

## Appendix 4.11

Detailed Calculations of Idling  
Emission  
(for Operational Air Quality  
Assessment)

Example Calculations of Total Idling Emission at Kiosks / Loading Bays / Unloading Bays for Year 2022 (during Peak Hour) - for Operational Air Quality Assessment

NOx						Kiosk		Unloading Bay		Loading Bay			
Bound	Vehicle Type	Total Peak Traffic Flow (veh/hr)	Veh Type (EmFAC)	% Vehicle	Traffic Flow	Idling Emission Factor	Processing Time	Emission Rate	Processing Time	Emission Rate	Processing Time	Emission Rate	
					(veh/hr)	(g/veh/hr)	(min/veh)	(g/hr)	(min/veh)	(g/hr)	(min/veh)	(g/hr)	
In (SB)	Car	44	PC	100%	44	12.000	1.6	14.1	-	-	-	-	
	Coach	17	NFB (6)	41%	7	53.471	0.1	0.6	0.9	5.6	4.5	27.9	
			NFB (7)	29%	5	55.303	0.1	0.5	0.9	4.1	4.5	20.7	
			NFB (8)	30%	5	53.008	0.1	0.4	0.9	4.0	4.5	20.1	
	<b>sub-total</b>					<b>17</b>	-	-	<b>1.5</b>	-	<b>13.7</b>	-	<b>68.7</b>
	GV	183	LGV (4)	5%	9	7.375	1.1	1.2	-	-	-	-	
			LGV (6)	3%	6	8.715	1.1	0.9	-	-	-	-	
			HGV (7)	19%	34	50.232	1.1	31.6	-	-	-	-	
			HGV (8)	73%	134	68.356	1.1	167.9	-	-	-	-	
	<b>sub-total</b>					<b>183</b>	-	-	<b>201.7</b>	-	-	-	-
Out (NB)	Car	48	PC		48	12.000	1.7	16.3	-	-	-	-	
	Coach	17	NFB (6)	41%	7	53.471	0.1	0.6	0.7	4.3	4.4	27.3	
			NFB (7)	29%	5	55.303	0.1	0.5	0.7	3.2	4.4	20.2	
			NFB (8)	30%	5	53.008	0.1	0.4	0.7	3.1	4.4	19.7	
	<b>sub-total</b>					<b>17</b>	-	-	<b>1.5</b>	-	<b>10.7</b>	-	<b>67.2</b>
	GV	163	LGV (4)	5%	8	7.375	1.4	1.4	-	-	-	-	
			LGV (6)	3%	5	8.715	1.4	1.0	-	-	-	-	
			HGV (7)	19%	31	50.232	1.4	35.9	-	-	-	-	
			HGV (8)	73%	119	68.356	1.4	190.4	-	-	-	-	
	<b>sub-total</b>					<b>163</b>	-	-	<b>228.6</b>	-	-	-	-

RSP / FSP						Kiosk		Unloading Bay		Loading Bay			
Bound	Vehicle Type	Total Peak Traffic Flow (veh/hr)	Veh Type (EmFAC)	% Vehicle	Traffic Flow	Idling Emission Factor	Processing Time	Emission Rate	Processing Time	Emission Rate	Processing Time	Emission Rate	
					(veh/hr)	(g/veh/hr)	(min/veh)	(g/hr)	(min/veh)	(g/hr)	(min/veh)	(g/hr)	
In (SB)	Car	44	PC	100%	44	0.000	1.6	0.00	-	-	-	-	
	Coach	17	NFB (6)	41%	7	1.145	0.1	0.01	0.9	0.12	4.5	0.60	
			NFB (7)	29%	5	1.150	0.1	0.01	0.9	0.09	4.5	0.43	
			NFB (8)	30%	5	1.215	0.1	0.01	0.9	0.09	4.5	0.46	
	<b>sub-total</b>					<b>17</b>	-	-	<b>0.03</b>	-	<b>0.30</b>	-	<b>1.49</b>
	GV	183	LGV (4)	5%	9	0.673	1.0	0.10	-	-	-	-	
			LGV (6)	3%	6	0.916	1.0	0.08	-	-	-	-	
			HGV (7)	19%	34	0.973	1.0	0.56	-	-	-	-	
			HGV (8)	73%	134	1.333	1.0	2.98	-	-	-	-	
	<b>sub-total</b>					<b>183</b>	-	-	<b>3.72</b>	-	-	-	-
Out (NB)	Car	48	PC		48	0.000	1.7	0.00	-	-	-	-	
	Coach	17	NFB (6)	41%	7	1.145	0.1	0.01	0.7	0.09	4.4	0.58	
			NFB (7)	29%	5	1.150	0.1	0.01	0.7	0.07	4.4	0.42	
			NFB (8)	30%	5	1.215	0.1	0.01	0.7	0.07	4.4	0.45	
	<b>sub-total</b>					<b>17</b>	-	-	<b>0.03</b>	-	<b>0.23</b>	-	<b>1.46</b>
	GV	163	LGV (4)	5%	8	0.673	1.9	0.17	-	-	-	-	
			LGV (6)	3%	5	0.916	1.9	0.14	-	-	-	-	
			HGV (7)	19%	31	0.973	1.9	0.94	-	-	-	-	
			HGV (8)	73%	119	1.333	1.9	5.04	-	-	-	-	
	<b>sub-total</b>					<b>163</b>	-	-	<b>6.30</b>	-	-	-	-

Note:

1. Traffic flow and processing time at kiosks / loading bay / unloading bay for each vehicle type are provided by the Traffic Engineer.
2. All cars are assumed to be powered by petrol
3. No information on the vehicle breakdown of coaches. Reference is therefore made to the latest available 2010 Hong Kong vehicle population as the best available information.
4. Vehicle breakdown of GV is provided by the Traffic Engineer and based on the latest available 2010 Hong Kong vehicle population.
5. It is assumed that FSP emission is the same as RSP as a conservative approach.

Hourly Idling Vehicular Emission Factor for Year 2022 (For Operational Air Quality Assessment)

NOx

Table with columns: Description, Link ID, X1(m), Y1(m), X2(m), Y2(m), Length(m), Hr 01-24 (Flow, Emf), Hr 03-24 (Flow, Emf), Hr 05-24 (Flow, Emf), Hr 07-24 (Flow, Emf), Hr 09-24 (Flow, Emf), Hr 11-24 (Flow, Emf), Hr 13-24 (Flow, Emf), Hr 15-24 (Flow, Emf), Hr 17-24 (Flow, Emf), Hr 19-24 (Flow, Emf), Hr 21-24 (Flow, Emf), Hr 23-24 (Flow, Emf). Rows include Out-Bound Kiosks (Coach), Out-Bound Kiosks (GV), Out-Bound Kiosks (Car), Out-Bound Unloading Bay, Out-Bound Loading Bay, In-Bound Kiosks (Coach), In-Bound Kiosks (GV), In-Bound Kiosks (Car), In-Bound Unloading Bay, and In-Bound Loading Bay.

RSP / FSP

Table with columns: Description, Link ID, X1(m), Y1(m), X2(m), Y2(m), Length(m), Hr 01-24 (Flow, Emf), Hr 03-24 (Flow, Emf), Hr 05-24 (Flow, Emf), Hr 07-24 (Flow, Emf), Hr 09-24 (Flow, Emf), Hr 11-24 (Flow, Emf), Hr 13-24 (Flow, Emf), Hr 15-24 (Flow, Emf), Hr 17-24 (Flow, Emf), Hr 19-24 (Flow, Emf), Hr 21-24 (Flow, Emf), Hr 23-24 (Flow, Emf). Rows include Out-Bound Kiosks (Coach), Out-Bound Kiosks (GV), Out-Bound Kiosks (Car), Out-Bound Unloading Bay, Out-Bound Loading Bay, In-Bound Kiosks (Coach), In-Bound Kiosks (GV), In-Bound Kiosks (Car), In-Bound Unloading Bay, and In-Bound Loading Bay.

Note:

- 1. Operation hours of the Man Kam To Control Point is Hr 08 to Hr 22, hence there are no traffic and emission during non-operation hours.
2. The 24-hour traffic profile for the Man Kam To Control Point is provided by Traffic Engineer.

Example Calculations of Total Idling Emission at Kiosks / Loading Bays / Unloading Bays for Year 2030 (during Peak Hour) - for Operational Air Quality Assessment

NOx					Kiosk		Unloading Bay		Loading Bay				
Bound	Vehicle Type	Total Peak Traffic Flow (veh/hr)	Veh Type (EmFAC)	% Vehicle	Traffic Flow	Idling Emission Factor	Processing Time	Emission Rate	Processing Time	Emission Rate	Processing Time	Emission Rate	
					(veh/hr)	(g/veh/hr)	(min/veh)	(g/hr)	(min/veh)	(g/hr)	(min/veh)	(g/hr)	
In (SB)	Car	43	PC	100%	44	12.000	1.6	14.1	-	-	-	-	
	Coach	17	NFB (6)	41%	7	47.393	0.1	0.5	0.9	4.9	4.5	24.7	
			NFB (7)	29%	5	47.634	0.1	0.4	0.9	3.6	4.5	17.8	
			NFB (8)	30%	5	48.288	0.1	0.4	0.9	3.7	4.5	18.4	
	<b>sub-total</b>					<b>17</b>	-	-	<b>1.4</b>	-	<b>12.2</b>	-	<b>60.9</b>
	GV	184	LGV (4)	5%	9	4.477	1.1	0.7	-	-	-	-	
			LGV (6)	3%	6	5.212	1.1	0.5	-	-	-	-	
			HGV (7)	19%	34	35.152	1.1	22.1	-	-	-	-	
			HGV (8)	73%	134	49.827	1.1	122.4	-	-	-	-	
	<b>sub-total</b>					<b>183</b>	-	-	<b>145.8</b>	-	-	-	
Out (NB)	Car	48	PC		48	12.000	1.7	16.3	-	-	-	-	
	Coach	17	NFB (6)	41%	7	47.393	0.1	0.5	0.7	3.8	4.4	24.2	
			NFB (7)	29%	5	47.634	0.1	0.4	0.7	2.8	4.4	17.4	
			NFB (8)	30%	5	48.288	0.1	0.4	0.7	2.9	4.4	17.9	
	<b>sub-total</b>					<b>17</b>	-	-	<b>1.4</b>	-	<b>9.5</b>	-	<b>59.5</b>
	GV	166	LGV (4)	5%	8	4.477	1.4	0.8	-	-	-	-	
			LGV (6)	3%	5	5.212	1.4	0.6	-	-	-	-	
			HGV (7)	19%	31	35.152	1.4	25.1	-	-	-	-	
			HGV (8)	73%	119	49.827	1.4	138.8	-	-	-	-	
	<b>sub-total</b>					<b>163</b>	-	-	<b>165.3</b>	-	-	-	

RSP / FSP					Kiosk		Unloading Bay		Loading Bay				
Bound	Vehicle Type	Total Peak Traffic Flow (veh/hr)	Veh Type (EmFAC)	% Vehicle	Traffic Flow	Idling Emission Factor	Processing Time	Emission Rate	Processing Time	Emission Rate	Processing Time	Emission Rate	
					(veh/hr)	(g/veh/hr)	(min/veh)	(g/hr)	(min/veh)	(g/hr)	(min/veh)	(g/hr)	
In (SB)	Car	44	PC	100%	44	0.000	1.6	0.00	-	-	-	-	
	Coach	17	NFB (6)	41%	7	1.130	0.1	0.01	0.9	0.12	4.5	0.59	
			NFB (7)	29%	5	1.118	0.1	0.01	0.9	0.08	4.5	0.42	
			NFB (8)	30%	5	1.130	0.1	0.01	0.9	0.09	4.5	0.43	
	<b>sub-total</b>					<b>17</b>	-	-	<b>0.03</b>	-	<b>0.29</b>	-	<b>1.44</b>
	GV	183	LGV (4)	5%	9	0.166	1.0	0.03	-	-	-	-	
			LGV (6)	3%	6	0.235	1.0	0.02	-	-	-	-	
			HGV (7)	19%	34	0.784	1.0	0.45	-	-	-	-	
			HGV (8)	73%	134	1.121	1.0	2.50	-	-	-	-	
	<b>sub-total</b>					<b>183</b>	-	-	<b>3.00</b>	-	-	-	
Out (NB)	Car	48	PC		48	0.000	1.7	0.00	-	-	-	-	
	Coach	17	NFB (6)	41%	7	1.130	0.1	0.01	0.7	0.09	4.4	0.58	
			NFB (7)	29%	5	1.118	0.1	0.01	0.7	0.06	4.4	0.41	
			NFB (8)	30%	5	1.130	0.1	0.01	0.7	0.07	4.4	0.42	
	<b>sub-total</b>					<b>17</b>	-	-	<b>0.03</b>	-	<b>0.22</b>	-	<b>1.40</b>
	GV	163	LGV (4)	5%	8	0.166	1.9	0.04	-	-	-	-	
			LGV (6)	3%	5	0.235	1.9	0.04	-	-	-	-	
			HGV (7)	19%	31	0.784	1.9	0.76	-	-	-	-	
			HGV (8)	73%	119	1.121	1.9	4.24	-	-	-	-	
	<b>sub-total</b>					<b>163</b>	-	-	<b>5.08</b>	-	-	-	

Note:

1. Traffic flow and processing time at kiosks / loading bay / unloading bay for each vehicle type are provided by the Traffic Engineer.
2. All cars are assumed to be powered by petrol
3. No information on the vehicle breakdown of coaches. Reference is therefore made to the latest available 2010 Hong Kong vehicle population as the best available information.
4. Vehicle breakdown of GV is provided by the Traffic Engineer and based on the latest available 2010 Hong Kong vehicle population.
5. It is assumed that FSP emission is the same as RSP as a conservative approach.

Hourly Idling Vehicular Emission Factor for Year 2030 (for Operational Air Quality Assessment)

NOx

Description	Link ID	X1 (m)	Y1 (m)	X2 (m)	Y2 (m)	Length (m)	Hr 01		Hr 02		Hr 03		Hr 04		Hr 05		Hr 06		Hr 07		Hr 08		Hr 09		Hr 10		Hr 11		Hr 12		Hr 13		Hr 14		Hr 15		Hr 16		Hr 17		Hr 18		Hr 19		Hr 20		Hr 21		Hr 22		Hr 23		Hr 24	
							Flow	Emf	Flow	Emf	Flow	Emf	Flow	Emf	Flow	Emf	Flow	Emf	Flow	Emf	Flow	Emf	Flow	Emf	Flow	Emf	Flow	Emf	Flow	Emf	Flow	Emf	Flow	Emf	Flow	Emf	Flow	Emf	Flow	Emf	Flow	Emf	Flow	Emf	Flow	Emf	Flow	Emf	Flow	Emf	Flow	Emf	Flow	Emf
Out-Bound Kiosks (Coach)	NB_BK-1	831404	844138	831399	844141	6	0	0.000	0	0.000	0	0.000	0	0.000	0	0.000	0	0.000	0	0.000	0	0.000	0	0.000	0	0.000	0	0.000	0	0.000	0	0.000	0	0.000	0	0.000	0	0.000	0	0.000	0	0.000	0	0.000	0	0.000	0	0.000	0	0.000	0	0.000	0	0.000

RSP / FSP

Description	Link ID	X1 (m)	Y1 (m)	X2 (m)	Y2 (m)	Length (m)	Hr 01		Hr 02		Hr 03		Hr 04		Hr 05		Hr 06		Hr 07		Hr 08		Hr 09		Hr 10		Hr 11		Hr 12		Hr 13		Hr 14		Hr 15		Hr 16		Hr 17		Hr 18		Hr 19		Hr 20		Hr 21		Hr 22		Hr 23		Hr 24	
							Flow	Emf	Flow	Emf	Flow	Emf	Flow	Emf	Flow	Emf	Flow	Emf	Flow	Emf	Flow	Emf	Flow	Emf	Flow	Emf	Flow	Emf	Flow	Emf	Flow	Emf	Flow	Emf	Flow	Emf	Flow	Emf	Flow	Emf	Flow	Emf	Flow	Emf	Flow	Emf	Flow	Emf	Flow	Emf	Flow	Emf	Flow	Emf
Out-Bound Kiosks (Coach)	NB_BK-1	831404	844138	831399	844141	6	0	0.000	0	0.000	0	0.000	0	0.000	0	0.000	0	0.000	0	0.000	0	0.000	0	0.000	0	0.000	0	0.000	0	0.000	0	0.000	0	0.000	0	0.000	0	0.000	0	0.000	0	0.000	0	0.000	0	0.000	0	0.000	0	0.000	0	0.000	0	0.000