Hexham Train Support Facility Depot Relocation Soil and Water Management Plan

12 September 2022

Plan Approval Table

Position	Name	Signature	Date
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Revision History

Rev	Date	Author	Comments
1	12/09/22	Harry Egan	Final

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Glossary

Term	Definitions
ADWF	Average Dry Weather Flow
ANZECC	Australian and New Zealand Environment and Conservation Council
the Approval	State Significant Infrastructure MP07_0171 MOD 1
Aurizon	Aurizon Operations Pty Ltd
CMF	Combined Maintenance Facility
CWR	Coal Washery Reject
DAF	Dissolved aeration floatation
EPL	Environmental Protection Licence
EP&A Act	*Environmental Planning and Assessment Act 1979*
NCC	Newcastle City Council
PAH	Poly Aromatic Hydrocarbon
PASS	Potential acid sulphate soils
PF	Provisioning Facility
PWWF	Peak Wet Weather Flow
SCADA	Supervisory Control and Data Acquisition
Septic System Approval	OS2015/0503
SGMP	Surface and Groundwater Monitoring Plan
SWMP	Soil and Water Management Plan
the Site	Hexham Train Support Facility
SoC	Statement of Commitments
SSI	State Significant Infrastructure
TPH	Total Petroleum Hydrocarbon
TSF	Train Support Facility
UST	Underground storage tank
WWTP	Waste Water Treatment Plant

1.0 Introduction

1.1 Site Description

The Aurizon Operations Pty Ltd (Aurizon) Hexham Train Support Facility (the Site) has a total area of 255ha and is located at Hexham approximately 16km north-west of the Newcastle Central Business District.

The Site shares borders with the Main Northern Railway and Pacific Highway to the east and the New England Highway to the north. To the south and west rural properties and the Hexham Swamp Nature Reserve are adjacent. The Site is located within a predominantly industrial setting, with only a small number of residential dwellings within the local vicinity.

The Site's history as a coal handling facility has resulted in the southern portion of the site containing an abandoned rail loop corridor and coal washery reject (CWR). CWR is retained within vegetated stockpiles however it is also present extensively in sub surface deposits. Remediation completed during the construction of the TSF and Turning Angle has resulted in excavated CWR and Potential Acid Sulphate Soil (PASS) being stockpiled in the southern portion of the site

Brancourts Manufacturing and Processing Pty Ltd are currently licensed to use a portion of the site for a wastewater treatment plant and effluent irrigation area under Environmental Protection Licence (EPL) 816. Effluent is irrigated over the above mentioned CWR stockpiles.

1.2 Operational Activities

The Site provides routine and ad hoc provisioning and maintenance services to outbound locomotives and wagons. The treatment of generated septic and operational waste water is undertaken onsite through the utilisation of a septic treatment plant and dissolved aeration floatation (DAF) plant.

Infrastructure associated with the Site and the above mentioned operational activities are restricted to approximately a 38 hectare portion of the Site and consists of:

- Seven train tracks (10.5 kilometres) parallel to the existing mainline and a shunt track;
- turning angle
- a provisioning building, service vehicle garage and combined maintenance/administrative centre;
- surface water management infrastructure including retention basins;
- bulk fuel storage area; and
- A wastewater treatment plant with on-site effluent irrigation and DAF.

1.3 Construction Activities

The Hunter Valley Coal business is experiencing a sustained reduction in coal haulage volumes. The key regional priority is to consolidate and simplify the footprint and operating complexity of the Aurizon business while continuing to support the transportation of coal throughout the Hunter region. The Depot Relocation (the Project) will achieve this by the following:

- Construction of the following elements:
    - A warehouse for the storage of rail maintenance equipment.
    - A depot for office staff and train crew.

    - Ancillary staff and visitor car park connected to the private roadway (existing main access road).
- Rail wagon storage area located on the western portion of the western portion
- Ancillary infrastructure (hardstand, water management, landscaping, lighting etc)
- Utilities connection.

1.4 Legislative Context

The project was assessed and approved as State Significant Infrastructure (SSI) under Part 5.1 of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

The Site was approved by a delegate of the Minister for Planning and Infrastructure under MP07_0171 (the Approval), dated 10 October 2013. The Hexham TSF Turning Angle (the Turning Angle) Modification MP 07_0171 (SSI-6090) was approved on the 09 October 2019. The Project MP 07_0171 Mod 2 (SSI-6090) was approved in September 2022.

This Soil and Water Management Plan (SWMP) has been developed and implemented as required by the Condition E63 of the Approval.

A matrix of the conditions of approval is included as Appendix A. This matrix identifies where these conditions/commitments have been addressed in the SWMP.

The SWMP has been developed with reference to the Guidelines for the Preparation of Environmental Management Plans (Department of Planning, 2004).

1.5 Purpose and Objectives

The SWMP details the environmental management activities to be implemented at the Site required to ensure compliance with relevant regulatory obligations and approvals is achieved and to manage the implemented stormwater management system.

2.0 Site Hydrological Context

2.1 Site Water Quality Context

Historical contamination concerns are summarised as follows:

- Total Petroleum Hydrocarbon (TPH) C10-C36;
- Poly Aromatic Hydrocarbon (PAH);
- Heavy metals;
- CWR; and
- PASS.

The extensive use of CWR as fill in the southern portion of the Site associated with the former coal handling preparation plant and rail sidings was identified. Characterisation results returned a mix of positive and negative detections at various sampling locations and depths, including natural soils and in the CWR fill material.

TPH impacts were greatest in the fill used for the construction of Woodlands Close, former underground storage tank (UST) and refuelling areas.

Groundwater was found to be acidic to slightly alkaline and predominately brackish, with the exception of samples from the south to north western boundary which were found to be saline, and north to central eastern boundary which were found to be fresh. Widespread contamination of surface water comprising faecal coliforms, E.coli, nutrients and metals was identified both on and immediately off-site.

Surface and groundwater contamination was deemed to be associated with cattle disturbing historically deposited contaminated sediment and mobilisation of CWR stockpile in situ contaminants from effluent irrigation. Irrigation is undertaken by Brancourts Manufacturing and Processing Pty under EPL 816.

A summary of monitoring results from surface and groundwater determined that the majority of chemical analysis results were generally consistent within Australian and New Zealand Environment and Conservation Council (ANZECC) trigger values.

2.2 Site Hydrology

The hydrodynamics within the existing Site have been significantly altered by historical coal stockpiling, infilling of wetlands, construction of tailings ponds and installation of surface drainage. The groundwater environment is highly complex due to a shallow natural groundwater level and Brancourts effluent irrigation which contributes to perched water tables located within coal emplacement areas.

The overall Site is predominantly flat with drainage systems designed to fall at absolute minimum gradients (sometimes flat) due to Site constraints. When rainfall does occur, surface water is generally retained on-site in the lower lying areas with runoff only generated during heavy rain fall events.

When runoff does occur it is noted that due to the relatively flat terrain, restricted pipe culverts and mounding, there can be significant overflows between catchments and ponding over large areas that limits accuracy of hydrologic and hydraulic modelling.

The Site currently, and during construction of the Project, drains to three locations:

- TSF infrastructure area drains via swale drains to Water Quality Control Basins (Basins) 1 – 3;
- the Hunter River via culverts to the north and south of the site below the existing Great Northern railway line; and

- To the west to Hexham Swamp via pipe culverts above Hunter Water Corporation's water main.

Swales constructed for the Site drain the rail formation and other operational areas to one of the three Site retention basins. The basins have been designed to prevent the mixing of surface and groundwater and comprise sediment ponds, floating wetland treatment systems and gross pollutant traps.

The Site and proposed Project stormwater system has been designed to address the following:

- Potential changes to the hydrologic response of catchments contributing to sensitive areas during normal wetting and drying cycle events (i.e. events <1 year ARI return period).
- Management of peak flows from the developed site in larger storm events (up to 10% AEP) to ensure they are as close to pre-developed conditions as possible.

Site catchment, impacts and respective sources are detailed in Table 1 and the Site hydrology illustrated in Figure 1 and Figure 2 below. It should be noted that the construction and operation of the Project will not alter existing catchment arrangements.

Table 1 - Catchment and Potential Impacts

Sub-catchment	Area (Ha)	Monitoring Locations	Impacted Surface Water Discharge Locations	Comment
101	1.54	Basin 3, SW05 (via sub-catchment 6) (MW302R, MW101R (SE)	Category B (south east corner of TSF)	• Southern area of TSF area draining to south; • Rail infrastructure; • TSF stormwater drainage infrastructure;
102	9.55	Basin 2, SW03 (via sub-catchment 3), MW106R, MW301R	*Category C (infiltrate) & Category A (Overland to culvert under Hunter Water Easement that flows to Middle Creek)	• Central area of TSF, draining to north; • Rail infrastructure; • CMF; • Provisioning Facility; • Bulk Fuel Storage; • TSF stormwater drainage infrastructure;
103	8.02	Basin 1, MW109, SW1	Category A (Middle Creek downstream of TSF)	• Northern tip of TSF, draining to north; • Rail infrastructure;
1	31.1	SW01	*Category A (Middle creek downstream of TSF)	• Swamp Oak Forest; • Grazing / agriculture; • TSF and Hexham Relief Roads (HRR) access road.
2	25.8	SW02	Category A (Middle Creek upstream of TSF)	• Swamp Oak Forest; • Grazing / agriculture (upstream).
3	32.09	SW03, MW101R	Category A (Culvert under Hunter Water Easement that flows to Middle Creek)	• Third party irrigation plant; • Effluent irrigation (**third party); • Grazing / agriculture.

Sub-catchment	Area (Ha)	Monitoring Locations	Impacted Surface Water Discharge Locations	Comment
4	28.24	*To west* SW4, MW108R, MW307R, SW6 (via catchment 5)	*Category B (western border and south west corner of Aurizon lands)	• Eastern portion of CWR stockpile; • Construction phase ASS treatment pad (southern portion); • Effluent irrigation (third party); • Grazing / agriculture.
5	22.5	SW4, MW108R, MW307R	Category B (western border of Aurizon lands)	• Western portion of CWR stockpile; • Construction phase ASS treatment pad (southern portion) • Effluent irrigation (third party); • Grazing / agriculture.
6	25.2	SW6, SW7, SW05, MW308R, MW02, MW01R	Category B (southern border of Aurizon lands)	• Southern area of site incorporating old rail loop; • CWR emplacements; • Grazing; • Effluent irrigation pad (Aurizon);
7	280	SW02, SW03, SW11	Category A (Hunter River via Middle Creek)	• Large, flat agricultural catchment to west of site; • Grazing / agriculture; • Effluent irrigation (third party) (south-eastern portion).

2.3 Tidal Exchange

The northern end of the Site traverses an existing highly disturbed and modified estuarine channel (which forms part of Middle Creek), and which provides tidal flows between the Northern Hexham Swamp and the Hunter River. The Middle Creek bridge crossing over this channel has been designed to ensure there is no alteration to the existing channel's hydraulic capacity, to minimise impact on the hydrodynamics of the upstream wetlands.

Apart from the channel crossings, the Site does not include any modifications within the tidal zone or modifications to any channels conveying tidal flows.

The area to the south of the proposed development also exhibits estuarine characteristics. The extent of this depends on the degree of saltwater intrusion which is generally dependant on the conveyance of drains in the adjacent site. No change to infrastructure associated with the Site have been made which would impact on tidal flushing of Coastal Salt Marsh areas.

2.4 Groundwater

Groundwater levels within the Project and greater TSF project boundary are high, variable and responsive to tidal influences and meteorological events. Groundwater gradient can be generally characterised as flat and flowing east towards the Hunter River.

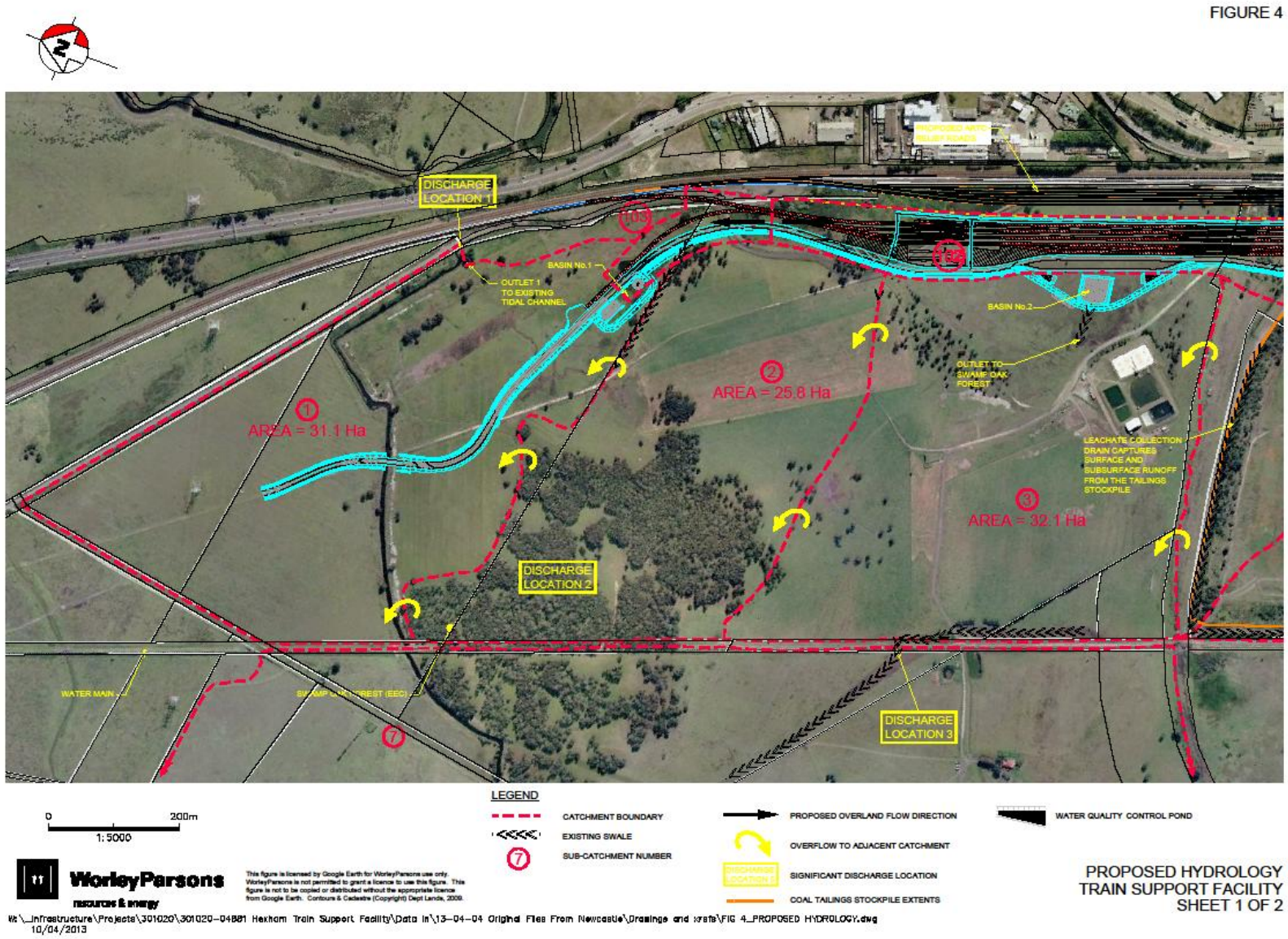

Figure 1 - Site Hydrology (a)

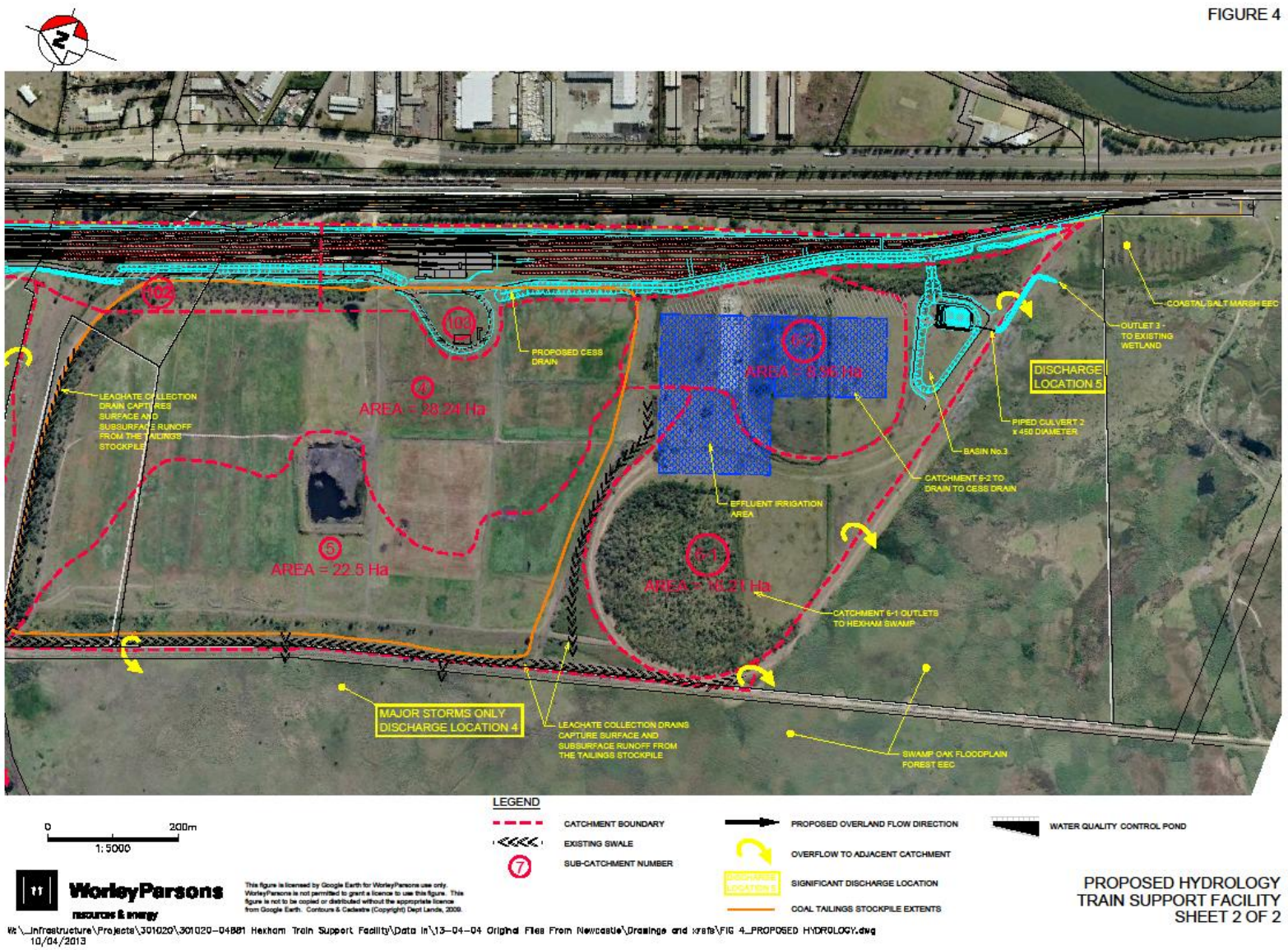

Figure 2 - Site Hydrology (b)

3.0 Project Water Management

3.1 Stormwater Management Strategy

The stormwater management strategy consists of key elements detailed in Table 2 below:

Table 2 - Stormwater Management Strategy

Number	Element	Requirement
1	Prevention	• Implementation of operational procedures which define how to operate the site in an environmentally responsible manner. Procedures are to include disposal of hazardous and potentially hazardous material and contingencies in the case of a potentially damaging environmental event (such as hydrocarbon spillage). • Management to be in accordance with all relevant Australian Standards and Guidelines including *AS1940-Storage and Handling of Flammable and Combustible Liquids* and the OEH's Environmental Protection Manual technical Bulletin Bunding and Spill Management. • Implementation of sediment and erosion control measures consistent with the Managing Urban Stormwater: Soils and Construction V1.
2	Isolation	• Operational activities identified as potentially generating significant contamination are isolated from the greater stormwater system where practicable. The construction site is within the existing TSF footprint and bound by existing stormwater drainage structures. • Stormwater drainage and basins are lined with impermeable capping where built within CWR or a risk of interaction with groundwater exists as required to prevent interaction between surface and groundwater flows as discussed in the CCMP • All water generated in the PF and CMF is to be disposed of as trade waste or treated on-site and re-used.
3	Treatment	• Runoff is to be treated or controlled by a series of stormwater management devices inclusive of retention Basins 1-3, vegetated drains, gross pollutant traps and engineered systems prior to discharge into the environment. • Water may be discharged from Basin 1 -3 as long as they meet performance criteria detailed in Section 5. • Treatment of contaminated surface water is detailed in the CCMP.
4	Contingencies	There is a potential for accidental spill/leak to occur at any point in the rail yard. Appropriate measures are to be implemented to isolate an area for clean-up purposes.
5	Monitoring	The SWMP has been devised by Aurizon to establish existing baseline parameters and observe the surface and groundwater quality during operational activities.

3.2 Groundwater Management

The groundwater management strategy consists of key elements detailed in Table 3 below:

Table 3 - Groundwater Management Strategy

Number	Element	Requirement
1	Prevention	Excavation depth will be restricted to approved as built design. Studies undertaken as part of the Environmental Assessment determined that all proposed excavations would be above identified groundwater levels.
2	Isolation	Stormwater drainage and basins are lined with impermeable capping where built within CWR or a risk of interaction with groundwater exists as required to prevent interaction between surface and groundwater flows.
3	Treatment	All excavated soil will be treated as PASS with associated groundwater/seepage to be characterised and neutralised prior to removal from site by a licenced waste contractor. Treatment of groundwater is detailed in the CCMP.
4	Contingencies	As detailed in the Geotechnical Investigation Operational Depot and Long-Term Wagon Storage, Hexham TSF (GHD, 18 October 2021), test pitting identified groundwater levels ranging from 1.2 meters to 3.3 meters below ground level. Overlay of the detailed design proposed excavation depths indicate that formation fill foundations will lie above the identified groundwater table indicating that no interaction with groundwater is expected as part of the Project assuming absence of significant meteorological events. Where draw down of groundwater or unplanned connection with surface water is identified a review of construction activities will be undertaken to address the issue. No draw down or pump out of groundwater is expected to occur due to all construction works being above the identified groundwater level.
5	Monitoring	The SWMP has been devised by Aurizon to establish existing baseline parameters and observe the surface and groundwater quality during operational activities.

3.3 SEPP14 Wetlands and EEC Communities

Controls detailed in Table 4 have been incorporated to minimise adverse impacts on the existing sensitive surrounding environments. The controls are based on principles of wetland hydrology outlined in the Lower Central Coast Regional Environmental Management Strategy (LHCCREMS, 2003).

Table 4 - SEPP14 Wetland and ECC Communities Implemented Controls

Number	Activity	Requirement/Comment
1	Minimising changes in flow regimes to the Swamp Oak Forest for smaller low flow (high frequency) storm events.	It is considered that changes in larger storm events (i.e. greater than 1 or 2 year frequency) will not adversely impact these areas, provided any potential erosion issues are addressed.

Number	Activity	Requirement/Comment
2	Minimising increases in fresh water discharges to and preventing impediments to continued tidal flushing of the Coastal Saltmarsh south of the site.	Prevent potential alterations to the flora composition of this community.
3	Construction of Site access roads.	Minimise impoundment of water.
4	Minimise continuous wetting from frequent discharges from the TSF site associated with low recurrence interval storm events.	This may result from changes in wetting/drying patterns which influences both physical characteristics (e.g. gas diffusion) and chemical (e.g. redox) characteristics of the soil substratum.

3.4 Project Water Balance

The TSF site is connected to town water supply and is supplemented by harvested stormwater runoff. All project water will be sourced from a standpipe connected to the TSF town water supply for the duration of the project.

Project water usage will be restricted to construction related activities, dust management and vehicle wash down as required and with consideration to meteorological conditions. All effluent will be treated by the existing onsite waste water treatment plant.

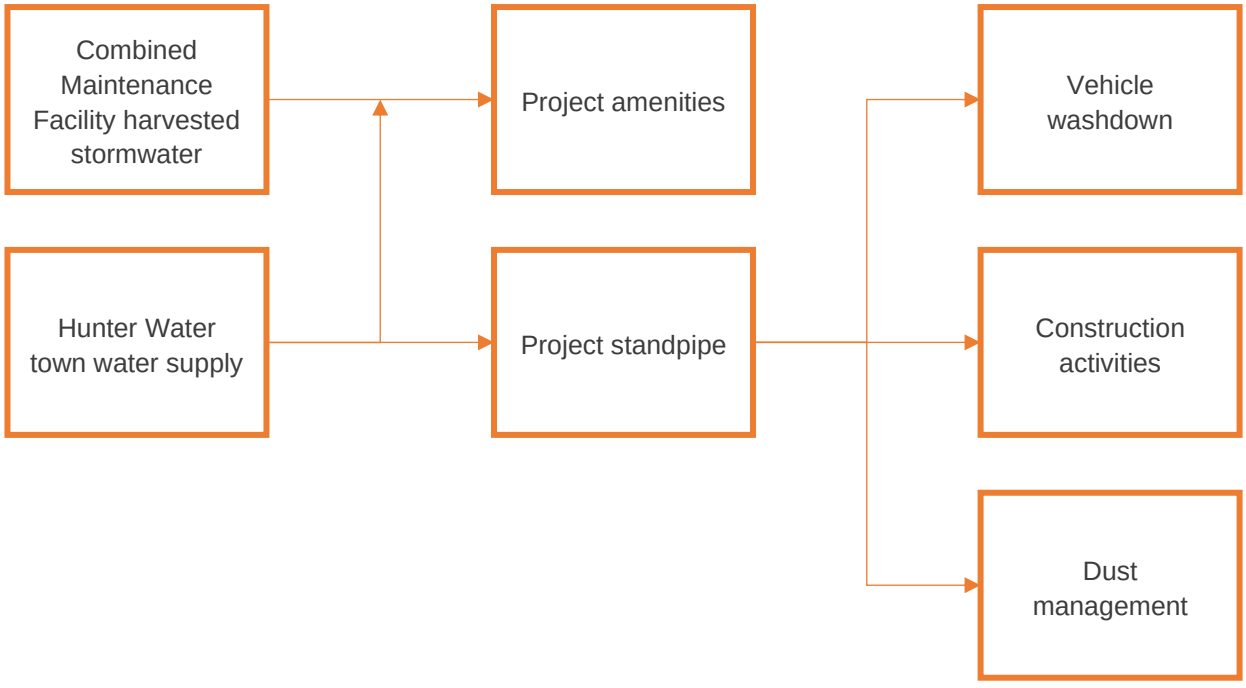

Figure 3 - Site Water Balance

3.5 Water Treatment Systems

Three separate wastewater systems operate on-site. These systems are categorised as either 'non-sanitary' or 'sanitary' as per Table 5:

Table 5 - Trade Waste Systems

Type	Catchment	Trade Waste System
Non-sanitary	Bulk Fuel and Provisioning Shed	2 x 10 kL trade waste tanks
	Combined Maintenance Facility and Locomotive Wash Bay	DAF plant
Sanitary	Administration Building (toilets, showers, lunch rooms etc.)	Waste Water Treatment Plant (WWTP)

3.5.1 Bulk Fuel and Provisioning Shed

All covered and bunded areas within the provisioning facility and bulk fuel unloading areas drain to two 10kL (20kL capacity total) trade-waste tanks located within a bunded area on a concrete hard stand. Drainage to the tanks is via dedicated trade waste collection pits located adjacent to the bulk fuel facility.

The tanks are equipped with external gauges to allow for regular monitoring and are inspected on a weekly basis. The tank levels should be monitored at an increased frequency during extended rainfall events as there is potential for minor incursion of rainwater from the covered bulk-fuel supply envelope bund.

3.5.2 Combined Maintenance Facility and Locomotive Wash Bay

The CMF floor and wash bay areas are bunded and covered. Waste water from the CMF drop pit and wash down facility reports to a central trade waste collection pit located within the wash down bay. The trade waste collection pit is subsequently pumped to a 10kL dirty water collection tank adjacent to the wash bay prior to treatment within the waste water recycling system.

The waste water recycling system is comprised of gross pollutant traps, to remove larger particulate fragments, and a DAF plant. Suitably recycled water is discharged to a 10kL capacity recycled water tank with the remainder discharged to a 10kL capacity sludge tank for off-site disposal by a regulated waste contractor.

Recycled water stored in the 10kL tank is used for rolling stock wash down purposes within the designated wash bay. Water from the wash bay area is to be continually recycled with the dirty water tank overflow and directed to the wash bay area for cyclical processing.

Recycled water is supplemented by rainwater collected from the CMF structure's roof via a first flush diverter and 2 x 10kL capacity rainwater storage tanks.

As a contingency, the treated water storage tank overflows to the on-site stormwater treatment system. It is anticipated that discharge from this system would occur infrequently as the system is designed in accordance with intended wash bay utilisation rates.

3.5.3 WWTP Septic System

The WWTP is operated in compliance with the approval conditions of the Newcastle City Council (NCC) Application No. OS2015/0503 under Section 68 of the *Local Government Act 1993*. The WWTP has been designed and installed in accordance with the:

- *Environment and Health Protection Guidelines;* the *NSW Health On-site Single Domestic Wastewater Management*; and
- AS/NZS 1547:2012, On-site Domestic Wastewater Management.

Wastewater from the administration building (toilets, showers, lunch rooms etc.) will be treated using a package WWTP (aerated wastewater treatment system). Treated effluent is disposed of via a dedicated

effluent irrigation area in the southern portion of the Site. The WWTP processes is detailed in Table 6 and Figure 4 below.

Table 6 – WWTP Septic System

Stage	Component	Process
Primary Treatment	• Fine screening, • Sand and grit removal	Removal of fine solids – screen size <= 3mm and sand/grit.
Biological treatment	• MBBR-BNR system;	• Stage 1 – anoxic stage for pre-denitrification. • Stage 2 – aerobic stage for Biochemical Oxygen Demand (BOD) removal; and • Stage 3 – aerobic stage for final BOD removal and nitrification. Internal circulation from the 3rd stage to the 1st stage ensures sufficient de-nitrification. A perforated screen is installed at the outlet of each stage in order to maintain the carriers inside the reactor, while the wastewater flows downstream.
Flocculation	• Flocculation tank	Addition of flocculants to achieve required effluent quality for the secondary clarifier.
Secondary Clarifier	• Secondary clarifier,	Chemical dosing to enhance solids separation and ensure effluent Total Phosphorous remains <5mg/l.
Tertiary Treatment	• Media filtration; • UV disinfection – disinfection of the filtered water; • Water quality monitoring.	Utilised to inactivate potential pathogens present in the water and provides an additional disinfection barrier.
Irrigation	Irrigation area and associated infrastructure	Irrigation.

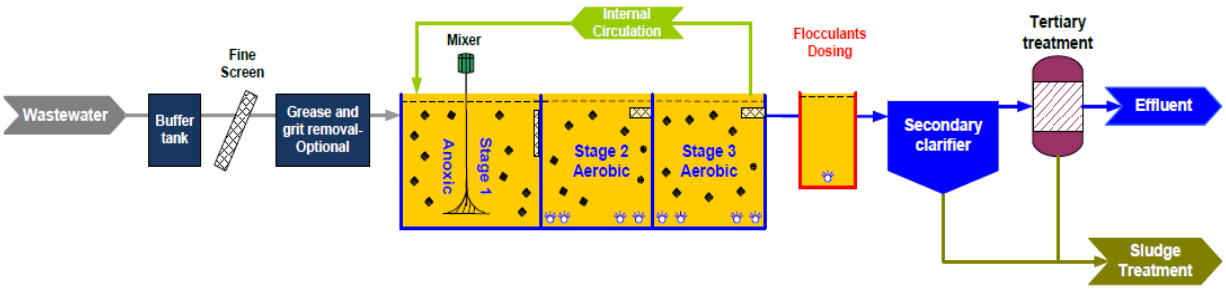

Figure 4 WWTP schematic (Aquise 2015)

3.5.4 WWTP Septic Irrigation Area

The effluent irrigation area has been designed in accordance with the findings of the Effluent Disposal Assessment: Proposed Train Support Facility, Woodlands Close, Hexham (Douglas Partners, 2012)

(Effluent Disposal Assessment) undertaken in accordance with AS/NZS 1547:2012, On-site Domestic Wastewater Management.

The Effluent Disposal Assessment (Douglas Partners, 2012) considers the effluent quality criteria detailed in Table 10 and hydraulic capacity of the land to accept effluent and nutrients. The calculated average dry weather flow (ADWF) and peak wet weather flow (PWWF) rates reporting to the WWTP have been detailed in Table 7 below.

Table 7 - Estimated Sewage Flow Rate

Stage	Rate ADWF (Litres/Day)	Rate PWWF (Litres/Day)
Ultimate ADWF	13,210	129,600

The required disposal area for the ADWF rate of 13,210L/day is 39,300m^2. In order to account for potential future expansion, the buffer storage pond has been constructed and a secondary irrigation area of 20,000m^2 allowed for.

The following site improvement recommendations outlined in the Effluent Disposal Assessment (Douglas Partners, 2012) have been incorporated into the design of the irrigation area to mitigate impacts from irrigation activities.

- Addition of lime to acidic soils to maintain plant growth;
- addition of gypsum to improve the soil structure and reduce dispersion/erosion;
- earthworks to prevent surface water entering or runoff exiting the irrigation area;
- placement of fill to raise site levels to at least 1m above the permanent groundwater table and /or at least 0.6m between the highest seasonal water table level;
- placement of clay loam to form irrigation surface area to improve soil properties and minimise potential for groundwater pollution from infiltration; and
- Installation of catch drains / bunds upslope and downslope of the disposal area to prevent rainfall run-on and run-off.

3.5.5 WWTP Septic Buffer Storage Pond

The treated effluent buffer storage pond has been installed to allow for storage of treated effluent during wet weather periods where effluent is required to be irrigated at a lower rate, or when effluent cannot be irrigated.

The effluent storage pond has a capacity of approximately 900m^3 and is sized to allow for the equivalent of 60 days of effluent discharged at the ADWF for the TSF functioning at full operational capacity.

The volume of the treated water in the buffer storage pond is to be monitored regularly. In the event of an abnormal circumstance (i.e. prolonged wet weather) resulting in the buffer storage pond reaching or nearing full capacity, the treated effluent is to be pumped out and disposed of off-site by a suitably licensed contractor at a suitably licensed facility.

3.5.6 Basin and Floating Wetlands

The permitter swale drains direct surface water runoff from the rail formation and other operational areas to the Site Retention Basins 1 -3. The Basins have been designed to prevent the mixing of surface and groundwater and comprise sediment ponds, floating wetland treatment systems and gross pollutant traps.

Floating wetlands located within Basins 1 – 3 act to improve the quality of retained stormwater prior to passive discharge offsite. The floating wetland dimensions are detailed in Table 8 below.

As the Site does not hold an EPL discharges offsite must comply with *Section 120 of the Protection of the Environment and Operations Act 1997*.

Table 8- Basin and Floating Wetland Specification

Basin	Pond Permanent Water Volume (m^3)	Surface Area	Depth (m)	Floating Wetland Area (m^2)
1	520	2,190	0.6	150
2	390	6,800	0.6	1,400
3	240	6,560	0.6	1,000

4.0 Erosion and Sediment Control

4.1 Context

Condition E63(d) of the Approval requires the development of measures to control soil erosion onsite and to monitor discharge of sediment to surrounding water ways and lands.

Stormwater controls included in the detailed design are to be constructed and integrated into the existing TSF stormwater system prior to and during civil earthworks. Civil earthworks will be constructed in a manner to minimise the extent of disturbance at any one time.

A description of the construction methodology is included in the CEMP.

4.2 Erosion and Sediment Control Management Measures

The following management measures as detailed in Table 9 will be implemented to ensure erosion and sediment control objectives are met.

Table 9 - Erosion and Sediment Control Management Measures

Aspect	Requirement
Erosion and Sediment Control	• Disturbance of ground will be approved by the 14-FRM-006-WHS Permit to Work or equivalent which will detail required erosion and sediment controls. • All stockpiles will have appropriate erosion and sediment controls installed (e.g. bunding, sediment fencing, basins). • All erosion and sediment control structures will comply with the Blue Book. • All disturbance will be within the existing site stormwater management system. • All water way and drainage inspection undertaken as per the Stormwater Maintenance Checklist. • Monitoring of surface water runoff is undertaken as per the Surface and Groundwater Management Plan. • Runoff from disturbed areas must either be retained in designated on Site storage areas or report to the existing stormwater management system. • All disturbance shall be rehabilitated upon the completion of works consistent with the Construction Fauna and Flora Management Plan.

Impacts to streams resulting in bed and bank erosions are not proposed to occur due to no construction works occurring within the vicinity of existing waterways and alteration to flow events expected.

Monitoring of surface and groundwater quality will be undertaken as detailed in the Surface and Groundwater Monitoring Program.

4.3 Fill and Spoil Management

All fill material will be sourced from licenced suppliers and stockpiled onsite in designated locations with approved erosion and sediment controls in place.

All excavated spoil has been identified as Possible Acid Sulphate Soil. As such all excavated spoil will be neutralised onsite in accordance with the ASSMP/SMP with neutralised spoil stockpiled above the 1% AEP flood height.

All neutralised stockpiles will be revegetated in accordance with the Construction Fauna and Flora Management Plan (FFMP).

5.0 Monitoring

5.1 Monitoring Program

Surface and groundwater monitoring locations and monitoring frequencies are detailed in Table 10 below with a site layout showing monitoring locations included as Figure 4.

Table 10 - Monitoring Network and Program

Site	Type	Easting	Northing	Monitoring Frequency	Rainfall Event
MW01R	Groundwater	377080	6365705	Quarterly	No
MW301R	Groundwater	376564	6367446	Quarterly	No
MW302R	Groundwater	376918	6366499	Quarterly	No
MW307R	Groundwater	376287	6366363	Quarterly	No
MW308R	Groundwater	376405	6365896	Quarterly	No
MW109	Groundwater	376273	6368095	Quarterly	No
MW106R	Groundwater	376758	6366928	Quarterly	No
MW02	Groundwater	376711	6365816	Quarterly	No
101R	Groundwater	377110	6365956	Quarterly	No
MW108R	Groundwater	376083	6366960	Quarterly	No
MW101R	Groundwater	376282	6367404	Quarterly	No
SW1	Surface Water	376210	6368225	Quarterly	Yes
SW2	Surface Water	375612	6368068	Quarterly	Yes
SW3	Surface Water	375884	6367384	Quarterly	Yes
SW4	Surface Water	376197	6366571	Quarterly	Yes
SW4A	Surface Water	376222	6366553	Quarterly	Yes
SW05	Surface Water	377144	6365655	Quarterly	Yes
SW6	Surface Water	376411	6365873	Quarterly	Yes
SW07	Surface Water	376680	6365799	Quarterly	Yes
SW8	Surface Water	377474	6365420	Quarterly	Yes
SW9	Surface Water	377496	6365387	Quarterly	Yes
SW10	Surface Water	376776	6367600	Quarterly	Yes

Site	Type	Easting	Northing	Monitoring Frequency	Rainfall Event
SW11	Surface Water	375433	6367878	Quarterly	Yes
Basin 1	Surface Water	376205	6367977	Monthly	Yes
Basin 2	Surface Water	376481	6367284	Monthly	Yes
Basin 3	Surface Water	377038	6365758	Monthly	Yes

Routine surface and groundwater monitoring has been undertaken since 2014 on a quarterly basis with sampling of Basins 1 - 3 undertaken monthly. Monitoring has been for analytes listed in Table 11.

5.2 Rainfall Event Sampling

Rainfall sampling will be undertaken following rainfall totalling greater than 75mm over a duration of 5 consecutive days or less. Rainfall is measured from the from the Manly Hydraulics Lab, Hexham Bridge, station number 210448 (http://www.mhl.nsw.gov.au/Site-210448).

Sampled sites will consist of all surface water and site Basins for the analytical schedule detailed in Table 11.

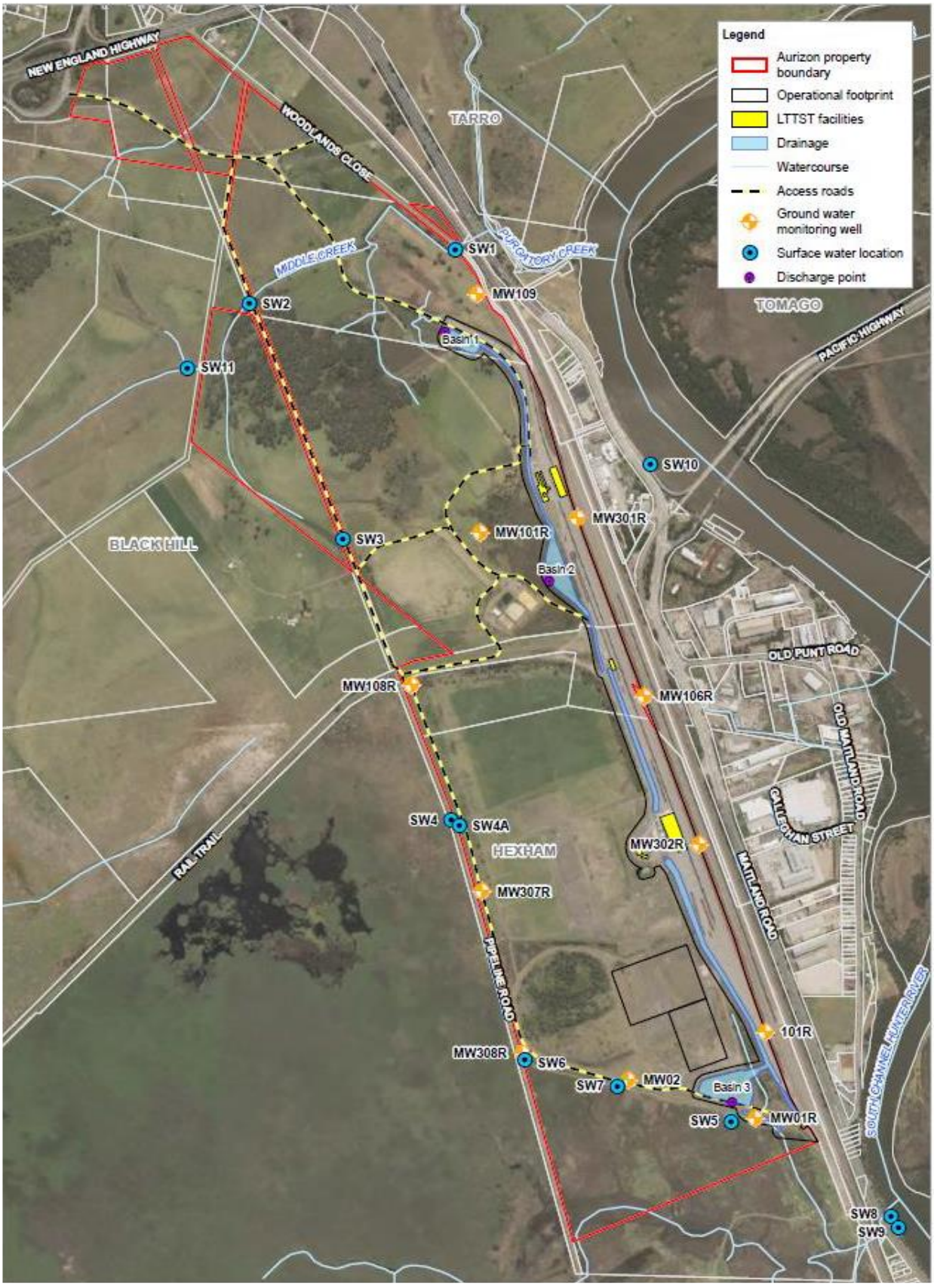

Figure 5 Surface and Groundwater Monitoring Locations

5.3 Performance Criteria

Performance criteria were developed for Aurizon by Douglas Partners Pty. Ltd. in February 2014[1] utilising information on water quality originating from the site since 1999. Criteria was based on the *Australian and New Zealand Guidelines for Fresh Water Quality 95% species protection levels (ANZECC, 2000)*. The ANZECC 95% investigation levels apply to typical slightly to moderately disturbed fresh waters systems. The DP report applied statistical analysis to the historic and baseline surface and groundwater data to determine appropriate background chemistry.

Performance criteria are categorised as A, B or C, based on the different categories of receiving environments as listed below:

- Performance Criteria A – Hunter River (SW01, SW02 and SW03);
- Performance Criteria B – Hexham Swamp (SW04, SW05, SW06, SW07); and
- Performance Criteria C – (Groundwater).

As groundwater levels are generally flat and highly variable in response to tidal and meteorological conditions performance criteria for groundwater levels have not been identified by Aurizon or approved by the DPI&E.

As detailed in the Geotechnical Investigation Operational Depot and Long-Term Wagon Storage, Hexham TSF (GHD, 18 October 2021), test pitting identified groundwater levels ranging from 1.2 meters to 3.3 meters below ground level.

Overlay of the detailed design proposed excavation depths indicate that formation fill foundations will lie at closest approximately 0.8m above the identified groundwater table indicating that no interaction with groundwater is expected as part of the Project assuming absence of significant meteorological events.

The developed/referenced criteria and monitoring analytical schedule is shown in Table 11 and takes into account the sites historical utilisation and will be used to assess the quality of surface and groundwater results.

Table 11 – Surface and Groundwater Performance Criteria and Analytical Schedule

Parameter	Units	Performance Criteria A	Performance Criteria B	Performance Criteria C	ANZECC 2000
Depth	mAHD	N/A	N/A	-	N/A
Conductivity	uS/cm	40000	6000	20500	20500
pH	pH Units	6.5 - 8.5	5.5 - 8.5	6.5 - 8.5	6.5 - 8.5
Aluminium (Al)	mg/L	2.5	2.5	0.055	0.055
Arsenic (As)	mg/L	0.013	0.013	0.013	0.013
Cadmium (Cd)	mg/L	0.0002	0.0002	0.0002	0.0002
Chromium (Cr)	mg/L	0.004	0.002	0.002	0.001

[1]Douglas Partners, 2014, *Report on discharge Criteria Assessment: Proposed Long Term Train Support Facility, Woodlands Close, Hexham.* Report for Aurizon Operations Limited.

Parameter	Units	Performance Criteria A	Performance Criteria B	Performance Criteria C	ANZECC 2000
Copper (Cu)	mg/L	0.0045	0.0026	0.0071	0.0014
Iron (Fe)	mg/L	35	1.3	350	0.3
Lead (Pb)	mg/L	0.0044	0.0034	0.0034	0.0034
Mercury (Hg)	mg/L	0.0006	0.0006	0.0006	0.0006
Nickel (Ni)	mg/L	0.017	0.011	0.18	0.011
Zinc (Zn)	mg/L	0.054	0.019	0.65	0.008
Ammonia	mg/L	0.9	0.9	25	0.9
Turbidity	NTU	60	50	1200	50
Total Susp. Solids	mg/L	50	40	650	N/A
TKN	mg/L	8	4	12	N/A
Total Nitrogen	mg/L	10	4	12	0.5
Total Phosphorus	mg/L	2.75	1.9	14.5	0.05
Faecal Coliforms	cfu/100mL	1500	500	2000	150
BOD	mg/L	40	15	30	15
TRH C6-C36	mg/L	0.15	0.15	0.3	N/A
Naphthalene	mg/L	0.05	0.05	0.05	0.05
Phenanthrene	mg/L	0.0006	0.0006	0.0015	0.0006
Anthracene	mg/L	0.0006	0.0006	0.00095	0.00001
Fluoranthene	mg/L	0.001	0.001	0.0015	0.001
Benzo(a) pyrene	mg/L	0.0006	0.0001	0.0007	0.0001
Total PAHs	mg/L	0.01	0.0015	0.02	N/A
Benzene	mg/L	0.95	0.95	0.95	0.95
Ethyl Benzene	mg/L	0.08	0.08	0.08	0.08
Toluene	mg/L	0.18	0.18	0.18	0.18
Xylenes (total)	mg/L	0.625	0.625	0.625	0.625

Note: Groundwater metals will be dissolved and surface water total respectively.

Water quality criteria for the WWTP and irrigation area have been taken from Environment and Health Protection Guidelines – Onsite Sewerage Management for Single Households (EPA, Jan 1998) and Use of Effluent by Irrigation (DEC, 2004) as detailed in Table 12 below.

Performance criteria for pollutants not listed in Table 12 will be consistent with ANZECC (2000).

Table 12 - WWTP Performance Criteria

Parameter	Unit	Effluent Quality Standard (post treatment)	Selected WWTP parameters (post treatment)
Total Nitrogen	mg/L	<=25	<=15
Total Phosphorous	mg/L	<=5	<=5
Total Suspended Solids	mg/L	<=20	<=20
Faecal Coliforms	CFU	<100/100mL	<100/100mL
pH	pH	7 - 8.5	6-8
Biological Oxygen Demand	mg/L	<=20	<=20
Total Dissolved Solids	mg/L	<600	NA*
Ammonia*	mg/L	<=2	<=2
Turbidity*	NTU	<=2	<=2

*NCC requirements

5.4 Monitoring Methodology

The methodology required to be implemented when completing all surface and groundwater monitoring is detailed in Table 13 below.

Table 13 - Monitoring Methodology

Item	Surface Water	Groundwater
Relevant Technical Guidelines	*ASTM D6771–02, Standard practice for low-flow purging and sampling for wells and devices used for groundwater quality investigations, ASTM International.* *Australian Standard 5667:1998 Water Quality – Sampling, Part 1: Guidance on the design of sampling programs, sampling techniques and the preservation and handling of samples (AS 5667.1:1998).* *Australian Standard 5667:1998 Water Quality – Sampling, Part 11: Guidance on the Sampling of Groundwater (AS 566.11:1998).*	
Field Sampling	Surface water sampling is conducted using a reach pole with a dedicated sampling bottle attached. The bottle is lowered into the water body to allow a sample to be collected from below the surface. The sample is poured into the sample bottle and lid closed being careful to not	Monitoring wells are gauged using an oil/water interface probe to measure standing water levels (SWL) and assess for the potential presence of LNAPL. Groundwater sampling is conducted using low flow techniques (peristaltic pump).

Item	Surface Water	Groundwater
	overfill causing loss of preservatives. Air bubbles are to be minimised in the sample bottle.	The sample is poured into the sample bottle and lid closed being careful to not overfill causing loss of preservatives. Air bubbles are to be minimised in the sample bottle.
Field Analysis	Field measurements are taken using a calibrated water quality meter with measurements of temperature, pH, electrical conductivity (EC), turbidity, dissolved oxygen (DO) and oxidation-reduction potential (REDOX) recorded.	
Decontamination	Prior to and following the collection of each sample, all non-disposable sampling equipment will undergo decontamination including: • Washing of equipment with phosphate-free detergent (Decon Neutracon); and • Rinsing of equipment with fresh water.	
Sample Handling and Transport	Following collection, water samples are immediately placed on ice and stored in a cool, dark environment (esky) prior to being forwarded to the analytical laboratory within the specified holding times along with a COC form.	

5.5 Quality Assurance

The methodology required to be implemented when completing all surface and groundwater monitoring is detailed in Table 14 below.

Table 14 - Quality Assurance

Item	Description	Requirement
Laboratory Analysis	All surface and groundwater samples are submitted to laboratories accredited by the National Association of Testing Authorities (NATA).	
Field Duplicates	Field duplicates are duplicate samples that are sent as independent samples to the same laboratory for analysis to assess the precision of the analytical results. Field duplicates should generally be collected from a well-mixed sample of soil, water or air. Water duplicates should be taken from the sample container simultaneously.	1 in 20 samples or 1 per day whichever is greater.
Field Splits	Field splits are duplicate samples that are sent to different laboratories for analysis to assess the precision of the results.	1 in 20 samples or 1 per day whichever is greater.

Item	Description	Requirement
	Field splits should be collected using the same procedures as for field duplicates.	
Equipment Blanks	Equipment blanks monitor possible contamination that may be introduced by inadequate equipment decontamination. After equipment has been decontaminated deionised water should be run through or over that section of the equipment that is used to collect the samples. The deionised water should be collected, sealed and labelled as a sample.	Equipment blanks can be placed on hold at the laboratory and only analysed should the primary data set indicate potential for cross contamination.
Trip Blanks	Trip blanks monitor possible contamination introduced during field and laboratory work. Before commencement of work each day that sampling is undertaken, in a clean location the trip blank sample container is filled with deionised water, sealed and labelled. It is then taken into the field for the duration of the work that day and is sent alongside all the other samples for analysis.	Trip blanks are usually placed on hold at the laboratory and only analysed should the primary data set indicate potential for cross contamination.

Real time monitoring of the operational status of the WWTP and DAF plant is undertaken through the Site Supervisory Control and Data Acquisition (SCADA) system.

Monitoring of impacts on surface and groundwater receptors at the Site from waste water treatment activities, including irrigation, is detailed in the SGMP.

Monitoring of the waste water treatment systems will be undertaken as per the relevant system Operation and Maintenance Manuals. This monitoring has been summarised in Table 15 below.

Table 15 - Waste Water Treatment System Monitoring

Infrastructure	Frequency	Sample Offtake Point
DAF Plant	Monthly	Offtake point
WWTP	Monthly	Post treatment offtake point
Buffer Storage Pond	Monthly	Surface water sample

6.0 Compliance and Reporting

6.1 Reporting Requirements

Reporting requirements are detailed in Table 16 below.

Table 16 - Reporting Requirements

Type	Requirements	Approval Authority	Frequency
Event	• In response to environmental incident	Aurizon	As required
Post Completion Report	• Completed monitoring and QA; • Statistical comparison of monitoring results to site specific criteria and historical results; • identification of exceedances;	Aurizon	Quarterly
Annual Comprehensive Report	• photograph of monitoring locations for comparison with previous years; and • Graphing of monitoring results.	DP&E	Annual (calendar year)

The Post Completion Report will be submitted to the DPE to ensure non-compliances are identified and corrective actions implemented as required.

As per condition C19(j) of the approval results of completed monitoring will be reported to the DP&E and NCC through completion and submission of an annual report.

As required by Condition 7 of OS2015/0503 (Septic System Approval) a quarterly report summarising the completed maintenance activities and monitoring results will be submitted to NCC. Reported monitoring results will identify compliance against prescribed performance criteria.

6.2 Inspections and Maintenance

Routine inspections of the stormwater and waste water treatment systems are to be carried out to assess the need for maintenance and are primarily concerned with checking the functionality of the storm water drainage and treatment facilities. The inspection and maintenance regimes are detailed in Table 17.

Inspections will be completed by the Facilities Coordinator with the exception of the CMF wash bay which will be inspected by the Regional Maintenance Leader or delegate.

Table 17 - Inspections

Infrastructure	Component	Inspection Frequency	Possible Maintenance
Stormwater pits and pipes	• Stormwater inlets • GPT litter nets	Quarterly Rainfall event >75mm/5 days	Removal of litter and debris as required Replacement of oil socks as required.
Stormwater pits and pipes	• CCTV inspection of pipes	Five yearly	TBC from inspection
Permitter Drains and Culverts (including Purgatory Creek)	• Perimeter drains • Pipe outlets	Quarterly	Removal of sediment as required Annual weed management via slashing and or spraying
Permitter Drains and Culverts (including Purgatory Creek)	• Pipe outlets • Head walls, culverts and weir integrity	Annual	Maintenance of headwalls, outlets and weirs
Basins 1 - 3	• Floating wetland condition	Monthly	Increase of water level
Basins 1 - 3	• Outlet and discharges point • Basin water level	Monthly Rainfall event >75mm/5 days	Removal of litter and debris as required
Basins 1 - 3	• Outlet and discharges point structural integrity • Sediment level • Floating wetlands	Quarterly	Structural repair or outlet and identified erosion as required. Desilting of sediment ponds when settlement >500 mm. Tether and plant replacement.
Basins 1 - 3	• Bund integrity	Annual	Identification of bund failure and repair as required. Consult geotechnical engineer.
Temporary erosion and sediment controls	• Sediment fences • Coir logs/hay bails • Temporary basins	Weekly Prior to forecast rainfall events where required Rainfall event >75mm/5 days	Rectification of faults and desilting of basins.
CMF Wash Bay	• Wash bay pumps, sumps and drainage systems.	Weekly	Visual inspection targeting blockages.

Infrastructure	Component	Inspection Frequency	Possible Maintenance
Trade Waste System (Provisioning Shed and CMF)	• Sumps, pumps and trade waste tanks	Weekly	Maintenance as required.
WWTP	• Sludge tank. • Septic buffer storage	Rainfall event Weekly	Sludge removal from tank as required. Pump out of buffer storage if required.
WWTP	• Maintenance of WWTP and sample collection	Monthly	As per plant Operation and Maintenance Manual.
WWTP	• Irrigation infrastructure (pipe work, isolation valves and drip lines).	Quarterly	Maintenance as required.

6.3 Incident Response

Management of major incidents inclusive of large-scale fuel or chemical spills will be undertaken in accordance with the Site Emergency Response Procedure and Section 7 of the CEMP.

6.4 Corrective Actions

As per Section 5.0 of the CEMP:

- Identified non-conformances with the SWMP, legislative or other requirement will be managed in accordance with *BSEMS-STD25 Operational Non-Conformance & Incident Reporting*; and
- corrective and preventative actions arising from non-conformances will be managed in accordance with *BSEMS-STD05 Effectiveness of Corrective & Preventative Actions*.

Non-conformances will be identified by the completion of routine inspections of the Site undertaken as per Section 6.2. Exceedances of prescribed monitoring criteria will be identified during review of monitoring data as per Section 6.1.

In the event that chronic exceedances of the listed performance criteria are recorded an investigation into the cause, potential impacts and feasible mitigation options will be triggered. The investigation will be undertaken by Aurizon in consultation with suitably qualified consultant and the Environment Representative.

6.5 Plan Revision

The Senior Advisor Environment will review this SWMP and its implementation following a change in construction activities, incident or as required by the findings of an audit. The purpose of the review is to ensure that the SWMP and operating system is meeting the facility's statutory requirements.

The Senior Adviser Environment or Environment Representative, if required to be engaged, has the authority to approve/ reject minor amendments to the SWMP. Minor amendments are changes that do not have a detrimental effect on the environment or increase the risk profile.

This SWMP incorporate a surface and groundwater monitoring program as required by Condition 19 of the Approval. The program, as detailed in Section 5.0, has formerly been approved by the DPI&E and has been in place for monitoring of operational activities since 2014.

Changes to the frequency, methodology and extent of the existing program is only permitted to occur in consultation with regulatory authorities where a reduction in monitoring is proposed.

APPENDICIES

APPENDIX A – Minister Conditions of Approval MP07_0171Mod 2 and Statement of Commitments

Relevant Minister Conditions of Approval

MCoA	Description	Section
C9	Prior to the commencement of construction, the proponent shall, in consultation with the NoW and OEH, prepare a Stormwater Management Plan and submit the plan for the approval for the Director-General at least one month prior to commencement of construction of the SSI. The Plan shall include but not necessarily be limited to: A. Final details of operational stormwater management measures to be implemented for the SSI based on detailed design, including identification of offsite discharge locations; B. If required, identification of the water quality standards to which wastewater from the wastewater treatment plant would be treated prior to its irrigation. The plan shall demonstrate that the water quality criteria to which the waste water would be treated to is suitable for irrigation purposes based on the land capability of the irrigation site (including nutrient loads, pH and salinity), considering existing baseline conditions and cumulative inputs from other irrigation sources to the site; C. Identification of the water quality standards to which stormwater from the three stormwater detention basins would be treated to prior to offsite discharge with consideration of the receiving environment and relevant water quality standards such as, *Managing Urban Stormwater: Environmental Targets* (DECC & CMA, October 2007); and D. Monitoring, review and maintenance procedures to assess and maintain the operational stormwater integrity and performance of the SSI consistent with the requirements of condition C19. Nothing in this condition precludes the proponent from updating the Stormwater Management Plan presented in Appendix E (Stormwater Management Plan) or the document referred to in condition C19 to meet the requirements of this condition.	Section 2 – Site Hydrological Context Section 3 – Waste Water Treatment Standards Section 4 – Monitoring Section 5.2 - Inspections and Maintenance Surface and Groundwater Monitoring Program
C19	A Surface Water and Groundwater Monitoring Program shall be prepared and implemented to monitor impacts on surface water and groundwater quality and hydrology. The Program shall be developed in consultation with the EPA, the Water Group and Hunter LLS and shall include, but not necessarily be limited to: A. identification of works and activities during construction of the SSI, including emergencies and spill events, that have the potential to impact on surface and groundwater water quality and groundwater depths and flows; B. identification of surface and groundwater monitoring locations which are representative of the potential extent of impacts from the construction and operation of the SSI on water quality and groundwater depths and flows (including watercourses, waterbodies, wetlands, drainage swales and licensed discharge points);	Section 6.5

MCoA	Description	Section
	C. a description of the parameters (including physico-chemical) and standards against which any changes to water quality will be monitored and assessed, having regard to the principles of the Australian and New Zealand Guidelines for Fresh and Marine Water Quality 2000 (ANZECC, 2000); D. details of representative background monitoring of surface and groundwater quality parameters and groundwater depths and flows undertaken to date (or required to be undertaken) to establish baseline conditions; E. identification of 'trigger points' for further investigation or action to be taken; F. identification of the frequency and methodology of monitoring during background, construction and operation monitoring periods; G. details on how the results of monitoring would be recorded; H. details of how interactions with the ARTC Hexham Relief Roads Project and potential cumulative impacts would be monitored and managed; I. contingency and ameliorative measures in the event that adverse impacts to surface waters and groundwater are identified consequent to the construction and/or operation of the SSI; and J. methodology for reporting of the monitoring results to the Department and EPA. Monitoring shall be undertaken in accordance with the requirements of the approved Construction Soil and Water Management Plan required under Condition E 63(d) and Operation Environment Management Plan required by condition F2. The Program shall be submitted to the Planning Secretary for approval at least one month prior to the commencement of construction of the SSI, or as otherwise agreed by the Planning Secretary. Prior to construction of the Turning Angle Works, the Proponent must provide a copy of the revised plan including the Turning Angle Works to the Environmental Representative for approval. The ER may approve minor updates to the plan without further consultation with public authorities.	
C26	The Proponent shall maximise the reuse and/or recycling of waste materials generated on site as far as practicable, to minimise the need for treatment or disposal of those materials off site.	Section 3.3

MCoA	Description		Section
C28	All waste materials removed from the site shall be appropriately tracked and shall only be directed to a waste management facility or premises lawfully permitted to accept the materials.		Section 3 – Waste Water Treatment Standards
E27	Fluvial geomorphology, soil and water management measures consistent with the recommended mitigation measures in Appendix E of the document referred to in condition B1 (c) and the measures in Managing Urban Stormwater - Soils and Construction Volumes 1 and 2, 4th Edition (Landcom, 2006) shall be employed prior to and during the construction of the SSI (including prior to clearing) to minimise soil erosion and the discharge of sediment and other pollutants to land and/or waters.		Section 4.0
E63(d)	A Construction Soil and Water Management Plan to manage surface water and groundwater impacts during the construction of the SSI. The Plan shall be developed in consultation with the City of Newcastle, the Water Group and Hunter-Central Rivers CMA and include, but not necessarily be limited to:		-
	(i)	surface water and groundwater impact assessment criteria consistent with the principles of the Australian and New Zealand Environment Conservation Council (ANZECC) guidelines;	Section 5.3
	(ii)	identification of all potential sources of water pollution and contaminants and details on the mitigation measures to be implemented to prevent the discharge of pollutants and contaminants from the SSI site, including saline and acid sulphate soils, and groundwater contaminants;	Section 2.0
	(iii)	details of the control measures to be employed to minimise surface and groundwater impacts, including drawdown of groundwater levels and connections with surface waters;	Section 3.0
	(iv)	management measures to be used to minimise surface and groundwater impacts, including identification of water treatment measures and discharge points, details of how spoil and fill material required by the SSI will be sourced, handled, stockpiled, reused and managed; erosion and sediment control measures; salinity control measures and the consideration of flood events;	Section 3.0 Section 4.0
	(v)	management measures for contaminated material and a contingency plan to be implemented in the case of unanticipated discovery of contaminated material during construction;	Site Management Plan
	(vi)	details on the methods for managing surface water runoff (including inlets and outlets and their capacity) and any accumulation of groundwater (including from excavation and dewatering) and surface water, including procedures for handling, treatment and disposal and/or reuse;	Section 3.0

MCoA	Description		Section
	(vii)	details of how construction activities would be managed and mitigated to minimise erosion and sedimentation, consistent with condition E27;	Section 4.
	(viii)	a program for reporting on the effectiveness of the water management measures and sediment and erosion controls against performance criteria; including procedures for rectifying any non-compliances;	Section 5.0 Section 6.0
	(ix)	water quality monitoring consistent with the requirements of condition C19;	Section 5.0
	(x)	contingency plans to be implemented in the event of major fuel spills or other chemicals;	Section 6.0
	(xi)	an Acid Sulfate Soils Management Plan consistent with the Acid Sulfate Soils Manual, including a contingency plan to deal with the unexpected discovery of actual or potential acid sulfate soils, including procedures for the investigation, handling, treatment and management of such soils and water seepage;	SMP/ASSMP
	(xii)	a contingency plan in the event that groundwater levels are observed to fall below the top of areas defined as containing potential acid sulfate soils;	Section 3.0 Section 6.0
	(xiii)	a water balance plan detailing the source and security of construction water supply, water use on site, and water and wastewater management on site;	Section 3.4
	(xiv)	measures to minimise stream hydrology impacts, including measures to stabilise bank structures where required and details of proposed buffer zones adjacent to waterways;	Section 4.0
	(xv)	a description of how the effectiveness of these actions and measures would be monitored during the proposed works, clearly indicating how often this monitoring would be undertaken, the locations where monitoring would take place, how the results of the monitoring would be recorded and reported, and, if any exceedance of the criteria is detected how any non-compliance can be rectified; and	Section 5.0 Section 6.0

MCoA	Description		Section
	(xvi)	mechanisms for the monitoring, review and amendment of this Plan	Section 6.0