Annex F5

Groundwater Monitoring Results

Table F5.1 Groundwater Monitoring Results (July 2022)

Parameters	Units	MWX-1	MWX-2	MWX-3	MWX-4	MWX-5	MWX-6	MWX-7	MWX-8	MWX-9	MWX-10	MWX-11	MWX-12	MWX-13	MWX-14
Water Level	mPD	3.5	3.63	3.7	3.73	3.76	3.76	3.37	3.62	4.59	4.74	4.73	7.17	38.35	46.08
Bicarbonate Alkalinity as CaCO3	mg/L	107	276	163	<1	36	<1	<1	<1	171	173	122	56	16	11
Carbonate Alkalinity as CaCO3	mg/L	<1	<1	<1	61	22	103	91	82	<1	<1	<1	<1	<1	<1
Total Alkalinity as CaCO3	mg/L	107	276	163	68	58	170	141	116	171	173	122	56	16	11
pH Value	pH Unit	8	7.9	7.8	10.3	9.4	11.3	11.1	10.7	8.1	7.6	7.6	6.9	5.7	5.3
Electrical Conductivity	µS/cm	702	2060	1080	681	883	1300	1300	3140	14600	1380	433	319	92	120
Ammonia as N	mg/L	0.26	0.21	1.12	2	0.55	3.25	4.85	14	0.63	<0.01	0.02	0.01	<0.01	<0.01
Chloride	mg/L	101	338	154	108	127	169	195	1020	4130	228	36	18	14	22
Nitrite as N	mg/L	<0.01	0.01	<0.01	<0.01	0.02	<0.01	<0.01	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Reactive Phosphorus as P	mg/L	<0.01	0.07	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	0.05	0.02	<0.01	0.03	<0.01	<0.01
Sulphate as SO4 - Turbidimetric	mg/L	70	209	132	81	135	132	138	42	795	154	45	68	3	4
Sulphide as S2	mg/L	0.1	<0.1	<0.1	3.4	<0.1	3.6	5.1	13	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total Kjeldahl Nitrogen as N	mg/L	0.4	0.4	1.3	2	0.9	3.7	5.1	14.2	0.9	0.1	0.1	<0.1	<0.1	<0.1
Nitrate as N	mg/L	<0.01	0.78	0.06	<0.01	<0.01	<0.01	<0.01	<0.01	0.06	<0.01	0.17	<0.01	0.13	0.18
Total Nitrogen as N	mg/L	0.4	1.2	1.4	2	0.9	3.7	5.1	14.2	1	0.1	0.3	<0.1	0.2	0.2
Boron	µg/L	110	290	190	220	220	200	220	540	2690	160	90	20	20	20
Calcium	mg/L	42.8	78.4	91.3	18.5	18.2	36.4	23.9	71.3	111	104	45.7	28.6	0.92	1.4
Mercury	µg/L	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Magnesium	mg/L	4.95	75.2	6.42	1.32	0.31	<0.05	<0.05	0.13	228	11.1	2.54	4.58	1	1.2
Sodium	mg/L	73	224	106	92.1	123	161	186	582	2460	156	33.2	24	13	16.2
Iron	mg/L	0.05	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	0.32	<0.04	<0.04
Potassium	mg/L	17.1	22.6	27.1	27.4	47.8	62.4	53.1	4.06	11.8	12.4	7.43	2.93	3.81	4.16
Cadmium	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Chromium	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Copper	µg/L	<1	<1	<1	<1	2	<1	<1	<1	<1	1	2	<1	<1	<1
Lead	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Manganese	µg/L	517	366	936	2	3	<1	<1	<1	229	1490	9	738	17	16
Nickel	µg/L	<1	<1	<1	<1	<1	1	2	<1	<1	<1	<1	<1	<1	<1
Zinc	µg/L	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	13	10	12
Biochemical Oxygen Demand	mg/L	<2	<2	2	<2	<2	3	<2	13	<2	<2	<2	<2	<2	<2
Chemical Oxygen Demand	mg/L	26	6	15	16	12	32	35	42	60	15	9	<2	<2	6
Total Organic Carbon	mg/L	6	2	9	7	8	11	14	12	6	6	5	1	1	4

Table F5.2 Groundwater Monitoring Results (August 2022)

Parameters	Units	MWX-1	MWX-2	MWX-3	MWX-4	MWX-5	MWX-6	MWX-7	MWX-8	MWX-9	MWX-10	MWX-11	MWX-12	MWX-13	MWX-14
Water Level	mPD	3.58	3.69	3.79	3.87	3.95	3.83	3.31	3.61	4.36	4.38	5.46	7.28	38.57	45.07
Bicarbonate Alkalinity as CaCO3	mg/L	95	210	178	<1	49	<1	<1	<1	60	182	143	59	18	12
Carbonate Alkalinity as CaCO3	mg/L	<1	<1	<1	76	22	134	111	82	<1	<1	<1	<1	<1	<1
Total Alkalinity as CaCO3	mg/L	95	210	178	100	71	200	152	109	60	182	143	59	18	12
pH Value	pH Unit	8.2	8	7.9	10.8	9.4	11.4	11	10.7	8.2	7.7	7.9	7	6.1	5.8
Electrical Conductivity	µS/cm	536	6390	1120	834	828	1360	1380	2480	2400	1280	408	325	96	122
Ammonia as N	mg/L	0.2	1.38	1.29	1.91	0.55	2.79	5.63	9.22	0.97	0.01	0.01	<0.01	0.03	<0.01
Chloride	mg/L	81	1950	176	133	117	197	274	636	520	221	28	21	15	24
Nitrite as N	mg/L	<0.01	0.34	0.01	0.01	<0.01	<0.01	<0.01	0.32	0.16	<0.01	<0.01	<0.01	<0.01	<0.01
Reactive Phosphorus as P	mg/L	<0.01	<0.01	0.04	<0.01	<0.01	<0.01	0.01	<0.01	<0.01	0.02	<0.01	0.04	<0.01	<0.01
Sulphate as SO4 - Turbidimetric	mg/L	42	310	123	91	135	112	97	116	388	151	30	65	3	5
Sulphide as S2	mg/L	0.1	<0.1	<0.1	5.6	0.4	11.3	14.2	9.8	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total Kjeldahl Nitrogen as N	mg/L	0.4	1.5	1.6	2.3	1	3.6	6.5	10.2	1.6	0.2	<0.1	<0.1	<0.1	<0.1
Nitrate as N	mg/L	<0.01	0.17	<0.01	<0.01	<0.01	<0.01	0.01	0.07	2.3	<0.01	0.1	<0.01	0.13	0.17
Total Nitrogen as N	mg/L	0.4	2	1.6	2.3	1	3.6	6.6	10.6	4	0.2	0.2	<0.1	0.2	0.2
Boron	µg/L	100	970	220	210	240	180	250	410	640	230	80	30	20	20
Calcium	mg/L	28.1	90	85.3	32.1	14.1	39.7	22.2	42.1	82.6	90.8	46.9	28.5	0.84	1.19
Mercury	µg/L	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Magnesium	mg/L	4.49	106	5.64	0.28	0.19	<0.05	<0.05	0.09	25.5	9.43	2.58	4.33	0.96	1.2
Sodium	mg/L	53.9	1060	105	104	113	162	196	320	407	133	24.6	23.8	12.6	15.2
Iron	mg/L	0.05	<0.04	0.07	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	0.53	<0.04	<0.04
Potassium	mg/L	12.7	48.7	27.2	28.5	45.8	62.5	51.9	49.4	46.5	11.4	6.76	2.92	3.78	4.25
Cadmium	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Chromium	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Copper	µg/L	<1	1	<1	<1	2	<1	<1	<1	2	<1	<1	<1	2	4
Lead	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Manganese	µg/L	336	130	854	3	2	<1	<1	<1	50	986	13	778	35	11
Nickel	µg/L	<1	<1	<1	<1	<1	1	2	2	1	<1	<1	<1	<1	<1
Zinc	µg/L	<10	<10	<10	12	<10	<10	<10	<10	<10	<10	<10	11	11	14
Biochemical Oxygen Demand	mg/L	<2	<2	2	<2	<2	6	3	<2	<2	<2	<2	2	<2	<2
Chemical Oxygen Demand	mg/L	10	17	19	21	20	30	43	29	28	8	7	6	6	5
Total Organic Carbon	mg/L	2	<1	6	6	7	9	12	11	8	1	2	1	1	<1

Table F5.3 Groundwater Monitoring Results (September 2022)

Parameters	Units	MWX-1	MWX-2	MWX-3	MWX-4	MWX-5	MWX-6	MWX-7	MWX-8	MWX-9	MWX-10	MWX-11	MWX-12	MWX-13	MWX-14
Water Level	mPD	3.09	3.3	3.21	3.32	3.38	3.3	2.88	3.14	3.65	3.81	4.01	6.99	37.41	45.7
Bicarbonate Alkalinity as CaCO3	mg/L	108	269	155	<1	20	<1	<1	<1	108	173	132	58	18	12
Carbonate Alkalinity as CaCO3	mg/L	<1	<1	<1	92	38	145	122	102	<1	<1	<1	<1	<1	<1
Total Alkalinity as CaCO3	mg/L	108	269	155	118	57	185	155	123	108	173	132	58	18	12
pH Value	pH Unit	8.2	8.2	8.2	11.2	9.8	11.3	11.2	11.1	8.2	7.9	7.3	7.2	6	5.6
Electrical Conductivity	µS/cm	1570	989	1240	833	1000	1250	1200	1620	8450	1220	335	315	91	117
Ammonia as N	mg/L	0.59	0.04	1.78	2.88	1.48	3.54	5.04	5.74	1.68	<0.01	<0.01	<0.01	0.03	<0.01
Chloride	mg/L	373	53	205	132	173	193	185	297	2510	214	20	21	14	25
Nitrite as N	mg/L	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.05	0.15	<0.01	<0.01	<0.01	<0.01	<0.01
Reactive Phosphorus as P	mg/L	0.02	0.01	0.01	<0.01	<0.01	0.01	0.01	<0.01	0.03	0.03	0.01	0.04	0.01	<0.01
Sulphate as SO4 - Turbidimetric	mg/L	77	179	132	75	133	109	127	177	567	124	12	64	3	4
Sulphide as S2	mg/L	0.2	<0.1	0.1	5.4	2	9.2	7.5	0.9	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total Kjeldahl Nitrogen as N	mg/L	0.7	0.2	1.9	3	1.7	3.9	5.4	6.1	1.8	<0.1	<0.1	<0.1	<0.1	<0.1
Nitrate as N	mg/L	<0.01	0.71	<0.01	<0.01	<0.01	<0.01	0.01	0.02	1.6	<0.01	0.05	<0.01	0.12	0.17
Total Nitrogen as N	mg/L	0.7	0.9	1.9	3	1.7	3.9	5.4	6.2	3.5	<0.1	<0.1	<0.1	0.2	0.2
Boron	µg/L	200	190	210	190	210	190	200	180	560	150	40	20	20	10
Calcium	mg/L	57.4	62	80.6	36.2	16.2	32.9	27.1	40.8	141	93.4	41.9	29.2	0.97	1.12
Mercury	µg/L	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Magnesium	mg/L	13.3	56.4	5.59	<0.05	0.17	<0.05	<0.05	0.06	31.5	10.2	2.38	4.53	1.08	1.25
Sodium	mg/L	185	61.3	117	90.8	145	152	153	209	525	140	21	25.3	13.8	16.7
Iron	mg/L	0.1	<0.04	0.15	<0.04	0.24	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	0.62	0.15	<0.04
Potassium	mg/L	19.8	13.6	28.2	28.3	50.1	57.1	47.8	64.9	63.2	11.4	6.25	3.35	4.28	4.75
Cadmium	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Chromium	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Copper	µg/L	<1	2	<1	<1	<1	<1	<1	<1	2	<1	<1	<1	1	2
Lead	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Manganese	µg/L	806	174	1060	<1	1	<1	<1	<1	64	1690	15	797	32	12
Nickel	µg/L	<1	<1	<1	<1	1	1	2	3	1	<1	<1	<1	<1	<1
Zinc	µg/L	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	11	10
Biochemical Oxygen Demand	mg/L	<2	<2	<2	<2	<2	<2	4	<2	<2	<2	<2	<2	<2	<2
Chemical Oxygen Demand	mg/L	15	5	21	26	24	44	42	27	29	5	3	<2	<2	<2
Total Organic Carbon	mg/L	3	<1	7	6	7	10	10	11	12	1	1	1	<1	<1

Figure F5.1 Graphical Presentation for Groundwater Monitoring (MWX-1)

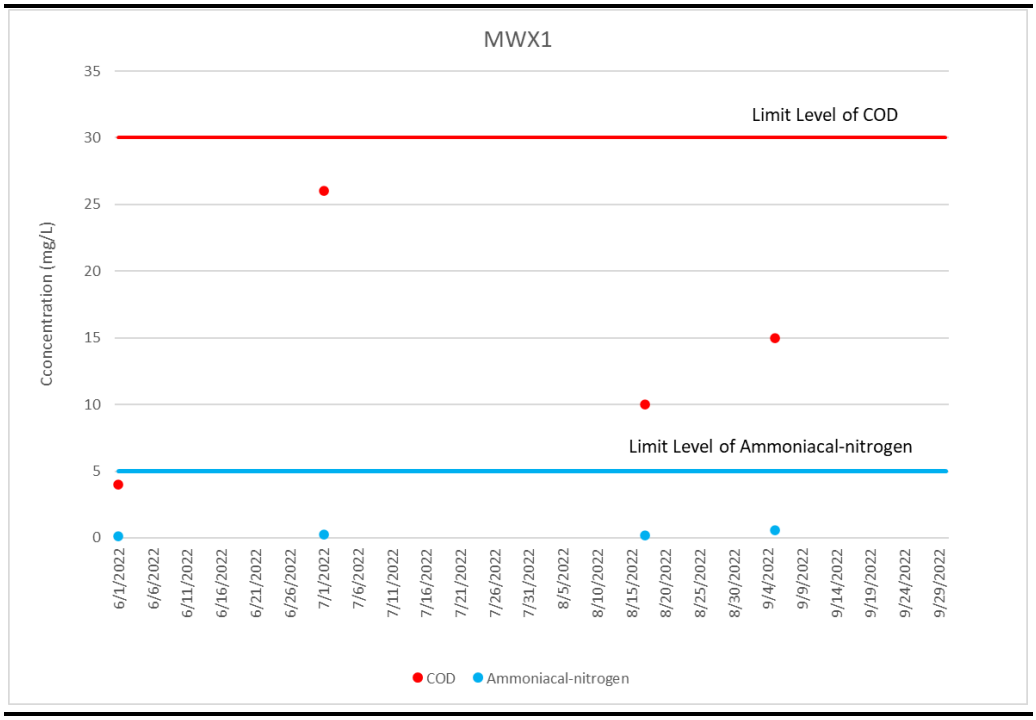

Figure F5.2 Graphical Presentation for Groundwater Monitoring (MWX-2)

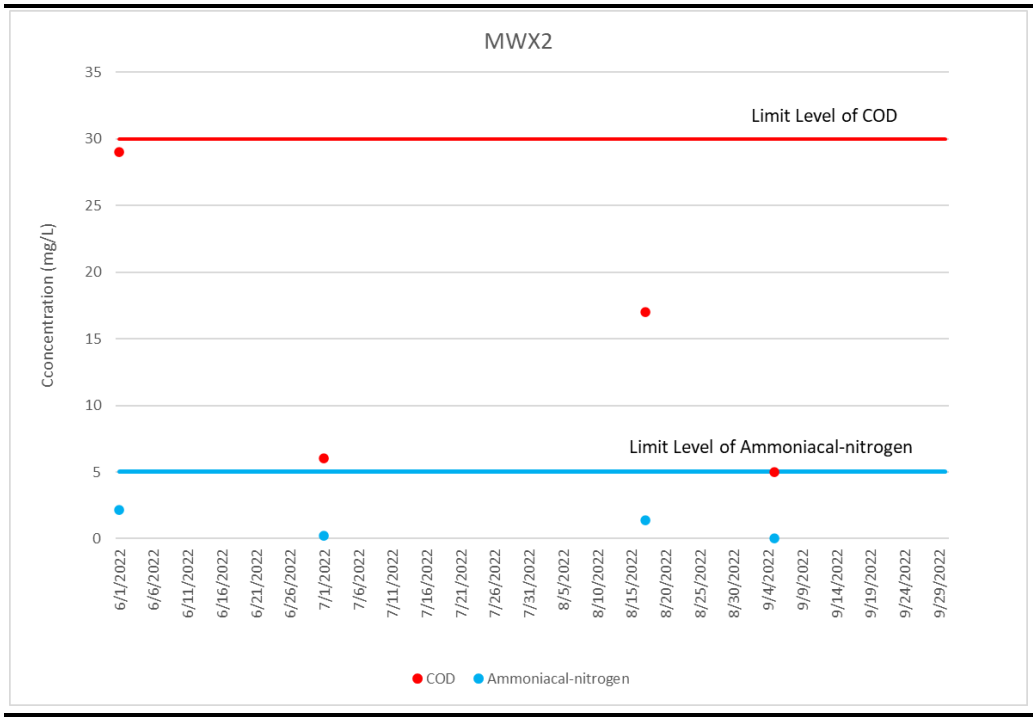

Figure F5.3 Graphical Presentation for Groundwater Monitoring (MWX-3)

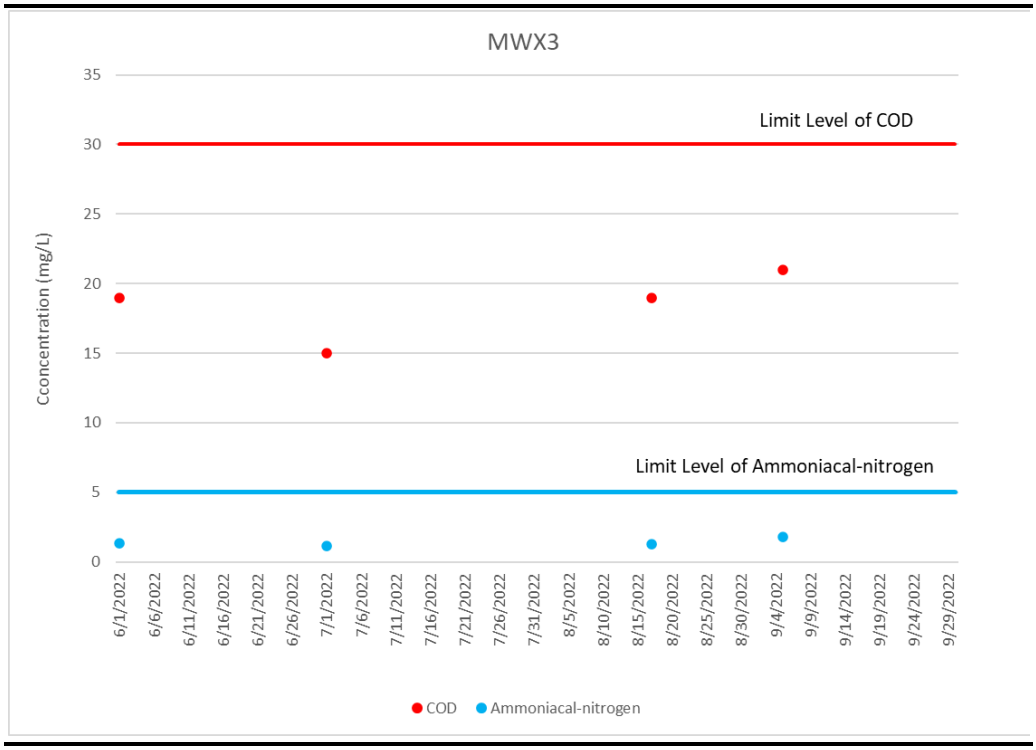

Figure F5.4 Graphical Presentation for Groundwater Monitoring (MWX-4)

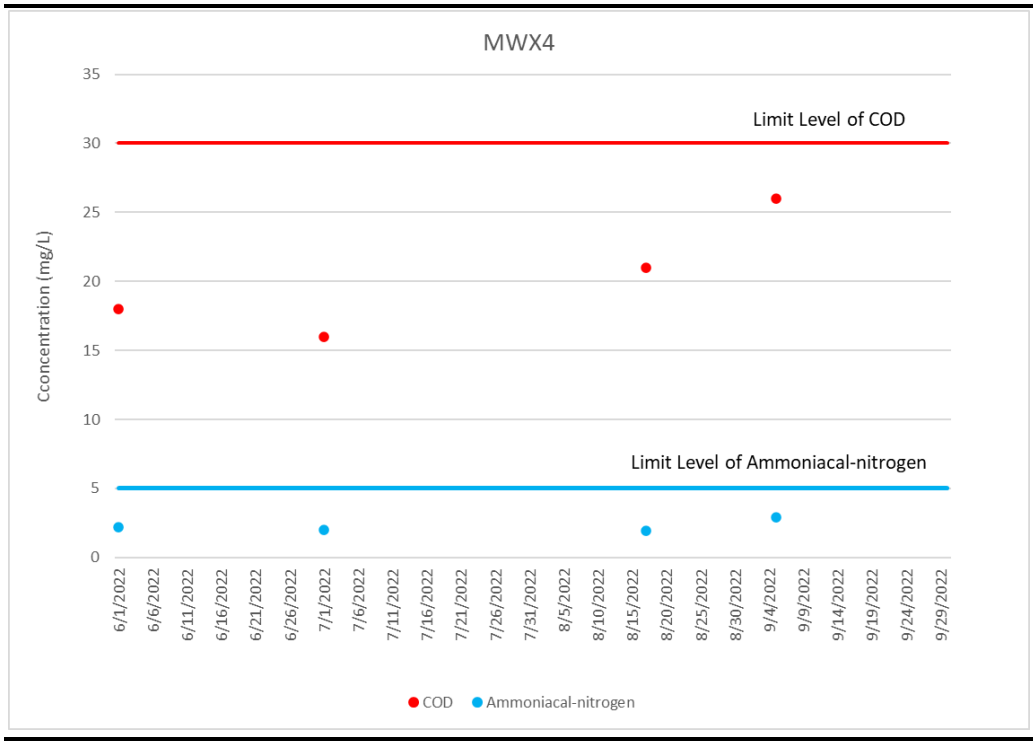

Figure F5.5 Graphical Presentation for Groundwater Monitoring (MWX-5)

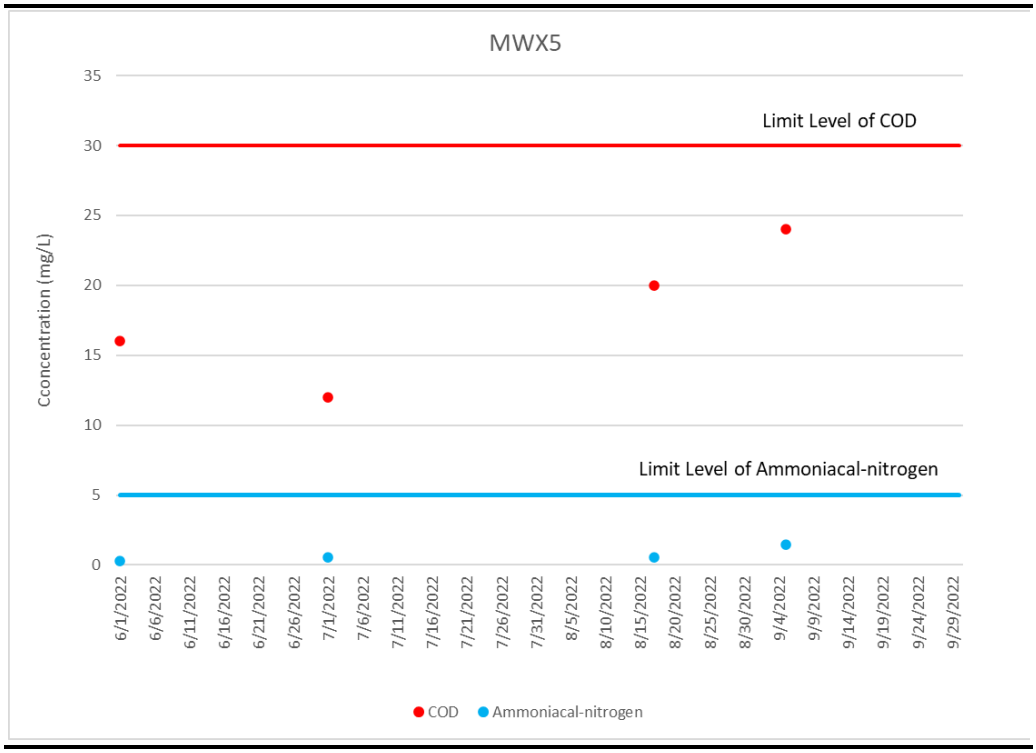

Figure F5.6 Graphical Presentation for Groundwater Monitoring (MWX-6)

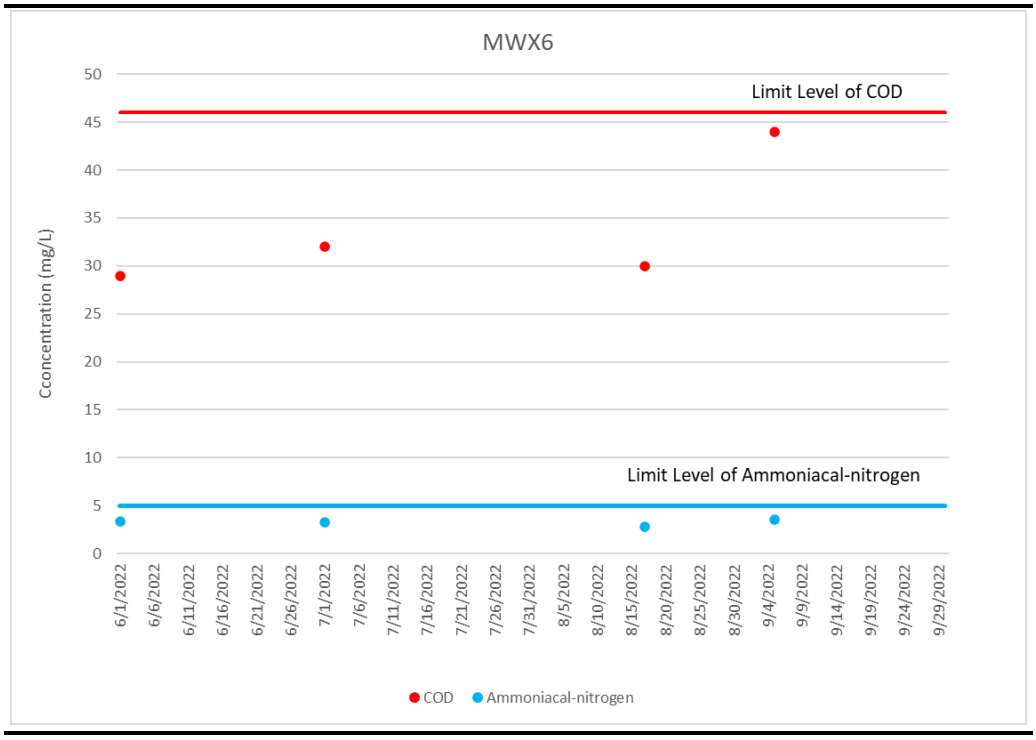

Figure F5.7 Graphical Presentation for Groundwater Monitoring (MWX-7)

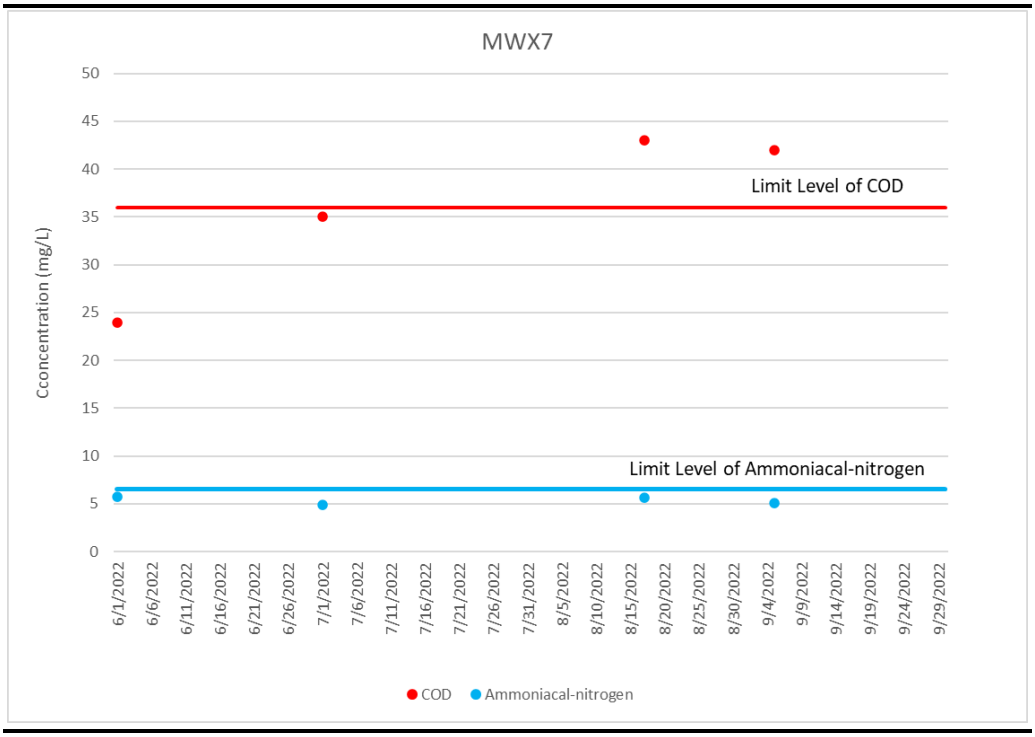

Figure F5.8 Graphical Presentation for Groundwater Monitoring (MWX-8)

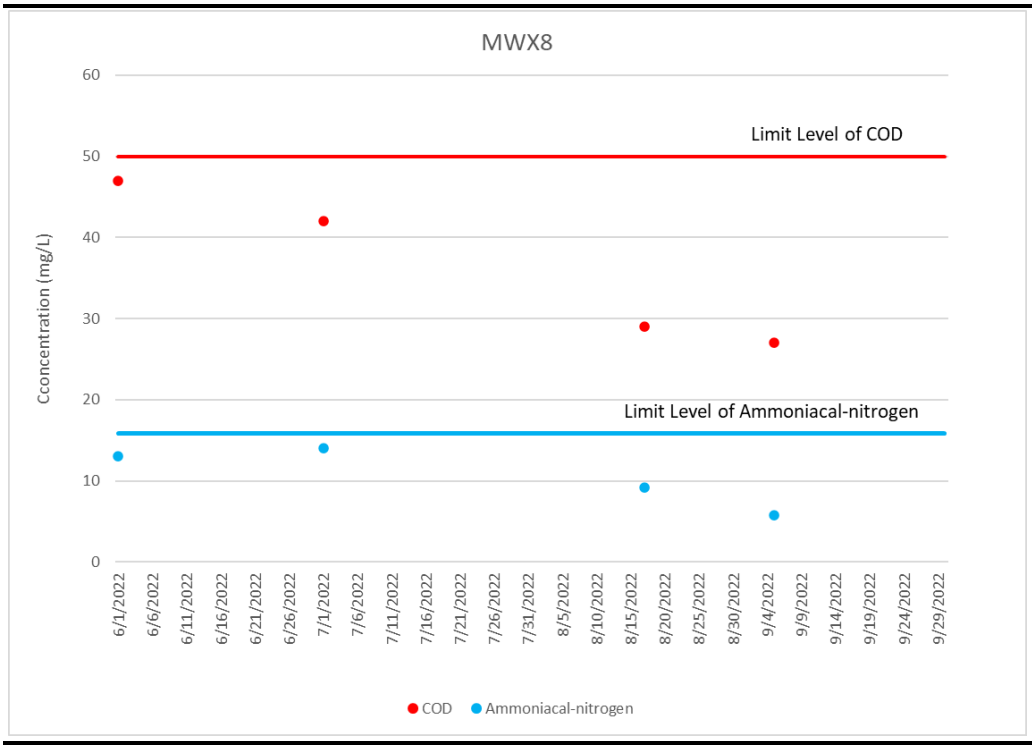

Figure F5.9 Graphical Presentation for Groundwater Monitoring (MWX-9)

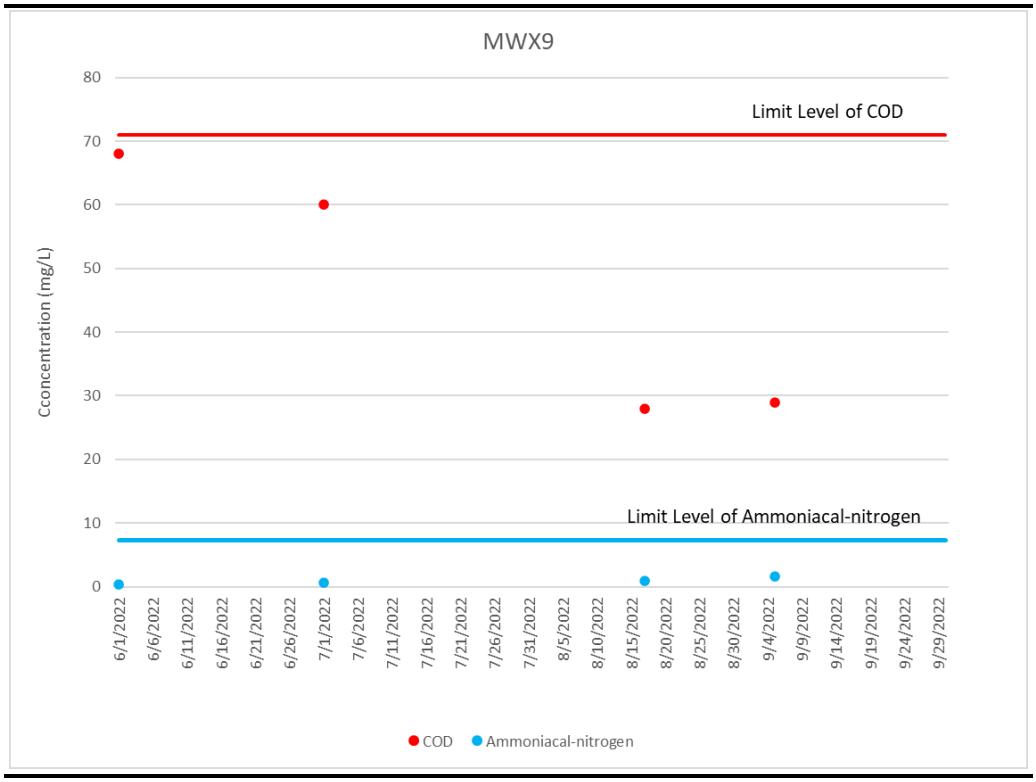

Figure F5.10 Graphical Presentation for Groundwater Monitoring (MWX-10)

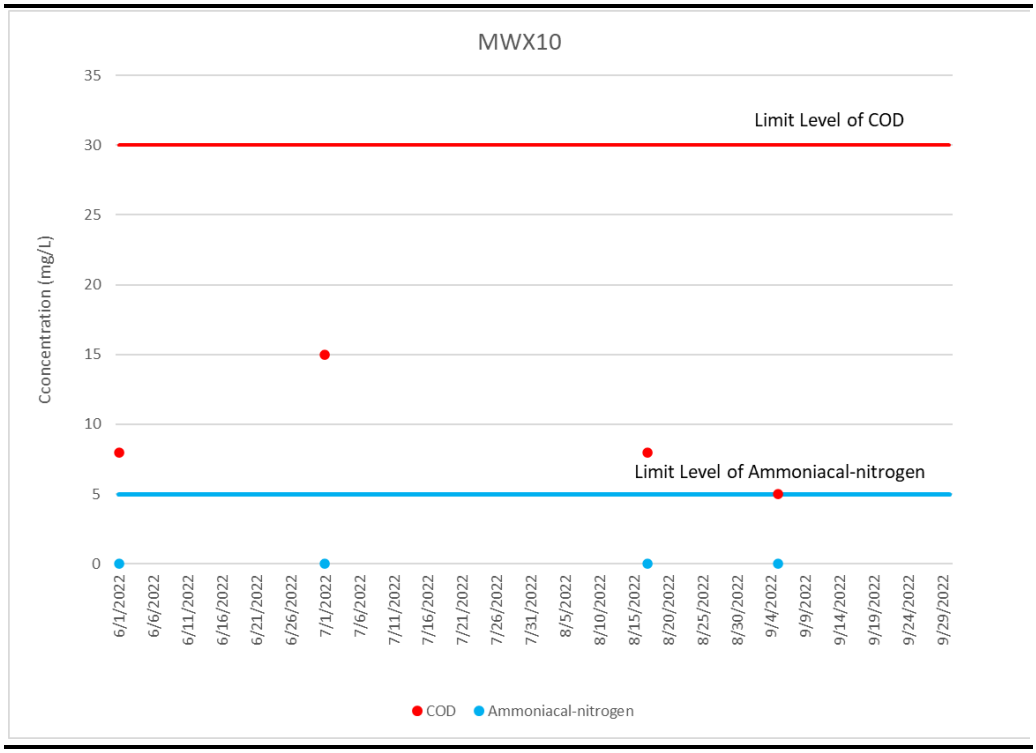

Figure F5.11 Graphical Presentation for Groundwater Monitoring (MWX-11)

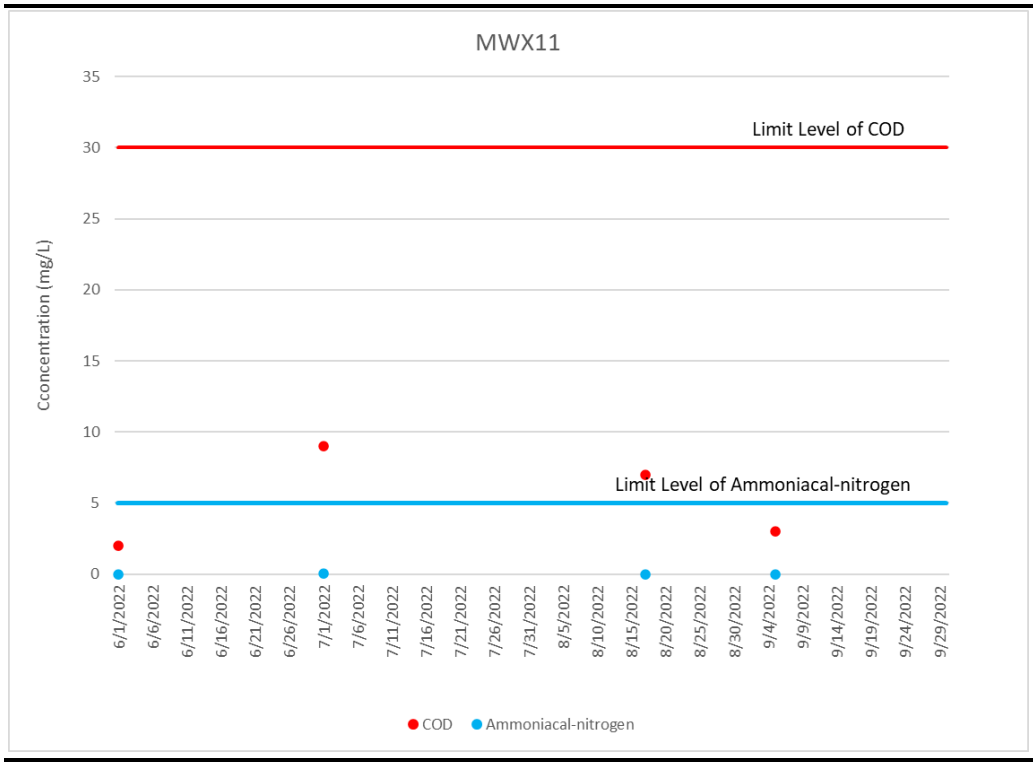

Figure F5.12 Graphical Presentation for Groundwater Monitoring (MWX-12)

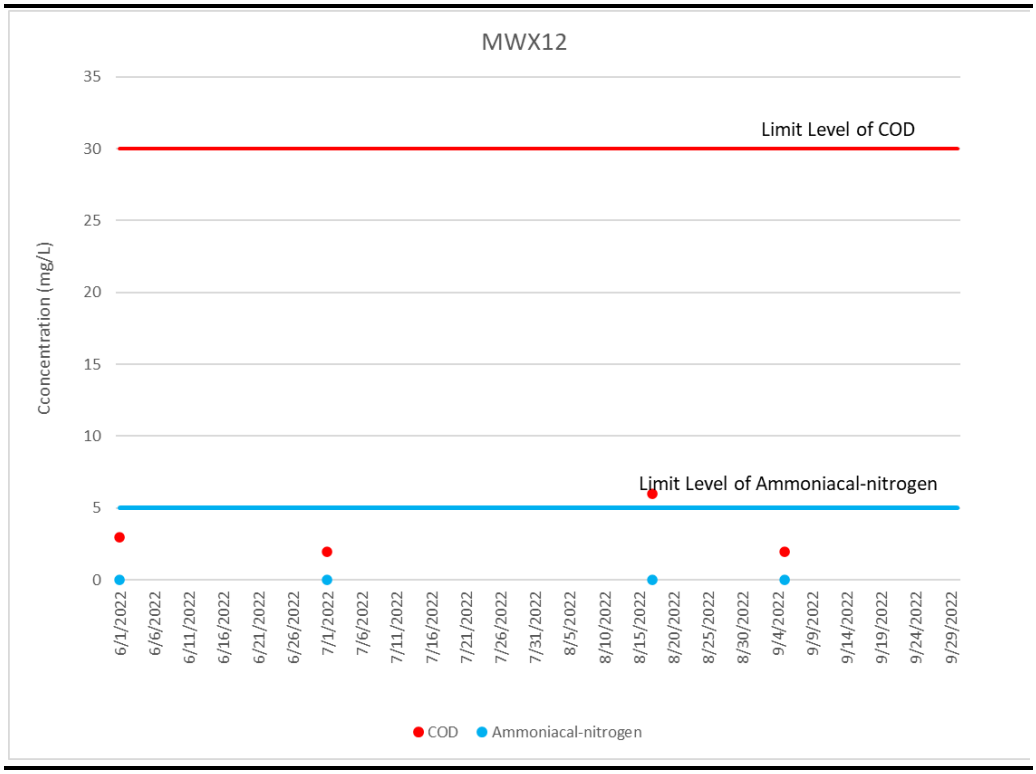

Figure F5.13 Graphical Presentation for Groundwater Monitoring (MWX-13)

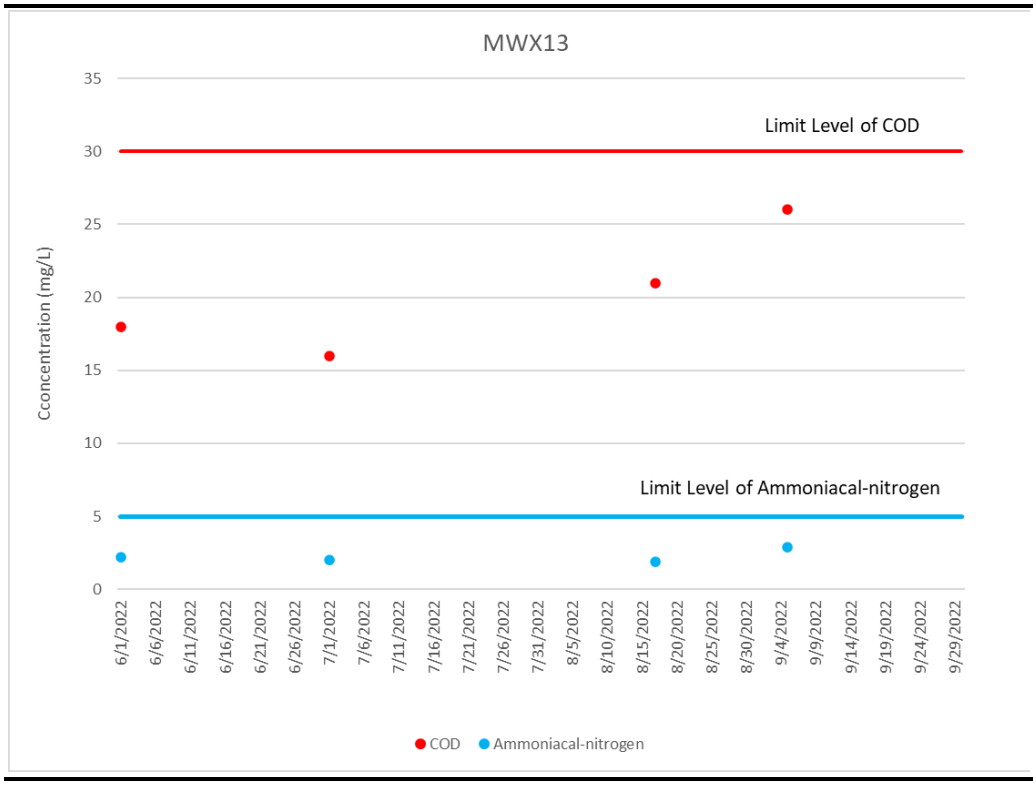

Figure F5.14 Graphical Presentation for Groundwater Monitoring (MWX-14)