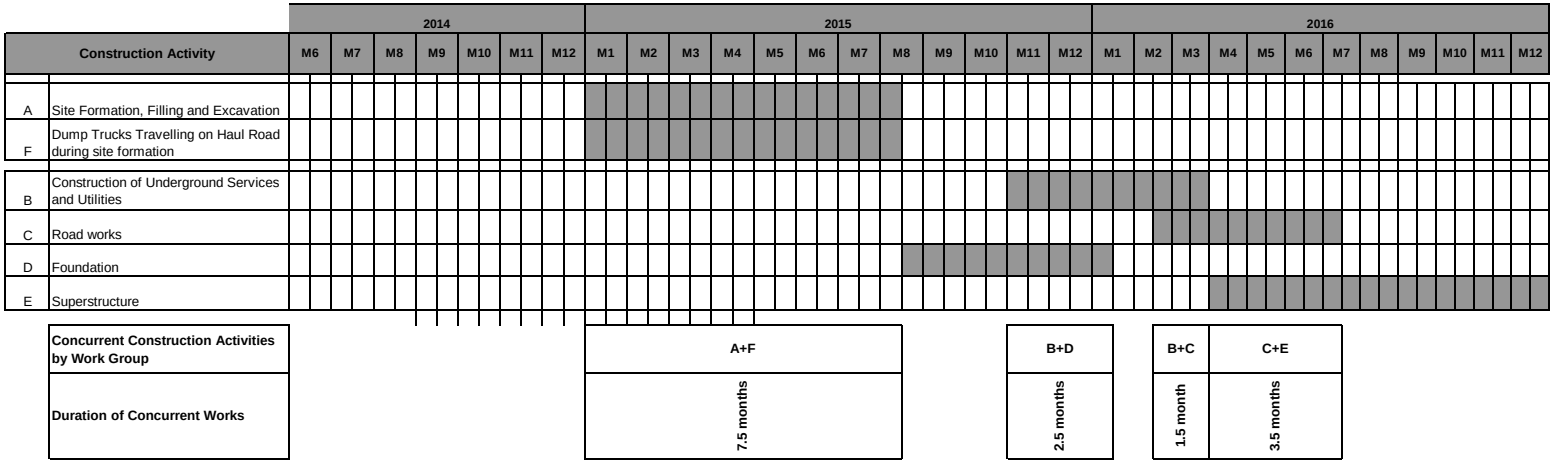
Appendix 4-6B

Estimated Construction Noise Levels
Due to Planned Kam Pok Road Site

Appendix 4-6B-1 Indicative Project Construction Programme for Planned Kam Pok Road Site



Remark:

The above Construction Programme for Site Formation is prepared with the following assumption:
Working hours = 08:00 to 18:00
Working days = 25 days per month

Appendix 4-6B-2 Summary Table of Calculated Construction Noise Level at NSRs (Mitigated Scenario with QPMEs and Movable Noise Barriers)

NSR Label	Descriptions	Construction Noise Level from Each Work Group							Cumulative Construction Noise Due to Concurrent Works				Highest Noise Level, dB(A)	Noise Criteria, dB(A)
		A	B	C	D	E	D&E	F	A+F	B+D	B+C	C+E		
		Site Formation, Filing and Excavation	Construction of Underground Services and Utilities	Road works	Foundation	Superstructure	xxx	Dump Trucks Travelling on Haul Road						
N1	Fairview Park	56	55	56	57	55	0	55	59	59	59	59	**59**	75
N2	Fairview Park	56	55	56	57	55	0	55	58	59	58	58	**59**	75
N3	Fairview Park	61	60	61	62	60	0	58	63	64	63	63	**64**	75
N4	Fairview Park	62	61	62	63	61	0	58	63	65	64	64	**65**	75
N5	Fairview Park	56	55	56	57	55	0	55	59	59	59	59	**59**	75
N6	Fairview Park	52	51	52	53	51	0	53	56	56	55	55	**56**	75
N7	Yau Mei San Tsuen	50	49	50	51	49	0	64	64	53	53	53	**64**	75
N8	Chuk Yuen Tsuen	57	56	57	58	56	0	55	59	60	59	59	**60**	75
N9	Chuk Yuen Tsuen	56	55	56	57	55	0	55	59	59	59	59	**59**	75
N10	Bethel High School	60	59	60	61	59	0	57	61	63	62	62	**63**	70 (65 during examination)
N11	Helene Terrace	64	63	64	65	63	0	59	65	67	67	67	**67**	75
N12	Villa Camllia	63	62	63	64	62	0	59	65	66	66	66	**66**	75
N13	Fairview Park	59	58	59	60	58	0	56	61	62	61	61	**62**	75
N14	Wong Chan Sook Ying Memorial School	58	57	58	59	57	0	56	60	61	61	61	**61**	70 (65 during examination)
N15	Man Yuen Tsuen	59	58	59	60	58	0	56	61	62	61	61	**62**	75
N16	Fairview Park	52	51	52	53	51	0	53	55	55	54	54	**55**	75
N17	Palm Springs	48	47	48	49	47	0	51	53	51	51	51	**53**	75
N18	Temp. house at Yau Mei San Tsuen	49	48	49	50	48	0	52	53	52	52	52	**53**	75
N19	Existing village house	72	71	72	73	71	0	63	72	75	74	74	**75**	75
N20	Fairview Park	52	51	52	53	51	0	53	56	55	55	55	**56**	75

Appendix 4-6B-3 Plant Inventory and Calculated SWLs for Construction Noise Impact Assessment for Planned Kam Pok Road Site (with QPMEs, Movable Noise Barriers)

			PMEs Inventory - Mitigated (with QPMEs and Movable Noise Barriers)									
Construction Activity	**Sub. Work Group**		**Powered Mechanical Equipment**	**Reference**	**SWL per unit**	**Qty**	**Total, SWL**	**At-source Noise Mitigation Measure**	**Noise Barrier Effect ****	**Total SWL (Mitigated)**	**Total SWL, dB(A)**	**Highest SWL of Each Construction Activity, dB(A) @**
(A) Site Formation, Filling and Excavation	A1	Excavation and Filling	Air Compressor	CNP001	100	2	103	Movable noise barrier	-10	93	111	111
			Breaker, mini-robot mounted	EPD *	115	2	118	Movable noise barrier and installation of commercially made sound proof hammer bracket # & ##	-10	108		
			Excavator, wheeled/tracked	KATO model HD820V (EPD-01233)	99	3	104	Movable noise barrier	-5	99		
			Generator, super silenced	CNP103	95	3	100	Movable noise barrier	-10	90		
			Dump Truck (5.5 tonne < Gross vehicle weight <= 38	EPD *	105	2	108			108		
	A2	Ground Compression	Roller, vibratory	SAKAI model	95	2	98			98	106	
			Bulldozer	Komatsu modelled D21A-8	102	2	105			105		
(B) Construction of Underground Services and Utilities	B1	Earthwork	Breaker, mini-robot mounted	EPD *	115	1	115	Movable noise barrier and installation of commercially made sound proof hammer bracket # & ##	-10	105	110	110
			Dump Truck (5.5 tonne < Gross vehicle weight <= 38 tonne)	EPD *	105	2	108			108		
			Excavator, mini-robot mounted	EPD *	94	2	97	Movable noise barrier	-5	92		
						0			0			
	B2	Utilities laying	Air Compressor	CNP001	100	2	103	Movable noise barrier	-10	93	105	
			Generator, super silenced	CNP103	95	2	98	Movable noise barrier	-10	88		
			Lorry (5.5 tonne < Gross vehicle weight <= 38 tonne)	EPD *	105	1	105			105		
			Water Pump, Submersible(electric)	CNP283	85	2	88	Movable noise barrier	-10	78		
	B3	Ground reinstatement	Concrete Lorry Mixer	CNP044	109	1	109	Movable noise barrier	-10	99	102	
			Power rammer (petrol)	Dynapac model LT700 (EPD-00536)	107	1	107	Movable noise barrier	-10	97		
			Poker, vibratory, hand-held (electric)	EPD *	102	1	102	Movable noise barrier	-10	92		
			Roller, vibratory	SW250-1 (EPD-00509)	95	1	95			95		
(C) Road Works	C1	Earthwork	Dump Truck (5.5 tonne < Gross vehicle weight <= 38 tonne)	EPD *	105	2	108			108	108	111
			Excavator, wheeled/tracked	KATO model HD820V (EPD-01233)	99	1	99	Movable noise barrier	-5	94		
	C2	Concreting Works	Concrete Lorry Mixer	CNP044	109	2	112	Movable noise barrier	-10	102	103	
			Generator, super silenced	CNP103	95	2	98	Movable noise barrier	-10	88		
			Poker, vibratory, hand-held (electric)	EPD *	102	2	105	Movable noise barrier	-10	95		
	C3	Road Finishing	Air Compressor	CNP001	100	2	103	Movable noise barrier	-10	93	111	
			Asphalt Paver	VOLVO model. No. ABG5770 (EPD-01226)	104	2	107			107		
			Generator, super silenced	CNP103	95	2	98	Movable noise barrier	-10	88		
			Lorry (5.5 tonne < Gross vehicle weight <= 38 tonne)	EPD *	105	2	108			108		
			Power rammer (petrol)	Dynapac model LT700 (EPD-00536)	107	1	107	Movable noise barrier	-10	97		
			Road roller	HITACHI model CP220-3 (EPD-01183)	97	1	97			97		
(D) Foundation	D1	General foundation construction	Air Compressor	CNP001	100	5	107	Movable noise barrier	-10	97	111	112
			Bar bender and cutter (electric)	CNP021	90	5	97	Movable noise barrier	-10	87		
			Mobile Crane	Hitachi Sumitomo SCX700, 132kW	101	3	106	Movable noise barrier	-5	101		
			Generator, super silenced	CNP103	95	4	101	Movable noise barrier	-10	91		
			Lorry (5.5 tonne < Gross vehicle weight <= 38 tonne)	EPD *	105	2	108			108		
			Drill/grinder, hand-held (electric)	CNP065	98	4	104	Movable noise barrier	-10	94		
			Excavator, wheeled/tracked	KATO model HD820V (EPD-01233)	99	3	104	Movable noise barrier	-5	99		
			Saw, circular, wood	CNP201	108	4	114	Movable noise barrier	-10	104		
			Water pump, submersible (electric)	CNP283	85	4	91	Movable noise barrier	-10	81		
	D2	Piling works	Generator, super silenced	CNP103	95	4	101	Movable noise barrier	-10	91	112	
			Continuous Flight Auger (CFA) piles (piling, earth auger)	CNP167	114	2	117	Provision of acoustic shielding	-5	112		

			PMEs Inventory - Mitigated (with QPMEs and Movable Noise Barriers)									
Construction Activity	**Sub. Work Group**		**Powered Mechanical Equipment**	**Reference**	**SWL per unit**	**Qty**	**Total, SWL**	**At-source Noise Mitigation Measure**	**Noise Barrier Effect ****	**Total SWL (Mitigated)**	**Total SWL, dB(A)**	**Highest SWL of Each Construction Activity, dB(A) @**
	D3	Concreting Works	Concrete Lorry Mixer	CNP044	109	3	114	Movable noise barrier	-10	104	105	
			Generator, super silenced	CNP103	95	4	101	Movable noise barrier	-10	91		
			Poker, vibratory, hand-held (electric)	EPD *	102	3	107	Movable noise barrier	-10	97		
(E) Superstructure	E1	General construction works	Air Compressor	CNP001	100	6	108	Movable noise barrier	-10	98	108	110
			Bar bender and cutter (electric)	CNP021	90	9	100	Movable noise barrier	-10	90		
			Mobile Crane	Hitachi Sumitomo SCX700, 132kW	101	3	106	Movable noise barrier	-5	101		
			Drill/grinder, hand-held (electric)	CNP065	98	10	108	Movable noise barrier	-10	98		
			Generator, super silenced	CNP103	95	4	101	Movable noise barrier	-10	91		
			Saw, circular, wood	CNP201	108	7	116	Movable noise barrier	-10	106		
	E2	Concreting works	Concrete Lorry Mixer	CNP044	109	8	118	Movable noise barrier	-10	108	110	
			Concrete Pump	CNP047	109	4	115	Movable noise barrier	-10	105		
			Generator, super silenced	CNP103	95	4	101	Movable noise barrier	-10	91		
			Poker, vibratory, hand-held (electric)	EPD *	102	7	110	Movable noise barrier	-10	100		
(F) Dump Trucks Travelling on Haul Road During Site Formation	F	Dump Trucks Travelling on Haul Road	Dump Truck (5.5 tonne < Gross vehicle weight <= 38 tonne)	EPD *	105	8	114			114	114	114

Note: Noise levels of the above construction plants are based on the "Technical Memorandum on Noise From Construction Work Other Than Percussive Piling" and EPD's QPMEs database (available at: http://www.epd.gov.hk/cgi-bin/npg/qpme/index.pl?lang=eng)

* EPD website: http://www.epd.gov.hk/epd/english/application_for_licences/guidance/files/OtherSWLe.pdf

** According to EIAO Guidance Note No. 9/2010, with provision of noise barriers, a 5dB(A) noise reduction for movable plant, 10 dB(A) for stationary plant and 15 dB(A) for enclosed ones can be assumed.

\# According to "A Practical Guide for the Reduction of Noise from Construction Works" (page 11), published by HKSAR Gov. Environmental Protection Department, July 1989, excavated-mounted breaker with sound proof hammer bracket installed could achieve a noise reduction up to 10dB(A).

According to the "Best Practice Guide for Environmental Protection on Construction Sites", page 6-9, published by Hong Kong Construction Association, January 2009, excavator-mounted breaker with sound proof hammer bracket can achieve a noise reduction of up to 10dB(A). (Doc. Available at: http://www.hkca.com.hk/front/20090306bpg.pdf)

@ The highest SWL calculated for each Construction Activity for construction noise impact assessment. Each Construction Activity has been divided into several sub. work groups based on the sequence of construction works. Construction activities of respective sub-work groups under each Construction Activity will not overlap with one another.

The above plant inventory has been based on assumption and plant inventory of similar development project.

Appendix 4-6B-4 Calculation of Construction Noise Level (Mitigated Scenario with QPMEs and Movable Noise Barriers)

NSR	Work Type	Construction Activities	Total SWL, dB(A)	Dist. (NSR to Site Boundary) (A), m **	Dist. (Site Boundary to Notional Source) (B), m **& #	Horz. Distance (= A+B), m **	Dist. Corr., dB(A)	Façade Corr., dB(A)	CNL, dB(A)
N1	A	Site Formation, Filling and Excavation	111	272	43	315	-57.9	3.0	56
	B	Construction of Underground Services and Utilities	110	272	43	315	-57.9	3.0	55
	C	Road works	111	272	43	315	-57.9	3.0	56
	D	Foundation	112	272	43	315	-57.9	3.0	57
	E	Superstructure	110	272	43	315	-57.9	3.0	55
N2	A	Site Formation, Filling and Excavation	111	286	42	328	-58.3	3.0	56
	B	Construction of Underground Services and Utilities	110	286	42	328	-58.3	3.0	55
	C	Road works	111	286	42	328	-58.3	3.0	56
	D	Foundation	112	286	42	328	-58.3	3.0	57
	E	Superstructure	110	286	42	328	-58.3	3.0	55
N3	A	Site Formation, Filling and Excavation	111	130	50	180	-53.1	3.0	61
	B	Construction of Underground Services and Utilities	110	130	50	180	-53.1	3.0	60
	C	Road works	111	130	50	180	-53.1	3.0	61
	D	Foundation	112	130	50	180	-53.1	3.0	62
	E	Superstructure	110	130	50	180	-53.1	3.0	60
N4	A	Site Formation, Filling and Excavation	111	112	50	162	-52.2	3.0	62
	B	Construction of Underground Services and Utilities	110	112	50	162	-52.2	3.0	61
	C	Road works	111	112	50	162	-52.2	3.0	62
	D	Foundation	112	112	50	162	-52.2	3.0	63
	E	Superstructure	110	112	50	162	-52.2	3.0	61
N5	A	Site Formation, Filling and Excavation	111	257	50	307	-57.7	3.0	56
	B	Construction of Underground Services and Utilities	110	257	50	307	-57.7	3.0	55
	C	Road works	111	257	50	307	-57.7	3.0	56
	D	Foundation	112	257	50	307	-57.7	3.0	57
	E	Superstructure	110	257	50	307	-57.7	3.0	55
N6	A	Site Formation, Filling and Excavation	111	430	50	480	-61.6	3.0	52
	B	Construction of Underground Services and Utilities	110	430	50	480	-61.6	3.0	51
	C	Road works	111	430	50	480	-61.6	3.0	52
	D	Foundation	112	430	50	480	-61.6	3.0	53
	E	Superstructure	110	430	50	480	-61.6	3.0	51
N7	A	Site Formation, Filling and Excavation	111	563	50	613	-63.7	3.0	50
	B	Construction of Underground Services and Utilities	110	563	50	613	-63.7	3.0	49
	C	Road works	111	563	50	613	-63.7	3.0	50
	D	Foundation	112	563	50	613	-63.7	3.0	51
	E	Superstructure	110	563	50	613	-63.7	3.0	49
N8	A	Site Formation, Filling and Excavation	111	242	50	292	-57.3	3.0	57
	B	Construction of Underground Services and Utilities	110	242	50	292	-57.3	3.0	56
	C	Road works	111	242	50	292	-57.3	3.0	57
	D	Foundation	112	242	50	292	-57.3	3.0	58
	E	Superstructure	110	242	50	292	-57.3	3.0	56
N9	A	Site Formation, Filling and Excavation	111	262	50	312	-57.9	3.0	56
	B	Construction of Underground Services and Utilities	110	262	50	312	-57.9	3.0	55
	C	Road works	111	262	50	312	-57.9	3.0	56
	D	Foundation	112	262	50	312	-57.9	3.0	57
	E	Superstructure	110	262	50	312	-57.9	3.0	55
N10	A	Site Formation, Filling and Excavation	111	162	50	212	-54.5	3.0	60
	B	Construction of Underground Services and Utilities	110	162	50	212	-54.5	3.0	59
	C	Road works	111	162	50	212	-54.5	3.0	60
	D	Foundation	112	162	50	212	-54.5	3.0	61
	E	Superstructure	110	162	50	212	-54.5	3.0	59
N11	A	Site Formation, Filling and Excavation	111	72	50	122	-49.7	3.0	64
	B	Construction of Underground Services and Utilities	110	72	50	122	-49.7	3.0	63
	C	Road works	111	72	50	122	-49.7	3.0	64
	D	Foundation	112	72	50	122	-49.7	3.0	65
	E	Superstructure	110	72	50	122	-49.7	3.0	63
N12	A	Site Formation, Filling and Excavation	111	86	50	136	-50.7	3.0	63
	B	Construction of Underground Services and Utilities	110	86	50	136	-50.7	3.0	62
	C	Road works	111	86	50	136	-50.7	3.0	63
	D	Foundation	112	86	50	136	-50.7	3.0	64
	E	Superstructure	110	86	50	136	-50.7	3.0	62
N13	A	Site Formation, Filling and Excavation	111	183	50	233	-55.3	3.0	59
	B	Construction of Underground Services and Utilities	110	183	50	233	-55.3	3.0	58
	C	Road works	111	183	50	233	-55.3	3.0	59
	D	Foundation	112	183	50	233	-55.3	3.0	60
	E	Superstructure	110	183	50	233	-55.3	3.0	58
N14	A	Site Formation, Filling and Excavation	111	200	50	250	-55.9	3.0	58
	B	Construction of Underground Services and Utilities	110	200	50	250	-55.9	3.0	57
	C	Road works	111	200	50	250	-55.9	3.0	58
	D	Foundation	112	200	50	250	-55.9	3.0	59
	E	Superstructure	110	200	50	250	-55.9	3.0	57
N15	A	Site Formation, Filling and Excavation	111	186	50	236	-55.4	3.0	59
	B	Construction of Underground Services and Utilities	110	186	50	236	-55.4	3.0	58
	C	Road works	111	186	50	236	-55.4	3.0	59
	D	Foundation	112	186	50	236	-55.4	3.0	60
	E	Superstructure	110	186	50	236	-55.4	3.0	58
N16	A	Site Formation, Filling and Excavation	111	479	50	529	-62.5	3.0	52
	B	Construction of Underground Services and Utilities	110	479	50	529	-62.5	3.0	51
	C	Road works	111	479	50	529	-62.5	3.0	52
	D	Foundation	112	479	50	529	-62.5	3.0	53
	E	Superstructure	110	479	50	529	-62.5	3.0	51
N17	A	Site Formation, Filling and Excavation	111	720	50	770	-65.7	3.0	48
	B	Construction of Underground Services and Utilities	110	720	50	770	-65.7	3.0	47
	C	Road works	111	720	50	770	-65.7	3.0	48
	D	Foundation	112	720	50	770	-65.7	3.0	49
	E	Superstructure	110	720	50	770	-65.7	3.0	47
N18	A	Site Formation, Filling and Excavation	111	663	50	713	-65.0	3.0	49

NSR	Work Type	Construction Activities	Total SWL, dB(A)	Dist. (NSR to Site Boundary) (A), m **	Dist. (Site Boundary to Notional Source) (B), m **&#	Horz. Distance (= A+B), m **	Dist. Corr., dB(A)	Façade Corr., dB(A)	CNL, dB(A)
	B	Construction of Underground Services and Utilities	110	663	50	713	-65.0	3.0	48
	C	Road works	111	663	50	713	-65.0	3.0	49
	D	Foundation	112	663	50	713	-65.0	3.0	50
	E	Superstructure	110	663	50	713	-65.0	3.0	48
N19	A	Site Formation, Filling and Excavation	111	3	50	53	-42.5	3.0	72
	B	Construction of Underground Services and Utilities	110	3	50	53	-42.5	3.0	71
	C	Road works	111	3	50	53	-42.5	3.0	72
	D	Foundation	112	3	50	53	-42.5	3.0	73
	E	Superstructure	110	3	50	53	-42.5	3.0	71
N20	A	Site Formation, Filling and Excavation	111	440	50	490	-61.8	3.0	52
	B	Construction of Underground Services and Utilities	110	440	50	490	-61.8	3.0	51
	C	Road works	111	440	50	490	-61.8	3.0	52
	D	Foundation	112	440	50	490	-61.8	3.0	53
	E	Superstructure	110	440	50	490	-61.8	3.0	51

Remark: ** Distance is based on shortest horizontal distance.

The notional noise source location is assumed based on the methodology listed in the statutory Technical Memorandum on Noise from Construction work other than Percussive Piling and that used in the approved EIA report for Wo Shan Wai. It has been assumed that all PME items are operating and gathered within a worksite for a conservative assessment.

Calculation of Noise Level Due to Travelling of Dump Truck within the Project Construction Area During Site Formation, Filling and Excavation Stage

NSR	Work Type	Construction Activities	No. of Trucks/ hr.	SWL per Unit, dB(A)	Horz. Distance From NSR, m	Average Speed, km/hr	Calculated LAeq Due to Travelling of Dump Truck, dB(A) @
N1	F	Dump Trucks Travelling on Haul Road	8	114	315	10	55
N2	F	Dump Trucks Travelling on Haul Road	8	114	328	10	55
N3	F	Dump Trucks Travelling on Haul Road	8	114	180	10	58
N4	F	Dump Trucks Travelling on Haul Road	8	114	162	10	58
N5	F	Dump Trucks Travelling on Haul Road	8	114	307	10	55
N6	F	Dump Trucks Travelling on Haul Road	8	114	480	10	53
N7	F	Dump Trucks Travelling on Haul Road	8	114	613	10	52
N8	F	Dump Trucks Travelling on Haul Road	8	114	292	10	55
N9	F	Dump Trucks Travelling on Haul Road	8	114	312	10	55
N10	F	Dump Trucks Travelling on Haul Road	8	114	212	10	57
N11	F	Dump Trucks Travelling on Haul Road	8	114	122	10	59
N12	F	Dump Trucks Travelling on Haul Road	8	114	136	10	59
N13	F	Dump Trucks Travelling on Haul Road	8	114	233	10	56
N14	F	Dump Trucks Travelling on Haul Road	8	114	250	10	56
N15	F	Dump Trucks Travelling on Haul Road	8	114	236	10	56
N16	F	Dump Trucks Travelling on Haul Road	8	114	529	10	53
N17	F	Dump Trucks Travelling on Haul Road	8	114	770	10	51
N18	F	Dump Trucks Travelling on Haul Road	8	114	713	10	52
N19	F	Dump Trucks Travelling on Haul Road	8	114	53	10	63
N20	F	Dump Trucks Travelling on Haul Road	8	114	490	10	53

Remark: * According to information available at EPD website: http://www.epd.gov.hk/epd/english/application_for_licences/guidance/files/OtherSWLe.pdf

@ Based on equation in the British Standard "Noise Control on Construction and Open Sites, BS 5228: Part 1: 2009": LAeq = SWL – 33 + 10log10 Q – 10 Log10 V – 10log10d

Where,

SWL = Sound Power Level of the dump truck

Q is the number of vehicles per hour

V is the average speed (10 km/hr)

D is the distance of receiver position from the haul road (m) (the horizontal distance between the receiver position and the construction notional noise source is taken in this noise assessment)