



Australian Government

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



AUSTRALIAN
ANTARCTIC
PROGRAM

Initial Environmental Evaluation

Antarctic Infrastructure Renewal Program – Davis Critical Infrastructure Works

June 2026



© Commonwealth of Australia 2026

Ownership of intellectual property rights

Unless otherwise noted, copyright (and any other intellectual property rights) in this publication is owned by the Commonwealth of Australia (referred to as the Commonwealth).

Creative Commons licence

All material in this publication is licensed under a [Creative Commons Attribution 4.0 International Licence](https://creativecommons.org/licenses/by/4.0/) except content supplied by third parties, logos and the Commonwealth Coat of Arms.

Inquiries about the licence and any use of this document should be emailed to copyright@dcceew.gov.au.



Cataloguing data

This publication (and any material sourced from it) should be attributed as: AAD 2026, *Initial Environmental Evaluation: Antarctic Infrastructure Renewal Program – Davis Critical Infrastructure Works*, Australian Antarctic Division, March. CC BY 4.0.

Australian Antarctic Division
203 Channel Highway,
Kingston Tasmania 7050
Telephone +61 3 6232 3209
Web antarctica.gov.au

Disclaimer

The Australian Government acting through the Australian Antarctic Division, Department of Climate Change, Energy, the Environment and Water has exercised due care and skill in preparing and compiling the information and data in this publication. Notwithstanding, the Australian Antarctic Division, its employees and advisers disclaim all liability, including liability for negligence and for any loss, damage, injury, expense or cost incurred by any person as a result of accessing, using or relying on any of the information or data in this publication to the maximum extent permitted by law.

Acknowledgements

The authors thank the Australian Antarctic Division's Antarctic Infrastructure Renewal Program, Environmental Management Unit, Antarctic Infrastructure Renewal Alliance team and Science Branch Subject Matter Experts for their input.

Acknowledgement of Country

Our department recognises the First Peoples of this nation and their ongoing connection to culture and country. We acknowledge Aboriginal and Torres Strait Islander Peoples as the Traditional Owners, Custodians and Lore Keepers of the world's oldest living culture and pay respects to their Elders past, and present.

Contents

Non-Technical Summary	1
1 Introduction and scope	3
1.1 Introduction	3
1.1.1 Master planning	4
1.2 Statutory requirements	5
1.3 Purpose and scope of the document	5
2 Description of the proposed activity.....	7
2.1 Location of the proposed activity	7
2.2 Project overview	12
2.2.1 Existing site infrastructure and operations	12
2.2.2 Project scope descriptions	15
2.3 Timing	19
2.3.1 Summary of activities	19
2.3.2 Schedule of activities.....	21
2.4 Detailed description of activities	22
2.4.2 Davis Critical Infrastructure Works	29
2.4.3 Storage	43
2.4.4 Construction	47
2.4.5 Acquiring fill	50
2.4.6 Refurbishment.....	53
2.4.7 Demolition.....	54
2.4.8 Installation and commissioning.....	56
2.4.9 Waste management	57
3 Alternatives to the proposed activity	59
3.1 Do not proceed (do nothing)	59
3.2 Patch and repair of existing infrastructure.....	59
3.3 Replace infrastructure with like-for-like and no increased capacity.....	60
3.4 Design alternatives	60
3.4.1 Location	60
3.4.2 Architecture	60
3.5 Blasting alternatives	61
4 Description of the environment.....	62

4.1	Physical characteristics of the environment	62
4.2	Meteorology and climate	62
4.3	Geology and soils.....	63
4.4	Surface water and groundwater.....	64
4.5	Terrestrial and sublithic communities	65
4.5.1	Field surveys and distribution modelling	68
4.6	Wildlife.....	71
4.6.1	Avian species	71
4.6.2	Pinniped species.....	71
4.6.3	Cetacean species	72
4.7	Nearshore marine communities.....	76
4.8	Cultural heritage values.....	78
4.9	Human presence and impacts	80
4.10	Wilderness, aesthetic and intrinsic values	86
5	Assessment of environmental impacts.....	87
5.1	Methodology	87
5.2	Proposed activities	92
5.3	Environmental aspects	92
5.4	Potential impacts and mitigation measures.....	93
5.4.1	Biological change and biosecurity	94
5.4.2	Habitat and landscape change	96
5.4.3	Disturbance and/or destruction of terrestrial flora and soil communities.....	98
5.4.4	Disturbance and/or destruction of fauna	100
5.4.5	Disturbance and/or destruction of benthic communities	103
5.4.6	Noise pollution	104
5.4.7	Pollution of land, sea water, sediments, snow, ice, underground water and inland water	104
5.4.8	Pollution of the air.....	107
5.4.9	Degradation of heritage or cultural values	108
5.4.10	Degradation of wilderness values	109
5.4.11	Depletion of non-renewables resources.....	110
5.4.12	Depletion of water	111
5.4.13	Landfill and hazardous landfill/disposal.....	112
5.4.14	Impacts on other programs or projects	113

IEE Davis Critical Infrastructure Works

5.4.15	High risks	115
5.4.16	Severe risk	118
5.5	Davis Critical Infrastructure Works: Environmental Impact Matrix	121
5.6	Cumulative impacts	148
5.6.1	Additional vessel and aviation activities	149
5.6.2	Future works	150
6	Environmental management	151
6.1	AAD's environmental management system	151
6.2	Incident and hazards reporting	151
6.2.1	Environmental monitoring	151
6.2.2	Environmental compliance and auditing	159
7	Uncertainties.....	161
8	Conclusion.....	162
9	Authors.....	163
10	Acknowledgements.....	163
	Acronyms and abbreviations	165
	References	167
	Appendix 1 – Compliance with legislative requirements	171
	Appendix 2 – 5-Year plan	173
	Appendix 3 – Construction environmental management plan.....	185
	Appendix 4 – Environmental monitoring and reporting framework.....	186

Table of Figures

Figure 1. Davis station location in reference to mainland Australia (AAD, 2015)	9
Figure 2. Limits for Davis station (AAD, 2024a)	10
Figure 3. Davis station existing buildings and structures (AAD, 2024b)	11
Figure 4. Davis station existing condition survey (AAD, 2017)	13
Figure 5. Davis station asbestos presence in buildings (AAD, 2023)	14
Figure 6. Davis station (top); Davis station with the proposed DCIW (bottom) (estimate locations) (Photo credit: David Barringhaus 2012).....	17
Figure 7. DCIW proposed site plan and helicopter exclusion zone (shaded light red)	18
Figure 8. DCIW program.....	21
Figure 9. DCIW design stages	24
Figure 10. Utility Building render	29
Figure 11. Utility Building concept 3D arrangement	30
Figure 12. Davis station’s current water production and discharge operations	33
Figure 13. Summarised service reticulation between DCIW objectives and existing station.....	33
Figure 14. Proposed service reticulation pathway (green) within the DCIW proposed site plan for Davis station	34
Figure 15. Concept render of New Pump House (noting the building is currently designed at ground level)	36
Figure 16. New Pump House mechanical services layout and equipment positioning	37
Figure 17. Temporary seawater pump intake details.....	39
Figure 18. Davis station RO#2 foundation elevation drawing	40
Figure 19. Current condition of the Old Living Quarters (internal) (Photo credit: Unknown).....	41
Figure 20. Davis station existing Main Powerhouse (blue) (Photo credit: Chris Hill)	42
Figure 21. Davis station existing Emergency Powerhouse (Photo credit: Mark Booth)	43
Figure 22. Location of existing and proposed DCIW cargo laydown areas within Davis Station, showing indicative spatial extent (blue) and stacking arrangements (green).....	46
Figure 23. Typical existing services support with expansion (top) and typical new site services support (bottom)	48
Figure 24. Davis station RO#1 during construction (2024–25) (Photo credit: Thomas De Leon).....	50
Figure 25. Aerial image of Davis station and approximate Utility Building, borrow pit and quarry location (Photo credit: David Barringhaus 2012).....	52
Figure 26. Davis station quarry (Photo credit: David Barringhaus 2012)	52
Figure 27. Davis station Emergency (top) and Main (bottom) Powerhouse service reticulation infrastructure flagged for removal (orange border) (Photo credit: David Barringhaus 2012)	55

Figure 28. Examples of geology and soils at Davis station (AAD, 2024d)	63
Figure 29. Glaciomarine sediments in the vicinity of Watts Hut containing Holocene marine subfossils (AAD, 2024d)	64
Figure 30. Davis station vegetation (AAD, 2024c)	67
Figure 31. Sublithic communities on underside of quartz rocks at Davis station, 2019-20 summer survey (Photo credit: Dana Bergstrom, Patti Virtue)	68
Figure 32. AAD flora survey data 2018–20 (AECOM, 2021)	70
Figure 33. Vestfold Hills region and Davis station wildlife concentrations (AAD, 2025a)	74
Figure 34. Davis station wildlife (AAD, 2024e)	75
Figure 35. Davis station 2010 survey of Prydz Bay (left: STP 1, right: STP 2) (Table 11) (Photo credit: Jonathan Stark)	77
Figure 36. Davis station heritage values (AAD 2024f)	79

Table of Tables

Table 1. DCIW project activity description.....	16
Table 2. High level summary of activities	20
Table 3. DCIW scope design status and summary	22
Table 4. Summary of DCIW key activities scope	23
Table 5. DCIW logistics and cargo by season	26
Table 6. Fuel use estimates for the DCIW.....	27
Table 7. Projected DCIW cargo volumes, seasonal laydown area requirements, identified laydown locations and container return assumptions from 2026–27 to 2031–32.....	44
Table 8. List of bird species found within Davis station vicinity (AAD, 2024d).....	71
Table 9. List of seal species found within Davis station vicinity (AAD, 2024d).....	72
Table 10. List of whale species found within Davis station vicinity (AAD, 2024d).....	73
Table 11. Davis station 2010 survey site descriptions	77
Table 12. Summary of knowledge gaps and recommendations from the PSI (AAD, 2021a).....	82
Table 13. Additional guidance for environmental consequence criteria (adapted from AAD’s Environmental Aspects and Impacts Register)	88
Table 14. Criteria to describe the consequence of the impact occurring (adapted from AAD’s Environmental Aspects and Impacts Register)	88
Table 15. Additional guidance for environmental consequence criteria (adapted from AAD’s Environmental Aspects and Impacts Register)	89
Table 16. Environmental risk rating matrix (adapted from AAD’s Environmental Aspects and Impacts Register).....	90
Table 17. Relationship of AAD risk ratings to the levels of impact significance described in Article 8(1) of the Environmental Protocol (adapted from AAD’s Environmental Aspects and Impacts Register).91	
Table 18. Summary of high-risk activities within the environmental impact matrix.....	115
Table 19. Environmental risk matrix excerpt.....	118
Table 20. Ecological water quality guideline values (HEPA, 2025)	119
Table 21. Environmental impact assessment matrix.....	121
Table 22. Cumulative impacts risk indicator (orange = higher cumulative impact; green = lower cumulative impact)	148
Table 23. Subject matter expert contributions on environmental features.....	164

NON-TECHNICAL SUMMARY

The Australian Antarctic Division (AAD) has prepared this Initial Environmental Evaluation (IEE) to assess the potential environmental impacts associated with the activities of the proposed Davis Critical Infrastructure Works (DCIW). The aim of the DCIW is to replace end-of-life water, power and mechanical services operations at Davis station to enable the station to be capable of supporting full station capacity and to continue to produce world-leading science.

The DCIW activities that will be undertaken include:

- **Storage** – use, expansion and rehabilitation of existing and new laydown areas for cargo (equipment, containerised and bulk break).
- **Construction** – construction of a Utility Building, New Pump House and Reverse Osmosis plant including service reticulation.
- **Acquiring fill** – acquiring and/or processing of fill within the Davis station quarry and works areas.
- **Installation and commissioning** – internal fit out, testing and handover of new buildings and processes.
- **Refurbishment** – floor installation within the Old Living Quarters building and asbestos removal within the Trades Workshop.
- **Demolition** – of the existing Emergency and Main Powerhouses.
- **Waste management** – return to mainland Australia of appropriate waste and recyclables.

The DCIW IEE has been prepared on the basis that these activities will be undertaken within the next 6 years, concluding in February 2032. This IEE identifies the environmental risks arising from the proposed activities, assessment of the impact, and the identification of the management and mitigation measures employed to enhance the protection of the Antarctic environment. This assessment also considers potential cumulative environmental impacts from the DCIW activities.

The key potential environmental risks identified through the impact assessment process include disturbance to wildlife and the destruction or disruption of terrestrial flora associated with the proposed DCIW activities. Additional risks identified that may have notable impacts include various forms of pollution (e.g. to land, sea, or air) as well as the potential degradation of wilderness values, and habitat change.

Potential environmental impacts are mitigated through an extensive suite of measures that include mandatory training for all personnel, with implemented biosecurity protocols both prior to departure from mainland Australia (Australian mainland and Tasmania) and on arrival to Antarctica to ensure protection against invasive species. Activities will be confined to designated works areas and under prescribed timelines to minimise disturbance, with strict adherence to environmental management plans, and ongoing monitoring and auditing. Wildlife and landscape values are safeguarded through seasonal planning, implementation of exclusion zones, and ongoing consultation with subject matter experts. Potential dust, noise, and contamination risks will be managed via modelling, sampling, environmental monitoring, and adaptive work practices. Generated waste will be carefully segregated and managed under Return to mainland Australia

(RTA) plans. Most equipment will be commissioned in mainland Australia, and sustainability is embedded in design and operations, aligning with AAD net-zero targets.

However, there are some uncertainties regarding the effectiveness of some measures, which are detailed in Section 7, and some activities have unavoidable impacts, such as to wilderness values. In these cases, mitigation may not be possible or could be dependent on emerging and future practices and technologies, and alternative fuel resources.

Key environmental indicators, activities and incidents will be monitored during the works to ensure unforeseen impacts are detected and managed appropriately, and in accordance with relevant AAD Standard Operating Procedures (SOP). Monitoring of activities, through surveys, inspections, observations, audits and incident reporting will ensure the DCIW remains compliant with regulations, international standards, the AAD's Environmental Policy, and the AAD's commitment to continuous environmental improvement.

The assessment concludes that the DCIW activities described in this IEE will result in some environmental impacts. While construction activities may present a higher potential impact compared to other activities, these are addressed through targeted mitigation measures. Overall, provided all mitigation measures, monitoring, and reporting are implemented as described, the DCIW activities will have no more than a minor or transitory impact on the environment.

1 Introduction and scope

1.1 Introduction

Australia's Antarctic program is managed on behalf of the Australian Government by the Australian Antarctic Division (AAD) of the Department of Climate Change, Energy, the Environment and Water (DCCEEW) (the Department). The AAD is tasked with advancing Australia's strategic, scientific, environmental and economic interests in the Antarctic by protecting, administering and researching the region. To this end, Australia maintains 3 year-round research stations on the coast of East Antarctica – Casey station in Wilkes Land, Davis station in Princess Elizabeth Land, and Mawson station in Mac.Robertson Land.

In April 2016, the then Prime Minister launched the *Australian Antarctic Strategy and 20 Year Action Plan* (The Strategy and Action Plan), which sets out Australia's national interests and our vision for Australia's future engagement in Antarctica (AAD, 2022a). One of the key deliverables from The Strategy and Action Plan is to:

Implement an overhaul, as needed, of the infrastructure of our Antarctic research stations to create a station network that is efficient, flexible and suited to our future needs

A funding investment was then announced in 2019 by the Australian Government to upgrade Australia's network of Antarctic research stations and the supporting infrastructure over the next decade. The last time major infrastructure renewal occurred (of this scale) at Australia's Mawson, Casey and Davis stations was the 1980s.

This funding is in recognition of the critical assets required to support a robust and safe operation of the Australian Antarctic Program (AAP). The renewal undertaken as part of the works will enhance Australia's ability to lead world-class science and environmental stewardship across East Antarctica.

The AAD has established the Antarctic Infrastructure Renewal Program (AIRP) to deliver critical infrastructure, assets, technology and equipment. The Davis Critical Infrastructure Works (DCIW) is a component of the AIRP that has an overall vision to:

Renew ageing infrastructure and deliver future ready infrastructure that can support a world class Antarctic program that enables Antarctic scientists to focus on answering critical questions of global significance for generations to come.

The aim of the DCIW is to replace end-of-life water, power and mechanical services operations at Davis station to enable the station to be capable of supporting full station capacity. Major infrastructure renewal at Davis station was selected as the initial package of works due to the insufficient power and water supply/production on site. As critical infrastructure for expeditioners, the station lacks the capacity to support full bed occupancy and meet operational demands.

To achieve this aim, the following objectives for DCIW have been developed:

- a. Enhance the health, safety, and wellbeing of occupants on site
- b. Support and facilitate world-leading science
- c. Represent Australia in Antarctica
- d. Implement strong environmental protection practices
- e. Showcase holistic sustainability practices
- f. Provide improved future flexibility in station infrastructure by using modular structures to allow for easier interior refurbishment and reorganisation to respond to changing needs
- g. Seek opportunities to minimise the operational energy demand by designing building modules that have a high-performance thermal envelope to reduce energy use and ensure a healthy, mechanically ventilated interior
- h. Seek opportunities to minimise the station's reliance on fossil fuels by transitioning to renewable energy and utilising battery storage.

1.1.1 Master planning

The 2022 update to The Strategy and Action Plan (AAD, 2022a) provides an action plan for 2022–2036, as well as a 3-year summary from 2022–2026. Beyond 2026, the Australian Government is committed to finalising station modernisation works across all Antarctic and sub-Antarctic research stations to create a station network that is efficient, flexible and suited to our future needs. It includes the directive to:

Deliver a comprehensive Master Plan for Antarctic stations to tackle ageing infrastructure, with an initial masterplan completed for Davis station.

AAD Antarctic station master planning is an engineering response to this high-level direction to identify requirements and opportunities to modernise and improve infrastructure across all 3 of Australia's Antarctic stations. Work to date includes the creation of site plans and key documents that lay out the fundamentals on which the rest of the design is based.

Master planning is separate to DCIW. However, as an engineering plan for how stations might look in the future, it is helping to inform and guide elements of DCIW. This includes aspects of building design and construction materials and parts, as these materials could be common across Davis, Casey and Mawson stations in the future.

1.2 Statutory requirements

To ensure the protection of the Antarctic environment, 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 (Environment Protection) (ATEP) Act 1980* and *Environmental Impact Assessment Regulations 1993* (the Regulations).

The ATEP Act provides for 3 levels of environmental assessment – Preliminary Assessment (PA), IEE, and Comprehensive Environmental Evaluation (CEE). The required level of assessment is related to the likely extent of the impacts of an activity. A PA for the ‘Antarctic Infrastructure Renewal Program – Davis Critical Infrastructure Works’ was submitted on 16 January 2025. Based on this PA, the Minister’s delegate determined the requirement for an IEE (this document). Part 3 of the Regulations specifies the mandatory content of IEEs for the purposes of paragraph 12G(2)(a) of the ATEP Act. Compliance with the required content is provided in Appendix 1.

1.3 Purpose and scope of the document

The purpose of this IEE is to provide details of the DCIW, and the potential impact of these activities on the Antarctic environment. It includes consideration of alternatives to the proposed activity and consideration of cumulative impacts in light of existing and known planned activities covered under separate environmental authorisations, including:

- **IEE – RSV *Nuyina* Operations and Science Systems 2024–2029** (October 2024)
 Authorised Activities:
 - **Operation**
 - Port Call Hobart – loading of cargo, equipment, stores and personnel in Hobart
 - Transit voyages – resupply and marine science voyages
 - Ballast water management
 - Waste management
 - Sewage management
 - Ice breaking
 - Anchoring – includes the use of mooring lines and over ice resupply
 - Cargo transfer
 - Bulk fuel transfer
 - Personnel transfer
 - Emergency response
 - Fire fighting
 - Vessel distress assistance
 - Search and rescue activities.
 - **Science Systems**
 - Key science systems while the Vessel is underway
- **IEE – All Stations Operations 2024–2027** (September 2024)
 Authorised Activities:

- **Presence, maintenance and modification of facilities and infrastructure** – includes station buildings, field huts, building maintenance and modifications, road/pathway maintenance, snow clearing and grooming
- **Operation of facilities at all stations** – includes generation of power, water, wastewater, waste incineration, materials and facilities management, Information Communications Technology (ICT), hydroponics and laboratory operations, and the operation and maintenance of unattended science projects
- **Station occupation and personnel movements** – includes management of and transfer of people for training and for minor recreational activities. Includes personnel undertaking foot and vehicular travel over ice, snow, rock and beaches, field trips, field camps, recreational drone use and Bureau of Meteorology activities
- **Vehicle maintenance and operations** – includes watercraft operations and land-based operations
- **Fuel and hazardous chemicals management** – includes onshore fuel storage, fuel transfer and resupply activities.
- **IEE – Australian Antarctic Program Aviation Operations 2025–2030** (August 2025)
Authorised Activities
 - **Aviation operations** – includes operation of aircraft, take-offs and landings, remotely piloted aircraft, cargo transfer, personnel transfer, and science activities requiring aviation support
 - **Operation of aviation facilities at all Antarctic stations and Wilkins Aerodrome** – includes maintenance of runways, ski landing areas and helipads, generation of power, water, wastewater, waste incineration and ICT
 - **Vehicle maintenance and operations** – includes minor activities including maintenance of vehicles and machinery at Wilkins Aerodrome, e.g. snow groomers, passenger vehicles etc. Maintenance of these vehicles using station infrastructure is authorised under the All-Stations Operations IEE
 - **Fuel and hazardous chemicals management** – includes onshore fuel storage, vehicle and aircraft refuelling (including air-to-air), fuel transfer, waste removal and resupply activities.

Included in this IEE is an evaluation of the measures to be undertaken and applied to minimise or avoid these impacts. Unless otherwise stated, all references to plans, procedures, policies, guidelines and other documents within this IEE are to include any updates or subsequent versions of these documents. For the purposes of this IEE, “mainland Australia” refers to the Australian mainland and Tasmania. This document contains the following sections:

- Section 2 describes the proposed activities
- Section 3 describes the alternatives considered
- Section 4 describes the local environment
- Section 5 describes the environmental impacts and the measures proposed to minimise or avoid them
- Section 6 describes the environmental management
- Section 7 identifies any uncertainties and knowledge gaps relevant to preparation of the evaluation, and

- Section 8 outlines the conclusions.

Potential operational impacts from the DCIW assets will be addressed in the 2027 renewal of the All Stations Operations IEE. A non-technical summary has been included at the beginning of the document to provide an overview of this IEE.

2 Description of the proposed activity

2.1 Location of the proposed activity

The proposed activity will be conducted within an existing Australian Antarctic research station footprint.

Name of location: Davis station (Figure 1).

Coordinates of location: 68°34'36"S, 77°58'03"E

Located 4,838 kilometres (km) south-west of Hobart, Davis station is Australia's most southerly Antarctic station. Davis station is situated in the Vestfold Hill, on the Ingrid Christensen Coast of Princess Elizabeth Land. The station sits on a relatively flat site at the top of a steep slope, approximately 20–25 meters above sea level (m ASL), and approximately 20 km from the edge of the continental ice sheet. This vast region contains low-lying hilly country that is deeply indented with the continent's largest variety of sea inlets, lakes, and tarns (small mountain lakes) of varying salinity. Additionally, there is a human-made depression adjacent to the helicopter aviation area at Davis Station, known as the borrow pit. The borrow pit was originally excavated to provide fill material for various construction projects at Davis Station, including the development of the helicopter aviation area. The station is also located near numerous islands within 5 km of the coastline, beyond which is predominantly grounded icebergs. The limits for Davis station are identified in Figure 2.

Davis station was established in 1957 as a scientific research station with capacity to accommodate up to 80–90 people during summer (October – March) and approximately 20–30 people during winter (April – October) months, however current power and water infrastructure limitations reduce this maximum summer occupancy to 66 people. The station is considered large and complex, accommodating a range of infrastructure to support scientific research and expeditioners (Figure 3), which includes:

- a. Scientific laboratories
- b. General living areas
- c. Maintenance areas and workshops
- d. Medical facilities
- e. Amenity and store areas
- f. Communications facilities
- g. Power, sewerage, and water production/treatment facilities.

Davis station supports research across multiple fields, including but not limited to:

- a. Geodetic systems and geophysics
- b. Ultraviolet radiation
- c. Upper atmosphere temperature
- d. Antarctic clouds, radiation and precipitation
- e. Atmospheric ozone
- f. High latitude gravity waves
- g. Near-surface atmosphere and cryosphere observations
- h. Landscape vulnerability and recovery
- i. Seal distribution and abundance in the Vestfold Hills
- j. Old growth mosses as proxies for past Antarctic climates
- k. Seabird status, trends, and research to improve management strategies and conservation outcomes for Antarctic breeding seabirds
- l. Research into lake and soil micro-invertebrates, and marine invertebrates
- m. Human impacts on the environment and climate.

Davis station is considered a priority for renewal to reduce safety risks to expeditioners and to improve station operations and capability.

IEE Davis Critical Infrastructure Works

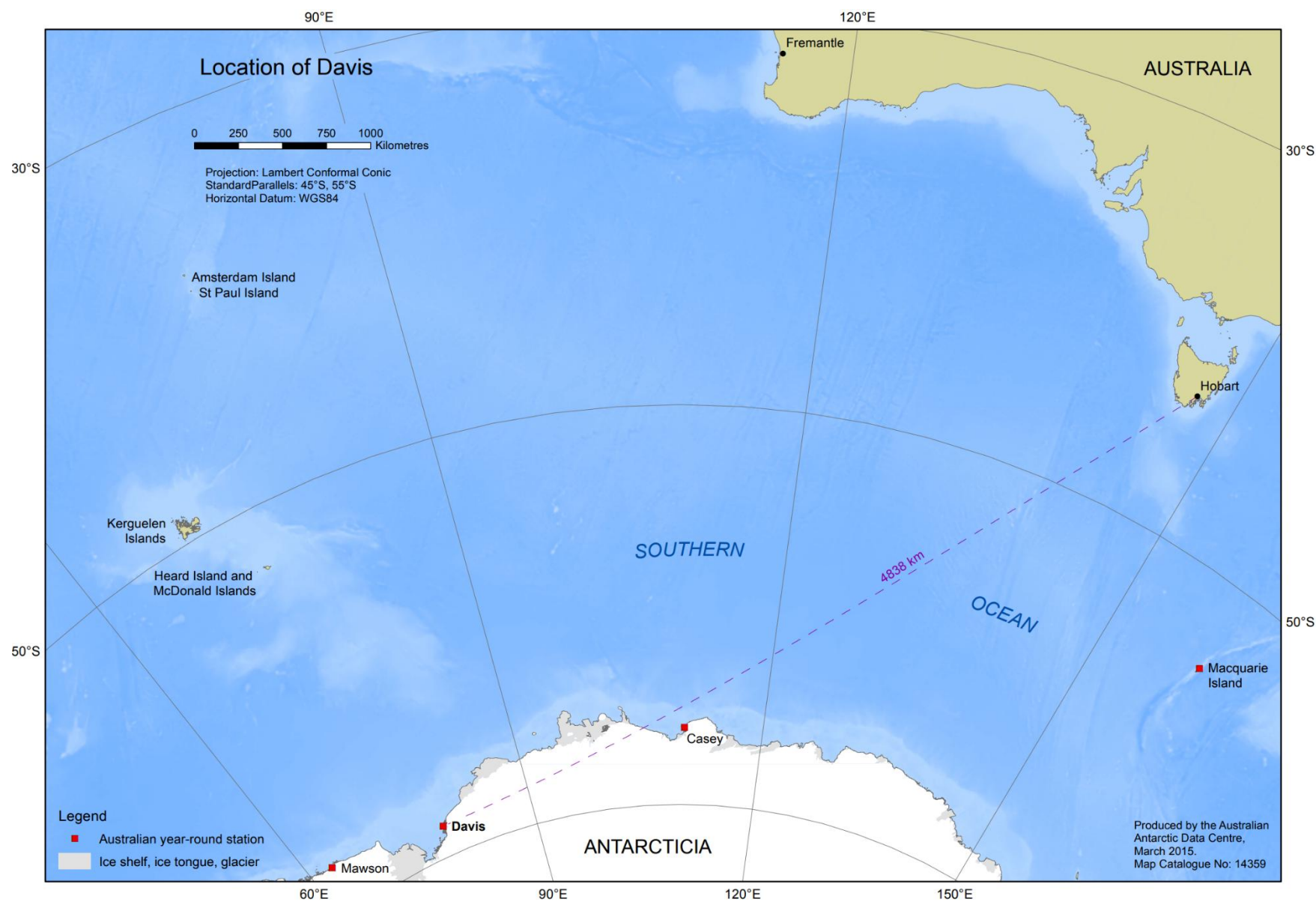


Figure 1. Davis station location in reference to mainland Australia (AAD, 2015)

DAVIS

STATION LIMITS

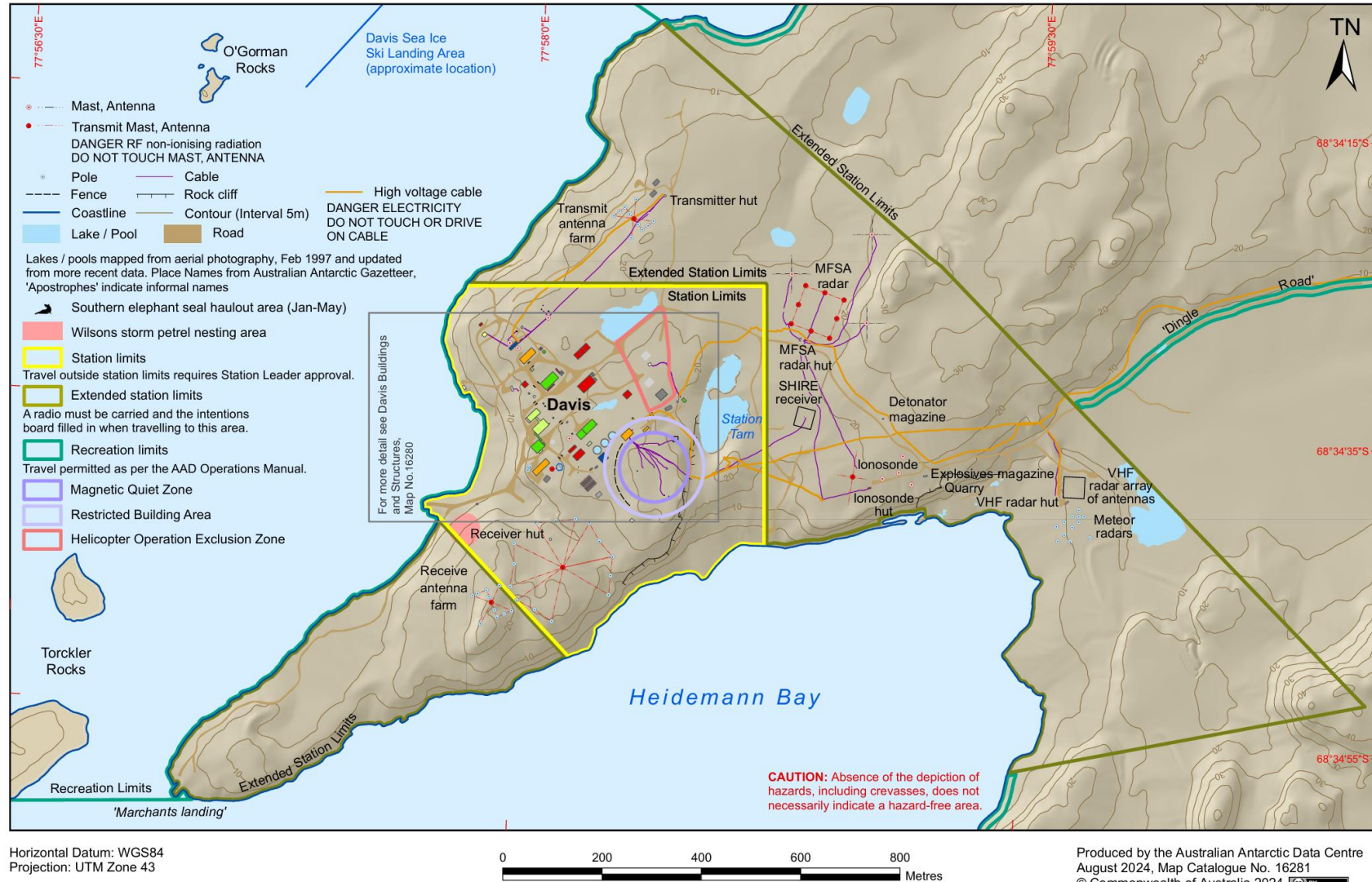


Figure 2. Limits for Davis station (AAD, 2024a)

DAVIS BUILDINGS AND STRUCTURES

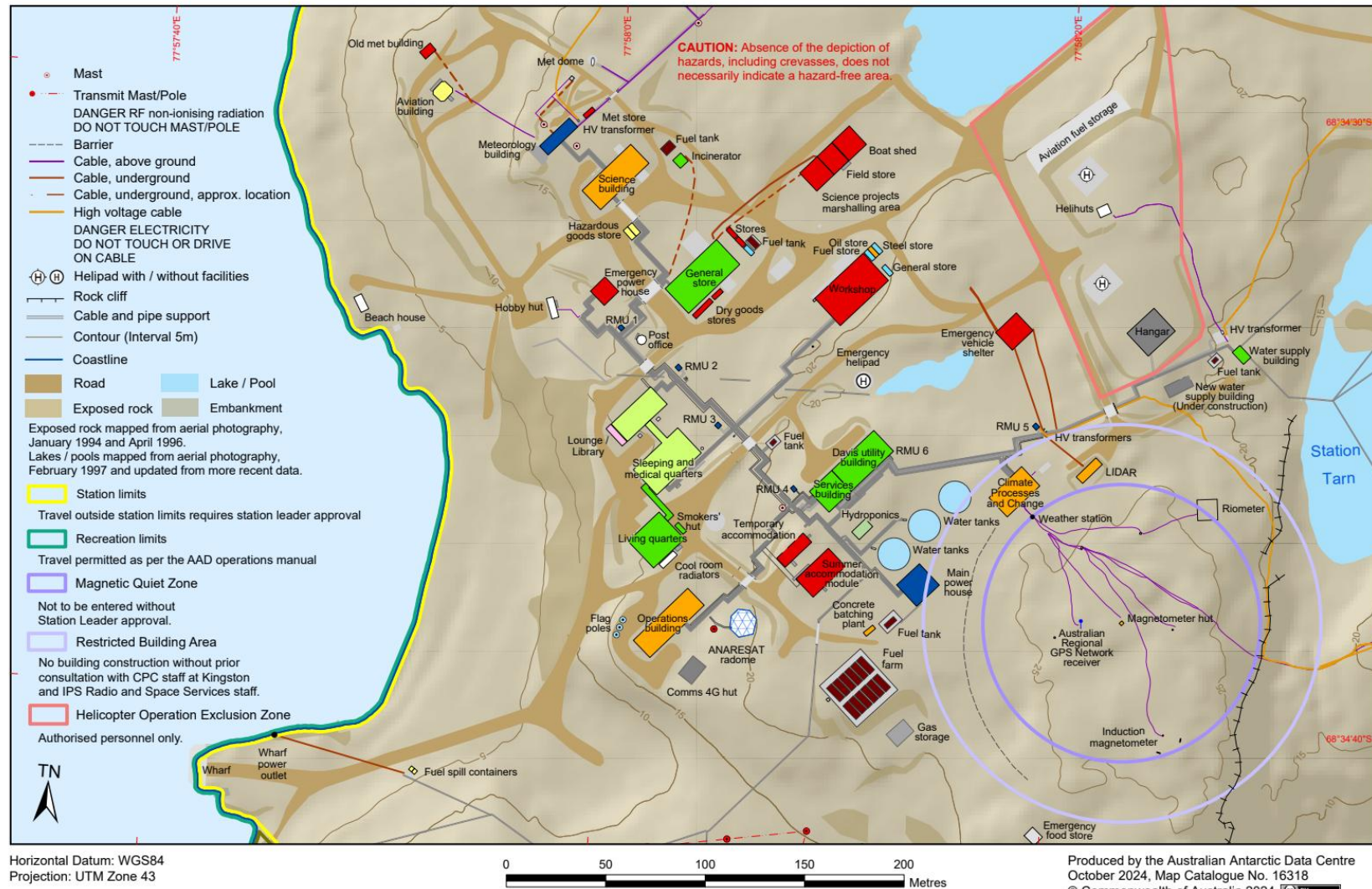


Figure 3. Davis station existing buildings and structures (AAD, 2024b)

2.2 Project overview

The aim of the DCIW is to provide suitable infrastructure to support the ongoing day to day operations at Davis station while considering potential for future opportunities of the station's scientific research capabilities and operational requirements. The scope of works involves alleviating the key on-site challenges experienced at Davis station and include:

- a. Aged infrastructure and the reticulation capacity on site.
- b. Insufficient power supply currently provided to the site.
- c. Insufficient water supply and capacity on site.
- d. Consolidation of the infrastructure to minimise the station footprint.

2.2.1 Existing site infrastructure and operations

The existing Davis station comprises of several individual buildings primarily orientated southwest–northeast, in line with the north-easterly prevailing wind.

A draft Davis station Condition Assessment (AAD, 2017) was carried out on this infrastructure on 20 March 2020 (Figure 4). The outcomes of which indicated that the following facilities are considered to be in poor condition:

- a. Old Living Quarters
- b. Trades Workshop
- c. temporary accommodation
- d. Main Powerhouse
- e. Emergency Powerhouse
- f. water storage and Reverse Osmosis plant
- g. fuel tanks and services
- h. Australian National Antarctic Research Expeditions Satellite (ANARESAT) dome, masts and antennae.

Water-related infrastructure is of particular concern due its insufficient capacity to serve the current station's design capacity despite the station's significant reliance on it. The station's existing reverse osmosis plant is still in operation despite it passing its effective design life in 2018. This issue is exacerbated by the limited water quality and supply which the station Tarn can provide.

Due to the age of infrastructures construction (circa 1980s), multiple buildings have asbestos present (Figure 5).

IEE Davis Critical Infrastructure Works

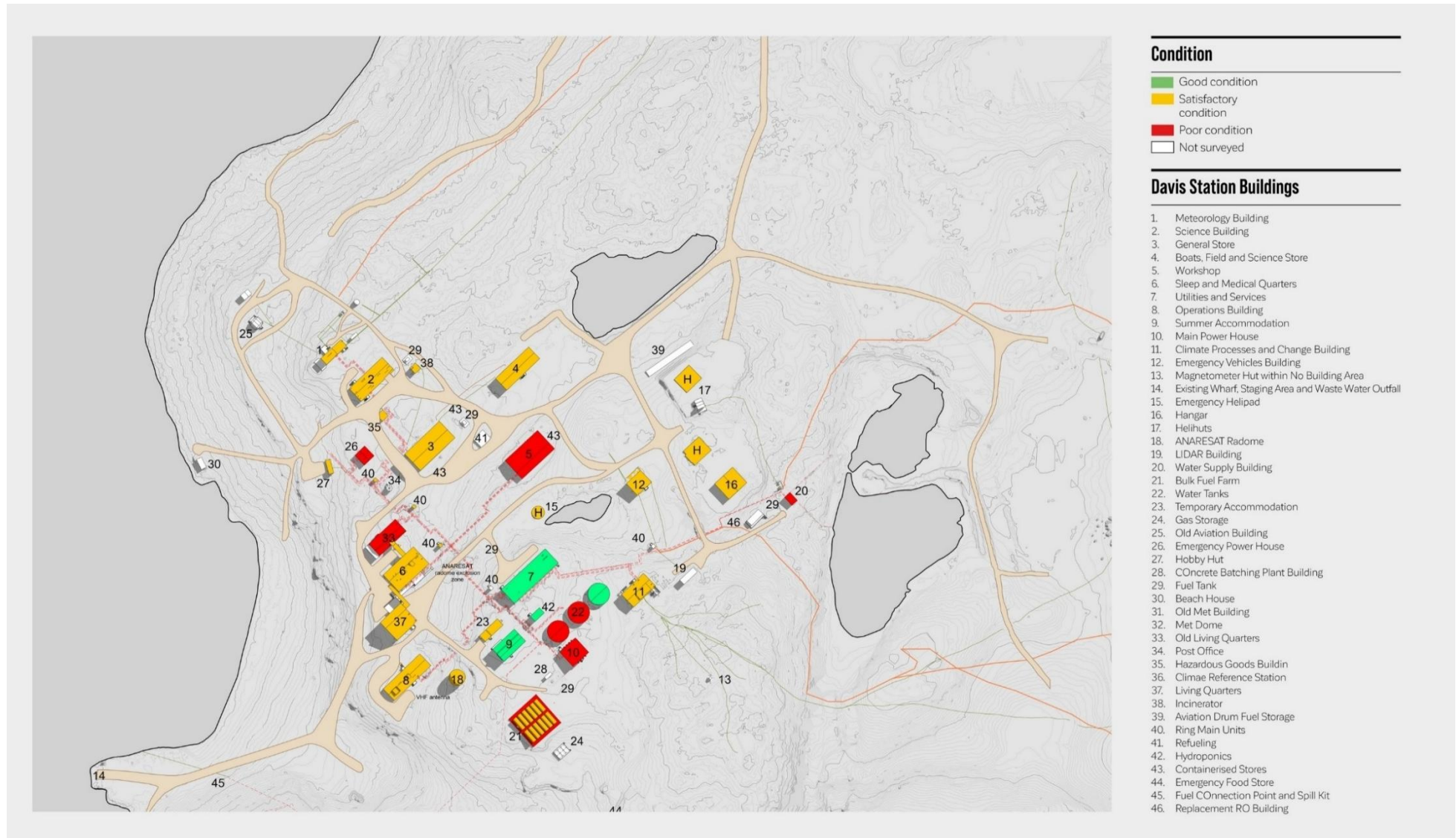


Figure 4. Davis station existing condition survey (AAD, 2017)

ASBESTOS PRESENCE IN BUILDINGS

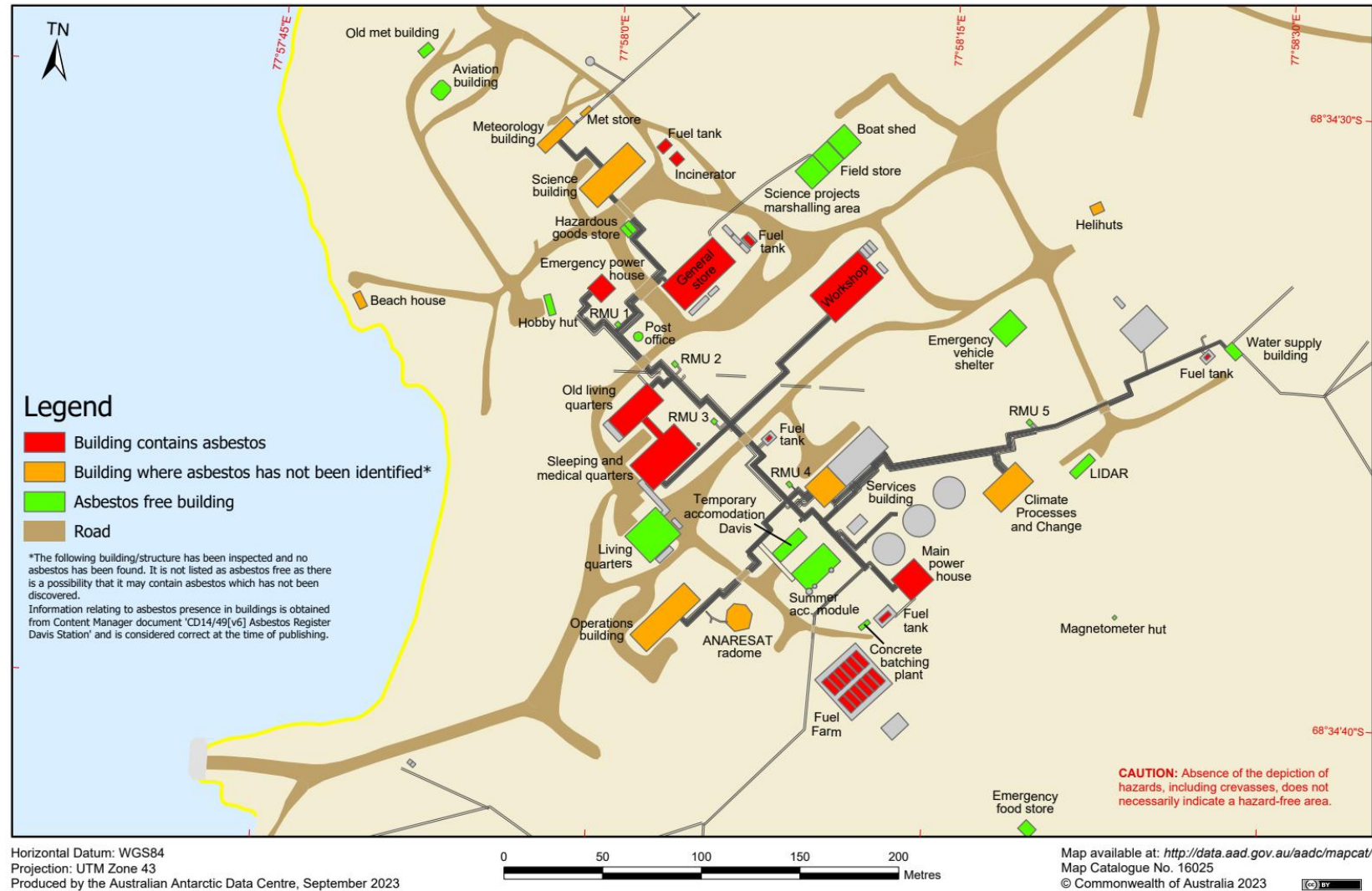


Figure 5. Davis station asbestos presence in buildings (AAD, 2023)

2.2.2 Project scope descriptions

To address the power production of Davis station, the DCIW encompasses the construction of a new Utility Building (UTB), which will house a new main powerhouse. This building will also incorporate the functions of the trade workshop, including new mechanical workshops capable of servicing, all current plant and equipment on station, and new trades workshops. This will allow the old Trades Workshop (WKS) to be refurbished or demolished in future (not within scope of this IEE). Asbestos will be removed from the Trades Workshop as part of DCIW.

To provide a stable potable water resource for station operations the works involve the construction and installation of a New Pump House (NPH) with a deployable Seawater Intake, a Reverse Osmosis (RO) plant, and sitewide Services Reticulation (STW).

To extend the usage of the Old Living Quarters (OLQ), a new floor will be installed. And finally, the old Main Powerhouse (MPH) and old Emergency Powerhouse (EPH) will be demolished, and the materials will be returned to mainland Australia.

DCIW scope and descriptions are outlined in Table 1, and visually represented in Figure 6 and Figure 7, noting proposed building locations and service reticulation pathways are approximate and subject to change.

Table 1. DCIW project activity description

Project scope	Code	Description
Old Living Quarters	OLQ	Install floor and use as offices for DCIW team until Utility Building is completed
Utility Building	UTB	A new building to accommodate power, vehicle workshops, part stores, offices and rest area. Power – Access points for equipment replacement, cold porch, main generator room(s), switchgear room, water heater room, ancillary storage room. Vehicle Workshop – Large format workshop, separate welding bays, trades workshop, circulation pathways, emergency shower and eyewash station's, petroleum, oil and lubricants store, batteries stores, hazardous goods stores, respective spill kits, cold porch, ablutions block, plant room, electrical cupboard(s), server room(s). Parts stores – a large and small parts storage area.
New Pump House	NPH	A new seasonal Seawater Intake and pump facility to provide filtered and pre-heated seawater to RO plant(s) for the production of potable water.
Reverse Osmosis	RO	A new water production facility including a building containing an ultrafiltration RO water treatment plant. Constructed and installed adjacent to the recently installed RO#1 plant.
Trades Workshop	WKS	Complete asbestos removal, including providing a Clearance Certificate. Workshop doors, floor, wall structural reinforcement, repair and/or replacement if required (referred to as 'Workshop' in Figure 5).
Services Reticulation	STW	New reticulation infrastructure to support incoming water, electrical power and data services will be required to connect the water intake and New Pump House next to the sea to the new water production facility and the proposed new Utility Building. New reticulation infrastructure to support potable water, fire water, drainage, electrical power and data services will be provided to connect with the proposed new Utility Building. The new reticulation will be constructed to the side of existing infrastructure. An additional new reticulation spur for potable water, fire water, electrical power and data services will be made to the Science Building.
Main Powerhouse	MPH	Demolition of facilities, including removal of materials from site as RTA cargo.
Emergency Powerhouse	EPH	Demolition of facilities, including removal of materials from site as RTA cargo.

IEE Davis Critical Infrastructure Works

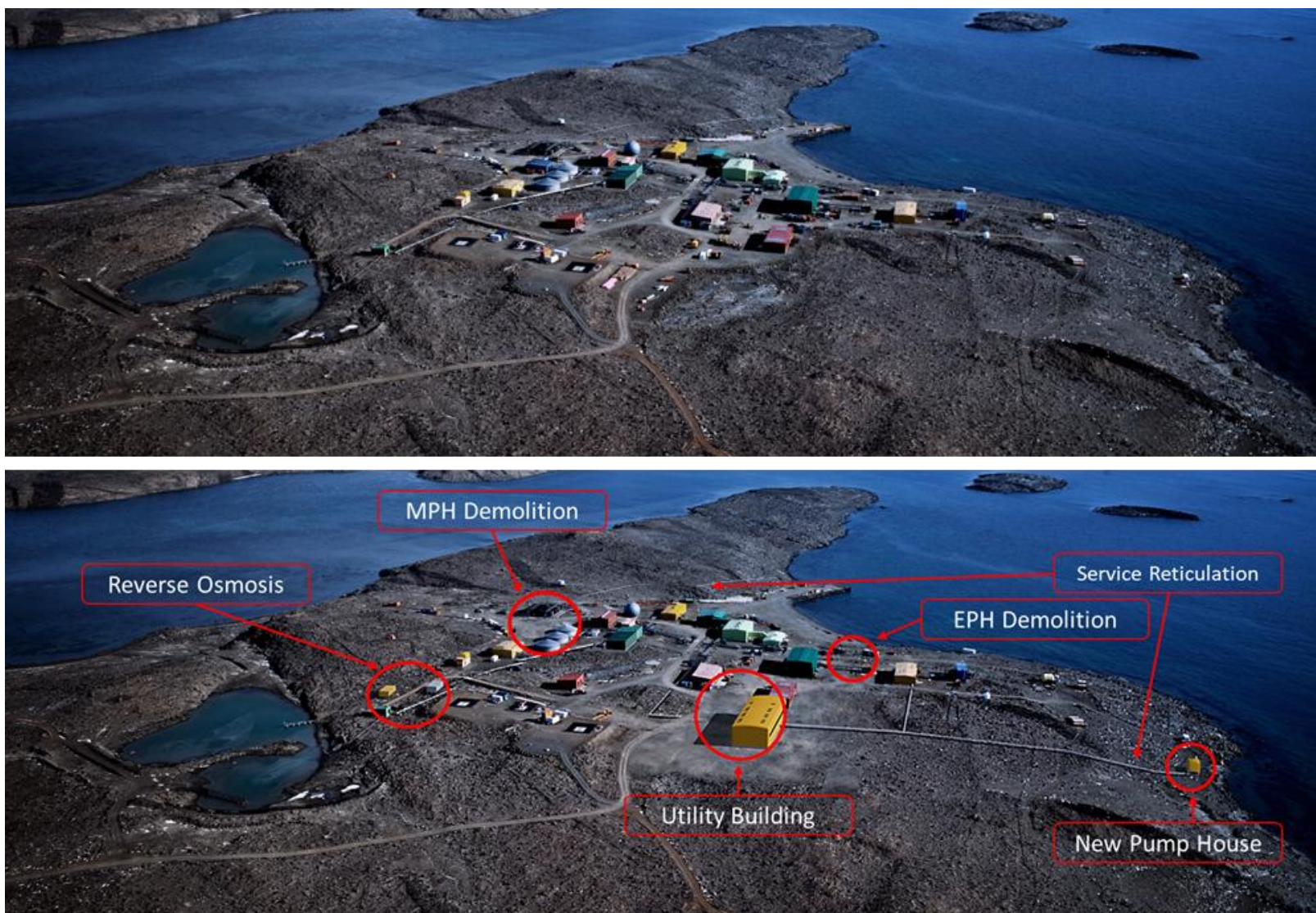


Figure 6. Davis station (top); Davis station with the proposed DCIW (bottom) (estimate locations) (Photo credit: David Barringhaus 2012)

IEE Davis Critical Infrastructure Works

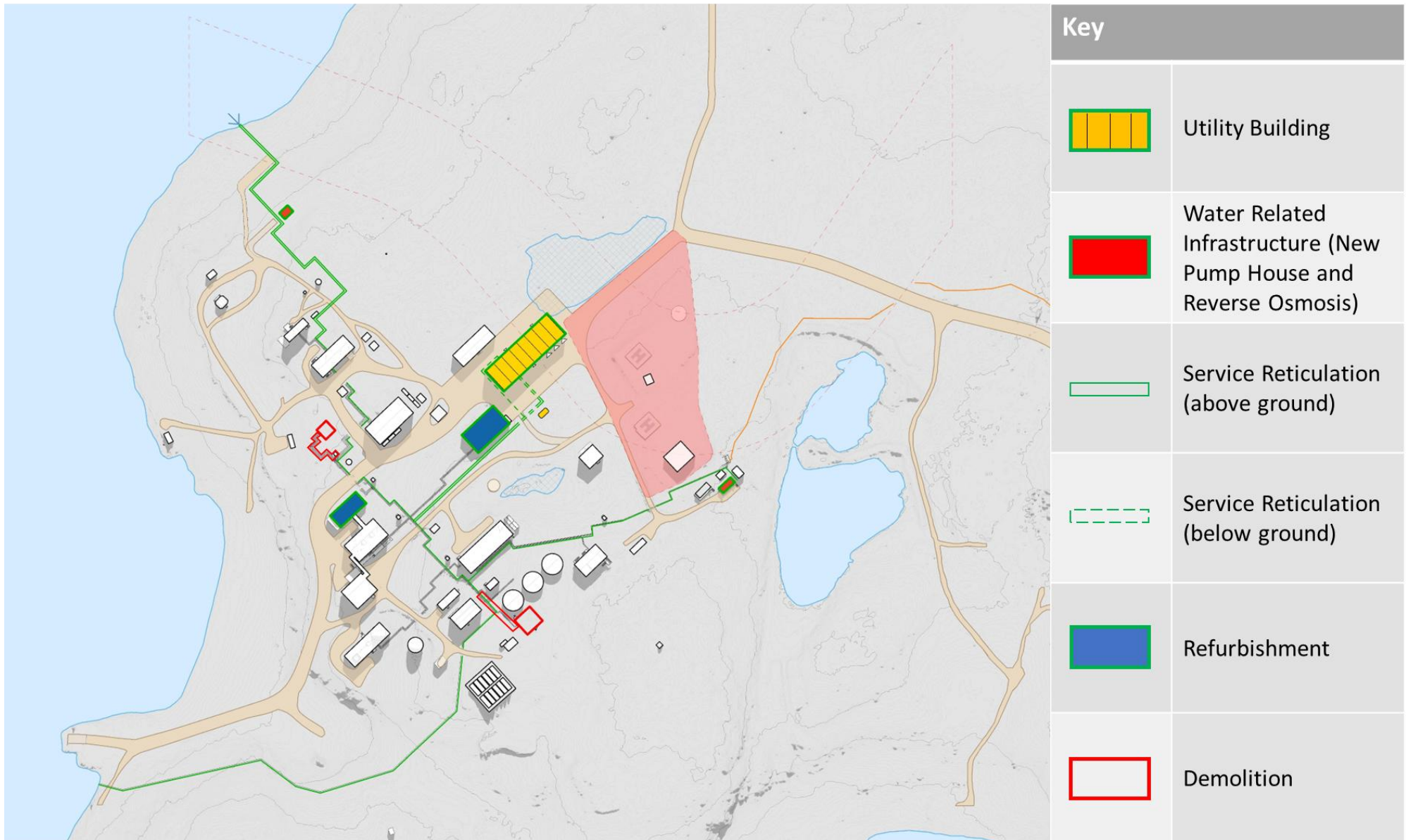


Figure 7. DCIW proposed site plan and helicopter exclusion zone (shaded light red)

2.3 Timing

2.3.1 Summary of activities

The commencement of the DCIW at Davis station is planned for October/November 2026 and planned exit is February/March 2032 (Table 2 and Figure 8). Exact dates are dependent on operational planning decisions and environmental conditions endured throughout the construction phase. Depending on productivity, operational, planning, and environmental considerations, the timing of proposed works may shift by approximately one season earlier or later.

A detailed DCIW 5-year plan is attached within Appendix 2, which is subject to regular (bi-annual or as required) updates.

IEE Davis Critical Infrastructure Works

Table 2. High level summary of activities

Field season	Project scope	Key activities	Shipping	Aviation	Personnel	Cargo ¹ (RTA) ²
2026–27	Reverse Osmosis	Storage Earthworks	RSV <i>Nuyina</i>	-	23	1,600 m ³ (115 m ³)
	New Pump House	Construction				
	Utility Building	Installation & Commissioning	Chartered Vessel			
	Services Reticulation	Waste Management				
2027–28	Old Living Quarters	Storage Earthworks	RSV <i>Nuyina</i>	-	25	6,700 m ³ (835 m ³)
	Utility Building	Acquiring Fill Construction				
	Services Reticulation	Refurbishment Installation & Commissioning	Chartered Vessel			
		Waste Management				
2028–29	Utility Building	Storage Construction	RSV <i>Nuyina</i>	-	20	300 m ³ (1,091 m ³)
	Services Reticulation	Installation & Commissioning Waste Management	Chartered Vessel			
2029–30	Utility Building	Storage Construction	RSV <i>Nuyina</i>	-	26	3,600 m ³ (3,472 m ³)
	Services Reticulation	Installation Commissioning Waste Management	Chartered Vessel			
2030–31	Utility Building	Storage Refurbishment	RSV <i>Nuyina</i>	-	29	155 m ³ (2,486 m ³)
	Trades Workshop Refurbishment	Installation & Commissioning Waste Management	Chartered Vessel			
2031–32	Trades Workshop Refurbishment	Storage Refurbishment Demolition	RSV <i>Nuyina</i>	-	6	155 m ³ (776 m ³)
	Main and Emergency Powerhouse Demolition	Waste Management	Chartered Vessel			

¹South bound (to Antarctica) cargo volume.

²North bound (Return to mainland Australia) cargo volume.

2.3.2 Schedule of activities

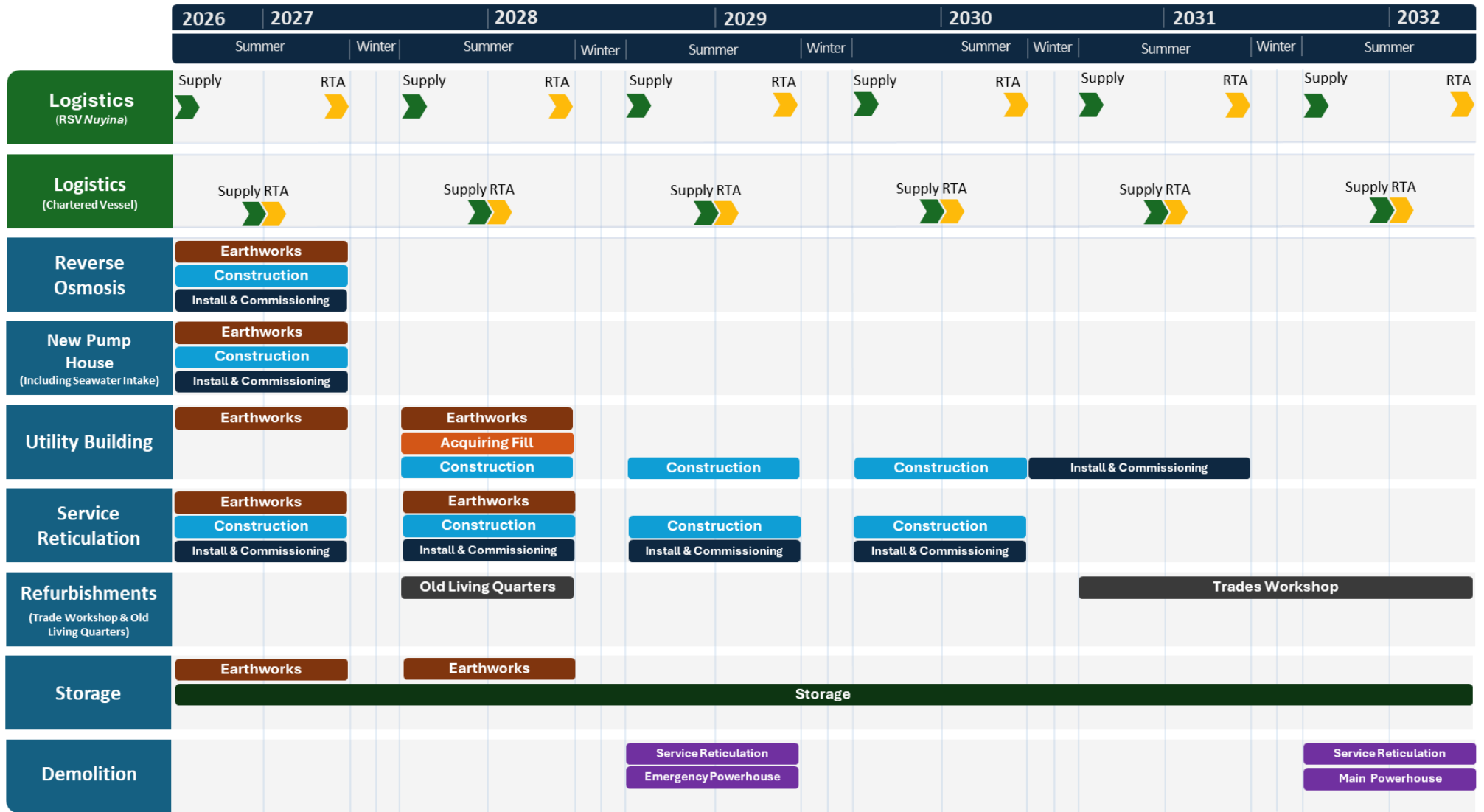


Figure 8. DCIW program

2.4 Detailed description of activities

The DCIW scope is designed to achieve its overarching aim of upgrading and modernising assets and infrastructure at the end of their useful life, which in turn will contribute to improved operational and scientific outcomes.

The DCIW includes the replacement of end-of-life water, power and mechanical services operations at Davis station to enable the station to be capable of supporting full station capacity. The DCIW scope spans multiple years, and is overlapping and involves a combination of unique, non-recurring, and/or recurring key activities. The DCIW scope can be summarised across 7 key activities:

- Storage
- Construction
- Acquiring fill
- Refurbishment
- Demolition
- Installation and
- Waste

The detailed DCIW scope displayed in Table 1 and summarised in Table 3. The scope of the DCIW has been grouped into Key Activities and displayed in Table 4. Design stage status is reflective of time of submission, December 2025.

Table 3. DCIW scope design status and summary

DCIW scope	Acronym	Design stage	Scope summary	Section
Utility Building	UTB	Schematic	New	2.4.2.1
New Pump House	NPH	Detailed	New	2.4.2.3
Trades Workshop	WKS	Pre-Design	Refurbishment	2.4.2.6
Services Reticulation	STW	Schematic	New/Change/Remove	2.4.2.2
Reverse Osmosis	RO	Detailed	New	2.4.2.6
Old Living Quarters	OLQ	Pre-Design	Refurbishment	2.4.2.6
Main Powerhouse	MPH	Pre-Design	Remove	2.4.2.8
Emergency Powerhouse	EPH	Pre-Design	Remove	2.4.2.8

Table 4. Summary of DCIW key activities scope

Key activity	Scope summary
Storage	Cargo storage prior to transportation via vessel to Antarctica. Including cargo processing and storage outside of the Cargo Biosecurity Centre. ¹ Storage (including the construction and rehabilitation of laydown areas) of all DCIW containerised and break-bulk cargo at Davis station.
Construction	Utility Building associated earthworks, groundworks, foundations, erection of frame, façade close in and rehabilitation. Service Reticulation earthworks, foundations/anchoring and support structure establishment and rehabilitation. Reverse Osmosis earthworks, groundworks, foundations and rehabilitation. New Pump House and Seawater Intake earthworks, ground works, construction and rehabilitation.
Acquiring Fill	Blasting of selected area within the quarry to source fill for construction activities and blasting of the (earth) rock within and around the footprint of the Utility Building.² Processing of fill material within the quarry and construction footprint of the Utility Building.
Demolition	Main Powerhouse demolition of redundant infrastructure and rehabilitation. Emergency Powerhouse demolition of redundant infrastructure and rehabilitation.
Refurbishment	Old Living Quarters floor installation. Trades Workshop refurbishment includes complete asbestos removal, monitoring of doors, walls and flooring with associated structural reinforcement if required.
Installation and Commissioning	Utility Building installation of internal fit out and associated services, along with associated commissioning. Service Reticulation installation along support structure and connections to existing or new buildings. Commissioning and testing to ensure in working order. Reverse Osmosis installation of associated internal infrastructure and equipment along with commissioning. New Pump House and Seawater Intake installation of internal infrastructure and equipment, followed by testing and commissioning
Waste Management	Waste management in alignment with station operations (e.g. incineration, Kroll heater, etc.) and the RTA of hazardous chemicals and materials, recyclables, general waste and building and construction waste.

¹Not in scope of this IEE as activities occurs outside of the Antarctic region (the area south of 60 degrees South latitude).

²Activity not currently in scope of this IEE, pending further investigation and assessment.

2.4.1.1 Design stages

Given the DCIW scope, the project objectives are at varying stages of design development. At the time of submission (December 2025), the current design phase is outlined in Table 3, indicating the level of detailed information pertaining to each objective. Design stages are displayed in Figure 9.

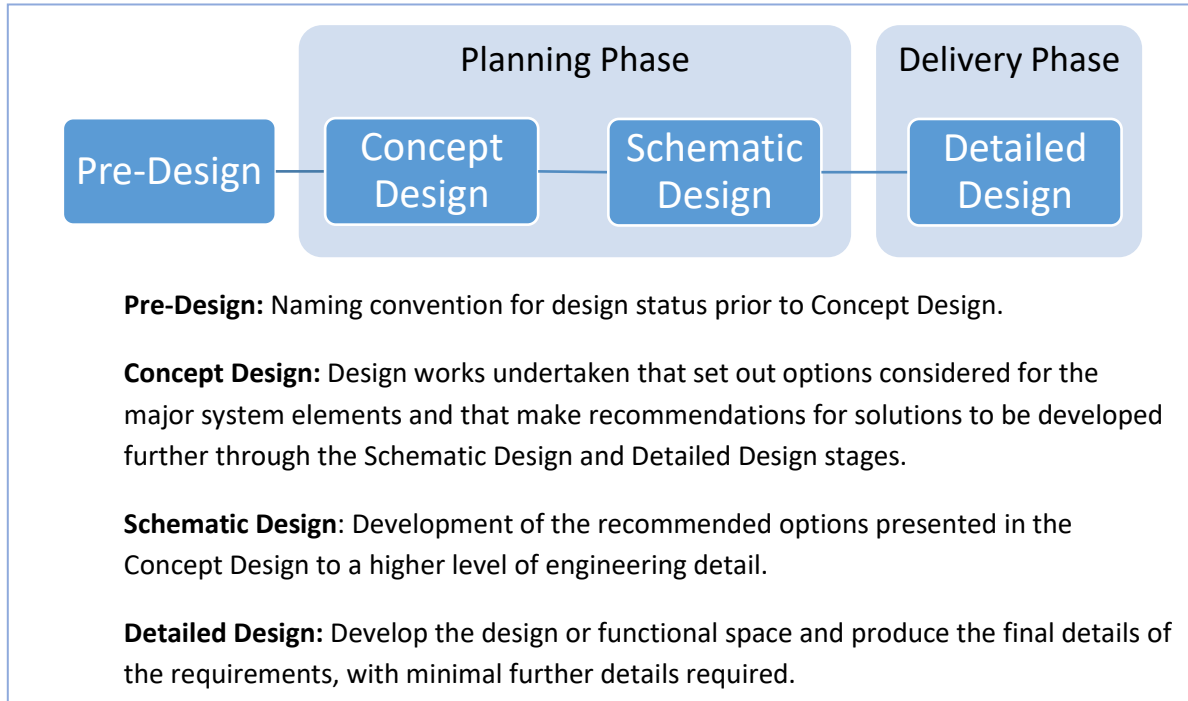


Figure 9. DCIW design stages

2.4.1.2 Transportation (maritime and aviation)

Transportation of DCIW cargo (all necessary materials and equipment) and personnel will occur across existing maritime and aviation activities as well as, yet to be assessed, supplementary shipping. The use of supplementary shipping will be required to ensure DCIW is delivered to the proposed program. Transportation activities of DCIW cargo and personnel on RSV *Nuyina* and AAP aircraft to and from Antarctica are covered under separate authorisations, including:

- IEE – All Stations Operations 2024–2027 (September 2024)
- IEE – RSV *Nuyina* Operations and Science Systems 2024–2029 (May 2024)
- IEE – Australian Antarctic Program Aviation Operations 2025–2030 (May 2025)

The above authorisations include the transportation of DCIW cargo up until the point of arrival at Davis station (on land at the Antarctica continent). DCIW cargo and personnel will undertake transportation in alignment with the activity descriptions within these IEEs and associated authorisations. Movement of cargo from Davis station wharf (arrival on land) to the proposed laydown areas is included in scope of this IEE. This will be undertaken as per the description of activity outlined within the RSV *Nuyina* Operations and Science Systems IEE (AAD, 2024g) Section 4.1.1 resupply – Davis Research Station. All Stations Operations IEE Section 3.1.2 also describes the authorised activity for the movement of people on Davis station, of which DCIW personnel will be consistent with and aligned to. Where appropriate, the use of a 100-tonne crane may be utilised

instead of the current Davis station crane, due to operational requirements (e.g. crane operating weight limits).

Additionally, the process for procuring supplementary shipping (an additional chartered vessel) to support the transportation of DCIW cargo is underway by the AAD. DCIW cargo transported by RSV *Nuyina*, during Davis station resupply operations, is to be conducted over ice or water as per the current process and authorisation (AAD, 2024g). Cargo and personnel transferred from the additional chartered vessel to Davis station would likely be carried out over water with additional support vessels (e.g. barges). Specific details are yet to be confirmed and will require a separate assessment process to the DCIW IEE. Due to the lack of available information regarding supplementary shipping at the time of this IEE, it is assumed to be available for resupply and RTA every season of the DCIW and is reflected in Figure 8. This also accounts for AAD programmatic contingency. DCIW logistics planning, has only accounted for supplementary shipping in season 2027-28 and 2029-30 and is displayed in Table 5.

Aviation activities to support the DCIW are currently unplanned, however, there is the possibility of utilising aircraft under the AAD's current Aviation Operations authorisation for cargo or personnel transfer in unforeseen circumstances. In this circumstance, cargo would be kept to a minimum, in line with intracontinental flights cargo capacity to Davis station. Personal movements would be subject to AAD Operations Planning and also limited to intracontinental flights movement capacity.

2.4.1.3 Logistics

DCIW logistics and cargo are detailed within Table 5. At the time of writing, some planning is still to be confirmed (TBC).

Table 5. DCIW logistics and cargo by season

	2026–27	2027–28	2028–29	2029–30	2030–31	2031–32
Cargo volumes	1,300 m ³	6,700 m ³	300 m ³	3,600 m ³	155 m ³	155 m ³
Estimated / planned potential specific cargo heavy lifts	Precast concrete in Half-Height containers, Steel work and cladding in 20ft containers, Preplace materials in 20ft containers, Tools/Lab, RO#2 containers (4x20ft), NPH containers (3x20ft), Polaris in bulk, Plant excavator CAT-315 in bulk, Plant excavator CAT-330 in bulk, Plant excavators' attachment and RTA.	RSV <i>Nuyina</i> : Plant Hydrema 922 Tip body, roller compactor. UTB Precast Foundations Chartered Vessel: Mobile crane 100T, Asbestos-containing material (ACM) Decontamination Units, OLQ Foundations UTB precast parapet, 238 slabs in bulk, UTB steel portals in bulk UTB cladding and roof, and RTA.	Preplace materials in 20ft containers, Plants consumables in 20ft containers. RTA.	RSV <i>Nuyina</i> : Preplace materials in 20ft containers Chartered Vessel: Preplace materials, UTB fit out materials, MEP material and equipment, FF&E material and equipment, and RTA.	RTA	TBC
Dangerous goods specified	Li Batteries, under 100W/hr / Earthworks Plant / Grouts / SS 2-part foam / Plumbing Glues / Silicon / Paints	Li Batteries, under 100W/hr / Earthworks Plant / Grouts / expanding foam / Plumbing Glues / Silicon / Paints	Li Batteries, under 100W/hr / Earthworks Plant / Grouts / SS 2 part foam / Plumbing Glues / Silicon / Paints	Li Batteries, under 100W/hr /Earthworks Plants / Grouts / SS 2 part foam / Plumbing Glues / Silicon / Paints	TBC	TBC
Special lifts or non-standard cargo	Excavator CAT-315 Excavator CAT-330	CAT-CS7 Soil Compactor	TBC	TBC	TBC	TBC
Expected duration to load and/or discharge	RSV <i>Nuyina</i> – AIRP cargo (10 Day)	RSV <i>Nuyina</i> (10 Days) Chartered Vessel (28 days)	RSV <i>Nuyina</i> (10 Days)	RSV <i>Nuyina</i> (10 Days) Chartered Vessel (14 days)	RSV <i>Nuyina</i> (10 Days)	TBC
Anticipated cargo delivery dates (in mainland Australia)	RSV <i>Nuyina</i> Jul – Aug 2026	RSV <i>Nuyina</i> : Jul – Aug 2027 Charter Vessel: Sept – Oct 2027	RSV <i>Nuyina</i> : Jul – Aug 2027	TBC	TBC	TBC

2.4.1.4 Plant and equipment

Additional plant and equipment (hereafter referred to as Earthwork plant) required for the DCIW, beyond the equipment currently in use by the AAD at Davis Station for authorised station operations and resupply, are as follows:

- Skidder CAT-518 and 20ft trailer
- Bobcat CAT-289
- Concrete mixer
- Mobile crane RT540
- Mobile crane RT550
- Excavator 307 with all attachments
- Excavator 307 with Montabert drill mast
- Truck Hydrema
- Isuzu nps300
- Telehandler
- Loader CAT-962
- Loader CAT-966
- Rock crushing attachment
- Scissor lifts
- Isuzu trucks
- Excavator 315 with all attachments
- Excavator 315 with drill mast
- Excavator 330 with all attachments
- Mobile crane 100T
- Roller compactor CAT-CS7
- Elevating works platform
- Dozer D6
- Telehandler
- Excavator 329 with all attachments
- Rock crusher (on station)
- Hilux Utes
- Polaris
- 40ft Trailer
- Elevated Works Platforms

An extensive number of power tools will also be required to complete the proposed DCIW, including use of common handheld tools used in building construction (e.g. cordless drills, angle grinders, circular saws, impact drivers and reciprocating saws). Additional niche power tools for specific purposes or modifications for use in Antarctic environments may also be required.

2.4.1.4.1 Fuel use

Fuel estimates for the DCIW are displayed in Table 6, with a total cumulative fuel use of an approximate 900,000 litres of fuel in addition to station operations. These estimates are based on current assumptions and preliminary information and is provided for impact assessment purposes only. Accordingly, fuel usage may vary between seasons in response to evolving construction methodologies, site conditions, and work program requirements.

Table 6. Fuel use estimates for the DCIW

Season	Plant and equipment	Commissioning	Total
2026 - 27	63,119 L	35,000 L	98,119 L
2027 – 28	95,600 L	10,000 L	105,600 L
2028 – 29	100,500 L	10,000 L	110,500 L
2029 – 30	107,600 L	50,000 L	157,600 L
2030 – 31	50,000 L	275,000 L	325,000 L
2031 – 32	46,000 L	50,000 L	96,000 L
Total	462,819 L	430,000 L	892,819 L

Refuelling of the required plant and equipment is proposed to occur at both existing refuelling locations with Davis station and, where required, at proposed work areas where it is not practicable to relocate plant and/or equipment to the existing refuelling station. Refuelling will be undertaken by self-bunded transportable units, and all plant will access to a spill kit.

2.4.1.5 Operational continuity

The DCIW works are scheduled to occur alongside authorised station operations. Ensuring operational continuity is a high priority throughout the duration of the works. However, some interruptions to station operations will likely occur and will be foreseeable, communicated and managed. An example of this includes crane operations within the Helicopter Operation Exclusion Zone (Figure 7), which will likely impact the northwest corner of exclusion zone for aviation operations. In the event of any unplanned interruptions emergency plans will be in place.

Additionally, due to the insufficient water and power supply on station, no increase in station population will occur as a result from the DCIW, in alignment with the All Stations Operations IEE (AAD, 2024d).

2.4.2 Davis Critical Infrastructure Works

A detailed description of the scope of the DCIW is provided within this section, following the summary presented in Table 1 and Table 3. This section outlines a clear understanding of the intended purpose and implementation of each component of the DCIW activities.

2.4.2.1 Utility Building

The external colour scheme of the Utility Building is cladding of glass-reinforced plastic composite panels (yellow) and/or Kingspan composite panels (metallic silver-grey), displayed in Figure 10. The proposed Utility Building is a 3-story (approximately 11 metres) multifunctional building providing energy generation and distribution, a main power facility, vehicle workshop, parts stores, trades workshops, offices, rest areas, and some unallocated space (Figure 11).



Figure 10. Utility Building render

IEE Davis Critical Infrastructure Works

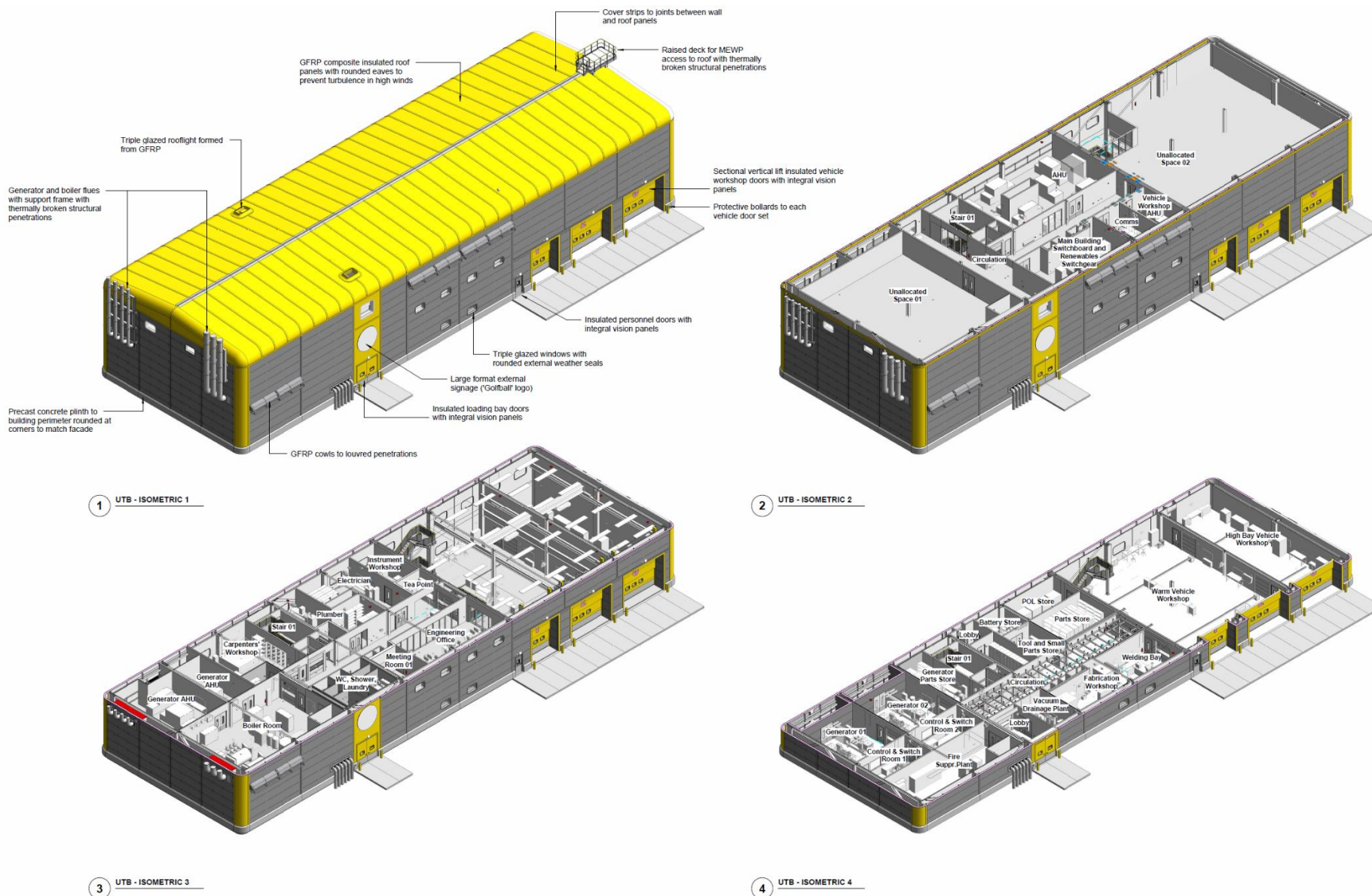


Figure 11. Utility Building concept 3D arrangement

Maintaining safe and reliable energy generation and distribution for the entire Davis station is critical for continued safe station operations. Residing within the Utility Building will be a new main power facility, with initial installed capacity for 100% of existing operations, including additional spacing requirements for the station's future anticipated demand. The Utility Building will be sized for 100% energy and heating demand as currently required. Heated water is reticulated from these new main and emergency power facilities and distributed throughout the station.

All power related infrastructure is designed with appropriate spacing for renewable technologies, whenever they become available, however is not within scope of this project. For example, installing solar panels on the building facade would require a large number of penetrations through the external cladding system. This significantly increases design and construction complexity and introduces several risks, including thermal bridging, loss of thermal performance, and heightened potential for water ingress. In addition, the building is being designed for extreme wind speeds, which presents substantial challenges in ensuring the structural integrity of facade-mounted solar panels. The risk of panels detaching under extreme wind loading cannot be mitigated to an acceptable level. As a result, the relatively small energy return from these panels is far outweighed by the risks they introduce to the building envelope and overall safety. Small-scale wind turbines were also investigated as an alternative renewable energy source. However, commercially available systems are limited, and the only options identified were experimental units under development by various universities. These systems have not been validated in Antarctic conditions and have maximum operational wind speeds well below design requirements for the Utility Building. Their robustness, reliability, and long-term performance therefore remain unproven, making them unsuitable for deployment.

The new Vehicle Workshop is a purpose-built facility, designed to deliver a safe, compliant, and efficient environment for vehicle maintenance and operations. Vehicle maintenance areas incorporate three 8 m wide vehicle bays. The design includes suitable and appropriate drainage lines and interceptor traps, vehicle doors, access points, gantry crane, reticulated air, heating, lighting and storage. Additionally, the Vehicle Workshop includes battery stores, petroleum, oil, and lubricants store, hazardous goods stores, appropriate spill kits, and a large and small parts stores. Welding bays and metal fabrication workshops, as well as other trade service workshops, are separate to the Vehicle Workshop.

Within the Utility Building will include a rest area, an open plan office, cold porch, amenities, a plant room, electrical cupboard/s, server room/s and suitable pedestrian pathways. Due to the size and interchanging design requirements some internal areas are shown as unallocated space which is yet to be determined.

Additional loading on services will comprise of machinery workshop washdown water and domestic sewage. Vehicle workshops will incorporate trench grates and drainage sumps to capture wastewater contaminated with fuel, oil, and debris. A specialised oil-water separator using oleophilic plate filters is adopted to remove oils and grease before discharging to the wastewater treatment plant (WWTP). This configuration aligns with the proven wastewater pumping arrangements adopted in other buildings at Davis Station and provides a robust and consistent solution across the site.

2.4.2.2 Service reticulation

The services reticulation for the DCIW comprises of two key elements:

- i. The reticulation required to support the water and wastewater production capability
- ii. The services reticulation that will be required to distribute services to and from the Utility Building.

The new services distribution and reticulation installations will connect the new buildings and facilities to the existing station infrastructure. The installations required may include any/all of the following services:

- a. Fire safety and suppression installations (i.e. static fire water storage, fire pumps, site hydrants, automatic fire sprinklers and fire detection and alarm systems etc.)
- b. Electricity
- c. Heating hot water
- d. Water reticulation systems (sitewide via a centralised plant system)
- e. Potable water (also used as fire water)
- f. Drainage
- g. Waste disposal (including reverse osmosis brine discharge) to sea
- h. Sewage
- i. Data and telecommunications

The proposed new buildings connections via service reticulation to the existing Davis station will increase the loading requirements of services including but not limited to power, fuel, water and sewage.

Davis station's current operations relating to water production and relevant wastewater management are displayed in Figure 12. The changes in water and wastewater service reticulation between new infrastructure, the existing station and marine environment, as a result of DCIW works are displayed in Figure 13. Due to current operations, RO#1 will retain a physical connection for discharging of brine to the stations Tarn. Operational discharging of brine to the stations Tarn is not foreseeable, unless unforeseen circumstances require it. Operational activities are not within scope of this IEE.

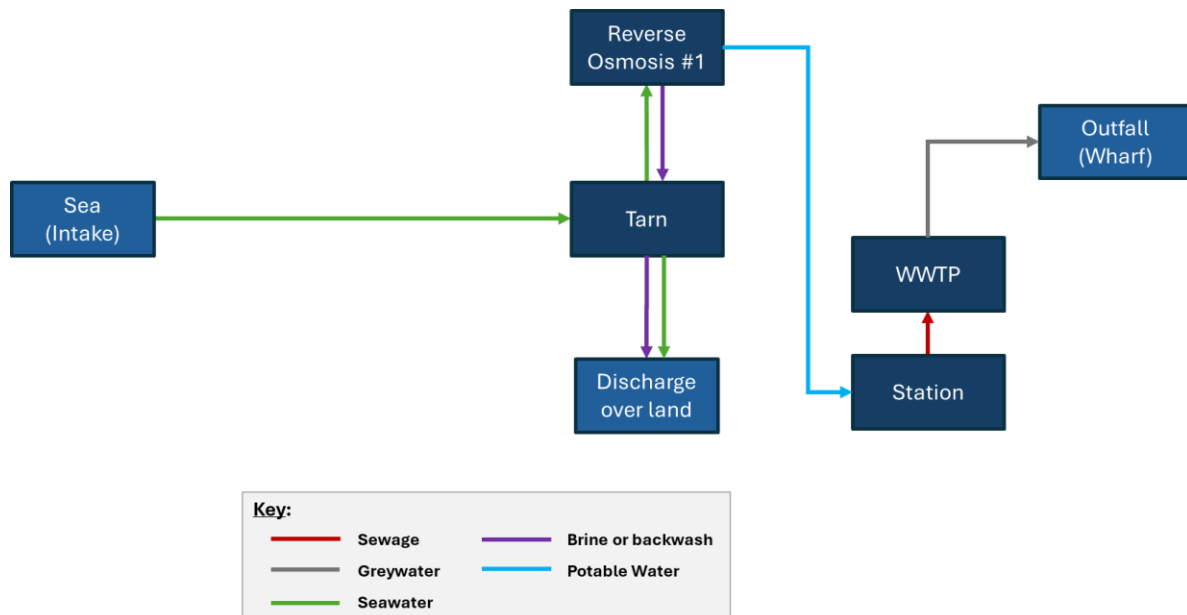


Figure 12. Davis station's current water production and discharge operations

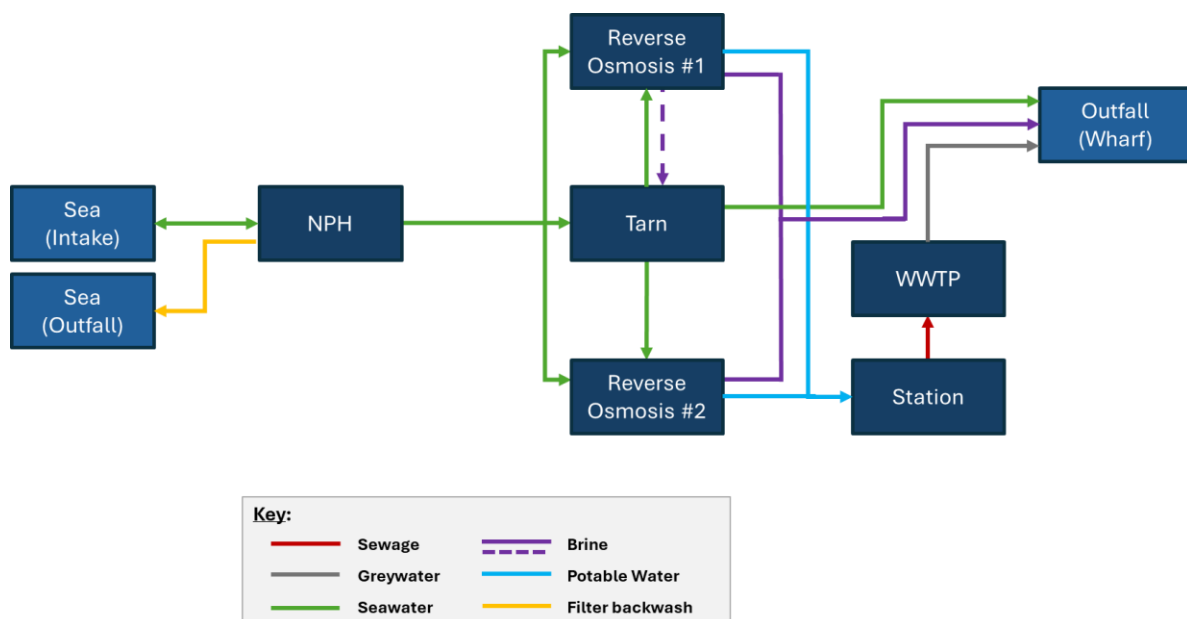


Figure 13. Summarised service reticulation between DCIW objectives and existing station

Figure 14 presents the proposed service reticulation routes at Davis Station. New reticulation pathways are planned between the New Pump House, Davis station, and the Utility Building. A minor service reticulation connection is required for the proposed Reverse Osmosis plant. All other highlighted pathways in represent either proposed modifications or use of existing service reticulation infrastructure.

IEE Davis Critical Infrastructure Works



Figure 14. Proposed service reticulation pathway (green) within the DCIW proposed site plan for Davis station

2.4.2.3 New Pump House and Seawater Intake

The proposed New Pump House scope includes, a New Pump House (building), a Seawater Intake pump (deployable), and associated supporting services reticulation.

2.4.2.4 New Pump House

The New Pump House would be a structure used to house the pre-filtration system for the water production, heating systems to raise the seawater temperature to maintain flow, and pumps to transfer the filtered seawater across the station to the RO plants. Located approximately 65 m inland from the shoreline in an area which was previously levelled for the original station, and more recently has been used for storage of the 'ARTEMIS' autonomous weather monitoring station. The New Pump House will be connected to the existing water production facility, the proposed RO plant, and the seasonal Seawater Intake system, operational during winter for a period of approximately four weeks (subject to operational requirements) via a combination of new and existing service reticulation.

The level nature of the site has resulted in the proposed building at grade access, Figure 15 is a render of a previous design with a minimum 1.2 m elevation above ground level. The position of the New Pump House indicated on the drawings has been selected based on reduced environmental impacts and improved access for construction, operation and maintenance.

The proposed New Pump House structure will connect from service reticulation at the shoreline to the Seawater Intake container, at a point allowing sufficient ice depth (of approximately 2 m) to draw sea water under the sea-ice (maximum deployment length is approximately 100 m from the shoreline). The New Pump House will draw water through sitewide service reticulation (pipework) for distribution to the existing (RO#1) and proposed (RO#2) RO plants, located in the northwest area of Davis station. Potable water reticulation from the RO plant to the station's water storage tanks, along with service reticulation to both the New Pump House and RO plants, will be required.

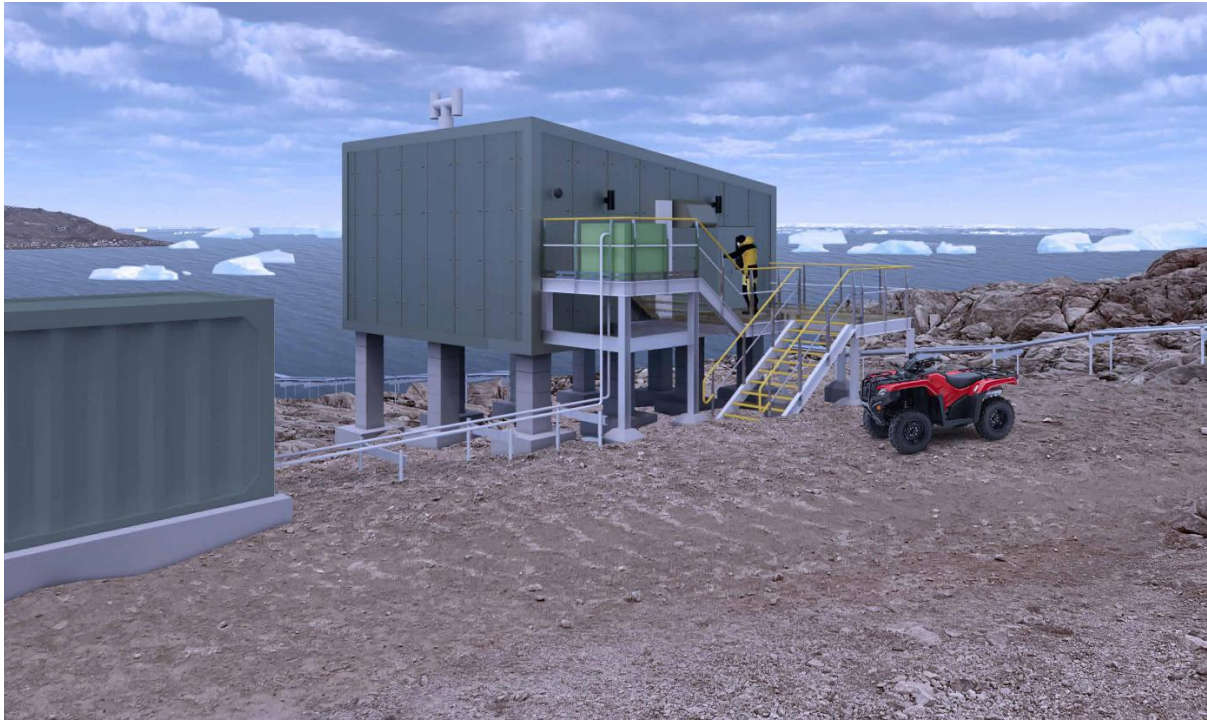


Figure 15. Concept render of New Pump House (noting the building is currently designed at ground level)

The design for the New Pump House fuel system features a 1,000-litre day tank that draws Special Antarctic Blend (SAB) diesel from a nearby (new) 10,000-litre bulk fuel tank via pumps. The day tank, located adjacent to the New Pump House (Figure 16), supplies the boiler (hot water generator) via gravity, with the boiler's burner providing slight suction of fuel.

Additionally, limited widening and extension of the existing road towards the New Pump House may be required, to improve access. Shaping the road to achieve proper longitudinal and transverse gradients for drainage will be critical. Longitudinal gradients will not exceed 10% and transverse gradients will be between approximately 3% and 6%, with no superelevation required. Road widths will be approximately 4 m.

IEE Davis Critical Infrastructure Works

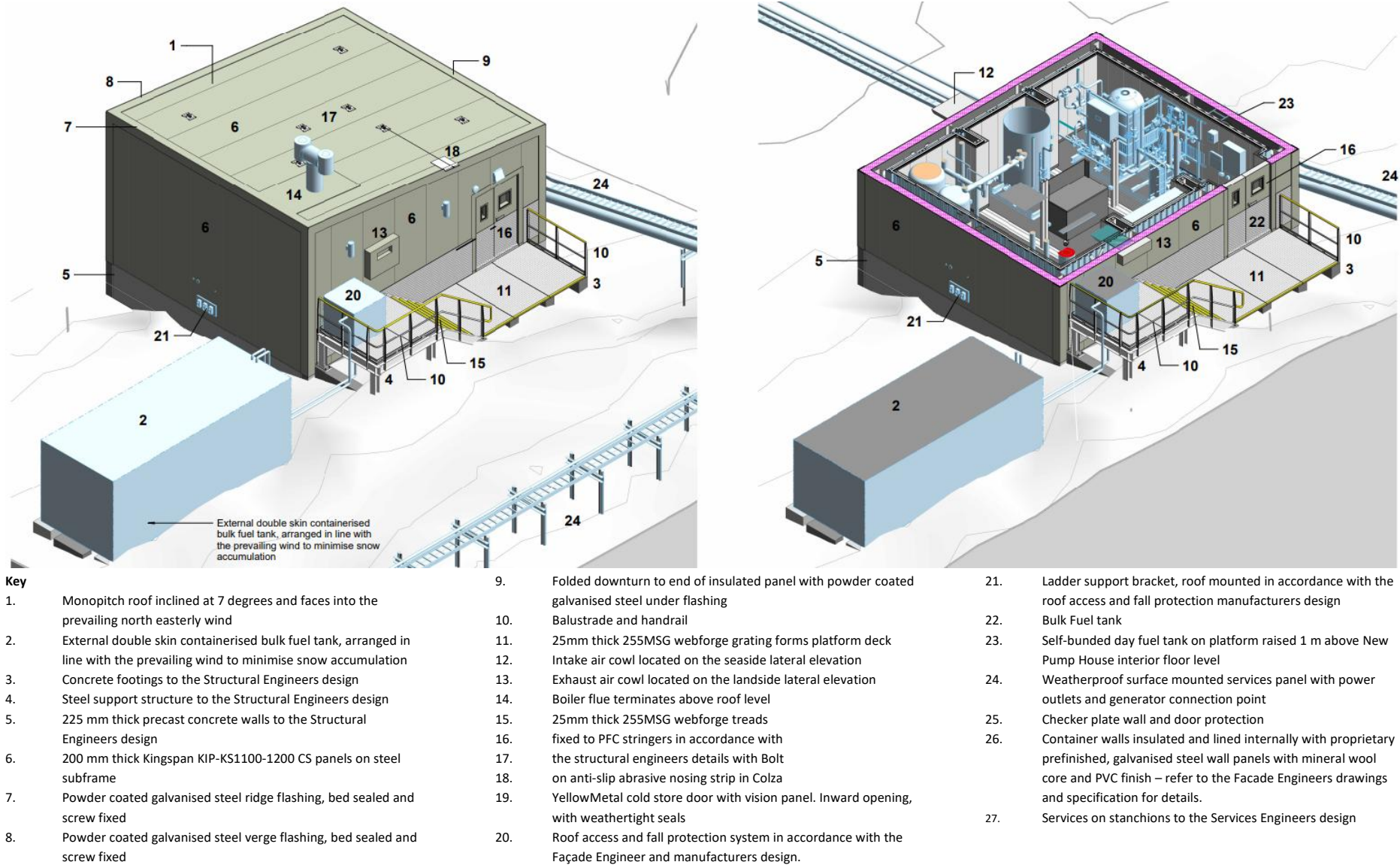


Figure 16. New Pump House mechanical services layout and equipment positioning

The New Pump House will have a service reticulation that extends to the near-shore ice (marine environment) for small frequent (daily) volumes of filter discharge material, which includes algae, and/or debris caught within the filtration system. During operation, the deployment of the Seawater Intake will occur across the winter season (June – October), for a duration of approximately 4 weeks, subject to operational needs.

2.4.2.5 Seawater Intake

The Seawater Intake system is comprised of a temporary intake pump, housed in a 6 ft container that sits on top of the sea ice and extracts seawater. Seawater is then pumped via a flexible delivery line to the New Pump House. Both the container housing the Seawater Intake system and flexible delivery line will be stored within Davis station's current bulk/cargo storage areas when not in use.

The system is designed around a rotary lobe positive displacement pump, powered by a motor, and connected to a flexible delivery line. A dedicated backwash discharge line can return seawater to the ocean (Figure 17). Two separate conduits are provided, one for power and one for control systems. The intake pipeline is supported by constant flow to mitigate the risk of freezing. The system will include an ice anchoring system while in use to prevent movement during weather events.

The pump casing includes a drain feature to allow complete drainage of the intake system when required. The entire seawater intake pump assembly is housed within a standard container, offering protection from environmental elements and ease of deployment.

The position of the intake system will need to be assessed annually to ensure sufficient ice thickness to accommodate the load from the complete intake system and container. The second factor in positioning is the depth of water; this must be such that the suction hose and strainer have sufficient separation from the bottom of the ice to not draw in algae, and above the seabed to prevent the intake of sediment.

On disestablishment, flexible delivery line can be disconnected from the intake pump and the whole container can be lifted off the ice allowing for it to be broken out of the ice separately. Establishment and disestablishment are proposed to occur via machinery at Davis station onto the ice. A hole can be drilled by auger through the sea ice to retrieve the abstraction pipework.

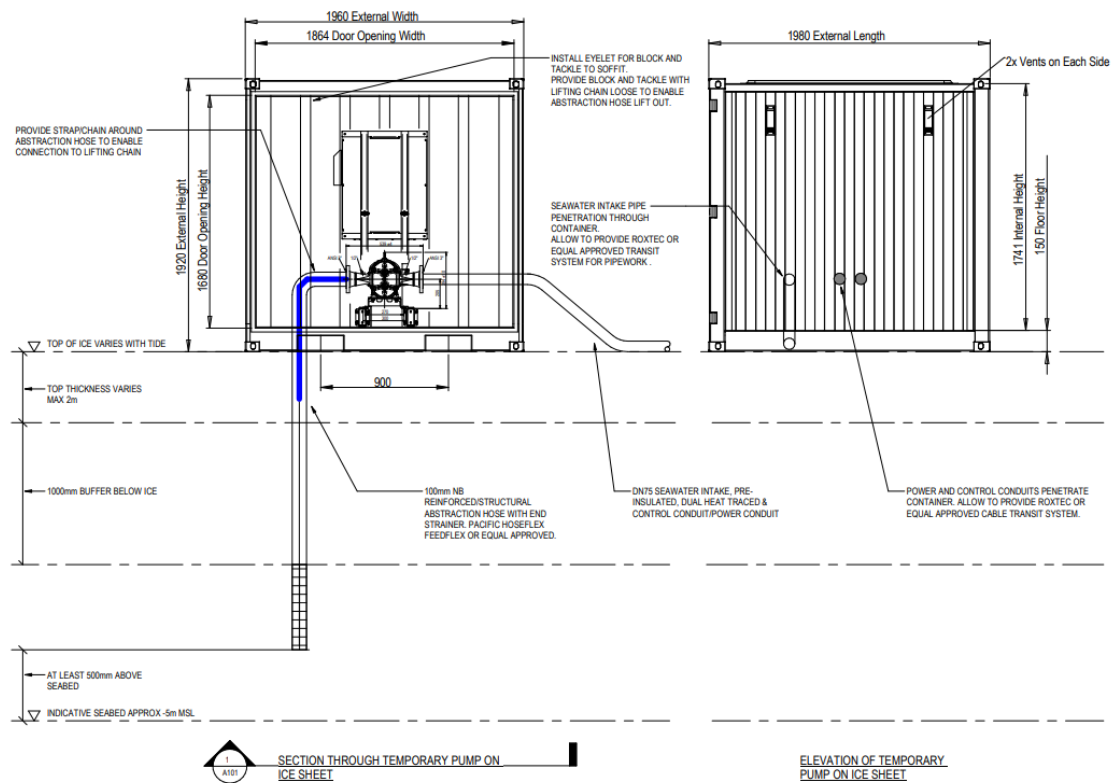


Figure 17. Temporary seawater pump intake details

2.4.2.6 Reverse osmosis

Davis station currently produces potable water by drawing water from the station's Tarn to the existing reverse osmosis plant, with brine returned to the Tarn. As operationally required, the Tarn is replenished by seawater from Prydz Bay using a temporarily deployed hose, approximately 1,000 m in length. When the Tarn's salinity exceeds recommended water parameters for the RO plant equipment, the station's Tarn is pumped out and discharged over the terrestrial environment in the direction towards Heidemann Bay, occurring every 3–5 years. The station's Tarn is known to contain PFAS, with 2024–25 water testing returning concentrations between 0.0160 – 0.0460 µg/L. PFAS contamination of the Tarn is a current issue, likely due to contaminants being mobilised from fire-fighting agents deployed near/within Davis station's helicopter pads.

The station's new water production system incorporates two identical RO plants; RO#1 and RO#2, which have already been designed and manufactured to AAD requirements (Figure 18). RO#1 was installed at Davis station over several recent seasons (2022–23 to 2025–26) by the AAD. The proposed RO#2 location is adjacent to the existing RO#1 to maximise efficiency from existing infrastructure.

Seawater will be transferred from the New Pump House to both RO#1 and RO#2, via the supply line with an interconnection between both RO plants. This provides connection from both water sources, the Tarn and seawater, to both RO plants to produce potable water. Both RO#1 and RO#2 will be connected to the pre-existing discharge line, towards the wharf (also referred to as the WWTP plant outfall pipeline) to reduce the need for the ROs to discharge to, and increase the salination of, the station's Tarn. The treated potable water will be transferred via existing pipework to the three existing 600 kL storage tanks.

IEE Davis Critical Infrastructure Works

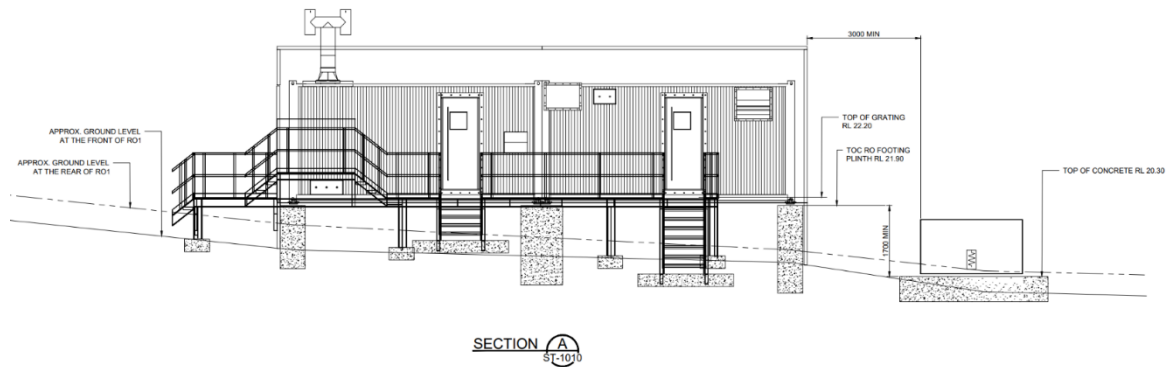


Figure 18. Davis station RO#2 foundation elevation drawing

A modular facility comprising of four 20 ft containers will be prefabricated in mainland Australia. These containers will be elevated using a precast concrete pad and plinth system.

An independent steel support structure will be constructed to accommodate a 75 mm thick Kingspan Cold Store panel cladding system, ensuring thermal efficiency.

Site works will also include the reconfiguration of the existing service road to facilitate site access and logistics, utilising the earthworks plant over previously impacted ground, similar in scope to the New Pump House road construction (Section 2.4.2.3). Seawater will be sourced from the sea via the New Pump House, with an alternative supply available from the station's Tarn if required for both RO systems. Power and telecommunications connections will be established using existing site services and Ring Main Units (RMU). Additionally, the facility will integrate with the existing fuel infrastructure from the RO#1 project.

2.4.2.7 Refurbishment

2.4.2.7.1 Old Living Quarters

Flooring (structural, precast foundations and steel floor supports) will be installed to replace the current earth floor (Figure 19) for potential use as an office or trades space for the DCIW until the Utility Building is completed.



Figure 19. Current condition of the Old Living Quarters (internal) (Photo credit: Unknown)

2.4.2.7.2 Trades Workshop

The Trades Workshop is an Australian Antarctic Building System (AANBUS) structure completed in 1981. Current issues with the building include, but are not limited to:

- a. The walls are lined with asbestos panels to approximately 1.8 m high.
- b. There is evidence of sub-surface water under the building which is undermining the floor slabs
- c. There is evidence of subsidence along the north elevation, evidenced by cracks in the floor slabs and movement of wall panels.
- d. Doors are at end of life.

The scope of the Trades Workshop refurbishment within the DCIW is the complete asbestos removal from the building, including providing a Clearance Certificate. Additional monitoring may be required to manage structural stability and inform future refurbishment works (not in scope of this IEE), and includes the following:

- a. Monitor workshop doors over seasons 1 to 4 and include repair or replacement in additional works if required
- b. Structural reinforcement – monitor north wall over seasons 1–4, and
- c. Monitor cracks in the floor to determine if additional works are required during the refurbishment.

2.4.2.8 Demolition

The inclusion of power generation within the Utility Building provides the opportunity to reduce the station's footprint by demolishing the current Main Powerhouse and Emergency Powerhouse buildings. The current scope of demolition of these buildings is to remove all above ground structures, retaining the slab and foundations for future storage use. Rehabilitation works will also occur, ensuring disturbed sites are restored to a similar original condition.

2.4.2.8.1 Main Powerhouse

The current Main Powerhouse, adjacent to the water storage tanks (Figure 20), was constructed in the 1980s. Over time the Main Powerhouse has become insufficient for Davis station as power requirements have increased, the infrastructure has aged/weathered, and it has no available footprint for expansion.



Figure 20. Davis station existing Main Powerhouse (blue) (Photo credit: Chris Hill)

2.4.2.8.2 Emergency Powerhouse

The Emergency Powerhouse (Figure 21), located in proximity to the Science and Stores buildings, was also constructed with the 1980s. Also identified as in poor condition, as is the Main Powerhouse. The Emergency Powerhouse also has become insufficient for the station's needs, with no footprint expansion capacity.



Figure 21. Davis station existing Emergency Powerhouse (Photo credit: Mark Booth)

2.4.3 Storage

2.4.3.1 Storage prior to arrival in Antarctica

Available details regarding storage activities prior to arrival in the Antarctic region have been included, despite not in scope of the IEE, as the activity occurs outside of the Antarctic region (the area south of 60 degrees South latitude). Currently there are limited details on the logistical arrangements for the processing of cargo at an alternative location to the AAD's Cargo Biosecurity Centre in Hobart, Tasmania. There is a possibility for additional AAD projects (outside of the scope of this IEE) to utilise a shared alternative location, potentially on mainland Australia. DCIW cargo potentially processed through alternative locations will align with the AAD's Biosecurity Management Plan and Biosecurity Standard Operating Procedures and any updates of these documents at a minimum standard for operations.

2.4.3.2 Storage in Antarctica

Existing laydowns and disturbed areas will be used and prioritised for the DCIW, with additional storage areas limited to previously disturbed sites. To facilitate construction, initial groundwork and earthworks will be required to prepare areas for cargo and equipment storage. This work will involve the movement of an approximate 2,000 m³ of fill, which includes partial Utility Building earthworks estimates. This includes earthwork activities within the laydown areas and material produced by cut and fill methodology using earthwork plant equipment, including excavators, drum rollers, cranes, crushers and diesel generators. Soil sampling for RTA will also be required from this works area. Dust monitoring equipment may be attached to containers within storage laydown areas, or to existing buildings.

Storage laydown area management is detailed within Table 7.

Table 7. Projected DCIW cargo volumes, seasonal laydown area requirements, identified laydown locations and container return assumptions from 2026–27 to 2031–32.

Category	2026–27	2027–28	2028–29	2029–30	2030–31	2031–32
Anticipated annual volume requirements	1,350 m ³	6,500 m ³	360 m ³	3,300 m ³	TBC	TBC
Expected laydown volume requirements for the season	485 m ² [25 TEU + Plant (x1)]	4,000 m ² [115 TEU + Bulk + Plant (x2)] stacking plan TBC	180 m ² [10 TEU]	1,500 m ² [90 TEU + Bulk]	TBC	TBC
Laydown areas (Figure 22)	Cargo laydown Areas: 10 - single stack 14 - double stack 19 - double stack 24 - double stack	Cargo laydown Areas: 10 - double stack 14 - double stack 15 - double stack 17 - single stack 18 - double stack 19 - double stack 20 - single stack 24 - single stack	Cargo laydown Areas: 10 - double stack 14 - double stack 15 - double stack 17 - single stack 18 - double stack 19 - double stack 20 - single stack 24 - single stack	TBC	TBC	TBC
Necessary RTA volume to ensure future laydown area capacity	6 TEU returned with RTA V1 2027	28 TEU returned with RTA V1 2028	40 TEU returned with RTA V1 2029 & Chartered Vessel 2028	TBC	TBC	TBC
Container rotation plan	TBC	TBC	TBC	TBC	TBC	TBC

This proposed activity will accommodate new and expanded laydown areas within the direct proximity to the Utility Building (Figure 22– areas 9.1, 9.2, 18.1, 18.2 and 18.3) and New Pump House (Figure 22– area 24.1 and 24.2). Area 24.1 is the location of the NPH and a pre-disturbed site in proximity to the location of the 1960’s garage slab (Rando & Davies, 1996) and previously used as the temporary location of the aquarium in 2009 (K. Smith, personal comms., 2025). Temporary stockpiling of fill generated from nearby work areas (e.g. Figure 22 – area 24.2 for the New Pump

house) may be required within laydown areas. Additional laydown areas are required at several locations, including pre-existing laydown areas (Figure 22 – areas 10.1, 14.1, 17.1, 17.2, 17.3, 18.1, 18.2, 18.3, 19.1 and 20.1). However, earthworks may be necessary to expand these areas to meet the required storage capacity. The temporary increase to station footprint from storage areas is an approximate 1,500 m². Storage of cargo (containers and bulk break) in all laydown areas will be placed on the windward side, to minimise impacts of blizzard conditions.

Due to unforeseen operational circumstances, pre-existing laydown area use may increase or change to include the use of any authorised pre-existing laydowns area at Davis station (AAD, 2024d, Section 3.1.2 Operation of Facilities and Infrastructure).

2.4.3.2.1 Rehabilitation

Rehabilitation from construction of additional storage/laydown areas will include the restoration of all areas disturbed during the works. Rehabilitation of disturbed sites during construction will be returned as closely as possible to their original condition. This includes removing all debris, dust, plant, equipment and any other materials associated with the works, and ensuring the site is left clean and tidy.

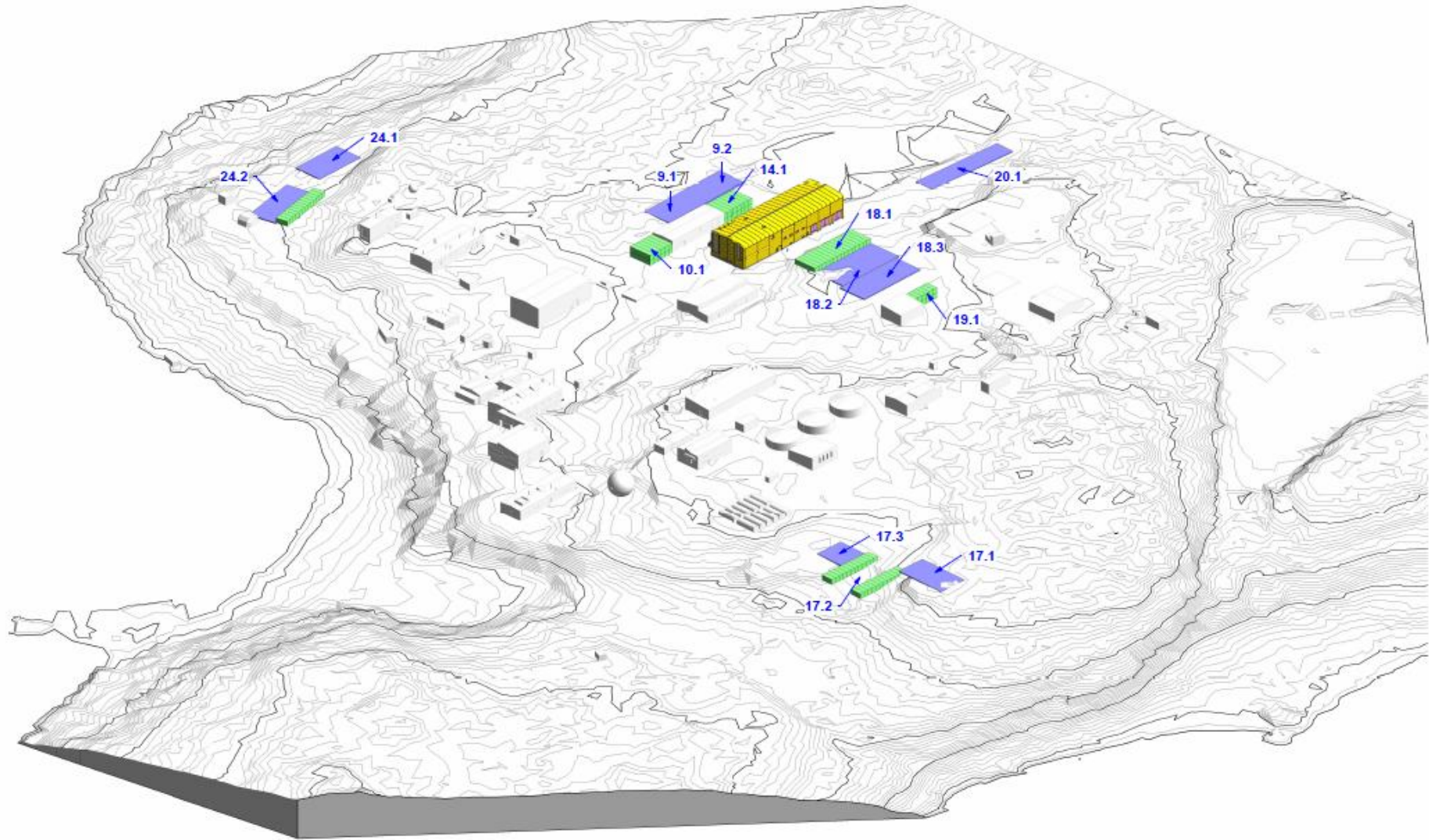


Figure 22. Location of existing and proposed DCIW cargo laydown areas within Davis Station, showing indicative spatial extent (blue) and stacking arrangements (green).

2.4.4 Construction

2.4.4.1 Utility Building

To facilitate the construction of a building this size, initial groundwork (site preparation activities such as clearing, levelling and services preparation) and earthworks (excavation, cutting, filling and ground re-profiling) will be required, as well as the need and use of thaw stable fill. This work will involve the movement of fill to and from the immediate area, including transfer to designated laydown areas and/or the quarry, using earthworks plant. To enable excavation efforts within the proposed Utility Building's footprint, shallow blasting may be required to dismantle large rock that would otherwise be difficult to excavate with the earthworks plant alone and detailed within Section 2.4.4.5. Additional fill material will likely be required and sourced from either pre-existing material within the Davis station quarry or from quarrying (blasting and processing), further detailed within Section 2.4.4.5. Any fill material generated from the Utility Building's earthworks that is unsuitable for incorporation into the building construction will be repurposed as backfill for the borrow pit, beyond the 15-metre perimeter required for the DCIW around the new building. Soil sampling for RTA will also be required from this works area.

Once earthworks are completed, the building will need a total of approximately 60 footings requiring further drilling (approximately 4 x 150 mm deep per footing), subject to minor changes as design develops. This will allow the installation of the buildings slab and prefabricated flooring. The structure's steel frame will be erected with temporary support framework as needed. Due to operational timing of the project, the buildings completed framework will remain positioned across a winter season, before any significant further works to the structure occur. Sequentially, work will continue on the ground floor construction, followed by the first and second floor. Construction efforts will conclude with the building's façade to complete the 'close in' of the building, with conclusion of the internal installation to be completed thereafter.

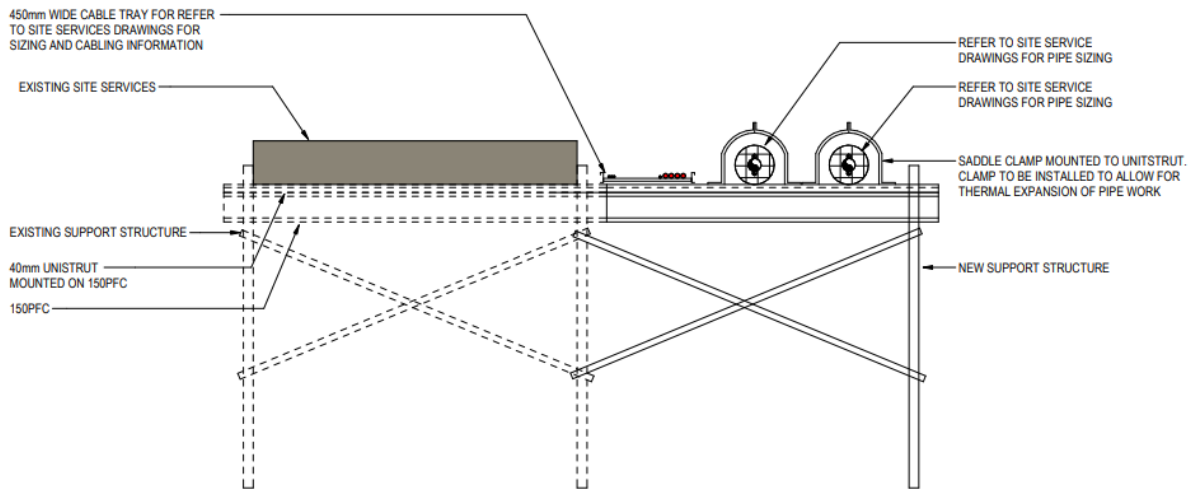
2.4.4.2 Service reticulation

For the new reticulation routes, the proposal is to use a similar system to the existing; comprising of a combination of Unistrut's and scaffolds as illustrated in Figure 23. This system has been proven to work well, is simple to install, allows for flexibility in installation to reflect site conditions, and is easily maintainable. As such, there is no discernible benefits of moving to a new system.

For the sections of the system where utilising the existing reticulation system is proposed, modifications may be required to the existing supports. This will allow additional services to be incorporated whilst also retaining full access to the existing services for maintenance purposes.

The proposed route will be cleared of rubble and loose rocks. Structural support erection consists of main and brace posts cementitious grouted into the rock below. If the rock is considered unsound, an anchor post will be installed to a depth of approximately 1,000 mm. Some hole drilling for testing purposes may also be required, to a depth of 300 mm.

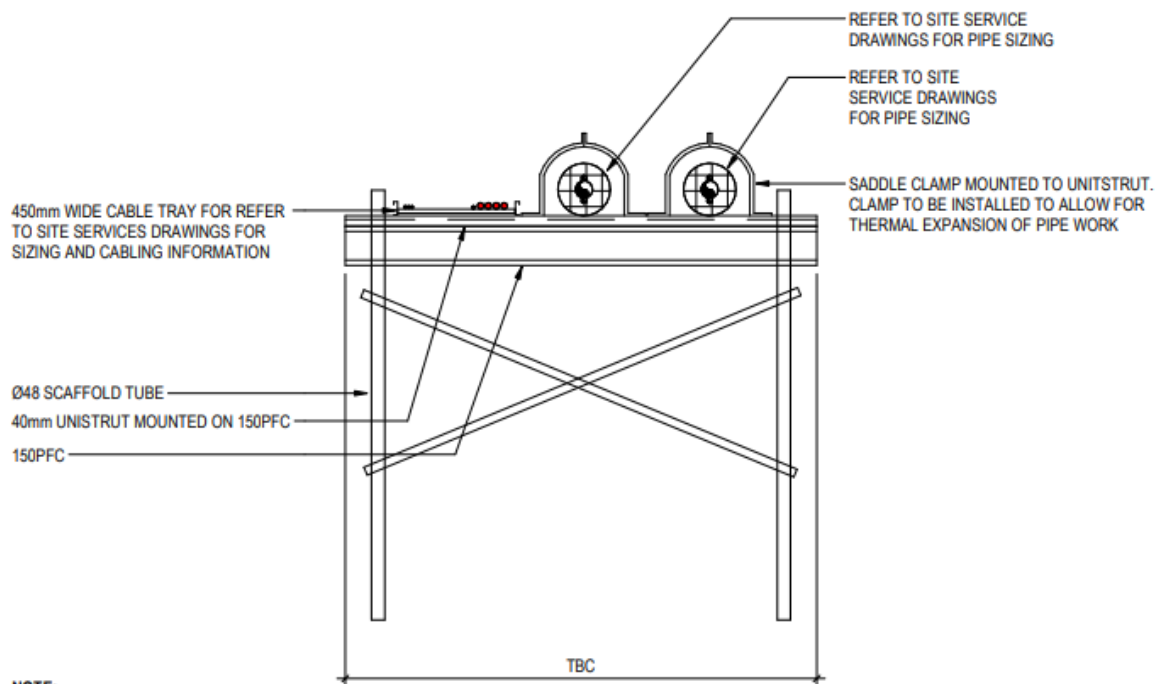
IEE Davis Critical Infrastructure Works



NOTE:
REFER TO DRAWINGS FOR EXACT PIPING ON
SUPPORT SYSTEM FOR EACH SECTION.
(TYPICAL)

TYPICAL EXISTING SERVICE SUPPORT

1 : 20



NOTE:
REFER TO DRAWINGS FOR EXACT PIPING ON
SUPPORT SYSTEM FOR EACH SECTION.
(TYPICAL)

TYPICAL NEW SERVICES SUPPORT

1 : 20

Figure 23. Typical existing services support with expansion (top) and typical new site services support (bottom)

2.4.4.3 New Pump House and Seawater Intake

Groundwork (site clearance) and earthworks will be required at the site to enable the construction of the New Pump House building. Widening of the existing roadway may be necessary to accommodate the safe movement of machinery and cargo.

The roads will be unsealed and will be constructed by careful clearing of boulders and rocks, with grading to the desired alignment to establish the required profile and drainage channels. Layers of locally sourced (earthworks or quarried) granular material are then placed and compacted to create a stable pavement structure. Proper shaping ensures adequate longitudinal and transverse gradients for water runoff. All pavement materials will be site produced, processed, and suitable to withstand cold-region conditions

The structure requires foundations on bedrock, backfill with thawed stable fill. Fill is expected to be sourced from the building's earthwork activities. Additionally, the building will require ground anchors, drilled into the rock below the foundations, approximately 3 m deep. Footings are to be used to address variability in ground conditions. Adjustable height precast concrete columns will be installed to allow for variability in depth to rock head on site and grouted together with central reinforcing.

The underside of the facility will be enclosed using a precast 'skirt' with internal insulation to minimise snow and deleterious materials accumulating below the building. Modified shipping containers will be seated on the concrete plinths, and an independent steel framed shell encloses the containers. The external shell will be clad in 200 mm thick Kingspan cold store insulated sandwich panels on the walls and roof. The external shell will have a personnel door and services penetrations. Soil sampling for RTA will also be required from this works area.

2.4.4.4 Reverse Osmosis

The construction process of the RO system begins with the groundworks and earthworks to prepare the site for foundation work. Once the earthworks are completed, the precast concrete foundations are to be anchored, with an approximate volume of 10 m³ of concrete batching and pouring occurring on-site. Following this, precast concrete footings will be installed upon the foundations. Once footing installation is complete, the modular prefabricated containers can be positioned and secured in place. A structural frame and cladding, as well as external walkways will also be installed (Figure 24).

Minor service reticulation connection and modification will be required to connect the RO system to the existing infrastructure. Additionally, some road modifications will be required, similar to design and methodology for road establishment for the New Pump House (Section 2.4.2.3 and 2.4.4.3). Excess fill produced from earthworks will be either incorporated into the road modifications, used as fill for the Utility Building, or if unusable, relocated to the quarry.



Figure 24. Davis station RO#1 during construction (2024–25) (Photo credit: Thomas De Leon)

2.4.4.5 Rehabilitation

Rehabilitation from construction of the Utility Building, Service Reticulation, New Pump house, and Reverse Osmosis facilities will include the restoration of all areas disturbed during the works. Rehabilitation of disturbed sites during construction will be returned as closely as possible to their original condition. This includes removing all debris, dust, plant, equipment and any other materials associated with the works, and ensuring the site is left clean and tidy.

2.4.5 Acquiring fill

Earthworks for the DCIW will primarily consist of cut and fill, trenching and drilling. Cut and fill methodology will be required to level ground and provide a stable base for the new buildings and infrastructure. The amount of fill required will be minimised through careful site selection, balancing the volumes of material to be cut and filled, and pacing activities so that fill needs can be met through earthwork activities as much as practicable.

Fill required for the DCIW will primarily consist of site-won material, generated during site levelling, soil excavated from foundation works and earthworks, and existing station stockpiles. The use of this primary fill will be prioritised, however, to ensure the fill is thaw stable and meets required engineering requirements, acquiring fill from the quarry may be required. Additionally, unusable fill produced from earthworks activities is proposed to be relocated to the quarry or re fill and rehabilitate the existing borrow pit.

2.4.5.1 Blasting

Due to the current uncertainty regarding the requirement for blasting, this activity is not included within the scope of this IEE. The need for blasting will be determined following the completion of initial site works. Should blasting be required, it will be addressed through a formal variation to this IEE. Notwithstanding its exclusion from scope at this stage, available information relating to blasting has been retained within the IEE to ensure transparency regarding its potential future requirement.

Blasting will only be considered as a last resort, and its necessity will be assessed during the 2026–27 season, following initial earthworks at the proposed Utility Building site.

Fill required for the DCIW and the Utility Building will primarily be sourced from station stockpiles, earthworks, and foundation excavations. If additional material is needed, it may be obtained from the Davis station quarry, where blasting has historically occurred, last occurring in 2014.

Throughout the blasted or quarried area, drilling of test holes may occur, and natural backfilling by snow and water, which will subsequently freeze is expected. Depending on site conditions (i.e. depth of rock) and the performance of earthworks equipment during this first season, additional blasting may also be required at and around the Utility Building site. If necessary, this activity will be coordinated with quarry blasting to minimize noise and vibration impacts (Figure 25 and Figure 26).

While blasting generates dust, noise, and vibrations that can disturb fauna and contribute to pollution, limited and well-managed blasting is considered preferable to prolonged jackhammering. Mitigation measures, such as the use of blast mats and scheduling of blasting activities to avoid sensitive wildlife periods are detailed in Sections 5.4, 5.4.15.5, and 5.5.

Assets requiring protection may include power, communications, water, and infrasound cables. Site rehabilitation of ground disturbance is proposed to be undertaken upon completion of the works program, in addition to documenting photographic records of pre- and post-work conditions.



Figure 25. Aerial image of Davis station and approximate Utility Building, borrow pit and quarry location (Photo credit: David Barringhaus 2012).

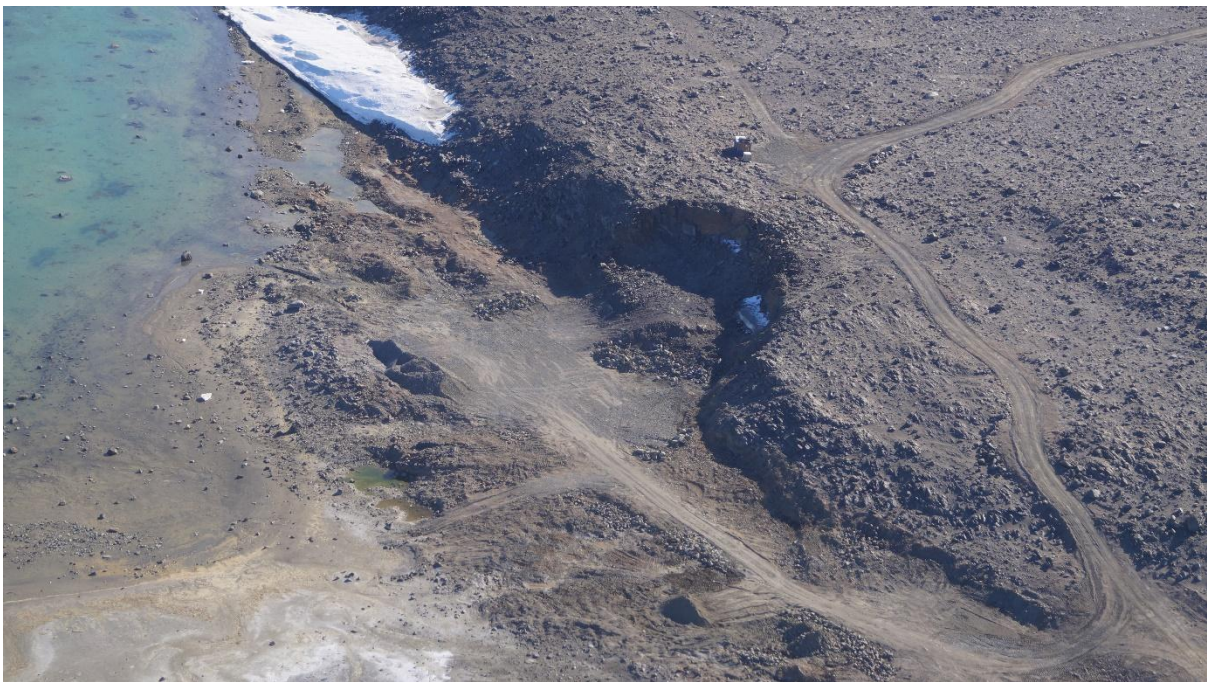


Figure 26. Davis station quarry (Photo credit: David Barringhaus 2012)

The need for blasting and the associated quantities of fill material will be determined during the initial season of works. As such blasting design and details are limited and will be provided once available.

2.4.5.2 Processing of fill

Equipment such as rock crushers (or excavator like attachments) will be used to process and grade fill material, while compactors will be used to compact fill once in place. Equipment is listed within Section 2.4.1.4. Due to limited design information, processing of material between 6,000 and up to 10,000 m³ total is likely to be required between all works areas and the quarry.

Unsuitable fill will be stored in the quarry area or used as backfill for the borrow pit, located adjacent to the Utility Building and helicopter pads (Figure 25). The borrow pit was created in the 1980's during a project to construct the helicopter aviation area in Davis station and was the primary source of fill during the earthworks of this previous project, only limited information for this project is available.

2.4.6 Refurbishment

2.4.6.1 Old Living Quarters

Refurbishment of the Old Living Quarters includes cutting of existing materials, installation of structural supports and prefabricated flooring. Excavation of approximately 400 mm around the building's external walls is required to facilitate flooring installation. All modifications will be carried out with the objective of preserving the integrity of the original structure while enhancing its overall resilience and safety.

The installation of the prefabricated flooring will include the attachment of concrete fasteners on the skirting of the building and insulation of ground and side walls up to 100 mm to provide an internal thermal break.

As part of the refurbishment, the installation of precast concrete flooring and insulated timber cassette flooring will play a key role in restoring the Old Living Quarters building. Once refurbished, this building may serve as a site office during the construction of the DCIW. Until refurbishment is complete, the science building may be used as the site office (Figure 3).

2.4.6.2 Trades Workshop

The refurbishment of the Trades Workshop is limited to the removal of asbestos containing materials (ACM) in wall panels to a height of 1.8 m. Asbestos air testing (prior to, during and after works) and ACM removal will be undertaken in accordance with Safework Australia requirements. It is also assumed that asbestos dust particles are present throughout the building and an entire internal strip-out will occur to remove any materials potentially containing asbestos. The scope includes the careful removal of ACM, secure storage, and preparation for transport to mainland Australia and subsequent disposal. In conjunction with this, remedial work will be carried out on the cladding along the north elevation, where the structural integrity has been compromised.

As part of the proposed refurbishment works for the existing Trades Workshop building, several key interventions have been identified to ensure the structure remains safe and functional.

2.4.7 Demolition

2.4.7.1 Main and Emergency Powerhouses

The demolition scope of works includes the safe removal of all asbestos-containing materials, complete internal strip-out, and full demolition of above ground structures, followed by rehabilitation of the area. Buildings concrete slabs and foundations will be retained. Main Powerhouse demolition will commence only after the successful completion of the power infrastructure and the full construction and commissioning of the new Utility Building. Upon completion of demolition, all materials, plant and equipment are to be removed from the site and returned to mainland Australia for recycling or disposal.

Additional demolition activities will include removal of the reticulation services and supporting structures within proximity of both the Main and Emergency Powerhouse, including partial demolition of a Ring Main Power unit (Figure 27). Soil sampling for RTA may be required from this works area and, if undertaken, would be conducted in accordance with a Site Assessment and Quality Plan developed for this activity.

2.4.7.1.1 Rehabilitation

Rehabilitation from demolition activities will include the restoration of all areas disturbed during the works. Rehabilitation of disturbed sites during construction will be returned as closely as possible to their original condition. This includes removing all debris, dust, plant, equipment and any other materials associated with the works, and ensuring the site is left clean and tidy.



Figure 27. Davis station Emergency (top) and Main (bottom) Powerhouse service reticulation infrastructure flagged for removal (orange border) (Photo credit: David Barringhaus 2012)

2.4.8 Installation and commissioning

2.4.8.1 Utility Building

Internal installation or 'fit out' will occur periodically throughout the building's construction, including the installation of internal walls, flooring, ceiling, internal services, cabinetry/benches, equipment, storage and furniture. Commissioning and handover of the building is expected to last several weeks, ensuring each area is operating in alignment with the project's aims and expectations.

2.4.8.2 Service reticulation

The support structure for services consists of pipes in a single crossbar structure, fitted with diagonal and rear braces as necessary to support service pipes. The pipe support assembly will be carried out sequentially, starting with the installation of brace posts and the cross bar. This will be followed by vertical alignment and grouting, then levelling, and finally cutting and fitting the poles to the required size. Once these steps are completed, the diagonal bracing will be installed.

Once the necessary structural supports are installed along a required series (from point to point), service pipes and cable trays will run together along them, housing the necessary reticulated services.

2.4.8.3 Reverse Osmosis

Once positioning and weatherproofing of the containers is complete, internal commissioning of the RO system will commence. Similar to the New Pump House and Seawater Intake system, the RO equipment will be pre-assembled and successfully commissioned in Kingston, Tasmania prior to departure. Onsite commissioning of the RO system will include the initial plant operation (start-up) and the resulting production of brine wastewater, discharged along an existing and expanded services reticulation route towards the wharf area (Section 2.4.2.2) for release to the marine environment. Seawater, wastewater (brine), and water sampling will occur to ensure compliance with commissioning.

2.4.8.4 New Pump House and Seawater Intake

The New Pump House interior insulation will be installed on the container walls and ceiling to provide enhanced thermal protection with load bearing insulation to the floor and subfloor. Prefinished proprietary interior wall and ceiling panels will be installed to allow for the surface fixing of services and equipment. The only furniture, fittings and equipment required for the New Pump House is a workbench. Installation of equipment and services with the New Pump House include boilers, pumps, ventilation system, tanks and heat exchangers. All systems within the New Pump House and Seawater Intake will be pre-assembled and successfully commissioned in Kingston, Tasmania prior to departure. The Seawater Intake commissioning may require sea ice drilling to a depth of approximately 2 m to enable seawater access. Seawater use will be required to complete commissioning as well as seawater sampling, volumes are currently uncertain.

The primary source of wastewater will be via the pre-filtration systems, with both the glass media and disc filtration routinely activating automatic backwashing to self-cleanse the filters. Wastewater will primarily consist of seawater within an increased concentration of small debris, marine organisms, or anything greater than the filter size (25 mm x 25 mm aperture) and smaller than the

inlets filter (100 micron). This wastewater will be returned to the marine environment directly in front of the proposed location of the New Pump House via a temporary pipeline. Frequency of backwashing will be small volumes (exact volume to be confirmed) occurring daily over the commissioning of the sea water intake, an approximate two-week period. Additionally, to ensure uninterrupted flowing, the New Pump House will be able to return (unfiltered) seawater directly back to the Seawater Intake. Additionally, floor drainage and emergency eyewash equipment will occasionally contribute to wastewater production, however this will be captured and managed separately.

The design will enable seawater to be pumped directly from the Seawater Intake (via the New Pump House) to the station's Tarn, as well as the planned RO systems, this will enable the RO systems input from either the ocean or the Tarn, subject to station requirements at the time. Seawater and wastewater sampling will be undertaken, where required, to verify compliance with relevant contractual performance and environmental monitoring requirements.

2.4.9 Waste management

2.4.9.1 Return to mainland Australia

Due to the nature of the works, waste generation will be unavoidable, including general waste, packaging, construction and demolition waste. Materials will be segregated onsite for appropriate disposal or recycling (e.g. metal, steel, glass).

General waste types and their management, identified within the IEE - All Stations Operations Activities (AAD, 2024d) include:

- Solid, liquid and medical wastes
- Waste storage on station
 - Sewage sludge, incinerator ash, cooking oil/fat (used), grease traps, food (plant/animal origin), co-mingled recyclable material, scrap metal, timber and mixed industrial waste, machinery (used) and tyres.
- Movement of cargo (RTA waste)
- Waste incineration operation

Waste generated from the DCIW will ideally be managed separately, but due to operational circumstances may be integrated with Davis station operational waste streams and will be RTA, complying with the procedures and policies of the AAD and biosecurity requirements of the Department of Agriculture, Fisheries and Forestry and the Australian Border Force.

2.4.9.2 Hazardous waste management

Hazardous materials, including asbestos and other building-related hazardous substances (e.g. fuels, oils, paints and sealants), have been identified within several buildings throughout Davis Station and will be managed in accordance with applicable hazardous materials and waste management procedures. For example, asbestos waste removal and management of the DCIW will align to the AAD standards; *AAD Asbestos Management Plan Australian Antarctic Territory and Macquarie Island – 2023–2026* and *AAD Asbestos Register Davis Station*, and any updates of these documents. Additionally, asbestos removal will be undertaken and transported under a valid licence issued by

WorkSafe Tasmania (Licence No. 90781014, expiry 22/10/2029). Should asbestos removal be required beyond the current licence period, including as part of the planned demolition of the main powerhouse, removal activities would only proceed under a renewed or alternative valid licence in place at the time. All asbestos waste will be returned to mainland Australia for disposal.

3 Alternatives to the proposed activity

The proposed project is multifaceted, and multiple alternatives are possible, inclusive of not proceeding. However, due to the workplace health and safety (WHS), environmental and operational concerns of the Davis station, this option is not viable. Patch and repair, as well as replacement with like-for-like are also possible, but not practical to implement due to the age, configuration and practicality (layout) of the station as it is today.

3.1 Do not proceed (do nothing)

Not proceeding with the proposed renewal of infrastructure at Davis station will result in further deterioration of the infrastructure and increasing WHS risk for occupants and users of the station. Failing infrastructure would also present an environmental risk from degraded materials and contamination as the infrastructure deteriorates and dispersed within the environment under the local freeze and thaw cycles and strong winds. Should there be catastrophic loss of water and/or power, then station abandonment is possible, due to not being able to sustain life. Not providing a viable and sustainable alternative potable water production infrastructure will continue to limit the station population capacity and represents an ongoing safety and welfare issue.

The Do Not Proceed option is not viable based on WHS, environmental and operational practicalities.

3.2 Patch and repair of existing infrastructure

Patching and repairing the failing infrastructure at Davis station could stop further deterioration in the short-term but would not address medium and long-term issues of inefficiency and unsuitability of the existing layout of the station. This option would require a significant level of effort and continual maintenance to stop the infrastructure from deteriorating further. The majority of station infrastructure is operating beyond its design life and failures would become common, presenting WHS and environmental risks resulting in beds on station being increasingly dominated by trades and support staff to maintain station operations and thereby reduce the AAD's ability to deliver world class science.

Not upgrading the seawater extraction and potable water production infrastructure would leave the station vulnerable to water shortages and ongoing operational risks associated with the current practice of draining and refilling the station Tarn.

The patch and repair option is no longer viable based on increasing WHS and environmental risks, and operational practicalities and impacts on science, which compromises commitments made under The Strategy and Action Plan (AAD, 2022a) and the Science Decadal Strategy.

3.3 Replace infrastructure with like-for-like and no increased capacity

Replacing the existing infrastructure with new versions of the same would reduce the WHS and environmental risks but would retain long-term issues of inefficiency and unsuitability of the existing layout of Davis station. This option would be costly and would miss the opportunity to renew the infrastructure with higher efficiency and sustainability in using modern systems that would provide improved WHS and environmental outcomes for 50+ years.

This option would not advance Davis station's capability and capacity to support AAP activities into the future.

3.4 Design alternatives

The design process incorporated an iterative process over the course of multiple months for the proposed works. The scope of this process includes stakeholder workshops, user group meetings, design workshops, design team meetings and supplementary visits to enable the development of a design meeting design principles, inclusive of environmental and sustainability core objectives within The Strategy and Action Plan (AAD, 2022a). The design process alternative outcomes can be summarised into two key areas of changes, location and architecture.

3.4.1 Location

Numerous constraints have been considered in the design of the proposed buildings to accommodate current and potential future buildings (not within the DCIW scope), needs, restrictions and changes. Examples specifically include:

- Existing infrastructure at Davis station and operational needs (e.g. helipads)
- Alignment of buildings to the prevailing wind from the northeast carrying snow and ice in winter and grit during summer.
- Alignment with the current development of master planning for the future of Australian Antarctic stations (noting, masterplan is not endorsed, funded or approved at the time of submission).
- Alignment of buildings to avoid snow shadows on downwind buildings (if applicable).
- Place access for pedestrians, vehicles and services on the side elevations.
- Minimise operational impact.
- Maintain existing roads, especially those passing the buildings.
- Extent of earthworks required, with the intent to minimise as much as possible.

3.4.2 Architecture

Design reports for the proposed works outline the benefits and disadvantages of each option, culminating in a recommended solution. The architectural options for the entire scope of the DCIW is extremely broad and encompasses a wide range of considerations across the following disciplines:

- Structural Form
- Foundation Types
- Geotechnics and Earthworks
- Structural Engineering
- Façade Engineering
- Hydraulic Engineering
- Mechanical Engineering
- Fuel Engineering
- Electrical Engineering
- Fire Protection
- Constructability

3.5 Blasting alternatives

As blasting is proposed primarily as a means of sourcing construction fill, the key alternatives considered are the importation of construction material from mainland Australia or excavation without blasting.

While the option of importing construction material was considered, it presents significant logistical and biosecurity risks, given the estimated volumes required. Importing material into Antarctica carries the potential for accidental introduction of non-native species, which could have severe and irreversible impacts on the Antarctic ecosystem.

In addition, imported material lacks flexibility for on-site requirements. It would not allow for variation in material sizes needed for sub-ground foundations and drainage systems. Conversely, sourcing material locally enables tailored sizing and reduces environmental impact by minimizing waste and surplus material that would otherwise need to be RTA, adding pressure to already constrained waste management systems.

The logistical complexity of importing the required volume of material is prohibitive. Current estimates indicate that approximately 347 half-height containers, each weighing around 42 tonnes, would be needed. This far exceeds the station's SOP lifting limit of 7 tonnes, necessitating repackaging and increasing container numbers 6-fold. Such a scenario would require over 20 additional *Nuyina* voyages, significantly increasing carbon emissions, costs, delivery risks and delays to the proposed schedule.

Excavation as an alternative source of construction material was also considered. While theoretically feasible, excavation presents several substantial operational and environmental challenges. Ground conditions at the site are expected to be extremely compacted, permafrost-cemented, which would place significant strain on excavation machinery. This would increase the number of machines required, elevate fuel consumption, and extend the duration of works, ultimately increasing the DCIW's impact. In addition, breaking and removing hard rock would generate sustained high noise levels due to repetitive mechanical impact. This would amplify noise disturbance to nearby personnel and wildlife relative to other material sourcing methods.

4 Description of the environment

4.1 Physical characteristics of the environment

The Vestfold Hills, where Davis station is located, is a 411 km² coastal ice-free area located on the eastern coastline of Prydz Bay, East Antarctica. Vestfold Hills area is bounded by the Antarctic ice plateau (Davis Plateau) to the east, Sørsdal Glacier to the south and Prydz Bay to the north and west.

The Vestfold Hills area is of low relief (<160 m) and bears rock exposures with crustal histories in the 2.5-billion-year range. Typically, this area is a fragmented coastal oasis, with numerous offshore islands, and 3 major peninsulas separated by deep marine inlets, rarely found in Antarctica (Pickard, 1986). Davis station predominantly lies between 16 and 22 m ASL (AAD, 2024d).

There are two separate Antarctic Specially Protected Areas (ASPA) in the Vestfold Hills:

1. ASPA 167: Hawker Island (68°34'60" S, 77°49'60" E). Located approximately 8 km southwest of Davis station and approximately 300 m offshore from Vestfold Hills, the island comprises an area of 2.17 km². The area supports the southernmost breeding of southern giant petrels (*Macronectes giganteus*), as well as Adélie penguins (*Pygoscelis adeliae*) in addition to a limited number of flying birds.
2. ASPA 143: Marine Plain, Mule Peninsula (68°37'50" S, 78°7'55" E). Located approximately 10 km southeast of the station and comprising an area of 20.46 km². The area is of exceptional ongoing scientific interest due its relevance to the palaeoecological and paleoclimatic record of Antarctica and unique vertebrate fossil fauna.

4.2 Meteorology and climate

The climate at Davis station is relatively mild. Summer can reach a maximum of +13°C, and the recorded winter minimum is -40°C. However, average temperatures (from occupied years 1957–2016) sit between +3.2°C and -1.2°C in summer, and between -14°C and -20.8°C in winter.

The Vestfold Hills do not accumulate much snow overall, although isolated snow drifts are common in the lee of rocky ridges and station buildings. Mean annual precipitation at Davis station is approximately 69.6 mm (water equivalent), falling predominantly as snow, although occasional rainfall events have been recorded (Bureau of Meteorology, 2025). Annual snowfall accumulation averages approximately 33 mm (water equivalent), with observed values reaching up to around 50 mm/year under certain conditions (AAD, 2024d & 2025b). Snow accumulation can comprise of both locally precipitated snow and snow transported by wind from the ice sheet.

In the summer, the sun stays above the horizon for most of December and January and in winter it stays below the horizon for about two months from early June. During the winter, the 'day' is made up of several hours of twilight. The exposed undulating rock dampens the katabatic winds and the prevailing north-easterly wind averages around 20 km/h, although sudden storms can occur with gusts in excess of 200 km/h (AAD, 2024d).

4.3 Geology and soils

The geological record preserved in the Vestfold Hills has typical characteristics of many coastal oases in Antarctica. Ancient basement rocks, belonging to the Mossel group, are thinly covered by Pleistocene and Holocene glacial and marine sediments. The Mossel group is a compositionally heterogeneous layered orthopyroxene-quartz-feldspar gneiss of predominantly biotite-orthopyroxene tonalite with subordinate granodiorite and granite (Collerson & Sheraton, 1986; Sheraton & Collerson, 1983).

Sediment cores extracted from lakes in the Vestfold Hills area provide a record of glacial climatic history. The geology of the area has been affected by the repeated advance and retreat of the East Antarctic ice sheet and its outlet glaciers. There is extensive surface exposure of basement rock, as well as extensive deposits of unconsolidated glacial sediments. Past sea level rise and retreat inundated land below 10 m current elevation are now strongly influenced by salt (Gore, *et al.*, 1996).

Marine Plain, a southern area within the Vestfold Hills, contains the Sørsdal Formation, a deposit of Pliocene glacial and glaciomarine sediments (Quilty *et al.*, 2000, McLennan *et al.*, 2021). This unique area contains Pliocene-age vertebrate and invertebrate fossil fauna and is protected as ASPA No. 143, Marine Plain. Ancient, mummified seals and seabirds are scattered throughout the Vestfold Hills, with aggregations at Cemetery Lake, Deep Lake and other areas.

Glacial sediments in the vicinity of Davis station consist of sand, gravel and boulders overlying basement rock. These extensive sediment deposits are likely low in organic material compared to sites previously assessed in the Vestfold Hills, noting a comprehensive assessment of Davis station has not yet been undertaken (Figure 28). Aeolian sediment transport is driven by the strong prevailing north-east winds. Gravel, cobbles and boulders can create an armouring of the soil surface after finer sandy sediments have been winnowed out, with sandy windblown sediments typically deposited in snowdrifts and in the lee of boulders (Quilty & Franklin, 1997).



Figure 28. Examples of geology and soils at Davis station (AAD, 2024d)

Glaciomarine sediments, identified as littoral and nearshore are associated with Death Valley and Watts/Lebed' Lakes (McLennan *et al.*, 2021). This type of geology contains fragile marine fossils that are vulnerable to damage and are common along walking routes for field training, scientific research and recreation trips in the Vestfold Hills. Littoral and nearshore glaciomarine sediments have also been identified around the shoreline of Watts Lake to the south of Watts Hutt (McLennan *et al.* 2021) (Figure 29).



Figure 29. Glaciomarine sediments in the vicinity of Watts Hut containing Holocene marine subfossils (AAD, 2024d)

The soil at Davis station has been classified as ‘Anthropogenic deposits: undifferentiated’, comprised of till blanket, till veneer and bedrock materials modified by human activities within Davis station limits and a nearby antenna array area (McLennan *et al.*, 2021). This is the anticipated geology and soil anticipated within the proposed DCIW areas, further work is required to determine and inform construction (including earthworks) and acquiring fill activities.

Antarctic soil surfaces can be vulnerable to physical disturbance from trampling due to foot traffic or from vehicles. Human trampling and track formation as a result of field camp installation, scientific activities and tourism can produce some undesirable consequences on soils. These impacts can affect soil physiochemical and biological properties at different scales, and may extend to terrestrial communities and their potential habitat. The longevity of disturbances depends on soil type, regional climate, impact severity, remediation effort (if any), and what components of the ecosystem are being affected. In some cases, impacts continue decades after disturbance (Tejedo *et al.*, 2009; Tejedo & O’Neill, 2018).

4.4 Surface water and groundwater

Davis station has a mean annual precipitation of 69.6 mm (Bureau of Meteorology, 2025). Four small tarns are within the Davis station limits, with the largest being the station’s Tarn. This tarn has a surface area of 1 hectare (ha) and is a saline water source for the station’s potable water production facility. High conductivity brine generated from the existing RO is currently discharged back into the Tarn. The Tarn is periodically replenished with seawater pumped from offshore. Both the brine discharge and replenishment activities contribute to the Tarn’s water being saline (AAD, 2024d).

Davis station's topography in proximity to the station's Tarn indicates that meltwater from the eastern portion of the station would flow into either the Tarn or Heidemann Bay. Alternatively, the meltwater from the western portion of the station flows towards Davis station beach and discharges to Prydz Bay (AAD, 2024d). Survey work to map surface water movement from the DCIW areas in Davis station to the Tarn is underway.

4.5 Terrestrial and sublithic communities

Terrestrial communities are richest in the eastern (landward) areas of the Vestfold Hills region. Western areas that are closer to the coast are less diverse as a result of higher salinity. For this reason, field huts and their transit routes are likely areas of higher biodiversity than the station operational zone (AAD, 2024d). There are 3 habitats containing living values within the Vestfold Hills:

1. The coastal littoral zone habitat: mudflats, beaches and rocky shores, inclusive of the intertidal zones of marine inlets and islands.

Littoral zone ecosystems exist along the coast of the station. Species present include a rare marine lichen, *Verucaria* sp., predominantly found on low tide rocks around the station's coast. The distribution of this lichen appears limited to the Broad Peninsula surroundings, and along the southern side of Long Peninsula. Marine lichens have not been recorded/found anywhere else in East Antarctica (AAD, 2024d).

2. The terrestrial habitat: soil, sediment and rocks.

Vestfold Hills terrestrial communities are primarily composed of cyanobacteria, bacteria, algae, fungi, lichens, mosses, protists and microinvertebrates (Seppelt & Broady, 1988). Microinvertebrate communities are dominated by rotifers, tardigrades, nematodes and mites, with highest abundances associated with surface vegetation (Velasco-Castrillón *et al.*, 2014). Hypolithic (on underside of rock) and sublithic (soil beneath rock) communities are a significant feature in the Vestfold Hills (Clarke *et al.* 2024; AAD, 2024d).

Salt-affected areas in the Vestfold Hills (the boundary of which is referred to as the salt line) are influenced by previous marine inundation during the Holocene glacial highstand, wind-blown salt and the dispersal of salt-saturated marine sediments (Pickard, 1982; Gore *et al.*, 1996, Zwartz *et al.*, 1998). The salinity in the environment impacts plant growth viability and is responsible for the decline of abundance in lush terrestrial vegetation west of the salt line, whereas more abundance is found east of the salt line (AAD, 2024d).

Davis station is situated west of the salt line and terrestrial surface vegetation such as mosses and lichens have not been recorded within the station limits. However, beneath the surface, hypolithic and sublithic communities, dominated by bacteria/cyanobacteria and algal species are present under translucent quartz rocks and in ephemeral streams. Found throughout the station, these hypolithic and sublithic communities are most common east of the meteorological building and in ephemeral streams that run behind the main accommodation building towards the shore. Hypolithic and sublithic communities are hotspots for soil biodiversity and productivity. Individual rocks can have unique assemblages beneath, which can be tens to hundreds of years old (Clarke *et al.*, 2024; AAD, 2024d). These communities are sensitive to disturbance, but should they be encountered

during DCIW works associated rocks will be carefully excavated and relocated in the same orientation and position following advice from subject matter experts.

3. The Limnetic systems: glacial meltwaters, streams, rivers, snowbanks, ponds and lakes.

There is a remarkable network of lakes within the Vestfold Hills region. These lakes harbour communities that are generally more distinct, compared to those found in soil and limno-terrestrial habitats. Community assemblages within lakes vary, subject to unique assemblages of biota in each lake that may not be found elsewhere. Glacial and sea level history impact and influence diversity, with salinity as the primary driver of species diversity within these lakes. Within the Davis station limits, pond communities are dominated by green algae (*Prasiola crispa*) and the cyanobacteria *Nostoc commune*, whereas the biodiversity of the four small tarns is currently unknown (Figure 30) (AAD, 2024d).

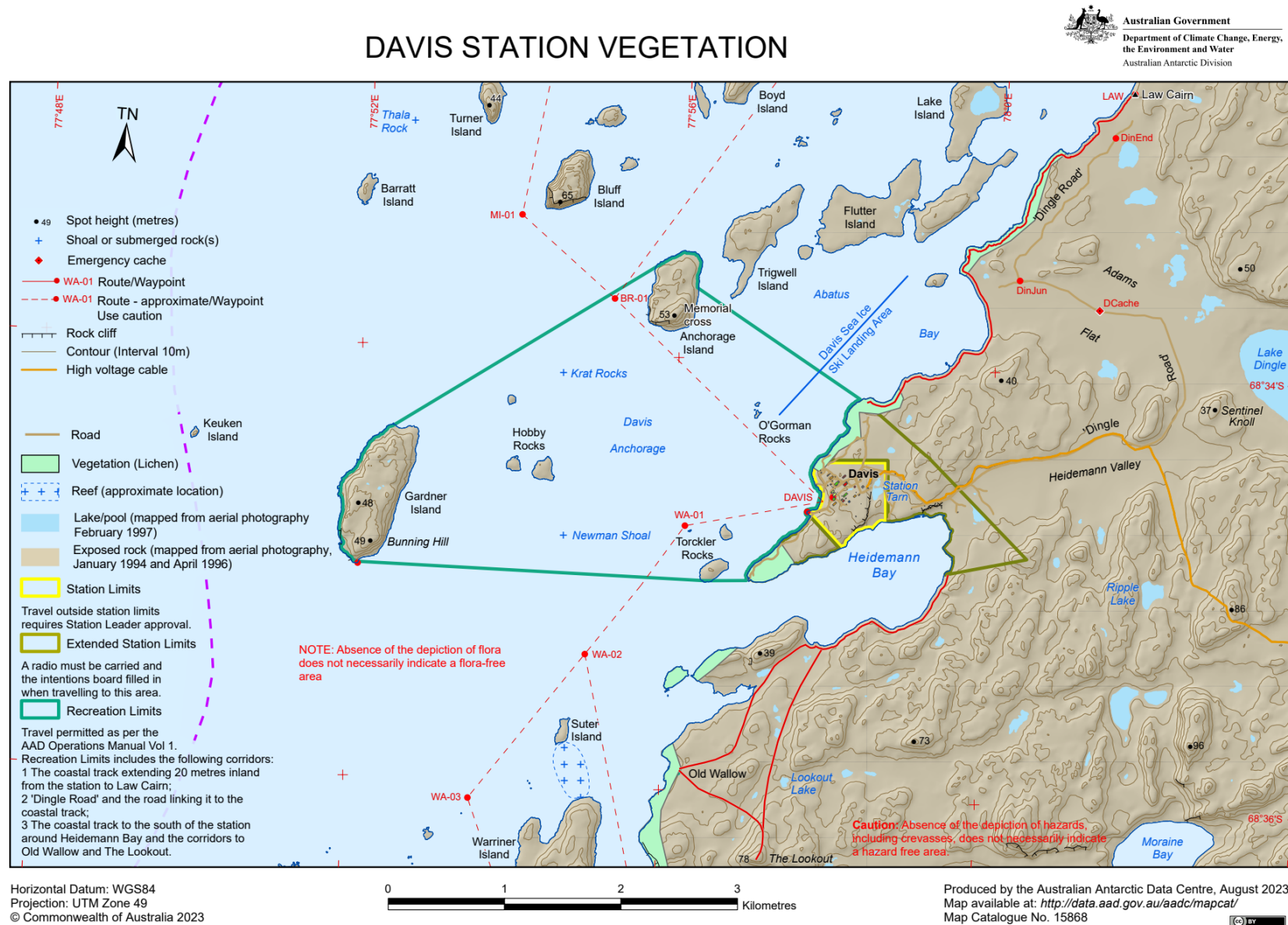


Figure 30. Davis station vegetation (AAD, 2024c)

4.5.1 Field surveys and distribution modelling

While the available data was primarily collected from outside the immediate station footprint, it provides a useful regional perspective on terrestrial and sublithic communities. The Davis station footprint is comparatively more disturbed than the broader region, and communities within the station area are therefore likely to have experienced a greater degree of historical disturbance.

Field data collection and surveys of terrestrial flora was undertaken in 2018–19 and 2019–20 summer seasons within Davis station limits and the broader Vestfold Hills area. Terrestrial flora survey methodology included both field and laboratory genera and species identification for lichens and mosses, and some algae and cyanobacteria. The location of any vegetation found was marked using a handheld global positioning system (GPS) (Garmin GPSMAP 64s). Data is point-data only and is not an exhaustive representation of vegetation distribution. Deoxyribonucleic acid (DNA) sequencing occurred for limited number of samples collected. Sublithic communities were examined with the careful overturning and replacement of rocks (Figure 31). The data collected within these summer seasons is displayed in Figure 32, and were used to develop predictive models of where habitat and vegetation communities may be located within the study area (AECOM, 2021).



Figure 31. Sublithic communities on underside of quartz rocks at Davis station, 2019–20 summer survey (Photo credit: Dana Bergstrom, Patti Virtue).

Species distribution modelling was undertaken to provide a prediction of the probability of observing a vegetation type at a site given a set of habitat predictor variables (Howat *et al.*, 2019), at a horizontal spatial resolution of 200 m. The modelling provided a probability of potential habitat and probability of presence, where taxa are expected to occur (indicating suitable microhabitat somewhere within pixel (200 m x 200 m)). Within Davis station limits, the modelling indicated that

epilithic lichens and moss had a low probability of presence, whereas sublithic algal communities had a very high probability of presence throughout (AECOM, 2021).

Findings of the field surveys are presented in Figure 32.

DAVIS

DAP Flora Field Observations 2018-20

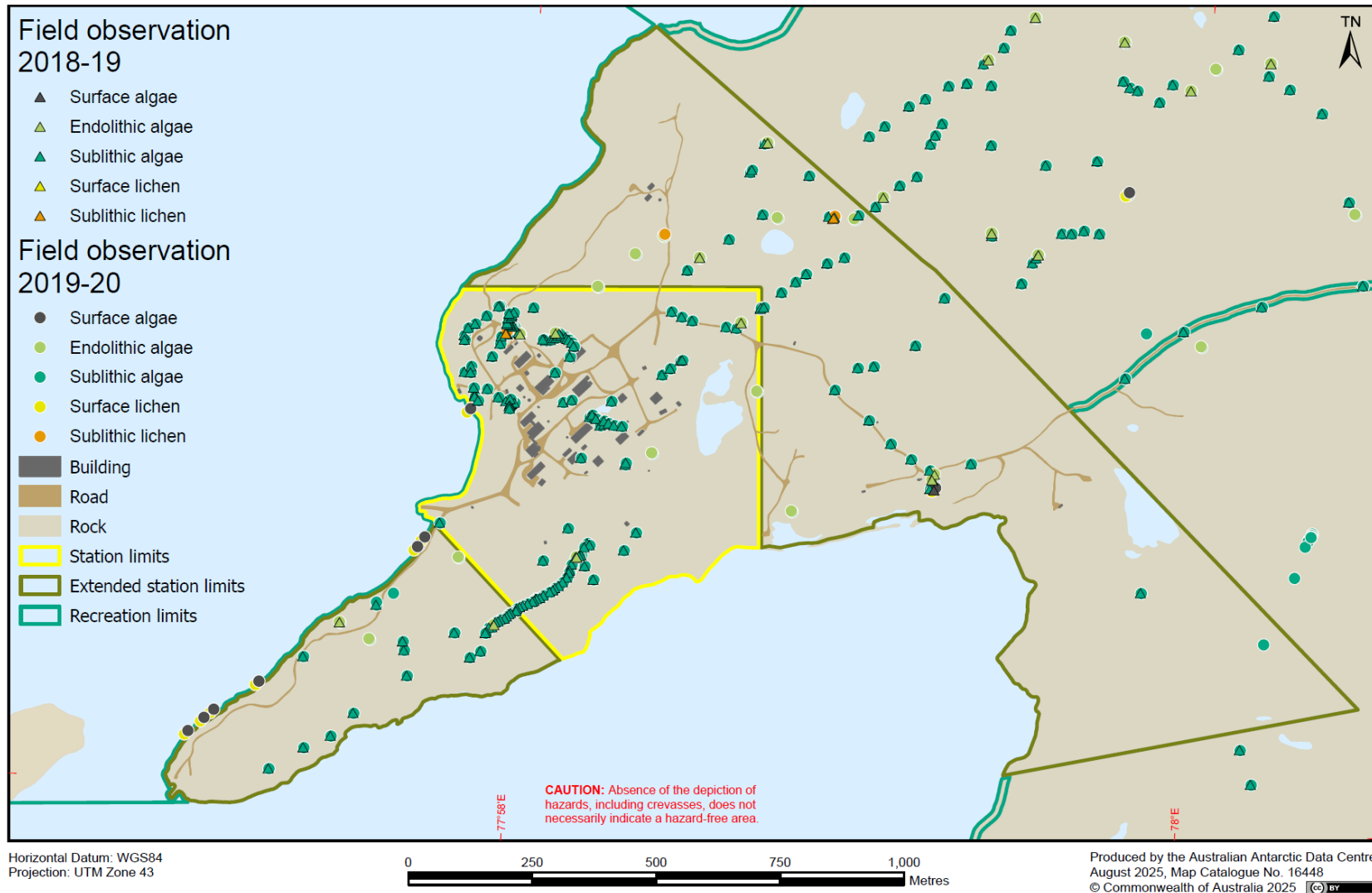


Figure 32. AAD flora survey data 2018–20 (AECOM, 2021)

4.6 Wildlife

The Vestfold Hills region supports a diverse community of wildlife, including a rich assemblage of avian, pinniped, and cetacean species recorded in the vicinity of Davis station and surrounding areas. Wildlife areas are detailed in Figure 33 and Figure 34. Seabird and seal monitoring is undertaken on a regular basis at Davis Station. Seabird surveys are typically conducted annually by visiting seabird ecologists, with wildlife data collected or verified and spatial datasets updated accordingly. In addition, seal monitoring is undertaken annually by the Station Environment Officer in consultation with AAD seal subject matter experts, with data recorded on species presence and abundance within the station area and surrounding environment. Should any knowledge gaps be identified within the proposed DCIW areas, additional wildlife surveys will be undertaken prior to any works commencing.

4.6.1 Avian species

Avian (bird) species observed in the vicinity of Davis station are presented in Table 8.

Table 8. List of bird species found within Davis station vicinity (AAD, 2024d)

Common name	Scientific name
Adélie penguin	<i>Pygoscelis adeliae</i>
Emperor penguin	<i>Aptenodytes forsteri</i>
Cape petrel	<i>Daption capense</i>
Southern giant petrel	<i>Macronectes giganteus</i>
South polar skua	<i>Stercorarius maccormicki</i>
Snow petrel	<i>Pagodroma nivea</i>
Wilson's storm petrel	<i>Oceanites oceanicus</i>

Adélie penguin colonies are mostly located on islands offshore from the Vestfold Hills, but also on continental ice-free land at Long Peninsula. Emperor penguins may be observed transiting through the area either over the surface of the sea ice or in the water or using occasional coastal moulting sites. Cape petrels breed at several locations in the southern Vestfold Islands including Bluff Island, and southern giant petrels breed on Hawker Island approximately 8 km southwest of Davis station, in ASPA 167. Snow petrels and Wilson's storm petrels are breeding in most areas in the Davis station region that have been searched (AAD, 2024d).

Thalassoica Antarctica (Antarctic petrel) and *Fulmarus glacialisoides* (southern fulmar) breed on Rauer Island, 27 km south of Davis station and may occasionally be observed offshore near to the station. Additionally, an emperor penguin colony with several thousand pairs is located in Amanda Bay (ASPA 169), 88 km southwest of Davis station (AAD, 2024d).

4.6.2 Pinniped species

Pinniped (seal) species observed in the vicinity of Davis station are presented in Table 9.

Table 9. List of seal species found within Davis station vicinity (AAD, 2024d)

Common name	Scientific name
Southern elephant seal	<i>Mirounga leonina</i>
Weddell seal	<i>Leptonychotes weddelli</i>
Leopard seal	<i>Hydrurga leptonyx</i>
Crabeater seal	<i>Lobodon carcinophagus</i>
Antarctic fur seal	<i>Arctocephalus gazella</i>
Ross seal	<i>Ommatophoca rossii</i>

Six seal species are known to the Vestfold Hills area: southern elephant seal, Weddell seal, leopard seal, crabeater seal, Antarctic fur seal and Ross seal. The two most numerous species are the Weddell and southern elephant seal (AAD, 2024d).

Weddell seals are permanent inhabitants of the fast ice area of the Vestfold Hills and the only seal species to reproduce in the Vestfold Hills. They congregate from about September to March within Long Fjord and Tryne Fjord, and the Wyatt Earp Islands to breed and moult. Southern elephant seals, originating from the Iles Kerguelen/Heard Island population, migrate annually into the region and congregate between January and April to moult. Haul out areas are mainly on coastal beaches between Ellis Fjord and Long Fjord, as well as offshore islands including Hawker and Mule islands, and Davis Beach located within station limits (AAD, 2024d). Recent research indicates that the Vestfold Hills population of southern elephant seals is declining, with the most rapid declines at haul-out areas closest to Davis station (van den Hoff, 2024; AAD, 2025b).

The leopard, Ross and crabeater seals inhabit the drifting pack ice; they follow the ice edge as it recedes to the coast during summer. Leopard seals are present at the Vestfold Hills region year-round. During winter, they are associated with the edge of the fast ice and are most often seen resting on ice floes or hunting Adélie penguins during summer. Crabeater seals very occasionally come ashore at a time which coincides with their moult period (January–February), Antarctic fur seals (which likely originate from Iles Kerguelen/Heard Island) may be seen on coastal beaches during late summer (February–March), and Ross seals have only been detected in the water by hydrophone deployed near Gardner Island (AAD, 2024d).

4.6.3 Cetacean species

There is limited baseline information available to characterise cetacean presence and seasonal patterns in the Prydz Bay and nearshore Davis station. Existing data are derived primarily from opportunistic sightings and surveys conducted between 1977 and 2006, with approximately 75% of survey efforts occurring during the summer, resulting in a limited understanding of winter occurrence or year-round residency patterns (AAD, 2021b). The absence of data cannot be interpreted as true absence. It is likely that cetacean occurrence is temporally linked to periods of higher productivity in coastal and shelf areas during summer, when reduced sea ice extent facilitates access and feeding opportunities, whereas winter presence may be constrained by extensive sea ice cover, though this requires further evidence to address the data gaps. Cetacean distribution in the region is also expected to be strongly influenced by prey availability, particularly Antarctic krill

(*Euphausia superba* and related species), which form the primary food source for most baleen whales and are themselves closely associated with sea ice dynamics and seasonal productivity cycles (AAD, 2021b). However, there is limited site-specific information on prey distribution and abundance, further contributing to uncertainty in understanding cetacean habitat use and temporal occurrence in the study area.

Cetacean (whale) species observed either directly or acoustically via hydrophone within 10 km of the Vestfold Hills coastline are listed in Table 10.

Table 10. List of whale species found within Davis station vicinity (AAD, 2024d)

Common name	Scientific name
Killer whale	<i>Orcinus orca</i>
Minke whale	<i>Balaenoptera bonaerensis</i>
Humpback whale	<i>Megaptera novaeangliae</i>
Fin whale (presence unconfirmed)	<i>Balaenoptera physalus</i>

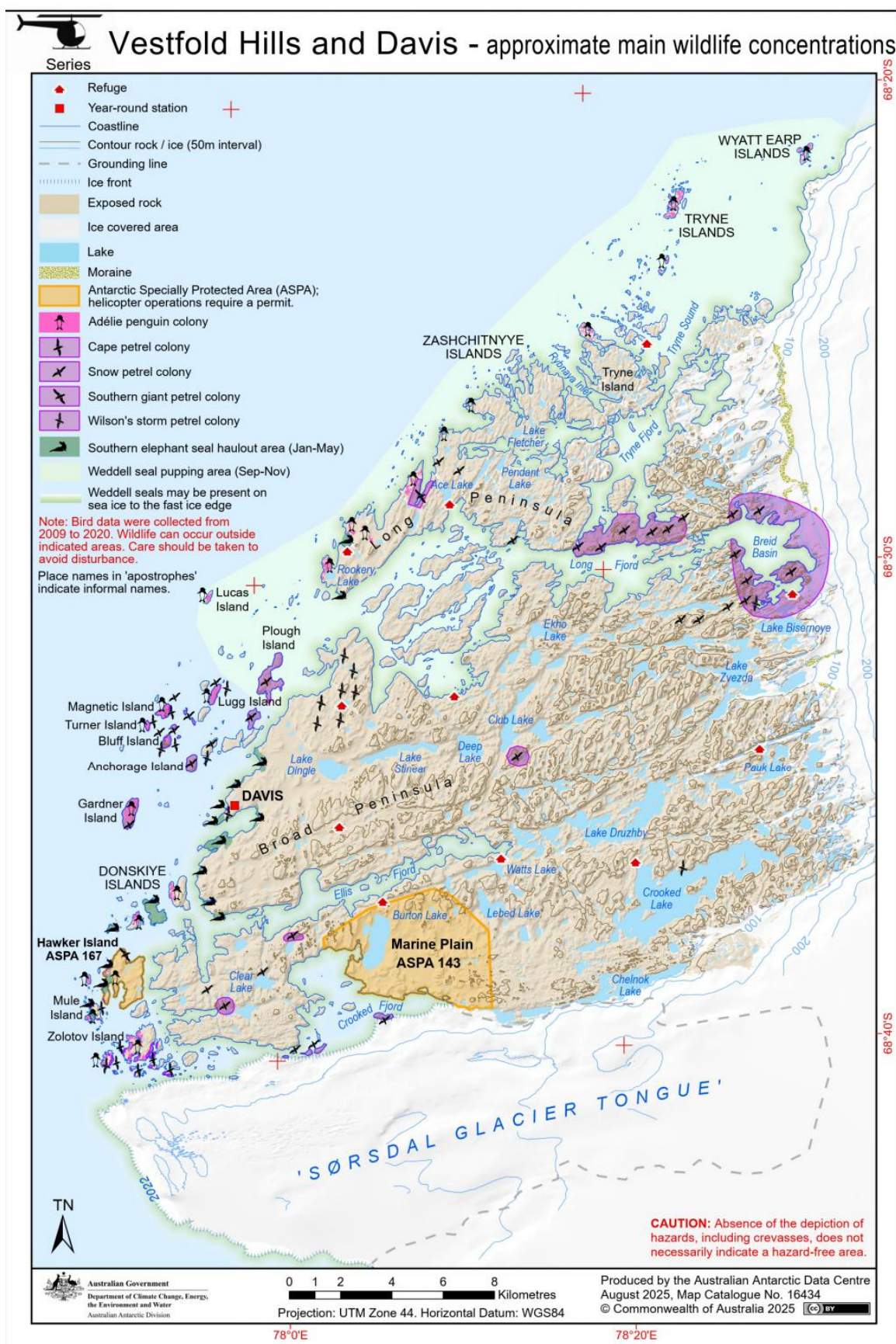


Figure 33. Vestfold Hills region and Davis station wildlife concentrations (AAD, 2025a)

DAVIS STATION WILDLIFE

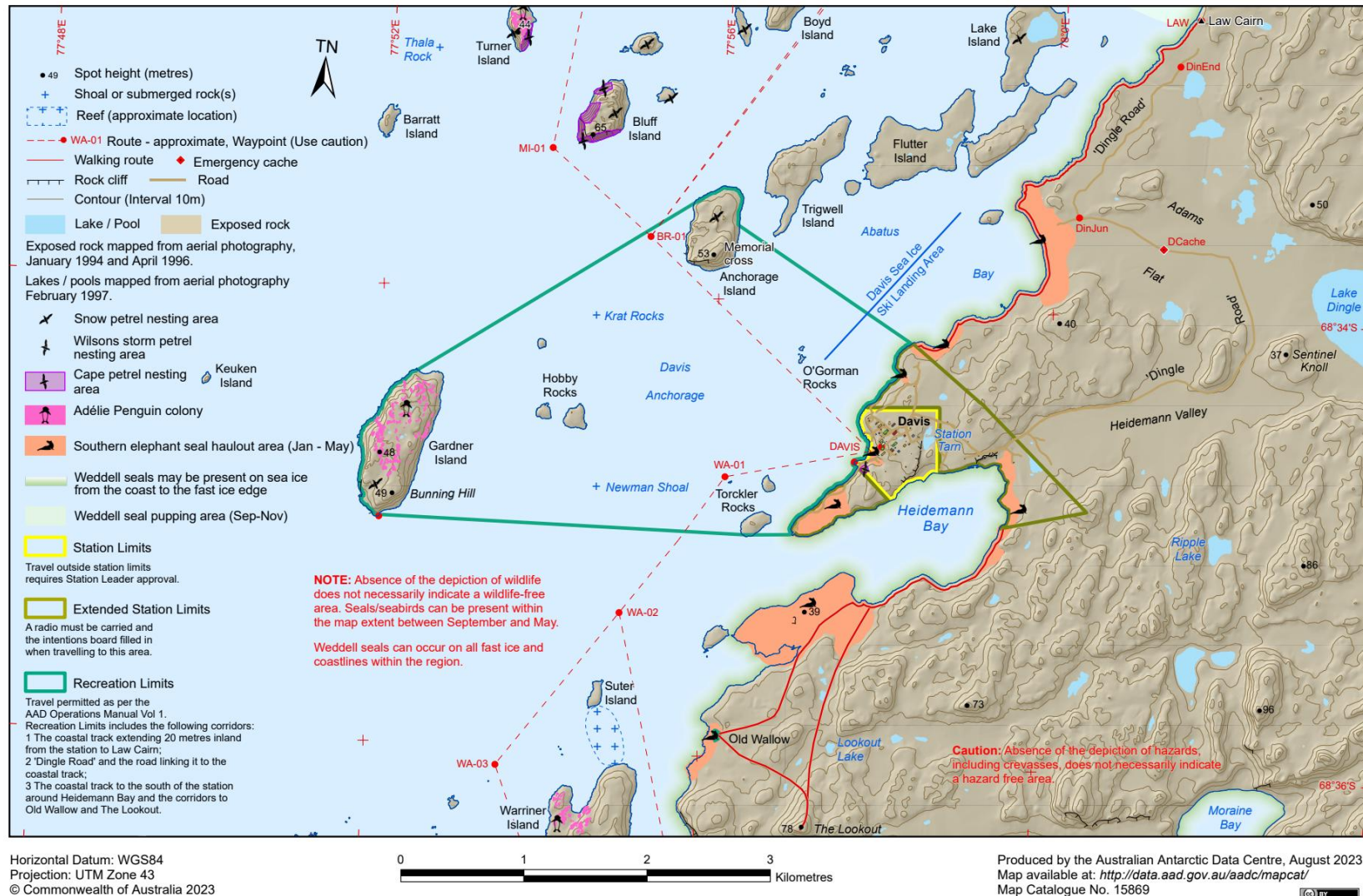


Figure 34. Davis station wildlife (AAD, 2024e)

4.7 Nearshore marine communities

Shallow nearshore marine ecosystems are uncommon along the continental Antarctic coastline, which are typically separated by vast stretches of deep ocean waters (Clark *et al.*, 2015). The Vestfold Hills shallow nearshore marine area is spatially highly variable, and comparable in extent to the terrestrial ice-free area, supporting high biodiversity, productivity and a wide range of habitats. The marine area directly adjacent to the Vestfold Hills area is comparably (to other Australian research stations) shallow and generally does not exceed a depth of 50 m until several kilometres offshore. An exception to this is the marine fjords (Tryne, Long, Ellis and Crooked), which are very deep (exceeding 100 m), large in extent and geographically complex, with steep sides and shallow sills that restrict water flow between the deep basins and the entrances. Very little is known of these fjords, with the exception of Ellis Fjord and some areas in the mouth of Long Fjord (AAD, 2024d).

The Vestfold Hills nearshore marine ecosystem contains community assemblages that are similar to those found throughout coastal East Antarctica. The nearshore marine ecosystem communities include demersal fish species, a large variety of invertebrates including echinoderms (starfish, sea urchins, brittle stars, sea cucumbers), crustaceans, porifera (sponges), ascidians (sea squirts), bryozoans, polychaete worms, cnidarians (anemones, hydroids and corals), molluscs and other phyla (AAD, 2024d).

There are communities and species that have not been previously reported in areas outside of the Vestfold Hills. For example, the polychaete reefs in Ellis Fjord (located 5 km south-east of Davis station) comprise very large aggregations of the tube building serpulid *Serpula narconensis*, which have formed an extensive reef (estimated to be 8 km long) not observed elsewhere to date (AAD, 2025b).

The bay directly adjacent to Davis station has a range of habitats, including coarse sandy sediments, fine muddy sediments, rocky reefs and outcrops with a range of macroalgal communities. These habitats include combined communities of green (e.g. *Monostroma*), red (e.g. *Iridea* and *Palmaria*) and brown (e.g. *Desmarestia* and *Himantothalus*) macroalgae (AECOM, 2021).

Invertebrate communities dominate some of the steeper slopes and areas of sediment in the Davis station area. In shallow waters, there are abundant populations of the bivalve mollusc *Laternula elliptica* and the urchin *Abatus* sp. (Figure 35 – Right and Table 11), with a range of smaller highly mobile invertebrates such as the amphipod *Paramoera walkeri* and other amphipod species, isopods and polychaete worms. Some species found at Davis station include: the giant isopod *Glyptanotus antarcticus*, crinoid echinoderms, the serpulid polychaete *Serpula narconensis* and a range of ascidians and sea anemones.

An extensive sampling program was conducted in the 2009–10 summer season as part of an environmental impact assessment of the Davis station wastewater outfall (Stark *et al.*, 2016a; Stark *et al.*, 2016b). The 2010 survey of marine benthic communities utilised scuba divers to examine 30 sites. A range of techniques was used to survey benthic ecosystems including line transects to survey habitats, photoquadrat surveys and sediment coring. Examples in proximity to Davis station wharf are displayed in Figure 35 and Table 11. These surveys indicate the wharf area had a total organic matter context, concentrations of acid-labile metals (a proxy for bioavailable metals), hydrocarbon

concentrations, persistent organic pollutants, benthic habitat types, diversity and abundance and community compositions, spatial variation and patterns.



Figure 35. Davis station 2010 survey of Prydz Bay (left: STP 1, right: STP 2) (Table 11) (Photo credit: Jonathan Stark)

Table 11. Davis station 2010 survey site descriptions

Location (coordinates approximate)	Description	Depth (m)	Sediment grain size classification	Date sampled and method	Reference
STP 1 (68°34'43"S 77°57'11"E)	Sandy with abundant Laternula, some Abatus and a few boulders and cobbles covered with algae (brown and red).	4.5 – 7	Fine sand	Photoquadrats and cores 2010	Stark <i>et al.</i> 2016b
STP 2 (68°34'41"S 77°57'41"E)	Sandy bottom with boulders and reef, majority of bottom covered in red macroalgae, Iridea and Himantothalys. Some Laternula in sandy patches.	4 – 6	Medium to coarse sand	Photoquadrats and cores 2010	Stark <i>et al.</i> 2016b

4.8 Cultural heritage values

Davis station was named after Antarctic mariner, Captain John King Davis. Due to its relatively mild Antarctic climate and location on the coastal edge of the Vestfold Oasis, Davis station is known as the 'Riviera of the South'. Davis station is the only Australian station that has not been continuously occupied as it was closed from 1965 to 1968 to concentrate on building Australia's third station, Casey.

A heritage assessment of buildings and other structures and sites at Davis station was undertaken in 1996 (Rando and Davies). In recognition of its historical cultural value, Davis station was registered on the Register of the National Estate in 1999 and is an Indicative Place on the Commonwealth Heritage List. Listing as an 'indicative place' does not afford protection to the structures.

Thirteen heritage buildings and structures can be found at or near Davis station. Those located on station are the Paint Store, Old Balloon Hut, Remote Transmitter Hut, Electrical Store, Scientific Store, Magnetic Absolute Building, Biology Laboratory and Emergency Powerhouse. Those located further afield are Platcha Hut, Brookes Hut, Watts Hut, RMIT Van, and Law Cairn. Additionally, two historic sites near the station hold international historical significance: Wilkins' Cairn (HSM 6) and Mikkelsen's Cairn (HSM 72), which is also on the Register of the National Estate in 1997 and an Indicative Place on the Commonwealth Heritage List. Finally, artefacts and vehicle tracks at nearby Camp Lake, from Phillip Law's early scouting for a site for the station, hold local historical significance (Figure 36).

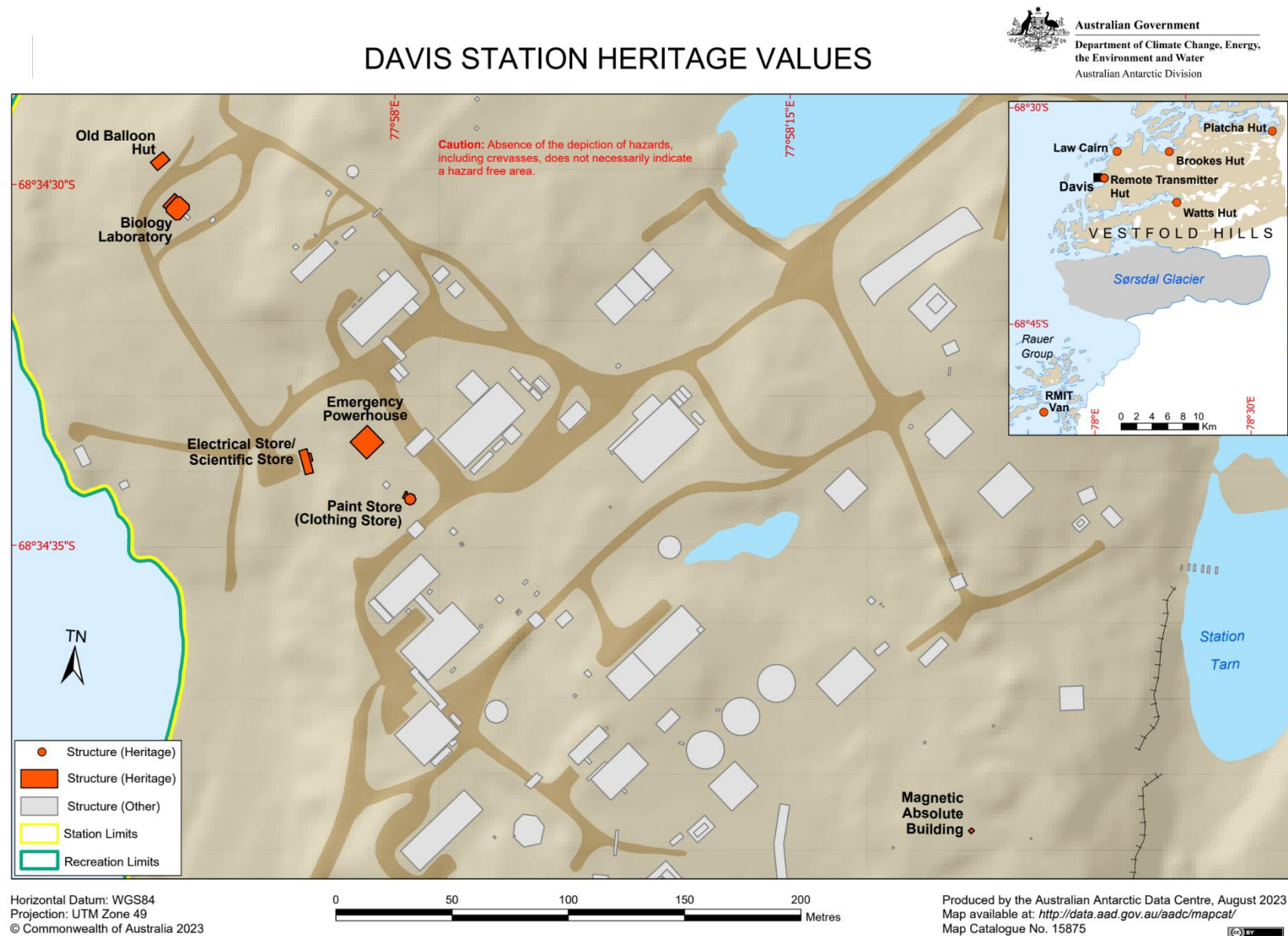


Figure 36. Davis station heritage values (AAD 2024f)

4.9 Human presence and impacts

Davis station was established as a scientific research base in 1957. It is a large and complex facility, accommodating up to 90 personnel and including outbuildings, accommodation, laboratories, workshops, antenna installations and weather stations. The existing infrastructure includes buildings, aviation facilities, cargo laydown areas, boat ramp, wharves, jetties and roads to facilitate resupply activities. The AAD maintains 11 field huts in the Vestfold Hills and surrounding region, some of which have adjacent helicopter landing pads.

In 2021, a Preliminary Site Investigation (PSI) was completed to identify potential sources of human contamination at Davis station. The PSI documented the current site setting and sources of contamination, reviewed previous investigations, developed conceptual site models and compiled knowledge gaps and recommendations. The PSI confirmed that there is known and potential contamination within Davis station and the surrounding area (where operational infrastructure and equipment is located). Petroleum hydrocarbon spills within Davis station consist of Special Antarctic Blend (SAB) diesel, aviation turbine kerosene (ATK), unleaded petroleum and a range of other hydrocarbon-based products (i.e. motor oil, marine distillate, intermediate fuel oil, lubricant and hydraulic fluid). The 2021 PSI is currently being updated by the AAD as part of the *A Cleaner Antarctica* science program.

Davis station has known areas of hydrocarbon spills, some of which have been recorded in volumes up to several thousand litres around the helipads and aviation fuel drum farm, workshop, refuelling bowser, fuel farm and powerhouses. A Station Leader annual report from 1983 references the loss of 60,000 L of fuel, however no further information is available to determine the location of the loss. A fuel spill of up to 8,000 L was recorded near the RO tank in July 1995. There have been several historical incidents related to aviation activities. In 2010, a helicopter sling loading 3 x 205 L drums of SAB between Davis station and Davis Plateau ski landing area lost its load immediately north of Dingle Lake. The impact of the drums on the ground resulted in all fuel being spilt. In June 1997, a valve was left open during SAB diesel transfer from the fuel farm to the Main Powerhouse, resulting in a 4,000 L spill. This spill was contained within the concrete bund. Minor fuel spills (<20 L) have also occurred at other ski landing areas in the Davis station region during past refuelling activities. The most recent incidents occurred in the 2024–25 field season and involved the release of <5 L of ATK at the Davis Plateau ski landing area when a small number of drums were damaged during retrieval and extraction from snow/ice, as well as a loss of <0.1 L of fuel during 2025-26 field season. All spills were managed, at the time of occurrence, in accordance with AAD fuel spill procedures and the best practice standards applicable at that time and were reported via AAD's environmental incident reporting system.

A previously used tip site is located 160 m south of the station fuel farm. Historical practices involved burning off combustible materials and compacting the remaining waste with machinery and gravel fill. A preliminary estimate of the tip site area is 0.7 hectares, with a small melt-stream in the in-filled valley flowing towards Heidemann Bay. Biological and non-biological wastes were historically dumped at the Davis station tip site. Other contaminants known to be present (or may potentially be present) at Davis station include metals, polychlorinated biphenyls, polyaromatic hydrocarbons, dioxins and furans, asbestos in soils, radioactive substances and per- and poly-fluoroalkyl substances

(PFAS). A station water supply overview report references detections of PFAS in the station Tarn (AAD, 2018). Historical contaminant remediation activities have been undertaken at Davis Station, including relocation of impacted soil from the Dingle Lake fuel spill for treatment; however, no current or ongoing remedial works are being conducted.

Relevant knowledge gaps and recommendations made within the PSI are within Table 12, which includes the site, PSI overview, knowledge gaps, other contaminants of potential concern (COPC) and high-level recommendations for further investigation.

Table 12. Summary of knowledge gaps and recommendations from the PSI (AAD, 2021a)

Site description	Stage 1 PSI overview	Knowledge gaps	COPC	High-level recommendations for further investigation*
Petroleum hydrocarbon storage and spills				
Workshop	The vehicle and equipment maintenance workshop. Waste oil drains beneath the vehicle servicing bays to a sump. Past practices consisted of pumping out the sump onto the ground out the front of the workshop. Spills from waste oil drums have been recorded out the front of the workshop.	No soil analytical data available to assess potential hydrocarbon impact in soil along the north-western wall of the workshop.	- Total Recoverable Hydrocarbons - Benzene, Toluene, Ethylbenzene, Xylene and Naphthalene - Polyaromatic hydrocarbons	Collect soil samples along the north-western wall of the workshop for analysis for the COPC.***
Main Powerhouse and aboveground storage tank (AST)	Two 700 L diesel day tanks are located inside the MPH. Diesel fuel is supplied to the day tanks from a 36,000 L bunded AST. Overflow of the AST during refuelling occurred in 1992, resulting in 200 L of SAB diesel being lost to ground in the absence of concrete bunding at the time. In February 1995 a bowser was removed from the southern corner of the MPH due to malfunction.	- No soil analytical data available to assess potential hydrocarbon impact around the AST. - No soil analytical data available to assess potential hydrocarbon impact at the former bowser location.	- Total Recoverable Hydrocarbons - Benzene, Toluene, Ethylbenzene, Xylene and Naphthalene - Polyaromatic hydrocarbons	- Collect soil samples around the perimeter of the AST bunding for analysis for the COPC.** - Collect soil samples at the former bowser location for analysis for the COPC.**
Emergency Powerhouse	Two 650 L diesel day tanks are located inside the EPH. Historical excerpts indicate that the EPH was supplied by	No soil analytical data available to assess potential hydrocarbon	Total Recoverable Hydrocarbons	Collect soil samples around the perimeter of

IEE Davis Critical Infrastructure Works

	a 950 L AST which was removed in 1994. Staining in the area of the removed 950 L AST and downgradient of this location has been observed. External asbestos sheeting has been reported on the exterior of the EPH.		impact at (and downgradient of) the former 950 L AST.	• Benzene, Toluene, Ethylbenzene, Xylene and Naphthalene • Polyaromatic hydrocarbons	the EPH for analysis for the COPC.** • Collect soil samples at the former 950 L AST location for analysis for the COPC.**
Water Supply Building and AST	The Station Tarn is the freshwater drinking supply for the station. The desalination plant is connected to a 10,000 L bunded AST. Historical excerpts indicate that an 8,000 L SAB diesel spill occurred from the AST in 1995. Obvious contamination along the shoreline and strong hydrocarbon odour was reported in 1996. PFAS has been reported in water samples collected from the Station Tarn.	• No soil, sediment or water sampling data associated with the spill investigation has been made available. • No soil stockpile data associated with the spill clean-up has been made available. • No validation data is available to confirm if hydrocarbon impacted soil was removed from the Station Tarn.		• Total Recoverable Hydrocarbons • Benzene, Toluene, Ethylbenzene, Xylene and Naphthalene • Polyaromatic hydrocarbons • Per- and poly-fluoroalkyl substances	• Review existing PFAS analytical data for the Station Tarn. ** • Collect soil samples around the AST and downgradient towards the Station Tarn for analysis for the COPC.**** • Collect sediment samples from the western shoreline of the Station Tarn for analysis for the COPC.**** • Collect water samples from the Station Tarn for analysis for the COPC.*****
Living Quarters and AST	The living quarters are supplied by a 10,000 L bunded AST. Small diesel and glycol spills have been recorded in the	• No soil analytical data available to assess if any		• Total Recoverable Hydrocarbons	• Collect soil samples around the AST for analysis for the COPC.**

IEE Davis Critical Infrastructure Works

	vicinity of the living quarters due to ruptured hoses and leaking valves.	- fuel spills have occurred in the vicinity of the AST. - No soil analytical data available to assess the extent of contaminated soil in the vicinity of the living quarters.	- Benzene, Toluene, Ethylbenzene, Xylene and Naphthalene - Polyaromatic hydrocarbons Glycol	Collect soil samples where the diesel fuel lines enter the living quarters.**
Mobile Vehicle Spills	Site photographs indicate that light and heavy vehicles are parked across the station precinct during the summer months. Hydraulic oil, diesel and glycol spills to surface soil from mobile vehicles have occurred across the station precinct.	Limited information available for the location of incident, hazard and improvement suggestion reporting system (IHIS) reported mobile vehicle spills.	- Total Recoverable Hydrocarbons - Benzene, Toluene, Ethylbenzene, Xylene and Naphthalene - Polyaromatic hydrocarbons	Ensure GPS coordinates are collected for all hydrocarbon spills associated with mobile vehicles to ensure accurate clean-up and validation of the COPC. *****
Wastewater				
Sewage Outfall	The sewage outfall discharges directly to Prydz Bay. Historical excerpts suggest that until completion of the wastewater treatment plant in 1991, an outfall pipe transported kitchen waste and urine from the Old Living Quarters directly into Prydz Bay. Sampling for sterols and aliphatic hydrocarbons has been completed in the vicinity of the sewage outfall.	No information is available for the potential discharge of PFAS through the sewerage outfall line.	Per- and poly-fluoroalkyl substances	Collect water samples at the sewage outfall for analysis for the COPC. *****

***The recommendations for further investigation are based on the information available for review at the time of writing the Stage 1 PSI. Careful consideration is needed as to the depth of soil sample collection to ensure the source-pathway-receptor linkages are adequately assessed.**

**** Recommendation that will be addressed as part of the DCIW, (Section 5.4 and 5.5)**

***** Only asbestos removal is scheduled for the Trades Workshop, no ground disturbance is required, therefore this recommendation for further investigation will not be completed as part of the proposed DCIW.**

****** Diverting hyper saline brine away from the Tarn is proposed, no further impacts to the Tarn is anticipated, therefore these recommendations are not included.**

******* Already completed by AAD.**

******* Underway by AAD, outside of scope of DCIW.**

4.10 Wilderness, aesthetic and intrinsic values

As the Environmental Protocol acknowledges, Antarctica possesses intrinsic value, including wilderness and aesthetic values. Wilderness values apply to natural areas visually undisturbed by human activities or structures and characterised by remoteness from settlement, remoteness from access, apparent naturalness and biophysical naturalness. A variety of definitions for wilderness exist. In comparative terms, all of Antarctica can be considered a wilderness regardless of varying degrees of degradation across Antarctic regions (AAD, 2024d).

The wider Vestfold Hills region includes areas of considerable, if not outstanding, aesthetic value. The region features on macro and micro scales, providing a sense of wonderment or appreciation variously deriving from the sight of the vast and expansive Antarctic plateau; concentrations of intensely coloured lakes; the formation and retreat of sea ice; the clarity of the near-shore water; the variety, patterns and textures of geology at landscape scale through to individual rocks; and/or the abundance or engaging behaviour of wildlife. Experiences of Antarctica's wilderness values are similarly associated with the continent's remoteness and senses of solitude, discovery and scale (AAD, 2025b).

The wilderness values attributed to the Davis station limits have largely been impacted by human presence. As outlined in Section 4.9, Davis station features an array of buildings and facilities required for the continued operation of Davis station in undertaking world leading science.

Construction of new infrastructure will result in unavoidable impacts to wilderness and aesthetic values in the immediate and surrounding areas. The removal of redundant infrastructure, however, also poses opportunity to positively attribute to wilderness values.

Impacts to wilderness values will largely be the result of ground disturbance including new roads and laydown areas, and the presence of new buildings. Blasting at the quarry, if required, is expected to have a notable short-term impact to wilderness values associated with dust and noise, however as the quarry is an existing site the impact to landform has largely already been disturbed.

5 Assessment of environmental impacts

5.1 Methodology

The assessment of environmental impacts from the DCIW involved four key stages consistent with the objectives of Annex I of the Protocol on Environmental Protection to the Antarctic Treaty and AAD's Environmental Management System (EMS) approach to managing the AAD's interaction with the environment:

1. Identify the key activities of the project (Section 2.4).
2. Identify the environmental aspects, i.e. how the activities interact with the environment (Section 5.3).
3. Identify the environmental impacts, i.e. the change in environmental values or resources as a result of the activities (Section 5.4).
4. Assess the significance of impacts, including the spatial extent, duration, and environmental consequences (Section 5.5).
5. Assess and summarise the cumulative impacts of activities on specific environmental features (Section 5.6).

The assessment incorporates past knowledge and experience in conducting construction activities within the AAP and advice from subject matter experts (SMEs) within the AAD's Assets and Infrastructure and Science Branches. The SMEs were consulted and engaged in the environmental risk assessment process, including Geoscience Australia. Individual activities were discussed and assessed with an agreed level of risk applied.

Cumulative impacts were summarised using the outcomes of the environmental risk assessment outlined above and are further described in Section 5.6. In assessing the cumulative impacts to environmental values, all activities were assigned against the environmental features identified within this IEE (e.g. disturbance/destruction of fauna, habitat change, degradation of wilderness values etc.).

The assessment of significance was based on the likelihood (Table 13) and consequence (Table 14) of a particular impact or group of impacts occurring because of an activity. In order to determine the overall significance and risk, each potential impact was assessed using the following criteria:

Table 13. Additional guidance for environmental consequence criteria (adapted from AAD's Environmental Aspects and Impacts Register)

Likelihood	Description
Almost Certain	Is expected to occur in most circumstances. Has occurred in the AAD or similar in the past year.
Likely	Will probably occur. Has occurred in the AAD or similar in the past two years.
Possible	Might occur (could happen) at some time in the future. Has occurred in the AAD or similar in the past five years.
Unlikely	Could occur but considered unlikely or doubtful. Has occurred in the AAD or similar in the past ten years.
Remote	May occur in exceptional circumstances. Has not occurred in the AAD or similar in the past ten years.

Table 14. Criteria to describe the consequence of the impact occurring (adapted from AAD's Environmental Aspects and Impacts Register)

Consequence	Description
Insignificant	Negligible environmental impact, with any effects being minor, localised and readily reversible without intervention.
Minor	Isolated but significant instances of environmental damage that could be reversed with intensive efforts.
Moderate	Significant instances of environmental damage that could be reversed with intensive efforts.
Major	Major loss of environmental amenity and real danger of continuing.
Catastrophic	Severe widespread loss of environmental amenity and irrecoverable environmental damage.

In determining significance, the following additional criteria were used to take into consideration the range of potential consequences resulting from an activity or impact:

- Spatial extent
- Reversibility
- Intensity/magnitude, and
- Duration.

Table 15 includes environmental consequence criteria descriptions that provide additional guidance in assigning an environmental consequence rating. Where activities may result in a combination of impacts across multiple environmental features, the feature with the highest risk rating has been applied, therefore adopting a conservative approach.

Table 15. Additional guidance for environmental consequence criteria (adapted from AAD's Environmental Aspects and Impacts Register)

Environmental consequence	Insignificant	Minor	Moderate	Major	Catastrophic
Spatial extent – over what approximate area are environmental impacts likely to occur?	<10 m ² e.g. less than 3 m x 3 m or 5 m x 2 m	<100 m ² e.g. less than 10 m x 10 m	<1,000 m ² e.g. less than 32 m x 32 m or 10 m x 100 m	<10,000 m ² e.g. less than 100 m x 100 m or 10 m x 1000 m	>10,000 m ² e.g. over 100 m x 100 m or 10 m x 1000 m
Reversibility – how possible is it that the environmental impacts can be reversed?	Reversible with minor intervention	Reversible with moderate intervention	Reversible with intensive effort	Reversible with intensive long-term effort	Effectively irreversible
Intensity / magnitude – how much change to the environment is likely to occur?					
Consider change to landscape features <i>e.g. stone polygons, rare or unusual rock formations or mineral assemblages, ice-free areas.</i>	Degradation or loss of < 1% of the area of local occurrences of a landscape feature	Degradation or loss of < 5% of the area of local occurrences of a landscape feature	Degradation or loss of <20% of the area of local occurrences of a landscape feature	Degradation or loss of <50% of the area of local occurrences of a landscape feature <i>or</i> Degradation or loss of up to 5% of the area of all known occurrences of a landscape feature (globally)	Greater than 50% of the area of local examples of a landscape feature <i>or</i> Degradation or loss greater than 5% of the area of all known occurrences of a landscape feature (globally)
Consider change to species of fauna and flora, including threatened species <i>e.g. moss beds, invertebrates.</i>	No observable change	Some individuals impacted. No population impact and no impact on	Loss of individuals. Minimal impact on population <i>or</i> Some impact on individuals	Substantial impact on or loss of population. Potential loss of genetic diversity <i>or</i> Loss of	Local extinction of species. Loss of genetic diversity <i>or</i> Impact on one or more populations of

		threatened species	of threatened species	individuals of threatened species	threatened species
Consider change to environmental values of sites <i>e.g. biological, scientific, historic, aesthetic or wilderness value.</i>	No observable change	Some degradation of values	Substantial degradation or loss of values <i>or</i> Some degradation of values within nationally or internationally significant sites (ASPA, ASMA & Heritage managed areas)	Loss of values <i>or</i> Substantial degradation of a nationally <i>or</i> internationally significant site	Loss of values of a nationally <i>or</i> internationally significant site
Duration – over what period are the impacts likely to occur?	<1 month	<1 year	<5 years	<15 years	>15 Years

The likelihood and consequence were considered for each activity against the aspects of the environment it interacts with and the potential environmental impacts. The risk ratings in Table 16 were applied for activities pre- and post-mitigation.

Table 16. Environmental risk rating matrix (adapted from AAD's Environmental Aspects and Impacts Register)

Likelihood	Consequence				
	Insignificant	Minor	Moderate	Major	Catastrophic
Almost certain	Medium	Medium	High	Severe	Severe
Likely	Low	Medium	High	High	Severe
Possible	Low	Low	Medium	High	High
Unlikely	Low	Low	Medium	Medium	High
Will be remote	Low	Low	Low	Medium	Medium

For the purposes of this assessment, the classifications in Table 17 have been applied to determine residual risk ratings for the activities described in Section 5.2, consistent with the three levels of impact significance outlined in Article 8(1) of the Environmental Protocol. This table has been used as a general guide, noting that while it is consistent with those applied in IEEs for operational

activities, construction-related impacts may differ in duration and permanence. Accordingly, each activity has been assessed on the basis of its specific interaction with the environment.

Table 17. Relationship of AAD risk ratings to the levels of impact significance described in Article 8(1) of the Environmental Protocol (adapted from AAD's Environmental Aspects and Impacts Register)

Risk Rating	Level of significance
Low	Less than minor or transitory
Medium	No more than minor or transitory
High	More than minor or transitory
Severe	

5.2 Proposed activities

A detailed description of the scope and locations of the activities associated with the DCIW is addressed in Section 2.4 of this document. These activities have been summarised for the impact assessment process:

- **Storage:**
 - Cargo storage prior to transportation via vessel to Antarctica. Including cargo processing and storage outside of the Cargo Biosecurity Centre.¹
 - Storage (including the construction and rehabilitation of laydown areas) of all DCIW containerised and break-bulk cargo at Davis station.
- **Construction:** Construction and rehabilitation of New Pump House, Reverse Osmosis, Utility Building and Service Reticulation (support structures).
- **Acquiring Fill:**
 - Blasting of selected area within the quarry to source fill for construction activities and blasting rock within the footprint of the Utility Building.²
 - Processing of fill material within the quarry and construction footprint of the Utility Building.
- **Refurbishment:** Refurbishment of Old Living Quarters and Trades Workshop.
- **Demolition:** Demolition and rehabilitation of Emergency Powerhouse and Main Powerhouse.
- **Installation and Commissioning:** Installation and commissioning of equipment within the New Pump House, Reverse Osmosis, Utility Building and Service Reticulation.
- **Waste Management:** Waste management in alignment with station operations and the return to mainland Australia of hazardous chemicals and materials, recyclables, general waste and building and construction waste.

¹ Not in scope of this IEE as activities occurs outside of the Antarctic region (the area south of 60 degrees South latitude).

² Activity not currently in scope of this IEE, pending further investigation and assessment.

As necessary, the entirety of the key activities listed above are collectively referred to as the Davis Critical Infrastructure Works within the Environmental Risk Matrix.

5.3 Environmental aspects

Environmental aspects are the element of an organisation's activities, products or services that interact or can interact with the environment (ISO-14001). As described in the Revised Guidelines for Environmental Impacts Assessment in Antarctica (2016) (adopted under Antarctic Treaty Consultative Meeting Resolution 1 [2016]), an environmental aspect may include emission of pollutants/noise/light, human presence, transfer of native or non-native species, direct contact with wildlife/vegetation, and/or a leak or spill of hazardous substances, amongst others. These Guidelines provide non-binding guidance to support the environmental impact assessment process established

under Article 8 and Annex I of the Protocol on Environmental Protection to the Antarctic Treaty, and do not amend or replace those legal requirements.

Environmental aspects may also involve removal from the environment of organic or inorganic material, including collection of fauna and flora and the removal of water, ice or rocks.

The AAD uses the following definitions in its Environmental Management System (EMS) Environmental Aspects and Impacts Register:

- Energy Use – includes the use of electricity, non-renewable resources, refrigerants, water and release of exhaust, gaseous and radioactive emissions.
- Physical Disturbance – includes human activities, introduction of non-indigenous species, parasites and diseases, disturbance to soils, flora, fauna, communities and ecosystems, building and infrastructure maintenance and construction and station activities.
- Hazardous Chemicals – includes the storage, use and disposal of chemicals and hazardous materials.
- Waste Management – includes the management of combustible, hazardous, sewage and domestic liquid and solid waste products.

5.4 Potential impacts and mitigation measures

This section outlines the potential environmental impacts resulting from the proposed activities described in Section 5.2. The potential impacts, inherent and residual risks, and mitigation measures applied are presented in Section 5.5 and Table 21.

The following categories of environmental impact have been used in this assessment:

- Biological change and biosecurity
- Habitat and Landscape change
- Disturbance/destruction of terrestrial flora and soil communities
- Disturbance/destruction of fauna
- Destruction of benthic communities
- Noise pollution
- Pollution of land, sea water, sediments, snow, ice, underground water and inland water
- Pollution of the air
- Degradation of heritage/cultural values
- Degradation of wilderness values
- Depletion of non-renewable resources
- Depletion of water
- Landfill

Mitigation measures such as SOPs, guidelines, manuals, standards policies and any updates of these documents, as well as continual improvement through the framework of AAD's EMS are proposed to be consistently applied to the DCIW activities and are relevant to several potential impacts. These mitigation measures include:

- Mandatory training for all AAP expeditioners, including:
 - completion of an online learning course, “Introduction to Environmental Management in Antarctica/the sub-Antarctic”
 - attendance at an “Environmental Management pre-departure session”
 - attendance at an Expeditioner Summit, which covers environmental best practice, incident reporting, waste management and other environmental matters to prioritise when on station.
- Applying AAD’s SOPs for plant operation, snow clearing and the safe operation and maintenance of vehicles. All expeditioners are trained and certified for each vehicle and piece of plant equipment that they are required to operate, including a review of relevant SOPs. Training and correct usage is the responsibility of the Mechanical and Mobile Plant team.
- Use of AAD’s incident reporting system, which continually identifies emerging environmental issues or risks and maps trends on how activities and operations can be improved. The Environmental Management Unit manages information received from all environmental incident reports as they are submitted. Where incidents identify an opportunity or need for improvement, the owner of the activity is consulted and is responsible for the planning and implementation of that improvement.
- Development of new SOPs where new procedures are proposed as part of commissioning new equipment and facilities.
- Additional DCIW specific training, which will be provided for the expeditioners of each season. The training will cover the proposed works authorisation and conditions, environmental impacts and mitigation measures, waste management and environmental stewardship requirements, in line with the AAD’s current Environmental Policy.
- Adherence to the AIRP DCIW Construction Environmental Management Plan (CEMP) and associated sub plans.
- Regular site inspections, audits and monitoring undertaken by the Quality, Health, Safety, and Environment (QHSE) Coordinator or equivalent expeditioner as per the AIRP DCIW CEMP.
- Use of an asset maintenance program through Maximo, which ensures operational efficiency of equipment is maintained.
- Adherence to the AIRP DCIW CEMP.
- Adherence to the AAD Environmental Code of Conduct by all personnel.
- Limiting all works to the designated project area and timeline as outlined in the AIRP Construction Management Plan.
- Applying appropriate fuel management, which includes only having trained staff undertake refuelling activities, use of fuel spill kits, and appropriate storage.
- Adherence to an unexpected finds procedure to be included in the AIRP DCIW CEMP to assist in identification of fuel spills and leaks. The procedure will incorporate information from the Davis Station – Preliminary Site Investigation, along with any subsequent events.

5.4.1 Biological change and biosecurity

Non-native species, parasites, diseases, microbes and other biological contaminants (e.g. soil, webs, nests, bird faeces) may be transported to Antarctica via vessel during the loading of cargo,

equipment, stores and personnel in mainland Australia. Whilst most non-native species would not survive the extreme conditions in Antarctica the risk of potential biological change remains present. This risk applies to storage activities of cargo outside of the Cargo Biosecurity Centre (CBC) prior to transportation and the subsequent storage of DCIW containerised and break-bulk cargo and equipment at Davis station.

The proposed activity of storing cargo may present biosecurity risks and the potential for biological change over time. Concerns include cargo potentially bypassing CBC processing, which may increase the likelihood of contamination or introduction of non-native species. Additionally, third-party or contractor-packed cargo may contain Biosecurity Risk Material (BRM), especially in break bulk shipments, without proper screening. Contractors and suppliers may also be unaware of the required bespoke biosecurity standards, potentially resulting in inadequate handling and processing. Furthermore, personnel may transport BRM through Unaccompanied Personal Effects. These factors collectively heighten the potential for biological change.

It is essential to implement robust biosecurity protocols and awareness training to prevent these impacts. Cargo not processed through the CBC will align with AAD's Biosecurity Management Plan and related SOPs, with all principles and procedures reflected as a minimum standard for operations. Additionally, DCIW specific training for expeditioners prior to departure will be implemented, addressing environmental and biosecurity risks in addition to AADs mandatory expeditioner training. Supplementary shipping will also be required to adhere to all AAD biosecurity procedures.

Mitigation measures that will be applied to avoid biological change include the following:

- Inclusion of biosecurity conditions within service agreements (contracts) with third-party providers.
- All plant, equipment, and personal effects are to be clean and free from pests and agents of disease prior to packing and storage. Where required, items to be packed into new or clean boxes/containers, fumigated and sealed to prevent potential biosecurity risk material incursion. Ensuring that adequate cleaning/wash-down events and biosecurity screening occurs for all necessary cargo prior to departure.
- Pre-departure biosecurity audits/inspections are undertaken on all cargo, including equipment and materials of third-party providers to ensure compliance with biosecurity protocols.
- Use of Biosecurity Officers/Coordinators that are trained for the bespoke Australian Antarctic Division biosecurity requirements for all audits and inspections.
- All staff and contractors involved in cargo preparation and dispatch to complete the AAD Biosecurity Training Package (when available).
- Training and education of expeditioners for biosecurity requirements/ identification through AAD training and separate project inductions.
- Biosecurity audit requirements will be detailed in the AIRP Biosecurity Management Sub-plan.
- Development of detailed processes and alignment of biosecurity practices and management of cargo that isn't directly processed via the CBC.

- Testing and commissioning of key equipment within mainland Australia prior to departure, to assist in identifying potential BRM that may be exposed.
- Adherence to both the AAD's Biosecurity Management Plan and the AIRP Biosecurity Management Sub-Plan, with the latter aligned to and supporting the objectives of the AAD's Plan.
- Prioritisation of cargo through the AAD's capabilities (CBC), via cargo ranking based on its physical attributes and its origin, in consultation with SMEs.
- Procurement of new equipment/machinery to lower the likelihood of transporting BRM to Antarctica.
- Alignment with AAD's minimum quarantine/desiccation period for containers bound for RTA, if required for Highly Pathogenic Avian Influenza virus management.

5.4.2 Habitat and landscape change

Antarctic landscapes in the vicinity of stations have been highly modified by the presence of station facilities and infrastructure since the mid-20th century. The proposed DCIW activities may contribute to varying degrees to habitat and landscape changes generally associated with ground clearance of previously undisturbed areas and works in proximity to wildlife habitat.

Expansion of laydown areas for cargo storage will result in physical disturbance, which will lead to landscape changes and potentially impact wildlife habitats. Construction activities for new infrastructure and the processing and use of fill material from quarry sites will further modify local, terrain.

The storage of containerised and break-bulk cargo and equipment within existing and expanded laydown areas may also lead to landscape and habitat changes. Physical disturbance from human activity in these areas could disrupt local fauna, particularly seabirds that may nest within or near the cargo laydown areas. The expansion of these storage areas increases the risk of habitat degradation and displacement of native species.

The acquisition of fill material from the Davis station quarry will disturb the natural terrain, leading to changes in landform. These disturbances can have effects on soil stability, vegetation recovery, and the ecological integrity of the surrounding environment.

The construction of the new infrastructure (New Pump House, Reverse Osmosis Plant, Utility Building and Service Reticulation) may present additional impacts to the surrounding landscape and habitats. These construction activities include ground disturbance through earthworks, cut and fill operations, and the use of processed fill material from the quarry. The movement of machinery and foot traffic along existing roads, the expansion (widening) of roads, temporary stockpiling, and material sprawl increase the footprint of disturbance. The assembly of structures, including the tallest building on station (excluding telecommunications towers), and the expansion of service reticulation supports along the wharf outfall line as well as the partial backfilling of the borrow pit, will alter the existing landscape. In addition to these physical modifications, the presence of new buildings, expanded laydown areas, and stored cargo will also influence local micro-habitats through the creation of snow drifts, altered wind patterns, and changes in meltwater flow paths. These

indirect effects can modify small-scale habitat conditions, potentially affecting local species that utilise these micro-environments.

In general, installation and commissioning activities will be internal to the new infrastructure and have minimal impact on the landscape. However, potential habitat impacts arising from commissioning of the New Pump House and RO include the discharge of brine and backwash water into the marine environment. This impact is discussed further in Section 5.4.5. Due to the volumes and duration of discharge associated with commissioning activities, impact on habitat and landscape is considered minimal. Waste management activities, including excess building waste, if not returned to mainland Australia when planned, could also impact habitats and landscapes.

The scope of the proposed DCIW is confined to the Davis station limits, an area that is already highly modified and disturbed by existing infrastructure and activities. Consequently, the anticipated impacts on the surrounding landscape are also minimal, with negligible changes to the natural environment.

Mitigation measures that will be applied for habitat and landscape change include the following:

- Undertake assessment of terrestrial flora presence within works areas before works commence. Consultation with flora SMEs in the event any terrestrial flora (including hypolithic biota beneath translucent quartz stones) is present and may include advice on how best to relocate any floral communities outside the area of disturbance.
- Periodic monitoring of flora species impacted by DCIW activities within active disturbance areas, as identified in the baseline survey, will be undertaken in accordance with the Environmental Monitoring and Reporting Framework. Monitoring will include visual assessments of individual colonies and documentation of any significant changes compared to baseline conditions, with particular attention to identified areas of special interest
- Review of the Blast Management Plan by an expert in Antarctic wilderness values and landscape change, specifically reviewing the proposed quarried area (March 2026).
- The use of already disturbed areas wherever possible, within the existing station's footprint, for the location of new buildings, including roads and laydown areas.
- Wherever earthworks occur, minimise the disturbance footprint as much as possible. This will be supported by planning, geotechnical calculations, and survey work (outside the scope of this IEE and subject to separate authorisation).
- Limiting all works to the designated project area and timeline as outlined in the AIRP Construction Management Plan.
- Where blasting is proposed, it must be carried out under the supervision of and in accordance with the advice provided by an on-site suitably qualified and experienced demolition/explosives engineer.
- Completing all necessary engineering and geotechnical calculations/requirements to quantify needs of fill to limit over processing and over production.
- Determining the location/positioning/placement of proposed buildings to reduce the need or volume of fill material required, as much as practicable.
- Adherence to the Antarctic station Return to mainland Australia Plan, ensuring DCIW waste planning is integrated into this existing plan.

- Development and utilisation of an annual laydown area planning document for efficient use of laydown areas. Laydown area planning will consider each laydown area's proximity to wildlife and the seasonality of any wildlife expected to be in the vicinity. Laydown area planning is to be updated regularly, prior to the start of every summer season, however, updates may be more frequent, on an as needed basis.
- DCIW buildings have been designed to produce minimal impacts arising from snow accumulation, drifts and wind pattern changes.

5.4.3 Disturbance and/or destruction of terrestrial flora and soil communities

The DCIW may impact terrestrial flora and soil communities through land clearance, dust generation and potential contamination to land or water. Historical surveys have not reported terrestrial surface flora within the works areas and detailed surveys have not been undertaken. However, as predictive models show that sublithic communities have a very high probability of presence throughout the station area, they are potentially present within the works area.

Anecdotal information from expeditioners at Davis station suggest that dust emissions are often elevated due to prevailing wind conditions and the absence of snow during the summer season. Dust can be further generated from general station operations, blasting, earthworks, demolition, and cargo storage/handling activities. These emissions have the potential to negatively impact terrestrial flora and soil communities. Fine dust particles can settle on vegetation, reducing photosynthesis and health, while also altering soil conditions. These impacts can intensify if dust reduction measures fail and if dust accumulates and/or mobilises over time, particularly in areas with repeated construction or machinery use.

Fuel and chemical spills during construction, demolition, and installation/commissioning activities can significantly impact terrestrial flora and sublithic communities. Leaks from machinery, refuelling operations, storage tanks, and associated infrastructure can contaminate soil, which may lead to direct toxicity, reduced nutrient availability, and long-term degradation of plant health (Aislabie et al., 2004 & Schafer et al., 2007). These impacts occur when fuels, oils, coolants, and other hazardous substances infiltrate the soil, possibly inhibiting vegetation growth, recovery or establishment and degrade the resilience of the entire soil trophic structure (Aislabie et al., 2004 & Nydahl et al., 2015).

Human presence associated with construction, installation/commissioning, and storage activities can impact flora and soil communities through increased physical disturbance. These impacts arise from expanded infrastructure footprints, road widening, and increased vehicle and foot traffic, which could lead to vegetation trampling, soil compaction, and habitat fragmentation. As well as micro-habitat changes from changes in snow accumulation/melt from new or changed use of the area.

The proposed blasting activity poses a risk to sublithic communities, if present, within the quarried area, resulting in their destruction. The processing and use of fill material during construction activities can impact both terrestrial flora and soil communities through direct landscape disturbance. These impacts may occur when these communities or individuals are potentially removed or buried during excavation, earthworks, and stockpiling. Additional disturbance from machinery movement, road widening, and the expansion of infrastructure footprints further contributes to habitat loss, soil compaction, and reduced vegetation recovery potential.

The collection of environmental samples during construction, demolition, and commissioning activities can also unintentionally impact soil and microbial communities. These impacts occur when soil samples are taken without proper controls, leading to the removal or disturbance of microorganisms essential to plant health and/or nutrient cycling. Due to the nature and extent of sampling proposed, this activity is expected to have an insignificant impact on the environment.

Mitigation measures that will be applied for flora and soil communities include the following:

- Undertaking baseline surveys of terrestrial flora and sublithic communities at proposed areas of DCIW activities and before works commence. Suitably qualified or trained personnel will undertake the initial surveys using clear guidance documents and photos from SMEs. Consult with flora SMEs if any terrestrial flora or sublithic communities are present.
- Periodic monitoring of flora species impacted by DCIW activities within active disturbance areas, as identified in the baseline survey, will be undertaken in accordance with the Environmental Monitoring and Reporting Framework. Monitoring will include visual assessments of individual colonies and documentation of any significant changes compared to baseline conditions, with particular attention to identified areas of special interest.
- Undertake a daily review of weather conditions. Develop and implement a decision matrix which outlines wind thresholds for specific activities and associated mitigations where average wind forecast is expected to be greater than 20 knots and dust generated is likely to be deposited in areas of identified sensitive receptors, identified within the AIRP DCIW CEMP.
- Adhere to dust control measures outlined in the AIRP DCIW CEMP.
- Develop and implement a dust monitoring program that incorporates quantifiable dust monitoring.
- Undertake desktop dust assessment of the proposed works to determine weather conditions that result in distribution of dust on ecological receptors, assessment to inform appropriate mitigations.
- Modify activities if dust generation exceeds limits within the AIRP DCIW CEMP.
- Wherever earthworks occur, minimise the disturbance footprint as much as possible. This will be supported by planning, geotechnical calculations, and survey work (outside the scope of this IEE and subject to separate authorisation).
- Utilise previously disturbed areas wherever possible, including roads, laydowns and for the location of new buildings.
- Complete all necessary engineering and geotechnical calculations/requirements to quantify the amount of fill to limit over processing and over production.
- Determine the location/positioning/placement of proposed buildings to reduce the need or volume of fill material required, as much as practicable.
- Train and educate expeditioners about terrestrial communities through AAD training and project inductions prior to commencing onsite, as well as toolbox and pre-start discussions during works.

5.4.4 Disturbance and/or destruction of fauna

Dust emissions resulting from storage, construction, refurbishment, demolition, and installation/commissioning activities will have various degrees of impacts to local wildlife. The movement and handling of cargo, earthworks for laydown areas, and poor dust management could lead to the disturbance of wildlife. Similar earthworks associated with construction activities can generate airborne dust that may settle on local fauna, potentially affecting their health, behaviour, and habitat. Blasting and crushing operations could further exacerbate dust release, especially if dust suppression measures fail. Refurbishment and demolition work will disturb a small footprint. However, dust accumulated within these buildings may be released into the environment. Installation and commissioning of equipment may also generate a small volume of dust through cleaning, operational activities, and dust extractor failures. Collectively, these processes can disrupt wildlife presence and activities. There is also a risk of impacts to cryptic cavity-nesting fauna (e.g., birds or invertebrates utilising voids in rock piles, infrastructure cavities, or quarry faces) if nests or shelter sites are not detected prior to earthworks, blasting, or material handling in these areas.

Noise and vibration emissions generated during construction works can have considerable impacts on wildlife. Existing noise associated with stations operations is unknown however key DCIW activities including earthworks, blasting, rock drilling and the use of heavy machinery for cargo movement and earthworks will contribute to elevated noise levels that may disrupt fauna behaviour and may lead to habitat avoidance. Construction activities involving multiple tools, equipment, and increased human presence will elevate ambient noise levels in specific locations and may lead to displacement of individuals.

Key noise generating activities include blasting and rock breaking/jack hammering. Blasting operations will produce intense, short-duration noise and vibrations that can startle or harm nearby wildlife, especially if suppression measures fail. Continued processing of fill material, including drilling and crushing, adds to the acoustic disturbance. Refurbishment and internal works also contribute to localised noise pollution, while equipment testing and commissioning may result in unpredictable noise spikes due to malfunctions or inadequate insulation. Collectively, these disturbances can alter habitat use patterns, and interfere with feeding, breeding, and communication among wildlife. In the absence of pre-work inspections, blasting and mechanical disturbance may directly affect undetected cavity nesting species.

Artificial light and increased light exposure can disrupt wildlife by altering natural behaviours such as foraging, breeding, and navigation. Many species rely on seasonal light cues, so artificial illumination can cause disorientation and stress. Artificial lighting within the DCIW is expected to remain minimal during the summer period due to the high levels of natural light.

The presence and activities of personnel during the DCIW can affect local wildlife through direct and indirect disturbance and habitat encroachment, however, there will be no overall increase in base population. Expanded cargo laydown areas near coastlines increase the risk of disrupting nesting seabirds. Construction activities, particularly near the New Pump House and along the wharf outfall line, may disturb seal haul-out sites and nesting birds. Increased foot and vehicle traffic, along with the widening of road footprints, may encroach on wildlife habitats. During installation and

commissioning, inspections and works near the sea intake area could disturb coastal communities. These impacts from human activity can alter natural behaviours and interfere with wildlife presence.

Contamination, spills and disturbance of existing contamination during construction and demolition activities pose serious risks to humans, wildlife and surrounding ecosystems. Accidental releases of fuels, oils, coolants, solvents, and other hazardous substances from machinery, refuelling operations, or infrastructure failures can lead to pollution impacting wildlife. These pollutants can degrade habitats and directly impact wildlife through exposure or ingestion. Wildlife may be displaced or suffer physiological stress due to chemical exposure, particularly in coastal environments near the New Pump House. Without effective containment and response measures, such incidents can result in persistent contamination, reducing biodiversity and compromising the health of local wildlife populations, pollution mitigations are presented in Section 5.4.7.

Mitigation measures that will be applied for the protection of fauna include the following:

- Undertake baseline surveying of wildlife and terrestrial flora before works commence, by suitably trained personnel within all proposed activities to determine the potential use by wildlife (such as nesting sites).
- Undertake desktop noise modelling of proposed works (e.g. blasting) under different environmental conditions (e.g. wind speeds and direction). Adjust timing of noisy activities to avoid periods where impacts to wildlife are likely to be exacerbated by weather conditions.
- Undertake baseline and real-time noise monitoring, as described within the noise monitoring plan, before and during works. Use baseline monitoring to determine impact of activities and use real time monitoring to inform the potential adjustment of current works as needed.
- Undertake daily wildlife inspections during all DCIW activities.
- Pre-activity nest surveys to inform disturbance distance to implement, where possible, during nesting season.
- All expeditioners will follow the AAD's Wildlife Approach Distance Guidelines.
- Develop a decision matrix to determine appropriate mitigation measures if wildlife is present within the minimum separation distances when utilising vehicles or powered equipment. Minimum separation distances that must be maintained when on foot or in a vehicle are prescribed within the AAD's Avoiding Wildlife Disturbance Policy ([Guidelines for animal approach distances – the Australian Antarctic Program](#)).
- Undertake mandatory AAD pre-departure training for all expeditioners, which includes information on preventing wildlife disturbance.
- Development and utilisation of an annual laydown area planning document for efficient use of laydown areas. Laydown area planning will consider each laydown area's proximity to wildlife and the seasonality of any wildlife expected to be in the vicinity. Laydown area planning is to be updated regularly, prior to the start of every summer season, however, updates may be more frequent, on an as needed basis.
- Engage with the Davis station Environmental Officer to ensure wildlife approach distance guidelines are consistently communicated to all expeditioners while on station.
- Apply human safety buffer (exclusion) zones for all asbestos work to (air breathing) wildlife.

- Implement the Australian National Light Pollution Guidelines for Wildlife.
- Direct lighting away and/or shield lighting from seabird nesting and seal haul-out areas (coastal areas or as guided by wildlife SMEs).
- Potential use of preventative measures in key impacted areas, under the advice of wildlife SME, to discourage nesting of avian species. Preventative measures may include the covering of existing nests within the works area to discourage cavity nesting bird species, only to be undertaken if wildlife are not present in the area, prior to their arrival in November – December.
- Review the proposed timing of associated works against the seasonality of wildlife presence and apply where necessary, physical demarcation to maintain activity exclusion zones for wildlife.
- Schedule ground disturbance to avoid periods when wildlife is likely to be within the relevant separation distances to the activities ([Guidelines for animal approach distances – the Australian Antarctic Program](#)).
- Provide an opportunity for review of the blasting methodology when available by AAD wildlife SMEs.
- Enforce traffic management and speed limits of 15 km/h to reduce dust generation and impacts to wildlife.
- Wherever possible, include project planning contingencies to enable overall works to progress in other areas if wildlife presence restricts works progressing within specific locations.
- Avoid, wherever reasonably practicable, high noise generating activities, such as earthworks, cutting, dropping of material, metal on metal interactions and use of horns, beepers and sirens when fauna is within the defined works area (defined within the most recent revision of the AIRP Construction Management Plan).
- Undertake a daily review of weather conditions. Develop and implement a decision matrix which outlines wind thresholds for specific activities and associated mitigations where average wind forecast is expected to be greater than 20 knots and dust generated is likely to be deposited in areas of identified sensitive receptors, identified within the AIRP DCIW CEMP.
- Wherever possible restrict storage area access/use when wildlife is present – this is particularly relevant to storage areas in proximity to seal haul-out areas and known moulting locations.
- Wherever possible, conduct in situ commissioning activities outside of known wildlife areas.
- Station Supply Officer/Station Environmental Officer/Engineering Services Supervisors or equivalent to undertake assessment of unpacked cargo for plastics and removal of materials prone to shredding or dispersal to the environment.
- Adherence to the procedures outlined within AIRP DCIW CEMP for general housekeeping, site management including emu bobs/picking, waste management and plant/equipment storage.

5.4.5 Disturbance and/or destruction of benthic communities

Construction activities, including groundwork, building modifications, and snow clearing, may contribute to airborne dust loads that can settle on ice and marine environments, affecting benthic flora, fauna and communities. Due to ground and weather conditions at Davis station, dust generation and mobilisation over ice is a pre-existing issue however dust generated during construction would exacerbate potential impacts. Dust accumulation alters light penetration and ultimately sediment composition, potentially smothering benthic flora and fauna and disrupting ecological processes such as nutrient cycling and primary production. Over time, repeated dust deposition can degrade habitat quality, reduce biodiversity, and impair the resilience of benthic marine ecosystems to environmental change.

Seawater sampling activities can unintentionally disturb benthic marine communities during the collection of marine sediments resulting in the removal of microorganisms and small organisms. However, due to the nature and extent of sampling activities this is not considered to have notable impact on marine communities. Additionally, the placement of infrastructure such as the Seawater Intake and associated inspections may further disturb benthic marine habitats by altering sediment composition and reducing microbial diversity. The extent of this activities impact within the DCIW is likely to be negligible.

Human activities associated with the installation and commissioning of infrastructure, specifically the New Pump House and Reverse Osmosis systems, can disturb benthic communities. Physical interventions such as the placement of the Seawater Intake and sea ice drilling near coastal zones has a possibility of disrupting sediment layers and benthic habitats. Filtration backwash from the New Pump House and returned seawater is not expected to have notable impact on benthic communities.

The brine discharge from RO plants, may result in increased salinity and possible per- and polyfluoroalkyl substances (PFAS). Discharge to the ocean may impact water chemistry and sediment quality, resulting in bioaccumulation of contaminants. As existing conditions, including PFAS concentrations in both the brine and the receiving environment, and sea water dispersion is largely unknown, the impact on benthic communities is yet to be determined. The brine would be discharged via the existing effluent line, which sits above ground and brine would be dispersed relatively slowly via tides and currents (AAD, 2024d). Due to its higher density, brine would likely sink and accumulate in depressions along the seafloor. This localised accumulation could lead to elevated toxicity levels, adversely affecting the benthic community within the immediate area.

Supplementary shipping activities are likely to have a impact to benthic marine communities, however these impacts will be assessed separately and are not in scope of this IEE.

Mitigation measures that will be applied for benthic communities include the following:

- Develop and implement a dust monitoring program that incorporates quantifiable dust monitoring.
- Undertake desktop dust assessment of the proposed works to determine weather conditions that result in distribution of dust on ecological receptors, assessment to inform appropriate mitigations.

- Modify activities if dust generation exceeds limits within the AIRP DCIW CEMP.
- Equipment will be commissioned in mainland Australia prior to departure for Antarctica wherever possible, with priority given to major systems such as powerhouse generators and reverse osmosis units over minor items like toilets and small electric pumps.
- Development and adherence to a sampling protocol for seawater.
- Adherence to any applicable and existing AAD sampling permits.
- Chemical fixatives are used away from the waterbodies and have a minimum two levels of (double) containment to ensure spill risk is lowered.
- Conduct brine discharge dispersion modelling study and SME engagement in result analysis.

5.4.6 Noise pollution

Noise pollution impacts from proposed activities may result in the disturbance of fauna (Section 5.4.4), degradation of wilderness values (Section 5.4.10), and potential harm from vibrations to heritage and cultural values (Section 5.4.9). Details of the specific impacts on each environmental feature from noise pollution as well as respective mitigation measures are provided in the relevant sections.

Mitigation measures that will be applied for noise related impacts are addressed within Section 5.4.4.

5.4.7 Pollution of land, sea water, sediments, snow, ice, underground water and inland water

Risks associated with DCIW activities include the potential to pollute land and water include hazardous materials spills, dust, waste, and discharges to the marine environment.

Spills and contamination from fuels, hazardous chemicals, and construction and demolition-related materials pose serious risks to Antarctic environments. Accidental releases from machinery, refuelling operations, and infrastructure failures can lead to the pollution of soil, fresh water, sea water, sediments, snow, and ice, affecting both surface and subsurface ecosystems. Contaminants, such as hydrocarbons, coolants, solvents, and anthropogenic-generated particulate matter including silica, gypsum, wood, metal, fibreglass, cement, paint and coating dusts can be remobilised through direct or indirect activities, spreading beyond the initial spill site. These pollutants may disrupt benthic and pelagic communities, degrade water quality, impact soils and aquatic ecosystems, and contribute to long-term habitat change. In addition, disturbance of historically contaminated soils during demolition activities (i.e. Main and Emergency Powerhouses) may mobilise existing contaminants such as hydrocarbons. This could increase the risk of contaminant redistribution via dust generation, surface runoff, or meltwater transport, potentially expanding the area of impact beyond previously affected zones. In snow and ice-covered regions, contaminants can become trapped and later released during melt events.

Fine particulate dust containing contaminants (e.g. plastics, hydrocarbons, etc.) generated from machinery movement and ground disturbance can be transported by wind or meltwater into nearby marine and surface water (tarn) environments impacting receiving waters and sediments. Once deposited, dust can alter the physical and chemical properties of these environments, affecting light

penetration, sediment composition, and water quality. In snow and ice-covered regions, dust accumulation can accelerate melting and release trapped contaminants.

Brine discharge from the RO plant, which is likely to contain contaminants such as PFAS, can alter marine water chemistry and sediment composition, and can potentially impact marine ecological communities. The New Pump House filtration backwash and returned seawater is expected to deposit collected organic matter and any pre-existing contamination already within the seawater (such as PFAS) is not expected to result in adverse impacts to the marine environment. Chemical concentrations of brine discharges associated with commissioning phase of the RO plant are largely unknown, however due to the extent of commissioning activities, release to the marine environment is not considered to have a material impact. Equipment malfunctions may exacerbate these impacts by releasing water with elevated parameters (such as conductivity/salinity), contributing to bioaccumulation and nutrient imbalance in marine ecosystems.

The production, storage and RTA of construction and building material waste, can lead to pollution to air, land or sea if not properly planned and managed. Unintentional release of items due to incorrect storage can result in debris that contaminate the environment. These impacts could be amplified by a lack of awareness or assumptions about the risks associated with waste management. Additionally, failure to securely transport waste from Davis station and the inability to return it to mainland Australia could contribute to waste accumulation. The unintentional release of waste and/or hazardous waste substances during demolition, particularly through airborne distribution, and incorrect storage or misidentification of hazardous waste can also contribute to pollution across multiple environmental media. Air pressured container cleaning for reverse biosecurity may unintentionally release paint flakes into the environment.

Proposed construction and demolition activities would generate various waste materials, and when incorrectly stored, transported, or disposed of, they may become environmental debris. Hazardous substances such as asbestos, chemicals, and dangerous goods pose an even greater risk if containment fails or waste accumulates on station due to logistical constraints. These pollutants can be dispersed by wind, meltwater, or runoff, entering terrestrial, freshwater, marine and cryosphere environments.

Mitigation measures that will be applied to reduce the likelihood of causing pollution include the following:

- Undertake desktop dust assessment of the proposed works to determine weather conditions that result in distribution of dust on ecological receptors, assessment to inform appropriate mitigations.
- Undertake desktop assessment of contamination likelihood in area of earthworks before works commence. Results used to inform precautionary management of the site, credible risk pathways, prioritisation of risks and avoidance of high-risk areas. Consultation with SME advice where required.
- Develop and implement a dust monitoring program that incorporates quantifiable dust monitoring.
- Utilisation of available tools that can be deployed to station (e.g. Photoionization Detector) to identify potential contamination. Where contamination is suspected, samples may be

returned to mainland Australia for detailed analytical testing, in consultation with Australian Antarctic Division contamination and remediation subject matter experts.

- Modify activities if dust generation exceeds limits within the AIRP DCIW CEMP.
- Undertake an assessment of the likelihood of contamination in areas where earthworks are proposed, before works commence. Consult with SMEs when required.
- Assess suspected contamination, by a qualified or suitably trained person, in consultation with AAD contamination, risk and remediation SMEs.
- Include the AAD contamination, risk and remediation SMEs in reporting any spills of fuels or other contaminants via the AAD's environmental incident reporting system.
- Sampling before discharge to the marine environment from the New Pump House Discharge and Reverse Osmosis Plant and engage SMEs in result analysis.
- Conduct brine discharge dispersion modelling study and SME engagement in result analysis.
- Develop and adhere to new SOPs to reflect the change or establishment of new operations.
- Commission equipment in mainland Australia prior to departure for Antarctica wherever possible, with priority given to major systems such as powerhouse generators and reverse osmosis units over minor items such as toilets and small electric pumps.
- Adhere to the AAD's Waste Management Strategy and station RTA plan.
- Develop and adhere to an AIRP RTA plan (June 2026).
- Adhere to the Import Permit for Asbestos (Ref: 13-2025).
- Undertake asbestos removal under valid licencing from WorkSafe Tasmania (Licence Number: 90781014).
- Station Supply Officer/Engineering Services Supervisors/QHSE Coordinator or equivalent to undertake assessment of unpacked cargo for plastics and removal of materials prone to shredding or dispersal to the environment.
- In the event that adhesive labels are used on the exterior of cargo or containers these will be removed at station to avoid them becoming a source of pollution if they detach and become windborne.
- Adherence to the procedures outlined within AIRP DCIW CEMP for general housekeeping, site management including emu bobs/picking, waste management and plant/equipment storage.
- Clear and concise emergency response and incident management procedures in line with AAD Standard Operating Procedures and manuals and consultation with AAD contamination and remediation SMEs.
- All refuelling of construction-related equipment and machinery is to be undertaken with appropriate mitigations including spill kits and mats as per Standard Operating Procedure away from water bodies.
- Use of designated refuelling areas outlined within the AIRP DCIW CEMP.
- All DCIW personnel will be inducted in the unexpected finds procedure detailed in the CEMP.
- Air pressured container cleaning will occur in a designated location and any paint flakes will be cleaned up immediately. Container cleaning is not undertaken in windy conditions.

5.4.8 Pollution of the air

Dust emissions from the proposed activities may degrade air quality across Davis station and the surrounding area. Fine particulate matter released during earthworks, cargo movement, equipment operation, and construction can become airborne, contributing to atmospheric pollution. Airborne particles can affect human health, wildlife and can settle on nearby ecosystems, leading to secondary deposition/contamination of soil, water, snow and ice.

Exhaust emissions and gas releases can degrade air quality and affect both human and ecological health. Engine exhaust from machinery, boilers, and generators contributes to the release of particulate matter and persistent organic pollutants, which may accumulate in the environment. Malfunctioning equipment and concurrent operation of multiple machines can intensify these emissions. Additionally, activities such as spray painting, welding, and cleaning have the potential to release harmful vapours and gases, especially when ventilation is inadequate or storage practices are poor.

Airborne pollutants including hydrocarbons, asbestos fibres, chemical vapours, and fine particulate matter from materials like silica, gypsum, paint, and fibreglass may be released with associated construction and demolition activities. These substances may become airborne due to poor storage, handling failures, or mechanical disturbances, contributing to atmospheric pollution. Inadequate identification and containment of hazardous waste further increase the likelihood of airborne distribution, especially in windy conditions or when disturbed.

Mitigation measures that will be applied to minimise pollution of the air include the following:

- Service all machinery prior to departure to ensure maximum efficiency.
- Ensure efficient use of equipment, including additional generators and machinery.
- Wherever reasonably practicable, limit the number of exhaust emitting equipment/machinery operating at any one time.
- Align with AAD machinery and equipment maintenance servicing frequency (service intervals are twice as frequent as standard manufacturer recommendation).
- Review AIRP DCIW CEMP compliance through regular inspections, auditing and monitoring (6-month frequency minimum for review; however, inspection, auditing and monitoring will be more frequent).
- Educate expeditioners of the environmental impacts and mitigation measures as per the AIRP DCIW CEMP through AAD training and project inductions, toolbox talks and pre-start meetings.
- Store dangerous goods as per the relevant Material Safety Data Sheet in designated locations with appropriate bunding and ventilation.
- Develop and adhere to new Standard Operating Procedures to reflect the change or establishment of new operations, ensuring consistent, controlled practices that minimise disturbance, reduce the likelihood of impacts. This will enable the correct operation of equipment to ensure operations occur appropriately and in line with manufacture standards and expectations.

- Commission all equipment in mainland Australia prior to departure wherever possible, with priority given to major systems such as powerhouse generators and reverse osmosis units over minor items like toilets and small electric pumps.
- Undertake a daily review of weather conditions. Develop and implement a decision matrix which outlines wind thresholds for specific activities and associated mitigations where average wind forecast is expected to be greater than 20 knots and dust generated is likely to be deposited in areas of identified sensitive receptors, identified within the AIRP DCIW CEMP.
- Develop and adhere to a demolition work plan (December 2027).
- Undertake regular site inspections, audits and monitoring – by QHSE Coordinator or equivalent – as per the AIRP DCIW CEMP.
- Undertake desktop dust assessment of the proposed works to determine weather conditions that result in distribution of dust on ecological receptors, assessment to inform appropriate mitigations.
- Develop and adhere to a blast works method statement (September 2027).
- Modify activities if dust generation exceeds limits within the AIRP DCIW CEMP.
- Alignment with Government strategy and net zero targets, influence on the DCIW design and use of new technologies that reduce emissions in Antarctica, wherever practicable.

5.4.9 Degradation of heritage or cultural values

Proposed activities across Davis station present risks to heritage and cultural values through direct physical disturbance and vibration induced damage. These activities may unintentionally impact known or unexpected heritage features such as artefact scatters, fossil sites, or culturally significant landscapes. Ground disturbance, excavation, and landscape modification increase the likelihood of damaging or displacing these heritage features. Even routine operations like sampling or infrastructure installation can affect the integrity of heritage sites if not carefully managed. In addition to physical disturbance, indirect effects such as noise, vibration, and dust emissions can further degrade heritage and cultural values (e.g. resulting in structural damage). These disturbances may obscure surface features or diminish the visual and environmental character of culturally significant areas. This includes impacts to listed heritage structures such as the Emergency Powerhouse, which is proposed for demolition, noting that listing as an ‘indicative place’ does not afford structures statutory protection.

Mitigation measures that will be applied for the protection of heritage or cultural values include the following:

- Adherence to the unexpected finds procedure for cultural heritage and geo-heritage within the AIRP DCIW CEMP.
- Training and education of expeditioners for Cultural Heritage impacts through AAD training and separate project inductions.
- Implementation of the AIRP DCIW CEMP through AAD training and project inductions, toolbox talks and prestart meetings. Mandatory for all expeditioners.
- Adoption of the AAD’s Heritage Impact Mitigation Plan/Strategy (placeholder name, available 2027).

- Regular site inspections, audits and monitoring undertaken by QHSE Coordinator or equivalent as per the AIRP DCIW CEMP.
- Pre- and post-construction condition surveys to assess vibration-induced impacts, aligned with existing AAD procedures for vibration monitoring.
- Development and implementation of AAD Guidance Notes for Cultural Heritage to support expeditioner actions on station in the event of encountering artefacts of possible cultural value.

5.4.10 Degradation of wilderness values

The storage and construction activities associated with DCIW may compromise wilderness values through cumulative and direct disturbances. Expansion of laydown areas and movement of cargo may introduce temporary noise, vibration, and visual intrusion, disrupting the natural soundscape and diminishing the sense of remoteness for the period of works. Earthworks and machinery use alter the landscape, as well as the potential for poor cargo management and footprint creep that could contribute to environmental debris and pollution, further eroding the wilderness values of the area. Construction of new buildings would intensify the existing station's impact by introducing permanent structures that would visually dominate the natural setting, reducing the area's wilderness aesthetic.

Blasting and excavation activities within the Davis station quarry and the Utility Building footprint would detract from wilderness values and cause landscape disturbance, permanently altering the landscape. The use of heavy machinery for drilling, crushing, and jackhammering would generate persistent noise and vibration, which would also disrupt the natural soundscape. These impacts are compounded by the potential failure of noise suppression measures, amplifying the intrusion into otherwise relatively undisturbed environments.

Refurbishment, installation and commissioning, and waste management activities may present some disturbance to the surrounding environmental character of the area, albeit at a smaller scale compared to major construction and fill acquisition activities. While the physical footprint and intensity of these activities are more limited, their cumulative impacts remain important. Waste management failures, such as improper containment or inability to return waste to mainland Australia, could also result in pollution through debris, hazardous materials, and long-term accumulation, undermining the area's natural values integrity.

Mitigation measures that will be applied for the management of wilderness values include the following:

- Use existing tracks and laydown areas, where possible, to minimise disturbance footprint and develop and implement a track/laydown restoration plan (December 2026).
- Use already disturbed areas wherever possible, within an existing station's footprint for the location of new buildings.
- Wherever earthworks occur, minimise the disturbance footprint as much as possible. This will be supported by planning, geotechnical calculations, and survey work (outside the scope of this IEE and subject to separate authorisation).

- Limiting all works to the designated project area and timeline as outlined in the most recent revision of the AIRP Construction Management Plan.
- Regular site inspections, audits and monitoring undertaken by QHSE Coordinator or equivalent as per the AIRP DCIW CEMP.
- Undertake an external colour selection study for the assessment of the Utility Building colour, with criteria inclusive of environmental considerations.

5.4.11 Depletion of non-renewables resources

The depletion of non-renewable resources during the construction and demolition of Antarctic infrastructure will be required throughout the DCIW. Construction activities, for the proposed New Pump House, Reverse Osmosis, Utility Building, and service reticulation require high volumes of fossil fuels to power equipment, machinery, generators and tools. This contributes to the consumption of finite energy reserves. Abnormal and emergency scenarios such as fuel spills from machinery, transformers, delivery systems, and maintenance activities would further compound this impact if they occur. Similarly, demolition of the Emergency and Main Powerhouses involves energy-intensive processes and risks fuel leaks during equipment decommissioning.

The installation and commissioning of equipment within the New Pump House, Reverse Osmosis system, Utility Building, and service reticulation will also contribute to the depletion of non-renewable resources through both routine and abnormal operations. Under normal operating conditions, equipment operation relies heavily on fossil fuels, drawing energy from diesel powered generators. In abnormal scenarios, failures such as fuel tank leaks, fuel line faults, overfilling incidents, and insulation breakdowns can lead to unintentional release of fuel and increased resource consumption.

Mitigation measures that will be applied to manage the use of non-renewable resources include the following:

- Use of an asset maintenance program through Maximo ensures operational efficiency of equipment is maintained.
- Adoption of new carbon reducing technologies/equipment as available/feasible in the Antarctic environment.
- Use of the AAD's environmental incident reporting system for mapping trends and identifying how practices can be improved.
- Alignment with Government strategy and net zero targets, which influence the DCIW design and use of new technologies that reduce emissions in Antarctica, wherever practicable.
- Adherence to AIRP Sustainability Management Plan.
- Adhering to best practice standards for machinery and equipment regarding start up, stand by and shut down periods.
- Develop and adhere to new Standard Operating Procedures to reflect the change or establishment of new operations, ensuring consistent, controlled practices that minimise disturbance, reduce the likelihood of impacts. This will enable the correct operation of equipment to ensure operations occur appropriately and in line with manufacture standards and expectations.

- Equipment will be commissioned in mainland Australia prior to departure for Antarctica wherever possible, with priority given to major systems such as powerhouse generators and reverse osmosis units over minor items like toilets and small electric pumps.
- Contractual sustainability requirements within the design of the buildings enabling lowered fuel consumption.
- Exploration of alternative fuels and (potential or planning of) compatibility of generators with lower emissions fuel sources and efficiencies.

5.4.12 Depletion of water

Water depletion resulting from the proposed construction and commissioning activities would apply pressure on the limited freshwater resources at Davis station. Concrete batching, equipment cleaning, and if required, fire suppression, during construction will require use of potable water. Commissioning of new infrastructure and systems may lead to over-consumption of freshwater or its uncontrolled release due to equipment failures or service reticulation issues. These activities can reduce the availability of freshwater in a remote and resource-limited environment and must be carefully managed.

Mitigation measures that will be applied for the depletion of water include the following:

- Adherence to the AAD 'Plumbers Handbook' to guide water generation, treatment, and supply.
- Adherence to the AIRP DCIW CEMP.
- Completion of AAD's training for on station water management for all expeditioners prior to departure.
- Additional induction training packages for expeditioners, focusing on efficient, selective, and mindful water (and other resource) consumption and use.
- Washdown area management, ensuring preference for pressure air cleaning methods and minimal water use if water cleaning is required or if water is consumed during routine construction activities, such as concrete batching.
- Application of evaporative water management principles (for wastewater) during construction activities.
- Adherence to the minimum station water supply limits.
- Compliance with water restriction protocols (if required).
- Complete, wherever possible, testing and commissioning without the use of potable water until a reasonable degree of certainty that operations can function effectively is achieved to limit potential wastage.
- Investigate the re-use of potable water used for commissioning for other works (staging dependant) washdowns, other testing, firewater.
- Develop and adhere to new Standard Operating Procedures to reflect the change or establishment of new operations, ensuring consistent, controlled practices that minimise disturbance, reduce the likelihood of impacts. This will enable the correct operation of equipment to ensure operations occur appropriately and in line with manufacture standards and expectations.

- All equipment will be commissioned in mainland Australia prior to departure for Antarctica wherever possible, with priority given to major systems such as powerhouse generators and reverse osmosis units over minor items like toilets and small electric pumps.
- Prioritisation of the water production infrastructure completion within the DCIW schedule.

5.4.13 Landfill and hazardous landfill/disposal

Certain materials generated during the proposed DCIW cannot be recycled and must be returned to mainland Australia for disposal in landfill. These include construction debris, building materials, and equipment, as well as hazardous wastes such as asbestos and dangerous goods.

All waste-management activities associated with the DCIW will be implemented in accordance with recognised best-practice approaches for Antarctic operations, consistent with AAD standards. The scope of this IEE is limited to activities undertaken south of 60°S and does not extend to any waste handling or disposal processes occurring north of this latitude.

The AAD is currently developing a Davis station RTA plan, applicable for activities consistent with the All Stations Operations IEE (AAD, 2024d). The DCIW RTA plan will differ by focussing on DCIW related waste specifically, such as recyclables, hazardous materials, building and construction wastes.

Mitigation measures that will be applied for waste management include the following:

- Effective waste material type segregation to maximise recycling upon RTA.
- Development and adherence to a DCIW RTA Plan (June 2026), inclusive of 'reverse' biosecurity requirements (Australian import).
- Adherence to AAD's Davis station RTA plan, ensuring DCIW waste planning is integrated into this existing plan.
- On-station DCIW Waste Management Officer (or responsibilities incorporated within another role), for education, demarcation and communication regarding waste management.
- Adherence to AAD's preferred method for high pressure air cleaning of containers and clean-up of any dislodged waste material.
- Containers utilised for waste management are appropriately secured, clearly marked and incorporated within storage laydown area planning.
- Station Supply Officer/Engineering Services Supervisors/QHSE Coordinator or equivalent to undertake assessment of unpacked cargo for plastics and removal of materials prone to shredding or dispersal to the environment.
- Minimise, wherever possible, the amount of material sent to Antarctica that may become waste.
- Engagement with AAD's Station Environmental Officer to support education and communication regarding waste management.
- Adherence to the procedures outlined within AIRP DCIW CEMP for general housekeeping, site management including emu bobs/picking, waste management and plant/equipment storage.
- Adherence to the AAD sampling protocol for asbestos or the development of one.
- Adherence to the Import Permit for Asbestos (Ref: 13-2025).

- Asbestos removal will be undertaken and transported under valid licencing from WorkSafe Tasmania (Licence Number: 90781014).
- Adherence to any applicable and existing AAD sampling permits.
- Adherence to the AAD Asbestos Management Plan Australian Antarctic Territory and Macquarie Island – 2023–2026.
- Construction waste will be segregated by type to maximise RTA recycling and stored in covered and labelled containers/bins.

5.4.14 Impacts on other programs or projects

The DCIW will regularly interface with other programs and projects in the Antarctic region. While some impacts to other projects and programs, caused by DCIW, will be unavoidable, the improvements delivered by DCIW are critical to the success of the AAP. The project team will work to minimise and mitigate these impacts where possible. The impacts of the DCIW on other programs or projects can be summarised into 3 areas of impact:

- **Science projects** include multidisciplinary research on climate and atmospheric processes, ice-sheet dynamics, marine and terrestrial ecosystems, geophysics, and geology, providing critical insights into global environmental change
- **Other projects** include undertaking smaller infrastructure projects of varying scope and scale, such as upgrades to water production systems, power generation, workshops, and living facilities.
- **Station operations** are essential activities such as logistics, transport, maintenance, and environmental management to ensure the safe, efficient, and sustainable functioning of the station.

5.4.14.1 Science projects

Davis station supports a variety of scientific projects including those that monitor and research issues involving atmospheric observations, breeding seabirds, ocean sea level and variability, seal populations, human impacts, geodetics and geophysical monitoring. It also includes remediation works that fall under the project *A Cleaner Antarctica*.

Researchers for these projects come from organisations including the AAD, the University of Tasmania, Geoscience Australia, the Bureau of Meteorology, Kyushu University (Japan) and the Australian Radiation Protection and Nuclear Safety Agency . Some of these organisations send expeditioners to Davis station to conduct field work and observations, while others instead rely on autonomous data collecting equipment and support from AAD expeditioners who are already on station.

Key science locations on station include the Science building, Meteorology building, Magnetometer Hut and Operations building. Immediately off-station are locations such as the Ionosonde Hut and SHIRE Receiver, as well as locations in the Vestfold Hills, the bays and further afield – all supported by Davis station. DCIW will not be making changes to science buildings, equipment or facilities, and these will continue to be accessible for use throughout the Works.

The construction work required to deliver DCIW will necessitate an increased number of tradespeople on site at Davis station. Because there will be no overall increase to station capacity, this will limit the number of scientific expeditioners who are able to access Davis station. The number of required DCIW trades personnel will vary year-by-year, depending on the work planned for each season, with the maximum number expected to be around 30 DCIW expeditioners in season 2030–31.

The AIRP team is working closely with Science Planning and Coordination and Operations Planning to identify mitigation strategies to minimise disruptions to scientific research at Davis station. All AAP science projects will continue to be assessed and prioritised according to the AAD's Integrated Planning Guidance, by the Science Planning and Coordination and Operations Planning teams. These teams identify which projects can be best accommodated at which station per season and prioritise projects according to factors such as urgency and contribution to The Strategy and Action Plan (AAD, 2022a). The AIRP team is also consulting directly with science project Chief Investigators to discuss the DCIW works and identify specific challenges and impacts that may arise. To date, no specific concerns have been raised by stakeholders.

5.4.14.2 Other projects

Non-science projects occur at Davis station alongside science projects. AIRP work falls under this category, as does work such as some remediation works and operations projects.

Construction works at Davis station that are not part of AIRP include commissioning a new reverse osmosis plant (RO#1) and services, refurbishing the potable water Tank 1, and constructing a new emergency powerhouse in the existing Utility Building. These works will be completed in the 2025–26 season and will not be impacted by DCIW activities.

In subsequent seasons, works include the continued remediation of 3 km of road originally constructed for the now-obsolete Davis Aerodrome Project and the refurbishment or replacement of portable water tanks on station. The AIRP team is working with the relevant construction teams to ensure all works can proceed without hindrance.

Helicopter operations support several functions at Davis station. These include transport of personnel and equipment from station to field camps (as noted in Section 2.4.1.2), and emergency evacuation if needed. The use of cranes and construction of a 3-storey building (the new Utility Building) near the Helicopter Operation Exclusion Zone will interfere and restrict helicopter operations (as noted in Section 2.4.1.5 Operational continuity). The AIRP team is working with relevant stakeholders to discuss these potential impacts and possible mitigation strategies, including the potential for the helicopter pads to be temporarily relocated to resolve this issue.

As with science projects, all non-science projects, including the DCIW, are assessed and prioritised according to the AAD's Integrated Planning Guidance. The AIRP team is working with the relevant teams to minimise the impacts of DCIW on other projects.

5.4.14.3 Station operations

Davis station relies on a team of trades and operations expeditioners to keep the station running. These positions and all business-as-usual will continue alongside DCIW.

DCIW is focused on construction of new infrastructure and will not be managing business-as-usual tasks, including running or maintenance of existing facilities. However, expeditioners working on DCIW will complete general station tasks, as is expected of everyone on station, and will also assist station in situations where additional help is required, such as when dealing with extreme weather.

A strong and positive team culture is vital when working in extreme environments and all expeditioners will be held to high standards to support a good team and on-station dynamic. Expeditioners will be taught appropriate workplace culture, health, safety and wellbeing, including psychological safety and inclusion.

Additionally, a Service Interruption Plan will be developed, reviewed, communicated and implemented before the start of each season of DCIW works.

5.4.15 High risks

Despite the proposed application of both direct and indirect mitigation measures across multiple risk pathways, several risks have retained an unchanged rating from their inherent risk rating (in the absence of controls) to their current risk rating (with all proposed mitigation measures in place) displayed in Section 5.5. These outcomes are summarised in Table 18, with detailed justification for each risk provided in Sections 5.4.15.1 – 5.4.15.5.

Table 18. Summary of high-risk activities within the environmental impact matrix

Risk serial	Activity (aspect or impact)	Inherent risk	Current risk	Section
1	Davis Critical Infrastructure Works (cultural heritage)	High	High	5.4.15.1
5	Davis Critical Infrastructure Works (contamination)	High	High	5.4.15.2
6	Storage (introductions – Australia)	High	High	5.4.15.3
7	Storage (dust)	High	High	
9	Storage (introductions – Antarctica)	High	High	
11	Storage (wilderness values)	High	High	
17	Construction (dust)	High	High	5.4.15.4
18	Construction (noise)	High	High	
21	Construction (wilderness values)	High	High	
25	Acquiring fill (dust)	High	High	5.4.15.5
26	Acquiring fill (landscape)	High	High	

5.4.15.1 Cultural heritage

A cultural heritage high-risk rating has been retained despite the implementation of mitigation measures, due to the potential loss of unregistered or undocumented artefacts.

The absence of formal listing or registration of potentially lost artefacts complicates the assessment of consequence, as the cultural value of such items would be unknown. Accordingly, SMEs have recommended a conservative approach, maintaining a high-risk classification to ensure appropriate care and due diligence across all proposed activities. This includes strict adherence to the unexpected finds procedure. While the probability of encountering such artefacts may be low, the uncertainty surrounding their presence and significance warrants no adjustment to the assessed likelihood or consequence.

This precautionary approach reflects a commitment to responsible management rather than an indication of environmental impact greater than minor or transitory. This risk rating aligns with the AAD All Stations Operations IEE (AAD, 2024d) Environmental Risk Assessment of a similar activity.

5.4.15.2 Contamination

The introduction of a new aspect for *Physical Disturbance – Contamination* was recommended during an environmental workshop to ensure potential disturbance of pre-existing contamination is appropriately considered across all proposed activities. Mitigation measures have reduced the likelihood, supported by information available within the preliminary site investigations at Davis station. While a comprehensive site investigation to fully define the extent of historic contamination is yet to be completed, a precautionary approach has been adopted to maintain the current consequence rating. This reflects a commitment to attentiveness and responsible management throughout the extent of earthworks, rather than an indication of elevated environmental impact.

5.4.15.3 Storage

The proposed mitigation measures to manage the potential introduction of non-native species into Antarctica are expected to reduce the likelihood of occurrence. However, due to the inherently fragile, highly protected, and ecologically sensitive nature of the Antarctic environment, any introduction, however unlikely, could have irreversible consequences. Therefore, while the likelihood is reduced through stringent biosecurity mitigation and control measures, the consequence rating remains unchanged. This risk rating aligns with the AAD All Stations Operations IEE (AAD, 2024d) Environmental Risk Assessment of a similar activity.

Dust emissions associated with the construction and operation of cargo storage areas at Davis station have the potential to disturb or damage local flora. Despite the implementation of mitigation strategies, such as spatial planning, the consequence has been assessed as moderate. This results in a residual risk rating of high, primarily driven by uncertainty around dust dispersal patterns and its potential impact on nearby vegetation. Ongoing dust monitoring and adaptive management will help refine this assessment over time.

The increased volume of cargo required to support the proposed DCIW may affect the station's wilderness values, due to expansion of storage areas. While mitigation measures can reduce the likelihood of impact, the intrinsic wilderness character of the region is sensitive to any substantial increase in human activity. As such, the consequence remains unchanged. Avoidance of impact to wilderness values would require the proposed works to not progress.

The activity of storage within the DCIW demonstrates a potential high risk of environmental impact arising from introductions of non-native species, in alignment with the current authorisation (AAD, 2024d). The precautionary risk associated with dust generation from potentially expanding storage laydown areas arises from the uncertainty regarding its presence and dispersal. While the impact on wilderness values from increased cargo at the station is unavoidable, the overall environmental effect of storage activities is considered transitory, as the storage of DCIW-related cargo is temporary and bound by a defined schedule conclusion.

5.4.15.4 Construction

Dust emissions associated with the proposed construction activities at Davis station have the potential to disturb or damage local flora and soil communities. Similar to the dust arising from the proposed construction of laydown areas, the implementation of mitigation strategies has not changed the consequence associated with flora impacts. This results in a residual risk rating of high, primarily driven by the uncertainty around dust dispersal patterns and its potential impact on potential vegetation or subalpine communities nearby. This rating is largely precautionary and reflects the uncertainty surrounding dust behaviour in the local environment and the precise location of flora than confirmed adverse outcomes. Adaptive management approaches are expected to improve understanding over time, allowing for refinement of the risk assessment as more data becomes available.

Noise and vibrations generated by the proposed construction activities are anticipated to have some level of interaction with local wildlife; however, the extent of impact is expected to be limited. The implementation of mitigation measures is likely to significantly reduce the likelihood of disturbance. The high residual risk remains, as the consequence is retained given that works will be undertaken whilst fauna may be present in the local area, however the potential for negative effects is considered to be transitory. This is due to the range of mitigation measures in place throughout the construction period to minimise wildlife disturbance. Ongoing monitoring will support early detection of any unexpected responses, allowing for timely adjustments to minimise impact.

The proposed construction activities of the DCIW will impact on wilderness values which, even with mitigation measures, has not resulted in a reduced consequence of impact due to activities such as construction potentially causing irreversible disturbance to wilderness values. The intrinsic wilderness character of the region is sensitive to any substantial increase in human activity and infrastructure development. Consequently, the consequence rating for impacts to wilderness values remains unchanged, primarily due to the nature of the activity rather than the effectiveness of mitigation. Avoidance of impact would require the proposed works to not proceed; however, with careful planning, monitoring, and design sensitivity, it may be possible to limit the extent of perceived degradation to wilderness values and maintain key wilderness attributes over time.

5.4.15.5 Acquiring fill

Dust emissions resulting from the proposed drilling, crushing, jackhammering, and/or similar disturbance of fill material generated by blasting at both the quarry and Utility Building remains a high risk. This risk rating remains unchanged due to the potential for adverse impacts on terrestrial flora, similar to those previously identified for storage and construction activities related to dust emissions. The primary driver of this risk is due to the uncertainty surrounding dust dispersal patterns and the potential for deposition on nearby vegetation. To better understand and manage

this risk, ongoing monitoring and adaptive management strategies will be undertaken. These measures will help refine the risk assessment over time and support more informed mitigation planning. Processing of the fill material is required to complete the earthworks for the proposed buildings and is considered transitory and expected to occur over one to two operational seasons.

The risk rating for physical disturbance to the landscape is primarily associated with the removal of material from the quarry and the potential disruption to sublithic communities within the soil profile. Spatially, the area of impact is expected to fall between the environmental consequence ratings of Minor (<100 m²) and Moderate (<1,000 m²) (Table 16). While some degree of disturbance is anticipated, the overall footprint remains relatively contained. The reversibility of impacts to sublithic communities is considered limited, given current knowledge gaps regarding their composition and ecological function in the area. Due to this uncertainty, a precautionary approach has been adopted. The potential for loss of sublithic individuals and assemblages from quarrying and blasting activities at the proposed Utility Building site cannot be fully ruled out. SMEs have assessed the likelihood of disturbance as almost certain, with a moderate consequence, resulting in a high-risk rating. This aligns with previous conservative assessments where uncertainty has warranted elevated risk categorisation. Nonetheless, the overall impact to the landscape and sublithic communities is appropriately captured within this risk framework, and mitigation measures will be considered to minimise disturbance where feasible.

5.4.16 Severe risk

A severe environmental risk rating has been retained due the discharge of hyper saline brine containing PFAS contamination to the marine environment (Table 19).

Table 19. Environmental risk matrix excerpt

Serial	Location	Activity description	Aspect	Impact(s)	Potential causes/sources of an impact happening	Inherent			Current		
						Likelihood	Consequence	RISK	Likelihood	Consequence	RISK2
44	Antarctica	Installation and Commissioning	Physical disturbance-Landscape	Disturbance/Destruction of benthic flora and fauna, Pollution of sea water/sediments/snow/ice	1. Discharge of the brine from Reverse Osmosis to the marine environment (PFAS contamination).	Almost certain	Major	Severe	Almost certain	Major	Severe

There is currently an unknown level of PFAS contamination within the greywater that is discharged to the marine environment from the existing wastewater treatment plant at Davis station. This discharge occurs via the service reticulation outfall, which flows into the marine environment adjacent to the station's wharf.

Although sample sizes are relatively small and available data is limited, PFAS concentrations (including Perfluorooctanoic acid [PFOA] and Perfluorooctanesulfonic acid [PFOS]) have been detected in 2024–25 at several key locations around Davis station:

- Heidemann Bay – collection points are close to the existing quarry.
 - <0.0005 µg/L PFOA; <0.0003 µg/L PFOS; <0.0003 µg/L PFAS
- Prydz Bay – both northern and southern ends of Davis station beach.
 - <0.0005 µg/L PFOA; 0.0025 – 0.0035 µg/L PFOS; 0.0030 – 0.0043 µg/L PFAS
- Davis station Tarn – with multiple sampling sites confirming contamination.
 - <0.002 – 0.025 µg/L PFOA; 0.013 – 0.038 µg/L PFOS; 0.0160 – 0.0460 µg/L PFAS

These values align between 95 – 99% species protection guideline values within the current Australian guidelines (PFAS National Environmental Management Plan 3.0) for protection of marine environments, displayed in Table 20.

Table 20. Ecological water quality guideline values (HEPA, 2025)

Exposure scenario	Guideline value	PFOS µg/L	PFOA µg/L
Interim marine	99% species protection – high conservation value systems	0.00023	19
	95% species protection – slightly to moderately disturbed systems	0.13	220
	90% species protection – highly disturbed systems	2	632
	80% species protection – highly disturbed systems	31	1824

The Tarn currently provides a source of saline input water to the station's RO system, which produces potable water. While PFAS has been detected in the input water, the treated potable water consistently shows PFAS levels below the Australian Drinking Water Guidelines and is considered safe for consumption. It is assumed that PFAS compounds are not destroyed during the RO process but are instead retained within the hypersaline brine produced as a by-product.

Mitigation measures have been proposed to specifically address the environmental risk arising from PFAS contamination, despite the environmental impact pre-existing to the proposed DCIW. PFAS mitigations include the following:

- Conduct additional PFAS sampling at existing monitoring sites to increase the dataset and improve confidence in assessment of environmental risk.
- RO brine discharge sampling for PFAS concentrations prior to discharge into the marine environment (discharge will occur to the station's Tarn). This will quantify the concentration of PFAS contained within the brine.
- Process improvement by concluding the existing procedure (via the new process of the proposed works) of release of the Tarn's water over the terrestrial environment, before reaching the marine environment within Heidemann Bay. Therefore, eliminating the environmental impact of pollution of land, (terrestrial) habitat change, disturbance and/or destruction of terrestrial flora and soil communities produced from this current activity.
- The proposed brine discharge will occur via the Davis station WWTP and may be diluted by the wastewater treatment plant's grey water (if production times align).
- Brine discharge dispersion modelling study and SME engagement in result analysis.
- Develop and adhere to new Standard Operating Procedures to reflect the change or establishment of new operations, ensuring consistent, controlled practices that minimise disturbance, reduce the likelihood of impacts. This will enable the correct operation of equipment to ensure operations occur appropriately and in line with manufacture standards and expectations.
- Reverse Osmosis equipment will be commissioned in mainland Australia prior to departure for Antarctica. This will contribute to lowering the risk of equipment malfunctions during installation and commissioning and reducing the impact arising from testing that may result in higher concentrations of water parameters or contaminants such as PFAS.

As the current All Stations Operations IEE (AAD, 2024d, pp. 36-37) authorisation permits this activity, the proposed operational change of discharging PFAS-containing wastewater (brine) directly to the marine environment rather than via land, represents a controlled environmental impact to the marine environment. The potential impact to the marine environment is considered minor based on the infrequent and relatively small discharge volume, the dispersive properties of the marine receiving environment, existing AAD wastewater management practices, and the application of operational controls and monitoring. The associated severe risk rating reflects the potential consequence of PFAS entering the marine environment under conservative assumptions and in the absence of controls, rather than an expectation of significant environmental harm. Proposed mitigations are specifically intended to address data gaps, validate assumptions, and inform future operational management.

5.5 Davis Critical Infrastructure Works: Environmental Impact Matrix

Table 21. Environmental impact assessment matrix

Activity #	Location	Activity description	Condition	Aspects	Impact(s)	Potential causes/sources of an impact happening	Inherent Risk Rating			Existing Reduction/Control Measures - against the Aspect	Residual Risk Rating		
							Likelihood	Consequence	RISK		Likelihood	Consequence	RISK
1	Antarctica	Davis Critical Infrastructure Works	Normal	Physical disturbance- Landscape	Degradation of heritage/cultural values	1. Impact to unexpected finds of artifact scatter (surface concentration). 2. Impact to unexpected finds of geo-heritage (fossils). 3. Impact to existing or identified areas/places of cultural heritage significance.	Almost certain	Moderate	High	1. Adherence to the unexpected finds procedure for cultural heritage and geo-heritage within the AIRP DCIW CEMP, including the identification and handling of cultural heritage artefacts. 2. Training and education of expeditioners for Cultural Heritage impacts through Australian Antarctic Division training and separate project inductions. 3. Implementation of the Environmental Management Plan through Australian Antarctic Division training and project inductions, toolbox talks and prestart meetings. Mandatory for all expeditioners. 4. Adoption of the Australian Antarctic Division's Heritage Strategy (placeholder name, available 2027). 5. Regular site inspections, audits and monitoring undertaken by QHSE Coordinator or equivalent as per the AIRP DCIW CEMP. 6. Pre- and post-construction condition surveys to assess vibration-induced impacts, aligned with current Australian Antarctic Division procedure for vibration monitoring. 7. Development and implementation of Australian Antarctic Division Guidance Notes for Cultural Heritage to support expeditioner actions on station in the event of encountering artefacts of possible cultural value.	Almost certain	Moderate	High
2	Antarctica	Davis Critical Infrastructure Works	Normal	Physical disturbance- Noise/Vibration emission	Degradation of heritage/cultural values	1. Impact to unexpected finds of artifact scatter (surface concentration). 2. Impact to unexpected finds of geo-heritage (fossils). 3. Impact to existing or identified areas/places of cultural heritage significance.	Possible	Moderate	Medium	1. Adherence to the unexpected finds procedure for cultural heritage and geo-heritage within the AIRP DCIW CEMP, including the identification and handling of cultural heritage artefacts. 2. Training and education of expeditioners for Cultural Heritage impacts through Australian Antarctic Division training and separate project inductions. 3. Implementation of the Environmental Management Plan through Australian Antarctic Division training and project inductions, toolbox talks and prestart meetings. Mandatory for all expeditioners. 4. Adoption of the Australian Antarctic Division's Heritage Strategy (placeholder name, available 2027). 5. Regular site inspections, audits and monitoring undertaken by QHSE Coordinator or equivalent as per the AIRP DCIW CEMP. 6. Pre- and post-construction condition surveys to assess vibration-induced impacts, aligned with current Australian Antarctic Division procedure for vibration monitoring. 7. Development and implementation of Australian Antarctic Division Guidance Notes for Cultural Heritage to support expeditioner actions on station in the event of encountering artefacts of possible cultural value.	will be Remote	Moderate	Low
3	Antarctica	Davis Critical Infrastructure Works	Normal	Physical disturbance- Dust emission	Degradation of heritage/cultural values	1. Impact to unexpected finds of artifact scatter (surface concentration). 2. Impact to unexpected finds of geo-heritage (fossils). 3. Impact to existing or identified areas/places of cultural heritage significance.	Possible	Moderate	Medium	1. Adherence to the unexpected finds procedure for cultural heritage and geo-heritage within the AIRP DCIW CEMP, including the identification and handling of cultural heritage artefacts. 2. Training and education of expeditioners for Cultural Heritage impacts through Australian Antarctic Division training and separate project inductions. 3. Implementation of the Environmental Management Plan through Australian Antarctic Division training and project inductions, toolbox talks and prestart meetings. Mandatory for all expeditioners. 4. Adoption of the Australian Antarctic Division's Heritage Strategy (placeholder name, available 2027). 5. Regular site inspections, audits and monitoring undertaken by QHSE Coordinator or equivalent as per the AIRP DCIW CEMP. 6. Pre- and post-construction condition surveys to assess vibration-induced impacts, aligned with current Australian Antarctic Division procedure for vibration monitoring. 7. Development and implementation of Australian Antarctic Division Guidance Notes for Cultural Heritage to support expeditioner actions on station in the event of encountering artefacts of possible cultural value.	will be Remote	Moderate	Low

Activity #	Location	Activity description	Condition	Aspects	Impact(s)	Potential causes/sources of an impact happening	Inherent Risk Rating			Existing Reduction/Control Measures - against the Aspect	Residual Risk Rating		
							Likelihood	Consequence	RISK		Likelihood	Consequence	RISK
4	Antarctica	Davis Critical Infrastructure Works	Normal	Physical disturbance- Taking samples	Degradation of heritage/cultural values	1. Impact to unexpected finds of artifact scatter (surface concentration). 2. Impact to unexpected finds of geo-heritage (fossils). 3. Impact to existing or identified areas/places of cultural heritage significance.	Possible	Moderate	Medium	1. Adherence to the unexpected finds procedure for cultural heritage and geo-heritage within the AIRP DCIW CEMP, including the identification and handling of cultural heritage artefacts. 2. Training and education of expeditioners for Cultural Heritage impacts through Australian Antarctic Division training and separate project inductions. 3. Implementation of the Environmental Management Plan through Australian Antarctic Division training and project inductions, toolbox talks and prestart meetings. Mandatory for all expeditioners. 4. Adoption of the Australian Antarctic Division's Heritage Strategy (placeholder name, available 2027). 5. Regular site inspections, audits and monitoring undertaken by QHSE Coordinator or equivalent as per the AIRP DCIW CEMP. 6. Pre- and post-construction condition surveys to assess vibration-induced impacts, aligned with current Australian Antarctic Division procedure for vibration monitoring. 7. Development and implementation of Australian Antarctic Division Guidance Notes for Cultural Heritage to support expeditioner actions on station in the event of encountering artefacts of possible cultural value.	Unlikely	Moderate	Medium
5	Antarctica	Davis Critical Infrastructure Works	Abnormal	Physical disturbance- Contamination	Disturbance/Destruction of terrestrial flora, Disturbance/Destruction of soil communities, Disturbance/Destruction of fauna, Pollution of the air, Pollution of sea water/sediments/snow/ice, Pollution of inland waters/sediments, Habitat change	1. Disturbance of pre-existing hydrocarbon contamination within soil and released into the greater environment. 2. Unintended release of particulate matter from anthropogenic sources, such as silica, gypsum, wood, metal, fibreglass, cement, paint and coating dusts. 3. Remobilization of any form of pollution via direct or indirect activities from all associated works.	Likely	Major	High	1. Adherence to the Job Hazard Analysis guidelines for specific activities. 2. Adherence to the Environmental Code of Conduct for participants of the Australian Antarctic Program. 3. Use of Operation and Maintenance Manuals, including but not limited to the Australian Antarctic Division Standard Operating Procedure Operations Manual Volume 1: Station and Field Waste Management Guide and Volume 2: Emergency Response Standard Operating Procedures. 4. Use of the Australian Antarctic Division Incident Reporting System for mapping trends and identifying how practices can be improved. 5. Regular site inspections, audits, and monitoring undertaken by the QHSE Coordinator (or equivalent) as per the AIRP DCIW CEMP. 6. Adherence to mitigation/response measures outlined in the AIRP DCIW CEMP. 7. Training and education on refuelling standard operating procedures and incident response as per the AIRP DCIW CEMP through Australian Antarctic Division training and project inductions, toolbox talks, and pre-start meetings, ensuring all personnel complete Fuel Spill Contingency Training. 8. Adherence to the Unexpected Finds Procedure within the AIRP DCIW CEMP to assist in the identification of fuel spills and leaks. 9. Inspection by a qualified person under demolished facilities to identify possible staining/colouring or odour associated with historic spills or leaks. 10. Assessment by a qualified or suitably trained person of suspected contamination in consultation with Australian Antarctic Division contamination and remediation subject matter experts. 11. Utilisation of portable field/station equipment/tools that can be deployed to station (e.g. Photoionization Detector) to identify potential contamination. Where contamination is suspected, samples may be returned to Australia for detailed analytical testing, in consultation with Australian Antarctic Division contamination and remediation subject matter experts. 12. Undertake desktop assessment of contamination likelihood in area of earthworks before works commence. Results used to inform precautionary management of the site, credible risk pathways, prioritisation of risks and avoidance of high-risk areas. Consultation with Subject Matter Expert advice where required.	Possible	Major	High
6	Australia	Storage	Normal	Physical disturbance- Introductions	Biological change, Disturbance/Destruction of terrestrial flora, Habitat change, Disturbance/Destruction of fauna	1. Cargo not being processed through the Cargo Biosecurity Centre or in bio secure storage conditions. 2. Third party/contractor packing of cargo containing biosecurity risk material. 3. Break bulk cargo	Likely	Major	High	1. Adherence to the Australian Antarctic Division Standard Operating Procedures, Operations Manual, Volume 9 – Cargo Standard Operating Procedure. 2. Adherence to the Australian Antarctic Division Code of Practice for Packing of Cargo Transport Units. 3. Adherence to the Australian Antarctic Division Transporting Cargo and Plant Standard Operating Procedure. 4. Adherence to the Australian Antarctic Division Standard Operating Procedures – Packing and Unpacking Cargo Transport Units. 5. Adherence to the Australian Antarctic Division Environmental and Work Health Safety Purchasing Policy. 6. Use of the Australian Antarctic Division Incident Reporting System for mapping trends and identifying how practices can be improved.	Possible	Major	High

Activity #	Location	Activity description	Condition	Aspects	Impact(s)	Potential causes/sources of an impact happening	Inherent Risk Rating			Existing Reduction/Control Measures - against the Aspect	Residual Risk Rating		
							Likelihood	Consequence	RISK		Likelihood	Consequence	RISK
						containing biosecurity risk material. 4. Contractors/suppliers processing cargo unaware of biosecurity screening requirements and standards. 5. Personnel transporting biosecurity risk material via personal Unaccompanied Personal Effects. 6. Biosecurity risk material within prohibited items.				7. Inclusion of biosecurity conditions within service agreements (contracts) with third-party providers. 8. Inspections (by suitably trained staff) of third-party providers of equipment and materials to ensure compliance with biosecurity protocols, including ensuring all plant, equipment, and personal effects are clean and free from pests and agents of disease prior to packing, packing into new or clean existing boxes/containers which, once packed, are fumigated and sealed to prevent potential BRM incursion. 9. Pre-departure biosecurity audits/inspections are undertaken on all cargo, including equipment and materials of third-party providers to ensure compliance with biosecurity protocols. 10. Development of detailed processes and alignment of biosecurity practices and management of cargo that isn't directly processed via the Cargo Biosecurity Centre. 11. Ensuring that adequate cleaning/wash-down events and biosecurity screening occurs for all necessary cargo prior to departure. 12. Testing and commissioning of key equipment within mainland Australia prior to departure, to assist in identifying potential BRM that may be exposed. 13. Adherence to both the Australian Antarctic Division's Biosecurity Management Plan and the AIRP Biosecurity Management Sub-Plan, with the latter aligned to and supporting the objectives of the Australian Antarctic Division's. 14. All staff and contractors involved in cargo preparation and dispatch will complete the Australian Antarctic Division Biosecurity Training Package (when available). 15. Training and education of expeditioners for Biosecurity and biosecurity risk material requirements/identification through Australian Antarctic Division training and separate project inductions. 16. Prioritisation of cargo through the Australian Antarctic Division's capabilities (Cargo Biosecurity Centre), via cargo ranking based on its physical attributes and its origin, in consultation with subject matter experts. 17. Procurement of new equipment/machinery to lower (not eliminate) the possibility of biosecurity risk material. 18. Use of Biosecurity Officers/Coordinators that are trained for the bespoke Australian Antarctic Division biosecurity requirements for all audits and inspections. 19. Air pressured container cleaning will occur in a designated location, and any paint flakes will be cleaned up immediately. Container cleaning is not undertaken in windy conditions.			
7	Antarctica	Storage	Normal	Physical disturbance- Dust emission	Disturbance/Destruction of terrestrial flora, Disturbance/Destruction of fauna, Pollution of the air, Pollution of sea water/sediments/snow/ice, Pollution of inland waters/sediments, Habitat change	1. Movement of stored cargo (containerised or not) to/from and within storage laydown area using machinery. 2. Residual build up and release of dust/sediments on containers. 3. Snow build-up requiring additional ground surface clearing due to additional cargo storage. 4. Poor placement and management of cargo resulting in additional dust accumulation and dispersion into the environment. 5	Almost certain	Moderate	High	1. Adherence to the Job Hazard Analysis guidelines for construction activities. 2. Adherence to the Environmental Code of Conduct for participants of the AIRP. 3. Adherence to the Operation and Maintenance Manuals for equipment used. 4. Use of the Australian Antarctic Division Incident reporting system for mapping trends and identifying how practices can be improved. 5. Utilising existing tracks and laydown areas, where possible, to minimise disturbance footprint. 6. Regular site inspections, audits and monitoring undertaken by the QHSE Coordinator (or equivalent) as per the AIRP DCIW CEMP. 7. Adherence to dust control measures outlined in the AIRP DCIW CEMP. 8. Plan storage and laydown to minimise traffic movements and maximise practical and efficient access/use. 9. Traffic management ensuring speed limits are complied with (15 km/h) to reduce dust generation and impacts to wildlife. 10. Undertake a daily review of weather conditions. Develop and implement a decision matrix which outlines wind thresholds for specific activities and associated mitigations where average wind forecast is expected to be greater than 20 knots and dust generated is likely to be deposited in area of identified sensitive receptors, identified within the AIRP DCIW CEMP. 11. Review the proposed timing of associated works against the seasonality of wildlife presence and apply where necessary, physical demarcation to maintain activity exclusion zones for wildlife. 12. Undertake baseline surveying of wildlife before works commence, by suitably trained personnel within all proposed laydown areas to determine the potential use by wildlife (such as nesting sites). 13. Undertake additional wildlife surveying directly before use of laydown areas. 14. Wherever possible restrict storage area access/use when wildlife is present – this is particularly relevant to storage areas in	Likely	Moderate	High

Activity #	Location	Activity description	Condition	Aspects	Impact(s)	Potential causes/sources of an impact happening	Inherent Risk Rating			Existing Reduction/Control Measures - against the Aspect	Residual Risk Rating		
							Likelihood	Consequence	RISK		Likelihood	Consequence	RISK
						. Earthworks/Groundworks for laydown areas.				proximity to seal haul-out areas and known moulting locations. 15. Development and utilisation of an annual laydown area planning document for efficient use of laydown areas. Laydown area planning will consider each laydown area's proximity to wildlife and the seasonality of any wildlife expected to be in the vicinity. Laydown area planning is to be update regularly, prior to the start of every summer season, however, updates may be more frequent, on a as needed basis. 16. Develop and implement a dust monitoring program that incorporates quantifiable dust monitoring. 17. Undertake desktop dust assessment of the proposed works to determine weather conditions that result in distribution of dust on ecological receptors, assessment to inform appropriate mitigations. 18. Schedule ground disturbance to avoid periods when wildlife are likely to be within the relevant separation distances to the activities (Guidelines for animal approach distances – the Australian Antarctic Program). Develop a decision matrix to determine appropriate mitigation measures if wildlife are present. To be included with the AIRP DCIW CEMP. 19. Undertake assessment of terrestrial flora presence within works areas before works commence. 20. Modify activities if dust generation exceeds limits within the AIRP DCIW CEMP.			
8	Antarctica	Storage	Normal	Physical disturbance-Noise/Vibration emission	Disturbance/Destruction of fauna, Degradation of wilderness values, Noise pollution, Habitat change	1. Construction works to expand or create laydown areas. 2. Movement of stored cargo (containerised or not) to/from and within storage laydown area using machinery. 3. Earthworks/Groundworks for laydown areas. 4. Equipment/Machinery use for construction and use of laydown areas.	Almost certain	Moderate	High	1. Adherence to the Australian Antarctic Division Environmental Code of Conduct by all personnel. 2. All expeditioners will follow the AAD's Avoiding Wildlife Disturbance Policy. Develop a decision matrix to determine appropriate mitigation measures if wildlife is present within the minimum separation distances when utilising vehicles or powered equipment. Minimum separation distances that must be maintained when on foot or in a vehicle are prescribed within the AAD's Avoiding Wildlife Disturbance Policy (Guidelines for animal approach distances – the Australian Antarctic Program). 3. Australian Antarctic Division mandatory predeparture training for all expeditioners which includes instruction on avoiding impacts to wildlife. 4. Use of the Australian Antarctic Division Incident reporting system for mapping trends identifying how practices can be improved. 5. Asset maintenance program through Maximo ensures operational efficiency of equipment is maintained. 6. Adherence to the Standard Operating Procedure, Volume 1: Station and Field Operating Procedures, Chapter 4: Field Operations. 7. All machinery is maintained and serviced to minimise noise generation and impacts. 8. Ensure the most efficient and minimal use of equipment, including additional generators and machinery. Use of low vibration settings and vibration sensitive equipment where possible. 9. Wherever reasonably practicable, limit the number of equipment/machinery operating at any one time as part of the Traffic Management plan. 10. Align with AAD machinery and equipment maintenance servicing frequency (service intervals are twice as frequent as standard manufacturer recommendation). 11. Efficient material handling and planning to ensure that double handling of materials, and subsequent vehicle use is limited. 12. Works are to be undertaken between 7am-10pm wherever possible to reduce impacts. Where works outside these hours are deemed necessary, notification and justification is required and should be limited to low noise generating activities. 13. Avoid, wherever reasonably practical, high noise generating activities such as earthworks, cutting, dropping of material, metal on metal interactions and use of horns, beepers and sirens when fauna is within the defined works area (defined within the AIRP Construction Management Plan). 14. Regular site inspections, audits and monitoring undertaken by the QHSE Coordinator (or equivalent) as per the AIRP DCIW CEMP. 15. Training and education of associated noise impacts and mitigations as per the AIRP DCIW CEMP through training and project inductions, toolbox talks and prestart meetings. 16. Review the proposed timing of associated works against the seasonality of wildlife presence and apply where necessary, physical demarcation to maintain activity exclusion zones for wildlife. 17. Undertake baseline surveying of wildlife before works commence, by suitably trained personnel within all proposed laydown areas to determine the potential use by wildlife.	Possible	Moderate	Medium

Activity #	Location	Activity description	Condition	Aspects	Impact(s)	Potential causes/sources of an impact happening	Inherent Risk Rating			Existing Reduction/Control Measures - against the Aspect	Residual Risk Rating		
							Likelihood	Consequence	RISK		Likelihood	Consequence	RISK
										18. Undertake additional wildlife surveying directly before use of laydown areas. 19. Wherever possible restrict storage area access/use when wildlife is present – this is particularly relevant to storage areas in proximity to seal haul-out areas and known moulting locations. 20. Undertake noise monitoring before and during within key areas to determine activities impact and adjust works as necessary/practical. Undertake baseline and real time noise monitoring, as described within the noise monitoring plan, before and during works. baseline monitoring to determine activities impact and with real time monitoring to inform the potential to adjust current works as needed. 21. Undertake desktop noise modelling of proposed works (e.g. blasting) under different environmental conditions (e.g. wind speeds and direction). Adjust timing of noisy activities to avoid periods where impacts to wildlife are likely to be exacerbated by weather conditions. 22. Development and utilisation of an annual laydown area planning document for efficient use of laydown areas. Laydown area planning will consider each laydown area’s proximity to wildlife and the seasonality of any wildlife expected to be in the vicinity. Laydown area planning is to be update regularly, prior to the start of every summer season, however, updates may be more frequent, on a as needed basis.			
9	Antarctica	Storage	Normal	Physical disturbance- Introductions	Biological change, Disturbance/Destruction of terrestrial flora, Disturbance/Destruction of fauna, Habitat change	1. Release of invasive species due to biosecurity risk material within break bulk cargo. 2. Release of invasive species due to biosecurity risk material within the containerised cargo. 3. Release of invasive species due to biosecurity risk material within equipment cargo (machinery). 4. Lack of awareness/ignorance of or assumption about specific activities that represent risk. 5. biosecurity risk material within prohibited items.	Likely	Major	High	1. Adherence to the Australian Antarctic Division Standard Operating Procedures, Operations Manual, Volume 9 – Cargo Standard Operating Procedure. 2. Adherence to the Australian Antarctic Division Code of Practice for Packing of Cargo Transport Units. 3. Adherence to the Australian Antarctic Division Transporting Cargo and Plant Standard Operating Procedure. 4. Adherence to the Australian Antarctic Division Standard Operating Procedures – Packing and Unpacking Cargo Transport Units. 5. Adherence to the Australian Antarctic Division Environmental and Work Health Safety Purchasing Policy. 6. Use of the Australian Antarctic Division Incident reporting system for mapping trends and identifying how practices can be improved. 7. Adherence to AIRP Biosecurity Management Plan. 8. All expeditioners involved in cargo preparation and dispatch will complete the Australian Antarctic Division Biosecurity Training Package (available Dec 2025). 9. Training and education on Biosecurity and biosecurity risk material requirements through Australian Antarctic Division training and project inductions prior to commencing onsite and toolbox and pre-start discussions during works. 10. Wherever reasonably practicable, undertake biosecurity audits (by suitably trained staff) of cargo upon arrival. Cargo risk categorisation and prioritisation for audits. 11. Adherence to the Australian Antarctic Division’s Biosecurity Management Plan. 12. Adherence to the Australian Antarctic Division’s Discovery of Non-Native Organisms Procedure. 13. A biosecurity auditing plan is to be developed and adhered to between each season of works to ensure compliance. 14. Use of Biosecurity Officers/Coordinators that are trained for the bespoke Australian Antarctic Division biosecurity requirements for all audits and inspections. 15. All mitigation measures outlined to prevent biosecurity risk material within mainland Australia (prior to departure, Risk Serial No. 1), before departure.	Possible	Major	High
10	Antarctica	Storage	Normal	Physical disturbance- Prohibited items	Landscape change, Pollution of land, Pollution of sea water/sediments/snow/ice, Pollution of inland waters/sediments, Disturbance/Destruction	1. Cargo packaging material include prohibited items (polystyrene beads, chips or similar forms of packaging). 2. Equipment contains spray on foam. 3. Personnel items/tools contain prohibited items.	Likely	Moderate	High	1. Adherence to the Australian Antarctic Division Standard Operating Procedures, Operations Manual, Volume 9 – Cargo Standard Operating Procedure. 2. Adherence to the Australian Antarctic Division Code of Practice for Packing of Cargo Transport Units. 3. Adherence to the Australian Antarctic Division Transporting Cargo and Plant Standard Operating Procedure. 4. Adherence to the Australian Antarctic Division Standard Operating Procedures – Packing and Unpacking Cargo Transport Units. 5. Adherence to the Australian Antarctic Division Environmental and Work Health Safety Purchasing Policy. 6. Use of the Australian Antarctic Division Incident reporting system for mapping trends identifying how practices can be improved.	Possible	Moderate	Medium

Activity #	Location	Activity description	Condition	Aspects	Impact(s)	Potential causes/sources of an impact happening	Inherent Risk Rating			Existing Reduction/Control Measures - against the Aspect	Residual Risk Rating		
							Likelihood	Consequence	RISK		Likelihood	Consequence	RISK
					ction of terrestrial flora	4. Failed identification of prohibited items. 5. Marine debris (and generation of) release into the environment				7. Inspections of third-party providers of equipment and materials prior to departure to ensure compliance with both biosecurity and prohibited items as well as material use protocols, with appropriate action (removal or correction of noncompliance). 8. Inclusion of prohibited items conditions within service agreements (contracts) with third-party providers. 9. Training and education of associated environmental impacts and mitigations as per the AIRP DCIW CEMP through training and project inductions, toolbox talks and prestart meetings. 10. All contractors involved in cargo preparation and dispatch will complete the Australian Antarctic Division Biosecurity Training Package (available Dec 2025). 11. Undertake pathway mapping of prohibited item sources to determine a risk matrix for identification of higher risk cargo that may contain prohibited items (March 2026). 12. Station Environmental Officer/Engineering Services Supervisors or equivalent to undertake assessment of unpacked cargo for plastics and removal of materials prone to shredding or dispersal to the environment. 13. Adherence to Australian Antarctic Division Waste Management Strategy.			
11	Antarctica	Storage	Normal	Physical disturbance- Landscape	Degradation of wilderness values, Landscape change, Disturbance/Destruction of soil communities	1. Expansion of disturbance footprint from earthworks or groundworks within existing cargo laydown areas to accommodate extra cargo. 2. Increased visual impact from cargo laydown areas. 3. Increase of station debris from poor cargo and container management. 4. Movement of hydrocarbon contamination. 5. Storage footprint 'creep' (unapproved expansion over time). 6. Unintentional release of materials/foreign objects/equipment/items from incorrect storage that become debris and pollution of the environment.	Almost certain	Moderate	High	1. Adherence to the AIRP DCIW CEMP. 2. Use of the Australian Antarctic Division Station and Field Waste Management Guide and adherence to requirements. 3. Use of the Australian Antarctic Division Incident Reporting System for mapping trends and identifying how practices can be improved. 4. Utilising existing tracks and laydown areas, where possible, to minimise disturbance footprint. 5. Planning storage areas to avoid blizzlines and to reduce potential for blizz waste. 6. Project area to be detailed in relevant management plans and, where required, physically demarcated on-site. 7. Excess soil/rock to be reused or removed from project area to quarry as soon as practicable. 8. Regular site inspections, audits, and monitoring undertaken by the QHSE Coordinator (or equivalent) as per the AIRP DCIW CEMP. 9. Training and education of associated environmental impacts and mitigations as per the AIRP DCIW CEMP through Australian Antarctic Division training and project inductions, toolbox talks, and pre-start meetings. 10. Wherever earthworks occur, minimise the disturbance footprint as much as possible. This will be supported by planning, geotechnical calculations, and survey work (outside the scope of this IEE and subject to separate authorisation). 11. Utilise previously disturbed areas wherever possible, including roads, laydowns and for the location of new buildings. 12. Limiting all works to the defined project area and timeline as outlined in the most recent revision AIRP Construction Management Plan. 13. Development and adherence to an AIRP Return to mainland Australia Plan (June 2026), detailing reduction of cargo on station and improving storage area management. 14. Use of aerial imagery (e.g., photogrammetry, satellite, drone, or similar sources) for analysis and compliance of storage area changes and use. 15. Adherence to the Code of Practice for Packing of Cargo Transport Units. 16. Adherence to the Transporting Cargo and Plant Standard Operating Procedure. 17. Adherence to the Standard Operating Procedures – Packing and Unpacking Cargo Transport Units. 18. Adherence to the Hazardous Chemicals Management Policy and associated procedures.	Likely	Moderate	High
12	Antarctica	Storage	Normal	Physical disturbance- Human impact	Disturbance/Destruction of fauna, Disturbance/Destruction of terrestrial flora, Degradation of wilderness values	1. Birdlife nesting within cargo laydown area. 2. Expanded cargo laydown areas within proximity to coastline and/or wildlife. 3. Trampling flora present within/around laydown area.	Almost certain	Moderate	High	1. Adherence to mitigation measures outlined in AIRP DCIW CEMP. 2. All participants of the AIRP adhere to the Australian Antarctic Division's Environmental Code of Conduct. 3. Use of Australian Antarctic Division's Incident reporting system for mapping trends identifying how practices can be improved. 4. Regular site inspections, audits and monitoring undertaken by QHSE Coordinator or equivalent as per the AIRP DCIW CEMP. 5. Schedule ground disturbance to avoid periods when wildlife are likely to be within the relevant separation distances to the activities (Guidelines for animal approach distances – the Australian Antarctic Program). Develop a decision matrix to determine appropriate mitigation measures if wildlife are present. To be included with the AIRP DCIW CEMP. 6. Review the proposed timing of associated works against the seasonality of wildlife presence and apply where necessary, physical demarcation to maintain activity exclusion zones for wildlife.	Possible	Moderate	Medium

Activity #	Location	Activity description	Condition	Aspects	Impact(s)	Potential causes/sources of an impact happening	Inherent Risk Rating			Existing Reduction/Control Measures - against the Aspect	Residual Risk Rating		
							Likelihood	Consequence	RISK		Likelihood	Consequence	RISK
										7. Undertake baseline surveying of wildlife within all proposed laydown areas to determine the potential use as nesting, haul out and moulting sites. 8. All expeditioners will follow the AAD's Avoiding Wildlife Disturbance Policy. Develop a decision matrix to determine appropriate mitigation measures if wildlife is present within the minimum separation distances when utilising vehicles or powered equipment. Minimum separation distances that must be maintained when on foot or in a vehicle are prescribed within the AAD's Avoiding Wildlife Disturbance Policy (Guidelines for animal approach distances – the Australian Antarctic Program). 9. Undertake baseline surveying of wildlife before works commence, by suitably trained personnel within all proposed laydown areas to determine the potential use by wildlife (such as nesting sites). 10. Undertake additional wildlife surveying directly before use of laydown areas. 11. Wherever possible restrict storage area access/use when wildlife is present – this is particularly relevant to storage areas in proximity to seal haul-out areas and known moulting locations. 12. Development and utilisation of an annual laydown area planning document for efficient use of laydown areas. Laydown area planning will consider each laydown area's proximity to wildlife and the seasonality of any wildlife expected to be in the vicinity. Laydown area planning is to be update regularly, prior to the start of every summer season, however, updates may be more frequent, on a as needed basis. 13. Undertake baseline surveying of terrestrial flora, including for presence of sublithic communities under quartz stones, before works commence, by suitably trained personnel within all proposed laydown areas. Consultation with flora Subject Matter Experts in the event any terrestrial flora is present. 14. Periodic monitoring of flora species impacted by DCIW activities within active disturbance areas, as identified in the baseline survey, will be undertaken in accordance with the Environmental Monitoring and Reporting Framework. Monitoring will include visual assessments of individual colonies and documentation of any significant changes compared to baseline conditions, with particular attention to identified areas of special interest			
13	Antarctica	Construction	Abnormal, Emergency	Energy use- Leak/spill of fuels	Pollution of land, Pollution of sea water/sediments/s now/ice, Pollution of underground water, Depletion of non-renewable resources, Disturbance/Destruction of terrestrial flora, Disturbance/Destruction of fauna, Disturbance/Destruction of soil communities	1. Fuel spill from machinery and equipment during construction activities. 2. Fuel spill from refuelling or transfer activities of/to/from additional vehicles and machinery. 3. Fuel spill from vehicle or equipment tanks. 4. Fuel spills from transformers. 5. Failure of fuel delivery systems to any facility. 6. Fuel spill from fuel line, valves and associated infrastructure. 7. Maintenance activities of equipment (accidental oil and fuel release). 8. Leak/spill of coolant concentrate, adhesives, battery acid (these batteries are transported as dry batteries), solvents	Likely	Major	High	1. Adherence to the Australian Antarctic Division Station Fuel Spill Contingency Plans. 2. Ensuring all personnel complete Australian Antarctic Division Fuel Spill Contingency Training. 3. Ensuring that fuel spill kits are on site, accessible, and all construction personnel are trained to use them. 4. Operating Instructions for Waste Oil and Water Separator are followed. 5. Asset maintenance program through Maximo ensures operational efficiency of equipment is maintained. 6. Adherence to the Australian Antarctic Division Hazardous Chemicals Management Policy and procedures. 7. Use of the Australian Antarctic Division Incident reporting system for mapping trends and identifying how practices can be improved. 8. Refuelling of all equipment is undertaken as per Standard Operating Procedures including with appropriate drains/traps/bunding. 9. Batch collection of oily water interceptor waste in the mechanical workshops, drained and cleared on a 3-monthly cycle. Wastewater is put through the Wastewater Treatment Plan to be processed. Oil is returned to mainland Australia. 10. Portable drum containment systems - paints and thinners are decanted directly into drums for return to mainland Australia. 11. Storage of dangerous goods as per Material Safety Data Sheet in designated locations with appropriate bunding and ventilation. 12. All plant will have access to mobile spill kits. 13. All refuelling of construction-related equipment and machinery is to be undertaken with appropriate mitigations including spill kits and mats as per Standard Operating Procedure away from water bodies. 14. Training and education of refuelling Standard Operating Procedures and incident response as per the AIRP DCIW CEMP through Australian Antarctic Division training, project inductions, toolbox talks, and pre-start meetings. 15. Plant and equipment will be serviced and maintained as per Australian Antarctic Division standards and will undergo visual inspection to ensure equipment is in good working order. 16. Adherence to the discovery of fuel spills or other contamination procedures included within the AIRP DCIW CEMP to assist in the identification, extent, and management of contamination.	Possible	Moderate	Medium

Activity #	Location	Activity description	Condition	Aspects	Impact(s)	Potential causes/sources of an impact happening	Inherent Risk Rating			Existing Reduction/Control Measures - against the Aspect	Residual Risk Rating		
							Likelihood	Consequence	RISK		Likelihood	Consequence	RISK
						used in metal cleaning, glycols used in cooling systems, paints, fire suppression products.				17. Inclusion of Australian Antarctic Division remediation team and contamination subject matter experts in reporting fuel spills via the environmental incident reporting system. 18. Use of designated refuelling areas outlined within the AIRP DCIW CEMP. 19. Firefighting agents are PFAS-free and comprised of standard DCP extinguishers. 20. Adherence to the Australian Antarctic Division's Crisis Management and Recovery Manual. 21. Undertake assessment of terrestrial flora presence within works areas before works commence.			
14	Antarctica	Construction	Normal	Energy use-Non-renewable resources	Depletion of non-renewable resources	1. Use of a high volumes of non-renewable resource to power all construction equipment via generators. 2. Use of a high volumes of non-renewable resource from station's power to run smaller equipment/tools.	Almost certain	Minor	Medium	1. Asset maintenance program through Maximo ensures operational efficiency of equipment is maintained. 2. Adoption of new carbon reducing technologies/equipment if feasible in Antarctic environment. 3. Australian Antarctic Division Incident reporting system for mapping trends identifying how practices can be improved. 4. Use of Australian Antarctic Division Incident reporting system for mapping trends identifying how practices can be improved. 5. Alignment with Government strategy and net zero targets, influence on the DCIW design and use of new technologies that reduce emissions in Antarctica, wherever practicable. 6. Adherence to the AIRP Sustainability Management Plan. 7. Responsible management of fuel use for essential construction activities only, as reasonably practicable. 8. Adhering to best practice standards for machinery and equipment regarding start-up, standby, and shutdown periods. 9. All equipment will be commissioned in mainland Australia prior to departure for Antarctica wherever possible, with priority given to major systems such as powerhouse generators and reverse osmosis units over minor items like toilets and small electric pumps. 10. Contractual sustainability requirements within the design of the buildings enabling lowered fuel consumption. 11. Alternative fuel exploration and (potential or planning of) compatibility of generators with lower emissions fuel sources and efficiencies.	Almost certain	Minor	Medium
15	Antarctica	Construction	Normal	Energy use-water/equivalent	Depletion of water/equivalent	1. Concrete batching activities utilising water. 2. Cleaning of equipment, structures, building materials or cargo. 3. Fire suppression activities.	Almost certain	Minor	Medium	1. Adherence to the Australian Antarctic Division 'Plumbers Handbook' to guide water generation, treatment, and supply. 2. Adherence to the AIRP DCIW CEMP. 3. Completion of Australian Antarctic Division's training for all expeditioners prior to departure. 4. Additional induction training packages for expeditioners, focusing on efficient, selective, and mindful water (and other resource) consumption and use. 5. Washdown area management, ensuring preference for pressure air cleaning methods and minimal water use if water cleaning is required or if water is consumed during routine construction activities, such as concrete batching. 6. Application of evaporative water management principles (for wastewater) during construction activities. 7. Adherence to the minimum station water supply limits. 8. Compliance with water restriction protocols (if required). 9. Prioritisation of the water production infrastructure completion within the DCIW schedule. 10. Air pressured container cleaning will occur in a designated location and any paint flakes will be cleaned up immediately. Container cleaning is not undertaken in windy conditions.	Likely	Minor	Medium
16	Antarctica	Construction	Normal	Energy use-exhaust emission	Degradation of wilderness values, Disturbance/Destruction of fauna, Noise pollution, Pollution of the air	1. Exhaust emissions arising from engines. 2. Bioaccumulation of Persistent Organic Pollutants. 3. Malfunctioning engines releasing higher than normal exhaust particulates. 4. Cumulative emissions from multiple machinery	Almost certain	Moderate	High	1. All machinery is maintained and serviced prior to departure to ensure maximum efficiency. 2. Ensure efficient use of equipment, including additional generators and machinery. 3. Wherever reasonably practicable, limit the number of exhaust emitting equipment/machinery operating at any one time. 4. Align with AAD machinery and equipment maintenance servicing frequency (service intervals are twice as frequent as standard manufacturer recommendation). 5. Review of AIRP DCIW CEMP compliance through regular inspections, auditing and monitoring (6-month frequency minimum for review; however, inspection, auditing and monitoring will be more frequent). 6. Training and education of associated environmental impacts and mitigations as per the AIRP DCIW CEMP through Australian Antarctic Division training and project inductions, toolbox talks and pre-start meetings.	Almost certain	Minor	Medium

Activity #	Location	Activity description	Condition	Aspects	Impact(s)	Potential causes/sources of an impact happening	Inherent Risk Rating			Existing Reduction/Control Measures - against the Aspect	Residual Risk Rating		
							Likelihood	Consequence	RISK		Likelihood	Consequence	RISK
						equipment operating concurrently.							
17	Antarctica	Construction	Normal	Physical disturbance- Dust emission	Disturbance/Destruction of terrestrial flora, Disturbance/Destruction of soil communities, Disturbance/Destruction of fauna, Destruction of benthic flora and fauna, Pollution of inland waters/sediments, Pollution of sea water/sediments, Pollution of the air, Pollution of sea water/sediments/snow/ice	1. Groundwork activities at all construction locations within station limits. 2. Earthwork activities at all construction locations or material source locations (e.g. quarry for existing quarried materials). 3. Construction activities of buildings, road modifications, site services support structures establishment. 4. Modifications to the buildings during construction over multiple seasons (dust accumulation). 5. Temporary pipe or service connections. 6. Snow clearing for construction related purposes across the site. 7. Earthwork equipment operations, including crushing, drilling, grinding, use of cranes, excavating and truck movements. 8. Temporary supporting structure placement for frame work stability. 9. Additional vehicle movements throughout the station and to the quarry. 10. Dust suppression failure resulting in release to environment (surface water and dust mobilization to marine environments). 11. Dust accumulation on	Almost certain	Moderate	High	1. Adherence to the Job Hazard Analysis guidelines for construction activities. 2. Adherence to mitigation measures outlined in AIRP DCIW CEMP. 3. All participants of the Australian Antarctic Program adhere to the Australian Antarctic Division Environmental Code of Conduct. 4. Operation and Maintenance Manuals for equipment are followed and used. 5. Use of Australian Antarctic Division Incident reporting system for mapping trends identifying how practices can be improved. 6. Regular site inspections, audits and monitoring undertaken by QHSE Coordinator or equivalent as per the AIRP DCIW CEMP. 7. Undertake a daily review of weather conditions. Develop and implement a decision matrix which outlines wind thresholds for specific activities and associated mitigations where average wind forecast is expected to be greater than 20 knots and dust generated is likely to be deposited in area of identified sensitive receptors, identified within the AIRP DCIW CEMP. 8. Adherence to dust control measures outlined in AIRP DCIW CEMP. 9. All cutting/drilling or similar operations that can be reasonably relocated to occur within a controlled and appropriate indoor environment with dust extraction or similar. 10. Construction staging to ensure external works are completed prior to internal, where possible, to contain dust generation within the structure. Dust and debris within internal structures to be vacuumed, captured and disposed in accordance with waste storage for Return to mainland Australia. 11. All works limited to the project defined project area, prohibiting the stockpiling of any material outside this area. Rubble/soil/rock stockpiles are to be used or relocated to quarry as soon as practical. 12. Minimising, wherever practical, the stockpiling of fill material. 13. Wherever reasonably practicable, pace construction activities to accommodate the generation and use of fill material to minimise temporary stockpiling within the construction zone/area. 14. Training and education of associated environmental impacts and mitigations as per the AIRP DCIW CEMP through training and project inductions, toolbox talks and prestart meetings. 15. Before use inspection of equipment (including dust suppression equipment such as overhead air extraction) to ensure in working order. 16. Modify activities if dust generation exceeds limits within the AIRP DCIW CEMP. 17. Review the proposed timing of associated works against the seasonality of wildlife presence and apply where necessary, physical demarcation to maintain activity exclusion zones for wildlife. 18. Undertake baseline surveying of wildlife and terrestrial flora, including presence of sublithic communities under quartz stones before works commence, by suitably trained personnel within all proposed laydown areas to determine the potential use by wildlife (such as nesting sites). Consultation with wildlife Subject Matter Experts in the event any wildlife evidence/activity is present 19. Undertake additional surveying directly before use of laydown and construction areas. 20. Develop and implement a dust monitoring program that incorporates quantifiable dust monitoring. 21. Undertake desktop dust assessment of the proposed works to determine weather conditions that result in distribution of dust on ecological receptors, assessment to inform appropriate mitigations. 22. Schedule ground disturbance to avoid periods when wildlife are likely to be within the relevant separation distances to the activities (Guidelines for animal approach distances – the Australian Antarctic Program). Develop a decision matrix to determine appropriate mitigation measures if wildlife are present. To be included with the AIRP DCIW CEMP. 23. Periodic monitoring of flora species impacted by DCIW activities within active disturbance areas, as identified in the baseline survey, will be undertaken in accordance with the Environmental Monitoring and Reporting Framework. Monitoring will include	Likely	Moderate	High

Activity #	Location	Activity description	Condition	Aspects	Impact(s)	Potential causes/sources of an impact happening	Inherent Risk Rating			Existing Reduction/Control Measures - against the Aspect	Residual Risk Rating		
							Likelihood	Consequence	RISK		Likelihood	Consequence	RISK
						ice, impacting ice, benthic communities.				visual assessments of individual colonies and documentation of any significant changes compared to baseline conditions, with particular attention to identified areas of special interest			
18	Antarctica	Construction	Normal	Physical disturbance-Noise/Vibration emission	Disturbance/Destruction of fauna, Degradation of wilderness values, Noise pollution, Habitat change	1. Increased noise levels from multiple pieces of machinery/equipment operating concurrently. 2. Construction activities requiring machining, carpenter, metal works, plumbing, power tools etc. 3. Increased human associated noise levels in construction areas, permeating throughout the area. 4. Increased vehicle movements to support construction activities. 5. Vibration impact from machinery.	Almost certain	Moderate	High	1. Adherence to the Australian Antarctic Division Environmental Code of Conduct by all personnel. 2. All expeditioners will follow the AAD's Avoiding Wildlife Disturbance Policy. Develop a decision matrix to determine appropriate mitigation measures if wildlife is present within the minimum separation distances when utilising vehicles or powered equipment. Minimum separation distances that must be maintained when on foot or in a vehicle are prescribed within the AAD's Avoiding Wildlife Disturbance Policy (Guidelines for animal approach distances – the Australian Antarctic Program). 3. Australian Antarctic Division mandatory pre-departure training for all expeditioners which includes instruction on avoiding impacts to wildlife. 4. Australian Antarctic Division Incident reporting system for mapping trends identifying how practices can be improved 5. Asset maintenance program through Maximo ensures operational efficiency of equipment is maintained. 6. Adherence to the Standard Operating Procedure, Volume 1: Station and Field Operating Procedures, Chapter 4: Field Operations. 7. All machinery is maintained and serviced to minimise noise generation and impacts. 8. Ensure the most efficient and minimal use of equipment, including additional generators and machinery. Use of low vibration settings and vibration sensitive equipment where possible. 9. Wherever reasonably practicable, limit the number of equipment/machineries operating at any one time as part of the Traffic Management plan. 10. Align with AAD machinery and equipment maintenance servicing frequency (service intervals are twice as frequent as standard manufacturer recommendation). 11. Condition surveys pre-/post construction to assess vibration induced impacts, undertaken by trained personnel. 12. Efficient material handling and planning to ensure that double handling of materials, and subsequent vehicle use is limited. 13. Works are to be undertaken between 7am-10pm wherever possible to reduce impacts. Where works outside these hours are deemed necessary, notification and justification is required and should be limited to low noise generating activities. 14. Avoid, wherever reasonably practical, high noise generating activities such as earthworks, cutting, dropping of material, metal on metal interactions and use of horns, beepers and sirens when fauna is within the defined works area (defined within the most recent revision of the AIRP Construction Management Plan). 15. Where possible undertake noisy works away from station operational facilities, consider undertaking works inside buildings or using containers to shield noise between construction works and station operations buildings. 16. Regular site inspections, audits and monitoring undertaken by QHSE Coordinator or equivalent as per the AIRP DCIW CEMP. 17. Training and education of associated environmental impacts and mitigations as per the AIRP DCIW CEMP through training and project inductions, toolbox talks and prestart meetings. 18. Review the proposed timing of associated works against the seasonality of wildlife presence and apply where necessary, physical demarcation to maintain activity exclusion zones for wildlife. 19. Undertake baseline surveying of wildlife before works commence, by suitably trained personnel within all proposed laydown areas to determine the potential use by wildlife (such as nesting sites). 20. Undertake additional surveying directly before construction. 21. Undertake noise monitoring before and during within key areas to determine activities impact and adjust works as necessary/practical. Undertake baseline and real time noise monitoring, as described within the noise monitoring plan, before and during works. Baseline monitoring to determine activities impact and with real-time monitoring to inform the potential to adjust current works as needed. 22. Undertake desktop noise modelling of proposed works (e.g. blasting) under different environmental conditions (e.g. wind speeds and direction). Adjust timing of noisy activities to avoid periods where impacts to wildlife are likely to be exacerbated by weather conditions.	Almost certain	Moderate	High

Activity #	Location	Activity description	Condition	Aspects	Impact(s)	Potential causes/sources of an impact happening	Inherent Risk Rating			Existing Reduction/Control Measures - against the Aspect	Residual Risk Rating		
							Likelihood	Consequence	RISK		Likelihood	Consequence	RISK
19	Antarctica	Construction	Normal	Physical disturbance- Human impact	Disturbance/Destruction of fauna, Disturbance/Destruction of terrestrial flora, Disturbance/Destruction of soil communities	1. Poor personnel attitude to risk and noncompliance with protocols. 2. Disturbance to nesting birds along wharf outfall line. 3. Disturbance to seal haul outs near New Pump House. 4. Temporary increase to overall total number of structures on site. 5. Increased vehicle and foot traffic near New Pump House. 6. Increase (widening) of existing road footprint.	Almost certain	Moderate	High	1. Adherence to the Australian Antarctic Division Environmental Code of Conduct by all personnel. 2. All expeditioners will follow the AAD's Avoiding Wildlife Disturbance Policy. Develop a decision matrix to determine appropriate mitigation measures if wildlife is present within the minimum separation distances when utilising vehicles or powered equipment. Minimum separation distances that must be maintained when on foot or in a vehicle are prescribed within the AAD's Avoiding Wildlife Disturbance Policy (Guidelines for animal approach distances – the Australian Antarctic Program). 3. Australian Antarctic Division mandatory pre-departure training for all expeditioners. 4. Use of Australian Antarctic Division Incident reporting system for mapping trends identifying how practices can be improved 5. Asset maintenance program through Maximo ensures operational efficiency of equipment is maintained. 6. Use of the Australian Antarctic Division Antarctic Field Manual by all expeditioners. 7. Adherence to the Standard Operating Procedure, Volume 1: Station and Field Operating Procedures, Chapter 4: Field Operations. 8. Vibration condition surveys pre and post construction activities at earthwork areas and seeking/adherence to additional advice and Subject Matter Expert input if adverse environmental outcomes are observed. 9. Regular site inspections, audits and monitoring undertaken by QHSE Coordinator or equivalent as per the AIRP DCIW CEMP. 10. Training and education of associated environmental impacts and mitigations as per the AIRP DCIW CEMP through training and project inductions, toolbox talks and pre-start meetings. 11. Implement the Australian National Light Pollution Guidelines for Wildlife. 12. Lighting must be directed away and shielded from seabird nesting and seal haul-out areas (coastal areas or otherwise guided by wildlife subject matter experts). 13. Traffic management ensuring speed limits are complied with (15km/h) to reduce disturbance and impacts to wildlife. 14. Pre-activity surveys by trained personnel within the work sites to confirm the absence of nests. If nest sites are found within the work site, employ mitigation measures to discourage birds from re-establishing nests at the start of the breeding season, such as covering or blocking cavities. This is only to be undertaken using subject matter expert advice and direction. 15. Adherence to the Environment Protection and Biodiversity Conservation listing and statutory management plans, wherever applicable. 16. Undertake baseline surveying of wildlife before works commence, by suitably trained personnel within all proposed laydown areas to determine the potential use by wildlife (such as nesting sites). 17. Schedule ground disturbance to avoid periods when wildlife are likely to be within the relevant separation distances to the activities (Guidelines for animal approach distances – the Australian Antarctic Program). Develop a decision matrix to determine appropriate mitigation measures if wildlife are present. To be included with the AIRP DCIW CEMP. 18. Review the proposed timing of associated works against the seasonality of wildlife presence and apply where necessary, physical demarcation to maintain activity exclusion zones for wildlife. 19. Undertake additional surveying for wildlife directly before construction begins. 20. Undertake assessment of terrestrial flora, including for presence of sublithic communities under quartz stones, before works commence.	Possible	Moderate	Medium
20	Antarctica	Construction	Normal	Physical disturbance- Landscape	Landscape change, Disturbance/Destruction of terrestrial flora, Disturbance/Destruction of soil communities	1. Use of existing (processed) fill material from quarry location. 2. Ground disturbance from increased machinery traversing existing roads as well as foot traffic. 3. Earthworks for foundations, cut and fill methodology. 4. Temporary stockpiling of	Almost certain	Minor	Medium	1. Adherence to the Australian Antarctic Division Environmental Code of Conduct by all personnel. 2. Adherence to the Plant Operation Standard Operating Procedure. 3. Adherence to the Snow Clearing Standard Operating Procedure. 4. Use of the Mechanical Handbook for safe operation and maintenance of vehicles. 5. All relevant personnel trained and certified in the operation and maintenance of vehicles. 6. Use of Australian Antarctic Division Incident reporting system for mapping trends identifying how practices can be improved. 7. Use of Australian Antarctic Division Station and Field Waste Management Guide. 8. Adherence to the AIRP DCIW CEMP. 9. Adherence to the Standard Operating Procedure, Volume 1: Station and Field Operating Procedures, Chapter 2: Environmental Protection and Management. 10. Appropriate project areas are to be physically demarcated onsite, wherever practicable.	Likely	Minor	Medium

Activity #	Location	Activity description	Condition	Aspects	Impact(s)	Potential causes/sources of an impact happening	Inherent Risk Rating			Existing Reduction/Control Measures - against the Aspect	Residual Risk Rating		
							Likelihood	Consequence	RISK		Likelihood	Consequence	RISK
						fill. 5. Erection of building frames, scaffolding and building facade. 6. Increased footprint of service reticulation supports along wharf outfall line. 7. Temporary storage of building material at construction site and sprawl/footprint increase. 8. Partial backfill of the borrow pit from fill required for Utility Building. 9. Presence of buildings impacting wilderness values. 10. Erection of tallest building on station (excluding telecommunication towers) and increase bird-strikes				11. Excess soil/rock to be reused or removed from project area to quarry as soon as practicable. 12. Regular site inspections, audits and monitoring undertaken by QHSE Coordinator or equivalent as per the AIRP DCIW CEMP. 13. Waste and materials to be stored securely to avoid pollution of land and water. 14. Training and education of associated environmental impacts and mitigations as per the AIRP DCIW CEMP through Australian Antarctic Division training and project inductions, toolbox talks and pre-start meetings 15. Concrete / grout washouts to be captured and contained for evaporation, solids to be crushed if possible for onsite reuse or contained for Return to mainland Australia disposal. 16. Use already disturbed areas wherever possible, within an existing station's footprint for the location of new buildings. 17. Wherever earthworks occur, minimise the disturbance footprint as much as possible. This will be supported by planning, geotechnical calculations, and survey work (outside the scope of this IEE and subject to separate authorisation). 18. Limiting all works to the designated project area and timeline as outlined in the most recent revision of the AIRP Construction Management Plan. 19. Undertake assessment of terrestrial flora, including for presence of sublithic communities under quartz stones, before works commence.			
21	Antarctica	Construction	Normal	Physical disturbance- Landscape	Degradation of wilderness values	1. Use of existing (processed) fill material from quarry location. 2. Ground disturbance from increased machinery traversing existing roads as well as foot traffic. 3. Earthworks for foundations, cut and fill methodology. 4. Temporary stockpiling of fill. 5. Erection of building frames, scaffolding and building facade. 6. Increased footprint of service reticulation supports along wharf outfall line. 7. Temporary storage of building material at construction site and	Almost certain	Moderate	High	1. Adherence to the Australian Antarctic Division Environmental Code of Conduct by all personnel. 2. Adherence to the Plant Operation Standard Operating Procedure. 3. Adherence to the Snow Clearing Standard Operating Procedure. 4. Use of the Mechanical Handbook for safe operation and maintenance of vehicles. 5. All relevant personnel are trained and certified in the operation and maintenance of vehicles. 6. Use of Australian Antarctic Division Incident reporting system for mapping trends identifying how practices can be improved. 7. Use of Australian Antarctic Division Station and Field Waste Management Guide. 8. Adherence to the AIRP DCIW CEMP. 9. Adherence to the Standard Operating Procedure, Volume 1: Station and Field Operating Procedures, Chapter 2: Environmental Protection and Management. 10. Appropriate project areas are to be physically demarcated onsite, wherever practicable. 11. Excess soil/rock to be reused or removed from project area to quarry as soon as practicable. 12. Regular site inspections, audits and monitoring undertaken by QHSE Coordinator or equivalent as per the AIRP DCIW CEMP. 13. Waste and materials to be stored securely to avoid pollution to land and water. 14. Training and education of associated environmental impacts and mitigations as per the AIRP DCIW CEMP through Australian Antarctic Division training and project inductions, toolbox talks and pre-start meetings 15. Use already disturbed areas wherever possible, within an existing station's footprint for the location of new buildings. 16. Wherever earthworks occur, minimise the disturbance footprint as much as possible. This will be supported by planning, geotechnical calculations, and survey work (outside the scope of this IEE and subject to separate authorisation). 17. Limiting all works to the designated project area and timeline as outlined in the most recent revision of the AIRP Construction Management Plan.	Almost certain	Moderate	High

Activity #	Location	Activity description	Condition	Aspects	Impact(s)	Potential causes/sources of an impact happening	Inherent Risk Rating			Existing Reduction/Control Measures - against the Aspect	Residual Risk Rating		
							Likelihood	Consequence	RISK		Likelihood	Consequence	RISK
						sprawl/footprint increase. 8. Partial backfill of the borrow pit from fill required for Utility Building. 9. Presence of buildings impacting wilderness values. 10. Erection of tallest building on station (excluding telecommunication towers) and increase bird-strikes				18. Undertake an external colour selection study for the assessment of the Utility Building colour, with criteria inclusive of environmental considerations.			
22	Antarctica, Australia	Construction	Normal	Physical disturbance-Taking samples	Disturbance/Destruction of terrestrial flora, Disturbance/Destruction of soil communities Disturbance/Destruction of fauna, Habitat change, Hazardous landfill/disposal, Landfill, Disturbance/Destruction of benthic flora and fauna	1. Personnel attitude to risk and noncompliance with protocols. 2. Additional seawater sampling and accidental collection/destruction of marine organisms. 3. Unintentional collection of soil microorganisms during soil sampling. 4. Removal of seawater, microorganisms and/or organisms whilst sampling seawater. 5. Unintentional collection of marine sediment microorganisms during sampling.	Almost certain	Insignificant	Medium	1. Adherence to the Australian Antarctic Division Antarctic Field Manual. 2. Adherence to the AIRP DCIW CEMP. 3. Development and adherence to a sampling protocol for seawater. 4. Development and adherence to a sampling protocol for soil. 5. Adherence to any applicable and existing Australian Antarctic Division sampling permits. 6. Chemical fixatives are used away from the waterbodies and have at minimum two levels of (double) containment to ensure spill risk is lowered.	Possible	Insignificant	Low
23	Antarctica	Construction	Abnormal	Hazardous Chemicals-Leak/spill	Biological change, Disturbance/Destruction of terrestrial flora, Disturbance/Destruction of soil communities Disturbance/Destruction of fauna, Habitat change, Hazardous landfill/disposal	1. Accidental spills or release of paint, chemical or other hazardous material/liquid packaging or containers to the environment.	Possible	Moderate	Medium	1. Adherence to the Station Fuel Spill Contingency Plans. 2. Ensuring all personnel complete Fuel Spill Contingency Training. 3. Ensuring that fuel spill kits are on site, accessible and all construction personnel are trained to use. 4. Operating Instructions for Waste Oil and Water Separator are followed. 5. Asset maintenance program through Maximo ensures operational efficiency of equipment is maintained. 6. Adherence to the Hazardous Chemicals Management Policy and Procedures. 7. Use of Australian Antarctic Division Incident reporting system for mapping trends identifying how practices can be improved. 8. Refuelling of all equipment is undertaken as per Standard Operating Procedures including with appropriate drains/traps/bunding. 9. Batch collection of oily water interceptor waste in the mechanical workshops, drained and cleared on a 3-monthly cycle. Wastewater is put through the Wastewater Treatment Plan to be processed. Oil is Returned to mainland Australia. 10. Portable drum containment systems - paints and thinners are decanted directly into drums for Return to mainland Australia. 11. Storage of dangerous goods as per Material Safety Data Sheet in designated locations with appropriate bunding and ventilation.	Unlikely	Minor	Low

Activity #	Location	Activity description	Condition	Aspects	Impact(s)	Potential causes/sources of an impact happening	Inherent Risk Rating			Existing Reduction/Control Measures - against the Aspect	Residual Risk Rating		
							Likelihood	Consequence	RISK		Likelihood	Consequence	RISK
										12. All plant will have access to mobile spill kits. 14. Plant and equipment will be serviced and maintained as per Australian Antarctic Division requirements, and will be visually inspected before use to ensure equipment is in good working order. 15. Unexpected finds procedure to be included in the AIRP DCIW CEMP to assist in identification of fuel spills and leaks. 16. Adherence to the Standard Operating Procedure, Volume 2: Emergency Response Standard Operating Procedures. 17. Adherence to the Standard Operating Procedure Operations Manual Volume 1: Station and Field Waste Management Guide.			
24	Antarctica	Acquiring Fill	Normal	Physical disturbance- Dust emission	Disturbance/Destruction of terrestrial flora, Disturbance/Destruction of fauna, Pollution of the air, Pollution of sea water/sediments/snow/ice	1. Multiple, short duration (<10 second) infrequent explosions/blasting of rock within Utility Building footprint and quarry. 2. Failure of dust suppression measures (such as blast mats).	Likely	Moderate	High	1. Adherence to Job Hazard Analysis guidelines for blasting activities. 2. Adherence to the Environmental Code of Conduct for participants of the AIRP. 3. Adherence to the Operation and Maintenance Manuals for equipment used. 4. Use of Australian Antarctic Division Incident reporting system for mapping trends identifying how practices can be improved 5. Regular site inspections, audits and monitoring undertaken by QHSE Coordinator or equivalent as per the AIRP DCIW CEMP. 6. Adherence to mitigation measures outlined in AIRP DCIW CEMPs 7. Undertake a daily review of weather conditions. Develop and implement a decision matrix which outlines wind thresholds for specific activities and associated mitigations where average wind forecast is expected to be greater than 20 knots and dust generated is likely to be deposited in area of identified sensitive receptors, identified within the AIRP DCIW CEMP. 8. Where blasting is proposed, it must be carried out under the supervision of and in accordance with the advice provided by an on-site suitably qualified and experienced demolition/explosives engineer. 9. Undertake baseline surveying of wildlife before works commence, by suitably trained personnel to determine the potential use by wildlife (such as nesting sites). 10. Undertake additional wildlife surveying directly before activity occurs. 11. Review the proposed timing of associated works against the seasonality of wildlife presence and apply where necessary, physical demarcation to maintain activity exclusion zones for wildlife. 12. Develop and implement a dust monitoring program that incorporates quantifiable dust monitoring. 13. Undertake desktop dust assessment of the proposed works to determine weather conditions that result in distribution of dust on ecological receptors, assessment to inform appropriate mitigations. 14. Schedule ground disturbance to avoid periods when wildlife are likely to be within the relevant separation distances to the activities (Guidelines for animal approach distances – the Australian Antarctic Program). Develop a decision matrix to determine appropriate mitigation measures if wildlife are present. To be included with the AIRP DCIW CEMP. 15. Adherence to blasting and processing control measures outlined in AIRP DCIW CEMP. 16. Use of blast mats on all blasting related activities to mitigate noise and dust emissions. 17. Use of leading technology, equipment and design to minimise the impacts (lowest noise and dust generation solutions) arising from the blast. 19. Completing all necessary engineering and geotechnical calculations/requirements to quantify the amount of fill to limit over processing and over production. 20. Development and adherence to a blast works method statement (September 2027). 21. Determination of the location/positioning/placement of proposed buildings to reduce the need or volume of fill material required, as much as practicable. 22. Modify activities if dust generation exceeds limits within the AIRP DCIW CEMP.	Possible	Moderate	Medium

Activity #	Location	Activity description	Condition	Aspects	Impact(s)	Potential causes/sources of an impact happening	Inherent Risk Rating			Existing Reduction/Control Measures - against the Aspect	Residual Risk Rating		
							Likelihood	Consequence	RISK		Likelihood	Consequence	RISK
25		Acquiring Fill	Normal	Physical disturbance- Dust emission	Disturbance/Destruction of terrestrial flora, Disturbance/Destruction of fauna, Pollution of the air, Pollution of sea water/sediments/snow/ice	1. Further drilling, crushing, jack hammering or similar activity of the post-blasted rock. 2. Stockpiling of fines within the quarry. 3. Failure of dust suppression measures.	Almost certain	Moderate	High	1. Adherence to Job Hazard Analysis guidelines for blasting activities. 2. Adherence to the Environmental Code of Conduct for participants of the AIRP. 3. Adherence to the Operation and Maintenance Manuals for equipment used. 4. Use of Australian Antarctic Division Incident reporting system for mapping trends identifying how practices can be improved 5. Regular site inspections, audits and monitoring undertaken by QHSE Coordinator or equivalent as per the AIRP DCIW CEMP. 6. Adherence to dust control measures outlined in AIRP DCIW CEMP. 7. Undertake a daily review of weather conditions. Develop and implement a decision matrix which outlines wind thresholds for specific activities and associated mitigations where average wind forecast is expected to be greater than 20 knots and dust generated is likely to be deposited in area of identified sensitive receptors, identified within the AIRP DCIW CEMP. 8. Where blasting is proposed, it must be carried out under the supervision of and in accordance with the advice provided by an on-site suitably qualified and experienced demolition/explosives engineer. 9. Training and education of associated environmental impacts and mitigations as per the AIRP DCIW CEMP through training and project inductions, toolbox talks and pre-start meetings. 10. Adherence to rock crushing and processing control measures outlined in AIRP DCIW CEMP. 11. Undertake baseline surveying of wildlife before works commence, by suitably trained personnel to determine the potential use by wildlife (such as nesting sites). 12. Undertake additional wildlife surveying directly before activity occurs. 13. Review the proposed timing of associated works against the seasonality of wildlife presence and apply where necessary, physical demarcation to maintain activity exclusion zones for wildlife. 14. Develop and implement a dust monitoring program that incorporates quantifiable dust monitoring. 15. Undertake desktop dust assessment of the proposed works to determine weather conditions that result in distribution of dust on ecological receptors, assessment to inform appropriate mitigations. 16. Schedule ground disturbance to avoid periods when wildlife are likely to be within the relevant separation distances to the activities (Guidelines for animal approach distances – the Australian Antarctic Program). Develop a decision matrix to determine appropriate mitigation measures if wildlife are present. To be included with the AIRP DCIW CEMP. 17. Completing all necessary engineering and geotechnical calculations/requirements to quantify needs of fill to limit over processing and over production. 18. Investigation the use and practicality of covering of fines with a geotextile (or similar) material and anchoring to reduce distribution. 19. Reducing drop heights of fill material from equipment as much as practicable. 20. Determination of the location/positioning/placement of proposed buildings to reduce the need or volume of fill material required, as much as practicable. 21. Modify activities if dust generation exceeds limits within the AIRP DCIW CEMP.	Almost certain	Moderate	High
26		Acquiring Fill	Normal	Physical disturbance- Landscape	Disturbance/Destruction of terrestrial flora, Landscape change, Degradation of wilderness values, Disturbance/Destruction of soil communities, Habitat change	1. Landscape disturbance from the removal of material within the Davis station quarry. 2. Destruction of flora or sublitic communities within the quarried area from the removal of material.	Almost certain	Moderate	High	1. Completing all necessary engineering and geotechnical calculations/requirements to quantify the amount of fill to limit over processing and over production. 2. Limiting work to the project defined areas to minimise the works footprint over extension. 3. Where blasting is proposed, it must be carried out under the supervision of and in accordance with the advice provided by an on-site suitably qualified and experienced demolition/explosives engineer. 4. Regular site inspections, audits and monitoring undertaken by QHSE Coordinator or equivalent as per the AIRP DCIW CEMP. 5. Determination of the location/positioning/placement of proposed buildings to reduce the need or volume of fill material required, as much as practicable. 6. Undertake baseline surveying of wildlife before works commence, by suitably trained personnel within all proposed laydown areas to determine the potential use by wildlife (such as nesting sites). 7. Undertake additional wildlife surveying directly before activity occurs.	Almost certain	Moderate	High

Activity #	Location	Activity description	Condition	Aspects	Impact(s)	Potential causes/sources of an impact happening	Inherent Risk Rating			Existing Reduction/Control Measures - against the Aspect	Residual Risk Rating		
							Likelihood	Consequence	RISK		Likelihood	Consequence	RISK
										8. Undertake a wilderness values and landscape change subject matter review of the Blast Management Plan, specifically reviewing the proposed quarried area.			
27	Antarctica	Acquiring Fill	Normal	Physical disturbance-Noise/Vibration emission	Disturbance/Destruction of fauna, Degradation of wilderness values, Noise pollution	1. Multiple, short duration (<10 second) infrequent explosions/blasting of rock within Utility Building footprint and quarry. 2. Failure of noise suppression measures (such as blast mats).	Almost certain	Major	Severe	1. Adherence to Job Hazard Analysis guidelines for blasting activities. 2. Adherence to the Environmental Code of Conduct for participants of the Australian Antarctic Program. 3. Adherence to noise control measures outlined in AIRP DCIW CEMP 4. Use of leading technology, equipment and design to minimise the impacts (lowest noise and dust generation solutions) arising from the blast. 5. Use of detonator explosive systems for lowest noise generation solutions. 6. Undertake a daily review of weather conditions. Develop and implement a decision matrix which outlines wind thresholds for specific activities and associated mitigations where average wind forecast is expected to be greater than 20 knots and dust generated is likely to be deposited in area of identified sensitive receptors, identified within the AIRP DCIW CEMP. 7. Provide an opportunity for review of the blasting methodology when available by AAD wildlife SMEs 8. Where blasting is proposed, it must be carried out under the supervision of and in accordance with the advice provided by an on-site suitably qualified and experienced demolition/explosives engineer. 9. Potential use of preventative measures in key impacted areas, under the advice of wildlife SME, to discourage nesting of avian species. Preventative measures include the covering of existing nests within the works area to discourage cavity nesting bird species, only to be undertaken if wildlife are not present in the area, prior to their arrival in November – December. 10. Undertake desktop noise modelling of the proposed works to quantify noise impact at known sensitive receptor (wildlife) locations. 11. Review the proposed timing of associated works against the seasonality of wildlife presence and apply where necessary, physical demarcation to maintain activity exclusion zones for wildlife. 12. Undertake additional wildlife surveying directly before the activity occurs. 13. Undertake baseline and real-time noise monitoring, as described within the noise monitoring plan, before and during works. baseline monitoring to determine activities impact and with real time monitoring to inform the potential to adjust current works as needed. 14. Undertake desktop noise modelling of proposed works (e.g. blasting) under different environmental conditions (e.g. wind speeds and direction). Adjust timing of noisy activities to avoid periods where impacts to wildlife are likely to be exacerbated by weather conditions. 15. Adherence to blasting and processing control measures outlined in the AIRP DCIW CEMP. 16. Use of blast mats on all blasting related activities to mitigate noise and dust emissions. 17. Completing all necessary engineering and geotechnical calculations/requirements to quantify the amount of fill to limit over processing and over production. 18. Development and adherence to a blast works method statement (September 2027). 19. Undertake desktop underwater noise impact modelling for blasting (September 2027). 20. Determination of the location/positioning/placement of proposed buildings to reduce the need or volume of fill material required, as much as practicable. 21. Development of a communication strategy or equivalent regarding blasting for expeditioners, including consideration of timing of blasts to minimise the impact to wilderness values (July 2026).	Possible	Moderate	Medium

Activity #	Location	Activity description	Condition	Aspects	Impact(s)	Potential causes/sources of an impact happening	Inherent Risk Rating			Existing Reduction/Control Measures - against the Aspect	Residual Risk Rating		
							Likelihood	Consequence	RISK		Likelihood	Consequence	RISK
28		Acquiring Fill	Normal	Physical disturbance-Noise/Vibration emission	Disturbance/Destruction of fauna, Degradation of wilderness values, Noise pollution	1. Further drilling, crushing, jack hammering or similar activity of the post-blasted rock. 2. Failure of noise suppression measures.	Almost certain	Moderate	High	1. Adherence to Job Hazard Analysis guidelines for blasting activities. 2. Adherence to the Environmental Code of Conduct for participants of the Australian Antarctic Program. 3. Adherence to the AIRP DCIW CEMP. 4. Undertake a daily review of weather conditions. Develop and implement a decision matrix which outlines wind thresholds for specific activities and associated mitigations where average wind forecast is expected to be greater than 20 knots and dust generated is likely to be deposited in area of identified sensitive receptors, identified within the AIRP DCIW CEMP. 5. Where blasting is proposed, it must be carried out under the supervision of and in accordance with the advice provided by an on-site suitably qualified and experienced demolition/explosives engineer. 6. Potential use of preventative measures in key impacted areas, under the advice of wildlife SME, to discourage nesting of avian species. Preventative measures include the covering of existing nests within the works area to discourage cavity nesting bird species, only to be undertaken if wildlife are not present in the area, prior to their arrival in November – December. 7. Review the proposed timing of associated works against the seasonality of wildlife presence and apply where necessary, physical demarcation to maintain activity exclusion zones for wildlife. 8. Undertake baseline surveying of wildlife before works commence, by suitably trained personnel within all proposed laydown areas to determine the potential use by wildlife (such as nesting sites). 9. Undertake additional wildlife surveying directly before the activity occurs. 10. Undertake baseline and real time noise monitoring, as described within the noise monitoring plan, before and during works. Baseline monitoring to determine activities impact and with real time monitoring to inform the potential to adjust current works as needed. 11. Undertake desktop noise modelling of proposed works (e.g. blasting) under different environmental conditions (e.g. wind speeds and direction). Adjust timing of noisy activities to avoid periods where impacts to wildlife are likely to be exacerbated by weather conditions. 12. Adherence to rock crushing and processing control measures outlined in AIRP DCIW CEMP. 13. Completing all necessary engineering and geotechnical calculations/requirements to quantify the amount of fill to limit over processing and over production. 14. Determination of the location/positioning/placement of proposed buildings to reduce the need or volume of fill material required, as much as practicable. 15. Development of a communication strategy or equivalent regarding rock drilling and crushing for expeditioners, including consideration of timing of activities to minimise the impact to wilderness values (July 2026).	Possible	Moderate	Medium
29	Antarctica	Refurbishment	Normal	Physical disturbance-Dust emission	Degradation of wilderness values, Disturbance/Destruction of terrestrial flora, Disturbance/Destruction of fauna, Pollution of the air, Pollution of sea water/sediments/snow/ice	1. Removal of earth around the outer wall of the Old Living Quarters building to enable access.	Likely	Minor	Medium	1. Adherence to the Job Hazard Analysis guidelines for refurbishment activities. 2. Adherence to dust control measures outlined in the AIRP DCIW CEMP. 3. Adherence to the Environmental Code of Conduct for participants of the AIRP. 4. Operation and Maintenance Manuals for equipment are followed and used. 5. Use of Australian Antarctic Division Incident reporting system for mapping trends identifying how practices can be improved. 6. Regular site inspections, audits and monitoring undertaken by QHSE Coordinator or equivalent as per the AIRP DCIW CEMP. 7. Undertake a daily review of weather conditions. Develop and implement a decision matrix which outlines wind thresholds for specific activities and associated mitigations where average wind forecast is expected to be greater than 20 knots and dust generated is likely to be deposited in area of identified sensitive receptors, identified within the AIRP DCIW CEMP. 8. Construction staging to ensure external works are completed prior to internal, where possible, to contain dust generation within the structure. Dust and debris within internal structures to be vacuumed, captured and disposed. 9. All works are limited to the project defined project area within the AIRP DCIW CEMP, prohibiting the stockpiling of any material outside this area. Rubble/soil/rock stockpiles are to be used or relocated to the quarry as soon as practicable. 10. Minimising, wherever practicable, the storage of fill material. 11. Construction speed to accommodate the generation and use of fill material to minimise temporary stockpiling within the construction zone/area.	Possible	Minor	Low

Activity #	Location	Activity description	Condition	Aspects	Impact(s)	Potential causes/sources of an impact happening	Inherent Risk Rating			Existing Reduction/Control Measures - against the Aspect	Residual Risk Rating		
							Likelihood	Consequence	RISK		Likelihood	Consequence	RISK
										12. Training and education of associated environmental impacts and mitigations as per the AIRP DCIW CEMP through training and project inductions, toolbox talks and pre-start meetings. 13. Develop and implement a dust monitoring program that incorporates quantifiable dust monitoring. 14. Undertake desktop dust assessment of the proposed works to determine weather conditions that result in distribution of dust on ecological receptors, assessment to inform appropriate mitigations. 15. Modify activities if dust generation exceeds limits within the AIRP DCIW CEMP.			
30	Antarctica	Refurbishment	Normal	Physical disturbance-Taking samples	Hazardous landfill/disposal	1. Air sampling for asbestos management before, during and after asbestos removal. 2. Personnel attitude to risk and noncompliance with protocols.	Almost certain	Minor	Medium	1. Adherence to the Australian Antarctic Division Antarctic Field Manual. 2. Adherence to AIRP DCIW CEMP. 3. Adherence to the Australian Antarctic Division sampling protocol for asbestos or the development of one. 4. Adherence to Import Permit for Asbestos (Ref: 13-2025) 5. Asbestos removal will be undertaken and transported under valid licencing from WorkSafe Tasmania (Licence Number: 90781014) 6. Adherence to any applicable and existing Australian Antarctic Division sampling permits. 7. Adherence to the Australian Antarctic Division Asbestos Management Plan Australian Antarctic Territory and Macquarie Island - 2023-2026.	Possible	Minor	Low
31	Antarctica	Refurbishment	Normal	Physical disturbance-Noise/Vibration emission	Disturbance/Destruction of fauna, Degradation of wilderness values, Noise pollution	1. Minor earthworks surround the Old Living Quarters building. 2. Internal works in both the Trades Workshop and Old Living Quarters.	Almost certain	Minor	Medium	1. Adherence to the Australian Antarctic Division Environmental Code of Conduct by all personnel. 2. Australian Antarctic Division mandatory pre-departure training for all expeditioners which includes information on preventing wildlife disturbance. 3. Asset maintenance program through Maximo ensures operational efficiency of equipment is maintained. 4. All machinery is maintained and serviced to minimise noise generation and impacts. 5. Ensure the most efficient and minimal use of equipment, including additional generators and machinery. Use of low-vibration settings and vibration sensitive equipment where possible. 6. Align with AAD machinery and equipment maintenance servicing frequency (service intervals are twice as frequent as standard manufacturer recommendation). 7. Condition surveys pre-/post construction to assess vibration induced impacts. 8. Efficient material handling and planning to ensure that double handling of materials, and subsequent vehicle use is limited. 9. Works are to be undertaken between 7am-10pm wherever possible to reduce impacts. Where works outside these hours are deemed necessary, notification and justification is required and should be limited to low noise generating activities. 10. Avoid, wherever reasonably practicable, high noise generating activities such as earthworks, cutting, dropping of material, metal on metal interactions and use of horns, beepers and sirens and when fauna is within the defined works area (defined within the most recent revision of the AIRP Construction Management Plan). 11. Where possible undertake noisy works inside buildings or using containers to shield noise between construction works and station operations buildings. 12. Review of AIRP DCIW CEMP compliance through regular inspections, auditing and monitoring (six month frequency minimum for review, however inspection, auditing and monitoring will be more frequent) 13. Training and education of associated environmental impacts and mitigations as per the AIRP DCIW CEMP through Australian Antarctic Division training and project inductions, toolbox talks and pre-start meetings. 14. Wherever possible include project planning contingencies to enable overall works to progress in other areas if wildlife presence restricts works progressing within specific locations.	Possible	Minor	Low

Activity #	Location	Activity description	Condition	Aspects	Impact(s)	Potential causes/sources of an impact happening	Inherent Risk Rating			Existing Reduction/Control Measures - against the Aspect	Residual Risk Rating		
							Likelihood	Consequence	RISK		Likelihood	Consequence	RISK
32	Australia	Demolition	Normal	Physical disturbance- Dust emission	Disturbance/Destruction of terrestrial flora, Disturbance/Destruction of fauna, Pollution of the air, Disturbance/Destruction of soil communities	- Disturbance of accumulated dust within structure during demolition and escape to the environment. - Inadequate dust suppression during demolition activities resulting in uncontrolled release into the environment. - Dust release due to collapse of any building materials. - Incorrect decommissioning or demolition procedures undertaken. - Dust suppression control failure. - Trapped dust that is released into the environment from blizztails and snow accumulation.	Almost certain	Minor	Medium	- Adherence to Job Hazard Analysis guidelines for demolition activities. - Adherence to the Environmental Code of Conduct for participants of the Australian Antarctic Program. - Use of Operation and Maintenance Manuals for equipment. - Use of Australian Antarctic Division Incident reporting system for mapping trends identifying how practices can be improved - Regular site inspections, audits and monitoring undertaken by QHSE Coordinator or equivalent as per the AIRP DCIW CEMP. - Undertake a daily review of weather conditions. Develop and implement a decision matrix which outlines wind thresholds for specific activities and associated mitigations where average wind forecast is expected to be greater than 20 knots and dust generated is likely to be deposited in area of identified sensitive receptors, identified within the AIRP DCIW CEMP. - Adherence to the AIRP DCIW CEMP. - Air quality monitoring required for asbestos removal works. - Follow the demolition procedure of having a container flush against the building to capture material, which is then packaged and stored ready for Return to mainland Australia. - Development and adherence to a demolition work plan (December 2027). - Unexpected finds procedure to be included in the AIRP DCIW CEMP to assist in the identification of fuel spills and leaks. - Assessment by a qualified or suitably trained person of suspected contamination in consultation with Australian Antarctic Division contamination and remediation subject matter experts. - Development and adherence to a rehabilitation plan (December 2026). - Development and adherence to a clean-as-you-go procedure within the AIRP DCIW CEMP, detailing immediate action regarding hazardous chemicals/materials as well as general housekeeping. - Utilisation of available tools that can be deployed to station (e.g. Photoionization Detector) to identify potential contamination. Where contamination is suspected, samples may be returned to mainland Australia for detailed analytical testing, in consultation with Australian Antarctic Division contamination and remediation subject matter experts. - Demolition activities are approached with the assumption that high levels of contamination are present directly underneath and within a two-meter perimeter. Soil disturbance within this area is to be as minimal as possible. - External cladding to be removed on low wind days to lower the likelihood of airborne dispersion of contamination. - Wherever possible, the demarcation around the buildings being demolished. - The application of exclusion zones (buffers) for asbestos demolition works pertaining to human safety will also apply to all air breathing wildlife. - Modify activities if dust generation exceeds limits within the AIRP DCIW CEMP.	Possible	Minor	Low
33	Antarctica	Demolition	Normal	Hazardous Chemicals/Materials-Wastes	Hazardous landfill/disposal, Pollution of land, Pollution of sea water/sediments/snow/ice, Pollution of the air, Pollution of underground water	- Unintentional release of waste that may/does contain hazardous materials/chemicals from demolition activities (including via airborne distribution). - Incorrect storage of hazardous materials/chemicals waste. - Incorrect identification of hazardous waste materials. - Poor personnel attitude to risk and noncompliance with protocols.	Likely	Major	High	- Adherence to the Job Hazard Analysis guidelines for construction/demolition activities. - Adherence to the Environmental Code of Conduct for participants of the Australian Antarctic Program. - Use of Operation and Maintenance Manuals including but not limited to Australian Antarctic Division Standard Operating Procedure Operations Manual Volume 1: Station and Field Waste Management Guide and Volume 2: Emergency Response Standard Operating Procedure. - Use of Australian Antarctic Division Incident reporting system for mapping trends identifying how practices can be improved - Regular site inspections, audits and monitoring undertaken by QHSE Coordinator or equivalent as per the AIRP DCIW CEMP. - Services to facilities will be abolished prior to decommissioning, with drainage systems appropriately capped ahead of refurbishment to prevent the potential entry of hazardous chemicals. - Storage of dangerous goods as per the Material Safety Data Sheet in designated locations with appropriate bunding and ventilation. - Unexpected finds procedure to be included in the AIRP DCIW CEMP to assist in the identification of fuel spills and leaks. - Inspection by a qualified person of the infrastructure to identify possible staining/discoloration or odour associated with historic spills or leaks. - Assessment by a qualified or suitably trained person of suspected contamination in consultation with Australian Antarctic Division contamination and remediation subject matter experts.	Unlikely	Major	Medium

Activity #	Location	Activity description	Condition	Aspects	Impact(s)	Potential causes/sources of an impact happening	Inherent Risk Rating			Existing Reduction/Control Measures - against the Aspect	Residual Risk Rating		
							Likelihood	Consequence	RISK		Likelihood	Consequence	RISK
										11. Development and adherence to a rehabilitation plan (December 2026). 12. Development and adherence to a clean-as-you-go procedure within the AIRP DCIW CEMP, detailing immediate action regarding hazardous chemicals/materials as well as general housekeeping. 13. Utilisation of available tools that can be deployed to station (e.g. Photoionization Detector) to identify potential contamination. Where contamination is suspected, samples may be returned to mainland Australia for detailed analytical testing, in consultation with Australian Antarctic Division contamination and remediation subject matter experts. 14. Demolition activities are approached with the assumption that high levels of contamination are present directly underneath and withing a 2 meter perimeter. Soil disturbance within this area is to be as minimal as possible. 15. Undertake a daily review of weather conditions. Develop and implement a decision matrix which outlines wind thresholds for specific activities and associated mitigations where average wind forecast is expected to be greater than 20 knots and dust generated is likely to be deposited in areas of identified sensitive receptors, identified within the AIRP DCIW CEMP. 16. External cladding to be removed on low wind days to lower the likelihood of airborne dispersion of contamination. 17. Wherever possible the demarcation around the buildings being demolished. 18. The application of exclusion zones (buffers) for asbestos demolition works pertaining to human safety will also apply to all air breathing wildlife. 19. Follow the demolition procedure of having a container flush against the building to capture material, which is then packaged and stored ready for Return to mainland Australia. 20. Development and adherence to a demolition work plan (December 2027). 21. Clear and concise emergency response and incident management procedures in line with Australian Antarctic Division Standard Operating Procedures and manuals and consultation with Australian Antarctic Division contamination and remediation subject matter experts.			
34	Antarctica	Demolition	Normal	Physical disturbance- Taking samples	Hazardous landfill/disposal, Disturbance/Destruction of terrestrial flora, Habitat change, Disturbance/Destruction of benthic flora and fauna	1. Air sampling for asbestos management before, during and after asbestos removal. 2. Personnel attitude to risk and noncompliance with protocols. 3. Unintentional collection of soil microorganisms during soil sampling. 4. Sampling event of sediments (e.g. in the event of a fuel spill).	Possible	Insignificant	Low	1. Adherence to the Australian Antarctic Division Antarctic Field Manual. 2. Adherence to the AIRP DCIW CEMP. 3. Adherence to the Australian Antarctic Division sampling protocol for asbestos or the development of one. 4. Adherence to the Import Permit for Asbestos (Ref: 13-2025). 5. Asbestos removal will be undertaken and transported under valid licencing from WorkSafe Tasmania (Licence Number: 90781014) 6. Adherence to any applicable and existing Australian Antarctic Division sampling permits. 7. Adherence to the Australian Antarctic Division Asbestos Management Plan Australian Antarctic Territory and Macquarie Island - 2023-2026. 8. Adherence to the Australian Antarctic Division sampling protocol for soil or the development of one.	Unlikely	Insignificant	Low
35	Antarctica	Demolition	Normal	Energy use- Leak/spill of fuels	Pollution of land, Pollution of sea water/sediments/snow/ice, Pollution of underground water, Depletion of non-renewable resources, Disturbance/Destruction of terrestrial	1. Fuel spill from machinery and equipment during demolition activities. 2. Fuel spill from refuelling or transfer activities of/to/from additional vehicles and machinery. 3. Fuel spill from decommissioning of Main	Likely	Major	High	1. Adherence to the Job Hazard Analysis guidelines for construction/demolition activities. 2. Adherence to the Environmental Code of Conduct for participants of the Australian Antarctic Program. 3. Use of Operation and Maintenance Manuals including but not limited to Australian Antarctic Division Standard Operating Procedure Operations Manual Volume 1: Station and Field Waste Management Guide and Volume 2: Emergency Response standard Operating Procedure. 4. Use of Australian Antarctic Division Incident reporting system for mapping trends identifying how practices can be improved. 5. Regular inspection, auditing and monitoring undertaken as per the AIRP DCIW CEMP to review compliance. 6. Adherence to mitigation measures outlined in AIRP DCIW CEMP. 7. Adherence to the Station Fuel Spill Contingency Plans. 8. Training and education of refuelling Standard Operating Procedures and incident response as per the AIRP DCIW CEMP	Unlikely	Moderate	Medium

Activity #	Location	Activity description	Condition	Aspects	Impact(s)	Potential causes/sources of an impact happening	Inherent Risk Rating			Existing Reduction/Control Measures - against the Aspect	Residual Risk Rating		
							Likelihood	Consequence	RISK		Likelihood	Consequence	RISK
					flora, Disturbance/Destruction of fauna, Disturbance/Destruction of soil communities	or Emergency Powerhouse equipment.				through Australian Antarctic Division training and project inductions, toolbox talks and pre-start meetings, ensuring all personnel complete Fuel Spill Contingency Training. 9. Ensuring that fuel spill kits are on site, accessible and all construction personnel are trained to use them. 10. Plant and equipment will be serviced and maintained as per Australian Antarctic Division requirements and will be visually inspected to ensure equipment is in good working order. Asset maintenance program through Maximo ensures operational efficiency of equipment is maintained. 11.Services to facilities will be abolished prior to decommissioning, with drainage systems appropriately capped ahead of refurbishment to prevent the potential entry of hazardous chemicals. 12. Storage of dangerous goods as per the Material Safety Data Sheet in designated locations with appropriate bunding and ventilation. 13. Unexpected finds procedure to be included in the AIRP DCIW CEMP to assist in identification of fuel spills and leaks. Incorporating information from the Davis Station – Preliminary Site Investigation, along with any subsequent events. 14. Operating Instructions for Waste Oil and Water Separator are followed. 15. Refuelling of all equipment is undertaken as per Standard Operating Procedures including with appropriate drains/traps/bunding and away from water bodies. 16. Batch collection of oily water interceptor waste in the mechanical workshops, drained and cleared on a 3-monthly cycle. Wastewater is put through the Wastewater Treatment Plant to be processed. Oil is Return to mainland Australia. 17. Portable drum containment systems - paints and thinners are decanted directly into drums for Return to mainland Australia. 18. Develop and adhere to new Standard Operating Procedures to reflect the change or establishment of new operations, ensuring consistent, controlled practices that minimise disturbance, reduce the likelihood of impacts. This will enable the correct operation of equipment to ensure operations occur appropriately and in line with manufacture standards and expectations. 19. Inspection by a qualified person infrastructure to identify possible staining/discoloration or odour associated with historic spills or leaks. 20. Assessment by a qualified or suitably trained person of suspected contamination in consultation with Australian Antarctic Division contamination and remediation subject matter experts. 21. Fuel tank design to include either appropriate compliant bunding (Australian Standard) or self-bunding (dual skin design)			
36	Antarctica	Installation and Commissioning	Normal, Abnormal	Energy use-Emission of gases	Pollution of the air	1. Spray painting, welding, parts cleaning, fibre glassing, carpentry. 2. Use of oxyacetylene and welding activities. 3. Spray-painting vapours and fumes from parts cleaner. 4. Equipment or mechanical failure. 5. Poor storage practices and ventilation.	Almost certain	Insignificant	Medium	1. Use of the Workshop Operation and Maintenance Manual. 2. Adherence to the Standard Operating Procedure, Volume 1: Station and Field Operating Procedures. 3. Use of Workshop and Maintenance Manuals for plant and vehicles and workshop equipment and machinery. 4. Use of the Mechanical Handbook for safe operation and maintenance of vehicles. 5. Storage of dangerous goods as per Material Safety Data Sheet in designated locations with appropriate bunding and ventilation. 6. Develop and adhere to new Standard Operating Procedures to reflect the change or establishment of new operations, ensuring consistent, controlled practices that minimise disturbance, reduce the likelihood of impacts. This will enable the correct operation of equipment to ensure operations occur appropriately and in line with manufacture standards and expectations. 7. All equipment will be commissioned in mainland Australia prior to departure for Antarctica wherever possible, with priority given to major systems such as powerhouse generators and reverse osmosis units over minor items like toilets and small electric pumps.	Unlikely	Insignificant	Low

Activity #	Location	Activity description	Condition	Aspects	Impact(s)	Potential causes/sources of an impact happening	Inherent Risk Rating			Existing Reduction/Control Measures - against the Aspect	Residual Risk Rating		
							Likelihood	Consequence	RISK		Likelihood	Consequence	RISK
37	Antarctica	Installation and Commissioning	Abnormal	Energy use-Leak/spill of fuels	Pollution of land, Pollution of sea water/sediments/snow/ice, Pollution of underground water, Depletion of non-renewable resources, Disturbance/Destruction of terrestrial flora, Disturbance/Destruction of soil communities	1. Fuel tank storage failure within Reverse Osmosis, New Pump House and Utility Building. 2. Fuel/Power line failure. 3. Equipment (with enclosed fuel tank) failures. 4. Overflowing/overfilling (refuelling failure) from fuel tanks within Reverse Osmosis, New Pump House and Utility Building. 5. Insulation failure of fuel tanks.	Likely	Major	High	1. Adherence to the Job Hazard Analysis guidelines for construction/demolition activities. 2. Adherence to the Environmental Code of Conduct for participants of the Australian Antarctic Program. 3. Use of Operation and Maintenance Manuals including but not limited to Australian Antarctic Division Standard Operating Procedure Operations Manual Volume 1: Station and Field Waste Management Guide and Volume 2: Emergency Response Standard Operating Procedure. 4. Use of Australian Antarctic Division Incident reporting system for mapping trends identifying how practices can be improved 5. Regular inspection, auditing and monitoring undertaken as per the AIRP DCIW CEMP to review compliance. 6. Adherence to mitigation measures outlined in AIRP DCIW CEMP. 7. Adherence to the Station Fuel Spill Contingency Plans. 8. Training and education of refuelling Standard Operating Procedures and incident response as per the AIRP DCIW CEMP through Australian Antarctic Division training and project inductions, toolbox talks and pre-start meetings, ensuring all personnel complete Fuel Spill Contingency Training. 9. Ensuring that fuel spill kits are on site, accessible and all construction personnel are trained to use them. 10. Plant and equipment will be serviced and maintained as per Australian Antarctic Division requirements, and will be visually inspected to ensure equipment is in good working order. Asset maintenance program through Maximo ensures operational efficiency of equipment is maintained. 11. Services to facilities will be abolished prior to decommissioning, with drainage systems appropriately capped ahead of refurbishment to prevent the potential entry of hazardous chemicals. 12. Storage of dangerous goods as per the Material Safety Data Sheet in designated locations with appropriate bunding and ventilation. 13. Unexpected finds procedure to be included in the AIRP DCIW CEMP to assist in identification of fuel spills and leaks. Visual inspection under demolished facilities to identify possible staining or odour associated with historic spills or leaks. Incorporating information from the Davis Station – Preliminary Site Investigation, along with any subsequent events. 14. Operating Instructions for Waste Oil and Water Separator are followed. 15. Refuelling of all equipment is undertaken as per Standard Operating Procedures including with appropriate drains/traps/bunding and away from water bodies. 16. Batch collection of oily water interceptor waste in the mechanical workshops, drained and cleared on a 3-monthly cycle. Wastewater is put through the Wastewater Treatment Plan to be processed. Oil is Return to mainland Australia. 17. Portable drum containment systems - paints and thinners are decanted directly into drums for Return to mainland Australia. 18. Develop and adhere to new Standard Operating Procedures to reflect the change or establishment of new operations, ensuring consistent, controlled practices that minimise disturbance, reduce the likelihood of impacts. This will enable the correct operation of equipment to ensure operations occur appropriately and in line with manufacture standards and expectations. 19. All equipment will be commissioned in mainland Australia prior to departure for Antarctica wherever possible, with priority given to major systems such as powerhouse generators and reverse osmosis units over minor items like toilets and small electric pumps. 20. Assessment by a qualified or suitably trained person of suspected contamination in consultation with Australian Antarctic Division contamination and remediation subject matter experts. 21. Fuel tank design to include either appropriate compliant bunding (Australian Standard) or self-bunding (dual skin design).	Unlikely	Moderate	Medium
38	Antarctica	Installation and Commissioning	Normal	Energy use-Non-renewable resources	Depletion of non-renewable resources	1. Use of non-renewable resource to power equipment.	Almost certain	Minor	Medium	1. Asset maintenance program through Maximo ensures operational efficiency of equipment is maintained. 2. Adoption of new carbon reducing technologies/equipment if feasible in the Antarctic environment. 3. Australian Antarctic Division Incident reporting system for mapping trends identifying how practices can be improved. 4. Use of Australian Antarctic Division Incident reporting system for mapping trends identifying how practices can be improved. 5. Alignment with Government strategy and net zero targets, influence on the DCIW design and use of new technologies that reduce emissions in Antarctica, wherever practicable. 6. Adherence to AIRP Sustainability Management Plan. 7. Adhering to best practice standards for machinery and equipment regarding start up, stand by and shut down periods.	Almost certain	Minor	Medium

Activity #	Location	Activity description	Condition	Aspects	Impact(s)	Potential causes/sources of an impact happening	Inherent Risk Rating			Existing Reduction/Control Measures - against the Aspect	Residual Risk Rating		
							Likelihood	Consequence	RISK		Likelihood	Consequence	RISK
										8. Develop and adhere to new Standard Operating Procedures to reflect the change or establishment of new operations, ensuring consistent, controlled practices that minimise disturbance, reduce the likelihood of impacts. This will enable the correct operation of equipment to ensure operations occur appropriately and in line with manufacture standards and expectations. 9. All equipment will be commissioned in mainland Australia prior to departure for Antarctica wherever possible, with priority given to major systems such as powerhouse generators and reverse osmosis units over minor items like toilets and small electric pumps. 10. Contractual sustainability requirements within the design of the buildings enabling lowered fuel consumption. 11. Alternative fuel exploration and (potential or planning of) compatibility of generators with lower emissions fuel sources and efficiencies.			
39	Antarctica	Installation and Commissioning	Normal	Energy use-water/equivalent	Depletion of water/equivalent	1. Freshwater over-consumption from any new structure (that require water connection). 2. Key equipment failures during commissioning resulting in uncontrolled release of water to environment. 3. Failure of the service connections to existing or new infrastructure.	Almost certain	Minor	Medium	1. Adherence to the Australian Antarctic Division 'Plumbers Handbook' to guide water generation, treatment and supply. 2. Adherence to the AIRP DCIW CEMP. 3. Completion of Australian Antarctic Division's training for all expeditioners prior to departure. 4. Additional induction training packages for expeditioners, focusing on efficient, selective, and mindful water (and other resource) consumption and use. 5. Complete, wherever possible, testing and commissioning without the use of potable water until a reasonable degree of certainty that operations can function effectively is achieved to limit potential wastage. 6. Investigate the re-use of potable water used for commissioning for other works (staging dependant) such as washdowns, other testing, firewater. 7. Develop and adhere to new Standard Operating Procedures to reflect the change or establishment of new operations, ensuring consistent, controlled practices that minimise disturbance, reduce the likelihood of impacts. This will enable the correct operation of equipment to ensure operations occur appropriately and in line with manufacture standards and expectations. 8. All equipment will be commissioned in mainland Australia prior to departure for Antarctica wherever possible, with priority given to major systems such as powerhouse generators and reverse osmosis units over minor items like toilets and small electric pumps. 9. Prioritisation of the water production infrastructure completion within the DCIW schedule.	Possible	Minor	Low
40	Antarctica	Installation and Commissioning	Normal	Energy use-exhaust emission	Pollution of the air	1. Boiler use within New Pump House and Utility Building. 2. Gensets within Utility Building and New Pump House. 3. Any other equipment use within any building.	Almost certain	Insignificant	Medium	1. All machinery is maintained and serviced prior to departure to ensure maximum efficiency. 2. Ensure efficient use of equipment, including additional generators and machinery. 3. Wherever reasonably practicable, limit the number of exhaust emitting equipment/machinery operating at any one time. 4. Align with AAD machinery and equipment maintenance servicing frequency (service intervals are twice as frequent as standard manufacturer recommendation). 5. Review of AIRP DCIW CEMP compliance through regular inspections, auditing and monitoring (6 month frequency minimum for review, however inspection, auditing and monitoring will be more frequent). 6. Training and education of associated environmental impacts and mitigations as per the AIRP DCIW CEMP through Australian Antarctic Division training and project inductions, toolbox talks and pre-start meetings. 7. Develop and adhere to new Standard Operating Procedures to reflect the change or establishment of new operations, ensuring consistent, controlled practices that minimise disturbance, reduce the likelihood of impacts. This will enable the correct operation of equipment to ensure operations occur appropriately and in line with manufacture standards and expectations. 8. All equipment will be commissioned in mainland Australia prior to departure for Antarctica wherever possible, with priority given to major systems such as powerhouse generators and reverse osmosis units over minor items like toilets and small electric pumps.	Possible	Insignificant	Low

Activity #	Location	Activity description	Condition	Aspects	Impact(s)	Potential causes/sources of an impact happening	Inherent Risk Rating			Existing Reduction/Control Measures - against the Aspect	Residual Risk Rating		
							Likelihood	Consequence	RISK		Likelihood	Consequence	RISK
41	Antarctica	Installation and Commissioning	Normal	Physical disturbance-Dust emission	Disturbance/Destruction of terrestrial flora, Disturbance/Destruction of fauna, Pollution of inland waters/sediments, Pollution of the air	1. Accumulation and subsequent release of dust from cleaning activities. 2. Operational activities within the Utility Building including trade workshops. 3. Sawdust and dust extractor failure within Utility Building. 4. Additional modification work to any structures external facade.	Likely	Insignificant	Low	1. Adherence to the Job Hazard Analysis guidelines for construction activities. 2. Adherence to the Environmental Code of Conduct for participants of the AIRP. 3. Adherence to the Operation and Maintenance Manuals for equipment used. 4. Use of Australian Antarctic Division Incident reporting system for mapping trends identifying how practices can be improved. 5. Review AIRP DCIW CEMP compliance through regular inspections, auditing and monitoring. 6. Adherence to mitigation measures outlined in the AIRP DCIW CEMP. 7. Develop and adhere to new Standard Operating Procedures to reflect the change or establishment of new operations, ensuring consistent, controlled practices that minimise disturbance, reduce the likelihood of impacts. This will enable the correct operation of equipment to ensure operations occur appropriately and in line with manufacture standards and expectations. 8. All equipment will be commissioned in mainland Australia prior to departure for Antarctica wherever possible, with priority given to major systems such as powerhouse generators and reverse osmosis units over minor items like toilets and small electric pumps. 9. Modify activities if dust generation exceeds limits within the AIRP DCIW CEMP.	Unlikely	Insignificant	Low
42	Antarctica	Installation and Commissioning	Normal	Physical disturbance-Noise/Vibration emission	Noise pollution, Disturbance/Destruction of fauna, Degradation of wilderness values	1. Malfunctions during commissioning activities of equipment, (e.g. pumps, motors and boilers). 2. Residual (anticipated) noise from the installation of building internals. 3. Testing permutations of equipment to various intensities. 4. Incorrect insulation within buildings.	Likely	Insignificant	Low	1. Adherence to the Job Hazard Analysis guidelines for construction activities. 2. Adherence to the Environmental Code of Conduct for participants of the AIRP. 3. Adherence to the Operation and Maintenance Manuals for equipment used. 4. Use of Australian Antarctic Division Incident reporting system for mapping trends identifying how practices can be improved. 5. Review AIRP DCIW CEMP compliance through regular inspections, auditing and monitoring. 6. Adherence to mitigation measures outlined in the AIRP DCIW CEMP. 7. Develop and adhere to new Standard Operating Procedures to reflect the change or establishment of new operations, ensuring consistent, controlled practices that minimise disturbance, reduce the likelihood of impacts. This will enable the correct operation of equipment to ensure operations occur appropriately and in line with manufacture standards and expectations. 8. All equipment will be commissioned in mainland Australia prior to departure for Antarctica wherever possible, with priority given to major systems such as powerhouse generators and reverse osmosis units over minor items like toilets and small electric pumps. 9. Modify activities if dust generation exceeds limits within the AIRP DCIW CEMP.	Unlikely	Insignificant	Low
43	Antarctica	Installation and Commissioning	Normal	Physical disturbance-Human impact	Disturbance/Destruction of terrestrial flora, Disturbance/Destruction of fauna, Landscape change, Disturbance/Destruction of benthic flora and fauna, Disturbance/Destruction of soil communities	1. Inspection of services along outfall line to wharf area for brine discharge. 2. New Pump House associated works including the placement of the sea intake near coastal wildlife. 3. Sea ice drilling for sea intake.	Possible	Insignificant	Low	1. Adherence to the Australian Antarctic Division Environmental Code of Conduct by all personnel. 2. All expeditioners will follow the AAD's Avoiding Wildlife Disturbance Policy. Develop a decision matrix to determine appropriate mitigation measures if wildlife is present within the minimum separation distances when utilising vehicles or powered equipment. Minimum separation distances that must be maintained when on foot or in a vehicle are prescribed within the AAD's Avoiding Wildlife Disturbance Policy (Guidelines for animal approach distances – the Australian Antarctic Program). 3. Australian Antarctic Division mandatory pre-departure training for all expeditioners. 4. Use of Australian Antarctic Division Incident reporting system for mapping trends identifying how practices can be improved 5. Asset maintenance program through Maximo ensures operational efficiency of equipment is maintained. 6. Use of the Australian Antarctic Division Antarctic Field Manual. 7. Adherence to the Standard Operating Procedure, Volume 1: Station and Field Operating Procedures, Chapter 4: Field Operations. 8. Standard Operating Procedure for Watercraft, Chapter 7.1 General (All Watercraft) Operations with required speed limits when operating near wildlife. 9. Where commissioning and testing works occur during winter additional light pollution mitigations shall be considered to minimise impact to fauna and station personnel. 10. Develop and adhere to new Standard Operating Procedures to reflect the change or establishment of new operations, ensuring consistent, controlled practices that minimise disturbance, reduce the likelihood of impacts. This will enable the correct operation of equipment to ensure operations occur appropriately and in line with manufacture standards and expectations. 11. All equipment will be commissioned in mainland Australia prior to departure for Antarctica wherever possible, with priority given to major systems such as powerhouse generators and reverse osmosis units over minor items like toilets and small electric	Possible	Insignificant	Low

Activity #	Location	Activity description	Condition	Aspects	Impact(s)	Potential causes/sources of an impact happening	Inherent Risk Rating			Existing Reduction/Control Measures - against the Aspect	Residual Risk Rating		
							Likelihood	Consequence	RISK		Likelihood	Consequence	RISK
										pumps. 12. Wherever possible, in situ commissioning occurring outside of known wildlife presence within the localised area. 13. Undertake assessment of terrestrial flora, including for presence of sublithic communities under quartz stones, before works commence. 14. Engagement with Australian Antarctic Divisions Station Environmental Officer regarding communications for Avoiding Wildlife Disturbance Policy. 15. Training and education of personnel on the presence of terrestrial communities, through Australian Antarctic Division training and project inductions prior to commencing onsite and toolbox and pre-start discussions during works.			
44	Antarctica	Installation and Commissioning	Normal	Physical disturbance-Landscape	Disturbance/Destruction of benthic flora and fauna, Pollution of seawater/sediments/snow/ice	1. Discharge of the brine from Reverse Osmosis to the marine environment (PFAS contamination). 2. Equipment malfunction resulting in higher water parameters in brine. 3. Bioaccumulation or concentration of nutrients/parameters in seawater from returned seawater. 4. Discharge of backwash from New Pump House filtration system to marine environment. 5. Seawater deposited from Seawater Intake (via the New Pump House) to either the Tarn or marine environment.	Almost certain	Major	Severe	1. Adherence to the Australian Antarctic Division Environmental Code of Conduct by all personnel. 2. Adherence to the Plant Operation Standard Operating Procedure. 3. Adherence to the Snow Clearing Standard Operating Procedure. 4. Use of the Mechanical Handbook for safe operation and maintenance of vehicles. 5. All relevant personnel trained and certified in the operation and maintenance of vehicles. 6. Adherence to the Standard Operating Procedure, Volume 1: Station and Field Operating Procedures. 7. Use of Australian Antarctic Division Incident reporting system for mapping trends identifying how practices can be improved. 8. Use of Australian Antarctic Division Station and Field Waste Management Guide. 9. Adherence to the Environment Protection and Biodiversity Conservation Act listing and statutory management plans, wherever applicable. 10. Adherence to AIRP DCIW CEMP. 11. Sampling of discharge to the marine environment from New Pump House Discharge and Reverse Osmosis and Subject Matter Expert engagement in result analysis. 12. Brine discharge dispersion modelling study and Subject Matter Expert engagement in result analysis. 13. Develop and adhere to new Standard Operating Procedures to reflect the change or establishment of new operations, ensuring consistent, controlled practices that minimise disturbance, reduce the likelihood of impacts. This will enable the correct operation of equipment to ensure operations occur appropriately and in line with manufacture standards and expectations. 14. All equipment will be commissioned in mainland Australia prior to departure for Antarctica wherever possible, with priority given to major systems such as powerhouse generators and reverse osmosis units over minor items like toilets and small electric pumps.	Almost certain	Major	Severe
45	Antarctica	Installation and Commissioning	Normal	Physical disturbance-Taking samples	Disturbance/Destruction of benthic flora and fauna	1. Authorised and unauthorised sampling events of seawater. 2. Removal of seawater, microorganisms and/or organisms whilst sampling seawater. 3. Unintentional collection of marine sediment microorganisms during sampling.	Possible	Minor	Low	1. Adherence to the Australian Antarctic Division Antarctic Field Manual. 2. Adherence to the AIRP DCIW CEMP. 3. Development and adherence to a sampling protocol for seawater. 4. Development and adherence to a sampling protocol for soil. 5. Adherence to any applicable and existing Australian Antarctic Division sampling permits. 6. Chemical fixatives are used away from the waterbodies and have at minimum two levels of (double) containment to ensure spill risk is lowered.	Possible	Minor	Low

Activity #	Location	Activity description	Condition	Aspects	Impact(s)	Potential causes/sources of an impact happening	Inherent Risk Rating			Existing Reduction/Control Measures - against the Aspect	Residual Risk Rating		
							Likelihood	Consequence	RISK		Likelihood	Consequence	RISK
46	Antarctica	Installation and Commissioning	Emergency	Waste Management- Sewage/grey water	Pollution of land	1. Utility Building wastewater failure resulting in untreated waste release to the environment. 2. Services Reticulation pipe failure along reticulation pathway.	Possible	Minor	Low	1. Adherence to Standard Operating Procedure, Volume 2: Emergency Response Standard Operating Procedure. 2. Adherence to Australian Antarctic Division Standard Operating Procedure Operations Manual Volume 1 : Station and Field Waste Management Guide. 3. Use of Wastewater Treatment Plant Operation and Maintenance manuals. 4. Ensuring all personnel complete Fuel Spill Contingency Training. 5. Ensuring that spill kits are on site, accessible and all construction personnel are trained to use. 6. Use of Australian Antarctic Division Incident reporting system for mapping trends identifying how practices can be improved. 7. Sampling of discharge to marine environment from New Pump House Discharge and Reverse Osmosis and Subject Matter Expert engagement in result analysis. 8. Brine discharge dispersion modelling study and Subject Matter Expert engagement in result analysis. 9. Develop and adhere to new Standard Operating Procedures to reflect the change or establishment of new operations, ensuring consistent, controlled practices that minimise disturbance, reduce the likelihood of impacts. This will enable the correct operation of equipment to ensure operations occur appropriately and in line with manufacture standards and expectations. 10. All equipment will be commissioned in mainland Australia prior to departure for Antarctica wherever possible, with priority given to major systems such as powerhouse generators and reverse osmosis units over minor items like toilets and small electric pumps.	Unlikely	Minor	Low
47	Antarctica, Southern Ocean, Australia	Waste Management	Normal	Waste Management- Landfill	Landfill, Pollution of land, Pollution of sea water/sediments/snow/ice, Biological change, Degradation of wilderness values	1. Production and storage of waste materials including construction and building materials and equipment. 2. Unintentional release of materials/foreign objects/equipment/items from incorrect storage that become debris and pollution of the environment. 3. Lack of awareness/ignorance of or assumption about waste management activities that represent risk. 4. Failure to transport securely from station. 5. Inability to return waste to Australia and waste accumulation on station.	Almost certain	Moderate	High	1. Adherence to Standard Operating Procedures, Operations Manual, Volume 9 – Cargo Standard Operating Procedure. 2. Adherence to the Code of Practice for Packing of Cargo Transport Units. 3. Adherence to the Transporting Cargo and Plant Standard Operating Procedure. 4. Adherence to Standard Operating Procedures – Packing and Unpacking Cargo Transport Units. 5. Clear and concise emergency response and incident management procedures inline with Australian Antarctic Division Standard Operating Procedures and manuals. Spill kit equipment on site available for immediate deployment 6. Use of Australian Antarctic Division Incident reporting system for mapping trends identifying how practices can be improved. 7. Use of Station Waste Management Guide. 8. Clear waste management processes including waste segregation, waste staging, ongoing packaging and long term storage in containers, and waste tracking. 9. Review of AIRP DCIW CEMP compliance through regular inspections, auditing and monitoring (six month frequency minimum for review, however inspections, auditing and monitoring will be more frequent). 10. Maintain containers and packaging, where possible, for reuse in Return to mainland Australia waste containment. 11. Wastewater to be captured and contained for application of evaporative water management. Solid / residual waste to be collected and contained for Return to mainland Australia. 12. Training and education of waste management requirements through Australian Antarctic Division training and project inductions prior to commencing onsite and toolbox and prestart discussions during works. 13. Effective waste material type segregation to maximise recycling upon Return to mainland Australia. 14. Development and adherence to an AIRP Return to mainland Australia Plan (June 2026), inclusive of 'reverse' biosecurity requirements (Australian import). 15. On station Davis Critical Infrastructure Works - Waste Management Officer (or responsibilities incorporated within another role), for education, demarcation and communication regarding waste management. 16. Adherence to the Australian Antarctic Division's waste management strategy and station Return to mainland Australia plan. 17. Adherence to AAD's preferred method for high pressure air cleaning of containers and clean-up of any dislodged waste material. 18. Alignment with Australian Antarctic Division's minimum quarantine/desiccation period for containers bound for Return to mainland Australia, if required for Highly Pathogenic Avian Influenza virus management. 19. Containers utilised for waste management are appropriately secured, clearly marked and incorporated within storage laydown area planning.	Unlikely	Moderate	Medium

Activity #	Location	Activity description	Condition	Aspects	Impact(s)	Potential causes/sources of an impact happening	Inherent Risk Rating			Existing Reduction/Control Measures - against the Aspect	Residual Risk Rating		
							Likelihood	Consequence	RISK		Likelihood	Consequence	RISK
										20. Station Supply Officer/Station Environmental Officer/Engineering Services Supervisors or equivalent to undertake assessment of unpacked cargo for plastics and removal of materials prone to shredding or dispersal to the environment. 21. Minimise, wherever possible, the amount of material sent to Antarctica that may become waste. 22. In the event that adhesive labels are used on the exterior of cargo or containers these will be removed at station to avoid them becoming a source of pollution if they detach and become windborne. 23. Engagement with Australian Antarctic Divisions Station Environmental Officer to support education and communication regarding waste management. 24. Adherence to the procedures outlined within AIRP DCIW CEMP for general housekeeping, site management including emu bobs/picking, waste management and plant/equipment storage. 25. Air pressured container cleaning will occur in a designated location and any paint flakes will be cleaned up immediately. Container cleaning is not undertaken in windy conditions. 26. Adherence to AAD's Davis station Return to mainland Australia plan, ensuring DCIW waste planning is integrated into this existing plan.			
48	Antarctica, Australia, Southern Ocean	Waste Management	Normal	Hazardous Chemicals/Materials-Wastes	Pollution of land, Pollution of sea water/sediments/snow/ice, Disturbance/Destruction of terrestrial flora, Disturbance/Destruction of fauna, Pollution of underground water, Pollution of the air, Degradation of wilderness values	1. Storage failure of collected asbestos waste. 2. Uncollected and stored asbestos waste materials. 3. Dangerous Good release due to storage failure. 4. Inability to return waste to Australia and waste accumulation on station.	Possible	Major	High	1. Adherence to Hazardous Chemicals Management Policy and procedures. 2. Hazardous waste is Returned to mainland Australia for landfill disposal by licensed contractor under import permits 3. Use of the Australian Antarctic Division Incident reporting system for mapping trends identifying how practices can be improved. 4. Adherence to the Australian Antarctic Division Asbestos Management Plan Australian Antarctic Territory and Macquarie Island - 2023–2026 5. Hazardous chemicals and wastes to be stored in line with the Australian Antarctic Division and Australian Standards as per the Material Safety Data Sheet in designated locations with appropriate bunding and ventilation. 6. Clear and concise emergency response and incident management procedures in line with Australian Antarctic Division Standard Operating Procedures and manuals and consultation with Australian Antarctic Division contamination and remediation subject matter experts. 7. Training and education of waste management requirements through Australian Antarctic Division training and project inductions prior to commencing onsite and toolbox and prestart discussions during works. 8. Development and adherence to an AIRP Return to mainland Australia Plan (June 2026), inclusive of 'reverse' biosecurity requirements (Australian import). 9. Adherence to the Australian Antarctic Division's waste management strategy and station Return to mainland Australia plan. 10. Human safety buffer (exclusion) zones for all asbestos work applied to (air breathing) wildlife. 11. Adherence to the Australian Antarctic Division Antarctic Field Manual. 12. Adherence to the AIRP DCIW CEMP. 13. Adherence to the Australian Antarctic Division sampling protocol for asbestos or the development of one. 14. Adherence to the Import Permit for Asbestos (Ref: 13-2025). 15. Asbestos removal will be undertaken and transported under valid licencing from WorkSafe Tasmania (Licence Number: 90781014). 16. Adherence to any applicable and existing Australian Antarctic Division sampling permits.	Unlikely	Major	Medium

5.6 Cumulative impacts

Cumulative impacts are changes to the environment caused by the combined impact of past, present and future human activities. Further, the multiple impacts of different activities can have an additive, synergistic or antagonistic effect on one another and with natural processes.

The potential cumulative impacts from DCIW activities have been assessed by identifying the type and number of activities that have the potential to pose an additive effect on a range of environmental features, and to highlight where risks to environmental values from activities are concentrated. This comparative risk analysis across DCIW activities serves as a tool to inform priorities for current and future mitigations and monitoring.

Cumulative impacts were assessed using a quantitative, risk-based approach derived from the Environmental Aspects and Impacts Register. All proposed DCIW activities were mapped against a consistent set of environmental features, and existing risk ratings (Low, Medium, High, Severe), based on established likelihood and consequence criteria, were converted to numerical scores. These scores were aggregated across activities to generate cumulative risk scores for each environmental feature. The resulting scores were used to comparatively rank environmental features and inform the cumulative impact interpretations presented in this section.

Listed in Table 22 are the potential activity cumulative risks on environmental features.

Table 22. Cumulative impacts risk indicator (orange = higher cumulative impact; green = lower cumulative impact)

Environmental feature	Cumulative risk rating indicator
Disturbance/destruction of fauna	Orange
Disturbance/destruction of flora	
Pollution of sea water, sediments, snow and ice	
Degradation of wilderness values	
Pollution of air	
Habitat change	Yellow
Disturbance/destruction of soil communities	
Pollution of land	
Noise pollution	Green
Pollution of inland waters and sediments	
Disturbance/destruction of benthic flora and fauna	
Landscape change	
Pollution of underground water	
Depletion of non-renewable resources (in Antarctica)	
Landfill	
Biosecurity (biological change)	
Degradation of heritage/cultural values	
Depletion of water (in Antarctica)	

The environmental feature with the highest cumulative risk attributable to the proposed DCIW is the potential for the disturbance of fauna. In particular, fauna may be disturbed during construction, cargo storage and acquisition of fill, in respective order of risk.

The second highest cumulative impact risk is to the destruction of flora, arising from the uncertainties of flora presence, including the presence of sublithic communities under quartz stones, within the proposed works area. The largest impacts arise from storage, construction and fill acquisition.

Environmental features that incurred a medium cumulative risk (in descending order) include pollution of sea water, sediments, snow and ice, degradation of wilderness values, pollution of air, habitat change and disturbance/destruction of soil communities.

The remaining environmental features incur low cumulative risk scores. In descending order, these are pollution of land, noise pollution, pollution of inland waters and sediment, disturbance/destruction of benthic flora and fauna, landscape change, pollution of underground water, depletion of non-renewable resources (in Antarctica), landfill, biosecurity (biological change), degradation of heritage/cultural values and depletion of water (in Antarctica).

5.6.1 Additional vessel and aviation activities

A separately authorised additional vessel is required to enable the transportation of cargo to Antarctica and complete the DCIW. Due to the extensive timing to procure and authorise a vessel, and the proposed timing of the DCIW, it was necessary to exclude this activity (transportation) from the current IEE. At the time of writing, the vessel, length of operations, and requirements for the AAD outside of the DCIW are uncertain. However, the vessel is likely to be a similar cargo type vessel, as a 'Happy D' class, which the AAD has utilised before.

Impacts arising from this activity are likely to have a cumulative impact on environmental features including pollution of sea water, sediments, snow and ice, pollution of air, disturbance/destruction of fauna, habitat change, biological change and wilderness values. These impacts have been derived from previous Preliminary Assessments submitted for supplementary vessels to support past AAD operations.

Cumulative impacts arising from an additional vessel will be considered during the environmental impact assessment process as part of the authorisation process.

No additional aviation activities are required to support the DCIW. If expeditioners travel by air during the works (not currently planned), this will be incorporated within the AAD's Aviation Operations IEE and Authorisation (i.e., AAD aviation tickets/seats on pre-planned operations [in alignment with the Aviation Operations IEE] may be allocated to DCIW expeditioners).

5.6.2 Future works

Physical deterioration has become noticeable at our stations, some deep field camps and the Wilkins Aerodrome, despite ongoing maintenance. These buildings have now reached, or are close to reaching, the end of their serviceable life. The AAD is working to upgrade assets and infrastructure at Australia's Antarctic research stations. This long-term investment in Antarctic infrastructure renewal will help transform the AAP, by renewing, modernising and upgrading infrastructure, assets, technology and equipment, while also reducing carbon emissions and supporting a net zero future for AAP operations in Antarctica.

In February 2022, The Strategy and Action Plan was released setting out Australia's national Antarctic interests and a vision for Australia's future engagement in Antarctica. It recognises Australia's strong strategic and scientific interests in Antarctica and the Southern Ocean and sets out actions to support these over 20 years.

In the second decade of The Strategy and Action Plan the Australian Government will:
Finalise station modernisation works across all Antarctic and sub-Antarctic research stations to create a station network that is efficient, flexible and suited to our future needs.

Future packages of works to address The Strategy and Action Plans beyond 2026 are beyond the scope of this IEE.

Cumulative impacts arising from future packages of work will be taken into account during preparation of related documents for the environmental impact assessment process. Given that the scope of future work is unknown at the time of writing, determining the impacts is not possible nor accurate.

6 Environmental management

6.1 AAD's environmental management system

Australia is strongly committed to the comprehensive protection of the Antarctic environment. The AAD is responsible for fulfilling that commitment, as well as mitigating and managing the environmental impacts of Australia's activities in the Southern Ocean and sub-Antarctic.

The AAD's Environmental Policy outlines a commitment to continual improvement in environmental management performance and forms an integral part of the AAD's Environmental Management System (EMS).

The EMS provides a systematic framework for managing the AAD's interaction with the environment. It considers the environmental aspects, impacts, risks and opportunities for improvement associated with activities and strategic planning. Furthermore, the EMS framework enables the evaluation of the mitigation measures applied for AAD activities through planning, monitoring, auditing, reporting and the development of targets and key performance indicators.

The overall objective of the EMS is to protect the unique environmental values of Antarctica and the Southern Ocean, and to ensure environmental monitoring and management are foremost in planning and operations within the organisation. These objectives are guided by the AAD and Australian Government policy commitments to environmental protection, biodiversity and conservation.

6.2 Incident and hazards reporting

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 that either directly or indirectly have the potential 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.

6.2.1 Environmental monitoring

The Environmental Monitoring and Reporting framework (Appendix 4) is a subsidiary of the CEMP (Appendix 3). This framework details the monitoring and reporting requirements to be undertaken throughout the construction of the program in accordance with legislative and program requirements.

The Environmental Monitoring and Reporting framework is applicable to all members of the DCIW project team, including staff and site workers undertaking the DCIW scope.

The QHSE Coordinator, or their delegate, will ensure that a documented procedure is in place for planning and conducting site inspections, as well as monitoring the site's overall environmental performance. This process is designed to identify hazards and implement corrective actions based on assessed risk levels. It also aims to actively engage workers – including subcontractors, where practicable – as part of the Environmental Inspection Program, fostering a culture of shared responsibility and continuous improvement.

The QHSE Coordinator will be required to undertake weekly formal and recorded environmental inspections which will include:

- housekeeping and waste management
- environmental complaints
- chemical and fuel storage and handling
- contaminated waste
- environmental monitoring and reporting framework
- air quality and dust
- noise, vibration and lighting impact
- water quality
- other impacts to flora or fauna, including hypolithic communities found under quartz rock
- erosion and sediment control
- vehicle and equipment hygiene
- site management, rehabilitation and remediation (where required).

The site inspection findings will be supported by relevant evidence such as photographs, maps, or monitoring data.

In addition to the formal weekly inspection, the QHSE Coordinator or delegate will be undertaking a daily visual observation of the work activities.

Any environmental corrective or preventive actions arising from these inspections shall be recorded and reported to the Work Health, Safety, Environment, Sustainability (WHSES) Manager or delegate. The WHSES Manager or delegate is responsible for ensuring the appropriate close out of any corrective or preventive actions is undertaken in a timely manner. Environmental inspections and associated actions will be reported using 3D Safety. 3D safety is software that utilises three-dimensional modelling and visualisation to identify hazards, simulate scenarios, and improve safety planning and training.

Environmental monitoring will be carried out by personnel who are appropriately qualified and experienced. All monitoring equipment will be maintained, stored, and calibrated in accordance with manufacturer specifications and, where applicable, regulatory requirements. This ensures the accuracy and reliability of monitoring data and supports compliance with environmental standards.

Ongoing monitoring and measurement of the main impacts and key environmental indicators identified in the IEE include but are not limited to:

- weather
- air quality
- water quality
- wildlife
- biosecurity
- noise
- energy
- water consumption
- waste
- carbon emissions.

6.2.1.1 Weather

The Construction Manager, Site Supervisor or QHSE Coordinator will review daily meteorological conditions and forecasts provided by the AAD to inform construction planning. Where conditions have potential to elevate environmental risk, additional controls may be implemented or works activities will be reviewed.

6.2.1.2 Air quality

A dust assessment will be undertaken of the proposed works to determine likely dust deposition based on weather conditions. The assessment will consider impacts to ecological receptors including known habitat, vegetation and wildlife to inform appropriate management and monitoring measures.

Baseline air quality data is limited to ambient conditions obtained near the quarry location, existing conditions associated with station activities is unknown.

A desktop dust assessment will be undertaken prior to works to determine activities and weather conditions that may result in distribution of dust on ecological receptors. The assessment will inform the Trigger Action Response Plan and quantifiable dust monitoring requirements for earthworks. The Trigger Action Response Plan defines the procedures for managing and responding when trigger thresholds are reached or exceeded. Quantifiable dust monitoring will include particulate matter 10 µm monitoring where required, additionally visual monitoring will be undertaken throughout construction for air quality and dust.

6.2.1.3 Water quality

Weekly visual inspections will include assessment of sediment runoff from works areas and water quality. Key areas of the assessment will include:

- Drainage points: assessment of flow paths (including those created by snowmelt) and potential discharge locations including the nearest potential receiving water bodies.
- Indicators of erosion and sediment: turbid runoff, sediment movement, dust deposits, and erosion rills.

- Identification of contamination: observations for oily sheen and soil/water discolouration.

Water quality testing of physicochemical parameters would be undertaken where potential impacts to receiving environments are identified. Testing would be triggered by activities or conditions with the potential to alter water quality. Physicochemical parameters would be selected based on the identified risk, environmental setting and equipment available and may include pH, turbidity/suspended solids, electrical conductivity, hydrocarbons, and relevant nutrients or metals. Monitoring results would be used to inform management decisions on activities, including the need for additional controls, investigation, or modification of operations where potential impacts are identified.

6.2.1.4 Wildlife

Prior to commencement of works each day, the Site Supervisor or QHSE Coordinator will be responsible for undertaking a visual wildlife inspection. If wildlife are present within the approach distances, additional controls may be required such as reduced speed limits, installation of physical barriers or ceasing works until the prescribed approach distances are achieved.

Prior to works each season, pre-activity surveys within the proposed activity disturbance footprint are required to confirm the absence of nests. If nest sites are found within the footprint, mitigation measures that discourage birds from re-establishing nests at the start of the breeding season, such as covering or blocking cavities, could be implemented to avoid impacts to eggs and chicks later in the season. Where required, engaging with AAD Wildlife subject matter experts.

Pre-activity nest surveys to inform disturbance distance to implement, where possible, during nesting season:

- Skuas (October - February)
- Snow petrels (November - February)

Impacts to wildlife shall consider indirect impacts from lighting, noise and vibration. If behavioural disturbance in wildlife attributable to lighting, noise or vibration is observed, project works will cease and advice will be sought from suitably qualified SMEs to determine and implement appropriate mitigation measures prior to recommencing works.

6.2.1.5 Biosecurity

Biosecurity management will be conducted in alignment with the AAD's Biosecurity Management Plan. Additionally, DCIW cargo will comply with AAD Supply Chain operations to ensure that all cargo that is shipped or flown to the Antarctic or sub-Antarctic Stations and RTA materials and containers are processed through AAD biosecurity screening process and follows the AAD cargo biosecurity process, including:

- AAD Cargo Biosecurity SOP Supply Chain Operations
- AAD Biosecurity Checklist

The following is directly excerpted from the current draft of the AAD Biosecurity Management Plan (2025):

The AAD Biosecurity Management Plan (2025) details a 3-step process applies to all cargo being transported to the Antarctic continent and sub-Antarctic Macquarie Island. This process aims to address biosecurity risks during the packing and storage process and are preventative controls applied at the CBC. These measures are:

- Biosecurity Measure 1 – External inspection of cargo surfaces
- Biosecurity Measure 2 – External inspection, cargo consolidation and internal fogging
- Biosecurity Measure 3 – External inspection of containers/cage pallets and external fogging

The Biosecurity Coordinator will conduct visual inspections of cargo before loading and during vessel transit to ensure compliance with biosecurity requirements and regulations and prevent the introduction of pests or contaminants.

Before arriving at Antarctic stations and/or returning to mainland Australia, all personnel are required to clean personal effects such as walking boots and any clothing with Velcro and sterilised before arrival. All RTA Cargo heading north to mainland Australia undergoes the same three biosecurity measures excluding the fogging.

While some biosecurity measures occur outside the scope of this IEE, all such activities will still be implemented following established best-practice protocols to ensure risks to the Antarctic environment remain minimised.

6.2.1.6 Cargo not stored inside the CBC

On occasion cargo may require storage outside the CBC (e.g. large plant, large/long break bulk, dangerous goods etc.). These items will undergo the same level of inspection measures and treatment as other cargo utilising the AAD Biosecurity Management Plan treatment process where appropriate and necessary prior to departure (AAD, 2025c).

Where possible and prior to loading, additional inspection and treatment measures including visual inspection of crevices, weld brakes and holes, and high-pressure air hose cleaning are conducted to ensure quarantine compliance. Plant, earthmoving equipment and watercraft will be thoroughly cleaned to remove any excess build-up of soil using the TasPorts washdown bay located on site (AAD Biosecurity Management Plan, 2025).

All timber products are inspected on arrival at the CBC for the presence of bark, crevices and niches where BRM could reside. If bark is present, it is either returned to the supplier for replacement, or the bark is removed (AAD, 2025c).

Although activities north of 60°S fall outside the scope of this IEE, any associated waste-handling or disposal processes will continue to be undertaken in accordance with recognised best-practice standards and AAD operational requirements.

6.2.1.7 Noise

A desktop acoustic assessment will be undertaken to determine likely noise generated by site works under different weather conditions. The assessment will inform construction monitoring requirements.

Noise monitoring using a hand-held sound meter will be undertaken routinely (to be determined from noise desktop assessment), in general accordance with AS 2436-2010 '*Guide to noise and vibration control on construction, demolition and maintenance sites*'. Samples will be collected over minimum period of 15 minutes and measured using A-weighting (dBA), with results reported in terms of Leq (15 min) and Lmax noise metrics.

Detailed records of monitoring shall be undertaken including:

- date, time and location of measurement
- type, model and serial number of instrumentations
- results of field calibration
- description of the measurement (sample duration, interval, time of day, location details, number of measurements)
- sample location plan, including north arrow and key activities
- weather conditions
- construction activities being undertaken during monitoring event
- other activities or noise sources.

Equipment shall be calibrated in general accordance with manufacturers specifications and relevant Australian Standards.

6.2.1.8 Energy

Within the design phase, the goals for Measurement and Verification (M&V) process are to be established, appropriate International Performance Measurement and Verification Protocol (IPMVP) options selected, and baseline data documented. A draft M&V plan is to be developed, outlining responsibilities. Computer simulation models of physical systems will be used to predict facility or process energy consumption and demand. The energy modelling methodology is based on the Green Star Energy Use calculation guide with important modifications aimed to capture the unique challenges of the Antarctic climate and the role of the building regarding the broader energy site wide context.

In the construction and commissioning stage, metering systems and data collection processes shall be implemented, site conditions are to be monitored, and operational verification will be confirmed. The M&V plan will be updated and integrated into the Construction Management Plan.

The modelling approach and methodology ideally results in energy savings in the first instance, determined through the simulation of energy consumption and the demand of the whole facility comparing the results to a simulated baseline. The intent of a calibrated model is for the actual energy savings to be determined through the simulation of the energy consumption in the facility and compare it to actual energy consumption once built. This approach is dependent on a

sophisticated metering and monitoring strategy. The detailed metering and monitoring requirements from an electrical and mechanical perspective are, at a high level, the following:

- Electrical – Building services requirements: the main power supply connections and the sub-distribution, including mechanical switchboards should be provided with a networked multi-functional power condition metering and monitoring system. The system should be capable of indication, data logging and remote interfacing.
- Energy generation requirements: energy demand metering (electrical and heating hot water) should be provided with a networked multi-functional power condition metering and monitoring system.

As a result, the metering required for the proposed modelling approach should be able to be achieved. A Building Management System should be included in buildings to support the metering strategy. The Building Management System will have the ability to monitor and control all building services. Continuous data on zone temperatures, humidity, air quality and energy consumption will help to optimise building energy efficiency, aligning with the IPMVP purposes of efficiency and managing energy budgets.

Sustainability monitoring and reporting requirements shall follow the requirements outlined in the M&V plan. The plan sets out how the energy efficiency initiatives included in the design and summarised in the Sustainability Management Plan are reviewed and monitored at the different stages. Through regular monitoring, deficiencies can be reported and corrective actions implemented. This continuous feedback loop fosters continual improvement and allows for early detection of non-compliance or potential incidents. The reporting includes:

- hourly data collection
- data analysis
- input to net zero road map with operational emissions data
- identification of discrepancies
- internal and external auditing
- monitoring records
- non-conformance, corrective actions and preventive actions
- monthly reporting
- annual reporting
- incident reporting
- non-conformance reports.

6.2.1.9 Water consumption

Sustainability monitoring and reporting requirements shall follow the requirements outlined in the M&V plan. Through regular monitoring, deficiencies can be reported and corrective actions implemented. The M&V process for water consumption is proposed to follow the framework of the IPMVP but will also align with the Green Star credit around verification and handover.

During the water baseline period or design phase, assumptions about water consumption are established. Estimated water usage is then calculated based on design specifications and expected occupancy profiles.

Throughout construction and commissioning, metering systems and ongoing data collection processes are established, as well as monitoring of site conditions for changes. Operational verification is to be confirmed, and the M&V plan is updated. Contractor obligations to align with the M&V requirements are incorporated into the building services contract documentation.

The following water metering shall be provided for during construction:

- total water use
- concrete production and wash out
- site cabin water use.

6.2.1.10 Waste

A Waste Management Plan, as part of the CEMP, detailing waste measurement, monitoring, verification, reporting during design, construction and operations is under development. The objectives of the Waste Management Plan are the following:

- Promote environmental responsibility and involvement in waste avoidance, waste minimisation and waste management across the supply chain.
- Implement a waste hierarchy for best practice waste minimisation.
- Prevent pollution to land and water through onsite waste management.
- Divert 80% of waste from landfill (excluding hazardous substances).

Throughout the current design period, coordination with the design team focuses on incorporating circular materials and designing for disassembly. This is supported through workshops, updates to the design report, and requirements outlined in the Sustainability Management Plan, led by the Sustainability Lead. Additionally, ambitious targets for waste minimisation and landfill diversion are set, with a waste management plan prepared to guide implementation.

Construction waste is minimised through the use of prefabrication and off-site assembly wherever possible. Reusable materials are repurposed on-site, and any non-reusable waste is returned to mainland Australia. At least 80% of construction waste is diverted from landfill, meeting the minimum requirements of Green Star Buildings v1 Credit 2.

Construction waste reports will be provided as outlined in the CEMP. Waste reduction will be measured against business-as-usual benchmarks, using calculated waste data to assess performance.

The development of the DCIW Return to mainland Australia Plan is scheduled for completion before September 2026. This plan will align with the AAD's station wide RTA plan and detail the identification and estimations (where applicable) of waste generation, logistics management, and the recyclability of materials involved.

6.2.1.11 Carbon emissions

A Life Cycle Assessment (LCA) has been provided as part of the design documentation and provides insights into the Program's performance relative to the baseline established by the AAD. This LCA will support informed decision-making and ensure alignment with the Program's carbon reduction targets.

By minimising material quantities, the Program aims to reduce upfront carbon emissions, not only through dematerialisation, but also by reducing emissions in transportation and construction processes, which are expected to be higher at Davis station than for a standard Australian Program.

Given the very limited access to natural resources, the program is designed to be highly efficient in energy, water, and waste management. The design team will collaborate to develop optimised and innovative solutions that minimise energy and water consumption while diverting waste from landfills. Buildings will benefit from systems already tested and implemented at the existing stations, such as the wastewater treatment plant and heat recovery systems.

Considering End-of-Life emissions is essential in Antarctica to minimise land contamination, reduce legacy waste and emissions related to transport of waste. To minimise these emissions, the following is under consideration:

- Design for disassembly.
- Identify opportunities for materials to be reused on site at their end of life.
- Specify materials that can be easily dismantled and shipped back.
- Specify materials that can be recycled.
- Ban hazardous materials.

Throughout the project lifecycle, greenhouse gas emissions monitoring and reporting requirements are clearly defined. During the design stage, LCA results are updated at each milestone using Cerclos E-tool and spreadsheets, led by the Sustainability Lead. In the construction phase, waste reports are prepared in accordance with the CEMP, supported by waste audits conducted by consultants and contractors. Waste reduction is assessed against business-as-usual benchmarks through calculated data. Energy and SAB fuel consumption are tracked using building management system data, overseen by the QHSE Officer. In operations, as-built data on material specifications and quantities are collected via invoices and datasheets, with cost control involved. Final LCA results are updated based on this data, again led by the Sustainability Lead, while energy and fuel monitoring continues under the QHSE Officer's responsibility.

6.2.2 Environmental compliance and auditing

6.2.2.1 Internal auditing

A Quality Management Plan has been developed for the DCIW to systematically manage and eliminate risk where practicable, or if not practicable, adequately control via application of a hierarchy of risk control. The Quality Management Plan comprises of an integrated audit schedule and management of non-conformances.

An annual risk-based audit program will be conducted to proactively manage requirements and compliance with the DCIW EMS, legislative requirements, and International and Australian Standards. Frequency of internal audits will be as required, but not greater than 12 months apart. Audit coverage will include the project scope and high risk (for both project and environmental) activities. Audits will be conducted on the project to ensure any risks associated with the work activities and products will be identified and mitigated so far as is reasonably practicable.

All project staff are assigned the responsibility and authority to identify, review, communicate and action any non-conformance in a prompt and appropriate manner to ensure the non-conformance can be effectively managed and the chance of recurrence minimised.

Reports from audits will be made available to all DCIW participants and will be recorded in the selected Electronic Document Management System.

6.2.2.2 Management of non-conformance

An Engineer/Quality Manager or representative will be assigned responsibility of tracking audit findings and close-out. Each audit finding will be assigned an action and timeframe for completion.

In consultation with the Design Manager or nominee, the responsible Engineer/Quality Manager or representative will assess the nonconformance and document the situation that has occurred, the proposed rectification works and (where appropriate) action to prevent recurrence. They shall ensure that any additional controls, where required, are put in place to prevent recurrence of the non-conformance. All non-conformances are recorded and submitted to Quality Manager, a non-conformance report will be developed and processed, as per the Management of Non-Conformance Procedure.

The Quality Manager will close out the non-conformance reports following inspection and verification of the completed rectification works. Any non-conformance should be considered as a hold point until such time it can demonstrated to be compliant

6.2.2.3 Certification auditing

Where required, certification audits will also be undertaken on the project to confirm compliance of the Integrated Management System to the relevant international and Australian standards and other relevant audit criteria. These audits will be carried out by independent auditing bodies. These can include the International Standard Organisation and other certification audits and may cover quality process, as well as other Integrated Management System systems such as health and safety, environment and sustainability, and technical processes.

7 Uncertainties

Across the AAD there is a high level of experience and understanding of Antarctic operations and the associated environmental impacts on the environment. Within the AAD there is extensive knowledge on these activities and subject matter expertise has been sought and applied to the environmental impact assessment and risk evaluation process. The assessments made and documented are reflective of information and understanding at this point in time and are subject to change as new information and technologies arise and are implemented.

Knowledge gaps were identified in the environmental risk assessment workshops with AAD Science Branch SMEs. Additional research in the following areas is either underway or may be beneficial in filling knowledge gaps:

- There are uncertainties around the timing and location of wildlife presence in project areas. Baseline data is limited for these specific areas, especially for hard-to-detect species like cavity nesting bird species.
- Accurate assessment of biosecurity risks associated with processing cargo at an alternative site(s) (outside the CBC) remains unclear due to insufficient information about the alternative sites, location, infrastructure and facilities.
- There are uncertainties around the potential presence and significance of cultural heritage items that may be impacted during proposed activities.
- Uncertainties exist around the extent and nature of historical contamination, as the AAD is yet to complete a comprehensive site investigation at Davis station.
- Uncertainties exist around the long-term and cumulative impacts of dust, sediment, brine, and wastewater discharges on nearshore marine ecosystems, particularly due to limited baseline data, unknown effects of hyper-saline brine in Antarctic conditions, gaps in PFAS monitoring and removal, and the lack of clarity on hydrodynamic flow patterns.
- Uncertainties remain around the ecological impacts of dust, hazardous chemicals, and brine discharge on ocean ecosystems, particularly due to limited baseline data on benthic communities, unknown effects of brine concentration and temperature on sea ice and microbial activity.
- There are uncertainties regarding the presence, sensitivity, and ecological value of terrestrial communities within the DCIW project area, due to a lack of baseline data, absence of prior sampling, and unknown impacts on soil microbes, invertebrates, and flora. Identification of soil biotic communities within the proposed impact areas has not been conducted.
- There are knowledge gaps around the effects of underwater noise and vibrations on Antarctic marine fauna, due to limited baseline data on species presence near Davis station and unknown behavioural responses to proposed activities.

8 Conclusion

The activities associated with DCIW outlined in this IEE support the renewal of Australia's aging Antarctic station network and ability to conduct world leading scientific research, thereby forming supporting an essential component of The Strategy and Action Plan (AAD, 2022a). Without this, Australia would be limited in its ability to operate its Antarctic stations, undertake scientific research, including in remote locations on land, or contribute information and leadership in discussions and decisions in the Antarctic Treaty system.

DCIW activities have been designed to have minimum impact on the environment while undertaking the key activities of storage, construction, refurbishment, demolition, acquiring fill and waste management. All procedures conform to relevant AAD standards and operating procedures in environmental management and adhere to all current conditions and permits issued under the *ATEP Act 1980*, including:

- IEE – RSV Nuyina Operations and Science Systems 2024–2029 (October 2024)
- IEE – All Stations Operations 2024–2027 (September 2024)
- IEE – Australian Antarctic Program Aviation Operations 2025–2030 (August 2025)

The assessment of impacts included in Section 5 of this IEE has identified that the majority of impacts can be effectively mitigated through a combination of existing AAD procedures and project-specific controls and compliance monitoring. Despite these mitigation measures, some activities retain a high-risk classification due to uncertainties relating to cultural heritage, contamination, dust emissions, and impacts on wilderness values. This precautionary approach reflects a commitment to responsible environmental management, ensuring ongoing monitoring and adaptive strategies to minimise potential adverse effects. Additionally, the discharge of PFAS-contaminated brine to the marine environment remains a severe risk, with proposed mitigations focused on reducing uncertainty and managing impacts through enhanced monitoring and process controls.

This IEE concludes that, provided the activity and the mitigations are undertaken in the manner described, this activity will have no more than a minor or transitory impact.

9 Authors

This IEE was prepared by Drew Rapley, Environmental Coordinator, Australian Antarctic Division 203 Channel Highway, Kingston Tasmania. Significant input was received from the AAD's Environmental Management Unit (EMU), specifically from Kirsten Leggett (Environmental Manager) and Melissa Wrohan (Environmental Lead). With technical input received from the Antarctic Infrastructure Renewal Alliance and the AIRP team, especially from Lucie Bradley (Stakeholder and Communication Coordinator), Georgia Sumner (Senior Environment Consultant) and Alice Buchanan (Work Placement Student) as well as advice and input from the numerous AAD science branch subject matter experts.

Mailing address:

Australian Antarctic Division
GPO Box 858
Canberra City, ACT 2601
Australia

10 Acknowledgements

Subject matter experts' contributions on the DCIW's storage, construction, acquiring fill, refurbishment, demolition and waste management activities were obtained from the AAD AIRP team (Matthew Wuersching, Josephine Gorrington, Lucie Bradley, Andrew Clifford, Leesa Borojevic, Lauren Wise, Jessica Lagerewskij, Sarah D'Oyley-Carter and Alice Buchanan) and Antarctic Infrastructure Renewal Alliance (Scott King, Mark Fleming, Don Murray, Kenny Smith, Fabrice Martin, Jean-Baptiste Donadieu De Lavit, Matthew Brown, Georgia Sumner, Vicki Singleton, Grant Sainsbery, Tom Williamson, Chris Wilson and Jack Morrison).

Contributors to the impact assessment for the DCIW via impact assessment focused workshops include the following subject matter experts: Colin Southwell, Louise Emmerson, Barbara Wienecke, John van den Hoff (wildlife), Aleks Terauds and Ewan McIvor (wilderness and landscape values), Kathryn Brown, Catherine King (flora), Jonathan Stark and Glenn Johnstone (Nearshore marine communities), Brian Miller (Underwater noise and vibrations), Elanor Bell and Rob King (Southern Ocean ecosystems), Justine Shaw and Jonathan Stark (Biosecurity and biological change), Steph McLennan (Geology and Soils – Geoscience Australia), Tim Spedding and Daniel Wilkins (Geology and Soils, Pollution to air, land, water, snow and ice, and Human presence and impacts), Rebecca Hingley (Cultural heritage) and Kirsten Leggett and Melissa Wrohan (throughout all workshops). Contributors to these sections are included in Table 23.

Contributors to baseline environmental information for this IEE is consistent with the subject matter expertise sought for the current All Stations Operations IEE, RSV *Nuyina* IEE and the Aviation Operations IEE.

Table 23. Subject matter expert contributions on environmental features

Environmental features	Subject matter experts
Terrestrial communities	Kathryn Brown and Catherine King
Wildlife	Louise Emmerson, Colin Southwell, Barbara Wienecke and John Van den Hoff
Nearshore marine communities	Jonathan Stark and Glenn Johnstone
Wilderness values and landscape change	Aleks Terauds and Ewan McIvor
Geology and soils, Pollution to air, land, water, snow and ice, and Human presence and impacts	Tim Spedding and Daniel Wilkins
Biosecurity and biological change	Justine Shaw and Jonathan Stark
Geoscience Australia	Steph McLennan
Southern Ocean ecosystems	Elanor Bell and Rob King
Underwater noise and vibrations	Brian Miller
Cultural heritage	Rebecca Hingley

All station maps used in this IEE are consistent with those included in the current All Stations Operations IEE (AAD, 2024d). All maps were updated in consultation with the AAD Mapping team.

Acronyms and abbreviations

AAD	Australian Antarctic Division
AAP	Australian Antarctic Program
ACM	Asbestos Containing Material
AIRP	Antarctic Infrastructure Renewal Program
ASL	Above Sea Level
ASMA	Antarctic Specially Managed Area
ASPA	Antarctic Specially Protected Area
ATEP	Antarctic Treaty (Environment Protection)
AWS	Automatic Weather Station
BRM	Biosecurity Risk Material
CBC	Cargo Biosecurity Centre
CEE	Comprehensive Environmental Evaluation
CEMP	Construction Environmental Management Plan
COPC	Contaminants of Potential Concern
DCCEEW	Department of Climate Change, Energy, the Environment and Water
DCIW	Davis Critical Infrastructure Works
EMS	Environmental Management System
EPH	Emergency Powerhouse
FF&E	Furniture, Fixtures & Equipment
GPS	Global Positioning System
ICT	Information and Communication Technology
IEE	Initial Environment Evaluation
IPMVP	International Performance Measurement and Verification Protocol
ISO	International Standards Organisation
LCA	Life Cycle Assessment

OLQ	Old Living Quarters
M&V	Measurement and Verification
MPH	Main Powerhouse
NPH	New Pump House
PA	Preliminary Assessment
PFAS	Per- and Poly-fluoroalkyl Substances
PFOA	Perfluorooctanoic acid
PFOS	Perfluorooctanesulfonic acid
POL	Petroleum, Oil, and Lubricants
PSI	Preliminary Site Investigation
QHSE	Quality, Health, Safety, Environment
RMU	Ring Main Unit
RO	Reverse Osmosis
RSV	Research and Supply Vessel
RTA	Return to mainland Australia
SAB	Special Antarctic Blend
SME	Subject Matter Expert
SOP	Standard Operating Procedure
STW	Services Reticulation
TBC	To Be Confirmed
TEU	Twenty-foot Equivalent Unit
UTB	Utility Building
UTM	Universal Transverse Mercator
WGS84	World Geodetic System 1984
WHSES	Work Health, Safety, Environment, Sustainability
WKS	Trades Workshop
WWTP	Wastewater Treatment Plant

REFERENCES

- AECOM (2021). *Draft Davis Aerodrome Project CEE* [Unpublished report]. Australian Antarctic Division.
- Aislabie, J.M., Balks, M.R., Foght, J.M. and Waterhouse, E.J. (2004). *Hydrocarbon spills on Antarctic soils: effects and management*. *Environmental Science & Technology*, 38(5), 1265–1274.
<https://doi.org/10.1021/es0305149>
- Antarctic Treaty Consultative Meeting (ATCM) (2016). *Resolution 1 (2016): Revised Guidelines for Environmental Impact Assessment in Antarctica*.
- Antarctic Treaty Consultative Parties [ATCPs]. (1991). *Protocol on Environmental Protection to the Antarctic Treaty (plus annexes)*. Antarctic Treaty Special Consultative Meeting. 11, 22-30 April, 17-23 June 1991.
- Australian Antarctic Division (2015). Location of Davis [Map]. Map Catalogue No. 14359. Scale 1:26,000,000. Projection: Lambert Conformal Conic. Horizontal Datum: WGS84. Australian Antarctic Data Centre. https://data.aad.gov.au/aadc/mapcat/display_map.cfm?map_id=14359
- Australian Antarctic Division (2017). *Davis Station - Station Capacity & Condition Assessment*. [Unpublished internal report].
- Australian Antarctic Division. (2018). *Water Improvement Project: Station Water Supply Overview, Hobart* [Unpublished internal report].
- Australian Antarctic Division (2021a). *Preliminary Site Investigation* [Unpublished report]. AECOM.
- Australian Antarctic Division (2021b). *Description of Existing Conditions Cetaceans* [Unpublished report]. AECOM.
- Australian Antarctic Division. (2022a). *Australian Antarctic Strategy and 20 Year Action Plan – Update (2022)*. Commonwealth of Australia.
- Australian Antarctic Division (2024a). *Davis: Station Limits [Map]*. Map Catalogue No. 16281. Edition 6. Scale 1:10,000. Projection: Universal Transverse Mercator. Horizontal Datum: WGS84. Australian Antarctic Data Centre. <https://data.aad.gov.au/map-catalogue/map/16281>.
- Australian Antarctic Division (2024b). *Davis: Buildings and Structures [Map]*. Map Catalogue No. 16318. Edition 11. Scale 1:2,500. Projection: Universal Transverse Mercator. Horizontal Datum: WGS84. Australian Antarctic Data Centre.
https://data.aad.gov.au/aadc/mapcat/display_map.cfm?map_id=16318
- Australian Antarctic Division (2024c). *Initial Environmental Evaluation Map 7: Davis Station Vegetation [Map]*. Map Catalogue No. 15868. Edition 1. Scale 1:40,000. Projection: Universal Transverse Mercator. Horizontal Datum: WGS84. Australian Antarctic Data Centre.
<https://data.aad.gov.au/map-catalogue/map/15868>

Australian Antarctic Division (2024d). *All Stations Operations Initial Environmental Evaluation*.
[https://www.ats.aq/devAS/EP/DownloadEvaluation/\(2684\)](https://www.ats.aq/devAS/EP/DownloadEvaluation/(2684))

Australian Antarctic Division (2024e). *Initial Environmental Evaluation Map 9: Davis Station Wildlife [Map]*. Map Catalogue No. 15869. Edition 1. Scale 1:40,000. Projection: Universal Transverse Mercator. Horizontal Datum: WGS84. Australian Antarctic Data Centre.
<https://data.aad.gov.au/map-catalogue/map/15869>

Australian Antarctic Division (2024f). *Initial Environmental Evaluation Map 13: Davis Station Heritage Values [Map]*. Map Catalogue No. 15875. Edition 1. Scale 1:10,000. Projection: Universal Transverse Mercator (Zone 44). Horizontal Datum: WGS84. Australian Antarctic Data Centre.
<https://data.aad.gov.au/map-catalogue/map/15875>

Australian Antarctic Division (2024g). *RSV Nuyina Operations and Science Systems*.
<https://www.ats.aq/devAS/EP/EIItemDetail/2687>

Australian Antarctic Division (2025a). *Vestfold Hills and Davis – approximate main wildlife concentrations (Helicopter Operations) [Map]*. Map Catalogue No. 16434. Edition 6. Scale 1:195,000. Projection: Universal Transverse Mercator (UTM Zone 44). Horizontal Datum: WGS84. Australian Antarctic Data Centre. https://data.aad.gov.au/aadc/mapcat/display_map.cfm?map_id=16434

Australian Antarctic Division (2025b). *Australian Antarctic Program Aviation Operations Initial Environmental Evaluation*. <https://www.ats.aq/devAS/EP/EIItemDetail/2799>

Australian Antarctic Division. (2025c). *Biosecurity management plan*. Australian Government Department of Climate Change, Energy, the Environment and Water.

Broady, P. A. (1982). Ecology of non-marine algae at Mawson Rock, Antarctica. *Nova Hedwegia*, 36, 209-229.

Bureau of Meteorology. (2025). *Climate averages for Australia*. Retrieved November 14, (2025), from https://www.bom.gov.au/climate/averages/tables/cw_300000.shtml

Clarke, L. J., Raes, E. J., Travers, T., Virtue, P., & Bergstrom, D. M. (2024). Extremophile hypolithic communities in the Vestfold Hills, East Antarctica. *Antarctic Science*, 36(1), 20–36.
<https://doi.org/10.1017/S0954102023000408>

Collerson, K., & Sheraton, J. (1986). Bedrock geology and crustal evolution of the Vestfold Hills, Antarctic Oasis: Terrestrial environments and the history of the Vestfold Hills. *Academic Press, Sydney*, 21-62.

Commonwealth of Australia (2022). *Mawson Station Heritage Management Plan*, Department of Climate Change, Energy, the Environment and Water, Canberra.

Gore, D. B., Creagh, D. C., Burgess, J. S., Colhoun, E. A., Spate, A. P., & Baird, A. S. (1996). Composition, distribution and origin of surficial salts in the Vestfold Hills, East Antarctica. *Antarctic Science*, 8(1), 73-84. doi:10.1017/S0954102096000119

HEPA (2025). PFAS National Environmental Management Plan Version 3.0. Heads of EPA Australia and New Zealand 2025. CC BY 4.0.

Howat, I. M., Porter, C., Smith, B. E., Noh, M-J. & Morin, P. (2019). The Reference Elevation Model of Antarctica. *The Cryosphere*, 13, 665-674. <https://doi.org/10.5194/tc-13-665-2019>

McLennan, S., Haiblen, A. M., & Smith, J. (2021). Surficial geology of the Vestfold Hills, East Antarctica (First Edition). *Geoscience Australia*. <https://pid.geoscience.gov.au/dataset/ga/145535>

Nydahl, A.C., King, C.K., Wasley, J., Jolley, D.F. and Robinson, S.A. (2015). *Toxicity of fuel-contaminated soil to Antarctic moss and terrestrial algae*. *Environmental Toxicology and Chemistry*, 34(9), 2004–2012. <https://doi.org/10.1002/etc.3021>

Pickard, J. (1986). Antarctic oases, Davis station and the Vestfold Hills. In J. Pickard (Ed.), *Antarctic oasis: terrestrial environments and history of the Vestfold Hills*. Academic Press.

Quilty, P. G., & Franklin, D. (1997). *Geology of possible runway sites in the Davis region, Vestfold Hills, East Antarctica* (ANARE Research Notes No. 98) [PDF]. Australian Antarctic Division. https://www.antarctica.gov.au/site/assets/files/64914/arn_098.pdf

Quilty, P.G., Lirio, J.M., & Jillett, D. (2000). Stratigraphy of the Pliocene Sørdsal Formation, Marine Plain, Vestfold Hills, East Antarctica. *Antarctic Science*, 12(2), 205-216, <https://doi.org/10.1017/s0954102000000262>

Rando, S., & Davies, M. (1996). Davis Station Heritage Study, Special Collection, Australian Antarctic Division Library, Tasmania.

Schafer, A.N., Snape, I. & Siciliano, S.D. (2007). *Soil biogeochemical toxicity end points for sub-Antarctic islands contaminated with petroleum hydrocarbons*. *Environmental Toxicology and Chemistry*, 26(5), 890–897. <https://doi.org/10.1897/06-420R.1>

Seppelt, R. D., & Broady, P. A. (1988), Antarctic terrestrial ecosystems: The Vestfold Hills in context. *Hydrobiologia*, 165(1), 177-184. <https://doi.org/10.1007/BF00025586>

Sheraton, J., & Collerson, K. (1983). Archean and Proterozoic Geological Relationships in the Vestfold Hills-Prydz Bay Area, Antarctica. *BMR Journal of Australian Geology and Geophysics*. 119-128.

Stark, J. S., Bridgen, P., Dunshea, G., Galton-Fenzi, B., Hunter, J., Johnstone, G., King, C., Leeming, R., Palmer, A., Smith, J., Snape, I., Stark, S. & Riddle, M. (2016a). Dispersal and dilution of wastewater from an ocean outfall at Davis Station, Antarctica, and resulting environmental contamination. *Chemosphere*, 152, 142-157.

Stark, J. S., Corbett, P. A., Dunshea, G., Johnstone, G., King, C., Mondon, J. A., Power, M., Samuel, A., Snape, I., & Riddle, M. (2016b). The environmental impact of sewage and wastewater outfalls in Antarctica: An example from Davis Station, East Antarctica. *Water Research*, 105, 602–614. <https://doi.org/10.1016/j.watres.2016.09.026>

Tejedo, P., Justel, A., Benayas, J., Rico, E., Convey, P. & Quesada, A. (2009). Soil trampling in an Antarctic Specially Protected Area: tools to assess levels of human impact. *Antarctic Science*, 21(3), 229-236. <https://doi.org/10.1017/S0954102009001795>

Tejedo, P., & O'Neill, T. A. (2018). The impacts of trampling and ground disturbances on Antarctic soils. *Antarctic Environments Portal*. <https://doi.org/10.18124/D44K9H>

van den Hoff, J. (2024). Diminishing numbers of male southern elephant seals (*Mirounga leonina* Pinnipedia: Phocidae, Linnaeus, 1758) at the Vestfold Hills, East Antarctica (1957–2022). *Antarctic Science*, 36(4). doi:10.1017/S095410202300038X

Velasco-Castrillón, A., Schultz, M. B., Colombo, F., Gibson, J. A. E., Davies, K. A., Austin, A. D., & Stevens, M. I. (2014). Distribution and diversity of soil microfauna from East Antarctica: Assessing the link between biotic and abiotic factors. *PLoS ONE*, 9(1), e87529. <https://doi.org/10.1371/journal.pone.0087529>

Zwartz, D., Bird, M., Stone, J., & Lambeck, K. (1998). Holocene sea-level change and ice-sheet history in the Vestfold Hills, East Antarctica. *Earth and Planetary Science Letters*, 155(1), 131–145. [https://doi.org/10.1016/S0012-821X\(97\)00204-5](https://doi.org/10.1016/S0012-821X(97)00204-5)

APPENDIX 1 – COMPLIANCE WITH LEGISLATIVE REQUIREMENTS

Required Content	Section
(a) a description of the activity, including a statement of: (i) the purpose; and (ii) the location; and (iii) the duration; and (iv) the intensity of the activity	2
(b) a description of possible alternatives to the activity, including the alternative of not carrying on the activity	3
(c) a description of the consequences of each possible alternative to the activity	3
(d) a description of the environmental reference state with which predicted changes are to be compared	4
(e) a prediction of the future environmental reference state if the activity does not take place	5
(f) an estimation of the nature, extent, duration and intensity of the likely direct impacts of the activity	5
(g) consideration of possible indirect impacts of the activity	5.4
(h) consideration of the cumulative impacts of the activity in the context of other activities in the same area that are planned, in progress, or reasonably foreseeable when the evaluation is being prepared	5.6
(i) consideration of the effects of the activity on scientific research and other uses and values, including historic values, of the areas that will be affected by the activity	5.4
(j) identification of unavoidable impacts of the activity	5.4
(k) a description of the methods and data used to forecast the impacts of the activity	5.4-5.6
(l) identification of uncertainties and lack of knowledge relevant to preparation of the evaluation	7
(m) identification of measures, including monitoring programs, that are proposed to be taken to: (i) minimise or mitigate impacts of the activity; and (ii) detect impacts of the activity that were not predicted in the evaluation; and (iii) provide early warning of adverse effects of the activity; and (iv) deal promptly and effectively with accidents	6
(n) a description of: (i) consultation of persons and organisations, other than the proponent of the activity, during preparation of the evaluation; and (ii) the comments received from persons consulted; and (iii) how the matters raised during consultation have been addressed	9 10
(o) a summary, in language that is not technical, of the information described in paragraphs (a) to (n) inclusive	1

IEE Davis Critical Infrastructure Works

(p) a statement of the arrangements that will be made to report to the Minister the results of the monitoring	6
(q) the name and address of the person who prepared the evaluation	9

APPENDIX 2 – 5-YEAR PLAN

		Season 2 T - 1 year 100% 2025–26	Season 3 T - 2 years 95% 2026–27	Season 4 T - 3 years 80% 2027–28	Season 5 T - 4 years 80% 2028–29	Season 6 T - 5 years 50% 2029–30	Season 7 T - 6 years 50% 2030–31	Season 8 T - 7 years 50% 2031–32
Project Objectives								
Project Intent								
Overview of Works	Design and procurement post PAA, Site inspection.	Installation of Reverse Osmosis (RO#2), Installation of sites services reticulation, Installation of New Pump House, Test and Commission Sea water intake, Commence Utility Building site earthworks, Establish Container laydown areas.	Earthworks for Utility Building, Installations of Foundations, Material Production for fill requirement, Install LQ foundation and floor.	Utility Building: Installation Ground Floor precast concrete, Erection of portal frame & steel structure, Installation 1st and 2nd Floor precast concrete. EPH Demolition	Summer: UTB Installation Façade, UTB Close in, Install site services to site Installation electrical board and heating. Winter: UTB Internal fit out including MEP.	Summer: Complete UTB fit out, Test & Commissioning of MPH, Decant Trades Workshop, WKS Asbestos Removal, WKS commence minimum fit out, UTB testing and commissioning. Winter: Utility Building Soft landing	Demolition of MPH Demobilisation of Alliance, RTA Waste.	
Work Break down / Key Deliverables	Design, Documentation and Governance On Station: Initial Site Survey, photo, video IT Testing Baseline noise sampling Water Sampling Site Familiarisation	Reverse Osmosis (RO#2) installed, clad, installed with services, New Pump House, clad, installed with Services, Sea water intake tested and commissioned, Site reticulation run from Pump House to Science, install on existing from science to ROs,	UTB Ground works, Dig in foundations, Place and install precast floor panels, Utilise wastewater outfall to deliver Brine from ROs to wharf area, Install LQ foundation and floor	Erection of Utility Portal frame, Installation of Level 1 & 2 precast floor panels Pre RTA and manage Laydown areas	Complete Portal frame & installation of Precast flooring panels Enclose Utility Building Structure, and make weathertight for winter fit out	Test, commissioning and handover of Utility Building including new Main Powerhouse	Old MPH ACM removal & demolition Demobilisation of Alliance	
High Risk Works	N/A	Work at Heights	Work at Heights	Work at Heights, ACM Removal	Work at Heights	Work at Heights / ACM removal	ACM Removal/ Demolition	

IEE Davis Critical Infrastructure Works

	100% 2025–26	Season 2 T - 1 year 95% 2026–27	Season 3 T- 2 years 80% 2027–28	Season 4 T- 3 years 80% 2028–29	Season 5 T - 4 years 50% 2029–30	Season 6 T - 5 years 50% 2030–31	Season 7 T - 6 years 50% 2031–32
Specialised power requirement	Integration Note; RMU1 Upgrade required for Pump House (AAD) A&T Project Initiation form submitted 3/04/2025.	Integration Note; RMU1 & 2 Upgrade required Pump House (1) LQ (2) (AAD) A&T Project Initiation form submitted 3/04/2025.	Integration Note; Feed to Construction site? Field Store or generator?	Integration Note; Remove services to EPH	Integration Note; Cut in Site services to Utility Building heating hot water for temp heating, liven boards / MEP / Alarms.	Integration Note; Connection of new powerhouse to existing station network.	None
Services Integration Points/ Holds		Integration Note; Connections to Reverse Osmosis plants / sea water feed site reticulation to RO / Services connection to LQ.	Integration Note; Cut in to wastewater outfall to deliver Brine from RO's to wharf area. Check Clearance Certificate for AMC removal in Old Living Quarters	Integration Note; Remove services to EPH	Integration Note; Cut in Site services to Utility Building heating hot water for temp heating, liven boards / MEP / Alarms.		Integration Note; Remove site service dead legs to old MPH & EPH.
Works planned for specialised equipment	None	None	None	ACM decontamination unit	None	None	None
Destination							
Season Duration	V1 Round Trip	16 Weeks	18 Weeks	20 Weeks	20 Weeks	18 Weeks	16 Weeks
Location of Works	Davis station	Davis station	Davis station	Davis station	Davis station	Davis station	Davis station
Specific locations	Site survey and trial digs PA expiry April 2026	RO 2 - Tarn area NPH - Waters edge north of BOM building / Site reticulation - NPH to Science Building cut in, utilise existing site services to RO unit sites and continue to Tarn. Utility Building North of Workshop, Old Living Quarters.	Utility Building North of Workshop, Old Living Quarters. Cargo laydown Areas 10,14,15,17,18,19, 20 & 24 (new)	Utility Building North of Workshop, Utilise wastewater outfall to deliver Brine from ROs to wharf area. Old EPH site & services. Cargo laydown Areas 10,14,15,17,18,19, 20 & 24 (new)	Utility Building North of Workshop. Cargo laydown areas 10,14,15,17,18,19 RTA areas 1,4,24	Utility Building North of Workshop, Internal Workshop.	Trades Workshop/ Old Main Powerhouse

IEE Davis Critical Infrastructure Works

	100% 2025–26	Season 2 T - 1 year 95% 2026–27	Season 3 T- 2 years 80% 2027–28	Season 4 T- 3 years 80% 2028–29	Season 5 T - 4 years 50% 2029–30	Season 6 T - 5 years 50% 2030–31	Season 7 T - 6 years 50% 2031–32
Priorities							
Cargo; Preferred Transport	RSV <i>NUYINA</i>	RSV <i>NUYINA</i>	RSV <i>NUYINA</i> & Chartered Vessel	RSV <i>NUYINA</i>	RSV <i>NUYINA</i> & Chartered Vessel	RSV <i>NUYINA</i>	RSV <i>NUYINA</i>
Personnel; Preferred Transport	AVIATION	RSV <i>NUYINA</i>	RSV <i>NUYINA</i>	RSV <i>NUYINA</i>	RSV <i>NUYINA</i>	RSV <i>NUYINA</i>	RSV <i>NUYINA</i>
Project logistics, Activities and destinations during season, order of destination and Timeframes		All works for Duration of Summer season Priority Works noted above	All works for Duration of Summer season Priority Works noted above	All works for Duration of Summer season Priority Works noted above	All works for Duration of Summer season + Winter program Priority Works noted above	All works for Duration of Summer season + Winter program Priority Works noted above	
Cargo Logistics							
Cargo Requirements							
Total Cargo Requirements:	234 m3	1299 .m3	6,701 m3	300 m3	3,660 m3	154 m3	154 m3
Cargo Requirements: Nuyina	234 m3	1299 .m3	257 m3	300 m3	160 m3	154 m3	154 m3
Cargo Requirements: Charter	-	-	6,500 m3	-	3,500 m3	-	-
RTA Requirements	Nil	6 TEU	28 TEU	20 TEU	TBC / RTA	TBC / RTA	TBC / RTA
Cargo Characteristics							

IEE Davis Critical Infrastructure Works

		Season 2 T - 1 year 95% 2026–27	Season 3 T- 2 years 80% 2027–28	Season 4 T- 3 years 80% 2028–29	Season 5 T - 4 years 50% 2029–30	Season 6 T - 5 years 50% 2030–31	Season 7 T - 6 years 50% 2031–32
Estimated / Planned potential specific cargo heavy lifts	Precast concrete in Half Hight container (to be unpack at the station), Site service pipe, scaffold Pipe, Unistrut and fixings in 20ft container, Excavator cat-315 in bulk.	Precast concrete in Half-Hight containers, Steel work and cladding in 20ft containers, Pre place materials in 20ft containers, Tools/Lab, RO#2 containers (4x20ft), NPH containers (3x20ft), Polaris in bulk Plant excavator cat-315 in bulk, Plant excavator cat-330 in bulk, Plant excavators attachment. Arrange RTA with AAD.	RSV Nuyina: Plant Hydrema 922 Tip body, roller compactor. UTB Precast Foundations x 88 Chartered Vessel: ACM Decontamination Units, LQ Foundations UTB precast parapet, 238 slab in bulk, UTB steel portals in bulk UTB cladding and roof Arrange RTA with AAD.	Pre place materials in 20ft containers, Plants consumables in 20ft containers. Arrange RTA with AAD.	RSV Nuyina: Pre place materials in 20ft containers Chartered Vessel: Pre place materials, UTB fit out materials, MEP material and equipment, FF&E material and equipment. Arrange RTA with AAD.	RTA Containers	
Dangerous goods specified	Li Batteries, under 100W/hr / Earthworks Plant	Li Batteries, under 100W/hr / Earthworks Plant / Grouts / SS 2 part foam / Plumbing Glues / Silicon's/ Paints	Li Batteries, under 100W/hr / Earthworks Plant / Grouts / part foam / Plumbing Glues / Silicon's / Paints	Li Batteries, under 100W/hr / Earthworks Plant / Grouts / SS 2 part foam / Plumbing Glues / Silicon's / Paints	Li Batteries, under 100W/hr / Earthworks Plants / Grouts / SS 2 part foam / Plumbing Glues / Silicon's / Paints		
Expected duration to load &/or discharge	RSV Nuyina - AIRP cargo (10 Day)	RSV Nuyina - AIRP cargo (10 Day)	RSV Nuyina (10 Days) Chartered Vessel (28 days)	RSV Nuyina (10 Days)	RSV Nuyina (10 Days) Chartered Vessel (14 days)	RSV Nuyina (10 Days)	
Special lifts or Non Standard Cargo		Yes, Excavator cat-315 Excavator cat-330	Yes, RSV Nuyina: CAT-CS7 Soil Compactor (8t)				

IEE Davis Critical Infrastructure Works

		Season 2 T - 1 year 95% 2026–27	Season 3 T- 2 years 80% 2027–28	Season 4 T- 3 years 80% 2028–29	Season 5 T - 4 years 50% 2029–30	Season 6 T - 5 years 50% 2030–31	Season 7 T - 6 years 50% 2031–32
Supply lift plan		Plant (excavator cat-315) (15t) Plant (excavator cat-330) (32t) - boom removed	RSV <i>Nuyina</i> : Plant (roller compactor / body dump truck). Chartered Vessel: Barge over water Roll-on-Roll-off (mobile crane 100t / EWP / 40ft trailer/CAT-CS7 Soil Compactor (8t)/2 x Polaris/Boom Lift/Scissor Lift.				
Load dates for non-standard cargo		Oct-26	Oct-27 & Dec-27	Oct-28			
Special stowage requirements		Earthworks Plant : Plant (excavator cat-315) (15t) Plant (excavator cat-330) (32t)	RSV <i>Nuyina</i> : HYDREMA 922G Body CAT-CS7 (Tier 3)				
Anticipated delivery dates		RSV <i>Nuyina</i> Jul - Aug 2026	RSV <i>Nuyina</i> : Jul - Aug 2027 Charter Vessel: Sept - Oct 2027	RSV <i>Nuyina</i> Jul - Aug 2028			
Dangerous Goods							
Including manifests and SDS + identification of any DG that may require stowage on the helideck							
Cargo Transfer							
Estimated volume of cargo to be transferred (air and /or vessel)	Davis -Vessel- Cargo Volume as above	Davis -Vessel- Cargo Volume as above	Vessel- Cargo TBC				

IEE Davis Critical Infrastructure Works

	100% 2025–26	Season 2 T - 1 year 95% 2026–27	Season 3 T - 2 years 80% 2027–28	Season 4 T - 3 years 80% 2028–29	Season 5 T - 4 years 50% 2029–30	Season 6 T - 5 years 50% 2030–31	Season 7 T - 6 years 50% 2031–32
Anticipated timing of vessel required at station	RSV <i>Nuyina</i> (V1) 30th October 2025	RSV <i>Nuyina</i> (V1) 30th October 2026	RSV <i>Nuyina</i> (V1) 30th October 2027 Chartered Vessel 5th January 2028	RSV <i>Nuyina</i> (V1) 30th October 2028	RSV <i>Nuyina</i> (V1) 30th October 2029 Charter Vessel: 5th January 2030	RSV <i>Nuyina</i> (V1) 30th October 2030	
Confirm duration to load and/ or discharge							
Laydown Areas							
Anticipated annual volume requirements	300 m3	1,050 m3	6,500 m3	360 m3	3,300 m3		
Expected laydown volume requirements for the season	155 m2 [9 TEU]	485 m2 [25 TEU + Plant (x1)]	4,000 m2 [115 TEU + Bulk + Plant (x2)] stacking plan TBC	180 m2 [10 TEU]	1,500 m2 [90 TEU + Bulk]		
Laydown areas	Location 19 x 3 containers Location "Old met building" x 6	Plant = Workshop x 2 plant Plant Spares x 2 TEU = Workshop RO#2 x 14 TEU = Location 19/23 NPH x 11 TEU = Location 24 (new)	Cargo laydown Areas: 10 - double stack 14 - double stack 15 - double stack 17 - single stack 18 - double stack 19 - double stack 20 - single stack 24 - single stack	Cargo laydown Areas: 10 - double stack 14 - double stack 15 - double stack 17 - single stack 18 - double stack 19 - double stack 20 - single stack 24 - single stack			
Necessary RTA volume to ensure future laydown area capacity		6 TEU returned with RTA V1 2027	28 TEU returned with RTA V1 2028	40 TEU returned with RTA V1 2029 & Chartered Vessel 2028			
Container rotation plan							
Fuel Estimates							

IEE Davis Critical Infrastructure Works

		Season 2 T - 1 year 95% 2026–27	Season 3 T- 2 years 80% 2027–28	Season 4 T- 3 years 80% 2028–29	Season 5 T - 4 years 50% 2029–30	Season 6 T - 5 years 50% 2030–31	Season 7 T - 6 years 50% 2031–32
Fuel; Estimates/ Confirmed fuel requirements		63,119 litres	95,600 litres	100,500 litres	107,600 litres	50,000 litres	46,000 litres
CO2 kg		168,500 kg	255,300 kg	268,450kg	287,300 kg	132,000 kg	122,000 kg
Personnel Logistics							
Personnel Numbers and Skill							
Total Personnel Numbers	2 Site Inspection	23	25	20	26	29	6
Skill Matrix; Include primary roles and additional skills and qualifications	Alliance manager (x1) / Design lead (x1)	Construction Manager (x1) / Surveyor (x 1)/ QHSE coordinator(x1) / Supervisor (x1) / Plant Operator (x5) / Carpenter (x5) / Rigger (x2) / Plumber (x3) / Electrician (x3) / Assistant Surveyor (x1)	Construction Manager (x1) / Surveyor (x1) / QHSE (x1) / Earthworks Supervisor (x1) / Geotech lab technician (x1) / Project Coordinator (x1) / Plant Operator (x5) / Carpenter (x5) / Rigger (x3) /Plumbers (x2) / Electrician (x3) / Assistant Surveyor (x1)	QHSE coordinator (x1) / Steel structure Supervisor (x1) / Project Coordinator (x1) / Plant Operator (x4) / Carpenter (x5) / Rigger (x4) / Plumber (x1) / Electrician (x3)	Trades Engineer (x1) / QHSE coordinator (x1) / Trades Supervisor (x1) / Project Coordinator (x1) / Plant Operator (x5) / Carpenter (x5) / Rigger (x4) / Plumber (x1) / Electrician (x3) / Facade (x4)	Trades Engineer (x1) / MEP engineer (x1) / QHSE coordinator (x1) / MEP supervisor (x1) / Project coordinator (x1) / Trades Supervisor (x1) / Plant Operator (x2) / Carpenter (x5) / Rigger (x2) / Plumber (x7) / Electrician (x7)	Trades Supervisor (x1) / Plant Operator (x2) / Carpenter (x1) / Rigger (x2)

IEE Davis Critical Infrastructure Works

		Season 2 T - 1 year 95% 2026–27	Season 3 T- 2 years 80% 2027–28	Season 4 T- 3 years 80% 2028–29	Season 5 T - 4 years 50% 2029–30	Season 6 T - 5 years 50% 2030–31	Season 7 T - 6 years 50% 2031–32
Construction Crew Potential Specialists			BMCS and controls specialist (and integrated systems testing) (x1)			Potential testing and commissioning specialists: Generators JDN Monocrane Safe access platforms Marioff HI-FOGG water mist BMS, controls and integrated systems Diesel and fuel reticulation systems Hot water generator burners Hoist / vertical transportation ICT integrated / cyber security Renewables e.g. solar/wind TBC Passive fire to AS 4072.1 Fire shutters Electrical earthing	
Personnel Transport							
Anticipated timing of passenger transfer	Late November back December 2025	Nov to Feb	Nov to Feb	Nov to Feb	Nov to Feb	Nov to Feb	Nov to Feb
Expected space on transport modes	2 Pax + 60 kg Baggage each	23 Pax + 60 kg Baggage each	25 Pax + 60 kg Baggage each	20 Pax + 60 kg Baggage each	26 Pax + 60 kg Baggage each	29 Pax + 60 kg Baggage each	6 Pax + 60 kg Baggage each
Expected month planning for passenger transfer	November / December	October / February	October / February	October / February	October / February	October / February	October / February
Planned Numbers of Alliance Personnel							

IEE Davis Critical Infrastructure Works

	100% 2025–26	Season 2 T - 1 year 95% 2026–27	Season 3 T- 2 years 80% 2027–28	Season 4 T- 3 years 80% 2028–29	Season 5 T - 4 years 50% 2029–30	Season 6 T - 5 years 50% 2030–31	Season 7 T - 6 years 50% 2031–32
Number of Pax deploying (V1)	0	23	25	20	26	29	6
Number of Pax returning (End of Season Voyage)	0	23	25	20	26 out 12 in for Winter	29 out 2 in for Winter	6
Number of beds required for Davis station (Summer)	2	23	25	20	26	29	6
Number of beds required for Davis station (Winter)	0	0	0	0	12	2	0
Duration of deployment	Summer season Only	Summer season Only	Summer season Only	Summer season Only	Summer season + Winter (x12)	Summer season + Winter (x2)	Summer Only
Required numbers Pax transfer (air)	2 Fly-in-fly-out Site Inspection	2 SME	2 SME	2 SME	2 SME	2 SME	
Required numbers of Pax transfer (vessel)							
RTA (Schedule)							
Cargo requirements; estimated / planned volumes		6 TEU returned with RTA V1 2026	20 TEU returned with RTA V1 2027, returned with RTA Chartered Vessel 2028	10 TEU returned with RTA V1 2028	TEU returned with RTA V1 2027, returned with RTA Chartered Vessel 2030		
Dangerous Goods						Li Batteries, under 100W/hr, ACM	Li Batteries, under 100W/hr /Earthworks Plants / ACM
Specific recycling requirements							
RTA Schedule							
Volume	N/A	231 m3	770 m3	770 m3			

IEE Davis Critical Infrastructure Works

		Season 2 T - 1 year 95% 2026–27	Season 3 T- 2 years 80% 2027–28	Season 4 T- 3 years 80% 2028–29	Season 5 T - 4 years 50% 2029–30	Season 6 T - 5 years 50% 2030–31	Season 7 T - 6 years 50% 2031–32
Characteristics	N/A	20 ft Containers 20ft Half Height Containers	20 ft Containers	20 ft Containers	64 x20ft Containers, Plant,43 x 40ft containers	20 ft Containers	20 ft Containers, Plant & Break Bulk, ACM RTA.
Expected duration to load / discharge	N/A	4 Days	4 Days	4 Days	4 Days	4 Days	TBC
AAD Station Support							
Required support on station	Resupply delivery- Use of AAD plant	Resupply delivery- Use of AAD plant	Resupply delivery- Use of AAD plant	Resupply delivery- Use of AAD plant	Resupply delivery- Use of AAD plant	Resupply delivery- Use of AAD plant	
AAD plant required		skidder cat-518 & 20ft trailer - 80 Days bobcat cat-289 bobcat - 15 Days concrete mixer - 21 Days mobile crane RT540 - 35 Days mobile crane RT550 - 45 Days excavator 307 with all attachment - 15 Days exca. 307 with montabert drill mast - 10 Days truck hydrema - 55 Days Isuzu nps300 - 54 Days telehandler - Season loader cat-962 - 40 Days	skidder cat-518 & 20ft trailer - 50 Days bobcat cat-289 - 50 Days concrete mixer - 36 Days mobile crane RT540 - Days mobile crane RT550 - 45 Days excavator 307 with all attachment - 15 Days excavator 329 with all attachment - 65 Days truck hydrema + body - 65 Days Isuzu nps300 - 54 Days telehandler - Season loader cat-962 - 42 Days	bobcat cat-289 - 12 Days concrete mixer - mobile crane RT540 - Days mobile crane RT550 - 90 Days 100T Crane - 90 Days excavator 307 with all attachment - excavator 329 with all attachment - 20 Days truck hydrema + body - 96 Days Isuzu nps300 - 48 Days telehandler - Season loader cat-962 - 70 Days	bobcat cat-289 - 12 Days concrete mixer - mobile crane RT540 - 86 Days mobile crane RT550 - 86 Days 100T Crane - 66 Days excavator 307 with all attachment - excavator 329 with all attachment - truck hydrema + body - 36 Days Isuzu nps300 - 60 Days telehandler - Season loader cat-962 - 120 Days	TBC telehandler - Season loader cat-962 - loader cat-966 - scissor lift x 2 - 2 x skidder cat-518 & 40ft trailer - mobile crane RT550 - Isuzu nps300 - bobcat cat-289 - Isuzu Truck - season	TBC telehandler - Season loader cat-962 - loader cat-966 - scissor lift x 2 - 2 x skidder cat-518 & 40ft trailer - mobile crane RT550 - Isuzu nps300 - bobcat cat-289 - Isuzu Truck - season

IEE Davis Critical Infrastructure Works

		Season 2 T - 1 year 95% 2026–27	Season 3 T - 2 years 80% 2027–28	Season 4 T - 3 years 80% 2028–29	Season 5 T - 4 years 50% 2029–30	Season 6 T - 5 years 50% 2030–31	Season 7 T - 6 years 50% 2031–32
		loader cat-966 - 40 Days rock crushing attachment - 42 Days scissor lift x 2 - 15 Days Isuzu Truck - season excavator 315 with all attachment - 18 Days excavator 315 with drill mast - 24 Days excavator 330 with all attachment - 60 Days	loader cat-966 - 95 Days rock crushing attachment - 60 Days scissor lift x 2 - 20 Days dozer D6 - 35 Days Isuzu Truck - season skidder cat-518 & 40ft trailer - 20 Days excavator 315 with all attachment - 36 Days excavator 315 with drill mast - 24 Days excavator 330 all attachment - 65 Days mobile crane 100T - 30 Days roller Compactor Cat-CS7 - 75 Days EWP - 20 Days	loader cat-966 - 70 Days rock crushing attachment - 24 Days scissor lift x 2 - 85 Days dozer D6 - Isuzu Truck - season skidder cat-518 & 40ft trailer - 90 Days excavator 315 with all attachment - 36 Days excavator 315 with drill mast - 24 Days excavator 330 all attachment - 20 days roller Compactor Cat-CS7 - 6 Days EWP x 2 - 85 Days	loader cat-966 - 120 Days rock crushing attachment - 24 Days scissor lift x 2 - 108 Days dozer D6 - Isuzu Truck - season 2 x skidder cat-518 & 40ft trailer - 96 Days excavator 315 with all attachment - 24 Days excavator 315 with drill mast - 24 Days excavator 330 all attachment - 24 mobile crane 100T - 60 Days roller Compactor Cat-CS7 - 24 Days 2 x EWP - 108 Days		
On station testing	*Water *Environmental monitoring	Water Soil Environmental Monitoring	Water Soil Environmental Monitoring	ACM related Air Monitoring		ACM related Air Monitoring	
Samples for RTA		Water Soil	Water Soil	Water Soil ACM	Water Soil	Water Soil	Water Soil

IEE Davis Critical Infrastructure Works

		Season 2 T - 1 year 95% 2026–27	Season 3 T- 2 years 80% 2027–28	Season 4 T- 3 years 80% 2028–29	Season 5 T - 4 years 50% 2029–30	Season 6 T - 5 years 50% 2030–31	Season 7 T - 6 years 50% 2031–32
Capability beyond BAU AAD support	Environmental Monitoring Integration Note; RMU1 Upgrade required for Pump House (AAD).	Environmental Monitoring- Integration Note; RMU1 & 2 Upgrade required Pump House (1) LQ (2) (AAD) / Connections to Reverse Osmosis plants / sea water feed site reticulation to RO / Services connection to LQ-require AAD SME to review integration plan.	Environmental Monitoring- Integration Note; Feed to Construction site- Field Store or generator? Cut in to wastewater outfall to deliver Brine from RO's to wharf area require AAD SME to review integration plan.	Environmental Monitoring.	Environmental Monitoring Integration Note; liven boards / heating/ Alarms-require AAD SME to review integration plan.	Environmental Monitoring Integration Note; Connection of new powerhouse to existing station network-require AAD SME to review integration plan.	Integration Note; Remove site service dead legs to old MPH & EPH- require AAD SME to review integration plan.

APPENDIX 3 – CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN

APPENDIX 4 – ENVIRONMENTAL MONITORING AND REPORTING FRAMEWORK