

**Dunmore Lakes Sand Project**  
**EPL 11147 Pollution Reduction Program U1**  
**Site Discharge Assessment Progress Report**

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## **Executive Summary**

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Dunmore Sand and Soil (DSS) holds Environment Protection Licence (EPL) 11147 covering its sand extraction and processing operation at Tabbita Road Dunmore. Section 8 Condition U1 of EPL 11147 sets out a monitoring and assessment program covering discharge events from the Stage 2 Pond. The final report is due by 21<sup>st</sup> June 2024 while progress reports are required to be submitted by 19<sup>th</sup> October 2023 and 15<sup>th</sup> February 2023. This report represents the first progress report.

During the reporting period between June and September 2023, there was one planned discharge event which occurred over a 4 day period. During this period approximately 60.5 ML was discharged from site. Four water samples were taken and the results indicate that the water would not have caused any adverse water quality impacts downstream.

The results over the four days were very consistent with little variation from the first day to the last day.

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## Appendices

### Appendix A – Water Quality Results

# 1. Introduction

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The Dunmore Lakes Sand Project (the Site) is operated by Dunmore Sand & Soil Pty Ltd (DSS) which is a wholly owned subsidiary of Boral Limited. The Site is located adjacent to Boral's Dunmore Hardrock Quarry at Tabbita Road Dunmore, to the west of the Princes Highway, approximately 12 km northwest of Kiama, NSW 2533. It holds EPL 11147 which covers the extraction and processing of sand as well as recovery of general waste. The licence allows for discharge to waters from the Stage 2 Dredge Pond and includes various monitoring conditions.

## 1.1 Background

International Environmental Consultants Pty Limited (IEC) was commissioned by DSS to prepare a Dredge Pond Discharge Report following a variation to EPL 11147 on 7<sup>th</sup> November 2022. The report was lodged with the EPA by DSS in January 2023, and the recommendations were subsequently used to review the licence and make various changes. The main changes included:

- Removal of the previous discharge point (EPL10) which was not needed.
- Remove non-essential background monitoring points from the licence.
- Move monitoring point EPL9 to the base of the discharge pipes to be more representative of the discharges from the Stage 2 Pond. This site is listed with discharge criteria.
- Simplifying the requirements to monitor discharges daily during discharge.
- Inserting a new Pollution Reduction Program which requires reporting and assessment of discharges over a 12 month period ending 21<sup>st</sup> June 2024.

This report represents the first progress report required under EPL Condition 1.3.

## 1.2 DSS Operation and Water Management Aspects

The DSS operation differs from most extractive industries in that the sand is dredged from flooded ponds that are naturally fed by surface water within a low lying drainage system. The raw sand is then pumped to the processing plant for screening to remove debris, organic matter, and oversized material prior to simple flotation to remove fines and then dewatering. The rehabilitation program uses Virgin Excavated Natural Materials (VENM) and Potential Acid Sulphate Soils (PASS) which are emplaced in the excavated ponds as part of the final landform design and final land use. Once rehabilitation has been completed, the final land use consists of a natural lake system which can be used for recreation purposes.

There are two key water management issues that are central to the environmental performance of the site. These are flooding and water quality. Both issues are important to avoid impacts on sensitive downstream wetlands.

The site is located just above the tidal reaches of the Minnamurra River which is fed by several tributaries which meander through the coastal flood plain of the Rocklow Creek catchment where the sand resource is located. Minimising flooding issues requires the operation to carefully manage surface and groundwater inflows to the dredge ponds in order to maintain the natural flow of water into the wetlands. This includes both flood controls and regular discharges.

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The second environmental aspect is water quality deterioration due to the use of VENM and PASS as backfill. This activity could lead to the addition of organic compounds and changes in metal concentration.

### **1.3 Study Scope**

This report represents the first progress report required under Condition 8 U1.2 of EPL 11147. The scope of this condition is as follows:

The Licensee must engage a suitably qualified person(s) to prepare a written report. The report must include but not be limited to:

- a) the frequency and volume of water discharges at monitoring point EPA identification No. 9;
- b) the rainfall events that are likely to result in:
  - i) discharges via the valved pipes at the Stage 2 pond
  - ii) overflows from the Stage 2 pond; and
  - iii) inability to access the discharge location to undertake monitoring
- c) water monitoring results for water discharges at monitoring point EPA identification no. 9 identified in the schedule;
- d) an assessment of the water pollutants present in discharges at monitoring point EPA identification no. 9. The assessment should identify those pollutants that may pose a risk of non-trivial harm to human health and the environment;
- e) recommendations for the regulation of water discharges at monitoring point EPA identification no. 9 in the Licence. This must include but not be limited to:
  - i) water pollutants to be monitored, discharge limits and reporting requirements;
  - ii) water discharge volume and frequency requirements; and
  - iii) Stage 2 pond freeboard for proper and efficient water management

The remaining conditions relate to the timing of the required discharge reports and that the reports must be made public on the Boral DSS web page.

## 2. Discharge Events

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This section provides information on clauses a) and b) of Condition 8 U1.2 of EPL 11147. As this is the first progress report, data is provided the 4 month period ending September 2023.

### 2.1 Discharge Point

Off site discharge occurs via a drainage channel under Tabbitta Road and into the re-aligned Western Tributary which then flows under the freeway via a culvert. At the entry of this drainage channel are three valved 400mm diameter discharge pipes controlled manually by individual butterfly valves. The location of the pipes and licensed discharge point are shown on the attached map as well as on Plates 1 and 2 below.



**Plate 1 – Discharge Pipe Butterfly Valve Arrangement**

These discharge pipes generally remain closed until discharge is required to maintain freeboard within the Stage 2 Pond. The freeboard is generally 1 m below the spillway which represents the top of the top of the discharge pipes. The pipes are also closed when material is being emplaced in the pond as part of the rehabilitation process to avoid turbid water from being discharged.

The Stage 2 Pond spillway consists of a 10 m wide by 2 m deep overflow structure which was sized according to flood modelling allowing for a discharge of 26.1 m<sup>3</sup>/s. This is sufficient to cater for peak discharge from a 1 in 100 year event without breaching the dam wall.

It is also possible for water to be transferred from the Stage 2 Pond to the Stage 3 Pond. This occurs as needed to maintain water levels but also as a supply source for the processing plant.



**Plate 2 – Discharge Pipes in with Valves in Closed Position**

Under the current management system, it is important to keep the water level below the top of the discharge pipes.

## **2.2 Rainfall for Reporting Period**

Rainfall during the reporting period is shown on Table 2.1.

**Table 2.1 - Rainfall Data**

<b>Month (2023)</b>	<b>Daily Maximum</b>	<b>Total Monthly</b>
June	6.2	12.6
July	10.8	15.4
August	30.2	86.6
September	30.0	37.6
<b>Total During Reporting Period</b>		<b>152.2</b>



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### 2.3 Discharges during Reporting Period

The discharge valves were opened on the following dates:

- 11<sup>th</sup> September 2023
- 12<sup>th</sup> September 2023
- 13<sup>th</sup> September 2023
- 14<sup>th</sup> September 2023

It is important to note that this event was planned and not a result of a particular rainfall event. As can be seen from the monthly rainfall data, June and July were low rainfall months while August was higher. There was no need to discharge during June and July. The elevated rainfall in August consisted of two heavy rain days in the middle of the month and a few minor showers towards the end of the month.

The discharge occurred in September, over two weeks after the last of the August rainfall. The valves were opened on Monday 11<sup>th</sup> September during a period of no rainfall and kept open until the water level fell to approximately half way down the pipe inlets. At this point, the volume of the discharge reduces significantly due to the loss of pressure head.

The delay between rainfall and opening the valves was a result of the time it takes for water to flow through the catchment and near surface sediments. Runoff is also reduced when the ground is dry which would have occurred during the earlier winter period requiring more substantive rainfall to allow meaningful runoff to occur. In higher rainfall periods towards the end of summer, the runoff response to rainfall events would be much shorter.

### 2.4 Discharge Volume

Discharge volume can be estimated by the reduction in water level of the Stage 2 Pond. With a surface area of 12.1 ha each 1 m of water level represents approximately 121 Megalitres (ML). During the discharge event between 11<sup>th</sup> to 14<sup>th</sup> September 2023, the pond water level was dropped by 0.5 m. This equates to approximately 60.5 ML in total or approximately 20.17 ML/day.

Average annual rainfall is in excess of 1,200 mm which generally consist of drier winters (70 to 80 mm/month and wetter in later summer (100 to 140 mm/month). It would be anticipated that discharge would occur more frequently and for longer durations during higher rainfall months.

### 2.5 Accessibility

The monitoring point was accessible during the reporting period. Daily samples could be taken during the discharge event and no sampling was missed due to inaccessibility.

### 3. Discharge Water Quality

The section provides details of water monitoring taken during the discharge event as required by condition U1.2c and d of EPL11147.

#### 3.1 Water Quality Results – EPL 9

Four daily samples were taken during the discharge event. The results are provided in Appendix A and summarised in Table 3.1 below.

**Table 3.1 – Discharge Water Quality EPL9**

Analyte	Units	11/9/23	12/9/23	13/9/23	14/9/23	Average
pH	pH	8.0	8.1	8.2	8.3	8.15
Conductivity	µS/cm	168	590	608	574	485
DO	mg/L	9.0	10.28	10.7	11.22	10.3
Turbidity	NTU	20	16	16	15	16.75
TSS	mg/L	10	11	7.0	19	11.75
Sulfate	mg/L	68	70	69	67	68.5
Chloride	mg/L	58	58	59	60	58.75
Phosphorus	mg/L	0.02	0.02	0.02	0.01	0.0175
T Phosphorus	mg/L	0.06	0.04	0.04	0.01	0.0375
Ammonia	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Nitrite	mg/L	0.01	0.01	<0.01	<0.01	0.01
Nitrate	mg/L	0.48	0.43	0.46	0.25	0.405
TKN	mg/L	0.18	0.17	0.24	0.16	0.1875
Total Nitrogen	mg/L	0.67	0.61	0.70	0.41	0.5975
Aluminium	mg/L	0.58	0.43	0.34	0.18	0.3825
Arsenic	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Boron	mg/L	0.05	0.04	0.04	0.04	0.425
Cadmium	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Cobalt	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Chromium	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Copper	mg/L	0.01	0.01	0.01	0.01	0.01
Iron	mg/L	0.39	0.28	0.22	0.12	0.2525
Mercury	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Selenium	mg/L	0.01	0.02	0.02	0.01	0.015
Manganese	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Lead	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Zinc	mg/L	<0.01	0.01	<0.01	<0.01	0.01
Nickel	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Vanadium	mg/L	0.18	0.18	0.19	0.19	0.185

#### 3.2 Comparison with Water Quality Goals

Table 3.2 provides a comparison with the average discharge results from Table 3.1 with recognised water quality goals. The goals have been derived from the Development Consent

DA195-8-2004MOD2, ANZECC & ARMCANZ (2000) guidelines as updated by the 2018 Water Quality Management Framework (WQMF 2018) (Recreation Guidelines) and typical EPA discharge criteria.

**Table 3.2 – Water Quality Assessment (units as per Table 3.1)**

Element	Water Quality Objective	Average for Discharge Event	Comment
pH	6.6 to 8.6	8.15	Complies
Conductivity	1,500	485	Complies
DO	>6	10.3	Complies
Turbidity	<20	16.75	Complies
TSS	<50	11.75	Complies
Sulfate	<250	68.5	Complies
Chloride	<300	58.75	Complies
Phosphorus	0.05	0.0175	Complies
T Phosphorus	<0.05	0.0375	Complies
Ammonia	0.9	<0.01	Complies
Nitrite	1.0	0.01	Complies
Nitrate	10	0.405	Complies
TKN	N/A	0.1875	No guidance
Total Nitrogen	10	0.5975	Complies
Aluminium	0.2	0.3825	Slightly elevated
Arsenic	0.05	<0.01	Complies
Boron	1.0	0.425	Complies
Cadmium	0.05	<0.01	Complies
Cobalt	N/A	<0.01	No guidance
Chromium	0.001	<0.01	Below detection limits
Copper	1.0	0.01	Complies
Iron	0.3	0.2525	Complies
Mercury	0.006	<0.01	Below detection limits
Selenium	0.01	0.015	Complies
Manganese	1.9	<0.01	Complies
Lead	0.05	<0.01	Complies
Zinc	5	0.01	Complies
Nickel	0.011	<0.01	Complies
Vanadium	N/A	0.185	No guidance

The water quality results are considered acceptable for discharge into a recreational area. The discharge was low in nutrients, salts and metals. The pH was slightly alkaline and coloured however both Total Suspended Particulates and Turbidity values were within guidelines.

## 4. Conclusions

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During the reporting period between June and September 2023, there was one planned discharge event which occurred over a 4 day period. During this period approximately 60.5 ML was discharged from site. Four water samples were taken and the results indicate that the water would not have caused any adverse water quality impacts downstream.

The results over the four days were very consistent with little variation from the first day to the last day.