



STORMWATER MANAGEMENT PLAN

Stolthaven Newcastle

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APPENDIX A: RISK MATRIX



DEFINITIONS

AEP	Annual Exceedance Probability
ANZECC	Australian and New Zealand Water Quality Guidelines
API	American Petroleum Institute
CoA	Conditions of Approval
CPS	Coalescing Plate Separators
CSMP	Contaminated Site Management Plan
DA	Development Approval
DO	Dissolved Oxygen
EPA	Environmental Protection Authority
EPL	Environmental Protection Licence (No. 20193)
ERP	Emergency Response Plan
FFRP	First Flush Retention Pit
kL	Kilolitres
ML	Megalitres
NTL	Newcastle
O/G	Oil and Grease
OEH	Office of Environmental Heritage
PIRMP	Pollution Incident Response Management Plan
PON	Port of Newcastle
RIB	Remote Impound Basin
SDS	Safety Data Sheet
SSD	State Significant Development (SSD 7065)
SWMP	Stormwater Management Plan
SWMS	Stormwater Management Strategy
TDS	Total Dissolved Solids
TSS	Total Suspended Solids



1 INTRODUCTION

This management plan covers the operation of equipment installed to assist with treatment 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 Puraceptor.

In order to protect the quality of the receiving water ways which run-off from the site, stormwater is directed 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)

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

Table 1: Conditions of Approval; Excerpt from SSD 7065

CoA	Requirement	SWMP Reference
Schedule C, Condition 44		
a)	be updated prior to the operation of the development;	Noted
b)	be prepared in accordance with OEH's <i>Managing Urban Stormwater</i> and other relevant guidelines;	Noted
c)	detail the stormwater infrastructure to be installed for the Development and explain how it integrates with the existing stormwater system on the Site;	Section 4.0
d)	describe measures that will be implemented to maintain this infrastructure over time;	Section 4.3
e)	include a program to monitor stormwater quality	Section 8



	and quantity; and	
f)	detail how the stormwater infrastructure integrates and is consistent with the PON’s Concept <i>Stormwater Management Strategy</i> dated 9 July 2015 or its latest version.	Section 4.0

2 OBJECTIVES

The objectives of this 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, 9th July 2015”.

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 2.

Table 2: 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.

3 RESPONSIBILITIES

Table 3: Stolthaven personnel responsibilities

Position	Responsibility
General Manager	The General Manager will assume overall accountability for the execution and ongoing implementation of this SWMP.



SHEQ & Compliance Manager	The group SHEQ Manager will be responsible for incident investigation with the NTL Operations Manager and corrective action implementation, auditing and review of the SWMP against changes in Environmental Laws and Regulations on a regular basis.
NTL Operations Manager	The NTL Operations Manager will be responsible for staff training; environmental monitoring against criteria; record keeping; and auditing. As well as, reviewing the SWMP against site operations on a regular basis.
Site Superintendent	Interpretation of results before release of water. Ensure adherence to procedure. <i>Note: Ensure Safety Data Sheet's (SDS) are accessible and followed to minimise risk of injury (refer to documentation)</i>
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 STORMWATER MANAGEMENT

The majority of the Site is sealed, and clean stormwater will be directed to the Hunter River via an existing box culvert stormwater drain. In order to prevent pollution of receiving river waters from stormwater from the Site, the existing stormwater management was designed in accordance with the requirements set out in Patterson Britton & Partners (2007) *Preliminary Design Stormwater Strategy*, prepared for the Concept Plan Area would continue to operate. The existing stormwater management system would be replicated for the new tank bund and gantry areas. Key aspects of the stormwater management system include:

- A first flush system pit to capture oil and grease from the road tankers on the paved roadways with testing of water quality prior to release to the site's Purceptor which is then discharged to the river;
- Remote retention pits to collect water from the road tankers fill areas, pump bay area;
- Prevention of spills;
- Water quality monitoring;
- System maintenance;
- Ability to send water from the remote retention pit to the API separator for treatment before released to the site's purceptor;
- Contingency plans for the management of contaminated stormwater; and
- Staff competency & training.

Water quality testing measures include:

- Visual inspections of stormwater within the bunded areas for grease, foam, visible oil, and litter;
- In-field testing of bund water quality prior to its release to the site purceptor;
- Laboratory analysis of samples water held in the First Flush pit (EPL point 5) to ensure it meets EPA criteria; and
- Comparison of the results against water quality criteria prior to release of the water.

Site stormwater from the bunded areas and roads would be segregated. Bund stormwater would be retained in the bund until tested and released, results have indicated these stormwater management systems to be effective in the detention, assessment and release of stormwater. Stolthaven discharges all water from the Site in accordance with the requirement of EPL 20193.



4.1.1 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.

4.1.2 MAYFIELD CONCEPT PLAN

In accordance with the Mayfield Concept Plan and the PON Stormwater Management Strategy, site specific design criteria or measure that have been incorporated into the development are listed in Table 4 below.

Table 4: Water Mitigation Measures, in accordance with the Mayfield Concept Plan and PON SWMS

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"> - Open channels to be adopted as a 'green' solution; - All open drains are to be lined to isolated drainage flows from the local groundwater; - When inverts are below the estimated groundwater table, will be sufficiently weighted to counter buoyancy forces; and - 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.
Minor open drains and swales	<ul style="list-style-type: none"> - Designed to convey the 5% AEP event; - Use of swales for treating stormwater is acceptable; - 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; - 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 - 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).
Major Open Drains	<ul style="list-style-type: none"> - Designed to convey the 1% AEP event; and - 0% longitudinal grade is permitted (where intent is to create a water

	quality function or intertidal zone, similar to the Eastern or Western Drains).
Tidal Drains	<ul style="list-style-type: none"> - Use of mangroves is preferable for vegetation treatment (use Manning's n of 0.1 for mangroves); and/ or - Flap valves to prevent tidal inundation of the stormwater system should be located at the upstream end of open channels.
Stormwater Pipes	<ul style="list-style-type: none"> - Minimum pipe slopes of 0.3% are to be adopted; - Consideration to be given to pipe blockage, including risk of blockage, design features to minimise risk of blockage and storage effects; and - 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.
Roof Water	<ul style="list-style-type: none"> - 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.
Bunds	<ul style="list-style-type: none"> - Catchments with a high risk of accumulation of contaminants, or spills and leaks are to be banded to contain potentially contaminated stormwater, and separated from clean stormwater runoff in adjacent sub-catchments; - Stormwater captured in banded areas will be retained on site until tested as suitable for discharge; - Bulk liquid storage tanks to be located in sealed banded 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.
Construction Materials	<ul style="list-style-type: none"> - If slag is used in the construction of major stormwater channels, testing is to be undertaken to demonstrate no leachate into the water.
All Excavation Works	<ul style="list-style-type: none"> - All works are to be carried out in accordance with the CSMP; - 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); - Designs and all disturbance works are to maintain the integrity of the site capping (as per the CSMP).

4.2 STORMWATER CONTROLS

Control	Description
Spill Containment Areas (incl. bunding)	Spill containment areas consists of tank bunding, M7 berth operational area, remote impound basin, first flush retention pit and the road tanker fill stand (gantry).
First Flush Retention Pit (FFRP)	<p>Pollutants deposited on to exposed areas can be dislodged and entrained by the rainfall-runoff process. Usually the stormwater that initially runs off an area will be more polluted than the stormwater that runs off later, after the rainfall has 'cleansed' the catchment. The stormwater containing this high initial pollutant load is called the 'first flush'.</p> <p>The existence of this first flush of pollutants provides an opportunity for controlling stormwater pollution from a broad range of land uses. First flush collection systems are employed to capture and isolate this most polluted runoff, with subsequent runoff being diverted directly to the stormwater system.</p>
Purceptor	The Purceptor is the last water treatment vessel before the outfall drain. There are interlocks for shutdown in emergency situations. There is a hydrocarbon detector on the terminal unit that will isolate from the outfall drain by an automated valve if hydrocarbons are detected to prevent release to neighbouring waterways.
Remote Impound	The pit located adjacent to the FFRP is designed to hold the water and product



Basin (RIB)	coming in from the load gantry and pump bay. Once collected all product is treated through the onsite CPS units and directed to stormwater via the site’s puraceptor.
In Field Testing	Stolthaven operations will sample and test internal bund stormwater with an Enviroequip 90- FLMV Water Testing Meter. For dissolved oxygen, pH, TDS, temperature and conductivity, note this is an internal site requirement only.
Staff Training	All Stolthaven personnel will have been trained in the importance of stormwater quality, which will include sample collection and analysis.

4.3 STORMWATER MAINTENANCE

Maintenance	Description
Daily Inspections	Stolthaven personnel perform daily inspections. These inspections cover all facets of stormwater, including: <ul style="list-style-type: none"> • Pits; • Sumps; • Drains • Bunds; • CPS; • FFRP; and • Puraceptor These inspections aid in the frequency of stormwater infrastructure cleaning. <i>i.e.</i> CPS draining and cleaning.
Monthly Scheduled Maintenance Inspections	Scheduled maintenance inspections cover the items described in section 4.2, in greater detail. If an item is found to be in a deteriorated state, it is flagged and actioned in the site’s computerized maintenance system Ultimo.
Puraceptor Clean	The puraceptor is inspected and cleaned as required on a quarterly basis.
First Flush Retention Pit (FFRP)	To adhere to the criteria stipulated within the sites EPL (No. 20193), the pit & catchment area is inspection in accordance with the daily inspections and, more comprehensive, monthly inspections. The FFRP pit is cleaned as required. Catchment areas are maintained with mechanical forklift sweeper.
Capping Inspection	In accordance with the Mayfield Concept Plan and PON SWMS, the entire site is inspection with respect to the capping layer integrity. This is to ensure that no ponding or erosion is occur which could impact stormwater quality.

5 POTENTIAL ENVIRONMENTAL IMPACTS

5.1 RISK MATRIX

Refer to Appendix A: Risk Matrix

5.2 RAW RISK ASSESSMENT (Risk rating before site controls)

Site activities, which if not appropriately managed, could potentially impact the quality of storm



water run-off from the site include:

Activity	Cause of Environmental Harm	Associated Risk
Receiving, storage and dispensing of bulk fuels.	Stormwater run-off coming into contact with a diesel spill/ leak	Medium
Heavy vehicular movements	Stormwater run-off coming into contact with heavy metals (brake pads) and hydrocarbons (engine drips) typically adsorbed to sediments	Medium
Excavation and stockpiling of contaminated soils and/ or soil containing hydrocarbon impact	Excavation during earthworks on site, damaging the capping layer	Low
Emergency procedures	Stormwater run-off coming into contact with emergency firefighting foam.	Low

Areas of the site that could potentially impact upon the quality of stormwater leaving the site include:

Area	Cause of Environmental Harm	Associated Risk
Above Ground Storage Tank Farm	Stormwater run-off coming into contact with a diesel spill/ leak	Medium
Berth area & Wharfline	Stormwater run-off coming into contact with a diesel spill/ leak	Medium
Concrete Driveways	Stormwater run-off coming into contact with heavy metals (brake pads) and hydrocarbons (engine drips) typically adsorbed to sediments	Low
Truck Loading Area	Stormwater run-off coming into contact with a diesel spill/ leak	Medium
Product Pump Pits	Stormwater run-off coming into contact with a diesel spill/ leak	Medium
Areas Containing Contaminated Soils	Excavation during earthworks on site, damaging the capping layer	Low
Spill Collection Area	Stormwater run-off coming into contact with a diesel spill/ leak and/or emergency firefighting foam.	Medium

6 PERFORMANCE CRITERIA

For stormwater monitoring the concentration of pollutant discharges must not exceed the limits as specified in section L3 of the site Environmental Protection Licence (EPL), see table 5.

The performance criteria to be applied in respect of assessing the implementation of the SWMP are the ANZECC (2000) Australian and New Zealand Water Quality Guidelines for Fresh and Marine Waters, 95% Species Protection Marine Waters Criterion.

6.1 FFRP (POINT 5)

- Minimise complaints regarding stormwater quality degradation during terminal operations
- No harm caused to surrounding marine communities as a result of terminal activities

The Environmental Protection Authority have issued the following criteria for the site:

Table 5: Extract from site EPL, L3.5, testing criteria for point 5.

Pollutant	Units of Measure	Frequency	Sampling	Criteria
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			Method	
Dissolved Oxygen	Milligrams per litre	Weekly during any discharge	Grab Sample [†]	> 2
Oil and Grease	Milligrams per litre	Weekly during any discharge	Grab Sample	10
pH	pH	Weekly during any discharge	Grab Sample	6.5 – 8.5
Total Suspended Solids	Milligrams per litre	Weekly during any discharge	Grab Sample	30
Volume	Mega litres per day	Continuous during discharge	Special method 1	N/A

7 CONSTRUCTION MANAGEMENT

For future development of the construction phase 'Stage 3' (SSD 7065), a Construction Environmental Management Plan (CEMP) will be issued to the satisfaction of the Secretary to manage & minimise the potential of environmental harm of the construction activity. Refer to condition D1, D2 & D3 of SSD 7065 consent.

8 PERFORMANCE MONITORING

Performance monitoring is undertaken on site to confirm the efficiency of stormwater run-off quality controls. Performance monitoring of this SWMP involves visual inspection of the site and areas receiving run-off from the site.

Performance monitoring is undertaken monthly and during and after rainfall events. Indicators of potential adverse water quality impact will include:

- Evidence of erosion and scouring around the stormwater pipe discharge outlets;
- Changes in clarity, colour and odour of receiving waters;
- Presence of debris/rubbish/flora and fauna stress;
- Presence of an oily film on water surface;
- Orange/ brown coating on banks, water surface or substrate.

In the event that visual observations indicate that run-off from site may have adversely affected the qualities of the receiving waters, a grab sample will be taken for analysis.

This procedure will activate when there is an accumulation of stormwater in the bunds and stormwater in the Remote Impounding Basin and the First Flush Retention Pit.

8.1 BUND WATER MANAGEMENT

All bund valves in operational areas are normally closed. Releasing of tank farm bund water is not permitted during product importing. Stolthaven Terminals will complete in field testing of bund water quality and hold a retention until the following rainfall/release event. The following criteria will be applied before release of bund water into the Purceptor.

8.1.1 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.



8.1.2 ACCEPTANCE CRITERIA

- No visual evidence of sheen (rainbow), grease, foam, visible floating hydrocarbons, litter and any other objectionable floating materials
- The pH range within approx.. 6.5-8.5 pH. Dissolved oxygen and conductivity will be monitored to establish site specific data. This will be recorded on a results log.

8.1.3 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.
- Record the volume of collected water in the bunds
- Operator to monitor bund area until water has been released.

If water samples do not meet the criteria set in section 8.1.2 of this document or if a fuel layer is noted on top of the surface of the collected water, the bund water will not be released. An investigation of the origin of the contaminant will be undertaken. If deemed significant, the Site shall follow the site's Emergency Response Plan, Pollution Incident Response Management Plan (PIRMP) and Procedures immediately as the presence of a fuel layer could mean a product loss from the tank(s) or associated fuel lines.

The Mayfield 7 berth bund drain valve will remain open outside of any operational activity. This will prevent any overflow of the bunded area in a rainfall event & ensure draining is managed through the berth's puraceptor. There are no products stored in the berth area outside of discharge. During any discharge operation at the berth, the bund valve must be normally shut unless continuously monitored.

8.2 FIRST FLUSH RETENTION PIT (FFRP)

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.

8.2.1 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.

8.2.2 ACCEPTANCE CRITERIA

Refer to section 6.1 of this document (SWMP)

8.2.3 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.
- Record the quantity of collected stormwater prior to release; capacity of the first flush pit has been measured to be 38,500 litres.

Note: If laboratory analysis of the water samples failed against EPL limits, a resample will be taken and



tested. If the second analysis fails, then effluent will be disposed off-site by approved waste disposal contractor & reported through the sites Incident management system.

8.2.4 ANNUAL FIRST FLUSH PIT MONITORING RESULTS

Results from first flush pit monitoring are presented below. Water quality results from water discharged from the Site's licenced discharged point are presented in the table 6 and water quality results from bund water sampling is summarised in the table 7.

Table 6 includes results from all water approved for release. Where exceedances are identified a retest would be carried out. If the second analysis fails, then the water would be removed offsite by an accredited waste removal company.

Biological Oxygen Demand was removed as a licence condition in 2016 hence no records of this topic from 2016 onwards.

Table 6: First Flush Pit Monitoring Results

Sample Year	Biological Oxygen Demand (BOD)(mg/L)	Dissolved Oxygen (mg/L)	Oil and Grease (mg/L)	pH	Total Suspended Solids	Volume discharged (L)
Limits		<2	10	6.5 – 8.5	30	
2014	<2 - 17	4.18 - 9.44	< 2 - 2	6.9 - 8.25	3 - 29	565'000
2015	<2 - 14	2.74 - 10.6	<2 - 7	6.8 – 8.4	1 - 28	643'000
2016	N/A	3.97- 8.90	<2 - 8	7.0 - 7.9	1 - 26	590,000
2017	N/A	3.78 - 9.01	<2 - 2	6.60 - 7.79	1 - 28	600,000
2018	N/A	6.42 - 9.90	<2 - 3	6.89 - 8.12	2 - 27	675,000
2019	N/A	5.30 – 9.85	<2 - 6	7.11 – 7.62	1 - 26	547'000
2020	N/A	6.95 – 9.91	<2 - 5	7.27 – 8.05	1 - 28	780'500
2021	N/A	6.34 – 9.40	<2 - 5	6.85 – 8.10	5-28	785'000
2022	N/A	4.70 – 10.90	<2 - 4	6.85 – 8.03	5 - 27	800'000



8.2.5 ANNUAL BUND WATER MONITORING RESULTS

Table 7: Bund Water Quality Results

2014	Minimum	Maximum	Average
pH	6.10	8.15	7.31
Total Dissolved Solids (ppm)	12.80	90.10	50.90
Dissolved Oxygen	4	61.30	27.73
Conductivity(uS/cm)	30.0	173.20	75.88
2015	Minimum	Maximum	Average
pH	6.87	8.58	7.4
Total Dissolved Solids (ppm)	0	185	47.8
Dissolved Oxygen	6.4	114	40.9
Conductivity(uS/cm)	0.1	271	74.4
2016	Minimum	Maximum	Average
pH	6.0	9.28	7.51
Total Dissolved Solids (ppm)	9.2	110	33.02
Dissolved Oxygen	6.4	87.7	51.97
Conductivity(uS/cm)	14.2	222.7	52.59
2017	Minimum	Maximum	Average
pH	5.14	9.70	7.25
Total Dissolved Solids (ppm)	17.1	110.0	44.19
Dissolved Oxygen (%SAT)	30.5	140.0	60.1
Dissolved Oxygen (mg/L)	4.3	8.9	7.0
Conductivity(uS/cm)	18.0	130.0	62.3
2018	Minimum	Maximum	Average
pH	5.80	8.95	7.37
Total Dissolved Solids (ppm)	10.2	73.9	32.4
Dissolved Oxygen (%SAT)	30.6	137.7	59.7
Conductivity(uS/cm)	15.7	130.0	49.8
2019	Minimum	Maximum	Average
pH	6.14	9.12	8.07
Total Dissolved Solids (ppm)	20.8	83.2	55.55
Dissolved Oxygen (%SAT)	47.7	86.9	68.50
Conductivity(uS/cm)	43.5	128.5	79.58
2020	Minimum	Maximum	Average
pH	6.04	8.9	7.74
Total Dissolved Solids (ppm)	20.3	85.8	50.55
Dissolved Oxygen (%SAT)	30.9	103.6	69.12
Conductivity(uS/cm)	30.7	298	80.68
2021	Minimum	Maximum	Average
pH	6.3	8.4	7.6
Total Dissolved Solids (ppm)	15.7	62.4	44.53
Dissolved Oxygen (%SAT)	30.9	103.6	70.56
Conductivity(uS/cm)	23.9	96.2	66.98
2022	Minimum	Maximum	Average
pH	6.48	8.51	7.53
Total Dissolved Solids (ppm)	12.2	66.7	37.89
Dissolved Oxygen (%SAT)	31.3	121.4	62.85
Conductivity(uS/cm)	19.8	78.3	42.30

9 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 Ncl Operations Manager, as defined in the Site Emergency Response Plan (ERP).

Stolthaven will submit an Annual Environmental Review to the Department of Planning and Environment on an annual basis, capturing the sites environmental performance which will incorporate;

This review 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:
 - a. relevant statutory requirements, limits or performance measures/ criteria;
 - b. monitoring results of previous years; and
 - c. 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.

In addition, every three years, unless the Secretary directs otherwise, Stolthaven will undertake an Independent Environmental Audit of the Site. This Audit will include;

- a) be conducted by a suitably qualified, experienced, and independent person whose appointment has been endorsed by the Secretary;
- b) include consultation with PON;
- c) assess the environmental performance of the Site, and its effects on the surrounding environment;
- d) determine whether the Site is complying with the relevant standards, performance measures and statutory requirements, including the Mayfield Concept Plan;
- e) review the adequacy of the Stolthaven EMS for the Site, compliance with the consent (SSD 7065), and any other licences and consents; and, if necessary;
- f) recommend measures or actions to improve the environmental performance of the Site, and/or any plan/ program required under this consent.

Within three months of commission the audit, or as otherwise agreed by the Secretary, Stolthaven must submit a copy of the audit report to DP&E, EPA and PON with a response to any recommendations contained in the audit report.

The nature of any corrective or preventative action following any audit that is implemented in respect of protecting stormwater quality run-off and will be recorded in the Site's Action Register.

In the event that a failure of stormwater run-off quality controls results in environmental harm then this matter is also reported to the relevant section of Local Authority, EPA, DP&E 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
- Environmental Protection Licence (20193)
- Department of Planning (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 Site's Compliant Register.

10 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.

11 DOCUMENTATION

- Emergency Response Plan (ERP)
- Pollution Incident Response Plan (PIRMP)
- Environmental Protection Licence (No. 20193)
- Development Consent SSD 7065
- Operational Environmental Management Plan (OEMP)

APPENDIX A: RISK MATRIX 1

Severity	Consequences				Increasing Likelihood				
	People	Asset	Environmental	Reputation	A	B	C	D	E
					Improbable OR Never heard of in Industry	Possible OR Heard of in industry	Incident has occurred in our Organisation or more than once in the Industry	Has happened at the location or more than once per year in Our Organisation	Happened more than once per year at the location
0	No health effect or injury	No Damage	No Effect	No Impact	L	L	L	L	L
1	Slight health effect/ injury	Slight damage <\$10K, No disruption	Slight Effect	Slight Impact	L	L	M	M	M
2	Minor health effect/ injury	Minor damage \$10K - \$100K, Brief disruption	Minor Effect	Limited impact	L	M	M	H	H
3	Major health effect/ injury	Moderate damage \$100K-\$1M, Partial shutdown	Moderate Effect	Moderate impact	M	M	H	H	E
4	PTD or up to 3 fatalities	Major damage \$1M-10M, Partial operational loss	Major Effect	Major/ National Impact	M	H	H	E	E
5	More than 3 fatalities	Extensive damage > \$10M, Substantial/ total loss	Massive Effect	Massive/ international impact	H	H	E	E	E