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Chief Executive Officer (CEO)  
Department of Water and Environmental Regulation  
Prime House  
8 Davidson Terrace  
Joondalup WA 6919  
Email: [info@dwer.wa.gov.au](mailto:info@dwer.wa.gov.au)



Dear 

**Covalent Lithium – Wastewater Treatment Plant  
Works Approval W6517/2021/1 - Time Limited Operations Compliance Report**

 received approval to commence time limited operations for Train 1, Stage 1 of the wastewater treatment plant (WWTP) at the Mt Holland site on the 6<sup>th</sup> July 2021 under Works Approval W6517/2021/1. This Compliance Report is submitted in accordance with Condition 15 and including the detail as required by Condition 16 of the Works Approval.

**Time Limited Operations Overview**

Time limited operations for train 1 of the WWTP commenced following receipt of notification by DWER of the acceptance of the infrastructure compliance report on 6<sup>th</sup> July 2022. The 180-day time limited operations period concluded on 2<sup>nd</sup> January 2022. During this time a maximum of 5,868 kL of effluent was processed through train 1 of the WWTP.

**Water Quality**

As expected when commissioning a sequencing batch reactor (SBR) WWTP, the water quality monitoring indicated that the WWTP was not meeting specification (Table 1) during the initial period of its operation, however the water quality of the effluent generally improved throughout the 180-day period with compliance reached towards the end of the period (refer Attachment 1).

Monitoring was undertaken in accordance with Condition 14 and Table 5 of W6517/2021/1, including weekly water quality sampling, except for:

- Continuous daily flow readings – due to instrument technical malfunction (flowmeter), throughput for this period was estimated based on the number of personnel in the camp utilising facilities at a rate of 250 L/person/day.
- Water quality sampling was not undertaken during four (4) weeks of the 26-week (180 day) time limited operations period (missing data for weeks 3, 12, 15 and 18) due to road closures from heavy rainfall events.

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**Table 1: Emission and discharge limits during time limited operations (Table 4 of W6517)**

Discharge Point	Parameter	Units	Limit
Sprayfield	Biological Oxygen Demand	mg/L	<20
	Total Suspended Solids	mg/L	<30
	Total Nitrogen	mg/L	<30
	Total Phosphorus	mg/L	<8
	pH	pH units	6.5-8.5
	Free Chlorine	mg/L	0.2-2
	<i>E. coli</i>	CFU/100 mL	<1,000

Further, it was discovered by Tristar Water Solutions (WWTP installation specialists) in November that the sampling tap was installed in the incorrect location and that the results were more reflective of stagnant water in the irrigation pipework system, rather than within the active, recirculated treatment area. Following the relocation of the tap in December, the water quality results improved significantly, suggesting that these results were more reflective of the system's performance as opposed to the historical data to that point.

Water quality is summarised in Table 2 with full results included as Attachment 1.

**Table 2: Water Quality Results Summary**

Parameter	Units	Criteria	Maximum	Minimum	Median
Biological Oxygen Demand	mg/L	20	396	2.00	10.0
Total Suspended Solids	mg/L	30	1,060	5.00	18.0
Total Nitrogen	mg/L	30	105	6.90	25.2
Total Phosphorus	mg/L	8	24.6	0.23	4.86
pH	pH units	6.5-8.5	8.3	7.37	7.75
Free Chlorine	mg/L	0.2-2	2.7	0.01	0.24
<i>E. coli</i>	CFU/100 mL	1,000	6,100,000	1.0	1,220

### Biological Oxygen Demand

Biological oxygen demand (BOD) ranged from <2 mg/L (below the laboratory limit of reporting) to 396 mg/L with a median value of 10 mg/L, which is compliant with the criteria of <20mg/L. Elevated results were recorded during the earlier commissioning phase and results have been compliant with the discharge criteria since week 16 of the 26-week phase, with BOD in the range 4-10 mg/L during this time.

### Total Suspended Solids

Total suspended solids (TSS) ranged from <5 mg/L (below the laboratory limit of reporting) to 1,060 mg/L with a median value of 18 mg/L, which is compliant with the criteria of <30 mg/L. Elevated TSS was recorded sporadically throughout the early commissioning phase but results have been compliant with criteria since week 14 of the 26-week phase, with TSS in the range 5-22 mg/L during this time.

### Total Nitrogen

Total nitrogen (TN) was reported in the range 6.9-105 mg/L with a median value of 25.2 mg/L, which is compliant with the criteria of <30 mg/L. Elevated TN results were reported during the early stages of the commissioning phase but have been compliant with criteria since week 14, with TN reported in the range 6.9-29.3 mg/L during this time.

### Total Phosphorus

Total phosphorus (TP) was reported in the range 0.23-24.6 mg/L with a median value of 4.9 mg/L, which is compliant with the criteria of <8 mg/L. TP results were reported in compliance with the criteria in all events, except for week 13 where the 24.6 mg/L was recorded from the spot sample. Interestingly, this was the same event that recorded significantly elevated results for most other parameters except free chlorine. The field records from this event also note that the sample resembled a sludge, which indicates sludge build up in the tank and fat residue.

### pH

pH was reported in the range 7.37-8.32 across all sampling events, which is compliant with the criteria (6.5-8.5).

### Free Chlorine

Free chlorine ranged from <0.01 mg/L (below the limit of reporting) to 2.68 mg/L with a median value of 0.2 mg/L, which is compliant with the criteria range of 0.2-2 mg/L.

### *E. coli*

*E.coli* ranged from <1 CFU/100 mL (below the limit of reporting) to 6,100,000 CFU/100 mL with a median of 1,220 CFU/100 mL, which slightly exceeds the criteria of 1,000 CFU/100 mL. Elevated *E.coli* results were typically recorded when free chlorine was low (<0.01 mg/L) and directly related

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to chlorine dosing pump issues. The final two sampling events of the time limited operations phase reported compliant results and furthermore, the most recent results following completion of the time limited operations phase reported *E.coli* in compliance with criteria.

### **Environmental Performance**

As discussed in the previous section, effluent discharges exceeded criteria (Table 1) during the time limited operations phase on several occasions but were generally compliant when comparing median values across all parameters. Furthermore, water quality results towards the completion of the time limited operations phase indicated that the WWTP (train 1) was operating in compliance with manufacturer's specification and hence the requirements of W6517/2021/1.

### **Mitigation**

During commissioning, water quality results were provided to Tristar for review and recommendations for improvement, including testing, flushing and priming dosing pump and lines, and testing and clearing of inlet screens. The first out-of-spec results received were reported internally as an environmental incident to ensure any defects and corrective actions identified by Tristar were recorded, and ongoing water quality tracked. The investigation process identified the root cause of poor water quality as a lack of dedicated and trained personnel. Contributing factors identified early during the commissioning phase included (03/08/21) that the decant pump was wired in reverse, which may have resulted in poor water quality results and a build-up of sludge and kitchen grease in the system. Subsequently, the WWTP train 1 sludge tank was pumped out and further training was provided by Tristar during October 2021.

To ensure the continued successful operation of the WWTP (both train 1 and now train 2), dedicated and trained personnel have the responsibility to ensure maintenance requirements are undertaken as per the operating manual and that work procedures are strictly upheld.

Yours sincerely

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## Attachment 1 – Water Quality Results

Parameter	Biological Oxygen Demand	Total Suspended Solids	Total Nitrogen	Total Phosphorus	pH	Free Chlorine	E. coli
Units	mg/L	mg/L	mg/L	mg/L	pH units	mg/L	CFU/100 mL
Criteria	20	30	30	8	6.5-8.5	0.2-2	1,000
Maximum	396	1,060	105	24.6	8.3	2.7	6,100,000
Minimum	2.00	5.00	6.90	0.23	7.37	0.01	1.0
Median	10.0	18.0	25.2	4.86	7.75	0.24	1,220
Week 1	70	76	45.8	7.39	8.32	<0.01	6,100,000
Week 2	45	50	47.9	7.43	7.76	0.76	<1
Week 3	NT	NT	NT	NT	NT	NT	NT
Week 4	29	33	57.4	4.4	8.02	0.26	2,600,000
Week 5	20	20	54.2	6.77	7.93	1.22	<1
Week 6	39	40	76	7.39	8.06	<0.01	610,000
Week 7	27	30	60.2	6.21	8.05	<0.01	11,000
Week 8	<2	38	50.1	5.75	8.02	1.48	<1
Week 9	<2	27	61.6	6.32	8.07	2.68	<1
Week 10	15	16	51.3	4.87	8.08	0.31	<1
Week 11	10	16	10.1	4.84	7.59	<0.01	450,000
Week 12	NT	NT	NT	NT	NT	NT	NT
Week 13	396	1060	105	24.6	7.43	<0.01	390,000
Week 14	24	22	13.3	5.22	7.53	<0.01	180,000
Week 15	NT	NT	NT	NT	NT	NT	NT
Week 16	10	14	12.3	1.5	7.99	0.07	10
Week 17	10	20	17.4	1.92	7.74	<0.01	<1
Week 18	NT	NT	NT	NT	NT	NT	NT
Week 19	6	7	7	0.23	7.71	0.6	11,000
Week 20	4	6	10.7	0.3	7.72	0.65	20
Week 21	6	7	21	1.14	7.45	0.35	2,900
Week 22	7	<5	11.5	0.99	7.6	0.21	4
Week 23	8	14	12.5	0.82	7.37	<0.01	1,700
Week 24	6	11	11.4	1.02	7.71	0.8	21,000
Week 25	5	<5	6.9	0.41	8.12	0.89	<1
Week 26	8	13	29.3	4.96	7.66	0.07	740

NT denotes "not tested" due to road conditions following heavy rainfall