Appendix 18 Draft Discharge Criteria Management Plan

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1 Introduction

This Draft Discharge Management Plan has been prepared to accompany Renascor's Environment Impact Statement (EIS) for the Battery Anode Material (BAM) Facility in the Bolivar area of Adelaide's northern suburbs as part of the Siviour Battery Anode Material Project (Siviour BAM Project).

EPA Licence Number	To be obtained post approval as part of OEMP
Project Name	Siviour BAM Facility
Address	Robinson Road, Bolivar
Contact Name	TBD
Contact details	TBD

1.1 Monitoring Objectives

This monitoring plan has been developed to fulfil two objectives:

1. Monitor BAM Facility treated process water return to the SA Water outfall channel against Environmental Protection Authority (EPA) compliance criteria (to be set by EPA licence) to demonstrate compliance with EPA licence.
2. Monitor data (including real time data) to allow for adaptive management techniques.

2 Legislative Requirements

The *Environment Protection Act 1993* creates a general environmental duty to take all reasonable and practical steps to prevent or minimise any resulting environmental harm. It outlines requirements and standards within Environment Protection Policies, including the *Environment Protection (Water Quality) Policy 2015* (Water Quality EPP) which provides the structure for managing and regulating surface and groundwater quality within SA.

The *Australian and New Zealand Guidelines for Fresh and Marine Water Quality (*ANZECC, 2000) and revision (ANZG, 2018) are referenced by the Water Quality EPP and provide additional guidance on planning and managing water quality or sediment quality, including the derivation of guidance values.

ANZG (2018) sets out a systematic approach to the management and assessment of water quality for aquatic and marine ecosystems. The guidelines refer to locally derived baseline values as the most appropriate source of water quality standards and targets as well as providing default guideline values where local baseline data is not available. This area falls within the Adelaide Coastal Water Quality Improvement Plan (ACWQIP) (EPA, 2013). The ACWQIP sets water quality objectives to be achieved in the gulf for a number of analytes, a monitoring and adaptive management plan and reporting requirements.

The BAM Facility produces treated process water that is returned to the SA Water outfall channel; a man made wastewater channel and as such is not defined as surface water (i.e. the surface water quality requirements under the various policies and guidelines do not apply). The channel enters Gulf St Vincent at Freshwater Creek estuary. As the legislative water quality criteria do not apply to the SA Water outfall channel this DCMP has been developed as best practice and based on ANZG and ACWQIP where appropriate.

3 Background Information

3.1 Description of Receiving Environment

As detailed previously, the Project site is located approximately 3 km east of the coast at St Kilda. Treated process water from the project will be returned to the SA Water outfall channel which travels for approximately 11 km before entering the Gulf St Vincent at Freshwater Creek estuary. The broader estuary environment, including at the location of Freshwater Creek location, comprises mangroves within the intertidal zone and seagrass beds in adjacent coastal waters. The estuary and coastal environment across the wider area provides important feeding and nursery grounds for migratory birds, fish, crustaceans and molluscs.

The coastline from the southern end of Torrens Island to Lower Light is protected under both the *Adelaide Dolphin Sanctuary Act 2005* and the Winaityinaityi Pangkara – Adelaide International Bird Sanctuary.

A number of existing industries in the vicinity that have potential impacts on the Gulf St Vincent (including through marine discharge). These include the operating Port in Port Adelaide as well as a number of marinas and boat ramps, thermal discharge from Torrens Island Power Station, discharge from multiple WWTPs, septic tanks and community wastewater management systems around the greater Adelaide area, and stormwater run off from urban areas (CSIRO, 2007). It is noted since the review of Adelaide Coastal Waters in 2007 there has been increasing urban infill and development of the North South connector which has increased the volumes of urban stormwater being discharged to Gulf St Vincent.

The key threats to this region are high levels of suspended solids, turbidity and nutrients resulting in growth of epiphytes and reduced light for seagrass beds (EPA SA, 2013b). In late 2020 a die back event impacted approximately 9 ha of mangroves, 10 ha saltmarsh and 5 ha of sparsely vegetated or aquatic ecosystems (DEW, 2023b).

Existing Marine Water Quality

Historic industrial, commercial and urban development have had significant impacts on water quality in the Port River estuary itself. Heavy metal concentrations have however shown a decrease since the 1970s, with the phasing out of lead based petrol (CSIRO, 2007).

A summary of water quality parameters for EPA monitoring Site 8 (ACWQIP, 2008) are provided in Table 3-1. It should be noted that a longer-term (1995- 2008) data set for Site 7 (the closest to monitoring Site 8) show overall similar values (EPA SA, 2023b).

Table 3-1 Summary of background marine water quality data at EPA monitoring Site 8 (1995 – 2000)

Metal (Units)	Mean	Standard deviation	90th Percentile
Turbidity (NTU)	1.8 NTU	1.4 NTU	3.5 NTU
Salinity (µS)	56,023 µS	4,298 µS	62,300 µS
Temperature (°C)	18 °C	4.7 °C	24 °C
Cadmium (mg/L)	0.0020 mg/L	0.0002 mg/L	0.0020 mg/L
Copper (mg/L)	0.013 mg/L	0.008 mg/L	0.016 mg/L
Lead (mg/L)	0.010 mg/L	-	0.010 mg/L
Mercury(mg/L)	0.00036 mg/L	0.00012 mg/L	0.00050 mg/L
Iron (mg/L)	0.075 mg/L	0.076 mg/L	0.172 mg/L
Soluble Aluminium (mg/L)	0.039 mg/L	0.024 mg/L	0.071 mg/L
Total Aluminium (mg/L)	0.055 mg/L	0.040 mg/L	0.102 mg/L
Soluble Zinc (mg/L)	0.027 mg/L	0.021 mg/L	0.053 mg/L
Total Zinc (mg/L)	0.040 mg/L	0.038 mg/L	0.083 mg/L
Ammonia (N) (mg/L)	0.27 mg/L	0.45 mg/L	0.50 mg/L
Oxidised nitrogen (mg/L)	0.21 mg/L	0.21 mg/L	0.51 mg/L
Total Phosphorous (mg/L)	0.06 mg/L	0.06 mg/L	0.11 mg/L

Marine Water Quality Targets

The Adelaide Coastal Water Quality Improvement Plan (ACWQIP) (EPA SA, 2013b) sets out the key parameters in Table 3-2 as targets for the waters surrounding Adelaide in the Gulf St Vincent.

Table 3-2 Water Quality Objectives set out in Adelaide Coastal Water Quality Improvement Plan

Parameter	ACWQIP water quality objective	Notes
Physical parameters		
Suspended solids	< 3 mg/L (90 percentile)	
Turbidity	<1 NTU > 200 m offshore (90 percentile)	
pH	7.5 to 8.5	
Metals (95% level of protection)		
Copper	0.0013 mg/L (90 percentile)	Marine water quality exceeded this limit at time of ACWQIP
Lead	0.0044 mg/L (90 percentile)	
Zinc	0.015 mg/L (90 percentile)	Marine water quality exceeded this limit at time of ACWQIP
Cadmium	0.0055 mg/L (90 percentile)	
Organics (95% protection)		
Oils and petroleum hydrocarbons	< 1 mg/L (95 percentile)	

3.2 Project Description

The Project involves the construction and operation of a downstream mineral processing facility to produce PSG as a key component of battery anodes. The BAM Facility comprises of:

- Micronisation and spheronisation milling trains
- Caustic roast kiln
- Water treatment equipment (including reverse osmosis plant, demineralisation, caustic process water treatment and acid process water treatment)
- Leach tanks (caustic and acid), filtration structures and repulp tanks
- Industrial buildings
- Product storage silos
- Chemical reagents and waste storage including appropriate bunding and hardstand
- Truck loading and unloading facilities, access and egress
- Product bagging plant equipment
- Mechanical, hydraulic and pneumatic conveyance and feed structures
- Water pipes to the Bolivar Wastewater Treatment Plant (WWTP) outfall channel including intake and outfall points.

Other associated infrastructure upgrades, including an upgrade of Robinson Road, electricity and gas supply lines, are outside the scope of this project.

Raw water for the Project will be sourced from the SA Water outfall channel. Treated process water from the Project will be returned to the SA Water outfall channel (see above) which travels in an open channel for approximately 11 km before entering the Gulf St Vincent at Freshwater Creek estuary (refer Figure 3-1).

The Bolivar WWTP and proposed Project outfall location is located at the start of the SA Water outfall channel, and other sources discharge to the channel downstream diluting the treated process water further before it reaches the marine environment. Proposed location of monitors in relation to intake and outfall pipelines is shown in Figure 3-1.

Figure 3-1 Location of intake and outfall points for the BAM Facility

4 Monitoring

4.1 Sampling Locations

Sample locations are shown in Figure 3-1 and summarised in Table 4-1.

Table 4-1 Monitoring locations

Location	Description	Types of monitoring
-34.744, 138.555	Up stream	Real time monitoring (EC, pH, Temp) Water Quality sampling and testing
-34.738, 138.552	Down stream	Real time monitoring (EC, pH, Temp) Water Quality sampling and testing

4.2 Sampling Methodology

Real time monitors will be installed in the flow path of the channel to ensure it provides a well mixed sample of the water quality. Real time monitors will record:

- Electrical Conductivity (EC) – as proxy for salinity (ppt)[1]
- Temperature
- pH

Real time monitors will be accessed quarterly for maintenance purposes (replacing batteries, cleaning, calibration etc) or more frequently if required.

Quarterly water quality samples will be undertaken at these locations in accordance with methodology in *Regulatory monitoring and testing water and wastewater sampling* (EPA, 2007).

4.3 Analytical Methods

Quarterly water quality samples will be analysed in a NATA approved laboratory at the frequency and for the analytes set out in Table 4-2.

Table 4-2 Monitoring frequency

Frequency	Parameters Measured	Notes
Real time (RT)	Salinity, pH, temperature	Checked, cleaned and calibrated quarterly or as soon as practicable when there is a noticeable decline in RT monitoring data.
Quarterly	Salinity (in field meter, refractometer, or salinity / density meter), pH	To calibrate real time monitors

[1] Salinity calculated using standard method developed by Australian Water Quality Centre

4.4 Proposed Trigger Values and Management Actions

Comparing salinity (calculated from EC and temperature data) and pH between the upstream and downstream monitoring locations (6 hour rolling averages) will be used to determine performance of the BAM WWTP and quality of treated process water. See Table 4-3 for the triggers and actions appropriate.

Table 4-3 Trigger and Response Plan

Analyte	Value	Action
pH	Below 7.35 and above 8.75 at downstream monitor – 6 hour rolling average	Review operation of effluent treatment plants to ensure operating within normal parameters.
EC	Downstream monitor reading 3 ppt above upstream monitor over a 6 hour rolling average period.	Review operation of effluent treatment plants to ensure operating within normal parameters.
EC	Downstream monitor reading 3 ppt above upstream monitor over a 24 hour rolling average period.	Investigate the source of the increase, identify action to rectify.
EC	Downstream monitor reading 3 ppt above Upstream monitor over a 72 hour rolling average period.	Cease discharge if sustained increase (>3 ppt increase) for > 72 hours.
Temperature	n/a	Use for EC to ppt conversion.

Salinity is calculated using the following equation:

$$TDS = \frac{(0.548 \times EC) + (2.2 \times 10^{-6} \times EC^2) - (2.06 \times 10^{-12} \times EC^3)}{100}$$

Where:

- TDS is Total Dissolved Solids (g/L), and
- EC is specific conductivity (µS/cm) normalised to 25°C (Based on 2% per degree difference from 25°C).

TDS (g/L) is converted to parts per thousand (ppt) by dividing by 1.026. This assumes an average seawater density of 1.026 g/ml based on a salinity of 37 psu and a water temperature of 20°C at a depth of 15 metres.

Water quality samples will be collected on a quarterly basis and analysed for metals of interest to inform ongoing management of the effluent treatment plant.

5 Reporting and Compliance

All incidents related to water management (including trigger criteria being met, any notice received from a government agency or a non-compliance) will be reported to the Renascor Site Management within one hour of the incident occurring, or if not reasonably practicable, as soon as possible. The relevant notification entry will be made into the Renascor Incident Management System (IMS) / Environmental and Social Management System (ESMS) within 24 hours.

Following updated sample results the overall trends will be analysed to inform updated water treatment as required. Environmental Monitoring data will be required regularly (frequency to be determined in accordance with regulatory requirements) including:

- Results and interpretation of water quality and flow rate modelling.
- Report of compliance with approval and licencing conditions
- Summary of incidents occurred during the reporting period and appropriate investigations and actions undertaken to remedy them.

Non-compliances will be reported to the Renascor Site Management and appropriate corrective actions undertaken in line with the Renascor ESMS.

Key roles and responsibilities will be presented in the overarching OEMP.

6 Review

This procedure will be formally reviewed at least annually by the Siviour BAM Facility Project Manager.

Review will include a process of adaptive management, whereby the effectiveness and performance of current controls and mitigation measures are assessed and improved to ensure robust environmental performance.