Australian Government
Department of Climate Change, Energy, the Environment and Water
Australian Antarctic Division

AUSTRALIAN ANTARCTIC PROGRAM

AAD
Environmental Management Plan
RSV *Nuyina*

Project Name	RSV *Nuyina* Operations 2024-2029
Project Location	Southern Ocean, Antarctic and sub-Antarctic stations
Principal Contractor details	Australian Antarctic Division, Department of Climate Change, Energy the Environment and Water 203 Channel Highway, Kingston Tasmania 7050 PH: 03 6232 3610
ABN/ACN	ABN: 34 190 894 983
Authorisation Number	D25/3759
Date of preparation	February 2025

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Issue	**Date**	**Status**
1-22	8 April 2022	Drafts – for internal Review
22	6 May 2022	Serco review
23	18 May 2022	Shipping review
FINAL	3 June 2022	Serco Final review
FINAL	20 July 2023	Annual review
FINAL	11 March 2025	Annual review

Contents

Introduction

Australia's Antarctic program is managed on behalf of the Australian Government by the Australian Antarctic Division (AAD), (Department of Climate Change, Energy, the Environment and Water). The AAD is tasked with advancing Australia's strategic, scientific, environmental and economic interests in the Antarctic by protecting, administering and researching the region. Australia maintains three research stations on the coast of East Antarctica – Casey in Wilkes Land, Davis in Princess Elizabeth Land, and Mawson in Mac Robertson Land. The Australian Antarctic Strategy and 20-year Action Plan, outlines Australia's national interests and our vision for Australia's future engagement in Antarctica. The AAD's Icebreaker RSV *Nuyina* is a multi-purpose icebreaker with capacity to resupply Australia's Antarctic station network and to support scientific research in the sea-ice zone and coastal fringe. The operation of the vessel is an essential component in delivering Australia's national interests in Antarctica.

The AAD is responsible for the Antarctic research stations Casey, Davis and Mawson (and the sub-Antarctic station at Macquarie Island). These stations are dependent on seasonal resupply, normally undertaken during October to April. Annual resupply is essential to maintain station operations and Australia's year-round presence in Antarctica. Ice strengthened and icebreaker vessels are the principle means by which supplies (primarily dry cargo, fuel and water), equipment and expeditioners (personnel), are transported from Hobart to the research stations and are a vital platform for conducting science in the Southern Ocean. RSV *Nuyina'*s primary role is to be a platform for station resupply and scientific research. RSV *Nuyina's* secondary purpose is to support the capability of Australia's other agencies and to contribute to emergency response (both Australian and international) as required.

1.1 Purpose and background

1.1.1 Purpose

The purpose of this Environmental Management Plan (EMP) is to provide AAD and Serco with an overview of activities conducted on RSV *Nuyina,* outline the key environmental objectives, reporting and review requirements, and identify the roles and responsibilities of crew and AAD personnel. The plan summarises the environmental management actions and procedures undertaken to ensure the highest levels of environmental protection are maintained during the operation of the vessel.

1.1.2 Background

The *Antarctic Treaty (Environmental Protection) (ATEP) Act*'s environmental impact assessment process for the RSV *Nuyina's* operations requires the development of an Initial Environmental Evaluation (IEE). The IEE includes an assessment of potential environmental impacts and the identification of mitigation measures and controls to minimise those impacts. Included in the IEE is the project Environmental Aspects and Impacts Register, which informs the environmental management approach for the operation of RSV Nuyina and its science systems, and is included in **Appendix A**. Serco maintains a separate Environmental Aspects and Impacts Register which is managed and reviewed by Serco on an annual basis or as required. Both registers are aligned in their intent and approach for improving environmental outcomes from the operation of the vessel.

The outcomes of the IEE assessment and obligatory conditions for the activity are prescribed in a Notice of Determination and Authorisation (hereafter referred to as the Authorisation), issued by the Division's Antarctic Environmental Regulation (AER) section. Under the Authorisation for the

"Operation of RSV *Nuyina* 2024-2029," AAD must meet all conditions to meet environmental compliance requirements. Condition 4 of the Authorisation specifies a requirement for the development of an Environmental Management Plan (EMP).

RSV *Nuyina* operations and its extent of operational capabilities is continually unfolding and will become more apparent following each season of operation. Over the authorisation period, reviews of this EMP will occur, typically post-season and will require input and feedback from AAD's Maritime Assets team, AAD Subject Matter Experts (SMEs), Serco, AER and AAD's Environmental Management Unit (EMU). Post-season debriefs, in particular, will be an important part of the review process. This review and evaluation process enables improved environmental outcomes to be realised and supports the AAD's Environmental Management System's (EMS) operating model for continual improvement.

Serco has been contracted to undertake vessel operations and maintenance for RSV *Nuyina* and is required to meet environmental management requirements specified in the Authorisation. All workers, AAD directed subcontractors and visitors shall meet the requirements of this EMP in accordance with the project scope of works.

The key potential environmental impacts and the mitigation measures applied to address operational impacts are detailed in Section 9 of this EMP.

Conditions of Approval

1.2 Antarctic Treaty (Environment Protection) (ATEP)Act

To ensure the protection of the Antarctic environment, the Antarctic Treaty nations adopted the Protocol on Environmental Protection to the Antarctic Treaty, which came into force in 1998. Australia enforces the provisions of the Environmental Protocol through the *Antarctic Treaty (Environmental Protection) (ATEP) Act* 1980 and *Environmental Impact Assessment Regulations* 1993. The *Antarctic Marine Living Resources Conservation (AMLRC) Act* 1981 implements the *Convention of the Conservation of Antarctic Marine Living Resources*.

Under Sections 12H and 12J of the ATEP Act, the activity must be assessed for its environmental impacts and provided Authorisation to proceed. The conditions of the Authorisation for RSV *Nuyina* Operations include the requirement for an EMP. A copy of the Authorisation is provided in **Appendix B**.

An environmental monitoring plan is also a condition of the Authorisation (Conditions 8-10) of the *Notice of Determination and Authorisation for RSV Nuyina Operations and Science Systems (2024-2029) (Reference number 24/2453)*, providing an evidence-based environmental performance review of RSV *Nuyina* operations. All environmental monitoring requirements are addressed in a separate Environmental Monitoring Plan for *Nuyina*.

The Conditions relating specifically to this EMP are provided in Table 1 below.

Table 1 ATEP Authorisation Condition Reference Table

Auth. Ref	Condition	Condition Requirement	EMP Section
4		The proponent must present the EMP to the General Manager of Policy and International Branch for approval by 01 August 2022	NA
5	(a)	The EMP must: Be implemented in accordance with the objectives set out in the AAD's EMP for RSV *Nuyina*	4
5	(b)	Identify all potential environmental impacts concerning RSV *Nuyina*'s operation	9 & Appendix A
5	(c)	stipulate safeguard and mitigation measures for implementation	9 & Appendix A
5	(d)	stipulate operational procedures and standards to support implementation of safeguards and mitigation measures	9 & Appendix A
5	(e)	stipulate a Person-In-Charge whom will be accountable for the implementation of safeguards and mitigation measures	5
5	(f)	implement an environmental training program	7
5	(g)	utilise the AAD's Environmental Incident Reporting system	6.3
6		The Person-In-Charge must notify the Environment Manager and General Manager of Policy and International Branch of any actual or potential environmental harm stemming from the operation of RSV *Nuyina* as soon as is reasonably practicable.	As required

Activity Description

Stations are dependent on seasonal resupply, normally performed during the period October to April, to maintain and support year-round station operations in Antarctica and on Macquarie Island. Shipping is the prime means used to deliver supplies (primarily dry cargo, fuel and water), equipment and expeditioners from Hobart to the research stations. A station resupply voyage could require any combination of key vessel-to-shore interface enablers including barges, Light Amphibious Resupply Cargo vehicles (LARCs), helicopters, science tender, workboats and other small watercraft.

An overview of the extensive scientific capability of the RSV *Nuyina* which will continue Australia's longstanding commitment to science in the Southern Ocean and Antarctica and the Antarctic Treaty System is described in Section 4 of the AAD Initial Environmental Evaluation (IEE) for RSV *Nuyina* Operations (2024-2029). A range of onboard underway science capabilities are part of RSV *Nuyina*'s day-to-day operations in the Southern Ocean.

The roles and responsibilities associated with *Nuyina* operations and maintenance are shared between AAD and Serco, who provide expert in-service support to efficiently operate and maintain RSV *Nuyina* during voyages. The specific roles and responsibilities adopted by both AAD and Serco are detailed in Section 5 of this EMP.

1.3 Resupply Operations

The objective of resupply operational activities is to conduct annual resupply of Australia's Antarctic research stations to facilitate the conduct of AAD sponsored scientific research, which delivers Australia's national scientific priorities and objectives. Detailed information on resupply activities and logistics for each station is summarised in Section 4 of the IEE for RSV *Nuyina* Operations (2024-2029).

1.4 Science Capability

A wide variety of scientific equipment and support systems are installed and integrated into the vessel permanently or temporarily as required to meet changing scientific requirements. This can range from simple configuration of temporary equipment for a particular voyage, through to significant engineering works to prepare for a major scientific research campaign or task. More detailed information on the science operations and research capabilities is provided in Section 4.3 of the AAD IEE for RSV *Nuyina* Operations (2024-2029).

1.5 Site Locations

Station resupply is conducted within station operational areas with the vessel positioned at or near to each Antarctic station, as per the coordinates below. No activities are undertaken in protected areas.

Name of location(s): Davis research station, Casey research station, Mawson research station.

Co-ordinates of location(s):
Davis: 68° 34 36”S 77° 58.03”E,
Casey: 66° 16’ 55”S 110° 31’.39”E,
Mawson: 67° 36’ 10”S 62° 52’ 26”E

A map of each station location and an example of typical voyage shipping routes is provided below in **Error! Reference source not found.**.

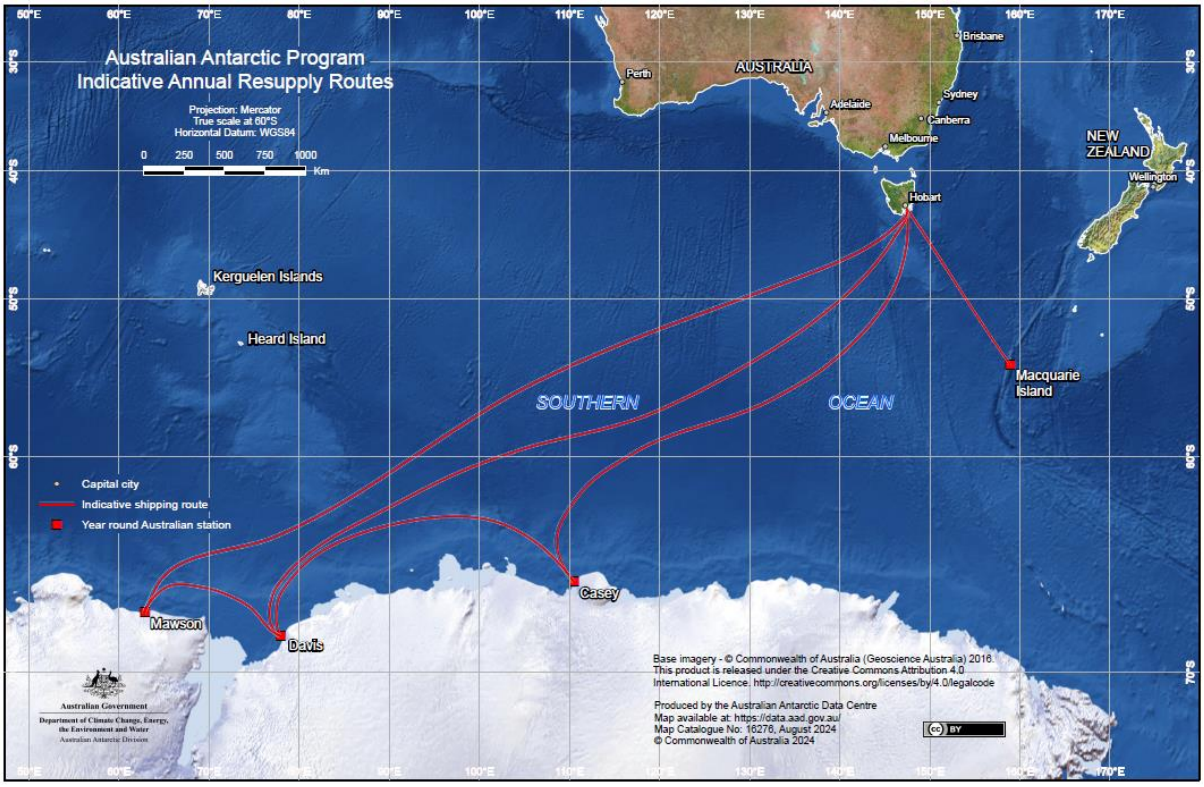

Figure 1 Typical shipping routes undertaken by RSV Nuyina

Key Environmental Objectives

The key environmental objectives associated with the operation of RSV *Nuyina* and science systems (2024-2029) are derived from the outcomes of the ATEP Environmental Impact Assessment (EIA). The EIA process requires the assessment of operational and underway science activities, their potential impact on the environment and the mitigation measures applied to reduce those potential impacts.

A full breakdown of the assessment is provided in the RSV *Nuyina* Operations Environmental Aspects and Impacts Matrix (**Appendix A**).

Table 2 below summarises the key environmental management outcomes for the project, including any monitoring and reporting requirements, associated with the project Authorisation conditions.

Table 2 Summary of key environmental outcomes

AAD Objective: To conserve and protect the unique environments of the Australian Antarctic Territory (including sub-Antarctic environments), manage environmental impacts and meet international obligations (Action Plan 2022-2026).

EMP Objective: To meet compliance requirements of Conditions outlined in Notice of Determination and Authorisation: Operation of RSV *Nuyina* 2024-2029

- Ensure impacts are avoided or limited consistent with the environmental principles of the Madrid Protocol
- Establish the accuracy of the IEE's conclusion that the impacts of shipping operations are likely to remain minor and transitory
- Inform any changes needed to practices to comply with impact thresholds set by regulators
- Ensure impacts are not in conflict with the broader community's expectations in relation to Antarctica's protection.

Management Target	Environmental Impact Category	Management outcome	Monitoring	Timing/Staging	Reporting
Condition clause number and associated text **4 (b) Identify all potential environmental impacts from operation of RSV *Nuyina* and its science systems.**					
No biological change and habitat change	• Introduction of non-native species to Antarctica and the sub-Antarctic • Potential for invasive marine species transported on ship's hull to establish in Antarctic coastal waters and for organisms to be introduced to the offshore marine environment during ballast water exchange	• Biosecurity procedures, staff training, emergency response and maintenance activities prevent establishment of non-native species in Antarctica and the sub-Antarctic • AAD biosecurity screening system is effective in reducing the likelihood of non-native organisms in all	• Monitoring of compliance with Authorisation conditions • Refer to *Nuyina* Environmental Monitoring Plan • AAD annual hull inspection monitoring.	• Refer to *Nuyina* Environmental Monitoring Plan • Mandatory pre-departure training on biosecurity matters • Pre-Arrival Report (PAR) to the shipping agent	• Refer to *Nuyina* Environmental Monitoring Plan • Refer to the Serco *Nuyina* Environmental Management Plan. • Report of Activities to AER (annual)

Management Target	Environmental Impact Category	Management outcome	Monitoring	Timing/Staging	Reporting
	• Organisms introduced from the atmosphere e.g. insects and birds • Transport of organisms or wildlife in/on cargo • Organisms introduced or removed from the environment during ballasting, charging of fire main, engine cooling, fresh water generation and uncontaminated sea water system, trace metal sea water system, wet well sampling.	cargo destined for the Antarctic and sub-Antarctic environments • Annual hull inspections and cleaning undertaken prior to V1. • Application of Biofouling monitoring and management plans minimise risk of transferring invasive aquatic species • Incident and hazard reporting facilitate a culture of continual environmental improvement.			• Incident reporting (as required) • Hull inspection report (annual).
Avoid impacts to flora and fauna	• Pollution resulting from oil spills, collision and grounding • Marine wildlife disturbed in response to pollution events e.g. booms, increased activity etc. • Noise and vibration impact to marine wildlife	• Demonstrable compliance with all Maritime regulations to ensure positive environmental performance • Mandatory training for all personnel creates awareness of risks to fauna	• Monitoring of compliance with Authorisation conditions • Monitoring of collisions with wildlife required • Monitoring wildlife interactions	• Refer to *Nuyina* Environmental Monitoring Plan • Pre-departure training on wildlife matters	Report of Activities to AER (annual) Incident reporting (as required)

Management Target	Environmental Impact Category	Management outcome	Monitoring	Timing/Staging	Reporting
	• Light pollution from navigation lights and internal lighting • Collision with wildlife and disturbance of marine life on voyage routes (causing injury or death) • Organisms and wildlife impacted during ballasting • Disturbance of wildlife from ship-to-shore activities • Impacts on benthic/nearshore marine communities from anchors, cables and operation of small vessels.	resulting in low likelihood of disturbance • Knowledge of and training in Standard Operating Procedures and emergency management results in minimal disturbance to wildlife.	(collisions or behaviour change) when in areas of high environmental value (e.g. ASPAs, ASMAs) • Refer to *Nuyina* Environmental Monitoring Plan		
Minimise noise pollution, light pollution and pollution of the air	• Pollution of the air from diesel emissions, internal combustion engines that generate electricity, and waste heat recovery systems • Noise and vibration from engines, generators, propellers and vessel passing through water • Noise and vibration from the ship breaking ice	• Silent R notation and ship design and compliance requirements maintain low risk of noise pollution • Compliance with air pollution prevention certificate, AAD and Serco SOPs result in minimal visual air pollution during operations.	• Monitoring of compliance with Authorisation conditions • Monitoring of light and noise pollution is required • Refer to *Nuyina* Environmental Monitoring Plan	Refer to *Nuyina* Environmental Monitoring Plan	Report of Activities to AER (annual) Incident reporting (as required) Emissions reporting to DCCEEW

Management Target	Environmental Impact Category	Management outcome	Monitoring	Timing/Staging	Reporting
	• Underwater radiated noise and vibration during transit and underway science activities may disturb marine life activity • Light pollution from navigation lights and internal lighting • Exceedance of GHG emissions.				
Avoid Pollution of sea water/sediments	• Pollution of sea ice and water from hull paint residue • Waste materials being dispersed due to weather conditions or inadvertently released, blown or washed over the side of the Vessel • Waste separation not adhered to by staff and crew • Failure of sewage treatment plants and release of grey and black water • Fuel leaks / spills leading to sea water/ice/ground contamination	• Application of Ship Specific Procedures (SSPs) protect the environment from pollution • P Class notation and Ship Emergency Response Service (SERS) reduces risk of catastrophic pollution events • Compliance with AAD SOPs, Operating Manuals (OM's) and Management Manuals reduce the likelihood of pollution events • AAD mandatory station fuel spill	• Monitoring of compliance with Authorisation conditions • Monitoring of fuel and contaminant spillage is required • Refer to *Nuyina* Environmental Monitoring Plan	• Refer to *Nuyina* Environmental Monitoring Plan • Pre-departure training on environmental matters	Report of Activities to AER (annual) Incident reporting (as required)

Management Target	Environmental Impact Category	Management outcome	Monitoring	Timing/Staging	Reporting
	• Fuel spill during station refuelling operations or small boat refuelling at sea • Aqueous Film Forming Foam (AFFF) release overboard from onboard fuel fire.	exercise prior to resupply, prevents the likelihood of major fuel spill events.			
Avoid Degradation of wilderness values	• Anchor and cable will be dropped from the bow of the Vessel(s) causing damage to the seafloor • Loss of container or equipment over side of ship • Landing barges will impact shoreline.	• Wilderness values are not compromised as a result of RSV *Nuyina* operations and science activities • Compliance with AAD SOPs, Operating Manuals (OM's) and Management procedures prevent the degradation of wilderness values.	Monitoring of compliance with Authorisation conditions	• Pre-departure training on environmental matters	Report of Activities to AER (annual) Incident reporting (as required)

Operation Roles and Responsibilities

1.6 AAD Roles and Responsibilities

Director, Maritime Assets Management: responsible for ensuring this document is up-to-date and that it is used to ensure all environmental aspects have been addressed during the planning and induction process and also during the shipping season.

Assistance Director, Assurance and Compliance (Maritime Assets Management): responsible for updating this plan considering all environmental aspects in each phase of the shipping season.

AAD Voyage Management Team: be aware of the activities being undertaken. Ensure all Special Purpose Personnel (i.e., expeditioners and subcontractors) onboard adheres to, and implements the relevant environmental policies and procedures, including this document.

Director, Maritime Logistics: responsible for using this document as a reference to ensure that all environmental aspects are being addressed during the ongoing activities of the shipping season.

All Special Purpose Personnel (SPP) onboard (including subcontractors if used): responsible for ensuring this plan and the current Standard Operating Procedures (SOPs) referred to in this document are understood before performing any tasks and during the activity**.**

Table 3 AAD environmental management roles and responsibilities

Activity	Who is responsible?	Type of action and records
Environmental hazard identification, assessment and control	AAD Director, Maritime Assets Management AAD Director, Maritime Logistics All SPP onboard	• Environmental Risk Assessment using the AAD Aspects and Impacts Register
Compliance with the EMP, legislation, regulations, SOPs, permit requirements (e.g. threatened species)	AAD Directors, Maritime Assets Management and Maritime Logistics Assistant Director, Assurance and Compliance AAD Voyage Management Team All SPP onboard	• Surveillance and observation • The AAD should comply with all current relevant legislation, guidelines, standards and Management Plans
Provide general work, safety and vessel-specific induction training to all SPP	AAD Voyage Management Team	• Vessel induction for all SPP provided by Serco
Manage environmental emergency procedures	AAD Voyage Management Team AAD Voyage Doctor	• Emergency Contacts List • Emergency Procedures & Plans • Incident reporting

	AAD Directors, Maritime Assets Management and Maritime Logistics	

1.7 Serco Roles and Responsibilities

The Serco roles and responsibilities associated with the RSV *Nuyina* operations are described in detail in the Serco Environmental Management Plan (ENVMP). Please refer to Sections – Subcontractor performance management and Serco roles and responsibilities.

Reporting

1.8 Antarctic Treaty (Environment Protection) (ATEP)Act

Under the ATEP Notice of Determination and Authorisation Operation of RSV *Nuyina* and Science Systems (2024-2029) a Report on Activities is required as part of the Authorisation conditions (Clause 26). The reporting requirements for this activity are outlined in Table 4.

Table 4 Reporting requirements under ATEP Authorisation

Clause	Reporting Requirement	Responsibility
25	The proponent must maintain accurate and complete records (including photographs) to verify compliance with the conditions of the Authorisation.	AAD Maritime Assets Management
26	By 31 May each year the authorisation is in force, the Proponent must submit an Annual report to the Minister or Delegate. The Annual Report must include accurate and complete details of: a) Compliance with the conditions of the authorisation b) Implementation of mitigation measures listed in the IEE c) The status of all plans listed in the authorisation.	AAD Maritime Assets Management
4 (g)	Utilise the AAD's Environmental Incident Reporting system.	Voyage Management

1.9 Environmental Monitoring and reporting

Key environmental indicators, activities and incidents will be monitored to ensure unforeseen and predicted impacts are monitored and managed appropriately. Monitoring activities will include audits and assessment of vessel systems undertaken to maintain compliance with international standards and the AAD's environmental policy and commitment to continuous improvement.

Environmental monitoring and reporting will be undertaken to:

- ensure impacts are avoided or limited and are consistent with the environmental principles of the Madrid Protocol
- establish the accuracy of the conclusion of the *Initial Environmental Evaluation (IEE) for the operation of RSV Nuyina and Science Systems 2024-2029*, i.e., that the impacts of the operations of RSV *Nuyina* and science systems are likely to remain minor and transitory
- inform any changes needed to practices described in the IEE and associated management systems to comply with impact thresholds

- ensure that the impacts of the operations of RSV *Nuyina* and its science systems are not in conflict with the broader community's expectations in relation to Antarctica's protection, and
- inform the mitigation of any unforeseen but potentially significant impacts of shipping operations and science systems whilst underway.

Monitoring reporting requirements are further detailed in the RSV *Nuyina* Environmental Monitoring Plan.

1.10 Incident reporting and investigation

1.10.1 Australian Antarctic Division

The AAD's environmental incident and hazard reporting system is a key component of the AAD's EMS and provides the capacity to monitor and track activities or incidents which either directly or indirectly have the potential (near misses and improvements) to impact the environment. This reporting system forms part of a monitoring framework that identifies, prioritises and responds to environmental impacts or risks in real-time. The integration of this reporting system into AAD quarterly and annual reporting provides analysis of incidents and trends to identify and monitor environmental impacts and response actions. AAD's environmental incident reporting system provides an evidence-based approach for the development and delivery of continual improvements to the AAD's EMS and Antarctic operations.

1.10.2 Serco

The process for Serco incident reporting on board the RSV *Nuyina*, including generating, monitoring, and investigating, and communicating incidents with AAD, is detailed in the Serco Environmental Management Plan (ENVMP) – Environmental Incident Reporting.

All Serco generated environmental incident reports are forwarded to the Ship Management Group (SMG) for visibility and tracking. The SMG is then responsible for creating an incident report in the AAD's incident reporting system. In addition to this, Serco reports environmental incidents to the Australian Maritime Safety Authority (AMSA) and any cetacean strikes/interaction to the Department of Climate Change, Energy, the Environment and Water (DCCEEW). Some environmental incidents that AAD would consider reportable may not trigger the AMSA reporting criteria. In this case the incident is addressed through AAD consultation with the Serco Master and /or Operations Manager to ensure visibility by both parties.

1.11 State of the Environment and Department reporting

Various AAP environmental performance indicators such as energy use, greenhouse gas emissions, water consumption and waste returned to Australia are monitored on an annual basis to support reporting requirements for the *Department of Climate Change, Energy, the Environment and Water Annual Report* and the 5-yearly *State of the Environment (SoE) Report*. Indicators relevant to shipping operations are primarily associated with fuel usage and greenhouse gas emissions, which are relevant to impacts related to the emission of diesel engine exhaust to the environment (Section 6.2).

RSV Nuyina fuel usage and greenhouse gas emissions data that are collated by the AAD for these reports will be included in the data analysis and reporting for RSV Nuyina. Fuel usage and

greenhouse gas emissions calculations will be reviewed against calculations done by the ship's operator, Serco, as part of the RSV Nuyina's Ship Energy Efficiency Management Plan.

Environmental Training

All crew and AAD personnel taking part in RSV *Nuyina* Operations have received the relevant environmental training to ensure full understanding of responsibilities when implementing the environmental management plan. Environmental training is tailored to individual roles and their level of involvement on the project. Training on environmental matters and management of potential impacts extends to contractors, sub-contractors and visitors and includes any one or combination of the following training requirements:

1.12 AAD Training

A suite of environmental training and awareness is provided to AAD staff prior to any voyage or expedition to Antarctica and sub-Antarctic regions. Training includes, but is not limited to, the following:

- Environmental management briefing to Voyage Management by EMU
- Pre-departure training delivered to all expeditioners at AAD Expeditioner Summits by EMU
- Environmental management briefing to all staff and expeditioners once on board the vessel
- Environmental management briefing for designated Station Environmental Officers by EMU
- Site inductions
- Identification of key points of environmental value and any relevant Matters of National Environmental Significance (MNES)
- Understanding the requirements of the environmental management plan and the individual's role
- Environmental incident emergency response procedures
- Site environmental controls
- Compliance requirements in meeting environmental responsibilities, including monitoring and reporting.

Records of all training are documented and maintained in relevant project folders within the AAD Document Management System.

AAD has the ability to provide additional input on environmental matters at the Master Vessel Safety Briefing which occurs prior to, or immediately upon sailing. Following the briefing the AAD Voyage Leader, Deputy Voyage Leader and Doctor have an opportunity to provide input. Environmental matters are addressed at this time. Mandatory environmental briefings are provided to all AAD expeditioners and Serco crew members prior to any disembarkation at Antarctic stations.

1.13 Serco Training

All Serco staff receive environmental awareness and training associated with the operations and maintenance of RSV *Nuyina* and science systems. Training includes, but is not limited to, the following:

- Maritime Safety Induction which includes environmental matters, prior to joining the ship. The induction also applies to AAD personnel and contractors working on the ship and/or equipment
- Onboard familiarisations with specific relevance to personnel role, operation or area of ship
- Regular drills in accordance with the Drills Matrix
- Maritime Training System (MTS) is available onboard throughout the voyage and contains approximately 200 maritime specific courses, many of which include an environmental protection focus.

Emergency Contacts and Procedures

1.14 Environmental Emergency Management

Environmental emergencies on *Nuyina* shall be managed in accordance with Serco's emergency management procedures, and supported by existing AAD procedures, instructions and policies.

Table 5 Possible environmental emergency scenarios

Specific issues for which an emergency response could be necessary	Emergency response
Fire response	As per ship, station and port emergency response procedures.
Fuel spill	Refer to relevant fuel spill contingency plan. AAD is responsible for the supply, operation and maintenance of equipment including fuel hoses, hose reels, storage containers and additional pumps.
DG or hazardous materials spills	As per ship, station and port emergency response procedures.
Pollution of waterways	As per ship, station and port emergency response procedures.

1.15 Emergency Contacts

The emergency contacts responsible for managing environmental emergencies associated with the project are identified in Table 6. The identified personnel have the ability to stop and direct works so that emergencies can be managed effectively.

Table 6 Emergency contacts for environmental matters

Position	Name	Contact Details
Serco 24-hour Emergency Management Number	Emergency contact	+61 3 9411 2113
Branch Head, Operations and Logistics	Matt Filipowski	03 62323465 0447 339 013
Director, Maritime Assets Management	Kriss Lawler	03 6232 3489 0400 544 940
Assistant Director, Maritime Assets Management	David Witzke	03 6232 3261 0437 130 473

Voyage Leader	Appointed VL	As per voyage plan/directions
Station Leader	Appointed SL	As per voyage plan/directions
AAD Environmental Manager	Kirsten Leggett	(03) 6232 3352 0481 063 991
AAD Environmental Management Unit (EMU)	EMU Team	AADEnvironment@aad.gov.au

Potential Environmental Impacts & Mitigation Measures

1.16 Potential impacts to values protected under the ATEP Act

Potential impacts to environmental aspects, and the mitigation measures applied to minimise those impacts associated with the RSV *Nuyina* Operations have been identified through the AAD environmental risk assessment process (refer to the Environmental Aspects and Impacts Register in **Appendix A**).

Audit and Review

1.17 Environmental auditing

AAD has developed an Environmental Audit program, which outlines the process and rationale for environmental audits including any reporting requirements. The implementation and effectiveness of the *Nuyina* EMP may be included in the AAD Audit program in any given year. The Audit program forms part of the AAD Environmental Management System (EMS). For further information regarding environmental audits including: processes, tools, audit schedule and previous audits, refer to the AAD's intranet – Environmental Internal Audit page.

All Class certificates require an annual review survey conducted by an independent Class surveyor with authority granted by AMSA. The Serco survey schedule is managed via Class Direct and are responsible for the recertification of equipment and construction requirements in accordance with MARPOL and the Polar Code. Serco is also subject to Port State/Flag State Control and Biosecurity inspections at the discretion of the authority. Under ISO 14001, Serco undertakes both internal and external audits annually and is recertified every 3 years.

1.18 Environmental management plan review

Over the authorisation period, reviews of this EMP will occur, typically post-season and supports the AAD's Environmental Management System's (EMS) operating model for continual improvement.

The triggers for reviewing this EMP may include, but are not limited to, the following:

- At the end of each shipping season
- Following significant environmental incidents
- When there is a need to improve performance in an area of environmental impact
- As requested by the Department or on the direction of the Antarctic Environmental Regulation (AER) section.

Serco undertake annual Masters and management review of the Safety Management System (SMS) which includes the ENVMP and all supporting documents referenced within.

Acronyms and Abbreviations

AMLRC	Antarctic Marine Living Resources Conservation
AAD	Australian Antarctic Division
AAP	Australian Antarctic Program
AFFF	Aqueous Film Forming Foam
ATEP	Antarctic Treaty (Environment Protection)
BSD	Biosecurity Status Document
BMP	Biofouling Management Plan
BWMP	Ballast Water Management Plan
CBC	Cargo and Biosecurity Centre
CEMP	Construction Environmental Management Plan
CMR	Crisis Management Response
DAWE	Department of Agriculture, Water and Environment
DG	Dangerous Goods
DNV	Det Norsk Veritas
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
EMU	Environmental Management Unit
EMS	Environmental Management System
ENVMP	Environmental Management Plan (Serco)
ESS	Engineering Site Supervisor
EPBC	Environmental Protection and Biodiversity Conservation
GFM	Government Furnished Materials
GMP	Garbage Management Plan
IEE	Initial Environmental Evaluation
IMO	International Maritime Organisation
ISPP	International Sewage Pollution Prevention
LARCS	Lighter, Amphibious, Resupply, Cargo
MARPOL	The International Convention for the Prevention of Pollution from Ships
MARS	Maritime Arrivals Reporting System
MNES	Matters of National Environmental Significance
NPRMA	National Parks and Reserves Management Act
OM	Operational Manual
OSMP	Operational Services Management Plan
PAR	Pre-Arrival Report
RSV	Research Supply Vessel
SEEMP	Ship Energy Efficiency Management Plan
SERP	Shore Emergency Response Plan
SERS	Ship Emergency Response Service
SOPEP	Shipboard Oil Pollution Emergency Plan
SOP	Standard Operating Procedure
SOW	Statement of Work
SSP	Ship Specific Procedure
TPWS	Tasmanian Parks and Wildlife Service
TET	Territories, Environment and Treaties

Appendix A: RSV *Nuyina* Environmental Aspects and Impacts Register

Serial	Location	Activity description	Condition	ASPECT *- choose ONE*	IMPACT(S) *- can choose multiple impacts*	Potential causes/sources of an impact happening *- brief dot points*	Inherent			Existing Reduction/Control Measures - against the Aspect. *e.g. Policy, procedures, outside controls or organisations, monitoring and reporting systems…*	Residual		
							Likelihood	Consequence	RISK		Likelihood-2	Consequence-2	RISK2
1	Australia	**Nuyina Shipping Operations:** Nuyina port call - Hobart. Loading of cargo, equipment, stores and personnel in Hobart.	Normal	Physical disturbance- Introductions	Biological change, Habitat change	Potential to introduce non-native species to Antarctica and the sub-Antarctic islands.	Almost certain	Moderate	High	1. AAD Cargo Biosecurity SOP CD23/93[v4] includes procedure, staff training, emergency response and maintenance of buildings, external work areas and equipment. Includes application of multiple layers of protection for biosecurity risk material. 2. Mandatory training for all AAP expeditioners - must complete eLearning *PDE101 Introduction to Environmental Management in Antarctic/sub-Antarctic* and attend Expeditioner summit which includes a presentation on key Environmental Management priorities. Both presentations cover biosecurity requirements. 3. Cargo, equipment and stores quarantined at AAD head office and CBC before being loaded in RSV Nuyina. 4. The CBC has an Approved Arrangement to manage biosecurity risks on behalf of the Australia Government. 5. RSV Nuyina uses ratguards on berthing lines when alongside the wharf to mitigate rodent incursions. 6. The AAD maintains an incident reporting system to monitor, respond and learn from biosecurity issues and threats in a timely and effective manner.	Possible	Insignificant	Low
2	Australia	**Nuyina Shipping Operations**: Nuyina port call - Hobart. Transit. Voyages from Hobart to the stations and return. Establishment of non-native species in Antarctic and sub-Antarctic waters during ballast water exchange.	Normal	Physical disturbance- Introductions	Biological change, Habitat change	• Potential to introduce non-native species from vessel hull and niche area biofouling. • Organisms introduced from the atmosphere e.g. insects and birds	Likely	Moderate	High	1. RSV Nuyina holds a Lloyds Register Class Notation ECO (BIO) in accordance with the Lloyd's Register Rules and Regulations for the Classification of Ships. This notation requires bio-fouling management plans and records to be in place in accordance IMO Resolution MEPC.207(62) – *2011 Guidelines for the Control and Management of Ships' Biofouling to minimize the transfer of invasive Aquatic Species.* 2. Annual hull inspections and assessments are undertaken by a suitably qualified and experienced biofouling inspector prior to the first voyage of a season, and an environmental risk assessment undertaken. If required, commercial divers can be utilised, to remove any flora and fauna on its hull. a. If in-water cleaning is deemed to be required, it will be undertaken in accordance with the guidance s stipulated in AMSA Marine Notice 09/2017 *Biofouling and In-Water Cleaning*, the Department of Agriculture, Fisheries and Forestry *Anti-fouling and in-water cleaning guidelines* as well as any requirement stipulated by Biosecurity Tasmania - Department of Natural Resources and Environment and the local port authority (TasPorts). 3. In accordance with the vessels In-Water-Survey requirements, RSV Nuyina is required to undertake a docking every 5 years where the hull and all niche areas (intakes, drains, moon pool, sea chest, port and starboard drop keels etc) are thoroughly cleaned.	Possible	Minor	Low

Serial	Location	Activity description	Condition	ASPECT *- choose ONE*	IMPACT(S) *- can choose multiple impacts*	Potential causes/sources of an impact happening *- brief dot points*	Inherent			Existing Reduction/Control Measures - against the Aspect. *e.g. Policy, procedures, outside controls or organisations, monitoring and reporting systems…*	Residual		
							Likelihood	Consequence	RISK		Likelihood-2	Consequence-2	RISK2
3	Australia, Antarctica, Southern Ocean	**Nuyina Shipping Operations:** Transit. Voyages from Hobart to the stations and return. Including power & water generation. Multiple times during the season, approx. 4 voyages.	Normal, Abnormal, Emergency	Hazardous Chemicals-Leak/spill	Disturbance/Destruction of fauna, Pollution of sea water/sediments/ snow/ice	• Oil pollution caused by collision or grounding. • Fuel and oil spills. • Pollution resulting from inadvertent release of oil, oily water, black or grey water or pumping of bilges. • Pollution of sea ice and water from hull paint residue. • Marine wildlife impacted by seawater intake in response to spill/leak clean up. Equipment used: • Ship (26,000tonnes), • 2 x Diesel engines (19,200kW total) • 4 x Diesel generators (11,000Kw total) • 3 x bow thrusters (1,300kW each) • 3 x stern thrusters (1,300kW each • Oily water separator • Holding tanks	Almost certain	Catastrophic	Severe	1. RSV Nuyina is designed, built, operated and Maintained in accordance with Marine Order 98 (Marine pollution – anti-fouling systems) which requires compliance to International Convention on the Control of Harmful Anti-fouling Systems on Ships (AFS Convention). (a) RSV Nuyina holds an International Anti-Fouling System Certificate issued under the authority of the Government of Australia by Lloyd's Register attesting compliance to the AFS Convention. 2.RSV Nuyina is designed, built, operated and maintained in accordance with Marine Order 91 (Marine Pollution Prevention - Oil 2014) with requires compliance to Annex I of the International Convention for the Prevention of Pollution from Ships, 1973. (a) RSV Nuyina holds an International Oil Pollution Prevention Certificate issued under the authority of the Government of Australia by Lloyd's Register attesting compliance to this MARPOL Annex I. (b) In accordance with MARPOL Annex I, RSV Nuyina has an approved Shipboard Oil Pollution Emergency Plan (SOPEP) on board, which details the processes for preventing and responding to an oil spill event. Any spills are managed using the dedicated SOPEP Kit on board. (c) In accordance with MARPOL Annex I, RSV Nuyina maintains an Oil record book which details all oil products, volumes, type, locations etc brought onto the ship. 3. RSV Nuyina holds a Lloyds Register Class Notation ECO (P), ECO (IBTS)and ECO(OW) in accordance with the Lloyd's Register Rules and Regulations for the Classification of Ships. (a) ECO (P) is assigned where all Pollutant (P) tanks including all oil fuel, lubricating oil and hydraulic oil tanks are to be located in a protected location away from the ships side or bottom. (b) ECO (OW) is assigned where the Oily Water (OW) including all drainage from machinery bilge spaces is discharged to sea with oil-in-water content less than 5ppm or where oily water is retained onboard with dedicated holding tank(s) for discharged ashore. (c) ECO (IBTS) is assigned where a an integrated bilge water system designed and installed to meet the requirements of the Revised Guidelines for Systems for Handling Oily Wastes in Machinery Spaces of Ships and incorporating various IMO MPEC Circulars as described in the Lloyd's Register Rules and Regulations for the Classification of Ships. 4. RSV Nuyina conducts all operations in accordance with Ship Specific Procedures (SSPs). Specific to this aspect: (a) RSV Nuyina SSPs require all RSV Nuyina watercraft to maintain any water in the bilges whilst underway and manually remove water when hoisted inboard the RSV Nuyina at the completion of operations. Any oily water from watercraft will be transferred to Nuyina's tanks. (b) RSV Nuyina SSPs require all valves that discharge overboard to be checked shut and locked. (c) When in Antarctic waters treated sewage and grey water will be discharged as far as practicably from the nearest land, ice-shelf, fast ice or areas of ice concentration exceeding 1/10 in accordance with PART II-A of the Polar Code	will be Remote	Major	Medium
4	Australia, Antarctica, Southern Ocean	**Nuyina Shipping Operations:** Transit. Voyages from Hobart to the stations and return. Including power & water generation. Multiple times during the season, approx. 4 voyages.	Normal	Physical disturbance-Introductions	Disturbance/Destruction of fauna, Biological change	• Organisms removed from the environment during ballasting, charging of fire main, engine cooling, fresh water generation (plate evaporator) and uncontaminated sea water system, trace metal sea water system, wet well sampling.	Almost certain	Moderate	High	1. RSV Nuyina holds a Lloyds Register Class Notation ECO (BIO) in accordance with the Lloyd's Register Rules and Regulations for the Classification of Ships. This notation requires bio-fouling management plans and records to be in place in accordance IMO Resolution MEPC.207(62) – *2011 Guidelines for the Control and Management of Ships' Biofouling to minimize the transfer of invasive Aquatic Species.* 2. RSV Nuyina is designed, built, operated and maintained in accordance with the requirements of the Biosecurity Act 2015, which requires compliance to the International Convention for the Control and Management of Ships' Ballast Water and Sediments 2004 (the Ballast Water Management Convention). (a) RSV Nuyina holds an International Ballast Water Management Certificate attesting compliance to the Ballast Water Management Convention. (b) RSV Nuyina maintains a Ballast Water Management Plan and Ballast Water Record Book for the purpose of recording all ballast water operations and use of the treatment system. 3. RSV Nuyina holds a Lloyds Register Class Notation ECO (BWT) in accordance with the Lloyd's Register Rules and Regulations for the Classification of Ships. (a) the ECO (GW) notation is assigned where a Ballast Water Treatment (BWT) system is installed, provided that the treatment system is installed, utilised and approved in accordance with MEPC 174(58).RSV Nuyina uses ultra-violet and filtration treatments as ballast water enters and discharges the vessel. 4. General seawater inlets are fitted with perforated steel plates to restrict foreign objects (including marine life) from being sucked into the vessel with seawater. Wet well sampling inlet sized targeted sampling to minimise loss of marine life.	Unlikely	Moderate	Medium

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							Likelihood	Consequence	RISK		Likelihood-2	Consequence-2	RISK2
5	Australia, Antarctica, Southern Ocean	**Nuyina Shipping Operations:** Transit. Voyages from Hobart to the stations and return. Including power & water generation. Multiple times during the season, approx. 4 voyages.	Normal	Energy use-Emission of gases	Pollution of the air	• Pollution from diesel engine exhaust • Internal combustion engines using marine diesel oil will drive 'alternators' to generate electricity. • Fresh water generated from waste heat recovery from diesel generators and thermal oil boilers. Equipment used: • 2 main engine driven electric motors (6,400kW total) • 4 x Diesel generators (11,000Kw total)	Almost certain	Moderate	High	1. RSV Nuyina is designed, built, operated and maintained in accordance with Marine Order 97 (Marine Pollution Prevention - Air Pollution 2022) which requires compliance to Annex VI of the International Convention for the Prevention of Pollution from Ships, 1973. (a) RSV Nuyina holds an International Air Pollution Prevention Certificate issued under the authority of the Government of Australia by Lloyd's Register attesting compliance to the Convention. 2. RSV Nuyina holds a Lloyds Register Class Notation ECO (NOx-2), ECO (SOx)and ECO(SEEMP) in accordance with the Lloyd's Register Rules and Regulations for the Classification of Ships. (a) ECO (NOx-2) assigned where the total weighted value of NOx emissions from all installed diesel engines onboard is not to exceed 80 percent of the total weight NOx emission limits specified in MARPOL Annex VI Regulation 13. (b) ECO (SOx) Assigned where the fuel used onboard is distillate with sulphur content less than 0.10 percent mass/mass or equivalent fuel which provides the equivalent emission limit. (c) ECO (SEEMP) is assigned where a vessel carries a Shipboard Energy Efficiency Management Plan (SEEMP) in accordance with MARPOL Annex VI 3. In addition to the above, RSV Nuyina is working towards achieving the Lloyds Register Class Notation ECO (EnMS) which is assigned when compliance is demonstrated to ISO 50001 (Energy Management).	Likely	Insignificant	Low
6	Australia, Antarctica, Southern Ocean	**Nuyina Shipping Operations:** Transit. Voyages from Hobart to the stations and return. Including power & water generation. Multiple times during the season, approx. 4 voyages.	Normal	Physical disturbance-Noise emission	Noise pollution, Disturbance/Destruction of fauna, Degradation of wilderness values	• Noise and vibration created by the engines, generators, propellers and vessel passing through the water. • Noise and vibration from the ship breaking ice • Fresh water generated from waste heat recovery from diesel generators and thermal oil boilers - minimal impact.	Almost certain	Moderate	High	1. RSV Nuyina's holds a Det Norske Veritas (DNV) Silent R notation equivalent at 8 knots electric propulsion for science acoustic work. As a consequence of the decisions made on equipment and design (e.g. Engine choice and resiliently mounted equipment) the ship has much lower waterborne noise than equivalent sized ships across the range of ship speeds and operating modes. 2. RSV Nuyina holds a Lloyds Register Class Notation CAC2 in accordance with the Lloyds Register Rules and Regulations for the Classification of Ships. (a) CAC2 is assigned to vessels which have crew accommodation and work areas compliant with standards for noise and vibration levels defined in the Rules and Regulations for the Classification of Ships. The numeral 2 indicates the acceptance criteria to which the noise and vibration levels have been assessed. 3. RSV Nuyina holds Noise Survey Report (SOLAS 1974, reg II-1/3-12; Noise Code, sec 4.3) to confirm the vessel has taken all measures to reduce machinery noise and that the vessel operates within the required noise limits set by the IMO. 4. All rotating machinery is resiliently mounted to minimise external vibration.	Likely	Insignificant	Low
7	Australia, Antarctica, Southern Ocean	**Nuyina Shipping Operations:** Transit. Voyages from Hobart to the stations and return. Including power & water generation. Multiple times during the season, approx. 4 voyages.	Normal	Physical disturbance-Landscape	Disturbance/Destruction of fauna	• Light pollution from navigation lights and internal lights. • Light pollution from deck lighting. • Large object disturbance in remote environments. • Visual disturbance to wilderness and wildlife.	Almost certain	Insignificant	Medium	1. Black-out blinds are installed throughout the ship to reduce light pollution. On sunset and prior to dark all blinds are drawn or red lights in operation to reduce/eliminate light pollution. 2. Searchlights available, when required, to locate venerable wildlife. 3. External lighting, not used for navigation, safety or operations is reduced as far as reasonably practicable.	Possible	Insignificant	Low
8	Antarctica, Southern Ocean	**Nuyina Shipping Operations:** Transit. Voyages from Hobart to the stations and return. Including power & water generation. Multiple times during the season, approx. 4 voyages.	Normal	Physical disturbance-Human impact	Disturbance/Destruction of fauna	• Collision with cetaceans and other marine life. • Disturbance of marine life on voyage routes.	Possible	Moderate	Medium	1. Searchlights available to use between sunset and sunrise to locate vulnerable wildlife whilst in transit. 2. Vessel crew maintain constant watch whilst underway and revise voyage pathway/route and speed if required to avoid wildlife concentrations.	Possible	Minor	Low

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							Likelihood	Consequence	RISK		Likelihood-2	Consequence-2	RISK2
9	Antarctica, Southern Ocean	**Nuyina Shipping Operations:** Waste Management. Waste generated during the voyage to be separated as it is produced and stored ready for incineration or to be returned to Australia for disposal. At all times whilst at sea and at anchor.	Normal	Waste Management-Combustible solids	Pollution of sea water/sediments/ snow/ice	• Waste materials being dispersed due to weather conditions. • Waste materials being inadvertently released over the side of the vessel. • Waste separation not adhered to by staff and crew. • General waste/items blown or washed off overboard. Equipment used: • Rubbish bins • Cage pallet • Incinerator • Refrigerated garbage store	Possible	Moderate	**Medium**	1. RSV Nuyina is designed, built, operated and maintained in accordance with Marine Order 95(Marine pollution prevention — Garbage 2018) which requires compliance to Annex V of the International Convention for the Prevention of Pollution from Ships, 1973. (a) RSV Nuyina holds a statement of Conformance issued by Lloyds Register attesting compliance to this convention. (b) RSV Nuyina maintains a Garbage Management Plan (MARPOL Annex V, reg 10) which sets out the procedures to be followed onboard for collecting, processing, storing and disposing of garbage onboard RSV Nuyina. The Garbage Management Plan also designates a person or persons in charge of carrying out the plan. This plan is regularly audited by the Australian Maritime Safety Authority. (c) RSV Nuyina maintains a Garbage Record Book (MARPOL Annex V, reg 10) onboard the vessel. The Garbage Record Book records details of all garbage discharge from RSV Nuyina, and sea and alongside. 2. RSV Nuyina holds a Lloyds Register Class Notation ECO (IHM) in accordance with the Lloyd's Register Rules and Regulations for the Classification of Ships. (a) the ECO (IHM) notation is assigned where the ship possesses an inventory of hazardous materials in compliance with Regulation 5 of the Hong Kong International Convention for the Safe and Environmentally Sound Recycling of Ships. 3. RSV Nuyina conducts all operations in accordance with Ship Specific Procedures (SSPs). Specific to this aspect: (a) Waste onboard RSV Nuyina is separated and stored below decks to minimise handling and exposure to personnel and the environment. (b) RSV Nuyina uses a refrigerated garbage store to storage waste onboard until it is offloaded in Australia. (c) RSV Nuyina uses an incinerator combustible waste, where the ash is filtered and returned to Australia for disposal. (d) RSV Nuyina's SSPs require all other garbage will be retained on-board and returned to Australia for disposal. (e) Medical waste is retained on board and returned to Australia for disposal. (f) All expeditioners embarking in RSV Nuyina are required to participate in Waste separation guidance provided through the vessel onboard induction. (g) All materials/items stowed securely, with regular checks by the crew.	Unlikely	Minor	**Low**
10	Antarctica, Southern Ocean	**Nuyina Shipping Operations:** Grey and black water management. Grey and black water to be treated onboard and stored in holding tanks or discharged into the environment, depending on vessel location.	Normal	Waste Management-Sewage/greywater	Pollution of sea water/sediments/ snow/ice	• Grey and black water release: Failure of two sewage treatment plants with ability to process grey and black water onboard. Equipment used: 2 x Gertsen & Olufsen a/s sewage treatment plant.	Likely	Moderate	**High**	1. RSV Nuyina is designed, built, operated and maintained in accordance with Marine Order 96 (Marine pollution prevention—sewage) which requires compliance to Annex IV of the International Convention for the Prevention of Pollution from Ships, 1973. (a) RSV Nuyina holds an International Sewage Pollution Prevention Certificate issued under the authority of the Government of Australia by Lloyd's Register attesting compliance to the Annex IV of MARPOL. (b) RSV Nuyina's sewage treatment plant is certified to meet the effluent standards as provided for in the Guidelines on implementation of effluent standards and performance test for sewage treatment plants, adopted by resolution MEPC.227(64), as amended (c) RSV Nuyina has a Sewage and grey water discharge booklet to record discharges time and location. STP is built and certified to comply with MARPOL Annex IV. There are 2 sewage treatment plants onboard for redundancy purposes. PPM discharge is as Standard set by MEPC.2(VI). Installed plants meet this requirement. (d) When in Antarctic waters treated sewage and grey water will be discharged as far as practicably from the nearest land, ice-shelf, fast ice or areas of ice concentration exceeding 1/10 in accordance with PART II-A of the Polar Code 2. RSV Nuyina holds a Lloyds Register Class Notation ECO (GW) in accordance with the Lloyd's Register Rules and Regulations for the Classification of Ships. (a) the ECO (GW) notation is assigned where a Grey Water Treatment (GWT) system is installed meeting the rule requirements or where grey water is retained onboard in a dedicated holding tank(s) for discharge ashore. RSV Nuyina has a waste water and sewage treatment plant (STP) contained within machinery spaces. 3. RSV Nuyina conducts all operations in accordance with Ship Specific Procedures (SSPs). Specific to this aspect: (a) RSV Nuyina SSPs require daily service checks and inspections of the waste water and sewage treatment plant machinery. (b) Grey and black water is stored in holding tanks when within 3 nautical miles of the nearest land and in Antarctic waters	Unlikely	Minor	**Low**

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							Likelihood	Consequence	RISK		Likelihood-2	Consequence-2	RISK2
11	Antarctica, Southern Ocean	**Nuyina Shipping Operations:** Ballast water. Ballasting will occur to ensure ship's stability is maintained in accordance with requirements. At regular intervals throughout the voyage.	Normal	Physical disturbance-Human impact	Disturbance/Destruction of fauna, Disturbance/Destruction of flora, Pollution of sea water/sediments/ snow/ice	Organisms and wildlife impacted from the environment during ballasting.	Almost certain	Moderate	High	1. RSV Nuyina is designed, built, operated and maintained in accordance with the requirements of the Biosecurity Act 2015, which requires compliance to the International Convention for the Control and Management of Ships' Ballast Water and Sediments 2004 (the Ballast Water Management Convention). (a) RSV Nuyina holds an International Ballast Water Management Certificate issued under the authority of the Government of Australia by Lloyd's Register attesting compliance to the Ballast Water Management Convention. (b) RSV Nuyina maintains a Ballast Water Management Plan (BWM 2004, reg B-1; res MEPC. 127(53) (c) RSV Nuyina maintains a Ballast Water Record Book (BWM 2004, Reg B-2) for the purpose of recording all ballast water operations and use of the treatment system. 2. RSV Nuyina holds a Lloyds Register Class Notation ECO (BWT) in accordance with the Lloyd's Register Rules and Regulations for the Classification of Ships. (a) the ECO (GW) notation is assigned where a Ballast Water Treatment (BWT) system is installed, provided that the treatment system is installed, utilised and approved in accordance with MEPC 174(58).RSV Nuyina uses ultra-violet and filtration treatments as ballast water enters and discharges the vessel.	Likely	Minor	Medium
12	Antarctica, Southern Ocean	**Nuyina Shipping Operations:** Anchoring. Securing the vessel(s) in position at the stations. During station visit or potentially during an emergency.	Normal, Emergency	Physical disturbance-Landscape	Disturbance/Destruction of fauna, Disturbance/Destruction of flora,	Anchor and cable will be dropped from the bow of the vessel. Damage to the seafloor.	Almost certain	Moderate	High	1. The Ships Anchor will be typically dropped in the designated anchorage area at the stations. 2. The Ships Anchor is washed with sea water (returned to the area) when raised. 3. No anchoring at Mawson Station. Vessel to be secured to shore using mooring lines and holding position using astern thrust on the propellers. 4. External lighting, not used for navigation/safety/or operations, will be dimmed to reduce backscatter and visual disturbance between sunset and sunrise.	Almost certain	Insignificant	Medium
13	Antarctica, Southern Ocean	**Nuyina Shipping Operations:** Bulk fuel transfer. Transfer of bulk quantities of Special Antarctic Blend (SAB) Diesel to station bulk storage tanks. Once per resupply voyage at each station.	Normal, Emergency	Hazardous Chemicals-Leak/spill	Pollution of sea water/sediments/ snow/ice, Disturbance/Destruction of flora, Disturbance/Destruction of fauna	• Fuel leaks / spills leading to sea water/ice/ground contamination • Fuel spill during station refuelling operations or small boat refuelling at sea Equipment: • Fuel hoses, manifold and couplings. • Pump. • Inflatable Rescue Boats (IRBs)	Likely	Moderate	High	1. RSV Nuyina is designed, built, operated and maintained in accordance with Marine Order 91 (Marine Pollution Prevention - Oil 2014) with requires compliance to Annex I of the International Convention for the Prevention of Pollution from Ships, 1973. (a) RSV Nuyina holds an International Oil Pollution Prevention Certificate issued under the authority of the Government of Australia by Lloyd's Register attesting compliance to this MARPOL Annex I. (b) In accordance with MARPOL Annex I, RSV Nuyina has an approved Shipboard Oil Pollution Emergency Plan (SOPEP) on board, which details the processes for preventing and responding to an oil spill event. Any spills are managed using the dedicated SOPEP Kit on board. Vessel-specific procedures for the maintenance and use of equipment support the SOPEP and ensure Crew are trained in the use of that equipment (c) Drills are carried out as required and equipment is maintained in accordance with the SOPEP. 2. AAD Operations Manual Volume 6 Section F: Station Refuelling Manual CD18/10, includes a number of environmental controls, including but not limited to: *- constant monitoring of equipment during the transfer stage by workers, including a dedicated crew member to be rostered on the deck to share the monitoring of the refuelling* *- routine inspection and testing of refuelling equipment* *- training and briefing of personnel.* 3. AAD fuel spill contingency plans for each station and supply of spill response equipment on vessel and at each station. 4. AAD Crisis Management and Recovery (CMR) Manual details Environmental Management representation and duties on the incident response as required.	Possible	Minor	Low

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							Likelihood	Consequence	RISK		Likelihood-2	Consequence-2	RISK2
14	Antarctica, Southern Ocean	**Nuyina Shipping Operations:** Cargo, stores and equipment transfer. Transfer of cargo, stores and equipment in containers from ship to station using watercraft, helicopter and lifting equipment over ice.	Normal	Physical disturbance-Human impact	Disturbance/Destruction of fauna, Landscape change, Noise pollution	• Loss of container or equipment over side of ship • Collison with cetaceans and other marine life causing injury or death. • Landing barges will impact shoreline. • Transport of organisms or wildlife in or on cargo. • Noise from engines • Disturbance of wildlife by vehicle, helicopters, personnel walking and equipment movements.	Likely	Moderate	High	1. AAD Cargo Biosecurity SOP CD23/93[v4] includes procedure, staff training, emergency response and maintenance of buildings, external work areas and equipment. Includes application of multiple layers of protection for biosecurity risk material. 2. Nuyina is required to maintain a Cargo Securing Manual (SOLAS 1974, reg VI/5.6 and VII/5; MSC.1/Circ.1353/Rev.1), which reduces the risk of containers or equipment being lost over the side of the vessel. 3. RSV Nuyina operational procedures adopt the environmental aspects of the AAD Watercraft Standard Operating Procedures which the environmental requirements, including distances to maintain from fauna when watercraft are being used during resupply operations. 4. AAD Environmental Policy and Code of Conduct requirements for interactions between vehicles, watercraft and wildlife. Including wildlife separation distances. 5. Watercraft refuelling inlets are bunded to contain any oil spilt during refuelling, oil spill equipment on board will be used to clean out the bund prior to the watercraft's departure. 6. AAD SOPs for barges and water craft operations to ensure low speed movements in shallow waters to reduce wake and wash on shore as well as minimise impacts on benthic communities and sediments of turbulence from jets or propellers. 7. Watercraft will be restricted to using designated station boat ramps to discharge and backload cargo. 8. AAD Standard Operating Procedure Vol. 5 Aviation includes ship-to-shore helicopter operations. Includes: -fixed landing sites -all aircraft movements must be initiated by a task approval process and risk assessment -fuel management guidelines, including storage of fuel drums.	Possible	Minor	Low
15	Antarctica	**Nuyina Shipping Operations:** Personnel transfer Transfer of expeditioners from Nuyina to the stations. Multiple times per resupply. Via helicopters, watercraft, vehicles and on foot.	Normal	Physical disturbance-Human impact	Disturbance/Destruction of fauna, Noise pollution	• Personnel walking ship-to-shore • Noise from engines • Underwater radiated noise and vibration during transit may disturb marine life activity. • Collison with cetaceans and other marine life causing injury or death. Equipment used: 3 x Personnel Transfer Tenders (PTTs)	Likely	Major	High	1. RSV Nuyina operational procedures adopt the environmental aspects of the AAD Watercraft Standard Operating Procedures which outline the Environmental Policy requirements for interactions between watercraft and wildlife. 2. PTTs will be restricted to using designated station boat wharves, ramps and jetties to discharge and backload personnel and cargo. 3. Watercraft are cleaned and meet biosecurity requirements prior to reaching Antarctic waters. 4. Mandatory training for all AAP expeditioners - must complete eLearning PDE101 Introduction to Environmental Management in Antarctic/sub-Antarctic and attend Expeditioner summit which includes a presentation on key Environmental Management priorities. Both presentations cover wildlife management and the AAD Environmental Code of Conduct for expeditioners. 5. AAD voyage environmental procedures include use of biocide footbaths and provision of cleaning equipment at all embarkation and disembarkation locations on the vessel.	Unlikely	Insignificant	Low
16	Antarctica	**Nuyina Shipping Operations:** Personnel transfer Transfer of expeditioners from Nuyina to the stations. Multiple times per resupply. Via helicopters, watercraft, vehicles and on foot.	Normal	Hazardous Chemicals-Leak/spill	Disturbance/Destruction of fauna, Pollution of sea water/sediments/ snow/ice	• Fuel leaks / spills leading to sea water/ contamination Equipment used: 3 x Personnel Transfer Tenders (PTTs)	Likely	Moderate	High	1. RSV Nuyina Watercraft (Personnel Transfer Tenders, Barges and the Science Tender) are designed, built, operated and maintained to the National Standard for Commercial Vessels (NSCV) Code, Category 2C and hold a Certificate of Survey from the Australian Maritime Safety Authority attesting compliance to the Standard. 2. The RSV Nuyina Watercraft Operations Manual provides a system from which all of RSV Nuyina's watercraft are operated. The document provides information on the safe operation, operational parameters, maintenance, unique risks, and safety considerations for each watercraft and includes provision for the management of refuelling and the minimisation of environmental impact during watercraft operations. 3. The RSV Nuyina Helicopter Operations Manual provides guidance and instruction with respect to helicopter operations onboard RSV Nuyina, and includes provisions for the management of aviation fuel and the minimisation of any environmental impacts during helicopter operations.	Unlikely	Insignificant	Low

Serial	Location	Activity description	Condition	ASPECT *- choose ONE*	IMPACT(S) *- can choose multiple impacts*	Potential causes/sources of an impact happening *- brief dot points*	Inherent			Existing Reduction/Control Measures - against the Aspect. *e.g. Policy, procedures, outside controls or organisations, monitoring and reporting systems…*	Residual		
							Likelihood	Consequence	RISK		Likelihood-2	Consequence-2	RISK2
17	Antarctica, Southern Ocean	**Nuyina Shipping Operations:** Firefighting. Firefighting capability to extinguish helicopter and aviation fuel fires onboard Nuyina.	Normal	Hazardous Chemicals-Leak/spill	Disturbance/Destruction of fauna, Pollution of sea water/sediments/ snow/ice, Pollution of the air	A helicopter crash on deck, or an aviation fuel fire on the upper decks would be extinguished using manually operated fire hoses and/or automatic fire canons positioned forward and after. It is likely AFFF would be disbursed overboard.	Almost certain	Moderate	High	1. Seawater inlets are fitted with perforated steel plates to restrict foreign objects from being sucked into the vessel with seawater. 2. Nuyina will carry the most environmentally friendly version of Formtec AFFF (short chained C6) as practicable in Antarctic conditions (-30 degrees C). No fluorine free foams are able to be used in -30ºC conditions. This makes fluorine free foams unfit for purpose for Nuyina. Short Chained (C6) AFFF foams are able to be used effectively in our operating conditions and break down considerably quicker in the environment than conventional AFFF. These foams consequently accumulate far slower in water systems making them less hazardous to marine life. 3. In the event of a discharge of AFFF, containment and clean-up methods followed as detailed in SDS.	Likely	Insignificant	Low
18	Antarctica, Southern Ocean	**Nuyina Operation of Science Systems:** Use and deployment of science systems while underway and as part of underway scientific research.	Normal	Physical disturbance-Landscape/Seascape	Pollution of sea water/sediments/ snow/ice	• Pollution from mooring weights not retrieved, and from the moorings themselves if their retrieval is unsuccessful • Pollution through deployment of scientific probes whilst underway with no retrieval (e,g, XBTs, Argo floats etc.).	Almost certain	Insignificant	Medium	1. Moorings: - All mooring components except the weights will be removed from the environment at the completion of their use - Moorings will use the least amount of weight required to keep the mooring securely in place throughout deployment. 2. A minimum number of XBTs will be deployed to achieve the scientific goals of the voyage.	Possible	Insignificant	Low
19	Antarctica, Southern Ocean	**Nuyina Operation of Science Systems:** Use and deployment of science systems while underway and as part of underway scientific research.	Normal	Physical disturbance-Taking samples	Disturbance/Destruction of fauna	• Removal of krill, plankton and microbes from the ocean • Unintentional capture of fish larvae during krill trawling, drop net and wet well operations. • Unintentional disturbance of wildlife whilst the ship is underway.	Likely	Minor	Medium	1. CPR, wet well and underway seawater sampling operations will be kept to a minimum to reduce the biomass of organisms removed. The impact on zooplankton to be removed is considered negligible given the insignificant volume of the ocean that will be sampled. The impact on microorganisms to be removed is also considered negligible given the insignificant volume of the ocean that will be sampled. 2. The ship will never approach wildlife intentionally and will mostly remain on transit (apart from approved mooring recovery / deployments). If wildlife appears disturbed whilst underway the ship will navigate further away. 3. A current animal ethics permit, issued by the Animal Ethics Committee, is in place for marine science activities.	Unlikely	Minor	Low
20	Antarctica, Southern Ocean	**Nuyina Operation of Science Systems:** Use and deployment of science systems while underway and as part of underway scientific research.	Normal	Physical disturbance-Noise emission	Disturbance/Destruction of fauna, Noise pollution	• Noise generated from underway science activities impacts on wildlife (disturbance). Noting the noise generated from science systems does not exceed noise generated from the ship's operational noise except for the use of some active acoustic systems (particularly the EM122 •Multibeam Acoustic System and TOPAS PS18 sub-bottom profiler). Active acoustic systems have the potential to cause disturbance to marine organisms including cetaceans.	Almost certain	Minor	Medium	1. RSV Nuyina's holds a Det Norske Veritas (DNV) Silent R notation equivalent at 8 knots electric propulsion for science acoustic work. As a consequence of the decisions made on equipment and design (e.g. Engine choice and resiliently mounted equipment) the ship has much lower waterborne noise than equivalent sized ships across the range of ship speeds and operating modes. 2. RSV Nuyina holds a Lloyds Register Class Notation CAC2 in accordance with the Lloyds Register Rules and Regulations for the Classification of Ships. a. CAC2 is assigned to vessels which have crew accommodation and work areas compliant with standards for noise and vibration levels defined in the Rules and Regulations for the Classification of Ships. The numeral 2 indicates the acceptance criteria to which the noise and vibration levels have been assessed. 3. RSV Nuyina holds Noise Survey Report (SOLAS 1974, reg II-1/3-12; Noise Code, sec 4.3) to confirm the vessel has taken all measures to reduce machinery noise and that the vessel operates within the required noise limits set by the IMO. 4. All rotating machinery is resiliently mounted to minimise external vibration. 5. The EM122 multibeam systems and TOPAS PS18 sub-bottom profiler will be operated in accordance with the approved Standard Operating Procedures which has specific start up protocols as well as other operating controls and observer requirements to minimise any potential impact on cetaceans and other marine life.	Possible	Minor	Low

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Appendix B: Project Notice of Determination and Authorisation

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Appendix C: RSV *Nuyina* Standard Operating Procedures (SOPs) and Operating Manuals (OMs)

AAD Documents	Serco Documents
AAD Crisis Management and Response (CMR) Manual CD18/18	Ballast Water Management Manual (Damen issued document)
AAD Environmental Policy	Ballast Water Management Plan (BWMP)
AAD Operations Manual – Watercraft – Standard Operations Procedure (SOP) – Workboat Operations – Chapter 7.5 CD17/1	Biofouling Management Plan (BMP) (Damen issued document)
Annual hull monitoring report	Biosecurity Risk Assessment Pre-Arrival Report (PAR) – online only and generated through the MARS system
Aviation Facilities Operation – Standard Operating Procedure (SOP) – 2022 - 2023 D21/177782	Biosecurity Status Document (BSD) – A Department of Agriculture, Water and Environment issued digital document via the MARS system
Environmental Code of Conduct – Antarctic Expeditioners D13/39161	Cargo Securing Document
Incident Reporting System - Environmental	Code of Conduct referred to as 'mycode'
Introduction to environmental management in Antarctic and the sub-Antarctic	Critical Risks Management Manual
Logistics Operations – Supply Chain Operations - Cargo Biosecurity Standard Operating Procedure (SOP) D19/43754	Engine International Air Pollution (EIAPP) Certificate
Operations Manual – Volume 6 – Section F2 – SOP – Fuel Transfer – All Stations – Station Refuelling Manual D12/34565	Environment and Climate Change Policy
	Environmental Impacts & Aspects Register (EIAR)
	Environmental Management Plan (ENVMP)
	Class approved Garbage Management Plan (GMP) (Damen issued document)
	Hazardous Substances SOP
	Health, Safety and Environment Policy
	International Air Pollution Prevention (IAPP) Certificate
	International Anti-fouling System Certificate
	International Ballast Water Certificate
	International Oil Pollution Prevention (IOPP) Certificate
	International Sewage Pollution Prevention (ISPP) Certificate
	Lloyd's Statement of Compliance - DNV Silent-R Notation
	Operational Services Management Plan (OSMP)
	Risk Management SOP
	Sewerage System Management Plan

AAD Documents	Serco Documents
	Shipboard Energy Efficiency Management Plan (SEEMP) (Part I and II)
	Class approved Shipboard Oil Pollution Emergency Plan (SOPEP) (Damen issued document)
	Ship Specific Procedures (SPP) - watercraft
	Ship Sanitation Control Exemption Certificate
	Vessel Emergency Response Plan (VERP)
	Vessel Health, Safety and Environment Policy