailing wind (e.g. E, ESE, ENE, SW) would likely dissipate at the long façade of the OZP Compliant Scheme and would not reach the downward areas. It is expected that the wind environment at immediate downwind areas would be lower.

3.2.7 Under the Proposed Scheme, the overall building footprint has been reduced. The podium adopts stepping design and would also have at least 15m setback from southern boundary. There is also some building setback at northeast corner. The proposed southern footbridge adopts permeable design with minimum wind blockage. It would not significantly obstruct any concerned prevailing wind (especially E wind) penetration across the Application Site. Four numbers of residential towers have been proposed atop the podium with building separation of not less than 15m between Tower 2 and Tower 3. It is expected the wind blockage by building frontage would significantly decrease. In addition of the proposed building separation, which allow the annual and summer prevailing E, ESE, ENE, WSW wind to penetrate through, the open plaza at ground level under Proposed Scheme in connection with Lam Hing Street would welcome E, ESE, ENE wind penetration through the urban window underneath the central exhibition multi-purpose hall towards the Application Site. Moreover, the podium garden (about 6m in height) at second floor of residential portion would facilitate annual and summer prevailing wind penetration from E, ESE, ENE, WSW SSW

and SW directions. It is expected that the wind environment at the Application Site and its immediate surrounding areas are greatly enhanced under Proposed Scheme.

Building Height

3.2.8 The proposed maximum building height of the Proposed Scheme at +140mPD is higher than the maximum building height permissible under the OZP compliant scheme (+100mPD) and the existing development. Theoretically, the Proposed Scheme with higher building height would result in more wind blockage impact and it is more difficult for wind to pass over the building and come to the pedestrian level when compared to the OZP Compliant Scheme. Thus, larger wake area due to building height is expected on downwind side. However, the permeable design measure such as building separation and building setback would facilitate wind flow around and through the Application Site. Such building setback is aligned to east/west directions so that most prevailing wind directions (E, ESE, ENE, WSW) can be benefited. The building setback also benefits all annual and summer prevailing wind directions, The podium building footprint under Proposed Scheme is significantly smaller in comparing with that under OZP Compliant Scheme. More wind would be able to flow around the building mass at or near the pedestrian level towards the downwind area.

3.2.9 On the other hand, the high-rise buildings could generate downwash wind from the wind at upper level to the pedestrian level within the Application Site and the adjacent surrounding areas including Trademart Drive, Kai Cheung Road and Kai Fuk Road. Although downwash effect may not be as effective as building separation and setback, it is considered that blockage effect due to higher building height can be further offset in certain extent.

3.2.10 Therefore, it is anticipated that unfavourable impact in terms of wind environment would be offset in certain degree and minimised. The Proposed Scheme is expected to have similar air ventilation performance when compared with the OZP Compliant Scheme.

Northern and Southern Footbridge Extension

3.2.11 The proposed northern footbridge extension connects the proposed development and northward crossing Kai Cheung Road and Shing Kai Road. The tentative design of the footbridge is elevated not less than 5.5m aboveground and with opening and permeable railing on both sides which would enable natural ventilation and minimise obstruction to wind flow. The road carriageways it is crossing include Kai Cheung Road and Shing Kai Road, both are wide and considered as air paths that can facilitate prevailing wind flow (e.g. E, SSW, SW, WSW). Nevertheless, the proposed footbridge is not a substantial structure as discussed above and would not significantly block wind flow. Moreover, it is elevated higher so that there is least impact on wind flow at pedestrian level. The air ventilation impact due to the proposed northern footbridge connection on pedestrian area is not considered significant.

3.2.12 Similarly, the southern link bridge (connected to the existing government Kai Fuk Road footbridge) is of much small scale (less than 5m outside Site). It will mainly generate some blockage under E, ENE, ESE, WSW wind. Again, the building structure is not substantial and is located at higher level so that there is least impact on wind flow at pedestrian level. The air ventilation impact due to the proposed southern footbridge connection on pedestrian area is not considered significant.

3.3 Directional Analysis of the development

3.3.1 As discussed in **Sections 2.1** to **2.3**, winds from ENE, E, ESE and SE directions are annual prevailing winds whereas winds from E, ESE, SE, SW, SSW, and WSW are dominant in the summer. The following appraises the situation with respect to the Proposed Scheme.

ENE Wind

3.3.2 Under annual prevailing ENE wind condition, the wind flows towards the Application Site through Kai Cheung Road, which is known as the major air path. The ENE wind would penetrate the Application Site through the setback between residential tower and the northern site boundary (at +25.9mPD and above). The ENE wind would continue to flow along Kai Cheung Road and increase wind availability at KTD and the Kai Tak Promenade Area on downwind side.

3.3.3 Similarly, building setback from southern boundary will increase the effectiveness of another air path along existing open space (about 15m in width) to the immediate south. ENE wind can flow through Lam Wah Street and the Non-building Area within Hong Kong Post Building then through the abovementioned air path towards the downwind area.

3.3.4 Some portion of ENE wind would travel along Lam Hing Street from the KBBA and penetrate the urban window underneath central exhibition/multi-purpose hall and reach the open plaza at pedestrian level. It would promote air ventilation within the Application Site locally. The high-level ENE wind from Lam Hing Street would flow atop exhibition/multi-purpose hall then penetrate through building separation of not less than 15m between Tower 2 and Tower 3 above the podium (+25.9mPD) and reach downstream area at pedestrian level gradually. The stepped podium design at the residential portion also facilitate wind to reach pedestrian level easier after pass over the podium.

3.3.5 Despite that there is higher building mass, the building setback and more building separations can facilitate wind penetration. The podium garden (about 6m in height) at lower elevation (+16.8mPD to +22.8mPD) combined with setback (at least 15m) pf residential tower from northern site boundary (at +25.9mPD and above) allow ENE wind from Kai Cheung Road to travel towards its downwind area. It is likely that there is some improvement especially for areas immediate downwind of the Application Site under ENE wind.

3.3.6 On the other hand, the development under the OZP Compliant Scheme is oriented perpendicularly to the incoming ENE wind flow with a longitudinal façade, it would limit the incoming wind to penetrate through the Application Site. In comparison with the OZP Compliant Scheme, the Proposed Scheme has adopted various permeable design features to improve the overall air ventilation performance despite it has higher building height.

3.3.7 Thus, the air ventilation impact to the immediate downwind area would be slightly improved under the Proposed Scheme in comparing with the OZP Compliant Scheme under ENE wind condition.

E and ESE Wind

3.3.8 The annual and summer prevailing E and ESE wind would flow towards the Application Site through Kai Cheung Road, Lam Hing Street and Lam Wah Street, similar to ENE wind. The E and ESE wind along Kai Cheung Road would flow through the building setback from the northern site boundary of the Application Site (at +25.9mPD and

above) and reach its downwind areas. Besides, Lam Wah Street also facilitate the E and ESE wind to flow across the KBBA and penetrate through the non-building area towards the Application Site. The wind is then penetrating through the building setback area (at least 15m from southern boundary) and the open space to the immediate south of the Proposed Development. Furthermore, high-level prevailing E wind flows along Lam Hing Street would penetrate through the building separation of not less than 15m between Tower 2 & Tower 3 and would reach leeward area, such as KTD, Kai Tak Promenade Area and further west of the Application Site. On the other hand, E wind at pedestrian level would flow through the urban window underneath central exhibition/multi-purpose hall to reach the open plaza to improve air ventilation performance within the Application Site.

3.3.9 The proposed maximum building height of the Proposed Scheme would be higher than that of the OZP Compliant Scheme. It is anticipated that the proposed development would block the incoming easterly wind flow (E and ESE wind) at the higher level. Wake area would be generated at the immediate leeward side of the proposed development including Kai Fuk Road. However, the Proposed Scheme is promoting the easterly wind to penetrate through tower separations and atop the second floor of the proposed podium. The permeable podium garden at this level is expected to improve the permeability of the proposed development while providing comfortable wind environment for the users of the space.

3.3.10 On the other hand, the development under the OZP Compliant Scheme is oriented perpendicularly to the incoming easterly wind flow with a longitudinal façade, it would limit the wind to penetrate through the Application Site. In comparison, the overall ventilation impact by the building orientation under the OZP Compliant Scheme would likely be much higher than the Proposed Scheme with higher building height.

3.3.11 Therefore, it is anticipated that the air ventilation performance for immediate downwind area under the Proposed Scheme would be slightly improved under E and ESE wind condition.

SE Wind

3.3.12 Kai Fuk Road is well aligned with annual and summer prevailing SE wind direction. Kwun Tong Bypass should be able to facilitate SE wind flow as well.

3.3.13 The annual and summer prevailing SE wind would mainly flow along Kai Fuk Road and facilitate wind breeze. SE wind would continue flow along Kai Fuk Road and towards the downwind areas with no obstruction from the Proposed Development. There is setback of residential towers in the Proposed Scheme (at +25.9mPD and above) to facilitate more SE wind flow at higher level towards the downwind area. The proposed setback would welcome wind circulation within the Application Site and further improve surrounding pedestrian wind environment. Some portion of SE wind would flow through the setback area from southern boundary and the open space at the immediate south of the Application Site then obstructed by the proposed office tower. However, the higher-level SE wind would then downwash to the adjacent pedestrian walkway. Although downwash effect may not be as effective as building separation and setback, it is considered that blockage effect due to higher building effect due to higher building height can still be further offset.

3.3.14 Some portion of SE wind would flow along Trademart Drive and Kwun Tong Bypass. There is no significant difference between Baseline Scheme and Proposed Scheme.

3.3.15 Under SE wind direction, the increased building height in Proposed Scheme has some impact to the overall ventilation performance. SE wind would take advantage of

building setback and flow around the Application Site under both Baseline and Proposed Scheme. The Baseline Scheme has building separation in-between oriented to SSE/NNW axis which can let portion of SE wind penetrate through it as well. As the building height of the Proposed Scheme is higher, the air ventilation performance would be slightly worsened when compared to Baseline Scheme under SE wind.

SSW and SW wind

3.3.16 The building separation and setback are not well aligned with SSW and SW wind.

3.3.17 The summer prevailing SSW and SW wind would be more able to penetrate through the northern and northwestern side of Application Site along Kai Cheung Road taking advantage of the building setback of the Proposed Scheme. More building setback from southern boundary can allow more SSW and SW wind to enter Trademart Drive at pedestrian level and higher elevations as well. Apart from the above, the Proposed Scheme cannot allow further wind penetration.

3.3.18 Moreover, the higher building height is expected to induce more wind blockage at higher level. The residential towers on southwest side in the Proposed Scheme oriented perpendicular to the SSW and SW wind direction. Wake area would be induced at the leeward side and affecting the wind environment at the immediate surrounding such as Kai Cheung Road and Trademart Drive. As discussed before impact along Trademart Drive is partially offset by wind penetrating from building setback area on southern side. The residential tower setback can enable more SSW and SW wind to flow around the western and northwestern side of the development to downwind area such as Kai Cheung Road so that the impact is reduced again.

3.3.19 Since there are surrounding building masses on leeward side, the increased building height would not effect to contribute to any significant additional air ventilation impact to further downwind area such as Wang Kee Road and Kai Shun Road as the existing building masses immediate to these pedestrian areas would already generate the impact.

3.3.20 On the other hand, the development under the OZP Compliant Scheme is generally not permeable under SSW and SW wind. In comparison, the overall ventilation impact by the building orientation under the OZP Compliant Scheme would likely be higher than the Proposed Scheme.

WSW Wind

3.3.21 The summer prevailing WSW wind would penetrate the Application Site along Kai Cheung Road taking advantage of residential tower setback of the Proposed Scheme. It can reach Trademart Drive through the setback area from southern boundary of the Proposed Scheme. Some portion of WSW wind is also able to flow through the building separation (not less than 15m) between Tower 2 and Tower 3 towards the downwind areas. The proposed separation has an effective width of not less than 15m, which could promote more wind flow to penetrate through the Proposed Development.

3.3.22 On the other hand, the development under the OZP Compliant Scheme is generally not permeable under WSW wind. In comparison, the overall ventilation impact by the building orientation under the OZP Compliant Scheme would likely be higher than the Proposed Scheme.

3.4 Summary of Relative Air Ventilation Performance

3.4.1 The air ventilation performance of the OZP Compliant Scheme and the Proposed Scheme has been appraised. Under the OZP Compliant Scheme, it consists of full-

coverage podium (+20mPD) and long and continuous office tower building frontage with height of about +100mPD.

3.4.2 Under the Proposed Scheme, higher maximum building height (+140mPD) is proposed but with air ventilation design measures of building separation at E/W direction, building setbacks along site boundaries, permeable podium garden, stepped podium and urban window design.

3.4.3 Building separation is aligned with most annual and summer prevailing wind direction (ENE, E, ESE and WSW) that will facilitate wind flow across the Proposed Development. Besides, the building setbacks from the site boundary (a minimum 15m building setback of all major building structures from southern boundary, and minimum 15m setback of residential towers at +25.9mPD and above from southwest, west, northwest and north boundaries) also facilitate the prevailing wind flows. In addition, podium garden of about 6m height underneath residential towers (mainly Towers 1 to 3) can allow wind penetration with respect to ENE, E, ESE, WSW, SW, SSW wind. Stepped podium allows wind to flow over the podium and then reach pedestrian level easier. The open plaza and urban window can improve air ventilation within the Proposed Development.

3.4.4 Moreover, the high-rise buildings of the Proposed Scheme might impose more blockage at higher level on one hand, but it could also generate downwash wind on the other hand, which would benefit the air ventilation performance of the area in close vicinity and offset the impact of higher building mass in some degree.

3.4.5 Combination of various good design measures have been incorporated in the Proposed Scheme wight higher building height so that it would unlikely impose significant adverse overall air ventilation impacts on the surrounding as compared with the OZP Compliant Scheme.

4. CONCLUSION

4.1.1 A qualitative assessment on the air ventilation performance of the Proposed Development has been carried out.

4.1.2 According to the findings of this AVA-EE, the annual prevailing wind comes from ENE, E, ESE and SE directions while the summer prevailing wind comes from E, ESE, SE, SSW, SW and WSW directions. Good design features of the Proposed Development include a building separation of not less than 15m-wide between Towers 2 and 3, a minimum 15m building setback of all major building structures from southern boundary, minimum 15m setback of residential towers at +25.9mPD and above from southwest, west, northwest and north boundaries, about 6m height podium garden underneath residential towers, stepped podium design, open plaza plus urban window are provided to maintain good comparable air ventilation performance.

4.1.3 After considering the potential air ventilation impacts on the Application Site under all prevailing wind directions, it is considered that the Proposed Scheme with the good design features incorporated would unlikely impose significant adverse overall air ventilation impacts on the surrounding as compared with the OZP Compliant Scheme.

Figures

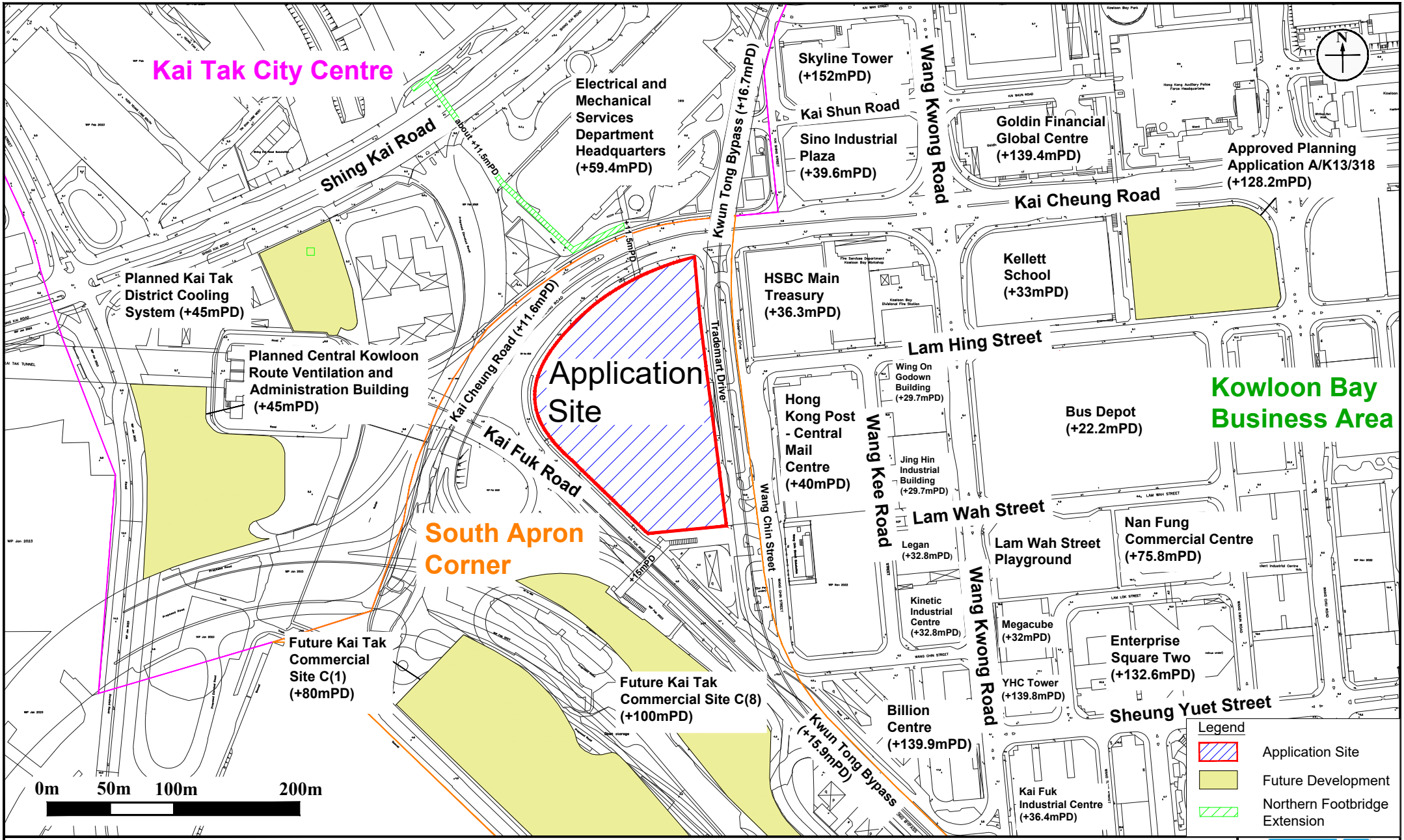

Figure: 1

Title: Location Plan of the Proposed Development

Project: Proposed Composite Redevelopment with Trade Mart/Exhibition and Commercial, Residential, Social Welfare Facilities and School Uses and Minor Relaxation of Building Height Restriction, New Kowloon inland Lot No. 6032, 1 Trademart Drive, Kowloon Bay, Kowloon

RAMBOLL

Drawn by:	AW
Checked by:	CC
Rev.:	2.0
Date:	Jan 25

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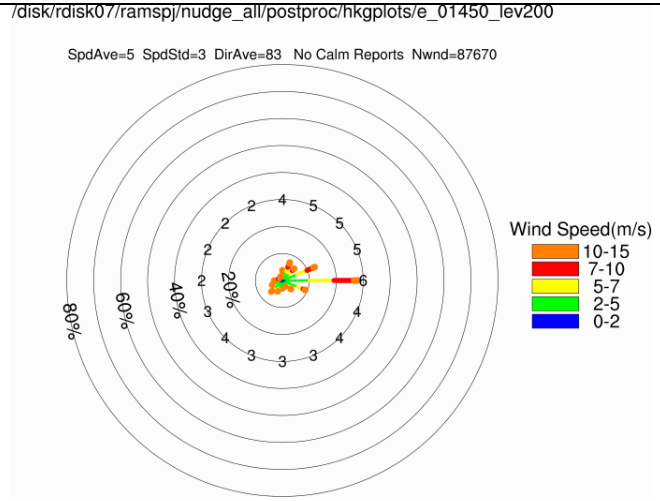
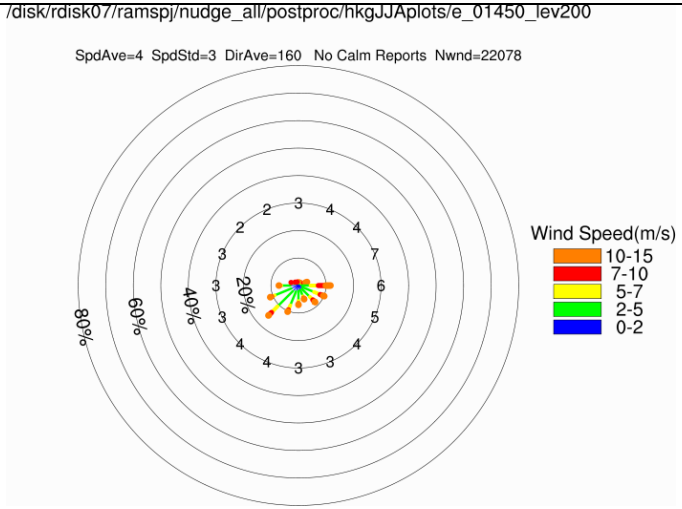
Y: 043)



Annual



Summer

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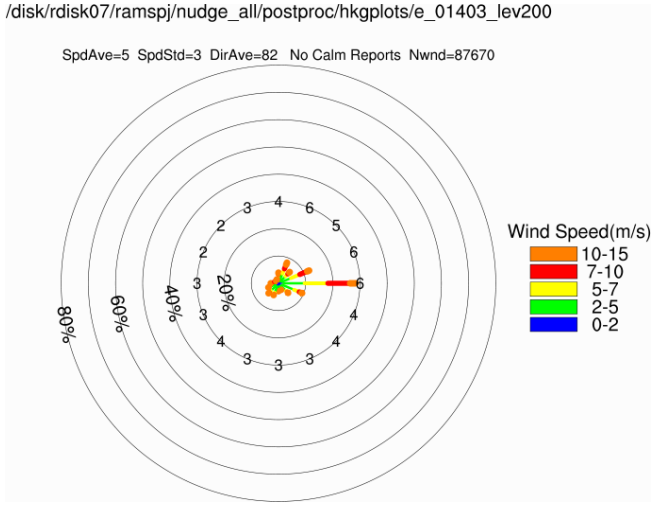
Y: 044)



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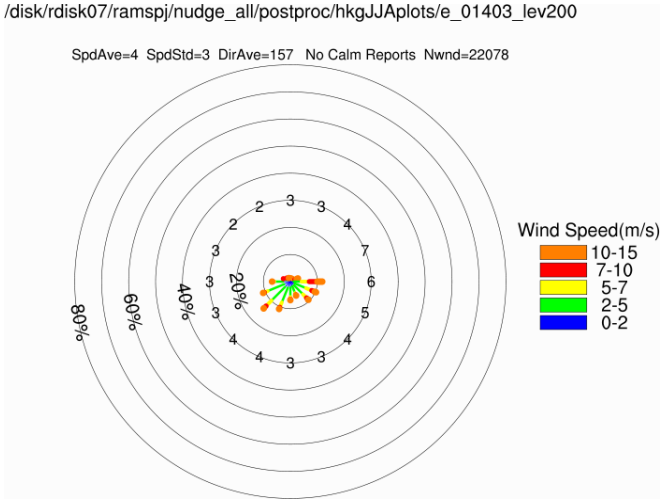

Summer

Figure:	2a	RAMBOLL
Title:	Windrose Diagram representing V∞ of the Area under Concern at 200m above ground (X:086, Y:043; X:086, Y:044)	Drawn by: AW Checked by: CC
Project:	Proposed Composite Redevelopment with Trade Mart/Exhibition and Commercial, Residential, Social Welfare Facilities and School Uses and Minor Relaxation of Building Height Restriction, New Kowloon inland Lot No. 6032, 1 Trademart Drive, Kowloon Bay, Kowloon	Rev.: 2.0 Date: Jan 2025

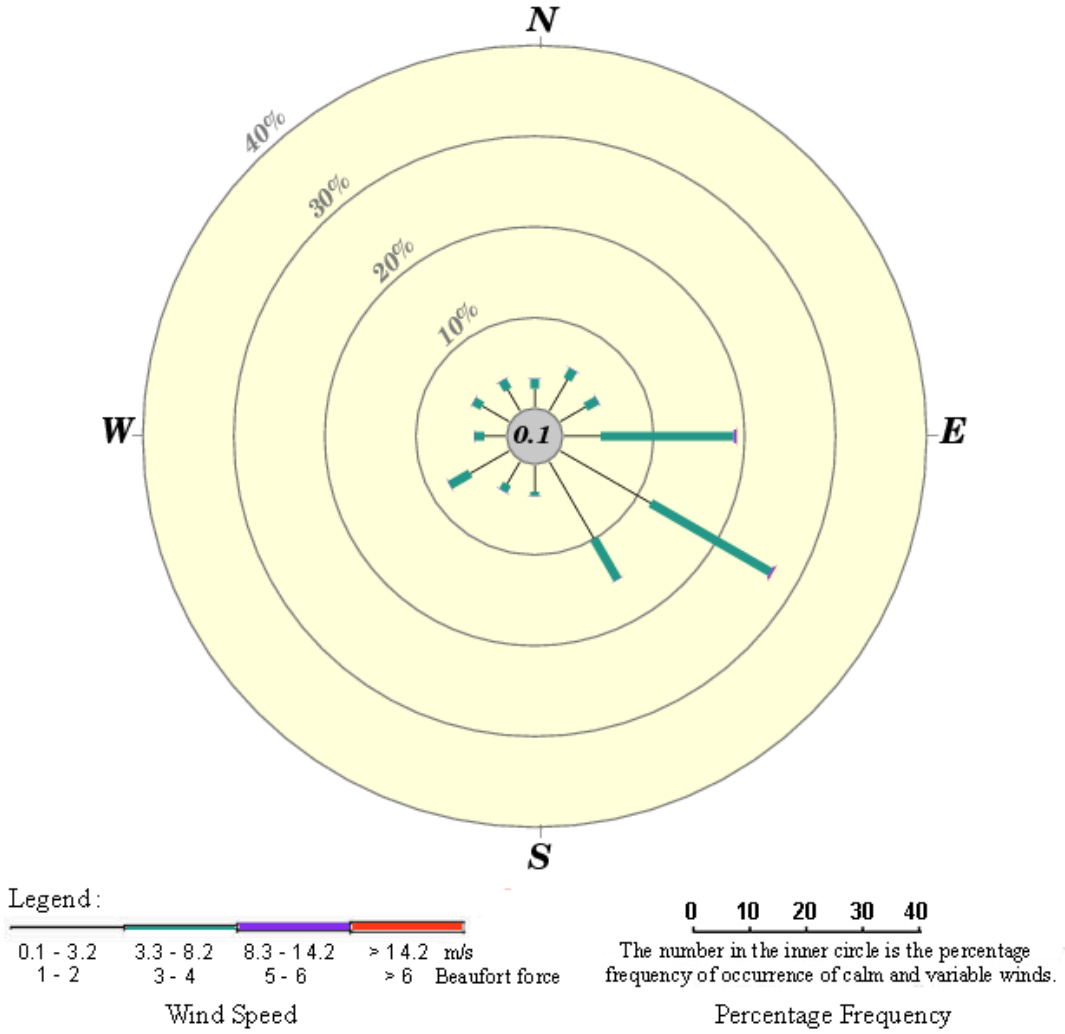

Figure:	2b	RAMBOLL
Title:	Annual Windrose Diagram of Kai Tak Hong Kong Observatory Wind Station (1999-2019)	Drawn by: AW Checked by: CC
Project:	Proposed Composite Redevelopment with Trade Mart/Exhibition and Commercial, Residential, Social Welfare Facilities and School Uses and Minor Relaxation of Building Height Restriction, New Kowloon inland Lot No. 6032, 1 Trademart Drive, Kowloon Bay, Kowloon	Rev.: 2.0 Date: Jan 2025

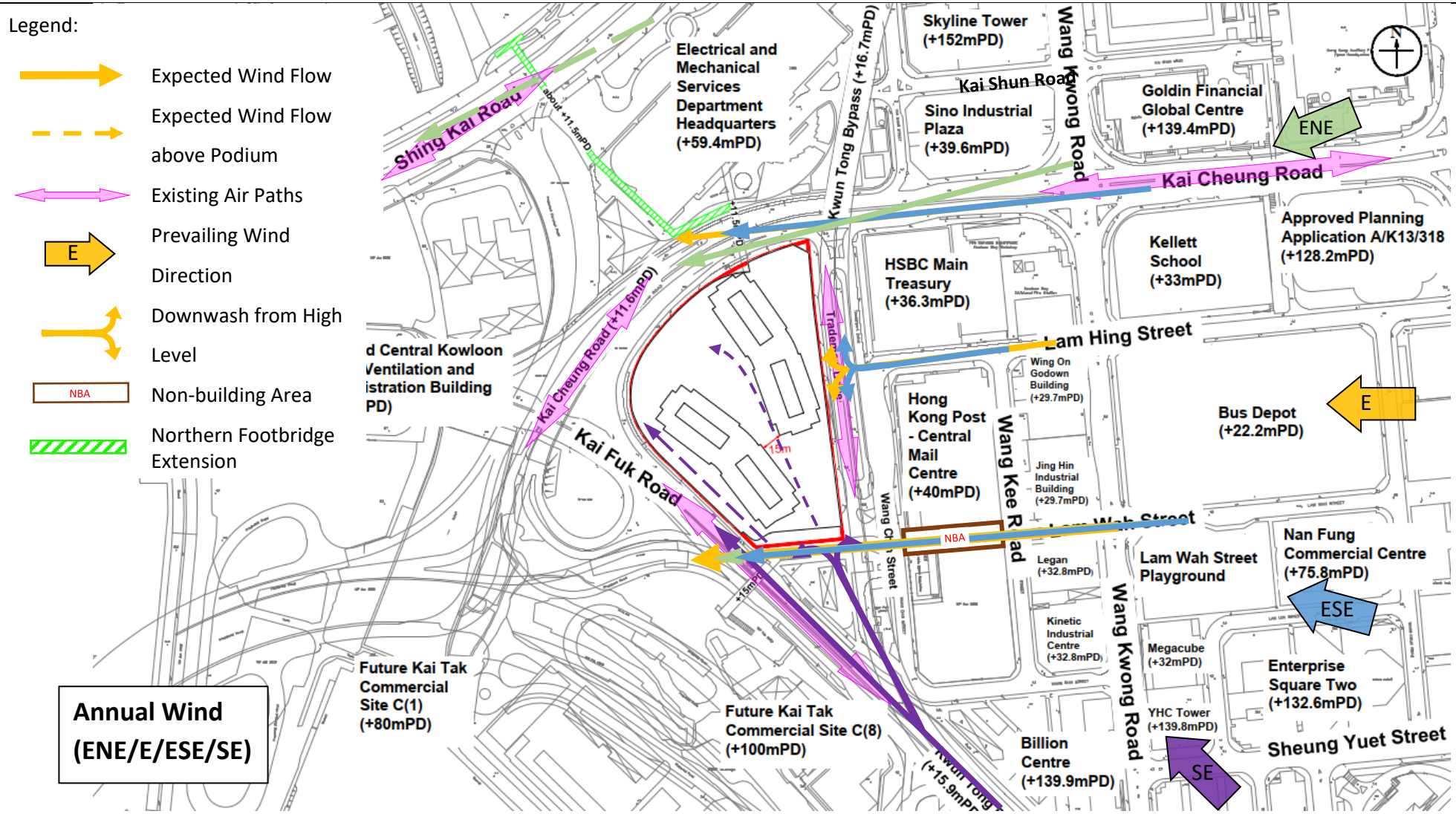

Figure: 3	RAMBOLL
Title: Illustration of Wind Flow from Annual Wind Directions for OZP Compliant Scheme	Drawn by: AW Checked by: CC
Project: Proposed Composite Redevelopment with Trade Mart/Exhibition and Commercial, Residential, Social Welfare Facilities and School Uses and Minor Relaxation of Building Height Restriction, New Kowloon inland Lot No. 6032, 1 Trademart Drive, Kowloon Bay, Kowloon	Rev.: 2.0 Date: Jan 2025

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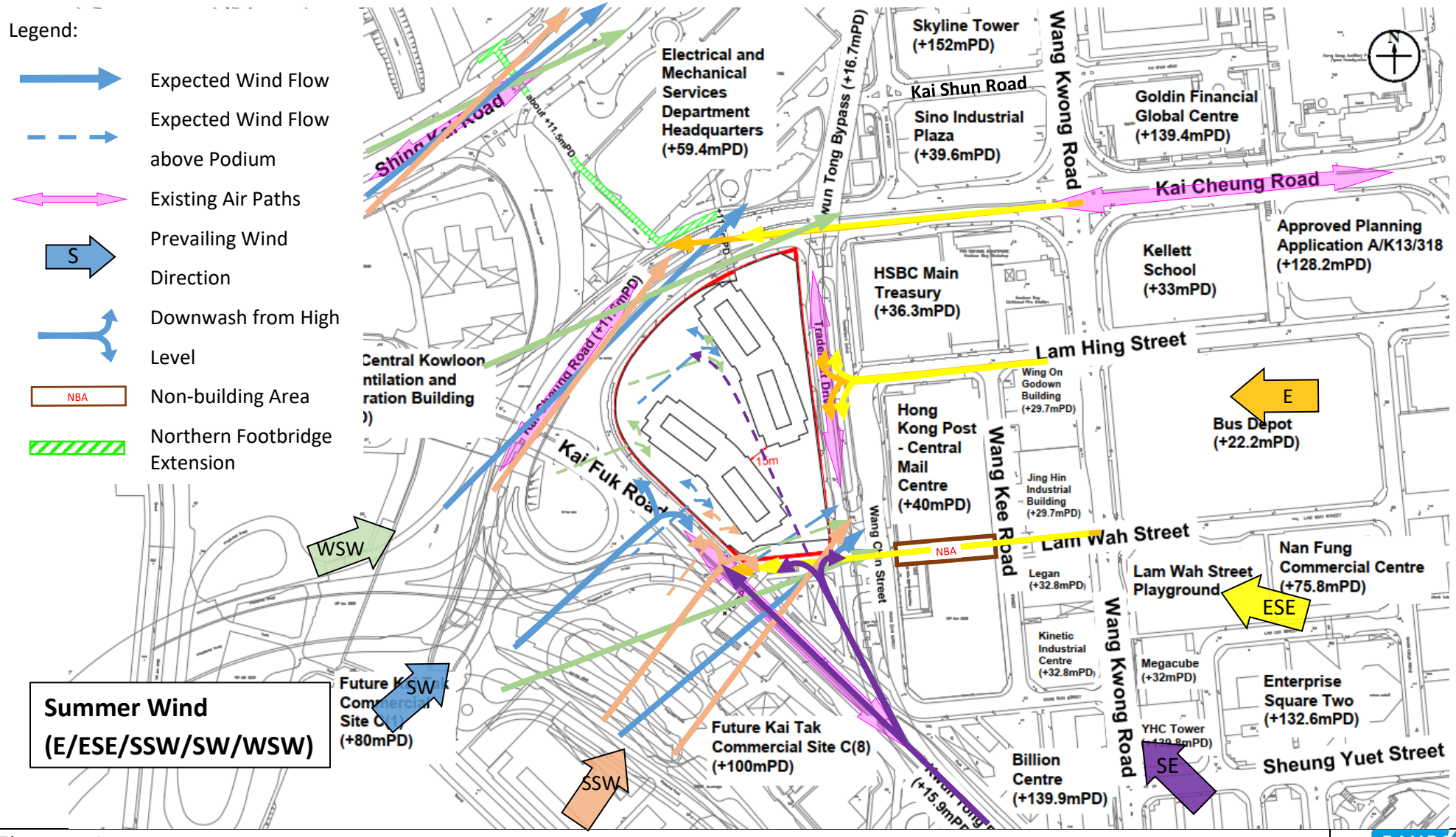

Figure: 4	RAMBOLL
Title: Illustration of Wind Flow from Summer Wind Directions for OZP Compliant Scheme	Drawn by: AW Checked by: CC
Project: Proposed Composite Redevelopment with Trade Mart/Exhibition and Commercial, Residential, Social Welfare Facilities and School Uses and Minor Relaxation of Building Height Restriction, New Kowloon inland Lot No. 6032, 1 Trademart Drive, Kowloon Bay, Kowloon	Rev.: 2.0 Date: Jan 2025

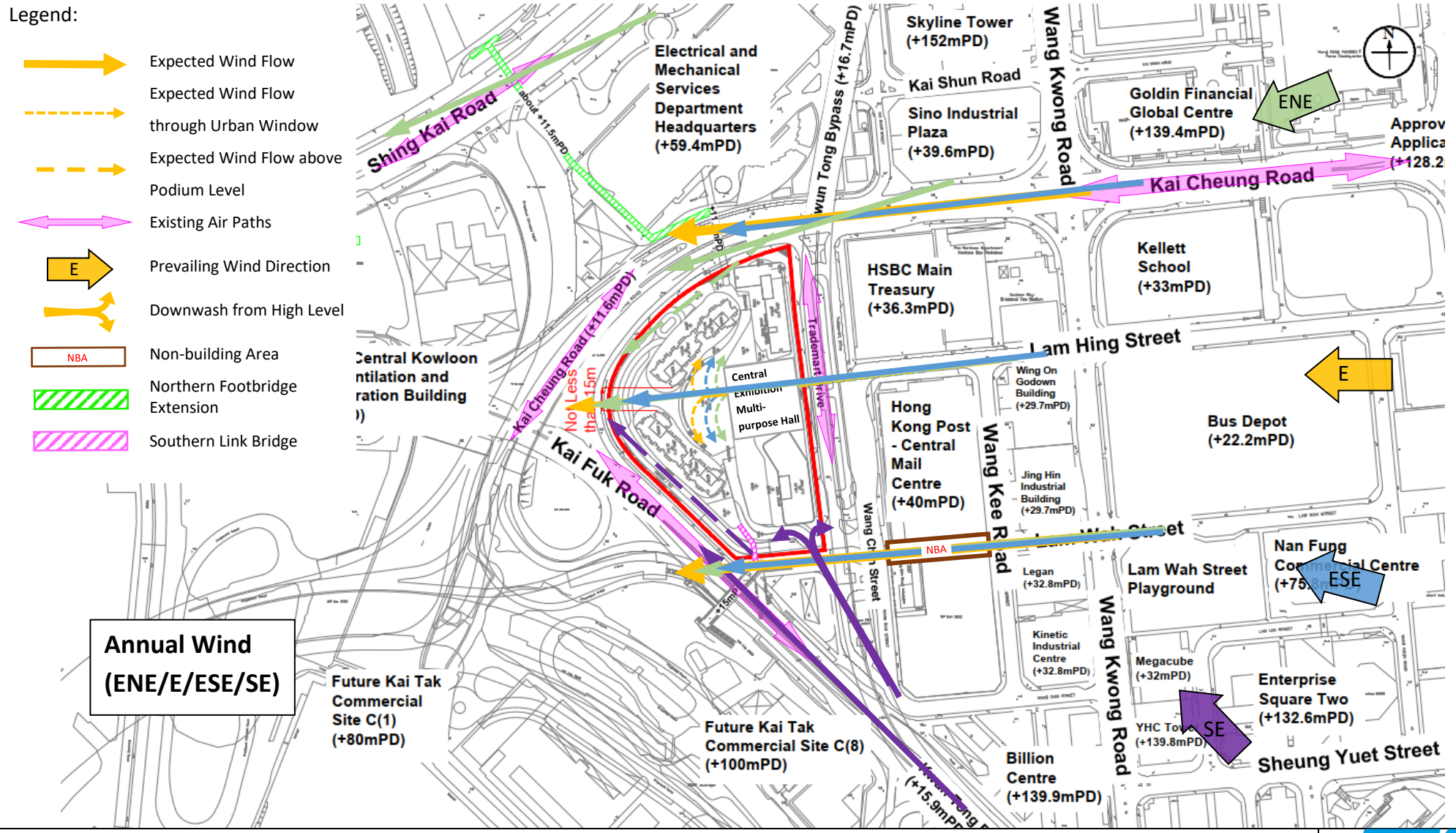

Figure: 5	RAMBOLL
Title: Illustration of Wind Flow from Annual Wind Directions for Proposed Scheme	Drawn by: AW Checked by: CC
Project: Proposed Composite Redevelopment with Trade Mart/Exhibition and Commercial, Residential, Social Welfare Facilities and School Uses and Minor Relaxation of Building Height Restriction, New Kowloon inland Lot No. 6032, 1 Trademart Drive, Kowloon Bay, Kowloon	Rev.: 2.0 Date: Jan 2025

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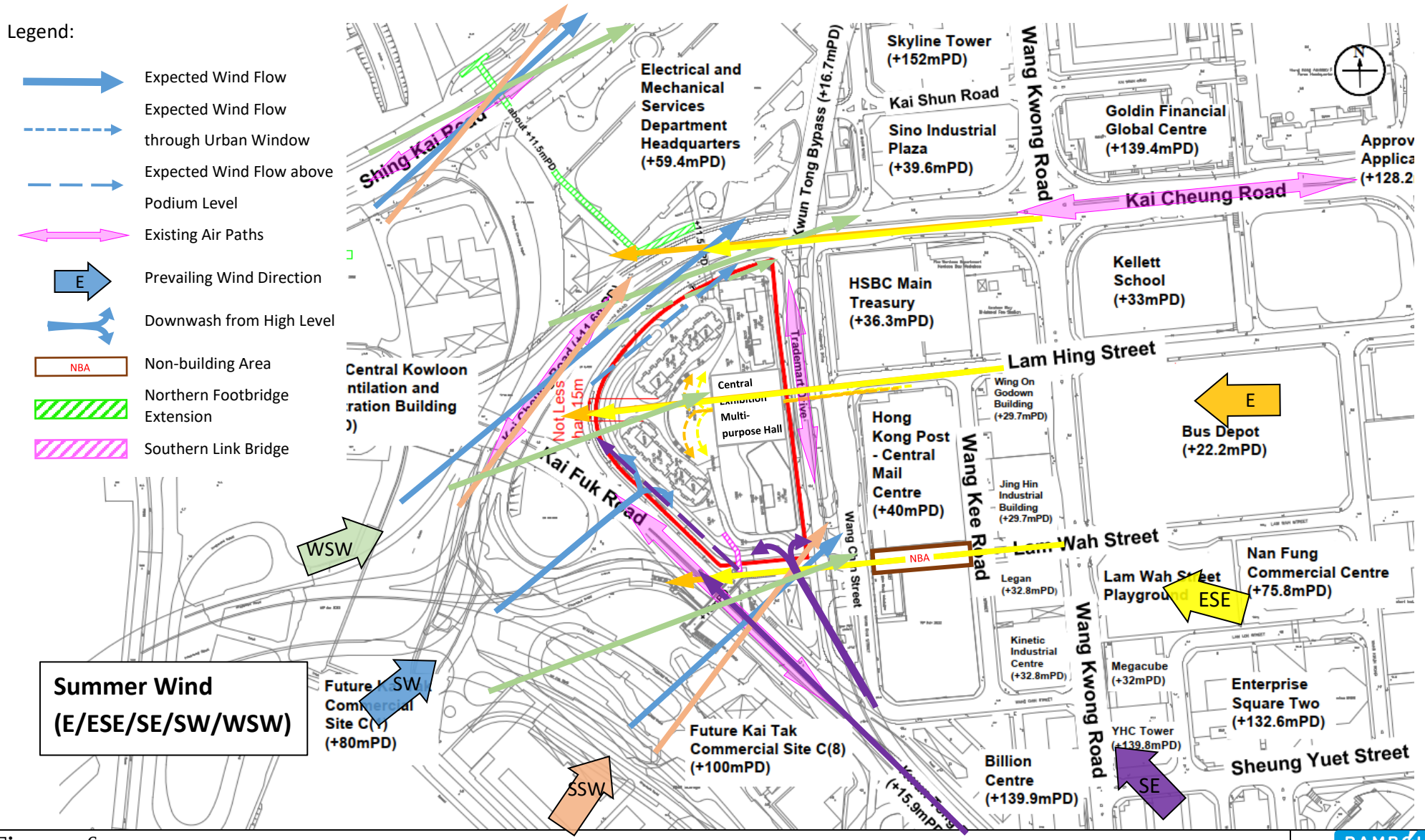
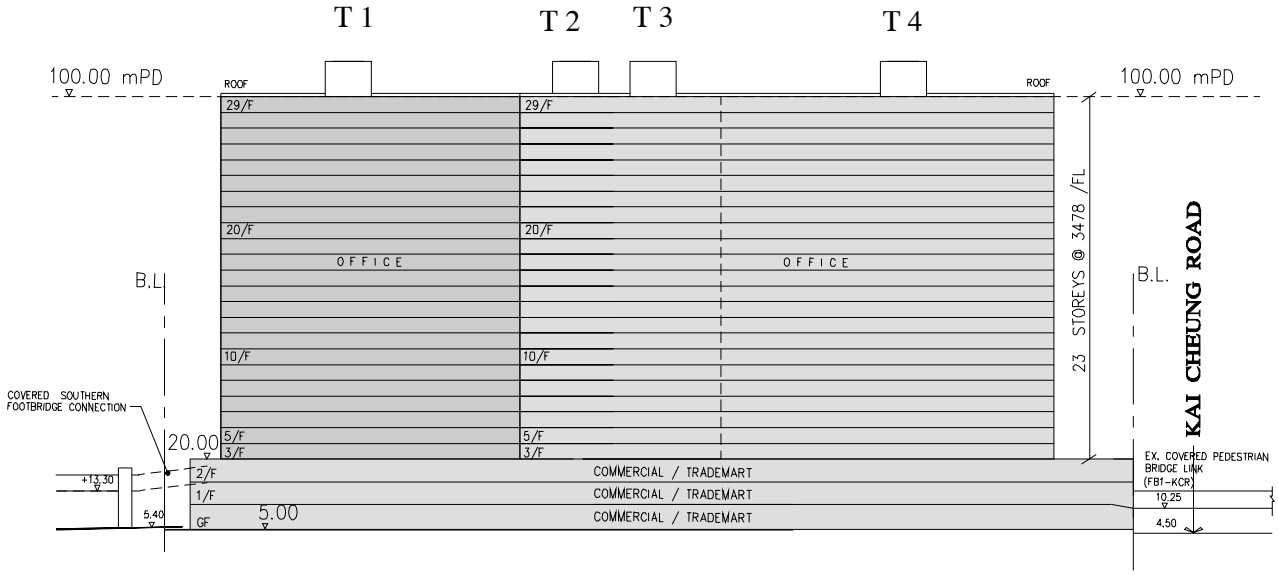


Figure: 6	RAMBOLL
Title: Illustration of Wind Flow from Summer Wind Directions for Proposed Scheme	Drawn by: AW Checked by: CC
Project: Proposed Composite Redevelopment with Trade Mart/Exhibition and Commercial, Residential, Social Welfare Facilities and School Uses and Minor Relaxation of Building Height Restriction, New Kowloon inland Lot No. 6032, 1 Trademart Drive, Kowloon Bay, Kowloon	Rev.: 2.0 Date: Jan 2025

Appendix 1

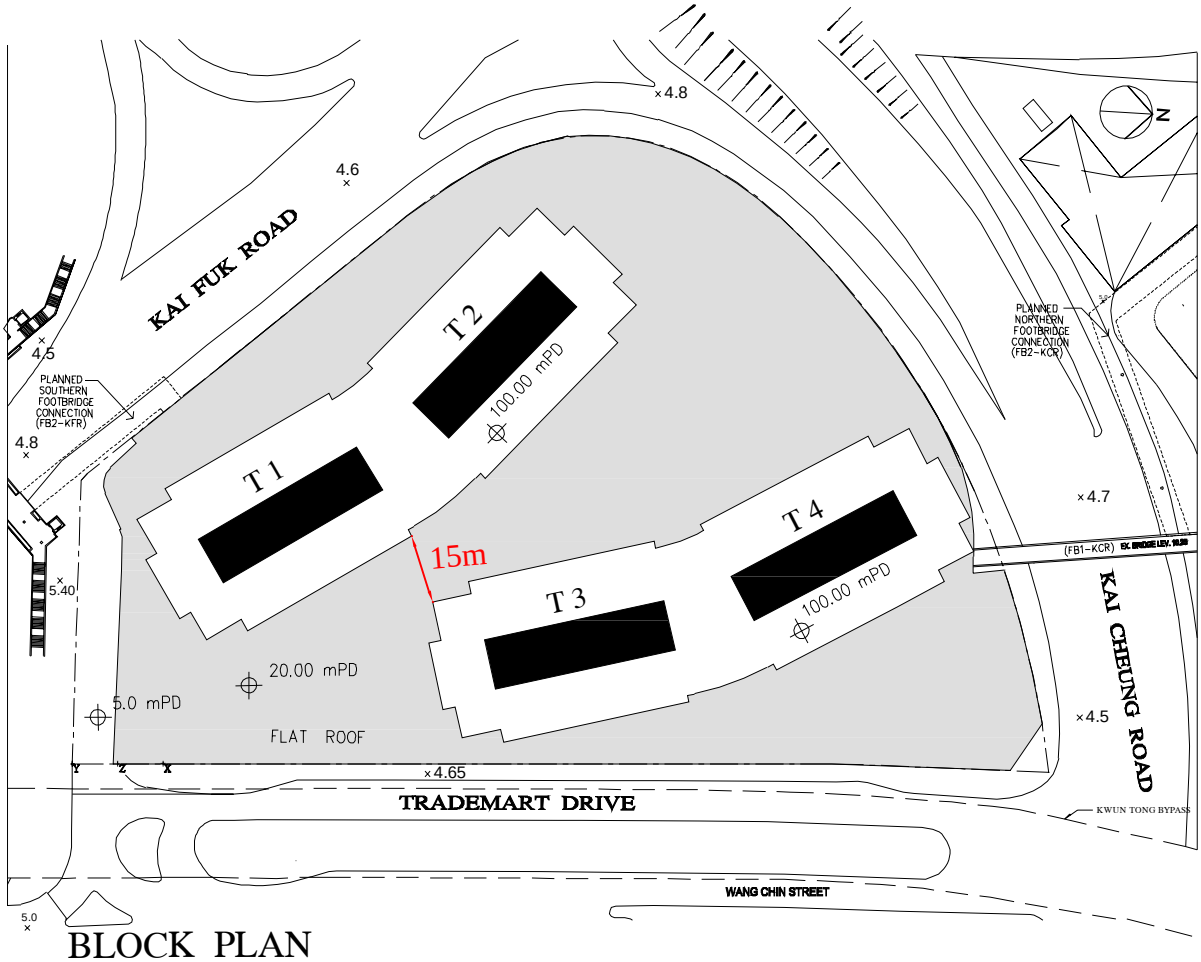
The Indicative Block Plan of the OZP Compliant Scheme

COMPLIANCE SCHEME
BASED ON PR 12 & EXISTING BH 100mPD



DIAGRAMMATIC SECTION

FLOOR NOS. WITHOUT 4,13,& 14



BLOCK PLAN

Appendix 2

The Indicative Block Plan of the Proposed Scheme

G/F Building Mass

1/F Building Mass

2/F Building Mass

Transfer Plate above 2/F

KAI FUK ROAD

KAI CHEUNG ROAD

TRADEMART DRIVE

At Least 15m

At Least 15m

At Least 15m

At Least 15m

CANOPY

EVA / DRIVEWAY

PAVEMENT

TOWER 2

133.70
FLAT ROOF

TOWER 1

133.70
FLAT ROOF

25.90

TOWER 3

140.00
FLAT ROOF

25.90

140.00
FLAT ROOF

TOWER 5

10.90

16.80

16.80

16.80

10.90

15.80

22.80

5.00
OPEN PLAZA

FOOTBRIDGE

FOOTBRIDGE

BRIDGE LEV. 13.30

EXISTING GOVERNMENT SOUTHERN FOOTBRIDGE

PLANNED SOUTHERN LINK BRIDGE

5.00

18.00

26.50

OFFICE TOWER

140.00
FLAT ROOF

26.50
ROOF OF EXHIBITION / MULTI-PURPOSE HALL

18.00

23.00

63.00

MIXED BLOCK
(INCLUDING HOTEL, COMMERCIAL / SHOWROOMS)

140.00
FLAT ROOF

18.00

63.00

PINK CROSS HATCHED BLACK AREA

EXISTING GOVERNMENT NORTHERN FOOTBRIDGE

BRIDGE LEV. 10.25

PROPOSED OPENING TO CONNECT WITH EXISTING GOVERNMENT NORTHERN FOOTBRIDGE

PINK HATCHED BLACK AREA

E M S D HEADQ

N

5.0

5.0

BLOCK PLAN

(SCALE 1:800)

PROPOSED COMPOSITE REDEVELOPMENT WITH TRADE MART / EXHIBITION AND COMMERCIAL, RESIDENTIAL, SOCIAL WELFARE FACILITIES AND SCHOOL USES AND MINOR RELAXATION OF BUILDING HEIGHT RESTRICTION, NEW KOWLOON INLAND LOT NO. 6032, 1 TRADEMART DRIVE, KOWLOON BAY, KOWLOON

MLA ARCHITECTS (HK) LTD
馬梁建築師事務所(香港)有限公司

Drawing No. MLP-01
Dated: 22 JAN 2025

Podium Garden

19.30
RCHE

U2/F
FOR T1 and T2 only

KAI FUK ROAD

KAI CHEUNG ROAD

N

LIFT LOBBY TOWER-2

SWIMMING POOL

16.80
RESIDENTIAL CLUBHOUSE

16.80
POOL DECK

LIFT LOBBY TOWER-3

15.80
RCHE

LIFT LOBBY TOWER-1

55000
RCHE / PETROL STATION

BRIDGE LEV. 13.30

15.80
FLAT ROOF

UPPER PART OF OPEN PLAZA

16.80
RESIDENTIAL CLUBHOUSE

16.80
PODIUM GARDEN

LIFT LOBBY TOWER-5

FOOTBRIDGE ROOF

PINK CROSS HATCHED BLACK AREA

BRIDGE LEV. 10.25

18.00
FLAT ROOF

UPPER PART OF EXHIBITION / MULTI-PURPOSE HALL

18.00
FLAT ROOF

FOOTBRIDGE ROOF

18.00
SHOWROOMS

COMMERCIAL

18.00
SHOWROOMS

18.00

COMMERCIAL

PINK HATCHED BLACK AREA

E M S D HEADQ

TRADEMART DRIVE

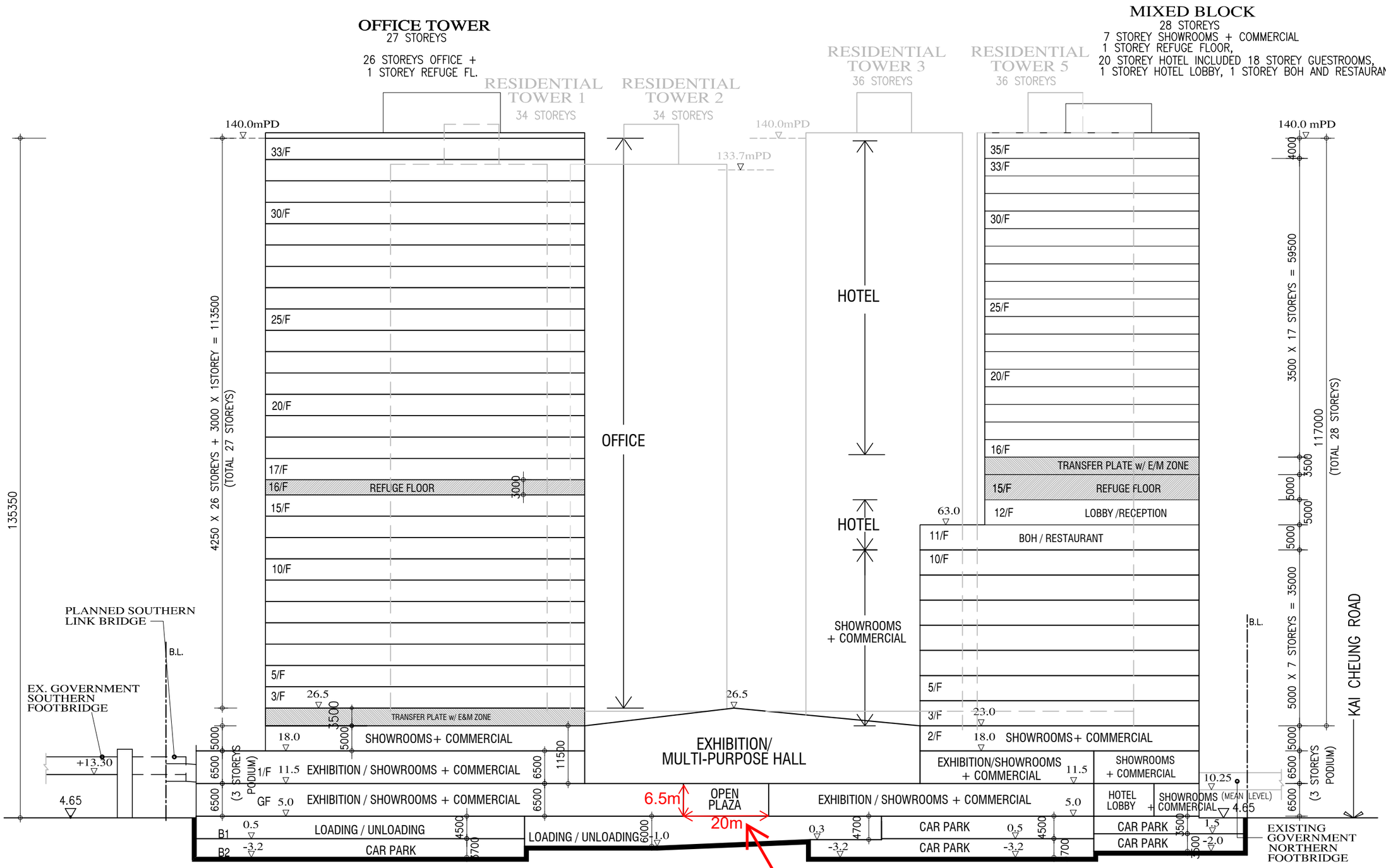
SECOND FLOOR PLAN

(SCALE 1:800)

PROPOSED COMPOSITE REDEVELOPMENT WITH TRADE MART / EXHIBITION AND COMMERCIAL, RESIDENTIAL, SOCIAL WELFARE FACILITIES AND SCHOOL USES AND MINOR RELAXATION OF BUILDING HEIGHT RESTRICTION, NEW KOWLOON INLAND LOT NO. 6032, 1 TRADEMART DRIVE, KOWLOON BAY, KOWLOON

MLA ARCHITECTS (HK) LTD
馬梁建築師事務所(香港)有限公司

Drawing No. MLP-06
Dated: 17 FEB 2025



DIAGRAMMATIC SECTION A

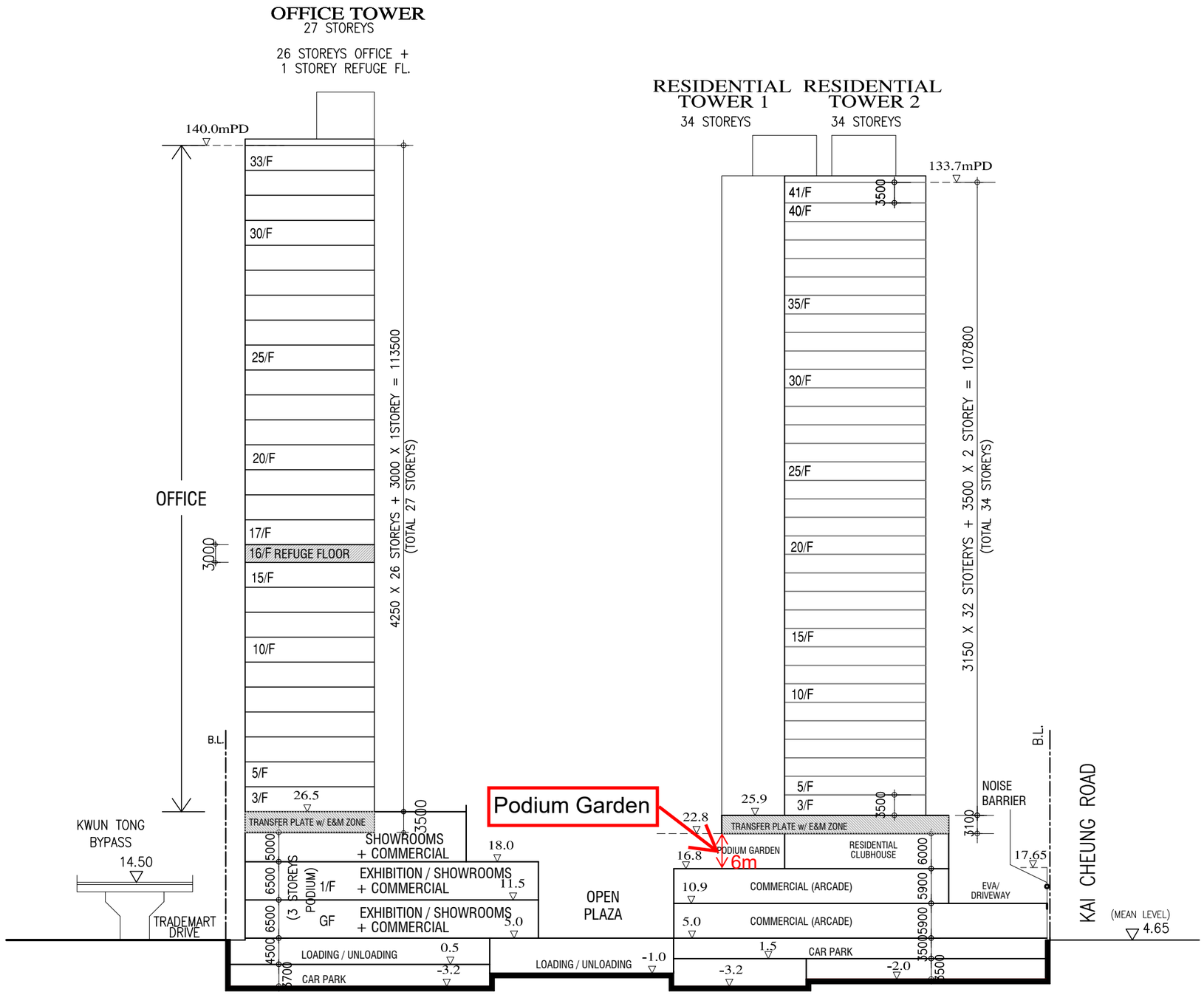
* 4/F, 13/F, 14/F, 24/F & 34/F OMITTED
(SCALE 1:800)

Urban Window

PROPOSED COMPOSITE REDEVELOPMENT WITH TRADE MART / EXHIBITION AND COMMERCIAL, RESIDENTIAL, SOCIAL WELFARE FACILITIES AND SCHOOL USES AND MINOR RELAXATION OF BUILDING HEIGHT RESTRICTION, NEW KOWLOON INLAND LOT NO. 6032, 1 TRADEMART DRIVE, KOWLOON BAY, KOWLOON

MLA ARCHITECTS (HK) LTD
馬梁建築師事務所(香港)有限公司

Drawing No. MLP-10
Dated: 17 FEB 2025



DIAGRAMMATIC SECTION B

* 4/F, 13/F, 14/F, 24/F & 34/F OMITTED
(SCALE 1:800)

PROPOSED COMPOSITE REDEVELOPMENT WITH TRADE MART / EXHIBITION AND COMMERCIAL, RESIDENTIAL, SOCIAL WELFARE FACILITIES AND SCHOOL USES AND MINOR RELAXATION OF BUILDING HEIGHT RESTRICTION, NEW KOWLOON INLAND LOT NO. 6032, 1 TRADEMART DRIVE, KOWLOON BAY, KOWLOON

MLA ARCHITECTS (HK) LTD
馬梁建築師事務所(香港)有限公司

Drawing No. MLP-11
Dated: 17 FEB 2025