Details of Dust Emission Sources for 1-hour TSP (Tier 1)

Details of Dust Emission Sources for 1-hour TSP Assessment (Tier 1)

Kong Nga Po - Feasibility Study

Work Area	Sources	Parameter			Remarks
Kong Nga Po	Heavy construction Source ID: 1 - 22, 24 - 52	Percentage active area, p	100	%	Assume 100% works area for heavy construction
		Mitigation efficiency	91.7	%	Water spraying 8 times a day (once every 1.25 hours)
		No. of working days per month, d	26	days	
		No. of working hours per day, h	10	hour	Mon to Sat, 8:00 to 18:00
		Emission Factor for TSP	2.69	Mg/hectare/month of activity	AP42, Section 13.2.3.3
		Emission Rate	2.87393E-04	g/m²/s (unmitigated)	=2.69*1000000/(10000*d*h*60*60)*p/100
			2.38536E-05	g/m²/s (mitigated)	
	Wind Erosion for Working Hours Source ID: Same as above	Percentage active area, p	100	%	
		Mitigation efficiency	91.7	%	Water spraying 8 times a day (once every 1.25 hours)
		Emission Factor for TSP	0.85	Mg/hectare/year	AP42, Table 11.9-4
		Emission Rate	2.69533E-06	g/m²/s (unmitigated)	=0.85*1000000/(10000*365*24*60*60)*p/100
			2.23713E-07	g/m²/s (mitigated)	
	Wind Erosion for Non-Working Hours Source ID: Same as above	Percentage active area, p	100	%	
		Emission Factor for TSP	0.85	Mg/hectare/year	AP42, Table 11.9-4
		Emission Rate	2.69533E-06	g/m²/s (unmitigated)	=0.85*1000000/(10000*365*24*60*60)*p/100

Details of Dust Emission Sources for 1-hour TSP Assessment (Tier 1)

Kong Nga Po - Feasibility Study

Work Area	Sources	Parameter			Remarks
Kong Nga Po Roadworks - at grade	Heavy construction Source ID: R24 - R40	Percentage active area, p	100	%	Assume 100% works area for heavy construction
		Mitigation efficiency	91.7	%	Water spraying 8 times a day (once every 1.25 hours)
		No. of working days per month, d	26	days	
		No. of working hours per day, h	10	hour	Mon to Sat, 8:00 to 18:00
		Emission Factor for TSP	2.69	Mg/hectare/month of activity	AP42, Section 13.2.3.3
					Assume road width equals 12m, therefore multiply emission rate by 12m.
		Emission Rate	3.44872E-03	g/m/s (unmitigated)	=2.69*1000000/(10000*d*h*60*60)*p/100 * 12
			2.86244E-04	g/m/s (mitigated)	
	Wind Erosion for Working Hours Source ID: Same as above	Percentage active area, p	100	%	
		Mitigation efficiency	91.7	%	Water spraying 8 times a day (once every 1.25 hours)
		Emission Factor for TSP	0.85	Mg/hectare/year	AP42, Table 11.9-4
		Emission Rate	3.2344E-05	g/m/s (unmitigated)	=0.85*1000000/(10000*365*24*60*60)*p/100 *12
			2.68455E-06	g/m/s (mitigated)	
	Wind Erosion for Non-Working Hours Source ID: Same as above	Percentage active area, p	100	%	
		Emission Factor for TSP	0.85	Mg/hectare/year	AP42, Table 11.9-4
		Emission Rate	3.2344E-05	g/m/s (unmitigated)	=0.85*1000000/(10000*365*24*60*60)*p/100 *12

Details of Dust Emission Sources for 1-hour TSP Assessment

Kong Nga Po - Feasibility Study

Description	Sources	Parameter	Emission Rate		Remarks
C&D Stockpile Area	Material handling and storage piles Source ID: 23	Percentage open stockpile area, p	20	%	80% stockpiling area is covered by impervious sheets and all dusty material should be sprayed with water immediately prior to any loading or transfer operation so as to keep the dusty material wet.
		Particle size multiplier, k	0.74		k (particle size < 30μm)
		Moisture content, M	14	%	From engineer
		Average wind speed, U	2.9	m/s	from PATH mm5 data grids (25,43), (25,44), (25,45) and (26,44), maximum annual average wind speed for 2010
		Emission Factor, E	0.00011122	kg/Mg	E=k*0.0016*[(U/2.2)^1.3/(M/2)^1.4]
		Monthly output	20,000	m3/month	From engineer
		Maximum hourly output, op	76.9	m3/hr	26 days per month, 10 working hours per day
			153.8	Mg/hr	Assumed capacity of dump truck is 15,000kg/2,000kg/m^3=7.5m^3 and 15 tons
		Area of stockpile, A	7,569	m^2	
		Emission Rate	6.27954E-07	g/m²/s (unmitigated)	Unmitigated Emission Rate=E*1000*op/(A*60*60)
			1.25591E-07	g/m²/s (mitigated)	Mitigated Emission Rate'=E*1000*op/(A*60*60)*p/100
	Wind erosion Source ID: As above	Percentage open stockpile area, p	100	% (unmitigated)	
			20	% (mitigated)	80% stockpiling area is covered by impervious sheets
		Emission Factor	0.85	Mg/hectare/year	AP42, Section 11.9.4
		Emission Rate	2.69533E-06	g/m²/s (unmitigated)	=0.85*1000000/(10000*365*24*60*60)*p/100
			5.39066E-07	g/m²/s (mitigated)	

Details of Dust Emission Sources for 1-hour TSP Assessment (Tier 1)

Kong Nga Po - Feasibility Study

Work Area	Sources	Parameter			Remarks
Kong Nga Po Concurrent Project: Columbarium Crematorium and Related Facilities at Sandy Ridge Area Sources	Heavy construction Source ID: C3, C6, C7, C8, C10, C11	Percentage active area, p Mitigation efficiency No. of working days per month, d No. of working hours per day, h Emission Factor for TSP Emission Rate	100 91.7 26 10 2.69 2.87393E-04 2.38536E-05	% % days hour Mg/hectare/month of activity g/m²/s (unmitigated) g/m²/s (mitigated)	Assume 100% works area for heavy construction Assume water spraying 8 times a day (once every 1.25 hours) Assume Mon to Sat, 8:00 to 18:00 AP42, Section 13.2.3.3 =2.69*1000000/(10000*d*h*60*60)*p/100
	Wind Erosion for Working Hours Source ID: Same as above	Percentage active area, p Mitigation efficiency Emission Factor for TSP Emission Rate	100 91.7 0.85 2.69533E-06 2.23713E-07	% % Mg/hectare/year g/m²/s (unmitigated) g/m²/s (mitigated)	 Assume water spraying 8 times a day (once every 1.25 hours) AP42, Table 11.9-4 =0.85*1000000/(10000*365*24*60*60)*p/100
	Wind Erosion for Non-Working Hours Source ID: Same as above	Percentage active area, p Emission Factor for TSP Emission Rate	100 0.85 2.69533E-06	% Mg/hectare/year g/m²/s (unmitigated)	 AP42, Table 11.9-4 =0.85*1000000/(10000*365*24*60*60)*p/100
Kong Nga Po Concurrent Project: Columbarium Crematorium and Related Facilities at Sandy Ridge Line Sources	Heavy construction Source ID: C1, C2, C4, C5, C9, C12, C13, C14	Percentage active area, p Mitigation efficiency No. of working days per month, d No. of working hours per day, h Emission Factor for TSP Emission Rate (C1, C2) Emission Rate (C4, C5, C9) Emission Rate (C12, C13, C14)	100 91.7 26 10 2.69 8.62179E-03 7.15609E-04 5.74786E-03 4.77073E-04 4.31090E-03 3.57804E-04	% % days hour Mg/hectare/month of activity g/m/s (unmitigated) g/m/s (mitigated) g/m/s (unmitigated) g/m/s (mitigated) g/m/s (unmitigated) g/m/s (mitigated)	Assume 100% works area for heavy construction Assume water spraying 8 times a day (once every 1.25 hours) Assume Mon to Sat, 8:00 to 18:00 AP42, Section 13.2.3.3 Assume road width equals 30m, therefore multiply emission rate by 30m. =2.69*1000000/(10000*d*h*60*60)*p/100 * 30 Assume road width equals 20m, therefore multiply emission rate by 20m. =2.69*1000000/(10000*d*h*60*60)*p/100 * 20 Assume road width equals 15m, therefore multiply emission rate by 15m. =2.69*1000000/(10000*d*h*60*60)*p/100 * 15
	Wind Erosion for Working Hours Source ID: Same as above	Percentage active area, p Mitigation efficiency Emission Factor for TSP Emission Rate (C1, C2) Emission Rate (C4, C5, C9) Emission Rate (C12, C13, C14)	100 91.7 0.85 8.08600E-05 6.71138E-06 5.39066E-05 4.47425E-06 4.04300E-05 3.35569E-06	% % Mg/hectare/year g/m/s (unmitigated) g/m/s (mitigated) g/m/s (unmitigated) g/m/s (mitigated) g/m/s (unmitigated) g/m/s (mitigated)	 Assumed water spraying 4 times a day (once every 2.5 hours) AP42, Table 11.9-4 =0.85*1000000/(10000*365*24*60*60)*p/100 *30 =0.85*1000000/(10000*365*24*60*60)*p/100 *20 =0.85*1000000/(10000*365*24*60*60)*p/100 *15
	Wind Erosion for Non-Working Hours Source ID: Same as above	Percentage active area, p Emission Factor for TSP Emission Rate (C1, C2) Emission Rate (C4, C5, C9) Emission Rate (C12, C13, C14)	100 0.85 8.08600E-05 5.39066E-05 4.04300E-05	% Mg/hectare/year g/m/s (unmitigated) g/m/s (unmitigated) g/m/s (unmitigated)	 AP42, Table 11.9-4 =0.85*1000000/(10000*365*24*60*60)*p/100 *30 =0.85*1000000/(10000*365*24*60*60)*p/100 *20 =0.85*1000000/(10000*365*24*60*60)*p/100 *15
Kong Nga Po Concurrent Project: Organic Waste Treatment Facilities (Phase 2)	Heavy construction Source ID: S2 - S7	Percentage active area, p Mitigation efficiency No. of working days per month, d No. of working hours per day, h Emission Factor for TSP Emission Rate	100 87.5 26 12 2.69 2.39494E-04 2.99368E-05	% % days hour Mg/hectare/month of activity g/m²/s (unmitigated) g/m²/s (mitigated)	Assume 100% works area for heavy construction (From EIA) Water suppression 8 times a day (From EIA) From EIA From EIA, assume Mon to Sat, 8:00 to 20:00 AP42, Section 13.2.3.3 =2.69*1000000/(10000*d*h*60*60)*p/100
	Wind Erosion Source ID: Same as above	Percentage active area, p Emission Factor for TSP Emission Rate	100 0.85 2.69533E-06	% Mg/hectare/year g/m²/s	 AP42, Table 11.9-4 =0.85*1000000/(10000*365*24*60*60)*p/100

Details of Dust Emission Sources for 1-hour TSP Assessment

Kong Nga Po - Feasibility Study

Description	Sources	Parameter	Emission Rate		Remarks
Kong Nga Po Concurrent Project: Organic Waste Treatment Facilities (Phase 2) C&D Stockpile Area	Material handling and storage piles Source ID: S1 & S8	Percentage open stockpile area, p	20	%	From EIA: 80% stockpiling area is covered by impervious sheets and all dusty material should be sprayed with water immediately prior to any loading or transfer operation so as to keep the dusty material wet.
		Particle size multiplier, k	0.74		k (particle size < 30μm)
		Moisture content, M	5	%	Asuume made by engineer, worst case scenario
		Average wind speed, U	2.5	m/s	Annual mean wind speed from mm5 year 2010 (date 2 Jan to 30 Dec)
		Emission Factor, E	0.000387622	kg/Mg	E=k*0.0016*[(U/2.2)^1.3/(M/2)^1.4], AP42, Section 13.2.4.3
		Maximum daily average output	106.8	m^3/day	From engineer Total volume of output: 25,000 m^3 Anticipated dusty construction activities duration: 9 months (assume 26 working days per month)
		Maximum hourly average output, op	8.9	m^3/hr	12 hours per day
			22	Mg/hr	Assume capacity of dump truck is 6m^3 and 15 tons
		Area of the stockpile, A	4012.08	m^2	Assumption made by consultant
		Emission Rate	5.97336E-07	g/m²/s (unmitigated)	Unmitigated Emission Rate=E*1000*op/(A*60*60)
			1.19467E-07	g/m²/s (mitigated)	Mitigated Emission Rate'=E*1000*op/(A*60*60)*p/100
	Wind erosion Source ID: As above	Percentage open stockpile area, p	100	% (unmitigated)	
			20	% (mitigated)	80% stockpiling area is covered by impervious sheets
		Emission Factor	0.85	Mg/hectare/year	AP42, Table 11.9.4
		Emission Rate	2.69533E-06	g/m²/s (unmitigated)	=0.85*1000000/(10000*365*24*60*60)*p/100
			5.39066E-07	g/m²/s (mitigated)	

Details of Dust Emission Sources for Daily RSP (Tier 1)

Details of Dust Emission Sources for Daily RSP Assessment (Tier 1)

Kong Nga Po - Feasibility Study

Work Area	Sources	Parameter			Remarks
Kong Nga Po	Heavy construction Source ID: 1 - 22, 24 - 52	Percentage active area, p	100	%	Assume 100% works area for heavy construction
		Mitigation efficiency	91.7	%	Water spraying 8 times a day (once every 1.25 hours)
		No. of working days per month, d	26	days	
		No. of working hours per day, h	10	hour	Mon to Sat, 8:00 to 18:00
		Emission Factor for TSP	2.69	Mg/hectare/month of activity	AP42, Section 13.2.3.3
		% content of RSP	30	% of TSP	
		Emission Factor for RSP	0.81	Mg/hectare/year	
		Emission Rate for RSP	8.62179E-05	g/m²/s (unmitigated)	=2.69*0.3*1000000/(10000*d*h*60*60)*p/100
			7.15609E-06	g/m²/s (mitigated)	
	Wind Erosion for Working Hours Source ID: Same as above	Percentage active area, p	100	%	
		Mitigation efficiency	91.7	%	Water spraying 8 times a day (once every 1.25 hours)
		Emission Factor for TSP	0.85	Mg/hectare/year	AP42, Table 11.9-4
		% content of RSP	30	% of TSP	
		Emission Factor for RSP	0.26	Mg/hectare/year	
		Emission Rate for RSP	8.086E-07	g/m²/s (unmitigated)	=0.85*0.3*1000000/(10000*365*24*60*60)*p/100
			6.71138E-08	g/m²/s (mitigated)	
	Wind Erosion for Non-Working Hours Source ID: Same as above	Percentage active area, p	100	%	
		Emission Factor for TSP	0.85	Mg/hectare/year	AP42, Table 11.9-4
		% content of RSP	30	% of TSP	
		Emission Factor for RSP	0.26	Mg/hectare/year	
		Emission Rate for RSP	8.086E-07	g/m²/s (unmitigated)	=0.85*0.3*1000000/(10000*365*24*60*60)*p/100

Details of Dust Emission Sources for Daily RSP Assessment (Tier 1)

Kong Nga Po - Feasibility Study

Work Area	Sources	Parameter			Remarks
Kong Nga Po Roadworks - at grade	Heavy construction Source ID: R24 - R40	Percentage active area, p	100	%	Assume 100% works area for heavy construction
		Mitigation efficiency	91.7	%	Water spraying 8 times a day (once every 1.25 hours)
		No. of working days per month, d	26	days	
		No. of working hours per day, h	10	hour	Mon to Sat, 8:00 to 18:00
		Emission Factor for TSP	2.69	Mg/hectare/month of activity	AP42, Section 13.2.3.3
		% content of RSP	30	% of TSP	
		Emission Factor for RSP	0.81	Mg/hectare/year	
		Emission Rate for RSP	1.03462E-03	g/m/s (unmitigated)	Assume road width equals 12m, therefore multiply emission rate by 12m. '=2.69*0.3*1000000/(10000*d*h*60*60)*p/100 * 12
			8.58731E-05	g/m/s (mitigated)	
	Wind Erosion for Working Hours Source ID: Same as above	Percentage active area, p	100	%	
		Mitigation efficiency	91.7	%	Water spraying 8 times a day (once every 1.25 hours)
		Emission Factor for TSP	0.85	Mg/hectare/year	AP42, Table 11.9-4
		% content of RSP	30	% of TSP	
		Emission Factor for RSP	0.26	Mg/hectare/year	
		Emission Rate for RSP	9.7032E-06	g/m/s (unmitigated)	=0.85*0.3*1000000/(10000*365*24*60*60)*p/100 *12
			8.05365E-07	g/m/s (mitigated)	
	Wind Erosion for Non-Working Hours Source ID: Same as above	Percentage active area, p	100	%	
		Emission Factor for TSP	0.85	Mg/hectare/year	AP42, Table 11.9-4
		% content of RSP	30	% of TSP	
		Emission Factor for RSP	0.26	Mg/hectare/year	
		Emission Rate for RSP	9.7032E-06	g/m/s (unmitigated)	=0.85*0.3*1000000/(10000*365*24*60*60)*p/100*12

Details of Dust Emission Sources for Daily and Annual RSP Assessment

Kong Nga Po - Feasibility Study

Description	Sources	Parameter	Emission Rate		Remarks
C&D Stockpile Area	Material handling and storage piles Source ID: 23	Percentage open stockpile area, p	20	%	80% stockpiling area is covered by impervious sheets and all dusty material should be sprayed with water immediately prior to any loading or transfer operation so as to keep the dusty material wet.
		Particle size multiplier, k	0.35		k (particle size < 10μm)
		Moisture content, M	14	%	From engineer
		Average wind speed, U	2.9	m/s	from PATH mm5 data grids (25,43), (25,44), (25,45) and (26,44), maximum annual average wind speed for 2010
		Emission Factor, E	5.2604E-05	kg/Mg	E=k*0.0016*[(U/2.2)^1.3/(M/2)^1.4]
		Monthly output	20,000	m3/month	From engineer
		Maximum hourly output, op	76.9	m3/hr	26 days per month, 10 working hours per day
			153.8	Mg/hr	Assumed capacity of dump truck is 15,000kg/2,000kg/m^3=7.5m^3 and 15 tons
		Area of stockpile, A	7,569	m^2	
		Emission Rate	2.97005E-07	g/m²/s (unmitigated)	Unmitigated Emission Rate=E*1000*op/(A*60*60)
			5.94011E-08	g/m²/s (mitigated)	Mitigated Emission Rate'=E*1000*op/(A*60*60)*p/100
	Wind erosion Source ID: As above	Percentage open stockpile area, p	100	% (unmitigated)	
			20	% (mitigated)	80% stockpiling area is covered by impervious sheets
		Emission Factor	0.85	Mg/hectare/year	AP42, Section 11.9.4
		Emission Rate	2.69533E-06	g/m²/s (unmitigated)	=0.85*1000000/(10000*365*24*60*60)*p/100
			5.39066E-07	g/m²/s (mitigated)	

Details of Dust Emission Sources for Daily RSP Assessment (Tier 1)

Kong Nga Po - Feasibility Study

Work Area	Sources	Parameter			Remarks
Kong Nga Po Concurrent Project: Columbarium Crematorium and Related Facilities at Sandy Ridge Area Sources	Heavy construction Source ID: C3, C6, C7, C8, C10, C11	Percentage active area, p	100	%	Assume 100% works area for heavy construction
		Mitigation efficiency	91.7	%	Assume water spraying 8 times a day (once every 1.25 hours)
		No. of working days per month, d	26	days	
		No. of working hours per day, h	10	hour	Assume Mon to Sat, 8:00 to 18:00
		Emission Factor for TSP	2.69	Mg/hectare/month of activity	AP42, Section 13.2.3.3
		% content of RSP	30	% of TSP	
		Emission Factor for RSP	0.81	Mg/hectare/year	
		Emission Rate for RSP	8.62179E-05	g/m²/s (unmitigated)	=2.69*0.3*1000000/(10000*d*h*60*60)*p/100
			7.15609E-06	g/m²/s (mitigated)	
	Wind Erosion for Working Hours Source ID: Same as above	Percentage active area, p	100	%	
		Mitigation efficiency	91.7	%	Assume water spraying 8 times a day (once every 1.25 hours)
		Emission Factor for TSP	0.85	Mg/hectare/year	AP42, Table 11.9-4
		% content of RSP	30	% of TSP	
		Emission Factor for RSP	0.26	Mg/hectare/year	
		Emission Rate for RSP	8.086E-07	g/m²/s (unmitigated)	=0.85*0.3*1000000/(10000*365*24*60*60)*p/100
			6.71138E-08	g/m²/s (mitigated)	
	Wind Erosion for Non-Working Hours Source ID: Same as above	Percentage active area, p	100	%	
		Emission Factor for TSP	0.85	Mg/hectare/year	AP42, Table 11.9-4
		% content of RSP	30	% of TSP	
		Emission Factor for RSP	0.26	Mg/hectare/year	
		Emission Rate for RSP	8.086E-07	g/m²/s (unmitigated)	=0.85*0.3*1000000/(10000*365*24*60*60)*p/100
Kong Nga Po Concurrent Project: Columbarium Crematorium and Related Facilities at Sandy Ridge Line Sources	Heavy construction Source ID: C1, C2, C4, C5, C9, C12, C13, C14	Percentage active area, p	100	%	Assume 100% works area for heavy construction
		Mitigation efficiency	91.7	%	Assume water spraying 8 times a day (once every 1.25 hours)
		No. of working days per month, d	26	days	
		No. of working hours per day, h	10	hour	Assume Mon to Sat, 8:00 to 18:00
		Emission Factor for TSP	2.69	Mg/hectare/month of activity	AP42, Section 13.2.3.3
		% content of RSP	30	% of TSP	
		Emission Factor for RSP	0.81	Mg/hectare/year	
		Emission Rate (C1, C2)	2.58654E-03	g/m/s (unmitigated)	Assume road width equals 30m, therefore multiply emission rate by 30m =2.69*0.3*1000000/(10000*d*h*60*60)*p/100 *30
			2.14683E-04	g/m/s (mitigated)	
		Emission Rate (C4, C5, C9)	1.72436E-03	g/m/s (unmitigated)	Assume road width equals 20m, therefore multiply emission rate by 20m =2.69*0.3*1000000/(10000*d*h*60*60)*p/100 *20
			1.43122E-04	g/m/s (mitigated)	
		Emission Rate (C12, C13, C14)	1.29327E-03	g/m/s (unmitigated)	Assume road width equals 15m, therefore multiply emission rate by 15m =2.69*0.3*1000000/(10000*d*h*60*60)*p/100 *15
			1.07341E-04	g/m/s (mitigated)	
	Wind Erosion for Working Hours Source ID: Same as above	Percentage active area, p	100	%	
		Mitigation efficiency	91.7	%	Assume water spraying 8 times a day (once every 1.25 hours)
		Emission Factor for TSP	0.85	Mg/hectare/year	AP42, Table 11.9-4
		% content of RSP	30	% of TSP	
		Emission Factor for RSP	0.26	Mg/hectare/year	
		Emission Rate (C1, C2)	2.42580E-05	g/m/s (unmitigated)	=0.85*0.3*1000000/(10000*365*24*60*60)*p/100 *30
			2.01341E-06	g/m/s (mitigated)	
		Emission Rate (C4, C5, C9)	1.61720E-05	g/m/s (unmitigated)	=0.85*0.3*1000000/(10000*365*24*60*60)*p/100 *20
			1.34228E-06	g/m/s (mitigated)	
		Emission Rate (C12, C13, C14)	1.21290E-05	g/m/s (unmitigated)	=0.85*0.3*1000000/(10000*365*24*60*60)*p/100 *15
			1.00671E-06	g/m/s (mitigated)	
	Wind Erosion for Non-Working Hours Source ID: Same as above	Percentage active area, p	100	%	
		Emission Factor for TSP	0.85	Mg/hectare/year	AP42, Table 11.9-4
		% content of RSP	30	% of TSP	
		Emission Factor for RSP	0.26	Mg/hectare/year	
		Emission Rate (C1, C2)	2.42580E-05	g/m/s (unmitigated)	=0.85*0.3*1000000/(10000*365*24*60*60)*p/100 *30
		Emission Rate (C4, C5, C9)	1.61720E-05	g/m/s (unmitigated)	=0.85*0.3*1000000/(10000*365*24*60*60)*p/100 *20
		Emission Rate (C12, C13, C14)	1.21290E-05	g/m/s (unmitigated)	=0.85*0.3*1000000/(10000*365*24*60*60)*p/100 *15
Kong Nga Po Concurrent Project: Organic Waste Treatment Facilities (Phase 2)	Heavy construction Source ID: S2 - S7	Percentage active area, p	100	%	Assume 100% works area for heavy construction
		Mitigation efficiency	87.5	%	Water suppression 8 times a day
		No. of working days per month, d	26	days	From EIA
		No. of working hours per day, h	12	hour	From EIA, assume Mon to Sat, 8:00 to 20:00
		Emission Factor for TSP	2.69	Mg/hectare/month of activity	AP42, Section 13.2.3.3
		% content of RSP	30	% of TSP	
		Emission Factor for RSP	0.81	Mg/hectare/year	
		Emission Rate for RSP	7.18483E-05	g/m²/s (unmitigated)	=2.69*0.3*1000000/(10000*d*h*60*60)*p/100
			8.98104E-06	g/m²/s (mitigated)	
	Wind Erosion Source ID: Same as above	Percentage active area, p	100	%	
		Emission Factor for TSP	0.85	Mg/hectare/year	AP42, Table 11.9-4
		% content of RSP	30	% of TSP	
		Emission Factor for RSP	0.26	Mg/hectare/year	
		Emission Rate for RSP	8.086E-07	g/m²/s	=0.85*0.3*1000000/(10000*365*24*60*60)*p/100

Details of Dust Emission Sources for Daily and Annual RSP Assessment

Kong Nga Po - Feasibility Study

Description	Sources	Parameter	Emission Rate		Remarks
Kong Nga Po Concurrent Project: Organic Waste Treatment Facilities (Phase 2) C&D Stockpile Area	Material handling and storage piles Source ID: S1 & S8	Percentage open stockpile area, p	20	%	From EIA: 80% stockpiling area is covered by impervious sheets and all dusty material should be sprayed with water immediately prior to any loading or transfer operation so as to keep the dusty material wet.
		Particle size multiplier, k	0.35		k (particle size < 10μm)
		Moisture content, M	5	%	Asuume made by engineer, worst case scenario
		Average wind speed, U	2.5	m/s	Annual mean wind speed from mm5 year 2010 (date 2 Jan to 30 Dec)
		Emission Factor, E	0.000183335	kg/Mg	E=k*0.0016*[(U/2.2)^1.3/(M/2)^1.4]
		Maximum daily average output	106.8	m^3/day	From engineer Total volume of output: 25,000 m^3 Anticipated dusty construction activities duration: 9 months (assume 26 working days per month)
		Maximum hourly average output, op	8.9	m^3/hr	12 hours per day
			22	Mg/hr	Assume capacity of dump truck is 6m^3 and 15 tons
		Area of the stockpile, A	4012.08	m^2	Assumption made by consultant
		Emission Rate	2.82524E-07	g/m²/s (unmitigated)	Unmitigated Emission Rate=E*1000*op/(A*60*60)
			5.65048E-08	g/m²/s (mitigated)	Mitigated Emission Rate'=E*1000*op/(A*60*60)*p/100
	Wind erosion	Percentage open stockpile area, p	100	% (unmitigated)	
			20	% (mitigated)	80% stockpiling area is covered by impervious sheets
	As above	Emission Factor	0.85	Mg/hectare/year	AP42, Table 11.9.4
		Emission Rate	2.69533E-06	g/m²/s (unmitigated)	=0.85*1000000/(10000*365*24*60*60)*p/100
			5.39066E-07	g/m²/s (mitigated)	

Details of Dust Emission Sources for Daily FSP (Tier 1)

Details of Dust Emission Sources for Daily FSP Assessment (Tier 1)

Kong Nga Po - Feasibility Study

Work Area	Sources	Parameter			Remarks
Kong Nga Po	Heavy construction Source ID: 1 - 22, 24 - 52	Percentage active area, p	100	%	Assume 100% works area for heavy construction
		Mitigation efficiency	91.7	%	Water spraying 8 times a day (once every 1.25 hours)
		No. of working days per month, d	26	days	
		No. of working hours per day, h	10	hour	Mon to Sat, 8:00 to 18:00
		Emission Factor for TSP	2.69	Mg/hectare/month of activity	AP42, Section 13.2.3.3
		% content of FSP	3	% of TSP	
		Emission Factor for FSP	0.08	Mg/hectare/year	
		Emission Rate for FSP	8.62179E-06	g/m²/s (unmitigated)	=2.69*0.03*1000000/(10000*d*h*60*60)*p/100
			7.15609E-07	g/m²/s (mitigated)	
	Wind Erosion for Working Hours Source ID: Same as above	Percentage active area, p	100	%	
		Mitigation efficiency	91.7	%	Water spraying 8 times a day (once every 1.25 hours)
		Emission Factor for TSP	0.85	Mg/hectare/year	AP42, Table 11.9-4
		% content of FSP	3	% of TSP	
		Emission Factor for FSP	0.03	Mg/hectare/year	
		Emission Rate for FSP	8.086E-08	g/m²/s (unmitigated)	=0.85*0.03*1000000/(10000*365*24*60*60)*p/100
			6.71138E-09	g/m²/s (mitigated)	
	Wind Erosion for Non-Working Hours Source ID: Same as above	Percentage active area, p	100	%	
		Emission Factor for TSP	0.85	Mg/hectare/year	AP42, Table 11.9-4
		% content of FSP	3	% of TSP	
		Emission Factor for FSP	0.03	Mg/hectare/year	
		Emission Rate for FSP	8.086E-08	g/m²/s (unmitigated)	=0.85*0.03*1000000/(10000*365*24*60*60)*p/100

Details of Dust Emission Sources for Daily FSP Assessment (Tier 1)

Kong Nga Po - Feasibility Study

Work Area	Sources	Parameter			Remarks
Kong Nga Po Roadworks - at grade	Heavy construction Source ID: R24 - R40	Percentage active area, p Mitigation efficiency No. of working days per month, d No. of working hours per day, h Emission Factor for TSP % content of FSP Emission Factor for FSP Emission Rate for FSP	100 91.7 26 10 2.69 3 0.08 1.03462E-04 8.58731E-06	% % days hour Mg/hectare/month of activity % of TSP Mg/hectare/year g/m/s (unmitigated) g/m/s (mitigated)	Assume 100% works area for heavy construction Water spraying 8 times a day (once every 1.25 hours) Mon to Sat, 8:00 to 18:00 AP42, Section 13.2.3.3 Assume road width equals 12m, therefore multiply emission rate by 12m. '=2.69*0.03*1000000/(10000*d*h*60*60)*p/100 * 12
	Wind Erosion for Working Hours Source ID: Same as above	Percentage active area, p Mitigation efficiency Emission Factor for TSP % content of FSP Emission Factor for FSP Emission Rate for FSP	100 91.7 0.85 3 0.03 9.7032E-07 8.05365E-08	% % Mg/hectare/year % of TSP Mg/hectare/year g/m/s (unmitigated) g/m/s (mitigated)	Water spraying 8 times a day (once every 1.25 hours) AP42, Table 11.9-4 =0.85*0.03*1000000/(10000*365*24*60*60)*p/100 *12
	Wind Erosion for Non-Working Hours Source ID: Same as above	Percentage active area, p Emission Factor for TSP % content of FSP Emission Factor for FSP Emission Rate for FSP	100 0.85 3 0.03 9.7032E-07	% Mg/hectare/year % of TSP Mg/hectare/year g/m/s (unmitigated)	AP42, Table 11.9-4 =0.85*0.03*1000000/(10000*365*24*60*60)*p/100 *12

Details of Dust Emission Sources for Daily and Annual FSP Assessment

Kong Nga Po - Feasibility Study

Description	Sources	Parameter	Emission Rate		Remarks
C&D Stockpile Area	Material handling and storage piles Source ID: 23	Percentage open stockpile area, p	20	%	80% stockpiling area is covered by impervious sheets and all dusty material should be sprayed with water immediately prior to any loading or transfer operation so as to keep the dusty material wet.
		Particle size multiplier, k	0.053		k (particle size < 2.5μm)
		Moisture content, M	14	%	From engineer
		Average wind speed, U	2.9	m/s	from PATH mm5 data grids (25,43), (25,44), (25,45) and (26,44), maximum annual average wind speed for 2010
		Emission Factor, E	7.96575E-06	kg/Mg	E=k*0.0016*[(U/2.2)^1.3/(M/2)^1.4]
		Monthly output	20,000	m3/month	From engineer
		Maximum hourly output, op	76.9	m3/hr	26 days per month, 10 working hours per day
			153.8	Mg/hr	Assumed capacity of dump truck is 15,000kg/2,000kg/m^3=7.5m^3 and 15 tons
		Area of stockpile, A	7,569	m^2	
		Emission Rate	4.49751E-08	g/m²/s (unmitigated)	Unmitigated Emission Rate=E*1000*op/(A*60*60)
			8.99502E-09	g/m²/s (mitigated)	Mitigated Emission Rate'=E*1000*op/(A*60*60)*p/100
	Wind erosion Source ID: As above	Percentage open stockpile area, p	100	% (unmitigated)	
			20	% (mitigated)	80% stockpiling area is covered by impervious sheets
		Emission Factor	0.85	Mg/hectare/year	AP42, Section 11.9.4
		Emission Rate	2.69533E-06	g/m²/s (unmitigated)	=0.85*1000000/(10000*365*24*60*60)*p/100
			5.39066E-07	g/m²/s (mitigated)	

Details of Dust Emission Sources for Daily FSP Assessment (Tier 1)

Kong Nga Po - Feasibility Study

Work Area	Sources	Parameter			Remarks
Kong Nga Po Concurrent Project: Columbarium Crematorium and Related Facilities at Sandy Ridge Area Sources	Heavy construction Source ID: C3, C6, C7, C8, C10, C11	Percentage active area, p	100	%	Assume 100% works area for heavy construction
		Mitigation efficiency	91.7	%	Assume water spraying 8 times a day (once every 1.25 hours)
		No. of working days per month, d	26	days	
		No. of working hours per day, h	10	hour	Assume Mon to Sat, 8:00 to 18:00
		Emission Factor for TSP	2.69	Mg/hectare/month of activity	AP42, Section 13.2.3.3
		% content of FSP	3	% of TSP	
		Emission Factor for FSP	0.08	Mg/hectare/year	
		Emission Rate for FSP	8.62179E-06	g/m²/s (unmitigated)	=2.69*0.03*1000000/(10000*d*h*60*60)*p/100
			7.15609E-07	g/m²/s (mitigated)	
	Wind Erosion for Working Hours Source ID: Same as above	Percentage active area, p	100	%	
		Mitigation efficiency	91.7	%	Assume water spraying 8 times a day (once every 1.25 hours)
		Emission Factor for TSP	0.85	Mg/hectare/year	AP42, Table 11.9-4
		% content of FSP	3	% of TSP	
		Emission Factor for FSP	0.03	Mg/hectare/year	
		Emission Rate for FSP	8.086E-08	g/m²/s (unmitigated)	=0.85*0.03*1000000/(10000*365*24*60*60)*p/100
			6.71138E-09	g/m²/s (mitigated)	
	Wind Erosion for Non-Working Hours Source ID: Same as above	Percentage active area, p	100	%	
		Emission Factor for TSP	0.85	Mg/hectare/year	AP42, Table 11.9-4
		% content of FSP	3	% of TSP	
		Emission Factor for FSP	0.03	Mg/hectare/year	
		Emission Rate for FSP	8.086E-08	g/m²/s (unmitigated)	=0.85*0.03*1000000/(10000*365*24*60*60)*p/100
Kong Nga Po Concurrent Project: Columbarium Crematorium and Related Facilities at Sandy Ridge Line Sources	Heavy construction Source ID: C1, C2, C4, C5, C9, C12, C13, C14	Percentage active area, p	100	%	Assume 100% works area for heavy construction
		Mitigation efficiency	91.7	%	Assume water spraying 8 times a day (once every 1.25 hours)
		No. of working days per month, d	26	days	
		No. of working hours per day, h	10	hour	Assume Mon to Sat, 8:00 to 18:00
		Emission Factor for TSP	2.69	Mg/hectare/month of activity	AP42, Section 13.2.3.3
		% content of FSP	3	% of TSP	
		Emission Factor for FSP	0.08	Mg/hectare/year	
		Emission Rate (C1, C2)	2.58654E-04	g/m/s (unmitigated)	Assume road width equals 30m, therefore multiply emission rate by 30m =2.69*0.03*1000000/(10000*d*h*60*60)*p/100 *30
			2.14683E-05	g/m/s (mitigated)	
		Emission Rate (C4, C5, C9)	1.72436E-04	g/m/s (unmitigated)	Assume road width equals 20m, therefore multiply emission rate by 20m =2.69*0.03*1000000/(10000*d*h*60*60)*p/100 *20
			1.43122E-05	g/m/s (mitigated)	
		Emission Rate (C12, C13, C14)	1.29327E-04	g/m/s (unmitigated)	Assume road width equals 15m, therefore multiply emission rate by 15m =2.69*0.03*1000000/(10000*d*h*60*60)*p/100 *15
			1.07341E-05	g/m/s (mitigated)	
	Wind Erosion for Working Hours Source ID: Same as above	Percentage active area, p	100	%	
		Mitigation efficiency	91.7	%	Assume water spraying 8 times a day (once every 1.25 hours)
		Emission Factor for TSP	0.85	Mg/hectare/year	AP42, Table 11.9-4
		% content of FSP	3	% of TSP	
		Emission Factor for FSP	0.03	Mg/hectare/year	
		Emission Rate (C1, C2)	2.42580E-06	g/m/s (unmitigated)	=0.85*0.03*1000000/(10000*365*24*60*60)*p/100 *30
			2.01341E-07	g/m/s (mitigated)	
		Emission Rate (C4, C5, C9)	1.61720E-06	g/m/s (unmitigated)	=0.85*0.03*1000000/(10000*365*24*60*60)*p/100 *20
			1.34228E-07	g/m/s (mitigated)	
		Emission Rate (C12, C13, C14)	1.21290E-06	g/m/s (unmitigated)	=0.85*0.03*1000000/(10000*365*24*60*60)*p/100 *15
			1.00671E-07	g/m/s (mitigated)	
	Wind Erosion for Non-Working Hours Source ID: Same as above	Percentage active area, p	100	%	
		Emission Factor for TSP	0.85	Mg/hectare/year	AP42, Table 11.9-4
		% content of FSP	3	% of TSP	
		Emission Factor for FSP	0.03	Mg/hectare/year	
		Emission Rate (C1, C2)	2.42580E-06	g/m/s (unmitigated)	=0.85*0.03*1000000/(10000*365*24*60*60)*p/100 *30
		Emission Rate (C4, C5, C9)	1.61720E-06	g/m/s (unmitigated)	=0.85*0.03*1000000/(10000*365*24*60*60)*p/100 *20
		Emission Rate (C12, C13, C14)	1.21290E-06	g/m/s (unmitigated)	=0.85*0.03*1000000/(10000*365*24*60*60)*p/100 *15
Kong Nga Po Concurrent Project: Organic Waste Treatment Facilities (Phase 2)	Heavy construction Source ID: S2 - S7	Percentage active area, p	100	%	Assume 100% works area for heavy construction
		Mitigation efficiency	87.5	%	Water suppression 8 times a day
		No. of working days per month, d	26	days	From EIA
		No. of working hours per day, h	12	hour	From EIA, assume Mon to Sat, 8:00 to 20:00
		Emission Factor for TSP	2.69	Mg/hectare/month of activity	AP42, Section 13.2.3.3
		% content of FSP	3	% of TSP	
		Emission Factor for FSP	0.08	Mg/hectare/year	
		Emission Rate for FSP	7.18483E-06	g/m²/s (unmitigated)	=2.69*0.03*1000000/(10000*d*h*60*60)*p/100
			8.98104E-07	g/m²/s (mitigated)	
	Wind Erosion Source ID: Same as above	Percentage active area, p	100	%	
		Emission Factor for TSP	0.85	Mg/hectare/year	AP42, Table 11.9-4
		% content of FSP	3	% of TSP	
		Emission Factor for FSP	0.03	Mg/hectare/year	
		Emission Rate for FSP	8.086E-08	g/m²/s	=0.85*0.03*1000000/(10000*365*24*60*60)*p/100

Details of Dust Emission Sources for Daily and Annual FSP Assessment

Kong Nga Po - Feasibility Study

Description	Sources	Parameter	Emission Rate		Remarks
Kong Nga Po Concurrent Project: Organic Waste Treatment Facilities (Phase 2) C&D Stockpile Area	Material handling and storage piles Source ID: S1 & S8	Percentage open stockpile area, p	20	%	From EIA: 80% stockpiling area is covered by impervious sheets and all dusty material should be sprayed with water immediately prior to any loading or transfer operation so as to keep the dusty material wet.
		Particle size multiplier, k	0.053		k (particle size < 2.5μm)
		Moisture content, M	5	%	Asuume made by engineer, worst case scenario
		Average wind speed, U	2.5	m/s	Annual mean wind speed from mm5 year 2010 (date 2 Jan to 30 Dec)
		Emission Factor, E	2.77621E-05	kg/Mg	E=k*0.0016*[(U/2.2)^1.3/(M/2)^1.4]
		Maximum daily average output	106.8	m^3/day	From engineer Total volume of output: 25,000 m^3 Anticipated dusty construction activities duration: 9 months (assume 26 working days per month)
		Maximum hourly average output, op	8.9	m^3/hr	12 hours per day
			22	Mg/hr	Assume capacity of dump truck is 6m^3 and 15 tons
		Area of the stockpile, A	4012.08	m^2	Assumption made by consultant
		Emission Rate	4.27822E-08	g/m²/s (unmitigated)	Unmitigated Emission Rate=E*1000*op/(A*60*60)
			8.55644E-09	g/m²/s (mitigated)	Mitigated Emission Rate'=E*1000*op/(A*60*60)*p/100
	Wind erosion	Percentage open stockpile area, p	100	% (unmitigated)	
			20	% (mitigated)	80% stockpiling area is covered by impervious sheets
	As above	Emission Factor	0.85	Mg/hectare/year	AP42, Table 11.9.4
		Emission Rate	2.69533E-06	g/m²/s (unmitigated)	=0.85*1000000/(10000*365*24*60*60)*p/100
			5.39066E-07	g/m²/s (mitigated)	