Attachment D

Baseline water quality data

D.1 Departures from water quality objectives

Table D.1 Departures from WQOs – plateau

Watercourse	analyte	Summer/autumn dry weather conditions			Winter/spring dry weather conditions			Wet weather conditions		
		Frequent exceedance[1]	Occasional exceedance[2]	# Samples/ exceedances	Frequent exceedance[1]	Occasional exceedance[2]	# Samples/ exceedances	Frequent exceedance[1]	Occasional exceedance[2]	# Samples/ exceedances
Murrumbidgee River	Dissolved oxygen	✓		15/14	✓		16/14		No data available	
	pH	✓		18/5		✓	20/3			
	Ammonia		✓	18/2		✓	21/2			
	Oxidised nitrogen	✓		17/9	✓		21/7			
	Total nitrogen	✓		18/4		✓	21/2			
	Total phosphorus		✓	18/1		✓	21/1			
	Aluminium	✓		16/14	✓		21/21			
	Arsenic			16/0		✓	21/1			
	Iron	✓		16/6		✓	21/3			
	Zinc			16/0		✓	21/3			
Eucumbene River	Dissolved oxygen	✓		11/11	✓		13/11		No data available	
	pH		✓	14/1	✓		17/4			
	Ammonia			14/0		✓	18/3			
	Oxidised nitrogen	✓		14/9	✓		18/7			
	Total nitrogen		✓	14/1			18/0			
	Total phosphorus		✓	14/2		✓	18/1			
	Aluminium	✓		14/4	✓		18/5			
	Boron		✓	14/1			18/0			
	Copper		✓	14/1			18/0			

Table D.1 Departures from WQOs – plateau

Watercourse	analyte	Summer/autumn dry weather conditions			Winter/spring dry weather conditions			Wet weather conditions		
		Frequent exceedance[1]	Occasional exceedance[2]	# Samples/ exceedances	Frequent exceedance[1]	Occasional exceedance[2]	# Samples/ exceedances	Frequent exceedance[1]	Occasional exceedance[2]	# Samples/ exceedances
	Zinc			14/0		✓	18/3			
Tantangara Creek	Dissolved oxygen	✓		11/9	✓		11/10		No data available	
	pH		✓	13/2	✓		15/6			
	Ammonia			13/0	✓		15/5			
	Oxidised nitrogen	✓		13/9	✓		15/5			
	Total nitrogen	✓		13/3			15/0			
	Total phosphorus		✓	13/1		✓	15/2			
	Aluminium	✓		12/10	✓		15/12			
	Boron		✓	12/1			15/0			
	Copper			12/0		✓	15/2			
	Zinc			12/0		✓	15/2			
Gooandra Creek	Dissolved oxygen	✓		5/4	✓		6/5		No data available	
	pH	✓		6/2	✓		8/4			
	Ammonia			6/0	✓		8/2			
	Oxidised nitrogen	✓		5/2	✓		8/3			
	Total nitrogen			6/0		✓	8/1			
	Total phosphorus			6/0		✓	8/1			
	Aluminium	✓		5/1	✓		8/3			
	Chromium (total)	✓		5/1		✓	8/1			

Table D.1 Departures from WQOs – plateau

Watercourse	analyte	Summer/autumn dry weather conditions			Winter/spring dry weather conditions			Wet weather conditions		
		Frequent exceedance[1]	Occasional exceedance[2]	# Samples/ exceedances	Frequent exceedance[1]	Occasional exceedance[2]	# Samples/ exceedances	Frequent exceedance[1]	Occasional exceedance[2]	# Samples/ exceedances
	Copper			5/0		✓	8/1			
	Zinc	✓		5/1	✓		8/2			
Nungar Creek	Dissolved oxygen	✓		3/3	✓		4/4	No data available		
	pH	✓		4/1		✓	6/1			
	Oxidised nitrogen	✓		4/2		✓	7/1			
	Total nitrogen			4/0		✓	7/1			
	Total phosphorus			4/0		✓	7/1			
	Aluminium	✓		4/3	✓		7/6			
	Copper	✓		4/1			7/0			
	Iron	✓		4/1			7/0			
Kellys Plain Creek	Dissolved oxygen	✓		5/5	✓		6/5	✓		1/1
	pH	✓		6/2		✓	8/1			1/0
	Ammonia			6/0		✓	9/1			1/0
	Oxidised nitrogen	✓		6/5	✓		9/6			1/0
	Total nitrogen		✓	6/1	✓		9/2			1/0
	Total phosphorus		✓	6/1		✓	9/1			1/0
	Aluminium	✓		6/6	✓		9/8	✓		1/1
	Copper		✓	6/1		✓	9/1	✓		1/1
	Iron			6/0		✓	9/1			1/0

Table D.1 Departures from WQOs – plateau

Watercourse	analyte	Summer/autumn dry weather conditions			Winter/spring dry weather conditions			Wet weather conditions		
		Frequent exceedance[1]	Occasional exceedance[2]	# Samples/ exceedances	Frequent exceedance[1]	Occasional exceedance[2]	# Samples/ exceedances	Frequent exceedance[1]	Occasional exceedance[2]	# Samples/ exceedances
	Zinc			6/0	✓		9/3			1/0
Minor watercourses	Dissolved oxygen	✓		13/13	✓		11/11	No data available		
	pH	✓		17/5	✓		21/7			
	Turbidity		✓	16/2		✓	19/3			
	Ammonia	✓		19/4		✓	25/4			
	Oxidised nitrogen	✓		18/15	✓		25/17			
	Total nitrogen	✓		19/13	✓		25/11			
	Reactive phosphorus		✓	16/1			25/0			
	Total phosphorus	✓		19/14	✓		25/11			
	Aluminium	✓		16/12	✓		25/20			
	Arsenic			16/0		✓	25/2			
	Chromium (total)		✓	16/1			25/0			
	Copper		✓	16/3		✓	25/2			
	Iron	✓		16/7	✓		25/6			
	Zinc			16/0	✓		25/8			

Notes: 1. Exceedances are described as frequent if the WQO value was exceeded in 20% or more of samples.
2. Exceedances are described as occasional if the WQO value was exceeded in at least one sample, but in less than 20% of samples.

Table D.2 Departures from WQOs – ravine

Watercourse	analyte	Summer/autumn dry weather conditions			Winter/spring dry weather conditions			Wet weather conditions		
		Frequent exceedance[1]	Occasional exceedance[2]	# Samples/ exceedances	Frequent exceedance[1]	Occasional exceedance[2]	# Samples/ exceedances	Frequent exceedance[1]	Occasional exceedance[2]	# Samples/ exceedances
Yarrangobilly River	Dissolved oxygen	✓		27/22	✓		31/21	✓		5/4
	pH	✓		27/15	✓		31/11	✓		5/1
	Turbidity			23/0			21/0			5/1
	Ammonia		✓	27/2	✓		30/7			5/0
	Oxidised nitrogen	✓		23/14	✓		31/11	✓		5/1
	Total nitrogen		✓	27/1			30/0	✓		5/2
	Reactive phosphorus			20/0		✓	31/1			5/0
	Total phosphorus		✓	27/1		✓	30/1	✓		5/2
	Aluminium	✓		20/5	✓		30/19			5/0
	Chromium (total)		✓	20/1		✓	30/1			5/0
	Copper			20/0		✓	30/2	✓		5/5
	Zinc			20/0	✓		30/7	✓		5/2
Wallaces Creek	Dissolved oxygen	✓		8/7	✓		10/7	No data available		
	pH	✓		9/2		✓	10/1			
	Turbidity			7/0		✓	7/1			
	Ammonia			9/0		✓	10/1			
	Oxidised nitrogen	✓		6/3	✓		10/3			
	Total nitrogen			9/0		✓	10/1			

Table D.2 Departures from WQOs – ravine

Watercourse	analyte	Summer/autumn dry weather conditions			Winter/spring dry weather conditions			Wet weather conditions		
		Frequent exceedance[1]	Occasional exceedance[2]	# Samples/ exceedances	Frequent exceedance[1]	Occasional exceedance[2]	# Samples/ exceedances	Frequent exceedance[1]	Occasional exceedance[2]	# Samples/ exceedances
	Reactive phosphorus			6/0	✓		10/2			
	Copper		✓	6/1	✓		10/2			
	Zinc		✓	6/1		✓	10/3			
Lick Hole Gully	Dissolved oxygen	✓		1/1	✓		5/5	✓		1/1
	Electrical conductivity	✓		1/1	✓		5/5	✓		1/1
	Turbidity	✓		1/1	✓		3/1			1/0
	Ammonia			1/0	✓		5/2			1/0
	Oxidised nitrogen			1/0	✓		5/2			1/0
	Total nitrogen	✓		1/1			5/0			1/0
	Total phosphorus	✓		1/1	✓		5/1			1/0
	Arsenic			1/0	✓		5/1			1/0
	Copper	✓		1/1	✓		5/5	✓		1/1
	Zinc			1/0	✓		5/1	✓		1/1
Minor watercourses	Dissolved oxygen	✓		3/3	✓		7/7	✓		2/2
	pH	✓		3/1		✓	7/1			2/0
	Ammonia			3/0	✓		7/3			2/0
	Total nitrogen			3/0		✓	7/1	✓		2/2
	Total phosphorus	✓		3/2		✓	7/1	✓		2/1

Table D.2 Departures from WQOs – ravine

Watercourse	analyte	Summer/autumn dry weather conditions			Winter/spring dry weather conditions			Wet weather conditions		
		Frequent exceedance[1]	Occasional exceedance[2]	# Samples/ exceedances	Frequent exceedance[1]	Occasional exceedance[2]	# Samples/ exceedances	Frequent exceedance[1]	Occasional exceedance[2]	# Samples/ exceedances
	Aluminium			3/0		✓	7/1	✓		2/2
	Arsenic			3/0		✓	7/1			2/0

Notes: 1. Exceedances are described as frequent if the WQO value was exceeded in 20% or more of samples.
2. Exceedances are described as occasional if the WQO value was exceeded in at least one sample, but in less than 20% of samples.

Table D.3 Departures from WQOs – Lobs Hole runoff

Waterbody	analyte	March 2019			May 2019		
		Frequent exceedance[1]	Occasional exceedance[2]	# Samples/ exceedances	Frequent exceedance[1]	Occasional exceedance[2]	# Samples/ exceedances
Runoff	Dissolved oxygen	✓		10/10	✓		8/8
	pH	✓		10/8	✓		8/5
	Turbidity	✓		10/10	✓		8/8
	Ammonia	✓		10/5		✓	8/1
	Oxidised nitrogen	✓		10/8	✓		8/6
	Total nitrogen	✓		10/10	✓		8/8
	Reactive phosphorus	✓		10/3			8/0
	Total phosphorus	✓		10/10	✓		8/8
	Aluminium	✓		10/10	✓		8/8
	Arsenic	✓		10/3	✓		8/2
	Chromium (total)			10/0		✓	8/1
	Cobalt			10/0		✓	8/1
	Copper	✓		10/9	✓		8/4
	Iron	✓		10/4	✓		8/3
	Lead		✓	10/1		✓	8/1
	Zinc	✓		10/2	✓		8/3

Notes: 1. Exceedances are described as frequent if the WQO value was exceeded in 20% or more of samples.
2. Exceedances are described as occasional if the WQO value was exceeded in at least one sample, but in less than 20% of samples.

Table D.4 Departures from WQOs – Rock Forest

Watercourse	analyte	Summer/autumn dry weather conditions			Winter/spring dry weather conditions			Wet weather conditions		
		Frequent exceedance[1]	Occasional exceedance[2]	# Samples/ exceedances	Frequent exceedance[1]	Occasional exceedance[2]	# Samples/ exceedances	Frequent exceedance[1]	Occasional exceedance[2]	# Samples/ exceedances
Camerons Creek	Dissolved oxygen	✓		2/2	✓		1/1	✓		1/1
	Turbidity	✓		3/1			1/0			1/0
	Ammonia	✓		3/3	✓		1/1			1/0
	Oxidised nitrogen	✓		3/3			1/0			1/0
	Total nitrogen	✓		3/3	✓		1/1	✓		1/1
	Reactive phosphorus	✓		3/1			1/0			1/0
	Total phosphorus	✓		3/3	✓		1/1	✓		1/1
	Aluminium	✓		3/3	✓		1/1	✓		1/1
	Copper	✓		3/1			1/0	✓		1/1
	Iron	✓		3/3			1/0	✓		1/1

Notes: 1. Exceedances are described as frequent if the WQO value was exceeded in 20% or more of samples.
2. Exceedances are described as occasional if the WQO value was exceeded in at least one sample, but in less than 20% of samples.

Table D.5 Departures from WQOs – Talbingo Reservoir

Waterbody	analyte	Summer/autumn dry weather conditions			Winter/spring dry weather conditions		
		Frequent exceedance[1]	Occasional exceedance[2]	# Samples/ exceedances	Frequent exceedance[1]	Occasional exceedance[2]	# Samples/ exceedances
Talbingo Reservoir	Electrical conductivity	✓		23/9	✓		36/11
	pH		✓	23/4	✓		36/14
	Ammonia			23/0	✓		28/20
	Oxidised nitrogen		✓	23/4	✓		28/23
	Total nitrogen			23/0		✓	28/1
	Reactive phosphorus			23/1		✓	28/1
	Total phosphorus	✓		8/8	✓		28/7
	Chromium (total)		✓	23/4			36/0
	Copper	✓		23/10		✓	36/1
	Lead		✓	23/1			36/0
	Zinc	✓		23/12		✓	36/1

Notes: 1. Exceedances are described as frequent if the WQO value was exceeded in 20% or more of samples.
2. Exceedances are described as occasional if the WQO value was exceeded in at least one sample, but in less than 20% of samples.

Table D.6 Departures from WQOs – Tantangara Reservoir

Waterbody	analyte	Summer/autumn dry weather conditions			Winter/spring dry weather conditions		
		Frequent exceedance[1]	Occasional exceedance[2]	# Samples/ exceedances	Frequent exceedance[1]	Occasional exceedance[2]	# Samples/ exceedances
Tantangara Reservoir	Dissolved oxygen	✓		8/3			12/0
	pH		✓	23/1		✓	27/1
	Ammonia		✓	22/3			19/0
	Oxidised nitrogen		✓	22/3			19/0
	Total nitrogen		✓	22/3			19/0
	Reactive phosphorus		✓	22/2		✓	19/1
	Total phosphorus	✓		8/8	✓		19/7
	Aluminium	✓		23/8	✓		27/27
	Chromium (total)		✓	23/2			27/0
	Cobalt		✓	23/1			27/0
	Copper	✓		23/15			27/0
	Iron	✓		23/19			27/0
	Lead		✓	23/2			27/0
	Zinc	✓		23/15			27/0

Notes: 1. Exceedances are described as frequent if the WQO value was exceeded in 20% or more of samples.
2. Exceedances are described as occasional if the WQO value was exceeded in at least one sample, but in less than 20% of samples.

D.2 Summary tables

D.2.1 Watercourses

i Plateau

Table D.7 Baseline water quality results summary: Murrumbidgee River (PL_SW_005, PN_SW_002, TanS_SW_002)

			Summer/autumn dry weather conditions				Winter/spring dry weather conditions				Wet weather conditions			
	Unit	WQO value[1]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]
Field Parameters														
Temperature	°C	-	18/0	14.3	17.4	23.1	21/0	5.6	9.2	19.5	-	-	-	-
Dissolved oxygen	%	90-110[1]	15/14	**54**	**75**	**85**	16/14	**13**	**65**	**87**	-	-	-	-
Electrical conductivity	µS/cm	30-350[1]	18/0	26	32	36	21/0	14	26	33	-	-	-	-
pH	-	6.5-8.0[1]	18/5	6.7	7.5	**8.3**	20/3	6.6	7.3	**8.0**	-	-	-	-
Oxidising and reducing potential	-	-	18/0	-6	120	155	19/0	40	106	164	-	-	-	-
Turbidity	NTU	2-25[1]	14/0	2.1	3.9	6.5	16/0	1.5	2.6	6.3	-	-	-	-
Analytical results – general														
Suspended solids	mg/L	-	18/0	<5	<5	7	21/0	<5	<5	7	-	-	-	-
Total hardness (as $CaCO_3$)	mg/L	-	16/0	4	9	11	21/0	<1	5	9	-	-	-	-
Total alkalinity (as $CaCO_3$)	mg/L	-	2/0	15	16	16	-	-	-	-	-	-	-	-
Analytical results – nutrients														
Ammonia	mg/L	0.013	18/2	<0.01	<0.01	**0.02**	21/2	<0.01	<0.01	0.01	-	-	-	-
Oxidised nitrogen	mg/L	0.015	17/9	<0.01	**0.02**	**0.05**	21/7	<0.01	<0.01	**0.03**	-	-	-	-
Total kjeldahl nitrogen	mg/L	-	17/0	<0.1	0.1	0.2	21/0	<0.1	0.1	0.2	-	-	-	-
Total nitrogen	mg/L	0.25	18/4	<0.1	0.10	**0.30**	21/2	<0.1	0.1	0.2	-	-	-	-
Reactive phosphorus	mg/L	0.015	16/0	<0.01	<0.01	<0.01	21/0	<0.01	<0.01	<0.01	-	-	-	-
Total phosphorus	mg/L	0.020	18/1	<0.01	<0.01	0.02	21/1	<0.01	<0.01	0.01	-	-	-	-

Table D.7 Baseline water quality results summary: Murrumbidgee River (PL_SW_005, PN_SW_002, TanS_SW_002)

			Summer/autumn dry weather conditions				Winter/spring dry weather conditions				Wet weather conditions			
	Unit	WQO value[1]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]
Total organic carbon	mg/L	-	16/0	2	2	4	20/0	1	2	3	-	-	-	-
Dissolved organic carbon	mg/L	-	16/0	2	2	3	21/0	2	2	5	-	-	-	-
Analytical results – inorganics														
Cyanide	mg/L	0.004	12/0	<0.004	<0.004	<0.004	12/0	<0.004	<0.004	<0.004	-	-	-	-
Analytical results – metals (dissolved)														
Aluminium (Al)	mg/L	0.027	16/14	0.03	**0.05**	**0.10**	21/21	**0.04**	**0.06**	**0.10**	-	-	-	-
Arsenic (As)	mg/L	0.0008[2,6]	16/0	<0.001	<0.001	<0.001	21/1	<0.001	<0.001	<0.001	-	-	-	-
Barium (Ba)	mg/L	-	16/0	0.006	0.008	0.011	21/0	0.005	0.008	0.011	-	-	-	-
Beryllium (Be)	mg/L	-	16/0	<0.001	<0.001	<0.001	21/0	<0.001	<0.001	<0.001	-	-	-	-
Boron (B)	mg/L	0.09	16/0	<0.05	<0.05	<0.05	21/0	<0.05	<0.05	<0.05	-	-	-	-
Cadmium (Cd)	mg/L	0.00006[6]	16/0	<0.0001	<0.0001	<0.0001	21/0	<0.0001	<0.0001	<0.0001	-	-	-	-
Total chromium (Cr)	mg/L	0.00001[3,6]	16/0	<0.001	<0.001	<0.001	21/0	<0.001	<0.001	<0.001	-	-	-	-
Cobalt (Co)	mg/L	0.0014[4]	16/0	<0.001	<0.001	<0.001	21/0	<0.001	<0.001	<0.001	-	-	-	-
Copper (Cu)	mg/L	0.001	16/0	<0.001	<0.001	<0.001	21/0	<0.001	<0.001	0.001	-	-	-	-
Iron (Fe)	mg/L	0.3[4]	16/6	0.08	0.13	**0.44**	21/3	0.05	0.12	**0.40**	-	-	-	-
Lead (Pb)	mg/L	0.001	16/0	<0.001	<0.001	<0.001	21/0	<0.001	<0.001	<0.001	-	-	-	-
Manganese (Mn)	mg/L	1.2	16/0	0.002	0.006	0.040	21/0	0.002	0.004	0.026	-	-	-	-
Mercury (Hg)	mg/L	0.00006[6]	16/0	<0.0001	<0.0001	<0.0001	21/0	<0.0001	<0.0001	<0.0001	-	-	-	-

Table D.7 Baseline water quality results summary: Murrumbidgee River (PL_SW_005, PN_SW_002, TanS_SW_002)

			Summer/autumn dry weather conditions				Winter/spring dry weather conditions				Wet weather conditions			
	Unit	WQO value[1]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]
Nickel (Ni)	mg/L	0.008	16/0	<0.001	<0.001	<0.001	21/0	<0.001	<0.001	<0.001	-	-	-	-
Selenium (Se)	mg/L	0.005[6]	16/0	<0.01	<0.01	<0.01	21/0	<0.01	<0.01	<0.01	-	-	-	-
Silver (Ag)	mg/L	0.00002[6]	16/0	<0.001	<0.001	<0.001	21/0	<0.001	<0.001	<0.001	-	-	-	-
Vanadium (V)	mg/L	0.006[4,6]	16/0	<0.01	<0.01	<0.01	21/0	<0.01	<0.01	<0.01	-	-	-	-
Zinc (Zn)	mg/L	0.0024[6]	16/0	<0.005	<0.005	<0.005	21/3	<0.005	<0.005	**0.006**	-	-	-	-

Notes:
1. The WQO values for field parameters and nutrients refer to the WQO values for physical and chemical stressors in south-east Australia (upland river) that are reported in Tables 3.3.2 and 3.3.3 of ANZECC/ARMCANZ (2000). Toxicant trigger values are for the protection of 99% of aquatic species.
2. For As (V).
3. For Cr (VI).
4. Refers to a low reliability WQO value.
5. If less than 10 samples are available, the minimum value is reported instead of the 10th percentile value and the maximum value is reported instead of the 90th percentile value.
6. Denotes WQO lower than Limit of Reporting (LOR) (or laboratory detection limits). Exceedances below LOR are not identified in the baseline data.
7. An exceedance refers to any result that is above detection limit and exceeds the WQO value. Where a range is given for the WQO value, exceedances are determined in relation to the upper limit for turbidity and electrical conductivity, the lower limit for dissolved oxygen and the lower and upper limit for pH.

Bold denotes WQO value is exceeded.

Table D.8 Baseline water quality results summary: Eucumbene River (PL_SW_003, PL_SW_006, PL_SW_007)

			Summer/autumn dry weather conditions				Winter/spring dry weather conditions				Wet weather conditions			
	Unit	WQO value[1]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]
Field Parameters														
Temperature	°C	-	14/0	9.8	13.3	22.3	18/0	5.4	9.6	13.9	-	-	-	-
Dissolved oxygen	%	90-110[1]	11/11	**69**	**81**	**87**	13/11	**39**	**69**	105	-	-	-	-
Electrical conductivity	µS/cm	30-350[1]	14/0	36	38	41	18/0	19	30	37	-	-	-	-
pH	-	6.5-8.0[1]	14/1	6.6	7.3	7.7	17/4	**6.4**	7.4	7.8	-	-	-	-
Oxidising and reducing potential	-	-	14/0	-14	80	116	17/0	63	99	173	-	-	-	-
Turbidity	NTU	2-25[1]	12/0	1.1	1.5	2.5	16/0	1.0	1.5	3.2	-	-	-	-
Analytical results – general														
Suspended solids	mg/L	-	14/0	<5	<5	5	18/0	<5	<5	8	-	-	-	-
Total hardness (as $CaCO_3$)	mg/L	-	14/0	9	12	16	18/0	4	9	12	-	-	-	-
Total alkalinity (as $CaCO_3$)	mg/L	-									-	-	-	-
Analytical results – nutrients														
Ammonia	mg/L	0.013	14/0	<0.01	<0.01	<0.01	18/3	<0.01	<0.01	**0.03**	-	-	-	-
Oxidised nitrogen	mg/L	0.015	14/9	0.01	**0.03**	**0.05**	18/7	<0.01	0.01	**0.05**	-	-	-	-
Total kjeldahl nitrogen	mg/L	-	14/0	<0.1	<0.1	<0.1	18/0	<0.1	<0.1	<0.1	-	-	-	-
Total nitrogen	mg/L	0.25	14/1	<0.1	<0.1	<0.1	18/0	<0.1	<0.1	<0.1	-	-	-	-
Reactive phosphorus	mg/L	0.015	14/0	<0.01	<0.01	<0.01	18/0	<0.01	<0.01	<0.01	-	-	-	-
Total phosphorus	mg/L	0.020	14/2	<0.01	<0.01	**0.04**	18/1	<0.01	<0.01	0.01	-	-	-	-

Table D.8 Baseline water quality results summary: Eucumbene River (PL_SW_003, PL_SW_006, PL_SW_007)

			Summer/autumn dry weather conditions				Winter/spring dry weather conditions				Wet weather conditions			
	Unit	WQO value[1]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]
Total organic carbon	mg/L	-	14/0	<1	<1	2	18/0	<1	1	2	-	-	-	-
Dissolved organic carbon	mg/L	-	14/0	<1	1	2	18/0	<1	1	3	-	-	-	-
Analytical results – inorganics														
Cyanide	mg/L	0.004	12/0	<0.004	<0.004	<0.004	12/0	<0.004	<0.004	<0.004	-	-	-	-
Analytical results – metals (dissolved)														
Aluminium (Al)	mg/L	0.027	14/4	0.01	0.02	**0.03**	18/5	0.01	0.02	**0.03**	-	-	-	-
Arsenic (As)	mg/L	0.0008[2,6]	14/0	<0.001	<0.001	<0.001	18/0	<0.001	<0.001	<0.001	-	-	-	-
Barium (Ba)	mg/L	-	14/0	0.002	0.003	0.004	18/0	0.002	0.003	0.008	-	-	-	-
Beryllium (Be)	mg/L	-	14/0	<0.001	<0.001	<0.001	18/0	<0.001	<0.001	<0.001	-	-	-	-
Boron (B)	mg/L	0.09	14/1	<0.05	<0.05	<0.05	18/0	<0.05	<0.05	<0.05	-	-	-	-
Cadmium (Cd)	mg/L	0.00006[6]	14/0	<0.0001	<0.0001	<0.0001	18/0	<0.0001	<0.0001	<0.0001	-	-	-	-
Total chromium (Cr)	mg/L	0.00001[3,6]	14/0	<0.001	<0.001	<0.001	18/0	<0.001	<0.001	<0.001	-	-	-	-
Cobalt (Co)	mg/L	0.0014[4]	14/0	<0.001	<0.001	<0.001	18/0	<0.001	<0.001	<0.001	-	-	-	-
Copper (Cu)	mg/L	0.001	14/1	<0.001	<0.001	0.001	18/0	<0.001	<0.001	0.001	-	-	-	-
Iron (Fe)	mg/L	0.3[4]	14/0	<0.05	0.06	0.09	18/0	<0.05	<0.05	0.05	-	-	-	-
Lead (Pb)	mg/L	0.001	14/0	<0.001	<0.001	<0.001	18/0	<0.001	<0.001	<0.001	-	-	-	-
Manganese (Mn)	mg/L	1.2	14/0	0.002	0.004	0.006	18/0	<0.001	0.002	0.004	-	-	-	-
Mercury (Hg)	mg/L	0.00006[6]	14/0	<0.0001	<0.0001	<0.0001	18/0	<0.0001	<0.0001	<0.0001	-	-	-	-

Table D.8 Baseline water quality results summary: Eucumbene River (PL_SW_003, PL_SW_006, PL_SW_007)

			Summer/autumn dry weather conditions				Winter/spring dry weather conditions				Wet weather conditions			
	Unit	WQO value[1]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]
Nickel (Ni)	mg/L	0.008	14/0	<0.001	<0.001	<0.001	18/0	<0.001	<0.001	<0.001	-	-	-	-
Selenium (Se)	mg/L	0.005[6]	14/0	<0.01	<0.01	<0.01	18/0	<0.01	<0.01	<0.01	-	-	-	-
Silver (Ag)	mg/L	0.00002[6]	14/0	<0.001	<0.001	<0.001	18/0	<0.001	<0.001	<0.001	-	-	-	-
Vanadium (V)	mg/L	0.006[4,6]	14/0	<0.01	<0.01	<0.01	18/0	<0.01	<0.01	<0.01	-	-	-	-
Zinc (Zn)	mg/L	0.0024[6]	14/0	<0.005	<0.005	<0.005	18/3	<0.005	<0.005	**0.006**	-	-	-	-

Notes:
1. The WQO values for field parameters and nutrients refer to the WQO values for physical and chemical stressors in south-east Australia (upland river) that are reported in Tables 3.3.2 and 3.3.3 of ANZECC/ARMCANZ (2000). Toxicant trigger values are for the protection of 99% of aquatic species.
2. For As (V).
3. For Cr (VI).
4. Refers to a low reliability WQO value.
5. If less than 10 samples are available, the minimum value is reported instead of the 10th percentile value and the maximum value is reported instead of the 90th percentile value.
6. Denotes WQO lower than Limit of Reporting (LOR) (or laboratory detection limits). Exceedances below LOR are not identified in the baseline data.
7. An exceedance refers to any result that is above detection limit and exceeds the WQO value. Where a range is given for the WQO value, exceedances are determined in relation to the upper limit for turbidity and electrical conductivity, the lower limit for dissolved oxygen and the lower and upper limit for pH.

Bold denotes WQO value is exceeded.

Table D.9 Baseline water quality results summary: Tantangara Creek (PL_SW_002, PL_SW_004, PL_SW_009)

			Summer/autumn dry weather conditions				Winter/spring dry weather conditions				Wet weather conditions			
	Unit	WQO value[1]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]
Field Parameters														
Temperature	°C	-	13/0	9.5	14.2	21.9	15/0	4.6	10.3	19.0	-	-	-	-
Dissolved oxygen	%	90-110[1]	11/9	**32**	**76**	90	11/10	**43**	**66**	**90**	-	-	-	-
Electrical conductivity	µS/cm	30-350[1]	13/0	33	37	46	15/0	16	32	44	-	-	-	-
pH	-	6.5-8.0[1]	13/2	7.1	7.4	7.9	15/6	**6.2**	7.1	7.8	-	-	-	-
Oxidising and reducing potential	-	-	13/0	6	115	153	15/0	81	122	191	-	-	-	-
Turbidity	NTU	2-25[1]	9/0	1.0	2.4	5.4	13/0	1.4	2.1	8.8	-	-	-	-
Analytical results – general														
Suspended solids	mg/L	-	13/0	<5	<5	7	15/0	<5	<5	10	-	-	-	-
Total hardness (as $CaCO_3$)	mg/L	-	12/0	7	12	12	15/0	2	5	9	-	-	-	-
Total alkalinity (as $CaCO_3$)	mg/L	-	1/0	17	17	17					-	-	-	-
Analytical results – nutrients														
Ammonia	mg/L	0.013	13/0	<0.01	<0.01	<0.01	15/5	<0.01	<0.01	**0.03**	-	-	-	-
Oxidised nitrogen	mg/L	0.015	13/9	<0.01	**0.03**	**0.05**	15/5	<0.01	<0.01	**0.05**	-	-	-	-
Total kjeldahl nitrogen	mg/L	-	13/0	<0.1	<0.1	0.3	15/0	<0.1	0.1	0.2	-	-	-	-
Total nitrogen	mg/L	0.25	13/3	<0.1	<0.1	**0.3**	15/0	<0.1	0.1	0.2	-	-	-	-
Reactive phosphorus	mg/L	0.015	12/0	<0.01	<0.01	<0.01	15/0	<0.01	<0.01	<0.01	-	-	-	-
Total phosphorus	mg/L	0.020	13/1	<0.01	<0.01	0.02	15/2	<0.01	<0.01	**0.03**	-	-	-	-

Table D.9 Baseline water quality results summary: Tantangara Creek (PL_SW_002, PL_SW_004, PL_SW_009)

			Summer/autumn dry weather conditions				Winter/spring dry weather conditions				Wet weather conditions			
	Unit	WQO value[1]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]
Total organic carbon	mg/L	-	12/0	1	2	4	15/0	1	2	3	-	-	-	-
Dissolved organic carbon	mg/L	-	12/0	<1	2	2	15/0	1	2	4	-	-	-	-
Analytical results – inorganics														
Cyanide	mg/L	0.004	8/0	<0.004	<0.004	<0.004	8/0	<0.004	<0.004	<0.004	-	-	-	-
Analytical results – metals (dissolved)														
Aluminium (Al)	mg/L	0.027	12/10	0.02	**0.03**	**0.05**	15/12	0.02	**0.04**	**0.05**	-	-	-	-
Arsenic (As)	mg/L	0.0008[2,6]	12/0	<0.001	<0.001	<0.001	15/0	<0.001	<0.001	<0.001	-	-	-	-
Barium (Ba)	mg/L	-	12/0	0.004	0.005	0.006	15/0	0.004	0.005	0.008	-	-	-	-
Beryllium (Be)	mg/L	-	12/0	<0.001	<0.001	<0.001	15/0	<0.001	<0.001	<0.001	-	-	-	-
Boron (B)	mg/L	0.09	12/1	<0.05	<0.05	<0.05	15/0	<0.05	<0.05	<0.05	-	-	-	-
Cadmium (Cd)	mg/L	0.00006[6]	12/0	<0.0001	<0.0001	<0.0001	15/0	<0.0001	<0.0001	<0.0001	-	-	-	-
Total chromium (Cr)	mg/L	0.00001[3,6]	12/0	<0.001	<0.001	<0.001	15/0	<0.001	<0.001	<0.001	-	-	-	-
Cobalt (Co)	mg/L	0.0014[4]	12/0	<0.001	<0.001	<0.001	15/0	<0.001	<0.001	<0.001	-	-	-	-
Copper (Cu)	mg/L	0.001	12/0	<0.001	<0.001	<0.001	15/2	<0.001	<0.001	**0.002**	-	-	-	-
Iron (Fe)	mg/L	0.3[4]	12/0	0.07	0.10	0.14	15/0	<0.05	0.10	0.14	-	-	-	-
Lead (Pb)	mg/L	0.001	12/0	<0.001	<0.001	<0.001	15/0	<0.001	<0.001	<0.001	-	-	-	-
Manganese (Mn)	mg/L	1.2	12/0	0.002	0.002	0.003	15/0	0.001	0.003	0.005	-	-	-	-
Mercury (Hg)	mg/L	0.00006[6]	12/0	<0.0001	<0.0001	<0.0001	15/0	<0.0001	<0.0001	<0.0001	-	-	-	-

Table D.9 Baseline water quality results summary: Tantangara Creek (PL_SW_002, PL_SW_004, PL_SW_009)

			Summer/autumn dry weather conditions				Winter/spring dry weather conditions				Wet weather conditions			
	Unit	WQO value[1]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]
Nickel (Ni)	mg/L	0.008	12/0	<0.001	<0.001	<0.001	15/0	<0.001	<0.001	<0.001	-	-	-	-
Selenium (Se)	mg/L	0.005[6]	12/0	<0.01	<0.01	<0.01	15/0	<0.01	<0.01	<0.01	-	-	-	-
Silver (Ag)	mg/L	0.00002[6]	12/0	<0.001	<0.001	<0.001	15/0	<0.001	<0.001	<0.001	-	-	-	-
Vanadium (V)	mg/L	0.006[4,6]	12/0	<0.01	<0.01	<0.01	15/0	<0.01	<0.01	<0.01	-	-	-	-
Zinc (Zn)	mg/L	0.0024[6]	12/0	<0.005	<0.005	<0.005	15/2	<0.005	<0.005	**0.005**	-	-	-	-

Notes:
1. The WQO values for field parameters and nutrients refer to the WQO values for physical and chemical stressors in south-east Australia (upland river) that are reported in Tables 3.3.2 and 3.3.3 of ANZECC/ARMCANZ (2000). Toxicant trigger values are for the protection of 99% of aquatic species.
2. For As (V).
3. For Cr (VI).
4. Refers to a low reliability WQO value.
5. If less than 10 samples are available, the minimum value is reported instead of the 10th percentile value and the maximum value is reported instead of the 90th percentile value.
6. Denotes WQO lower than Limit of Reporting (LOR) (or laboratory detection limits). Exceedances below LOR are not identified in the baseline data.
7. An exceedance refers to any result that is above detection limit and exceeds the WQO value. Where a range is given for the WQO value, exceedances are determined in relation to the upper limit for turbidity and electrical conductivity, the lower limit for dissolved oxygen and the lower and upper limit for pH.

Bold denotes WQO value is exceeded.

Table D.10 Baseline water quality results summary: Gooandra Creek (PL_SW_001)

			Summer/autumn dry weather conditions				Winter/spring dry weather conditions				Wet weather conditions			
	Unit	WQO value[1]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]
Field Parameters														
Temperature	°C	-	6/0	8.6	12.5	21.9	8/0	2.2	8.0	16.8	-	-	-	-
Dissolved oxygen	%	90-110[1]	5/4	**67**	**78**	105	6/5	**36**	**70**	104	-	-	-	-
Electrical conductivity	µS/cm	30-350[1]	6/0	33	35	68	8/0	14	37	50	-	-	-	-
pH	-	6.5-8.0[1]	6/2	7.0	7.7	**10.9**	8/4	**6.0**	7.3	**8.9**	-	-	-	-
Oxidising and reducing potential	-	-	6/0	-25	126	189	8/0	14	81	237	-	-	-	-
Turbidity	NTU	2-25[1]	4/0	1.4	1.8	2.6	7/0	0.7	1.9	12.5	-	-	-	-
Analytical results – general														
Suspended solids	mg/L	-	6/0	<2[8]	<5[8]	5	8/0	<5	<5	22	-	-	-	-
Total hardness (as $CaCO_3$)	mg/L	-	5/0	5	10	12	8/0	5	5	12	-	-	-	-
Total alkalinity (as $CaCO_3$)	mg/L	-	1/0	17	17	17	-	-	-	-	-	-	-	-
Analytical results – nutrients														
Ammonia	mg/L	0.013	6/0	<0.01[8]	<0.01[8]	<0.1[8]	8/2	<0.01	<0.01	**0.03**	-	-	-	-
Oxidised nitrogen	mg/L	0.015	5/2	<0.01	0.01	**0.04**	8/3	<0.01	<0.01	**0.05**	-	-	-	-
Total kjeldahl nitrogen	mg/L	-	5/0	<0.1	<0.1	<0.1	8/0	<0.1	<0.1	0.3	-	-	-	-
Total nitrogen	mg/L	0.25	6/0	<0.1	<0.1	0.1	8/1	<0.1	<0.1	**0.3**	-	-	-	-
Reactive phosphorus	mg/L	0.015	5/0	<0.01	<0.01	<0.01	8/0	<0.01	<0.01	<0.01	-	-	-	-
Total phosphorus	mg/L	0.020	6/0	<0.01	<0.01	0.01	8/1	<0.01	<0.01	**0.05**	-	-	-	-

Table D.10 Baseline water quality results summary: Gooandra Creek (PL_SW_001)

			Summer/autumn dry weather conditions				Winter/spring dry weather conditions				Wet weather conditions			
	Unit	WQO value[1]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]
Total organic carbon	mg/L	-	5/0	<1	<1	3	8/0	<1	1	2	-	-	-	-
Dissolved organic carbon	mg/L	-	5/0	<1	<1	2	8/0	<1	2	8	-	-	-	-
Analytical results – inorganics														
Cyanide	mg/L	0.004	4/0	<0.004	<0.004	<0.004	4/0	<0.004	<0.004	<0.004	-	-	-	-
Analytical results – metals (dissolved)														
Aluminium (Al)	mg/L	0.027	5/1	<0.01	0.02	**0.03**	8/3	0.01	0.02	**0.06**	-	-	-	-
Arsenic (As)	mg/L	0.0008[2,6]	5/0	<0.001	<0.001	<0.001	8/0	<0.001	<0.001	<0.001	-	-	-	-
Barium (Ba)	mg/L	-	5/0	0.004	0.004	0.006	8/0	0.003	0.004	0.014	-	-	-	-
Beryllium (Be)	mg/L	-	5/0	<0.001	<0.001	<0.001	8/0	<0.001	<0.001	<0.001	-	-	-	-
Boron (B)	mg/L	0.09	5/0	<0.05	<0.05	<0.05	8/0	<0.05	<0.05	<0.05	-	-	-	-
Cadmium (Cd)	mg/L	0.00006[6]	5/0	<0.0001	<0.0001	<0.0001	8/0	<0.0001	<0.0001	<0.0001	-	-	-	-
Total chromium (Cr)	mg/L	0.00001[3,6]	5/1	<0.001	<0.001	**0.002**	8/1	<0.001	<0.001	**0.002**	-	-	-	-
Cobalt (Co)	mg/L	0.0014[4]	5/0	<0.001	<0.001	<0.001	8/0	<0.001	<0.001	<0.001	-	-	-	-
Copper (Cu)	mg/L	0.001	5/0	<0.001	<0.001	0.001	8/1	<0.001	<0.001	**0.002**	-	-	-	-
Iron (Fe)	mg/L	0.3[4]	5/0	<0.05	<0.05	0.08	8/0	<0.05	0.06	0.08	-	-	-	-
Lead (Pb)	mg/L	0.001	5/0	<0.001	<0.001	<0.001	8/0	<0.001	<0.001	<0.001	-	-	-	-
Manganese (Mn)	mg/L	1.2	5/0	<0.001	0.002	0.002	8/0	<0.001	0.002	0.002	-	-	-	-
Mercury (Hg)	mg/L	0.00006[6]	5/0	<0.0001	<0.0001	<0.0001	8/0	<0.0001	<0.0001	<0.0001	-	-	-	-

Table D.10 Baseline water quality results summary: Gooandra Creek (PL_SW_001)

			Summer/autumn dry weather conditions				Winter/spring dry weather conditions				Wet weather conditions			
	Unit	WQO value[1]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]
Nickel (Ni)	mg/L	0.008	5/0	<0.001	<0.001	<0.001	8/0	<0.001	<0.001	0.002	-	-	-	-
Selenium (Se)	mg/L	0.005[6]	5/0	<0.01	<0.01	<0.01	8/0	<0.01	<0.01	<0.01	-	-	-	-
Silver (Ag)	mg/L	0.00002[6]	5/0	<0.001	<0.001	<0.001	8/0	<0.001	<0.001	<0.001	-	-	-	-
Vanadium (V)	mg/L	0.006[4,6]	5/0	<0.01	<0.01	<0.01	8/0	<0.01	<0.01	<0.01	-	-	-	-
Zinc (Zn)	mg/L	0.0024[6]	5/1	<0.005	<0.005	**0.012**	8/2	<0.005	<0.005	**0.007**	-	-	-	-

Notes:
1. The WQO values for field parameters and nutrients refer to the WQO values for physical and chemical stressors in south-east Australia (upland river) that are reported in Tables 3.3.2 and 3.3.3 of ANZECC/ARMCANZ (2000). Toxicant trigger values are for the protection of 99% of aquatic species.
2. For As (V).
3. For Cr (VI).
4. Refers to a low reliability WQO value.
5. If less than 10 samples are available, the minimum value is reported instead of the 10th percentile value and the maximum value is reported instead of the 90th percentile value.
6. Denotes WQO lower than Limit of Reporting (LOR) (or laboratory detection limits). Exceedances below LOR are not identified in the baseline data.
7. An exceedance refers to any result that is above detection limit and exceeds the WQO value. Where a range is given for the WQO value, exceedances are determined in relation to the upper limit for turbidity and electrical conductivity, the lower limit for dissolved oxygen and the lower and upper limit for pH.
8. Where more than one LOR has been used in the reporting of an analyte, the lowest and highest LOR are considered in calculating 10th percentile, median and 90th percentile values.

Bold denotes WQO value is exceeded.

Table D.11 Baseline water quality results summary: Nungar Creek (TanR_SW_001)

			Summer/autumn dry weather conditions				Winter/spring dry weather conditions				Wet weather conditions			
	Unit	WQO value[1]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]
Field Parameters														
Temperature	°C	-	4/0	14.2	16.4	27.8	7/0	5.5	12.0	20.1	-	-	-	-
Dissolved oxygen	%	90-110[1]	3/3	**62**	**66**	**66**	4/4	**11**	**42**	**75**	-	-	-	-
Electrical conductivity	µS/cm	30-350[1]	4/0	24	27	43	7/0	11	21	30	-	-	-	-
pH	-	6.5-8.0[1]	4/1	**6.1**	7.4	7.9	6/1	**5.8**	6.8	7.4	-	-	-	-
Oxidising and reducing potential	-	-	4/0	60	88	106	7/0	88	119	185	-	-	-	-
Turbidity	NTU	2-25[1]	3/0	2.1	3.3	3.3	5/0	1.9	2.6	4.7	-	-	-	-
Analytical results – general														
Suspended solids	mg/L	-	4/0	<5	6	32	7/0	<5	<5	12	-	-	-	-
Total hardness (as $CaCO_3$)	mg/L	-	4/0	<1	7	16	7/0	<1	<1	12	-	-	-	-
Total alkalinity (as $CaCO_3$)	mg/L	-									-	-	-	-
Analytical results – nutrients														
Ammonia	mg/L	0.013	4/0	<0.01	<0.01	0.01	7/0	<0.01	<0.01	0.01	-	-	-	-
Oxidised nitrogen	mg/L	0.015	4/2	<0.01	**0.03**	**0.06**	7/1	<0.01	<0.01	**0.03**	-	-	-	-
Total kjeldahl nitrogen	mg/L	-	4/0	<0.1	<0.1	0.1	7/0	<0.1	<0.1	0.4	-	-	-	-
Total nitrogen	mg/L	0.25	4/0	<0.1	<0.1	0.1	7/1	<0.1	<0.1	**0.4**	-	-	-	-
Reactive phosphorus	mg/L	0.015	4/0	<0.01	<0.01	<0.01	7/0	<0.01	<0.01	<0.01	-	-	-	-
Total phosphorus	mg/L	0.020	4/0	<0.01	<0.01	<0.01	7/1	<0.01	0.01	**0.03**	-	-	-	-

Table D.11 Baseline water quality results summary: Nungar Creek (TanR_SW_001)

			Summer/autumn dry weather conditions				Winter/spring dry weather conditions				Wet weather conditions			
	Unit	WQO value[1]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]
Total organic carbon	mg/L	-	4/0	1	2	18	7/0	1	2	3	-	-	-	-
Dissolved organic carbon	mg/L	-	4/0	1	2	2	7/0	1	2	5	-	-	-	-
Analytical results – inorganics														
Cyanide	mg/L	0.004	3/0	<0.004	<0.004	<0.004	4/0	<0.004	<0.004	<0.004	-	-	-	-
Analytical results – metals (dissolved)														
Aluminium (Al)	mg/L	0.027	4/3	0.02	**0.05**	**0.07**	7/6	0.01	**0.05**	**0.06**	-	-	-	-
Arsenic (As)	mg/L	0.0008[2,6]	4/0	<0.001	<0.001	<0.001	7/0	<0.001	<0.001	<0.001	-	-	-	-
Barium (Ba)	mg/L	-	4/0	0.009	0.010	0.011	7/0	0.001	0.010	0.030	-	-	-	-
Beryllium (Be)	mg/L	-	4/0	<0.001	<0.001	<0.001	7/0	<0.001	<0.001	<0.001	-	-	-	-
Boron (B)	mg/L	0.09	4/0	<0.05	<0.05	<0.05	7/0	<0.05	<0.05	<0.05	-	-	-	-
Cadmium (Cd)	mg/L	0.00006[6]	4/0	<0.0001	<0.0001	<0.0001	7/0	<0.0001	<0.0001	<0.0001	-	-	-	-
Total chromium (Cr)	mg/L	0.00001[3,6]	4/0	<0.001	<0.001	<0.001	7/0	<0.001	<0.001	<0.001	-	-	-	-
Cobalt (Co)	mg/L	0.0014[4]	4/0	<0.001	<0.001	<0.001	7/0	<0.001	<0.001	<0.001	-	-	-	-
Copper (Cu)	mg/L	0.001	4/1	<0.001	<0.001	**0.005**	7/0	<0.001	<0.001	<0.001	-	-	-	-
Iron (Fe)	mg/L	0.3[4]	4/1	0.18	0.22	**0.33**	7/0	<0.05	0.14	0.21	-	-	-	-
Lead (Pb)	mg/L	0.001	4/0	<0.001	<0.001	<0.001	7/0	<0.001	<0.001	<0.001	-	-	-	-
Manganese (Mn)	mg/L	1.2	4/0	0.007	0.008	0.012	7/0	<0.001	0.004	0.007	-	-	-	-
Mercury (Hg)	mg/L	0.00006[6]	4/0	<0.0001	<0.0001	<0.0001	7/0	<0.0001	<0.0001	<0.0001	-	-	-	-

Table D.11 Baseline water quality results summary: Nungar Creek (TanR_SW_001)

			Summer/autumn dry weather conditions				Winter/spring dry weather conditions				Wet weather conditions			
	Unit	WQO value[1]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]
Nickel (Ni)	mg/L	0.008	4/0	<0.001	<0.001	0.001	7/0	<0.001	<0.001	<0.001	-	-	-	-
Selenium (Se)	mg/L	0.005[6]	4/0	<0.01	<0.01	<0.01	7/0	<0.01	<0.01	<0.01	-	-	-	-
Silver (Ag)	mg/L	0.00002[6]	4/0	<0.001	<0.001	<0.001	7/0	<0.001	<0.001	<0.001	-	-	-	-
Vanadium (V)	mg/L	0.006[4,6]	4/0	<0.01	<0.01	<0.01	7/0	<0.01	<0.01	<0.01	-	-	-	-
Zinc (Zn)	mg/L	0.0024[6]	4/0	<0.005	<0.005	<0.005	7/0	<0.005	<0.005	<0.005	-	-	-	-

Notes:
1. The WQO values for field parameters and nutrients refer to the WQO values for physical and chemical stressors in south-east Australia (upland river) that are reported in Tables 3.3.2 and 3.3.3 of ANZECC/ARMCANZ (2000). Toxicant trigger values are for the protection of 99% of aquatic species.
2. For As (V).
3. For Cr (VI).
4. Refers to a low reliability WQO value.
5. If less than 10 samples are available, the minimum value is reported instead of the 10th percentile value and the maximum value is reported instead of the 90th percentile value.
6. Denotes WQO lower than Limit of Reporting (LOR) (or laboratory detection limits). Exceedances below LOR are not identified in the baseline data.
7. An exceedance refers to any result that is above detection limit and exceeds the WQO value. Where a range is given for the WQO value, exceedances are determined in relation to the upper limit for turbidity and electrical conductivity, the lower limit for dissolved oxygen and the lower and upper limit for pH.

Bold denotes WQO value is exceeded.

Table D.12 Baseline water quality results summary: Kellys Plain Creek (TanS_SW_001)

			Summer/autumn dry weather conditions				Winter/spring dry weather conditions				Wet weather conditions			
	Unit	WQO value[1]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]
Field Parameters														
Temperature	°C	-	6/0	13.7	16.4	23.2	9/0	1.1	7.8	18.8	1/0	9.8	9.8	9.8
Dissolved oxygen	%	90-110[1]	5/5	**67**	**84**	**88**	6/5	**1**	**58**	102	1/1	**72**	**72**	**72**
Electrical conductivity	µS/cm	30-350[1]	6/0	30	33	37	9/0	20	29	37	1/0	40	40	40
pH	-	6.5-8.0[1]	6/2	**6.0**	7.2	**8.5**	8/1	**6.4**	7.3	7.7	1/0	7.3	7.3	7.3
Oxidising and reducing potential	-	-	6/0	41	90	145	9/0	87	114	212	1/0	174	174	174
Turbidity	NTU	2-25[1]	4/0	2.2	2.8	14.7	6/0	1.8	2.4	6.8	1/0	3.7	3.7	3.7
Analytical results – general														
Suspended solids	mg/L	-	6/0	<5	<5	34	9/0	<5	<5	24	1/0	7	7	7
Total hardness (as $CaCO_3$)	mg/L	-	6/0	2	9	13	9/0	<1	7	13	1/0	9	9	9
Total alkalinity (as $CaCO_3$)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Analytical results – nutrients														
Ammonia	mg/L	0.013	6/0	<0.01	<0.01	<0.01	9/1	<0.01	<0.01	**0.05**	1/0	<0.01	<0.01	<0.01
Oxidised nitrogen	mg/L	0.015	6/5	<0.01	**0.03**	**0.06**	9/6	<0.01	**0.02**	**0.06**	1/0	0.01	0.01	0.01
Total kjeldahl nitrogen	mg/L	-	6/0	<0.1	<0.1	0.4	9/0	<0.1	<0.1	0.3	1/0	0.1	0.1	0.1
Total nitrogen	mg/L	0.25	6/1	<0.1	<0.1	**0.5**	9/2	<0.1	<0.1	**0.3**	1/0	0.1	0.1	0.1
Reactive phosphorus	mg/L	0.015	6/0	<0.01	<0.01	<0.01	9/0	<0.01	<0.01	<0.01	1/0	<0.01	<0.01	<0.01
Total phosphorus	mg/L	0.020	6/1	<0.01	0.01	**0.04**	9/1	<0.01	<0.01	**0.03**	1/0	0.02	0.02	0.02

Table D.12 Baseline water quality results summary: Kellys Plain Creek (TanS_SW_001)

			Summer/autumn dry weather conditions				Winter/spring dry weather conditions				Wet weather conditions			
	Unit	WQO value[1]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]
Total organic carbon	mg/L	-	6/0	1	2	6	9/0	<1	2	16	1/0	3	3	3
Dissolved organic carbon	mg/L	-	6/0	1	2	5	9/0	1	2	4	1/0	3	3	3
Analytical results – inorganics														
Cyanide	mg/L	0.004	4/0	<0.004	<0.004	<0.004	4/0	<0.004	<0.004	<0.004	1/0	<0.004	<0.004	<0.004
Analytical results – metals (dissolved)														
Aluminium (Al)	mg/L	0.027	6/6	**0.03**	**0.04**	**0.11**	9/8	0.02	**0.05**	**0.44**	1/1	**0.04**	**0.04**	**0.04**
Arsenic (As)	mg/L	0.0008[2,6]	6/0	<0.001	<0.001	<0.001	9/0	<0.001	<0.001	<0.001	1/0	<0.001	<0.001	<0.001
Barium (Ba)	mg/L	-	6/0	0.010	0.011	0.014	9/0	0.009	0.010	0.026	1/0	0.014	0.014	0.014
Beryllium (Be)	mg/L	-	6/0	<0.001	<0.001	<0.001	9/0	<0.001	<0.001	<0.001	1/0	<0.001	<0.001	<0.001
Boron (B)	mg/L	0.09	6/0	<0.05	<0.05	<0.05	9/0	<0.05	<0.05	<0.05	1/0	<0.05	<0.05	<0.05
Cadmium (Cd)	mg/L	0.00006[6]	6/0	<0.0001	<0.0001	<0.0001	9/0	<0.0001	<0.0001	<0.0001	1/0	<0.0001	<0.0001	<0.0001
Total chromium (Cr)	mg/L	0.00001[3,6]	6/0	<0.001	<0.001	<0.001	9/0	<0.001	<0.001	<0.001	1/0	<0.001	<0.001	<0.001
Cobalt (Co)	mg/L	0.0014[4]	6/0	<0.001	<0.001	<0.001	9/0	<0.001	<0.001	<0.001	1/0	<0.001	<0.001	<0.001
Copper (Cu)	mg/L	0.001	6/1	<0.001	<0.001	**0.002**	9/1	<0.001	<0.001	**0.002**	1/1	**0.003**	**0.003**	**0.003**
Iron (Fe)	mg/L	0.3[4]	6/0	0.10	0.10	0.20	9/1	<0.05	0.06	**0.31**	1/0	0.10	0.10	0.10
Lead (Pb)	mg/L	0.001	6/0	<0.001	<0.001	<0.001	9/0	<0.001	<0.001	<0.001	1/0	<0.001	<0.001	<0.001
Manganese (Mn)	mg/L	1.2	6/0	0.002	0.003	0.008	9/0	0.002	0.002	0.021	1/0	0.004	0.004	0.004
Mercury (Hg)	mg/L	0.00006[6]	6/0	<0.0001	<0.0001	<0.0001	9/0	<0.0001	<0.0001	<0.0001	1/0	<0.0001	<0.0001	<0.0001

Table D.12 Baseline water quality results summary: Kellys Plain Creek (TanS_SW_001)

			Summer/autumn dry weather conditions				Winter/spring dry weather conditions				Wet weather conditions			
	Unit	WQO value[1]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]
Nickel (Ni)	mg/L	0.008	6/0	<0.001	<0.001	<0.001	9/0	<0.001	<0.001	<0.001	1/0	0.003	0.003	0.003
Selenium (Se)	mg/L	0.005[6]	6/0	<0.01	<0.01	<0.01	9/0	<0.01	<0.01	<0.01	1/0	<0.01	<0.01	<0.01
Silver (Ag)	mg/L	0.00002[6]	6/0	<0.001	<0.001	<0.001	9/0	<0.001	<0.001	<0.001	1/0	<0.001	<0.001	<0.001
Vanadium (V)	mg/L	0.006[4,6]	6/0	<0.01	<0.01	<0.01	9/0	<0.01	<0.01	<0.01	1/0	<0.01	<0.01	<0.01
Zinc (Zn)	mg/L	0.0024[6]	6/0	<0.005	<0.005	<0.005	9/3	<0.005	<0.005	**0.007**	1/0	<0.005	<0.005	<0.005

Notes:
1. The WQO values for field parameters and nutrients refer to the WQO values for physical and chemical stressors in south-east Australia (upland river) that are reported in Tables 3.3.2 and 3.3.3 of ANZECC/ARMCANZ (2000). Toxicant trigger values are for the protection of 99% of aquatic species.
2. For As (V).
3. For Cr (VI).
4. Refers to a low reliability WQO value.
5. If less than 10 samples are available, the minimum value is reported instead of the 10th percentile value and the maximum value is reported instead of the 90th percentile value.
6. Denotes WQO lower than Limit of Reporting (LOR) (or laboratory detection limits). Exceedances below LOR are not identified in the baseline data.
7. An exceedance refers to any result that is above detection limit and exceeds the WQO value. Where a range is given for the WQO value, exceedances are determined in relation to the upper limit for turbidity and electrical conductivity, the lower limit for dissolved oxygen and the lower and upper limit for pH.

Bold denotes WQO value is exceeded.

Table D.13 Baseline water quality results summary: Minor watercourses (PL_SW_008, TanN_SW_001, TanS_SW_003, TanS_SW_004, TanS_SW_005, TanS_SW_006)

			Summer/autumn dry weather conditions				Winter/spring dry weather conditions				Wet weather conditions			
	Unit	WQO value[1]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]
Field Parameters														
Temperature	°C	-	17/0	12.7	16.0	21.7	25/0	6.7	11.6	21.8	-	-	-	-
Dissolved oxygen	%	90-110[1]	13/13	**62**	**75**	**88**	11/11	**0**	**54**	**82**	-	-	-	-
Electrical conductivity	µS/cm	30-350[1]	17/0	31	52	77	25/0	20	39	65	-	-	-	-
pH	-	6.5-8.0[1]	17/5	**5.9**	6.7	7.8	21/7	**5.9**	6.9	7.6	-	-	-	-
Oxidising and reducing potential	-	-	17/0	53	92	149	25/0	89	119	203	-	-	-	-
Turbidity	NTU	2-25[1]	16/2	1.2	8.1	**32.9**	19/3	0.9	4.9	**32.4**	-	-	-	-
Analytical results – general														
Suspended solids	mg/L	-	19/0	7	33	60	25/0	<5	12	75	-	-	-	-
Total hardness (as $CaCO_3$)	mg/L	-	16/0	2	10	27	25/0	2	9	25	-	-	-	-
Total alkalinity (as $CaCO_3$)	mg/L	-	3/0	14	26	31					-	-	-	-
Analytical results – nutrients														
Ammonia	mg/L	0.013	19/4	<0.01	<0.01	**0.03**	25/4	<0.01	<0.01	**0.02**	-	-	-	-
Oxidised nitrogen	mg/L	0.015	18/15	<0.01	**0.03**	**0.14**	25/17	<0.01	**0.03**	**0.09**	-	-	-	-
Total kjeldahl nitrogen	mg/L	-	18/0	<0.1	0.3	1.4	25/0	<0.1	0.2	0.5	-	-	-	-
Total nitrogen	mg/L	0.25	19/13	<0.1	**0.30**	**1.48**	25/11	<0.1	0.2	**0.5**	-	-	-	-
Reactive phosphorus	mg/L	0.015	16/1	<0.01	<0.01	0.01	25/0	<0.01	<0.01	<0.01	-	-	-	-

Table D.13 Baseline water quality results summary: Minor watercourses (PL_SW_008, TanN_SW_001, TanS_SW_003, TanS_SW_004, TanS_SW_005, TanS_SW_006)

			Summer/autumn dry weather conditions				Winter/spring dry weather conditions				Wet weather conditions			
	Unit	WQO value[1]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]
Total phosphorus	mg/L	0.020	19/14	0.01	**0.05**	**0.26**	25/11	<0.01	0.02	**0.13**	-	-	-	-
Total organic carbon	mg/L	-	16/0	2	3	6	25/0	<1	2	6	-	-	-	-
Dissolved organic carbon	mg/L	-	16/0	<1	3	6	25/0	<1	2	7	-	-	-	-
Analytical results – inorganics														
Cyanide	mg/L	0.004	16/0	<0.004	<0.004	<0.004	18/0	<0.004	<0.004	<0.004	-	-	-	-
Analytical results – metals (dissolved)														
Aluminium (Al)	mg/L	0.027	16/12	<0.01	**0.05**	**0.18**	25/20	0.01	**0.07**	**0.16**	-	-	-	-
Arsenic (As)	mg/L	0.0008[2,6]	16/0	<0.001	<0.001	<0.001	25/2	<0.001	<0.001	<0.001	-	-	-	-
Barium (Ba)	mg/L	-	16/0	0.002	0.013	0.024	25/0	0.002	0.015	0.028	-	-	-	-
Beryllium (Be)	mg/L	-	16/0	<0.001	<0.001	<0.001	25/0	<0.001	<0.001	<0.001	-	-	-	-
Boron (B)	mg/L	0.09	16/0	<0.05	<0.05	<0.05	25/0	<0.05	<0.05	<0.05	-	-	-	-
Cadmium (Cd)	mg/L	0.00006[6]	16/0	<0.0001	<0.0001	<0.0001	25/0	<0.0001	<0.0001	<0.0001	-	-	-	-
Total chromium (Cr)	mg/L	0.00001[3,6]	16/1	<0.001	<0.001	<0.001	25/0	<0.001	<0.001	<0.001	-	-	-	-
Cobalt (Co)	mg/L	0.0014[4]	16/0	<0.001	<0.001	<0.001	25/0	<0.001	<0.001	<0.001	-	-	-	-
Copper (Cu)	mg/L	0.001	16/3	<0.001	<0.001	**0.003**	25/2	<0.001	<0.001	0.001	-	-	-	-
Iron (Fe)	mg/L	0.3[4]	16/7	<0.05	0.11	**0.84**	25/6	<0.05	0.14	**0.36**	-	-	-	-
Lead (Pb)	mg/L	0.001	16/0	<0.001	<0.001	<0.001	25/0	<0.001	<0.001	<0.001	-	-	-	-

Table D.13 Baseline water quality results summary: Minor watercourses (PL_SW_008, TanN_SW_001, TanS_SW_003, TanS_SW_004, TanS_SW_005, TanS_SW_006)

			Summer/autumn dry weather conditions				Winter/spring dry weather conditions				Wet weather conditions			
	Unit	WQO value[1]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]
Manganese (Mn)	mg/L	1.2	16/0	<0.001	0.009	0.053	25/0	<0.001	0.012	0.036	-	-	-	-
Mercury (Hg)	mg/L	0.00006[6]	16/0	<0.0001	<0.0001	<0.0001	25/0	<0.0001	<0.0001	<0.0001	-	-	-	-
Nickel (Ni)	mg/L	0.008	16/0	<0.001	<0.001	<0.001	25/0	<0.001	<0.001	<0.001	-	-	-	-
Selenium (Se)	mg/L	0.005[6]	16/0	<0.01	<0.01	<0.01	25/0	<0.01	<0.01	<0.01	-	-	-	-
Silver (Ag)	mg/L	0.00002[6]	16/0	<0.001	<0.001	<0.001	25/0	<0.001	<0.001	<0.001	-	-	-	-
Vanadium (V)	mg/L	0.006[4,6]	16/0	<0.01	<0.01	<0.01	25/0	<0.01	<0.01	<0.01	-	-	-	-
Zinc (Zn)	mg/L	0.0024[6]	16/0	<0.005	<0.005	<0.005	25/8	<0.005	<0.005	**0.007**	-	-	-	-

Notes:
1. The WQO values for field parameters and nutrients refer to the WQO values for physical and chemical stressors in south-east Australia (upland river) that are reported in Tables 3.3.2 and 3.3.3 of ANZECC/ARMCANZ (2000). Toxicant trigger values are for the protection of 99% of aquatic species.
2. For As (V).
3. For Cr (VI).
4. Refers to a low reliability WQO value.
5. If less than 10 samples are available, the minimum value is reported instead of the 10th percentile value and the maximum value is reported instead of the 90th percentile value.
6. Denotes WQO lower than Limit of Reporting (LOR) (or laboratory detection limits). Exceedances below LOR are not identified in the baseline data.
7. An exceedance refers to any result that is above detection limit and exceeds the WQO value. Where a range is given for the WQO value, exceedances are determined in relation to the upper limit for turbidity and electrical conductivity, the lower limit for dissolved oxygen and the lower and upper limit for pH.

Bold denotes WQO value is exceeded.

ii Ravine

Table D.14 Baseline water quality results summary: Yarrangobilly River (PN_SW_001, LH_SW_004, LH_SW_006, LH_SW_007)

			Summer/autumn dry weather conditions				Winter/spring dry weather conditions				Wet weather conditions			
	Unit	WQO value[1]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]
Field Parameters														
Temperature	°C	-	27/0	13.4	20.9	23.6	31/0	4.0	9.3	18.7	5/0	14.5	15.8	17.8
Dissolved oxygen	%	90-110[1]	27/22	**39**	**78**	93	31/21	**2**	**77**	112	5/4	**0**	**61**	92
Electrical conductivity	µS/cm	30-350[1]	27/0	66	160	187	31/0	26	70	109	5/0	89	116	155
pH	-	6.5-8.0[1]	27/15	7.5	**8.0**	**8.5**	31/11	7.1	7.8	**8.2**	5/1	**6.2**	7.3	7.9
Oxidising and reducing potential	-	-	27/0	-20	108	149	27/0	51	164	210	5/0	78	96	157
Turbidity	NTU	2-25[1]	23/0	0.0	0.4	1.7	21/0	0.8	1.6	4.4	5/1	6.4	13.7	**42.1**
Analytical results – general														
Suspended solids	mg/L	-	27/0	<2[8]	<5[8]	5	31/0	<5	<5	<5	5/0	<5	10	148
Total hardness (as $CaCO_3$)	mg/L	-	20/0	22	75	88	31/0	7	32	53	5/0	43	51	78
Total alkalinity (as $CaCO_3$)	mg/L	-	7/0	29	86	109	1/0	16	16	16	-	-	-	-
Analytical results – nutrients														
Ammonia	mg/L	0.013	27/2	<0.01[8]	<0.01[8]	<0.1[8]	30/7	<0.01	<0.01	**0.02**	5/0	<0.01	<0.01	<0.01
Oxidised nitrogen	mg/L	0.015	23/14	<0.01	**0.02**	**0.05**	31/11	<0.01	<0.01	**0.03**	5/1	<0.01	<0.01	**0.03**
Total kjeldahl nitrogen	mg/L	-	23/0	<0.1	<0.1	<0.1	30/0	<0.1	<0.1	0.1	5/0	<0.1	0.1	2.1
Total nitrogen	mg/L	0.25	27/1	<0.1	<0.1	0.1	30/0	<0.1	<0.1	0.1	5/2	<0.1	0.1	**2.1**
Reactive phosphorus	mg/L	0.015	20/0	<0.01	<0.01	<0.01	31/1	<0.01	<0.01	<0.01	5/0	<0.01	<0.01	<0.01
Total phosphorus	mg/L	0.020	27/1	<0.01	<0.01	0.01	30/1	<0.01	<0.01	0.01	5/2	<0.01	0.02	**0.20**

Table D.14 Baseline water quality results summary: Yarrangobilly River (PN_SW_001, LH_SW_004, LH_SW_006, LH_SW_007)

			Summer/autumn dry weather conditions				Winter/spring dry weather conditions				Wet weather conditions			
	Unit	WQO value[1]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]
Total organic carbon	mg/L	-	20/0	1	2	7	30/0	<1	2	3	5/0	2	2	4
Dissolved organic carbon	mg/L	-	20/0	<1	2	2	30/0	1	2	5	5/0	2	3	4
Analytical results – inorganics														
Cyanide	mg/L	0.004	16/0	<0.004	<0.004	<0.004	16/0	<0.004	<0.004	<0.004	5/0	<0.004	<0.004	<0.004
Analytical results – metals (dissolved)														
Aluminium (Al)	mg/L	0.027	20/5	<0.01	<0.01	**0.04**	30/19	0.01	**0.03**	**0.11**	5/0	<0.01	<0.01	0.01
Arsenic (As)	mg/L	0.0008[2,6]	20/0	<0.001	<0.001	<0.001	30/0	<0.001	<0.001	<0.001	5/0	<0.001	<0.001	<0.001
Barium (Ba)	mg/L	-	20/0	0.018	0.026	0.036	30/0	0.011	0.016	0.026	5/0	0.013	0.024	0.029
Beryllium (Be)	mg/L	-	20/0	<0.001	<0.001	<0.001	30/0	<0.001	<0.001	<0.001	5/0	<0.001	<0.001	<0.001
Boron (B)	mg/L	0.09	20/0	<0.05	<0.05	<0.05	30/0	<0.05	<0.05	<0.05	5/0	<0.05	<0.05	<0.05
Cadmium (Cd)	mg/L	0.00006[6]	20/0	<0.0001	<0.0001	<0.0001	30/0	<0.0001	<0.0001	<0.0001	5/0	<0.0001	<0.0001	<0.0001
Total chromium (Cr)	mg/L	0.00001[3,6]	20/1	<0.001	<0.001	<0.001	30/1	<0.001	<0.001	<0.001	5/0	<0.001	<0.001	<0.001
Cobalt (Co)	mg/L	0.0014[4]	20/0	<0.001	<0.001	<0.001	30/0	<0.001	<0.001	<0.001	5/0	<0.001	<0.001	<0.001
Copper (Cu)	mg/L	0.001	20/0	<0.001	<0.001	<0.001	30/2	<0.001	<0.001	0.001	5/5	**0.002**	**0.006**	**0.027**
Iron (Fe)	mg/L	0.3[4]	20/0	<0.05	<0.05	0.08	30/0	<0.05	<0.05	0.07	5/0	<0.05	<0.05	<0.05
Lead (Pb)	mg/L	0.001	20/0	<0.001	<0.001	<0.001	30/0	<0.001	<0.001	<0.001	5/0	<0.001	<0.001	<0.001
Manganese (Mn)	mg/L	1.2	20/0	<0.001	0.002	0.002	30/0	<0.001	0.001	0.002	5/0	0.002	0.004	0.006
Mercury (Hg)	mg/L	0.00006[6]	20/0	<0.0001	<0.0001	<0.0001	30/0	<0.0001	<0.0001	<0.0001	5/0	<0.0001	<0.0001	<0.0001

Table D.14 Baseline water quality results summary: Yarrangobilly River (PN_SW_001, LH_SW_004, LH_SW_006, LH_SW_007)

			Summer/autumn dry weather conditions				Winter/spring dry weather conditions				Wet weather conditions			
	Unit	WQO value[1]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]
Nickel (Ni)	mg/L	0.008	20/0	<0.001	<0.001	<0.001	30/0	<0.001	<0.001	<0.001	5/0	<0.001	<0.001	<0.001
Selenium (Se)	mg/L	0.005[6]	20/0	<0.01	<0.01	<0.01	30/0	<0.01	<0.01	<0.01	5/0	<0.01	<0.01	<0.01
Silver (Ag)	mg/L	0.00002[6]	20/0	<0.001	<0.001	<0.001	30/0	<0.001	<0.001	<0.001	5/0	<0.001	<0.001	<0.001
Vanadium (V)	mg/L	0.006[4,6]	20/0	<0.01	<0.01	<0.01	30/0	<0.01	<0.01	<0.01	5/0	<0.01	<0.01	<0.01
Zinc (Zn)	mg/L	0.0024[6]	20/0	<0.005	<0.005	<0.005	30/7	<0.005	<0.005	**0.006**	5/2	<0.005	<0.005	**0.006**

Notes:
1. The WQO values for field parameters and nutrients refer to the WQO values for physical and chemical stressors in south-east Australia (upland river) that are reported in Tables 3.3.2 and 3.3.3 of ANZECC/ARMCANZ (2000). Toxicant trigger values are for the protection of 99% of aquatic species.
2. For As (V).
3. For Cr (VI).
4. Refers to a low reliability WQO value.
5. If less than 10 samples are available, the minimum value is reported instead of the 10th percentile value and the maximum value is reported instead of the 90th percentile value.
6. Denotes WQO lower than Limit of Reporting (LOR) (or laboratory detection limits). Exceedances below LOR are not identified in the baseline data.
7. An exceedance refers to any result that is above detection limit and exceeds the WQO value. Where a range is given for the WQO value, exceedances are determined in relation to the upper limit for turbidity and electrical conductivity, the lower limit for dissolved oxygen and the lower and upper limit for pH.
8. Where more than one LOR has been used in the reporting of an analyte, the lowest and highest LOR are considered in calculating 10th percentile, median and 90th percentile values.

Bold denotes WQO value is exceeded.

Table D.15 Baseline water quality results summary: Wallaces Creek (LH_SW_001, LH_SW_002, LH_SW_003)

			Summer/autumn dry weather conditions				Winter/spring dry weather conditions				Wet weather conditions			
	Unit	WQO value[1]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]
Field Parameters														
Temperature	°C	-	9/0	13.0	14.6	19.4	10/0	3.5	6.4	13.6	-	-	-	-
Dissolved oxygen	%	90-110[1]	8/7	**72**	**80**	92	10/7	**62**	**77**	105	-	-	-	-
Electrical conductivity	µS/cm	30-350[1]	9/0	65	163	185	10/0	36	64	89	-	-	-	-
pH	-	6.5-8.0[1]	9/2	**6.2**	7.5	**8.4**	10/1	6.8	7.8	8.0	-	-	-	-
Oxidising and reducing potential	-	-	9/0	12	101	167	9/0	-19	170	210	-	-	-	-
Turbidity	NTU	2-25[1]	7/0	0.2	0.4	0.7	7/1	0.1	1.3	**152.0**	-	-	-	-
Analytical results – general														
Suspended solids	mg/L	-	9/0	<2[8]	<5[8]	5	10/0	<5	<5	<5	-	-	-	-
Total hardness (as $CaCO_3$)	mg/L	-	6/0	42	67	94	10/0	16	28	55	-	-	-	-
Total alkalinity (as $CaCO_3$)	mg/L	-	3/0	38	99	104	-	-	-	-	-	-	-	-
Analytical results – nutrients														
Ammonia	mg/L	0.013	9/0	<0.01[8]	<0.01[8]	<0.1[8]	10/1	<0.01	<0.01	0.01	-	-	-	-
Oxidised nitrogen	mg/L	0.015	6/3	<0.01	0.02	**0.04**	10/3	<0.01	<0.01	**0.02**	-	-	-	-
Total kjeldahl nitrogen	mg/L	-	6/0	<0.1	<0.1	<0.1	10/0	<0.1	<0.1	0.1	-	-	-	-
Total nitrogen	mg/L	0.25	9/0	<0.05[8]	<0.1[8]	0.15	10/1	<0.1	<0.1	0.1	-	-	-	-
Reactive phosphorus	mg/L	0.015	6/0	<0.01	<0.01	<0.01	10/2	<0.01	<0.01	**0.02**	-	-	-	-
Total phosphorus	mg/L	0.020	9/0	<0.01	0.01	0.02	10/0	<0.01	<0.01	0.02	-	-	-	-

Table D.15 Baseline water quality results summary: Wallaces Creek (LH_SW_001, LH_SW_002, LH_SW_003)

			Summer/autumn dry weather conditions				Winter/spring dry weather conditions				Wet weather conditions			
	Unit	WQO value[1]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]
Total organic carbon	mg/L	-	6/0	<1	2	25	10/0	<1	1	2	-	-	-	-
Dissolved organic carbon	mg/L	-	6/0	1	1	2	10/0	1	2	4	-	-	-	-
Analytical results – inorganics														
Cyanide	mg/L	0.004	4/0	<0.004	<0.004	<0.004	4/0	<0.004	<0.004	<0.004	-	-	-	-
Analytical results – metals (dissolved)														
Aluminium (Al)	mg/L	0.027	6/0	<0.01	<0.01	<0.01	10/0	<0.01	<0.01	0.02	-	-	-	-
Arsenic (As)	mg/L	0.0008[2,6]	6/0	<0.001	<0.001	<0.001	10/0	<0.001	<0.001	<0.001	-	-	-	-
Barium (Ba)	mg/L	-	6/0	0.060	0.082	0.106	10/0	0.029	0.044	0.057	-	-	-	-
Beryllium (Be)	mg/L	-	6/0	<0.001	<0.001	<0.001	10/0	<0.001	<0.001	<0.001	-	-	-	-
Boron (B)	mg/L	0.09	6/0	<0.05	<0.05	<0.05	10/0	<0.05	<0.05	<0.05	-	-	-	-
Cadmium (Cd)	mg/L	0.00006[6]	6/0	<0.0001	<0.0001	<0.0001	10/0	<0.0001	<0.0001	<0.0001	-	-	-	-
Total chromium (Cr)	mg/L	0.00001[3,6]	6/0	<0.001	<0.001	<0.001	10/0	<0.001	<0.001	<0.001	-	-	-	-
Cobalt (Co)	mg/L	0.0014[4]	6/0	<0.001	<0.001	<0.001	10/0	<0.001	<0.001	<0.001	-	-	-	-
Copper (Cu)	mg/L	0.001	6/1	<0.001	<0.001	**0.003**	10/2	<0.001	<0.001	**0.002**	-	-	-	-
Iron (Fe)	mg/L	0.3[4]	6/0	<0.05	<0.05	<0.05	10/0	<0.05	<0.05	0.06	-	-	-	-
Lead (Pb)	mg/L	0.001	6/0	<0.001	<0.001	<0.001	10/0	<0.001	<0.001	<0.001	-	-	-	-
Manganese (Mn)	mg/L	1.2	6/0	0.001	0.002	0.002	10/0	<0.001	<0.001	0.001	-	-	-	-
Mercury (Hg)	mg/L	0.00006[6]	6/0	<0.0001	<0.0001	<0.0001	10/0	<0.0001	<0.0001	<0.0001	-	-	-	-

Table D.15 Baseline water quality results summary: Wallaces Creek (LH_SW_001, LH_SW_002, LH_SW_003)

			Summer/autumn dry weather conditions				Winter/spring dry weather conditions				Wet weather conditions			
	Unit	WQO value[1]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]
Nickel (Ni)	mg/L	0.008	6/0	<0.001	<0.001	0.001	10/0	<0.001	<0.001	<0.001	-	-	-	-
Selenium (Se)	mg/L	0.005[6]	6/0	<0.01	<0.01	<0.01	10/0	<0.01	<0.01	<0.01	-	-	-	-
Silver (Ag)	mg/L	0.00002[6]	6/0	<0.001	<0.001	<0.001	10/0	<0.001	<0.001	<0.001	-	-	-	-
Vanadium (V)	mg/L	0.006[4,6]	6/0	<0.01	<0.01	<0.01	10/0	<0.01	<0.01	<0.01	-	-	-	-
Zinc (Zn)	mg/L	0.0024[6]	6/1	<0.005	<0.005	**0.006**	10/3	<0.005	<0.005	**0.008**	-	-	-	-

Notes:
1. The WQO values for field parameters and nutrients refer to the WQO values for physical and chemical stressors in south-east Australia (upland river) that are reported in Tables 3.3.2 and 3.3.3 of ANZECC/ARMCANZ (2000). Toxicant trigger values are for the protection of 99% of aquatic species.
2. For As (V).
3. For Cr (VI).
4. Refers to a low reliability WQO value.
5. If less than 10 samples are available, the minimum value is reported instead of the 10th percentile value and the maximum value is reported instead of the 90th percentile value.
6. Denotes WQO lower than Limit of Reporting (LOR) (or laboratory detection limits). Exceedances below LOR are not identified in the baseline data.
7. An exceedance refers to any result that is above detection limit and exceeds the WQO value. Where a range is given for the WQO value, exceedances are determined in relation to the upper limit for turbidity and electrical conductivity, the lower limit for dissolved oxygen and the lower and upper limit for pH.
8. Where more than one LOR has been used in the reporting of an analyte, the lowest and highest LOR are considered in calculating 10th percentile, median and 90th percentile values.

Bold denotes WQO value is exceeded.

Table D.16 Baseline water quality results summary: Tumut River (TalS_SW_001)

			Summer/autumn dry weather conditions				Winter/spring dry weather conditions				Wet weather conditions			
	Unit	WQO value[1]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]
Field Parameters														
Temperature	°C	-	6/0	12.7	17.2	21.6	7/0	4.5	7.7	18.0	-	-	-	-
Dissolved oxygen	%	90-110[1]	6/6	**58**	**72**	**89**	7/5	**52**	**81**	160	-	-	-	-
Electrical conductivity	µS/cm	30-350[1]	6/0	86	99	118	7/0	36	68	157	-	-	-	-
pH	-	6.5-8.0[1]	6/1	6.6	7.7	**9.5**	7/1	**5.6**	7.4	7.8	-	-	-	-
Oxidising and reducing potential	-	-	6/0	96	148	193	6/0	84	154	217	-	-	-	-
Turbidity	NTU	2-25[1]	5/0	0.2	0.8	1.1	6/0	0.4	4.0	13.9	-	-	-	-
Analytical results – general														
Suspended solids	mg/L	-	6/0	<2[8]	<5[8]	6	7/0	<5	<5	23	-	-	-	-
Total hardness (as $CaCO_3$)	mg/L	-	5/0	30	32	32	7/0	12	21	27	-	-	-	-
Total alkalinity (as $CaCO_3$)	mg/L	-	1/0	46	46	46	-	-	-	-	-	-	-	-
Analytical results – nutrients														
Ammonia	mg/L	0.013	6/0	<0.01	<0.01	**0.10**	7/3	<0.01	<0.01	**0.02**	-	-	-	-
Oxidised nitrogen	mg/L	0.015	5/3	<0.01	**0.02**	**0.03**	7/2	<0.01	<0.01	**0.04**	-	-	-	-
Total kjeldahl nitrogen	mg/L	-	5/0	<0.1	<0.1	0.2	7/0	<0.1	<0.1	0.3	-	-	-	-
Total nitrogen	mg/L	0.25	6/0	<0.1	<0.1	0.2	7/1	<0.1	<0.1	**0.3**	-	-	-	-
Reactive phosphorus	mg/L	0.015	5/0	<0.01	<0.01	<0.01	7/0	<0.01	<0.01	<0.01	-	-	-	-
Total phosphorus	mg/L	0.020	6/0	<0.01	<0.01	0.01	7/1	<0.01	<0.01	**0.05**	-	-	-	-

Table D.16 Baseline water quality results summary: Tumut River (TalS_SW_001)

			Summer/autumn dry weather conditions				Winter/spring dry weather conditions				Wet weather conditions			
	Unit	WQO value[1]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]
Total organic carbon	mg/L	-	5/0	1	2	2	7/0	1	2	6	-	-	-	-
Dissolved organic carbon	mg/L	-	5/0	1	2	2	7/0	1	3	4	-	-	-	-
Analytical results – inorganics														
Cyanide	mg/L	0.004	4/0	<0.004	<0.004	<0.004	4/0	<0.004	<0.004	<0.004	-	-	-	-
Analytical results – metals (dissolved)														
Aluminium (Al)	mg/L	0.027	5/0	<0.01	0.01	0.02	7/6	0.02	**0.03**	**0.11**	-	-	-	-
Arsenic (As)	mg/L	0.0008[2,6]	5/0	<0.001	<0.001	<0.001	7/0	<0.001	<0.001	<0.001	-	-	-	-
Barium (Ba)	mg/L	-	5/0	0.006	0.008	0.010	7/0	0.006	0.008	0.017	-	-	-	-
Beryllium (Be)	mg/L	-	5/0	<0.001	<0.001	<0.001	7/0	<0.001	<0.001	<0.001	-	-	-	-
Boron (B)	mg/L	0.09	5/0	<0.05	<0.05	<0.05	7/0	<0.05	<0.05	<0.05	-	-	-	-
Cadmium (Cd)	mg/L	0.00006[6]	5/0	<0.0001	<0.0001	<0.0001	7/0	<0.0001	<0.0001	<0.0001	-	-	-	-
Total chromium (Cr)	mg/L	0.00001[3,6]	5/0	<0.001	<0.001	<0.001	7/1	<0.001	<0.001	**0.001**	-	-	-	-
Cobalt (Co)	mg/L	0.0014[4]	5/0	<0.001	<0.001	<0.001	7/0	<0.001	<0.001	<0.001	-	-	-	-
Copper (Cu)	mg/L	0.001	5/0	<0.001	<0.001	0.001	7/0	<0.001	<0.001	0.001	-	-	-	-
Iron (Fe)	mg/L	0.3[4]	5/0	0.08	0.11	0.15	7/0	<0.05	0.08	0.17	-	-	-	-
Lead (Pb)	mg/L	0.001	5/0	<0.001	<0.001	<0.001	7/0	<0.001	<0.001	<0.001	-	-	-	-
Manganese (Mn)	mg/L	1.2	5/0	0.004	0.008	0.012	7/0	0.002	0.003	0.007	-	-	-	-
Mercury (Hg)	mg/L	0.00006[6]	5/0	<0.0001	<0.0001	<0.0001	7/0	<0.0001	<0.0001	<0.0001	-	-	-	-

Table D.16 Baseline water quality results summary: Tumut River (TalS_SW_001)

			Summer/autumn dry weather conditions				Winter/spring dry weather conditions				Wet weather conditions			
	Unit	WQO value[1]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]
Nickel (Ni)	mg/L	0.008	5/0	<0.001	<0.001	0.001	7/0	<0.001	<0.001	0.001	-	-	-	-
Selenium (Se)	mg/L	0.005[6]	5/0	<0.01	<0.01	<0.01	7/0	<0.01	<0.01	<0.01	-	-	-	-
Silver (Ag)	mg/L	0.00002[6]	5/0	<0.001	<0.001	<0.001	7/0	<0.001	<0.001	<0.001	-	-	-	-
Vanadium (V)	mg/L	0.006[4,6]	5/0	<0.01	<0.01	<0.01	7/0	<0.01	<0.01	<0.01	-	-	-	-
Zinc (Zn)	mg/L	0.0024[6]	5/0	<0.005	<0.005	<0.005	7/3	<0.005	<0.005	**0.007**	-	-	-	-

Notes:
1. The WQO values for field parameters and nutrients refer to the WQO values for physical and chemical stressors in south-east Australia (upland river) that are reported in Tables 3.3.2 and 3.3.3 of ANZECC/ARMCANZ (2000). Toxicant trigger values are for the protection of 99% of aquatic species.
2. For As (V).
3. For Cr (VI).
4. Refers to a low reliability WQO value.
5. If less than 10 samples are available, the minimum value is reported instead of the 10th percentile value and the maximum value is reported instead of the 90th percentile value.
6. Denotes WQO lower than Limit of Reporting (LOR) (or laboratory detection limits). Exceedances below LOR are not identified in the baseline data.
7. An exceedance refers to any result that is above detection limit and exceeds the WQO value. Where a range is given for the WQO value, exceedances are determined in relation to the upper limit for turbidity and electrical conductivity, the lower limit for dissolved oxygen and the lower and upper limit for pH.
8. Where more than one LOR has been used in the reporting of an analyte, the lowest and highest LOR are considered in calculating 10th percentile, median and 90th percentile values.

Bold denotes WQO value is exceeded.

Table D.17 Baseline water quality results summary: Lick Hole Gully (LH_SW_005)

			Summer/autumn dry weather conditions				Winter/spring dry weather conditions				Wet weather conditions			
	Unit	WQO value[1]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]
Field Parameters														
Temperature	°C	-	1/0	16.9	16.9	16.9	5/0	8.6	13.2	13.9	1/0	16.7	16.7	16.7
Dissolved oxygen	%	90-110[1]	1/1	**60**	**60**	**60**	5/5	**48**	**62**	**70**	1/1	**1**	**1**	**1**
Electrical conductivity	µS/cm	30-350[1]	1/1	**801**	**801**	**801**	5/5	**403**	**640**	**814**	1/1	**783**	**783**	**783**
pH	-	6.5-8.0[1]	1/0	7.8	7.8	7.8	5/0	7.1	7.5	7.8	1/0	6.8	6.8	6.8
Oxidising and reducing potential	-	-	1/0	136	136	136	4/0	131	159	221	1/0	116	116	116
Turbidity	NTU	2-25[1]	1/1	**198.0**	**198.0**	**198.0**	3/1	0.4	3.4	**73.4**	1/0	0.7	0.7	0.7
Analytical results – general														
Suspended solids	mg/L	-	1/0	172	172	172	5/0	<5	12	168	1/0	5	5	5
Total hardness (as $CaCO_3$)	mg/L	-	1/0	474	474	474	5/0	305	310	497	1/0	402	402	402
Total alkalinity (as $CaCO_3$)	mg/L	-	-	**-**	**-**	-	-	**-**	**-**	-	-	**-**	**-**	-
Analytical results – nutrients														
Ammonia	mg/L	0.013	1/0	<0.01	<0.01	<0.01	5/2	<0.01	<0.01	**0.02**	1/0	<0.01	<0.01	<0.01
Oxidised nitrogen	mg/L	0.015	1/0	<0.01	<0.01	<0.01	5/2	<0.01	0.01	**0.11**	1/0	<0.01	<0.01	<0.01
Total kjeldahl nitrogen	mg/L	-	1/0	0.4	0.4	0.4	5/0	<0.1	<0.1	0.2	1/0	0.2	0.2	0.2
Total nitrogen	mg/L	0.25	1/1	**0.4**	**0.4**	**0.4**	5/0	<0.1	0.1	0.2	1/0	0.2	0.2	0.2
Reactive phosphorus	mg/L	0.015	1/0	<0.01	<0.01	<0.01	5/0	<0.01	<0.01	<0.01	1/0	<0.01	<0.01	<0.01
Total phosphorus	mg/L	0.020	1/1	**0.16**	**0.16**	**0.16**	5/1	<0.01	<0.01	**0.08**	1/0	<0.01	<0.01	<0.01

Table D.17 Baseline water quality results summary: Lick Hole Gully (LH_SW_005)

			Summer/autumn dry weather conditions				Winter/spring dry weather conditions				Wet weather conditions			
	Unit	WQO value[1]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]
Total organic carbon	mg/L	-	1/0	3	3	3	5/0	<1	1	2	1/0	3	3	3
Dissolved organic carbon	mg/L	-	1/0	3	3	3	5/0	<1	2	5	1/0	5	5	5
Analytical results – inorganics														
Cyanide	mg/L	0.004	1/0	<0.004	<0.004	<0.004	3/0	<0.004	<0.004	<0.004	1/0	<0.004	<0.004	<0.004
Analytical results – metals (dissolved)														
Aluminium (Al)	mg/L	0.027	1/0	<0.01	<0.01	<0.01	5/0	<0.01	<0.01	<0.01	1/0	<0.01	<0.01	<0.01
Arsenic (As)	mg/L	0.0008[2,6]	1/0	<0.001	<0.001	<0.001	5/1	<0.001	<0.001	**0.001**	1/0	<0.001	<0.001	<0.001
Barium (Ba)	mg/L	-	1/0	0.153	0.153	0.153	5/0	0.108	0.116	0.128	1/0	0.113	0.113	0.113
Beryllium (Be)	mg/L	-	1/0	<0.001	<0.001	<0.001	5/0	<0.001	<0.001	<0.001	1/0	<0.001	<0.001	<0.001
Boron (B)	mg/L	0.09	1/0	<0.05	<0.05	<0.05	5/0	<0.05	<0.05	<0.05	1/0	<0.05	<0.05	<0.05
Cadmium (Cd)	mg/L	0.00006[6]	1/0	<0.0001	<0.0001	<0.0001	5/0	<0.0001	<0.0001	<0.0001	1/0	<0.0001	<0.0001	<0.0001
Total chromium (Cr)	mg/L	0.00001[3,6]	1/0	<0.001	<0.001	<0.001	5/0	<0.001	<0.001	<0.001	1/0	<0.001	<0.001	<0.001
Cobalt (Co)	mg/L	0.0014[4]	1/0	<0.001	<0.001	<0.001	5/0	<0.001	<0.001	<0.001	1/0	<0.001	<0.001	<0.001
Copper (Cu)	mg/L	0.001	1/1	**0.011**	**0.011**	**0.011**	5/5	**0.002**	**0.003**	**0.008**	1/1	**0.010**	**0.010**	**0.010**
Iron (Fe)	mg/L	0.3[4]	1/0	<0.05	<0.05	<0.05	5/0	<0.05	<0.05	<0.05	1/0	<0.05	<0.05	<0.05
Lead (Pb)	mg/L	0.001	1/0	<0.001	<0.001	<0.001	5/0	<0.001	<0.001	<0.001	1/0	<0.001	<0.001	<0.001
Manganese (Mn)	mg/L	1.2	1/0	0.009	0.009	0.009	5/0	0.002	0.002	0.015	1/0	0.002	0.002	0.002
Mercury (Hg)	mg/L	0.00006[6]	1/0	<0.0001	<0.0001	<0.0001	5/0	<0.0001	<0.0001	<0.0001	1/0	<0.0001	<0.0001	<0.0001

Table D.17 Baseline water quality results summary: Lick Hole Gully (LH_SW_005)

			Summer/autumn dry weather conditions				Winter/spring dry weather conditions				Wet weather conditions			
	Unit	WQO value[1]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]
Nickel (Ni)	mg/L	0.008	1/0	<0.001	<0.001	<0.001	5/0	<0.001	<0.001	0.002	1/0	0.002	0.002	0.002
Selenium (Se)	mg/L	0.005[6]	1/0	<0.01	<0.01	<0.01	5/0	<0.01	<0.01	<0.01	1/0	<0.01	<0.01	<0.01
Silver (Ag)	mg/L	0.00002[6]	1/0	<0.001	<0.001	<0.001	5/0	<0.001	<0.001	<0.001	1/0	<0.001	<0.001	<0.001
Vanadium (V)	mg/L	0.006[4,6]	1/0	<0.01	<0.01	<0.01	5/0	<0.01	<0.01	<0.01	1/0	<0.01	<0.01	<0.01
Zinc (Zn)	mg/L	0.0024[6]	1/0	<0.005	<0.005	<0.005	5/1	<0.005	<0.005	**0.006**	1/1	**0.006**	**0.006**	**0.006**

Notes:
1. The WQO values for field parameters and nutrients refer to the WQO values for physical and chemical stressors in south-east Australia (upland river) that are reported in Tables 3.3.2 and 3.3.3 of ANZECC/ARMCANZ (2000). Toxicant trigger values are for the protection of 99% of aquatic species.
2. For As (V).
3. For Cr (VI).
4. Refers to a low reliability WQO value.
5. If less than 10 samples are available, the minimum value is reported instead of the 10th percentile value and the maximum value is reported instead of the 90th percentile value.
6. Denotes WQO lower than Limit of Reporting (LOR) (or laboratory detection limits). Exceedances below LOR are not identified in the baseline data.
7. An exceedance refers to any result that is above detection limit and exceeds the WQO value. Where a range is given for the WQO value, exceedances are determined in relation to the upper limit for turbidity and electrical conductivity, the lower limit for dissolved oxygen and the lower and upper limit for pH.

Bold denotes WQO value is exceeded.

Table D.18 Baseline water quality results summary: Minor watercourses (LH_SW_008, LH_SW_009)

			Summer/autumn dry weather conditions				Winter/spring dry weather conditions				Wet weather conditions			
	Unit	WQO value[1]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]
Field Parameters														
Temperature	°C	-	3/0	12.4	14.0	21.3	7/0	8.4	11.1	20.5	2/0	14.0	14.3	14.5
Dissolved oxygen	%	90-110[1]	3/3	**39**	**39**	**45**	7/7	**35**	**63**	**75**	2/2	**57**	**58**	**59**
Electrical conductivity	µS/cm	30-350[1]	3/0	79	87	107	7/0	42	63	83	2/0	70	72	74
pH	-	6.5-8.0[1]	3/1	6.7	7.8	**8.3**	7/1	**6.5**	7.1	7.9	2/0	7.1	7.4	7.7
Oxidising and reducing potential	-	-	3/0	113	118	162	6/0	151	179	223	2/0	165	169	173
Turbidity	NTU	2-25[1]	3/0	0.1	0.4	1.0	7/0	0.2	0.9	5.7	2/0	5.2	5.7	6.3
Analytical results – general														
Suspended solids	mg/L	-	3/0	<5	<5	5	7/0	<5	<5	8	2/0	<5	<5	<5
Total hardness (as $CaCO_3$)	mg/L	-	3/0	35	39	45	7/0	21	28	39	2/0	28	29	30
Total alkalinity (as $CaCO_3$)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Analytical results – nutrients														
Ammonia	mg/L	0.013	3/0	<0.01	<0.01	<0.01	7/3	<0.01	0.01	**0.03**	2/0	<0.01	<0.01	<0.01
Oxidised nitrogen	mg/L	0.015	3/0	<0.01	<0.01	<0.01	7/0	<0.01	<0.01	0.01	2/0	<0.01	<0.01	<0.01
Total kjeldahl nitrogen	mg/L	-	3/0	<0.1	<0.1	<0.1	7/0	<0.1	<0.1	2.4	2/0	0.3	0.3	0.3
Total nitrogen	mg/L	0.25	3/0	<0.1	<0.1	<0.1	7/1	<0.1	<0.1	**2.4**	2/2	**0.3**	**0.3**	**0.3**
Reactive phosphorus	mg/L	0.015	3/0	<0.01	<0.01	<0.01	7/0	<0.01	<0.01	<0.01	2/0	<0.01	<0.01	<0.01
Total phosphorus	mg/L	0.020	3/2	<0.01	**0.04**	**0.06**	7/1	<0.01	<0.01	**1.12**	2/1	0.02	**0.03**	**0.03**

Table D.18 Baseline water quality results summary: Minor watercourses (LH_SW_008, LH_SW_009)

			Summer/autumn dry weather conditions				Winter/spring dry weather conditions				Wet weather conditions			
	Unit	WQO value[1]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]
Total organic carbon	mg/L	-	3/0	<1	<1	1	7/0	<1	<1	2	2/0	7	8	8
Dissolved organic carbon	mg/L	-	3/0	1	1	1	7/0	<1	2	5	2/0	7	8	8
Analytical results – inorganics														
Cyanide	mg/L	0.004	3/0	<0.004	<0.004	<0.004	5/0	<0.004	<0.004	<0.004	2/0	<0.004	<0.004	<0.004
Analytical results – metals (dissolved)														
Aluminium (Al)	mg/L	0.027	3/0	<0.01	<0.01	<0.01	7/1	<0.01	0.02	**0.10**	2/2	**0.10**	**0.14**	**0.17**
Arsenic (As)	mg/L	0.0008[2,6]	3/0	<0.001	<0.001	<0.001	7/1	<0.001	<0.001	**0.002**	2/0	<0.001	<0.001	<0.001
Barium (Ba)	mg/L	-	3/0	0.014	0.015	0.020	7/0	0.010	0.011	0.017	2/0	0.012	0.013	0.013
Beryllium (Be)	mg/L	-	3/0	<0.001	<0.001	<0.001	7/0	<0.001	<0.001	<0.001	2/0	<0.001	<0.001	<0.001
Boron (B)	mg/L	0.09	3/0	<0.05	<0.05	<0.05	7/0	<0.05	<0.05	<0.05	2/0	<0.05	<0.05	<0.05
Cadmium (Cd)	mg/L	0.00006[6]	3/0	<0.0001	<0.0001	<0.0001	7/0	<0.0001	<0.0001	<0.0001	2/0	<0.0001	<0.0001	<0.0001
Total chromium (Cr)	mg/L	0.00001[3,6]	3/0	<0.001	<0.001	<0.001	7/0	<0.001	<0.001	<0.001	2/0	<0.001	<0.001	<0.001
Cobalt (Co)	mg/L	0.0014[4]	3/0	<0.001	<0.001	<0.001	7/0	<0.001	<0.001	<0.001	2/0	<0.001	<0.001	<0.001
Copper (Cu)	mg/L	0.001	3/0	<0.001	<0.001	<0.001	7/0	<0.001	<0.001	0.001	2/0	<0.001	<0.001	<0.001
Iron (Fe)	mg/L	0.3[4]	3/0	<0.05	<0.05	<0.05	7/0	<0.05	<0.05	0.06	2/0	0.14	0.18	0.21
Lead (Pb)	mg/L	0.001	3/0	<0.001	<0.001	<0.001	7/0	<0.001	<0.001	<0.001	2/0	<0.001	<0.001	<0.001
Manganese (Mn)	mg/L	1.2	3/0	<0.001	<0.001	0.020	7/0	<0.001	<0.001	0.001	2/0	0.002	0.002	0.002
Mercury (Hg)	mg/L	0.00006[6]	3/0	<0.0001	<0.0001	<0.0001	7/0	<0.0001	<0.0001	<0.0001	2/0	<0.0001	<0.0001	<0.0001

Table D.18 Baseline water quality results summary: Minor watercourses (LH_SW_008, LH_SW_009)

			Summer/autumn dry weather conditions				Winter/spring dry weather conditions				Wet weather conditions			
	Unit	WQO value[1]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]
Nickel (Ni)	mg/L	0.008	3/0	<0.001	<0.001	<0.001	7/0	<0.001	<0.001	0.002	2/0	<0.001	<0.001	<0.001
Selenium (Se)	mg/L	0.005[6]	3/0	<0.01	<0.01	<0.01	7/0	<0.01	<0.01	<0.01	2/0	<0.01	<0.01	<0.01
Silver (Ag)	mg/L	0.00002[6]	3/0	<0.001	<0.001	<0.001	7/0	<0.001	<0.001	<0.001	2/0	<0.001	<0.001	<0.001
Vanadium (V)	mg/L	0.006[4,6]	3/0	<0.01	<0.01	<0.01	7/0	<0.01	<0.01	<0.01	2/0	<0.01	<0.01	<0.01
Zinc (Zn)	mg/L	0.0024[6]	3/0	<0.005	<0.005	<0.005	7/0	<0.005	<0.005	<0.005	2/0	<0.005	<0.005	<0.005

Notes:
1. The WQO values for field parameters and nutrients refer to the WQO values for physical and chemical stressors in south-east Australia (upland river) that are reported in Tables 3.3.2 and 3.3.3 of ANZECC/ARMCANZ (2000). Toxicant trigger values are for the protection of 99% of aquatic species.
2. For As (V).
3. For Cr (VI).
4. Refers to a low reliability WQO value.
5. If less than 10 samples are available, the minimum value is reported instead of the 10th percentile value and the maximum value is reported instead of the 90th percentile value.
6. Denotes WQO lower than Limit of Reporting (LOR) (or laboratory detection limits). Exceedances below LOR are not identified in the baseline data.
7. An exceedance refers to any result that is above detection limit and exceeds the WQO value. Where a range is given for the WQO value, exceedances are determined in relation to the upper limit for turbidity and electrical conductivity, the lower limit for dissolved oxygen and the lower and upper limit for pH.

Bold denotes WQO value is exceeded.

Table D.19 Baseline water quality results summary: Wet weather sampling (March 2019)

			Receiving water				Access track			Mine workings		Access track		
	Unit	WQO value[1]	LH_WW_006	LH_WW_007	WW_1	WW_2	WW_3	WW_4	WW_5	WW_6	WW_7	WW_8	WW_9	WW_10
Field Parameters														
Temperature	°C	-	17.8	17.1	17.4	17.3	16.8	16.3	16.7	17.5	18.0	18.9	18.5	18.0
Dissolved oxygen	%	90-110	**82**	92	**81**	**74**	**83**	**72**	**81**	**71**	**80**	**68**	**74**	**87**
Electrical conductivity	µS/cm	30-350	155	154	10	33	12	17	53	24	20	10	19	78
pH	-	6.5-8.0	6.9	**6.2**	**5.9**	**5.2**	**5.0**	**5.3**	7.4	**6.1**	**6.0**	**5.6**	7.4	**6.1**
Oxidising and reducing potential	-	-	78	96	115	159	159	132	71	168	137	124	66	145
Turbidity	NTU	2-25	17	14	**3311**	**1216**	**4229**	**925**	**974**	**186**	**1993**	**1370**	**1336**	**2232**
Analytical results – general														
Suspended solids	mg/L	-	<5	10	1200	379	1200	605	705	77	436	184	390	1340
Total hardness (as $CaCO_3$)	mg/L	-	76	78	<1	5	<1	<1	22	<1	<1	<1	2	34
Total alkalinity (as $CaCO_3$)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Analytical results – nutrients														
Ammonia	mg/L	0.013	<0.01	<0.01	0.01	<0.01	**0.04**	<0.01	**0.04**	**0.08**	<0.01	**0.02**	0.01	**0.02**
Oxidised nitrogen	mg/L	0.015	**0.03**	0.01	**0.03**	<0.01	**0.14**	**0.02**	**0.18**	**0.40**	<0.01	**0.07**	**0.06**	**0.22**

Table D.19 Baseline water quality results summary: Wet weather sampling (March 2019)

			Receiving water				Access track			Mine workings		Access track		
	Unit	WQO value[1]	LH_WW_006	LH_WW_007	WW_1	WW_2	WW_3	WW_4	WW_5	WW_6	WW_7	WW_8	WW_9	WW_10
Total kjeldahl nitrogen	mg/L	-	<0.1	<0.1	3.1	1.3	2.9	2.6	6.7	1.1	2.0	1.6	2.7	5.3
Total nitrogen	mg/L	0.25	<0.1	<0.1	**3.1**	**1.3**	**3.0**	**2.6**	**6.9**	**1.5**	**2.0**	**1.7**	**2.8**	**5.5**
Reactive phosphorus	mg/L	0.015	<0.01	<0.01	0.01	**0.02**	<0.01	<0.01	**0.11**	**0.03**	<0.01	<0.01	<0.01	<0.01
Total phosphorus	mg/L	0.020	<0.01	<0.01	**0.71**	**0.41**	**0.86**	**0.30**	**1.10**	**0.22**	**0.73**	**0.52**	**0.82**	**0.97**
Total organic carbon	mg/L	-	2	2	16	28	15	25	14	7	30	11	15	16
Dissolved organic carbon	mg/L	-	4	3	16	24	10	19	8	8	24	8	13	17
Analytical results – inorganics														
Cyanide	mg/L	0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Analytical results – metals (dissolved)														
Aluminium (Al)	mg/L	0.027	<0.01	0.01	**0.23**	**0.42**	**0.22**	**0.64**	**0.33**	**0.38**	**2.85**	**0.27**	**0.22**	**0.57**
Arsenic (As)	mg/L	0.0008[2,5]	<0.001	<0.001	<0.001	**0.001**	<0.001	<0.001	**0.001**	<0.001	<0.001	<0.001	<0.001	**0.001**
Barium (Ba)	mg/L	-	0.029	0.029	0.005	0.056	0.016	0.02	0.011	0.027	0.031	0.006	0.042	0.019
Beryllium (Be)	mg/L	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Boron (B)	mg/L	0.09	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Cadmium (Cd)	mg/L	0.00006[5]	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Total chromium (Cr)	mg/L	0.00001[3,5]	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001

Table D.19 Baseline water quality results summary: Wet weather sampling (March 2019)

			Receiving water			Access track				Mine workings		Access track		
	Unit	WQO value[1]	LH_WW_006	LH_WW_007	WW_1	WW_2	WW_3	WW_4	WW_5	WW_6	WW_7	WW_8	WW_9	WW_10
Cobalt (Co)	mg/L	0.0014[4]	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.001	0.001	<0.001	<0.001	<0.001
Copper (Cu)	mg/L	0.001	**0.008**	**0.027**	<0.001	**0.531**	**0.037**	**0.006**	**0.008**	**0.381**	**0.02**	**0.002**	**0.003**	**0.159**
Iron (Fe)	mg/L	0.3[4]	<0.05	<0.05	0.08	**0.31**	0.11	**0.36**	0.2	0.2	**0.33**	0.25	0.12	**0.65**
Lead (Pb)	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	**0.002**	0.001	<0.001	<0.001
Manganese (Mn)	mg/L	1.2	0.004	0.006	0.055	0.14	0.026	0.111	0.008	0.065	0.106	0.081	0.248	0.046
Mercury (Hg)	mg/L	0.00006[5]	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Nickel (Ni)	mg/L	0.008	<0.001	<0.001	<0.001	0.003	<0.001	0.001	0.001	0.001	<0.001	0.001	<0.001	<0.001
Selenium (Se)	mg/L	0.005[5]	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Silver (Ag)	mg/L	0.00002[5]	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Vanadium (V)	mg/L	0.006[4,5]	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Zinc (Zn)	mg/L	0.0024[5]	<0.005	**0.005**	<0.005	<0.005	<0.005	**0.007**	<0.005	**0.014**	<0.005	<0.005	<0.005	<0.005

Notes:
1. The WQO values for field parameters and nutrients refer to the WQO values for physical and chemical stressors in south-east Australia (upland river) that are reported in Tables 3.3.2 and 3.3.3 of ANZECC/ARMCANZ (2000). Toxicant trigger values are for the protection of 99% of aquatic species.
2. For As (V).
3. For Cr (VI).
4. Refers to a low reliability WQO value.
5. Denotes WQO lower than Limit of Reporting (LOR) (or laboratory detection limits). Exceedances below LOR are not identified in the baseline data.
6. An exceedance refers to any result that is above detection limit and exceeds the WQO value. Where a range is given for the WQO value, exceedances are determined in relation to the upper limit for turbidity and electrical conductivity, the lower limit for dissolved oxygen and the lower and upper limit for pH.

Bold denotes WQO value is exceeded.

Table D.20 Baseline water quality results summary: Wet weather sampling (May 2019)

			Receiving water						Access track							
	Unit	WQO value[1]	LH_SW_004	LH_SW_005	LH_SW_006	LH_SW_007	LH_SW_008	LH_SW_009	WW_11	WW_12	WW_13	WW_14	WW_15	WW_16	WW_17	WW_18
Field Parameters																
Temperature	°C	-	15.7	16.7	14.5	15.8	14.0	14.5	19.4	15.6	16.1	18.0	16.5	15.3	17.0	19.4
Dissolved oxygen	%	90-110	**0**	**1**	**61**	**32**	**59**	**57**	**53**	**33**	**46**	**53**	**0**	**33**	**4**	**0**
Electrical conductivity	µS/cm	30-350	89	**783**	116	103	70	74	8	34	26	16	35	39	76	13
pH	-	6.5-8.0	7.3	6.8	7.9	7.5	7.7	7.1	7.3	**4.7**	7.1	8.0	**4.1**	**5.8**	**5.7**	**5.6**
Oxidising and reducing potential	-	-	107	116	157	90	165	173	139	219	166	142	260	176	187	167
Turbidity	NTU	2-25	**42**	**1**	6	**7**	5	6	**1431**	**110**	**1553**	**519**	**34**	**643**	**125**	**132**
Analytical results – general																
Suspended solids	mg/L	-	148	5	6	24	<5	<5	464	120	458	2720	20	304	154	111
Total hardness (as $CaCO_3$)	mg/L	-	43	402	51	43	28	30	<1	5	5	<1	2	5	27	<1
Total alkalinity (as $CaCO_3$)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Analytical results – nutrients																
Ammonia	mg/L	0.013	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	**0.04**	<0.01	<0.01	<0.01	<0.01
Oxidised nitrogen	mg/L	0.015	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	**0.24**	<0.01	<0.01	**0.97**	**0.95**	**0.09**	**1.60**	**0.11**
Total kjeldahl nitrogen	mg/L	-	2.1	0.2	0.1	0.5	0.3	0.3	0.9	0.6	3.3	6.7	0.6	0.8	1.2	1.2
Total nitrogen	mg/L	0.25	**2.1**	0.2	0.1	**0.5**	**0.3**	**0.3**	**1.1**	**0.6**	**3.3**	**7.7**	**1.6**	**0.9**	**2.8**	**1.3**

Table D.20 Baseline water quality results summary: Wet weather sampling (May 2019)

			Receiving water						Access track							
	Unit	WQO value[1]	LH_SW_004	LH_SW_005	LH_SW_006	LH_SW_007	LH_SW_008	LH_SW_009	WW_11	WW_12	WW_13	WW_14	WW_15	WW_16	WW_17	WW_18
Reactive phosphorus	mg/L	0.015	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	<0.01
Total phosphorus	mg/L	0.020	**0.2**	<0.01	0.02	**0.03**	0.02	**0.03**	**0.59**	**0.26**	**1.04**	**2.64**	**0.08**	**0.28**	**0.20**	**0.14**
Total organic carbon	mg/L	-	4	3	2	3	7	8	2	11	14	5	5	8	8	7
Dissolved organic carbon	mg/L	-	4	5	2	3	7	8	6	10	12	4	5	9	9	7
Analytical results – inorganics																
Cyanide	mg/L	0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Analytical results – metals (dissolved)																
Aluminium (Al)	mg/L	0.027	0.01	<0.01	<0.01	<0.01	**0.1**	**0.17**	**0.13**	**0.67**	**1.07**	**0.06**	**0.31**	**0.15**	**0.07**	**0.46**
Arsenic (As)	mg/L	0.0008[2,5]	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	**0.001**	<0.001	<0.001	<0.001	<0.001	<0.001	**0.001**
Barium (Ba)	mg/L	-	0.013	0.113	0.024	0.02	0.012	0.013	<0.001	0.056	0.016	0.007	0.044	0.029	0.053	0.009
Beryllium (Be)	mg/L	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Boron (B)	mg/L	0.09	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Cadmium (Cd)	mg/L	0.00006[5]	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Total chromium (Cr)	mg/L	0.00001[3,5]	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	**0.001**	<0.001	<0.001	<0.001	<0.001	<0.001
Cobalt (Co)	mg/L	0.0014[4]	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	**0.002**	<0.001	<0.001	<0.001
Copper (Cu)	mg/L	0.001	**0.003**	**0.01**	**0.006**	**0.002**	<0.001	<0.001	<0.001	**0.319**	**0.004**	<0.001	**0.665**	<0.001	**0.003**	<0.001
Iron (Fe)	mg/L	0.3[4]	<0.05	<0.05	<0.05	<0.05	0.14	0.21	0.06	**0.6**	**0.88**	<0.05	0.13	0.06	0.08	**0.35**
Lead (Pb)	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	**0.002**	<0.001	<0.001	<0.001	<0.001	<0.001

Table D.20 Baseline water quality results summary: Wet weather sampling (May 2019)

			Receiving water						Access track							
	Unit	WQO value[1]	LH_SW_004	LH_SW_005	LH_SW_006	LH_SW_007	LH_SW_008	LH_SW_009	WW_11	WW_12	WW_13	WW_14	WW_15	WW_16	WW_17	WW_18
Manganese (Mn)	mg/L	1.2	0.004	0.002	0.002	0.002	0.002	0.002	<0.001	0.074	0.09	0.025	0.095	0.061	0.029	0.007
Mercury (Hg)	mg/L	0.00006[5]	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Nickel (Ni)	mg/L	0.008	<0.001	0.002	<0.001	<0.001	<0.001	<0.001	<0.001	0.007	0.002	<0.001	0.001	<0.001	<0.001	<0.001
Selenium (Se)	mg/L	0.005[5]	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Silver (Ag)	mg/L	0.00002[5]	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Vanadium (V)	mg/L	0.006[4,5]	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Zinc (Zn)	mg/L	0.0024[5]	**0.006**	**0.006**	<0.005	<0.005	<0.005	<0.005	<0.005	**0.007**	**0.009**	<0.005	**0.012**	<0.005	<0.005	<0.005

Notes: 1. The WQO values for field parameters and nutrients refer to the WQO values for physical and chemical stressors in south-east Australia (upland river) that are reported in Tables 3.3.2 and 3.3.3 of ANZECC/ARMCANZ (2000). Toxicant trigger values are for the protection of 99% of aquatic species.
2. For As (V).
3. For Cr (VI).
4. Refers to a low reliability WQO value.
5. Denotes WQO lower than Limit of Reporting (LOR) (or laboratory detection limits). Exceedances below LOR are not identified in the baseline data.
6. An exceedance refers to any result that is above detection limit and exceeds the WQO value. Where a range is given for the WQO value, exceedances are determined in relation to the upper limit for turbidity and electrical conductivity, the lower limit for dissolved oxygen and the lower and upper limit for pH.
Bold denotes WQO value is exceeded.

iii Rock Forest

Table D.21 Baseline water quality results summary: Camerons Creek (TRL_SW_001)

			Summer/autumn dry weather conditions				Winter/spring dry weather conditions				Wet weather conditions			
	Unit	WQO value[1]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]
Field Parameters														
Temperature	°C	-	3/0	10.8	14.9	21.0	1/0	10.9	10.9	10.9	1/0	13.6	13.6	13.6
Dissolved oxygen	%	90-110[1]	2/2	**60**	**60**	**61**	1/1	**31**	**31**	**31**	1/1	**60**	**60**	**60**
Electrical conductivity	µS/cm	30-350[1]	3/0	60	65	124	1/0	67	67	67	1/0	68	68	68
pH	-	6.5-8.0[1]	3/0	6.6	6.9	7.0	1/0	6.6	6.6	6.6	1/0	7.0	7.0	7.0
Oxidising and reducing potential	-	-	3/0	25	49	134	1/0	172	172	172	1/0	156	156	156
Turbidity	NTU	2-25[1]	3/1	1.3	13.2	**38.2**	1/0	14.4	14.4	14.4	1/0	14.0	14.0	14.0
Analytical results – general														
Suspended solids	mg/L	-	3/0	6	6	37	1/0	13	13	13	1/0	7	7	7
Total hardness (as $CaCO_3$)	mg/L	-	3/0	13	17	30	1/0	11	11	11	1/0	13	13	13
Total alkalinity (as $CaCO_3$)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Analytical results – nutrients														
Ammonia	mg/L	0.013	3/3	**0.05**	**0.19**	**0.20**	1/1	**0.06**	**0.06**	**0.06**	1/0	<0.01	<0.01	<0.01
Oxidised nitrogen	mg/L	0.015	3/3	**0.03**	**0.07**	**0.09**	1/0	<0.01	<0.01	<0.01	1/0	0.01	0.01	0.01
Total kjeldahl nitrogen	mg/L	-	3/0	0.8	0.8	1.2	1/0	0.6	0.6	0.6	1/0	0.8	0.8	0.8
Total nitrogen	mg/L	0.25	3/3	**0.8**	**0.9**	**1.3**	1/1	**0.6**	**0.6**	**0.6**	1/1	**0.8**	**0.8**	**0.8**
Reactive phosphorus	mg/L	0.015	3/1	<0.01	0.01	**0.04**	1/0	<0.01	<0.01	<0.01	1/0	<0.01	<0.01	<0.01
Total phosphorus	mg/L	0.020	3/3	**0.07**	**0.08**	**0.09**	1/1	**0.25**	**0.25**	**0.25**	1/1	**0.05**	**0.05**	**0.05**

Table D.21 Baseline water quality results summary: Camerons Creek (TRL_SW_001)

			Summer/autumn dry weather conditions				Winter/spring dry weather conditions				Wet weather conditions			
	Unit	WQO value[1]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]
Total organic carbon	mg/L	-	3/0	6	6	8	1/0	4	4	4	1/0	9	9	9
Dissolved organic carbon	mg/L	-	3/0	5	6	8	1/0	4	4	4	1/0	10	10	10
Analytical results – inorganics														
Cyanide	mg/L	0.007	3/0	<0.004	<0.004	<0.004	1/0	<0.004	<0.004	<0.004	1/0	<0.004	<0.004	<0.004
Analytical results – metals (dissolved)														
Aluminium (Al)	mg/L	0.055	3/3	**0.19**	**0.24**	**0.26**	1/1	**0.18**	**0.18**	**0.18**	1/1	**0.13**	**0.13**	**0.13**
Arsenic (As)	mg/L	0.013[2]	3/0	0.001	0.002	0.002	1/0	0.001	0.001	0.001	1/0	<0.001	<0.001	<0.001
Barium (Ba)	mg/L	-	3/0	0.010	0.011	0.018	1/0	0.003	0.003	0.003	1/0	0.012	0.012	0.012
Beryllium (Be)	mg/L	-	3/0	<0.001	<0.001	<0.001	1/0	<0.001	<0.001	<0.001	1/0	<0.001	<0.001	<0.001
Boron (B)	mg/L	0.37	3/0	<0.05	<0.05	<0.05	1/0	<0.05	<0.05	<0.05	1/0	<0.05	<0.05	<0.05
Cadmium (Cd)	mg/L	0.0002[6]	3/0	<0.0001	<0.0001	<0.0001	1/0	<0.0001	<0.0001	<0.0001	1/0	<0.0001	<0.0001	<0.0001
Total chromium (Cr)	mg/L	0.001[3,6]	3/0	<0.001	<0.001	<0.001	1/0	<0.001	<0.001	<0.001	1/0	<0.001	<0.001	<0.001
Cobalt (Co)	mg/L	0.0014[4]	3/0	<0.001	<0.001	<0.001	1/0	<0.001	<0.001	<0.001	1/0	<0.001	<0.001	<0.001
Copper (Cu)	mg/L	0.0014	3/1	<0.001	0.001	**0.002**	1/0	<0.001	<0.001	<0.001	1/1	**0.004**	**0.004**	**0.004**
Iron (Fe)	mg/L	0.3[4]	3/3	**0.47**	**0.70**	**1.27**	1/0	0.28	0.28	0.28	1/1	**0.39**	**0.39**	**0.39**
Lead (Pb)	mg/L	0.0034	3/0	<0.001	<0.001	<0.001	1/0	<0.001	<0.001	<0.001	1/0	<0.001	<0.001	<0.001
Manganese (Mn)	mg/L	1.9	3/0	0.014	0.017	0.090	1/0	0.006	0.006	0.006	1/0	0.013	0.013	0.013
Mercury (Hg)	mg/L	0.00006[6]	3/0	<0.0001	<0.0001	<0.0001	1/0	<0.0001	<0.0001	<0.0001	1/0	<0.0001	<0.0001	<0.0001

Table D.21 Baseline water quality results summary: Camerons Creek (TRL_SW_001)

			Summer/autumn dry weather conditions				Winter/spring dry weather conditions				Wet weather conditions			
	Unit	WQO value[1]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]
Nickel (Ni)	mg/L	0.011	3/0	0.001	0.001	0.002	1/0	<0.001	<0.001	<0.001	1/0	0.003	0.003	0.003
Selenium (Se)	mg/L	0.005[6]	3/0	<0.01	<0.01	<0.01	1/0	<0.01	<0.01	<0.01	1/0	<0.01	<0.01	<0.01
Silver (Ag)	mg/L	0.00005[6]	3/0	<0.001	<0.001	<0.001	1/0	<0.001	<0.001	<0.001	1/0	<0.001	<0.001	<0.001
Vanadium (V)	mg/L	0.006[4,6]	3/0	<0.01	<0.01	<0.01	1/0	<0.01	<0.01	<0.01	1/0	<0.01	<0.01	<0.01
Zinc (Zn)	mg/L	0.008[6]	3/0	<0.005	<0.005	<0.005	1/0	<0.005	<0.005	<0.005	1/0	0.008	0.008	0.008

Notes:
1. The WQO values for field parameters and nutrients refer to the WQO values for physical and chemical stressors in south-east Australia (upland river) that are reported in Tables 3.3.2 and 3.3.3 of ANZECC/ARMCANZ (2000). Toxicant trigger values are for slightly – moderately disturbed ecosystems.
2. For As (V).
3. For Cr (VI).
4. Refers to a low reliability WQO value.
5. If less than 10 samples are available, the minimum value is reported instead of the 10th percentile value and the maximum value is reported instead of the 90th percentile value.
6. Denotes WQO lower than Limit of Reporting (LOR) (or laboratory detection limits). Exceedances below LOR are not identified in the baseline data.
7. An exceedance refers to any result that is above detection limit and exceeds the WQO value. Where a range is given for the WQO value, exceedances are determined in relation to the upper limit for turbidity and electrical conductivity, the lower limit for dissolved oxygen and the lower and upper limit for pH.

Bold denotes WQO value is exceeded.

D.2.2 Reservoirs

Table D.22 Baseline water quality results summary: Talbingo Reservoir

			Summer/autumn dry weather conditions				Winter/spring dry weather conditions				Wet weather conditions			
	Unit	WQO value[1]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]
Field Parameters														
Temperature	°C	-	23/0	8.6	18.1	27.5	36/0	6.3	12.2	21.2	-	-	-	-
Dissolved oxygen	%	90-110[1]	8/0	99	101	107	12/0	99	100	103	-	-	-	-
Electrical conductivity	µS/cm	20-30[1]	23/9	18	27	**41**	36/11	13	22	**35**	-	-	-	-
pH	-	6.5-8.0[1]	23/4	**6.3**	7.0	8.0	36/14	7.7	8.0	**8.2**	-	-	-	-
Oxidising and reducing potential	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Turbidity	NTU	1-20[1]	8/0	1.0	1.4	1.5	12/0	1.0	1.1	1.3	-	-	-	-
Analytical results – general														
Suspended solids	mg/L	-	23/0	<1	2	5	36/0	<1	<1	5	-	-	-	-
Total hardness (as $CaCO_3$)	mg/L	-	15/0	6	7	10	24/0	5	5	12	-	-	-	-
Total alkalinity (as $CaCO_3$)	mg/L	-	15/0	<20	<20	<20	24/0	9	10	14	-	-	-	-
Analytical results – nutrients														
Ammonia	mg/L	0.01	23/0	<0.005	<0.01	<0.01	28/20	<0.005	**0.015**	**0.027**	-	-	-	-
Oxidised nitrogen	mg/L	0.01	23/4	<0.002	<0.05	**0.058**	28/23	<0.002	**0.027**	**0.044**	-	-	-	-
Total kjeldahl nitrogen	mg/L	-	23/0	<0.2	<0.2	0.20	28/0	0.07	0.09	0.23	-	-	-	-
Total nitrogen	mg/L	0.35	23/0	<0.2	<0.2	0.20	28/1	0.11	0.12	0.23	-	-	-	-
Reactive phosphorus	mg/L	0.005	23/1	<0.05	<0.05	**0.050**	28/1	0.002	0.002	0.003	-	-	-	-
Total phosphorus	mg/L	0.01	8/8	**0.017**	**0.026**	**0.039**	28/7	0.010	0.010	**0.020**	-	-	-	-

Table D.22 Baseline water quality results summary: Talbingo Reservoir

			Summer/autumn dry weather conditions				Winter/spring dry weather conditions				Wet weather conditions			
	Unit	WQO value[1]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]
Total organic carbon	mg/L	-	15/0	<5	<5	<5	24/0	1	1	2	-	-	-	-
Dissolved organic carbon	mg/L	-	15/0	<5	<5	<5	24/0	1	2	2	-	-	-	-
Analytical results – inorganics														
Cyanide	mg/L	0.007	-	-	-	-	-	-	-	-	-	-	-	-
Analytical results – metals (dissolved)														
Aluminium (Al)	mg/L	0.055	23/0	<0.01	<0.05	0.05	36/0	<0.01	0.01	0.03	-	-	-	-
Arsenic (As)	mg/L	0.013[2]	23/0	<0.001	<0.001	0.001	36/0	<0.001	<0.001	<0.001	-	-	-	-
Barium (Ba)	mg/L	-	23/0	<0.02	<0.02	0.020	36/0	0.005	0.007	0.013	-	-	-	-
Beryllium (Be)	mg/L	-	23/0	<0.001	<0.001	<0.001	36/0	<0.001	<0.001	<0.001	-	-	-	-
Boron (B)	mg/L	0.37	23/0	<0.05	<0.05	<0.05	36/0	<0.05	<0.05	<0.05	-	-	-	-
Cadmium (Cd)	mg/L	0.0002	23/0	<0.0001	<0.0002	<0.0002	36/0	<0.0001	<0.0001	<0.0001	-	-	-	-
Total chromium (Cr)	mg/L	0.001[3]	23/4	<0.001	<0.001	**0.002**	36/0	<0.001	<0.001	<0.001	-	-	-	-
Cobalt (Co)	mg/L	0.0014[4]	23/0	<0.001	<0.001	<0.001	36/0	<0.001	<0.001	<0.001	-	-	-	-
Copper (Cu)[9]	mg/L	0.0014	23/10	<0.001	<0.001	**0.046**	36/1	<0.001	<0.001	<0.001	-	-	-	-
Iron (Fe)	mg/L	0.3[4]	23/0	<0.05	<0.05	<0.05	36/0	<0.05	<0.05	<0.05	-	-	-	-
Lead (Pb)	mg/L	0.0034	23/1	<0.001	<0.001	0.003	36/0	<0.001	<0.001	<0.001	-	-	-	-
Manganese (Mn)	mg/L	1.9	23/0	<0.001	<0.005	<0.005	36/0	<0.001	<0.001	0.003	-	-	-	-
Mercury (Hg)	mg/L	0.00006[6]	23/0	<0.0001	<0.0001	<0.0001	36/0	<0.0001	<0.0001	<0.0001	-	-	-	-

Table D.22 Baseline water quality results summary: Talbingo Reservoir

			Summer/autumn dry weather conditions				Winter/spring dry weather conditions				Wet weather conditions			
	Unit	WQO value[1]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]
Nickel (Ni)	mg/L	0.011	23/0	<0.001	<0.001	0.004	36/0	<0.001	<0.001	<0.001	-	-	-	-
Selenium (Se)	mg/L	0.005[6]	23/0	<0.001	<0.001	<0.01	36/0	<0.01	<0.01	<0.01	-	-	-	-
Silver (Ag)	mg/L	0.00005	23/0	<0.001	<0.005	<0.005	36/0	<0.001	<0.001	<0.001	-	-	-	-
Vanadium (V)	mg/L	0.006[4,6]	23/0	<0.005	<0.005	<0.01	36/0	<0.01	<0.01	<0.01	-	-	-	-
Zinc (Zn)[9]	mg/L	0.008	23/12	<0.005	**0.010**	**0.058**	36/1	<0.005	<0.005	<0.005	-	-	-	-

Notes:
1. The WQO values for field parameters and nutrients refer to the WQO values for physical and chemical stressors in south-east Australia (freshwater lakes and reservoirs) that are reported in Tables 3.3.2 and 3.3.3 of ANZECC/ARMCANZ (2000). Toxicant trigger values are for slightly – moderately disturbed ecosystems.
2. For As (V).
3. For Cr (VI).
4. Refers to a low reliability WQO value.
5. If less than 10 samples are available, the minimum value is reported instead of the 10th percentile value and the maximum value is reported instead of the 90th percentile value.
6. Denotes WQO lower than Limit of Reporting (LOR) (or laboratory detection limits). Exceedances below LOR are not identified in the baseline data.
7. An exceedance refers to any result that is above detection limit and exceeds the WQO value. Where a range is given for the WQO value, exceedances are determined in relation to the upper limit for turbidity and electrical conductivity, the lower limit for dissolved oxygen and the lower and upper limit for pH.
8. Where more than one LOR has been used in the reporting of an analyte, the lowest and highest LOR are considered in calculating 10th percentile, median and 90th percentile values.
9. It is noted that all but one of the copper exceedances and two of the zinc exceedances occurred during March 2018 sampling, where 80% of samples exceeded the WQO values. Different analysis methods (consistent with the methods applied more broadly to EIS sampling) were applied to subsequent sampling.

Bold denotes WQO value is exceeded.

Table D.23 Baseline water quality results summary: Tantangara Reservoir

			Summer/autumn dry weather conditions				Winter/spring dry weather conditions				Wet weather conditions			
	Unit	WQO value[1]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]
Field Parameters														
Temperature	°C	-	23/0	17.5	17.7	23.1	27/0	8.5	10.1	16.7	-	-	-	-
Dissolved oxygen	%	90-110[1]	8/3	**86**	91	92	12/0	90	94	96	-	-	-	-
Electrical conductivity	µS/cm	20-30[1]	23/0	22	22	26	27/0	13	14	23	-	-	-	-
pH	-	6.5-8.0[1]	23/1	6.6	6.7	7.6	27/1	7.4	7.8	8.0	-	-	-	-
Oxidising and reducing potential	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Turbidity	NTU	1-20[1]	8/0	1.9	2.4	3.0	12/0	1.1	1.6	2.0	-	-	-	-
Analytical results – general														
Suspended solids	mg/L	-	23/0	<1	4	6	27/0	<1[8]	<5[8]	5	-	-	-	-
Total hardness (as $CaCO_3$)	mg/L	-	15/0	<5	5	6	15/0	2	2	2	-	-	-	-
Total alkalinity (as $CaCO_3$)	mg/L	-	15/0	<20	<20	<20	15/0	8	8	8	-	-	-	-
Analytical results – nutrients														
Ammonia	mg/L	0.01	22/3	<0.005[8]	<0.01[8]	**0.019**	19/0	<0.005	<0.005	0.006	-	-	-	-
Oxidised nitrogen	mg/L	0.01	22/3	<0.002[8]	<0.05[8]	**0.050**	19/0	<0.002	0.004	0.007	-	-	-	-
Total kjeldahl nitrogen	mg/L	-	22/0	<0.2	0.20	0.39	19/0	0.10	0.11	0.30	-	-	-	-
Total nitrogen	mg/L	0.35	22/3	<0.2	0.20	**0.39**	19/0	0.10	0.11	0.30	-	-	-	-
Reactive phosphorus	mg/L	0.005	22/2	<0.001[8]	<0.05[8]	**0.050**	19/1	<0.001	<0.001	0.002	-	-	-	-
Total phosphorus	mg/L	0.01	8/8	**0.024**	**0.028**	**0.042**	19/7	0.008	0.009	**0.020**	-	-	-	-

Table D.23 Baseline water quality results summary: Tantangara Reservoir

			Summer/autumn dry weather conditions				Winter/spring dry weather conditions				Wet weather conditions			
	Unit	WQO value[1]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]
Total organic carbon	mg/L	-	15/0	<5	<5	<5	15/0	2	2	2	-	-	-	-
Dissolved organic carbon	mg/L	-	15/0	<5	<5	<5	15/0	2	2	2	-	-	-	-
Analytical results – inorganics														
Cyanide	mg/L	0.007	-	-	-	-	-	-	-	-	-	-	-	-
Analytical results – metals (dissolved)														
Aluminium (Al)	mg/L	0.055	23/8	<0.05	0.05	**0.13**	27/27	**0.06**	**0.07**	**0.08**	-	-	-	-
Arsenic (As)	mg/L	0.013[2]	23/0	<0.001	<0.001	0.001	27/0	<0.001	<0.001	<0.001	-	-	-	-
Barium (Ba)	mg/L	-	23/0	<0.02	<0.02	0.020	27/0	0.007	0.007	0.008	-	-	-	-
Beryllium (Be)	mg/L	-	23/0	<0.001	<0.001	<0.001	27/0	<0.001	<0.001	<0.001	-	-	-	-
Boron (B)	mg/L	0.37	23/0	<0.05	<0.05	<0.05	27/0	<0.05	<0.05	<0.05	-	-	-	-
Cadmium (Cd)	mg/L	0.0002	23/0	<0.0001[8]	<0.0002[8]	<0.0002[8]	27/0	<0.0001	<0.0001	<0.0001	-	-	-	-
Total chromium (Cr)	mg/L	0.001[3]	23/2	<0.001	<0.001	0.001	27/0	<0.001	<0.001	<0.001	-	-	-	-
Cobalt (Co)	mg/L	0.0014[4]	23/1	<0.001	<0.001	<0.001	27/0	<0.001	<0.001	<0.001	-	-	-	-
Copper (Cu)[9]	mg/L	0.0014	23/15	<0.001	**0.015**	**0.053**	27/0	<0.001	<0.001	<0.001	-	-	-	-
Iron (Fe)	mg/L	0.3[4]	23/19	0.26	**0.57**	**0.70**	27/0	0.18	0.19	0.20	-	-	-	-
Lead (Pb)	mg/L	0.0034	23/2	<0.001	0.001	0.003	27/0	<0.001	<0.001	<0.001	-	-	-	-
Manganese (Mn)	mg/L	1.9	23/0	0.001	0.019	0.043	27/0	<0.001	0.003	0.008	-	-	-	-
Mercury (Hg)	mg/L	0.00006[6]	23/0	<0.0001	<0.0001	<0.0001	27/0	<0.0001	<0.0001	<0.0001	-	-	-	-

Table D.23 Baseline water quality results summary: Tantangara Reservoir

			Summer/autumn dry weather conditions				Winter/spring dry weather conditions				Wet weather conditions			
	Unit	WQO value[1]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]
Nickel (Ni)	mg/L	0.011	23/0	<0.001	0.002	0.004	27/0	<0.001	<0.001	<0.001	-	-	-	-
Selenium (Se)	mg/L	0.005[6]	23/0	<0.001[8]	<0.001[8]	<0.01[8]	27/0	<0.01	<0.01	<0.01	-	-	-	-
Silver (Ag)	mg/L	0.00005	23/0	<0.001[8]	<0.005[8]	<0.005[8]	27/0	<0.001	<0.001	<0.001	-	-	-	-
Vanadium (V)	mg/L	0.006[4,6]	23/0	<0.005[8]	<0.005[8]	<0.01[8]	27/0	<0.01	<0.01	<0.01	-	-	-	-
Zinc (Zn)[9]	mg/L	0.008	23/15	<0.005	**0.018**	**0.081**	27/0	<0.005	<0.005	<0.005	-	-	-	-

Notes:
1. The WQO values for field parameters and nutrients refer to the WQO values for physical and chemical stressors in south-east Australia (freshwater lakes and reservoirs) that are reported in Tables 3.3.2 and 3.3.3 of ANZECC/ARMCANZ (2000). Toxicant trigger values are for slightly – moderately disturbed ecosystems.
2. For As (V).
3. For Cr (VI).
4. Refers to a low reliability WQO value.
5. If less than 10 samples are available, the minimum value is reported instead of the 10th percentile value and the maximum value is reported instead of the 90th percentile value.
6. Denotes WQO lower than Limit of Reporting (LOR) (or laboratory detection limits). Exceedances below LOR are not identified in the baseline data.
7. An exceedance refers to any result that is above detection limit and exceeds the WQO value. Where a range is given for the WQO value, exceedances are determined in relation to the upper limit for turbidity and electrical conductivity, the lower limit for dissolved oxygen and the lower and upper limit for pH.
8. Where more than one LOR has been used in the reporting of an analyte, the lowest and highest LOR are considered in calculating 10th percentile, median and 90th percentile values.
9. It is noted that all but one of the copper exceedances and two of the zinc exceedances occurred during March 2018 sampling, where 80% of samples exceeded the WQO values. Different analysis methods (consistent with the methods applied more broadly to EIS sampling) were applied to subsequent sampling.

Bold denotes WQO value is exceeded.

D.2.3 Groundwater

i Plateau

Table D.24 Baseline water quality results summary: Gooandra Volcanics and Temperance Formation

			Gooandra Volcanics (MB01C, MB02, MB03, MB11A, PB04, SMB04, SMB05, TMB02A, TMB02B, TMB03A, TMB03B, TMB03C, TMB04)				Temperance Formation (MB04A, MB04B, MB07A, MB07B MB13A, MB13B, SMB03, PB10)			
	Unit	WQO value[1]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]
Field Parameters										
Temperature	°C	-	142/0	8.0	9.4	12.7	74/0	8.7	10.2	12.7
Dissolved oxygen	%	90-110[1]	96/95	**2**	**33**	**77**	48/47	**1**	**14**	**66**
Electrical conductivity	µS/cm	30-350[1]	142/0	41	103	175	74/43	96	**420**	**1566**
pH	-	6.5-8.0[1]	139/0	5.8	7.1	8.4	72/0	6.5	7.8	8.6
Oxidising and reducing potential	-	-	142/0	-174	82	176	74/0	-227	-79	139
TDS	NTU	-	128/0	28	67	114	67/0	66	321	827
Analytical results – general										
Total hardness (as $CaCO_3$)	mg/L	-	93/0	13	36	64	54/0	35	89	321
Bicarbonate (as CaCO3)	mg/L	-	143/0	25	49	78	73/0	16	61	138
Carbonate (as $CaCO_3$)	mg/L	-	143/0	<1	<1	<1	73/0	<1	<1	<1
Hydroxide (as $CaCO_3$)	mg/L	-	143/0	<1	<1	<1	73/0	<1	<1	<1
Total alkalinity (as $CaCO_3$)	mg/L	-	143/0	25	49	78	73/0	18	64	147
Analytical results – nutrients										
Ammonia	mg/L	0.013	146/44	<0.01	<0.01	**0.04**	75/35	<0.01	0.01	**0.07**
Oxidised nitrogen	mg/L	0.015	147/78	<0.01	**0.02**	**0.22**	75/37	<0.01	0.01	**0.27**
Total kjeldahl nitrogen	mg/L	-	146/0	<0.1	<0.1	0.2	75/0	<0.1	<0.1	0.4

Table D.24 Baseline water quality results summary: Gooandra Volcanics and Temperance Formation

			Gooandra Volcanics (MB01C, MB02, MB03, MB11A, PB04, SMB04, SMB05, TMB02A, TMB02B, TMB03A, TMB03B, TMB03C, TMB04)				Temperance Formation (MB04A, MB04B, MB07A, MB07B MB13A, MB13B, SMB03, PB10)			
	Unit	WQO value[1]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]
Total nitrogen	mg/L	0.25	146/18	<0.1	<0.1	**0.4**	75/17	<0.1	0.1	**0.6**
Reactive phosphorus	mg/L	0.015	93/16	<0.01	<0.01	**0.02**	53/13	<0.01	<0.01	**0.02**
Total phosphorus	mg/L	0.020	146/66	<0.01	0.02	**0.12**	75/41	<0.01	**0.03**	**0.19**
Analytical results – major ions										
Calcium	mg/L	-	143/0	4	12	20	73/0	8	25	117
Chloride	mg/L	-	143/0	<1	<1	2	73/0	<1	6	45
Magnesium	mg/L	-	143/0	<1	2	5	73/0	1	4	7
Sodium	mg/L	-	143/0	2	6	9	73/0	4	30	112
Potassium	mg/L	-	143/0	<1	<1	2	73/0	<1	2	9
Sulphate	mg/L	-	143/0	<1	3	14	73/0	7	82	363
Cyanide	mg/L	0.004	88/0	<0.004	<0.004	<0.004	51/0	<0.004	<0.004	<0.004
Fluoride	mg/L	2.4	143/0	<0.1	<0.1	0.2	73/0	<0.1	0.4	0.7
Analytical results – metals (dissolved)										
Aluminium (Al)	mg/L	0.027	92/7	<0.01	<0.01	0.02	53/14	<0.01	0.01	**0.13**
Arsenic (As)	mg/L	0.0008[2,6]	146/68	<0.001	<0.001	**0.007**	75/32	<0.001	<0.001	**0.028**
Barium (Ba)	mg/L	-	92/0	0.004	0.015	0.026	53/0	0.005	0.036	0.141
Beryllium (Be)	mg/L	-	92/0	<0.001	<0.001	<0.001	53/0	<0.001	<0.001	<0.001

Table D.24 Baseline water quality results summary: Gooandra Volcanics and Temperance Formation

			Gooandra Volcanics (MB01C, MB02, MB03, MB11A, PB04, SMB04, SMB05, TMB02A, TMB02B, TMB03A, TMB03B, TMB03C, TMB04)				Temperance Formation (MB04A, MB04B, MB07A, MB07B MB13A, MB13B, SMB03, PB10)			
	Unit	WQO value[1]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]
Boron (B)	mg/L	0.09	92/1	<0.05	<0.05	<0.05	53/4	<0.05	<0.05	0.09
Cadmium (Cd)	mg/L	0.00006[6]	146/1	<0.0001	<0.0001	<0.0001	75/0	<0.0001	<0.0001	<0.0001
Total chromium (Cr)	mg/L	0.00001[3,6]	146/11	<0.001	<0.001	<0.001	75/5	<0.001	<0.001	<0.001
Cobalt (Co)	mg/L	0.0014[4]	92/0	<0.001	<0.001	<0.001	53/0	<0.001	<0.001	<0.001
Copper (Cu)	mg/L	0.001	146/83	<0.001	**0.002**	**0.011**	75/38	<0.001	**0.002**	**0.010**
Iron (Fe)	mg/L	0.3[4]	92/21	<0.05	<0.05	**1.58**	53/11	<0.05	0.05	**1.40**
Lead (Pb)	mg/L	0.001	146/4	<0.001	<0.001	<0.001	75/3	<0.001	<0.001	<0.001
Manganese (Mn)	mg/L	1.2	92/0	<0.001	0.015	0.291	53/0	<0.001	0.093	0.189
Mercury (Hg)	mg/L	0.00006[6]	146/1	<0.0001	<0.0001	<0.0001	75/1	<0.0001	<0.0001	<0.0001
Nickel (Ni)	mg/L	0.008	146/7	<0.001	<0.001	0.005	75/4	<0.001	<0.001	0.004
Selenium (Se)	mg/L	0.005[6]	92/0	<0.01	<0.01	<0.01	53/0	<0.01	<0.01	<0.01
Silver (Ag)	mg/L	0.00002[6]	92/0	<0.001	<0.001	<0.001	53/0	<0.001	<0.001	<0.001
Vanadium (V)	mg/L	0.006[4,6]	92/0	<0.01	<0.01	<0.01	53/1	<0.01	<0.01	<0.01
Zinc (Zn)	mg/L	0.0024[6]	146/86	<0.005	**0.006**	**0.015**	75/45	<0.005	**0.006**	**0.037**

Notes: 1. The WQO values for field parameters and nutrients refer to the WQO values for physical and chemical stressors in south-east Australia (upland river) that are reported in Tables 3.3.2 and 3.3.3 of ANZECC/ARMCANZ (2000).
2. For As (V).
3. For Cr (VI).
4. Refers to a low reliability WQO value.

5. If less than 10 samples are available, the minimum value is reported instead of the 10th percentile value and the maximum value is reported instead of the 90th percentile value.
6. Denotes WQO lower than Limit of Reporting (or laboratory detection limits). Exceedances below LOR are not identified in the baseline data.
7. An exceedance refers to any result that is above detection limit and exceeds the WQO value. Where a range is given for the WQO value, exceedances are determined in relation to the upper limit for electrical conductivity, the lower limit for dissolved oxygen and the lower and upper limit for pH.
Bold denotes WQO value is exceeded.

Table D.25 Baseline water quality results summary: Boggy Plain Suite and Tantangara Formation

			Boggy Plain Suite (SMB02)				Tantangara Formation (MB08A, MB08B, PB06)			
	Unit	WQO value[1]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]
Field Parameters										
Temperature	°C	-	6/0	5.0	12.8	25.8	9/0	10.4	11.3	13.8
Dissolved oxygen	%	90-110[1]	6/6	**0**	**50**	**84**	4/4	**2**	**6**	**55**
Electrical conductivity	µS/cm	30-350[1]	6/0	173	197	225	9/0	118	246	300
pH	-	6.5-8.0[1]	6/0	7.3	7.7	8.3	9/0	6.7	7.8	8.8
Oxidising and reducing potential	-	-	6/0	-85	85	131	9/0	-249	-186	74
TDS	NTU	-	6/0	112	128	148	8/0	77	163	196
Analytical results – general										
Total hardness (as $CaCO_3$)	mg/L	-	4/0	68	76	83	9/0	41	81	86
Bicarbonate (as CaCO3)	mg/L	-	6/0	76	87	94	9/0	52	107	114
Carbonate (as $CaCO_3$)	mg/L	-	6/0	<1	<1	<1	9/0	<1	<1	16
Hydroxide (as $CaCO_3$)	mg/L	-	6/0	<1	<1	<1	9/0	<1	<1	<1
Total alkalinity (as $CaCO_3$)	mg/L	-	6/0	76	87	94	9/0	52	107	130
Analytical results – nutrients										
Ammonia	mg/L	0.013	6/1	<0.01	<0.01	**0.02**	9/2	<0.01	<0.01	**0.03**
Oxidised nitrogen	mg/L	0.015	6/3	<0.01	**0.03**	**0.44**	9/2	<0.01	<0.01	**0.02**
Total kjeldahl nitrogen	mg/L	-	6/0	<0.1	0.3	0.4	9/0	<0.1	<0.1	6.4
Total nitrogen	mg/L	0.25	6/4	<0.1	**0.3**	**0.8**	9/2	<0.1	<0.1	**6.4**

Table D.25 Baseline water quality results summary: Boggy Plain Suite and Tantangara Formation

			Boggy Plain Suite (SMB02)				Tantangara Formation (MB08A, MB08B, PB06)			
	Unit	WQO value[1]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]
Reactive phosphorus	mg/L	0.015	4/0	<0.01	<0.01	<0.01	9/4	<0.01	0.01	**0.02**
Total phosphorus	mg/L	0.020	6/3	<0.01	**0.03**	**0.07**	9/5	<0.01	**0.03**	**15.20**
Analytical results – major ions										
Calcium	mg/L	-	6/0	21	25	30	9/0	10	16	18
Chloride	mg/L	-	6/0	1	2	5	9/0	<1	2	3
Magnesium	mg/L	-	6/0	2	2	2	9/0	4	10	10
Sodium	mg/L	-	6/0	10	10	14	9/0	4	31	47
Potassium	mg/L	-	6/0	<1	<1	4	9/0	<1	4	6
Sulphate	mg/L	-	6/0	6	7	16	9/0	<1	30	39
Cyanide	mg/L	0.004	4/0	<0.004	<0.004	<0.004	9/0	<0.004	<0.004	<0.004
Fluoride	mg/L	2.4	6/0	0.3	0.3	0.4	9/0	<0.1	0.4	0.5
Analytical results – metals (dissolved)										
Aluminium (Al)	mg/L	0.027	4/4	**0.03**	**0.05**	**0.10**	9/2	<0.01	0.01	**0.58**
Arsenic (As)	mg/L	0.0008[2,6]	6/0	<0.001	<0.001	<0.001	9/7	<0.001	**0.004**	**0.016**
Barium (Ba)	mg/L	-	4/0	0.013	0.018	0.021	9/0	0.033	0.448	1.020
Beryllium (Be)	mg/L	-	4/0	<0.001	<0.001	<0.001	9/0	<0.001	<0.001	<0.001
Boron (B)	mg/L	0.09	4/0	<0.05	<0.05	<0.05	9/0	<0.05	<0.05	<0.05
Cadmium (Cd)	mg/L	0.00006[6]	6/0	<0.0001	<0.0001	<0.0001	9/0	<0.0001	<0.0001	<0.0001

Table D.25 Baseline water quality results summary: Boggy Plain Suite and Tantangara Formation

			Boggy Plain Suite (SMB02)				Tantangara Formation (MB08A, MB08B, PB06)			
	Unit	WQO value[1]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]
Total chromium (Cr)	mg/L	0.00001[3,6]	6/3	<0.001	<0.001	**0.002**	9/1	<0.001	<0.001	**0.001**
Cobalt (Co)	mg/L	0.0014[4]	4/0	<0.001	<0.001	<0.001	9/0	<0.001	<0.001	0.001
Copper (Cu)	mg/L	0.001	6/5	<0.001	**0.003**	**0.006**	9/3	<0.001	<0.001	**0.005**
Iron (Fe)	mg/L	0.3[4]	4/0	<0.05	0.06	0.10	9/1	<0.05	0.10	**0.57**
Lead (Pb)	mg/L	0.001	6/0	<0.001	<0.001	<0.001	9/1	<0.001	<0.001	**0.002**
Manganese (Mn)	mg/L	1.2	4/0	0.002	0.004	0.007	9/0	0.009	0.145	0.388
Mercury (Hg)	mg/L	0.00006[6]	6/0	<0.0001	<0.0001	<0.0001	9/0	<0.0001	<0.0001	<0.0001
Nickel (Ni)	mg/L	0.008	6/0	<0.001	<0.001	0.001	9/0	<0.001	<0.001	0.002
Selenium (Se)	mg/L	0.005[6]	4/0	<0.01	<0.01	<0.01	9/0	<0.01	<0.01	<0.01
Silver (Ag)	mg/L	0.00002[6]	4/0	<0.001	<0.001	<0.001	9/0	<0.001	<0.001	<0.001
Vanadium (V)	mg/L	0.006[4,6]	4/0	<0.01	<0.01	<0.01	9/0	<0.01	<0.01	<0.01
Zinc (Zn)	mg/L	0.0024[6]	6/6	**0.016**	**0.042**	**0.071**	9/4	<0.005	<0.005	**0.104**

Notes:
1. The WQO values for field parameters and nutrients refer to the WQO values for physical and chemical stressors in south-east Australia (upland river) that are reported in Tables 3.3.2 and 3.3.3 of ANZECC/ARMCANZ (2000).
2. For As (V).
3. For Cr (VI).
4. Refers to a low reliability WQO value.
5. If less than 10 samples are available, the minimum value is reported instead of the 10th percentile value and the maximum value is reported instead of the 90th percentile value.
6. Denotes WQO lower than Limit of Reporting (or laboratory detection limits). Exceedances below LOR are not identified in the baseline data.
7. An exceedance refers to any result that is above detection limit and exceeds the WQO value. Where a range is given for the WQO value, exceedances are determined in relation to the upper limit for electrical conductivity, the lower limit for dissolved oxygen and the lower and upper limit for pH.

Bold denotes WQO value is exceeded.

Table D.26 Baseline water quality results summary: Kellys Plain Volcanics and Tertiary basalt

			Kellys Plain Volcanics (PB01)				Tertiary basalt (MB01B)			
	Unit	WQO value[1]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]
Field Parameters										
Temperature	°C	-	6/0	10.4	13.8	16.0	16/0	8.6	9.1	12.3
Dissolved oxygen	%	90-110[1]	5/5	**1**	**19**	**29**	12/12	**29**	**49**	**66**
Electrical conductivity	µS/cm	30-350[1]	6/0	97	146	165	16/0	47	82	176
pH	-	6.5-8.0[1]	5/0	8.3	9.1	9.9	16/0	5.4	5.8	7.9
Oxidising and reducing potential	-	-	6/0	-105	78	205	16/0	44	116	177
TDS	NTU	-	5/0	81	96	107	13/0	31	52	104
Analytical results – general										
Total hardness (as $CaCO_3$)	mg/L	-	4/0	50	55	60	9/0	18	36	114
Bicarbonate (as CaCO3)	mg/L	-	6/0	39	63	77	15/0	22	39	63
Carbonate (as $CaCO_3$)	mg/L	-	6/0	<1	10	18	15/0	<1	<1	<1
Hydroxide (as $CaCO_3$)	mg/L	-	6/0	<1	<1	<1	15/0	<1	<1	<1
Total alkalinity (as $CaCO_3$)	mg/L	-	6/0	55	72	83	15/0	22	39	63
Analytical results – nutrients										
Ammonia	mg/L	0.013	6/3	<0.01	**0.02**	**0.08**	16/5	<0.01	<0.01	**0.09**
Oxidised nitrogen	mg/L	0.015	6/4	<0.01	**0.02**	**0.06**	16/13	<0.01	**0.04**	**0.17**
Total kjeldahl nitrogen	mg/L	-	6/0	<0.1	<0.1	0.2	16/0	<0.1	<0.1	0.6
Total nitrogen	mg/L	0.25	6/0	<0.1	<0.1	0.2	16/4	<0.1	<0.1	**0.6**

Table D.26 Baseline water quality results summary: Kellys Plain Volcanics and Tertiary basalt

			Kellys Plain Volcanics (PB01)				Tertiary basalt (MB01B)			
	Unit	WQO value[1]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]
Reactive phosphorus	mg/L	0.015	4/0	<0.01	<0.01	<0.01	9/2	<0.01	<0.01	**0.06**
Total phosphorus	mg/L	0.020	6/3	<0.01	**0.04**	**0.25**	16/16	**0.08**	**0.62**	**1.85**
Analytical results – major ions										
Calcium	mg/L	-	6/0	8	11	13	15/0	4	8	19
Chloride	mg/L	-	6/0	<1	1	5	15/0	<1	<1	1
Magnesium	mg/L	-	6/0	4	7	8	15/0	1	2	3
Sodium	mg/L	-	6/0	9	11	11	15/0	1	1	4
Potassium	mg/L	-	6/0	<1	<1	1	15/0	<1	<1	3
Sulphate	mg/L	-	6/0	<1	9	10	15/0	<1	2	10
Cyanide	mg/L	0.004	4/0	<0.004	<0.004	<0.004	8/0	<0.004	<0.004	<0.004
Fluoride	mg/L	2.4	6/0	<0.1	<0.1	0.2	15/0	<0.1	<0.1	<0.1
Analytical results – metals (dissolved)										
Aluminium (Al)	mg/L	0.027	4/0	<0.01	<0.01	<0.01	9/1	<0.01	0.01	**0.08**
Arsenic (As)	mg/L	0.0008[2,6]	6/0	<0.001	<0.001	<0.001	16/2	<0.001	<0.001	**0.002**
Barium (Ba)	mg/L	-	4/0	0.016	0.038	0.056	9/0	0.011	0.026	2.390
Beryllium (Be)	mg/L	-	4/0	<0.001	<0.001	<0.001	9/0	<0.001	<0.001	<0.001
Boron (B)	mg/L	0.09	4/0	<0.05	<0.05	<0.05	9/1	<0.05	<0.05	**1.06**
Cadmium (Cd)	mg/L	0.00006[6]	6/0	<0.0001	<0.0001	<0.0001	16/0	<0.0001	<0.0001	<0.0001

Table D.26 Baseline water quality results summary: Kellys Plain Volcanics and Tertiary basalt

			Kellys Plain Volcanics (PB01)				Tertiary basalt (MB01B)			
	Unit	WQO value[1]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]
Total chromium (Cr)	mg/L	0.00001[3,6]	6/0	<0.001	<0.001	<0.001	16/3	<0.001	<0.001	**0.002**
Cobalt (Co)	mg/L	0.0014[4]	4/0	<0.001	<0.001	<0.001	9/0	<0.001	<0.001	0.001
Copper (Cu)	mg/L	0.001	6/1	<0.001	0.001	**0.002**	16/15	**0.003**	**0.010**	**0.024**
Iron (Fe)	mg/L	0.3[4]	4/0	<0.05	<0.05	0.13	9/0	<0.05	<0.05	0.21
Lead (Pb)	mg/L	0.001	6/0	<0.001	<0.001	<0.001	16/1	<0.001	<0.001	<0.001
Manganese (Mn)	mg/L	1.2	4/0	0.019	0.022	0.038	9/0	0.004	0.012	0.137
Mercury (Hg)	mg/L	0.00006[6]	6/0	<0.0001	<0.0001	<0.0001	16/0	<0.0001	<0.0001	<0.0001
Nickel (Ni)	mg/L	0.008	6/0	<0.001	<0.001	0.001	16/0	<0.001	0.001	0.003
Selenium (Se)	mg/L	0.005[6]	4/0	<0.01	<0.01	<0.01	9/0	<0.01	<0.01	<0.01
Silver (Ag)	mg/L	0.00002[6]	4/0	<0.001	<0.001	<0.001	9/0	<0.001	<0.001	<0.001
Vanadium (V)	mg/L	0.006[4,6]	4/0	<0.01	<0.01	<0.01	9/0	<0.01	<0.01	<0.01
Zinc (Zn)	mg/L	0.0024[6]	6/0	<0.005	<0.005	<0.005	16/10	<0.005	**0.006**	**0.012**

Notes:
1. The WQO values for field parameters and nutrients refer to the WQO values for physical and chemical stressors in south-east Australia (upland river) that are reported in Tables 3.3.2 and 3.3.3 of ANZECC/ARMCANZ (2000).
2. For As (V).
3. For Cr (VI).
4. Refers to a low reliability WQO value.
5. If less than 10 samples are available, the minimum value is reported instead of the 10th percentile value and the maximum value is reported instead of the 90th percentile value.
6. Denotes WQO lower than Limit of Reporting (or laboratory detection limits). Exceedances below LOR are not identified in the baseline data.
7. An exceedance refers to any result that is above detection limit and exceeds the WQO value. Where a range is given for the WQO value, exceedances are determined in relation to the upper limit for electrical conductivity, the lower limit for dissolved oxygen and the lower and upper limit for pH.

Bold denotes WQO value is exceeded.

Table D.27 Baseline water quality results summary: Plateau bogs/fens

			Plateau bogs/fens (BH01, BH02, BH03, GH01, GH02, GH03, TC01, TC02, TC03)							
	Unit	WQO value[1]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]
Field Parameters										
Temperature	°C	-	9/0	16.4	17.6	24.3	-	-	-	-
Dissolved oxygen	%	90-110[1]	9/9	**0**	**13**	**22**	-	-	-	-
Electrical conductivity	µS/cm	30-350[1]	9/0	42	103	343	-	-	-	-
pH	-	6.5-8.0[1]	9/8	**4.2**	**5.7**	6.7	-	-	-	-
Oxidising and reducing potential	-	-	9/0	-135	-4	145	-	-	-	-
TDS	NTU	-	9/0	27	67	223	-	-	-	-
Analytical results – general										
Total hardness (as $CaCO_3$)	mg/L	-	8/0	2	8	90	-	-	-	-
Bicarbonate (as CaCO3)	mg/L	-	7/0	11	31	101	-	-	-	-
Carbonate (as $CaCO_3$)	mg/L	-	7/0	<1	<1	<1	-	-	-	-
Hydroxide (as $CaCO_3$)	mg/L	-	7/0	<1	<1	<1	-	-	-	-
Total alkalinity (as $CaCO_3$)	mg/L	-	7/0	11	31	101	-	-	-	-
Analytical results – nutrients										
Ammonia	mg/L	0.013	8/8	**0.02**	**0.11**	**0.54**	-	-	-	-
Oxidised nitrogen	mg/L	0.015	8/5	<0.01	**0.06**	**0.33**	-	-	-	-
Total kjeldahl nitrogen	mg/L	-	8/0	<0.1	3.8	421.0	-	-	-	-
Total nitrogen	mg/L	0.25	8/7	<0.1	**4.0**	**421.0**	-	-	-	-

Table D.27 Baseline water quality results summary: Plateau bogs/fens

			Plateau bogs/fens (BH01, BH02, BH03, GH01, GH02, GH03, TC01, TC02, TC03)							
	Unit	WQO value[1]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]
Reactive phosphorus	mg/L	0.015	8/1	<0.01	<0.01	**0.02**	-	-	-	-
Total phosphorus	mg/L	0.020	8/8	**0.09**	**1.73**	**74.20**	-	-	-	-
Analytical results – major ions										
Calcium	mg/L	-	8/0	1	2	26	-	-	-	-
Chloride	mg/L	-	8/0	<1	4	6	-	-	-	-
Magnesium	mg/L	-	8/0	<1	<1	6	-	-	-	-
Sodium	mg/L	-	8/0	2	7	28	-	-	-	-
Potassium	mg/L	-	8/0	<1	<1	2	-	-	-	-
Sulphate	mg/L	-	8/0	1	9	36	-	-	-	-
Cyanide	mg/L	0.004	8/0	<0.004[8]	<0.004[8]	<0.4[8]	-	-	-	-
Fluoride	mg/L	2.4	8/0	<0.1[8]	<0.1[8]	<1[8]	-	-	-	-
Analytical results – metals (dissolved)										
Aluminium (Al)	mg/L	0.027	8/6	<0.01	**0.15**	**8.63**	-	-	-	-
Arsenic (As)	mg/L	0.0008[2,6]	8/0	<0.001	<0.001	<0.01[8]	-	-	-	-
Barium (Ba)	mg/L	-	8/0	0.012	0.017	1.370	-	-	-	-
Beryllium (Be)	mg/L	-	8/0	<0.001	<0.001	<0.01[8]	-	-	-	-
Boron (B)	mg/L	0.09	8/1	<0.05	<0.05	**0.93**	-	-	-	-
Cadmium (Cd)	mg/L	0.00006[6]	8/0	<0.0001	<0.0001	<0.001[8]	-	-	-	-

Table D.27 Baseline water quality results summary: Plateau bogs/fens

			Plateau bogs/fens (BH01, BH02, BH03, GH01, GH02, GH03, TC01, TC02, TC03)							
	Unit	WQO value[1]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]
Total chromium (Cr)	mg/L	0.00001[3,6]	8/2	<0.001	<0.001	**0.010**	-	-	-	-
Cobalt (Co)	mg/L	0.0014[4]	8/3	<0.001	**0.002**	**0.010**	-	-	-	-
Copper (Cu)	mg/L	0.001	8/2	<0.001	<0.001	**0.010**	-	-	-	-
Iron (Fe)	mg/L	0.3[4]	8/5	<0.05	**0.75**	**2.41**	-	-	-	-
Lead (Pb)	mg/L	0.001	8/0	<0.001	<0.001	<0.01[8]	-	-	-	-
Manganese (Mn)	mg/L	1.2	8/0	0.008	0.039	0.399	-	-	-	-
Mercury (Hg)	mg/L	0.00006[6]	8/0	<0.0001	<0.0001	<0.001[8]	-	-	-	-
Nickel (Ni)	mg/L	0.008	8/0	<0.001	<0.001	**0.010**	-	-	-	-
Selenium (Se)	mg/L	0.005[6]	8/0	<0.01	<0.01	<0.1[8]	-	-	-	-
Silver (Ag)	mg/L	0.00002[6]	8/0	<0.001	<0.001	<0.01[8]	-	-	-	-
Vanadium (V)	mg/L	0.006[4,6]	8/1	<0.01	<0.01	**0.10**	-	-	-	-
Zinc (Zn)	mg/L	0.0024[6]	8/5	<0.005	**0.009**	**0.479**	-	-	-	-

Notes:
1. The WQO values for field parameters and nutrients refer to the WQO values for physical and chemical stressors in south-east Australia (upland river) that are reported in Tables 3.3.2 and 3.3.3 of ANZECC/ARMCANZ (2000).
2. For As (V).
3. For Cr (VI).
4. Refers to a low reliability WQO value.
5. If less than 10 samples are available, the minimum value is reported instead of the 10th percentile value and the maximum value is reported instead of the 90th percentile value.
6. Denotes WQO lower than Limit of Reporting (or laboratory detection limits). Exceedances below LOR are not identified in the baseline data.
7. An exceedance refers to any result that is above detection limit and exceeds the WQO value. Where a range is given for the WQO value, exceedances are determined in relation to the upper limit for electrical conductivity, the lower limit for dissolved oxygen and the lower and upper limit for pH.
8. Where more than one LOR has been used in the reporting of an analyte, the lowest and highest LOR are considered in calculating 10th percentile, median and 90th percentile values.

Bold denotes WQO value is exceeded.

ii Ravine

Table D.28 Baseline water quality results summary: Ravine Beds

			Ravine Beds East (MB12A, MB12B, PB09)				Ravine Beds West (PB05, BH8101, BH8102, EWPB1, EWPB3, TMB01B, TMB05A, TMB05B)			
	Unit	WQO value[1]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]
Field Parameters										
Temperature	°C	-	14/0	10.5	12.3	13.7	33/0	13.1	15.7	21.0
Dissolved oxygen	%	90-110[1]	6/6	**0**	**7**	**15**	26/25	**0**	**5**	**74**
Electrical conductivity	µS/cm	30-350[1]	14/4	137	223	**647**	33/28	196	**677**	**2342**
pH	-	6.5-8.0[1]	14/0	5.3	6.9	7.6	33/0	7.4	7.7	9.2
Oxidising and reducing potential	-	-	14/0	-243	-103	123	33/0	-198	-153	108
TDS	NTU	-	12/0	91	145	406	32/0	139	442	1524
Analytical results – general										
Total hardness (as $CaCO_3$)	mg/L	-	14/0	65	76	156	27/0	29	99	166
Bicarbonate (as CaCO3)	mg/L	-	14/0	61	80	192	34/0	82	278	1002
Carbonate (as $CaCO_3$)	mg/L	-	14/0	<1	<1	<1	34/0	<1	<1	52
Hydroxide (as $CaCO_3$)	mg/L	-	14/0	<1	<1	<1	34/0	<1	<1	<1
Total alkalinity (as $CaCO_3$)	mg/L	-	14/0	61	80	192	34/0	82	325	1002
Analytical results – nutrients										
Ammonia	mg/L	0.013	14/2	<0.01	<0.01	**0.02**	34/29	0.01	**0.21**	**0.25**
Oxidised nitrogen	mg/L	0.015	14/5	<0.01	<0.01	**0.02**	34/19	<0.01	**0.02**	**0.26**
Total kjeldahl nitrogen	mg/L	-	14/0	<0.1	<0.1	1.6	34/0	<0.1	0.2	0.4

Table D.28 Baseline water quality results summary: Ravine Beds

			Ravine Beds East (MB12A, MB12B, PB09)				Ravine Beds West (PB05, BH8101, BH8102, EWPB1, EWPB3, TMB01B, TMB05A, TMB05B)			
	Unit	WQO value[1]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]
Total nitrogen	mg/L	0.25	14/4	<0.1	<0.1	**1.6**	34/13	<0.1	0.2	**0.6**
Reactive phosphorus	mg/L	0.015	14/0	<0.01	<0.01	0.01	27/10	<0.01	<0.01	**0.05**
Total phosphorus	mg/L	0.020	14/6	<0.01	0.02	**0.56**	34/19	<0.01	**0.03**	**0.19**
Analytical results – major ions										
Calcium	mg/L	-	14/0	14	16	48	34/0	5	19	25
Chloride	mg/L	-	14/0	<1	1	12	34/0	1	12	191
Magnesium	mg/L	-	14/0	7	8	10	34/0	4	10	21
Sodium	mg/L	-	14/0	2	7	87	34/0	9	154	516
Potassium	mg/L	-	14/0	<1	<1	2	34/0	2	5	12
Sulphate	mg/L	-	14/0	<1	4	139	34/0	3	9	23
Cyanide	mg/L	0.004	14/0	<0.004	<0.004	<0.004	26/0	<0.004	<0.004	<0.004
Fluoride	mg/L	2.4	14/0	<0.1	<0.1	0.1	34/12	0.2	1.8	**4.0**
Analytical results – metals (dissolved)										
Aluminium (Al)	mg/L	0.027	14/0	<0.01	<0.01	<0.01	26/7	<0.01	0.01	**0.04**
Arsenic (As)	mg/L	0.0008[2,6]	14/5	<0.001	<0.001	**0.005**	34/28	<0.001	**0.004**	**0.037**
Barium (Ba)	mg/L	-	14/0	0.029	0.040	0.057	26/0	0.059	0.408	7.410
Beryllium (Be)	mg/L	-	14/0	<0.001	<0.001	<0.001	26/0	<0.001	<0.001	<0.001

Table D.28 Baseline water quality results summary: Ravine Beds

			Ravine Beds East (MB12A, MB12B, PB09)				Ravine Beds West (PB05, BH8101, BH8102, EWPB1, EWPB3, TMB01B, TMB05A, TMB05B)			
	Unit	WQO value[1]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]
Boron (B)	mg/L	0.09	14/0	<0.05	<0.05	<0.05	26/20	<0.05	**0.48**	**1.54**
Cadmium (Cd)	mg/L	0.00006[6]	14/1	<0.0001	<0.0001	<0.0001	34/0	<0.0001	<0.0001	<0.0001
Total chromium (Cr)	mg/L	0.00001[3,6]	14/0	<0.001	<0.001	<0.001	34/7	<0.001	<0.001	**0.002**
Cobalt (Co)	mg/L	0.0014[4]	14/2	<0.001	<0.001	**0.002**	26/6	<0.001	<0.001	**0.002**
Copper (Cu)	mg/L	0.001	14/5	<0.001	<0.001	**0.038**	34/7	<0.001	<0.001	**0.003**
Iron (Fe)	mg/L	0.3[4]	14/4	<0.05	0.06	**26.64**	26/2	<0.05	0.12	0.25
Lead (Pb)	mg/L	0.001	14/0	<0.001	<0.001	<0.001	34/0	<0.001	<0.001	<0.001
Manganese (Mn)	mg/L	1.2	14/0	0.079	0.250	0.432	26/0	0.005	0.064	0.158
Mercury (Hg)	mg/L	0.00006[6]	14/0	<0.0001	<0.0001	<0.0001	34/0	<0.0001	<0.0001	<0.0001
Nickel (Ni)	mg/L	0.008	14/4	<0.001	0.003	**0.016**	34/2	<0.001	0.001	0.007
Selenium (Se)	mg/L	0.005[6]	14/0	<0.01	<0.01	<0.01	26/0	<0.01	<0.01	<0.01
Silver (Ag)	mg/L	0.00002[6]	14/0	<0.001	<0.001	<0.001	26/0	<0.001	<0.001	<0.001
Vanadium (V)	mg/L	0.006[4,6]	14/0	<0.01	<0.01	<0.01	26/0	<0.01	<0.01	<0.01
Zinc (Zn)	mg/L	0.0024[6]	14/6	<0.005	<0.005	**0.027**	34/15	<0.005	<0.005	**0.012**

Notes: 1. The WQO values for field parameters and nutrients refer to the WQO values for physical and chemical stressors in south-east Australia (upland river) that are reported in Tables 3.3.2 and 3.3.3 of ANZECC/ARMCANZ (2000).
2. For As (V).
3. For Cr (VI).
4. Refers to a low reliability WQO value.

5. If less than 10 samples are available, the minimum value is reported instead of the 10th percentile value and the maximum value is reported instead of the 90th percentile value.
6. Denotes WQO lower than Limit of Reporting (or laboratory detection limits). Exceedances below LOR are not identified in the baseline data.
7. An exceedance refers to any result that is above detection limit and exceeds the WQO value. Where a range is given for the WQO value, exceedances are determined in relation to the upper limit for electrical conductivity, the lower limit for dissolved oxygen and the lower and upper limit for pH.
Bold denotes WQO value is exceeded.

Table D.29 Baseline water quality results summary: Boraig Group

			Boraig Group (MB06A, MB06B, TMB01A)							
	Unit	WQO value[1]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]
Field Parameters										
Temperature	°C	-	37/0	10.4	11.2	14.9	-	-	-	-
Dissolved oxygen	%	90-110[1]	28/28	**1**	**19**	**47**	-	-	-	-
Electrical conductivity	µS/cm	30-350[1]	37/15	92	265	**395**	-	-	-	-
pH	-	6.5-8.0[1]	37/0	5.7	6.7	7.7	-	-	-	-
Oxidising and reducing potential	-	-	37/0	-158	15	178	-	-	-	-
TDS	NTU	-	35/0	63	228	257	-	-	-	-
Analytical results – general										
Total hardness (as $CaCO_3$)	mg/L	-	25/0	35	51	126	-	-	-	-
Bicarbonate (as CaCO3)	mg/L	-	39/0	51	92	166	-	-	-	-
Carbonate (as $CaCO_3$)	mg/L	-	39/0	<1	<1	<1	-	-	-	-
Hydroxide (as $CaCO_3$)	mg/L	-	39/0	<1	<1	<1	-	-	-	-
Total alkalinity (as $CaCO_3$)	mg/L	-	39/0	51	92	166	-	-	-	-
Analytical results – nutrients										
Ammonia	mg/L	0.013	38/14	<0.01	<0.01	**0.04**	-	-	-	-
Oxidised nitrogen	mg/L	0.015	39/12	<0.01	<0.01	**0.03**	-	-	-	-
Total kjeldahl nitrogen	mg/L	-	38/0	<0.1	<0.1	0.2	-	-	-	-
Total nitrogen	mg/L	0.25	38/4	<0.1	<0.1	0.2	-	-	-	-

Table D.29 Baseline water quality results summary: Boraig Group

			Boraig Group (MB06A, MB06B, TMB01A)							
	Unit	WQO value[1]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]
Reactive phosphorus	mg/L	0.015	25/0	<0.01	<0.01	0.01	-	-	-	-
Total phosphorus	mg/L	0.020	38/22	<0.01	**0.03**	**0.26**	-	-	-	-
Analytical results – major ions										
Calcium	mg/L	-	39/0	8	15	35	-	-	-	-
Chloride	mg/L	-	39/0	1	7	11	-	-	-	-
Magnesium	mg/L	-	39/0	2	4	9	-	-	-	-
Sodium	mg/L	-	39/0	2	30	69	-	-	-	-
Potassium	mg/L	-	39/0	<1	2	2	-	-	-	-
Sulphate	mg/L	-	39/0	<1	12	76	-	-	-	-
Cyanide	mg/L	0.004	24/0	<0.004	<0.004	<0.004	-	-	-	-
Fluoride	mg/L	2.4	39/0	<0.1	0.1	1.4	-	-	-	-
Analytical results – metals (dissolved)										
Aluminium (Al)	mg/L	0.027	24/1	<0.01	<0.01	0.02	-	-	-	-
Arsenic (As)	mg/L	0.0008[2,6]	37/13	<0.001	<0.001	**0.005**	-	-	-	-
Barium (Ba)	mg/L	-	24/0	0.080	0.106	0.812	-	-	-	-
Beryllium (Be)	mg/L	-	24/0	<0.001	<0.001	<0.001	-	-	-	-
Boron (B)	mg/L	0.09	24/8	<0.05	<0.05	**0.29**	-	-	-	-
Cadmium (Cd)	mg/L	0.00006[6]	37/0	<0.0001	<0.0001	<0.0001	-	-	-	-

Table D.29 Baseline water quality results summary: Boraig Group

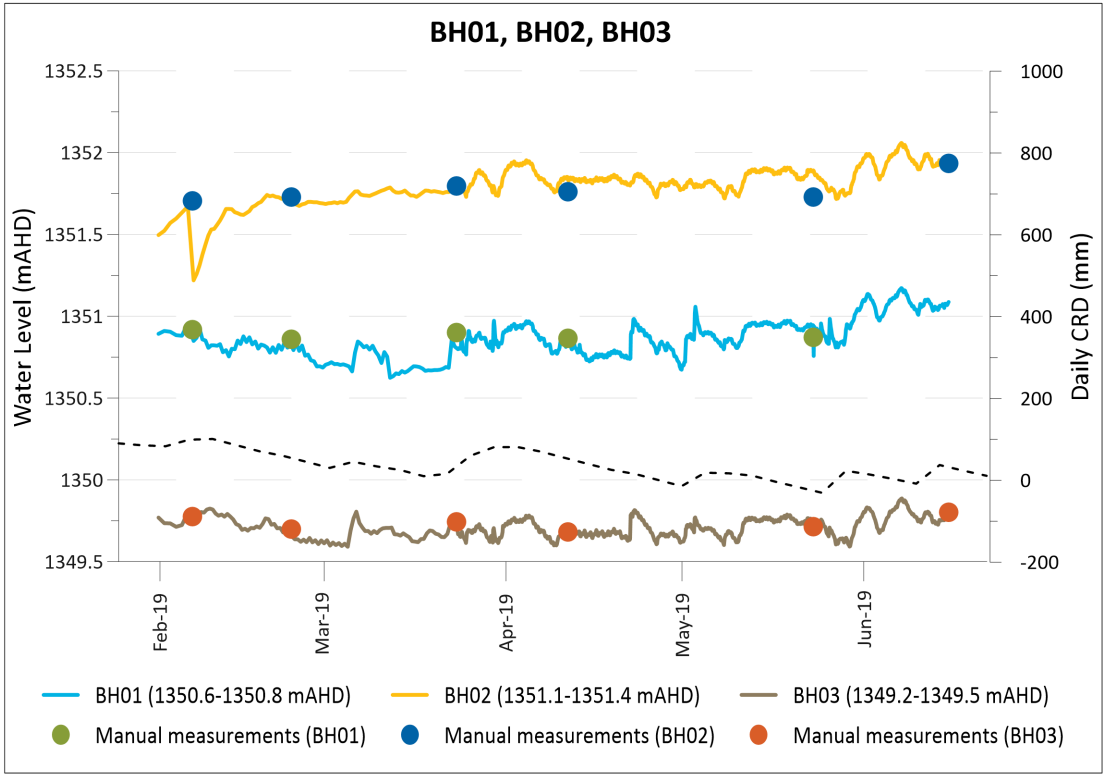
			Boraig Group (MB06A, MB06B, TMB01A)							
	Unit	WQO value[1]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]
Total chromium (Cr)	mg/L	0.00001[3,6]	37/14	<0.001	<0.001	**0.002**	-	-	-	-
Cobalt (Co)	mg/L	0.0014[4]	24/0	<0.001	<0.001	<0.001	-	-	-	-
Copper (Cu)	mg/L	0.001	37/19	<0.001	**0.002**	**0.005**	-	-	-	-
Iron (Fe)	mg/L	0.3[4]	24/7	<0.05	0.08	**0.57**	-	-	-	-
Lead (Pb)	mg/L	0.001	37/0	<0.001	<0.001	<0.001	-	-	-	-
Manganese (Mn)	mg/L	1.2	24/0	0.010	0.026	0.178	-	-	-	-
Mercury (Hg)	mg/L	0.00006[6]	37/0	<0.0001	<0.0001	<0.0001	-	-	-	-
Nickel (Ni)	mg/L	0.008	37/14	<0.001	0.003	**0.024**	-	-	-	-
Selenium (Se)	mg/L	0.005[6]	24/0	<0.01	<0.01	<0.01	-	-	-	-
Silver (Ag)	mg/L	0.00002[6]	24/0	<0.001	<0.001	<0.001	-	-	-	-
Vanadium (V)	mg/L	0.006[4,6]	24/0	<0.01	<0.01	<0.01	-	-	-	-
Zinc (Zn)	mg/L	0.0024[6]	37/27	<0.005	**0.007**	**0.025**	-	-	-	-

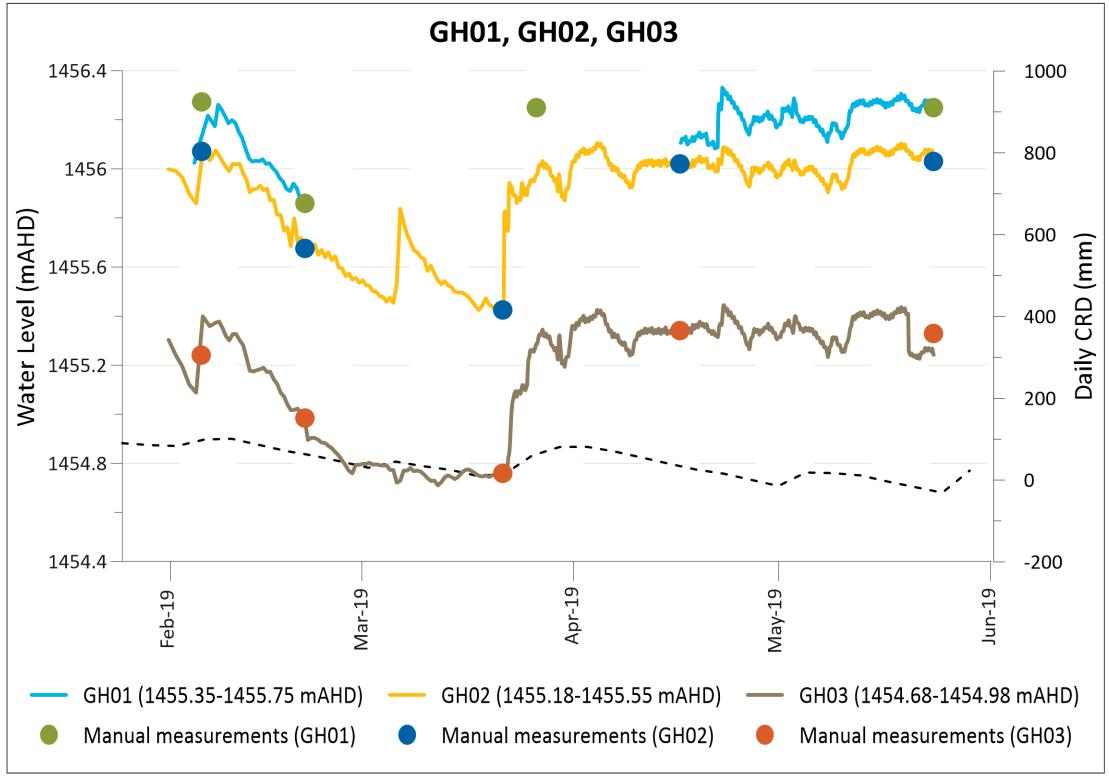
Notes:
1. The WQO values for field parameters and nutrients refer to the WQO values for physical and chemical stressors in south-east Australia (upland river) that are reported in Tables 3.3.2 and 3.3.3 of ANZECC/ARMCANZ (2000).
2. For As (V).
3. For Cr (VI).
4. Refers to a low reliability WQO value.
5. If less than 10 samples are available, the minimum value is reported instead of the 10th percentile value and the maximum value is reported instead of the 90th percentile value.
6. Denotes WQO lower than Limit of Reporting (or laboratory detection limits). Exceedances below LOR are not identified in the baseline data.
7. An exceedance refers to any result that is above detection limit and exceeds the WQO value. Where a range is given for the WQO value, exceedances are determined in relation to the upper limit for electrical conductivity, the lower limit for dissolved oxygen and the lower and upper limit for pH.

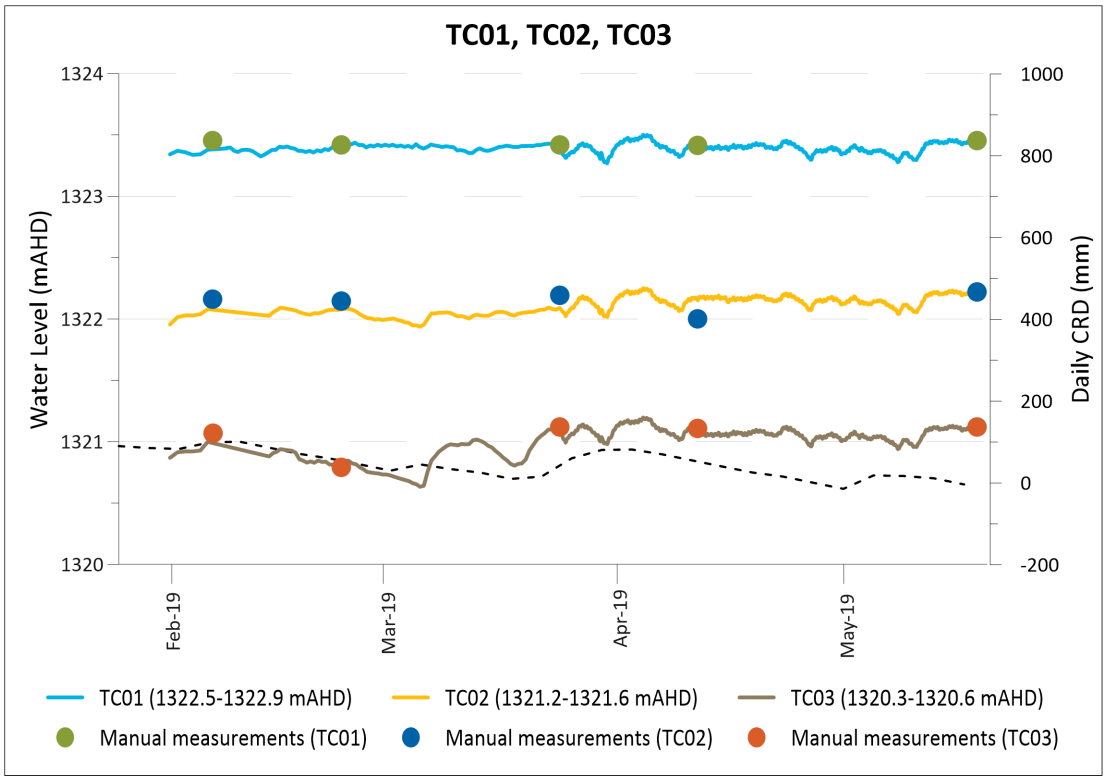
Bold denotes WQO value is exceeded.

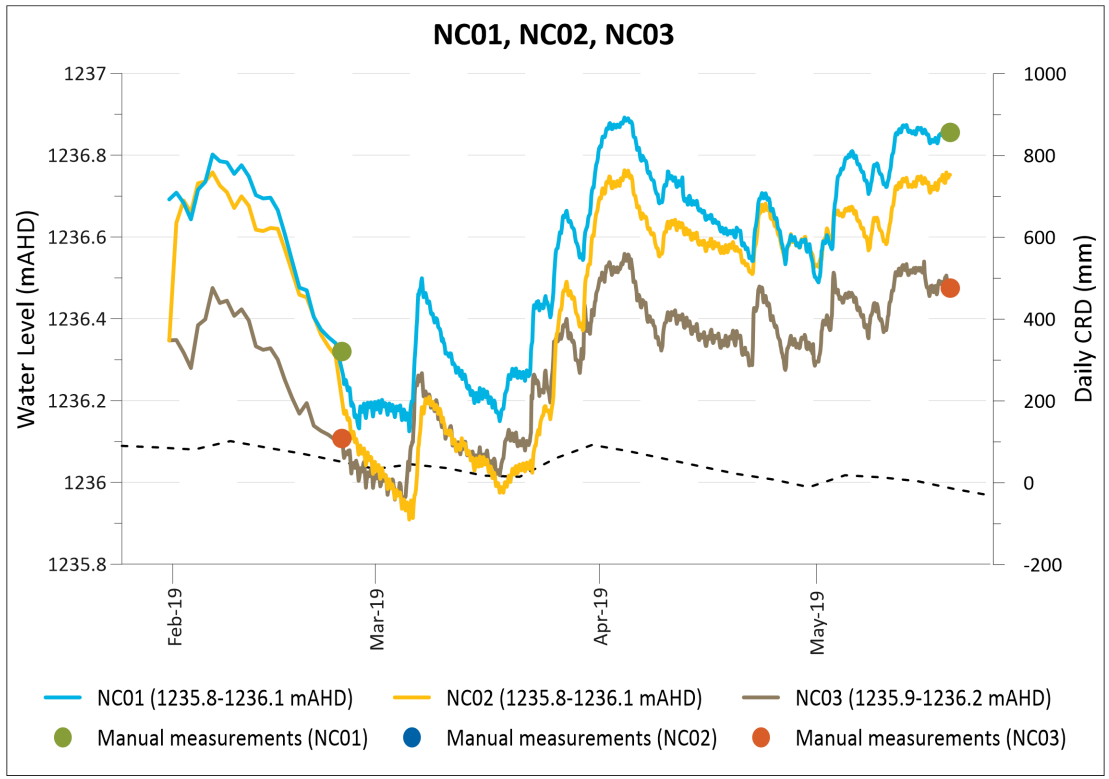
Attachment E

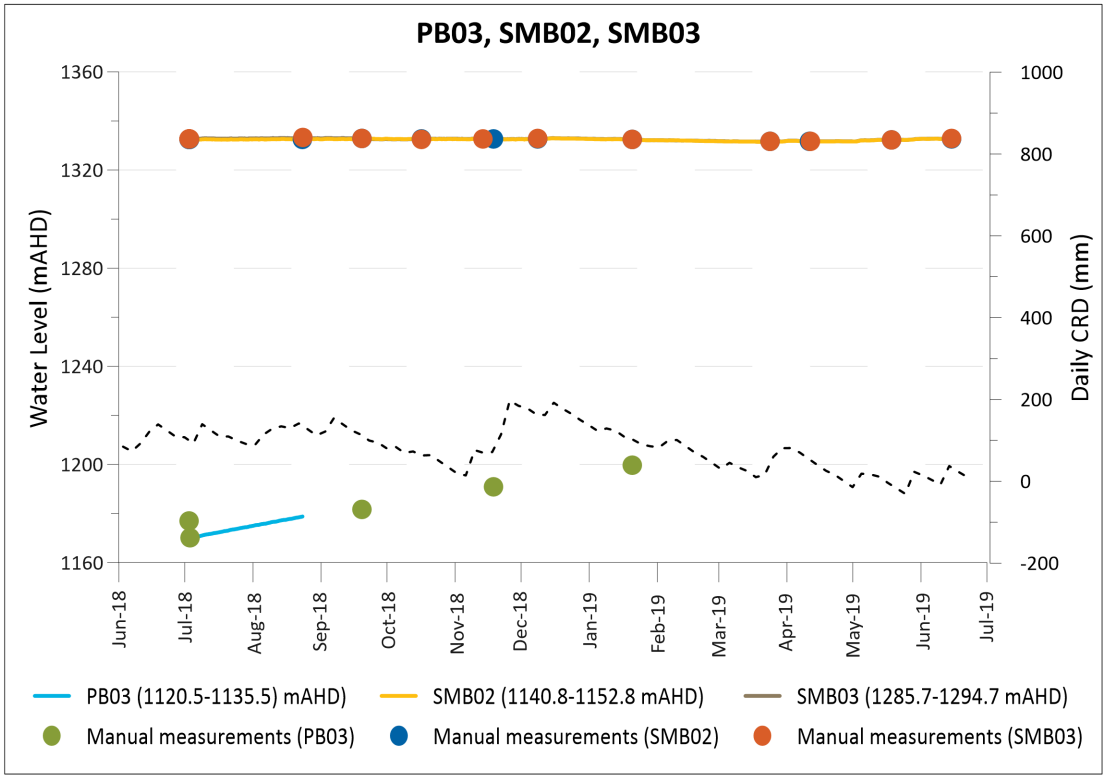
Hydrographs

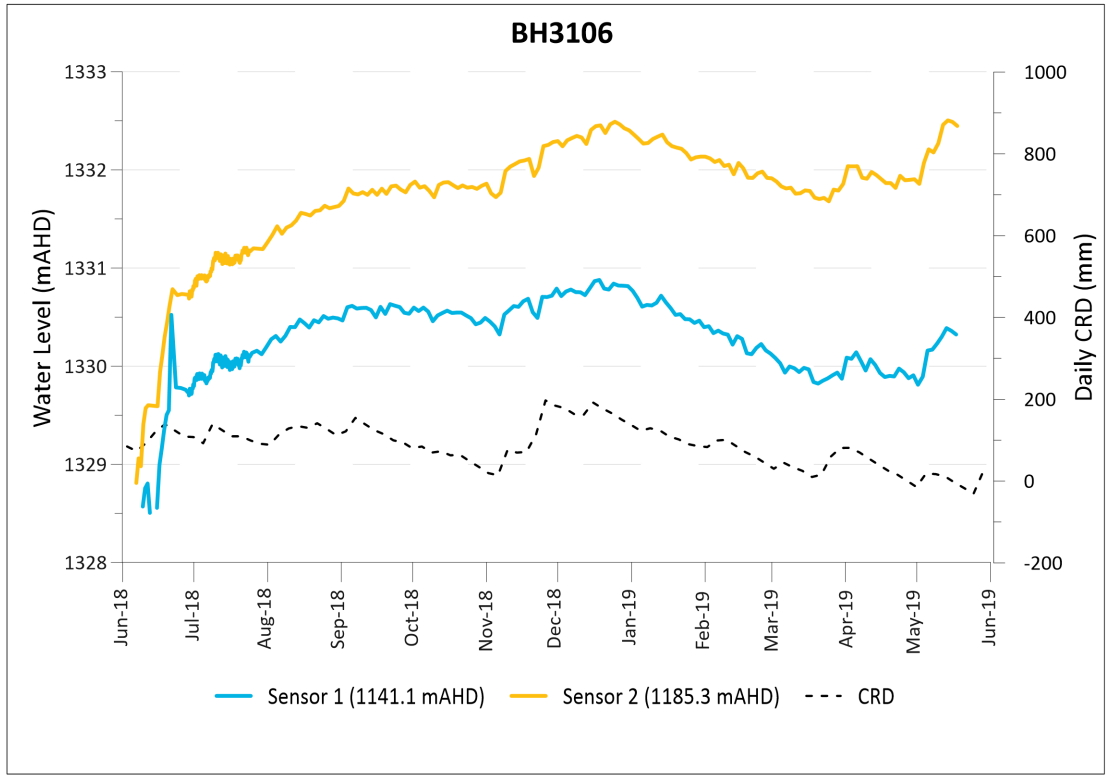

BH01, BH02, BH03
Water Level (mAHD)
Daily CRD (mm)
1352.5
1352
1351.5
1351
1350.5
1350
1349.5
1000
800
600
400
200
0
-200
Feb-19
Mar-19
Apr-19
May-19
Jun-19
BH01 (1350.6-1350.8 mAHD)
BH02 (1351.1-1351.4 mAHD)
BH03 (1349.2-1349.5 mAHD)
Manual measurements (BH01)
Manual measurements (BH02)
Manual measurements (BH03)

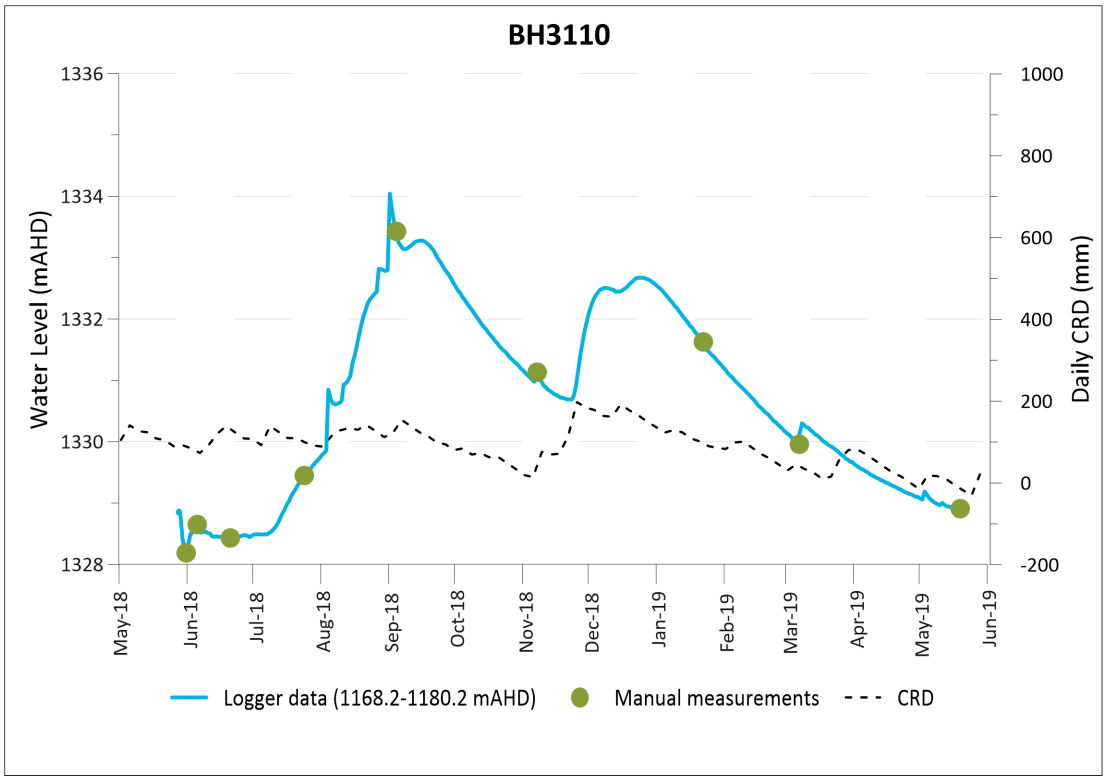

GH01, GH02, GH03
Water Level (mAHD)
Daily CRD (mm)
1456.4
1456
1455.6
1455.2
1454.8
1454.4
1000
800
600
400
200
0
-200
Feb-19
Mar-19
Apr-19
May-19
Jun-19
GH01 (1455.35-1455.75 mAHD)
GH02 (1455.18-1455.55 mAHD)
GH03 (1454.68-1454.98 mAHD)
Manual measurements (GH01)
Manual measurements (GH02)
Manual measurements (GH03)

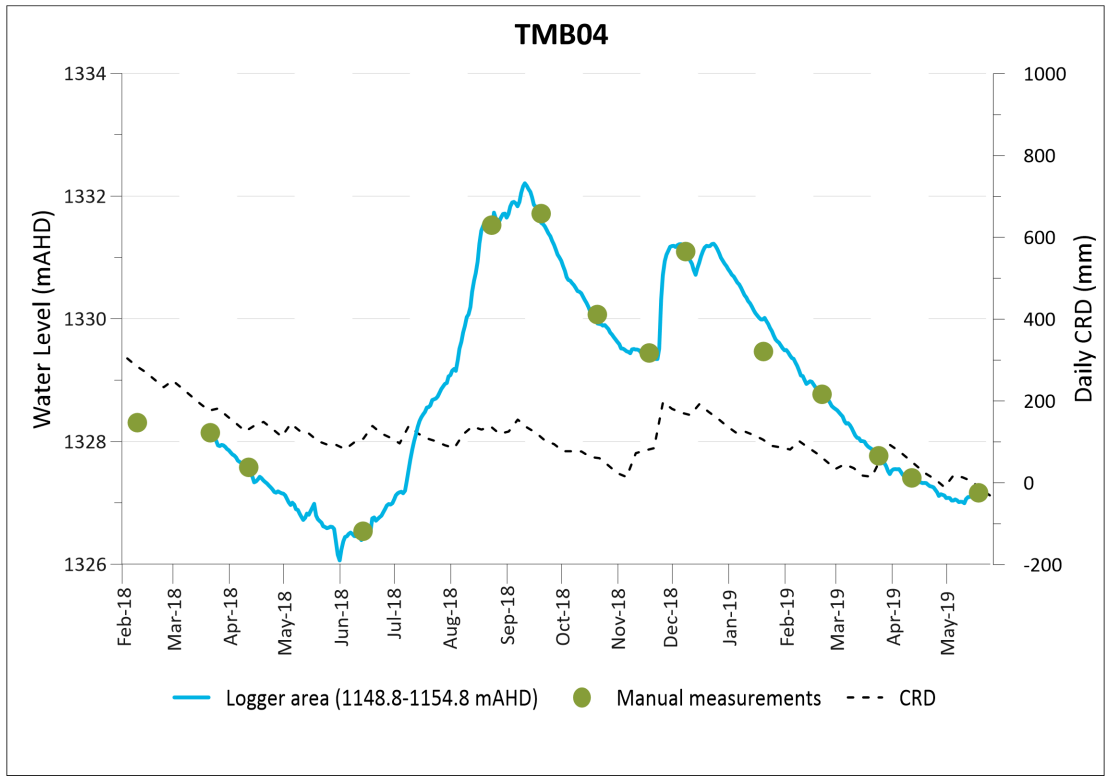

TC01, TC02, TC03
Water Level (mAHD)
Daily CRD (mm)
1324
1323
1322
1321
1320
1000
800
600
400
200
0
-200
Feb-19
Mar-19
Apr-19
May-19
TC01 (1322.5-1322.9 mAHD)
TC02 (1321.2-1321.6 mAHD)
TC03 (1320.3-1320.6 mAHD)
Manual measurements (TC01)
Manual measurements (TC02)
Manual measurements (TC03)

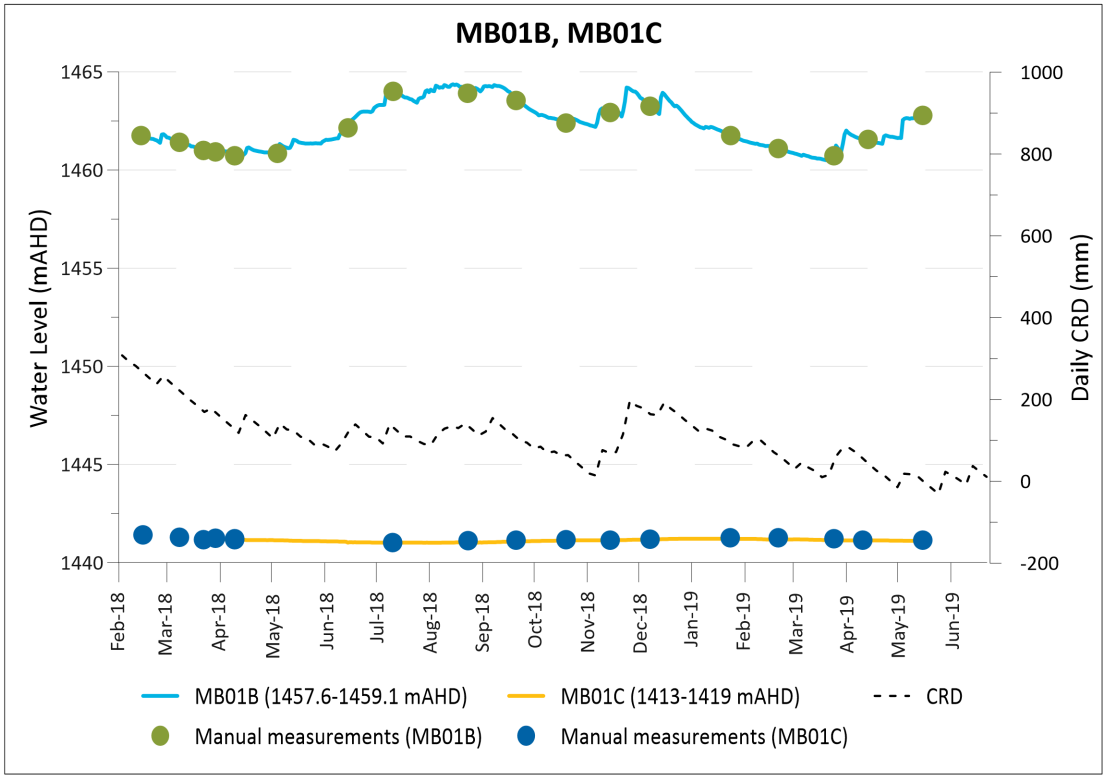

NC01, NC02, NC03
Water Level (mAHD)
Daily CRD (mm)
1237
1236.8
1236.6
1236.4
1236.2
1236
1235.8
1000
800
600
400
200
0
-200
Feb-19
Mar-19
Apr-19
May-19
NC01 (1235.8-1236.1 mAHD)
NC02 (1235.8-1236.1 mAHD)
NC03 (1235.9-1236.2 mAHD)
Manual measurements (NC01)
Manual measurements (NC02)
Manual measurements (NC03)

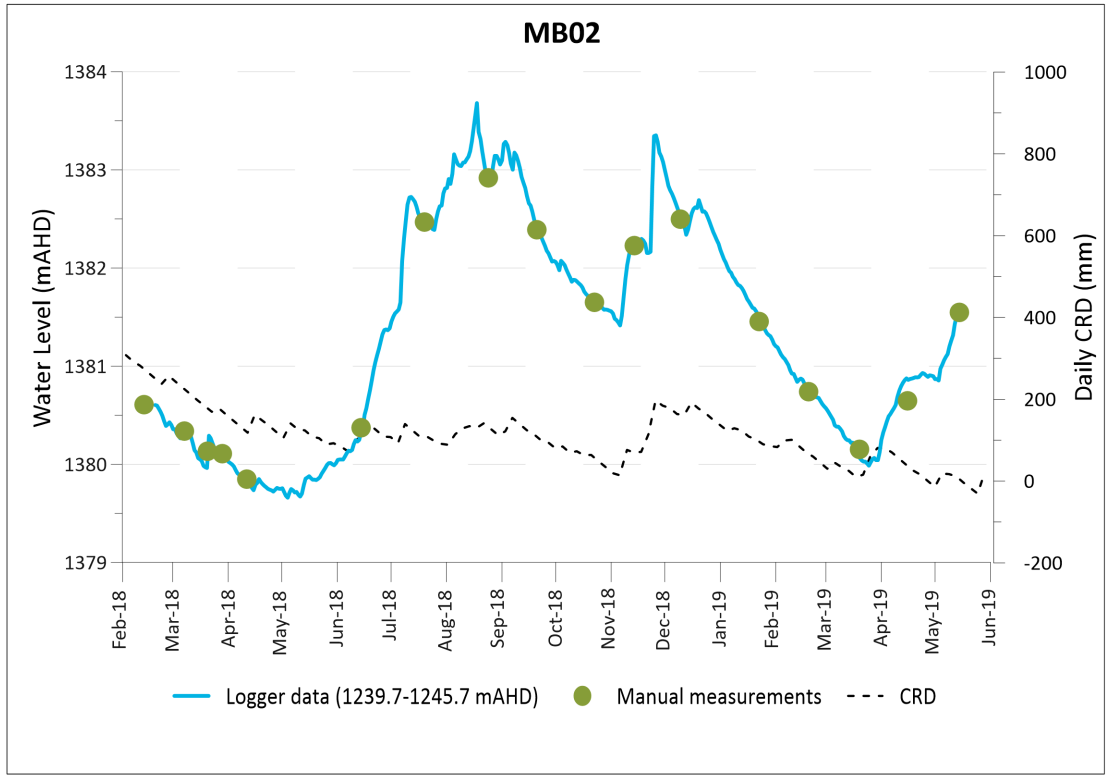

PB03, SMB02, SMB03
Water Level (mAHD)
Daily CRD (mm)
1360
1320
1280
1240
1200
1160
1000
800
600
400
200
0
-200
Jun-18
Jul-18
Aug-18
Sep-18
Oct-18
Nov-18
Dec-18
Jan-19
Feb-19
Mar-19
Apr-19
May-19
Jun-19
Jul-19
PB03 (1120.5-1135.5) mAHD)
SMB02 (1140.8-1152.8 mAHD)
SMB03 (1285.7-1294.7 mAHD)
Manual measurements (PB03)
Manual measurements (SMB02)
Manual measurements (SMB03)

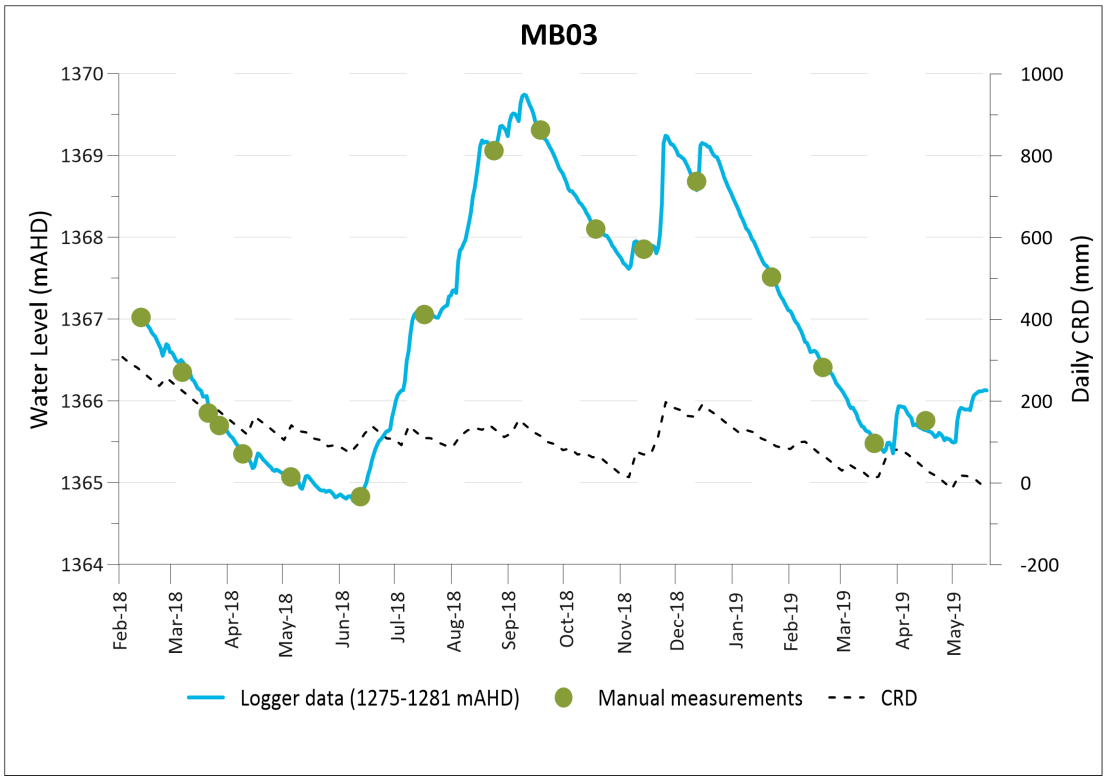

BH3106
Water Level (mAHD)
Daily CRD (mm)
1333
1332
1331
1330
1329
1328
1000
800
600
400
200
0
-200
Jun-18
Jul-18
Aug-18
Sep-18
Oct-18
Nov-18
Dec-18
Jan-19
Feb-19
Mar-19
Apr-19
May-19
Jun-19
Sensor 1 (1141.1 mAHD)
Sensor 2 (1185.3 mAHD)
CRD

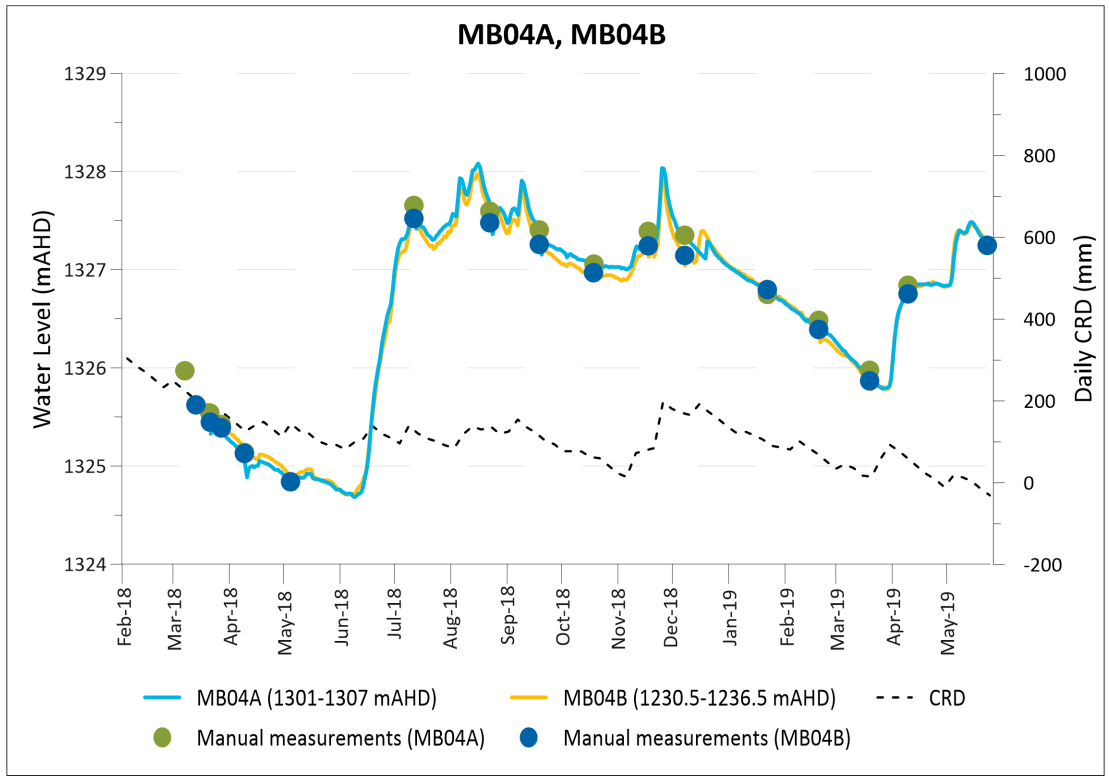

BH3110
Water Level (mAHD)
Daily CRD (mm)
1336
1334
1332
1330
1328
1000
800
600
400
200
0
-200
May-18
Jun-18
Jul-18
Aug-18
Sep-18
Oct-18
Nov-18
Dec-18
Jan-19
Feb-19
Mar-19
Apr-19
May-19
Jun-19
Logger data (1168.2-1180.2 mAHD)
Manual measurements
CRD

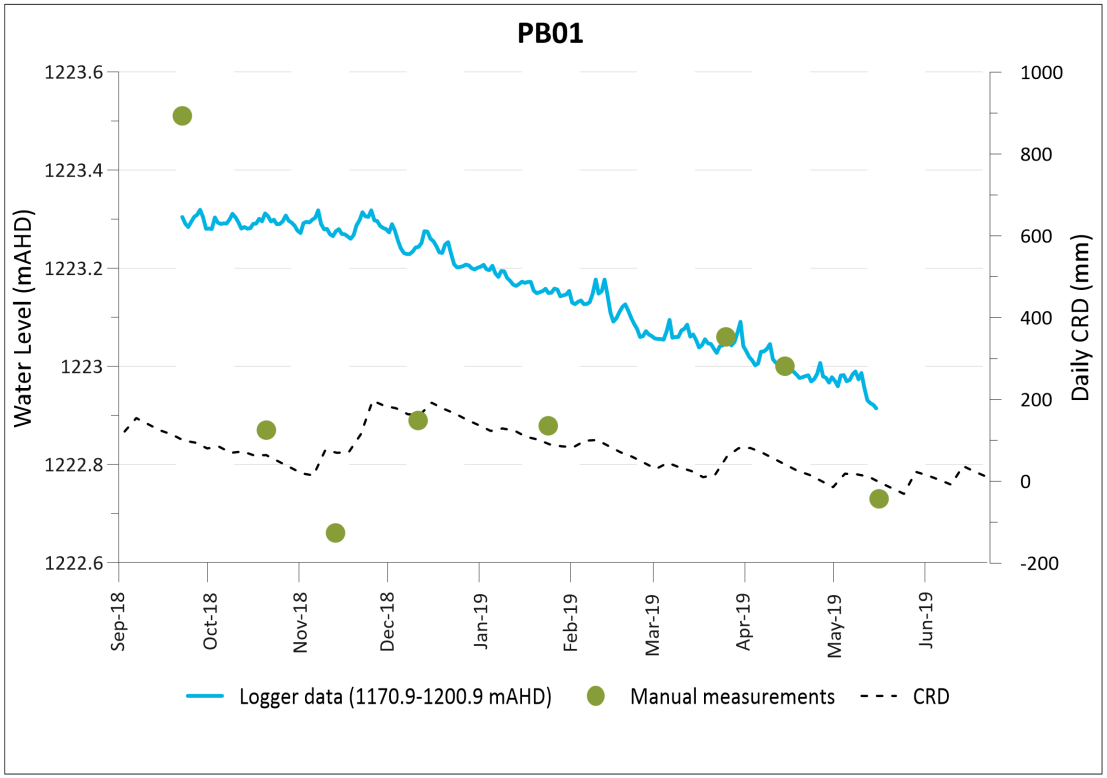

TMB04
Water Level (mAHD)
Daily CRD (mm)
1334
1332
1330
1328
1326
1000
800
600
400
200
0
-200
Feb-18
Mar-18
Apr-18
May-18
Jun-18
Jul-18
Aug-18
Sep-18
Oct-18
Nov-18
Dec-18
Jan-19
Feb-19
Mar-19
Apr-19
May-19
Logger area (1148.8-1154.8 mAHD)
Manual measurements
CRD

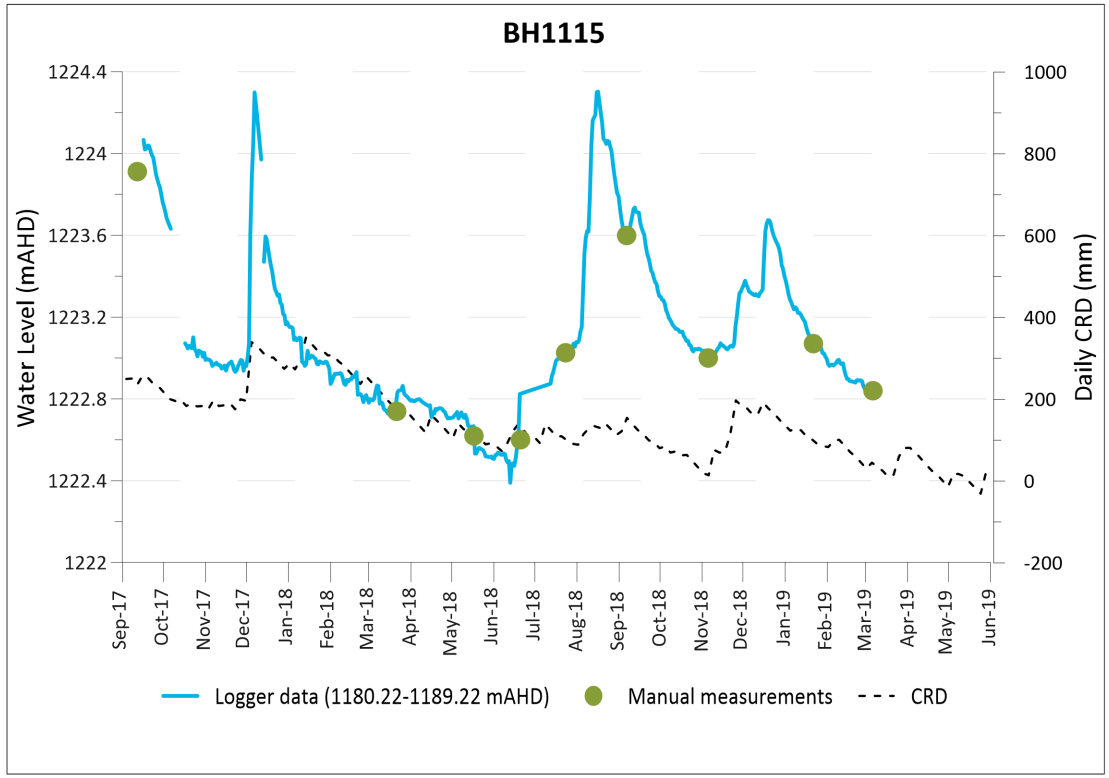

MB01B, MB01C
Water Level (mAHD)
Daily CRD (mm)
1465
1460
1455
1450
1445
1440
1000
800
600
400
200
0
-200
Feb-18
Mar-18
Apr-18
May-18
Jun-18
Jul-18
Aug-18
Sep-18
Oct-18
Nov-18
Dec-18
Jan-19
Feb-19
Mar-19
Apr-19
May-19
Jun-19
MB01B (1457.6-1459.1 mAHD)
MB01C (1413-1419 mAHD)
CRD
Manual measurements (MB01B)
Manual measurements (MB01C)

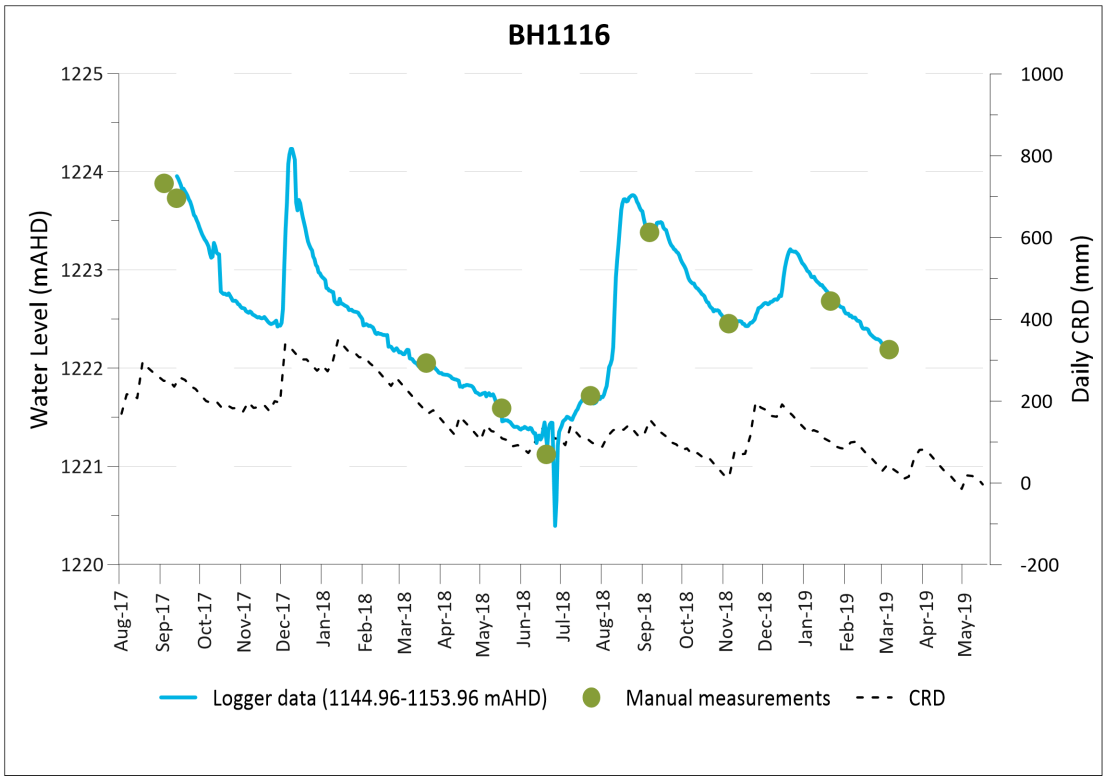

MB02
Water Level (mAHD)
Daily CRD (mm)
1384
1383
1382
1381
1380
1379
1000
800
600
400
200
0
-200
Feb-18
Mar-18
Apr-18
May-18
Jun-18
Jul-18
Aug-18
Sep-18
Oct-18
Nov-18
Dec-18
Jan-19
Feb-19
Mar-19
Apr-19
May-19
Jun-19
Logger data (1239.7-1245.7 mAHD)
Manual measurements
CRD

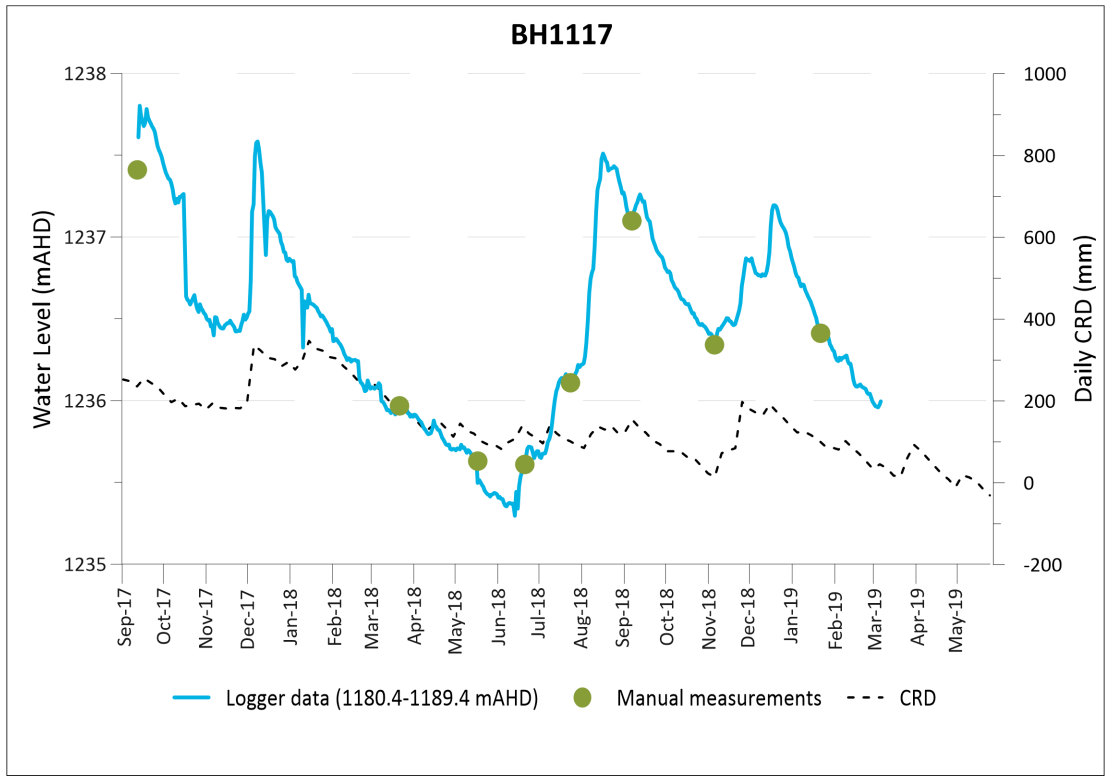

MB03
Water Level (mAHD)
Daily CRD (mm)
1370
1369
1368
1367
1366
1365
1364
1000
800
600
400
200
0
-200
Feb-18
Mar-18
Apr-18
May-18
Jun-18
Jul-18
Aug-18
Sep-18
Oct-18
Nov-18
Dec-18
Jan-19
Feb-19
Mar-19
Apr-19
May-19
Logger data (1275-1281 mAHD)
Manual measurements
CRD

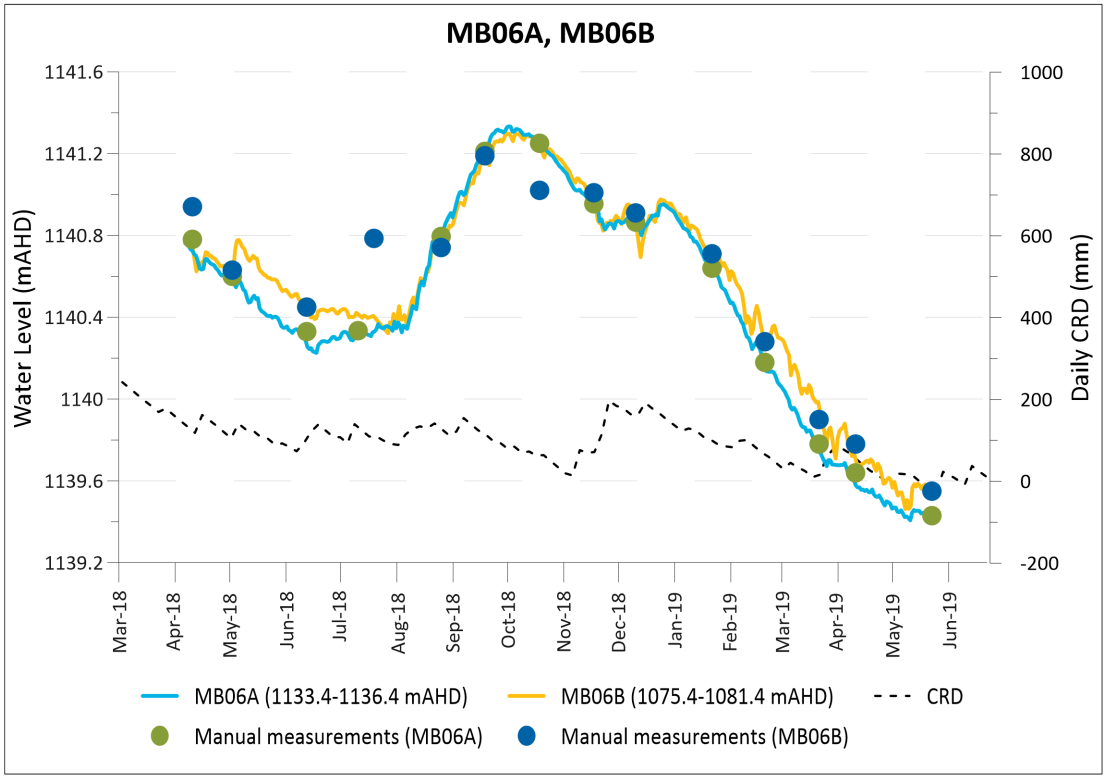

MB04A, MB04B
Water Level (mAHD)
Daily CRD (mm)
1329
1328
1327
1326
1325
1324
1000
800
600
400
200
0
-200
Feb-18
Mar-18
Apr-18
May-18
Jun-18
Jul-18
Aug-18
Sep-18
Oct-18
Nov-18
Dec-18
Jan-19
Feb-19
Mar-19
Apr-19
May-19
MB04A (1301-1307 mAHD)
MB04B (1230.5-1236.5 mAHD)
CRD
Manual measurements (MB04A)
Manual measurements (MB04B)

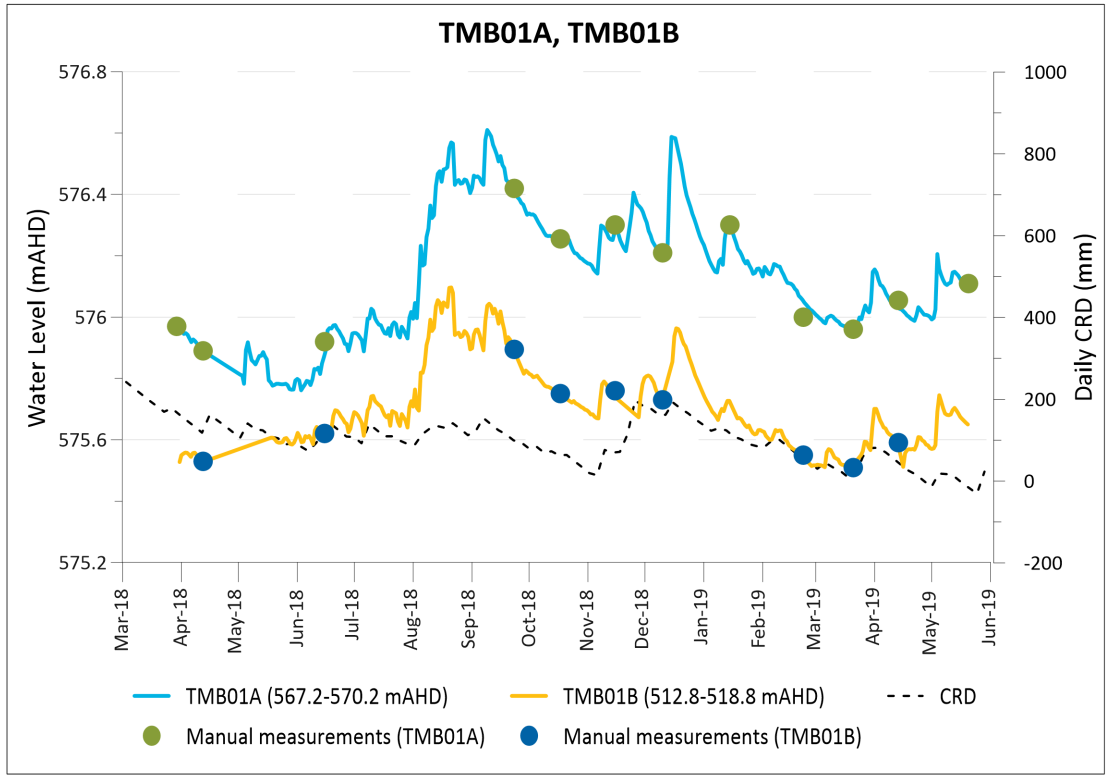

PB01
Water Level (mAHD)
Daily CRD (mm)
1223.6
1223.4
1223.2
1223
1222.8
1222.6
1000
800
600
400
200
0
-200
Sep-18
Oct-18
Nov-18
Dec-18
Jan-19
Feb-19
Mar-19
Apr-19
May-19
Jun-19
Logger data (1170.9-1200.9 mAHD)
Manual measurements
CRD

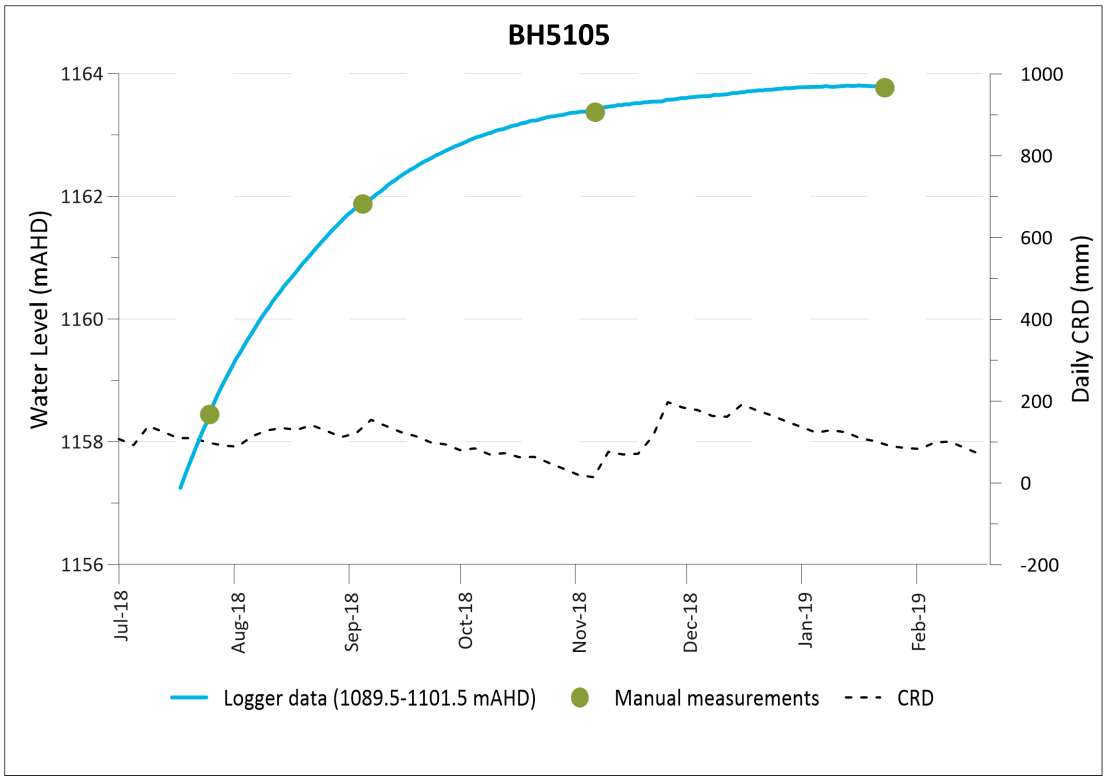

BH1115
Water Level (mAHD)
Daily CRD (mm)
1224.4
1224
1223.6
1223.2
1222.8
1222.4
1222
1000
800
600
400
200
0
-200
Sep-17
Oct-17
Nov-17
Dec-17
Jan-18
Feb-18
Mar-18
Apr-18
May-18
Jun-18
Jul-18
Aug-18
Sep-18
Oct-18
Nov-18
Dec-18
Jan-19
Feb-19
Mar-19
Apr-19
May-19
Jun-19
Logger data (1180.22-1189.22 mAHD)
Manual measurements
CRD

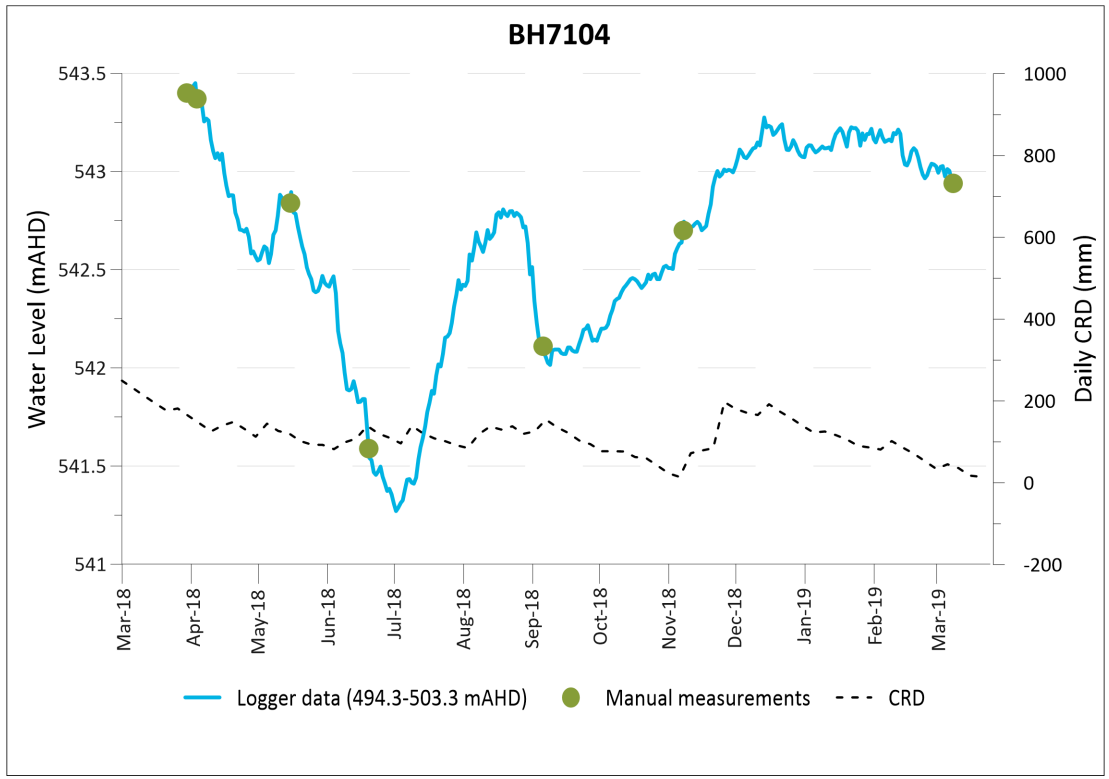

BH1116
Water Level (mAHD)
Daily CRD (mm)
1225
1224
1223
1222
1221
1220
1000
800
600
400
200
0
-200
Aug-17
Sep-17
Oct-17
Nov-17
Dec-17
Jan-18
Feb-18
Mar-18
Apr-18
May-18
Jun-18
Jul-18
Aug-18
Sep-18
Oct-18
Nov-18
Dec-18
Jan-19
Feb-19
Mar-19
Apr-19
May-19
Logger data (1144.96-1153.96 mAHD)
Manual measurements
CRD

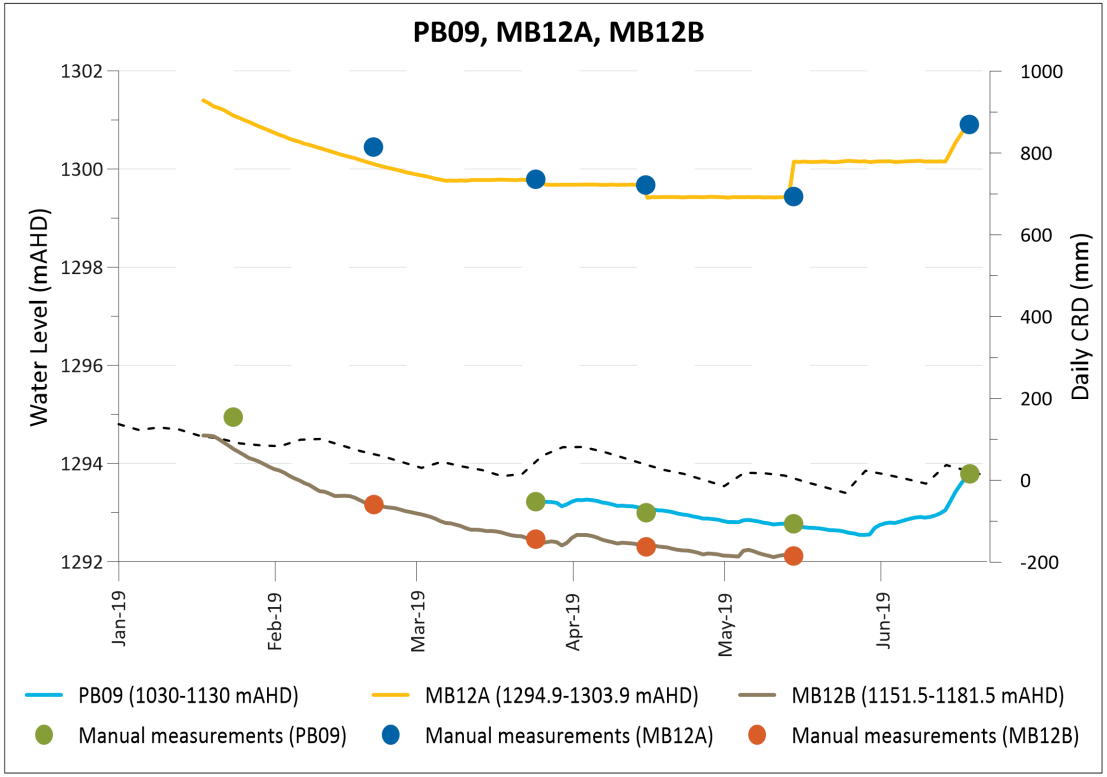

BH1117
Water Level (mAHD)
Daily CRD (mm)
1238
1237
1236
1235
1000
800
600
400
200
0
-200
Sep-17
Oct-17
Nov-17
Dec-17
Jan-18
Feb-18
Mar-18
Apr-18
May-18
Jun-18
Jul-18
Aug-18
Sep-18
Oct-18
Nov-18
Dec-18
Jan-19
Feb-19
Mar-19
Apr-19
May-19
Logger data (1180.4-1189.4 mAHD)
Manual measurements
CRD

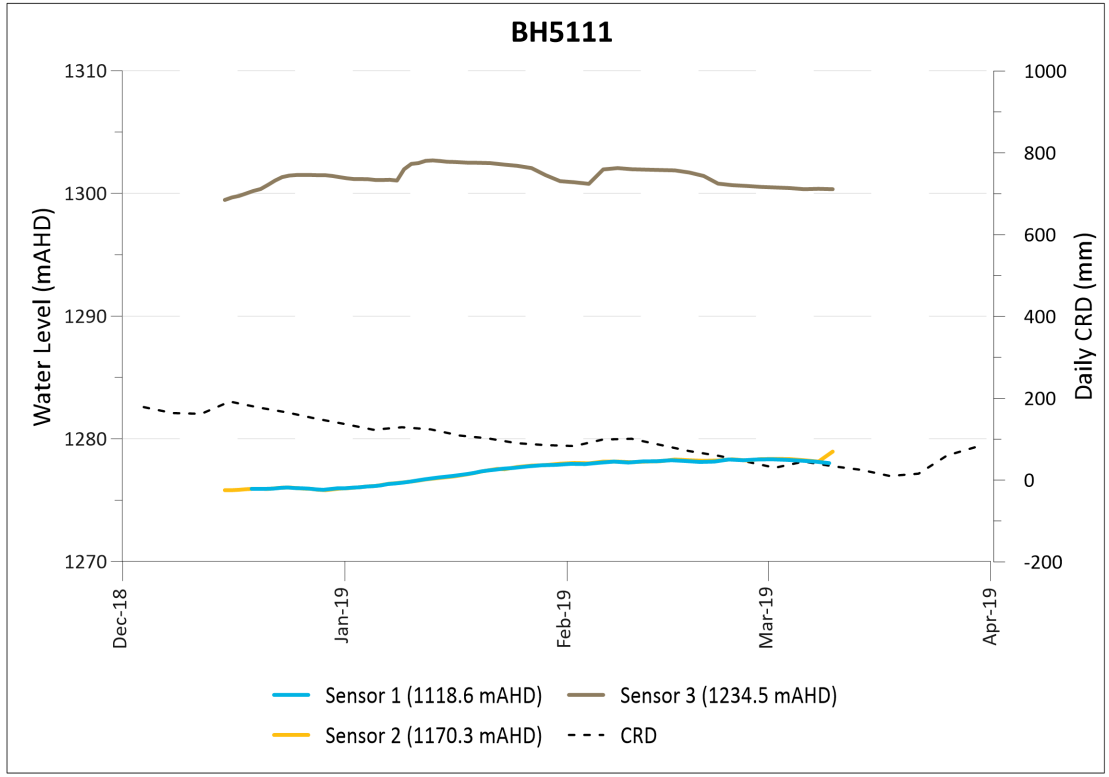

MB06A, MB06B
Water Level (mAHD)
Daily CRD (mm)
1141.6
1141.2
1140.8
1140.4
1140
1139.6
1139.2
1000
800
600
400
200
0
-200
Mar-18
Apr-18
May-18
Jun-18
Jul-18
Aug-18
Sep-18
Oct-18
Nov-18
Dec-18
Jan-19
Feb-19
Mar-19
Apr-19
May-19
Jun-19
MB06A (1133.4-1136.4 mAHD)
MB06B (1075.4-1081.4 mAHD)
CRD
Manual measurements (MB06A)
Manual measurements (MB06B)

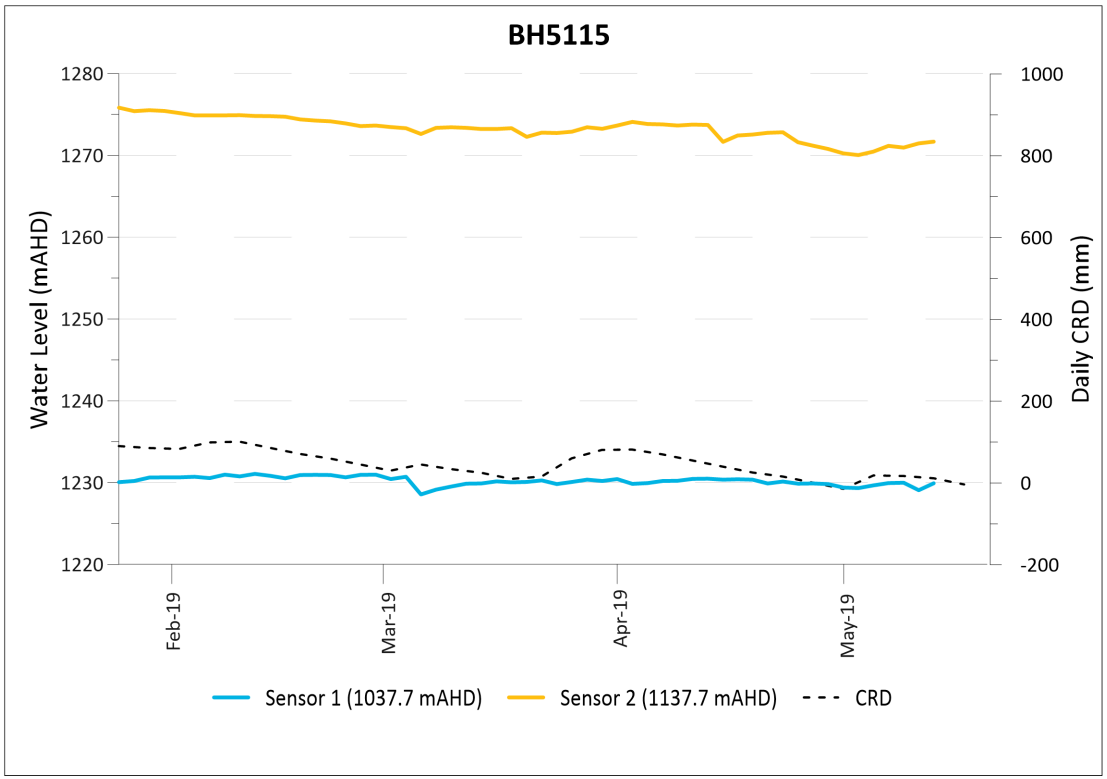

TMB01A, TMB01B
Water Level (mAHD)
Daily CRD (mm)
576.8
576.4
576
575.6
575.2
1000
800
600
400
200
0
-200
Mar-18
Apr-18
May-18
Jun-18
Jul-18
Aug-18
Sep-18
Oct-18
Nov-18
Dec-18
Jan-19
Feb-19
Mar-19
Apr-19
May-19
Jun-19
TMB01A (567.2-570.2 mAHD)
TMB01B (512.8-518.8 mAHD)
CRD
Manual measurements (TMB01A)
Manual measurements (TMB01B)

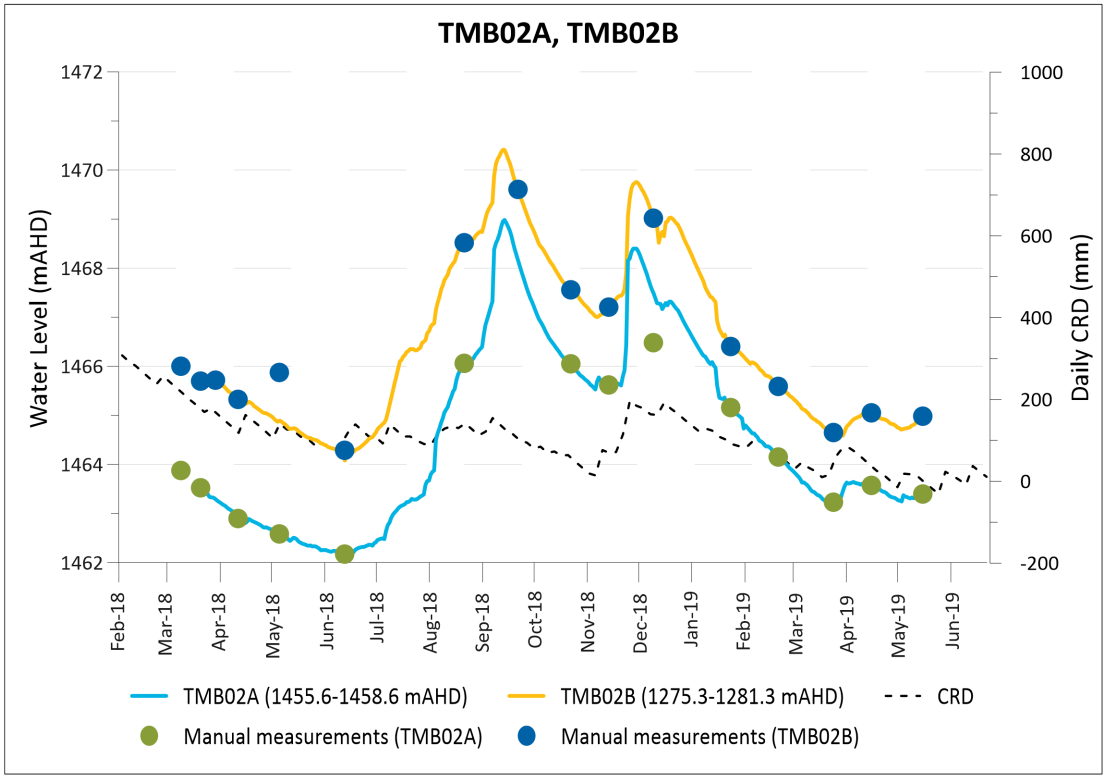

BH5105
Water Level (mAHD)
Daily CRD (mm)
1164
1162
1160
1158
1156
1000
800
600
400
200
0
-200
Jul-18
Aug-18
Sep-18
Oct-18
Nov-18
Dec-18
Jan-19
Feb-19
Logger data (1089.5-1101.5 mAHD)
Manual measurements
CRD

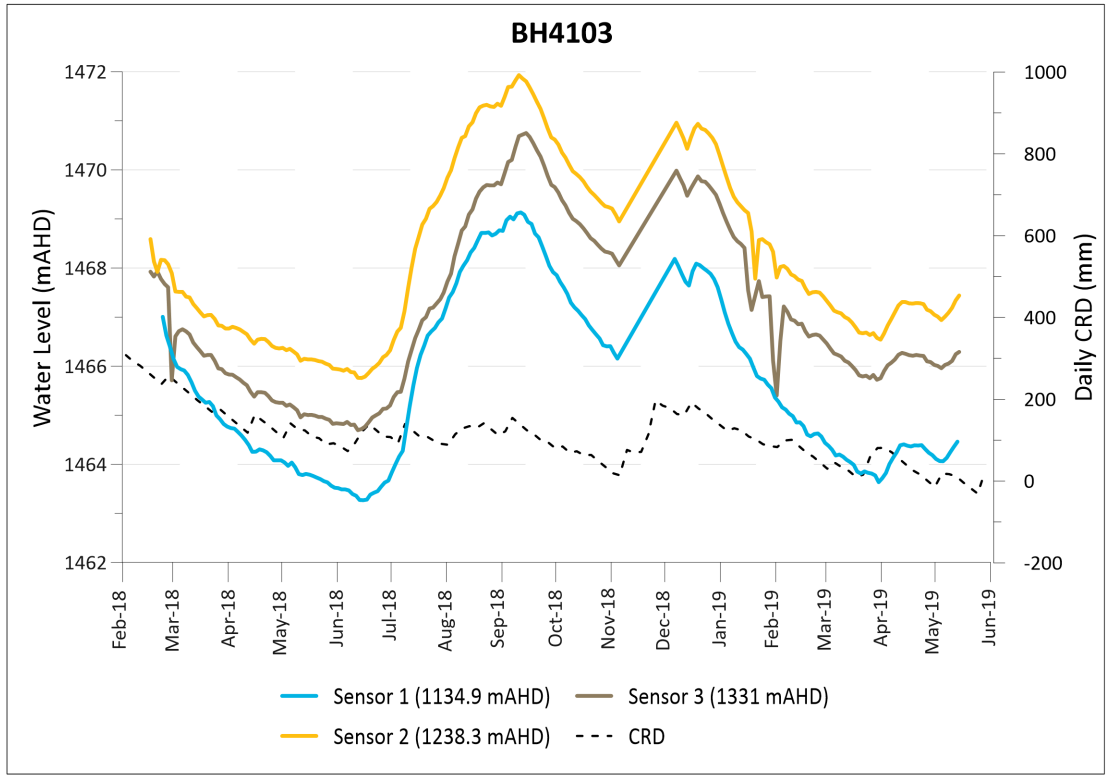

BH7104
Water Level (mAHD)
Daily CRD (mm)
543.5
543
542.5
542
541.5
541
1000
800
600
400
200
0
-200
Mar-18
Apr-18
May-18
Jun-18
Jul-18
Aug-18
Sep-18
Oct-18
Nov-18
Dec-18
Jan-19
Feb-19
Mar-19
Logger data (494.3-503.3 mAHD)
Manual measurements
CRD

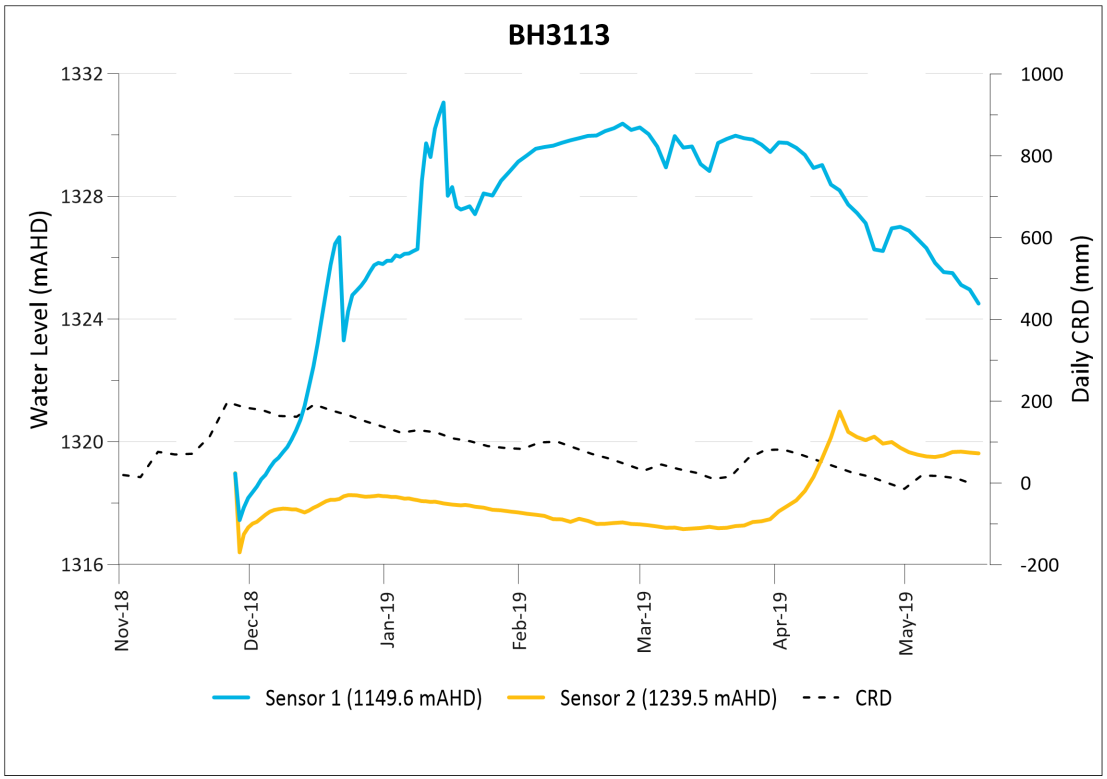

PB09, MB12A, MB12B
Water Level (mAHD)
Daily CRD (mm)
1302
1300
1298
1296
1294
1292
1000
800
600
400
200
0
-200
Jan-19
Feb-19
Mar-19
Apr-19
May-19
Jun-19
PB09 (1030-1130 mAHD)
MB12A (1294.9-1303.9 mAHD)
MB12B (1151.5-1181.5 mAHD)
Manual measurements (PB09)
Manual measurements (MB12A)
Manual measurements (MB12B)

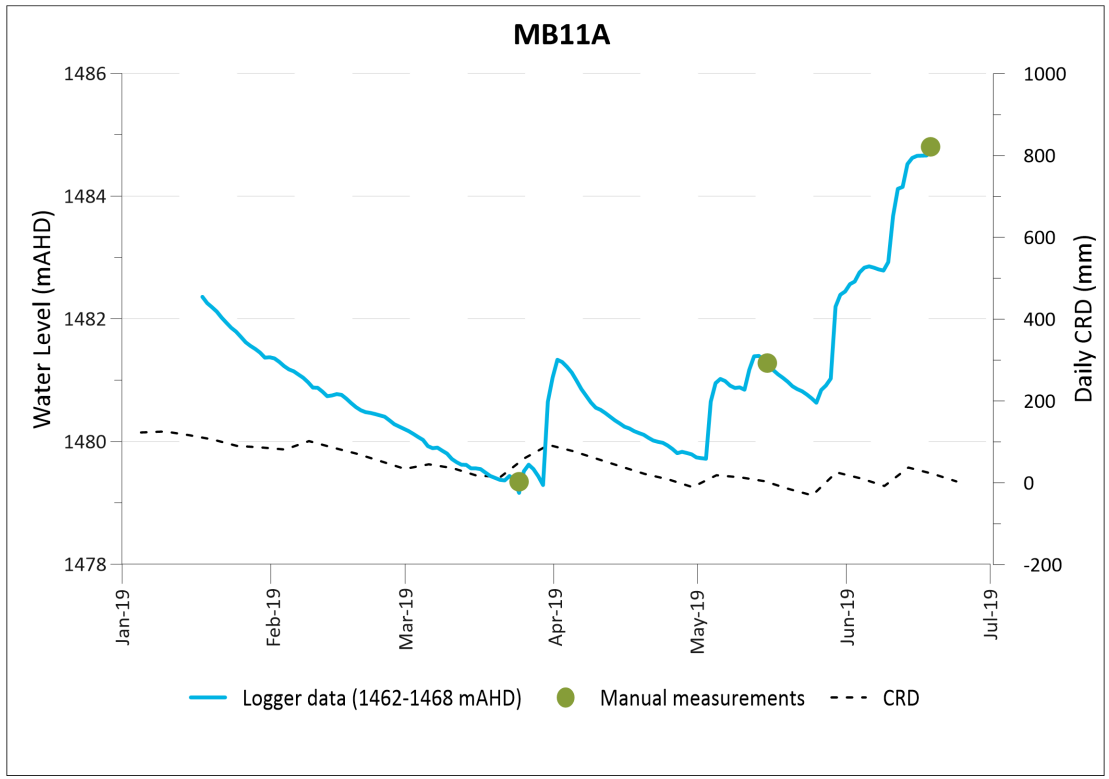

BH5111
Water Level (mAHD)
Daily CRD (mm)
1310
1300
1290
1280
1270
1000
800
600
400
200
0
-200
Dec-18
Jan-19
Feb-19
Mar-19
Apr-19
Sensor 1 (1118.6 mAHD)
Sensor 3 (1234.5 mAHD)
Sensor 2 (1170.3 mAHD)
CRD

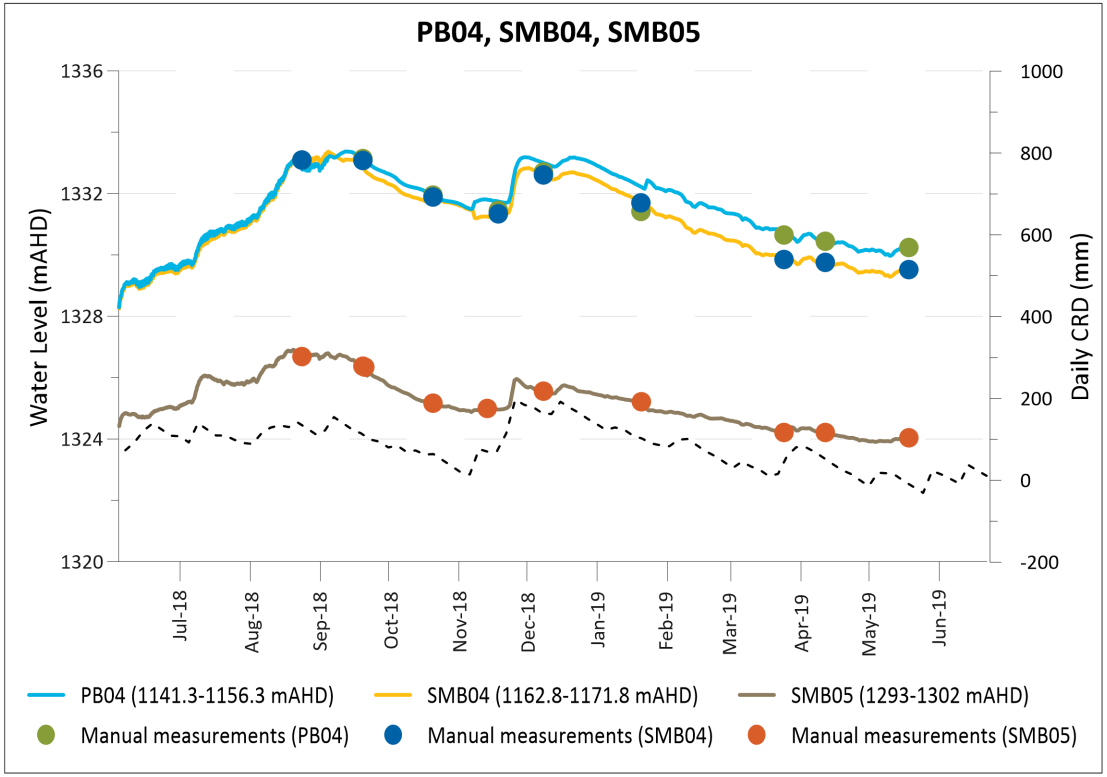

BH5115
Water Level (mAHD)
Daily CRD (mm)
1280
1270
1260
1250
1240
1230
1220
1000
800
600
400
200
0
-200
Feb-19
Mar-19
Apr-19
May-19
Sensor 1 (1037.7 mAHD)
Sensor 2 (1137.7 mAHD)
CRD

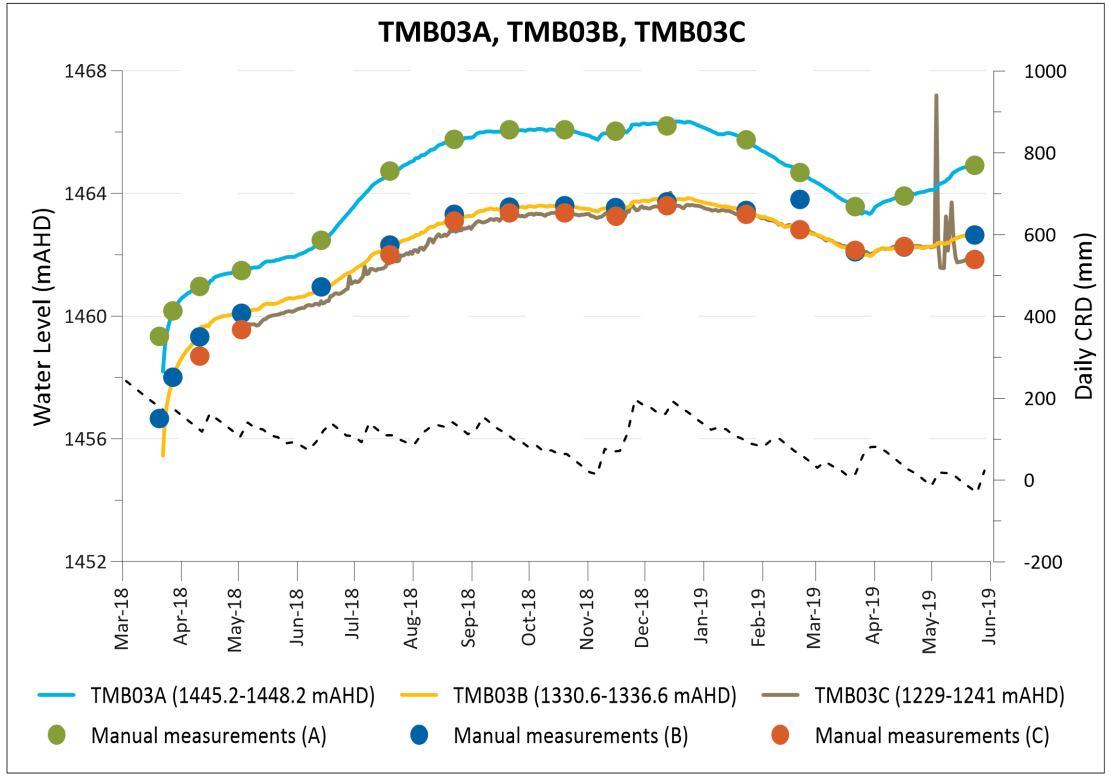

TMB02A, TMB02B
Water Level (mAHD)
Daily CRD (mm)
1472
1470
1468
1466
1464
1462
1000
800
600
400
200
0
-200
Feb-18
Mar-18
Apr-18
May-18
Jun-18
Jul-18
Aug-18
Sep-18
Oct-18
Nov-18
Dec-18
Jan-19
Feb-19
Mar-19
Apr-19
May-19
Jun-19
TMB02A (1455.6-1458.6 mAHD)
TMB02B (1275.3-1281.3 mAHD)
CRD
Manual measurements (TMB02A)
Manual measurements (TMB02B)

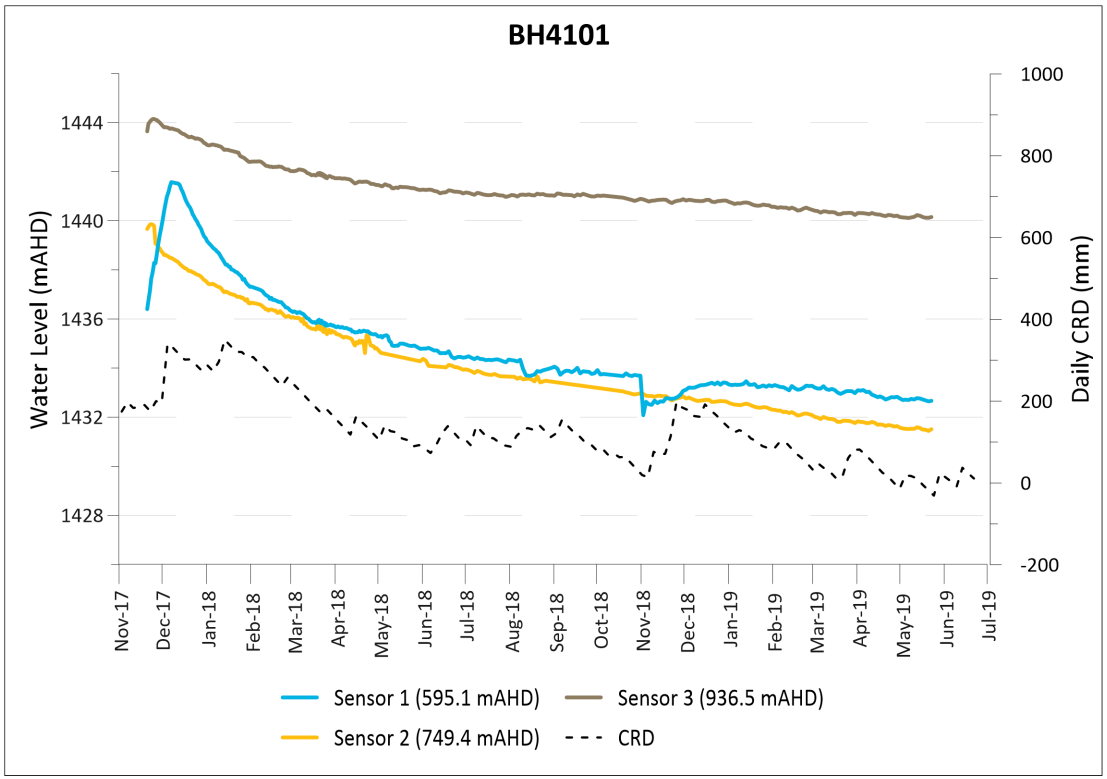

BH4103
Water Level (mAHD)
Daily CRD (mm)
1472
1470
1468
1466
1464
1462
1000
800
600
400
200
0
-200
Feb-18
Mar-18
Apr-18
May-18
Jun-18
Jul-18
Aug-18
Sep-18
Oct-18
Nov-18
Dec-18
Jan-19
Feb-19
Mar-19
Apr-19
May-19
Jun-19
Sensor 1 (1134.9 mAHD)
Sensor 3 (1331 mAHD)
Sensor 2 (1238.3 mAHD)
CRD

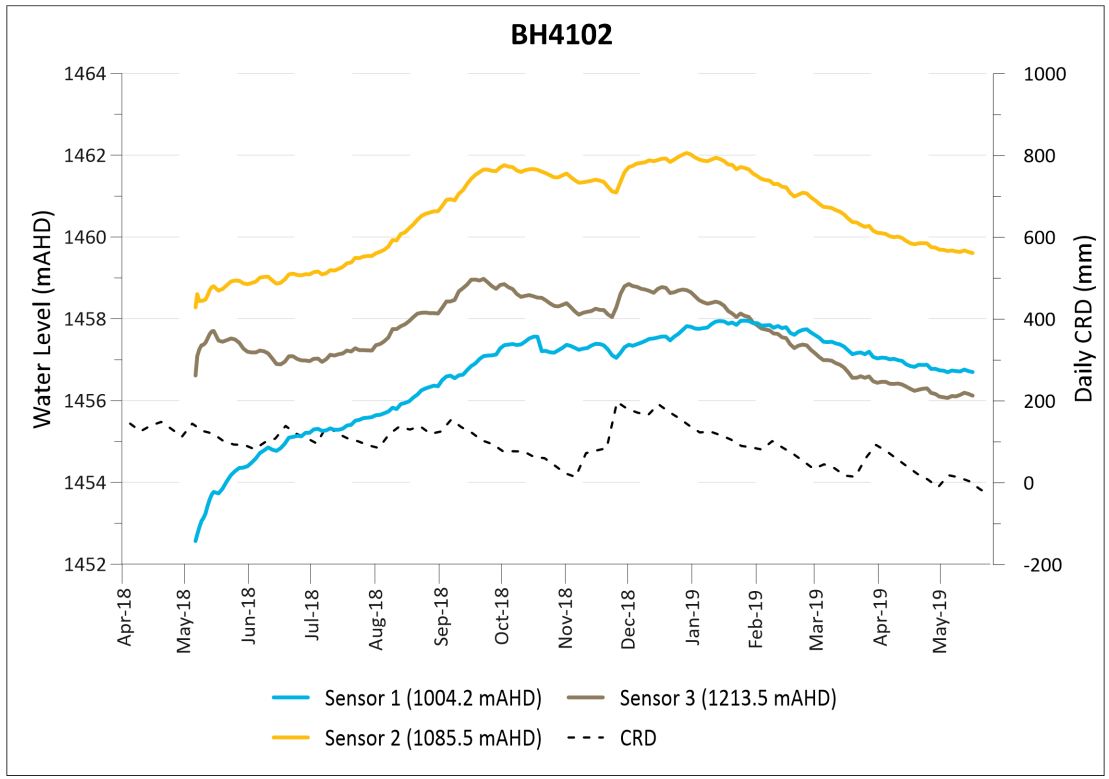

BH3113
Water Level (mAHD)
Daily CRD (mm)
1332
1328
1324
1320
1316
1000
800
600
400
200
0
-200
Nov-18
Dec-18
Jan-19
Feb-19
Mar-19
Apr-19
May-19
Sensor 1 (1149.6 mAHD)
Sensor 2 (1239.5 mAHD)
CRD

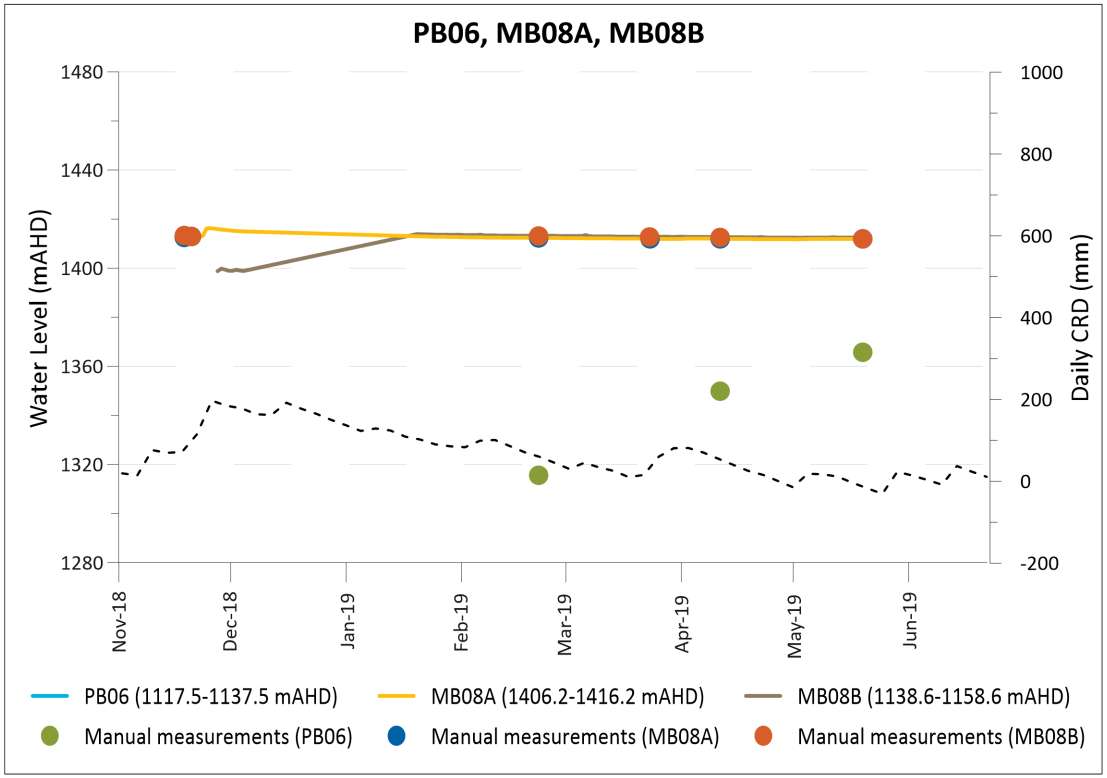

MB11A
Water Level (mAHD)
Daily CRD (mm)
1486
1484
1482
1480
1478
1000
800
600
400
200
0
-200
Jan-19
Feb-19
Mar-19
Apr-19
May-19
Jun-19
Jul-19
Logger data (1462-1468 mAHD)
Manual measurements
CRD

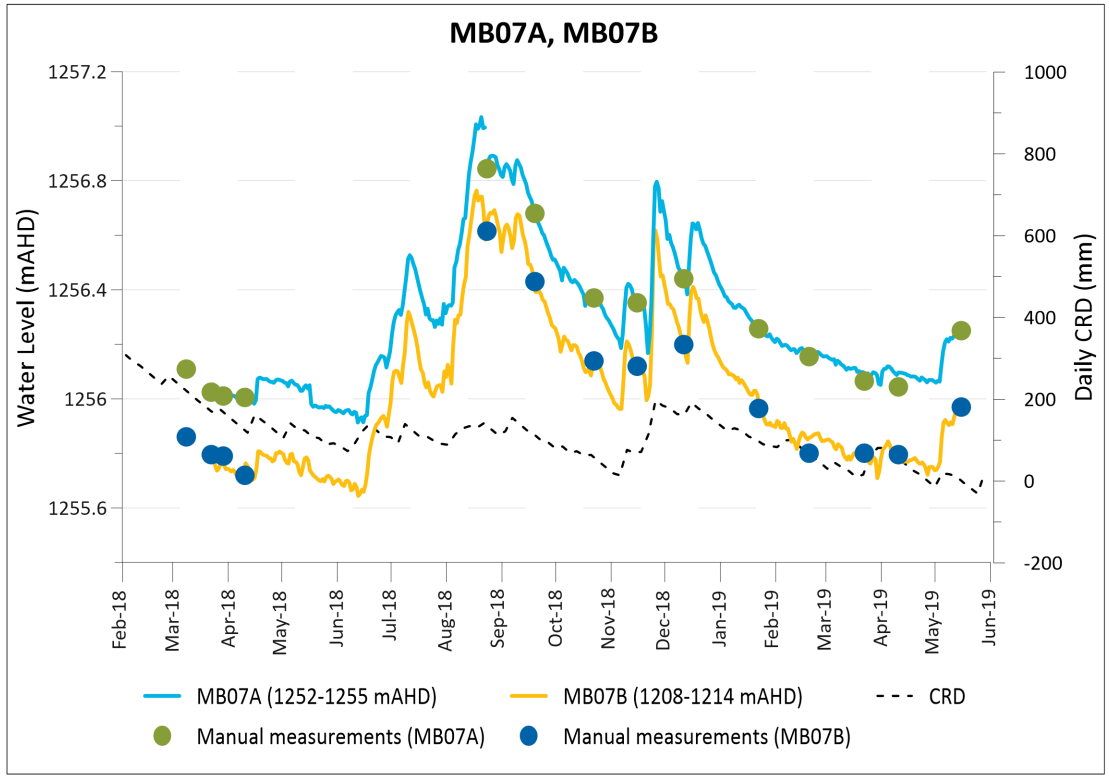

PB04, SMB04, SMB05
Water Level (mAHD)
Daily CRD (mm)
1336
1332
1328
1324
1320
1000
800
600
400
200
0
-200
Jul-18
Aug-18
Sep-18
Oct-18
Nov-18
Dec-18
Jan-19
Feb-19
Mar-19
Apr-19
May-19
Jun-19
PB04 (1141.3-1156.3 mAHD)
SMB04 (1162.8-1171.8 mAHD)
SMB05 (1293-1302 mAHD)
Manual measurements (PB04)
Manual measurements (SMB04)
Manual measurements (SMB05)

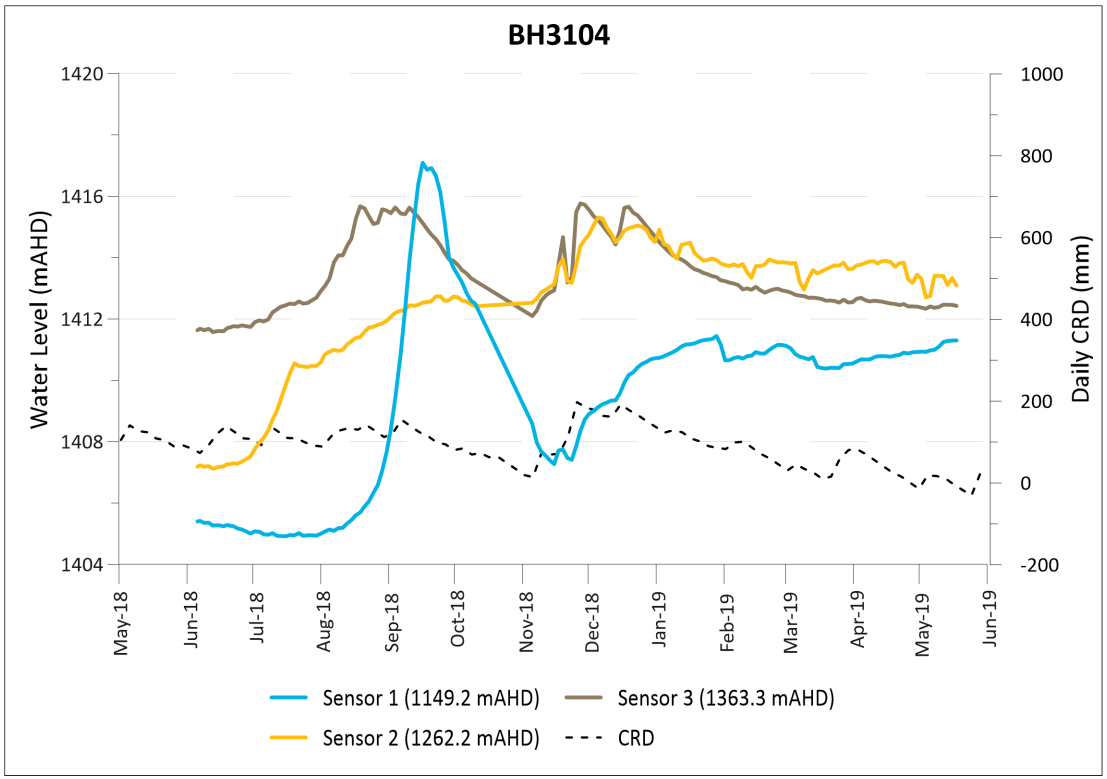

TMB03A, TMB03B, TMB03C
Water Level (mAHD)
Daily CRD (mm)
1468
1464
1460
1456
1452
1000
800
600
400
200
0
-200
Mar-18
Apr-18
May-18
Jun-18
Jul-18
Aug-18
Sep-18
Oct-18
Nov-18
Dec-18
Jan-19
Feb-19
Mar-19
Apr-19
May-19
Jun-19
TMB03A (1445.2-1448.2 mAHD)
TMB03B (1330.6-1336.6 mAHD)
TMB03C (1229-1241 mAHD)
Manual measurements (A)
Manual measurements (B)
Manual measurements (C)

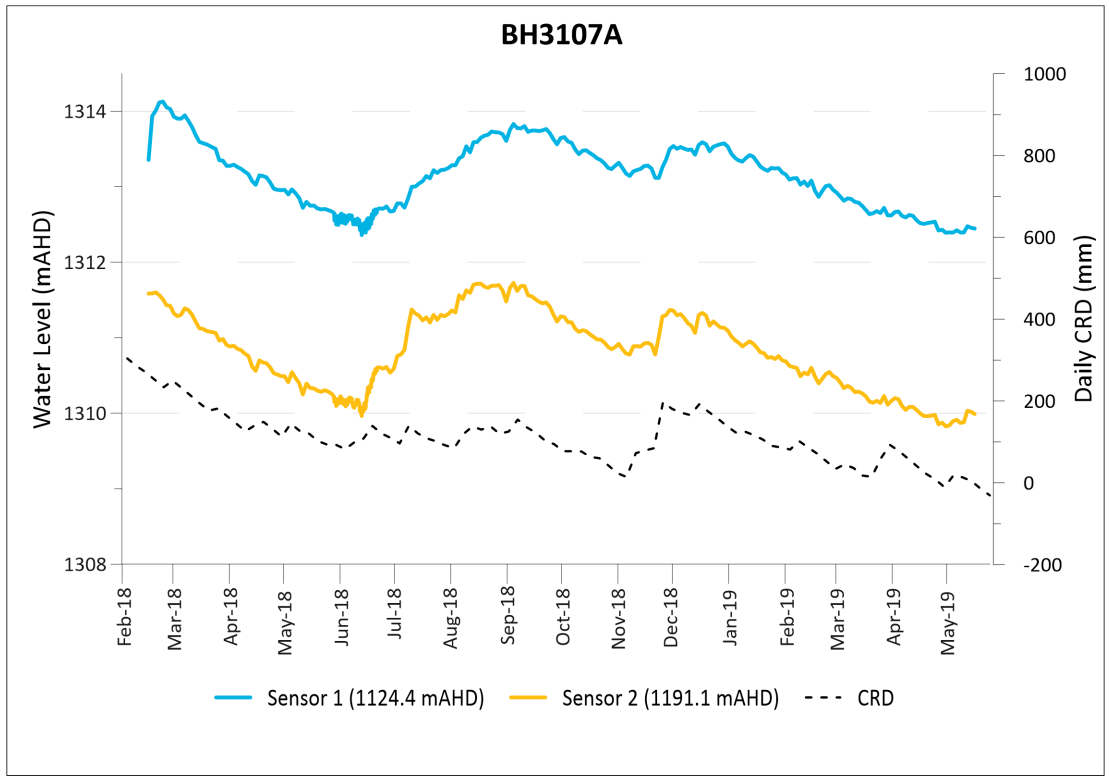

BH4101
Water Level (mAHD)
Daily CRD (mm)
1444
1440
1436
1432
1428
1000
800
600
400
200
0
-200
Nov-17
Dec-17
Jan-18
Feb-18
Mar-18
Apr-18
May-18
Jun-18
Jul-18
Aug-18
Sep-18
Oct-18
Nov-18
Dec-18
Jan-19
Feb-19
Mar-19
Apr-19
May-19
Jun-19
Jul-19
Sensor 1 (595.1 mAHD)
Sensor 3 (936.5 mAHD)
Sensor 2 (749.4 mAHD)
CRD

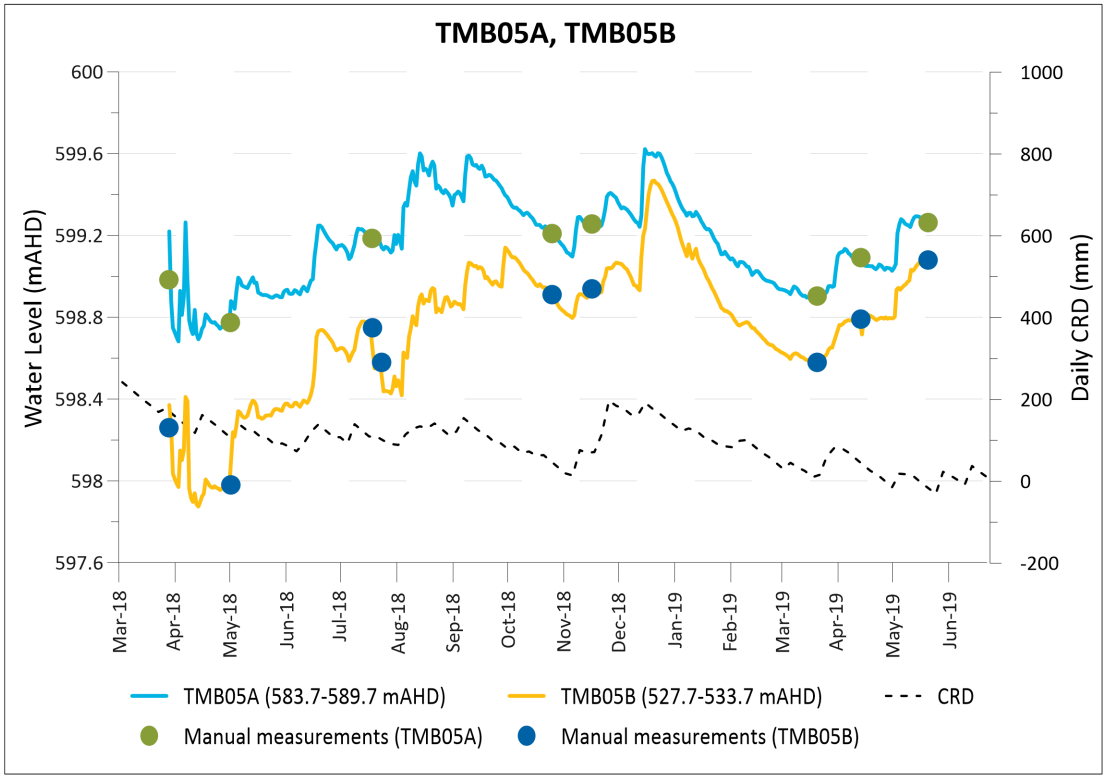

BH4102
Water Level (mAHD)
Daily CRD (mm)
1464
1462
1460
1458
1456
1454
1452
1000
800
600
400
200
0
-200
Apr-18
May-18
Jun-18
Jul-18
Aug-18
Sep-18
Oct-18
Nov-18
Dec-18
Jan-19
Feb-19
Mar-19
Apr-19
May-19
Sensor 1 (1004.2 mAHD)
Sensor 3 (1213.5 mAHD)
Sensor 2 (1085.5 mAHD)
CRD

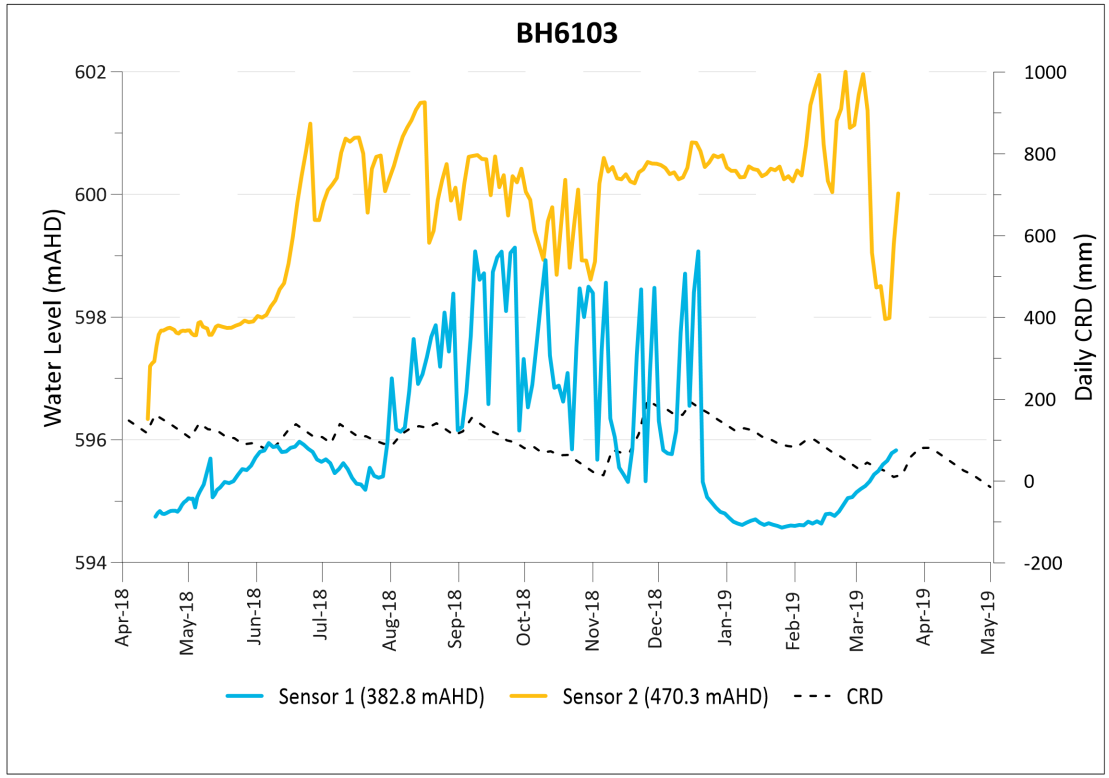

PB06, MB08A, MB08B
Water Level (mAHD)
Daily CRD (mm)
1480
1440
1400
1360
1320
1280
1000
800
600
400
200
0
-200
Nov-18
Dec-18
Jan-19
Feb-19
Mar-19
Apr-19
May-19
Jun-19
PB06 (1117.5-1137.5 mAHD)
MB08A (1406.2-1416.2 mAHD)
MB08B (1138.6-1158.6 mAHD)
Manual measurements (PB06)
Manual measurements (MB08A)
Manual measurements (MB08B)

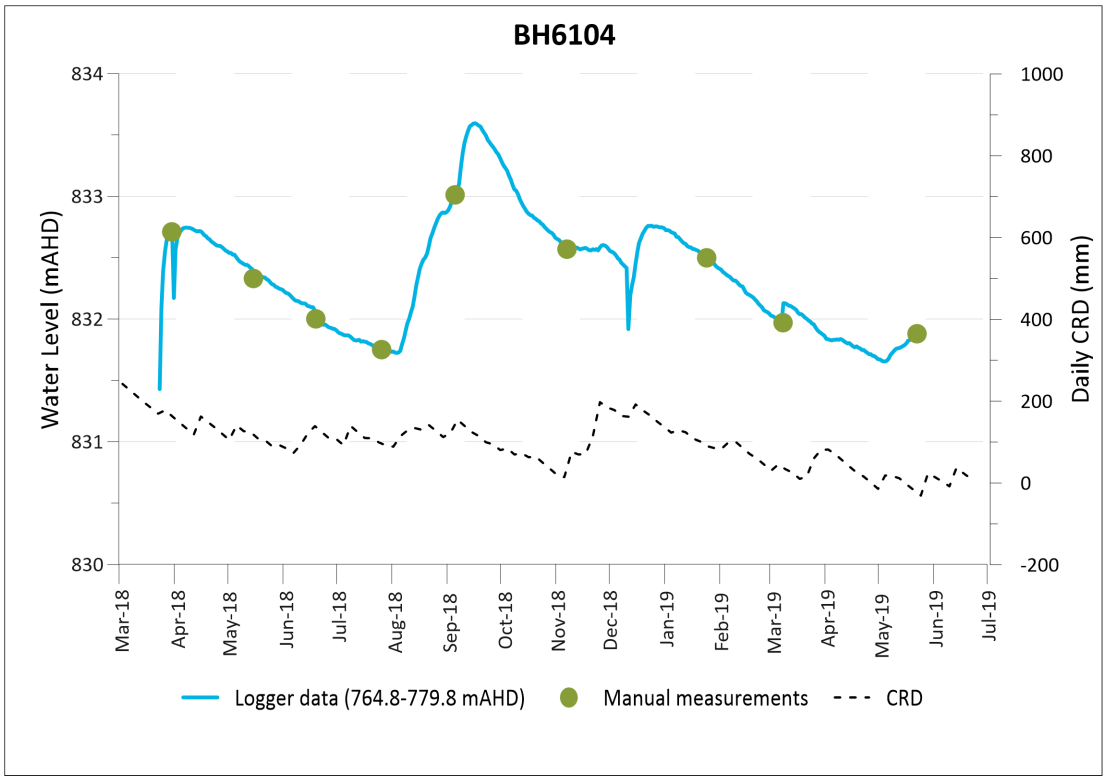

MB07A, MB07B
Water Level (mAHD)
Daily CRD (mm)
1257.2
1256.8
1256.4
1256
1255.6
1000
800
600
400
200
0
-200
Feb-18
Mar-18
Apr-18
May-18
Jun-18
Jul-18
Aug-18
Sep-18
Oct-18
Nov-18
Dec-18
Jan-19
Feb-19
Mar-19
Apr-19
May-19
Jun-19
MB07A (1252-1255 mAHD)
MB07B (1208-1214 mAHD)
CRD
Manual measurements (MB07A)
Manual measurements (MB07B)

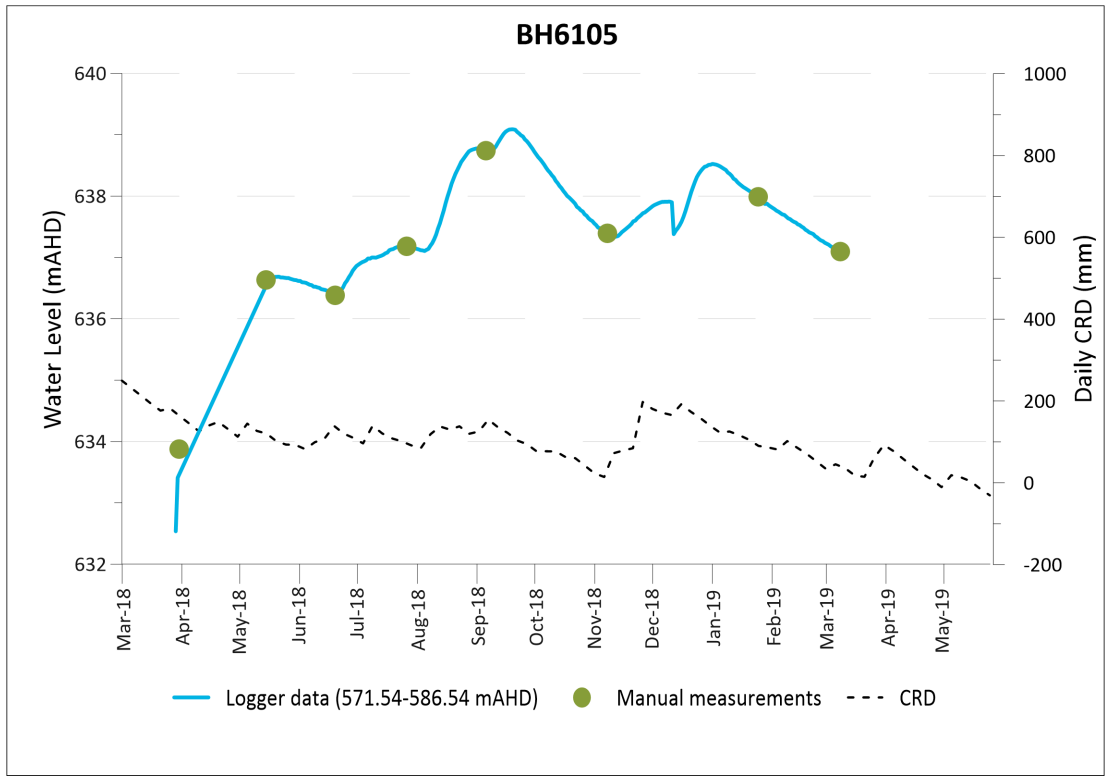

BH3104
Water Level (mAHD)
Daily CRD (mm)
1420
1416
1412
1408
1404
1000
800
600
400
200
0
-200
May-18
Jun-18
Jul-18
Aug-18
Sep-18
Oct-18
Nov-18
Dec-18
Jan-19
Feb-19
Mar-19
Apr-19
May-19
Jun-19
Sensor 1 (1149.2 mAHD)
Sensor 3 (1363.3 mAHD)
Sensor 2 (1262.2 mAHD)
CRD

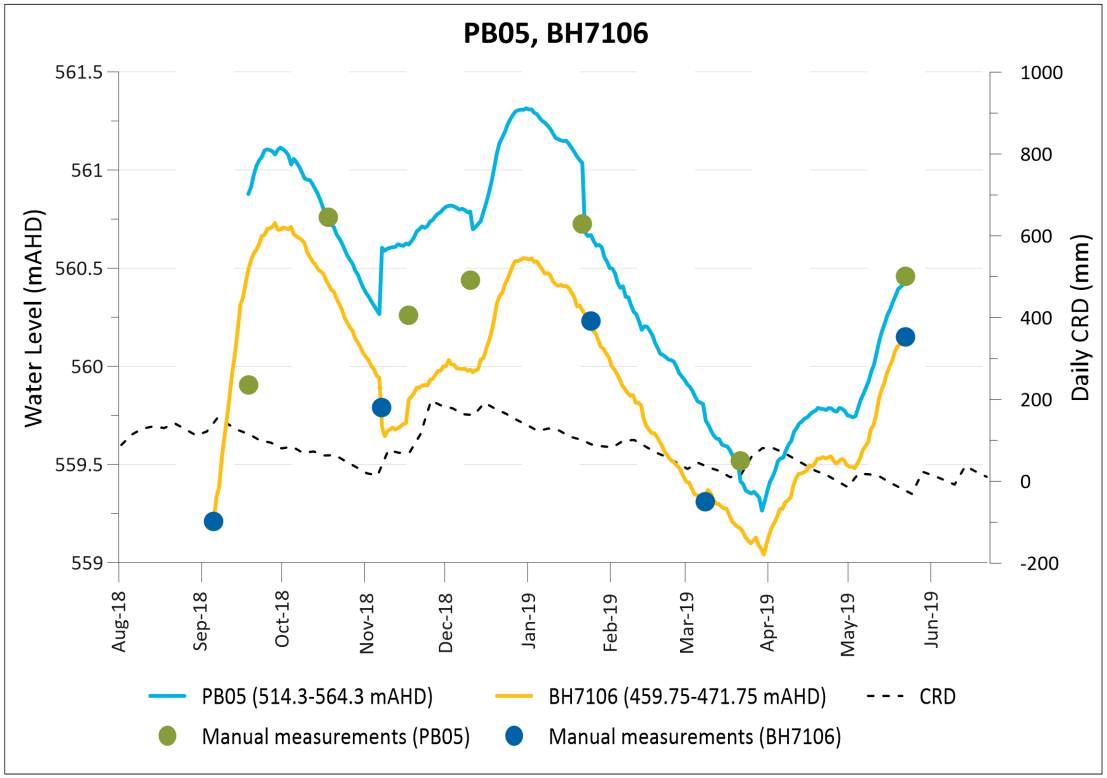

BH3107A
Water Level (mAHD)
Daily CRD (mm)
1314
1312
1310
1308
1000
800
600
400
200
0
-200
Feb-18
Mar-18
Apr-18
May-18
Jun-18
Jul-18
Aug-18
Sep-18
Oct-18
Nov-18
Dec-18
Jan-19
Feb-19
Mar-19
Apr-19
May-19
Sensor 1 (1124.4 mAHD)
Sensor 2 (1191.1 mAHD)
CRD

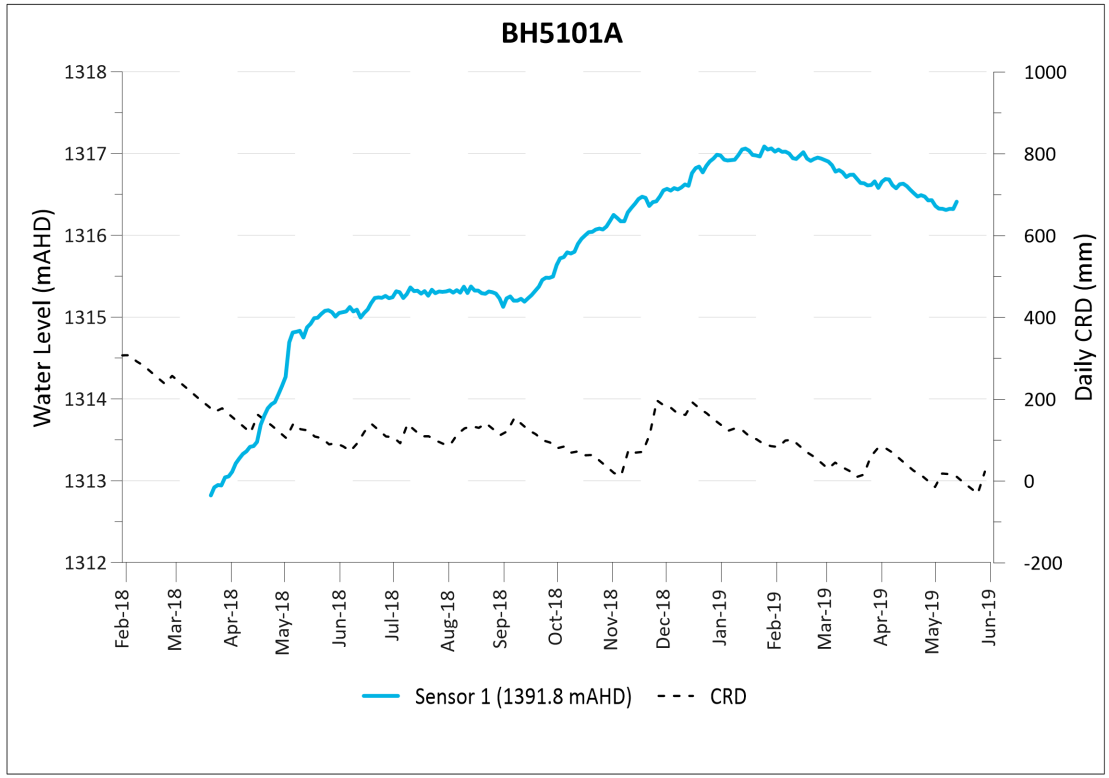

TMB05A, TMB05B
Water Level (mAHD)
Daily CRD (mm)
600
599.6
599.2
598.8
598.4
598
597.6
1000
800
600
400
200
0
-200
Mar-18
Apr-18
May-18
Jun-18
Jul-18
Aug-18
Sep-18
Oct-18
Nov-18
Dec-18
Jan-19
Feb-19
Mar-19
Apr-19
May-19
Jun-19
TMB05A (583.7-589.7 mAHD)
TMB05B (527.7-533.7 mAHD)
CRD
Manual measurements (TMB05A)
Manual measurements (TMB05B)

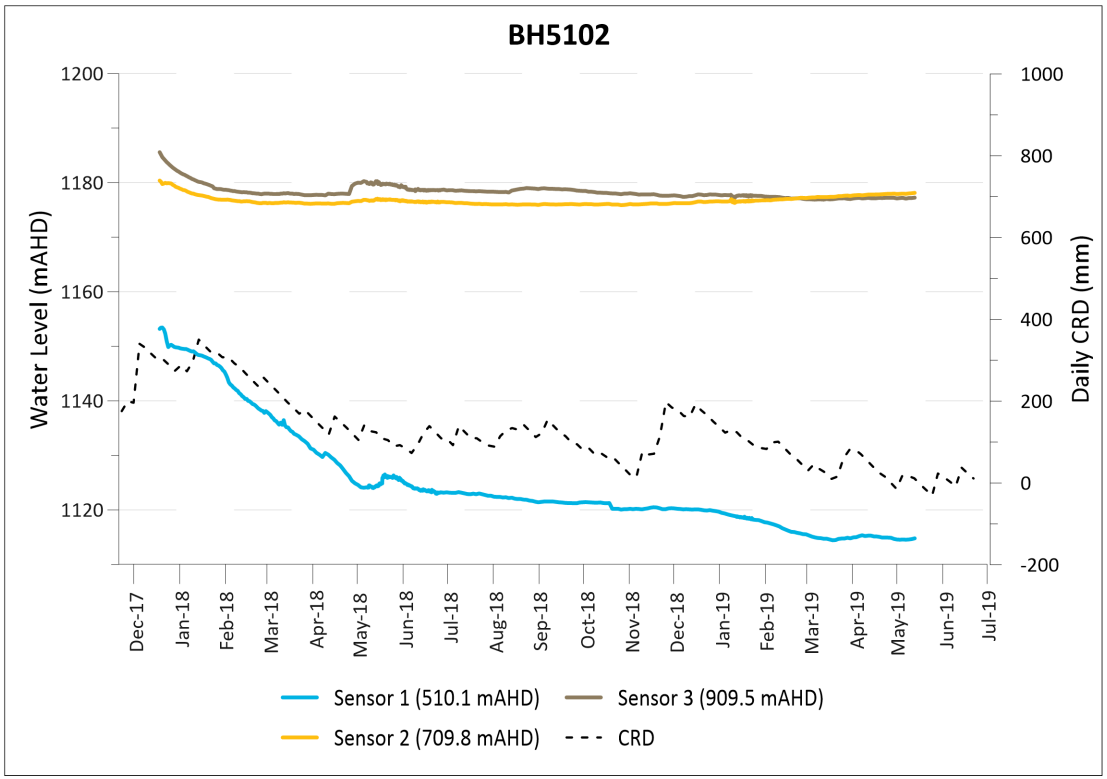

BH6103
Water Level (mAHD)
Daily CRD (mm)
602
600
598
596
594
1000
800
600
400
200
0
-200
Apr-18
May-18
Jun-18
Jul-18
Aug-18
Sep-18
Oct-18
Nov-18
Dec-18
Jan-19
Feb-19
Mar-19
Apr-19
May-19
Sensor 1 (382.8 mAHD)
Sensor 2 (470.3 mAHD)
CRD

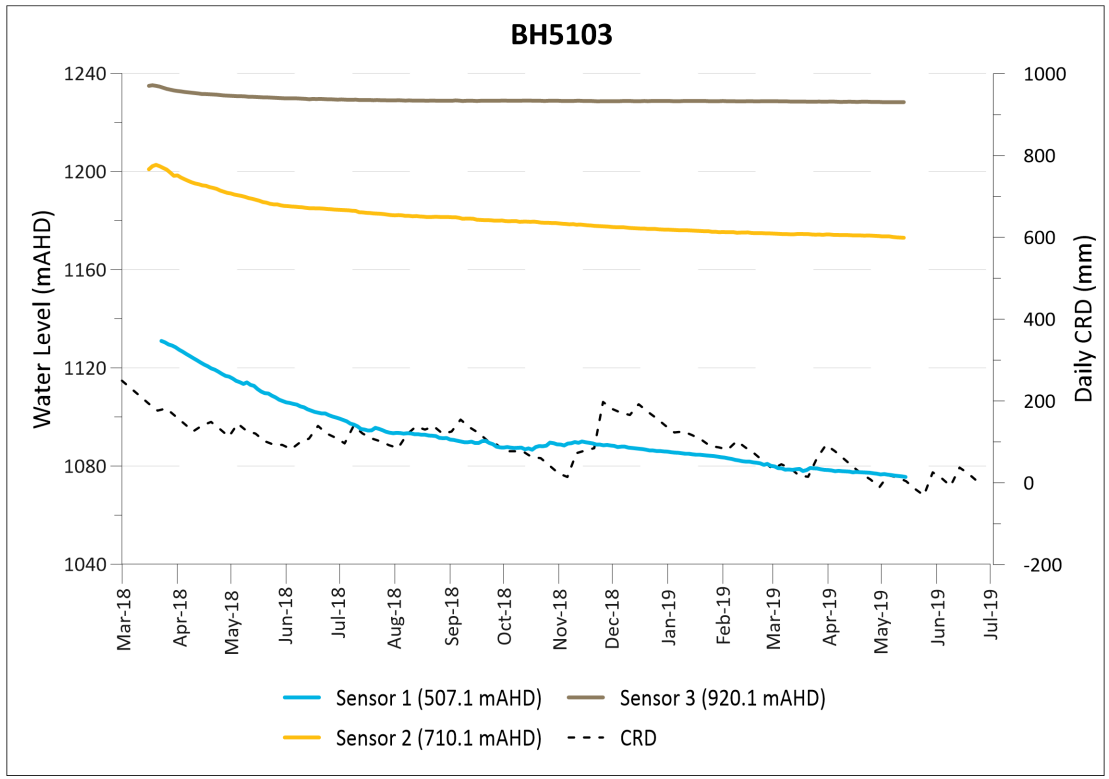

BH6104
Water Level (mAHD)
Daily CRD (mm)
834
833
832
831
830
1000
800
600
400
200
0
-200
Mar-18
Apr-18
May-18
Jun-18
Jul-18
Aug-18
Sep-18
Oct-18
Nov-18
Dec-18
Jan-19
Feb-19
Mar-19
Apr-19
May-19
Jun-19
Jul-19
Logger data (764.8-779.8 mAHD)
Manual measurements
CRD

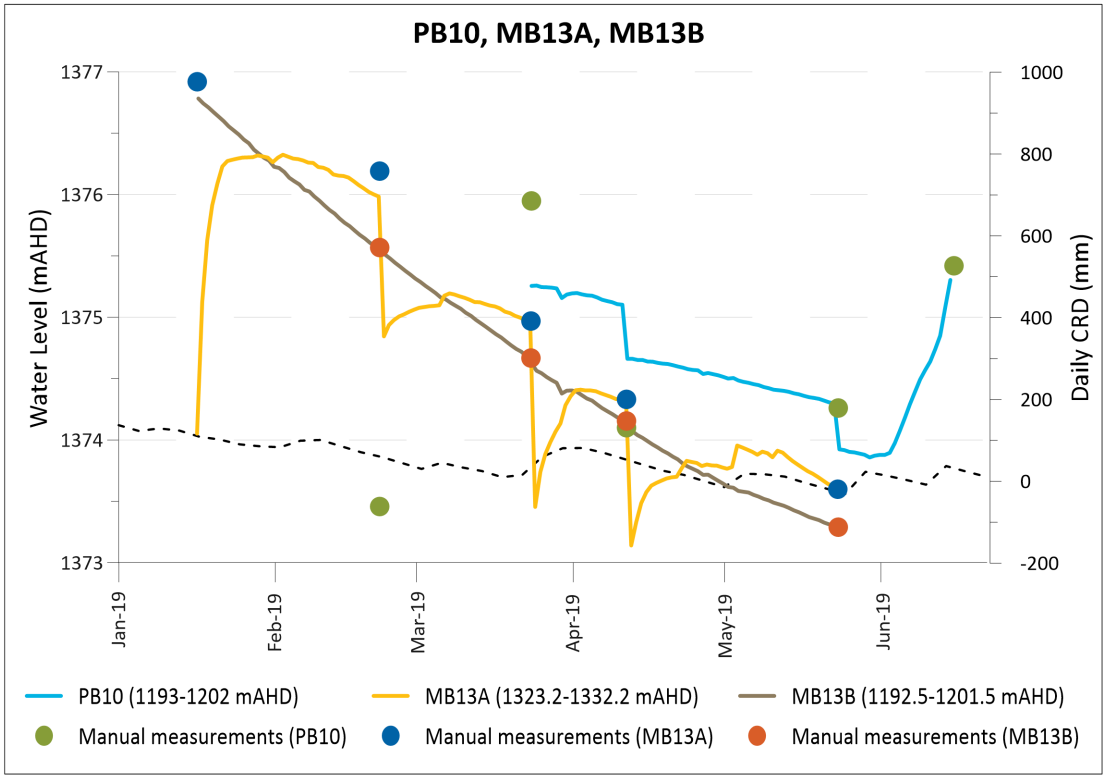

BH6105
Water Level (mAHD)
Daily CRD (mm)
640
638
636
634
632
1000
800
600
400
200
0
-200
Mar-18
Apr-18
May-18
Jun-18
Jul-18
Aug-18
Sep-18
Oct-18
Nov-18
Dec-18
Jan-19
Feb-19
Mar-19
Apr-19
May-19
Logger data (571.54-586.54 mAHD)
Manual measurements
CRD

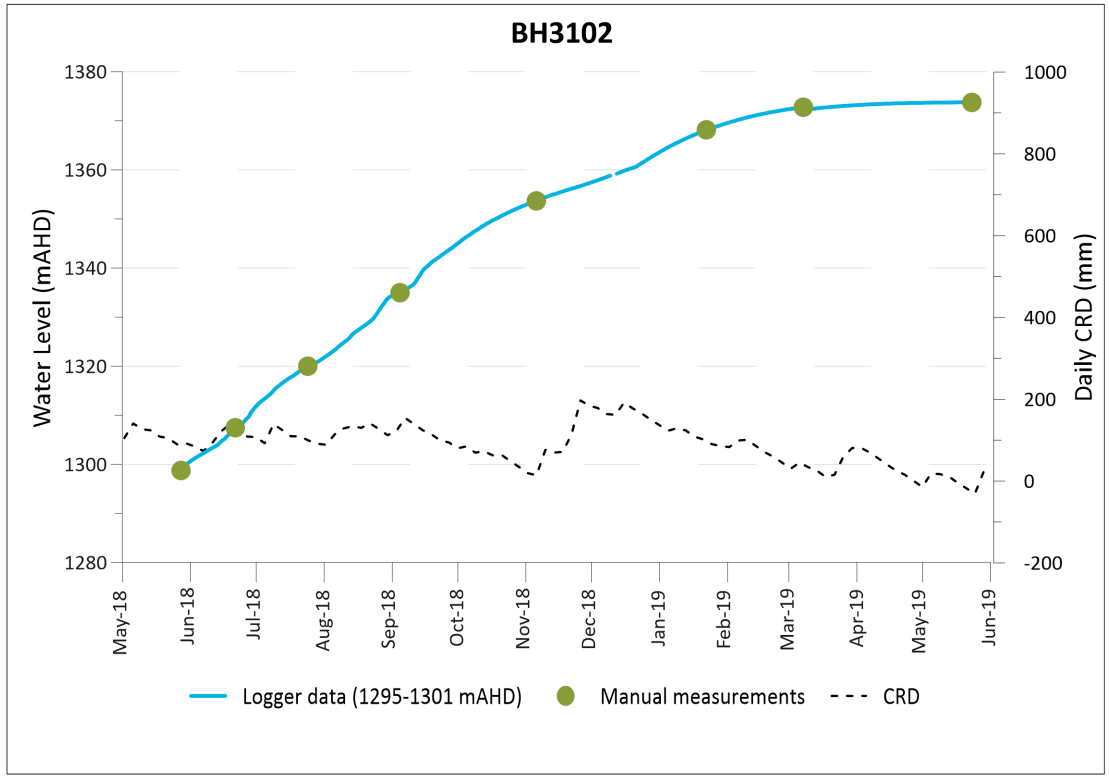

PB05, BH7106
Water Level (mAHD)
Daily CRD (mm)
561.5
561
560.5
560
559.5
559
1000
800
600
400
200
0
-200
Aug-18
Sep-18
Oct-18
Nov-18
Dec-18
Jan-19
Feb-19
Mar-19
Apr-19
May-19
Jun-19
PB05 (514.3-564.3 mAHD)
BH7106 (459.75-471.75 mAHD)
CRD
Manual measurements (PB05)
Manual measurements (BH7106)

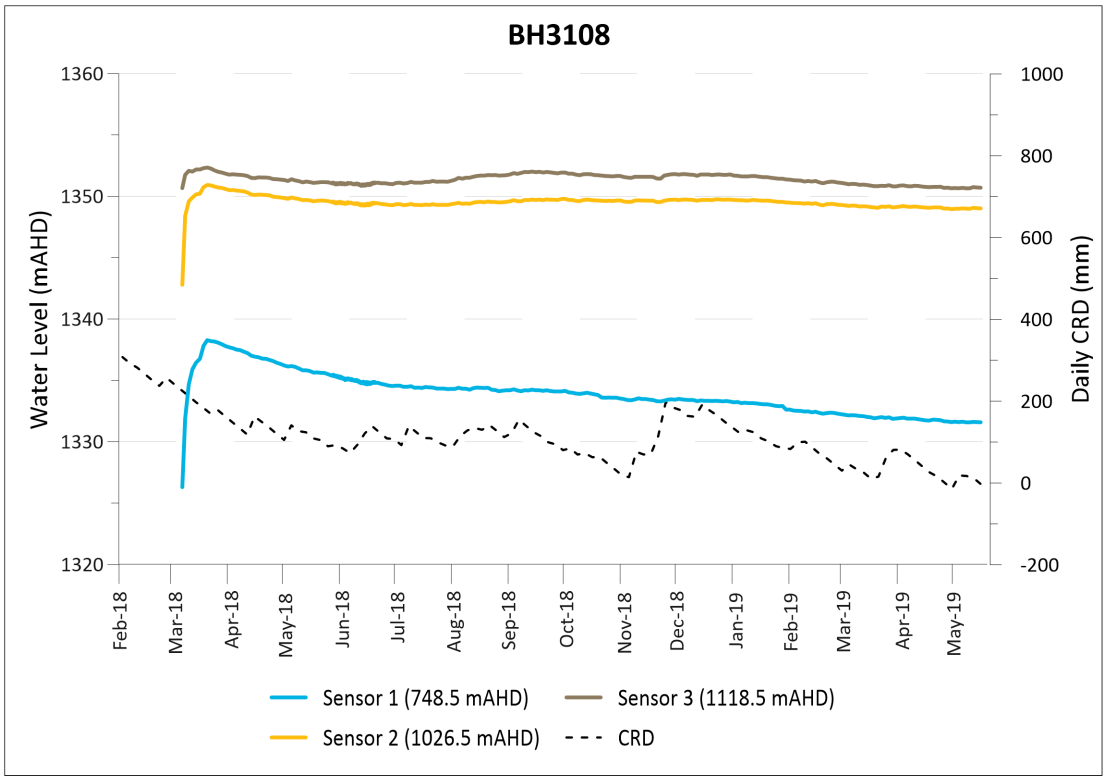

BH5101A
Water Level (mAHD)
Daily CRD (mm)
1318
1317
1316
1315
1314
1313
1312
1000
800
600
400
200
0
-200
Feb-18
Mar-18
Apr-18
May-18
Jun-18
Jul-18
Aug-18
Sep-18
Oct-18
Nov-18
Dec-18
Jan-19
Feb-19
Mar-19
Apr-19
May-19
Jun-19
Sensor 1 (1391.8 mAHD)
CRD

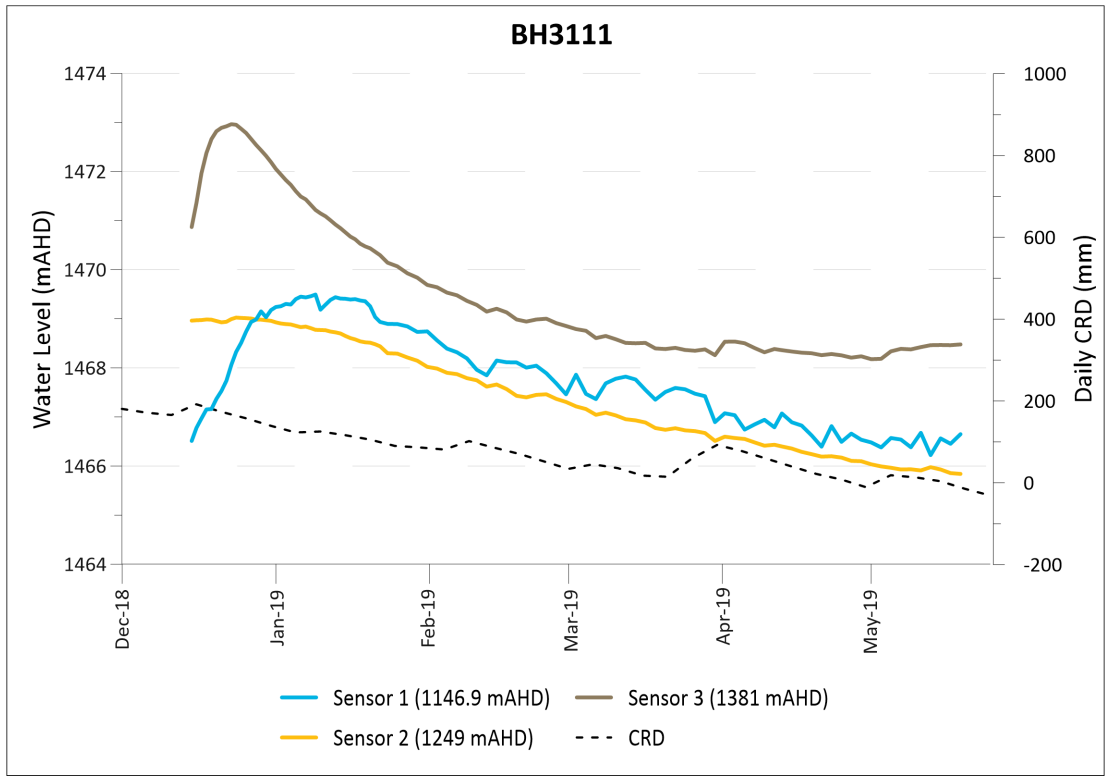

BH5102
Water Level (mAHD)
Daily CRD (mm)
1200
1180
1160
1140
1120
1000
800
600
400
200
0
-200
Dec-17
Jan-18
Feb-18
Mar-18
Apr-18
May-18
Jun-18
Jul-18
Aug-18
Sep-18
Oct-18
Nov-18
Dec-18
Jan-19
Feb-19
Mar-19
Apr-19
May-19
Jun-19
Jul-19
Sensor 1 (510.1 mAHD)
Sensor 3 (909.5 mAHD)
Sensor 2 (709.8 mAHD)
CRD

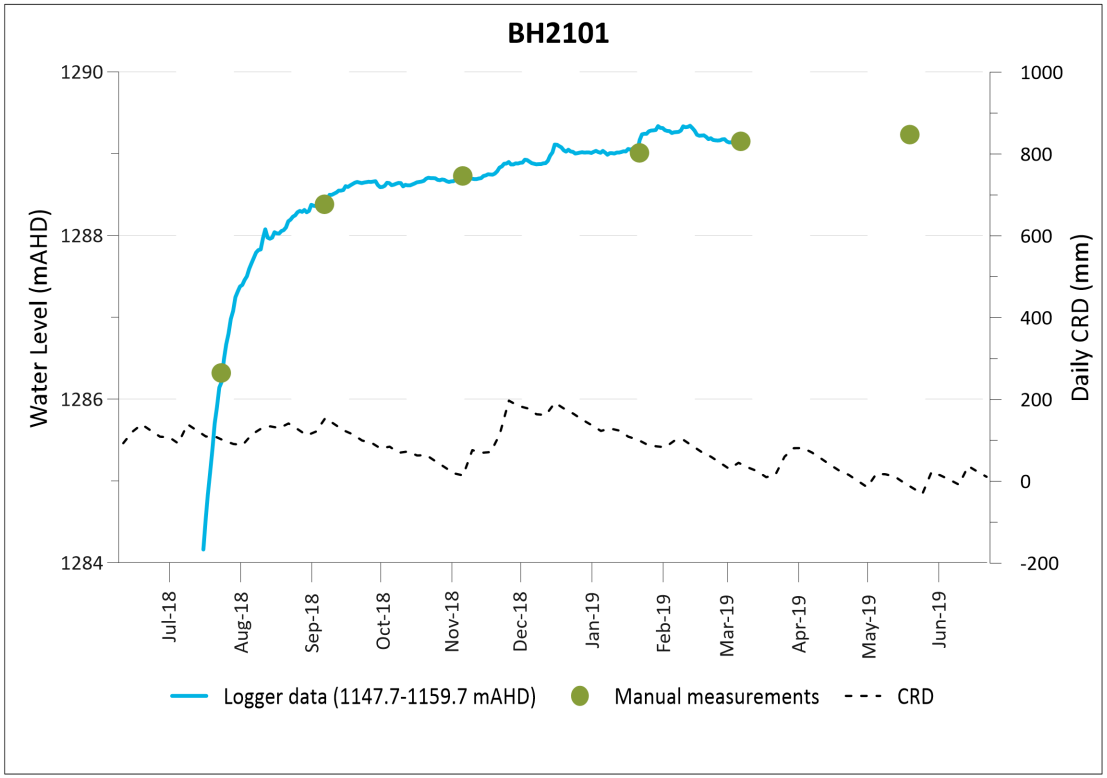

BH5103
Water Level (mAHD)
Daily CRD (mm)
1240
1200
1160
1120
1080
1040
1000
800
600
400
200
0
-200
Mar-18
Apr-18
May-18
Jun-18
Jul-18
Aug-18
Sep-18
Oct-18
Nov-18
Dec-18
Jan-19
Feb-19
Mar-19
Apr-19
May-19
Jun-19
Jul-19
Sensor 1 (507.1 mAHD)
Sensor 3 (920.1 mAHD)
Sensor 2 (710.1 mAHD)
CRD

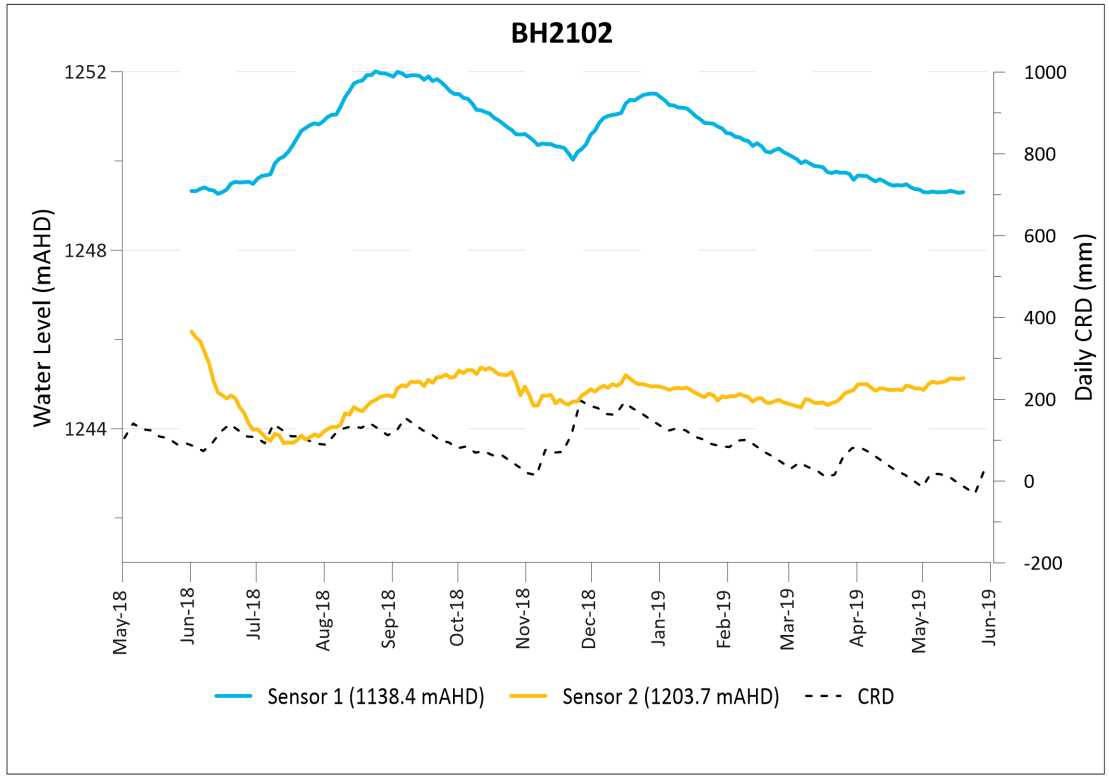

PB10, MB13A, MB13B
Water Level (mAHD)
Daily CRD (mm)
1377
1376
1375
1374
1373
1000
800
600
400
200
0
-200
Jan-19
Feb-19
Mar-19
Apr-19
May-19
Jun-19
PB10 (1193-1202 mAHD)
MB13A (1323.2-1332.2 mAHD)
MB13B (1192.5-1201.5 mAHD)
Manual measurements (PB10)
Manual measurements (MB13A)
Manual measurements (MB13B)

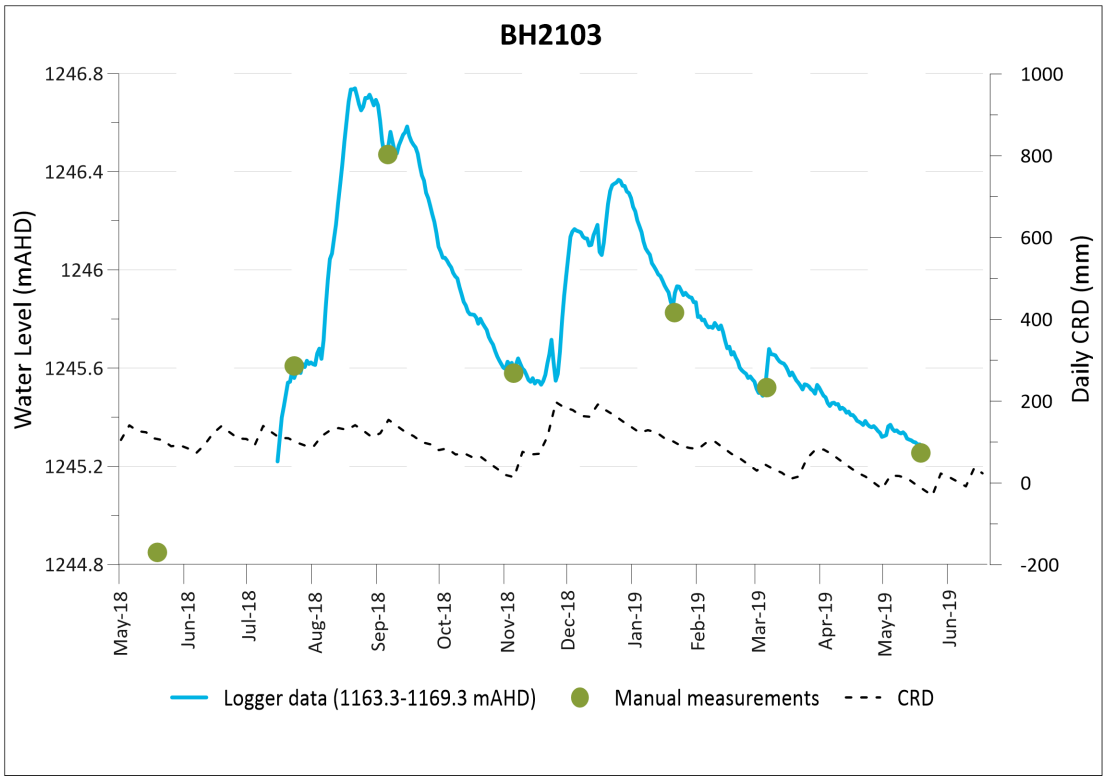

BH3102
Water Level (mAHD)
Daily CRD (mm)
1380
1360
1340
1320
1300
1280
1000
800
600
400
200
0
-200
May-18
Jun-18
Jul-18
Aug-18
Sep-18
Oct-18
Nov-18
Dec-18
Jan-19
Feb-19
Mar-19
Apr-19
May-19
Jun-19
Logger data (1295-1301 mAHD)
Manual measurements
CRD

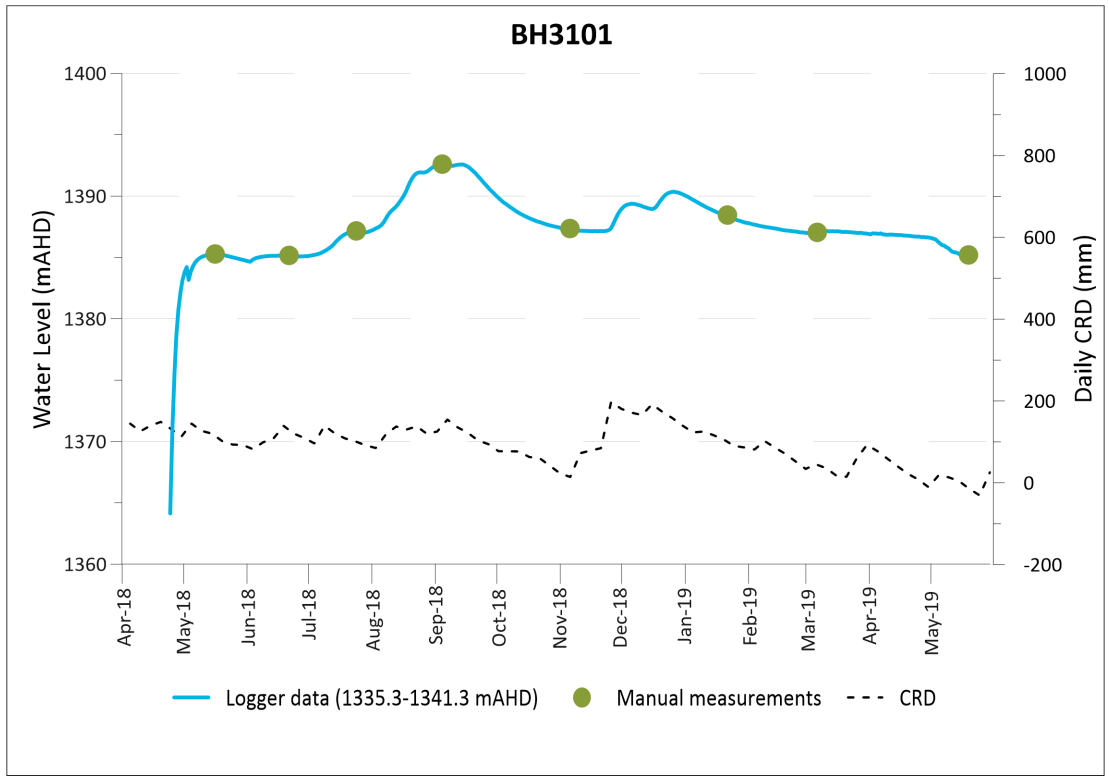

BH3108
Water Level (mAHD)
Daily CRD (mm)
1360
1350
1340
1330
1320
1000
800
600
400
200
0
-200
Feb-18
Mar-18
Apr-18
May-18
Jun-18
Jul-18
Aug-18
Sep-18
Oct-18
Nov-18
Dec-18
Jan-19
Feb-19
Mar-19
Apr-19
May-19
Sensor 1 (748.5 mAHD)
Sensor 3 (1118.5 mAHD)
Sensor 2 (1026.5 mAHD)
CRD

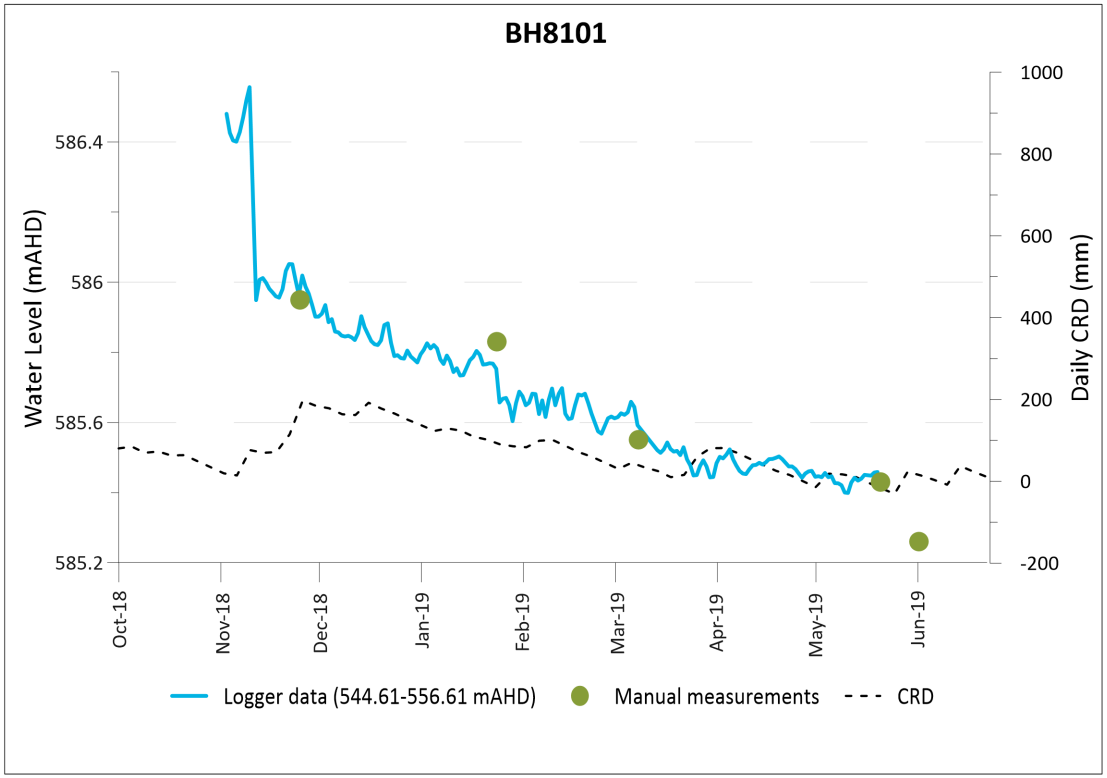

BH3111
Water Level (mAHD)
Daily CRD (mm)
1474
1472
1470
1468
1466
1464
1000
800
600
400
200
0
-200
Dec-18
Jan-19
Feb-19
Mar-19
Apr-19
May-19
Sensor 1 (1146.9 mAHD)
Sensor 3 (1381 mAHD)
Sensor 2 (1249 mAHD)
CRD

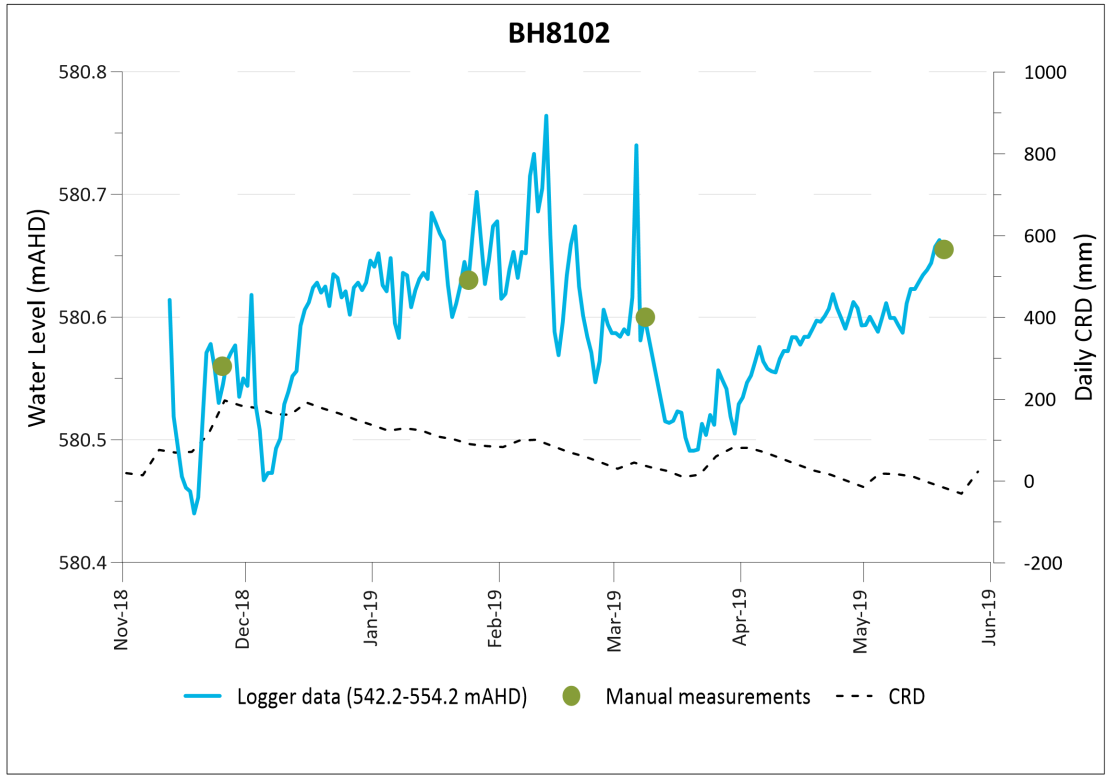

BH2101
Water Level (mAHD)
Daily CRD (mm)
1290
1288
1286
1284
1000
800
600
400
200
0
-200
Jul-18
Aug-18
Sep-18
Oct-18
Nov-18
Dec-18
Jan-19
Feb-19
Mar-19
Apr-19
May-19
Jun-19
Logger data (1147.7-1159.7 mAHD)
Manual measurements
CRD

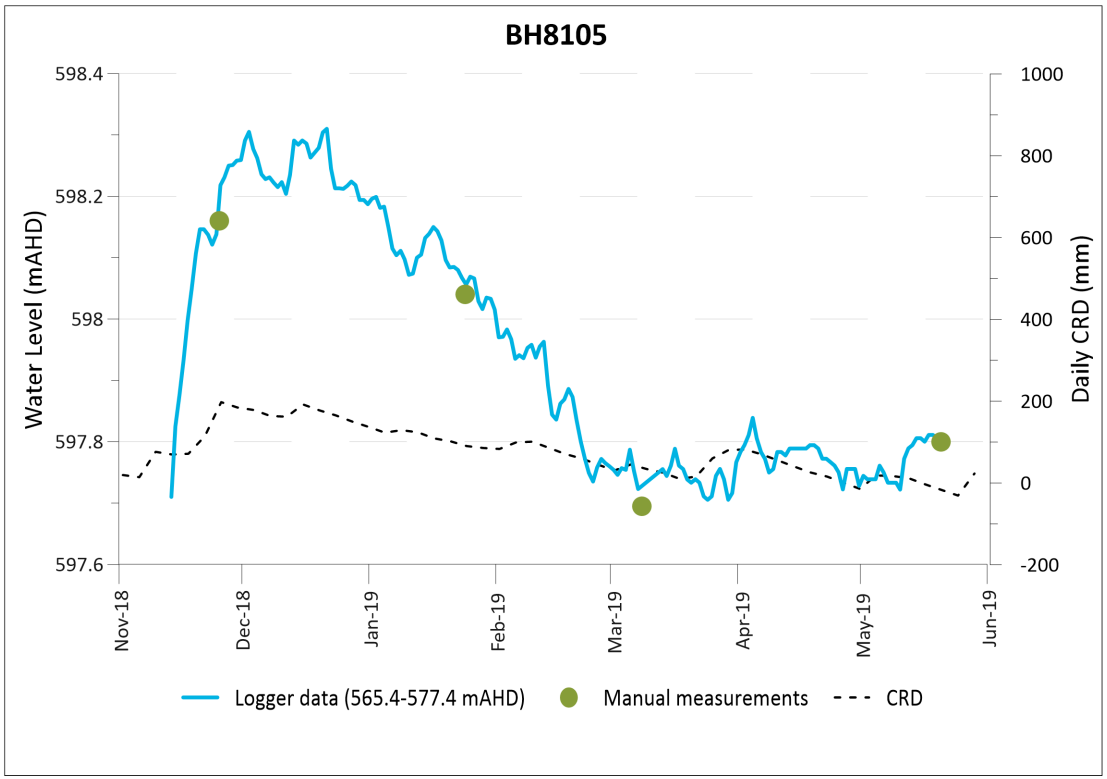

BH2102
Water Level (mAHD)
Daily CRD (mm)
1252
1248
1244
1000
800
600
400
200
0
-200
May-18
Jun-18
Jul-18
Aug-18
Sep-18
Oct-18
Nov-18
Dec-18
Jan-19
Feb-19
Mar-19
Apr-19
May-19
Jun-19
Sensor 1 (1138.4 mAHD)
Sensor 2 (1203.7 mAHD)
CRD

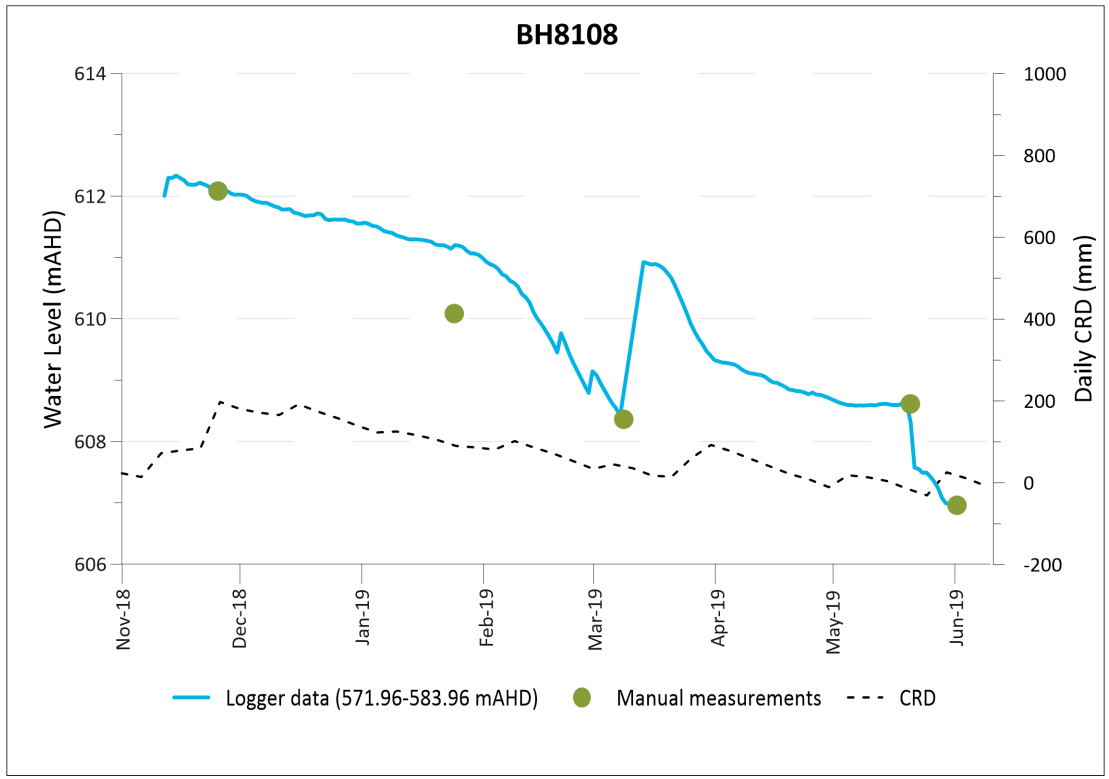

BH2103
Water Level (mAHD)
Daily CRD (mm)
1246.8
1246.4
1246
1245.6
1245.2
1244.8
1000
800
600
400
200
0
-200
May-18
Jun-18
Jul-18
Aug-18
Sep-18
Oct-18
Nov-18
Dec-18
Jan-19
Feb-19
Mar-19
Apr-19
May-19
Jun-19
Logger data (1163.3-1169.3 mAHD)
Manual measurements
CRD

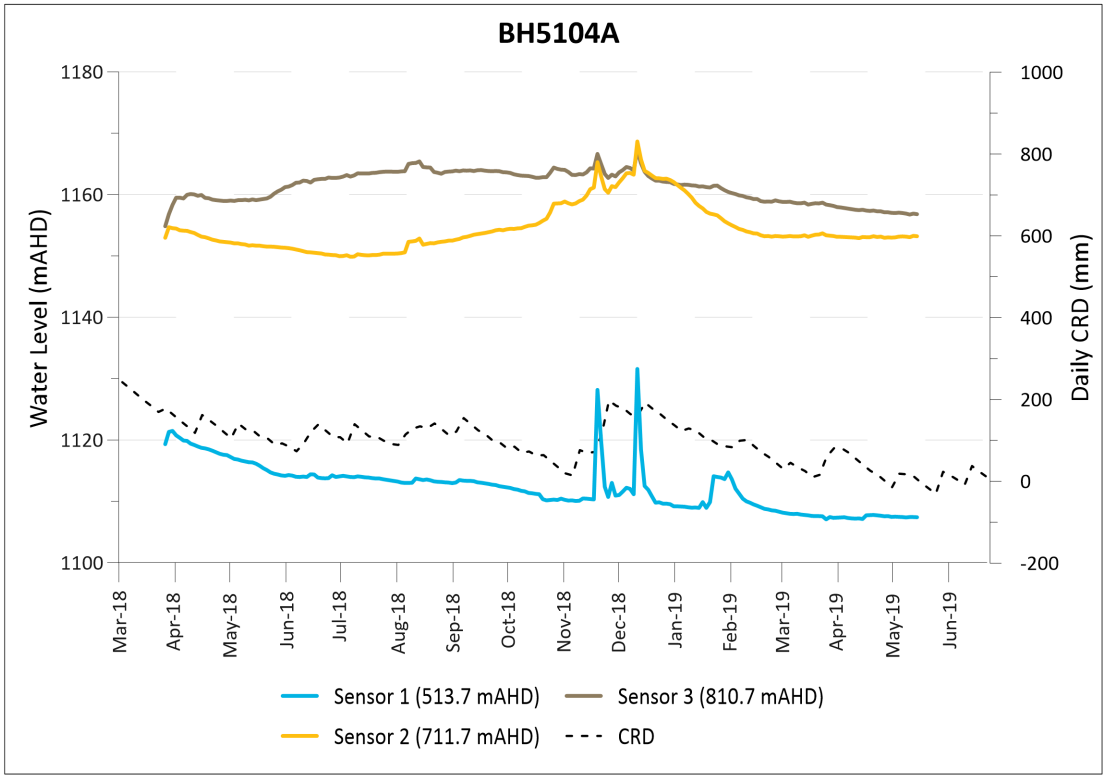

BH3101
Water Level (mAHD)
Daily CRD (mm)
1400
1390
1380
1370
1360
1000
800
600
400
200
0
-200
Apr-18
May-18
Jun-18
Jul-18
Aug-18
Sep-18
Oct-18
Nov-18
Dec-18
Jan-19
Feb-19
Mar-19
Apr-19
May-19
Logger data (1335.3-1341.3 mAHD)
Manual measurements
CRD

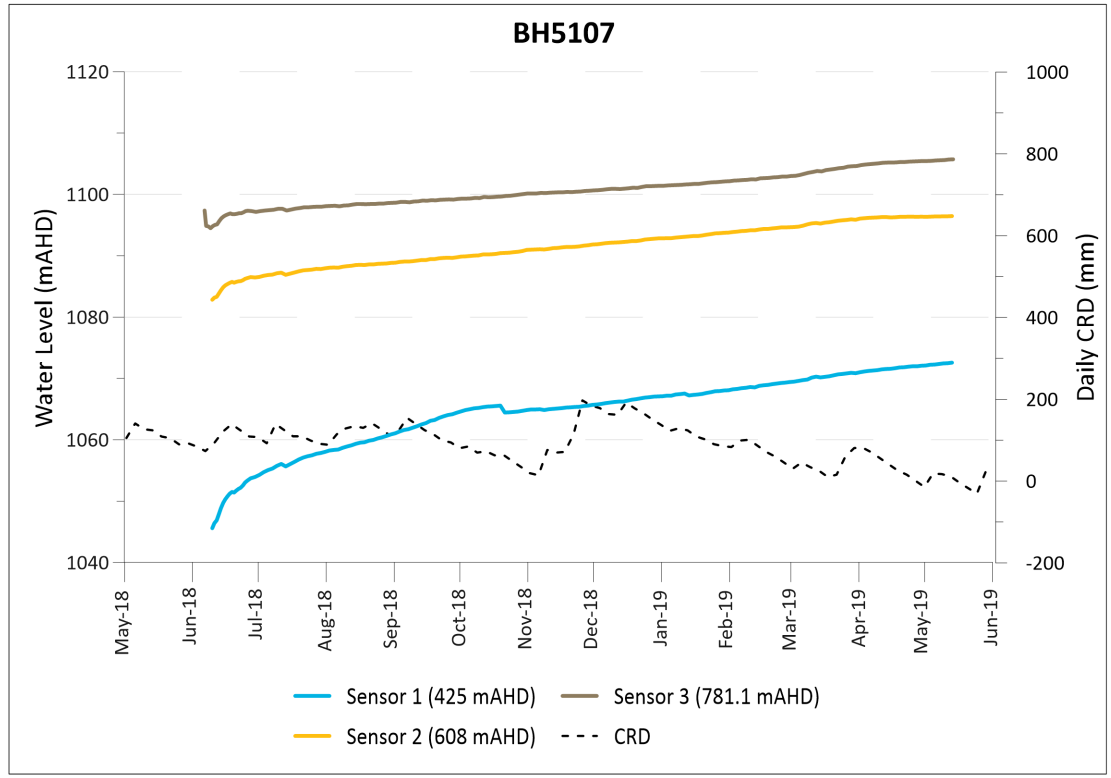

BH8101
Water Level (mAHD)
Daily CRD (mm)
586.4
586
585.6
585.2
1000
800
600
400
200
0
-200
Oct-18
Nov-18
Dec-18
Jan-19
Feb-19
Mar-19
Apr-19
May-19
Jun-19
Logger data (544.61-556.61 mAHD)
Manual measurements
CRD

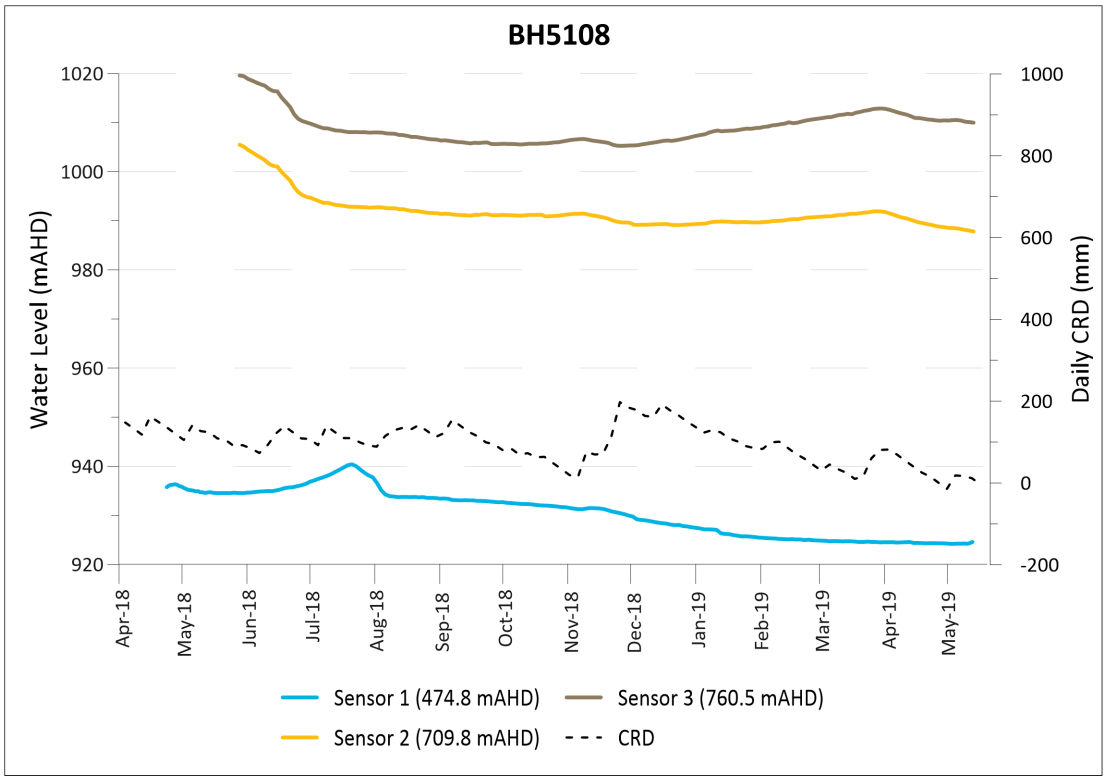

BH8102
Water Level (mAHD)
Daily CRD (mm)
580.8
580.7
580.6
580.5
580.4
1000
800
600
400
200
0
-200
Nov-18
Dec-18
Jan-19
Feb-19
Mar-19
Apr-19
May-19
Jun-19
Logger data (542.2-554.2 mAHD)
Manual measurements
CRD

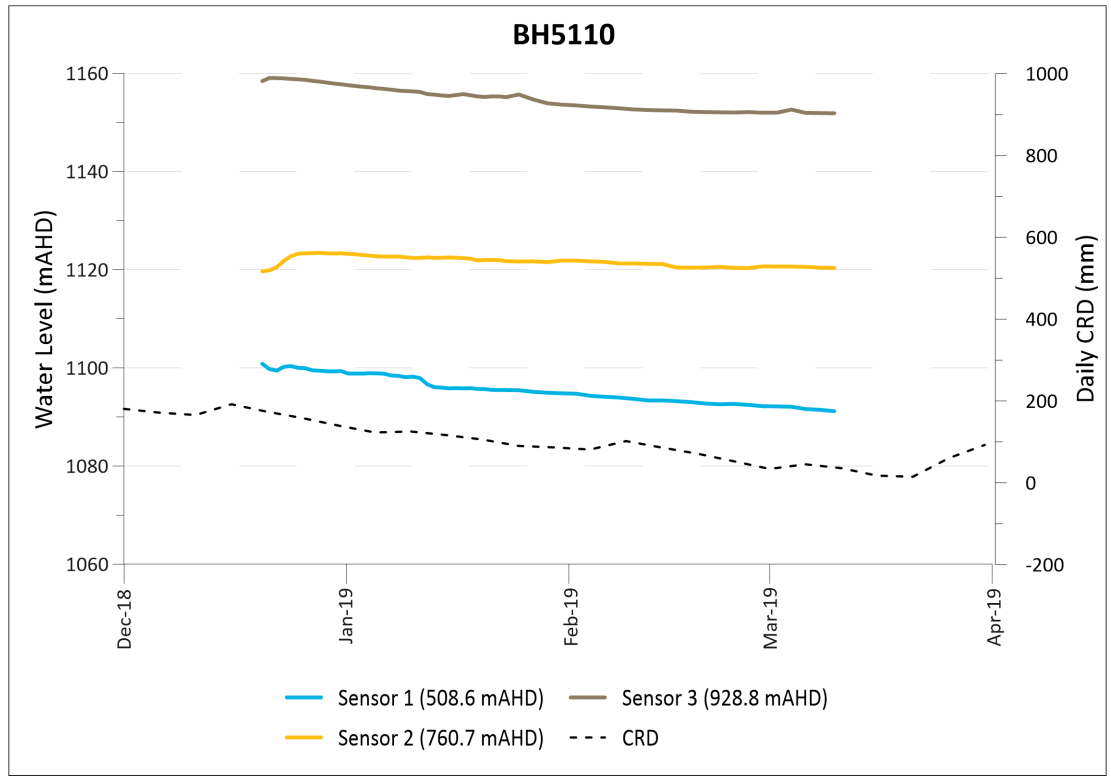

BH8105
Water Level (mAHD)
Daily CRD (mm)
598.4
598.2
598
597.8
597.6
1000
800
600
400
200
0
-200
Nov-18
Dec-18
Jan-19
Feb-19
Mar-19
Apr-19
May-19
Jun-19
Logger data (565.4-577.4 mAHD)
Manual measurements
CRD

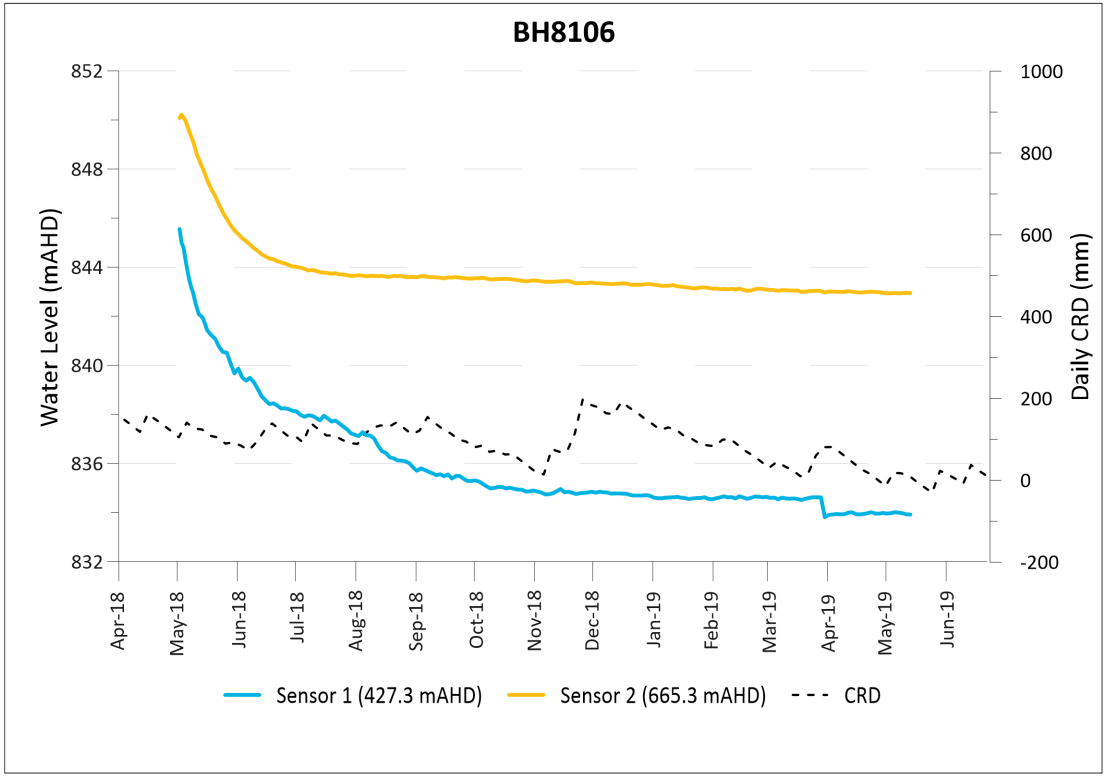

BH8108
Water Level (mAHD)
Daily CRD (mm)
614
612
610
608
606
1000
800
600
400
200
0
-200
Nov-18
Dec-18
Jan-19
Feb-19
Mar-19
Apr-19
May-19
Jun-19
Logger data (571.96-583.96 mAHD)
Manual measurements
CRD

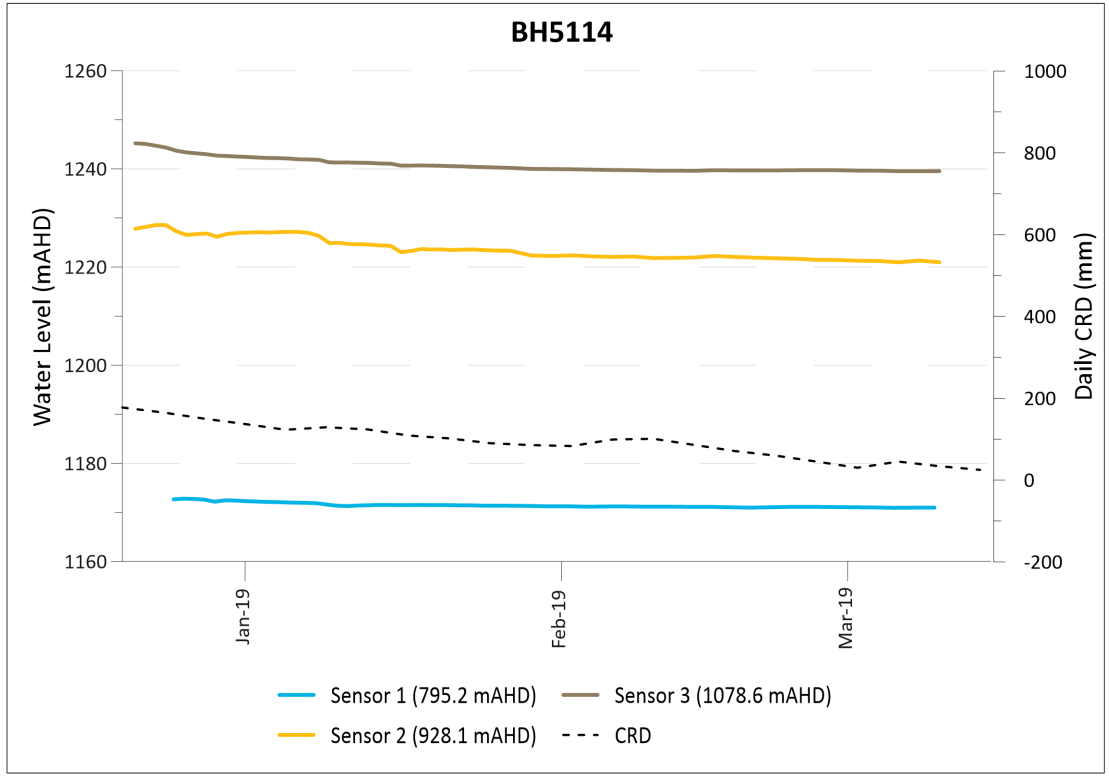

BH5104A
Water Level (mAHD)
Daily CRD (mm)
1180
1160
1140
1120
1100
1000
800
600
400
200
0
-200
Mar-18
Apr-18
May-18
Jun-18
Jul-18
Aug-18
Sep-18
Oct-18
Nov-18
Dec-18
Jan-19
Feb-19
Mar-19
Apr-19
May-19
Jun-19
Sensor 1 (513.7 mAHD)
Sensor 3 (810.7 mAHD)
Sensor 2 (711.7 mAHD)
CRD

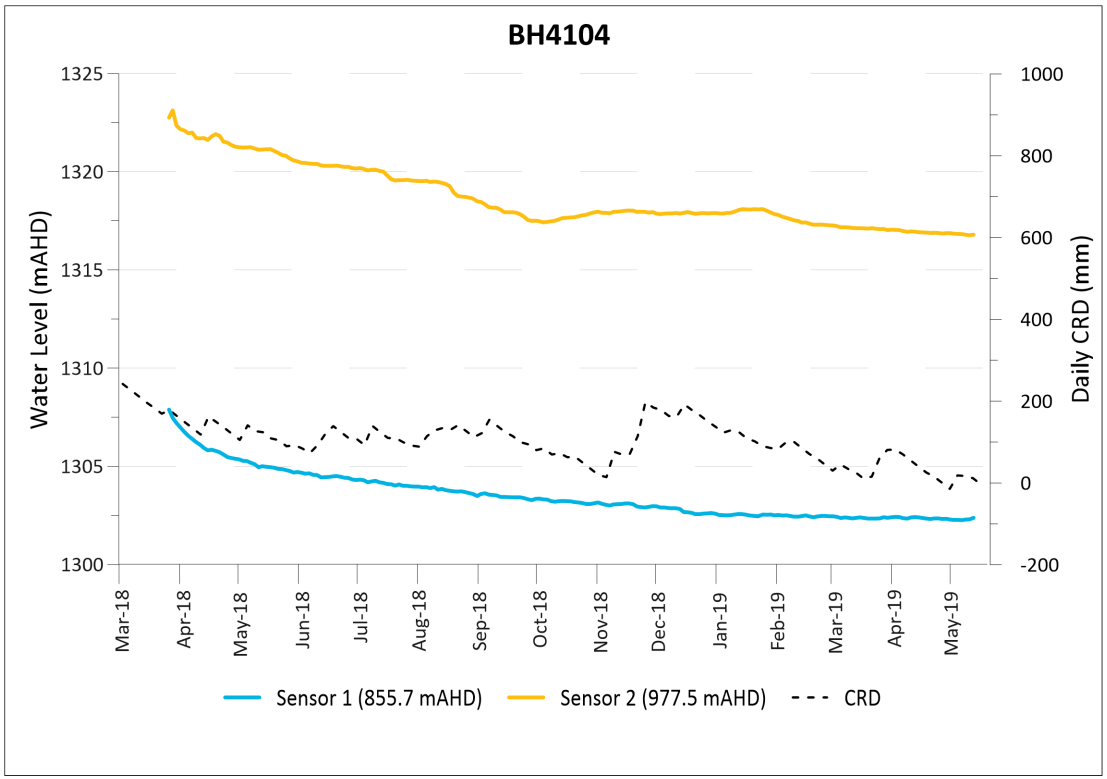

BH5107
Water Level (mAHD)
Daily CRD (mm)
1120
1100
1080
1060
1040
1000
800
600
400
200
0
-200
May-18
Jun-18
Jul-18
Aug-18
Sep-18
Oct-18
Nov-18
Dec-18
Jan-19
Feb-19
Mar-19
Apr-19
May-19
Jun-19
Sensor 1 (425 mAHD)
Sensor 3 (781.1 mAHD)
Sensor 2 (608 mAHD)
CRD

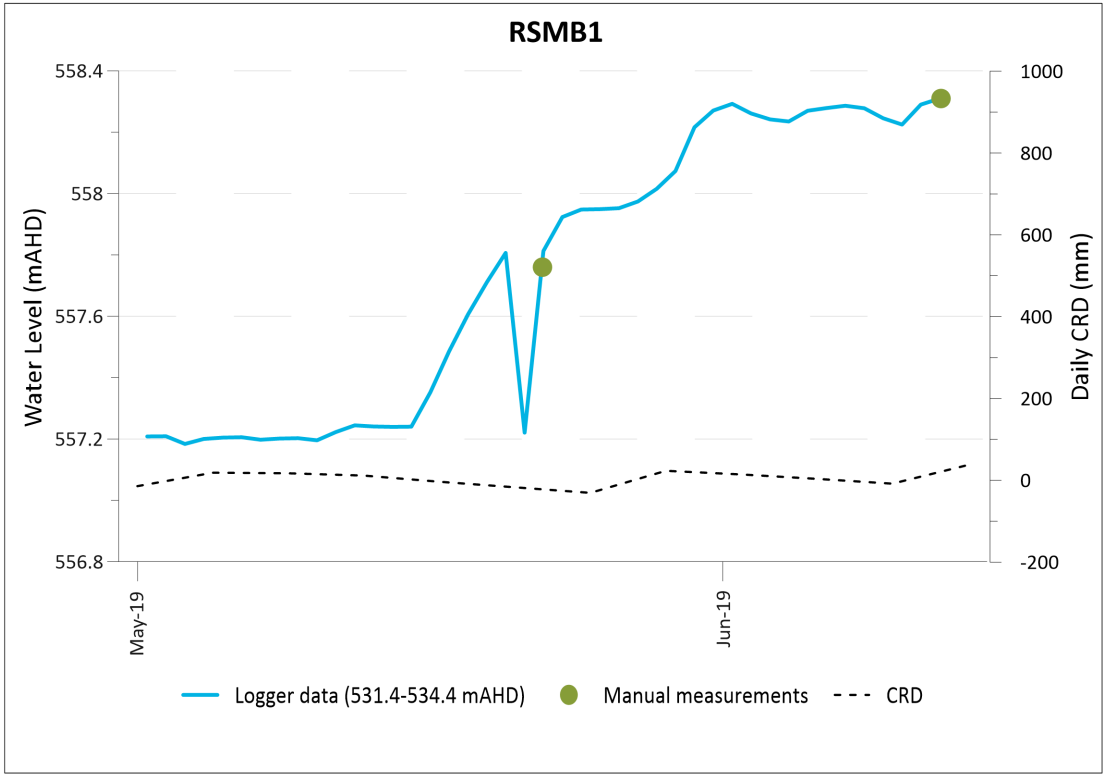

BH5108
Water Level (mAHD)
Daily CRD (mm)
1020
1000
980
960
940
920
1000
800
600
400
200
0
-200
Apr-18
May-18
Jun-18
Jul-18
Aug-18
Sep-18
Oct-18
Nov-18
Dec-18
Jan-19
Feb-19
Mar-19
Apr-19
May-19
Sensor 1 (474.8 mAHD)
Sensor 3 (760.5 mAHD)
Sensor 2 (709.8 mAHD)
CRD

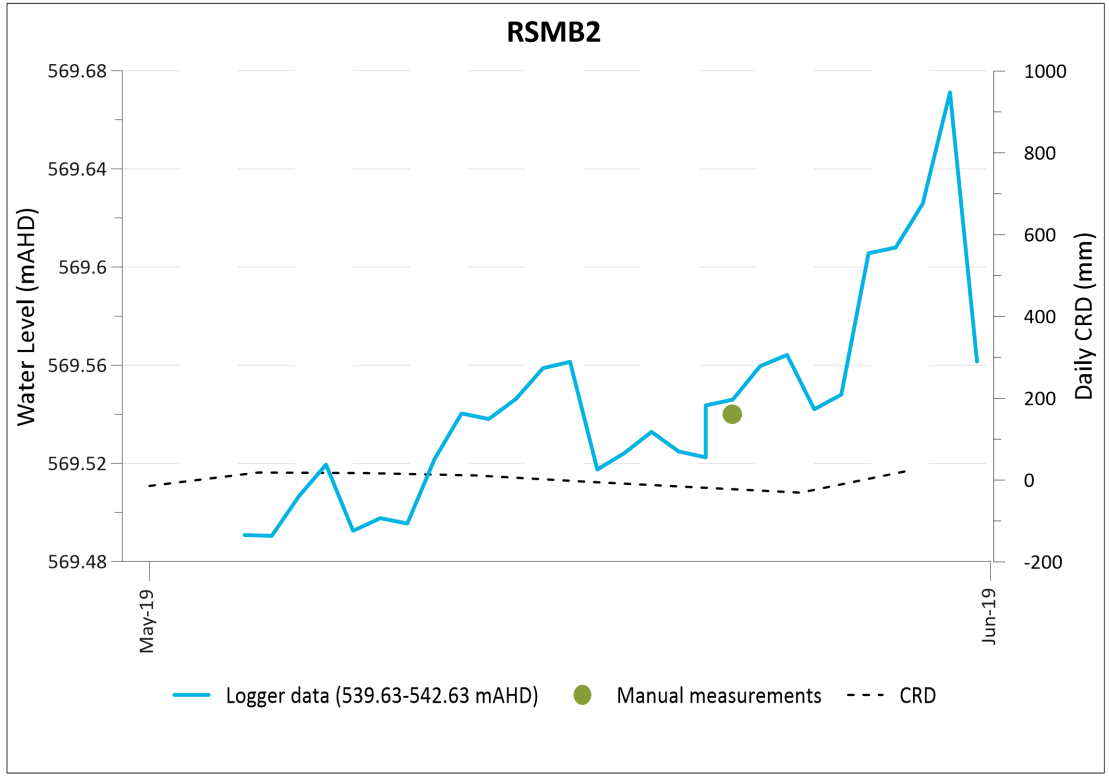

BH5110
Water Level (mAHD)
Daily CRD (mm)
1160
1140
1120
1100
1080
1060
1000
800
600
400
200
0
-200
Dec-18
Jan-19
Feb-19
Mar-19
Apr-19
Sensor 1 (508.6 mAHD)
Sensor 3 (928.8 mAHD)
Sensor 2 (760.7 mAHD)
CRD

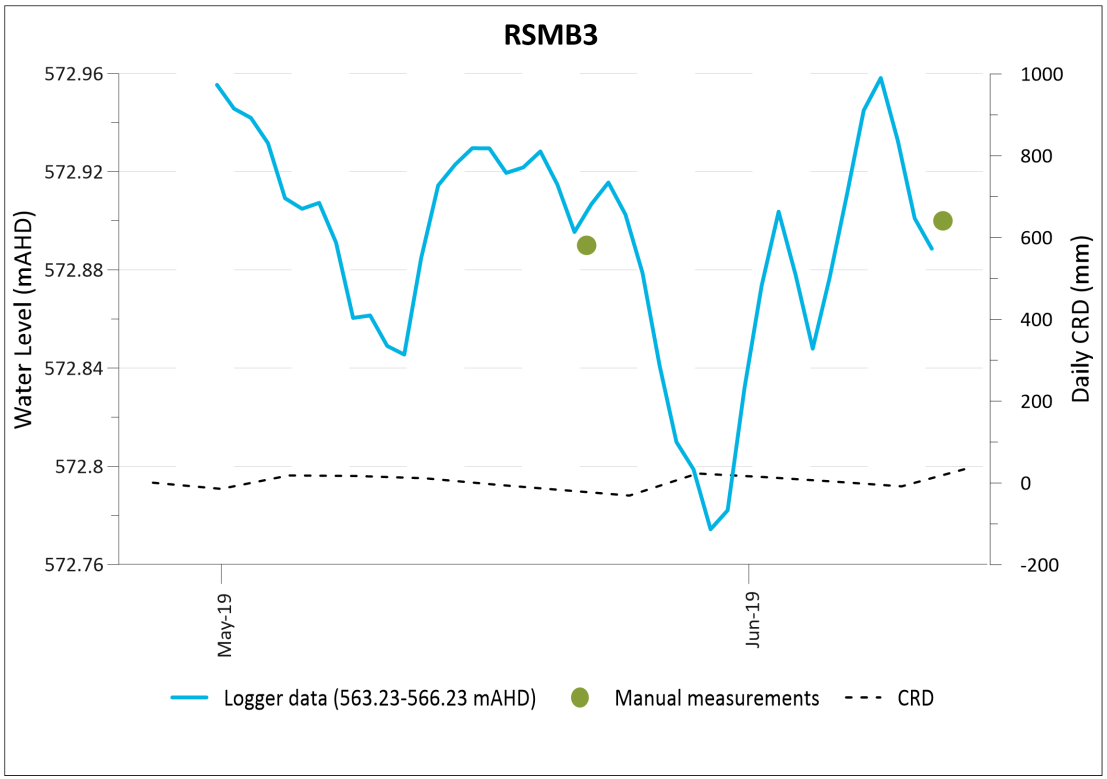

BH8106
Water Level (mAHD)
Daily CRD (mm)
852
848
844
840
836
832
1000
800
600
400
200
0
-200
Apr-18
May-18
Jun-18
Jul-18
Aug-18
Sep-18
Oct-18
Nov-18
Dec-18
Jan-19
Feb-19
Mar-19
Apr-19
May-19
Jun-19
Sensor 1 (427.3 mAHD)
Sensor 2 (665.3 mAHD)
CRD


BH5114
Water Level (mAHD)
Daily CRD (mm)
1260
1240
1220
1200
1180
1160
1000
800
600
400
200
0
-200
Jan-19
Feb-19
Mar-19
Sensor 1 (795.2 mAHD)
Sensor 3 (1078.6 mAHD)
Sensor 2 (928.1 mAHD)
CRD


BH4104
Water Level (mAHD)
Daily CRD (mm)
1325
1320
1315
1310
1305
1300
1000
800
600
400
200
0
-200
Mar-18
Apr-18
May-18
Jun-18
Jul-18
Aug-18
Sep-18
Oct-18
Nov-18
Dec-18
Jan-19
Feb-19
Mar-19
Apr-19
May-19
Sensor 1 (855.7 mAHD)
Sensor 2 (977.5 mAHD)
CRD


RSMB1
Water Level (mAHD)
Daily CRD (mm)
558.4
558
557.6
557.2
556.8
1000
800
600
400
200
0
-200
May-19
Jun-19
Logger data (531.4-534.4 mAHD)
Manual measurements
CRD


RSMB2
Water Level (mAHD)
Daily CRD (mm)
569.68
569.64
569.6
569.56
569.52
569.48
1000
800
600
400
200
0
-200
May-19
Jun-19
Logger data (539.63-542.63 mAHD)
Manual measurements
CRD


RSMB3
Water Level (mAHD)
Daily CRD (mm)
572.96
572.92
572.88
572.84
572.8
572.76
1000
800
600
400
200
0
-200
May-19
Jun-19
Logger data (563.23-566.23 mAHD)
Manual measurements
CRD

Attachment F

Sediment data

Eurofins Sample ID	Eastwest	Sample location	Gravel (2.36-4.75 mm)	Very Coarse Sand (1.18-2.36 mm)	Coarse Sand (0.6-1.18 mm)	Medium Sand (0.3-0.6 mm)	Fine Sand (0.15-0.30mm)	VeryFineSand (0.075-0.15 mm)	Coarse Silt (0.02-0.075 mm)	Fine Silt (0.002-0.020 mm)	Clay (<0.002 mm)	
			Sieve	Sieve	Sieve	Sieve	Sieve	Sieve	Hydrometer	Hydrometer	Hydrometer	
			%	%	%	%	%	%	%	%	%	
S18-Ma35519 18-Ma35520 18-Ma35521 18-Ma35522	180905-1	TALN_SQ_03D1, TALN_SQ_03D2, TALS_SQ_11A1, TALS_SQ_11A2	3.4	0	1.7	3.1	1.9	1.6	73.4	5.9	9.1	
S18-Ma35520	180905-2	TALN_SQ_03D2	0.6	0.3	1	1.5	1.3	1.4	81.3	5	7.4	
S18-Ma35521	180905-3	TALS_SQ_11A1	0	0	0.1	1.8	1.3	3.7	72.5	10.5	10.1	
S18-Ma35522	180905-4	TALS_SQ_11A2	0	0	0.4	0.8	1.7	2.9	71.3	12.6	10.3	
S18-Ma35523	180905-5	TALS_SQ_11B1	0	0	0.1	0.9	0.9	2.9	70.5	13.3	11.5	
S18-Ma35524	180905-6	TALS_SQ_11B2	0.2	0	0.6	2.1	1.3	2.1	66.7	17	9.9	
S18-Ma35525	180905-7	TALS_SQ_11C1	2.6	1.6	2.9	1.9	1.2	0.8	77.3	3	8.5	
S18-Ma35526	180905-8	TALS_SQ_11C2	0.1	0.2	1.5	2.9	3	3.8	70.5	8.5	9.7	
S18-Ma35527	180905-9	TALS_SQ_11D1	2.7	1.7	3.5	3.7	2.4	1.7	69	5.5	9.7	
S18-Ma35528	180905-10	TALS_SQ_11D2	0	0.2	0.7	2.4	2.1	2.6	76.8	4.8	10.3	
S18-Ma35529	180905-11	TALS_SQ_01A1	0	0.1	0.2	1.1	2.2	2.7	76.2	4.6	12.7	
S18-Ma35530	180905-12	TALS_SQ_01A2	0.1	0.1	0.5	1.1	5.3	7.8	63.4	9.9	11.9	
S18-Ma35531	180905-13	TALN_SQ_AS1	0.7	0.6	1.7	3.3	2.4	3.5	72.3	8.5	7	
S18-Ma35532	180905-14	TALN_SQ_AS2	0.6	0.1	0.9	1.8	1.7	3	72.2	11.9	7.8	
S18-Ma35533	180905-15	TANN_SQ_09A1	0.1	0.1	0.7	2.6	2.5	4.1	78.2	5.6	6	
S18-Ma35534	180905-16	TANN_SQ_09A2	0	0.1	1.1	2.9	3	4.9	79.5	4.3	4.2	
S18-Ma35535	180905-17	TANN_SQ_09B1	0.1	0	0.3	2.3	2.6	2	81.8	5.2	5.7	
S18-Ma35536	180905-18	TANN_SQ_09B2	0	0.1	0.8	2.1	2.1	2.7	81.1	5	6	
S18-Ma35537	180905-19	TANN_SQ_09C1	0	0.3	2.1	3.4	3	2.6	77.9	4.6	6.1	
S18-Ma35538	180905-20	TALS_SQ_09	0	0	1.5	2.4	2.5	2.3	79.3	4.9	7	Note: error in lab report
S18-Ma35539	180905-21	TANN_SQ_09D1	0	0.2	1.3	4.1	4.7	4.1	76.4	3.9	5.4	
S18-Ma35540	180905-22	TANN_SQ_09D2	0	0.4	1.9	3.5	3.7	3.2	79.4	3.7	4.1	
S18-Ma35541	180905-23	TANN_SQ_07A1	0	0.1	0.7	1.8	2.1	2.3	78.1	4.7	10.2	
S18-Ma35542	180905-24	TANN_SQ_07A2	0	0.2	1	4.4	1.9	9.7	61.6	4.9	10.2	
S18-Ma35543	180905-25	TANN_SQ_07B1	0	0	1.4	2.5	2.5	2.6	77.7	4.2	9.1	
S18-Ma35544	180905-26	TANN_SQ_07B2	0	0.3	0.9	3.3	3.1	3.5	76.9	3.9	8.1	
S18-Ma35545	180905-27	TANN_SQ_07C1	0.8	1.3	3.2	4.1	4.1	5.7	61.7	8.5	10.5	
S18-Ma35546	180905-28	TANN_SQ_07C2	0.7	1.1	2.6	4.1	4.3	5.5	66.6	7.8	7.3	
S18-Ma35547	180905-29	TANN_SQ_07_D1	8.2	3	3.1	5.9	3.8	3	45.2	11.2	16.5	
S18-Ma35548	180905-30	TANN_SQ_07D2	1.1	1.3	2.8	5.6	3.6	4.7	60.4	9.3	11.3	
S18-Ma35549	180905-31	TANS_SQ_05A1	0	0.7	2.1	3.2	2.1	2.9	79.8	4.2	5.1	
S18-Ma35550	180905-32	TANS_SQ_05A2	0.4	1.2	2.1	2.3	1.5	1.5	81.1	4.1	5.9	
S18-Ma35551	180905-33	TANS_SQ_05B1	0	0.1	1	1.7	2.6	2.5	79.4	4.1	8.5	
S18-Ma35552	180905-34	TANS_SQ_05B2	0	0.5	1.7	2	0.9	1.4	79.2	5.2	9.1	
S18-Ma35553	180905-35	TANS_SQ_05C1	0	0.6	2.3	2.8	8.6	10.7	59	7.5	8.4	
S18-Ma35554	180905-36	TANS_SQ_05C2	0.7	1.1	4.2	9.8	11.9	6.5	50	7	8.7	
S18-Ma35555	180905-37	TANS_SQ_05D1	24.6	7.7	5	3.4	1.8	1.4	43.2	4.7	8.2	
S18-Ma35556	180905-38	TANS_SQ_05D2	26.5	7.8	7.7	4	2.7	1.8	36.7	4.7	8.2	
S18-Ma35596	180905-39	TALS_SQ_07A1	0	0	0.1	0.5	0.2	0.1	76.4	10.5	12.2	
S18-Ma35597	180905-40	TALS_SQ_07A2	0	0	0.2	0.5	0.5	0.6	73.7	11	13.5	
S18-Ma35598	180905-41	TALS_SQ_07	0	0	0.2	0.5	0.3	0.2	76.4	10.7	11.8	
S18-Ma35599	180905-42	TALS_SQ_07B2	0	0	0	0.1	0.2	0.6	72	13.2	14	
S18-Ma35600	180905-43	TALS_SQ_07D1	0.7	0.2	0.4	0.6	0.5	0.9	76.8	9.7	10.2	
S18-Ma35601	180905-44	TALS_SQ_07D2	0	0.3	0.8	0.6	0.5	0.4	76.3	9.5	11.6	
S18-Ma35602	180905-45	TALS_SQ_07C1	0	0.1	0.5	0.6	0.5	2.3	75.3	11	9.6	
S18-Ma35603	180905-46	TALS_SQ_07C2	1.4	1.3	1.5	1.7	2.1	3.5	65.5	11	12	
S18-Ma35604	180905-47	TALS_SQ_03A1	0	0.1	0.3	0.6	1.3	2.2	75.1	7.9	12.4	
S18-Ma35605	180905-48	TALS_SQ_03A2	0	0.1	0.2	0.4	0.7	1.9	73	9.5	14.3	

CARDNO NSW SNOWY HYDRO 2.0 (59918111/003) **SEDIMENT SAMPLE-** **TALBINGO**	SQGV	SQGV-high	TALN_SQ_03D1 S18-Ma35519	TALN_SQ_03D2 S18-Ma35520	TALS_SQ_11A1 S18-Ma35521	TALS_SQ_11A2 S18-Ma35522	TALS_SQ_11B1 S18-Ma35523	TALS_SQ_11B2 S18-Ma35524	TALS_SQ_11C1 S18-Ma35525	TALS_SQ_11C2 S18-Ma35526	TALS_SQ_11D1 S18-Ma35527	TALS_SQ_11D2 S18-Ma35528	TALS_SQ_01A1 S18-Ma35529	TALS_SQ_01A2 S18-Ma35530	TALN_SQ_AS1 S18-Ma35531	TALN_SQ_AS2 S18-Ma35532	TALS_SQ_07A1 S18-Ma35596	TALS_SQ_07A2 S18-Ma35597	TALS_SQ_07D1 S18-Ma35600	TALS_SQ_07D2 S18-Ma35601	TALS_SQ_07C1 S18-Ma35602	TALS_SQ_07C2 S18-Ma35603	TALS_SQ_03A1 S18-Ma35604	TALS_SQ_03A2 S18-Ma35605
% Moisture			64	63	58	57	48	53	64	52	60	63	65	64	57	56	63	59	62	62	59	48	57	56
Nitrate & Nitrite (as N)			< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Particle Size Distribution by Sieve and Hydrometer			see below	see below	see below	see below	see below	see below	see below	see below	see below	see below	see below	see below	see below	see below	see below	see below	see below	see below	see below	see below	see below	see below
Phosphorus			410	460	1200	950	1000	1100	820	470	1000	810	900	1100	320	410	1100	870	780	860	670	550	560	560
Total Inorganic Carbon			0.4	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	< 0.1	0.3	0.2	0.4	0.3	0.7	0.4	0.3	0.2
Total Kjeldahl Nitrogen (as N)			1200	1000	1400	1400	790	1100	1300	1200	1600	1200	1400	1200	1100	1000	1000	1300	1300	1600	1200	1400	1200	1100
Total Nitrogen (as N)			1200	1000	1400	1400	790	1100	1300	1200	1600	1200	1400	1200	1100	1000	1000	1300	1300	1600	1200	1400	1200	1100
Total Organic Carbon			4.3	3.6	3.3	3.4	2.2	2.5	4.4	2.6	3.9	5.1	3.7	3.1	5	5.8	4.1	3.1	3.4	3	2.5	2.9	3.8	3.2
BTEX																								
Benzene			< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.2	< 0.2	< 0.1	< 0.2	< 0.2	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Ethylbenzene			< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.2	< 0.2	< 0.1	< 0.2	< 0.2	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
m&p-Xylenes			< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.4	< 0.4	< 0.2	< 0.4	< 0.4	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
o-Xylene			< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.2	< 0.2	< 0.1	< 0.2	< 0.2	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Toluene			< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.2	< 0.2	< 0.1	< 0.2	< 0.2	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Xylenes - Total			< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.6	< 0.6	< 0.3	< 0.6	< 0.6	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
4-Bromofluorobenzene (surr.)			93	104	98	91	103	78	92	101	106	93	104	95	80	77	127	63	78	79	92	87	82	87
Heavy Metals																								
Aluminium			27000	27000	49000	43000	37000	42000	37000	22000	31000	33000	35000	39000	27000	35000	31000	33000	34000	36000	25000	25000	36000	35000
Arsenic	20	70	5.1	4.5	11	7.4	7.6	8.2	7	4	9.4	7.8	9.7	8	2.7	2.2	34	14	12	10	6.7	5.2	5.6	5.9
Barium			170	170	290	260	240	260	340	200	210	190	230	290	110	110	270	280	180	210	140	140	180	170
Beryllium			< 2	< 2	2.1	2	< 2	< 2	2.3	< 2	< 2	2.1	2.5	2.3	< 2	< 2	2.1	2.4	< 2	< 2	< 2	< 2	2.3	2.2
Boron			< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	14	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Cadmium	1.5	10	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4
Chromium	80	370	17	20	**110**	**95**	**130**	**130**	55	23	46	45	46	80	12	12	50	57	61	64	42	44	35	35
Cobalt			6.6	7.3	29	27	33	34	20	9.4	26	21	18	26	< 5	< 5	20	27	24	24	16	17	13	12
Copper	65	270	25	28	51	46	46	49	39	19	49	42	42	45	12	10	47	55	50	54	40	44	28	28
Iron			26000	22000	64000	49000	54000	54000	42000	33000	42000	39000	44000	45000	14000	14000	64000	43000	48000	46000	37000	34000	26000	26000
Lead	50	220	21	22	21	19	15	18	37	19	19	25	33	25	13	12	26	32	17	21	13	13	32	33
Manganese			470	480	1000	1100	1100	1100	1100	300	1200	1200	1000	1300	530	410	2000	2800	2000	1500	850	1000	1300	1300
Mercury	0.15	1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Molybdenum			< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Nickel			12	15	100	87	120	120	48	18	41	37	40	73	9.6	8.2	51	60	52	58	33	34	29	29
Selenium			< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Silver	1	4	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Vanadium			32	32	120	100	120	110	68	43	60	62	60	85	23	26	53	56	75	71	51	56	45	44
Zinc	200	410	58	66	110	96	86	92	92	46	67	86	87	92	43	46	94	110	93	100	67	71	72	72
Organochlorine Pesticides																								
4.4'-DDD			< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
4.4'-DDE			< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
4.4'-DDT			< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
a-BHC			< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aldrin			< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aldrin and Dieldrin (Total)*			< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
b-BHC			< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Chlordanes - Total			< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
d-BHC			< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
DDT + DDE + DDD (Total)*			< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Dieldrin			< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Endosulfan I			< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Endosulfan II			< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Endosulfan sulphate			< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Endrin			< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Endrin aldehyde			< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Endrin ketone			< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
g-BHC (Lindane)			< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Heptachlor			< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Heptachlor epoxide			< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Hexachlorobenzene			< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Methoxychlor			< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Toxaphene			< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Vic EPA IWRG 621 OCP (Total)*			< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Vic EPA IWRG 621 Other OCP (Total)*			< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dibutylchlorendate (surr.)			116	100	79	101	117	129	113	75	102	60	105	112	108	122	98	101	91	105	111	76	91	109
Tetrachloro-m-xylene (surr.)			109	138	144	80	103	127	110	76	96	56	100	98	98	81	97	94	69	82	97	68	77	105

CARDNO NSW SNOWY HYDRO 2.0 (59918111/003) **SEDIMENT SAMPLE-** **TALBINGO**	SQGV	SQGV-high	TALN_SQ_03D1 S18-Ma35519	TALN_SQ_03D2 S18-Ma35520	TALS_SQ_11A1 S18-Ma35521	TALS_SQ_11A2 S18-Ma35522	TALS_SQ_11B1 S18-Ma35523	TALS_SQ_11B2 S18-Ma35524	TALS_SQ_11C1 S18-Ma35525	TALS_SQ_11C2 S18-Ma35526	TALS_SQ_11D1 S18-Ma35527	TALS_SQ_11D2 S18-Ma35528	TALS_SQ_01A1 S18-Ma35529	TALS_SQ_01A2 S18-Ma35530	TALN_SQ_AS1 S18-Ma35531	TALN_SQ_AS2 S18-Ma35532	TALS_SQ_07A1 S18-Ma35596	TALS_SQ_07A2 S18-Ma35597	TALS_SQ_07D1 S18-Ma35600	TALS_SQ_07D2 S18-Ma35601	TALS_SQ_07C1 S18-Ma35602	TALS_SQ_07C2 S18-Ma35603	TALS_SQ_03A1 S18-Ma35604	TALS_SQ_03A2 S18-Ma35605
Organophosphorus Pesticides																								
Azinphos-methyl			< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Bolstar			< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chlorfenvinphos			< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chlorpyrifos			< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chlorpyrifos-methyl			< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Coumaphos			< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Demeton-O			< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Demeton-S			< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Diazinon			< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Dichlorvos			< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Dimethoate			< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Disulfoton			< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
EPN			< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Ethion			< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Ethoprop			< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Ethyl parathion			< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Fenitrothion			< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Fensulfothion			< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Fenthion			< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Malathion			< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Merphos			< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Methyl parathion			< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Mevinphos			< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Monocrotophos			< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Naled			< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Omethoate			< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Phorate			< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Pirimiphos-methyl			< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Pyrazophos			< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Ronnel			< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Terbufos			< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Tetrachlorvinphos			< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Tokuthion			< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Trichloronate			< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Triphenylphosphate (surr.)			106	81	106	114	96	94	88	117	91	87	40	51	108	20	83	91	95	92	89	104	80	90
Polycyclic Aromatic Hydrocarbons																								
Acenaphthene			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Acenaphthylene			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Anthracene			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Benz(a)anthracene			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(a)pyrene			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(a)pyrene TEQ (lower bound) *			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(a)pyrene TEQ (medium bound) *			0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Benzo(a)pyrene TEQ (upper bound) *			1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
Benzo(b&j)fluoranthene			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(g.h.i)perylene			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(k)fluoranthene			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Chrysene			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dibenz(a.h)anthracene			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Fluoranthene			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Fluorene			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Indeno(1.2.3-cd)pyrene			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Naphthalene			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Phenanthrene			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Pyrene			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Total PAH*			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
p-Terphenyl-d14 (surr.)			120	99	115	119	109	127	87	132	92	87	63	91	59	108	70	65	78	82	91	99	84	86
2-Fluorobiphenyl (surr.)			97	82	59	94	115	66	104	124	95	115	83	52	66	107	58	103	100	67	88	93	73	81
Total Recoverable Hydrocarbons - 1999 NEPM Fractions	280	550																						
TRH C10-36 (Total)			< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	131	63	148	62	54	< 50	< 50	< 50	< 50
TRH C10-C14			< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	40	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
TRH C15-C28			< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	91	63	94	62	54	< 50	< 50	< 50	< 50
TRH C29-C36			< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	54	< 50	< 50	< 50	< 50	< 50	< 50
TRH C6-C9			< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 40	< 40	< 20	< 40	< 40	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	280	550																						
Naphthalene			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
TRH >C10-C16			< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50
TRH >C10-C16 less Naphthalene (F2)			< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50
TRH >C16-C34			< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	100	< 100	< 100	< 100	< 100	< 100	< 100
TRH >C34-C40			< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100
TRH C6-C10			< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 40	< 40	< 20	< 40	< 40	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
TRH C6-C10 less BTEX (F1)			< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 40	< 40	< 20	< 40	< 40	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20

CARDNO NSW
SNOWY HYDRO 2.0 (59918111/003)
SEDIMENT SAMPLE-
TALBINGO

	SQGV	SQGV-high	TALN_SQ_03D1 S18-Ma35519	TALN_SQ_03D2 S18-Ma35520	TALS_SQ_11A1 S18-Ma35521	TALS_SQ_11A2 S18-Ma35522	TALS_SQ_11B1 S18-Ma35523	TALS_SQ_11B2 S18-Ma35524	TALS_SQ_11C1 S18-Ma35525	TALS_SQ_11C2 S18-Ma35526	TALS_SQ_11D1 S18-Ma35527	TALS_SQ_11D2 S18-Ma35528	TALS_SQ_01A1 S18-Ma35529	TALS_SQ_01A2 S18-Ma35530	TALN_SQ_AS1 S18-Ma35531	TALN_SQ_AS2 S18-Ma35532	TALS_SQ_07A1 S18-Ma35596	TALS_SQ_07A2 S18-Ma35597	TALS_SQ_07D1 S18-Ma35600	TALS_SQ_07D2 S18-Ma35601	TALS_SQ_07C1 S18-Ma35602	TALS_SQ_07C2 S18-Ma35603	TALS_SQ_03A1 S18-Ma35604	TALS_SQ_03A2 S18-Ma35605
Volatile Organics																								
1.1.1.2-Tetrachloroethane			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1.1.1-Trichloroethane			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1.1.2.2-Tetrachloroethane			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1.1.2-Trichloroethane			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1.1-Dichloroethane			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1.1-Dichloroethene			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1.2.3-Trichloropropane			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1.2.4-Trimethylbenzene			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1.2-Dibromoethane			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1.2-Dichlorobenzene			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1.2-Dichloroethane			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1.2-Dichloropropane			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1.3.5-Trimethylbenzene			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1.3-Dichlorobenzene			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1.3-Dichloropropane			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1.4-Dichlorobenzene			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
2-Butanone (MEK)			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
2-Propanone (Acetone)			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
4-Chlorotoluene			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
4-Methyl-2-pentanone (MIBK)			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Allyl chloride			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Benzene			< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.2	< 0.2	< 0.1	< 0.2	< 0.2	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Bromobenzene			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Bromochloromethane			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Bromodichloromethane			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Bromoform			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Bromomethane			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Carbon disulfide			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Carbon Tetrachloride			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Chlorobenzene			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Chloroethane			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Chloroform			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Chloromethane			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
cis-1.2-Dichloroethene			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
cis-1.3-Dichloropropene			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dibromochloromethane			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dibromomethane			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichlorodifluoromethane			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Ethylbenzene			< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.2	< 0.2	< 0.1	< 0.2	< 0.2	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Iodomethane			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Isopropyl benzene (Cumene)			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
m&p-Xylenes			< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.4	< 0.4	< 0.2	< 0.4	< 0.4	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Methylene Chloride			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
o-Xylene			< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.2	< 0.2	< 0.1	< 0.2	< 0.2	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Styrene			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Tetrachloroethene			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Toluene			< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.2	< 0.2	< 0.1	< 0.2	< 0.2	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Total MAH*			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
trans-1.2-Dichloroethene			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
trans-1.3-Dichloropropene			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Trichloroethene			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Trichlorofluoromethane			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Vic EPA IWRG 621 CHC (Total)*			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Vic EPA IWRG 621 Other CHC (Total)*			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Vinyl chloride			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Xylenes - Total			< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.6	< 0.6	< 0.3	< 0.6	< 0.6	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Toluene-d8 (surr.)			61	69	70	59	69	59	60	65	73	64	67	63	50	67	111	56	77	78	92	77	87	78
4-Bromofluorobenzene (surr.)			93	104	98	91	103	78	92	101	106	93	104	95	80	77	127	63	78	79	92	87	82	87
Gravel (2.36-4.75 mm)			-	0.6	0	0	0	0.2	2.6	0.1	2.7	0	0	0.1	0.7	0.6	0	0	0.7	0	0	1.4	0	0
Very Coarse Sand (1.18-2.36 mm)			-	0.3	0	0	0	0	1.6	0.2	1.7	0.2	0.1	0.1	0.6	0.1	0	0	0.2	0.3	0.1	1.3	0.1	0.1
Coarse Sand (0.6-1.18 mm)			-	1	0.1	0.4	0.1	0.6	2.9	1.5	3.5	0.7	0.2	0.5	1.7	0.9	0.1	0.2	0.4	0.8	0.5	1.5	0.3	0.2
Medium Sand (0.3-0.6 mm)			-	1.5	1.8	0.8	0.9	2.1	1.9	2.9	3.7	2.4	1.1	1.1	3.3	1.8	0.5	0.5	0.6	0.6	0.6	1.7	0.6	0.4
Fine Sand (0.15-0.30mm)			-	1.3	1.3	1.7	0.9	1.3	1.2	3	2.4	2.1	2.2	5.3	2.4	1.7	0.2	0.5	0.5	0.5	0.5	2.1	1.3	0.7
VeryFineSand (0.075-0.15 mm)			-	1.4	3.7	2.9	2.9	2.1	0.8	3.8	1.7	2.6	2.7	7.8	3.5	3	0.1	0.6	0.9	0.4	2.3	3.5	2.2	1.9
Coarse Silt (0.02-0.075 mm)			-	81.3	72.5	71.3	70.5	66.7	77.3	70.5	69	76.8	76.2	63.4	72.3	72.2	76.4	73.7	76.8	76.3	75.3	65.5	75.1	73
Fine Silt (0.002-0.020 mm)			-	5	10.5	12.6	13.3	17	3	8.5	5.5	4.8	4.6	9.9	8.5	11.9	10.5	11	9.7	9.5	11	11	7.9	9.5
Clay (<0.002 mm)			-	7.4	10.1	10.3	11.5	9.9	8.5	9.7	9.7	10.3	12.7	11.9	7	7.8	12.2	13.5	10.2	11.6	9.6	12	12.4	14.3
Sum			0	99.8	100	100	100.1	99.9	99.8	100.2	99.9	99.9	99.8	100.1	100	100	100	100	100	100	99.9	100	99.9	100.1
%<75 um			0	95.1	96.8	97.1	98.2	95.7	89.6	92.5	85.9	94.5	96.2	93	91.3	94.9	99.2	98.8	97.6	97.8	98.2	92	97.6	98.7

CARDNO NSW SNOWY HYDRO 2.0 (59918111/003) **SEDIMENT SAMPLE-** **TALBINGO Reservoir**	SQGV	SQGV-high	TALN_SQ_03D1 S18-Ma35519	TALN_SQ_03D2 S18-Ma35520	TALS_SQ_11A1 S18-Ma35521	TALS_SQ_11A2 S18-Ma35522	TALS_SQ_11B1 S18-Ma35523	TALS_SQ_11B2 S18-Ma35524	TALS_SQ_11C1 S18-Ma35525	TALS_SQ_11C2 S18-Ma35526	TALS_SQ_11D1 S18-Ma35527	TALS_SQ_11D2 S18-Ma35528	TALS_SQ_01A1 S18-Ma35529	TALS_SQ_01A2 S18-Ma35530	TALN_SQ_AS1 S18-Ma35531	TALN_SQ_AS2 S18-Ma35532	TALS_SQ_07A1 S18-Ma35596	TALS_SQ_07A2 S18-Ma35597	TALS_SQ_07D1 S18-Ma35600	TALS_SQ_07D2 S18-Ma35601	TALS_SQ_07C1 S18-Ma35602	TALS_SQ_07C2 S18-Ma35603	TALS_SQ_03A1 S18-Ma35604	TALS_SQ_03A2 S18-Ma35605
% Moisture			64	63	58	57	48	53	64	52	60	63	65	64	57	56	63	59	62	62	59	48	57	56
Nitrate & Nitrite (as N)			< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Particle Size Distribution by Sieve and Hydrometer			see below	see below	see below	see below	see below	see below	see below	see below	see below	see below	see below	see below	see below	see below	see below	see below	see below	see below	see below	see below	see below	see below
Phosphorus			410	460	1200	950	1000	1100	820	470	1000	810	900	1100	320	410	1100	870	780	860	670	550	560	560
Total Inorganic Carbon			0.4	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	< 0.1	0.3	0.2	0.4	0.3	0.7	0.4	0.3	0.2
Total Kjeldahl Nitrogen (as N)			1200	1000	1400	1400	790	1100	1300	1200	1600	1200	1400	1200	1100	1000	1000	1300	1300	1600	1200	1400	1200	1100
Total Nitrogen (as N)			1200	1000	1400	1400	790	1100	1300	1200	1600	1200	1400	1200	1100	1000	1000	1300	1300	1600	1200	1400	1200	1100
Total Organic Carbon			4.3	3.6	3.3	3.4	2.2	2.5	4.4	2.6	3.9	5.1	3.7	3.1	5	5.8	4.1	3.1	3.4	3	2.5	2.9	3.8	3.2
BTEX																								
Benzene			< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.2	< 0.2	< 0.1	< 0.2	< 0.2	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Ethylbenzene			< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.2	< 0.2	< 0.1	< 0.2	< 0.2	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
m&p-Xylenes			< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.4	< 0.4	< 0.2	< 0.4	< 0.4	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
o-Xylene			< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.2	< 0.2	< 0.1	< 0.2	< 0.2	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Toluene			< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.2	< 0.2	< 0.1	< 0.2	< 0.2	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Xylenes - Total			< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.6	< 0.6	< 0.3	< 0.6	< 0.6	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
4-Bromofluorobenzene (surr.)			93	104	98	91	103	78	92	101	106	93	104	95	80	77	127	63	78	79	92	87	82	87
Heavy Metals																								
Aluminium			27000	27000	49000	43000	37000	42000	37000	22000	31000	33000	35000	39000	27000	35000	31000	33000	34000	36000	25000	25000	36000	35000
Arsenic	20	70	5.1	4.5	11	7.4	7.6	8.2	7	4	9.4	7.8	9.7	8	2.7	2.2	34	14	12	10	6.7	5.2	5.6	5.9
Barium			170	170	290	260	240	260	340	200	210	190	230	290	110	110	270	280	180	210	140	140	180	170
Beryllium			< 2	< 2	2.1	2	< 2	< 2	2.3	< 2	< 2	2.1	2.5	2.3	< 2	< 2	2.1	2.4	< 2	< 2	< 2	< 2	2.3	2.2
Boron			< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	14	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Cadmium	1.5	10	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4
Chromium	80	370	17	20	110	95	130	130	55	23	46	45	46	80	12	12	50	57	61	64	42	44	35	35
Cobalt			6.6	7.3	29	27	33	34	20	9.4	26	21	18	26	< 5	< 5	20	27	24	24	16	17	13	12
Copper	65	270	25	28	51	46	46	49	39	19	49	42	42	45	12	10	47	55	50	54	40	44	28	28
Iron			26000	22000	64000	49000	54000	54000	42000	33000	42000	39000	44000	45000	14000	14000	64000	43000	48000	46000	37000	34000	26000	26000
Lead	50	220	21	22	21	19	15	18	37	19	19	25	33	25	13	12	26	32	17	21	13	13	32	33
Manganese			470	480	1000	1100	1100	1100	1100	300	1200	1200	1000	1300	530	410	2000	2800	2000	1500	850	1000	1300	1300
Mercury	0.15	1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Molybdenum			< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Nickel			12	15	100	87	120	120	48	18	41	37	40	73	9.6	8.2	51	60	52	58	33	34	29	29
Selenium			< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Silver	1	4	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Vanadium			32	32	120	100	120	110	68	43	60	62	60	85	23	26	53	56	75	71	51	56	45	44
Zinc	200	410	58	66	110	96	86	92	92	46	67	86	87	92	43	46	94	110	93	100	67	71	72	72
Organochlorine Pesticides																								
4.4'-DDD			< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
4.4'-DDE			< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
4.4'-DDT			< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
a-BHC			< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aldrin			< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aldrin and Dieldrin (Total)*			< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
b-BHC			< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Chlordanes - Total			< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
d-BHC			< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
DDT + DDE + DDD (Total)*			< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Dieldrin			< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Endosulfan I			< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Endosulfan II			< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Endosulfan sulphate			< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Endrin			< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Endrin aldehyde			< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Endrin ketone			< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
g-BHC (Lindane)			< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Heptachlor			< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Heptachlor epoxide			< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Hexachlorobenzene			< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Methoxychlor			< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Toxaphene			< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Vic EPA IWRG 621 OCP (Total)*			< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Vic EPA IWRG 621 Other OCP (Total)*			< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dibutylchlorendate (surr.)			116	100	79	101	117	129	113	75	102	60	105	112	108	122	98	101	91	105	111	76	91	109
Tetrachloro-m-xylene (surr.)			109	138	144	80	103	127	110	76	96	56	100	98	98	81	97	94	69	82	97	68	77	105

CARDNO NSW SNOWY HYDRO 2.0 (59918111/003) **SEDIMENT SAMPLE-** **TALBINGO Reservoir**	SQGV	SQGV-high	TALN_SQ_03D1 S18-Ma35519	TALN_SQ_03D2 S18-Ma35520	TALS_SQ_11A1 S18-Ma35521	TALS_SQ_11A2 S18-Ma35522	TALS_SQ_11B1 S18-Ma35523	TALS_SQ_11B2 S18-Ma35524	TALS_SQ_11C1 S18-Ma35525	TALS_SQ_11C2 S18-Ma35526	TALS_SQ_11D1 S18-Ma35527	TALS_SQ_11D2 S18-Ma35528	TALS_SQ_01A1 S18-Ma35529	TALS_SQ_01A2 S18-Ma35530	TALN_SQ_AS1 S18-Ma35531	TALN_SQ_AS2 S18-Ma35532	TALS_SQ_07A1 S18-Ma35596	TALS_SQ_07A2 S18-Ma35597	TALS_SQ_07D1 S18-Ma35600	TALS_SQ_07D2 S18-Ma35601	TALS_SQ_07C1 S18-Ma35602	TALS_SQ_07C2 S18-Ma35603	TALS_SQ_03A1 S18-Ma35604	TALS_SQ_03A2 S18-Ma35605
Organophosphorus Pesticides																								
Azinphos-methyl			< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Bolstar			< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chlorfenvinphos			< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chlorpyrifos			< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chlorpyrifos-methyl			< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Coumaphos			< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Demeton-O			< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Demeton-S			< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Diazinon			< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Dichlorvos			< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Dimethoate			< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Disulfoton			< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
EPN			< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Ethion			< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Ethoprop			< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Ethyl parathion			< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Fenitrothion			< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Fensulfothion			< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Fenthion			< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Malathion			< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Merphos			< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Methyl parathion			< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Mevinphos			< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Monocrotophos			< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Naled			< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Omethoate			< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Phorate			< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Pirimiphos-methyl			< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Pyrazophos			< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Ronnel			< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Terbufos			< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Tetrachlorvinphos			< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Tokuthion			< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Trichloronate			< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Triphenylphosphate (surr.)			106	81	106	114	96	94	88	117	91	87	40	51	108	20	83	91	95	92	89	104	80	90
Polycyclic Aromatic Hydrocarbons																								
Acenaphthene			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Acenaphthylene			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Anthracene			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Benz(a)anthracene			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(a)pyrene			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(a)pyrene TEQ (lower bound) *			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(a)pyrene TEQ (medium bound) *			0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Benzo(a)pyrene TEQ (upper bound) *			1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
Benzo(b&j)fluoranthene			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(g.h.i)perylene			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(k)fluoranthene			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Chrysene			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dibenz(a.h)anthracene			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Fluoranthene			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Fluorene			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Indeno(1.2.3-cd)pyrene			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Naphthalene			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Phenanthrene			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Pyrene			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Total PAH*			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
p-Terphenyl-d14 (surr.)			120	99	115	119	109	127	87	132	92	87	63	91	59	108	70	65	78	82	91	99	84	86
2-Fluorobiphenyl (surr.)			97	82	59	94	115	66	104	124	95	115	83	52	66	107	58	103	100	67	88	93	73	81
Total Recoverable Hydrocarbons - 1999	280	550																						
TRH C10-36 (Total)			< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	131	63	148	62	54	< 50	< 50	< 50	< 50
TRH C10-C14			< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	40	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
TRH C15-C28			< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	91	63	94	62	54	< 50	< 50	< 50	< 50
TRH C29-C36			< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	54	< 50	< 50	< 50	< 50	< 50	< 50
TRH C6-C9			< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 40	< 40	< 20	< 40	< 40	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20

CARDNO NSW SNOWY HYDRO 2.0 (59918111/003) **SEDIMENT SAMPLE-** **TALBINGO Reservoir**	SQGV	SQGV-high	TALN_SQ_03D1 S18-Ma35519	TALN_SQ_03D2 S18-Ma35520	TALS_SQ_11A1 S18-Ma35521	TALS_SQ_11A2 S18-Ma35522	TALS_SQ_11B1 S18-Ma35523	TALS_SQ_11B2 S18-Ma35524	TALS_SQ_11C1 S18-Ma35525	TALS_SQ_11C2 S18-Ma35526	TALS_SQ_11D1 S18-Ma35527	TALS_SQ_11D2 S18-Ma35528	TALS_SQ_01A1 S18-Ma35529	TALS_SQ_01A2 S18-Ma35530	TALN_SQ_AS1 S18-Ma35531	TALN_SQ_AS2 S18-Ma35532	TALS_SQ_07A1 S18-Ma35596	TALS_SQ_07A2 S18-Ma35597	TALS_SQ_07D1 S18-Ma35600	TALS_SQ_07D2 S18-Ma35601	TALS_SQ_07C1 S18-Ma35602	TALS_SQ_07C2 S18-Ma35603	TALS_SQ_03A1 S18-Ma35604	TALS_SQ_03A2 S18-Ma35605
Total Recoverable Hydrocarbons - 2013	280	550																						
Naphthalene			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
TRH >C10-C16			< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50
TRH >C10-C16 less Naphthalene (F2)			< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50
TRH >C16-C34			< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	100	< 100	< 100	< 100	< 100	< 100	< 100
TRH >C34-C40			< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100
TRH C6-C10			< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 40	< 40	< 20	< 40	< 40	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
TRH C6-C10 less BTEX (F1)			< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 40	< 40	< 20	< 40	< 40	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Volatile Organics																								
1.1.1.2-Tetrachloroethane			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1.1.1-Trichloroethane			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1.1.2.2-Tetrachloroethane			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1.1.2-Trichloroethane			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1.1-Dichloroethane			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1.1-Dichloroethene			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1.2.3-Trichloropropane			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1.2.4-Trimethylbenzene			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1.2-Dibromoethane			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1.2-Dichlorobenzene			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1.2-Dichloroethane			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1.2-Dichloropropane			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1.3.5-Trimethylbenzene			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1.3-Dichlorobenzene			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1.3-Dichloropropane			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1.4-Dichlorobenzene			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
2-Butanone (MEK)			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
2-Propanone (Acetone)			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
4-Chlorotoluene			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
4-Methyl-2-pentanone (MIBK)			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Allyl chloride			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Benzene			< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.2	< 0.2	< 0.1	< 0.2	< 0.2	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Bromobenzene			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Bromochloromethane			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Bromodichloromethane			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Bromoform			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Bromomethane			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Carbon disulfide			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Carbon Tetrachloride			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Chlorobenzene			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Chloroethane			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Chloroform			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Chloromethane			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
cis-1.2-Dichloroethene			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
cis-1.3-Dichloropropene			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dibromochloromethane			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dibromomethane			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichlorodifluoromethane			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Ethylbenzene			< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.2	< 0.2	< 0.1	< 0.2	< 0.2	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Iodomethane			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Isopropyl benzene (Cumene)			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
m&p-Xylenes			< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.4	< 0.4	< 0.2	< 0.4	< 0.4	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Methylene Chloride			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
o-Xylene			< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.2	< 0.2	< 0.1	< 0.2	< 0.2	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Styrene			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Tetrachloroethene			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Toluene			< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.2	< 0.2	< 0.1	< 0.2	< 0.2	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Total MAH*			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
trans-1.2-Dichloroethene			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
trans-1.3-Dichloropropene			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Trichloroethene			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Trichlorofluoromethane			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Vic EPA IWRG 621 CHC (Total)*			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Vic EPA IWRG 621 Other CHC (Total)*			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Vinyl chloride			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Xylenes - Total			< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.6	< 0.6	< 0.3	< 0.6	< 0.6	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Toluene-d8 (surr.)			61	69	70	59	69	59	60	65	73	64	67	63	50	67	111	56	77	78	92	77	87	78
4-Bromofluorobenzene (surr.)			93	104	98	91	103	78	92	101	106	93	104	95	80	77	127	63	78	79	92	87	82	87

CARDNO NSW SNOWY HYDRO 2.0 (59918111/003) **SEDIMENT SAMPLE-** **TALBINGO Reservoir**	SQGV	SQGV-high	TALN_SQ_03D1 S18-Ma35519	TALN_SQ_03D2 S18-Ma35520	TALS_SQ_11A1 S18-Ma35521	TALS_SQ_11A2 S18-Ma35522	TALS_SQ_11B1 S18-Ma35523	TALS_SQ_11B2 S18-Ma35524	TALS_SQ_11C1 S18-Ma35525	TALS_SQ_11C2 S18-Ma35526	TALS_SQ_11D1 S18-Ma35527	TALS_SQ_11D2 S18-Ma35528	TALS_SQ_01A1 S18-Ma35529	TALS_SQ_01A2 S18-Ma35530	TALN_SQ_AS1 S18-Ma35531	TALN_SQ_AS2 S18-Ma35532	TALS_SQ_07A1 S18-Ma35596	TALS_SQ_07A2 S18-Ma35597	TALS_SQ_07D1 S18-Ma35600	TALS_SQ_07D2 S18-Ma35601	TALS_SQ_07C1 S18-Ma35602	TALS_SQ_07C2 S18-Ma35603	TALS_SQ_03A1 S18-Ma35604	TALS_SQ_03A2 S18-Ma35605
Gravel (2.36-4.75 mm)			-	0.6	0	0	0	0.2	2.6	0.1	2.7	0	0	0.1	0.7	0.6	0	0	0.7	0	0	1.4	0	0
Very Coarse Sand (1.18-2.36 mm)			-	0.3	0	0	0	0	1.6	0.2	1.7	0.2	0.1	0.1	0.6	0.1	0	0	0.2	0.3	0.1	1.3	0.1	0.1
Coarse Sand (0.6-1.18 mm)			-	1	0.1	0.4	0.1	0.6	2.9	1.5	3.5	0.7	0.2	0.5	1.7	0.9	0.1	0.2	0.4	0.8	0.5	1.5	0.3	0.2
Medium Sand (0.3-0.6 mm)			-	1.5	1.8	0.8	0.9	2.1	1.9	2.9	3.7	2.4	1.1	1.1	3.3	1.8	0.5	0.5	0.6	0.6	0.6	1.7	0.6	0.4
Fine Sand (0.15-0.30mm)			-	1.3	1.3	1.7	0.9	1.3	1.2	3	2.4	2.1	2.2	5.3	2.4	1.7	0.2	0.5	0.5	0.5	0.5	2.1	1.3	0.7
VeryFineSand (0.075-0.15 mm)			-	1.4	3.7	2.9	2.9	2.1	0.8	3.8	1.7	2.6	2.7	7.8	3.5	3	0.1	0.6	0.9	0.4	2.3	3.5	2.2	1.9
Coarse Silt (0.02-0.075 mm)			-	81.3	72.5	71.3	70.5	66.7	77.3	70.5	69	76.8	76.2	63.4	72.3	72.2	76.4	73.7	76.8	76.3	75.3	65.5	75.1	73
Fine Silt (0.002-0.020 mm)			-	5	10.5	12.6	13.3	17	3	8.5	5.5	4.8	4.6	9.9	8.5	11.9	10.5	11	9.7	9.5	11	11	7.9	9.5
Clay (<0.002 mm)			-	7.4	10.1	10.3	11.5	9.9	8.5	9.7	9.7	10.3	12.7	11.9	7	7.8	12.2	13.5	10.2	11.6	9.6	12	12.4	14.3
Sum			0	99.8	100	100	100.1	99.9	99.8	100.2	99.9	99.9	99.8	100.1	100	100	100	100	100	100	99.9	100	99.9	100.1
%<75 um			0	95.1	96.8	97.1	98.2	95.7	89.6	92.5	85.9	94.5	96.2	93	91.3	94.9	99.2	98.8	97.6	97.8	98.2	92	97.6	98.7

CARDNO NSW SNOWY HYDRO 2.0 (59918111/003) **SEDIMENT SAMPLE-** **TANTANGARA RESERVOIR**	SQGV	SQGV-high	TANN_SQ_09A1 S18-Ma35533	TANN_SQ_09A2 S18-Ma35534	TANN_SQ_09B1 S18-Ma35535	TANN_SQ_09B2 S18-Ma35536	TANN_SQ_09C1 S18-Ma35537	TANN_SQ_09C2 S18-Ma35538	TANN_SQ_09D1 S18-Ma35539	TANN_SQ_09D2 S18-Ma35540	TANN_SQ_07A1 S18-Ma35541	TANN_SQ_07A2 S18-Ma35542	TANN_SQ_07B1 S18-Ma35543	TANN_SQ_07B2 S18-Ma35544	TANN_SQ_07C1 S18-Ma35545	TANN_SQ_07C2 S18-Ma35546	TANN_SQ_07D1 S18-Ma35547	TANN_SQ_07D2 S18-Ma35548	TANS_SQ_05A1 S18-Ma35549	TANS_SQ_05A2 S18-Ma35550	TANS_SQ_05B1 S18-Ma35551	TANS_SQ_05B2 S18-Ma35552	TANS_SQ_05C1 S18-Ma35553	TANS_SQ_05C2 S18-Ma35554	TANS_SQ_05D1 S18-Ma35555	TANS_SQ_05D2 S18-Ma35556
% Moisture			67	64	69	72	66	67	69	69	68	49	67	70	45	53		51	73	75	69	67	49	43		46
Nitrate & Nitrite (as N)			< 5	< 5	< 5	< 10	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5		< 5	< 5	< 5	< 5	< 5	< 5	< 5		< 5
Particle Size Distribution by Sieve and Hydrometer			see below	see below	see below	see below	see below	see below	see below	see below	see below	see below	see below	see below	see below	see below	see below	see below	see below	see below	see below	see below	see below	see below	see below	see below
Phosphorus			970	980	910	970	710	930	760	980	1400	670	1200	1100	620	740		610	1100	1200	1200	1300	680	550		540
Total Inorganic Carbon			< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.4	0.3	0.4	0.6	0.3	0.5		0.4	0.5	0.5	0.3	0.4	0.2	0.2		0.3
Total Kjeldahl Nitrogen (as N)			2500	2400	1800	1600	2100	2000	1900	2200	2000	1600	2500	1800	800	2100		1400	1900	1700	2000	1700	1100	1200		890
Total Nitrogen (as N)			2500	2400	1800	1600	2100	2000	1900	2200	2000	1600	2500	1800	800	2100		1400	1900	1700	2000	1700	1100	1200		890
Total Organic Carbon			8.2	8.6	7.4	7.5	7.3	7.3	7.5	8	4.8	1.9	3.2	4.6	1.8	3.1		2.4	5.6	5.2	4.5	4.6	2.1	1.7		1.7
BTEX																										
Benzene			< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1		< 0.1
Ethylbenzene			< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1		< 0.1
m&p-Xylenes			< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2		< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2		< 0.2
o-Xylene			< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1		< 0.1
Toluene			< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1		< 0.1
Xylenes - Total			< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3		< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3		< 0.3
4-Bromofluorobenzene (surr.)			78	72	62	79	78	73	79	78	77	83	77	73	86	75		72	76	75	68	75	80	80		82
Heavy Metals																										
Aluminium			28000	25000	25000	28000	19000	29000	21000	31000	35000	23000	36000	35000	21000	22000		24000	31000	36000	32000	32000	24000	19000		23000
Arsenic	20	70	4.5	4.7	3.5	3.8	< 2	3.2	2.2	3.4	8.2	5	6.9	7.3	7.6	9.1		7.2	5.5	6.1	7.3	7.2	6.2	4.9		5.5
Barium			180	170	150	160	110	190	140	190	280	160	240	250	130	190		100	230	260	250	250	190	180		170
Beryllium			< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	2.1	< 2	< 2	< 2	< 2	< 2		< 2	< 2	2.2	< 2	< 2	< 2	< 2		< 2
Boron			< 10	< 10	< 10	< 10	< 10	< 10	< 10	13	< 10	< 10	< 10	< 10	< 10	< 10		< 10	< 10	16	< 10	< 10	< 10	< 10		< 10
Cadmium	1.5	10	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4		< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4		< 0.4
Chromium	80	370	31	30	26	29	17	27	20	30	34	27	37	37	23	23		26	29	33	33	32	24	19		24
Cobalt			12	11	8.7	9.3	5.8	9.3	6.1	9.7	29	16	21	21	7	9.5		8.5	16	21	25	24	14	11		14
Copper	65	270	27	28	24	26	14	22	17	24	29	20	27	28	15	15		19	23	25	28	27	16	13		16
Iron			23000	21000	20000	22000	13000	21000	13000	20000	48000	27000	40000	41000	21000	27000		26000	29000	33000	41000	43000	29000	24000		27000
Lead	50	220	21	20	20	22	14	21	16	21	31	20	29	30	17	17		16	25	28	28	27	19	17		19
Manganese			510	440	290	280	240	370	280	370	1100	610	720	830	340	800		490	650	780	970	1000	730	850		1000
Mercury	0.15	1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1		< 0.1	< 0.1	0.1	< 0.1	< 0.1	< 0.1	< 0.1		< 0.1
Molybdenum			< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5		< 5	< 5	< 5	< 5	< 5	< 5	< 5		< 5
Nickel			19	18	15	17	9.5	15	11	17	20	15	20	19	12	12		12	17	20	19	19	14	12		15
Selenium			< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2		< 2	< 2	< 2	< 2	< 2	< 2	< 2		< 2
Silver	1	4	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2		< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2		< 0.2
Vanadium			47	45	44	48	26	42	31	46	65	45	64	67	39	40		48	53	58	61	59	39	31		40
Zinc	200	410	98	98	89	93	49	80	59	89	110	80	110	110	52	58		45	87	99	100	100	66	57		61
Organochlorine Pesticides																										
4.4'-DDD			< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05		< 0.05
4.4'-DDE			< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05		< 0.05
4.4'-DDT			< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05		< 0.05
a-BHC			< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05		< 0.05
Aldrin			< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05		< 0.05
Aldrin and Dieldrin (Total)*			< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05		< 0.05
b-BHC			< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05		< 0.05
Chlordanes - Total			< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1		< 0.1
d-BHC			< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05		< 0.05
DDT + DDE + DDD (Total)*			< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05		< 0.05
Dieldrin			< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05		< 0.05
Endosulfan I			< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05		< 0.05
Endosulfan II			< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05		< 0.05
Endosulfan sulphate			< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05		< 0.05
Endrin			< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05		< 0.05
Endrin aldehyde			< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05		< 0.05
Endrin ketone			< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05		< 0.05
g-BHC (Lindane)			< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05		< 0.05
Heptachlor			< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05		< 0.05
Heptachlor epoxide			< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05		< 0.05
Hexachlorobenzene			< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05		< 0.05
Methoxychlor			< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05		< 0.05
Toxaphene			< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1		< 1	< 1	< 1	< 1	< 1	< 1	< 1		< 1
Vic EPA IWRG 621 OCP (Total)*			< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1		< 0.1
Vic EPA IWRG 621 Other OCP (Total)*			< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1		< 0.1
Dibutylchlorendate (surr.)			66	78	54	51	69	71	87	73	72	90	81	61	94	84		144	114	95	75	83	72	81		110
Tetrachloro-m-xylene (surr.)			69	73	65	52	97	59	67	85	60	65	80	56	88	81		139	110	54	63	78	64	61		102

Attachment G

Sediment sampling investigation, Talbingo Reservoir

REPORT

Sediment Sampling Investigation Talbingo Reservoir

Factual Report

Client: Snowy Hydro Ltd

Reference: PA1804M&ARP180927

Status: 1.0/Final

Date: 27-Sep-18

Royal HaskoningDHV

Enhancing Society Together

HASKONING AUSTRALIA PTY LTD.

Level 14
56 Berry Street
NSW 2060 North Sydney
Maritime & Aviation
Trade register number: ACN153656252

+61 2 8854 5000 **T**
+61 2 9929 0960 **F**
project.admin.australia@rhdhv.com **E**
royalhaskoningdhv.com **W**

Document title:	Sediment Sampling Investigation Talbingo Reservoir
Document short title:	Sediment Sampling Investigation
Reference:	PA1804M&ARP180927
Status:	1.0/Final
Date:	27-Sep-18
Project name:	Snowy 2.0
Project number:	PA1804
Author(s):	Rick Plain

Drafted by:	Rick Plain
Checked by:	Greg Britton
Date / initials:	7/9/18
Approved by:	Greg Britton
Date / initials:	27/9/18

Classification
Project related

Disclaimer

No part of these specifications/printed matter may be reproduced and/or published by print, photocopy, microfilm or by any other means, without the prior written permission of Haskoning Australia PTY Ltd.; nor may they be used, without such permission, for any purposes other than that for which they were produced. Haskoning Australia PTY Ltd. accepts no responsibility or liability for these specifications/printed matter to any party other than the persons by whom it was commissioned and as concluded under that Appointment. The integrated QHSE management system of Haskoning Australia PTY Ltd. has been certified in accordance with ISO 9001:2015, ISO 14001:2015 and OHSAS 18001:2007.

Table of Contents

1 Introduction 1

2 Scope of Work 1

2.1 Sediment Sampling 1

2.2 Laboratory Testing 3

3 Investigation Results 4

3.1 Sediment Sampling 4

3.2 Laboratory Testing 5

4 Interpretation 8

Appendices

Appendix A – Core Locations

Appendix B – Core Logs and Photographs

Appendix C – Laboratory Results

1 Introduction

Snowy Hydro Pty Ltd engaged Royal HaskoningDHV (RHDHV) to undertake a sediment sampling program in Talbingo Reservoir in order to assess the geochemical and physical properties of the sediment, and to estimate historic sedimentation rates. The work has been completed in accordance with our proposed Assignment 6 (reference M&APA1804L006F0.1 dated 26 June 2018). RHDHV sub-consulted Geochemical Assessments to undertake the collection of the samples. An engineer from RHDHV was on-board the sampling vessel during part of the sample collection exercise.

Snowy 2.0 is a proposed pumped-hydro scheme that will utilise existing reservoirs. A power waterway (tunnel) is proposed to connect Tantangara Reservoir and Talbingo Reservoir. The project is expected to produce approximately 10 million cubic metres of excavated rock, the majority of which is proposed to be placed below the minimum operating level (MOL) in Talbingo Reservoir. The investigation herein collected three (3) to five (5) sediment samples from five (5) locations as follows:

1. Middle Bay dredge footprint - proposed location of barge access infrastructure associated with construction of the scheme
2. Talbingo Reservoir intake structure - proposed location of the power waterway intake
3. Ravine Bay - proposed subaqueous excavated rock placement location
4. Plain Creek Bay - proposed subaqueous excavated rock placement location
5. Cascade Bay - proposed subaqueous excavated rock placement location

The aim of the investigation was to obtain sediment samples for laboratory contamination testing, to estimate the rate of historic sedimentation, and to obtain information to assist in design of dredged channels and excavated rock placement locations. Of particular interest to the design of dredged channels and excavated rock placement locations is the depth of sediment overlying bedrock and density/consistency of the various sediment strata.

2 Scope of Work

The scope of work comprised:

1. Sediment sampling; and,
2. Laboratory testing.

2.1 Sediment Sampling

Sediment sampling was undertaken with different equipment, depending on the water depth. The sampling equipment included:

- Piston corer (suitable for water depths up to approximately 15m); and,
- Gravity driven piston corer (suitable for water depths in excess of approximately 15m).

Both types of equipment would encounter refusal on rock, stiff clay, or other impenetrable stratigraphies. Details of these coring methods, reproduced from the study proposal, are provided below.

Piston coring
A highly effective, manual piston coring technique would be used to collect cores of unconsolidated sediment in water depths to about 15m. This method has been used to collect cores in lacustrine, fluvial, estuarine and marine environments. The piston corer collects sediment cores to a maximum length of 3m.

Minimal disturbance, low compaction and good recovery of cores can be achieved in muds or sandy muds. However, thick or gravel horizons may be impenetrable.

The stainless steel piston coring head unit holds 50.8mm diameter core barrels. The piston corer is lowered and recovered from the bed using aluminium rods. As the barrel is pushed into the sediment, the piston creates a partial vacuum that reduces core compaction and enables full core recovery.

Gravity-driven piston coring

A custom built gravity-driven piston corer would be used to collect fine grained sediments in water depths greater than 15m. A 50.8mm OD barrel would be loaded into the corer and the device lowered to the bed of the reservoir. Sediment is initially excluded from the barrel by a removable “shoe”. The corer is then raised above the bed and the shoe is removed, prior to release of the corer. The corer penetrates the bed using gravity and the piston retains the core in the barrel. The corer has collected cores greater than 2m long in soft, unconsolidated muds.

Plans showing the sample locations and coordinates of each location are included in **Appendix A**. **Table 1** provides a list of the sediment samples, coordinates of the sampling location, bed level at the sample location, the equipment used to obtain the sample and the total depth of the sample recovered.

Table 1: Sample locations and coordinates.

Location	Sediment Sample ID	Easting	Northing	Bathymetry (m AHD)	Equipment	Depth of Sample (m)
Middle Bay dredge footprint	MBC1	624731	6040384	535	Piston Corer	1.5
	MBC2	624641	6040353	534	Piston Corer	1.07
	MBC3	624563	6040353	533	Piston Corer	0.96
	MBC4	624478	6040407	534	Piston Corer	1.5
	MBC5	624326	6040416	533	Piston Corer	0.7
Talbingo Reservoir intake structure	ISC1	624272	6040722	530	Piston Corer	0.7
	ISC2	624331	6040726	529.5	Piston Corer	1.1
	ISC3	624280	6040750	530	Piston Corer	0.74
Ravine Bay	RAC1	622756	6041717	510	Gravity Corer	0.62
	RAC2	623038	6041818	512	Gravity Corer	0.85
	RAC3	623378	6041670	513	Gravity Corer	0.25
	RAC4	622861	6041714	516	Gravity Corer	0.63
Plain Creek Bay	PLC1	621476	6042231	509	Gravity Corer	0.48
	PLC2	621475	6042308	513	Gravity Corer	0.4
	PLC3	621598	6042338	515	Gravity Corer	0.57
Cascade Bay	CAC1	620143	6044046	511	Gravity Corer	0.3
	CAC2	620327	6044154	501	Gravity Corer	0.53
	CAC3	620516	6044154	494	Gravity Corer	0.7

2.2 Laboratory Testing

Laboratory testing included physical analysis of the sediments to determine the particle size distribution (PSD), and geochemical analysis to determine the total concentration of contaminants to appropriate limits of reporting (LOR). Consistent with previous sediment sampling and testing programs within the reservoir, the samples were tested for analytes including:

- metals;
- nutrients;
- total organic carbon; and
- total sulfur.

In addition, random samples were tested for a broader suite of parameters to confirm these substances are not present. Also consistent with previous sediment sampling and testing programs within the reservoir, the broader suite of parameters comprised:

- BTEX
- Organochlorine Pesticides
- Organophosphorus Pesticides
- Polycyclic Aromatic Hydrocarbons
- Total Recoverable Hydrocarbons - 1999 NEPM Fractions
- Total Recoverable Hydrocarbons - 2013 NEPM Fractions
- Volatile Organics

The location and depth of samples collected for laboratory testing are outlined in **Table 2**. The samples collected for laboratory analysis are a composite subsample of a particular sediment unit observed in the core.

Table 2: Samples collected for laboratory analysis.

		Parameters Analysed								
Sediment Sample ID	Depth of Sample below reservoir bed (m)	Metals	Nutrients	Total Organic Carbon	Total Sulphur	BTEX	Organochlorine Pesticides, Organophosphorus Pesticides and Polycyclic Aromatic Hydrocarbons	Total Recoverable Hydrocarbons	Volatile Organics	Particle Size Distribution
CAC1	0.1-0.3	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
CAC2	0.2-0.53	Yes	Yes	Yes	Yes					Yes
CAC3	0.2-0.7	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
ISC1	0.0-0.7	Yes	Yes	Yes	Yes					
ISC2	0.0-0.45	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
ISC2	0.45-0.55	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
ISC2	0.55-1.1	Yes	Yes	Yes	Yes					Yes
ISC3	0.0-0.74	Yes	Yes	Yes	Yes					
MBC1	0.6-1.0	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
MBC1	1.0-1.55	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
MBC3	0.78-0.96	Yes	Yes	Yes	Yes					
MBC5	0.51-0.7	Yes	Yes	Yes	Yes					
PLC1	0.1-0.43	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
PLC3	0.15-0.57	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
RAC3	0.1-0.2	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
RAC1	0.3-0.63	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

3 Investigation Results

3.1 Sediment Sampling

Core logs and photographs from the sediment sampling are provided in **Appendix B**.

With the exception of ISC1 and ISC2, the cores identified brown to grey hydrous silt at the surface. This silt layer was homogenous (layering was not apparent) nor was there a presence of roots. This silt material is a reservoir deposit that would have accumulated following completion of the dam wall and flooding of the Tumut River and Yarrangobilly River in 1971.

The surface material at ISC1 contained sandy mud with abundant rootlets. The rootlets were not observed in the hydrous silt at any other location. It is unclear whether this material is a reservoir deposit, in which case the rootlets would be from aquatic vegetation, or whether the material is an alluvial deposit (pre-flooding of the Tumut and Yarrangobilly Rivers), in which case, the rootlets are from terrestrial vegetation and similar to that observed in the alluvial and residual strata at other locations. A similar material, with a notable presence of rootlets, was observed underlying a thin hydrous silt layer at ISC3.

Gravelly sand was observed near the surface at ISC2. This layer was underlain by a brown to grey silt, which appeared to be similar to the reservoir deposits at other nearby locations. The sandy gravel layer is thought to be a 'recent' deposit of scree.

The reservoir deposits were underlain by alluvial deposits (pre-flooding of the Tumut and Yarrangobilly Rivers) at the sampling locations close to the thalweg of the channel at MBC3 and CAC3. The alluvial deposits were identifiable by the rounded gravel that was intermixed with sand and silt. Other sediment types underlying the reservoir deposit at MBC1, MBC4 and RAC3 described as sandy silts or silty sands may be alluvial deposits. However, they could not be clearly distinguished.

Residual material was identified, particularly in Cascade Bay, Plain Creek Bay and Ravine Bay. The residual deposits were typically grey to cream clay with varying composition of sand and gravel. Abundant roots were noted in the residual deposit and a thin layer of darker coloured topsoil was occasionally observed.

Refusal on hard strata, assumed to be bedrock, was recorded at one location at RAC3. The coring equipment is not capable of recovering rock. However, the end of the barrel was bent, which indicated refusal on hard strata such as rock. Dense gravel or roots would not be capable of bending the core barrel.

The interface between the reservoir deposits and alluvial deposits or residual material was occasionally identified by a layer of vegetation including leaves, bark and sticks. This organic material would be expected to have been deposited in the months following completion of the dam wall and flooding of the rivers. Immersion of terrestrial vegetation would have resulted in dieback and deposition of organic matter.

3.2 Laboratory Testing

Laboratory results of the chemical testing of the sediments are included in **Appendix C**. The results have been summarised and compared to the screening levels provided in the National Assessment Guidelines for Dredging (NAGD) 2009 (refer **Table 3**). The NAGD screening levels are generally the same values as the Interim Sediment Quality Guideline (ISQG) low values provided in ANZECC/ ARMCANZ (2000) Australian and New Zealand Guidelines for Fresh and Marine Water Quality: Sediment Quality Guidelines.

The NAGD screening levels and ISQG low trigger values form the basis for the assessment of risk that any sediment contaminants might pose to the environment. Concentrations less than the NAGD screening levels or ISQG low trigger values pose a low risk. Concentrations greater than the screening levels or ISQG low trigger values require further investigations in accordance with the ANZECC/ARMCANZ tiered framework for the assessment of contaminated sediments.

The concentrations in the samples tested for the full suite of parameters were all below laboratory detection levels or below screening levels for the following parameters:

- BTEX;

- Organochlorine Pesticides;
- Organophosphorus Pesticides;
- Polycyclic Aromatic Hydrocarbons;
- Total Recoverable Hydrocarbons - 1999 NEPM Fractions;
- Total Recoverable Hydrocarbons - 2013 NEPM Fractions; and
- Volatile Organics.

The results of the total metal analysis are summarised in **Table 3**. Concentrations of antimony and silver were all below laboratory detection in all samples. Concentrations of arsenic, chromium, mercury, and cadmium were all below the NAGD screening levels. Concentrations of nickel were greater than the NAGD screening levels in the majority of samples. Concentrations of lead were greater than the NAGD screening levels in three samples in the vicinity of the intake structure and one sample in Plain Creek Bay. Concentrations of copper exceeded the screening levels for one sample at Middle Bay. Concentrations of zinc also exceeded the screening levels for one sample near the intake structure.

The results show similar concentrations of contaminants at the three placement locations for the three observed material types (reservoir deposits, alluvial deposits and residual material).

The samples within the vicinity of the intake structure (reservoir deposits, alluvial deposits and residual material) have more elevated concentrations of some metals, in particular lead, nickel and zinc, than the placement locations and Middle Bay.

The one sample at Middle Bay with a concentration of copper exceeding the screening level was for a sample of recent reservoir deposits. This result is consistent with the surface grab sampling undertaken in May 2018 which also showed some copper exceedences of the screening level for the recent reservoir deposits. The underlying residual and alluvial deposits at Middle Bay, the placement locations and the intake structure had copper concentrations below the screening level.

Concentrations of nickel were greater than the screening levels in the majority of samples tested from the coring exercise (reservoir deposits, alluvial deposits and residual material). This is consistent with the elevated concentrations of nickel which were observed for the May 2018 Middle Bay sampling and testing and the broader sampling and testing throughout Talbingo Reservoir that was undertaken on 29th March 2018.

Table 3: Metal concentrations (mg/kg) from Talbingo Reservoir sediment samples.

Metals	Material Description		Location	Aluminium	Arsenic	Antimony	Cadmium	Chromium	Cobalt	Copper	Iron	Lead	Manganese	Mercury	Nickel	Selenium	Silver	Vanadium	Zinc
NAGD ML[1]				-	70	-	10	370	-	270	-	220	-	1	52	-	3.7	-	410
NAGD SL[2]				-	20	-	1.5	80	-	65	-	50	-	0.15	21	-	1	-	200
CAC1 0.1-0.3	Silty Sandy GRAVEL with clay, gravel flat and angular, approximately 20mm diameter, red/brown, abundant roots	(RESIDUAL)	Cascade Bay	13000	1.52	<0.50	<0.1	15.5	10.4	29.9	19300	9.6	518	0.01	11.1	0.3	<0.1	30.1	40.4
CAC2 0.2-0.53	Sandy SILT/Silty SAND with clay, with gravel, brown/cream, angular gravel, up to 15mm diameter, dark grey	(RESIDUAL)		13800	2.45	<0.50	<0.1	22.9	10.9	25.6	21100	10.6	388	0.01	16.2	0.6	<0.1	37.8	42.3
CAC3 0.2-0.7	CLAY with sand, grey, soft becoming firm, roots/vegetation visible	(RESIDUAL)		21700	4.88	<0.50	<0.1	75.5	22.1	24.4	41700	11.3	652	0.01	64.9	1.1	<0.1	74	62.8
ISC1 0.0-0.7	Sandy MUD, grey/brown, very soft, homogenous, abundant roots	(RESIDUAL or ALLUVIAL)	Intake Structure	10900	6.24	<0.50	0.1	33.5	11.5	22.6	21600	21.8	498	0.02	36.2	0.9	<0.1	20.3	70
ISC2 0.0-0.45	Gravelly SAND with mud, angular shale pink/orange/grey	(POSSIBLY SCREE)		12800	2.45	<0.50	<0.1	56.5	17	25	29600	51.5	752	0.01	85.8	0.4	<0.1	25.1	181
ISC2 0.45-0.55	MUD, brown/grey	(RESERVOIR DEPOSIT)		16600	7.19	<0.50	0.3	55.4	20.3	39.1	30100	59.5	1020	0.04	57.6	1.3	<0.1	36.1	114
ISC2 0.55-1.1	Muddy GRAVEL/SAND, grey angular gravel approximately 10-15mm diameter becoming finer with depth, approximately 5 mm diameter	(ALLUVIAL or RESIDUAL)		16000	3.07	<0.50	0.2	62	21.8	35.6	37200	81.6	855	0.02	91.7	0.7	<0.1	34	202
ISC3 0.0-0.74	MUD, grey/brown, very soft	(RESERVOIR DEPOSIT)		10500	5.83	<0.50	0.1	31.2	10.8	19.8	20200	20.8	404	0.01	33.2	0.9	<0.1	18.9	73.4
MBC1 0.6-1.0	Sandy SILT with clay, brown, soft, minor organic material, some vesicles	(RESERVOIR DEPOSIT)	Middle Bay	15000	6.94	<0.50	0.2	44.9	13.8	79.2	27000	27.6	458	0.03	49.4	1.1	<0.1	26.2	88.3
MBC1 1-1.55	Silty Clayey SAND, grey/brown, soft	(RESIDUAL)		9700	4.91	<0.50	<0.1	27	9.3	19.2	19800	18.5	276	0.01	33.1	0.6	0.5	16.9	65.4
MBC3 0.78-0.96	Gravelly muddy SAND, grey, dense, Rounded lithic pebbles to 40mm diameter, quartz and other lithic fragments.	(ALLUVIAL)		10900	7.95	<0.50	0.1	31.3	11	32.9	20800	21.2	539	0.02	36.1	0.8	<0.1	23.1	62.4
MBC5 0.51-0.7	Muddy GRAVEL/Gravelly MUD, firm, shale fragments to 30mm diameter, abundant vegetation.	(RESUDUAL or ALLUVIAL)	Plain Creek Bay	14000	4.04	<0.50	0.2	69.1	14.1	25.7	24600	54.3	818	0.02	72.2	0.7	<0.1	38.8	141
PLC1 0.1-0.43	Silty SAND with clay, dark grey, abundant roots from 0.2 to 0.3m	(RESIDUAL)		15600	4.66	<0.50	<0.1	87.4	20	25.5	32800	8.6	1070	0.01	71.2	0.7	<0.1	60.4	63
PLC3 0.15-0.57	Clayey SILT/SAND trace gravelly, creamy brown, soft, trace roots.	(RESIDUAL)		7460	2.32	<0.50	<0.1	15.2	4.2	5.2	12700	6.2	146	0.01	5.7	0.4	<0.1	19.4	11
RAC3 0.1-0.2	Muddy SAND, brown, abundant roots	(TOPSOIL)	Ravine Bay	9040	6.21	<0.50	<0.1	25.1	8.2	32.4	17200	18.6	642	0.01	29.2	0.6	<0.1	16.8	48.9
RAC1 0.3-0.63	Silty Clayey SAND, creamy brown, becoming lighter with depth, trace roots.	(RESIDUAL)		8990	5.29	<0.50	<0.1	26.6	9.7	11.9	18500	17	264	0.02	20.8	0.6	<0.1	20.9	36.4

Note: ML – Maximum Level (NAGD 2009), SL – Screening level (NAGD, 2009), exceedances of the screening level are shown in red.

4 Interpretation

The depth of reservoir deposits can be identified through review of the core logs and used to estimate the average rate of sedimentation as this material would have accumulated following completion of the dam wall and flooding of the Tumut and Yarrangobilly Rivers in 1971. The estimated average rate of sedimentation is outlined in **Table 4**.

The estimated average rate of sedimentation near Middle Bay is around 15mm per year and is higher further upstream. This rate of sedimentation is higher than at other locations, where the average rate of sedimentation is approximately 2mm per year. The higher rate of sedimentation at Middle Bay is a result of relatively higher flow rate/velocity and sediment flux (bed load and suspended sediment load) down the Yarrangobilly River. As the Yarrangobilly River discharges into Talbingo Reservoir, the flow velocity would rapidly decrease. The reduced flow velocity would be insufficient to maintain the bed load sediment transport and suspended sediment would also settle out of suspension.

Table 4: Rate of sedimentation in Talbingo Reservoir.

Sediment Sample ID	Depth of Hydrous Layer (m)	Estimated Average Sedimentation Rate (1971-2018 mm/yr)
MBC1	*1**	*21**
MBC2	0.85	18
MBC3	0.78	17
MBC4	*0.37**	*8**
MBC5	0.5	11
ISC1	*0**	*0**
ISC2	0	0
ISC3	*0.07**	*1**
RAC1	0.07	1
RAC2	0.1	2
RAC3	0.125	3
RAC4	0.13	3
PLC1	0.1	2
PLC2	0.1	2
PLC3	0.01	0
CAC1	0.07	1
CAC2	0.02	0
CAC3	0.05	1

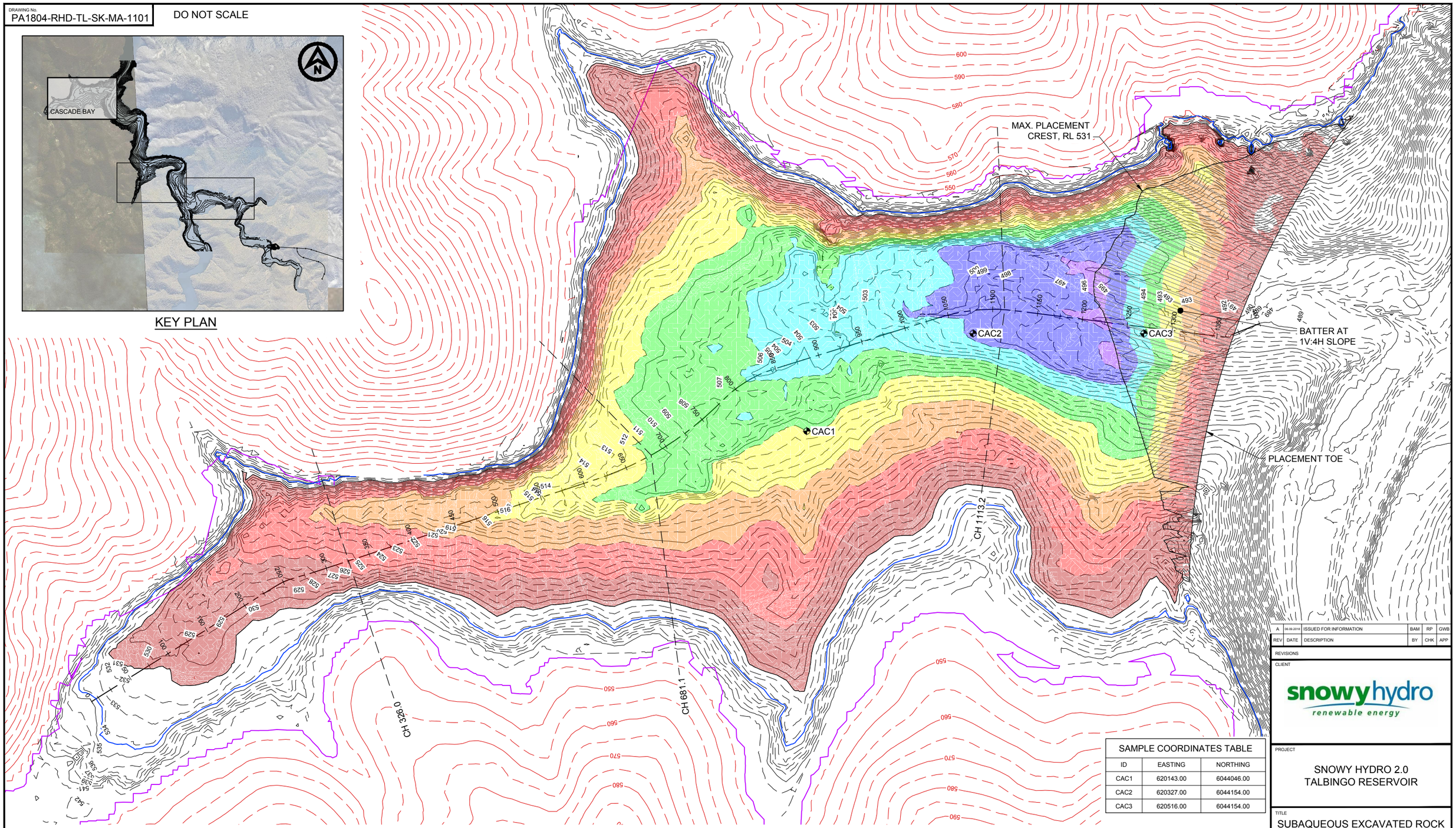
*Note: * indicates uncertainty in the interface between reservoir deposits and alluvial deposits/residual material.*

Appendix A – Core Locations

DRAWING No.
PA1804-RHD-TL-SK-MA-1101

DO NOT SCALE

KEY PLAN



SAMPLE COORDINATES TABLE		
ID	EASTING	NORTHING
CAC1	620143.00	6044046.00
CAC2	620327.00	6044154.00
CAC3	620516.00	6044154.00

VOLUME TABLE		
MIN. (m)	MAX. (m)	VOL (m3)
0.0	5.0	1,766,563
5.0	10.0	1,364,809
10.0	15.0	1,037,811
15.0	20.0	764,899
20.0	25.0	460,683
25.0	30.0	217,792
30.0	35.0	73,808
35.0	40.0	1,175
	TOTAL	5,687,540

COLOUR BAND
FOR 2D AREA (m^2) CALCULATION

PLACEMENT DEPTH BAND (m)
FOR VOLUME (m^3) CALCULATION

0 5 10 15 20 25 30 35 40

2D AREA TABLE			
MIN. (m)	MAX. (m)	AREA (m2)	COLOUR
0.0	5.0	87,373	
5.0	10.0	73,944	
10.0	15.0	58,645	
15.0	20.0	56,101	
20.0	25.0	59,433	
25.0	30.0	36,134	
30.0	35.0	25,134	
35.0	40.0	2,560	
	TOTAL	399,324	

NOTES

1. BATHYMETRIC SURVEY DATED 26/02/2018, LEVELS TO AHD.
2. FILL TO RL 531mAHD

LEGEND

- LIDAR CONTOUR
- BATHYMETRIC CONTOUR
- FULL SUPPLY LEVEL (FSL) = RL 543.19mAHD
- MIN. OPERATING LEVEL (MOL) = RL 534.35mAHD
- CAC1 VIBROCORE LOCATION (2018)

40 0 40 80 120 160 200m
1:4000 (A3) 1:2000 (A1)

S2 FOR INFORMATION | **NOT FOR CONSTRUCTION** | **AUSTRALIAN HEIGHT DATUM**

REV	DATE	DESCRIPTION	BY	CHK	APP
A	06.09.2018	ISSUED FOR INFORMATION	BAM	RP	GWB

REVISIONS

CLIENT
snowyhydro
renewable energy

PROJECT
SNOWY HYDRO 2.0
TALBINGO RESERVOIR

TITLE
SUBAQUEOUS EXCAVATED ROCK PLACEMENT
CASCADE BAY
DETAIL PLAN

Royal HaskoningDHV
Enhancing Society Together
Level 14, 56 Berry Street
North Sydney NSW 2060
Australia
Tel +61 2 88545000
Fax +61 2 99290960
Email: project.admin.australia@rhdhv.com
Website: www.royalhaskoningdhv.com

DRAWN	COORD. SYSTEM	DATUM	DATE
BAM	MGA ZONE 55	AHD	07.09.2018
SCALE AT A1	AS SHOWN	REF	PA1804-RHD-TL-M3-MA-1000-PLACEMENT-SUB

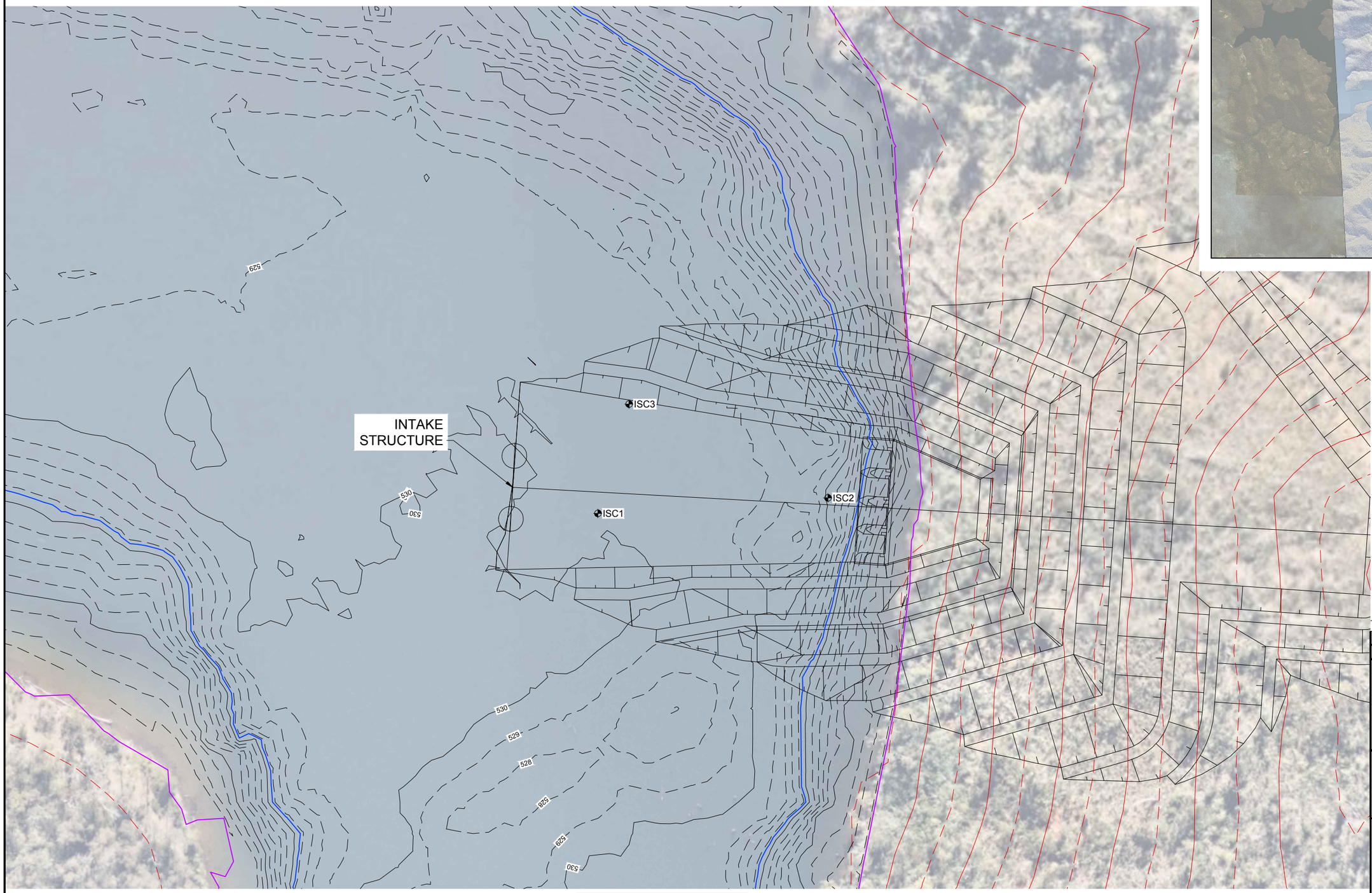
DRAWING No. PA1804-RHD-TL-SK-MA-1101
REVISION A

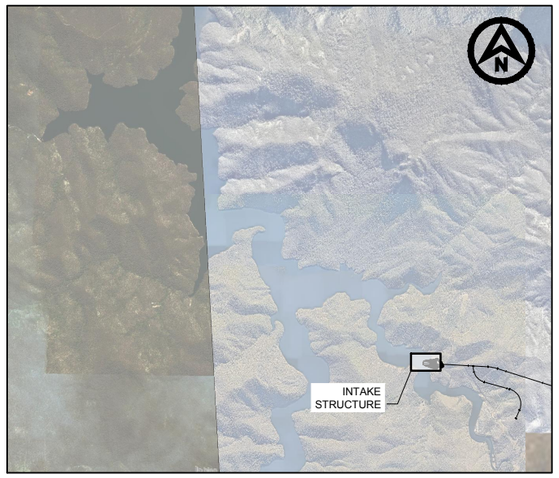
© Haskoning Australia Pty Ltd

I:\PA1804\TECHNICAL_DATA\~PA1804 - SNOWY HYDRO DAMS\E02 WORKING DRAWINGS\PA1804-RHD-TL-M3-MA-1000-PLACEMENT-SUB

DRAWING No.
PA1804-RHD-TL-SK-MA-3200

DO NOT SCALE





LEGEND

- LIDAR CONTOUR
- BATHYMETRIC CONTOUR (26/02/2018)
- FULL SUPPLY LEVEL (FSL) = RL 543.19mAHD
- MIN. OPERATING LEVEL (MOL) = RL 534.35mAHD
- ISC1 VIBROCORE LOCATION (2018)

SAMPLE COORDINATES TABLE		
Description	Easting	Northing
ISC1	624272.00	6040722.00
ISC2	624331.00	6040726.00
ISC3	624280.00	6040750.00

10 0 10 20 30 40 50m

1:1000 (A3) 1:500 (A1)

© Haskoning Australia Pty Ltd

S2 FOR INFORMATION | **NOT FOR CONSTRUCTION** | **AUSTRALIAN HEIGHT DATUM**

REV	DATE	DESCRIPTION	BY	CHK	APP
A	06.09.2018	ISSUED FOR INFORMATION	BAM	RP	GWB

REVISIONS

CLIENT

snowyhydro renewable energy

PROJECT

SNOWY HYDRO 2.0
TALBINGO RESERVOIR

TITLE

BARGE ACCESS INFRASTRUCTURE
INTAKE STRUCTURE
SEDIMENT SAMPLE PLAN

Royal HaskoningDHV
Enhancing Society Together
Level 14, 56 Berry Street
North Sydney NSW 2060
Australia
Tel: +61 2 85545000
Fax: +61 2 99290960
Email: project.admin.australia@rhdhv.com
Website: www.royalhaskoningdhv.com

DRAWN	COORD. SYSTEM	DATUM	DATE
BAM	MGA ZONE 55	AHD	06.09.2018

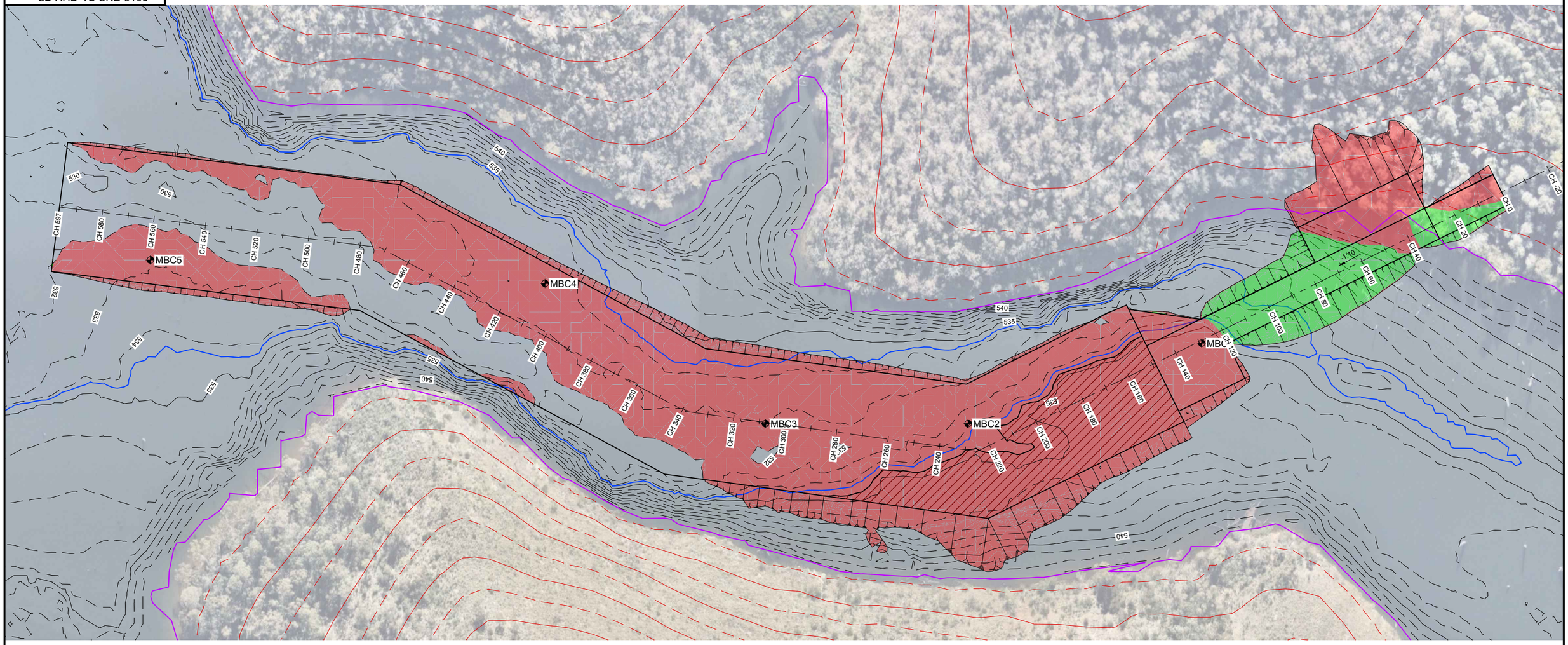
SCALE AT A1 AS SHOWN | REF PA1804-RHD-TL-M3-MA-3000-SOUTH

DRAWING No. PA1804-RHD-TL-SK-MA-3200 | REVISION A

I:\PA1804\TECHNICAL_DATA\~PA1804 - SNOWY HYDRO DAMS\E02 WORKING DRAWINGS\PA1804-RHD-TL-M3-MA-3000-SOUTH

DRAWING No.
S2-RHD-TL-SKE-3103

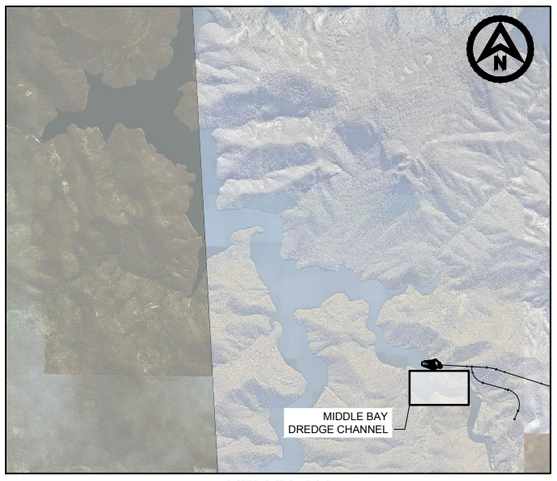
DO NOT SCALE



LEGEND

- LIDAR CONTOUR
- BATHYMETRIC CONTOUR (26/02/2018)
- FULL SUPPLY LEVEL (FSL) = RL 543.19mAHD
- MIN. OPERATING LEVEL (MOL) = RL 534.35mAHD
- MBC1 VIBROCORE LOCATION (2018)

SAMPLE COORDINATES TABLE		
Description	Easting	Northing
MBC1	624731.00	6040384.00
MBC2	624641.00	6040353.00
MBC3	624563.00	6040353.00
MBC4	624478.00	6040407.00
MBC5	624326.00	6040416.00



KEY PLAN

S2 FOR INFORMATION

NOT FOR CONSTRUCTION

AUSTRALIAN HEIGHT DATUM

15 0 15 30 45 60 75m

1:1500 (A3) 1:750 (A1)

REV	DATE	DESCRIPTION	BY	CHK	APP
A	06.09.2018	ISSUED FOR INFORMATION	BAM	RP	GWB

REVISIONS

CLIENT

snowyhydro renewable energy

PROJECT

SNOWY 2.0

TITLE

BARGE ACCESS INFRASTRUCTURE
MIDDLE BAY
SEDIMENT SAMPLE PLAN

Royal HaskoningDHV
Enhancing Society Together
Level 14, 56 Berry Street
North Sydney NSW 2060
Australia
Tel +61 2 88545000
Fax +61 2 99290960
Email: project.admin.australia@rhdhv.com
Website: www.royalhaskoningdhv.com

DRAWN	COORD. SYSTEM	DATUM	DATE
BAM	MGA ZONE 55	AHD	11.09.2018

SCALE AT A1: AS SHOWN

REF: S2-RHD-TL-MOD-3000-SOUTH

DRAWING No. S2-RHD-TL-SKE-3103

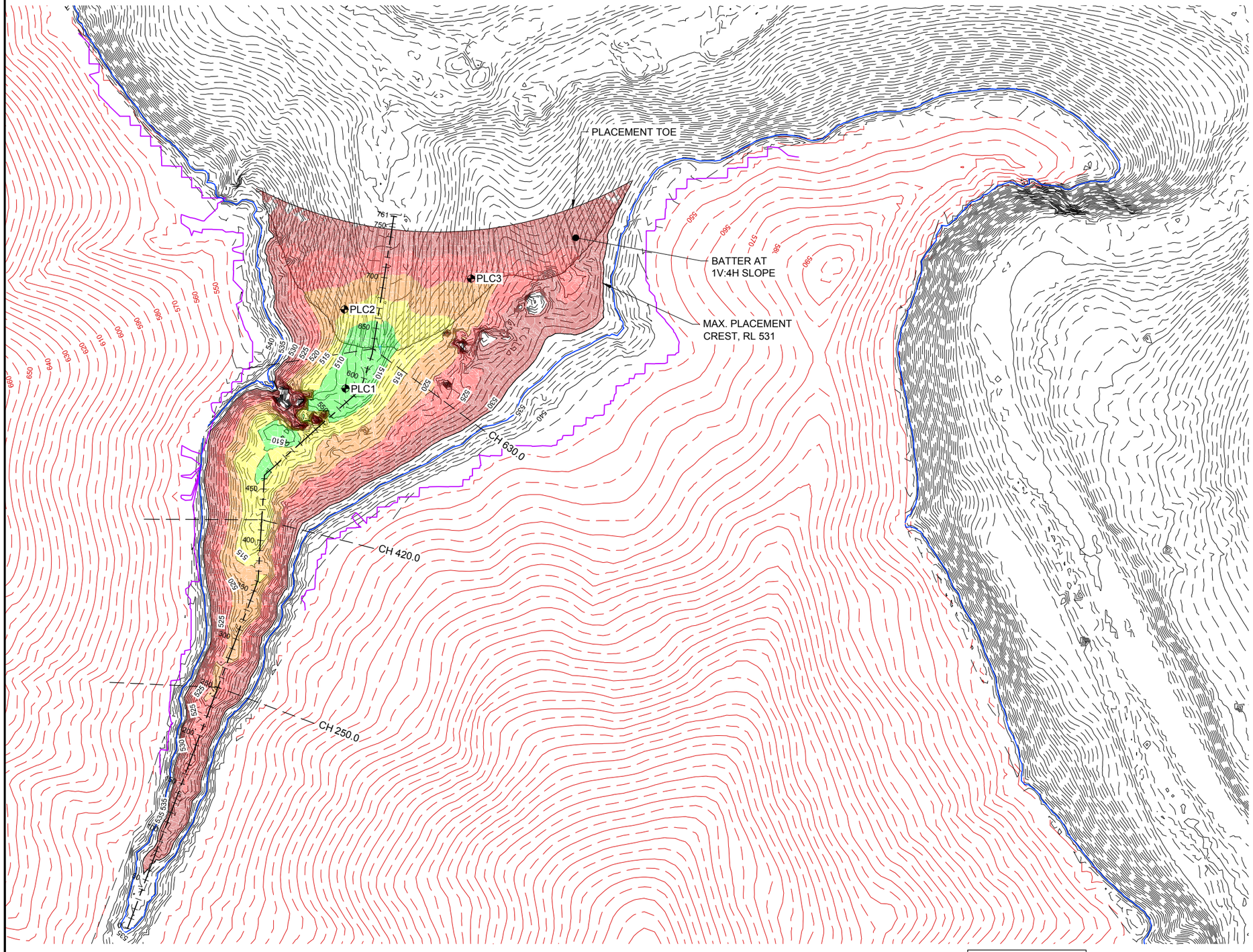
REVISION A

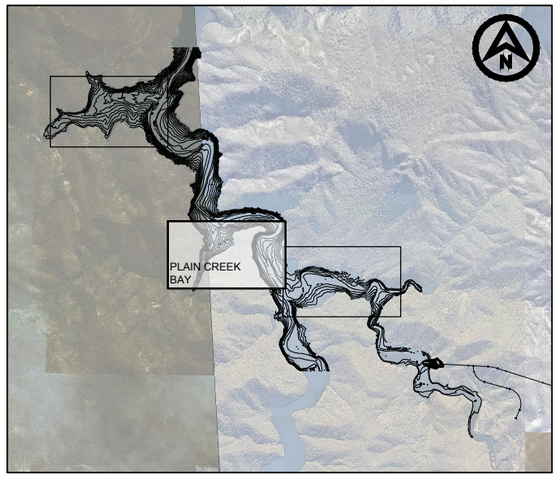
© Haskoning Australia Pty Ltd

I:\PA1804\TECHNICAL_DATA\~PA1804 - SNOWY HYDRO DAMS\E02 WORKING DRAWINGS\S2-RHD-TL-MOD-3000-SOUTH

DRAWING No.
PA1804-RHD-TL-SK-MA-1201

DO NOT SCALE





KEY PLAN

NOTES

1. BATHYMETRIC SURVEY DATED 26/02/2018, LEVELS TO AHD.
2. FILL TO RL 531mAHD.

LEGEND

- LIDAR CONTOUR
- BATHYMETRIC CONTOUR
- FULL SUPPLY LEVEL (FSL) = RL 543.19mAHD
- MIN. OPERATING LEVEL (MOL) = RL 534.35mAHD
- PLC1 VIBROCORE LOCATION (2018)

S2 FOR INFORMATION | **NOT FOR CONSTRUCTION** | **AUSTRALIAN HEIGHT DATUM**

40 0 40 80 120 160 200m

1:4000 (A3) 1:2000 (A1)

SAMPLE COORDINATES TABLE

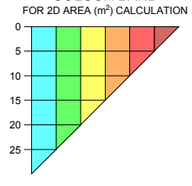
ID	EASTING	NORTHING
PLC1	621476.00	6042231.00
PLC2	621475.00	6042308.00
PLC3	621598.00	6042338.00

VOLUME TABLE

MIN. (m)	MAX. (m)	VOL (m3)
0.0	5.0	362,911
5.0	10.0	225,638
10.0	15.0	127,845
15.0	20.0	56,401
20.0	25.0	11,023
25.0	30.0	1
	TOTAL	783,818

COLOUR BAND
FOR 2D AREA (m^2) CALCULATION

PLACEMENT DEPTH BAND (m)
FOR VOLUME (m^3) CALCULATION



2D AREA TABLE

MIN. (m)	MAX. (m)	AREA (m2)	COLOUR
0.0	5.0	31,943	
5.0	10.0	22,941	
10.0	15.0	17,149	
15.0	20.0	11,653	
20.0	25.0	5,754	
25.0	30.0	15	
	TOTAL	89,454	

© Haskoning Australia Pty Ltd

REV	DATE	DESCRIPTION	BY	CHK	APP
A	06.09.2018	ISSUED FOR INFORMATION	BAM	RP	GWB

REVISIONS

CLIENT

snowyhydro
renewable energy

PROJECT

SNOWY HYDRO 2.0
TALBINGO RESERVOIR

TITLE

SUBAQUEOUS EXCAVATED ROCK PLACEMENT
PLAIN CREEK BAY
DETAIL PLAN

Royal HaskoningDHV
Enhancing Society Together
Level 14, 56 Berry Street
North Sydney NSW 2060
Australia
Tel +61 2 85545000
Fax +61 2 99290960
Email: project.admin.australia@rhdhv.com
Website: www.royalhaskoningdhv.com

DRAWN	COORD. SYSTEM	DATUM	DATE
BAM	MGA ZONE 55	AHD	07.09.2018

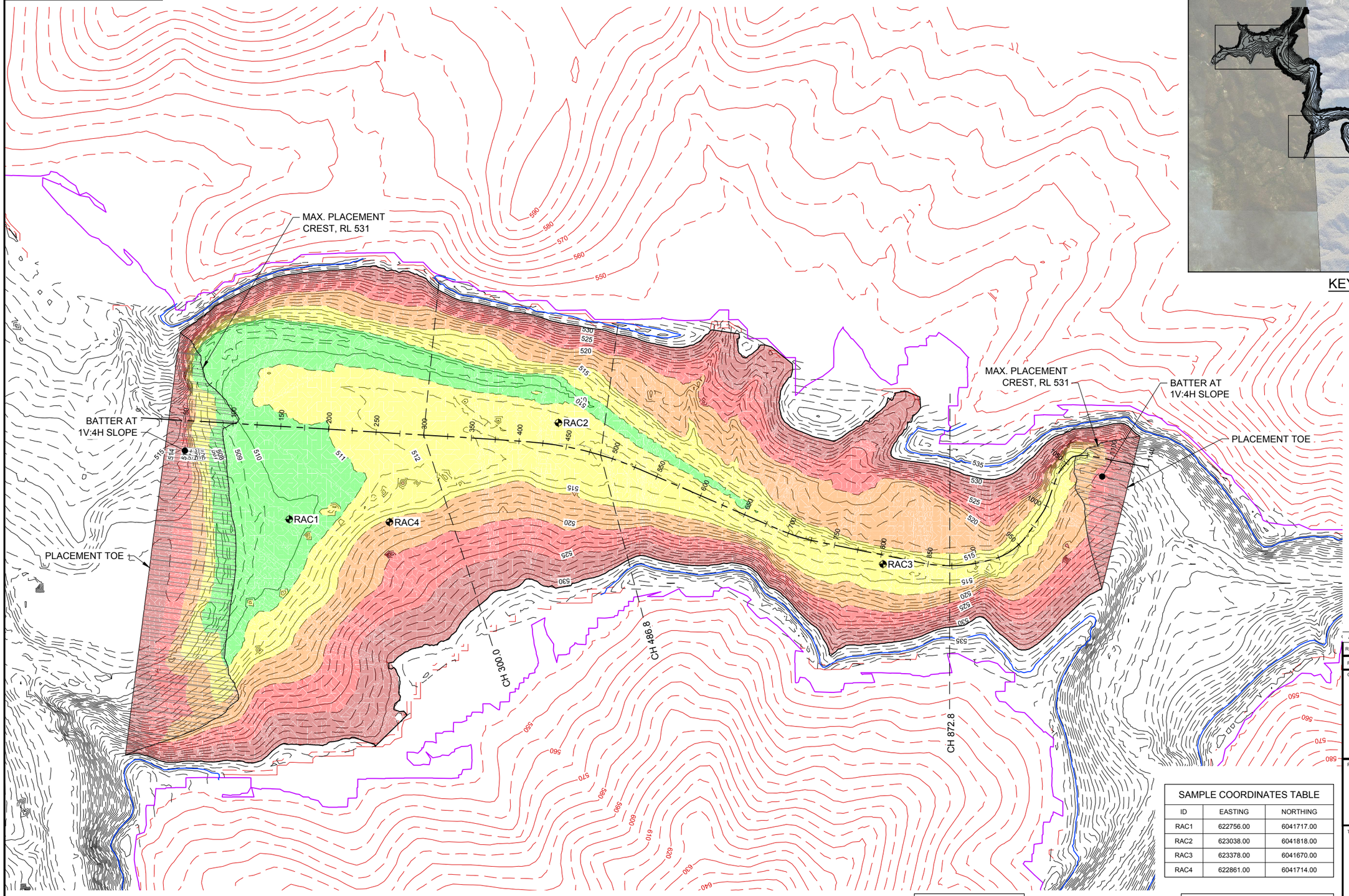
SCALE AT A1: AS SHOWN
REF: PA1804-RHD-TL-M3-MA-1000-PLACEMENT-SUB

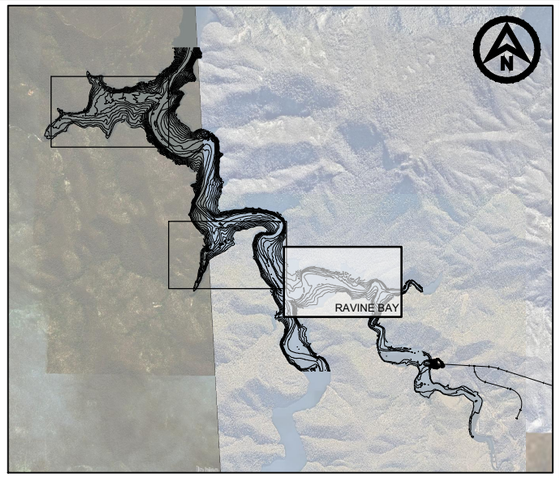
DRAWING No. PA1804-RHD-TL-SK-MA-1201
REVISION A

I:\PA1804\TECHNICAL_DATA\~PA1804 - SNOWY HYDRO DAMS\E02 WORKING DRAWINGS\PA1804-RHD-TL-M3-MA-1000-PLACEMENT-SUB

DRAWING No.
PA1804-RHD-TL-SK-MA-1301

DO NOT SCALE





KEY PLAN

NOTES

1. BATHYMETRIC SURVEY DATED 26/02/2018, LEVELS TO AHD.
2. FILL TO RL 531mAHD.

LEGEND

- LIDAR CONTOUR
- BATHYMETRIC CONTOUR
- FULL SUPPLY LEVEL (FSL) = RL 543.19mAHD
- MIN. OPERATING LEVEL (MOL) = RL 534.35mAHD
- RAC1 VIBROCORE LOCATION (2018)

S2 FOR INFORMATION | **NOT FOR CONSTRUCTION** | **AUSTRALIAN HEIGHT DATUM**

40 0 40 80 120 160 200m
1:4000 (A3) 1:2000 (A1)

SAMPLE COORDINATES TABLE

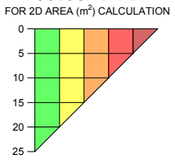
ID	EASTING	NORTHING
RAC1	622756.00	6041717.00
RAC2	623038.00	6041818.00
RAC3	623378.00	6041670.00
RAC4	622861.00	6041714.00

VOLUME TABLE

MIN. (m)	MAX. (m)	VOL (m3)
0.0	5.0	1,383,943
5.0	10.0	1,112,739
10.0	15.0	813,577
15.0	20.0	467,991
20.0	25.0	58,067
	TOTAL	3,836,316

PLACEMENT DEPTH BAND (m)
FOR VOLUME (m^3) CALCULATION

COLOUR BAND
FOR 2D AREA (m^2) CALCULATION



2D AREA TABLE

MIN. (m)	MAX. (m)	AREA (m2)	COLOUR
0.0	5.0	55,333	
5.0	10.0	54,691	
10.0	15.0	63,845	
15.0	20.0	85,478	
20.0	25.0	45,316	
	TOTAL	304,664	

© Haskoning Australia Pty Ltd

REV	DATE	DESCRIPTION	BY	CHK	APP
A	06.09.2018	ISSUED FOR INFORMATION	BAM	RP	GWB

REVISIONS

CLIENT
snowyhydro renewable energy

PROJECT
SNOWY HYDRO 2.0
TALBINGO RESERVOIR

TITLE
SUBAQUEOUS EXCAVATED ROCK PLACEMENT
RAVINE BAY
DETAIL PLAN

Royal HaskoningDHV
Enhancing Society Together
Level 14, 56 Berry Street
North Sydney NSW 2060
Australia
Tel +61 2 88545000
Fax +61 2 99290969
Email: project.admin.australia@rhdhv.com
Website: www.royalhaskoningdhv.com

DRAWN	COORD. SYSTEM	DATUM	DATE
BAM	MGA ZONE 55	AHD	07.09.2018
SCALE AT A1 AS SHOWN	REF. PA1804-RHD-TL-M3-MA-1000-PLACEMENT-SUB		

DRAWING No. PA1804-RHD-TL-SK-MA-1301 REVISION A

I:\PA1804\TECHNICAL_DATA\~PA1804 - SNOWY HYDRO DAMS\E02 WORKING DRAWINGS\PA1804-RHD-TL-M3-MA-1000-PLACEMENT-SUB

Appendix B – Core Logs and Photographs

Geotechnical Explanatory Notes

Introduction

These notes have been produced to supplement the geotechnical aspects of the report and appendices. In particular, the notes provide specific details relating to geotechnical logging and interpretation of borehole logs, test pit logs and in situ tests presented as part of the appendix.

Geotechnical fieldwork, interpretation and reporting has been carried out by a suitably qualified engineer or scientist. The reliability of the geotechnical information provided in the logs and penetration tests will depend to some extent on the frequency and method of excavation and penetration testing. Large variation may occur in the subsurface geological conditions and records from excavations or penetration tests may vary significantly from other locations across the site.

Description and Classification Methods

The methods of description and classification of soils and rocks in this report is based on Australian Standards AS1726: Geotechnical Site Investigation. Field descriptions and classifications are based on visual and tactile assessment. Where appropriate, laboratory data and penetration testing will be used to verify field descriptions and classifications.

Penetration Testing

Penetration testing is used to determine soil consistency or density. Commonly implemented penetration tests includes:

DCP – Dynamic Cone Penetrometer tests are carried out by driving a 16mm rod into the ground using a 9kg hammer and recording the number of blows per 100mm. Two similar tests are commonly used: the cone penetrometer utilises a 20mm diameter cone end driven into the ground with the hammer dropping from a height of 510mm (AS1289, Test F3.2), while the Perth Sand Penetrometer utilises a 16mm flat end driven into the ground with the hammer dropping from a height of 600mm (AS1289, Test F3.3).

SPT – Standard Penetration Tests is carried out by driving a 50mm diameter split sample tube 450mm into the ground using a 63kg weight falling from a height of 760mm (AS1289, Test F3.1). These tests are normally carried out in boreholes. Blows per 150mm are recorded and the 'N' value is taken as the number of blow for the last 300mm.

Sampling

Sampling is carried out during drilling or test pitting to allow for visual and tactile assessment and to allow for laboratory testing (if required). Sampling methods include:

- U_{50} - Undisturbed Sample Tube (50mm)
- B – Bulk Sample (>10kg sample size)
- D – Disturbed Sample
- W – Water Sample
- SPT – SPT Sample
- S – Surface Sample
- PID – Photoionisation detector reading in ppm

Laboratory Testing

Laboratory Testing is carried out by a NATA accredited laboratory in accordance with the Australian Standards 1289 – Methods of Testing Soil for Engineering Purposes Code.

Groundwater

There are several problems associated with measuring the water level in boreholes. Perched water tables above impermeable layers may lead to an erroneous indication of the true water level in underlying strata. Also, water levels may fluctuate with changing climatic conditions, some drilling methods do not enable the presence of groundwater to be detected and in low permeability soils where groundwater flow is slow, water may not enter the hole in the time it is left open. Despite the problems, the level of groundwater is often important for design and the following symbols may be used to indicate the presence of groundwater on site.

- ▼ - Standing water level
- GNO - Groundwater Not Observed
- GNE - Groundwater Not Encountered
- ▶ - Groundwater inflow/seepage
- ◀ - Groundwater outflow/loss

Royal HaskoningDHV
Enhancing Society Together

Graphic Symbols for Soil and Rock

General

- Asphalt
- Road base
- Concrete
- Filling

Soils

- Topsoil
- Peat
- Clay
- Silty clay
- Sandy clay
- Gravelly clay
- Shaly clay
- Silt
- Clayey silt
- Sandy silt
- Sand
- Clayey sand
- Silty sand
- Gravel
- Sandy gravel
- Cobbles, boulders
- Talus

Sedimentary Rocks

- Boulder conglomerate
- Conglomerate
- Conglomeratic sandstone
- Sandstone
- Siltstone
- Laminite
- Mudstone, claystone, shale
- Coal
- Limestone

Metamorphic Rocks

- Slate, phyllite, schist
- Gneiss
- Quartzite

Igneous Rocks

- Granite
- Dolerite, basalt, andesite
- Dacite, epidote
- Tuff, breccia
- Porphyry

Royal HaskoningDHV
Enhancing Society Together

Soil Classification

Particle size and descriptive terms

Name	Subdivision	Size
Boulders	N/A	>200mm
Cobbles	N/A	63 mm to 200 mm
Gravel	Coarse Medium Fine	20 mm to 63 mm 6 mm to 20 mm 2.36 mm to 6 mm
Sand	Coarse Medium Fine	0.6 mm to 2.36 mm 0.2 mm to 0.6 mm 0.075 mm to 0.2 mm

Soil classification is conducted on material nominally finer than 63mm. The proportion of boulders and cobbles is recorded along with the packing characteristics as follows:

- Clast supported - clasts touching, with or without the presence of a soil matrix, and
- Matrix supported - clasts supported in a soil matrix.

Minor Component

The primary soil name is modified to include minor components as follows:

Modifier	Percentage of minor component
Omit, or use 'trace'	Fine soil in primarily coarse material: ≤5% Coarse soil in primarily fines material: ≤15%
Describe as 'with clay/silt/sand/ gravel' as applicable	Fine soil in primarily coarse material: 5-12% Coarse soil in primarily fines material: 15-30%
Prefix soil as 'silty/clayey/sandy/ gravelly'' as applicable	Fine soil in primarily coarse material: >12% Coarse soil in primarily fines material: >30%

Moisture Condition

Condition	Symbol	Guide
Dry	D	Cohesive soils are hard and friable or powdery. Granular soils are cohesionless and free running.
Moist	M	Soil feels cool and darkened in places. Cohesive soils can be remoulded. Granular soils tend to cohere.
Wet	W	Soil feels cool, darkened in colour. Free water forms on hands when handled. Cohesive soils are weakened. Granular soils tend to cohere.

Cohesive Soils

Cohesive refers to soil behaviour. Cohesive soils are classified based of strength (consistency).

Consistency

Term	Symbol	Field Guide to Consistency	Undrained Shear Strength, S_u (kPa)
Very Soft	VS	Extrudes between fingers when squeezed in hand.	<12
Soft	S	Can be remoulded by light finger pressure. Easily penetrated by thumb 30-40mm.	12-25
Firm	F	Can be remoulded by strong finger pressure. Penetrated by thumb 20-30mm with moderate effort.	25-50
Stiff	St	Cannot be remoulded by fingers. Can be indented by thumb.	50-100
Very Stiff	VSt	Can be intended by thumb nail.	100-200
Hard	H	Difficult to indent with thumb nail.	>200

Cohesionless Soil

Cohesionless refers to soil behaviour. Cohesionless soils are classified based of relative density.

Density

Term	Symbol	Field Guide to Consistency	Density Index %
Very Loose	VL	Very easily shovelled, almost no resistance.	≤15
Loose	L	Low resistance to shovelling.	15-35
Medium Dense	MD	Considerable resistance to shovelling.	35-65
Dense	D	Requires handpick for excavation.	65-85
Very Dense	VD	Requires power tool for excavation.	>85

Origin

Residual Soil	Weathered in-situ
Aeolian Soil	Deposited by wind
Alluvial Soil	Deposited by streams and rivers
Colluvial Soil	Deposited on slopes
Lacustrine Soil	Deposited by lakes
Marine Soil	Deposited in ocean basins, bays, beaches and estuaries
Littoral	Beach deposits
Fill	Man-made deposits. Fill may be significantly more variable between tested locations than naturally occurring soils.

Royal HaskoningDHV
Enhancing Society Together

Guide to the Description Identification and Classification of Soil (AS 1726)

FIELD IDENTIFICATION PROCEDURES (Excluding particles larger than 60mm and basing fractions on estimated mass)					GROUP SYMBOLS	PRIMARY NAME
COARSE GRAINED SOILS (more than half of material less than 63mm is larger than 0.075 mm)	GRAVELS More than half of the coarse fraction is larger than 2.36mm	CLEAN GRAVELS (Little or no fines)	Wide range in grain size and substantial amounts of all intermediate sizes, not enough fines to bind coarse grains, no dry strength.		GW	GRAVEL
			Predominantly one size or range of sizes with some intermediate sizes missing, not enough fines to bind coarse grains, no dry strength.		GP	GRAVEL
		GRAVELS WITH FINES (Appreciable amount of fines)	Excess of non-plastic fines, zero to medium dry strength.		GM	SILTY GRAVEL
			Excess of plastic fines, medium to high dry strength.		GC	CLAYEY GRAVEL
	SANDS More than half of the coarse fraction is smaller than 2.36mm	CLEAN SANDS (Little or no fines)	Wide range in grain size and substantial amounts of all intermediate sizes, not enough fines to bind coarse grains, no dry strength.		SW	SAND
			Predominantly one size or range of sizes with some intermediate sizes missing, not enough fines to bind coarse grains, no dry strength.		SP	SAND
		SANDS WITH FINES (Appreciable amount of fines)	Excess of non-plastic fines, zero to medium dry strength.		SM	SILTY SAND
			Excess of plastic fines, medium to high dry strength.		SC	CLAYEY SAND
		DRY STRENGTH	**DILATANCY**	**TOUGHNESS**		
FINE GRAINED SOILS (more than half of material less than 63mm is smaller than 0.075 mm)	SILTS AND CLAYS Liquid limit less than 50	None to Low	Quick to slow	None	ML	SILT
		Medium to High	None	Medium	CL	CLAY
		Low to Medium	Slow to very slow	Low	OL	ORGANIC SILT
	SILTS AND CLAYS Liquid limit greater than 50	Low to Medium	Slow to very slow	Low to Medium	MH	SILT
		High	None	High	CH	CLAY
		Medium to High	None	Low to Medium	OH	ORGANIC CLAY
HIGHLY ORGANIC SOILS		Identified by colour, odour, spongy feel and generally by fibrosous texture.			Pt	Peat

VIBROCORE LOG

Royal HaskoningDHV
Enhancing Society Together

VIBROCORE # **CAC1**

SHEET 1 of 1

CLIENT:	Snowy Hydro Ltd	**DATE COMMENCED:**	09-08-18
PROJECT:	Snowy 2.0	**DATE COMPLETED:**	09-08-18
LOCATION:	Talbingo Reservoir	**LOGGED BY:**	R Plain
JOB NUMBER:	PA1804	**CHECKED BY:**	S Taylor

Contractor:	Geochemical Assessments	**Core diameter (OD):**		**Easting:**	620143	**Bathymetry:**	511 mAHD
Equipment:	Gravity Corer		**(ID):**	**Northing:**	6044046	**Datum:**	MGA 55

sub sample	Depth below bed level (m)	Graphic Log	USC Symbol	Material Description	Field Observations
	0.07			SILT, brown/grey, very soft	Hydrous (RESERVOIR DEPOSIT)
	0.1			Organics, dark grey, primarily bark	
PSD METALS	0.3			Silty Sandy GRAVEL with clay, gravel flat and angular, approximately 20mm diameter, red/brown	Abundant roots
				EOH 0.3m	
	0.5				
	1				
	1.5				
	2				
	2.5				
	3				

Core Log Photograph

CAC1

VIBROCORE LOG

Royal HaskoningDHV
Enhancing Society Together

VIBROCORE # **CAC2**

SHEET 1 of 1

CLIENT:	Snowy Hydro Ltd	**DATE COMMENCED:**	09-08-18
PROJECT:	Snowy 2.0	**DATE COMPLETED:**	09-08-18
LOCATION:	Talbingo Reservoir	**LOGGED BY:**	R Plain
JOB NUMBER:	PA1804	**CHECKED BY:**	S Taylor

Contractor:	Geochemical Assessments	**Core diameter (OD):**		**Easting:**	620327	**Bathymetry:**	501 mAHD
Equipment:	Gravity Corer		**(ID):**	**Northing:**	6044154	**Datum:**	MGA 55

sub sample	Depth below bed level (m)	Graphic Log	USC Symbol	Material Description	Field Observations
	0.02			SILT, brown/grey, very soft	Hydrous (RESERVOIR DEPOSIT)
				Sandy CLAY, dark grey becoming brown/cream, trace gravel, subangular, <3mm diameter.	Abundant vegetation/roots (TOPSOIL)
	0.2				
PSD METALS				Sandy SILT/Silty SAND with clay, with gravel, brown/cream, angular gravel, up to 15mm diameter, dark grey.	(RESIDUAL)
	0.5				
	0.53			EOH 0.53m	
	1				
	1.5				
	2				
	2.5				
	3				

Core Log Photograph

CAC2

VIBROCORE LOG

Royal HaskoningDHV
Enhancing Society Together

VIBROCORE # **CAC3**

SHEET 1 of 1

CLIENT:	Snowy Hydro Ltd	**DATE COMMENCED:**	09-08-18
PROJECT:	Snowy 2.0	**DATE COMPLETED:**	09-08-18
LOCATION:	Talbingo Reservoir	**LOGGED BY:**	R Plain
JOB NUMBER:	PA1804	**CHECKED BY:**	S Taylor

Contractor:	Geochemical Assessments	**Core diameter (OD):**		**Easting:**	620516	**Bathymetry:**	494 mAHD
Equipment:	Gravity Corer		**(ID):**	**Northing:**	6044154	**Datum:**	MGA 55

sub sample	Depth below bed level (m)	Graphic Log	USC Symbol	Material Description	Field Observations
	0.05			SILT, brown/grey, very soft	Hydrous (RESERVOIR DEPOSIT)
	0.16			Silty Sandy GRAVEL, brown/dark grey, gravel <5mm, rounded, cream colour	(ALLUVIAL)
METALS				CLAY with sand, grey, soft becoming firm.	Vegetation/roots visible. (RESIDUAL)
	0.5				
	0.7			EOH 0.7m	
	1				
	1.5				
	2				
	2.5				
	3				

Core Log Photograph

CAC3

VIBROCORE LOG

Royal HaskoningDHV
Enhancing Society Together

VIBROCORE # **ISC1**

SHEET 1 of 1

CLIENT:	Snowy Hydro Ltd	**DATE COMMENCED:**	08-08-18
PROJECT:	Snowy 2.0	**DATE COMPLETED:**	08-08-18
LOCATION:	Talbingo Reservoir	**LOGGED BY:**	R Plain
JOB NUMBER:	PA1804	**CHECKED BY:**	S Taylor

Contractor:	Geochemical Assessments	**Core diameter (OD):**		**Easting:**	624272	**Bathymetry:**	530 mAHD
Equipment:	Piston Corer		**(ID):**	**Northing:**	6040722	**Datum:**	MGA 55

sub sample	Depth below bed level (m)	Graphic Log	USC Symbol	Material Description	Field Observations
METALS				Sandy MUD, grey/brown, very soft becoming firm below 0.02m becoming darker at depth.	Homogenous, abundant rootlets.
	0.5				
	0.7			EOH at 0.7m	
	1				
	1.5				
	2				
	2.5				
	3				

Core Log Photograph

ISC1

VIBROCORE LOG

Royal HaskoningDHV
Enhancing Society Together

VIBROCORE # **ISC2**

SHEET 1 of 1

CLIENT:	Snowy Hydro Ltd	**DATE COMMENCED:**	08-08-18
PROJECT:	Snowy 2.0	**DATE COMPLETED:**	08-08-18
LOCATION:	Talbingo Reservoir	**LOGGED BY:**	R Plain
JOB NUMBER:	PA1804	**CHECKED BY:**	S Taylor

Contractor:	Geochemical Assessments	**Core diameter (OD):**		**Easting:**	624331	**Bathymetry:**	529.5 mAHD
Equipment:	Piston Corer		**(ID):**	**Northing:**	6040726	**Datum:**	MGA 55

sub sample	Depth below bed level (m)	Graphic Log	USC Symbol	Material Description	Field Observations
				Gravelly SAND with mud, angular shale pink/orange/grey	Possibly scree from upslope.
	0.44				
PSD	0.5			MUD, brown/grey	Fine, no sand.
METALS	0.55				
PSD METALS				Muddy GRAVEL/SAND, grey angular gravel approximately 10-15mm diameter becoming finer with depth, approximately 5 mm diameter	trace roots below 1m
	1				
	1.1			EOH 1.1m	
	1.5				
	2				
	2.5				
	3				

Core Log Photograph

ISC2

VIBROCORE LOG

Royal HaskoningDHV
Enhancing Society Together

VIBROCORE # **ISC3**

SHEET 1 of 1

CLIENT:	Snowy Hydro Ltd	**DATE COMMENCED:**	08-08-18
PROJECT:	Snowy 2.0	**DATE COMPLETED:**	08-08-18
LOCATION:	Talbingo Reservoir	**LOGGED BY:**	R Plain
JOB NUMBER:	PA1804	**CHECKED BY:**	S Taylor

Contractor:	Geochemical Assessments	**Core diameter (OD):**		**Easting:**	624280	**Bathymetry:**	530 mAHD
Equipment:	Piston Corer		**(ID):**	**Northing:**	6040750	**Datum:**	MGA 55

sub sample	Depth below bed level (m)	Graphic Log	USC Symbol	Material Description	Field Observations
METALS				MUD, grey/brown, very soft	Hydrous (RESERVOIR DEPOSIT)
	0.5			becoming stiff	
	0.74			EOH 0.74m	
	1				
	1.5				
	2				
	2.5				
	3				

Core Log Photograph

ISC3

VIBROCORE LOG

Royal HaskoningDHV
Enhancing Society Together

VIBROCORE # **MBC1**

SHEET 1 of 1

CLIENT:	Snowy Hydro Ltd	**DATE COMMENCED:**	07-08-18
PROJECT:	Snowy 2.0	**DATE COMPLETED:**	07-08-18
LOCATION:	Talbingo Reservoir	**LOGGED BY:**	S Taylor
JOB NUMBER:	PA1804	**CHECKED BY:**	R Plain

Contractor:	Geochemical Assessments	**Core diameter (OD):**		**Easting:**	624731	**Bathymetry:**	535 mAHD
Equipment:	Piston Corer		**(ID):**	**Northing:**	6040384	**Datum:**	MGA 55

sub sample	Depth below bed level (m)	Graphic Log	USC Symbol	Material Description	Field Observations
	0.04			MUD, brown, very soft	Hydrous (RESERVOIR DEPOSIT)
				MUD, reddish brown, soft	Some vesicles
	0.5				
	0.6				
PSD METALS				Sandy SILT with clay, brown, soft	Minor organic material, some vesicles.
	1				
PSD METALS				Silty Clayey SAND, grey/brown, soft	
	1.45				
				No core recovered	
	1.5			EOH at 1.5m	
	2				
	2.5				
	3				

Core Log Photograph

MBC1 0-0.5m

Core Log Photograph

MBC1 0.4-1.0m

Core Log Photograph

MBC1 – 1.0-1.5m

VIBROCORE LOG

Royal HaskoningDHV
Enhancing Society Together

VIBROCORE # **MBC2**

SHEET 1 of 1

CLIENT:	Snowy Hydro Ltd	**DATE COMMENCED:**	07-08-18
PROJECT:	Snowy 2.0	**DATE COMPLETED:**	07-08-18
LOCATION:	Talbingo Reservoir	**LOGGED BY:**	S Taylor
JOB NUMBER:	PA1804	**CHECKED BY:**	R Plain

Contractor:	Geochemical Assessments	**Core diameter (OD):**		**Easting:**	624641	**Bathymetry:**	534 mAHD
Equipment:	Piston Corer		**(ID):**	**Northing:**	6040353	**Datum:**	MGA 55

sub sample	Depth below bed level (m)	Graphic Log	USC Symbol	Material Description	Field Observations
	0.02			MUD, brown	Hydrous (RESERVOIR DEPOSIT)
				MUD, light grey/brown	Vesicles, some very fine fibrous organic material
	0.5				
	0.85			Sandy MUD, dark brown, with 'lumps' of clay.	Distinctly different texture to above. Possibly original soil profile. Clay 'lumps' 2-5mm diameter.
	1				
	1.07			EOH at 1.07m	
	1.5				
	2				
	2.5				
	3				

Core Log Photograph

MBC2 – 0-0.5m

Core Log Photograph

MBC2 – 0.3-0.8m

Core Log Photograph

MBC2 – 0.7-1.07m

VIBROCORE LOG

Royal HaskoningDHV
Enhancing Society Together

VIBROCORE # **MBC3**

SHEET 1 of 1

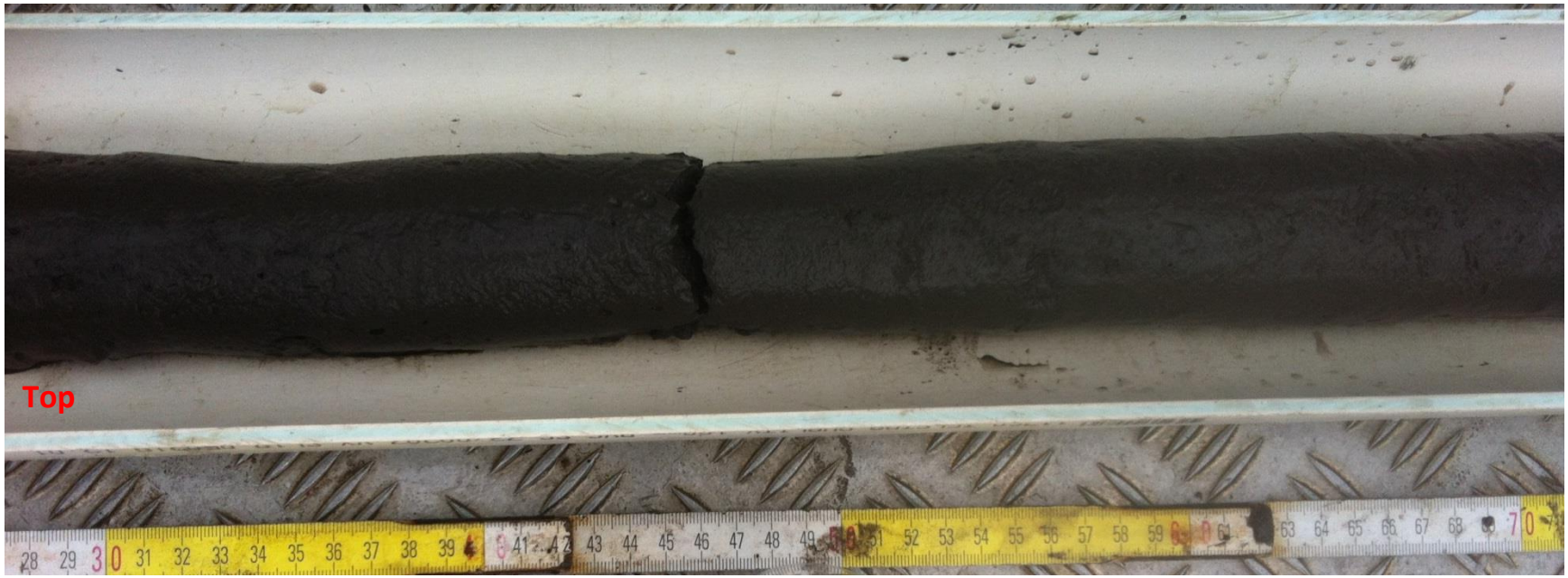
CLIENT:	Snowy Hydro Ltd	**DATE COMMENCED:**	07-08-18
PROJECT:	Snowy 2.0	**DATE COMPLETED:**	07-08-18
LOCATION:	Talbingo Reservoir	**LOGGED BY:**	S Taylor
JOB NUMBER:	PA1804	**CHECKED BY:**	R Plain

Contractor:	Geochemical Assessments	**Core diameter (OD):**		**Easting:**	624563	**Bathymetry:**	533 mAHD
Equipment:	Piston Corer	**(ID):**		**Northing:**	6040353	**Datum:**	MGA 55

sub sample	Depth below bed level (m)	Graphic Log	USC Symbol	Material Description	Field Observations
				MUD, brown/grey, very soft	Hydrous (RESERVOIR DEPOSIT)
	0.1			MUD, grey, uniform texture, soft	Some vesicles, fine fibrous material
	0.5			with trace sand	
METALS	0.78			Gravelly muddy SAND, grey, dense	Rounded lithic pebbles to 40mm diameter, quartz and other lithic fragments. (ALLUVIAL)
	0.96			EOH at 0.96m	
	1				
	1.5				
	2				
	2.5				
	3				

Core Log Photograph

MBC3 – 0-0.4m



Core Log Photograph

MBC3 – 0.3-0.7m

Core Log Photograph

MBC3 – 0.7-0.96m

VIBROCORE LOG

Royal HaskoningDHV
Enhancing Society Together

VIBROCORE # **MBC4**

SHEET 1 of 1

CLIENT:	Snowy Hydro Ltd	**DATE COMMENCED:**	07-08-18
PROJECT:	Snowy 2.0	**DATE COMPLETED:**	07-08-18
LOCATION:	Talbingo Reservoir	**LOGGED BY:**	S Taylor
JOB NUMBER:	PA1804	**CHECKED BY:**	R Plain

Contractor:	Geochemical Assessments	**Core diameter (OD):**		**Easting:**	624478	**Bathymetry:**	534 mAHD
Equipment:	Piston Corer	**(ID):**		**Northing:**	6040407	**Datum:**	MGA 55

sub sample	Depth below bed level (m)	Graphic Log	USC Symbol	Material Description	Field Observations
				MUD, grey, homogenous, very soft	Minor fibrous material, one 'stick'
	0.37			Muddy SAND, grey	Thin fibrous organic matter from 0.37-0.6m. Homogenous 0.6-0.98m
	0.5				
	0.98			Gravelly sandy MUD, dark grey, soft becoming firm	Vegetation material especially 1.0-1.1m
	1				
	1.5			EOH 1.5m	
	2				
	2.5				
	3				

Core Log Photograph

MBC4 – 0-0.4m

Core Log Photograph

MBC4 – 0.4-0.8m

9

Core Log Photograph

MBC4 – 0.8-1.2m

Core Log Photograph

MBC4 – 1.2-1.5m

VIBROCORE LOG

Royal HaskoningDHV
Enhancing Society Together

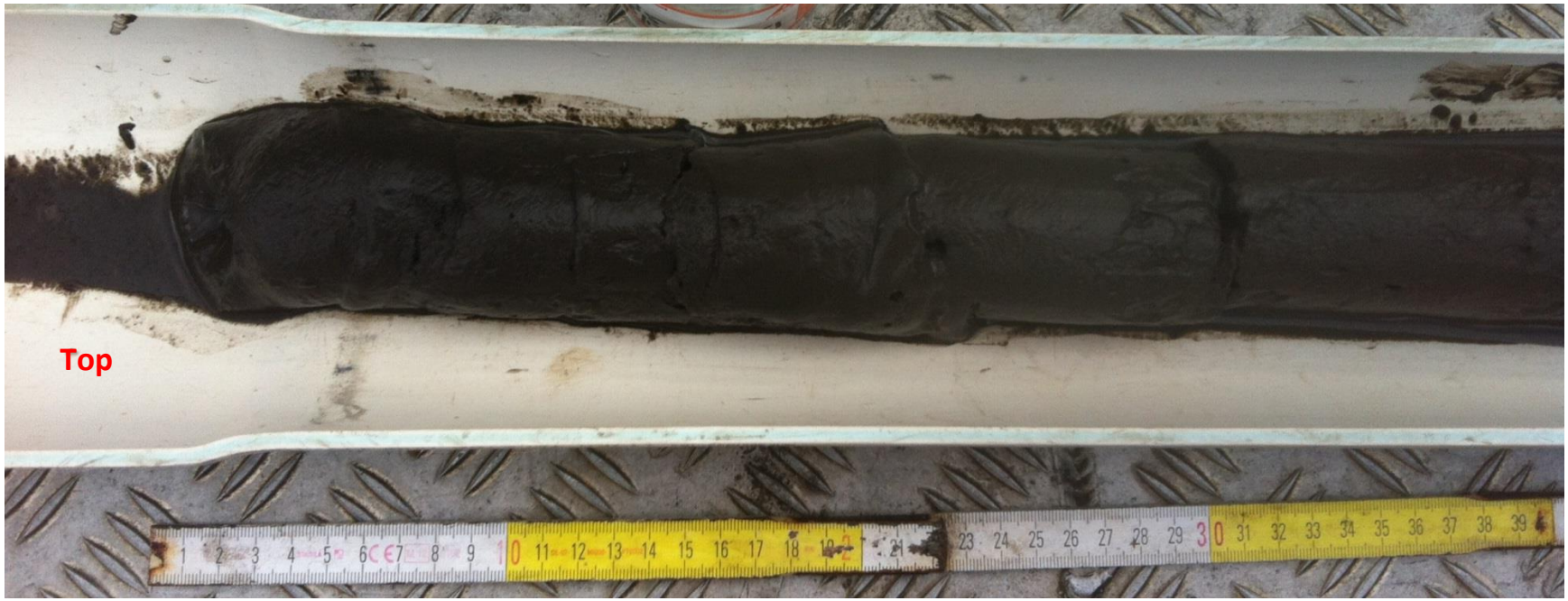
VIBROCORE # **MBC5**

SHEET 1 of 1

CLIENT:	Snowy Hydro Ltd	**DATE COMMENCED:**	07-08-18
PROJECT:	Snowy 2.0	**DATE COMPLETED:**	07-08-18
LOCATION:	Talbingo Reservoir	**LOGGED BY:**	S Taylor
JOB NUMBER:	PA1804	**CHECKED BY:**	R Plain

Contractor:	Geochemical Assessments	**Core diameter (OD):**		**Easting:**	624326	**Bathymetry:**	533 mAHD
Equipment:	Piston Corer	**(ID):**		**Northing:**	6040416	**Datum:**	MGA 55

sub sample	Depth below bed level (m)	Graphic Log	USC Symbol	Material Description	Field Observations
				MUD, brown/grey, very soft	Some vesicles and fibrous material.
				becoming soft below 0.25m	
METALS	0.5			Muddy GRAVEL, firm	Shale fragments to 30mm diameter. Abundant vegetation.
	0.62			Gravelly MUD, stiff, gravel at base	Abundant vegetation
	0.7			EOH 0.7m	
	1				
	1.5				
	2				
	2.5				
	3				



Core Log Photograph

MBC5 – 0-0.4m

Core Log Photograph

MBC5 – 0.4-0.7m

VIBROCORE LOG

Royal HaskoningDHV
Enhancing Society Together

VIBROCORE # **PLC1**

SHEET 1 of 1

CLIENT:	Snowy Hydro Ltd	**DATE COMMENCED:**	09-08-18
PROJECT:	Snowy 2.0	**DATE COMPLETED:**	09-08-18
LOCATION:	Talbingo Reservoir	**LOGGED BY:**	R Plain
JOB NUMBER:	PA1804	**CHECKED BY:**	S Taylor

Contractor:	Geochemical Assessments	**Core diameter (OD):**		**Easting:**	621476	**Bathymetry:**	509 mAHD
Equipment:	Gravity Corer		**(ID):**	**Northing:**	6042231	**Datum:**	MGA 55

sub sample	Depth below bed level (m)	Graphic Log	USC Symbol	Material Description	Field Observations
				SILT, brown/grey	Hydrous (RESERVOIR DEPOSIT)
	0.1			Layer of bark/leaves at 0.1m	
PSD METALS				Silty SAND with clay, dark grey	Abundant roots from 0.2 to 0.3m (RESIDUAL)
				from 0.3m, becoming green/grey, firm, trace gravel up to 15mm diameter, laminated angular quartz.	
	0.5			EOH at 0.48m	
	1				
	1.5				
	2				
	2.5				
	3				

Core Log Photograph

PLC1

VIBROCORE LOG

Royal HaskoningDHV
Enhancing Society Together

VIBROCORE # **PLC2**

SHEET 1 of 1

CLIENT:	Snowy Hydro Ltd	**DATE COMMENCED:**	09-08-18
PROJECT:	Snowy 2.0	**DATE COMPLETED:**	09-08-18
LOCATION:	Talbingo Reservoir	**LOGGED BY:**	R Plain
JOB NUMBER:	PA1804	**CHECKED BY:**	S Taylor

Contractor:	Geochemical Assessments	**Core diameter (OD):**		**Easting:**	621475	**Bathymetry:**	513 mAHD
Equipment:	Gravity Corer		**(ID):**	**Northing:**	6042308	**Datum:**	MGA 55

sub sample	Depth below bed level (m)	Graphic Log	USC Symbol	Material Description	Field Observations
	0.1			SILT, brown/grey, orange/red on surface	Hydrous (RESERVOIR DEPOSIT)
	0.4			Sandy CLAY with gravel, brown, angular gravel, blue/grey, siliceous from 0.2, becoming cream/brown.	Abundant roots (RESIDUAL) From 0.2, trace roots
				EOH 0.4m	
	0.5				
	1				
	1.5				
	2				
	2.5				
	3				

Core Log Photograph

PLC2

VIBROCORE LOG

Royal HaskoningDHV
Enhancing Society Together

VIBROCORE # **PLC3**

SHEET 1 of 1

CLIENT:	Snowy Hydro Ltd	**DATE COMMENCED:**	08-08-18
PROJECT:	Snowy 2.0	**DATE COMPLETED:**	08-08-18
LOCATION:	Talbingo Reservoir	**LOGGED BY:**	R Plain
JOB NUMBER:	PA1804	**CHECKED BY:**	S Taylor

Contractor:	Geochemical Assessments	**Core diameter (OD):**		**Easting:**	621598	**Bathymetry:**	515 mAHD
Equipment:	Gravity Corer		**(ID):**	**Northing:**	6042338	**Datum:**	MGA 55

sub sample	Depth below bed level (m)	Graphic Log	USC Symbol	Material Description	Field Observations
	0.01			SILT, brown/grey	Hydrous (RESERVOIR DEPOSIT)
				Sandy CLAY, brown/creamy brown/grey	Abundant roots (TOPSOIL)
	0.15				
PSD METALS				Clayey SILT/SAND trace gravelly, creamy brown, soft	trace roots (RESIDUAL)
	0.45				
				Sandy Clayey GRAVEL, creamy brown/orange, becoming firm	
	0.5				
	0.57				
				EOH 0.57m	
	1				
	1.5				
	2				
	2.5				
	3				

Core Log Photograph

PLC3

VIBROCORE LOG

Royal HaskoningDHV
Enhancing Society Together

VIBROCORE # **RAC1**

SHEET 1 of 1

CLIENT:	Snowy Hydro Ltd	**DATE COMMENCED:**	08-08-18
PROJECT:	Snowy 2.0	**DATE COMPLETED:**	08-08-18
LOCATION:	Talbingo Reservoir	**LOGGED BY:**	R Plain
JOB NUMBER:	PA1804	**CHECKED BY:**	S Taylor

Contractor:	Geochemical Assessments	**Core diameter (OD):**		**Easting:**	622756	**Bathymetry:**	510 mAHD
Equipment:	Gravity Corer		**(ID):**	**Northing:**	6041717	**Datum:**	MGA 55

sub sample	Depth below bed level (m)	Graphic Log	USC Symbol	Material Description	Field Observations
				SILT, brown/grey, fine	Hydrous (RESERVOIR DEPOSIT)
	0.07			Sandy MUD, brown	Abundant roots (TOPSOIL)
	0.19				
PSD METALS				Silty Clayey SAND, creamy brown, becoming lighter with depth	Trace roots (RESIDUAL)
	0.5				
	0.62			EOH 0.62m	
	1				
	1.5				
	2				
	2.5				
	3				

Core Log Photograph

RAC1

VIBROCORE LOG

Royal HaskoningDHV
Enhancing Society Together

VIBROCORE # **RAC2**

SHEET 1 of 1

CLIENT:	Snowy Hydro Ltd	**DATE COMMENCED:**	08-08-18
PROJECT:	Snowy 2.0	**DATE COMPLETED:**	08-08-18
LOCATION:	Talbingo Reservoir	**LOGGED BY:**	R Plain
JOB NUMBER:	PA1804	**CHECKED BY:**	S Taylor

Contractor:	Geochemical Assessments	**Core diameter (OD):**		**Easting:**	623038	**Bathymetry:**	512 mAHD
Equipment:	Gravity Corer		**(ID):**	**Northing:**	6041818	**Datum:**	MGA 55

sub sample	Depth below bed level (m)	Graphic Log	USC Symbol	Material Description	Field Observations
	0.1			SILT, brown/grey, fine	Hydrous (RESERVOIR DEPOSIT)
	0.2			Sandy MUD, brown	Abundant roots (TOPSOIL)
	0.5			Sandy MUD, creamy brown becoming lighter with depth	Trace roots. Possibly residual soil.
	1			EOH 0.85m, full core barrel	
	1.5				
	2				
	2.5				
	3				

Core Log Photograph

RAC2

VIBROCORE LOG

Royal HaskoningDHV
Enhancing Society Together

VIBROCORE # **RAC3**

SHEET 1 of 1

CLIENT:	Snowy Hydro Ltd	**DATE COMMENCED:**	08-08-18
PROJECT:	Snowy 2.0	**DATE COMPLETED:**	08-08-18
LOCATION:	Talbingo Reservoir	**LOGGED BY:**	R Plain
JOB NUMBER:	PA1804	**CHECKED BY:**	S Taylor

Contractor:	Geochemical Assessments	**Core diameter (OD):**		**Easting:**	623378	**Bathymetry:**	513 mAHD
Equipment:	Gravity Corer		**(ID):**	**Northing:**	6041670	**Datum:**	MGA 55

sub sample	Depth below bed level (m)	Graphic Log	USC Symbol	Material Description	Field Observations
				SILT, brown/grey, fine	Hydrous (RESERVOIR DEPOSIT)
	0.125			layer of leaves at 0.125m	
PSD METALS	0.25			Muddy SAND, brown	Abundant roots
				EOH 0.25m. Core barrel bent. Refusal on rock.	
	0.5				
	1				
	1.5				
	2				
	2.5				
	3				

Core Log Photograph

RAC3

VIBROCORE LOG

Royal HaskoningDHV
Enhancing Society Together

VIBROCORE # **RAC4**

SHEET 1 of 1

CLIENT:	Snowy Hydro Ltd	**DATE COMMENCED:**	09-08-18
PROJECT:	Snowy 2.0	**DATE COMPLETED:**	09-08-18
LOCATION:	Talbingo Reservoir	**LOGGED BY:**	R Plain
JOB NUMBER:	PA1804	**CHECKED BY:**	S Taylor

Contractor:	Geochemical Assessments	**Core diameter (OD):**		**Easting:**	622861	**Bathymetry:**	516 mAHD
Equipment:	Gravity Corer		**(ID):**	**Northing:**	6041714	**Datum:**	MGA 55

sub sample	Depth below bed level (m)	Graphic Log	USC Symbol	Material Description	Field Observations
				SILT, brown/grey, very soft	Hydrous (RESERVOIR DEPOSIT)
	0.13			Layer of leaves/bark at 0.13m	
				Gravelly CLAY, cream/brown becoming lighter with depth, angular gravel up to 15mm diameter.	Trace roots (RESIDUAL)
				from 0.45m, becoming firm	
	0.5				
	0.63			EOH at 0.63m	
	1				
	1.5				
	2				
	2.5				
	3				

Core Log Photograph

RAC4

Appendix C – Laboratory Results

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **ES1824346**	Page	: 1 of 35
Client	: **HASKONING AUSTRALIA- ROYAL HASKONING**	Laboratory	: Environmental Division Sydney
Contact	: ALI WATTERS	Contact	: Customer Services ES
Address	: LEVEL 14 56 Berry Street NORTH SYDNEY 2060	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: +61 02 8854 5000	Telephone	: +61-2-8784 8555
Project	: SNOWY 2.0 - VIBROCORING	Date Samples Received	: 17-Aug-2018 18:55
Order number	:	Date Analysis Commenced	: 20-Aug-2018
C-O-C number	: ----	Issue Date	: 27-Aug-2018 16:47
Sampler	: RICK PLAIN		
Site	: ----		
Quote number	: EN/222/17		
No. of samples received	: 16		
No. of samples analysed	: 16		

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics, Smithfield, NSW
Dianne Blane	Laboratory Coordinator (2IC)	Newcastle - Inorganics, Mayfield West, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Ivan Taylor	Analyst	Sydney Inorganics, Smithfield, NSW
Kim McCabe	Senior Inorganic Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD
Pabi Subba	Senior Organic Chemist	Sydney Organics, Smithfield, NSW

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- EA150H: Soil Particle Density required for Hydrometer analysis according to AS 1289.3.5.1 2006 was not requested by the client. Typical sediment SPD values used for calculations and consequently NATA endorsement does not apply to hydrometer results.
- EA150H: Particle Size Analysis was performed but unable to be reported for sample #6 as insufficient sample was supplied by the client to report a valid result.
- EP131B : LOR is raised due to high amount of moistures is present.
- EP071: Poor duplicate precision for sample CPB1 0.0-0.7 due to sample heterogeneity. Confirmed by re-extraction and re-analysis.

Analytical Results

Sub-Matrix: SEDIMENT (Matrix: SOIL)			Client sample ID	CAC1 0.1-0.3	CAC2 0.2-0.53	CAC3 0.2-0.7	ISC1 0.0-0.7	ISC2 0.0-0.45
			Client sampling date / time	17-Aug-2018 00:00	17-Aug-2018 00:00	17-Aug-2018 00:00	17-Aug-2018 00:00	17-Aug-2018 00:00
Compound	CAS Number	LOR	Unit	ES1824346-001	ES1824346-002	ES1824346-003	ES1824346-004	ES1824346-005
				Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	29.1	25.2	35.8	32.8	25.7
EA150: Particle Sizing								
+75µm	----	1	%	69	59	----	----	86
+150µm	----	1	%	65	54	----	----	86
+300µm	----	1	%	61	48	----	----	86
+425µm	----	1	%	57	45	----	----	85
+600µm	----	1	%	54	41	----	----	83
+1180µm	----	1	%	47	33	----	----	73
+2.36mm	----	1	%	39	24	----	----	42
+4.75mm	----	1	%	30	14	----	----	16
+9.5mm	----	1	%	23	7	----	----	3
+19.0mm	----	1	%	11	<1	----	----	<1
+37.5mm	----	1	%	<1	<1	----	----	<1
+75.0mm	----	1	%	<1	<1	----	----	<1
EA150: Soil Classification based on Particle Size								
Clay (<2 µm)	----	1	%	6	12	----	----	8
Silt (2-60 µm)	----	1	%	21	26	----	----	6
Sand (0.06-2.00 mm)	----	1	%	31	35	----	----	35
Gravel (>2mm)	----	1	%	42	27	----	----	51
Cobbles (>6cm)	----	1	%	<1	<1	----	----	<1
ED042T: Total Sulfur by LECO								
Sulfur - Total as S (LECO)	----	0.01	%	0.02	0.02	0.02	0.02	<0.01
EG005-SD: Total Metals in Sediments by ICP-AES								
Aluminium	7429-90-5	50	mg/kg	13000	13800	21700	10900	12800
Iron	7439-89-6	50	mg/kg	19300	21100	41700	21600	29600
EG020-SD: Total Metals in Sediments by ICPMS								
Antimony	7440-36-0	0.50	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
Arsenic	7440-38-2	1.00	mg/kg	1.52	2.45	4.88	6.24	2.45
Cadmium	7440-43-9	0.1	mg/kg	<0.1	<0.1	<0.1	0.1	<0.1
Chromium	7440-47-3	1.0	mg/kg	15.5	22.9	75.5	33.5	56.5
Copper	7440-50-8	1.0	mg/kg	29.9	25.6	24.4	22.6	25.0
Cobalt	7440-48-4	0.5	mg/kg	10.4	10.9	22.1	11.5	17.0
Lead	7439-92-1	1.0	mg/kg	9.6	10.6	11.3	21.8	51.5
Manganese	7439-96-5	10	mg/kg	518	388	652	498	752

Analytical Results

Sub-Matrix: SEDIMENT (Matrix: SOIL)			Client sample ID	CAC1 0.1-0.3	CAC2 0.2-0.53	CAC3 0.2-0.7	ISC1 0.0-0.7	ISC2 0.0-0.45
			Client sampling date / time	17-Aug-2018 00:00	17-Aug-2018 00:00	17-Aug-2018 00:00	17-Aug-2018 00:00	17-Aug-2018 00:00
Compound	CAS Number	LOR	Unit	ES1824346-001	ES1824346-002	ES1824346-003	ES1824346-004	ES1824346-005
				Result	Result	Result	Result	Result
EG020-SD: Total Metals in Sediments by ICPMS - Continued								
Nickel	7440-02-0	1.0	mg/kg	11.1	16.2	64.9	36.2	85.8
Selenium	7782-49-2	0.1	mg/kg	0.3	0.6	1.1	0.9	0.4
Silver	7440-22-4	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Vanadium	7440-62-2	2.0	mg/kg	30.1	37.8	74.0	20.3	25.1
Zinc	7440-66-6	1.0	mg/kg	40.4	42.3	62.8	70.0	181
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.01	mg/kg	0.01	0.01	0.01	0.02	0.01
EK055: Ammonia as N								
Ammonia as N	7664-41-7	20	mg/kg	30	<20	60	80	<20
EK057G: Nitrite as N by Discrete Analyser								
Nitrite as N (Sol.)	14797-65-0	0.1	mg/kg	<0.1	<0.1	0.1	<0.1	<0.1
EK058G: Nitrate as N by Discrete Analyser								
Nitrate as N (Sol.)	14797-55-8	0.1	mg/kg	<0.1	<0.1	0.5	<0.1	<0.1
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Nitrite + Nitrate as N (Sol.)	----	0.1	mg/kg	<0.1	<0.1	0.6	<0.1	<0.1
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Total Kjeldahl Nitrogen as N	----	20	mg/kg	470	320	450	1030	260
EK062: Total Nitrogen as N (TKN + NOx)								
^ Total Nitrogen as N	----	20	mg/kg	470	320	450	1030	260
EK067G: Total Phosphorus as P by Discrete Analyser								
Total Phosphorus as P	----	2	mg/kg	794	432	402	429	464
EP003: Total Organic Carbon (TOC) in Soil								
Total Organic Carbon	----	0.02	%	0.61	0.17	0.62	1.10	0.12
EP074A: Monocyclic Aromatic Hydrocarbons								
Benzene	71-43-2	0.2	mg/kg	<0.2	----	<0.2	----	<0.2
Toluene	108-88-3	0.5	mg/kg	<0.5	----	<0.5	----	<0.5
Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	----	<0.5	----	<0.5
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	----	<0.5	----	<0.5
Styrene	100-42-5	0.5	mg/kg	<0.5	----	<0.5	----	<0.5
ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	----	<0.5	----	<0.5
Isopropylbenzene	98-82-8	0.5	mg/kg	<0.5	----	<0.5	----	<0.5
n-Propylbenzene	103-65-1	0.5	mg/kg	<0.5	----	<0.5	----	<0.5
1.3.5-Trimethylbenzene	108-67-8	0.5	mg/kg	<0.5	----	<0.5	----	<0.5

Analytical Results

Sub-Matrix: SEDIMENT (Matrix: SOIL)			Client sample ID	CAC1 0.1-0.3	CAC2 0.2-0.53	CAC3 0.2-0.7	ISC1 0.0-0.7	ISC2 0.0-0.45
			Client sampling date / time	17-Aug-2018 00:00	17-Aug-2018 00:00	17-Aug-2018 00:00	17-Aug-2018 00:00	17-Aug-2018 00:00
Compound	CAS Number	LOR	Unit	ES1824346-001	ES1824346-002	ES1824346-003	ES1824346-004	ES1824346-005
				Result	Result	Result	Result	Result
EP074A: Monocyclic Aromatic Hydrocarbons - Continued								
sec-Butylbenzene	135-98-8	0.5	mg/kg	<0.5	----	<0.5	----	<0.5
1.2.4-Trimethylbenzene	95-63-6	0.5	mg/kg	<0.5	----	<0.5	----	<0.5
tert-Butylbenzene	98-06-6	0.5	mg/kg	<0.5	----	<0.5	----	<0.5
p-Isopropyltoluene	99-87-6	0.5	mg/kg	<0.5	----	<0.5	----	<0.5
n-Butylbenzene	104-51-8	0.5	mg/kg	<0.5	----	<0.5	----	<0.5
EP074B: Oxygenated Compounds								
Vinyl Acetate	108-05-4	5	mg/kg	<5	----	<5	----	<5
2-Butanone (MEK)	78-93-3	5	mg/kg	<5	----	<5	----	<5
4-Methyl-2-pentanone (MIBK)	108-10-1	5	mg/kg	<5	----	<5	----	<5
2-Hexanone (MBK)	591-78-6	5	mg/kg	<5	----	<5	----	<5
EP074C: Sulfonated Compounds								
Carbon disulfide	75-15-0	0.5	mg/kg	<0.5	----	<0.5	----	<0.5
EP074D: Fumigants								
2.2-Dichloropropane	594-20-7	0.5	mg/kg	<0.5	----	<0.5	----	<0.5
1.2-Dichloropropane	78-87-5	0.5	mg/kg	<0.5	----	<0.5	----	<0.5
cis-1.3-Dichloropropylene	10061-01-5	0.5	mg/kg	<0.5	----	<0.5	----	<0.5
trans-1.3-Dichloropropylene	10061-02-6	0.5	mg/kg	<0.5	----	<0.5	----	<0.5
1.2-Dibromoethane (EDB)	106-93-4	0.5	mg/kg	<0.5	----	<0.5	----	<0.5
EP074E: Halogenated Aliphatic Compounds								
Dichlorodifluoromethane	75-71-8	5	mg/kg	<5	----	<5	----	<5
Chloromethane	74-87-3	5	mg/kg	<5	----	<5	----	<5
Vinyl chloride	75-01-4	5	mg/kg	<5	----	<5	----	<5
Bromomethane	74-83-9	5	mg/kg	<5	----	<5	----	<5
Chloroethane	75-00-3	5	mg/kg	<5	----	<5	----	<5
Trichlorofluoromethane	75-69-4	5	mg/kg	<5	----	<5	----	<5
1.1-Dichloroethene	75-35-4	0.5	mg/kg	<0.5	----	<0.5	----	<0.5
Iodomethane	74-88-4	0.5	mg/kg	<0.5	----	<0.5	----	<0.5
trans-1.2-Dichloroethene	156-60-5	0.5	mg/kg	<0.5	----	<0.5	----	<0.5
1.1-Dichloroethane	75-34-3	0.5	mg/kg	<0.5	----	<0.5	----	<0.5
cis-1.2-Dichloroethene	156-59-2	0.5	mg/kg	<0.5	----	<0.5	----	<0.5
1.1.1-Trichloroethane	71-55-6	0.5	mg/kg	<0.5	----	<0.5	----	<0.5
1.1-Dichloropropylene	563-58-6	0.5	mg/kg	<0.5	----	<0.5	----	<0.5
Carbon Tetrachloride	56-23-5	0.5	mg/kg	<0.5	----	<0.5	----	<0.5
1.2-Dichloroethane	107-06-2	0.5	mg/kg	<0.5	----	<0.5	----	<0.5

Analytical Results

Sub-Matrix: SEDIMENT (Matrix: SOIL)			Client sample ID	CAC1 0.1-0.3	CAC2 0.2-0.53	CAC3 0.2-0.7	ISC1 0.0-0.7	ISC2 0.0-0.45
			Client sampling date / time	17-Aug-2018 00:00	17-Aug-2018 00:00	17-Aug-2018 00:00	17-Aug-2018 00:00	17-Aug-2018 00:00
Compound	CAS Number	LOR	Unit	ES1824346-001	ES1824346-002	ES1824346-003	ES1824346-004	ES1824346-005
				Result	Result	Result	Result	Result
EP074E: Halogenated Aliphatic Compounds - Continued								
Trichloroethene	79-01-6	0.5	mg/kg	<0.5	----	<0.5	----	<0.5
Dibromomethane	74-95-3	0.5	mg/kg	<0.5	----	<0.5	----	<0.5
1.1.2-Trichloroethane	79-00-5	0.5	mg/kg	<0.5	----	<0.5	----	<0.5
1.3-Dichloropropane	142-28-9	0.5	mg/kg	<0.5	----	<0.5	----	<0.5
Tetrachloroethene	127-18-4	0.5	mg/kg	<0.5	----	<0.5	----	<0.5
1.1.1.2-Tetrachloroethane	630-20-6	0.5	mg/kg	<0.5	----	<0.5	----	<0.5
trans-1.4-Dichloro-2-butene	110-57-6	0.5	mg/kg	<0.5	----	<0.5	----	<0.5
cis-1.4-Dichloro-2-butene	1476-11-5	0.5	mg/kg	<0.5	----	<0.5	----	<0.5
1.1.2.2-Tetrachloroethane	79-34-5	0.5	mg/kg	<0.5	----	<0.5	----	<0.5
1.2.3-Trichloropropane	96-18-4	0.5	mg/kg	<0.5	----	<0.5	----	<0.5
Pentachloroethane	76-01-7	0.5	mg/kg	<0.5	----	<0.5	----	<0.5
1.2-Dibromo-3-chloropropane	96-12-8	0.5	mg/kg	<0.5	----	<0.5	----	<0.5
Hexachlorobutadiene	87-68-3	0.5	mg/kg	<0.5	----	<0.5	----	<0.5
EP074F: Halogenated Aromatic Compounds								
Chlorobenzene	108-90-7	0.5	mg/kg	<0.5	----	<0.5	----	<0.5
Bromobenzene	108-86-1	0.5	mg/kg	<0.5	----	<0.5	----	<0.5
2-Chlorotoluene	95-49-8	0.5	mg/kg	<0.5	----	<0.5	----	<0.5
4-Chlorotoluene	106-43-4	0.5	mg/kg	<0.5	----	<0.5	----	<0.5
1.3-Dichlorobenzene	541-73-1	0.5	mg/kg	<0.5	----	<0.5	----	<0.5
1.4-Dichlorobenzene	106-46-7	0.5	mg/kg	<0.5	----	<0.5	----	<0.5
1.2-Dichlorobenzene	95-50-1	0.5	mg/kg	<0.5	----	<0.5	----	<0.5
1.2.4-Trichlorobenzene	120-82-1	0.5	mg/kg	<0.5	----	<0.5	----	<0.5
1.2.3-Trichlorobenzene	87-61-6	0.5	mg/kg	<0.5	----	<0.5	----	<0.5
EP074G: Trihalomethanes								
Chloroform	67-66-3	0.5	mg/kg	<0.5	----	<0.5	----	<0.5
Bromodichloromethane	75-27-4	0.5	mg/kg	<0.5	----	<0.5	----	<0.5
Dibromochloromethane	124-48-1	0.5	mg/kg	<0.5	----	<0.5	----	<0.5
Bromoform	75-25-2	0.5	mg/kg	<0.5	----	<0.5	----	<0.5
EP074H: Naphthalene								
Naphthalene	91-20-3	1	mg/kg	<1	----	<1	----	<1
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
>C10 - C16 Fraction	----	3	mg/kg	**5**	----	<3	----	<3
>C16 - C34 Fraction	----	3	mg/kg	**16**	----	**5**	----	**4**
>C34 - C40 Fraction	----	5	mg/kg	**9**	----	<5	----	<5

Analytical Results

Sub-Matrix: SEDIMENT (Matrix: SOIL)			Client sample ID	CAC1 0.1-0.3	CAC2 0.2-0.53	CAC3 0.2-0.7	ISC1 0.0-0.7	ISC2 0.0-0.45
			Client sampling date / time	17-Aug-2018 00:00	17-Aug-2018 00:00	17-Aug-2018 00:00	17-Aug-2018 00:00	17-Aug-2018 00:00
Compound	CAS Number	LOR	Unit	ES1824346-001	ES1824346-002	ES1824346-003	ES1824346-004	ES1824346-005
				Result	Result	Result	Result	Result
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued								
>C10 - C40 Fraction (sum)	----	3	mg/kg	**30**	----	**5**	----	**4**
>C10 - C16 Fraction minus Naphthalene (F2)	----	3	mg/kg	**5**	----	<3	----	<3
EP080-SD / EP071-SD: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	3	mg/kg	<3	----	<3	----	<3
C10 - C14 Fraction	----	3	mg/kg	<3	----	<3	----	<3
C15 - C28 Fraction	----	3	mg/kg	**13**	----	**3**	----	<3
C29 - C36 Fraction	----	5	mg/kg	**10**	----	<5	----	<5
^ C10 - C36 Fraction (sum)	----	3	mg/kg	**23**	----	**3**	----	<3
EP080-SD / EP071-SD: Total Recoverable Hydrocarbons								
C6 - C10 Fraction	C6_C10	3	mg/kg	<3	----	<3	----	<3
C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	3.0	mg/kg	<3.0	----	<3.0	----	<3.0
EP080-SD: BTEXN								
Benzene	71-43-2	0.2	mg/kg	<0.2	----	<0.2	----	<0.2
Toluene	108-88-3	0.2	mg/kg	<0.2	----	<0.2	----	<0.2
Ethylbenzene	100-41-4	0.2	mg/kg	<0.2	----	<0.2	----	<0.2
meta- & para-Xylene	108-38-3 106-42-3	0.2	mg/kg	<0.2	----	<0.2	----	<0.2
ortho-Xylene	95-47-6	0.2	mg/kg	<0.2	----	<0.2	----	<0.2
^ Total Xylenes	----	0.5	mg/kg	<0.5	----	<0.5	----	<0.5
^ Sum of BTEX	----	0.2	mg/kg	<0.2	----	<0.2	----	<0.2
Naphthalene	91-20-3	0.2	mg/kg	<0.2	----	<0.2	----	<0.2
EP130A: Organophosphorus Pesticides (Ultra-trace)								
Bromophos-ethyl	4824-78-6	10	µg/kg	<10	----	<10	----	<10
Carbophenothion	786-19-6	10	µg/kg	<10	----	<10	----	<10
Chlorfenvinphos (E)	18708-86-6	10.0	µg/kg	<10.0	----	<10.0	----	<10.0
Chlorfenvinphos (Z)	18708-87-7	10	µg/kg	<10	----	<10	----	<10
Chlorpyrifos	2921-88-2	10	µg/kg	<10	----	<10	----	<10
Chlorpyrifos-methyl	5598-13-0	10	µg/kg	<10	----	<10	----	<10
Demeton-S-methyl	919-86-8	10	µg/kg	<10	----	<10	----	<10
Diazinon	333-41-5	10	µg/kg	<10	----	<10	----	<10
Dichlorvos	62-73-7	10	µg/kg	<10	----	<10	----	<10
Dimethoate	60-51-5	10	µg/kg	<10	----	<10	----	<10
Ethion	563-12-2	10	µg/kg	<10	----	<10	----	<10

Analytical Results

Sub-Matrix: SEDIMENT (Matrix: SOIL)			Client sample ID	CAC1 0.1-0.3	CAC2 0.2-0.53	CAC3 0.2-0.7	ISC1 0.0-0.7	ISC2 0.0-0.45
			Client sampling date / time	17-Aug-2018 00:00	17-Aug-2018 00:00	17-Aug-2018 00:00	17-Aug-2018 00:00	17-Aug-2018 00:00
Compound	CAS Number	LOR	Unit	ES1824346-001	ES1824346-002	ES1824346-003	ES1824346-004	ES1824346-005
				Result	Result	Result	Result	Result
EP130A: Organophosphorus Pesticides (Ultra-trace) - Continued								
Fenamiphos	22224-92-6	10	µg/kg	<10	----	<10	----	<10
Fenthion	55-38-9	10	µg/kg	<10	----	<10	----	<10
Malathion	121-75-5	10	µg/kg	<10	----	<10	----	<10
Azinphos Methyl	86-50-0	10	µg/kg	<10	----	<10	----	<10
Monocrotophos	6923-22-4	10	µg/kg	<10	----	<10	----	<10
Parathion	56-38-2	10	µg/kg	<10	----	<10	----	<10
Parathion-methyl	298-00-0	10	µg/kg	<10	----	<10	----	<10
Pirimphos-ethyl	23505-41-1	10	µg/kg	<10	----	<10	----	<10
Prothiofos	34643-46-4	10	µg/kg	<10	----	<10	----	<10
EP131A: Organochlorine Pesticides								
Aldrin	309-00-2	0.50	µg/kg	<0.50	----	<0.50	----	<0.50
alpha-BHC	319-84-6	0.50	µg/kg	<0.50	----	<0.50	----	<0.50
beta-BHC	319-85-7	0.50	µg/kg	<0.50	----	<0.50	----	<0.50
delta-BHC	319-86-8	0.50	µg/kg	<0.50	----	<0.50	----	<0.50
4.4`-DDD	72-54-8	0.50	µg/kg	<0.50	----	<0.50	----	<0.50
4.4`-DDE	72-55-9	0.50	µg/kg	<0.50	----	<0.50	----	<0.50
4.4`-DDT	50-29-3	0.50	µg/kg	<0.50	----	<0.50	----	<0.50
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/50-2	0.50	µg/kg	<0.50	----	<0.50	----	<0.50
Dieldrin	60-57-1	0.50	µg/kg	<0.50	----	<0.50	----	<0.50
alpha-Endosulfan	959-98-8	0.50	µg/kg	<0.50	----	<0.50	----	<0.50
beta-Endosulfan	33213-65-9	0.50	µg/kg	<0.50	----	<0.50	----	<0.50
Endosulfan sulfate	1031-07-8	0.50	µg/kg	<0.50	----	<0.50	----	<0.50
^ Endosulfan (sum)	115-29-7	0.50	µg/kg	<0.50	----	<0.50	----	<0.50
Endrin	72-20-8	0.50	µg/kg	<0.50	----	<0.50	----	<0.50
Endrin aldehyde	7421-93-4	0.50	µg/kg	<0.50	----	<0.50	----	<0.50
Endrin ketone	53494-70-5	0.50	µg/kg	<0.50	----	<0.50	----	<0.50
Heptachlor	76-44-8	0.50	µg/kg	<0.50	----	<0.50	----	<0.50
Heptachlor epoxide	1024-57-3	0.50	µg/kg	<0.50	----	<0.50	----	<0.50
Hexachlorobenzene (HCB)	118-74-1	0.50	µg/kg	<0.50	----	<0.50	----	<0.50
gamma-BHC	58-89-9	0.25	µg/kg	<0.25	----	<0.25	----	<0.25
Methoxychlor	72-43-5	0.50	µg/kg	<0.50	----	<0.50	----	<0.50
cis-Chlordane	5103-71-9	0.25	µg/kg	<0.25	----	<0.25	----	<0.25
trans-Chlordane	5103-74-2	0.25	µg/kg	<0.25	----	<0.25	----	<0.25
^ Total Chlordane (sum)	----	0.25	µg/kg	<0.25	----	<0.25	----	<0.25

Analytical Results

Sub-Matrix: SEDIMENT (Matrix: SOIL)			Client sample ID	CAC1 0.1-0.3	CAC2 0.2-0.53	CAC3 0.2-0.7	ISC1 0.0-0.7	ISC2 0.0-0.45
			Client sampling date / time	17-Aug-2018 00:00	17-Aug-2018 00:00	17-Aug-2018 00:00	17-Aug-2018 00:00	17-Aug-2018 00:00
Compound	CAS Number	LOR	Unit	ES1824346-001	ES1824346-002	ES1824346-003	ES1824346-004	ES1824346-005
				Result	Result	Result	Result	Result
EP131A: Organochlorine Pesticides - Continued								
Oxychlordane	27304-13-8	0.50	µg/kg	<0.50	----	<0.50	----	<0.50
EP131B: Polychlorinated Biphenyls (as Aroclors)								
^ Total Polychlorinated biphenyls	----	5.0	µg/kg	<5.0	----	<5.0	----	<5.0
Aroclor 1016	12674-11-2	5.0	µg/kg	<5.0	----	<5.0	----	<5.0
Aroclor 1221	11104-28-2	5.0	µg/kg	<5.0	----	<5.0	----	<5.0
Aroclor 1232	11141-16-5	5.0	µg/kg	<5.0	----	<5.0	----	<5.0
Aroclor 1242	53469-21-9	5.0	µg/kg	<5.0	----	<5.0	----	<5.0
Aroclor 1248	12672-29-6	5.0	µg/kg	<5.0	----	<5.0	----	<5.0
Aroclor 1254	11097-69-1	5.0	µg/kg	<5.0	----	<5.0	----	<5.0
Aroclor 1260	11096-82-5	5.0	µg/kg	<5.0	----	<5.0	----	<5.0
EP132B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	5	µg/kg	<5	----	<5	----	<5
2-Methylnaphthalene	91-57-6	5	µg/kg	<5	----	<5	----	<5
Acenaphthylene	208-96-8	4	µg/kg	<4	----	<4	----	<4
Acenaphthene	83-32-9	4	µg/kg	<4	----	<4	----	<4
Fluorene	86-73-7	4	µg/kg	<4	----	<4	----	<4
Phenanthrene	85-01-8	4	µg/kg	<4	----	<4	----	<4
Anthracene	120-12-7	4	µg/kg	<4	----	<4	----	<4
Fluoranthene	206-44-0	4	µg/kg	<4	----	<4	----	<4
Pyrene	129-00-0	4	µg/kg	<4	----	<4	----	<4
Benz(a)anthracene	56-55-3	4	µg/kg	<4	----	<4	----	<4
Chrysene	218-01-9	4	µg/kg	<4	----	<4	----	<4
Benzo(b+j)fluoranthene	205-99-2 205-82-3	4	µg/kg	<4	----	<4	----	<4
Benzo(k)fluoranthene	207-08-9	4	µg/kg	<4	----	<4	----	<4
Benzo(e)pyrene	192-97-2	4	µg/kg	<4	----	<4	----	<4
Benzo(a)pyrene	50-32-8	4	µg/kg	<4	----	<4	----	<4
Perylene	198-55-0	4	µg/kg	**9**	----	<4	----	**6**
Benzo(g.h.i)perylene	191-24-2	4	µg/kg	<4	----	<4	----	<4
Dibenz(a.h)anthracene	53-70-3	4	µg/kg	<4	----	<4	----	<4
Indeno(1.2.3.cd)pyrene	193-39-5	4	µg/kg	<4	----	<4	----	<4
Coronene	191-07-1	5	µg/kg	<5	----	<5	----	<5
^ Sum of PAHs	----	4	µg/kg	**9**	----	<4	----	**6**
EP074S: VOC Surrogates								
1.2-Dichloroethane-D4	17060-07-0	0.5	%	**99.9**	----	**106**	----	**107**

Analytical Results

Sub-Matrix: SEDIMENT (Matrix: SOIL)			Client sample ID	CAC1 0.1-0.3	CAC2 0.2-0.53	CAC3 0.2-0.7	ISC1 0.0-0.7	ISC2 0.0-0.45
			Client sampling date / time	17-Aug-2018 00:00	17-Aug-2018 00:00	17-Aug-2018 00:00	17-Aug-2018 00:00	17-Aug-2018 00:00
Compound	CAS Number	LOR	Unit	ES1824346-001	ES1824346-002	ES1824346-003	ES1824346-004	ES1824346-005
				Result	Result	Result	Result	Result
EP074S: VOC Surrogates - Continued								
Toluene-D8	2037-26-5	0.5	%	80.0	----	83.1	----	80.4
4-Bromofluorobenzene	460-00-4	0.5	%	78.7	----	87.8	----	86.5
EP080-SD: TPH(V)/BTEX Surrogates								
1.2-Dichloroethane-D4	17060-07-0	0.2	%	82.4	----	86.6	----	88.6
Toluene-D8	2037-26-5	0.2	%	79.1	----	91.7	----	88.4
4-Bromofluorobenzene	460-00-4	0.2	%	86.2	----	89.8	----	89.3
EP130S: Organophosphorus Pesticide Surrogate								
DEF	78-48-8	10	%	59.3	----	69.2	----	70.9
EP131S: OC Pesticide Surrogate								
Dibromo-DDE	21655-73-2	0.50	%	81.7	----	90.1	----	85.2
EP131T: PCB Surrogate								
Decachlorobiphenyl	2051-24-3	0.5	%	46.4	----	56.4	----	64.2
EP132T: Base/Neutral Extractable Surrogates								
2-Fluorobiphenyl	321-60-8	10	%	85.4	----	89.0	----	77.9
Anthracene-d10	1719-06-8	10	%	115	----	93.2	----	86.7
4-Terphenyl-d14	1718-51-0	10	%	107	----	83.4	----	85.5

Analytical Results

Sub-Matrix: SEDIMENT (Matrix: SOIL)			Client sample ID	ISC2 0.45-0.55	ISC2 0.55-1.1	ISC3 0.0-0.74	MBC1 0.6-1.0	MBC1 1-1.55
			Client sampling date / time	17-Aug-2018 00:00	17-Aug-2018 00:00	17-Aug-2018 00:00	17-Aug-2018 00:00	17-Aug-2018 00:00
Compound	CAS Number	LOR	Unit	ES1824346-006	ES1824346-007	ES1824346-008	ES1824346-009	ES1824346-010
				Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	58.8	26.9	33.4	58.7	36.5
EA150: Particle Sizing								
+75µm	----	1	%	----	75	----	21	76
+150µm	----	1	%	----	75	----	13	58
+300µm	----	1	%	----	74	----	7	38
+425µm	----	1	%	----	74	----	4	23
+600µm	----	1	%	----	72	----	2	10
+1180µm	----	1	%	----	59	----	<1	2
+2.36mm	----	1	%	----	36	----	<1	<1
+4.75mm	----	1	%	----	21	----	<1	<1
+9.5mm	----	1	%	----	10	----	<1	<1
+19.0mm	----	1	%	----	<1	----	<1	<1
+37.5mm	----	1	%	----	<1	----	<1	<1
+75.0mm	----	1	%	----	<1	----	<1	<1
EA150: Soil Classification based on Particle Size								
Clay (<2 µm)	----	1	%	----	12	----	9	8
Silt (2-60 µm)	----	1	%	----	12	----	57	11
Sand (0.06-2.00 mm)	----	1	%	----	33	----	34	80
Gravel (>2mm)	----	1	%	----	43	----	<1	1
Cobbles (>6cm)	----	1	%	----	<1	----	<1	<1
ED042T: Total Sulfur by LECO								
Sulfur - Total as S (LECO)	----	0.01	%	0.04	0.02	0.02	0.04	0.02
EG005-SD: Total Metals in Sediments by ICP-AES								
Aluminium	7429-90-5	50	mg/kg	16600	16000	10500	15000	9700
Iron	7439-89-6	50	mg/kg	30100	37200	20200	27000	19800
EG020-SD: Total Metals in Sediments by ICPMS								
Antimony	7440-36-0	0.50	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
Arsenic	7440-38-2	1.00	mg/kg	7.19	3.07	5.83	6.94	4.91
Cadmium	7440-43-9	0.1	mg/kg	0.3	0.2	0.1	0.2	<0.1
Chromium	7440-47-3	1.0	mg/kg	55.4	62.0	31.2	44.9	27.0
Copper	7440-50-8	1.0	mg/kg	39.1	35.6	19.8	79.2	19.2
Cobalt	7440-48-4	0.5	mg/kg	20.3	21.8	10.8	13.8	9.3
Lead	7439-92-1	1.0	mg/kg	59.5	81.6	20.8	27.6	18.5
Manganese	7439-96-5	10	mg/kg	1020	855	404	458	276

Analytical Results

Sub-Matrix: SEDIMENT (Matrix: SOIL)			Client sample ID	ISC2 0.45-0.55	ISC2 0.55-1.1	ISC3 0.0-0.74	MBC1 0.6-1.0	MBC1 1-1.55
			Client sampling date / time	17-Aug-2018 00:00	17-Aug-2018 00:00	17-Aug-2018 00:00	17-Aug-2018 00:00	17-Aug-2018 00:00
Compound	CAS Number	LOR	Unit	ES1824346-006	ES1824346-007	ES1824346-008	ES1824346-009	ES1824346-010
				Result	Result	Result	Result	Result
EG020-SD: Total Metals in Sediments by ICPMS - Continued								
Nickel	7440-02-0	1.0	mg/kg	57.6	91.7	33.2	49.4	33.1
Selenium	7782-49-2	0.1	mg/kg	1.3	0.7	0.9	1.1	0.6
Silver	7440-22-4	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	0.5
Vanadium	7440-62-2	2.0	mg/kg	36.1	34.0	18.9	26.2	16.9
Zinc	7440-66-6	1.0	mg/kg	114	202	73.4	88.3	65.4
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.01	mg/kg	0.04	0.02	0.01	0.03	0.01
EK055: Ammonia as N								
Ammonia as N	7664-41-7	20	mg/kg	80	20	90	240	40
EK057G: Nitrite as N by Discrete Analyser								
Nitrite as N (Sol.)	14797-65-0	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
EK058G: Nitrate as N by Discrete Analyser								
Nitrate as N (Sol.)	14797-55-8	0.1	mg/kg	0.1	<0.1	<0.1	0.1	<0.1
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Nitrite + Nitrate as N (Sol.)	----	0.1	mg/kg	0.1	<0.1	<0.1	0.1	<0.1
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Total Kjeldahl Nitrogen as N	----	20	mg/kg	2480	370	1260	2340	770
EK062: Total Nitrogen as N (TKN + NOx)								
^ Total Nitrogen as N	----	20	mg/kg	2480	370	1260	2340	770
EK067G: Total Phosphorus as P by Discrete Analyser								
Total Phosphorus as P	----	2	mg/kg	812	447	465	501	302
EP003: Total Organic Carbon (TOC) in Soil								
Total Organic Carbon	----	0.02	%	2.54	0.23	1.44	3.67	0.89
EP074A: Monocyclic Aromatic Hydrocarbons								
Benzene	71-43-2	0.2	mg/kg	<0.2	----	----	<0.2	<0.2
Toluene	108-88-3	0.5	mg/kg	<0.5	----	----	<0.5	<0.5
Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	----	----	<0.5	<0.5
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	----	----	<0.5	<0.5
Styrene	100-42-5	0.5	mg/kg	<0.5	----	----	<0.5	<0.5
ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	----	----	<0.5	<0.5
Isopropylbenzene	98-82-8	0.5	mg/kg	<0.5	----	----	<0.5	<0.5
n-Propylbenzene	103-65-1	0.5	mg/kg	<0.5	----	----	<0.5	<0.5
1.3.5-Trimethylbenzene	108-67-8	0.5	mg/kg	<0.5	----	----	<0.5	<0.5

Analytical Results

Sub-Matrix: SEDIMENT (Matrix: SOIL)			Client sample ID	ISC2 0.45-0.55	ISC2 0.55-1.1	ISC3 0.0-0.74	MBC1 0.6-1.0	MBC1 1-1.55
			Client sampling date / time	17-Aug-2018 00:00	17-Aug-2018 00:00	17-Aug-2018 00:00	17-Aug-2018 00:00	17-Aug-2018 00:00
Compound	CAS Number	LOR	Unit	ES1824346-006	ES1824346-007	ES1824346-008	ES1824346-009	ES1824346-010
				Result	Result	Result	Result	Result
EP074A: Monocyclic Aromatic Hydrocarbons - Continued								
sec-Butylbenzene	135-98-8	0.5	mg/kg	<0.5	----	----	<0.5	<0.5
1.2.4-Trimethylbenzene	95-63-6	0.5	mg/kg	<0.5	----	----	<0.5	<0.5
tert-Butylbenzene	98-06-6	0.5	mg/kg	<0.5	----	----	<0.5	<0.5
p-Isopropyltoluene	99-87-6	0.5	mg/kg	<0.5	----	----	<0.5	<0.5
n-Butylbenzene	104-51-8	0.5	mg/kg	<0.5	----	----	<0.5	<0.5
EP074B: Oxygenated Compounds								
Vinyl Acetate	108-05-4	5	mg/kg	<5	----	----	<5	<5
2-Butanone (MEK)	78-93-3	5	mg/kg	<5	----	----	<5	<5
4-Methyl-2-pentanone (MIBK)	108-10-1	5	mg/kg	<5	----	----	<5	<5
2-Hexanone (MBK)	591-78-6	5	mg/kg	<5	----	----	<5	<5
EP074C: Sulfonated Compounds								
Carbon disulfide	75-15-0	0.5	mg/kg	<0.5	----	----	<0.5	<0.5
EP074D: Fumigants								
2.2-Dichloropropane	594-20-7	0.5	mg/kg	<0.5	----	----	<0.5	<0.5
1.2-Dichloropropane	78-87-5	0.5	mg/kg	<0.5	----	----	<0.5	<0.5
cis-1.3-Dichloropropylene	10061-01-5	0.5	mg/kg	<0.5	----	----	<0.5	<0.5
trans-1.3-Dichloropropylene	10061-02-6	0.5	mg/kg	<0.5	----	----	<0.5	<0.5
1.2-Dibromoethane (EDB)	106-93-4	0.5	mg/kg	<0.5	----	----	<0.5	<0.5
EP074E: Halogenated Aliphatic Compounds								
Dichlorodifluoromethane	75-71-8	5	mg/kg	<5	----	----	<5	<5
Chloromethane	74-87-3	5	mg/kg	<5	----	----	<5	<5
Vinyl chloride	75-01-4	5	mg/kg	<5	----	----	<5	<5
Bromomethane	74-83-9	5	mg/kg	<5	----	----	<5	<5
Chloroethane	75-00-3	5	mg/kg	<5	----	----	<5	<5
Trichlorofluoromethane	75-69-4	5	mg/kg	<5	----	----	<5	<5
1.1-Dichloroethene	75-35-4	0.5	mg/kg	<0.5	----	----	<0.5	<0.5
Iodomethane	74-88-4	0.5	mg/kg	<0.5	----	----	<0.5	<0.5
trans-1.2-Dichloroethene	156-60-5	0.5	mg/kg	<0.5	----	----	<0.5	<0.5
1.1-Dichloroethane	75-34-3	0.5	mg/kg	<0.5	----	----	<0.5	<0.5
cis-1.2-Dichloroethene	156-59-2	0.5	mg/kg	<0.5	----	----	<0.5	<0.5
1.1.1-Trichloroethane	71-55-6	0.5	mg/kg	<0.5	----	----	<0.5	<0.5
1.1-Dichloropropylene	563-58-6	0.5	mg/kg	<0.5	----	----	<0.5	<0.5
Carbon Tetrachloride	56-23-5	0.5	mg/kg	<0.5	----	----	<0.5	<0.5
1.2-Dichloroethane	107-06-2	0.5	mg/kg	<0.5	----	----	<0.5	<0.5

Analytical Results

Sub-Matrix: SEDIMENT (Matrix: SOIL)			Client sample ID	ISC2 0.45-0.55	ISC2 0.55-1.1	ISC3 0.0-0.74	MBC1 0.6-1.0	MBC1 1-1.55
			Client sampling date / time	17-Aug-2018 00:00	17-Aug-2018 00:00	17-Aug-2018 00:00	17-Aug-2018 00:00	17-Aug-2018 00:00
Compound	CAS Number	LOR	Unit	ES1824346-006	ES1824346-007	ES1824346-008	ES1824346-009	ES1824346-010
				Result	Result	Result	Result	Result
EP074E: Halogenated Aliphatic Compounds - Continued								
Trichloroethene	79-01-6	0.5	mg/kg	<0.5	----	----	<0.5	<0.5
Dibromomethane	74-95-3	0.5	mg/kg	<0.5	----	----	<0.5	<0.5
1.1.2-Trichloroethane	79-00-5	0.5	mg/kg	<0.5	----	----	<0.5	<0.5
1.3-Dichloropropane	142-28-9	0.5	mg/kg	<0.5	----	----	<0.5	<0.5
Tetrachloroethene	127-18-4	0.5	mg/kg	<0.5	----	----	<0.5	<0.5
1.1.1.2-Tetrachloroethane	630-20-6	0.5	mg/kg	<0.5	----	----	<0.5	<0.5
trans-1.4-Dichloro-2-butene	110-57-6	0.5	mg/kg	<0.5	----	----	<0.5	<0.5
cis-1.4-Dichloro-2-butene	1476-11-5	0.5	mg/kg	<0.5	----	----	<0.5	<0.5
1.1.2.2-Tetrachloroethane	79-34-5	0.5	mg/kg	<0.5	----	----	<0.5	<0.5
1.2.3-Trichloropropane	96-18-4	0.5	mg/kg	<0.5	----	----	<0.5	<0.5
Pentachloroethane	76-01-7	0.5	mg/kg	<0.5	----	----	<0.5	<0.5
1.2-Dibromo-3-chloropropane	96-12-8	0.5	mg/kg	<0.5	----	----	<0.5	<0.5
Hexachlorobutadiene	87-68-3	0.5	mg/kg	<0.5	----	----	<0.5	<0.5
EP074F: Halogenated Aromatic Compounds								
Chlorobenzene	108-90-7	0.5	mg/kg	<0.5	----	----	<0.5	<0.5
Bromobenzene	108-86-1	0.5	mg/kg	<0.5	----	----	<0.5	<0.5
2-Chlorotoluene	95-49-8	0.5	mg/kg	<0.5	----	----	<0.5	<0.5
4-Chlorotoluene	106-43-4	0.5	mg/kg	<0.5	----	----	<0.5	<0.5
1.3-Dichlorobenzene	541-73-1	0.5	mg/kg	<0.5	----	----	<0.5	<0.5
1.4-Dichlorobenzene	106-46-7	0.5	mg/kg	<0.5	----	----	<0.5	<0.5
1.2-Dichlorobenzene	95-50-1	0.5	mg/kg	<0.5	----	----	<0.5	<0.5
1.2.4-Trichlorobenzene	120-82-1	0.5	mg/kg	<0.5	----	----	<0.5	<0.5
1.2.3-Trichlorobenzene	87-61-6	0.5	mg/kg	<0.5	----	----	<0.5	<0.5
EP074G: Trihalomethanes								
Chloroform	67-66-3	0.5	mg/kg	<0.5	----	----	<0.5	<0.5
Bromodichloromethane	75-27-4	0.5	mg/kg	<0.5	----	----	<0.5	<0.5
Dibromochloromethane	124-48-1	0.5	mg/kg	<0.5	----	----	<0.5	<0.5
Bromoform	75-25-2	0.5	mg/kg	<0.5	----	----	<0.5	<0.5
EP074H: Naphthalene								
Naphthalene	91-20-3	1	mg/kg	<1	----	----	<1	<1
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
>C10 - C16 Fraction	----	3	mg/kg	**19**	----	----	**52**	**3**
>C16 - C34 Fraction	----	3	mg/kg	**155**	----	----	**149**	**12**
>C34 - C40 Fraction	----	5	mg/kg	**104**	----	----	**89**	**7**

Analytical Results

Sub-Matrix: SEDIMENT (Matrix: SOIL)			Client sample ID	ISC2 0.45-0.55	ISC2 0.55-1.1	ISC3 0.0-0.74	MBC1 0.6-1.0	MBC1 1-1.55
			Client sampling date / time	17-Aug-2018 00:00	17-Aug-2018 00:00	17-Aug-2018 00:00	17-Aug-2018 00:00	17-Aug-2018 00:00
Compound	CAS Number	LOR	Unit	ES1824346-006	ES1824346-007	ES1824346-008	ES1824346-009	ES1824346-010
				Result	Result	Result	Result	Result
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued								
>C10 - C40 Fraction (sum)	----	3	mg/kg	278	----	----	290	22
>C10 - C16 Fraction minus Naphthalene (F2)	----	3	mg/kg	19	----	----	52	3
EP080-SD / EP071-SD: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	3	mg/kg	<3	----	----	<3	<3
C10 - C14 Fraction	----	3	mg/kg	10	----	----	14	<3
C15 - C28 Fraction	----	3	mg/kg	86	----	----	121	8
C29 - C36 Fraction	----	5	mg/kg	137	----	----	116	8
^ C10 - C36 Fraction (sum)	----	3	mg/kg	233	----	----	251	16
EP080-SD / EP071-SD: Total Recoverable Hydrocarbons								
C6 - C10 Fraction	C6_C10	3	mg/kg	<3	----	----	<3	<3
C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	3.0	mg/kg	<3.0	----	----	<3.0	<3.0
EP080-SD: BTEXN								
Benzene	71-43-2	0.2	mg/kg	<0.2	----	----	<0.2	<0.2
Toluene	108-88-3	0.2	mg/kg	<0.2	----	----	<0.2	<0.2
Ethylbenzene	100-41-4	0.2	mg/kg	<0.2	----	----	<0.2	<0.2
meta- & para-Xylene	108-38-3 106-42-3	0.2	mg/kg	<0.2	----	----	<0.2	<0.2
ortho-Xylene	95-47-6	0.2	mg/kg	<0.2	----	----	<0.2	<0.2
^ Total Xylenes	----	0.5	mg/kg	<0.5	----	----	<0.5	<0.5
^ Sum of BTEX	----	0.2	mg/kg	<0.2	----	----	<0.2	<0.2
Naphthalene	91-20-3	0.2	mg/kg	<0.2	----	----	<0.2	<0.2
EP130A: Organophosphorus Pesticides (Ultra-trace)								
Bromophos-ethyl	4824-78-6	10	µg/kg	<10	----	----	<10	<10
Carbophenothion	786-19-6	10	µg/kg	<10	----	----	<10	<10
Chlorfenvinphos (E)	18708-86-6	10.0	µg/kg	<10.0	----	----	<10.0	<10.0
Chlorfenvinphos (Z)	18708-87-7	10	µg/kg	<10	----	----	<10	<10
Chlorpyrifos	2921-88-2	10	µg/kg	<10	----	----	<10	<10
Chlorpyrifos-methyl	5598-13-0	10	µg/kg	<10	----	----	<10	<10
Demeton-S-methyl	919-86-8	10	µg/kg	<10	----	----	<10	<10
Diazinon	333-41-5	10	µg/kg	<10	----	----	<10	<10
Dichlorvos	62-73-7	10	µg/kg	<10	----	----	<10	<10
Dimethoate	60-51-5	10	µg/kg	<10	----	----	<10	<10
Ethion	563-12-2	10	µg/kg	<10	----	----	<10	<10

Analytical Results

Sub-Matrix: SEDIMENT (Matrix: SOIL)			Client sample ID	ISC2 0.45-0.55	ISC2 0.55-1.1	ISC3 0.0-0.74	MBC1 0.6-1.0	MBC1 1-1.55
			Client sampling date / time	17-Aug-2018 00:00	17-Aug-2018 00:00	17-Aug-2018 00:00	17-Aug-2018 00:00	17-Aug-2018 00:00
Compound	CAS Number	LOR	Unit	ES1824346-006	ES1824346-007	ES1824346-008	ES1824346-009	ES1824346-010
				Result	Result	Result	Result	Result
EP130A: Organophosphorus Pesticides (Ultra-trace) - Continued								
Fenamiphos	22224-92-6	10	µg/kg	<10	----	----	<10	<10
Fenthion	55-38-9	10	µg/kg	<10	----	----	<10	<10
Malathion	121-75-5	10	µg/kg	<10	----	----	<10	<10
Azinphos Methyl	86-50-0	10	µg/kg	<10	----	----	<10	<10
Monocrotophos	6923-22-4	10	µg/kg	<10	----	----	<10	<10
Parathion	56-38-2	10	µg/kg	<10	----	----	<10	<10
Parathion-methyl	298-00-0	10	µg/kg	<10	----	----	<10	<10
Pirimphos-ethyl	23505-41-1	10	µg/kg	<10	----	----	<10	<10
Prothiofos	34643-46-4	10	µg/kg	<10	----	----	<10	<10
EP131A: Organochlorine Pesticides								
Aldrin	309-00-2	0.50	µg/kg	<0.50	----	----	<0.50	<0.50
alpha-BHC	319-84-6	0.50	µg/kg	<0.50	----	----	<0.50	<0.50
beta-BHC	319-85-7	0.50	µg/kg	<0.50	----	----	<0.50	<0.50
delta-BHC	319-86-8	0.50	µg/kg	<0.50	----	----	<0.50	<0.50
4.4`-DDD	72-54-8	0.50	µg/kg	<0.50	----	----	<0.50	<0.50
4.4`-DDE	72-55-9	0.50	µg/kg	<0.50	----	----	<0.50	<0.50
4.4`-DDT	50-29-3	0.50	µg/kg	<0.50	----	----	<0.50	<0.50
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/50-2	0.50	µg/kg	<0.50	----	----	<0.50	<0.50
Dieldrin	60-57-1	0.50	µg/kg	<0.50	----	----	<0.50	<0.50
alpha-Endosulfan	959-98-8	0.50	µg/kg	<0.50	----	----	<0.50	<0.50
beta-Endosulfan	33213-65-9	0.50	µg/kg	<0.50	----	----	<0.50	<0.50
Endosulfan sulfate	1031-07-8	0.50	µg/kg	<0.50	----	----	<0.50	<0.50
^ Endosulfan (sum)	115-29-7	0.50	µg/kg	<0.50	----	----	<0.50	<0.50
Endrin	72-20-8	0.50	µg/kg	<0.50	----	----	<0.50	<0.50
Endrin aldehyde	7421-93-4	0.50	µg/kg	<0.50	----	----	<0.50	<0.50
Endrin ketone	53494-70-5	0.50	µg/kg	<0.50	----	----	<0.50	<0.50
Heptachlor	76-44-8	0.50	µg/kg	<0.50	----	----	<0.50	<0.50
Heptachlor epoxide	1024-57-3	0.50	µg/kg	<0.50	----	----	<0.50	<0.50
Hexachlorobenzene (HCB)	118-74-1	0.50	µg/kg	<0.50	----	----	<0.50	<0.50
gamma-BHC	58-89-9	0.25	µg/kg	<0.25	----	----	<0.25	<0.25
Methoxychlor	72-43-5	0.50	µg/kg	<0.50	----	----	<0.50	<0.50
cis-Chlordane	5103-71-9	0.25	µg/kg	<0.25	----	----	<0.25	<0.25
trans-Chlordane	5103-74-2	0.25	µg/kg	<0.25	----	----	<0.25	<0.25
^ Total Chlordane (sum)	----	0.25	µg/kg	<0.25	----	----	<0.25	<0.25

Analytical Results

Sub-Matrix: SEDIMENT (Matrix: SOIL)			Client sample ID	ISC2 0.45-0.55	ISC2 0.55-1.1	ISC3 0.0-0.74	MBC1 0.6-1.0	MBC1 1-1.55
			Client sampling date / time	17-Aug-2018 00:00	17-Aug-2018 00:00	17-Aug-2018 00:00	17-Aug-2018 00:00	17-Aug-2018 00:00
Compound	CAS Number	LOR	Unit	ES1824346-006	ES1824346-007	ES1824346-008	ES1824346-009	ES1824346-010
				Result	Result	Result	Result	Result
EP131A: Organochlorine Pesticides - Continued								
Oxychlordane	27304-13-8	0.50	µg/kg	<0.50	----	----	<0.50	<0.50
EP131B: Polychlorinated Biphenyls (as Aroclors)								
^ Total Polychlorinated biphenyls	----	5.0	µg/kg	<6.2	----	----	<6.2	<5.0
Aroclor 1016	12674-11-2	5.0	µg/kg	<6.2	----	----	<6.2	<5.0
Aroclor 1221	11104-28-2	5.0	µg/kg	<6.2	----	----	<6.2	<5.0
Aroclor 1232	11141-16-5	5.0	µg/kg	<6.2	----	----	<6.2	<5.0
Aroclor 1242	53469-21-9	5.0	µg/kg	<6.2	----	----	<6.2	<5.0
Aroclor 1248	12672-29-6	5.0	µg/kg	<6.2	----	----	<6.2	<5.0
Aroclor 1254	11097-69-1	5.0	µg/kg	<6.2	----	----	<6.2	<5.0
Aroclor 1260	11096-82-5	5.0	µg/kg	<6.2	----	----	<6.2	<5.0
EP132B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	5	µg/kg	<5	----	----	<5	<5
2-Methylnaphthalene	91-57-6	5	µg/kg	<5	----	----	<5	<5
Acenaphthylene	208-96-8	4	µg/kg	<4	----	----	<4	<4
Acenaphthene	83-32-9	4	µg/kg	<4	----	----	<4	<4
Fluorene	86-73-7	4	µg/kg	<4	----	----	<4	<4
Phenanthrene	85-01-8	4	µg/kg	<4	----	----	**5**	<4
Anthracene	120-12-7	4	µg/kg	<4	----	----	<4	<4
Fluoranthene	206-44-0	4	µg/kg	<4	----	----	<4	<4
Pyrene	129-00-0	4	µg/kg	<4	----	----	**4**	<4
Benz(a)anthracene	56-55-3	4	µg/kg	<4	----	----	<4	<4
Chrysene	218-01-9	4	µg/kg	<4	----	----	<4	<4
Benzo(b+j)fluoranthene	205-99-2 205-82-3	4	µg/kg	<4	----	----	<4	<4
Benzo(k)fluoranthene	207-08-9	4	µg/kg	<4	----	----	<4	<4
Benzo(e)pyrene	192-97-2	4	µg/kg	<4	----	----	<4	<4
Benzo(a)pyrene	50-32-8	4	µg/kg	<4	----	----	<4	<4
Perylene	198-55-0	4	µg/kg	**403**	----	----	**191**	<4
Benzo(g.h.i)perylene	191-24-2	4	µg/kg	<4	----	----	<4	<4
Dibenz(a.h)anthracene	53-70-3	4	µg/kg	<4	----	----	**48**	<4
Indeno(1.2.3.cd)pyrene	193-39-5	4	µg/kg	<4	----	----	**42**	<4
Coronene	191-07-1	5	µg/kg	<5	----	----	<5	<5
^ Sum of PAHs	----	4	µg/kg	**403**	----	----	**290**	<4
EP074S: VOC Surrogates								
1.2-Dichloroethane-D4	17060-07-0	0.5	%	**98.2**	----	----	**101**	**91.4**

Analytical Results

Sub-Matrix: SEDIMENT (Matrix: SOIL)			Client sample ID	ISC2 0.45-0.55	ISC2 0.55-1.1	ISC3 0.0-0.74	MBC1 0.6-1.0	MBC1 1-1.55
			Client sampling date / time	17-Aug-2018 00:00	17-Aug-2018 00:00	17-Aug-2018 00:00	17-Aug-2018 00:00	17-Aug-2018 00:00
Compound	CAS Number	LOR	Unit	ES1824346-006	ES1824346-007	ES1824346-008	ES1824346-009	ES1824346-010
				Result	Result	Result	Result	Result
EP074S: VOC Surrogates - Continued								
Toluene-D8	2037-26-5	0.5	%	74.5	----	----	78.0	74.5
4-Bromofluorobenzene	460-00-4	0.5	%	80.9	----	----	79.9	74.0
EP080-SD: TPH(V)/BTEX Surrogates								
1.2-Dichloroethane-D4	17060-07-0	0.2	%	81.1	----	----	81.8	74.7
Toluene-D8	2037-26-5	0.2	%	79.9	----	----	77.0	75.0
4-Bromofluorobenzene	460-00-4	0.2	%	83.9	----	----	80.9	76.5
EP130S: Organophosphorus Pesticide Surrogate								
DEF	78-48-8	10	%	43.6	----	----	50.3	46.0
EP131S: OC Pesticide Surrogate								
Dibromo-DDE	21655-73-2	0.50	%	73.9	----	----	68.1	89.5
EP131T: PCB Surrogate								
Decachlorobiphenyl	2051-24-3	0.5	%	66.8	----	----	62.5	48.1
EP132T: Base/Neutral Extractable Surrogates								
2-Fluorobiphenyl	321-60-8	10	%	80.2	----	----	77.4	78.8
Anthracene-d10	1719-06-8	10	%	106	----	----	107	93.2
4-Terphenyl-d14	1718-51-0	10	%	89.4	----	----	94.9	88.6

Analytical Results

Sub-Matrix: SEDIMENT (Matrix: SOIL)			Client sample ID	MBC3 0.78-0.96	MBC5 0.51-0.7	PLC1 0.1-0.43	PLC3 0.15-0.57	RAC3 0.1-0.2
			Client sampling date / time	17-Aug-2018 00:00	17-Aug-2018 00:00	17-Aug-2018 00:00	17-Aug-2018 00:00	17-Aug-2018 00:00
Compound	CAS Number	LOR	Unit	ES1824346-011	ES1824346-012	ES1824346-013	ES1824346-014	ES1824346-015
				Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	52.6	30.6	37.4	35.5	44.0
EA150: Particle Sizing								
+75µm	----	1	%	----	----	67	35	70
+150µm	----	1	%	----	----	58	28	50
+300µm	----	1	%	----	----	44	24	21
+425µm	----	1	%	----	----	34	22	10
+600µm	----	1	%	----	----	26	20	5
+1180µm	----	1	%	----	----	13	15	1
+2.36mm	----	1	%	----	----	5	8	<1
+4.75mm	----	1	%	----	----	<1	4	<1
+9.5mm	----	1	%	----	----	<1	3	<1
+19.0mm	----	1	%	----	----	<1	<1	<1
+37.5mm	----	1	%	----	----	<1	<1	<1
+75.0mm	----	1	%	----	----	<1	<1	<1
EA150: Soil Classification based on Particle Size								
Clay (<2 µm)	----	1	%	----	----	7	17	6
Silt (2-60 µm)	----	1	%	----	----	22	35	20
Sand (0.06-2.00 mm)	----	1	%	----	----	64	38	73
Gravel (>2mm)	----	1	%	----	----	7	10	1
Cobbles (>6cm)	----	1	%	----	----	<1	<1	<1
ED042T: Total Sulfur by LECO								
Sulfur - Total as S (LECO)	----	0.01	%	0.02	0.02	0.02	<0.01	0.03
EG005-SD: Total Metals in Sediments by ICP-AES								
Aluminium	7429-90-5	50	mg/kg	10900	14000	15600	7460	9040
Iron	7439-89-6	50	mg/kg	20800	24600	32800	12700	17200
EG020-SD: Total Metals in Sediments by ICPMS								
Antimony	7440-36-0	0.50	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
Arsenic	7440-38-2	1.00	mg/kg	7.95	4.04	4.66	2.32	6.21
Cadmium	7440-43-9	0.1	mg/kg	0.1	0.2	<0.1	<0.1	<0.1
Chromium	7440-47-3	1.0	mg/kg	31.3	69.1	87.4	15.2	25.1
Copper	7440-50-8	1.0	mg/kg	32.9	25.7	25.5	5.2	32.4
Cobalt	7440-48-4	0.5	mg/kg	11.0	14.1	20.0	4.2	8.2
Lead	7439-92-1	1.0	mg/kg	21.2	54.3	8.6	6.2	18.6
Manganese	7439-96-5	10	mg/kg	539	818	1070	146	642

Analytical Results

Sub-Matrix: SEDIMENT (Matrix: SOIL)			Client sample ID	MBC3 0.78-0.96	MBC5 0.51-0.7	PLC1 0.1-0.43	PLC3 0.15-0.57	RAC3 0.1-0.2
			Client sampling date / time	17-Aug-2018 00:00	17-Aug-2018 00:00	17-Aug-2018 00:00	17-Aug-2018 00:00	17-Aug-2018 00:00
Compound	CAS Number	LOR	Unit	ES1824346-011	ES1824346-012	ES1824346-013	ES1824346-014	ES1824346-015
				Result	Result	Result	Result	Result
EG020-SD: Total Metals in Sediments by ICPMS - Continued								
Nickel	7440-02-0	1.0	mg/kg	36.1	72.2	71.2	5.7	29.2
Selenium	7782-49-2	0.1	mg/kg	0.8	0.7	0.7	0.4	0.6
Silver	7440-22-4	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Vanadium	7440-62-2	2.0	mg/kg	23.1	38.8	60.4	19.4	16.8
Zinc	7440-66-6	1.0	mg/kg	62.4	141	63.0	11.0	48.9
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.01	mg/kg	0.02	0.02	0.01	0.01	0.01
EK055: Ammonia as N								
Ammonia as N	7664-41-7	20	mg/kg	80	20	40	20	30
EK057G: Nitrite as N by Discrete Analyser								
Nitrite as N (Sol.)	14797-65-0	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
EK058G: Nitrate as N by Discrete Analyser								
Nitrate as N (Sol.)	14797-55-8	0.1	mg/kg	<0.1	0.1	<0.1	0.2	<0.1
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Nitrite + Nitrate as N (Sol.)	----	0.1	mg/kg	<0.1	0.1	<0.1	0.2	<0.1
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Total Kjeldahl Nitrogen as N	----	20	mg/kg	1740	2110	840	410	1660
EK062: Total Nitrogen as N (TKN + NOx)								
^ Total Nitrogen as N	----	20	mg/kg	1740	2110	840	410	1660
EK067G: Total Phosphorus as P by Discrete Analyser								
Total Phosphorus as P	----	2	mg/kg	387	578	571	146	358
EP003: Total Organic Carbon (TOC) in Soil								
Total Organic Carbon	----	0.02	%	1.44	3.61	0.97	0.18	2.70
EP074A: Monocyclic Aromatic Hydrocarbons								
Benzene	71-43-2	0.2	mg/kg	----	----	<0.2	<0.2	<0.2
Toluene	108-88-3	0.5	mg/kg	----	----	<0.5	<0.5	<0.5
Ethylbenzene	100-41-4	0.5	mg/kg	----	----	<0.5	<0.5	<0.5
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	----	----	<0.5	<0.5	<0.5
Styrene	100-42-5	0.5	mg/kg	----	----	<0.5	<0.5	<0.5
ortho-Xylene	95-47-6	0.5	mg/kg	----	----	<0.5	<0.5	<0.5
Isopropylbenzene	98-82-8	0.5	mg/kg	----	----	<0.5	<0.5	<0.5
n-Propylbenzene	103-65-1	0.5	mg/kg	----	----	<0.5	<0.5	<0.5
1.3.5-Trimethylbenzene	108-67-8	0.5	mg/kg	----	----	<0.5	<0.5	<0.5

Analytical Results

Sub-Matrix: SEDIMENT (Matrix: SOIL)			Client sample ID	MBC3 0.78-0.96	MBC5 0.51-0.7	PLC1 0.1-0.43	PLC3 0.15-0.57	RAC3 0.1-0.2
			Client sampling date / time	17-Aug-2018 00:00	17-Aug-2018 00:00	17-Aug-2018 00:00	17-Aug-2018 00:00	17-Aug-2018 00:00
Compound	CAS Number	LOR	Unit	ES1824346-011	ES1824346-012	ES1824346-013	ES1824346-014	ES1824346-015
				Result	Result	Result	Result	Result
EP074A: Monocyclic Aromatic Hydrocarbons - Continued								
sec-Butylbenzene	135-98-8	0.5	mg/kg	----	----	<0.5	<0.5	<0.5
1.2.4-Trimethylbenzene	95-63-6	0.5	mg/kg	----	----	<0.5	<0.5	<0.5
tert-Butylbenzene	98-06-6	0.5	mg/kg	----	----	<0.5	<0.5	<0.5
p-Isopropyltoluene	99-87-6	0.5	mg/kg	----	----	<0.5	<0.5	<0.5
n-Butylbenzene	104-51-8	0.5	mg/kg	----	----	<0.5	<0.5	<0.5
EP074B: Oxygenated Compounds								
Vinyl Acetate	108-05-4	5	mg/kg	----	----	<5	<5	<5
2-Butanone (MEK)	78-93-3	5	mg/kg	----	----	<5	<5	<5
4-Methyl-2-pentanone (MIBK)	108-10-1	5	mg/kg	----	----	<5	<5	<5
2-Hexanone (MBK)	591-78-6	5	mg/kg	----	----	<5	<5	<5
EP074C: Sulfonated Compounds								
Carbon disulfide	75-15-0	0.5	mg/kg	----	----	<0.5	<0.5	<0.5
EP074D: Fumigants								
2.2-Dichloropropane	594-20-7	0.5	mg/kg	----	----	<0.5	<0.5	<0.5
1.2-Dichloropropane	78-87-5	0.5	mg/kg	----	----	<0.5	<0.5	<0.5
cis-1.3-Dichloropropylene	10061-01-5	0.5	mg/kg	----	----	<0.5	<0.5	<0.5
trans-1.3-Dichloropropylene	10061-02-6	0.5	mg/kg	----	----	<0.5	<0.5	<0.5
1.2-Dibromoethane (EDB)	106-93-4	0.5	mg/kg	----	----	<0.5	<0.5	<0.5
EP074E: Halogenated Aliphatic Compounds								
Dichlorodifluoromethane	75-71-8	5	mg/kg	----	----	<5	<5	<5
Chloromethane	74-87-3	5	mg/kg	----	----	<5	<5	<5
Vinyl chloride	75-01-4	5	mg/kg	----	----	<5	<5	<5
Bromomethane	74-83-9	5	mg/kg	----	----	<5	<5	<5
Chloroethane	75-00-3	5	mg/kg	----	----	<5	<5	<5
Trichlorofluoromethane	75-69-4	5	mg/kg	----	----	<5	<5	<5
1.1-Dichloroethene	75-35-4	0.5	mg/kg	----	----	<0.5	<0.5	<0.5
Iodomethane	74-88-4	0.5	mg/kg	----	----	<0.5	<0.5	<0.5
trans-1.2-Dichloroethene	156-60-5	0.5	mg/kg	----	----	<0.5	<0.5	<0.5
1.1-Dichloroethane	75-34-3	0.5	mg/kg	----	----	<0.5	<0.5	<0.5
cis-1.2-Dichloroethene	156-59-2	0.5	mg/kg	----	----	<0.5	<0.5	<0.5
1.1.1-Trichloroethane	71-55-6	0.5	mg/kg	----	----	<0.5	<0.5	<0.5
1.1-Dichloropropylene	563-58-6	0.5	mg/kg	----	----	<0.5	<0.5	<0.5
Carbon Tetrachloride	56-23-5	0.5	mg/kg	----	----	<0.5	<0.5	<0.5
1.2-Dichloroethane	107-06-2	0.5	mg/kg	----	----	<0.5	<0.5	<0.5

Analytical Results

Sub-Matrix: SEDIMENT (Matrix: SOIL)			Client sample ID	MBC3 0.78-0.96	MBC5 0.51-0.7	PLC1 0.1-0.43	PLC3 0.15-0.57	RAC3 0.1-0.2
			Client sampling date / time	17-Aug-2018 00:00	17-Aug-2018 00:00	17-Aug-2018 00:00	17-Aug-2018 00:00	17-Aug-2018 00:00
Compound	CAS Number	LOR	Unit	ES1824346-011	ES1824346-012	ES1824346-013	ES1824346-014	ES1824346-015
				Result	Result	Result	Result	Result
EP074E: Halogenated Aliphatic Compounds - Continued								
Trichloroethene	79-01-6	0.5	mg/kg	----	----	<0.5	<0.5	<0.5
Dibromomethane	74-95-3	0.5	mg/kg	----	----	<0.5	<0.5	<0.5
1.1.2-Trichloroethane	79-00-5	0.5	mg/kg	----	----	<0.5	<0.5	<0.5
1.3-Dichloropropane	142-28-9	0.5	mg/kg	----	----	<0.5	<0.5	<0.5
Tetrachloroethene	127-18-4	0.5	mg/kg	----	----	<0.5	<0.5	<0.5
1.1.1.2-Tetrachloroethane	630-20-6	0.5	mg/kg	----	----	<0.5	<0.5	<0.5
trans-1.4-Dichloro-2-butene	110-57-6	0.5	mg/kg	----	----	<0.5	<0.5	<0.5
cis-1.4-Dichloro-2-butene	1476-11-5	0.5	mg/kg	----	----	<0.5	<0.5	<0.5
1.1.2.2-Tetrachloroethane	79-34-5	0.5	mg/kg	----	----	<0.5	<0.5	<0.5
1.2.3-Trichloropropane	96-18-4	0.5	mg/kg	----	----	<0.5	<0.5	<0.5
Pentachloroethane	76-01-7	0.5	mg/kg	----	----	<0.5	<0.5	<0.5
1.2-Dibromo-3-chloropropane	96-12-8	0.5	mg/kg	----	----	<0.5	<0.5	<0.5
Hexachlorobutadiene	87-68-3	0.5	mg/kg	----	----	<0.5	<0.5	<0.5
EP074F: Halogenated Aromatic Compounds								
Chlorobenzene	108-90-7	0.5	mg/kg	----	----	<0.5	<0.5	<0.5
Bromobenzene	108-86-1	0.5	mg/kg	----	----	<0.5	<0.5	<0.5
2-Chlorotoluene	95-49-8	0.5	mg/kg	----	----	<0.5	<0.5	<0.5
4-Chlorotoluene	106-43-4	0.5	mg/kg	----	----	<0.5	<0.5	<0.5
1.3-Dichlorobenzene	541-73-1	0.5	mg/kg	----	----	<0.5	<0.5	<0.5
1.4-Dichlorobenzene	106-46-7	0.5	mg/kg	----	----	<0.5	<0.5	<0.5
1.2-Dichlorobenzene	95-50-1	0.5	mg/kg	----	----	<0.5	<0.5	<0.5
1.2.4-Trichlorobenzene	120-82-1	0.5	mg/kg	----	----	<0.5	<0.5	<0.5
1.2.3-Trichlorobenzene	87-61-6	0.5	mg/kg	----	----	<0.5	<0.5	<0.5
EP074G: Trihalomethanes								
Chloroform	67-66-3	0.5	mg/kg	----	----	<0.5	<0.5	<0.5
Bromodichloromethane	75-27-4	0.5	mg/kg	----	----	<0.5	<0.5	<0.5
Dibromochloromethane	124-48-1	0.5	mg/kg	----	----	<0.5	<0.5	<0.5
Bromoform	75-25-2	0.5	mg/kg	----	----	<0.5	<0.5	<0.5
EP074H: Naphthalene								
Naphthalene	91-20-3	1	mg/kg	----	----	<1	<1	<1
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
>C10 - C16 Fraction	----	3	mg/kg	----	----	**10**	**4**	**14**
>C16 - C34 Fraction	----	3	mg/kg	----	----	**35**	**14**	**58**
>C34 - C40 Fraction	----	5	mg/kg	----	----	**27**	**7**	**52**

Analytical Results

Sub-Matrix: SEDIMENT (Matrix: SOIL)			Client sample ID	MBC3 0.78-0.96	MBC5 0.51-0.7	PLC1 0.1-0.43	PLC3 0.15-0.57	RAC3 0.1-0.2
			Client sampling date / time	17-Aug-2018 00:00	17-Aug-2018 00:00	17-Aug-2018 00:00	17-Aug-2018 00:00	17-Aug-2018 00:00
Compound	CAS Number	LOR	Unit	ES1824346-011	ES1824346-012	ES1824346-013	ES1824346-014	ES1824346-015
				Result	Result	Result	Result	Result
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued								
>C10 - C40 Fraction (sum)	----	3	mg/kg	----	----	72	25	124
>C10 - C16 Fraction minus Naphthalene (F2)	----	3	mg/kg	----	----	10	4	14
EP080-SD / EP071-SD: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	3	mg/kg	----	----	<3	<3	<3
C10 - C14 Fraction	----	3	mg/kg	----	----	5	3	6
C15 - C28 Fraction	----	3	mg/kg	----	----	27	11	42
C29 - C36 Fraction	----	5	mg/kg	----	----	27	9	51
^ C10 - C36 Fraction (sum)	----	3	mg/kg	----	----	59	23	99
EP080-SD / EP071-SD: Total Recoverable Hydrocarbons								
C6 - C10 Fraction	C6_C10	3	mg/kg	----	----	<3	<3	<3
C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	3.0	mg/kg	----	----	<3.0	<3.0	<3.0
EP080-SD: BTEXN								
Benzene	71-43-2	0.2	mg/kg	----	----	<0.2	<0.2	<0.2
Toluene	108-88-3	0.2	mg/kg	----	----	<0.2	<0.2	<0.2
Ethylbenzene	100-41-4	0.2	mg/kg	----	----	<0.2	<0.2	<0.2
meta- & para-Xylene	108-38-3 106-42-3	0.2	mg/kg	----	----	<0.2	<0.2	<0.2
ortho-Xylene	95-47-6	0.2	mg/kg	----	----	<0.2	<0.2	<0.2
^ Total Xylenes	----	0.5	mg/kg	----	----	<0.5	<0.5	<0.5
^ Sum of BTEX	----	0.2	mg/kg	----	----	<0.2	<0.2	<0.2
Naphthalene	91-20-3	0.2	mg/kg	----	----	<0.2	<0.2	<0.2
EP130A: Organophosphorus Pesticides (Ultra-trace)								
Bromophos-ethyl	4824-78-6	10	µg/kg	----	----	<10	<10	<10
Carbophenothion	786-19-6	10	µg/kg	----	----	<10	<10	<10
Chlorfenvinphos (E)	18708-86-6	10.0	µg/kg	----	----	<10.0	<10.0	<10.0
Chlorfenvinphos (Z)	18708-87-7	10	µg/kg	----	----	<10	<10	<10
Chlorpyrifos	2921-88-2	10	µg/kg	----	----	<10	<10	<10
Chlorpyrifos-methyl	5598-13-0	10	µg/kg	----	----	<10	<10	<10
Demeton-S-methyl	919-86-8	10	µg/kg	----	----	<10	<10	<10
Diazinon	333-41-5	10	µg/kg	----	----	<10	<10	<10
Dichlorvos	62-73-7	10	µg/kg	----	----	<10	<10	<10
Dimethoate	60-51-5	10	µg/kg	----	----	<10	<10	<10
Ethion	563-12-2	10	µg/kg	----	----	<10	<10	<10

Analytical Results

Sub-Matrix: SEDIMENT (Matrix: SOIL)			Client sample ID	MBC3 0.78-0.96	MBC5 0.51-0.7	PLC1 0.1-0.43	PLC3 0.15-0.57	RAC3 0.1-0.2
			Client sampling date / time	17-Aug-2018 00:00	17-Aug-2018 00:00	17-Aug-2018 00:00	17-Aug-2018 00:00	17-Aug-2018 00:00
Compound	CAS Number	LOR	Unit	ES1824346-011	ES1824346-012	ES1824346-013	ES1824346-014	ES1824346-015
				Result	Result	Result	Result	Result
EP130A: Organophosphorus Pesticides (Ultra-trace) - Continued								
Fenamiphos	22224-92-6	10	µg/kg	----	----	<10	<10	<10
Fenthion	55-38-9	10	µg/kg	----	----	<10	<10	<10
Malathion	121-75-5	10	µg/kg	----	----	<10	<10	<10
Azinphos Methyl	86-50-0	10	µg/kg	----	----	<10	<10	<10
Monocrotophos	6923-22-4	10	µg/kg	----	----	<10	<10	<10
Parathion	56-38-2	10	µg/kg	----	----	<10	<10	<10
Parathion-methyl	298-00-0	10	µg/kg	----	----	<10	<10	<10
Pirimphos-ethyl	23505-41-1	10	µg/kg	----	----	<10	<10	<10
Prothiofos	34643-46-4	10	µg/kg	----	----	<10	<10	<10
EP131A: Organochlorine Pesticides								
Aldrin	309-00-2	0.50	µg/kg	----	----	<0.50	<0.50	<0.50
alpha-BHC	319-84-6	0.50	µg/kg	----	----	<0.50	<0.50	<0.50
beta-BHC	319-85-7	0.50	µg/kg	----	----	<0.50	<0.50	<0.50
delta-BHC	319-86-8	0.50	µg/kg	----	----	<0.50	<0.50	<0.50
4.4`-DDD	72-54-8	0.50	µg/kg	----	----	<0.50	<0.50	<0.50
4.4`-DDE	72-55-9	0.50	µg/kg	----	----	<0.50	<0.50	<0.50
4.4`-DDT	50-29-3	0.50	µg/kg	----	----	<0.50	<0.50	<0.50
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/50-2	0.50	µg/kg	----	----	<0.50	<0.50	<0.50
Dieldrin	60-57-1	0.50	µg/kg	----	----	<0.50	<0.50	<0.50
alpha-Endosulfan	959-98-8	0.50	µg/kg	----	----	<0.50	<0.50	<0.50
beta-Endosulfan	33213-65-9	0.50	µg/kg	----	----	<0.50	<0.50	<0.50
Endosulfan sulfate	1031-07-8	0.50	µg/kg	----	----	<0.50	<0.50	<0.50
^ Endosulfan (sum)	115-29-7	0.50	µg/kg	----	----	<0.50	<0.50	<0.50
Endrin	72-20-8	0.50	µg/kg	----	----	<0.50	<0.50	<0.50
Endrin aldehyde	7421-93-4	0.50	µg/kg	----	----	<0.50	<0.50	<0.50
Endrin ketone	53494-70-5	0.50	µg/kg	----	----	<0.50	<0.50	<0.50
Heptachlor	76-44-8	0.50	µg/kg	----	----	<0.50	<0.50	<0.50
Heptachlor epoxide	1024-57-3	0.50	µg/kg	----	----	<0.50	<0.50	<0.50
Hexachlorobenzene (HCB)	118-74-1	0.50	µg/kg	----	----	<0.50	<0.50	<0.50
gamma-BHC	58-89-9	0.25	µg/kg	----	----	<0.25	<0.25	<0.25
Methoxychlor	72-43-5	0.50	µg/kg	----	----	<0.50	<0.50	<0.50
cis-Chlordane	5103-71-9	0.25	µg/kg	----	----	<0.25	<0.25	<0.25
trans-Chlordane	5103-74-2	0.25	µg/kg	----	----	<0.25	<0.25	<0.25
^ Total Chlordane (sum)	----	0.25	µg/kg	----	----	<0.25	<0.25	<0.25

Analytical Results

Sub-Matrix: SEDIMENT (Matrix: SOIL)			Client sample ID	MBC3 0.78-0.96	MBC5 0.51-0.7	PLC1 0.1-0.43	PLC3 0.15-0.57	RAC3 0.1-0.2
			Client sampling date / time	17-Aug-2018 00:00	17-Aug-2018 00:00	17-Aug-2018 00:00	17-Aug-2018 00:00	17-Aug-2018 00:00
Compound	CAS Number	LOR	Unit	ES1824346-011	ES1824346-012	ES1824346-013	ES1824346-014	ES1824346-015
				Result	Result	Result	Result	Result
EP131A: Organochlorine Pesticides - Continued								
Oxychlordane	27304-13-8	0.50	µg/kg	----	----	<0.50	<0.50	<0.50
EP131B: Polychlorinated Biphenyls (as Aroclors)								
^ Total Polychlorinated biphenyls	----	5.0	µg/kg	----	----	<5.0	<5.0	<5.0
Aroclor 1016	12674-11-2	5.0	µg/kg	----	----	<5.0	<5.0	<5.0
Aroclor 1221	11104-28-2	5.0	µg/kg	----	----	<5.0	<5.0	<5.0
Aroclor 1232	11141-16-5	5.0	µg/kg	----	----	<5.0	<5.0	<5.0
Aroclor 1242	53469-21-9	5.0	µg/kg	----	----	<5.0	<5.0	<5.0
Aroclor 1248	12672-29-6	5.0	µg/kg	----	----	<5.0	<5.0	<5.0
Aroclor 1254	11097-69-1	5.0	µg/kg	----	----	<5.0	<5.0	<5.0
Aroclor 1260	11096-82-5	5.0	µg/kg	----	----	<5.0	<5.0	<5.0
EP132B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	5	µg/kg	----	----	<5	<5	**8**
2-Methylnaphthalene	91-57-6	5	µg/kg	----	----	<5	<5	<5
Acenaphthylene	208-96-8	4	µg/kg	----	----	<4	<4	<4
Acenaphthene	83-32-9	4	µg/kg	----	----	<4	<4	<4
Fluorene	86-73-7	4	µg/kg	----	----	<4	<4	<4
Phenanthrene	85-01-8	4	µg/kg	----	----	<4	<4	<4
Anthracene	120-12-7	4	µg/kg	----	----	<4	<4	<4
Fluoranthene	206-44-0	4	µg/kg	----	----	<4	<4	<4
Pyrene	129-00-0	4	µg/kg	----	----	<4	<4	<4
Benz(a)anthracene	56-55-3	4	µg/kg	----	----	<4	<4	<4
Chrysene	218-01-9	4	µg/kg	----	----	<4	<4	<4
Benzo(b+j)fluoranthene	205-99-2 205-82-3	4	µg/kg	----	----	<4	<4	<4
Benzo(k)fluoranthene	207-08-9	4	µg/kg	----	----	<4	<4	<4
Benzo(e)pyrene	192-97-2	4	µg/kg	----	----	<4	<4	<4
Benzo(a)pyrene	50-32-8	4	µg/kg	----	----	<4	<4	<4
Perylene	198-55-0	4	µg/kg	----	----	<4	**11**	**5**
Benzo(g.h.i)perylene	191-24-2	4	µg/kg	----	----	<4	<4	<4
Dibenz(a.h)anthracene	53-70-3	4	µg/kg	----	----	<4	<4	<4
Indeno(1.2.3.cd)pyrene	193-39-5	4	µg/kg	----	----	<4	<4	<4
Coronene	191-07-1	5	µg/kg	----	----	<5	<5	<5
^ Sum of PAHs	----	4	µg/kg	----	----	<4	**11**	**13**
EP074S: VOC Surrogates								
1.2-Dichloroethane-D4	17060-07-0	0.5	%	----	----	**106**	**101**	**101**

Analytical Results

Sub-Matrix: SEDIMENT (Matrix: SOIL)			Client sample ID	MBC3 0.78-0.96	MBC5 0.51-0.7	PLC1 0.1-0.43	PLC3 0.15-0.57	RAC3 0.1-0.2
			Client sampling date / time	17-Aug-2018 00:00	17-Aug-2018 00:00	17-Aug-2018 00:00	17-Aug-2018 00:00	17-Aug-2018 00:00
Compound	CAS Number	LOR	Unit	ES1824346-011	ES1824346-012	ES1824346-013	ES1824346-014	ES1824346-015
				Result	Result	Result	Result	Result
EP074S: VOC Surrogates - Continued								
Toluene-D8	2037-26-5	0.5	%	----	----	86.0	77.4	75.2
4-Bromofluorobenzene	460-00-4	0.5	%	----	----	89.3	86.4	81.0
EP080-SD: TPH(V)/BTEX Surrogates								
1.2-Dichloroethane-D4	17060-07-0	0.2	%	----	----	87.8	83.3	83.5
Toluene-D8	2037-26-5	0.2	%	----	----	95.3	86.0	81.8
4-Bromofluorobenzene	460-00-4	0.2	%	----	----	95.1	91.5	87.3
EP130S: Organophosphorus Pesticide Surrogate								
DEF	78-48-8	10	%	----	----	69.2	58.0	50.1
EP131S: OC Pesticide Surrogate								
Dibromo-DDE	21655-73-2	0.50	%	----	----	106	63.9	38.2
EP131T: PCB Surrogate								
Decachlorobiphenyl	2051-24-3	0.5	%	----	----	68.8	52.9	47.6
EP132T: Base/Neutral Extractable Surrogates								
2-Fluorobiphenyl	321-60-8	10	%	----	----	95.6	93.8	88.1
Anthracene-d10	1719-06-8	10	%	----	----	98.2	85.3	118
4-Terphenyl-d14	1718-51-0	10	%	----	----	88.2	81.8	106

Analytical Results

Sub-Matrix: SEDIMENT (Matrix: SOIL)			Client sample ID	RAC1 0.3-0.63	----	----	----	----
			Client sampling date / time	17-Aug-2018 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit	ES1824346-016	--------	--------	--------	--------
				Result	----	----	----	----
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	23.7	----	----	----	----
EA150: Particle Sizing								
+75µm	----	1	%	44	----	----	----	----
+150µm	----	1	%	26	----	----	----	----
+300µm	----	1	%	12	----	----	----	----
+425µm	----	1	%	6	----	----	----	----
+600µm	----	1	%	2	----	----	----	----
+1180µm	----	1	%	<1	----	----	----	----
+2.36mm	----	1	%	<1	----	----	----	----
+4.75mm	----	1	%	<1	----	----	----	----
+9.5mm	----	1	%	<1	----	----	----	----
+19.0mm	----	1	%	<1	----	----	----	----
+37.5mm	----	1	%	<1	----	----	----	----
+75.0mm	----	1	%	<1	----	----	----	----
EA150: Soil Classification based on Particle Size								
Clay (<2 µm)	----	1	%	18	----	----	----	----
Silt (2-60 µm)	----	1	%	31	----	----	----	----
Sand (0.06-2.00 mm)	----	1	%	51	----	----	----	----
Gravel (>2mm)	----	1	%	<1	----	----	----	----
Cobbles (>6cm)	----	1	%	<1	----	----	----	----
ED042T: Total Sulfur by LECO								
Sulfur - Total as S (LECO)	----	0.01	%	<0.01	----	----	----	----
EG005-SD: Total Metals in Sediments by ICP-AES								
Aluminium	7429-90-5	50	mg/kg	8990	----	----	----	----
Iron	7439-89-6	50	mg/kg	18500	----	----	----	----
EG020-SD: Total Metals in Sediments by ICPMS								
Antimony	7440-36-0	0.50	mg/kg	<0.50	----	----	----	----
Arsenic	7440-38-2	1.00	mg/kg	5.29	----	----	----	----
Cadmium	7440-43-9	0.1	mg/kg	<0.1	----	----	----	----
Chromium	7440-47-3	1.0	mg/kg	26.6	----	----	----	----
Copper	7440-50-8	1.0	mg/kg	11.9	----	----	----	----
Cobalt	7440-48-4	0.5	mg/kg	9.7	----	----	----	----
Lead	7439-92-1	1.0	mg/kg	17.0	----	----	----	----
Manganese	7439-96-5	10	mg/kg	264	----	----	----	----

Analytical Results

Sub-Matrix: SEDIMENT (Matrix: SOIL)			Client sample ID	RAC1 0.3-0.63	----	----	----	----
			Client sampling date / time	17-Aug-2018 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit	ES1824346-016	--------	--------	--------	--------
				Result	----	----	----	----
EG020-SD: Total Metals in Sediments by ICPMS - Continued								
Nickel	7440-02-0	1.0	mg/kg	**20.8**	----	----	----	----
Selenium	7782-49-2	0.1	mg/kg	**0.6**	----	----	----	----
Silver	7440-22-4	0.1	mg/kg	<0.1	----	----	----	----
Vanadium	7440-62-2	2.0	mg/kg	**20.9**	----	----	----	----
Zinc	7440-66-6	1.0	mg/kg	**36.4**	----	----	----	----
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.01	mg/kg	**0.02**	----	----	----	----
EK055: Ammonia as N								
Ammonia as N	7664-41-7	20	mg/kg	**20**	----	----	----	----
EK057G: Nitrite as N by Discrete Analyser								
Nitrite as N (Sol.)	14797-65-0	0.1	mg/kg	<0.1	----	----	----	----
EK058G: Nitrate as N by Discrete Analyser								
Nitrate as N (Sol.)	14797-55-8	0.1	mg/kg	**0.2**	----	----	----	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Nitrite + Nitrate as N (Sol.)	----	0.1	mg/kg	**0.2**	----	----	----	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Total Kjeldahl Nitrogen as N	----	20	mg/kg	**340**	----	----	----	----
EK062: Total Nitrogen as N (TKN + NOx)								
^ Total Nitrogen as N	----	20	mg/kg	**340**	----	----	----	----
EK067G: Total Phosphorus as P by Discrete Analyser								
Total Phosphorus as P	----	2	mg/kg	**337**	----	----	----	----
EP003: Total Organic Carbon (TOC) in Soil								
Total Organic Carbon	----	0.02	%	**0.20**	----	----	----	----
EP074A: Monocyclic Aromatic Hydrocarbons								
Benzene	71-43-2	0.2	mg/kg	<0.2	----	----	----	----
Toluene	108-88-3	0.5	mg/kg	<0.5	----	----	----	----
Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	----	----	----	----
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	----	----	----	----
Styrene	100-42-5	0.5	mg/kg	<0.5	----	----	----	----
ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	----	----	----	----
Isopropylbenzene	98-82-8	0.5	mg/kg	<0.5	----	----	----	----
n-Propylbenzene	103-65-1	0.5	mg/kg	<0.5	----	----	----	----
1.3.5-Trimethylbenzene	108-67-8	0.5	mg/kg	<0.5	----	----	----	----

Analytical Results

Sub-Matrix: SEDIMENT (Matrix: SOIL)			Client sample ID	RAC1 0.3-0.63	----	----	----	----
			Client sampling date / time	17-Aug-2018 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit	ES1824346-016	--------	--------	--------	--------
				Result	----	----	----	----
EP074A: Monocyclic Aromatic Hydrocarbons - Continued								
sec-Butylbenzene	135-98-8	0.5	mg/kg	<0.5	----	----	----	----
1.2.4-Trimethylbenzene	95-63-6	0.5	mg/kg	<0.5	----	----	----	----
tert-Butylbenzene	98-06-6	0.5	mg/kg	<0.5	----	----	----	----
p-Isopropyltoluene	99-87-6	0.5	mg/kg	<0.5	----	----	----	----
n-Butylbenzene	104-51-8	0.5	mg/kg	<0.5	----	----	----	----
EP074B: Oxygenated Compounds								
Vinyl Acetate	108-05-4	5	mg/kg	<5	----	----	----	----
2-Butanone (MEK)	78-93-3	5	mg/kg	<5	----	----	----	----
4-Methyl-2-pentanone (MIBK)	108-10-1	5	mg/kg	<5	----	----	----	----
2-Hexanone (MBK)	591-78-6	5	mg/kg	<5	----	----	----	----
EP074C: Sulfonated Compounds								
Carbon disulfide	75-15-0	0.5	mg/kg	<0.5	----	----	----	----
EP074D: Fumigants								
2.2-Dichloropropane	594-20-7	0.5	mg/kg	<0.5	----	----	----	----
1.2-Dichloropropane	78-87-5	0.5	mg/kg	<0.5	----	----	----	----
cis-1.3-Dichloropropylene	10061-01-5	0.5	mg/kg	<0.5	----	----	----	----
trans-1.3-Dichloropropylene	10061-02-6	0.5	mg/kg	<0.5	----	----	----	----
1.2-Dibromoethane (EDB)	106-93-4	0.5	mg/kg	<0.5	----	----	----	----
EP074E: Halogenated Aliphatic Compounds								
Dichlorodifluoromethane	75-71-8	5	mg/kg	<5	----	----	----	----
Chloromethane	74-87-3	5	mg/kg	<5	----	----	----	----
Vinyl chloride	75-01-4	5	mg/kg	<5	----	----	----	----
Bromomethane	74-83-9	5	mg/kg	<5	----	----	----	----
Chloroethane	75-00-3	5	mg/kg	<5	----	----	----	----
Trichlorofluoromethane	75-69-4	5	mg/kg	<5	----	----	----	----
1.1-Dichloroethene	75-35-4	0.5	mg/kg	<0.5	----	----	----	----
Iodomethane	74-88-4	0.5	mg/kg	<0.5	----	----	----	----
trans-1.2-Dichloroethene	156-60-5	0.5	mg/kg	<0.5	----	----	----	----
1.1-Dichloroethane	75-34-3	0.5	mg/kg	<0.5	----	----	----	----
cis-1.2-Dichloroethene	156-59-2	0.5	mg/kg	<0.5	----	----	----	----
1.1.1-Trichloroethane	71-55-6	0.5	mg/kg	<0.5	----	----	----	----
1.1-Dichloropropylene	563-58-6	0.5	mg/kg	<0.5	----	----	----	----
Carbon Tetrachloride	56-23-5	0.5	mg/kg	<0.5	----	----	----	----
1.2-Dichloroethane	107-06-2	0.5	mg/kg	<0.5	----	----	----	----

Analytical Results

Sub-Matrix: SEDIMENT (Matrix: SOIL)			Client sample ID	RAC1 0.3-0.63	----	----	----	----
			Client sampling date / time	17-Aug-2018 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit	ES1824346-016	--------	--------	--------	--------
				Result	----	----	----	----
EP074E: Halogenated Aliphatic Compounds - Continued								
Trichloroethene	79-01-6	0.5	mg/kg	<0.5	----	----	----	----
Dibromomethane	74-95-3	0.5	mg/kg	<0.5	----	----	----	----
1.1.2-Trichloroethane	79-00-5	0.5	mg/kg	<0.5	----	----	----	----
1.3-Dichloropropane	142-28-9	0.5	mg/kg	<0.5	----	----	----	----
Tetrachloroethene	127-18-4	0.5	mg/kg	<0.5	----	----	----	----
1.1.1.2-Tetrachloroethane	630-20-6	0.5	mg/kg	<0.5	----	----	----	----
trans-1.4-Dichloro-2-butene	110-57-6	0.5	mg/kg	<0.5	----	----	----	----
cis-1.4-Dichloro-2-butene	1476-11-5	0.5	mg/kg	<0.5	----	----	----	----
1.1.2.2-Tetrachloroethane	79-34-5	0.5	mg/kg	<0.5	----	----	----	----
1.2.3-Trichloropropane	96-18-4	0.5	mg/kg	<0.5	----	----	----	----
Pentachloroethane	76-01-7	0.5	mg/kg	<0.5	----	----	----	----
1.2-Dibromo-3-chloropropane	96-12-8	0.5	mg/kg	<0.5	----	----	----	----
Hexachlorobutadiene	87-68-3	0.5	mg/kg	<0.5	----	----	----	----
EP074F: Halogenated Aromatic Compounds								
Chlorobenzene	108-90-7	0.5	mg/kg	<0.5	----	----	----	----
Bromobenzene	108-86-1	0.5	mg/kg	<0.5	----	----	----	----
2-Chlorotoluene	95-49-8	0.5	mg/kg	<0.5	----	----	----	----
4-Chlorotoluene	106-43-4	0.5	mg/kg	<0.5	----	----	----	----
1.3-Dichlorobenzene	541-73-1	0.5	mg/kg	<0.5	----	----	----	----
1.4-Dichlorobenzene	106-46-7	0.5	mg/kg	<0.5	----	----	----	----
1.2-Dichlorobenzene	95-50-1	0.5	mg/kg	<0.5	----	----	----	----
1.2.4-Trichlorobenzene	120-82-1	0.5	mg/kg	<0.5	----	----	----	----
1.2.3-Trichlorobenzene	87-61-6	0.5	mg/kg	<0.5	----	----	----	----
EP074G: Trihalomethanes								
Chloroform	67-66-3	0.5	mg/kg	<0.5	----	----	----	----
Bromodichloromethane	75-27-4	0.5	mg/kg	<0.5	----	----	----	----
Dibromochloromethane	124-48-1	0.5	mg/kg	<0.5	----	----	----	----
Bromoform	75-25-2	0.5	mg/kg	<0.5	----	----	----	----
EP074H: Naphthalene								
Naphthalene	91-20-3	1	mg/kg	<1	----	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
>C10 - C16 Fraction	----	3	mg/kg	<3	----	----	----	----
>C16 - C34 Fraction	----	3	mg/kg	**5**	----	----	----	----
>C34 - C40 Fraction	----	5	mg/kg	**5**	----	----	----	----

Analytical Results

Sub-Matrix: SEDIMENT (Matrix: SOIL)			Client sample ID	RAC1 0.3-0.63	----	----	----	----
			Client sampling date / time	17-Aug-2018 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit	ES1824346-016	--------	--------	--------	--------
				Result	----	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued								
>C10 - C40 Fraction (sum)	----	3	mg/kg	**10**	----	----	----	----
>C10 - C16 Fraction minus Naphthalene (F2)	----	3	mg/kg	<3	----	----	----	----
EP080-SD / EP071-SD: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	3	mg/kg	<3	----	----	----	----
C10 - C14 Fraction	----	3	mg/kg	<3	----	----	----	----
C15 - C28 Fraction	----	3	mg/kg	<3	----	----	----	----
C29 - C36 Fraction	----	5	mg/kg	**6**	----	----	----	----
^ C10 - C36 Fraction (sum)	----	3	mg/kg	**6**	----	----	----	----
EP080-SD / EP071-SD: Total Recoverable Hydrocarbons								
C6 - C10 Fraction	C6_C10	3	mg/kg	<3	----	----	----	----
C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	3.0	mg/kg	<3.0	----	----	----	----
EP080-SD: BTEXN								
Benzene	71-43-2	0.2	mg/kg	<0.2	----	----	----	----
Toluene	108-88-3	0.2	mg/kg	<0.2	----	----	----	----
Ethylbenzene	100-41-4	0.2	mg/kg	<0.2	----	----	----	----
meta- & para-Xylene	108-38-3 106-42-3	0.2	mg/kg	<0.2	----	----	----	----
ortho-Xylene	95-47-6	0.2	mg/kg	<0.2	----	----	----	----
^ Total Xylenes	----	0.5	mg/kg	<0.5	----	----	----	----
^ Sum of BTEX	----	0.2	mg/kg	<0.2	----	----	----	----
Naphthalene	91-20-3	0.2	mg/kg	<0.2	----	----	----	----
EP130A: Organophosphorus Pesticides (Ultra-trace)								
Bromophos-ethyl	4824-78-6	10	µg/kg	<10	----	----	----	----
Carbophenothion	786-19-6	10	µg/kg	<10	----	----	----	----
Chlorfenvinphos (E)	18708-86-6	10.0	µg/kg	<10.0	----	----	----	----
Chlorfenvinphos (Z)	18708-87-7	10	µg/kg	<10	----	----	----	----
Chlorpyrifos	2921-88-2	10	µg/kg	<10	----	----	----	----
Chlorpyrifos-methyl	5598-13-0	10	µg/kg	<10	----	----	----	----
Demeton-S-methyl	919-86-8	10	µg/kg	<10	----	----	----	----
Diazinon	333-41-5	10	µg/kg	<10	----	----	----	----
Dichlorvos	62-73-7	10	µg/kg	<10	----	----	----	----
Dimethoate	60-51-5	10	µg/kg	<10	----	----	----	----
Ethion	563-12-2	10	µg/kg	<10	----	----	----	----

Analytical Results

Sub-Matrix: SEDIMENT (Matrix: SOIL)			Client sample ID	RAC1 0.3-0.63	----	----	----	----
			Client sampling date / time	17-Aug-2018 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit	ES1824346-016	--------	--------	--------	--------
				Result	----	----	----	----
EP130A: Organophosphorus Pesticides (Ultra-trace) - Continued								
Fenamiphos	22224-92-6	10	µg/kg	<10	----	----	----	----
Fenthion	55-38-9	10	µg/kg	<10	----	----	----	----
Malathion	121-75-5	10	µg/kg	<10	----	----	----	----
Azinphos Methyl	86-50-0	10	µg/kg	<10	----	----	----	----
Monocrotophos	6923-22-4	10	µg/kg	<10	----	----	----	----
Parathion	56-38-2	10	µg/kg	<10	----	----	----	----
Parathion-methyl	298-00-0	10	µg/kg	<10	----	----	----	----
Pirimphos-ethyl	23505-41-1	10	µg/kg	<10	----	----	----	----
Prothiofos	34643-46-4	10	µg/kg	<10	----	----	----	----
EP131A: Organochlorine Pesticides								
Aldrin	309-00-2	0.50	µg/kg	<0.50	----	----	----	----
alpha-BHC	319-84-6	0.50	µg/kg	<0.50	----	----	----	----
beta-BHC	319-85-7	0.50	µg/kg	<0.50	----	----	----	----
delta-BHC	319-86-8	0.50	µg/kg	<0.50	----	----	----	----
4.4`-DDD	72-54-8	0.50	µg/kg	<0.50	----	----	----	----
4.4`-DDE	72-55-9	0.50	µg/kg	<0.50	----	----	----	----
4.4`-DDT	50-29-3	0.50	µg/kg	<0.50	----	----	----	----
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/50-2	0.50	µg/kg	<0.50	----	----	----	----
Dieldrin	60-57-1	0.50	µg/kg	<0.50	----	----	----	----
alpha-Endosulfan	959-98-8	0.50	µg/kg	<0.50	----	----	----	----
beta-Endosulfan	33213-65-9	0.50	µg/kg	<0.50	----	----	----	----
Endosulfan sulfate	1031-07-8	0.50	µg/kg	<0.50	----	----	----	----
^ Endosulfan (sum)	115-29-7	0.50	µg/kg	<0.50	----	----	----	----
Endrin	72-20-8	0.50	µg/kg	<0.50	----	----	----	----
Endrin aldehyde	7421-93-4	0.50	µg/kg	<0.50	----	----	----	----
Endrin ketone	53494-70-5	0.50	µg/kg	<0.50	----	----	----	----
Heptachlor	76-44-8	0.50	µg/kg	<0.50	----	----	----	----
Heptachlor epoxide	1024-57-3	0.50	µg/kg	<0.50	----	----	----	----
Hexachlorobenzene (HCB)	118-74-1	0.50	µg/kg	<0.50	----	----	----	----
gamma-BHC	58-89-9	0.25	µg/kg	<0.25	----	----	----	----
Methoxychlor	72-43-5	0.50	µg/kg	<0.50	----	----	----	----
cis-Chlordane	5103-71-9	0.25	µg/kg	<0.25	----	----	----	----
trans-Chlordane	5103-74-2	0.25	µg/kg	<0.25	----	----	----	----
^ Total Chlordane (sum)	----	0.25	µg/kg	<0.25	----	----	----	----

Analytical Results

Sub-Matrix: SEDIMENT (Matrix: SOIL)			Client sample ID	RAC1 0.3-0.63	----	----	----	----
			Client sampling date / time	17-Aug-2018 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit	ES1824346-016	--------	--------	--------	--------
				Result	----	----	----	----
EP131A: Organochlorine Pesticides - Continued								
Oxychlordane	27304-13-8	0.50	µg/kg	<0.50	----	----	----	----
EP131B: Polychlorinated Biphenyls (as Aroclors)								
^ Total Polychlorinated biphenyls	----	5.0	µg/kg	<5.0	----	----	----	----
Aroclor 1016	12674-11-2	5.0	µg/kg	<5.0	----	----	----	----
Aroclor 1221	11104-28-2	5.0	µg/kg	<5.0	----	----	----	----
Aroclor 1232	11141-16-5	5.0	µg/kg	<5.0	----	----	----	----
Aroclor 1242	53469-21-9	5.0	µg/kg	<5.0	----	----	----	----
Aroclor 1248	12672-29-6	5.0	µg/kg	<5.0	----	----	----	----
Aroclor 1254	11097-69-1	5.0	µg/kg	<5.0	----	----	----	----
Aroclor 1260	11096-82-5	5.0	µg/kg	<5.0	----	----	----	----
EP132B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	5	µg/kg	<5	----	----	----	----
2-Methylnaphthalene	91-57-6	5	µg/kg	<5	----	----	----	----
Acenaphthylene	208-96-8	4	µg/kg	<4	----	----	----	----
Acenaphthene	83-32-9	4	µg/kg	<4	----	----	----	----
Fluorene	86-73-7	4	µg/kg	<4	----	----	----	----
Phenanthrene	85-01-8	4	µg/kg	<4	----	----	----	----
Anthracene	120-12-7	4	µg/kg	<4	----	----	----	----
Fluoranthene	206-44-0	4	µg/kg	<4	----	----	----	----
Pyrene	129-00-0	4	µg/kg	<4	----	----	----	----
Benz(a)anthracene	56-55-3	4	µg/kg	<4	----	----	----	----
Chrysene	218-01-9	4	µg/kg	<4	----	----	----	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	4	µg/kg	<4	----	----	----	----
Benzo(k)fluoranthene	207-08-9	4	µg/kg	<4	----	----	----	----
Benzo(e)pyrene	192-97-2	4	µg/kg	<4	----	----	----	----
Benzo(a)pyrene	50-32-8	4	µg/kg	<4	----	----	----	----
Perylene	198-55-0	4	µg/kg	<4	----	----	----	----
Benzo(g.h.i)perylene	191-24-2	4	µg/kg	<4	----	----	----	----
Dibenz(a.h)anthracene	53-70-3	4	µg/kg	<4	----	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	4	µg/kg	<4	----	----	----	----
Coronene	191-07-1	5	µg/kg	<5	----	----	----	----
^ Sum of PAHs	----	4	µg/kg	<4	----	----	----	----
EP074S: VOC Surrogates								
1.2-Dichloroethane-D4	17060-07-0	0.5	%	93.6	----	----	----	----

Analytical Results

Sub-Matrix: SEDIMENT (Matrix: SOIL)			Client sample ID	RAC1 0.3-0.63	----	----	----	----
			Client sampling date / time	17-Aug-2018 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit	ES1824346-016	--------	--------	--------	--------
				Result	----	----	----	----
EP074S: VOC Surrogates - Continued								
Toluene-D8	2037-26-5	0.5	%	77.4	----	----	----	----
4-Bromofluorobenzene	460-00-4	0.5	%	79.4	----	----	----	----
EP080-SD: TPH(V)/BTEX Surrogates								
1.2-Dichloroethane-D4	17060-07-0	0.2	%	77.6	----	----	----	----
Toluene-D8	2037-26-5	0.2	%	76.7	----	----	----	----
4-Bromofluorobenzene	460-00-4	0.2	%	82.8	----	----	----	----
EP130S: Organophosphorus Pesticide Surrogate								
DEF	78-48-8	10	%	60.0	----	----	----	----
EP131S: OC Pesticide Surrogate								
Dibromo-DDE	21655-73-2	0.50	%	80.3	----	----	----	----
EP131T: PCB Surrogate								
Decachlorobiphenyl	2051-24-3	0.5	%	60.5	----	----	----	----
EP132T: Base/Neutral Extractable Surrogates								
2-Fluorobiphenyl	321-60-8	10	%	98.9	----	----	----	----
Anthracene-d10	1719-06-8	10	%	88.6	----	----	----	----
4-Terphenyl-d14	1718-51-0	10	%	80.6	----	----	----	----

Surrogate Control Limits

Sub-Matrix: **SEDIMENT**		Recovery Limits (%)	
Compound	*CAS Number*	*Low*	*High*
EP074S: VOC Surrogates			
1.2-Dichloroethane-D4	17060-07-0	64	130
Toluene-D8	2037-26-5	66	136
4-Bromofluorobenzene	460-00-4	60	122
EP080-SD: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	67	137
Toluene-D8	2037-26-5	74	134
4-Bromofluorobenzene	460-00-4	73	137
EP130S: Organophosphorus Pesticide Surrogate			
DEF	78-48-8	14	102
EP131S: OC Pesticide Surrogate			
Dibromo-DDE	21655-73-2	10	119
EP131T: PCB Surrogate			
Decachlorobiphenyl	2051-24-3	10	106
EP132T: Base/Neutral Extractable Surrogates			
2-Fluorobiphenyl	321-60-8	55	135
Anthracene-d10	1719-06-8	70	136
4-Terphenyl-d14	1718-51-0	57	127

Certificate of Analysis

ALS Laboratory Group Pty Ltd
5/585 Maitland Road
Mayfield West, NSW 2304
pH 02 4014 2500
fax 02 4968 0349
samples.newcastle@alsenviro.com

ALS Environmental

Newcastle, NSW

CLIENT:	Ali Watters	**DATE REPORTED:**	24-Aug-2018
COMPANY:	HASKONING AUSTRALIA-ROYAL HASKONING	**DATE RECEIVED:**	17-Aug-2018
ADDRESS:	LEVEL 14 56 Berry Street NORTH SYDNEY	**REPORT NO:**	ES1824346-001 / PSD
PROJECT:	Snowy 2.0 - Vibrocoring	**SAMPLE ID:**	CAC1 0.1-0.3

Particle Size Distribution

Particle Size (mm)	% Passing
37.5	100%
19.0	89%
9.50	77%
4.75	70%
2.36	61%
1.18	53%
0.600	46%
0.425	43%
0.300	39%
0.150	35%
0.075	31%
Particle Size (microns)	
52	26%
37	26%
26	25%
19	23%
14	21%
10	20%
7	16%
5	13%
2	6%

Analysis Notes

Samples analysed as received.

** Soil Particle Density required for Hydrometer analysis according to AS 1289.3.5.1—2006 was not requested by the client . Typical sediment SPD values used for calculations and consequently, NATA endorsement does not apply to hydrometer results*

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Median Particle Size (mm)*	0.931

Sample Comments:		**Analysed:**	22-Aug-18
Loss on Pretreatment	NA	**Limit of Reporting:**	1%
Sample Description:	FINES, SAND, STONE	**Dispersion Method**	Shaker
Test Method:	AS1289.3.6.2/AS1289.3.6.3	**Hydrometer Type**	ASTM E100

Soil Particle Density (<2.36mm) #N/A g/cm³

NATA Accreditation: 825 Site: Newcastle
This document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025. This document shall not be reproduced, except in full.

Dianne Blane
Laboratory Coordinator
Authorised Signatory

Certificate of Analysis

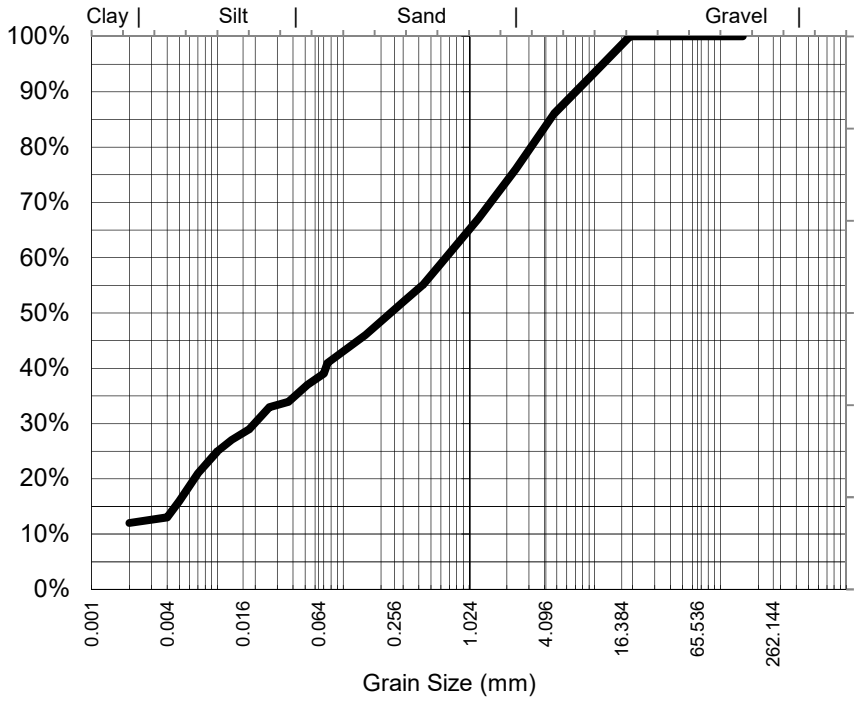
ALS Laboratory Group Pty Ltd
5/585 Maitland Road
Mayfield West, NSW 2304
pH 02 4014 2500
fax 02 4968 0349
samples.newcastle@alsenviro.com

ALS Environmental

Newcastle, NSW

CLIENT:	Ali Watters	**DATE REPORTED:**	24-Aug-2018
COMPANY:	HASKONING AUSTRALIA-ROYAL HASKONING	**DATE RECEIVED:**	17-Aug-2018
ADDRESS:	LEVEL 14 56 Berry Street NORTH SYDNEY	**REPORT NO:**	ES1824346-002 / PSD
PROJECT:	Snowy 2.0 - Vibrocoring	**SAMPLE ID:**	

Particle Size Distribution



Particle Size (mm)	% Passing
19.0	100%
9.50	93%
4.75	86%
2.36	76%
1.18	67%
0.600	59%
0.425	55%
0.300	52%
0.150	46%
0.075	41%
Particle Size (microns)	
52	37%
37	34%
26	33%
18	29%
13	27%
10	25%
7	21%
5	16%
2	12%

Analysis Notes

Samples analysed as received.

** Soil Particle Density required for Hydrometer analysis according to AS 1289.3.5.1—2006 was not requested by the client . Typical sediment SPD values used for calculations and consequently, NATA endorsement does not apply to hydrometer results*

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Median Particle Size (mm)*	0.250

Sample Comments:

Analysed: 22-Aug-18

Loss on Pretreatment NA

Limit of Reporting: 1%

Sample Description: FINES, SAND, STONE

Dispersion Method Shaker

Test Method: AS1289.3.6.2/AS1289.3.6.3

Hydrometer Type ASTM E100

Soil Particle Density (<2.36mm) #N/A g/cm³

NATA Accreditation: 825 Site: Newcastle
This document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025. This document shall not be reproduced, except in full.

NATA
WORLD RECOGNISED ACCREDITATION

Dianne Blane
Laboratory Coordinator
Authorised Signatory

Certificate of Analysis

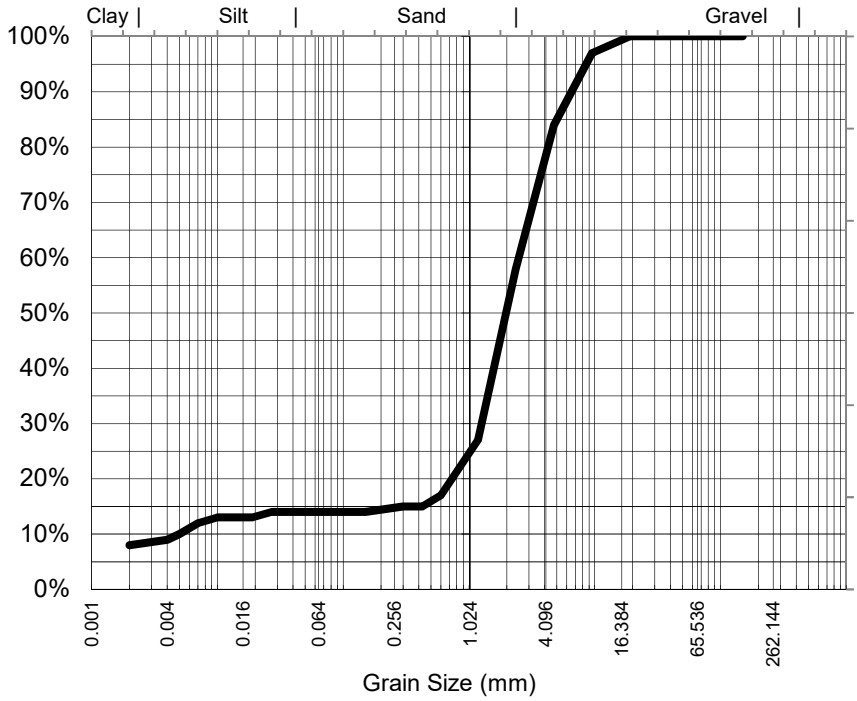
ALS Laboratory Group Pty Ltd
5/585 Maitland Road
Mayfield West, NSW 2304
pH 02 4014 2500
fax 02 4968 0349
samples.newcastle@alsenviro.com

ALS Environmental

Newcastle, NSW

CLIENT:	Ali Watters	**DATE REPORTED:**	24-Aug-2018
COMPANY:	HASKONING AUSTRALIA-ROYAL HASKONING	**DATE RECEIVED:**	17-Aug-2018
ADDRESS:	LEVEL 14 56 Berry Street NORTH SYDNEY	**REPORT NO:**	ES1824346-005 / PSD
PROJECT:	Snowy 2.0 - Vibrocoring	**SAMPLE ID:**	

Particle Size Distribution



Particle Size (mm)	% Passing
19.0	100%
9.50	97%
4.75	84%
2.36	58%
1.18	27%
0.600	17%
0.425	15%
0.300	15%
0.150	14%
0.075	14%
Particle Size (microns)	
54	14%
38	14%
27	14%
19	13%
14	13%
10	13%
7	12%
5	10%
2	8%

Analysis Notes

Samples analysed as received.

** Soil Particle Density required for Hydrometer analysis according to AS 1289.3.5.1—2006 was not requested by the client . Typical sediment SPD values used for calculations and consequently, NATA endorsement does not apply to hydrometer results*

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Median Particle Size (mm)*	2.055

Sample Comments:

Analysed: 22-Aug-18

Loss on Pretreatment NA

Limit of Reporting: 1%

Sample Description: SAND, STONE

Dispersion Method Shaker

Test Method: AS1289.3.6.2/AS1289.3.6.3

Hydrometer Type ASTM E100

Soil Particle Density (<2.36mm) #N/A g/cm³

NATA Accreditation: 825 Site: Newcastle
This document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025. This document shall not be reproduced, except in full.

NATA
WORLD RECOGNISED ACCREDITATION

Dianne Blane
Laboratory Coordinator
Authorised Signatory

Certificate of Analysis

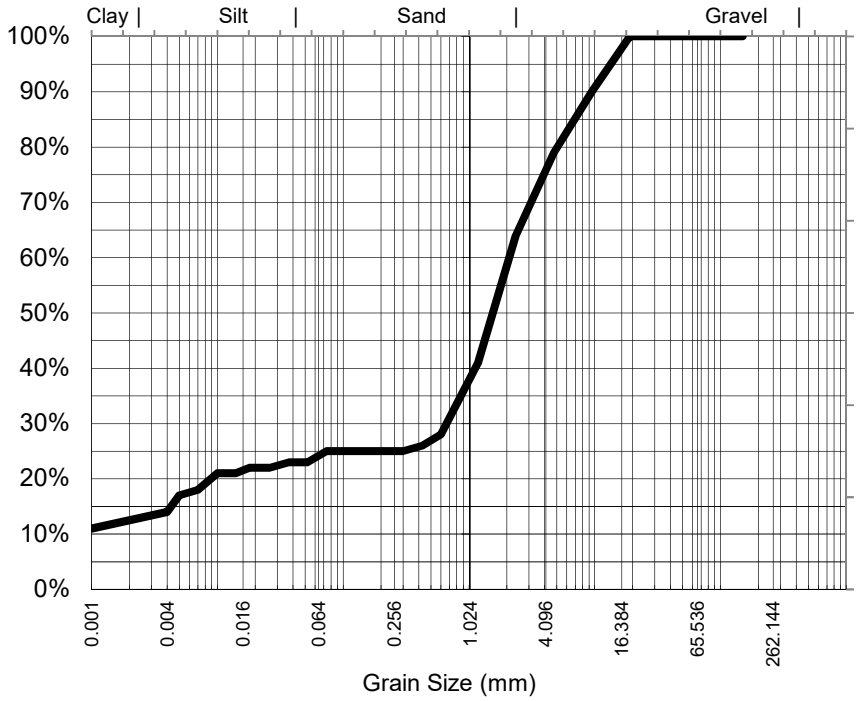
ALS Laboratory Group Pty Ltd
5/585 Maitland Road
Mayfield West, NSW 2304
pH 02 4014 2500
fax 02 4968 0349
samples.newcastle@alsenviro.com

ALS Environmental

Newcastle, NSW

CLIENT:	Ali Watters	**DATE REPORTED:**	24-Aug-2018
COMPANY:	HASKONING AUSTRALIA-ROYAL HASKONING	**DATE RECEIVED:**	17-Aug-2018
ADDRESS:	LEVEL 14 56 Berry Street NORTH SYDNEY	**REPORT NO:**	ES1824346-007 / PSD
PROJECT:	Snowy 2.0 - Vibrocoring	**SAMPLE ID:**	

Particle Size Distribution



Particle Size (mm)	% Passing
19.0	100%
9.50	90%
4.75	79%
2.36	64%
1.18	41%
0.600	28%
0.425	26%
0.300	25%
0.150	25%
0.075	25%
Particle Size (microns)	
52	23%
37	23%
26	22%
18	22%
14	21%
10	21%
7	18%
5	17%
1	11%

Analysis Notes

Samples analysed as received.

** Soil Particle Density required for Hydrometer analysis according to AS 1289.3.5.1—2006 was not requested by the client . Typical sediment SPD values used for calculations and consequently, NATA endorsement does not apply to hydrometer results*

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Median Particle Size (mm)*	1.642

Sample Comments:

Analysed: 22-Aug-18

Loss on Pretreatment NA

Limit of Reporting: 1%

Sample Description: FINES, SAND, STONE

Dispersion Method Shaker

Test Method: AS1289.3.6.2/AS1289.3.6.3

Hydrometer Type ASTM E100

Soil Particle Density (<2.36mm) #N/A g/cm³

NATA Accreditation: 825 Site: Newcastle
This document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025. This document shall not be reproduced, except in full.

NATA
WORLD RECOGNISED ACCREDITATION

Dianne Blane
Laboratory Coordinator
Authorised Signatory

Certificate of Analysis

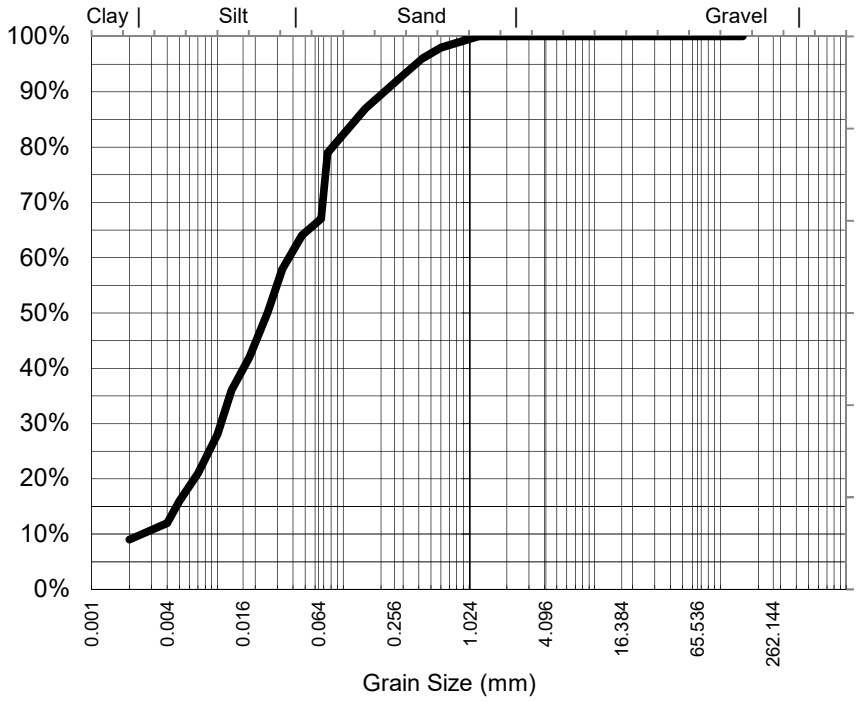
ALS Laboratory Group Pty Ltd
5/585 Maitland Road
Mayfield West, NSW 2304
pH 02 4014 2500
fax 02 4968 0349
samples.newcastle@alsenviro.com

ALS Environmental

Newcastle, NSW

CLIENT:	Ali Watters	**DATE REPORTED:**	24-Aug-2018
COMPANY:	HASKONING AUSTRALIA-ROYAL HASKONING	**DATE RECEIVED:**	17-Aug-2018
ADDRESS:	LEVEL 14 56 Berry Street NORTH SYDNEY	**REPORT NO:**	ES1824346-009 / PSD
PROJECT:	Snowy 2.0 - Vibrocoring	**SAMPLE ID:**	

Particle Size Distribution



Particle Size (mm)	% Passing
1.18	100%
0.600	98%
0.425	96%
0.300	93%
0.150	87%
0.075	79%
Particle Size (microns)	
47	64%
33	58%
25	50%
18	42%
13	36%
10	28%
7	21%
5	16%
2	9%

Analysis Notes

Samples analysed as received.

** Soil Particle Density required for Hydrometer analysis according to AS 1289.3.5.1—2006 was not requested by the client . Typical sediment SPD values used for calculations and consequently, NATA endorsement does not apply to hydrometer results*

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Median Particle Size (mm)*	0.025

Sample Comments:

Analysed: 22-Aug-18

Loss on Pretreatment NA

Limit of Reporting: 1%

Sample Description: FINES, SAND

Dispersion Method Shaker

Test Method: AS1289.3.6.2/AS1289.3.6.3

Hydrometer Type ASTM E100

Soil Particle Density (<2.36mm) #N/A g/cm³

NATA Accreditation: 825 Site: Newcastle
This document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025. This document shall not be reproduced, except in full.

NATA
WORLD RECOGNISED ACCREDITATION

Dianne Blane
Laboratory Coordinator
Authorised Signatory

Certificate of Analysis

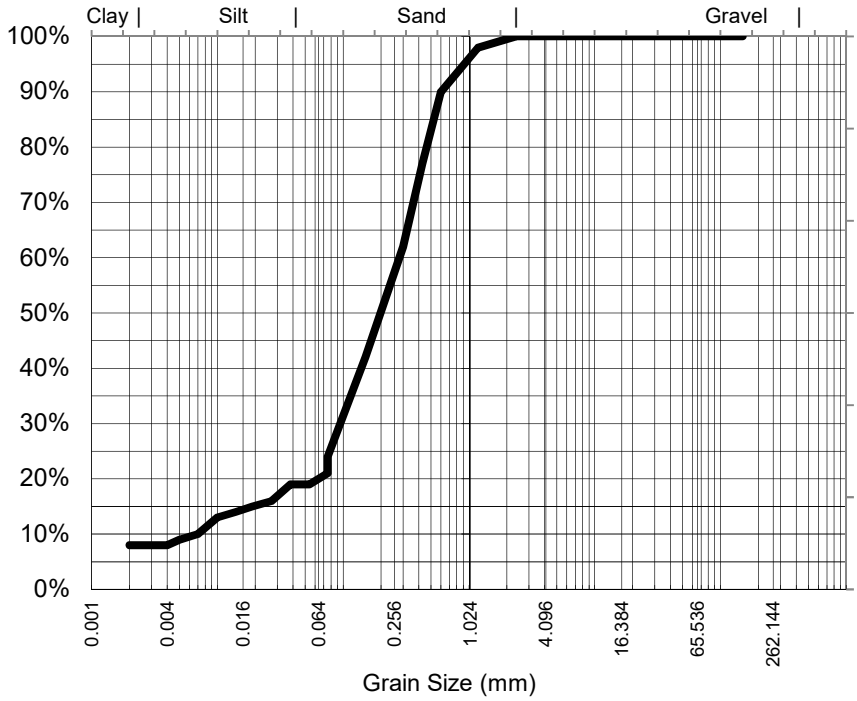
ALS Laboratory Group Pty Ltd
5/585 Maitland Road
Mayfield West, NSW 2304
pH 02 4014 2500
fax 02 4968 0349
samples.newcastle@alsenviro.com

ALS Environmental

Newcastle, NSW

CLIENT:	Ali Watters	**DATE REPORTED:**	24-Aug-2018
COMPANY:	HASKONING AUSTRALIA-ROYAL HASKONING	**DATE RECEIVED:**	17-Aug-2018
ADDRESS:	LEVEL 14 56 Berry Street NORTH SYDNEY	**REPORT NO:**	ES1824346-010 / PSD
PROJECT:	Snowy 2.0 - Vibrocoring	**SAMPLE ID:**	

Particle Size Distribution



Particle Size (mm)	% Passing
2.36	100%
1.18	98%
0.600	90%
0.425	77%
0.300	62%
0.150	42%
0.075	24%
Particle Size (microns)	
54	19%
38	19%
27	16%
19	15%
14	14%
10	13%
7	10%
5	9%
2	8%

Analysis Notes

Samples analysed as received.

** Soil Particle Density required for Hydrometer analysis according to AS 1289.3.5.1—2006 was not requested by the client . Typical sediment SPD values used for calculations and consequently, NATA endorsement does not apply to hydrometer results*

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Median Particle Size (mm)*	0.210

Sample Comments:		**Analysed:**	22-Aug-18
Loss on Pretreatment	NA	**Limit of Reporting:**	1%
Sample Description:	SAND, FINES	**Dispersion Method**	Shaker
Test Method:	AS1289.3.6.2/AS1289.3.6.3	**Hydrometer Type**	ASTM E100

Soil Particle Density (<2.36mm) #N/A g/cm³

NATA Accreditation: 825 Site: Newcastle
This document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025. This document shall not be reproduced, except in full.

NATA
WORLD RECOGNISED ACCREDITATION

Dianne Blane
Laboratory Coordinator
Authorised Signatory

Certificate of Analysis

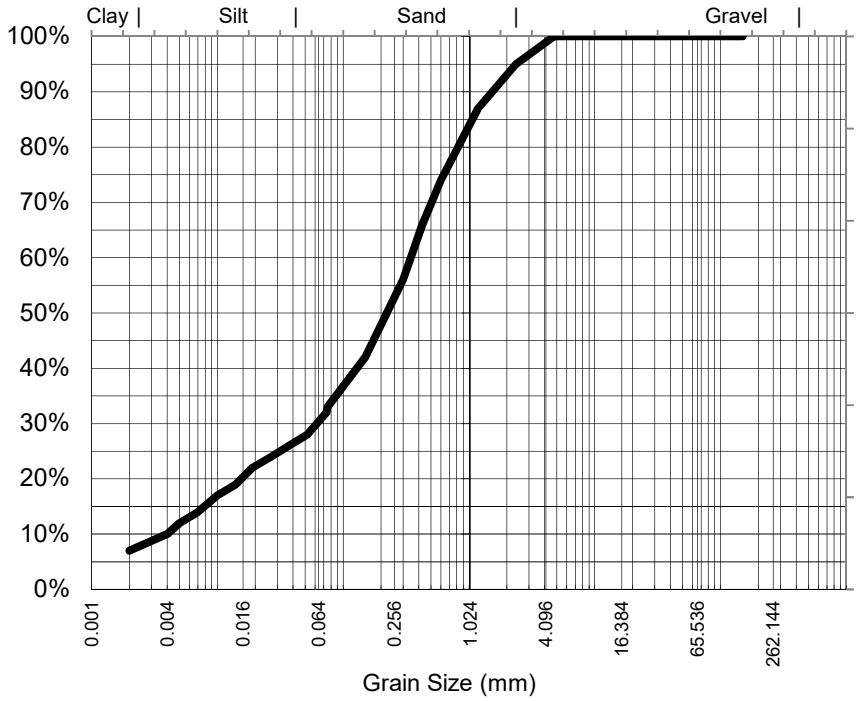
ALS Laboratory Group Pty Ltd
5/585 Maitland Road
Mayfield West, NSW 2304
pH 02 4014 2500
fax 02 4968 0349
samples.newcastle@alsenviro.com

ALS Environmental

Newcastle, NSW

CLIENT:	Ali Watters	**DATE REPORTED:**	24-Aug-2018
COMPANY:	HASKONING AUSTRALIA-ROYAL HASKONING	**DATE RECEIVED:**	17-Aug-2018
ADDRESS:	LEVEL 14 56 Berry Street NORTH SYDNEY	**REPORT NO:**	ES1824346-013 / PSD
PROJECT:	Snowy 2.0 - Vibrocoring	**SAMPLE ID:**	

Particle Size Distribution



Particle Size (mm)	% Passing
4.75	100%
2.36	95%
1.18	87%
0.600	74%
0.425	66%
0.300	56%
0.150	42%
0.075	33%
Particle Size (microns)	
52	28%
37	26%
27	24%
19	22%
14	19%
10	17%
7	14%
5	12%
2	7%

Median Particle Size (mm)*	0.236

Analysis Notes

Samples analysed as received.

** Soil Particle Density required for Hydrometer analysis according to AS 1289.3.5.1—2006 was not requested by the client . Typical sediment SPD values used for calculations and consequently, NATA endorsement does not apply to hydrometer results*

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Sample Comments:		**Analysed:**	22-Aug-18
Loss on Pretreatment	NA	**Limit of Reporting:**	1%
Sample Description:	SAND, FINES	**Dispersion Method**	Shaker
Test Method:	AS1289.3.6.2/AS1289.3.6.3	**Hydrometer Type**	ASTM E100

Soil Particle Density (<2.36mm) #N/A g/cm³

NATA Accreditation: 825 Site: Newcastle
This document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025. This document shall not be reproduced, except in full.

NATA
WORLD RECOGNISED ACCREDITATION

Dianne Blane
Laboratory Coordinator
Authorised Signatory

Certificate of Analysis

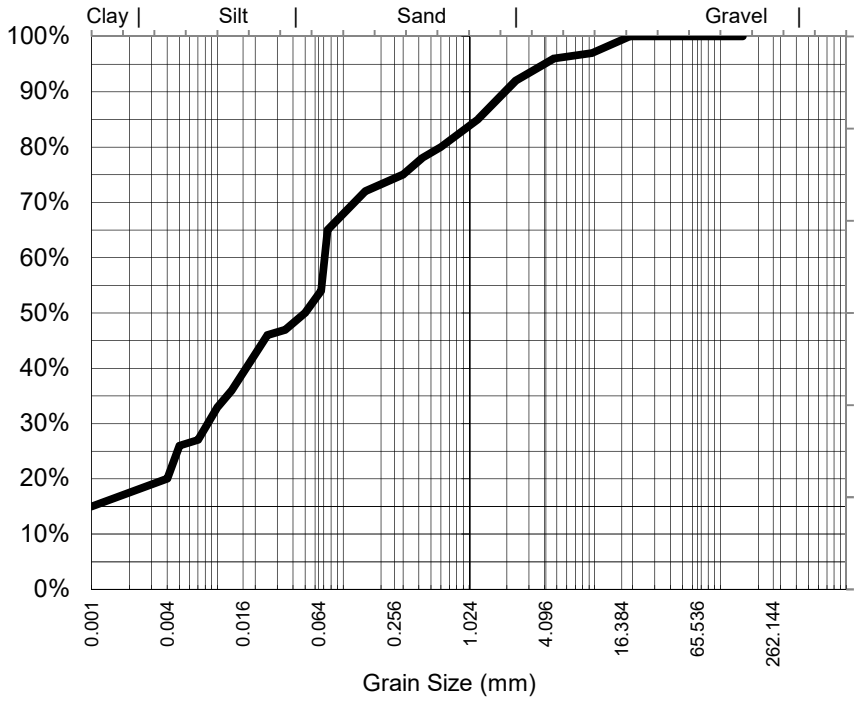
ALS Laboratory Group Pty Ltd
5/585 Maitland Road
Mayfield West, NSW 2304
pH 02 4014 2500
fax 02 4968 0349
samples.newcastle@alsenviro.com

ALS Environmental

Newcastle, NSW

CLIENT:	Ali Watters	**DATE REPORTED:**	24-Aug-2018
COMPANY:	HASKONING AUSTRALIA-ROYAL HASKONING	**DATE RECEIVED:**	17-Aug-2018
ADDRESS:	LEVEL 14 56 Berry Street NORTH SYDNEY	**REPORT NO:**	ES1824346-014 / PSD
PROJECT:	Snowy 2.0 - Vibrocoring	**SAMPLE ID:**	

Particle Size Distribution



Particle Size (mm)	% Passing
19.0	100%
9.50	97%
4.75	96%
2.36	92%
1.18	85%
0.600	80%
0.425	78%
0.300	75%
0.150	72%
0.075	65%
Particle Size (microns)	
50	50%
35	47%
25	46%
18	41%
13	36%
10	33%
7	27%
5	26%
1	15%

Analysis Notes

Samples analysed as received.

** Soil Particle Density required for Hydrometer analysis according to AS 1289.3.5.1—2006 was not requested by the client . Typical sediment SPD values used for calculations and consequently, NATA endorsement does not apply to hydrometer results*

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Median Particle Size (mm)*	0.050

Sample Comments:

Analysed: 22-Aug-18

Loss on Pretreatment NA

Limit of Reporting: 1%

Sample Description: FINES, STONE

Dispersion Method Shaker

Test Method: AS1289.3.6.2/AS1289.3.6.3

Hydrometer Type ASTM E100

Soil Particle Density (<2.36mm) #N/A g/cm³

NATA Accreditation: 825 Site: Newcastle
This document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025. This document shall not be reproduced, except in full.

NATA
WORLD RECOGNISED ACCREDITATION

Dianne Blane
Laboratory Coordinator
Authorised Signatory

Certificate of Analysis

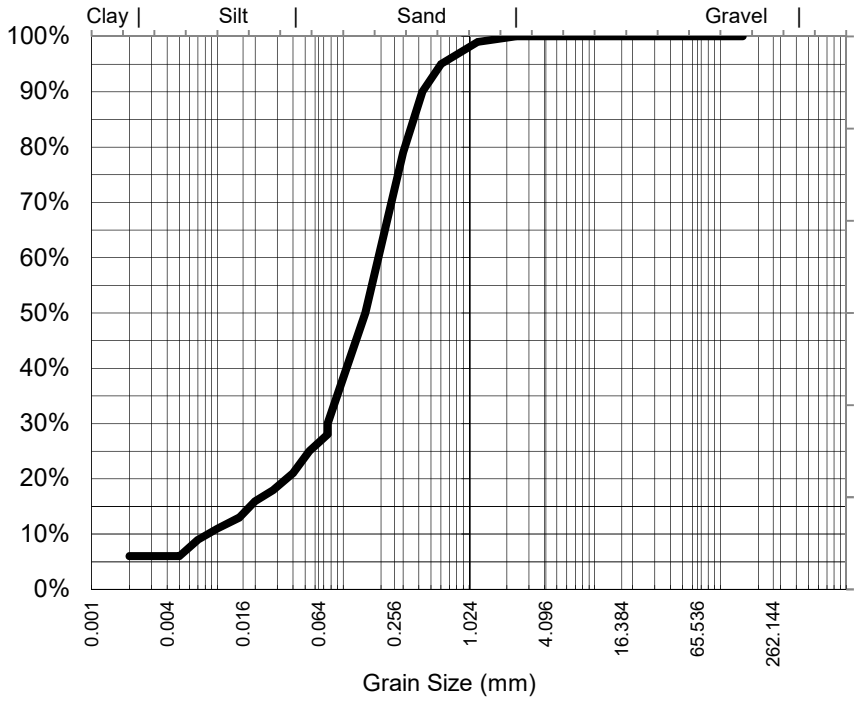
ALS Laboratory Group Pty Ltd
5/585 Maitland Road
Mayfield West, NSW 2304
pH 02 4014 2500
fax 02 4968 0349
samples.newcastle@alsenviro.com

ALS Environmental

Newcastle, NSW

CLIENT:	Ali Watters	**DATE REPORTED:**	24-Aug-2018
COMPANY:	HASKONING AUSTRALIA-ROYAL HASKONING	**DATE RECEIVED:**	17-Aug-2018
ADDRESS:	LEVEL 14 56 Berry Street NORTH SYDNEY	**REPORT NO:**	ES1824346-015 / PSD
PROJECT:	Snowy 2.0 - Vibrocoring	**SAMPLE ID:**	

Particle Size Distribution



Particle Size (mm)	% Passing
2.36	100%
1.18	99%
0.600	95%
0.425	90%
0.300	79%
0.150	50%
0.075	30%
Particle Size (microns)	
54	25%
40	21%
28	18%
20	16%
15	13%
10	11%
7	9%
5	6%
2	6%

Analysis Notes

Samples analysed as received.

** Soil Particle Density required for Hydrometer analysis according to AS 1289.3.5.1—2006 was not requested by the client . Typical sediment SPD values used for calculations and consequently, NATA endorsement does not apply to hydrometer results*

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Median Particle Size (mm)*	0.150

Sample Comments:		**Analysed:**	22-Aug-18
Loss on Pretreatment	NA	**Limit of Reporting:**	1%
Sample Description:	SAND, FINES	**Dispersion Method**	Shaker
Test Method:	AS1289.3.6.2/AS1289.3.6.3	**Hydrometer Type**	ASTM E100

Soil Particle Density (<2.36mm) #N/A g/cm³

NATA Accreditation: 825 Site: Newcastle
This document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025. This document shall not be reproduced, except in full.

NATA
WORLD RECOGNISED ACCREDITATION

Dianne Blane
Laboratory Coordinator
Authorised Signatory

Certificate of Analysis

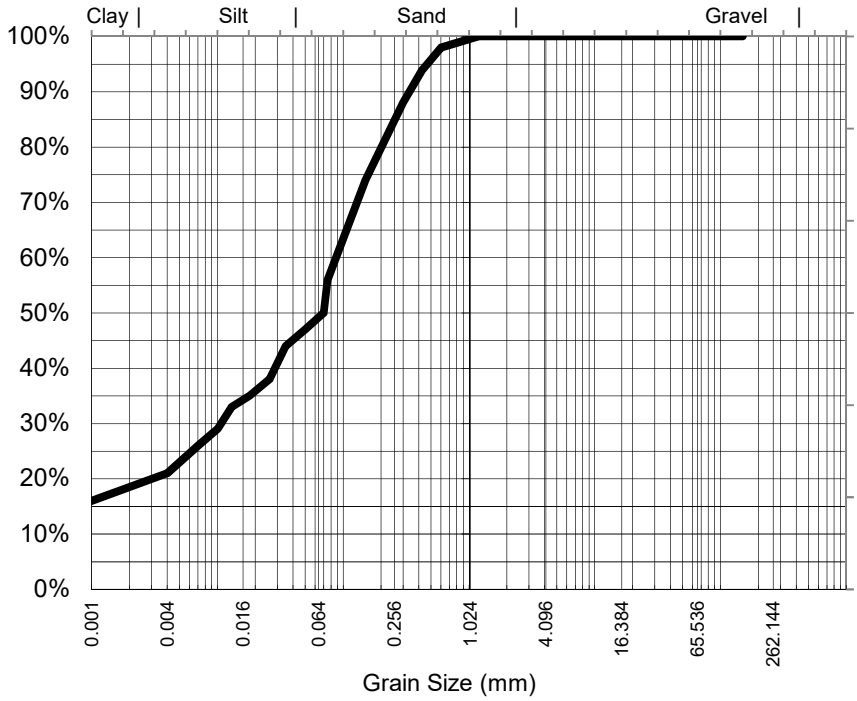
ALS Laboratory Group Pty Ltd
5/585 Maitland Road
Mayfield West, NSW 2304
pH 02 4014 2500
fax 02 4968 0349
samples.newcastle@alsenviro.com

ALS Environmental

Newcastle, NSW

CLIENT:	Ali Watters	**DATE REPORTED:**	24-Aug-2018
COMPANY:	HASKONING AUSTRALIA-ROYAL HASKONING	**DATE RECEIVED:**	17-Aug-2018
ADDRESS:	LEVEL 14 56 Berry Street NORTH SYDNEY	**REPORT NO:**	ES1824346-016 / PSD
PROJECT:	Snowy 2.0 - Vibrocoring	**SAMPLE ID:**	

Particle Size Distribution



Particle Size (mm)	% Passing
1.18	100%
0.600	98%
0.425	94%
0.300	88%
0.150	74%
0.075	56%
Particle Size (microns)	
50	47%
35	44%
26	38%
18	35%
13	33%
10	29%
7	26%
5	23%
1	16%

Analysis Notes

Samples analysed as received.

** Soil Particle Density required for Hydrometer analysis according to AS 1289.3.5.1—2006 was not requested by the client . Typical sediment SPD values used for calculations and consequently, NATA endorsement does not apply to hydrometer results*

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Median Particle Size (mm)*	0.070

Sample Comments:

Analysed: 22-Aug-18

Loss on Pretreatment NA

Limit of Reporting: 1%

Sample Description: FINES, SAND

Dispersion Method Shaker

Test Method: AS1289.3.6.2/AS1289.3.6.3

Hydrometer Type ASTM E100

Soil Particle Density (<2.36mm) #N/A g/cm³

NATA Accreditation: 825 Site: Newcastle
This document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025. This document shall not be reproduced, except in full.

NATA
WORLD RECOGNISED ACCREDITATION

Dianne Blane
Laboratory Coordinator
Authorised Signatory

Attachment H

Sediment sampling investigation, operational scenario assessment

REPORT

Sediment Sampling Investigation Operational Scenario Assessment Talbingo and Tantangara Reservoirs

Factual Report

Client: Snowy Hydro Ltd

Reference: PA1804MARP190715

Status: 1.1/Final

Date: 15 July 2019

Royal HaskoningDHV

Enhancing Society Together

HASKONING AUSTRALIA PTY LTD.

Level 14
56 Berry Street
NSW 2060 North Sydney
Maritime & Aviation
Trade register number: ACN153656252

+61 2 8854 5000 **T**
+61 2 9929 0960 **F**
project.admin.australia@rhdhv.com **E**
royalhaskoningdhv.com **W**

Document title:	Sediment Sampling Investigation Operational Scenario Assessment Talbingo and Tantangara Reservoirs
Document short title:	Sediment Sampling Investigation
Reference:	PA1804MARP190715
Status:	1.1/Final
Date:	15 July 2019
Project name:	Snowy 2.0
Project number:	PA1804
Author(s):	Rick Plain

Drafted by:	Rick Plain
Checked by:	Greg Britton
Date / initials:	26/06/19
Approved by:	Greg Britton
Date / initials:	11/07/19

Classification
Project related

Disclaimer

No part of these specifications/printed matter may be reproduced and/or published by print, photocopy, microfilm or by any other means, without the prior written permission of Haskoning Australia PTY Ltd.; nor may they be used, without such permission, for any purposes other than that for which they were produced. Haskoning Australia PTY Ltd. accepts no responsibility or liability for these specifications/printed matter to any party other than the persons by whom it was commissioned and as concluded under that Appointment. The integrated QHSE management system of Haskoning Australia PTY Ltd. has been certified in accordance with ISO 9001:2015, ISO 14001:2015 and OHSAS 18001:2007.

Table of Contents

1	**Introduction**	**1**
2	**Scope of Work**	**1**
2.1	Sediment Sampling	1
2.2	Laboratory Testing	4
3	**Investigation Results**	**6**
3.1	Tantangara Reservoir Sediment Sampling	6
3.2	Talbingo Reservoir	9
4	**Laboratory Results**	**11**
4.1	Tantangara Reservoir	11
4.2	Talbingo Reservoir	13
5	**Interpretation**	**15**
5.1	Tantangara Reservoir	15
5.2	Talbingo Reservoir	19
6	**References**	**21**

Appendices

Appendix A – Core Locations

Appendix B – Core Logs and Photographs

Appendix C – Laboratory Results

1 Introduction

Snowy Hydro Pty Ltd engaged Haskoning Australia Pty Ltd, a company of Royal HaskoningDHV (Haskoning), to undertake a sediment sampling program at Talbingo Reservoir and Tantangara Reservoir in order to assess the physical properties of the sediment and to determine the thickness of sediment layers. The rate of historic sedimentation could also be estimated from the core samples. The investigation was completed in accordance with our proposed Assignment 11 (Contract No. 94605).

Snowy 2.0 is a proposed pumped-hydro scheme comprising a power waterway (tunnel) connecting two existing reservoirs, Tantangara Reservoir and Talbingo Reservoir. The sampling is required to inform operational impacts from Snowy 2.0 (to be reported separately). The thickness of sediment layers and physical properties of the sediment, in conjunction with hydrodynamic modelling, are required to estimate the propensity for erosion and sediment entrainment under Snowy 2.0 commissioning/operational flows. Sediment deposition, following entrainment, may also occur. These mechanisms are highly dependent on the particle size distribution of the sediment.

Haskoning sub-consulted Geochemical Assessments to collect sediment cores in order to obtain sediment samples. An engineer from Haskoning was on-board the sampling vessel during the coring exercise.

2 Scope of Work

The scope of work comprised:

1. Coring and sediment sampling; and,
2. Laboratory testing.

2.1 Sediment Sampling

Three different coring methods were utilised for the sediment sampling. The preferred coring method was dependent on the water depth and type of material. The coring method and sampling equipment included:

- Piston corer;
- Gravity driven piston corer; and,
- Medium weight vibrocorer.

All coring methods are conducted from a 5 m vessel. The coring methods would encounter refusal on rock, stiff clay, or other impenetrable materials. Details of these coring methods are provided below.

Piston coring
A highly effective, manual piston coring technique used to collect cores of unconsolidated sediment in water depths to about 15 m. This method has been used to collect cores in lacustrine, fluvial, estuarine and marine environments. The piston corer collects sediment cores to a maximum length of 3 m. Minimal disturbance, low compaction and good recovery of cores can be achieved in muds or sandy muds. However, thick or gravel horizons may be impenetrable.

The stainless-steel piston coring head unit holds 50.8 mm outside diameter (OD) core barrels. The piston corer is lowered and recovered from the bed using aluminium rods. As the barrel is pushed into the sediment, the piston creates a partial vacuum that reduces core compaction and enables full core recovery.

Gravity-driven piston coring

A custom-built gravity-driven piston corer is used to collect fine grained sediments in water depths greater than 15 m. A 50.8 mm OD stainless steel barrel is loaded into the corer and the device lowered to the bed of the reservoir. Sediment is initially excluded from the barrel by a removable “shoe”. The corer is then raised above the bed and the shoe is removed, prior to release of the corer. The corer penetrates the bed using gravity and the piston retains the core in the barrel. The corer is used to collect cores greater than 2 m long in soft, unconsolidated muds.

Medium weight vibrocoring

A medium weight vibrocorer is used to collect long cores in muddy or sandy sediments. The vibrocorer typically uses 50.8 mm OD stainless steel core tubes to a maximum length of 6 m, but in practice, core barrels up to 3 m long are used from Geochemical Assessments’ 5 m vessel. The medium weight vibrocorer is suitable for water depths up to around 20 m.

Plans showing the core locations are included in **Appendix A**. **Table 1** and **Table 2** provide a list of the core identification (ID), coordinates of the core location, bed level at the core location, the equipment used to obtain the core and the total depth of penetration for the sediment sampling at Tantangara Reservoir and Talbingo Reservoir respectively.

Table 1: Sample locations and coordinates at Tantangara Reservoir.

Core ID	Equipment	Easting	Northing	Date	Approximate Bed Level (m AHD)	Depth of Penetration (m)
TANT01	Gravity Corer	649864	6038136	25-03-19	1199.0	0.52
TANT01a	Gravity Corer	649844	6038151	25-03-19	1199.5	0.70
TANT01b	Vibrocorer	649845	6038146	26-03-19	1199.5	0.30
TANT02	Gravity Corer	649907	6038149	25-03-19	1198.0	0.55
TANT02a	Vibrocorer	649907	6038149	26-03-19	1198.0	0.20
TANT03	Gravity Corer	650044	6038151	25-03-19	1197.0	0.40
TANT04	Piston Corer	650168	6038136	25-03-19	1208.0	0.05
TANT05	Gravity Corer	649852	6037860	25-03-19	1201.5	0.52
TANT06	Gravity Corer	650011	6037860	25-03-19	1196.5	0.50
TANT07	Piston Corer	650147	6037864	25-03-19	1210.0	0.10
TANT08	Gravity Corer	649930	6038452	26-03-19	1197.5	0.40
TANT09	Gravity Corer	650055	6038435	26-03-19	1201.5	0.05
TANT10	Piston Corer	650167	6038410	25-03-19	1206.5	0.85
TANT10a	Piston Corer	650167	6038410	25-03-19	1206.5	0.90
TANT11d	Gravity Corer	649830	6038296	26-03-19	1202.5	0.45
TANT11s	Piston Corer	649710	6038300	25-03-19	1207.5	0.45
TANT11sa	Piston Corer	649710	6038300	25-03-19	1207.5	0.40
TANT13	Gravity Corer	650001	6038282	26-03-19	1197.0	0.86
TANT15	Gravity Corer	649738	6038053	26-03-19	1206.0.	0.55
TANT16	Gravity Corer	649959	6037946	26-03-19	11970	0.45
TANT30	Gravity Corer	649912	6038760	26-03-19	1202.5	0.05
TANT31	Gravity Corer	649782	6038736	26-03-19	1199.0	0.50

Table 2: Sample locations and coordinates at Talbingo Reservoir.

Core ID	Equipment	Easting	Northing	Date	Approximate Bed Level (m AHD)	Depth of Penetration (m)
TAL01	Gravity Corer	624205	6040734	27-03-19	530.0	0.62
TAL02	Gravity Corer	623866	6040858	27-03-19	526.5	0.32
TAL03	Gravity Corer	623836	6040766	27-03-19	526.5	~0.05
TAL03a	Gravity Corer	623738	6040801	27-03-19	526.5	~0.20
TAL04	Gravity Corer	623616	6041243	27-03-19	537.0	~0.05
TAL05	Gravity Corer	623554	6041241	27-03-19	521.0	0.64
TAL06	Gravity Corer	623752	6041628	27-03-19	521.0	~0.25
TAL07	Piston Corer	623458	6041770	28-03-19	532.0	0.15
TAL08	Gravity Corer	622757	6041530	27-03-19	523.0	N/A
TAL08a	Piston Corer	622902	6041571	28-03-19	532.0	0.24
TAL09	Gravity Corer	622594	6041634	27-03-19	508.0	0.34
TAL10	Gravity Corer	622430	6041661	27-03-19	502.0	~0.40
TAL11	Gravity Corer	624033	6040823	27-03-19	528.0	0.77
TAL13	Gravity Corer	623764	6040988	27-03-19	534.0	0.67
TAL14	Gravity Corer	623687	6040988	27-03-19	525.0	N/A
TAL15	Gravity Corer	623687	6040988	27-03-19	525.0	0.82
TAL17	Piston Corer	623582	6041573	28-03-19	533.0	0.05
TAL20	Gravity Corer	622505	6041355	28-03-19	504.0	~0.05
TAL25	Piston Corer	623918	6041663	28-03-19	523.0	0.10
TAL26	Piston Corer	622536	6042006	28-03-19	533.0	0.35
TAL27	Piston Corer	622662	6041199	28-03-19	530.0	0.30

2.2 Laboratory Testing

Laboratory testing comprised physical analysis of the sediments to determine the particle size distribution (PSD). Sieve analysis was used to quantitatively determine the PSD in the sediment samples down to 75 µm in accordance with AS1289.3.6.2. A hydrometer was used to quantitatively determine particle size finer than the 75 µm screen in accordance with AS1289.3.6.3. The results from the sieve analysis and hydrometer are reported as percent (%) passing by mass.

The location and depth of samples (below bed level) collected for particle size distribution is outlined in **Table 3**. The samples collected for PSD analysis are a composite of subsamples of a particular stratum[1] observed in the core.

[1] *Strata (plural) are sediment or rock layers with internal consistent characteristics that distinguish it from other layers. The main soil characteristics include composition, texture, colour and organic content. The sediment composition, texture, colour and organics is used to infer the origin of the strata.*

Table 3: Core ID and sample depth for particle size analysis.

Tantangara Reservoir			Talbingo Reservoir		
Core ID	**Depth (m below bed level)**	**Sample ID**	**Core ID**	**Depth (m below bed level)**	**Sample ID**
TANT01	0.00 - 0.18	TANT01 0-0.18	TAL01	0.10 - 0.20	TAL01 0.1-0.2
TANT01	0.30 - 0.52	TANT01 0.3-0.52	TAL01	0.30 - 0.40	TAL01 0.3-0.4
TANT01a	0.00 - 0.15	TANT01a 0-0.15	TAL02	0.10 - 0.20	TAL02 0.1-0.2
TANT01a	0.40 - 0.50	TANT01a 0.4-0.5	TAL05	0.15 - 0.25	TAL05 0.15-0.25
TANT02	0.05 - 0.20	TANT02 0.05-0.2	TAL08a	0.00 - 0.10	TAL08a 0-0.1
TANT02	0.45 - 0.55	TANT02 0.45-0.55	TAL09	0.20 - 0.30	TAL09 0.2-0.3
TANT03	0.10 - 0.30	TANT03 0.1-0.3	TAL10	0.10 - 0.20	TAL10 0.1-0.2
TANT05	0.00 - 0.10	TANT05 0-0.1	TAL11	0.10 - 0.20	TAL11 0.1-0.2
TANT05	0.20 - 0.40	TANT05 0.2-0.4	TAL11	0.30 - 0.40	TAL11 0.3-0.4
TANT06	0.00 - 0.06	TANT06 0-0.06	TAL13	0.30 - 0.40	TAL13 0.3-0.4
TANT06	0.10 - 0.30	TANT06 0.1-0.3	TAL14	0.00 - 0.20	TAL14 0-0.2
TANT08	0.10 - 0.20	TANT08 0.1-0.2	TAL15	0.00 - 0.15	TAL15 0-0.15
TANT08	0.30 - 0.40	TANT08 0.3-0.4	TAL15	0.35 - 0.45	TAL15 0.35-0.45
TANT10	0.00 - 0.08	TANT10 0 - 0.08	TAL15	0.45 - 0.55	TAL15 0.45-0.55
TANT10a	0.05 - 0.15	TANT10a 0.05-0.15	TAL06	0.00 - 0.20	TAL06 0-0.2
TANT10a	0.55 - 0.80	TANT10a 0.55-0.8	TAL25	0.00 - 0.10	TAL25 0-0.1
TANT11d	0.20 - 0.40	TANT11d 0.2-0.4	TAL26	0.00 - 0.10	TAL26 0-0.1
TANT11sa	0.04 - 0.36	TANT11sa 0.04-0.36			
TANT11sa	0.36 - 0.42	TANT11sa 0.36-0.42			
TANT11s	0.02 - 0.35	TANT11s 0.02-0.35			
TANT13	0.00 - 0.10	TANT13 0-0.1			
TANT13	0.15 - 0.25	TANT13 0.15-0.25			
TANT13	0.50 - 0.60	TANT13 0.5-0.6			
TANT15	0.00 - 0.15	TANT15 0-0.15			
TANT15	0.20 - 0.30	TANT15 0.2-0.3			
TANT16	0.20 - 0.30	TANT16 0.2-0.3			
TANT31	0.20 - 0.40	TANT31 0.2-0.4			

3 Investigation Results

Core logs and photographs from the sediment sampling are provided in **Appendix B**.

3.1 Tantangara Reservoir Sediment Sampling

A total of four sediment strata, of different origin, were sampled. These were:

- Lacustrine (reservoir) deposits – unconsolidated surface material deposited by standing water, such as a reservoir.
- Topsoil – terrestrial surface layer of a soil profile. Topsoil typically exhibits some organic accumulation and is darker and more fertile than underlying layers. Topsoil is generally a sub-profile of the underlying soil that has been reworked over a long period of time.
- Alluvial deposits – a deposit formed by flowing water, prior to flooding of the valley; and,
- Residual soil – in-situ weathering of parent rock to form a soil profile that has experienced minimal lateral movement.

Bedrock was also encountered on the eastern side of the reservoir.

With the exception of TANT02 and TANT03 all cores encountered an upper stratum of brown to grey hydrous silty clay/clayey silt with traces of sand. This stratum was homogenous (layering was not apparent) nor was there a presence of root fibres. It is a lacustrine deposit that would have accumulated following completion of the dam wall and flooding of the Murrumbidgee River in 1960.

With the exception of TANT13 and TANT08, topsoil was identified across the site, underlying the lacustrine deposit. The topsoil comprised varying composition of silt, sand and gravel. The topsoil was generally dark brown and abundant root fibres were observed. This stratum would have been present prior to flooding of the Murrumbidgee River.

Alluvial deposits were encountered at TANT08 and TANT13, underlying the lacustrine deposit. These core locations were near the thalweg[2] of the reservoir, along the alignment of the flooded Murrumbidgee River. The alluvial deposits would have been deposited prior to flooding of the valley. The alluvial material was typically dark brown and highly variable in composition comprising silt, sand and gravel of varying composition. Root fibres were observed at TANT08 while organics (woody debris) were observed at TANT13. Variability in alluvial deposits is typical in meandering river environments, such as the Murrumbidgee River. Larger particles are deposited along the river bed, where the water velocity is higher, with finer sediment deposited on adjacent floodplains, where the water velocity typically decreases.

Residual soil was observed underlying the topsoil, alluvial deposit or lacustrine deposit at TANT02, TANT03, TANT08 and TANT11sa. The residual soil was typically sandy clayey silt with up to 26% gravel. The coring techniques deployed are not suited to sampling thick gravel horizons or cobbles. Roots were observed in the residual soil and the clay was typically grey or brown with orange mottling. In-situ weathering to form residual soil is a slow process occurring over thousands (likely hundreds of thousands) of years. Residual soils would have predominantly formed prior to flooding of the reservoir.

Shallow bedrock was encountered at TANT04, TANT07, TANT09 and TANT30 on the eastern side of the reservoir. The bedrock was evident on the vessel's sonar depth sounder. The geology was inferred to comprise 0.05 – 0.10 m of loose or hydrous material overlying bedrock.

[2] *Thalweg is a line connecting the lowest points of successive cross-sections along the course of a valley, river or reservoir.*

The recorded thickness of the four recovered sediment strata, as measured in the cores, is listed in **Table 4**. The absolute thickness of a stratum can be determined with confidence when an underlying stratum is recovered. However, if refusal of a core occurs within a stratum, the absolute thickness of the stratum cannot be determined. It can be deduced that the thickness of the stratum is in excess of the recovered core length. The maximum absolute thickness of the encountered sediment strata is summarised as follows:

- Lacustrine deposits - up to 0.18 m at TANT01 and TANT15. Typical thickness around 0.05 m at the locations where lacustrine was encountered.
- Topsoil – in excess of 0.85 m at TANT10a and 0.55 m TANT01a. Typically thickness around 0.30 m at the locations where topsoil was encountered.
- Alluvial deposit – in excess of 0.73 m at TANT13.
- Residual soil – in excess of 0.22 m at TANT02.

Table 4: Thickness of strata at Tantangara Reservoir.

Core ID	Thickness of Strata (m)				Shallow Bedrock	Core Loss (m)	Depth of Core Penetration (m)
	Lacustrine Deposit	Topsoil	Alluvial Deposit	Residual Soil			
TANT01	0.18	0.34					0.52
TANT01a	0.15	0.55					0.70
TANT01b	0.06	0.24					0.30
TANT02		0.30		0.25			0.55
TANT02a							
TANT03		0.30		0.10			0.40
TANT04					Yes	0.05*	
TANT05	0.10	0.42					0.52
TANT06	0.06	0.44					0.50
TANT07					Yes	0.05–0.10*	
TANT08	0.02		0.26	0.12			0.40
TANT09					Yes	<0.05*	
TANT10	0.08	0.47				0.30	0.85
TANT10a	0.05	0.85					0.90
TANT11d	0.06	0.39					0.45
TANT11s	0.02	0.33				0.10	0.45
TANT11sa	0.04	0.32		0.04			0.40
TANT13	0.13		0.73				0.86
TANT15	0.18	0.37					0.55
TANT16	0.06	0.39					0.45
TANT30					Yes	<0.05*	
TANT31	0.03	0.47					0.50

**estimated based on site observations of vessel's depth sounder, visual observations of surrounding geology and 'feel' of the coring equipment on the bottom of the reservoir.*

3.2 Talbingo Reservoir

A total of 4 sediment strata, of different origin, were sampled. These were:

- Lacustrine deposits;
- Topsoil;
- Alluvial deposits; and,
- Residual soil.

Bedrock was also encountered at numerous locations.

With the exception of TAL07, TAL09, TAL17, TAL25, TAL26 and TAL27 the cores encountered an upper stratum of brown to grey hydrous clayey silt with traces of sand. This layer was homogenous (layering was not apparent) nor was there a presence of root fibres. It is a lacustrine deposit that would have accumulated following completion of the dam wall and flooding of the Tumut River in 1971.

Topsoil was encountered at TAL07, TAL08a, TAL09, TAL13 and TAL27, underlying the lacustrine deposit. The topsoil typically comprised silty clayey sand with gravel. The topsoil was generally brown and abundant root fibres were noted. This stratum would have been present prior to flooding of the Tumut River.

Alluvial deposits were encountered at TAL01, TAL02, TAL11 and TAL15 underlying the lacustrine deposit. These core locations were near the thalweg of the reservoir, along the alignment of the flooded Yarrangobilly River. The alluvial deposits would have been deposited prior to flooding of the valley and they are typically dark brown and highly variable in composition comprising silt, sand and gravel. The gravel content was up to 29%. Traces of root fibres were observing at all locations.

Residual soil was observed underlying the topsoil or lacustrine deposits at TAL05, TAL07, TAL08a, TAL08, TAL13, TAL17, TAL25 and TAL26. The residual soil was typically silty clayey sand with traces of gravel. Abundant root fibres were noted in the residual soil. In-situ weathering to form residual soil is a slow process occurring over thousands (likely hundreds of thousands) of years. Residual soils would have predominantly formed prior to flooding of the reservoir.

Shallow bedrock was evident on the vessel's sonar depth sounder at TAL03, TAL03a, TAL04, TAL08 and TAL20 with no core recovery possible. The cores at TAL07 and TAL08a were assumed to refuse on bedrock at a depth below bed level of 0.15 m and 0.24 m respectively. Refusal on hard strata, assumed to be bedrock, was recorded TAL10, 0.30 m below the ground surface. The end of the barrel was bent, which indicated refusal on hard strata such as rock. Dense gravel or root fibres would not be capable of bending the core barrel.

The interface between the lacustrine deposits and alluvial deposits or residual material was occasionally identified by a layer of vegetation including leaves, bark and sticks. This organic material is expected to have been deposited in the months following completion of the dam wall and flooding of the rivers. Immersion of terrestrial vegetation would have resulted in dieback and deposition of organic matter.

The recorded thickness of the four recovered sediment strata, as measured in the cores, is listed in **Table 5**. The absolute thickness of a stratum can be determined with confidence when an underlying stratum is recovered. However, if refusal of a core occurs within a stratum, the absolute thickness of the stratum cannot be determined. It can be deduced that the thickness of the stratum is in excess of the recovered core length. The maximum absolute thickness of the encountered sediment strata is summarised as follows:

- Lacustrine deposits – in excess of 0.30 m at TAL10 and approximately 0.25 m at TAL02, TAL06 and TAL11.

  The thickness of reservoir deposits was generally higher at the following locations:
  - closer to the inflow of the Yarrangobilly River; and,
  - near the thalweg of Talbingo Reservoir.

  Throughout Ravine Bay, the depth of lacustrine deposits were generally less than 0.02 – 0.03 m.
- Topsoil – up to 0.18 m at TAL27. Typically thickness around 0.05 m at the locations where topsoil was encountered.
- Alluvial deposit – in excess of 0.54 m at TAL11.
- Residual soil – in excess of 0.65 m at TAL15.

Table 5: Thickness of strata at Talbingo Reservoir.

Core ID	Thickness of Strata (m)				Shallow Bedrock	Core Loss (m)	Depth of Core Penetration (m)
	Lacustrine Deposit	Topsoil	Alluvial Deposit	Residual Soil			
TAL01	0.18		0.44				0.62
TAL02	0.24		0.08				0.32
TAL03					Yes	<0.10*	<0.10*
TAL03a					Yes	<0.20*	<0.20*
TAL04					Yes	<0.05*	<0.05*
TAL05	0.15			0.17		0.32	0.64
TAL06	0.25					Unknown	Unknown
TAL07		0.05		0.06		0.04	15
TAL08					Yes	Unknown	Unknown
TAL08a	0.01	0.09		0.02		0.12	0.24
TAL09		0.03		0.31			0.34
TAL10	0.30					Unknown	Unknown
TAL11	0.23		0.54				0.77
TAL13	0.04	0.07		0.56			0.67
TAL14	0.20					Unknown	Unknown
TAL15	0.17		0.65				0.82
TAL17				0.05			0.05
TAL20					Yes	~0.05*	~0.05*
TAL25				0.10			0.10
TAL26				0.05		0.30	0.35
TAL27		0.18				0.12	0.30

**estimated based on site observations of vessel's depth sounder, visual observations of surrounding geology and 'feel' of the coring equipment on the bottom of the reservoir.*

4 Laboratory Results

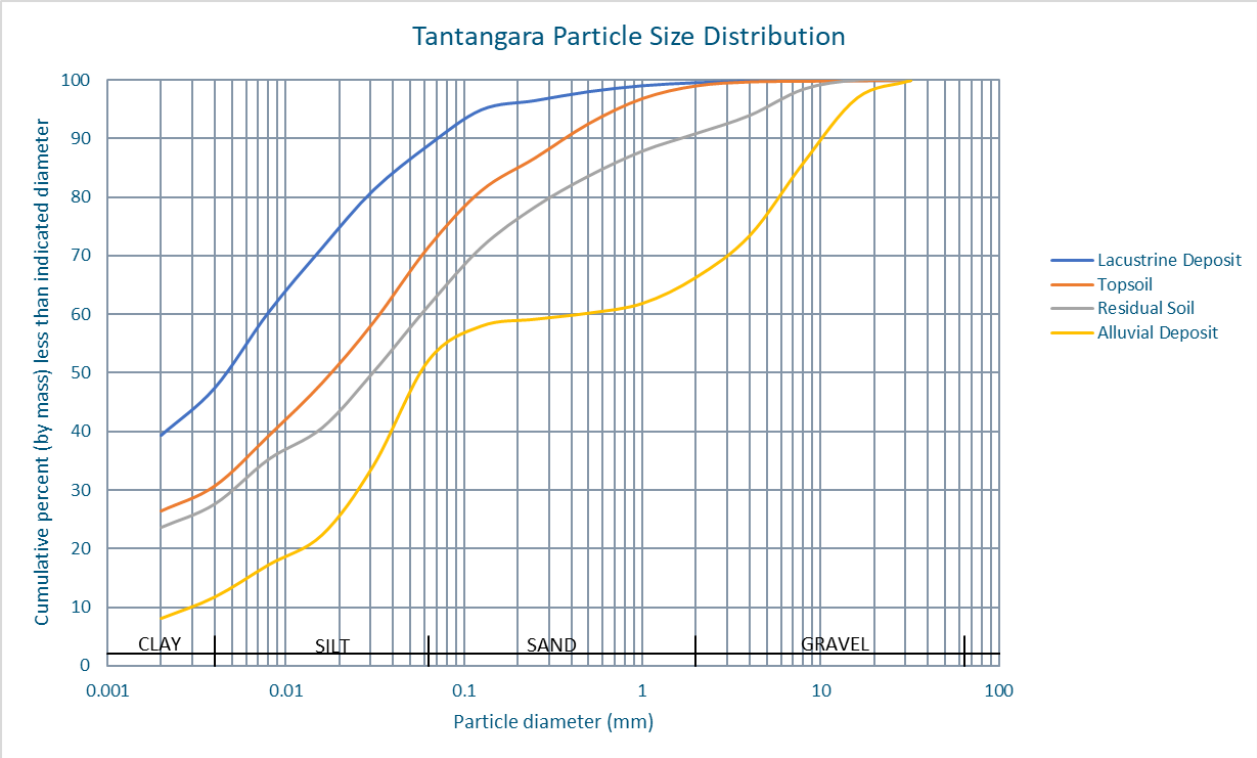
Laboratory analysis was undertaken by ALS Environmental. Particle size distribution results are attached in **Appendix C**.

4.1 Tantangara Reservoir

A total of 7 samples of the lacustrine deposit, 15 samples of topsoil, 2 samples of alluvial deposit and 3 samples of residual soil were submitted for laboratory analysis. A summary of the PSD grading is provided in **Table 6**. The size range for the different material descriptors is based on the Udden-Wentworth scale. An average particle size distribution of the 4 sediment strata, of varying origin, is provided in **Graph 1**Error! Reference source not found..

Table 6: Particle size grading and median particle diameter of sediment samples from Tantangara Reservoir.

Sample ID	Origin	Percent of Mass				Median Diameter – d50 (µm)
		Gravel (>2 mm)	Sand (0.63 – 2 mm)	Silt (4 – 63 µm)	Clay (<4 µm)	
TANT13 0.15-0.25	Alluvial Deposit	57	15	19	9	3394
TANT13 0.5-0.6	Alluvial Deposit	10	13	62	15	37
TANT01 0-0.18	Lacustrine Deposit	0	5	39	56	3
TANT01a 0-0.15	Lacustrine Deposit	0	14	40	46	5
TANT05 0-0.1	Lacustrine Deposit	0	12	35	53	3
TANT06 0-0.06	Lacustrine Deposit	0	14	30	56	3
TANT10 0 - 0.08	Lacustrine Deposit	1	26	48	25	19
TANT13 0-0.1	Lacustrine Deposit	1	2	44	53	3
TANT15 0-0.15	Lacustrine Deposit	0	3	54	43	6
TANT02 0.45-0.55	Residual Soil	0	31	40	29	24
TANT08 0.3-0.4	Residual Soil	1	39	38	22	44
TANT11sa 0.36-0.42	Residual Soil	26	19	23	33	31
TANT05 0.2-0.4	Topsoil	1	34	31	35	17
TANT01 0.3-0.52	Topsoil	0	33	45	21	27
TANT01a 0.4-0.5	Topsoil	1	28	29	42	8
TANT02 0.05-0.2	Topsoil	0	24	38	38	12
TANT03 0.1-0.3	Topsoil	4	30	30	37	22
TANT06 0.1-0.3	Topsoil	0	21	48	31	16
TANT08 0.1-0.2	Topsoil	1	59	20	21	100
TANT10a 0.55-0.8	Topsoil	1	17	48	35	12
TANT11d 0.2-0.4	Topsoil	0	28	40	32	14
TANT11sa 0.04-0.36	Topsoil	1	24	55	20	33
TANT11s 0.02-0.35	Topsoil	1	30	28	42	8
TANT15 0.2-0.3	Topsoil	2	34	39	25	34
TANT16 0.2-0.3	Topsoil	0	13	61	27	13
TANT31 0.2-0.4	Topsoil	0	13	61	26	13
TANT10a 0.05-0.15	Topsoil, possibly colluvial	5	34	34	28	28



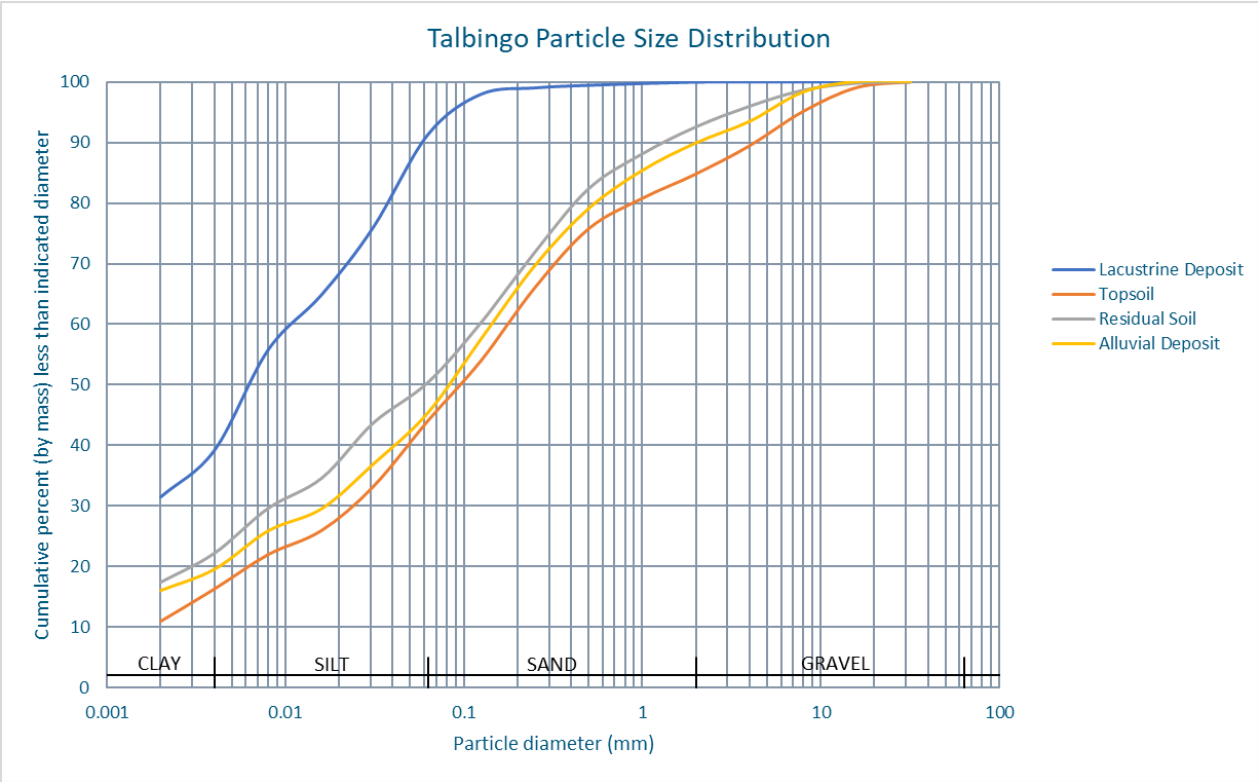
Graph 1: Average particle size distribution for the sediment strata recovered at Tantangara Reservoir.

4.2 Talbingo Reservoir

A total of 7 samples of the lacustrine deposits, 1 sample of topsoil, 4 samples of alluvial deposits, 5 samples of residual soil and were submitted for laboratory analysis. A summary of the PSD grading is provided in **Table 7**. The size range for the different material descriptors is based on the Udden-Wentworth scale. An average particle size distribution of the 4 sediment strata, of varying origin, is provided in **Graph 2**.

Table 7: Particle size grading and median particle diameter of sediment samples from Talbingo Reservoir.

Sample ID	Origin	Percent of Mass				Median Diameter – d50 (µm)
		Gravel (>2 mm)	Sand (0.63 – 2 mm)	Silt (4 – 63 µm)	Clay (<4 µm)	
TAL01 0.3-0.4	Alluvial Deposit	0	42	35	23	37
TAL11 0.3-0.4	Alluvial Deposit	0	46	33	21	53
TAL15 0.35-0.45	Alluvial Deposit	11	52	19	17	208
TAL15 0.45-0.55	Alluvial Deposit	29	38	16	17	314
TAL01 0.1-0.2	Lacustrine Deposit	0	18	53	29	15
TAL02 0.1-0.2	Lacustrine Deposit	0	8	55	38	10
TAL10 0.1-0.2	Lacustrine Deposit	0	4	44	53	3
TAL11 0.1-0.2	Lacustrine Deposit	0	11	59	30	24
TAL14 0-0.2	Lacustrine Deposit	0	8	56	36	6
TAL15 0-0.15	Lacustrine Deposit	0	9	50	41	7
TAL06 0-0.2	Lacustrine Deposit	0	2	48	50	4
TAL05 0.15-0.25	Residual Soil	1	49	29	21	65
TAL09 0.2-0.3	Residual Soil	0	49	32	19	59
TAL13 0.3-0.4	Residual Soil	11	33	28	27	46
TAL25 0-0.1	Residual Soil	12	51	15	22	155
TAL26 0-0.1	Residual Soil	12	28	37	23	28
TAL08a 0-0.1	Topsoil	15	41	28	16	100



Graph 2: Average particle size distribution for the sediment strata recovered at Talbingo Reservoir.

5 Interpretation

5.1 Tantangara Reservoir

The encountered geology was notably different on the eastern and western side of the flooded Murrumbidgee River at Tantangara Reservoir.

The eastern side of the channel thalweg was characterised by steep sided slopes and shallow soil profiles overlying rock. This is depicted in a photograph from the site investigation in **Figure 1**. With the exception of TANT10, core recovery was not possible.

The western side of the reservoir was characterised by a deep weathered residual soil profile overlain by well-developed topsoil. The primary difference between the residual soil and the topsoil is the colour attributed by the organic content. Erosion near the boat ramp at the southern end of Tantangara Reservoir clearly portrays the typical soil profile with dark brown topsoil overlying red gravelly clay as shown in **Figure 2**. A notable gravel horizon is evident near the upper extent of the residual soil stratum. The size of the gravel and thickness of horizon would not allow for penetration by the coring methods.

Figure 1: Looking south across Tantangara Reservoir. Eastern side of reservoir (left bank) characterised by steep slopes, shallow soil profiles and rock outcrops.

Figure 2: Eroded soil profile near the boat ramp representative of a typical profile along the western portion of Tantangara Reservoir. Shallow, well developed topsoil profile overlying residual soil.

Interestingly, cores up to 0.90 m were obtained at TANT10, on the eastern side of Tantangara Reservoir. This was unexpected and does not align with observations from nearby core locations. Further, there could be some degree of colluvial deposits[3] intermixed with the recovered sediment samples. The deep soil profile could be indicative of a fault, dyke or geological boundary in close proximity to TANT10 where accelerated or preferential weathering of the bedrock has occurred. The 1:250,000 Canberra Geological Series Sheet SI 55-16 provided in **Figure 3** indicates that the boundary between Kellys Plain Volcanics

[3] *Colluvial deposits are loose, unconsolidated sediments that have been deposited at the base of hillslopes by either rain-wash, sheet-wash, slow continuous downslope creep, or a variable combination of these processes.*

(Dk) and Tantangara Beds Formation is located near TANT10. This geological boundary possibly also locally controls the alignment of Kellys Plain Creek. Between TANT10 and Kellys Plain Creek, there is potentially a narrow band of relatively deeply weathered material.

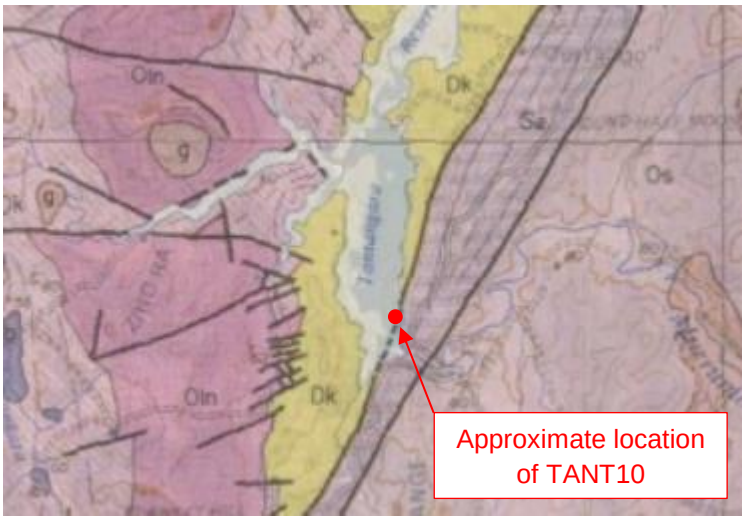


Figure 3: 1:250,000 Canberra Geological Series Sheet SI 55-16 covering Tantangara Reservoir.

The depth of lacustrine deposits can be used to estimate the average rate of sedimentation at a particular point in the reservoir as this material would have accumulated following completion of the dam wall and flooding of the Murrumbidgee River in 1960. The estimated average rate of sedimentation is outlined in **Table 8**.

The estimated average rate of sedimentation across the reservoir is between 0 mm and 3 mm per year. Sedimentation is marginally higher along the western side of the reservoir. There is no obvious increase in sedimentation near the thalweg.

There is anticipated to be a reduction in the thickness of lacustrine deposits above the Minimum Operating Level (MOL) (or typical low water level) and below the Full Supply Level (FSL). Lacustrine deposits would be readily remobilised by nearshore waves (wind generated waves or boat wash) and deposited in deeper water. As the water level in the reservoir decreases, any lacustrine deposits near the shoreline would be expected to be ‘dragged down’ the slope and into deeper water. The average rate of sedimentation noted above may therefore be overstated near MOL.

Table 8: Rate of sedimentation in Tantangara Reservoir.

Core ID	Depth of Lacustrine Deposit (mm)	Rate of Sedimentation (1960-2019 (mm/yr.)
TANT01	180	3
TANT01a	150	3
TANT01b	60	1
TANT02	0	0
TANT02a	No Core Recovery	0
TANT03	0	0
TANT04	No Core Recovery	0
TANT05	100	2
TANT06	60	1
TANT07	No Core Recovery	0
TANT08	20	0
TANT09	No Core Recovery	0
TANT10	80	1
TANT10a	50	1
TANT11d	60	1
TANT11s	20	0
TANT11sa	40	1
TANT13	130	2
TANT15	180	3
TANT16	60	1
TANT30	No Core Recovery	0
TANT31	30	1

5.2 Talbingo Reservoir

The geology at Talbingo Reservoir is somewhat uniform across the area of investigation. Shallow bedrock was generally encountered across the site. Relatively deep alluvial deposits were encountered near the flooded Yarrangobilly River. The thickness of topsoil and residual soil was relatively thin.

The depth of lacustrine deposits can be used to estimate the average rate of sedimentation as this material would have accumulated following completion of the dam wall and flooding of the Tumut River in 1971. The estimated average rate of sedimentation is outlined in **Table 9**.

Near the proposed intake structure, the estimated average rate of sedimentation is around 5 mm per year. Throughout the remainder of the reservoir, the rate of sedimentation is typically negligible, with the exception of the thalweg, where the rate of sedimentation is anticipated to be around 6 mm per year. The rate of sedimentation near Middle Bay (upstream of the proposed intake structure) was previously reported to be 15 mm per year (RHDHV, 2018). It is noted that the previous investigation collected samples from further upstream.

The rate of sedimentation is higher near the thalweg of the reservoir and closer to the inflow of the Yarrangobilly River at Middle Bay. The higher rate of sedimentation at Middle Bay is a result of relatively higher flow rate/velocity and sediment flux (bed load and suspended sediment load) down the Yarrangobilly River. As the Yarrangobilly River discharges into Talbingo Reservoir, the flow velocity would rapidly decrease. The reduced flow velocity would be insufficient to maintain the bed load sediment transport and suspended sediment would also settle out of suspension, forming a delta.

The higher rate of sedimentation near the channel thalweg is a result of the reservoir's topography. The reservoir was formed by flooding a steep sided, v-shaped valley. The thalweg of the reservoir is relatively flat compared to the side slopes. The side slopes are generally steeper than the underwater angle of repose of unconsolidated lacustrine sediments. Sediment potentially deposited on the steep sided slopes of the reservoir would 'slide down' the slope and accumulate near the thalweg.

Table 9: Rate of sedimentation in Talbingo Reservoir.

Core ID	Depth of Lacustrine Deposit (mm)	Rate of Sedimentation (1971-2019 (mm/yr.)
TAL01	180	4
TAL02	240	5
TAL03	No Core Recovery	0
TAL03a	No Core Recovery	0
TAL04	No Core Recovery	0
TAL05	150	3
TAL06	250	5
TAL07	0	0
TAL08	No Core Recovery	0
TAL08a	10	0
TAL09	0	0
TAL10	300	6
TAL11	230	5
TAL13	40	1
TAL14	200	4
TAL15	170	4
TAL17	0	0
TAL20	No Core Recovery	0
TAL25	0	0
TAL26	0	0
TAL27	0	0

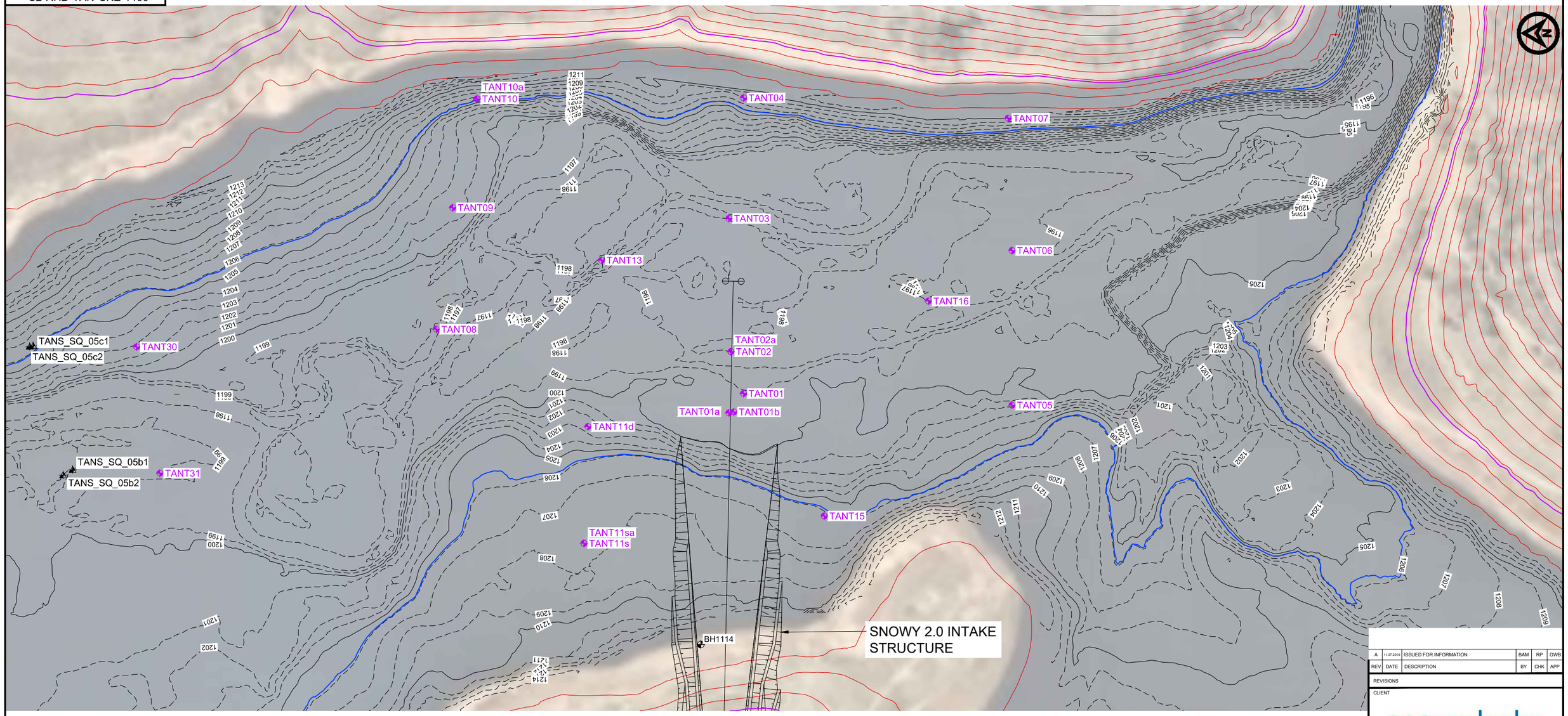
6 References

Royal HaskoningDHV (RHDHV, 2018), *Sediment Sampling Investigation Talbingo Reservoir*, Reference PA1804M&ARP180927, 27/9/18.

Appendix A – Core Locations

DRAWING No.
S2-RHD-TAN-SKE-1400

DO NOT SCALE



AS-BUILT CORE COORDINATES TABLE		
ID	EASTING	NORTHING
TANT01	649864	6038136
TANT01a	649844	6038151
TANT01b	649845	6038146
TANT02	649907	6038149
TANT02a	649907	6038149
TANT03	650044	6038151
TANT04	650168	6038136
TANT05	649852	6037860
TANT06	650011	6037860
TANT07	650147	6037864
TANT08	649930	6038452
TANT09	650055	6038435
TANT10	650167	6038410
TANT10a	650167	6038410
TANT11d	649830	6038296
TANT11s	649710	6038300
TANT11sa	649710	6038300
TANT13	650001	6038282

AS-BUILT CORE COORDINATES TABLE		
ID	EASTING	NORTHING
TANT15	649738	6038053
TANT16	649959	6037946
TANT30	649912	6038760
TANT31	649782	6038736

NOTES

1. BATHYMETRIC SURVEY DATED 26/02/2018. LEVELS TO AHD.
2. ALL LEVELS AND DIMENSIONS ARE SUBJECT TO DESIGN DEVELOPMENT.

LEGEND

- LIDAR CONTOURS
- BATHYMETRIC CONTOURS
- FULL SUPPLY LEVEL (FSL) = RL 1228.69mAHD
- MIN. OPERATING LEVEL (MOL) = RL 1205.88mAHD

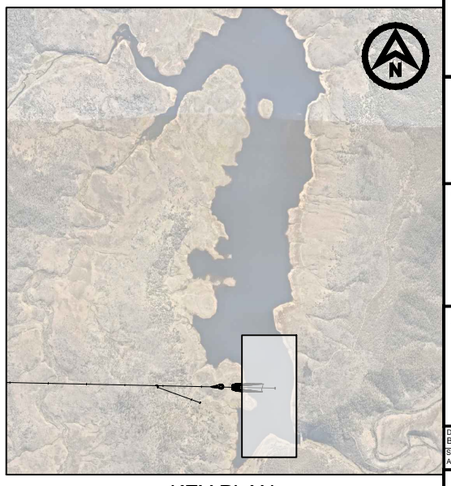
SEDIMENT SAMPLE LOCATIONS:

- BH1114 — BOREHOLE LOCATION (SMEC, 2018)
- TANS_SQ_05c1 — GRAB SAMPLE (CARDNO, 2018)
- TANT01 — AS-BUILT CORE LOCATION (RHDHV, 2019)

S2 FOR INFORMATION | **NOT FOR CONSTRUCTION** | **AUSTRALIAN HEIGHT DATUM**

40 0 40 80 120 160 200m

1:4000 (A3) 1:2000 (A1)



KEY PLAN

© Haskoning Australia Pty Ltd

REV	DATE	DESCRIPTION	BY	CHK	APP
A	11.07.2019	ISSUED FOR INFORMATION	BAM	RP	GWB

REVISIONS

CLIENT

snowyhydro renewable energy

PROJECT

SNOWY 2.0
SEDIMENT SAMPLING INVESTIGATION

TITLE

TANTANGARA RESERVOIR CORE LOCATION

Royal HaskoningDHV
Enhancing Society Together
Level 14, 56 Berry Street
North Sydney NSW 2060
Australia
Tel +61 2 88545000
Fax +61 2 99290960
Email: project.admin.australia@rhdhv.com
Website: www.royalhaskoningdhv.com

DRAWN	COORD. SYSTEM	DATUM	DATE
BAM	MGA ZONE 55	AHD	11.07.2019

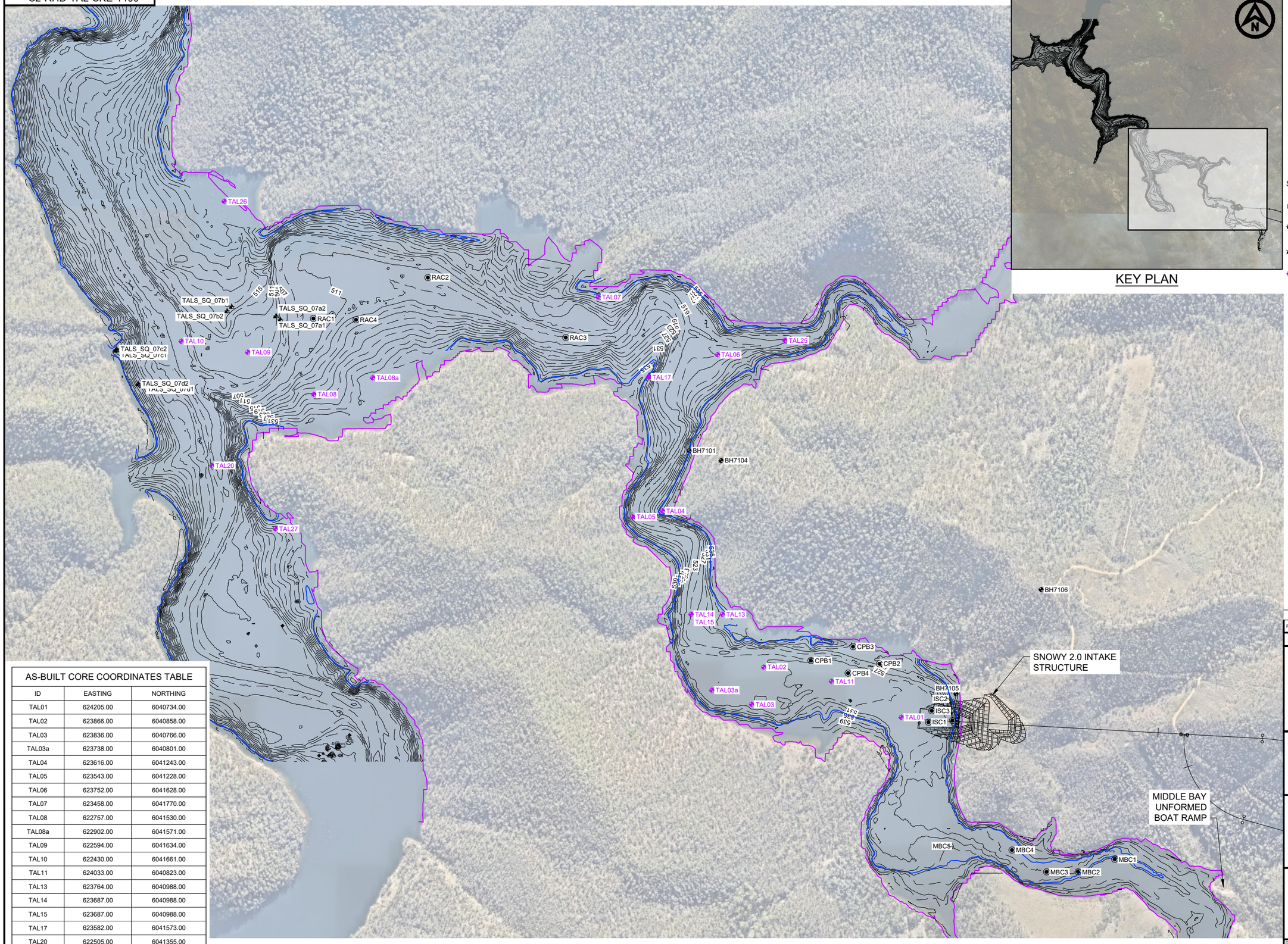
SCALE AT A1: AS SHOWN
REF: S2-RHD-TAN-MOD-1400-GEOTECH

DRAWING No.: S2-RHD-TAN-SKE-1400
REVISION: A

I:\PA1804\TECHNICAL_DATA\~PA1804 - SNOWY HYDRO DAMS\E02 WORKING DRAWINGS\S2-RHD-TAN-MOD-1400-GEOTECH

DRAWING No.
S2-RHD-TAL-SKE-1400

DO NOT SCALE



KEY PLAN

NOTES

1. BATHYMETRIC SURVEY DATED 26/02/2018, ADDITIONAL PLACEMENT AREA SURVEY PROVIDED AUGUST 2018. LEVELS TO AHD.

LEGEND

- LIDAR CONTOUR
- BATHYMETRIC CONTOUR
- FULL SUPPLY LEVEL (FSL) = RL 543.19mAHD
- MIN. OPERATING LEVEL (MOL) = RL 534.35mAHD

SEDIMENT SAMPLE LOCATIONS:

- RAC1 — VIBROCORE LOCATION (RHDHV, 2018)
- BH7101 — BOREHOLE LOCATION (SMEC/GHD, 2019)
- TALS_SQ_07a1 — GRAB SAMPLE (CARDNO, 2018)
- TAL01 — AS-BUILT CORE (RHDHV, 2019)

AS-BUILT CORE COORDINATES TABLE

ID	EASTING	NORTHING
TAL01	624205.00	6040734.00
TAL02	623866.00	6040858.00
TAL03	623836.00	6040766.00
TAL03a	623738.00	6040801.00
TAL04	623616.00	6041243.00
TAL05	623543.00	6041228.00
TAL06	623752.00	6041628.00
TAL07	623458.00	6041770.00
TAL08	622757.00	6041530.00
TAL08a	622902.00	6041571.00
TAL09	622594.00	6041634.00
TAL10	622430.00	6041661.00
TAL11	624033.00	6040823.00
TAL13	623764.00	6040988.00
TAL14	623687.00	6040988.00
TAL15	623687.00	6040988.00
TAL17	623582.00	6041573.00
TAL20	622505.00	6041355.00
TAL25	623918.00	6041663.00
TAL26	622536.00	6042006.00
TAL27	622662.00	6041199.00

S2 FOR INFORMATION

NOT FOR CONSTRUCTION

AUSTRALIAN HEIGHT DATUM

80 0 80 160 240 320 400m

1:9000 (A3) 1:4500 (A1)

© Haskoning Australia Pty Ltd

REV	DATE	DESCRIPTION	BY	CHK	APP
A	11.07.2019	ISSUED FOR INFORMATION	BAM	RP	GWB

REVISIONS

CLIENT

snowyhydro renewable energy

PROJECT

SNOWY 2.0
SEDIMENT SAMPLING INVESTIGATION

TITLE

TALBINGO RESERVOIR CORE LOCATION

Royal HaskoningDHV
Enhancing Society Together
Level 14, 56 Berry Street
North Sydney NSW 2060
Australia
Tel +61 2 88545000
Fax +61 2 99290969
Email: project.admin.australia@rhdhv.com
Website: www.royalhaskoningdhv.com

DRAWN	COORD. SYSTEM	DATUM	DATE
BAM	MGA ZONE 55	AHD	11.07.2019

SCALE AT A1: AS SHOWN
REF.: S2-RHD-TAL-MOD-1400-GEOTECH

DRAWING No.: S2-RHD-TAL-SKE-1400
REVISION: A

I:\PA1804\TECHNICAL_DATA\~PA1804 - SNOWY HYDRO DAMS\E02 WORKING DRAWINGS\S2-RHD-TAL-MOD-1400-GEOTECH

Appendix B – Core Logs and Photographs

Geotechnical Explanatory Notes

Introduction

These notes have been produced to supplement the geotechnical aspects of the report and appendices. In particular, the notes provide specific details relating to geotechnical logging and interpretation of borehole logs, test pit logs and in situ tests presented as part of the appendix.

Geotechnical fieldwork, interpretation and reporting has been carried out by a suitably qualified engineer or scientist. The reliability of the geotechnical information provided in the logs and penetration tests will depend to some extent on the frequency and method of excavation and penetration testing. Large variation may occur in the subsurface geological conditions and records from excavations or penetration tests may vary significantly from other locations across the site.

Description and Classification Methods

The methods of description and classification of soils and rocks in this report is based on Australian Standards AS1726: Geotechnical Site Investigation. Field descriptions and classifications are based on visual and tactile assessment. Where appropriate, laboratory data and penetration testing will be used to verify field descriptions and classifications.

Penetration Testing

Penetration testing is used to determine soil consistency or density. Commonly implemented penetration tests includes:

DCP – Dynamic Cone Penetrometer tests are carried out by driving a 16mm rod into the ground using a 9kg hammer and recording the number of blows per 100mm. Two similar tests are commonly used: the cone penetrometer utilises a 20mm diameter cone end driven into the ground with the hammer dropping from a height of 510mm (AS1289, Test F3.2), while the Perth Sand Penetrometer utilises a 16mm flat end driven into the ground with the hammer dropping from a height of 600mm (AS1289, Test F3.3).

SPT – Standard Penetration Tests is carried out by driving a 50mm diameter split sample tube 450mm into the ground using a 63kg weight falling from a height of 760mm (AS1289, Test F3.1). These tests are normally carried out in boreholes. Blows per 150mm are recorded and the 'N' value is taken as the number of blow for the last 300mm.

Sampling

Sampling is carried out during drilling or test pitting to allow for visual and tactile assessment and to allow for laboratory testing (if required). Sampling methods include:

- U_{50} - Undisturbed Sample Tube (50mm)
- B – Bulk Sample (>10kg sample size)
- D – Disturbed Sample
- W – Water Sample
- SPT – SPT Sample
- S – Surface Sample
- PID – Photoionisation detector reading in ppm

Laboratory Testing

Laboratory Testing is carried out by a NATA accredited laboratory in accordance with the Australian Standards 1289 – Methods of Testing Soil for Engineering Purposes Code.

Groundwater

There are several problems associated with measuring the water level in boreholes. Perched water tables above impermeable layers may lead to an erroneous indication of the true water level in underlying strata. Also, water levels may fluctuate with changing climatic conditions, some drilling methods do not enable the presence of groundwater to be detected and in low permeability soils where groundwater flow is slow, water may not enter the hole in the time it is left open. Despite the problems, the level of groundwater is often important for design and the following symbols may be used to indicate the presence of groundwater on site.

- ▼ - Standing water level
- GNO - Groundwater Not Observed
- GNE - Groundwater Not Encountered
- ▶ - Groundwater inflow/seepage
- ◀ - Groundwater outflow/loss

Royal HaskoningDHV
Enhancing Society Together

Graphic Symbols for Soil and Rock

General

- Asphalt
- Road base
- Concrete
- Filling

Soils

- Topsoil
- Peat
- Clay
- Silty clay
- Sandy clay
- Gravelly clay
- Shaly clay
- Silt
- Clayey silt
- Sandy silt
- Sand
- Clayey sand
- Silty sand
- Gravel
- Sandy gravel
- Cobbles, boulders
- Talus

Sedimentary Rocks

- Boulder conglomerate
- Conglomerate
- Conglomeratic sandstone
- Sandstone
- Siltstone
- Laminite
- Mudstone, claystone, shale
- Coal
- Limestone

Metamorphic Rocks

- Slate, phyllite, schist
- Gneiss
- Quartzite

Igneous Rocks

- Granite
- Dolerite, basalt, andesite
- Dacite, epidote
- Tuff, breccia
- Porphyry

Royal HaskoningDHV
Enhancing Society Together

Soil Classification

Particle size and descriptive terms

Name	Subdivision	Size
Boulders	N/A	>200mm
Cobbles	N/A	63 mm to 200 mm
Gravel	Coarse Medium Fine	20 mm to 63 mm 6 mm to 20 mm 2.36 mm to 6 mm
Sand	Coarse Medium Fine	0.6 mm to 2.36 mm 0.2 mm to 0.6 mm 0.075 mm to 0.2 mm

Soil classification is conducted on material nominally finer than 63mm. The proportion of boulders and cobbles is recorded along with the packing characteristics as follows:

- Clast supported - clasts touching, with or without the presence of a soil matrix, and
- Matrix supported - clasts supported in a soil matrix.

Minor Component

The primary soil name is modified to include minor components as follows:

Modifier	Percentage of minor component
Omit, or use 'trace'	Fine soil in primarily coarse material: ≤5% Coarse soil in primarily fines material: ≤15%
Describe as 'with clay/silt/sand/ gravel' as applicable	Fine soil in primarily coarse material: 5-12% Coarse soil in primarily fines material: 15-30%
Prefix soil as 'silty/clayey/sandy/ gravelly'' as applicable	Fine soil in primarily coarse material: >12% Coarse soil in primarily fines material: >30%

Moisture Condition

Condition	Symbol	Guide
Dry	D	Cohesive soils are hard and friable or powdery. Granular soils are cohesionless and free running.
Moist	M	Soil feels cool and darkened in places. Cohesive soils can be remoulded. Granular soils tend to cohere.
Wet	W	Soil feels cool, darkened in colour. Free water forms on hands when handled. Cohesive soils are weakened. Granular soils tend to cohere.

Cohesive Soils

Cohesive refers to soil behaviour. Cohesive soils are classified based of strength (consistency).

Consistency

Term	Symbol	Field Guide to Consistency	Undrained Shear Strength, S_u (kPa)
Very Soft	VS	Extrudes between fingers when squeezed in hand.	<12
Soft	S	Can be remoulded by light finger pressure. Easily penetrated by thumb 30-40mm.	12-25
Firm	F	Can be remoulded by strong finger pressure. Penetrated by thumb 20-30mm with moderate effort.	25-50
Stiff	St	Cannot be remoulded by fingers. Can be indented by thumb.	50-100
Very Stiff	VSt	Can be intended by thumb nail.	100-200
Hard	H	Difficult to indent with thumb nail.	>200

Cohesionless Soil

Cohesionless refers to soil behaviour. Cohesionless soils are classified based of relative density.

Density

Term	Symbol	Field Guide to Consistency	Density Index %
Very Loose	VL	Very easily shovelled, almost no resistance.	≤15
Loose	L	Low resistance to shovelling.	15-35
Medium Dense	MD	Considerable resistance to shovelling.	35-65
Dense	D	Requires handpick for excavation.	65-85
Very Dense	VD	Requires power tool for excavation.	>85

Origin

Residual Soil	Weathered in-situ
Aeolian Soil	Deposited by wind
Alluvial Soil	Deposited by streams and rivers
Colluvial Soil	Deposited on slopes
Lacustrine Soil	Deposited by lakes
Marine Soil	Deposited in ocean basins, bays, beaches and estuaries
Littoral	Beach deposits
Fill	Man-made deposits. Fill may be significantly more variable between tested locations than naturally occurring soils.

Royal HaskoningDHV
Enhancing Society Together

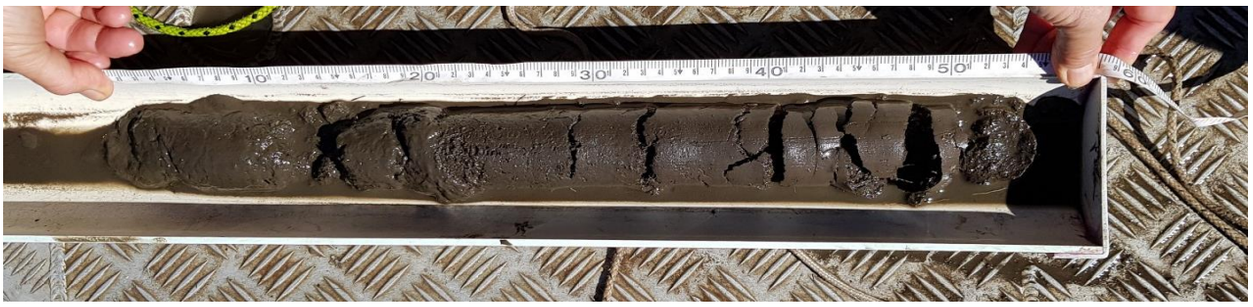
Guide to the Description Identification and Classification of Soil (AS 1726)

FIELD IDENTIFICATION PROCEDURES (Excluding particles larger than 60mm and basing fractions on estimated mass)					GROUP SYMBOLS	PRIMARY NAME
COARSE GRAINED SOILS (more than half of material less than 63mm is larger than 0.075 mm)	GRAVELS More than half of the coarse fraction is larger than 2.36mm	CLEAN GRAVELS (Little or no fines)	Wide range in grain size and substantial amounts of all intermediate sizes, not enough fines to bind coarse grains, no dry strength.		GW	GRAVEL
			Predominantly one size or range of sizes with some intermediate sizes missing, not enough fines to bind coarse grains, no dry strength.		GP	GRAVEL
		GRAVELS WITH FINES (Appreciable amount of fines)	Excess of non-plastic fines, zero to medium dry strength.		GM	SILTY GRAVEL
			Excess of plastic fines, medium to high dry strength.		GC	CLAYEY GRAVEL
	SANDS More than half of the coarse fraction is smaller than 2.36mm	CLEAN SANDS (Little or no fines)	Wide range in grain size and substantial amounts of all intermediate sizes, not enough fines to bind coarse grains, no dry strength.		SW	SAND
			Predominantly one size or range of sizes with some intermediate sizes missing, not enough fines to bind coarse grains, no dry strength.		SP	SAND
		SANDS WITH FINES (Appreciable amount of fines)	Excess of non-plastic fines, zero to medium dry strength.		SM	SILTY SAND
			Excess of plastic fines, medium to high dry strength.		SC	CLAYEY SAND
		DRY STRENGTH	**DILATANCY**	**TOUGHNESS**		
FINE GRAINED SOILS (more than half of material less than 63mm is smaller than 0.075 mm)	SILTS AND CLAYS Liquid limit less than 50	None to Low	Quick to slow	None	ML	SILT
		Medium to High	None	Medium	CL	CLAY
		Low to Medium	Slow to very slow	Low	OL	ORGANIC SILT
	SILTS AND CLAYS Liquid limit greater than 50	Low to Medium	Slow to very slow	Low to Medium	MH	SILT
		High	None	High	CH	CLAY
		Medium to High	None	Low to Medium	OH	ORGANIC CLAY
HIGHLY ORGANIC SOILS		Identified by colour, odour, spongy feel and generally by fibrosous texture.			Pt	Peat

CORE LOG

CLIENT	Snowy Hydro Ltd	**JOB No.**	PA1804
PROJECT	Snowy 2.0 Operational Analysis	**LOGGED BY**	R Plain
LOCATION	Tantangara Reservoir	**DATUM**	MGA55
CONTRACTOR	Geochemical Assessments		

CORE ID	TANT01	**EASTING**	649864
EQUIPMENT	Gravity Corer	**NORTHING**	6038136
DATE/TIME	25-03-19	**BATHYMETRY (m AHD)**	1199
Depth Below Bed Level (m)	**Material Description**	**Field Observations**	**Sample ID / Test**
0.00 - 0.18	Silty CLAY/Clayey SILT trace sand, brown, very soft.	RESERVOIR DEPOSIT.	TANT01 0-0.18
0.18		Layer of vegetation (bark).	
0.18 - 0.52	Sandy SILT with clay, trace coarse sand, dark brown.	Root fibres, TOPSOIL.	TANT01 0.3-0.52
0.52		Abundant root fibres.	
0.52	EOH.		
Comments	Nil		



CORE ID	TANT01a	**EASTING**	649844
EQUIPMENT	Gravity Corer	**NORTHING**	6038151
DATE/TIME	25-03-19	**BATHYMETRY (m AHD)**	1199.5
Depth Below Bed Level (m)	**Material Description**	**Field Observations**	**Sample ID / Test**
0.00 - 0.15	Silty CLAY/Clayey SILT trace sand, brown, very soft.	RESERVOIR DEPOSIT.	TANT01a 0-0.15
0.15 - 0.70	CLAY with silt and sand, coarse sand, dark brown. from 0.5 m, becoming brown.	Abundant root fibres, TOPSOIL.	TANT01a 0.4-0.5
0.70	EOH.		
Comments	Nil		

CORE LOG

CLIENT	Snowy Hydro Ltd	**JOB No.**	PA1804
PROJECT	Snowy 2.0 Operational Analysis	**LOGGED BY**	R Plain
LOCATION	Tantangara Reservoir	**DATUM**	MGA55
CONTRACTOR	Geochemical Assessments		

CORE ID	TANT01b	**EASTING**	649845
EQUIPMENT	Vibrocorer	**NORTHING**	6038146
DATE/TIME	26-03-19	**BATHYMETRY (m AHD)**	1199.5
Depth Below Bed Level (m)	**Material Description**	**Field Observations**	**Sample ID / Test**
0.00 - 0.06	Silty CLAY/Clayey SILT trace sand, brown, very soft.	RESERVOIR DEPOSIT.	
0.06 - 0.30	CLAY, with sand, brown.	Abundant root fibres, TOPSOIL.	
0.30	EOH.		
Comments	Vibrocorer fell on 3 attempts. 1.5 m barrel. Assumed refusal on layer of cobbles at EOH.		

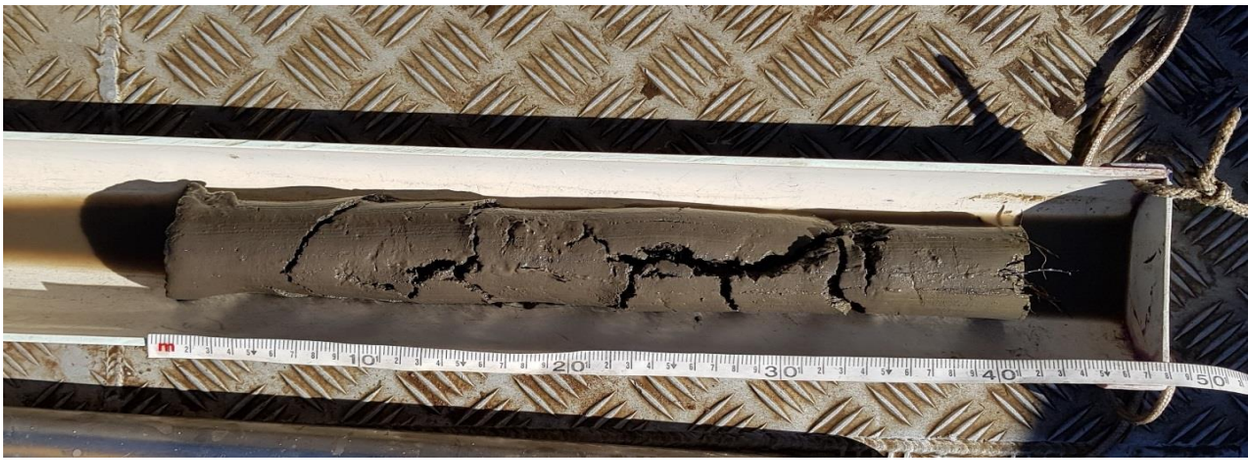
CORE ID	TANT02	**EASTING**	649907
EQUIPMENT	Gravity Corer	**NORTHING**	6038149
DATE/TIME	25-03-19	**BATHYMETRY (m AHD)**	1198
Depth Below Bed Level (m)	**Material Description**	**Field Observations**	**Sample ID / Test**
0.00 - 0.30	Silty CLAY/Clayey SILT with sand, dark brown, trace gravel. Gravel equidimensional and angular.	Abundant root fibres, TOPSOIL.	TANT02 0.05-0.2
0.30-0.55	Sandy clayey SILT, brown.	Root fibres, RESIDUAL.	TANT02 0.45-0.55
	from 0.5 m, abundant root fibres.		
0.55	EOH.		
Comments	Nil		

CORE LOG

CLIENT	Snowy Hydro Ltd	**JOB No.**	PA1804
PROJECT	Snowy 2.0 Operational Analysis	**LOGGED BY**	R Plain
LOCATION	Tantangara Reservoir	**DATUM**	MGA55
CONTRACTOR	Geochemical Assessments		

CORE ID	TANT02a	**EASTING**	649907
EQUIPMENT	Vibrocorer	**NORTHING**	6038149
DATE/TIME	26-03-19	**BATHYMETRY (m AHD)**	1198
Depth Below Bed Level (m)	**Material Description**	**Field Observations**	**Sample ID / Test**
0.00 - 0.20	Core Loss.		
0.20	EOH.		
Comments	Vibrocorer fell over after ~20 cm penetration. 1.0 m barrel. Assumed refusal on layer of cobbles. No core recovery.		

CORE ID	TANT03	**EASTING**	650044
EQUIPMENT	Gravity Corer	**NORTHING**	6038151
DATE/TIME	25-03-19	**BATHYMETRY (m AHD)**	1197
Depth Below Bed Level (m)	**Material Description**	**Field Observations**	**Sample ID / Test**
0.00 - 0.30	Sandy Silty CLAY, coarse sand, brown.	Abundant root fibres, TOPSOIL.	TANT03 0.1-0.3
0.30 - 0.40	CLAY, mottled orange/grey, stiff/firm.	Root fibres, RESIDUAL.	
0.40	EOH.		
Comments	Nil.		



CORE LOG

CLIENT	Snowy Hydro Ltd	**JOB No.**	PA1804
PROJECT	Snowy 2.0 Operational Analysis	**LOGGED BY**	R Plain
LOCATION	Tantangara Reservoir	**DATUM**	MGA55
CONTRACTOR	Geochemical Assessments		

CORE ID	TANT04	**EASTING**	650168
EQUIPMENT	Piston Corer	**NORTHING**	6038136
DATE/TIME	25-03-19	**BATHYMETRY (m AHD)**	1208
Depth Below Bed Level (m)	**Material Description**	**Field Observations**	**Sample ID / Test**
0.00 - 0.05	Core Loss.		
0.05	EOH.		
Comments	~5 cm of sediment overlying rock. No core recovery. Predicted to be muddy gravel. Rock bottom visible on depth sounder.		

CORE ID	TANT05	**EASTING**	649852
EQUIPMENT	Gravity Corer	**NORTHING**	6037860
DATE/TIME	25-03-19	**BATHYMETRY (m AHD)**	1201.5
Depth Below Bed Level (m)	**Material Description**	**Field Observations**	**Sample ID / Test**
0.00 - 0.10	Silty CLAY/Clayey SILT trace sand, brown, very soft.	RESERVOIR DEPOSIT.	TANT05 0-0.1
0.10 - 0.52	Silty Sandy CLAY, brown, becoming firm/stiff.	Abundant root fibres, TOPSOIL.	TANT05 0.2-0.4
0.52	EOH.		
Comments	Nil.		

CORE LOG

CLIENT	Snowy Hydro Ltd	**JOB No.**	PA1804
PROJECT	Snowy 2.0 Operational Analysis	**LOGGED BY**	R Plain
LOCATION	Tantangara Reservoir	**DATUM**	MGA55
CONTRACTOR	Geochemical Assessments		

CORE ID	TANT06	**EASTING**	650011
EQUIPMENT	Gravity Corer	**NORTHING**	6037860
DATE/TIME	25-03-19	**BATHYMETRY (m AHD)**	1196.5
Depth Below Bed Level (m)	**Material Description**	**Field Observations**	**Sample ID / Test**
0.00 - 0.06	Silty CLAY/Clayey SILT trace sand, brown, very soft.	RESERVOIR DEPOSIT.	TANT06 0-0.06
0.06 - 0.50	Clayey SILT with sand, brown, becoming firm/stiff.	Abundant root fibres, TOPSOIL.	TANT06 0.1-0.3
0.50	EOH.		
Comments	Nil.		

CORE ID	TANT07	**EASTING**	650147
EQUIPMENT	Piston Corer	**NORTHING**	6037864
DATE/TIME	25-03-19	**BATHYMETRY (m AHD)**	1210
Depth Below Bed Level (m)	**Material Description**	**Field Observations**	**Sample ID / Test**
0.00 - 0.10	Core loss.		
0.10	EOH.		
Comments	5 - 10 cm of sediment overlying rock. No core recovery. Predicted to be muddy gravel. Rock visible on depth sounder.		

CORE LOG

CLIENT	Snowy Hydro Ltd	**JOB No.**	PA1804
PROJECT	Snowy 2.0 Operational Analysis	**LOGGED BY**	R Plain
LOCATION	Tantangara Reservoir	**DATUM**	MGA55
CONTRACTOR	Geochemical Assessments		

CORE ID	TANT08	**EASTING**	649930
EQUIPMENT	Gravity Corer	**NORTHING**	6038452
DATE/TIME	26-03-19	**BATHYMETRY (m AHD)**	1197.5
Depth Below Bed Level (m)	**Material Description**	**Field Observations**	**Sample ID / Test**
0.00 - 0.02	Silty CLAY/Clayey SILT trace sand, brown, very soft.	RESERVOIR DEPOSIT.	
0.02 - 0.28	Silty Clayey SAND trace gravel, brown.	Abundant root fibres, ALLUVIAL.	TANT08 0.1-0.2
0.28 - 0.40	SILT with sand and clay, grey mottled orange, firm/stiff, trace coarse sand.	Trace root fibres, RESIDUAL.	TANT08 0.3-0.4
0.40	EOH.		
Comments	Nil.		

CORE ID	TANT09	**EASTING**	650055
EQUIPMENT	Gravity Corer	**NORTHING**	6038435
DATE/TIME	26-03-19	**BATHYMETRY (m AHD)**	1201.5
Depth Below Bed Level (m)	**Material Description**	**Field Observations**	**Sample ID / Test**
Comments	Shallow sediment layer overlying rock. No core recovery. Rock visible on depth sounder.		

CORE LOG

CLIENT	Snowy Hydro Ltd	**JOB No.**	PA1804
PROJECT	Snowy 2.0 Operational Analysis	**LOGGED BY**	R Plain
LOCATION	Tantangara Reservoir	**DATUM**	MGA55
CONTRACTOR	Geochemical Assessments		

CORE ID	TANT10	**EASTING**	650167
EQUIPMENT	Piston Corer	**NORTHING**	6038410
DATE/TIME	25-03-19	**BATHYMETRY (m AHD)**	1206.5
Depth Below Bed Level (m)	**Material Description**	**Field Observations**	**Sample ID / Test**
0.00 - 0.08	Silty CLAY/Clayey SILT with sand, brown, very soft.	RESERVOIR DEPOSIT.	TANT10 0 - 0.08
0.08 - 0.16	Sandy CLAY, trace gravel, brown.		
0.16 - 0.55	CLAY with sand, dark brown, soft to very soft.	Root fibres, TOPSOIL.	
0.55 - 0.85	Core loss.		
0.85	EOH.		
Comments	Same location sampled. Approximately 3-4cm of sediment overlying rock.		

CORE ID	TANT10a	**EASTING**	650167
EQUIPMENT	Piston Corer	**NORTHING**	6038410
DATE/TIME	25-03-19	**BATHYMETRY (m AHD)**	1206.5
Depth Below Bed Level (m)	**Material Description**	**Field Observations**	**Sample ID / Test**
0.00 - 0.05	Silty CLAY/Clayey SILT trace sand, brown, very soft.	RESERVOIR DEPOSIT.	
0.05 - 0.15	Sandy clayey SILT trace gravel, brown.		TANT10a 0.05-0.15
0.15	at 0.15 m, sand horizon.		
0.15 - 0.90	Clayey SILT with sand trace gravel, brown, angular gravel. from 0.55 m, trace sand and gravel.	TOPSOIL. Trace root fibres becoming abundant with depth.	TANT10a 0.55-0.8
0.90	EOH.		
Comments	Nil.		

CORE LOG

CLIENT	Snowy Hydro Ltd	**JOB No.**	PA1804
PROJECT	Snowy 2.0 Operational Analysis	**LOGGED BY**	R Plain
LOCATION	Tantangara Reservoir	**DATUM**	MGA55
CONTRACTOR	Geochemical Assessments		

CORE ID	TANT11d	**EASTING**	649830
EQUIPMENT	Gravity Corer	**NORTHING**	6038296
DATE/TIME	26-03-19	**BATHYMETRY (m AHD)**	1202.5
Depth Below Bed Level (m)	**Material Description**	**Field Observations**	**Sample ID / Test**
0.00 - 0.06	Silty CLAY/Clayey SILT trace sand, brown, very soft.	RESERVOIR DEPOSIT.	
0.06 - 0.45	Sandy clayey SILT, dark brown. below 0.4 m, becoming brown.	Abundant root fibres, TOPSOIL.	TANT11d 0.2-0.4
0.45	EOH.		
Comments	Nil.		

CORE ID	TANT11s	**EASTING**	649710
EQUIPMENT	Piston Corer	**NORTHING**	6038300
DATE/TIME	25-03-19	**BATHYMETRY (m AHD)**	1207.5
Depth Below Bed Level (m)	**Material Description**	**Field Observations**	**Sample ID / Test**
0.00 - 0.02	Silty CLAY/Clayey SILT trace sand, brown, very soft.	RESERVOIR DEPOSIT.	
0.02 - 0.35	Sandy Silty CLAY, dark drown - black, becoming lighter with depth.	Root fibres, TOPSOIL.	TANT11s 0.02-0.35
0.35 - 0.45	Core loss.		
0.45	EOH.		
Comments	Nil.		

CORE LOG

CLIENT	Snowy Hydro Ltd	**JOB No.**	PA1804
PROJECT	Snowy 2.0 Operational Analysis	**LOGGED BY**	R Plain
LOCATION	Tantangara Reservoir	**DATUM**	MGA55
CONTRACTOR	Geochemical Assessments		

CORE ID	TANT11sa	**EASTING**	649710
EQUIPMENT	Piston Corer	**NORTHING**	6038300
DATE/TIME	25-03-19	**BATHYMETRY (m AHD)**	1207.5
Depth Below Bed Level (m)	**Material Description**	**Field Observations**	**Sample ID / Test**
0.00 - 0.04	Silty CLAY/Clayey SILT trace sand, brown, very soft.	RESERVOIR DEPOSIT.	
0.04 - 0.36	SILT with clay and sand, dark drown, becoming lighter with depth. below 0.32 m, trace gravel.	Root fibres, TOPSOIL.	TANT11sa 0.04-0.36
0.36 - 0.40	Silty CLAY/Clayey SILT with sand and gravel, brown/orange, slightly mottled, gravel orange and angular.	RESIDUAL.	TANT11sa 0.36-0.42
0.40	EOH		
Comments	Nil.		

CORE ID	TANT13	**EASTING**	650001
EQUIPMENT	Gravity Corer	**NORTHING**	6038282
DATE/TIME	26-03-19	**BATHYMETRY (m AHD)**	1197
Depth Below Bed Level (m)	**Material Description**	**Field Observations**	**Sample ID / Test**
0.00 - 0.13	Silty CLAY/Clayey SILT trace sand, brown, very soft.	RESERVOIR DEPOSIT.	TANT13 0-0.1
0.13 - 0.28	Sandy silty GRAVEL, dark brown, gravel angular, flat.	ALLUVIAL.	TANT13 0.15-0.25
0.28 - 0.86	SILT with clay trace sand and gravel, brown, soft.	Trace organics. ALLUVIAL.	TANT13 0.5-0.6
0.86	EOH.		
Comments	Nil.		

CORE LOG

CLIENT	Snowy Hydro Ltd	**JOB No.**	PA1804
PROJECT	Snowy 2.0 Operational Analysis	**LOGGED BY**	R Plain
LOCATION	Tantangara Reservoir	**DATUM**	MGA55
CONTRACTOR	Geochemical Assessments		

CORE ID	TANT15	**EASTING**	649738
EQUIPMENT	Gravity Corer	**NORTHING**	6038053
DATE/TIME	26-03-19	**BATHYMETRY (m AHD)**	1206
Depth Below Bed Level (m)	**Material Description**	**Field Observations**	**Sample ID / Test**
0.00 - 0.18	Silty CLAY/Clayey SILT trace sand, brown, very soft.	RESERVOIR DEPOSIT.	TANT15 0-0.15
0.18 - 0.55	Sandy SILT with clay, brown. below 0.4 m, becoming firm. below 0.5m, becoming gravelly, angular up to approximately 15mm diameter.	Abundant root fibres, TOPSOIL.	TANT15 0.2-0.3
0.55	EOH.		
Comments	Nil.		

CORE ID	TANT16	**EASTING**	649959
EQUIPMENT	Gravity Corer	**NORTHING**	6037946
DATE/TIME	26-03-19	**BATHYMETRY (m AHD)**	1197
Depth Below Bed Level (m)	**Material Description**	**Field Observations**	**Sample ID / Test**
0.00 - 0.06	Silty CLAY/Clayey SILT trace sand, brown, very soft.	RESERVOIR DEPOSIT.	
0.06 - 0.45	Clayey SILT trace sand, brown, soft-firm.	Abundant root fibres, TOPSOIL.	TANT16 0.2-0.3
0.45	EOH.		
Comments	Nil.		

CORE LOG

CLIENT	Snowy Hydro Ltd	**JOB No.**	PA1804
PROJECT	Snowy 2.0 Operational Analysis	**LOGGED BY**	R Plain
LOCATION	Tantangara Reservoir	**DATUM**	MGA55
CONTRACTOR	Geochemical Assessments		

CORE ID	TANT30	**EASTING**	649912
EQUIPMENT	Gravity Corer	**NORTHING**	6038760
DATE/TIME	26-03-19	**BATHYMETRY (m AHD)**	1202.5
Depth Below Bed Level (m)	**Material Description**	**Field Observations**	**Sample ID / Test**
Comments	Shallow sediment overlying rock. No core recovery. Rock visible on depth sounder. Hydrous silt on tip of barrel.		

CORE ID	TANT31	**EASTING**	649782
EQUIPMENT	Gravity Corer	**NORTHING**	6038736
DATE/TIME	26-03-19	**BATHYMETRY (m AHD)**	1199
Depth Below Bed Level (m)	**Material Description**	**Field Observations**	**Sample ID / Test**
0.00 - 0.03	Silty CLAY/Clayey SILT trace sand, brown, very soft.	RESERVOIR DEPOSIT.	
0.03 - 0.50	Clayey SILT trace sand, brown. below 0.2 m, becoming firm.	Abundant root fibres, TOPSOIL.	TANT31 0.2-0.4
0.50	EOH.		
Comments	Nil.		

CORE LOG

CLIENT	Snowy Hydro Ltd	**JOB No.**	PA1804
PROJECT	Snowy 2.0 Operational Analysis	**LOGGED BY**	R Plain
LOCATION	Talbingo Reservoir	**DATUM**	MGA55
CONTRACTOR	Geochemical Assessments		

CORE ID	TAL01	**EASTING**	624205
EQUIPMENT	Gravity Corer	**NORTHING**	6040734
DATE/TIME	27-03-19	**BATHYMETRY (m AHD)**	530
Depth Below Bed Level (m)	**Material Description**	**Field Observations**	**Sample ID / Test**
0.00 - 0.18	Clayey SILT with sand, brown, very soft, trace organics.	RESERVOIR DEPOSIT.	TAL01 0.1-0.2
0.26 - 0.62	Sandy SILT with clay, brown.	Trace root fibres, ALLUVIAL.	TAL01 0.3-0.4
0.62	EOH		
Comments	Nil		

CORE ID	TAL02	**EASTING**	623866
EQUIPMENT	Gravity Corer	**NORTHING**	6040858
DATE/TIME	27-03-19	**BATHYMETRY (m AHD)**	526.5
Depth Below Bed Level (m)	**Material Description**	**Field Observations**	**Sample ID / Test**
0.00 - 0.24	Clayey SILT trace sand, brown, very soft, trace organics.	RESERVOIR DEPOSIT.	TAL02 0.1-0.2
0.24 - 0.32	CLAY, with sand, brown, soft, fine grained sand.	Abundant root fibres, ALLUVIAL.	
0.32	EOH.		
Comments	Nil		

CORE LOG

CLIENT	Snowy Hydro Ltd	**JOB No.**	PA1804
PROJECT	Snowy 2.0 Operational Analysis	**LOGGED BY**	R Plain
LOCATION	Talbingo Reservoir	**DATUM**	MGA55
CONTRACTOR	Geochemical Assessments		

CORE ID	TAL03	**EASTING**	623836
EQUIPMENT	Gravity Corer	**NORTHING**	6040766
DATE/TIME	27-03-19	**BATHYMETRY (m AHD)**	526.5
Depth Below Bed Level (m)	**Material Description**	**Field Observations**	**Sample ID / Test**
<0.1	Core loss.		
<0.1	EOH		
Comments	Rocky bottom visible on the depth sounder and steep rock slopes to the west and south. Short penetration of gravity corer before it fell over. No core recovery.		

CORE ID	TAL03a	**EASTING**	623738
EQUIPMENT	Gravity Corer	**NORTHING**	6040801
DATE/TIME	27-03-19	**BATHYMETRY (m AHD)**	526.5
Depth Below Bed Level (m)	**Material Description**	**Field Observations**	**Sample ID / Test**
~0.2	Core loss.		
~0.2	EOH		
Comments	Rocky bottom visible on the depth sounder and steep rock slopes to the west and south. Short penetration of gravity corer before it fell over. No core recovery. Assumed ~0.2 m silt overlying rock.		

CORE LOG

CLIENT	Snowy Hydro Ltd	**JOB No.**	PA1804
PROJECT	Snowy 2.0 Operational Analysis	**LOGGED BY**	R Plain
LOCATION	Talbingo Reservoir	**DATUM**	MGA55
CONTRACTOR	Geochemical Assessments		

CORE ID	TAL04	**EASTING**	623616
EQUIPMENT	Gravity Corer	**NORTHING**	6041243
DATE/TIME	27-03-19	**BATHYMETRY (m AHD)**	537
Depth Below Bed Level (m)	**Material Description**	**Field Observations**	**Sample ID / Test**
~0.05	Core Loss.		
~0.05	EOH.		
Comments	Rocky bottom visible on the depth sounder and steep rocky ridge to the east with sparse vegetation. No core recovery.		

CORE ID	TAL05	**EASTING**	623554
EQUIPMENT	Gravity Corer	**NORTHING**	6041241
DATE/TIME	27-03-19	**BATHYMETRY (m AHD)**	521
Depth Below Bed Level (m)	**Material Description**	**Field Observations**	**Sample ID / Test**
0.00 - 0.15	SILT, brown, very soft.	RESERVOIR DEPOSIT.	
0.15 - 0.32	Silty clayey SAND, brown, fine grained, trace gravel.	Root fibres, RESIDUAL.	TAL05 0.15-0.25
0.32 - 0.64	Core loss.		
0.64	EOH.		
Comments	Three attempts to recover core. First attempt, piston of gravity corer pushed in 40 cm (approximate depth of sediment). Second attempt, gravity corer fell over and piston pulled to the top. Third attempt logged.		

CORE LOG

CLIENT	Snowy Hydro Ltd	**JOB No.**	PA1804
PROJECT	Snowy 2.0 Operational Analysis	**LOGGED BY**	R Plain
LOCATION	Talbingo Reservoir	**DATUM**	MGA55
CONTRACTOR	Geochemical Assessments		

CORE ID	TAL06	**EASTING**	623752
EQUIPMENT	Gravity Corer	**NORTHING**	6041628
DATE/TIME	27-03-19	**BATHYMETRY (m AHD)**	521
Depth Below Bed Level (m)	**Material Description**	**Field Observations**	**Sample ID / Test**
0.00 - 0.25	Silty CLAY/Clayey SILT, brown, very soft.	RESERVOIR DEPOSIT	TAL06 0-0.2
Depth Unknown.	Sandy SILT/SILTY Sand, abundant organics.		
Depth Unknown.	EOH.		
Comments	Two attempts to recover core. First attempt (logged), gravity corer fell over and piston pulled to the top. Second attempt, gravity corer fell over, piston pulled to the top and recovered ~10 cm of hydrous silt. Assumed very soft silt overlying rock.		

CORE ID	TAL07	**EASTING**	623458
EQUIPMENT	Piston Corer	**NORTHING**	6041770
DATE/TIME	28-03-19	**BATHYMETRY (m AHD)**	532
Depth Below Bed Level (m)	**Material Description**	**Field Observations**	**Sample ID / Test**
0.00 - 0.05	Clayey SAND, dark brown.	Trace root fibres, TOPSOIL.	
0.05 - 0.11	Sandy CLAY, red.	Abundant root fibres, RESIDIUAL.	
0.11 - 0.15	Core loss.		
0.15	EOH.		
Comments	Assumed refusal on red siltstone.		

CORE LOG

CLIENT	Snowy Hydro Ltd	**JOB No.**	PA1804
PROJECT	Snowy 2.0 Operational Analysis	**LOGGED BY**	R Plain
LOCATION	Talbingo Reservoir	**DATUM**	MGA55
CONTRACTOR	Geochemical Assessments		

CORE ID	TAL08	**EASTING**	622757
EQUIPMENT	Gravity Corer	**NORTHING**	6041530
DATE/TIME	27-03-19	**BATHYMETRY (m AHD)**	523
Depth Below Bed Level (m)	**Material Description**	**Field Observations**	**Sample ID / Test**
Depth unknown.	Core Loss.		
Depth unknown.	EOH.		
Comments	Two attempts to recover core. First attempt, 60 cm penetration, no core recovered. Second attempt, gravity corer fell over and piston pulled to the top. Assumed residual pink clay.		

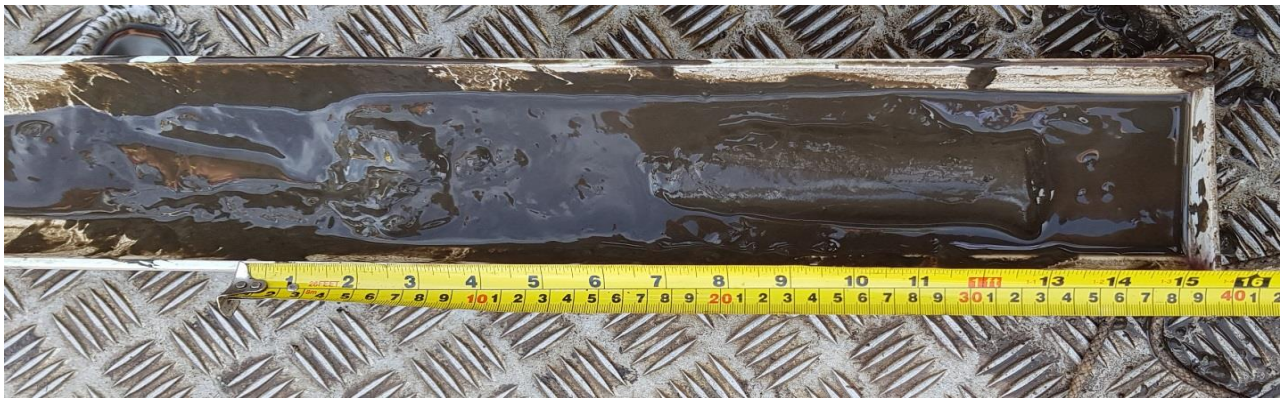
CORE ID	TAL08a	**EASTING**	622902
EQUIPMENT	Piston Corer	**NORTHING**	6041571
DATE/TIME	28-03-19	**BATHYMETRY (m AHD)**	532
Depth Below Bed Level (m)	**Material Description**	**Field Observations**	**Sample ID / Test**
0.00 - 0.01	SILT, brown, very soft.	RESERVOIR DEPOSIT.	
0.01 - 0.10	Silty Clayey SAND with gravel, brown, soft.	Abundant root fibres and organics, TOPSOIL.	TAL08a 0-0.1
0.10 - 0.12	Sandy GRAVEL with silt, beige (pale), angular gravel up to to 20 mm diameter.	Trace root fibres, RESIDUAL.	
0.12 - 0.24	Core loss.		
0.24	EOH.		
Comments	Assumed termination on friable rock.		

CORE LOG

CLIENT	Snowy Hydro Ltd	**JOB No.**	PA1804
PROJECT	Snowy 2.0 Operational Analysis	**LOGGED BY**	R Plain
LOCATION	Talbingo Reservoir	**DATUM**	MGA55
CONTRACTOR	Geochemical Assessments		

CORE ID	TAL09	**EASTING**	622594
EQUIPMENT	Gravity Corer	**NORTHING**	6041634
DATE/TIME	27-03-19	**BATHYMETRY (m AHD)**	508
Depth Below Bed Level (m)	**Material Description**	**Field Observations**	**Sample ID / Test**
0.00 - 0.03	CLAY, with sand, brown.	Abundant root fibres, TOPSOIL.	
0.03 - 0.34	Silty clayey SAND, cream/pink, firm-stiff.	Abundant root fibres, RESIDUAL.	TAL09 0.2-0.3
0.34	EOH.		
Comments	Nil.		

CORE ID	TAL10	**EASTING**	622430
EQUIPMENT	Gravity Corer	**NORTHING**	6041661
DATE/TIME	27-03-19	**BATHYMETRY (m AHD)**	502
Depth Below Bed Level (m)	**Material Description**	**Field Observations**	**Sample ID / Test**
0.00 - 0.30	Silty CLAY/.Clayey SILT, brown, very soft.	RESERVOIR DEPOSIT.	TAL10 0.1-0.2
Depth unknown.	Core loss, possibly sand.		
Depth unknown.	EOH.		
Comments	Assumed refusal on shallow rock. Core barrel bent.		



CORE LOG

CLIENT	Snowy Hydro Ltd	**JOB No.**	PA1804
PROJECT	Snowy 2.0 Operational Analysis	**LOGGED BY**	R Plain
LOCATION	Talbingo Reservoir	**DATUM**	MGA55
CONTRACTOR	Geochemical Assessments		

CORE ID	TAL11	**EASTING**	624033
EQUIPMENT	Gravity Corer	**NORTHING**	6040823
DATE/TIME	27-03-19	**BATHYMETRY (m AHD)**	528
Depth Below Bed Level (m)	**Material Description**	**Field Observations**	**Sample ID / Test**
0.00 - 0.23	Clayey SILT trace sand, brown, very soft.	RESERVOIR DEPOSIT.	TAL11 0.1-0.2
0.23 - 0.77	Silty clayey SAND, brown, fine grained sand.	Trace root fibres, ALLUVIAL.	TAL11 0.3-0.4
0.77	EOH.		
Comments	Nil.		

CORE ID	TAL13	**EASTING**	623764
EQUIPMENT	Gravity Corer	**NORTHING**	6040988
DATE/TIME	27-03-19	**BATHYMETRY (m AHD)**	534
Depth Below Bed Level (m)	**Material Description**	**Field Observations**	**Sample ID / Test**
0.00 - 0.04	SILT, brown, very soft.	RESERVOIR DEPOSIT.	
0.04 - 0.11	CLAY, with sand and gravel, brown.	Abundant root fibres, TOPSOIL.	
0.11 - 0.67	Sandy clayey SILT, brown-orange, sand coarse grained. below 0.4 m, becoming red, firm to stiff.	Trace roots up to 1 cm diameter, RESDIDUAL.	TAL13 0.3-0.4
0.67	EOH.		
Comments	Nil.		

CORE LOG

CLIENT	Snowy Hydro Ltd	**JOB No.**	PA1804
PROJECT	Snowy 2.0 Operational Analysis	**LOGGED BY**	R Plain
LOCATION	Talbingo Reservoir	**DATUM**	MGA55
CONTRACTOR	Geochemical Assessments		

CORE ID	TAL14	**EASTING**	623687
EQUIPMENT	Gravity Corer	**NORTHING**	6040988
DATE/TIME	27-03-19	**BATHYMETRY (m AHD)**	525
Depth Below Bed Level (m)	**Material Description**	**Field Observations**	**Sample ID / Test**
0.00 - 0.20	Clayey SILT trace sand, brown, very soft.	RESERVOIR DEPOSIT.	TAL14 0-0.2
Depth unknown.	Core loss.		
Depth unknown.	EOH.		
Comments	Gravity corer, with 1.5 m barrel, started to fall over. Piston pulled up 80 cm.		

CORE ID	TAL15	**EASTING**	623687
EQUIPMENT	Gravity Corer	**NORTHING**	6040988
DATE/TIME	27-03-19	**BATHYMETRY (m AHD)**	525
Depth Below Bed Level (m)	**Material Description**	**Field Observations**	**Sample ID / Test**
0.00 - 0.17	Clayey SILT trace sand, brown, very soft.	RESERVOIR DEPOSIT.	TAL15 0-0.15
0.17 - 0.82	Silty clayey SAND, brown, sand fine grained. from 0.45-0.57 m, with rounded gravel, fine to medium grained (~3-10mm diameter). below 0.57m, Clayey SAND, becoming light brown.	Trace root fibres, ALLUVIAL. below 0.45 m, no root fibres.	TAL15 0.35-0.45 TAL15 0.45-0.55
0.82	EOH.		
Comments	Gravity corer with 0.8 m barrel.		

CORE LOG

CLIENT	Snowy Hydro Ltd	**JOB No.**	PA1804
PROJECT	Snowy 2.0 Operational Analysis	**LOGGED BY**	R Plain
LOCATION	Talbingo Reservoir	**DATUM**	MGA55
CONTRACTOR	Geochemical Assessments		

CORE ID	TAL17	**EASTING**	623582
EQUIPMENT	Piston Corer	**NORTHING**	6041573
DATE/TIME	28-03-19	**BATHYMETRY (m AHD)**	533
Depth Below Bed Level (m)	**Material Description**	**Field Observations**	**Sample ID / Test**
0.00 - 0.05	Clayey GRAVEL, with sand, red, gravel angular, red, siltstone up to 20 mm diameter.	RESIDUAL.	
0.05	EOH.		
Comments	Nil.		

CORE ID	TAL20	**EASTING**	622505
EQUIPMENT	Gravity Corer	**NORTHING**	6041355
DATE/TIME	28-03-19	**BATHYMETRY (m AHD)**	504
Depth Below Bed Level (m)	**Material Description**	**Field Observations**	**Sample ID / Test**
~0.00 - 0.05	Core loss.		
~0.05	EOH.		
Comments	Five attempts, no recovery. Assumed ~5cm brown silt over rock.		

CORE LOG

CLIENT	Snowy Hydro Ltd	**JOB No.**	PA1804
PROJECT	Snowy 2.0 Operational Analysis	**LOGGED BY**	R Plain
LOCATION	Talbingo Reservoir	**DATUM**	MGA55
CONTRACTOR	Geochemical Assessments		

CORE ID	TAL25	**EASTING**	623918
EQUIPMENT	Piston Corer	**NORTHING**	6041663
DATE/TIME	28-03-19	**BATHYMETRY (m AHD)**	523
Depth Below Bed Level (m)	**Material Description**	**Field Observations**	**Sample ID / Test**
0.00 - 0.10	Clayey silty SAND with gravel, brown/pink, angular gravel up to 15 mm diameter.	Trace root fibres, RESIDUAL.	TAL25 0-0.1
0.10	EOH.		
Comments	Assumed terminated on rock. Core barrel bent. 2.5 m drop height.		

CORE ID	TAL26	**EASTING**	622536
EQUIPMENT	Piston Corer	**NORTHING**	6042006
DATE/TIME	28-03-19	**BATHYMETRY (m AHD)**	533
Depth Below Bed Level (m)	**Material Description**	**Field Observations**	**Sample ID / Test**
0.00 - 0.05	Sandy SILT with clay trace gravel, cream/beige.	Trace organics and root fibres. RESIDUAL.	TAL26 0-0.1
0.05 - 0.35	Core loss.		
0.35	EOH.		
Comments	Two attempts. First attempt logged above. Second attempt, four penetrations one after the other. Longest penetration ~20 cm. Sandy gravelly clay, cream to beige, organics and roots, gravel subangular up to 20 mm diameter. Sample 0-0.1.		

CORE LOG

CLIENT	Snowy Hydro Ltd	**JOB No.**	PA1804
PROJECT	Snowy 2.0 Operational Analysis	**LOGGED BY**	R Plain
LOCATION	Talbingo Reservoir	**DATUM**	MGA55
CONTRACTOR	Geochemical Assessments		

CORE ID	TAL27	**EASTING**	622662
EQUIPMENT	Piston Corer	**NORTHING**	6041199
DATE/TIME	28-03-19	**BATHYMETRY (m AHD)**	530
Depth Below Bed Level (m)	**Material Description**	**Field Observations**	**Sample ID / Test**
0.00 - 0.10	Sandy CLAY, with gravel, brown, fine grained gravel.		
0.10 - 0.18	SILT, with gravel, brown, angular gravel, typically platy, <5 mm diameter.	Trace root fibres and organics, TOPSOIL.	
0.18 - 0.30	Core loss.		
0.30	EOH.		
Comments	Nil.		

Appendix C – Laboratory Results

Certificate of Analysis

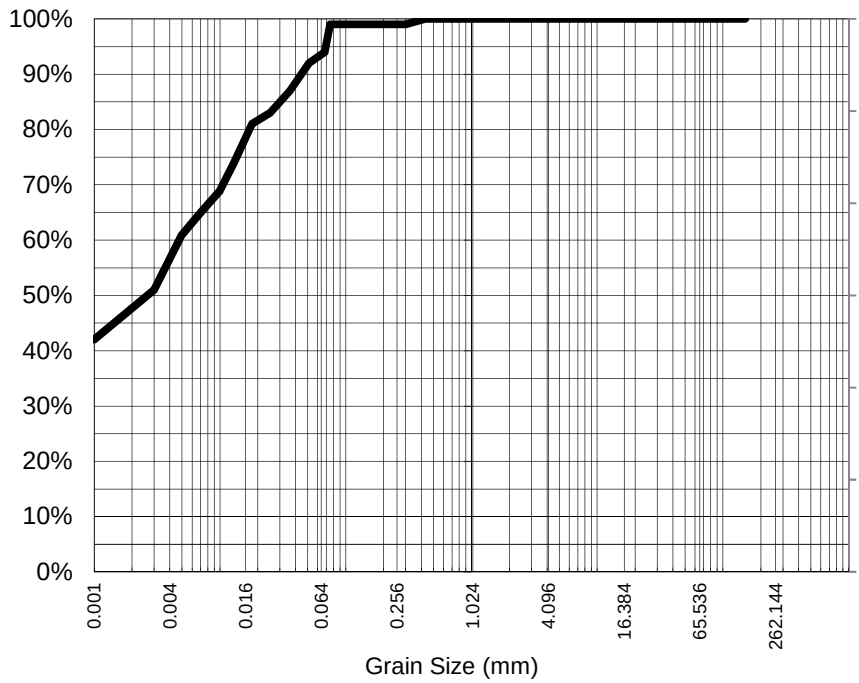
ALS Laboratory Group Pty Ltd
5/585 Maitland Road
Mayfield West, NSW 2304
pH 02 4014 2500
fax 02 4968 0349
samples.newcastle@alsenviro.com

ALS Environmental

Newcastle, NSW

CLIENT:	RICK PLAIN	**DATE REPORTED:**	14-Jun-2019
COMPANY:	HASKONING AUSTRALIA-ROYAL HASKONING	**DATE RECEIVED:**	3-Jun-2019
ADDRESS:	Level 14 56 Berry Street North Sydney	**REPORT NO:**	ES1916915-025 / PSD
PROJECT:	SNOWY 2.0 - VIBROCORING	**SAMPLE ID:**	TANT01 0-0.18

Particle Size Distribution



Particle Size (mm)	% Passing
0.425	100%
0.300	99%
0.150	99%
0.075	99%
Particle Size (microns)	
51	92%
36	87%
25	83%
18	81%
13	74%
10	69%
7	65%
5	61%
1	42%

Median Particle Size (mm)*	<0.007

Analysis Notes

Samples analysed as received.
** Soil Particle Density required for Hydrometer analysis according to AS 1289.3.5.1—2006 was not requested by the client . Typical sediment SPD values used for calculations and consequently, NATA endorsement does not apply to hydrometer results*

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Sample Comments:

Analysed: 7-Jun-19

Loss on Pretreatment NA

Limit of Reporting: 1%

Sample Description: FINES, SAND, VEG

Dispersion Method Shaker

Test Method: AS1289.3.6.2/AS1289.3.6.3

Soil Particle Density (<2.36mm) 2.65

NATA Accreditation: 825 Site: Newcastle
This document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025. This document shall not be reproduced, except in full.

NATA
WORLD RECOGNISED ACCREDITATION

Peter Keyte
Technical Manager Air
Authorised Signatory

Certificate of Analysis

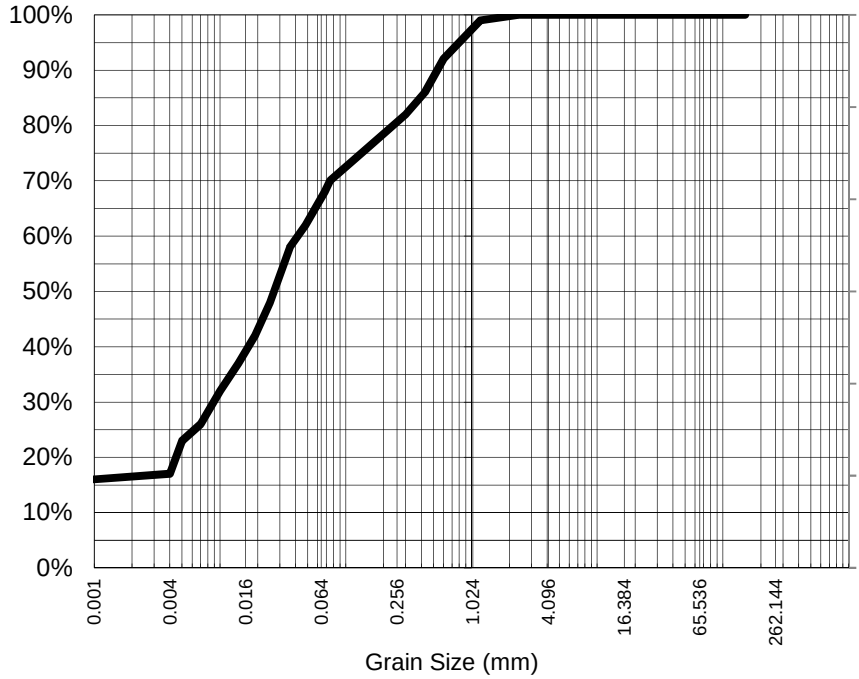
ALS Laboratory Group Pty Ltd
5/585 Maitland Road
Mayfield West, NSW 2304
pH 02 4014 2500
fax 02 4968 0349
samples.newcastle@alsenviro.com

ALS Environmental

Newcastle, NSW

CLIENT:	RICK PLAIN	**DATE REPORTED:**	14-Jun-2019
COMPANY:	HASKONING AUSTRALIA-ROYAL HASKONING	**DATE RECEIVED:**	3-Jun-2019
ADDRESS:	Level 14 56 Berry Street North Sydney	**REPORT NO:**	ES1916915-026 / PSD
PROJECT:	SNOWY 2.0 - VIBROCORING	**SAMPLE ID:**	TANT01 0.3-0.52

Particle Size Distribution



Particle Size (mm)	% Passing
2.36	100%
1.18	99%
0.600	92%
0.425	86%
0.300	82%
0.150	76%
0.075	70%
Particle Size (microns)	
48	62%
36	58%
25	48%
19	42%
14	37%
10	32%
7	26%
5	23%
1	16%

Median Particle Size (mm)*	0.027

Analysis Notes

Samples analysed as received.
** Soil Particle Density required for Hydrometer analysis according to AS 1289.3.5.1—2006 was not requested by the client . Typical sediment SPD values used for calculations and consequently, NATA endorsement does not apply to hydrometer results*

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Sample Comments:

Analysed: 7-Jun-19

Loss on Pretreatment NA

Limit of Reporting: 1%

Sample Description: FINES, SAND, VEG

Dispersion Method Shaker

Test Method: AS1289.3.6.2/AS1289.3.6.3

Soil Particle Density (<2.36mm) 2.65

NATA Accreditation: 825 Site: Newcastle
This document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025. This document shall not be reproduced, except in full.

NATA
WORLD RECOGNISED ACCREDITATION

Peter Keyte
Technical Manager Air
Authorised Signatory

Certificate of Analysis

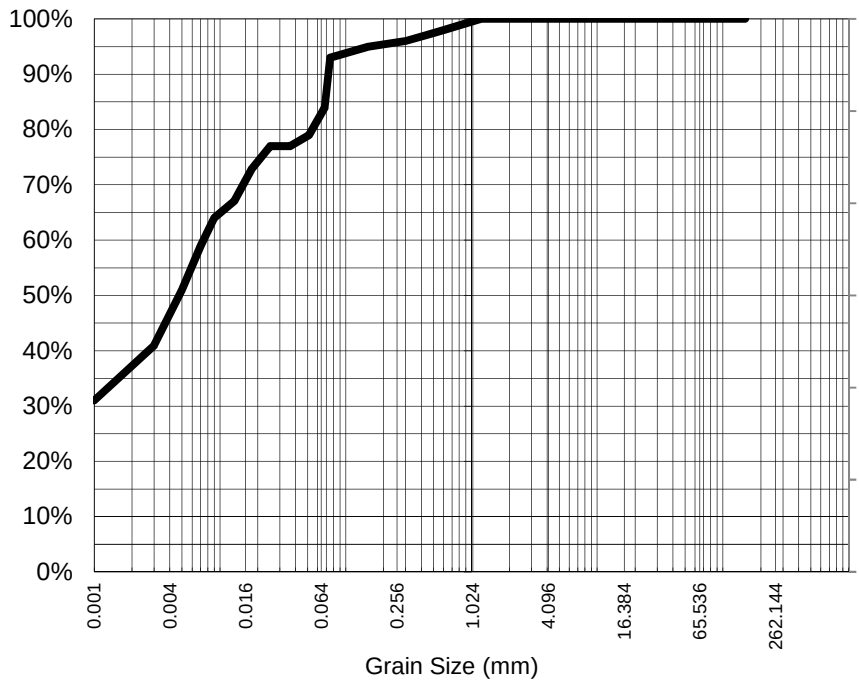
ALS Laboratory Group Pty Ltd
5/585 Maitland Road
Mayfield West, NSW 2304
pH 02 4014 2500
fax 02 4968 0349
samples.newcastle@alsenviro.com

ALS Environmental

Newcastle, NSW

CLIENT:	RICK PLAIN	**DATE REPORTED:**	14-Jun-2019
COMPANY:	HASKONING AUSTRALIA-ROYAL HASKONING	**DATE RECEIVED:**	3-Jun-2019
ADDRESS:	Level 14 56 Berry Street North Sydney	**REPORT NO:**	ES1916915-027 / PSD
PROJECT:	SNOWY 2.0 - VIBROCORING	**SAMPLE ID:**	TANT01a 0-0.15

Particle Size Distribution



Particle Size (mm)	% Passing
1.18	100%
0.600	98%
0.425	97%
0.300	96%
0.150	95%
0.075	93%
Particle Size (microns)	
51	79%
36	77%
25	77%
18	73%
13	67%
9	64%
7	59%
5	51%
1	31%

Median Particle Size (mm)*	<0.007

Analysis Notes

Samples analysed as received.
** Soil Particle Density required for Hydrometer analysis according to AS 1289.3.5.1—2006 was not requested by the client . Typical sediment SPD values used for calculations and consequently, NATA endorsement does not apply to hydrometer results*

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Sample Comments:

Analysed: 7-Jun-19

Loss on Pretreatment NA

Limit of Reporting: 1%

Sample Description: FINES, SAND, VEG

Dispersion Method Shaker

Test Method: AS1289.3.6.2/AS1289.3.6.3

Soil Particle Density (<2.36mm) 2.65

NATA Accreditation: 825 Site: Newcastle
This document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025. This document shall not be reproduced, except in full.

NATA
WORLD RECOGNISED ACCREDITATION

Peter Keyte
Technical Manager Air
Authorised Signatory

Certificate of Analysis

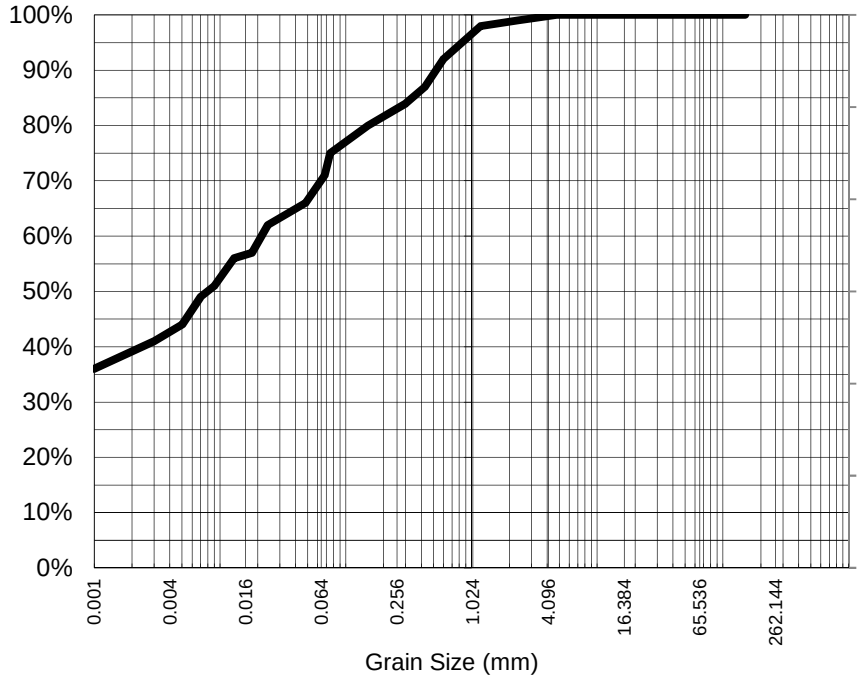
ALS Laboratory Group Pty Ltd
5/585 Maitland Road
Mayfield West, NSW 2304
pH 02 4014 2500
fax 02 4968 0349
samples.newcastle@alsenviro.com

ALS Environmental

Newcastle, NSW

CLIENT:	RICK PLAIN	**DATE REPORTED:**	14-Jun-2019
COMPANY:	HASKONING AUSTRALIA-ROYAL HASKONING	**DATE RECEIVED:**	3-Jun-2019
ADDRESS:	Level 14 56 Berry Street North Sydney	**REPORT NO:**	ES1916915-028 / PSD
PROJECT:	SNOWY 2.0 - VIBROCORING	**SAMPLE ID:**	TANT01a 0.4-0.5

Particle Size Distribution



Particle Size (mm)	% Passing
4.75	100%
2.36	99%
1.18	98%
0.600	92%
0.425	87%
0.300	84%
0.150	80%
0.075	75%
Particle Size (microns)	
48	66%
34	64%
24	62%
18	57%
13	56%
9	51%
7	49%
5	44%
1	36%

Median Particle Size (mm)*	0.008

Analysis Notes

Samples analysed as received.
** Soil Particle Density required for Hydrometer analysis according to AS 1289.3.5.1—2006 was not requested by the client . Typical sediment SPD values used for calculations and consequently, NATA endorsement does not apply to hydrometer results*

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Sample Comments:

Analysed: 7-Jun-19

Loss on Pretreatment NA

Limit of Reporting: 1%

Sample Description: FINES, SAND, VEG

Dispersion Method Shaker

Test Method: AS1289.3.6.2/AS1289.3.6.3

Soil Particle Density (<2.36mm) 2.65

NATA Accreditation: 825 Site: Newcastle
This document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025. This document shall not be reproduced, except in full.

NATA
WORLD RECOGNISED ACCREDITATION

Peter Keyte
Technical Manager Air
Authorised Signatory

Certificate of Analysis

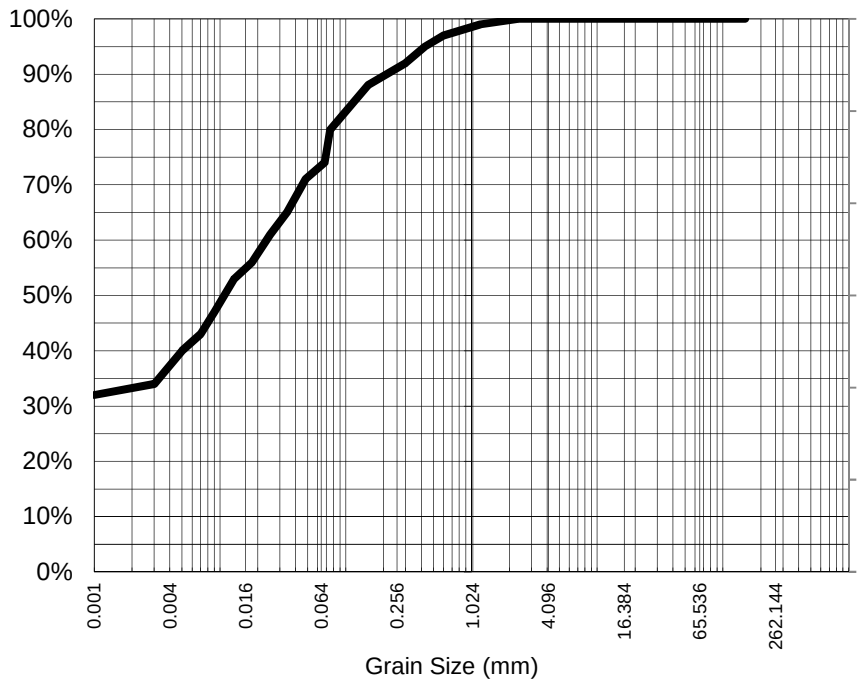
ALS Laboratory Group Pty Ltd
5/585 Maitland Road
Mayfield West, NSW 2304
pH 02 4014 2500
fax 02 4968 0349
samples.newcastle@alsenviro.com

ALS Environmental

Newcastle, NSW

CLIENT:	RICK PLAIN	**DATE REPORTED:**	14-Jun-2019
COMPANY:	HASKONING AUSTRALIA-ROYAL HASKONING	**DATE RECEIVED:**	3-Jun-2019
ADDRESS:	Level 14 56 Berry Street North Sydney	**REPORT NO:**	ES1916915-029 / PSD
PROJECT:	SNOWY 2.0 - VIBROCORING	**SAMPLE ID:**	TANT02 0.05-0.2

Particle Size Distribution



Particle Size (mm)	% Passing
2.36	100%
1.18	99%
0.600	97%
0.425	95%
0.300	92%
0.150	88%
0.075	80%
Particle Size (microns)	
48	71%
34	65%
25	61%
18	56%
13	53%
9	47%
7	43%
5	40%
1	32%

Median Particle Size (mm)*	0.011

Analysis Notes

Samples analysed as received.
** Soil Particle Density required for Hydrometer analysis according to AS 1289.3.5.1—2006 was not requested by the client . Typical sediment SPD values used for calculations and consequently, NATA endorsement does not apply to hydrometer results*

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Sample Comments:

Analysed: 7-Jun-19

Loss on Pretreatment NA

Limit of Reporting: 1%

Sample Description: FINES, SAND, VEG

Dispersion Method Shaker

Test Method: AS1289.3.6.2/AS1289.3.6.3

Soil Particle Density (<2.36mm) 2.65

NATA Accreditation: 825 Site: Newcastle
This document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025. This document shall not be reproduced, except in full.

NATA
WORLD RECOGNISED ACCREDITATION

Peter Keyte
Technical Manager Air
Authorised Signatory

Certificate of Analysis

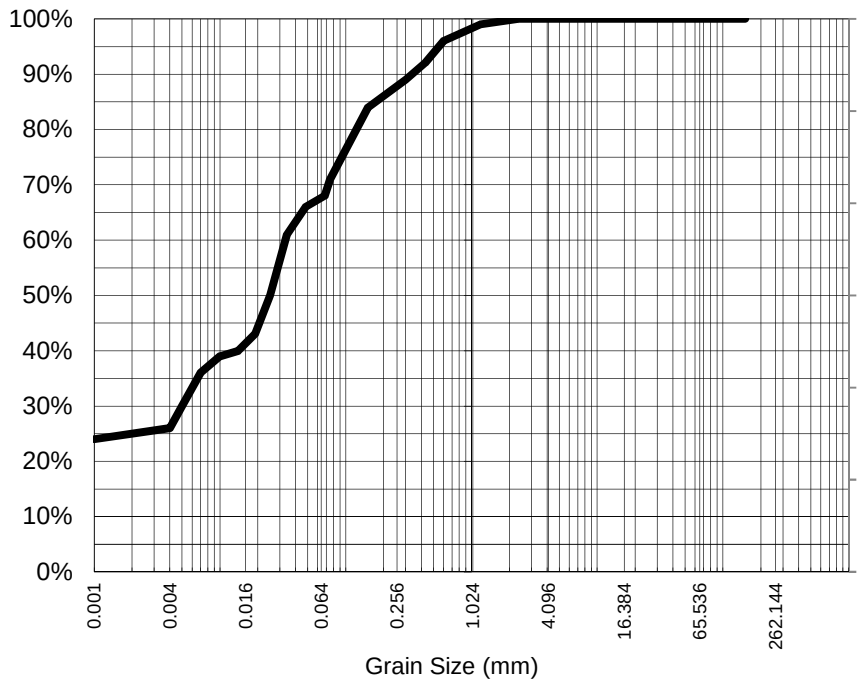
ALS Laboratory Group Pty Ltd
5/585 Maitland Road
Mayfield West, NSW 2304
pH 02 4014 2500
fax 02 4968 0349
samples.newcastle@alsenviro.com

ALS Environmental

Newcastle, NSW

CLIENT:	RICK PLAIN	**DATE REPORTED:**	14-Jun-2019
COMPANY:	HASKONING AUSTRALIA-ROYAL HASKONING	**DATE RECEIVED:**	3-Jun-2019
ADDRESS:	Level 14 56 Berry Street North Sydney	**REPORT NO:**	ES1916915-030 / PSD
PROJECT:	SNOWY 2.0 - VIBROCORING	**SAMPLE ID:**	TANT02 0.45-0.55

Particle Size Distribution



Particle Size (mm)	% Passing
2.36	100%
1.18	99%
0.600	96%
0.425	92%
0.300	89%
0.150	84%
0.075	71%
Particle Size (microns)	
48	66%
34	61%
25	50%
19	43%
14	40%
10	39%
7	36%
5	30%
1	24%

Median Particle Size (mm)*	0.025

Analysis Notes

Samples analysed as received.
** Soil Particle Density required for Hydrometer analysis according to AS 1289.3.5.1—2006 was not requested by the client . Typical sediment SPD values used for calculations and consequently, NATA endorsement does not apply to hydrometer results*

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Sample Comments:

Analysed: 7-Jun-19

Loss on Pretreatment NA

Limit of Reporting: 1%

Sample Description: FINES, SAND, VEG

Dispersion Method Shaker

Test Method: AS1289.3.6.2/AS1289.3.6.3

Soil Particle Density (<2.36mm) 2.65

NATA Accreditation: 825 Site: Newcastle
This document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025. This document shall not be reproduced, except in full.

NATA
WORLD RECOGNISED ACCREDITATION

Peter Keyte
Technical Manager Air
Authorised Signatory

Certificate of Analysis

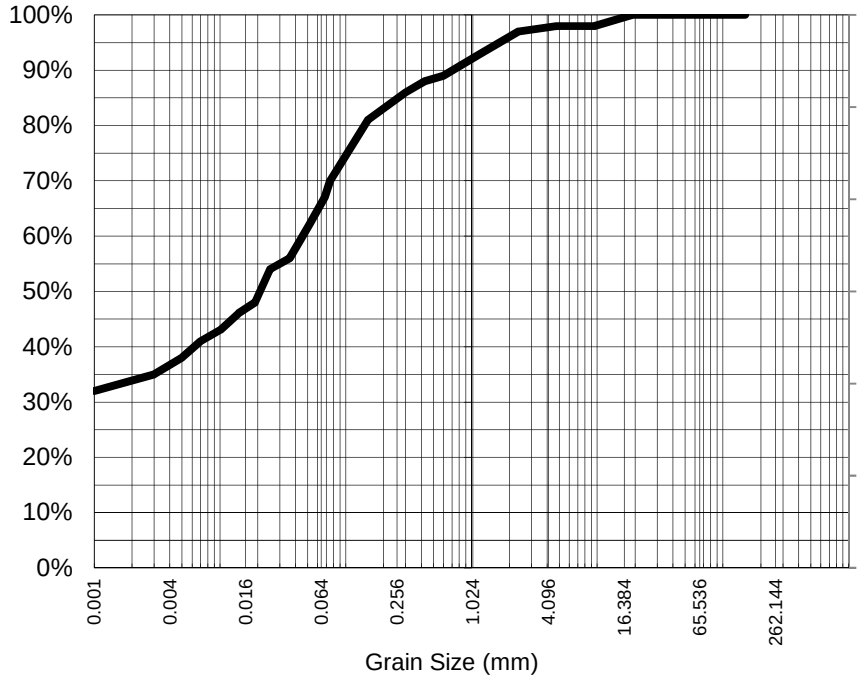
ALS Laboratory Group Pty Ltd
5/585 Maitland Road
Mayfield West, NSW 2304
pH 02 4014 2500
fax 02 4968 0349
samples.newcastle@alsenviro.com

ALS Environmental

Newcastle, NSW

CLIENT:	RICK PLAIN	**DATE REPORTED:**	14-Jun-2019
COMPANY:	HASKONING AUSTRALIA-ROYAL HASKONING	**DATE RECEIVED:**	3-Jun-2019
ADDRESS:	Level 14 56 Berry Street North Sydney	**REPORT NO:**	ES1916915-031 / PSD
PROJECT:	SNOWY 2.0 - VIBROCORING	**SAMPLE ID:**	TANT03 0.1-0.3

Particle Size Distribution



Particle Size (mm)	% Passing
19.0	100%
9.50	98%
4.75	98%
2.36	97%
1.18	93%
0.600	89%
0.425	88%
0.300	86%
0.150	81%
0.075	70%
Particle Size (microns)	
51	62%
36	56%
25	54%
19	48%
14	46%
10	43%
7	41%
5	38%
1	32%

Median Particle Size (mm)*	0.021

Analysis Notes

Samples analysed as received.
** Soil Particle Density required for Hydrometer analysis according to AS 1289.3.5.1—2006 was not requested by the client . Typical sediment SPD values used for calculations and consequently, NATA endorsement does not apply to hydrometer results*

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Sample Comments:

Analysed: 7-Jun-19

Loss on Pretreatment NA

Limit of Reporting: 1%

Sample Description: FINES, SAND, VEG

Dispersion Method Shaker

Test Method: AS1289.3.6.2/AS1289.3.6.3

Soil Particle Density (<2.36mm) 2.65

NATA Accreditation: 825 Site: Newcastle
This document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025. This document shall not be reproduced, except in full.

NATA
WORLD RECOGNISED ACCREDITATION

Peter Keyte
Technical Manager Air
Authorised Signatory

Certificate of Analysis

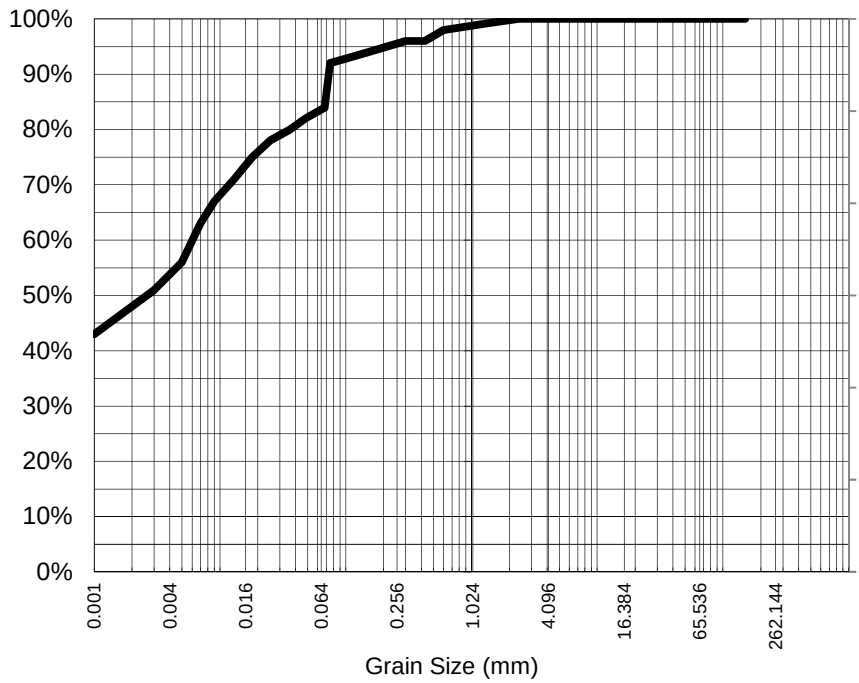
ALS Laboratory Group Pty Ltd
5/585 Maitland Road
Mayfield West, NSW 2304
pH 02 4014 2500
fax 02 4968 0349
samples.newcastle@alsenviro.com

ALS Environmental

Newcastle, NSW

CLIENT:	RICK PLAIN	**DATE REPORTED:**	14-Jun-2019
COMPANY:	HASKONING AUSTRALIA-ROYAL HASKONING	**DATE RECEIVED:**	3-Jun-2019
ADDRESS:	Level 14 56 Berry Street North Sydney	**REPORT NO:**	ES1916915-032 / PSD
PROJECT:	SNOWY 2.0 - VIBROCORING	**SAMPLE ID:**	TANT05 0-0.1

Particle Size Distribution



Particle Size (mm)	% Passing
2.36	100%
1.18	99%
0.600	98%
0.425	96%
0.300	96%
0.150	94%
0.075	92%
Particle Size (microns)	
48	82%
36	80%
25	78%
18	75%
13	71%
9	67%
7	63%
5	56%
1	43%

Median Particle Size (mm)*	<0.007

Analysis Notes

Samples analysed as received.
** Soil Particle Density required for Hydrometer analysis according to AS 1289.3.5.1—2006 was not requested by the client . Typical sediment SPD values used for calculations and consequently, NATA endorsement does not apply to hydrometer results*

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Sample Comments:

Analysed: 7-Jun-19

Loss on Pretreatment NA

Limit of Reporting: 1%

Sample Description: FINES, SAND, VEG

Dispersion Method Shaker

Test Method: AS1289.3.6.2/AS1289.3.6.3

Soil Particle Density (<2.36mm) 2.65

NATA Accreditation: 825 Site: Newcastle
This document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025. This document shall not be reproduced, except in full.

NATA
WORLD RECOGNISED ACCREDITATION

Peter Keyte
Technical Manager Air
Authorised Signatory

Certificate of Analysis

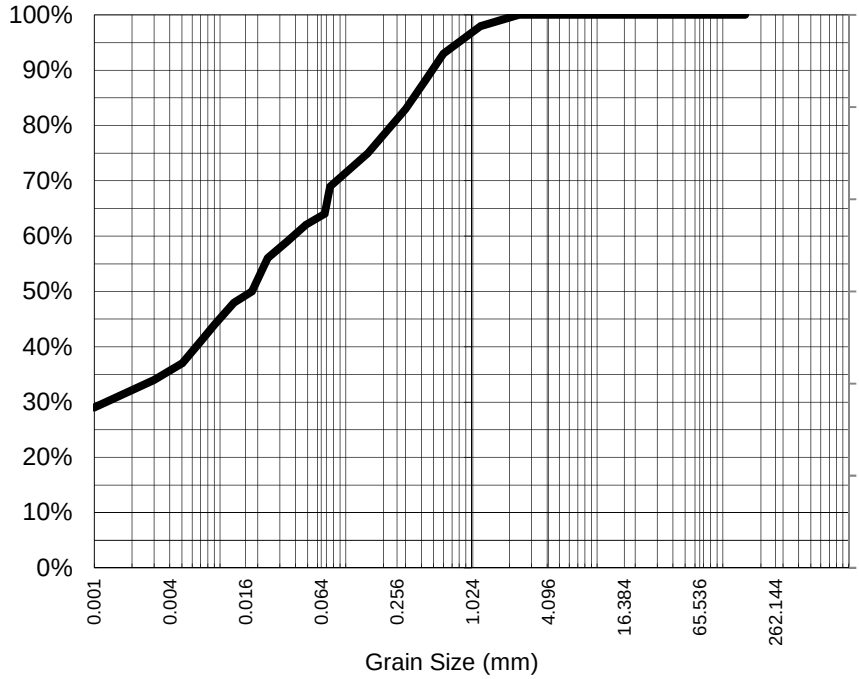
ALS Laboratory Group Pty Ltd
5/585 Maitland Road
Mayfield West, NSW 2304
pH 02 4014 2500
fax 02 4968 0349
samples.newcastle@alsenviro.com

ALS Environmental

Newcastle, NSW

CLIENT:	RICK PLAIN	**DATE REPORTED:**	14-Jun-2019
COMPANY:	HASKONING AUSTRALIA-ROYAL HASKONING	**DATE RECEIVED:**	3-Jun-2019
ADDRESS:	Level 14 56 Berry Street North Sydney	**REPORT NO:**	ES1916915-033 / PSD
PROJECT:	SNOWY 2.0 - VIBROCORING	**SAMPLE ID:**	TANT05 0.2-0.4

Particle Size Distribution



Particle Size (mm)	% Passing
2.36	100%
1.18	98%
0.600	93%
0.425	88%
0.300	83%
0.150	75%
0.075	69%
Particle Size (microns)	
48	62%
34	59%
24	56%
18	50%
13	48%
9	44%
7	41%
5	37%
1	29%

Median Particle Size (mm)*	0.018

Analysis Notes

Samples analysed as received.
** Soil Particle Density required for Hydrometer analysis according to AS 1289.3.5.1—2006 was not requested by the client . Typical sediment SPD values used for calculations and consequently, NATA endorsement does not apply to hydrometer results*

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Sample Comments:

Analysed: 7-Jun-19

Loss on Pretreatment NA

Limit of Reporting: 1%

Sample Description: FINES, SAND, VEG

Dispersion Method Shaker

Test Method: AS1289.3.6.2/AS1289.3.6.3

Soil Particle Density (<2.36mm) 2.65

NATA Accreditation: 825 Site: Newcastle
This document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025. This document shall not be reproduced, except in full.

NATA
WORLD RECOGNISED ACCREDITATION

Peter Keyte
Technical Manager Air
Authorised Signatory

Certificate of Analysis

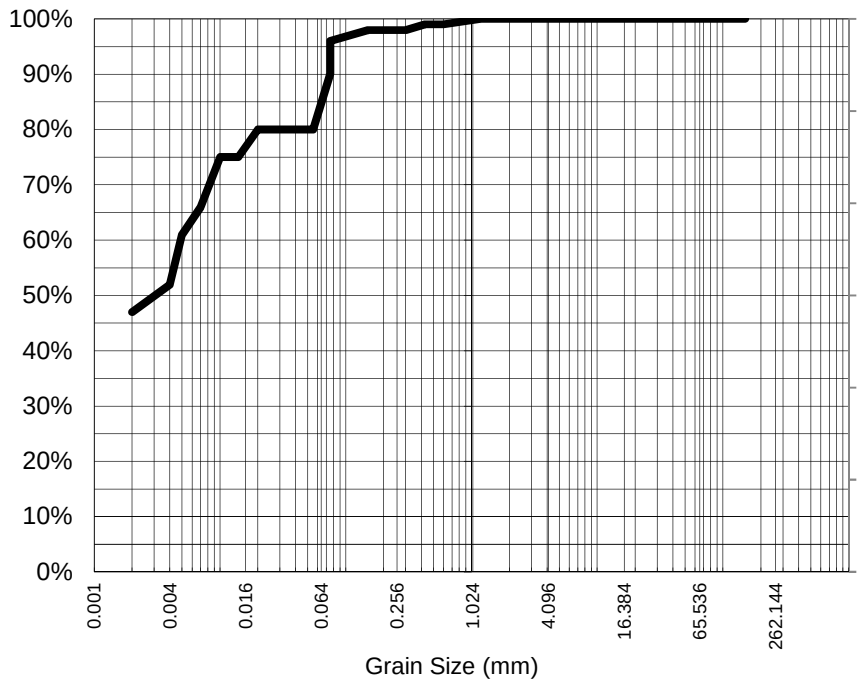
ALS Laboratory Group Pty Ltd
5/585 Maitland Road
Mayfield West, NSW 2304
pH 02 4014 2500
fax 02 4968 0349
samples.newcastle@alsenviro.com

ALS Environmental

Newcastle, NSW

CLIENT:	RICK PLAIN	**DATE REPORTED:**	14-Jun-2019
COMPANY:	HASKONING AUSTRALIA-ROYAL HASKONING	**DATE RECEIVED:**	3-Jun-2019
ADDRESS:	Level 14 56 Berry Street North Sydney	**REPORT NO:**	ES1916915-034 / PSD
PROJECT:	SNOWY 2.0 - VIBROCORING	**SAMPLE ID:**	TANT06 0-0.06

Particle Size Distribution



Particle Size (mm)	% Passing
1.18	100%
0.600	99%
0.425	99%
0.300	98%
0.150	98%
0.075	96%
Particle Size (microns)	
55	80%
39	80%
28	80%
20	80%
14	75%
10	75%
7	66%
5	61%
2	47%

Median Particle Size (mm)*	<0.007

Analysis Notes

Samples analysed as received.
** Soil Particle Density required for Hydrometer analysis according to AS 1289.3.5.1—2006 was not requested by the client . Typical sediment SPD values used for calculations and consequently, NATA endorsement does not apply to hydrometer results*

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Sample Comments:

Analysed: 7-Jun-19

Loss on Pretreatment NA

Limit of Reporting: 1%

Sample Description: FINES, SAND, VEG

Dispersion Method Shaker

Test Method: AS1289.3.6.2/AS1289.3.6.3

Soil Particle Density (<2.36mm) 2.65

NATA Accreditation: 825 Site: Newcastle
This document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025. This document shall not be reproduced, except in full.

NATA
WORLD RECOGNISED ACCREDITATION

Peter Keyte
Technical Manager Air
Authorised Signatory

Certificate of Analysis

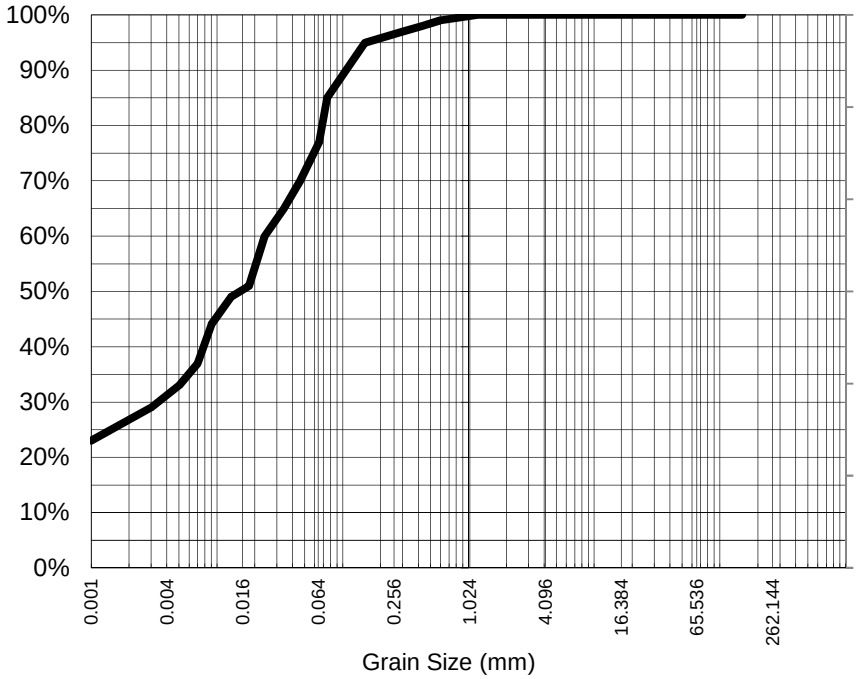
ALS Laboratory Group Pty Ltd
5/585 Maitland Road
Mayfield West, NSW 2304
pH 02 4014 2500
fax 02 4968 0349
samples.newcastle@alsenviro.com

ALS Environmental

Newcastle, NSW

CLIENT:	RICK PLAIN	**DATE REPORTED:**	14-Jun-2019
COMPANY:	HASKONING AUSTRALIA-ROYAL HASKONING	**DATE RECEIVED:**	3-Jun-2019
ADDRESS:	Level 14 56 Berry Street North Sydney	**REPORT NO:**	ES1916915-035 / PSD
PROJECT:	SNOWY 2.0 - VIBROCORING	**SAMPLE ID:**	TANT06 0.1-0.3

Particle Size Distribution



Particle Size (mm)	% Passing
1.18	100%
0.600	99%
0.425	98%
0.300	97%
0.150	95%
0.075	85%
Particle Size (microns)	
46	70%
34	65%
24	60%
18	51%
13	49%
9	44%
7	37%
5	33%
1	23%

Median Particle Size (mm)*	0.016

Analysis Notes

Samples analysed as received.
** Soil Particle Density required for Hydrometer analysis according to AS 1289.3.5.1—2006 was not requested by the client . Typical sediment SPD values used for calculations and consequently, NATA endorsement does not apply to hydrometer results*

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Sample Comments:

Analysed: 7-Jun-19

Loss on Pretreatment NA

Limit of Reporting: 1%

Sample Description: FINES, SAND, VEG

Dispersion Method Shaker

Test Method: AS1289.3.6.2/AS1289.3.6.3

Soil Particle Density (<2.36mm) 2.65

NATA Accreditation: 825 Site: Newcastle
This document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025. This document shall not be reproduced, except in full.

NATA
WORLD RECOGNISED ACCREDITATION

Peter Keyte
Technical Manager Air
Authorised Signatory

Certificate of Analysis

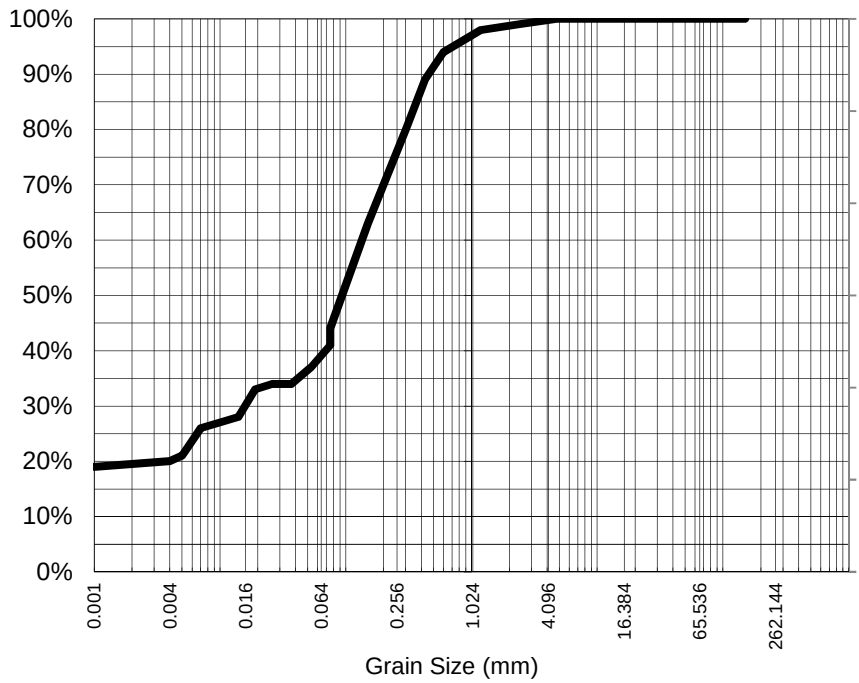
ALS Laboratory Group Pty Ltd
5/585 Maitland Road
Mayfield West, NSW 2304
pH 02 4014 2500
fax 02 4968 0349
samples.newcastle@alsenviro.com

ALS Environmental

Newcastle, NSW

CLIENT:	RICK PLAIN	**DATE REPORTED:**	14-Jun-2019
COMPANY:	HASKONING AUSTRALIA-ROYAL HASKONING	**DATE RECEIVED:**	3-Jun-2019
ADDRESS:	Level 14 56 Berry Street North Sydney	**REPORT NO:**	ES1916915-036 / PSD
PROJECT:	SNOWY 2.0 - VIBROCORING	**SAMPLE ID:**	TANT08 0.1-0.2

Particle Size Distribution



Particle Size (mm)	% Passing
4.75	100%
2.36	99%
1.18	98%
0.600	94%
0.425	89%
0.300	80%
0.150	63%
0.075	44%
Particle Size (microns)	
53	37%
37	34%
26	34%
19	33%
14	28%
10	27%
7	26%
5	21%
1	19%

Median Particle Size (mm)*	0.099

Analysis Notes

Samples analysed as received.

** Soil Particle Density required for Hydrometer analysis according to AS 1289.3.5.1—2006 was not requested by the client . Typical sediment SPD values used for calculations and consequently, NATA endorsement does not apply to hydrometer results*

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Sample Comments:

Analysed: 7-Jun-19

Loss on Pretreatment NA

Limit of Reporting: 1%

Sample Description: FINES, SAND, VEG

Dispersion Method Shaker

Test Method: AS1289.3.6.2/AS1289.3.6.3

Soil Particle Density (<2.36mm) 2.65

NATA Accreditation: 825 Site: Newcastle
This document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025. This document shall not be reproduced, except in full.

NATA
WORLD RECOGNISED ACCREDITATION

Peter Keyte
Technical Manager Air
Authorised Signatory

Certificate of Analysis

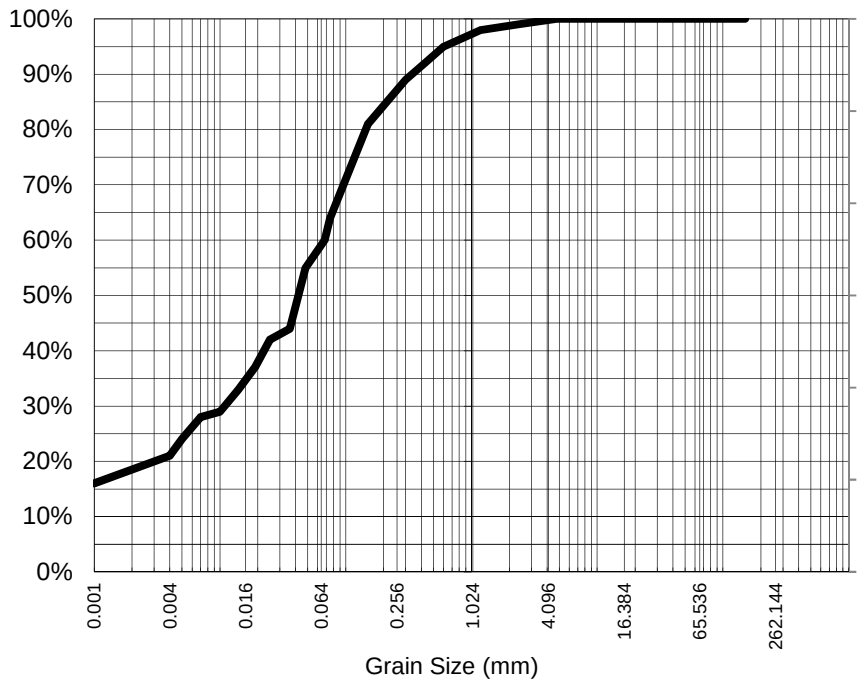
ALS Laboratory Group Pty Ltd
5/585 Maitland Road
Mayfield West, NSW 2304
pH 02 4014 2500
fax 02 4968 0349
samples.newcastle@alsenviro.com

ALS Environmental

Newcastle, NSW

CLIENT:	RICK PLAIN	**DATE REPORTED:**	14-Jun-2019
COMPANY:	HASKONING AUSTRALIA-ROYAL HASKONING	**DATE RECEIVED:**	3-Jun-2019
ADDRESS:	Level 14 56 Berry Street North Sydney	**REPORT NO:**	ES1916915-013 / PSD
PROJECT:	SNOWY 2.0 - VIBROCORING	**SAMPLE ID:**	TANT08 0.3-0.4

Particle Size Distribution



Particle Size (mm)	% Passing
4.75	100%
2.36	99%
1.18	98%
0.600	95%
0.425	92%
0.300	89%
0.150	81%
0.075	64%
Particle Size (microns)	
48	55%
36	44%
25	42%
19	37%
14	33%
10	29%
7	28%
5	24%
1	16%

Median Particle Size (mm)*	0.043

Analysis Notes

Samples analysed as received.
** Soil Particle Density required for Hydrometer analysis according to AS 1289.3.5.1—2006 was not requested by the client . Typical sediment SPD values used for calculations and consequently, NATA endorsement does not apply to hydrometer results*

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Sample Comments:

Analysed: 7-Jun-19

Loss on Pretreatment NA

Limit of Reporting: 1%

Sample Description: FINES, SAND, VEG

Dispersion Method Shaker

Test Method: AS1289.3.6.2/AS1289.3.6.3

Soil Particle Density (<2.36mm) 2.65

NATA Accreditation: 825 Site: Newcastle
This document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025. This document shall not be reproduced, except in full.

NATA
WORLD RECOGNISED ACCREDITATION

Peter Keyte
Technical Manager Air
Authorised Signatory

Certificate of Analysis

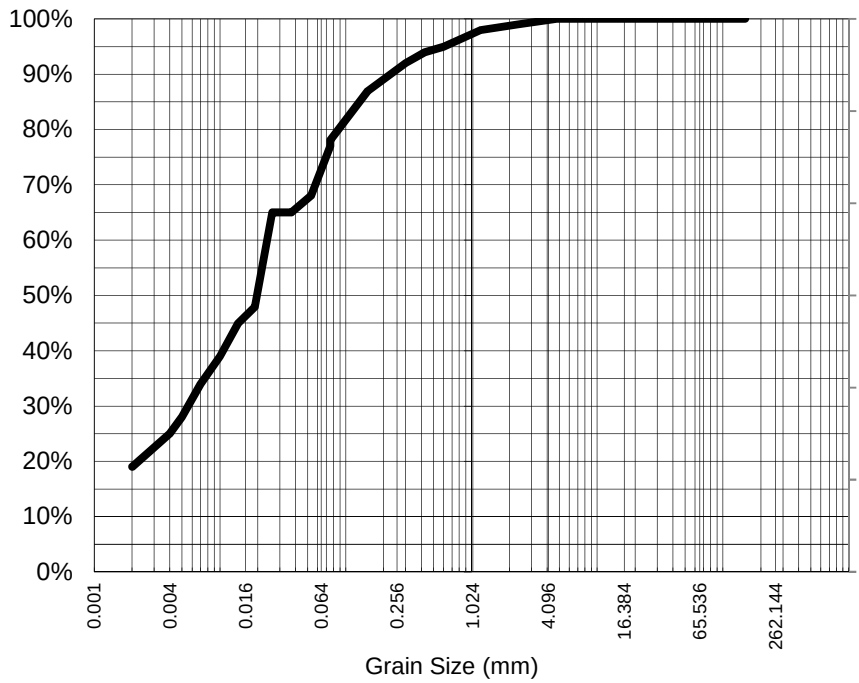
ALS Laboratory Group Pty Ltd
5/585 Maitland Road
Mayfield West, NSW 2304
pH 02 4014 2500
fax 02 4968 0349
samples.newcastle@alsenviro.com

ALS Environmental

Newcastle, NSW

CLIENT:	RICK PLAIN	**DATE REPORTED:**	14-Jun-2019
COMPANY:	HASKONING AUSTRALIA-ROYAL HASKONING	**DATE RECEIVED:**	3-Jun-2019
ADDRESS:	Level 14 56 Berry Street North Sydney	**REPORT NO:**	ES1916915-014 / PSD
PROJECT:	SNOWY 2.0 - VIBROCORING	**SAMPLE ID:**	TANT10 0-0.08

Particle Size Distribution



Particle Size (mm)	% Passing
4.75	100%
2.36	99%
1.18	98%
0.600	95%
0.425	94%
0.300	92%
0.150	87%
0.075	78%
Particle Size (microns)	
53	68%
37	65%
26	65%
19	48%
14	45%
10	39%
7	34%
5	28%
2	19%

Median Particle Size (mm)*	0.020

Analysis Notes

Samples analysed as received.
** Soil Particle Density required for Hydrometer analysis according to AS 1289.3.5.1—2006 was not requested by the client . Typical sediment SPD values used for calculations and consequently, NATA endorsement does not apply to hydrometer results*

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Sample Comments:

Analysed: 7-Jun-19

Loss on Pretreatment NA

Limit of Reporting: 1%

Sample Description: FINES, SAND, VEG

Dispersion Method Shaker

Test Method: AS1289.3.6.2/AS1289.3.6.3

Soil Particle Density (<2.36mm) 2.65

NATA Accreditation: 825 Site: Newcastle
This document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025. This document shall not be reproduced, except in full.

NATA
WORLD RECOGNISED ACCREDITATION

Peter Keyte
Technical Manager Air
Authorised Signatory

Certificate of Analysis

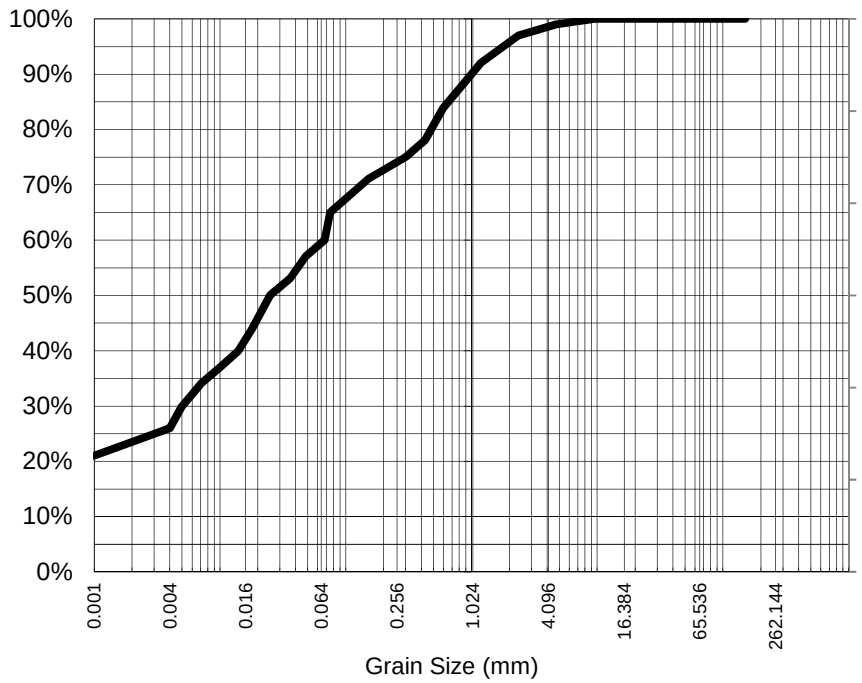
ALS Laboratory Group Pty Ltd
5/585 Maitland Road
Mayfield West, NSW 2304
pH 02 4014 2500
fax 02 4968 0349
samples.newcastle@alsenviro.com

ALS Environmental

Newcastle, NSW

CLIENT:	RICK PLAIN	**DATE REPORTED:**	14-Jun-2019
COMPANY:	HASKONING AUSTRALIA-ROYAL HASKONING	**DATE RECEIVED:**	3-Jun-2019
ADDRESS:	Level 14 56 Berry Street North Sydney	**REPORT NO:**	ES1916915-015 / PSD
PROJECT:	SNOWY 2.0 - VIBROCORING	**SAMPLE ID:**	TANT10a 0.05-0.15

Particle Size Distribution



Particle Size (mm)	% Passing
9.50	100%
4.75	99%
2.36	97%
1.18	92%
0.600	84%
0.425	78%
0.300	75%
0.150	71%
0.075	65%
Particle Size (microns)	
48	57%
36	53%
25	50%
18	44%
14	40%
10	37%
7	34%
5	30%
1	21%

Median Particle Size (mm)*	0.025

Analysis Notes

Samples analysed as received.
** Soil Particle Density required for Hydrometer analysis according to AS 1289.3.5.1—2006 was not requested by the client . Typical sediment SPD values used for calculations and consequently, NATA endorsement does not apply to hydrometer results*

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Sample Comments:

Analysed: 7-Jun-19

Loss on Pretreatment NA

Limit of Reporting: 1%

Sample Description: FINES, SAND, VEG

Dispersion Method Shaker

Test Method: AS1289.3.6.2/AS1289.3.6.3

Soil Particle Density (<2.36mm) 2.65

NATA Accreditation: 825 Site: Newcastle
This document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025. This document shall not be reproduced, except in full.

NATA
WORLD RECOGNISED ACCREDITATION

Peter Keyte
Technical Manager Air
Authorised Signatory

Certificate of Analysis

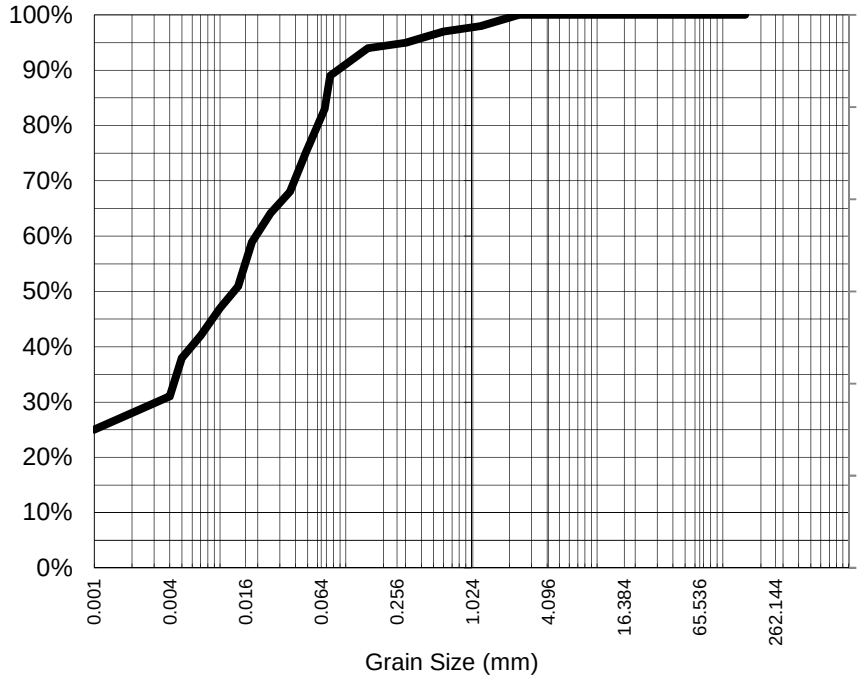
ALS Laboratory Group Pty Ltd
5/585 Maitland Road
Mayfield West, NSW 2304
pH 02 4014 2500
fax 02 4968 0349
samples.newcastle@alsenviro.com

ALS Environmental

Newcastle, NSW

CLIENT:	RICK PLAIN	**DATE REPORTED:**	14-Jun-2019
COMPANY:	HASKONING AUSTRALIA-ROYAL HASKONING	**DATE RECEIVED:**	3-Jun-2019
ADDRESS:	Level 14 56 Berry Street North Sydney	**REPORT NO:**	ES1916915-016 / PSD
PROJECT:	SNOWY 2.0 - VIBROCORING	**SAMPLE ID:**	TANT10a 0.55-0.8

Particle Size Distribution



Particle Size (mm)	% Passing
2.36	100%
1.18	98%
0.600	97%
0.425	96%
0.300	95%
0.150	94%
0.075	89%
Particle Size (microns)	
48	75%
36	68%
25	64%
18	59%
14	51%
10	47%
7	42%
5	38%
1	25%

Median Particle Size (mm)*	0.013

Analysis Notes

Samples analysed as received.
** Soil Particle Density required for Hydrometer analysis according to AS 1289.3.5.1—2006 was not requested by the client . Typical sediment SPD values used for calculations and consequently, NATA endorsement does not apply to hydrometer results*

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Sample Comments:

Analysed: 7-Jun-19

Loss on Pretreatment NA

Limit of Reporting: 1%

Sample Description: FINES, SAND, VEG

Dispersion Method Shaker

Test Method: AS1289.3.6.2/AS1289.3.6.3

Soil Particle Density (<2.36mm) 2.65

NATA Accreditation: 825 Site: Newcastle
This document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025. This document shall not be reproduced, except in full.

NATA
WORLD RECOGNISED ACCREDITATION

Peter Keyte
Technical Manager Air
Authorised Signatory

Certificate of Analysis

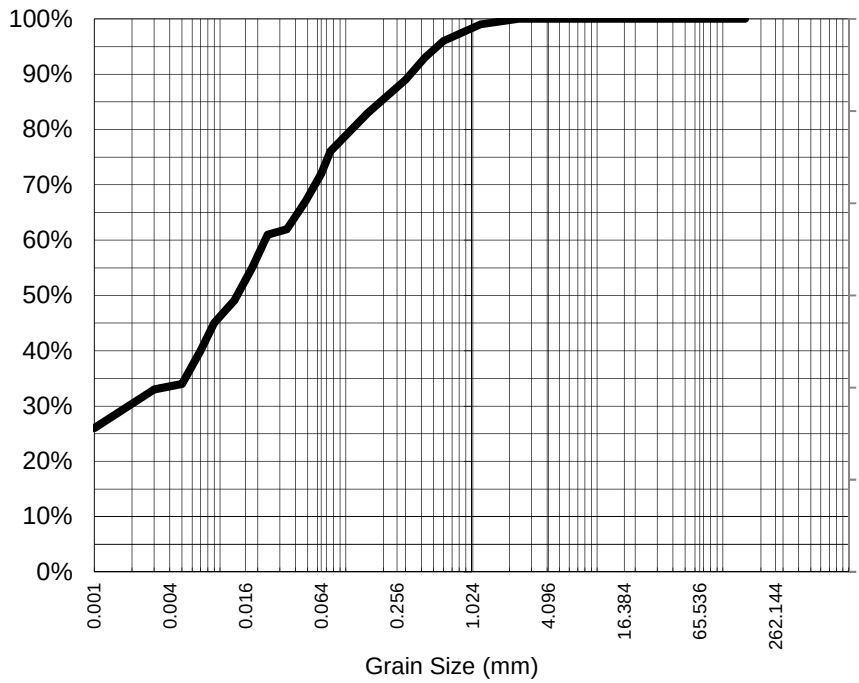
ALS Laboratory Group Pty Ltd
5/585 Maitland Road
Mayfield West, NSW 2304
pH 02 4014 2500
fax 02 4968 0349
samples.newcastle@alsenviro.com

ALS Environmental

Newcastle, NSW

CLIENT:	RICK PLAIN	**DATE REPORTED:**	14-Jun-2019
COMPANY:	HASKONING AUSTRALIA-ROYAL HASKONING	**DATE RECEIVED:**	3-Jun-2019
ADDRESS:	Level 14 56 Berry Street North Sydney	**REPORT NO:**	ES1916915-017 / PSD
PROJECT:	SNOWY 2.0 - VIBROCORING	**SAMPLE ID:**	TANT11d 0.2-0.4

Particle Size Distribution



Particle Size (mm)	% Passing
2.36	100%
1.18	99%
0.600	96%
0.425	93%
0.300	89%
0.150	83%
0.075	76%
Particle Size (microns)	
48	67%
34	62%
24	61%
18	55%
13	49%
9	45%
7	40%
5	34%
1	26%

Median Particle Size (mm)*	0.014

Analysis Notes

Samples analysed as received.
** Soil Particle Density required for Hydrometer analysis according to AS 1289.3.5.1—2006 was not requested by the client . Typical sediment SPD values used for calculations and consequently, NATA endorsement does not apply to hydrometer results*

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Sample Comments:

Analysed: 7-Jun-19

Loss on Pretreatment NA

Limit of Reporting: 1%

Sample Description: FINES, SAND, VEG

Dispersion Method Shaker

Test Method: AS1289.3.6.2/AS1289.3.6.3

Soil Particle Density (<2.36mm) 2.65

NATA Accreditation: 825 Site: Newcastle
This document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025. This document shall not be reproduced, except in full.

NATA
WORLD RECOGNISED ACCREDITATION

Peter Keyte
Technical Manager Air
Authorised Signatory

Certificate of Analysis

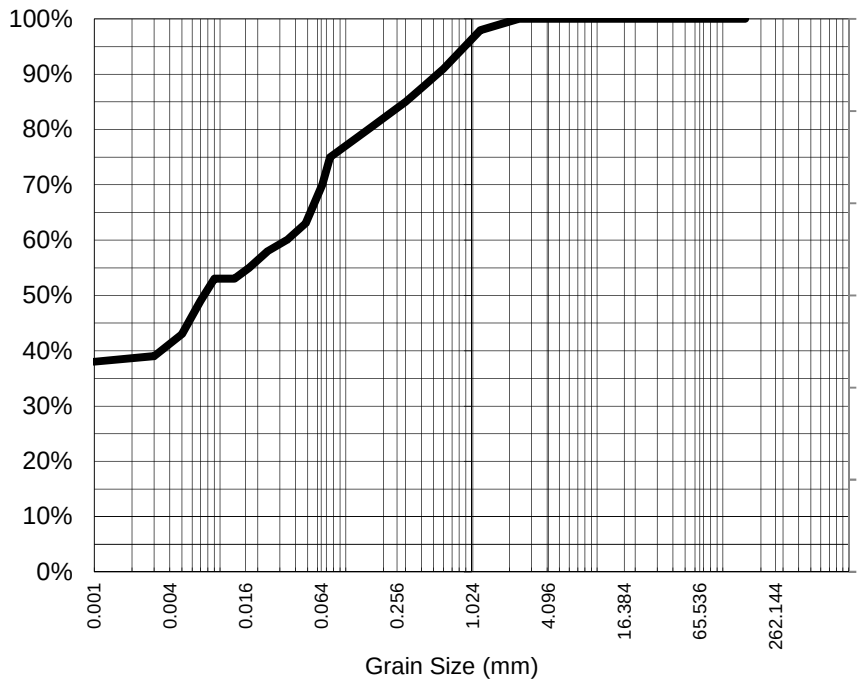
ALS Laboratory Group Pty Ltd
5/585 Maitland Road
Mayfield West, NSW 2304
pH 02 4014 2500
fax 02 4968 0349
samples.newcastle@alsenviro.com

ALS Environmental

Newcastle, NSW

CLIENT:	RICK PLAIN	**DATE REPORTED:**	14-Jun-2019
COMPANY:	HASKONING AUSTRALIA-ROYAL HASKONING	**DATE RECEIVED:**	3-Jun-2019
ADDRESS:	Level 14 56 Berry Street North Sydney	**REPORT NO:**	ES1916915-044 / PSD
PROJECT:	SNOWY 2.0 - VIBROCORING	**SAMPLE ID:**	TANT11s 0.02-0.35

Particle Size Distribution



Particle Size (mm)	% Passing
2.36	100%
1.18	98%
0.600	91%
0.425	88%
0.300	85%
0.150	80%
0.075	75%
Particle Size (microns)	
48	63%
34	60%
24	58%
17	55%
13	53%
9	53%
7	49%
5	43%
1	38%

Median Particle Size (mm)*	0.008

Analysis Notes

Samples analysed as received.
** Soil Particle Density required for Hydrometer analysis according to AS 1289.3.5.1—2006 was not requested by the client . Typical sediment SPD values used for calculations and consequently, NATA endorsement does not apply to hydrometer results*

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Sample Comments:

Analysed: 7-Jun-19

Loss on Pretreatment NA

Limit of Reporting: 1%

Sample Description: FINES, SAND, VEG

Dispersion Method Shaker

Test Method: AS1289.3.6.2/AS1289.3.6.3

Soil Particle Density (<2.36mm) 2.65

NATA Accreditation: 825 Site: Newcastle
This document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025. This document shall not be reproduced, except in full.

NATA
WORLD RECOGNISED ACCREDITATION

Peter Keyte
Technical Manager Air
Authorised Signatory

Certificate of Analysis

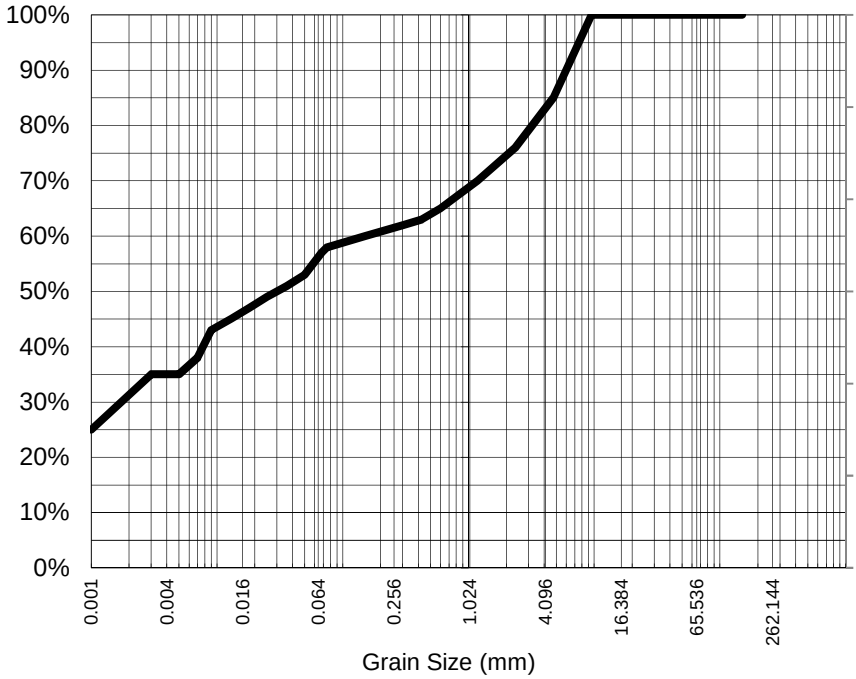
ALS Laboratory Group Pty Ltd
5/585 Maitland Road
Mayfield West, NSW 2304
pH 02 4014 2500
fax 02 4968 0349
samples.newcastle@alsenviro.com

ALS Environmental

Newcastle, NSW

CLIENT:	RICK PLAIN	**DATE REPORTED:**	14-Jun-2019
COMPANY:	HASKONING AUSTRALIA-ROYAL HASKONING	**DATE RECEIVED:**	3-Jun-2019
ADDRESS:	Level 14 56 Berry Street North Sydney	**REPORT NO:**	ES1916915-018 / PSD
PROJECT:	SNOWY 2.0 - VIBROCORING	**SAMPLE ID:**	TANT 115a 0.36-0.42

Particle Size Distribution



Particle Size (mm)	% Passing
9.50	100%
4.75	85%
2.36	76%
1.18	70%
0.600	65%
0.425	63%
0.300	62%
0.150	60%
0.075	58%
Particle Size (microns)	
50	53%
36	51%
25	49%
18	47%
13	45%
9	43%
7	38%
5	35%
1	25%

Median Particle Size (mm)*	0.031

Analysis Notes

Samples analysed as received.
** Soil Particle Density required for Hydrometer analysis according to AS 1289.3.5.1—2006 was not requested by the client . Typical sediment SPD values used for calculations and consequently, NATA endorsement does not apply to hydrometer results*

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Sample Comments:

Analysed: 7-Jun-19

Loss on Pretreatment NA

Limit of Reporting: 1%

Sample Description: FINES, SAND, VEG

Dispersion Method Shaker

Test Method: AS1289.3.6.2/AS1289.3.6.3

Soil Particle Density (<2.36mm) 2.65

NATA Accreditation: 825 Site: Newcastle
This document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025. This document shall not be reproduced, except in full.

NATA
WORLD RECOGNISED ACCREDITATION

Peter Keyte
Technical Manager Air
Authorised Signatory

Certificate of Analysis

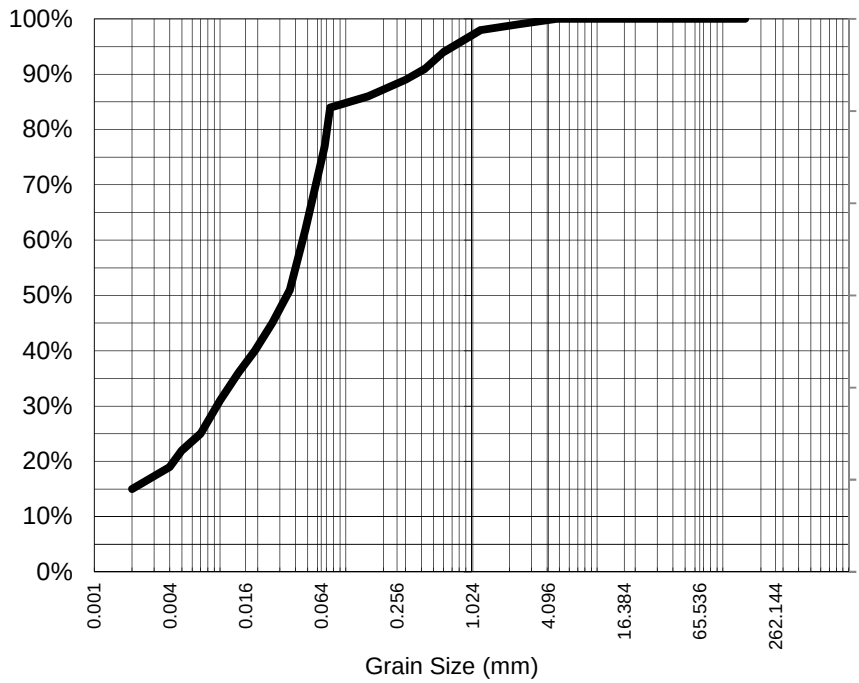
ALS Laboratory Group Pty Ltd
5/585 Maitland Road
Mayfield West, NSW 2304
pH 02 4014 2500
fax 02 4968 0349
samples.newcastle@alsenviro.com

ALS Environmental

Newcastle, NSW

CLIENT:	RICK PLAIN	**DATE REPORTED:**	14-Jun-2019
COMPANY:	HASKONING AUSTRALIA-ROYAL HASKONING	**DATE RECEIVED:**	3-Jun-2019
ADDRESS:	Level 14 56 Berry Street North Sydney	**REPORT NO:**	ES1916915-019 / PSD
PROJECT:	SNOWY 2.0 - VIBROCORING	**SAMPLE ID:**	TANT115 0.04-0.36

Particle Size Distribution



Particle Size (mm)	% Passing
4.75	100%
2.36	99%
1.18	98%
0.600	94%
0.425	91%
0.300	89%
0.150	86%
0.075	84%
Particle Size (microns)	
48	62%
36	51%
26	45%
19	40%
14	36%
10	31%
7	25%
5	22%
2	15%

Median Particle Size (mm)*	0.034

Analysis Notes

Samples analysed as received.
** Soil Particle Density required for Hydrometer analysis according to AS 1289.3.5.1—2006 was not requested by the client . Typical sediment SPD values used for calculations and consequently, NATA endorsement does not apply to hydrometer results*

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Sample Comments:

Analysed: 7-Jun-19

Loss on Pretreatment NA

Limit of Reporting: 1%

Sample Description: FINES, SAND, VEG

Dispersion Method Shaker

Test Method: AS1289.3.6.2/AS1289.3.6.3

Soil Particle Density (<2.36mm) 2.65

NATA Accreditation: 825 Site: Newcastle
This document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025. This document shall not be reproduced, except in full.

NATA
WORLD RECOGNISED ACCREDITATION

Peter Keyte
Technical Manager Air
Authorised Signatory

Certificate of Analysis

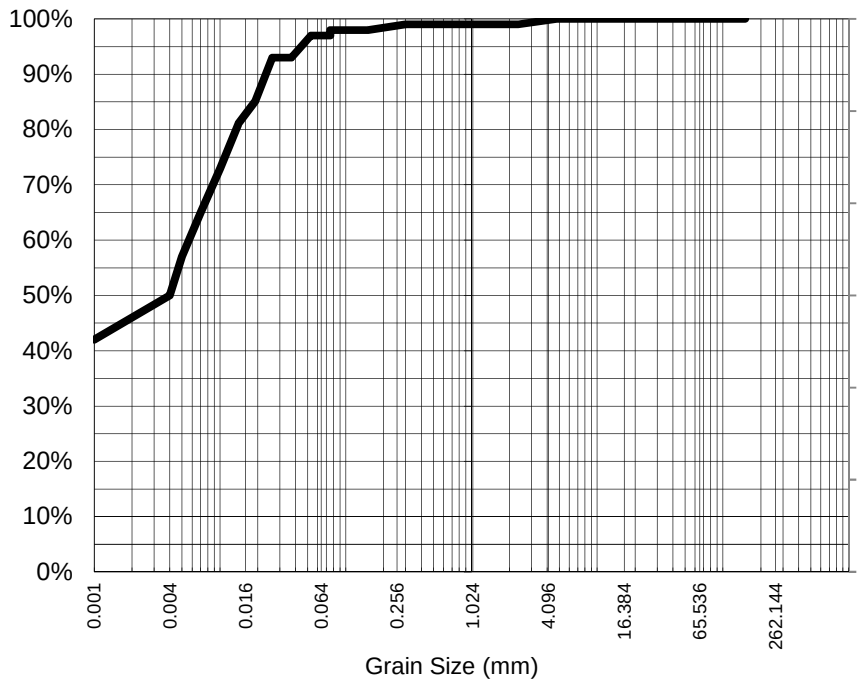
ALS Laboratory Group Pty Ltd
5/585 Maitland Road
Mayfield West, NSW 2304
pH 02 4014 2500
fax 02 4968 0349
samples.newcastle@alsenviro.com

ALS Environmental

Newcastle, NSW

CLIENT:	RICK PLAIN	**DATE REPORTED:**	14-Jun-2019
COMPANY:	HASKONING AUSTRALIA-ROYAL HASKONING	**DATE RECEIVED:**	3-Jun-2019
ADDRESS:	Level 14 56 Berry Street North Sydney	**REPORT NO:**	ES1916915-020 / PSD
PROJECT:	SNOWY 2.0 - VIBROCORING	**SAMPLE ID:**	TANT13 0-0 .1

Particle Size Distribution



Particle Size (mm)	% Passing
4.75	100%
2.36	99%
1.18	99%
0.600	99%
0.425	99%
0.300	99%
0.150	98%
0.075	98%
Particle Size (microns)	
53	97%
37	93%
26	93%
19	85%
14	81%
10	73%
7	65%
5	57%
1	42%

Median Particle Size (mm)*	<0.007

Analysis Notes

Samples analysed as received.
** Soil Particle Density required for Hydrometer analysis according to AS 1289.3.5.1—2006 was not requested by the client . Typical sediment SPD values used for calculations and consequently, NATA endorsement does not apply to hydrometer results*

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Sample Comments:

Analysed: 7-Jun-19

Loss on Pretreatment NA

Limit of Reporting: 1%

Sample Description: FINES, SAND, VEG

Dispersion Method Shaker

Test Method: AS1289.3.6.2/AS1289.3.6.3

Soil Particle Density (<2.36mm) 2.65

NATA Accreditation: 825 Site: Newcastle
This document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025. This document shall not be reproduced, except in full.

NATA
WORLD RECOGNISED ACCREDITATION

Peter Keyte
Technical Manager Air
Authorised Signatory

Certificate of Analysis

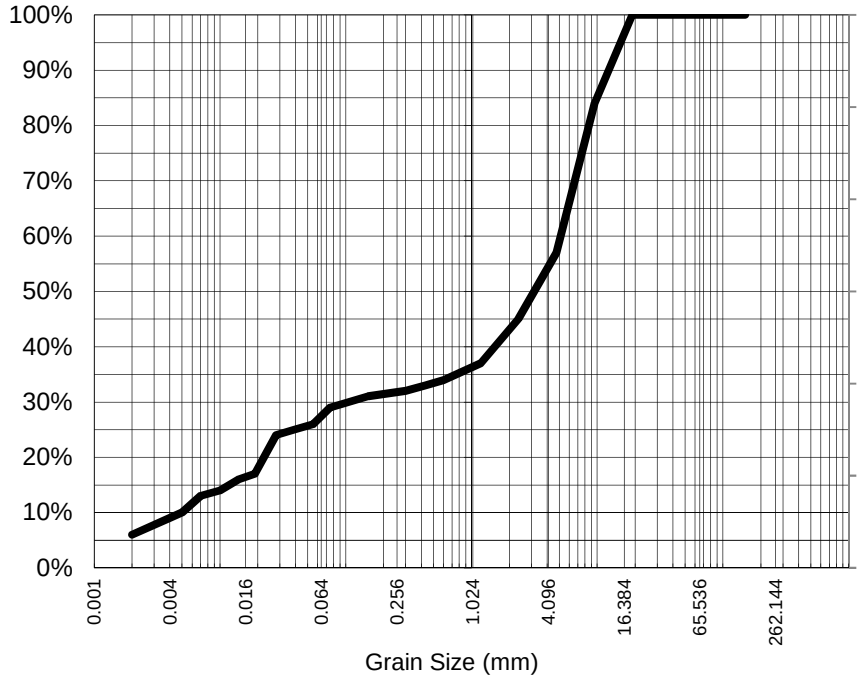
ALS Laboratory Group Pty Ltd
5/585 Maitland Road
Mayfield West, NSW 2304
pH 02 4014 2500
fax 02 4968 0349
samples.newcastle@alsenviro.com

ALS Environmental

Newcastle, NSW

CLIENT:	RICK PLAIN	**DATE REPORTED:**	14-Jun-2019
COMPANY:	HASKONING AUSTRALIA-ROYAL HASKONING	**DATE RECEIVED:**	3-Jun-2019
ADDRESS:	Level 14 56 Berry Street North Sydney	**REPORT NO:**	ES1916915-021 / PSD
PROJECT:	SNOWY 2.0 - VIBROCORING	**SAMPLE ID:**	TANT13 0.15-0.25

Particle Size Distribution



Particle Size (mm)	% Passing
19.0	100%
9.50	84%
4.75	57%
2.36	45%
1.18	37%
0.600	34%
0.425	33%
0.300	32%
0.150	31%
0.075	29%
Particle Size (microns)	
55	26%
39	25%
28	24%
19	17%
14	16%
10	14%
7	13%
5	10%
2	6%

Median Particle Size (mm)*	3.356

Analysis Notes

Samples analysed as received.
** Soil Particle Density required for Hydrometer analysis according to AS 1289.3.5.1—2006 was not requested by the client . Typical sediment SPD values used for calculations and consequently, NATA endorsement does not apply to hydrometer results*

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Sample Comments:

Analysed: 7-Jun-19

Loss on Pretreatment NA

Limit of Reporting: 1%

Sample Description: FINES, SAND, VEG

Dispersion Method Shaker

Test Method: AS1289.3.6.2/AS1289.3.6.3

Soil Particle Density (<2.36mm) 2.65

NATA Accreditation: 825 Site: Newcastle
This document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025. This document shall not be reproduced, except in full.

NATA
WORLD RECOGNISED ACCREDITATION

Peter Keyte
Technical Manager Air
Authorised Signatory

Certificate of Analysis

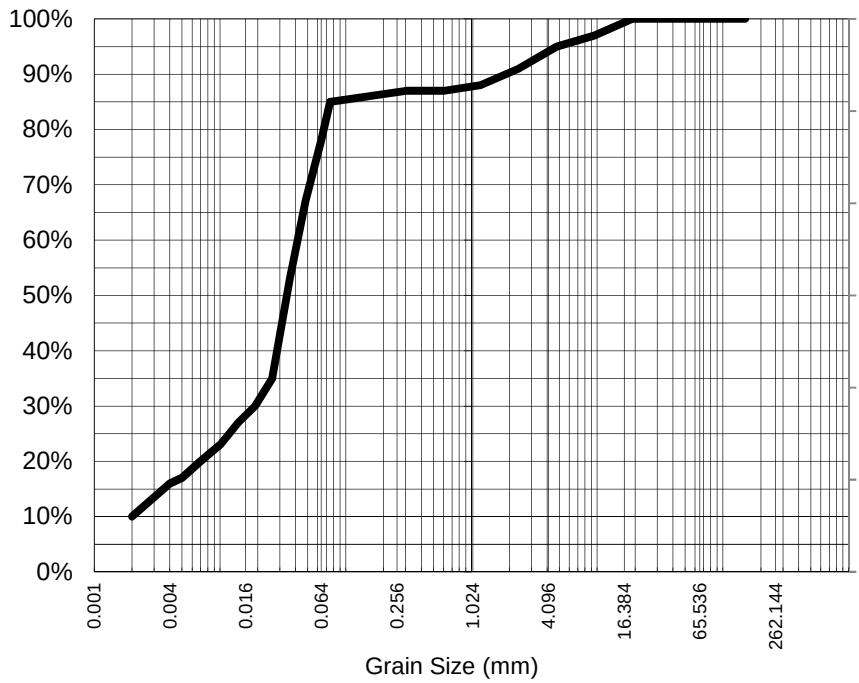
ALS Laboratory Group Pty Ltd
5/585 Maitland Road
Mayfield West, NSW 2304
pH 02 4014 2500
fax 02 4968 0349
samples.newcastle@alsenviro.com

ALS Environmental

Newcastle, NSW

CLIENT:	RICK PLAIN	**DATE REPORTED:**	14-Jun-2019
COMPANY:	HASKONING AUSTRALIA-ROYAL HASKONING	**DATE RECEIVED:**	3-Jun-2019
ADDRESS:	Level 14 56 Berry Street North Sydney	**REPORT NO:**	ES1916915-022 / PSD
PROJECT:	SNOWY 2.0 - VIBROCORING	**SAMPLE ID:**	TANT13 0.5-0.6

Particle Size Distribution



Particle Size (mm)	% Passing
19.0	100%
9.50	97%
4.75	95%
2.36	91%
1.18	88%
0.600	87%
0.425	87%
0.300	87%
0.150	86%
0.075	85%
Particle Size (microns)	
48	67%
36	53%
26	35%
19	30%
14	27%
10	23%
7	20%
5	17%
2	10%

Median Particle Size (mm)*	0.034

Analysis Notes

Samples analysed as received.
** Soil Particle Density required for Hydrometer analysis according to AS 1289.3.5.1—2006 was not requested by the client . Typical sediment SPD values used for calculations and consequently, NATA endorsement does not apply to hydrometer results*

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Sample Comments:

Analysed: 7-Jun-19

Loss on Pretreatment NA

Limit of Reporting: 1%

Sample Description: FINES, SAND, VEG

Dispersion Method Shaker

Test Method: AS1289.3.6.2/AS1289.3.6.3

Soil Particle Density (<2.36mm) 2.65

NATA Accreditation: 825 Site: Newcastle
This document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025. This document shall not be reproduced, except in full.

NATA
WORLD RECOGNISED ACCREDITATION

Peter Keyte
Technical Manager Air
Authorised Signatory

Certificate of Analysis

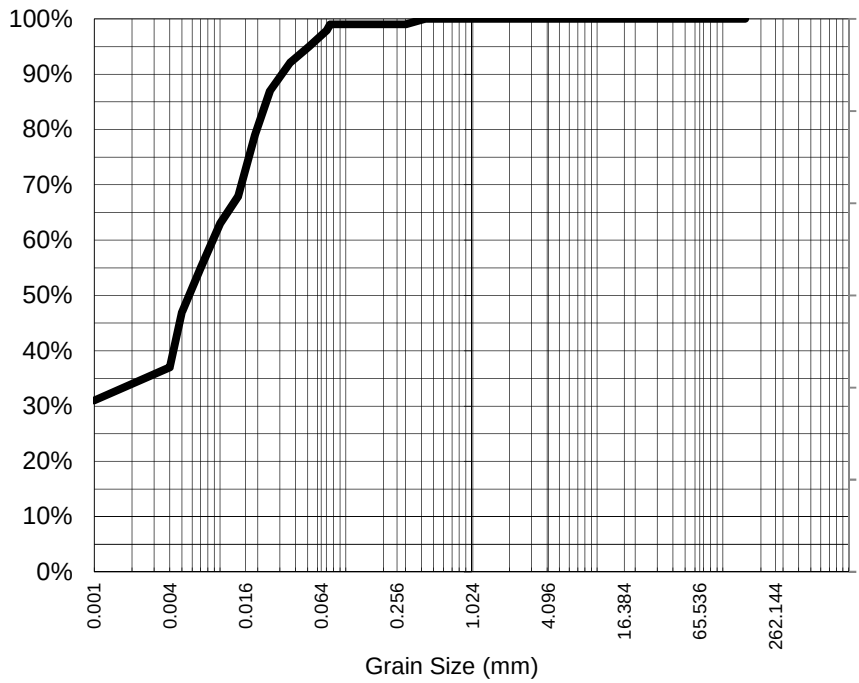
ALS Laboratory Group Pty Ltd
5/585 Maitland Road
Mayfield West, NSW 2304
pH 02 4014 2500
fax 02 4968 0349
samples.newcastle@alsenviro.com

ALS Environmental

Newcastle, NSW

CLIENT:	RICK PLAIN	**DATE REPORTED:**	14-Jun-2019
COMPANY:	HASKONING AUSTRALIA-ROYAL HASKONING	**DATE RECEIVED:**	3-Jun-2019
ADDRESS:	Level 14 56 Berry Street North Sydney	**REPORT NO:**	ES1916915-023 / PSD
PROJECT:	SNOWY 2.0 - VIBROCORING	**SAMPLE ID:**	TANT15 0-0.15

Particle Size Distribution



Particle Size (mm)	% Passing
0.425	100%
0.300	99%
0.150	99%
0.075	99%
Particle Size (microns)	
51	95%
36	92%
25	87%
19	79%
14	68%
10	63%
7	55%
5	47%
1	31%

Median Particle Size (mm)*	<0.007

Analysis Notes

Samples analysed as received.
** Soil Particle Density required for Hydrometer analysis according to AS 1289.3.5.1—2006 was not requested by the client . Typical sediment SPD values used for calculations and consequently, NATA endorsement does not apply to hydrometer results*

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Sample Comments:

Analysed: 7-Jun-19

Loss on Pretreatment NA

Limit of Reporting: 1%

Sample Description: FINES, SAND, VEG

Dispersion Method Shaker

Test Method: AS1289.3.6.2/AS1289.3.6.3

Soil Particle Density (<2.36mm) 2.65

NATA Accreditation: 825 Site: Newcastle
This document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025. This document shall not be reproduced, except in full.

NATA
WORLD RECOGNISED ACCREDITATION

Peter Keyte
Technical Manager Air
Authorised Signatory

Certificate of Analysis

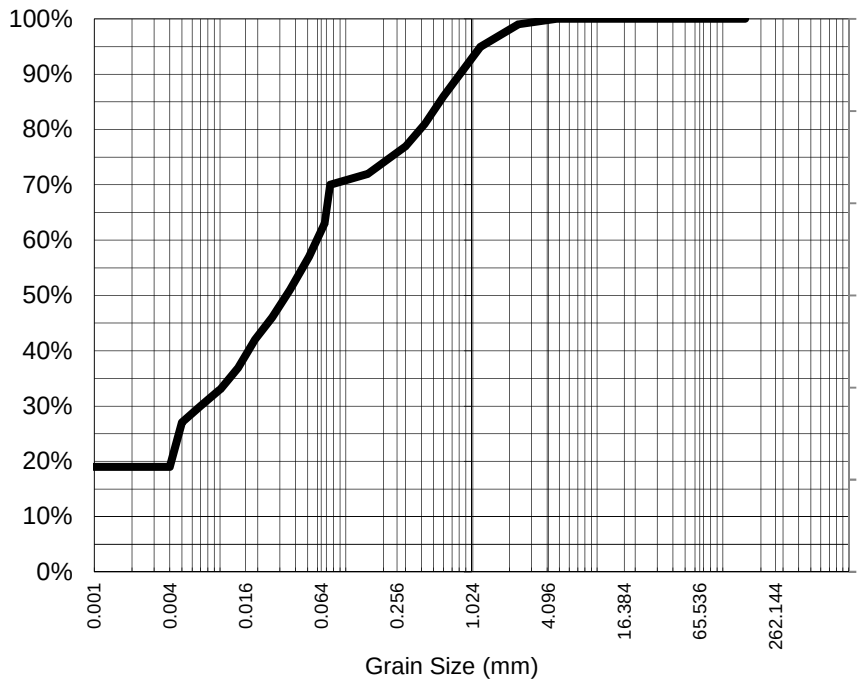
ALS Laboratory Group Pty Ltd
5/585 Maitland Road
Mayfield West, NSW 2304
pH 02 4014 2500
fax 02 4968 0349
samples.newcastle@alsenviro.com

ALS Environmental

Newcastle, NSW

CLIENT:	RICK PLAIN	**DATE REPORTED:**	14-Jun-2019
COMPANY:	HASKONING AUSTRALIA-ROYAL HASKONING	**DATE RECEIVED:**	3-Jun-2019
ADDRESS:	Level 14 56 Berry Street North Sydney	**REPORT NO:**	ES1916915-024 / PSD
PROJECT:	SNOWY 2.0 - VIBROCORING	**SAMPLE ID:**	TANT15 0.2-0.3

Particle Size Distribution



Particle Size (mm)	% Passing
4.75	100%
2.36	99%
1.18	95%
0.600	86%
0.425	81%
0.300	77%
0.150	72%
0.075	70%
Particle Size (microns)	
51	57%
36	51%
26	46%
19	42%
14	37%
10	33%
7	30%
5	27%
1	19%

Median Particle Size (mm)*	0.034

Analysis Notes

Samples analysed as received.
** Soil Particle Density required for Hydrometer analysis according to AS 1289.3.5.1—2006 was not requested by the client . Typical sediment SPD values used for calculations and consequently, NATA endorsement does not apply to hydrometer results*

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Sample Comments:

Analysed: 7-Jun-19

Loss on Pretreatment NA

Limit of Reporting: 1%

Sample Description: FINES, SAND, VEG

Dispersion Method Shaker

Test Method: AS1289.3.6.2/AS1289.3.6.3

Soil Particle Density (<2.36mm) 2.65

NATA Accreditation: 825 Site: Newcastle
This document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025. This document shall not be reproduced, except in full.

NATA
WORLD RECOGNISED ACCREDITATION

Peter Keyte
Technical Manager Air
Authorised Signatory

Certificate of Analysis

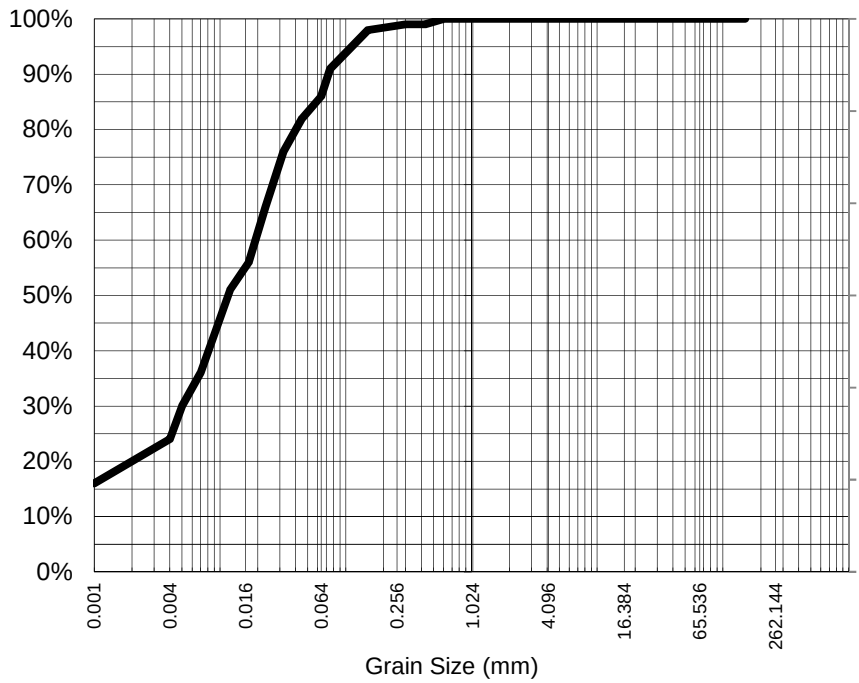
ALS Laboratory Group Pty Ltd
5/585 Maitland Road
Mayfield West, NSW 2304
pH 02 4014 2500
fax 02 4968 0349
samples.newcastle@alsenviro.com

ALS Environmental

Newcastle, NSW

CLIENT:	RICK PLAIN	**DATE REPORTED:**	14-Jun-2019
COMPANY:	HASKONING AUSTRALIA-ROYAL HASKONING	**DATE RECEIVED:**	3-Jun-2019
ADDRESS:	Level 14 56 Berry Street North Sydney	**REPORT NO:**	ES1916915-001 / PSD
PROJECT:	SNOWY 2.0 - VIBROCORING	**SAMPLE ID:**	TANT16 0.2-0.3

Particle Size Distribution



Particle Size (mm)	% Passing
0.600	100%
0.425	99%
0.300	99%
0.150	98%
0.075	91%
Particle Size (microns)	
45	82%
32	76%
23	66%
17	56%
12	51%
9	43%
7	36%
5	30%
1	16%

Median Particle Size (mm)*	0.012

Analysis Notes

Samples analysed as received.
** Soil Particle Density required for Hydrometer analysis according to AS 1289.3.5.1—2006 was not requested by the client . Typical sediment SPD values used for calculations and consequently, NATA endorsement does not apply to hydrometer results*

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Sample Comments:

Analysed: 7-Jun-19

Loss on Pretreatment NA

Limit of Reporting: 1%

Sample Description: FINES, SAND, VEG

Dispersion Method Shaker

Test Method: AS1289.3.6.2/AS1289.3.6.3

Soil Particle Density (<2.36mm) 2.65

NATA Accreditation: 825 Site: Newcastle
This document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025. This document shall not be reproduced, except in full.

NATA
WORLD RECOGNISED ACCREDITATION

Peter Keyte
Technical Manager Air
Authorised Signatory

Certificate of Analysis

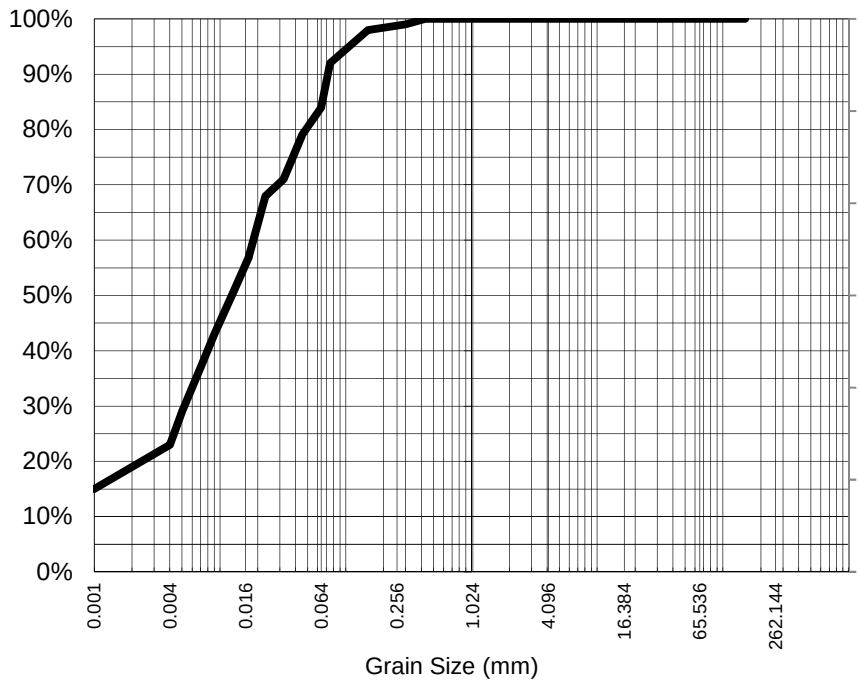
ALS Laboratory Group Pty Ltd
5/585 Maitland Road
Mayfield West, NSW 2304
pH 02 4014 2500
fax 02 4968 0349
samples.newcastle@alsenviro.com

ALS Environmental

Newcastle, NSW

CLIENT:	RICK PLAIN	**DATE REPORTED:**	14-Jun-2019
COMPANY:	HASKONING AUSTRALIA-ROYAL HASKONING	**DATE RECEIVED:**	3-Jun-2019
ADDRESS:	Level 14 56 Berry Street North Sydney	**REPORT NO:**	ES1916915-002 / PSD
PROJECT:	SNOWY 2.0 - VIBROCORING	**SAMPLE ID:**	TANT31 0.2-0.4

Particle Size Distribution



Particle Size (mm)	% Passing
0.425	100%
0.300	99%
0.150	98%
0.075	92%
Particle Size (microns)	
45	79%
32	71%
23	68%
17	57%
13	51%
9	43%
7	37%
5	29%
1	15%

Median Particle Size (mm)*	0.013

Analysis Notes

Samples analysed as received.
** Soil Particle Density required for Hydrometer analysis according to AS 1289.3.5.1—2006 was not requested by the client . Typical sediment SPD values used for calculations and consequently, NATA endorsement does not apply to hydrometer results*

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Sample Comments:

Analysed: 7-Jun-19

Loss on Pretreatment NA

Limit of Reporting: 1%

Sample Description: FINES, SAND, VEG

Dispersion Method Shaker

Test Method: AS1289.3.6.2/AS1289.3.6.3

Soil Particle Density (<2.36mm) 2.65

NATA Accreditation: 825 Site: Newcastle
This document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025. This document shall not be reproduced, except in full.

NATA
WORLD RECOGNISED ACCREDITATION

Peter Keyte
Technical Manager Air
Authorised Signatory

Certificate of Analysis

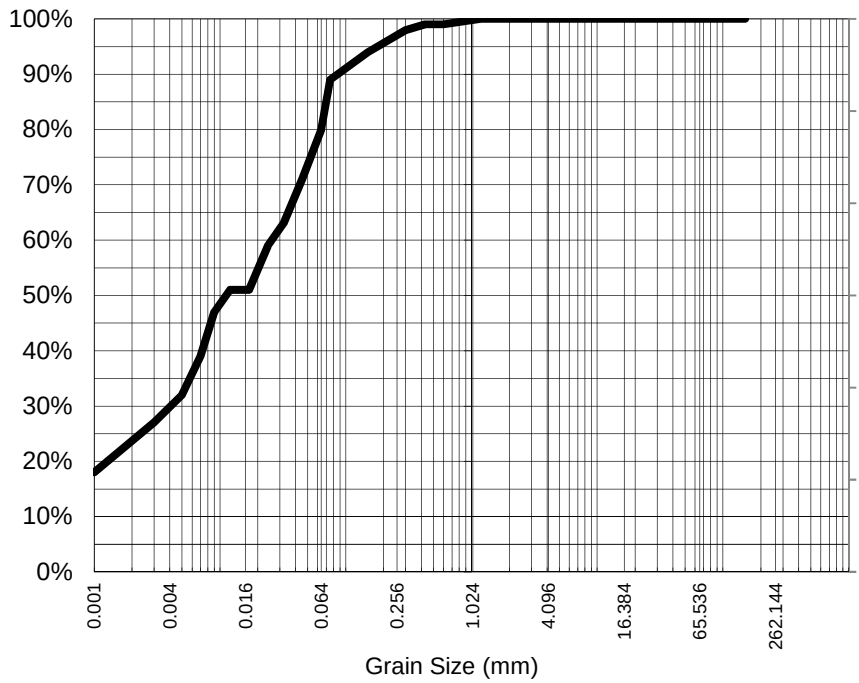
ALS Laboratory Group Pty Ltd
5/585 Maitland Road
Mayfield West, NSW 2304
pH 02 4014 2500
fax 02 4968 0349
samples.newcastle@alsenviro.com

ALS Environmental

Newcastle, NSW

CLIENT:	RICK PLAIN	**DATE REPORTED:**	14-Jun-2019
COMPANY:	HASKONING AUSTRALIA-ROYAL HASKONING	**DATE RECEIVED:**	3-Jun-2019
ADDRESS:	Level 14 56 Berry Street North Sydney	**REPORT NO:**	ES1916915-003 / PSD
PROJECT:	SNOWY 2.0 - VIBROCORING	**SAMPLE ID:**	TAL01 0.1-0.2

Particle Size Distribution



Particle Size (mm)	% Passing
1.18	100%
0.600	99%
0.425	99%
0.300	98%
0.150	94%
0.075	89%
Particle Size (microns)	
45	71%
32	63%
24	59%
17	51%
12	51%
9	47%
7	39%
5	32%
1	18%

Median Particle Size (mm)*	0.011

Analysis Notes

Samples analysed as received.
** Soil Particle Density required for Hydrometer analysis according to AS 1289.3.5.1—2006 was not requested by the client . Typical sediment SPD values used for calculations and consequently, NATA endorsement does not apply to hydrometer results*

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Sample Comments:

Analysed: 7-Jun-19

Loss on Pretreatment NA

Limit of Reporting: 1%

Sample Description: FINES, SAND, VEG

Dispersion Method Shaker

Test Method: AS1289.3.6.2/AS1289.3.6.3

Soil Particle Density (<2.36mm) 2.65

NATA Accreditation: 825 Site: Newcastle
This document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025. This document shall not be reproduced, except in full.

NATA
WORLD RECOGNISED ACCREDITATION

Peter Keyte
Technical Manager Air
Authorised Signatory

Certificate of Analysis

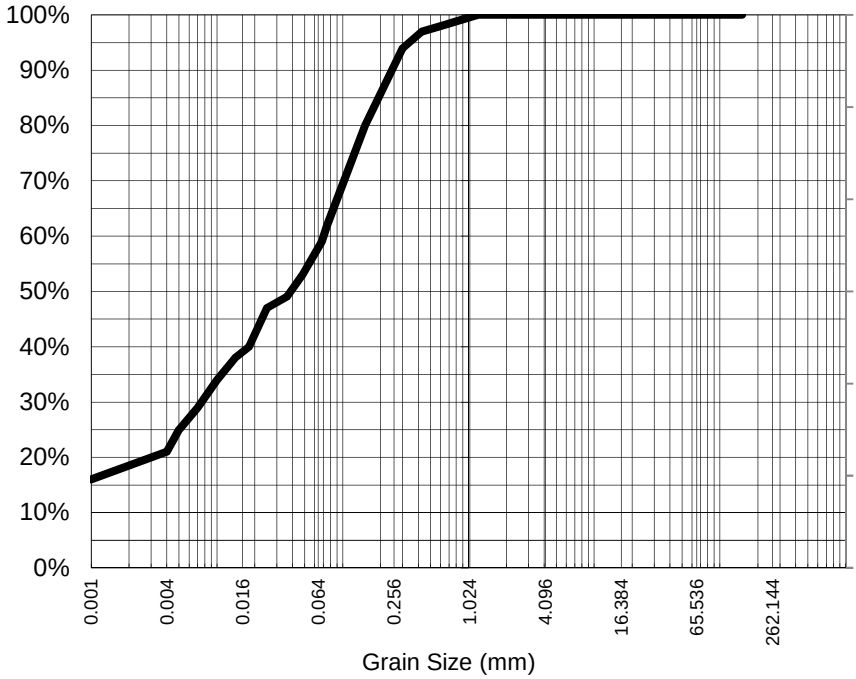
ALS Laboratory Group Pty Ltd
5/585 Maitland Road
Mayfield West, NSW 2304
pH 02 4014 2500
fax 02 4968 0349
samples.newcastle@alsenviro.com

ALS Environmental

Newcastle, NSW

CLIENT:	RICK PLAIN	**DATE REPORTED:**	14-Jun-2019
COMPANY:	HASKONING AUSTRALIA-ROYAL HASKONING	**DATE RECEIVED:**	3-Jun-2019
ADDRESS:	Level 14 56 Berry Street North Sydney	**REPORT NO:**	ES1916915-004 / PSD
PROJECT:	SNOWY 2.0 - VIBROCORING	**SAMPLE ID:**	TAL01 0.3-0.4

Particle Size Distribution



Particle Size (mm)	% Passing
1.18	100%
0.600	98%
0.425	97%
0.300	94%
0.150	80%
0.075	62%
Particle Size (microns)	
48	53%
36	49%
25	47%
18	40%
14	38%
10	34%
7	29%
5	25%
1	16%

Median Particle Size (mm)*	0.039

Analysis Notes

Samples analysed as received.
** Soil Particle Density required for Hydrometer analysis according to AS 1289.3.5.1—2006 was not requested by the client . Typical sediment SPD values used for calculations and consequently, NATA endorsement does not apply to hydrometer results*

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Sample Comments:

Analysed: 7-Jun-19

Loss on Pretreatment NA

Limit of Reporting: 1%

Sample Description: FINES, SAND, VEG

Dispersion Method Shaker

Test Method: AS1289.3.6.2/AS1289.3.6.3

Soil Particle Density (<2.36mm) 2.65

NATA Accreditation: 825 Site: Newcastle
This document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025. This document shall not be reproduced, except in full.

NATA
WORLD RECOGNISED ACCREDITATION

Peter Keyte
Technical Manager Air
Authorised Signatory

Certificate of Analysis

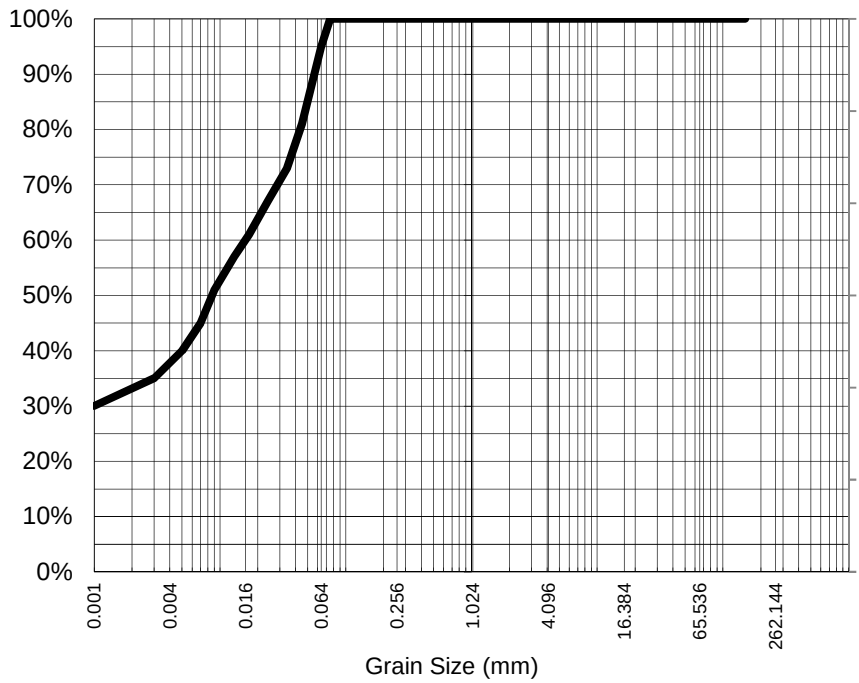
ALS Laboratory Group Pty Ltd
5/585 Maitland Road
Mayfield West, NSW 2304
pH 02 4014 2500
fax 02 4968 0349
samples.newcastle@alsenviro.com

ALS Environmental

Newcastle, NSW

CLIENT:	RICK PLAIN	**DATE REPORTED:**	14-Jun-2019
COMPANY:	HASKONING AUSTRALIA-ROYAL HASKONING	**DATE RECEIVED:**	3-Jun-2019
ADDRESS:	Level 14 56 Berry Street North Sydney	**REPORT NO:**	ES1916915-005 / PSD
PROJECT:	SNOWY 2.0 - VIBROCORING	**SAMPLE ID:**	TAL02 0.1-0.2

Particle Size Distribution



Particle Size (mm)	% Passing
Particle Size (microns)	
45	81%
34	73%
24	67%
17	61%
13	57%
9	51%
7	45%
5	40%
1	30%

Median Particle Size (mm)*	0.009

Analysis Notes

Samples analysed as received.
** Soil Particle Density required for Hydrometer analysis according to AS 1289.3.5.1—2006 was not requested by the client . Typical sediment SPD values used for calculations and consequently, NATA endorsement does not apply to hydrometer results*

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Sample Comments:

Analysed: 7-Jun-19

Loss on Pretreatment NA

Limit of Reporting: 1%

Sample Description: FINES, SAND, VEG

Dispersion Method Shaker

Test Method: AS1289.3.6.2/AS1289.3.6.3

Soil Particle Density (<2.36mm) 2.65

NATA Accreditation: 825 Site: Newcastle
This document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025. This document shall not be reproduced, except in full.

NATA
WORLD RECOGNISED ACCREDITATION

Peter Keyte
Technical Manager Air
Authorised Signatory

Certificate of Analysis

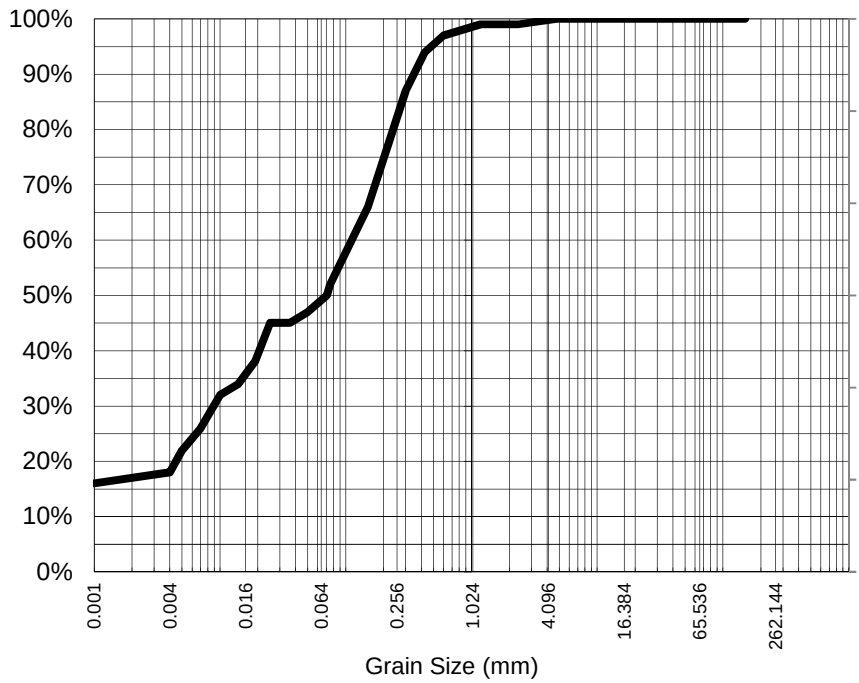
ALS Laboratory Group Pty Ltd
5/585 Maitland Road
Mayfield West, NSW 2304
pH 02 4014 2500
fax 02 4968 0349
samples.newcastle@alsenviro.com

ALS Environmental

Newcastle, NSW

CLIENT:	RICK PLAIN	**DATE REPORTED:**	14-Jun-2019
COMPANY:	HASKONING AUSTRALIA-ROYAL HASKONING	**DATE RECEIVED:**	3-Jun-2019
ADDRESS:	Level 14 56 Berry Street North Sydney	**REPORT NO:**	ES1916915-006 / PSD
PROJECT:	SNOWY 2.0 - VIBROCORING	**SAMPLE ID:**	TAL05 0.15-0.25

Particle Size Distribution



Particle Size (mm)	% Passing
4.75	100%
2.36	99%
1.18	99%
0.600	97%
0.425	94%
0.300	87%
0.150	66%
0.075	52%
Particle Size (microns)	
50	47%
36	45%
25	45%
19	38%
14	34%
10	32%
7	26%
5	22%
1	16%

Median Particle Size (mm)*	0.071

Analysis Notes

Samples analysed as received.
** Soil Particle Density required for Hydrometer analysis according to AS 1289.3.5.1—2006 was not requested by the client . Typical sediment SPD values used for calculations and consequently, NATA endorsement does not apply to hydrometer results*

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Sample Comments:

Analysed: 7-Jun-19

Loss on Pretreatment NA

Limit of Reporting: 1%

Sample Description: FINES, SAND, VEG

Dispersion Method Shaker

Test Method: AS1289.3.6.2/AS1289.3.6.3

Soil Particle Density (<2.36mm) 2.65

NATA Accreditation: 825 Site: Newcastle
This document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025. This document shall not be reproduced, except in full.

NATA
WORLD RECOGNISED ACCREDITATION

Peter Keyte
Technical Manager Air
Authorised Signatory

Certificate of Analysis

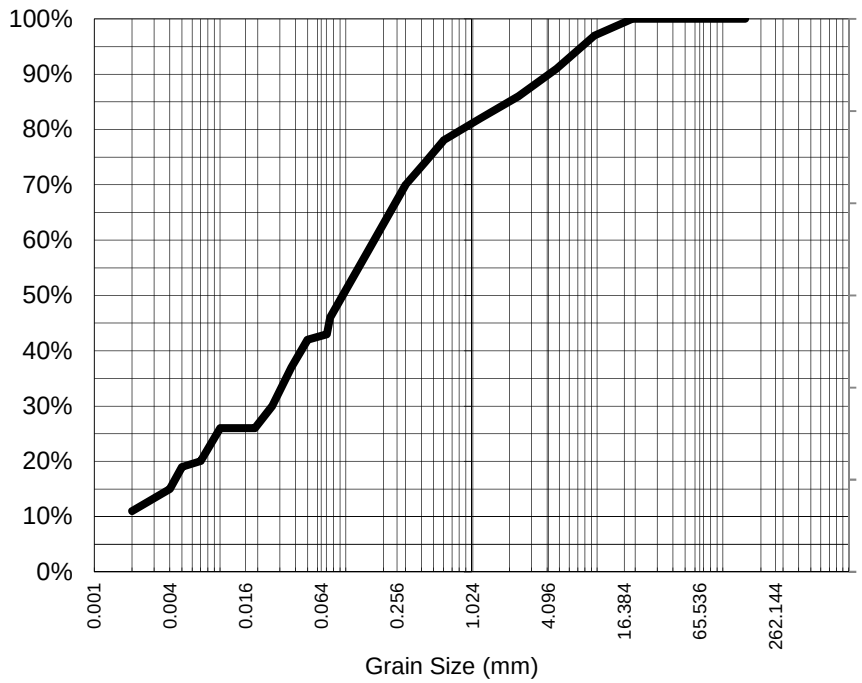
ALS Laboratory Group Pty Ltd
5/585 Maitland Road
Mayfield West, NSW 2304
pH 02 4014 2500
fax 02 4968 0349
samples.newcastle@alsenviro.com

ALS Environmental

Newcastle, NSW

CLIENT:	RICK PLAIN	**DATE REPORTED:**	14-Jun-2019
COMPANY:	HASKONING AUSTRALIA-ROYAL HASKONING	**DATE RECEIVED:**	3-Jun-2019
ADDRESS:	Level 14 56 Berry Street North Sydney	**REPORT NO:**	ES1916915-007 / PSD
PROJECT:	SNOWY 2.0 - VIBROCORING	**SAMPLE ID:**	TAL08a 0-0.1

Particle Size Distribution



Particle Size (mm)	% Passing
19.0	100%
9.50	97%
4.75	91%
2.36	86%
1.18	82%
0.600	78%
0.425	74%
0.300	70%
0.150	58%
0.075	46%
Particle Size (microns)	
50	42%
37	37%
26	30%
19	26%
14	26%
10	26%
7	20%
5	19%
2	11%

Median Particle Size (mm)*	0.100

Analysis Notes

Samples analysed as received.
** Soil Particle Density required for Hydrometer analysis according to AS 1289.3.5.1—2006 was not requested by the client . Typical sediment SPD values used for calculations and consequently, NATA endorsement does not apply to hydrometer results*

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Sample Comments:

Analysed: 7-Jun-19

Loss on Pretreatment NA

Limit of Reporting: 1%

Sample Description: FINES, SAND, VEG

Dispersion Method Shaker

Test Method: AS1289.3.6.2/AS1289.3.6.3

Soil Particle Density (<2.36mm) 2.65

NATA Accreditation: 825 Site: Newcastle
This document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025. This document shall not be reproduced, except in full.

NATA
WORLD RECOGNISED ACCREDITATION

Peter Keyte
Technical Manager Air
Authorised Signatory

Certificate of Analysis

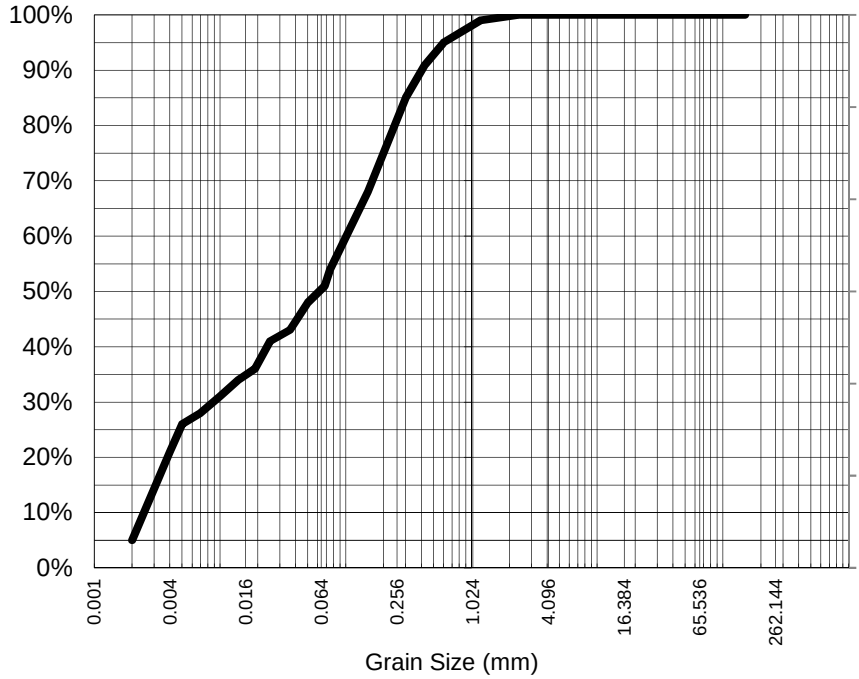
ALS Laboratory Group Pty Ltd
5/585 Maitland Road
Mayfield West, NSW 2304
pH 02 4014 2500
fax 02 4968 0349
samples.newcastle@alsenviro.com

ALS Environmental

Newcastle, NSW

CLIENT:	RICK PLAIN	**DATE REPORTED:**	14-Jun-2019
COMPANY:	HASKONING AUSTRALIA-ROYAL HASKONING	**DATE RECEIVED:**	3-Jun-2019
ADDRESS:	Level 14 56 Berry Street North Sydney	**REPORT NO:**	ES1916915-008 / PSD
PROJECT:	SNOWY 2.0 - VIBROCORING	**SAMPLE ID:**	TAL09 0.2-0.3

Particle Size Distribution



Particle Size (mm)	% Passing
2.36	100%
1.18	99%
0.600	95%
0.425	91%
0.300	85%
0.150	68%
0.075	54%
Particle Size (microns)	
50	48%
36	43%
25	41%
19	36%
14	34%
10	31%
7	28%
5	26%
2	5%

Median Particle Size (mm)*	0.062

Analysis Notes

Samples analysed as received.
** Soil Particle Density required for Hydrometer analysis according to AS 1289.3.5.1—2006 was not requested by the client . Typical sediment SPD values used for calculations and consequently, NATA endorsement does not apply to hydrometer results*

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Sample Comments:

Analysed: 7-Jun-19

Loss on Pretreatment NA

Limit of Reporting: 1%

Sample Description: FINES, SAND, VEG

Dispersion Method Shaker

Test Method: AS1289.3.6.2/AS1289.3.6.3

Soil Particle Density (<2.36mm) 2.65

NATA Accreditation: 825 Site: Newcastle
This document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025. This document shall not be reproduced, except in full.

NATA
WORLD RECOGNISED ACCREDITATION

Peter Keyte
Technical Manager Air
Authorised Signatory

Certificate of Analysis

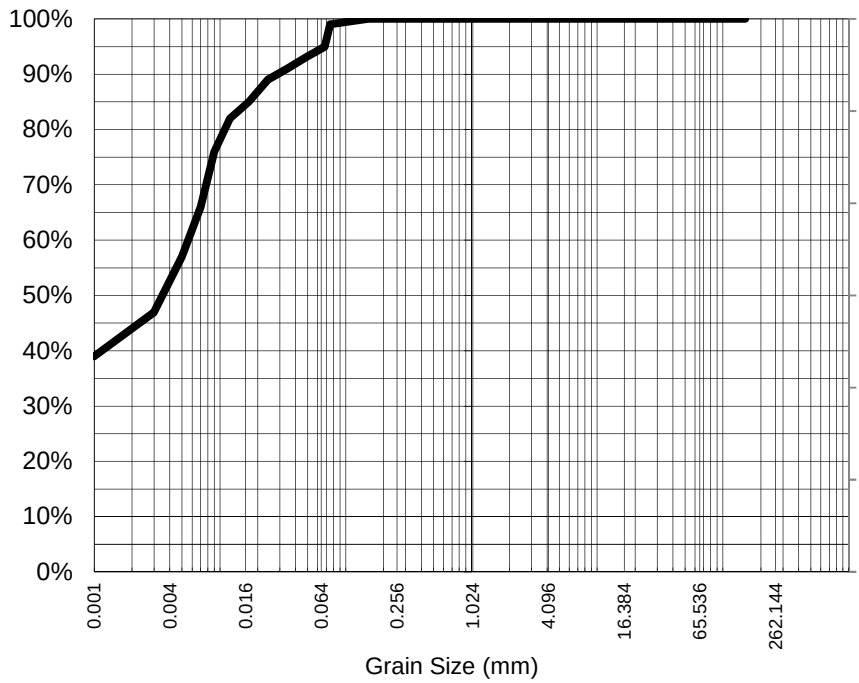
ALS Laboratory Group Pty Ltd
5/585 Maitland Road
Mayfield West, NSW 2304
pH 02 4014 2500
fax 02 4968 0349
samples.newcastle@alsenviro.com

ALS Environmental

Newcastle, NSW

CLIENT:	RICK PLAIN	**DATE REPORTED:**	14-Jun-2019
COMPANY:	HASKONING AUSTRALIA-ROYAL HASKONING	**DATE RECEIVED:**	3-Jun-2019
ADDRESS:	Level 14 56 Berry Street North Sydney	**REPORT NO:**	ES1916915-009 / PSD
PROJECT:	SNOWY 2.0 - VIBROCORING	**SAMPLE ID:**	TAL10 0.1-0.2

Particle Size Distribution



Particle Size (mm)	% Passing
0.150	100%
0.075	99%
Particle Size (microns)	
48	93%
34	91%
24	89%
17	85%
12	82%
9	76%
7	66%
5	57%
1	39%

Median Particle Size (mm)*	<0.007

Analysis Notes

Samples analysed as received.
** Soil Particle Density required for Hydrometer analysis according to AS 1289.3.5.1—2006 was not requested by the client . Typical sediment SPD values used for calculations and consequently, NATA endorsement does not apply to hydrometer results*

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Sample Comments:

Analysed: 7-Jun-19

Loss on Pretreatment NA

Limit of Reporting: 1%

Sample Description: FINES, SAND, VEG

Dispersion Method Shaker

Test Method: AS1289.3.6.2/AS1289.3.6.3

Soil Particle Density (<2.36mm) 2.65

NATA Accreditation: 825 Site: Newcastle
This document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025. This document shall not be reproduced, except in full.

NATA
WORLD RECOGNISED ACCREDITATION

Peter Keyte
Technical Manager Air
Authorised Signatory

Certificate of Analysis

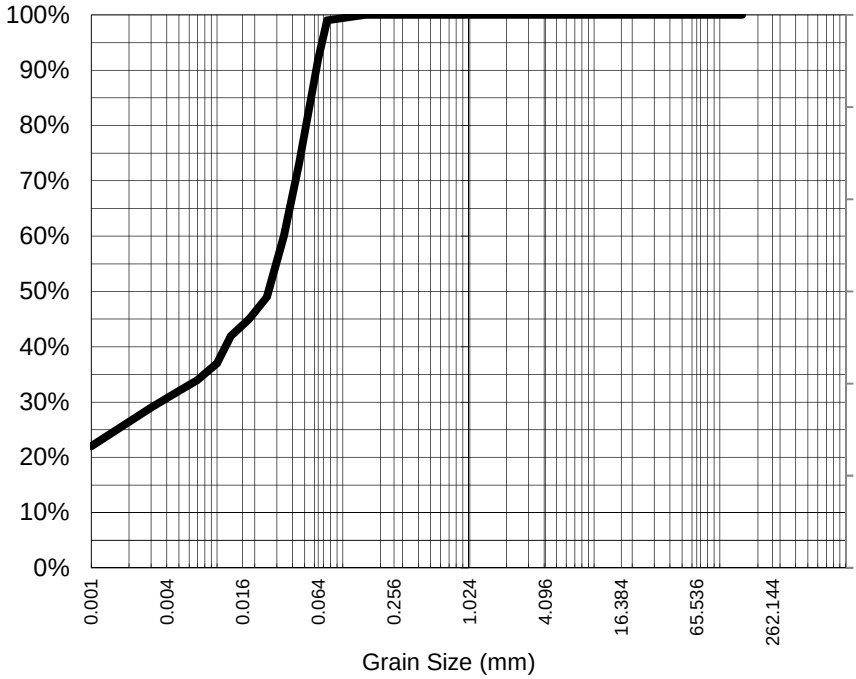
ALS Laboratory Group Pty Ltd
5/585 Maitland Road
Mayfield West, NSW 2304
pH 02 4014 2500
fax 02 4968 0349
samples.newcastle@alsenviro.com

ALS Environmental

Newcastle, NSW

CLIENT:	RICK PLAIN	**DATE REPORTED:**	14-Jun-2019
COMPANY:	HASKONING AUSTRALIA-ROYAL HASKONING	**DATE RECEIVED:**	3-Jun-2019
ADDRESS:	Level 14 56 Berry Street North Sydney	**REPORT NO:**	ES1916915-010 / PSD
PROJECT:	SNOWY 2.0 - VIBROCORING	**SAMPLE ID:**	TAL11 0.1-0.2

Particle Size Distribution



Particle Size (mm)	% Passing
0.150	100%
0.075	99%
Particle Size (microns)	
45	73%
34	60%
25	49%
18	45%
13	42%
10	37%
7	34%
5	32%
1	22%

Median Particle Size (mm)*	0.026

Analysis Notes

Samples analysed as received.
** Soil Particle Density required for Hydrometer analysis according to AS 1289.3.5.1—2006 was not requested by the client . Typical sediment SPD values used for calculations and consequently, NATA endorsement does not apply to hydrometer results*

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Sample Comments:

Analysed: 7-Jun-19

Loss on Pretreatment NA

Limit of Reporting: 1%

Sample Description: FINES, SAND, VEG

Dispersion Method Shaker

Test Method: AS1289.3.6.2/AS1289.3.6.3

Soil Particle Density (<2.36mm) 2.65

NATA Accreditation: 825 Site: Newcastle
This document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025. This document shall not be reproduced, except in full.

NATA
WORLD RECOGNISED ACCREDITATION

Peter Keyte
Technical Manager Air
Authorised Signatory

Certificate of Analysis

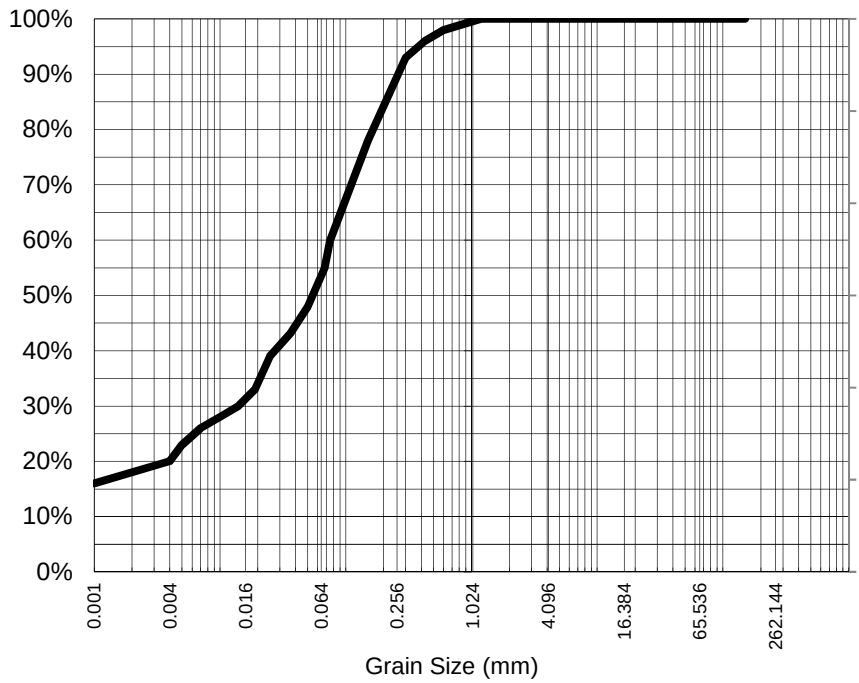
ALS Laboratory Group Pty Ltd
5/585 Maitland Road
Mayfield West, NSW 2304
pH 02 4014 2500
fax 02 4968 0349
samples.newcastle@alsenviro.com

ALS Environmental

Newcastle, NSW

CLIENT:	RICK PLAIN	**DATE REPORTED:**	14-Jun-2019
COMPANY:	HASKONING AUSTRALIA-ROYAL HASKONING	**DATE RECEIVED:**	3-Jun-2019
ADDRESS:	Level 14 56 Berry Street North Sydney	**REPORT NO:**	ES1916915-011 / PSD
PROJECT:	SNOWY 2.0 - VIBROCORING	**SAMPLE ID:**	TAL11 0.3-0.4

Particle Size Distribution



Particle Size (mm)	% Passing
1.18	100%
0.600	98%
0.425	96%
0.300	93%
0.150	78%
0.075	60%
Particle Size (microns)	
50	48%
36	43%
25	39%
19	33%
14	30%
10	28%
7	26%
5	23%
1	16%

Median Particle Size (mm)*	0.055

Analysis Notes

Samples analysed as received.
** Soil Particle Density required for Hydrometer analysis according to AS 1289.3.5.1—2006 was not requested by the client . Typical sediment SPD values used for calculations and consequently, NATA endorsement does not apply to hydrometer results*

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Sample Comments:

Analysed: 7-Jun-19

Loss on Pretreatment NA

Limit of Reporting: 1%

Sample Description: FINES, SAND, VEG

Dispersion Method Shaker

Test Method: AS1289.3.6.2/AS1289.3.6.3

Soil Particle Density (<2.36mm) 2.65

NATA Accreditation: 825 Site: Newcastle
This document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025. This document shall not be reproduced, except in full.

NATA
WORLD RECOGNISED ACCREDITATION

Peter Keyte
Technical Manager Air
Authorised Signatory

Certificate of Analysis

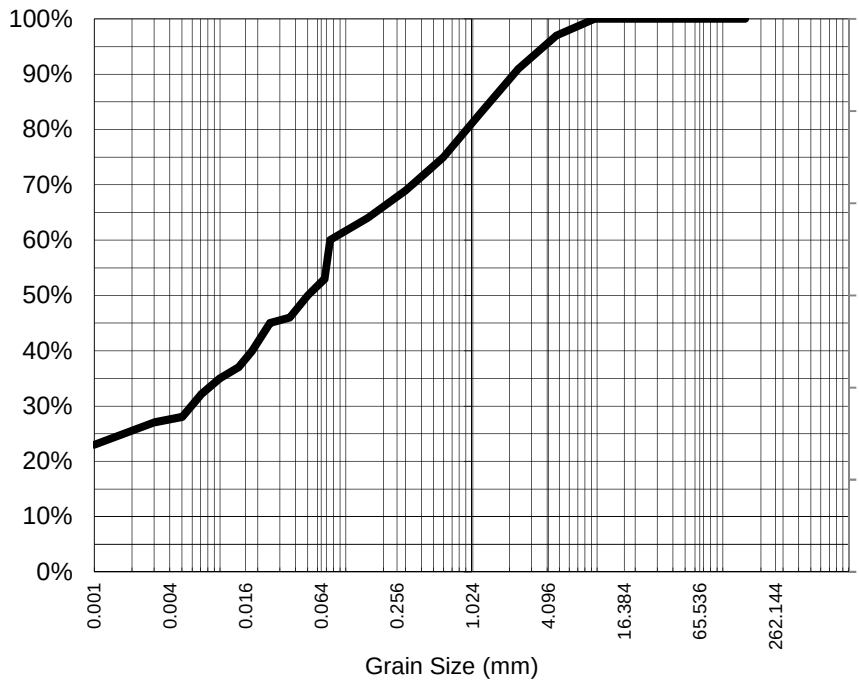
ALS Laboratory Group Pty Ltd
5/585 Maitland Road
Mayfield West, NSW 2304
pH 02 4014 2500
fax 02 4968 0349
samples.newcastle@alsenviro.com

ALS Environmental

Newcastle, NSW

CLIENT:	RICK PLAIN	**DATE REPORTED:**	14-Jun-2019
COMPANY:	HASKONING AUSTRALIA-ROYAL HASKONING	**DATE RECEIVED:**	3-Jun-2019
ADDRESS:	Level 14 56 Berry Street North Sydney	**REPORT NO:**	ES1916915-012 / PSD
PROJECT:	SNOWY 2.0 - VIBROCORING	**SAMPLE ID:**	TAL13 0.3-0.4

Particle Size Distribution



Particle Size (mm)	% Passing
9.50	100%
4.75	97%
2.36	91%
1.18	83%
0.600	75%
0.425	72%
0.300	69%
0.150	64%
0.075	60%
Particle Size (microns)	
50	50%
36	46%
25	45%
18	40%
14	37%
10	35%
7	32%
5	28%
1	23%

Median Particle Size (mm)*	0.050

Analysis Notes

Samples analysed as received.
** Soil Particle Density required for Hydrometer analysis according to AS 1289.3.5.1—2006 was not requested by the client . Typical sediment SPD values used for calculations and consequently, NATA endorsement does not apply to hydrometer results*

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Sample Comments:

Analysed: 7-Jun-19

Loss on Pretreatment NA

Limit of Reporting: 1%

Sample Description: FINES, SAND, VEG

Dispersion Method Shaker

Test Method: AS1289.3.6.2/AS1289.3.6.3

Soil Particle Density (<2.36mm) 2.65

NATA Accreditation: 825 Site: Newcastle
This document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025. This document shall not be reproduced, except in full.

NATA
WORLD RECOGNISED ACCREDITATION

Peter Keyte
Technical Manager Air
Authorised Signatory

Certificate of Analysis

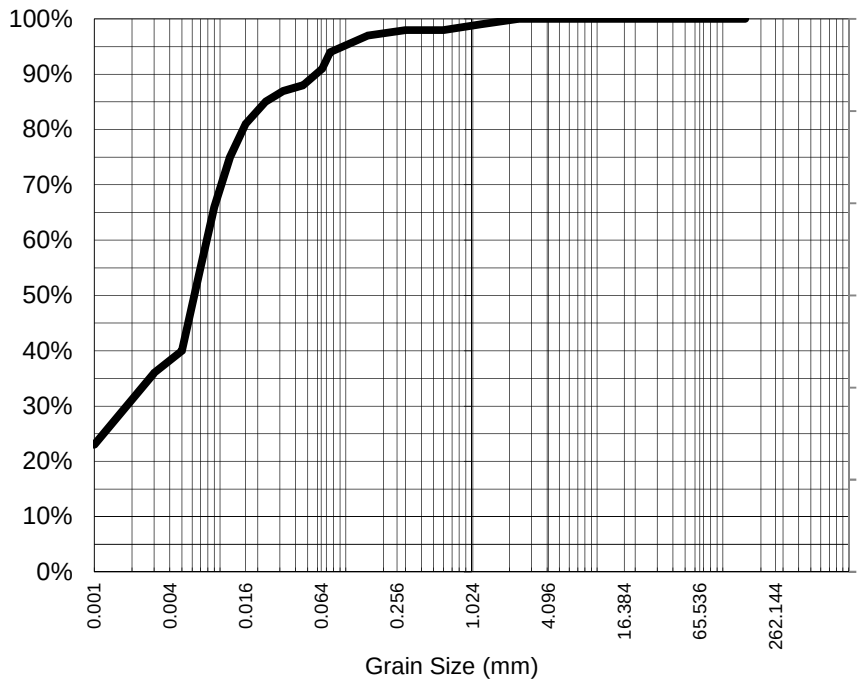
ALS Laboratory Group Pty Ltd
5/585 Maitland Road
Mayfield West, NSW 2304
pH 02 4014 2500
fax 02 4968 0349
samples.newcastle@alsenviro.com

ALS Environmental

Newcastle, NSW

CLIENT:	RICK PLAIN	**DATE REPORTED:**	14-Jun-2019
COMPANY:	HASKONING AUSTRALIA-ROYAL HASKONING	**DATE RECEIVED:**	3-Jun-2019
ADDRESS:	Level 14 56 Berry Street North Sydney	**REPORT NO:**	ES1916915-037 / PSD
PROJECT:	SNOWY 2.0 - VIBROCORING	**SAMPLE ID:**	TAL14 0-0.2

Particle Size Distribution



Particle Size (mm)	% Passing
2.36	100%
1.18	99%
0.600	98%
0.425	98%
0.300	98%
0.150	97%
0.075	94%
Particle Size (microns)	
46	88%
32	87%
23	85%
16	81%
12	75%
9	66%
7	55%
5	40%
1	23%

Median Particle Size (mm)*	<0.007

Analysis Notes

Samples analysed as received.
** Soil Particle Density required for Hydrometer analysis according to AS 1289.3.5.1—2006 was not requested by the client . Typical sediment SPD values used for calculations and consequently, NATA endorsement does not apply to hydrometer results*

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Sample Comments:

Analysed: 7-Jun-19

Loss on Pretreatment NA

Limit of Reporting: 1%

Sample Description: FINES, SAND, VEG

Dispersion Method Shaker

Test Method: AS1289.3.6.2/AS1289.3.6.3

Soil Particle Density (<2.36mm) 2.65

NATA Accreditation: 825 Site: Newcastle
This document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025. This document shall not be reproduced, except in full.

NATA
WORLD RECOGNISED ACCREDITATION

Peter Keyte
Technical Manager Air
Authorised Signatory

Certificate of Analysis

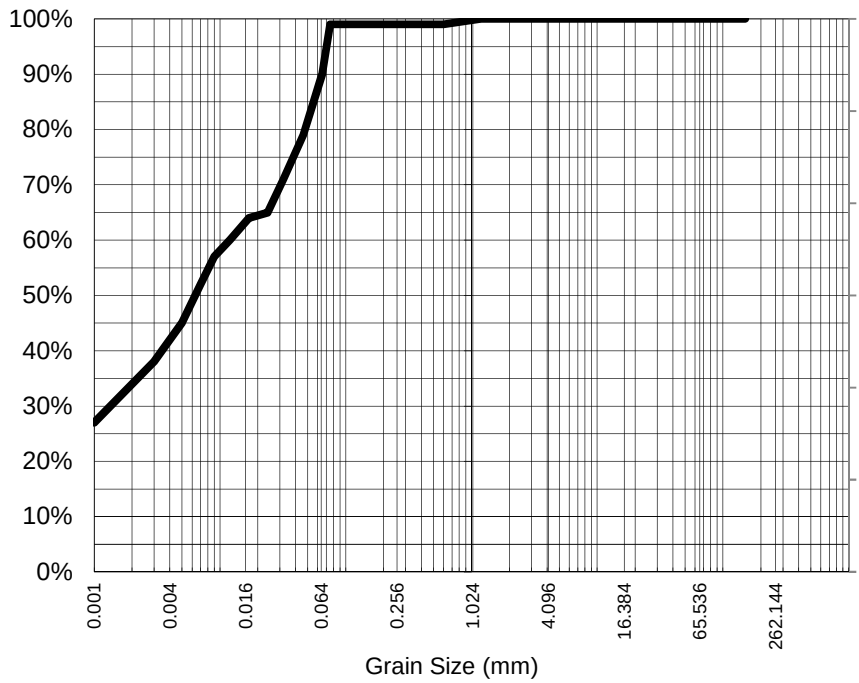
ALS Laboratory Group Pty Ltd
5/585 Maitland Road
Mayfield West, NSW 2304
pH 02 4014 2500
fax 02 4968 0349
samples.newcastle@alsenviro.com

ALS Environmental

Newcastle, NSW

CLIENT:	RICK PLAIN	**DATE REPORTED:**	14-Jun-2019
COMPANY:	HASKONING AUSTRALIA-ROYAL HASKONING	**DATE RECEIVED:**	3-Jun-2019
ADDRESS:	Level 14 56 Berry Street North Sydney	**REPORT NO:**	ES1916915-038 / PSD
PROJECT:	SNOWY 2.0 - VIBROCORING	**SAMPLE ID:**	TAL15 0-0.15

Particle Size Distribution



Particle Size (mm)	% Passing
1.18	100%
0.600	99%
0.425	99%
0.300	99%
0.150	99%
0.075	99%
Particle Size (microns)	
46	79%
32	71%
24	65%
17	64%
12	60%
9	57%
7	52%
5	45%
1	27%

Median Particle Size (mm)*	<0.007

Analysis Notes

Samples analysed as received.
** Soil Particle Density required for Hydrometer analysis according to AS 1289.3.5.1—2006 was not requested by the client . Typical sediment SPD values used for calculations and consequently, NATA endorsement does not apply to hydrometer results*

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Sample Comments:

Analysed: 7-Jun-19

Loss on Pretreatment NA

Limit of Reporting: 1%

Sample Description: FINES, SAND, VEG

Dispersion Method Shaker

Test Method: AS1289.3.6.2/AS1289.3.6.3

Soil Particle Density (<2.36mm) 2.65

NATA Accreditation: 825 Site: Newcastle
This document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025. This document shall not be reproduced, except in full.

NATA
WORLD RECOGNISED ACCREDITATION

Peter Keyte
Technical Manager Air
Authorised Signatory

Certificate of Analysis

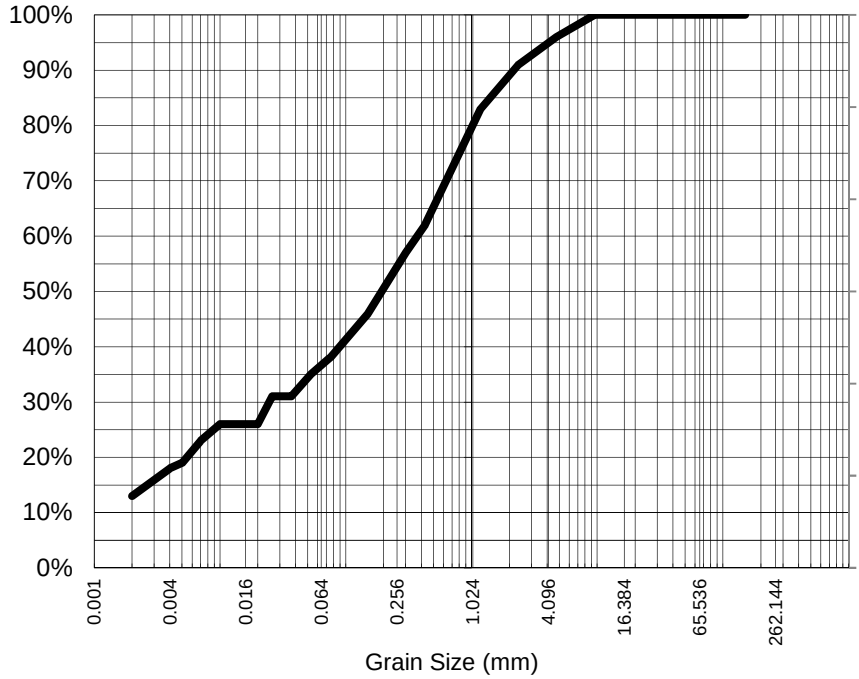
ALS Laboratory Group Pty Ltd
5/585 Maitland Road
Mayfield West, NSW 2304
pH 02 4014 2500
fax 02 4968 0349
samples.newcastle@alsenviro.com

ALS Environmental

Newcastle, NSW

CLIENT:	RICK PLAIN	**DATE REPORTED:**	14-Jun-2019
COMPANY:	HASKONING AUSTRALIA-ROYAL HASKONING	**DATE RECEIVED:**	3-Jun-2019
ADDRESS:	Level 14 56 Berry Street North Sydney	**REPORT NO:**	ES1916915-039 / PSD
PROJECT:	SNOWY 2.0 - VIBROCORING	**SAMPLE ID:**	TAL15 0.35-0.45

Particle Size Distribution



Particle Size (mm)	% Passing
9.50	100%
4.75	96%
2.36	91%
1.18	83%
0.600	69%
0.425	62%
0.300	57%
0.150	46%
0.075	38%
Particle Size (microns)	
53	35%
37	31%
26	31%
20	26%
14	26%
10	26%
7	23%
5	19%
2	13%

Median Particle Size (mm)*	0.205

Analysis Notes

Samples analysed as received.
** Soil Particle Density required for Hydrometer analysis according to AS 1289.3.5.1—2006 was not requested by the client . Typical sediment SPD values used for calculations and consequently, NATA endorsement does not apply to hydrometer results*

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Sample Comments:

Analysed: 7-Jun-19

Loss on Pretreatment NA

Limit of Reporting: 1%

Sample Description: FINES, SAND, VEG

Dispersion Method Shaker

Test Method: AS1289.3.6.2/AS1289.3.6.3

Soil Particle Density (<2.36mm) 2.65

NATA Accreditation: 825 Site: Newcastle
This document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025. This document shall not be reproduced, except in full.

NATA
WORLD RECOGNISED ACCREDITATION

Peter Keyte
Technical Manager Air
Authorised Signatory

Certificate of Analysis

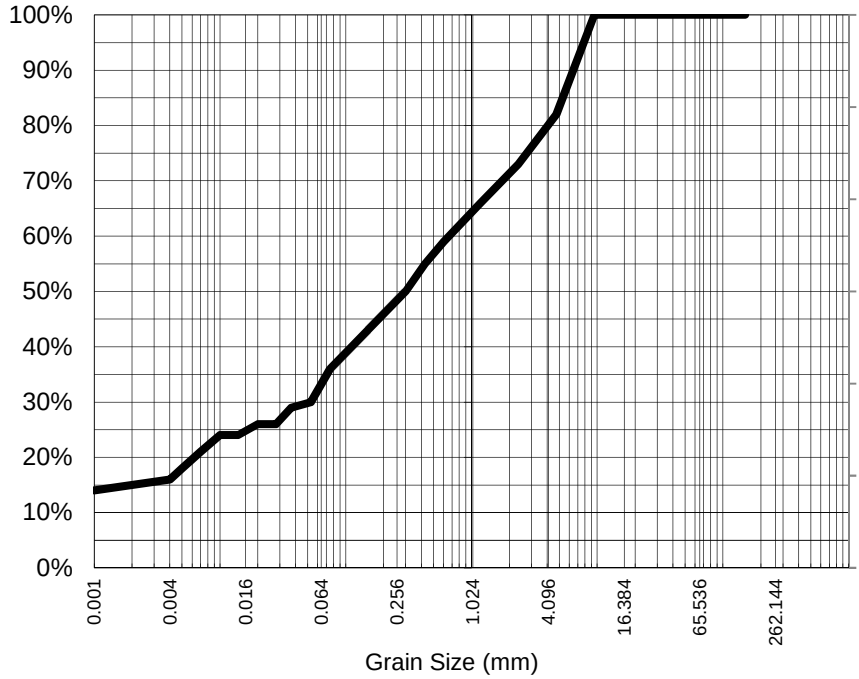
ALS Laboratory Group Pty Ltd
5/585 Maitland Road
Mayfield West, NSW 2304
pH 02 4014 2500
fax 02 4968 0349
samples.newcastle@alsenviro.com

ALS Environmental

Newcastle, NSW

CLIENT:	RICK PLAIN	**DATE REPORTED:**	14-Jun-2019
COMPANY:	HASKONING AUSTRALIA-ROYAL HASKONING	**DATE RECEIVED:**	3-Jun-2019
ADDRESS:	Level 14 56 Berry Street North Sydney	**REPORT NO:**	ES1916915-040 / PSD
PROJECT:	SNOWY 2.0 - VIBROCORING	**SAMPLE ID:**	TAL15 0.45-0.55

Particle Size Distribution



Particle Size (mm)	% Passing
9.50	100%
4.75	82%
2.36	73%
1.18	66%
0.600	59%
0.425	55%
0.300	50%
0.150	43%
0.075	36%
Particle Size (microns)	
53	30%
37	29%
28	26%
20	26%
14	24%
10	24%
7	21%
5	18%
1	14%

Median Particle Size (mm)*	0.300

Analysis Notes

Samples analysed as received.
** Soil Particle Density required for Hydrometer analysis according to AS 1289.3.5.1—2006 was not requested by the client . Typical sediment SPD values used for calculations and consequently, NATA endorsement does not apply to hydrometer results*

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Sample Comments:

Analysed: 7-Jun-19

Loss on Pretreatment NA

Limit of Reporting: 1%

Sample Description: FINES, SAND, VEG

Dispersion Method Shaker

Test Method: AS1289.3.6.2/AS1289.3.6.3

Soil Particle Density (<2.36mm) 2.65

NATA Accreditation: 825 Site: Newcastle
This document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025. This document shall not be reproduced, except in full.

NATA
WORLD RECOGNISED ACCREDITATION

Peter Keyte
Technical Manager Air
Authorised Signatory

Certificate of Analysis

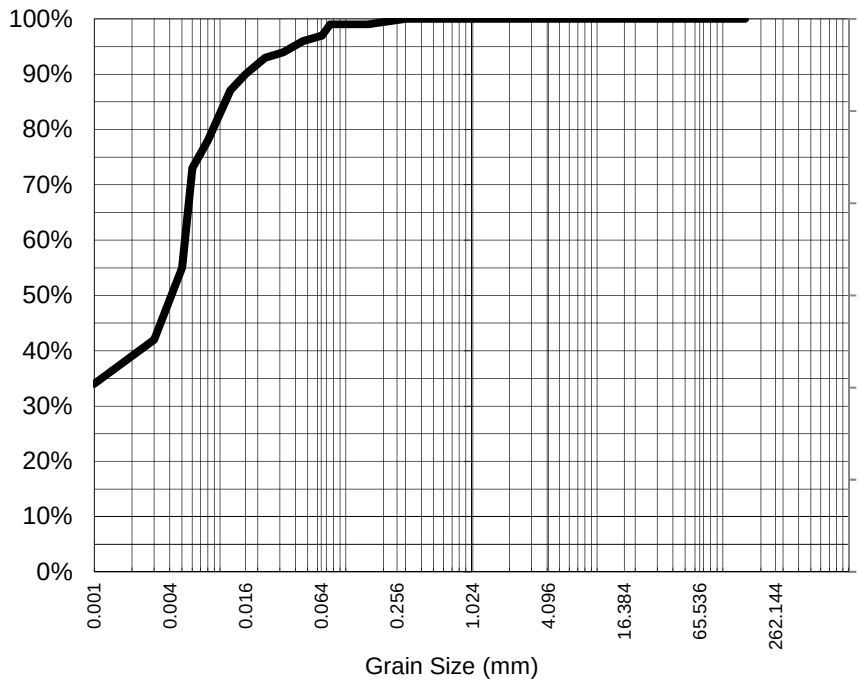
ALS Laboratory Group Pty Ltd
5/585 Maitland Road
Mayfield West, NSW 2304
pH 02 4014 2500
fax 02 4968 0349
samples.newcastle@alsenviro.com

ALS Environmental

Newcastle, NSW

CLIENT:	RICK PLAIN	**DATE REPORTED:**	14-Jun-2019
COMPANY:	HASKONING AUSTRALIA-ROYAL HASKONING	**DATE RECEIVED:**	3-Jun-2019
ADDRESS:	Level 14 56 Berry Street North Sydney	**REPORT NO:**	ES1916915-041 / PSD
PROJECT:	SNOWY 2.0 - VIBROCORING	**SAMPLE ID:**	TAL06 0-0.2

Particle Size Distribution



Particle Size (mm)	% Passing
0.300	100%
0.150	99%
0.075	99%
Particle Size (microns)	
46	96%
32	94%
23	93%
16	90%
12	87%
8	78%
6	73%
5	55%
1	34%

Median Particle Size (mm)*	<0.006

Analysis Notes

Samples analysed as received.
** Soil Particle Density required for Hydrometer analysis according to AS 1289.3.5.1—2006 was not requested by the client . Typical sediment SPD values used for calculations and consequently, NATA endorsement does not apply to hydrometer results*

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Sample Comments:

Analysed: 7-Jun-19

Loss on Pretreatment NA

Limit of Reporting: 1%

Sample Description: FINES, SAND, VEG

Dispersion Method Shaker

Test Method: AS1289.3.6.2/AS1289.3.6.3

Soil Particle Density (<2.36mm) 2.65

NATA Accreditation: 825 Site: Newcastle
This document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025. This document shall not be reproduced, except in full.

NATA
WORLD RECOGNISED ACCREDITATION

Peter Keyte
Technical Manager Air
Authorised Signatory

Certificate of Analysis

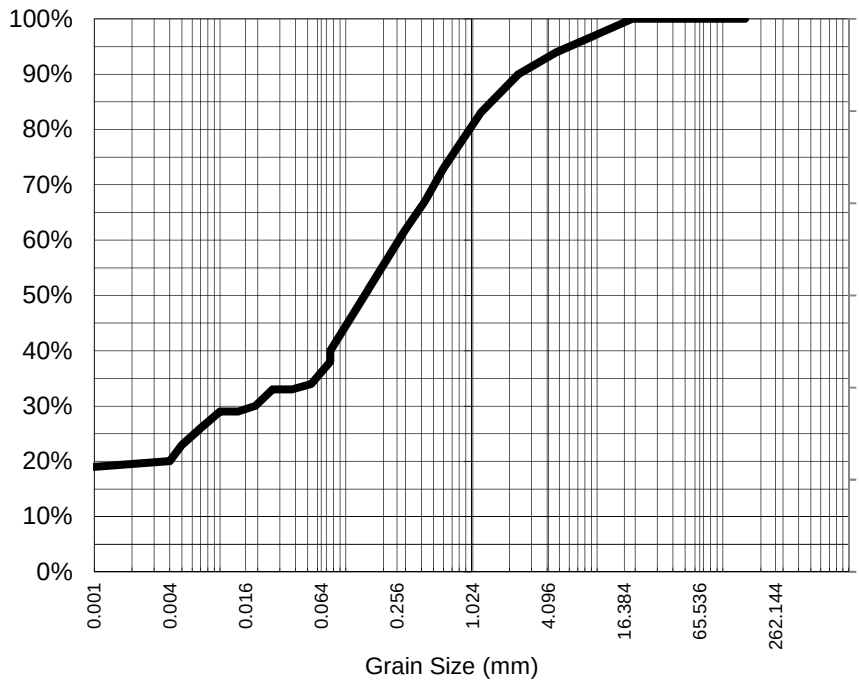
ALS Laboratory Group Pty Ltd
5/585 Maitland Road
Mayfield West, NSW 2304
pH 02 4014 2500
fax 02 4968 0349
samples.newcastle@alsenviro.com

ALS Environmental

Newcastle, NSW

CLIENT:	RICK PLAIN	**DATE REPORTED:**	14-Jun-2019
COMPANY:	HASKONING AUSTRALIA-ROYAL HASKONING	**DATE RECEIVED:**	3-Jun-2019
ADDRESS:	Level 14 56 Berry Street North Sydney	**REPORT NO:**	ES1916915-042 / PSD
PROJECT:	SNOWY 2.0 - VIBROCORING	**SAMPLE ID:**	TAL25 0-0.1

Particle Size Distribution



Particle Size (mm)	% Passing
19.0	100%
9.50	97%
4.75	94%
2.36	90%
1.18	83%
0.600	73%
0.425	67%
0.300	62%
0.150	51%
0.075	40%
Particle Size (microns)	
53	34%
37	33%
26	33%
19	30%
14	29%
10	29%
7	26%
5	23%
1	19%

Median Particle Size (mm)*	0.143

Analysis Notes

Samples analysed as received.
** Soil Particle Density required for Hydrometer analysis according to AS 1289.3.5.1—2006 was not requested by the client . Typical sediment SPD values used for calculations and consequently, NATA endorsement does not apply to hydrometer results*

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Sample Comments:

Analysed: 7-Jun-19

Loss on Pretreatment NA

Limit of Reporting: 1%

Sample Description: FINES, SAND, VEG

Dispersion Method Shaker

Test Method: AS1289.3.6.2/AS1289.3.6.3

Soil Particle Density (<2.36mm) 2.65

NATA Accreditation: 825 Site: Newcastle
This document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025. This document shall not be reproduced, except in full.

NATA
WORLD RECOGNISED ACCREDITATION

Peter Keyte
Technical Manager Air
Authorised Signatory

Certificate of Analysis

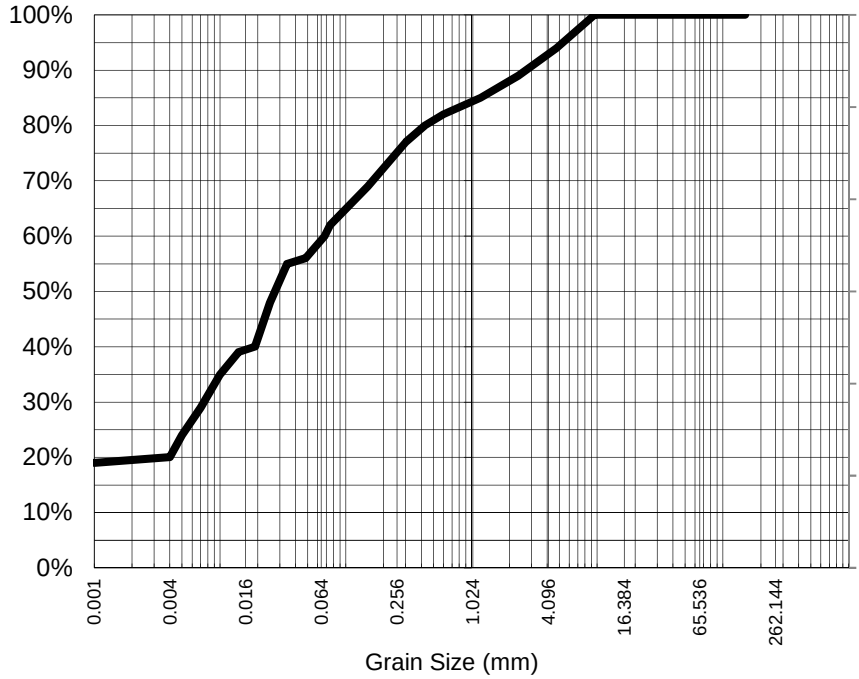
ALS Laboratory Group Pty Ltd
5/585 Maitland Road
Mayfield West, NSW 2304
pH 02 4014 2500
fax 02 4968 0349
samples.newcastle@alsenviro.com

ALS Environmental

Newcastle, NSW

CLIENT:	RICK PLAIN	**DATE REPORTED:**	14-Jun-2019
COMPANY:	HASKONING AUSTRALIA-ROYAL HASKONING	**DATE RECEIVED:**	3-Jun-2019
ADDRESS:	Level 14 56 Berry Street North Sydney	**REPORT NO:**	ES1916915-043 / PSD
PROJECT:	SNOWY 2.0 - VIBROCORING	**SAMPLE ID:**	TAL26 0-0.1

Particle Size Distribution



Particle Size (mm)	% Passing
9.50	100%
4.75	94%
2.36	89%
1.18	85%
0.600	82%
0.425	80%
0.300	77%
0.150	69%
0.075	62%
Particle Size (microns)	
48	56%
34	55%
25	48%
19	40%
14	39%
10	35%
7	29%
5	24%
1	19%

Median Particle Size (mm)*	0.028

Analysis Notes

Samples analysed as received.
** Soil Particle Density required for Hydrometer analysis according to AS 1289.3.5.1—2006 was not requested by the client . Typical sediment SPD values used for calculations and consequently, NATA endorsement does not apply to hydrometer results*

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Sample Comments:

Analysed: 7-Jun-19

Loss on Pretreatment NA

Limit of Reporting: 1%

Sample Description: FINES, SAND, VEG

Dispersion Method Shaker

Test Method: AS1289.3.6.2/AS1289.3.6.3

Soil Particle Density (<2.36mm) 2.65

NATA Accreditation: 825 Site: Newcastle
This document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025. This document shall not be reproduced, except in full.

NATA
WORLD RECOGNISED ACCREDITATION

Peter Keyte
Technical Manager Air
Authorised Signatory