BUMIARMADA

2024 UKCS ENVIRONMENTAL STATEMENT

KRK-UKS-OPI-ENV-RPT-00003

LEGACY DOCUMENT NUMBER: KRK-UKS-OPI-HSE-RPT-00001

This document describes the environmental performance of the Armada Kraken FPSO in 2024.

Rev	Issue Date	Description	Prepared by	Reviewed by	Approved by
A1	26-May-25	Inter-Disciplinary/Departmental Check (IDC/IDR)	Adam Heys	Helen Drewery	Scott Calderwood

Document Type	RPT - Report
Discipline	ENV - Environmental
Department	OPI - Operations International

Review Classification			
Each Management Review Meeting	☐	Review Period 3 Years	☒
Review Period 5 Years	☐	Not Required	☐

Consulted Personnel

Date	Name	Title
29-Apr-25	Helen Drewery	HSEQ Manager
29-Apr-25	Scott Calderwood	Operations Manager
29-Apr-25	Rod Macleod	VP Operations Europe

Revision History

Revision No.	Date	Revision Description
A1	26 -May-25	Inter-Disciplinary/Departmental Check (IDC/IDR)
00	30 -Apr-25	Issue for Use
A0	29-Apr-25	Issue for internal review

List of Superseded Document(s)

Document Number	Document Title
N/A	N/A

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

1.0 INTRODUCTION

This statement has been prepared to fulfil the regulatory requirement under the OSPAR recommendation 2003/5 to produce an annual public environmental statement. It represents an open and transparent representation of the Armada Kraken FPSO environmental performance for 2024.

1.1 Bumi Armada Overview

Bumi Armada Berhad (BAB) is a Malaysia-based international provider of offshore production and support services with a presence in over 17 countries, spread across five continents, supported by over 1,700 people from 49 nationalities.

Bumi Armada UK Limited (BAUK) is the UK arm of the FPO Operations business unit, which was formed to operate the Armada Kraken FPSO on behalf of EnQuest.

Under the Offshore Installations (Offshore Safety Directive) (Safety Case etc.) Regulations 2015 (SI 398/2015) BAUK has been appointed as the Installation Operator for the Armada Kraken FPSO and is the appointed Installation Operator under the Offshore Petroleum Licensing (Offshore Safety Directive) Regulations 2015 (SI 385/2015).

1.2 Armada Kraken FPSO

The Armada Kraken FPSO is based upon the conversion of the 2007 built Suezmax sized conventional trading tanker Prisco Alcor (Figure 1). As a trading tanker, the vessel was classed with DNV as 1A1 ICE-1A (for max draught of 15.4 m) Tanker for Oil ESP SPM EO VCS-2 CLEAN TMON NAUTICUS (new building) and was built by Hyundai Heavy Ind. Co. Ltd. The vessel has undergone R&LE to strengthen the hull to withstand the expected conditions of the North Sea.

1.3 Kraken Operations

The Kraken Field is located in Block 9/2b in the southern part of the East Shetland Basin in the northern North Sea. This area is approximately 130 km east of the nearest landfall at Noss, the Shetland Islands and 44 km west of the UK/Norway trans-boundary median line (Figure 2). The development consists of the North, Central and South Kraken Fields which all lie within UK Block 9/2b. The field was initially discovered in 1985 with further appraisal carried out over the period 2007-2013.

Oil recovery is a line-drive horizontal well water-flood development consisting of 14 production and 12 injection wells. The wells are tied back to the Armada Kraken FPSO from 4 production/injection drilling centres. First oil from the Armada Kraken was achieved on the 23rd June 2017.

Figure 1 – Armada Kraken FPSO.

Figure 2 – Location of the Armada Kraken FPSO in the UKCS.

2.0 REFERENCES

Table 1 – Internal Reference Documents

Document Number	Document Title
N/A.	N/A.

3.0 DEFINITIONS, ACRONYMS AND ABBREVIATIONS

3.1 Abbreviations

Table 2 – Abbreviations

Abbreviation	Description
BAB	Bumi Armada Berhad
BAUK	Bumi Armada UK
Cefas	Centre for Environment, Fisheries and Aquaculture Science
CO_2	Carbon Dioxide
CO_2e	Carbon Dioxide Equivalent
EMS	Environmental Management System
ETS	Emissions Trading Scheme
FPO	Floating Production and Operation
FPSO	Floating Production Storage and Offloading
GHG	Greenhouse Gas
HS&E	Health, Safety & Environment
HSSEQ	Health Safety Security Environment and Quality
OiW	Oil in Water
OMS	Offshore Marine Services
OPEP	Oil Pollution Emergency Plan
OPRED	Offshore Petroleum Regulator for Environment and Decommissioning
OSPAR	Oslo Paris Convention
OSV	Offshore Support Vessel
PEMS	Predictive Emissions Monitoring System
PON1	Petroleum Operations Notice
PW	Produced Water
mg/L	milligrams per litre
R&LE	Repair & Life Extension

Abbreviation	Description
SC	Subsea Construction
WI/HSP	Water Injection/Hydraulic Submersible Pumps
UKCS	United Kingdom Continental Shelf

3.2 Definitions

Table 3 – Definitions

Term	Description
N/A.	N/A.

4.0 ENVIRONMENTAL MANAGEMENT SYSTEM

BAUK operates an integrated Health, Safety and Environment Management System (HS&E MS) which has been accepted and endorsed by the Board and embedded across all levels of the organisation. The system forms a core component of the company's overall management framework and is implemented through a structured hierarchy of policies, procedures, standards and work instructions.

The primary objective of the HS&E MS is to ensure that BAUK's activities do not pose unacceptable risks to people, the environment, assets, or the company's reputation. The Bumi Armada HSSEQ Policy, which underpins this commitment is presented in Figure 3.

In addition, BAUK's Environment Management System (EMS) has been independently verified against the OSPAR 2003/5 criteria, reinforcing our commitment to responsible environmental stewardship in offshore operations.

Figure 3 – Bumi Armada Berhad HSSE Policy.

BUMIARMADA

HEALTH, SAFETY, SECURITY & ENVIRONMENT (HSSE) MANAGEMENT POLICY

COMMITMENTS

The "Company" (herewith refer to Bumi Armada Berhad and all its subsidiaries and joint ventures that are within its management and operational control) is committed to operating our business with the objective of safeguarding the people, environment, asset and reputation in locations where we operates. The "Company" shall manage HSSE in line with this policy to ensure:

- Health and Safety of our employees, contractors and those (including the communities) who could be directly impacted by our business activities;
- Compliance with all relevant HSSE regulations and local governmental rules, and to adopt existing standards in regions where laws and regulations do not exist;
- Protection of the environment and the communities in which we operate through pollution prevention, waste management, emissions (GHG and non-GHG) and effluents minimisation, as well as consultation with stakeholders on environmental issues;
- Mitigation of physical security risks to our employees, contractors and assets through adoption of relevant international security standards and statutory compliance;
- Continual improvement in HSSE performance through implementation of Integrated Management System (IMS) for all activities;
- Ensure operation integrity through the development and implementation of Process Safety Management (PSM) to reduce, and ultimately eliminate, fatal and high severity Process Safety Event (PSE).

PRINCIPLES

To achieve these objectives, the "Company" will operate with the following principles:

- Demonstrate and promote visible leadership commitment and employee participation to ensure health and safety of employee, the protection of the environment and the delivery of quality products / services;
- Encourage consultation and participation of workers, and, where they exist, workers' representatives on HSSE related matters;
- Promote and foster a culture of collaboration and participation among all employees in the implementation of our HSSE commitments;
- Eliminate identified hazards and reduce HSSE risks, including associated Cyber Security risks to As Low As Reasonably Practicable (ALARP) throughout the asset lifecycle by providing safe and reliable design and operational asset integrity processes;
- Demonstrate our capability to plan for, respond to, and recover from any HSSE emergency or crisis;
- Monitor and report our HSSE performance throughout the "Company" as a means of providing feedback and promote continuous improvement across the organisation.

GARY CHRISTENSON
Executive Director / Chief Executive Officer
Date: 2nd December 2024

BUMI ARMADA BERHAD (Company No. 376200 K)
Level 21, Menara Perak, 24 Jalan Perak, 50450 Kuala Lumpur, Malaysia.
Tel: +603 2171 5799 Fax: +603 2163 5799 www.bumiarmada.com

BAB-GEN-HSE-HSG-POL-00002_09

5.0 ENVIRONMENTAL PERFORMANCE

The environmental statistics presented in this document cover the period 1st January 2024 until 31st December 2024.

5.1 Discharges to Sea

During normal production operations, water is co-produced alongside hydrocarbons from the reservoir. Although treated prior to discharge, produced water still contains trace amounts of oil and is therefore subject to stringent regulatory control. BAUK holds an oil discharge permit issued by the Offshore Petroleum Regulator for Environment and Decommissioning (OPRED). This permit allows for the discharge of produced water, provided hydrocarbon concentrations remain within the limits specified in the permit. To minimise the environmental impact of produced water discharges to sea, the Armada Kraken FPSO reinjects c.99% of all produced water.

Discharges to sea also include production chemicals used to support offshore operations. These chemicals such as scale inhibitors, corrosion inhibitors, demulsifiers and biocides are used to assist with the separation of oil and water, prevent damage to subsea infrastructure and to prevent ‘souring’ of the reservoir. Any chemical used offshore during oil and gas production must be approved by the Centre for Environment, Fisheries and Aquaculture Science (Cefas). The use and discharge of production chemicals is controlled under the Offshore Chemical Regulations 2002 (as amended).

BAUK, in collaboration with its contractors and chemical suppliers, continually seeks to minimise the environmental impact of chemicals used by identifying and adopting more environmentally acceptable chemical alternatives through a robust chemical management process.

5.2 Spills

Due to the nature of offshore operations, there is an inherent risk of accidental spills. All spills to sea, regardless of volume, must be reported to OPRED through a Petroleum Operations Notice (PON1).

BAUK has developed and implemented a robust set of processes to prevent unplanned releases. These include planned maintenance of equipment, asset integrity inspections, activity risk assessments, routine area inspections, procedural controls and ongoing training and competency assurance for personnel. Additionally, all unpermitted hydrocarbon or chemical releases are internally recorded and thoroughly investigated. These investigations enhance the understanding of root causes and support the application of corrective and preventative actions to minimise the risk of recurrences.

5.3 Atmospheric Emissions

Atmospheric emissions from offshore production operations primarily result from fuel combustion for power generation, boiler operations and gas flaring. These emissions are regulated under the UK Greenhouse Gas Emissions Trading Scheme (UK ETS) and the Offshore Combustion Installation (Prevention and Control of Pollution) Regulations 2013.

In 2023, BAUK implemented Emissions AI software to enhance monitoring and control of CO2 emissions. This advanced tool provides real-time emissions data, enabling BAUK to evaluate the impact of operational strategies and process adjustments. As a result, measurable reductions in emissions were achieved across several systems including the Sulphate Reduction Unit and Seawater Heater System. Emissions AI supported BAUK's emissions reduction efforts by equipping operators with real-time insights, enabling the identification of optimisation opportunities and quantifying emissions savings achieved.

During 2024, BAUK continued to advance the Emissions AI platform by developing and successfully implementing a Predictive Emissions Monitoring System (PEMS). By combining empirical stack measurements with plant data such as temperature, flow rates, excess oxygen, fuel composition and equipment electrical loading, the PEMS continuously learns and adapts to provide real-time estimates of emissions levels across pollutants such as NOx, CO and SO2.

The primary objective of the PEMS is to support emissions reduction initiatives by delivering a dynamic, real-time view of the emissions profile from the Armada Kraken's main combustion equipment. The level of visibility on the emissions profile enhances operational awareness and offers actionable insights into the factors driving emissions.

5.4 Waste Management

The Armada Kraken FPSO operations involve the consumption of natural resources and other material which generates a range of waste streams. BAUK ensures that all waste is segregated, transported and disposed of in full compliance with applicable legislation. In collaboration with onshore waste management contractors, BAUK actively seeks new opportunities to maximise recycling and reduce landfill disposal. Regular audits are conducted to assess and continuously improve waste management practices across the operation.

6.0 DISCHARGES TO SEA

BAUK is committed to minimising the environmental impact associated with produced water discharges. The produced water treatment process is designed to effectively remove the majority of

hydrocarbons and suspended solids prior to discharge. Produced water is continuously monitored to ensure compliance with regulatory limits and to protect the marine environment.

6.1 Oil in Water

As produced water contains traces of hydrocarbons, discharges are regulated under the Offshore Petroleum Activities (Oil Pollution, Prevention & Control) Regulations 2005 (as amended) which requires the average monthly permitted oil in water content of produced water to not exceed 30 mg/L. Figures 4 to 6 present the average oil concentration (Figure 4), the volume of produced water discharged to sea (Figure 5), and the corresponding total mass of oil discharged (Figure 6) for each discharge route.

Two discharge routes exceeded the regulatory threshold in 2024. The WI/HSP Pump Min Flow route recorded an annual average of 47.99 mg/L. However, the mass of oil discharged via this route was minimal at 0.42 tonnes (as shown in Figure 6). Similarly, the PW Transfer pump route exceeded the average monthly limit with a yearly average of 42.09 mg/L, though the associated mass of oil discharged was also minimal at 3.49 tonnes (as shown in Figure 5).

Figure 4 – Average Oil Concentration (mg/L) Of Produced Water by Route During 2024.

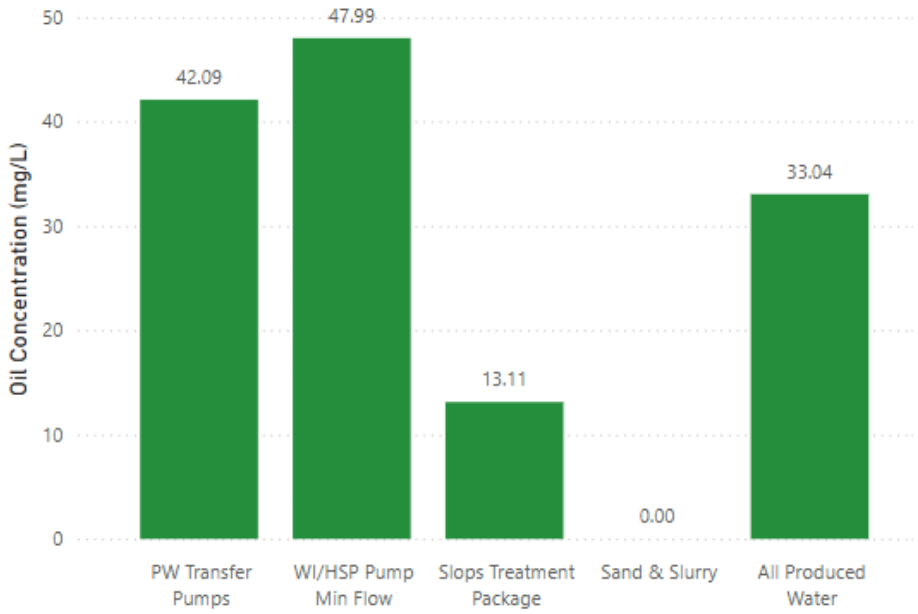


Figure 5 – Volume (m^3) Of Produced Water Discharged by Route During 2024.

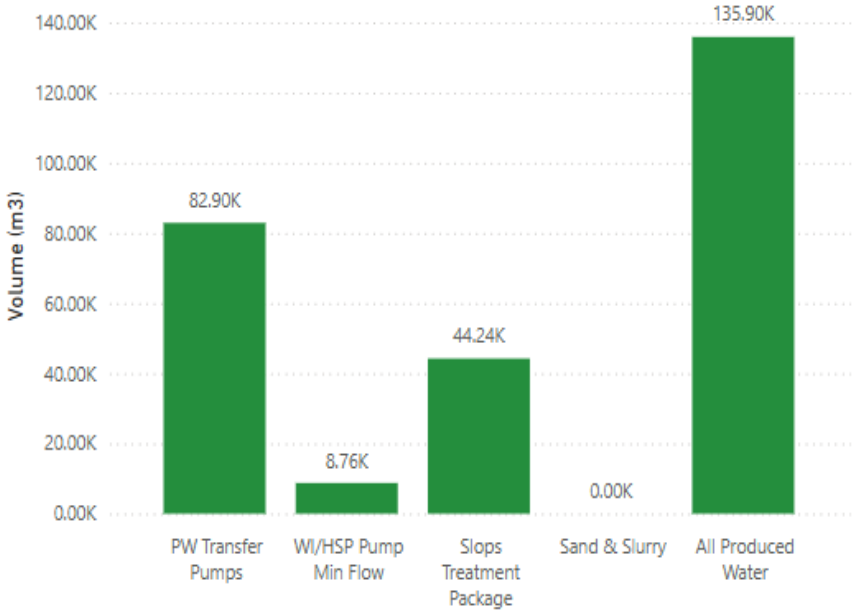
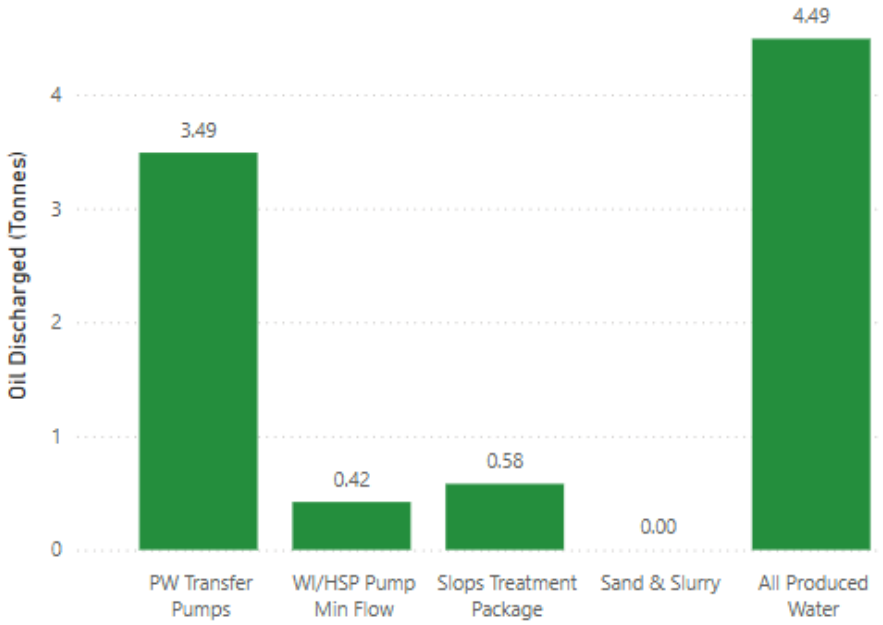


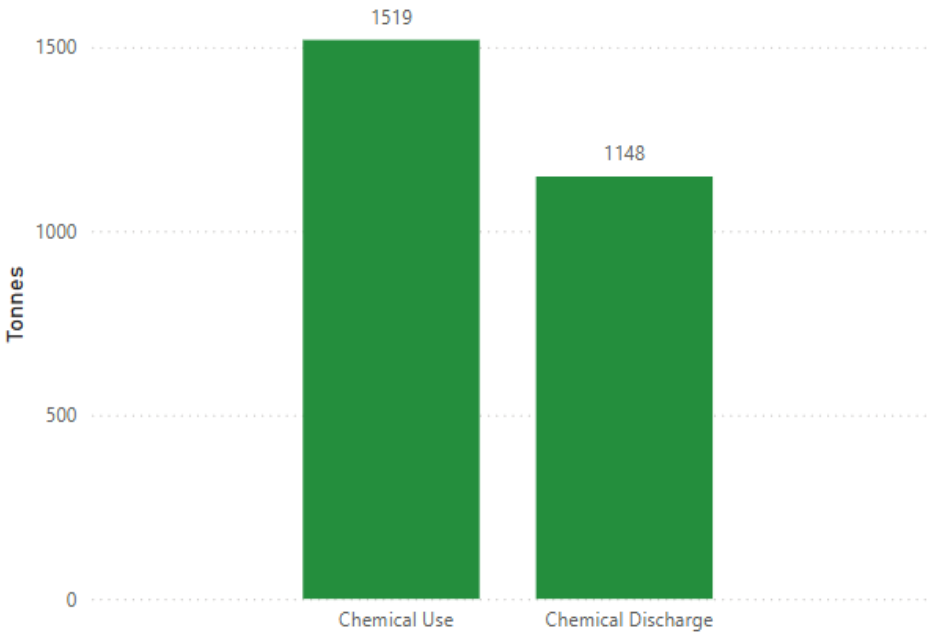
Figure 6 – Tonnes of oil in produced water discharged to sea by route during 2024.



6.2 Chemical Usage

Total chemical use and discharge by the Armada Kraken FPSO in 2024 is shown in Figure 7.

Figure 7 – Tonnes of chemical used and discharged to sea during 2024.



7.0 SPILLS

Recognising the potential environmental impact of marine spills, BAUK maintains a strong focus on prevention as the primary means of risk reduction. An OPRED-approved Oil Pollution Emergency Plan (OPEP) is in place, supported by regular spill response exercises to ensure that procedures remain effective, response equipment is readily available, and personnel are fully trained and prepared to respond swiftly and competently to any spill at sea.

7.1 2024 Spill Summary

All spills to the marine environment, regardless of their volume, must be reported to OPRED through a Petroleum Operations Notice (PON1). In 2024, two PON1 submissions were made following minor releases of crude oil (2.27kg) and hydraulic oil (0.0015kg). Comprehensive incident investigations were conducted for both events, resulting in the implementation of robust corrective and preventative measures designed to significantly reduce the likelihood of future spills to sea.

8.0 ATMOSPHERIC EMISSIONS

The Armada Kraken operation uses energy during the extracting, processing and exporting of oil. BAUK manages energy consumption efficiently to reduce the emissions from Armada Kraken operations. Figure 8 and Table 4 provide the detail of verified Armada Kraken GHG 2024 emissions expressed as a CO_2 equivalent (CO_2e). In 2024, the Armada Kraken FPSO produced 230,790.76 tonnes CO_2e with 99.7% of all emissions resulting from diesel combustion, natural gas combustion and gas flaring activities.

Figure 8 – Percentage Breakdown of 2024 Armada Kraken GHG Emissions (CO_2e) by Emissions Source.

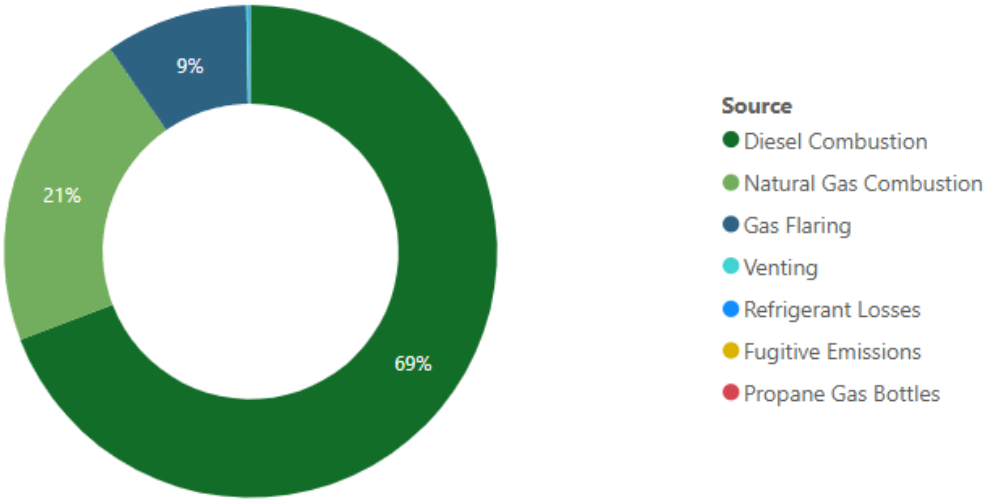


Table 4 – 2024 Armada Kraken GHG Emissions (Tonnes CO2e) by Emissions Source.

Source	Total CO2e (Tonnes)
Diesel Combustion	159,603.07
Natural Gas Combustion	48,944.57
Gas Flaring	21,590.13
Venting	358.00
Refrigerant Losses	265.03
Fugitive Emissions	29.27
Propane Gas Bottles	0.69
Total	**230,790.76**

9.0 WASTE MANAGEMENT

Armada Kraken operations consume natural resources and other material which generates a range of wastes. BAUK manages waste according to the waste management hierarchy – Prevention, Prepare for reuse, Recycle, Recover other value (e.g., energy) and disposal. BAUK seeks to minimise the quantity of waste disposed to landfill. Figure 9 and Table 5 show the destination of waste that was generated by the Armada Kraken FPSO in 2024. The total quantity of waste generated by the Armada Kraken FPSO in 2024 was 177.82 tonnes with only 9% of this being disposed of via landfill.

Figure 9 – Percentage Breakdown of 2024 Armada Kraken Waste Disposal Routes

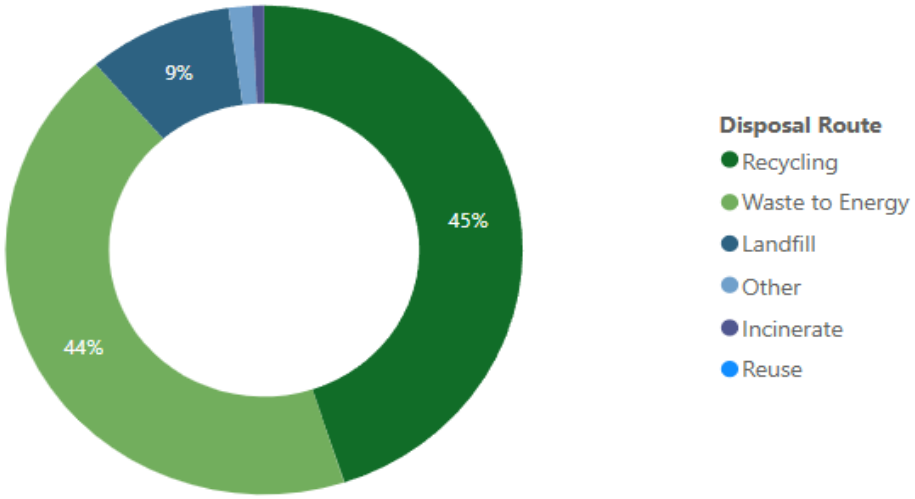


Table 5 – 2024 Armada Kraken Waste Disposal Summary

Waste Disposal Route	Tonnes
Recycling	79.99
Waste to Energy	77.77
Landfill	16.13
Other	2.60
Incinerate	1.33
Reuse	0.00
Total	**177.82**