

22 July 2020

Tactical Group

██████████ ██████████  
Level 15  
124 Walker Street  
NORTH SYDNEY NSW 2060

Dear Madam

**Re: MPW3 Soil and Water Management Plan- SSD 10431**

As per your request, we provide this letter pertaining to Moorebank Precinct West (MPW) Stage 3, located at Moorebank Avenue, Moorebank. The purpose of this letter is to provide an assessment on the proposed MPW Stage 3 State Significant development (**SSD 10431**) for the relocation of the existing site works compound.

## 1 INTRODUCTION

Costin Roe Consulting has been commissioned by Tactical Group, on behalf of Qube, to prepare this letter to accompany the proposed MPW Stage 3 submission. The purpose of the letter being to demonstrate consistency with the approved concept plan (**SSD 5066**) and with the strategies proposed at part of the Moorebank Intermodal Precinct West Stage 2 project approved under **SSD 7709**.

The proposed application is for subdivision of the MPW Site, construction of a works compound and construction and installation of associated ancillary infrastructure. The Project is predominately located in the southern portion of the MPW development site.

Further, this letter confirms consistency with the post approval assessments completed for MPW Stage 2 (**SSD 7709**) including the *Construction Soil and Water Management Plan (CSWMP, Ref: Co13455.07-03a.rpt)* & the *Stormwater Development Design Report (SDDR, Ref: Co13455.07-02b.rpt)* prepared by Costin Roe Consulting (CRC). The intention is to extend the application of the approved MPW Stage 2 SSD 7709 CSWMP to the proposed development, noting that the MPW 2 CSWMP is presently applicable to the entirety of the MPW site, inclusive of the area subject to the proposed development.

Typical sediment control measure drawings, and sediment treatment and discharge procedures provided in the CSWMP, and the stormwater design principles and operational requirements as detailed in the approved Stormwater Development Design Report (SDDR) (Costin Roe, 29 April 2020) prepared for MPW, would be adopted for the proposed development.

An *Environmental Impact Statement Scoping Report* (Ref: J3191223.2) has been prepared for the approval by Aspect Environmental. Reference to this report should be made for detailed site descriptions, project overview, site context and other EIS related impact assessments.

A review of management measures for the compound has been made, noting that management measures for the compound relate only to the construction period measures which are encapsulated in the CSWMP produced as part of post approval documentation for SSD 7709.

A set of drawings has also been produced (refer **Enclosure 1**) which confirm Soil and Water Management measures and Erosion and Sediment Control measures for the Stage 3 works and consistency with the CSWMP.

### 1.1 PLANNING SECRETARY'S ENVIRONMENTAL ASSESSMENT REQUIREMENTS (SEAR's)

This SWMP and associated drawings have been completed in accordance with the approved SSD7709 stormwater management strategy for Moorebank Precinct West Stage 2 as documented in the SDDR, and in accordance with the requirements of the CSWMP. The key measures set out in the SDDR and CSWMP will manage runoff from the proposed construction compound as set out in this letter.

We provide the following table which confirms how and where, within the report or respective drawings and models, each of the requirements of SSD\_10431 SEAR's have been met:

#### SSD10431 SEARs Matrix

<i>SEAR No.</i>	<i>Item and Response</i>
7	<i>An assessment of soil and water impacts for the site. The assessment must:</i>
7a	<p><i>Assess impacts on surface and groundwater flows, quality and quantity</i></p> <p><u>Response</u></p> <p>The intention is to extend the application of the approved MPW Stage 2 SSD 7709 CSWMP to the proposed development, noting that the MPW 2 CSWMP and SDDR are presently applicable to the entirety of the MPW site, inclusive of the area subject to the proposed development.</p> <p>This SWMP and associated drawings have been completed in accordance with the approved SSD7709 stormwater management strategy for Moorebank Precinct West Stage 2 as documented in the SDDR, and in accordance with the requirements of the CSWMP.</p> <p>The key measures set out in the SDDR and CSWMP will manage runoff from the proposed construction compound as set out in this letter. Minor modifications to drainage diversions are required to the ESCP to address layout changes, however sediment basin locations and arrangements as set out in the approved CSWMP will be adopted for the proposed development. No additional measures are required to address operational requirements.</p>
7b	<p><i>Assess flooding impacts and characteristics, to and from the project, with an assessment of the potential changes to flooding behaviour (levels, velocities and direction) and impacts on bed and bank stability, through flood modelling, including:</i></p> <p><i>i. hydraulic modelling for a range of flood events</i></p>

<b>SEAR No.</b>	<b>Item and Response</b>
	<p>ii. <i>description, justification and assessment of design objectives (including bridge, culvert and embankment design)</i></p> <p>iii. <i>an assessment of afflux and flood duration (inundation period) on property;</i></p> <p>iv. <i>consideration of the effects of climate change, including changes to rainfall frequency and/or intensity, including an assessment of the capacity of stormwater drainage structures</i></p> <p>v. <i>v. relevant provisions of the NSW Floodplain Development Manual 2005</i></p> <p><u>Response</u></p> <p>A detailed flood assessment has been completed as part of the EIS for SSD7709. This has been summarised in <b>Section 5</b> of this letter.</p> <p>It is confirmed that the proposed compound is clear of both the 1% AEP and PMF floods, and there is no impact on flooding from the development, nor impact on the development from flooding. A detailed flood assessment is not necessary for the current EIS.</p>
7c	<p><i>Assess effects to downstream rivers, wetlands, estuaries, marine waters and floodplain areas, water dependent fauna and flora (including Groundwater Dependent Ecosystems), having regard to advice received from EESG (see Attachment 1)</i></p> <p><u>Response</u></p> <p>The effect of development to downstream rivers, wetlands, estuaries, marine waters and floodplain areas, water dependent fauna and flora (including Groundwater Dependent Ecosystems) has been completed and confirmed by Cumberland Ecology as part of SSD7709 approvals.</p> <p>It is confirmed that the current application does not change or affect any of the proposed measures included in the SSD7709 approval hence further assessments for the proposed compound are not relevant.</p>
7d	<p><i>Describe any mitigating effects of the proposed stormwater and wastewater management during and after construction on hydrological attributes such as volumes, flow rates, management methods and re-use options</i></p> <p><u>Response</u></p> <p>Per Item 7a response above, this SWMP has been completed in accordance with the requirements of the SDDR, and in accordance with the requirements of the CSWMP. This SWMP does not change or affect any of the proposed measures included in the SSD7709 approval hence further assessments for the proposed compound are not relevant.</p> <p>Reference is to be made to <i>Section 6</i> of the CSWMP for mitigating effects of wastewater management during construction &amp; <i>Sections 4 and 5</i> of the SDDR for mitigating effects of wastewater management after construction.</p>

<b>SEAR No.</b>	<b>Item and Response</b>
7e	<p><i>Identify proposed monitoring of hydrological attributes</i></p> <p><u>Response</u></p> <p>Per Item 7a response above, this SWMP has been completed in accordance with the requirements of the SDDR, and in accordance with the requirements of the CSWMP.</p> <p>Reference is to be made to <i>Section 8</i> of the CSWMP for the approved Monitoring requirements to be undertaken during construction. This SWMP does not change or affect any of the proposed measures included in the SSD7709 approval hence further assessments for the proposed compound are not relevant.</p>
7f	<p><i>Address drainage issues associated with the development / site, including the incorporation of Water Sensitive Urban Design measures, stormwater and drainage infrastructure such as on-site detention systems to ensure peak discharges and flow velocities post development must not exceed existing peak flows and velocities</i></p> <p><u>Response</u></p> <p>Per Item 7a response above, this SWMP has been completed in accordance with the requirements of the SDDR, and in accordance with the requirements of the CSWMP.</p> <p>Reference is to be made to <i>Sections 3-5</i> of the SDDR for WSUD measures implemented within the MPW Stage 2 approval. This SWMP does not change or affect any of the proposed measures included in the SSD7709 approval hence further assessments for the proposed compound are not relevant.</p>
7g	<p><i>Undertake an assessment of surface water quality during construction (including reference to water quality objectives for the relevant catchment where objectives have been determined), including an identification of works that may impact water quality, and a summary of proposed monitoring and mitigation measures in accordance with Managing Urban Stormwater – Soils &amp; Construction Volume 1 2004 (Landcom) and Volume 2 (DECC 2008)</i></p> <p><u>Response</u></p> <p>Per Item 7a response above, this SWMP has been completed in accordance with the requirements of the SDDR, and in accordance with the requirements of the CSWMP.</p> <p>Reference is to be made to <i>Sections 3-5</i> of the SDDR for WSUD measures implemented within the MPW Stage 2 approval. This SWMP does not change or affect any of the proposed measures included in the SSD7709 approval hence further assessments for the proposed compound are not relevant.</p>
7h	<p><i>Consideration of stormwater quality and management (including monitoring) during use of the site with the objective of maintaining or</i></p>



<b>SEAR No.</b>	<b>Item and Response</b>
	<p><i>improving existing water quality taking into account the Water Quality Objectives</i></p> <p><u>Response</u></p> <p>Per Item 7a response above, this SWMP has been completed in accordance with the requirements of the SDDR, and in accordance with the requirements of the CSWMP.</p> <p>Reference is to be made to <i>Section 8</i> of the CSWMP for the approved Monitoring requirements to be undertaken during construction &amp; <i>Section 6</i> of the SDDR for the approved Monitoring requirements to be undertaken after construction. This SWMP does not change or affect any of the proposed measures included in the SSD7709 approval hence further assessments for the proposed compound are not relevant.</p>
7i	<p><i>Consider whether the existing sewerage system can cater for the proposal and whether environmental performance of the existing system will be impacted</i></p> <p><u>Response</u></p> <p>Refer to the MPW Stage 2 EIS (by Arcadis) for sewer system response.</p>
7j	<p><i>Identify and assess the soil characteristics and properties that may impact or be impacted by the project, including acid sulfate soils, salinity, erodibility, unstable or unsuitable ground and unrippable rock</i></p> <p><u>Response</u></p> <p>The Proposal includes the importation (from offsite locations) of approximately 280,000 m<sup>3</sup> of unconsolidated clean fill for compaction up to final land level and approximately 540,000 m<sup>3</sup> of structural fill for warehouse pad completion, in addition to the imported fill approved under SSD 5066 MOD 1.</p> <p>Fill material imported to the site under MPW Stage 2 represents the majority of bulk earthworks to meet the requirement to establish a stable surface landform across the MPW Site. Land disturbance and land filling activities for MPW Stage 2 will be undertaken in accordance with SSD 7709 CoC B41 and the approved Stormwater Development Design Report (SDDR) (Costin Roe, 29 April 2020). Subsequent fill requirements under the proposed development are in accordance with the MPW Concept MOD 1 CoC 19B to achieve final finished surface levels.</p> <p>Noting that the intention is to extend the application of the approved MPW Stage 2 SSD 7709 CSWMP to the proposed development, noting that the MPW 2 CSWMP (which includes consideration to existing soil characteristics noted above) is presently applicable to the entirety of the MPW site, inclusive of the area subject to the proposed development.</p>

<b>SEAR No.</b>	<b>Item and Response</b>
7k	<p data-bbox="459 293 1362 405"><i>Include a bulk earthworks strategy detailing the volume of spoil to be extracted from the site, planned reuse and amount of material to be imported.</i></p> <p data-bbox="459 421 592 456"><u>Response</u></p> <p data-bbox="459 472 1390 584">No materials are proposed to be extracted from the site under the proposed development, and so a bulk earthworks strategy for extraction is not required.</p> <p data-bbox="459 600 1394 786">Approximately 280,000 m<sup>3</sup> of unconsolidated clean fill for compaction up to final land level and approximately 540,000 m<sup>3</sup> of structural fill for warehouse pad completion is proposed to be imported to the site under the Proposal from offsite locations, in addition to the imported fill approved under SSD 5066 MOD 1.</p>

## 2 MPW PRECINCT DESCRIPTION

### 2.1 Pre-Existing Conditions

The MPW site is located approximately 27 kilometers (km) south-west of the Sydney Central Business District (CBD) and approximately 26 km west of Port Botany. The site is situated within the Liverpool Local Government Area (LGA), in Sydney's South West Sub-Region, approximately 2.5 km from the Liverpool City Centre.

The development is located within The MPW Precinct of the Moorebank Logistics Park. The MPW Precinct development footprint is irregular in shape being bounded by the Georges River on the west, M5 Motorway on the north (and existing ABB Facility), Moorebank Avenue and Moorebank Precinct East (MPE) on the east, and undeveloped crown land to the south. Also, on the eastern extent is Basin 10 (being constructed on the western side of Moorebank Avenue as part of MPE works) and the interstate intermodal terminal and rail sidings.

Access to the MPW Precinct is via Moorebank Avenue, south of the Moorebank Avenue interchange with the M5 Motorway. The MPW Precinct is noted to comprise relatively flat topography. The highest level is RL 17.8m AHD located at the south-east corner of the site. The lowest level is RL 3.0m AHD adjacent to Georges River. Generally, the levels over the site fall between a range of RL 13.5m AHD to RL 7.5m AHD. Site grading is flat to undulating, as noted, however generally falls from east to west at grades of 0.5% to 1%.

It is noted that Moorebank Avenue reaches levels of RL 25.2m AHD at the East Hills Railway Line crossing and associated bridge abutment approach at the southern end of the MPW Precinct development footprint.

Further, it is noted that an existing works compound is located within the northern half of the MPW site, which has been utilised for construction works around the precinct's vicinity.

### 2.2 MPW Stage 3 Development Description

The proposed MPW Stage 3 works involves and construction of a new site compound. The compound is proposed to be located within the southern portion of MPW Stage 2 development area. The proposed compound is intended to provide office and administrative amenities, and for material stockpile zones, site entry and staging zones for the MPW Stages 1 & 2 approved developments.

The proposed compound design is consistent with the approved original concept plan (**SSD 5066**), albeit in a revised position located within in the southern portion of the MPW site, and will not compromise the intent of the future developments proposed to be built within the Stage 3 Region. Refer to drawings in **Enclosure 1** for the proposed SSD civil works plans and Figure 1 for general layout of the works.

Details of the key components of MPW Stage 3 construction works includes the following:

- The works compound is proposed to be positioned on the eastern portion of the proposed Lot 10.
- Hardstand, laydown and materials stockpile areas have been proposed to be located within the proposed Lots 8 & 9 to facilitate the works of MPW Stages 1 & 2, and future MPW warehouse construction, operation and maintenance phases.

- A materials storage area and car parking regions have been proposed to be positioned within the western region of the proposed Lot 10.
- A Temporary Loop Road and Permanent Ring Road are proposed within the south-western portion of the MPW site. The roads are proposed to facilitate access to all lots throughout MPW Stage 3. It is proposed that Services and utilities are provided under the Permanent Ring Road.
- Vegetation clearing, topsoil stripping and stockpiling and site earthworks and erosion and sediment control works.
- Appropriate importation of clean general fill (VENM/ENM), engineered fill materials and other construction materials.
- Construction and operation of sediment basins to be consistent with the approved concept plan (SSD 5066), the CSWMP.

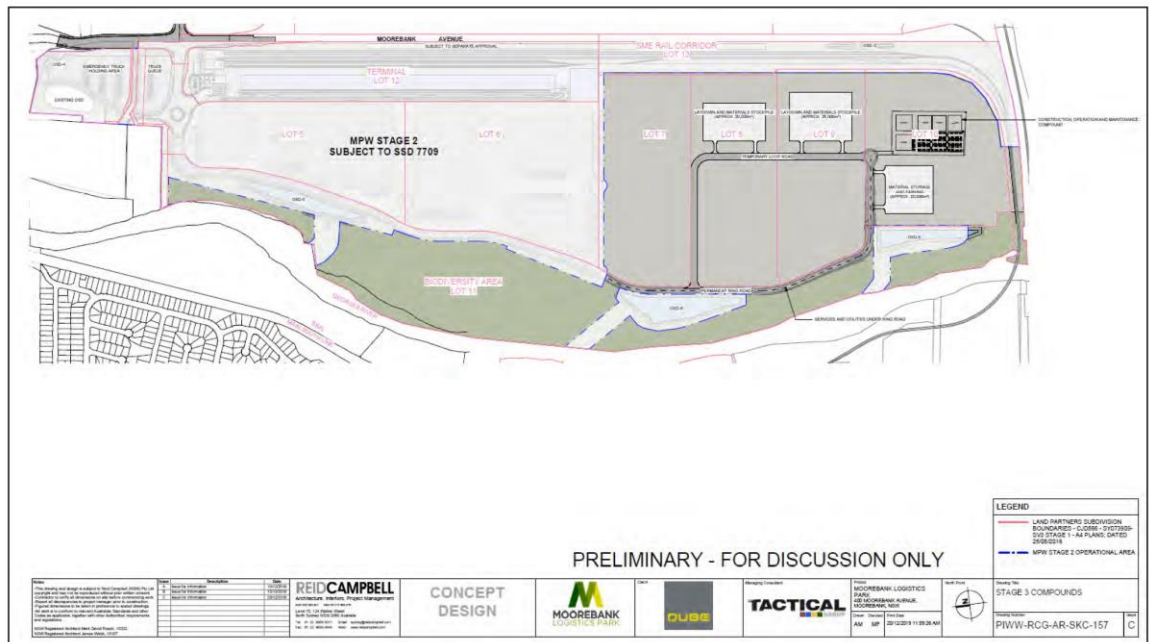


Figure 1. General Layout of Proposed Compound

### 3 SOIL & EROSION & SEDIMENT CONTROLS

#### 3.1 General Requirements

This section of the letter has been prepared with the purpose of providing the general requirements for site management procedures to control the severity and extent of soil erosion and pollutant transport during the implementation of the new compound.

The requirements for soil and water are to be undertaken and completed in accordance with the guidelines in *Managing Urban Stormwater - Soils and Construction Volume 1 (Landcom 2004)*, the CSWMP, the approved Construction Environmental Management Plan (CEMP) and any compound specific variations as set out in the drawings included in **Enclosure 1**.

#### 3.2 Description of Proposed Soil and Water Management Measures

Management of stormwater runoff from the MPW Stage 3 catchment is proposed to be captured and managed within Sediment Basins 6 & 8. These sediment basins are proposed to be also used during the operational phase of the site's development.

Design of the proposed sediment basins (6 & 8) has been captured in the **CSWMP** and include the area designated for the MPW Stage 3 compound. No additional storage in the proposed sediment basins is required to accommodate the Stage 3 works. Refer to drawings **MPWS3-COS-CV-DWG-0200, 0250 & 0251** in **Enclosure 1** for erosion sediment control plans and details.

The proposed sediment basins (6 & 8) will occupy a similar volume as anticipated for the future open detention basins. The proposed operational basins will be utilised as temporary sediment basins until site stabilisation and construction are completed for Stage 3 works as required by the CSWMP.

#### 3.3 Typical Minimum Management Requirements

Detailed soil and water management requirements are included in the CSWMP as previously discussed in this letter. We provide the following general typical minimum requirements for soil and water management for information purposes only. The below should be read in conjunction with drawings included in **Enclosure 1** and the CSWMP.

##### Pre-Construction

The following minimum requirements are to be met prior to commencement of construction:

- Construction of stabilised site entry.
- Construction of Sediment fences and other temporary ESC measures as shown on drawings. Sediment fences should also be constructed on the upstream edges of the designated buffer strips and at the base of fill embankments.
- Areas for plant and construction material storage are to be designated along with associated drains and spillage holding ponds.
- Construction of sediment basins.
- Diversion banks are to be created at the upstream boundaries of construction activities to ensure clean upstream runoff is diverted around any exposed areas. Catch drains are to be created at the downstream boundary of construction activities.
- Silt fences and/or sandbags are to be placed along the catch drains to slow flow, reduce scour and capture some sediment from runoff.

- Site personnel are to be educated to the sediment and erosion control measures implemented on site.

#### During Construction

The following minimum requirements are to be met during construction:

- Progressive re-vegetation of filled areas and filled batters.
- Construction activities are to be confined to the necessary construction areas.
- The provision of a construction exit (truck shaker) to minimise the tracking of debris from tyres of vehicles leaving the site onto public roads. Only one construction exit will be nominated to limit the movement of construction equipment.
- Topsoil and temporary stockpile location will be nominated to coincide with areas already disturbed. A sediment fence is to be constructed around the downstream side of the stockpile and a diversion drain at the upstream side if required.
- Regular inspection and maintenance of silt fences, sediment basins and other erosion control measures are to be made. Following rainfall events greater than 50mm inspection of erosion control measures and removal of collected material should be undertaken. Replacement of any damaged measures should be performed immediately.

## 4 WATER CYCLE MANAGEMENT & WATER SENSITIVE URBAN DESIGN (WSUD)

### 4.1 General Requirements

This section of the letter has been prepared with the purpose of providing the general requirements for site management procedures to control the severity and extent of soil erosion and pollutant transport during the implementation of the new compound.

The requirements for water quantity and quality management are to be undertaken and completed in accordance the Stormwater Development Design Report (SDDR), the approved Construction Environmental Management Plan (CEMP) and any compound specific variations as set out in the drawings included in **Enclosure 1**. The Water Cycle Management measures below are consistent with the SDDR noted above.

### 4.2 Water Cycle Management & WSUD Key Areas and Objectives

Water Cycle Management (WCM) is a holistic approach that addresses competing demands placed on a region's water resources, whilst optimising the social and economic benefits of development in addition to enhancing and protecting the environmental values of receiving waters.

Developing a WCMS at the SSD stage of the land development process provides guidance on urban water management issues to be addressed for the estate and development as a whole. This assists urban rezoning and estate infrastructure planning for the industrial development proposed on the land.

This WCMS has been prepared to inform the DPIE and stakeholders that the development is able to provide and integrate WCM measures into the stormwater management strategy for the MPW Stage 2. It presents guiding principles for WCM which includes establishing water management targets and identifying management measures required for future building developments to meet these targets.

Several WCM measures have been included in the WCMS and engineering design, which are set out in this report and the attached drawings. The key WCM elements and targets which have been adopted in the design are included in **Table 1** following.

As required of *CoC 5 & B9*, WSUD principles are to be incorporated within the design.

A number of WCM & WSUD measures have been included in the stormwater management strategy and designs, which are set out in this report and the attached drawings. The following key WSUD considerations, specific to stormwater, have been included in the design:

- *Stormwater Quantity Management*
- *Stormwater Quality Management*
- *Flood Management & Large Rainfall Events*
- *Water Demand Reduction/ Rainwater Reuse*

Element	Target	Reference
<b>Water Quantity</b>	Maintaining or improving the volume of stormwater flows to from this site. <i>“it will be necessary to demonstrate that there will be no increase in runoff from the site as a result of the development for the 1 in 1-year ARI and the 1 in 100-year ARI storm events”.</i>	CoC  Liverpool Council - Stormwater Management Policy
<b>Stream Erosion Index</b>	A stream erosion index between 3.5-5.0 has been targeted to manage frequent flows resulting from the development.	Best Practice
<b>Water Quality</b>	Load-based pollution reduction targets based on an untreated urbanised catchment: Gross Pollutants 90% Total Suspended Solids 85% Total Phosphorus 60% Total Nitrogen 45% Total Hydrocarbons 90%	Council DCP DPIE
<b>Flooding</b>	Buildings and roads set 500mm above 1% AEP.  No affectation to upstream downstream or adjoining properties as a result of development Local overland flow paths to achieve 150mm freeboard to building floor levels	Council DCP. NSW Floodplain Development Manual.  Council DCP  CoC
<b>Water Supply</b>	Reduce Demand on non-potable water uses by 50%.	Council DCP DPIE
<b>Erosion and Sediment Control</b>	Appropriate erosion and sedimentation control measures must be described in the environmental assessment for all stages of construction to mitigate potential impacts to receiving waters. Refer separate <b>Soil and Water Management Plan (SWMP)</b> by Costin Roe Consulting, Ref: <b>Co13455.03.rpt</b> & this document.	Landcom Blue Book DPIE

**Table 1. WCM/ WSUD Targets**



A summary of how each of the WCM objectives will be achieved are described below. Reference to the relevant sections of the SDDR should be made for further and technical details relating to the WCM measures:

A brief summary of the management objectives is described below:

- *Stormwater Quantity Management (Refer SDDR Section 4)*

The intent of this criterion is to reduce the impact of urban development on existing drainage system by limiting post-development discharge within the receiving waters to the pre-development peak, and to ensure no affectation of upstream, downstream or adjacent properties.

Attenuation of stormwater runoff from the development is proposed to be managed via a series of open detention basins provided in strategic locations for each of the development catchments. These detention basins are proposed to be in use during the operational phase of the site's development. As per the consent conditions the objective is to attenuate stormwater flow from the development to pre-developed flows, and to ensure no affectation to upstream, downstream and adjoining properties as a result of the development.

Sizing of the basin systems has been completed using DRAINS modelling software in accordance with the Liverpool City Council Policy and CoC's for the 1 in 1-year ARI to 1 in 100-year ARI storms for various durations. The modelling accounts for the drainage system provided for the adjacent sites.

Refer to **Section 4** of the SDDR for detailed sizing of detention systems.

- *Stormwater Quality Management (Refer SDDR Section 5)*

There is a need to target pollutants that are present in stormwater runoff to minimise the adverse impact these pollutants could have on downstream receiving waters during warehouse operations.

Water quality, and pollution reduction objective shown in **Table 3.1** of the SDDR, are achieved through a treatment train of proprietary gross pollutant traps and natural bio-retention systems. Reference to **Section 5** of the SDDR should be made for detailed Stormwater Quality modelling and measures.

- *Flood Management and Large Rainfall Events*

The proposed development considered flooding and large rainfall events, both from the adjacent Georges River, and from site generated runoff.

The following measures have been incorporated in the design:

- All buildings are sited 500mm above the 1% AEP design flood level of the Georges River.
- Flood storage compensation has been provided where filling in localised pre-developed flood affected areas occurs;
- Stormwater detention measures have been included to manage pre and post development runoff as discussed above and in SDDR **Section 4**; and
- Overland flow paths to manage runoff in large storm events have been included which achieve at least 150mm freeboard to building levels from the flow paths.

### 4.3 Site Drainage

#### 4.3.1 Pre-Existing and Current Site Drainage

Until recently, the MPW Stage site was operating as part of the School of Military Engineering. The Department of Defence have now vacated the site.

As part of the previous uses on the site, existing remnant in-ground drainage structures are present. These systems will generally become redundant, other than existing drainage discharge locations.

As noted previously four main catchments drain to the west, being G04 (28.94 Ha), G05 (36.96 Ha), G06 (44.13 Ha) and G08 (11.17 Ha), and one to the east, G03 (24.82 Ha). Catchments are as depicted in the SWMP within the EIS (*Figure 5-1*) by Arcadis and reproduced as **Figure 2** below. Refer also to drawing **PIWW-COS-CV-DWG-0420**.

It is also noted that, a catchment of approximately 75 Ha from MPE (IMEX – 62.7 Ha, MPE Basin 9 and part of Warehouse 5 – 12.3 Ha) drains through the site via an existing drainage channel. The existing channel is in a state of poor maintenance and will be upgraded as what has been coined as the “*East-West Culvert*”. Construction of the *East-West Culvert* will comprise reinforced concrete box culverts (RCBC) with base slab extending from the existing Moorebank Avenue crossing to The Georges River. It is proposed that the alignment of the new culvert will be offset, however aligned parallel to the existing culvert (other than the start and end of the culvert) to ensure the existing channel can remain operational during the construction of the new culvert. This will assist in ensuring that potential for scour erosion is minimised and associated environmental impact associated with the construction is also minimised.

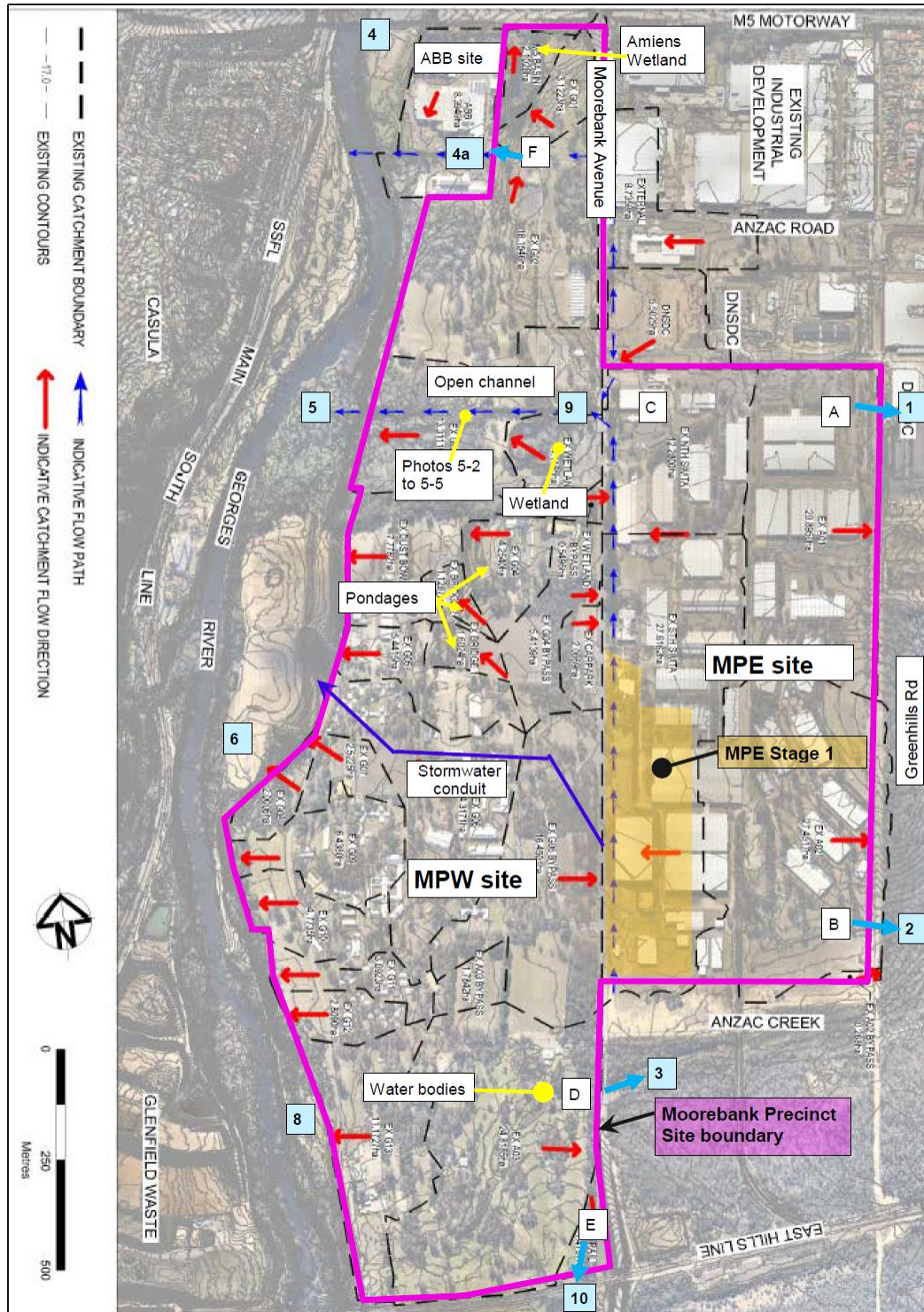


Figure 5-1: Existing Site Conditions (refer also to Appendix B Existing Conditions catchment plan)

Figure 2. Existing Catchments (Source: SSD16-7099 SWMP Fig 5-1 Arcadis 2018)

### 4.3.2 Proposed Infrastructure Drainage

As per general engineering practice, and with reference to LCC guidelines, the proposed stormwater drainage system for the development will comprise a minor and major system to safely and efficiently convey collected stormwater run-off from the development.

The minor system is to consist of a piped drainage system which has been designed to accommodate the 5% AEP or 1 in 20-year ARI storm event (Q20). This results in the piped system being able to convey all stormwater runoff up to and including the 5% AEP event. The major system through new paved areas has been designed to cater for storms up to and including the 1% AEP or 1 in 100-year ARI storm event (Q100). The major system employs the use of defined overland flow paths to safely convey excess run-off from the site to the two discharge points allowing for 350mm of freeboard to building levels, as shown on SDDR drawing **PIWW-COS-CV-DWG-0461 & 0465**. Further consideration of overland flow for events greater than 1% AEP, or in the event of blockage has been made in the design as required of **CoC B5** and **B9**. This includes ensuring a minimum 150mm freeboard is maintained for events greater than 1% AEP, or in the event of blockage.

The overall stormwater management objectives, including catchment breakdown, water quality objectives and water quantity discharge rates, remain consistent with the Arcadis MPW Flooding and Stormwater Assessment, presented in the EIS for MPW Stage 2, and all of the CoC's. It is noted, however, that the proposed water quantity and quality management measures proposed for construction vary slightly from the approved extent and storage requirements as a result of detail design calculations and hydrological and hydraulic assessments, in consideration to the consent requirements and WCM outcomes.

A summary of the main stormwater measures for the MPW Stage 2 development, with reference to SDDR catchment plans **PIWW-COS-CV-DWG-0420 & 421**, and layout plans **PIWW-COS-CV-DWG-0401 to 0411**, is as follows:

#### Outlet 3

- Pre-development catchment of 24.82 Ha.
- Post developed catchment of 9.28 Ha proposed to be conveyed to *Outlet 3*. The proposed catchment is a reduction between pre and post development of 63%.
- Water quantity will be managed by a relatively small above ground basin. Due to the substantially reduced post development catchment, the increase in runoff from urbanisation remains at or below the 1 in 1-year ARI storm and the 1 in 100-year storm as required of the CoC at *Outlet 3*. The management basin as such will provide only a water quality and SEI function during operation.
- The open basin has been designed with the provision of 1V:4H batter slopes.
- Primary water quality will be managed by a Vortech style gross pollutant trap (Rocla CDS or approved equivalent) which treats hydrocarbons/ oil and grease, gross pollutants, sediments, some nutrients and litter.
- Tertiary water quality will be managed via a 1,000m<sup>2</sup> minimum bio-retention system. This system will further target hydrocarbons, fine sediments and nutrients. The minimum bio-retention media area is based on 1% of the contributing 9.28 Ha post development catchment and has a cell of less than 1000m<sup>2</sup> as required of the CoC.
- The basin discharges to the east to Anzac Creek via existing concrete box culverts underneath Moorebank Avenue.

#### Outlet 4

- Pre-development catchment of 28.94 Ha.
- Post developed catchment of 3.59 Ha is proposed to be conveyed to *Outlet 4*. The proposed catchment is a reduction between pre and post development of 89%.
- Water quantity will be managed by a relatively small above ground basin. Due to the substantially reduced post development catchment, the increase in runoff from

urbanisation remains at or below the 1 in 1-year ARI storm and the 1 in 100-year storm as required of the CoC at *Outlet 4*. The management basin as such will provide only a water quality and SEI function during operation.

- Primary water quality will be managed by a Vortech style gross pollutant trap (Rocla CDS or approved equivalent) which treats hydrocarbons/ oil and grease, gross pollutants, sediments, some nutrients and litter.
- Tertiary water quality will be managed via a 400m<sup>2</sup> minimum bio-retention system (within future detention Basin 1 footprint) which will further target hydrocarbons, fine sediments and nutrients. The minimum bio-retention media area is based on 1% of the contributing 3.59 Ha catchment.
- Basin 4 discharges through pits and pipes within an existing easement sited to the north of the MPW site. No discharge works are proposed for this existing infrastructure.

#### Outlet 5

- Pre-development catchment of 36.96 Ha.
- Post developed catchment of 39.50 Ha proposed to be conveyed to *Outlet 5*.
- Water quantity will be managed by an above ground basin. The basin attenuates peak stormwater runoff from the post-developed catchment to pre-developed catchment for the 1 in 1-year ARI event and the 1 in 100-year ARI event with a maximum active storage in the 1 in 100-year ARI event of 23,200m<sup>3</sup>.
- The open basin has been designed with the provision of 1V:4H batter slopes.
- Primary water quality will be managed by a Vortech style gross pollutant trap (Rocla CDS or approved equivalent) which treats hydrocarbons/ oil and grease, gross pollutants, sediments, some nutrients and litter.
- Tertiary water quality will be managed via a 4000m<sup>2</sup> minimum bio-retention system. This system will further target hydrocarbons, fine sediments and nutrients. The minimum bio-retention media area is based on 1% of the contributing 39.50 Ha post development catchment and has been separated into five cells of less than 1000m<sup>2</sup> as required of the CoC.
- It is also noted that discharge of the East-West Culvert will be made at Outlet 5. Stormwater flows from MPE management systems OSD9 and OSD10 bypass the proposed OSD5, and discharge directly to The Georges River. The contributing catchments of approximately 75 Ha from MPE (IMEX – 62.7 Ha, MPE Basin 9 and part of Warehouse 5 – 12.3 Ha) and peak flow of 7.6m<sup>3</sup>/s will be conveyed within the *East-West Culvert*.
- The basin outlet, and discharge from the East-West Culvert, to The Georges River has been designed in accordance with NSW Office of Water Guidelines for Riparian Corridors comprising naturalised systems integrated into the existing riverbanks as required of the CoC.

#### Outlet 6

- Pre-development catchment of 44.13 Ha.
- Post developed catchment of 58.90 Ha proposed to be conveyed to *Outlet 6*.
- Water quantity will be managed by an above ground basin. The basin attenuates peak stormwater runoff from the post-developed catchment to pre-developed catchment for the 1 in 1-year ARI event and the 1 in 100-year ARI event with a maximum active storage in the 1 in 100-year ARI event of 39,790m<sup>3</sup>.
- The open basin has been designed with the provision of 1V:4H batter slopes.

- Primary water quality will be managed by a Vortech style gross pollutant trap (Rocla CDS or approved equivalent) which treats hydrocarbons/ oil and grease, gross pollutants, sediments, some nutrients and litter.
- Tertiary water quality will be managed via a 5,900m<sup>2</sup> minimum bio-retention system. This system will further target hydrocarbons, fine sediments and nutrients. The minimum bio-retention media area is based on 1% of the contributing 58.9 Ha post development catchment and has been separated into six cells of less than 1000m<sup>2</sup> as required of the CoC.
- The basin outlet to The Georges River has been designed in accordance with NSW Office of Water Guidelines for Riparian Corridors comprising naturalised systems integrated into the existing riverbanks as required of the CoC.

### Outlet 8

- Pre-development catchment of 11.17 Ha.
- Post developed catchment of 26.5 Ha proposed to be conveyed to *Outlet 8*.
- Water quantity will be managed by an above ground basin. The basin attenuates peak stormwater runoff from the post-developed catchment to pre-developed catchment for the 1 in 1-year ARI event and the 1 in 100-year ARI event with a maximum active storage in the 1 in 100-year ARI event of 20,300m<sup>3</sup>.
- The open basin has been designed with the provision of 1V:4H batter slopes.
- Primary water quality will be managed by a Vortech style gross pollutant trap (Rocla CDS or approved equivalent) which treats hydrocarbons/ oil and grease, gross pollutants, sediments, some nutrients and litter.
- Tertiary water quality will be managed via a 2,700m<sup>2</sup> minimum bio-retention system. This system will further target hydrocarbons, fine sediments and nutrients. The minimum bio-retention media area is based on 1% of the contributing 26.5 Ha post development catchment and has been separated into three cells of less than 1000m<sup>2</sup> as required of the CoC.
- The basin outlet to The Georges River has been designed in accordance with NSW Office of Water Guidelines for Riparian Corridors comprising naturalised systems integrated into the existing riverbanks as required of the CoC.



## 5 EXTERNAL CATCHMENTS AND FLOODING

The proposed MPW Stage 3 footprint is not affected by any overland flow paths or external catchments. As such no allowance for conveyance of upstream catchments is required in this SSD.

The MPW Stage 3 site is located adjacent to the Georges River hence flood considerations should be made for the development. A flood assessment was completed by Arcadis and formed *Appendix R of the EIS (Moorebank Precinct Intermodal Terminal Facility – MPW Stage 2 Stormwater and Flooding Environmental Assessment)*.

Reference to **Figure 3** and **Table 2** below should be made for flood modelling information and levels.

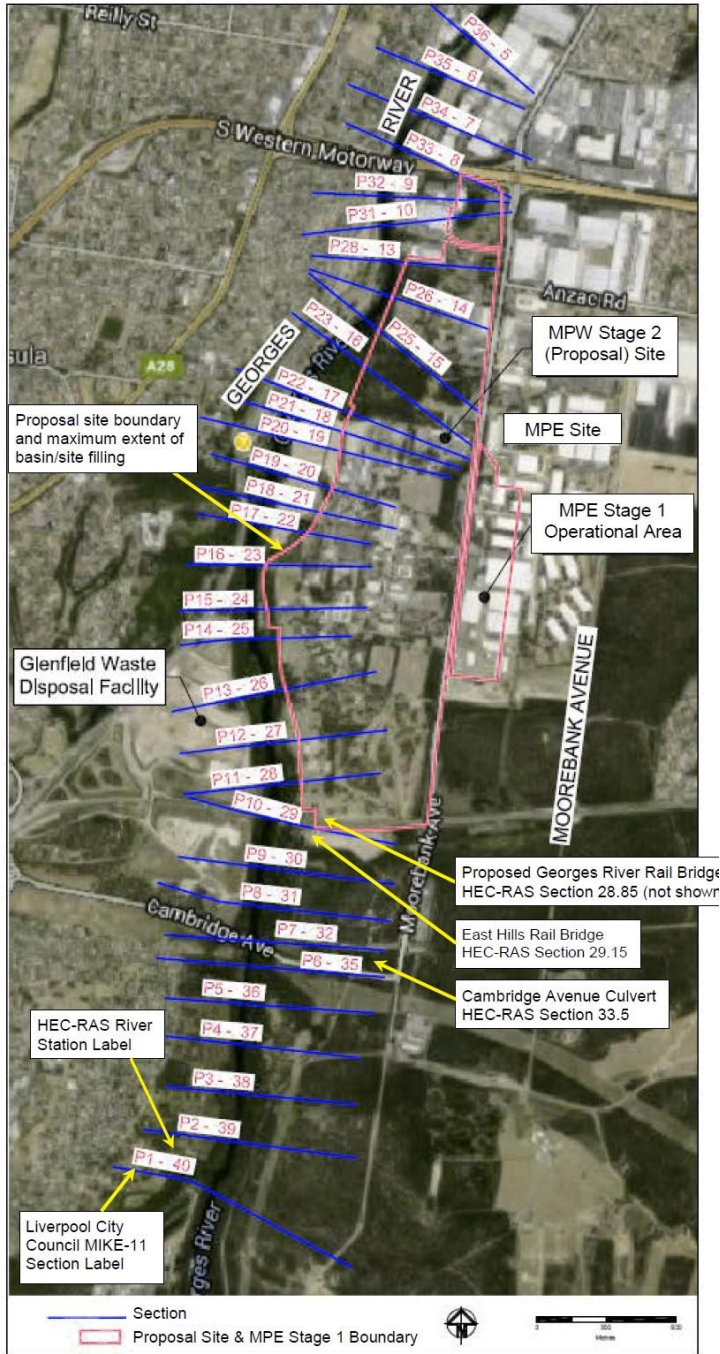


Figure 4-2: Location of HEC-RAS Model Sections

**Figure 3. Location of HEC-RAS Flood Model Sections (Source: Arcadis Figure 4-2)**

**Table 2. MPW S2 Flood Levels (Source: Arcadis Table 4-1)**

Table 4-1: Comparison of 'Base-Case' and 'MPW Stage 2 Proposed Development' Flood Levels

Location	100 year ARI			PMF		
	Flood Level (mAHD)		Flood Impact (mm)	Flood Level (mAHD)		Flood Impact (mm)
	Base-case Condition*	Proposed Condition		Base-case Condition*	Proposed Condition	
36	12.68	12.67	-0.01	16.24	16.24	0.00
35	12.68	12.67	-0.01	15.98	15.99	0.01
34	12.26	12.26	0.00	15.19	15.20	0.01
Cambridge Ave culvert	-	-	-	-	-	-
33	12.16	12.16	0.00	15.26	15.26	0.00
32	12.06	12.06	0.00	14.98	14.98	0.00
31	11.99	11.99	0.00	14.93	14.93	0.00
30	11.88	11.88	0.00	14.80	14.80	0.00
29.3	11.82	11.81	-0.01	14.72	14.72	0.00
29.2	11.76	11.75	-0.01	14.63	14.63	0.00
Existing Rail Bridge	-	-	-	-	-	-
29.1	11.73	11.73	0.00	14.42	14.43	0.01
29	11.70	11.69	-0.01	14.43	14.43	0.00
28.9	11.72	11.72	0.00	14.43	14.43	0.00
Proposed MPE Stage 1 Rail Bridge	-	-	-	-	-	-
28.8	11.69	11.69	0.00	14.22	14.22	0.00
28.7	11.49	11.49	0.00	13.89	13.89	0.00
28	11.35	11.35	0.00	13.72	13.72	0.00
27	11.35	11.35	0.00	13.83	13.84	0.01
26	11.40	11.40	0.00	13.83	13.83	0.00
25	11.20	11.20	0.00	13.51	13.52	0.01
24	11.11	11.11	0.00	13.36	13.36	0.00
23	10.92	10.92	0.00	12.86	12.86	0.00
22	10.93	10.93	0.00	13.15	13.15	0.00
21	10.99	10.99	0.00	13.25	13.26	0.01
20	10.98	10.98	0.00	13.25	13.25	0.00
19	10.92	10.92	0.00	13.16	13.17	0.01
18	10.82	10.82	0.00	13.00	13.00	0.00
17	10.82	10.82	0.00	12.96	12.96	0.00
16	10.80	10.80	0.00	12.94	12.95	0.01
15	10.73	10.73	0.00	12.85	12.86	0.01
14	10.63	10.63	0.00	12.77	12.77	0.00

\* i.e. with MPE Stage 1 Rail link potential flood impact (preliminary only, to be further assessed in MPE Stage 1 design)

The 1% Average Exceedance Probability (AEP) flood line, as defined in the above EIS assessment, has also been shown on drainage layout drawings in **Appendix A**. This shows that all SDDR measure are located clear and above the flood affected areas other than items associated with drainage outlets.

It is further noted that generally site levels are all higher than the PMF event, hence the site can be considered flood free in relation to the regional flood conditions.

Local flooding relates to site runoff and contributing catchments relating to the MPW Stage 2 development areas and conveyance of runoff in the east-west culvert only.



Local drainage runoff and overland flow is addressed in the ESCP as endorsed by the CPESC.

Given the site is free from regional flooding and local overland flow is managed through ESCP measures, flood liability and risk (SSD 7709 CoC B30(a)(ii)) is considered low to negligible.

## 6 CONCLUSION

This letter and associated concept drawings (**Enclosure 1**) have been prepared for Tactical Group, on behalf of Qube, to confirm that the proposed MPW Stage 3 works are consistent with the approved original concept plan **SSD 5066**, the **SSD 7709 CSWMP & SDDR**.

This letter provides information to confirm that the civil engineering for the MPW Stage 3 development has been completed in accordance with accepted design practices and policies, and are in accordance with the requirements and management measures defined approved original concept plan **SSD 5066**, **CSWMP** submitted under **SSD 7709**, and the **SDDR** also submitted under **SSD 7709**.

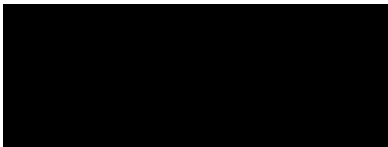
A civil engineering strategy for the project has been developed which provides a best practice solution within the constraints of the existing landform and proposed precinct layout and ultimate constructed arrangement.

The MPW Stage 3 proposes a new site works compound, ancillary infrastructure and progressive subdivision of lots within Stage 3 boundaries. The civil works during Stage 3 are proposed to facilitate the site works within Stages 1 & 2 and for future developments on the MPW land and are consistent with the original concept plan (**SSD 5066**).

Further, an erosion and sediment control strategy has been proposed to remain consistent with the early works approved as per the approved concept plan (**SSD 5066**). The proposed sediment basins are proposed to be consistent with the stormwater management strategy requirements as per the **CSWMP**.

Yours faithfully,

**COSTIN ROE CONSULTING PTY LTD**



 MIEAust CPEng NER

Director

**Enc. Drawings by Costin Roe Consulting**

**ENCLOSURE 1**  
**DRAWINGS BY COSTIN ROE CONSULTING**



# MOOREBANK PRECINCT WEST-STAGE 3

## MOOREBANK AVENUE, MOOREBANK, NSW

### SSD CIVIL WORKS PACKAGE



nearmap  
current, clear, change

LOCALITY PLAN  
NOT TO SCALE

**FOR INFORMATION ONLY**

ISSUED FOR INFORMATION ONLY	DATE	ISSUE	AMENDMENTS
	27.02.20	A	

DEVELOPER

ARCHITECT

**REIDCAMPBELL**  
Architecture, Interiors, Project Management

PROJECT MANAGER

**TACTICAL GROUP**

PROJECT

PRECINCT INFRASTRUCTURE WORKS WEST  
MOOREBANK AVENUE, MOOREBANK

COSTIN ROE CONSULTING

Costin Roe Consulting Pty Ltd.  
Consulting Engineers

**Costin Roe Consulting**

PRECISION | COMMUNICATION | ACCOUNTABILITY

DRAWING TITLE

MOOREBANK PRECINCT WEST -S3  
LOCALITY PLAN

DRAWING No: MPWS3-COS-CV-DWG-0100

ISSUE: A



**DRAWING LIST**

DRAWING NO.	DRAWING TITLE
MPWS3-COS-CV-DWG-0100	MOOREBANK PRECINCT WEST-S3 LOCALITY PLAN
MPWS3-COS-CV-DWG-0110	MPW STAGE 3 DRAWING LIST & GENERAL NOTES
MPWS3-COS-CV-DWG-0200	EROSION & SEDIMENT CONTROL PLAN-MPWS3
MPWS3-COS-CV-DWG-0250	EROSION & SEDIMENT CONTROL DETAILS- SHEET 1
MPWS3-COS-CV-DWG-0251	EROSION & SEDIMENT CONTROL DETAILS - SHEET 2
MPWS3-COS-CV-DWG-0400	MPWS3 CIVIL WORKS PLAN

**GENERAL NOTES:**

- THESE DRAWINGS SHALL BE READ IN CONJUNCTION WITH ALL ARCHITECTURAL AND OTHER CONSULTANTS' DRAWINGS AND SPECIFICATIONS AND WITH SUCH OTHER WRITTEN INSTRUCTIONS AS MAY BE ISSUED DURING THE COURSE OF THE CONTRACT. ANY DISCREPANCY SHALL BE REFERRED TO THE ENGINEER BEFORE PROCEEDING WITH THE WORK.
- ALL MATERIALS AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE RELEVANT AND CURRENT STANDARDS AUSTRALIA CODES AND WITH THE BY-LAWS AND ORDINANCES OF THE RELEVANT BUILDING AUTHORITIES EXCEPT WHERE VARIED BY THE PROJECT SPECIFICATION.
- ALL DIMENSIONS SHOWN SHALL BE VERIFIED BY THE BUILDER ON SITE. ENGINEER'S DRAWINGS SHALL NOT BE SCALED FOR DIMENSIONS. ENGINEER'S DRAWINGS ISSUED IN ANY ELECTRONIC FORMAT MUST NOT BE USED FOR DIMENSIONAL SETOUT. REFER TO THE ARCHITECT'S DRAWINGS FOR ALL DIMENSIONAL SETOUT INFORMATION.
- DURING CONSTRUCTION THE STRUCTURE SHALL BE MAINTAINED IN A STABLE CONDITION AND NO PART SHALL BE OVERSTRESSED. TEMPORARY BRACING SHALL BE PROVIDED BY THE BUILDER TO KEEP THE WORKS AND EXCAVATIONS STABLE AT ALL TIMES.
- UNLESS NOTED OTHERWISE ALL LEVELS ARE IN METRES AND ALL DIMENSIONS ARE IN MILLIMETRES.
- ALL WORKS SHALL BE UNDERTAKEN IN ACCORDANCE WITH ACCEPTABLE SAFETY STANDARDS & APPROPRIATE SAFETY SIGNS SHALL BE INSTALLED AT ALL TIMES DURING THE PROGRESS OF THE JOB.

**ELECTRONIC INFORMATION NOTES:**

- THE ISSUED DRAWINGS IN HARD COPY OR PDF FORMAT TAKE PRECEDENCE OVER ANY ELECTRONICALLY ISSUED INFORMATION, LAYOUTS OR DESIGN MODELS.
- THE CONTRACTOR'S DIRECT AMENDMENT OR MANIPULATION OF THE DATA OR INFORMATION THAT MIGHT BE CONTAINED WITHIN AN ENGINEER-SUPPLIED DIGITAL TERRAIN MODEL AND ITS SUBSEQUENT USE TO UNDERTAKE THE WORKS WILL BE SOLELY AT THE DISCRETION OF AND AT THE RISK OF THE CONTRACTOR.
- THE CONTRACTOR IS REQUIRED TO HIGHLIGHT ANY DISCREPANCIES BETWEEN THE DIGITAL TERRAIN MODEL AND INFORMATION PROVIDED IN THE CONTRACT AND/OR DRAWINGS AND IS REQUIRED TO SEEK CLARIFICATION FROM THE SUPERINTENDENT.
- THE ENGINEER WILL NOT BE LIABLE OR RESPONSIBLE FOR THE POSSIBLE ON-GOING NEED TO UPDATE THE DIGITAL TERRAIN MODEL, SHOULD THERE BE ANY AMENDMENTS OR CHANGES TO THE DRAWINGS OR CONTRACT INITIATED BY THE CONTRACTOR.

**FINISHED LEVELS PLAN NOTES:**

- LEVELS DATUM IS A.H.D.
- ALL CONTOUR LINES & SPOT LEVELS INDICATE FINISHED PAVEMENT LEVELS U.N.O. ON PLAN.
- THE MAJOR CONTOUR INTERVAL IS 0.5m
- THE MINOR CONTOUR INTERVAL IS 0.1m.
- MINIMUM PAVEMENT GRADE IS TO BE 1:100 (1%)
- MAXIMUM PAVEMENT GRADE IS TO BE 1:20 (5%) IN CARPARKING AREAS AND 1:25 (4%) ELSEWHERE.
- MAXIMUM RAMP GRADES ARE TO BE 1:12 (8.3%) U.N.O. ON PLAN
- PROVIDE MINIMUM 3.0m LONG TRANSITION WHERE CHANGES GRADE EXCEED 1:20 (5%).
- PERMANENT BATTER SLOPES ARE TO HAVE A MAXIMUM GRADE OF 1V:3H.
- ALL BATTER SLOPE WITH GRADES AT OR EXCEEDING 1V:6H ARE TO BE TURFED IMMEDIATELY OR APPROPRIATE EROSION CONTROL IS TO BE PROVIDED TO THE SATISFACTION OF THE ENGINEER.
- THE ACCESS ROAD TO THE HARDSTAND AREA IS TO HAVE A CROSSFALL OF 2% AS INDICATED ON PLAN.
- ALL FOOTPATHS ARE TO FALL AWAY FROM THE BUILDING AT 2.5% NOMINAL GRADE.
- ALL PAVEMENTS ARE TO BE SET AT 50mm BELOW THE FINISHED FLOOR LEVEL OF THE WAREHOUSE AND OFFICE AREAS.

**SURVEY NOTE:**

EXISTING SITE LEVELS AND DETAILS BASED ON A PLAN OF SURVEY '115804500 REV 22' BY 'CARDNO' DATED 12/10/2017.

EXISTING SITE LEVELS AND DETAILS IN THE NORTH EAST OF THE SITE ARE BASED ON SURVEY INFORMATION PROVIDED '11889601001 REV. 01' BY 'CARDNO' DATED 01/05/2019

**LIVERPOOL CITY COUNCIL NOTE:**

ALL WORKS TO BE CARRIED OUT IN ACCORDANCE WITH LIVERPOOL CITY COUNCIL STANDARDS AND CIVIL WORKS SPECIFICATIONS.

**ROADWORKS NOTE:**

ALL ESTATE ROAD WORKS TO BE CARRIED OUT IN ACCORDANCE WITH LIVERPOOL COUNCIL STANDARDS AND CIVIL WORKS SPECIFICATIONS.

**EXISTING SERVICES NOTES:**

- DURING THE EXECUTION OF WORKS, THE CONTRACTOR SHALL MAINTAIN THE INTEGRITY OF EXISTING SERVICES. THE CONTRACTOR SHALL REPAIR ANY DAMAGE CAUSED TO THE EXISTING SERVICES TO THE SATISFACTION OF THE SUPERINTENDENT AND THE RELEVANT SERVICE AUTHORITY, AT NO COST TO THE PRINCIPAL.
- WHERE IT IS NECESSARY TO REMOVE, DIVERT OR CUT INTO ANY EXISTING SERVICE, THE CONTRACTOR SHALL GIVE AT LEAST THREE (3) DAYS NOTICE OF ITS REQUIREMENTS TO THE SUPERINTENDENT, WHO WILL ADVISE WHAT ARRANGEMENTS SHOULD BE MADE FOR THE ALLOCATION OF SUCH EXISTING WORKS.
- EXISTING SERVICES HAVE BEEN PLOTTED FROM SUPPLIED DATA. THE ACCURACY IS NOT GUARANTEED. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO ESTABLISH THE LOCATION AND LEVEL OF ALL EXISTING SERVICES PRIOR TO COMMENCING WORK. ALL CLEARANCES AND APPROVALS SHALL ALSO BE OBTAINED FROM THE RELEVANT SERVICE AUTHORITY PRIOR TO THE COMMENCEMENT OF WORK.
- ALL NEW AND EXHUMED SERVICES THAT CROSS EXISTING AND FUTURE ROADS/PAVEMENTS WITHIN THE SITE SHALL BE BACKFILLED WITH DGB20 MATERIAL TO SUBGRADE LEVEL AND COMPACTED TO 98% STANDARD DENSITY RATIO. SUBJECT TO PRIOR APPROVAL FROM RELEVANT AUTHORITY.
- ON COMPLETION OF SERVICES INSTALLATION, ALL DISTURBED AREAS SHALL BE RESTORED TO ORIGINAL, INCLUDING KERBS, FOOTPATHS, CONCRETE AREAS, GRAVEL AREAS, GRASSED AREAS AND ROAD PAVEMENTS.
- CARE TO BE TAKEN WHEN EXCAVATING NEAR UTILITY SERVICES. NO MECHANICAL EXCAVATION TO BE UNDERTAKEN OVER SERVICES. LIAISE WITH RELEVANT AUTHORITY.
- THE CONTRACTOR SHALL ALLOW FOR THE CAPPING OFF, EXCAVATION AND REMOVAL IF REQUIRED OF ALL EXISTING SERVICES IN AREAS AFFECTED BY THE WORKS WITHIN THE CONTRACT AREA AS SHOWN ON THE DRAWINGS UNLESS DIRECTED OTHERWISE BY THE SUPERINTENDENT. ALL TO REGULATORY AUTHORITY STANDARDS AND APPROVAL.
- THE CONTRACTOR IS TO MAINTAIN EXISTING STORMWATER DRAINAGE FLOWS THROUGH THE ROADS AT ALL TIMES. MAKE DUE ALLOWANCE FOR ALL SUCH FLOWS AT ALL TIMES.
- PRIOR TO COMMENCEMENT OF ANY WORKS THE CONTRACTOR SHALL OBTAIN THE SUPERINTENDENT'S APPROVAL OF THE PROGRAM FOR THE RELOCATION/CONSTRUCTION OF TEMPORARY SERVICES.
- CONTRACTOR SHALL CONSTRUCT TEMPORARY SERVICES AS REQUIRED TO MAINTAIN EXISTING SUPPLY TO BUILDINGS REMAINING IN OPERATION DURING WORKS TO THE SATISFACTION AND APPROVAL OF THE SUPERINTENDENT. ONCE DIVERSION IS COMPLETE AND COMMISSIONED THE CONTRACTOR SHALL REMOVE ALL SUCH TEMPORARY SERVICES AND MAKE GOOD TO THE SATISFACTION OF THE SUPERINTENDENT.
- INTERRUPTION TO SUPPLY OF EXISTING SERVICES SHALL BE DONE SO AS NOT TO CAUSE ANY INCONVENIENCE OR DAMAGE TO THE ADJACENT RESIDENCES. CONTRACTOR TO GAIN APPROVAL OF THE SUPERINTENDENT FOR TIME OF INTERRUPTION.
- THE CONTRACTOR SHALL UNDERTAKE A DIAL BEFORE YOU DIG (DBYD 1100) SERVICES SEARCH BEFORE THE COMMENCEMENT OF ANY WORKS.

**SITE PREPARATION NOTES:**

- ALL EARTHWORKS SHALL BE COMPLETED GENERALLY IN ACCORDANCE WITH THE SPECIFICATION PROVIDED BY THE GOLDNER AND ASSOCIATES UNDER LEVEL 1 GEOTECHNICAL SUPERVISION PER AS3798
- EXISTING LEVELS ARE BASED ON INFORMATION PROVIDED BY CARDNO TITLED '115804500 REV.22' DATED 12/10/2017.
- GENERAL FILL MATERIAL IN ALL AREAS TO BE -20% CBR SANDSTONE OR APPROVED EQUIVALENT. ALTERNATIVE FILL MATERIAL TO BE CONFIRMED BY THE ENGINEER PRIOR TO PLACEMENT.
- CONTRACTOR TO ENSURE MINIMUM 600MM OF -20% CBR BELOW NOMINATED BEL/PAVEMENT LAYERS UNDER ROAD AND ITV AREAS (INCLUDING LICENSE AREAS).
- CONTRACTOR TO CONFIRM CBR OF IN-SITU SANDSTONE MATERIAL PRIOR TO CONSTRUCTION OF ROAD PAVEMENTS.
- STRIP ANY TOP SOIL OR DELETERIOUS MATERIAL AND DISPOSE OF FROM SITE OR STORE AS DIRECTED.
- COMPLETE CUT TO FILL EARTHWORKS TO ACHIEVE THE REQUIRED LEVELS AS INDICATED ON THE DRAWINGS WITHIN A TOLERANCE OF +0mm/-10mm THROUGH BUILDING PADS/PAVEMENTS AND +0mm/-20mm ELSEWHERE.
- PREPARE STEEP BATTERS TO RECEIVE FILL BY CONSTRUCTING BENCHING TO FACILITATE FILL PLACEMENT AND COMPACTION WET.
- AREAS TO RECEIVE FILL (THAT ARE NOT ON BENCHED BATTERS) AND AREAS IN CUT SHALL BE PROOF ROLLED TO IDENTIFY ANY SOFT HEAVING MATERIAL. SOFT MATERIAL SHALL BE BOXED OUT AND REMOVED PRIOR TO FILL PLACEMENT. PROOF ROLLING TO BE INSPECTED BY A GEOTECHNICAL ENGINEER OR THE EARTHWORKS DESIGNER.
- SITE WON FILL SHALL BE COMPACTED IN MAXIMUM 300mm LAYERS AND TO DRY OR HILF DENSITY RATIOS (STANDARD COMPACTION) OF BETWEEN 98% AND 103%. THE PLACEMENT MOISTURE VARIATION OR HILF MOISTURE VARIATION SHALL BE CONTROLLED TO BE BETWEEN 2% DRY AND 2% WET.
- IMPORTED FILL SHALL BE COMPACTED IN MAXIMUM 300mm LAYERS AND TO DRY OR HILF DENSITY RATIOS (STANDARD COMPACTION) OF BETWEEN 98% AND 103%. THE PLACEMENT MOISTURE VARIATION OR HILF MOISTURE VARIATION SHALL BE CONTROLLED TO BE BETWEEN 2% DRY AND 2% WET.
- ALL ENGINEERED FILL PARTICLES SHALL BE ABLE TO BE INCORPORATED WITHIN A SINGLE LAYER. FURTHER, LESS THAN 30% OF PARTICLES SHALL BE RETAINED ON THE 37.5 MM SIEVE. ENGINEERED FILL SHALL BE ABLE TO BE TESTED IN ACCORDANCE WITH THE STANDARD COMPACTION METHOD (AS1289.5.4.1) OR HILF TEST METHOD (AS1289.5.7.1). THESE METHODS REQUIRE LESS THAN 20% PARTICLES ARE RETAINED ON THE 37.5 MM SIEVE. WHERE BETWEEN 20% AND 30% OF PARTICLES ARE RETAINED ON THE 37.5 MM SIEVE THE ABOVE TEST METHODS SHALL STILL BE ADOPTED AND TEST REPORTS ANNOTATED APPROPRIATELY. THESE REQUIREMENTS SHOULD BE MET BY THE MATERIAL AFTER PLACEMENT AND COMPACTION
- ALL THE EARTHWORKS UNDERTAKEN AND THE SUBGRADE CONDITION IN THE CUT AREAS (IN THE STATED PERIOD) ARE DOCUMENTED IN THE REPORTS AND HAVE BEEN UNDERTAKEN IN ACCORDANCE WITH THE SPECIFICATION
- PRIOR TO ANY EARTHWORKS, EROSION CONTROL AS OUTLINED IN THE EROSION AND SEDIMENTATION CONTROL PLAN SHALL BE COMPLETED.
- EXISTING ROCK, IF ANY, SHALL BE REMOVED BY HEAVY ROCK BREAKING OR RIPPING.
- MATCH EXISTING LEVELS AT BATTER INTERFACE.
- CONTRACTOR TO MATCH EXISTING LEVELS AT THE INTERFACE OF EARTHWORKS AND EXISTING SURFACE AT BATTER LOCATIONS OR WHERE NO RETAINING WALLS ARE PRESENT. ANY DISCREPANCY BETWEEN DESIGN AND EXISTING LEVELS TO BE REFERRED TO THE ENGINEER FOR DIRECTION OR ADJUSTMENTS TO DESIGN LEVELS.

**STORMWATER DRAINAGE NOTES:**

- ALL STORMWATER WORKS TO BE COMPLETED IN ACCORDANCE WITH AUSTRALIAN STANDARD AS3500.3: PLUMBING AND DRAINAGE, PART 3: STORMWATER DRAINAGE.
  - THE MINOR (PIPED) SYSTEM HAS BEEN DESIGNED FOR THE 1 IN 20 YEAR ARI STORM EVENT AND THE MAJOR (OVERLAND) SYSTEM HAS BEEN DESIGNED FOR THE 1 IN 100 YEAR ARI STORM EVENT.
  - ALL FINISHED PAVEMENT LEVELS SHALL BE AS INDICATED ON FINISHED LEVELS PLANS.
  - PIT SIZES SHALL BE AS INDICATED IN THE SCHEDULE WHILE PIPE SIZES AND DETAILS ARE PROVIDED ON PLAN.
  - EXISTING STORMWATER PIT LOCATIONS AND INVERT LEVELS TO BE CONFIRMED BY SURVEY PRIOR TO COMMENCING WORKS ON SITE.
  - ALL STORMWATER PIPES, UNDER ESTATE ROADS, Ø375 OR GREATER SHALL BE CLASS 4 (WITH HS2 SUPPORT) REINFORCED CONCRETE WITH RUBBER RING JOINTS UNLESS NOTED OTHERWISE.
  - ALL STORMWATER PIPES, UNDER WAREHOUSE PAVEMENTS, Ø375 OR GREATER SHALL BE CLASS 3 (WITH HS2 SUPPORT) REINFORCED CONCRETE WITH RUBBER RING JOINTS UNLESS NOTED OTHERWISE.
  - ALL PIPES UP TO AND INCLUDING Ø300 TO BE uPVC GRADE S8B UNO.
  - PIPE CLASS NOMINATED ARE FOR IN-SERVICE LOADING CONDITIONS ONLY. CONTRACTOR IS TO MAKE ANY NECESSARY ADJUSTMENTS REQUIRED FOR CONSTRUCTION CONDITIONS.
  - ALL CONCRETE PITS GREATER THAN 1000mm DEEP SHALL BE REINFORCED USING N12-200 EACH WAY CENTERED IN WALL AND BASE. LAP MINIMUM 300mm WHERE REQUIRED. ALL CONCRETE FOR PITS SHALL BE F'c 25 MPA. PRECAST PITS MAY BE USED WITH THE APPROVAL OF THE ENGINEER.
  - ALL CONCRETE PITS IN ESTATE ROADS & CONTAINER AREAS SHALL BE CAST IN-SITU PITS REINFORCED USING N16-200 EACH WAY CENTERED IN WALL AND BASE. LAP MINIMUM 300mm WHERE REQUIRED. ALL CONCRETE FOR PITS SHALL BE F'c 25 MPA.
  - IN ADDITION TO ITEM 10 ABOVE, ALL CONCRETE PITS GREATER THAN 3000mm DEEP SHALL HAVE WALLS AND BASE THICKNESS INCREASED TO 200mm.
  - IN ADDITION TO ITEM 11 ABOVE, ALL CONCRETE PITS GREATER THAN 2000mm DEEP IN ESTATE ROADS & CONTAINER AREAS SHALL HAVE WALLS AND BASE THICKNESS INCREASED TO 250mm.
  - PIPES SHALL BE LAID AS PER PIPE LAYING DETAILS. PARTICULAR CARE SHALL BE TAKEN TO ENSURE THAT THE PIPE IS FULLY AND EVENLY SUPPORTED. RAM AND PACK FILLING AROUND AND UNDER BACK OF PIPES AND PIPE FAUCETS, WITH NARROW EDGED RAMMERS OR OTHER SUITABLE TAMPING DETAILS.
  - CONCRETE PIPES UNDER, OR WITHIN THE ZONE OF INFLUENCE OF PAVED AREAS SHALL BE LAID USING HS2/HS3 TYPE SUPPORT, AS A MINIMUM, IN ACCORDANCE WITH AS 3725. AGGREGATE BACKFILL SHALL NOT BE USED FOR PIPE BEDDING AND OR HAUNCH/SIDE SUPPORT.
  - WHERE PIPE LINES ENTER PITS, PROVIDE 2m LENGTH OF STOCKING WRAPPED SLOTTED Ø100 uPVC TO EACH SIDE OF PIPE.
  - ALL SUBSOIL DRAINAGE LINES SHALL BE Ø100 SLOTTED uPVC WITH APPROVED FILTER WRAP LAID IN 300mm WIDE GRANULAR FILTER UNLESS NOTED OTHERWISE. LAY SUBSOIL LINES TO MATCH FALLS OF LAND AND/OR 1 IN 200 MINIMUM. PROVIDE CAPPED CLEANING EYE (RODDING POINT) AT UPSTREAM END OF LINE AND AT 30m MAX. CTS. PROVIDE SUBSOIL LINES TO ALL PAVEMENT/ LANDSCAPED INTERFACES, TO REAR OF RETAINING WALLS (AS NOMINATED BY STRUCTURAL ENGINEER) AND AS SHOWN ON PLAN.
  - ALL PIPE GRADES 1 IN 100 MINIMUM UNO.
  - PROVIDE STEP IRONS IN PITS DEEPER THAN 1000mm.
  - MIN 600 COVER TO PIPE OVBERT BENEATH ROADS & MIN. 400 COVER BENEATH LANDSCAPED AND PEDESTRIAN AREAS.
  - PIT COVERS IN SHUTTLE ROAD PAVEMENT SHALL BE CLASS G 'EXTRA HEAVY DUTY', PIT COVERS IN TRAFFICABLE PAVEMENT SHALL BE CLASS D 'HEAVY DUTY', THOSE LOCATED IN NON-TRAFFICABLE AREAS SHALL BE CLASS B 'MEDIUM DUTY' U.N.O.
  - PROVIDE CLEANING EYES (RODDING POINTS) TO PIPES AT ALL CORNERS AND T-JUNCTIONS WHERE NO PITS ARE PRESENT.
  - DOWN PIPES (DP) TO BE AS PER HYDRAULIC ENGINEERS DETAILS WITH CONNECTOR TO MATCH DP SIZE U.N.O. ON PLAN. PROVIDE CLEANING EYE AT GROUND LEVEL.
  - PIPE LENGTHS NOMINATED ON PLAN OR LONGSECTIONS ARE MEASURED FROM CENTER OF PITS TO THE NEAREST 0.5m AND DO NOT REPRESENT ACTUAL LENGTH. THE CONTRACTOR IS TO ALLOW FOR THIS.
- DUST CONTROL NOTES:**
- IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO ENSURE DUST CONTROL MEASURES ARE APPLIED AND MAINTAINED IN ACCORDANCE WITH THE GOVERNING AUTHORITIES REQUIREMENTS
  - THE APPLICATION OF LIQUID BASED DUST SUPPRESSION MEASURES MUST BE SUCH THAT SEDIMENT LADEN RUNOFF RESULTING FROM SUCH MEASURES DOES NOT CREATE A TRAFFIC OR ENVIRONMENTAL HAZARD. (EG UTILISING SEDIMENT CONTROL)
  - DUST GENERATION ASSOCIATED WITH WIND EROSION TO BE CONTROLLED USING WATER TRUCKS, DUST SUPPRESSING FOG, MIST GENERATORS, SEALANT PLACED OVER THE SOIL, SURFACE ROUGHENING OR RE-VEGETATION.
  - THE FOLLOWING ACTIVITIES SHALL BE ADOPTED, IF NECESSARY, TO MANAGE DUST CONTROL ON SITE:
    - LIMITING THE AREA OF SOIL DISTURBANCE AT ANY GIVEN TIME
    - REPLACING TOPSOIL AFTER COMPLETION OF EARTHWORKS.
    - PROGRAMMING WORK TO MINIMISE THE LIFE OF STOCKPILES.
    - TEMPORARILY STABILISING LONG-TERM STOCKPILES.
    - GRAVELLING UNSEALED ACCESS AND HAUL ROADS.
    - MINIMISING TRAFFIC MOVEMENT ON EXPOSED SURFACES.
    - LIMITING VEHICULAR TRAFFIC TO 15km/h.
    - RETAINING EXISTING VEGETATION AS WIND BREAKS.
    - UTILISING A WATER CART WITH POTABLE WATER ONLY
  - OIL, LANDFILL GAS CONDENSATE OR ANY CONTAMINATED LEACHATE IS NOT TO BE USED FOR DUST SUPPRESSION.

**EROSION CONTROL NOTES**

- ALL CONTROL WORK INCLUDING DIVERSION BANKS AND CATCH DRAINS, V-DRAINS AND SILT FENCES SHALL BE COMPLETED DIRECTLY FOLLOWING THE COMPLETION OF THE EARTHWORKS.
- SILT FENCES AND SILT FENCE RETURNS SHALL BE ERECTED CONVEX TO THE CONTOUR TO POND WATER.
  - HAY BALE BARRIERS AND GEOFABRIC FENCES ARE TO BE CONSTRUCTED TO TOE OF BATTER, PRIOR TO COMMENCEMENT OF EARTHWORKS, IMMEDIATELY AFTER CLEARING OF VEGETATION AND BEFORE REMOVAL OF TOP SOIL.
  - ALL TEMPORARY EARTH BERMS, DIVERSION AND SILT DAM EMBANKMENTS ARE TO BE MACHINE COMPACTED, SEEDED AND MULCHED FOR TEMPORARY VEGETATION COVER AS SOON AS THEY HAVE BEEN FORMED.
  - CLEAR WATER IS TO BE DIVERTED AWAY FROM DISTURBED GROUND AND INTO THE DRAINAGE SYSTEM.
  - THE CONTRACTOR IS RESPONSIBLE FOR MAINTAINING AND PROVIDING ON GOING ADJUSTMENT TO EROSION CONTROL MEASURES AS REQUIRED DURING CONSTRUCTION.
  - ALL SEDIMENT TRAPPING STRUCTURES AND DEVICES ARE TO BE INSPECTED AFTER STORMS FOR STRUCTURAL DAMAGE OR CLOGGING, TRAPPED MATERIAL IS TO BE REMOVED TO A SAFE, APPROVED LOCATION.
  - ALL FINAL EROSION PREVENTION MEASURES INCLUDING THE ESTABLISHMENT OF GRASSING ARE TO BE MAINTAINED UNTIL THE END OF THE DEFECTS LIABILITY PERIOD.
  - ALL EARTHWORKS AREAS SHALL BE ROLLED ON A REGULAR BASIS TO SEAL THE EARTHWORKS.
  - ALL FILL AREAS ARE TO BE LEFT WITH A BUND AT THE TOP OF THE SLOPE AT THE END OF EACH DAY'S EARTHWORKS. THE HEIGHT OF THE BUND SHALL BE A MINIMUM OF 200MM.
  - ALL CUT AND FILL SLOPES ARE TO BE SEEDED AND HYDROMULCHED WITHIN 10 DAYS OF COMPLETION OF FORMATION.
  - AFTER REVEGETATION OF THE SITE IS COMPLETE AND THE SITE IS STABLE IN THE OPINION OF A SUITABLY QUALIFIED PERSON ALL TEMPORARY WORK SUCH AS SILT FENCE, DIVERSION DRAINS ETC SHALL BE REMOVED.
  - ALL TOPSOIL STOCKPILES ARE TO BE SUITABLY COVERED TO THE SATISFACTION OF THE SITE MANAGER TO PREVENT WIND AND WATER EROSION.
  - ANY AREA THAT IS NOT APPROVED BY THE CONTRACT ADMINISTRATOR FOR CLEARING OR DISTURBANCE BY THE CONTRACTOR'S ACTIVITIES SHALL BE CLEARLY MARKED AND SIGN POSTED, FENCED OFF OR OTHERWISE APPROPRIATELY PROTECTED AGAINST ANY SUCH DISTURBANCE.
  - ALL STOCKPILE SITES SHALL BE SITUATED IN AREAS APPROVED FOR SUCH USE BY THE SITE MANAGER. A 6m BUFFER ZONE SHALL EXIST BETWEEN STOCKPILE SITES AND ANY STREAM OR FLOW PATH. ALL STOCKPILES SHALL BE ADEQUATELY PROTECTED FROM EROSION AND CONTAMINATION OF THE SURROUNDING AREA BY USE OF THE MEASURES APPROVED IN THE EROSION AND SEDIMENTATION CONTROL PLAN.
  - ACCESS AND EXIT AREAS SHALL INCLUDE SHAKE-DOWN OR OTHER METHODS APPROVED BY THE SITE MANAGER FOR THE REMOVAL OF SOIL MATERIALS FROM MOTOR VEHICLES.
  - THE CONTRACTOR IS TO ENSURE RUNOFF FROM ALL AREAS WHERE THE NATURAL SURFACE IS DISTURBED BY CONSTRUCTION, INCLUDING ACCESS ROADS, DEPOT AND STOCKPILE SITES, SHALL BE FREE OF POLLUTANTS BEFORE IT IS EITHER DISPERSED TO STABLE AREAS OR DIRECTED TO NATURAL WATERCOURSES.
  - THE CONTRACTOR SHALL PROVIDE AND MAINTAIN SLOPES, CROWNS AND DRAINS ON ALL EXCAVATIONS AND EMBANKMENTS TO ENSURE SATISFACTORY DRAINAGE AT ALL TIMES WATER SHALL NOT BE ALLOWED TO POND ON THE WORKS UNLESS SUCH PONDING IS PART OF AN APPROVED ESCP / SWMP.

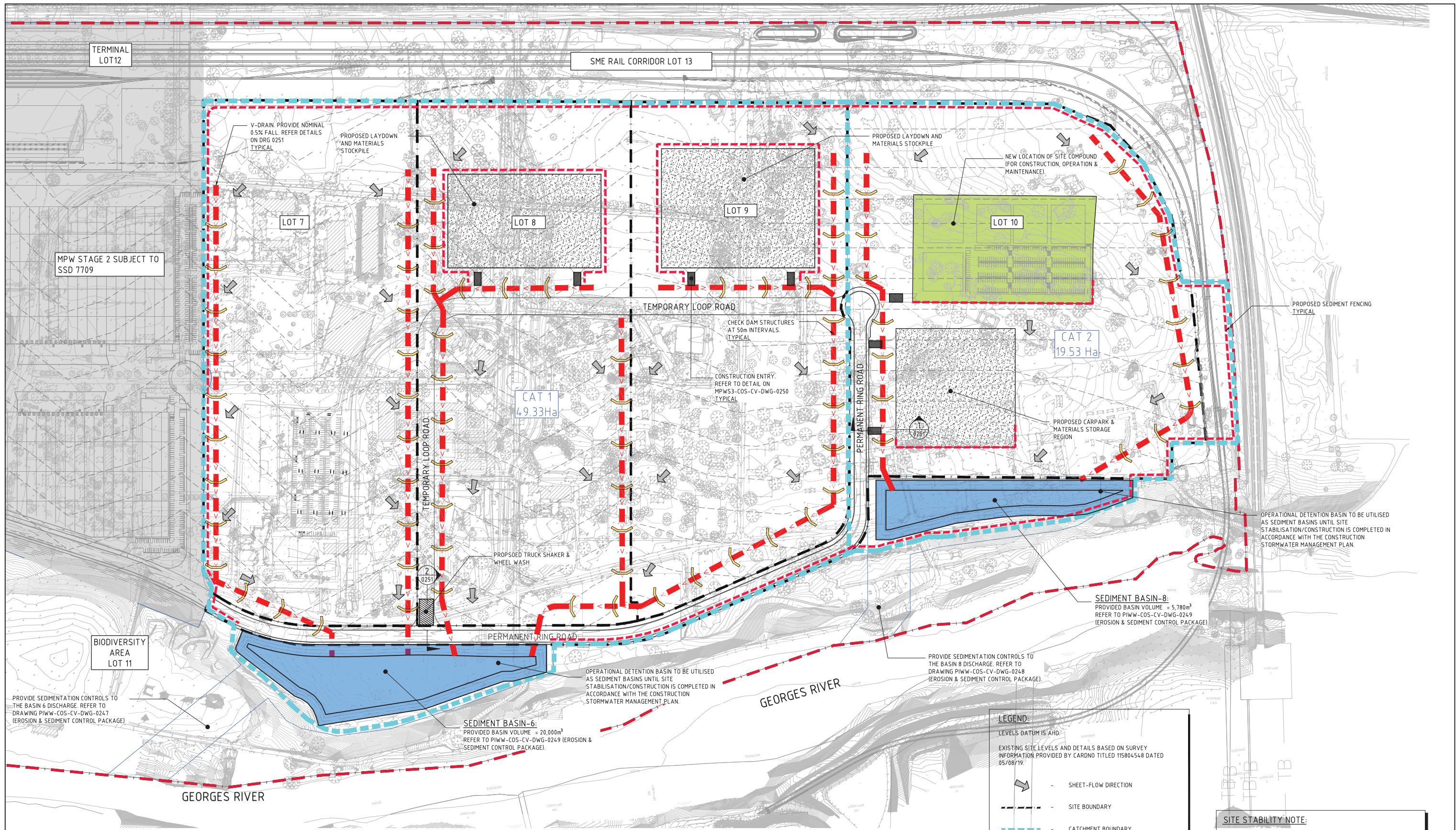
**SEDIMENT CONTROL POND NOTES**

- TYPE D BASIN IS REQUIRED.
- VOLUME OF THE BASIN'S POND SHALL BE AS NOMINATED ON DRAWING. NOMINAL POND LOCATIONS AND NOMINAL DIMENSIONS.
- SEDIMENT BUILD UP TO NOT EXCEED 33% TOTAL CAPACITY OF POND.
- WATER LEVEL TO BE MAINTAINED AT 20% CAPACITY DURING SETTLING PERIOD.
- PROVIDE SECURITY FENCE TO POND FOR SAFETY.
- DEWATERING OF POND TO BE PERFORMED TO THE BOTTOM OF THE SEDIMENT SETTLING ZONE FOLLOWING ACHIEVEMENT OF WOOD'S. MANAGEMENT OF DOSAGE AND DISCHARGE TO BE ACHIEVED IN A TIMELY MANNER BEFORE THE NEXT RAIN EVENT AND WITHIN 5 DAYS OF THE INITIAL RAINFALL EVENT.
- WATER TO BE DOSED WITH GYPSUM TO ACCELERATE SETTLEMENT OF SUSPENDED SOLIDS
- GYPSUM DOSAGE RATE TO BE APPLIED AT APPROX. 32kg PER 100 CUBIC METRE OF COLLECTED RUNOFF.
- THE USE OF ALUM AS A FLOCCULANT IS NOT RECOMMENDED AND IS TO BE USED ONLY FOLLOWING CONSULTATION WITH AND ACCEPTANCE FROM COUNCIL ESC OFFICERS.
- DISCHARGE FROM POND IS PERMISSIBLE WHEN THE WATER PH IS 6.5-8.5 AND IS CLARIFIED TO AT OR BELOW A TSS OF 50mg/L (75 NTU). CLARIFICATION WOULD GENERALLY BE ACHIEVED IN 36-72 HOURS WITH THE USE OF GYPSUM.
- DEWATERING SHALL BE DONE IN SUCH A MANNER AS TO REMOVE THE RELATIVELY CLEAN WATER WITHOUT REMOVING OR DISTURBING THE SEDIMENT THAT HAS SETTLED. THE PUMP INTAKE PIPE IS NOT TO REST ON THE SETTLED SEDIMENT LAYER.
- IF WATER EXCEEDS TSS OF 50mg/L (75 NTU) DURING DEWATERING, PUMPING IS TO CEASE
- RECORDS ARE TO BE KEPT (ON-SITE AT ALL TIMES) OF ALL MEASUREMENT PRIOR TO, DURING AND AFTER DISCHARGE. RECORDS TO BE MADE AVAILABLE TO COUNCIL OFFICERS UPON REQUEST.

**FOR INFORMATION ONLY**

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AMENDMENTS	DATE	ISSUE	AMENDMENTS	DATE	ISSUE
DEVELOPER		 		ARCHITECT	
				<b>REID CAMPBELL</b> Architects, Interiors, Project Management Level 15, 55 Walker Street North Sydney NSW 2060 Australia Tel: 61 02 9550 4000 Email: reid@reidcampbell.com www.reidcampbell.com	
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				PROJECT	
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				Costin Roe Consulting Pty Ltd. Consulting Engineers Level 1, 8 Widdrill Street Walsh Bay, Sydney NSW 2000 Tel: (02) 9551-7889 Fax: (02) 9541-3721 email: mail@costinroe.com.au	
					
				DRAWING TITLE MPW STAGE 3 DRAWING LIST & GENERAL NOTES	
				DRAWING No MPWS3-COS-CV-DWG-0110	
				ISSUE A	
				PRECISION   COMMUNICATION   ACCOUNTABILITY	





TERMINAL LOT12

SME RAIL CORRIDOR LOT 13

LOT 7

LOT 8

LOT 9

LOT 10

MPW STAGE 2 SUBJECT TO SSD 7709

CAT 1  
49.33Ha

CAT 2  
19.53 Ha

BIODIVERSITY AREA LOT 11

PROVIDE SEDIMENTATION CONTROLS TO THE BASIN 6 DISCHARGE. REFER TO DRAWING PIW-COS-CV-DWG-0247 (EROSION & SEDIMENT CONTROL PACKAGE)

GEORGES RIVER

SEDIMENT BASIN-6:  
PROVIDED BASIN VOLUME = 20,000m<sup>3</sup>  
REFER TO PIW-COS-CV-DWG-0249 (EROSION & SEDIMENT CONTROL PACKAGE).

OPERATIONAL DETENTION BASIN TO BE UTILISED AS SEDIMENT BASINS UNTIL SITE STABILISATION/CONSTRUCTION IS COMPLETED IN ACCORDANCE WITH THE CONSTRUCTION STORMWATER MANAGEMENT PLAN.

GEORGES RIVER

PROVIDE SEDIMENTATION CONTROLS TO THE BASIN 8 DISCHARGE. REFER TO DRAWING PIW-COS-CV-DWG-0248 (EROSION & SEDIMENT CONTROL PACKAGE).

SEDIMENT BASIN-8:  
PROVIDED BASIN VOLUME = 5,780m<sup>3</sup>  
REFER TO PIW-COS-CV-DWG-0249 (EROSION & SEDIMENT CONTROL PACKAGE)

OPERATIONAL DETENTION BASIN TO BE UTILISED AS SEDIMENT BASINS UNTIL SITE STABILISATION/CONSTRUCTION IS COMPLETED IN ACCORDANCE WITH THE CONSTRUCTION STORMWATER MANAGEMENT PLAN.

**LEGEND:**

LEVELS DATUM IS AHD  
EXISTING SITE LEVELS AND DETAILS BASED ON SURVEY INFORMATION PROVIDED BY CARDNO TITLED 115804548 DATED 05/08/19.

- SHEET-FLOW DIRECTION
- SITE BOUNDARY
- CATCHMENT BOUNDARY
- DIVERSION DRAIN - MAJOR
- SEDIMENT FENCING
- SEDIMENT BASIN (REFER TO PLAN)
- NEW SITE STORAGE COMPOUND LOCATION
- MPW STAGE 2 WORKS

**SITE STABILITY NOTE:**

LAND DISTURBANCE & LAND FILLING ACTIVITIES MUST BE UNDERTAKEN IN A PHASED MANNER, IMPACTING A MAXIMUM AREA OF 65Ha AT ANY ONE TIME PER CONDITION B4.1(a).  
DISTURBED AREAS MUST BE STABILISED TO A C-FACTOR OF 0.05 PRIOR TO THE COMPLETION OF ANY OTHER WORKS PER CONDITION B4.1(b). REFER TO TABLE 1 ON DRAWING 0200 FOR APPROVED STABILISATION METHODS

**EROSION & SEDIMENT CONTROL NOTES:**

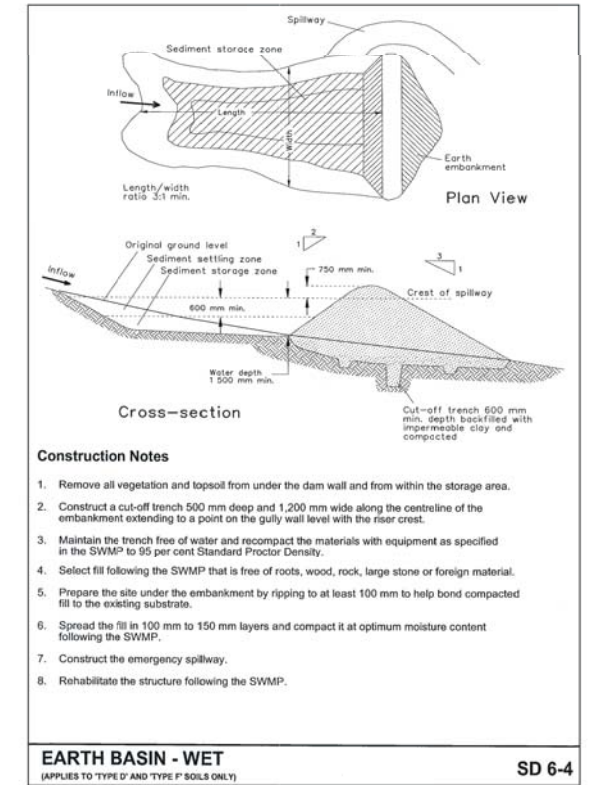
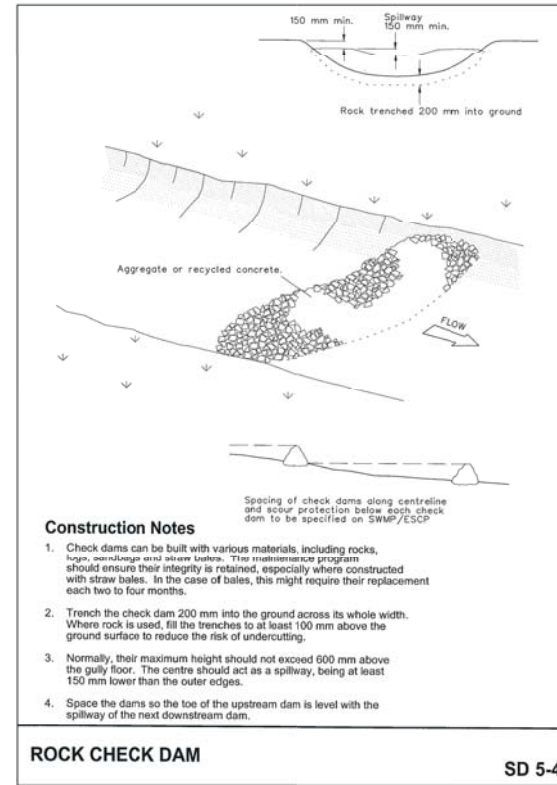
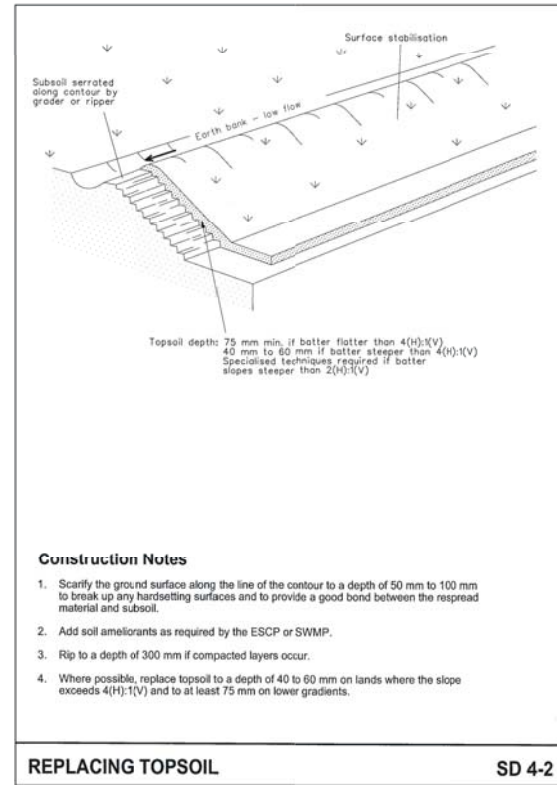
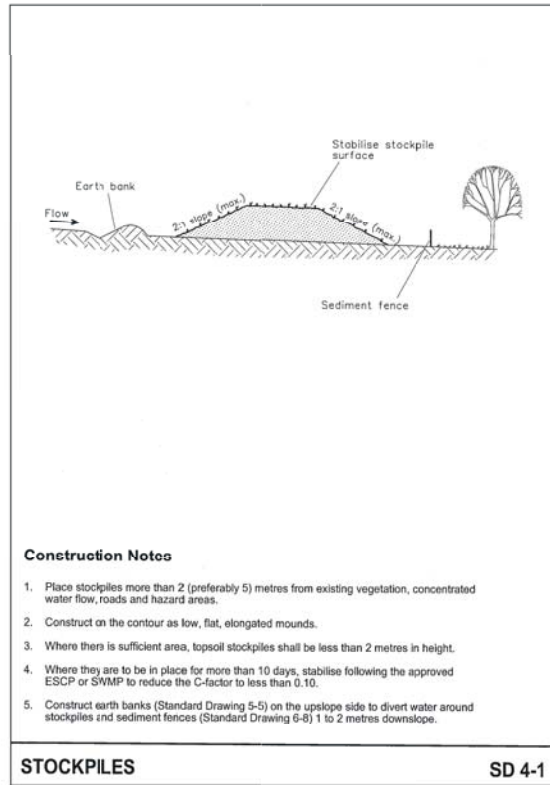
REFER TO DRAWING 0110 FOR EROSION & SEDIMENT CONTROL NOTES

**EROSION & SEDIMENT CONTROL PLAN - MPW3**  
1:1500 SCALE

15m 0 15 30 45 60 75 90 105 120 135 150m  
1:1500 SCALE AT A0 SHEET SIZE

**FOR INFORMATION ONLY**



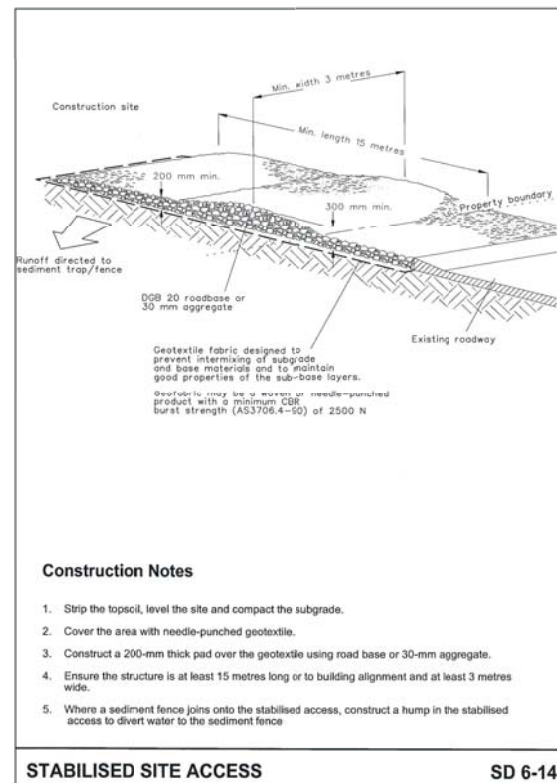
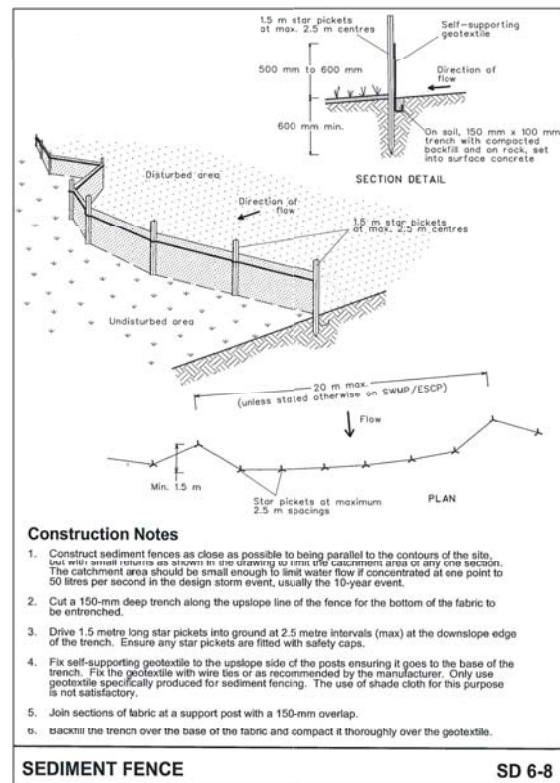


4-5

4-6

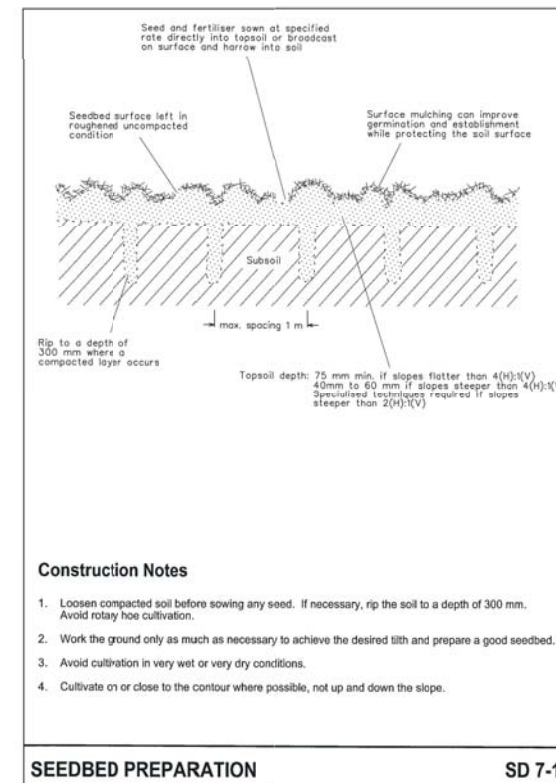
5-22

6-19



6-36

6-48



7-7

**EROSION & SEDIMENT CONTROL NOTES:**  
REFER TO DRAWING 0110 FOR EROSION & SEDIMENT CONTROL NOTES

**FOR INFORMATION ONLY**

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	27.02.20	A			

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**PROJECT MANAGER**

**TACTICAL GROUP**

**PROJECT**

**PRECINCT INFRASTRUCTURE WORKS WEST**  
MOOREBANK AVENUE, MOOREBANK

DESIGNED DRAWN DATE CHECKED SIZE SCALE CAD REF:  
D.S. S.M. FEB '20 A0 AS SHOWN P:\CW-COS-CV-DWG-0250

**Costin Roe Consulting Engineers**  
Level 1, 8 Widdrill Street  
Wahah Bay, Sydney NSW 2000  
Tel: (02) 9551-7889 Fax: (02) 9541-3721  
email: mail@costinroe.com.au

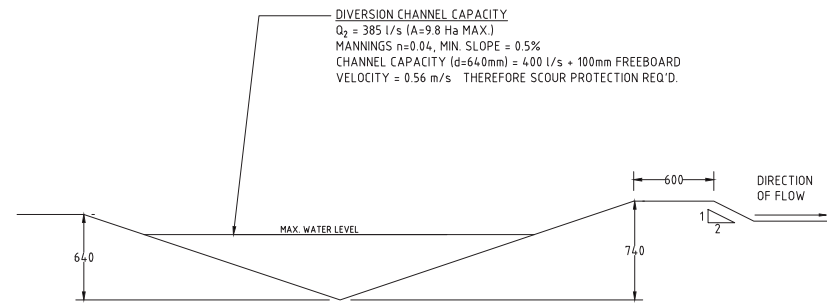
**Costin Roe Consulting**

PRECISION | COMMUNICATION | ACCOUNTABILITY

**DRAWING TITLE**

**EROSION & SEDIMENT CONTROL DETAILS - SHEET 1**

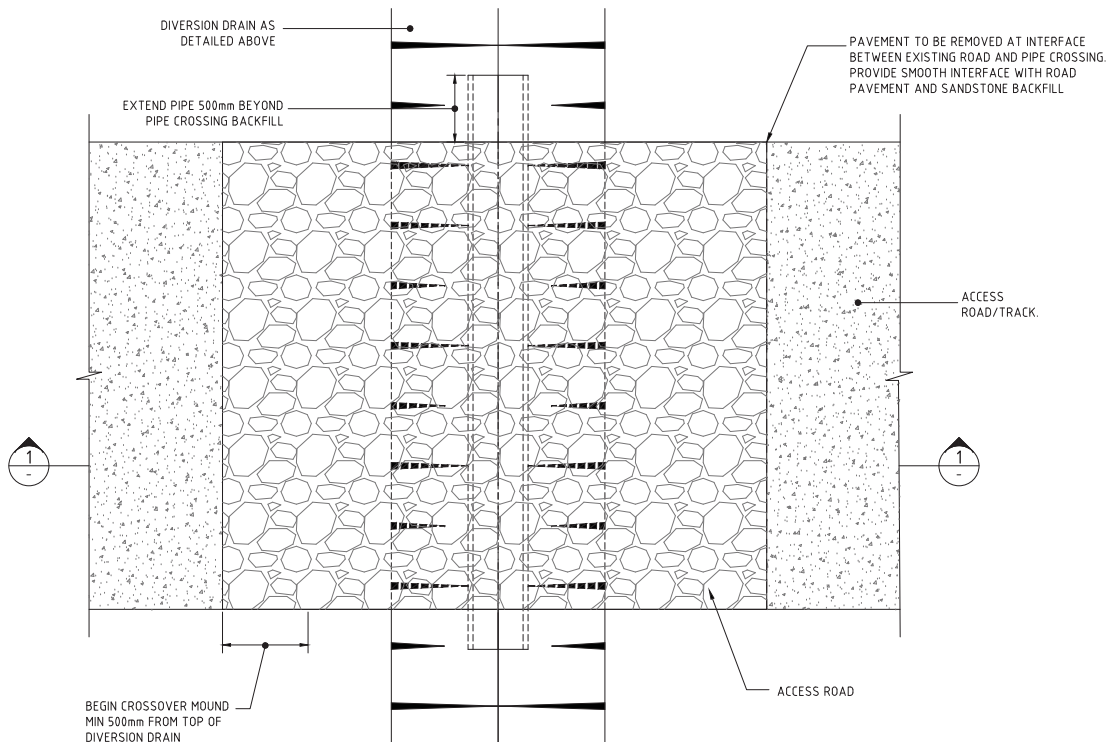
DRAWING No: **MPWS3-COS-CV-DWG-0250** ISSUE: **A**



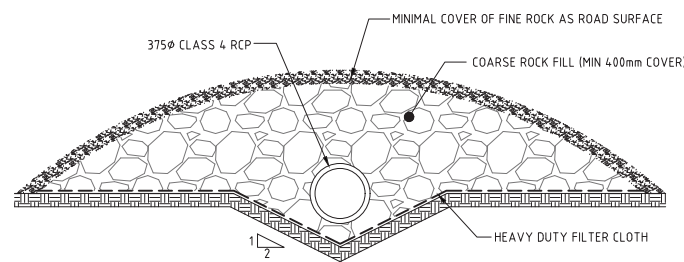
**DIVERSION DRAIN SECTION**  
SCALE 1:20

TEMPORARILY PROTECT THE SWALE FROM EROSION DURING CONSTRUCTION.

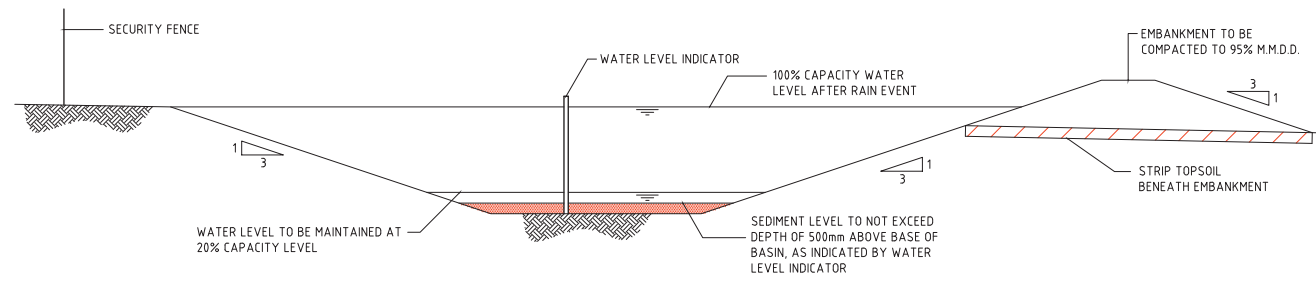
- TEMPORARY DIVERSION DRAINS SHALL BE STABILISED BY A 3000mm WIDE SECTION OF BIODEGRADABLE JUTE OPEN WEAVE MESH. JUTE TO BE INSTALLED IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATION
- EARTHEN CLEAN WATER DIVERSION DRAINS SHALL BE STABILISED BY:
  - TURF REINFORCEMENT, OR
  - GEOTEXTILE LINER, OR
  - POLYMER HYDRAULIC SOIL STABILISER. DOSAGE TO BE TO MANUFACTURER'S SPECIFICATION FOR FLOW RATES NOMINATED. DOSAGE SHALL BE SUCH THAT  $C=0.05$ .



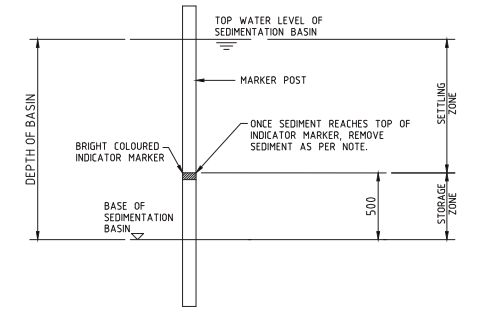
**TYPICAL CROSSING OVER DIVERSION CHANNEL - PLAN**  
SCALE 1:20



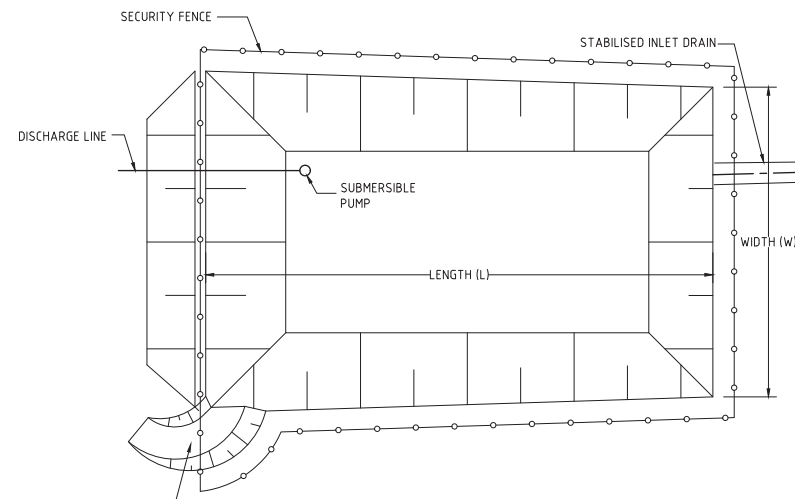
**SECTION 1:20**  
TYPICAL CROSSING OVER DIVERSION CHANNEL



**TYPICAL SEDIMENT CONTROL BASIN SECTION**  
SCALE 1:50

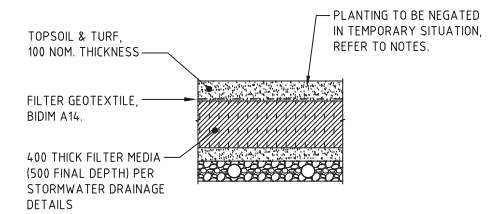


**SEDIMENT STORAGE MARKER**  
SCALE 1:20



**TYPICAL SEDIMENT CONTROL POND PLAN**  
SCALE 1:250

SPILLWAY TO CATER FOR Q<sub>2</sub> FLOW FOR 6-12 MONTHS. REFER TO PLAN FOR SPILLWAY WIDTH. SPILLWAY TO BE STABILISED WITH SANDSTONE BOULDERS



**TEMPORARY BIO-RETENTION PROTECTION DETAIL**  
SCALE 1:20

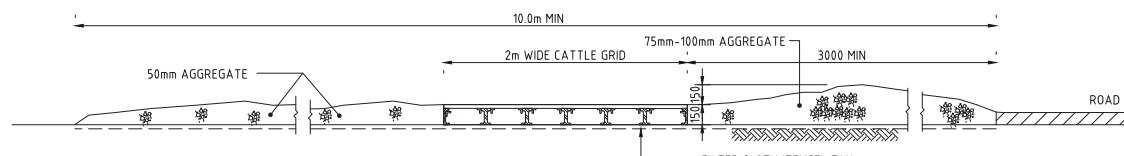
TEMPORARY CONSTRUCTION REQUIREMENT DETAIL - PROVIDE 100mm TOPSOIL AND TEMPORARY EROSION PROTECTION (JUTEMASTER OR EQUIV) TO SWALE BATTER SLOPES AND ADJACENT LANDSCAPED AREAS. NOTE THAT NO TOPSOIL IS TO BE PLACED OVER FILTRATION MEDIA. PROVIDE SILT FENCE TO TOP OF BANK UNTIL SUCH TIME AS THIS STABILISING AND VEGETATION HAS BEEN COMPLETED.

BIO-RETENTION TO BE PARTIALLY INSTALLED, FOLLOWING COMPLETION OF ROADWORKS, WITH THE TOP 75-100mm OF FILTER MEDIA REPLACED WITH A FINE TO COARSE SAND UNDERLAIN WITH A GEOTEXTILE LAYER (PER ABOVE DETAIL). FOLLOWING COMPLETION OF THE UPSTREAM DEVELOPMENT AND SITE STABILISATION, THE SAND IS TO BE REMOVED, REPLACED WITH FILTER MATERIAL AND PLANTED OUT. REFER TO BIO-RETENTION NOTES ON DRAWING PIWW-COS-CV-DWG-0453

**TEMPORARY BIO-RETENTION BASIN PROTECTION DETAILS**

**NOTES:**  
ALL EROSION & SEDIMENT CONTROL MEASURES TO BE INSPECTED & MAINTAINED DAILY BY SITE MANAGER.  
MINIMISE DISTURBED AREAS.  
ROADS & FOOTPATHS TO BE SWEEP DAILY.  
1.2m TURF TO BE PLACED BEHIND KERBS.  
DUST MINIMISATION CONTROL BY WATERING TO BE IMPLEMENTED BY SITE MANAGER AS REQUIRED OR AS DIRECTED BY THE EPA.

**EROSION & SEDIMENT CONTROL NOTES:**  
REFER TO DRAWING 0110 FOR EROSION & SEDIMENT CONTROL NOTES



**SECTION 1:20**  
STABILISED CONSTRUCTION ENTRANCE 'TRUCK SHAKER'

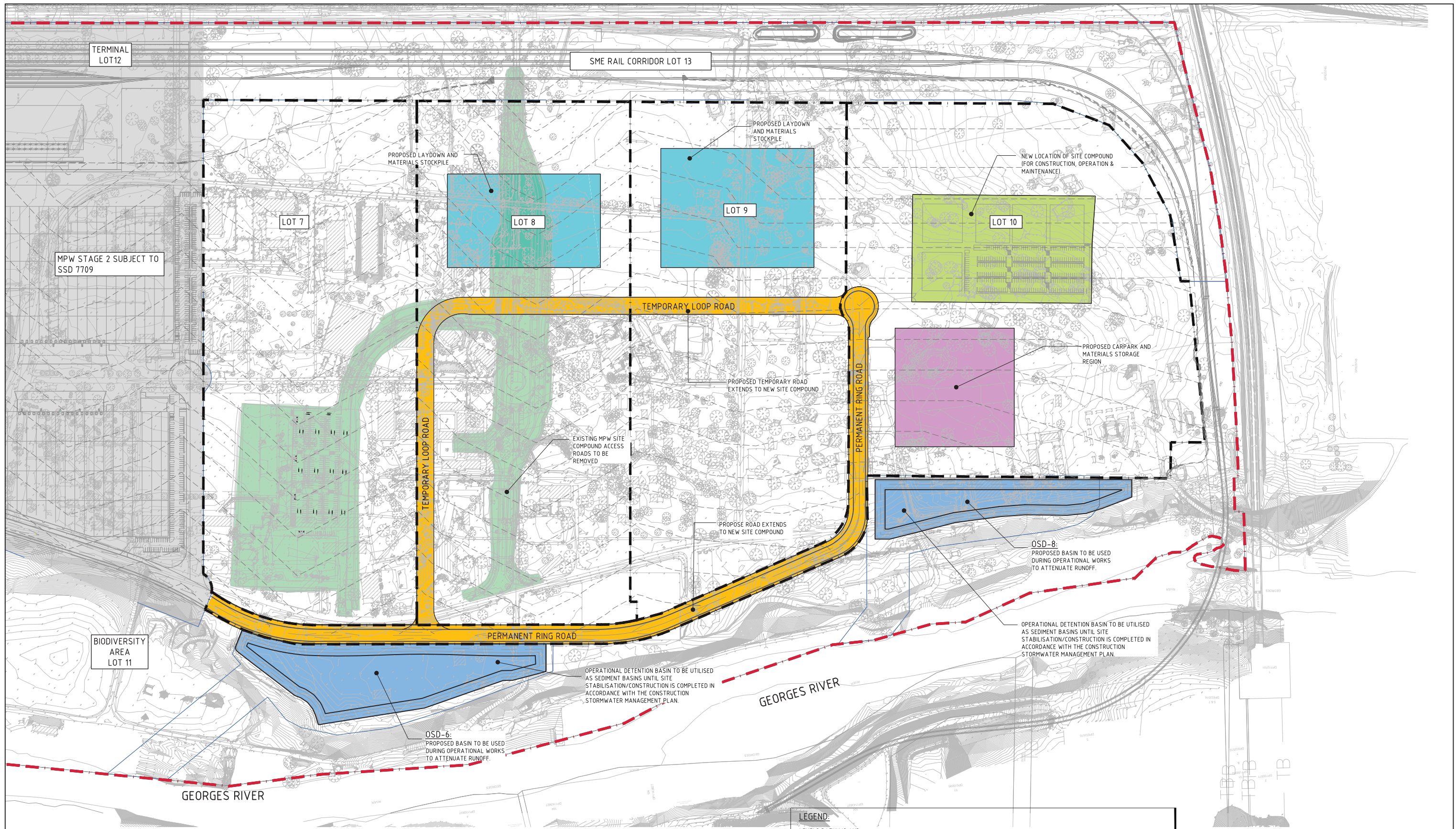
2m 0 5 10 15 20 25m  
SCALE 1:250 AT A0 SHEET SIZE

500mm 0 1 2 3 4 5m  
SCALE 1:50 AT A0 SHEET SIZE

200mm 0 500 1000 1500 2000mm  
SCALE 1:20 AT A0 SHEET SIZE

**FOR INFORMATION ONLY**





TERMINAL LOT12

SME RAIL CORRIDOR LOT 13

LOT 7

LOT 8

LOT 9

LOT 10

BIODIVERSITY AREA LOT 11

MPW STAGE 2 SUBJECT TO SSD 7709

PROPOSED LAYDOWN AND MATERIALS STOCKPILE

PROPOSED LAYDOWN AND MATERIALS STOCKPILE

NEW LOCATION OF SITE COMPOUND (FOR CONSTRUCTION, OPERATION & MAINTENANCE)

TEMPORARY LOOP ROAD

TEMPORARY LOOP ROAD

PERMANENT RING ROAD

PERMANENT RING ROAD

PROPOSED TEMPORARY ROAD EXTENDS TO NEW SITE COMPOUND

PROPOSE ROAD EXTENDS TO NEW SITE COMPOUND

EXISTING MPW SITE COMPOUND ACCESS ROADS TO BE REMOVED

PROPOSED CARPARK AND MATERIALS STORAGE REGION

OSD-8: PROPOSED BASIN TO BE USED DURING OPERATIONAL WORKS TO ATTENUATE RUNOFF.

OPERATIONAL DETENTION BASIN TO BE UTILISED AS SEDIMENT BASINS UNTIL SITE STABILISATION/CONSTRUCTION IS COMPLETED IN ACCORDANCE WITH THE CONSTRUCTION STORMWATER MANAGEMENT PLAN.

OPERATIONAL DETENTION BASIN TO BE UTILISED AS SEDIMENT BASINS UNTIL SITE STABILISATION/CONSTRUCTION IS COMPLETED IN ACCORDANCE WITH THE CONSTRUCTION STORMWATER MANAGEMENT PLAN.

OSD-6: PROPOSED BASIN TO BE USED DURING OPERATIONAL WORKS TO ATTENUATE RUNOFF.

GEORGES RIVER

GEORGES RIVER



MPWS3 CIVIL WORKS PLAN  
1:1500 SCALE

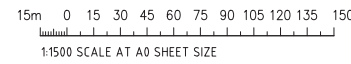
**LEGEND:**  
LEVELS DATUM IS AHD.

EXISTING SITE LEVELS AND DETAILS BASED ON SURVEY INFORMATION PROVIDED BY CARDNO TITLED 115804548 DATED 05/08/19.

	- SHEET-FLOW DIRECTION		- NEW SITE STORAGE COMPOUND LOCATION
	- SITE BOUNDARY		- LAYDOWN & MATERIALS STOCKPILE
	- EXISTING MPW SITE STORAGE COMPOUND		- CARPARK & MATERIALS STORAGE
	- PROPOSED ROADS		- MPW STAGE 2 WORKS

**SITE STABILITY NOTE:**

LAND DISTURBANCE & LAND FILLING ACTIVITIES MUST BE UNDERTAKEN IN A PHASED MANNER, IMPACTING A MAXIMUM AREA OF 65ha AT ANY ONE TIME PER CONDITION B4.1(a). DISTURBED AREAS MUST BE STABILISED TO A C-FACTOR OF 0.05 PRIOR TO THE COMPLETION OF ANY OTHER WORKS PER CONDITION B4.1(b). REFER TO TABLE 1 ON DRAWING 0200 FOR APPROVED STABILISATION METHODS



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DRAWING TITLE

**MPWS3 CIVIL WORKS PLAN**

DRAWING No: MPWS3-COS-CV-DWG-04.00