Appendix 3.5

Calculation of Portal Emission and Ventilation Building

Appendix 3.5 Calculation of Portal Emission and Emission of Ventilation Building

Scenario: Year 2031 - Year 2039

Portal Name	Description	Percentage from Portal [3]	Length (m)	Portal ID	Source ID	No. of Volume Source	Hour	Q [1]	Total E.F. (portal + VB) [2]				Total emission rate (portal + VB) [4]				Emission rate (from portal within 500m Study Area)				Emission rate (from Vent Bldg.)				Daily Emission Rate / Diurnal Profile (from 1st 50m for each portal source)				Daily Emission Rate / Diurnal Profile (from 2nd 50m for each portal source)				Daily Emission Rate / Diurnal Profile (from Vent Bldg.)			
								(veh/hr)	NO E.F. (g/mile-veh)	NO2 E.F. (g/mile-veh)	FSP E.F. (g/mile-veh)	RSP E.F. (g/mile-veh)	NO (g/s)	NO2 (g/s)	FSP (g/s)	RSP (g/s)	NO (g/s)	NO2 (g/s)	FSP (g/s)	RSP (g/s)	NO (g/s)	NO2 (g/s)	FSP (g/s)	RSP (g/s)	NO (g/s) / %	NO2 (g/s) / %	FSP (g/s) / %	RSP (g/s) / %	NO (g/s) / %	NO2 (g/s) / %	FSP (g/s) / %	RSP (g/s) / %	NO (g/s) / %	NO2 (g/s) / %	FSP (g/s) / %	RSP (g/s) / %
A	Tung Mun Western Bypass	10%	4000	A1-A8	502	14	1	136	0.1872	0.0625	0.0103	0.0112	1.752E-02	5.846E-03	9.665E-04	1.049E-03	1.752E-03	5.846E-04	9.665E-05	1.049E-04	1.577E-02	5.261E-03	8.698E-04	9.443E-04	1.3%	1.2%	1.3%	1.3%	1.3%	1.2%	1.3%	1.3%	1.3%	1.2%	1.3%	1.3%
							2	89	0.1875	0.0625	0.0103	0.0112	1.150E-02	3.834E-03	6.332E-04	6.874E-04	1.150E-03	3.834E-04	6.332E-05	6.874E-05	1.035E-02	3.450E-03	5.699E-04	6.187E-04	0.9%	0.8%	0.9%	0.9%	0.9%	0.8%	0.9%	0.9%	0.9%	0.8%	0.9%	0.9%
							3	65	0.1878	0.0626	0.0103	0.0112	8.487E-03	2.829E-03	4.666E-04	5.065E-04	8.487E-04	2.829E-04	4.666E-05	5.065E-05	7.638E-03	2.546E-03	4.199E-04	4.559E-04	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%
							4	49	0.3367	0.1285	0.0188	0.0204	1.140E-02	4.351E-03	6.351E-04	6.901E-04	1.140E-03	4.351E-04	6.351E-05	6.901E-05	1.026E-02	3.916E-03	5.716E-04	6.211E-04	0.8%	0.9%	0.9%	0.9%	0.8%	0.9%	0.9%	0.9%	0.8%	0.9%	0.9%	0.9%
							5	26	0.3832	0.1327	0.0194	0.0211	6.940E-03	2.404E-03	3.513E-04	3.818E-04	6.940E-04	2.404E-04	3.513E-05	3.818E-05	6.246E-03	2.164E-03	3.162E-04	3.436E-04	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%
							6	37	0.3838	0.1329	0.0194	0.0211	9.731E-03	3.370E-03	4.919E-04	5.345E-04	9.731E-04	3.370E-04	4.919E-05	5.345E-05	8.758E-03	3.033E-03	4.427E-04	4.810E-04	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%
							7	87	0.3840	0.1330	0.0194	0.0211	2.295E-02	7.947E-03	1.159E-03	1.260E-03	2.295E-03	7.947E-04	1.159E-04	1.260E-04	2.065E-02	7.152E-03	1.043E-03	1.134E-03	1.7%	1.6%	1.6%	1.6%	1.7%	1.6%	1.6%	1.6%	1.7%	1.6%	1.6%	1.6%
							8	239	0.3834	0.1332	0.0194	0.0211	6.319E-02	2.196E-02	3.203E-03	3.480E-03	6.319E-03	2.196E-03	3.203E-04	3.480E-04	5.688E-02	1.976E-02	2.882E-03	3.132E-03	4.7%	4.5%	4.3%	4.3%	4.7%	4.5%	4.3%	4.3%	4.7%	4.5%	4.3%	4.3%
							9	306	0.4797	0.1645	0.0202	0.0219	1.015E-01	3.480E-02	4.266E-03	4.634E-03	1.015E-02	3.480E-03	4.266E-04	4.634E-04	9.134E-02	3.132E-02	3.839E-03	4.171E-03	7.5%	7.1%	5.8%	5.8%	7.5%	7.1%	5.8%	5.8%	7.5%	7.1%	5.8%	5.8%
							10	273	0.3808	0.1340	0.0199	0.0217	7.166E-02	2.523E-02	3.753E-03	4.078E-03	7.166E-03	2.523E-03	3.753E-04	4.078E-04	6.449E-02	2.270E-02	3.378E-03	3.670E-03	5.3%	5.2%	5.1%	5.1%	5.3%	5.2%	5.1%	5.1%	5.3%	5.2%	5.1%	5.1%
							11	263	0.3841	0.1379	0.0209	0.0227	6.967E-02	2.502E-02	3.792E-03	4.121E-03	6.967E-03	2.502E-03	3.792E-04	4.121E-04	6.270E-02	2.252E-02	3.413E-03	3.709E-03	5.2%	5.1%	5.1%	5.1%	5.2%	5.1%	5.1%	5.1%	5.2%	5.1%	5.1%	5.1%
							12	249	0.3838	0.1378	0.0209	0.0227	6.603E-02	2.371E-02	3.593E-03	3.904E-03	6.603E-03	2.371E-03	3.593E-04	3.904E-04	5.942E-02	2.134E-02	3.233E-03	3.514E-03	4.9%	4.9%	4.9%	4.9%	4.9%	4.9%	4.9%	4.9%	4.9%	4.9%	4.9%	4.9%
							13	216	0.3744	0.1317	0.0199	0.0217	5.595E-02	1.968E-02	2.979E-03	3.237E-03	5.595E-03	1.968E-03	2.979E-04	3.237E-04	5.035E-02	1.771E-02	2.681E-03	2.914E-03	4.2%	4.0%	4.0%	4.0%	4.2%	4.0%	4.0%	4.0%	4.2%	4.0%	4.0%	4.0%
							14	405	0.3267	0.1252	0.0196	0.0212	9.143E-02	3.505E-02	5.472E-03	5.946E-03	9.143E-03	3.505E-03	5.472E-04	5.946E-04	8.229E-02	3.154E-02	4.925E-03	5.351E-03	6.8%	7.2%	7.4%	7.4%	6.8%	7.2%	7.4%	7.4%	6.8%	7.2%	7.4%	7.4%
							15	432	0.3187	0.1217	0.0191	0.0208	9.516E-02	3.634E-02	5.702E-03	6.196E-03	9.516E-03	3.634E-03	5.702E-04	6.196E-04	8.565E-02	3.271E-02	5.132E-03	5.576E-03	7.1%	7.4%	7.7%	7.7%	7.1%	7.4%	7.7%	7.7%	7.1%	7.4%	7.7%	7.7%
							16	455	0.3184	0.1214	0.0190	0.0206	9.994E-02	3.811E-02	5.954E-03	6.469E-03	9.994E-03	3.811E-03	5.954E-04	6.469E-04	8.995E-02	3.429E-02	5.359E-03	5.822E-03	7.4%	7.8%	8.0%	8.0%	7.4%	7.8%	8.0%	8.0%	7.4%	7.8%	8.0%	8.0%
							17	464	0.3307	0.1265	0.0193	0.0209	1.060E-01	4.055E-02	6.175E-03	6.710E-03	1.060E-02	4.055E-03	6.175E-04	6.710E-04	9.538E-02	3.649E-02	5.558E-03	6.039E-03	7.9%	8.3%	8.3%	8.3%	7.9%	8.3%	8.3%	8.3%	7.9%	8.3%	8.3%	8.3%
							18	492	0.2982	0.1120	0.0173	0.0188	1.012E-01	3.801E-02	5.862E-03	6.369E-03	1.012E-02	3.801E-03	5.862E-04	6.369E-04	9.110E-02	3.421E-02	5.276E-03	5.732E-03	7.5%	7.8%	7.9%	7.9%	7.5%	7.8%	7.9%	7.9%	7.5%	7.8%	7.9%	7.9%
							19	545	0.2694	0.0978	0.0147	0.0159	1.014E-01	3.680E-02	5.514E-03	5.988E-03	1.014E-02	3.680E-03	5.514E-04	5.988E-04	9.124E-02	3.312E-02	4.962E-03	5.389E-03	7.5%	7.5%	7.4%	7.4%	7.5%	7.5%	7.4%	7.4%	7.5%	7.5%	7.4%	7.4%
							20	448	0.2432	0.0871	0.0134	0.0145	7.513E-02	2.692E-02	4.135E-03	4.490E-03	7.513E-03	2.692E-03	4.135E-04	4.490E-04	6.762E-02	2.423E-02	3.721E-03	4.041E-03	5.6%	5.5%	5.6%	5.6%	5.6%	5.5%	5.6%	5.6%	5.6%	5.5%	5.6%	5.6%
							21	341	0.2331	0.0828	0.0129	0.0140	5.480E-02	1.946E-02	3.025E-03	3.285E-03	5.480E-03	1.946E-03	3.025E-04	3.285E-04	4.932E-02	1.751E-02	2.723E-03	2.957E-03	4.1%	4.0%	4.1%	4.1%	4.1%	4.0%	4.1%	4.1%	4.1%	4.0%	4.1%	4.1%
							22	293	0.2237	0.0787	0.0124	0.0135	4.526E-02	1.592E-02	2.514E-03	2.730E-03	4.526E-03	1.592E-03	2.514E-04	2.730E-04	4.073E-02	1.433E-02	2.262E-03	2.457E-03	3.4%	3.3%	3.4%	3.4%	3.4%	3.3%	3.4%	3.4%	3.4%	3.3%	3.4%	3.4%
							23	262	0.1869	0.0624	0.0103	0.0112	3.377E-02	1.127E-02	1.866E-03	2.026E-03	3.377E-03	1.127E-03	1.866E-04	2.026E-04	3.040E-02	1.014E-02	1.680E-03	1.823E-03	2.5%	2.3%	2.5%	2.5%	2.5%	2.3%	2.5%	2.5%	2.5%	2.3%	2.5%	2.5%
							24	210	0.1870	0.0624	0.0103	0.0112	2.716E-02	9.064E-03	1.500E-03	1.628E-03	2.716E-03	9.064E-04	1.500E-04	1.628E-04	2.445E-02	8.158E-03	1.350E-03	1.465E-03	2.0%	1.9%	2.0%	2.0%	2.0%	1.9%	2.0%	2.0%	2.0%	1.9%	2.0%	2.0%
							Daily	-	-	-	-	-	1.348E+00	4.885E-01	7.401E-02	8.040E-02	1.348E-01	4.885E-02	7.401E-03	8.040E-03	1.213E+00	4.396E-01	6.661E-02	7.236E-02	1.284E-02	4.652E-03	7.048E-04	7.657E-04	6.418E-03	2.326E-03	3.524E-04	3.829E-04	1.213E+00	4.396E-01	6.661E-02	7.236E-02

Remarks:

1. Traffic data is extracted from the Traffic forecast of Year 2036 presented in Appendix 3.3.
2. Composite emission factor is extracted from Appendix 3.4.
3. No update of TMWB is available at this stage. 10% emission from the portal and 90% emission from the ventilation building is assumed with reference to Tuen Mun Chek Lap Kok Link EIA.
4. Emission rate is determined by Q x EF x Length / (1609.3 x 3600) where the factor of 1609.3 is the conversion factor for mile to meter (1 mile = 1609.3 meter) and the factor of 3600 is the conversion factor for hour to second (1 hr = 60 min x 60 sec)

Appendix 3.5 Calculation of Portal Emission and Emission of Ventilation Building

Scenario: Year 2031 - Year 2039

Road ID	Height (m)	Width (m)	Base Height (m)	Source ID	X	Y	Daily Emission Factor (QS) (g/s) NO	NO2	FSP	RSP	HS	SY	SZ	total NO	total NO2	total FSP	total RSP
A	5	8.3	35	A1	816234.5	833053.2	1.284E-02	4.652E-03	7.048E-04	7.657E-04	2.50	3.86	2.33				
	"	"	"	A2	816242.5	833051.1	1.284E-02	4.652E-03	7.048E-04	7.657E-04	2.50	3.86	2.33				
	"	"	"	A3	816250.6	833049.0	1.284E-02	4.652E-03	7.048E-04	7.657E-04	2.50	3.86	2.33				
	"	"	"	A4	816258.6	833047.0	1.284E-02	4.652E-03	7.048E-04	7.657E-04	2.50	3.86	2.33				
	"	"	"	A5	816266.7	833044.9	1.284E-02	4.652E-03	7.048E-04	7.657E-04	2.50	3.86	2.33				
	"	"	"	A6	816274.7	833042.8	1.284E-02	4.652E-03	7.048E-04	7.657E-04	2.50	3.86	2.33				
	"	"	"	A7	816282.7	833040.7	1.284E-02	4.652E-03	7.048E-04	7.657E-04	2.50	3.86	2.33				
	"	"	"	A8	816290.8	833038.6	6.418E-03	2.326E-03	3.524E-04	3.829E-04	2.50	3.86	2.33				
	"	"	"	A9	816298.8	833036.6	6.418E-03	2.326E-03	3.524E-04	3.829E-04	2.50	3.86	2.33				
	"	"	"	A10	816306.8	833034.5	6.418E-03	2.326E-03	3.524E-04	3.829E-04	2.50	3.86	2.33				
	"	"	"	A11	816314.9	833032.4	6.418E-03	2.326E-03	3.524E-04	3.829E-04	2.50	3.86	2.33				
	"	"	"	A12	816322.9	833030.3	6.418E-03	2.326E-03	3.524E-04	3.829E-04	2.50	3.86	2.33				
	"	"	"	A13	816330.9	833028.2	6.418E-03	2.326E-03	3.524E-04	3.829E-04	2.50	3.86	2.33				
	"	"	"	A14	816339.0	833026.1	6.418E-03	2.326E-03	3.524E-04	3.829E-04	2.50	3.86	2.33	1.348E-01	4.885E-02	7.401E-03	8.040E-03

Ventilation	Source ID	X	Y	Base Height (m)	Daily Emission Factor (QS) (g/s) NO	NO2	FSP	RSP	Height (m) [1]	Release Height (HS) (m) [1]	Exit Temperature (TS) (K) [1]	Exit Velocity (VS) (m/s) [1]	Stack Diameter (DS) (m) [1]
Ventilation Building Stack 1 (90% from VB)	V1	816230.5	833054.2	49.50	1.21297055	0.43961842	0.06660742	0.07236193	7.00	56.50	303.00	4.00	8.97

Remark:

1. Stack parameters of TMWB are adopted from Tuen Mun Chek Lap Kok Link EIA, including stack height of 7m, exhaust volume of 252.9 m3/s at exit velocity of 4 m/s with stack diameter 8.97 m, expected temperature is 5C higher than ambient temperature.

Appendix 3.5 Calculation of Portal Emission and Emission of Ventilation Building

Scenario: Year 2031 - Year 2039

Hourly Profile for Portals

Hour	Link 502 (Eastbound)			
	NO	NO2	FSP	RSP
Hour 1	0.0130	0.0120	0.0131	0.0130
Hour 2	0.0085	0.0078	0.0086	0.0085
Hour 3	0.0063	0.0058	0.0063	0.0063
Hour 4	0.0085	0.0089	0.0086	0.0086
Hour 5	0.0051	0.0049	0.0047	0.0047
Hour 6	0.0072	0.0069	0.0066	0.0066
Hour 7	0.0170	0.0163	0.0157	0.0157
Hour 8	0.0469	0.0449	0.0433	0.0433
Hour 9	0.0753	0.0712	0.0576	0.0576
Hour 10	0.0532	0.0516	0.0507	0.0507
Hour 11	0.0517	0.0512	0.0512	0.0513
Hour 12	0.0490	0.0485	0.0485	0.0486
Hour 13	0.0415	0.0403	0.0403	0.0403
Hour 14	0.0678	0.0718	0.0739	0.0740
Hour 15	0.0706	0.0744	0.0770	0.0771
Hour 16	0.0742	0.0780	0.0805	0.0805
Hour 17	0.0786	0.0830	0.0834	0.0835
Hour 18	0.0751	0.0778	0.0792	0.0792
Hour 19	0.0752	0.0753	0.0745	0.0745
Hour 20	0.0557	0.0551	0.0559	0.0558
Hour 21	0.0407	0.0398	0.0409	0.0409
Hour 22	0.0336	0.0326	0.0340	0.0340
Hour 23	0.0251	0.0231	0.0252	0.0252
Hour 24	0.0202	0.0186	0.0203	0.0202

Appendix 3.5 Calculation of Portal Emission and Emission of Ventilation Building

Scenario: Year 2031 - Year 2039

Hourly Profile for Ventilation Buildings

Hour	V1			
	NO	NO2	FSP	RSP
Hour 1	0.0130	0.0120	0.0131	0.0130
Hour 2	0.0085	0.0078	0.0086	0.0085
Hour 3	0.0063	0.0058	0.0063	0.0063
Hour 4	0.0085	0.0089	0.0086	0.0086
Hour 5	0.0051	0.0049	0.0047	0.0047
Hour 6	0.0072	0.0069	0.0066	0.0066
Hour 7	0.0170	0.0163	0.0157	0.0157
Hour 8	0.0469	0.0449	0.0433	0.0433
Hour 9	0.0753	0.0712	0.0576	0.0576
Hour 10	0.0532	0.0516	0.0507	0.0507
Hour 11	0.0517	0.0512	0.0512	0.0513
Hour 12	0.0490	0.0485	0.0485	0.0486
Hour 13	0.0415	0.0403	0.0403	0.0403
Hour 14	0.0678	0.0718	0.0739	0.0740
Hour 15	0.0706	0.0744	0.0770	0.0771
Hour 16	0.0742	0.0780	0.0805	0.0805
Hour 17	0.0786	0.0830	0.0834	0.0835
Hour 18	0.0751	0.0778	0.0792	0.0792
Hour 19	0.0752	0.0753	0.0745	0.0745
Hour 20	0.0557	0.0551	0.0559	0.0558
Hour 21	0.0407	0.0398	0.0409	0.0409
Hour 22	0.0336	0.0326	0.0340	0.0340
Hour 23	0.0251	0.0231	0.0252	0.0252
Hour 24	0.0202	0.0186	0.0203	0.0202

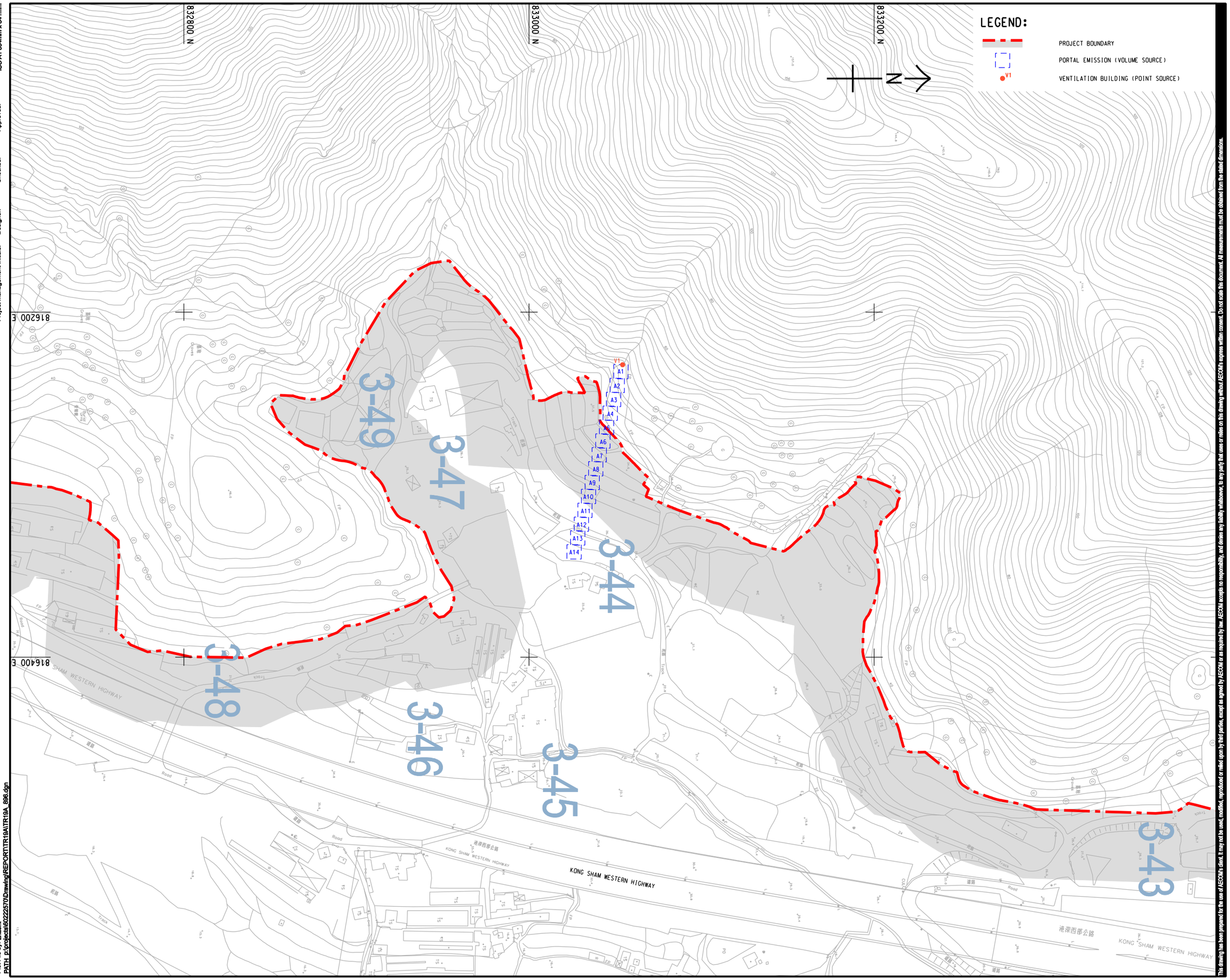
ISO A1 594mm x 841mm

Approved:

Checked:

Designer:

Project Management Initials:



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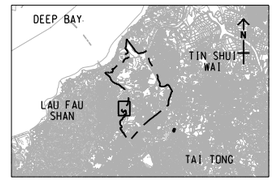

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SHEET TITLE
圖紙名稱

LOCATIONS OF PORTAL EMISSION AND VENTILATION BUILDING

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