



# WATER MANAGEMENT PLAN

Stolthaven Newcastle

Last Updated: July 2023



**DOCUMENT CONTROL**

Document Title: Water Management Plan

Document ID: SHNC-OPS-WMP

File Location: C:\Users\rdk\Stolt-Nielsen Limited\+DEP-SHVN Operations - Australia - Documents\General\Newcastle\Management Plans

Issue	Date	Description of Revision	Reviewed	Approved
0	Sep 15	Draft	LBU	RDK
1	Nov 15	Revision in accordance with recommendations made by the DoP	LBU	RDK
2	Sep 16	Review & change to review period, 2 yearly	ANW	RDK
3	Jun 18	Incorporation of Mayfield 7 Berth & consent update	ANW/RDK	RDK
4	Aug 19	Addition of Yearly Water Usage Table for Terminal	SHEQ	RDK
5	June 20	SSD 6664 surrender amendment and table update	ANW/RDK	RDK
6	June 22	General review & minor/data updates	RDK	RDK
6.1	July 23	Historical data update	RDK	RDK

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## DEFINITIONS

AHD	Australian Height Datum
CBD	Central Business District
CoA	Conditions of Approval
CSMP	Contaminated Site Management Plan
DA	Development Approval
DO	Dissolved Oxygen
EPA	Environmental Protection Authority
EPL	Environmental Protection Licence
HDC	Hunter Development Corporation
M7	Mayfield 7 Berth
MCP	Mayfield Concept Plan
NTU	Nephelometric Turbidity Units
O/G	Oil & Grease
OEMP	Operational Environmental Management Plan
PAH	Polycyclic Aromatic Hydrocarbons
POEO Act	Protection of the Environmental Operations Act, 1997
PIG	Pipeline Inspection Gauge
PON	Port of Newcastle
RAP	Remediation Action Plan
SHEQ	Safety Health Environment & Quality
SSD	State Significant Development
TPH	Total Petroleum Hydrocarbons
TSS	Total Suspended Solids
VRA	Voluntary Remediation Agreement
WMP	Water Management Plan



## 1 INTRODUCTION

This Water Management Plan (WMP) developed by Stolthaven Terminals Mayfield facility, provides an operation water management protocol; to ensure that best practice controls to manage potential water and wastewater impacts during the operation of the facility are established and maintained. Stolthaven has approval to operate a Bulk liquid Storage Terminal at Mayfield, NSW. The site is located within the area covered by the Mayfield Concept Plan (MCP). The site dispatches a combination of diesel and biodiesel fuels. Diesel is imported to the facility by vessel, whereas biodiesel is imported by either vessel or road tanker, with both products being exported by road tanker.

Both products are imported to the facility by vessel and distributed by road tanker, with biodiesel also being able to be delivered by truck.

Stolthaven was granted approval SSD 7065 on the 15 of December 2016. The project approval identifies requirements for implementation, monitoring and auditing of water and wastewater management. These requirements will be addressed in this WMP to satisfy the project approval.

This WMP is to be consistent with:

- a) The Site's Operational Environmental Management Plan (OEMP);
- b) The Minister for Planning's Project Approval (SSD 7065) dated 15<sup>th</sup> Dec 2016;
- c) The EPA issued Environmental Protection Licence (No. 20193);
- d) Mayfield Concept Approval (Application 09\_0096) dated 16 July 2012; and
- e) Port of Newcastle (PON) overarching WMP.

### Operations to which this OEMP Apply

The operations to which this OEMP applies are:

- The operation of approved established terminal & the new combustible fuels wharf line which connects the existing terminal to Mayfield Berth No. 7, as approved under SSD\_7065. The operation of the wharf line also includes the following ancillary elements:
  - Fire and safety systems
  - Lighting and CCTV
  - Power and communications systems
  - Fencing.

Note: The operation of any other elements of the project approved under SSD\_7065 would be subject to additional updated to this OEMP, review and approval by the Department of Planning and Environment.

### 1.1 CONDITIONS OF APPROVAL

Condition 11 of the consent requires the preparation and implementation of an WMP for the Facility, to outline monitoring, management procedures and measures to minimise operational water impacts. This condition and the rest of the consent related to water management, associated with the Facility are outlined in the table below.

CoA	Requirement	WMP Reference
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Schedule C, Condition C45 – Specific Environmental Conditions		
a)	be updated prior to operation of the development	See revision table
b)	include procedures for the prevention and management of spills and leaks from the Development, including terminal, M7 Berth, pipeline;	Section 12.0
c)	include a surface water monitoring program to measure the quality and quantity of water discharges from the Site in accordance with an EPL for the Site;	Section 9.4, 9.5 & 10.5
d)	include a groundwater monitoring program to evaluate the integrity of the surface capping in minimising groundwater contamination and monitor in accordance with the requirements of an EPL for the Site; and	Section 9
e)	include surface and groundwater response plan, including remedial actions and procedures to be followed in the event of an incident.	Section 9

## 2 OBJECTIVE

The main objectives of this WMP are to:

- a) Meet the Department of Planning's Conditions of Approval (CoA);
- b) Meet the requirements outlined in the sites Environmental Protection Licence (No. 20193);
- c) Meet the requirements of the Mayfield Concept Plan (MCP);
- d) Detail required mitigation measurements and management methods to control collection and release of water at the bulk fuel facility;
- e) Meet water monitoring requirements;
- f) Minimise the potential for water release from the Project operational activities, including from plant, equipment on the site; and
- g) Define the responsibilities and actions required to manage operational water and waste water and respond to relative incidents.

## 3 ROLES AND RESPONSIBILITIES

Position	Responsibility
General Manager	The General Manager will assume overall accountability for the implementation of this WMP.
SHEQ Manager	The group SHEQ Manager will have an overall responsibility for incident investigation and corrective action implementation, auditing and review of the SWMP against changes in Environmental Laws and Regulations.
Operations Manager	The Newcastle Operations Manager will be responsible for staff training; environmental monitoring against criteria; record keeping; and auditing. As well as, reviewing the WMP against site operations on a biennial basis.





Site Superintendent	Interpretation of results before release of water.  <i>Note:</i> Ensure Safety Data Sheet's (SDS) are accessible and followed to minimise risk of injury (refer to documentation)
Operational Team	Is responsible for ensuring this procedure is followed during operation for the retention of water sample and the arranging of an authorised water-testing contractor to take water samples and analysis.

## 4 ENVIRONMENTAL SETTING

### 4.1 LOCATION

The project is located on the former BHP steelworks site in Mayfield North, adjacent to the Hunter River, approximately 5 km north-west of Newcastle CBD. The site location falls within the MCP area, which is currently being redeveloped as an industrial precinct.

The terminal facility is used for the storage and blending of high-quality fuels, which includes nine primary storage tanks, in addition to receiving ships at Mayfield No. 7 Berth with an interconnecting 16" pipeline.

### 4.2 SITE HISTORY

The Facility is located on what was part of the former BHP Steelworks Site. BHP was located on the Site from 1915 to 1999. In July 2002, ownership of that part of the former Steelworks Site known as the Closure Area Site was transferred to the State Government. In March 2007, the Hunter Development Corporation (HDC) (formerly the Regional Land Management Corporation Pty Ltd) was created by the Government to manage the day-to-day activities of former BHP and other Crown lands in the Lower Hunter Region, including remedial and redevelopment works for the Closure Area Site (SKM 2004). On 14 June 2001, under former Section 21 of the *Contaminated Land Management Act 1997* (CLM Act), the Environment Protection Authority (EPA) declared the Closure Site to be a remediation site.

A Remediation Action Plan (RAP) was prepared by SKM in 2004 to address contamination issues associated with soils and groundwater. A Voluntary Remediation Agreement (VRA No. 26025) for the remediation of the Site was issued by the EPA on 30 August 2005. HDC undertook to fulfil these remediation commitments. In March 2008, a Contaminated Site Management Plan (CSMP) for the Closure Area of Former Steelworks Site Mayfield was prepared by HDC. The CSMP provided a common framework to be applied across the whole of the site for the design, implementation, completion, use and maintenance of remediation and project works. In mid-2008, HDC completed Stage 1 of the remediation works. Stage 1 dealt with the majority of contamination risks located within Area 1, and included the following activities:

- The construction of an underground barrier wall to three sides of Area 1. The barrier walls lie up to 49 m deep and 1.5 km long, and function by reducing groundwater flow to the Hunter River;
- The placement of low permeability capping (10<sup>-9</sup>m/s) to reduce the infiltration of groundwater;
- The construction of new major stormwater drains at the east and west ends of the site; and
- Associated demolition, land farming and environmental works.

Stage 2 of the remediation works were subsequently completed in 2013. Stage 2 activities involved further capping, land forming, and surface drainage works.



The site and surrounding area was also involved in the Hunter River Remediation Project (HRRP) undertaken by BHP Billiton. This involved the dredging and onshore treatment of contaminated sediments in the Hunter River at Mayfield Berths 1 and 2. The sediment removal work was completed by 2011 with remediation of the Site completed by 2012. Following the completion of the land and river remediation works in 2013, the site was capped and returned to a hardstand area with minimal infrastructure in anticipation of future development for port and related industries.

#### 4.2.1 EXISTING STORMWATER MANAGEMENT SYSTEM

The detailed design of the existing stormwater infrastructure was based on a preliminary stormwater design (Patterson Britton 2006) for the ultimate redevelopment of the entire site. A stormwater trunk drainage network was established in association with the remediation carried out across the site. This drainage network includes two trunk drains (an eastern and a western drain) which receive run-off from the hard stand areas, open drains and pipes across the site before discharging via nominated points to the Hunter River. The trunk drains are intended to provide a permanent trunk drainage solution for the site. Additionally, a number of smaller, temporary, lined shallow ponds and drains have been provided across the remediation area. These ponds contain weirs to control water levels and drain off-site via lined channels or existing underground drainage.

The site has been partly contoured to direct stormwater runoff into the stormwater drains. These ponds and drains serve as an interim drainage system until the final use of the site is determined and a permanent drainage system is implemented.

The stormwater management system, in conjunction with the capping of the site, provide a barrier minimising groundwater and surface water interaction and have been designed to work together to reduce the amount of rainwater infiltrating the site and the movement of groundwater through contaminated soil and into the South Arm of the Hunter River. Following completion of the contamination works the impervious capping was placed across the site to direct runoff to the truck drainage network.

#### 4.2.2 EXISTING SURFACE WATER QUALITY

The estuary of the Hunter River has undergone significant environmental and physical changes associated with port and industrial development over the last 200 years. The South Arm of the Hunter River is highly disturbed as a result of historical and ongoing industrial activity in and around the Port of Newcastle. Heavy industry, manufacturing and shipping have contributed to poor water quality within the lower reaches of the Hunter River, including the South Arm.

Sampling and analysis of surface water across the site was undertaken by Coffey Environment (2008) during the remediation works (June 2007 and March 2008). As summarised in the EA (AECOM 2010), in general the following observations were made:

- Exceedances of Australian and New Zealand Environment Conservation Council (ANZECC) marine trigger values (95 percent level of protection) were common for heavy metals across all monitoring locations, particularly copper, lead and zinc. Chromium and cadmium exceedances were also observed. Elevated heavy metal concentrations were attributed in part to suspended particles in the water samples (which were not filtered prior to laboratory testing);
- Turbidity exceedances of the ANZECC guideline value (0.5 to 10 Nephelometric Turbidity Units (NTU)) were attributed to increased suspended sediments resulting from earthworks, including construction of the cap, and erosion of uncapped areas; and
- In general, Total Petroleum Hydrocarbons (TPH) concentrations were below the intervention/investigation level of 325 micrograms per litre ( $\mu\text{g/L}$ ). Elevated TPH concentrations in one sampling location were attributed to the high use of trucks, cars and other heavy equipment at that location.



Sampling was also undertaken by GHD between November 2008 and October 2009. The results demonstrated:

- In general, turbidity exceedances were observed at all locations, with the highest and most frequent exceedances occurring in the south east of the site (in Area 2). These areas are currently uncapped and turbidity exceedances are likely the result of disturbance of sediments from earthworks and erosion of uncapped areas draining to the sampling locations;
- Heavy metal exceedances, particularly copper, lead and zinc occurred for all sampling events and in all locations, including the Eastern and Western Drains;
- TPH concentrations were generally below detection limits for all sites except SW9, located in the south east of the site, which recorded elevated levels of TPH since May 2009, with an exceedance of the guideline value on one sampling event (September 2009); and
- PAH concentrations were generally below limits of recording for all sites except SW9.

4.2.3 STRUCTURAL COMPLIANCE

All structures, which includes bunded areas have been inspected and approved by Aurecon to be compliant with AS 1940: *The Storage and handling of flammable and combustible liquids*; provided by the 'Structural Construction Certificate' – dated 20 September 2013.

4.3 ENVIRONMENTAL PROTECTION LICENCE (EPL)

The Site holds product and operates in a manner so as to achieve compliance with the condition of its Environmental Protection Licence (EPL) No. 20193. It is issued under Section 55 of the *Protection of the Environmental Operations Act 1997* (POEO Act) and is administered by the NSW EPA. The EPL sets out conditions regulating a range of aspects of Site operations with potential to impact on the environment, including aspects associated with managing impacts on surface waters.

The EPL licence nominates environmental monitoring and/or permissible discharge points with corresponding identification numbers.

The EPL defines treatment/ monitoring requirements and/ or nominates limits for the emissions utilising the corresponding identification numbers.

Table 1 presents the sections relevant to operations water management in the EPL applicable to the operation and includes where the requirements have been addressed in this WMP.

Table 1: Environmental Protection Licence Criteria

EPL Condition	Requirement		
P1.3	The following points referred to in the table are identified in this licence for the purposes of the monitoring and/ or the setting of limits for discharges of pollutants to water from the point.		
	EPA Identification No.	Type of Monitoring Point	Location Description
	1	Ground Water	Groundwater monitoring well shown as "49" marked on the plan titled "General Layout Stages 1,2 and 3" Rev C



	2	Ground Water	Groundwater monitoring well shown as "50" marked on the plan titled "General Layout Stages 1,2 and 3" Rev C
	3	Ground Water	Groundwater monitoring well shown as "51" marked on the plan titled "General Layout Stages 1,2 and 3" Rev C
	4	Ground Water	Groundwater monitoring well shown as "52" marked on the plan titled "General Layout Stages 1,2 and 3" Rev C
	5	Surface Water	Discharge collection pit shown as "15" marked on the plan titled "General Layout for Stage 1 EPA Licence Application"
	16	Ground Water	Groundwater monitoring well shown as "91" marked on the plan titled "General Layout Stages 1,2 and 3" Rev C
	17	Ground Water	Groundwater monitoring well shown as "92" marked on the plan titled "General Layout Stages 1,2 and 3" Rev C
	18	Ground Water	Groundwater monitoring well shown as "93" marked on the plan titled "General Layout Stages 1,2 and 3" Rev C
	19	Ground Water	Groundwater monitoring well shown as "94" marked on the plan titled "General Layout Stages 1,2 and 3" Rev C
	20	Ground Water	Groundwater monitoring well shown as "95" marked on the plan titled "General Layout Stages 1,2 and 3" Rev C
	<p><i>Note all dredging activities included in the EPL have been excluded from this table as these activities were completed during M7 construction and are no longer active.</i></p>		
L3.1	For each monitoring/ discharge point or utilisation area specified in the table\>s below (by a point number), the concentration of a pollutant discharged at that point, or applied to that area, must not exceed the concentration limits specified for that pollutant in the table.		
L3.2	Where a pH quantity limit is specified in the table, the specified percentage of samples must be within the specified ranges.		
L3.3	To avoid any doubt, this condition does not authorise the pollution of waters by any pollutant other than those specified in the table\>s.		



L3.5	<p>Water and/ or Land Concentration Limits</p> <table border="1" data-bbox="375 280 1316 627"> <thead> <tr> <th>Pollutant</th> <th>Units of Measure</th> <th>100 percentile concentration limit</th> </tr> </thead> <tbody> <tr> <td>Dissolved Oxygen</td> <td>Milligrams per litre</td> <td>&gt;2</td> </tr> <tr> <td>Oil and Grease</td> <td>Milligrams per litre</td> <td>10</td> </tr> <tr> <td>pH</td> <td>pH</td> <td>6.5 – 8.5</td> </tr> <tr> <td>Total Suspended Solids</td> <td>Milligrams per litre</td> <td>30</td> </tr> </tbody> </table>	Pollutant	Units of Measure	100 percentile concentration limit	Dissolved Oxygen	Milligrams per litre	>2	Oil and Grease	Milligrams per litre	10	pH	pH	6.5 – 8.5	Total Suspended Solids	Milligrams per litre	30																									
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M2.1	<p>For each monitoring/ discharge point or utilisation area specified below (by a point number), the licensee must monitor (by sampling and obtained results by analysis) the concentration of each pollutant specified in Column 1. The licensee must use the sampling method, unit of measure, and sample at the frequency, specified opposite in the other columns.</p>																																								
M2.3	<p>Water and/ or Land Monitoring Requirements:</p> <p>Point 1,2,3,4,16,17,18,19,20:</p> <table border="1" data-bbox="375 952 1316 1310"> <thead> <tr> <th>Pollutant</th> <th>Units of Measure</th> <th>Frequency</th> <th>Sampling Method</th> </tr> </thead> <tbody> <tr> <td>BTEX</td> <td>Milligrams per litre</td> <td>Quarterly</td> <td>Representative Sample</td> </tr> <tr> <td>pH</td> <td>pH</td> <td>Quarterly</td> <td>Representative Sample</td> </tr> <tr> <td>Standing Water Level</td> <td>Metres</td> <td>Quarterly</td> <td><i>In situ</i></td> </tr> <tr> <td>TPH</td> <td>Milligrams per litre</td> <td>Quarterly</td> <td>Representative Sample</td> </tr> </tbody> </table> <p>Point 5:</p> <table border="1" data-bbox="375 1400 1348 1758"> <thead> <tr> <th>Pollutant</th> <th>Units of Measure</th> <th>Frequency</th> <th>Sampling Method</th> </tr> </thead> <tbody> <tr> <td>Dissolved Oxygen</td> <td>Milligrams per litre</td> <td>Weekly during any discharge</td> <td>Grab sample</td> </tr> <tr> <td>Oil and Grease</td> <td>Milligrams per litre</td> <td>Weekly during any discharge</td> <td>Grab sample</td> </tr> <tr> <td>pH</td> <td>Milligrams per litre</td> <td>Weekly during any discharge</td> <td>Grab sample</td> </tr> <tr> <td>Total Suspended Solids</td> <td>Milligrams per litre</td> <td>Weekly during any discharge</td> <td>Grab sample</td> </tr> </tbody> </table>	Pollutant	Units of Measure	Frequency	Sampling Method	BTEX	Milligrams per litre	Quarterly	Representative Sample	pH	pH	Quarterly	Representative Sample	Standing Water Level	Metres	Quarterly	<i>In situ</i>	TPH	Milligrams per litre	Quarterly	Representative Sample	Pollutant	Units of Measure	Frequency	Sampling Method	Dissolved Oxygen	Milligrams per litre	Weekly during any discharge	Grab sample	Oil and Grease	Milligrams per litre	Weekly during any discharge	Grab sample	pH	Milligrams per litre	Weekly during any discharge	Grab sample	Total Suspended Solids	Milligrams per litre	Weekly during any discharge	Grab sample
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M3.2	<p>Subject to any express provision to the contrary in this licence, monitoring for the concentration of a pollutant discharged to waters or applied to a utilisation area must be done in accordance with the Approved Methods Publication unless another method has been approved by the EPA in writing before any tests are conducted.</p>																																								



## 5 MAYFIELD CONCEPT PLAN

### 5.1 PRINCIPLES AND OBJECTIVES

In accordance with the Mayfield Concept Plan and the Stormwater Management Strategy (PON), site specific design criteria or measures that are to be incorporated into the development are listed in Table 2 below. These have been compiled based on commitments or mitigation measures presented in the Port of Newcastle Environmental Assessment Preliminary Strategy.

Table 2: Water Mitigation Measure; Excerpt from PON Stormwater Management Plan, in accordance with the Mayfield Concept Plan

Feature	Guidelines
Site Grading	Site is to be graded to be free-draining and free of ponded areas. Site grading to be designed to maintain separation of potentially contaminated run-off ( <i>i.e.</i> tank farms, stockpiles and wash down areas, <i>etc.</i> ) from clean stormwater run-off.
General	<ul style="list-style-type: none"> <li>- Open channels to be adopted as a 'green' solution;</li> <li>- All open drains are to be lined to isolated drainage flows from the local groundwater;</li> <li>- When inverts are below the estimated groundwater table, will be sufficiently weighted to counter buoyancy forces; and</li> <li>- Appropriately sized culverts and/or drains will be constructed under road and rail infrastructure to maintain connectivity between catchments and reduce the likelihood of localised flooding.</li> </ul>
Minor open drains and swales	<ul style="list-style-type: none"> <li>- Designed to convey the 5% AEP event;</li> <li>- Use of swales for treating stormwater is acceptable;</li> <li>- Grassed batters – no minimum slope (maintained by boom-style mowers) and may undulate if required. Low flow drainage will be provided to drain flat sections;</li> <li>- Acceptable to run overflows along swales as well as road and footways during larger events (<i>i.e.</i> safe overland and major flow paths); and</li> <li>- Velocity x Depth product to be less than 1.0 (in a 1% AEP event) (or as otherwise recommended in updated versions of Australian Rainfall and Runoff).</li> </ul>
Major Open Drains	<ul style="list-style-type: none"> <li>- Designed to convey the 1% AEP event; and</li> <li>- 0% longitudinal grade is permitted (where intent is to create a water quality function or intertidal zone, similar to the Eastern or Western Drains).</li> </ul>
Tidal Drains	<ul style="list-style-type: none"> <li>- Use of mangroves is preferable for vegetation treatment (use Manning's <math>n</math> of 0.1 for mangroves); and/ or</li> <li>- Flap valves to prevent tidal inundation of the stormwater system should be located at the upstream end of open channels.</li> </ul>
Tailwater Conditions	<ul style="list-style-type: none"> <li>- A tailwater of 0.8m AHD (spring high tide) for the 1% AEP flood event (across the site) is considered appropriate, and this should be compared to a flood event based on a storm surge tailwater (1.35m AHD) with a 10% AEP rainfall event.</li> </ul>
Stormwater Pipes	<ul style="list-style-type: none"> <li>- Minimum pipe slopes of 0.3% are to be adopted;</li> <li>- Consideration to be given to pipe blockage, including risk of blockage, design features to minimise risk of blockage and storage effects; and</li> <li>- Pits, pipes, culverts and headwalls shall be constructed so that drainage flows are isolated from groundwater. Therefore, conduits are to be sealed and open drains lined with HDPE.</li> </ul>
Roof Water	<ul style="list-style-type: none"> <li>- Roof water will be captured and stored on site and reused for wash down facilities, irrigation of landscaping, or other non-potable reuse purposes where practicable.</li> </ul>



Basins	<ul style="list-style-type: none"> <li>- To perform either a water quality or flood attenuation function;</li> <li>- To be connected to the main drains;</li> <li>- Designed with sufficient capacity to contain up to the 1% AEP event; and</li> <li>- Wet basins to have side slopes of no steeper than 1V:3H, lined with HDPE to prevent groundwater interaction.</li> </ul>
Bunds	<ul style="list-style-type: none"> <li>- Catchments with a high risk of accumulation of contaminants, or spills and leaks are to be bunded to contain potentially contaminated stormwater, and separated from clean stormwater runoff in adjacent sub-catchments;</li> <li>- Stormwater captured in bunded areas will be retained on site until tested as suitable for discharge;</li> <li>- Bulk liquid storage tanks to be located in sealed bunded area, with capacity to hold 120% of the tank volume storage volume. Tank farm areas to be encompassed by a second bund in the unlikely event of an individual bund failure.</li> </ul>
Interaction with Groundwater	<ul style="list-style-type: none"> <li>- Design and construction of all drains must consider the potential to interact with the groundwater table and implement measures to reduce infiltration and prevent leaching of groundwater into the stormwater system.</li> </ul>
Construction Materials	<ul style="list-style-type: none"> <li>- If slag is used in the construction of major stormwater channels, testing is to be undertaken to demonstrate no leachate into the water.</li> </ul>
All Excavation Works	<ul style="list-style-type: none"> <li>- All works are to be carried out in accordance with the CSMP;</li> <li>- Use of geotextile liners or temporary capping would reduce infiltration of surface water runoff where capping is disturbed during construction (to be reinstated and maintained during operation);</li> <li>- Designs and all disturbance works are to maintain the integrity of the site capping (as per the CSMP).</li> </ul>
Bulk liquids Storage Tanks	<ul style="list-style-type: none"> <li>- Each tank to be fitted with auto-level gauging, high/high and high/low level alarms, multi-level temperature measurement, multi-level sampling equipment, water draining and low-level product drains for maintenance;</li> <li>- Filling of storage tanks to be controlled by a computer-controlled system that would monitor storage tank levels and reduce the risk of overfilling; and</li> <li>- Design tanks to meet or exceed the applicable standards. Storage tanks to be placed on a reinforced concrete foundation and include a tell-tale drain installed under each tank to assist with leak detection.</li> </ul>

## 6 OPERATIONAL RISKS

Bulk liquid operations may include the receipt, storage, blending and distribution of fuels and biofuels. Fuel types handled include diesel and biodiesel. These products are delivered to the site by ship and biodiesel can be delivered by road or Ship. Infrastructure includes tank farms with steel storage tanks, fuel distribution pipelines, loading / unloading facilities for trucks, bunded areas, workshops and administration buildings.

Ships at berth transfer diesel through flexible hoses to an aboveground pipeline and into the bulk liquid facilities. There is the potential for spills and leaks to occur during transfer of the liquids from ships to facilities, from damaged hoses and pipelines. There is also the potential for overfilling of storage tanks during receipt of fuels from both ships and road tankers which could result in large spills into the drainage system of the precinct or directly to the Hunter River. Large spills are unlikely to occur as there are strict procedures set out in environmental management plans, incorporating visual inspections, supervision of transfers and regular maintenance of hoses and pipes, as well as additional engineering controls, e.g. high-level alarms and automatic shutdown devices, etc.



Bulk fuel storage tanks have the capacity to store significant volumes of fuel on the site. Damage to tanks, corrosion, malfunction of valves and level gauges and failure of bunding, although highly unlikely, could result serious leaks, spills and overflows of potentially large volumes of fuels to the receiving environment. The resultant impacts of uncontrolled fuel spills on the Hunter River would be significant and potentially cause long-term damage to water quality, habitats and sediments within the river. Bunding is placed around storage tanks to contain spills and overflows and emergency response plans would be implemented to ensure the risk and impact of spills and overflows is minimised.

Bunded areas create micro-catchments within the precinct, potentially impacting flood risk potential. Stormwater drainage infrastructure would be designed to ensure bunded areas are incorporated into the stormwater system, thereby managing the potential for flood risk impacts within or downstream of the precinct.

## 7 WATER SUPPLY AND USAGE

### 7.1 WATER SUPPLY

Two separate reticulate water supplies have been provided to the site; one dedicated for potable water and the other for fire-fighting purposes. Both water supplies have been provided by Port of Newcastle to a point within the Stolthaven Terminal site via a mains pipeline connection point located on adjoin land owned by PON; close to the rail crossing at Selwyn Street.

PON has committed to provide the water supply at the volume and pressure available from Hunter Water reticulate water system. The Stolthaven site has incorporated additional fire water tanks with adjoining pump systems to supply water and flow to meet the requirements of the sites fire safety study.

### 7.2 WATER USAGE

The site consumes approximately 200 - 300 KL of fresh water per year for operations, which includes services, amenities & fire system top up. An example of the yearly water usage for Stolthaven Newcastle are displayed in Table 3 below.

Table 3: Yearly Water Usage

Year	Potable (KL)	Fire Water Tank (KL)	Mayfield 7 Berth (KL)
2014	140	No Data Recorded	
2015	133	No Data Recorded	
2016	147	450 (first reading)	
2017	164	27	
2018	168	119	
2019	171	59	
2020	146	36	
2021	178	89	
2022	156	97	18

*Note: in 2022 a new water connection was made at Mayfield 7 Berth to improve water pressure to safety showers and eyewash stations. Water usage for Mayfield 7 will be added to the above from 2022.*





### 7.2.1 DOMESTIC USAGE

Potable water is utilised for a range of domestic and commercial type uses on the site, including:

- Toilet flushing;
- Hand basins;
- Cleaning;
- Change-room showers;
- Lunchroom and kitchen sinks; and
- Drinking water.

### 7.2.2 PROCESS USAGE

The majority of process water is consumed by the following activities:

- Safety showers;
- Fire system use & maintenance;
- Eye wash stations; and
- Laboratory use.

## 7.3 IMPACT ASSESSMENT

### 7.3.1 CONSTRUCTION PHASE

Water supply would be required during the construction phase for a range of activities, including:

- Construction use, *e.g.* dust suppression;
- Tank cleaning;
- Hydro-testing; and
- General workforce amenities.

This water would be potable water supplied by PON via the Hunter Water reticulated mains network; with existing site infrastructure being utilised.

## 7.4 WATER REDUCTION AND REUSE

Options to reduce water consumption through the implementation of efficiency measures, such as usage avoidance, reuse and recycling, have been considered, in accordance with the site's operational energy efficiency management plan, to date limited opportunities have been identified. Potential water efficiency measures will continue to be considered during the further design stages of the project, and if viable, will be implemented.

# 8 DOMESTIC WASTEWATER MANAGEMENT

## 8.1 SOURCES OF DOMESTIC WASTEWATER

Domestic wastewater, also referred to as sewage, sanitary effluent and septic effluent is generally derived from toilets, showers and other domestic water uses described in *Section 7.2.1* of this WMP.

Currently the site domestic wastewater is generated from the following areas:

- Operational control room;
- Drivers room;
- Mayfield 7 Berth amenities;



- Test room; and/ or
- Load Gantry.

#### 8.1.1 SEPTIC EFFLUENT QUANTITY

Due to the site not being connected to a sewerage network, all waste effluent is stored on site in a 5 kl (Terminal) & a 2 kl (M7 berth) septic/holding tank. In accordance with the site's environmental protection licence, the waste effluent is removed by certified trade waste from site weekly; with an approximate volume of 3.5 kL on average.

The site has installed automated tank level gauging incorporating a high alarm on the Terminal's high use 5 kl septic tank to allow regular content monitoring & overflow prevention. The berth septic tank also has a high alarm installed which alerts the operators of any unexpected high levels. This additional control was driven by the site's ongoing improvement initiative.

## 9 STORMWATER MANAGEMENT

The site has a stormwater management system that separates stormwater from potentially impacted water. Rainwater that falls within tank bund areas or within the load gantry area, which could be potentially impacted, is collected in either the bund itself or a first flush retention pit.

In accordance with the sites EPL (No. 20193), all collected water must satisfy a predetermined criteria before being discharged off-site.

### 9.1 STORMWATER MANAGEMENT PLAN (SWMP)

*For more detail on stormwater management, refer to the Stolthaven Newcastle Stormwater Management Plan (SWMP)*

### 9.2 SCOPE

The Stormwater Management Plan (SWMP) covers the operation of equipment installed to assist with the control of site stormwater and bund water before releasing off site through the outfall drain, as well as, assessing the testing and sampling regime of stormwater and bund water. The key equipment items are the First Flush Retention Pit/ Remote Impounding Basin, two Coalescing Plate Separators and the Purceptor. In order to protect the quality of the receiving water ways which run-off from the site, stormwater is drained into stormwater drains or enters via overland flow. The quality of the stormwater run-off from the site is managed by:

- Management objectives;
- Management tasks and actions;
- Performance criteria;
- Performance monitoring;
- Corrective actions;
- Reporting and review procedures; and
- Responsible person(s) and organisation(s)

### 9.3 NOTIFICATION

All monitoring results are submitted to the PON on a bimonthly basis in accordance with the Mayfield Concept Plan Stormwater Management Plan and the criteria stipulated in the sites development approval (SSD 7065).



**9.4 OBJECTIVES**

The objectives of the Stormwater Management Plan are to:

- Introduce appropriate measures to prevent marine, stormwater and groundwater degradation;
- Collect, direct and release stormwater runoff from the site in a controlled manner that does not cause accelerated erosion processes;
- Comply with all legislative water quality requirements;
- Operate in full compliance with the terminal’s procedures for work prevent environmental harm during terminal activities;
- Establish a spill clean-up plan in the event that product, soil spills or debris should enter the marine environment; and
- Comply with the broader Mayfield Concept Plan “Concept Stormwater Management Strategy, AECOM, 9<sup>th</sup> July 2005”.

As part of the Contaminated Site Management Plan (CSMP) specific control measures have been outlined for the maintenance of the integrity of the capping layer. These control measures are adopted as part of the on-going site environmental management controls, see *table 4*.

*Table 4: Environmental Management Controls*

Key Environmental Performance Objectives	
1	Ensure the integrity of the capping layer is preserved.
Key Environmental Considerations	
1	A breach in capping layer as a result of failure of control resulting in exposure to potential contamination.
Environmental Action and Management Measures	
1	No excavation work will be allowed on site without an excavation permit and/or notification. The authorisation process will include notification via PON to consider if capping integrity could be compromised by the proposed work.
2	Any breach of capping integrity will be recorded within the Stolthaven incident Reporting and Recording System and managed as per the Stolthaven incident management procedure/

**9.5 STORMWATER MONITORING**

**9.5.1 BUND WATER MANAGEMENT**

All bund valves in operational areas will remain closed at all times outside of draining operations. Stolthaven Terminals will do in field testing of bund water quality. The following criteria will be applied before release of bund water into the Purceptor.

**9.5.1.1 TESTING REGIME**

- Visual inspection of accumulated water within the bund pits for grease, foam, visible floating hydrocarbons, litter and any other objectionable floating materials.
- A retention sample will be taken and in field testing conducted on the bund water sample. This sample will be held until the next rainfall event.

**9.5.1.2 ACCEPTANCE CRITERIA**



- No visual evidence of grease, foam, visible floating hydrocarbons, litter and any other objectionable floating materials
- The pH range within ~6-9pH. Dissolved oxygen and conductivity will be monitored to establish site specific data. This will be recorded in the sites log.

#### 9.5.2 RELEASE OF BUND WATER

- Following confirmation of acceptance criteria being met, authorisation must be given by the Operations Coordinator upon inspection of results from the log. Once authorisation given the bund water can be released to the Puraceptor. Estimated volume of water to be logged
- Operator to monitor bund area until water has been released.

### 9.6 FIRST FLUSH RETENTION PIT (FFRP)

In accordance with EPL (No. 20913) the stormwater collected in the FFRP will be tested weekly during any discharge on a batch basis to assess the water quality. This water quality testing will be done by authorised water testing contractor.

#### 9.6.1 TESTING REGIME

- Visual inspection of accumulated water within the bund pits for grease, foam, visible floating hydrocarbons, litter and any other objectionable floating materials.
- A sample will be supplied to an authorised water testing contractor for laboratory analysis for Oil and grease, Total Suspended Solids, pH and dissolved oxygen.
- The volume of the pit must be recorded before the release of any collected stormwater to remain compliant with the Sites EPL:
  - The FFRP has a maximum holding capacity of 38,500 litres.

#### 9.6.2 ACCEPTANCE CRITERIA

*Refer to section 4.3 of this document*

#### 9.6.3 RELEASE OF STORMWATER

- Following confirmation of acceptance criteria being met, authorisation must be given by the Operations Coordinator or Ncl operations Manager upon inspection of results from laboratory analysis. Once authorisation has been given, the stormwater can be released from the FFRP to the outfall drain.

### 9.7 REMIDIAL ACTION

All suspected stormwater contamination will be resampled and tested for confirmation. If the resampled results indicate a compliant result, the collected stormwater may be removed offsite by normal discharge procedures. However, if the sample confirms a second non-compliant result then the contaminated water will be removed off-site by certified trade waste. The contamination will be recorded in Stolthaven Incident reporting system and investigated to identify the source of contaminant.



## 10 GROUNDWATER MANAGEMENT

### 10.1 GROUNDWATER MANAGEMENT PLAN (GWMP)

### 10.2 SCOPE

In order to protect the quality of the receiving waterways, which groundwater beneath the site discharges into via groundwater migration, the quality of the groundwater conditions beneath the site are managed through the application of:

1. Periodic (quarterly) monitoring and assessment of groundwater conditions beneath the site; and
2. Adherence to the groundwater management plan, the requirements and conditions of the Site Environmental protection Licence (No. 20193) under section 55 of the protection of the Environment Operations Act (PEOA, 1997), which specifies:
  - Management objectives;
  - Management tasks and actions;
  - Performance criteria;
  - Performance monitoring;
  - Corrective actions;
  - Reporting and review procedures; and
  - Responsible person(s) and organisation(s)

### 10.3 OBJECTIVES

To avoid potential detrimental impacts to the water qualities and ecology of downstream aquatic habitats that can result from the migration of impacted groundwater from beneath the site. As well as, to fully comply with the conditions of the Site Environmental protection licence (No. 20193).

The specific groundwater management tasks are to be implemented at the site to achieve the objectives of the GMP are summarised below.

1. For the purpose of this GMP, key groundwater monitoring wells that should be maintained in an operational condition include: EPL monitoring points 1, 2, 3, 4, 16, 17, 18, 19, 20. In the event of damage to monitoring wells, the Ncl Operations Manager must ensure that the monitoring wells are reinstated prior to the next scheduled monitoring event to maintain continuity of monitoring information.

*Note: All groundwater monitoring wells are to be maintained in a usable condition.*

2. It is the responsibility of the Ncl Operations Manager to ensure that quarterly groundwater monitoring events (GME) are undertaken at the site to confirm site data and trend analysis. Results will be compiled and included in reporting as per the conditions of the site environmental licence (No. 20193).
3. At the completion of four rounds of groundwater monitoring events, a report will be submitted to the group SHEQ Manager providing information on groundwater conditions beneath the site, including monitoring results, an assessment of ground water contamination and recommendations for further action (if required).



#### 10.4 GROUNDWATER MONITORING POINTS

Groundwater monitoring is achieved via 4 monitoring wells located around the operational site. In accordance with the *Water Act 1912* and/or the *Water Management Act 2000* the following licences have been obtained from the Department of Primary industries (Office of Water):

- 20BL173828
- 20BL173829; and
- 20BL173830.

#### 10.5 GROUNDWATER MONITORING

Performance monitoring will be undertaken on a quarterly basis in accordance with the sites EPL, with events being scheduled so that groundwater conditions beneath the site during the 'wet' and 'dry' seasons are investigated. Indicators of potential adverse groundwater quality impact will include (but not limited to) the following:

- Evidence of non-aqueous phase liquid (NAPL) (e.g. separate fuel layer) on the groundwater table;
- Changes in clarity, colour and odour of groundwater;
- Increases in concentrations of dissolved phase impact;

In addition to the table above, groundwater quality parameters to be monitored may include:

- Dissolved oxygen concentrations; and
- Temperature.

Sample results will be assessed by a qualified environmental consultant.

#### 10.6 REMEDIAL ACTION

Due to the nature of groundwater monitoring and the limited impact from daily operations, Stolthaven personnel will operate in accordance with the Sites Emergency Response Plan (ERP) and the Incident, Accident Reporting Procedure, in the event of groundwater contamination. This may involve additional monitoring events to establish a more accurate data series, as well as, notification to governing bodies.

### 11 FIRE WATER SYSTEM

#### 11.1 SCOPE

The site has a comprehensive fire protection system, which includes a fire water ring main and fire hydrant system. Fire water is delivered by three available diesel driven firewater pumps located at the fire pump house and two fire water tanks with a total capacity of 2.4 ML.

#### 11.2 SUPPLY AND STORAGE

AS1940 requires that sufficient firewater should be available from static firewater storage tanks or mains or a combination of both to supply the sum of the requirements for foam water and supplementary water for a suitable application time and cooling water for at least 90 minutes. The firewater demands are as follows:

- Diesel storage compound:



- As storage is limited to combustible liquids, the only fire protection requirement is a hydrant main with hydrants spaced every 60 m. The total firewater demand for this fire protection element is 1,800 LPM (three hydrants capable of flowing 600 LPM each); and
- Minimum storage required for a duration of 90 minutes is 162 kL.
- Gantry:
  - The firewater requirement for a gantry fire is based on providing 6.5 LPM/m<sup>2</sup> simultaneously to the four gantry bays (877 m<sup>2</sup>). The total flowrate required is 5,700 LPM. The gantry fire protection system shall be designed to supply foam solution for a period of 10 minutes followed by application of cooling firewater at an application density of 10.2 LPM/m<sup>2</sup>; and
  - Minimum storage required for a duration of 20 minutes is 145 kL.
- Mayfield 7 Berth:
  - The fire water requirement at Mayfield 7 is based off the International Safety Guide for Oil Tankers and Terminals (ISGOTT) which will deliver 700 m<sup>3</sup>/hr. This supply is fed off the terminal ring main via a 300mm pipe to the berth. Based on the site's static storage supply the terminal has 3 hours of storage at this flow rate, excluding any make up (town's supply) water.

The design of the fire protection system is based on supplying all firewater requirements from static storage, with the provision of a mains backup system for refill if required.

2 x 1,200 kL static firewater tanks are installed onsite and are filled from the town water main supply. The fire protection system has capacity exceeding that required under AS 1940.

Brigade hydrant suction points are provided on the eastern boundary of the facility to allow water to be drawn from either the tank or mains supply. A set of brigade inlets points are also provided such that the fire service can boost the hydrant ring main from tank supply or directly from the mains supply.

### 11.3 WATER DISTRIBUTION SYSTEM

The firewater distribution system will be designed to meet discharge pressure and flow requirements of the hydrant and foam/water spray systems. Water distribution requirements are:

- Diesel storage compound:
  - The maximum firewater demand for the hydrant main is 1,800 LPM. For this flow rate, the velocity and pressure drop within a DN150 ring main will respectively be 1.6 m/s and 0.1 bar per 100 m.
- Gantry:
  - The gantry fire protection system is a fixed, separate and open system. The gantry nozzles typically require an inlet pressure of 3.5 bar. For this system, a DN150 line will provide a velocity of 4.5 m/s with a pressure drop of 1.0 bar per 100 m, which will be adequate for the gantry foam system.
- Mayfield 7 Berth
  - The ISGOTT requires 700 m<sup>3</sup>/hr supply to a berth managing 50'000 of deadweight or more. This supply is fed off the site's ring main.

Firewater will be provided to the above by three firewater pumps, two duty pumps and standby (redundant) pump, with a duty point of 11,500 LPM at 10 bar discharge pressure. The pumps can meet the maximum firewater demand for the site, 11'667 LPM for a berth fire incident. It also provides 100% redundancy in the case of a pump failure. Dual outlet hydrants will be spaced every 60 m in the hydrant ring main to ensure effective tank coverage and positioned at each end of the



Mayfield 7 berth.

## 12 LOSS CONTROL & SPILL MANAGEMENT

There is existing infrastructure and a number of systems and procedures in place at the site that would largely continue to be utilised as part of the operation. These include systems for the prevention and management of loss of containment of petroleum hydrocarbons and other potential contaminants to manage impacts on surface waters.

### 12.1 EMERGENCY RESPONSE PLAN (ERP)

#### 12.1.1 SCOPE

The emergency response plan provides a consistent approach and an information source for terminal personnel and the emergency services in reacting to emergency situations that may develop within and outside the site and to close industrial neighbours.

#### 12.1.2 OBJECTIVES

The objectives of effective emergency management are to:

- Protect and preserve human life;
- Protect the environment surrounding the terminal including the harbour;
- Protect the terminal against major damage, which could render it inoperable;
- Control and mitigate the effects of an emergency;
- Communicate vital information to all relevant persons (on-site personnel, emergency services, community and the media) as quickly as possible;
- Provide for competency-based training so that the right level of preparedness can be continually maintained for the site;
- Provide a basis for updating and reviewing emergency procedures; and
- Provide a systematic approach to managing emergencies.

### 12.2 POLLUTION INCIDENT RESPONSE PLAN (PIRMP)

The Pollution Incident Response Management Plan (PIRMP) has been prepared by Stolthaven Terminals Pty Ltd – Newcastle Terminal (EPA Licence No. 20193). The purpose of the PIRMP is to identify the requirements for achieving compliance with the Protection of the Environment Legislation Amendment Act 2011 (POELA Act, 2011). As well as additional details prescribed by Section 98C of the POEO Act, 2009.

### 12.3 SPILL MANAGEMENT

The primary loss control strategy to be adopted by Stolthaven Terminals can be summarised as follows:

- Primary focus on ensuring that a spill does not occur from the primary containment systems (*i.e.* Tanks and transfer systems);
- If a spill does occur it is detected quickly and responded to rapidly; and
- It is contained in normally isolated adequately sized bunds.

In the reasonably unlikely event of a significant spill, the site has substantial contingency arrangements. Initially it would be contained, dewatered or drained; in accordance with well-established emergency response procedures.





## 12.4 MAYFIELD BERTH 7

### 12.4.1 OPERATION DUTIES

During a vessel discharge operation on Mayfield Berth 7, equipment is set up prior to vessel arrival, this includes provisions for:

- a) Discharge Operations; and
- b) Emergency Response.

The procedure for berth set up is detailed within the Stolthaven Newcastle Berth Attendant Procedures. These procedures also provides information on operational requirements, during vessel operations as well as pack up.

### 12.4.2 BERTH SPILL CONTROL

The Mayfield 7 Berth has a bunded area for the operational activities. The concrete bund is capable of containing a 309'000 litre spill including fire foam/water. The area drains into a sump pit that is connected to the berth's purceptor system for the removal of any separated fuel and gross pollutants before discharging into the Hunter river. Spill controls that are put into place consist of:

- a) Permanent Bunding;
- b) Drain Isolation;
- c) Purceptor controls (hydrocarbon shut off); and
- d) Procedural Control.

#### 12.4.2.1 BERTH SPILL EQUIPMENT

Two spill kits are located on the berth during vessel discharge operations in the event of loss of containment; with additional spill equipment located at the Stolthaven site facility.

#### 12.4.2.2 PERMANENT BUNDING (Op Area)

The berth's operational area is contained within a concrete bund. The bund is formed using a concrete 150 mm curb with ramped access at each end of the bund (East and West).

#### 12.4.2.3 DRAIN ISOLATION

A berth drain is located within the bunded area; which has volume capacity of approximately 309,000 litres. Before commencement of vessel related operations, the isolation valve within the berth drain is closed, this is registered on the pre vessel documentation. The isolation valve can be permitted to be opened during operation under constant supervision. In addition to the bund isolation the purceptor by design will automatically shut on the change of density from water to hydrocarbon.

#### 12.4.2.4 BERTH PIPELINE

During normal terminal operations, the berth line is free of product and isolated. This is achieved by 'pigging' the line on the completion of each vessel discharge. The berth pipeline only contains product during vessel operations; during which, it is monitored at periodic intervals with all observations recorded.

### 12.4.3 MAYFIELD 7 EMERGENCY RESPONSE PLAN

For more detail on spill management, refer to the Site's Emergency Response Plan.



### 13 REPORTING

Any site personnel or contractor that becomes aware of an actual or potential failure in the stormwater run-off quality controls will report this matter as soon as practically possible to the Newcastle Operations Manager, as defined in the Site Emergency Response Plan (ERP).

Stolthaven will provide the detailed results from the Environmental Monitoring Program in an annual Environmental Management Report to the Secretary. The report will:

- a) be prepared in consultation with PON;
- b) describe the operations that were carried out in the past year;
- c) analyse the monitoring results and complaints records of the development over the past year, which includes a comparison of these results against the:
  - relevant statutory requirements, limits or performance measures/ criteria;
  - monitoring results of previous years; and
  - predictions in the EIS
- d) identify any non-compliance over the last year, and describe what actions were (or are being) taken to ensure compliance;
- e) identify any trends in the monitoring data;
- f) identify any discrepancies between the impacts predicted in the EIS and the actual impacts of the Site and analyse the potential cause of any significant discrepancies; and
- g) describe what measure will be implemented over the next year to improve the environmental performance of the Site.

Stolthaven will also supply to the EPA an annual return in the approved form as noted in the site EPA licence (No. 20193). The annual return for the reporting period will be supplied to the EPA no later than 60 days after the end of each reporting period.

The nature of any corrective actions that are implemented in respect of protecting water quality and the results of validation monitoring conducted in respect thereof will be recorded in the Site's Action Register.

In the event that a failure of water quality controls results in environmental harm then this matter is also reported to the relevant section of Local Authority, EPA and PON. This must be completed in reference to the requirements of the site EPA licence permit. For a more detailed reporting scheme reference the following documents:

- Pollution Incident Response Plan (PIRMP)
- Emergency Response Plan (ERP)
- Environmental Protection Licence (20193)
- Development Approval (SSD 7065)

Any enquiries concerning the impact that Stolthaven operations may have upon the qualities of receiving waters that are received by the General Manager and/or Ncl operations Manager from the members of the public or Officers of the council or any other relevant statutory authority will be noted in the Sites Incident system.

### 14 CORRECTIVE ACTIONS

In the event that performance monitoring indicates that the stormwater run-off quality controls are not achieving compliance with the performance criteria, the following actions will be implemented in line with Stolthaven Newcastle Emergency Response Plan (ERP) and Environmental Protection Licence (EPL):



- Immediate notification must be made to the Environmental Line Service (131 555);
- Reporting in accordance with part 5.7 of the Protection of the Environment Operations Act (PEOA, 1997);
- Determine the cause(s) of non-compliance to relevant criteria;
- Implement specific corrective measures, which may include replacement or maintenance of erosion and sediment control structure and/or stormwater quality improvement devices, removal of any fuel or liquid waste spillage, collection and removal of any fugitive litter, etc.;
- Relevant validation monitoring to verify that corrective measures have been implemented and are achieving the required performance level.

## 15 REFERENCES

1. Contaminated Land Management Act, 1997
2. Contaminated Site Management Plan, 2008
3. Environmental Protection Licence (No. 20193)
4. Mayfield Concept Approval (No. 09\_0096)
5. Operational Environmental Management Plan
6. Port of Newcastle Water Management Plan
7. Project Approval (SSD 7065)
8. Protection of the Environmental Operations Act, 1997
9. Remediation Action Plan (SKM), 2004
10. Voluntary Remediation Agreement (No. 26025)
11. Berth Attendant Duties Manual