2025

# MINERAL RESOURCE ESTIMATE FOR THE EL3 COOK ISLANDS POLYMETALLIC NODULE DEPOSIT

**S-K 1300 Technical Report Summary on a Mineral Resource Estimate for the EL3 Cook Islands Polymetallic Nodule Deposit**


| | |
|---|---|
| Report prepared for: | MOANA MINERALS LTD<br>Grand Central Building<br>Main Road<br>Avarua<br>Rarotonga, Cook Islands |
| Qualified Person: | René Sterk, MSc FAusIMM CP(Geo) MAIG (RPGeo) MSEG MInstD<br>Sean Aldrich, MSc MAusIMM MAIG |


www.rscmme.com

# Date & Signature

## Report issued by

RSC Consulting Ltd

245 Stuart Street, Dunedin 9016, New Zealand

Postal Address: PO Box 5647, Dunedin, 9054, New Zealand

## Report prepared for

| | |
|---|---|
| **Client name** | MOANA MINERALS LTD |
| **Project name** | EL3 COOK ISLANDS POLYMETALLIC NODULE DEPOSIT |
| **Contact name** | Hans Smit |
| **Contact title** | President and CEO |
| **Contact address** | Grand Central Building, Main Road, Avarua, Rarotonga, Cook Islands |

## Report Information

| | |
|---|---|
| **File name** | 250711 RSC Moana Technical Report |
| **Effective date** | August 1, 2025 |
| **Report status** | Final |

## Date & Signature

| Contributing author (QP) | Signature | Date |
|---|---|---|
| **René Sterk, MSc FAusIMM CP(Geo) MAIG (RPGeo) MSEG MInstD** | | |
| **Sean Aldrich, MSc MAusIMM MAIG** | | |

# Contents

## List of Tables

## List of Figures

## Acronyms

| | |
|---|---|
| °C | degrees Celsius |
| 2D | two-dimensional |
| 3D | three-dimensional |
| µm | micrometer |
| AD | armed dredge |
| Ag | silver |
| Al | aluminum |
| As | arsenic |
| AusIMM | Australasian Institute of Mining and Metallurgy |
| AUV | autonomous underwater vehicle |
| Ba | barium |
| BC | box core |
| BGRIMM | Beijing General Research Institute for Mining and Metallurgy |
| BS | benthic sled |
| BSE | backscattered electron mode |
| Ca | calcium |
| CCD | carbonate compensation depth |
| CCOP/SOPAC | Committee for Coordination of Joint Prospecting for Minerals Resources in South Pacific Offshore Areas |
| CCZ | Clarion-Clipperton Zone |
| Cd | cadmium |
| Ce | cerium |
| CIPA | Cook Islands Port Authority |
| CO | carbon monoxide |
| Co | cobalt |
| CPGeo | Chartered Professional Geologist |
| Cr | chromium |
| CRM | certified reference material |
| Cs | cesium |
| CSR | Cobalt Seabed Resources Limited |
| CTD | conductivity, temperature, depth |
| Cu | copper |
| CV | coefficient of variation |
| DGPS | differential global positioning system |
| DQO | data quality objective |
| DVL | doppler velocity logger |
| Dy | dysprosium |
| E1L2 | Expedition 1, Leg 2 |
| eDNA | environmental DNA |
| EEZ | exclusive economic zone |
| EIA | environmental impact assessment |
| EL3 | Exploration License 3 |
| ENSO | El Niño–Southern Oscillation |
| Er | erbium |
| Eu | europium |
| EXP2 | Expedition 2 |
| EXP3 | Expedition 3 |
| EXP4 | Expedition 4 |
| Fe | iron |
| FFG | freefall grab |
| FS | Feasibility Study |
| g | gram |
| Ga | gallium |
| GCS | geographic coordinate system |
| Gd | gadolinium |
| GPS | global positioning system |
| GSR | Global Sea Mineral Resources |
| Hf | hafnium |
| Ho | holmium |
| ICI | Infrastructure Cook Islands |
| ICP-AES | inductively coupled plasma atomic emission spectroscopy |
| ICP-MS | inductively coupled plasma mass spectrometry |
| ISA | International Seabed Authority |
| ISO | International Organization for Standardization |
| JICA | Japan International Cooperation Agency |
| K | potassium |
| KE | kriging efficiency |
| ka | thousand years ago |
| kg | kilogram |
| kHz | kilohertz |
| km | kilometer |

| | |
|---|---|
| kyr | thousand years |
| L | liter |
| La | lanthanum |
| LARS | launch and recovery system |
| LC | long core |
| LED | light-emitting diode |
| LOI | loss on ignition |
| LOQ | limit of quantification |
| Lu | lutetium |
| m | meter |
| Ma | million years ago |
| MBES | multibeam echosounder |
| MC | multicore |
| MFES | multi-frequency exploration system |
| Mg | magnesium |
| mi | miles |
| ml | milliliter |
| mm | millimeter |
| MMAJ | Metal Mining Agency of Japan |
| MML | Moana Minerals Limited |
| Mn | manganese |
| Mo | molybdenum |
| MRE | mineral resource estimate |
| Mt | megaton |
| MV | motor vessel |
| Na | sodium |
| Nb | niobium |
| Ni | nickel |
| NNSS | Navy Navigation Satellite System |
| NOAA | National Oceanic and Atmospheric Administration |
| OML | Ocean Minerals LLC |
| O | oxygen |
| P | phosphorous |
| Pb | lead |
| PFS | Pre-Feasibility Study |
| Pr | praseodymium |
| QA | quality assurance |
| QAT | quality assurance testing |
| QC | quality control |
| QEMSCAN | quantitative evaluation of minerals by scanning electron microscopy |
| QP | Qualified Person |
| QQ | quantile-quantile |
| RALS | riser and lift system |
| Rb | rubidium |
| RBF | radial basis functions |
| RC01 | Research Cruise 1 |
| REEs | rare earth elements |
| REY | rare earth elements and yttrium |
| RL | reduced level |
| RMSCV | root mean square coefficient of variation |
| ROV | remotely operated vehicle |
| RPEEE | reasonable prospects for eventual economic extraction |
| RSC | RSC Consulting Ltd |
| SBMA | Seabed Minerals Authority |
| SD | standard deviation |
| SEC | South Equatorial Current |
| SEM | scanning electron microscope |
| S | sulfur |
| Sc | scandium |
| Si | silicon |
| Sm | samarium |
| Sn | tin |
| SOP | standard operating procedure |
| Sr | strontium |
| t | ton |
| Ta | tantalum |
| Tb | terbium |
| Th | thorium |
| Ti | titanium |
| Tl | thallium |
| Tm | thulium |
| TMS | tether management system |
| TRS | Technical Report Summary |
| U | uranium |
| USBL | ultra-short baseline |
| UTM | Universal Transverse Mercator |

| | |
|---|---|
| V | vanadium |
| W | tungsten |
| XRD | X-ray diffraction |
| XRF | X-ray fluorescence |
| Y | yttrium |
| Yb | ytterbium |
| Zn | zirconium |

# 1. Executive Summary

Moana Minerals Limited (MML) commissioned RSC to prepare a technical report, compliant with S-K 1300 standards, on its polymetallic nodule project (Project)located within the Cook Island exclusive economic zone (EEZ). RSC prepared an independent technical report in accordance with the JORC Code (2012) in July 2024. RSC was engaged by MML to report the mineral resource in this report, conforming to the United States Securities and Exchange Commission's (SEC) Modernized Property Disclosure Requirements for Mining Registrants, as described in Subpart 229.1300 of Regulation S-K, Disclosure by Registrants Engaged in Mining Operations (S-K 1300), and Item 601 (b)(96) Technical Report Summary (TRS).

The effective date of this TRS report is August 1, 2025, while the effective date of the Mineral Resource estimate (MRE) was July 19, 2024

## 1.1 Property Description & Ownership

The Project is located within the EEZ of the Cook Islands, in the South Pacific Ocean. While the Project is confined to the boundary of EL3, the project is part of a wider known deposit of polymetallic nodules found within the Cook Islands' EEZ. The Project is located on the seabed, more than 5,000 m below sea level.

EL3 was granted to Moana Minerals Limited (MML) — a wholly owned Cook Islands registered company subsidiary of Ocean Minerals, LLC (OML) — on 23 February 2022, by the Seabed Minerals Authority (SBMA) on behalf of the Cook Island Government. The license is valid for a term of five years. An application for license renewal can be made at least 90 days before the expiry of the license, in line with Section 63 of the Seabed Minerals (Exploration) Regulations (2020).

## 1.2 Geology & Mineralization

Polymetallic nodules are part of a spectrum of ferromanganese precipitates that are found throughout the world's oceans. The Cook Islands are distinctive in having relatively ancient and stable ocean crust, coupled with very low-modelled net export of organic material to the seabed, and the interpreted influence of a long-lived deep-water ocean current.

Most of the Project area consists of relatively flat abyssal plains, with sea knolls and seamounts scattered across the Project area, but with a higher concentration in the center and center-west.

Polymetallic nodule abundance and element grades vary throughout the Project area but are more consistent compared to the wider EEZ. 'Nodule abundance' is the term used to describe the number of nodules found in a given sample area; it is measured in kilograms per square meter because nodules typically form on the seabed as a single layer, several centimeters thick, so are, in effect, a two-dimensional deposit. The nodule abundance in the Project ranges from 0–50.8 kg/m$^2$ and has an average abundance of 26.9 kg/m$^2$. Nodule abundance is typically higher in areas of abyssal plains.

Polymetallic nodules in the Cook Islands are geochemically unique, compared to other deposits, due to their low Mn/Fe ratio and elevated Co grades. The average Mn/Fe ratio is 0.83, which indicates the nodules are formed via hydrogenetic

processes. This is supported by nodule morphology (relatively smooth texture), and the low number of buried nodules recovered — most nodules are found on the surface of the seabed.

## 1.3 Status of Exploration

Exploration has been conducted to at least some extent across the entire Project. The eastern and southern quadrants are the most explored, as MML has conducted sampling on a nominal 12-km grid. By contrast, the northwestern quadrant is the least explored and was sampled on ~50-km sample spacing by the Japan International Cooperation Agency (JICA).

## 1.4 Development & Operations

Since 2019, MML has conducted at least five cruises. MML used freefall grab (FFG), box core (BC), multicore (MC), and benthic sled (BS) sampling tools to collect polymetallic nodule samples, supported by remotely operated vehicle (ROV) surveys.

## 1.5 Mineral Resource Estimate

The Mineral Resources exclusive of mineral reserves are summarized in Table 1-1. The data informing the Mineral Resource estimate (MRE) consists of declustered samples collected by JICA and during Research Cruise 1 (RC01), as well as samples collected during Expedition 1 Leg 2 (E1L2) and Expedition 4 (EXP4) for which no sampling issues were indicated. All samples were reprojected to Universal Transverse Mercator (UTM) zone 4S. The reduced level (RL) was set to 0. No corrections were applied to the geochemical or nodule abundance data.

Table 1-1: Mineral Resource statement at a nodule abundance cut-off of 12.5 kg/m$^2$.

| Classification | Abundance (wet) kg/m$^2$ | Nodules (wet) Mt | Metal Grade | | | | |
|---|---|---|---|---|---|---|---|
| | | | Co (%) | Cu (% | Fe (%) | Mn (%) | Ni (%) |
| **Indicated** | 26.7 | 417 | 0.49 | 0.15 | 18.9 | 15.6 | 0.27 |
| **Inferred** | 26 | 102 | 0.5 | 0.1 | 19 | 16 | 0.2 |

*Notes:*
1. *Mineral Resources have an effective date of 19 July 2024.*
2. *Mineral Resources are reported using the S-K 1300 definitions.*
3. *Mineral Resources are not Mineral Reserves and do not have demonstrated economic viability.*
4. *Numbers have been rounded as required by reporting guidelines and may result in apparent summation differences.*
5. *Abundance is the wet weight (kilograms) of polymetallic nodules per square meter.*
6. *The estimate of tons and abundance is provided at a cut-off of 12.5 kg/m$^2$.*
7. *The estimate is reported where the modifying factor of slope has been considered, and the proportion of slope >10° is applied locally to each block within the Low Abundance domain.*

The controls on mineralization are consistent across the Project area and fit in with the wider EEZ geological framework. At deposit scale, variation in Cu, Mn and Ni grades is low and RSC did not identify any sub-populations. Variations in Co, Fe and Mo and nodule abundance were identified, with an area of low grade and low abundance associated with areas of relief (e.g. around the central seamount and eastern ridge geomorphological domains).

Experimental semi-variograms were modelled with relatively low $\gamma_0$ values and one or two spherical structures. All variograms display reasonable structure for global estimation and are compatible with the classification of Indicated and

Inferred Mineral Resources. A block size of 6,250 m × 6,250 m was selected for estimation, based on sample spacing and existing mineral resource models. Sub-blocking of 3,125 m × 3,125 m was applied to gain a better definition of the license boundary and of the geomorphological domain. Estimation was done using ordinary kriging. Validation methods included visual review and comparison of means as well as validation plots. Sensitivity testing through variance of the parameter settings found the estimate to be robust. A multifactor scorecard was also applied to data quality to support the classification of the estimate.

The MRE is supported by consideration of minerals harvesting (mining) and metallurgical processing methods. In assessing the reasonable prospects for eventual economic extraction (RPEEE), the Qualified Person (QP) has considered conceptual mining, metallurgical, and economic parameters as well as environmental and social aspects.

### 1.6 Mineral Reserve Estimate

Not applicable to this TRS.

### 1.7 Capital & Operating Costs

Not applicable to this TRS.

### 1.8 Economic Analysis

Not applicable to this TRS.

### 1.9 Permitting Requirements

Not applicable to this TRS.

### 1.10 Conclusions & Recommendations

RSC has completed an MRE for MML's polymetallic nodule project within EL3. RSC reviewed the available data, including historical sampling collected by JICA, samples collected by MML, SOPs, and QC data.

RSC conducted a review of the data quality (Section 8.6), and identified issues with the FFG and BC data. Video footage of the sampling was a critical component of the quality review process, as it allowed RSC to identify samples without sampling issues, and separate these from samples where issues had occurred.

Polymetallic nodule abundance and element grades vary throughout the Project area but are more consistent compared to the wider EEZ. The average nodule abundance in the Project area is 26.9 kg/m$^2$; however, nodule abundance is higher in areas of abyssal plains. The nodules found in the Cook Islands are geochemically unique compared to other deposits due to their low Mn/Fe ratio and elevated Co grades. The average Mn/Fe ratio is 0.83, which indicates the nodules are formed via hydrogenetic processes. This is supported by nodule morphology (relatively smooth texture), and the low number of buried nodules recovered — most nodules are found on the surface of the seabed.

RSC estimated nodule abundance and elemental concentrations using ordinary kriging. A range of block sizes and search parameters were assessed and optimized. A range of sensitivity testing was performed which indicated the estimation was sound and robust. The Mineral Resource has been classified following S-K 1300 definitions. The classification of the resource is based on sample quality, confidence in geological understanding, and on the quality of the estimate itself, as broadly determined during the validation process. Based on the review of all provided data and information, the Qualified Person (QP) regards the data as fit for the purpose of classifying Indicated and Inferred Mineral Resources.

The exploration potential for polymetallic nodules in the Cook Islands EEZ is significant, especially within EL3, as indicated by exploration by JICA and MML. A large proportion of EL3 has been explored by 12-km grid sampling; however, the area in the north, particularly the northwest, remains under investigated.

Future exploration work should aim to:

- increase sample density in the northwest, where the current sample spacing is ~50 km; and
- increase sample density in the north, where the current sample spacing is ~25 km.

This exploration work would provide the basis for upgrading the Inferred portion of the Mineral Resource, on the condition that the quality of the data collected supports the upgrade. Infill sampling in the north will also provide additional sample support and validation to the historical sampling conducted by JICA.

With further exploration (i.e. infill sampling), and some management of the risks identified in Section 11.12, areas of the Project could be upgraded to the Measured category.

# 2. Introduction

## 2.1 Registrant Information

This Technical Report Summary (TRS) for the EL3 property, located in the EEZ of the Cook Islands in the South Pacific Ocean, was prepared by RSC Consulting Ltd (RSC) for Moana Minerals Limited (MML). As noted on the Date & Signature Page, the technical work summarized in this TRS was supervised by René Sterk, MSc FAusIMM CP(Geo) MAIG (RPGeo) MSEG MInstD.

## 2.2 Terms of Reference & Purpose

The effective date of this TRS report is August 1, 2025, while the effective date of the Mineral Resource estimate (MRE) was July 19, 2024. The Qualified Person confirms that there are no known material changes impacting the MRE between July 19, 2024, and August 1, 2025.

This TRS uses US English spelling and a combination of metric and imperial units of measure. Costs are presented in USD, as of July 19, 2024.

Except where noted, coordinates in this TRS are presented in metric units, using the WGS UTM Zone 4S coordinate system.

The purpose of this TRS is to report Mineral Resources for MML's EL3 property.

## 2.3 Sources of Information

The information in this TRS is based on data supplied by MML.

MML provided the following data via access to its SharePoint folders:

- standard operating procedures and method statements;
- deployment data;
- geological data including deck logging sheets, weighing log sheets, nodule description logs, and sedimentary logs;
- a media drive including sampling videography, deck photographs, and tray photographs;
- surveying data;
- a GIS database; and
- assay certificates.

The Qualified Person takes responsibility for the content of this report and considers the data review to be accurate and complete in all material aspects.

## 2.4 Qualified Persons

This Report was completed by the following Qualified Persons (QPs).

**René Sterk** is a Fellow of the Australasian Institute of Mining and Metallurgy (AusIMM) and a Chartered Professional Geologist (CP Geo) with the AusIMM. René is the Qualified Person responsible for all sections of the report. René holds an MSc in Structural Geology and Tectonics from the Vrije University Amsterdam (2002) and is a full-time employee and Managing Director of RSC, an independent international consulting group. His experience includes assessment and evaluation of seabed nodule deposits near New Zealand, Cook Islands, and in the Clarion-Clipperton Zone (CCZ). René has been the principal author of technical papers concerning seabed sampling techniques, and documentation of seabed resources prepared according to industry codes. He has presented at professional seabed mining industry conferences, facilitated resource estimation training workshops for the seabed mineral industry, and has also been involved with expert working groups addressing seabed mining policy. René is responsible for all sections of this report, except Section 2.5.

**Sean Aldrich** is a Member of the Australasian Institute of Mining and Metallurgy (MAusIMM) and a Member of the Australian Institute of Geoscientists (MAIG). Mr Aldrich is a full-time employee and principal geologist with RSC. Mr Aldrich holds an MSc in Earth Sciences from the University of Waikato (1996). His experience includes assessment and evaluation of phosphate nodules and manganese nodules and crusts. He also has offshore experience for manganese nodule exploration campaigns and is experienced with resource evaluation and technical reporting. His recent consulting work includes seabed mineral resource estimations and critical mineral development. He is responsible for Section 2.5 of this report.

## 2.5 Personal Inspection Summary

The QP (Sean Aldrich) was onboard the MV *Anuanua Moana* for E1L2 from 13–26 May 2023. The QP monitored geological sampling and preparation and reviewed standard operating procedures (SOPs) and quality control (QC) processes. The QP did not conduct a further site visit; however, an RSC geologist (Stephie Tay) was onboard MV *Anuanua Moana* for EXP4 from 8–30 November 2023. Ms Tay remained on site in Rarotonga for an additional 10 days to conduct check measurements.

## 2.6 Previously Filed Technical Report Summary Reports

This is the first TRS filed for the EL3 property.

# 3. Property Description

## 3.1 Location

The Project is located within the EEZ of the Cook Islands, in the South Pacific Ocean (Figure 3-1). While the Project is confined to the boundary of EL3, which covers an area of 9,118 mi$^2$, the Project is part of a wider known deposit of polymetallic nodules found within the Cook Islands' EEZ. The Project is located on the seabed, more than 5,000 m below sea level. The Project is located 323 miles from Avarua, Rarotonga, 163 miles from Aitutaki, and 2,370 miles from Auckland, New Zealand.

The center of the Project is located at 16.5° S and 159.5° W.

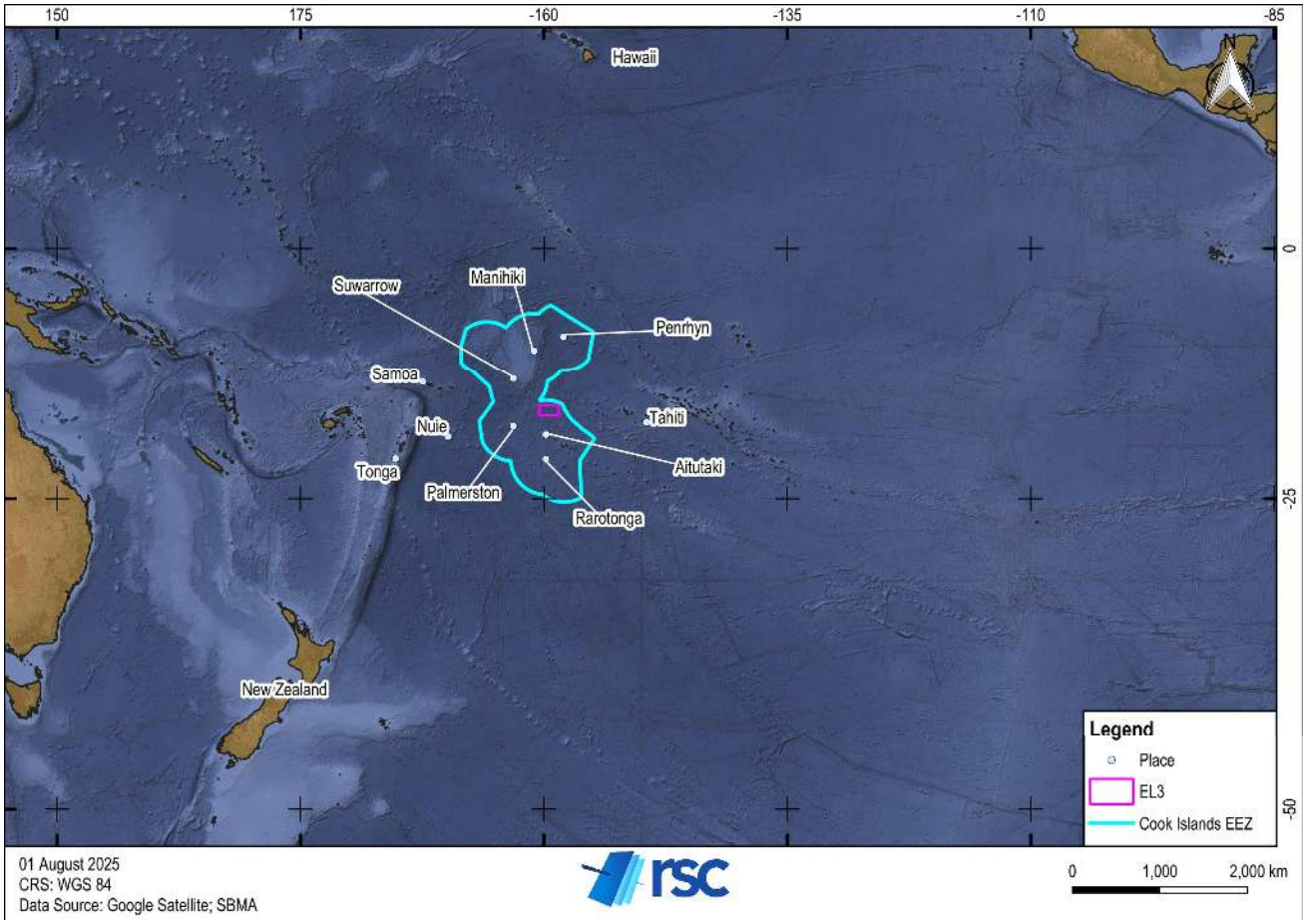


Figure 3-1: Location of the Project (EL3) in the South Pacific Ocean.

## 3.2 Mineral Tenure

EL3 was granted to MML, a wholly owned subsidiary Cook Islands registered company of Ocean Minerals, LLC (OML), on 23 February 2022 by the Seabed Minerals Authority (SBMA) on behalf of the Cook Island Government (Table 3-1). The license is valid for a term of five years. An application for license renewal can be made at least 90 days before the expiry of the license in line with Section 63 of the Seabed Minerals (Exploration) Regulations (2020).

Table 3-1: Status of MML's license.

| License | License Name | Ownership | Commodities | Grant Date | Expiry Date | Size (mi²) |
|---|---|---|---|---|---|---|
| **EL3** | Exploration License 3 | 100% Moana Minerals Ltd | Polymetallic nodules | February 23, 2022 | February 23, 2027 | 9,118 |

## 3.3 Royalties & Encumbrances

Royalties are dealt with in the Seabed Minerals (Royalties) Regulations 2013. The regulations state that holders of a mining license are liable for a royalty equal to 3% of the export value of minerals recovered under a mining license. The export value of minerals recovered is the free-on-board (FOB) price received. Transfer pricing considerations are included in Income Tax (Transfer Pricing) Regulations 2014.

Under the *Seabed Minerals Act 2019*, any royalties paid to the Crown or the Authority (Seabed Minerals Authority; SBMA) are to be managed by the Ministry of Finance and Economic Management separately from other public money within an established sovereign wealth fund.

The *Income Tax Act* (consolidated as of 2019) contains provisions concerning various tax issues, including:

- tax payable by local companies (20%; all license holders are required to be local companies) as well as foreign contractors (28%);
- deductions and exempt income (for example, deductions related to ongoing exploration and remedial work and environmental funds);
- ring-fencing of accounts and income to jurisdiction;
- write-downs and capital gains tax;
- withholding tax; and mi²
- additional profits tax, including adjustments and instalments.

## 3.4 Environmental Liabilities & Permits

There are no registered environmental liabilities in the Project area.

Activities under the *Environmental Act* and Environment (Seabed Minerals Activities) Regulations (2023) are managed under a tiered system: Tier 1 activities are managed under the exploration license, Tier 2 activities require Environmental Consent, and Tier 3 activities require an Environmental Permit after submission of an Environmental Impact Assessment (EIA).

For exploration activities, MML must provide environmental notice (e.g. environmental significance declaration) and an objectives plan prior to each cruise to the National Environmental Service and SBMA.

For activities including (trial) mining and mineral harvesting, MML would need to undertake an environmental risk assessment, environmental scoping exercise and report, environmental impact assessment, environmental impact statement, environmental management system including an environmental management and monitoring plan, and closure

plan. Guidelines regarding the various environmental assessments, plans and statements are reported on the SBMA website; however, some plans are still in the drafting process.