



Soil and Water Management Plan

**Shared Path Bridge over Newcastle
Road, Jesmond**

1630

INTEGRATED MANAGEMENT SYSTEM

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1 INTRODUCTION

This Soil and Water Management Plan (SWMP) forms part of the Construction Environmental Management Process Plan (CEMPP) for the Shared Path Bridge (SPB) over Newcastle Road, Jesmond which is being delivered as early works for the Newcastle Inner City Bypass (NICB) between Rankin Park and Jesmond (RP2J).

1.1 PURPOSE

This SWMP has been developed with specific information to allow for effective management and control of the soil and water aspects. This plan has been developed taking into consideration the Integrated Project Management Plan (IPMP), Daracons Legal and Other Requirements including but not limited to relevant Acts, Regulations, Codes of Practice and Industry Standards / Guidelines.

In addition, the framework for this plan has been prepared to align with the Daracon Management System (DMS), AS/NZS & ISO Standards and Client requirements.

The purpose of the Soil and Water Management Plan is to ensure;

- Prevent pollution of surface water through appropriate erosion and sediment control;
- Maintain existing water quality of surrounding surface watercourses;
- Reduce potential for drawdown of surrounding groundwater resources;
- Prevent pollution of groundwater through appropriate controls;
- Maximise re-use of water where possible;
- Protection of the ecosystem surrounding the Project area;
- Reduce potential for erosion and sedimentation during the Project works and;
- Ensure stockpiles are managed effectively.

1.2 SCOPE

The project involves the construction of a new shared path bridge over Newcastle Road and associated works at Jesmond, within the Newcastle City Council Local Government Area (LGA).

The scope of work required for the project involves the following specific activities:

- Site Establishment
- Vegetation clearing, including riparian vegetation, and topsoil stripping
- Earthworks, including excavation or filling
- Transportation of cut or fill materials
- Site access
- Drainage works
- Stockpiling of topsoil, vegetation and other construction materials
- Movement of heavy vehicles across exposed ground
- Demolition works to remove a redundant retaining wall and ramps structures

- Piling works to facilitate the construction of the SPB
- Construction of a new shared path bridge over Newcastle Road west of Steel Street;
- Concrete Ramps, stairs and retaining structures providing access to the new shared path bridge;
- Relocation of existing utilities including overhead electricity and underground water mains;
- Roadworks in Coles Street and Jesmond park to connect the new bridge to existing facilities;
- Roadworks for minor widening on the northern side of Newcastle road west of Steel Street;
- Removal of the existing mid-block pedestrian crossing and removal of the existing bus shelter and
- Miscellaneous works including erosion and sedimentation control, utility adjustments, the construction of earthworks, drainage, kerbs and/or gutters, pavement, safety barriers, concrete paving for the shared path, footpaths and driveways, pavement markings and vegetation works.

Other operations will be undertaken by Daracon that are considered normal in delivery of the above activities. Additional activities may also be realised at the request of the Client throughout the duration of the project.

See [Figure 1](#) outlining the Shared Path Bridge (SPB) Project Location on the following page.

FIGURE 1 –SHARED PATH BRIDGE PROJECT LOCATION



1.3 CONSULTATION

1.3.1 CONSULTATION FOR PREPARATION OF THE SWMP

This CSWMP has been developed in consultation with Newcastle City Council (NCC) as required by CoA A9(a). In accordance with CoA A5, the evidence of the consultation undertaken for the preparation of this CSWMP, this documented in the following table.

1.3.2 CONSULTATION LOG

TABLE 1 – CONSULTATION LOG

Department	Contact	Date	Correspondence Type	Description
CoN	[REDACTED]	13 June 2019	Email	Nil comments
Environmental Representative	[REDACTED]	16 August 2019	Email	Draft plan submitted 13/8/19 and found to satisfy requirements. Updated by Daracon and resubmitted 8/11/19.

1.3.3 ONGOING CONSULTATION DURING CONSTRUCTION

Ongoing consultation between Roads and Maritime and Daracon, stakeholders, the community and NCC regarding the management of soil and water impacts will be undertaken during the construction of the SPB as required. The process for consultation is documented in the Construction Community Liaison Management Plan (CCLMP), which includes the key principals contained within the RP2J Community Communication Strategy (CCS) developed by Roads and Maritime.

2 OBJECTIVES AND TARGETS

2.1 OBJECTIVES

The key objective of the SWMP is to ensure that impacts on soil and water due to construction of the SPB are minimised and contaminated land is managed appropriately. To achieve this objective, the Daracon will:

- implement controls and procedures during construction activities to avoid or minimise erosion/sedimentation impacts and potential impacts to water quality in watercourses (including Dark Creek) and groundwater during construction
- implement appropriate measures to address the requirements of the conditions of approval outlined in [Table 6](#) and the EMMs detailed in [Table 8](#).

2.2 TARGETS

Targets for the management of soil, water and contaminated land impacts during construction of the SPB are to:

- achieve the water quality outcomes described in the EIS and SPIR
- maintain the NSW Water Quality Objectives (refer Section 2.2.1)

2.2.1 WATER QUALITY OBJECTIVES

Default ANZECC Water quality triggers

The SPIR identifies proposed water quality triggers for the creeks and wetlands downstream of the SPB, based on the default trigger values provided in the ANZECC water quality guidelines (ANZECC, 2000). The proposed trigger values are reproduced in [Table 2](#).

It should be noted that the default water quality triggers are not site discharge limits but are guidelines for water quality monitoring in the downstream watercourses and wetlands.

The surface water quality data presented in the EIS shows that there are exceedances of the default ANZECC guidelines for some sampling events in Dark Creek and Dark Creek tributaries.

TABLE 2 – DEFAULT WATER QUALITY TRIGGER VALUES

Parameter	Default trigger values Creeks (mg/L)	Default trigger values Wetlands (mg/L)
Total suspended solids (TSS)	6(a)(b)	6(a)(b)
NOx as N	0.040(a)	0.040(a)
Total nitrogen as N (TN)	0.35(a)(b)	0.35(a)(b)
Filterable reactive phosphorus as P	0.02(a)	0.005(b)
Total phosphorus as P (TP)	0.025(a)	0.03(b)
Copper	0.0014(c)	0.0003(d)
Nickel	0.011(c)	0.007(d)

Lead	0.0034(c)	0.0022(d)
Zinc	0.008(c)	0.007(d)

* water quality for downstream wetlands included for comparative purposes only

(a) NSW coastal rivers.

(b) NSW estuaries.

(c) 95% protection, fresh. Apply to dissolved concentrations.

(d) 99%, marine. Apply to dissolved concentrations.

Source: SPIR Appendix G – Supplementary water quality and watercourse assessment

Impacts on Ramsar wetlands

In addition to the default trigger values for wetlands, the Commonwealth Department of the Environment and Energy provides guidance on determining the significance of impacts on Ramsar wetlands in Significant impact guidelines 1.1: Matters of National Environmental Significance (DoEE 2013). These Guidelines specify that for a declared Ramsar wetland, a significant impact is one which has a ‘real chance of a substantial and measurable change in the water quality of the wetland’.

NSW Water Quality Objectives

The NSW Water Quality Objectives (WQO) define agreed environmental values and long term goals for NSW’s surface waters (OEH 2006). The values defined for the Hunter River for protection of aquatic ecosystems have been adopted for the construction of the SPB.

The adopted WQO for estuaries and catchments that are affected by urban development (OEH 2006) are listed in Table 3. Trigger values are provided for both creeks and estuaries (wetlands). The trigger values are consistent with ANZECC default trigger values (Table 2).

TABLE 3 – NSW WATER QUALITY OBJECTIVES: HUNTER RIVER

Parameter	Numerical trigger value Creeks	Numerical trigger value Estuaries
Total suspended solids (TSS)	6 mg/L	6 mg/L
Total phosphorus as P (TP)	0.025	0.03 mg/L
Total nitrogen as N (TN)	0.35	0.3 mg/L
Chlorophyll-a	5 µg/L	4 µg/L
Salinity	125 – 2,200 µS/cm	
Dissolved oxygen	85 – 100%	80 – 110%
pH	6.5 – 8.5	7 – 8.5
Temperature	More than 80% temperature increase or a 20% temperature decrease	
Chemical contaminants or toxicants	Various ANZECC trigger levels for toxicants	
Biological assessment indicators	Management goals for ecosystem protection	

Source: SPIR Appendix G – Supplementary water quality and watercourse assessment

3 SUB-PLAN REFERENCE DOCUMENTS

Daracon will comply with all legislation, standards and guidelines, client documents and project approvals, as nominated within the [Section 3](#) of this SWMP.

3.1 LEGISLATION

- Environmental Planning and Assessment Act 1979 (EP&A Act)
- Protection of the Environment Operations Act 1997 (POEO Act)
- Water Management Act 2000
- Work Health Safety Act 2011 (WHS Act)
- Work Health Safety Regulation (2017)
- Contaminated Land Management Act 1997 (NSW)
- Water Act 1912
- Protection of the Environment Operations (Waste) Regulation (2014)
- Protection of the Environment Operations (Waste) Regulation (2016)
- Environmentally Hazardous Chemicals Act 1995
- Environmentally Hazardous Chemicals Regulation 2008

3.2 STANDARDS, CODES OR GUIDELINES

- *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* (ANZECC and ARMCANZ, 2000)
- *Approved Methods for the Sampling and Analysis of Water Pollutants in NSW* (DEC, 2004)
- *Managing Urban Stormwater: Soils and Construction* (4th Edition) Volume 1 (Landcom, 2004) (the “Blue Book”)
- *Managing Urban Stormwater: Soils and Construction Volume 2D Main Roads Construction* (DECCW, 2008)
- *Guideline for Batter Surface Stabilisation using vegetation* (Roads and Maritime 2015).
- *Technical Guideline – Environmental Management of Construction Site Dewatering* (RTA, 2011)
- *Stockpile Site Management Guidelines* (Roads and Maritime, 2015)
- *Environment Direction - Management of Tannins from Vegetation Mulch* (Roads and Maritime, 2012)
- *The RMS Code of Practice for Water Management*
- *Guideline for the Management of Contamination* (Roads and Maritime, 2013)

3.3 CLIENT DOCUMENTS

The following Client documents have been identified as being important to ensure Daracon deliver the project safely, with minimal environmental impact and to specification.

TABLE 4 – CLIENT DOCUMENTS

Client Document Number and Name	
Document Number	Document Name
	Newcastle Inner City Bypass – Rankin Park to Jesmond Environmental Impact Statement (GHD, November 2016)
	Submissions and Preferred Infrastructure Report – Newcastle Inner City Bypass, Rankin Park to Jesmond (GHD, March 2018)
	NSW Department of Planning & Environment Minister’s Conditions of Approval (Feb 2019)
	Department of the Environment and Energy (DoEE) - Commonwealth Controlled Action Approval (April 2019)
QA Specification G1	Job Specific Requirements
QA Specification G36	Environmental Protection
QA Specification G38	Soil and Water Management
QA Specification G40	Clearing and Grubbing
QA Specification G10	Traffic Management
QA Specification G22	Work Health and Safety (Construction and Maintenance Works)
QA Specification Q6	Quality Management System (Type 6)

Where there are changes to the above document references, communication of changes that are applicable to this project will be communicated to all workers using a suitable means of communication as prescribed within this Sub-Plan.

3.4 PROJECT APPROVALS AND/OR LICENSING

The following approvals have been obtained by Roads and Maritime:

- EPBC Decision Notice dated October 2015 (confirming the RP2J project is a controlled action).
- Project Approval under Part 5.2 of the EP&A Act – SSI 6888 granted by the minister for planning on 15 February 2019.

All necessary licences, permits and approvals required for Daracon’s contracted works will be obtained and maintained as required throughout the life of the Project. Inspection and monitoring programs completed as part of this plan will ensure the control measures outlined in any of the above approvals, licenses or permits are complied with at all times.

3.5 HOLDPOINTS

Roads and Maritime specifications are a key source of environmental protection management processes relevant to this SWMP. The specifications set out environmental protection requirements, including Hold Points, that will be complied with during construction of the SPB. A Hold Point is a point beyond which a work process must not proceed without express written authorisation from Roads and Maritime. Hold points applicable to soil and water management are provided in [Table 5](#).

TABLE 5 – HOLDPOINTS APPLICABLE TO SOIL AND WATER MANAGEMENT

Clause no.	Description
Specification Q6 – Quality management System (Type 6)	
8.3	Implementation of rectification work
8.5.2	The process referred to in the Corrective Action Request
Specification G1 – Job Specific Requirements	
5.2 & 14.1	Establishment of Site Facilities
19	Use of revised construction staging strategy
28	Transport of the fabricated steel arch span to the Site
Specification G10 – Traffic Management	
1.7.4	Submission of traffic control personnel details
2.1.1	Submission of Road Occupancy Licence application for Newcastle Road
2.1.1	Submission of a copy of Road Occupancy Licence application and approval (including any conditions) from Newcastle City Council for local roads
2.2.1	Submission of Traffic Management Plan (TMP) and associated documents
2.4.1	Submission of Traffic Control Plan (TCP), where submitted separately from the TMP
4.4.2	Opening of temporary roadway or detour to traffic.

4 CONDITIONS OF APPROVAL

The Rankin Park to Jesmond Project proposal was subject to assessment and approval under the EP&A Act. The EPBC Act conditions directly reflect the EP&A Act conditions of approval. Subsequently, the NSW infrastructure Conditions of Approval (CoA) listed below in Table 6, detail the Commonwealth and State CoA's relevant to the SWMP;

TABLE 6 – COA RELEVANT TO THE SWMP

CoA	Requirement	Reference
E57 and DoEE 1	All reasonably practicable erosion and sediment controls must be installed and appropriately maintained to prevent water pollution. When implementing such controls, any relevant guidance in the <i>Managing Urban Stormwater</i> series must be considered.	Clause 7 Appendix 1
E58	Areas of soil contamination identified within the documents referred to in Condition A1 must be managed in accordance with Management Measure SW04 and SW05 as described in the SPIR.	Clause 7.8 UCLAFP
E59	An Unexpected Contaminated Land and Asbestos Finds Procedure must be prepared before the commencement of construction and must be followed should unexpected contaminated land or asbestos (or suspected contaminated land or asbestos) be excavated or otherwise discovered during construction.	Clause 7.8 UCLAFP
E60	The Unexpected Contaminated Land and Asbestos Finds Procedure must be implemented throughout construction.	Clause 7.8 UCLAFP
E85	The SSI must be... constructed...to achieve the outcomes described in the documents listed in condition A1 and/or to maintain the <i>NSW Water Quality Objectives</i> where they are being achieved as at the date of this approval, and contribute towards achievement of the <i>NSW Water Quality Objectives</i> over time where they are not being achieved as at the date of this approval, unless an EPL in force in respect of the SSI contains different requirements in relation to the <i>NSW Water Quality Objectives</i> , in which case those requirements must be complied with.	Clause 2 Clause 7 Appendix 6 No EPL applicable to the construction of the SBP

E86	Drainage feature crossings (permanent and temporary watercourse crossings and stream diversions) and drainage swales and depressions must be in accordance with relevant guidelines and designed by a suitably qualified and experienced person.	No Watercourse crossing for SPB Clause 7.7 Appendix 1
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5 EXISTING ENVIRONMENT

The following section summaries the existing soil and water conditions within and adjacent to the SPB, based on information contained in the EIS.

5.1 TOPOGRAPHY, GEOLOGY AND SOIL CHARACTERISTICS

5.1.1 TOPOGRAPHY

The topography is varied across the SPB project site, with small steeper areas associated with existing embankments along Newcastle Road, and moderate slopes in the parkland areas to the south of Newcastle Road. Slopes within the proposal area are relatively short, ranging from 2m on steep embankments to around 50m in the parkland to the south of Newcastle Road.

5.1.2 GEOLOGY

The SPB is located in an area which is generally underlain by broad geological variation, including the Newcastle Cole Measures and Tomago Coal Measures. The Newcastle Coal Measures consist of superficial soils (including topsoil, silts, clays and gravels), the Adamstown subgroup (including sandstone, conglomerate, tuff and coal), the Lambton subgroup (including sandstone, conglomerate, tuff and coal) and Waratah Sandstone.

5.1.3 SOIL LANDSCAPE

The *1:100,000 Soil Landscape Sheet of the Newcastle Region* (Department of Land and Water Conservation (DLWC) 1995) shows that soil landscapes in the vicinity of the project are mostly the Killingworth and Beresfield soil landscapes, with Killingworth soils landscapes dominant within the SPB project site. Dominant soils in these soil landscapes include brownish black pedal loam (topsoil), bleached hard setting loamy sand to sandy clay loam (topsoil) and pedal yellowish-brown clay (subsoil).

The Killingworth and Beresfield soil landscapes are limited by water erosion hazard, seasonal waterlogging on lower slopes and localised high run-on, mine subsidence, foundation hazard, shallow soils, very strongly acidic soils of low fertility, and rock outcrops.

5.1.4 ACID SULFATE SOIL

The *1:25,000 Acid Sulfate Soil Risk Map E2* (DLWC 1997) indicates the SPB area is mapped as 'No Known Occurrence' where acid sulfate soils are not known or expected to occur.

Acid sulfate rock testing was carried out as part of the geotechnical assessment for the RP2J project. Chromium reducible sulfur results for all 21 samples were low, ranging from less than 0.005 to 0.03%, indicating low potential acidity in the samples and a low risk of acid generation resulting from the exposure of rock to the atmosphere when excavated.

5.2 CONTAMINATION

Contamination GHD (2016) completed a contamination assessment for the RP2J project found that there was potential for contaminated land to be present in the RP2J project area due to a range of historical and current activities, including pest and weed control, fill materials of unknown origin and illegal dumping.

A search of the NSW Environment Protection Authority (EPA) database for NSW EPA notices in suburbs surrounding the RP2J corridor on 2 November 2015 identified no notices of contaminated sites.

No soil sampling was carried out in the immediately vicinity of the SPB. The nearest sampling results are for locations south of the proposed northern interchange, to the west of the SPB.

These results give some indication of potential contamination which might be found in the vicinity of the SPB.

Coal tar asphalt may be present in the pavement of the previous road connection from Jesmond Park to Newcastle Road in the area between Robinson Avenue, Dark Creek and the access road and car park area and may be encountered during excavation for utility relocations, drainage and bridge foundation construction including piling.

If coal tar material is encountered during the SBP, refer to the Unexpected Contaminated Land and Asbestos Finds Procedure (UCLAFFP) for details.

5.3 SURFACE WATER

5.3.1 CATCHMENTS AND WATERWAYS

The waterways and contributing catchments in the vicinity of the SPB are shown on [Figure 2](#) and [Figure 3](#). The SPB is located within the catchment of Dark Creek (WC1 on Figure 3). The sub-catchments draining to the ephemeral watercourse W2 upstream of the SPB include:

- Sub-catchment E – this catchment contains the southern branch of WC2 and consists of an area of moderate slopes which is vegetated with native forest.
- Sub-catchment F – this catchment contains the northern branch of WC2 and contains an area of bushland with moderate slopes draining to Dark Creek in the north
- Sub-catchment G – this catchment contains the confluence of the northern and southern branches of WC2 and is bounded in the north by the east-west Jesmond cycle path within Jesmond Park. This catchment consists of bushland with minor to moderate slopes.

Sub-catchments E, F and G drain to W2 via several small creeks. W2 flows in a northerly direction and discharges to Dark Creek (W1) via a box culvert on the northern side of the Jesmond cycle path.

Sub-catchment H, located to the east of the RP2J footprint, drains to Dark Creek (W1) via a number of creeks, as shown on Figure 3. Sub-catchment H comprises natural bush areas in the upstream

southern portion of the catchment and urbanised areas in the downstream northern portion of the catchment.

Dark Creek is a highly modified concrete lined channel in the vicinity of Newcastle Road and the SPB. Downstream of the of the SPB, Dark Creek is a significantly modified waterway that includes a concrete lined channel, road culverts and piped sections for a distance of about 1.6 km. It then flows through a modified unlined drainage channel for about 900 m before it discharges into Ironbark Creek. Ironbark Creek flows through a maintained unlined channel for about 1 km after which it reverts to a relatively unmodified channel system and enters the sensitive aquatic environment of the wetlands.

In the vicinity of the SPB, the ephemeral watercourses W1 and W2 provide very limited opportunities for native aquatic or wetland vegetation and are not considered key fish habitat.

Sub-catchments A to D drain west to Blue Wren Creek and do not influence water quality or flow conditions at the SPB.

FIGURE 2: WATERWAYS AND CATCHMENTS IMPACTED BY THE RP2J PROJECT

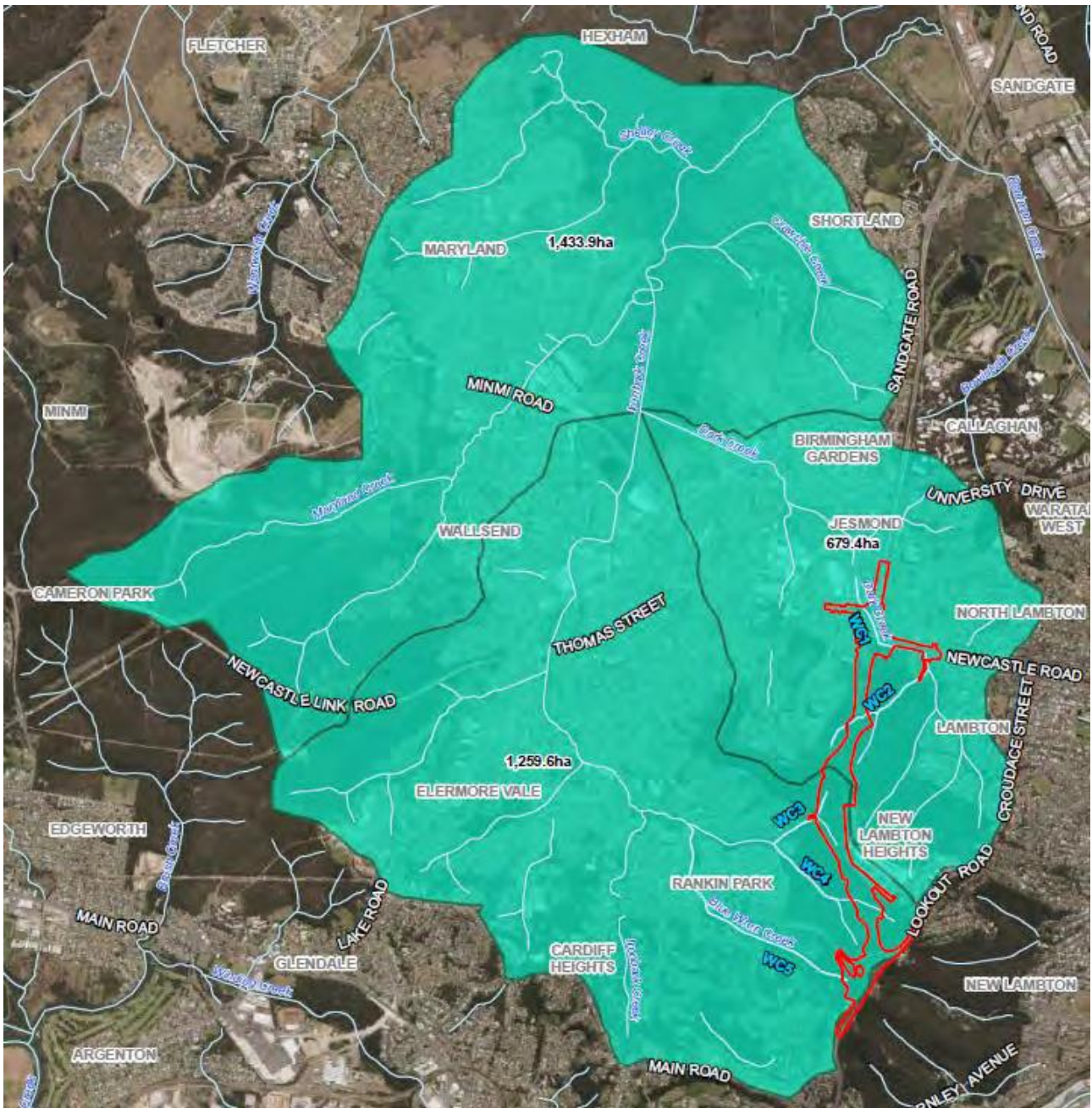
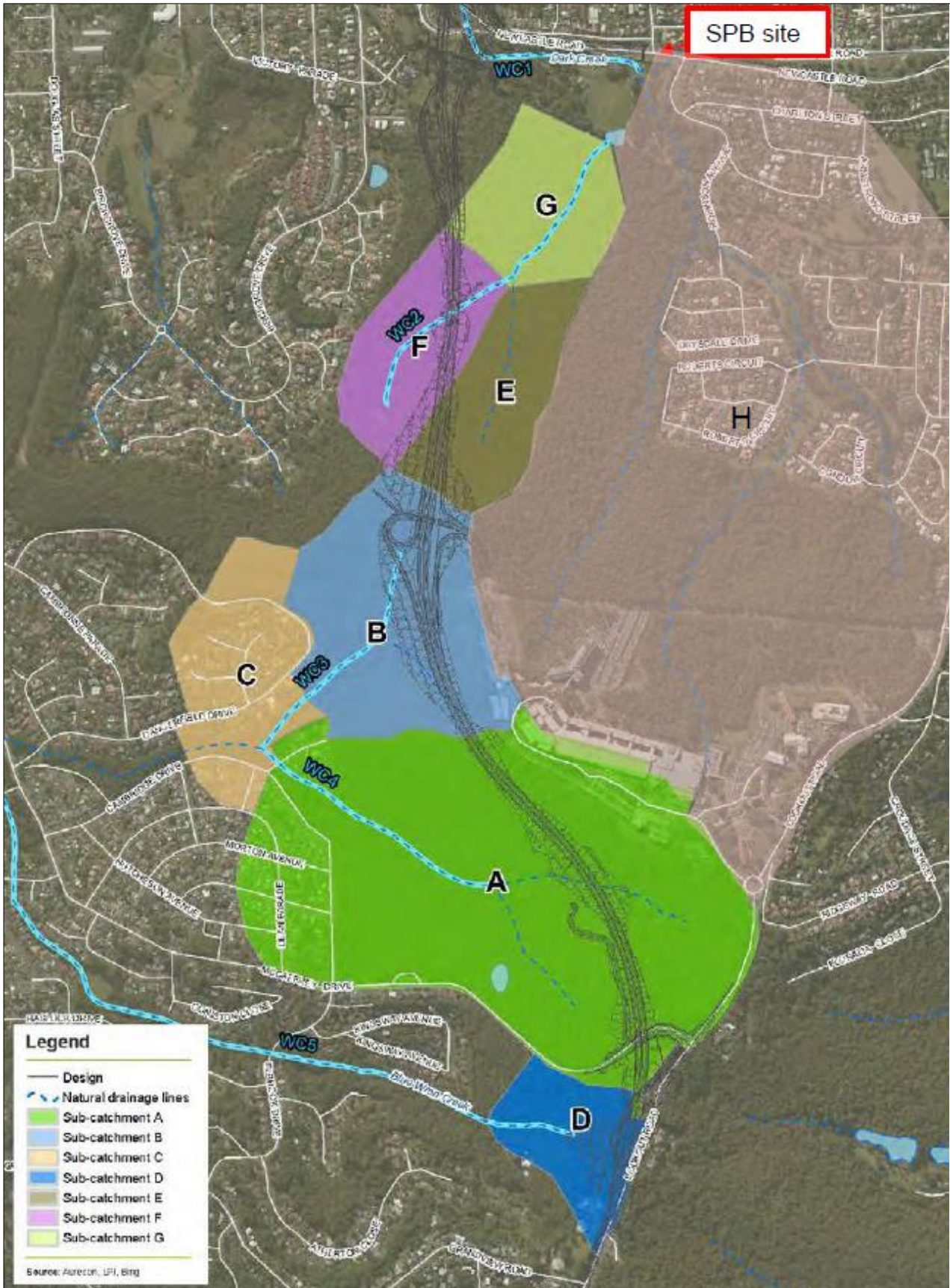


FIGURE 3 : WATERWAYS AND CATCHMENTS IN THE VICINITY OF THE SPB PROJECT LOCATION



5.3.2 WATERCOURSE GEOMORPHOLOGY

Dark Creek is a highly modified system consisting of a concrete lined stormwater drain leading into a culvert that flows under the Newcastle Road roundabout at Jesmond.

WC2 (refer [Figure 3](#)) is an un-named ephemeral tributary of Dark Creek. The northern branch of WC2, in the vicinity of the SPB, has a moderate gradient of approximately 3%, with no defined or continuous channel. It consists of a valley invert typically 3 to 5 m wide infilled with colluvium, including occasional scour holes less than 0.5 metres deep. Headward erosion with a gully head about 1 m high occurs at the confluence with the southern branch.

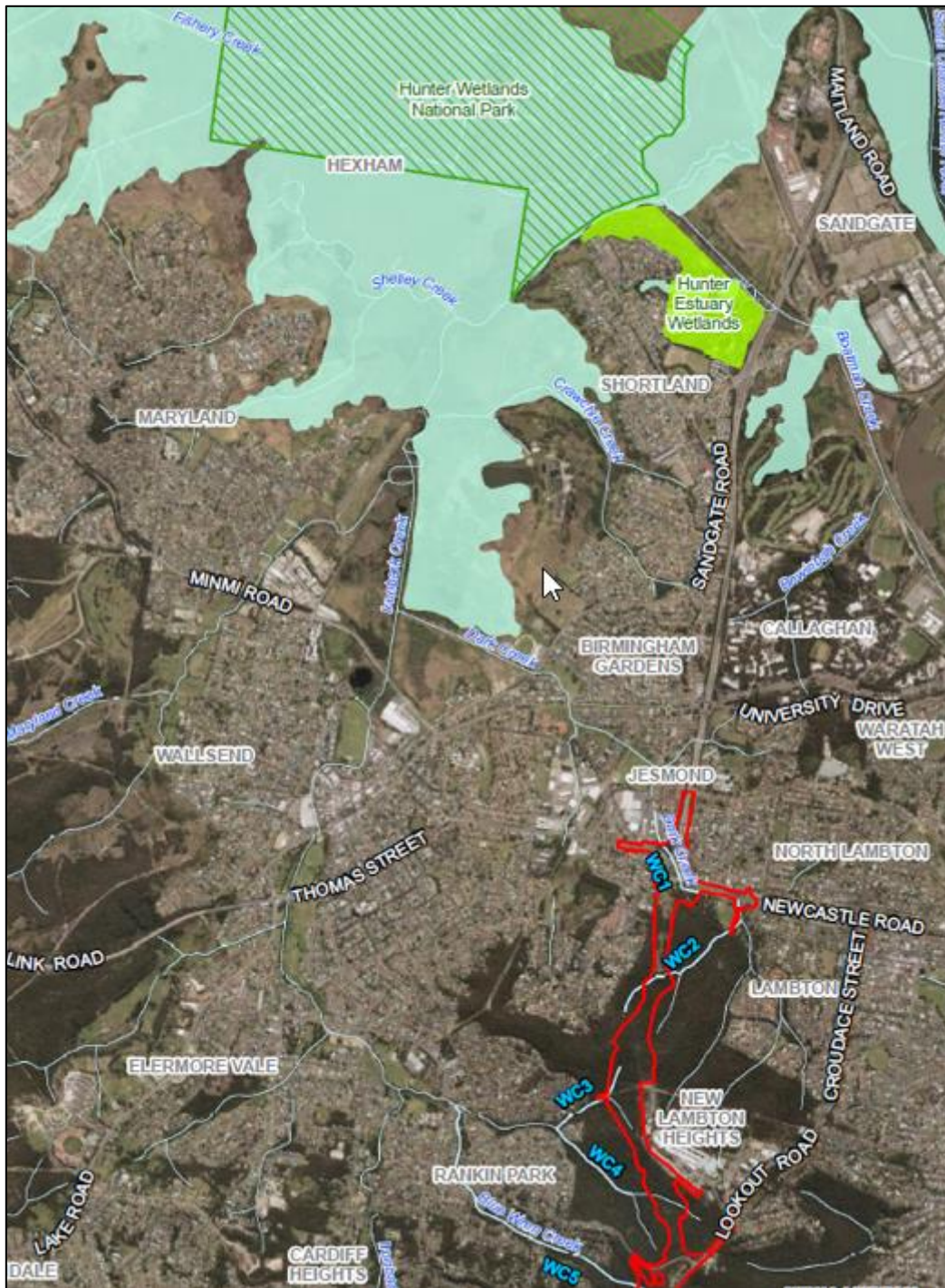
5.3.3 SENSITIVE RECEIVING ENVIRONMENTS

A sensitive receiving environment is defined as having a high conservation or community value and/or supports ecosystems or human uses of water that are particularly sensitive to pollution or degradation of water quality. The lower reaches of the Ironbark Creek catchment contain extensive areas of wetlands associated with the Hunter River floodplain which are classified as sensitive receiving environments:

- Hunter Estuary Wetlands Ramsar site (EPBC Act) – comprises the Kooragang Nature Reserve (located on the north arm of the Hunter River) and Shortland Wetlands (located about 6 km downstream of the SPB)
- Hunter Wetlands Nature Reserve (*NSW National Parks and Wildlife Act 1974*) – comprises a number of areas on the south and north arms of the Hunter River, the nearest of which is about 6 km downstream of the SPB. This area is also mapped as a nationally important wetland
- There are a number of areas mapped under the former State environmental planning policy no. 14 – Coastal wetlands (SEPP 14) on the south and north arms of the Hunter River, the nearest of which is about 3 km downstream of the SPB.

The locations of these sensitive receiving environments are shown on [Figure 4](#).

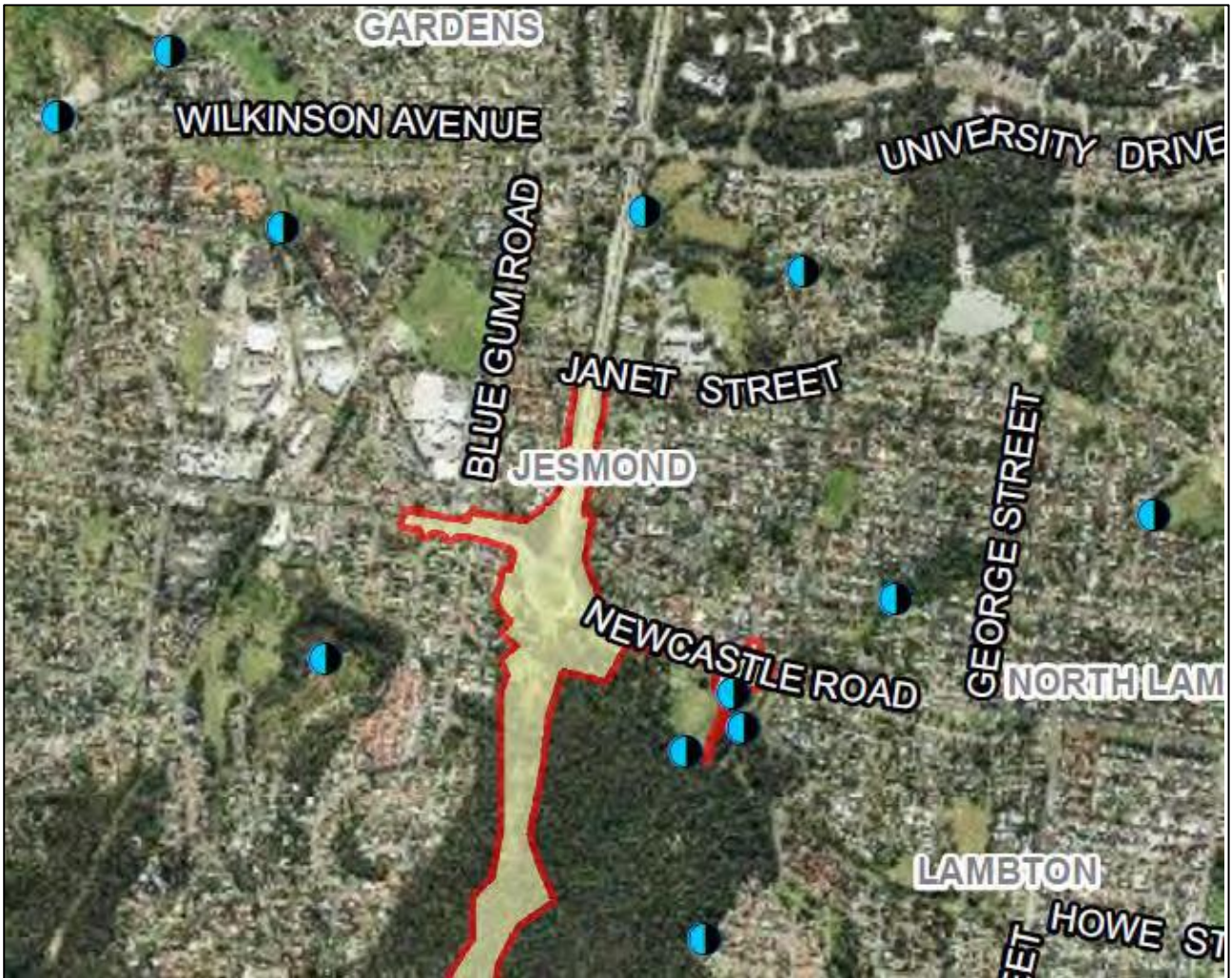
FIGURE 4: SENSITIVE RECEIVING ENVIRONMENTS



5.3.4 SURFACE WATER QUALITY

As part of the EIS (GHD 2016), surface water quality was assessed, which included review of NCC data for Dark Creek. Local water quality sampling locations in the vicinity of the SPB are shown in [Figure 5](#). No water quality samples were collected from directly within the construction footprint due to the ephemeral nature of watercourses within the footprint.

FIGURE 5: SURFACE WATER QUALITY SAMPLING LOCATIONS – EXISTING DATA



The data indicated that the existing quality in the Dark Creek catchment can be characterised as follows;

- Fresh to Brackish
- Slightly acidic to slightly alkaline\
- Turbidity: typically, <20NTU, with a maximum of 280 NTU
- Dissolved oxygen: 0.1 – 15.3 mg/L
- Total nitrogen: <0.01 – 1.2 mg/L
- Available phosphates: 0.01 – 2 mg/L

5.4 GROUND WATER

Hydrogeology in the vicinity of the RP2J project consists of a low yielding perched upper groundwater source at the southern end of the project with a deeper regional groundwater table located at about sea level and is relevant to the SPB construction footprint.

Groundwater is expected to flow through localised weathered and fractured zones in the underlying Newcastle Coal Measures. Recharge of the groundwater system is from rainfall infiltration.

Groundwater seepage due to the discharge of the perched groundwater may occur on and below sloped areas. The perched groundwater seeps naturally into local watercourses and influences surface water quality in the surrounding ephemeral watercourses that drain to Dark Creek. Regional groundwater in the area of the SPB was observed at 8.16 m and 8.64 m AHD.

No groundwater dependent ecosystems are located in the vicinity of the SPB.

5.5 CLIMATE

The Hunter region has a warm temperature climate with a current average daily maximum temperature in summer of 24.9°C

Statistics for the Bureau of Meteorology (BoM) rainfall station at Newcastle University (61390) located approximately 3 km from the SPB. The statistics indicate that the average annual rainfall in the vicinity of the SPB is about 1,147 mm. Rainfall is nearly evenly distributed during the year with a slight dominance in summer to autumn. The average rainfall over summer is 294 mm and over winter is 244 mm.

5.5.1 RAINFALL RECORDS AND DESIGN PARAMETERS

The rainfall statistics for the project have been derived from the Commonwealth Bureau of Meteorology Automatic weather station at Newcastle University (61390) located approximately 3 km from the SPB. [Table 7](#) details the monthly mean and median rainfall statistics.

TABLE 7 - MONTHLY MEAN AND MEDIAN RAINFALL

Statistic	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Mean (mm)	84.5	139.6	125.2	132	89.8	131.7	54.8	57.5	66.9	66.2	109.2	69.4	1147.1
Median (mm)	73.7	127.9	107.6	134.8	66.1	129.4	40.5	40.3	43.8	53.4	89.2	65.4	1068.3
Mean rain days	7.6	9.4	9.0	8.6	7.6	9.2	7.2	6.3	6	6.4	9.2	7.4	93.9

The data shows that the Hunter region has a warm temperature climate with a current average daily maximum temperature in summer of 24.9°C. The statistics indicate that the average annual rainfall in the vicinity of the SPB is about 1,147 mm. Rainfall is nearly evenly distributed during the year with a slight dominance in summer to autumn. The average rainfall over summer is 294 mm and over winter is 244 mm.

6 ENVIRONMENTAL ASPECTS AND IMPACTS

6.1 CONSTRUCTION ACTIVITIES

During construction, the SPB will require some clearing and disturbance of land within the construction footprint. These activities have the potential to generate sediment-laden runoff which, without proper erosion and sediment controls, could pollute the downstream environment. Key aspects of the construction of the SPB that could result in adverse impacts to soils and water include:

- site establishment
- vegetation clearing, including riparian vegetation, and topsoil stripping
- earthworks, including excavation, filling and piling works
- transportation of cut or fill materials
- movement of heavy vehicles across exposed ground
- disturbance of existing contaminated soil
- site access
- drainage works
- demolition of redundant retaining wall and pavements
- piling works for the construction of the SBP
- concrete construction works
- stockpiling of topsoil, vegetation and other construction materials
- water use / extraction
- landscaping and re-vegetation
- ancillary facility operation including fuel and chemical storage, refuelling and chemical handling
- noxious weed treatment including herbicide spraying.

6.2 IMPACTS

Potential impacts on soil and water depend on the nature, extent and magnitude of construction activities and their interaction with the natural environment. Further details of impacts resulting from the construction of the SPB are provided below. [Section 7](#) provides a range of management measures that will be implemented to avoid or minimise these impacts

6.2.1 WATER QUALITY

Construction of the SPB has the potential to impact on water quality, both in the vicinity of the SPB in Dark Creek and further downstream at the sensitive Ramsar wetlands. Potential impacts include:

- off-site transport of eroded sediments and pollutants from the exposure of soils during vegetation clearing and earthworks
- reduction of water quality and health of aquatic ecosystems due to release of sediment to adjoining watercourses from the removal of riparian vegetation
- soil loss from spoil and topsoil stockpiles due to the effects of wind or water in the absence of suitable stabilisation and management measures
- export of pollutants to receiving waters resulting from damage to ancillary facilities including flood damage
- pollution due to spills, plant and equipment maintenance, refuelling, washout of concrete trucks, inappropriate handling and use of chemicals, or demolition waste
- release of concentrated tannins from cleared native vegetation due to leaching
- interception of groundwater
- disturbance of soils where the contaminants exceed the adopted ecological and/or health criteria.

6.2.2 GROUNDWATER

Impacts to groundwater levels, flows and connectivity, groundwater chemistry and aquifers due to construction of the SPB are expected to be negligible to minor.

6.2.3 CONTAMINATION

The contamination assessment identified that there is a low potential for significant wide spread soil contamination associated with previous land uses in the area.

Soil sampling identified localised areas of shallow fills and natural soils with existing levels of contaminants above the relevant environmental and health assessment criteria. Disturbance of these soils during construction has the potential to result in the following impacts:

- phytotoxicity to sensitive plant and animal species
- impacts on groundwater or surface water quality and downstream sensitive receptors due to mobilisation of contaminants to air, groundwater or surface water
- exposure to construction personnel via direct contact (ingestion, absorption) with contaminated soils and groundwater and inhalation of odours or gases from naturally occurring coal seams
- impacts due to disturbance of asbestos-containing material from imported fill, historical dump sites or during demolition of structures
- contamination of soils, surface water and groundwater from accidental spills or oil leaks, including grease or fuel from machinery and vehicles, construction sites or ancillary facilities, or spills of other chemicals that may be used during the course of construction.

7 ENVIRONMENTAL MITIGATION AND MANAGEMENT MEASURES

In accordance with the SPIR / EIS, the following environmental management measures have been developed to minimise potential impacts on Soil and Water Management. Relative management measures applicable to the SWMP during construction are identified below;

TABLE 8 – ENVIRONMENTAL MANAGEMENT MEASURES

No.	Environmental Safeguards	Daracon Reference	Responsibility	Timing
F007	A flood Management Plan will be developed to ensure that any activity that may affect existing drainage systems will be carried out so that existing hydraulic capacity of these systems is maintained where possible.	CFRMP / EWMS & PESCP's	Daracon / Soil Conservationist	Pre-construction / Construction
SW02	A soil and water management plan will be prepared in accordance with: <ul style="list-style-type: none"> Managing Urban Stormwater, Soils and Construction, Volume 1 4th Edition, March 2004 (Landcom 2004) and Managing Urban Stormwater, Volume 2D - Main road construction (DECC 2008). Roads and Maritime Stockpile Site Management Guideline (Roads and Maritime 2011). Management of Tannins from Vegetation Mulch (Roads and Maritime 2012) Guideline for Batter Surface Stabilisation using vegetation (Roads and Maritime 2015). 	This SWMP Clause 3.2	Daracon	Pre-construction / Construction
SW03	The soil and water management plan will address the following (but not limited to): <ul style="list-style-type: none"> Identify areas of high risk based on soil erodibility. Management strategies to be used to minimise surface water impacts, including identification of water treatment measures, discharge points and erosion and sediment control measures. Minimising stormwater (volume and velocity) from running onto downstream work by appropriate staging of the work and, where necessary, utilising erosion control measures. Maximising diversion of clean water around or through disturbed portions of the site. Sedimentation basin construction and management. Measures to monitor and manage spoil, fill and materials. Protection of waterways. Management of tannins that may be generated from stockpiled vegetation. Monitoring of discharge waters. Measures for the management of tannins from stockpiled vegetative materials. Management of stockpiles. 	This SWMP Clause 5.1.3 Clause 7.1 Clause 7.3 Appendix 1 Appendix 2 Appendix 3 Appendix 4 Appendix 5	Daracon / Soil Conservationist	Pre-construction / Construction

SW04	Further soil testing would be carried out to delineate the extent of areas of contamination and classify the soils against the relevant criteria for reuse on-site or for disposal off-site.	Clause 7.8 RWMP Clause 7.4 UCLAFF	Daracon	Pre-construction / Construction
SW05	<p>The management of contaminated soils will be incorporated into the soil and water management plan. Management of contaminated soils will be in accordance with the <i>Contaminated Land Management Act 1997</i>, <i>Roads and Maritime Guideline for the Management of Contaminated Land (Roads and Maritime 2013)</i>, <i>Roads and Maritime Environmental Incident Classification and Reporting Procedure</i>, (<i>Roads and Maritime 2016</i>) and EPA Guidelines on contaminated land management.</p> <p>The management of contaminated soil will include:</p> <ul style="list-style-type: none"> Contaminated land legislation and guidelines including any relevant licences and approvals to be obtained. Identification of locations of known or potential contamination. Identification of rehabilitation requirements, classification, transport and disposal requirements of any contaminated soil. Measures to manage excavation, segregation, stockpiling, validation and disposal requirements for potentially contaminated materials. Measures to ensure the contaminated soil is managed so that it does not pose a risk to water quality. Measures to be implemented include ensuring contaminated soils are deep buried and blended where further testing confirms on-site reuse is acceptable, or off-site disposal to a licensed facility where required. Contaminated management measures including unexpected finds procedures for unanticipated discovery of contaminated material or other source of contamination during construction. 	Clause 7.8 UCLAFF	Daracon	Pre-construction / Construction
SW06	The project will be constructed in accordance with the soil and water management plan.	This SWMP PIRMP	Daracon	Pre-construction
SW07	An emergency spill response procedure will be prepared to minimise the impact of spills including details on the requirements for managing, cleaning up and reporting.	Clause 7.9 PIRMP	Daracon	Pre-construction
SW08	Spill kits and adequate quantities of suitable material to counteract spillage would be kept readily available.	Clause 7.9 PIRMP	Daracon	Pre-construction / Construction

SW09	The refuelling of plant and maintenance of machinery will be carried out in designated refuelling areas. Refuelling would be attended at all times.	Clause 7.9 Appendix 1	Daracon	Construction
SW10	Vehicle wash-downs and/or concrete truck washouts will be located in a designated bunded area or located off-site.	Clause 7.9 Appendix 1	Daracon	Construction
SW11	Machinery will be checked daily to ensure that there are no oil, fuel, or other liquid leaks.	Clause 7.9	Daracon	Construction
SW12	In the event that indicators of contamination are encountered during construction of the project (such as odours or visually contaminated materials), work in the area will cease until advice on the need for remediation or other action is obtained from the Roads and Maritime project manager.	Clause 7.8 UCLAFF	Daracon	Construction
SW13	A soil conservation specialist will be engaged during construction to advise on the planning and implementation of erosion and sedimentation controls.	Clause 7.1.1 Clause 8.1.1	Daracon	Pre-construction / Construction
SW14	Sediment laden water will be directed through the construction phase water management system. All construction sedimentation basins and associated temporary drainage shall be designed and constructed as detailed in this report to manage flows generated by the 80 th percentile five-day rainfall event.	Clause 7.1.1 Clause 7.1.2	Daracon	Construction / No Basis for SPB
SW15	Water quality monitoring will be carried out at key discharge points from the construction phase water management system. The monitoring requirements will be defined in the soil and water management plan and will include collection of samples for analysis from sedimentation basin discharge points and visual monitoring of other points of release of construction waters.	Clause 8.5.1 Clause 8.5.2	Daracon	Pre-construction / Construction
SW16	During demolition the following controls will be implemented: <ul style="list-style-type: none"> • Scheduling of work to avoid strong winds and rainfall. • Mandatory coverage of trucks carrying waste and debris • Temporary barriers or dust screens, as appropriate, to suppress the effect of dust movement to uncontrolled sites. • Dust suppression such as wetting measures. 	Clause 7.1.1 Clause 7.3 AQMP	Daracon	Construction

	<ul style="list-style-type: none"> • Appropriate control of temporary stockpiles on hardstands. 			
AQ02	<p>The following mitigation measures will be used on-site and included as part of the CEMP:</p> <ul style="list-style-type: none"> • Scheduling of work to avoid strong winds and rainfall. • Areas of exposed surfaces are to be minimised through construction site planning and programming. • Locating stockpiled material as far as possible from sensitive receivers. • All stockpiles will be designed, established, operated and decommissioned in accordance with Roads and Maritime <i>Stockpile Site Management Guideline</i> (Roads and Maritime, 2011). • Dust suppression measures, such as the use of water carts or soil binders, will be used on any unsealed surfaces and other exposed areas. • Sealed roads at access points will be watered-down regularly to minimise the resuspension of dust on sealed roads. • Imposing work vehicle speed limits and designating specific routes for haulage and access. • Construction activities which would generate dust would be avoided or modified during high wind periods where possible. • All trucks will be covered when transporting materials to and from the site. • All construction equipment will be maintained and operated in accordance with manufacturer specifications. 	<p>Clause 7.1 Clause 7.3 AQMP</p>	Daracon	Construction

7.1 EROSION AND SEDIMENT CONTROLS

Temporary erosion and sediment control measures will be installed to protect water quality on the Project. Controls and management measures will be designed (stability, location, type and size), constructed, operated and maintained in accordance with *Managing Urban Stormwater: Soils and Construction* (Landcom, 2004) and *Managing Urban Stormwater – Soils and Construction, Volume 2D, Main road construction* (DECC, 2008).

7.1.1 SITE SPECIFIC EROSION AND SEDIMENT CONTROL PLANS

In consultation with a suitably qualified (CPESC) consultant, site specific erosion and sediment control plans (ESCP) shall be developed for each separate area of work and will be reviewed and updated as required during the course of the SPB. The erosion and sediment control plans shall be prepared in accordance with the Blue Book requirements and RMS Specifications. An initial ESCP has been developed for the SPB, refer [Appendix 1](#).

ESCPs are planning documents that show the site layout and the location of erosion and sediment control structures. They cover all construction stages from initial vegetation clearing through to rehabilitation when erosion and sediment control are no longer required and are removed. The purpose of erosion and sediment controls is to:

- divert clean water around the disturbance area
- minimise the area of the site that is able to generate suspended material when water runs over it
- control and divert the drainage from all areas that will mobilise suspended solids when stormwater runs over these areas through appropriate erosion and sediment control measures to limit sediment moving off-site and sediment laden water entering any watercourse, drainage lines, or drain inlets
- reduce water velocity
- minimise the amount of material transported from site to surrounding pavement surfaces.

ESCP's will be prepared and regularly reviewed by a suitably experienced and qualified person with (CPESC qualifications). The ESCP will be developed and implemented by prior to commencing activities, ESCP's will be progressively modified and revised due to changes in the construction program, change in work methods, or whenever the work methods and control structures are found to be ineffective or are no longer required. The current ESCP will be available for inspection and review during the weekly environmental inspections.

The ESCP will identify all erosion and sediment control risks and describe how these will be addressed during construction. The ESCP will include details of the following where relevant:

- primary and secondary erosion and sediment control measures required:
 - before clearing and grubbing

- before removal of topsoil and commencement of earthworks within the catchment area
- how upstream water will be managed and diverted around or through disturbed areas so it is not impacted by the construction activities
- a progressive restoration plan and timeframe for rehabilitation including the reinstatement of disturbed surfaces and temporary drains as soon as practicable, the maintenance of erosion controls until the disturbed areas have been stabilised
- measures to minimise erosion during construction of embankments, retaining walls or pavements
- measures to minimise erosion and control sedimentation from stockpiles
- controls in runoff flow paths to reduce flow velocities and minimise the potential for erosion
- measures for controlling waste water discharge on or around the site from dewatering, piling/boring, concrete washout, saw cutting, drilling, washing vehicles and plant and any other activities which add pollutants to water
- measures to be put in place during an extended shut-down of the site or when rainfall in excess of 10 mm in a 24-hour period is predicted
- maintenance of erosion and sediment control structures including measures to restore their capacity
- inspection and auditing program for all erosion and sediment controls to ensure that no disturbed area is left without adequate erosion and sediment controls
- measures to be implemented to ensure that the use of operational water quality swales during construction for the temporary diversion of on-site construction water do not reduce their operational effectiveness
- identify and control vehicle entry and exit points to minimise tracking of soil and particulates onto offsite pavement surfaces
- removal of any materials transported onto adjacent road pavement surfaces such as sweeping as soon as practical or at a minimum at the end of each working day
- measures to manage contaminated soil and/or water that may be present and/or identified
- separation of off-site and on-site water
- location of temporary soil stockpiles on the lowest risk practicable areas of the site, away from erosion or flood hazard areas
- temporary stabilisation of disturbed areas to reduce the potential for erosion
- shaping of land to minimise slope lengths and gradients and improve drainage
- use of appropriate measures to prevent wind-blown dust entering waterways
- reduction of site surface water flow velocities and the avoidance of excess velocities such as implementation/construction of level spreaders, check dams, bank and channel linings
- use of designated areas for plant and construction material storage within the site
- measures to ensure that any runoff permitted to leave the work area is complies with Blue Book requirements

Erosion and sediment controls will remain in place until 70% of the disturbed area beyond the pavement is stabilised or as otherwise agreed with the Roads and Maritime Environmental Manager (or delegate).

The ESCP will include construction boundaries, environmentally sensitive areas and exclusion zones, locations of all ancillary activities and/or areas and activities that may impact on water quality, such as:

- access and haulage tracks including stabilisation and controls at entry and exit points to minimise tracking soil onto pavements
- plant and vehicle parking areas
- stockpile and storage areas
- temporary work areas
- materials processing areas
- compound areas
- location(s) of concrete washouts
- known (or discovered areas) of contamination.

7.1.2 DESIGN CONSIDERATIONS

When designing ESCP's, certain criteria must be considered and calculated in order to prepare designs suitable for each location, for example:

- Location, size and type of catchment including average rainfall (see – blue book):
 - Design rainfall event
- Receiving waters and other known sensitive receivers;
- Soil Loss Prediction using the Revised Universal Soil Loss Equation '*RUSLE*';
- Any water treatment requirements

Note: There may be other elements and project risks to consider that will impact on the final design which shall be assessed at each location. Therefore, the aforementioned considerations are a guide only.

For the SPB project the following site characteristics have been considered when assessing the RUSLE calculations and the requirement for sediment basins;

- Soil landscape type – Killingworth: refer [Appendix 2](#)
- Default site characteristics applied to RULSE Calculations: refer [Appendix 3](#)
- RULSE Calculations: refer [Appendix 4](#)

In accordance with the environmental management measures the RULSE calculations have been completed by adopting the 80th percentile five-day rainfall event, and the results have determined no sediment basins are required for the SPB.

7.2 CONSTRUCTION SITE DE-WATERING

Dewatering involving the pumped transfer or discharge of construction site water offsite will be carried out generally in accordance with the *RMS Technical Guideline EMS-TG-011: Environmental Management of Construction Site Dewatering* and shall comply with s120 of the PoEO Act.

Additionally, dewatering will be undertaken in accordance with a Daracons' permitting system (refer [Appendix 6](#)). This permit will be completed and approved by the Project Engineer, prior to a discharge event. The dewatering permit requests the following information;

- Part A – Notification: responsible person
- Part B – Conditions of release: water quality parameters
- Part C – Turbidity/TSS Correlation: *Not relevant to SPB.*
- Part D – Water quality records: concentrations of water quality parameters
- Part E – Release details: volume, method, date
- Part F – Permit approval: completed by responsible person.

Prior to the commencement of any dewatering, the Environmental Site Representative (ESR) will confirm the water quality complies with the discharge criteria and assess the dewatering process, including the pumping and discharge locations to prevent the risk of pollution and to prevent the occurrence of;

- discharge of sediment laden waters due to intake suction being placed within the deposited sediments
- erosion at discharge locations and downstream areas
- discharge of untreated or unsuitable waters.

The dewatering process will be supervised at all times to ensure pumping operations are working effectively.

Monitoring data, including water quality prior to discharge, will be recorded and available upon request.

7.3 STOCKPILE MANAGEMENT

Stockpiles will be managed in accordance with the requirements of *Managing Urban Stormwater: Soils and Construction* (Landcom, 2004), *Roads and Maritime Stockpile Site Management Guideline (2015)*. Stockpiles will be managed to ensure they are appropriately designed, established, operated and decommissioned to minimise impacts to the environment during construction of the SPB.

The ESR, in consultation with the CPESC, will be responsible for the establishment, management and monitoring and maintenance of stockpiles. The CPESC will advise on the location and management of stockpiles during the SPB, and this information will be included within ESCP's.

Stockpile management measures include;

Location Criteria

- Not within tree protection zones – nominated in Ancillary Facility D
- Where practical, 20m away from – *Dark Creek*. If stockpiling occurs within 20m of Dark Creek additional controls will be actioned including;
 - Sediment fencing or similar will be installed downslope of the stockpile
 - Where practical stockpiles will be covered with geofabric or similar
 - The duration of the stockpile located within this zone will be minimised
- so that slumping does not affect erosion and sediment control measures or infringe specified minimum clearance requirements
- to ensure no cross contamination of materials occurs
- so that the appropriate erosion and sediment control measures can be installed and will operate effectively
- readily accessible through the SPB construction boundary and road network.
- to minimise the need for heavy vehicles to travel on local roads
- on relatively level land
- on land above 20-year ARI flood levels
- within an approved construction compound.

Stockpile management – Erosion and Sediment Controls

- delineation of the perimeter of the stockpile with a bund, fencing or barrier
- upslope water diversion to limit surface water entering the bund
- erosion and sedimentation controls to be erected between the stockpile site and any drainage lines or down-slope areas
- covers, or other erosion protections for stockpiles that will be in place for more than 20 days as well as any temporary stockpiles that are susceptible to wind or water erosion, within 5 days of forming each stockpile
- keep stockpile heights to no greater than 2 m and slopes to no steeper than 2:1 dust management measures (including for vehicle movements associated with stockpiling activities) will be implemented in accordance with the requirements of the Construction Air Quality Management Plan
- monitoring of odours and odour control measures
- exit points from stockpile areas will be stabilised to prevent mud tracking.

Topsoil stockpiles

- be free from weeds, subsoil, other excavated materials, contaminated materials (including asbestos), refuse, clay lumps and stones, timber or other rubbish
- be managed to ensure no growth of weeds

- be trimmed to a regular shape to facilitate measuring with a height not exceeding 2 m and batter slopes not steeper than 2:1
- have their batters track rolled or stabilised by other means
- seeded in accordance with Roads and Maritime Specification R178, to encourage vegetation cover
- be less than 1,000 m³ each

Decommissioning of stockpile sites

- clearing all stockpile material from the site and re-using if suitable, or disposing of it at a licensed facility
- stabilising the site by planting and/or landscaping the site
- removing control measures such as erosion and sedimentation devices once the stabilisation has occurred
- undertaking an inspection of the site
- notifying the Roads and Maritime Environmental Manager (or delegate) that the stockpile site has been removed
- updating records in the Stockpile Register.

7.4 SOIL MANAGEMENT

Soil sampling for re-use or off-site disposal

Soil sampling will be undertaken by a suitably qualified environmental consultant, to determine a classification and subsequent management strategy for soils generated during the SPB. Typical management strategies for excavated materials include;

- re-use onsite – for virgin excavated natural material (VENM), excavated natural material (ENM)
- disposal offsite – for waste and contaminated materials
- re-use offsite – utilising waste recovery or exemption orders

Soils will be classified in accordance with the requirements of the Resource and Waste Management Plan (refer to Appendix 9 of the CEMPP).

7.5 TANNIN MANAGEMENT

Controls will be implemented to manage the use and stockpiling of mulch on site to reduce the risk of tannin leachate from mulch flowing into waterways in accordance with *Management of Tannins from Vegetation Mulch* (Roads and Maritime 2012 – refer to [Appendix 5](#)).

7.6 WATER EXTRACTION MANAGEMENT

Water for the construction of the SPB will not be extracted from local waterways. Water for construction may be sourced from excavation/pile/bore dewatering, stormwater, recycled water or other suitable water sources to avoid the use of potable water, where feasible. However, it is anticipated the town water supply will be utilised as the main source of water to service the SPB.

7.7 WORKING IN WATERWAYS

No work in waterways is proposed as part of the construction of the SPB. Should any works be identified, they will be subject to review and approval from Roads and Maritime Services.

7.8 CONTAMINATED LAND MANAGEMENT

Based on the information provided in the EIS and SPIR, no existing contamination has been identified in the vicinity of the SPB project foot print. It is anticipated that there may only be potential for isolated low concentrations of contamination to be encountered during the construction works. . The isolation and containment of the contamination will be prioritised where possible to prevent the uncontrolled spread of the material and facilitate its lawful management and/or disposal.

Where unexpected contamination is encountered during the SPB construction, materials will be managed in accordance with the Unexpected Contaminated Finds and Asbestos Finds Procedure (refer to Appendix 11 of the CEMPP).

7.9 REFUELLING, WASHDOWN AND CHEMICAL STORAGE

The following controls will be implemented during the SPB;

- All fuels and chemicals will be stored in a lockable, bunded storage container with impermeable floors.
- Storage containers will not be located within 50m of aquatic habitat, or within 20m of *Dark Creek*
- Refuelling or maintenance of plant and equipment, will not be undertaken within 20m of *Dark Creek* or in a location which drains directly to waters or environmentally sensitive areas without the appropriate temporary bunding being provided.
- Plant and equipment will be inspected daily to detect leakages.
- Major repairs of plant and equipment will be undertaken offsite where possible
- A dedicated concrete washout facility, that is to be bunded and has an impervious surface, will be established during the works. Concrete washout facility locations will be nominated within ESCP's.
- Dangerous goods and hazardous materials will be stored, handled and disposed of in accordance with suppliers' instructions, Australian Standards, the WHS Act, *Storage and Handling of Dangerous Goods Code of Practice* (WorkCover NSW, 2005) and other relevant guidelines.

- SDS will be obtained prior to materials arriving onsite and a register of all of all hazardous materials will be maintained.
- Spill kits will be available and maintained at refuelling locations.

7.10 SPILL PREVENTION AND RESPONSE

Spill prevention and response controls measures have been identified within the Pollution Incident Response Management Plan (PIRMP), refer to Appendix 8 of the CEMPP for further details.

8 COMPLIANCE MANAGEMENT

8.1 ROLES AND RESPONSIBILITIES

The organisational structure and roles and responsibilities for Daracon personnel are provided within IPMP (refer IPMP – Appendix 2). The roles and responsibilities specific to the construction of the SPB are provided within IPMP, which displays the organisational chart for the project (refer IPMP – Appendix 1).

8.1.1 SOIL CONSERVATIONIST

A suitably experienced and qualified Certified Practising Erosion and Sediment Control Professional (CPESC) will be engaged during the construction of the SPB. The CPESC will review and advise on ESCP's and provide advice and recommendations with regards to the implementation of erosion and sediment controls.

8.2 COMMUNICATION

Communication with stakeholders and the community is detailed within the Construction Community Liaison Management Plan (CCLMP), which includes the key aspects identified within the Community Communication Strategy (CCS) developed by RMS.

Soil and water quality management information will be communicated to the community and stakeholders in accordance with the principles and procedures outlined CCLMP.

8.3 COMPLAINTS MANAGEMENT

The management of complaints for the SPB will be in accordance with the Construction Community Liaison Management Plan (CCLMP), which includes the key aspects identified within the Complaints Management System (CMS) developed by RMS.

8.4 TRAINING

To ensure the effective implementation of this SWMP, personnel will undergo training relating to soil and water management issues, this training will include;

- SWMP requirements, including ESCP's and PIRMP
- Incident Response
- Site inductions
- Environmentally Safe Work Methods (EWMS)
- Tool Box Talks – focused on environmental aspects
- Dewatering Permits

For further details on training refer to section 8 of the IPMP, and section 5.5 of the CEMPP.

8.5 MONITORING AND INSPECTION

8.5.1 MONITORING

Monitoring required for this SWMP will include;

- monitoring of any site discharges as detailed in [Section 7.2](#)
- regular (at least weekly) visual monitoring of local water quality (i.e. for plumes of turbidity and hydrocarbon spills/slicks) to identify any potential spills or deficient controls when working in or near waterways
- monitoring and management of spoil, fill and materials stockpile sites including details of how spoil, fill or material will be handled, stockpiled, reused and disposed
- daily monitoring and recording of rainfall forecast and rainfall at the site (in mm)
- weekly and post rainfall inspections to evaluate the effectiveness of erosion and sediment controls measures in accordance with Section 6.1.1 of the CEMPP
- monitoring of the effectiveness of erosion and sediment control actions and measures during construction. The type, timing, frequency, assessment criteria and associated reporting requirements will be detailed in the ESCP.

8.5.1.1 WATER QUALITY MONITORING

Water quality monitoring for the SPB will include both visual monitoring as part of weekly inspections and qualitative monitoring, in accordance with the relevant Australian Standard (AS/NA 5667.6).

Water quality monitoring will be undertaken by the ESR and monitoring for the SPB will include;

- Pre-construction to determine the indicative existing water quality.
- During construction;
 - to demonstrate compliance with RMS specifications.
 - Following significant rainfall events (>10mm of rain in less than 24 hours) to demonstrate effectiveness of ESCP controls.
 - Prior to dewatering discharge events
- Post-construction to confirm no residual impact on receiving waters and to confirm the site stabilisation.

8.5.1.2 WATER SAMPLING LOCATIONS

Water samples will be obtained in accordance with the relevant Australian Standard (AS/NA 5667.6) as required at the following locations;

TABLE 9 – POTENTIAL WATER SAMPLING LOCATIONS

Sample No.	Identifier	Sampling Location
1	WM001	Dark Creek Upstream – From SPB Project Boundary
2	WM002	Dark Creek Downstream – From SPB Project Boundary

The downstream locations have been determined on the basis that they fall within the influence of the discharge of the project. The upstream site locations have been determined on the basis that they allow sampling to be undertaken as close to, but outside the area of influence of the project.

8.5.2 INSPECTIONS

Regular inspections of sensitive areas, activities and control measures will occur for the duration of the construction of the SPB. A weekly environmental inspection (refer [Appendix 7](#)) will be completed by the ESR and /or PE. Additionally, inspections will occur;

- within 24 hours of rainfall events exceeding 10 mm in a 24-hour period.
- following significant Rainfall events (>10mm in a 24hr period) to assess erosion and sediment controls. Further details are provided in the Construction Flood Risk Management Plan (CFRMP).
- conducted by RMS to confirm compliance with this SWMP
- an RMS appointed soil conservationist will conduct regular inspections
- prior to extended breaks or cessation of works

With respect to the RMS and/or RMS appointed soil conservationist environmental inspection reports, Daracon will advise of the actions being taken to complete any rectification works. Rectification actions identified within inspections will be actioned as follows;

- immediate: on day of inspection
- high: within 24 hours of inspection
- medium: within three working days of inspection
- low: within three working days of inspection.

The Proposed inspections to be carried out that are relevant to soil, and water are contained within [Table 9](#).

TABLE 10 – SOIL AND WATER INSPECTIONS

Inspection	Responsibility	Frequency
<ul style="list-style-type: none"> Inspect all plant and equipment daily for leakages of fuel, oil or hydraulic fluid. Repair any leaks before using item of plant or equipment. Maintain records of plant inspections 	Site Supervisor / Operators	Daily
<ul style="list-style-type: none"> Inspect all stockpile sites 	Environmental Site Representative or Project Engineer	Weekly
<ul style="list-style-type: none"> Inspection of the implementation of all environmental requirements and controls 	Daracon Environmental Site Representative /Project Engineer/Site Supervisor	<ul style="list-style-type: none"> At least Weekly during standard construction hours Daily during periods of rainfall in excess of 10 mm in 24 hrs prior to any site closure of greater than 48 hours.

8.6 INCIDENTS

Incidents will be managed in accordance with Section 9 of the IPMP and Section 6.11 of the CEMPP

8.7 AUDITING

Audits (both internal and external) will be undertaken to assess the effectiveness of soil and water quality management measures, compliance with this SWMP, conditions of approval and other relevant approvals, licenses and guidelines. Audit requirements are detailed in Section 11.4 of the IPMP and Section 5.9 of the CEMPP.

8.8 NON-CONFORMANCES

A non-conformance is the failure or refusal to comply with the requirements of project system documentation, including this SWMP. Non-conformances may be identified through auditing and review processes (Section 11.4 of the IPMP and section 5.9 of the CEMPP), monitoring and inspection processes (Section 11 of the IPMP) or incident management (Section 9 of the IPMP and Section 6.11 of the CEMPP).

8.9 REPORTING

Reporting requirements and responsibilities are documented in Section 5.11 of the IPMP and section 5.11 of the CEMPP.

Records for dewatering activities will be maintained as follows;

- date and time for each discharge at each location
- water quality test results for each discharge
- personnel approving the dewatering activities
- evidence of discharge monitoring, or risk assessment and mitigation measures used to eliminate the risks of pollution or erosion.

A register of inspection and maintenance of all erosion control and sediment capture measures, observations and works undertaken to repair and/or maintain soil and water management works, dates of non-passive discharge, water treatment (flocculation) performed, discharge water quality and daily rainfall and provide copies of these records to Roads and Maritime or the ER on request.

9 REVIEW AND IMPROVEMENT

9.1 CONTINUOUS IMPROVEMENT

Continuous improvement of this SWMP will be achieved by the ongoing evaluation of environmental management performance against environmental policies, objectives and targets for the purpose of identifying opportunities for improvement.

- identify areas of opportunity for improvement of soil and water quality management and performance of environmental controls
- identify environmental risks not included within the GRA or Environmental Risk Register
- determine the cause or causes of non-conformances and deficiencies
- develop and implement a plan of corrective and preventative action to address any non-conformances and deficiencies
- verify the effectiveness of the corrective and preventative actions
- document any changes in procedures resulting from process improvement
- make comparisons with objectives and targets.

9.2 CPESC REVIEW

ESCP's will be reviewed by a suitably qualified CPESC as outlined in Section 8.1.1 The soil conservationist review and any recommendations will be incorporated within ESCP's.

All erosion and sediment control measures will be reviewed by the nominated CPESC prior to installation.

9.3 SWMP UPDATE AND AMENDMENT

The processes described in Section 11 of the IPMP may result in the need to update or revise this CSWMP. This will occur as needed.

Any revisions and/or changes to the SWMP will be distributed to all relevant stakeholders in accordance with the approved document control procedure detailed in Section 13 of the IPMP.

10 DEFINITIONS

All terms referenced within this plan are included within [REG.00001](#) *Definitions & Glossary of Terms Register*.

11 ASSOCIATED DOCUMENTS AND PROCEDURES

Approved Forms, Process Flowcharts, Registers and/or other documents referenced within the body of, or those that are associated with this plan, are accessible and made available for all Daracon personnel via the following link: <https://dms.daracon.com.au/documents>

APPENDIX 1 Erosion and Sediment Control Plan



Jesmond Pedestrian
Bridge - Ancillary Fac

APPENDIX 2 Soil Landscape Report



Soil Landscape
Report.pdf

APPENDIX 3 Default Site Characteristics

Location	Shared Path Bridge Project
Construction Duration	(Approx. 58 Weeks) >12 months (80 th ile 5 day) (Sect. 6.3.4 – (f). Blue Book Vol.1 & Table 6.1 Volume 2D)
Soil Landscape	Killingworth (ki)
Erosion Hazard	Low hazard below 9% grade (Sect 4.4.1 & Figure 4.6 – Blue Book)
Soil Loss Class	Class 3: Low-Moderate (Sect 4.4.2. & Table 4.2 – Blue Book)
Batter Restrictions	Yes, 21m @ 2:1, 28m @ 3:1.
Volumetric runoff coefficient - Cv	0.64 – Soil Hydrologic Group D (Blue Book – Appendix F: Table F2) or dependant on other site characteristics
Rainfall Intensity - millimetres per hour	8.74 mm/hr (2 Year, 6 Hour storm) BOM IFD Table
Rainfall Erosivity – R factor	2580 (Calculated from 2-year ARI, 6 Hour storm Where 10.9 mm/hour = S, & where $R = 164.74(1.1177)^{SS0.6444}$. (Blue Book - Appendix A2 & B)
Soil erodibility factor – K factor	0.036 (Blue Book Volume – Appendix C3)
Soil hydrologic group	C/D
Sediment Type	F & D
Slope Length	Variable – 6m Adopted
Grade	Variable – 30% Adopted
LS Factor	2.77
Erosion control practice factor – P factor	1.3
80 th %ile (5-day rainfall event)	30.5 mm (Sect. 6.3.4 – (f). Blue Book)
Seasonal erosion hazard / Zone	No – Zone 1 (Sect 4.4.2 – (c) & Table 4.3)
Ground cover – C Factor	1.0

APPENDIX 4 RUSLE Calculations



Appendix 4.pdf

APPENDIX 5 Management of Tannins from Vegetation Mulch



ed25-mgt-tannins-f
rom-veg-mulch.pdf

APPENDIX 6 Dewatering Permit



Appendix 6
Rev02.pdf

APPENDIX 7 Environmental Inspection



IM-REP-0503-001
Environmental Inspe