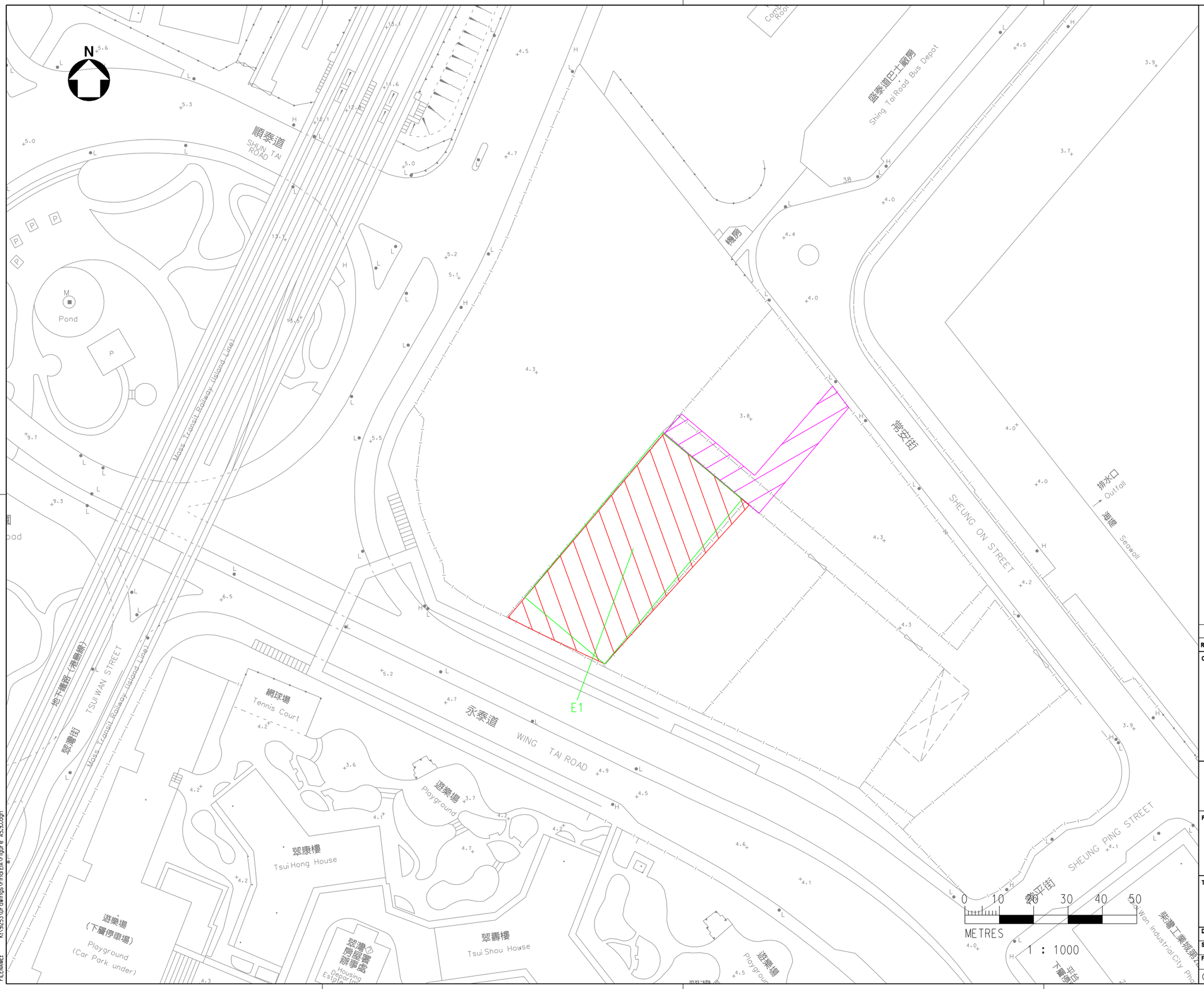

LEGEND:

- NON EXCLUSIVE RIGHT OF WAY
- SITE BOUNDARY
- EMISSION SOURCES E1

Rev.	Issue State	Amendment	By	Chk.	App.	Date

Client

機電工程署
EMSD

建築署
Architectural Services Department

Meinhardt Infrastructure and Environment Limited
邁進基建環保工程顧問有限公司

Project: Quotation No. ASD/PSB/PM1/PM14/01/11
Consultancy Services for Application for Environmental Permit under the Environmental Impact Assessment Ordinance for Construction of EMSD Hong Kong Workshop at Sheung On Street, Chai Wan

Title: LOCATIONS OF THE Emission SOURCES OF THE EMSD Workshop AT CHAI WAN

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First Issued	Figure No.: A5.9.1	Rev.: -

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Appendix 5.9
Calculation of Emission Rates of NOx of the Project

Event	Average Time, s	Travel Distance, m	NOx Rate (Motocycle)	NOx Rate (Private Vehicle)	NOx Rate (Ambulance / Van)	NOx Rate (Composite)	Velocity, km/hr	Aging Factor	No. of Motocycles	No. of Private Vehicles	No. of Ambulance / Van	NOx
			EURO 3, g/hr/veh	EURO 3, g/hr/veh	EURO 3, g/hr/veh	EURO 3, g/hr/veh						g/s
Idling	900	--	--	--	27.5	--	0	2.5	0	0	3	0.014323
Travelling	--	140	9	9	69.8	33.3	20	2.5	1	2	2	0.000810

Notes:
(1) According to the reference - "*Road Tunnels: Vehicle Emissions and Air Demand for Ventilation*", there is no emission factor for the Motocycle. Therefore, the emission factor of Passenger Cars in Table II.3-31 of the reference has been adopted.
(2) According to the reference - "*Road Tunnels: Vehcile Emissions and Air Demand for Ventilation*", the emission factor of Passenger Cars in Table II.3-31 of the reference has been adopted.
(3) According to the reference - "*Road Tunnels: Vehcile Emissions and Air Demand for Ventilation*", there is no emission factor for ambulance / van. Therefore, the emission factor of Heavy Duty Vehicles in Table II.3-49 has been adopted.
(4) All the idling vehicles with started engines are assumed as ambulance / van for the worst case scenario because the emission factor of ambulance / van is the highest.

Source ID	X-Coodinate	Y-Coordinate	Elevation	X-distance (m)	Y-distance (m)	Angle (with +y-axis)	NOx
							g/s/m^2
E1_Idling	842831.8	814480.0	4.8	30.24	62.43	39.87	7.58676E-06
E1_Travelling	842831.8	814480.0	4.8	30.24	62.43	39.87	4.28978E-07

Calculation of Idling Emission Rate

Idling Emission Factor = NOx Rate (Ambulance / Van) x (900/3600) x Aging Factor / 3600 x No. of Ambulance / Van
Idling Emission Factor = 27.5 x (900/3600) x 2.5 / 3600 x 3
Idling Emission Factor = 0.014323 g/s

Calculation of NOx Rate (Composite)

NOx Rate (Composite) = NOx Rate (Motocycle) x (No. of Motocycle / Total No. of Vehicles) + NOx Rate (Private Vehicle) x (No. of Private Vehicle / Total No. of Vehicles) + NOx Rate (Ambulance / Van) x (No. of Ambulance / Van / Total No. of Vehicles)
NOx Rate (Composite) = 9 x (1 / 5) + 9 x (2 / 5) + 69.8 x (2 / 5)
NOx Rate (Composite) = 33.3 g/ hr/veh

Calculation of Travelling Emission Rate

Travelling Emission Factor = NOx Rate (Composite) x Aging Factor / Velocity x (Travel Distance / 1000) x (No. of Ambulance / Motocycle + No. of Private Vehicles / Van + No. of Ambulance / Van) / 3600
Travelling Emission Factor = 33.3 x 2.5 / 20 x (140 / 1000) x (1 + 2 + 2) / 3600
Travelling Emission Factor = 0.000810 g/s

Calculation of E1_Idling

E1_Idling = Idling Emission Rate / Area of E1_Idling
E1_Idling = 0.014323 / (30.24 x 62.43)
E1_Idling = 7.58676E-06 g/s/m^2

Calculation of E1_Travelling

E1_Travelling = Travelling Emission Rate / Area of E1_Travelling
E1_Travelling = 0.000810 / (30.24 x 62.43)
E1_Travelling = 4.28978E-07 g/s/m^2

Appendix 5.9
Calculation of Emission Rates of RSP of the Project

Event	Average Time, s	Travel Distance, m	Turbidity Rate (Motocycle)	Turbidity Rate (Private Vehicle)	Turbidity Rate (Ambulance / Van)	RSP Rate (Composite)	Velocity, km/hr	Conversion Factor	Aging Factor	No. of Motocycles	No. of Private Vehicles	No. of Ambulance / Van	RSP
			EURO 3, m^2/hr/veh	EURO 3, m^2/hr/veh	EURO 3, m^2/hr/veh	EURO 3, g/hr/veh		1g = 4.7 m^2					g/s
Idling	900	--	--	--	5.6	--	0	4.7	2.5	0	0	3	0.000621
Travelling	--	140	2.57	2.57	8.2	1.0	20	4.7	2.5	1	2	2	0.000025

Notes:
(1) According to the reference - "*Road Tunnels: Vehicle Emissions and Air Demand for Ventilation*", there is no emission factor for the Motocycle. Therefore, the emission factor of Passenger Cars in Table II.3-36 of the reference has been adopted.
(2) According to the reference - "*Road Tunnels: Vehicle Emissions and Air Demand for Ventilation*", the emission factor of Passenger Cars in Table II.3-36 of the reference has been adopted.
(3) According to the reference - "*Road Tunnels: Vehicle Emissions and Air Demand for Ventilation*", there is no emission factor for ambulance / van. Therefore, the emission factor of Heavy Duty Vehicles in Table II.3-55 has been adopted.
(4) All the idling vehicles with started engines are assumed as ambulance / van for the worst case scenario because the emission factor of ambulance / van is the highest.

Source ID	X-Coodinate	Y-Coordinate	Elevation	X-distance (m)	Y-distance (m)	Angle (with +y-axis)	RSP g/s/m^2
E1_Idling	842831.8	814480.0	4.8	30.24	62.43	39.87	3.28711E-07
E1_Travelling	842831.8	814480.0	4.8	30.24	62.43	39.87	1.32087E-08

Calculation of Idling Emission Rate

Idling Emission Factor = Turbidity Rate (Ambulance / Van) / Conversion Factor x (900/3600) x Aging Factor / 3600 x No. of Ambulance / Van
Idling Emission Factor = 5.6 / 4.7 x (900/3600) x 2.5 / 3600 x 3
Idling Emission Factor = 0.000621 g/s

Calculation of RSP Rate (Composite)

RSP Rate (Composite) = RSP Rate (Motocycle) x (No. of Motocycle / Total No. of Vehicles / Conversion Factor) + RSP Rate (Private Vehicle) x (No. of Private Vehicle / Total No. of Vehicles / Conversion Factor) + RSP Rate (Ambulance / Van) x (No. of Ambulance / Van / Total No. of Vehicles / Conversion Factor)
RSP Rate (Composite) = 2.57 x (1 / 5 / 4.7) + 2.57 x (2 / 5 / 4.7) + 8.2 x (2 / 5 / 4.7)
RSP Rate (Composite) = 1.0 g/ hr/veh

Calculation of Travelling Emission Rate

Travelling Emission Factor = RSP Rate (Composite) x Aging Factor / Velocity x (Travel Distance / 1000) x (No. of Ambulance / Motocycle + No. of Private Vehicles / Van + No. of Ambulance / Van) / 3600
Travelling Emission Factor = 1.0 x 2.5 / 20 x (140 / 1000) x (1 + 2 + 2) / 3600
Travelling Emission Factor = 0.000025 g/s

Calculation of E1_Idling

E1_Idling = Idling Emission Rate / Area of E1_Idling
E1_Idling = 0.000621 / (30.24 x 62.43)
E1_Idling = 3.28711E-07 g/s/m^2

Calculation of E1_Travelling

E1_Travelling = Travelling Emission Rate / Area of E1_Travelling
E1_Travelling = 0.000025 / (30.24 x 62.43)
E1_Travelling = 1.32087E-08 g/s/m^2