22.1 Introduction

The proposed expansion of EAW will result in the generation of emissions, discharges and waste during the construction and operational phases of the project. Construction and operation of the proposed development will also require storage and use of some hazardous materials. These waste streams and emissions have the potential to impact the environment and cause "environmental nuisance" if appropriate management and / or mitigation measures are not undertaken by the proponent.

The Waste Management and Pollution Control Act defines environmental nuisance as:

- an adverse effect on the amenity of an area that:
- is caused by noise, smoke, dust, fumes or odour; and
- unreasonably interferes with or is likely to unreasonably interfere with the enjoyment of the area by persons who occupy a place within the area or are otherwise lawfully in the area; or
- an unsightly or offensive condition caused by contaminants or waste.

It is highly likely that oil / petroleum storage (at the MSB) will be listed under Schedule 2 of the Waste Management and Pollution Control Act and a licence to store these hazardous materials at the MSB will be required. It is also possible that fuel will be piped in from the nearby Vopak facility, depending on the final MSB design. The MSB fuel storage facility will comply with any licence conditions specified, as well as all regulations set down by the Act

This chapter identifies the emissions and waste (solid and liquid) that will be produced through the different phases of the project, and the potential for the project to create environmental nuisance. The waste management strategy and actions to limit potential negative environmental impacts associated with waste generation and storage / use of hazardous materials are also discussed in this chapter.

Generation and discharges of stormwater, GHG emissions, and assessment of visual impacts caused by light emissions are discussed elsewhere in this EIS:

- Stormwater: Chapter 10
- GHG emissions: Chapter 12
- Visual amenity: Chapter 17.

22.2 Waste

Solid and liquid wastes will be generated during both the construction and operational phases of the proposed development. The types and quantities of wastes generated during construction will be distinct from those generated once the development is operating. Waste generated will also vary between project components.

This section identifies the types of solid and liquid wastes which will be generated during construction and operation of the proposed development. The estimates of waste quantities possible at this early stage of planning are necessarily approximate, and are based on industry accepted waste volumes per person on site.

22.2.1 Liquid Wastes

Liquid wastes will be generated during both the construction and operational phases of the proposed development, and will be mainly limited to grey water and sewage. Smaller volumes of liquid wastes such as lubricants and solvents will also be produced.



Sewage and Grey Water

Sewage and grey water will be generated during both the construction and operation phases of the proposed development. It is anticipated that on average approximately 100-200 workers will be on site during the construction phase of the project. The MSB will have a maximum FTE staff of 20 workers once operational.

Sewage from offshore rigs will be delivered to the MSB by rig tender vessels. It will be transferred from the ships to liquid waste disposal trucks, and then transported to a licensed waste treatment facility (outside of EAW). Options of temporary storage of sewerage is being investigated as part of the detailed design for the MSB, with appropriate management measures included in management plans for the MSB.

Miscellaneous Liquid Waste

In addition to the major liquid waste streams listed above, small volumes of other liquid wastes will be generated during construction and operation of the proposed development. During construction, some maintenance of construction equipment and vehicles may be undertaken on site, which has the potential to generate waste liquids such as lubricants, coolants, hydraulic fluids, and fuels (including spills).

Waste liquids are likely to be disposed of from rig tenders to the MSB once it is operational. These waste liquids would mostly be generated on oil rigs and other offshore infrastructure, and transported to the MSB for disposal. The barge ramp hardstand will also store hazardous chemicals, including fuels and lubricants.

22.2.2 Solid Wastes

Solid wastes will be generated during both the construction and operational phases of each project component. The construction force will be accommodated offsite in Darwin, but each construction zone will include a portable facility for consumption of meals during working hours. Construction wastes will be largely inert, and will include dredged soil and rock, excavated soil and rock, packaging materials, scrap metal and plastic.

The most significant waste product resulting from construction of the proposed development, in terms of volume, is dredged spoil. Channels will be dredged for the barge ramp, MSB, and tug and small vessel berths, and approximately 1,100,000 m³ of spoil in total is expected to be dredged. All dredged spoil is proposed to be disposed of offsite, in accordance with a DMP (refer to Appendix B).

Other wastes associated with construction of the proposed development are mainly limited to domestic waste generated by workers on site, sewage, and packaging of some industrial / construction materials. The EAW precinct is currently serviced by municipal waste collection, and domestic waste associated with construction of the proposed development would be collected by this service. Skips will be provided at construction laydown areas for the duration of construction activities. Additional skips will be provided at work zones. The skips would be used for waste generated by construction activities, and will be emptied / removed by licensed contractors as necessary.

Various goods and materials will therefore be stored at the MSB at times, including drilling mud, rock, construction materials, fuels, lubricants, food, safety equipment, and maintenance materials. Some of these materials will be hazardous materials. Volumes and quantities of the various materials to be stored at the MSB are unknown at this stage.



Contractors and subcontractors will be required to prepare CEMPs in accordance with the requirements of NRETAS and DPC. The scope of the CEMPs will include construction inputs, and potential environmental aspects such as spills. The operator of the MSB will be required to prepare an EMP in accordance with NRETAS and DPC requirements.

The MSB and tug berths will have staff working on site during operations, with basic kitchen and meal consumption facilities. The MSB will include a small administrative building, which will have toilet, washroom and kitchen facilities. A Support Services Building will operate at the tug / small vessel berth. Solid wastes generated during operation of the proposed development will include domestic waste (packaging, food), waste oils and other lubricants (delivered to the MSB), and recyclables (e.g. aluminium drink cans, plastic packaging, paper). Generation of waste or other by-products and outputs associated with operation of the proposed development will be negligible.

22.3 Management and Mitigation Measures

A Waste Management Plan (WMP) will be prepared by DPC for the entire proposed development (i.e. all four project components). The WMPs will provide a strategic framework to ensure that waste management during both the construction and operation phases of the proposed development meets the objectives and targets expressed in the EAW environment management plan (EMP).

The Contractor/s responsible for construction of each project component will be required to prepare a CEMP for each component/s, and each CEMP will address construction waste flows and their disposal / recycling in accordance with the DPC WMP. Waste management measures to be implemented during construction, including recycling, will be detailed in each CEMP.

The operator of each component of the EAW expansion will prepare an EMP specific to that component prior to the new component operating at the wharf. The project component EMPs will be developed in accordance with the objectives and targets of the EAW EMP, and will include a detailed description of waste management measures to be implemented during operation of each project component.

22.3.1 Waste

Waste associated with the proposed development will be managed according to principles that are environmentally responsible and limit the amount of waste produced, in compliance with the EAW EMP (Coffey Environments, 2010).

The project components will be developed in accordance with the waste management targets as stated in the EAW EMP (Coffey Environments, 2010) where appropriate, including:

- Recycling facilities and systems in place to allow the separation and recycling of materials (including, paper, cardboard, drink containers, scrap metal, waste oil, lead acid batteries and printer cartridges).
- Manage quarantine waste in accordance with AQIS requirements.
- Manage general waste to prevent litter, odour and pest infestations.

A Construction Waste Management Plan (CWMP) will be developed by DPC for the construction activities required, in accordance with the EAW EMP. The CWMP will address provision of recycling and waste disposal facilities at the construction sites, reduction of waste related environmental

nuisance (e.g. covered receptacles, regular collection of waste and recyclables from site to reduce odour), and promotion of recycled packaging and construction materials where practicable.

Project component specific EMPs will address waste management measures for each facility. The waste management measures to be addressed will include as a minimum, recycling and waste disposal facilities, mitigation of waste related environmental nuisance, and composting of organics where practicable.

All solid waste generated during construction and operation of the proposed development will be disposed of at a licensed waste disposal facility. Skips will be provided at construction laydown areas for the duration of construction activities. Additional skips will be provided at work zones. The skips would be used for waste generated by construction activities, and will be emptied / removed by licensed contractors as necessary. Recyclable material will be sent to a licensed recycling facility. Composted materials will be utilised on site (in landscaped areas) or made available to site users for personal use (in private gardens).

The CWMP and project component specific EMPs will also detail:

- Responsibilities for waste management, collection, disposal, and documentation.
- All chemicals, including fuels, to be stored and / or used on the project site.
- Proposed methods for transportation, storage and use of chemicals.
- All government approvals and agreements required and obtained for all waste disposal and management matters.

Each construction laydown will have a dedicated storage area for fuels, lubricants, and small quantities of other hazardous materials (e.g. pesticides, herbicides, cleaning products). These storage areas will be covered and bunded to reduce the risk of spills and leaks.

During operations, storage areas of the MSB and barge ramp hardstand will be covered and bunded to prevent spills or leakages of any hazardous materials stored within. The MSB refuelling transfer infrastructure will also be covered and bunded.

Security fencing and lockable doors will also be installed at the MSB and barge ramp hardstand facility to prevent misuse of any goods and materials stored within. The MSB fuel supply area and barge ramp hardstand will be paved, bunded, and graded away from the harbour to an oil separator. This will prevent any spillage during refuelling or fuel loading activities from contaminating soil or water at the EAW.

Skips will be provided at the tug berths and MSB for miscellaneous domestic waste generated by small vessels or offshore supply vessels, respectively. These will be emptied regularly by licensed contractors. Smaller bins will also be installed in appropriate locations (e.g. administrative buildings) for disposal of the various waste streams. The current municipal waste service at EAW would collect domestic waste from the smaller bins at MSB and tug berth facilities.

22.3.2 Sewage

During construction, the work zone for each project component will include at least one toilet and bathroom. Toilet / washroom facilities for construction workers will be provided in the form of portable facilities. These facilities will retain sewage and sullage in sealed tanks until they are removed by a licensed contractor for disposal to an approved waste disposal site. Licensed contractors will be engaged to maintain these facilities and dispose of sewage as required.



Ablution facilities, including male and female toilets, and hand washing facilities, will be installed at the MSB and tug berths. These facilities will also include basic kitchen facilities for meal and drink preparation. Both the MSB administrative building and tug berth support services building will be connected to the sewer via a rising mains connection. Toilets, bathing, and kitchen facilities will not be included for the other project components once operational.

The MSB refuelling and rig tender sewage transfer infrastructure will be covered and bunded.

22.4 Commitments

- The construction contractor/s responsible for of each project component will be required to prepare a CEMP for each component/s.
- The operator of each component of the EAW expansion will prepare an operational EMP specific to that component prior to the new component operating at the wharf.
- Waste receptacles will allow separation and recycling of materials.
- Quarantine waste will be managed in accordance with AQIS requirements.
- Manage general waste to prevent litter, odour and pest infestations.
- A CWMP will be developed
- Site specific EMPs will address waste management measures for each facility.
- All solid waste generated during construction and operation of the proposed development will be disposed of at a licensed waste disposal facility.
- Each construction laydown will have a dedicated storage area for fuels, lubricants, and small quantities of other hazardous materials.
- Security fencing and lockable doors will be installed at the MSB and barge ramp hardstand to prevent misuse of any goods and materials stored within.
- The MSB fuel supply area and barge ramp hardstand will be paved, bunded, and graded away from the harbour to an oil separator.
- MSB refuelling and rig tender sewage transfer infrastructure will be covered and bunded.
- Appropriate spill management equipment will be placed at readily accessible areas as part of emergency response measures.



References

Coffey Environments, 2010, East Arm Wharf Environmental Management Plan. Report prepared for DPC.

