

Appendix 3-3 Chimney Survey and Emission Inventory

Photographic Surveys

Photographic surveys were conducted in September 2013 at elevated levels (top level of Metroplaza) to inspect the chimney location and condition. It also served for the purpose of validating and updating the chimney inventory referenced from Technical Appendices of EIA152/2008 Tsuen Wan Bypass, Widening of Tsuen Wan Road between Tsuen Tsing Interchange and Kwai Tsing Interchange and Associated Junction Improvement Works by CEDD. Existing status of chimneys were checked visually and incorporated necessary updates on the chimney inventory. In order to supplement the Photographic survey, site surveys at the ground level were also conducted in September 2013. Identified chimneys from the surveys are shown in **Photo 1** and **Photo 2**.



Photo 1 – Kingsford Industrial Building Phase 1



Photo 2 – Kwai Tak Industrial Centre

Request of Chimney Information

Letters enclosed with enquiry form were sent (by mail and fax on 23 September 2013) to 32 nos. of industrial buildings in the vicinity. Property management offices/incorporated owners of the buildings were requested to distribute the enquiry forms to the chimney owners/operators in their properties to collect the chimney emission information. Completed forms were asked to return in October 2013. As a result, 11 out of 32 responses were received by fax and email.

Among the 11 responded industrial buildings, no chimney operation was reported in 10 buildings, and 1 building provided emission information. For others did not response, chimneys are considered operating as the information given in previous EIA reports.

Chimney Emission Inventory

After the validation and updating processes, there are totally 5 chimneys identified and the chimney locations are illustrated in **Figure 3-4**.

The fuel consumption rates of the emission inventory has made reference to Table 1.3-1 and Table 1.3-6 Criteria Pollution Emission Factors for Fuel Oil Combustion of USEPA AP-42, with the following assumptions made:-

- (1) Combustion consumes distillate oil as fuel.
- (2) Maximum sulphur content of fuel is 0.5 wt%.
- (3) Load factor during daytime is 41% (assumed as general industrial operation pattern in the area).
- (4) Load factor during night time is 23% (assumed as general industrial operation pattern in the area).

Emissions of SO₂, NO_x, PM10 and PM2.5 can be deduced from the emission factors listed in the abovementioned Table 1.3-1 and Table 1.3-6. The calculation is demonstrated below.

Emission Rate = Emission Factor x Fuel Consumption Rate

Emission Factor of SO₂ = 142S lb SO₂/10³ gal fuel consumed, where S = sulphur content (%) in fuel

Emission Factor of NO_x = 20 lb NO_x/10³ gal fuel consumed

Emission Factor of PM10 = 1 lb RSP/10³ gal fuel consumed

Emission Factor of PM2.5 = 0.25 lb RSP/10³ gal fuel consumed

Therefore,

Emission Rate of SO₂ : Emission Rate of NO_x : Emission Rate of PM10 : Emission Rate of PM2.5

= 71 : 20 : 1 : 0.25

Then,

Daytime Emission Rate = Emission Factor x Fuel Consumption Rate x 41%

Night time Emission Rate = Emission Factor x Fuel Consumption Rate x 23%

The chimney emission inventory for the operational air quality impact assessment is detailed in table below.

Chimney ID	Subject Premises	X-Coordinate	Y-Coordinate	Base Elevation (m)	Stack Height (m)	Stack Temp. (K)	Stack Exit Velocity (m/s)	Stack Diameter (m)	SO2 Emission Rate (g/s)	NOx Emission Rate (g/s)	PM10 Emission Rate (g/s)	PM2.5 Emission Rate (g/s)
KT-01	Kingsford Industrial Building Phase I	830653	824316	7.8	117.7	322	0.88	0.30	1.05	0.2958	0.01479	0.00370
KT-02	Kingsford Industrial Building Phase I	830645	824300	7.8	117.7	322	0.88	0.30	1.05	0.2958	0.01479	0.00370
KT-03	Kwai Tak Industrial Centre	830737	823836	5.0	54.8	322	0.88	0.20	1.05	0.2958	0.01479	0.00370
KT-04	Kwai Tak Industrial Centre	830726	823815	5.0	54.8	322	0.88	0.20	1.05	0.2958	0.01479	0.00370
KT-05	Kwai Tak Industrial Centre	830745	823859	5.0	54.8	322	0.88	0.20	1.05	0.2958	0.01479	0.00370

Notes:

- (1) Flue gas temperature is referenced from EIA 152/2008;
- (2) Exit velocity is referenced from EIA 152/2008;
- (3) Pollutant emission rate is referenced from EIA 152/2008; and
- (4) Stack height and diameter are referenced from EIA 152/2008.