Annex F5

Groundwater Monitoring Results

Table F5.1 Groundwater Monitoring Results (April 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	2.41	2.53	2.49	2.52	2.51	2.48	2.24	2.37	2.45	2.36	2.72	6.16	35.09	40.74
Bicarbonate Alkalinity as CaCO3	mg/L	132	328	123	<1	<1	<1	70	<1	89	204	239	57	15	11
Carbonate Alkalinity as CaCO3	mg/L	<1	<1	<1	93	101	157	4	109	<1	<1	<1	<1	<1	<1
Total Alkalinity as CaCO3	mg/L	132	328	123	121	129	189	74	120	89	204	239	57	15	11
pH Value	pH Unit	8	8.1	8	11	11.1	11.3	8.4	10.7	8.1	7.9	8.1	7.1	5.5	5.3
Electrical Conductivity	µS/cm	905	972	1150	1010	1330	1240	3030	1700	1590	1890	977	326	98	104
Ammonia as N	mg/L	0.15	<0.01	1.45	5.2	4.71	4.14	6.32	7.74	1.89	0.02	0.16	<0.01	0.01	<0.01
Chloride	mg/L	150	35	197	190	214	173	798	331	300	292	88	21	14	17
Nitrite as N	mg/L	<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
Reactive Phosphorus as P	mg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.02	<0.01	0.01	0.01	0.01	0.05	0.01	<0.01
Sulphate as SO4 - Turbidimetric	mg/L	69	135	90	58	131	92	42	179	210	287	114	59	3	5
Sulphide as S2	mg/L	0.2	<0.1	<0.1	7.3	8.7	9.1	0.7	4.9	0.2	<0.1	0.1	0.1	<0.1	<0.1
Total Kjeldahl Nitrogen as N	mg/L	0.2	0.1	1.7	5.8	4.9	5	6.4	8.1	2.1	0.2	0.3	<0.1	<0.1	<0.1
Nitrate as N	mg/L	<0.01	0.68	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.09	0.07
Total Nitrogen as N	mg/L	0.2	0.8	1.7	5.8	4.9	5	6.4	8.1	2.1	0.2	0.3	<0.1	0.2	0.1
Boron	µg/L	120	220	200	170	180	180	670	170	290	210	70	20	10	10
Calcium	mg/L	47.7	69.8	73	49.9	47.2	35	31	30.5	82	144	117	28.1	0.8	1.07
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	7.07	58.6	4.13	<0.05	<0.05	<0.05	14.5	<0.05	6.12	11.3	8.17	4.16	0.86	0.8
Sodium	mg/L	102	42.7	126	125	174	173	477	260	235	244	63.6	28	13.9	13.8
Iron	mg/L	0.12	<0.04	0.18	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	0.45	<0.04	<0.04
Potassium	mg/L	20.1	11.6	27.3	32.7	57.8	57.5	47.5	63.8	34.7	17.3	12.1	3.34	4.24	3.7
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	<1	1	<1	<1	2	<1
Lead	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Manganese	µg/L	890	359	895	<1	<1	<1	9	<1	41	985	814	764	38	14
Nickel	µg/L	<1	<1	<1	1	2	2	<1	4	<1	<1	<1	<1	<1	<1
Zinc	µg/L	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	1070	68	18
Biochemical Oxygen Demand	mg/L	<2	<2	2	2	3	6	<2	2	2	<2	<2	<2	<2	<2
Chemical Oxygen Demand	mg/L	5	4	15	40	43	60	10	36	16	12	6	5	12	<2
Total Organic Carbon	mg/L	4	5	12	9	10	12	5	12	7	8	5	3	5	2

Table F5.2 Groundwater Monitoring Results (May 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	3.38	3.32	3.59	3.63	3.70	2.36	2.27	2.37	2.46	4.72	4.77	5.96	35.15	40.87
Bicarbonate Alkalinity as CaCO3	mg/L	95	147	163	<1	34	<1	70	<1	52	202	138	56	15	12
Carbonate Alkalinity as CaCO3	mg/L	<1	<1	<1	86	<1	98	6	73	<1	<1	<1	<1	<1	<1
Total Alkalinity as CaCO3	mg/L	95	147	163	123	69	209	76	110	52	202	138	56	15	12
pH Value	pH Unit	8.0	7.9	7.8	11.0	9.6	11.4	8.5	10.7	7.8	7.5	7.7	6.7	5.7	5.6
Electrical Conductivity	µS/cm	459	12600	1070	907	941	1510	3060	1850	2840	1580	566	339	101	106
Ammonia as N	mg/L	0.06	3.46	0.91	2.59	0.70	3.82	5.83	7.41	0.59	0.01	<0.01	0.01	0.03	0.06
Chloride	mg/L	50	4140	144	126	125	185	740	342	486	250	45	22	15	17
Nitrite as N	mg/L	<0.01	<0.01	<0.01	<0.01	0.33	<0.01	<0.01	<0.01	1.36	<0.01	<0.01	<0.01	<0.01	<0.01
Reactive Phosphorus as P	mg/L	0.03	0.02	0.08	<0.01	<0.01	<0.01	0.02	<0.01	<0.01	0.02	<0.01	0.04	<0.01	<0.01
Sulphate as SO4 - Turbidimetric	mg/L	36	433	102	65	127	89	41	170	558	168	54	58	3	5
Sulphide as S2	mg/L	<0.1	<0.1	<0.1	4.4	0.9	8.2	1.4	3.9	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total Kjeldahl Nitrogen as N	mg/L	0.2	3.5	1.0	2.7	1.0	5.4	6.7	8.7	<10.0	0.1	0.1	0.1	0.1	<0.1
Nitrate as N	mg/L	0.07	0.01	0.77	0.01	0.38	<0.01	<0.01	<0.01	21.6	0.02	0.36	<0.01	0.09	0.05
Total Nitrogen as N	mg/L	0.2	3.6	1.8	2.7	1.7	5.4	6.7	8.7	26.4	0.2	0.5	0.1	0.2	0.1
Boron	µg/L	70	1460	240	200	200	170	710	180	340	310	100	30	20	20
Calcium	mg/L	25.4	144	80	36.6	20.9	54.5	30.5	29.9	200	102	58.6	27	0.77	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	3.25	178.00	4.29	0.11	0.36	<0.05	14.8	<0.05	3.39	8.13	3.46	4.25	0.93	0.84
Sodium	mg/L	46.0	2110.0	100.0	103.0	117.0	161.0	457.0	266.0	316.0	174.0	35.3	24.7	13.4	14.2
Iron	mg/L	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	0.50	<0.04	<0.04
Potassium	mg/L	12.70	79.90	24.50	27.70	47.60	57.40	46.40	68.70	58.40	17.20	7.90	2.84	3.79	3.64
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	<1
Lead	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Manganese	µg/L	334	609	731	2	2	<1	11	<1	66	405	8	771	18	8
Nickel	µg/L	<1	<1	<1	<1	<1	2	<1	4	1	<1	<1	<1	<1	<1
Zinc	µg/L	<10	<10	<10	<10	<10	<10	<10	28	12	<10	<10	20	56	14
Biochemical Oxygen Demand	mg/L	<2	<2	<2	6	<2	3	<2	<2	<2	<2	<2	<2	<2	<2
Chemical Oxygen Demand	mg/L	5	<20	12	24	15	44	10	35	32	17	4	<2	<2	<2
Total Organic Carbon	mg/L	4	<10	7	8	8	14	6	13	15	6	6	2	3	3

Table F5.3 Groundwater Monitoring Results (June 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	3.63	3.70	3.86	3.87	3.95	4.05	3.47	3.68	4.73	4.87	4.91	6.73	37.29	45.18
Bicarbonate Alkalinity as CaCO3	mg/L	95	192	172	<1	52	<1	16	<1	175	180	123	55	14	8
Carbonate Alkalinity as CaCO3	mg/L	<1	<1	<1	71	14	110	47	79	<1	<1	<1	<1	<1	<1
Total Alkalinity as CaCO3	mg/L	95	192	172	93	66	160	63	106	175	180	123	55	14	8
pH Value	pH Unit	7.9	8.0	7.9	10.9	8.9	11.2	9.7	10.6	8.2	7.7	7.6	6.3	5.4	5.2
Electrical Conductivity	µS/cm	466	6860	1140	992	826	1310	2280	3100	14600	1440	411	341	100	107
Ammonia as N	mg/L	0.13	2.16	1.32	2.20	0.32	3.35	5.76	13.0	0.37	0.02	<0.01	0.02	0.01	<0.01
Chloride	mg/L	55	2160	184	180	119	212	714	1010	5260	252	33	22	15	19
Nitrite as N	mg/L	<0.01	0.02	<0.01	0.16	0.43	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Reactive Phosphorus as P	mg/L	0.01	<0.01	0.03	<0.01	<0.01	<0.01	0.02	0.01	0.06	0.02	<0.01	0.05	0.01	<0.01
Sulphate as SO4 - Turbidimetric	mg/L	42	269	125	116	131	131	66	37	911	192	36	61	2	2
Sulphide as S2	mg/L	<0.1	<0.1	<0.1	2.9	<0.1	4.3	1.8	14.6	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total Kjeldahl Nitrogen as N	mg/L	0.2	2.2	1.8	2.5	0.8	4.1	6.4	13.8	0.5	0.1	0.2	<0.1	<0.1	<0.1
Nitrate as N	mg/L	0.01	0.14	0.02	0.02	1.02	0.13	<0.01	<0.01	0.01	<0.01	0.31	<0.01	0.12	0.11
Total Nitrogen as N	mg/L	0.2	2.4	1.8	2.7	2.2	4.2	6.4	13.8	0.5	0.1	0.5	<0.1	0.2	0.1
Boron	µg/L	80	900	160	190	190	180	470	490	2940	210	70	20	10	10
Calcium	mg/L	32.2	97.8	86.3	39.7	18.6	31.8	27.2	63.9	94.4	101	43.7	27.7	0.88	1.01
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	3.63	107	5.96	0.9	0.38	<0.05	1.37	0.25	233	9.66	2.69	4.21	0.94	0.94
Sodium	mg/L	47.3	1160	109	124	110	158	394	540	2540	158	26.3	27	13	13.2
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	0.41	<0.04	<0.04
Potassium	mg/L	13.6	52.8	26.9	29.9	46.1	57.1	60.1	56.9	124	13.7	6.39	2.9	3.87	3.82
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	<1	<1	1	<1
Lead	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Manganese	µg/L	419	511	1000	1	<1	<1	<1	<1	238	310	7	791	18	8
Nickel	µg/L	<1	<1	<1	<1	<1	1	<1	<1	<1	<1	<1	<1	<1	<1
Zinc	µg/L	<10	162	<10	<10	<10	<10	11	<10	<10	<10	<10	609	<10	10
Biochemical Oxygen Demand	mg/L	<2	2	<2	<2	<2	<2	<2	3	<2	<2	<2	<2	<2	<2
Chemical Oxygen Demand	mg/L	4	29	19	18	16	29	24	47	68	8	<2	3	5	2
Total Organic Carbon	mg/L	4	7	10	7	7	12	7	11	7	7	4	4	5	4

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

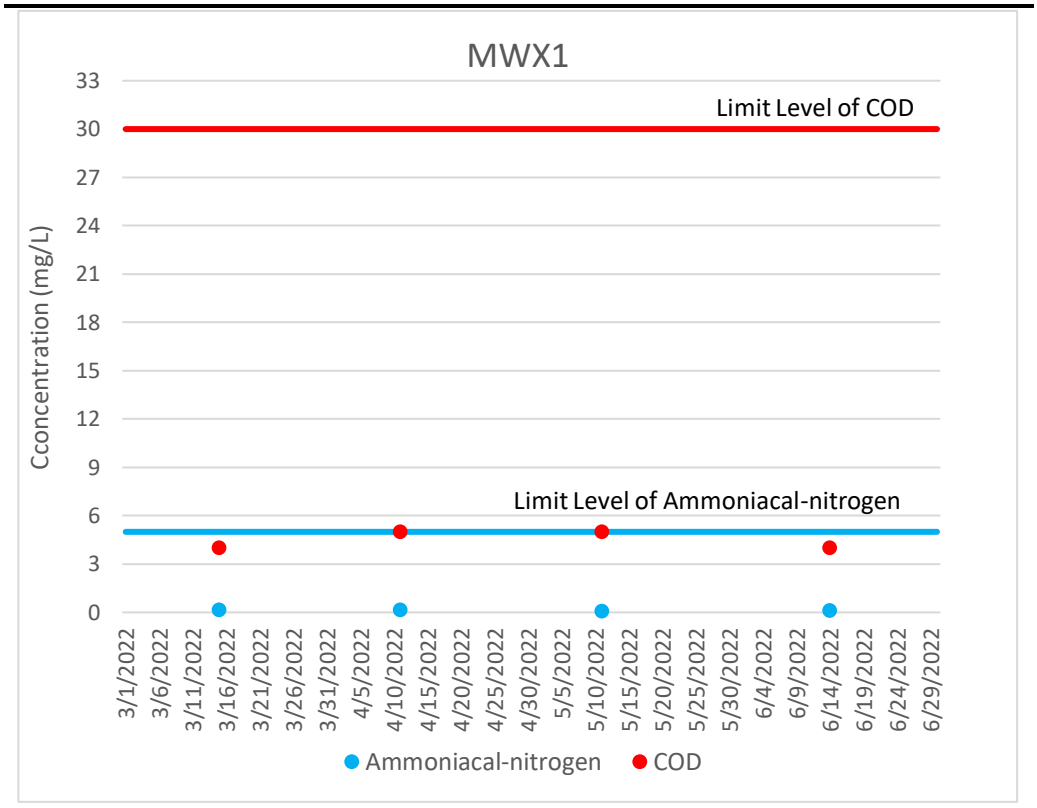

Figure F5.2 Graphical Presentation for Groundwater Monitoring (MWX-2)

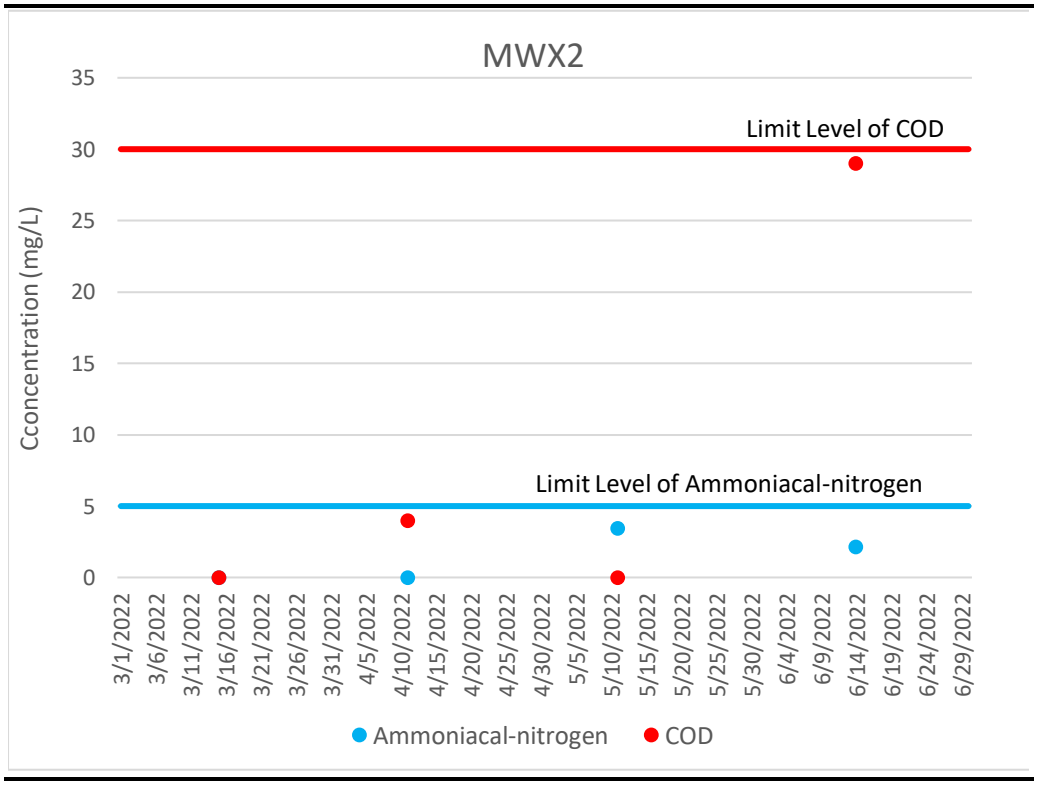

Figure F5.3 Graphical Presentation for Groundwater Monitoring (MWX-3)

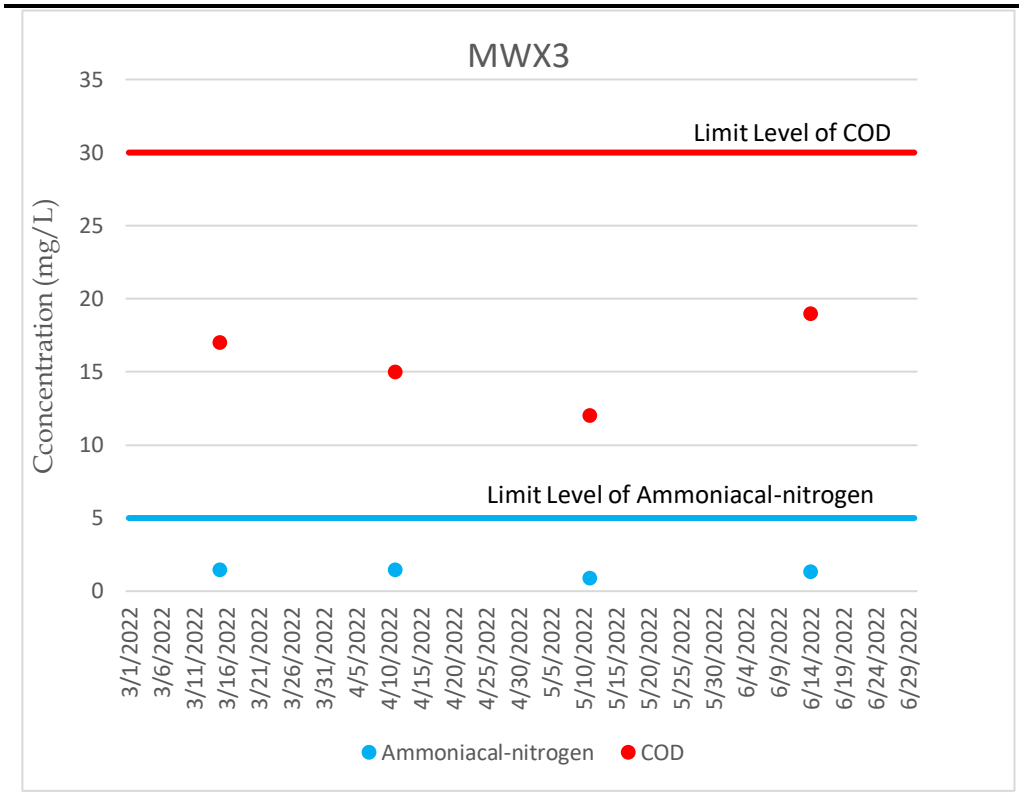

Figure F5.4 Graphical Presentation for Groundwater Monitoring (MWX-4)

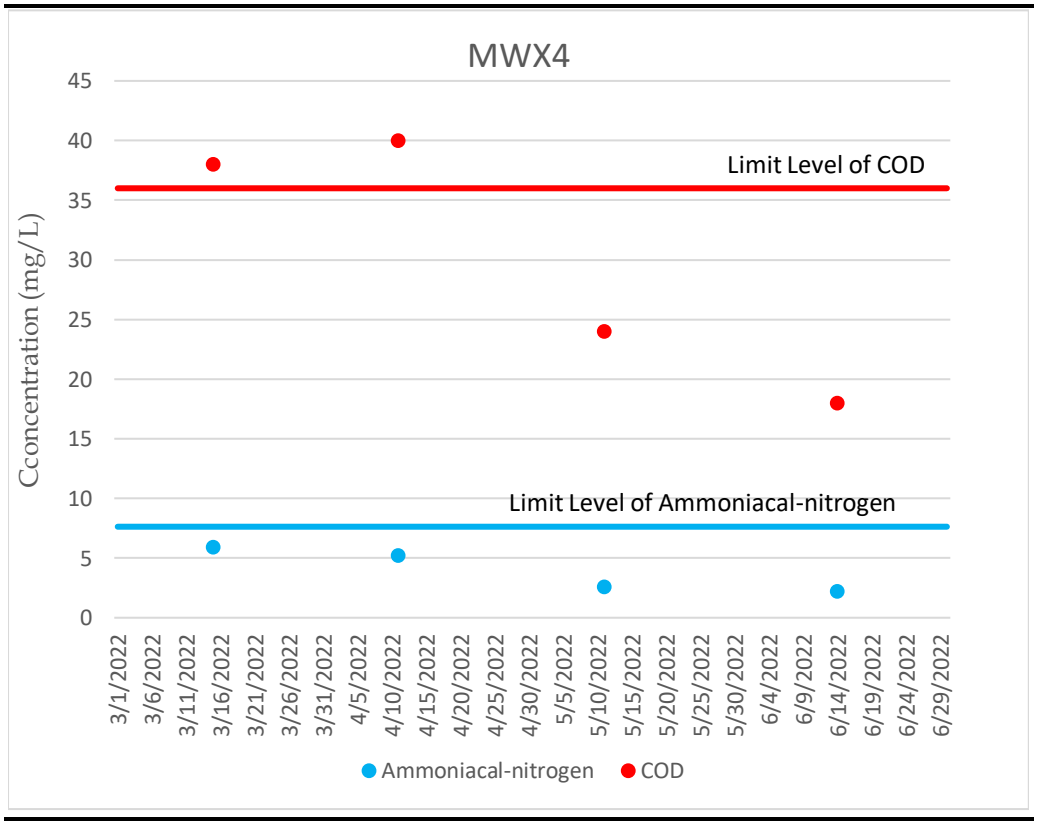

Figure F5.5 Graphical Presentation for Groundwater Monitoring (MWX-5)

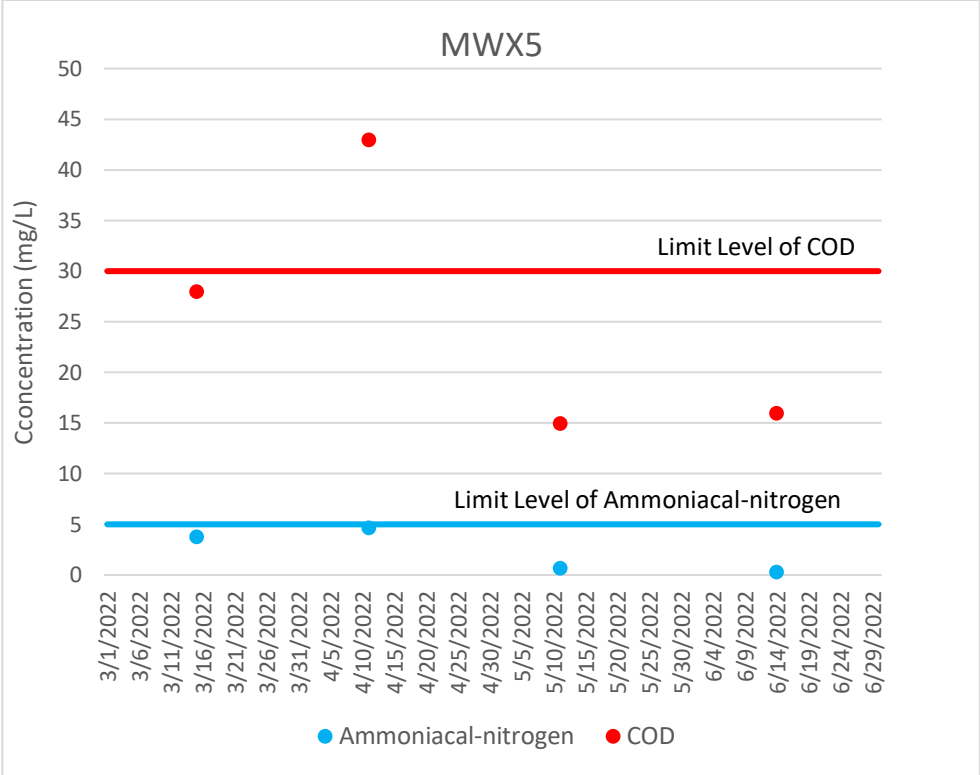

Figure F5.6 Graphical Presentation for Groundwater Monitoring (MWX-6)

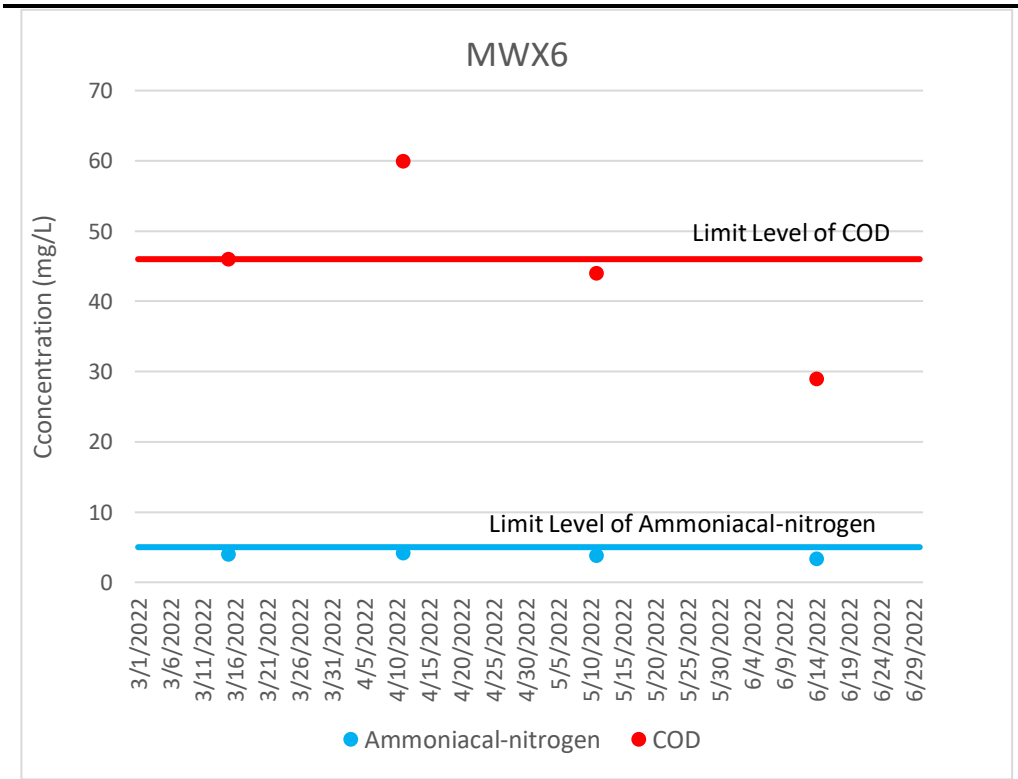

Figure F5.7 Graphical Presentation for Groundwater Monitoring (MWX-7)

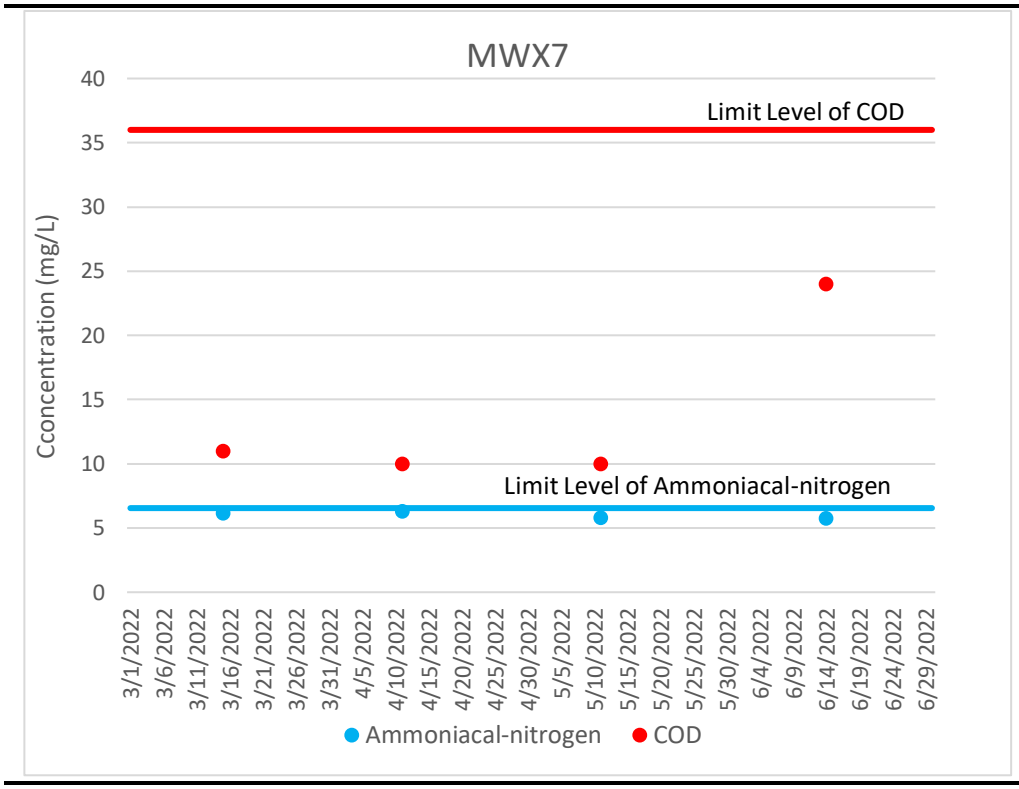

Figure F5.8 Graphical Presentation for Groundwater Monitoring (MWX-8)

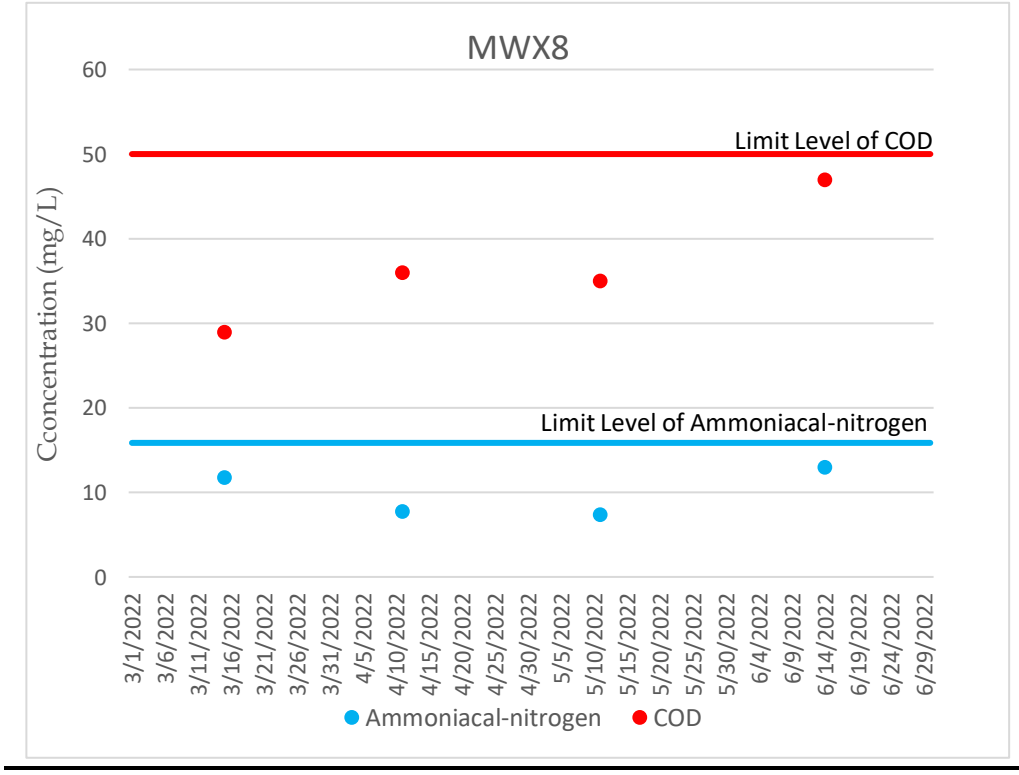

Figure F5.9 Graphical Presentation for Groundwater Monitoring (MWX-9)

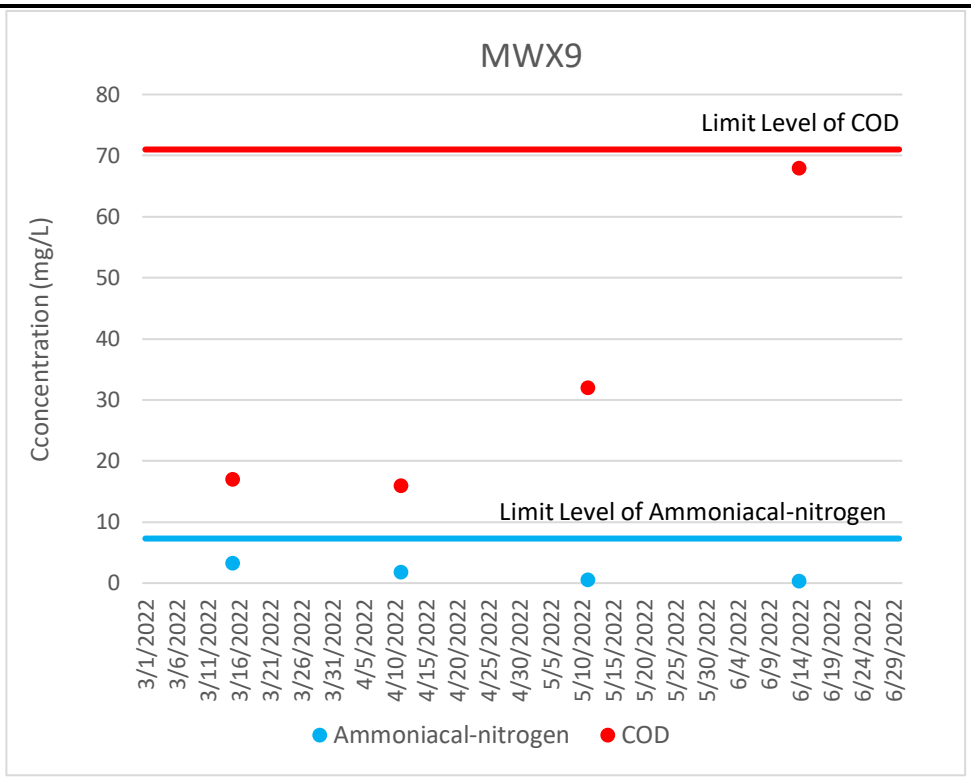

Figure F5.10 Graphical Presentation for Groundwater Monitoring (MWX-10)

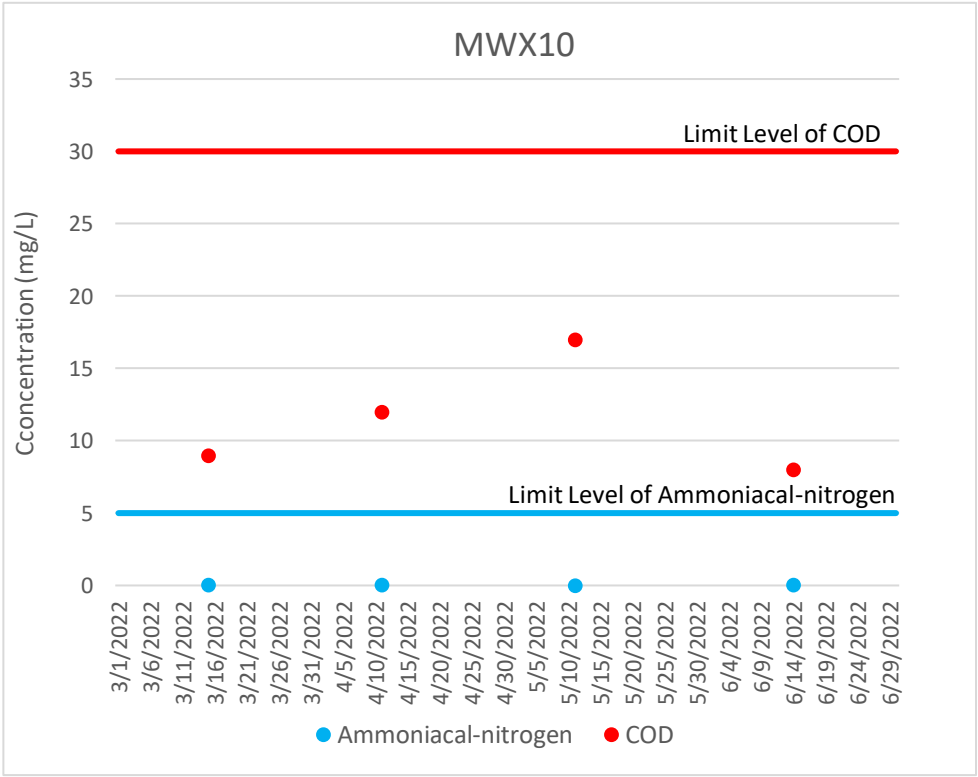

Figure F5.11 Graphical Presentation for Groundwater Monitoring (MWX-11)

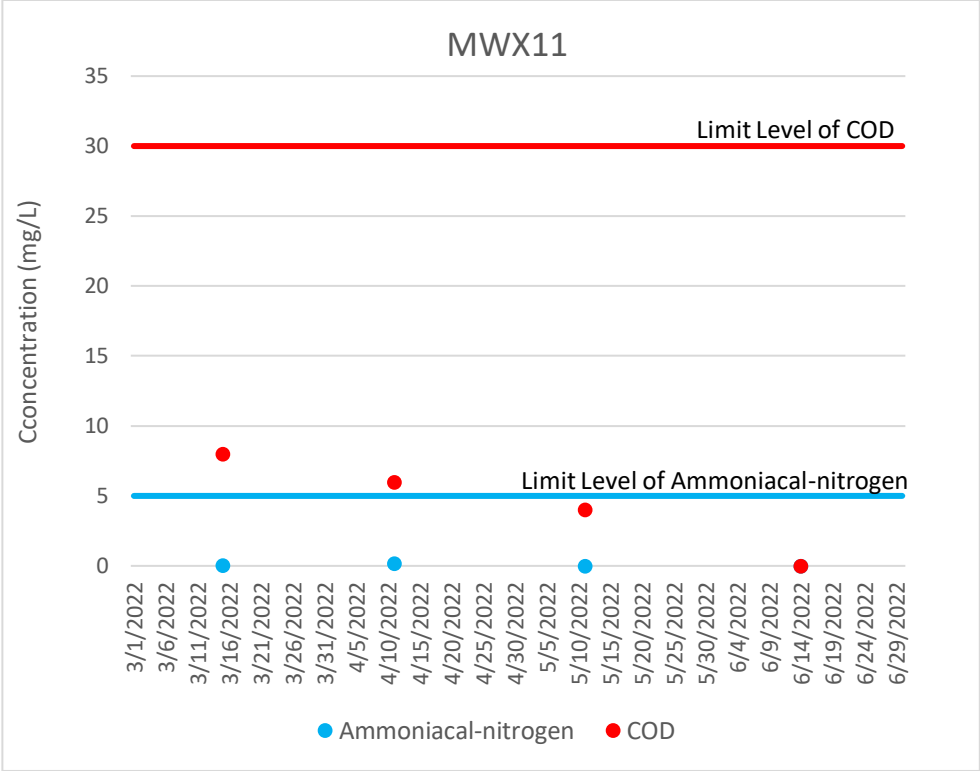

Figure F5.12 Graphical Presentation for Groundwater Monitoring (MWX-12)

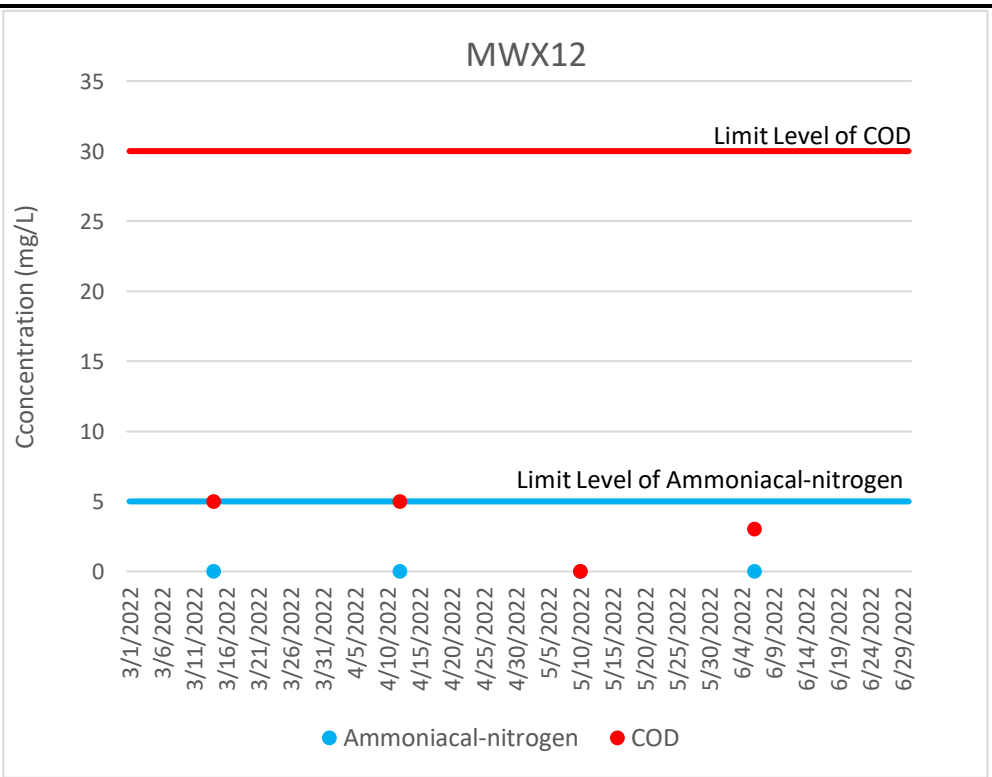

Figure F5.13 Graphical Presentation for Groundwater Monitoring (MWX-13)

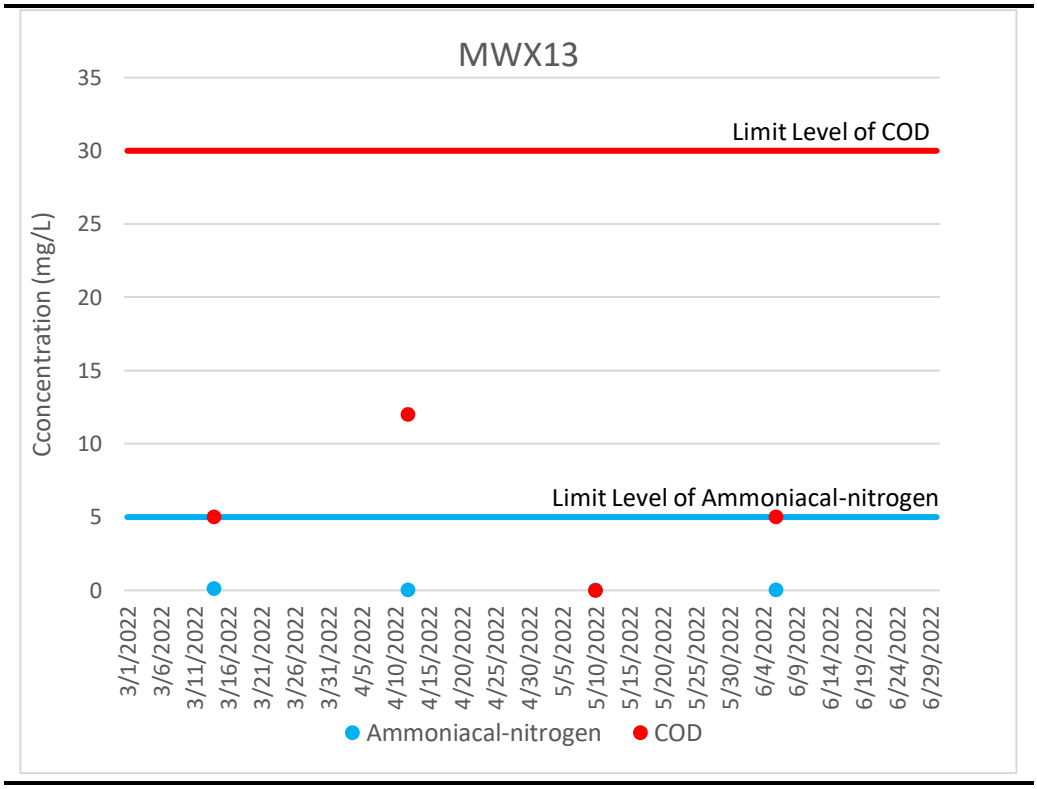

Figure F5.14 Graphical Presentation for Groundwater Monitoring (MWX-14)