INTRODUCTION

The purpose of this air ventilation assessment (AVA) is to evaluate the ventilation performance of the proposed Recommended Outline Development Plans (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. The Computational Fluid Dynamics (CFD) AVA is a quantitative assessment that had been carried out to evaluate the proposed developments from air ventilation viewpoint with 16 wind directions to assess the ventilation performance of the RODPs of the Kwu Tung North (KTN), Fanling North (FLN) and Ping Che/Ta Kwu Ling (PC/TKL) NDAs and their surrounding environment in order to achieve the following tasks:

- To assess the characteristics of the wind availability of the site in detail; and
- To analyse the ventilation performance of the RODPs of the three NDAs.

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;
- PC/TKL NDA: Annual prevailing wind – Easterly; Summer prevailing wind– Southerly.

MITIGATION MEASURES ADOPTED

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

OVERALL VENTILATION PERFORMANCE OF THE RODPS

KTN NDA

- The buildings at the easternmost of the NDA are in alignment with the annual prevailing wind in order to maintain wind penetration to the inner sites;
- Terraced podium design is applied to the sites at the town centre of the NDA;
- The long strip type planning alignment from east to west could create localized air path/wind corridor in between the “strips” to maintain a good air penetration from the eastern region;
- The wind corridors are not far apart from each other so that there could be certain degrees of air exchange between the corridors. This could then enhance the overall ventilation performance for the development sites.

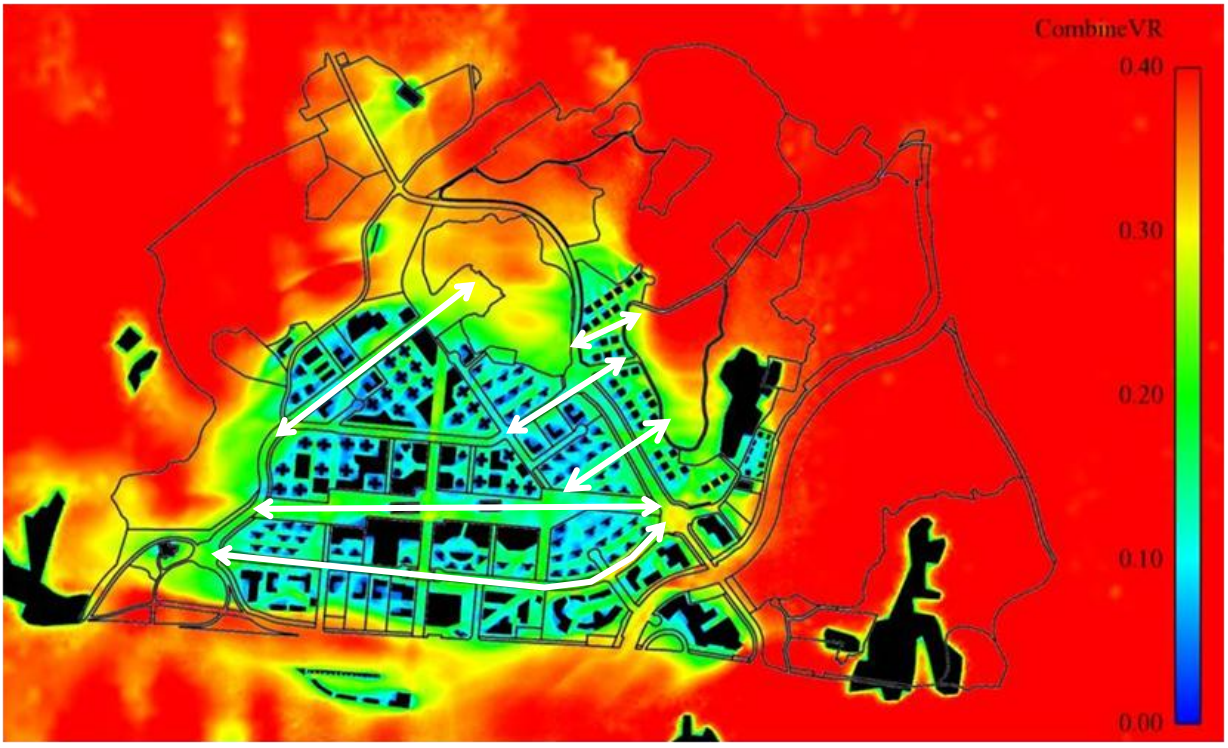

Figure 1 Contour Map of Annual Weighted Average VR for the KTN NDA

FLN NDA

- The annual VR result shows that the road network and some dedicated open space/NBA and setback area provide a good network for ventilation;
- Terraced podium design is applied to the sites in the eastern part of the NDA for facilitating wind penetration;
- No major stagnant zone is identified within the NDA.

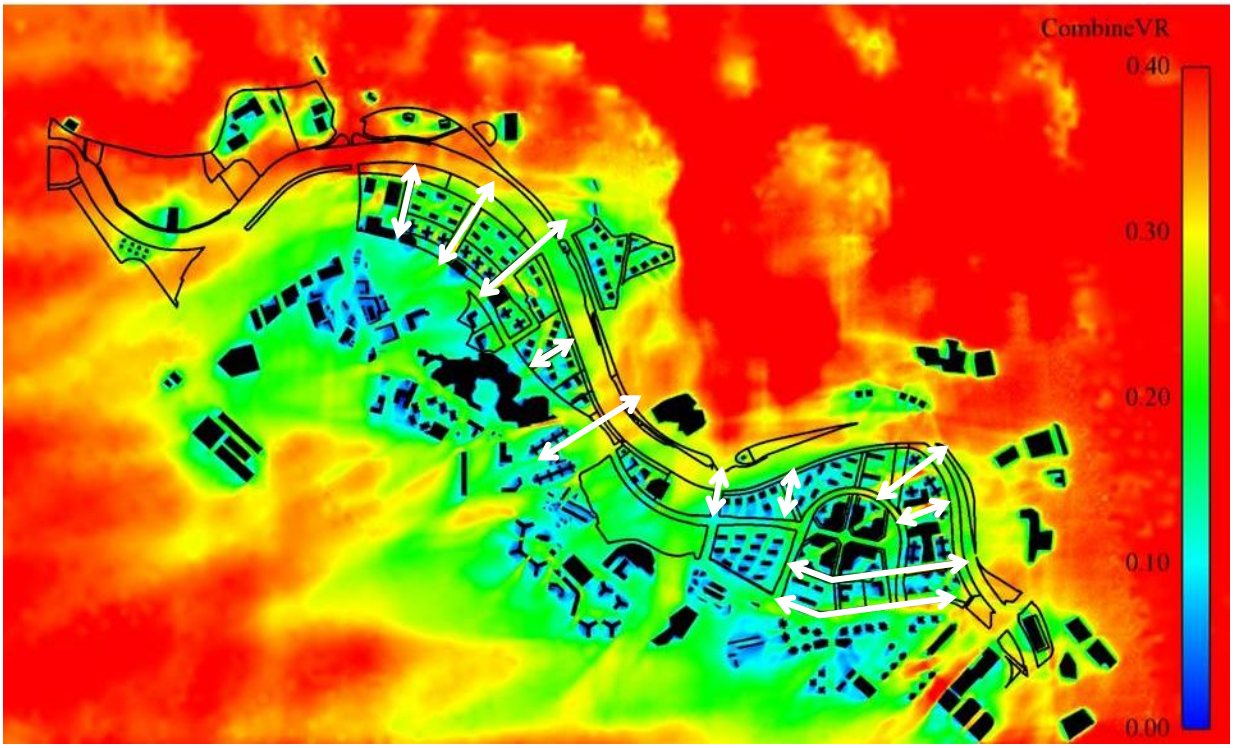

Figure 2 Contour Map of Annual Weighted Average VR for the FLN NDA

PC/TKL NDA

- Due to the limited site wind resources to the NDA, the wind speed is generally lower than the other two NDAs;
- Strip-like building blocks are proposed in the NDA, which basically align with the annual prevailing wind;
- The horseshoe road network arrangement in the east allows wind coming to and from most directions;
- Good alignment of the building blocks leads to the formation of various local air paths which could improve the local ventilation.

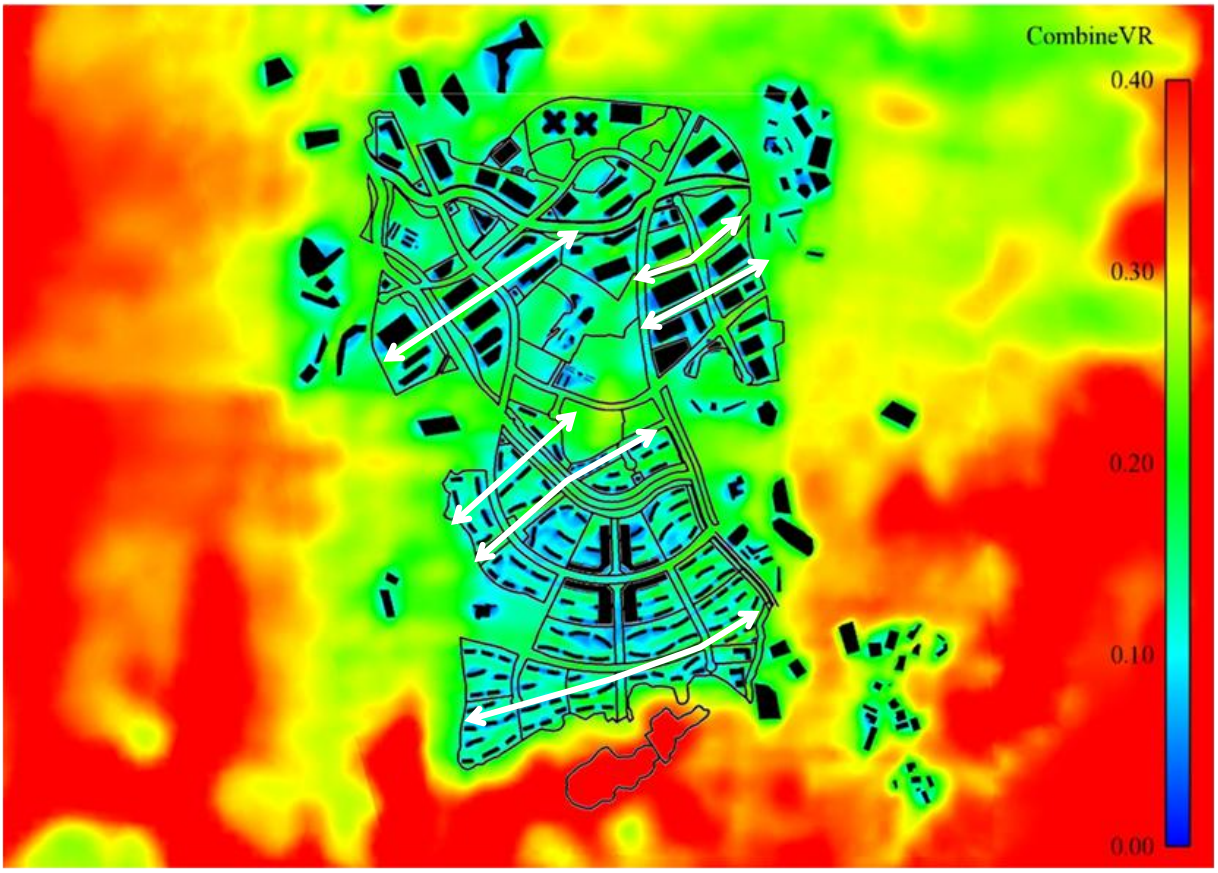

Figure 3 Contour Map of Annual Weighted Average VR for the PC/TKL NDA

CONCLUSIONS

This report provides the CFD AVA of the NENT NDA RODPs. Site wind availability studies have been conducted to obtain the wind characteristics of the incoming wind to each NDA. Detailed quantitative assessment on ventilation performance for each NDA has also been carried out. Through the CFD AVA, localized air paths of each NDA have been identified and examined. Various major wind corridors are proposed for each NDA and their functionalities are assessed. In short, there is no major wind problem anticipated under the current RODPs.