

Appendix 4-K. Justifications on the Determination of the Surface Roughness

With reference to Clause 3.4 of “*Guidelines on Choice of Models and Model parameters in Air Quality Assessment*”, in urban areas such as Tsuen Wan, the urban surface roughness height is 370cm. On the other hand, since a large piece of water surface, Rambler Channel, locates at the western side of the study area (see **Figure A4-K.1**). Refer to “*Summary of Meteorological Observations in Hong Kong*” from 2002 to 2006 by Hong Kong Observatory, prevailing wind direction of 130 degree was recorded in 2006 at Ching Pak House automatic weather station, which is the nearest station to the Project area. In view of the observation that the prevailing wind direction is in parallel direction to the alignment of the structure, it is deemed that the breezes from seashore and inland are not dominating the flow of air pollutants, and so for their adverse effect on the surrounding potential ASRs. Since the project area is adjacent to both urban area and water surface, a weighted surface roughness with respect to prevailing wind direction was evaluated, which was considered to be best describing the actual surface roughness that could be adopted in this assessment. The weighted surface roughness was estimated by considering the ratio of water surface area to urban area portion within the 500 m assessment area for air quality impact assessment.

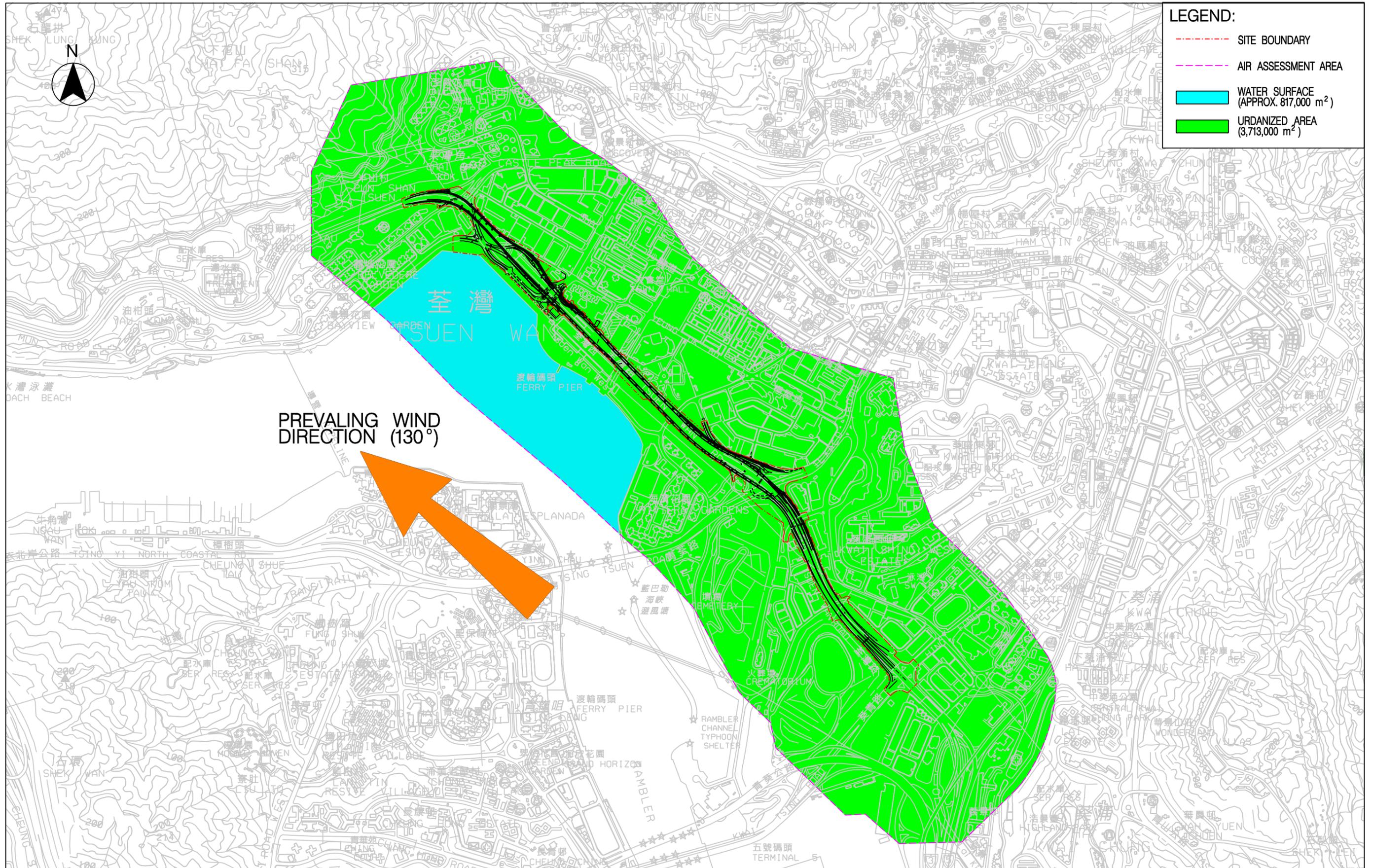
Surface roughness calculation is shown as below,

Surface Roughness height of water surface	= 0.1 cm	(Arya, 1999)
Surface Roughness height of urban surface	= 370 cm	
Percentage of water surface area	= 18.27%	
Percentage of urban area percentage	= 81.73%	
Weighted surface Roughness height in the area	= $0.1 \times 18.27\% + 370 \times 81.73\%$	
	= <u>302 cm</u>	

Hence, Surface Roughness Height of **302 cm** was adopted in the Study.

Reference:

Arya S.P., 1999, “*Air Pollution Meteorology and Dispersion*”, Oxford



ANALYSIS OF SURFACE ROUGHNESS

Drawing No. 圖則編號	FIGURE A4-K.1			
Drawn 設計 TWKW	Checked 核核 ICWR	Approved 批准 ICWR		
Scale 比例 1:15000 (A3)	Date 日期 SEPT,2008	Date 日期 SEPT,2008		
	Status 現況	FINAL		