



**NATIONAL  
INTERMODAL**

# Moorebank Avenue Realignment Works

Construction Soil and Water Management Plan

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SSI - 10053

22 August 2023

# NATIONAL INTERMODAL CORPORATION

## MOOREBANK AVENUE REALIGNMENT WORKS

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## ACRONYMS AND DEFINITIONS

Acronym	Definition
ARI	Annual Recurrence Interval
BOM	Bureau of Meteorology
CAQMP	Construction Air Quality Management Plan
CBMP	Construction Biodiversity Management Plan
CCMP	Construction Contamination Management Plan
CCS	Community Communication Strategy
CEMP	Construction Environmental Management Plan
CHMP	Construction Heritage Management Plan
CLM Act	<i>Contaminated Land Management Act 1997 (NSW)</i>
CNVMP	Construction Noise and Vibration Management Plan
CoA	Conditions of Approval
Construction	Includes all work required to construct the Project as described in the EIS and RfS (NSW CoA A1) including commissioning trials of equipment and temporary use of any part of the Project but excluding Low Impact Work which is carried out or completed before approval of the CEMP.
CPESC	Certified Professional in Erosion and Sediment Control
CSWMP	Construction Soil and Water Management Plan (CSWMP),
CTTMP	Construction Traffic and Transport Management Plan
CWRMP	Construction Waste and Resource Management Plan
DAWE	Department of Agriculture, Water and Environment (now DCCEEW)
DCCEEW	Department of Climate Change, Energy, Environment and Water (formerly DAWE)
DECC	Department of Environment and Climate Change (now DPE)
DEC	Department of Environment and Conservation (now DPE)
DJLU	Defence Joint Logistics Unit
DPE	Department of Planning and Environment (formerly DPIE)
DPI	Department of Primary Industries
DPIE	Department of Planning, Industry and Environment (now DPE)
EHC Act	<i>Environmentally Hazardous Chemicals Act 1985 (NSW)</i>
EES	NSW Environment, Energy and Science (part of DPE)
EHG	NSW Environment and Heritage Group (part of DPE)
EIS	Environmental Impact Statement
EMP	Environmental Management Plan
EMS	Environmental management system
EP&A Act	<i>Environmental Planning and Assessment Act 1979</i>
EPA	NSW Environment Protection Authority

Acronym	Definition
EPBC Act	<i>Environmental Protection and Biodiversity Conservation Act 1999</i>
EPL	Environment Protection Licence
ER	Environmental Representative
ERP	Emergency response plan
ERSED	Erosion and sediment controls
ESCP	Erosion and Sediment Control Plan
EWMS	Environmental Work Method Statement
HSE	Health Safety and Environment
Infrastructure Approval	SSI 10053 or NSW CoA
INP	Industry Noise Policy
LCC	Liverpool City Council
Low Impact Work	As defined in the Infrastructure Approval, and which includes activities like survey work, investigative drilling, minor clearing, installation of mitigation measures etc. The low impact work described in this definition becomes construction when the Construction Environmental Management Plan is approved. This also applies to low impact work that has already commenced.
LV	Light vehicles
MARW	Moorebank Avenue Realignment Works
MIP	Moorebank Intermodal Precinct, which includes MPE and MPW
MPE	Moorebank Precinct East
MPE Site	Comprises the MPE Stage 1 Project as approved by SSD 14-6766 for the development of the intermodal terminal facility (IMT) at Moorebank and MPE Stage 2 as approved under SSD 7628 (as modified) and MPE Concept Approval (MP 10_0193) for the construction and operation of warehousing and distribution facilities and upgrades to approximately 2.1 kilometres of Moorebank Avenue.
MPW	Moorebank Precinct West
MPW Site	Comprises the MPW Stage 2 Project which is the second stage of development under the MPW Concept Approval (SSD 5066) and SSD 7709. The Project involves the construction and operation of a multi-purpose intermodal terminal facility, Rail link connection, warehousing and upgraded intersection on Moorebank Avenue.
National Intermodal	National Intermodal Corporation
NGER Act	<i>National Greenhouse and Energy Reporting Act 2007 (Commonwealth)</i>
NML	Noise management level
OEH	NSW Office of Environment and Heritage (now NSW EES, a part DPE)
PASS	Potential Acid Sulfate Soils
PIRMP	Pollution Incident Response Management Plan
PMF	Probable Maximum Flood
Planning Secretary	Secretary to the DPE



Acronym	Definition
Project Site	Refers to the construction footprint which is approximately 18.96 hectares and includes access for the construction of road embankments and cuttings, temporary and permanent fencing, temporary and permanent water quality control basins, ancillary facilities, access roads and construction side roads. It is generally bounded by the Defence Joint Logistics Unit (DJLU), MPE, Boot Land and the Sydney Trains owned land adjacent to the East Hills Railway.
REMM	Revised Environmental Management Measures
RMS	Roads and Maritime Services (now TfNSW)
RTA	Roads and Traffic Authority (now TfNSW)
RtS	Response to Submissions
RUSLE	Revised Universal Soil Loss Equation
SDS	Safety Data Sheets
SEARs	Secretary Environmental Assessment Requirements
SEMP	Site Establishment Management Plan
SES	State Emergency Service
SSI	State significant infrastructure
TfNSW	Transport for NSW
TSI	Targeted Site Investigations
The Project	Moorebank Avenue Realignment Works
TSI	Targeted Site Investigation
Waterfront Land	As defined in the <i>Water Management Act 2000</i> , the bed of any river, lake or estuary, and the land within 40 metres of the river banks, lake shore or estuary mean high-water mark
WMP	Water Management Plan

# 1 INTRODUCTION

## 1.1 Context

This Construction Soil and Water Management Plan (CSWMP) forms part of the Construction Environmental Management Plan (CEMP) for the Moorebank Avenue Realignment Works (MARW) (the Project).

This CSWMP has been prepared to address the requirements of the NSW Minister's Conditions of Approval (CoA) and the Revised Environmental Management Measures (REMMs) detailed in the Response to Submissions (RtS) and the applicable legislation.

## 1.2 Background and Project Description

National Intermodal Corporation (National Intermodal) plans to realign and upgrade a section of Moorebank Avenue. The Project involves the realignment of an existing two-kilometre section of Moorebank Avenue, from about 130 meters south of the Anzac Road/Moorebank Avenue intersection to a point immediately north of the East Hills Railway. Moorebank Avenue currently divides the Moorebank Intermodal Precinct (MIP) into the Moorebank East Precinct (MPE site) and the Moorebank West Precinct (MPW site) (See Figure 1.1).

The project is about three kilometres of additional road which ties in with the existing Moorebank Avenue at the northern and southern extremities. From its northernmost point, the realigned Moorebank Avenue follows the northern boundary of the MPE site, before continuing south along the MPE Site eastern boundary. This section of the realignment comprises four lanes (i.e. two lanes in each direction). At the south-western corner of MPE, the additional road section merges to become a dual lane road (i.e. one lane in each direction) before continuing in a south-west direction, crossing Anzac Creek, and re-joining the existing Moorebank Avenue alignment near the East Hills Railway (refer to Figure 1.1). At completion and commissioning of the realigned road section, the public through traffic using Moorebank Avenue will be redirected onto the upgraded alignment. The existing road alignment will be decommissioned and modified to function as a restricted access to the MIP.

The Project Site is about 18.96 hectares and includes access for the construction of road embankments and cuttings, temporary and permanent fencing, temporary and permanent water quality control basins, ancillary facilities, access roads and construction side roads. It is generally bounded by the Defence Joint Logistics Unit (DJLU), MPE, Boot Land and the Sydney Trains owned land adjacent to the East Hills Railway (refer to Figure 1.1).

A detailed description of the Project is provided in Section 2 of the CEMP and is also shown on Figure 1.2.

The Project will not be staged but is anticipated to be undertaken in phases. Construction is expected to take approximately 16 months to complete.

An Environmental Impact Statement (EIS) for the Project was prepared in March 2021 to describe and assess the Project and recommend management measures to address impacts. The EIS was exhibited by the then NSW Department of Planning, Industry and Environment<sup>1</sup> (DPIE) from 17 March 2021 to 13 April 2021 to give the community and stakeholders the opportunity to provide comment. A RtS was submitted in May 2021 to address the identified issues.

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<sup>1</sup> Now NSW Department of Planning and Environment (DPE)

The Project was approved by the NSW Minister for Planning on 14 October 2021 as State Significant Infrastructure (SSI-10053) (Infrastructure Approval) under Division 5.2 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). The Project is also a controlled action under Section 130(1) and 133(1) of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and was approved by the Minister for the Environment on 7 December 2021 (EPBC Approval 2020-8839).

The EIS assessed the construction soil and water impacts for the Project. As part of EIS development, a detailed Water Assessment (Appendix G of the EIS) was prepared in accordance with the legislation. The Assessment was prepared to address the Secretary's Environmental Assessment Requirements (SEARs) issued by the DPE and the Commonwealth EIS Guidelines.

Revised Environmental Management Measures (REMMs) were provided within the RtS. Where applicable, the REMMs from the RtS have been included in this CSWMP (Section 6.7 and Appendix C).

### 1.3 Scope of the Plan

This CSWMP is applicable to the construction stage of the Project. The CSWMP describes how potential soil and water impacts will be managed during construction of the Project. Operational soil and water impacts and operation measures do not fall within the scope of this CSWMP and therefore are not included within the processes contained herein.

Additionally, in line with NSW CoA A6 and outlined in the approved Project environmental risk assessment, the Soil and Water Management Plan is a combination of the following management plans:

- Water Management Plan
- Construction Soil and Water Management Plan
- Erosion and Sediment Control Plan
- Flood Emergency Response and Evacuation Plan.

### 1.4 Environmental Management System Overview

The environmental management framework for the Project is described in Section 3 of the CEMP. This CSWMP forms part of the framework for the Project. The requirements of the NSW CoA and the REMMs identified in the CSWMP will be complied with during construction.

Management measures identified in this CSWMP may also be incorporated into site or activity specific Environmental Work Method Statements (EWMS). EWMS incorporate appropriate mitigation measures and controls and identify key procedures to be used during construction activities. A template EWMS is provided in Appendix F of the CEMP.

### 1.5 CSWMP Endorsement and Approval

This CSWMP has been prepared to satisfy the NSW CoA's in relation to soil and water management during construction of the Project.

This CSWMP will be reviewed by the Project Manager / Delivery Team and will be endorsed by the Environmental Representative (ER) (Appendix A) at least one month prior to the commencement of construction as nominated in the Project Risk Assessment Matrix approved by the DPE in accordance with NSW CoA A19. Construction of the Project will not commence prior to the approval of the CEMP by the Planning Secretary and endorsement of the CSWMP by the ER. The final endorsed Plan will be available on



the MIP and/or National Intermodal website within 20 business days of approval by the Planning Secretary in accordance with Commonwealth CoA 15.

The ER can approve minor amendments to this CSWMP if they do not increase impacts to nearby receivers, are of an administrative nature and are consistent with the conditions of the Infrastructure Approval. This does not include any modifications to the conditions of the Infrastructure Approval.

### 1.5.1 Interactions with Other Management Plans

This CSWMP has interrelationships with other management plans and documents as detailed below:

- Emergency response protocols and procedures as addressed in the Construction Environmental Management Plan (CEMP)
- The Contamination Management Plan (CMP) addresses the management of contaminated lands and unexpected contaminated finds
- The Construction Air Quality Management Plan (CAQMP) addresses the management of dust and odour
- The Construction Biodiversity Management Plan (CBMP) addresses the management of flora and fauna including aquatic and riparian habitats and vegetation rehabilitation
- The Construction Waste and Resources Management Plan (CWRMP) addresses the management of waste and resources including the classification and handling of spoil and water reuse
- Pollution Incident Response Management Plan (PIRMP) (prepared upon the receipt of the EPL) details how pollution incidents will be managed in accordance with the CEMP.

## 1.6 Consultation

### 1.6.1 Consultation for Preparation of the CSWMP

There is no requirement to consult with government agencies and stakeholders during the development of this CSWMP as nominated in the Project Risk Assessment Matrix. Refer to Appendix D of the CEMP for additional consultation requirements.

### 1.6.2 Ongoing Consultation during Construction

Ongoing consultation between the Project and stakeholders, relevant agencies and the community regarding the management of soil and water impacts will be undertaken during the construction of the Project as required. The process for the consultation will be documented in the CCS.

### 1.6.3 Flooding Consultation

In accordance with NSW CoA E11, Liverpool City Council and Campbelltown City Council (if required), the Environment and Heritage Group (EHG) and the State Emergency Service (SES) must be notified in writing that flooding information including flood reports, models and geographic information systems outputs and surveying of flood prone land is available no later than one month following the completion of construction. If the information is requested by any of the parties, the flood information must be provided no later than six months following the completion of construction or within another timeframe agreed with Council, EHG and the SES.

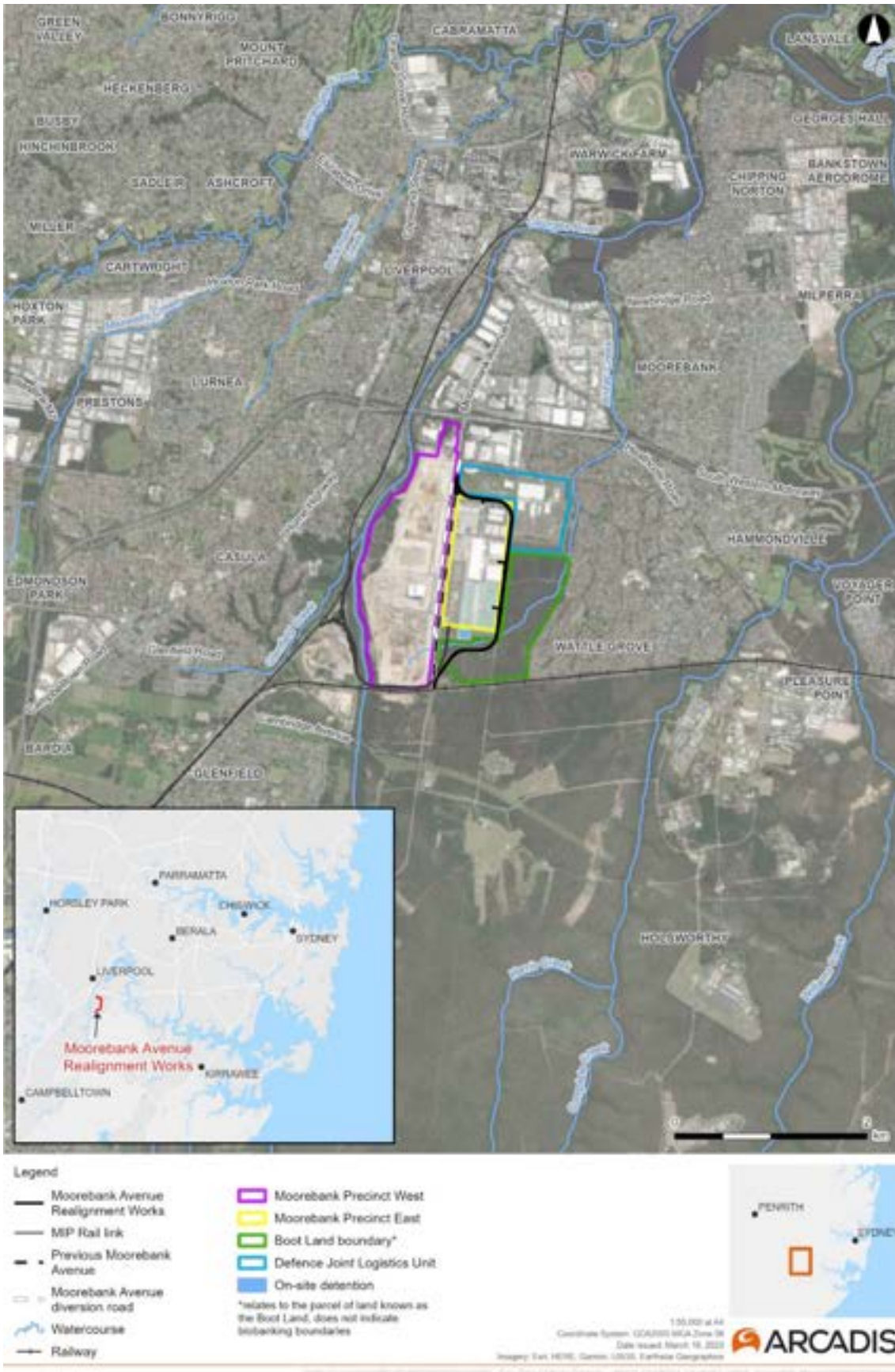


Figure 1.1: Project Location





Figure 1.2: Project Layout



## 2 PURPOSE AND OBJECTIVES

### 2.1 Purpose

The purpose of the CSWMP is to describe how construction impacts for soil and water will be minimised and managed during the construction of the Project.

### 2.2 Objectives

The key objective of the CSWMP is to ensure that soil and water impacts are managed appropriately throughout the construction of the Project and consider the mitigation and management measures referred to in:

- NSW Minister's Infrastructure Approval dated 14 October 2021 (SSI-10053)
- Federal Minister for the Environment Approval dated 7 December 2021 (EPBC 2020-8839)
- *Moorebank Avenue Realignment Environmental Impact Statement Volume 1 and Volume 2* prepared by EMM for Sydney Intermodal Terminal Alliance dated March 2021 (EIS) (EMM 2021a)
- *Moorebank Avenue Realignment Response to Submissions* prepared for Sydney Intermodal Terminal Alliance dated May 2021 (RtS) (EMM 2021b).

The NSW Water Quality Objective requirements are the agreed environmental values and long-term goals for NSW's surface water (DECCW, 2006). Upon receipt of the EPL, these objectives will be met by the Construction Contractor during construction of the Project through the implementation of management measures detailed within this CSWMP.

### 2.3 Targets

Table 2.1 details the targets established for the management of soil and water impacts during construction of the Project.

Table 2.1: Project environmental targets for soil and water

Objective	Target	Timeframe	Responsibility
Maintain compliance with relevant NSW and Commonwealth CoA and applicable legislation.	No written warnings or infringement notices	Throughout construction	Construction Contractor
Implement controls and procedures during construction activities to avoid, minimise or manage potential adverse soil, water and/or flooding impacts within and adjacent to the Project Site.	100% compliance	Throughout construction	Construction Contractor
Minimise impacts to, and complaints from, community and stakeholders regarding soil and water impacts.	No complaints from community or stakeholders	Throughout construction	Construction Contractor
Avoid degradation to the receiving environment and waterways. As a result of soil disturbances, surface water runoff and pollution incidents	No reportable incidents	Throughout construction	Construction Contractor
Induction training of construction personnel to include detail on soil and water management during construction	100% of relevant staff	Before and throughout construction	Construction Contractor

Objective	Target	Timeframe	Responsibility
Meet the Water Quality Objectives requirements upon receipt of the EPL during construction.	100% compliance	Throughout construction	Construction Contractor

## 3 ENVIRONMENTAL REQUIREMENTS

### 3.1 Relevant Legislation and Guidelines

#### 3.1.1 Legislation

All legislation relevant to the Project is included in Appendix B of the CEMP. Legislation considered during the development of the CSWMP includes:

- *Commonwealth Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act)
- *Environmental Planning and Assessment Act 1979* (EP&A Act)
- Environmental Planning and Assessment Regulation 2000
- *Protection of the Environment Operations Act 1997* (POEO Act)
- *Water Management Act 2000*
- *Fisheries Management Act 1994*
- *Work Health and Safety Act 2011* (WHS Act)
- *Contaminated Land Management Act 1997* (CLM Act).

#### 3.1.2 Additional Approvals, Licences, Permits and Requirements

Refer to Appendix C of the CEMP.

#### 3.1.3 Guidelines and Standards

The main guidelines, specifications and policy documents relevant to the CSWMP include:

##### Guidelines

- Acid Sulfate Soils Assessment Guidelines (DoP, 2008)
- Acid Sulfate Soil Manual (ASSMAC, 1998).
- Bunding and Spill Management Guidelines contained within EPA Environmental Protection Manual for Authorised Officers (EPA, 1995)
- Department of Environment and Conservation (DEC): Bunding & Spill Management. Insert to the Environment Protection Manual for Authorised Officers – Technical section “Bu” November 1997
- Environmental Best Management Practice Guideline for Concreting Contractors (DEC, 2004)
- Fairfull, S. and Witheridge, G. (2003) *Why do Fish Need to Cross the Road? Fish Passage Requirements for Waterway Crossings. NSW Fisheries*
- Fishnote – Policy and Guidelines for Fish Friendly Waterway Crossings (Ref: NSWF – 1181) (NSW Fisheries, November 2003)
- Guidelines for watercourse crossings on waterfront land (DPE, 2022a)
- Guidelines for controlled activities on waterfront land – Riparian Corridors (DPE, 2022b)
- Managing Urban Stormwater: Soils and Construction Volume 1, Landcom, (4<sup>th</sup> Edition) March 2004 (reprinted 2006) (the “Blue Book”)
- Managing Urban Stormwater: Soils and Construction Volume 2A Installation of Services (DECCW, 2008).
- Managing Urban Stormwater: Soils and Construction Volume 2C Unsealed Roads (DECCW, 2008)



- Managing Urban Stormwater: Soils and Construction Volume 2D Main Roads Construction (DECCW, 2008)
- Roads and Salinity (Department of Infrastructure, Planning and Natural Resources (DIPNR), 2003)

#### Standards

- Approved Methods for the Sampling and Analysis of Water Pollutants in NSW (DECC, 2008)
- AS/NZS 5667.1.1988 (R2016) Water quality -Sampling Guidance on the design of sampling programs, sampling techniques and the preservation and handling of samples
- Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC and ARMCANZ, 2000)

#### Codes of practice

- Code of Practice for Water Management – Road Development and Management (RTA, 1999)
- Storage and Handling of Dangerous Goods Code of Practice (WorkCover NSW, 2005).

#### Policies

- NSW Aquifer Interference Policy (NSW DPI – Office of Water, 2012)
- Policy and Guidelines for Fish Habitat Conservation and Management (DPI Fisheries, 2013)

## 3.2 Commonwealth Approval

The Project is considered a controlled action under the EPBC Act and is therefore subject to Commonwealth CoA's. There are no Commonwealth CoA related to soil and water and flood management.

## 3.3 NSW Infrastructure Approval

The requirements of the Infrastructure Approval relevant to the development of this CSWMP are shown in Table 3.1. These are defined as 'primary NSW CoA' and specifically relate to the development of the CSWMP. Secondary CoA relevant to, but not specific to the development of the CSWMP, have been listed in Appendix B. A cross reference is also included to indicate where the CoA is addressed in the CSWMP or other Project plans.

Table 3.1: Primary NSW CoA relevant to the CSWMP

No.	Requirements	Document reference
A6	A strategy, plan or program (or the like) required by the terms of this approval may be combined with any other strategy(ies), plan(s) or program(s) with the agreement of the Planning Secretary.	Section 1.3
C6	CEMP Sub-plans as identified in documents listed in Condition A1 must be prepared in consultation with relevant government agencies and stakeholders. Relevant government agencies and stakeholders must be nominated in the risk assessment matrix submitted to the Planning Secretary require in accordance with Condition A14 or A19. Details of all information requested by an agency during consultation must be provided to the Planning Secretary as part of any submission of the relevant CEMP Sub-plan, including copies of all correspondence from those agencies as required by Condition A5.	Section 1.6
C7	The CEMP Sub-plans must state how:	
	(a) the environmental performance outcomes identified in the documents listed in Condition A1 will be achieved	Section 2.2 Section 2.3



No.	Requirements	Document reference
		Section 6 Section 7 Section 8
	(b) the mitigation measures identified in the documents listed in Condition A1 will be implemented	Section 6.8
	I the relevant terms of this approval will be complied with	Table 3.1 Table 3.2
	(d) issues requiring management during construction (including cumulative impacts), as identified through ongoing environmental risk analysis, will be managed through SMART principles.	Section 2.2 Section 2.3 Section 5.3 Section 6.8
C8	With the exception of any CEMP Sub-plans expressly nominated by the Planning Secretary to be endorsed by the ER, all CEMP sub-plans must be submitted to the Planning Secretary for approval. <i>Note: The Planning Secretary will consider the assessment of the predicted level of environmental risk and potential level of community concern required under Condition I(e) when deciding whether any CEMP Sub-plans may be endorsed by the ER.</i>	Section 1.5 Appendix A
C9	The CEMP Sub-plans not requiring the Planning Secretary's approval must obtain the endorsement of the ER as being in accordance with the conditions of approval and all relevant undertakings made in the documents listed in Condition A1. Any of these CEMP Sub-plans must be submitted to the ER with, or subsequent to, the submission of the CEMP but in any event, no later than one (1) month before construction or where construction is staged no later than one (1) month before the commencement of that stage	Section 1.5 Appendix A
C10	Any of the CEMP Sub-plans to be approved by the Planning Secretary must be submitted to the Planning Secretary with, or subsequent to, the submission of the CEMP but in any event, no later than one (1) month before construction or where construction is staged no later than one (1) month before the commencement of that stage.	Section 1.5 Appendix A
C11	Construction must not commence until the CEMP and all CEMP Sub-plans have been approved by the Planning Secretary or endorsed by the ER (whichever is applicable), unless otherwise agreed by the Planning Secretary. The CEMP and CEMP Sub-plans, as approved by the Planning Secretary or endorsed by the ER (whichever is applicable), including any minor amendments approved by the ER, must be implemented for the duration of construction	Section 1.5 Appendix A

### 3.4 Revised Environmental Management Measures

The REMMs relevant to the development of this CSWMP, defined as 'primary REMMs' are detailed in Table 3.2. A cross reference is also included to indicate where the REMM is addressed in the CSWMP or other Project plans. Secondary REMMs relevant to, but not specific to the development of the CSWMP, have been listed in Appendix B.

Table 3.2: Primary REMMs relevant to the development of the CSWMP

No.	Requirements	Timing	Document reference
WAR01	A Water Management Plan (WMP) will be developed for the Project post-approval and will be encompassed within the CEMP. The WMP will provide details for the ongoing management and maintenance of water management and mitigation measures during the construction phase of the Project.	Prior to construction	This CSWMP Section 1.3
WAR02	A Soil and Water Management Plan (SWMP) will be prepared in accordance with Managing Urban Stormwater: Soils and Construction – Volume 1 (Landcom, 2004) for the construction phase of the Project and will be encompassed within the CEMP.	Prior to construction	This CSWMP Section 1.3
WAR03	A surface water monitoring program for the construction phase of the Project will be developed as part of the SWMP. Monitoring locations will target discharge locations such as temporary sediment basins and receiving waters.	Prior to construction During construction	Appendix C
WAR06	A dewatering and discharge procedure is to be incorporated in the SWMP. Recommended discharge criteria is provided in Section 5.8 of the Water Assessment.	Prior to construction During construction	Appendix D
WAR15	A flood emergency response and evacuation plan or equivalent will be prepared and implemented for the construction phase of the Project to minimise hazard to construction personnel, construction plant/equipment and downstream watercourses.	Prior to construction During construction	Figure 4.3 Appendix E

## 4 EXISTING ENVIRONMENT

### 4.1 Key References

The sources of data and information for the Water Assessment carried out and used to develop this CSWMP are Section 7.7 and Appendix G of the Project EIS and Section 4.13 and Appendix D of the Project RfS.

The Project boundary and relevant environmental constraints are shown on the Sensitive Area Plans included in Appendix D of the CEMP.

Key components of the Water Assessment included:

Desktop review of existing environmental information:

- Moorebank Logistics Park Concept Design – Stormwater (Arcadis, 2020)
- Atlas of Australian Acid Sulfate Soils (CSIRO, 2023)
- Moorebank Intermodal Terminal Project: Environmental Impact Statement – Surface Water Assessment (Parsons Brinckerhoff, 2014)
- Water Sharing Plan for the Greater Metropolitan Region Unregulated River Water Source–2011 - Lower Georges River and Bunbury Curran Creek Management Zone (NSW Government, 2011a)
- Water Sharing Plan for the Greater Metropolitan Region Groundwater Sources–2011 - Sydney Basin Central Groundwater Source (NSW Government, 2011b)
- SIMTA Intermodal Terminal Facility – Stage 1 – Phase 2 Environmental Site Assessment (JBS&G, 2015)
- Overland Flow Report – SSI 10053 Moorebank Avenue Realignment (Costin Roe, 2020)
- Anzac Creek Floodplain Risk Management Study and Plan (FRMSP) (BMT WBM, 2008)
- Georges River Floodplain Risk Management Study and Plan (Bewsher, 2004)
- Georges River Flood Study: Final Draft Report (BMT, 2020)
- Liverpool Local Environmental Plan 2008
- Liverpool Development Control Plan 2008
- NSW Water Quality and River Flow Objectives (DECCW, 2006)
- Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZG, 2018)
- Working on waterfront land (NRAR, 2020)
- Guidelines for controlled activities on waterfront land – Riparian Corridors (DPE, 2022b)
- Controlled activities on waterfront land – Guidelines for watercourse crossings on waterfront land (DPE, 2022a)
- Policy and Guidelines for Fish Habitat Conservation and Management (DPI Fisheries, 2013).
- Other relevant environmental and strategic planning documents.

The following sections summarise existing soil and water conditions within and adjacent to the Project Site including soil conditions, surface water, groundwater, stormwater infrastructure and flooding.

### 4.2 Environmental Aspects

#### 4.2.1 Regional Context

The area surrounding the Project Site is mostly flat with isolated areas that are steep in gradient and short in distance; these isolated areas are associated with permanent and ephemeral water courses and drainage



lines. The surrounding area has experienced previous disturbance from clearing of vegetation and subsequent earthworks (cut and fill), largely for the creation of transmission line easements and access tracks.

The Georges River and Anzac Creek are the closest waterways to the Project Site. The Georges River catchment (960 km<sup>2</sup>) is located 500 metres west of the Project Site. Georges River flows in a south to north direction and is well defined with vegetated banks on both sides of the river. The receiving environment of the Georges River catchment is Botany Bay catchment and includes residential, industrial, commercial, recreational and bushland with the main sources of pollution coming from stormwater runoff.

The Georges River forms the western boundary of the MPW site where the channel is well defined with vegetated banks on both sides of the channel.

Anzac Creek is a sub-catchment of the Georges River catchment, a first order ephemeral tributary (10.6 km<sup>2</sup>). The tributary flows towards the DJLU site and discharges into the Georges River, three kilometres north of the Project Site. The upstream Anzac Creek channel is characterised by a series of linked ponds constructed as part of the former Royal Australian Engineers golf course (now the MPW Site). Anzac Creek is predominately in a natural state within the Boot Land adjacent and immediately downstream of the Project Site. The watercourse has been extensively altered further downstream within the DJLU land and adjacent to Wattle Grove; structures including several instream culverts run along the length of the creek, upstream of the Project Site.

The Georges River and Anzac Creek are considered sensitive receiving environments i.e. they are both defined as having a high conservation or community value and/or support ecosystems or human uses of water that are particularly sensitive to pollution or degradation of water quality.

## 4.2.2 Project Site

### 4.2.2.1 Topography, Soils and Geology

The Project Site is comprised of predominantly flat areas with isolated areas of steeper slopes near watercourses and drainage lines. The Project Site is underlain by sand or clayey sand fill to depths of up to 1.5 metres over interbedded alluvial sand and clay which is likely to be floodplain deposits associated with the Georges River with depths of up to 23 metres (Golder, 2016).

Alluvium soils are present extensively across the northern, western, and southern extents of the Project Site and decreases in thickness towards the east. Ashfield Shale lies below the alluvium layer with Hawkesbury Sandstone, a part of the Triassic age Wianamatta Group, immediately below the alluvium in the southern portion of the Project Site.

### 4.2.2.2 Acid Sulfate Soils

Based on the review of the Atlas of Australian Acid Sulfate Soils, there is a low to extremely low chance of acid sulfate soils being present at the Project Site.

Based on a review of the *Liverpool Local Environmental Plan 2008* mapping, category 1 (likely to be found below the natural ground surface) acid sulfate soils have been recorded in the Georges River.

### 4.2.2.3 Saline Soils

Based on a review of the *Liverpool Local Environmental Plan 2008* mapping, no saline soils have been identified within or adjacent to the Project Site.

#### 4.2.2.4 Rainfall and Climate

The average yearly rainfall in the vicinity of the Project Site was based on data collected at the Bankstown Airport Automatic Weather Station (AWS). Rainfall averages have been inferred from the Bureau of Meteorology (BoM) for the period from 1968 to April 2023. The annual average rainfall is 890.5 millimetres, with the wettest month being March, with an average rainfall of 113.5 millimetres. The driest month is September with an average of 44.5 millimetres (BoM, 2023).

Average maximum temperatures at the Bankstown Airport AWS have been inferred from BoM (2023) for the period 1968 to 2023. The lowest average temperatures are in July at 17.6 degrees Celsius and highest in January at 28.5 degrees Celsius. Average minimum temperatures were lowest in July at 15.5 degrees Celsius, and highest in January at 25.3 degrees Celsius (BoM, 2023).

#### 4.2.2.5 Surface Water

##### *Catchments and waterways*

As described in Section 4.2.1, Anzac Creek rises west of the Project Site and flows in an easterly direction traversing the existing Moorebank Avenue and Moorebank Intermodal Precinct Rail Link and crosses into the Project Site (see Figure 4.1).

A review of the water quality monitoring data for Anzac Creek has shown that the creek was identified as a potential pathway for the migration of per and poly-fluoroalkyl substances (PFAS). PFAS concentrations in water samples collected from Anzac Creek were found to be greater than the human health drinking water guidelines, but below recreational water use guidelines (CH2M HILL, 2018). Refer to Section 4.2.5 of the Construction Contamination Management Plan (CCMP) for further details.

##### *Surface water quality*

Previous water quality sampling (Hyder, 2013; Parsons Brinckerhoff, 2014; CH2M HILL, 2018, Biosis, 2018; Bio-Analysis, 2023) for Anzac Creek indicates the following water quality characteristics:

- Most physico-chemical water quality parameters are within ANZECC (2000) guidelines for low land aquatic ecosystems in south-eastern Australia, with the exception of pH and dissolved oxygen which were occasionally lower than the guideline range and turbidity which occasionally exceeded the guideline value
- No major exceedances of metals that indicate unusual or long-term trends of concern. However, aluminium concentrations were observed to exceed guideline values in one sample on Anzac Creek (Hyder, 2013)
- Total nitrogen and total phosphorus occasionally exceed ANZECC (2000) guideline values. Anzac Creek was observed to exceed guideline values more frequently, which was attributed to runoff from the former Royal Australian Engineers golf course (Parsons Brinckerhoff, 2014).
- Most water and sediment sampling undertaken in Anzac Creek were within the ANZECC (2000) guidelines with the exception of aluminium (260 ug/L), nickel (25 mg/kg) and lead (91 mg/kg) that exceeded the ANZECC criteria which provides the baseline survey for Anzac Creek (Biosis, 2018)
- Bi-annual water and sediment quality monitoring has been undertaken in Anzac Creek for the MPE Stage 2 Project since 2018 (Bio-Analysis, 2023). The latest reporting period for spring 2022 indicated ANZECC guideline (2000) exceedances for water sampling including aluminium (survey 1: 4000 ug/L and survey 2: 93 ug/L) and copper (survey 1: 2.6 ug/L).



Figure 4.1: Nearby Waterways



#### 4.2.2.6 Groundwater

Two groundwater systems have potential to interact with the Project Site:

- Alluvial groundwater systems
- Semi confined groundwater systems within the bedrock.

Alluvial groundwater systems are unconfined (not under pressure) to semi confined (partially pressurised) alluvial groundwater systems associated with Georges River and Anzac Creek.

##### *Groundwater levels*

No registered groundwater bores were identified within the Project Site. However, there is one existing groundwater monitoring well located in the Project Site and three groundwater monitoring wells located within MPE site (JBS&G, 2015).

The BoM Groundwater Explorer (BoM, 2023b) displays 18 groundwater bores present within a 2 kilometre radius of the Project Site. Of the 18 groundwater bores, approximately 11 are functional; the groundwater bore depths range from 4-23.7 metres.

The Hydrogeology Map of Australia (Geoscience Australia) identified that aquifers within the Project Site are likely to be low to moderate productivity. Regional groundwater flows are expected to be in a west and northerly direction towards the Georges River.

Two main aquifer systems were identified as part of previous investigations conducted at the MPW site:

- A perched system within the alluvium soils near the Georges River
- A deeper aquifer within the bedrock.

Groundwater depth varies across the Project Site (four metres to seven metres below ground level (mbgl)). Groundwater within the shallow alluvial aquifer flows towards the Georges River at depths typically around seven to eight mbgl. Groundwater is generally shallower near Anzac Creek around 1.5 mbgl in the south-eastern corner of the MPE Site.

##### *Groundwater Dependant Ecosystems*

Parts of the Project Site which relate to ecosystem types identified in the Groundwater Dependent Ecosystems (GDE) Atlas including Castlereagh Swamp Woodland, Castlereagh Scribbly Gum Woodland and Castlereagh Ironbark Forest, have been identified as GDE in the south-western portion of the Project Site (refer to Figure 4.2 and the CBMP for further detail on GDEs).



Figure 4.2: Groundwater dependent ecosystems



#### 4.2.2.7 Stormwater Infrastructure

Existing stormwater drainage infrastructure in proximity to the Project Site primarily consists of pit and pipe network and open channels associated with the MPE and MPW Sites as well as the existing Moorebank Avenue and DJLU. The majority of the existing Project Site drains to Anzac Creek, while the north-western extent of the Project Site drains towards the current infrastructure established as part of the MPE and MPW developments before discharging to the Georges River. It is noted that some aspects of the stormwater infrastructure associated with the MPE and MPW developments are still in construction, as such, stormwater flow may be subject to change as construction progresses.

There are four external stormwater catchments upstream of the Project Site as detailed in the Revised Water Assessment in the RtS. Table 4.1 summarises the upstream drainage catchments located on or adjacent to the Project Site.

Table 4.1: Summary of upstream drainage catchments

Catchment	Area (ha)	Outlet ID	Outlet location	Peak discharge at outlet <sup>2</sup>	Receiving waterway
MPE A	22.8	A	North crossing Project Site	2.9 m <sup>3</sup> /s (Costin Roe, 2019)	Anzac Creek
MPE B	24.9	B	Central crossing of Project Site	2.1 m <sup>3</sup> /s (Costin Roe, 2018)	Anzac Creek
MPE C	57.3	C	Previous Moorebank Avenue	6.7 m <sup>3</sup> /s (Arcadis, 2019)	Georges River
DJLU	5.1	C	Previous Moorebank Avenue	6.7 m <sup>3</sup> /s (Arcadis, 2019)	Georges River

#### 4.2.2.8 Flooding

The 100-year Annual Recurrence Interval (ARI) flood extent is about 400 metres west of the Project Site. While the Probable Maximum Flood (PMF) event is shown to extend up to the north-western section of the Project Site it does not encroach on the Project Site. Some backwater flooding effects during such an extreme flood event may be experienced in the channel located in the MPW site that conveys water from MPE Catchment C and the DJLU Catchment to the Georges River. The critical storm duration for the Georges River near the Project Site is 36 hours for the 100-year ARI storm event (Parsons Brinckerhoff, 2014). Flood levels resulting from the critical storm are expected to remain elevated for a relatively long period of time, in the order of a day or more.

Further flood modelling was carried out to assess the existing flood conditions during stormwater events for Anzac Creek (Costin Roe, 2020). Flood mapping shows that shallow overland flooding extends across much of the Project Site for all events. However, mainstream flooding along Anzac Creek is relatively well confined to the creek line for events up to the 100-year ARI (refer to Figure 4.3). Existing 1% Annual Exceedance Probability (AEP) flood mapping has been undertaken for the Project Site during 85% detailed design that is shown in Appendix E.

The critical storm duration for the upper reaches of Anzac Creek near the Project Site were determined to be in the order of 1.5 hours (Costin Roe, 2020). Critical storm durations for lower parts of the catchment are typically in the order of 9 hours (BMT WBM, 2008). As Anzac Creek has a significantly shorter critical storm duration than the Georges River, the timing of peak flows from Anzac Creek are expected to occur well before the Georges River peak as is experienced by other local tributary catchments (BMT, 2020).

<sup>2</sup> Peak discharge for the 100-year ARI design storm event



Depths of flooding in the vicinity of the Project alignment reach up to about 1.5 metres in the 100-year ARI event, extending to a maximum of about 2.5 metre deep for the PMF. Flooding conditions along Anzac Creek would be typically of relatively high hazard and unsafe for construction workers and vehicles during the construction period for all events assessed, whilst overland flows approaching the creek line would be typically of low hazard. A Flood Emergency Response plan is provided in Appendix E.

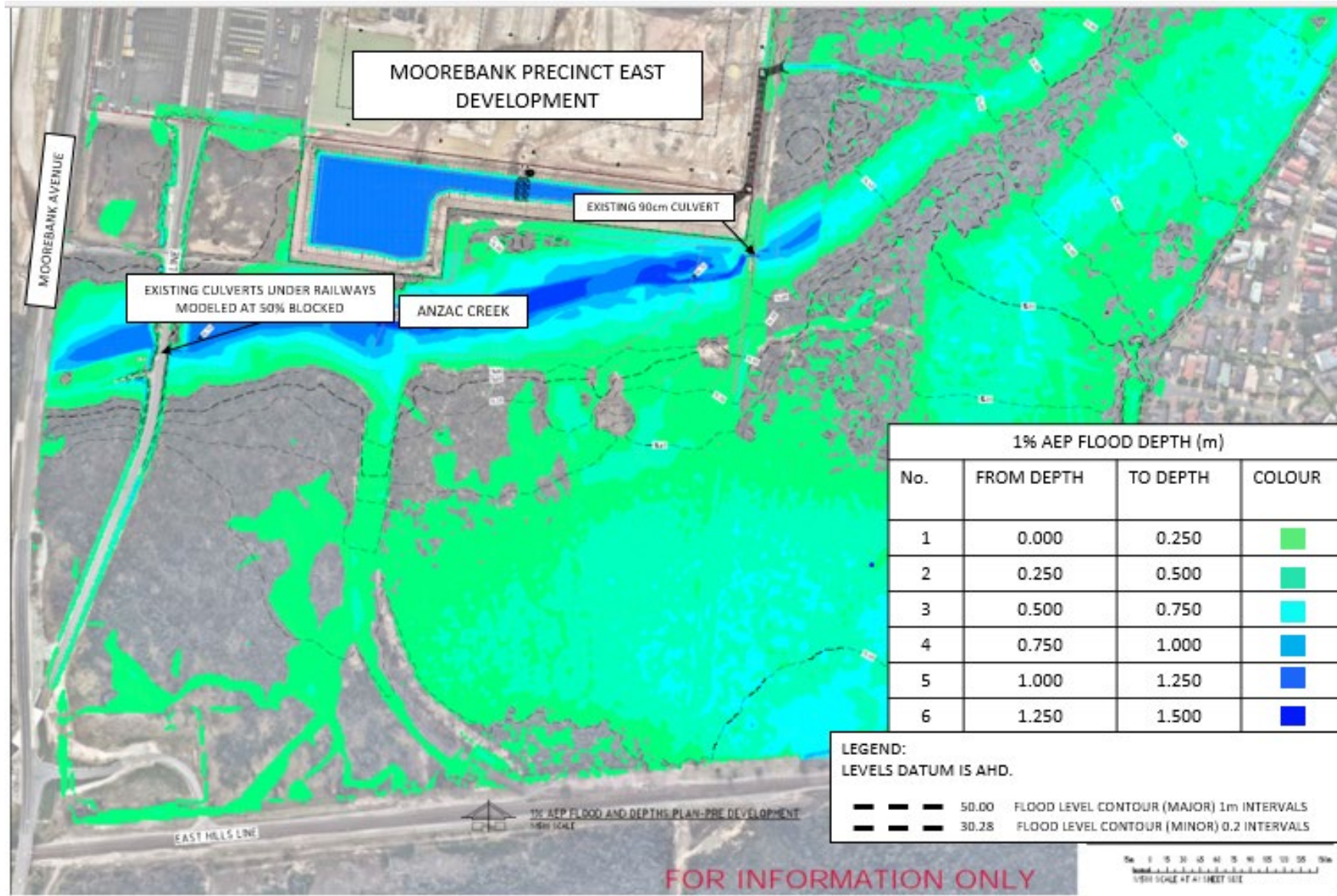


Figure 4.3: Anzac Creek existing condition flood level and depth (100-year ARI)(Costin Roe, 2020)

## 5 ENVIRONMENTAL ASPECTS AND IMPACTS

### 5.1 Construction Activities

Section 2.3 of the CEMP provides an overview of the construction activities that have the potential for environmental impact. The potential risks have been identified based on the outcomes of the risk assessment provided in Appendix D of the CEMP. The potential environmental aspects and impacts associated with construction are identified in Table 4.1 of the CEMP.

Key aspects of the Project that could result in adverse impacts to soils and water include:

- Preliminary enabling works
- Vegetation clearing and topsoil stripping
- Construction of ancillary facilities, site compounds and storage areas for plan, construction materials and spoil
- Earthworks and excavations during construction, including excavations required for culvert and basin construction as part of stormwater drainage work
- Temporary and permanent watercourse crossings and work platforms
- Temporary access roads
- Construction in areas of highly erodible soil and potential contaminated land
- Material stockpiling
- Pavement construction including installation of pavement and subsoil drainage
- Construction discharges including surface water runoff and dewatering of sediment basins.

### 5.2 Impacts

Construction of the Project may result in direct and indirect impacts to soil and water and flooding, including:

- Changes to streamflow flow regimes including catchment yield, peak discharge, and velocity as a result of increased impervious area and/or flow diversions.
- Increased risk of erosion and scour of downstream waterways due to exposed soils, altered streamflow regimes and the installation of stormwater infrastructure without adequate scour protection.
- Altered watercourse geomorphology due to increased risk of erosion and scour of exposed soils and changes in streamflow flow regimes.
- Reduction in the water quality of receiving watercourses resulting from:
  - Increased concentrations and loads of suspended solids, nutrients, and metals in runoff from exposed soils due to disturbance activities and vehicle movements
  - Spills and/or leaks of fuel, oils, hydraulic fluids and other substances used in construction
  - Run-off from potentially contaminated excavation areas and works within waterways disturbing contaminated sediment.
- Increased flood risk resulting in:
  - Hazard to site workers health and safety and plant/equipment damage
  - Construction materials being washed into watercourses
  - Increased localised upstream flooding where existing drainage lines are undergoing construction.



- Groundwater ingress into the construction area, increasing the volume of water that requires management and reducing the effectiveness of management measures.
- Reduction in groundwater quality where groundwater interception occurs during construction.

Potential impacts on soil and water and flooding as a result of construction of the Project will be minimised through the implementation of the environmental management measures provided in Section 6.

### 5.3 Cumulative Impacts

Cumulative soil and water and flooding impacts may arise from the interplay between construction activities associated with the Project, other approved or proposed projects that are likely to occur within the area. When considered in isolation, specific impacts may be considered minor. These minor impacts may be more substantial however, when the impact of multiple projects on the same receivers is considered.

As outlined in the EIS, a number of other projects in the area that may coincide with construction works include, but are not limited to the following:

- MPE Stage 2 (SSD 7628)
- MPW Stage 2 (SSD 7709) and Stage 3 (SSD 10431)
- M5 Motorway Westbound Traffic Upgrade
- Glenfield Waste Services Resource Recovery Facility (SSD 6249).

Although impacts are likely to be associated with soil erosion, soil management, contamination and spills, it is anticipated that these impacts will be short-term and minor as they will be limited to the construction phase and will be minimised through the implementation of management measures identified in Section 1.1.

Communication between the Construction Contractor and developers for these adjacent projects will be undertaken with the aim of combining messages when possible, to coordinate disruptive activities and manage and minimise cumulative impacts to the local community as per the CCS.

## 6 ENVIRONMENTAL MITIGATION AND MANAGEMENT MEASURES

### 6.1 Erosion and Sediment Control

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

A Preliminary Erosion and Sediment Control Plan (ESCP) has been prepared and details the location, design and maintenance of erosion and sediment control measures during construction (refer to Appendix F).

The Construction Contractors will prepare progressive ESCPs, based upon the Preliminary ESCP, as construction progresses and will take into account the construction program, work methods, and location of the works and surrounding sensitive receivers. The progressive ESCPs will identify ERSED control risks and describe how these will be addressed during construction. The progressive ESCPs will include drawings showing all controls required to avoid erosion and sedimentation within the Project Site, surrounding areas, watercourses, drainage systems, water bodies and wetlands (as appropriate). The drawings will be updated as the site conditions change during construction and will include as relevant:

- Diversions for clean water around construction work areas
- Use of natural ERSED controls where practicable e.g. using felled trees, organic materials, micro water capture and contour shaping.
- Scour protection measures where there is an erosion hazard due to steepness, soil erodibility or potential for concentrating runoff flow
- Stabilisation methods for disturbed areas and temporary drains
- ERSED controls for stockpiles
- Measures to minimise mud tracking on roads
- Measures to retain topsoil on the batter slopes
- Locations of the sediment basins (refer to Section 6.2.1)
- Measures to reduce flow velocities and minimise the potential for erosion in runoff flow paths
- Controls for wastewater (e.g. dewatering, surface washing, grit blasting, saw cutting, drilling, washing vehicles and plant) to minimise discharge on or around the site
- Maintenance of ERSED control structures.

The progressive ESCPs will include all ancillary activities and/or areas and activities that may impact on water quality, such as:

- Access and haulage tracks
- Stockpile and storage areas
- Temporary work areas
- Materials processing areas
- Ancillary and compound areas

- Location(s) of concrete washouts
- Known (or discovered areas) of contamination.

Environmental Work Method Statements (EWMS) will be prepared to manage and control high risk activities (such as works in Anzac Creek) that have the potential to negatively impact on the environment, and where required, will include an activity specific ESCP. The ESCP developed for high-risk activities, will be prepared in consultation with a Certified Professional in Erosion and Sediment Control (CPESC). An EWMS template has been provided in Appendix E of the CEMP.

## 6.2 Sediment Basins

Temporary sediment basins will be required during construction of the Project. Sediment Basin A, C and 3 (See Appendix F) may be used by the Construction Contractor during construction. Basins A and C will later be converted to bio-retention basins for operations. Storage volumes and basin locations are included in the ESCP. Locations and sizing will be refined by the Construction Contractor, with consideration of the relevant guidelines, as construction progresses and updated in the progressive ESCPs (refer to Section 3.1.3). Water from the sediment basins may be used as dust suppression during construction. This water will be screened prior to usage on site.

### 6.2.1 Rainfall Erosivity and Erosion Hazard

The rainfall erosivity factor is a measure of the ability of rainfall to cause erosion (referred as “R” in the Revised Universal Soil Loss Equation (RUSLE)). The rainfall erosivity factor is used to determine the soil loss in tonnes per hectare over one year, and is used in calculations when sizing construction sediment basins.

The annual soil loss estimates will be used to demonstrate whether sediment basins will be required, or whether sediment traps, fences and other localised controls will be adequate along the alignment. Sediment basins will be designed to the 80<sup>th</sup> percentile of a 5-day event rainfall with opportunity to increase capacity based on the recommendations of the TSI and site constraints.

Where areas of the Project Site are constrained, in particular at tie-ins to existing roads (e.g. areas where the terrain is flat, and levels limit the use of some water management measures), alternative water management such as clean and dirty water diversions, progressive ground cover, temporary sediment traps etc will be implemented where practical and detailed within the ESCP.

## 6.3 Acid Sulfate Soils and Saline Soils

As described in Section 4.2.2.1, there is a low to extremely low chance of acid sulfate soils being present at the Project Site and no saline soil has been mapped within or adjacent to the Project Site. Nevertheless, best practice measures will be put in place to manage any unexpected finds in relation to acid sulfate soils and saline soils.

## 6.4 Tannin Management

Tannins may result from the storage and use of mulch and are generally highest from mulched vegetation that is stockpiled in areas that are subject to inundation. Placement in wet areas will result in accelerated leaching of tannins into water, concentration of tannins in pooled water, and result in greater impacts on water quality.



The temporary application during construction and the application of mulch for permanent landscaping will be designed and planned to avoid material and tannin runoff and will be addressed within the ESCP. This will include limiting the application of mulch near waterways where practicable.

## 6.5 Dewatering Management

Dewatering is any activity that involves the removal of ponded stormwater or infiltrated groundwater from any location within the Project Site (including from sediment basins and dams) and the subsequent reuse or discharge of that water. The Construction Contractors will plan to avoid and minimise discharges as much as practicable and undertake dewatering activities in a manner to minimise erosion and pollution of the environment. The EPL will determine the discharge criteria for licensed discharge points. The CSWMP will be updated upon receipt of the EPL.

A Dewatering and Discharge Procedure has been prepared (Appendix D) and outlines disposal options.

## 6.6 Work in Waterways

Works on waterfront land<sup>3</sup> will be carried out in accordance with controlled activity guidelines (refer to Section 4.1 and Figure 4.1). Where work is required within waterways, an EWMS for the work(s) will be prepared and will detail the control measures to avoid or minimise erosion and any adverse impact on water quality and riparian fauna and flora.

Where culvert works are required within Anzac Creek, these will be scheduled during periods of lower rainfall where possible to limit contact with stormwater. Cofferdams and diversions will be installed to provide dry working disturbed areas within Anzac Creek. Outlet structures will be constructed in accordance with NRAR's Guideline for outlet structures on waterfront land (NSW Office of Water, 2012).

### 6.6.1 Temporary Waterway Crossings

Temporary waterway crossings may be required for the Project. A suitably qualified and experienced engineer within the Construction Contractors team will design, construct and maintain temporary waterway crossings and maintain fish passage consistent with the following guidelines:

- Guidelines for controlled activities on waterfront land – Riparian Corridors (DPE, 2022a)
- Controlled activities on waterfront land – Guidelines for watercourse crossings on waterfront land (DPE, 2022b)
- Policy and Guidelines for Fish Habitat Conservation and Management (DPI Fisheries, 2013).

Permanent design features will be confirmed during detailed design.

## 6.7 Groundwater

In accordance with REMM WAR17 and WAR18, hydrogeological investigations will be undertaken by a suitability qualified person to assess the potential impacts on the excavation of an underlying aquifer and determine the base of excavation with respect to the groundwater level. Where impacts may occur, the suitability qualified person will determine if mitigation to protect groundwater quality is required.

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<sup>3</sup> Defined in the *Water Management Act 2000* as the bed of any river, lake or estuary, and the land within 40 metres of the river banks, lake shore or estuary mean high-water mark

## 6.8 Management Measures

Management actions prescribed by this CSWMP aim to avoid and minimise soil and water impacts are summarised in Table 6.1.

The development of management measures has been based on SMART principles i.e. measures that are specific, measurable, achievable, relevant, and time-bound:

- **S**pecific –mitigation and management measures identified in specifically to manage soil and water impacts during construction
- **M**easurable – Inspection and monitoring requirements detailed in Section Table 7.1 include specific measures or indicators for which inspection and monitoring requirements will be triggered
- **A**chievable – Ongoing compliance with the Infrastructure Approval (Table 3.1 and Table 3.2) and Commonwealth CoAs, is achievable throughout the delivery of construction and represents the minimum requirements to be implemented by the Construction Contractor
- **R**elevant - The management measures outlined in represent the approach to monitoring and tracking against the objectives, targets and environmental performance outcomes (identified in Section 2 of the CSWMP)
- **T**ime-bound – The management measures set out within are required to be implemented for the duration of construction, setting a clear and defined time frame and includes reference to other timeframes, including during detailed design, pre-construction, post-construction and/or operation.

Table 6.1: Soil and water management and mitigation measures

ID	Management Measure	Timing	Responsibility	Reference	Evidence
<b>Erosion and Sediment Control</b>					
SW01	The Construction Contractor must prepare ESCPs for the duration of construction. The ESCPs must be prepared by a person with demonstrated skills and experience in preparing ESCPs in accordance with the Blue Book guidelines (Landcom, 2004). The ESCPs must be reviewed and updated to reflect site conditions during construction.	Prior to construction During construction	Construction Contractor	NSW CoA E31 REMM WAR04 REMM BIO26	ESCP
SW02	Erosion and sediment control measures will be implemented and maintained at all work sites in accordance with the principles and requirements in Managing Urban Stormwater – Soils and Construction, Volume 1 (Landcom 2004) and Volume 2D (DECC, 2008).	During construction	Construction Contractor	NSW CoA E31 REMM BIO07 REMM BIO22 REMM BIO26 REMM WAR14	ESCP
SW03	The NSW Water Quality Objective requirements (upon receipt of the EPL) will be met during construction of the Project through the implementation of management measures detailed within this Plan.	Detailed Design During construction	Designers Construction Contractor	NSW CoA E75 NSW CoA E79 REMM WAR08	Detailed Design Report EPL
SW04	Construction activities will be staged where possible to minimise clearing and total disturbance of an area, particularly around drainage lines and watercourses which should remain in their natural state. This will include: <ul style="list-style-type: none"> <li>• Screen water that is intended for dust suppression use</li> <li>• Constructing clean water diversions and drains to accommodate up to the 10-year ARI design storm event</li> <li>• Revegetating areas of disturbance following construction in accordance with Blue Book (Landcom, 2004)</li> <li>• Stabilisation and rehabilitations of works areas as soon as practicable.</li> </ul>	Prior to construction During construction	Construction Contractor	REMM BIO15 REMM BIO16 REMM BIO23 REMM BIO24 REMM WAR09 REMM AIR16	ESCP



ID	Management Measure	Timing	Responsibility	Reference	Evidence
<b>Sediment basin management</b>					
SW05	Sediment basins must be designed and constructed in accordance with the Blue Book (Landcom, 2004) detailed within the ESCP and will consider the outcomes of the Targeted Site Investigation.	Prior to construction During construction	Construction Contractor	REMM WAR08 TSI	ESCP
SW06	<p>Sediment basins will be managed in accordance with Blue Book (Landcom, 2004) for the duration of construction. The Construction Contractor will consider the following:</p> <ul style="list-style-type: none"> <li>• Provide and maintain suitable access to sediment basins and sediment traps to allow inspection, maintenance, monitoring and cleaning out in all weather conditions</li> <li>• Sediment basins should be cleaned out whenever the accumulated sediment exceeds 60% of the sediment storage zone</li> <li>• Accumulated sediment from sediment basins and traps must be removed in such a manner as not to damage the structures and disposed of, or reused, in accordance with Construction Waste and Resources Management Plan (CWRMP).</li> <li>• Captured water within sediment basins used for dust suppression within the Project Site rather than using potable water, where practicable and following screening of water to ensure appropriate for that use.</li> <li>• Remove all construction sediment basins and sediment traps prior to completion of works and ensure all upstream areas have been vegetated or otherwise stabilised.</li> </ul>	During construction	Construction Contractor	REMM BIO15 REMM BIO25 REMM WAR05	Inspection records
<b>Dewatering Management</b>					
SW07	A Dewatering and Discharge Procedure will be prepared which will outline the dewatering methodology, testing requirements, supervision requirements, staff responsibilities and training, and approvals required before any de-watering activity begins.	Prior to construction	Construction Contractor	REMM WAR06	Appendix D

ID	Management Measure	Timing	Responsibility	Reference	Evidence
	The personnel responsible for approval and/or carrying out dewatering activities must be adequately trained and inducted on the use of the dewatering procedure.				
SW08	<p>If it is proposed to discharge stormwater, a Water Pollution Impact Assessment will be required. This must be consistent with Nation Water Quality Guidelines and submitted to the Planning Secretary for information. The assessment must:</p> <ul style="list-style-type: none"> <li>• Provide details of the discharge locations and receiving waterways</li> <li>• Characterise the expected discharge quality under typical and worst-case conditions for all pollutants present at levels that pose a risk of non-trivial harm to human health or the environment</li> <li>• Assess the potential impact of discharges on the environmental values of the receiving waterway, including typical through to worst-case scenarios with reference to the relevant Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZG 2018) for slightly to moderately disturbed ecosystems for standard receiving environments</li> <li>• Demonstrate that all practical and reasonable measures to avoid discharges (e.g. stormwater reuse or tinkering for offsite disposal) and minimise water pollution and protect human health and the environment from harm are investigated and implemented.</li> </ul>	Prior to water discharge	Construction Contractor	CoA NSW E79 REMM WAR06	EPL Permit to Discharge Construction Water Quality and Discharge Impact Assessment
SW09	<p>The following records will be kept in relation to dewatering:</p> <ul style="list-style-type: none"> <li>• Dewatering procedure</li> <li>• Date and time for each discharge at each location</li> <li>• Water quality test results for each discharge</li> <li>• Personnel approving the dewatering activities</li> <li>• Evidence of discharge monitoring, or risk assessment and mitigation measures used to eliminate the risks of pollution or erosion</li> <li>• Any other EPA licence requirements where issued.</li> </ul>	During construction	Construction Contractor	REMM WAR06	Appendix D

ID	Management Measure	Timing	Responsibility	Reference	Evidence
<b>Working in waterways</b>					
SW10	<p>Work on waterfront land must have regard to the following guidelines:</p> <ul style="list-style-type: none"> <li>Guidelines for controlled activities on waterfront land – Riparian Corridors (DPE, 2022a)</li> <li>Controlled activities on waterfront land – Guidelines for watercourse crossings on waterfront land (DPE, 2022b)</li> <li>Policy and Guidelines for Fish Habitat Conservation and Management (DPI Fisheries, 2013).</li> </ul>	<p>Prior to construction</p> <p>During construction</p>	Construction Contractor	<p>NSW CoA E76</p> <p>NSW CoA E77</p> <p>NSW CoA E78</p> <p>REMM BIO07</p> <p>REMM WAR16</p>	Best practice
SW11	<p>Where work is required within waterways, an Environmental Work Method Statement (EWMS) will be prepared for the work(s) which will include the ESCP developed in consultation with a CPESC. The EWMS for work in waterways must detail the control measures and must include the following:</p> <ul style="list-style-type: none"> <li>Plan work to avoid, where practicable, any activities in aquatic habitats and riparian zones</li> <li>Plan works during periods of lower rainfall</li> <li>Properly protect and signpost as environmentally sensitive areas, all waterways areas in or adjacent to the site which are excluded from the work areas</li> <li>Minimise riparian vegetation removal where practicable, and restrict access to the waterways to the minimum amount of bank length required for the activity</li> <li>Retain stumps in riparian zones and aquatic habitats, where practicable, to reduce the potential for bank erosion</li> <li>Carry out any refuelling of plant and equipment, chemical storage and decanting at least 50 metres away from aquatic habitats.</li> </ul>	Prior to construction	Construction Contractor	<p>REMM BIO15</p> <p>REMM WAR07</p>	EWMS
SW12	<p>The following measures will be carried out to manage activities within watercourses or on waterfront land:</p> <ul style="list-style-type: none"> <li>Implementing practices to minimise disturbance of banks</li> <li>Undertaking bank stabilisation and installing instream structures</li> </ul>	During construction	Construction Contractor	<p>REMM BIO15</p> <p>REMM WAR07</p>	Inspection records



ID	Management Measure	Timing	Responsibility	Reference	Evidence
	<ul style="list-style-type: none"> <li>Maintaining minimum flows to assist in maintaining the viability of aquatic communities and preventing barriers to fish passage</li> <li>Constructing instream crossings during low flows and design so that drainage off crossing doesn't contribute sediment load to the stream.</li> </ul> <p>All drainage feature crossings (permanent and temporary watercourse crossings and stream diversions), drainage swales and depressions will be designed by a suitably qualified and experienced professional and will be designed and constructed in accordance with relevant guidelines.</p> <p>A suitably qualified and experienced engineer within the Construction Contractors team will design, construct and maintain temporary waterway crossings and maintain fish passage consistent with the following guidelines:</p> <ul style="list-style-type: none"> <li>Guidelines for controlled activities on waterfront land – Riparian Corridors (DPE, 2022a)</li> <li>Controlled activities on waterfront land – Guidelines for watercourse crossings on waterfront land (DPE, 2022b)</li> <li>Policy and Guidelines for Fish Habitat Conservation and Management (DPI Fisheries, 2013).</li> </ul>				
SW13	<p>If temporary waterway crossings are required, the following measures will be implemented:</p> <ul style="list-style-type: none"> <li>The crossing will be designed by a suitably qualified and experienced person and will maintain fish passage consistent with the guidelines</li> <li>Hard, sound, durable rock, free of fine particles and not contaminated with foreign materials will be used to avoid erosion of fine sediment material entering the waterway.</li> <li>ERSED controls will be implemented at the entry and exits points of temporary waterway crossings to minimise mud tracking on the crossing.</li> <li>All personnel will complete the induction training for ERSED control.</li> </ul>	During construction	Construction Contractor	Best practice	ESCP
<b>Acid sulfate soils and saline soils</b>					
SW14	Construction in the vicinity of waterways where there is a moderate risk of encountering Potential Acid Sulfate Soils (PASS) and any unexpected PASS	During construction	Construction Contractor	Best practice	Incident response

ID	Management Measure	Timing	Responsibility	Reference	Evidence
	<p>finds and will be managed in accordance with the Acid Sulfate Soil Manual (1998). The manual includes procedures for the investigation, handling, treatment and management of such soils. Management strategies will include:</p> <ul style="list-style-type: none"> <li>• Avoid land where PASS occurs</li> <li>• Avoid disturbing PASS if present on land</li> <li>• Undertake shallow soil disturbance so as not to disturb PASS at depth</li> <li>• Cover PASS with clean fill material</li> <li>• Set aside or do not disturb PASS material.</li> </ul>				
SW15	Soil salinity management will also be carried out in accordance with the NSW Department of Primary Industries (2014) Salinity Training Handbook	During construction	Construction Contractor	Best practice	Incident response
<b>Stockpile Management</b>					
SW16	<p>Stockpile management will comply with the following:</p> <ul style="list-style-type: none"> <li>• Locate stockpiles outside of the tree protection zone of trees or native vegetation identified for retention. Delineate exclusion zones in accordance with AS 4970.</li> <li>• Minimise the number of stockpiles, area used for stockpiles, and time that they are left exposed</li> <li>• Stabilise stockpiles, establish appropriate sediment controls and suppress dust as required</li> <li>• Locate stockpiles at least five metres from likely areas of concentrated water flows and at least 10 metres from waterways that are classified as Class 1 and Class 2 from the DPI Fisheries guideline <i>"Why do Fish Need to Cross the Road? Fish Passage Requirements for Waterway Crossings"</i>.</li> <li>• Keep stockpile heights to no greater than two metres, unless otherwise approved by the Principal, and slopes to no steeper than 2:1.</li> </ul>	<p>Prior to construction</p> <p>During construction</p>	Construction Contractor	Best practice	ESCP Inspection records

ID	Management Measure	Timing	Responsibility	Reference	Evidence
	<ul style="list-style-type: none"> <li>Cover, or otherwise protect from erosion, stockpiles that will be in place for more than 20 days as well as any stockpiles that are susceptible to wind or water erosion, within 10 days of forming each stockpile.</li> <li>Keep topsoil that is not contaminated by noxious weeds in stockpiles for later spreading on fill batters and other areas. Other material may also be stockpiled but kept separated from the topsoil stockpiles.</li> <li>Implement measures to prevent the growth of weeds in topsoil stockpiles.</li> <li>Construct a diversion bank up-slope of stockpiles to divert overland flow around the stockpiles.</li> <li>Minimise loss of soil material from stockpiles by installing sediment fence or geotextile wrapped straw bale filters on the downslope side of the stockpile.</li> </ul>				
<b>Tannin Management</b>					
SW17	Prepare a procedure to manage the use and stockpiling of mulch on site and to reduce the risk of tannin leachate from mulch flowing into waterways, and include this within the ESCP. Prepare the procedure in accordance with TfNSW Environmental Direction 25: Management of Tannins from Vegetation Mulch.	Prior to construction During construction	Construction Contractor	Best practice	ESCP
<b>Monitoring</b>					
SW18	The Construction Contractor will monitor on site weather conditions daily using the BOM website and prepare the site for potential rain events when there is more than a 50% chance of 10 mm of rainfall or greater and following rainfall events.	Pre, during and post rainfall	Construction Contractor	Blue Book (Landcom, 2004)	Inspection records
SW19	Surface water monitoring must be undertaken in accordance with the Construction Soil and Water Monitoring Program and implemented for the duration of construction and for any longer period set out in the monitoring program or specified by the Planning Secretary, whichever is the greater.	During construction	Construction Contractor	REMM WAR03	Monitoring records Construction Surface Water Quality Monitoring Program (Appendix C)



ID	Management Measure	Timing	Responsibility	Reference	Evidence
<b>Groundwater</b>					
SW20	Due to the depth of groundwater, the depth of excavations are not expected to penetrate the underlying aquifer. However, should it become apparent that the groundwater will be intercepted, a Hydrogeological Assessment will be undertaken to consider the installation of an impermeable liner to protect the groundwater quality.	Detailed Design Prior to construction	Construction Contractor	REMM WAR17 REMM WAR18	Hydrogeological Assessment
<b>Flooding</b>					
SW21	A flood emergency response plan will be prepared and implemented during construction that details hazards, construction plant/equipment and downstream watercourses.	Prior to construction	Construction Contractor	REMM WAR15	Appendix E Emergency Response Plan
SW22	Flood information including flood reports, models and geographic information system outputs, and work as executed information from a registered surveyor certifying finished ground levels and the dimensions and finished levels of all structures within the flood prone land, will be provided to the Liverpool City Council (Council), Environment and Heritage Group (EHG) (Former NSW Office Environment and Heritage) and the State Emergency Service (SES).  This will occur in writing no later than one month following the completion of construction and any additional information requested by the Council, EHG or SES will be provided no later than six months following the completion of construction or within another timeframe agreed with the relevant Council EHG or SES.	One month prior to finishing construction works	Principal Construction Contractor	CoA NSW E11	Flood reporting and extent maps Flood mapping notification
<b>Refuelling, washdown and chemical storage</b>					
SW23	Storage, handling and use of dangerous goods and hazardous substances must be in accordance with the <i>Work Health and Safety Act 2011</i> and the <i>Storage and Handling of Dangerous Goods Code of Practice (WorkCover NSW, 2005)</i> .	During construction	Construction Contractor	Best practice	Inspection records
SW24	All fuels, chemicals, and liquids must be stored on slopes less than 1:10 and at least 50 metres away from waterways (including existing stormwater drainage systems) and flood prone areas.	During construction	Construction Contractor	Best practice	Inspection records



ID	Management Measure	Timing	Responsibility	Reference	Evidence
	Secure, bunded areas must be provided around storage areas for oils, fuels and other hazardous liquids.				
SW25	Safety Data Sheets (SDS) must be obtained for dangerous goods and hazardous substances stored onsite before their arrival.	During construction	Construction Contractor	Best practice	Inspection records Safety Data Sheets
SW26	All hazardous substances must be transported in accordance with relevant legislation and codes, including the Road and Rail Transport (Dangerous Goods) (Road) Regulation 1998 and the 'Australian Code for the Transport of Dangerous Goods by Road and Rail' (National Transport Commission, 2008).	During construction	Construction Contractor	Best practice	PIRMP/CEMP Transport register
SW27	Spill prevention and response will comply with: <ul style="list-style-type: none"> <li>• Relevant legislation and Australian Standards</li> <li>• EPA "Bunding and Spill Management Guidelines" contained within EPA Environmental Protection Manual for Authorised Officers".</li> </ul>	During construction	Construction Contractor	Best practice	PIRMP Incident report
SW28	The Construction Contractor must not refuel or maintain plant and equipment, undertake plant/equipment washdown, mix cutting oil with bitumen, or carry out any other activity which may result in spillage of a chemical, fuel or lubricant at any location which drains directly to waters or environmentally sensitive areas, without the appropriate temporary bunding being provided. Refuelling operations must be attended.	During construction	Construction Contractor	Best practice	PIRMP Incident report
<b>Spill Prevention and Response</b>					
SW29	A spill response procedure will be prepared as part of the PIRMP, to minimise the impact of spills. The procedure will include details on the requirements for managing, cleaning up and reporting of spills.	During construction	Construction Contractor	Best practice	PIRMP
SW30	Spill kits will be located to allow for timely response to uncontained spills. Adequate quantities of suitable material to counteract spillage will be readily available. Site inductions will include a briefing on the use of spill kits.	During construction	Construction Contractor	Best practice	Inspection records
SW31	The Construction Contractor will prepare a procedure(s) for the following activities, as a minimum, to minimise the possibility of pollution of the site:	During construction	Construction Contractor	Best practice	PIRMP Inspection records Incident reports

ID	Management Measure	Timing	Responsibility	Reference	Evidence
	<ul style="list-style-type: none"> <li>• Refuelling or maintenance and cleaning of plant and equipment including concrete agitators, bitumen spray bars and asphalt pavers</li> <li>• On-site batching of concrete and asphalt</li> <li>• Mixing of bitumen with cutting oil and additives;</li> <li>• Application of liquid membranes, including paint and thermoplastic, resin, emulsion, precoat agent and curing compound;</li> <li>• Bulk fuel or chemical deliveries;</li> <li>• Removal and disposal of excess chemicals and water used for washing down of equipment;</li> <li>• Pumping out of oil and grease collection pits;</li> <li>• Decanting operations such as for fuel, chemicals and bitumen</li> </ul> <p>The procedure will include the following, as a minimum:</p> <ul style="list-style-type: none"> <li>• Details of the management of the bunded areas including monitoring of the bunded areas, drainage requirements and measures to ensure that bund capacities are maintained</li> <li>• Details of the management associated with the removal and transportation of chemical drums from bunded areas</li> <li>• Routine maintenance requirements of machinery, pumps and other equipment to prevent and/or minimise leaks</li> <li>• Installation of controls for the capture and filtering of all chemicals that may runoff in storm events, for example wax and hydrocarbon curing compounds, bitumen tack coat and saw cutting material.</li> </ul>				

## 7 COMPLIANCE MANAGEMENT

### 7.1 Roles and Responsibilities

The Project organisational structure and overall roles and environmental responsibilities are outlined in Section 5.1 of the CEMP. Specific responsibilities for the implementation of soil and water management are detailed in Section 6 of this CSWMP.

### 7.2 Training

All site personnel (including sub-Construction Contractors) will undergo site induction training relating to soil and water management and flooding issues prior to construction commencing. The induction training will address elements related to soil and water management, including:

- Existence and requirements of this CSWMP
- Relevant legislation, regulations and pending EPL conditions
- Incident response, management and reporting
- Environmentally sensitive locations and exclusion zones
- Emergency response measures in high rainfall or flood events
- The Pollution Incident Response Management Plan (PIRMP)
- Mulch and tannin management
- Stockpile location criteria
- Roles and responsibilities for soil and water management
- ERSED control installation methodology and maintenance
- Sediment basin construction and management
- Dewatering requirements
- Working near or in drainage lines and creeks
- Water quality management and protection measures
- Groundwater issues
- Spill response.
- Specific responsibilities for the protection of soil and water
- All requirements of appendices contained within this CSWMP.

A register will be kept and updated to record employees who have completed the soil and water induction and their date of completion.

Targeted training in the form of toolbox talks or specific training will also be provided to personnel with a key role in soil and water management or those undertaking an activity with a high risk of environmental impact. Project Site personnel will undergo refresher training at not less than six monthly intervals.

Daily pre-start meetings conducted by the Construction Contractor Site Supervisor will inform the site workforce of any environmental issues relevant to soil and water that could potentially be impacted by, or impact on, the day's activities.

Further details regarding staff induction and training are provided in Section 5.2 of the CEMP.

## 7.3 Monitoring and Inspections

Inspections and monitoring of activities with the potential to impact soil and water will occur for the duration of the construction phase of the Project.

Requirements and responsibilities in relation to monitoring and inspections are documented in Section 7.1 of the CEMP. Specific water quality monitoring and inspection requirements are detailed in the following sections.

### 7.3.1 Inspections

Inspection requirements are summarised in Table 7.1.

#### 7.3.1.1 Daily and Weekly Inspections

A daily site walk over and weekly environmental inspections will be undertaken to review compliance and effectiveness of controls. Items that require action will be documented during environmental inspection and notified to the Construction Contractor Site Supervisor.

The Site Supervisor will be responsible for providing appropriate resources in terms of labour, plant and equipment to enable the items to be rectified in the nominated timeframes. Monitoring under this CSWMP will be undertaken by the Construction Contractor's Environmental Advisor during weekly inspections of construction activities to monitor compliance with the requirements of the CoCs and this plan.

Weekly inspections will focus on the following key issues:

- Integrity, capacity and performance of ERSED and flood control measures (e.g. sediment fences, drainage protection, sediment basins, diversion bunds, drain protection devices)
- Rehabilitation works.

#### 7.3.1.2 Wet Weather Preparedness

Where a wet weather event is predicted, the Construction Contractor's Environmental Advisor will undertake a review of site erosion and sediment controls. Wet weather events are defined as more than a 50% chance of 10 mm of rainfall or greater triggering the requirement to prepare the site for wet weather. Wet weather sampling in accordance with monitoring program will occur when >24.4 mm rainfall occurs in a 24 hour period.

The erosion and sediment control review will include:

- Inspection of the site to ensure that all erosion/sedimentation and stabilisation controls are in place and in effective working order
- Actions to be taken to prevent any environmental incidents such as potential pollution incidents
- Measures to be implemented to protect disturbed ground from erosion
- Additional measures to be taken to protect the Project Site from the wet weather event.

An inspection will be undertaken during the wet weather event to review site performance. Following the wet weather event, a post wet weather inspection will be undertaken to review and repair controls as required.

#### 7.3.1.3 Site Shutdown

Prior to a prolonged shut period, the Construction Contractor will undertake a review of all site ERSED controls and prepare the site to minimise potential for pollution during the shut down period. Maintenance will be undertaken if required to ensure the controls are working effectively.



### 7.3.2 Monitoring

Surface water monitoring for the Project will be carried out in accordance with the Construction Surface Water Monitoring Program (refer to Appendix C). Monitoring of discharged water will be undertaken in accordance with the Dewatering and Discharge Procedure (refer to Appendix D).

Monitoring requirements are summarised in Table 7.1.

Table 7.1: Inspections and Monitoring relevant to Soil and Water

Inspection / Monitoring	Frequency	Responsibility	Requirement
<b>Inspections</b>			
Daily site inspections	Daily	Construction Contractor Site Supervisor	Best practice
Inspect all plant and equipment daily for leakages of fuel, oil or hydraulic fluid. Repair any leaks before using item of plant or equipment and maintain records of plant inspections	Daily	Construction Contractor	Best practice
Inspection of sediment basins	Monthly	Construction Contractor	Blue Book (Landcom, 2004)
<b>Rainfall inspections</b> All water quality control and sediment control structures (i.e. ERSERD controls, stockpiles, disturbed areas, revegetated/ stabilised areas and bunded area and sediment basins)	Prior to, during and post wet weather event During dry conditions within 24 hours of expected rainfall defined as more than a 50% chance of 10 mm of rainfall	Construction Contractor Site Supervisor Construction Contractor Environmental Advisor	Best practice
Inspection of all erosion and sediment controls, stockpiles, disturbed areas etc prior to a shutdown	Prior to and after a site shutdown (e.g., Christmas shutdown)	Construction Contractor Construction Contractor Environmental Advisor	Best practice
Pre-flood and post flood inspections	Prior to heavy rainfall and following a flood event	Construction Contractor Construction Contractor Environmental Advisor	Best practice Appendix E
<b>Monitoring</b>			
Review BoM forecast for heavy rainfall events and flood warnings	Daily	Construction Contractor Construction Contractor Environmental Advisor	Appendix E
Visual monitoring of local water quality (i.e. checking for plumes of turbidity and oil and grease)	Daily	Construction Contractor Construction Contractor Environmental Advisor	Appendix C

Inspection / Monitoring	Frequency	Responsibility	Requirement
Monitoring of surface water quality	As per procedure detailed in Appendix C	Construction Contractor Construction Contractor Environmental Advisor	Appendix C
Monitoring of dewatering activities	As per procedure detailed in Appendix D	Construction Contractor Construction Contractor Environmental Advisor	Appendix D

## 7.4 Auditing

Audits (both internal and external) will be undertaken to assess the effectiveness of environmental controls, compliance with this sub plan, State and Commonwealth CoA and other relevant approvals, licenses and guidelines.

Audit requirements are detailed in Section 7.3 of the CEMP.

## 7.5 Reporting and Identified Records

Reporting requirements and responsibilities are documented in Section 7.4 of the CEMP.

Specific reporting requirements associated with the CSWMP are outlined in Table 7.2.

Table 7.2: Reporting Requirements relevant to Soil and Water Management

Report	Frequency	Responsibility
Construction Soil and Water Monitoring Results	For the duration of construction and as required by the Planning Secretary	Construction Contractor

The Construction Contractor will be required to maintain accurate records substantiating all construction activities associated with the Project or relevant to the State and Commonwealth CoA, including measures taken to implement this CSWMP. Records will be made available to the DPE and DCCEEW upon request, within the timeframe nominated in the request.

## 7.6 Incidents

It is the responsibility of all personnel to report any incident in accordance with the incident management procedures detailed to Section 6.1 of the CEMP.

## 7.7 Complaints

Complaints will be managed as soon as possible in accordance with the requirements of the Community Communication Strategy (CCS) and Complaints Management System developed in accordance with NSW CoA B7 and B8 respectively. Complaints will be managed in accordance with Section 5.4.3 of the CEMP and CCS.

## 7.8 Non-Compliances and Corrective Actions

Non-compliance may be identified via internal and external audits, site monitoring, inspections and observations, environmental incidents and emergencies, complaints and management reviews.

Non-compliance and resulting corrective actions will be managed in accordance with Section 7.2 of the CEMP.



## 8 REVIEW AND IMPROVEMENT

### 8.1 Continuous Improvement

Continuous improvement of the CSWMP 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 and through SMART principles:

The continuous improvement process will be designed to:

- Identify areas of opportunity for improvement of environmental management and performance
- Determine the cause or causes of non-compliances and deficiencies
- Develop and implement a plan of corrective and preventative action to address any non-compliances 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.
- Project environmental risks will be identified and included in the risk register and appropriate mitigation measures implemented throughout the construction of the Project as part of the continuous improvement process.

The process for ongoing risk identification and management during construction is outlined in Section 4.2 and Appendix D of the CEMP.

### 8.2 CSWMP Update and Amendment

The processes described in Section 7.5 of the CEMP may result in the need to update or revise the CSWMP. This will occur as needed.

Any revisions to the CSWMP will be endorsed and / or approved in accordance with the process outlined in Section 1.5 of the CEMP.

A copy of the updated CSWMP and changes will be distributed to all relevant stakeholders in accordance with the approved document control procedure.

## **APPENDIX A Environmental Representative Endorsement**



2 September 2023

Our Ref: 2205 L10

National Intermodal Corporation  
Senior Manager – Planning and Environment  
Attention: Westley Owers

Dear Westley

**SSI 10053 - Moorebank Avenue Realignment Works (MARW)  
Environmental Representative (ER) - Endorsement of the Construction Soil and Water  
Management Plan**

Pursuant to SSI10053 Conditions of Approval (CoA) A31(d) and C9, I confirm that I have reviewed and endorsed the following documentation as being consistent with the conditions of approval and relevant undertakings made in the documents listed in Condition A1:

- National Intermodal Corporation, Moorebank Avenue Realignment Works, Appendix F, Construction Soil and Water Management Plan, Version D, dated 22 August 2023 (CSWMP).

In accordance with CoA A6, and as agreed by a nominee of the Planning Secretary (Department of Planning and Environment letter dated 22 November 2022, Reference: SSI-10053-PA-4), the CSWMP includes:

- Water Management Plan (REMM WAR01)
- Erosion and Sediment Control Plan (REMM WAR04)
- Soil and Water Management Plan (REMM WAR02)
- Flood Emergency Response Plan (REMM WAR06)
- Surface Water Monitoring Program (REMM WAR03)

In accordance with CoA C8, the CWRMP was expressly nominated by a nominee of the Planning Secretary to be endorsed by the ER (Department of Planning and Environment letter dated 22 November 2022, Reference: SSI-10053-PA-4).

Yours sincerely,

Maurice Pignatelli  
Environmental Representative – MARW Project  
OptimE Pty Ltd



# APPENDIX B Secondary CoA and REMMs



## B1: NSW Infrastructure Secondary CoA

No.	Requirement	Timing	Document Reference
E11	Flood information including flood reports, models and geographic information system outputs, and work as executed information from a registered surveyor certifying finished ground levels and the dimensions and finished levels of all structures within the flood prone land, must be provided to the relevant Council, OEH and the SES in order to assist in preparing relevant documents and to reflect changes in flood behaviour as a result of the SSI. The Council, OEH and the SES must be notified in writing that the information is available no later than one month following the completion of construction. Information requested by the relevant Council, OEH or the SES must be provided no later than six months following the completion of construction or within another timeframe agreed with the relevant Council, OEH and the SES.	One month following the completion of construction	Section 1.6.3 Flood extent maps Detailed Design drawings Table 6.1 SW22
E31	Before the commencement of any work, erosion and sediment controls must be installed and maintained in accordance with the publication Managing Urban Stormwater: Soils & Construction (4th edition, Landcom 2004) commonly referred to as the 'Blue Book'.	Prior to construction	Section 6.1 SW02
E75	The SSI must be designed, constructed and operated so as to maintain the NSW Water Quality Objectives where they are being achieved as at the date of this approval, and contribute towards achievement of the NSW Water Quality Objectives 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 NSW Water Quality Objectives, in which case those requirements must be complied with.	Prior to construction	Appendix D (Refer to EPL once received)
E77	Work on waterfront land must be carried out in accordance with controlled activity guidelines.	During construction	Section 6.6 Table 6.1 SW10
E78	Unless an EPL is in force in respect to the SSI and that licence specifies alternative criteria, discharges from construction water treatment plants to surface waters must not exceed:  (a) the Australian and New Zealand Guidelines for Fresh and Marine Water Quality 2018 (ANZG 2018) default guideline values for toxicants at the 90 per cent species protection level  (b) for physical and chemical stressors, the guideline values set out in Tables 3.3.2 and 3.3.3 of the Australian and New Zealand Guidelines for Fresh and Marine Water Quality 2000  (c) for bioaccumulative and persistent toxicants, the ANZG 2018 values at a minimum of 95 per cent species protection level.  Where the ANZG 2018 does not provide a default guideline value for a particular pollutant, the approaches set out in the ANZG 2018 for deriving guideline values, using interim guideline values and/or using other	During construction	No treatment plants are proposed for construction.  The water quality parameters prescribed within the EPL will be adhered to and the Construction Dewatering and Discharge Procedure will be updated once received.

No.	Requirement	Timing	Document Reference
	lines of evidence such as international scientific literature or water quality guidelines from other countries, must be used.		
E79	<p>If stormwater discharges are proposed during construction, a Water Pollution Impact Assessment commensurate with the potential risk and consistent with the National Water Quality Guidelines must be prepared and submitted to the Planning Secretary for information. The assessment at a minimum must:</p> <p>(a) Provide details of the discharge locations and receiving waterways</p> <p>(b) Characterise the expected discharge quality under typical and worst-case conditions for all pollutants present at levels that pose a risk of non-trivial harm to human health or the environment</p> <p>(c) Assess the potential impact of discharges on the environmental values of the receiving waterway, including typical through to worst-case scenarios with reference to the relevant Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZG 2018) for slightly to moderately disturbed ecosystems for standard receiving environments; and</p> <p>(d) Demonstrate that all practical and reasonable measures to avoid discharges (e.g. stormwater reuse or tinkering for offsite disposal) and minimise water pollution and protect human health and the environment from harm are investigated and implemented.</p>	During construction	Stormwater discharges to waterways are not proposed during construction. However, should discharges direct to water courses be required, the procedures outlined in Appendix D will be implemented.



## B2: Secondary REMMs

No.	Requirements	Timing	Document reference
BIO07	Sediment controls will be developed and implemented at Anzac Creek crossing.	Prior to construction During construction	Section 6.1 Section 6.6 Table 6.1 SW11 SW12
BIO15	Re-vegetation of cleared areas as quickly as possible following construction.	During construction	Table 6.1 SW04
BIO16	Screening of water that is used for dust suppression.	During construction	Table 6.1 SW04
BIO22	Use of natural erosion controls incorporating organic materials, micro water capture and contour shaping.	During construction	Section 6.1
BIO23	Diversion of clean water around construction areas, rather than through them.	During construction	Section 6.1
BIO24	Stabilisation and rehabilitation of works areas as soon as practicable.	During construction	Section 6.1 SW04
BIO25	Siting of sediment basins to manage run-off from construction areas and use of captured water for dust suppression.	During construction	Section 6.1 SW05 SW06 Section 6.2
BIO26	Management of sedimentation via sediment and erosion control plans for the entire construction footprint.	During construction	Section 6.1 SW01
WAR04	An Erosion and Sediment Control Plan (ESCP) will be prepared in accordance with Managing Urban Stormwater: Soils and Construction – Volume 1 (Landcom 2004) for the construction phase of the Project.	Prior to and during construction	Section 6.1 SW01 Appendix F
WAR05	Stormwater re-use is to be prioritised over potable water for site water usage where possible.	During construction	Section 6.1
WAR07	Culvert works are to be scheduled during periods of lower rainfall where possible to limit contact with stormwater. Cofferdams and diversions will be installed to provide dry working disturbed areas within Anzac Creek.	During construction	Section 6.6
WAR08	Construction sediment basins will be designed to the 80 <sup>th</sup> percentile 5-day rainfall event. Basin design will also consider the outcomes of the Targeted Site Investigation.	During construction	Section 6.2.1
WAR09	Implementation of diversion channels and drains will be constructed to divert water around the Project Site for up to the 10-year ARI design storm event.	During construction	Section 6.1 Section 6.6 Table 6.1 SW04
WAR14	Where areas of the Project site is constrained at tie-ins to existing roads (e.g. areas where the terrain is flat, and levels limit the use of some water management measures). At these areas, where	During construction	Section 6.2.1

No.	Requirements	Timing	Document reference
	practical, alternative water management measures will be implemented.		
WAR16	Outlet structures within Anzac Creek will be constructed in accordance with NRAR's Guideline for outlet structures on waterfront land (NSW Office of Water 2012).	Prior to construction During construction	Section 6.6 Table 6.1 SW10
WAR17	A hydrogeological assessment will be undertaken to assess the impacts of the excavations on the underlying aquifer and determine where the base of the excavation is with respect to site groundwater levels.	Prior to construction	Section 6.7 Table 6.1 SW20
WAR18	Each stormwater retention excavation work will be subject to assessment to determine if an impermeable liner is required in order to protect the underlying groundwater quality.	Prior to construction During construction	Section 6.7
AIR16	Revegetation of earthworks and exposed areas/soil stockpiles to stabilise surfaces will be undertaken as soon as practicable.	During construction	Table 6.1 SW04



**SSI-10053**

# **MOOREBANK AVENUE REALIGNMENT WORKS**

## **APPENDIX C**

Construction Surface Water Monitoring Program

22 AUGUST 2023

# NATIONAL INTERMODAL CORPORATION

## MOOREBANK AVENUE REALIGNMENT WORKS

### CONSTRUCTION SURFACE WATER MONITORING PROGRAM

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## ACRONYMS AND DEFINITIONS

Acronym	Definition
BTEXN	Benzene, Toluene, Ethylbenzene, Xylene, Naphthalene
CoA	Conditions of Approval
Construction	Includes all work required to construct the Project as described in the EIS and RtS (NSW CoA A1) including commissioning trials of equipment and temporary use of any part of the Project but excluding Low Impact Work which is carried out or completed before approval of the CEMP.
CSWMP	Construction Soil and Water Management Plan
EIS	Environmental Impact Statement
EPA	NSW Environment Protection Authority
EPL	Environment Protection Licence
ER	Environmental Representative
Infrastructure Approval	SSI 10053 or NSW CoA
Low Impact Work	As defined in the Infrastructure Approval, and which includes activities like survey work, investigative drilling, minor clearing, installation of mitigation measures etc. The low impact work described in this definition becomes construction when the Construction Environmental Management Plan is approved. This also applies to low impact work that has already commenced.
MARW	Moorebank Avenue Realignment Works
MIP	Moorebank Intermodal Precinct, which includes MPE and MPW
Monitoring Program	This Surface Water Monitoring Program
MPE	Moorebank Precinct East
MPE Site	Comprises the MPE Stage 1 Project as approved by SSD 14-6766 for the development of the intermodal terminal facility (IMT) at Moorebank and MPE Stage 2 as approved under SSD 7628 (as modified) and MPE Concept Approval (MP 10_0193) for the construction and operation of warehousing and distribution facilities and upgrades to approximately 2.1 kilometres of Moorebank Avenue.
MPW	Moorebank Precinct West
MPW Site	Comprises the MPW Stage 2 Project which is the second stage of development under the MPW Concept Approval (SSD 5066) and SSD 7709. The Project involves the construction and operation of a multi-purpose intermodal terminal facility, Rail link connection, warehousing and upgraded intersection on Moorebank Avenue.
NATA	National Association of Testing Authorities
National Intermodal	National Intermodal Corporation
NTU	Nephelometric Turbidity Units
PAH	Poly-cyclic aromatic hydrocarbons
PFAS	Per and poly-fluoroalkyl substances
PCB	Polychlorinated Biphenyls
Planning Secretary	Secretary to the DPE

Acronym	Definition
Project Site	Refers to the construction footprint area which is approximately 18.96 hectares and includes access for the construction of road embankments and cuttings, temporary and permanent fencing, temporary and permanent water quality control basins, ancillary facilities, access roads and construction side roads. It is generally bounded by the Defence Joint Logistics Unit (DJLU), MPE, Boot Land and the Sydney Trains owned land adjacent to the East Hills Railway.
REMM	Revised Environmental Management Measures
RIS	Response to Submissions
SSI	State significant infrastructure
TfNSW	Transport for NSW
The Project	Moorebank Avenue Realignment Works
The Proponent	National Intermodal Corporation
TSS	Total Suspended Solids

# 1 INTRODUCTION

## 1.1 Context

This Construction Surface Water Monitoring Program ('Monitoring Program') has been developed in accordance with NSW Revised Environmental Management Measure (REMM) WAR03. It describes the environmental surface water monitoring activities to be undertaken during construction of the Moorebank Avenue Realignment Works (the Project). The purpose of this Monitoring Program is to:

- Provide procedures to monitor surface water impacts during construction of the Project
- Assess the effectiveness of the water management system
- Identify and quantify water quality impacts to receiving waters
- Meet the requirements of the REMM for the Project
- Meet any relevant legal and other requirements for the Project.

SMART (Specific, Measurable, Achievable, Realistic and Timely) principles have been considered in the preparation of this Monitoring Program. See Section 6.8 in the Construction Soil and Water Management Plan (CSWMP) for more information.

This Monitoring Program is to be read in conjunction with the CSWMP. Where details within both plans overlap, these have been retained in the CSWMP only and reference to sections within the CSWMP have been made for ease of reference within this Monitoring Program.

## 1.2 Background and Project Description

National Intermodal Corporation (National Intermodal) plans to realign a section of Moorebank Avenue. The Project involves the realignment of an existing two-kilometre section of Moorebank Avenue, from approximately 130 meters south of the Anzac Road/Moorebank Avenue intersection to a point immediately north of the East Hills Railway. Moorebank Avenue currently divides the Moorebank Intermodal Precinct (MIP) into the Moorebank East Precinct (MPE site) and the Moorebank West Precinct (MPW site).

## 1.3 Responsibilities

Site personnel or sub-contractors with suitable experience and qualifications will undertake the monitoring outlined in this Monitoring Program.

The Construction Contractor is responsible for ensuring that all legal and other requirements described in this Monitoring Program are met.

## 1.4 Approval, Review and Modification

This Monitoring Program will be reviewed every six months and as required. Any amendments will be documented in subsequent revisions of this Monitoring Program. A copy of the updated Monitoring Program and changes will be distributed to all relevant stakeholders in accordance with the approved document control procedure outlined in the CEMP. Site personnel with responsibilities relevant to surface water monitoring will be informed of any amendments to the Monitoring Program and training provided where required.

## 1.5 Guidelines, Policies and Specification

The main guidelines, specifications and policy documents relevant to this Monitoring Program include:

- Approved Methods for the Sampling and Analysis of Water Pollutants in NSW (DECC, 2008)
- Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC and ARMCANZ, 2000)
- Code of Practice for Water Management - Road Development and Management (RTA, 1999)
- AS/NZS 5667.1.1988 (R2016) Water quality - Sampling Guidance on the design of sampling programs, sampling techniques and the preservation and handling of samples

## 1.6 Revised Environmental Management Measures

The applicable REMM relevant to the development of this Monitoring Program is listed in Table 1.1.

Table 1.1: Monitoring Program Requirements

No.	Requirements	Document reference
REMM WAR03	<p>A surface water monitoring program for the construction phase of the Project will be developed as part of the SWMP.</p> <p>Monitoring locations will target discharge locations such as temporary sediment basins and receiving waters.</p>	This Monitoring Program



## 2 BASELINE DATA

Pre-construction baseline data has been collected since 2013 for Anzac Creek. Baseline data has been compiled into the following reports:

- Moorebank Precinct East Stage 2: Biodiversity Monitoring in Anzac Creek Spring 2022 Survey (Bio-Analysis, 2023)
- Moorebank Precinct East (MPE) Stage 2: Baseline Aquatic Ecological Monitoring Report and Biodiversity Monitoring Strategy (Biosis, 2018)
- Moorebank Intermodal Terminal Project: Environmental Impact Statement – Surface Water Assessment (Parsons Brinckerhoff, 2014)
- SIMTA Moorebank Intermodal Terminal Facility: Flora and Fauna Assessment (Hyder, 2013).

The Moorebank Precinct East (MPE) Stage 2: Baseline Aquatic Ecological Monitoring Report and Biodiversity Monitoring Strategy (Biosis, 2018) provides the baseline data for the Project which is provided in Annexure 1. General water quality sampling along Anzac Creek has been undertaken from 2013 with the most recent monitoring undertaken in Spring 2022 (Bio-Analysis 2023). This is summarised in Table 2.1.

Table 2.1: Previous Water Quality Sampling Summary

Water Quality Sampling Report	Observations
Moorebank Precinct East Stage 2: Biodiversity Monitoring in Anzac Creek Spring 2022 Survey (Bio-Analysis, 2023)	<ul style="list-style-type: none"> <li>• Aluminium, nickel and copper concentrations were observed to exceed guideline values in Anzac Creek</li> <li>• pH and dissolved oxygen were lower than the ANZECC (2000) guideline range</li> <li>• Turbidity exceeded the ANZECC guideline value</li> <li>• Total nitrogen occasionally exceed ANZECC guideline value.</li> </ul>
MPE Stage 2: Baseline Aquatic Ecological Monitoring Report and Biodiversity Monitoring Strategy (Biosis, 2018)	<ul style="list-style-type: none"> <li>• Most physico-chemical water quality parameters are within ANZECC guidelines for low land aquatic ecosystems in south-eastern Australia</li> <li>• pH and dissolved oxygen were occasionally lower than the ANZECC guideline range</li> <li>• Turbidity exceeded the ANZECC guideline value.</li> </ul>
Moorebank Intermodal Terminal Project: Environmental Impact Statement – Surface Water Assessment, prepared (Parsons Brinckerhoff, 2014)	<ul style="list-style-type: none"> <li>• No major exceedances of metals that indicate unusual or long-term trends of concern</li> <li>• Aluminium concentrations were observed to exceed guideline values in one sample on Anzac Creek</li> </ul>
SIMTA Moorebank Intermodal Terminal Facility: Flora and Fauna Assessment (Hyder, 2013)	<ul style="list-style-type: none"> <li>• Total nitrogen and total phosphorus occasionally exceed ANZECC guideline values</li> <li>• Anzac Creek was observed to exceed guideline values more frequently, which was attributed to runoff from the Royal Australian Engineers golf course</li> </ul>

### 2.1 Receiving Surface Water Quality

Pre-construction surface water quality to date has been assessed against the ANZECC and ARMCANZ water quality guidelines (2000) including trigger values for protection of slightly disturbed south-eastern Australian lowland river ecosystems (i.e. systems at < 150 metres altitude).

## 3 MONITORING PROCEDURES

### 3.1 Monitoring Criteria

The EPL will stipulate specific conditions related to water management including monitoring requirements. Water quality parameters upon receipt of the EPL will be adhered to and this Monitoring Program will be updated as required. These criteria will be used to assess potential impacts to surface water receiving environments.

Procedures for monitoring discharges and dewatering events are addressed in the Discharge Management Plan (Appendix D of the CSWMP).

### 3.2 Surface Water Monitoring Locations

The Project surface water monitoring sites are listed in Table 3.1. These monitoring locations are based on baseline data provided in the Biosis 2018 report. Surface water monitoring has previously been undertaken prior to construction of MPE Stage 2 and continues to be undertaken seasonally.

The monitoring locations will be reviewed prior to construction and monitoring locations closer to the Project alignment may be proposed. Locations will be reviewed with the intention of identifying sites that most accurately identify water quality changes due to the Project itself, rather than external influences in the catchment (especially in downstream samples) (see Figure 3.1).

Table 3.1: Proposed Monitoring Locations

ID	Location	Waterway	Catchment
SWML 1	-33.961109, 150.922984	Anzac Creek	N/A (not indicated in the EIS/RtS)
SWML 2	-33.960533, 150.928408	Anzac Creek	N/A (not indicated in the EIS/RtS)
SWML 3	-33.948835, 150.937309	Anzac Creek	Outlet C
SWML 4	-33.946449, 150.937092	Anzac Creek	Outlet B

Monitoring locations and changes to the number of locations may also be refined based on monitoring results, adaptive management outcomes and upon receipt of the EPL (refer to Section 4.1). The CSWMP will be updated to reflect these changes.

### 3.3 Surface Water Monitoring Frequency

#### 3.3.1 Routine Sampling Frequency

Receiving water samples will be analysed for the analytes identified in Table 3.2 at least monthly during construction.

#### 3.3.2 Wet Weather Sampling

Wet weather sampling events are defined as 24.4 mm or more of rain within 24 hours recorded at the Bankstown AWS Bureau of Meteorology (BoM) gauge (#066137). The trigger is designed to capture one wet weather sampling event per 6-month period. Sampling will occur once within the following 24 hours of the rain event. If rainfall events are regularly less than 24.4 mm, opportunistic wet weather monitoring will be undertaken to enable wet weather data to be collected.



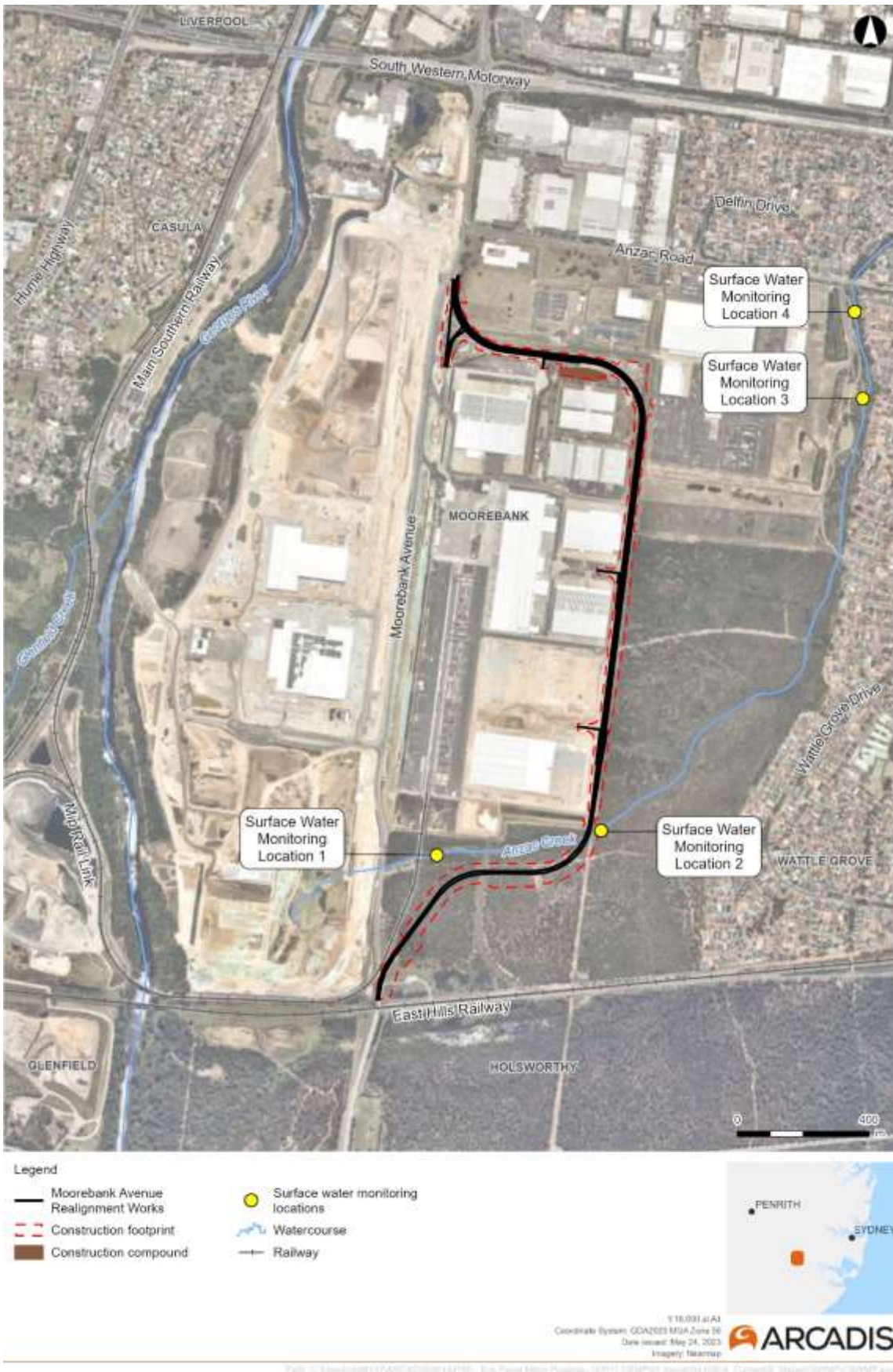


Figure 3.1: Proposed Monitoring Locations

### 3.4 Monitoring Analytes

The Revised Water Assessment (Appendix D of the RfS) recommended an analytical suite for the Project. These are presented in Table 3.2.

Table 3.2: Recommended Analytes

Category	Parameters	Analysis Method
Physical and chemical stressors	Dissolved oxygen, electrical conductivity, pH, total dissolved solids, turbidity	In situ with a calibrated hand-held water quality meter
	Total suspended solids (TSS)	Analysis undertaken at National Association of Testing Authorities (NATA) accredited laboratory
Nutrients	Ammonia (NH <sub>3</sub> ), nitrate (NO <sub>2</sub> ), nitrite (NO <sub>3</sub> ), total Kjeldahl nitrogen (TKN), total nitrogen (TN), soluble reactive phosphorus (SRP), total phosphorus (TN)	Analysis undertaken at NATA accredited laboratory
Dissolved metals	Aluminium, arsenic, boron, cadmium, chromium, copper, iron, lead, manganese, nickel, zinc	Analysis undertaken at NATA accredited laboratory
Other	Total hardness, oil and grease, Total Recoverable Hydrocarbons (TRH), BTEXN, polycyclic aromatic hydrocarbons (PAH), PFAS	Analysis undertaken at NATA accredited laboratory

### 3.5 Sampling Methodology

Water quality sampling will be conducted in accordance with:

- 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/NZS 5667.1:1998)
- Australian Standard 5667:1998 Water Quality – Sampling, Part 6: Guidance on sampling of rivers and streams (AS/NZS 5667.6:1998)
- Appointed consultant standard operating procedures (SOP) for surface water quality sampling, which complies with procedures detailed in the ANZECC & ARMICANZ (2000) guidelines and the NSW EPA's Approved Methods for the Sampling and Interpretation of Results of Water Pollutants (NSW EPA, 2004).

*In situ* water quality parameters will be recorded and grab samples collected from each site for laboratory analysis.

#### 3.5.1 In Situ Water Quality Measurement

*In situ* field measurements of water quality are to be undertaken at all monitoring locations following a wet weather event and during the monthly site inspection by the Construction Contractor.

The following physical and chemical stressors (with the exception of total suspended solids) will be monitored *in situ* with a calibrated hand-held water quality meter for instantaneous results. All other parameters will be analysed at a laboratory accredited by the National Association of Testing Authorities (NATA).

- Temperature (°C)
- pH (pH units)
- Electrical Conductivity (µS/cm)



- Dissolved Oxygen (mg/L and % saturation)
- Turbidity (NTU).

Relevant site descriptions and notes will be taken for each site and visual observations made of:

- Visual oil and grease
- Occurrence of algal scum
- Streamflow
- Water clarity
- Water colour, odour and any other notable observations.

Photos will be taken to record the visual appearance of each water quality sample site at the time of sampling. Where appropriate, photos of the stream bank will also be taken to provide a record of bank stability, geomorphology and riparian vegetation condition.

### 3.5.2 Surface Water Sampling

Grab samples will be collected near the *in-situ* monitoring point to ensure representative sampling. At each site, several sub-samples will be taken from 100 - 200 mm depth below the surface using a long-handled sampling pole and bottle. The sub-samples will be combined in a bucket to form a 'composite' sample from which the sample bottles for analyses are filled. The bucket and the sampling bottle will be washed between sampling sites to minimise the potential for cross contamination.

Water quality samples will be transported with ice in an ice box to a NATA accredited laboratory, under Chain of Custody (CoC) requirements. Samples are analysed for the following:

- Microbiological public health indicator: Thermotolerant Coliforms
- Water quality indicators:
  - TSS - sediment runoff indicator
  - Nutrients - NH<sub>3</sub>, NO<sub>2</sub>, NO<sub>3</sub>, TKN, TN, TP, SRP - nutrient indicators that are attributable to runoff impacts
  - Chlorophyll-a - algal indicator; algae proliferate in water if enriched by nutrients
  - Oil and grease - associated with runoff from construction activities related to roads
- Major urban pollutants: including ultra-trace Polychlorinated Biphenyls (PCBs); organochlorine and organo-phosphorus pesticides; fumigants; halogenated aliphatic and aromatic compounds; BTEXN (Benzene, Toluene, Ethylbenzene, Xylene, Naphthalene); phenols and poly-cyclic aromatic hydrocarbons (PAHs). These pollutants are associated with runoff from construction activities in relation to roads and certain landscapes
- Heavy metals: Arsenic (As), Cadmium (Cd), Chromium (Cr), Copper (Cu), Lead (Pb), Mercury (Hg), Nickel (Ni) and Zinc (Zn). These metals are associated with runoff from construction activities from certain peri-urban landscapes such as the Project area.

### 3.5.3 Sediment Basin Sampling

Testing of water will be undertaken prior to discharge in accordance with the Dewatering and Discharge Procedure, included as Appendix D of CSWMP. The Dewatering and Discharge Procedure also details discharge criteria and under what circumstances water can be discharged and the location of the discharge.

Any sump or trenched depressions containing substantial water will be monitored and pumped into the closest sediment basin by the Construction Contractor, if possible. If the water cannot be relocated to a nearby sediment basin, the water will be used for dust suppression or removed from site via a licenced liquid waste facility provider.

### 3.5.4 NTU and TSS Correlation

Turbidity is measured in Nephelometric Turbidity Units (NTU) and is a measurement of how light scatters when it is aimed at water and bounces off the suspended particles. It is not a measurement of the particles themselves, TSS provides this data can only be undertaken in a laboratory.

The Turbidity/TSS relationship is interpreted by linear regression analysis, but the relationship between TSS and turbidity is unique to each instrument and each construction site. Instruments will therefore be calibrated prior to each measurement.

To obtain a correlation:

**Step 1:** An *in-situ* test of turbidity and a grab sample must be taken. The grab sample will be sent to a NATA accredited laboratory to test for TSS. Monitoring will be undertaken before, during and after rainfall events

**Step 2:** Plot the correlation between turbidity and TSS

**Step 3:** Determine the correlation between turbidity and TSS based on TSS requirement. Dewatering can be undertaken based *on in-situ* turbidity measurements once correlation has been made. If correlation is not undertaken, a sample for TSS must be taken for each discharge.

Upon receipt of the EPL, this will determine the criteria parameter limits to meet for NTU and/or TSS and will be used for water sampling.

## 3.6 Calibration of Hand-held Meters

As identified in Table 3.2, a hand-held water quality meter will be used on site to spot check water quality to identify potential risks to surface water sources. Water quality meters will be calibrated in accordance with the manufacturers guidelines.

## 4 COMPLIANCE REQUIREMENT

### 4.1 Adaptive Management

This section outlines the procedures to identify and implement additional mitigation measures where criteria set out in this Monitoring Program are exceeded and found to be directly attributable to the Project:

- Analysis of the results by the Construction Contractor, in consultation with the Principals Representative and Construction Contractor Environmental Advisor, will be undertaken to determine possible causes for the exceedance, including identifying the specific activity responsible for the issue
- Site inspection by the Construction Contractor and Principals Representative
- Identified issues will be raised with the relevant personnel
- Identification and agreement of actions and/or additional mitigation measures to resolve or mitigate the exceedance
- Implement actions to rectify or mitigate the exceedance, including stop work arrangements where necessary or if directed by the ER
- Identifying and implementing additional mitigation measures.

Mitigation measures and preventative / corrective actions will be developed and the procedure for dealing with non-compliance with environmental management controls outlined in Section 7.2 of the CEMP. The Construction Contractor will be required to verify and document the effectiveness of any management measures or preventative / corrective actions implemented to avoid further exceedances.

The Construction Contractor will communicate regularly to ensure plans are co-ordinated and water quality impacts are minimised. The timing for any improvement will be agreed between the relevant Construction Contractor and Principals Representative (and ER if required) based on the level of risk or reoccurrence.

## 5 RECORDS

The Construction Contractor will maintain records of relevant data for each sampling event. This will include but not be limited to:

- Date and time for the sampling event at each location
- Water quality test results
- NATA chain of custody and NATA laboratory results
- Summary of monthly rainfall data and/or significant rainfall and storm events (if wet weather sampling)
- Compliance with the relevant criteria
- Calibration certificates
- Any other EPA licence requirements
- Analysis of the results and recommendations arising from the monitoring.

The Construction Contractors will report on sampling events and monitoring results in the Soil and Water Monitoring Reports to be prepared for the Project.



## ANNEXURE 1 Baseline Data (Biosis, 2018)

Baseline surface water quality monitoring results for autumn 2018 in Anzac Creek are provided in the table below.

Figure	Parameter
Baseline Data 1	Field parameters (pH, EC, DO, turbidity, nutrients)
Baseline Data 2	Sediment metal results
Baseline Data 3	Sediment PFAS results
Baseline Data 4	Water PFAS results
Baseline Data 5	Metals

### Baseline data 1 – Water quality field monitoring results (autumn, 2018)

Physicochemical parameter	NSW water quality and river flow objectives: Freshwater (Georges River Catchment)	AQ11	AQ12
<b>Field measurements</b>			
pH (pH units)	6.5-8.5	6.61	7.01
Dissolved Oxygen (% Saturation)	85-110	38	62
Electrical Conductivity (µS/cm)	125-2200	287	354
Temperature (°C)	-	26.72	18.49
Turbidity (NTU)	6-50	68	91
<b>Nutrients (µg/L)</b>			
Total Phosphorous	25	580	-
Total Nitrogen	350	8200	-
Total Kjeldahl Nitrogen	-	8200	-

### Baseline data 2 – Sediment metal results (autumn 2018)

Physicochemical parameter	ISQG Trigger value	AQ1	AQ2	AQ4	AQ14
<b>Total metals (mg/kg)</b>					
Arsenic	20	<5	<5	<5	<5
Barium		110	110	60	<10
Beryllium		<1	<1	1	<1
Boron		<50	<50	<50	<50
Cadmium	1.5	<1	<1	<1	<1
Chromium	80	23	19	21	3
Cobalt		8	4	6	<2
Copper	65	31	40	12	<5
Lead	50	91	36	44	<5
Manganese		45	252	69	16
Mercury	0.15	<0.1	<0.1	<0.1	<0.1
Nickel	21	14	11	9	<2
Selenium		<5	<5	<5	<5
Vanadium		48	35	54	10
Zinc	200	93	103	96	17

## Baseline data 3 – Sediment PFAS sample results (autumn 2018)

Physicochemical parameter	Urban/residential investigation levels (DEE 2016)	AQ1	AQ2	AQ4	AQ14
<b>Perfluoroalkyl Sulfonic Acids (mg/kg)</b>					
Perfluorobutane sulfonic acid (PFBS)		<0.0002	<0.0002	<0.0002	<0.0002
Perfluorohexane sulfonic acid (PFHxS)		0.0036	0.0008	0.0007	<0.0002
Perfluorooctane sulfonic acid (PFOS)	32	0.0444	0.0037	0.0061	0.0005
<b>Perfluoroalkyl Carboxylic Acids (mg/kg)</b>					
Perfluorobutanoic acid (PFBA)		<0.001	<0.001	<0.001	<0.001
Perfluoropentanoic acid (PFPeA)		<0.0002	<0.0002	<0.0002	<0.0002
Perfluorohexanoic acid (PFHxA)		<0.0002	<0.0002	<0.0002	<0.0002
Perfluoroheptanoic acid (PFHpA)		<0.0002	<0.0002	<0.0002	<0.0002
Perfluorooctanoic acid (PFOA)	29	0.0003	<0.0002	<0.0002	<0.0002
<b>Fluorotelomer Sulfonic Acids (mg/kg)</b>					
4:2 Fluorotelomer sulfonic acid (4:2 FTS)		<0.0005	<0.0005	<0.0005	<0.0005
6:2 Fluorotelomer sulfonic acid (6:2 FTS)		<0.0005	<0.0005	<0.0005	<0.0005
8:2 Fluorotelomer sulfonic acid (8:2 FTS)		<0.0005	<0.0005	<0.0005	<0.0005
10:2 Fluorotelomer sulfonic acid (10:2 FTS)		<0.0005	<0.0005	<0.0005	<0.0005
<b>PFAS Sums (mg/kg)</b>					
Sum of PFHxS and PFOS		0.048	0.0045	0.0068	0.0005
Sum of PFAS (WA DER List)		0.0483	0.0045	0.0068	0.0005

## Baseline data 4 – Water PFAS sample results (autumn 2018)

Physicochemical parameter	95% species protection (DEE 2016)	AQ11
<b>Perfluoroalkyl Sulfonic Acids (µg/L)</b>		
Perfluorobutane sulfonic acid (PFBS)		<0.02
Perfluorohexane sulfonic acid (PFHxS)		0.02
Perfluorooctane sulfonic acid (PFOS)	0.13	0.03
<b>Perfluoroalkyl Carboxylic Acids (µg/L)</b>		
Perfluorobutanoic acid (PFBA)		<0.1
Perfluoropentanoic acid (PFPeA)		<0.02
Perfluorohexanoic acid (PFHxA)		<0.02
Perfluoroheptanoic acid (PFHpA)		<0.02
Perfluorooctanoic acid (PFOA)	220	<0.01
<b>Fluorotelomer Sulfonic Acids (µg/L)</b>		
4:2 Fluorotelomer sulfonic acid (4:2 FTS)		<0.05
6:2 Fluorotelomer sulfonic acid (6:2 FTS)		<0.05
8:2 Fluorotelomer sulfonic acid (8:2 FTS)		<0.05
10:2 Fluorotelomer sulfonic acid (10:2 FTS)		<0.05
<b>PFAS Sums (µg/L)</b>		
Sum of PFHxS and PFOS		0.05
Sum of PFAS (WA DER List)		0.05

## Baseline data 5 – dissolved metals results (Autumn 2018)

Physicochemical parameter	ANZECC (2000) 90% protection criteria	AQ11
<b>Dissolved metals (µg/L)</b>		
Aluminium	80	260
Arsenic	42 (Arsenic as V)	<1
Barium	-	2
Beryllium	-	<1
Boron	680	<50
Cadmium	0.4	<0.1
Chromium	6	<1
Cobalt	-	<1
Copper	1.8	2
Iron	-	450
Lead	5.6	<1
Manganese	2500	3
Mercury	1.9 (inorganic Mercury)	<0.1
Molybdenum	-	<1
Nickel	13	<1
Selenium	18	<10
Strontium	-	52
Vanadium	-	<10
Zinc	15	<5
<b>Total petroleum hydrocarbons (µg/L)</b>		
C6 - C9 Fraction	-	<20
C10 - C14 Fraction	-	<50
C15 - C28 Fraction	-	<100
C29 - C36 Fraction	-	<50
C10 - C36 Fraction (sum)	-	<50
<b>Total recoverable hydrocarbons - NEPM 2013 Fractions (µg/L)</b>		
C6 - C10 Fraction	-	<20
C6 - C10 Fraction minus BTEX (F1)	-	<20
>C10 - C16 Fraction	-	<100
>C16 - C34 Fraction	-	<100
>C34 - C40 Fraction	-	<100
>C10 - C40 Fraction (sum)	-	<100
<b>BTEXN (µg/L)</b>		
Benzene	1300	<1
Toluene	-	<2
Ethylbenzene	-	<2
meta- & para-Xylene	-	<2
ortho-Xylene	470	<2
Total Xylenes	-	<2
Sum of BTEX	-	<1
Naphthalene	85	<5

**SSI-10053**

# **MOOREBANK AVENUE REALIGNMENT WORKS**

## **APPENDIX D**

### Construction Dewatering and Discharge Procedure

22 AUGUST 2023



# NATIONAL INTERMODAL CORPORATION

## MOOREBANK AVENUE REALIGNMENT WORKS

### DEWATERING AND DISCHARGE PROCEDURE

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## ACRONYMS AND DEFINITIONS

Acronym	Definition
ARI	Annual Recurrence Interval
CEMP	Construction Environmental Management Plan
CoA	Conditions of Approval
Construction	Includes all work required to construct the Project as described in the EIS and RTS (NSW CoA A1) including commissioning trials of equipment and temporary use of any part of the Project but excluding Low Impact Work which is carried out or completed before approval of the CEMP.
CSWMP	Construction Soil and Water Management Plan (CSWMP).
DEC	Department of Environment and Conservation (now DPE)
DJLU	Defence Joint Logistics Unit
DPE	Department of Planning and Environment (formerly DPIE)
DPI	Department of Primary Industries
DPIE	Department of Planning, Industry and Environment (now DPE)
EES	NSW Environment, Energy and Science (part of DPE)
EIS	Environmental Impact Statement
EMP	Environmental Management Plan
EMS	Environmental management system
EP&A Act	<i>Environmental Planning and Assessment Act 1979</i>
EPA	NSW Environment Protection Authority
EPBC Act	<i>Environmental Protection and Biodiversity Conservation Act 1999</i>
EPL	Environment Protection Licence
ER	Environmental Representative
ESCP	Erosion and Sediment Control Plan
EWMS	Environmental Work Method Statement
Infrastructure Approval	SSI 10053 or NSW CoA
Low Impact Work	As defined in the Infrastructure Approval, and which includes activities like survey work, investigative drilling, minor clearing, installation of mitigation measures etc. The low impact work described in this definition becomes construction when the Construction Environmental Management Plan is approved. This also applies to low impact work that has already commenced.
MARW	Moorebank Avenue Realignment Works
MIP	Moorebank Intermodal Precinct, which includes MPE and MPW
MPE	Moorebank Precinct East
MPE Site	Comprises the MPE Stage 1 Project as approved by SSD 14-6766 for the development of the intermodal terminal facility (IMT) at Moorebank and MPE Stage 2 as approved under SSD 7628 (as modified) and MPE Concept Approval (MP 10_0193) for the construction and operation of warehousing and distribution facilities and upgrades to approximately 2.1 kilometres of Moorebank Avenue.

Acronym	Definition
MPW	Moorebank Precinct West
MPW Site	Comprises the MPW Stage 2 Project which is the second stage of development under the MPW Concept Approval (SSD 5066) and SSD 7709. The Project involves the construction and operation of a multi-purpose intermodal terminal facility, Rail link connection, warehousing and upgraded intersection on Moorebank Avenue.
National Intermodal	National Intermodal Corporation
Planning Secretary	Secretary to the DPE
Project Site	Refers to the construction footprint which is approximately 18.96 hectares and includes access for the construction of road embankments and cuttings, temporary and permanent fencing, temporary and permanent water quality control basins, ancillary facilities, access roads and construction side roads. It is generally bounded by the Defence Joint Logistics Unit (DJLU), MPE, Boot land and the Sydney Trains owned land adjacent to the East Hills Railway.
REMM	Revised Environmental Management Measures
RtS	Response to Submissions
SDS	Safety Data Sheets
SEARs	Secretary Environmental Assessment Requirements
SSI	State significant infrastructure
TfNSW	Transport for NSW
The Project	Moorebank Avenue Realignment Works
TSI	Targeted Site Investigation
WMP	Water Management Plan
WPIA	Water Pollution Impact Assessment



# 1 INTRODUCTION

## 1.1 Context

This Dewatering and Discharge Procedure ('the Procedure') has been developed in accordance with NSW Revised Environmental Management Measure (REMM) WAR06. This Procedure provides guidance to ensure that site dewatering activities are completed in a manner that does not cause harm to the environment during construction of the Moorebank Avenue Realignment Works (the Project). The purpose of this Procedure is to:

- Provide procedures to discharge water during construction of the Project
- Meet the requirements of the Revised Environmental Management Measures for the Project
- Meet any relevant legal and other requirements for the Project.
- Implement industry standard methods for dewatering
- Provide a clear methodology for the management of water discharges from the Project Site
- Ensure that water discharges from site are compliant with the:
  - Environmental Protection Licence (EPL)
  - Construction Soil and Water Management Plan.

SMART (Specific, Measurable, Achievable, Realistic and Timely) principles have been considered in the preparation of this Procedure. See Section 6.8 in the Construction Soil and Water Management Plan (CSWMP) for more information.

This Procedure is to be read in conjunction with the CSWMP. Where details within both plans overlap, these have been retained in the CSWMP only and reference to sections within the CSWMP have been made for ease of reference within this Procedure.

## 1.2 Background and Project Description

National Intermodal Corporation (National Intermodal) plans to realign a section of Moorebank Avenue. The Project involves the realignment of an existing two-kilometre section of Moorebank Avenue, from approximately 130 meters south of the Anzac Road/Moorebank Avenue intersection to a point immediately north of the East Hills Railway. Moorebank Avenue currently divides the Moorebank Intermodal Precinct (MIP) into the Moorebank East Precinct (MPE site) and the Moorebank West Precinct (MPW site).

## 1.3 Responsibilities

Site personnel or sub-contractors with suitable experience and qualifications who are trained and authorised will undertake the dewatering and discharge activities outlined in this Procedure.

The Construction Contractor is responsible for ensuring that all legal and other requirements described in this Procedure are met.

## 1.4 Approval, Review and Modification

This Procedure will be reviewed every six months and as required. Any amendments will be documented in subsequent revisions of this Procedure. A copy of the updated Procedure and changes will be distributed to all relevant stakeholders in accordance with the approved document control procedure outlined in the CEMP. Site personnel with responsibilities relevant to dewatering will be informed of any amendments to the Procedure and training provided where required.

## 1.5 Guidelines, Policies and Specification

The main guidelines, specifications and policy documents relevant to this Procedure include:

- Protection of the Environment Operations Act 1997 (POEO Act)
- Managing Urban Stormwater Soils and Construction (Landcom, 2004)
- TfNSW Water Discharge and Reuse Guideline (TfNSW, 2016)
- National Water Quality Guidelines.

## 1.6 Requirements

The applicable NSW CoA and REMMs relevant to the development of this Plan are listed in Table 1.1.

Table 1.1: Dewatering Requirements

No.	Requirements	Document reference
NSW CoA E75	The SSI must be designed, constructed and operated so as to maintain the NSW Water Quality Objectives where they are being achieved as at the date of this approval, and contribute towards achievement of the NSW Water Quality Objectives 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 NSW Water Quality Objectives, in which case those requirements must be complied with.	Section 2 Section 2.4 Section 3
NSW CoA E78	Unless an EPL is in force in respect to the SSI and that licence specifies alternative criteria, discharges from construction water treatment plants to surface waters must not exceed:	Section 2 Section 2.4
	(a) the Australian and New Zealand Guidelines for Fresh and Marine Water Quality 2018 (ANZG 2018) default guideline values for toxicants at the 90 per cent species protection level;	Section 2.3.2
	(b) for physical and chemical stressors, the guideline values set out in Tables 3.3.2 and 3.3.3 of the Australian and New Zealand Guidelines for Fresh and Marine Water Quality 2000; and	Section 2.3.2
	(c) for bioaccumulative and persistent toxicants, the ANZG 2018 values at a minimum of 95 per cent species protection level. Where the ANZG 2018 does not provide a default guideline value for a particular pollutant, the approaches set out in the ANZG 2018 for deriving guideline values, using interim guideline values and/or using other lines of evidence such as international scientific literature or water quality guidelines from other countries, must be used.	Section 2.3.2
NSW CoA E79	If stormwater discharges are proposed during construction, a Water Pollution Impact Assessment commensurate with the potential risk and consistent with the National Water Quality Guidelines must be prepared and submitted to the Planning Secretary for information. The assessment at a minimum must:	Section 2.3 Construction Water Quality and Discharge Impact Assessment
	a) Provide details of the discharge locations and receiving waterways;	
	b) Characterise the expected discharge quality under typical and worst-case conditions for all pollutants present at levels that pose a risk of non-trivial harm to human health or the environment;	
	c) Assess the potential impact of discharges on the environmental values of the receiving waterway, including typical through to worst-case scenarios	

No.	Requirements	Document reference
	<p>with reference to the relevant Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZG 2018) for slightly to moderately disturbed ecosystems for standard receiving environments; and</p> <p>d) Demonstrate that all practical and reasonable measures to avoid discharges (e.g. stormwater reuse or tinkering for offsite disposal) and minimise water pollution and protect human health and the environment from harm are investigated and implemented.</p>	
REMM WAR06	A dewatering and discharge procedure is to be incorporated in the SWMP. Recommended discharge criteria is provided in Section 5.8 of the Water Assessment.	This Procedure



## 2 DISCHARGING WATER

### 2.1 Approach

The Construction Contractors approach to dewatering will generally follow the below hierarchy:

- Investigate opportunities for reuse. Onsite reuse may include applications such as dust suppression, earthworks compaction, vegetation establishment/rehabilitation, and plant/vehicle wash-down
- Investigate opportunities of discharging water to land to allow the water to infiltrate into the ground, thus avoiding direct discharge to, or pollution of, waters
- Discharge offsite. Onsite reuse or land discharge may be limited by climatic or site conditions (i.e. saturated ground) and water may need to be discharged to meet the sediment basins requirements (i.e. reinstating capacity) identified in the Blue Book (Landcom, 2004).

### 2.2 Environmental Work Method Statement

The Construction Contractor will develop an EWMS to manage and control dewatering activities in a manner that does not cause harm to the environment, including where construction water may be discharged into natural waterways.

EWMS incorporate appropriate mitigation measures and controls and identifies key procedures to be used concurrently with the EWMS. EWMS are specifically designed to communicate requirements, actions, processes and controls to construction personnel using plans, diagrams and simply written instructions. EWMS for use by the Construction Contractor is provided in Appendix F of the CEMP.

### 2.3 Water Quality Assessment and Criteria

A Construction Water Quality and Discharge Impact Assessment has been prepared to accompany the EPL application detailing proposed water quality criteria for off-site discharge. The Project EPL will stipulate specific conditions related to water management including dewatering and discharge requirements and this will be updated in this Dewatering and Discharge Procedure upon receipt of the EPL. Prior to any water being discharged, water quality parameters will be adhered to.

Sampling collection and monitoring is described in the Soil and Water Monitoring Program (Appendix C) and will be carried out in accordance with the Approved Methods for Sampling and Analysis of Water Pollutants in New South Wales (DEC, 2004) and any EPL requirements once received.

It is noted that where water quality parameters cannot be met, treatment of water will occur in accordance with Section 2.4 or water must be taken to an appropriately licensed offsite discharge facility.

Water quality testing will be undertaken less than 24 hours prior to a controlled discharge and daily for any continued controlled discharge.

#### 2.3.1 Onsite Reuse

Onsite reuse includes reuse of water from sediment basins for onsite purposes only i.e. dust suppression. Parameters for onsite reuse of water are detailed in Table 2.1.

Table 2.1: Onsite Reuse Parameters

Parameter	Project Limits	Method of Assessment
Oil and grease	Not visible	Visual assessment



Parameter	Project Limits	Method of Assessment
pH	6.5-8.5	Water quality meter

If all criteria above are met, then the water may be authorised for reuse by the Construction Contractor. If the criteria are not met, treatment of water will occur in accordance with Section 2.4.

Onsite reuse can only occur if:

- Runoff generated by the reuse is to be minimised and controlled entirely within the site boundary
- Appropriate sediment controls are installed and maintained in accordance with the Blue Book
- There is no potential for discharged water to reach any watercourse (within or outside the site)
- No erosion is caused from the discharge
- Weather conditions are dry as wet conditions could lead to additional runoff.

Offsite discharge to land can only occur if:

- When the discharge occurs solely as a result of rainfall measured at the premises which exceeds a total of 24 mm of rainfall over any consecutive 5 day period
- Landholder permission is obtained
- Appropriate controls are installed at the discharge point and maintained in accordance with the Blue Book
- No erosion is caused from the discharge.

### 2.3.2 Offsite Discharges to Waterways and Drainage Channels

Stormwater discharges to waterways are anticipated to be minimal during construction. Water cannot be discharged off-site to water without an EPL in force.

Should discharge off-site be required, the water will be tested in accordance with criteria limits set out in Table 2.2 and will follow the dewatering procedure detailed in Section 2.5. Upon the receipt of the EPL, this Dewatering and Discharge Procedure will be updated with the criteria parameter limits.

Table 2.2: Parameters for off-site Discharge to Water

Parameter	ANZECC Limits	Method of Assessment
pH	6.5-8.5	Water quality meter
Total Suspended Solids	50 mg/L	Laboratory analysis and/or NTU and TSS correlation detailed in Construction Surface Water Monitoring Program
Turbidity	50 NTU	Water quality meter
Oil and grease	Not visible	Visual assessment
Colour	No visible discolouration	Visual assessment

### 2.3.3 Discharge, Inspection and Monitoring

Prior to the commencement of dewatering, the Construction Contractor will:

- Issue a Permit to Discharge

- Inspect the entire system, including intakes and outlets, pumping and discharge locations.

During discharge, the Construction Contractor will:

- Supervise dewatering activities at all times
- Inspect the entire system, including intakes and outlets, pumping and discharge locations
- Take hourly readings at the discharge point to ensure the criteria parameters for turbidity continue to be met
- Record all hourly readings in the Permit to Discharge
- STOP WORKS if any negative environmental impact such as flooding, erosion or dirty water discharge is observed.

## 2.4 Water Treatment

The Construction Contractor will identify the methods for treating water if the water does not meet the discharge criteria. This will include measures for treatment of pH, a flocculation procedure to manage total suspended solids (TSS), and methods to remove petroleum hydrocarbons, metals or other pollutants.

Where flocculation is necessary to settle suspended sediments in basins, the proposed coagulant will be applied as the flocculating agent to settle the sediments within 24 hours of the conclusion of each rain event causing runoff. Before applying a flocculating agent, the amount of the agent that is appropriate for the volume to be treated, the sediment type and the prevailing weather conditions will be determined.

The Construction Contractor will ensure that coagulants and other water treatment chemicals are appropriately stored on site. Bulk coagulants will be covered and positioned within erosion and sediment controls away from areas with the potential for water runoff. All treatment chemicals will be stored in appropriately bunded and covered locations that are locked to prevent unauthorised access. Requirements of the Safety Data Sheets will be followed.

## 2.5 Summary of Dewatering Procedure

Table 2.3 and Figure 2.1 detail the process for flocculation, dewatering and pumping of sediment basins.

Table 2.3: Dewatering Procedure

No.	Actions Required	Responsibility	When
<b>General</b>			
1	The Construction Contractor will develop an Environmental Work Method Statement (EWMS) for dewatering based on the requirements of the plan. Dewatering will be undertaken in accordance with the EWMS and this plan.	Construction Contractor's Environment Advisor	Prior to discharge
2	Those responsible for dewatering will be trained and authorised in the dewatering technique developed in the EWMS and this plan.	Construction Contractor's Environment Advisor	Prior to discharge
3	No discharge of water to be undertaken without a signed Permit to Discharge.	All Site Staff	During construction
<b>Water Quality Analysis</b>			



No.	Actions Required	Responsibility	When
1	Water quality analysis must be undertaken by trained and competent personnel using only approved and calibrated equipment on all water required to be discharged offsite.	Construction Contractor's Environment Advisor	Prior to discharge
2	Water quality analysis to be assessed against the discharge criteria established within the Dewatering and Discharge Procedure and updated criteria upon receipt of the EPL	Construction Contractor's Environment Advisor	Prior to discharge
3	If required adjust turbidity or pH to bring levels to within discharge criteria and re-test, or reapply until discharge criteria met: <ul style="list-style-type: none"> <li>• Gypsum or similar for turbidity</li> <li>• Add acid/alkali for pH</li> </ul> Dosage rates for gypsum to be determined on site by the Construction Contractors Environment Advisor based on site conditions. Dosage rate to be followed once determined.	Construction Contractor's Environment Advisor and Site Supervisor	Prior to discharge
4	Once discharge criteria have been met, a permit to discharge must be obtained and signed by the Construction Contractor's Environment Advisor and site staff that are trained and authorised undertaking the dewatering process. The discharge permit must be kept on site during the dewatering process.	Construction Contractor's Environment Advisor	Prior to discharge
5	Water quality monitoring results to be logged on the discharge permit.	Construction Contractor's Environment Advisor	Prior to discharge
<b>Prior to Discharge</b>			
1	The discharge location is to be confirmed and agreed i.e. onsite, offsite to land or offsite to water. The discharge location is to be inspected to ensure that the location is stabilised and additional erosion will not occur as a result of the discharging activities. Additional controls to be put in place if required.	Construction Contractor's Environment Advisor and Site Supervisor	Prior to discharge
2	Appropriate erosion and sediment controls will be established to minimise the potential for scour and erosion from dewatering activities.	Site Supervisor	Prior to discharge
<b>Dewatering Technique</b>			
1	Dewatering shall be undertaken with a power pump (e.g. flex drive pump), syphon, or High Efficiency Sediment (HES) basin, provided an appropriate risk assessment has been undertaken as part of the Dewatering Environmental Work Method Statement.	Site Supervisor	Prior to discharge
2	Where fuel powered pumps are used, the pump must be placed on a drip tray and water must be visually monitored for any oily film or residue by the operator or controller of the pump.	Site Supervisor	Prior to discharge

No.	Actions Required	Responsibility	When
3	Pump intakes shall be positioned (or suspended) above the floor of the excavation or sump to eliminate sediment pickup.	Site Supervisor	Prior to discharge
4	Where a permanent dewatering sump is to be setup, additional filtration is to be installed at the pump intake, where required.	Site Supervisor	Prior to discharge
5	Where watery slurry material is to be removed, a 'sucker truck' or sludge pump shall be used.	Site Supervisor	Prior to discharge
<b>During Discharge</b>			
1	The dewatering process to be attended at all times and discharge point to be monitored at least hourly.	Site Supervisor	During discharge
2	Water discharged to a sediment basin or storage tank must not cause any overflow of the basin or tanks to the surrounding work site or environment.	Site Supervisor	During discharge
3	The Site Supervisor will ensure the correct dewatering, treatment and discharge of water occurs.	Site Supervisor	During discharge



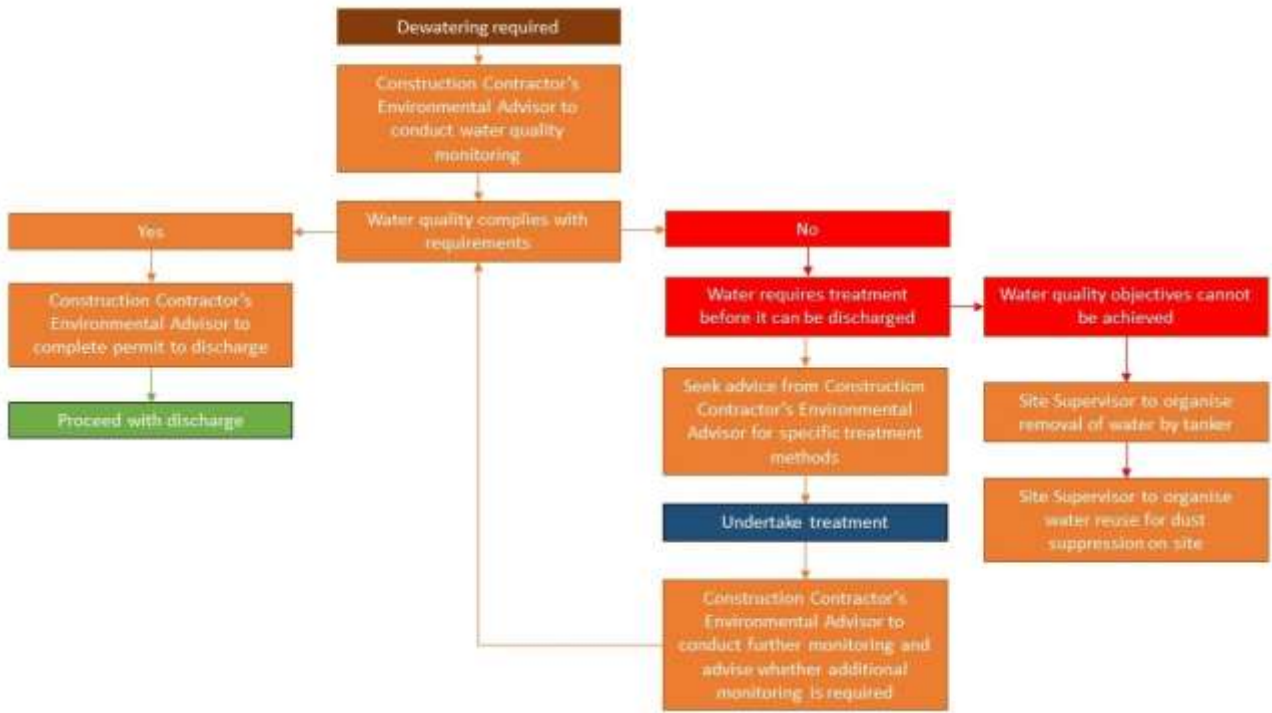


Figure 2.1: Dewatering Procedure Flowchart

### 3 RECORDS

The Construction Contractors will maintain records of relevant data, including records of water quality management and water discharge (Permit to Discharge).

A record will be maintained for each discharge that will include:

- 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
- Details of aquatic fauna captured and relocated after dam dewatering has occurred
- Any other EPA licence requirements.

The Construction Contractors will report on site discharge monitoring results in the Soil and Water Monitoring Reports to be prepared for the Project. Details of the reporting are outlined in the Construction Soil and Water Monitoring Program (refer Appendix C of the CSWMP).

## **APPENDIX E** Flood Emergency Response

The Project Site 1% AEP existing flooding conditions undertaken for 85% detailed design of the Project is shown in Figure E.1. Flood mapping shows that mainstream flooding along Anzac Creek is relatively well confined to the creek line for events of 1% AEP and the nearby MPE basin in the southern portion of the Project Site.



Figure E.1: Existing 1% AEP Flooding Conditions (Arcadis 85% Detailed Design)



Management actions for flood emergency response plan are summarised below.

### Pre-flood Actions

The following actions will be undertaken as preventative measures to prepare for flooding on the Project Site:

- Daily monitoring of weather forecasts and flood alerts, using the Bureau of Meteorology (BoM)
- Training in flood emergency response will be provided to key personnel including Construction Contractor
- Activities that may affect existing drainage systems during construction will be planned and carried out so that existing hydraulic capacity of these systems is maintained where practicable
- Site planning regular site inspections which include the following tasks:
  - Minimise obstructions within flood prone areas, including stockpiles
  - Locate site compounds, stockpiles, waste containers, chemicals and dangerous goods above flood prone areas
  - Locate plant and equipment above flood prone areas
  - Install and maintain appropriate
  - Erosion and sediment controls in accordance with the CSWMP.

### Preliminary Flood Response

The following actions will be undertaken on becoming aware of a potential flooding event through monitoring BOM forecasts or an alert/warning being raised:

- Alert all site personnel to changed weather conditions and the potential need to cancel deliveries, cease site movements and evacuate site
- If site conditions permit, site inspections which include the following tasks:
  - Secure all loose materials
  - Relocate waste containers, chemicals and dangerous goods above flood prone areas
  - Relocate plant and equipment above flood prone areas.

### During Flood Actions

The key principles of emergency flood response, according to the NSW State Flood Plan (March, 2018) include the following:

- Protection and preservation of human life (including the lives of responders and the community) is the highest priority
- Evacuation is the primary response strategy for people impacted by flood.

If localised heavy rainfall occurs with associated observation of rising water level on-site or adjacent waterway, site personnel will be directed to follow the Construction Contractors' incident response management plans.

- The BoM will issue Flood Warnings for the Georges River catchment through their website. They will also issue Severe Thunderstorm Warnings and Severe Weather Warnings for weather which may cause flooding in the Georges River catchment.

- The State Emergency Service (SES) augments this information to coordinate public information management strategies and provide information to the community relating to the potential impacts of flooding and what actions need to be undertaken. The SES will issue Local Flood Bulletins, Evacuation Warnings, Evacuation Orders and All Clears for areas impacted by floods in the Georges River catchment and share these on the SES website.
- Local radio stations and other media outlets also provide information updates and advice.
- The Construction Contractor will regularly consult these resources to stay abreast of any flood threats that may arise.

During the flood event, the following will be undertaken:

- Continue to monitor the BoM website / app for warnings, ABC radio broadcasts, local emergency services social media pages, and local news outlets
- Follow all advice and instructions given by emergency services
- Ensure all occupants on-site are informed of the incident response procedures (i.e. evacuation routes, assembly areas)
- Implementation of the flood mitigation measures as detailed in Table 6.1.

### **Post-flood Action**

Following flooding of the Project Site, the initial response will be to determine whether or not it is safe to return to work. A safety walk through will be undertaken by the Construction Contractor and Site Manager. The team will assess the following:

- Likelihood of flood damage to access roads and construction works
- Determine whether flood waters have receded
- Power boxes and electrical equipment that have been inundated or water affected. The power is to remain off until assessed by the electrician.

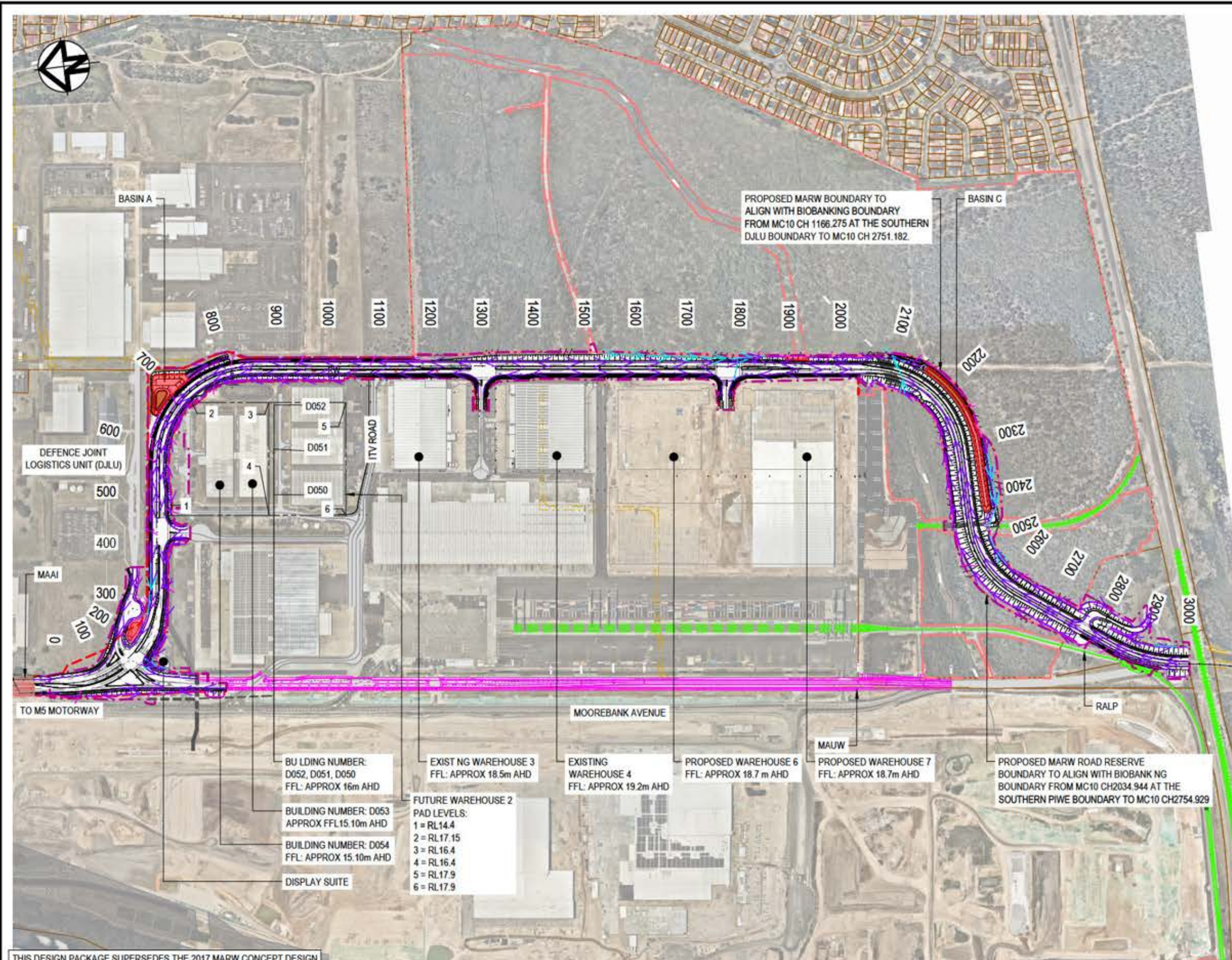
### **Return to Work**

Once it is deemed safe to return to work, the following will be undertaken:

- Any equipment, materials or debris moved by the flood water will be returned to correct area, or disposed of in accordance with the CWRMP, if damaged beyond repair/use
- Check stockpiles for erosion or losses.
- Restore erosion and sediment control devices as per this CSWMP
- Temporary onsite structures or partly constructed structures will be checked for erosion or other water damage prior to entering them or continuing work
- Determine whether any water held in excavations can be pumped to sediment basins/holding tanks for treatment prior to discharge.
- Undertake water testing/sampling in line with the CSWMP.

**APPENDIX F Preliminary Erosion and Sediment Control Plan**

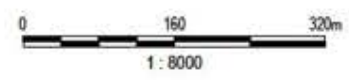




- ### SEDIMENT AND SOIL EROSION
1. THE SEDIMENT & EROSION CONTROL PLAN PRESENTS CONCEPTS ONLY. THE CONTRACTOR SHALL AT ALL TIMES BE RESPONSIBLE FOR THE ESTABLISHMENT & MANAGEMENT OF A DETAILED SCHEME MEETING COUNCILS DESIGN, OTHER REGULATORY AUTHORITY REQUIREMENTS AND MAKE GOOD PAYMENT OF ALL FEES.
  2. THE CONTRACTOR SHALL INSTIGATE ALL SEDIMENT AND EROSION CONTROL MEASURES IN ACCORDANCE WITH STATUTORY REQUIREMENTS AND IN PARTICULAR THE 'BLUE BOOK' (MANAGING URBAN STORMWATER SOILS AND CONSTRUCTION), PRODUCED BY THE DEPARTMENT OF HOUSING AND COUNCILS POLICIES. THESE MEASURES ARE TO BE INSPECTED AND MAINTAINED ON A DAILY BASIS.
  3. THE SITE SUPERINTENDENT SHALL ENSURE THAT ALL SOIL AND WATER MANAGEMENT WORKS ARE LOCATED AS INSTRUCTED IN THE DRAWINGS AND ADHERE TO ALL REGULATORY AUTHORITY REQUIREMENTS.
  4. THE CONTRACTOR SHALL INFORM ALL SUB CONTRACTORS OF THEIR RESPONSIBILITIES IN MINIMISING THE POTENTIAL FOR SOIL EROSION AND POLLUTION TO DOWNSLOPE LANDS AND WATERWAYS.
  5. WHERE PRACTICAL, THE SOIL EROSION HAZARD ON THE SITE SHALL BE KEPT AS LOW AS POSSIBLE. TO THIS END, WORKS SHOULD BE UNDERTAKEN IN THE FOLLOWING SEQUENCE;
    - 5.1. CONSTRUCT TEMPORARY STABILISED SITE ACCESS INCLUSIVE OF SHAKE DOWN / WASH PAD.
    - 5.2. INSTALL ALL TEMPORARY SEDIMENT FENCES AND BARRIER FENCES. WHERE FENCES ADJACENT EACH OTHER, THE SEDIMENT FENCE CAN BE INCORPORATED INTO THE BARRIER FENCE.
    - 5.3. INSTALL SEDIMENT CONTROL MEASURES AS OUTLINED ON THE APPROVED PLANS.
  6. UNDERTAKE SITE DEVELOPMENT WORKS SO THAT LAND DISTURBANCE IS CONFINED TO AREAS OF MINIMUM WORKABLE SIZE.
  7. AT ALL TIMES AND IN PARTICULAR DURING WINDY AND DRY WEATHER, LARGE UNPROTECTED AREAS WILL BE KEPT MOIST (NOT WET) BY SPRINKLING WITH WATER TO KEEP DUST UNDER CONTROL ENSURING CONFORMITY TO REGULATORY AUTHORITY REQUIREMENTS.
  8. ANY SAND USED IN THE CONCRETE CURING PROCESS (SPREAD OVER THE SURFACE) SHALL BE REMOVED AS SOON AS POSSIBLE AND WITHIN 10 WORKING DAYS FROM PLACEMENT.
  9. WATER SHALL BE PREVENTED FROM ENTERING THE PERMANENT DRAINAGE SYSTEM UNLESS THE CATCHMENT AREA HAS BEEN STABILISED AND/OR ANY LIKELY SEDIMENT BEEN FILTERED OUT.
  10. TEMPORARY SOIL AND WATER MANAGEMENT STRUCTURES SHALL BE REMOVED ONLY AFTER THE LANDS THEY ARE PROTECTING ARE STABILISED / REHABILITATED.
  11. ALLOW FOR GRASS STABILISATION OF EXPOSED AREAS, OPEN CHANNELS AND ROCK BATTERS DURING ALL PHASES OF CONSTRUCTION.
  12. EROSION AND SEDIMENT CONTROL MEASURES SHALL BE INSPECTED TO ENSURE THAT THEY OPERATE EFFECTIVELY. REPAIRS AND MAINTENANCE SHALL BE UNDERTAKEN REGULARLY AND AS REQUIRED, PARTICULARLY FOLLOWING RAIN EVENTS.
  13. RECEPTORS FOR CONCRETE AND MORTAR SLURRIES, PAINTS, ACID WASHINGS, LIGHT-WEIGHT WASTE MATERIALS AND LITTER SHALL BE DISPOSED OF IN ACCORDANCE WITH REGULATORY AUTHORITY REQUIREMENTS. CONTRACTOR TO PAY ALL FEES AND PROVIDE EVIDENCE OF SAFE DISPOSAL.
  14. IF A TEMPORARY SEDIMENT BASIN IS REQUIRED, ENSURE SAFE BATTER SLOPES IN ACCORDANCE WITH THE GEOTECHNICAL REPORT. MAINTAIN ADEQUATE STORAGE VOLUME IN ACCORDANCE WITH PLANS. TEMPORARY PUMP 'CLEAN FLOCCULATED' WATER TO COUNCILS STORMWATER SYSTEM. ENSURE WHOLE SITE RUN-OFF IS DIRECTED TO TEMPORARY SEDIMENT BASIN.

THIS DESIGN PACKAGE SUPERSEDES THE 2017 MARW CONCEPT DESIGN

Issue	Description	Date
B	85% DETAILED DESIGN SUBMISSION	30.08.2023
A	ISSUED TO CLIENT	26.06.2023



Client

Status	DETAILED DESIGN NOT TO BE USED FOR CONSTRUCTION	
Scales	1:8000	Current Issue Signatures
Original Size	A3	Drawn HSP
Height Datum	AHD	Designed RM
Grid	MGA94 - 56	Checked DBA
Filename:	MARW-ARC-CV-DD-DWG-1270.dwg	

Project

## MOOREBANK AVENUE REALIGNMENT WORKS (MARW)

Title

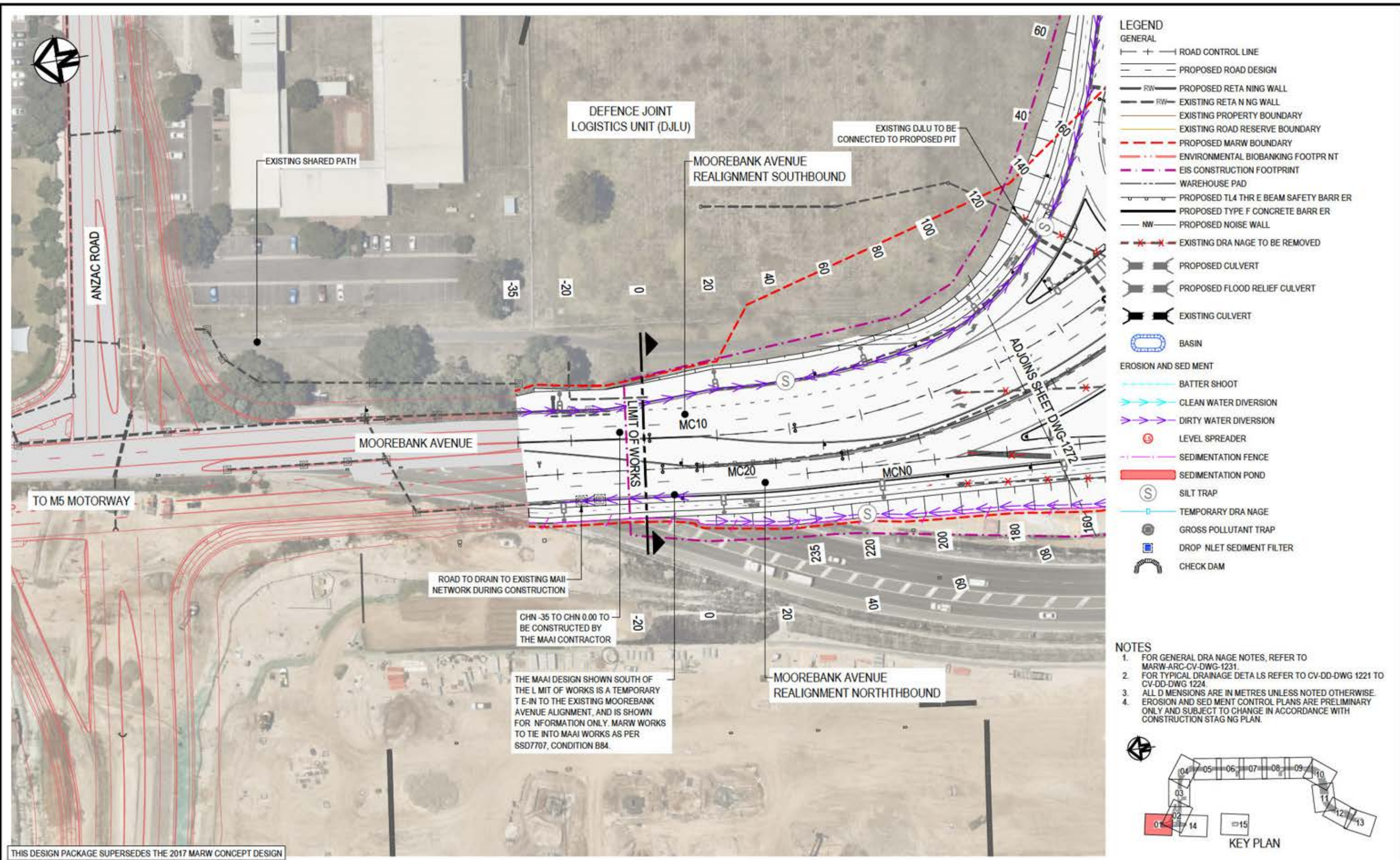
### PRELIMINARY CONSTRUCTION SOIL AND WATER MANAGEMENT PLAN OVERALL PLAN

Arcadis Australia Pacific Pty Limited  
Level 5, 225 St Georges Terrace  
PERTH WA 6000  
ABN 76 104 485 289  
Tel No: +61 8 9213 6700  
www.arcadis.com/au

Project No. 30100351  
Drawing No. MARW-ARC-CV-DD-DWG-1270 B  
Issue

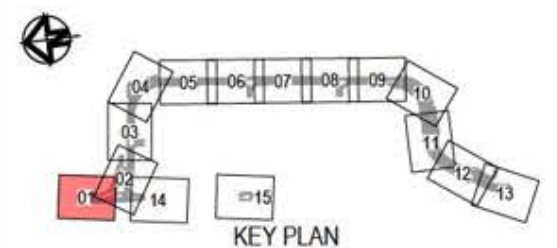
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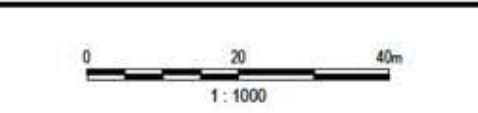
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- GENERAL**
- +— ROAD CONTROL LINE
  - — — PROPOSED ROAD DESIGN
  - RW — PROPOSED RETAINING WALL
  - RW — EXISTING RETAINING WALL
  - — — EXISTING PROPERTY BOUNDARY
  - — — EXISTING ROAD RESERVE BOUNDARY
  - — — PROPOSED MARW BOUNDARY
  - — — ENVIRONMENTAL BIOBANKING FOOTPRINT
  - — — EIS CONSTRUCTION FOOTPRINT
  - — — WAREHOUSE PAD
  - — — PROPOSED TL4 THRE BEAM SAFETY BARRIER
  - — — PROPOSED TYPE F CONCRETE BARRIER
  - NW — PROPOSED NOISE WALL
  - \* — EXISTING DRAINAGE TO BE REMOVED
  - — — PROPOSED CULVERT
  - — — PROPOSED FLOOD RELIEF CULVERT
  - — — EXISTING CULVERT
  - — — BASIN
- EROSION AND SEDIMENT**
- — — BATTER SHOOT
  - — — CLEAN WATER DIVERSION
  - — — DIRTY WATER DIVERSION
  - — — LEVEL SPREADER
  - — — SEDIMENTATION FENCE
  - — — SEDIMENTATION POND
  - — — SILT TRAP
  - — — TEMPORARY DRAINAGE
  - — — GROSS POLLUTANT TRAP
  - — — DROP INLET SEDIMENT FILTER
  - — — CHECK DAM

- NOTES**
1. FOR GENERAL DRAINAGE NOTES, REFER TO MARW-ARC-CV-DWG-1231.
  2. FOR TYPICAL DRAINAGE DETAILS REFER TO CV-DD-DWG 1221 TO CV-DD-DWG 1224.
  3. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.
  4. EROSION AND SEDIMENT CONTROL PLANS ARE PRELIMINARY ONLY AND SUBJECT TO CHANGE IN ACCORDANCE WITH CONSTRUCTION STAGING PLAN.



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Issue	Description	Date
B	85% DETAILED DESIGN SUBMISSION	30.08.2023
A	ISSUED TO CLIENT	26.06.2023



Client

Status <b>DETAILED DESIGN</b> NOT TO BE USED FOR CONSTRUCTION	
Scales 1:1000	Current Issue Signatures
Original Size A3	Drawn HSP
Height Datum AHD	Designed RM
Grid MGA94 - 56	Checked DBA
Filename: MARW-ARC-CV-DD-DWG-1271.dwg	Approved DKI

Project  
**MOOREBANK AVENUE REALIGNMENT WORKS (MARW)**

Title  
**PRELIMINARY CONSTRUCTION SOIL AND WATER MANAGEMENT PLAN**  
SHEET 1 OF 14

Arcadis Australia Pacific Pty Limited  
Level 5, 225 St Georges Terrace  
PERTH WA 6000  
ABN 76 104 485 289  
Tel No: +61 8 9213 6700  
www.arcadis.com/au

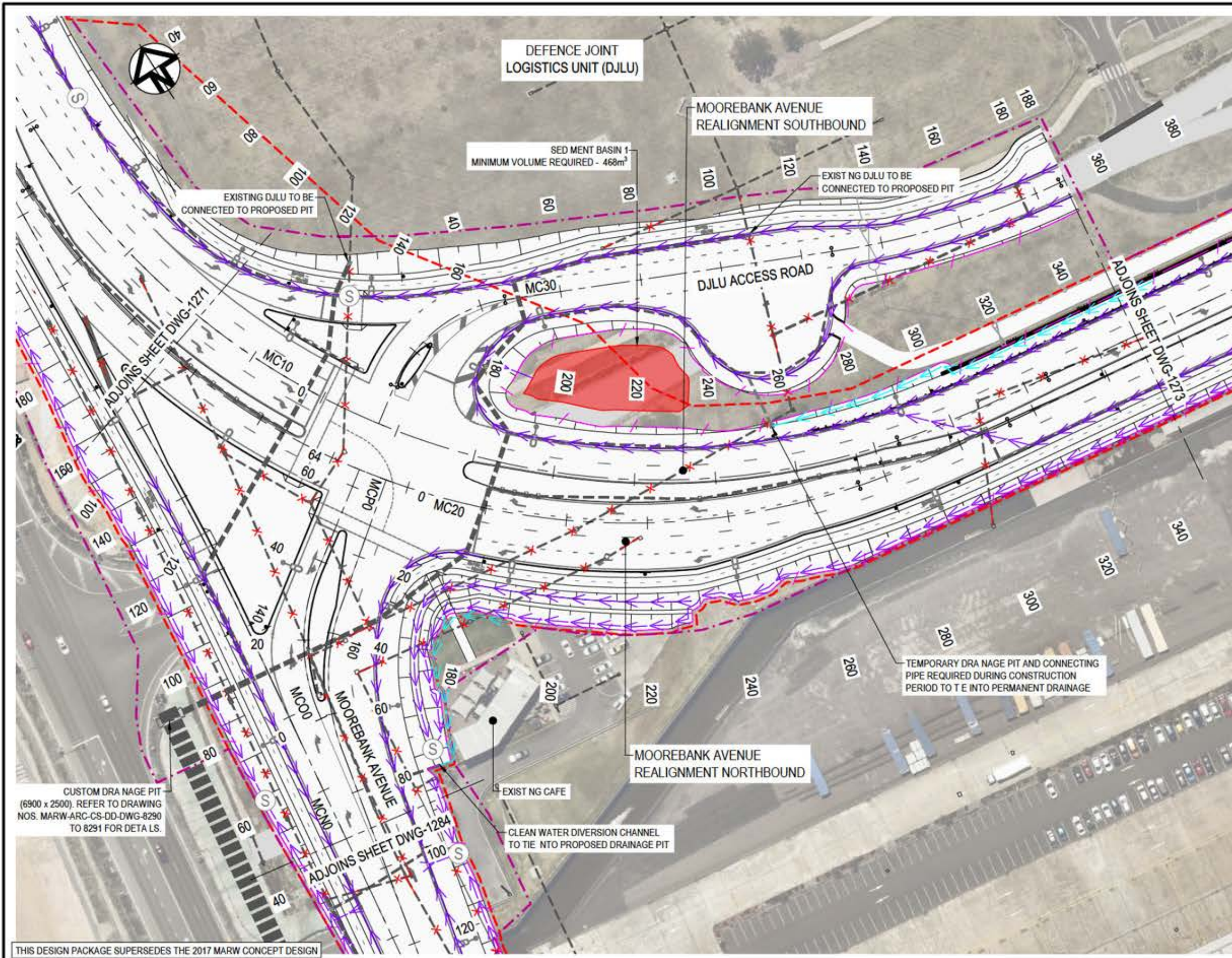
Project No.  
30100351

Drawing No.  
MARW-ARC-CV-DD-DWG-1271 B

Issue

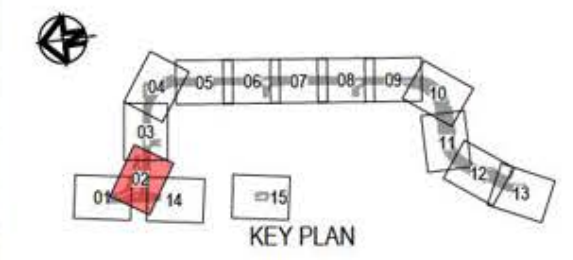
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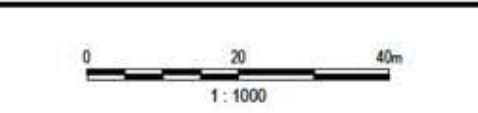
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- GENERAL**
- ROAD CONTROL LINE
  - PROPOSED ROAD DESIGN
  - PROPOSED RETAINING WALL
  - EXISTING RETAINING WALL
  - EXISTING PROPERTY BOUNDARY
  - EXISTING ROAD RESERVE BOUNDARY
  - PROPOSED MARW BOUNDARY
  - ENVIRONMENTAL BIOBANKING FOOTPRINT
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  - CHECK DAM

- NOTES**
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Issue	Description	Date
B	85% DETAILED DESIGN SUBMISSION	30.08.2023
A	ISSUED TO CLIENT	26.06.2023



Client

Status	DETAILED DESIGN NOT TO BE USED FOR CONSTRUCTION	
Scales	1:1000	Current Issue Signatures
Original Size	A3	Drawn HSP
Height Datum	AHD	Designed RM
Grid	MGA94 - 56	Checked DBA
Filename:	MARW-ARC-CV-DD-DWG-1272.dwg	Approved DK1

Project

**MOOREBANK AVENUE REALIGNMENT WORKS (MARW)**

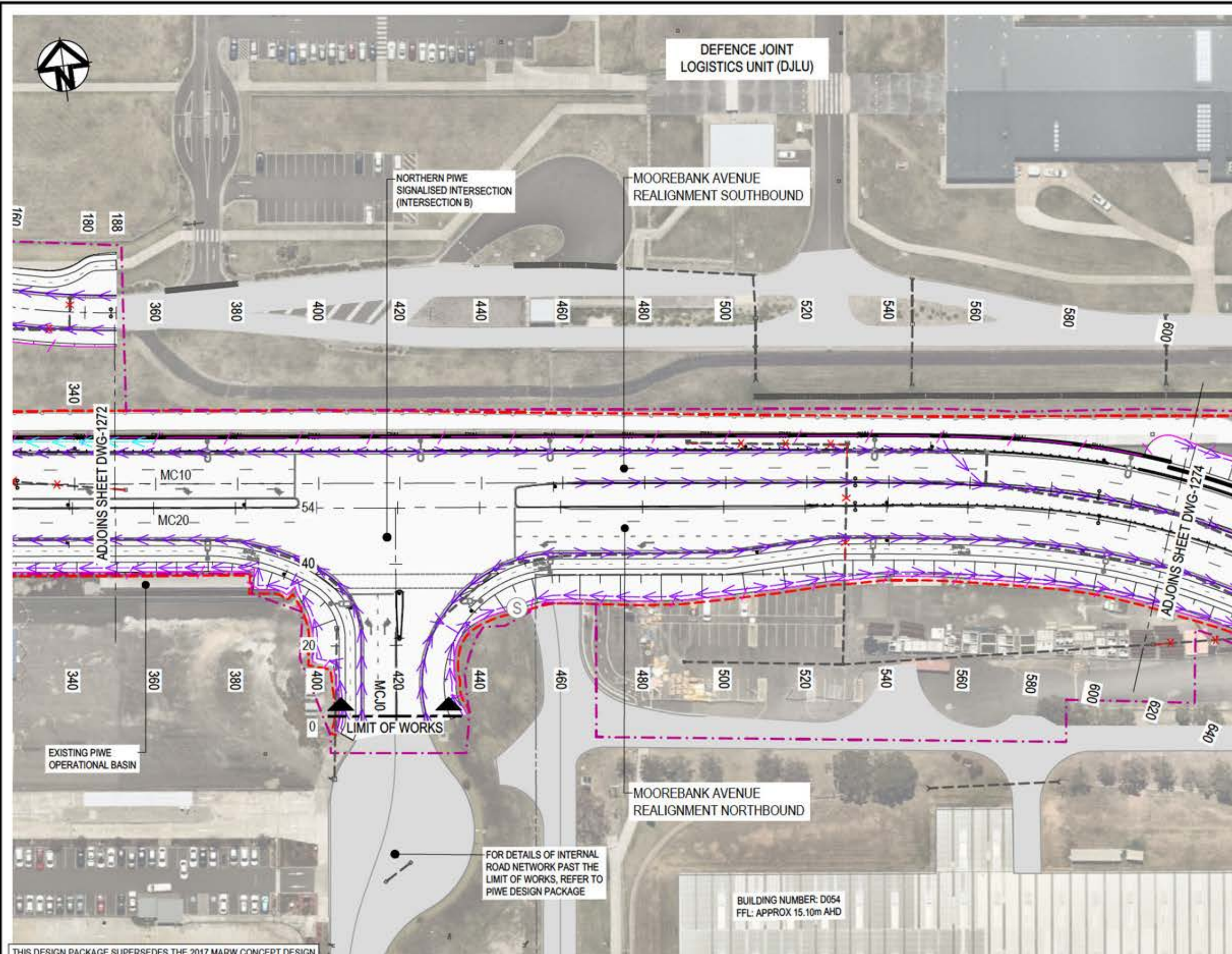
Title

**PRELIMINARY CONSTRUCTION SOIL AND WATER MANAGEMENT PLAN SHEET 2 OF 14**

Arcadis Australia Pacific Pty Limited  
Level 5, 225 St Georges Terrace  
PERTH WA 6000  
ABN 76 104 485 289  
Tel No: +61 8 9213 6700  
www.arcadis.com/au

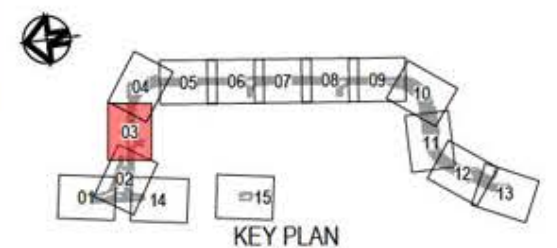
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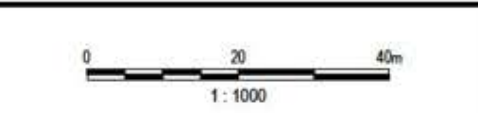
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- GENERAL**
- +— ROAD CONTROL LINE
  - — — PROPOSED ROAD DESIGN
  - RW — PROPOSED RETAINING WALL
  - RW — EXISTING RETAINING WALL
  - — — EXISTING PROPERTY BOUNDARY
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  - — — CHECK DAM

- NOTES**
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Issue	Description	Date
B	85% DETAILED DESIGN SUBMISSION	30.08.2023
A	ISSUED TO CLIENT	26.06.2023



Status	DETAILED DESIGN NOT TO BE USED FOR CONSTRUCTION	
Scales	1:1000	Current Issue Signatures
Original Size	A3	Drawn HSP
Height Datum	AHD	Designed RM
Grid	MGA94 - 56	Checked DBA
Filename:	MARW-ARC-CV-DD-DWG-1273.dwg	Approved DKI

Project  
**MOOREBANK AVENUE REALIGNMENT WORKS (MARW)**

Title  
**PRELIMINARY CONSTRUCTION SOIL AND WATER MANAGEMENT PLAN SHEET 3 OF 14**

Arcadis Australia Pacific Pty Limited  
Level 5, 225 St Georges Terrace  
PERTH WA 6000  
ABN 76 104 485 289  
Tel No: +61 8 9213 6700  
www.arcadis.com/au

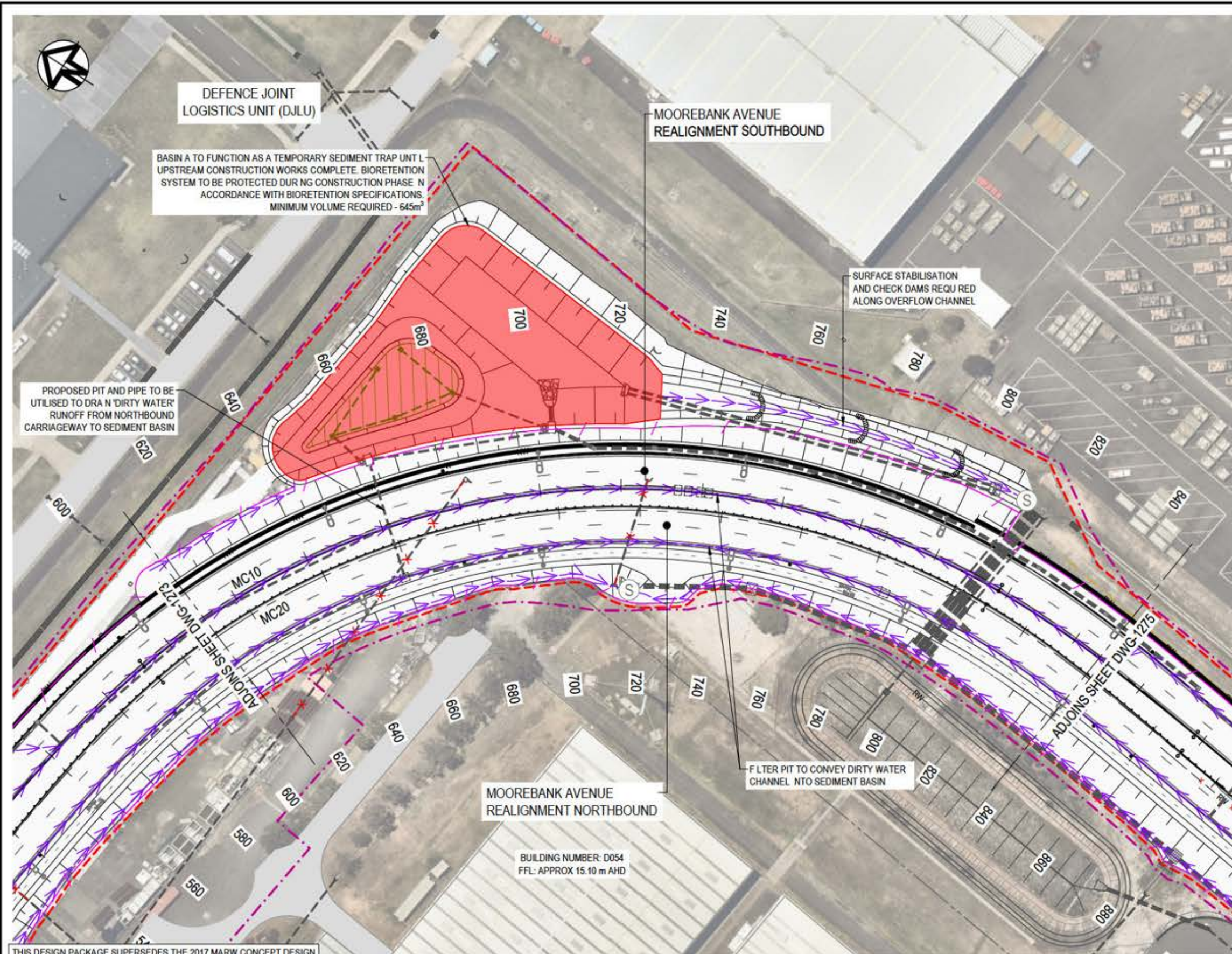
Project No.  
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Drawing No.  
MARW-ARC-CV-DD-DWG-1273 B

Issue

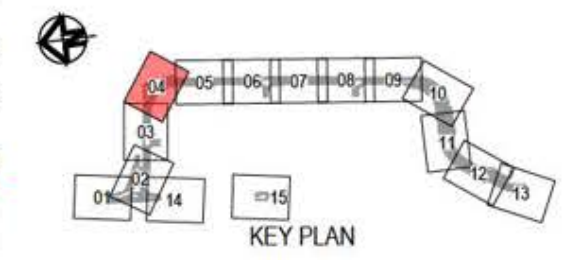
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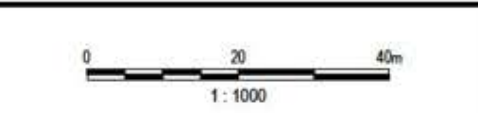
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- GENERAL**
- +— ROAD CONTROL LINE
  - — — PROPOSED ROAD DESIGN
  - RW — PROPOSED RETAINING WALL
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  - 4.



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Issue	Description	Date
B	85% DETAILED DESIGN SUBMISSION	30.08.2023
A	ISSUED TO CLIENT	26.06.2023



Client

Status: DETAILED DESIGN NOT TO BE USED FOR CONSTRUCTION	
Scales: 1:1000	Current Issue Signatures
Original Size: A3	Drawn: HSP
Height Datum: AHD	Designed: RM
Grid: MGA94 - 56	Checked: DBA
Filename: MARW-ARC-CV-DD-DWG-1274.dwg	Approved: DK1

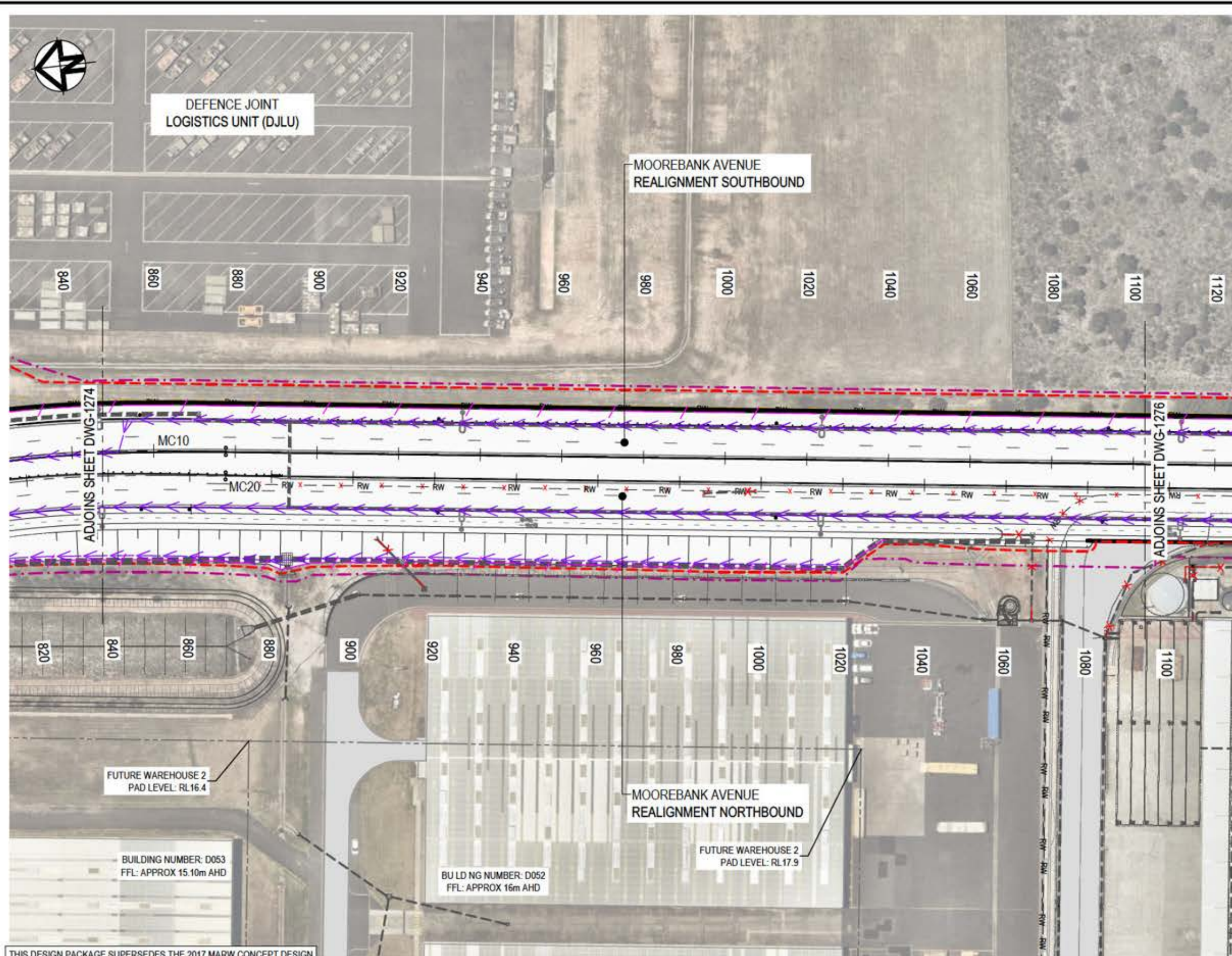
Project: MOOREBANK AVENUE REALIGNMENT WORKS (MARW)

Title: PRELIMINARY CONSTRUCTION SOIL AND WATER MANAGEMENT PLAN SHEET 4 OF 14

Arcadis Australia Pacific Pty Limited  
Level 5, 225 St Georges Terrace  
PERTH WA 6000  
ABN 76 104 485 289  
Tel No: +61 8 9213 6700  
www.arcadis.com/au

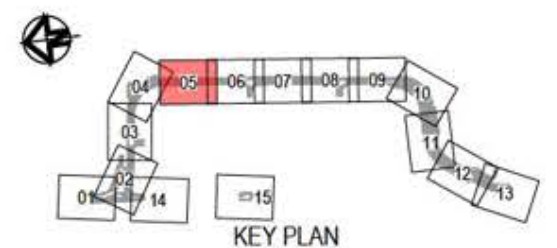
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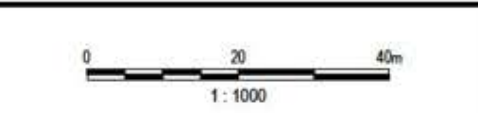
- LEGEND**
- GENERAL**
- +— ROAD CONTROL LINE
  - — — PROPOSED ROAD DESIGN
  - RW — PROPOSED RETAINING WALL
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  - — — PROPOSED TL4 THRE BEAM SAFETY BARRIER
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Issue	Description	Date
B	85% DETAILED DESIGN SUBMISSION	30.08.2023
A	ISSUED TO CLIENT	26.06.2023



Client

Status	DETAILED DESIGN NOT TO BE USED FOR CONSTRUCTION	
Scales	1:1000	Current Issue Signatures
Original Size	A3	Drawn HSP
Height Datum	AHD	Designed RM
Grid	MGA94 - 56	Checked DBA
Filename:	MARW-ARC-CV-DD-DWG-1275.dwg	

Project

**MOOREBANK AVENUE REALIGNMENT WORKS (MARW)**

Title

**PRELIMINARY CONSTRUCTION SOIL AND WATER MANAGEMENT PLAN**

SHEET 5 OF 14

Arcadis Australia Pacific Pty Limited  
Level 5, 225 St Georges Terrace  
PERTH WA 6000  
ABN 76 104 485 289  
Tel No: +61 8 9213 6700  
www.arcadis.com/au

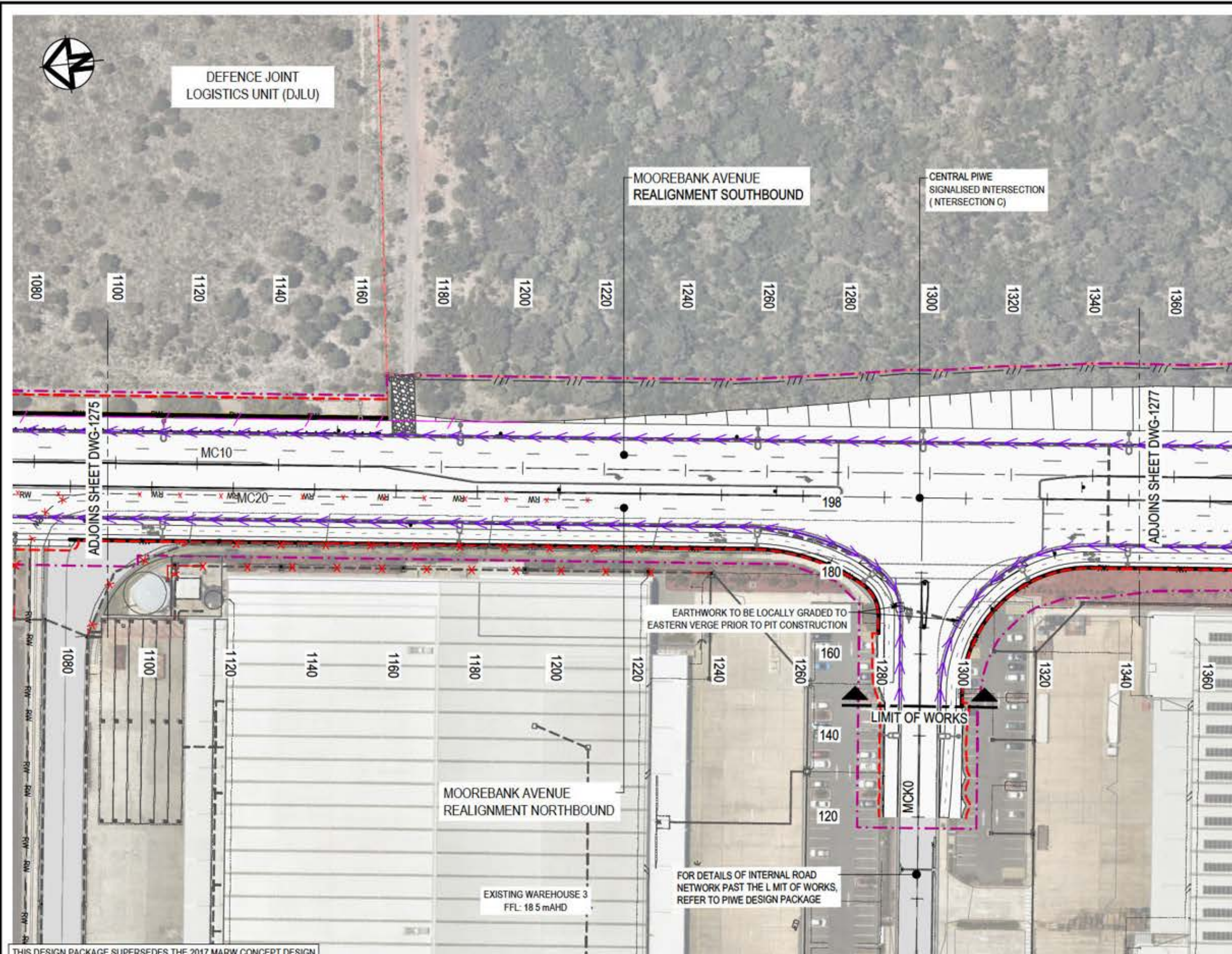
Project No. 30100351

Drawing No. MARW-ARC-CV-DD-DWG-1275 B

Issue

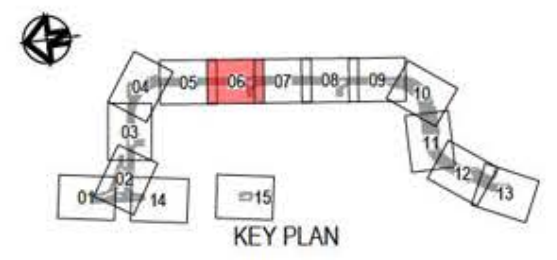
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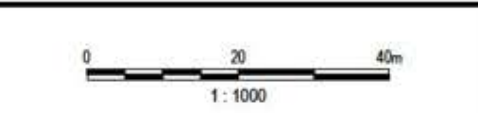
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- GENERAL**
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  - RW — PROPOSED RETAINING WALL
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Issue	Description	Date
B	85% DETAILED DESIGN SUBMISSION	30.08.2023
A	ISSUED TO CLIENT	26.06.2023



Client

Status	DETAILED DESIGN NOT TO BE USED FOR CONSTRUCTION	
Scales	1:1000	Current Issue Signatures
Original Size	A3	Drawn HSP
Height Datum	AHD	Designed RM
Grid	MGA94 - 56	Checked DBA
Filename:	MARW-ARC-CV-DD-DWG-1276.dwg	

Project

**MOOREBANK AVENUE REALIGNMENT WORKS (MARW)**

Title

**PRELIMINARY CONSTRUCTION SOIL AND WATER MANAGEMENT PLAN**

**SHEET 6 OF 14**

Arcadis Australia Pacific Pty Limited  
Level 5, 225 St Georges Terrace  
PERTH WA 6000  
ABN 76 104 485 289  
Tel No: +61 8 9213 6700  
www.arcadis.com/au

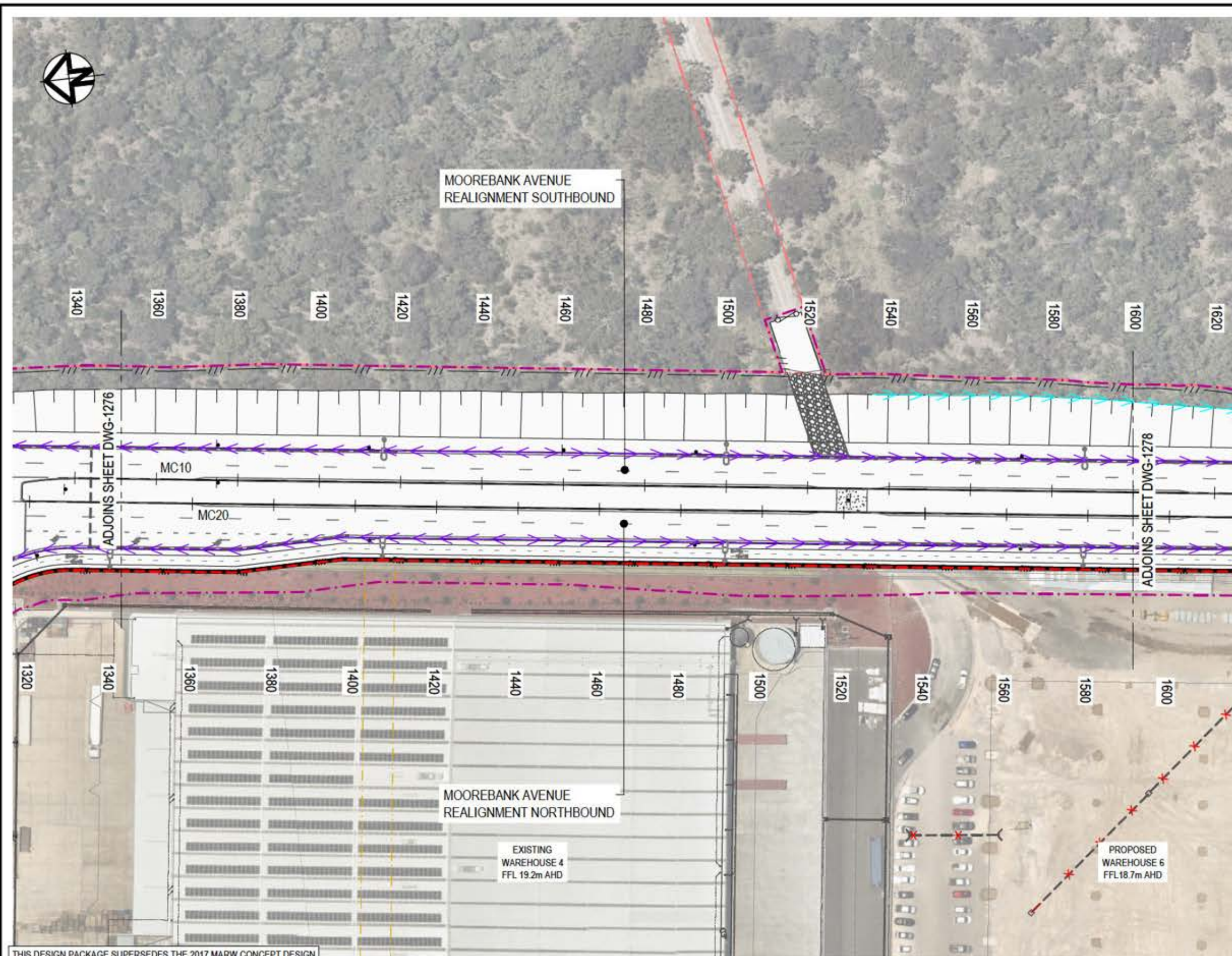
Project No. 30100351

Drawing No. Issue

**MARW-ARC-CV-DD-DWG-1276 B**

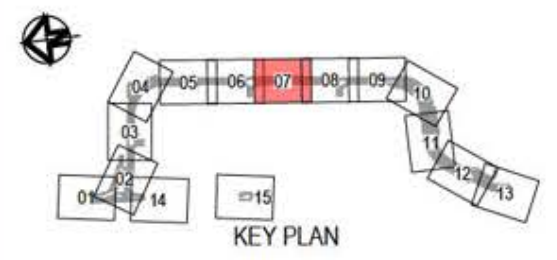
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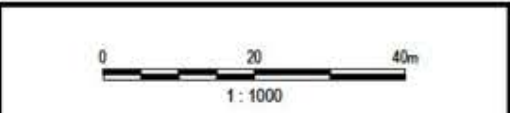
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- GENERAL**
- +— ROAD CONTROL LINE
  - — — PROPOSED ROAD DESIGN
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  - FOR TYPICAL DRAINAGE DETAILS REFER TO CV-DD-DWG 1221 TO CV-DD-DWG 1224.
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THIS DESIGN PACKAGE SUPERSEDES THE 2017 MARW CONCEPT DESIGN

Issue	Description	Date
B	85% DETAILED DESIGN SUBMISSION	30.08.2023
A	ISSUED TO CLIENT	26.06.2023



Client

Status	DETAILED DESIGN NOT TO BE USED FOR CONSTRUCTION	
Scales	1:1000	Current Issue Signatures
Original Size	A3	Drawn HSP
Height Datum	AHD	Designed RM
Grid	MGA94 - 56	Checked DBA
Filename:	MARW-ARC-CV-DD-DWG-1277.dwg	

Project

**MOOREBANK AVENUE REALIGNMENT WORKS (MARW)**

Title

**PRELIMINARY CONSTRUCTION SOIL AND WATER MANAGEMENT PLAN SHEET 7 OF 14**

Arcadis Australia Pacific Pty Limited  
Level 5, 225 St Georges Terrace  
PERTH WA 6000  
ABN 76 104 485 289  
Tel No: +61 8 9213 6700  
www.arcadis.com/au

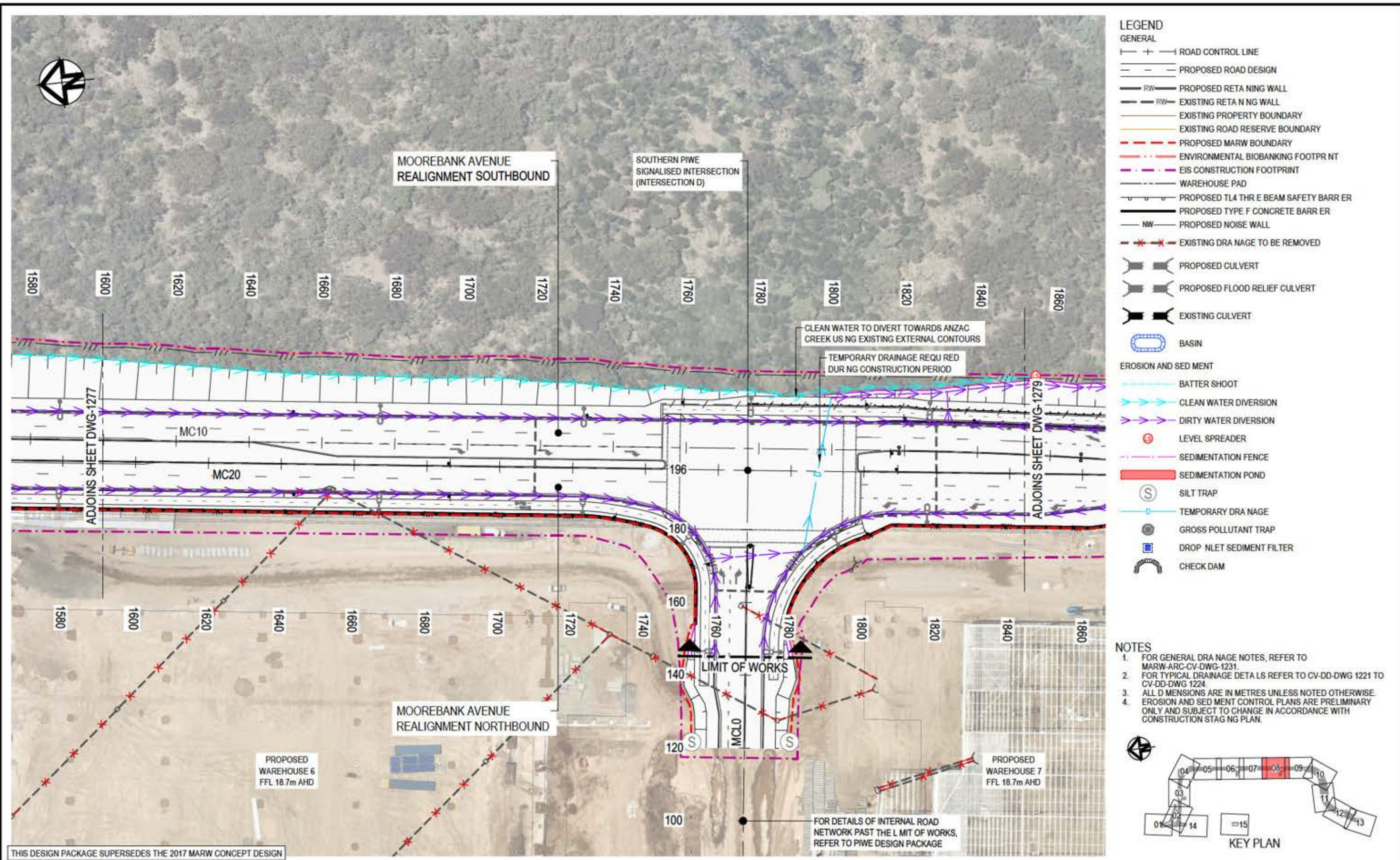
Project No. 30100351

Drawing No. MARW-ARC-CV-DD-DWG-1277 B

Issue

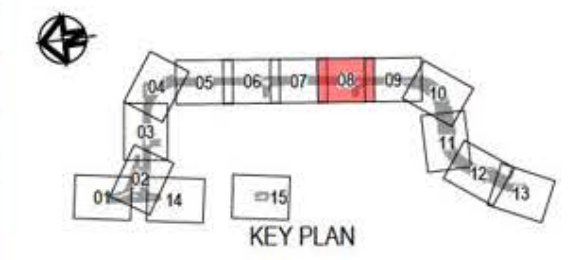
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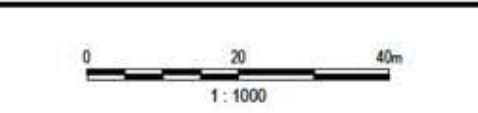
- LEGEND**
- GENERAL**
- +— ROAD CONTROL LINE
  - — — PROPOSED ROAD DESIGN
  - RW — PROPOSED RETAINING WALL
  - RW — EXISTING RETAINING WALL
  - — — EXISTING PROPERTY BOUNDARY
  - — — EXISTING ROAD RESERVE BOUNDARY
  - — — PROPOSED MARW BOUNDARY
  - — — ENVIRONMENTAL BIOBANKING FOOTPRINT
  - — — EIS CONSTRUCTION FOOTPRINT
  - — — WAREHOUSE PAD
  - — — PROPOSED TL4 THRE BEAM SAFETY BARRIER
  - — — PROPOSED TYPE F CONCRETE BARRIER
  - NW — PROPOSED NOISE WALL
  - \* — EXISTING DRAINAGE TO BE REMOVED
  - — — PROPOSED CULVERT
  - — — PROPOSED FLOOD RELIEF CULVERT
  - — — EXISTING CULVERT
  - — — BASIN
- EROSION AND SEDIMENT**
- — — BATTER SHOOT
  - — — CLEAN WATER DIVERSION
  - — — DIRTY WATER DIVERSION
  - — — LEVEL SPREADER
  - — — SEDIMENTATION FENCE
  - — — SEDIMENTATION POND
  - — — SILT TRAP
  - — — TEMPORARY DRAINAGE
  - — — GROSS POLLUTANT TRAP
  - — — DROP INLET SEDIMENT FILTER
  - — — CHECK DAM

- NOTES**
1. FOR GENERAL DRAINAGE NOTES, REFER TO MARW-ARC-CV-DWG-1231.
  2. FOR TYPICAL DRAINAGE DETAILS REFER TO CV-DD-DWG 1221 TO CV-DD-DWG 1224.
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Issue	Description	Date
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A	ISSUED TO CLIENT	26.06.2023



Client

Status	DETAILED DESIGN NOT TO BE USED FOR CONSTRUCTION	
Scales	1:1000	Current Issue Signatures
Original Size	A3	Drawn HSP
Height Datum	AHD	Designed RM
Grid	MGA94 - 56	Checked DBA
Filename:	MARW-ARC-CV-DD-DWG-1278.dwg	

Project

**MOOREBANK AVENUE REALIGNMENT WORKS (MARW)**

Title

**PRELIMINARY CONSTRUCTION SOIL AND WATER MANAGEMENT PLAN**

**SHEET 8 OF 14**

Arcadis Australia Pacific Pty Limited  
Level 5, 225 St Georges Terrace  
PERTH WA 6000  
ABN 76 104 485 289  
Tel No: +61 8 9213 6700  
www.arcadis.com/au

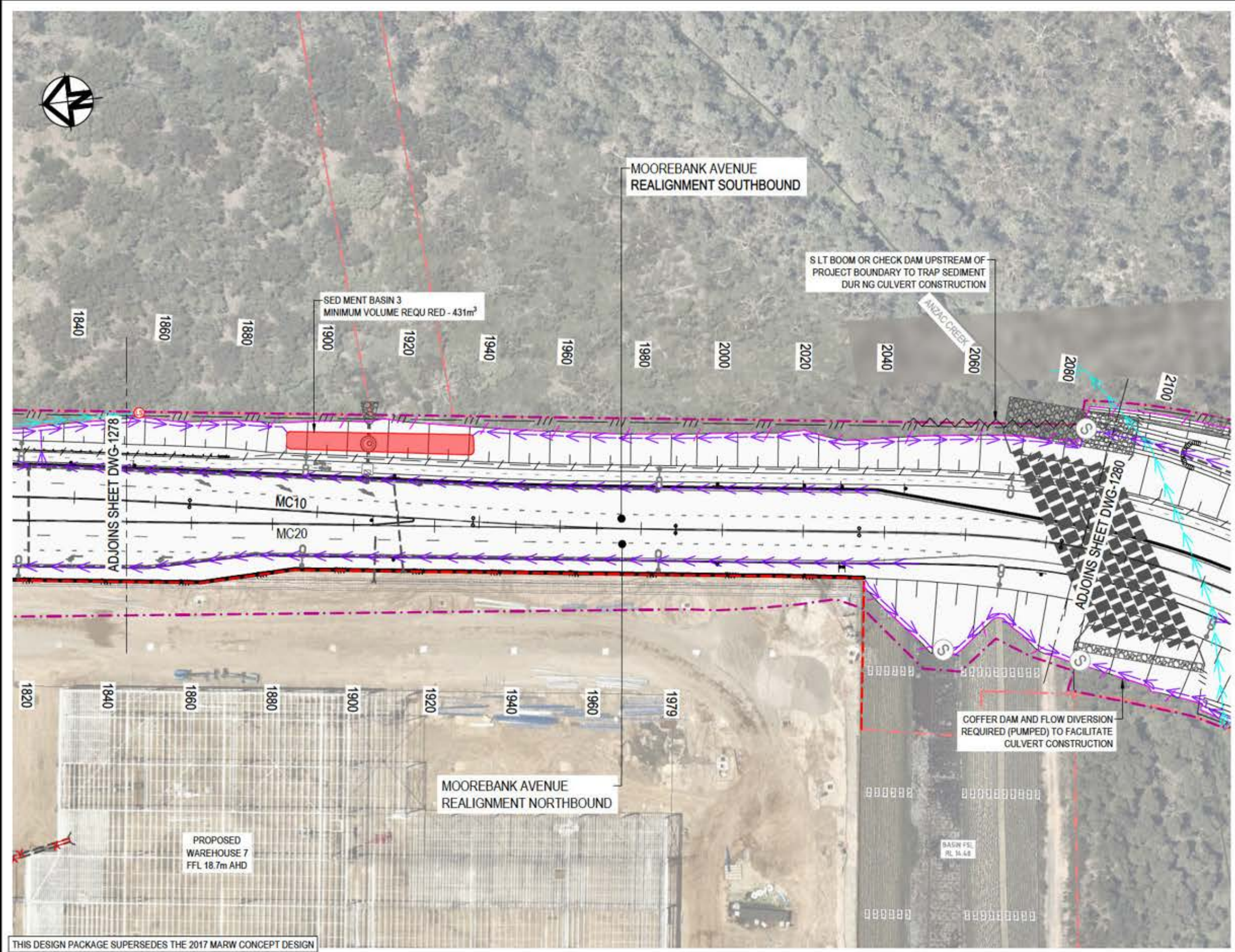
Project No. 30100351

Drawing No. MARW-ARC-CV-DD-DWG-1278 B

Issue

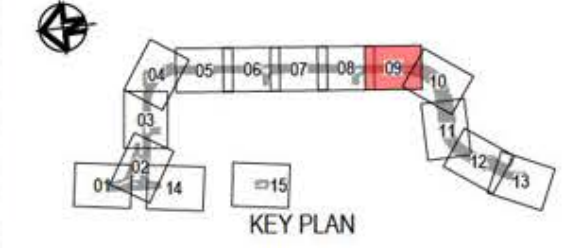
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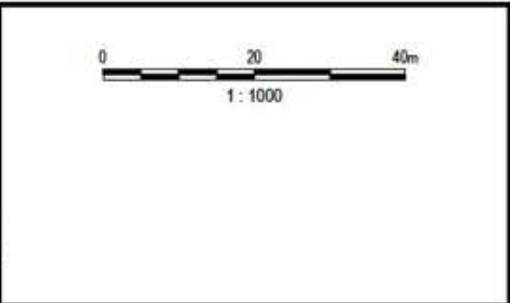
- LEGEND**
- GENERAL**
- +— ROAD CONTROL LINE
  - — — PROPOSED ROAD DESIGN
  - RW — PROPOSED RETAINING WALL
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  - — — CHECK DAM

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Issue	Description	Date
B	85% DETAILED DESIGN SUBMISSION	30.08.2023
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Client

Status	DETAILED DESIGN NOT TO BE USED FOR CONSTRUCTION	
Scales	1:1000	Current Issue Signatures
Original Size	A3	Drawn HSP
Height Datum	AHD	Designed RM
Grid	MGA94 - 56	Checked DBA
Filename:	MARW-ARC-CV-DD-DWG-1279.dwg	

Project

**MOOREBANK AVENUE REALIGNMENT WORKS (MARW)**

Title

**PRELIMINARY CONSTRUCTION SOIL AND WATER MANAGEMENT PLAN SHEET 9 OF 14**

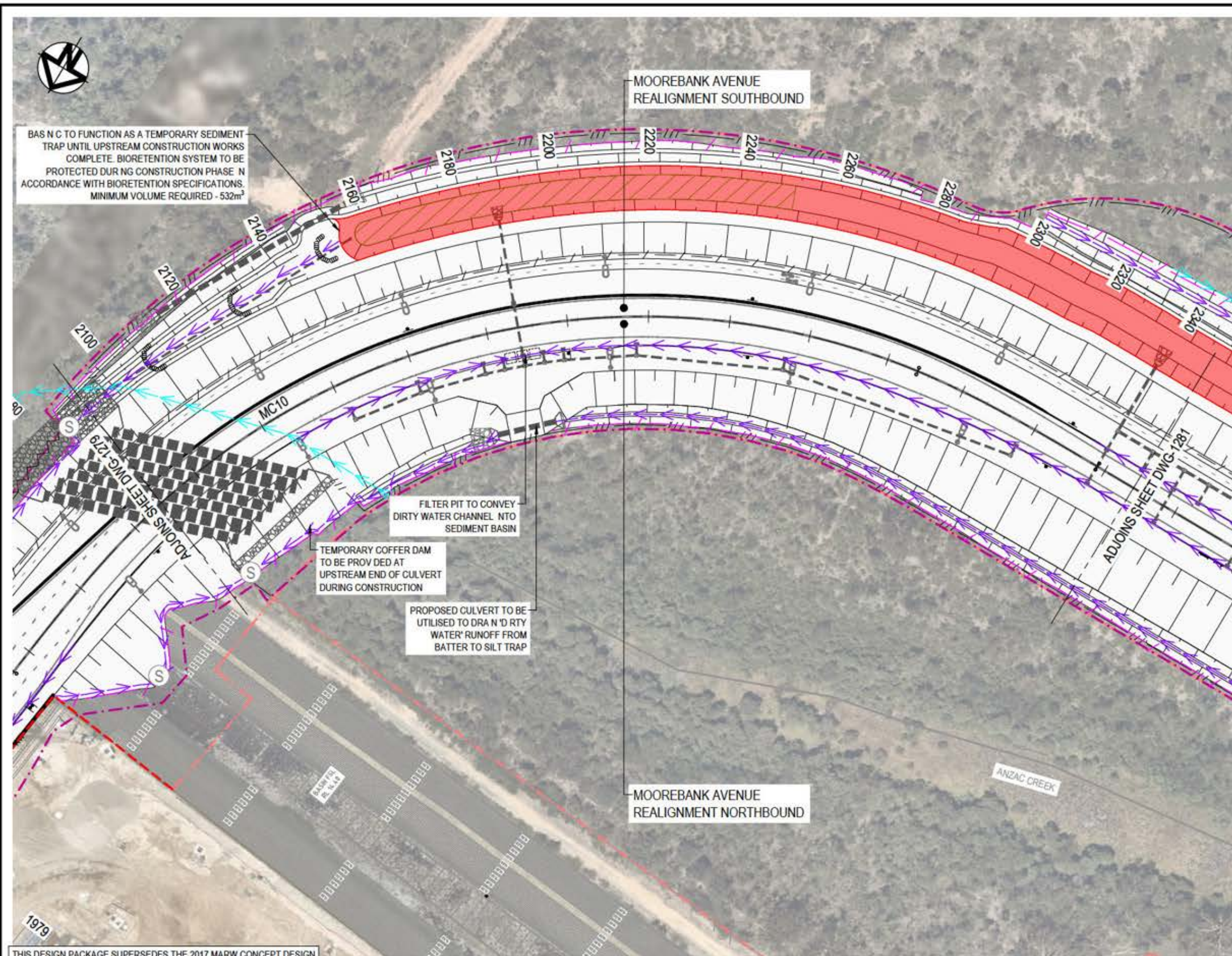
Arcadis Australia Pacific Pty Limited  
Level 5, 225 St Georges Terrace  
PERTH WA 6000  
ABN 76 104 485 289  
Tel No: +61 8 9213 6700  
www.arcadis.com/au

Project No. 30100351

Drawing No. MARW-ARC-CV-DD-DWG-1279 B

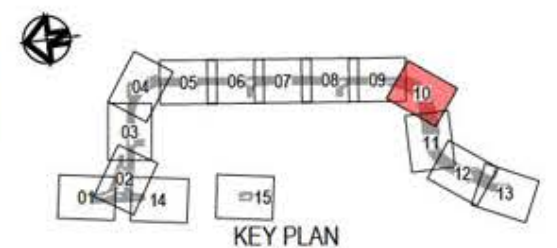
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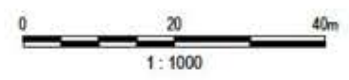
- LEGEND**
- GENERAL**
- +— ROAD CONTROL LINE
  - — — PROPOSED ROAD DESIGN
  - RW — PROPOSED RETAINING WALL
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Issue	Description	Date
B	85% DETAILED DESIGN SUBMISSION	30.08.2023
A	ISSUED TO CLIENT	26.06.2023



Status	DETAILED DESIGN NOT TO BE USED FOR CONSTRUCTION	
Scales	1:1000	Current Issue Signatures
Original Size	A3	Drawn HSP
Height Datum	AHD	Designed RM
Grid	MGA94 - 56	Checked DBA
Filename:	MARW-ARC-CV-DD-DWG-1280.dwg	

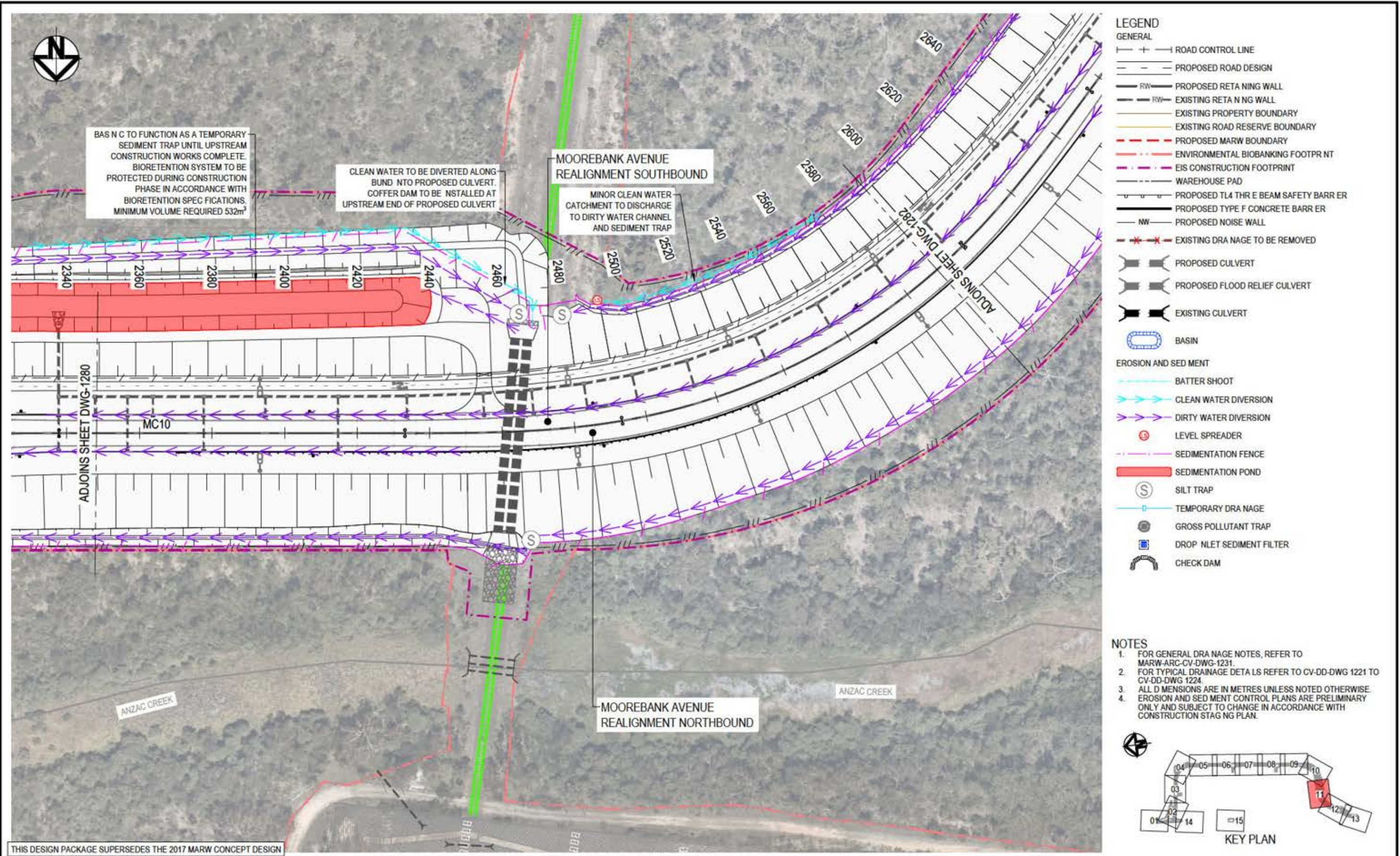
Project	MOOREBANK AVENUE REALIGNMENT WORKS (MARW)
Title	PRELIMINARY CONSTRUCTION SOIL AND WATER MANAGEMENT PLAN SHEET 10 OF 14

**ARCADIS**  
Arcadis Australia Pacific Pty Limited  
Level 5, 225 St Georges Terrace  
PERTH WA 6000  
ABN 76 104 485 289  
Tel No: +61 8 9213 6700  
www.arcadis.com/au

Project No. 30100351  
Drawing No. MARW-ARC-CV-DD-DWG-1280 B  
Issue

50mm on Original





BASIN TO FUNCTION AS A TEMPORARY SEDIMENT TRAP UNTIL UPSTREAM CONSTRUCTION WORKS COMPLETE. BIORETENTION SYSTEM TO BE PROTECTED DURING CONSTRUCTION PHASE IN ACCORDANCE WITH BIORETENTION SPECIFICATIONS. MINIMUM VOLUME REQUIRED 532m<sup>3</sup>

CLEAN WATER TO BE DIVERTED ALONG BUND INTO PROPOSED CULVERT. COFFER DAM TO BE INSTALLED AT UPSTREAM END OF PROPOSED CULVERT

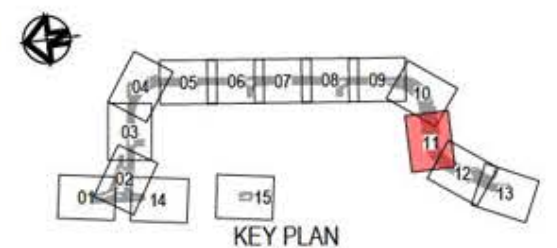
MOOREBANK AVENUE REALIGNMENT SOUTHBOUND

MINOR CLEAN WATER CATCHMENT TO DISCHARGE TO DIRTY WATER CHANNEL AND SEDIMENT TRAP

MOOREBANK AVENUE REALIGNMENT NORTHBOUND

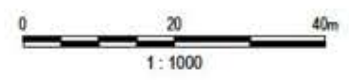
- LEGEND**
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- +— ROAD CONTROL LINE
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A	ISSUED TO CLIENT	26.06.2023



Client

Status	DETAILED DESIGN NOT TO BE USED FOR CONSTRUCTION	
Scales	1:1000	Current Issue Signatures
Original Size	A3	Drawn HSP
Height Datum	AHD	Designed RM
Grid	MGA94 - 56	Checked DBA
Filename:	MARW-ARC-CV-DD-DWG-1281.dwg	Approved DK1

Project

**MOOREBANK AVENUE REALIGNMENT WORKS (MARW)**

Title

**PRELIMINARY CONSTRUCTION SOIL AND WATER MANAGEMENT PLAN**

**SHEET 11 OF 14**

Arcadis Australia Pacific Pty Limited  
Level 5, 225 St Georges Terrace  
PERTH WA 6000  
ABN 76 104 485 289  
Tel No: +61 8 9213 6700  
www.arcadis.com/au

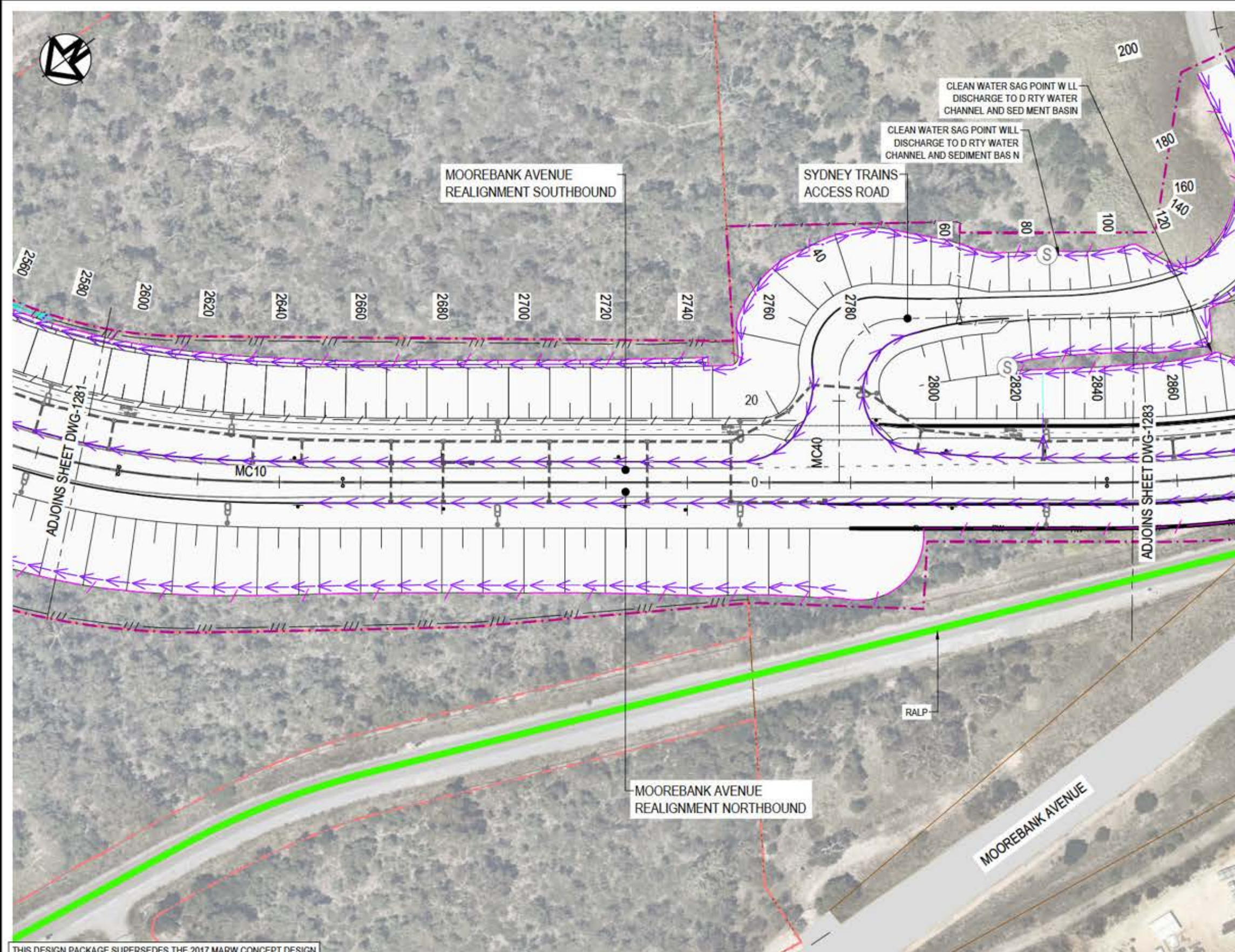
Project No. 30100351

Drawing No. MARW-ARC-CV-DD-DWG-1281 B

Issue

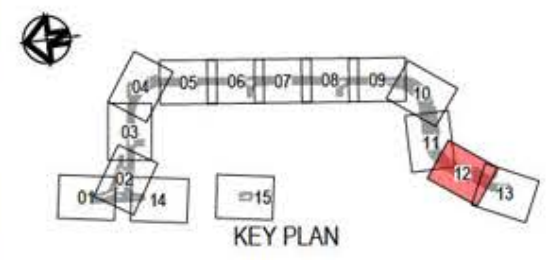
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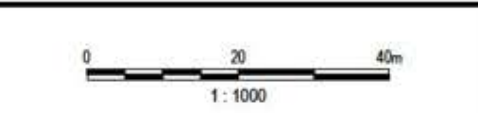
- LEGEND**
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- +— ROAD CONTROL LINE
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Scales	1:1000	Current Issue Signatures
Original Size	A3	Drawn HSP
Height Datum	AHD	Designed RM
Grid	MGA94 - 56	Checked DBA
Filename:	MARW-ARC-CV-DD-DWG-1282.dwg	Approved DKI

Project

**MOOREBANK AVENUE REALIGNMENT WORKS (MARW)**

Title

**PRELIMINARY CONSTRUCTION SOIL AND WATER MANAGEMENT PLAN**

**SHEET 12 OF 14**

Arcadis Australia Pacific Pty Limited  
Level 5, 225 St Georges Terrace  
PERTH WA 6000  
ABN 76 104 485 289  
Tel No: +61 8 9213 6700  
www.arcadis.com/au

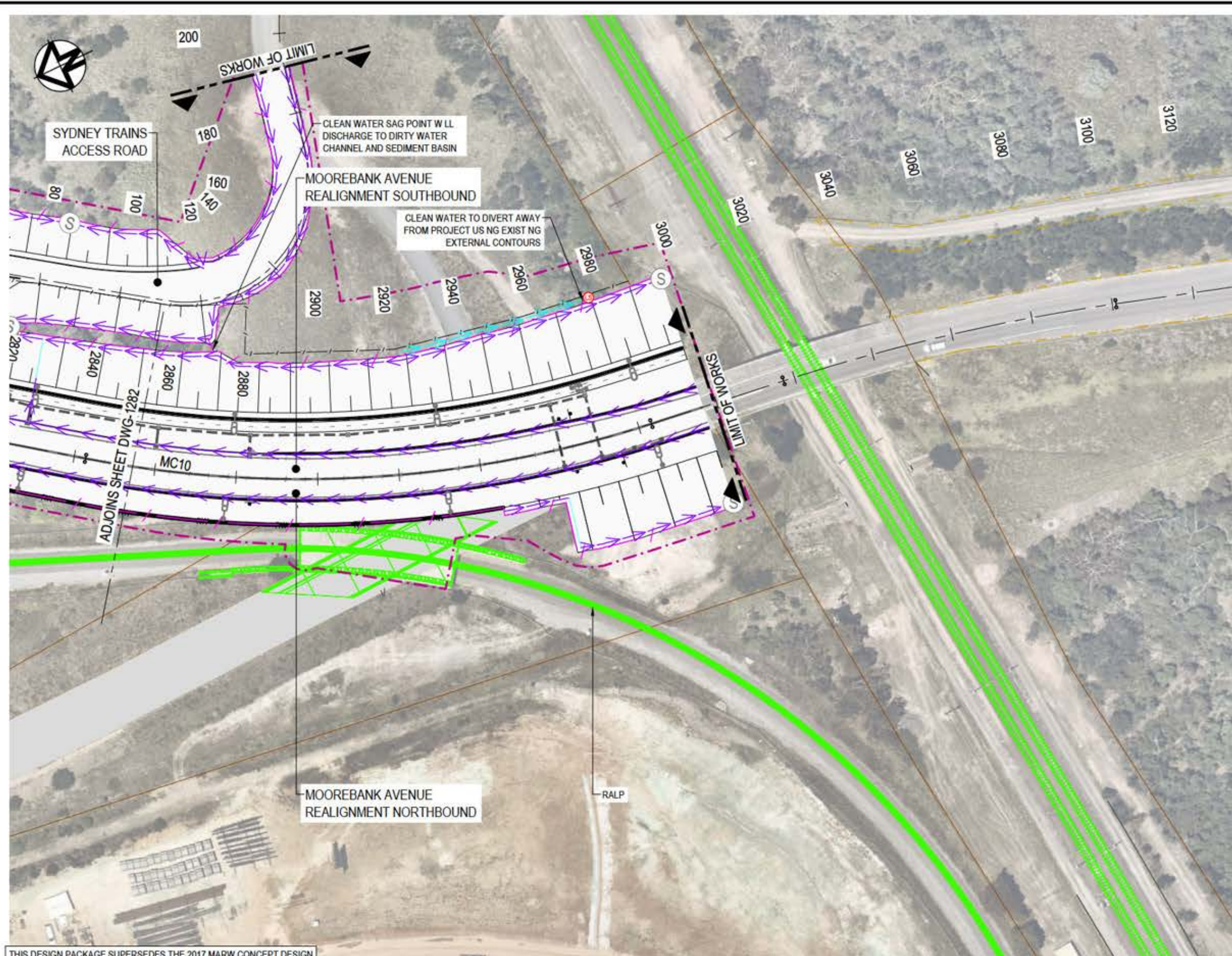
Project No. 30100351

Drawing No. MARW-ARC-CV-DD-DWG-1282 B

Issue

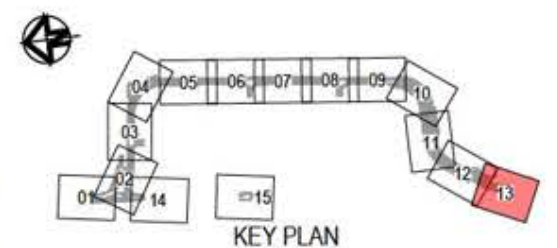
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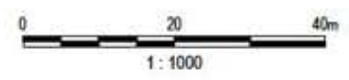
- LEGEND**
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- +— ROAD CONTROL LINE
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Original Size	A3	Drawn HSP
Height Datum	AHD	Designed RM
Grid	MGA94 - 56	Checked DBA
Filename:	MARW-ARC-CV-DD-DWG-1283.dwg	

Project  
**MOOREBANK AVENUE REALIGNMENT WORKS (MARW)**

Title  
**PRELIMINARY CONSTRUCTION SOIL AND WATER MANAGEMENT PLAN SHEET 13 OF 14**

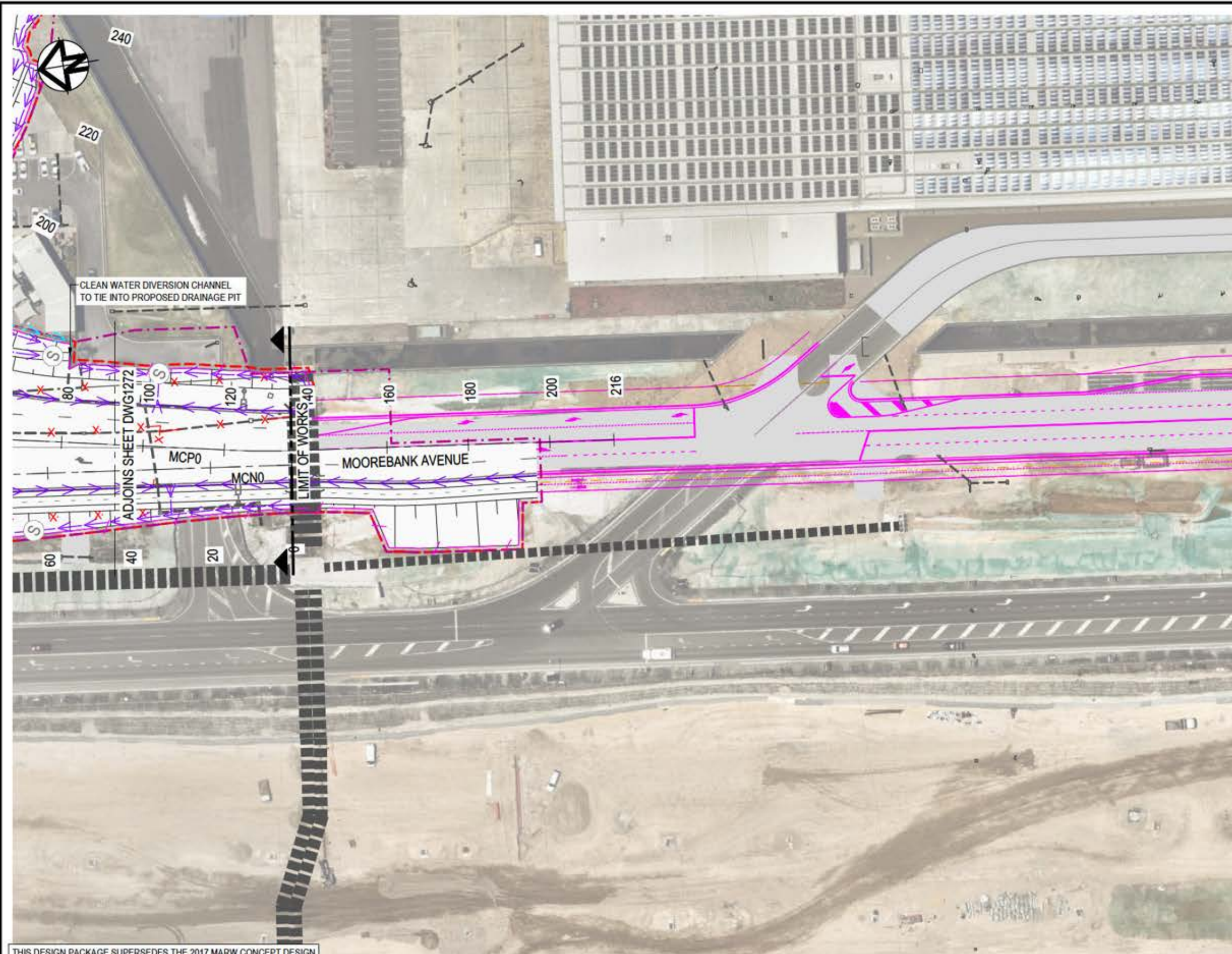
Arcadis Australia Pacific Pty Limited  
Level 5, 225 St Georges Terrace  
PERTH WA 6000  
ABN 76 104 485 289  
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www.arcadis.com/au

Project No.  
**30100351**

Drawing No.  
**MARW-ARC-CV-DD-DWG-1283 B**

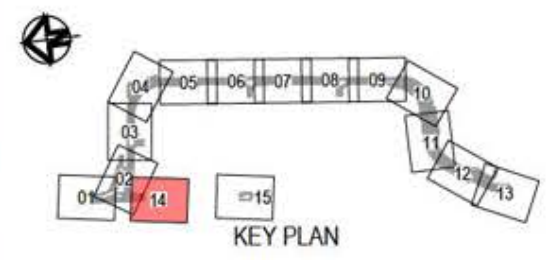
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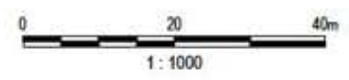
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  2. FOR TYPICAL DRAINAGE DETAILS REFER TO CV-DD-DWG 1221 TO CV-DD-DWG 1224.
  3. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.
  4. EROSION AND SEDIMENT CONTROL PLANS ARE PRELIMINARY ONLY AND SUBJECT TO CHANGE IN ACCORDANCE WITH CONSTRUCTION STAGING PLAN.



THIS DESIGN PACKAGE SUPERSEDES THE 2017 MARW CONCEPT DESIGN

Issue	Description	Date
B	85% DETAILED DESIGN SUBMISSION	30.08.2023
A	ISSUED TO CLIENT	26.06.2023



Client

Status <b>DETAILED DESIGN</b> NOT TO BE USED FOR CONSTRUCTION	
Scales 1:1000	Current Issue Signatures
Original Size A3	Drawn HSP
Height Datum AHD	Designed RM
Grid MGA94 - 56	Checked DBA
Filename: MARW-ARC-CV-DD-DWG-1284.dwg	Approved DKI

Project  
**MOOREBANK AVENUE REALIGNMENT WORKS (MARW)**

Title  
**PRELIMINARY CONSTRUCTION SOIL AND WATER MANAGEMENT PLAN SHEET 14 OF 14**

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Project No.  
30100351

Drawing No.  
MARW-ARC-CV-DD-DWG-1284 B

Issue

50mm on Original