

RICHMOND QUARRY
SURFACE WATER MONITORING RESULTS (MP1-MP5)

ANZECC 2000 Trigger Values ¹				6.5-8.5 ²	0.350 (dS/m)	0.7 (mg/L)	0.055 (mg/L)	0.024 (mg/L)	0.0002 (mg/L)	n/s (mg/L)	0.0014 (mg/L)	0.0006 (mg/L)	0.011 (mg/L)	No visible sheen or detectable odour	50 (mg/L) ³	0.0034 (mg/L)	0.008 (mg/L)	
Spreadsheet Trigger Values				<6.5 or >8.5	>0.35	>0.7	>0.055	>0.024	>0.0002	nil	>0.0014	>0.0006	0.011	nil	>50	>0.0034	>0.008	
Monitoring Point	Date	Quarter / Year	Sampling Conditions	pH	Conductivity	Nitrate (NO ₃)	Aluminium (Al)	Total Arsenic (As)	Cadmium (Cd)	Total Chromium (Cr)	Copper (Cu)	Mercury (Hg)	Nickel (Ni)	Oil & Grease	Total Suspended Solids	Lead (Pb)	Zinc (Zn)	
MP1	17/06/2014	Quarter 3 2014	Flow	5.85	0.157	<0.005	0.808	<0.001	<0.001	<0.001	0.001	<0.0005	0.001	None	4	<0.001	0.004	
	23/10/2014	Quarter 4 2014	Flow	7.13	0.159	0.014	0.1	<0.001	<0.001	<0.001	0.001	<0.0005	0.001	None	9	<0.001	<0.001	
	22/01/2015	Quarter 1 2015	Flow	6.98	0.196	<0.005	0.11	<0.001	<0.001	<0.001	0.001	<0.0005	0.001	None	10	<0.001	0.002	
	6/03/2015	Quarter 2 2015	Flow - following heavy rain	6.87	0.134	0.019	0.09	<0.001	<0.0001	<0.001	0.002	<0.0005	0.001	None	11	<0.001	0.002	
	7/04/2015	Quarter 2 2015	Flow - following heavy rain	6.7	0.123	0.166	1.994	0.001	<0.0001	0.002	0.002	<0.0005	0.002	None	25	<0.001	0.005	
	13/08/2015	Quarter 3 2015	Flow	7.25	0.152	0.024	1.119	<0.001	<0.0001	<0.001	<0.001	<0.0005	0.001	None	11	<0.001	0.002	
	18/12/2015	Quarter 4 2015	Flow	6.18	0.153	0.02	0.281	<0.001	<0.0001	0.001	0.001	<0.0005	0.001	None	20	<0.001	0.006	
		Quarter 1 2016	No Sample															
	26/05/2016	Quarter 2 2016	Flow	7.01	0.152	0.049	0.108	<0.001	<0.0001	<0.001	0.001	<0.0005	<0.001	None	13	<0.001	0.001	
	10/06/2016	Quarter 3 2016	Flow - following heavy rain	6.43	0.123	0.296	0.177	<0.001	<0.001	<0.001	0.001	<0.0005	0.001	None	8	<0.001	0.002	
	16/11/2016	Quarter 4 2016	Flow	7.07	0.164	0.007	0.137	<0.001	<0.001	<0.001	0.001	<0.0005	0.001	None	8	<0.001	0.004	
	21/02/2017	Quarter 1 2017	Flow	7.35	0.188	0.006	1.31	<0.001	<0.001	0.001	0.001	<0.0005	0.001	None	19	<0.001	0.007	
	8/06/2017	Quarter 2 2017	Flow	6.83	0.144	0.086	0.161	<0.001	<0.0001	<0.001	0.001	<0.0005	<0.001	None	18	<0.001	0.002	
	6/09/2017	Quarter 3 2017	Flow	7	0.155	0.02	0.596	<0.001	<0.0001	0.001	0.001	<0.0005	0.001	None	11	<0.001	0.002	
	7/12/2017	Quarter 4 2017	Flow	6.73	0.107	0.055	0.261	<0.001	<0.001	<0.001	0.002	<0.0005	0.001	None	19	<0.001	0.004	
	22/03/2018	Quarter 1 2018	Flow	7.02	0.134	0.036	0.161	<0.001	<0.0001	<0.001	0.001	<0.0005	0.001	None	9	<0.001	0.005	
	21/06/2018	Quarter 2 2018	Flow	6.94	0.158	0.042	0.117	<0.001	<0.0001	<0.001	0.001	<0.0005	0.001	None	8	<0.001	0.006	
	24/09/2018	Quarter 3 2018	Flow	7.27	0.178	0.01	0.541	<0.001	<0.0001	0.001	0.001	<0.0005	0.001	None	11	<0.001	0.006	
	6/12/2018	Quarter 4 2018	Flow	7.06	0.156	<0.005	0.079	<0.001	<0.0001	<0.001	0.013	<0.0005	<0.001	None	12	<0.001	0.003	
	19/03/2019	Quarter 1 2019	Flow	6.81	0.171	0.43	1.52	<0.001	<0.0001	0.002	0.001	<0.0005	0.002	None	16	<0.001	0.004	
	16/07/2019	Quarter 2 2019	Flow	7.03	0.142	0.1	0.992	<0.001	<0.0001	<0.001	<0.001	<0.0005	0.001	None	8	<0.001	0.008	
	10/09/2019	Quarter 3 2019	Flow	7.19	0.157	0.011	1.22	<0.001	0.0011	0.001	0.001	<0.0005	<0.001	None	9	<0.001	0.006	
	11/12/2019	Quarter 4 2019	Flow	7.27	0.28	<0.005	0.22	<0.001	<0.0001	<0.001	0.001	<0.0005	0.001	None	38	<0.001	0.002	
2/04/2020	Quarter 1 2020	Flow	6.77	0.146	0.018	0.163	<0.001	<0.0001	<0.001	<0.001	<0.0005	0.001	None	14	<0.001	0.004		
26/06/2020	Quarter 2 2020	Flow	6.86	0.149	0.041	0.186	<0.001	<0.0001	<0.001	<0.001	<0.0005	0.001	None	12	<0.001	0.005		
24/09/2020	Quarter 3 2020	Flow	6.91	0.154	<0.005	0.129	<0.001	<0.0002	<0.001	0.001	<0.0005	<0.001	None	15	<0.001	0.006		
14/01/2021	Quarter 4 2020	Flow	6.96	0.128	0.053	0.1	<0.001	<0.001	<0.001	0.001	<0.0005	0.001	None	15	<0.001	0.038		
MP2	17/06/2014	Quarter 3 2014	No Discharge															
	23/10/2014	Quarter 4 2014	No Discharge															
	22/01/2015	Quarter 1 2015	No Discharge															
	6/03/2015	Quarter 2 2015	Flow - following heavy rain	6.08	0.185	0.031	0.284	0.001	<0.0001	0.001	0.002	<0.0005	0.003	None	13	<0.001	0.006	
	7/04/2015	Quarter 2 2015	Flow - following heavy rain	6.38	0.111	0.035	2.894	<0.001	0	0.002	0.004	<0.0005	0.004	None	6	<0.001	0.025	
	13/08/2015	Quarter 3 2015	Minimal flow	6.37	0.244	<0.005	0.554	<0.001	<0.0001	0.001	0.002	<0.0005	0.002	None	33	<0.001	0.006	
	18/12/2015	Quarter 4 2015	Minimal flow	5.78	0.151	0.003	0.18	0.001	<0.0001	<0.001	0.001	<0.0005	0.001	None	24	<0.001	0.032	

ANZECC 2000 Trigger Values ¹			6.5-8.5 ²	0.350 (dS/m)	0.7 (mg/L)	0.055 (mg/L)	0.024 (mg/L)	0.0002 (mg/L)	n/s (mg/L)	0.0014 (mg/L)	0.0006 (mg/L)	0.011 (mg/L)	No visible sheen or detectable odour	50 (mg/L) ³	0.0034 (mg/L)	0.008 (mg/L)	
	26/05/2016	Quarter 2 2016	No Discharge														
	10/06/2016	Quarter 3 2016	Flow - following heavy rain	5.94	0.093	<0.005	0.992	<0.001	<0.001	0.001	0.002	<0.0005	0.001	None	17	<0.001	0.015
	16/11/2016	Quarter 4 2016	No Discharge														
	21/02/2017	Quarter 1 2017	No Discharge														
	8/06/2017	Quarter 2 2017	Flow	5.62	0.204	<0.005	0.434	<0.001	<0.0001	0.001	0.001	<0.0005	0.002	None	23	<0.001	0.008
	6/09/2017	Quarter 3 2017	No Discharge														
	7/12/2017	Quarter 4 2017	Flow	6.01	0.111	<0.005	0.532	<0.001	<0.001	0.001	0.002	<0.0005	0.003	None	12	<0.001	0.013
	22/03/2018	Quarter 1 2018	Flow	6.01	0.174	0.006	0.426	<0.001	<0.0001	0.001	0.002	<0.0005	0.002	None	41	<0.001	0.008
	21/06/2018	Quarter 2 2018	Flow	6.65	0.179	0.031	0.151	<0.001	<0.0001	<0.001	0.001	<0.0005	<0.001	None	10	<0.001	0.005
	24/09/2018	Quarter 3 2018	Flow	7.27	0.184	0.005	0.585	<0.001	<0.0001	<0.001	0.001	<0.0005	0.001	None	15	<0.001	0.005
	6/12/2018	Quarter 4 2018	Flow	7.05	0.156	<0.005	0.095	<0.001	<0.0001	<0.001	0.001	<0.0005	<0.001	None	12	<0.001	0.003
	19/03/2019	Quarter 1 2019	Flow	6.79	0.168	0.065	1.49	<0.001	<0.0001	0.002	0.001	<0.0005	0.002	None	18	<0.001	0.007
	16/07/2019	Quarter 2 2019	Flow	6.69	0.156	0.065	0.907	<0.001	<0.0001	<0.001	0.001	<0.0005	0.001	None	8	<0.001	0.009
	10/09/2019	Quarter 3 2019	Flow	7.23	0.159	<0.005	1.25	<0.001	0.0012	0.001	<0.001	<0.0005	<0.001	None	8	<0.001	0.003
	11/12/2019	Quarter 4 2019	Flow	7.26	0.282	<0.005	0.215	<0.001	<0.0001	<0.001	<0.001	<0.0005	0.001	None	29	<0.001	0.002
	2/04/2020	Quarter 1 2020	Flow	6.69	0.149	0.016	0.185	<0.001	<0.0001	<0.001	<0.001	<0.0005	0.001	None	13	<0.001	0.005
	26/06/2020	Quarter 2 2020	Flow	6.26	0.172	0.035	0.194	<0.001	<0.0001	<0.001	<0.001	<0.0005	0.002	None	16	<0.001	0.012
	24/09/2020	Quarter 3 2020	Flow	7.04	0.169	<0.005	0.19	<0.001	<0.0002	<0.001	0.002	<0.0005	<0.001	None	16	<0.001	0.006
	14/01/2021	Quarter 4 2020	Flow	5.96	0.176	<0.005	0.212	<0.001	<0.001	<0.001	0.002	<0.0005	0.003	None	6	<0.001	0.006
MP4	17/06/2014	Quarter 3 2014	Insufficient Water Levels														
	23/10/2014	Quarter 4 2014	Insufficient Water Levels														
	22/01/2015	Quarter 1 2015	Insufficient Water Levels														
	6/03/2015	Quarter 2 2015	Insufficient Water Levels														
	7/04/2015	Quarter 2 2015	Insufficient Water Levels														
	13/08/2015	Quarter 3 2015	Insufficient Water Levels														
	18/12/2015	Quarter 4 2015	Insufficient Water Levels														
		Quarter 1 2016															
	26/05/2016	Quarter 2 2016	Insufficient Water Levels														
	10/06/2016	Quarter 3 2016	Flow - following heavy rain	5.45	0.137	0.005	0.197	<0.001	<0.001	<0.001	0.001	<0.0005	0.001	None	4	<0.001	0.004
	16/11/2016	Quarter 4 2016	Insufficient Water Levels														
	21/02/2017	Quarter 1 2017	Insufficient Water Levels														
	8/06/2017	Quarter 2 2017	Insufficient Water Levels														
	6/09/2017	Quarter 3 2017	Insufficient Water Levels														
	7/12/2017	Quarter 4 2017	Insufficient Water Levels														
	22/03/2018	Quarter 1 2018	Insufficient Water Levels														
	21/06/2018	Quarter 2 2018	Insufficient Water Levels														
	24/09/2018	Quarter 3 2018	Insufficient Water Levels														

ANZECC 2000 Trigger Values ¹			6.5-8.5 ²	0.350 (dS/m)	0.7 (mg/L)	0.055 (mg/L)	0.024 (mg/L)	0.0002 (mg/L)	n/s (mg/L)	0.0014 (mg/L)	0.0006 (mg/L)	0.011 (mg/L)	No visible sheen or detectable odour	50 (mg/L) ³	0.0034 (mg/L)	0.008 (mg/L)	
	6/12/2018	Quarter 4 2018	Insufficient Water Levels														
	19/03/2019	Quarter 1 2019	Insufficient Water Levels														
	16/07/2019	Quarter 2 2019	Insufficient Water Levels														
	10/09/2019	Quarter 3 2019	Insufficient Water Levels														
	11/12/2019	Quarter 4 2019	Insufficient Water Levels														
	2/04/2020	Quarter 1 2020	Insufficient Water Levels														
	26/06/2020	Quarter 2 2020	Insufficient Water Levels														
	24/09/2020	Quarter 3 2020	Insufficient Water Levels														
	14/01/2021	Quarter 4 2020	Insufficient Water Levels														
MPS	17/06/2014	Quarter 3 2014	No discharge from WRD														
	23/10/2014	Quarter 4 2014	Yes	5.54	0.102	0.015	0.35	<0.001	<0.001	<0.001	<0.001	<0.0005	<0.001	None	44	<0.001	0.001
	22/01/2015	Quarter 1 2015	Yes	5.29	0.123	<0.005	0.184	<0.001	<0.001	<0.001	<0.001	<0.0005	<0.001	None	6	<0.001	0.002
	6/03/2015	Quarter 2 2015	Yes	5.74	0.076	0.005	0.445	<0.001	<0.0001	<0.001	<0.001	<0.0005	0.001	None	66	<0.001	0.002
	7/04/2015	Quarter 2 2015	Yes - following heavy rain	5.71	0.074	0.058	2.335	0.001	<0.0001	0.001	0.001	<0.0005	0.001	None	266	0.001	0.003
	13/08/115	Quarter 3 2015	Yes	5.47	0.059	0.119	1.552	<0.001	<0.0001	0.001	<0.001	<0.0005	<0.001	None	262	0.001	0.002
	18/12/2015	Quarter 4 2015	Yes	4.42	0.061	0.027	3.984	<0.001	<0.0001	0.003	<0.001	<0.0005	0.001	None	72	0.001	0.006
		Quarter 1 2016			0										0		
	26/05/2016	Quarter 2 2016	Yes	5.62	0.063	0.031	0.539	<0.001	<0.0001	<0.001	<0.001	<0.0005	<0.001	None	78	<0.001	0.001
	10/06/2016	Quarter 3 2016	Flow - following heavy rain	4.48	0.049	0.095	2.078	<0.001	<0.001	0.001	0.001	<0.0005	<0.001	None	478	0.002	0.003
	16/11/2016	Quarter 4 2016	Yes	5.55	0.066	0.041	0.419	<0.001	<0.001	<0.001	0.001	<0.005	<0.001	None	45	<0.001	0.004
	21/02/2017	Quarter 1 2017	Yes	5.55	0.067	<0.005	2.231	<0.001	<0.001	0.001	<0.001	<0.0005	<0.001	None	18	<0.001	0.004
	8/06/2017	Quarter 2 2017	Yes	4.99	0.045	0.268	1.153	<0.001	<0.0001	0.001	0.001	<0.0005	<0.001	None	141	0.001	0.003
	6/09/2017	Quarter 3 2017	Yes	5.46	0.043	0.188	2.463	<0.001	<0.0001	0.001	0.001	<0.0005	<0.001	None	236	0.002	0.003
	7/12/2017	Quarter 4 2017	Yes	5.71	0.05	<0.005	0.787	<0.001	<0.001	<0.001	0.001	<0.0005	<0.001	None	95	0.001	0.005
	22/03/2018	Quarter 1 2018	Yes	5.82	0.05	0.012	0.445	<0.001	<0.0001	<0.001	0.001	<0.0005	<0.001	None	69	<0.001	0.004
	21/06/2018	Quarter 2 2018	Yes	5.37	0.059	0.009	0.415	<0.001	<0.0001	<0.001	0.001	<0.0005	<0.001	None	76	0.001	0.004
	24/09/2018	Quarter 3 2018	Yes	4.88	0.082	0.008	0.286	<0.001	<0.0001	<0.001	0.005	<0.0005	0.001	None	15	0.001	0.004
	6/12/2018	Quarter 4 2018	Yes	6.72	0.086	0.005	0.069	<0.001	<0.001	<0.001	0.008	<0.0005	0.003	None	11	0.002	0.022
	19/03/2019	Quarter 1 2019	Yes	4.73	0.178	<0.005	0.294	<0.001	0.0001	<0.001	0.011	<0.0005	0.005	None	14	0.004	0.035
	16/07/2019	Quarter 2 2019	Yes	5.22	0.165	<0.005	0.22	<0.001	0.0001	<0.001	0.005	<0.0005	0.006	None	4	<0.001	0.035
	10/09/2019	Quarter 3 2019	Yes	7.16	0.189	<0.005	0.159	<0.001	0.0002	<0.001	0.002	<0.0005	0.004	None	2	<0.001	0.017
	11/12/2019	Quarter 4 2019	Yes	7.72	0.213	<0.005	0.091	<0.001	<0.0001	<0.001	<0.001	<0.0005	<0.001	None	6	<0.001	<0.001
	2/04/2020	Quarter 1 2020	Yes	6.84	0.105	0.006	0.067	<0.001	<0.0001	<0.001	<0.001	<0.0005	0.001	None	2	<0.001	0.003
	26/06/2020	Quarter 2 2020	Yes	5.9	0.107	<0.005	0.091	<0.001	<0.0001	<0.001	<0.001	<0.0005	0.002	None	5	<0.001	0.006
	24/09/2020	Quarter 3 2020	Yes	6.97	0.105	<0.005	0.056	<0.001	<0.0002	<0.001	0.001	<0.0005	0.002	None	2	<0.001	0.007
	14/01/2021	Quarter 4 2020	Yes	6.46	0.077	<0.005	0.133	<0.001	<0.001	<0.001	<0.001	<0.0005	0.002	None	5	<0.001	0.046

1. Initially data will be compared against ANZECC Trigger Values with the aim to develop site specific trigger levels after 2 years of operations once a larger data set is available.

2. pH level required will be reviewed following collection of baseline monitoring data in accordance with the Project Approval. Specifically it is noted that the pH of nearby soil and receiving waters are mildly acidic pH4.5-pH5.3. The natural acidic soil conditions encountered at the Project Site and subsequent influence on runoff may require that maintenance of ambient condition is the preferred water quality goal.

3. Maximum level once the stormwater management system is constructed and operational as per EPL 20562. Exceedance permitted at overflow point for duration of overflow when wet weather overflow is occurring due to stormwater events ≥ 60.2mm in total falling over any consecutive 5 day period.

4. Data in **bold** indicates the data is outside the trigger levels.