

#### **Appendix 4.6: Calculation of Dust Suppression Efficiency from Watering**

Dust suppression efficiency is assumed to be 87.5%. Assumptions are stated as below.

With reference to the Equation (5-4) of USEPA's Control of Open Fugitive Dust Sources (EPA-450/3-98-008), dust suppression efficiency can be estimated by:

$$C = 100 - \frac{0.8 \cdot p \cdot d \cdot t}{i}$$

where

C = average control efficiency, in percent

p = potential average hourly daytime evaporation rate in mm/hour

d = average hourly daytime traffic rate in vehicles per hour

i = application intensity in L/m<sup>2</sup>

t = time between applications in hour (t = 1)

The following assumptions are made for assessment purpose:

Assumption 1:

Potential average hourly daytime evaporation rate p can be estimated by  $0.0049 \cdot e$ , where e is the mean annual average evaporation rate (inches). From past measurement data in Hong Kong's Observatory, evaporation recorded at King's Park between 1981 - 2010 is 1227.3 mm<sup>1</sup>. Therefore  $p = 0.0049 \cdot (1227.3 \text{ mm}) = 0.0049 \cdot (48.3188976 \text{ inches}) = 0.2368$ .

Assumption 2:

Estimate average hourly daytime traffic rate in vehicles per hour = 3. (d = 3)

Assumption 3:

Assume watering application intensity as 0.0455 L/m<sup>2</sup>. (i = 0.0455)

Assumption 4:

Assumes watering frequency as once per hour. (t = 1)

With the above assumptions, dust suppression efficiency is calculated as below:

$$C = 100 - 0.8 \cdot (0.2368) \cdot (3) \cdot (1) / 0.0455 = \underline{\underline{87.5\%}}$$

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<sup>1</sup> The Hong Kong's Observatory evaporation recorded at King's Park between 1981 to 2010 is taken from [http://www.weather.gov.hk/cis/normal/1981\\_2010/normal\\_e.htm](http://www.weather.gov.hk/cis/normal/1981_2010/normal_e.htm)