

RANDWICK CAMPUS REDEVELOPMENT MANAGEMENT PLAN - STORMWATER AND EROSION

17/12/2020 | Revision No: 2.9



Sub Plan Revision Status				
Date	Revision (in numbers)	Purpose and Summary of Amendments	Reviewed by	Approved by
30/01/17	2	General update including LLB GMR and legislative amendments.		
04/12/2018	2.1	New Project		
21/03/2019]	2.2]	Updated Environmental Management Diagram]		
21/05/2019]	2.3]	Regular three month review]		
[13/09/19]	[2.4]	[Regular three month review, updated EMD and dewatering mgt plan]		
[12/12/19]	[2.5]	[Regular three month review, updated EMD]		
[18/03/20]	[2.6]	[Regular three month review, updated EMD]		
[17/06/20]	[2.7]	[Regular three month review, updated EMD]		
[17/09/20]	[2.8]	[Update for RCC approval]		
[17/12/20]	[2.9]	[General review]		
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1. SCOPE OF PROJECT AND SUB PLAN

Project Details	
Scope of the Sub Plan	<p>This Stormwater, Erosion and Sedimentation Management Sub Plan provides strategies and mitigation measures to manage disturbed areas of the site. It outlines appropriate measures to ensure that activities including excavated soil, stormwater, erosion, and sedimentation are managed appropriately during site establishment and construction of the project. It describes measures to be implemented during relevant construction activities and defines discharge protocols and treatment procedures that enable control of the impacts of the construction activities on potentially affected areas of adjacent water bodies.</p> <p>Refer to Section 1.1 and 3.1 of the Project EHS Management Plan for clarification on how the EHS Sub Plans form part of the Lendlease Building (LLB) EHS management system.</p> <p>Testing and classification to be in accordance with the <i>ANZECC Fresh and Marine water Quality Guidelines 2018</i>. Coates Engineers have been engaged to prepare a water treatment regime with the CEPT unit as outlined below.</p>
Objectives of the Sub Plan	<ul style="list-style-type: none"> ● To avoid erosion, contamination and sedimentation occurring, resulting from construction or demolition activities with a concentration on controls to minimise dust and vehicular mud-tracking. ● To control the quality of stormwater leaving the construction site, so that no unacceptable impact will intrude upon the natural watercourses and/or stormwater drains. ● To minimise disturbance of the surrounding hydrological regime ● To maximise opportunities for stormwater recycling on site. ● To effectively manage the bulk excavation and associated dewatering activities to minimise impact on any adjacent water bodies. ● Erosion and sediment controls are to be effective and properly maintained at all times. ● Water treatment procedures to treat collected /retained stormwater to achieve acceptable water quality criteria. ● To monitor the effects of activities and the effectiveness of mitigation measures
Scope of Works	<p>This Sub Plan has been prepared based on consideration of the following scope of works:</p> <ul style="list-style-type: none"> ● Site establishment including ATF and A Class hoarding installation, office and compound setup;

- Demolition of 92 existing residences and Eurimbla Avenue situated between High Street, Magill Street, Botany Street and Hospital Road and tree chipping and removal
- Infrastructure diversions and/or upgrades including sewer and stormwater diversions,
- Site establishment including vegetation removal, topsoil stripping,
- Excavation of pits for sewer diversion work, trenching and drilling work. Bulk excavation works will work from the North-East corner of basement excavation pushing the soil to the south west corner,
- A contiguous pile wall along grid 14,
- Construction of a 13 level Acute Services Building adjacent to the existing Prince of Wales Hospital in Randwick. This new build will include a new emergency department, helipad, IPU, ICU, MAU, expanded rehab and ambulatory care facilities and operating theatres
- The UNSW eastern expansion (base building only)
- Associated modifications within the IASB
- Lowering of Hospital Road
- Landscaping

Key Issues and Risks

The site is situated within High Street, Magill Street, Hospital Road, and Botany Street. The site is positioned directly west of the Randwick Hospital Campus and east of UNSW.

The soils at the site are noted to be:

- Well-draining

It is not expected that groundwater will be encountered at the depth that excavation is taking

The works required on site will involve significant ground disturbance creating the potential for erosion, sedimentation, runoff and environmental pollution, if appropriate controls are not implemented and maintained. The activities with the greatest potential to impact on the local environment and community from a stormwater, erosion and sedimentation perspective are:

- Site clearing, establishment and operation including storage areas;
- Bulk and detailed excavation and spoil generation;
- Stockpiling;
- The loading and haulage of materials off-site;
- Stormwater and groundwater detention and dewatering; and
- Waste disposal (spoil, sediment and water).

	<p>The impacts of these works may include:</p> <ul style="list-style-type: none"> • Cause of potential flow into stormwater system and/or adjacent surface water bodies from sediment laden water originating from the site. • Pollution of local ecosystems and waterways due to uncontrolled site runoff; • Pollution associated with the discharge of sediment laden or contaminated water during dewatering activities; • Vehicles exiting construction site potentially depositing dust/dirt/mud on public roads after rain periods. • Localised flooding during high intensity storm events. <p>The implementation of the control measures identified in the EHS Plan and Stormwater, Erosion and Sedimentation Management Sub Plan are intended to prevent or mitigate these impacts.</p>
<p>Legislation and Guidelines</p>	<p>Federal/National:</p> <p>The 'Blue Book' (Managing Urban Stormwater Soils and Construction) – Landcom, Fourth Edition (2004)</p> <p>'White Books' - IECA 2008. Best Practice Erosion and Sediment Control. Books 1-6. International Erosion Control Association (Australasia)</p> <p>Australian and New Zealand Guidelines for Fresh and Marine Water Quality 2000</p> <p>Australian Guidelines for Water Quality Monitoring and Reporting 2000</p> <p>State:</p> <p>Project approval: DA208/2018</p> <p>SSD 9113</p> <p>SSD 10339</p> <p>Local:</p> <ul style="list-style-type: none"> • Local Government Act 1993 <p>Lendlease Requirements:</p> <ul style="list-style-type: none"> • GMR: 4.13 Degradation or Pollution of the Environment • Workplace Delivery Code (WDC)

Summary of
Site Controls

Works must be planned and implemented in accordance with the Lendlease GMRs, the Project EHS Plan, this Sub Plan and the Lendlease Building WDC. These documents detail Lendlease's approach and commitment to pro-active and responsible site management.

Site specific controls, monitoring, reporting and performance measurements have been identified in this Sub Plan to prevent or minimise the impacts of construction on the environment and community. These include but are not limited to:

- Preventing erosion through minimal ground disturbance;
- The installation of erosion and sedimentation controls;
- Covering of stockpiles;
- The use of controls to trap sediment close to its source and prevent migration off site;
- The control and maintenance of site access and egress points to prevent tracking and off-site pollution; and
- The identification of acceptable detention, testing, treatment and dewatering processes.

A Stormwater, Erosion and Sedimentation Management Diagram (EMD) will be prepared prior to any site activities commencing including clearing and earthworks.

Construction stage stormwater, erosion and sedimentation requirements must be included in relevant specifications, contract agreements, quality assurance documents, and subcontractor work method statements.

Site inspections, monitoring and reporting will be undertaken by Lendlease and subcontractors as detailed in the EHS Plan and the following implementation table.

2. IMPLEMENTATION OF THE SUB PLAN

Control Measure	Timing	Methodology	Responsibility	Monitoring and Reporting	Performance Measurement
Planning and Site Establishment					
Include information in the Site Induction about the risks and potential impacts of stormwater runoff, erosion and sedimentation on the local environment and community.	Prior to works commencing and ongoing	Revise Lendlease standard induction package to include site specific information. Deliver induction material.	CM SM	WMS prepared by subcontractors to address stormwater, erosion and sedimentation	Site induction delivered to all workers on site.
Prepare a stormwater, erosion and sediment Environmental Management Diagram (EMD) showing the location of stormwater inlets, drains, stockpile locations and erosion and sediment control measures.	At site establishment and prior to works commencing	Review Environmental Management Diagram (EMD Appendix 1). Prepare diagram showing details of stormwater infrastructure and controls. Provide controls for all disturbed areas of the site and around/ within existing stormwater infrastructure.	CM SM	EMD reviewed. Diagram prepared prior to works commencing. Diagram updated every 3 months.	Diagram prepared containing all relevant details and communicated. Diagram updated to reflect changes in site conditions. Controls implemented in accordance with the EMD.
Limit ground disturbance to the area required for immediate construction.	Areas of clearing identified prior to works commencing	Detail excavation requirements on staging/sequencing program. WMS prepared by subcontractor. Identify and fence off trees/vegetation to be retained. Communicate details.	SM/Foreman /EHS	Review of program. Daily surveillance to assess condition of fencing. Weekly/monthly inspection checklist. Inspection after a rain event.	No unnecessary land disturbance. Vegetation protection fencing and signage maintained.

Install stormwater, erosion and sediment controls as per the EMD.	Prior to works commencing	Undertake a site inspection to verify the correct location of controls. Install controls in accordance with EMD, design/engineer's documentation.	SM	Daily surveillance to assess effectiveness and condition. Weekly/monthly inspection checklist.	EMD reviewed every 3 months. Controls modified or new controls installed as required.
Establish stable site exit points, parking areas, internal roads and turning areas to prevent the tracking of material off-site onto public roads.	Prior to works commencing. Maintain at all times	Retain existing hard surfaces where possible. Construct stable site entry/exit points and roadways using appropriate materials. Obtain clearance certificates for any imported (stabilising) material before receiving it on site.	SM Foreman	Daily surveillance and maintenance. Weekly/monthly inspection checklist. Inspection of imported materials.	No tracking onto public roads or dust. Clearance certificates for all imported materials.
Install a shaker facility at the site exit and a high-pressure water wand (Gerni or similar) for rinsing off tyres during inclement weather.	Prior to construction commencing	Assess requirement in IHRA. Maintain shaker grid/wheel rinsing facilities (Gerni) for vehicles leaving site. WMS to be prepared by subcontractor including a maintenance program. Engage sweeper. Limited hosing of hard surfaces only.	SM/Foreman	Daily surveillance. Weekly/monthly inspection checklist.	No mud/silt tracked onto roadways.
Provide sediment basins/detention areas/tanks to capture/store site runoff.	Prior to commencing works	Size and construct sediment basins/detention areas to meet authority requirements (i.e. project approval or Blue Book) as required.	CM/SM	Daily surveillance to assess condition and capacity. Weekly/monthly inspection checklist.	Appropriately designed and maintained detention areas/facilities. No overtopping under design conditions.

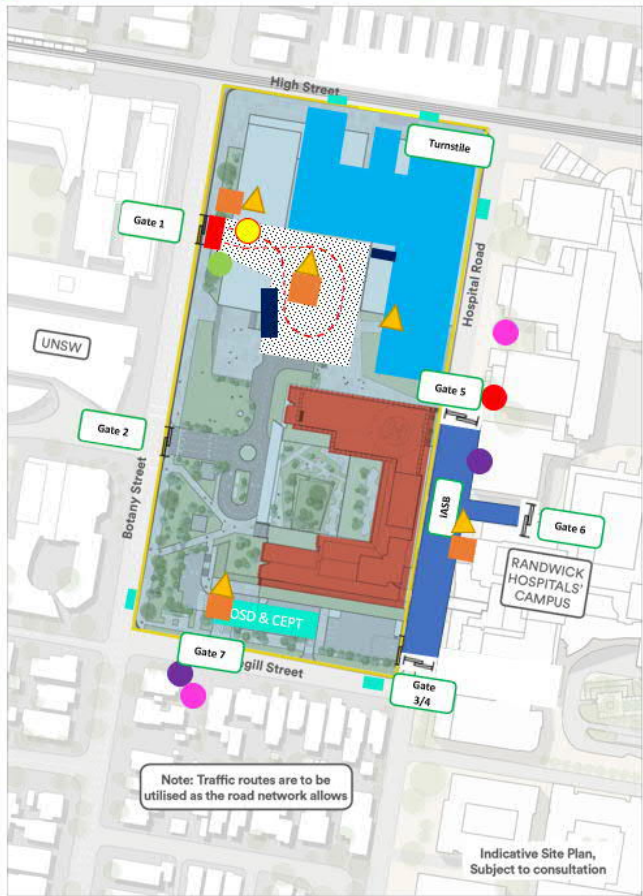
		Operate and maintain in accordance with design/ engineering documentation.		Inspection during and immediately after rain.	
Erosion and Sediment Control During Construction					
Maintain erosion and sediment controls in an operable condition.	At all times and after rain events	Check the condition of controls. Remove accumulated sediment and debris and dispose. Undertake maintenance as required. Install new controls as new work areas open.	SM/Foreman	Daily surveillance. Weekly/monthly inspection checklist. Post rain inspections. EMD updated.	Silt collected at base of fence. No breach of fence line.
Maintain stormwater pipes, pits and other controls (e.g. plugs).	At all times	WMS prepared by subcontractor. Check the condition and operation of stormwater infrastructure and controls. Remove debris and sediment and dispose. Monitor for blockages.	SM/Foreman	Daily surveillance. Weekly/monthly inspection checklist.	Free flowing pipes capable of discharging maximum flows.
Cover all loads leaving site to minimise the potential for spillage and tracking.	At all times	WMS prepared by subcontractor to address covering of loads and prevention of tracking. Loads and the condition of trucks/tailgates checked by subcontractor before leaving site.	SM/Foreman	Daily surveillance. Weekly/monthly inspection checklist	No uncovered loads No non-conformances identified.

Locate stockpiles away from drainage lines, watercourses, sensitive ecosystems and flood prone areas.	At all times	Stockpile locations identified on EMD diagram. WMS prepared by subcontractor addresses stockpile management.	SM/Foreman	Daily surveillance. Weekly inspection checklist.	No uncontrolled stockpiles. No stockpiled material runoff into the stormwater system.
Cover soil stockpiles and provide bunding and sediment controls around the base.	At all times	WMS prepared by subcontractor to address. Subcontractor to implement as part of soil management and monitoring on site.	SM/Foreman	Weekly/monthly inspection checklist.	Pre-construction check. No release of material.
Stabilise stockpiles with a soil binder, sealant or sterile cover crop (grass).	Maximum 1 month after stockpile placement (if the material is remaining on site)	Establish appropriately located and sized stockpiles in designated areas only. Stabilise in accordance with manufactures specifications and application procedures. Stabilise or cover stockpiles left for >4 weeks.	SM/Foreman	Weekly/monthly inspection checklist.	No erosion or dust generated from stockpiles.
Maintain erosion and sediment controls until the potential for erosion and sedimentation has been eliminated.	At all times	Maintain controls in accordance with SESC diagram. Do not remove controls prior to any area being deemed stable.	SM/Foreman /EHS	Weekly/monthly inspection checklist Inspections during rain events.	Controls effective and in good condition. No uncontrolled discharges of sediment off-site or into waterways.

Stormwater Detention and Dewatering					
Inspect basins/tanks, detention facilities and stormwater treatment devices and remove any build-up of debris.	Ongoing. Within 24hrs of a rain event	Retain capacity in detention facilities for storm events. Inspect the site within 24hrs of a 1 in 5-year Average Recurrence Interval (ARI) event including sediment basins/detention areas and stormwater treatment devices. WMS to be prepared by sub-contractor to address inspection, testing and dewatering.	SM	Inspection within 24hrs of nominated rain event. Weekly/monthly inspection checklist.	Detention areas and capacity of facilities maintained in operational condition. No uncontrolled discharges under design conditions.
Test, treat and reuse collected stormwater on-site for dust suppression, truck and plant washing (in designated areas only).	Ongoing	WMS prepared by subcontractor to address this option. Undertake water quality testing and treatment of stormwater. Meet required water quality criteria prior to reuse.	CM	Metering and recording of stormwater reused on site. Water quality test results from a NATA accredited laboratory.	Water treatment and dewatering undertaken in accordance with documented site procedure and Workplace Delivery Code. No discharge to exceed authority criteria. In accordance with Guidelines prior to discharge. RCC consent provided on management plan for ongoing use.
Test, treat and discharge collected stormwater off-site if it cannot be reused on site.	Ongoing	WMS prepared by subcontractor to address this option. Confirm that water quality testing, treatment and dewatering methods satisfy the	SM Sub-contractor	Water quality test results from a NATA accredited laboratory. Dockets for off-site disposal where the water	Water treatment and dewatering undertaken in accordance with documented site procedure and Workplace Delivery Code.

		<p>requirements of the relevant statutory authority.</p> <p>Undertake water quality testing and treatment of stormwater in accordance with Argus recommendations</p> <p>Meet specified water quality criteria prior to discharge.</p> <p>As a minimum:</p> <p>No chemical contamination and water quality must comply with any specific requirements of the Statutory Authority criteria.</p> <p>Water quality must meet the following criteria:</p> <ul style="list-style-type: none"> • pH is between 8.5 and 6.5 • Suspended solids are less than 50 mg/L, <p>To discharge to offsite / stormwater system</p>		is not acceptable for discharge.	No discharge of non-compliant water or off-site pollution.
Site Stabilisation					
Implement site stabilisation works and landscaping progressively to rehabilitate disturbed ground.	Progressively during construction	Stabilise and seal disturbed areas in accordance with the design/engineering/landscape plans and scope of works.	CM/SM/EHS	Weekly/monthly inspection checklist Project planning and design meetings.	Stabilisation of all disturbed work areas. No uncontrolled runoff containing sediment or contaminants.

ENVIRONMENTAL MANAGEMENT DIAGRAM- RANDWICK CAMPUS REDEVELOPMENT PROJECT



EXTENT MAP



KEY ENVIRONMENTAL ISSUES

- Dust both within site and leaving the site perimeter
- Unexpected finds
- Noise to general public
- Water Run Off
- Sediment Run Off

SENSITIVE RECEPTORS

- UNSW
- Randwick Hospital Campus (including Sydney Children's Hospital, Royal Women's Hospital, Prince of Wales Public & Private Hospital)
- Local Residents (High Street & Magill Street)

KEY CONTROL MEASURES

- Soil is to be managed in accordance with the RAP
- Silt barriers consisting of geotextiles with secondary filtering material will be established at one meter offsets from drains
- Geotextile to cover over drains to filter water along with sand bags when required
- Additional dust monitors in place within the Hospital Buildings along Hospital Road
- Sprinklers and water carts to reduce dust Ring main water around inside of hoarding with hose connections to control work zones
- Sprinklers set up over waste bins for dust suppression when emptying smaller bins
- Sealed hard stand area for materials handling
- Coconut logs for sediment control on Hospital Rd works

KEY CONTACTS PERSONS

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LEGEND

Icon	Descriptions
	Perimeter A-Class Hoarding
	Vehicle Entry Gate
	Site Accommodation and Offices
	Spill Kits
	Tyre cleaning run off pond (inclement weather)
	Vibration Monitors
	Acoustic Monitors
	Stormwater inlet
	Delivery vehicle movement
	Shaker grid
	Hazardous Materials and Dangerous Good Storage
	Dust Monitor
	Two coat chip seal hard stand area
	Refuel area for wheeled vehicles
	Waste bins

Appendix A – Dewatering Management Plan & Diagram

Remedial Measures

The RCR site has established sedimentation controls around all surround kerb inlet and any surface drainage pits. This is in accordance with Blue Book recommendations.

The construction of the Onsite Storage Tank has been fast tracked to provide a suitable basin to be used on the site during construction. This 600,000L tank is required as the concrete structure utilizes the majority of the site, not providing any other suitable area for water collection. With this size tank, this provides suitable means for holding water in order to carry out testing prior to discharge during construction activities. Towards the end of the project, and when all hardstand areas are constructed, the tank will be connected to the Council stormwater infrastructure. The tank will be certified for use at this time.

Dewatering Plan

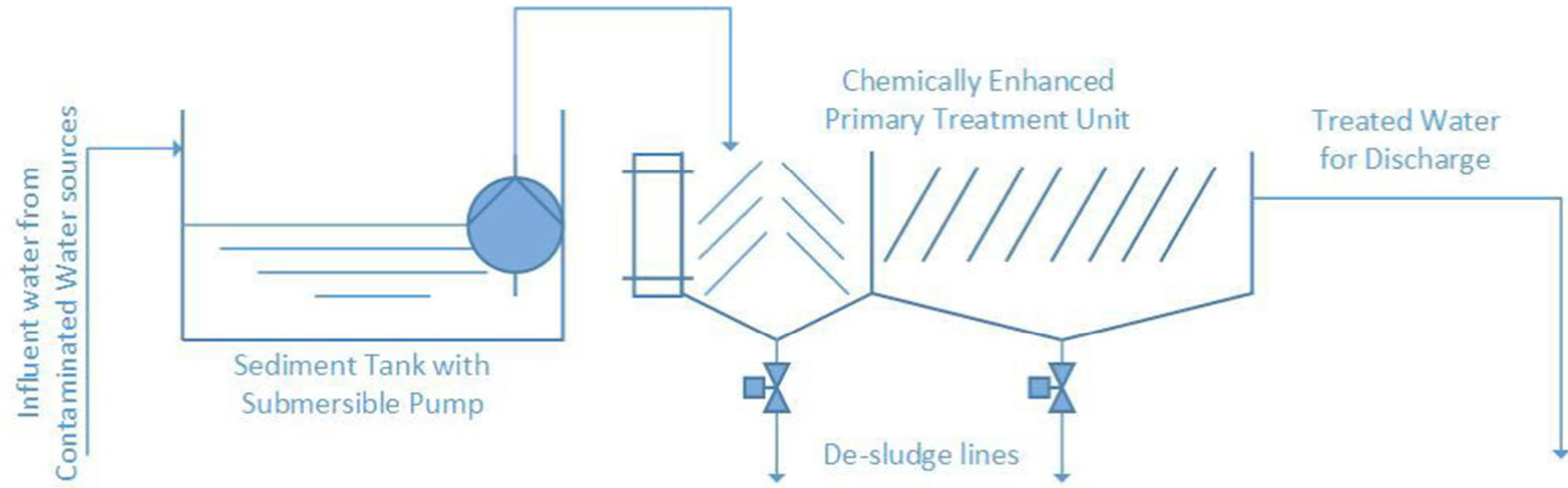
Lendlease has engaged Coates Hire to provide a Chemically enhanced primary treatment (CEPT) unit and associated ancillaries to facilitate site dewatering in accordance with Australian and New Zealand Guidelines for Fresh and Marine Water Quality (2000). The initial testing of water has been undertaken by an environmental consultant, ALS Environmental, to demonstrate water quality. Water testing will be identifying results for Turbidity, Total Suspended Solids, pH, Oil & Grease. The range is identified in the below table:

Contaminant	Unit	Discharge Objectives
pH	pH units	6.5-8.5
Total Suspended Solids	mg/L	50

Initial testing has been undertaken by an accredited laboratory. Refer to the results in Appendix B.

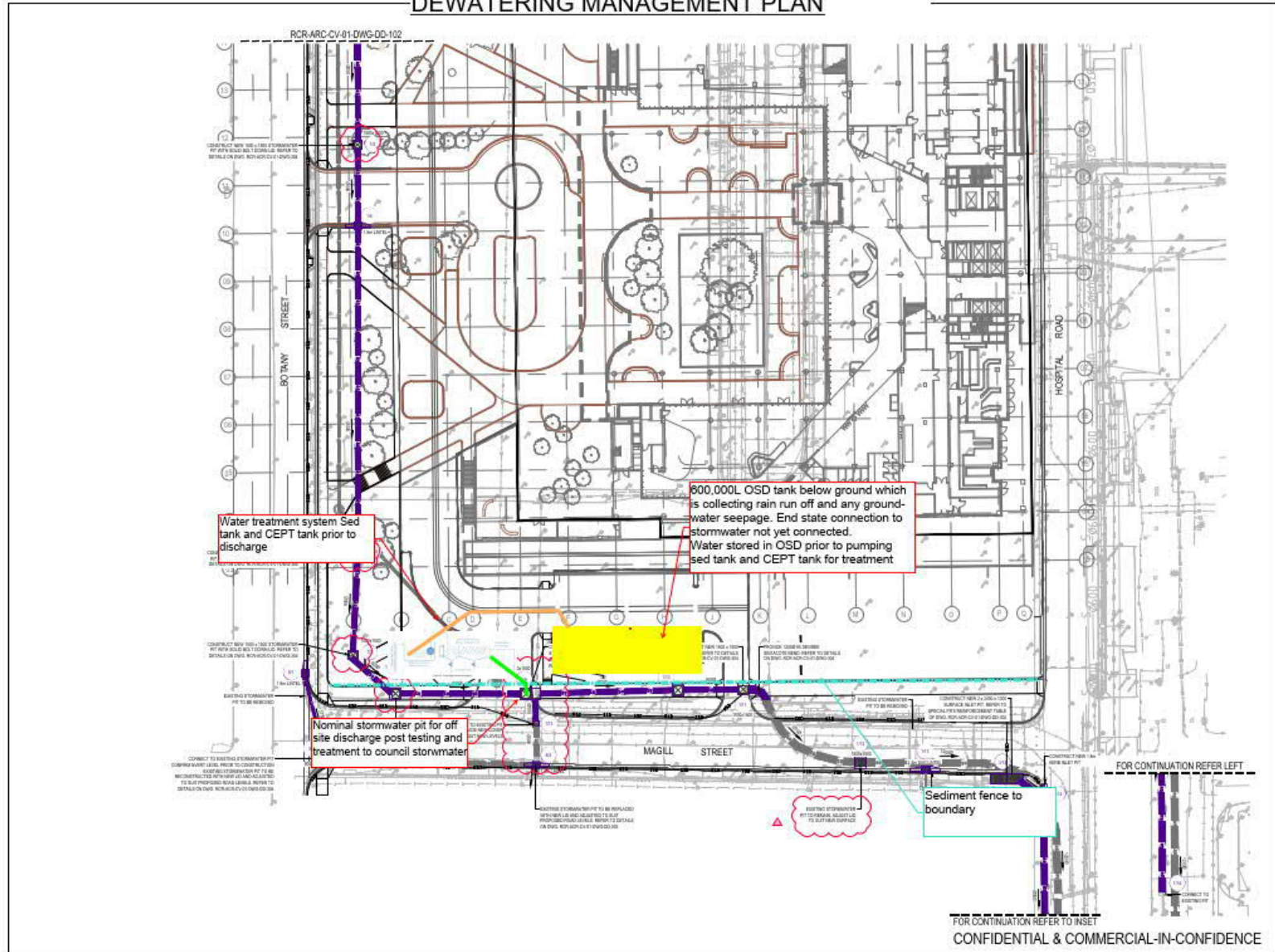
Influent water will be pumped into a sediment tank where heavy solids will settle and flow will be stabilized. Partially clarified water will then be transferred by a submersible pump into a chemically enhanced primary treatment (CEPT) unit, where pH correction, coagulant, and flocculant chemicals will be added to correct the pH and enhance the settling of suspended solids. The treated water will then overflow to a nominated discharge point. The CEPT unit has an automatic gravity operated 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 and CEPT unit shall be managed on site by the client, if left in the unit for an extended period of time the clarification process will be affected. This treatment system has a typical maximum treatment capacity of up to 1.5 L/s. The actual treatment flowrate will be dependent on the influent water quality received onsite and may vary.

The diagram indicates the process for storing and testing of influent water prior to discharging. This is provided by Coates Engineering department.

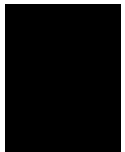


The Site plan below indicates the location on site of the OSD tank and CEPT arrangement proposed, with discharge point to existing stormwater.

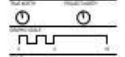
DEWATERING MANAGEMENT PLAN



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FOR REDEVELOPMENT
 ADULT SERVICES BUILDING
 SCHEDULED NSW AUSTRALIA



FOR CONSTRUCTION
 EARLY & ENABLING WORKS
 STORMWATER LAYOUT
 SHEET 1

Discharge Frequency

Frequency of discharge will be dependant on rain events. With the utilisation of a submersible pump in the OSD tank, the transfer of water to the 15,000L Sediment tank and CEPT will occur once the OSD tank is a 50% capacity with the use of a float pump. Weekly inspection of tank will be undertaken to monitor levels and water quality. Post significant rain events inspection will be undertaken to ensure functioning of system. to review levels and prepare for discharge as inspection offt is determined this will be after a significant rain event or be periodic

Storwwater Connection

The location of the stormwater drain to be used for the receiving discharged water has been identified on the Dewatering Mangement Plan diagram. This stormwater drain is located within the site boundary which provides close connection and has no impact on surrounding properties.

Location of Pump

The location of the pump that will transfer the discharged water from the CEPT into Council's stormwater drainage system is identified on the Dewatering Management Plan diagram. This is located adjacent to the OSD tank which is at the southern end of the site boundary. It will be located on an hardstand platform with power and connections.

Hydraulic Engineering

Coates Water Engineering services has designed the size of the CEPT system based on the 600,000L capacity OSD tank. This treatment system has a typical maximum treatment capacity of up to 1.5 L/s. The actual treatment flowrate will be dependent on the influent water quality received onsite at the time of testing. The size of the sedimentation tank connect to the CEPT system is 15,000L.

Monitoring and Implementing

A qualified environmental consultant will undertake weekly checks of the CEPT system and as required take water samples for quality of water prior to testing. In addition to this weekly test, a daily inspection of the OSD tank will be undertaken to review water levels and to ensure the Dewatering equipment is in a safe operating mode.

The Consultant will provide training of our site operatives into the process of water checks for turbidity and PH's levels in the event of a large rainfall.

Appendix B – NATA Test results