VOLUME 3

Draft : Environmental Impact Statement

# Chapter B15 Waste Management

# B15.1 Introduction

This chapter identifies and assesses the impacts associated with potential waste and wastewater generation during construction, operations and decommissioning for the Cairns Shipping Development Project (the project). It also describes proposed mitigation measures aimed at reducing the environmental and social impacts associated with the management of waste and wastewater. The aims of this chapter are to:

- Describe the legal framework associated with waste and wastewater management in the context of the project
- Explain the processes associated with the project that have the potential to generate waste and wastewater and the characteristics of the waste and wastewater itself
- Outline mitigation and management measures to minimise environmental and social impacts associated with the management of the potential waste streams generated as a result of the proposed development.

## B15.1.1 Methodology

### B15.1.2 Desktop Assessment

Baseline data collection and impact assessment has been undertaken based on a desktop review of current and predicted waste and wastewater generating activities, waste types and quantities, and waste and wastewater management activities.

The results of the impact assessment for this chapter are discussed in relation to three factors:

- The magnitude of impacts (significance/consequence) (**Table B15.2.1a**)
- The duration of impact (See **Chapter A1, Project Introduction**)
- The likelihood of impact (**Table B.15.2.1b**).

These were considered together to determine the initial risk assessment as well as a residual risk assessment once additional mitigation measures are applied. The risk assessment matrix is described in **Table B15.2.1c**.

**Table B15.2.1a Impact Significance for Waste**

| Impact Significance / Consequence | Description |
|---|---|
| **Very High** | Irreversible and severe change to current amenity (e.g visual amenity, odour), resulting in the displacement of residents and businesses. Irreversible and significant disturbance of ecology due to contamination of the environment (e.g land contamination, water quality impacts, and improper waste management causing wildlife poisoning, physical injury or death) over a regional spatial scale. Mitigation measures are unable to reduce impacts.<br><br>All solid waste generated by the project is disposed to landfill, with no reuse or recycling. A significant volume of solid waste beyond baseline levels is generated, representing >10 percent of waste processed at facilities in the region.<br><br>A significant increase in the volume of wastewater to be treated representing >10 percent of wastewater volume being treated at the receiving wastewater treatment plant. |
| **High** | Extensive disturbance to current amenity (e.g visual amenity, odour). Considerable permanent adverse disturbance of ecology due to contamination over a local scale. Mitigation measures and detailed design work are unlikely to remove all of the significant effects.<br><br>The majority of solid waste generated by the project is disposed to landfill, with little reuse or recycling. A high volume of solid waste beyond baseline levels is generated, representing five-10 percent of waste processed at facilities in the region.<br><br>A high increase in the volume of wastewater to be treated representing five-10 per cent of wastewater volume being treated at the receiving wastewater treatment plant. |

| Impact Significance / Consequence | Description |
|---|---|
| **Moderate** | Adverse change resulting in some loss of amenity. Loss and permanent damage to ecology on a local scale. Some recovery is anticipated following completion of the works concerned. Mitigation measures are anticipated to alleviate some impacts.<br><br>Some solid waste generated by the project is disposed to landfill, with a reasonable amount of reuse or recycling. A moderate volume of solid waste beyond baseline levels is generated, representing two-five percent of waste processed at facilities in the region.<br><br>A moderate increase in the volume of wastewater to be treated representing two-five percent increase of wastewater volume being treated at the receiving wastewater treatment plant. |
| **Minor** | Limited or temporary effects resulting in low levels of disturbance or loss to local amenity and ecology. Close to full recovery is anticipated following completion of the works concerned. Mitigation measures are anticipated to alleviate close to all impacts.<br><br>The majority of solid waste generated by the project is reused or recycled. A small volume of solid waste beyond baseline levels is generated, representing 0-two percent of waste processed at facilities in the region.<br><br>A minor increase in the volume of wastewater to be treated representing 0-two percent increase of wastewater volume being treated at the receiving wastewater treatment plant. |
| **Negligible** | No appreciable impact upon local amenity or ecology. Effects are within normal bounds of variation or within the margin of forecasting error. No additional solid waste or wastewater is generated beyond baseline levels. |
| **Positive** | Any measures that are expected to result in an improvement of social values, amenity and ecological health.<br><br>The amount of solid waste generated is less than that currently generated by the existing activities at the port.<br><br>Increased rates of recycling and recovery of waste streams than is currently achieved for waste generated at the port.<br><br>Recirculation measures to reduce wastewater generation result in less than what is currently generated requiring processing. |

**Table B15.2.1b Likelihood of Impact**

| Likelihood of Impacts | Risk Probability Categories |
|---|---|
| Highly Unlikely | Highly unlikely to occur but theoretically possible |
| Unlikely | May occur during construction of the project but probability well below 50 percent; unlikely, but not negligible. |
| Possible | Less likely than not but still appreciable; probability of about 50percent. |
| Likely | Likely to occur during construction or during a 12-month timeframe; probability greater than 50 percent. |
| Almost Certain | Very likely to occur as a result of the proposed project construction and/or operations; could occur multiple times during relevant impacting period. |

**Table B15.2.1c Risk Matrix**

| Likelihood | Significance | | | | |
|---|---|---|---|---|---|
| | Negligible | Minor | Moderate | High | Very High |
| Highly Unlikely/ Rare | Negligible | Negligible | Low | Medium | High |
| Unlikely | Negligible | Low | Low | Medium | High |
| Possible | Negligible | Low | Medium | Medium | High |
| Likely | Negligible | Medium | Medium | High | Extreme |
| Almost Certain | Low | Medium | High | Extreme | Extreme |

**Table B15.2.1d Risk Rating Legend**

| | |
|---|---|
| **Extreme Risk** | An issue requiring change in project scope; almost certain to result in a 'significant' impact on a Matter of National or State Environmental Significance |
| **High Risk** | An issue requiring further detailed investigation and planning to manage and reduce risk; likely to result in a 'significant' impact on a Matter of National or State Environmental Significance |
| **Medium Risk** | An issue requiring project specific controls and procedures to manage |
| **Low Risk** | Manageable by standard mitigation and similar operating procedures |
| **Negligible Risk** | No additional management required |

# B15.2 Legislative Framework

## B15.2.1 The London Protocol and the Environment Protection (Sea Dumping) Act 1981 (Cth)

Australia is party to the *1996 Protocol to the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter 1972*, now known as the London Protocol. The London Protocol regulates the types of materials that can be disposed of at sea. The aims of the London Protocol are to protect and preserve the marine environment from sources of pollution and to prevent, reduce and eliminate pollution by controlling the dumping of wastes and other materials at sea.

The waters surrounding Australia's coastline are protected from the dumping of wastes and pollution at sea through the *Environment Protection (Sea Dumping) Act 1981* (Cth). The Sea Dumping Act regulates the loading and dumping of waste at sea, fulfilling Australia's international obligations under the London Protocol to prevent marine pollution by dumping of wastes and other matter.

Ports North and ships that travel to the Port of Cairns are required to adhere to the provisions of the London Protocol, as regulated through the *Environment Protection (Sea Dumping) Act 1981* (Cth) in Commonwealth waters – which extend to the exclusive economic zone 200 nautical miles offshore.

## B15.2.2 MARPOL 73-78 and Protection of the Sea (Prevention of Pollution from Ships) Act 1983 (Cth)

The operational discharges from ships are regulated through the implementation of the *International Convention for the Prevention of Pollution from Ships 1973 as modified by the Protocol of 1978* (MARPOL), to which Australia is a signatory.

MARPOL 73/78 is the primary international protocol for the prevention of pollution of the marine environment by ship operations or accidents. It covers all forms of waste disposal from ships and includes regulations aimed at preventing and minimising pollution from ships via five technical annexes that cover oil, bulk noxious liquid substances, packages, sewage and garbage.

Under MARPOL, every ship of 100 gross tonnage and above, and every ship which is certified to carry 15 or more persons, is required to carry a Garbage Management Plan.

The Australian Maritime Safety Authority (AMSA) is charged with the implementation and enforcement of MARPOL 73/78 throughout Commonwealth waters. Implementation of MARPOL 73/78 is administrated through the ***Protection of the Sea (Prevention of Pollution from Ships) Act 1983*** (Cth).

The Great Barrier Reef has been designated by the International Maritime Organisation (IMO) as a Particularly Sensitive Sea Area (PSSA). Under MARPOL, there are specific requirements for waste management in these areas.

Management requirements in MARPOL also reference the defined term 'nearest land'. Nearest land means:

> ***"the baseline from which the territorial sea of the territory is established in accordance with international law, except where it is measured from a line drawn around the outer edge of the Great Barrier Reef Marine Park".*** (AMSA, no date)

In applying the Protection of the ***Sea (Prevention of Pollution from Ships) Act 1983*** (Cth), AMSA (no date[b]) states that vessels are not permitted to discharge the following wastes in the Great Barrier Reef Marine Park (GBRMP):

- Food waste that is ground up into small particles; however, discharge is permitted, while en route, as far as practicable from the GBRMP, but in any case, ≥ three nautical miles from the GBRMP boundary
- Food waste that is not ground up; however, discharge is permitted, while en route, as far as practicable from the nearest land (i.e. the GBRMP boundary), but in any case, ≥ 12 nautical miles (nm) from the GBRMP boundary
- Cargo residues (including residues that cannot be recovered using commonly available methods for unloading); however, discharge is permitted, while en route, as far as practicable from the GBRMP, but in any case, ≥ 12nm from the GBRMP boundary. In addition, there is a requirement that these substances must not be harmful to the environment. All other garbage including plastics, synthetic ropes, fishing gear, plastic garbage bags, incinerator ashes, clinkers, cooking oil, floating dunnage, lining and packing materials, paper, rags, glass, metal, bottles, crockery and similar refuse are not allowed to be discharged.

The following wastes (with conditions) are permitted to be discharged in the GBRMP:

- Cargo material contained in cargo hold bilge water is permitted to be discharged from a loaded hold through the ship's fixed piping bilge drainage system. There is a requirement that these substances must not be harmful to the environment. Cleaning agents and additives contained in cargo hold wash water
- For ships ≥ 400 gross tons, machinery space bilges may be discharged to all waters, as long as:
  - The vessel is proceeding en route (i.e. is not stationary)
  - Oil content is less than 15 parts per million
  - Oil discharge monitoring and control system and oil filtering equipment is operating.

For ships less than 400 gross tons, oil and all oily mixtures must be retained on board for on shore disposal unless the ship is proceeding on route and has in operation approved equipment that ensures oil content is less than 15 parts per million. With regard to greywater and sewage, as per MAPROL and GBRMPA advice (GBRMPA, 2011a), cruise ships operating in the GBRMP must ensure that:

- Greywater is only discharged when maintaining at least three nautical miles distance (or as far as possible) from a reef, island or the mainland
- Treated sewage (from an IMO approved plant) is only discharged when maintaining at least three nautical miles (or as far as possible) from a reef, island or the mainland
- Macerated and disinfected sewage (from an IMO approved plant) is not discharged into the GBRMP. Ships may only discharge this type of sewage if located at least three nautical miles from the boundary of the GBRMP boundary (which is taken as 'nearest land' by the IMO)
- Untreated or treated sewage (from a non-IMO approved plant) must not be discharged into the Marine Park or an area at least 12 nautical miles from the boundary of the GBRMP.

The ***Transport Operations (Marine Pollution) Act 1995*** (TOMPA) prohibits the discharge of sewage into marinas, boat harbours and smooth waters.

Commercial ships require written permission from the GBRMPA and the Queensland Department of Environment and Heritage (DEHP) to discharge waste, and these permissions may stipulate additional requirements for ships to manage discharges of waste. **Table B15.3.1a** describes the relevance of MARPOL for each type of waste generated by ships.

## B15.2.3 International Convention for the Control and Management of Ships' Ballast Water and Sediments (BWM) 2004

The International Convention for the Control and Management of Ships' Ballast Water and Sediments (BWM, 2004) has been tabled before Parliament as part of the ***Biosecurity Bill, 2012***. The Convention is not yet in force. This will occur 12 months after 30 states with combined merchant fleets constituting 35 percent of the gross tonnage of the world's merchant shipping have signed the Convention. Australia signed subject to ratification on 29 May 2005.

## B15.2.4 Australian Ballast Water Management Requirements, Department of Agriculture, 2011.

On 1 July 2001, Australia introduced mandatory ballast water management requirements (the requirements) to reduce the risk of introducing harmful aquatic organisms into Australia's marine environment through ballast water from international vessels.

These requirements are enforceable under the ***Quarantine Act 1908***.

The requirements are consistent with the IMO Ballast Water Convention 2004 that aims to minimise the translocation of harmful aquatic species in ships' ballast water and ballast tank sediments.

The discharge of high-risk ballast water in Australian ports or waters is prohibited.

All internationally plying vessels intending to discharge ballast water anywhere inside the Australian territorial sea are required to manage their ballast water in accordance with Australia's mandatory ballast water management requirements.

Therefore, this requirement applies to all international cruise ships visiting the Port of Cairns.

## B15.2.5 Transport Operations (Marine Pollution) Act (Qld) 1995

The overall purpose of the ***Transport Operations (Marine Pollution) Act 1995*** is to protect Queensland's marine and coastal environment by minimising deliberate and negligent discharges of ship-sourced pollutants into coastal waters. As mentioned in **Section B15.2.2**, the act gives effect to MARPOL 73/78 and compliments approaches adopted by the Commonwealth Government. The Act covers discharges within Queensland coastal waters, as well as waste discharges that enter Queensland coastal waters (after being discharged outside of Queensland coastal waters).

Ships entering the port (as well as Ports North's own fleet) are required to adhere to the provisions of the Act.

## B15.2.6 Quarantine Act 1908 (Cth)

The ***Quarantine Act 1908*** seeks to protect Australia's unique environment from harmful or invasive plant and animal species. Materials and substances, including waste products, are subject to quarantine requirements as advised by the Department of Agriculture (DOA).

Ship's masters are required to determine the procedures for the treatment and disposal of quarantine waste at ports from their agent or the DOA regional office.

## B15.2.7 Environmental Protection Act 1994 (Qld), Waste Reduction and Recycling Act 2011 and associated regulation

Section 13 of the ***Environmental Protection Act 1994*** (Qld) (EP Act) defines waste as 'anything, that is a left over, surplus, or an unwanted by-product, from an industrial, commercial, domestic or other activity. Waste can be a gas, liquid, solid or energy, or a combination of any of these'.

Under section 319 of the EP Act, waste generators are bound by the general environmental duty. This means that an activity undertaken by Ports North, cruise ship operators or contractors must not release waste that is likely to cause environmental harm, unless all reasonable and practical measures are taken to prevent or minimise the harm.

The waste generator must follow this general environmental duty and ensure that waste is transported by a licensed transporter and that it is delivered to a licensed facility.

The transportation of some wastes is also regulated. These are referred to as 'trackable wastes' under the Schedule 1 of the ***Waste Reduction and Recycling Regulation 2011***. If wastes are considered trackable, then appropriate records of the waste must be taken and passed on to the transporter.

### B15.2.8 Department of Environment and Heritage Protection, 2012, Technical Licensing Guideline - Wastewater Release to Queensland Waters

The regulation of wastewater management and discharge is controlled at state level through the DEHP, 2012, Technical Licensing Guideline - Wastewater Release to Queensland Waters through the DEHP.

## B15.3 Existing Waste Generation Activities and Management

### B15.3.1 Port of Cairns and Shipping Waste Management

Wastes generated by cruise-ship related activities are described in **Table B15.3.1a**. This includes wastes generated by cruise ships at port and whilst at sea. **Table B15.3.1b** describes wastes that are generated at the Cairns Cruise Liner Terminal (CCLT).

**Table B15.3.1a Existing Cruise Ship Operations Waste Generation and Management Procedures**

| Type/Generation | Management |
|---|---|
| General garbage<br>• This includes mixed solid waste (e.g food wastes, paper, glass, packaging) and recyclables.<br>• A cruise ship (all classes) produces approximately 3.5 kg of solid waste daily per passenger and crew (Butt, 2007; Campbell 1999 in EPA, 2008).<br>• Approximately 75 percent of solid waste produced in cruise ships is incinerated on board (ADEC 2000 in EPA, 2008). The incineration method generally reduces the solid waste volume by 90 percent and weight by 70 percent (World Bank 1999). Some 25percent of waste produced in the vessel is not incinerated (non-incinerable wastes include glass, aluminium, hazardous wastes, etc.). | • Discharge of incinerator ash at sea is prohibited under Annex V of MARPOL.<br>• General garbage is currently disposed of at the Port of Cairns via agreements with appropriately qualified and licenced waste contractors. When ships book into the port, the required waste facilities (timing and capacity) are identified by the ship's agent and waste contractors are then engaged to collect the waste when the ship arrives. All waste is transported to a suitable licenced facility. Recording of waste volumes/ masses and types is the responsibility of waste contractors.<br>• There is minimal transfer of recyclables due to quarantine requirements (see below). Recycling is the responsibility of each operator. |
| Regulated wastes and liquid wastes.<br>• This includes trackable and other hazardous wastes and excludes sewage.<br>• On cruise ships, this includes bilge water, residues, tank washing slops, ballast water, and other oily mixtures that contain chemicals. Other regulated wastes may include photo processing chemicals, cleaning wastes and used paints. | • These wastes are currently managed via agreements with appropriately qualified and licenced waste contractors. When ships book into the port, the required waste facilities (timing and capacity) are identified by the ships agent and waste contractors are then engaged. Recording of waste volumes/ masses and types is the responsibility of waste contractors.<br>• Waste management measures depend on the type of waste, though usually include skip bins, autoclave or tanker trucks that are able to pump, remove and transport liquid waste. All waste is transported to a suitable licenced facility.<br>• There are specific requirements relating to the management of ballast water which prohibit the discharge of high risk ballast water in Australian ports. All ships entering the Port are required to adhere to these regulations. |

| Type/Generation | Management |
|---|---|
| Sewage and greywater<br>• Approximately 30 litres of sewage per person per day is generated on board (EPA 2008) and approximately 250 litres of greywater per person per day is generated (EPA 2008). | • The *Transport Operations (Marine Pollution) Act 1995* (TOMPA) currently prohibits the discharge of sewage into marinas, boat harbours and smooth waters but discharge at sea (with conditions) is still acceptable (see **Section B15.2.5**).<br>• The majority of cruise vessels currently discharge sewage at sea in line with MARPOL and other regulations (see **Section B15.2**). Sewage and greywater generated at port and whilst within the GBRMP (where discharge is not permitted) is offloaded at port.<br>• Sewage tanker truck services are provided for cruise ships and other vessels berthing at the Port of Cairns. Each tanker uses a vacuum method for obtaining the sewage from vessels. The trucks transfer waste to one of the Cairns Regional Council (CRC) Pollution Control Plants. This can be a 24-hour operation for the duration of the ship's stay. Recording of waste volumes/masses and types is the responsibility of waste contractors. |
| Air emissions | Air emissions are described in **Chapter B11, Air Quality**. |
| Quarantine waste<br>• This includes quarantine wastes and ballast water taken up overseas with the intention of discharge within Australian waters<br>• The definition Quarantine Waste from the *Quarantine Regulations 2000* includes:<br>– material used to pack or stabilise cargo (dunnage)<br>– galley and food waste<br>– human, other animal or plant waste<br>– refuse or sweepings from holds or decks of vessels or installation<br>– any other waste or other material, which comes into contact with quarantine waste<br>– contents of DOA amnesty bins<br>– any goods surrendered to a Department of Agriculture officer<br>– articles seized by DOA which are not collected by clients<br>– Any other import that will not be used in the manner for which it was imported and is to be destroyed.<br>– Quantities of quarantine waste vary depending on the origin and size of ship. | • All quarantine waste that is discharged at the port must be collected, transported, stored and/or treated by an approved service provider signed on to a DOA compliance agreement or under DOA supervision. Recording of waste volumes/masses and types is the responsibility of waste contractors.<br>• At present, quarantine waste services are arranged through Ports North who engage an approved contractor to collect the waste and transport it to an approved incinerator.<br>• The packaging, transport and treatment of quarantine waste is conducted in accordance with DOA requirements. |

**Table B15.3.1b Existing Port Operations Waste Generation and Management Procedures**

| Type/Generation | Management |
|---|---|
| Sewage and greywater generated by built amenities at the wharves. | As per **Chapter A4, Project Description**, the Port has an existing sewer reticulation network that is connected to CRC's sewer main in Wharf Street (**Figure A4.2.5.8c**). This currently services built amenities at the wharves. |
| Maintenance dredging wastes.<br>As per **Chapter A4, Project Description**, the existing shipping channel is regularly monitored and dredged as required by Ports North to maintain safe navigation for all vessels entering Port of Cairns. Maintenance dredge waste is uncontaminated sediment that has been tested, and is suitable for sea based disposal. Approximately 350,000 cubic metres (m3) per year of dredge material is generated. | Dredge material from maintenance works is currently placed at an existing GBRMPA approved DMPA.<br>Refer to **Chapter A4, Project Description** for further information. |
| General garbage generated by Cairns Cruise Liner Terminal staff, pedestrians and cruise ship passengers within the Terminal and surrounds.<br>This includes mixed solid waste, e.g food wastes, paper, glass, packaging as well as recyclables. | Waste generated or deposited at the CCLT in waste receptacles is managed via agreements with appropriately qualified and licenced waste contractors. General waste bins are provided throughout the terminal and are collected regularly. All waste is transported to a suitable licenced facility.<br>Recording of waste volumes/masses and types is the responsibility of waste contractors. |

## B15.3.2 Waste Facilities in Cairns

General munipal solid waste (MSW) is taken to the Advanced Resource Recovery Technology Facility (ARRTF), operated by Sita Environmental Solutions at Portsmith, Cairns. All general MSW is processed at the plant, with green waste turned into compost for application on to agricultural areas including sugar cane production in the region. Residual MSW (non-organic waste that cannot be processed) is transported to landfill (CRC, no date [a]).

Recyclable MSW materials are segregated and managed via the CRC's Material Recovery Facility, where items are sorted and separated into plastics, paper, steel and aluminum and then baled. Almost all of these items are transported to Brisbane or southern states for recycling processing. The glass is separated and crushed for transport to southern Queensland recyclers, or to be used in council water, wastewater and waste operations. There are limited recycling facilities available at present for industry or commercial sectors (accepted on a case by case basis).

There are also four transfer stations in the council area, where residents can take household waste to be recycled or disposed.

Sewage and greywater is processed at several Waste Water Treatment Plants across the region. The Northern Waste Water Treatment Plant at Aeroglen services Cairns City (CRC, no date [b]) and is the closest to the port. This plant currently has an 8.3 ML/day capacity and treats effluent to a tertiary standard with a five-stage Enhanced Biological Phosphorus Removal configuration with three clarifiers (CRC, no date [b]). Effluent is also treated with UV and discharged into a feeder drain that enters Half-moon Creek.

# B15.4 Potential Impacts

The section identifies the potential impact of waste that is generated during the project'sconstruction and operations. It outlines the types and estimated quantities of waste that will be generated and assesses the significance of the potential impact.

## B15.4.1 Construction

The main source of waste generated during construction will be dredged sediment from the capital dredging works, associated with the channel expansion. Refer to **Chapter B3, Coastal Processes** for an assessment of impacts associated with the channel expansion.

Predicted wastes generated by the project during construction are presented in **Table B15.4.1a**. Due to the limited landside construction that is required (refer to **Chapter A4, Project Description**), construction waste volumes and masses have not been calculated relating to onsite works.

With implementation of a Construction Waste Management Plan (refer to **Section B15.5.1**), the project is likely to result in a temporary and negligible impact to scenic amenity, ecology and human health impact during construction. This represents a low level risk based on **Table B15.2.1c**.

**Table B15.4.1a Construction Waste Sources**

| Waste Type | Source | Potential Impacts |
|---|---|---|
| Concrete and Bitumen | Removal and upgrade of existing services (water mains, fire fighting services and sewage services) will create concrete/ bitumen waste.<br>Construction will also result in the removal of the existing concrete beam and deck for an area of approximately 4.0m by 7.0m (28m2). There will be a series of these concrete cut-outs to accommodate mooring dolphins.<br>Small amounts of concrete and bitumen waste may also be generated during trench excavation for the IFO pipeline. | • Negligible reductions in visual amenity associated with waste storage areas.<br>• Negligible impacts to surface and marine water quality due to minor quantities of concrete and bitumen to be removed. |
| Metals | Removal and upgrade of services will create metal waste from old pipes. There may also be metal offcuts from construction, i.e. from steel pile offcuts, and waste from steel formwork. | • Requirements for waste processing, including indirect impacts associated with requirements for landfill or recycling. This is considered to result in a negligible impact. |
| Wood products | A small amount of timber used as formwork during construction may be generated. Further to this, timber may be used as packing for construction materials. | • Requirements for waste processing, including indirect impacts associated with requirements for landfill or recycling<br>• Negligible reductions in visual amenity associated with waste storage areas |

| Waste Type | Source | Potential Impacts |
|---|---|---|
| Liquid hydrocarbons and other chemical wastes (including hazardous wastes) | Construction will require temporary construction workshops, supporting dredging equipment maintenance facilities and construction equipment maintenance areas. Liquid hydrocarbons and other waste chemicals generated from these areas include used industrial lubricants, oils, thinners, coolants, solvents, petrol and paints.<br>Although hazardous wastes are not specifically identified in this assessment, these will be managed appropriately as the need arises. The use and volumes of such substances are likely to be minimal during both construction and operation of the project. | • Minor risk of soil contamination<br>• Risk of impacts to water quality if spills occur.<br>• Negligible to low impacts due to odour<br>• Risks to impacts to human health (see **Chapter B17, Hazard and Risk**) or other fauna or flora. |
| Gaseous wastes and particulates | Machinery with internal combustion engines such as the dredge barge, dredge backhoe, on site generators, pile driving equipment, work boats, delivery transport and workforce vehicles will generate gaseous wastes such as Carbon dioxide, Hydrocarbons, Carbon monoxide, Nitrogen oxides, Sulphur dioxide and particulate matter. | Refer to **Chapter B11, Air Quality** for an assessment of air quality impacts associated with these wastes. |
| Sewage | Sewage will be generated during construction by construction staff. | • Risk of impacts to water quality if spills occur<br>• Negligible odour impacts<br>• Risks to human health or other fauna or flora if spill occurs<br>• Negligible reductions in visual amenity associated with mobile toilet facilities. |
| Office and other general waste | Site construction offices will generate general office waste. This could include cardboard, paper, food scraps, packaging, etc. | • Negligible reductions in visual amenity<br>• Negligible risk of injury to terrestrial or marine fauna<br>• Low risk of encouraging pest fauna (mosquitos or rodents). |
| Construction Dredging | See **Chapter A4, Project Description**. | See **Chapter A4, Project Description**. |

## B15.4.2 Operations

**Table B15.3.1a** and **Table B15.3.1b** outline current operational waste generation. The current sources of waste types are unlikely to change with the expansion of the port; however, it is anticipated that the volume of waste being collected at the port will increase into the future due to increases in port demand from ships. The additional waste generation will be driven by the increased number and size of ships that visit the port. The port currently provides for adventure class, boutique class, mid-size ships and some mega class cruise ships that can currently access the port under favourable conditions. The class of ships with the most potential for growth are the mid-sized and mega class cruise ships, which aligns with the trend with the cruise industry towards building and operating larger ships. **Table B15.4.2a** outlines the predicted growth of each of the ships under the baseline and project scenarios.

**Table B15.4.2a Predicted Ship Demand (excluding adventure class)**

| Ship Class | Baseline Demand in 2026 (ships per year) (no change to infrastructure) | Project Scenario Demand in 2026 (ships per year) (Fuel, channel and port infrastructure) | Difference between the two scenarios in 2025 (ships per year) |
|---|---|---|---|
| **Boutique** | 8 | 8 | 0 |
| **Mid-size** | 39 | 39 | 0 |
| **Mega** | 32* | 63 | 31 |
| **Total** | 79 | 110 | 31 |

* Note: These ships will be moored at Yorkeys Knob

To enable an estimation of the total solid waste, sewage and greywater generated and subsequently requiring management at the port due to the project, the following assumptions have been made:

- A cruise ship (all classes) may produce 3.5 kg of solid waste daily per passenger and crew, as quoted by the IMO (Butt, 2007; Campbell 1999 in EPA 2008). Solid waste includes bottles, cans, plastic, cardboard, glass, and food/ organic wastes, solid regulated wastes as per Table B15.3.1a
- Approximately 75 percent of solid waste produced in cruise ships is incinerated on board (ADEC 2000 in EPA 2008)
- The incineration method generally reduces the solid waste volume by 90 percent and weight by 70 percent (World Bank, 1999)
- 25 percent of waste produced in the vessel is not incinerated (non-incinerable wastes include glass, aluminium, hazardous wastes etc.
- It is assumed that 30 litres of sewage per person per day is generated whilst on board (EPA, 2008) and that two days' worth of sewage will need to be offloaded at port
- It is assumed that 250 litres of greywater per person per day is generated whilst on board (EPA, 2008) and that two days worth of greywater will need to be offloaded at port
- Four days of solid waste generation (between ports) is assumed, with all waste (apart from non-incinerable waste) assumed to be incinerated
- Waste production while in port (one day) has also been considered
- The following conservative assumptions are made regarding passengers and crew for each class of ship:
  - Boutique class –500 passengers and 150 crew members
  - Mid-size ships –1500 passengers and 500 crew members
  - Mega class ships – 3000 passengers and 1000 crew members.

Operational air emissions are discussed in **Chapter B11, Air Quality**, and maintenance dredging waste volumes for the proposed channel are described in **Chapter A4, Project Description**.

### B15.4.2.1 Solid Waste

**Table B15.4.2.1a** shows that by the year 2026, approximately 1,321 tonnes per annum (tpa) of incinerated waste per year will require handling at the port for subsequent disposal to landfill. It is predicted that approximately 488 tpa (37 percent) of this waste will be generated above the baseline scenario. In addition, and as shown in **Table B15.4.2.1b**, approximately 1,467 tpa of non-incinerable waste will require handling at the port and subsequent management through local waste management facilities. It is predicted that approximately 453 tpa (37 percent) of this waste will be generated above the baseline scenario in the year 2026. Therefore, the total waste (incinerated and non-incinerable) to be handled at the port in 2026 is estimated at 2,786 tpa. Although a proportion of the additional waste will be made up of hazardous or other regulated wastes, the proportion of waste that is considered regulated or hazardous cannot be accurately predicted.

**Table B15.4.2.1a Predicted Solid Waste Refuse – Incinerated Waste**

| Items | Units | Boutique Class | Mid-size Class | Mega Class | Total |
|---|---|---|---|---|---|
| Solid waste produced per day, per ship. | (kg/day) | 2,275 | 7,000 | 14,000 | 23,275 |
| Solid waste to be incinerated (75 percent of total waste produced). | (kg/day) | 1,706 | 5,250 | 10,500 | 17,456 |
| Incinerated waste (after incineration process, which reduces the mass by 70 percent). | (kg/day) | 512 | 1,575 | 3,150 | 5,237 |
| Total incinerated waste for removal at port, including quarantine facilities. (five days – refer to assumptions in above table). | (kg/visit) | 2,559 | 7,875 | 15,750 | 26,184 |
| Total incinerated waste for removal at port per year in 2026 project scenario (including quarantine facilities). | (tonnes/ year) | 21 | 307 | 993 | 1,321 |
| Total incinerated waste for removal at port per year in 2026, above baseline scenario (including quarantine facilities). | (tonnes/ year) | 0 | 0 | 488 | 488 |

**Table B15.4.2.1b Predicted Solid Waste Refuse – Non-Incinerated Waste**

| Items | Units | Boutique Class | Mid-size Class | Mega Class | Total |
|---|---|---|---|---|---|
| Solid waste produced per day, per ship. | (kg/day) | 2,275 | 7,000 | 14,000 | 23,275 |
| Non-incinerated waste (25 percent of total waste). | (kg/day) | 569 | 1,750 | 3,500 | 5,819 |
| Total non-incinerable waste for removal at port per visit. (five days). (refer to assumptions in above table). | (kg/visit) | 2,844 | 8,750 | 17,500 | 29,094 |
| Total non-incinerable waste for removal at port per year in 2026 (recyclables - aluminium, glass, etc), project scenario. | (tonnes/ year) | 23 | 341 | 1,103 | 1,467 |
| Total non-incinerable waste for removal at port per year in 2026 (recyclables - aluminium, glass, etc), above baseline scenario. | (tonnes/ year) | 0 | 0 | 543 | 543 |

Approximately 125,000 tonnes of waste is processed at the ARRT per year (SITA, 2014). It is predicted that waste volumes will grow approximately four percent per year based on estimations associated with Cairn's Waste Transfer Stations (CRC 2009). Although this rate of growth may change in the future, if it is extrapolated to the year 2025, approximately 243,000 tonnes of waste will be received at the ARRT (or similar facilities) in the 2025/26 financial year. The project would therefore represent less than one percent of the waste received by the ARRT (or similar facilities) in the region.

In the context of waste management in the region, the project will provide a permanent impact with a minor impact significance being likely. This represents a minor level risk based on **Table B15.2.1c**.

### B15.4.2.2 Maintenance Dredge Sediment

Maintenance dredge material which can also be considered a waste will increase due to the port expansion. It is predicted that there will be an increase of between 25-30 percent of outer channel maintenance dredge volume following the widening of the channel. Therefore it is predicted there could be up to 420,000 m3 of maintenance dredge material from the outer channel generated per annum. Furthermore, there will be the requirement for some limited maintenance dredging of the inner port. The amount of inner port maintenance dredging required is not expected to increase from its current annual volume of 30,000m3 per annum.

Maintenance dredge sediment will be disposed of at the new DMPA site and the impact is assessed in **Chapter B3, Coastal Processes**.

### B15.4.2.3 Wastewater

Based on port demand predictions, it is estimated that approximately 20.1 megalitres (ML) of sewage will be handled at the port by 2026. Of this, 7.4 ML (83 percent) will be above the baseline scenario. Further to this, it is estimated that approximately 167.6 ML of greywater will be handled at the port per year by 2026, with 62.0 ML (83 percent) of this above the baseline scenario. This equates to an estimated 187.71 ML of effluent being pumped into the local system. The current Waste Water Treatment Plant at Aeroglen services Cairns City and can handle 7,081 ML per year (CRC, no date [b]). Given that the predicted wastewater generation equates to less than three percent of the total capacity at Aeroglen and with the assumption that future wastewater treatment capacity will increase, the project is not likely to result in a significant impact to waste water treatment facilities in Cairns.

As mentioned in **Section B15.2.2**, as per MAPROL and GBRMPA advice (GBRMPA, 2011a), ships operating in the GBRMP must ensure:

- Greywater is only discharged when maintaining at least three nautical miles distance (or as far as possible) from a reef, island or the mainland
- Treated sewage (from an IMO approved plant) is only discharged when maintaining at least three nautical miles (or as far as possible) from a reef, island or the mainland
- Macerated and disinfected sewage (from an IMO approved plant) is not discharged into the GBRMP. Ships may only discharge this type of sewage if located at least three nautical miles from the boundary of the GBRMP boundary (which is taken as 'nearest land' by the IMO)
- Untreated or treated sewage (from a non IMO approved plant) must not be discharged into the Marine Park or an area at least 12 nautical miles from the boundary of the GBRMP boundary
- The *Transport Operations (Marine Pollution) Act 1995* (TOMPA) prohibits the discharge of sewage into marinas, boat harbours and smooth waters.

Most ships currently discharge sewage and greywater at sea, however, only greywater and treated sewage is permitted to be discharged into the GBRMP and only when at a distance of a minimium threeminimum 3 nautical miles from a reef, island or mainland. Therefore, while the increased shipping into Cairns may result in an increase in the discharge of greywater and treated sewage it would not result in any discharge of untreated, macerated or disinfected sewage into the GBRMP surrounding the Cairns region.

The *Great Barrier Reef Outlook Report* (GBRMPA 2009) outlines that discharge of sewage from vessels operating in the region surrounding the GBRMP contributes a very small load of nutrients to the system. Total sewage discharge accounts for approximately three to four percent of the total nutrient load of the GBRMP (Productivity Commission 2003, in GBRMPA 2009), and tourism vessels (including diving and reef tour vessels) contribute only a small portion of this total (GBRMPA, 2009).

For this reason, the project is expected to result in a very minor impact to nutrient loads and associated impacts on the GBRMP.

### B15.4.2.4 Liquid Shipping Wastes

The future generation of liquid shipping waste cannot be predicted with accuracy. This is because the amount of liquid waste generated varies significantly depending on a number of factors, including size of the ship, the engine room design, preventative measures that are in place and the age and condition of components (EPA 2008). However, MARPOL convention prohibits the discharge of cargo residues within 12 nautical miles of the GBRMP and also prohibits the discharge of any substance that could be considered harmful to the environment. The Australian Ballast Water Management Requirements, (DOA, 2011) prohibits the discharge of any high risk ballast waters into Australian water. Given the current regulation of liquid shipping wastes it is expected the project will result in a neglible impact from this type of waste.

### B15.4.2.5 Waste Generated at Landside Facilities

General garbage, sewerage and greywater generated at the terminal itself will also increase due to additional patronage (see **Table B15.3.1b**). This is likely to be insignificant when compared to the volume and type of wastes generated from cruise shipping operations and has therefore not been calculated.

### B15.4.2.6 Discussion

Despite the above estimations, waste volumes may significantly vary from estimations presented in this chapter due to influences outside the scope of the project. This may be due to changes to products, packaging, consumer behaviour, or waste management strategies or technologies on board and at waste transfer stations.

## B15.4.3 Decommissioning

It is assumed that the channel will be utilised indefinitely into the future, unless it is no longer required, or there is no longer capacity to maintain the channel. As such, active decommissioning of the channel or port itself is not expected to occur in the timeframe of the project.

Current plans in the City Port Local Area Plan (Cairns Port Authority, 2006) intend for the the port of Cairns to be developed to support the project. There are no plans beyond the project's current planned operational period. Waste types and impacts due to decommissioning of land-side infrastructure and the wharf structure will be assessed in the future, when it is required.

# B15.5 Mitigation

During construction and operations, separate Waste Management Plans will be in place to manage impacts to the port, amenity and surrounding environs. The waste management hierarchy, as shown in **Figure B15.5a**, will form the basis of both Waste Management Plans. This requires the project to reduce waste generation and carefully manage wastes if generation cannot be avoided.

**Figure B15.5a Waste Management Hierarchy**


The following sections outline management measures that will be employed during construction and operation to minimise the impacts of waste.

## B15.5.1 Construction

Management measures outlined here and in **Chapter C1, Construction and Operational Environmental Management Plan** will be integrated into a Construction Environmental Management Plan where appropriate. The plan will include waste management requirements and responsibilities of personnel.

Waste will be avoided or reduced via:

- Accurate estimation of materials for use during construction
- Consideration of the durability of construction materials to avoid ongoing replacement
- Where possible, sourcing materials from suppliers who participate in the Australian Packaging Covenant
- Encouraging suppliers to reduce packaging
- Where quality is maintained, preference should be given to sourcing products that have reduced packaging, alternative content (e.g fly ash in concrete) or higher recycling content
- Considering contractual clauses to encourage best practice waste management
- Separation of materials that can be reused or recycled to prevent contamination and prevent them from being transported to land fill
- Scheduling works to maximise the re-use of materials.

In general, the following management will also be implemented:

- Waste management locations will be identified prior to the commencement of construction
- Separate waste bins will be provided where feasible to facilitate source segregation
- All waste collection bins will be in place prior to construction commencing
- Bins will be covered to prevent wind, rain, animals or vandalism spreading litter or contaminants throughout the construction site
- Waste management locations will be kept tidy and well maintained
- Staff will be briefed on waste management procedures and actively encouraged to undertake re-use or recycling of materials
- Wastes will be regularly removed by a licenced contractor and disposed of in a suitable and licenced facility
- Hazardous, chemical or hydrocarbon wastes will be stored in a bunded or secure location prior to removal from site
- In the event of release of waste into the environment, incident response and incident reporting procedures will be followed as per requirements of the Construction Environmental Management Plan. An Environmental Incident Report and Corrective Action Report will also be completed within 24 hours of the incident occurring
- Appropriate spill clean-up procedures will be followed as per the Construction Environmental Management Plan
- Known contamination (e.g minor hydrocarbon spills) caused during construction will be remediated prior to completion of construction
- Any unknown or suspected materials will be handled and disposed of according to Safety Data Sheets and legislative requirements (e.g waste tracking)
- Records of waste generation will be kept via retention of waste receipts from contractors.

Specific waste management measures for each type of construction waste are presented in **Table B15.5.1a**.

**Table B15.5.1a Specific Waste Management Measures for Each Type of Construction Waste**

| Waste Type | Mitigation Measure |
|---|---|
| Concrete and Bitumen | • Separate stockpiles of waste concrete and bitumen will be created to avoid contamination with other waste streams. This will assist in the re-use or recycling<br>• Waste concrete and bitumen will be assessed for re-use as hard fill. |
| Metals | • There are several metal recycling facilities around Cairns. Metals will be separated into ferrous and nonferrous metals. These will then be directed to a recycling facility. |
| Wood products | • Waste wood will be re-used during the construction. Where this is not possible, wood products will be stockpiled separately and then dispatched to an appropriate end use such as recycling. |
| Liquid hydrocarbons and other chemical wastes (including hazardous wastes) | • Specific waste bins and bunding will be used to isolate waste liquids, chemicals and hazardous wastes<br>• Minimal quantities will be kept on site<br>• Empty drums and other storage containers will be stored sealed and in bunded areas<br>• Containers will be re-used or recycled where possible<br>• An inventory of safety data sheets for hazards substances will be maintained<br>• Licenced contracts will be engaged to regularly remove waste to the appropriate facility<br>• Spill kits will be available close to areas where chemicals are being used or kept. |
| Sewage | • Existing facilities that have connections to the reticulated waste water system will be used in preference to temporary and mobile ablution facilities<br>• The minimal number of temporary and mobile ablution facilities will be used on site. |
| Office and other general waste | • Recyclables will be sorted, stockpiled or contained in the appropriate recycling bins<br>• Licenced contracts will be engaged to regularly remove waste bins to the appropriate facility<br>• Waste areas will be kept tidy and all waste is to be placed in the appropriate receptacle<br>• Staff will be inducted on waste management<br>• Waste will be collected in sealed bins to reduce attracting pest fauna<br>• Any native vegetative waste will be diverted to existing green waste recovery facilities for mulching where possible. Weeds will be disposed of in general waste bins or skips. |

Waste management will also be undertaken in accordance with the following guidelines:

- *Code of Best Practice for Waste Processing in the Construction and Demolition Industries* (WMAA, no date)
- *Construction and Demolition Waste Guide – Recycling and Re-use Across the Supply Chain* (DSEWPC, 2012i)
- *Guidelines to the Recycling Policy for Buildings and Civil Infrastructure* (DPW, 2009).

Mitigation for air emissions during construction are discussed in **Chapter B11, Air Quality** and capital dredging waste volumes for the proposed channel are described in **Chapter A4, Project Description**.

## B15.5.2 Operations

Management of operational wastes predicted to be generated during operations by cruise-ship related activities is described in **Table B15.5.2a**. This includes management of wastes generated by cruise ships at port and whilst at sea. Ports North will have limited scope to manage wastes being handled at the port as ship wastes will continue be collected by appropriately qualified and licenced contractors who are engaged by booking agencies. Booking agencies operate independently of Ports North.

**Table B15.5.2b** describes the management of wastes that are predicted to be generated at the CCLT during operations. Mitigation for air emissions during operations is discussed in **Chapter B11, Air Quality** whilst maintenance dredging waste is described in **Chapter A4, Project Description**.

**Table B15.5.2a Management of Wastes Generated by Cruise Ships during Operations**

| Type/Generation | Management |
|---|---|
| General garbage<br><br>This includes mixed solid waste, (e.g food wastes, paper, glass, packaging) and recyclables | • As outlined in **Section B15.3.1**, discharge of general garbage to sea is not permitted under MARPOL<br>• Waste generation and management on board cruise ships (e.g incineration or waste separation) is outside the scope of management associated with the project. Thus, Ports North cannot directly influence the volume and type of waste being received at the port, except where regulations do not permit the waste to be offloaded<br>• In consultation with relevant authorities, when applicable, consideration will be made to install internationally recognised signs (e.g ISO signage) to aid international visitors and crew to meet Australian Maritime Safety Authority and Department of Agriculture requirements for their waste and to prevent mixing<br>• As per current operations, ship wastes (see **Table B15.3.1a**) will be collected by appropriately qualified and licenced contractors who are engaged by booking agencies. Booking agencies operate independently of Ports North.Ports North will seek to work with booking agencies and promote opportunities to improve waste management for cruise ship generated wastes. Furthermore, Ports North will look to develop an operational waste policy to define the processes for the management of waste generated at its own facilities<br>• Wastes will be transferred to a licenced reception facility by licenced contractors<br>• The port will continue to be kept free of wastes to avoid animal attraction (e.g rats) and breeding (e.g mosquitos)<br>• There is minimal transfer or recyclables due to quarantine requirements. Recycling will be the responsibility of each operator, as per current arrangements. |

| Type / Generation | Management |
|---|---|
| Regulated wastes and liquid wastes generated by cruise ship operations.<br><br>This includes bilge water, residues, tank washing slops, ballast water, and other oily mixtures that contain chemicals. It includes trackable and hazardous wastes. | • Control and regulation of discharges of regulated and liquid wastes will continue to be the responsibility of Queensland and Commonwealth Governments (including the GBRMPA), through the implementation of legislation discussed in **Section B15.2**.<br>• Regulated and liquid waste generation and management on board cruise ships is outside the scope of management associated with the project. Ports North cannot directly influence the volume and type of waste being received at the port, except where regulations do not permit the waste to be offloaded<br>• As per current operations, ship solid wastes (**Table B15.3.1a**) will be collected by appropriately qualified and licenced contractors who are engaged by booking agencies. As Ports North is not involved in collection of solid waste from ships at the port, there is limited scope for direct management of these waste streams.<br>Ports North will seek to work with booking agencies and promote opportunities to improve waste management for cruise ship generated wastes. Furthermore, Ports North will look to develop an operational procedure for waste to define the processes for the management of waste generated at the land based facilities subject to this project<br>• All waste will be transported to a suitable licenced facility<br>• Liquid wastes will only be removed from ships by suitably licenced contractors<br>• Licenced contractors will be required to handle regulated and liquid waste in accordance with the relevant Safety Data Sheet. Safety Data Sheets will be held by the contractor for reference during collection<br>• Licenced contractors will be required to carry spill kits and equipment in case of spillage. Other equipment will be made available by the port in case of large spills (see **Chapter B17, Hazard and Risk**)<br>• No liquid waste will be discharged that could be harmful to the environment or considered 'high risk'. |
| Sewage and greywater generated by cruise ship operations | • Sewage generation and management on board cruise ships is outside the scope of management associated with the project. Thus, Ports North cannot directly influence the volume and type of waste being discharged to sea or received at the port, except where regulations do not permit the waste to be offloaded (GBRMPA 2011b)<br>• Management of discharges of sewage and greywater in the region will continue to be the responsibility of Queensland and Commonwealth Governments (including the GBRMPA), though the implementation of legislation discussed in **Section B15.2**. The GBRMPA is currently intending to review its requirements regarding vessel-based sewage<br>• Although the current use of tanker trucks for sewage removal may be adequate for the future situation, a more robust system of direct discharge into council's sewage reticulation system is proposed as part of the project. **Chapter A4: Project Description** outlines the proposed sewerage system design. In summary, two connections to the existing sewerage systems are required. This includes one connection in the Wharf Three area which allows a sewage discharge of up to 7 L/s (limited use to vessels that comply with the required discharge flow) into Council's reticulation. The other connection will be in the Wharf 1 area and will allow a sewage discharge greater than 7 L/s. For this connection, a 150 millimetre (mm) diameter sewer line will discharge sewage to a storage facility and a submersible pumping station will limit the sewage discharge in Council's reticulation system to 7 L/s<br>• Prior to finalisation of design, information on likely flow volumes, trunk connection points and a network analysis will be provided to CRC to aid in the assessment of impacts to existing infrastructure. |

| Type / Generation | Management |
|---|---|
| Quarantine wastes generated by cruise ship operations. | • As per current operations, all movements and quantities of wastes will be recorded by contractors<br>• Ships will be required to adhere to relevant MARPOL annexes and other legislative requirements with regard to disposal of quarantine wastes<br>• Packaging, transport and treatment of wastes will continue to comply with DOA requirements. |

**Table B15.5.2b Management for Wastes Generated at Landside Facilities During Operations**

| Type / Generation | Management |
|---|---|
| Generated by wharf staff, pedestrians and cruise ship passengers within the passenger terminal and surrounds. | • As per current operations, waste generated at the CCLT is managed via agreements with appropriately qualified and licenced waste contractors. All waste will be transported to a suitable licenced facility<br>• Internationally recognised signs (e.g ISO signage) will be used to aid international visitors and crew to meet AMSA and DOA requirements for their waste and to prevent mixing<br>• General waste bins will continue to be provided throughout the terminal and will be collected regularly.<br>• Provision for recycling bins will also be made throughout the terminal commensurate with demand and will be collected regularly<br>• Waste bins will be covered to prevent wind, rain or animals spreading waste throughout the port<br>• The port will continue to be kept free of wastes to avoid animal attraction (e.g rats) and breeding (e.g mosquitos). |
| Sewage and greywater generated by built amenities at the wharves. | • No upgrades to built amenities at the wharves are proposed as part of the project, and sewage from existing facilities will continue to be discharged in council's reticulation. |

# B15.6 Residual Impacts

## B15.6.1 Construction

With implementation of management measures outlined in **Section B15.5.1**, waste generated during construction is expected to result in a negligible impact to human health, ecological values and amenity.

## B15.6.2 Operations

### B15.6.2.1 Cruise Ships

The volumes and types of solid waste generated by cruise ships is within the management scope of cruise ship operators. Through requirements of MARPOL and the *Protection of the Sea (Prevention of Pollution from Ships) Act 1983* (Cth), there is an intent to reduce waste volumes across the industry.

Ports North will have limited scope to manage wastes being handled at the port as ship wastes will continue be collected by appropriately qualified and licenced contractors who are engaged by booking agencies. Ports North will seek to work with booking agencies and promote opportunities to improve waste management for cruise-ship generated wastes. Furthermore, Ports North will look to develop an operational waste policy to define the processes for the management of waste generated at its own facilities.

CRC has prepared the *Cairns Regional Waste Management Strategy 2010-2015*, which is designed to achieve improved resource recovery, improved residual waste treatment and recovery and minimisation of waste sent to landfill. Successful implementation will reduce the impact of waste in the region.

With this in mind, solid, liquid and sewage waste collected at the port is likely to result in a low residual impact due to the requirement for follow-on treatment and/or disposal at a suitable receiving facility. This represents a low risk based on **Table B15.2.1c**.

### B15.6.2.2 Landside Facilities

Waste generated at landside facilities (at the CCLT) during operations is likely to be insignificant when compared to the volume and type of wastes from the cruise ships themselves. Waste management at the CCLT reduces the impact of waste to a negligible residual impact.

# B15.7 Conclusion

This chapter has outlined the regulatory framework associated with waste management at the port as well as current and proposed waste generation activities. Current and proposed waste management practices have also been presented.

Due to the extent of landside works required, waste generation during construction will be minimal. Works will generate wastes typical of a construction site, and a waste management plan will be implemented to minimise waste generation and the associated impacts.

During the operational phase, waste generated at the terminal building will be minimal and will continue to be collected by licenced waste contractors.

Waste from ships docked at the port is currently the largest source of waste handled at the port. Ships require offloading of a variety of wastes while at port, including general waste, quarantined waste, liquid and hazardous wastes, as well as sewage and greywater. During the operational phase of the project, shipping will continue to provide the largest contribution of waste handled at the port, and waste volumes will increase due to a greater number and size of ships visiting the port. There is limited scope for Ports North to management waste generation on board ships; though ships are required to carry Garbage Management Plans under MARPOL. The increase of waste handled at the port is likely to result in a low risk. Current systems of waste handling at the port will be capable of meeting the increased demand. Despite this, a more robust and efficient infrastructure is proposed to handle sewage and greywater at the port, replacing the use of tanker trucks with a system that is connected to council's piped sewerage system.

# B15.8 References

ADEC (Alaska Department of Environment Conservation) 2000, ***Alaska Cruise Ship Initiative Part 1 Final Report***. Available at www.dec.state.ak.us/water/cruise_ships/pdfs/finreportp10808.pdf

AMSA, no date, ***Summary of Discharge Standards for Ships and smaller vessels operating in Australian waters: MARPOL and local requirements***, viewed online 31 January 2013, available at https://www.amsa.gov.au/environment/legislation-and-prevention/maritime-discharges/discharges/index.asp

AMSA, no date[b], ***Summary of Discharge Standards for Ships and smaller vessels operating in Australian waters: MARPOL and local requirements***, Table 2 Garbage, viewed online 31 January 2013, available at https://www.amsa.gov.au/environment/legislation-and-prevention/maritime-discharges/discharges/index.asp

Butt, N. 2007, "The impact of cruise ship generated waste on home ports and ports of call: A study of Southampton", ***Marine Policy***, No. 31, pp. 591-598.

Cairns Regional Council 2009, ***Waste Management Strategy 2010-2015***, Cairns Regional Council Waste and Water, Cairns.

Cairns Regional Council, no date [a], ***Waste and Recycling Facilities***, viewed online 30 January 2014, available at http://www.cairns.qld.gov.au/environment/waste/facilities

Cairns Regional Council, no date [b], ***Waste Water Treatment Plants***, viewed online 30 January 2014, available at http://www.cairns.qld.gov.au/environment/water-and-waste/wastewater-management/treatment-plants

Campbell, F. A. 1999. ***Whispers and waste. Our Planet***, 10 (3). Available online at <http://www.ourplanet.com>. Accessed 2002-09-04.

DSEWPAC/GBRMPA 2013, ***Guidelines for an Environmental Impact statement for the Cairns Shipping Development (Trinity Inlet) Project, in Port of Cairns and Great Barrier Reef Marine Park, Queensland – March 2013***, Jointly prepared by the Australian Government Department of Sustainability, Environment, Water, Population and Communities and the Great Barrier Reef Park Marine Authority.

EPA (Environmental Protection Agency) 2008, ***Cruise Ship Discharge Assessment Report***, United States EPA.

GBRMPA 2011a, ***Commercial vessels, cruise ships and ships on international voyages***, viewed online 31 January 2014, available at http://www.gbrmpa.gov.au/zoning-permits-and-plans/legislation-regulations-and-policies/vessel-sewage-regulations/commerical-vessels,-cruise-ships-and-ships-on-international-voyages

GBRMPA 2011b, Planning for vessel based sewage discharge management – the way forward, viewed online 30 January 2014, available at http://www.gbrmpa.gov.au/about-us/legislation-regulations-and-policies/vessel-sewage-regulations/planning-for-vessel-based-sewage-discharge-management-the-way-forward

Productivity Commission 2003, ***Industries, land use and water quality in the Great Barrier Reef catchment: research report***. Department of Communications, IT and the Arts, Canberra, Australia.

SITA 2014, ***Cairns ARRT Facility***, viewed online 30 January 2014, available at http://www.sita.com.au/facilities/arrt-facilities/cairns-arrt-facility/

The Coordinator-General 2012, ***Cairns Shipping Development Project – Terms of reference for an environmental impact statement, November 2012***, Prepared by the Queensland Government Office of The Coordinator-General, Brisbane

TMR (Transport and Main Roads) 2014, ***Port Procedures and Information for Shipping – Port of Cairns***, January 2014, Queensland Government, Cairns.

World Bank 1999, Municipal Solid Waste Incineration, The International Bank for Reconstruction and Development / The World Bank, Washington, USA.