

**Quarterly Environmental Quality Monitoring
Report for the Landslide Disaster Protection
Project National Road Network Package - 1
(JICA Format)
Report No-07 (June 2019)**

(NOISE LEVEL MONITORING)

Mitigation Measures

Noise

1. Construction Stage

Item	One hour Laeq	Unit	Measured Value (Mean)	Measured Value (Max)	National standards (Max) *1	World Bank Guidelines * 2	Remarks			
							Location	Frequency	Implementation	
Noise *1	Day time (7:00 - 22:00)	dB(A)	67.4	71	50/75	55	Diyagala	Construction Stage : 4 times / year for 2 years	Constructor through approved monitoring agency	Supervisor RDA/ESD
	Night time (22:00 - 7:00)		45.2	48	40/50	45				

*1 : National Environmental (Protection & Quality) Regulations, CEA (2008)

*2 : Residential area IFC EHS general guideline, for General Health and safety (EHS) Guidelines (2007)

Noise should not exceed the levels presented in Table 3 or result in a maximum increase in background levels of 3dBA at the nearest off - site receptor

Mitigation Measures

Noise

1. Construction Stage

Item	One hour Laeq	Unit	Measured Value (Mean)	Measured Value (Max)	National standards (Max) *1	World Bank Guidelines *2	Remarks			
							Location	Frequency	Implementation	
Noise *1	Day time (7:00 - 22:00)	dB(A)	69.9	70	50/75	55	Nawalapitiya	Construction Stage : 4 times / year for 2 years	Constructor through approved monitoring agency	RDA/ESD Supervisor
	Night time (22:00 - 7:00)		47.6	51	40/50	45	Nawalapitiya			

*1 : National Environmental (Protection & Quality) Regulations, CEA (2008)

*2 : Residential area IFC EHS general guideline, for General Health and safety (EHS) Guidelines (2007)

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Mitigation Measures

Noise

1. Construction Stage

Item	One hour Laeq	Unit	Measured Value (Mean)	Measured Value (Max)	National standards (Max) *1	World Bank Guidelines * 2	Remarks			
							Location	Frequency	Implementation Supervisor	
Noise *1	Day time (7:00 - 22:00)	dB(A)	70.0	72	50/75	55	Kothmalegama-1	Construction Stage : 4 times / year for 2 years	Constructor through approved monitoring agency	RDA/ESD
	Night time (22:00 - 7:00)		48.3	49.2	40/50	45	Kothmalegama-1			

*1 : National Environmental (Protection & Quality) Regulations, CEA (2008)

*2 : Residential area IFC EHS general guideline, for General Health and safety (EHS) Guidelines (2007)

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Mitigation Measures

Noise

1. Construction Stage

Item	One hour Laeq	Unit	Measured Value (Mean)	Measured Value (Max)	National standards (Max) *1	World Bank Guidelines * 2	Remarks			
							Location	Frequency	Implementation	Supervisor
Noise *1	Day time (7:00 - 22:00)	dB(A)	64.6	67	50/75	55	Kothmalegama-2	Construction Stage : 4 times / year for 2 years	Construter through approved monitoring agency	RDA/ESD
	Night time (22:00 - 7:00)		44.1	47	40/50	45				

*1 : National Environmental (Protection & Quality) Regulations, CEA (2008)

*2 : Residential area IFC EHS general guideline, for General Health and safety (EHS) Guidelines (2007)

Noise should not exceed the levels presented in Table 3 or result in a maximum increase in background levels of 3dBA at the nearest off - site receptor

Mitigation Measures

Noise

1. Construction Stage

Item	One hour Laeq	Unit	Measured Value (Mean)	Measured Value (Max)	National standards (Max) *1	World Bank Guidelines * 2	Remarks			
							Location	Frequency	Implementation	
Noise *1	Day time (7:00 - 22:00)	dB(A)	68.8	71	50/75	55	Ramboda	Construction Stage : 4 times / year for 2 years	Constructor through approved monitoring agency	RDA/ESD
	Night time (22:00 - 7:00)		45.8	52	40/50	45	Ramboda			

*1 : National Environmental (Protection & Quality) Regulations, CEA (2008)

*2 : Residential area IFC EHS general guideline, for General Health and safety (EHS) Guidelines (2007)

Noise should not exceed the levels presented in Table 3 or result in a maximum increase in background levels of 3dBA at the nearest off - site receptor

Noise

1. Construction Stage

Item	One hour Laeq	Unit	Measured Value (Mean)	Measured Value (Max)	National standards (Max) *1	World Bank Guidelines * 2	Remarks			
							Location	Frequency	Implementation	
Noise *1	Day time (7:00 - 22:00)	dB(A)	66.9	70	50/75	55	Toppass	Construction Stage : 4 times / year for 2 years	Constructor through approved monitoring agency	Supervisor RDA/ESD
	Night time (22:00 - 7:00)		48.1	52	40/50	45				

*1 : National Environmental (Protection & Quality) Regulations, CEA (2008)

*2 : Residential area IFC EHS general guideline, for General Health and safety (EHS) Guidelines (2007)

Noise should not exceed the levels presented in Table 3 or result in a maximum increase in background levels of 3dBA at the nearest off - site receptor

Mitigation Measures

Noise

1. Construction Stage

Item	One hour Laeq	Unit	Measured Value (Mean)	Measured Value (Max)	National standards (Max) *1	World Bank Guidelines * 2	Remarks			
							Location	Frequency	Implementation	
Noise *1	Day time (7:00 - 22:00)	dB(A)	68.2	71	50/75	55	Keppetipola	Construction Stage : 4 times / year for 2 years	Constructor through approved monitoring agency	RDA/ESD
	Night time (22:00 - 7:00)		45.1	47	40/50	45				

*1 : National Environmental (Protection & Quality) Regulations, CEA (2008)

*2 : Residential area IFC EHS general guideline, for General Health and safety (EHS) Guidelines (2007)

Noise should not exceed the levels presented in Table 3 or result in a maximum increase in background levels of 3dBA at the nearest off - site receptor

Mitigation Measures

Noise

1. Construction Stage

Item	One hour Laeq	Unit	Measured Value (Mean)	Measured Value (Max)	National standards (Max) *1	World Bank Guidelines * 2	Remarks			
							Location	Frequency	Implementation	
Noise *1	Day time (7:00 - 22:00)	dB(A)	71.4	74	50/75	55	Ginigathhena	Construction Stage : 4 times / year for 2 years	Constructor through approved monitoring agency	RDA/ESD
	Night time (22:00 - 7:00)		64.2	66	40/50	45	Ginigathhena			

*1 : National Environmental (Protection & Quality) Regulations, CEA (2008)

*2 : Residential area IFC EHS general guideline, for General Health and safety (EHS) Guidelines (2007)

Noise should not exceed the levels presented in Table 3 or result in a maximum increase in background levels of 3dBA at the nearest off - site receptor

Mitigation Measures

Noise

1. Construction Stage

Item	One hour Laeq	Unit	Measured Value (Mean)	Measured Value (Max)	National standards (Max) *1	World Bank Guidelines * 2	Remarks			
							Location	Frequency	Implementation	
Noise *1	Day time (7:00 - 22:00)	dB(A)	69	71	50/75	55	Pitawala	Construction Stage : 4 times / year for 2 years	Constructor through approved monitoring agency	RDA/ESD
	Night time (22:00 - 7:00)		45.3	48	40/50	45				

*1 : National Environmental (Protection & Quality) Regulations, CEA (2008)

*2 : Residential area IFC EHS general guideline, for General Health and safety (EHS) Guidelines (2007)

Noise should not exceed the levels presented in Table 3 or result in a maximum increase in background levels of 3dBA at the nearest off - site receptor

Mitigation Measures

Noise

1. Construction Stage

Item	One hour Laeq	Unit	Measured Value (Mean)	Measured Value (Max)	National standards (Max) *1	World Bank Guidelines * 2	Remarks			
							Location	Frequency	Implementation	
Noise *1	Day time (7:00 - 22:00)	dB(A)	71.8	72.2	50/75	55	Theiligama	Construction Stage : 4 times / year for 2 years	Constructor through approved monitoring agency	RDA/ESD
	Night time (22:00 - 7:00)		46.5	48.1	40/50	45				

*1 : National Environmental (Protection & Quality) Regulations, CEA (2008)

*2 : Residential area IFC EHS general guideline, for General Health and safety (EHS) Guidelines (2007)

Noise should not exceed the levels presented in Table 3 or result in a maximum increase in background levels of 3dBA at the nearest off - site receptor

**Quarterly Environmental Quality Monitoring
Report for the Landslide Disaster Protection Project National
Road Network Package -1 (JICA Format)
Report No-07 (June 2019)**

(AIR QUALITY MONITORING)

Mitigation Measures

Air Quality (Ambient Air Quality)

Construction Stage

Item	Averaging Time	Unit	Measured value (mean)	Measured value (max)*1	National standards	WHO Guidelines*2	Location	Remarks		
								Frequency	Implementation	Supervision
SO ₂	24 hours	µg/m ³			80	20				
	8 hours				120	-				
	1 hour		26	29	200	-	Diyagala			
NO ₂	24 hours	µg/m ³			100	-				
	8 hours				150	-				
	1 hour		19.3	23	250	200	Diyagala			
	1 year				-	40				
CO	8 hours	µg/m ³			10000	10000				
	1 hour		3235	3320	30000	30000	Diyagala			
O ₃	8 hours	µg/m ³			-	100				
	1 hour		5.1	6	200	-	Diyagala			
Lead compounds	24 hours	µg/m ³			2	-				
	1 year		0.2	0.2	2	-				
PM ₁₀	24 hours	µg/m ³			0.5	0.5				
	3 hours		26.5	29.1		20				
	1 hour				500	-				
SPM	3 hours	µg/m ³			450	-				
	8 hours		144.3	152.4	350	-	Diyagala			
	24 hours				300	-				
	1 year				100	-				

*1: National Ambient Air Quality (NAAQS) of Sri Lanka (2009)

*2: WHO Air Quality guidelines for particulate matter, ozone, nitrogen dioxide and sulfur dioxide (2006)

Mitigation Measures

Air Quality (Ambient Air Quality)

Construction Stage

Item	Averaging Time	Unit	Measured value (mean)	Measured value (max)*1	National standards	WHO Guidelines*2	Location	Remarks		
								Frequency	Implementation	Supervision
SO ₂	24 hours	µg/m ³			80	20				
	8 hours				120	-				
	1 hour		13.2	14.8	200	-	Nawalapitiya			
NO ₂	24 hours	µg/m ³			100	-				
	8 hours				150	-				
	1 hour		17.8	18.1	250	200	Nawalapitiya			
	1 year				-	40				
CO	8 hours	µg/m ³			10000	10000				
	1 hour		1481	1526	30000	30000	Nawalapitiya			
O ₃	8 hours	µg/m ³			-	100				
	1 hour		5	6	200	-	Nawalapitiya			
Lead compounds	24 hours	µg/m ³			2	-				
	1 year				0.5	0.5				
PM ₁₀	24 hours	µg/m ³				20				
	3 hours		37.3	38.9			Nawalapitiya			
	1 hour				500	-				
SPM	3 hours	µg/m ³			450	-				
	8 hours		146.4	149.5	350	-	Nawalapitiya			
	24 hours				300	-				
	1 year				100	-				

*1: National Ambient Air Quality (NAAQS) of Sri Lanka (2009)

*2: WHO Air Quality guidelines for particulate matter, ozone, nitrogen dioxide and sulfur dioxide (2006)

Design Stage
1 time as a baseline data

Construction Stage:
4 time / year for 2 years

Constructor through approved monitoring agency

RDA/ESD

Investigation Measures

Air Quality (Ambient Air Quality)

Construction Stage

Item	Averaging Time	Unit	Measured value (mean)	Measured value (max)*1	National standards	WHO Guidelines*2	Location	Remarks		
								Frequency	Implementation	Supervision
SO ₂	24 hours	µg/m ³			80	20				
	8 hours				120	-				
	1 hour				200	-	Kothmalegama-1			
NO ₂	24 hours	µg/m ³	19.7	21.2	100	-				
	8 hours				150	-				
	1 hour				250	200				
	1 year				-	40				
CO	8 hours	µg/m ³			10000	10000				
	1 hour				30000	30000	Kothmalegama-1			
O ₃	8 hours	µg/m ³			-	100				
	1 hour				200	-	Kothmalegama-1			
Lead compounds	24 hours	µg/m ³	0.1	0.1	2	-				
	1 year				0.5	0.5				
PM ₁₀	24 hours	µg/m ³				20				
	3 hours				40.2		Kothmalegama-1			
SPM	1 hour	µg/m ³			500	-				
	3 hours				450	-				
	8 hours				350	-				
	24 hours				300	-				
	1 year			100	-					

*1: National Ambient Air Quality (NAAQS) of Sri Lanka (2009)

*2: WHO Air Quality guidelines for particulate matter, ozone, nitrogen dioxide and sulfur dioxide (2006)

Design Stage
1 time as a
baseline
data

Construction
Stage:
4 time / year
for 2 years

Constructor
through approved
monitoring agency

RDA/ESD

Mitigation Measures

Air Quality (Ambient Air Quality)

Construction Stage

Item	Averaging Time	Unit	Measured value (mean)	Measured value (max)*1	National standards	WHO Guidelines*2	Location	Remarks		
								Frequency	Implementation	Supervision
SO ₂	24 hours	µg/m ³			80	20				
	8 hours				120	-				
	1 hour		14.6	15.9	200	-	Kothmalegama-2			
NO ₂	24 hours	µg/m ³			100	-				
	8 hours				150	-				
	1 hour		17.4	19.2	250	200	Kothmalegama-2			
	1 year				-	40				
CO	8 hours	µg/m ³			10000	10000				
	1 hour		1634	1651	30000	30000	Kothmalegama-2			
	8 hours				-	100				
O ₃	1 hour	µg/m ³	4	5	200	-	Kothmalegama-2			
	24 hours		0.1	0.1	2	-				
Lead compounds	1 year	µg/m ³			0.5	0.5				
	24 hours		33.1	37.1		20				
PM ₁₀	3 hours	µg/m ³								
	1 hour		129.8	134.5	450	-	Kothmalegama-2			
SPM	3 hours	µg/m ³			350	-				
	8 hours				300	-				
	24 hours				100	-				
	1 year									

*1: National Ambient Air Quality (NAAQS) of Sri Lanka (2009)

*2: WHO Air Quality guidelines for particulate matter, ozone, nitrogen dioxide and sulfur dioxide (2006)

Mitigation Measures

Air Quality (Ambient Air Quality)

Construction Stage

Item	Averaging Time	Unit	Measured value (mean)	Measured value (max)*1	National standards	WHO Guidelines*2	Location	Remarks	
								Frequency	Implementation
SO ₂	24 hours	µg/m ³			80	20			
	8 hours				120	-			
	1 hour		17.3	19.8	200	-	Ramboda		
NO ₂	24 hours	µg/m ³			100	-			
	8 hours				150	-			
	1 hour		14	16	250	200	Ramboda		
	1 year				-	40			
CO	8 hours	µg/m ³			10000	10000			
	1 hour		1134	1152	30000	30000	Ramboda		
O ₃	8 hours	µg/m ³			-	100			
	1 hour		4.1	5.5	200	-	Ramboda		
Lead compounds	24 hours	µg/m ³			2	-			
	1 year		0.1	0.1	0.5	0.5			
PM ₁₀	24 hours	µg/m ³							
	3 hours		27.6	29.1		20	Ramboda		
SPM	1 hour	µg/m ³			500	-			
	3 hours		111.3	120.4	450	-	Ramboda		
	8 hours				350	-			
	24 hours				300	-			
	1 year			100	-				

*1: National Ambient Air Quality (NAAQS) of Sri Lanka (2009)

*2: WHO Air Quality guidelines for particulate matter, ozone, nitrogen dioxide and sulfur dioxide (2006)

Design Stage
1 time as a baseline data

Construction Stage:
4 time / year for 2 years

Constructor through approved monitoring agency

RDA/ESD

Mitigation Measures

Air Quality (Ambient Air Quality)

Construction Stage

Item	Averaging Time	Unit	Measured value (mean)	Measured value (max)*1	National standards	WHO Guidelines*2	Location	Remarks		
								Frequency	Implementation	Supervision
SO ₂	24 hours	µg/m ³			80	20				
	8 hours				120	-				
	1 hour		19	21	200	-	Toppass			
NO ₂	24 hours	µg/m ³			100	-				
	8 hours				150	-				
	1 hour		19.4	21.3	250	200	Toppass			
	1 year				-	40				
CO	8 hours	µg/m ³			10000	10000				
	1 hour		1216	1239	30000	30000	Toppass			
O ₃	8 hours	µg/m ³			-	100				
	1 hour		6.7	7.1	200	-	Toppass			
Lead compounds	24 hours	µg/m ³			2	-				
	1 year				0.5	0.5				
PM ₁₀	24 hours	µg/m ³				20				
	3 hours		28.4	30.6						
	1 hour				500	-				
SPM	3 hours	µg/m ³			450	-				
	8 hours		121.9	135.2	350	-	Toppass			
	24 hours				300	-				
	1 year				100	-				

*1: National Ambient Air Quality (NAAQS) of Sri Lanka (2009)

*2: WHO Air Quality guidelines for particulate matter, ozone, nitrogen dioxide and sulfur dioxide (2006)

Mitigation Measures

Air Quality (Ambient Air Quality)

Construction Stage

Item	Averaging Time	Unit	Measured value (mean)	Measured value (max)*1	National standards	WHO Guidelines*2	Location	Remarks		
								Frequency	Implementation	Supervision
SO ₂	24 hours	µg/m ³			80	20				
	8 hours				120	-				
	1 hour		17.3	19.1	200	-	Keppetipola			
NO ₂	24 hours	µg/m ³			100	-				
	8 hours				150	-				
	1 hour		16.8	18	250	200	Keppetipola			
	1 year				-	40				
CO	8 hours	µg/m ³			10000	10000				
	1 hour		2653	2687	30000	30000	Keppetipola			
O ₃	8 hours	µg/m ³			-	100				
	1 hour		5	5	200	-	Keppetipola			
Lead compounds	24 hours	µg/m ³			2	-				
	1 year				0.5	0.5				
PM ₁₀	24 hours	µg/m ³				20				
	3 hours		26.4	29.1			Keppetipola			
	1 hour				500	-				
SPM	3 hours	µg/m ³			450	-				
	8 hours		161	168	350	-	Keppetipola			
	24 hours				300	-				
	1 year				100	-				

*1: National Ambient Air Quality (NAAQS) of Sri Lanka (2009)

*2: WHO Air Quality guidelines for particulate matter, ozone, nitrogen dioxide and sulfur dioxide (2006)

Design Stage
1 time as a
baseline data

Construction
Stage:
4 time / year for
2 years

Constructor
through approved
monitoring agency

RDA/ESD

Mitigation Measures
Air Quality (Ambient Air Quality)

Construction Stage

Item	Averaging Time	Unit	Measured value (mean)	Measured value (max)*1	National standards	WHO Guidelines*2	Location	Remarks		
								Frequency	Implementation	Supervision
SO ₂	24 hours	µg/m ³			80	20				
	8 hours				120	-				
	1 hour				200	-	Ginigathhena			
NO ₂	24 hours	µg/m ³	24.5	26	100	-				
	8 hours				150	-				
	1 hour		19.4	21	250	200	Ginigathhena			
	1 year				-	40				
CO	8 hours	µg/m ³			10000	10000				
	1 hour		1639	1674	30000	30000	Ginigathhena			
O ₃	8 hours	µg/m ³			-	100				
	1 hour		5.2	6	200	-	Ginigathhena			
Lead compounds	24 hours	µg/m ³	0.2	0.2	2	-				
	1 year				0.5	0.5				
PM ₁₀	24 hours	µg/m ³				20				
	3 hours		37.4	42			Ginigathhena			
	1 hour				500	-				
SPM	3 hours	µg/m ³	166	194	450	-				
	8 hours				350	-	Ginigathhena			
	24 hours				300	-				
	1 year				100	-				

*1: National Ambient Air Quality (NAAQS) of Sri Lanka (2009)

*2: WHO Air Quality guidelines for particulate matter, ozone, nitrogen dioxide and sulfur dioxide (2006)

Design Stage
1 time as a
baseline data

Construction Stage: 4
time / year for 2
years

Constructor through
approved
monitoring agency

RDA/ESD
Supervision

Air quality (Ambient Air Quality)

1. Construction Stage

Item	Averaging Time	Unit	Measured value (mean)	Measured value (max)*1	National standards	WHO Guidelines*2	Remarks			
							Location	Frequency	Implementation	Supervision
SO ₂	24 hours	µg/m ³			80	20				
	8 hours				120	-				
	1 hour		19.2	21	200	-	Pitawala			
NO ₂	24 hours	µg/m ³			100	-				
	8 hours				150	-				
	1 hour		20.5	22	250	200	Pitawala			
	1 year				-	40				
CO	8 hours	µg/m ³			10000	10000				
	1 hour		2292	2331	30000	30000	Pitawala	Design Stage 1 time as a baseline data		
O ₃	8 hours	µg/m ³			-	100				
	1 hour		5	5	200	-	Pitawala	Construction Stage: 4 time / year for 2 years	Constructor through approved monitoring agency	RDA/ESD
Lead compounds	24 hours	µg/m ³	0.1	0.1	2	-				
	1 year				0.5	0.5				
POM ₁₀	24 hours	µg/m ³				20				
	1 year					50				
SPM	1 hour	µg/m ³			500	-				
	3 hours				450	-				
	8 hours		145.9	177.8	350	-	Pitawala			
	24 hours				300	-				
	1 year				100	-				

*1: National Ambient Air Quality (NAAQS) of Sri Lanka (2009)

*2: WHO Air Quality guidelines for particulate matter, ozone, nitrogen dioxide and sulfur dioxide (2006)

Mitigation Measures

1. Construction Stage

*1: National Ambient Air Quality (NAAQS) of Sri Lanka (2009)

Item	Averaging Time	Unit	Measured value (mean)	Measured value (max)*1	National standards	WHO Guidelines*2	Location	Remarks		
								Frequency	Implementation	Supervision
SO ₂	24 hours	µg/m ³			80	20				
	8 hours				120	-				
	1 hour		34.1	36	200	-	Theiligama			
NO ₂	24 hours	µg/m ³			100	-				
	8 hours				150	-				
	1 hour		27	29	250	200	Theiligama			
	1 year				-	40				
CO	8 hours	µg/m ³			10000	10000				
	1 hour		2159	2186	30000	30000	Theiligama			
O ₃	8 hours	µg/m ³			-	100				
	1 hour		6.2	7.3	200	-	Theiligama			
Lead compounds	24 hours	µg/m ³			2	-				
	1 year				0.5	0.5				
POM _{10p}	24 hours	µg/m ³				20				
	3 hour		30.4	33.2		50				
	1 hour				500	-				
SPM	3 hours	µg/m ³			450	-				
	8 hours		173.1	197.3	350	-	Theiligama			
	24 hours				300	-				
	1 year				100	-				

*2: WHO Air Quality guidelines for particulate matter, ozone, nitrogen dioxide and sulfur dioxide (2006)

**Quarterly Environmental Quality Monitoring
Report for the Landslide Disaster Protection Project National
Road Network Package -1 (JICA Format)
Report No-07 (June 2019)**

(VIBRATION LEVEL MONITORING)

Mitigation Measures

Vibration

1. Construction Stage

Item	Unit	Frequency Band	Measured Value (Mean)	Measured Value (Max.)	National Standards (Max.)	International Guidelines	Remarks			
							Location*2	Frequency	Implementation	Supervision
Vibration	mm/sec	0-10 Hz			1.0		Every 6 months during the construction stage, and on complain at the construction site	Diyagala	Constructor through approved monitoring agency	RDA/ESD
		10-50 Hz			2.0					
		Over 50 Hz	0.56	0.60	4.0					

* 1 : National Environmental (Protection & Quality) Regulations, CEA (2008), Category of the structure - "Type C" , Type of Vibration - "Intermittent".

* 2 : The distance from the source (radius / width of corridor) shall be decided by the constructor and RDA.

Mitigation Measures

Vibration

1. Construction Stage

Item	Unit	Frequency Band	Measured Value (Mean)	Measured Value (Max.)	National Standards (Max.)	International Guidelines	Remarks			
							Location ^{*2}	Frequency	Implementation	Supervision
Vibration	mm/sec	0-10 Hz			1.0			Every 6 months during the construction stage, and on complain at the construction site	Constructor through approved monitoring agency	RDA/ESD
		10-50 Hz			2.0					
		Over 50 Hz	0.57	0.59	4.0	Nawalapitiya				

* 1 : National Environmental (Protection & Quality) Regulations, CEA (2008), Category of the structure - "Type C" , Type of Vibration - "Intermittent" .

* 2 : The distance from the source (radius / width of corridor) shall be decided by the constructor and RDA.

Mitigation Measures

Vibration

1. Construction Stage

Item	Unit	Frequency Band	Measured Value (Mean)	Measured Value (Max.)	National Standards (Max.)	International Guidelines	Remarks			
							Location ^{*2}	Frequency	Implementation	Supervision
Vibration	mm/sec	0-10 Hz			1.0		Kothmalegama-1	Every 6 months during the construction stage, and on complain at the construction site	Constructor through approved monitoring agency	RDA/ESD
		10-50 Hz			2.0					
		Over 50 Hz	0.64	0.68	4.0					

* 1 : National Environmental (Protection & Quality) Regulations, CEA (2008), Category of the structure - "Type C" , Type of Vibration - "Intermittent".

* 2 : The distance from the source (radius / width of corridor) shall be decided by the constructor and RDA.

Mitigation Measures

Vibration

1. Construction Stage

Item	Unit	Frequency Band	Measured Value (Mean)	Measured Value (Max.)	National Standards (Max.)	International Guidelines	Remarks			
							Location*2	Frequency	Implementation	Supervision
Vibration	mm/sec	0-10 Hz			1.0		Kothmalegama- 2	Every 6 months during the construction stage, and on complain at the construction site	Constructor through approved monitoring agency	RDA/ESD
		10-50 Hz			2.0					
		Over 50 Hz	0.53	0.55	4.0					

* 1 : National Environmental (Protection & Quality) Regulations, CEA (2008), Category of the structure - "Type C" , Type of Vibration - "Intermittent".
 * 2 : The distance from the source (radius / width of corridor) shall be decided by the constructor and RDA.

Mitigation Measures

Vibration

1. Construction Stage

Item	Unit	Frequency Band	Measured Value (Mean)	Measured Value (Max.)	National Standards (Max.)	International Guidelines	Remarks			
							Location*2	Frequency	Implementation	Supervision
Vibration	mm/sec	0-10 Hz			1.0		Every 6 months during the construction stage, and on complain at the construction site	Ramboda	Constructor through approved monitoring agency	RDA/ESD
		10-50 Hz			2.0					
		Over 50 Hz	0.57	0.61	4.0					

* 1 : National Environmental (Protection & Quality) Regulations, CEA (2008), Category of the structure - "Type C" , Type of Vibration - "Intermittent".

* 2 : The distance from the source (radius / width of corridor) shall be decided by the constructor and RDA.

Mitigation Measures

Vibration

1. Construction Stage

Item	Unit	Frequency Band	Measured Value (Mean)	Measured Value (Max.)	National Standards (Max.)	International Guidelines	Remarks			
							Location*2	Frequency	Implementation	Supervision
Vibration	mm/sec	0-10 Hz			1.0			Every 6 months during the construction stage, and on complain at the construction site	Constructor through approved monitoring agency	RDA/ESD
		10-50 Hz			2.0					
		Over 50 Hz		0.67	0.72	4.0	Toppass			

* 1 : National Environmental (Protection & Quality) Regulations, CEA (2008), Category of the structure - "Type C" , Type of Vibration - "Intermittent".
 * 2 : The distance from the source (radius / width of corridor) shall be decided by the constructor and RDA.

Mitigation Measures

Vibration

1. Construction Stage

Item	Unit	Frequency Band	Measured Value (Mean)	Measured Value (Max.)	National Standards (Max.)	International Guidelines	Remarks			
							Location ^{*2}	Frequency	Implementation	Supervision
Vibration	mm/sec	0-10 Hz			1.0		Every 6 months during the construction stage, and on complain at the construction site	Constructor through approved monitoring agency	RDA/ESD	
		10-50 Hz			2.0					
		Over 50 Hz	0.56	0.59	4.0	Keppetipola				

* 1 : National Environmental (Protection & Quality) Regulations, CEA (2008), Category of the structure - "Type C" , Type of Vibration - "Intermittent".

* 2 : The distance from the source (radius / width of corridor) shall be decided by the constructor and RDA.

Mitigation Measures

Vibration

1. Construction Stage

Item	Unit	Frequency Band	Measured Value (Mean)	Measured Value (Max.)	National Standards (Max.)	International Guidelines	Remarks			
							Location*2	Frequency	Implementation	Supervision
Vibration	mm/sec	0-10 Hz			1.0		Every 6 months during the construction stage, and on complain at the construction site	Constructor through approved monitoring agency	RDA/ESD	
		10-50 Hz			2.0					
		Over 50 Hz	0.61	0.68	4.0	Ginigathhena				

* 1 : National Environmental (Protection & Quality) Regulations, CEA (2008), Category of the structure - "Type C" , Type of Vibration - "Intermittent" .

* 2 : The distance from the source (radius / width of corridor) shall be decided by the constructor and RDA.

Mitigation Measures

Vibration

1. Construction Stage

Item	Unit	Frequency Band	Measured Value (Mean)	Measured Value (Max.)	National Standards (Max.)	International Guidelines	Remarks			
							Location*2	Frequency	Implementation	Supervision
Vibration	mm/sec	0-10 Hz			1.0		Pitawala	Every 6 months during the stage, and on complain at the construction site	Constructor through approved monitoring agency	RDA/ESD
		10-50 Hz			2.0					
		Over 50 Hz	0.51	0.55	4.0					

* 1 : National Environmental (Protection & Quality) Regulations, CEA (2008), Category of the structure - "Type C" , Type of Vibration - "Intermittent".
 * 2 : The distance from the source (radius / width of corridor) shall be decided by the constructor and RDA.

Mitigation Measures

Vibration

1. Construction Stage

Item	Unit	Frequency Band	Measured Value (Mean)	Measured Value (Max.)	National Standards (Max.)	International Guidelines	Remarks			
							Location *2	Frequency	Implementation	Supervision
Vibration	mm/sec	0-10 Hz			1.0		Theligama	Every 6 months during the stage, and on complain at the construction site	Constructor through approved monitoring agency	RDA/ESD
		10-50 Hz			2.0					
		Over 50 Hz	0.48	0.54	4.0					

* 1 : National Environmental (Protection & Quality) Regulations, CEA (2008), Category of the structure - "Type C" , Type of Vibration - "Intermittent".
 * 2 : The distance from the source (radius / width of corridor) shall be decided by the constructor and RDA.

**Quarterly Environmental Quality Monitoring
Report for the Landslide Disaster Protection Project National
Road Network Package -1 (JICA Format)
Report No-07 (June 2019)**

(WATER QUALITY MONITORING)

Mitigation Measures

Water Quality (Effluent/Wastewater)

Construction Stage

Site Location: Kothmalegama-1 (A005-043)

Item	Unit	Measured Value (Mean)	Measured Value (Max.)	National Standards (Max) *1	International Guidelines	Remarks			
						Location	Frequency	Implementation	Supervision
EC	(S/m)	0.031	0.059	-	-	Kothmalegama-1	<u>Design Stage:</u> 1 time as a baseline data <u>Construction stage :</u> 4 times/year for 2 years	Constructor through approved monitoring agency RDA/ESD	
pH	-	6.7	6.9	6.0-8.5	6-9 *2				
DO	(mg/L)	10.3	12.1	-	-				
Turbidity	(mg/L)	0.12	0.21	-	<0.2*3				
TSS	(mg/L)	13.54	28	50	50*2				
BOD ₅	(mg/L)	0.85	1.23	30	30*2				
Lead	(mg/L)	Not Detected	Not Detected	0.1	0.01				
Oil & grease	(mg/L)	0	0	10	10*2				
Coliform	MPN/100mL	27	31	40	400*2				

*1: National Environmental (Protection & Quality) Regulations, CEA (2008)

*2: IFC EHS general guideline, for Sanitary Sewage Discharge (2007)

*3: ADB Guidelines & Standards in Relation to Wastewater Reuse (2011), Main usage – “All nondrinking water uses”

Water Quality (Effluent/Wastewater)

Construction Stage

Site Location: Diyagala (A007-057)

Item	Unit	Measured Value (Mean)	Measured Value (Max.)	National Standards (Max) *1	International Guidelines	Remarks		
						Location	Frequency	Implementation Supervision
EC	(S/m)	0.011	0.020	-	-	Diyagala	<u>Design Stage:</u> 1 time as a baseline data <u>Construction stage:</u> 4 times/year for 2 years	Constructor through approved monitoring agency RDA/ESD
pH	-	7.1	7.4	6.0-8.5	6-9 *2			
DO	(mg/L)	9.15	9.67	-	-			
Turbidity	(mg/L)	0.13	0.32	-	<0.2 *3			
TSS	(mg/L)	4.11	10.6	50	50 *2			
BOD ₅	(mg/L)	0.30	0.52	30	30 *2			
Lead	(mg/L)	Not Detected	Not Detected	0.1	0.01			
Oil & grease	(mg/L)	0	0	10	10 *2			
Coliform	MPN/100mL	27	31	40	400 *2			

*1: National Environmental (Protection & Quality) Regulations, CEA (2008)

*2: IFC EHS general guideline, for Sanitary Sewage Discharge (2007)

*3: ADB Guidelines & Standards in Relation to Wastewater Reuse (2011), Main usage -- "All nondrinking water uses"

Mitigation Measures

Water Quality (Effluent/Wastewater)

Construction Stage

Site Location: Kothmalegama- 02 (A005-044)

Item	Unit	Measured Value (Mean)	Measured Value (Max.)	National Standards (Max) *1	International Guidelines	Remarks		
						Location	Frequency	Implementation Supervision
EC	(S/m)	0.019	0.027	-	-	Kothmalegama 02	<u>Design Stage:</u> 1 time as a baseline data <u>Construction stage :</u> 4 times/year for 2 years	Constructor through approved monitoring agency RDA/ESD
pH	-	7.4	7.5	6.0-8.5	6-9 *2			
DO	(mg/L)	8.60	9.35	-	-			
Turbidity	(mg/L)	0.13	0.91		<0.2 *3			
TSS	(mg/L)	7.27	11.6	50	50 *2			
BOD ₅	(mg/L)	0.31	0.44	30	30 *2			
Lead	(mg/L)	Not Detected	Not Detected	0.1	0.01			
Oil & grease	(mg/L)	0	0	10	10 *2			
Coliform	MPN/100mL	23	28	40	400 *2			

*1: National Environmental (Protection & Quality) Regulations, CEA (2008)

*2: IFC EHS general guideline, for Sanitary Sewage Discharge (2007)

*3: ADB Guidelines & Standards in Relation to Wastewater Reuse (2011), Main usage – "All nondrinking water uses"

Water Quality (Effluent/Wastewater)

Construction Stage

Site Location: Ramboda (A005-046)

Item	Unit	Measured Value (Mean)	Measured Value (Max.)	National Standards (Max) *1	International Guidelines	Remarks			
						Location	Frequency	Implementation	Supervision
EC	(S/m)	0.050	0.052	-	-	Ramboda	<u>Design Stage:</u> 1 time as a baseline data <u>Construction stage :</u> 4 times/year for 2 years	Constructor through approved monitoring agency RDA/ESD	
pH	-	6.6	7.2	6.0-8.5	6-9 *2				
DO	(mg/L)	11.2	12.3	-	-				
Turbidity	(mg/L)	0.21	0.28		<0.2*3				
TSS	(mg/L)	15.2	31	50	50*2				
BOD ₅	(mg/L)	1.2	2.6	30	30*2				
Lead	(mg/L)	Not Detected	Not Detected	0.1	0.01				
Oil & grease	(mg/L)	1.0	1.7	10	10*2				
Coliform	MPN/100mL	34	35	40	400*2				

*1: National Environmental (Protection & Quality) Regulations, CEA (2008)

*2: IFC EHS general guideline, for Sanitary Sewage Discharge (2007)

*3: ADB Guidelines & Standards in Relation to Wastewater Reuse (2011), Main usage – “All nondrinking water uses”

Mitigation Measures

Water Quality (Effluent/Wastewater)

Construction Stage

Site Location: Toppass (A005-063)

Item	Unit	Measured Value (Mean)	Measured Value (Max.)	National Standards (Max) *1	International Guidelines	Remarks			
						Location	Frequency	Implementation	Supervision
EC	(S/m)	0.076	0.140	-	-	Toppass	<u>Design Stage:</u> 1 time as a baseline data <u>Construction stage :</u> 4 times/year for 2 years	Constructer through approved monitoring agency RDA/ESD	
pH	-	6.9	7.2	6.0-8.5	6-9 *2				
DO	(mg/L)	10.21	14.2	-	-				
Turbidity	(mg/L)	0.24	0.29		<0.2 *3				
TSS	(mg/L)	0.43	0.58	50	50 *2				
BOD ₅	(mg/L)	1.47	1.78	30	30 *2				
Lead	(mg/L)	Not Detected	Not Detected	0.1	0.01				
Oil & grease	(mg/L)	0	0	10	10 *2				
Coliform	MPN/100mL	32	33	40	400 *2				

*1: National Environmental (Protection & Quality) Regulations, CEA (2008)

*2: IFC EHS general guideline, for Sanitary Sewage Discharge (2007)

*3: ADB Guidelines & Standards in Relation to Wastewater Reuse (2011), Main usage – "All nondrinking water uses"

Water Quality (Effluent/Wastewater)

Construction Stage

Site Location: Keppetipola (A005-091)

Item	Unit	Measured Value (Mean)	Measured Value (Max.)	National Standards (Max) *1	International Guidelines	Remarks			
						Location	Frequency	Implementation	Supervision
EC	(S/m)	0.23	0.36	-	-	Keppetipola	<u>Design Stage:</u> 1 time as a baseline data <u>Construction stage :</u> 4 times/year for 2 years	Constructer through approved monitoring agency RDA/ESD	
pH	-	6.8	7.2	6.0-8.5	6-9 *2				
DO	(mg/L)	12.76	14.44	-	-				
Turbidity	(mg/L)	0.03	0.12		<0.2*3				
TSS	(mg/L)	6.15	8.52	50	50*2				
BOD ₅	(mg/L)	3.66	5.7	30	30*2				
Lead	(mg/L)	Not Detected	Not Detected	0.1	0.01				
Oil & grease	(mg/L)	0.05	0.17	10	10*2				
Coliform	MPN/100mL	27	30	40	400*2				

*1: National Environmental (Protection & Quality) Regulations, CEA (2008)

*2: IFC EHS general guideline, for Sanitary Sewage Discharge (2007)

*3: ADB Guidelines & Standards in Relation to Wastewater Reuse (2011), Main usage -- "All nondrinking water uses"

Water Quality (Effluent/Wastewater)

Construction Stage

Site Location: Nawalapitiya (A113-015)

Item	Unit	Measured Value (Mean)	Measured Value (Max.)	National Standards (Max) *1	International Guidelines	Remarks			
						Location	Frequency	Implementation	Supervision
EC	(S/m)	0.041	0.061	-	-	Nawalapitiya (A113-015)	Design Stage: 1 time as a baseline data Construction stage : 4 times/year for 2 years	Constructor through approved monitoring agency	RDA/ESD
pH	-	7.2	7.7	6.0-8.5	6-9 *2				
DO	(mg/L)	14.62	16.94	-	-				
Turbidity	(mg/L)	0.28	0.43		<0.2 *3				
TSS	(mg/L)	9.3	13	50	50 *2				
BOD ₅	(mg/L)	0.59	0.81	30	30 *2				
Lead	(mg/L)	Not Detected	Not Detected	0.1	0.01				
Oil & grease	(mg/L)	0.32	0.51	10	10 *2				
Coliform	MPN/100mL	36	41	40	400 *2				

*1: National Environmental (Protection & Quality) Regulations, CEA (2008)

*2: IFC EHS general guideline, for Sanitary Sewage Discharge (2007)

*3: ADB Guidelines & Standards in Relation to Wastewater Reuse (2011), Main usage – "All nondrinking water uses"

Mitigation Measures

Water Quality (Effluent/Wastewater)

Construction Stage

Site Location: Ginigathhena (A007-054)

Item	Unit	Measured Value (Mean)	Measured Value (Max.)	National Standards (Max) *1	International Guidelines	Remarks			
						Location	Frequency	Implementation	Supervision
EC	(S/m)	0.121	0.165	-	-	Ginigathhena (A007-054)	<u>Design Stage:</u> 1 time as a baseline data <u>Construction stage :</u> 4 times/year for 2 years	Constructer through approved monitoring agency RDA/ESD	
pH	-	7.1	7.6	6.0-8.5	6-9 ^{*2}				
DO	(mg/L)	3.6	3.8	-	-				
Turbidity	(mg/L)	0.24	0.29		<0.2 ^{*3}				
TSS	(mg/L)	0.55	0.86	50	50 ^{*2}				
BOD ₅	(mg/L)	1.57	1.94	30	30 ^{*2}				
Lead	(mg/L)	Not Detected	Not Detected	0.1	0.01				
Oil & grease	(mg/L)	0	0	10	10 ^{*2}				
Coliform	MPN/100mL	33	37	40	400 ^{*2}				

*1: National Environmental (Protection & Quality) Regulations, CEA (2008)

*2: IFC EHS general guideline, for Sanitary Sewage Discharge (2007)

*3: ADB Guidelines & Standards in Relation to Wastewater Reuse (2011), Main usage – "All nondrinking water uses"

Mitigation Measures

Water Quality (Effluent/Wastewater)

1). Construction Stage

Site location: Theiligama (A007-031)

Item	Unit	Measured Value (Mean)	Measured Value (Max.)	National Standards (Max) *1	International Guidelines	Remarks		
						Location	Frequency	Implementation Supervision
EC	(S/m)	0.035	0.071	-	-	Theiligama (A007-031)	<u>Design Stage:</u> 1 time as a baseline data <u>Construction stage :</u> 4 times/year for 2 years	Constructor through approved monitoring agency RDA/ESD
pH	-	6.8	6.9	6.0-8.5	6-9 ^{*2}			
DO	(mg/L)	2.71	3.44	-	-			
Turbidity	(mg/L)	0.27	0.36	-	<0.2 ^{*3}			
TSS	(mg/L)	3.2	4.9	50	50 ^{*2}			
BOD ₅	(mg/L)	0.39	0.54	30	30 ^{*2}			
Lead	(mg/L)	Not Detected	Not Detected	0.1	0.01			
Oil & grease	(mg/L)	0.6	1.1	10	10 ^{*2}			
Coliform	MPN/100mL	33	36	40	400 ^{*2}			

*1: National Environmental (Protection & Quality) Regulations, CEA (2008)

*2: IFC EHS general guideline, for Sanitary Sewage Discharge (2007)

Mitigation Measures

Water Quality (Effluent/Wastewater)

1). Construction Stage

Site location: Pitawala (A007-045)

Item	Unit	Measured Value (Mean)	Measured Value (Max.)	National Standards (Max) *1	International Guidelines	Remarks		
						Location	Frequency	Implementation Supervision
EC	(S/m)	0.13	0.16	-	-	Pitawala (A007-045)	Design Stage: 1 time as a baseline data Construction stage : 4 times/year for 2 years	Constructor through approved monitoring agency RDA/ESD
pH	-	6.5	7.1	6.0-8.5	6-9 *2			
DO	(mg/L)	2.9	4.2	-	-			
Turbidity	(mg/L)	0.33	0.39		<0.2 *3			
TSS	(mg/L)	1.22	1.72	50	50 *2			
BOD ₅	(mg/L)	1.8	2.4	30	30 *2			
Lead	(mg/L)	Not Detected	Not Detected	0.1	0.01			
Oil & grease	(mg/L)	1.9	3.6	10	10 *2			
Coliform	MPN/100mL	35	38	40	400 *2			

*1: National Environmental (Protection & Quality) Regulations, CEA (2008)

*2: IFC EHS general guideline, for Sanitary Sewage Discharge (2007)

