



Operations Environmental Management Plan (OEMP)

NTPM-MS-ST-001-AUS Rev No. 5



Operations Environmental Management Plan (OEMP)

This document has been prepared on behalf of and for the exclusive use of NT Port and Marine.

It is expected that this document in its entirety, including any related / referenced material and documentation shall be treated in strict confidence.

This document is uncontrolled once printed.

Please refer to the AusGroup Management System for the latest version.

Rev	Date	Revision Description	Prepared By	Checked By	Approved By
1	31/10/2016	Approved for Use	EcOz	W. Steffert	C. Litowchak
2	08/11/2016	Approved for Use	W. Steffert	E. Lewis	C. Litowchak
3	24/11/2016	Approved for Use	M. Szann	R. Muir	C. Litowchak
4	30/11/2016	Approved for Use (Document Number EZN-HSE-MN-009-AUS)	R. Muir	L. Santana	C. Litowchak
5	28/12/2017	Approved for Use	E. Lewis	A. Shima	C. Litowchak

Contents

Acronyms	5
1 Introduction.....	6
1.1 Company Details.....	5
1.2 Land Tenure	5
1.3 Site Location	5
1.4 Port Facility Purpose and Background	7
1.5 OEMP Objectives and Scope	9
2 Infrastructure and Operations Details	10
2.1 Current Infrastructure and Operations.....	9
2.2 Planned Future Operations and Infrastructure.....	20
3 Environmental Setting.....	22
3.1 Climate.....	21
3.2 Surface and Groundwater	21
3.3 Metocean Conditions.....	22
3.4 Landform, Habitats, Flora and Fauna.....	24
3.5 Heritage, Cultural and Recreational Values and Commercial Interests	30
3.6 Air Quality	31
4 Environmental Risk Assessment.....	32
4.1 Environmental Hazards and Impacts.....	31
4.2 Risk Assessment	32
5 Environmental Management Framework	40
5.1 Legislative and Regulatory Framework.....	39
5.2 Environmental Policy, Standards and Procedures.....	40
5.3 Roles and Responsibilities	41
5.4 Environmental Monitoring.....	47
5.5 Records and Document Control	47
5.6 Training, Inductions and Communications.....	48
5.7 Non-conformance, Incident Response and Reporting.....	49
5.8 Audits, Inspections, Reporting and Review.....	52
6 Environmental Management Actions	52
6.1 Biosecurity Management	52

6.2	Fuel Storage and Handling Management	56
6.3	Hazardous Materials Management	60
6.4	Surface Water Management	62
6.5	Groundwater Management.....	64
6.6	Wastewater Management	66
6.7	Waste Management	68
6.8	Erosion Management.....	69
6.9	Weed Management	70
6.10	Terrestrial Flora and Fauna Management	71
6.11	Marine Fauna Management	72
6.12	Fire Management	75
6.13	Air Quality Management.....	76
6.14	Biting Insects Management.....	78
6.15	Sacred, Cultural and Heritage Site Management	78
7	References	81
	Appendix A – Environmental Policy Statement.....	83
	Appendix B –Biosecurity Management Plan.....	84
	Appendix C – Oil Spill Contingency Plan	85
	Appendix D – Marine Pest Monitoring Protocol.....	86
	Appendix E – Erosion and Sediment Control Plan.....	89
	Appendix F – Weed Management Plan.....	90
	Appendix G – Fuel Transfer Manual	91
	Appendix H – Emergency Response Plan	92
	Appendix I – Recycled Water Management Plan	93
	Appendix J – Site Inspection Checklists.....	94
	Appendix K – Waste Management Plan	95
	Appendix L – Biting Insect Management Plan	96

Acronyms

AAPA	Aboriginal Areas Protection Authority
ABS	Australian Bureau of Statistics
AFD	Australia Fuel Distributors
AMSA	Australian Marine Safety Authority
AQIS	Australian Quarantine Inspection Service
ASS	Acid Sulphate Soils
BoM	Bureau of Meteorology
mCD	metres relative to Chart Datum
DLP	Department of Lands and Planning (Northern Territory), now Department of Lands, Planning and the Environment
DLPE	Department of Lands, Planning and the Environment (Northern Territory)
DLRM	Department of Land Resource Management (Northern Territory)
DME	Department of Mines and Energy (Northern Territory)
DAWR	Department of Agriculture and Water Resources (Australian Government) – formerly DAWR
DoH	Department of Health (Northern Territory)
DoE	Department of the Environment (Australian Government)
DPIF	Department of Primary Industries and Fisheries (Northern Territory)
EPA	Environment Protection Authority (Northern Territory)
EPBC	Environment Protection and Biodiversity Conservation Act (Commonwealth)
ESCP	Erosion and Sediment Control Plan
HSE	Health, Safety and Environment
IMO	International Maritime Organisation
ISM	International Safety Management Code
ISPS	International Ship and Port Facility Security Code
MARPOL	Marine Pollution; the IMO International Convention for the Prevention of Pollution from Ships
NPI	National Pollutant Inventory
NT	Northern Territory
NTPM	NT Port and Marine Pty Ltd.
OEMP	Operations Environmental Management Plan
AA	Approved Arrangements – formerly Quarantine Approved Premises (QAP)
SEWPaC	Department of Sustainability, Environment, Water, Population and Communities (Australian Government)
TLC	Tiwi Land Council
TPWC	Territory Parks and Wildlife Conservation Act

1 Introduction

1.1 Company Details

NT Port and Marine Pty Ltd.

Contact:

Chris Litowchak
Chief Operating Officer

NT Port and Marine Pty Ltd.
18-32 Parliament Place,
West Perth, WA 6005
Australia

Phone NTPM (08) 8930 6500
Mobile (61) 419 240 277
Email chris.litowchak@terasaustralia.com

Web www.agc-ausgroup.com

Throughout this OEMP, NT Port and Marine Pty Ltd. is referred to as “NTPM”.

NTPM operates the port, trading as Port Melville Port Corporation.

1.2 Land Tenure

The Tiwi Land Council (TLC) and Tiwi Aboriginal Land Trust own the land.

The port area is leased by Port Melville Pty. Ltd. and sub-leased to and operated by NT Port and Marine Pty Ltd. (NTPM) via a 50 year sub-lease.

1.3 Site Location

Port Melville is located approximately 122 km north of Darwin, Northern Territory, on Melville Island; the larger of the two Tiwi Islands, with the other being Bathurst Island (Figure 1-1). The port is situated on the Apsley Strait, which runs north-south between the two islands. Barlow Point is located immediately north of the port, and the community of Garden Point (Pirlangimpi) is approximately 1.5 km north of the port.

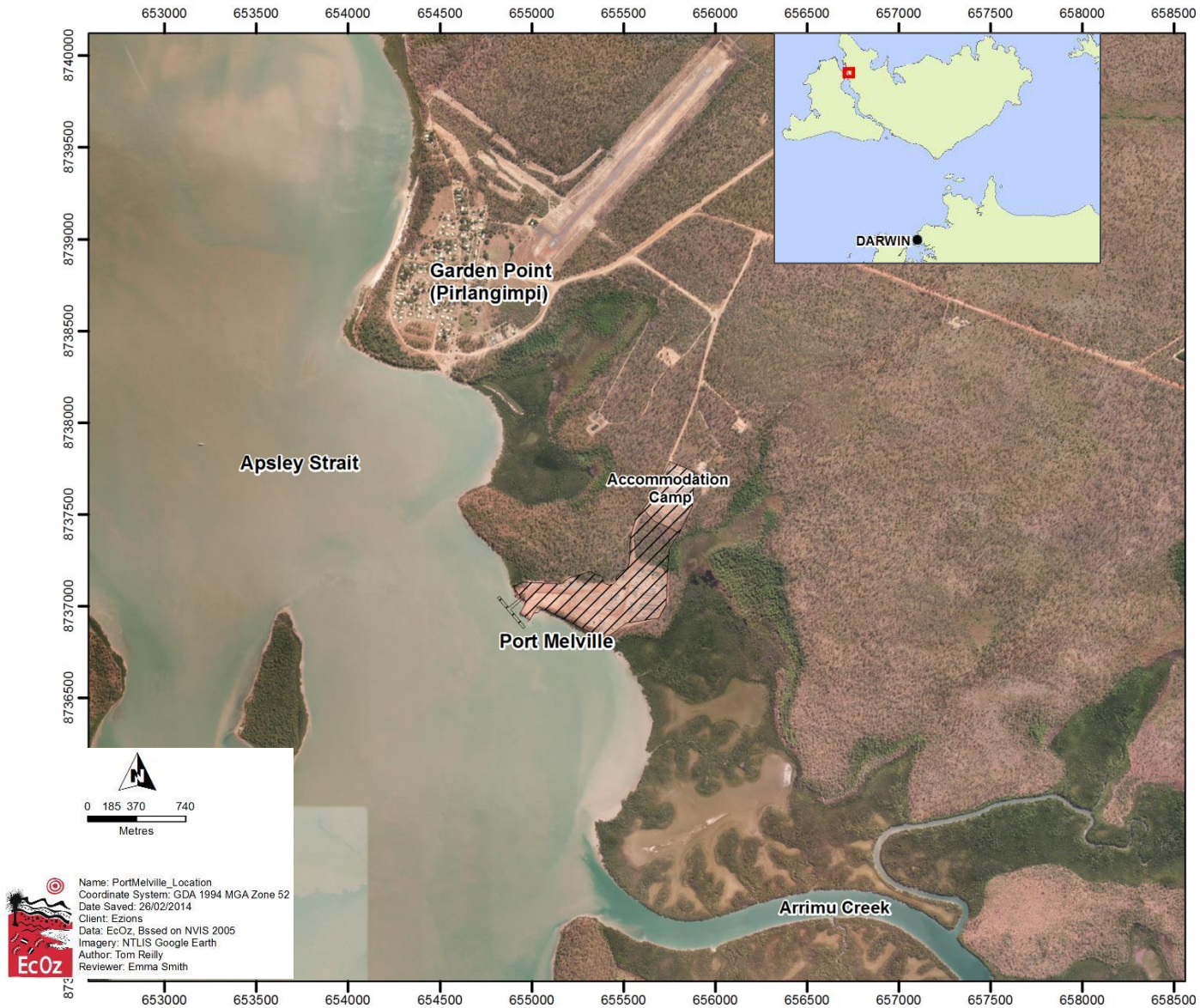


Figure 1-1. Port Melville site location

1.4 Port Facility Purpose and Background

Port Melville currently provides for the export of woodchips for Tiwi Plantations Corporation and during the next 12 months, NTPM plans to commence operation of the 30 ML diesel fuel supply facility. At some stage in the future, it is intended that the port will also be utilised for the shipment of equipment and supplies for other projects, such as the construction and operation of offshore oil and gas fields. This will include a custom bonded area, waste holding facility and associated infrastructure.

The port presents significant economic and development opportunities for local Tiwi people in providing a woodchip export facility for the Tiwi-owned Tiwi Plantations Corporation and also employment opportunities in port operations. The woodchip operations will see up to \$200 million flow to the Tiwi over the next 5 years and the creation of approximately 100 jobs. The accommodation camp will also involve opportunities for Tiwi people for investment and employment in managing and operating the camp. Opportunities will also arise for local Tiwi groups, such as the Tiwi Land Rangers and Tiwi Marine Rangers to be involved in environmental monitoring and land management work, such as weed control and marine pest monitoring at the port.

The wharf at Port Melville comprises three floating concrete pontoons; two joined together to form the wharf front where ships dock, and one linking these to the land (see Figure 1-2). The concrete pontoons are supported by a series of mooring piles or dolphin groups.

Adjacent on-shore facilities currently comprise 37 ha of laydown area, with fuel storage, workshop, woodchip stockpile area, port office facilities, unsealed access roads and erosion and sediment control infrastructure. An accommodation camp (up to 120-person) is located along the access road into the port; just northeast of the port's main laydown areas (Figure 1-1).

The wharf has a design life of 5 years to satisfy short-term woodchip product-handling requirements. Rapid installation and commissioning was possible by sourcing the floating pontoon units from a Canadian operation selling refurbished pontoons obtained from the Hood Canal Bridge in the U.S. Depending on potential future logistics requirements in the area, the wharf may be upgraded or replaced to permanent status within the 5-year period.

A previous wharf facility was constructed at the Port Melville site for the export of logs in 2003/4 (previous wharf remains shown in Figure 1-2). This wharf structure was weakened during a cyclone in 2005 and eventually failed in September 2007. The new pontoon wharf lies beyond the footprint of the failed wharf and the remnant failed wharf does not obstruct operation of the new wharf. Stabilisation or demolition of the failed structure may be required in future, should it become a risk to personnel or operations.

The Tiwi Islands are home to the Tiwi aboriginal people, who have a long history on the islands and strong cultural links to the island's environment. The islands also have significant environmental value, and support a number of threatened plant and animal species, such as several sea turtle species, dugong, the Red Goshawk, Partridge Pigeon, Hooded Robin, Masked Owl, Brush-tailed Rabbit Rat, Northern Brush-tailed Phascogale, Butlers Dunnart and a number of threatened plant species.

Importantly, the isolation of the Tiwi Islands provides some protection for plants and animals from threatening processes affecting many habitats on the Northern Territory mainland (such as Cane Toads and a number of invasive exotic weeds).

This Operations Environmental Management Plan (OEMP) aims to minimise any impact of Port Melville's operations on the surrounding environment, cultural values and local community.

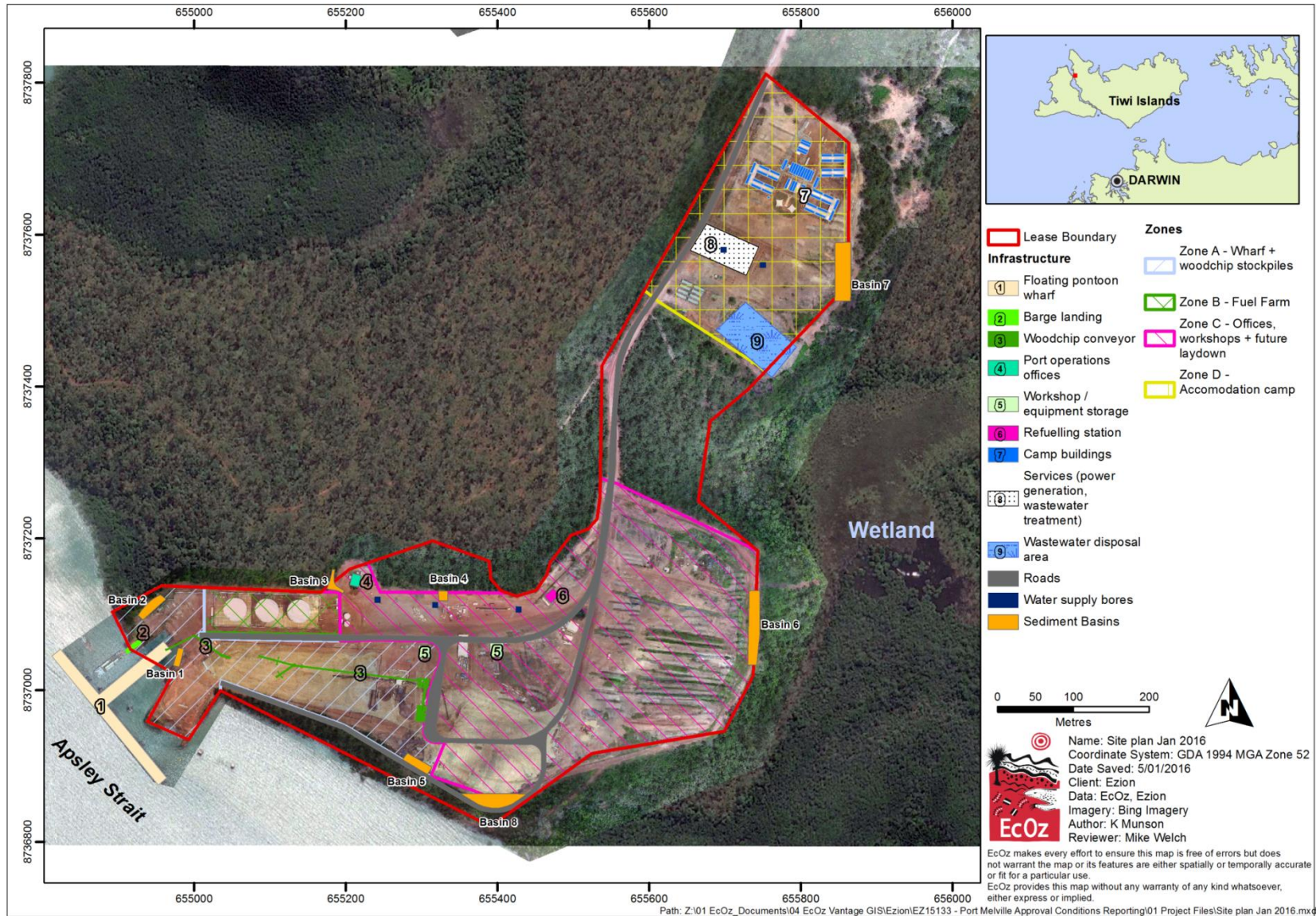


Figure1-2. Map showing Port Melville layout

1.5 OEMP Objectives and Scope

This Operations Environmental Management Plan (OEMP) sets out the framework for environmental management of Port Melville. It identifies the environmental risks for the port and outlines NTPM's specific objectives and targets for minimising environmental harm. It outlines the port's legislative requirements and the roles and responsibilities of port personnel for environmental management.

The objectives of this OEMP are as follows:

- To describe current operations and infrastructure and the surrounding environment
- To define the statutory obligations that must be fulfilled in relation to environmental management
- To provide a clear framework for effective environmental management of facility operations
- To outline the operational environmental management actions that will be implemented
- To assign clear and appropriate responsibilities for the implementation of environmental management actions
- To specify monitoring regimes to enable assessment of environmental performance
- To facilitate self-assessment to ensure that environmental management actions are being implemented and are effective

This OEMP is intended to a dynamic document subject to regular review, updating and improvement, and forms the basis for annual environmental auditing. This document covers current and planned operations.

2 Infrastructure and Operations Details

The infrastructure at Port Melville includes the wharf structure and ancillary infrastructure (e.g. fuel storage, laydown areas, accommodation camp etc.) as outlined in the sections below.

2.1 Current Infrastructure and Operations

2.1.1 Wharf Infrastructure

The main wharf (ship berthing) infrastructure at Port Melville (shown in Figure 1-2) comprises of:

- Three floating concrete pontoons; two joined together to form the wharf front where ships dock (220 m total length x 15 m wide), and an approach pontoon linking these to the land (109 m x 15 m).
- The wharf front pontoons are supported by a series of 'dolphins' (i.e. piles driven into the seabed to provide a fixing point). Steel pile berthing dolphins support the wharf pontoons during berthing actions and restraint dolphins at each end of the wharf front pontoons along with the berthing dolphins support the pontoons longitudinally against current and wind loading actions.
- The approach pontoon is supported by a number of cantilever vertical mooring piles.
- A ramp structure at the shore interface of the approach pontoon allows vehicular access onto to the wharf.
- A revetment retaining wall structure at the shore to pontoon interface, levels to suit pontoon access tidal geometry.
- Vessels berth against pneumatic fenders located along the wharf front pontoons.
- Fixed (static) bollards are provided along the wharf pontoons for support of pneumatic fender units and for mooring of small craft and barges.

- Larger vessel mooring is independent of the floating structures through use of shore/or sea clumps including forward and aft clump weight anchorages located parallel with the berth face.

The pontoons supported by the mooring piles/dolphin groups allow for tidal movement. The two wharf front pontoons are not rigidly fixed together but are connected via jump ramps.

The layout of the pontoon wharf has been developed to cater for the Handymax size woodchip vessel i.e. the maximum length overall (LOA) design vessel. This vessel has a length of 180 m LOA and draft of 10 m.

Table 2-1 outlines the design vessels used in development of the wharf.

The berthing area is located along the -12 to -14 mCD¹ depth contour (see Figure 1-2) to provide sufficient draft and to minimise the depths of the head and stern anchorage clumps.

The wharf currently has a 5-year design life, which assumes that regular, routine inspection and maintenance will be carried out in accordance with the maintenance plan. The wharf may in the coming years be further developed and upgraded to extend its design life beyond 5 years depending on need.

In addition to the wharf pontoon, a concrete barge loading ramp is located adjacent to the wharf (Figure 1-2) for loading and unloading barges travelling to and from Darwin.

Marine navigational markers may be installed to guide ship movements into the wharf if required.

The location of the wharf has been approved by the NT Department of Transport. It is ideally located in the Apsley Strait, where water depth drops steeply from the shoreline to greater than 20 m depth. Water depth along the front of the pontoon wharf is naturally maintained at greater than 20 m; negating the need for dredging, which is probably one of the highest risks to the environment usually associated with port facilities. Additionally, the Apsley Strait is a marked shipping channel and water depths within the Strait between St Asaph Bay and Port Melville is naturally maintained, with a central channel of greater than 18 m depth.

Table 2-1. Design criteria of vessels using Port Melville

Vessel	Design Criteria		
Flat top Barges	Max	Length Overall	130 m
		Beam	37 m
		Draft	5.1 m
		Moulded depth	6.1 m
		Barge Deadweight	14 866 MT
	Min	Length Overall	55 m
		Beam	18.3 m
		Draft	1.85 m
		Moulded depth	3.7 m
		Barge Deadweight	2 000 MT
Handymax Bulk Cargo Carrier (e.g. woodchips)	Max	Length Overall	200 m
		Beam	32 m
		Design Draft	12 m

¹ mCD – metres relative to Chart Datum; in this case, Mean Sea Level.

		DWT	50 000 T
Ocean Towing / Salvage Tug	Max	Length Overall	49.95 m
		Beam	12.6 m
		Draft (Summer)	4.8 m
		Moulded depth	5.75 m
		DWT	700 T (at 4.8 m draft)
	Min	Length Overall	23.5 m
		Beam	7.315 m
		Draft	2.7 m
DWT		n/a	
Product Tankers	Max	Length Overall	170m
		Beam	27.4m
		Draft (Summer)	11.82m
		Moulded depth	17.3m
		DWT	34,671 T
	Min	Length Overall	153.2m
		Beam	25m
		Draft (Summer)	10.02m
DWT		22,780 T	

The wharf-front pontoons are supported by a series of dolphins (i.e. steel piles driven into the seabed to provide a fixing point). These dolphins are designed to withstand the strong currents in the Apsley Strait and are embedded 25 to 30 m into the seabed. Specifically designed “berthing” dolphins support the wharf pontoons during ship berthing actions and “restraint” dolphins at each end of the wharf front pontoons, provide additional support longitudinally against current and wind loading actions. The pontoons and dolphins are connected in such a way as to allow for tidal movement and the two wharf front pontoons are not rigidly fixed together but are connected via jump ramps. The approach pontoon is supported by a number of cantilever vertical mooring piles to allow for tidal movement.

A revetment retaining wall structure supports the shore to pontoon interface and facilitates changes in tidal levels to allow pontoon access. Geotechnical investigations for design of the revetment retaining wall were completed by GALT Geotechnics in March 2013 (Galt 2013).

The wharf structure is designed to meet the following standards:

- BS6349 Parts 1–7 British Standard Code of Practice for Maritime Structures
- AS 1170 Parts 0,1, 2,& 4 Structural Design Actions
- AS 2159 Piling-Design and Installation
- AS 4997 Guidelines for the Design of Maritime Structures
- AS 1657 Fixed Platforms, Walkways, Stairways and Ladders, Design, Construction and Installation
- AS 3600 Concrete Structures
- AS 3774 Loads on Bulk Solid Containers
- AS 4100 Steel Structures
- AS 5100 Bridge Design Code
- AS 4678 Earth Retaining Structures

Operations Environmental Management Plan (OEMP)

- AS 3962 Guidelines for Design of Marinas
- IALA Guidelines for the Design of Leading Lines
- API RP2A Recommended Practice for Planning, Designing and Constructing Fixed Offshore Platforms
- PIANC Guidelines for the Design of Fender Systems: 2002

The wharf is designed to withstand a Category 2 cyclone. If the pontoon wharf was damaged during a storm or cyclone, there would be little environmental impact. No fuel or other chemicals are stored on the wharf. As part of the Appendix H – Emergency Response Plan

During a “Cyclone Watch” all heavy machinery and vehicles will be removed from the wharf and secured on land, and the fuel supply pipeline to the wharf will be emptied and shut off then secured to prevent any loss of fuel should the wharf be damaged.

Studies and evidence of the strength of the structures were provided by the design engineers based on:

- Climatic conditions
- Tide and surge levels
- Tidal lag and groundwater differentials at wharf structure
- Metocean conditions
- Ambient waves
- Extreme waves
- Currents
- Wave and current loadings
- Drag and inertia coefficients
- Marine growths
- Wind
- Earthquake loadings

The risk to benthic habitats in the area is assessed as low given the wharf has a small footprint (4950 m²), is located in relatively deep water where the seabed comprises bare sands, muds and rock and no known seagrass or coral reefs. Visual inspection has confirmed that no major erosion has occurred around the dolphins or other wharf structures since the wharf was completed in October 2013.

The existing collapsed wharf structure left in place by the previous Port operator has not experienced any further movement since its failure in September 2007. This structure does not obstruct the new pontoon wharf or vessel movements, and no modifications to this structure are required to facilitate the future development or operation of the new wharf facility. The on-going integrity of the failed wharf structure will be monitored, with a visual monthly inspection and detailed inspection following any major storm events. In the event the structure becomes unstable, NTPM will immediately conduct stabilisation works. The damaged wharf structure will eventually be demolished during project staged development.

Any future upgrades or replacement construction to the wharf at Port Melville for the docking of vessels will be in the same location and have the same or that of smaller dimensions of the existing pontoon wharf.

No upgrade or replacement is to commence without authorisation from NTPM chief operating officer after consultation with associated NT EPA and TIWI Island Governing bodies.

2.1.2 Ancillary Infrastructure

The current and planned (during the term of this OEMP) on-shore support facilities (shown in Figure 1-2) comprise of:

- Fuel storage for shore-based port operations (3 x self-bunded tanks; combined capacity 195 000 L)
- Fuel storage for accommodation camp (self-bunded tank capacity 65 000 L)
- Fuel storage for re-fuelling vessels (3 x above-ground bunded tanks each with capacity 10 ML), including power generation and fire water storage (1 x 10 000L tanks)
- Water supply bores (5)
- Workshop and laydown area
- Woodchip stockpile area
- Woodchip loading infrastructure, including a receiving/screening plant, reclaim hopper, mobile transfer conveyors (4) and mobile ship loading conveyor
- Office facilities
- Accommodation camp (up to 120-person), including power generation and wastewater treatment/disposal system
- Lighting for night operations
- Road access
- Erosion and sediment control infrastructure (e.g. drains, sediment ponds)

Water supply and storage

Total estimated annual water demand is estimated at 17.5 ML, including:

- Accommodation village and site offices -11 ML
- Fire suppression system flushing – 1.5 ML
- Dust suppression – 5 ML

All water requirements for Port Melville are sourced from five existing water supply bores (Figure 1-2). The water quality from these bores is good, although the maximum flow rate from individual bores is around 2.5 L/s but may be as low as 0.5 L/s. The total yield from existing bores (i.e. approx. 8 L/s) will be adequate for the current demand and an estimated future peak average daily water usage of up to 118 kL (1.4 L/s).

The total rate of water pumped from groundwater bores will be less than 15 L/s, therefore a Water Extraction Licence, under the NT *Water Act* is not required. Details of measures to ensure sustainability of groundwater abstraction are provided in Section 6.5 *Groundwater management*.

Details of the water storage infrastructure on site are provided below:

Accommodation village

- 2 x 72,000l tanks – Fire Water
- 2 x 72,000l tanks – Potable Water
- 1 x 72,000l tank – Raw water holding tank for WWTP

Port area

- 2 x 220,000l tanks – Fire Water for fuel tank farm

Fuel storage

Port operations fuel storage comprises three self-bunded tanks supplied by the fuel supplier (currently Puma); with a total combined capacity of 195 000 L. These tanks are compliant with Australian standards (AS1940 and AS1692). This fuel is used for port operations such as light and heavy vehicles and machinery, and for generators powering lights, office facilities, and workshops.

The diesel fuel farm for supply of visiting vessels includes the following:

- Three vertical storage tanks with a total capacity of 30 million litres
- Off-loading point designed to receive up to 20 million litres of Diesel fuel from International Handysize Tanker (Ship) per month
- Dispensing station designed to deliver around 600 kL of diesel fuel per dispensing operation to Offshore Rig Tenders
- Power generation and all electricity distribution and electronic control systems for the fuel facility and offload/dispensing operations
- Pipelines from the wharf off-loading point to the fuel farm and from the fuel farm to the wharf dispensing point
- Bund, wastewater and drainage system capable of treating the contaminated water and spillage from the fuel facility
- Fire protection system capable of reaching all sides of all tanks, and bund area
- Control room

Accommodation Camp

The on-site 120-person accommodation camp is located on the access road, just northeast of the port's main laydown areas (Figure 2-1). This area was used during the previous forestry operations as a laydown area.

Accommodation camp water supply is sourced from two supply bores within the bounds of the camp area. Power is generated using fuel from a dedicated self-bunded tank supplied by the fuel supplier (currently Puma) with a capacity of 65 000 L.

Road access between Port Melville and the Pirlangimpi community and airstrip is via 2.5 km of unsealed road.

Wastewater treatment

Wastewater is not accepted from vessels. Vessels must hold on to their wastewater until reaching a port with the appropriate approved wastewater treatment facilities.

Sewage wastewater from the existing port office toilet amenities goes to an underground septic that was previously installed in accordance with Department of Health's (DoH) *Code of Practice for Small On-site Sewage and Sullage* (DoH 1996).

Wastewater from the 120-person accommodation camp is treated by a modular activated sludge treatment plant ('Ozzi Kleen' SC250A), with a capacity of up to 55 kl/day (i.e. from showers, toilets, laundry and kitchen). This treats the water to a tertiary 'Class B' standard. The treated wastewater is irrigated in a dedicated 0.4 ha (Figure 2-1) irrigation area adjacent to the accommodation camp. Prior to installation, soils were tested and assessed as being suitable for wastewater irrigation, with a Long Term Acceptance Rate (LTAR) of 15. In accordance with the DoH's *Code of Practice for Small On-site Sewage and Sullage* (DoH 1996), this equates to a minimum irrigation surface area of 3666 m².

The wastewater treatment system is approved by the DoH in a Wastewater Works Design Approval on 5 March 2015 (DD2015/02034), which specifies performance criteria for the system (see Section 6.6).

Hazardous materials storage

Our range of Hazardous Material is stored in HAZMAT certified goods containers which means NTPM can safely transport and store a range of hazardous goods, including gas cylinders, flammable liquids, flammable solids, oxidising agents, organic peroxides, toxic substances, corrosive substance as well as a range of miscellaneous dangerous goods. Containers are not only suited to store dangerous goods, but also non-hazardous materials where there are possible risks with spillage.

A standard DG Container Store is 6.0m L x 2.4m W x 2.6m H, Open Side Design. Self Bunded Galvanized Grated Floor / Ventilated in conformance with AS1940.

Table 2-2 Hazardous Materials Own Use Storage

Port Melville Own Use		
Product Name	Unit Size	Quantity per Year
Sodium Hypochlorite Solution	20 Litres	4
Calcium Hypochlorite Tablets	10 Kgs	6
Dense Soda Ash	25 Kgs	40
Aluminium Sulphate Granular	25Kgs	10
Granular Urea	20Kgs	2
Molasses	1000	1
Diesel Engine Oil	208 Litres	10
Diesel Engine Coolant	205 Litres	2
Hydraulic Oil	205 Litres	2
Gear Box Oil	205	2
Differential Oil	205	2
Corrosion Inhibitor Concentrate	20 Litres	4
Liquid Lanolin	20 Litres	3
Chain and Wire Rope Lubricant	20 Litres	3
Air Drying Sanitiser	5 Litres	5
Air Freshener	5 Litres	5
Autofeed Dishwashing Liquid	5 Litres	5
Auto Feed Rinse Aid	5 Litres	5
Detergent Sachets - Laundry Powder	2Kg	5
Foodsafe - All-purpose Spray and Wipe	.500ml	5
HD Multipurpose Cleaner	.500ml	5
Heavy Duty Oven and grill	.500ml	5
Lemon 3 in 1 cleaner	.500ml	5
Liquid Soap	.500ml	5
Marine clean	5 Litres	4
Convoclean Floor Cleaner	10 Litres	3

*Note: Operational Quantities for Port and Camp Operation

Table 2-3 Hazardous Materials Warehouse Storage

Port Melville Warehouse Storage		
Product Name	Unit Size	Quantity per Month
Diesel Engine Oil	208 Litres	10
Diesel Engine Coolant	205 Litres	10
Hydraulic Oil	205 Litres	10
Gear Box Oil	205 Litres	10
Differential Oil	205 Litres	10
Corrosion Inhibitor Concentrate	205 Litres	10

Note* Quantities to be kept in stock for sale.

As per *Australian Dangerous Good Code 7.4* and *Northern Territory Work Health and Safety (National Uniform) Regulations, Schedule 15* and as prescribed in tables 15.1 and 15.2 NTPM warehouse storage of Hazardous Chemicals are well below threshold quantities.

Operations Environmental Management Plan (OEMP)

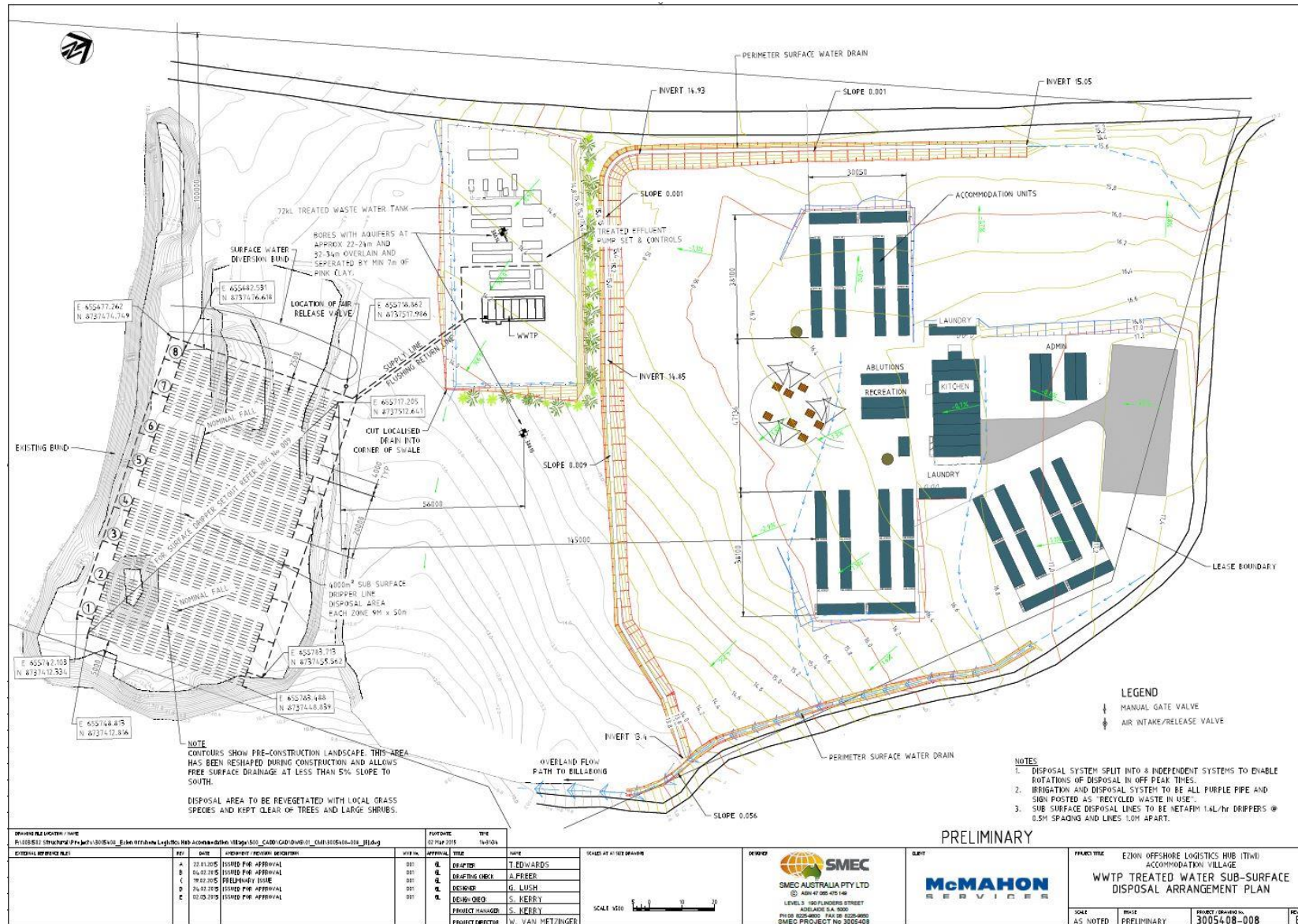


Figure2-1. Plan showing layout of accommodation camp and treated wastewater disposal area

2.1.3 Operations

Port Melville provides for the export of woodchips for Tiwi Plantations Corporation. The facility is capable of 24-hour operation, although most operations are undertaken during daylight hours.

At any one time, the on-site workforce currently includes up to 30 personnel (NTPM employees and contractors). These workers are accommodated at the onsite accommodation village.

Most vessels enter and exit the Apsley Strait from its northern entrance, with the exception of barges travelling between Darwin and Port Melville, which enter and exit the Apsley Strait from its southern entrance.

It is a legal requirement that Vessels navigating the Apsley straight to or from Port Melville follow a route that ensures maximum distance from the shores of Melville and Bathurst Islands, which aligns with the deepest sections of the Apsley straight, as regulated AMSA.

Vessels greater than 50m operationally enter and exit from the North of Apsley straight and will travel at speeds that reduce the risk of the safety to human life at sea and associated marine fauna.

The number of vessels between Port Melville and the North and Southern entrances of Apsley straight will not be greater than 20 per month.

Cargo transferred at Port Melville currently includes:

- Woodchip exports to overseas destinations
- Cargo movements between Darwin and Port Melville for on-site operations.

Equipment and vehicles servicing the wharf traverse the revetment structure and shore side access ramp during limited tidal windows, based on allowable vehicle ramp gradients.

Vessels

Current vessels servicing Port Melville are detailed in table 2-4 below, however

Other vessels traversing Apsley Strait Port Melville may include:

- Barge services to and from Darwin servicing Tiwi Island communities comprises 1 landing barge per week through the southern entrance operated by Seaswift and Toll
- Ferry services to Wurrumiyanga on the southern end of Bathurst island at the entrance to Apsley Strait three times per week operated by Sealink
- Recreational fishing and boating in the Strait – specific number unknown
- Customs patrol boats in the Strait – numbers unavailable. A designated anchorage is regularly used by Customs located north of Harris Island near Port Melville.
- Naval vessels in the Strait – numbers unavailable

Table 2-4 Vessel Berthing per year in Apsley Strait

Vessel Berthing Per Year	Year				
	2016	2017	2018	2019	2020
1) Vessel Berthing from the North (Mandatory for vessels >50m):					
Wood chip Vessels*	8	8	8	8	8
International Project Vessels*	0	2	2	2	2
International Product Tankers*	0	3	3	3	3
Rig Tenders/Offshore Support Vessels	0	48	72	84	96
Total Vessel Berthing from North	8	61	85	97	109
2) Vessel Berthing from the South:					
Domestic barges (includes Tiwi Islands community runs)	48	48	48	60	72
Assist Tugs	16	26	26	26	26
Total Vessel Berthing from the South	64	74	74	86	98
Subtotal Vessel Berthing from North and South	72	135	159	183	207
Pilot Vessels	16	26	26	26	26
Total Vessel Berthing via Apsley Strait	88	161	185	209	233

* Table 2-4 includes pilot vessels applicable to Wood chip Vessels, International Project Vessels and International Product Tankers.

Port security

The wharf berthing area and access pontoon is within a designated *Maritime Security Zone* in accordance with the security measures required under the *Maritime Transport and Offshore Facilities Security Act 2003 and regulations*. This zone is defined by security fencing and identification screening at the access point to the wharf where all personnel accessing the wharf must have a *Maritime Security Identification Card (MSIC)* or be accompanied by an MSIC holder.

Port Melville has an approved *Port Facility Security Officer* (i.e. the Port Manager), trained in accordance with the *Marine Transport and Offshore Facilities Act 2003*. Also, prior to commencement of operations, Port Melville will be classed as an approved port under this Act.

Vessel security whilst on voyage and in port will be in accordance with the *International Ship and Port Facility Security (ISPS) Code* for international vessels, User Vessels Safety Management System and vessel-specific security plans.

Australian vessels must comply with the *Marine Transport and Offshore Facilities Act 2003*.

2.2 Planned Future Operations and Infrastructure

It is intended that in future, Port Melville will be utilised for as a marine supply base for cargo transfer, waste transfer and potable water supply (up to 13 ML per year) for international vessels. Examples of potential cargoes include:

- Cargoes imported for temporary storage before transfer by rig tender to offshore facilities (e.g. construction materials, materials for repair and maintenance)
- Cargo or goods exported from Darwin or other Australian sources for transfer to offshore facilities (e.g. food, fuel and other supplies)
- Cargoes and waste imported to Port Melville from offshore facilities for transfer to Darwin or overseas destinations (e.g. machinery for servicing or disposal)

Refer to Table 2-4 for projected future vessel numbers visiting Port Melville associated with its use as a marine supply base.

Ancillary infrastructure to support future operations as a marine supply base is likely to include:

- Laydown areas (7.15 ha)
- 1 x 5 ML tank for potable water storage to supply vessels
- Customs bonded warehouse and yard (0.5 ha)
- Holding/transfer facility for acceptance of international shipping waste
- Wash-down and container inspection facilities (for biosecurity)
- Security fencing and security screening access point

Future imported and domestic cargoes likely to be brought to and stored within the port, prior to onward shipping to offshore facilities includes:

- | | |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> • Drilling mud • Pulverized cement • Diesel fuel • Potable water • Non-potable water • Chemicals including, friction reducers, stabilizers, surfactants, corrosion inhibitors, and biocides such as glutaraldehyde, dibromo, and nitrilopropionamide • Sand • Naturally occurring radioactive matter • Liquid hydrocarbons • Cross-linkers • Breaker additives | <ul style="list-style-type: none"> • Guar gum • AFFF concentrate (firefighting foam) • Pipe and tubing • Rigging- wire rope, tackle, cordage, cargo gear • Stores • Parts • Food - dry and perishables • Supplies – engine and deck • Lubricants and hydraulic oil • Tools - wellbore clean-up tools (various sizes of casing scrapers, casing brushes, riser brushes, jetting tools, riser jetting tools, debris catchers, magnets, junk baskets, mud tank cleaning equipment etc.). |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

To manage potential biosecurity risks associated with the future importation and export of cargoes at Port Melville, a draft *Port Melville Biosecurity Management Plan* (Appendix B) has been compiled and will be finalised prior to commencement of international cargo operations at the port.

3 Environmental Setting

3.1 Climate

Melville Island has a tropical monsoonal climate, experiencing two contrasting seasons each year; the wet season and the dry season. During the wet season, from around November to April, the Tiwi Islands receives the Northern Territory’s highest annual rainfall (average >1400 mm) and is subject to frequent storm activity. The risk of cyclones is also present during the wet season.

Temperatures during the wet season stay around the mid 30’s, with high humidity; whereas dry season temperatures range from the mid-20’s to low 30’s, with low humidity and little or no rain.

Average conditions for Pirlangimpi are provided below in Table 3-1.

Table3-1. Average climate conditions for Pirlangimpi

Climate parameter	Value
Mean monthly maximum recorded temperature	33.4°C (Oct/Nov)
Mean monthly minimum recorded temperature	18.3°C (Jul)
Mean Annual Rainfall	2 034 mm
Mean maximum monthly rainfall	408 mm (Jan)
Mean minimum monthly rainfall	3 mm (Jul)

(Source: BoM website www.bom.gov.au)

Mean monthly wind speed at the nearest weather station to provide online wind data (Darwin Airport 14015) ranges from 8.7 km/h (during November at 9 am) to 20.9 km/h (during September at 3 pm). Wind speeds generally display a higher maximum speed in the dry season months, when prevailing winds are south-easterly associated with high pressure cells in central Australia. During the wet season, monsoonal weather from the north-west is more typical. On average, throughout the course of a year, wind direction is predominantly east-south-east in the morning and north-west in the afternoon.

3.2 Surface and Groundwater

Surface Water

There are no watercourses within the port land-side area. The nearest waterway is a small tidal inlet located south-east of the port (i.e. the “swampland/floodplain” and “mangrove” in Figure 3-1). Surface water flows across the site from a high point at the north-eastern section of the site, with gently inclined southwest and southeast-facing slopes towards the shoreline and tidal inlet respectively (Figure 1-2). Surface water flows are managed in accordance with the *Erosion and Sediment Control Plan* (Appendix E) and as detailed in Section 6.8 *Erosion management* below.

Groundwater

Haig et al. (2003) identified two regional aquifer systems on the Tiwi Islands; a shallow, unconfined aquifer, and a deep confined aquifer. The shallow aquifer occurs within the Van Diemen Sandstone and overlying laterite and alluvium. It covers the majority of both Tiwi Islands and is the most readily used for bore water supplies.

Groundwater production potential is dependent on the thickness of the aquifer. In areas where the sandstone is greater than 60 m thick, yields of up to 10 L/s are likely. Areas of less than 20 m

thickness are likely to only produce up to 0.5 L/s, while shallow groundwater supplies are unlikely where there is no underlying Van Diemen Sandstone.

Recharge of this shallow aquifer system occurs each wet season through direct infiltration of rainfall. During the dry season, water drains from the system with shallow bores fluctuating up to 5 m between the wet season and dry season.

Water quality in this shallow sandstone aquifer is generally very good and retains the properties of its rainwater source. There are no health risks identified for this groundwater source.

The water supply for the nearby town of Pirlangimpi is the spring-fed Blue Water Creek, which lies within a separate catchment to that of the Port, and Power Water Corporation's extraction point from the creek is located approximately 3.5 km northeast of the Port. Assessment of current extraction rates and recharge for the Blue Water Creek catchment undertaken for the *Tiwi Islands Water Resource Strategy*, September 2011, indicate there still remains significant capacity for increased water extraction; whilst still leaving at least 80% of the water resource for environmental and cultural uses. Despite this additional capacity, NTPM do not intend to extract either surface or groundwater from the Blue Water Creek catchment on an ongoing basis. Additionally, groundwater extraction at Port Melville is unlikely to impact groundwater flows to the spring supplying Blue Water Creek given the distance of the creek from the Port and the fact the Port is in a separate catchment.

Groundwater from the port's water supply bores is drawn from a depth of 10-19 m, which is considered to be a shallow aquifer system. Water quality from the bores is good but yields can be low (i.e. 0.5 – 2.5 L/s). Water quality is generally good with low salinity (e.g. electrical conductivity [EC] 14.49 μ S/cm) and low nutrients (ammonia <1 mg/L, TKN <1 mg/L, nitrate 0.8 mg/L, phosphorus <0.1 mg/L).

3.3 Metocean Conditions

Metocean conditions (meteorological and oceanographic conditions) relevant to Port Melville are described below. Design criteria regarding wharf construction and operation were taken from the *Environmental Load Calculation Melville Island Supply Base Temporary Berth Facility* report (Maritime Engineers 2013). These design criteria were determined in accordance with the requirements of AS4997 – *Guidelines for the Design of Maritime Structure* and relevant parts of BS 6349 – *Design of Maritime Structures*.

Bathymetry

Port Melville is located on the Apsley Strait, a relatively deep and wide (average 3 km) channel that separates Melville Island from Bathurst Island. The northern section of channel, between Port Melville and the Strait's entrance into St Asaph Bay and the Timor Sea, is the deepest and generally much greater than 20 m deep in the centre of the channel (see *Apsley Strait [Northern Sheet]*, Nov 2008 and *Apsley Strait [Southern Sheet]*, Feb 2009, 1:50 000 Scale Nautical Charts, Australian Hydrographic Service).

The seabed directly off Port Melville drops steeply to greater than 40 mCD² water depth, making it a good port location in this respect. Water depth along the wharf front where ships berth is -12 to -14 mCD (see Figure 1-2).

² mCD – metres relative to Chart Datum; in this case Mean Sea Level.

Waves

Table 3-2 outlines the estimated wave climate. Wave loads on marine structures were calculated using appropriate high order (non-linear) wave theories including Stream Function and Stokes Theory approximations, and current loads from Morrison’s equation. In the absence of more detailed information, the maximum wave height (Hmax) was calculated as 1.7*Hs in accordance with AS 4997.

It is anticipated the majority of waves are wind generated, arriving at the wharf from either the southwest or northwest. These wave cases would effectively represent an incident wave angle perpendicular to the berthing line of the wharf facility for the southwest approach, and parallel to the berthing line for the northwest approach. Based on the wind speeds (see *Wind* section below), no significant wind-driven sea is anticipated.

The level of inundation to the site during cyclonic conditions and storm surge are not known.

Table 3-2. Wave climate

Wave Condition	Significant Wave Height Hs (m)	Wave Period Tp (s)
<i>Operational (ambient) conditions</i>		
SW approach	0.3 m	3 to 4 second peak
NW approach	0.3 m	3 to 4 second peak
<i>Cyclonic (extreme) conditions</i>		
SW approach	0.7 m	5 to 6 second peak
NW approach	0.7 m	5 to 6 second peak

Wind

Wind loadings determined for the wharf are given in These were calculated in accordance with AS 1170.2 – *Wind Design* using the parameters in Table 3-4.

Table 3-3. Wind loadings

Wind Condition	Period and Height	Velocity
Operational wind velocity	30 sec average at 10 m elevation and 50 years return period	20 m/s
Extreme wind velocity	30 sec average at 10 m elevation and 50 years return period	55 m/s

Table 3-4. Wind parameters

Parameter	Value
Region	C
Terrain Category	2
Importance Level	2
Average Recurrence Interval Ultimate Limit State	50 years
V _{R,U(cyclonic)}	52 m/s (FC =1.05)
V _{operational} (Maintenance will cease at this wind speed)	20m/s
V _{Mooring}	20 m/s (30 sec gust)

Wind Direction Multiplier M_D	1.0
Topographical Multiplier M_T	1.0
Shielding Multiplier M_S	1.0

Tidal Currents

The Apsley Strait is macro-tidal, experiencing a large tidal range and very strong tidal currents, with the flood tide running south, and the ebb tide running north. The tidal range relative to the chart datum at St Asaph Bay is outlined in Table 3-5 below.

Tidal current velocity was observed on site by Maritime Engineers Pty. Ltd. during spring tide (i.e. maximum tidal flow), approximately 1-2 hours after high water (Maritime Engineers 2013). Several measurements were taken in the near shore region and found to be about approximately 2.5 - 3.5 knots. For the purpose of design, a worst case of 5.5 knots has been selected to account for potential uncertainties in the measurements.

Previous reporting by other entities indicate that tidal currents are strong through the straight with neap tide measurements during preliminary surveys indicating 4.7 – 6.4 knots off Barlow Point; with maximums of approximately 8.9 knots noted mid-channel (SKM/Seatech Consultants 2003).

Table 3-5. Tidal range for the wharf based on St Asaph Bay Chart Datum
(taken from the Australian National Tide Tables 2008)

Water Level	CD (m)
Highest Astronomical Tide	+4.3 m
Mean High Water Spring	+4.0 m
Mean High Water Neap	+3.0 m
Mean Sea Level	+2.3 m
Mean Low Water Neap	+1.6 m
Mean Low Water Spring	+0.6 m
Lowest Astronomical Tide	0.0 m

3.4 Landform, Habitats, Flora and Fauna

The Tiwi Islands are identified as a *Site of Conservation Significance* by the Northern Territory Government, with details provided in the *Tiwi Islands Sites of Conservation Significance Information Sheet* (Harrison et al. 2009), available on the DLRM website. Relevant habitat, fauna and flora information from this Information Sheet is included below. Relevant information taken from the *Tiwi Islands Natural Resource Management Strategy*, developed by the Tiwi Land Council (2004) is also provided below.

More specific information for the Port Melville locality provided below is based on:

- Database searches using the *NT NRM Internet Search Tool* (<http://www.ntinfolnet.org.au/>)
- *NT Flora and Fauna Atlas* maintained by the NT Department of Land Resource Management (DLRM)
- Local knowledge of EcOz Environmental Scientists experienced in flora and fauna surveys on the Tiwi Islands
- A site visit by EcOz Environmental Scientists on 13th February 2014

3.4.1 Landform and Habitats

The Tiwi Islands are dominated by tall *Eucalypt* forests on sandy and lateritic plains and rises (Harrison et al. 2009). Rainforest patches occur in association with perennial freshwater springs and the coast is lined with long beaches and rocky headlands, interspersed with mangrove-lined creeks and rivers.

At Port Melville, the land-side port area is located on an elevated lateritic platform; around 5 to 10 mAHD. This platform extends inland and also northwest of the port to form Barlow Point. The main port operational laydown areas slope gently southwest towards the shoreline (towards the wharf) and also southeast towards a small tidal inlet. The seaward edge of the platform slopes very steeply into the Apsley Strait (Figure 1-2). Figure 3-1 shows the habitats surrounding Port Melville. Surrounding native vegetation predominant on the elevated lateritic platform and extending out to Barlow Point, is mainly *Eucalyptus miniata*, *Eucalyptus nesophila*, *Eucalyptus tetradonta* open forest. Mangroves and mud flats occur along the shoreline north and south of the port and associated with a small tidal creek located immediately south of the port. More extensive areas of mangrove and mud flats are located around 1.5 km south of the port, associated with the mouth of a larger tidal inlet; Arrimu Creek (see Figure 1-1). Scattered small patches of monsoon forest exist along the interface between the mangroves and *Eucalypt* forest.

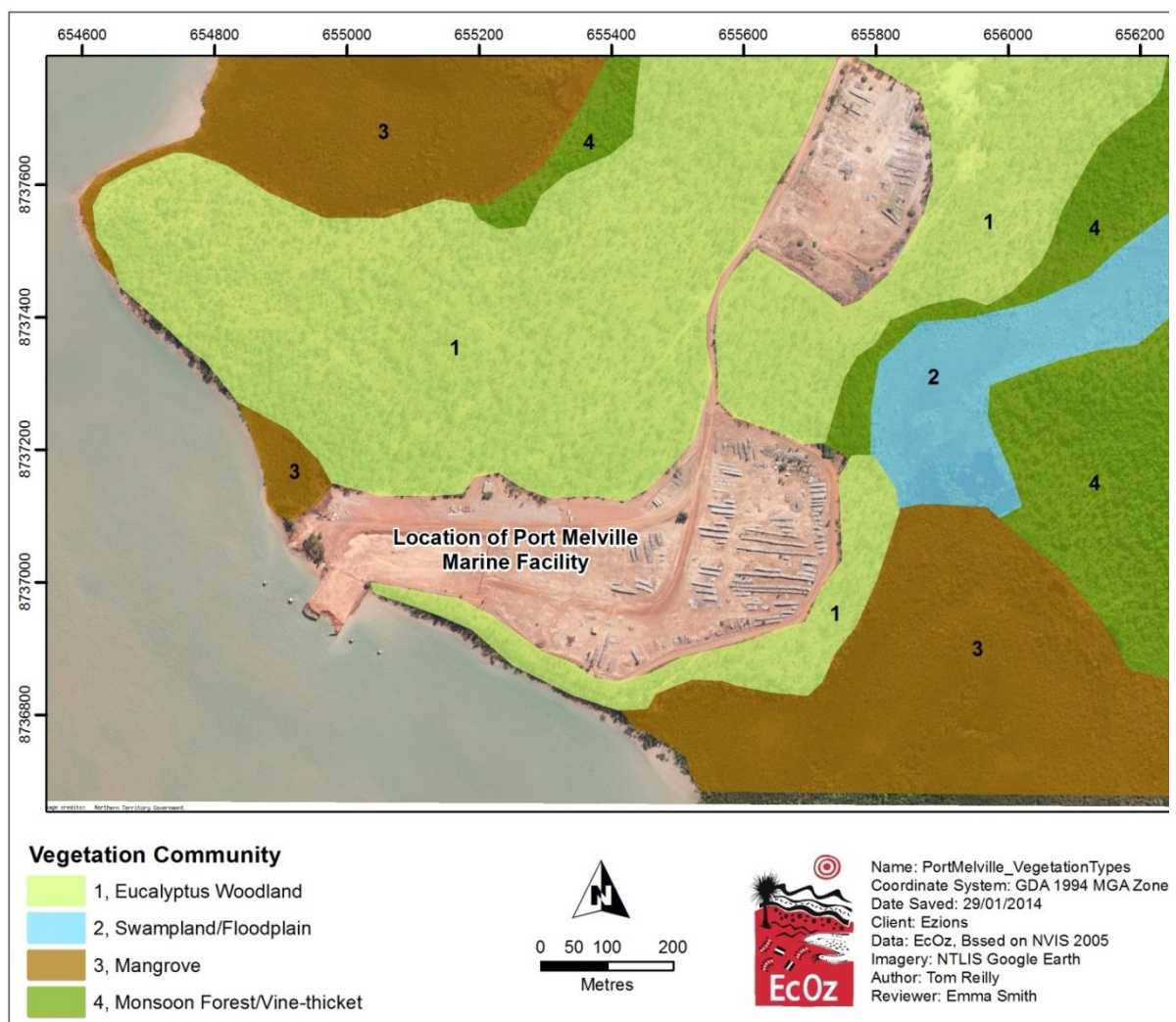


Figure 3-1. Map of habitats surrounding Port Melville
Mapped by EcOz from aerial imagery and knowledge of the site

3.4.2 Soils

In 2003, geotechnical consultant Douglas Partners carried out geotechnical testing of borehole samples for the previous (now-ruined) wharf (Douglas Partners 2003). Further geotechnical investigations for the on-shore area of the new wharf were completed by GALT Geotechnics (Galt 2013).

Borehole logs provided in Galt 2013 show the on-shore areas have a soil surface consisting of ferricrete gravel underlain by moist clayey sand, sandy clay and clay down to a depth of around 23 m. These are mottled red/brown/grey/yellow/orange/purple with medium to high plasticity. At depths below 23 m, the substrate changes abruptly to moist dark grey clay with high plasticity.

Based on visual observation of the sediment core photos provided in Galt 2013, the substrate of the on-shore areas appears typical of a lateritic soil profile, and is well oxidised down to 23 m depth (EcOz observation). Acid sulphate soil risk associated with this area of the port is considered low; given the area is an elevated lateritic platform, well above the highest tide mark where the pre-existing vegetation would have been *Eucalypt* forest. The nearest areas of mangrove, where acid sulphate soil risk would be high, are shown in Figure 3-1. These areas will not be disturbed by port development or operations.

3.4.3 Significant Flora and Fauna

Partly because of their isolation and because they occupy a climatic extreme (high rainfall), the Tiwi Islands support many flora and fauna species not recorded anywhere else in the Northern Territory (or in the world), as well as a number of range-restricted species (Harrison et al. 2009). The isolation of the Tiwi Islands also provides some protection for plants and animals from threatening processes affecting many habitats on the Northern Territory mainland (such as Cane Toads and a number of invasive exotic weeds).

Table 3-6 lists the species potentially in the region of Port Melville that are listed as threatened under the NT *Territory Parks and Wildlife Conservation Act* (TPWC) and/or Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC). Note this list was derived using the NT *NRM Internet Search Tool* (<http://www.ntinonet.org.au/>) that includes all species within a large grid cell (50 km x 50 km), so many species may not be present in the immediate vicinity of the port.

A total of 15 plant species were recorded as potentially within the Port Melville region (Table 3-6). Of these, three have been recorded in the *NT Flora and Fauna Atlas* as observed within 3 km of the port facility; *Cycas armstrongii*, *Luisia teretifolia*, and *Mitrella tiwiensis*. None of these records were within the existing port facility area.

At a broad scale, the Tiwi Islands coastline supports important nesting sites for marine turtles, internationally significant seabird rookeries, and some major aggregations of migratory shorebirds (Harrison et al. 2009).

Sandy beaches on the Tiwi Islands, particularly the west coast of Bathurst Island and the north coast of Melville Island, are highly important for marine turtle nesting. Nesting is dominated by Flatback and Olive Ridley Turtles, but Green Turtles and Hawksbill Turtles also nest on Tiwi beaches.

Threatened fauna species potentially within the Port Melville region includes 9 mammal, 8 bird, 5 turtle, 2 lizard and 1 snail species (Table 3-6).

Turtles are not known (or predicted) to nest along the Apsley Strait, based on information presented in Chatto and Baker (2005). It is however possible they may use the strait for transit between feeding sites and nesting beaches. The nearest important turtle nesting beaches to the port occur around St Asaph Bay and the northwest tip of Melville Island.

Dugongs are not known to use the Apsley Strait for feeding or breeding, since their main food source, seagrass, is not extensive within the strait (see *Significant Sites for Dugong and Seagrass* map in the *Tiwi Islands Regional Natural Resource Management Strategy*; Tiwi Land Council 2004). The nearest significant areas of seagrass occur along the northern coastline of Melville Island. Dugongs may however, be observed within Apsley Strait on transit between areas.

Important seabird and shorebird colonies do not occur in the immediate vicinity of Port Melville, therefore no colonies will be impacted by light or noise from Port operations. The nearest *seabird* colony is an internationally significant colony (>1% global population) of Crested Terns located on Seagull Island. This island lies approximately 5 km off the northwest tip of Melville Island (Cape Van Diemen) and around 30 km north-west of Port Melville. The next nearest seabird colonies are two nationally significant colonies located on the eastern side of Cape Van Diemen and north-western tip of Bathurst Island. Vessels when entering and exiting the Apsley Strait, will be restricted to the well-marked shipping channel and will remain well away (at least 9 km) from any of these colonies. These seabird colonies will therefore not be impacted by noise or light from vessels.

The nearest important *shorebird* populations to Port Melville are located near the southern entrance of the Apsley Strait on the extensive areas of sand and mud that become exposed at low tide in the vicinity of Medina Inlet and around Buchanan Island. All barges travelling to and from Port Melville using the southern entrance to the Apsley Strait will remain within the well-marked navigation channel within Medina Inlet. This channel is a well-established route, already currently used by barges servicing Tiwi Island communities. Additionally, all barge movements will be restricted to daylight hours.

Given the low risk, a specific protocol for managing light and noise impacts on turtle nesting areas and seabird and shorebird colonies is not considered necessary.

Given the above distribution of turtle nesting beaches, dugong seagrass feeding/breeding areas, and seabird colonies, the risk of significant impacts from port operations and ship movements within Apsley Strait is considered to be low.

The presence of other large marine fauna such as dolphins, sharks and rays, and their use of the Apsley Strait is not well-known. It is assumed however, that at least periodically, these marine fauna would be present in the strait.

Estuarine Crocodiles are present in Apsley Strait; however it would be unusual for these animals to remain in the path of a large vessel and strikes are rare.

It is unlikely that any whale species would enter the strait.

In regards to terrestrial fauna, the *Eucalyptus* woodland/forest that surrounds the landside portion of Port Melville may potentially contain several threatened fauna species (such as Red Goshawk, Partridge Pigeon, Hooded Robin, Masked Owl, Brush-tailed Rabbit Rat, Northern Brush-tailed Phascogale and Butlers Dunnart). Actual records of species presence listed in the NT Flora and Fauna Atlas databases however, indicate that only one threatened species, the Partridge Pigeon *Geophaps smithii*, has previously been recorded in the vicinity of the port (within 3 km).

Clearing of vegetation and or land adjacent to the Port is to be authorised by NTPM Chief Operating Officer with consultation from associated NT EPA and TIWI Island Governing bodies before any works is to commence.

Table 3-6. Threatened species potentially in the region of Port Melville
 (From NT NRM Infonet Search Tool <http://www.ntinfonet.org.au/>)

Group	Common Name	Scientific Name	NT Status	National Status
Cycad	Armstrong's Cycad	<i>Cycas armstrongii</i>	VU	
Cycad	Armstrong's Cycad	<i>Cycas armstrongii x maconochiei</i>	VU	
Flowering Plant	Mitrella	<i>Mitrella tiwiensis</i>	VU	VU
Flowering Plant	Xylopia	<i>Xylopia monosperma</i>	EN	EN
Flowering Plant	Native Walnut	<i>Endiandra limnophila</i>	VU	
Flowering Plant	Typhonium	<i>Typhonium mirabile</i>	EN	EN
Flowering Plant	Burmannia	<i>Burmannia sp. Bathurst Island</i>	EN	EN
Flowering Plant	Narrow Leaf Climbing Pandan	<i>Freycinetia excelsa</i>	VU	
Flowering Plant	Climbing Pandan	<i>Freycinetia percostata</i>	VU	
Flowering Plant	Luisia Orchid	<i>Luisia corrugata</i>	VU	
Flowering Plant	Epiphytic Orchid	<i>Thrixspermum congestum</i>	VU	
Flowering Plant	Mapania	<i>Mapania macrocephala</i>	VU	
Flowering Plant	Dendromyza	<i>Dendromyza reinwardtiana</i>	VU	
Flowering Plant	Blue Quandong	<i>Elaeocarpus miegei</i>	CR	
Flowering Plant	Tarennoidea	<i>Tarennoidea wallichii</i>	EN	
Snails	Land Snail	<i>Trochomorpha melvillensis</i>	VU	EN
Reptiles	Loggerhead Turtle	<i>Caretta caretta</i>	VU	EN
Reptiles	Green Turtle	<i>Chelonia mydas</i>		VU
Reptiles	Hawksbill Turtle	<i>Eretmochelys imbricata</i>	VU	VU
Reptiles	Olive Ridley	<i>Lepidochelys olivacea</i>	VU	EN
Reptiles	Flatback Turtle	<i>Natator depressus</i>		VU
Reptiles	Mertens Water Monitor	<i>Varanus mertensi</i>	VU	
Reptiles	Yellow-spotted Monitor	<i>Varanus panoptes</i>	VU	
Birds	Partridge Pigeon	<i>Geophaps smithii</i>	VU	VU
Birds	Red Goshawk	<i>Erythrotriorchis radiatus</i>	VU	VU
Birds	Greater Sand Plover	<i>Charadrius leschenaultii</i>	VU	VU
Birds	Bar-tailed Godwit	<i>Limosa lapponica</i>	VU	
Birds	Eastern Curlew	<i>Numenius madagascariensis</i>	VU	
Birds	Masked Owl (Tiwi Islands)	<i>Tyto novaehollandiae melvillensis</i>	EN	EN
Birds	Hooded Robin	<i>Melanodryas cucullata</i>	CR/-	EN/-
Birds	Hooded Robin (Tiwi)	<i>Melanodryas cucullata melvillensis</i>	CR	EN
Mammals	Northern Brush-tailed Phascogale	<i>Phascogale pirata</i>	EN	VU
Mammals	Butlers Dunnart	<i>Sminthopsis butleri</i>	VU	VU
Mammals	Common Brushtail Possum	<i>Trichosurus vulpecula</i>	EN/-	
Mammals	Brush-tailed Rabbit-rat	<i>Conilurus penicillatus</i>	EN	VU
Mammals	Black-footed Tree-rat	<i>Mesembriomys gouldii</i>	VU	
Mammals	Water Mouse	<i>Xeromys myoides</i>		VU
Mammals	Pale Field-rat	<i>Rattus tunneyi</i>	VU	
Mammals	Blue Whale	<i>Balaenoptera musculus</i>	DD	EN
Mammals	Humpback Whale	<i>Megaptera novaeangliae</i>		VU

CR = Critically Endangered; EN = Endangered; VU = Vulnerable; CR/- = one or more subspecies Critically Endangered; EN/- = one or more subspecies Endangered; DD = Data Deficient

3.4.4 Weeds

The spread of weeds is currently considered the greatest threatening process in the Tiwi's, both from an economic and ecological perspective (*Tiwi Islands Regional Natural Resource Management Strategy*; Tiwi Land Council 2004). Landholders must control or eradicate weeds on their land that are classified as *Weeds of National Significance* and/or declared under the *NT Weeds Management Act* (depending on their classification as either Class A, B, or C weeds).

Grassy weeds present the highest risk for weed spread and potential environmental damage across the islands; particularly in relation to their potential to change fire regimes. Grassy weeds of particular concern are Mission Grass (*Pennisetum polystachion*), Guinea Grass (*Panicum maximum syn. Urochloa maxima*) and Gamba Grass (*Andropogon gayanus*). Until recently, these grasses have been confined to communities, outstations and camping areas. In recent years, there has been increasing spread of Mission Grass outside communities along roadsides and within plantations, and small isolated outbreaks of Gamba Grass.

Other weeds of particular concern for the Tiwi Islands are Mimosa (*Mimosa pigra*), Fringed Spider Plant (*Cleome rutidosperma*), Lantana (*Lantana camara*), Rubber Vine (*Cryptostegia grandiflora*) and Bellyache Bush (*Jatropha gossypifolia*). Spread of the major plantation species *Acacia mangium* away from plantations is also of concern.

The Commonwealth Government Department of the Environment (DoE) website lists and provides information on the current *Weeds of National Significance*, *National Environmental Alert Weeds* (plants that are in the early stages of establishment and have the potential to become a significant threat to biodiversity) and *Sleeper Weeds* (exotic plants that have established small wild populations and appear benign for many years, but which may suddenly spread rapidly following a natural event or change in land management).

In regards to weeds that may potentially spread to Port Melville on international ships, the DAWRDAWR website provides an *Exotic Weeds Watch List* with information on the identification and characteristics of these weeds.

3.4.5 Feral Animals and Marine Pests

Feral animals present on the Tiwi Islands include buffalo, cattle, horses, pigs, dogs, cats and rats. Exotic ants have been recorded, with at least six species identified on the Islands; the most concerning being the African Big-headed Ant (*Pheidole megacephala*), Ginger Ant (*Solenopsis geminata*) and Singapore Ant (*Monomorium destructor*).

Pigs, cats and exotic ants are considered as significant threats to natural resource values (Tiwi Land Council 2004).

Pigs occur on Bathurst Island, where their presence has caused widespread degradation. On Melville Island, their occurrence appears limited to a small part of the northwest coast.

The extent of cat populations is not known.

Concentrations of buffalo mainly occur in the south and east of Melville Island.

African Big-headed Ants are known to be one of the world's worst invasive ants and can have major ecological impacts on rainforests. These ants have been recorded in large numbers at Pirlangimpi near to Port Melville, as well as a number of other communities across the Tiwi Islands. Control efforts however; appear to have eradicated these ants, which are currently not detected within these communities.

Ginger Ants and Singapore Ants are known to occur in many Tiwi communities.

The yellow crazy ant (*Anoplolepis gracilipes*) is known for its high impact on rainforests, although it has not yet been recorded on the Tiwi Islands, it is considered a high risk of being introduced.

The introduction of Cane Toads to the Tiwi Islands from the Northern Territory mainland presents one of the greatest threats to the Island's biodiversity. Cane Toads have caused widespread reductions in some species on the mainland. Evidence suggests that Northern Quolls, goannas, frogs, snakes, fish, Freshwater Crocodiles and egrets are most affected. The Tiwi Land Council developed a Cane Toad Action Plan in March 2001 to prevent the spread of Cane Toads to the Islands. This plan included

actions such as a wash-down bay at the Darwin departure point for Tiwi Barge Services, education, information brochures and signage to warn ships, boats and visitors to the Islands of Cane Toad prevention measures, and implementation of the Tiwi Islands Quarantine Procedures (see *Tiwi Islands Quarantine* on Tiwi Land Council website).

Marine pest monitoring activities undertaken by the NT Government Aquatic Biosecurity Unit commenced at Port Melville in August 2004, with the support of Great Southern Plantations and the Tiwi Marine Rangers (Maher et al. 2010; Beatty et al. 2011). The marine fouling community was sampled using settlement collectors, which were visually inspected monthly and periodically collected for species identification. Monitoring ceased in August 2010 due to termination of shipping activities in the area. This monitoring will recommence with shipping operations at Port Melville, as detailed in Section 6 *Biosecurity management*. During the August 2004 to August 2010 monitoring period, no exotic marine pests were detected at Port Melville.

The National Introduced Marine Pest Information System (NIMPIS) is utilised for identification of non-indigenous marine species. NIMPIS provides environmental, monitoring and species-specific information relevant to the prevention and control of non-indigenous marine species.

One nearby significant example of an exotic marine pest outbreak is that of the black-striped mussel (*Mytilopsis salleri*) detected in Darwin's Cullen Bay Marina in high densities and also in Tipperary Waters Marina and Frances Bay Mooring Basin. This mussel presented a major economic and environmental threat. Fortunately, early detection of the black-striped mussel led to a swift response by the NT Government and within 28 days the mussel had been treated and successfully eradicated.

One factor to consider regarding feral animal management is that buffalo and pigs are considered as having high food value to the Tiwi people, and are also valued for their contribution to tourism through trophy hunting.

3.5 Heritage, Cultural and Recreational Values and Commercial Interests

The Tiwi Land Council, who represents the traditional owners of the Tiwi Islands, owns the land on which the port is situated. The Tiwi Land Council leases this land to Port Melville Pty. Ltd. who sub-lease it to the port operators NTPM.

Meetings and discussions between NTPM and the Tiwi Land Council indicate there are no sacred or significant sites within or in close proximity to the port. If any artefacts, remains or indications of a sacred site are uncovered at or around the port, works will immediately stop in the area and the area cordoned off until advice is sought from the Tiwi Land Council.

The *Australian Heritage Database* (maintained by the Commonwealth Government Department of the Environment) lists one place on the *Register of the National Estate* in the vicinity of Port Melville; Fort Dundas. The remains of this fort are located on Barlow Point, approximately 600 m north-west of the port, although remains of the settlement associated with Fort Dundas have been found closer to the port area (see Fredericksen 2003).

Fort Dundas is significant as the remains of the first attempted European Settlement of the Tiwi Islands and the first attempted European and military settlement anywhere in northern Australia. It was established in 1824 as part of Britain's attempt to secure the sea lanes east of the newly established British trading post of Singapore against Dutch rivalry. The Fort's population of marines, convicts, ships' crews and a few civilians and families never rose much higher than 100 people. The settlement suffered from tropical sickness and isolation: access to the fort up the treacherous Apsley Strait discouraged traders and shipping. In addition, the settlers suffered sustained hostilities from the Tiwi people, who resisted the British colonisation of the island. These factors eventually led to

Operations Environmental Management Plan (OEMP)

the abandonment of the settlement in 1829. The Tiwi people consider the British withdrawal to be the direct result of Tiwi victory over the colonisers, which in fact, drove them from the island.

Fort Dundas buildings included a stockade 80m x 50m with gun emplacements, a wharf, commissariat store, hospital, barracks, gardens and at least twenty houses. Today the site is ruined and overgrown. Many features which have left no trace on the ground are known only from an 1827 map. Most of the remains are footings, terraces, ground irregularities and rubble. Only a few sections of walling have survived to any height. There is however, likely to be much archaeological information still on site.

In 2003, an archaeological survey (Fredericksen 2003) was undertaken around the site of Port Melville, at the request of the Tiwi Land Council. This was done because of concerns the port may be impacting the remains of the Fort Dundas settlement; i.e. the town associated with Fort Dundas, which extends well beyond the Fort itself. The survey found 13 features in the vicinity of the port, including the remains of the standing walls of a building and possible grave sites. Recommendations were made on ways to ensure that port operations did not impact on these features, including maintaining at least a 100 m buffer between areas to be cleared and historical remains.

Recreational fishing and boating is undertaken in the Apsley Strait by local Tiwi Islanders, people from Darwin, the Top End and also inter-state visitors. Recreational fishing permits are required from the Tiwi Land Council prior to fishing in waters and inlets around the Tiwi Islands.

Fishing is also undertaken in the Apsley Strait by commercial tourist fishing ventures run either locally from the Tiwi Islands or from Darwin.

The Apsley Strait is not commonly used by commercial fishing operations for the commercial supply of fish.

The community of Pirlangimpi (Garden Point) is located 1.5 km north of the port. Vessels travelling to and from the port would be visible from the community.

Other commercial shipping companies operating a barge service between Darwin and Pirlangimpi and Port Melville via the Apsley Strait include Sea Link (formerly Tiwi Barge Services), Perkins and Shorelands.

3.6 Air Quality

The only existing source of dust prior to clearing for the port would have been the unsealed road located north of the port facility linking Pirlangimpi to the rest of Melville Island.

The occurrence of bushfires in the natural bushland surrounding the port are also a pre-existing source of airborne particles, as well as dust from areas where vegetative cover has been burnt.

The only known pre-existing sources of odour, hydrocarbon or other chemical emissions in the vicinity of the port is from the Pirlangimpi waste disposal site, located immediately north of the lease boundary.

Seasonal patterns of rainfall, and wind speed and direction, influence the extent of dust. These are outlined in Section 3.1 Climate.

4 Environmental Risk Assessment

4.1 Environmental Hazards and Impacts

Table 4-1 outlines the identified environmental aspects/hazards and related potential impacts for Port Melville.

4.2 Risk Assessment

This risk assessment methodologies include:

- AS/NZS ISO 31000:2009: *Risk management – Principles and Guidelines (Standard)*
- HB 203:2006: *Environmental risk management – Principles and process (Guide)*
- HB 158:2010: *Delivering assurance based on ISO 31000:2009 – Risk management – Principles and Guidelines (Guide)*

4.2.1 Risk Assessment Methods

Risk is defined as the chance of something happening that will have a negative impact on objectives; in this case, to minimise any impacts from Port Melville operations on the environment, cultural values and local community.

The first step in risk assessment is to identify the hazards; defined as anything that will cause harm or prevent the achievement of objectives. The hazards and their potential impacts identified for Port Melville are given above in Table 4-1.

The “inherent” risk of each hazard is assessed for *likelihood* and *consequence*, based on the rankings provided in Table 4-2 and Table 4-3, and a risk ranking is assigned based on the matrix in Table 4-4 *Table*. A second (residual) risk ranking is also determined after consideration of Port Melville’s Environmental Management Framework (see Section 5 below) and Environmental Management Actions (see Section 6 below).

Table 4-5 presents the risk assessment results.

Table 4-1. Environmental aspects/hazards and potential impacts

Aspect/Hazards	Potential Impacts
Biosecurity: Introduction of weeds, pests or diseases to Port Melville and the Tiwi Islands on vessels and in cargo and goods transported from domestic and international locations Release of pests in ballast water into marine environment	Impacts on local flora and fauna; both marine and terrestrial Impacts to local agricultural industries Impacts on tourism and other local industries Disease spread to workers and local people
Fuel handling and storage: Fuel spills during vessel re-fuelling Fuel spills during vehicle/machinery refuelling Fuel leaks from storage tanks Oil spills from vessels	Contamination of soils Contamination of the marine environment and impacts on marine organisms Contamination of nearby waterways (including groundwater) and impacts on aquatic organisms Health and safety impacts on workers
Hazardous materials handling and storage: Spills during use Leaks while in on-site storage Leaks from vessels Inappropriate handling	Contamination of soils Contamination of the marine environment and impacts on marine organisms Contamination of nearby waterways (including groundwater) and impacts on aquatic organisms Health and safety impacts on workers
Wastewater: Leakage and/or inadequate performance of wastewater treatment and disposal systems Introduction of weeds, pests or diseases to Port Melville and the Tiwi Islands from wash-down wastewater	Contamination of soils Contamination of downstream waterways and impacts on aquatic organisms Contamination of water bore supply See also hazards/impacts as for <i>Biosecurity</i> above

Operations Environmental Management Plan (OEMP)

Waste: Domestic waste disposed of inappropriately onsite Domestic waste blown into nearby environments Waste from vessels released into nearby environment	Impacts on local flora and fauna Contamination of marine environment and impacts on marine organisms Contamination of nearby waterways and impacts on aquatic organisms See also hazards/impacts as for <i>Biosecurity</i> above
Erosion and sedimentation: Erosion of bare-soil areas of the port including laydown areas, roads, banks and drains Run-off of sediment-laden water into marine environment or other nearby waterways	Impacts on local flora and fauna Contamination of nearby waterways and impacts on aquatic organisms Damage to operational areas of the port requiring expensive repair and maintenance
Weeds: Introduction of new weeds from Darwin or international locations to Port Melville and the Tiwi Islands Spread of existing weeds to other parts of the Tiwi Islands and to other ports	Impacts on local flora and fauna Impacts to local agricultural industries
Flora and Fauna: Vessels striking marine fauna such as turtles and dugongs Excessive wash from vessels in Apsley Strait Vehicles striking animals on the road Clearing of native vegetation	Impacts on marine fauna Impacts on terrestrial fauna Erosion of banks and damage to shoreline environments Loss of habitat for native fauna
Air Quality: Dust from vehicle and machinery movements Pollution from vehicles and machinery	Health and safety impacts on workers Impacts on local flora and fauna
Noise and Light: Noise and light disturbances during night-time operations	Impacts on local flora and fauna (e.g. turtle nesting areas)
Biting Insects: Breeding of biting insects in standing pools of water created by port infrastructure and operations Introduction of exotic mosquitos on international ships	Health and safety impacts on workers Introduction and spread of diseases to workers and local community
Sacred, cultural and heritage sites: Disturbance or damage to sacred, cultural or heritage sites	Impacts on local communities and cultural and historical heritage

Table 4-2. Consequence rankings for risk assessment

Ranking		Explanation
1	Insignificant	No measurable impact on the environment No injuries Low-nil financial loss
2	Minor	Minor, temporary environmental impact No publicity likely and no stakeholder concerns First aid treatment required Medium-low financial loss
3	Moderate	Substantial temporary or permanent minor, localised environmental damage Stakeholder enquires (this may include government, unions or public) Medical attention required High-medium financial loss
4	Major	Substantial or permanent environmental damage Prosecution possible Loss of company credibility and high stakeholder interest Permanent injuries High financial loss
5	Catastrophic	Widespread severe and permanent Environmental damage Major stakeholder and media interest Prosecution likely Permanent injury or death Extreme financial loss

Operations Environmental Management Plan (OEMP)

Table 4-3. Likelihood rankings for risk assessment

Ranking		Explanation	Likelihood %
A	Rare	Practically impossible, will only occur in exceptional circumstances. Has never occurred in the industry.	0-1%
B	Unlikely	Could occur at some time but highly unlikely. Has occurred in the industry previously.	1-10%
C	Moderate	Might occur at some time. Has occurred in associated companies previously.	11-50%
D	Likely	Known to occur or will probably occur in most circumstances. Has occurred several times/year in associated companies.	51-90%
E	Almost Certain	Common or repeating occurrence. Is expected to occur several times/year in any associated business.	91-100%

Table 4-4. Risk ranking matrix

Consequence						
		1	2	3	4	5
Likelihood	A	1	3	6	10	15
	B	2	5	9	14	19
	C	4	8	13	18	22
	D	7	12	17	21	24
	E	11	16	20	23	25

Red = extreme risk intolerable
Purple = high risk intolerable to tolerable
Yellow = medium risk tolerable to acceptable
Green = low risk acceptable

4.2.2 Risk Assessment Results

Aspects/hazards of highest inherent risk (i.e. with no mitigation/control measures) are biosecurity and fuel handling and storage. These and other risks associated with Port Melville’s operations are presented in Table 4-5 below.

Table4-5. Risk assessment results

Aspect/Hazard	Potential Impacts	Initial Risk C=Consequence L=Likelihood RS=Risk Score			Management Measures	Residual Risk C=Consequence L=Likelihood RS= Risk Score		
		C	L	RS		C	L	RS
<p>Biosecurity: Introduction of weeds, pests or diseases to Port Melville and the Tiwi Islands on vessels/cargo from domestic and international locations Release of pests in ballast water into marine environment (Note: The assessment of this risk has been based on future operations, when transfer/storage of international cargo and waste is planned to occur)</p>	<p>Impacts on local flora and fauna, both marine and terrestrial Impacts to local agricultural industries Impacts on tourism and other local industries Disease spread to workers and local people</p>	4	C	18	See Section 6.1 <i>Biosecurity management.</i>	3	B	9
<p>Fuel handling and storage: Fuel spills during vessel re-fuelling Fuel spills during vehicle/machinery refuelling Fuel leaks from storage tanks Oil spills from vessels</p>	<p>Contamination of soils Contamination of the marine environment and impacts on marine organisms Contamination of nearby waterways (including groundwater) and impacts on aquatic organisms Health and safety impacts on workers</p>	4	C	18	See Section 6.2 <i>Fuel storage and handling management</i>	3	B	9

Operations Environmental Management Plan (OEMP)

Aspect/Hazard	Potential Impacts	Initial Risk C=Consequence L=Likelihood RS=Risk Score			Management Measures	Residual Risk C=Consequence L=Likelihood RS= Risk Score		
		C	L	RS		C	L	RS
Groundwater extraction: Unsustainable extraction rates	Potential effect on nearby town water supply (Blue Creek spring) Potential saline intrusion into aquifer	3	C	13	See Section 6.5 <i>Groundwater management</i>	3	B	9
Hazardous materials handling and storage: Spills during use Leaks while in on-site storage Leaks from vessels Inappropriate handling	Contamination of soils Contamination of the marine environment and impacts on marine organisms Contamination of nearby waterways (including groundwater) and impacts on aquatic organisms Health and safety impacts on workers	3	C	13	See Section 6.3 <i>Hazardous materials management</i>	3	B	9
Waste disposal: Domestic waste disposed of inappropriately onsite Domestic waste blown into nearby environments Waste from vessels released into nearby environment	Impacts on local flora and fauna Contamination of marine environment and impacts on marine organisms Contamination of nearby waterways and impacts on aquatic organisms See also Hazards/impacts as for <i>Biosecurity</i> above	3	C	13	See Section 6.7 <i>Waste management.</i>	3	B	9

Operations Environmental Management Plan (OEMP)

Aspect/Hazard	Potential Impacts	Initial Risk C=Consequence L=Likelihood RS=Risk Score			Management Measures	Residual Risk C=Consequence L=Likelihood RS= Risk Score		
		C	L	RS		C	L	RS
Erosion and sedimentation: Erosion of bare-soil areas of the port including laydown areas, roads, banks and drains Run-off of sediment-laden water into marine environment and nearby waterways	Impacts on local flora and fauna Impacts on marine and/or freshwater environments and organisms by smothering and/or turbidity impacts Visual impacts (i.e. public amenity) of sediment plumes if turbid waters are released into Apsley Strait Damage to operational areas of the port requiring expensive repair and maintenance	3	C	13	See Section 6.8 <i>Erosion management</i> .	2	B	5
Flora and fauna: Vessels striking marine fauna such as turtles and dugongs Noise and light disturbances during night-time operations Excessive wash from vessels in Apsley Strait Vehicles striking animals on the road Clearing of native vegetation	Impacts on marine fauna – injury/mortality (i.e. boat strike) and/or disturbance (e.g. feeding behaviour, turtle nesting) Impacts on terrestrial fauna Erosion of banks and damage to shoreline environments Loss of habitat for native fauna	3	C	13	See Section 6.10 <i>Terrestrial flora and fauna management</i> and Section 6.11 <i>Marine fauna management</i>	3	B	9
Wastewater: Leakage of septic systems Leachate from woodchip stockpiles	Contamination of soils and nearby marine and/or freshwater environments Contamination of water bore supply See also Hazards/impacts as for <i>Biosecurity</i> above	3	B	9	See Section 6.6 <i>Wastewater management</i>	3	A	6

Operations Environmental Management Plan (OEMP)

Aspect/Hazard	Potential Impacts	Initial Risk C=Consequence L=Likelihood RS=Risk Score			Management Measures	Residual Risk C=Consequence L=Likelihood RS= Risk Score		
		C	L	RS		C	L	RS
Biting Insects: Breeding of biting insects in standing pools of water created by port infrastructure and operations Introduction of exotic mosquitos on international shops	Health and safety impacts on workers Introduction and spread of diseases to workers and local community	3	B	9	See Section 6.15 Biting insect management.	3	A	6
Sacred, cultural and heritage sites: Disturbance or damage to sacred, cultural or heritage sites	Impacts on local communities and cultural and historical heritage	3	B	9	See Section 6.16 <i>Sacred, cultural and heritage site management.</i>	2	B	5
Air Quality: Dust from vehicle and machinery movements Emissions from vehicles and machinery	Health and safety impacts on workers Impacts on local flora and fauna	2	B	5	See Section 6.13 <i>Air quality management.</i>	2	A	3

5 Environmental Management Framework

5.1 Legislative and Regulatory Framework

From an environmental perspective, activities undertaken at Port Melville are governed by a range of Commonwealth and Northern Territory legislation, policies and guidelines, which include the following:

Commonwealth legislation:

- *Aboriginal and Torres Strait Islander Heritage Protection Act 1984*
- *Australian Maritime Safety Authority Act 1990*
- *Coastal Waters (Northern Territory Title) Act 1980*
- *Environment Protection and Biodiversity Conservation Act 1999*
- *Environment Protection and Biodiversity Conservation Regulations 2000*
- *Environment Protection (Sea Dumping) Act 1981*
- *Environment Protection (Sea Dumping) Regulations 1983*
- *Hazardous Waste (Regulation of Exports and Imports) Act 1989*
- *Hazardous Waste (Regulation of Exports and Imports) Regulations 1996*
- *Maritime Transport and Offshore Facilities Security Act 2003*
- *Native Title Act 1993*
- *Ozone Protection and Synthetic Greenhouse Gas Management Act 1989*
- *Ozone Protection and Synthetic Greenhouse Gas Management Regulations 1995*
- *Protection of the Sea (Prevention of Pollution from Ships) Act 1983*
- *Quarantine Act 1908*
- *Quarantine Regulations 2000*

Northern Territory legislation:

- *Aboriginal Land Act*
- *Building Act and regulations*
- *Bushfires Act and regulations*
- *Control of Roads Act*
- *Dangerous Goods Act and regulations*
- *Environmental Assessment Act*
- *Environmental Assessment Administrative Procedures*
- *Environmental Offences and Penalties Act and regulations*
- *Fisheries Act and regulations*
- *Heritage Act 2011 and regulations*
- *Litter Act*
- *Marine Pollution Act and regulations*
- *National Environment Protection Council (NT) Act*
- *Northern Territory Aboriginal Sacred Sites Act and regulations*
- *Planning Act and regulations*
- *Plant Health Act and regulations (NT Quarantine)*
- *Public and Environmental Health Act 2011*
- *Public Health (General Sanitation, Mosquito Prevention, Rat Exclusion and Prevention) Regulations*
- *Soil Conservation and Land Utilisation Act*
- *Territory Parks and Wildlife Conservation Act and Regulations*

- *Transport of Dangerous Goods by Road and Rail (National Uniform Legislation) Act and Regulations*
- *Waste Management and Pollution Control Act and Regulations*
- *Water Act and regulations*
- *Water Supply and Sewerage Services Act*
- *Weeds Management Act 2001 and regulations*
- *Work Health and Safety (National Uniform Legislation) Act 2011 and regulations*

A number of plans, strategies, standards and guidelines are also relevant to operations at Port Melville. These include:

- *Biosecurity Guide to the Major Resources and Energy Sector (DAFF 2013a)*
- *Anti-fouling and in-water cleaning guidelines (DAFF 2013b)*
- *Guidelines for the control and management of ships' biofouling to minimize the transfer of invasive aquatic species (Biofouling Guidelines) (IMO 2011)*
- *Australian Ballast Water Management Requirements (DAFF 2013c)*
- *International Maritime Organisation Conventions and Codes:*
 - *International Convention on the Prevention of Pollution from Ships (MARPOL)*
 - *International Convention on Oil Pollution Preparedness, Response and Co-operation*
 - *International Convention on the Control of Harmful Anti-fouling Systems on Ships*
 - *International Convention for the Control and Management of Ships Ballast Water and Sediments*
 - *International Safety Management (ISM) Code*
 - *International Ship and Port Facility Security (ISPS) Code*
 - *International Maritime Dangerous Goods (IMDG) Code*
 - *Recommendations on the Safe Transport of Dangerous Cargoes and Related Activities in Port Areas*
- *Northern Territory Oil Spill Contingency Plan (DLP 2012)*
- *Northern Territory Marine Pollution Contingency Plan (which supports the National Plan to Combat Pollution of the sea by Oil and other Noxious and Hazardous Substances; AMSA 2007)*
- *Environment Protection (National Pollution Inventory) Objective (NT)*
- *Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC 2000)*
- *Guidelines for Preventing Mosquito Breeding Associated with Construction Practice near Tidal Areas in the NT (DoH 2011)*
- *Tiwi Islands Quarantine Requirements, Tiwi Land Council*
- *Tiwi Island Weed Management Plan, Tiwi Land Council*
- *AS/NZS 4360:2004 Standard on Risk Management*
- *AS 3846 – 2005 The Handling and Transport of Dangerous Cargoes in Port Areas*
- *The Australian Dangerous Goods Code (ADG Code)*

5.2 Environmental Policy, Standards and Procedures

NTPM's *Environmental Policy Statement* is provided in Appendix A. Other policies, standards and procedures supporting environmental management at the port are:

- *Port Melville Biosecurity Management Plan*
- *Vessel Fuel Transfer Procedures*
- *Oil Spill Contingency Plan*
- *Weed Management Plan*
- *Erosion and Sediment Control Plan*
- *Incident Report Form*

- Facility Hygiene, Housekeeping and Pest Control Plan
- Security Procedures
- Port Melville Daily/Weekly Environmental Inspection Checklists
- User Vessels Shipboard Management System
- Melville Island’s Port and Berth General Agreement

These policies, standards and procedures are regularly reviewed and updated, therefore are not reproduced here. Please refer to the latest versions of these documents on the AusGroup Management System (AGMS).

5.3 Roles and Responsibilities

Figure 5-1 shows the hierarchy of roles and responsibilities at Port Melville; noting that NT Port and Marine Pty. Ltd. (NTPM) operates the port trading as Port Melville Port Corporation.

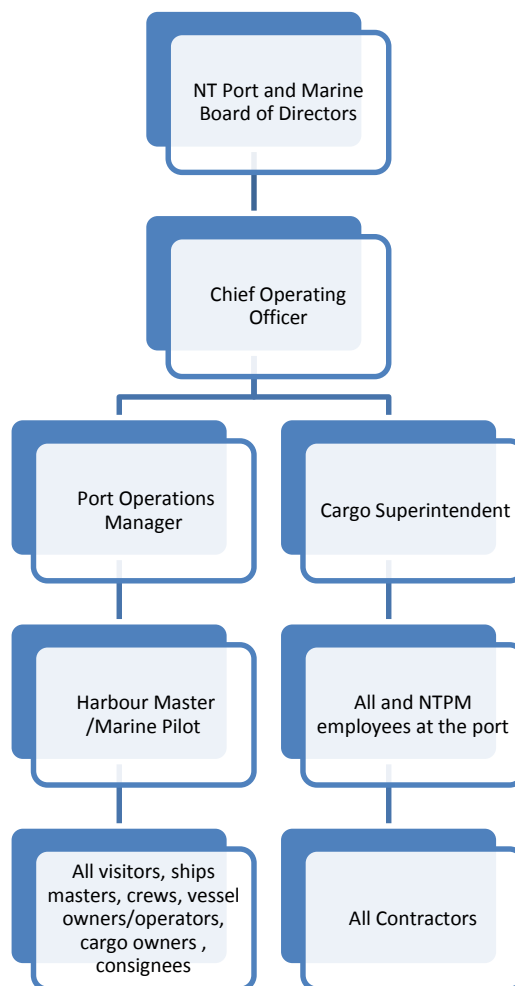


Figure 5-1. Organisational structure

Chief Operating Officer (NTPM)

- Overall responsibility for Port Melville and personnel working at the port employed by NTPM

Operations Environmental Management Plan (OEMP)

- Senior representative for liaison and correspondence with Australian and Northern Territory Government authorities on environmental and biosecurity matters
- Overall responsibility for compliance with Australian and State/Territory regulatory requirements
- Overall responsibility for the formulation and updating of Port Melville's OEMP and its implementation
- Dissemination of the OEMP to all relevant parties and stakeholders
- Overall responsibility for the formulation and updating of Port Melville's Information Handbook, management plans, environmental policies, standards and procedures, and ensuring these are communicated, understood and implemented by all employees, contractors, and marine vessel operators and crews
- Ensure overall compliance with Port Melville's OEMP, management plans, policies, standards and procedures
- Document control, including records of training, OEMP audits and other audits (e.g. of the Biosecurity Management Plan), environmental incident investigations and reviews, and reporting to and correspondence with regulatory authorities
- Ensure OEMP reviews, audits, updates and corrections are conducted as required
- Ensuring training and induction of relevant personnel in following Port Melville's, OEMP, management plans, environmental policies, standards and procedures
- Communicating and assigning staff their legal and other environmental accountabilities
- Assigning authority to staff responsible for ensuring appropriate authorities are informed of any environmental incidents in accordance with legislative requirements.

Port Manager

- On-site responsibility for ensuring environmental compliance with all Territory and Australian Government regulations
- Ensure implementation of all OEMP elements at site
- Ensure all vessel owners, operators, charterers, masters and cargo owners are informed of their environmental and biosecurity requirements well in advance of arrival at Port Melville and also provided with a copy of the Port Melville Information Handbook
- Ensure all NTPM personnel, permanent and casual contractors and regular calling vessel crew members complete the Port Melville induction, which includes modules on environmental management and procedures, as well as biosecurity requirements and procedures
- Maintain records of training and inductions completed by staff, contactors, vessel/cargo owners, crew and others for a minimum of two years for audit purposes
- Must report any environmental or biosecurity non-conformances to the relevant government authority and also the NTPM Chief Operating Officer and appropriate personnel
- Ensure action is taken immediately to rectify any environmental or biosecurity incident; noting that the NT EPA requires serious pollution incidents to be reported within 24 hours and DAWR recommends action to be taken within 48 hours of the incident becoming known

Operations Environmental Management Plan (OEMP)

- Maintain records of any environmental or biosecurity incidents, including details about the incident, to whom and when it was reported, any clean-up and response measures and the effectiveness of these measures
- Submit any environmental incident or biosecurity investigation reports to relevant government authorities with a copy to the Chief Operating Officer
- Ensure that all required environmental and biosecurity related records are created and retained for a minimum of two years and be available for internal and external audit purposes
- Ensure annual OEMP auditing and monitoring schedules are implemented and adhered to
- Ensure environmental inspections, assessments and audits are performed when required and by suitably qualified persons
- Maintain a register of any non-compliances arising from OEMP audits, Biosecurity audits, NT Government or Commonwealth Government inspections or notifications, or any complaints from the public or other stakeholders
- Maintain records of how non-compliances and complaints were addressed and any follow-up actions or communications.
- Address all non-compliances arising from OEMP audits, Biosecurity audits, NT Government or Commonwealth Government inspections or notifications, or any complaints from the public or other stakeholders
- Coordinate the annual review, update and improvement of this OEMP
- Tracking performance against OEMP objectives and targets
- Liaise with Territory and Australian Government agencies as required in regards to environmental compliance
- Liaise with stakeholders (local communities, businesses, interest groups etc.) in regards to environmental issues related to Port Melville
- Responsible for site weed and pest control management, includes monitoring weeds and pests and the implementation of appropriate control/eradication programs as per the Weed Management Plan
- Maintain all records associated with the on-going operation of this OEMP and that processes and procedures are compliant. Records are to be maintained for two years for audit purposes and made available to relevant government authorities on request
- Ensuring all environmental incidents, issues and impacts are identified, reported, documented and reviewed
- Ensuring this OEMP and all management plans, environmental policies, standards and procedures are readily available and communicated to all port staff, contactors and marine crews
- Quality control and document maintenance of all OEMP versions, management plans, environmental policies, standards and procedures
- The generation of new environmental policies, standards and procedures when required
- Conducting, reporting and maintaining results registers of the findings of environmental monitoring programmes

Operations Environmental Management Plan (OEMP)

- Ensuring that all environmental monitoring and measuring equipment is maintained and calibrated
- Maintain records of fuel use and transfer, water use, waste generation and disposal, and hazardous substances and dangerous goods stored and used on site
- Responsible for emergency preparedness and response plans and coordinating actions in the event of an emergency such as an oil spill. This may be in coordination with the Harbour Master.

All NTPM employees at Port Melville

- Compliance with this OEMP and all other port policies, standards, procedures and management plans whilst operating within the port area
- Undertake any training required to comply with this OEMP and all other relevant policies, standards, procedures or management plans
- Report any environmental or biosecurity incidents immediately to the Cargo Superintendent or Port Operations Manager

Woodchip Stevedoring Manager/Supervisor

- Responsible for woodchip operations, and in conjunction with the Cargo Superintendent, in undertaking the required environmental and biosecurity procedures
- Responsible for weed and pest management within the area of the port utilised for export of woodchips.

Ship's Waste Manager

- Responsible for the management of ship's wastes from ship to shore temporary storage in accordance with this OEMP and the Biosecurity Management Plan
- Responsible for ensuring only authorised personnel enter the temporary storage area
- Responsible for the disposal of wastes in accordance with DAWR approvals
- Maintain records of all waste removals and disposals

All contractors

As above NTPM employees at Port Melville

Vessel owners, operators, charterers, masters and cargo owners

- Must comply with all Australian biosecurity requirements as outlined on the DAWR website (<http://www.agriculture.gov.au/biosecurity/avm/vessels>) and regulations as listed in Section 5.1 *Legislative and regulatory framework*. This includes all requirements under the *Quarantine Act*, exporting and importing requirements, international conventions, ballast water requirements, site of departure and vessel hygiene, inspections, declarations, permits, form submission and reporting
- Must comply with all international, Australian and Northern Territory requirements and regulations regarding marine pollution, oil spills, ballast water and antifouling systems (see list in Section 5.1 *Legislative and regulatory framework*)

Operations Environmental Management Plan (OEMP)

- Ensure all vessel crew members are instructed in and comply with the above requirements, have been inducted to the vessel and have undertaken all required training
- Become familiar with Port Melville's environmental and biosecurity requirements, which are to be sent to each vessel along with the Port Melville Information Handbook by the NTPM Operations Manager well in advance of arriving at Port Melville
- Vessel owners, operators/charterers to support the ship's master in achieving the port's environmental requirements and also those set by DAWR in relation to cargo imports into Port Melville
- Vessel masters must keep a watch for any marine fauna such as turtles, dugongs and dolphins whilst in the Apsley Strait and manoeuvre the vessel so as to avoid any collision with these fauna, if safe to do so
- Must report any environmental or biosecurity incidents immediately to the relevant government authority and to the NTPM Port Operations Manager
- Maintain records of any on-board or within port environmental or biosecurity incidents, including details about the incident, to whom and when it was reported, any clean-up and response measures and the effectiveness of these measures
- Are responsible for the proper handling of any hazardous materials or dangerous goods on board the vessel or within vessel cargos transferred at the port
- Cargo owners or consignees are responsible for the permit to import cargo into Australia and for the timely release of cargo from Port Melville by authorities
- Cargo owners and consignees are also responsible for ensuring cargo is free from biosecurity risk material or declaration and treatment if it is not

Vessel Crews

- Become familiar with and follow all Port Melville environmental and biosecurity policies, procedures, standards and management plans relevant to their role
- Conduct in-transit inspections of vessel and equipment/ materials as directed by the vessel master
- Immediately report any environmental or biosecurity incidents or non-conformances to the vessel's master and then by the master to the relevant government authority
- Store, handle and consume food in designated areas only, and dispose of waste in accordance with the relevant policies/procedures
- Follow any directives issued by the vessel's master with respect to environmental or biosecurity compliance.

Regulatory authorities

Department of Agriculture and Water Resources (formerly AQIS)

The Department of Agriculture and Water Resources (DAWR) is the lead federal government agency providing quarantine inspection services for the arrival of international passengers, cargo, mail, animals and plants and their products into Australia.

DAWR is also responsible for the management of ballast water issues, including monitoring of compliance of shipping with the *Australian Ballast Water Management Requirements* (DAFF 2013c)

at each first port of call in Australia. These requirements are designed to reduce the risk of introduced harmful aquatic organisms into Australia's marine environment through ship's ballast water.

DAWR also inspects and certifies a range of animal and plant products exported from Australia.

DAWR officers may conduct inspections and audits of Port Melville's biosecurity measures from time to time.

Australian Maritime Safety Authority (AMSA)

The *Australian Maritime Safety Authority Act 1990* (Commonwealth) sets out the functions of the Australian Maritime Safety Authority (AMSA). Responsibilities include the protection of the marine environment from ship-sourced pollution. AMSA also has responsibilities under a variety of legislation relating to protection of the marine environment including the *Protection of the Sea (Prevention of Pollution from Ships) Act 1983* (Commonwealth).

AMSA administers *Australia's National Plan to Combat Pollution of the Sea by Oil and Other Noxious and Hazardous Substances* (AMSA 2007) and is responsible for coordinating, investigating and cleaning up oil spills of national significance.

Under 'Port State Control', AMSA conducts a program of inspections of foreign ships entering Australian ports based on their risk profile. These inspections are carried out to ensure that ships comply with the relevant requirements of the International Maritime Organisation (IMO), including MARPOL 73/78. Should a ship, the qualifications of its crew or shipboard safety management system, be found to not comply with the appropriate requirements, AMSA may require corrective action, which can include detention of the ship until satisfactory repairs are carried out, or remedial action is taken.

Department of Immigration and Border Protection (Border Force)

Border Force manage the security and integrity of Australia's borders. The service works closely with other government and international agencies, in particular the Australian Federal Police, the DAWR, the Department of Immigration and Multicultural and Indigenous Affairs and the Department of Defence, to detect and deter unlawful movement of goods and people across the border. Border Force may undertake a number of activities within the port, including security checks of international vessels.

Northern Territory Environment Protection Authority (EPA)

The NT Environment Protection Authority (EPA) provides advice to government and regulatory services for effective waste management, pollution control and sustainable practices.

Under the *Waste Management and Pollution Control Act*, pollution incidents requiring urgent attention must be reported to the EPA within 24 hours. Pollution incidents are those which "cause or have the potential to cause material or serious environment harm".

Northern Territory Department of Transport

The Marine Safety Branch of the NT Department of Transport is responsible for marine safety and pollution regulation matters in the Northern Territory. The Marine Safety Branch is responsible for marine pollution prevention and response activities.

The Marine Safety Branch administers the *NT Marine Pollution Act* and *Marine Pollution Regulations*.

The purpose of the Marine Pollution Act is to protect the marine and coastal environment by minimising intentional and negligent discharges of ship sourced pollutants into coastal waters.

The Marine Safety Branch is responsible for administering the *Northern Territory Oil Spill Contingency Plan*, which outlines the steps required for the management of marine oil pollution responses in Northern Territory waters.

5.4 Environmental Monitoring

Monitoring will be undertaken and records kept of:

- Fuel usage, storage and transfer
- Water usage
- Energy usage
- Waste volumes and types generated and collected at the port waste disposed of on-site or taken off-site for disposal.

Weed and erosion monitoring will be undertaken on an on-going basis by the Port Manager and also an annual weed survey will be undertaken by a suitably qualified consultant as outlined in the *Weed Management Plan* (Appendix F). Weed and erosion monitoring will be undertaken as part of a daily/weekly environmental inspection checklist that also includes inspection of the port's fuel storages, hazardous materials storages, waste disposal areas, potential biting insect habitat, and wastewater disposal areas.

Exotic mosquito monitoring is undertaken on a regular basis (i.e. weekly when ships are visiting), as outlined in the *Biting Insect Management Plan* and in consultation with DAWR and the NT Department of Health, Centre for Disease Control.

Other regular environmental monitoring undertaken includes:

- Potable water testing to detect any contamination of bore water supply
- Groundwater level and quality monitoring to assess potential impacts of extraction
- Surface water testing in sediment basins and Apsley Straight
- Marine sediment sampling in Apsley Straight
- Marine pest monitoring at the wharf

5.5 Records and Document Control

Environmental management-related records and biosecurity-related records will be maintained by the Port Manager using NTPM's electronic document management system.

Records will be kept of any environmental or biosecurity incidents, and any subsequent investigations, corrective actions, outcomes, and correspondence with authorities. This also includes records of and responses/corrective actions to any complaints from the public or others. Records of environmental/ biosecurity incidents and complaints will be maintained in a central incidents register.

Records of staff training and currency in relation to training required to undertake their duties, inductions completed, training in following environmental procedures. These records will be maintained in a central training register.

Records will be kept of the amount and types of all waste generated at the port, collected from vessels, treated for biohazard risk, and disposed of or taken offsite.

Records will be maintained of daily fuel storage, transfer and usage and any releases of ballast water by vessels.

Records will also be kept of any fuel spills, amount spilt, the cause, corrective/clean-up actions, reporting and correspondence with authorities, investigations, data and reports.

Daily energy and water usage will be recorded.

Records of all environmental monitoring undertaken, such as water quality, dust, noise, light, fauna sightings, marine animal strikes, weed monitoring. The analytical results of any monitoring must be recorded in a central spreadsheet or database.

All records are to be:

- Stored correctly using the NTPM's electronic document management system
- Kept in a suitably marked or identified location so as to be readily retrievable
- Backed up regularly
- Kept for at least two years for auditing purposes.

Control of documents will be maintained by having a single electronic copy. Documents will be reviewed as required and where there is more than one revision of a document, the most current revision will be the controlled electronic copy.

All hard copy documents are considered as 'uncontrolled' and users of uncontrolled documents are accountable for ensuring they are using the current revision.

The Port Manager and PMPS Cargo Superintendent will have full access to all relevant documentation for maintenance and updating purposes. All other personnel will have 'read only' access.

The NTPM Port Manager and Cargo Superintendent are responsible for ensuring the latest versions of environmental documents, policies, procedures and forms are made available to all relevant personnel. Document recipients are responsible for ensuring the hard copy they have is the latest version.

5.6 Training, Inductions and Communications

All Port Melville personnel and visitors, including all staff, contractors, cargo/vessel owners and crew, must undertake the relevant induction modules prior to working on site. The Port Melville induction includes modules on fuel/chemical handling and spill response, local flora and fauna protection, weed and pest identification and management, environmental incident reporting, sacred site, cultural and heritage site protection, and waste management.

All personnel requiring formalised training to undertake their duties will be trained to the required standard.

All personnel and other relevant contractors, cargo/vessel operators and crew (where applicable) will be trained in relation to the environmental policies, standards and procedures listed in this OEMP and other related plans (e.g. Biosecurity Management Plan).

All managers, contractors and vessel masters shall ensure their personnel working at the port and on vessels visiting the port are aware of this OEMP and its content. They shall also promote and reinforce the importance of good environmental and biosecurity management through, for example, toolbox meetings, vessel HSE meetings and HSE bulletin boards.

In regards to visitors to Port Melville:

- Escorted visitors shall be given a basic verbal briefing on environmental and biosecurity issues by the escort
- Unescorted visitors and one-off contractors shall be briefed on the OEMP components they need to be aware of for the area/s they will be operating in
- Regular contractors shall be inducted and briefed as per operations personnel, including the requirement for refresher training.

All staff and contractors requiring regular access to the Marine Security Zone encompassing the wharf must hold a valid Marine Security Identification Card (MSIC). All visitors and casual contractors entering this area without a MSIC must be accompanied by a MSIC-holder at all times.

Records of staff training and currency will be maintained in a central training register by the Port Operations Manager.

Vessel masters must ensure all vessel crew members are instructed in and comply with international, Australian and Port Melville environmental and biosecurity requirements, have been inducted to the vessel and have undertaken all required training to undertake their duties. All instruction, training and induction of crew must be recorded in the ship's log book.

Any new or emerging environmental issues requiring changes to staff operational procedures will be communicated to relevant staff and marine crews during toolbox meetings, on notice-boards, and other meetings and notices.

5.7 Non-conformance, Incident Response and Reporting

Environmental non-conformances may arise from incidents/accidents, monitoring results, audits of this OEMP, complaints from the community or other stakeholders, or deviations from policy, procedures, objectives and targets.

Corrective action to re-establish compliance should be taken as soon as practicably possible. This may involve investigations to identify and analyse the cause of the non-conformance and identify appropriate corrective actions. Corrective actions may include emergency response and clean-up, re-training or extra training of personnel in procedures, changes to this OEMP or procedures.

The Port Manager is responsible for reporting environmental and biosecurity incidents to the Chief Operating Officer and, depending on the severity of the incident, reporting it to the appropriate government authority. The Port Manager are also responsible for initiating investigations and corrective actions, reviewing investigation reports, and maintaining records of all documents and correspondence in relation to incidents in the incidents register. The Port Manager is responsible for reviewing OEMP audit results and responding to any non-conformances.

5.7.1 Incident Classification

An environmental incident for the purposes of this OEMP is an incident that occurs within the Port Melville site, or as result of activities occurring on the site. An environmental incident includes:

- An accident, emergency or malfunction
- A deliberate action, whether or not that action was taken by the person conducting the activity in the course of which the incident occurred

All environmental incidents should be documented in the Environmental Incident Register.

Environmental incidents that cause (or may cause) environmental harm require reporting to the Northern Territory Environmental Protection Authority (NT EPA) within 24 hours of NTPM first becoming aware of the incident by emailing details to waste@nt.gov.au.

Environmental incidents

Environmental incidents can include but are not limited to the following:

- Spills and/or leaks of fuel, oils, chemicals and/or other hazardous substances.
- Unintentional release of wastewater through overflows, leaks and spills; including structures associated with the wastewater irrigation system such as tanks and reticulation structures.
- Unauthorised or illegal waste disposal.

- Unauthorised dumping of waste.
- Air quality pollution through release of visible smoke, offensive odour, dust and/or particulates beyond the boundary of the premises.
- Noise which unreasonably interferes with the enjoyment of the area by persons who occupy a place i.e. local community.
- Inadequate installation and subsequent failure of erosion and sediment controls.
- Accidental starting of fire or a fire breaking out of containment; including fire that travels beyond the site boundary causing or potentially causing adverse impact to the environment or community.
- Unauthorised damage or interference to threatened species, endangered communities or critical habitat.
- Unauthorised harm to Indigenous objects or places, or significant non-Indigenous heritage objects.
- Any potential breach of legislation.

Environmental emergencies

An environmental emergency is considered to be any incident that has potential to cause serious environmental harm or adverse effect on the environment. Serious environmental harm includes environmental harm that:

- Is irreversible or otherwise of high impact harm or on a wide scale;
- Damages an aspect of the environment that is of high conservation value, high cultural value or high community value or is of special significance; or
- Results in expenses of more than \$50,000 in actions to prevent or minimise the environmental harm or to the rehabilitate the environment.

The most likely environmental emergency that could occur in relation to Port Melville would be a major hydrocarbon leak or spill associated with the bulk fuel facility operations. This is covered by the Appendix H – Emergency Response Plan

5.7.2 Incident Response

Emergency response to an oil spill into marine waters at the Port will follow the Appendix C – Oil Spill Contingency Plan

Emergency response to chemical spills into marine water at the port will depend on the nature of the spill.

NTPM’s emergency response to oil or chemical spills on land will follow the spill response procedure.

Any on-board environmental incidents (e.g. oil spill into the ocean) or evidence of vessel or cargo contamination and the corrective action taken (if any) shall be recorded in the ship’s log book and reported to Management Team. It remains the responsibility of the vessel owner/operator/charterer/master to inform the relevant government authority.

Cyclones and storm surge events present a risk to fuel and hazardous materials storages and pipelines on-site. All other impacts associated with cyclones/storm surges are related to human safety and economic loss. All risks, both environmental and human safety-related, are addressed through the management measures outlined in the Appendix H – Emergency Response Plan

5.7.3 Incident Reporting

NTPM personnel, contactors and anyone working on-site that discovers an environmental or biosecurity incident must report it to the NTPM Port Manager. They must also complete an NTPM incident report form in full and lodge it with the NTPM Port Manager.

Requirements in regards to external reporting to government authorities are as follows:

- Pollution incidents on land, including both fuel and chemical spills, must be reported to the NT EPA – see below for more details
- Marine pollution incidents, including both fuel and chemical spills must also be reported to the Marine Safety Branch of the Northern Territory Department of Transport
- Discovery of a declared weed under the NT *Weeds Management Act*, where it has not previously been, or known to have been present, must be reported to the Weed Management Branch of the NT Government within 14 days. Similarly, any *Weeds of National Significance*, *National Environmental Alert Weeds*, *Sleeper Weeds* or new exotic weeds such as any of those listed on the DAWR *Exotic Weeds Watch List* must be reported to the NT Weed Management Branch and also DAWR
- Biosecurity incidents must be reported to the Australian Government DAWR, and action is recommended within 48 hours.

Section 14 of the NT Waste Management and Pollution Control Act describes the duty to notify of incidents causing or threatening to cause pollution.

Section 14 requires that where an incident occurs in the conduct of an activity and the incident causes, or is threatening or may threaten to cause, pollution resulting in material environmental harm or serious environmental harm that the person conducting the activity must notify the NT EPA within 24 hours.

The NT EPA refers to a report of this nature as a 'Section 14 Incident Report'.

A Section 14 Incident Report must specify:

- (a) the incident causing or threatening to cause pollution;
- (b) the place where the incident occurred;
- (c) the date and time of the incident;
- (d) how the pollution has occurred, is occurring or may occur;
- (e) the attempts made to prevent, reduce, control, rectify or clean up the pollution or resultant environmental harm caused or threatening to be caused by the incident; and
- (f) the identity of the person notifying the NT EPA.

A Section 14 Incident Report is to be completed using the Section 14 Incident Report Form – these can be found on the NTEPA website: <http://www.ntepa.nt.gov.au/waste-pollution/compliance/incidents>, along with further guidance on reporting triggers.

5.7.4 Community Complaints

NTPM maintains a Complaints Register that records the following information:

- Person who received complaint
- Person responsible for managing the complaint
- The date and time the complaint was reported
- The date and time of events that led to the complaint

- Contact details of the complainant
- The nature of the complaint
- The nature of events giving rise to the complaint
- Prevailing weather conditions
- Action taken, including follow-up contact with the complainant
- If no action was taken, why

Any NTPM staff member who receives and or responds to a complaint is responsible for ensuring details are passed on to the Port Manager for recording in the Complaints Register and response and corrective actions recorded in the Incidents Register. A complaint cannot be closed until follow-up contact is made with the complainant to explain how the issue has been or is going to be addressed.

5.8 Audits, Inspections, Reporting and Review

The results of all monitoring, as well as OEMP audits will be made available to government authorities on request.

This OEMP will be audited annually by a suitably qualified independent environmental consultant, based on the performance criteria outlined in Section 6 *Environmental Management Actions*. The results of this audit will be made available to Northern Territory and Australian Government authorities on request.

Site inspections are undertaken to ensure that performance criteria for each of the environmental aspects are being met. The site is divided up into four zones (Figure 1-2) for the purposes of inspections, including:

- Zone A – Wharf and woodchip stockpiles
- Zone B – Fuel farm
- Zone C – Offices, workshops and laydown areas
- Zone D – Accommodation camp

Site inspections are undertaken by the NTPM Port Manager (or delegate), with observations recorded on the Appendix J – Site Inspection Checklists

As site operations/infrastructure changes and/or in response to the findings of audits, this OEMP will be reviewed and updated on at least four-monthly basis. The NTPM Port Manager is responsible for ensuring that the OEMP accurately reflects current site operations.

6 Environmental Management Actions

Management objectives, strategies and performance criteria are outlined below for 12 identified environmental aspects/hazards. An annual audit will use these performance criteria as the basis for assessment. An annual review will also be undertaken by the NTPM Port Manager to incorporate any findings from the audit, and update and/or improve these management objectives, strategies and performance criteria where required.

6.1 Biosecurity Management

Objective

No introduction of pests or diseases to Port Melville.

Strategies

Examples of biosecurity risk material includes:

- Animal material: hair, fur, skin, faeces, shells, blood and fluids, feathers, nests, honey, flesh and bone
- Marine pests
- Live animals: birds, rodents and reptiles
- Food refuse: food scraps
- Live insects: Khapra Beetle, wood borers, mosquitoes, bees, wasps
- Snails: Giant African Snail
- Plant pathogens: fungi, nematodes, bacteria, viruses etc.
- Plant material: pollen, bark, spores, flowers, seeds, gum, leaves, branches, roots, stems, wood, fruits and vegetables
- Soil: dirt, mud, gravel, clay and sand
- Water: possibly harbouring mosquitoes, larvae and eggs.

All international vessels docking at Port Melville are required to comply with Australia's quarantine laws and all other biosecurity-related regulations administered by the DAWR. Compliance with these is the responsibility of the ship's master, its crew, the vessel owner/operator and cargo owner. This includes the requirement for all vessels to minimise potential marine pest introduction via biofouling. The *Port Melville Biosecurity Management Plan* refers ship's masters, crew, and vessel owners/operators to the DAWR's biosecurity webpages for specific procedures and requirements (<http://www.agriculture.gov.au/biosecurity/avm/vessels>) and also the *National Biofouling Management Guidance for the Petroleum Production and Exploration Industry* (Commonwealth Government 2009).

NTPM, as port operator, is responsible for biosecurity risks *within* the port area, where it can exercise jurisdiction over operations, such as risks associated with cargos and equipment offloaded from vessels. NTPM is not responsible for biosecurity risks associated with vessels, such as biofouling. However, NTPM will offer full assistance where possible, to vessels whilst docked at Port Melville in addressing biosecurity-related issues. Please refer to the Appendix B – Biosecurity Management Plan for an outline of biosecurity management roles and responsibilities at the port.

Vessel Masters, owner/operators are responsible for submission of a *Quarantine Pre-Arrival Report* (QPAR) to the DAWR Maritime National Coordination Centre (MNCC) between 96 and 12 hours prior to arrival. Additionally, since Port Melville is a "non-proclaimed" port for quarantine purposes, where Port Melville is the first port of entry for a vessel, it must also complete the application form (20AA) for permission to enter an Australian non-proclaimed first port of entry. This must be submitted to the MNCC at least 10 working days before the intended date of arrival.

Once a vessel has submitted a QPAR and 20AA form it will receive an *Approval to Berth*, which outlines the conditions a vessel must comply with whilst in Australian waters.

Ballast Water Summary Sheets must also be provided to the MNCC prior to any ballast discharge in Australian waters. Written approval to discharge ballast will be provided once the vessel ballast summary sheets are approved.

Upon arrival at Port Melville, a DAWR Quarantine Officer may inspect a vessel if it is assessed as high-risk and also interview the Master to verify their claims on the QPAR and any other relevant paperwork. The Quarantine Officer will provide written instruction to the Master on any remedial actions required and issue a *Certificate of Pratique* once satisfied that the risks are minimal and contained.

It is planned that Port Melville will have a Approved Arrangements (AA) approved by the DAWR for on-site inspection and treatment of biosecurity risk cargos

Marine Pest Monitoring Program

NTPM undertakes a marine pest monitoring program at Port Melville in accordance with the *Australian Marine Pest Monitoring Guidelines* (DAFF 2010), where monthly monitoring results are reported to the NT Government Aquatic Biosecurity Unit (ABU). This program has been set up under guidance from the ABU and forms part of the NT Government's marine pest monitoring program that also includes monitoring locations at ports, marinas and wharfs throughout Darwin Harbour, as well as Gove Harbour and Groote Eylandt. Monitoring as part of this program was also undertaken previously at Port Melville, between August 2004 and August 2010, when the port was operated by Great Southern Plantations.

NTPM staff or its environmental consultants regularly maintain and inspect two deployed marine pest monitoring devices and send monthly inspection reports with photos to the ABU. Every four months, samples (PVC plates and a small rope mop) are collected and sent to the ABU for detailed identification of organisms growing on the devices.

Settlement device design and deployment

The settlement device is a cross made out of poly-pipes with PVC joins (Figure 6-1). Settlement plates (PVC) are attached to the two horizontal arms of the cross. The settlement device is attached to the wharf with a rope and when in position the settlement plates are sitting below the water line at between 2 and 2.5 m depth. The main rope is fixed to the top of the wharf and is weighted.



Figure 6-1. Photograph of marine pest monitoring settlement device

Specific deployment methods may need to be adjusted depending on the strength of currents and the wharf structure. Generally, a medium weight is sufficient to keep the trap from moving too much and being damaged, but also light enough to be lifted. If a heavier weight is used, or if the wharf is relatively high, the settlement collector can run along a secured rope line instead.

The two horizontal arms of the settlement collector are referred to as being either “Tagged” or “Untagged”, with the tagged side marked by two cable ties.

Sampling schedule

The schedule in Appendix D – Marine Pest Monitoring Protocol outlines monthly checks (photographs) and four-monthly replacement of settlement plates.

Any damage to the trap is repaired by NTPM staff if possible, and the damage and repairs reported to the ABU.

Reporting

Data and photos from the monthly inspection reports and the four-monthly settlement device inspections are assessed, collated and described by the ABU in a quarterly report. An annual report is also prepared after each year of monitoring.

Quarterly and annual reports will be provided to NTPM as well as other stakeholders such as the Tiwi Land Council.

Management of pest outbreaks

Any outbreaks of colonising marine pest species identified as part of the above monitoring will be managed in consultation with ABU and NTPM would dedicate any resources required.

Responsibilities

The NTPM Port Manager is responsible for managing biosecurity risks at the port, including inspection and treatment of cargo and goods.

Cargo owners, vessel owners/operators, consignees, and vessel masters are responsible for managing biosecurity risks aboard their vessel and within their cargo.

Vessel masters are responsible for ensuring all international and DAFF requirements and procedures regarding ballast water management are met.

NTPM staff and contractors at the port are responsible for following all biosecurity management procedures in their work practices.

The NTPM Port Manager is responsible for reporting any biosecurity breaches to the relevant government authorities and the NTPM Chief Operating Officer. The NTPM Port Manager is also responsible for maintaining records of any biosecurity incidents and how they were addressed; also, managing, maintaining and updating the Port Melville Biosecurity Management Plan. The NTPM Port Manager must ensure that all NTPM staff and contractors, vessel masters and vessel owners, cargo owners and consignees are aware of their biosecurity responsibilities and the procedures they must follow.

Performance Criteria

Number of biosecurity breaches (if any).

All biosecurity measures and procedures in the Port Melville Biosecurity Management Plan being followed.

All relevant staff and contractors trained and aware of their biosecurity management responsibilities and procedures.

No non-conformances from Biosecurity Management Plan audits conducted by DAWR.

Biosecurity Management Plan reviewed and updated when required.

Biosecurity inspection and checklist completed of cargo prior to departing Darwin TEMSB.

Biosecurity inspection and checklist completed of cargo upon arrival to Port Melville

6.2 Fuel Storage and Handling Management

WHS Requirements

The Northern Territory (NT) Work Health and Safety (National Uniform Legislation) Regulations 2011 (WHS Regulations) provides for storage, use and handling of hazardous chemicals (Not classified as a Major Hazard Facility) in accordance with:

- WHS Regulations Schedule 11 Placarding
- WHS Regulations Schedule 15, Table 15.2, Item 3 Flammable Materials – Liquids that meet the criteria for Class 3 Packaging Group II OR III – Threshold quantity (tonnes)

- Hazardous Chemicals Placard and Manifest Quantities (NT WorkSafe Bulletin)
- Labelling of Workplace Hazardous Chemicals (NT WorkSafe Code of Practice)
- Preparation of Safety Data Sheets for Hazardous Chemicals (NT WorkSafe Code of Practice).

Objective

No contamination of soil or waterways at the port from fuel spills or leaks.

Strategies

Re-fuelling of vehicles and machinery with diesel fuel stored in the two self-bunded tanks (total combined capacity 130 000 L) is undertaken using an in-built fuel pump and dispensing system. These self-bunded tanks are supplied by the fuel supplier (currently Puma) and built in accordance with Australian standards (AS1940 and AS1692). The design of these tanks and dispensing system minimises the risk of spillage during fuel transfer. If a spill was to occur, spill kits are located adjacent to the tanks and all port staff are trained in their use. These spill kits are kept well stocked and maintained.

The 65 000 L self-bunded bulk fuel tank located at the accommodation camp for power generation is the same as those described above.

This tank is piped to a 2800 L day tank and when the day tank level drops to 500 L it will call for fuel and shut of when the level reaches 2500 L. The day tank feeds tanks in each of the three generators within the camp services area. When a generator fuel tank level drops below 40 % it will call for fuel from the day tank and when the fuel level reaches 80 %, refuelling will stop.

All refuelling is conducted automatically and includes an automated shut-off and bypass system to ensure that the generator tank does not overflow during re-fuelling from the bulk tank.

The fuel farm area adjacent to the wharf consists of 3 x 10 ML above-ground bunded tanks, which are contained within a concrete-bunded area (capacity of 12.052 ML able to contain greater than 110 % of total capacity of largest tank, as per AS1940). A slops tank (capacity 54,200 L) is located outside the bund on the west side, adjacent to an oily water separator. All spills are contained within the main bund and directed to one of three main bund sumps. Each sump has a set of Duty/Duty sump pumps, which are capable of delivering captured liquid at 400 L/min to the oily water separator.

Each of the three bund sump pump sets are supplied with individual control panels for manual pump start and stop, as well as pump fault and power failure indication. The oily water separator receives water from the bund sumps. The separator allows incoming grit to settle to the bottom of the chamber and captures any fuel residue at the top of the chamber. The water in the middle is passed through a coalescer and discharged by gravity to the sedimentation pond (Figure 6-2).

Re-fuelling of vessels at the wharf from the fuel farm will be in accordance with the *NTPM Appendix G – Fuel Transfer Manual* and accompanying Procedures These procedures meet Australian Marine Safety Authority (AMSA) requirements, NT Department of Transport requirements, Industry Codes of Practice and Ports Australia Guidelines and Recommendations (see Ports Australia 2007).

The fuel farm facility includes a total of six ESD (Emergency Shutdown Devices), one of which will be manned at all times during a fuel transfer.

All personnel involved in re-fuelling operations must have the appropriate training and qualifications and must follow the NTPM re-fuelling procedures. These procedures include spill response and

reporting. Additionally, all port staff and contractors must undergo the port's induction, which includes the fuel management procedures and spill response.

Records will be maintained of all fuel stored, used and transferred at the port from all three storages, so that any leaks will be detected if there is a discrepancy.

Any substantial fuel spills or fuel leaks, either within the port land-side area or into the marine environment, must be reported to the NT EPA. It is mandatory under Section 14 of the *Waste Management and Pollution Control Act* that "all incidents which cause or have the potential to cause material or serious environmental harm" are reported to the EPA within 24 hours.

In the event of an oil spill from a vessel into the marine environment, the spill will be immediately responded to in accordance with the *NTPM Appendix C – Oil Spill Contingency Plan* and *NTPM Appendix H – Emergency Response Plan*

These plans align with the *Northern Territory Oil Spill Contingency Plan (DLP 2012)* administered by the NT Department of Transport, Marine Branch.

Marine pollution incidents, including both fuel and chemical spills must also be reported to the Marine Safety Branch of the Northern Territory Department of Transport.

Inspection of fuel storages is included in daily/weekly inspection checklist.

Cyclones and storm surge events present a risk to fuel and hazardous materials storages and pipelines on-site. All other impacts associated with cyclones/storm surges are related to human safety and economic loss. All risks associated with cyclones, both environmental and human safety-related, are addressed through the management measures outlined in the *Appendix H – Emergency Response Plan*

Operations Environmental Management Plan (OEMP)

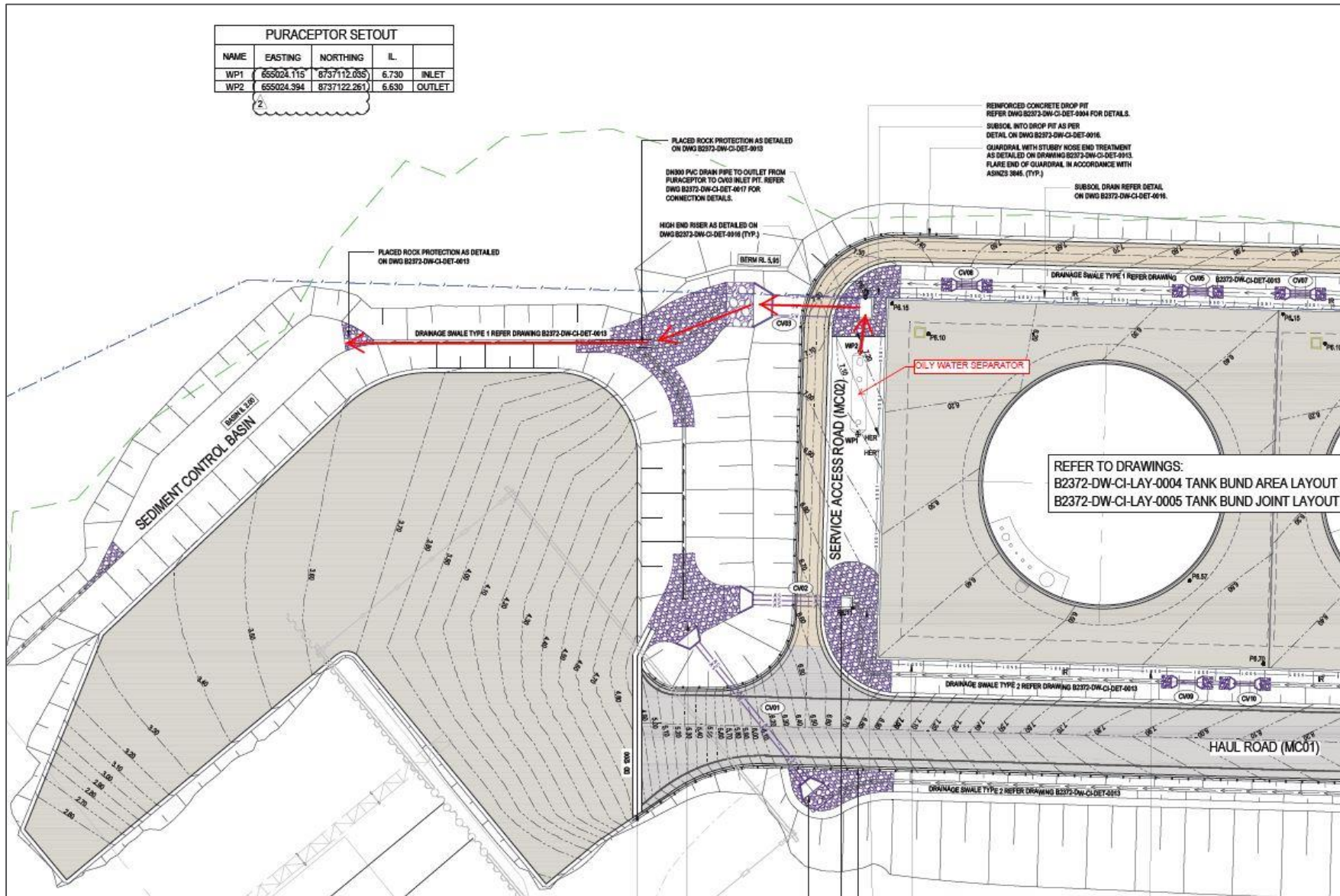


Figure 6-2. Diagram showing location of oily water separator and water flow to sediment basin

Responsibilities

NTPM staff and contractors are responsible for following all fuel handing procedures, carrying out spill response when required and reporting any fuel spills or leaks to the NTPM Port Manager.

Vessel masters are responsible for managing fuel aboard their vessel and reporting any spills to the NTPM Port Manager.

The NTPM Port Manager is responsible for reporting any significant fuel spills or leaks to the relevant government authorities and the NTPM Chief Operating Officer. The NTPM Port Manager is also responsible for maintaining records of any fuel spills or leaks and how they were addressed. Day-to-day records of fuel storage, usage and transfer will also be maintained by the NTPM Port Manager and the accommodation camp manager (in the case of fuel for the camp) to ensure any fuel leaks are detected through discrepancies in these records.

The NTPM Port Manager is responsible for managing, maintaining and updating all fuel storage and handling procedures and ensuring that all NTPM staff and contractors, and vessel masters are aware of their fuel handling responsibilities and the procedures they must follow.

The NTPM Port Manager is to ensure daily/weekly inspection checklist is undertaken.

Performance Criteria

No spillage or leakage of fuel at the port, or if spills or leaks occur, these are cleaned-up immediately.

All fuel handling procedures being followed.

All relevant staff and contractors trained and aware of their fuel handling responsibilities and procedures.

Records maintained of all fuel stored and transferred at the port.

Daily/weekly inspection checklist undertaken.

6.3 Hazardous Materials Management***Objective***

No contamination of soil or waterways at the port from hazardous materials spills or leaks.

Strategies

Materials, substances or chemicals used, stored or handled within the port area that are listed on the national *Hazardous Substances Information System* or classified as a dangerous good under the NT *Dangerous Goods Act* or in the *Australian Dangerous Goods Code* will be managed in accordance with those acts/codes.

Hazardous materials or dangerous goods from vessels transferred through the port will be managed in accordance with Australian Standard 3846 – 2005 *The Handling and Transport of Dangerous Cargoes in Port Areas*, and the International Maritime Organisations (IMO's) *International Maritime Dangerous Goods (IMDG) Code and Recommendations on the Safe Transport of Dangerous Cargoes and Related Activities in Port Areas*.

Hazardous materials stored and used on-site include lubricants, oils, batteries and other materials required for vehicle and machinery maintenance, herbicides for the control of any weeds and anti-foulants for the treatment and protection of boat hulls from marine organisms. These materials are

stored and used in designated areas, such as the workshop for vehicle and machinery maintenance, in accordance with the manufacturer's instructions and all relevant standards, codes and legislation. Anti-fouling of boats will adhere to the *Anti-fouling and in-water cleaning guidelines* (DAFF 2013b).

All personnel involved in handling hazardous materials or dangerous goods are required to have the appropriate training and qualifications. All port staff and contractors are required to complete the port's induction, which includes spill response procedures for hazardous materials.

The Port Manager maintains a register of all hazardous substances and dangerous goods stored and used at the port and will ensure that Material Safety Data Sheets (MSDS's) for all these materials are available on-site and their location is known to all staff.

Vessel masters/owners are responsible for any hazardous substances or dangerous goods on their vessel and must ensure these are managed in accordance with Northern Territory, Australian and international dangerous goods standards, codes and legislation.

Similarly to fuel, as described above, any substantial spills or leaks of hazardous materials, either within the port land-side area or into the marine environment, must be reported to the NT EPA. Marine pollution incidents must also be reported to the Marine Safety Branch of the Northern Territory Department of Transport.

Portable spill kits are positioned strategically around the Port to assist with any potential minor chemical spills that could occur during operations.

Inspection of hazardous material storages is included in weekly inspection checklist.

As mentioned in the previous section, cyclones and storm surge events present a risk to fuel and hazardous materials storages on-site and management measures to reduce this risk are included in the NTPM Appendix H – Emergency Response Plan.

Responsibilities

NTPM staff and contractors are responsible for ensuring all hazardous materials are stored and handled correctly following all relevant handling procedures, carrying out spill response when required and reporting any spills or leaks to the NTPM Port Manager.

Vessel masters are responsible for managing hazardous materials aboard their vessel and reporting any spills to the NTPM Port Operations Manager.

The NTPM Port Manager is responsible for reporting any significant spills or leaks to the relevant government authorities and the NTPM Chief Operating Officer. The NTPM Port Manager is also responsible for maintaining records of any spills or leaks and how they were addressed; also managing, maintaining and updating all hazardous materials storage and handling procedures.

The NTPM Port Manager must maintain records of all hazardous materials present on site and have MSDS's for all these hazardous materials available in a central location to all staff and contractors.

The NTPM Port Manager must ensure that all NTPM staff and contractors, and vessel masters are aware of their hazardous materials handling responsibilities and the procedures they must follow.

The NTPM Port Manager is responsible for managing, maintaining and updating all hazardous materials storage and handling procedures and ensuring that all NTPM staff and contractors, and vessel masters are aware of their handling responsibilities and the procedures they must follow.

The NTPM Port Manager is to ensure weekly inspection checklist is undertaken.

Performance Criteria

No spillage or leakage of hazardous materials at the port, or if spills or leaks occur, these are cleaned-up immediately.

All hazardous materials on site are stored appropriately.

All hazardous materials handling procedures being followed.

All relevant staff and contractors trained and aware of their hazardous materials responsibilities and procedures.

Records maintained of all hazardous materials present at the port and MSDS's for these in central location.

Weekly inspection checklist undertaken.

6.4 Surface Water Management

Objective

No contamination of nearby surface waters as a result of operational activities.

Strategies

Apsley Straight is the nearest surface water body that may be impacted as a result of Port operations and there is also a wetland located approximately 50 m from the eastern boundary of the site (Figure 1-2). The highest risk contamination sources are turbid/sediment-laden run-off and spills/leaks of hazardous materials (primarily hydrocarbons).

To address potential issues associated with turbid/sediment-laden run-off, erosion and sediment control infrastructure has been designed to minimise the velocity of overland flows and where possible, allow settling of fine materials in sediment basins prior to discharge off site. Details of erosion and sediment controls are provided in Section 6.8 Erosion Management and the [Appendix E – Erosion and Sediment Control Plan](#)

The risk of spills/leaks of hazardous materials to surface waters are mitigated in accordance with Sections 6.2 Fuel Storage and Handling Management and 6.3 Hazardous Materials Management.

To monitor for the potential impacts of port activities on the adjacent estuarine environment, monitoring of surface water and sediments is undertaken at Port Melville, as outlined in Table 6-1 and Figure 6-3 below. The monitoring program includes sampling of two sites in the vicinity of the Port (i.e. potentially impacted) and one site on the opposite side of Apsley Straight (i.e. un-impacted).

Table 6-1. Details of estuarine monitoring program at Port Melville

Monitoring Type	Frequency	Locations	Parameters
Estuarine water	Quarterly	PMSW01, PMSW02 (potential impacts) and PMSW03 (un-impacted reference)	Field parameters: pH, salinity, turbidity Lab parameters: Suspended solids, dissolved metals (As, Cd, Cr, Cu, Ni, Pb, Zn, Hg), hydrocarbons (TRH, BTEXN)
Estuarine sediments	Annual	PMSW01, PMSW02 (potential impacts) and PMSW03 (un-impacted reference)	Lab parameters: Particle size analysis, total organic carbon, total metals (As, Cd, Cr, Cu, Ni, Pb, Zn, Hg), hydrocarbons (TRH, BTEXN)

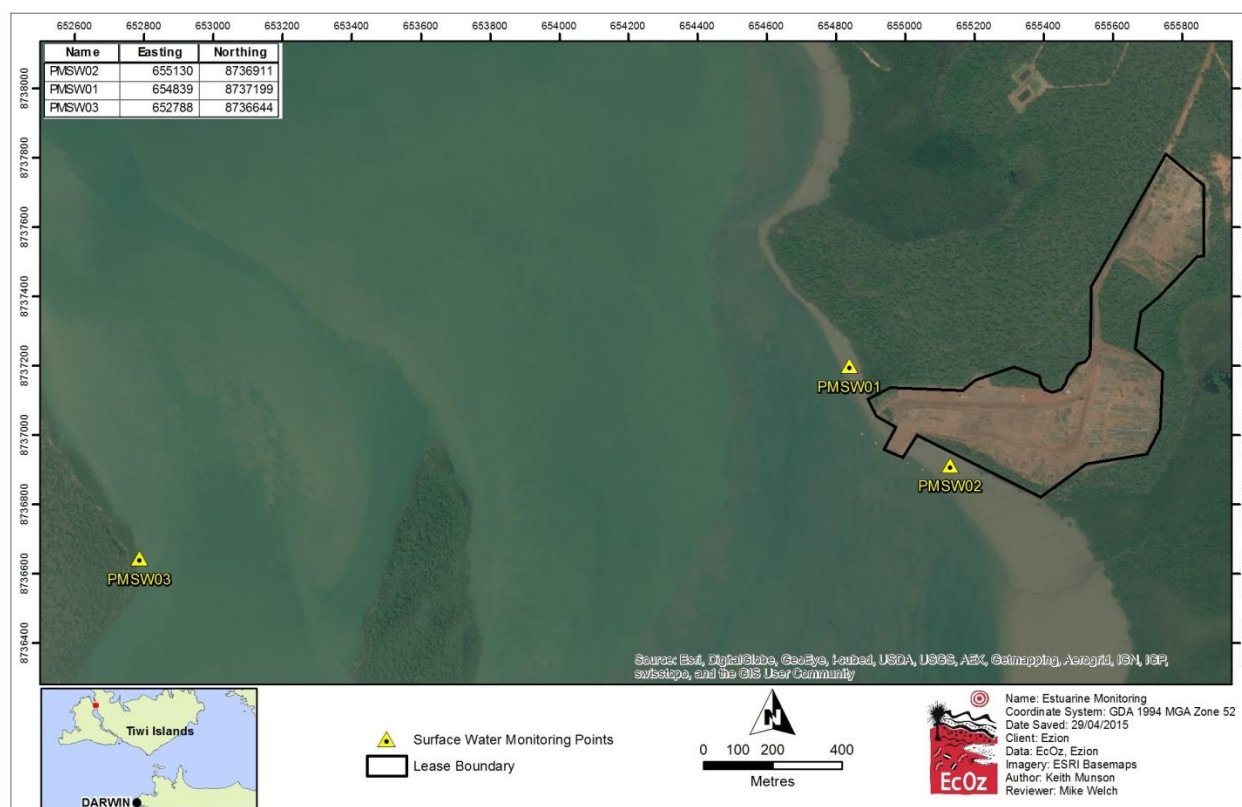


Figure 6-3. Map showing locations of estuarine surface water and sediment monitoring sites

Responsibilities

The NTPM Port Manager is responsible for ensuring that monitoring is undertaken in accordance with this plan.

The NTPM Port Manager is to ensure weekly/post-rainfall inspection checklists are undertaken, which include inspection of all infrastructure relevant to management of water quality (i.e. hazardous materials storage, spill containment, erosion and sediment controls, etc.).

Performance Criteria

Monitoring is undertaken in accordance with this plan

Daily/weekly inspection checklist undertaken

No evidence of contamination of surface waters as a result of NTPM operations

6.5 Groundwater Management

Objective

Ensure that groundwater extraction is sustainable and does not impact on nearby users or cause saline intrusion.

Strategies

Drawdown modelling undertaken prior to commencement of operations indicated that if the aquifer surrounding the port area is unconfined, the drawdown at the nearby Blue Water Creek spring extraction point would be unmeasurable, whereas if it is confined, in a worst-case scenario the drawdown could be up to 0.03 m.

Although drawdown modelling indicates a low risk of groundwater drawdown from extraction at the Port on the aquifer feeding the Blue Water Creek spring, monthly monitoring of groundwater levels in bores located between the Port and the Creek is undertaken. To monitor for potential saline intrusion, at least one bore between the extraction bores and the coast are monitored, as described below.

Standing water levels are recorded at all bores (i.e. both supply and monitoring bores) on a monthly basis, to assess potential aquifer drawdown. To assess potential saline intrusion, monthly sampling of two monitoring bores (i.e. one existing and one new bore to be installed approx. 80 m from coast) between the coast and water supply bores is undertaken, including testing of several parameters that may indicate saline intrusion. Details of the monitoring program are provided in Table 6-2.

Table 6-2. Details of groundwater monitoring program at Port Melville

Monitoring Types/Sites	Frequency	Measurements/Analytes	
		Ground Water Levels	Water Quality
Aquifer drawdown:			
Monitoring Bores 1 and 2 Accom. Camp 1 Base Bore 1	Monthly	Ground water levels	N/A
Saline intrusion:			
Office Bore (200 m from coast) New Bore (to be installed 80-100 m from coast)	Monthly	Ground water levels	Laboratory Analytical Assessment: Electrical Conductivity (EC), pH, Salinity, Total Alkalinity, Major anions (Cl, SO ₄ , CO ₃ /HCO ₃ , NO ₃ -N), Major cations (Ca, Mg, Na and K)

In order to distinguish between potential drawdown effects and natural seasonal variability in groundwater levels, previous monitoring data is available for Monitoring Bore 3 (RN32888). This

data, collected by NT Government over a two-year period, indicates that seasonal fluctuations in standing water levels are around 5 m below ground level (mbgl), with the lowest level recorded being 8.0 mbgl. The dry season hydrograph follows a very gentle curve, so any potential drawdown effect as a result of pumping should show as an inflection point if a cone of drawdown reaches it. As indicated by the modelling, potential drawdown at this distance is 0.01 to 0.02 m, which is probably not detectable, since it is about the same magnitude as the probable daily fluctuation due to changing barometric pressure.

Responsibilities

The NTPM Port Manager is responsible for ensuring that monitoring is undertaken in accordance with this plan.

The NTPM Port Manager is responsible for reporting of groundwater monitoring data to Power Water Corporation and DLRM on at least an annual basis.

Performance Criteria

Monitoring, comparison of data with triggers and associated actions outlined in Table 6-3 are undertaken.

No impacts of aquifer drawdown detected.

Table 6-3. Triggers and actions for assessing potential aquifer drawdown

Monitoring Type	Triggers	Actions
Aquifer drawdown	<ul style="list-style-type: none"> Standing water level for Monitoring Bore 3 (RN32888) >0.1 m lower than minimum historical/baseline groundwater levels for the time of year measured 	<ul style="list-style-type: none"> Review water levels in context of recharge from most recent wet season e.g. can it be attributed to low recharge? Repeat measurement and/or increase sampling frequency to confirm trend Compare with other monitoring bores to assess potential spatial extent of impact
Saline intrusion	<ul style="list-style-type: none"> Increase in EC of >100 μS/cm higher than historical maximum for the individual bore in question 	<ul style="list-style-type: none"> Compare with other monitoring bores to assess potential spatial extent of impact Review ionic composition to assess potential cause by NaCl (i.e. sea water) Repeat measurement and/or increase sampling frequency to confirm trend

If it evident that over-extraction of groundwater is occurring and causing aquifer drawdown and/or saline intrusion, NTPM will consider reduction of extraction rate and/or alternative source(s) of water. A reduction in extraction rate is unlikely to be sustainable in the long term if it will impact on operations, therefore alternative sources of water would need to be sought. Alternative sources of water may include purchase from Power Water Corporation from the town of Pirlangimpi’s supply (if it is within the sustainable extraction rate for that aquifer) or investigation of other nearby aquifers.

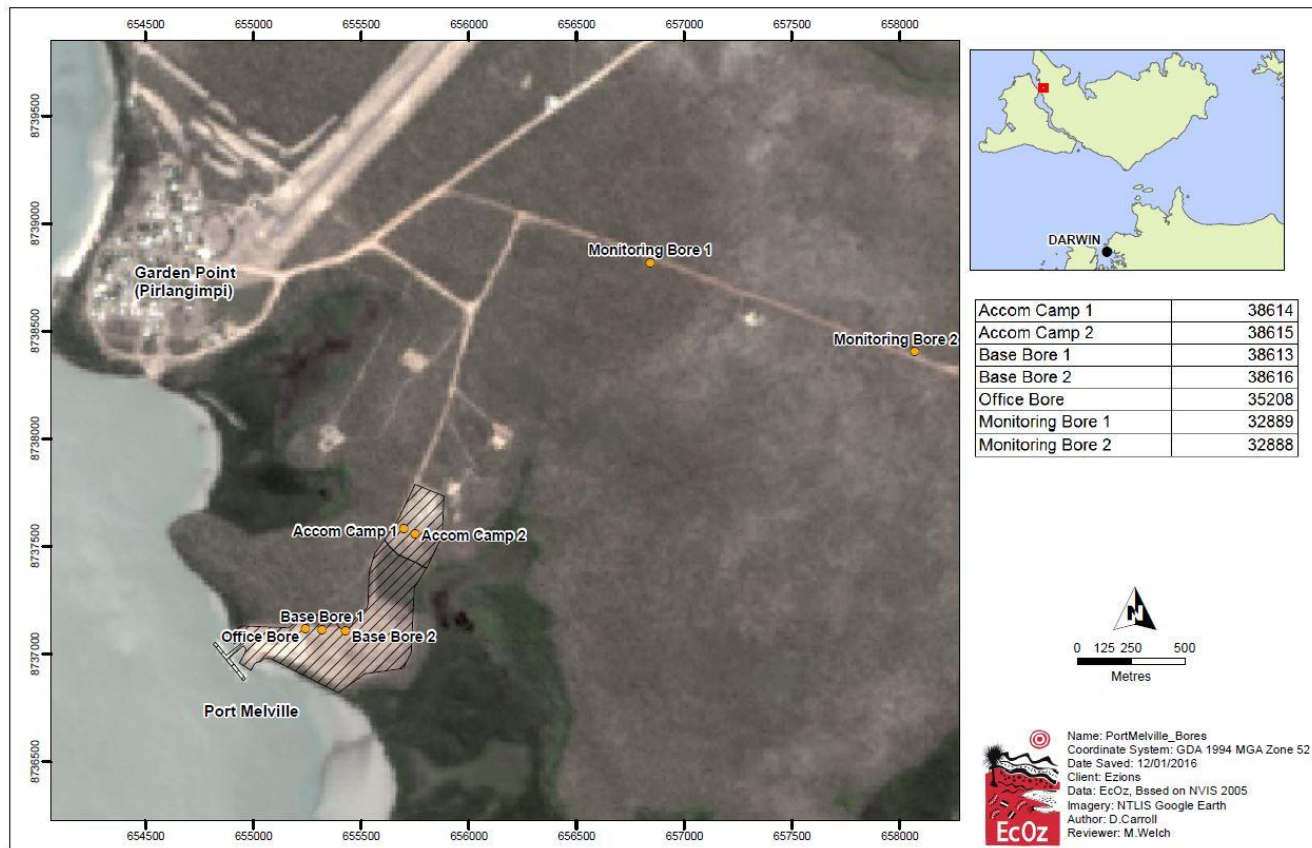


Figure 6-4. Map showing locations of water supply and monitoring bores

6.6 Wastewater Management

Objective

No contamination of soil, waterways, or the water supply bores and no introduction of pests or diseases to Port Melville and surrounding environments.

Wastewater treatment plant operating within water quality design criteria and no complaints about odour from neighbouring properties (i.e. Pirlangimpi or staff at the port).

Any leachate draining from woodchip stockpiles is captured and contained on site.

Strategies

Wastewater treatment systems are regularly inspected and maintained in accordance with DOH's Fact Sheet *Maintaining an on-site wastewater system* (DOH 2011a) and the *Code of Practice for Small On-site Sewage and Sullage* (DOH 1996).

Management of the wastewater treatment plant is undertaken in accordance with the [Appendix I – Recycled Water Management Plan](#)

Treated wastewater from the accommodation camp is sampled monthly from the treatment plant outlet (i.e. prior to irrigation) for the following parameters, in order to meet the compliance criteria specified in the DoH Wastewater Works Design Approval (DD2015/02034):

Parameter	Compliance Criteria
<i>E. coli</i>	<100 cfu/100mL
BOD ₅	<20 mg/L
Suspended solids (SS)	<30 mg/L
pH	6.5-8.5
Turbidity	<5 NTU (95 th percentile)
Disinfection – residual Cl	0.2 – 2.0 mg/L

The following are undertaken in relation to the accommodation camp wastewater irrigation disposal area:

- Regular checks that the automated backwash of in-line filter is occurring as expected
- Records of monthly flushing of each individual zone
- Weekly visual inspection of disposal zone during operation to check for leaks and/or surface discharge
- Continuous pressure sensor link to alarm system to identify low pressure (leakage or burst) and high pressure (blockages) events
- Monthly check of pressure records
- Monthly check of flow records
- Monthly check of pump time taken to discharge volumes to assess pump performance and potential blockages
- Every 3 months monitor flow rates and pressures for discharge in each zone to check for any changes in disposal time to assess for potential blockages in the system
- Recording data so that changes can be monitored over time

The following are undertaken in relation to the management of potential generation of leachate from woodchip stockpiles during the wet season:

- Limit entry of water to stockpiles to direct rainfall as far as possible, by diverting any stormwater run-off away from woodchip stockpiles
- In areas where leachate is observed to be a potential issue (e.g. discharged off site), direct any leachate from the base of stockpiles to a location where it can be contained (e.g. lined sump) and recycled on site (e.g. irrigation and evaporation)

The wastewater irrigation area is to be inspected for odours as part of the weekly inspections.

Responsibilities

The NTPM Port Manager is responsible for the proper management of wastewater on-site. This includes ensuring the treatment systems are regularly cleaned out and maintained.

The NTPM Port Manager is to ensure weekly inspection checklist is undertaken.

Vessel masters are responsible for wastewater on board their vessel and the proper disposal of this wastewater in accordance with international and Australian regulations.

Performance Criteria

Wastewater treatment systems regularly inspected and maintained.

Wastewater from treatment plant meets design criteria.

No discharge of woodchip stockpile leachate off site.

No complaints about odour from neighbouring properties (i.e. Pirlangimpi or staff at the port)

Weekly inspection checklist undertaken.

6.7 Waste Management

Objective

No contamination of surrounding environments from waste from the port and/or shipping associated with the port operation.

Strategies

Waste at the port is in accordance with the NTPM Appendix K – Waste Management Plan.

Non-recyclable waste generated within the port area, such as domestic waste from the accommodation camp and offices, and waste generated by the workshop and general port operations is segregated from hazardous and recyclable waste prior to being disposed of at the local waste disposal facility, under an agreement with Tiwi Regional Council. Hazardous and recyclable wastes are contained in designated areas/bins and transported by barge to Darwin for appropriate disposal.

Inspection of waste storages is included in the sites weekly inspection checklist.

The generation of waste from areas of the port such as the accommodation camp, office and workshop, shall be minimised through recycling, re-using and reducing resource-use where possible.

Timber that has the appropriate fumigation certificates and has been passed for entry into Australia by DAWR will be excluded from the hazardous material criteria once cleared/notified by DAWR.

Non-biosecurity wastes (e.g. plastics, glass, etc.) shall be handled in accordance with the NTPM Appendix K – Waste Management Plan

Vessel masters shall ensure their vessel is maintained in a clean state at all times and facilitate regular housekeeping inspections that are recorded in the ship's log book.

While in port, all vessel waste on deck must be secured so that it is inaccessible to birds or animals i.e. bagged and in lidded deck bins.

General waste shall be collected daily, double-bagged, sealed and placed in the appropriate waste management bins in accordance with the vessel's waste management plan.

In order to meet the requirements of DAWR, vessels are to be fitted or provided with metal waste receptacles that are capable of being closed with a lid for the storage of all waste. In the absence of such metal receptacles, vessels are to secure waste in a separate compartment (such as in the fore peak) until such time as they are able to discharge the waste to a DAWR-approved facility.

Certain perishable waste products shall be double-bagged, sealed and where possible refrigerated to minimize increased risk of contamination.

Eventually, all vessel waste must be disposed of responsibly in accordance with marine legislation, the ships' and ports' Waste Management Plans.

Responsibilities

The NTPM Port Manager is responsible for the proper management of waste on-site. This includes ensuring waste skips are regularly barged to Darwin for disposal at an approved waste facility and maintaining records of the amount and types of waste; although the accommodation camp contractor is responsible primarily for the management of camp waste.

Vessel masters are responsible for waste on board their vessel and the proper disposal of this waste in accordance with international and Australian regulations.

NTPM staff and contractors are responsible to ensuring they dispose of their waste responsibly and in accordance with the *NTPM Waste Management Plan*.

Performance Criteria

All waste from port operations and the accommodation camp contained and taken to Darwin for disposal/recycling at approved facility.

Records maintained of waste amount and types taken to landfill.

All port staff and contractors dispose of their waste in accordance with procedures.

Daily/weekly inspection checklist undertaken.

6.8 Erosion Management***Objective***

No contamination of surrounding environments with sediment from port operations areas.

Strategies

There exists a high potential for erosion and sedimentation from the site, given large rainfalls during the wet season and large areas of bare, un-vegetated soil and hard surfaces that accelerate flows and can lead to erosion. An Appendix E – Erosion and Sediment Control a primary focus being on prevention of sediment-laden/turbid run-off entering Apsley Straight, which includes all design specifications and a detailed layout of controls across the site (including all laydown areas and the access road), as well as the direction of overland flows and the calculations used for sizing and design of control measures based on predicted rainfall and run-off.

Inspection of erosion and sediment controls and any areas of erosion at the site are included in the Appendix J – Site Inspection Checklists

Responsibilities

The NTPM Port Manager is responsible for ensuring all erosion and sediment control measures such as drains and sediment ponds are well maintained and cleaned out when required. The NTPM Port Manager is also responsible for regularly reviewing the ESCP to ensure its on-going effectiveness and to reflect any infrastructure or operational changes on-site.

The NTPM Port Manager is to ensure weekly/post-rainfall inspection checklist is undertaken.

Performance Criteria

No evidence of significant erosion on site or sedimentation/turbidity of nearby environments.

Erosion and sediment control infrastructure is functioning as designed and is maintained as required.

Erosion and Sediment Control Plan updated when required.

Weekly/post-rainfall inspection checklist undertaken.

6.9 Weed Management

Objective

No introduction of new weeds to the port area and existing weeds to be eradicated or their spread controlled.

Strategies

NTPM have developed a **Appendix F – Weed Management Plan** that:

- Documents and maps existing weeds at the port.
- Outlines the measures for eradication and/or controlling the spread of these existing weeds.
- Lists the potential weeds of most concern for spread to the port and control measures for preventing the introduction of these weeds.
- Outlines the ongoing weed monitoring program.

Weed identification and control measures will be included in the induction for all staff and contractors at the port.

Vehicles, equipment, machinery and any cargos that may potentially carry weed seed, soil or plant material departing from Darwin will be washed-down, inspected and approved for transport prior to barging to Port Melville in accordance with the Tiwi Islands Quarantine procedure (see Tiwi Islands Quarantine factsheet on their website). The barge departure point located at East Arm Wharf has a dedicated wash-down bay for this purpose.

Discovery of any weeds on-site listed under the NT *Weeds Management Act*, listed as a *Weed of National Significance* or a potential new weed not yet known in Australia (see Section 3.6.3 *Weeds*) must be reported to the NT Government Weed Management Branch and their advice sought on its eradication or control.

Inspection of the site for weeds is included in daily/weekly inspection checklist.

Responsibilities

The NTPM Port Manager is responsible for ensuring that weed control and eradication activities are carried out in accordance with the *Weed Management Plan*; that this Plan is regularly reviewed and updated and that monitoring activities are regularly undertaken.

The NTPM Port Manager will ensure weekly inspection checklist is undertaken and notify NT Government Weeds Branch if any previously un-recorded declared weeds or non-native plants are detected on site, in accordance with Section 9, Part 1-c of the NT Weeds Management Act.

The Woodchip Stevedoring Manager/Supervisor is responsible for weed and pest management within the area of the port utilised for export of woodchips and for preventing the spread of weeds from plantations to the port.

NTPM staff and contractors are responsible for ensuring their work practices do not spread or introduce weeds at the port, including following all weed hygiene measures outlined in the Weed Management Plan and in site inductions.

Performance Criteria

No new weeds introduced to the site.

All existing weeds controlled in accordance with Appendix F – Weed Management Plan.

Records maintained of weeds on site and regular surveys to update weed maps of the port.

All weed hygiene measures carried out in accordance with Appendix F – Weed Management Plan.

All relevant staff and contractors trained and aware of their weed management responsibilities and procedures.

Appendix F – Weed Management Plan reviewed and updated when required.

Weekly inspection checklist undertaken.

6.10 Terrestrial Flora and Fauna Management

Objective

Minimal disturbance to terrestrial flora and fauna within or surrounding the port.

Strategies

Management actions to minimise any disturbances to terrestrial flora and fauna include:

- Maintain vehicle speed limits on site.
- Road kill management – vehicles to adhere to speed limits on access roads and be aware to avoid fauna strikes if safe to do so.
- See also, Section 6.7 *Waste Management* for mitigation measures to minimise impact of waste on terrestrial fauna, Section 6.9 *Weed management* for prevention of weed infestation of native habitats and 6.12 *Fire management* in relation to protection of surrounding vegetation from fire.
- Noise and light disturbances to wildlife are discussed in Section 6.11 *Marine fauna management* below.
- Any clearing of native vegetation is not to occur without relevant approvals and is to be kept within approved boundaries.

Responsibilities

Port staff and contractors to abide by speed limits and avoid collision with fauna on roads if safe to do so.

Performance Criteria

No unauthorised clearing of vegetation.

Minimal collisions with terrestrial fauna on access roads.

No impacts on flora and/or fauna as a result of inappropriate waste management, fire management or weed management.

6.11 Marine Fauna Management

6.11.1 Boat Strikes and Vessel Interaction

Objective

- Minimal disturbance (physical and/or behavioural) to marine fauna in the vicinity of the port and as a result of shipping movements.

Strategies

The vast majority of documented boat strikes for marine fauna result from smaller vessels (i.e. recreational boats) travelling at high speeds (i.e. > 20 knots). The risk of impacting marine fauna populations from boat strikes involving vessels travelling to and from Port Melville is considered low for the following reasons:

- Vessels navigating Apsley Strait, and entering the strait from either its northern or southern entrances, are restricted to an established, deep, central shipping channel, which is well-marked with permanent navigation markers, and follows a route that maximises the distance to shore (where turtles may nest) or shallow areas (where there may be areas of seagrass utilised by dugong).
- The number of vessel movements associated with Port Melville marine supply base operations is relatively few, which may in future be up to 8 large vessels movements on average per month (i.e. rig tenders, woodchip carriers and international project vessels) entering and exiting the Apsley Strait via the northern entrance, and approximately 4 barge movements per month entering and exiting the Strait via the southern entrance.
- Dugongs are not known to use the Apsley Strait for feeding or breeding since their main food source, seagrass, is not extensive within the strait. The nearest important seagrass areas occur along the northern coastlines of both Melville and Bathurst Islands. The route taken by vessels traveling through this area is restricted to the marked, shipping channel.
- In regards to the southern entrance to the Apsley Strait, vessel movements are limited to barges and assist tugs travelling between Darwin and Port Melville. Barges are already regularly using this route to service communities. No significant seagrass areas exist within the vicinity of the southern entrance or along the southern coastlines of Bathurst and Melville Islands. Similarly, no important turtle nesting beaches occur at the southern entrance of the Strait. Infrequent turtle nesting areas occur along the southern coastline of Bathurst and Melville Islands.
- Fully loaded vessels >50m will only navigate the Apsley Strait and the northern entrance channel on high water. This is required to ensure a sufficient under keel clearance and also maximises the distance around the vessel from shorelines and shallow areas; thus reducing the chance of marine fauna strike. **UKC requirements of 1.0m or 10% of ships draft as a minimum.**
- All large vessels (i.e. > 50 m length) travelling from Darwin will enter Apsley Strait from the north, to avoid potential dugong aggregation areas between Darwin Harbour and the south of Apsley Strait.
- All large vessels are overseen by a harbourmaster/pilot based at Port Melville, who will ensure that visiting vessels abide by the procedures to minimise potential impact on marine fauna, including a maximum vessel speed of 6 knots between or slowest safe navigable speed for vessel if over 6 knots. Port Melville and the Pilot Boarding Station, located approximately 30 km to the north-west of the mouth of Apsley Strait. This requirement is also specified in the *Port*

Melville Information Handbook, which must be read by all vessel masters prior to their arrival at Port Melville.

- Vessel masters must report any marine fauna sightings or strikes to the NTPM Port Manager, who will record the sighting/strike in the marine fauna observations register. Any occurrence of a marine fauna strike will require a review of procedures and implementation of measures to prevent future strikes. Outcomes of this review process and implemented mitigation measures will be recorded in the marine fauna sighting/strike register. Similarly, any trends or seasonal patterns in marine fauna sightings will be used to implement procedures and mitigation measures for preventing marine fauna impacts and disturbances e.g. timing of vessel movements etc. This register will be available to the NT EPA, other government authorities, or research organisations on request.

Responsibilities

Vessel masters must keep a watch for marine fauna whilst navigating the Apsley Strait and take all reasonable measures to avoid any strikes.

Vessel masters must report any marine fauna strikes to the NTPM Port Manager, who must maintain records of these strikes for implementing management actions if required.

Performance criteria

- Minimal strikes of marine fauna.
- Records maintained of any marine fauna strikes.

6.11.2 Noise

Context

During the operation of this project, shipping vessels will be the most significant sound sources. All are expected to operate in the range of 180-190 dB when measured at the source level (as opposed to the received level, which is the level experienced by the organism of interest). The propagation and transmission of noise in water differs from that in air; a noise source level of 80-90 dB in air has an underwater equivalent of 140-150 dB. Low frequency sounds are least absorbed by sea water and, as such, are the principal source of ambient background noise levels in the marine environment (URS 2009). Background ambient noise in a marine environment is in the order of 80-100 dB, with shipping often the dominant source of ambient noise in the low frequency range.

The predominantly low frequency sounds produced by large vessels is thought to be similar to the auditory sensitivity of large whales and several fish species, whereas commercial sonar may overlap with the hearing of dolphins and porpoises (Scholik and Southall 2009). Sounds between 120-190 dB (re 1 μ Pa) have been demonstrated to result in avoidance and other behavioural impacts upon baleen whales and dolphins, and noises of 175 dB have been reported to result in avoidance behaviour in green turtles (URS 2009). Southall (cited in URS 2009) provided a criterion of 230 dB at which pulsed noise can cause physical injury in cetaceans (irreversible hearing loss), and 190 dB re 1 μ Pa as resulting in avoidance behaviour.

The received level thresholds that may cause behavioural disturbance to fauna were summarised by McCauley and Salgado Kent (2008; reported on page 237 the Browse EIA) and are summarised in Table 6-4 below.

Table 6-4. Received acoustic level thresholds that may cause behavioural disturbance to fauna

Receptor	Approximate received acoustic level threshold for behavioural disturbance (dB re 1 µPa)	Reference/s
Cetaceans	Variable, beginning at 120-160 dB	Southall et al. 2007
Dugong	Unknown	Wartzok and Ketten 1999
Fish (hearing specialists)	Variable > 90 dB above hearing thresholds	Popper et al. 2003; Scholik and Yan 2002a; 2002b; Xodus 2009; Hastings et al. 1996.
Fish (hearing generalists)	Variable > 90 dB above hearing thresholds	Popper et al. 2003; Xodus 2009; Hastings et al. 1996
Marine turtles	> 170 dB	Bartol and Musick 2003; McCauley et al. 2000

Potential impacts

Impacts from anthropogenic noise on cetaceans have been well studied and noise pollution is known to potentially result in adverse effects on cetaceans (Nowacek et al. 2007). Information pertaining to the auditory systems of dugongs is scarce. Studies of noise impacts on marine turtles are also scarce. Juvenile Green Turtles are known to persist in areas subject to high levels of boating activity such as the Gold Coast seaway in Queensland, where macro-algae is abundant.

It is important to remember that the proposal represents the intensification of an existing use, and so most marine fauna are likely to be habituated to some degree to activities within the area. Within the waters of the port and channels, noise is expected to be attenuated significantly within tens of metres due to the shallow depths, soft substrates, and expected high ambient noise levels. For example, noise from a 200 dB source is estimated to drop to approximately 170 dB within 100 m; with attenuation of sound levels expected to further decrease with distance from the source.

Mitigation measures

The operation of the port is not expected to create noise pollution sufficient to modify the behaviour of marine fauna. The impact of shipping noise on marine fauna can be considered to be minimal given the low volume of traffic (12-13 return trips per month to the north and the south). No mitigation measures are proposed.

6.11.3 Light

Objective

- Minimal noise and light disturbances (behavioural) from the port and from shipping movements.

Strategies

Port operations

The majority of the port area is shielded by surrounding vegetation (i.e. average height 12-15 m), therefore the main risk of light spill impacts on marine fauna is limited to the wharf area. However, lighting within the port and accommodation camp will be kept to the minimum required to safely move around the site.

Prior to the commencement of port operations, an independent light audit was conducted to assess the potential impacts of lighting from the port on turtle nesting areas to the north, which concluded that

'under the present conditions and at the time of the survey, lights from Port Melville had no detectable impact on sea turtle nesting beaches in the Northern Tiwi Islands' (Guinea 2015).

Generally, project vessels will carry out cargo operations during daylight hours, except for exceptional circumstances required by customers.

Vessel movements

While steaming near and into Apsley Strait, vessels will only show the navigational lights (i.e. all deck lights will be extinguished during steaming near and into Apsley Strait) of the correct intensity (visible from 3 nm) as required by international law. These lights consist of port (red), starboard (green) and mast head (white).

Night shipping movements only occur when required (e.g. emergency situation where a vessel would need to evacuate the port on a high tide), with most vessels will enter the Apsley Strait during daylight hours.

Responsibilities

The NTPM Port Manager to review inspection results to confirm that lighting requirements are met.

Performance criteria

Regular inspections when night operations are taking place to confirm that:

- Mobile lighting towers are < 10 m above the wharf floor and angled towards shore or to the south.
- No unnecessary lighting on ships, other than that required for navigation and/or safe movement around the ship at night.

6.12 Fire Management

Fire can pose a risk to the environment surrounding Port Melville, either from fires originating on site impacting on surrounding vegetation or from fires that pose a risk to infrastructure on site (particularly fuel storage).

Objective

- No ignition or spread of fire within the project area or surrounding vegetation.
- Protection of infrastructure on site from fires originating in surrounding vegetation.

Strategies

Fire breaks of at least 4 m wide will be maintained around the perimeter of the project area, with weekly inspections during the dry season.

The Tiwi Land Council is responsible for the area surrounding Port Melville and will be consulted regarding the coordination of fuel-reduction burning as required.

Fire-fighting equipment will be maintained in case of emergencies on site. The diesel fuel farm will have its own fire protection system, capable of reaching all sides of all tanks and the bund area. The system has been designed and is to be installed in accordance to AS1940 and consists of two dedicated fire water tanks (231kL each), fire brigade boosters (six inlet), tanks booster, and a fire pump set all designed according to AS 2419.3.

All staff will be inducted in fire management and avoidance.

Responsibilities

Port staff are responsible for ensuring fire breaks are maintained around the project area, and that firefighting equipment is in operating order.

Performance criteria

- Fire breaks in place around site perimeter and fire-fighting infrastructure/equipment maintained in good working order.
- No fire incidents occur.
- Ensure effective housekeeping inspections and waste management is implemented removing potentially non-essential combustible items from the Port

6.13 Air Quality Management

Air quality includes airborne dust, deposited dust and fine particulate matter. It also includes odour and airborne pollutants such as smoke, hydrocarbon emissions or other chemical emissions.

Potential sources and impacts

Sources of dust at the port include the unsealed access road, laydown areas and other un-vegetated bare soil areas such as around the accommodation camp, offices and fuel farm.

Airborne dust from exposed soils at the port is potentially created by wind alone and/or vehicle and machinery movements.

Airborne dust mainly impacts visual amenity and visibility, which can reduce the safety of work sites. Depositional dust can be a nuisance when depositing onto neighbouring properties, such as the community of Pirlangimpi. It can also smother vegetation, impacting habitat quality, and contribute to sediment loads in runoff. Respirable dust (i.e. < PM10) is considered a health hazard as the particulate matter can be inhaled and may carry harmful materials (such as silica).

The wastewater treatment disposal area is a potential source of odour. Management of this facility is not covered here – see Section 6.6 *Wastewater management*.

Objective

No impacts from depositional dust on neighbouring properties i.e. Pirlangimpi

No visible plumes/dust clouds above the port area at any time

No impact from depositional dust on surrounding natural habitats, e.g. no excessive smothering of vegetation or sediment loads into waterways

The fuel farm and all vehicles and machinery are maintained in good working order to minimise emissions

Strategies

Implement dust suppression with water trucks whenever and wherever surface soils are dry and vehicle movements are occurring and/or surface soils are dry and winds are strong enough to carry dust. Water to be sourced from groundwater bores located onsite and water trucks capable of spraying water onto exposed soils to be available onsite at all times.

Cease activities when wind is excessive and visible dust plumes are occurring despite dust suppression with water trucks.

Enforce speed restrictions on internal access roads.

Weekly visual assessments (as part of the weekly inspection checklist) will be made of effectiveness of dust mitigation measures and changes made as required (e.g. increased water truck movements).

If visual assessments indicate an ongoing issue or there is a complaint made in relation to air quality or dust, the dust monitoring program outlined in Table 6-5 will be undertaken. This air quality monitoring program is based on the DEC (2005) impact assessment criteria.

Table 6-5. Air quality monitoring program (if visual monitoring and/or complaints indicate an issue)

Parameter	Equipment	Frequency	Duration
Deposited Matter (Insoluble Solids)	Dust deposition gauges	Monthly	12 months
TSP (Total Suspended Particulates)	Continuous light scatter sampler with filter for dust speciation	Randomly assigned 2 months. 24 hrs every 6 th day	1 month each sample (24hrs every 6 th day) 2 times each year
PM ₁₀	Continuous light scatter sampler with filter for dust speciation	Randomly assigned 2 months. 24 hrs every 6 th day	1 month each sample (24hrs every 6 th day) 2 times each year

The 4 g/m²/month maximum (based on a rolling annual average) level will be adopted as the criteria for deposited dust.

TSP and PM₁₀ will be monitored twice per year by two randomly assigned sampling periods consisting of consecutive one month sample periods (i.e. two months monitoring per analyte per year). The two month sampling periods will be separated by at least three months of the year.

During each one month sampling period, TSP and PM₁₀ will be measured over a 24 hour duration every 6th day. The TSP/PM₁₀ sampler will be run for the same duration as recommended in AS3580.9.3 and AS3580.9.6.

Strategies for minimising sediment loads into downstream natural waterways is covered by Section 6.4 *Surface Water Management* and the Appendix E – Erosion and Sediment Control Plan

Vehicle and machinery will be kept well maintained to minimise hydrocarbon emissions.

National Pollutant Inventory (NPI) reporting to be undertaken if required.

Responsibilities

The NTPM Port Manager to oversee implementation of dust suppression activities and ensure weekly monitoring is undertaken to assess effectiveness of dust suppression measures and implement actions if performance criteria are not being met

Operators must maintain their vehicles and machinery in good working order to minimise emissions.

NTPM Port Manager to record and respond to any complaints from the public.

Performance Criteria

Dust suppressed when required, no dust plumes visible above the port at any time.

All vehicles and machinery maintained in good working order.

Annual NPI report completed (if required).

No complaints from the public regarding dust, odour or other emissions.

Surrounding vegetation free of dust and runoff water from the site meets the performance criteria as outlined in Section 6.4 Surface Water Management.

Water cart Operated as required

6.14 Biting Insects Management

Objective

Minimise the risk of introduction of exotic mosquitos and exposure of people to mosquito-borne diseases

Undertake monitoring for potential introduction of exotic mosquitos

Implement appropriate procedures to ensure that adequate resources are available on site to rapidly respond to exotic mosquito detection.

Strategies

Measures for minimising the risk of introducing new exotic mosquito species to Port Melville on international ships are provided in the Appendix L – Biting Insect Management Plan). This includes on-going mosquito monitoring at the port to provide early detection, and a response plan should an incursion occur. This monitoring program and response plan were developed in consultation with DAWR and the NT Department of Health, Centre for Disease Control.

Responsibilities

NTPM Port Manager to ensure biting insect strategies specified in the Appendix L – Biting Insect Management Plan are implemented to protect Port staff and contractors from biting insects.

Performance Criteria

Areas of standing water at the port are minimised.

No complaints from workers or locals regarding biting insects within the port area.

Mosquito monitoring program being undertaken.

No detection of exotic mosquitoes at the port or local community that can be traced to insects inhabiting the port.

Weekly inspection checklist undertaken.

6.15 Sacred, Cultural and Heritage Site Management

Objective

No disturbance to any sacred, cultural or heritage sites at the port or surrounding the port.

Strategies

Port activities will remain within the existing cleared footprint and no clearing activities will be undertaken outside this area without prior approval from the Tiwi Land Council or without consulting the NT Heritage Branch. A minimum of a 100 m buffer is to be maintained between cleared areas and documented features at the Fort Dundas historical site, located immediately to the north of the Port (Figure 6-5).

Operations Environmental Management Plan (OEMP)

Port staff and contractors will be made aware they must restrict all activities to within the existing cleared footprint of the port and to report any previously unknown heritage of indigenous relics to the NTPM Port Manager.

If an indigenous or heritage relic is discovered, all works in the area are to be stopped immediately and the area cordoned off until the appropriate authorities are notified and their advice sought.

Responsibilities

Port staff and contractors must remain within the existing limits of the port cleared area unless otherwise authorised.

NTPM Port Manager to record and report to the relevant authorities any new discoveries of indigenous or heritage relics in the port vicinity.

Any further clearing of vegetation and or land adjacent to the Port is to be authorised by Chief Operating Officer with consultation from associated NT EPA and TIWI Island Governing bodies before any works is to commence.

Performance Criteria

No damage to any known or as yet unknown sacred, cultural or heritage items within or surrounding the port area.

All port activities have remained within existing cleared boundaries unless otherwise authorised.

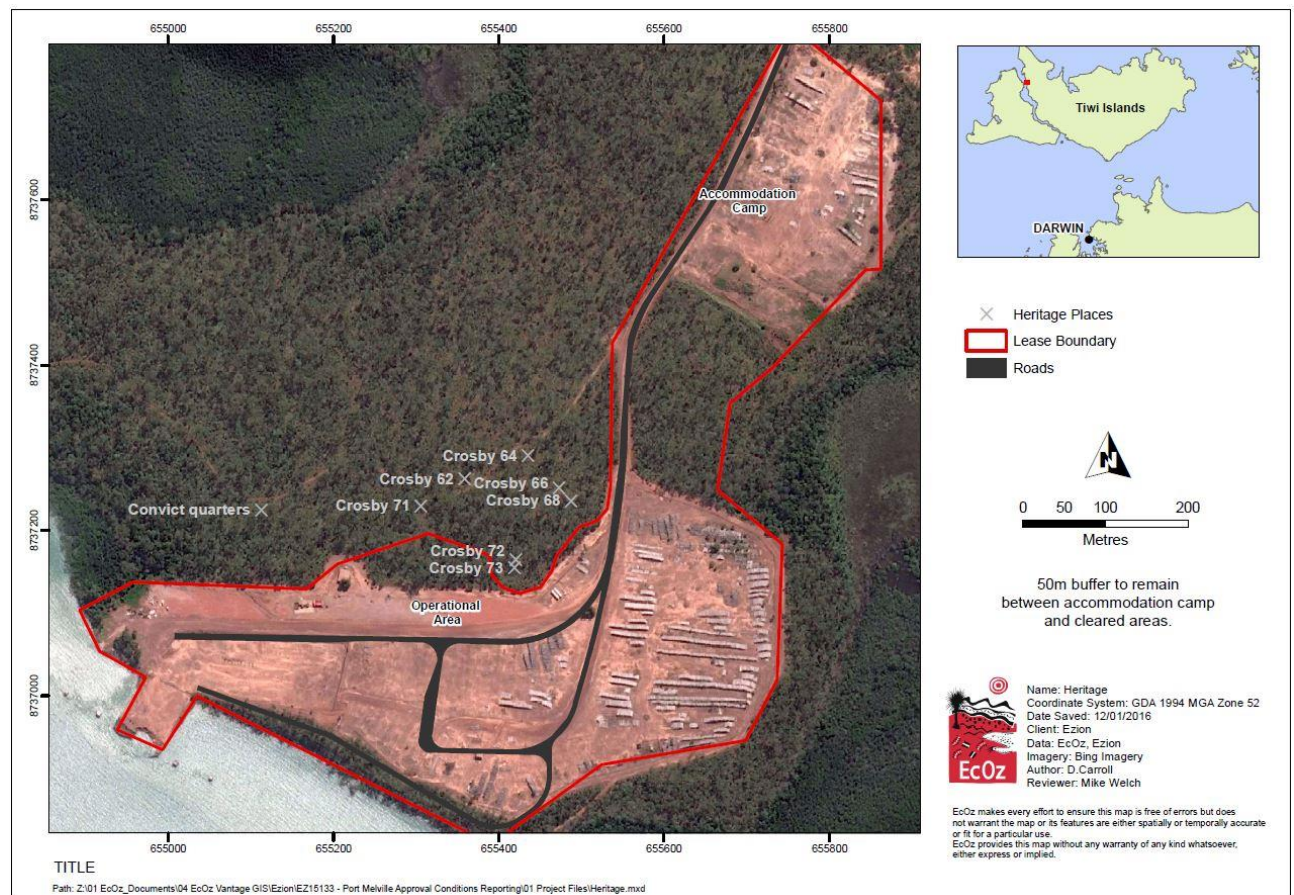


Figure 6-5. Location of Fort Dundas historical remains in relation to Port and planned clearing area

7 References

- AMSA 2007, *Australia's National Plan to Combat Pollution of the Sea by Oil and other Noxious and Hazardous Substances*, Australian Maritime Safety Authority (AMSA), Australian Government, Canberra.
- ANZECC 2000a, *Australian and New Zealand guidelines for fresh and marine water quality. National Water Quality Management Strategy Paper No 4*, Australian and New Zealand Environment and Conservation Council (ANZECC) & Agriculture and Resource Management Council of Australia and New Zealand, Canberra.
- ANZECC 2000b, *Australian guidelines for water quality monitoring and reporting. National Water Quality Management Strategy Paper No 7*, Australian and New Zealand Environment and Conservation Council (ANZECC) & Agriculture and Resource Management Council of Australia and New Zealand, Canberra.
- ANZECC 1992, *Guidelines for the Assessment and Management of Contaminated Sites*. Australian and New Zealand Environment and Conservation Council (ANZECC).
- ARR 1987, *Australian Rainfall & Runoff – A Guide to Flood Estimation*, Pilgrim, DH, (ed). Institution of Engineers, Australia, Barton, ACT, 1987.
- Australian Standard on *Water Quality Sampling - Part 1: Guidance on the design of sampling programs, sampling techniques and the preservation and handling of samples* (AS/NZS 5667.1:1998)
- Australian Standard on *Water Quality Sampling – Part 6: Guidance on sampling of rivers and streams* (AS/NZS 5667.6:1998)
- Australian Standard on *Water Quality Sampling – Part 10: Guidance on sampling of waste waters* (AN/NZS 5667.10:1998)
- Australian Standard on *Water Quality Sampling – Part 11: Guidance on sampling of groundwater* (AN/NZS 5667.11:1998)
- Australian Standard on *Guide to the investigation and sampling of sites with potentially contaminated soil Part 1: Non-volatile and semi-volatile compounds* (AS 4482.1-2005)
- Beatty, A, Maher, J and Cribb, H, 2011, *Monitoring for Marine Pests, Gove Harbour, Groote Eylandt and Melville Island, 2010-2011 Report*, Department of Resources, Northern Territory Government, Darwin.
- Chatto, R and Baker, B, 2008, *The Distribution and Status of Marine Turtle Nesting in the Northern Territory*. Technical Report 77. Parks and Wildlife Service, Department of Natural Resources, Environment, The Arts and Sport, Darwin.
- DAFF 2013a, *Biosecurity Guide to the Major Resources and Energy Sector*, Department of Agriculture (DAWR), Australian Government, Canberra. Online resource available: <http://www.daff.gov.au/biosecurity/import/major-resources-and-energy-sector>
- DAFF 2013b, *Antifouling and in-water cleaning guidelines*, Department of Agriculture, Forestry and Fisheries (DAFF) and Department Sustainability, Environment, Water, Population and Communities (SEWPaC), June 2013, Australian Government, Canberra.
- DAFF 2013c, *Australian Ballast Water Management Requirements*, Department of Agriculture, Forestry and Fisheries (DAFF), Australian Government, Canberra.
- DAFF 2010, *Australian Marine Pest Monitoring Guidelines*, Department of Agriculture, Forestry and Fisheries (DAFF), Australian Government, Canberra.

Operations Environmental Management Plan (OEMP)

- Department of Environment and Conservation NSW (DEC) 2005, *Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales*, Sydney, NSW.
- DHAC 2010, *Darwin Harbour Strategy*, Darwin Harbour Advisory Committee (DHAC), Darwin.
- DLP 2012, *Northern Territory Oil Spill Contingency Plan*, Department of Lands and Planning (DLP), Northern Territory Government, Darwin.
- DoH 1996, *Code of Practice for Small On-site Sewage and Sullage Treatment Systems and the Disposal or Reuse of Sewage Effluent*, November 1996, Department of Health (DOH), Northern Territory Government, Darwin.
- DoH 2011a, *Maintaining an on-site wastewater system*, Environmental Health Fact Sheet No. 504, August 2011, Department of Health (DoH), Northern Territory Government, Darwin.
- DoH 2011b, *Guidelines for Preventing Mosquito Breeding Associated with Construction Practice near Tidal Areas in the NT*, February 2011, Department of Health (DoH), Northern Territory Government, Darwin.
- DoH 2011c, *Personal protection from mosquitos and biting midges in the NT*, October 2011, Department of Health (DoH), Northern Territory Government, Darwin.
- Douglas Partners 2013, *Report on Geotechnical Assessment – Proposed Land Backed Wharf Melville Island, NT*, December 2003, Douglas Partners Pty. Ltd.
- EPA Victoria 2000, *Groundwater Sampling Guidelines*, Publication 669, Environment Protection Authority (EPA), April 2000, Victorian Government, Melbourne.
- NTPM 2013, *Port Melville Biosecurity Management Plan*, November 2013, NT Port and Marine Pty. Ltd., Perth, Western Australia.
- Galt 2013, *Factual report on geotechnical investigation proposed Melville Island marine facility, Melville Island, Northern Territory*, Prepared by Galt Geotechnics Pty. Ltd. for NT Port and Marine Pty. Ltd., April 2013, Galt Geotechnics Pty. Ltd, Perth, Western Australia.
- Haig, T, Knapton, A and Matsuyama, A, 2003, *Water Resources of the Tiwi Islands*, Department of Infrastructure, Planning and Environment, Northern Territory Government, Darwin.
- Guinea, M, 2015, *Port Melville Light Spill Assessment*, August 2015.
- Harrison, L, McGuire, L, Ward, S, Fisher, A, Pavey, C, Fegan, M and Lynch, B, 2009, *An inventory of sites of international and national significance for biodiversity values in the Northern Territory*, Department of Natural Resources, Environment, The Arts and Sport, Northern Territory Government, Darwin.
- IECA 2008, *Best Practice Erosion & Sediment Control – for building and construction sites*, Books 1 – 4, International Erosion Control Association (IECA) Australasia.
- IMO 2011, *Guidelines for the Control and Management of Ships' Biofouling to Minimize the Transfer of Invasive Aquatic Species (Ships' Biofouling)*, International Maritime Organisation (IMO), London.
- Maher, J, Cribb, H and Beatty, A, 2010, *Monitoring for Marine Pests, Gove Harbour, Groote Eylandt and Melville Island, 2009-2010 Report*, Department of Resources, Northern Territory Government, Darwin.
- Marine & Civil 2013, *Basis of Design, (Melville Island Marine Facility)*, Prepared by Marine & Civil Pty. Ltd. for NT Port and Marine Pty. Ltd., May 2013, Marine & Civil Pty. Ltd, Perth, Western Australia.
- Maritime Engineers 2013, *Environmental Load Calculation Melville Island Supply Base Temporary Berth Facility*, Prepared by Maritime Engineers Pty. Ltd. for NT Port and Marine Pty. Ltd., May 2013, Marine & Civil Pty. Ltd, Fremantle, Western Australia.

- NHMRC, NRMMC 2011, *Australian Drinking Water Guidelines*, Paper 6, National Water Quality Management Strategy. National Health and Medical Research Council (NHMRC), National Resource Management Ministerial Council (NRMMC), Commonwealth Government, Canberra.
- Ports Australia 2007, *Non-Cargo Liquid Transfer Practices In Australian Ports*, Ports Australia, Sydney.
- SKM/Seatech Consultants 2003, *Log Export – Melville Island Navigation and Marine Operations Appraisal*, March 2003, SKM/Seatech Consultants Pty. Ltd.
- Tiwi Land Council, 2004, *Tiwi Islands Regional Natural Resource Management Strategy*, Tiwi Land Council.
- URS Australia 2009, *Ichthys Gas Field Development Project: review of literature on sound in the ocean and on the effects of noise on marine fauna*, Report prepared for Inpex Browse Ltd, Perth.

Appendix A – Environmental Policy Statement

Appendix B – Biosecurity Management Plan

Appendix C – Oil Spill Contingency Plan

Appendix D – Marine Pest Monitoring Protocol

SCHEDULE

Location		2015						2016					
		Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Melville Island- Port Melville	Collector 1												
	Collector 2												

Location		2016						2017					
		Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Melville Island- Port Melville	Collector 1												
	Collector 2												

	Collect plates and rope mop
	Deploy plates and rope
	Inspect/photograph plates,

Inspecting Plates and Rope Mops

The traps need to be inspected on a monthly basis. Inspection requires the following:

1. Remove trap from water
2. Photograph the whole trap and the plates front and back on both sides. Photograph the rope mops.
3. Check the general condition of the trap and report damage, date inspected and general observations.
4. Repair any damage to the trap
5. Return trap to water
6. Forward the photographs and Inspection Report as soon as possible.

Collecting and Replacing Plates and Rope Mops

1. Remove trap from water
2. Remove the plates and rope mop. Place in the plastic tubs provided
3. Replace the plates and rope mop, make any repairs that may be needed and re-deploy trap.

Store all samples in an esky with ice immediately and send as soon as possible to:

To: Aquatic Biosecurity Unit (ABU)
 Goff Letts Building, Berrimah Farm
 Makagon Rd, Berrimah NT 0828

If you have any questions or problems, please call ABU on 0413 381 094

Appendix E – Erosion and Sediment Control Plan

Appendix F – Weed Management Plan

Appendix G – Fuel Transfer Manual

Appendix H – Emergency Response Plan

Appendix I – Recycled Water Management Plan

Appendix J – Site Inspection Checklists

Appendix K – Waste Management Plan

Appendix L – Biting Insect Management Plan