



## *Stormwater Return Dam (SRD)*

# Operational Environmental Management Plan (OEMP)

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# 1 Introduction

## 1.1 Overview

This Operational Environmental Management Plan (OEMP) describes the environmental management program to be implemented during the operation of the Stormwater Return Dam (SRD) and associated water management infrastructure at Abbot Point Coal Terminal Number 1 (herein referred to as 'APCT #1' or 'the Site').

This OEMP has been developed through a collaborative effort between the terminal lessee, North Queensland Export Terminal (NQXT), the terminal operator, Abbot Point Operations Pty Ltd (APO) and the Operation and Maintenance (O&M) Contractor, Abbot Point Bulkcoal Pty Ltd (APB).

The OEMP is a requirement of Condition 3 of the SRD Controlled Action Approval (EPBC 2010/5561) issued under the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act) (Controlled Action Approval) and applies to all stages from post construction through to full commissioning (where the SRD and associated infrastructure supplement water to the Bald Hill Reservoir) and operation of the SRD.

## 1.2 Scope and Structure

APB has implemented an Environmental Management Plan (APB EMP) to address environmental management of the Site, in compliance with the existing APCT #1 Environmental Authorities (EA) (Permit Reference Numbers EPPR 00511773 and EPPR 00551413) issued under the *Environmental Protection Act 1994* (Qld) (EP Act).

To avoid duplication, this OEMP will only refer to environmental approvals and controls specific to the SRD.

For the SRD and associated infrastructure, this OEMP includes:

- a) The overarching environmental management system (EMS) (this OEMP), together with the environmental policies ([Appendix A](#)) and Environmental Risk Register ([Appendix B](#))
- b) Environmental control procedures (ECPs), which detail specific objectives/performance standards, control measures, monitoring and responsibility ([Appendix C](#))
- c) OEMP environmental management sub-plans, consisting of:
  - i. Water Quality Monitoring Plan (WQMP) ([Appendix D](#))
  - ii. Erosion and Sediment Control Plan (ESCP) ([Appendix E](#))
  - iii. Acid Sulfate Soils Management Plan (ASSMP) ([Appendix F](#))
- d) SRD inspection checklist ([Appendix G](#))
- e) Copies of existing approvals ([Appendices H and I](#))
- f) Key contacts ([Appendix J](#))
- g) Terms and abbreviations ([Appendix K](#)).

## 2 SRD Layout, Infrastructure and Activities

### 2.1 SRD and Associated Infrastructure

This OEMP applies to the SRD and associated infrastructure, including:

- a) The SRD, consisting of a polyurethane lined 565 mega litre (ML) capacity dam;
- b) Secondary Settlement Pond (SSP) Pump House (located within the boundaries of SSP);
- c) Water Treatment Plant known as the Chemical Dosing Plant (CDP);
- d) Associated water pipelines providing connection between the SRD, SSP Pump House and channel, CDP and Bald Hill reservoir; and
- e) APB ancillary infrastructure, including but not limited to water quality treatment infrastructure, access tracks and security fences that are necessary to support operation, management and maintenance of the SRD and associated infrastructure.

A layout of the SRD and associated infrastructure is illustrated in **Figure 2-1**.



**Figure 2-1 – APCT #1 SRD and Associated Infrastructure**

### 2.2 Purpose of the SRD

The purpose of the SRD and associated infrastructure is to beneficially reuse stormwater captured in the site water management system by:

- a) Directing stormwater from the SPP to the SRD via the CDP (i.e., pH adjustment);
- b) Directing water from the SRD to Bald Hill Reservoirs via the CDP for water quality treatment (i.e., chlorination)
- c) Directing water from the SRD to the water management system in line with operational requirements.

## 2.3 SRD Water Compliance Requirements

As identified in **Section 1.1**, the OEMP and associated management plans aim to ensure compliance with the Controlled Action Approval for the SRD. The SRD is integral to stormwater management at APCT#1 such that although it operates as a separate storage, release of water from the SRD to the environment can only occur via the APCT #1 settlement pond system's licensed discharge point, W1, as approved in the EA (EPPR00577113).

Water from the SRD can make its way to the APCT #1 settlement pond system and W1 release point via the following paths:

- a) Water is directed from the SRD to the Bald Hill Reservoir and is utilised on site via the process water reticulated network. This water is then captured in the APCT #1 water management system (i.e., via stockyard drainage to the Western Drain (WD), Primary Settlement Pond (PSP) and SSP).
- b) Water flows from the SRD, via the spillway drainage system, to the APCT#1 water management system when the SRD is at capacity.
- c) Water is directed from the SRD to the APCT#1 settlement pond system as operational requirements dictate.

Water quality monitoring activities detailed under the OEMP WQMP ([Appendix D](#)) will be undertaken for all releases from the APCT #1 settlement pond system.

## 3 Environmental Management Framework

### 3.1 Commitment to Environmental Management

Together, NQXT, APO and APB are committed to managing the environmental aspects associated with the SRD in a manner that complies with relevant statutory requirements and aligns with the principles of ecologically sustainable development. To achieve these objectives, APB in its capacity as the operator and maintainer will:

- Identify, assess and manage environmental risks associated with operation and maintenance of the SRD and associated infrastructure;
- Set and strive to achieve measurable objectives and targets;
- Train and adequately resource personnel for their environmental responsibilities;
- Implement works in a manner which minimises hazardous and harmful substances; and
- Implement a program of continual improvement including monitoring and review of environmental performance.

### 3.2 Environmental Policies

All employees, contractors and sub-contractors involved in activities associated with the SRD and associated infrastructure are required to comply with APB's and NQXT's Environmental Policies ([Appendix A](#)).

### 3.3 Legislative Framework

Relevant legislation, standards and other reference information is regularly reviewed and monitored for updates and included in the site management system. This is facilitated through the [APB Legal Compliance Procedure \(APB HSEC PRO 0040\)](#).

Construction and operation of the SRD is subject to two approvals ([Appendix H and I](#)) as summarised in **Table 3-1**. Both of these approvals require an OEMP to be developed and submitted for approval prior to commencement of operations.

This OEMP has been prepared in accordance with the operational conditions of both approvals.

Permit/Approval	Subject Works	Subject Land	Approval Holder	Reference/Status
<b>Controlled Action Approval</b> EPBC Act	Works that have the potential to have a significant impact on Matters of National Environmental Significance (MNES) – Controlling provisions – World Heritage properties and National Heritage places	As described in the original SRD EPBC Act referral and Preliminary Documentation	NQXT	<b>EPBC 2010/5561</b> received 2 December 2011  Issued by the former Department of Sustainability, Environment, Water, Populations and Communities (SEWPaC) (now the Department of Agriculture, Water and the Environment (DAWE))
<b>Port Development Approval (PDA)</b> <i>Transport Infrastructure Act 1994 (Qld) (TIA)</i>	SRD and associated facilities – construction and operation	Strategic Port Land	NQXT	<b>PM/008/00262</b> received 19 March 2013  Issued by North Queensland Bulk Ports (NQBP)

**Table 3-1 - Relevant Environmental Permits and Approvals**

Both approvals are held by NQXT, the Terminal lessee. All APCT #1 infrastructure, including the SRD, is operated and maintained by APO on behalf of NQXT, who then sub-contract to APB through the O&M Contract.



## 4 Environmental Aspects and Potential Impacts

### 4.1 Environmental Values

Areas of significant environmental value surrounding the SRD and associated infrastructure and immediate surrounds include the Caley Valley Wetland and areas of Semi Evergreen Vine Thicket (SEVT), as shown in **Figure 4-1**. Infrastructure within close proximity to these areas is limited to the Pump House within the SSP, adjacent to the Caley Valley Wetland.

A number of significant flora and fauna species currently listed under the EPBC Act, the *Nature Conservation Act 1992* (Qld) (NC Act) and the *Vegetation Management Act 1999* (Qld) (VM Act) have the potential to be present on or near the SRD and associated infrastructure and immediate surrounds (SWRD CEMP, Worley Parsons, 29 June 2010). These are:

- SEVT (of the Brigalow Belt (North and South) and Nandewar Bioregions) – listed as an endangered threatened ecological community (TEC) under the EPBC Act, which includes Regional Ecosystem (RE) 11.2.3 listed as of concern under the VM Act;
- Beach stone-curlew (*Esacus magnirostris*) – listed as vulnerable under the NC Act;
- Black-necked stork (*Ephippiorhynchus asiaticus*) – listed as least concern under the NC Act; and
- Little tern (*Sternula albifrons*) – listed as Migratory under the EPBC Act and Special Least Concern under the NC Act.

No EPBC Act threatened flora species were recorded within the SRD or associated infrastructure and immediate surrounds during the GHD field survey and there are no historical records of these species occurring on site (Port of Abbot Point SRD Flora Assessment, Worley Parsons, 31 May 2010).



Figure 4-1 – Sensitive Areas near APCT #1

## 4.2 Cultural Heritage

Cultural heritage assessments were undertaken prior to construction. Ground surveys conducted by the Juru People found no areas of cultural significance within or immediately surrounding the SRD. The SRD construction took place largely on previously cleared and modified land, and the potential for cultural heritage values to be impacted upon was determined to be low (SRD CEMP, Worley Parsons, 29 June 2010).

If an artefact is discovered during the operation or maintenance of the SRD, action will be taken in accordance with the requirements of the *Aboriginal Cultural Heritage Act 2003* (Qld) (ACH Act) and associated *Duty of Care Guidelines*.

Any SRD maintenance or operational clearing will be undertaken in accordance with the [APB HSEC PRO 0012 Biodiversity and Land Management Procedure](#).

## 4.3 Risk Assessment

A risk assessment of the SRD has been undertaken by NQXT and reviewed by APB. The risk assessment identified three key operational activities associated with the SRD. These are defined as access, operation and maintenance of the SRD. Risks associated with these activities were assessed and appropriate controls identified to mitigate environmental risk to a low level. A summary of key SRD activities and associated environmental risk are provided in [Appendix B](#).

## 4.4 Control and Monitoring of Work Activities

Information from the risk assessment ([Appendix B](#)), site knowledge and the requirements of the Controlled Action Approval have been used to develop a series of ECPs to address various environmental aspects and impacts. These include:

- a) ECP 001 – Flora Management
- b) ECP 002 – Fauna Management
- c) ECP 003 – Land Management – Chemical
- d) ECP 004 – Land Management – Physical
- e) ECP 005 – Surface and Groundwater Quality Management
- f) ECP 006 – Surface Water Quality Management – Physical
- g) ECP 007 – Groundwater Quantity Management
- h) ECP 008 – Air Quality Management.

The ECPs provide a summary of the environmental aspects of the works, objectives, targets, performance standards, control measures and monitoring to minimise and, where possible, prevent environmental impacts. Routine monitoring requirements, responsibilities and performance targets which must be incorporated in day-to-day activities are also included in the ECPs and are consistent with APB's and NQXT's Environmental Policy ([Appendix A](#)) and requirements documented in the APB EMP. These ECPs are detailed in [Appendix C](#).

# 5 Implementation and Operation

## 5.1 Roles and Responsibilities

The APCT #1 is leased by NQXT under a 99-year lease arrangement from the previous terminal owner NQBP. The sale of the terminal lease was finalised in June 2011 and all contractual arrangements have been rolled over from NQBP to NQXT as the terminal lessee. NQBP remains as the regulatory Port Authority and the landowner for the Port of Abbot Point and APCT #1.

All APCT #1 infrastructure, including the SRD is operated by APO through the Abbot Point Coal Terminal O&M Contract, who sub-contract to APB through the O&M sub-contract as a service provider to execute the O&M Contract.

The environmental management roles and responsibilities of key APB, APO and NQXT personnel for the operation and maintenance of the SRD are summarised in **Table 5-1**.

Position/Organisation	Responsibilities and Authorities
Commercial Manager Operations (NQXT)	Primary person responsible for ensuring approval of the OEMP Submission of any relevant revised OEMP for DAWE and/or NQBP PDA Submission of annual compliance report and monitoring report to DAWE Ensuring that all incidents and non-compliances are reported to the appropriate organisations (e.g., DAWE and/or NQBP) Ensuring that the annual compliance report is published on the NQXT website for defined timeframes as highlighted in the approval
General Manager - Port (APO)	Promoting environmental incident avoidance Primary person responsible for implementation of the OEMP at APCT #1 Approving the allocation of resources Supporting the allocation of human and monetary resources to maintain ISO certification for 14001 and 9001 Approving the allocation of the environmental budget Supporting the Management in execution of their responsibilities and 'top-down' promotion of environmental best practice Ensuring that all incidents and non-compliances as relevant to the operation and maintenance of the SRD are reported to NQXT
Operations Manager – Port (APO)	Promote environmental incident avoidance Allocation of human resources for the day-to-day operation of the SRD and associated infrastructure Allocation of budget for day-to-day operation and maintenance of the SRD and associated infrastructure Coordination and execution of maintenance activities for the SRD and associated infrastructure
Environment and Community Personnel (EC Personnel) (APO)	Promoting environmental incident avoidance Ensuring that all environmental monitoring and reporting commitments are met Preparation of annual reports Environmental record management and reporting

**Table 5-1 - Responsibilities of Key APB, APO and NQXT Personnel**

## 5.2 Awareness, Training and Competence

Environmental awareness and training is undertaken through the existing APB management system ([APB HSEC PLN 0005 Training and Competency Procedure](#)).

## 5.3 Emergency Preparedness and Response

APO has an integrated health, safety and environmental emergency response and recovery plan (*APB HSEC PLN 0003 Emergency Management*) which addresses preparedness and response to specific environmental incidents and emergencies, including:

- a) Hydrocarbon/chemical spill to a freshwater environment
- b) Hydrocarbon/chemical spill onshore (land).

Any chemical spillage associated with the operation or maintenance of the SRD will be responded to in accordance with the procedures detailed in the *APB HSEC PLN 0003 Emergency Management* and reported in accordance with the *APB HSEC PRO 0020 Incident Reporting and Investigation procedure*.

The *APB HSEC PRO 0071 Severe Weather* procedure prescribes preparedness, response and recovery for severe weather events, such as cyclones.

## 6 Environmental Monitoring and Reporting

### 6.1 Compliance Reporting

Two annual reports are required under the Controlled Action Approval (2010/5561), as follows:

- Annual WQMP water quality compliance reporting under Condition 2; and
- Annual Compliance reporting under Condition 7.

An annual WQMP Report (Condition 2) was previously required for releases from the SSP, where the OEMP water quality monitoring requirements were triggered within the reporting period. In accordance with Condition 2 of the Controlled Action Approval, the annual WQMP report was required to be submitted for a period of 5 years from the date of the Controlled Action Approval.

Reporting of water quality monitoring results for the 5-year period has now been completed. APO continues to maintain water quality monitoring results in accordance with this OEMP, with records available upon request.

The annual compliance report (Condition 7) must provide a summary addressing compliance against all conditions of the approval over the previous 12 months. In accordance with condition 7 of the Controlled Action Approval, the reporting period concludes on the 28 February, with the final report to be published on the NQXT website within 3 months of the conclusion of the reporting period.

APB is responsible for report preparation and submission to NQXT for review and approval prior to their publication on the NQXT website.

### 6.2 Communication by APB to NQXT

APB reports routinely to NQXT on operational and maintenance matters. APB's reporting to NQXT includes the following as applicable to the SRD:

- Completed monthly SRD inspection ([Appendix G](#))
- Environmental incidents and corrective actions
- Complaints and action taken to address the complaint(s).

A summary of reporting requirements and communication lines are summarised in **Table 6-1**.

Reporting Element	Scope/ Reference	Record	Monthly	Quarterly	Annually	Responsible Person
Submission of Annual Compliance report for review and publication on the NQXT website (within 30 days of conclusion of the reporting period)	Condition 7, Controlled Action Approval (2010/5561)	Report			✓	APO General Manager – Port
Publication of the Annual Compliance Report on the company website within 3 months of the conclusion of the reporting period	Controlled Action Approval (2010/5561)	Report			✓	Commercial Manager Operations (NQXT)
SRD Monthly Inspection	ECPs (SRD Inspection Checklist)	Checklists	✓			APB EC Personnel
Submission of quarterly SRD Report to NQXT	ECPs (SRD Inspection Report)	Report		✓		APO General Manager – Port

**Table 6-1 – APB Reporting Requirements to NQXT**

## 6.3 Incidents and Complaints

**Table 6-2** summarises the reporting requirements in accordance with the Controlled Action Approval (2010/5561) and the NQBP PDA ([Appendices H and I](#)).

Scenario	Reported by	Reported to	Notification Timeframe	Incident Report Timeframe
Incidents, environmental emergencies or potentially harmful events associated with the operation of the SRD	APB	NQXT	Within 24 hours of becoming aware	Submitted within 7 business days
	NQXT	NQBP	Within 24 hours of becoming aware	Submitted within 14 days
		DAWE	Within 2 business days of becoming aware	Submitted within 10 business days
Incidents associated with the operation and maintenance of the SRD that have caused, or may cause material or serious environmental harm	APB	NQXT	Within 24 hours of becoming aware	Submitted within 7 business days
		DES	Within 24 hours of becoming aware	Submitted within 10 business days

**Table 6-2 – Incident Reporting Requirements**

A written Incident Report will be prepared by APB and submitted in accordance with the timeframes outlined in **Table 6-2**. The report will include as a minimum;

- Contact details of company representative;
- Details of the incident or event, including persons involved, location and time of the event;
- Likely cause and environmental impacts of the event;
- Results and interpretation of samples taken and analysed;
- Actions taken at the time to prevent or minimise environmental harm; and
- Proposed corrective actions to prevent a reoccurrence of the incident.

## 6.4 Record Keeping and Document Control

APB's Environmental Management Systems is certified to AS/NZS 14001 and AS/NZS 9001. All documents and records that are produced in relation to the operation and maintenance of the SRD will be managed through the APB compliance management software (CMO) and in accordance with the [APB HSEC PRO 0015 Records Management and Document and Data Control Procedure](#).

# 7 Continual Improvement

## 7.1 Monitoring and Review

APCT #1 has maintained ISO 14001:2015 accreditation since 2011. The management system includes a robust monitoring and assessment and continual improvement program. Monitoring and assessment as required through the operation and maintenance of the SRD will be undertaken in accordance with this OEMP and the following:

- a) *APB HSEC PLN 0002 Environmental Management Plan,*
- b) *APB HSEC MAN 0001 Environmental Monitoring and Inspection Manual:*
- c) *APB HSEC PRO 0044 Assessment and Reporting Procedure.*

Continual environmental improvement is driven through the annual planning process and alignment of activities with the business values and objectives.

## 7.2 OEMP Review

This OEMP will be reviewed by APB and NQXT annually and additionally if there is an event or scenario that warrants the need for review.

Amendments to the OEMP are required to be a) approved by the Minister (Condition 9 of the EPBC Approval) by way of a variation to the OEMP or b) by revision of the OEMP by APB and NQXT and notification (Condition 9A and 9B of the EPBC Approval) to the Department of the revised OEMP. This pathway is available where the amendments would not be likely to have a new or increase impact to protected matters.

Examples of event or scenario review triggers include:

- a) Substantiated complaint and/or an environmental incident causing material or serious environmental harm which directly relates to the operation or maintenance of the SRD;
- b) Changes in relevant legislation or standards;
- c) New or amended environmental approvals which relate to the operation or maintenance of the SRD; or
- d) Significant change in SRD operation or maintenance arrangements or the SRD and/or associated infrastructure itself.

## 8 Document Information

### 8.1 Change Information

Full details of the document history are recorded in the document control register, by version. A summary of the current change is provided in **Table 8-1**. Example detail shown below.

Revision		Date	Change Summary
1.0		17/12/2012	Draft
2.0		20/2/2013	Issued for APB review
3.0		26/4/2013	Issued to NQXT for review and sign off
4.0		10/5/2013	Issued for submission to SEWPaC
5.0		25/6/2013	Issued for submission to SEWPaC following receipt of comments
6.0		31/1/2014	Annual Review by APB and issued to NQXT for review and sign off
7.0		17/2/2014	Issued for Review by DotE
8.0		24/2/2014	Issued to Minister for approval
9.0		18/12/2014	Annual Review by APB and issued to NQXT for review and sign off
10.0		18/1/2017	Annual Review by APB and issued to NQXT for review and sign off
11.0		4/12/2016	Issued to Minister for approval
12.0		10/01/2021	Annual Review by APB with proposed amendment

**Table 8-1 – Change Information**



### Environmental Policy

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We recognise that our environmental performance, leadership and commitment is critical to the success of the organisation and we have an environmental management framework that is accessible, relevant and achievable.

North Queensland Export Terminal (NQXT) will undertake its activities in a manner which meets our legal obligations and environmental objectives whilst working closely with our internal and external stakeholders to improve environmental performance.

Our commitments are to:

- Minimise and/or prevent environmental harm and pollution through the active identification and management of environmental risks.
- Identify and establish performance objectives, measures, improvement targets and reporting of performance to support the implementation of this policy.
- Comply with relevant legislation, regulations, standards and other legal requirements.
- Develop, implement and maintaining an Environmental Management System in accordance with AS/NZS ISO 14001:2015 or subsequent revision.
- Investigate to understand incidents and implement effective corrective actions to prevent reoccurrence.
- Plan to respond to emergency situations to minimise their impacts and return to normal operations as soon as possible.
- Ensure the efficient use of resources, recycling of materials, and the reduction of waste.
- Undertake regular review and analysis of environmental performance in order to identify and implement continual improvement.
- Provide training, communication and consultation programs that improve the understanding and awareness of environmental requirements and develop supportive behaviours and organisational culture.

All NQXT staff and contractors have an accountability and responsibility to immediately report potential or actual environmental harm, follow work practices and procedures and encourage positive behaviours to prevent adverse environmental impacts.

A handwritten signature in black ink, appearing to be "Smy", written over a horizontal line.

**Director**  
North Queensland Export Terminal Pty Ltd

**Date:** 14 October 2020  
**Document:** IMS-POL-001-01

## Environment Policy



Abbot Point Operations operates and maintains a multi-user coal export port at Abbot Point, Bowen, Queensland. Will manage our asset base in an environmentally compliant and sustainable manner, and operate with best environmental practices at the forefront. This approach aims to meet the Abbot Point Operation business objectives of optimum terminal efficiency, cost effectiveness and respect for the local community and environment in which we operate.

Abbot Point Operations will undertake its operations in a manner which meets our legal obligations, recognises the importance of working closely with our internal and external stakeholders, and strives to prevent environmental harm and improve our environmental performance.

Abbot Point Operations understands that our environmental performance is critical to the sustainable success of the organisation and we will implement an Environmental Management Framework that is accessible, innovative and enduring.

### Our Commitment

Abbot Point Operations is committed to:

- Minimising and/or preventing environmental harm and pollution through the active identification and management of environmental risks
- Encouraging the efficient use of resources, recycling materials, and the reduction of waste
- Implementing outcome-oriented programs that include the use of technology solutions, in order to drive innovation and improvement
- Establishing objectives and targets that support the successful implementation of this policy
- Developing performance indicators and metrics that will enable the measurement and reporting of environmental performance to our stakeholders
- Developing, implementing and maintaining an Environmental Management System in accordance with ISO 14001:2015
- Comply with relevant environmental legislation, regulations and standards
- Undertaking regular review and analysis of environmental performance in order to identify and implement continual improvement
- Developing an organisational culture that promotes behaviours which achieve our environmental objectives
- Providing training, communication and consultation programs that improve the understanding and awareness of environmental requirements
- Acting as responsible stewards of our owners' assets and operate to leading practice and environmental standards
- Reducing our direct and indirect greenhouse gas emissions

All Abbot Point Operational Employees and Contractors have an accountability and responsibility to immediately report environmental harm, near misses and hazards, follow work practices, procedures, instructions and rules and encourage positive behaviours and prevent adverse environmental impacts.

Allan Brown

A handwritten signature in blue ink, appearing to read "A. Brown".

General Manager – Port Operations

14 May 2020

Number:	APD ENV POL 0001	Status:	For Use	Effective:	08/09/2020
Owner:	HSECQS Manager	Version:	3.1	Review:	08/09/2021

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## Appendix B - Environmental Risk Register

Activity	Environmental Aspects	Potential Impacts	Before Controls			Existing or Proposed Controls (Responsibility)	After Controls			Objectives and Targets	Target
			C	L	RR		C	L	RR		
Accessing the SRD	Air	Nuisance dust caused through driving which negatively affects air quality	Minor	Possible	1 - Low	All operational access/egress to be via existing tracks and disturbed areas within the SRD operational footprint ( <b>All Personnel</b> ) Driving to road conditions as highlighted in APB HSEC PLN 0008 Traffic Management Plan ( <b>All Personnel</b> ) Access tracks to be maintained in a safe and reliable state ( <b>Port Operations Manager</b> )	Minor	Unlikely	1 - Low	Nil dust complaints in relation to maintenance or operation of the SRD	Nil dust complaints in relation to the maintenance or operation of the SRD
	Biodiversity	Reduction in native flora due to weeds	Minor	Possible	1 - Low	All operational access/egress to be via existing tracks and disturbed areas within the SRD operational footprint ( <b>All Personnel</b> ) Routine weed control to be undertaken as part of general site maintenance activities ( <b>Port Operations Manager</b> )	Minor	Possible	1 - Low	Ensure general access and egress is via existing tracks and disturbed areas to prevent additional disturbance with flow on effects to native flora (e.g., spread of weeds)	100% access and egress through existing tracks unless this access is for legitimate maintenance or operational purposes. (e.g., weed management)
		Reduction in native flora due to land disturbance	Minor	Possible	1 - Low	Access tracks to be maintained in a safe and reliable state ( <b>Port Operations Manager</b> )	Minor	Possible	1 - Low	Ensure general access and egress is via existing tracks and disturbed areas to prevent additional disturbance with flow on effects to native flora	100% access and egress through existing tracks unless this access is for legitimate maintenance or operational purposes. (e.g., weed management)
	Biodiversity	Fauna reduction due to land disturbance	Minor	Possible	1 - Low	Access tracks to be maintained in a safe and reliable state ( <b>Port Operations Manager</b> )	Minor	Possible	1 - Low	Ensure general access and egress is via existing tracks and disturbed areas to prevent additional disturbance with flow on effects to native fauna	100% access and egress through existing tracks unless this access is for legitimate maintenance or operational purposes. (e.g., weed management)

Activity	Environmental Aspects	Potential Impacts	Before Controls			Existing or Proposed Controls (Responsibility)	After Controls			Objectives and Targets	Target
			C	L	RR		C	L	RR		
SRD Operations	Biodiversity	Reduction in native flora due to weeds	Minor	Possible	1 - Low	All operational access/egress to be via existing tracks and disturbed areas within the SRD operational footprint ( <b>All Personnel</b> ) Routine weed control to be undertaken as part of general site maintenance activities ( <b>Port Operations Manager</b> )	Minor	Possible	1 - Low	Ensure general access and egress is via existing tracks and disturbed areas to prevent additional disturbance with flow on effects to native flora	100% access and egress through existing tracks unless this access is for legitimate operational purposes. (e.g., weed management)
		Reduction in native flora due to land disturbance	Minor	Possible	1 - Low	SRD operational and maintenance clearing to be minimal and will be undertaken in accordance with the APB EMP and APB HSEC PRO 0012 Biodiversity and Land Management Procedure ( <b>All Personnel</b> ). Access tracks to be maintained in a safe and reliable state ( <b>Port Operations Manager</b> )	Minor	Possible	1 - Low	All operational and maintenance clearing to be undertaken in accordance with an internal ground disturbance permit (APB HSEC PRO 0012 Biodiversity and Land Management Procedure)	Nil occurrence of unauthorised clearing for SRD operations and maintenance activities
	Biodiversity	Reduction in native fauna due to land disturbance	Minor	Possible	1 - Low	SRD operational clearing will be minimal and will be undertaken in accordance with the APB EMP and APB HSEC PRO 0012 Biodiversity and Land Management Procedure ( <b>All Personnel</b> ) Access tracks to be maintained in a safe and reliable state ( <b>Port Operations Manager</b> )	Minor	Possible	1 - Low	All operational and maintenance clearing to be undertaken in accordance with an internal ground disturbance permit (APB HSEC PRO 0012 Biodiversity and Land Management Procedure)	Nil occurrence of unauthorised clearing for SRD operations and maintenance activities
		Reduction in native fauna due to drowning in the SRD	Moderate	Possible	2 - Moderate	Personnel will not feed native animals ( <b>All Personnel</b> ) SRD to be fully fenced to exclude fauna entry and reduce potential for fauna stranding ( <b>NQXT</b> ) Maintain all areas of fauna exclusion fencing to ensure its ongoing effectiveness ( <b>Port Operations Manager</b> )	Minor	Possible	1 - Low	Minimise the access of terrestrial native fauna into the SRD operational area	No deaths of terrestrial native fauna in the SRD operational area

Activity	Environmental Aspects	Potential Impacts	Before Controls			Existing or Proposed Controls (Responsibility)	After Controls			Objectives and Targets	Target
			C	L	RR		C	L	RR		
	Water Resources	Decline in surface and ground water quality due to chemical spills	Moderate	Possible	2 - Moderate	Bundings provided for in the CDP design is to be maintained through the operational phase ( <b>NQXT</b> ) Chemicals to be managed in accordance with the APB HSEC PRO 0038 Control of Hazardous Materials ( <b>All Personnel</b> ) Spill management in accordance with the APB EMP ( <b>All Personnel</b> ) CDP operation and maintenance to be undertaken by trained/competent persons ( <b>Port Operations Manager</b> )	Minor	Unlikely	1 - Low	Minimise the potential for contamination of surface water through chemical spillage	No category 2 or above incidents in relation to chemical spills in SRD
		Decrease in surface water quality of water within the SRD due to presence of Cyanobacteria	Moderate	Possible	2- Moderate	Monitoring of surface water quality and associated “trigger” actions will be undertaken in accordance with the OEMP WQMP ( <a href="#">Appendix D</a> ) Active management of SRD surface water quality to be undertaken to avoid, minimise and manage presence of Cyanobacteria in the SRD through water quality management infrastructure, treatment processes and/or biological or chemical control as determined to be appropriate ( <b>EC Personnel</b> ) CDP operation and maintenance to be undertaken by trained/competent persons ( <b>Port Operations Manager</b> )	Minor	Unlikely	1 – Low	Minimise the potential for the presence of Cyanobacteria in SRD water	Nil environmental or human health effect caused through surface water quality management infrastructure and processes required to manage SRD surface water quality. Nil environmental or human health effect associated with the beneficial reuse of SRD water throughout APCT #1.
		Decline in surface and groundwater water quality due to the SRD leaking	Moderate	Possible	2 - Moderate	SRD constructed with long-life HDPE liner to provide effective barrier and prevent leaking ( <b>NQXT</b> )	Minor	Unlikely	1 - Low	Nil environmental effect caused through SRD leaking	Effective liner system maintained

Activity	Environmental Aspects	Potential Impacts	Before Controls			Existing or Proposed Controls (Responsibility)	After Controls			Objectives and Targets	Target
			C	L	RR		C	L	RR		
		Decline in surface water quality due to sediment mobilisation as a result of SRD overtopping	Moderate	Possible	2 - Moderate	Overflow provided for in design via an integrated spillway leading into existing water management system ( <b>NQXT</b> ) Interlocks provided between SSP pick-up pump/s and SRD water level indicators to ensure sufficient freeboard ( <b>NQXT</b> ) Online real-time monitoring of filling operations via onsite Supervisory Control and Data Acquisition (SCADA) system ( <b>NQXT</b> )	Minor	Unlikely	1 - Low	No overfilling/ overtopping of SRD	No overfilling/ overtopping
		Decline in water quality due to mobilisation of sediment caused by failure of the SRD wall	Moderate	Possible	2 - Moderate	Overflow provided for in design via an integrated spillway leading into existing water management system ( <b>NQXT</b> ) SRD designed (through a failure impact assessment) to minimise the chance of a critical dam wall failure ( <b>NQXT</b> ) SRD wall stabilised with grass ( <b>NQXT</b> ) Active management of the SRD rehabilitated walls ( <b>Port Operations Manager</b> ) Interlocks provided between SSP pick-up pump/s and SRD water level indicators to ensure sufficient freeboard for rainfall events ( <b>NQXT</b> ) SRD constructed with outer toe/cess-drain, drained via erosion and sediment control devices to surrounding areas and existing APCT water management system ( <b>NQXT</b> )	Minor	Possible	1 - Low	Nil environmental effect caused through failure of SRD wall	No SRD wall failures



Activity	Environmental Aspects	Potential Impacts	Before Controls			Existing or Proposed Controls (Responsibility)	After Controls			Objectives and Targets	Target
			C	L	RR		C	L	RR		
		Decline in water quality due to mobilisation of sediment caused by failure of pipelines	Minor	Possible	1 - Low	Pipelines and pumps designed and fit for purpose ( <b>NQXT</b> ) All pipelines and pumps situated within controlled drainage area/s that ultimately drain to the Site's settlement ponds ( <b>NQXT</b> ) Maintenance and management of pipelines and pumps through the SAP (maintenance management system) ( <b>Port Operations Manager</b> )	Minor	Unlikely	1 - Low	Nil environmental effect caused through failure of pipelines	No major pipeline failures
		Decline in surface and groundwater water quality due to inappropriate management of waste	Minor	Unlikely	1 - Low	This will be managed in accordance with the APB EMP and APB HSEC PRO 0014 Waste Management Procedure	Minor	Unlikely	1 - Low	Managed through APB EMP	Compliance with the APB EMP
		Increase in volume of groundwater due to SRD leaking	Moderate	Possible	2 - Moderate	SRD constructed with long-life polyurethane liner to prevent leaking ( <b>NQXT</b> )	Minor	Unlikely	1 - Low	Nil environmental effect caused through SRD leaking	Effective liner system maintained
	Land	Contamination of land due to chemical spills	Moderate	Possible	2 - Moderate	Bunding provided for in the CDP design is to be maintained through the operational phase ( <b>NQXT</b> ) Chemicals to be managed in accordance with the APB HSEC PRO 0038 Control of Hazardous Materials ( <b>All Personnel</b> ) Spill management in accordance with the APB EMP ( <b>EC Personnel</b> ) CDP operation undertaken by trained/competent persons ( <b>Port Operations Manager</b> )	Minor	Unlikely	1 - Low	Minimise the potential for contamination of surface water through chemical spillage	No category 2 or above incidents in relation to chemical spills in SRD

Activity	Environmental Aspects	Potential Impacts	Before Controls			Existing or Proposed Controls (Responsibility)	After Controls			Objectives and Targets	Target
			C	L	RR		C	L	RR		
		Erosion of land caused by pipeline or pump failure	Minor	Possible	1 - Low	Pipelines and pumps designed and fit for purpose <b>(NQXT)</b> All pipelines and pumps to be situated within controlled drainage area/s that ultimately drain to the Site's settlement ponds <b>(NQXT)</b> Maintenance and management of pipelines and pumps through SAP (maintenance management system) <b>(Port Operations Manager)</b>	Minor	Unlikely	1 - Low	Nil environmental effect caused by pipeline failure	No major failures of the pipes or pumps
		Erosion of land caused by SRD wall failure	Moderate	Possible	2 - Moderate	SRD constructed with long-life HDPE liner to prevent leaking <b>(NQXT)</b>	Minor	Unlikely	1 - Low	Nil environmental effect caused through SRD leaking	No SRD leaks
		Erosion of land caused by SRD pipelines and pumps leaking	Minor	Possible	1 - Low	Pipelines and pumps designed and fit for purpose <b>(NQXT)</b> All pipelines and pumps situated within controlled drainage area/s that ultimately drain to the sites settlement ponds <b>(NQXT)</b> Maintenance and management of pipelines and pumps through the SAP (maintenance management system) <b>(Port Operations Manager)</b>	Minor	Unlikely	1 - Low	Nil environmental effect caused pipe failure	No major failures of the pipes or pumps
		Contamination of land due to inappropriate management of waste	Minor	Unlikely	1 - Low	This will be managed in accordance with the APB EMP and APB HSEC PRO 0014 Waste Management Procedure	Minor	Unlikely	1 - Low	Managed through APB EMP	Compliance with APB EMP
SRD maintenance	Air	Nuisance dust caused through driving which negatively affects air quality	Minor	Possible	1 - Low	All maintenance access/egress to be via existing tracks and disturbed areas within the construction footprint <b>(All Personnel)</b> Driving to road conditions as highlighted in APB HSEC PLN 0008 Traffic Management Plan <b>(All Personnel)</b> Access tracks to be maintained in a safe and reliable state <b>(Port Operations Manager)</b>	Minor	Unlikely	1 - Low	No dust complaints associated with the maintenance of the SRD	Nil dust complaints in relation to the maintenance of the SRD



Activity	Environmental Aspects	Potential Impacts	Before Controls			Existing or Proposed Controls (Responsibility)	After Controls			Objectives and Targets	Target
			C	L	RR		C	L	RR		
	Biodiversity	Reduction in native flora due to weeds	Minor	Unlikely	1 - Low	All maintenance access/egress to be via existing tracks and disturbed areas within the construction footprint ( <b>All Personnel</b> ) Routine weed control to be undertaken as part of general site maintenance activities ( <b>Site Services Superintendent</b> )	Minor	Unlikely	1 - Low	Ensure maintenance access and egress via existing tracks and disturbed areas to prevent additional disturbance with flow on effects to the native flora	100% access and egress through existing tracks unless this access is for legitimate maintenance purposes. (e.g., spraying weeds)
		Reduction in native flora due to land disturbance	Minor	Unlikely	1 - Low	SRD maintenance clearing will be minimal and will be undertaken in accordance with the APB EMP and APB HSEC PRO 0012 Biodiversity and Land Management Procedure ( <b>All Personnel</b> ) Access tracks to be maintained in a safe and reliable state ( <b>Site Services Superintendent</b> )	Minor	Unlikely	1 - Low	All maintenance clearing to be undertaken through an internal ground disturbance permit (APB HSEC PRO 0012 Biodiversity and Land Management Procedure)	Nil occurrence of unauthorised clearing for SRD operations
	Biodiversity	Reduction in native fauna due to land disturbance	Minor	Unlikely	1 - Low	SRD maintenance clearing will be minimal and will be undertaken in accordance with the APB EMP and APB HSEC PRO 0012 Biodiversity and Land Management Procedure ( <b>All Personnel</b> ) Access tracks to be maintained in a safe and reliable state ( <b>Site Services Superintendent</b> )	Minor	Unlikely	1 - Low	All maintenance clearing to be undertaken through an internal ground disturbance permit (APB HSEC PRO 0012 Biodiversity and Land Management Procedure)	Nil occurrence of unauthorised clearing for SRD operations
	Water Resources	Decline in surface and ground water quality due to chemical spills	Moderate	Possible	2 - Moderate	Bunding provided for in the CDP design is to be maintained through the operational phase ( <b>NQXT</b> ). Chemicals to be managed in accordance with APB HSEC PRO 0038 Control of Hazardous Materials ( <b>All Personnel</b> ) Spill management in accordance with the APB EMP (all personnel) CDP maintenance to be undertaken by trained/competent persons ( <b>Port Operations Manager</b> )	Minor	Unlikely	1 - Low	Minimise the potential for contamination of surface water through chemical spillage	No category 2 or above incidents in relation to chemical spills in SRD

Activity	Environmental Aspects	Potential Impacts	Before Controls			Existing or Proposed Controls (Responsibility)	After Controls			Objectives and Targets	Target
			C	L	RR		C	L	RR		
	Water Resources	Decline in surface and ground water quality due to hydrocarbons	Minor	Possible	1 - Low	Pumps and equipment are powered through electricity minimising the use of hydrocarbon fuels. <b>(NQXT)</b> All maintenance of pumps will be undertaken by competent maintenance personnel and this will be managed through the SAP system <b>(Port Operations Manager)</b> All refuelling of vehicles to be undertaken at designated refuelling areas located outside the SRD operational area <b>(All Personnel)</b> Hydrocarbons to be managed in accordance with the APB HSEC PRO 0038 Control of Hazardous Materials Procedure <b>(All Personnel)</b> Spills to be managed in accordance with the APB EMP (All Personnel)	Minor	Unlikely	1 - Low	Minimise the potential for contamination of surface water through hydrocarbon spillage	No category 2 or above incidents in relation to hydrocarbons in SRD footprint
	Water Resources	Decline in surface and groundwater water quality due to inappropriate management of waste	Minor	Possible	1 - Low	This will be managed in accordance with the APB EMP and APB HSEC PRO 0014 Waste Management Procedure	Minor	Possible	1 - Low	Managed through APB EMP	Compliance with APB EMP
	Land	Contamination of land due to chemical spills	Moderate	Possible	2 - Moderate	Bunding provided for in the CDP design is to be maintained throughout the construction phase <b>(NQXT)</b> Chemicals to be managed in accordance with APB HSEC PRO 0038 Control of Hazardous Materials <b>(All Personnel)</b> Spill management in accordance with APB EMP <b>(All Personnel)</b> CDP maintenance undertaken by trained/competent persons <b>(Port Operations Manager)</b>	Minor	Unlikely	1 - Low	Minimise the potential for contamination of surface water through chemical spillage	No category 2 or above incidents in relation to chemical spills in SRD
	Land	Contamination of land through	Minor	Possible	1 - Low	Pumps and equipment are powered through electricity	Minor	Unlikely	1 - Low	Minimise the potential for contamination of	No category 2 or above incidents in relation to

Activity	Environmental Aspects	Potential Impacts	Before Controls			Existing or Proposed Controls (Responsibility)	After Controls			Objectives and Targets	Target
			C	L	RR		C	L	RR		
		hydrocarbons spillage				<p>minimising the use of hydrocarbon fuels (<b>NQXT</b>)</p> <p>All maintenance of pumps will be undertaken by competent persons and this will be managed through the SAP system (<b>Port Operations Manager</b>)</p> <p>All refuelling of vehicles to be undertaken at designated refuelling areas located outside the SRD operational area (<b>All Personnel</b>)</p> <p>Hydrocarbons to be managed in accordance with APB HSEC PRO 0038 Control of Hazardous Materials Procedure (<b>All Personnel</b>)</p> <p>Spills to be managed in accordance with the APB EMP (<b>All Personnel</b>)</p>				surface water through hydrocarbon spillage	hydrocarbons in SRD footprint
	Land	Contamination of land due to maintenance excavation	Moderate	Unlikely	1 - Low	Whilst no additional excavations are planned beyond the construction phase, any excavation that is required to be undertaken will be in accordance with the OEMP ASSMP ( <i>OEMP <a href="#">Appendix F</a></i> ).	Minor	Unlikely	1 - Low	Minimise potential impacts of PASS or ASS	No disturbance of ASS or PASS as part of maintenance

**Table notes:**

C – Consequence

L - Likelihood

RR – Residual Risk

## Appendix C - Environmental Control Plans

ECP 001 – Flora Management	
Environmental Objectives	Ensure general access and egress via existing tracks and disturbed areas to prevent additional disturbance and spread of weeds. All maintenance or operational clearing to be undertaken through an APB Ground Disturbance Permit
Target	100% access and egress through existing tracks, unless this access is for legitimate maintenance or operational purposes (e.g., weed management) Nil occurrence of unauthorized clearing for SRD maintenance or operational activities
Performance Criteria	Number of access and egress not via existing tracks, unless this access is for legitimate maintenance or operational purposes (e.g., weed management) Occurrence of unauthorised clearing
Control Measures and Responsibility	All vehicles will remain on designated tracks and roadways within approved areas of the APCT #1 ( <b>All Personnel</b> ) Access tracks to be maintained in a safe and reliable state ( <b>EC Personnel</b> ) SRD maintenance or operational clearing will be minimal and will be undertaken in accordance with the APB EMP and APB HSEC PRO 0012 Biodiversity and Land Management Procedure ( <b>EC Personnel</b> ) Weed control to be undertaken as part of general site maintenance activities ( <b>EC Personnel</b> ) There will be active management of the planted grasses on the SRD walls ( <b>EC Personnel</b> )
Monitoring	SRD inspections will include: <ul style="list-style-type: none"> <li>- Evidence of off-road vehicle access</li> <li>- Presence of weeds</li> <li>- New areas of disturbance</li> </ul> Monitoring will be undertaken by or as authorised by <b>EC Personnel</b>
Reporting	Inspection checklists will be managed as per the site inspections under the APB EMP, with records being stored in CMO.
Corrective Actions	Corrective actions for issues identified by the suitably qualified person undertaking the SRD inspection will be included on the checklists. These actions will be entered with the inspection findings into CMO and the actions will be allocated to the responsible personnel. Action progress and completion are tracked through the CMO system.

ECP 002 – Fauna Management	
Environmental Objectives	Minimise the deaths of terrestrial based native fauna in the SRD operational area
Target	Nil deaths of terrestrial native fauna in the SRD operational area
Performance Criteria	Number of terrestrial native fauna deaths directly associated with the operation or maintenance of the SRD
Control Measures	<i>Due to the relationship between flora and fauna, the controls to manage native flora will additionally have a positive effect on fauna management. Therefore, controls are relevant for both fauna and flora. This ECP will only address additional controls for the management of fauna associated with the operation and maintenance of the SRD.</i> SRD was constructed with a fence to exclude fauna entry and reduce potential for stranded animals ( <b>NQXT</b> ) Personnel will not feed native animals ( <b>All Personnel</b> ) Maintain all areas of fencing to ensure its ongoing effectiveness ( <b>Port Operations Manager</b> )
Monitoring	Quarterly SRD inspections will include: <ul style="list-style-type: none"> <li>- Condition of the fence</li> <li>- Evidence of dead terrestrial fauna in the SRD</li> </ul> Monitoring will be undertaken by or as authorised by the <b>EC Personnel</b>
Reporting	Inspection checklists will be managed as per the site inspections under the APB EMP, with records being included into CMO

### ECP 002 – Fauna Management

Contingency Plan / Corrective Action	<p>Management of injured fauna will be in accordance with the APB HSEC PRO 0012 Biodiversity and Land Management Procedure.</p> <p>Corrective actions for issues identified by the suitably qualified person undertaking the SRD inspection will be included on the checklists. These actions will be entered with the inspection into CMO and the actions will be allocated to the responsible personnel. Action progress and completion are tracked through the CMO system.</p>
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### ECP 003 – Land Management - Chemical

Environmental Objectives	Minimise the potential of land contamination from chemical spillage
Target	No category 2 (see definitions) or above incidents in relation to chemical spills in the SRD
Performance Criteria	Number of Category 2 incidents (see definitions)
Control Measures	<p>CDP was constructed with appropriate bunding through design and construction (<b>NQXT</b>)</p> <p>Pumps and equipment are powered through electricity minimising the use of hydrocarbon fuels (<b>NQXT</b>)</p> <p>Hydrocarbons and chemicals are managed in accordance with the APB Control of Hazardous Materials (<b>All Personnel</b>)</p> <p>Spill management is in accordance with the APB EMP (<b>All Personnel</b>)</p> <p>CDP operation and maintenance to be undertaken by trained/competent persons (<b>Port Operations Manager</b>)</p> <p>All maintenance of pipelines and pumps will be undertaken by competent maintenance personnel and this will be managed through the SAP system (<b>Port Operations Manager</b>)</p> <p>Any refuelling of vehicles will be undertaken at designated refuelling areas located outside the SRD operational area as per APB HSEC PLN 0008 Traffic Management Plan (<b>All Personnel</b>)</p> <p>Waste will be managed in accordance with the APB EMP and APB HSEC PRO 0014 Waste Management Procedure (<b>All Personnel</b>)</p>
Monitoring	<p>SRD inspections will include:</p> <ul style="list-style-type: none"> <li>- Location of waste (if any)</li> <li>- Evidence of chemical spills</li> <li>- Bunding of chemicals</li> </ul> <p>Monitoring will be undertaken by or as authorised by the <b>EC Personnel</b></p>
Reporting	Inspection checklists will be managed as per the site inspections under APB EMP, with records being included into CMO.
Contingency Plan / Corrective Action	<p>In the event of a spill, clean-up will be undertaken in accordance with the APB HSEC PLN 0003 Emergency Management. The incident will then be reported and investigated in accordance with the APB HSEC PRO 0020 Incident Reporting and Investigation Procedure. Actions will be managed through CMO.</p> <p>Corrective actions for issues identified by the suitably qualified person undertaking the SRD inspection will be included on the checklists. These actions will be entered with the inspection into CMO and the actions will be allocated to the responsible personnel. Action progress and completion are tracked through the CMO system.</p>

### ECP 004 – Land Management – Physical

Environmental Objectives	Minimise the potential of soil erosion through operation and maintenance of the SRD
Target	Effective liner system maintained and no occurrence of SRD wall failures
Performance Criteria	Polyurethane liner provides effective barrier, SRD wall failures or overtopping events

Control Measures	<p>SRD was constructed with a long-life polyurethane liner to prevent leaking (<b>NQXT</b>)</p> <p>Interlocks have been installed between SSP pick-up pump/s and SRD water level indicators to ensure sufficient freeboard (<b>NQXT</b>)</p> <p>Online real time monitoring of filling operations via onsite SCADA system (<b>All Personnel</b>)</p> <p>SRD designed (through a failure impact assessment) to minimise the chance of a critical dam wall failure (<b>NQXT</b>)</p> <p>SRD wall stabilised with grass on construction completion (<b>NQXT</b>)</p> <p>SRD was constructed with outer toe/cess-drain, drained via erosion and sediment control devices to surrounding areas and existing APCT #1 water management system (<b>NQXT</b>)</p> <p>Implementation of the OEMP ESCP (<a href="#">Appendix E</a>) (<b>All Personnel</b>)</p> <p>Active management of the SRD rehabilitated walls (<b>EC Personnel</b>)</p>
Monitoring	<p>Quarterly SRD inspections will include:</p> <ul style="list-style-type: none"> <li>- Dam wall visual inspection</li> <li>- Evidence of dam leaking</li> <li>- Grass coverage on SRD walls</li> <li>- Sediment controls and status</li> </ul> <p>Monitoring will be undertaken by or as authorised by the <b>EC Personnel</b></p>
Reporting	<p>Inspection checklists will be managed as per the site inspections under then APB EMP, with records being included into CMO.</p>
Contingency Plan / Corrective Action	<p>Corrective actions for issues identified by the suitably qualified person undertaking the SRD inspection will be included on the checklists. These actions will be entered with the inspection into CMO and the actions will be allocated to the responsible personnel. Action progress and completion are tracked through the CMO system.</p>

ECP 005 – Surface and Ground Water Quality Management	
Environmental Objectives	<p>Minimise the potential for contamination of surface and groundwater through chemical spillage.</p> <p>Minimise the potential for the presence of Cyanobacteria in SRD water</p>
Target	<p>No category 2 (see definitions) or above incidents in relation to chemical spills in SRD.</p> <p>Nil environmental or human health biological effect from the beneficial reuse of SRD water throughout APCT #1 operational processes</p> <p>Nil environmental or human health biological effect caused through installing and operating surface water quality management infrastructure and processes that may be required to manage SRD surface water quality and Cyanobacteria</p>
Performance Criteria	<p>Number of category 2 incidents (see definitions)</p>
Control Measures	<p>CDP was constructed with appropriate bunding through design and construction (<b>NQXT</b>)</p> <p>Hydrocarbons and chemicals are managed in accordance with the APB HSEC PRO 0038 Control of Hazardous Materials (<b>All Personnel</b>)</p> <p>Pumps and equipment are powered through electricity minimising the use of hydrocarbon fuels (<b>NQXT</b>)</p> <p>Spill management is undertaken in accordance with the APB EMP (<b>All Personnel</b>)</p> <p>CDP operation and maintenance undertaken by trained/competent persons (<b>Maintenance Manager</b>)</p> <p>Waste will be managed in accordance with the APB EMP and APB HSEC PRO 0014 Waste Management Procedure (<b>All Personnel</b>)</p> <p>All maintenance of pumps and pipelines will be undertaken by competent maintenance personnel and this will be managed through the SAP system (<b>Maintenance Manager</b>)</p> <p>Any refuelling of vehicles will be undertaken at designated refuelling areas located outside the SRD operational area in accordance with the APB HSEC PLN 0008 Traffic Management Plan (<b>All Personnel</b>)</p> <p>Active management of SRD surface water quality to be undertaken to avoid, minimise and manage the presence of Cyanobacteria in the SRD through water quality</p>

ECP 005 – Surface and Ground Water Quality Management	
	management infrastructure, treatment processes and/or biological or chemical control as determined to be appropriate ( <b>EC Personnel</b> ) CDP operation and maintenance to be undertaken by trained/competent persons ( <b>Port Operations Manager</b> )
Monitoring	SRD inspections will include: <ul style="list-style-type: none"> <li>- Location of waste (if any)</li> <li>- Evidence of chemical spills</li> <li>- Bunding of chemicals</li> </ul> Monitoring will be undertaken by or as authorised by <b>EC Personnel</b> . Monitoring of surface water quality and associated “trigger” actions will be undertaken in accordance with the OEMP WQMP ( <a href="#">Appendix D</a> )
Reporting	Inspection checklists will be managed as per the site inspections under the APB EMP, with records being included into CMO. Monitoring data and compliance reporting will be submitted to DAWE annually as per Controlled Action Approval requirements
Contingency Plan / Corrective Action	In the event of a spill, clean-up will be undertaken in accordance with the APB HSEC PLN 0003 Emergency Management. The incident will then be reported and managed in accordance with the APB HSEC PRO 0020 Incident Reporting and Investigation Procedure, with the investigation and actions being managed through CMO. Corrective actions for issues identified by the suitably qualified person undertaking the SRD inspection will be included on the checklists. These actions will be entered with the inspection into CMO and the actions will be allocated to the responsible personnel. Action progress and completion are tracked through the CMO system

ECP 006 – Surface Water Quality Management – Physical	
Environmental Objectives	Minimise the potential for contamination of surface water caused through erosion
Target	Effective liner system maintained, no SRD wall failure
Performance Criteria	Polyurethane liner provides effective barrier, no SRD wall failures or overtopping
Control Measures	SRD was constructed with long-life polyurethane liner to provide effective liner system ( <b>NQXT</b> ). Interlocks have been installed between SSP pick-up pump/s and SRD water level indicators to ensure sufficient freeboard ( <b>NQXT</b> ) Online real time monitoring of filling operations via onsite SCADA system ( <b>NQXT</b> ) SRD wall stabilised with grass ( <b>NQXT</b> ) Active management of the SRD rehabilitated walls ( <b>EC Personnel</b> ) Implementation of OEMP ESCP ( <a href="#">Appendix E</a> ) ( <b>All Personnel</b> ) Implementation of the OEMP ASSMP if ASS/PASS are detected ( <a href="#">Appendix F</a> )
Monitoring	Quarterly SRD inspections will include: <ul style="list-style-type: none"> <li>- SRD wall visual inspection</li> <li>- Evidence of SRD leaking</li> <li>- Evidence of soil erosion</li> <li>- Sediment controls and status</li> </ul> Monitoring will be undertaken by or as authorised by <b>EC Personnel</b> . Monitoring of surface water quality and associated “trigger” actions will be undertaken in accordance with the OEMP WQMP ( <a href="#">Appendix C</a> )
Reporting	Inspection checklists will be managed as per the site inspections under the APB EMP, with records being included into CMO.
Contingency Plan / Corrective Action	Corrective actions for issues identified by the suitably qualified person undertaking the inspection through the quarterly SRD inspections will be included on the checklists. These actions will be entered with the inspection into CMO and the actions will be allocated to the responsible personnel. Action progress and completion are tracked through the CMO system

ECP 007 – Groundwater Quantity Management	
Environmental Objectives	No environmental effects caused through SRD leaking
Target	Effective liner system maintained
Performance Criteria	Polyurethane liner provides effective barrier
Control Measures	SRD was constructed with long-life polyurethane liner to prevent leaking ( <b>NQXT</b> )
Monitoring	<p>Quarterly SRD inspections will include:</p> <ul style="list-style-type: none"> <li>- SRD wall visual inspection</li> <li>- Evidence of SRD leaking</li> </ul> <p>Inspections will be undertaken by or as authorised by the <b>EC Personnel</b></p>
Reporting	Inspection checklists will be managed as per the site inspections under the APB EMP, with records being included into CMO
Contingency Plan / Corrective Action	<p>Corrective actions for issues identified by the suitably qualified person undertaking the inspection through the quarterly SRD inspections will be included on the checklists. These actions will be entered with the inspection into CMO and the actions will be allocated to the responsible personnel. Action progress and completion are tracked through the CMO system.</p>

ECP 008 – Air Quality Management	
Environmental Objectives	No dust complaints associated with the operation or maintenance of the SRD
Target	No dust complaints in relation to the maintenance and operation of the SRD
Performance Criteria	Number of substantiated dust complaints
Control Measures and Responsibility	<p>All maintenance and operational access/egress to be via existing tracks and disturbed areas within the construction footprint (<b>All Personnel</b>)</p> <p>Driving to road conditions in accordance with the APB HSEC PLN 0008 Traffic Management Plan (<b>All Personnel</b>)</p> <p>Access tracks within the APB lease area to be maintained in a safe and reliable state (Port Operations <b>Manager</b>)</p> <p>All excavations to be undertaken in accordance with site risk management procedures which include environmental hazards (APB HSEC PRO 0042 Risk Management Procedure) (<b>All Personnel</b>)</p>
Monitoring	<p>Substantiated complaints are managed through the APB HSEC PRO 0020 Incident Reporting and Investigation Procedure and reported through CMO.</p> <p>In addition, quarterly SRD inspections will include:</p> <ul style="list-style-type: none"> <li>- Evidence of off-road vehicle access</li> <li>- New areas of disturbance</li> </ul> <p>Monitoring will be undertaken by or as authorised by the <b>EC Personnel</b></p>
Reporting	Inspection checklists will be managed as per the site inspections under the APB EMP, with records being included into CMO.
Corrective Actions	<p>Substantiated complaints are investigated through the APB HSEC PRO 0020 Incident Reporting and Investigation Procedure and the implementation progress is managed through CMO.</p> <p>Corrective actions for issues identified by the suitably qualified person undertaking the inspection through the quarterly SRD inspections will be included on the checklists. These actions will be entered with the inspection into CMO and the actions will be allocated to the responsible personnel. Action progress and completion are tracked through the CMO system.</p>



## Appendix D - Water Quality Monitoring Plan

### D.1 Introduction

This Water Quality Monitoring Plan (WQMP) has been prepared to describe the monitoring program to be implemented during the operation of the SRD and associated infrastructure. The WQMP has been prepared to comply with the requirements of condition 2 of the Controlled Action Approval (2010/5561) which requires that a WQMP must be prepared and submitted for DAWE approval.

Information for the WQMP has been collated from the NQXT WQMP: SRD (E3 Consulting: 2012, 2012), and APB and NQXT personnel.

### D.2 Background

#### **Sensitive Receptors**

The nearest sensitive receptor to the APCT #1 is the Caley Valley Wetland located approximately 10 km radius west of the Site. Investigations undertaken by the Queensland DES (formally the Department of Environment and Heritage Protection (DEHP)), in September 1999 identified important wetland values within the Caley Valley Wetlands. Following this, a portion of the Caley Valley Wetland was designated by the Commonwealth as a Nationally Significant Wetland.

#### **Background Information on the Receiving Environment**

The Caley Valley Wetland system comprises a complex continuous wetland aggregation of sub-tidal and intertidal marine and estuarine wetlands, with a large fresh and brackish water wetland within an artificial impoundment (bund). The majority of the wetland system was artificially isolated from most tidal influence in 1956 when the Bowen Gun Club constructed a bund across Mt Stuart Creek at the location of the current causeway. This bund was developed to encourage waterbirds to the wetland for club shooting activities (Peter Hollingsworth and Associates 1979 and 1981). This causeway currently incorporates a rough access track (E3 Consulting 2012).

In 1984 following the construction of APCT #1, a second bund was constructed on the western side of the wetland area and the forementioned causeway. This bund restricts tidal inundation reaching the northern parts of the area between the two bunds (unlike the causeway bund, the western bund restricts flows to the northern part of the intertidal area between the two bunds only).

Land within the Caley Valley Wetland is owned by NQBP, the Office of the Coordinator General (OCG), Queensland Coal Investment and Economic Development Queensland (EDQ). Portions of the land are also leased by grazing companies. Anthropogenic and natural activities that occur within the Caley Valley Wetland include vegetation management through weed spraying and burn offs, feral pest management through baiting, aerial shooting and recreational hunting, and cattle grazing. These activities are outside the control of APB however all have the potential to impact on the monitoring parameters required of the OEMP and WQMP.

## D.3 Water Quality Values and Objectives

### D.3.1 Environmental values within and surrounding APCT #1

The Queensland Water Quality Guidelines provide environmental values that capture both aquatic ecosystem and human use values. An assessment of available information relating to the Caley Valley Wetland and APCT #1 settlement ponds has been used to determine which environmental values are applicable to the SSP (within which SRD water is released into) and the Caley Valley Wetland (E3 Consulting 2012).

Environmental values for the Caley Valley Wetland were determined by E3 Consulting and NQXT on the basis of NQBP's Environmental Management Plan, Queensland Water Quality Guidelines, ANZECC Guidelines and the WBM Environmental Management Plan for the Caley Valley Wetland.

A summary of the relevant environmental values within and surrounding the APCT #1 and water quality objectives is provided in **Table D-1**. Information assessed in making this determination included existing water quality monitoring data, flora and fauna assessments and historical records of land use and disturbance.

Environmental Value	QWQG Definition (DERM, 2009a)	Relevance to the Site
Aquatic Ecosystems - Level 1: High ecological/ conservation value (HEV) ecosystem	Effectively unmodified or other highly valued systems, typically occurring in national parks, conservations reserves or in remote and/inaccessible locations. The ecological integrity of HEV systems is regarded as intact	✖
Aquatic Ecosystems - Level 2: Slightly moderately disturbed (SMD) ecosystem	Ecosystems in which aquatic biological diversity may have been adversely affected to a relatively small but measurable degree by human activity. The biological communities remain in a healthy condition and ecosystem integrity is largely retained. Typically, freshwater systems would have slightly to moderately cleared catchments and/or reasonably intact riparian vegetation SMD systems could include rural streams receiving runoff from land disturbed to varying degrees by grazing or pastoralism	✓ The wetland area is considered to be SMD as two bunds have been constructed in the wetland historically modifying the natural flow regimes. Upstream landforms have been historically cleared for grazing use substantially modifying the natural ecosystem. The wetland also receives water inflow during controlled discharges from the adjacent Port.
Aquatic Ecosystems - Level 3: Highly disturbed (HD) ecosystem	These are measurably degraded ecosystems of lower ecological value. Examples of HD systems include rural streams receiving runoff from intensive horticulture	✓ The SSP is considered to be HD as this is an artificially created storage pond with vegetative regrowth
Primary Industries - Irrigation	Suitability of water supply for irrigation	✖ Not applicable
Primary Industries - Farm Water Supply	Suitability of domestic farm water supply, other than drinking water	✖ Not applicable
Primary Industries - Stock Watering	Suitability of water supply for production of healthy livestock	✖ Not applicable
Primary Industries - Aquaculture	Health of aquaculture species and humans consuming aquatic foods from commercial ventures	✖ Not applicable
Primary Industries - Human Consumers of Aquatic Foods	Health of humans consuming aquatic foods from natural waterways	✖ Not applicable
Recreation and Aesthetics - Primary Recreation	Health of humans during recreation which involves direct contact and a high probability of water being swallowed	✖ Not applicable

Environmental Value	QWQG Definition (DERM, 2009a)	Relevance to the Site
Recreation and Aesthetics - Secondary Recreation	Health of humans during recreation which involves indirect contact and a low probability of water being swallowed	✖ Not applicable downstream of the Study Area
Recreation and Aesthetics - Visual Recreation	Amenity of waterways for recreation which does not involve any contact with water	✖ Not applicable
Drinking Water	Suitability of raw drinking water supply. This assumes minimal treatment of water is required	✖ Not applicable
Industrial Uses	Suitability of water supply for industrial use	✓ SRD water is intended to be reused for port operations
Cultural and Spiritual Values	Indigenous and non-indigenous cultural heritage	✓ Water quality values are relevant to the Traditional Owners of the area
<p>In summary, the following environmental values are considered to be relevant to this WQMP:</p> <ul style="list-style-type: none"> <li>• Aquatic ecosystems – slightly to moderately disturbed – Wetlands</li> <li>• Aquatic ecosystems – highly disturbed – Sediment Pond 2</li> <li>• Industrial Uses – water reuse</li> <li>• Cultural and spiritual values.</li> </ul> <p>Water quality trigger values are proposed based on the existing water quality data, site and area knowledge and ANZECC guidelines, which were developed as part of the National Water Quality Management Strategy</p>		

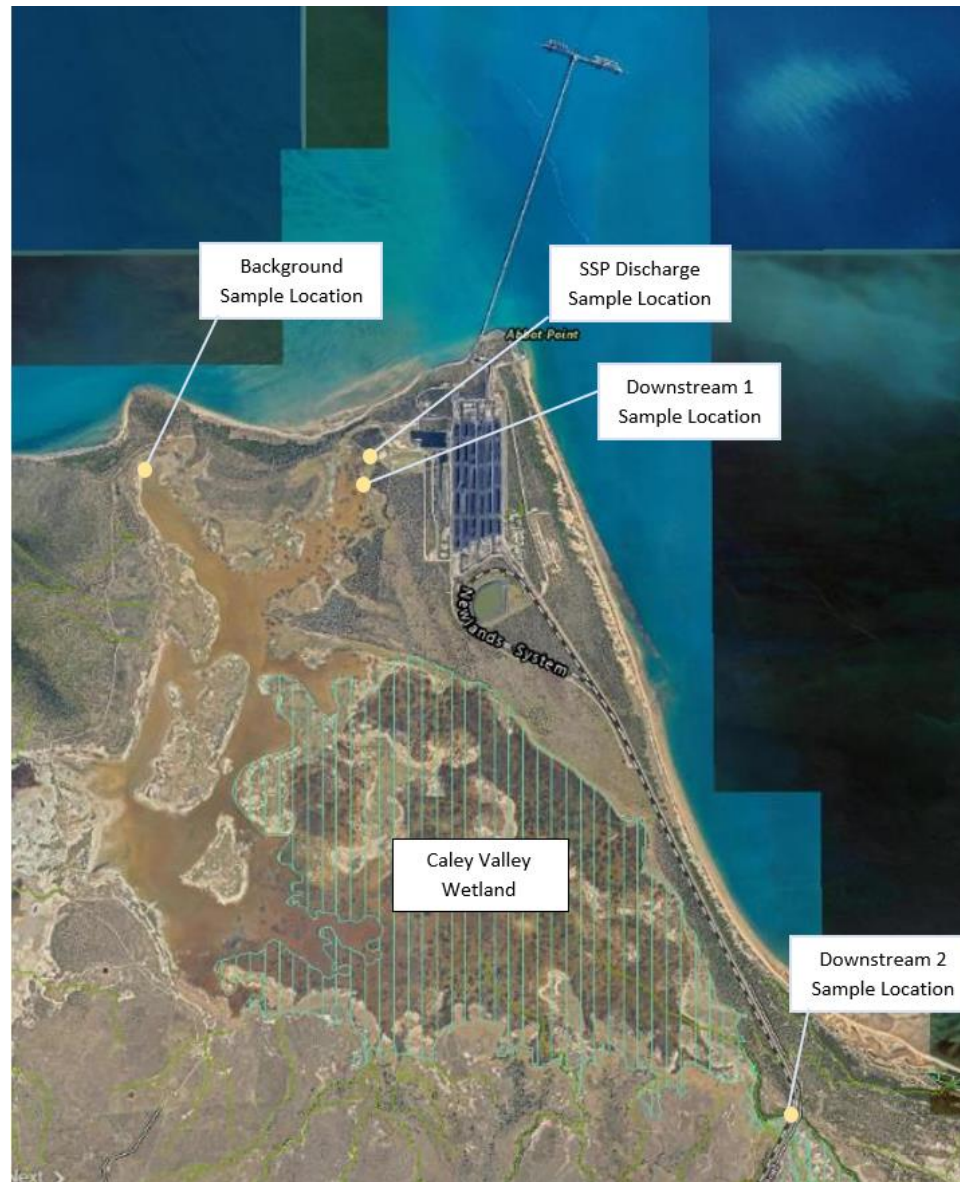
**Table D-1 – Study Area Values and Objectives**

### D.3.2 Sample Sites

The sample locations have been selected based on a number of factors, including:

- Utilising existing monitoring locations which offer connectivity to existing site data.
- Ensuring monitoring sites and access routes are safe to access; and
- Consideration of the requirement to include background and impact sites as per the Controlled Action Approval ([Appendix H](#)).

A summary of all sample sites is provided in **Table D-2**, with locations and site photographs provided in **Figure D-1** and **Table D-3**, respectively.



**Figure D-1 – OEMP Surface Water Quality Monitoring Locations**

Site Location	SSP	Background Sample Location – Caley Valley Wetland	Downstream 1 Sample Location – Caley Valley Wetland	Downstream 2 Sample Location – Caley Valley Wetland
<b>Bank Width</b>	N/A	N/A	N/A	1-3m
<b>Stream Width</b>	N/A- though at sample location the width of the wetland would be approximately 410m	N/A- though at sample location the width of the wetland would be approximately 1,000m	N/A - though at sample location the width of the wetland would be approximately 100m	Approximately 100m wide at the rail crossing
<b>Depth</b>	Varies but can be approximately 1.5m	Shallow <300mm	<300mm	Deep water body
<b>Bank Slope</b>	SRD wall	Low (10°-30°)	Low (10°-30°)	Low (10°-30°) to steep (60°-80°)
<b>Vegetation</b>	Some grass cover throughout the settlement pond. Some trees around the edge.	Long grasses, sedges and marine plant species present at the wetland fringe in the immediate vicinity of the sample location. Higher levels of the wetland fringe are covered with thick grass cover including marine couch and terrestrial grass species. Weed species are also prevalent on higher ground	Long grasses, sedges and marine plant species present at the wetland fringe in the immediate vicinity of the sample location. Paperbarks on side of wetland. Some weeds evident	Riparian vegetation in area with a thick woody weed infestation. A number of established water lilies in the immediate vicinity of the sample location.
<b>Distance to SSP Discharge</b>	SSP discharge location	Located approximately 2.2km to the west of the discharge location	This is approximately 260m downstream from discharge location	Approximately 5km downstream of the discharge location

**Table D-2 – Sample Monitoring Location Environmental Description**



Table D-3 – Sample Monitoring Location Photographs

Secondary Settlement Pond	Background Sample Location – Caley Valley Wetlands	Downstream 1 Sample Location – Caley Valley Wetlands	Downstream 2 Sample Location – Caley Valley Wetlands
			
			

### D3.3 Monitoring Methodology

All water quality monitoring will be undertaken in accordance with the APB Environmental Monitoring Manual, which has been prepared in line with the *Monitoring and Sampling Manual: Environmental Protection Water Policy* developed by the Department of Environment and Science and is subject to routine review.

Field equipment will be calibrated prior to sampling. Water quality sample analysis will be conducted by a National Association of Testing Authorities (NATA) accredited laboratory.

### D3.4 Release Event Monitoring

**Table D-4** details the required monitoring conducted prior to, during and following a release from the SSP.

Event	Locations	Monitoring Requirements	Frequency	Responsibility
Prior to Discharge Event	SSP Background Downstream 1 Downstream 2	<b><u>Insitu:</u></b> pH, Electrical conductivity (EC); Dissolved oxygen (DO); Temperature; and Turbidity. <b><u>Laboratory Analysis:</u></b> Total Suspended Solids (TSS); Total Nitrogen (TN); Total Phosphorus (TP); and Chemical Oxygen Demand (COD).	Prior to a SSP discharge event	EC Personnel
During a Discharge Event	SSP Background Downstream 1 Downstream 2	<b><u>Insitu:</u></b> pH, Electrical conductivity (EC); Dissolved oxygen (DO); Temperature; and Turbidity. <b><u>Laboratory Analysis:</u></b> Total Suspended Solids (TSS); Total Nitrogen (TN); Total Phosphorus (TP); and Chemical Oxygen Demand (COD).	Weekly during discharge	EC Personnel
Post Discharge Event	SSP Background Downstream 1 Downstream 2	<b><u>Insitu:</u></b> pH, Electrical conductivity EC); Dissolved oxygen (DO); Temperature; and Turbidity. <b><u>Laboratory Analysis:</u></b> Total Suspended Solids (TSS); Total Nitrogen (TN); Total Phosphorus (TP); and Chemical Oxygen Demand (COD).  This will continue for a fortnight after a discharge event. If another release event occurs within this fortnight, the 'During a Discharge Event' monitoring will continue	Weekly post discharge event for 2 weeks	EC Personnel

### D.3.5 Background percentiles and Trigger Values

The Controlled Action Approval requires that the baseline estimates for the 20<sup>th</sup>, 50<sup>th</sup> and 80<sup>th</sup> percentile are determined for the SSP and Caley Valley Wetland. E3 Consulting has generated baseline estimates based on 35 samples and 47 samples taken from 1997 to 2011, for SSP and Caley Valley Wetland, respectively. These values are provided in **Table D-5**.

Parameter	Units	Baseline Calculations for the Secondary Settlement Pond		
		20 <sup>th</sup> percentile	50 <sup>th</sup> Percentile	80 <sup>th</sup> Percentile
SSP				
pH	pH units	6.58	6.98	7.09
Electrical Conductivity	µS/cm	401.6	638.5	1256.2
Total Suspended Solids	mg/L	2	6	21.6
Total Nitrogen	µg/L	200	200	320
Total Phosphorus	µg/L	10	20	20
Baseline Calculations for the Caley Valley Wetland				
pH	pH units	6.73	7.21	7.87
Electrical Conductivity	µS/cm	704.40	2838.00	6337.60
Total Suspended Solids	mg/L	6.00	16.50	43.80
Total Nitrogen	µg/L	480	1000	1480
Total Phosphorus	µg/L	120	190	390
Chemical Oxygen Demand	NA	NA	NA	NA

**Table D-5 – Baseline Estimated Percentiles**

The objective of this OEMP WQMP is to ensure that the discharges from the SSP do not have an adverse effect on the Caley Valley Wetland. The approved OEMP (dated 2013) authorised Trigger Values based on 20% variance to be used as indication of potential impacts from a SSP release, due to the highly variant water qualities between the SSP and Caley Valley Wetland and the naturally declining water quality within the Caley Valley Wetland as water levels recede. These Trigger Values are for water released from a Commissioned SRD via the SSP and are assessed using Downstream 1 water quality data compared to the equivalent Background water quality data, for all parameters excluding pH and total suspended solids which are required under the existing T1 EA. These trigger values are summarised in **Table D-6**.

Water Quality Parameter	Units	Trigger Values	EA Compliance Limits
pH	pH units	pH at SSP is not to exceed background pH by more than 20%. If exceeded, SSP pH is not to exceed Downstream 1 pH by more than 20%	pH 6-9
Electrical Conductivity (EC)	µS/cm	EC at SSP is not to exceed background EC by more than 20%. If exceeded, SSP EC is not to exceed Downstream 1 EC by more than 20%	-
Total Suspended Solids (TSS)	Mg/L	SSP is not to exceed background TSS by more than 20% If exceeded, SSP TSS is not to exceed Downstream 1 TSS by more than 20% EC	<30mg/L
Total Nitrogen (TN)	µg/L	SSP is not to exceed background TN by more than 20% If exceeded, SSP TN is not to exceed Downstream 1 TN by more than 20%	N/A
Total Phosphorus (TP)	µg/L	SSP is not to exceed background TP by more than 20% If exceeded, SSP TP is not to exceed Downstream 1 TP by more than 20%	N/A



Water Quality Parameter	Units	Trigger Values	EA Compliance Limits
Chemical Oxygen Demand (COD)	N/A	SSP is not to exceed background COD by more than 20% If exceeded, SSP COD is not to exceed Downstream 1 COD by more than 20%	N/A

**Table D-6 – Release Event Monitoring Trigger Values**

There is no historical data for chemical oxygen demand and therefore this has been marked as N/A. This information will be collected within this WQMP and the baseline estimates will be determined once monitoring data has been collected for 2 years or when an adequate number of samples have been collected.

**What to do if a trigger value is exceeded:**

The following will be undertaken if a threshold trigger value is triggered:

- a) If the trigger values are exceeded, then APB will re-sample the site to determine if this is a true indication of the water quality in the area.
- b) If a repeat sample returns a similar result an investigation of potential cause of the exceedance will be undertaken
- c) If it is determined to be a natural variation, then the trigger values will be reviewed and adjusted accordingly.
- d) Exceedance of triggers will be reported to NQXT and to DAWE where required by the Controlled Action Approval conditions.

## Appendix E - Erosion and Sediment Control Plan

### E.1 Introduction

This Erosion and Sediment Control Plan (ESCP) has been prepared to detail the potential impacts, objectives and targets and performance criteria required to manage the erosion and sediment controls that have been established as part of the construction of the SRD and its associated infrastructure. The ESCP has been prepared to comply with the requirements of condition 3(a) of the Controlled Action Approval (2010/5561) which state that the OEMP must detail “sediment and erosion control measures, consistent with IECA (2008), Best Practice Erosion and Sediment Control, International Erosion Control Association (Australasia) [IECA].”

NQXT has constructed the SRD and its associated infrastructure in alignment with the Best Practice Erosion and Sediment Control, IECA; therefore this plan focuses on maintaining the erosion and sediment controls that have been installed.

It should be noted that there is a strong alignment between this ESCP and the ECP 004 – Land Management – Physical (refer **Section 4.4** and **Appendix C**) which intends to mitigate any potential impacts from the operation and maintenance of the SRD and its associated infrastructure.

### E.2 Potential impacts, objectives and targets, and mitigation measures

**Table E-1** details the key potential impacts of SRD operational activities relating to erosion and sediment transport, and objectives, targets and performance criteria for impact mitigation, and **Table E-2** summarises the proposed mitigation measures.

Potential Impacts	Objectives and Targets	Performance Criteria
Erosion of land due to operational management of the SRD e.g., overtopping of the SRD.  Degradation of water quality due to siltation and/or transport of physical and chemical contaminants.	Minimise the potential for contamination of surface water caused through erosion.  Minimise the potential of soil erosion caused through design construction or SRD management.  Compliance with water quality objectives specified in OEMP WQMP ( <b>Appendix D</b> ).	Effective liner system maintained; no SRD structural failures.  Compliance with trigger values as highlighted in the OEMP WQMP ( <b>Appendix D</b> )

**Table E-1 - Key potential impacts of operational activity relating to erosion and sediment transport, and objectives, targets and performance criteria for impact mitigation.**

Aspect	Control Measures	Timing	Responsible Person
Prior to Commissioning	Rehabilitation of the SRD walls and drainage lines will be undertaken where necessary	Completed during construction	NQXT
	All access roads will be constructed and handed over in a well-maintained state, to avoid unnecessary uncontrolled access.	Completed during construction	NQXT
	Erosion and sediment controls shall be constructed and maintained in accordance with the Best Practice Erosion and Sediment Control (IECA, 2008), as far as practicable considering site conditions and material availability and as summarised in <b>Figure E-1</b> . All controls will be handed over in a functioning state. The locations of these are contained in <b>Figure E-2</b> below.	Completed during construction	NQXT
	SRD and associated infrastructure will be designed to minimise the possibility of leaking, overtopping and SRD failure	Completed during construction	NQXT
Operation	Active management of the revegetated areas	Continual	EC personnel
	All routine access will be undertaken on existing port roads and APB roads. Access tracks will be actively maintained to ensure they remain in an appropriate state	Continual	Maintenance Manager
	Active management of rehabilitated areas will be undertaken on an ongoing basis	Continual	EC Personnel
	Interlock system between the SRD pumps and the process water pumps will be engaged throughout the operation to stop potential topping of the systems.	Continual	Production Manager
Maintenance of ESC	Inspections of the Erosion and Sediment Controls as highlighted in Diagram E-2 will be undertaken on a monthly basis. If there is major evidence of sedimentation, processes will be undertaken to clean out the drains. It should be noted that the collected material will be disposed of in a manner which prevents sediment charging control devices or water courses.	Continual	EC Personnel
Inspection and monitoring	Inspections and monitoring will be undertaken in accordance with the OEMP <a href="#">Appendix G</a> . In relation to the erosion and sediment control aspects, these align with the requirements for the Monthly inspection checklist from the IECA (2008), Best Practice Erosion and Sediment Control, IECA;”	As required	EC personnel
	Water quality monitoring shall be conducted in accordance with the water quality objectives specified in OEMP WQMP ( <a href="#">Appendix D</a> ).	As required	EC personnel

**Table E-2 - Mitigation Measures – Erosion and Sediment Control**

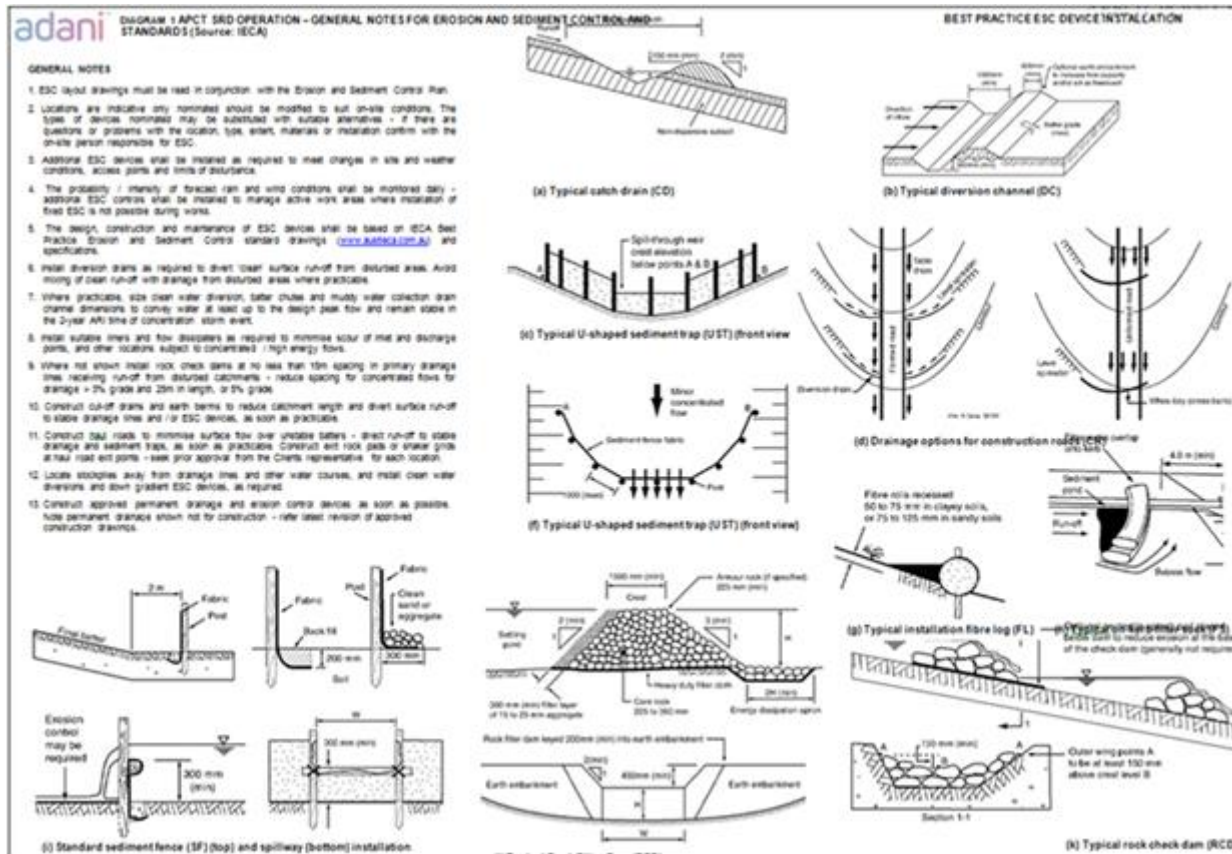


Figure E-1 APCT SRD Operation – General Notes for ESC and Standards (IECA)



*Figure E-2 Locations of SRD ESC Measures*



## Appendix F - Acid Sulfate Soils Management Plan (ASSMP)

### F.1 Introduction

The Acid Sulfate Soils Management Plan (ASSMP) has been prepared to comply with the requirements of condition 3(a) of the Controlled Action Approval which state that the OEMP must “detail ASS management measures, consistent with the Guidelines for Sampling and Analysis of Lowland ASS in Queensland (2008) and the Queensland ASS Technical Manual – Soil Management Guidelines (2002)”.

No acid sulfate soils were detected during the construction phase of the SRD therefore there is no ongoing management required.

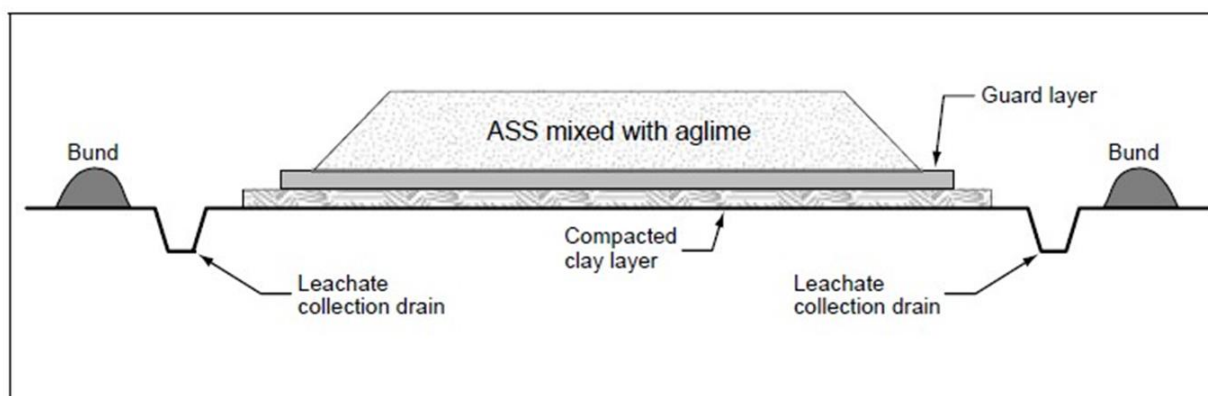
### F.2 Aspects and control measures

**Table F-1** details the aspects and control measures for the management of ASS for the SRD.

Aspect	Control Measures	Responsible Person
Inspection and monitoring	Regular visual monitoring shall be undertaken to detect: <ul style="list-style-type: none"> <li>- Unexplained scalding or degradation of vegetation iron staining</li> <li>- Green-blue or extremely clear water indicating high concentrations of aluminium.</li> </ul> Samples will be taken to determine presence of Acid Sulfate Soils.	EC personnel
Soil is deemed to be ASS with net acidity potentially > QASSIT Soil Management Guidelines action criteria)	The material shall be taken to a designated containment/treatment area (refer <b>Figure F-1</b> ) for verification testing and treatment in accordance with Queensland Acid Sulfate Soil Technical Manual – Soil Management Guidelines Version 4.0 (Queensland Government, 2014) or later	EC personnel
Determination of liming rates	Where liming rates cannot be determined using existing laboratory results, material shall be tested at a minimum rate of 1 sample/250 m <sup>3</sup> using the Chromium Reducible Sulphur Suite (Method 22B). Liming rates incorporating a combined safety and neutralising factor of 1.5 shall be calculated using the following equation: <i>(Maximum net acidity (moles H<sup>+</sup>/t) x 0.075) x Bulk Density = Liming rate (kg/m<sup>3</sup>)</i>	EC personnel
Treatment procedure	Soil will be treated with fine agricultural lime as the material is excavated or in stockpile on treatment pads. A homogenous mix of lime shall be incorporated into the material. Soils not meeting the following validation criteria will require additional treatment and verification, repeated as required.	EC personnel
ASS treatment validation criteria	The treatment of all acid sulfate material shall be validated at a minimum rate of 1 sample/250 m <sup>3</sup> (minimum 3 samples for volumes <250 m <sup>3</sup> ). Chromium suite acid base accounting will be used to validate treated material of the Laboratory Methods Guidelines (Ahern et al. 2004). The Laboratory Methods Guidelines (Ahern et al. 2004) specifies the following criteria for validation of properly ameliorated acid sulfate soil using the Chromium Reducible Sulphur method of analysis: <ul style="list-style-type: none"> <li>- The pH shall be ≥ 6.5; and</li> <li>- Titratable Actual Acidity (TAA) shall be zero; or</li> <li>- Net acidity is zero or negative. Net Acidity = Potential Sulfidic Acidity + Actual Acidity + Retained Acidity – Measured ANC/FF</li> </ul> If pH (KCl) is > 6.5, analysis of TAA is not required. If the soil did not contain retained acidity prior to treatment analysis of retained acidity (SNAS) and inclusion of retained acidity in calculating net acidity is not required.	EC personnel
Records and reporting	Maintain records in accordance with OEMP – <b>Section 6</b> .	EC personnel

Aspect	Control Measures	Responsible Person
	<p>The following records shall be maintained in the form of a lot register:</p> <ul style="list-style-type: none"> <li>- Volume of material</li> <li>- Material source and disposal location</li> <li>- Date of transport</li> </ul> <p>Report monitoring results and management actions to NQXT in accordance with OEMP – <b>Section 6</b>.</p>	EC personnel

**Table F-1 - ASSMP**



**Figure F-1 – Schematic cross-section of a treatment pad, including a compacted clay layer, guard layer, leachate collection system and containment with bunding (Source: Queensland ASS Technical Manual - Soil Management Guidelines v4.0, Queensland Government, 2014).**

## Appendix G - SRD Inspection Checklist

Inspection Date		Time	
Inspection Officer		Signature	

Environmental Conditions			
Rainfall since last inspection (mm)		Wind Speed (km/h)	
Temperature (°C)		Wind Direction	
Humidity (%)		Sky Conditions	
Other Comments			

SRD			
Aspect	Yes	No	Comments
Security fence in good condition			
Evidence of unauthorised entry			
Evidence of new tracks or failure to use existing tracks			
Access track around base of dam and access ramp in good condition and maintained			
Evidence of unusual movement on dam walls			
Evidence of erosion on dam walls requiring repair			
Vegetation on dam walls maintained and in good condition			
Evidence of invasive weeds			
Spillway in good condition and free of debris			
Visual evidence of erosion at embankment crest			
Visual evidence of liner cracking or splitting			
Evidence of native animals trapped or perished			
CDP			
Aspect	Yes	No	Comments
CDP bunding sealed and in good condition no sign of cracks			
Tank exterior in good condition no evidence of corrosion			
No evidence of corrosion on external instrument panels			
Emergency signage visible and in good condition			
Firefighting equipment in good condition and serviced within last 6 months			
Spill kit located in accessible location and serviced within last 3 months			



SSP Pump House			
Aspect	Yes	No	Comments
Security fence in good condition, no evidence of unauthorised entry			
Pump intake clear of vegetation and turtle barrier in good condition			
Emergency signage visible and in good condition			
Evidence of unusual ground movement at pump intake			
Evidence of erosion around pump intake and concrete pump housing			
Evidence of corrosion on aboveground valves and pipework			

Additional Comments			
Action	Assigned to	CMO or notification #	Due Date

## Controlled Action Approval (2010/5561)

Available on request

## **Appendix H - NQBP Port Development Approval (PM/008/00262)**

Available on request

## Appendix I - Key Contacts

Role/ Organisation	Contact Details
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## Appendix J - Terms and Abbreviations

Term/ Abbreviation	Description
NQXT	North Queensland Export Terminal
ACH Act	<a href="#">Aboriginal Cultural Heritage Act 2003</a> (Qld)
ANZECC	Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC/ARMCANZ, 2000)
APB	Abbot Point Bulkcoal Pty Ltd
APB EMP	Abbot Point Bulkcoal Pty Ltd Environmental Management Plan
APCT #1	Abbot Point Coal Terminal Number 1
APO	Abbot Point Operations Pty Ltd
ASSMP	Acid Sulfate Soils Management Plan ( <a href="#">Appendix E</a> )
Bund	An earth mound or similar structure (e.g., a concrete block wall), whether impervious or not, constructed to contain spilled material (e.g., petrol, diesel, oil etc.)
Category 2 incident	This is highlighted in APB HSEC PRO 0020 Incident Reporting and Investigation procedure. A category 2 incident is defined as “Short term impact, required minor remediation that is no longer than 1 month. This also includes any compliance breaches of any environmental licenses”. For example, a hydrocarbon spill of greater than 205L. This also includes any breaches of any APB licenses.
CDP	chemical dosing plant
CEO	Chief Executive Officer
CMO	A compliance management database used to facilitate incident, compliance, audit and inspection activities and their respective actions.
COD	chemical oxygen demand
Contaminant	As defined in the <a href="#">Environmental Protection Act 1994</a> (Qld)
Contractor	Organisation or person responsible for an activity or sub-contractor engaged to undertake an activity on their behalf.
DAWE	Australian Government Department of Agriculture, Water and the Environment (formerly SEWPaC)
DES	Queensland Department of Environment and Science (formerly DEHP)
EA	Environmental Authority
EC	Electrical conductivity
EC Personnel	Environment and Community Personnel
ECP	Environmental Control Procedure
EDQ	Economic Development Queensland
EMP	APB’s Environmental Management Plan and related sub-plans/ environmental control procedures prepared by NQXT for operation of the SRD and associated infrastructure
EMS	Environmental Management System
EP Act	<a href="#">Environmental Protection Act 1994</a> (Qld)
EPBC Act	<a href="#">Environment Protection and Biodiversity Conservation Act 1999</a> (Cth)
ESC	erosion and sediment control
ESCP	Erosion and Sediment Control Plan ( <a href="#">Appendix E</a> )
HD	highly disturbed ecosystem
HEV	High ecological/conservation value ecosystem
IECA	International Erosion Control Association

Term/ Abbreviation	Description
Infrastructure	Project infrastructure includes roads, tracks, culverts, dams, buildings, fixed machinery, pipelines, power lines, etc., which are constructed or installed specifically for the operation or maintenance of the SRD.
ML	mega litre
MNES	Matters of National Environmental Significance
NC Act	<a href="#">Nature Conservation Act 1992</a> (Qld)
NQBP	North Queensland Bulk Ports Corporation
Nuisance	As defined in the <a href="#">Environmental Protection Act 1994</a> (Qld)
OCG	Office of the Coordinator General
OEMP	Operational Environmental Management Plan (this document)
O&M	Operation and Maintenance Contract
PASS	Potential acid sulfate soils
PDA	Port Development Approval
PSP	Primary Settlement Pond
QWQG	Queensland Water Quality Guidelines (DERM, 2009)
RE	Regional ecosystem
SCADA	supervisory control and data acquisition – software
Sensitive receptor	a dwelling; library, childcare centre, kindergarten, school, college, university or other educational institution; a hospital, surgery or other medical institution; a park or garden that is open to the for use other than for sport or organised entertainment; an environmentally sensitive place.
Serious environmental harm	As defined in the <a href="#">Environmental Protection Act 1994</a> (Qld)
SEVT	Semi Evergreen Vine Thicket
SEWPaC	former Commonwealth Department of Sustainability, Environment, Water, Population and Communities (now the Department of Agriculture, Water and the Environment (DAWE))
Site	Land, waters or air within the Abbot Point Coal Terminal 1 property boundary
SMD	Slightly moderately disturbed
SRD	Stormwater Return Dam
SSP	Secondary Sediment Pond
Suitably qualified person	As defined in the <a href="#">Environmental Protection Act 1994</a> (Qld)
TEC	Threatened Ecological Community
TIA	<a href="#">Transport Infrastructure Act 1994</a> (Qld)
TN	total nitrogen
TP	total phosphorus
TSS	total suspended soils
VM Act	<a href="#">Vegetation Management Act 1999</a> (Qld)
Waters	As defined in the <a href="#">Environmental Protection Act 1994</a> (Qld)
WD	Western Drain
WQMP	Water Quality Monitoring Plan ( <a href="#">Appendix C</a> )