INTRODUCTION

The purpose of this air ventilation assessment (AVA) is to evaluate the ventilation performance of the revised Recommended Outline Development Plans (revised RODPs) of the North East New Territories (NENT) New Development Areas (NDAs) under the Technical Circular No. 1/06 jointly issued by the former Housing, Planning and Lands Bureau and Environment, Transport and Works Bureau and its Annex A – Technical Guide for Air Ventilation Assessment for Developments in Hong Kong. Since all proposed wind corridors and localized air paths are retained in the revised RODPs of Kwu Tung North (KTN) and Fanling North (FLN) NDAs compared with the RODPs which the ventilation performance was assessed through the Computational Fluid Dynamics in Stage 2 AVA, the changes made are assessed qualitatively through Expert Evaluation. The ventilation performance due to these changes is assessed under annual and summer prevailing wind directions.

SITE WIND AVAILABILITY OF THE NDAS

Site wind availability study was conducted for each NDA in which a 1:2,000 scale topography model was constructed in the low speed test section of the CLP Power Wind/Wave Tunnel Facility (WWTF) at The Hong Kong University of Science and Technology to determine the effectiveness of topography on local wind conditions of the NDAs. A number of representative approaching wind conditions were identified for each NDA to rationalize and characterize the effects of the various topographical and terrain features for the 16 measured wind directions and the incoming wind profile adopted in this Study. It is found that:

- KTN NDA: Annual prevailing wind – Easterly;
  Summer prevailing wind– Southwesterly;
- FLN NDA: Annual prevailing wind – Easterly;
  Summer prevailing wind– Southwesterly;

MITIGATION MEASURES

The following mitigation measures to improve ventilation performance have been widely adopted in the NDAs:

- Air paths/wind corridors
- Road networks aligning with prevailing wind directions
- Non-building areas (NBA)/ building separations/setbacks
- Staggered building alignment
- Podium garden
- Empty bays at G/F of buildings
- Aerodynamic building profile
- Terraced podium design
- Urban window

CHANGES MADE ON THE REVISED RODPS

KTN NDA

- Same proposed wind corridors and localized air paths are retained in the revised RODP. It is expected that the overall wind performance would not be significantly affected.

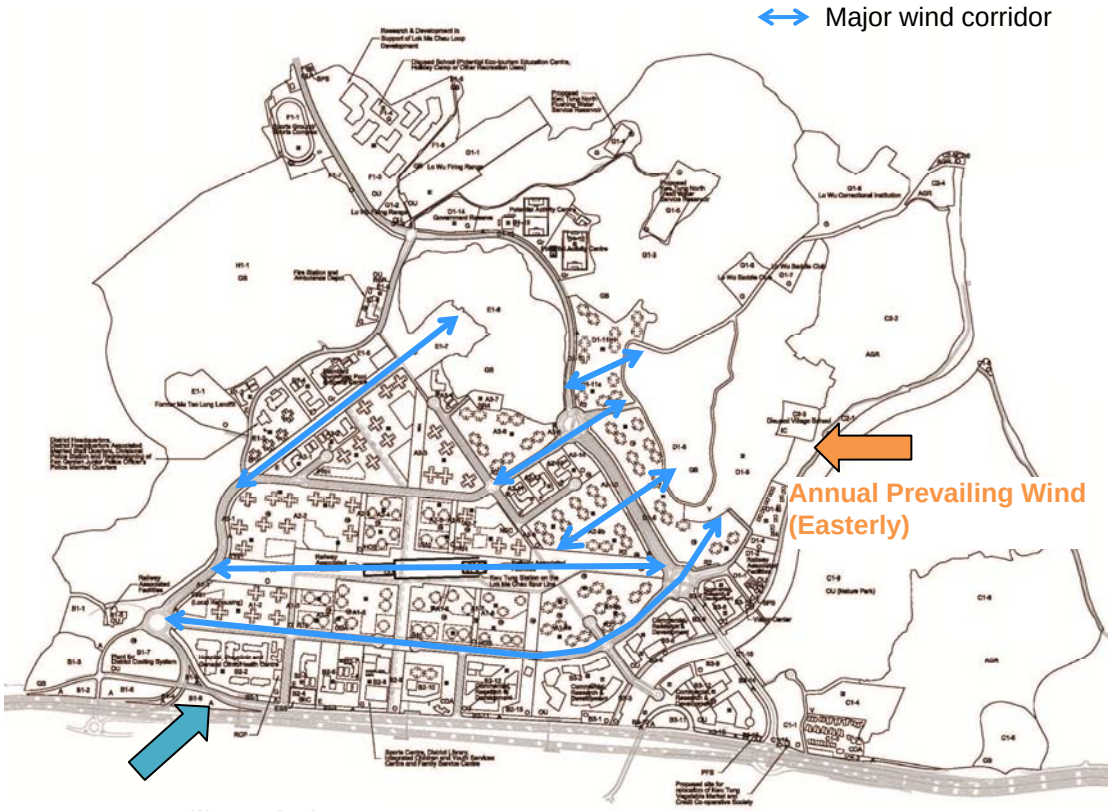

Figure 1 Locations of wind corridors in KTN NDA

- The RODP and revised RODP are overlaid as shown in Figure 2;
- Number of towers in Sites A1-2, A1-9, A2-7, A2-9, D1-7 and D1-11 and the footprint of purposed-designed non-domestic buildings in Sites A1-5, A2-2 and A3-3 are reduced that would increase building separations;
- However, in order to accommodate more population, the number of storeys of buildings in Sites A1-2, D1-7 and D1-11 of KTN NDA are increased by 5, 11 and 10 storeys respectively. Although the wind performance at fringe area of the KTN NDA would be affected by the increased building height, the impact would be minimal considering the fringe area of KTN NDA is mostly greenery;
- Some new buildings are added in the northern area of the NDA (including sports ground at Site F1-1, buildings for R&D uses at Site F1-3, potential activities centres at Sites D1-12 & D1-13, fire station at Site E1-6, school at Site E1-2), and at the southwest and southeast of the NDA, including District Cooling System (DCS) at Site B1-7 and Kwu Tung Vegetable Market and Credit Co-operation Society at Site C1-11 respectively. However, considering the building density of their surrounding areas, the impact due to these new buildings would be insignificant to the overall wind environment;
- Additional 10m-setback of terraced podia in Sites A2-4 and A2-5 from the open space spine widens one of the wind corridors that would have positive effect on the wind performance;
- Number of towers in Sites A1-4, A1-5, A1-6, A1-8 and A2-2 and the footprint of podia in Sites A1-2, A1-4, A1-6, A1-8 and A2-7 are increased that would reduce the wind permeability at pedestrian level. Minor impact on the local wind performance would be expected;
- The maximum number of storeys of buildings in Sites B3-12 and E1-2 are reduced by 6 and 1 storey respectively. Although reduction of building height would reduce the wind shadow casted on the downwind area, these sites are located near the site boundary of NDA that would have insignificant change on local wind performance;
- Change of the building shape and/or shift of building in NDA would not significantly affect the overall ventilation performance as all wind corridors and localized air paths are retained in the revised RODP;
- In sum, no significant impact on the overall wind performance would be expected.

Figure 2 Changes made in RODP of KTN NDA

FLN NDA

- Same proposed wind corridors and localized air paths are retained in the revised RODP of FLN NDA. It is expected that the overall wind performance would not be significantly affected.

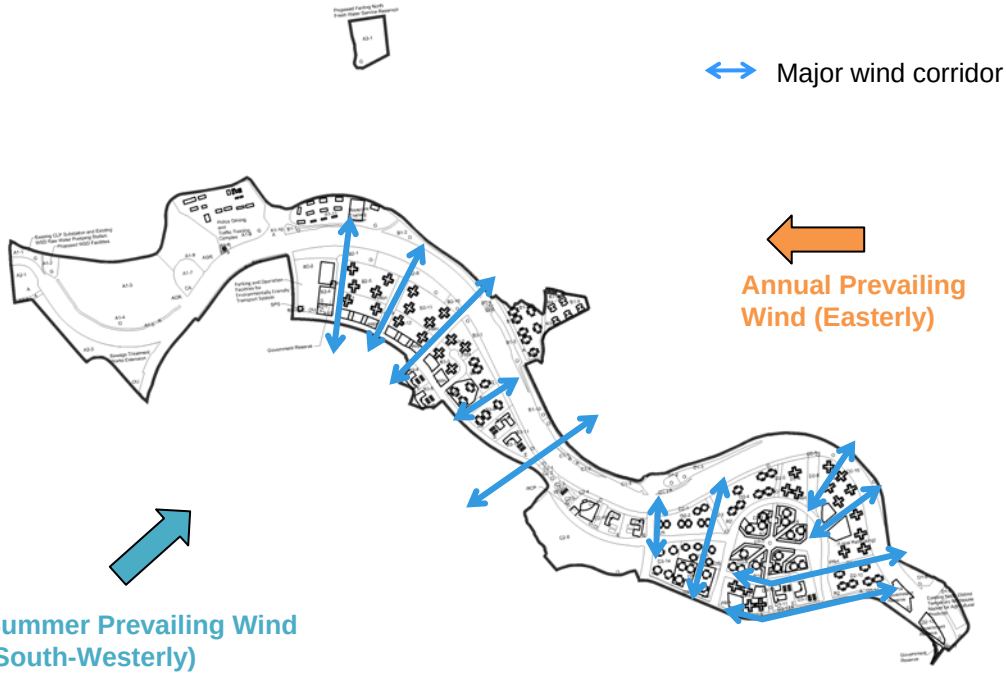

Figure 3 Locations of wind corridors in FLN NDA

- The RODP and revised RODP are overlaid as shown in Figure 4;
- Change of the building shape and/or shift of building in NDA would not significantly affect the overall ventilation performance as all wind corridors and localized air paths are retained in the revised RODP;
- The footprint of terraced podia in Sites D3-3, D3-4, D3-6 and D3-7 are larger. These four R1c sites abutting the cruciform open space in the District Centre are designed to have elevated towers on terraced podia for facilitating wind penetration to the downwind side (see Figure 5A);
- The footprint of podia in Sites B3-3 and D2-9 are reduced that would increase the wind permeability and thus slight change of local ventilation performance would be expected;
- Buildings in Sites B1-7, B2-6, B2-11, B3-2, B3-6, B3-7, B3-9, D2-2, D2-6, D3-1 and D3-8 are increased by 3~10 storeys in which the numbers of buildings in Sites B1-7, B2-6, B2-11, B3-7, B3-9 and D2-6 are reduced. In Sites B2-7, B2-12, C2-6, D2-4, D2-9, D3-1a and D3-8, the number of towers are also reduced. Considering the impacts due to both increase of building height and building separation, minor change on the local wind performance would be expected;
- While, new podia are added to Sites B3-3, B3-6, D3-1c and D3-8 in which terraced podium design is adopted to Site D3-1c, minor impact to the local wind ventilation would be expected in those areas at their downwind;
- The podia in Sites B2-7 and B2-12 of FLN NDA are larger that empty bay is provided to facilitate wind penetration to the downwind side under summer prevailing wind condition (see Figure 5B);
- Other than the changes of footprints, new buildings are added in Sites A1-8, A1-11, B1-9, B3-6, C2-7, C2-9, D2-2, D2-14, D2-15, D3-1b, D3-1c and D3-7. However, surrounding areas of sites except Sites D2-14, D2-15, D3-1b, D3-1c and D3-7, are either relatively open or greenery. Minor impact on the local wind performance would be expected. In the absence of information of building layout in Sites D2-14 and D2-15 with up to 10 storeys, wind shadow would cast over the existing residential area – Belair Monte. The impact to this residential cluster could be minimized by providing wind permeable building design e.g. sufficient building separations in Sites D2-14 and D2-15 to enhance wind permeability. As Site D3-7 is situated in the inner part of the NDA and sitting on the podium, the ventilation impact to its surrounding due to additional buildings is minor. However, the new buildings added in Sites D3-1b and D3-1c would reduce summer wind penetration and therefore a NBA is dedicated across Sites D3-1b and D3-1c to allow summer wind to penetrate to the FLN NDA and minimize the impact;
- No significant impact on the overall wind performance would be expected.

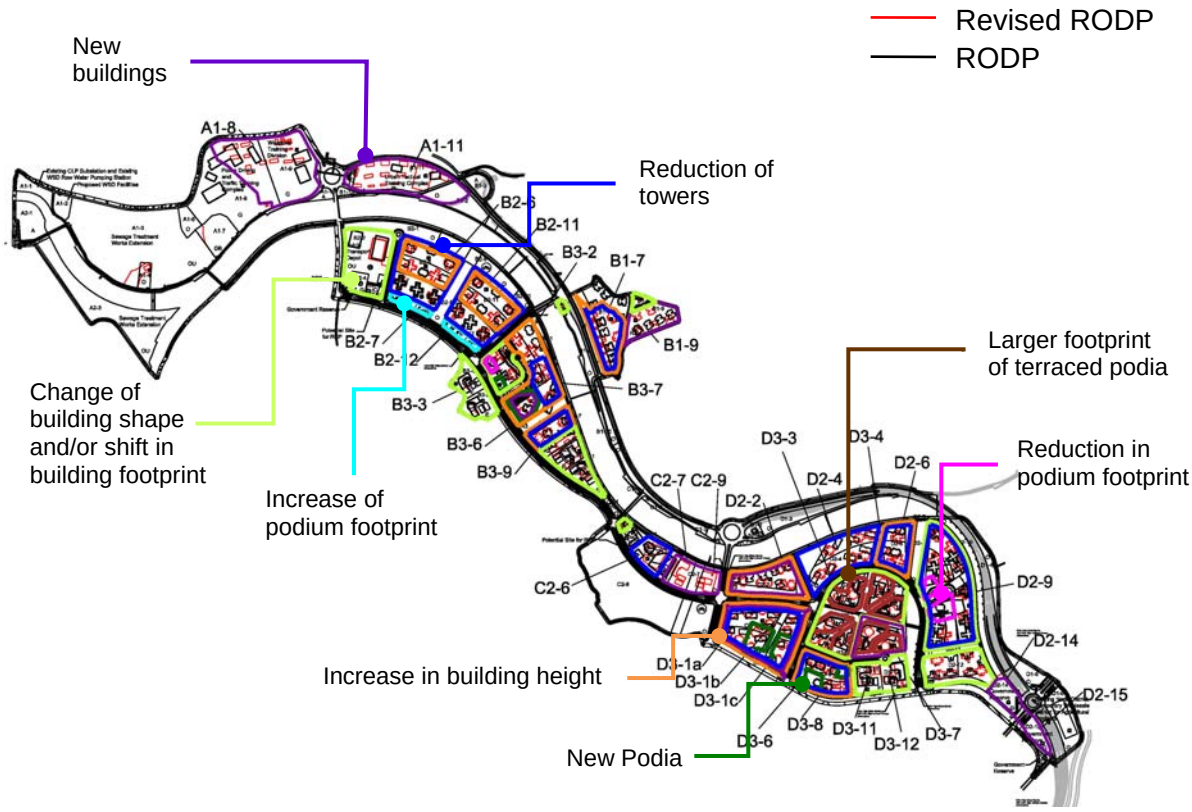

Figure 4 Changes made in RODP of FLN NDA

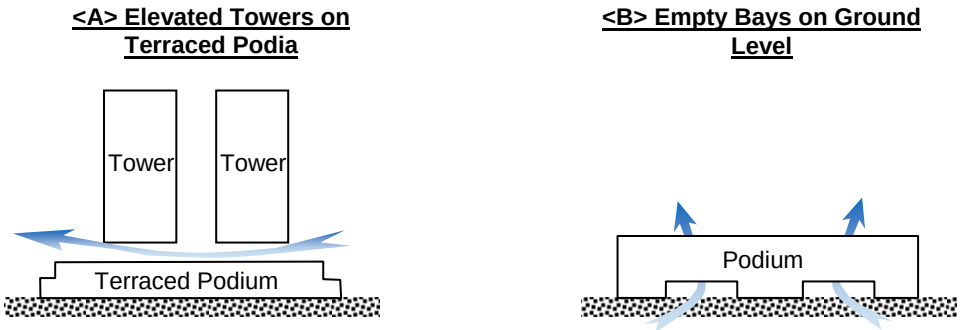

Figure 5 Design Principles of (A) Elevated towers on terraced podia and (B) Empty bays on Ground Level

CONCLUSIONS

This report provides the Expert Evaluation on the revised RODPs of NENT NDAs. Site wind availability studies have been conducted to obtain the wind characteristics of the incoming wind to each NDA. Detailed qualitative assessment on the ventilation performance due to each change made on the RODPs of KTN and FLN NDAs have been conducted. Since all proposed wind corridors and localized air paths suggested in Stage 2 Air Ventilation Assessment are retained in the revised RODPs, insignificant impact on the overall wind performance would be expected.