



**COOTAMUNDRA-
GUNDAGAI REGIONAL
COUNCIL**

Gundagai Sewage Treatment Plant (STP)

Environmental Protection License No. 1721

Effluent Quality Monitoring Report

April 2022

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Gundagai Sewage Treatment Plant

1.0 Background

Gundagai Sewerage system was constructed during 1930s. The sewerage systems consist of reticulation sewers, sewage pumping stations and rising mains and a sewage treatment plant. The existing sewage treatment plant has passed its useful life and a contract has been let to construct a new sewage treatment plant to replace the existing sewage treatment plant and part of the existing sewerage infrastructure.

The existing treatment plant consist of inlet works, Imhoff tank and trickling filters, humus tank, maturation pond and sludge digester. Digested sludge is discharged into drying beds and disposed at landfill sites. Treated effluent is used to irrigate parks, sporting fields and golf course.



Figure 1- Layout of Gundagai Sewage Treatment Plant

Maturation Pond

Sewage Treatment Plant

Golf Course Irrigation Pond

At present a new Sewage Treatment Plant is under construction with Intermittently Decanted Extended Aeration (IDEA) with sludge dewatering facilities. Upon completion of testing and commissioning of the new treatment plant which is designed to produce higher quality treated effluent for irrigation reuse.

The new plant will have screens, grit removal IDEA process with sludge dewatering facilities. The treated effluent will be disinfected with UV light unit prior to using it for irrigation of parks, garden, sporting fields and golf course. Treated Effluent will be discharged into the nearby waterways while there is not irrigation demand. Construction works are in progress and more than 80% completed.

2.0 Water Quality Monitoring

2.1 Water Quality Monitoring Locations

Sampling and testing of the Treated effluent is done at fortnightly interval at three locations which include;

- Maturation pond outlet
- Inlet to the irrigation pond
- Outlet to the irrigation pond irrigation delivery

The location of sampling points are shown in figure 2.

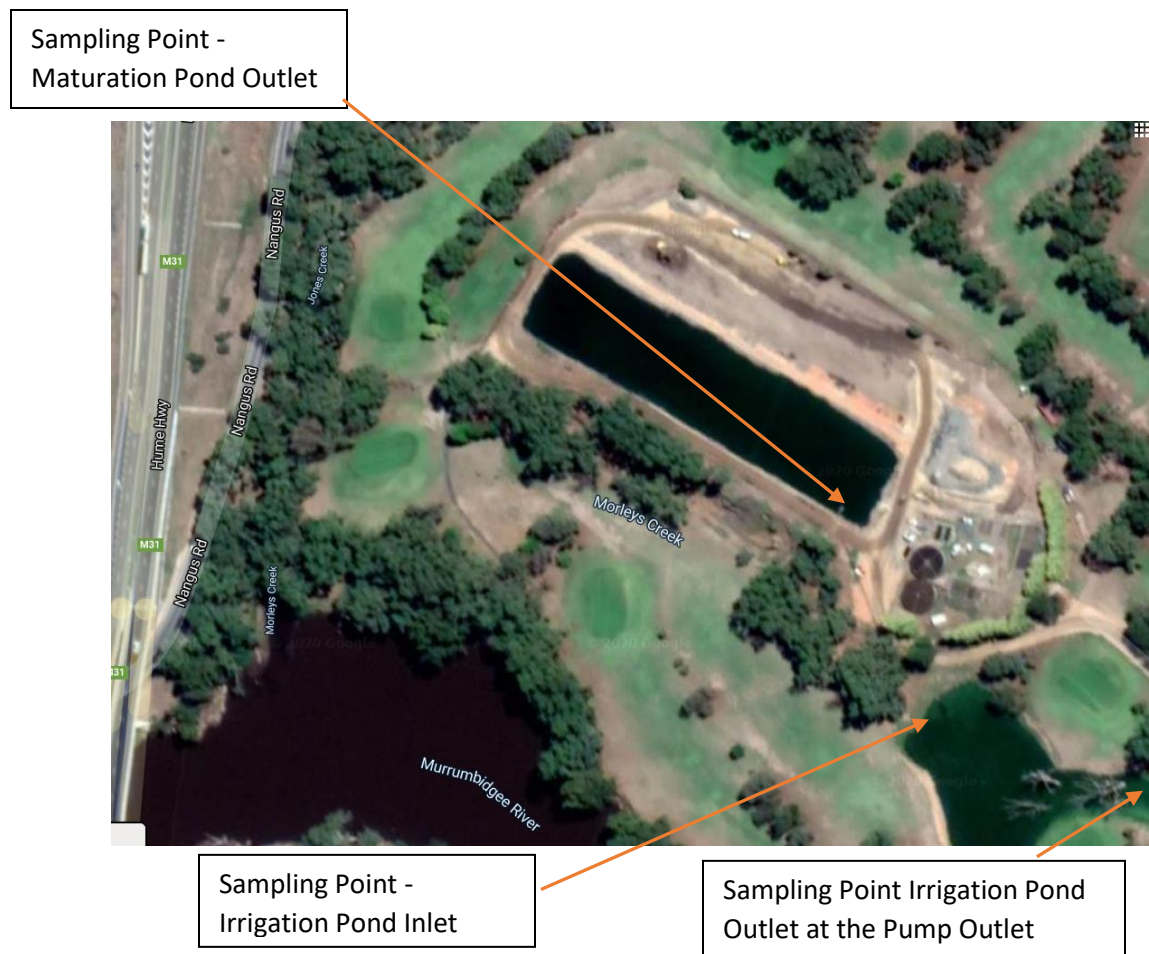


Figure 2- Location of Sampling Points

2.2 Water quality monitoring and reporting

Water samples are collected and dispatched for testing at NATA accredited laboratories and the test results are provided in Section 3 of this report.

Subsequent to a Risk Management Study on the treated effluent reuse facilities, it was proposed to install a disinfection unit based using sodium hypochlorite solution to reduce the coliform count on the irrigation water and to fully comply with License Requirements.

A skid Chlorinator using 12.5% hypochlorite solution was installed, tested and commissioned on 28 August 2020. Subsequent to this the coliform count in the irrigation point has dropped significantly representing an LRV of 3 and above achieved by the disinfection process. Further details can be found in the water quality report in Section 3 of this report.



Figure 3 - Chlorinator

2.3 Water Quality Monitoring Results

2.3.1 Coliform Count at Critical Control Points

Fortnightly Sampling of Treated Effluent - Bidgee Banks Golf Course (Point 1 Irrigation)		Bidgee Banks Golf Course (Golf Course Pond Inlet)		Bidgee Banks Golf Course (Maturation Pond Outlet)	
Date	Faecal coliforms	Date	Faecal coliforms	Date	Faecal coliforms
Units	cfu/100mL	Units	cfu/100mL	Units	cfu/100mL
1/2/18	30	1/2/18		1/2/18	
10/4/18	330	10/4/18		10/4/18	
15/10/18	45	15/10/18		15/10/18	
14/12/18	6160	14/12/18		14/12/18	
14/1/19	1	14/1/19	2500	14/1/19	
31/1/19	100	31/1/19	96700	31/1/19	
13/2/19	50	13/2/19	3670	13/2/19	6560
28/2/19	444	28/2/19	34400	28/2/19	40000
14/3/19	10	14/3/19	22500	14/3/19	15100
28/3/19	90	28/3/19	60000	28/3/19	83300
11/4/19	734	11/4/19	36000	11/4/19	41000
23/4/19	2600	23/4/19	73000	23/4/19	68000
9/5/19	6000	9/5/19	169000	9/5/19	187000
23/5/19	5600	23/5/19	96000	23/5/19	103000
6/6/19	6560	6/6/19	193000	6/6/19	212000
4/7/19	300	4/7/19	10800	4/7/19	13600
18/7/19	50	18/7/19	37400	18/7/19	12100
1/8/19	1	1/8/19	150	1/8/19	340
19/8/19	83	19/8/19	10000	19/8/19	10000
29/8/19	20	29/8/19	55	29/8/19	100
12/9/19	37	12/9/19	4500	12/9/19	4500
30/9/19	119	30/9/19	2020	30/9/19	2420
10/10/19	64	10/10/19	8590	10/10/19	44400
24/10/19	606	24/10/19	25600	24/10/19	90000
6/11/19	101	6/11/19	178000	6/11/19	178000
20/11/19	28	20/11/19	1620	20/11/19	8890
5/12/19	192	5/12/19	3160	5/12/19	6400
19/12/19	606	19/12/19	4340	19/12/19	4020
7/1/20	5050	7/1/20	122000	7/1/20	178000
24/1/20	550	24/1/20	50200	24/1/20	51100
5/2/20	140	5/2/20	27000	5/2/20	34000
18/2/20	10	18/2/20	33300	18/2/20	149000
3/3/20	505	3/3/20	33300	3/3/20	26300
16/3/20	2020	16/3/20	28300	16/3/20	45400

Fortnightly Sampling of Treated Effluent - Bidgee Banks Golf Course (Point 1 Irrigation)	
Date	Faecal coliforms
31/3/20	1410
14/4/20	800
22/4/20	210
13/5/19	3200
19/5/19	3100
22/5/20	3500
29/5/20	3330
2/6/20	108
5/6/20	800
9/6/20	1100
12/6/20	1110
16/6/20	372
19/6/20	3670
24/6/20	1670
26/6/20	12400
30/6/20	111
3/7/20	4670
14/7/20	26700
17/7/20	5330
21/7/20	1890
24/7/20	667
29/7/20	5110
31/7/20	1210
4/8/20	667
6/8/20	1560
11/8/20	222
25/8/20	73
8/9/20	1
23/9/20	1
6/10/20	1
20/10/20	70
3/11/20	<1
17/11/20	1440
1/12/20	<1
15/12/20	667

Bidgee Banks Golf Course (Golf Course Pond Inlet)	
Date	Faecal coliforms
31/3/20	48500
14/4/20	280000
22/4/20	20000
13/5/19	3800
19/5/19	24400
22/5/20	222000
29/5/20	233000
2/6/20	14000
5/6/20	167000
9/6/20	22200
12/6/20	14400
16/6/20	10000
19/6/20	100000
24/6/20	178000
26/6/20	389000
30/6/20	55600
3/7/20	144000
30/6/20	233000
17/7/20	75600
21/7/20	12200
24/7/20	1110
30/6/20	27800
31/7/20	11100
4/8/20	4440
6/8/20	16200
11/8/20	4040
25/8/20	5050
8/9/20	7070
23/9/20	2520
6/10/20	6670
20/10/20	88900
3/11/20	3030
17/11/20	147000
1/12/20	77800
15/12/20	5560

Bidgee Banks Golf Course (Maturation Pond Outlet)	
Date	Faecal coliforms
31/3/20	52500
14/4/20	300000
22/4/20	100000
13/5/19	
19/5/19	23200
22/5/20	3330000
29/5/20	189000
2/6/20	12700
5/6/20	411000
9/6/20	33300
12/6/20	322000
16/6/20	5300
19/6/20	100000
24/6/20	300000
26/6/20	511000
30/6/20	44400
3/7/20	189000
30/6/20	66700
17/7/20	82200
21/7/20	32200
24/7/20	27600
30/6/20	62200
31/7/20	47500
4/8/20	1110
6/8/20	10100
11/8/20	1010
25/8/20	13100
8/9/20	7070
23/9/20	2420
6/10/20	1670
20/10/20	116000
3/11/20	3030
17/11/20	178000
1/12/20	44400
15/12/20	7780

Fortnightly Sampling of Treated Effluent - Bidgee Banks Golf Course (Point 1 Irrigation)	
Date	Faecal coliforms
4/1/21	444
19/1/21	394
3/2/21	1440
16/2/21	556
2/3/21	55
16/3/21	1210
30/3/21	2420
13/4/21	1220
11/5/21	333
25/5/21	3330
8/6/21	1220
22/6/21	128
6/7/21	9
20/7/21	100
3/8/21	4
17/8/21	30
31/8/21	22
14/9/21	102
30/9/21	<1
12/10/21	4
26/10/21	<1
9/11/21	130
23/11/21	50
7/12/21	30
21/12/21	400
11/1/22	1940
25/1/22	360
8/2/22	4100
22/2/22	400
8/3/22	740
22/3/22	5000
5/4/22	330
19/4/22	24
3/5/22	1720
Average	1562

Bidgee Banks Golf Course (Golf Course Pond Inlet)	
Date	Faecal coliforms
4/1/21	10000
19/1/21	11100
3/2/21	93300
16/2/21	88900
2/3/21	22200
16/3/21	267000
30/3/21	88900
13/4/21	45600
11/5/21	42200
25/5/21	100000
8/6/21	54400
22/6/21	1820
6/7/21	1110
20/7/21	<1
3/8/21	2000
17/8/21	667
31/8/21	6
14/9/21	140
30/9/21	5960
12/10/21	100
26/10/21	1020
9/11/21	23600
23/11/21	909
7/12/21	14400
21/12/21	280
11/1/22	188
25/1/22	526
8/2/22	110
22/2/22	940
8/3/22	39000
22/3/22	24000
5/4/22	6100
19/4/22	166
3/5/22	116000
Average	51885

Bidgee Banks Golf Course (Maturation Pond Outlet)	
Date	Faecal coliforms
4/1/21	15600
19/1/21	32200
3/2/21	200000
16/2/21	200000
2/3/21	122000
16/3/21	344000
30/3/21	156000
13/4/21	164000
11/5/21	31100
25/5/21	187000
8/6/21	244000
22/6/21	13300
6/7/21	8890
20/7/21	100
3/8/21	4800
17/8/21	778
31/8/21	20
14/9/21	238
30/9/21	8000
12/10/21	116
26/10/21	1820
9/11/21	21700
23/11/21	5560
7/12/21	13300
21/12/21	640
11/1/22	9500
25/1/22	3100
8/2/22	12600
22/2/22	20
8/3/22	54000
22/3/22	101000
5/4/22	15500
19/4/22	4900
3/5/22	9600
Average	106535

2.3.2 Chemical Analysis Results

g of Treated Effluent - Bidgee Banks Golf Course (Irrigation)																						Fortnightly Sampling of Treated Effluent - Bidgee Banks Golf Course (Irrigation)																					
Parameter	Units	6/7/21	20/7/21	3/8/21	17/8/21	31/8/21	14/9/21	28/9/21	12/10/21	26/10/21	9/11/21	24/11/21	7/12/21	21/12/21	11/1/22	25/1/22	8/2/22	22/2/22	8/3/22	22/3/22	5/4/22	19/4/22	3/5/22	Average																			
Biochemical Oxygen Demand	mg/L	5	6	2	4	4	7	15	17	<2	5	8	<2	<2	15	14	5	8	15	13	7	14	20	12																			
Calcium (dissolved)	mg/L	19.3	19.4	26.9	23.0	25.5	21	22.4	25.1	22.0	21.5	20.7	24.3	23.4	19.5	20.7	20.1	21.2	17.3	18.7	20.1	18.0	20.0	21																			
Faecal coliforms	cfu/100mL	9	100	4	30	22	102	<1	4	<1	130	50	30	400	1940	360	4100	400	740	5000	330	24	1720	1414																			
Conductivity	µS/cm	584	603	651	563	575	587	593	566	632	662	552	620	593	580	600	610	560	874	560	556	606	580	609																			
Magnesium (dissolved)	mg/L	8.50	9.10	12.0	12.2	16.6	19.4	22.3	20.1	24.9	23.9	23.3	29.2	32.8	25.0	28.2	24.7	25.5	16.3	23.0	22.9	15.9	20.1	11																			
Nitrogen, total	mg/L	26	30	24	16	16	14	13	12	17	5	14	6	12	17	10	10	8	16	10	15	12	22	19																			
Nitrate/Nitrite as N	mg/L	5.6	5.5	3.5	0.4	<0.1	0.5	0.4	0.2	13.0	<0.1	12.4	2.9	9.5	4.8	5.0	3.2	3.8	3.5	4.9	10	3.6	10	5																			
Oil & Grease	mg/L	1	3	3	3	4	3	4	1	2	2	2	4	4	<1	<1	3	5	<1	1	2	<1	4	3																			
Phosphorus, Total	mg/L	3.99	4.43	4.01	4.22	4.30	4.12	4.18	3.28	2.59	2.90	2.06	2.88	2.78	2.66	3.21	2.62	2.55	2.55	4.16	2.88	3.66	2.91	4																			
pH	pH units	7.4	7.6	7.4	7.5	7.6	7.9	7.9	7.7	7.8	7.3	7.4	8.2	7.6	8.0	9.2	9.2	9.1	8.9	9.2	8.8	7.4	7.7	8																			
Sodium Adsorption Ratio	Ratio	2	2	2	2	2	2	2	3	2	2	2	2	2	1	2	1	1	1	2	2	1	2	3																			
Sodium (dissolved)	mg/L	45.2	44.2	61.3	43.8	46.2	43.9	47.9	45.5	64.3	68.9	46.0	67.1	49.1	41.7	47.8	42.1	43.3	28.0	52.8	53.8	28.0	50.1	61																			
Total Kjeldahl Nitrogen	mg/L	20	24	20	16	16	13	13	12	4	5	2	3	3	12	5	7	4	12	5	8	12	14	14																			
Total Suspended Solids	mg/L	2	5	<2	4	17	14	21	35	29	31	15	22	24	38	37	37	18	39	36	26	40	30	31																			
Treated Effluent - Bidgee Banks Golf Course (Golf Course Pond Inlet)																						Fortnightly Sampling of Treated Effluent - Bidgee Banks Golf Course (Golf Course Pond Inlet)																					
Parameter	Units	6/7/21	20/7/21	3/8/21	17/8/21	31/8/21	14/9/21	28/9/21	12/10/21	26/10/21	9/11/21	24/11/21	7/12/21	21/12/21	11/1/22	25/1/22	8/2/22	22/2/22	8/3/22	22/3/22	5/4/22	19/4/22	3/5/22	Average																			
Biochemical Oxygen Demand	mg/L	5	6	5	9	6	10	22	13	8	11	8	12	11	10	10	21	15	21	28	25	20	46	21																			
Calcium (dissolved)	mg/L	19.4	19.1	23.6	23.7	23.5	21.8	22.1	22.2	21.1	17.7	19.4	24.2	21.8	19.8	20.2	20.2	21.5	19.2	20.8	21.2	19.5	21.0	23																			
Faecal coliforms	cfu/100mL	1110	<1	2000	667	6	140	5960	100	1020	23600	909	14400	280	188	526	110	940	39000	24000	6100	166	116000	50076																			
Conductivity	µS/cm	582	570	565	620	649	618	648	624	476	531	585	630	570	555	570	565	580	596	574	630	620	637	637																			
Magnesium (dissolved)	mg/L	8.81	10.70	16.90	20.10	21.10	22.1	24.0	23.5	26.6	19.4	23.4	32.5	30.4	24.5	27.0	24.8	25.1	17.2	22.8	20.0	16.8	20.0	11																			
Nitrogen, total	mg/L	29	28	21	23	23	19	18	18	25	20	14	8	13	13	10	15	14	13	14	22	17	28	26																			
Nitrate/Nitrite as N	mg/L	6.4	7.8	5.0	7.0	7.0	6.6	6.8	6.5	16.0	11.9	10.9	3.4	8.0	2.9	4.2	4.3	3.9	2.9	5.4	11	3.0	11	7																			
Oil & Grease	mg/L	1	3	2	4	4	2	5	2	3	3	2	5	3	1	2	1	2	1	1	2	1	3	3																			
Phosphorus, Total	mg/L	3.96	3.99	4.22	3.84	3.95	4.25	4.22	4.21	3.79	3.49	2.49	4.84	4.88	3.81	3.93	3.88	3.89	3.89	6.37	3.88	3.92	3.95	6																			
pH	pH units	7.5	7.6	7.5	7.6	7.6	8.3	8.0	7.0	8.4	7.5	7.9	9.3	8.3	8.2	9.4	9.3	9.7	8.7	8.8	8.1	7.4	7.8	8																			
Sodium Adsorption Ratio	Ratio	2	2	2	2	2	2	2	2	2	1	2	2	1	1	2	2	1	1	2	2	1	2	3																			
Sodium (dissolved)	mg/L	44.3	39.1	43.5	47.1	50.8	46.3	50.9	49.9	53.2	37.0	43.6	57.3	41.8	41.1	47.6	43.0	42.8	29.3	53.4	54.7	29.0	55.8	60																			
Total Kjeldahl Nitrogen	mg/L	23	20	16	16	16	12	11	11	9	8	3	5	5	10	6	11	10	9	11	14	17	19	19																			
Total Suspended Solids	mg/L	4	5	5	<2	8	20	23	18	24	33	32	50	52	58	60	89	30	59	48	59	55	60	51																			
Bidgee Banks Golf Course (Maturation Pond Outlet)																						Bidgee Banks Golf Course (Maturation Pond Outlet)																					
Parameter	Units	6/7/21	20/7/21	3/8/21	17/8/21	31/8/21	14/9/21	28/9/21	12/10/21	26/10/21	9/11/21	24/11/21	7/12/21	21/12/21	11/1/22	25/1/22	8/2/22	22/2/22	8/3/22	22/3/22	5/4/22	19/4/22	3/5/22	Average																			
Biochemical Oxygen Demand	mg/L	7	8	7	8	10	18	41	11	10	17	10	19	20	10	22	22	16	18	27	35	18	30	21																			
Calcium (dissolved)	mg/L	21.0	19.9	25.4	24.6	22.4	22.3	21.5	21.6	20.9	18.4	20.6	22.9	23.0	19.3	19.6	20.1	21.4	20.0	21.0	21.5	20.0	21.2	21																			
Faecal coliforms	cfu/100mL	8890	100	4800	778	20	238	8000	116	1820	21700	5560	13300	640	9500	3100	12600	20	54000	101000	15500	4900	9600	108158																			
Conductivity	µS/cm	606	558	626	691	679	630	664	689	648	491	623	620	667	550	580	645	530	620	610	596	660	654	639																			
Magnesium (dissolved)	mg/L	10.4	11.4	21.7	25.8	22.0	24.7	24.9	23.9	27.4	20.0	29.5	36.3	33.7	20.2	27.1	21.1	20.8	16.1	22.0	16.3	16.0	18.1	11																			
Nitrogen, total	mg/L	34	26	22	22	24	18	18	18	26	21	17	10	14	13	15	16	15	14	22	21	28	35	29																			
Nitrate/Nitrite as N	mg/L	9.9	7.3	7.1	7.6	9.0	7.1	7.0	7.1	16.0	12.2	13.4	4.4	9.5	3.1	6.6	7.5	5.8	4.0	6.1	10	3.5	11.0	8																			
Oil & Grease	mg/L	<1	3	2	4	3	<1	23	<1	1	1	4	4	4	<1	2	1	2	<1	1	<1	<1	2	4																			
Phosphorus, Total	mg/L	4.10	3.69	5.35	3.22	4.81	4.44	4.51	4.60	3.84	3.64	3.50	3.36	3.55	3.88	3.47	4.34	4.01	3.90	8.20	4.02	3.92	3.99	6																			
pH	pH units	7.5	7.5	7.5	7.6	7.7	8.7	8.0	7.6	8.3	7.5	8.3	9.7	7.4	7.8	9.3	8.2	10.0	7.7	8.1	7.8	7.4	7.9	8																			
Sodium Adsorption Ratio	Ratio	2	2	2	2	2	2	2	2	2	1	2	2	1	1	2	1	1	1	2	2	1	2	3																			
Sodium (dissolved)	mg/L	44.6	39.1	46.2	52.2	54.9	48.9	52.1	49.9	54.1	38.2	49.9	62	45.9	34.8	45.3	34.5	36.1	27.9	52.3	55.3	28.0	55.1	60																			
Total Kjeldahl Nitrogen	mg/L	24	19	15	14	15	11	11	11	10	9	4	6	5	10	8	8	9	10	16	21	24	24	22																			
Total Suspended Solids	mg/L	11	<2	<2	<2	11	35	23	12	330	33	22	52	6	13	54	10	9	15	65	52	14	50	55																			

2.3.3 Coliform Count at Golf Course Irrigation Point

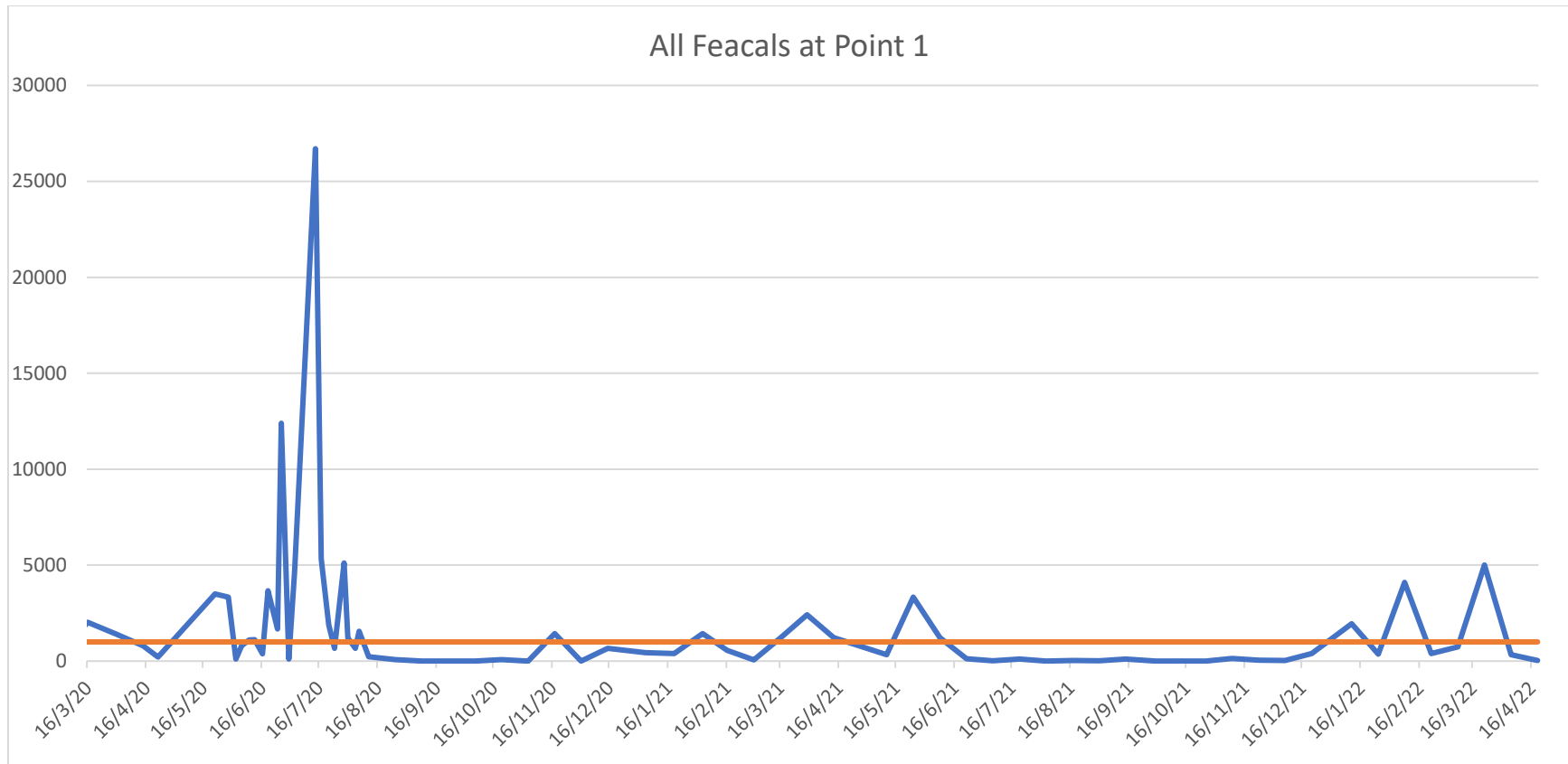


Figure 4 - Fecal Coliform Count (cfu/100 ml) at Irrigation Point