

2 MANDALA PARADE, CASTLE HILL

Construction Soil and Water Management Plan

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BASIS OF REPORT

This report has been prepared by SLR Consulting Australia Pty Ltd with all reasonable skill, care and diligence, and taking account of the timescale and resources allocated to it by agreement with the Client. Information reported herein is based on the interpretation of data collected, which has been accepted in good faith as being accurate and valid.

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DOCUMENT CONTROL

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1 Introduction

1.1 Background and Purpose

This Construction Soil and Water Management Plan (CSWMP) has been prepared for the 2 Mandala Parade, Castle Hill site where four 20-story mixed use (commercial and residential) buildings overlying a common podium structure with a stepped 6-story basement are to be constructed. This site is located immediately north of the Sydney Metro Hill Showground Station and tunnel.

The lowest basement level will require a Finished Floor Level (FFL) of RL 70.20m AHD. It is understood that a Bulk Excavation Level (BEL) of RL 69.1m will be required for the lowest basement level, which includes allowance for the construction of the basement slab. To achieve the BEL, excavation depths of 19.00m Below Existing Ground Level (BEGL) at the Doran Drive end of site to 26.60m BEGL at the Andalusian Way end of site have been estimated. Locally deeper excavations may be required for footings, service trenches, crane pads and lift overrun pits.

The purpose of the CSWMP is to prevent adverse impacts on the surrounding water quality and prevent pollution of the downslope environment during construction works. This CSWMP is applicable to employees, contractors and all personnel associated with the planning and construction of the proposed buildings.

This CSWMP has been prepared by Duncan Barnes of SLR Consulting who is a suitably qualified Principal Environmental Engineer and CPESC certified ((Cert No. 8494). A copy of Duncan's Curriculum Vitae (CV) is provided in Appendix A.

1.2 Scope and Objectives

The scope of this document is to outline the water and Erosion and Sediment Control (ESC) management protocols for construction of the mixed-use buildings and to provide the contractor with a baseline set of management strategies to assist with effectively managing water/runoff during construction. The CSWMP will be used by all personnel (including contractors) involved in project construction activities.

The objectives of this ESCP are to:

- Comply with all applicable legislation, regulations and conditions;
- Provide controls for construction activities to prevent adverse impacts to the surrounding environment and the general public;
- Prevent soil erosion from the site;
- Dewater excavations such as to ensure no discharge of untreated sediment laden or contaminated water occurs to catchment areas or stormwater drains;
- Avoid unnecessary ground disturbances; and
- Detail monitoring and maintenance requirements.

This CSWMP has been prepared to satisfy Condition 29 of the Stage Significant Development Application (SSDA 15882721). This condition and where the specific items have been addressed are provided below in Table 1.

Table 1 Condition 29 of SSDA 15882721 and Where Addressed

Item	Item Requirement	Where Addressed within this CSWMP
C29	Prior to the commencement of any earthwork or construction, the Applicant must submit to the satisfaction of the Certifier a Construction Soil and Water Management Sub-Plan which must be prepared by a suitably qualified expert, in consultation with Council and address, but not be limited to the following:	This Document
(a)	Describe all erosion and sediment controls to be implemented during construction	Sections 2 and 3
(b)	provide a plan of how all construction works will be managed in a wet-weather event (i.e. storage of equipment, stabilisation of the Site)	Section 2.2
(c)	detail all off-Site flows from the Site	Section 1.5
(d)	describe the measures that must be implemented to manage stormwater and flood flows for small and large sized events, including, but not limited to 1 in 1-year ARI, 1 in 5-year ARI and 1 in 100-year ARI.	Sections 2 and 3

1.3 Regulatory Framework

A review of legislation, regulations, statutory requirements, guidelines and strategies relevant to the site construction works was undertaken during the preparation of this CSWMP.

The following legislation is applicable to the building works in relation to water management during construction:

- Protection of the Environment Operations Act (1997) and associated regulations
- Catchment Management Authorities Act 2003
- Contaminated Land Management Act 1997
- Contaminated Land Management Regulation 2008
- Catchment Management Authorities Act 2003
- Noxious Weeds Act 1993
- Soil Conservation Act 1938
- Sydney Water Act 1994
- Sydney Water Catchment Management Act 1998
- Water Management Act 2000
- Environmental Planning and Assessment Act 1979 (EP&A Act)
- Environmental Planning and Assessment Regulation 2000
- Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)
- Protection of the Environment Operations Act (Underground Petroleum Storage Systems)

- Work Health and Safety Act 2011 (WHS)
- Work Health and Safety Regulation 2011

The following guidelines are also applicable to the proposed works:

- ANZECC Water Quality Guidelines for Fresh and Marine Waters (ANZECC, 2002)
- Managing Urban Storm water, Soils and Construction, The Blue Book (4th Edition, Landcom 2004)
- The NSW Acid Sulphate Soil Management Guidelines (ASSMAC,2009)
- Water Quality Management Guidelines 2002
- Water Quality Sampling Manual Third Edition 1999 Environment Protection Agency
- NSW Waste Classification Guidelines
- National Environmental Protection Council Schedule B: Guideline for the Investigation of Soil and Groundwater
- Australian Government Department of Sustainability, Environment, Water, Population and Communities 2009

These requirements are to be adhered to and complied with during the construction phase of works.

1.4 Construction Activities with Potential Impacts

This CSWMP specifically addresses the following activities associated with the construction of the mixed-use buildings that have the potential to cause environmental impacts unless controlled:

- Stripping of vegetation, subsoil and topsoil;
- Construction and establishment of infrastructure (including water management structures);
- Vehicle and machinery movements;
- Ground disturbances including basement excavation;
- Excavation dewatering activities;
- Liquid waste, fuel and oil spills; and
- Landscaping areas.

All works listed above will be undertaken within the construction footprint.

The Prospect/Parramatta River Acid Sulfate Soil Risk Map (1:25,000 scale; Murphy, 1997) and The Hills Local Environmental Plan 2019, indicate that the site is not situated in an Acid Sulfate Soils (ASS) classed area. As such, ASS is unlikely to be encountered during development works at the site.

1.5 Offsite Flows

The proposed construction works will be undertaken in three key stages in relation to offsite flows:

- Stage 1 – Initial site preparation prior to excavation;
- Stage 2 – Basement construction excavation; and

- Stage 3 – Mixed-use building construction.

Minor offsite flows for Stages 1 and 3 will occur to the surrounding streets but will be managed by suitable Erosion and Sediment Control (ESC) measures in accordance with Managing Urban Storm water, Soils and Construction, The Blue Book (4th Edition, Landcom 2004).

Offsite flows from Stage 2 will only occur via dewatering of the site excavation to the adjacent stormwater system in accordance with this CSWMP and the Dewatering Management Plan (DMP).

2 Summary of Control Measures to be Implemented

2.1 Soil and Water Management Principles

An Erosion and Sediment Control Plan (ESCP) was prepared for the site and is included in Appendix B. The proposed ESC measures have been designed to minimise the potential impact on soil erosion and downstream water quality. Wind and water erosion from disturbance areas cannot be eliminated completely, however the following measures will be undertaken to minimise their impact (in accordance with the Managing Urban Stormwater guidelines):

- Minimising the disturbance footprint;
- Separation / diversion of 'clean' water catchment runoff from disturbed runoff areas to minimise sediment-laden water volumes for management (where possible);
- Excavation dewatering activities, with water treatment as required (refer to the proposed water treatment system in Appendix C), to ensure that no discharge of untreated sediment laden or contaminated water occurs to catchment areas or stormwater drains. During excavation works sediment laden runoff and groundwater seepage that surfaces within the excavation shall be directed into a designated sump and managed in accordance with the Dewatering Management Plan (DMP);
- Minimising soil erosion (i.e. rehabilitation, drainage and erosion control measures) at the source, rather than trapping resultant sediment. Where this is not practicable, then all reasonable measures will be made to trap sediment by implementing sediment control measures compliant with the required treatment standards. Upslope and downslope ESC measures shall be installed prior to any ground disturbance (refer to Appendix B);
- Conducting best practice land clearing procedures for all proposed disturbance areas;
- Sediment fences will be utilised to control sheet flow from the initial disturbance areas during the construction works (refer to the ESCP drawing in Appendix B);
- SLR understands that soil will be trucked off site and disposed of in a suitable matter. If soil stockpiles are required then these stockpiles will be placed in areas away from roadways and other drainage lines. Suitable sediment control measures will be installed downslope of soil stockpiles and upslope clean water runoff diverted (where possible);
- Sealing or revegetation of external disturbed areas as soon as possible;
- Stabilised rock pads will be installed at the site entry / exit point on De Clambe Drive during the construction works (refer to the standard drawing in Appendix B);

- Visual inspections of all vehicles leaving the site will be undertaken and where it is deemed possible that sediment could be tracked onto De Clambe Drive the vehicles shall be washed down in a suitable location such that the wash down water reports to appropriate sediment controls. Street sweeping will be used as an additional contingency measure where sediment is observed on De Clambe Drive;
- Where there is potential for sediment laden runoff to enter stormwater pits suitable inlet protection measures will be installed around the pit inlets. These include straw bale filters and mesh / gravel inlet filters. Refer to the ESCP drawing in Appendix B;
- Effective dust suppression measures (where required);
- Any liquid wastes, fuels and oils stored on-site will be sufficiently banded to contain any potential spills. Accidental spillage or poor management of fuels, oils, lubricants, hydraulic fluids, solvents and other chemicals during the construction phase will be controlled through spill management actions (including the availability of spill kits) to prevent water quality impacts. Captured liquid wastes, fuels and oils should be pumped out by a liquid waste contractor and disposed of at an appropriately licenced facility;
- Barrier fencing will be installed for each stage of construction to delineate no go areas and to maintain disturbance areas and traffic movement to the designated areas; and
- Implementing an effective monitoring and maintenance program for the site.

2.2 Severe Weather Preparedness

2.2.1 Severe Weather Precautions

In the event of/or forecast of severe weather the following precautions should be implemented at a minimum:

- Severe Weather Identification – Identification of the weather system approaching and identification of potential outcome of the weather system (i.e. high winds, heavy rains, lightning etc.). This identification should be made with the support of the latest available information from the Bureau of Meteorology (BOM).
- Site specific plans will be incorporated on site when weather forecasts are reviewed to manage stormwater and flood flows for small and large sized events, including but not limited to 1 in 1-year ARI, 1 in 5-year ARI and 1 in 100-year ARI. Refer to the associated storm runoff volumes in Section 2.2.2 below.
- Risk Evaluation – Based on the identification of the weather system and latest information from BOM, a risk evaluation should be completed for the site and a determination of appropriate treatments should be formulated.
- Weather Treatments – A list of weather treatments formulated in the process of the risk evaluation should include immediate measures where appropriate to ensure the stability of the site and the protection of the environment to the greatest extent practicable based upon the type of severe weather anticipated. These measures may include the following:
 - Dewatering, treatment (if required) and discharge of stored excavation water prior to the weather event in accordance with the DMP;
 - Temporary cessation of construction works;
 - Laydown areas of equipment and materials etc to be positioned on high ground above flood mark;

- Additional sediment controls (e.g. sediment fencing, straw bale filters etc) to prevent surface erosion and surface runoff; and
- Temporary erosion controls such as temporarily laying geofabric over any exposed and vulnerable disturbance areas.
- Rectification and Recovery – Following a return to site, rectification of site environmental controls and a recovery of site to acceptable environmental standards shall occur prior to the commencement of works.
- Contact Personnel – A list of responsible persons for the project found in the CEMP for the project shall be available onsite in an accessible location so that all personnel on site are aware of whom to contact and able to do so.

2.2.2 Severe Storm Excavation Runoff Volumes

Runoff (excluding groundwater) excavation volumes from the 1, 5 and 100 year Average Recurrence Interval (ARI) storm events for both 24 hour (one day) and 72 hour (three days) are provided in Table 2 below for consideration during forecast wet weather risk evaluations. These volumes were calculated using:

- Rainfall was estimated for the region based on Intensity – Frequency – Duration (IFD) data for the Castle Hill area in accordance with the data presented in the Bureau of Meteorology (BOM)'s website;
- A runoff coefficient of 1 (i.e. no infiltration during the storm event) due to the likely saturated soil and heavily compacted excavation base; and
- The site area of 7969 m².

Table 2 Severe Storm Runoff Volumes

ARI Event	Duration (hrs)	Rainfall Depth (mm)	Total Runoff Volume (ML)
1	24	87	0.69
	72	127	1.01
5	24	143	1.14
	72	218	1.74
100	24	289	2.30
	72	441	3.51

2.3 ESC Program

The ESC measures detailed in the ESCP drawings (provided in Appendix B) will be installed prior to any ground disturbance works and maintained until the measures are no longer required (e.g. following excavation works). The Contractor shall remove temporary ESC measures when permanent measures are in place and / or site stabilisation has occurred.

3 Excavation Dewatering

3.1 Dewatering Management Plan

As the proposed basement construction was expected to intercept the local groundwater table a Dewatering Management Plan (DMP) was developed by EI Australia to detail dewatering activities to comply with the Hills Shire Council and NSW Office of Water (Water NSW) requirements. This DMP shall be adhered to during construction works.

The objectives of this DMP were to:

- Describe the dewatering methodology, groundwater treatment requirements, monitoring and reporting procedures to be employed during temporary dewatering activities; and
- Provide effective management and contingency procedures to ensure that the discharge of extracted groundwater does not pose unacceptable risks to the receiving environment.

3.2 Proposed Dewatering System

Runoff and water captured within the temporary construction excavations will be preferentially re-used on-site (e.g. for dust suppression). The dewatering system will comprise a sump and pump system with temporary discharge (during construction) into an existing stormwater pit located to the south of the site along Mandala Parade. If required, extracted groundwater will be treated on-site prior to discharge to the stormwater network. This water treatment system should be installed, tested and operational prior to the commencement of dewatering, to ensure that only treated water that meets the performance criteria is discharged to stormwater.

This treatment will involve the use of the following dependent on water quality testing results:

- Flocculation tanks or sumps where the water may be treated with flocculant and / or a pH adjuster. Any flocculation and dosing will be undertaken with an approved substance that is suitable for the surrounding environment;
- A water treatment train system, similar to the one proposed by Coates Hire Operations Pty Ltd (provided in Appendix C); and
- Dewatering tubes.

It is recommended that any pumped-out groundwater will be discharged into a vessel (basin, or equivalent). The preferred vessel type will require adequate capacity to accommodate the rate of groundwater seepage, estimated by the EI (2021) as approximately 4.32 ML / 365 days (assumed) for the construction phase. Continuous dewatering and operation of the pumping system will be required on a full-time basis for approximately 365 days for the duration of basement constructions.

3.3 Water Quality Management

Sediment laden runoff and groundwater migrating from the site would ultimately discharge into Cattai Creek. In accordance with NSW EPA minimum requirements for flows from site dewatering operations, extracted waters must be tested to ensure compliance with the ANZG (2018) 95% Freshwater Trigger Values (and 99% Trigger Values for bio-accumulative parameters) for the protection of the relevant receptor ecosystem.

The discharge water criteria are summarised in Table 3 and must be adhered to during the dewatering program, in compliance with the DMP and NSW Protection of the Environment Operations Act 1997. Water quality monitoring will be undertaken to determine if the water meets the requirements in Table 3 and will not pollute the downstream receiving waters. This monitoring is described in Section 4.1 below. Water that meets these requirements can then be discharged from site into the adjacent stormwater system. Water that does not meet the discharge water quality requirements will be contained on-site and treated further prior to additional testing.

Table 3 Minimum Discharge Criteria

Analyte	Discharge Water Criterion ($\mu\text{g/L}$) ¹
Physico-Chemical Parameters	
pH	6.5 – 8.0
Turbidity (NTU)	6-50
Metals	
Aluminium	55
Arsenic ^{III}	24
Arsenic ^V	13
Cadmium	0.2
Chromium ^{VI}	1 ³
Copper	1.4
Lead	3.4
Mercury (inorganic)	0.06 ²
Nickel	11
Zinc	8 ³
Light Petroleum Hydrocarbons	
Surface films (petrochemical sheen)	No visible surface films
Volatile TRH ($\text{C}^6 - <\text{C}^{10}$)	If TRH is detected analysis for BTEX and PAH is required
Semi-volatile TRH ($>\text{C}^{10} - \text{C}^{40}$)	
Monocyclic Aromatic Hydrocarbons (BTEX)	
Benzene	950
Toluene	180 ⁴
Ethylbenzene	80 ⁴
o - xylene	350
p - xylene	200 ⁴
m - xylene	75 ⁴
Polycyclic Aromatic Hydrocarbons (PAH)	
Benzo(α)pyrene	0.1
Naphthalene	16

Analyte	Discharge Water Criterion (µg/L) ¹
Chlorinated VOCs	
Tetrachloroethene (PCE)	70
Trichloroethene (TCE)	330
Chloroethene (vinyl chloride)	100
cis-1,2-Dichloroethene	60
trans-1,2-Dichloroethene	
1,1-Dichloroethane	700
1,2-Dichlorobenzene	160

1 - NEPM (2013) Groundwater Investigation Levels for fresh and marine water quality, based on ANZECC & ARMCANZ (2000).

2 - Chemical for which possible bioaccumulation and secondary poisoning effects should be considered, refer to ANZG (2018) for further guidance.

3 - Figure may not protect key species from chronic toxicity, refer to ANZECC & ARMCANZ (2000) for further guidance.

4 - Low reliability toxicity data, refer to ANZECC & ARMCANZ (2000).

Refer to the DMP for additional information pertaining to the dewatering of the site excavations. If water quality exceedances are observed, then an investigation will be undertaken to identify the cause of the exceedance with rectification works then undertaken as required.

4 Monitoring and Maintenance

4.1 Monitoring

The performance of ESC devices will decline if they are not maintained. All ESC devices will be inspected regularly and following significant rainfall events as detailed in Table 4 below. The results of all inspections and monitoring activities shall be recorded.

Reference shall also be made to the Dewatering Management Plan which provides additional information of the water quality monitoring including trial-run periods and details around reducing the monitoring frequency down to fortnightly (subject to the analytical monitoring result trends).

Table 4 Monitoring Frequency

Control Parameter	Monitoring Frequency	Target Level
ESC Devices	Weekly and following significant rainfall events (i.e. >10mm in a 24hr period)	All ESC devices functioning as intended including desilting as required
Water Quality	In accordance with the Dewatering Management Plan (Weekly to Fortnightly)	As per Table 3
Sediment on Roads	Visual monitoring during working hours	No sediment / mud tracked onto roads

If water quality exceedances are observed, then an investigation will be undertaken to identify the cause of the exceedance with rectification works then undertaken as required.

4.2 Maintenance

All erosion and sediment control measures will be maintained in a functioning condition until individual areas have been deemed “successfully” sealed, rehabilitated or no longer required due to excavation works. Where controls are observed to not be functioning correctly, they will be restored to meet the required standard. Where significant erosion is observed to be occurring on a regular basis, additional controls will be implemented.

Designated sump areas within the excavation will be dewatered in accordance with the DMP and released into the adjacent stormwater system provided that the water is of a suitable water quality.

5 Roles and Responsibilities

All staff must comply with this CSWMP. Specific responsibilities are detailed in Table 5.

Table 5 Responsibilities relating to ESC and Water Management

Position	Responsibility
SLR	Preparation and update of this CSWMP, in consultation with the construction team, to the satisfaction of regulators
Site Manager	Establishment of best practice culture and monitoring Enforcement of the requirements of this CSWMP
HSE Manager	Monitoring and maintenance of ESC structures in accordance with this CSWMP
Dewatering Contractor	Dewater the excavation sump / tanks in accordance with the DMP
Water Treatment Specialist	Design and maintain the water treatment system as required to meet the water quality objectives detailed within this CSWMP
All Construction Personnel	Undergo appropriate inductions and training Comply with the relevant Acts, Regulations and Standards. Compliance with this CSWMP Promptly report to management on any non-conformances or breaches of the system.

6 Limitations of this report

This CSWMP is intended for the mixed-used residential and commercial construction works and sets out minimum requirements. The Principal Contractor will need to review the appropriateness of ESC measures on site at each stage of construction, and may be required to adjust measures to ensure that they are appropriate at all times to prevent harm to the environment as site conditions change over time.

APPENDIX A

Duncan Barnes CV (CSWMP Author)

Duncan has over 14 years' experience in the assessment and design of water management infrastructure using a variety of modelling programs including GoldSim, DRAINS, MUSIC, 12D, Autocad, XP-RAFTS and XP-SWMM. He has been involved with numerous surface water management projects, particularly in the design and analysis of drainage systems (both water quantity and quality), WSUD, site water balances, surface water assessments and erosion and sediment control design (for which he is CPESC certified).

Duncan has experience in water management audits, facility closure plans, detailed dam design and the preparation of various management plans used at industrial, commercial, residential, mine and quarry sites. He also has experience in water quality / channel stability and subsidence monitoring. In addition, he has worked within the environment team supervising coal seam gas drilling in SE Queensland and during secondment placement on the Ravensworth North Project.

Duncan has had experience working on the pre-tender design of the South West Rail Link as part of an alliance drainage team and worked on a Pacific Highway upgrade from Coopernook to Herons Creek.

Education

- Bachelor of Environmental Engineering (1st Class Honours), University of Newcastle (2007)
- Certified Professional in Erosion and Sediment Control

Project Experience

Erosion and Sediment Control (ESC)

Woodside Solar Facility ESCP (2022)

Involved the preparation of an ESCP (report and drawings) for the proposed Woodside Solar Facility near Karratha, Western Australia.

Mount Lindesay Highway Upgrade (2020)

Involved the preparation of an ESCP (report and drawings) for the proposed Mount Lindesay highway upgrade works in Mount Lindesay, Queensland. The works included upgrading the highway to a 110km/h design speed 4 lane highway with future provision for 6 lanes, a grade separated interchange at Chambers Flat Road / Crowson Lane, service roads linking existing roads and properties, and upgrading of the interchange ramps at Stoney Camp Road Interchange.

Nerang to Murwillumbah Road Upgrade (2020)

Involved the preparation of an ESCP (report and drawings) for the proposed road upgrade works from Nerang to Murwillumbah in southern Queensland. The road works covered a road length of 37 kms.

Colmslie Beach Reserve Upgrade (2021)

Involved the preparation of an ESCP (report and drawings) for the proposed beach reserve upgrade at Colmslie Brisbane.

Regional Rail Facility ESCP Dubbo (2020)

Involved an ESC inspection and the preparation of an ESCP (report and drawings) for the proposed rail facility in Dubbo.

Mount Owen Operations Quarterly Inspections (2016-Ongoing)

Mount Owen Operations Quarterly ESC Inspections. The outcome of the ESC inspections was a comprehensive action spreadsheet with recommended actions and risk rankings of observed issues.

Rum Jungle (2020)

The former uranium mine in the NT was closed in 1960 and initially rehabilitated through the 1970's and 1980's. The ESCP (report and drawings) was prepared for all the rehabilitation works at the site which involved a large area of ground disturbance.

Mount Owen Complex Bayswater North (2019)

Involved the conceptual and detailed design (for construction) of water management structures to convey and treat runoff from the proposed Bayswater North dump area at the Mount Owen Complex. This design involved both hydrological and hydraulic modelling in XP-RAFTS.

Mount Pleasant Mine Audit (2017-2021)

Numerous ESC audits of the Mount Pleasant Mine. The outcome of the ESC audits was a comprehensive action spreadsheet with recommended actions and risk rankings of observed issues.

Hunter Valley Operations Glider Pit (2020)

Involved the conceptual and detailed design (for construction) of water management structures to convey and treat runoff from the proposed Glider Pit dump area at the Hunter Valley Operations mine. This design involved both hydrological and hydraulic modelling in XP-RAFTS and detailed design of several dams and conveyance channels.

Camp Hill Wetland Desilting (2019)

Involved the preparation of an ESCP (report and drawings) for the proposed desilting works at the Camp Hill Wetland.

Albert Street High Rise Development (2019)

Involved the preparation of an ESCP (report and drawings) for the proposed high-rise development at Albert Street, Brisbane.

Meteor Downs Rail Loop (2019)

Involved the preparation of an ESCP (report and drawings) for the proposed rail loop construction works at the Meteor Downs mine.

Ravensworth Open Cut, Pre-Strip (2018)

Involved the design of water management structures to convey and treat runoff from the proposed pre-strip disturbance areas at the Ravensworth Open Cut mine.

Darwin Luxury Hotel (2018)

Involved the preparation of an ESCP (report and drawings) for a proposed luxury hotel in Darwin.

Moreton Bay Cycleway (2018)

Involved the preparation of an ESCP (report and drawings) for a proposed cycleway in Brisbane. The project was undertaken for Brisbane City Council.

Bulga Commonwealth Drill Pad (2018)

Involved the preparation of ESCP drawings for the rehabilitation of a number of drill pads on Commonwealth land for the Bulga Underground Coal Mine.

Bulga Underground Quarterly ESC Inspections (2013-2018)

Bulga Underground Quarterly ESC Inspections. The outcome of the ESC inspections was a comprehensive action spreadsheet with recommended actions and risk rankings of observed issues.

Erskine Park Transfer Station (2018)

Involved the preparation of an ESCP (report and drawings) for the Erskine Park Transfer Station upgrade works. The ESCP included measures for both the construction and operational phases of the works.

Mount Owen Pre-Strip (2018)

Involved the design of water management structures (concept and detailed) to convey and treat runoff from the proposed pre-strip disturbance areas at the Mount Owen Complex mine.

Mount Pleasant Rail Loop (2018)

Involved the preparation of an ESCP (report and drawings) for the proposed rail loop at the Mount Pleasant mine.

Ipswich Hospital (2017)

Involved the preparation of an ESCP (report and drawings) for Ipswich Hospital construction works.

Ensham Mine (2017)

Involved the preparation of an ESCP (report and drawings) for the Ensham mine in Queensland. The ESCP provided guidance on ongoing ESC management at the mine.

Wambo Coal Mine (2017)

Preparation of a site wide ESCP of the Wambo Coal Mine. This included catchment analysis and capacity assessment of all sediment dams at the site. Detailed site catchment plans were prepared for Wambo Coal as part of this project.

Bulga Underground Longwall 8 Drill Pad (2016)

Involved the preparation of ESCP drawings for drill pads associated with Longwall 8 at the Bulga Underground Mine.

Bulga Surface Operations (2016)

ESCP drawings and report for a Noise and Visual Bund at the Bulga Coal Mine. The Noise and Visual Bund is a large emplacement dump which extends for approximately 10kms. The ESCP involved conceptual and detailed design of water conveyance structures to safely convey runoff to the toe of the emplacement.

Origin Energy Secondment (2014)

One month Environmental Officer secondment for Origin Energy in the coal seam gas fields of SE Old (based in Roma). Whilst the role involved the management of a range of environmental factors the primary role was to ensure suitable ESC management of gas pads and the access roads.

Surface Water Assessment, Management and Design

Austar Mine Closure Surface Water Gap Analysis (2021)

Prepared a surface water gap analysis assessment for closure of the Austar Coal Mine. This project included a detailed literature review and the preparation of findings (including recommendations and risk rankings) into a Desktop Knowledge Base Report and gap analysis spreadsheet.

Liddell Mine Closure Surface Water Gap Analysis (2020)

Prepared a surface water gap analysis assessment for closure of the Liddell Coal Mine. This project included a detailed literature review and the preparation of findings (including recommendations and risk rankings) into a Desktop Knowledge Base Report and Glencore spreadsheet.

CCI701 Closure Plan, Whitehaven Coal (2017-2019)

Prepared a Surface Water Assessment (SWA) to support a Detailed Mine Closure Plan for the Consolidated Coal Lease 701 (CCL701). CCL701 is the site of the former Gunnedah Colliery which operated for over 100 years until closure in September 2000. The lease covers 5,635ha, for which 951.6ha is owned by Whitehaven Coal.

CCL701 encompasses Melville Open Cut, a Coal Preparation Plant site, a Tailings Storage Facility and a number of underground portals. This SWA included the design of water management structures to manage runoff from large disturbance areas including hydrological modelling, site water balances and the development of a monitoring / maintenance program.

Macquarie Coal Preparation Plant Discharge Water Management Strategy (2017-2018)

Investigation to address the Environment Protection Licence (EPL) 1360 notice of variation which requires a Discharge Water Management Study (DWMS) for the Macquarie Coal Preparation Plant (MCPP). This investigation specifically addressed the requirements of condition U1.2 which included a detailed catchment plan, predictions of runoff volumes and water quality over time, an assessment against water quality limits and details of practicable measures to achieve the relevant objectives and prevent pollution of the receiving environment upon mine closure.

OCAL Complex Mine Closure Plan, Surface Water Assessment (2016)

Prepared a Surface Water Assessment (SWA) to support a Detailed Mine Closure Plan for the OCAL Complex which encompasses the West Wallsend Colliery (WWC), the Macquarie Coal Preparation Plant (MCPP), the former open-cut, Westside Mine and the former Teralba Colliery (Northgate and Southgate sites). This SWA included an assessment of the Westside Final Void including a water balance, spillway design (conceptual and for construction) and a final void water quality assessment.

Tarrawonga Water Management Plan (2016)

Preparation of a Water Management Plan (WMP) to satisfy project approval conditions for the

continuation of the Tarrawonga open cut mine, near Boggabri. Furthermore, the WMP was prepared in consultation with the relevant regulators and incorporated a Water Balance, Erosion and Sediment Control Plan and Surface Water Monitoring Program.

Abbey Green Rehabilitation Drainage Design (2015)

The project involved hydrological and hydraulic modelling to undertake a detailed design of the proposed water management structures at the Abbey Green Rehab area of the MTW mine. The detailed design involved the preparation of design drawings, a report detailing the methodology, assumptions and results of the design and a construction cost estimate.

Muswellbrook Coal Mine Surface Water Management Study (2015)

Undertook a surface water study for the Muswellbrook open cut coal mining operation located in the Hunter Valley, NSW. The focus of the study was to develop a final void landform design in accordance with the approved Mining Operations Plan (MOP) focussing on assessing existing water management infrastructure and developing the design of water management structures to be implemented during each of the remaining MOP phases. The study also addressed the risks associated with adequate sizing of water storage structures and the advantages of strategic rehabilitation and water management planning.

Mount Thorley Water Management Design (2015)

Desktop review and site inspection of the existing water management structures at the MTW mine in order to recommend improvements to the water management system. The recommended improvements were then conceptually designed and documented in a report.

Pine Dale Coal Mine, Stage 2 Extension Surface Water Assessment (2014)

Preparation of a Surface Water Assessment (SWA) for a proposed extension to the Pine Dale Coal Mine in the Western Coalfields region. The key aspects addressed within the Surface Water Assessment include the identification of potential surface water impacts as a result of the Proposal, a description of the proposed mitigation and management measures to be implemented to address these potential impacts, licensing requirements, recommendations for ongoing surface water monitoring and a site water balance. The site water balance includes a discussion on water sources, water security and the potential for discharges from the Site.

West Wallsend Colliery Pit Top Dam Assessment (2013)

Included an assessment of the water management system at the West Wallsend Colliery pit top area. This included hydrological modelling of the site, dam capacity calculations and detailed design (for construction) of dam augmentation works.

Chain Valley Colliery Surface Water Assessment (2012)

The Surface Water Assessment included standard ESC and rehabilitation measures to ensure the compliance with the site's statutory requirements and minimising the risk of pollution to downstream waterways due to disturbance works. The control measures included upstream clean water diversion drains, downstream sediment fences and the revegetation of disturbed areas (including hydromulch on cut/fill batters). A gravel surface was applied to all the hardstand areas immediately following earthworks to minimise erosion at the site.

Site Water Balance

CCL701 No 5 Entry Boxcut Water Balance (2017-2019)

Site water balance of the No 5 Entry Boxcut to make an assessment of the likely annual water volumes available for water use on the property. Due to the limited soil data available, the water balance investigation was intended as a high-level assessment of the possible water volumes likely to be available for farming purposes.

Tarrawonga Coal Mine, Water Balance, Whitehaven Coal (2018)

Site water balance of the No 5 Entry Boxcut to make an assessment of the likely annual water volumes available for water use on the property. Due to the limited soil data available, the water balance investigation was intended as a high-level assessment of the possible water volumes likely to be available for farming purposes.

New Acland Final Void Water Balance (2017)

Detailed daily time-step water balance of the proposed New Acland Mine Final Void in GoldSim to assess the potential for potential overflows and offsite discharges. The project also involved a salinity balance and a report to document the methodology, assumptions and results of the water balance investigation.

Rocglen Coal Mine (2017)

Detailed technical assessment of the preferred final landform option (including the final void) at the Rocglen Coal Mine (RCM) in response to questions and issues raised by the Department of Planning and Environment (DP&E). This technical assessment included a final void water and salinity balance, an assessment of groundwater inflow rates and long-term localised groundwater levels, a final void water quality assessment, recommendations pertaining to managing potential surface water and groundwater risks, a design of water management structures and monitoring and maintenance requirements.

Westside Final Void Water Balance (2016)

Detailed daily time-step water balance of the Westside Final Void in GoldSim to assess the potential for potential overflows and offsite discharges. The project also involved a report to document the methodology, assumptions and results of the water balance investigation.

McCahills Water Balance (2016)

Preparation of a site water balance of the MaCahill's waste management facility for inclusion into a site Stormwater and Wastewater Management Plan. The objective of the water balance was to assess both water security and the volume/frequency of potential site discharges. The project also involved a report to document the methodology, assumptions and results of the water balance investigation.

Pine Dale Coal Mine, Stage 2 Extension Water Balance (2014)

Detailed daily time-step water balance of the proposed Pine Dale Coal Mine Stage 2 Extension layouts in GoldSim to assess both water security and the volume/frequency of potential site discharges. The project also involved a report to document the methodology, assumptions and results of the water balance investigation.

Chain Valley Colliery Extension Water Balance (2012)

Detailed daily time-step water balance of the proposed Chain Valley Colliery extension to assess both water security and the volume/frequency of potential site discharges. The project also involved a report to document the methodology, assumptions and results of the water balance investigation.

Stormwater / Water Quality Design

Woodlawn Bioreactor Leachate Management Audit (2019-2021)

Independent annual leachate management audits of the Woodlawn Bioreactor site. The audits include consultation with regulators, an assessment of the leachate management system (including the leachate treatment plant) and improvement recommendations.

Erskine Park Waste Facility Stormwater Design and Surface Water Design (2017)

Surface water assessment and stormwater design of the proposed waste transfer station at the Erskine Park Resource Management Facility in Sydney. The project was classed as a State Significant Development (SSD) and included the design of pits/pipes, rainwater tanks, an on-site detention system and a bioretention basin.

McCahills Stormwater and Wastewater Management Plan (2016)

Prepared Stormwater and Wastewater Management Plan for the MaCahill's waste management facility in support of an application for an amendment to their Environmental Authority (EPPR00757513). The plan included an assessment of the surface water and leachate management system, the design of additional water management structures, a site water balance, environmental management recommendations and surface water monitoring plan.

Auckland Airport Water Efficiency Plan (2016)

Prepared a water efficiency plan for Auckland Airport to identify key trends in water consumption

and identify opportunities for improved water efficiency. The plan identified that the key water consuming areas of the Airport were the International and Domestic Terminal Buildings (e.g., lavatories and passenger showers) and the sanitary waste disposal facility. Key external controlled water users were identified as maintenance facilities and in-flight catering services.

Kooragang Island Surface Water Assessment (2014-2015)

Development application surface water assessment for a proposed expansion of Boral's waste recycling facility on Kooragang Island (Newcastle). Included an assessment of water demand, supply and reuse, flooding, stormwater quality and quantity, groundwater, ESC and the monitoring/maintenance program. The project also included a site water balance and design of water management structures including a number of infiltration basins.

Kennedy Cove Stormwater Design (2014)

The project involved a catchment analysis, development of a hydraulic model of the network, development of options to address the environmental issues being experienced and a multi-criteria analysis of the proposed options. Parameters considered included constructability, maintenance, operation, security, cost, etc. Reporting on the options developed was undertaken with a view to Council implementing the preferred option.

Karuah East Hard Rock Quarry Water Management Plan (2012)

Preparation of the Environmental Management System for the Karuah East Hard Rock Quarry (Hunter Quarries). This included the preparation of various management plans including a Water Management Plan and a Pollution Incident Response Management Plan.

South West Rail Link Stormwater Design (2011)

Worked as part of a drainage team that designed all of the drainage including cross drainage (culverts), longitudinal drainage (cess drains, pit/pipe networks, diversion drains) and additional local roads and car parks for a 11km section of a new rail line to the south of Sydney from Glenfield to Leppington.

Cooperook to Herons Creek Pacific Highway Upgrade Cross Drainage Works (2010)

Cooperook to Herons Creek, Pacific Highway Upgrade, TCA – Designed longitudinal and cross drainage for the Cooperook to Herons Creek, Pacific Highway Upgrade. This primarily involved hydraulic modelling in DRAINS.

Northlakes Subdivision Drainage Design (2010)

Developed stormwater management plan for numerous stages of the large residential subdivision. 12D was used to design the pit and pipe network. Water quality modelling was undertaken in MUSIC and the DRAINS model developed for water quantity was reviewed.

Wyong Car Park Drainage Design (2010)

Designed stormwater drainage system for a commuter car park at Wyong (adjacent to the train station). Involved iterative detailed design using both 12D and DRAINS. The client for this project was Transport Infrastructure Development Corp (TIDC).

Ourimbah Flooding Assessment, University of Newcastle (2010)

Flooding assessment of the Ourimbah University Campus. Involved hydrological and hydraulic modelling in XP-SWMM and assessment in HEC-RAS.

Waurm Ponds Carpark (2010)

Designed water quality devices including rain gardens, bio-retention swales and gross pollutant traps at a major shopping centre car park in Geelong, Victoria. Involved MUSIC modelling and working with Council to get their approval for the design.

Structural Inspections

Hunter Economic Zone (2009)

Carried out numerous construction inspections of a strip footing for a sewer main to be placed in a mine subsidence area. Regular inspections were undertaken on average 3 times a week for several months.

Alphine Way, Thredbo (2009)

As part of the RTA's requirements for ongoing road safety, inspections of culverts for stormwater drainage were conducted to identify faults and drainage issues present which could lead to failure. Over 100 culverts were inspected as part of this project. The RTA was very pleased with the quality and timing of the inspections.

Southern Region (2009)

Over 400 culvert inspections at the, Kings Highway, Goulburn Road, Federal Highway, Crookwell Road and the Old Hume Highway through Goulburn. Many of these culverts were located in urban areas and provided differing challenges to the ones on rural roads and highways. The RTA was very pleased with the quality and timing of the inspections.

Water Monitoring

Allworth Quarry Water Monitoring (2012)

Included the preparation of the Environmental Management System for the Allworth Park Quarry (Tricon Mining Equipment). This included the preparation of a Water Management Plan and a Water Monitoring Program which included monthly monitoring over several years.

Newcastle Harbour, Theiss (2009)

Hunter River / Newcastle Harbour water quality monitoring. A small area in the harbour was found to be contaminated from previous BHP work. A sheet pile wall was required, prior to dredging works, so no contaminants could escape into the harbour. 3 rigs were used to drive the piles into the ground. In order to do this piling they required suitable water quality monitoring to ensure that they weren't having an adverse effect on the harbour. The monitoring included going out on a boat for three months (six days a week) and undertook hourly water quality monitoring and water sampling two days a week.

Environmental Management

Wambo Coal Mine Bi-Annual Subsidence Monitoring (2017-Ongoing)

Bi-annual subsidence monitoring at the Wambo Coal Mine. The monitoring included recording the type and location of subsidence, and features including maximum width, length and depth of cracking. Photographs were taken and the depth of cracking was measured using an incremental string line with a weight attached to the end.

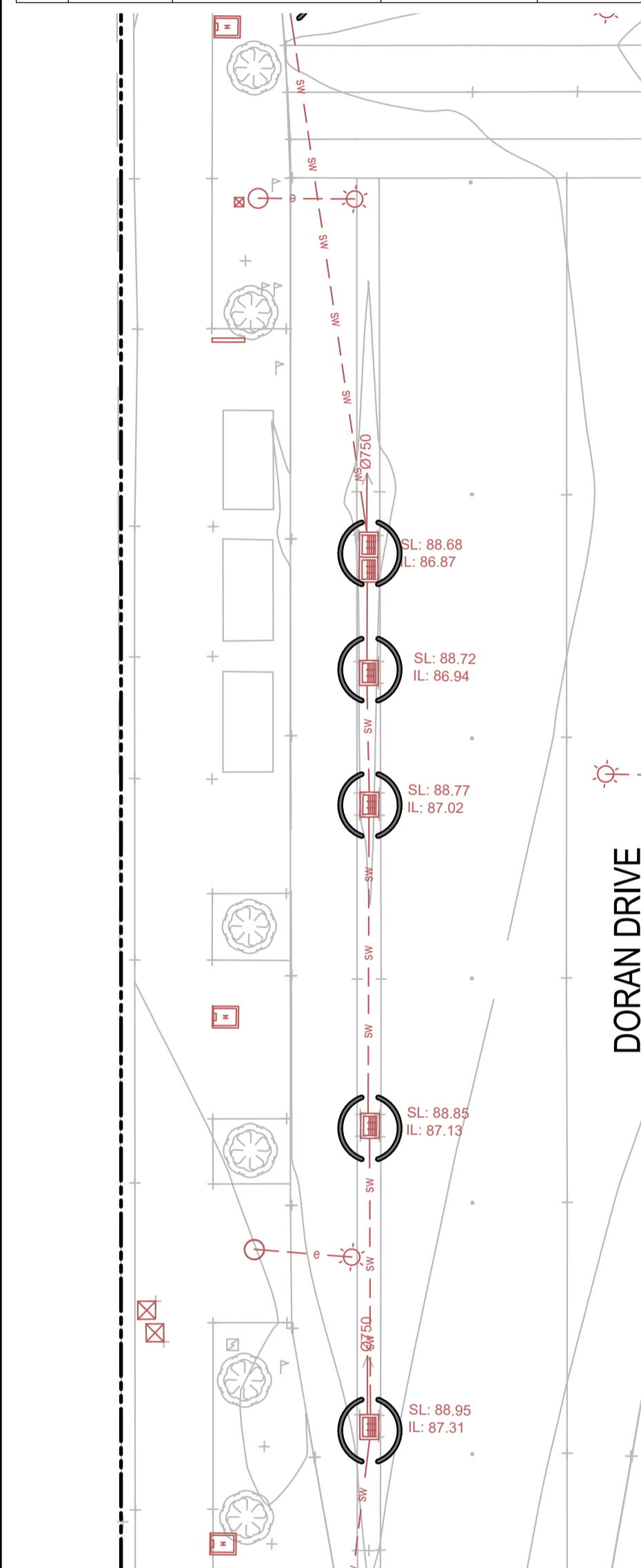
Confidential Client (2011)

Prepared a Sinkhole Rehabilitation Plan for a confidential client in the Hunter Valley.

APPENDIX B

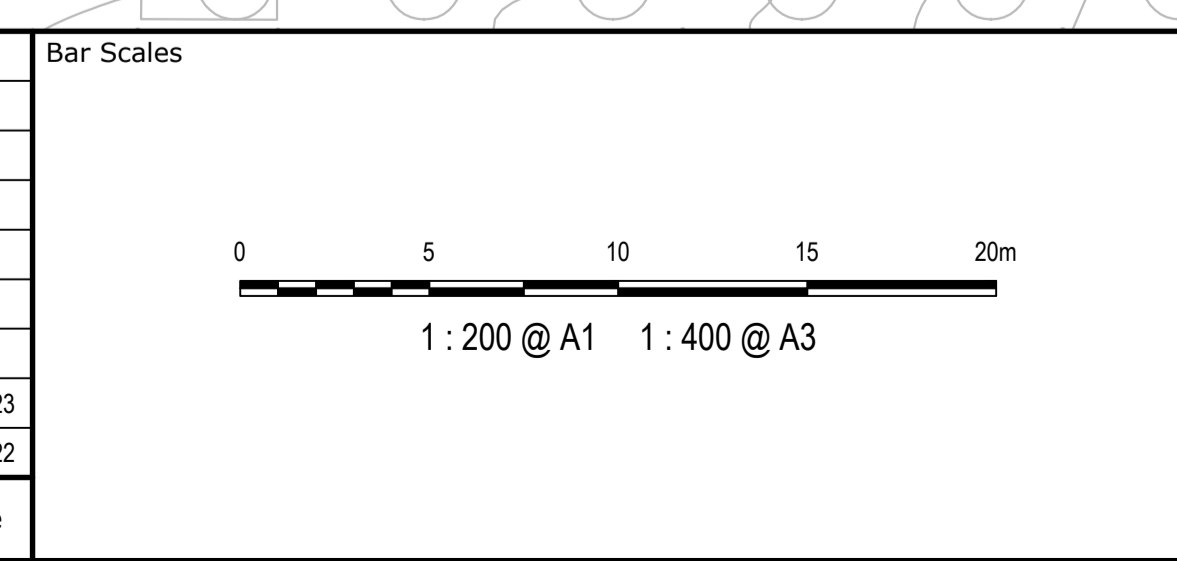
Conceptual Erosion and Sediment Control Drawings

Rev	Date	Description	DP Full Name	Reg No



LEGEND	
	SEDIMENT FENCE (SD 6-8)
	CATCH DRAIN
	BARRIER FENCE
	STRAW BALE FILTER (SD 6-7)
	MESH AND GRAVEL INLET FILTER (SD 6-11)
	GEOTEXTILE INLET (SD 6-12)
	STABILISED SITE ACCESS AND TRUCK WASH DOWN AREA (SD 6-14)
	PROPOSED SITE ACCESS GATE

Issue	Description	Date
B	ISSUE FOR CC APPROVAL	09-01-23
A	ISSUE FOR CC APPROVAL	20-10-22



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Client

Scales	Drawn	HG
1 : 200	Designed	CK
Grid MGA	Checked	GJ
Height Datum AHD	Approved	AT
SSD 15882721		

Project
DORAN DRIVE PRECINCT
CASTLE HILL

Title
EROSION AND
SEDIMENT CONTROL
PLAN

Civil Engineers and Project Managers

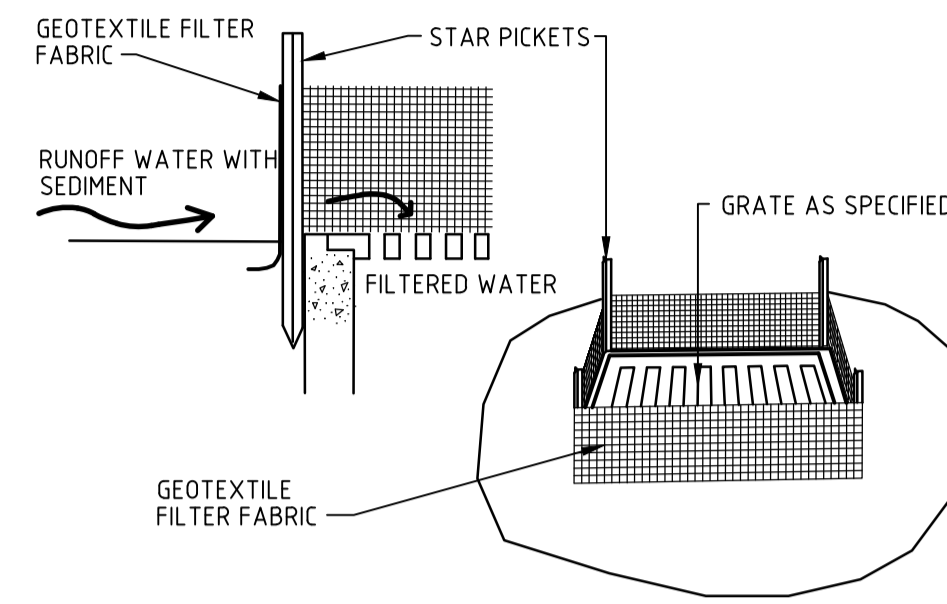
Level 7, 153 Walker Street
North Sydney NSW 2060
ABN 96 130 882 405
Tel: 02 9439 1777
Fax: 02 9923 1055
www.atl.net.au
info@atl.net.au

Status
FOR CC APPROVAL
NOT TO BE USED FOR CONSTRUCTION

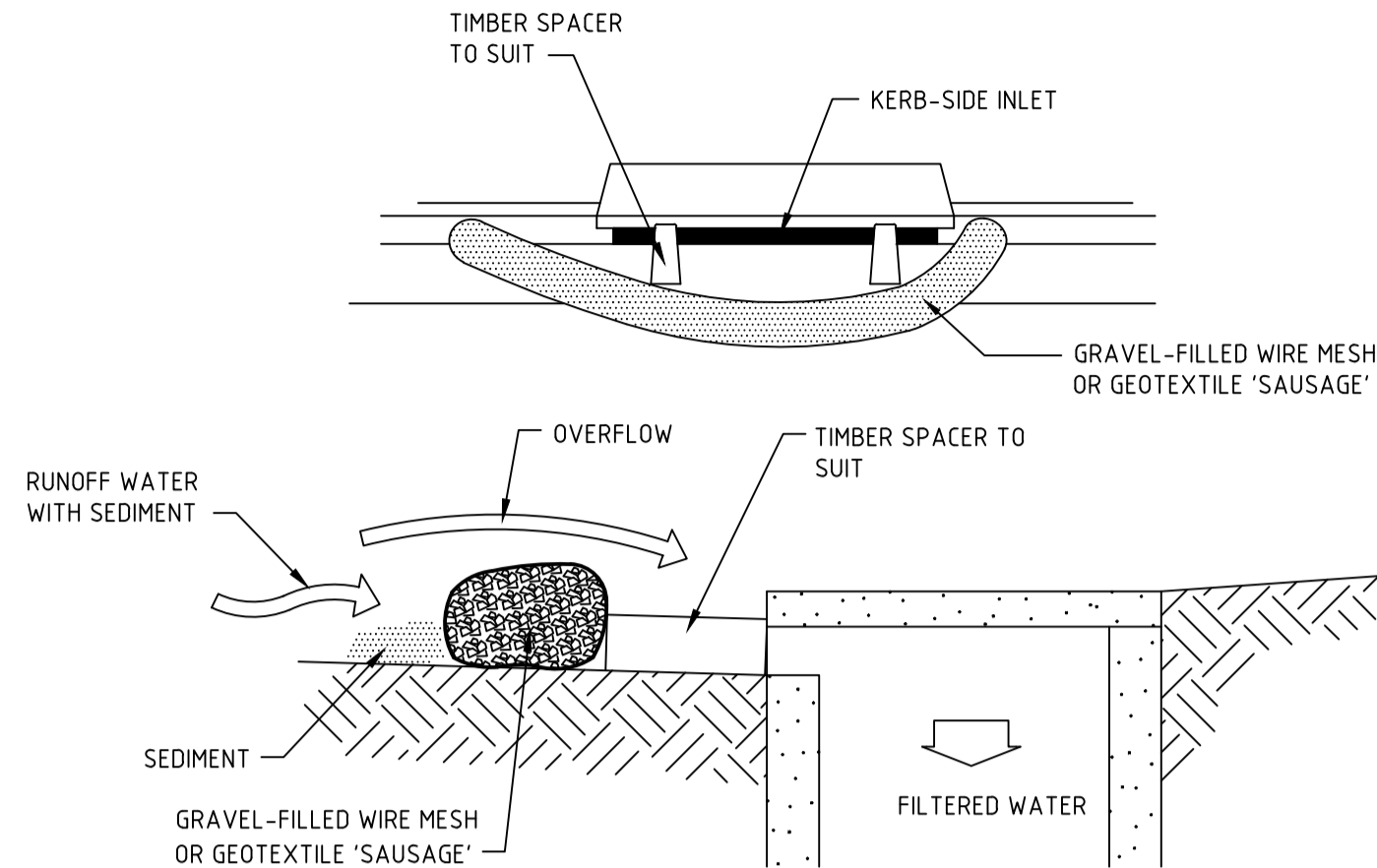
Project - Drawing No.
22-999-C1601

Issue
B

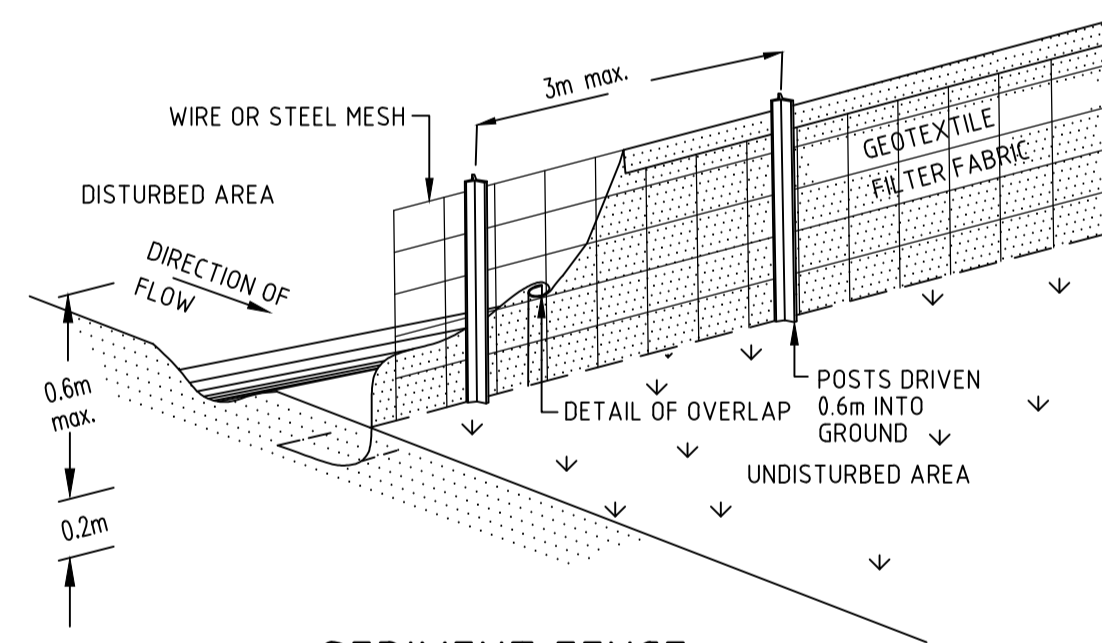
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Project Title: DORAN DRIVE PRECINCT CASTLE HILL				
Consent No: SSD 15882721		Body Corporate Reg No: -		
Drawing Title: ESC DETAILS		Drawing No: 22-999-C1602		
Rev	Date	Description	DP Full Name	Reg No
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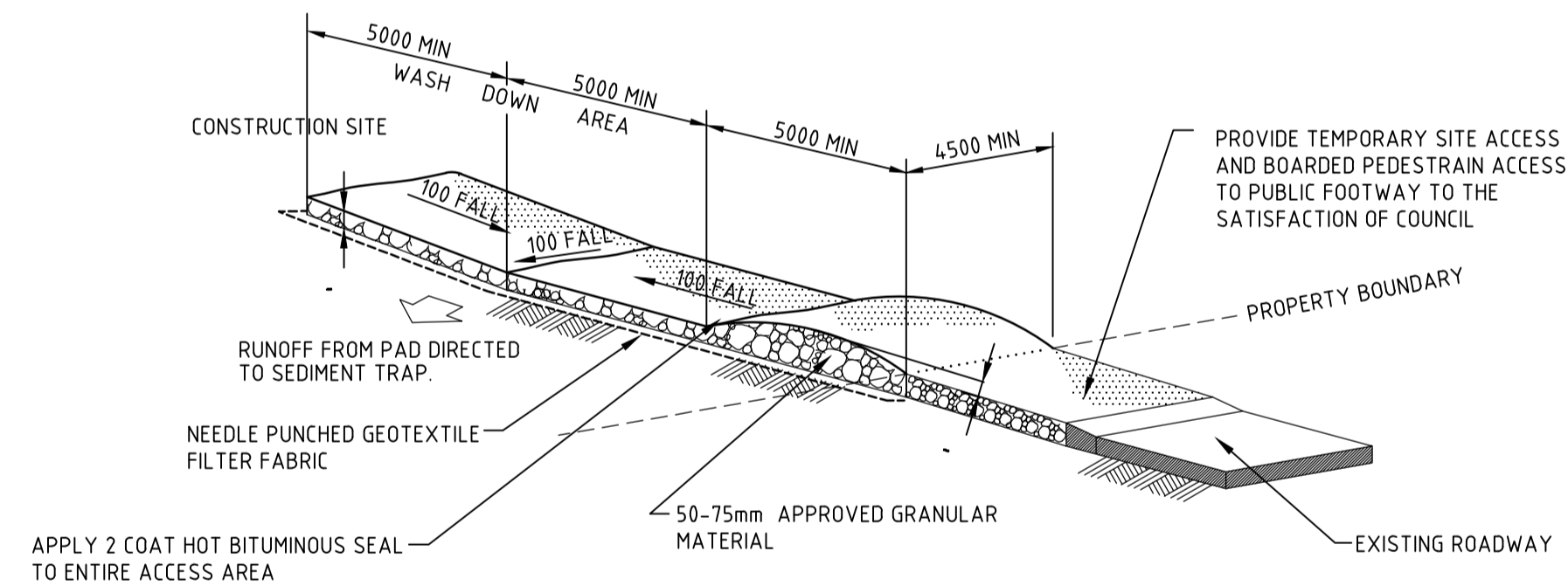
GEOTEXTILE FILTER PIT SURROUND
NTS



MESH AND GRAVEL INLET FILTER
NTS



SEDIMENT FENCE
NTS



STABILISED SITE ACCESS AND TRUCK WASH DOWN AREA
NTS

Issue	Description	Date
A	ISSUE FOR CC APPROVAL	20-10-22

Bar Scales

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Client

Scale	N.T.S.	Drawn	HG
		Designed	CK
Grid	MGA	Checked	GJ
Height Datum	AHD	Approved	AT
SSD 15882721			

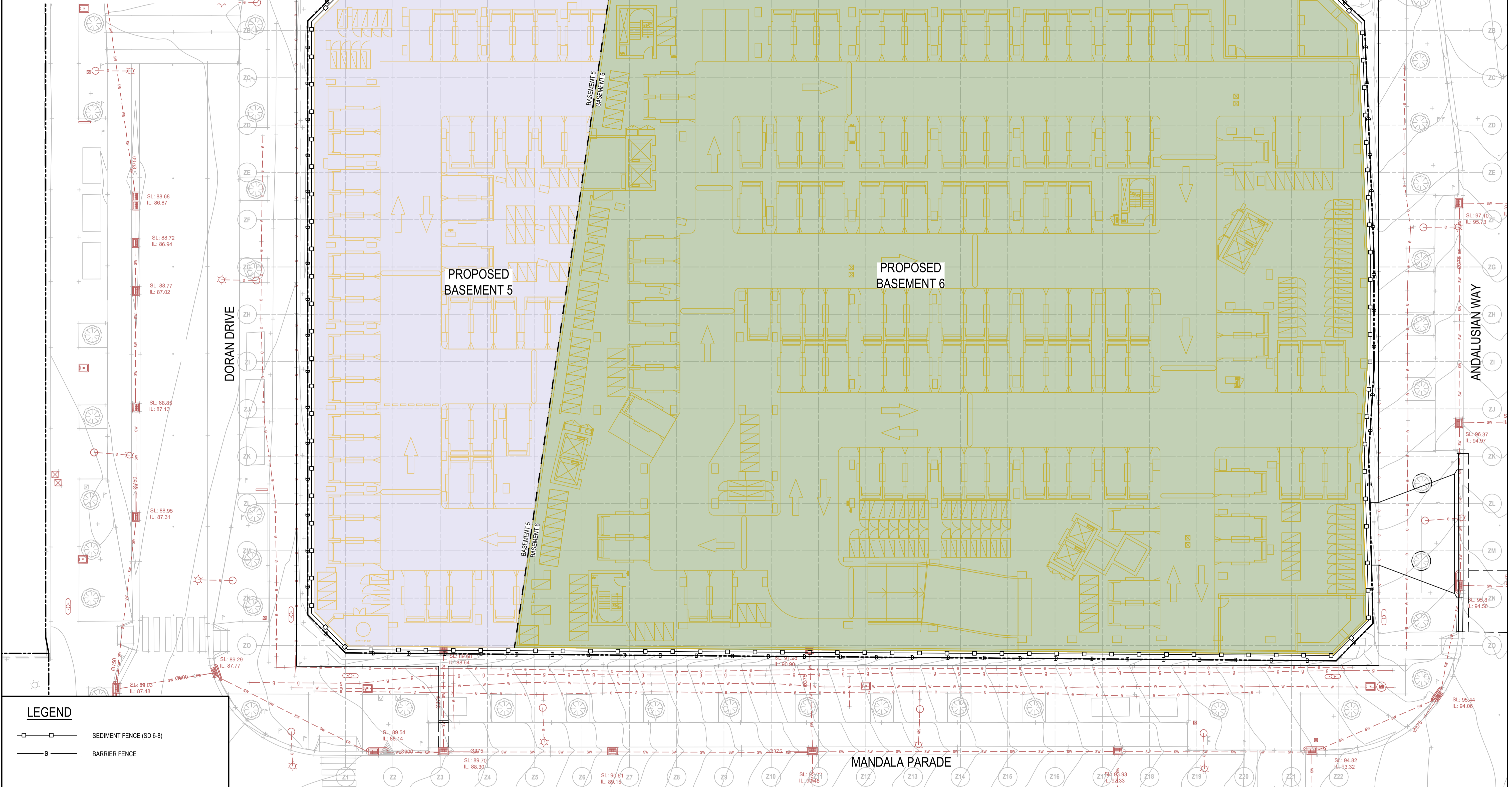
Project	DORAN DRIVE PRECINCT CASTLE HILL
Title	EROSION AND SEDIMENT CONTROL DETAILS

Civil Engineers and Project Managers

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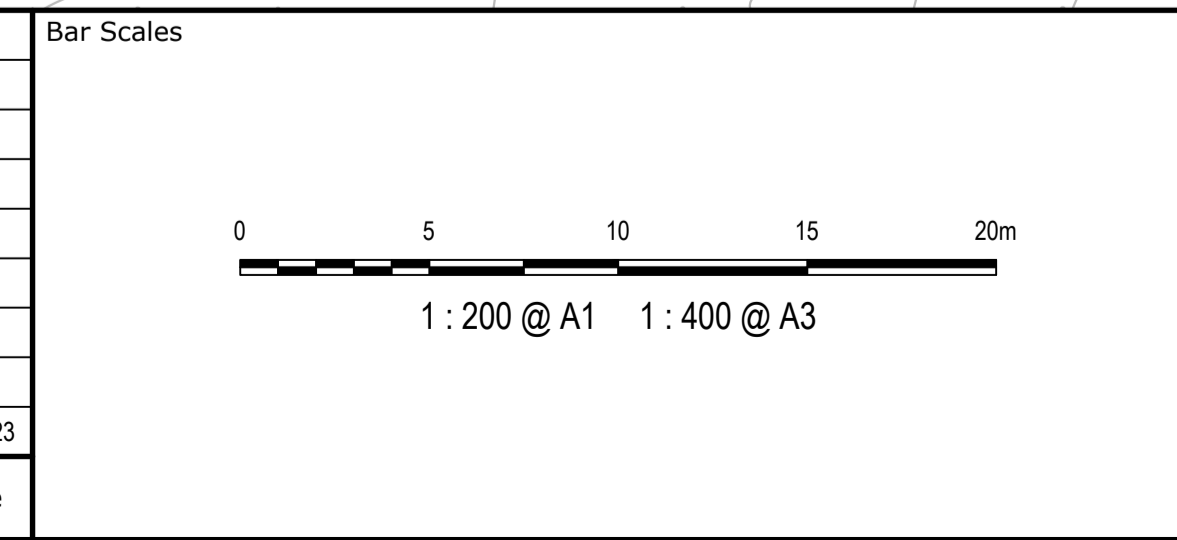
Status	FOR CC APPROVAL NOT TO BE USED FOR CONSTRUCTION	A1
Project - Drawing No.	22-999-C1602	Issue
		A

Regulated Design Record				
Project Address:				
Project Title:				
Consent No:		Body Corporate Reg No:		
Drawing Title:		Drawing No:		
Rev	Date	Description	DP Full Name	Reg No
	dd.mm.yy			



LEGEND	
	SEDIMENT FENCE (SD 6-8)
	BARRIER FENCE

Issue	Description	Date
A	ISSUE FOR CC APPROVAL	09-01-23



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Client

Scales	1 : 200	Drawn	BL	
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		Checked	GJ	
Height Datum	AHD	Approved	AT	
	SSD 15882721			

Project

**DORAN DRIVE PRECINCT
CASTLE HILL**

Title

**EROSION AND
SEDIMENT CONTROL
EXCAVATION
PLAN**

Civil Engineers and Project Managers

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Status	FOR CC APPROVAL NOT TO BE USED FOR CONSTRUCTION	A1
Project - Drawing No.	22-999-C1603	Issue

APPENDIX C

Coates Hire Operations Proposed Water Treatment System

Coates Hire Operations Pty Ltd

Level 6/241 O'Riordan St Mascot NSW 2020

13 15 52 | coates.com.au

ABN 99 074 126 971 | ACN (074 126 971)

Deicorp Construction Pty Ltd

2 Mandala Parade, Castle Hill, NSW - Water Treatment

Project Proposal

Prepare for: Deicorp Construction Pty Ltd
Jacob Wells
0286 654 100
Jwells@deicorp.com.au

Site Location: 2 Mandala Parade Castle Hill, NSW 2037

Prepared by: Mark Somers
0459 844 261
Mark.somers@coates.com.au

Document Number: 2467713-T-W-01

Rev	Date	Comments	Created	Checked
A	1/05/2023	Initial proposal submission	AT	YL

IMPORTANT NOTE:

The supply of any services and products referred to in this document is subject to the attached "Client Agreement – Design and Installation" ("Client Agreement"). A copy is also available by [clicking here](#). If you cannot access the Client Agreement on our webpage, please contact Coates Hire and a member of our team will provide you with a copy of the Client Agreement. Any terms and conditions provided by you in connection with the services or products to be supplied by Coates Hire will be of no legal effect and will not constitute part of the agreement to provide services or products by Coates Hire (even if any representative of Coates Hire signs those terms and conditions or annexes the terms and conditions to any purchase order). By issuing a purchase order, or directing us to proceed, you are deemed to have accepted and agree to be bound by the Client Agreement.

1. Solution Summary

1.1. Objective

The objective is to specify, supply, install, commission, and periodically maintain a Water Treatment System to treat site water. The Treatment System is designed to treat pH and Total Suspended Solids (TSS). The proposed system can also reduce turbidity if the turbidity is caused by TSS. It also has the capability to reduce the levels of Dissolved Heavy Metals (Aluminium, Copper, and Zinc).

If the reduction of these contaminants is not enough to meet the adopted Discharge Water Quality Performance (DWQP) criteria or any other additional contaminants are found in the influent water or if the raw water quality changes from the report provided, additional equipment may be required at an extra cost.

1.2. Supplied information

The following information has been supplied by client via Email to Mark Somers at 11:26am on 27 April 2023:

- Geotechnical Investigation (GI) for 2 Mandala Parade, Castle Hill NSW by EI Australia dated 9 July 2021.
- Dewatering Management Plan (DMP) for 2 Mandala Parade, Castle Hill NSW by EI Australia dated 18 November 2021.
- Geotechnical Opinion Letter for Condition C37 for 2 Mandala Parade, Castle Hill NSW by EI Australia dated 8 December 2022.
- Analytical Results (AR) for 2 Mandala Parade, Castle Hill NSW by SGS Alexandria Environmental dated 1 March 2023.

The “Geotechnical Opinion Letter for Condition C37” provides the total volume to be treated per year during construction and operational phases. “Analytical Results” document and “Dewatering Management Plan” report provide raw water quality analysis as well as the adopted Discharge Water Quality Performance (DWQP) criteria and mentioned below:

- ANZG (2018) 95% Freshwater Trigger Values (and 99% Trigger Values for bio-accumulative parameters)
- ANZECC/ARMCANZ (2000) Australian and New Zealand Guidelines for Fresh and Marine Water Quality

Based on the adopted Discharge Water Quality Performance (DWQP) criteria (Table 1) and water quality analysis (Table 2) presented below, it was found that:

1. pH of raw water is 4.7 and requires correction prior to discharge.
2. Turbidity (5.2NTU) of raw water sample is within the adopted DWQP criteria, thus requires no treatment prior to the discharge. However, if higher turbidity will be found on site, then treatment is required.
3. TSS of raw water is 6mg/L. For TSS, discharge criteria mentioned in Section 3 will be adopted. Client should inform Coates if different discharge criteria will be adopted for TSS.
4. Aluminium, Copper, and Zinc are exceeding the adopted DWQP criteria.

Client:	Deicorp Construction Pty Ltd
Project:	2 Mandala Parade, Castle Hill, NSW - Water Treatment
Site:	2 Mandala Parade Castle Hill, NSW 2037
Document #:	2467713-T-W-01

- All other contaminants including Heavy Metals (As, Cd, Cr, Pb, Ni and Hg), BTEX, PAHs, TRHs, Total Cyanide, Total Phenols, Electrical conductivity, TDS, and Hardness were detected either below the adopted DWQP or limit of reporting.

There are two different values were found for the estimated flow rate.

According to “DMP” report (dated 18 November 2021), estimated flow rate will be 4.32ML/365days or 11,750.4L/day, or 0.136L/s.

The “Geotechnical Opinion Letter for Condition C37” states that groundwater volume per year during construction phase is 1.09ML and groundwater volume during operational phase is 1.63ML. Therefore, according to “Geotechnical Opinion Letter for Condition C37” document (dated 8 December 2022), estimated flow rate will be 2.72ML/365days or 7,452L/day or 0.086L/s .

During drafting of this proposal, the latest estimated flow rate mentioned in “Geotechnical Opinion Letter for Condition C37” document has been considered.

A sample of site water (minimum 120L) will be required to confirm and verify that the treatment system and proposed methodology is suitable to treat for its application. Please note that this proposal is founded on previous site experiences only, the final design can only be confirmed once the raw water is received, bench test is completed and the results of the “simulated” treated water are received. If found that the reduction of these contaminants is not enough to meet the discharge criteria, additional equipment may be required at extra cost.

Analyte	Discharge Water Criterion (µg/L) ¹
Physico-Chemical Parameters	
pH	6.5 to 8.0
Turbidity (NTU)	6-50
Metals	
Aluminium	55
Arsenic ^{III}	24
Arsenic ^V	13
Cadmium	0.2
Chromium ^{VI}	1 ³
Copper	1.4
Lead	3.4
Mercury (inorganic)	0.06 ²
Nickel	11
Zinc	8 ³
Light Petroleum Hydrocarbons	
Surface films (petrochemical sheen)	No visible surface films
Volatile TRH (C ₆ – <C ₁₀)	If TRH is detected analysis for BTEX and PAH is required
Semi-volatile TRH (>C ₁₀ – C ₄₀)	
Monocyclic Aromatic Hydrocarbons (BTEX)	
Benzene	950
Toluene	180 ⁴
Ethylbenzene	80 ⁴
o - xylene	350
p - xylene	200 ⁴
m - xylene	75 ⁴

Client:	Deicorp Construction Pty Ltd
Project:	2 Mandala Parade, Castle Hill, NSW - Water Treatment
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Polycyclic Aromatic Hydrocarbons (PAH)	
Benzo(a)pyrene	0.1
Naphthalene	16
Chlorinated VOCs	
Tetrachloroethene (PCE)	70
Trichloroethene (TCE)	330
Chloroethene (vinyl chloride)	100
cis-1,2-Dichloroethene	
trans-1,2-Dichloroethene	60
1,1-Dichloroethane	700
1,2-Dichlorobenzene	160

Table 1. Adopted Discharge Water Quality Performance (DWQP) criteria from Dewatering Management Plan report.

Sample Identification	Date	Metals											
		Al	As	Cd	Cr ³⁺	Cu	Pb	Ni	Zn	Hg			
DW1	1/03/2023	2200	<1	<0.1	<1	4	<1	1	110	<0.1			
Guidelines													
ANZG (2018) ¹	Fresh Water	55 ⁷	24 (As III) 13 (As V)	0.2	3.3 (CrIII) ⁶ 1.0 (CrVI)	1.4	3.4	11	8	0.06 ⁵			
NHMRC (2011) ²	Recreational Water ^{2a}	200*	100	20		1,000 *	100	200	3,000*	10			
BTEX		PAHs			TRHs				Total Cyanide	Total Phenols			
Benzene	Toluene	Ethylbenzene	m + p-xylene	o-xylene	Benzo(a)pyrene	Naphthalene	Total PAH	F1			F2	F3	F4
<0.5	<0.5	<0.5	<1	<0.5	<0.1	<0.1	<1	<50	<60	<500	<500	<4	<50
950	180	80	275	350	0.1	16	2 ⁴	50 ⁴	60 ⁴	500 ⁴	500 ⁴	7	320
10	25*	3*	20 *	20 *	0.1							800	
Physicochemical Properties													
Sample Identification	Date Sampled	Electrical Conductivity (µS/cm)	Total Dissolved Solids (mg/L)	Total Suspended Solids (mg/L)	pH	Turbidity NTU	Hardness (mg/CaCO ₃ /L)						
DW1	1/03/2023	330	190	6	4.7	5.2	61						
Guidelines													
ANZG (2018) ¹	Fresh Water			40 ⁵	6.5-8.0 ⁴	1-50 ³							
NMHCRC (2011) ^{2,2a}	Recreational Water		1200		6.5-8.5	5	500						

Table 2. Raw Water Quality from Analytical Analysis document.

Client:	Deicorp Construction Pty Ltd
Project:	2 Mandala Parade, Castle Hill, NSW - Water Treatment
Site:	2 Mandala Parade Castle Hill, NSW 2037
Document #:	2467713-T-W-01

1.3. Solution Description

Influent water will enter a sediment tank where heavy suspended solids will settle. The partially clarified water will then be pumped into a chemically enhanced primary treatment unit (CEPT) whereby a pH correction chemical will be added to correct pH, a coagulant and flocculant chemical enhance the settling of solid particles. The water from the CEPT system will overflow into an intermediate holding tank (IBC), where it will be pumped to the media filtration system. The media filtration system utilises a specialised media to reduce the levels of Dissolved Heavy Metals (Aluminium, Copper, and Zinc). The treated water will overflow to the client's nominated discharge location.

The CEPT unit has an automatic desludge valves that will operate every 15-30 minutes, and requires an area to desludge into, such as a pit dug next to the unit. The sludge accumulated in the sediment tank, CEPT unit and filter media from MF unit shall be managed on site by the client, if left in the unit for an extended period the clarification process will be affected.

This treatment system has a typical maximum treatment capacity of up to 0.5L/s. However, the actual treatment flowrate will be dependent on the influent water quality received onsite and may vary. If any other contaminant/s were found and will need treatment, additional treatment methodology and equipment may be required at an extra cost.

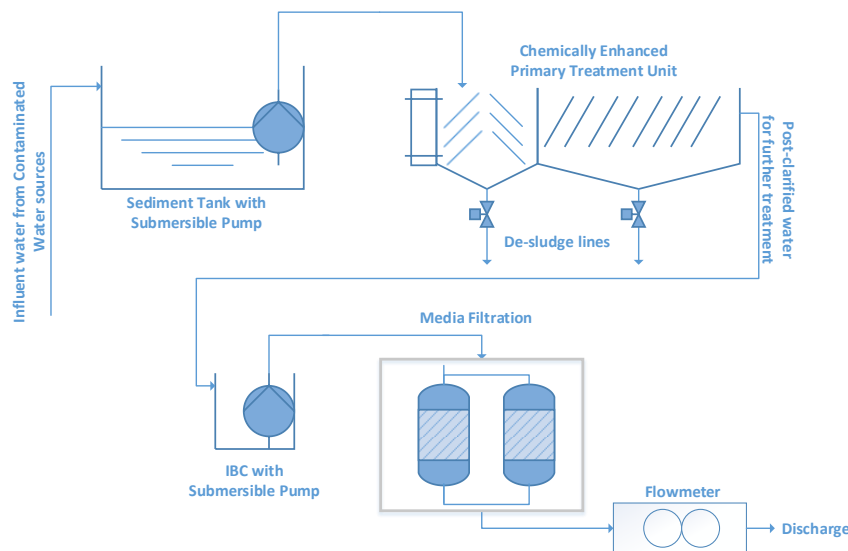


Figure 1. Proposed Water Treatment System

1.4. Site Layout

Please reference the below equipment footprints and suggested site layout when planning. Also note that a minimum of 1m space is required between all units to provide access for personnel, hoses, and pumps.

Footprint			
4m Sediment Tank	L: 4.1m	W: 2.2m	H: 2.0m
CEPT30	L: 3.0m	W: 1.8m	H: 2.5m
MF15	L: 3.2m	W: 2.5m	H: 2.5m
IBC	L: 1.0m	W: 1.0m	H: 1.0m
Flowmeter	L: 0.44m	W: 0.55m	H: 0.75m

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2. Quotation

2.1. Transport, Hire & Operational Costs – Water Treatment

Equipment Description (refer scope of works for further detail)	Weekly Rate ¹	Fixed Charge (per item)
Water Treatment System (Weekly Hire Rate) <ul style="list-style-type: none"> 1 x 4m Sediment Tank 1 x CEPT30 Unit 2 x 75mm Submersible pump 1 x IBC 1 x Media Filtration Unit (MF15) 1 x Flowmeter Unit 	\$ 5,985.00	-
Media fill of the Filtration Unit (MF15) ³	-	\$ 4,950.00
Delivery	-	\$ 1,800.00
Installation/On-Site Commissioning	-	\$ 3,040.00
Site Maintenance Fee ⁴	\$ 950.00	-
On-Site Decommissioning	-	\$ 1,900.00
Collection	-	\$ 1,800.00
Total	\$ 6,935.00	\$ 13,490.00
75 mm Lay Flat Hose (per meter) ⁵	\$ 3.50	-
75 mm Suction Hose (per meter) ⁵	\$ 4.20	-

Note 1: All Rates are Exclusive of GST

Note 2: All Hire Rates are exclusive of following if applicable

Damage Waiver @ 12.5% of Hire rates

Environmental Levy @ 1.3% of hire rates

Note 3: The media filters are required to be filled prior to delivery. The media has a treatment capacity and may exhaust at any time during the project. Should the media exhaust, replacement media will be required at the cost listed above. The client will manage the removal and disposal of the used media.

Note 4: Site Maintenance Fee consists of 5 x Water Treatment Technician visits per week (2 x hours on site, weekdays only) to monitor equipment and refill chemicals (if required). Additional time requested or required to be spent on site will be charged.

Note 5: Actual quantity and cost of hoses will be determined onsite upon commissioning of the system.

Note 6: The client will manage the removal and disposal of the unconsumed chemical in the tanks of the water treatment system prior to collection or when there is modification in the chemical requirement due to change in influent water quality. Coates Hire can handle the disposal of left-over chemicals at \$11.5/ litre, \$110 for the pallet plus transport cost.

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2.2. Consumables

Equipment Description	Unit	Unit Rate (ex GST)
Coagulant Concentrate (15L drum)	Each	\$72.00
Flocculant Concentrate (1L bottle)	Each	\$24.00
Sodium Hydroxide	Litre	\$4.20
Sulphuric Acid	Litre	\$4.00

Note 1: Chemical usage rates are subject to the influent water quality/contamination levels and may vary. Fees to supply treatment chemicals will be charged based on actual usage rate

2.3. Water Sample Analysis

Item Description	Unit	5-7 Day Turnaround Time (ex GST)	2-3 Day Turn Around Time (ex GST)
NATA Accredited Water Sample Analysis	Each	\$ 850.00	\$ 1,050.00

Note 1: Coates Hire can organise NATA Accredited water sample analysis upon request. Price of this analysis includes the testing of pH, Total Suspended Solids, Turbidity, Heavy Metals, BTEX, TRHs and PAHs Contaminants for each sample.

3. Design Notes & Assumptions

The design of the Water Treatment System specified in this proposal is based on information provided by the client. Any variations to the reported site conditions, raw water quality and discharge criteria may affect the scope of works and result in changes to the treatment measures required. The proposed system has been designed to treat the reported influent water to the following objectives:

Contaminant	Unit	Discharge Objectives
pH	-	6.5 - 8.0
Total Suspended Solids	mg/L	50

The proposed system can reduce turbidity if the turbidity is caused by TSS. The system is also designed to reduce the levels of Dissolved Heavy Metals (Aluminium, Copper and Zinc). However, if the reduction of these contaminants is not enough to meet the provided discharge criteria, additional equipment may be required at an extra cost.

The designed system has a typical maximum treatment flowrate of 0.5L/s but the actual treatment flowrate is dependent on the influent water quality received onsite and may vary.

Please note that a sample of site water (minimum 120L) will be required to confirm and verify that the treatment system and methodology proposed is suitable to treat for its application. Please note that this proposal is founded on previous site experiences only, the final design can only be confirmed once the raw water is received, bench test is completed and the results of the “simulated” treated water are received. If any other contaminant/s were found and will need treatment, additional treatment methodology and equipment may be required at an extra cost.

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4. Site Conditions Notes & Assumptions

The client must provide the following on site:

- 4.1 All necessary permits for works obtained prior to Us performing any Site Works
- 4.2 All water discharge is responsibility of license holder
- 4.3 Suitable traffic management, lane closures and permits, to be provided as required
- 4.4 Site access to loading / unloading area by appropriately sized truck/s
- 4.5 Power supply as required to operate water treatment and water management equipment (240V, 415V, 10A & 15A)
- 4.6 Clean water supply and connections as required to make up chemicals (0.25L/s - 0.5L/s)
- 4.7 Local authority approved discharge point for disposal of waters from dewater (written approval Shall be provided by You)
- 4.8 Clear & safe access to be provided to all areas of the site requiring site works
- 4.9 Suitable terrain for excavator / crane / lifting plant to be operated in during site works
- 4.10 Suitable crane / excavator / lifting plant, operator, dogman, lifting plans, lifting chains and all associated materials to be provided as required for all Site Works
- 4.11 Clear level & compact laydown area provided for storage and assembly of components
- 4.12 Suitable level pad area for installation of system (Requirements confirmed prior to supply)
- 4.13 Necessary Approvals & Licences for Operation of System as designed
- 4.14 Underground & overhead surveys performed to locate all existing services and obstructions
- 4.15 Site prepared to allow site works to be performed of in one continuous work period over consecutive days
- 4.16 Survey and set out point provided to us as required to perform site works
- 4.17 Access to site facilities / amenities etc. to be provided
- 4.18 Client to provide a de-sludge pit or bin for sludge removal from the system (Approx. 2m x 2m x 1m). Client will manage the sludge on site.
- 4.19 Parking and lighting on site.
- 4.20 Safe chemical storage and chemical spill kits on site
- 4.21 Sucker truck and forklift for media replacement loading.
- 4.22 Sufficient space and access for Coates to replace the media.

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5. Scope of Works Included

- 5.1. Engineering
 - 5.1.1. Specification of Water Treatment System
- 5.2. Equipment Hire
 - 5.2.1. As specified in Section 2.
- 5.3. Mobilisation of all equipment to site
- 5.4. Site Services
 - 5.4.1. Water treatment installation and commissioning
 - 5.4.2. Provide site inspections per week as specified in Section 2.1(Additional site visits will be charged)
 - 5.4.3. De-commission and dismantle water treatment system
- 5.5. De-mobilise equipment from site

6. Scope of Works Excluded

- 6.1. Engineering
 - 6.1.1. Verification of any data provided to us for Water Treatment Specification purposes
 - 6.1.2. Water quality testing (unless requested to test at NATA laboratory) for discharge purposes
- 6.2. Equipment Hire
 - 6.2.1. Any Dewatering System
 - 6.2.2. Pump(s) for De-watering system
 - 6.2.3. Temporary plumbing network (Suction, Lay flat hose)
 - 6.2.4. Any telemetry system
 - 6.2.5. Power generation for Coates Hire plant / equipment
- 6.3. Site Services
 - 6.3.1. Decontamination of Water treatment plant
 - 6.3.2. Removal, Handling, and classification of any contaminated material on or from site
 - 6.3.3. Disposal and handling of unused chemicals during chemical changeover or at end of project
- 6.4. Other:
 - 6.4.1. Time for Coates Hire personnel to complete any inductions, drug tests, Verification of Competency (VOC), etc. required to work on site
 - 6.4.2. Approved effluent discharge point
 - 6.4.3. Clean water supply and connections (0.25L/s-0.5L/s)
 - 6.4.4. Fuel for generator and pumping equipment
 - 6.4.5. Removal of any waste materials from site (including sludge generated by WT plant). Client to provide suitable sludge pit on site to dump sludge into.
 - 6.4.6. Supply / installation of plumbing from effluent discharge point in WTS to the discharge location
 - 6.4.7. Supply and or Installation of Scaffolding for working at heights (if necessary)
 - 6.4.8. Crane (including operator, dogman, lifting plans, etc.)
 - 6.4.9. Site specific risk assessment
 - 6.4.10. Liquidated damages (LD) and any other indirect costs resulting from site delays

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7 Conditions

7.1 Definitions:

- 7.1.1 **"We/Us/Our/Coates Hire"** means Coates Hire Operations Pty Limited (ACN 074 126 971) of Level 6, 241 O'Riordan Street, Mascot in the state of New South Wales.
- 7.1.2 **"The Client/You/Your"** means the person, firm, organisation, partnership, corporation, trust or other entity hiring Equipment from Us, as named in the Credit Application or the Hire Schedule (where You do not hold a Credit Account). The reference to "You" includes any employees, agents and contractors.
- 7.1.3 **"Shall"** means a term which indicates a provision is a requirement
- 7.1.4 **"Design"** means the design conducted by Coates Hire to determine and specify all components forming The Structure
- 7.1.5 **"Others"** means any person, firm, organisation, partnership, corporation, trust or other entity other than Coates Hire.
- 7.1.6 **"Project"** means 2 Mandala Parade, Castle Hill, NSW - Water Treatment
- 7.1.7 **"Proposal"** means this proposal document inclusive of all drawings and appendices
- 7.1.8 **"Site"** means the project location at 2 Mandala Parade Castle Hill, NSW 2037
- 7.1.9 **"Site Works"** means Installation of temporary works as specified in Temporary Works Proposal Document and associated Design Drawings to be performed by Coates Hire The supply of any services and products referred to in this document is subject to the attached "Client Agreement – Design and Installation" ("Client Agreement"). A copy is also available by [clicking here](#). If you cannot access the Client Agreement on our webpage, please contact Coates Hire and a member of our team will provide you with a copy of the Client Agreement. Any terms and conditions provided by you in connection with the services or products to be supplied by Coates Hire will be of no legal effect and will not constitute part of the agreement to provide services or products by Coates Hire (even if any representative of Coates Hire signs those terms and conditions or annexes the terms and conditions to any purchase order). By issuing a purchase order, or directing us to proceed, you are deemed to have accepted and agree to be bound by the Client Agreement.
- 7.2 This Proposal has been generated based on information supplied by You. It is Your responsibility to ensure that all supplied information is correct and to notify Us if there is any information shown that is found to be incorrect.
- 7.3 All rates detailed in the Quotation exclude GST.
- 7.4 The fees/ rates detailed in the Quotation are valid for a period of 30 days.
- 7.5 Transport costs were valid at the time of developing the Proposal and are based on weekday rates in normal business hours. This cost may be subject to change
- 7.6 Installation Services are based on weekday rates in normal business hours. Additional charges will apply where after hours or weekend services are required.
- 7.7 Equipment supply is subject to availability.
- 7.8 Minimum hire durations are as follows:

Equipment Type	Minimum Hire Duration
Water Management Equipment	12 Week(s)
Ancillary Items & All Other Items	12 Week(s)

- 7.9 Additional costs apply for site inspections, engineering services, variations to scope, cleaning, decontamination and disposal of contaminated waste, etc. Any applicable fee will be discussed with You prior to being applied. The fees are as follows:
- 7.10 The design variation rate structure as follows:

Item Description	Rate (ex. GST)
Installation Labourer	\$65.00
Installation Supervisor/ Field Technician	\$95.00
Site Engineer	\$170.00
Install crew stand-down rate	\$300.00 / hr
Auger drilling	\$25.00 / m drilled + 1off mobilisation fee
Vacuum Truck	Cost + 20%

- 7.10.1 All quoted rates assume work during normal business hours. Work required outside of normal business hours are subject to the following loading factors:

Description	Loading Factor
Saturdays & Nights (5:00PM – 7:00AM)	1.5
Sundays	2.0

Public Holidays	2.5
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- 7.10.2 A minimum site attendance time of 4 hours for Field Technician (inclusive of travel)
- 7.10.3 A minimum site attendance time of 2 hours for site engineering
- 7.10.4 Time requirements are based on application and determined at the discretion of Us
- 7.10.5 These fees & rates do not include flights & accommodation if required
- 7.11 The quotation amount for Site Works includes an allowance for site inductions, testing, & other requirements to enable Us to work on the Site, up to a total duration of 1 hour. Any additional time required on site for such requirements will be subject to an hourly charge.
- 7.12 The Quotation does not include any site remediation works or extra works required to be performed before, during or after installation / removal. Remediation works are the responsibility of You. If dewatering cannot be installed due to any obstruction, restricted or unsafe access, or any other reason identified by Us, this would constitute a requirement for remedial works.
- 7.13 Any delay or intermittency of operations due to restricted access, plant or personnel availability, or any other reason outside of Our control will be subject to an hourly stand-down rate. Refer Additional Rates Schedule for detail.
- 7.14 Data
 - 7.14.1 It is **Your** responsibility to ensure that all records, documentation, information and data ("Data") required to be retained with respect to the services being provided under this Proposal are retained in compliance with:
 - 7.14.1.1. All laws, legislation and regulations; and
 - 7.14.1.2. The requirements for any authority, department of government or agency
 - 7.14.2. You acknowledge that we are not responsible to retain any Data the subject of this Proposal and that such Data may not be available for retrieval once the services, the subject of this Proposal, are complete. You indemnify and release us from all liability with respect to any losses or claims we sustain arising with respect to this condition
- 7.15. We will not be liable for liquidated damages (LD) and any other indirect costs, losses or damages resulting from site delays of any kind.
- 7.16. All works area(s) to be located directly adjacent to the load / un-load area, or suitable materials transport between load / un-load area and the works area(s) to be provided by You.
- 7.17. Due to the variable nature of groundwater & surface water, the system that is proposed may have to be modified to achieve the specific draw down requirements. In the event that the dewatering system installed at site is not sufficient, Coates Hire may be forced to make modifications to the system as necessary to achieve the desired results.
- 7.18. You are to provide access to site facilities / amenities, trade waste, rubbish and spoil disposal facilities as required.
- 7.19. Coates Hire provides no guarantee on ability to install dewatering components to the design depth. If site conditions prevent installation from being completed, the design may need to be changed, or the project abandoned. We will not be liable for any costs or delay resulting from this.
- 7.20. By issuing a PO, accepting this proposal, or instructing us to proceed, you are acknowledging that:
 - 7.20.1. You have read and understand the Proposal in its entirety
 - 7.20.2. You are aware of the requirements for the safe handling, installation, use & de-installation of all equipment detailed in the Proposal
 - 7.20.3. You agree to the rate/ fee structure
 - 7.20.4. Physical preparation of equipment may be commenced immediately

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