

Agreement No. CE 10/2014 (CE)
Development of Anderson Road Quarry Site - Investigation, Design and Construction
EIA Report for Rock Cavern Developments

Sound Power Level of Powered Mechanical Equipment

PME	SWLs		
	Ref.	Description	SWL, dB(A)
Air Compressor	CNP 002	Air Compressor, air flow > 10m ³ /min and < 30m ³ /min	102
Backhoe	CNP 081	Excavator/loader, wheeled/tracked	112
Bar Bender, Cutter	CNP 021	Bar bender and cutter (electric)	90
Breaker, handheld	CNP 024	Breaker, hand-held, mass > 10kg and < 20kg	108
Concrete Lorry Mixer	CNP 044	Concrete lorry mixer	109
Concrete Pump	CNP 047	Concrete pump, stationary/lorry mounted	109
Crane Mobile	CNP 048	Crane, mobile/barge mounted (diesel)	112
Dump truck	CNP 067	Dump truck, gross vehicle weight > 38 tonne	117
Excavator	CNP 081	Excavator/loader, wheeled/tracked	112
Excavator-Mounted Hydraulic Hammer	CNP 028	Breaker, excavator mounted (hydraulic)	122
Excavator-Mounted Hydraulic Splitter	CNP 028	Breaker, excavator mounted (hydraulic)	122
Generator	CNP 101	Generator, standard	108
Handheld Hydraulic Splitter	CNP 025	Breaker, hand-held, mass > 20kg and < 35kg	111
Hydraulic Power Pack	CNP 168	Power pack for hand-held items of PME	100
Jumbo drill/drill rig	CNP 182	Rock drill, crawler mounted (hydraulic)	123
Loading and Haulage fleet	CNP 067	Dump truck, gross vehicle weight > 38 tonne	117
Lorry	CNP 141	Lorry, gross vehicle weight > 38 tonne	112
Poker, Vibratory, Hand Held	CNP 170	Poker, vibratory, hand-held	113
Saw, circular, wood	CNP 201	Saw, circular, wood	108
Ventilation Fan with Plastic Ducting	CNP 241	Ventilation fan	108
Vibratory Poker	CNP 170	Poker, vibratory, hand-held	113
Water pump (Electric)	CNP 281	Water pump (electric)	88

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 Detailed Powered Mechanical Equipment Inventory
 Works Site S22b - Site formation for Cavern

Activity	Item	SWL ref.	Unmitigated SWL	No. of Plant	Utilization Rate	Sub-Total SWL
Mobilization and Site Clearance	Backhoe	CNP 081	112	1	50%	109
	Breaker, handheld	CNP 024	108	1	20%	101
	Dump truck	CNP 067	117	2	50%	117
Total SWL:						118

Activity	Item	SWL ref.	Unmitigated SWL	No. of Plant	Utilization Rate	Sub-Total SWL
Slopes Excavation and Stabilisation	Jumbo drill/drill rig	CNP 182	123	1	30%	118
	Excavator	CNP 081	112	1	50%	109
	Excavator-Mounted Hydraulic Splitter	CNP 028	122	1	30%	117
	Excavator-Mounted Hydraulic Hammer	CNP 028	122	1	40%	118
	Handheld Hydraulic Splitter	CNP 025	111	4	30%	112
	Generator	CNP 101	108	1	100%	108
	Air Compressor	CNP 002	102	1	100%	102
	Loading and Haulage fleet	CNP 067	117	1	50%	114
	Hydraulic Power Pack	CNP 168	100	2	100%	103
	Total SWL:					

Activity	Item	SWL ref.	Unmitigated SWL	No. of Plant	Utilization Rate	Sub-Total SWL
Cavern Excavation	Jumbo drill/drill rig	CNP 182	123	1	30%	118
	Excavator	CNP 081	112	1	40%	108
	Excavator-Mounted Hydraulic Splitter	CNP 028	122	1	30%	117
	Excavator-Mounted Hydraulic Hammer	CNP 028	122	1	30%	117
	Handheld Hydraulic Splitter	CNP 025	111	4	20%	110
	Ventilation Fan with Plastic Ducting	CNP 241	108	1	100%	108
	Generator	CNP 101	108	1	100%	108
	Air Compressor	CNP 002	102	1	100%	102
	Hydraulic Power Pack	CNP 168	100	2	100%	103
	Loading and Haulage fleet	CNP 067	117	1	50%	114
Total SWL:						123

Activity	Item	SWL ref.	Unmitigated SWL	No. of Plant	Utilization Rate	Sub-Total SWL
Permanent Cavern and Adits Lining Works	Generator	CNP 101	108	1	100%	108
	Concrete Lorry Mixer	CNP 044	109	2	50%	109
	Bar Bender, Cutter	CNP 021	90	1	20%	83
	Saw, circular, wood	CNP 201	108	1	20%	101
	Concrete Pump	CNP 047	109	1	50%	106
	Vibratory Poker	CNP 170	113	2	30%	111
	Water pump (Electric)	CNP 281	88	1	100%	88
	Total SWL:					

Activity	Item	SWL ref.	Unmitigated SWL	No. of Plant	Utilization Rate	Sub-Total SWL
Landscaping & Finishing Works	Bar Bender, Cutter	CNP 021	90	1	20%	83
	Poker, Vibratory, Hand Held	CNP 170	113	1	20%	106
	Crane Mobile	CNP 048	112	1	30%	107
	Concrete Lorry Mixer	CNP 044	109	1	30%	104
	Lorry	CNP 141	112	1	80%	111
Total SWL:						114

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 Calculations of Construction Noise Levels

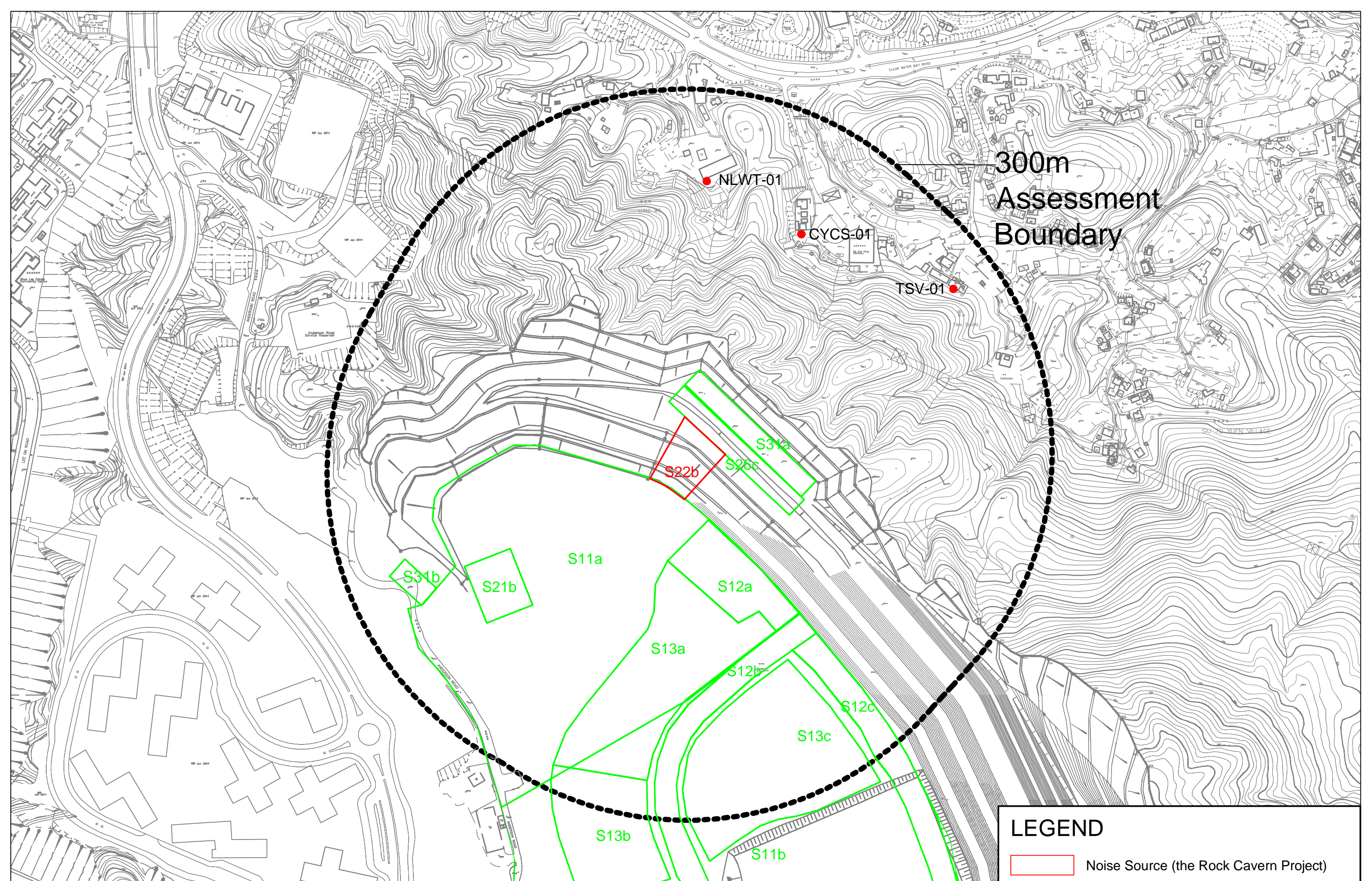
NSR		TSV-01		2018										2019										2020													
Works Area	Proposed Works	Activity	Start	End	SWL	Dist.	Distance Attenuation	Façade Correction	SPL [1]	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J			
Rock Cavern Development																																					
S22b	Site formation for Cavern	Mobilization and Site Clearance	Jan-18	Mar-18	118	277	-57	3	64	64	64	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
		Slopes Excavation and Stabilisation	Apr-18	Jul-18	124	277	-57	3	70	-	-	-	70	70	70	70	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
		Cavern Excavation	Aug-18	May-19	123	277	-57	3	69	-	-	-	-	-	-	-	-	69	69	69	69	69	69	69	69	69	69	69	69	69	69	69	69	69	69		
		Permanent Cavern and Adits Lining Works	Jun-19	Oct-19	115	277	-57	3	61	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	61	61	61	61	61	61	61	61		
		Landscaping & Finishing Works	Nov-19	Jan-20	114	277	-57	3	60	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	60	60	60		
Concurrent Projects [2] [3]																																					
S11a	Works Area WC04 - Site Formation and Engineering Infrastructure at Main Site - Phase 2 area	Earthwork	Jul-18	Jul-20	101	>300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
S11b	Works Area WC04 - Site Formation and Engineering Infrastructure at Main Site - Phase 2 area	Earthwork	Jul-18	Jul-20	101	>300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
S12a	Works Area WC04 - Site Formation and Engineering Infrastructure at Main Site - Phase 2 area	Roadwork	Apr-19	Oct-20	105	>300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
		Paving	Nov-20	Dec-20	101	>300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
S12b	Works Area WC04 - Site Formation and Engineering Infrastructure at Main Site - Phase 2 area	Roadwork	Apr-19	Oct-20	105	>300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
		Paving	Nov-20	Dec-20	101	>300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
S12c	Works Area WC04 - Site Formation and Engineering Infrastructure at Main Site - Phase 2 area	Roadwork	Apr-19	Oct-20	105	>300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
		Paving	Nov-20	Dec-20	101	>300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
S13a	Works Area WC04 - Site Formation and Engineering Infrastructure at Main Site - Phase 2 area	Piling	Jan-21	Dec-21	104	>300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
		Pile Cap - Excavation	Jan-22	Jun-22	108	>300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
		Superstructure	Mar-22	Aug-23	108	>300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
		MEP installation	Apr-23	Dec-23	97	>300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
S13b	Works Area WC04 - Site Formation and Engineering Infrastructure at Main Site - Phase 2 area	Piling	Jan-21	Dec-21	104	>300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
		Pile Cap - Excavation	Jan-22	Jun-22	107	>300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
		Superstructure	Mar-22	Aug-23	106	>300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
		MEP installation	Apr-23	Dec-23	97	>300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
S13c	Works Area WC04 - Site Formation and Engineering Infrastructure at Main Site - Phase 2 area	Piling	Jan-21	Dec-21	104	>300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
		Pile Cap - Excavation	Jan-22	Jun-22	108	>300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
		Superstructure	Mar-22	Aug-23	108	>300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
		MEP installation	Apr-23	Dec-23	97	>300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
S21b	Works Area WC05 - Drainage Retention Tank	Earthwork	Jul-16	Apr-17	103	>300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
		Superstructure	May-17	Oct-18	106	>300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
		Backfilling	Nov-18	Jun-19	101	>300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
S26c	Works Area WC09 - Viewing Platform	Site Clearance	Jan-18	Apr-18	101	244	-56	3	48	48	48	48	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
		Piling	May-18	Dec-18	103	244	-56	3	50	-	-	-	-	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50				
		Pile Cap-Excavation	Jan-19	Oct-19	107	244	-56	3	54	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	54	54	54	54	54	54	54	54	54	54	54		
		Superstructure	Nov-19	Dec-20	105	244	-56	3	52	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	52	52	52			
S31a	Works Area WC10 - Service Reservoirs, Pumping Station	Foundation - Concreting	Jul-18	Aug-19	105	226	-55	3	53	-	-	-	-	-	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53				
		Superstructure (Cast in-situ)	Nov-18	Dec-20	106	226	-55	3	54	-	-	-	-	-	-	-	-	-	-	-	-	-	-	54	54	54	54	54	54	54	54	54	54	54			
S31b	Works Area WC10 - Service Reservoirs, Pumping Station	Foundation - Concreting	Jul-18	Aug-19	103	>300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
		Superstructure (Cast in-situ)	Nov-18	Dec-20	104	>300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
Predicted Overall Noise Level (Leq 30mins)										64	64	64	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	63	63	63	63	63	63	61	61	61

Note:
 [1] Assume contribution from SPL of worksite(s) >300m away from the NSR is/are negligible.
 [2] Construction programme, period, sound power level (SWL) of the works activities and worksites location from concurrent projects (S11a, S11b, S12a, S12b, S12c, S13a, S13b, S13c, S26c & S31a) were referenced from the approved Schedule 3 EIA Report for Development of Anderson Road Quarry (EIA-222/2014).
 [3] Construction programme, period, sound power level (SWL) of the works activities and worksites location from concurrent project (S21b) was referenced from the latest Environmental Review Report for Schedule 3 EIA Report for Development of Anderson Road Quarry.

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 Calculations of Construction Noise Levels

Summary of Predicted Overall Noise Level

NSR	Max	2018												2019												2020
		J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J
TSV-01	70	64	64	64	70	70	70	70	70	70	70	70	70	70	70	70	70	70	63	63	63	63	63	61	61	61
NLWT-01	71	65	65	65	71	71	71	71	71	71	71	71	71	71	71	71	71	71	64	64	64	64	64	62	62	62
CYCS-01	72	66	66	66	72	72	72	72	72	72	72	72	72	72	72	72	72	72	65	65	65	65	65	63	63	63



300m
Assessment
Boundary

NLWT-01

CYCS-01

TSV-01

S11a

S12a

S13a

S12b

S12c

S13c

S13b

S11b

S31b

S21b

S22b

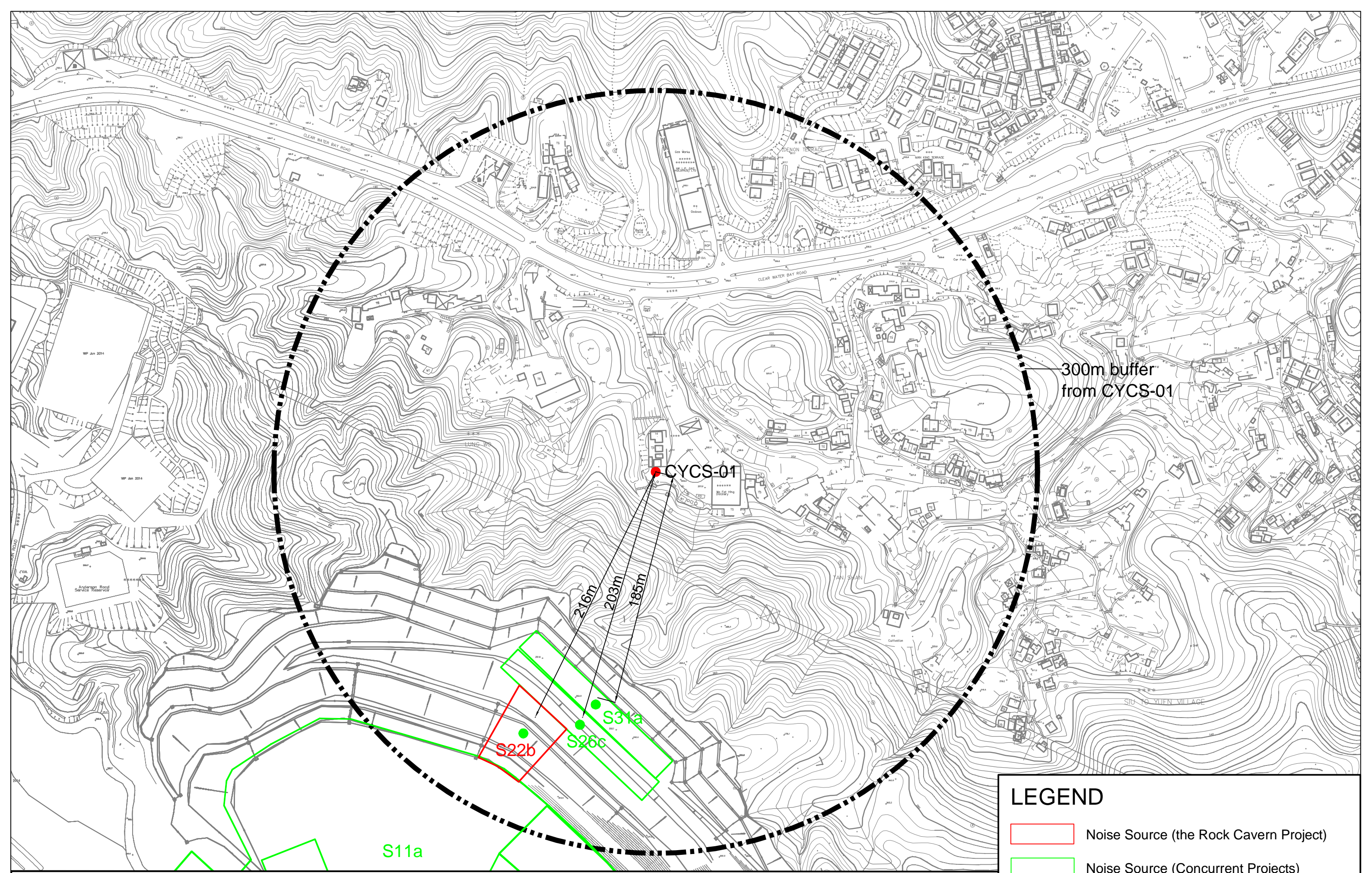
S26c

S31a

LEGEND

- Noise Source (the Rock Cavern Project)
- Noise Source (Concurrent Projects)
- NSR under Construction Noise Assessment

Location of Construction Noise Sources within the 300m Assessment Boundary



300m buffer
from CYCS-01

CYCS-01

216m

203m

185m

S22b

S26c

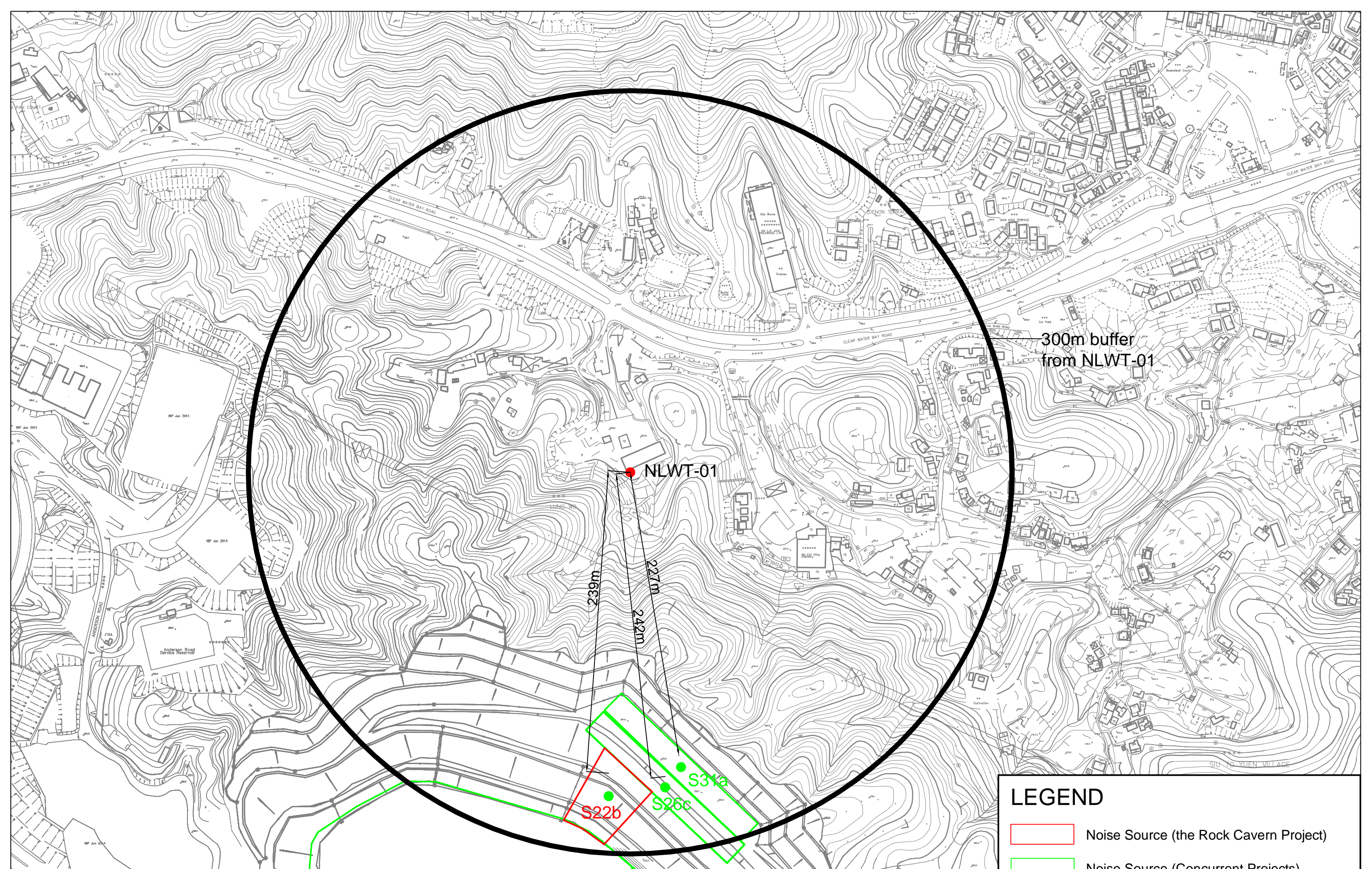
S31a

S11a

LEGEND

- Noise Source (the Rock Cavern Project)
- Noise Source (Concurrent Projects)
- NSR under Construction Noise Assessment
- X m Notional Distance (X in meter)

Notional Distances of CYCS-01



300m buffer
from NLWT-01

NLWT-01

239m

227m

242m

S22b

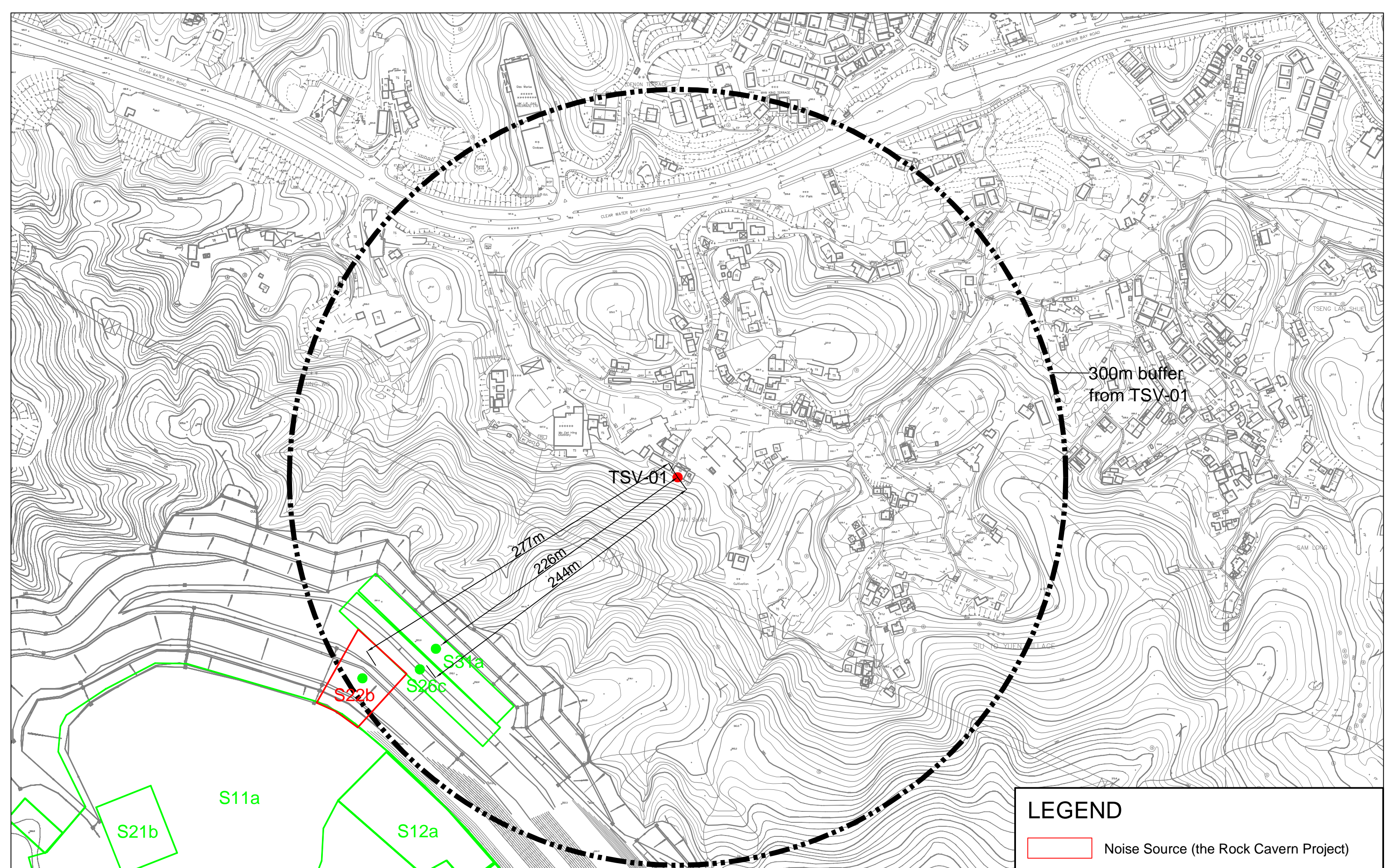
S26c

S31a

LEGEND

- Noise Source (the Rock Cavern Project)
- Noise Source (Concurrent Projects)
- NSR under Construction Noise Assessment
- X m Notional Distance (X in meter)

Notional Distances of NLWT-01



Notional Distances of TSV-01

LEGEND

- Noise Source (the Rock Cavern Project)
- Noise Source (Concurrent Projects)
- NSR under Construction Noise Assessment
- X m Notional Distance (X in meter)