COSTIN ROE CONSULTING

CIVIL ENGINEERING REPORT FOR DEVELOPMENT APPLICATION

114-120 OLD PITTWATER ROAD

BROOKVALE

Prepared for:

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Document Verification	
Project	114-120 Old Pittwater Road, Brookvale
Document Title	Civil Engineering Report for Development Application
Project Number	10628.01
Description	Civil Engineering Report for Land Subdivision Development Application
File Name	CO10628.01-03d.rpt

	Name	Title
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Document History		
Date	**Revision**	**Issued to**
23 Sep 2025	A	Mr. Marus Hinzack
9 Oct 2025	B	Mr. Marus Hinzack
17 Oct 2025	C	Mr. Marus Hinzack
4 Nov 2025	D	Mr. Marus Hinzack

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1 INTRODUCTION

1.1 Background

Centennial (the client) proposes to develop Lot 3 DP868761 at 114-120 Old Pittwater Road, Brookvale, NSW, as an industrial subdivision. Costin Roe Consulting has prepared this Civil Engineering Report to support a Development Application submission to the Northern Beaches Council (NBC).

The proposed development is for an industrial subdivision comprising of 3 lots between 0.6 to 0.85ha. Lot C on the west of the subdivision will be built to the earthworks level of the proposed built form and Lots A and B on the east of the subdivision will demolish the buildings currently on site.

1.2 Scope

Centennial has engaged Costin Roe Consulting Pty Ltd (CRC) to prepare this Civil Engineering Report to support the proposed Development Application for development on the site.

This report provides a summary of the design principles and planning objectives for the following civil engineering components of the project:

- Earthworks & Retaining Walls
- Stormwater Management, including stormwater quantity and quality,
- Erosion & Sediment Control,
- Flood planning considerations.

The engineering objectives for the development are to create a site which, based on the proposed architectural layout, responds to the topography and site constraints and to provide an appropriate and economical stormwater management system which incorporates best practice in water sensitive urban design and is consistent with the requirements of council's water quality objectives.

A set of drawings have been prepared to show the proposed finished levels, retaining walls, stormwater drainage and water quality requirements for the development. These drawings are conceptual only and subject to change during detail design.

1.3 Authority Jurisdiction

The consent authority for this development is Northern Beaches Council. The requirements of the Warringah DCP 2011 and Warringah LEP 2011 apply.

2 DEVELOPMENT SITE

2.1 Location

The proposed development is bounded by Old Pittwater Road to the west, industrial developments to the north and south and forested area to the left as shown in **Figure 2.1.** The development site has an area of approximately 2.18Ha.

Figure 2.1 - Locality Plan

2.2 Existing Site

The development site encompasses a total area of 21,770 m^2.

The site is located in Brookvale, NSW, and is bounded by Old Pittwater Road to the east, industrial developments to the north and south, and bushland to the west. The site is currently occupied by a warehouse and office building for a boat dealer.

The property is split by a rock wall face and the western portion of the site is approximately 10m higher than the eastern portion. The highest point on the site is at the back of the western side of the site at approximately RL32.00 and the lowest point of the site is at the southeastern corner of the site at approximately RL16.00. The site generally slopes from the west to the east for both portions of the site at an approximately 3-5% grade.

2.3 Proposed Development

The proposed development is for the subdivision as shown below in **Figure 2.2**, the proposed site plan is shown below in **Figure 2.3** and the demolition and tree removal plan is shown below in **Figure 2.4**. The proposed works are located within the area zoned as General Industrial. The western portion of Lot C, which is zoned as Public Recreation, will remain undeveloped. In accordance with the Arboricultural Impact Assessment Report (**Ref: 251016_120 OPRB_AIA_R1**), existing trees identified for retention will be preserved. The scope of the works has been designed to avoid any impact on these retained trees.

Lot C, on the western side of the subdivision and rock face, will be built to the earthworks pad level of the proposed development. Lots A and B on the eastern side is proposed to demolish the existing building and unlock land from the escarpment on the south of Lot B.

Civil works will include cut to fill earthworks, construction of retaining walls and stormwater drainage. The works included in this application are limited to within the boundaries, other than the driveway cross overs.

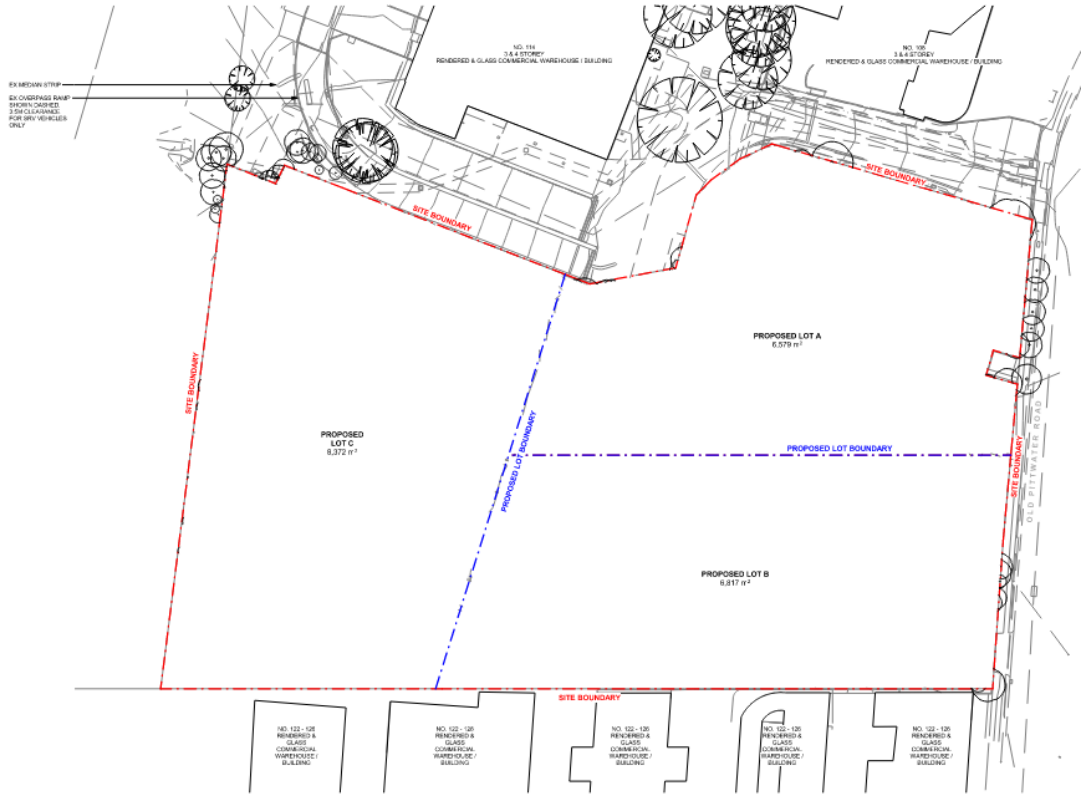

Figure 2.2 – Subdivision Layout (Source: Reid Campbell)

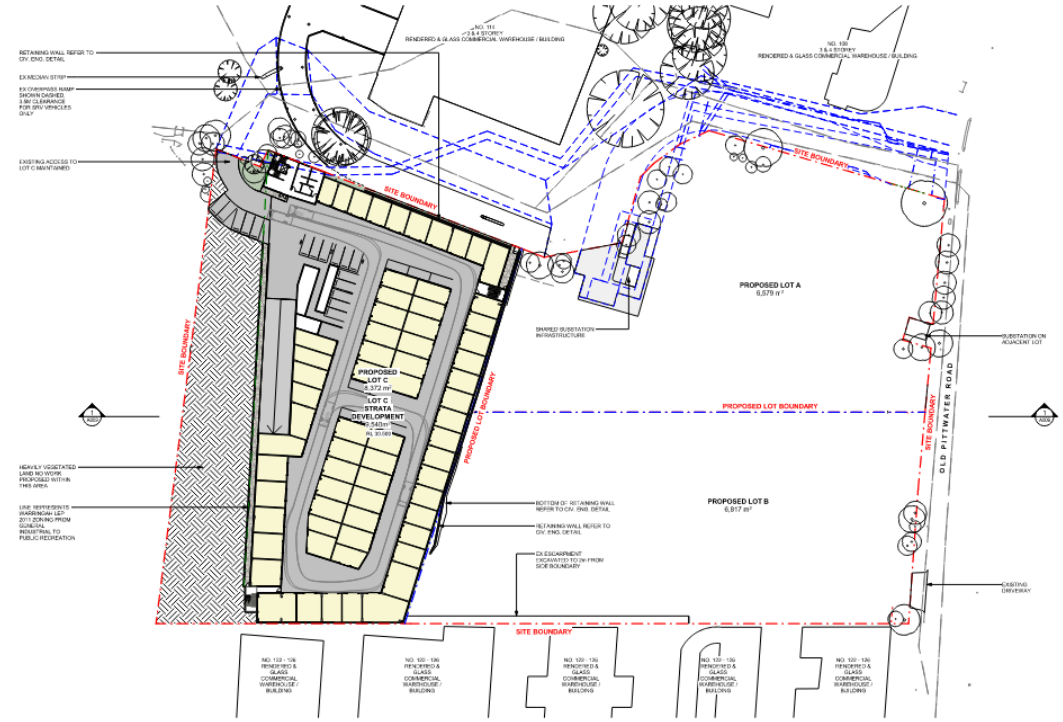

Figure 2.3 – Proposed Site Plan (Source: Reid Campbell)

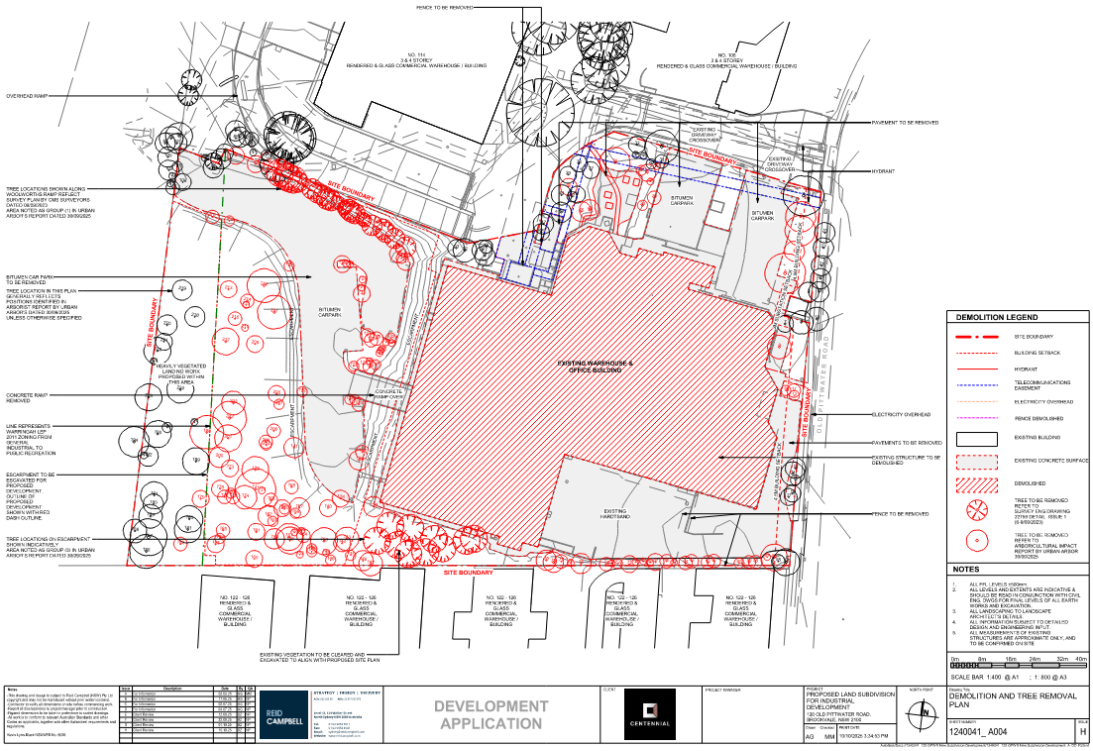

Figure 2.4 – Demolition and Tree Removal Plan (Source: Reid Campbell)

3 SITE WORKS

3.1 Bulk Earthworks & Retaining Walls

During the construction stage of the development, soil Erosion and Sediment Control measures are to be implemented as defined in the erosion and sediment control plan (ESCP) drawings (**Appendix A**) and discussed in **Section 7** of this report.

Bulk earthworks will be required for the development to accommodate a cut to fill balance of earthworks for the development site. The objective for the site will be to provide a flat building pad, facilitate site access and to drain the stormwater system via gravity.

An earthworks and volume estimate assessment has been completed for the development site based on the proposed development layout and an averaged pavement thickness of 300mm throughout the development. Given the preliminary nature of the assessment, an upper and lower bound of earthworks volumes has been included to allow for contingency in cost planning estimates.

The earthworks volume estimates are as follows:

	Apparent Volume	Upper Bound (+15%)	Lower Bound (-15%)
Cut (m^3)	- 24,40	- 28,400	- 32,660
Fill (m^3)	+ 1,318	+ 1,550	+ 1,783
Site Strip (m^3)	- 3,400	- 4,000	- 4,600
Allowance for Basins (m^3)	- 391	- 460	- 529
Balance (m^3)	- 26,614	- 31,310	- 36,007

The existing surface levels and the proposed bulk earthworks levels are as shown on drawing **CO10628.01-DA300.**

The final levels over the site will be subject to detailed earthworks modelling and volume assessments.

Soil Erosion and Sediment Control measures including sedimentation basins will also be provided during the construction works in accordance with the approved drawings and the Soil and Water Management Plan in **Section 7** of this report. Minor changes will be made to suit the current layout and site requirements.

3.2 Embankment Stability

To assist in maintaining embankment stability permanent batter slopes will be no steeper than the limits set by the geotechnical engineer. Temporary batters will be no steeper than 2 horizontals to 1 vertical.

Permanent batters will be adequately vegetated or turfed which will assist in maintaining embankment stability.

Stability of batters and reinstatement of vegetation shall be in accordance with the submitted drawings and the Soil and Water Management Plan in **Section 7** of this report.

3.3 Supervision of Earthworks

All geotechnical testing and inspections to be performed during the earthworks operations will be undertaken to Level 1 geotechnical control in accordance with AS3798-2007.

4 STORMWATER DRAINAGE

4.1 Hydrologic Modelling and Analysis

4.1.1 General Design Principles

The design of the stormwater system for this site will be based on relevant national design guidelines, Australian Standard Codes of Practice, Northern Beaches Council, and accepted engineering practice.

Runoff from buildings will generally be designed in accordance with *AS 3500.3 National Plumbing and Drainage Code Part 3 – Stormwater Drainage*.

Overall site runoff and stormwater management will generally be designed in accordance with the Institution of Engineers, Australia publication "*Australian Rainfall and Runoff*" (1987 Edition), Volumes 1 and 2 (AR&R).

Storm events for the 2 to 100 Year ARI event have been assessed.

4.1.2 Minor/ Major System Design

The piped stormwater drainage (minor) system has been designed to accommodate the 20-year ARI storm event (Q20). Overland flow paths (major) which will convey all stormwater runoff up to and including the Q100 event have also been provided which will limit major property damage and any risk to the public in the event of a piped system failure.

4.1.3 Rainfall Data

Rainfall intensity Frequency Duration (IFD) data used as a basis for DRAINS modelling for the 2 to 100 Year ARI events, was taken from Northern Beaches Council Water Management for Development Policy.

4.1.4 Runoff Models

In accordance with the recommendations and standards of Northern Beaches Council, the calculation of the runoff from storms of the design ARI has been calculated with the catchment modelling software DRAINS.

The design parameters for the DRAINS model are to be based on the recommendations as defined by Council and parameters for the area and are as follows:

Table 4.1 - DRAINS Parameters

Model	Model for Design and analysis run	Rational method	
	Rational Method Procedure	ARR87	
	Soil Type-Normal	2.5	
	Paved (Impervious) Area Depression Storage	1	mm
	Supplementary Area Depression Storage	1	mm
	Grassed (Pervious) Area Depression Storage	5	mm

AMC	Antecedent Moisture Condition (ARI=1-5 years)	2.5	
AMC	Antecedent Moisture Condition (ARI=10-20 years)	3.0	
AMC	Antecedent Moisture Condition (ARI=50-100 years)	3.5	
	Sag Pit Blocking Factor (Minor Systems)	0	
	On Grade Pit Blocking Factor (Minor Systems)	0	
	Sag Pit Blocking Factor (Major Systems)	0.5	
	On Grade Pit Blocking Factor (Major Systems)	0.2	
	Inlet Pit Capacity		

4.2 Hydraulics

4.2.1 General Requirements

Hydraulic calculations will be carried out utilising DRAINS modelling software during the detail design stage to ensure that all surface and subsurface drainage systems perform to or exceed the required standard.

4.2.2 Freeboard

The calculated water surface level in open junctions of the piped stormwater system will not exceed a freeboard level of 150mm below the finished ground/ grate level, for the peak runoff from the Minor System runoff.

The calculated water surface for the peak runoff from the Major System runoff will not exceed a freeboard level of 300mm below the finished floor level of the building.

4.2.3 Public Safety

For all areas subject to pedestrian traffic, the product (dV) of the depth of flow d (in metres) and the velocity of flow V (in metres per second) will be limited to 0.4, for all storms up to the 100-year ARI.

For other areas, the dV product will be limited to 0.6 for stability of vehicular traffic (whether parked or in motion) for all storms up to the 100-year ARI.

4.2.4 Inlet Pit Spacing

The spacing of inlets throughout the site will be such that the depth of flow, for the Major System design storm runoff, will not exceed the top of the kerb (150mm above gutter invert).

4.2.5 Overland Flow

Dedicated flow paths have been designed to convey all storms up to and including the 100-year ARI. These flow paths will convey stormwater from the site to the adjoining road.

4.3 Site Drainage

4.3.1 Existing Site Drainage

The property is a mostly impervious warehouse development with existing drainage on site. There is a 1-metre-wide drainage easement at the north of the site that connects into NBC stormwater drainage and an NBC stormwater pit adjacent to the southeastern boundary of the site.

4.3.2 Proposed Site Drainage

The proposed stormwater system consists of diversion swales that will be capture overland flows over the earthworks and convey it towards a sediment basin for each lot. The sediment basins on each lot will connect into adjacent existing council drainage infrastructure. The site is noted to be affected by an overland flow catchment to the west from Allambie Heights and the bushland to the west of the site. A swale will be installed to the west of lot C to capture this overland flow and will be directed towards a new pit built over and connected to NBC's stormwater drainage system.

Reference to drawing **CO10628.01-DA400** shows the proposed drainage layout. Further discussion on the stormwater management measure is made in Sections 5 & 6 of this report.

5 STORMWATER QUANTITY MANAGEMENT

5.1 Stormwater Detention

Northern Beaches Council requires water quantity management, or stormwater detention, to be provided for all developments in Region 2 – Central Catchments, to control the runoff discharged from private property into the underground piped drainage system to pre-developed flows and mitigate the increased stormwater generated by developments.

Refer to **Figure 4.1** for the extent of which Region 2 – Central Catchments apply.

Map 2 – Northern Beaches Stormwater Regions

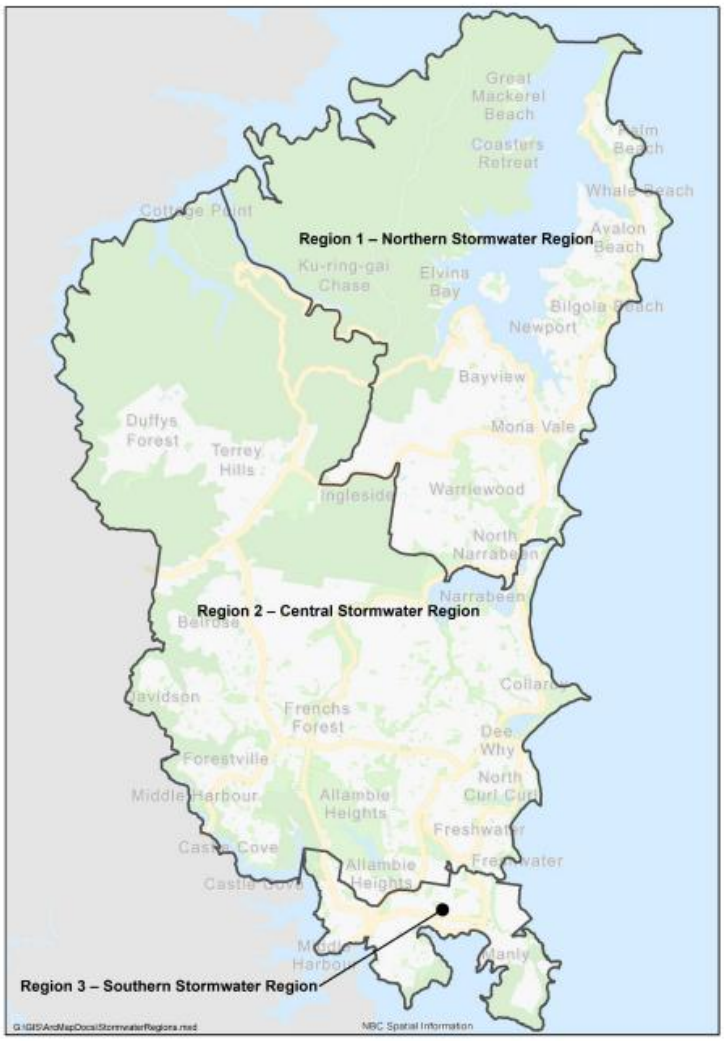

Figure 4.1. Northern Beaches Stormwater Regions

OSD will be undertaken by the lot developers and is therefore outside the scope of this development application. Any necessary assessments or approvals relating to treatment works will be addressed as part of subsequent applications by the respective lot developers.

6 STORMWATER QUALITY CONTROLS

6.1 Regional Parameters

There is a need to provide a design which incorporates the principles of Water Sensitive Urban Design (WSUD) and to target pollutants that are present in the stormwater so as to minimise the adverse impact these pollutants could have on receiving waters and to also meet the requirements specified by the North Beaches Council.

Northern Beaches Council has nominated, in Part 4.2 of their Water Management for Development Policy, the requirements for stormwater quality to be performed on a catchment wide basis. These are presented in terms of annual percentage pollutant reductions on a developed catchment and are as follows:

Gross Pollutants	90%
Total Suspended Solids	85%
Total Phosphorus	65%
Total Nitrogen	45%

Treatment will be undertaken by the lot developers and is therefore outside the scope of this development application. Any necessary assessments or approvals relating to treatment works will be addressed as part of subsequent applications by the respective lot developers.

7 EROSION & SEDIMENT CONTROL PLAN

An erosion and sediment control plan (ESCP) are included in drawings **CO12068.01-DA200**, **DA251** and **DA252**. These plans show the works can proceed without polluting receiving waters. A detailed plan will be prepared after development consent is granted and before works commence.

7.1 General Conditions

1. The ESCP will be read in conjunction with the engineering plans, and any other plans or written instructions that may be issued in relation to development at the subject site.
2. Contractors will ensure that all soil and water management works are undertaken as instructed in this specification and constructed following the guidelines stated in Managing Urban Stormwater, Soils and Construction (1998) and Northern Beaches Council specifications.
3. All subcontractors will be informed of their responsibilities in minimising the potential for soil erosion and pollution to down slope areas.

7.2 Land Disturbance

- Where practicable, the soil erosion hazard on the site will be kept as low as possible and as recommended in **Table 7.1.**

Table 7.1 - Limitations to access

Land Use	Limitation	Comments
Construction areas	Limited to 5 (preferably 2) metres from the edge of any essential construction activity as shown on the engineering plans.	All site workers will clearly recognise these areas that, where appropriate, are identified with barrier fencing (upslope) and sediment fencing (downslope), or similar materials.
Access areas	Limited to a maximum width of 5 metres	The site manager will determine and mark the location of these zones onsite. They can vary in position so as to best conserve existing vegetation and protect downstream areas while being considerate of the needs of efficient works activities. All site workers will clearly recognise these boundaries.
Remaining lands	Entry prohibited except for essential management works	

7.3 Erosion Control Conditions

1. Clearly visible barrier fencing shall be installed as shown on the plan and elsewhere at the discretion of the site superintendent to ensure traffic control and prohibit unnecessary site disturbance. Vehicular access to the site shall be limited to only those essential for construction work and they shall enter the site only through the stabilised access points.
2. Soil materials will be replaced in the same order they are removed from the ground. It is particularly important that all subsoils are buried, and topsoils remain on the surface at the completion of works.
3. Where practicable, schedule the construction program so that the time from starting land disturbance to stabilisation has a duration of less than six months.
4. Notwithstanding this, schedule works so that the duration from the conclusion of land shaping to completion of final stabilisation is less than 20 working days.
5. Land recently established with grass species will be watered regularly until an effective cover has properly established and plants are growing vigorously. Further application of seed might be necessary later in areas of inadequate vegetation establishment.
6. Where practical, foot and vehicular traffic will be kept away from all recently established areas
7. Earth batters shall be constructed in accordance with the Geotechnical Engineers Report or with as law a gradient as practical but not steeper than:
    a. 2H:1V where slope length is less than 7 metres
    b. 2.5H:1V where slope length is between 7 and 10 metres
    c. 3H:1V where slope length is between 10 and 12 metres
    d. 4H:1V where slope length is between 12 and 18 metres
    e. 5H:1V where slope length is between 18 and 27 metres
    f. 6H:1V where slope length is greater than 27 metres
8. All earthworks, including waterways/drains/spillways and their outlets, will be constructed to be stable in at least the design storm event.
9. During windy weather, large, unprotected areas will be kept moist (not wet) by sprinkling with water to keep dust under control. In the event water is not available in sufficient quantities, soil binders and/or dust retardants will be used or the surface will be left in a cloddy state that resists removal by wind.

7.4 Pollution Control Conditions

1. Stockpiles will not be located within 5 metres of hazard areas, including likely areas of high velocity flows such as waterways, paved areas and driveways. Silt/ sediment fences and appropriate stabilisation of stockpiles are to be provided as detailed on the drawings.
2. Sediment fences will:

a. Be installed where shown on the drawings, and elsewhere at the discretion of the site superintendent to contain the coarser sediment fraction (including aggregated fines) as near as possible to their source.

b. Have a catchment area not exceeding 720 square meters, a storage depth (including both settling and settled zones) of at least 0.6 meters, and internal dimensions that provide maximum surface area for settling, and

c. Provide a return of 1-meter upslope at intervals along the fence where catchment area exceeds 720 square meters, to limit discharge reaching each section to 10 litres/second in a maximum 20-year t_c discharge.

3. Sediment removed from any trapping device will be disposed in locations where further erosion and consequent pollution to down slope lands and waterways will not occur.

4. Water will be prevented from directly entering the permanent drainage system unless it is relatively sediment free (i.e. the catchment area has been permanently landscaped and/or likely sediment has been treated in an approved device). Nevertheless, stormwater inlets will be protected.

5. Temporary soil and water management structures will be removed only after the lands they are protecting are stabilised.

7.5 Waste Management Conditions

Acceptable bind will be provided for any concrete and mortar slurries, paints, acid washings, lightweight waste materials and litter. Clearance service will be provided at least weekly.

7.6 Site Inspection and Maintenance

1. A self-auditing program will be established based on a Check Sheet. A site inspection using the Check Sheet will be made by the site manager:

   a. At least weekly.

   b. Immediately before site closure.

   c. Immediately following rainfall events in excess of 5mm in any 24-hour period.

   The self-audit will include:

   a. Recording the condition of every sediment control device

   b. Recording maintenance requirements (if any) for each sediment control device

   c. Recording the volumes of sediment removed from sediment retention systems, where applicable

   d. Recording the site where sediment is disposed

   e. Forwarding a signed duplicate of the completed Check Sheet to the project manager/developer for their information

2. In addition, a suitably qualified person will be required to oversee the installation and maintenance of all soil and water management works on the site. The person shall be required to provide a short monthly written report. The responsible person will ensure that:

a. The plan is being implemented correctly

b. Repairs are undertaken as required

c. Essential modifications are made to the plan if and when necessary

The report shall carry a certificate that works have been carried out in accordance with the plan.

3. Waste bins will be emptied as necessary. Disposal of waste will be in a manner approved by the Site Superintendent.

4. Proper drainage will be maintained. To this end drains (including inlet and outlet works) will be checked to ensure that they are operating as intended, especially that,

   a. No low points exist that can overtop in a large storm event

   b. Areas of erosion are repaired (e.g. lined with a suitable material) and/or velocity of flow is reduced appropriately through construction of small check dams of installing additional diversion upslope.

   c. Blockages are cleared (these might occur because of sediment pollution, sand/soil/spoil being deposited in or too close to them, breached by vehicle wheels, etc.).

5. Sand/soil/spoil materials placed closer than 2 meters from hazard areas will be removed. Such hazard areas include and areas of high velocity water flows (e.g. waterways and gutters), paved areas and driveways.

6. Recently stabilised lands will be checked to ensure that erosion hazard has been effectively reduced. Any repairs will be initiated as appropriate.

7. Excessive vegetation growth will be controlled through mowing or slashing.

8. All sediment detention systems will be kept in good, working condition. In particular, attention will be given to:

   a. Recent works to ensure they have not resulted in diversion of sediment laden water away from them

   b. Degradable products to ensure they are replaced as required, and

   c. Sediment removal, to ensure the design capacity or less remains in the settling zone.

9. Any pollutants removed from sediment basins or litter traps will be disposed of in areas where further pollution to down slope lands and waterways should not occur.

10. Additional erosion and/or sediment control works will be constructed as necessary to ensure the desired protection is given to down slope lands and waterways, i.e. make ongoing changes to the plan where it proves inadequate in practice or is subjected to changes in conditions at the work site or elsewhere in the catchment.

11. Erosion and sediment control measures will be maintained in a functioning condition until all earthwork activities are completed and the site stabilised

12. Litter, debris and sediment will be removed from the gross pollutant traps and trash racks as required.

8 MAINSTREAM FLOODING AND OVERLAND FLOW

8.1 Introduction

The site has been identified as being flood affected by council, and as shown in the Northern Beaches Council Online Mapping and **Figure 8.1** below.

Figure 8.1 – NBC Flood Hazard Map (Source: NBC Online Mapping)

Given the site is identified by Council as being flood affected, a flood study of the site is required. This included an assessment of the pre and post development flood conditions and confirmation of affectation on the development by the flood and on the flood by the development is required. This is required to confirm that the proposed development will have sufficient flood immunity and protection during a flood event, and that the development will not result in affectation of upstream, downstream, and adjacent properties.

We provide our assessments relating to flooding and the proposed development as follows. It is noted that there are some anomalous areas of flood affectation have been shown on the site that are unlikely to be flood affected. These areas and allowances provided are explained in more detail in the following sections.

8.2 Existing Flood Scenario

Figure 8.1 shows the overland flow and flooding risks for pre-development conditions. The site is shown to be a low-risk precinct, which means the site is flood affected during the probably maximum flood (PMF) event. We believe the ponding and overland flow shown on to be anomalous and not representative of actual flooding on the site. For the reasons outlined in **Section 8.3**, we do not consider than any additional allowances for mainstream flooding.

8.3 Differences Between Council Flooding and Actual Flood Affectation

As noted above, we have assessed the area shown to be flood affected in councils' advice and flood extent, and do not believe this area to be affected by mainstream flooding in reality.

The reasons we believe the area in Figure 8.1 is unaffected by mainstream flooding in reality are outlined as follows:

- Council flood results are generated in a regional/broadscale flood study. This study as such:
    - Uses a LIDAR survey which is not representative of the ground profile as confirmed by LTS Surveyors.
    - Pits and pipes for the council systems are included but does not include pits and pipes within individual properties. This would mean that the drainage in the adjacent developments would not be included in the council flood risk model.
    - Employs a "rain on grid" method to produce runoff. Hence when rainfall and flows are conveyed to a surveyed low spot (without property drainage to enable free draining conditions) it will show ponding/flooding. However, this area would be free draining via the private existing drainage systems.

Based on the above reasons, we believe the areas shown in **Figure 8.1** are anomalous due to limited upstream catchments and low opportunity for overland flow from adjoining sites to enter this one. Therefore, the actual mainstream flood risk is low.

The site is subject to an overland flow path from the bushland and residential area of Allambie Heights to the west of the site as shown below in **Figure 8.2.** While the site is not subject to mainstream flooding, the site will experience flash flooding due to the local overland flow path and this will be addressed by our flood impact risk assessment (**Ref: CO10628.01-04.rpt**).

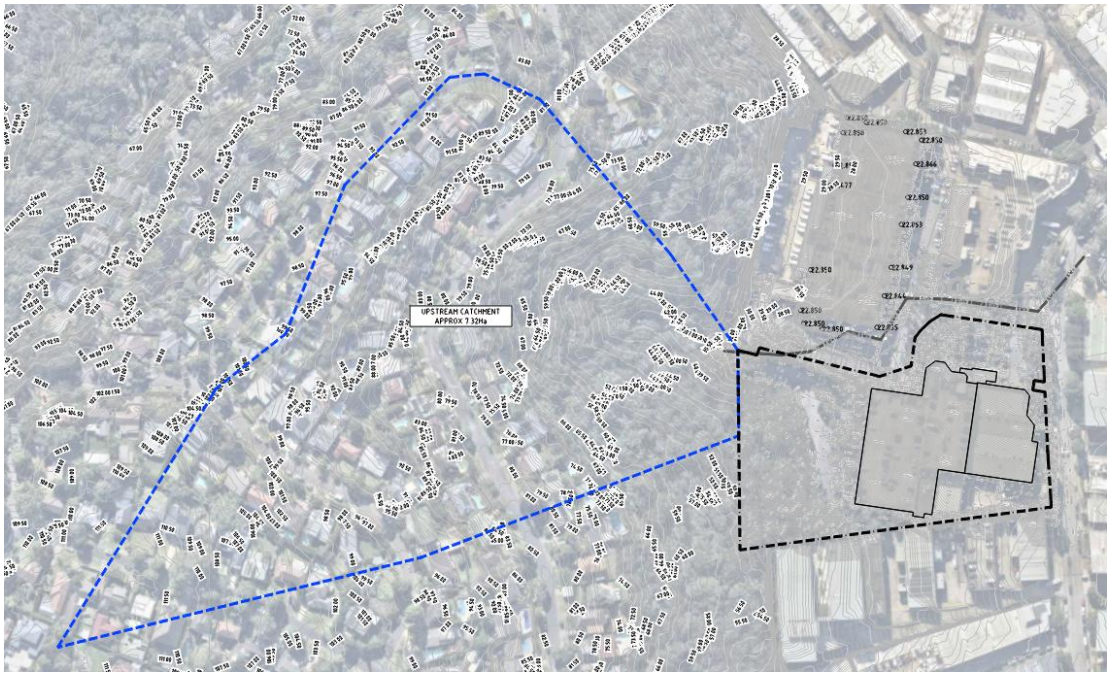

Figure 8.2 – Overland flow flooding catchment flowing towards the site

9 CONCLUSION

This Civil Engineering Details Report has been prepared to support the Development Application for a proposed 3 lot subdivision at 114-120 Old Pittwater Road, Brookvale.

A civil engineering strategy for the site has been developed which provides a best practice solution within the constraints of the existing landform and proposed development layout.

During the construction phase, a Sediment and Erosion Control Plan will be in place to ensure the downstream drainage system and receiving waters are protected from sediment laden runoff.

The stormwater management considers the staging of construction with self-sufficient systems which meet council's objectives for each stage of the development.

10 REFERENCES

- Warringah Council (2011) – Development Control Plan
- Warringah Council (2011) – Local Environmental Plan
- Northern Beaches Council (2025) – Water Management for Development Policy
- WMA Water (2018) – Manly Lagoon Floodplain Risk Management Study and Plan
- Landcom (2004). Managing Urban Stormwater – Soils and Construction – 4th Edition.

11 APPENDICES

APPENDIX A
DRAWINGS BY COSTIN ROE CONSULTING

PROPOSED LAND SUBDIVISION FOR INDUSTRIAL DEVELOPMENT

114-120 OLD PITTWATER ROAD, BROOKVALE, NSW, 2100

CIVIL DRAWINGS FOR DEVELOPMENT APPLICATION

DRAWING LIST:

DRAWING NO.	DRAWING TITLE
C010628.01-DA 100	DRAWING LIST, GENERAL NOTES & LOCALITY PLAN
C010628.01-DA 150	EXISTING SITE FEATURES & SERVICES
C010628.01-DA 200	EROSION & SEDIMENT CONTROL PLAN
C010628.01-DA 251	EROSION & SEDIMENT CONTROL DETAILS - SHEET 1
C010628.01-DA 252	EROSION & SEDIMENT CONTROL DETAILS - SHEET 2
C010628.01-DA 300	BULK EARTHWORKS PLAN
C010628.01-DA 301	CUT/FILL PLAN
C010628.01-DA 351	BULK EARTHWORKS SECTIONS - SHEET 1
C010628.01-DA 352	BULK EARTHWORKS SECTIONS - SHEET 2
C010628.01-DA 400	STORMWATER DRAINAGE PLAN
C010628.01-DA 451	STORMWATER DRAINAGE DETAILS - SHEET 1
C010628.01-DA 600	RETAINING WALL SETOUT PLAN
C010628.01-DA 651	RETAINING WALL DETAILS

GENERAL NOTES:

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

ELECTRONIC INFORMATION NOTES:

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

LOCALITY PLAN
NTS

FOR DEVELOPMENT APPLICATION

AMENDMENTS	DATE	ISSUE
ISSUED FOR DEVELOPMENT APPLICATION	09.10.25	B
ISSUED FOR INFORMATION	23.09.25	A

AMENDMENTS	DATE	ISSUE

ARCHITECT: REID CAMPBELL

CLIENT: CENTENNIAL

PROJECT: PROPOOSED LAND SUBDIVISION FOR INDUSTRIAL DEVELEOPMENT
114-120 OLD PITTWATER ROAD, BROOKVALE, NSW 2100

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
TW	JB	AUG' 2025	XC	B1	AS SHOWN	C010628.01-DA100

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DRAWING TITLE: DRAWING LIST, GENERAL NOTES & LOCALITY PLAN

DRAWING No: C010628.01-DA100

ISSUE: B

EXISTING SERVICES NOTES:

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

SERVICES COORDINATION NOTE:

LOCATION OF EXISTING SERVICES ARE FIGURATIVE ONLY, BASED ON 'DIAL BEFORE YOU DIG' AND SURVEY INFORMATION. THE CONTRACTOR SHALL VERIFY LOCATIONS OF ALL EXISTING SERVICES WITH THE RELEVANT AUTHORITIES BEFORE COMMENCING CONSTRUCTION. ANY COSTS ASSOCIATED WITH THE REPAIR OF DAMAGED EXISTING SERVICES SHALL BE PAID FOR BY THE CONTRACTOR. RELOCATION OF EXISTING SERVICES TO BE PERFORMED BY THE CONTRACTOR IN CONSULTATION AND IN ACCORDANCE WITH RELEVANT SERVICE PROVIDERS REQUIREMENTS AND SPECIFICATIONS.

LEGEND:

LEVELS DATUM IS AHD.

EXISTING SERVICES AND DETAILS BASED ON SURVEY INFORMATION PROVIDED BY LTS SURVEYORS PTY LTD REF#:52517 003DT_A DATED 08.07.25

- COMMUNICATIONS (DETECTED)
- E0 ELECTRICITY (DETECTED)
- GAS (DETECTED)
- Sx SEWER (DETECTED)
- STORMWATER (DETECTED)
- SITE BOUNDARY
- ADJOINING PROPERTY BOUNDARY
- EASEMENT AS NOTED ON LTS SURVEYS DRAWING 52517 003DT_A

EXISTING SITE FEATURES & SERVICES
SCALE 1:500

5m 0 10 20 30 40 50m
SCALE 1:500 AT B1 SIZE SHEET

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CIVIL & STRUCTURAL ENGINEERS

DRAWING TITLE
EXISTING SITE FEATURES & SERVICES

DRAWING No C010628.01-DA150
ISSUE B

SEDIMENTATION BASIN NOTES:

REFER TO SEDIMENT & EROSION CONTROL NOTES.
FOR SEDIMENT AND EROSION CONTROL DETAILS, REFER TO THE LANDCOM 'BLUE BOOK' AND EXTRACTS ON DRAWING DA251.
SEDIMENTATION BASIN SIZING BASED ON RECOMMENDATIONS OF 'SOILS AND CONSTRUCTION, MANAGING URBAN STORMWAER-THE BLUE BOOK'. CAPACITY BASED ON 5-DAY RAINFALL DEPTHS AT 85th PERCENTILE INTENSITY (38.8mm) IN THE SYDNEY CATCHMENT AREA.

SEDIMENT BASINS TO COLLECT RUN-OFF IN EXTREME RAINFALL EVENTS. COLLECTED RUN-OFF TO BE ASSESSED BY A QUALIFIED LABORATORY FOR DOUSING RATES OF ALUM OR GYPSUM TO ENSURE COAGULATION OF SEDIMENTS PRIOR TO WATER BEING DISCHARGED TO COUNCIL STORMWATER SYSTEM

EACH BASIN IS TO HAVE A MARKER PLACED AS PER THE DETAIL TO INDICATE WHEN SEDIMENT IS TO BE REMOVED. REMOVED SEDIMENT IS TO BE CLASSES AND DEWATERED PRIOR TO REMOVAL FROM SITE.

ALLOWANCE TO BE MADE DURING BENCHING OF SITE TO ENSURE RUN-OFF IS DIRECTED TO SEDIMENTATION BASINS.

DUST CONTROL NOTES:

1. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO ENSURE DUST CONTROL MEASURES ARE APPLIED AND MAINTAINED IN ACCORDANCE WITH THE CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN.
2. THE APPLICATION OF LIQUID BASED DUST SUPPRESSION MEASURES MUST BE SUCH THAT SEDIMENT LADEN RUNOFF RESULTING FROM SUCH MEASURES DOES NOT CREATE A TRAFFIC OR ENVIRONMENTAL HAZARD. (EG USING HAY BALES)
3. DUST GENERATION ASSOCIATED WITH WIND EROSION TO BE CONTROLLED USING WATER TRUCKS, DUST SUPPRESSING FOG, MIST GENERATORS, SEALANT PLACED OVER THE SOIL, SURFACE ROUGHENING OR RE-VEGETATION.
4. THE FOLLOWING ACTIVITIES SHALL BE ADOPTED, IF NECESSARY, TO MANAGE DUST CONTROL ON SITE:
   - LIMITING THE AREA OF SOIL DISTURBANCE AT ANY GIVEN TIME
   - REPLACING TOPSOIL AFTER COMPLETION OF EARTHWORKS.
   - PROGRAMMING WORK TO MINIMISE THE LIFE OF STOCKPILES.
   - TEMPORARILY STABILISING LONG-TERM STOCKPILES.
   - GRAVELLING UNSEALED ACCESS AND HAUL ROADS.
   - MINIMISING TRAFFIC MOVEMENT ON EXPOSED SURFACES.
   - LIMITING VEHICULAR TRAFFIC TO 15km/h.
   - RETAINING EXISTING VEGETATION AS WIND BREAKS.
5. OIL, LANDFILL GAS CONDENSATE OR ANY CONTAMINATED LEACHATE OR STORMWATER IS NOT TO BE USED FOR DUST SUPPRESSION.

EROSION CONTROL NOTES:

ALL CONTROL WORK INCLUDING DIVERSION BANKS AND CATCH DRAINS, V-DRAINS AND SILT FENCES SHALL BE COMPLETED DIRECTLY FOLLOWING THE COMPLETION OF THE EARTHWORKS.

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

LEGEND:

PROVIDE 1m RETURNS TO SILT FENCE AT 30m MAX. INTERVALS.
TYPICAL (N.S.O.P.)

- DENOTES DIVERSION DRAIN
- DENOTES SILT FENCE WITH CATCH DRAIN
- DENOTES SILT FENCE ONLY
- DENOTES CONSTRUCTION ENTRY
- DENOTES OVERLAND FLOW PATH
- DENOTES KERB INLET CONTROL
- DENOTES SITE BOUNDARY

SEDIMENT CONTROL BASIN NOTES:

1. TYPE D BASIN IS REQUIRED.
2. VOLUME OF THE BASINS SHALL BE AS NOMINATED ON DRAWING. NOMINAL POND LOCATIONS AND NOMINAL DIMENSIONS.
3. SEDIMENT BUILD UP TO NOT EXCEED 33% TOTAL CAPACITY OF BASIN.
4. DEWATERING OF BASIN TO BE PERFORMED TO THE BOTTOM OF THE SEDIMENT SETTLING ZONE FOLLOWING ACHIEVEMENT OF WQO's. MANAGEMENT OF DOSAGE AND DISCHARGE TO BE ACHIEVED WITHIN 5 DAYS OF THE INITIAL RAINFALL EVENT.
5. FOLLOWING DEWATERING PER NOTE 4, WATER LEVEL TO BE MAINTAINED AT 20% CAPACITY AFTER A FOUR DAY SETTLING PERIOD FOLLOWING A STORM EVENT.
6. WATER TO BE DOSED WITH GYPSUM TO ACCELERATE SETTLEMENT OF SUSPENDED SOLIDS AS REQUIRED.
7. GYPSUM DOSAGE RATE TO BE APPLIED AT APPROX. 32kg PER 100 CUBIC METRE OF COLLECTED RUNOFF.
8. THE USE OF ALUM (OR ANY OTHER ALTERNATIVE) AS A FLOCCULANT IS NOT RECOMMENDED. ALUM OR ANY OTHER FLOCCULANT IS TO BE USED ONLY FOLLOWING CONSULTATION WITH AND ACCEPTANCE FROM COUNCIL ESC OFFICERS.
9. DISCHARGE FROM POND IS PERMISSIBLE WHEN THE WATER PH IS 6.5-8.5 AND IS CLARIFIED TO AT OR BELOW A TSS OF 50mg/L. CLARIFICATION WOULD GENERALLY BE ACHIEVED IN 36-72 HOURS WITH THE USE OF GYPSUM. CORRELATION TESTS MUST BE UNDERTAKEN ON SITE TO ENSURE THIS IS ACHIEVED.
10. DEWATERING SHALL BE DONE IN SUCH A MANNER AS TO REMOVE THE CLEAN WATER (BEING WATER WITHIN THE ADOPTED CRITERIA) WITHOUT REMOVING OR DISTURBING THE SEDIMENT THAT HAS SETTLED. THE PUMP INTAKE PIPE IS NOT TO REST ON THE SETTLED SEDIMENT LAYER.
11. IF WATER EXCEEDS TSS OF 50mg/L DURING DEWATERING, PUMPING IS TO CEASE. RECORDS ARE TO BE KEPT (ON-SITE AT ALL TIMES) OF ALL MEASUREMENT PRIOR TO, DURING AND AFTER DISCHARGE. RECORDS TO BE MADE AVAILABLE TO COUNCIL OFFICERS UPON REQUEST.
12. PROVIDE SECURITY FENCE TO BASIN FOR SAFETY.

CLEAN WATER PUMP OUT TO EXISTING ROAD DRAINAGE.
OVERFLOW SPILLWAY TO STREET.
STABILISED CONSTRUCTION ENTRY
BENCHMARK DRILL HOLE & WING IN KERB RL 33.63 (AHD)
SILT FENCE ONLY
NOMINAL STOCKPILE LOCATION
DIVERSION DRAIN PROVIDE NOMINAL 0.5% FALL ON PAD TO DIVERSION DRAIN TYPICAL.
KERB INLET PIT PROTECTION REFER TO DRG DA251 FOR DETAILS

SEDIMENT BASIN 3:

CATHCMENT AREA	=0.7ha
REQUIRED BASIN VOLUME	=130m³
BASE DIMENSION (LxB)	=4.0m x 7m
TOP DIMENSION (LxB)	=13m x 16m
MAX SIDE SLOPE	=1V:3H
DEPTH	=1.5m
PROVIDED BASIN VOLUME	=156m³

SEDIMENT BASIN 1:

CATHCMENT AREA	=0.7ha
REQUIRED BASIN VOLUME	=130m³
BASE DIMENSION (LxB)	=4.0m x 7m
TOP DIMENSION (LxB)	=13m x 16m
MAX SIDE SLOPE	=1V:3H
DEPTH	=1.5m
PROVIDED BASIN VOLUME	=156m³

SEDIMENT BASIN 2:

CATHCMENT AREA	=0.7ha
REQUIRED BASIN VOLUME	=130m³
BASE DIMENSION (LxB)	=4.0m x 7m
TOP DIMENSION (LxB)	=13m x 16m
MAX SIDE SLOPE	=1V:3H
DEPTH	=1.5m
PROVIDED BASIN VOLUME	=156m³

EROSION & SEDIMENT CONTROL PLAN
SCALE 1:250

2m 0 5 10 15 20 25m
SCALE 1:250 AT B1 SIZE SHEET

FOR DEVELOPMENT APPLICATION

AMENDMENTS	DATE	ISSUE
ISSUED FOR DEVELOPMENT APPLICATION	03.11.25	D
ISSUED FOR DEVELOPMENT APPLICATION	17.10.25	C
ISSUED FOR DEVELOPMENT APPLICATION	09.10.25	B
ISSUED FOR INFORMATION	23.09.25	A

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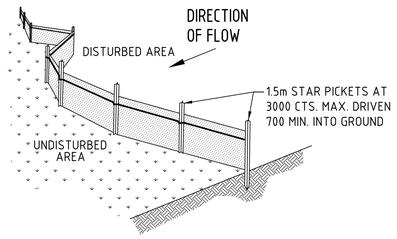
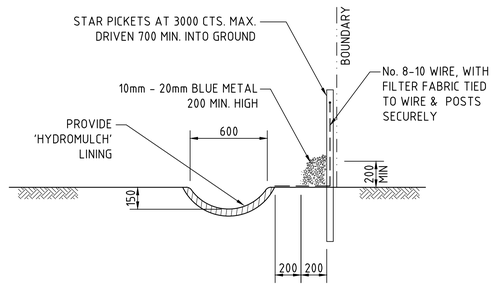
DRAWING TITLE: EROSION & SEDIMENT CONTROL PLAN
DRAWING No: C010628.01-DA200
ISSUE: D



TYPICAL SILT FENCE DETAIL

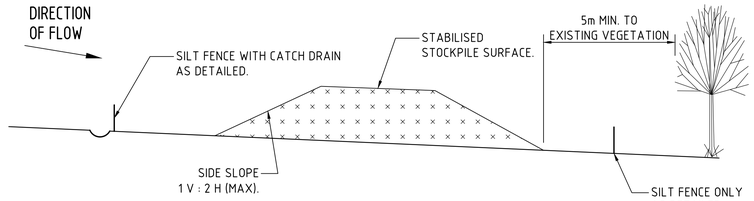
N.T.S

NOTE: PROVIDE 1m RETURNS AT 30m INTERVALS. TYPICAL



TYPICAL OPEN DRAIN & SILT FENCE

SCALE 1:20

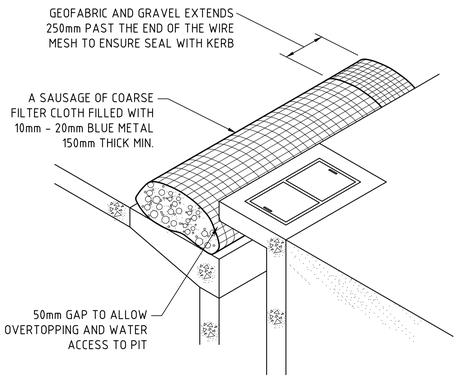


TYPICAL STOCKPILE DETAIL

N.T.S

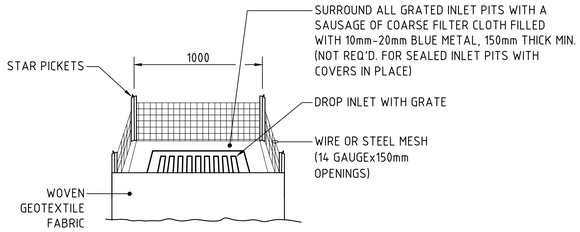
STOCKPILE NOTES

1. PLACE ALL STOCKPILES IN LOCATIONS MORE THAN 5m FROM EXISTING VEGETATION, ROADS & HAZARD AREAS.
2. CONSTRUCT ON THE CONTOUR AS LOW, FLAT ELONGATED MOUNDS. SIDE SLOPE TO BE 1 V: 2 H MAX.
3. WHERE THERE IS SUFFICIENT AREA, TOPSOIL STOCKPILES SHALL BE LESS THAN 2m IN HEIGHT.
4. WHERE STOCKPILES ARE TO BE IN PLACE FOR MORE THAN 10 DAYS, STABILISE USING WOOD CHIP MULCH - 16 TONNE/Ha.
5. CONSTRUCT SILT FENCE WITH CATCH DRAIN ON UPSLOPE SIDE TO DIVERT WATER AROUND STOCKPILES & SILT FENCE ONLY 1 TO 2m DOWNSLOPE AS SHOWN.



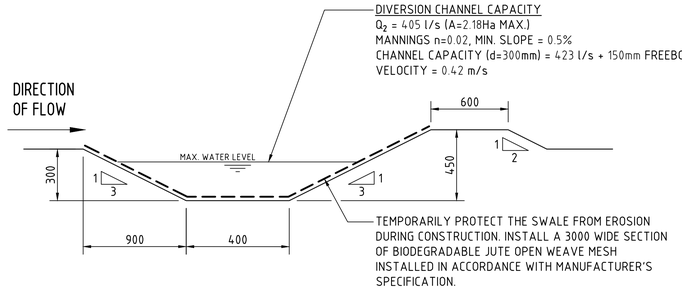
KERB INLET CONTROL

N.T.S



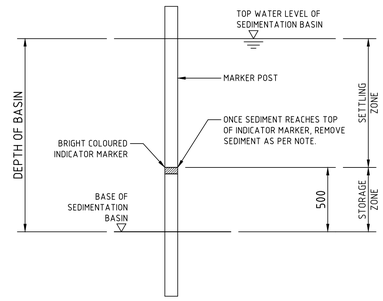
GRATED INLET PIT FILTER DETAIL

N.T.S



DIVERSION DRAIN SECTION

SCALE 1:20

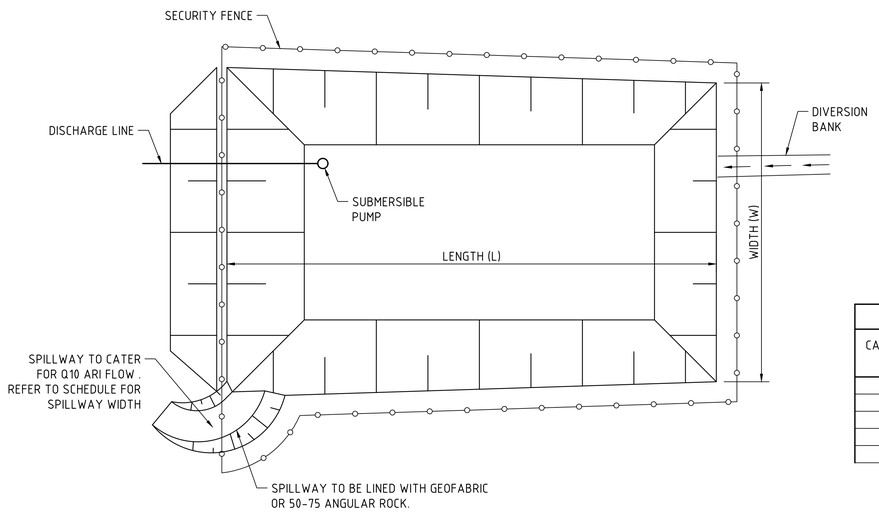


SEDIMENT STORAGE MARKER

SCALE 1:20

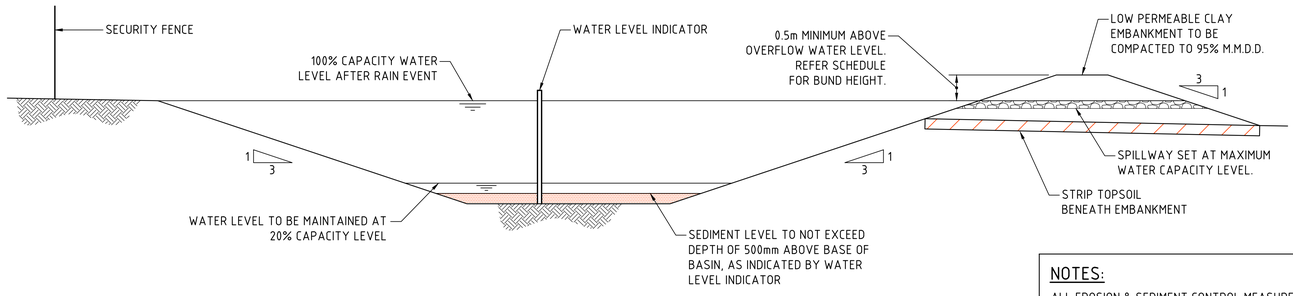
NOTE :

ADOPT ABOVE DETAILS AROUND ALL PITS WITHIN AREA ENCOMPASSED BY SILT FENCE & TO PITS ON THE ROAD ADJACENT TO SITE BOUNDARY.



TYPICAL SEDIMENT CONTROL POND PLAN

SCALE 1:250



TYPICAL SEDIMENT CONTROL BASIN SECTION

SCALE 1:50

SPILLWAY DETAIL & SCHEDULE

CATCHMENT (Ha)	FLOW (m^3/s)	WIDTH (mm)	FLOW DEPTH (mm)	ROCK SIZE (mm)	BUND HEIGHT ABOVE SPILLWAY (mm)
0.20	0.14	1000	200	-	600
0.5	0.2	2000	200	-	600
1	0.3	2000	200	-	700
2	0.6	4000	200	-	700
5	1.4	5000	300	200	800

NOTES:

ALL EROSION & SEDIMENT CONTROL MEASURES TO BE INSPECTED & MAINTAINED DAILY BY SITE MANAGER.

MINIMISE DISTURBED AREAS.

ROADS & FOOTPATHS TO BE SWEPT DAILY.

1.2m TURF TO BE PLACED BEHIND KERBS.

DUST MINIMISATION CONTROL BY WATERING TO BE IMPLEMENTED BY SITE MANAGER AS REQUIRED OR AS DIRECTED BY THE EPA.

2m 0 5 10 15 20 25m
SCALE 1:250 AT B1 SIZE SHEET

500mm 0 1 2 3 4 5m
SCALE 1:50 AT B1 SIZE SHEET

200mm 0 500 1000 1500 2000mm
SCALE 1:20 AT B1 SIZE SHEET

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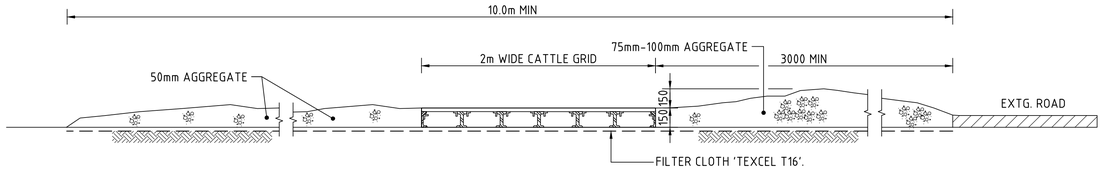
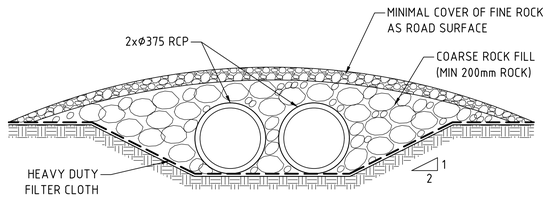
COSTIN ROE CONSULTING
CIVIL & STRUCTURAL ENGINEERS

DRAWING TITLE
EROSION & SEDIMENT CONTROL DETAILS
SHEET 1

DRAWING No C010628.01-DA251 ISSUE B



SECTION 1:20 (1) : STABILISED CONSTRUCTION ENTRANCE 'TRUCK SHAKER'



TYPICAL CROSSING OVER DIVERSION CHANNEL
SCALE 1:20

200mm 0 500 1000 1500 2000mm
SCALE 1:20 AT B1 SIZE SHEET

FOR DEVELOPMENT APPLICATION

AMENDMENTS	DATE	ISSUE
ISSUED FOR DEVELOPMENT APPLICATION	09.10.25	B
ISSUED FOR INFORMATION	23.09.25	A

AMENDMENTS	DATE	ISSUE

ARCHITECT: REID CAMPBELL

CLIENT: CENTENNIAL

PROJECT
PROPOOSED LAND SUBDIVISION FOR INDUSTRIAL DEVELEOPMENT
114-120 OLD PITTWATER ROAD, BROOKVALE, NSW 2100

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
TW	JB	AUG' 2025	XC	B1	AS SHOWN	C010628.01-DA252

CONSULT AUSTRALIA

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CIVIL & STRUCTURAL ENGINEERS

DRAWING TITLE
EROSION & SEDIMENT CONTROL DETAILS SHEET 2

DRAWING No C010628.01-DA252
ISSUE B

EARTHWORK ESTIMATES

SITE AREA	= 2.18 Ha
SITE STRIP	= ~4,000m³
CUT	= ~28,400m³
FILL	= ~1,550m³
ALLOWANCE FOR BASINS	= ~460m³
DIFFERENCE	= ~31,310m³ (i.e. CUT OVER FILL)

NOTE:
VOLUMES BASED ON 200mm SITE STRIP OVER THE NOMINATED AREA.
EARTHWORKS VOLUMES ARE APPROXIMATE ONLY.
NO ALLOWANCE HAS BEEN MADE FOR DELETERIOUS MATERIAL, EROSION AND SEDIMENT CONTROL, BULKING OR COMPACTION OF FILLED SOILS. THE REMOVAL OF UNCONTROLLED OR CONTAMINATED MATERIAL OR ANY OTHER UNSPECIFIED EXCAVATION RELATED TO CONSTRUCTION ACTIVITIES. DETAILED EXCAVATION ALLOWANCE IS APPROXIMATE ONLY AND ACCOUNTS FOR STORMWATER/SERVICES TRENCHING AND FOUNDATIONS. THE DETAILED EXCAVATION VOLUMES ARE TO BE CONFIRMED BY THE CONTRACTOR. REFER ANY CONCERNS TO ENGINEER.

SITE PREPARATION NOTES:

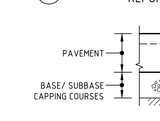
1. ALL EARTHWORKS SHALL BE COMPLETED GENERALLY IN ACCORDANCE WITH THE GUIDELINES SPECIFIED BY THE GEOTECHNICAL REPORT 29340Vrpt PROVIDED BY JK GEOTECHNICS DATED 13.05.2016.
2. EXISTING SERVICES AND DETAILS BASED ON SURVEY INFORMATION PROVIDED BY LTS SURVEYORS PTY LTD REF#: 52517 003DT_ A DATED 08.07.2025
3. STRIP ANY TOP SOIL OR DELETERIOUS MATERIAL AND DISPOSE OF FROM SITE OR STORE AS DIRECTED. TOPSOIL BLENDING IS NOT ACCEPTABLE. ANY BLENDING PROPOSAL IS TO BE REFERRED TO THE ENGINEER.
4. COMPLETE CUT TO FILL EARTHWORKS TO ACHIEVE THE REQUIRED LEVELS AS INDICATED ON THE DRAWINGS WITHIN A TOLERANCE OF +0mm/-10mm THROUGH BUILDING PADS/PAVEMENTS AND +0mm/-20mm ELSEWHERE.
5. PREPARE STEEP BATTERS TO RECEIVE FILL BY CONSTRUCTING BENCHING TO FACILITATE FILL PLACEMENT AND COMPACTION. WHERE EXPOSED ROCK (WEATHERED SHALE OR SANDSTONE) IS ENCOUNTERED AT CUT SUBGRADE LEVEL, THE EARTHWORKS CONTRACTOR IS TO ALLOW TO RIP THE SURFACE TO A NOMINAL 0.3-0.4m DEPTH AND RECOMPACT (PER THE ENGINEERING SPEC) AS REQUIRED.
6. AREAS TO RECEIVE FILL (THAT ARE NOT ON BENCHED BATTERS) AND AREAS IN CUT SHALL BE PROOF ROLLED TO IDENTIFY ANY SOFT HEAVING MATERIAL. SOFT MATERIAL SHALL BE BOXED OUT AND REMOVED PRIOR TO FILL PLACEMENT. PROOF ROLLING TO BE INSPECTED BY A GEOTECHNICAL ENGINEER OR THE EARTHWORKS DESIGNER.
7. SITE WON FILL SHALL BE COMPACTED IN MAXIMUM 300mm LAYERS AND TO DRY OR HILF DENSITY RATIOS (STANDARD COMPACTION) OF BETWEEN 98% AND 103%. THE PLACEMENT MOISTURE VARIATION OR HILF MOISTURE VARIATION SHALL BE CONTROLLED TO BE BETWEEN 2% DRY AND 2% WET.
8. IMPORTED FILL SHALL BE COMPACTED IN MAXIMUM 300mm LAYERS AND TO DRY OR HILF DENSITY RATIOS (STANDARD COMPACTION) OF BETWEEN 98% AND 103% THE PLACEMENT MOISTURE VARIATION OR HILF MOISTURE VARIATION SHALL BE CONTROLLED TO BE BETWEEN 2% DRY AND 2% WET.
9. ALL ENGINEERED FILL PARTICLES SHALL BE ABLE TO BE INCORPORATED WITHIN A SINGLE LAYER. FURTHER, LESS THAN 30% OF PARTICLES SHALL BE RETAINED ON THE 37.5 mm SIEVE. ENGINEERED FILL SHALL BE ABLE TO BE TESTED IN ACCORDANCE WITH THE STANDARD COMPACTION METHOD (AS1289.5.4.1) OR HILF TEST METHOD (AS1289.5.7.1). THESE METHODS REQUIRE LESS THAN 20% RETAINED ON THE 37.5 mm SIEVE. WHERE BETWEEN 20% AND 30% OF PARTICLES ARE RETAINED ON THE 37.5 mm SIEVE THE ABOVE TEST METHODS SHALL STILL BE ADOPTED AND TEST REPORTS ANNOTATED APPROPRIATELY. THESE REQUIREMENTS SHOULD BE MET BY THE MATERIAL AFTER PLACEMENT AND COMPACTION
10. ALL EARTHWORKS SHALL BE COMPLETED UNDER LEVEL 1 CONTROL IN ACCORDANCE WITH AS 3798-2007.
11. PRIOR TO ANY EARTHWORKS, EROSION CONTROL AS OUTLINED IN THE EROSION AND SEDIMENTATION CONTROL PLAN SHALL BE COMPLETED.
12. EXISTING ROCK, IF ANY, SHALL BE REMOVED BY HEAVY ROCK BREAKING OR RIPPING.
13. MATCH EXISTING LEVELS AT BATTER INTERFACE.
14. CONTRACTOR TO MATCH EXISTING LEVELS AT THE INTERFACE OF EARTHWORKS AND EXISTING SURFACE AT BATTER LOCATIONS OR WHERE NO RETAINING WALLS ARE PRESENT. ANY DISCREPANCY BETWEEN DESIGN AND EXISTING LEVELS TO BE REFERRED TO THE ENGINEER FOR DIRECTION OR ADJUSTMENTS TO DESIGN LEVELS.
15. DURING EARTHWORKS THE CONTRACTOR IS TO ENSURE ALL AREAS ARE FREE DRAINING & WILL NOT RETAIN WATER DURING RAINFALL. PROVIDE TEMPORARY MEASURES AS REQUIRED TO ENSURE FREE FLOWING RUNOFF THROUGH MANAGED DRAINAGE PATHS, DIVERSION DRAINS OR OTHER SUITABLE DISPOSAL METHOD AS AGREED DURING THE WORKS. REFER ANY CONCERNS TO THE ENGINEER. REFER TO EROSION AND SEDIMENT CONTROL DRAWINGS AND NOTES.

LEGEND:

LEVELS DATUM IS AHD.

EXISTING SITE LEVELS AND DETAILS BASED ON SURVEY INFORMATION PROVIDED BY LTS SURVEYORS DATED 08.07.2025.

- 50.00 – EXISTING CONTOUR (0.1m INTERVAL)
- 50.00 – B.E.L. CONTOUR (MAJOR 0.5m)
- 50.10 – B.E.L. CONTOUR (MINOR 0.1m)
- 50.00 – B.E.L. SPOT LEVEL
- TREE TO BE RETAINED PER ARBORIST REPORT (REF:250930_1200PRB_AIA)



NOMINATED B.E.L. DETAIL
NTS

SITE BOUNDARY
PROPOSED LOT BOUNDARY
PROPOSED FLAT PAD FOR PROPOSED LOT C BEL RL 30.20
LOT C STRATA DEVELOPMENT 9,540m² RL 30.500
EXTERNAL UPPER FLAT PAD PROPOSED LOT A BEL RL 18.12
UPPER FLAT PAD PROPOSED LOT A BEL RL 20.59
LOWER FLAT PAD PROPOSED LOT A BEL RL 16.05
UPPER FLAT PAD PROPOSED LOT B BEL RL 20.59
LOWER FLAT PAD PROPOSED LOT B BEL RL 16.05
PROPOSED LOT B 6,817 m²
SHARED SUBSTATION INFRASTRUCTURE
EXISTING BUILDING TO BE DEMOLISHED TO FLOOR LEVEL
BOTTOM OF RETAINING WALL REFER TO CIV. ENG. DETAIL
RETAINING WALL REFER TO CIV. ENG. DETAIL
EX ESCARPMENT EXCAVATED TO 2m FROM SIDE BOUNDARY
NO. 122 - 126 RENDERED & GLASS

BULK EARTHWORKS PLAN
SCALE 1:250

2m 0 5 10 15 20 25m
SCALE 1:250 AT B1 SIZE SHEET

FOR DEVELOPMENT APPLICATION

AMENDMENTS	DATE	ISSUE
ISSUED FOR INFORMATION	17.10.25	C
ISSUED FOR INFORMATION	08.10.25	B
ISSUED FOR INFORMATION	23.09.25	A

ARCHITECT: REID CAMPBELL
CLIENT: CENTENNIAL

PROJECT
PROPOSED LAND SUBDIVISION FOR INDUSTRIAL DEVELEOPMENT
114-120 OLD PITTWATER ROAD, BROOKVALE, NSW 2100

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
TW	JB	AUG' 2025	XC	B1	AS SHOWN	C010628.01-DA300

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DRAWING TITLE: BULK EARTHWORKS PLAN
DRAWING No: C010628.01-DA300
ISSUE: C

DEPTH RANGE			
No.	FROM DEPTH	TO DEPTH	COLOUR
1	-15.102	-3.000	
2	-3.000	-1.500	
3	-1.500	-0.500	
4	-0.500	0.000	
5	0.000	0.500	
6	0.500	1.000	
7	1.000	1.500	
8	1.500	5.700	

CUT

FILL

PROPOSED
FLAT PAD FOR PROPOSED LOT C
BEL RL 30.20

LOT C
STRATA
DEVELOPMENT
9,540m²
RL 30.500

EXTERNAL UPPER FLAT PAD
PROPOSED LOT A
BEL RL 18.12

SHARED SUBSTATION
INFRASTRUCTURE

UPPER FLAT PAD
PROPOSED LOT A
BEL RL 20.59

LOWER FLAT PAD
PROPOSED LOT A
BEL RL 16.05

UPPER FLAT PAD
PROPOSED LOT B
BEL RL 20.59

LOWER FLAT PAD
PROPOSED LOT B
BEL RL 16.05

PROPOSED LOT BOUNDARY

PROPOSED LOT B
6,817 m²

BOTTOM OF RETAINING WALL
REFER TO CIV. ENG. DETAIL

RETAINING WALL REFER TO
CIV. ENG. DETAIL

EX ESCARPMENT
EXCAVATED TO 2m FROM
SIDE BOUNDARY

SITE BOUNDARY

OLD PITTWATER ROAD

NO. 122 - 126
RENDERED &
GLASS

CUT/FILL PLAN
SCALE 1:250

2m 0 5 10 15 20 25m
SCALE 1:250 AT B1 SIZE SHEET

FOR DEVELOPMENT APPLICATION

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CLIENT: CENTENNIAL

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PROPOSED LAND SUBDIVISION
FOR INDUSTRIAL DEVELEOPMENT
114-120 OLD PITTWATER ROAD, BROOKVALE, NSW 2100

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
TW	JB	AUG' 2025	XC	B1	AS SHOWN	C010628.01-DA301

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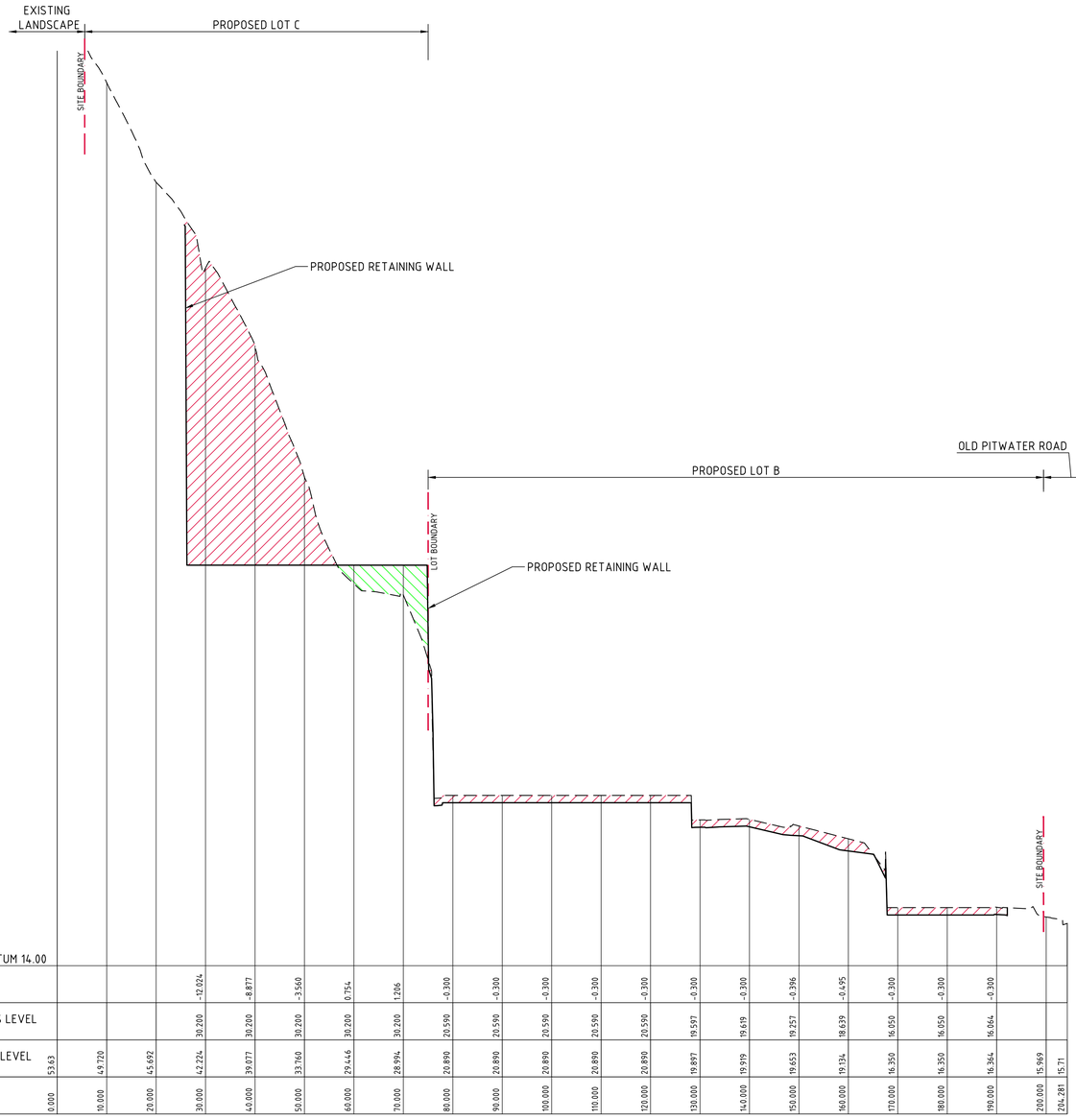
DRAWING TITLE
CUT/FILL PLAN

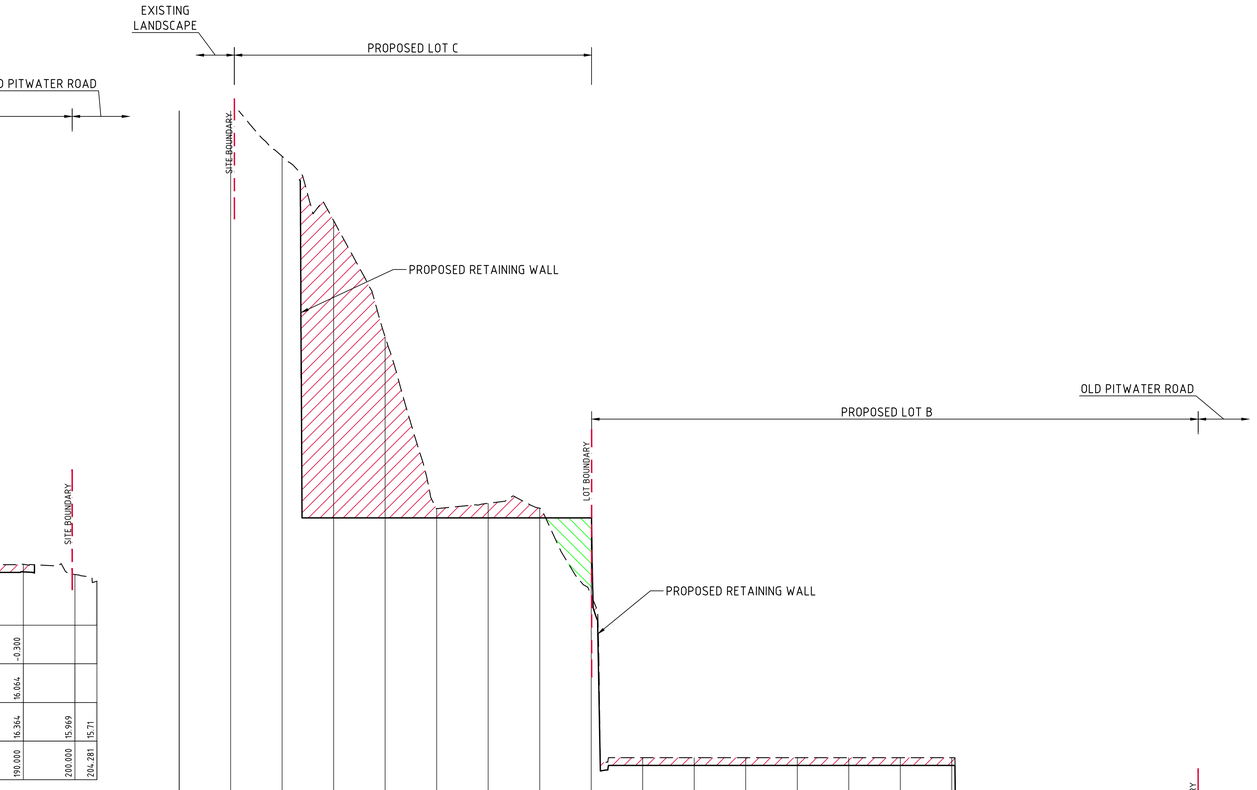
DRAWING No: C010628.01-DA301

ISSUE: C



DATUM 14.00																								
CUT/FILL DEPTH				-12.024	-8.877	-3.560	0.754	1.206	-0.300	-0.300	-0.300	-0.300	-0.300	-0.300	-0.300	-0.396	-0.495	-0.300	-0.300	-0.300				
BULK EARTHWORKS LEVEL				30.200	30.200	30.200	30.200	30.200	20.590	20.590	20.590	20.590	20.590	20.590	19.597	19.619	19.257	18.639	16.050	16.050	16.064			
EXISTING SURFACE LEVEL	53.63	49.720	45.692	42.224	39.077	33.760	29.446	28.994	20.890	20.890	20.890	20.890	20.890	20.890	19.897	19.919	19.653	19.134	16.350	16.350	16.364	15.969	15.71	
CHAINAGE	0.000	10.000	20.000	30.000	40.000	50.000	60.000	70.000	80.000	90.000	100.000	110.000	120.000	130.000	140.000	150.000	160.000	170.000	180.000	190.000	200.000	204.281		

SECTION 1
HORIZONTAL SCALE 1:100
VERTICAL SCALE 1:20



DATUM 14.00																								
CUT/FILL DEPTH				-11.539	-7.019	-0.358	-0.566	-0.375	3.013	-0.300	-0.300	-0.300	-0.300	-0.300	-0.300	-0.300	-0.300	-0.300	-0.300	-0.300	-0.301			
BULK EARTHWORKS LEVEL				30.200	30.200	30.200	30.200	30.200	30.200	20.590	20.590	20.590	20.590	20.590	20.590	20.590	20.590	16.050	16.050	16.050	16.154			
EXISTING SURFACE LEVEL	48.88	46.384	44.237	41.739	37.219	30.558	30.766	30.575	27.187	20.890	20.890	20.890	20.890	20.890	20.890	20.890	20.890	16.350	16.350	16.350	16.455	16.203	15.98	
CHAINAGE	0.000	10.000	20.000	30.000	40.000	50.000	60.000	70.000	80.000	90.000	100.000	110.000	120.000	130.000	140.000	150.000	160.000	170.000	180.000	190.000	200.000	202.851		

SECTION 2
HORIZONTAL SCALE 1:100
VERTICAL SCALE 1:20

LEGEND:

- DENOTES BULK EARTHWORKS PROFILE
- DENOTES EXISTING PROFILE
- DENOTES AREA IN CUT
- DENOTES AREA IN FILL

1m 0 1 2 3 4 5 6 7 8 9 10m
SCALE 1:100 AT B1 SIZE SHEET

5m 0 10 20 30 40 50m
SCALE 1:500 AT B1 SIZE SHEET

FOR DEVELOPMENT APPLICATION

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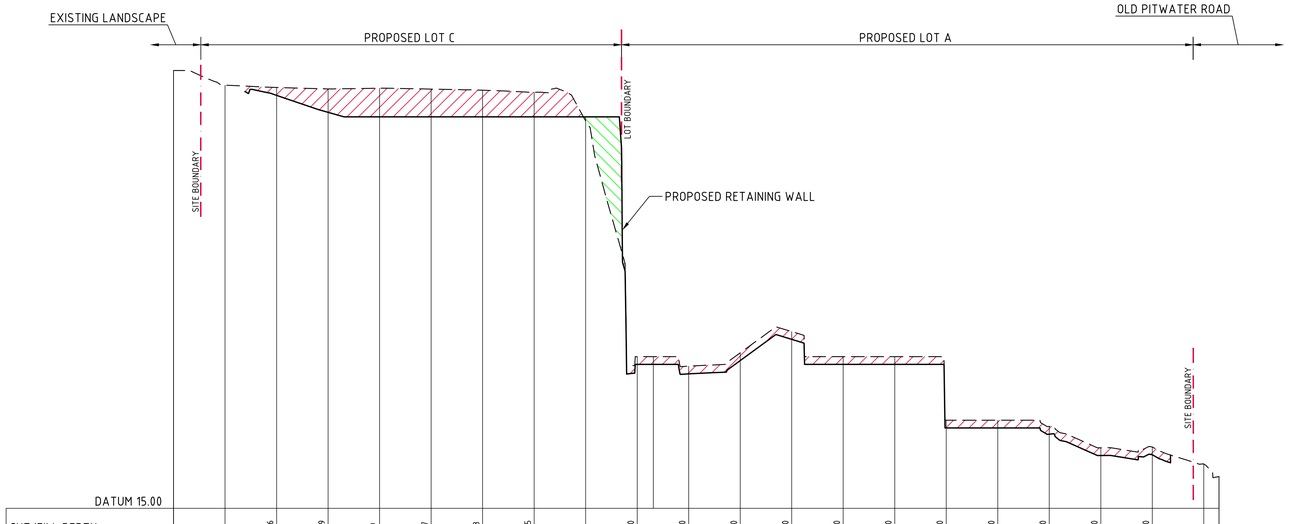
COSTIN ROE CONSULTING
CIVIL & STRUCTURAL ENGINEERS

DRAWING TITLE
BULK EARTHWORKS SECTIONS - SHEET 1

DRAWING No C010628.01-DA351 ISSUE B

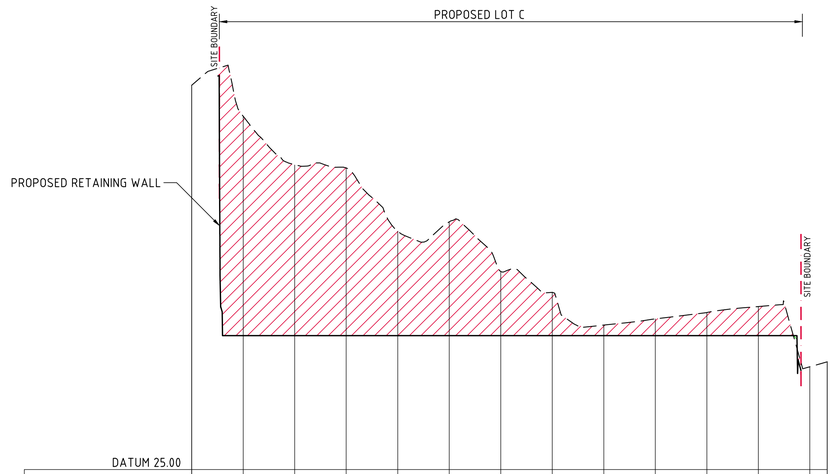


DATUM 15.00

CUT/FILL DEPTH			-0.306	-0.909	-1.109	-1.077	-1.033	-0.955	0.156	-0.300	-0.300	-0.300	-0.300	-0.300	-0.300	-0.300	-0.300	-0.300	-0.300	-0.300					
BULK EARTHWORKS LEVEL			31.033	30.373	30.200	30.200	30.200	30.200	30.200	20.590	20.221	20.737	21.563	20.590	20.590	18.120	18.120	17.880	17.052	17.083					
EXISTING SURFACE LEVEL	32.00	31.428	31.339	31.282	31.309	31.277	31.233	31.155	30.044	20.890	20.521	21.037	21.863	20.890	20.890	18.420	18.420	18.180	17.352	17.383	16.724	16.23			
CHAINAGE	0.000	10.000	20.000	30.000	40.000	50.000	60.000	70.000	80.000	90.000	100.000	110.000	120.000	130.000	140.000	150.000	160.000	170.000	180.000	190.000	200.000	202.963			

SECTION 3

HORIZONTAL SCALE 1:100
VERTICAL SCALE 1:20

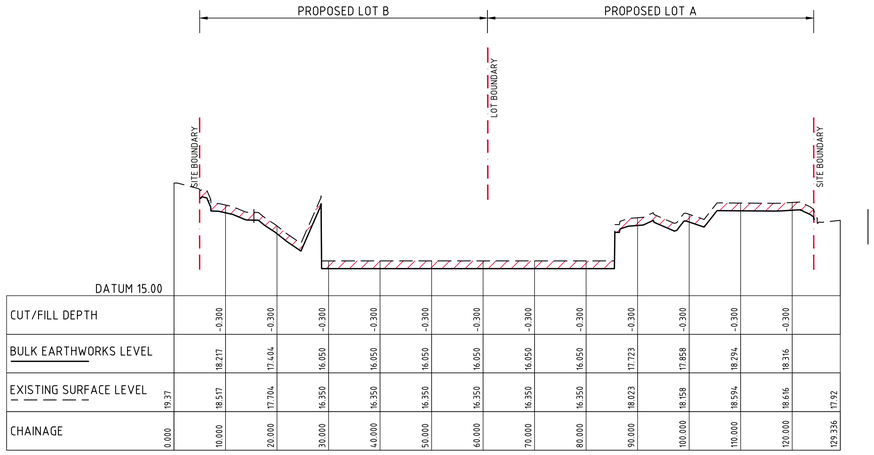


DATUM 25.00

CUT/FILL DEPTH		-8.515	-6.622	-6.512	-4.056	-4.419	-2.490	-1.678	-0.408	-0.649	-0.898	-1.129													
BULK EARTHWORKS LEVEL		30.200	30.200	30.200	30.200	30.200	30.200	30.200	30.200	30.200	30.200	30.200													
EXISTING SURFACE LEVEL	39.92	38.715	36.822	36.712	34.256	34.619	32.690	31.878	30.608	30.849	31.098	31.329	30.200	28.991	29.18										
CHAINAGE	0.000	10.000	20.000	30.000	40.000	50.000	60.000	70.000	80.000	90.000	100.000	110.000	120.000	123.369											

SECTION 6

HORIZONTAL SCALE 1:100
VERTICAL SCALE 1:20

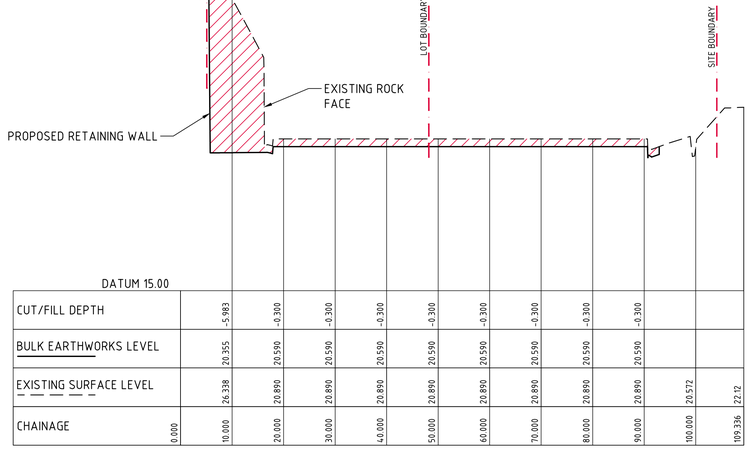


DATUM 15.00

CUT/FILL DEPTH		-0.300	-0.300	-0.300	-0.300	-0.300	-0.300	-0.300	-0.300	-0.300	-0.300	-0.300	-0.300												
BULK EARTHWORKS LEVEL		18.217	17.604	16.950	16.950	16.950	16.950	16.950	16.950	17.723	17.858	18.294	18.316												
EXISTING SURFACE LEVEL	19.37	18.517	17.704	16.350	16.350	16.350	16.350	16.350	16.350	18.023	18.158	18.594	18.616	17.92											
CHAINAGE	0.000	10.000	20.000	30.000	40.000	50.000	60.000	70.000	80.000	90.000	100.000	110.000	120.000	129.336											

SECTION 4

HORIZONTAL SCALE 1:100
VERTICAL SCALE 1:20



DATUM 15.00

CUT/FILL DEPTH		-5.983	-0.300	-0.300	-0.300	-0.300	-0.300	-0.300	-0.300	-0.300	-0.300														
BULK EARTHWORKS LEVEL		20.355	20.590	20.590	20.590	20.590	20.590	20.590	20.590	20.590	20.590														
EXISTING SURFACE LEVEL		26.338	20.890	20.890	20.890	20.890	20.890	20.890	20.890	20.890	20.890	20.572	22.12												
CHAINAGE	0.000	10.000	20.000	30.000	40.000	50.000	60.000	70.000	80.000	90.000	100.000	109.336													

SECTION 5

HORIZONTAL SCALE 1:100
VERTICAL SCALE 1:20

LEGEND:

- DENOTES BULK EARTHWORKS PROFILE
- DENOTES EXISTING PROFILE
- DENOTES AREA IN CUT
- DENOTES AREA IN FILL

1m 0 1 2 3 4 5 6 7 8 9 10m
SCALE 1:100 AT B1 SIZE SHEET

5m 0 10 20 30 40 50m
SCALE 1:500 AT B1 SIZE SHEET

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CONSULT AUSTRALIA

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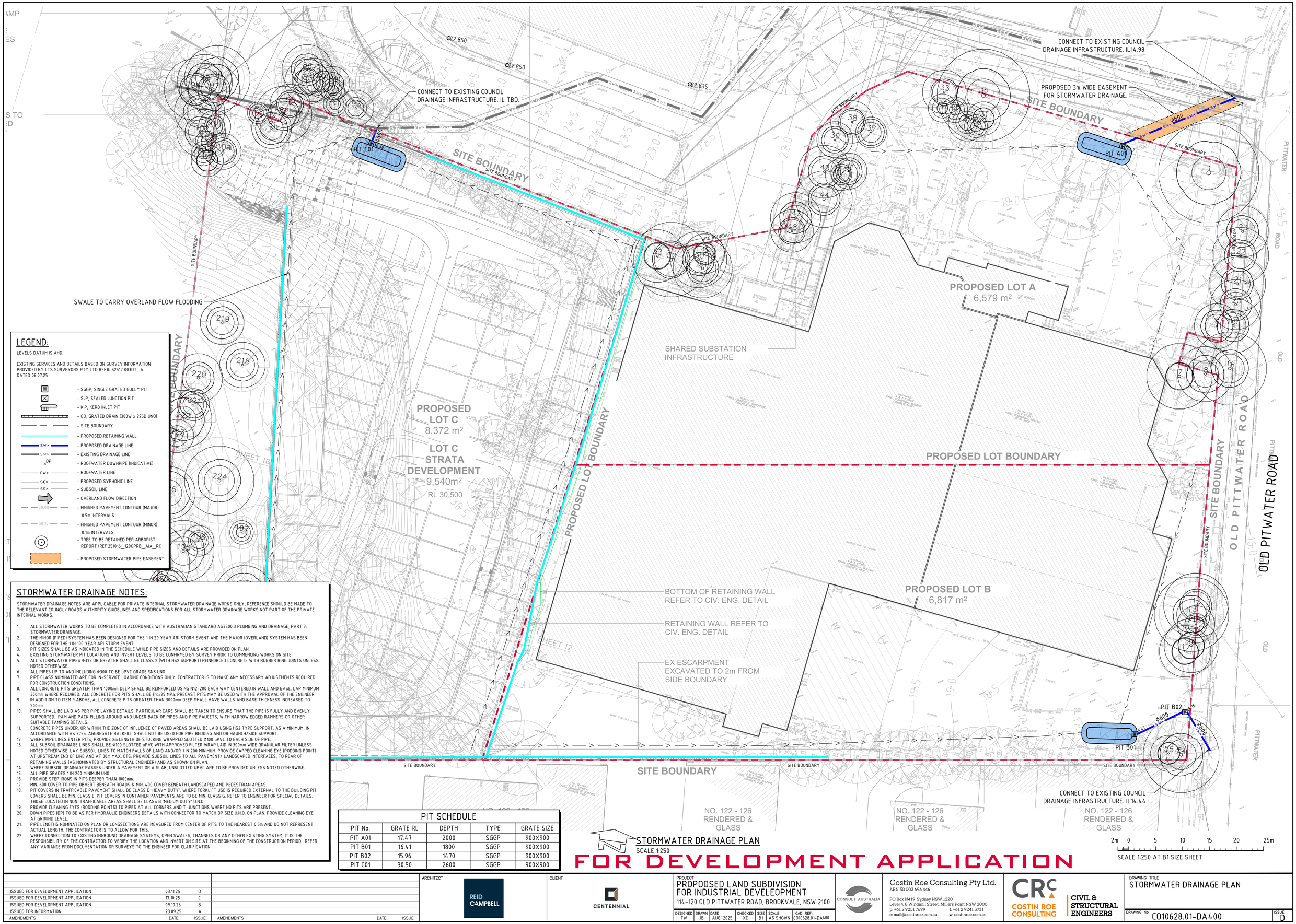
CRC COSTIN ROE CONSULTING | CIVIL & STRUCTURAL ENGINEERS

DRAWING TITLE
BULK EARTHWORKS SECTIONS - SHEET 2

DRAWING No C010628.01-DA352 ISSUE B



LEGEND:

LEVELS DATUM IS AHD.

EXISTING SERVICES AND DETAILS BASED ON SURVEY INFORMATION PROVIDED BY LTS SURVEYORS PTY LTD REF#: 52517 003DT_A DATED 08.07.25

- SGGP, SINGLE GRATED GULLY PIT
- SJP, SEALED JUNCTION PIT
- KIP, KERB INLET PIT
- GD, GRATED DRAIN (300W x 225D UNO)
- SITE BOUNDARY
- PROPOSED RETAINING WALL
- SW> PROPOSED DRAINAGE LINE
- SW> EXISTING DRAINAGE LINE
- DP ROOFWATER DOWNPIPE (INDICATIVE)
- RW> ROOFWATER LINE
- sd> PROPOSED SYPHONIC LINE
- SS> SUBSOIL LINE
- OVERLAND FLOW DIRECTION
- 50.00 FINISHED PAVEMENT CONTOUR (MAJOR) 0.5m INTERVALS
- 50.10 FINISHED PAVEMENT CONTOUR (MINOR) 0.1m INTERVALS
- TREE TO BE RETAINED PER ARBORIST REPORT (REF:251016_120OPRB_AIA_R1)
- PROPOSED STORMWATER PIPE EASEMENT

STORMWATER DRAINAGE NOTES:

STORMWATER DRAINAGE NOTES ARE APPLICABLE FOR PRIVATE INTERNAL STORMWATER DRAINAGE WORKS ONLY, REFERENCE SHOULD BE MADE TO THE RELEVANT COUNCIL/ ROADS AUTHORITY GUIDELINES AND SPECIFICATIONS FOR ALL STORMWATER DRAINAGE WORKS NOT PART OF THE PRIVATE INTERNAL WORKS.

1. ALL STORMWATER WORKS TO BE COMPLETED IN ACCORDANCE WITH AUSTRALIAN STANDARD AS3500.3 PLUMBING AND DRAINAGE, PART 3: STORMWATER DRAINAGE.
2. THE MINOR (PIPED) SYSTEM HAS BEEN DESIGNED FOR THE 1 IN 20 YEAR ARI STORM EVENT AND THE MAJOR (OVERLAND) SYSTEM HAS BEEN DESIGNED FOR THE 1 IN 100 YEAR ARI STORM EVENT.
3. PIT SIZES SHALL BE AS INDICATED IN THE SCHEDULE WHILE PIPE SIZES AND DETAILS ARE PROVIDED ON PLAN.
4. EXISTING STORMWATER PIT LOCATIONS AND INVERT LEVELS TO BE CONFIRMED BY SURVEY PRIOR TO COMMENCING WORKS ON SITE.
5. ALL STORMWATER PIPES Ø375 OR GREATER SHALL BE CLASS 2 (WITH HS2 SUPPORT) REINFORCED CONCRETE WITH RUBBER RING JOINTS UNLESS NOTED OTHERWISE.
6. ALL PIPES UP TO AND INCLUDING Ø300 TO BE uPVC GRADE SN8 UNO.
7. PIPE CLASS NOMINATED ARE FOR IN-SERVICE LOADING CONDITIONS ONLY. CONTRACTOR IS TO MAKE ANY NECESSARY ADJUSTMENTS REQUIRED FOR CONSTRUCTION CONDITIONS.
8. ALL CONCRETE PITS GREATER THAN 1000mm DEEP SHALL BE REINFORCED USING N12-200 EACH WAY CENTERED IN WALL AND BASE. LAP MINIMUM 300mm WHERE REQUIRED. ALL CONCRETE FOR PITS SHALL BE F'c=25 MPa. PRECAST PITS MAY BE USED WITH THE APPROVAL OF THE ENGINEER.
9. IN ADDITION TO ITEM 9 ABOVE, ALL CONCRETE PITS GREATER THAN 3000mm DEEP SHALL HAVE WALLS AND BASE THICKNESS INCREASED TO 200mm.
10. PIPES SHALL BE LAID AS PER PIPE LAYING DETAILS. PARTICULAR CARE SHALL BE TAKEN TO ENSURE THAT THE PIPE IS FULLY AND EVENLY SUPPORTED. RAM AND PACK FILLING AROUND AND UNDER BACK OF PIPES AND PIPE FAUCETS, WITH NARROW EDGED RAMMERS OR OTHER SUITABLE TAMPING DETAILS.
11. CONCRETE PIPES UNDER, OR WITHIN THE ZONE OF INFLUENCE OF PAVED AREAS SHALL BE LAID USING HS2 TYPE SUPPORT, AS A MINIMUM, IN ACCORDANCE WITH AS 3725. AGGREGATE BACKFILL SHALL NOT BE USED FOR PIPE BEDDING AND OR HAUNCH/SIDE SUPPORT.
12. WHERE PIPE LINES ENTER PITS, PROVIDE 2m LENGTH OF STOCKING WRAPPED SLOTTED Ø100 uPVC TO EACH SIDE OF PIPE.
13. ALL SUBSOIL DRAINAGE LINES SHALL BE Ø100 SLOTTED uPVC WITH APPROVED FILTER WRAP LAID IN 300mm WIDE GRANULAR FILTER UNLESS NOTED OTHERWISE. LAY SUBSOIL LINES TO MATCH FALLS OF LAND AND/OR 1 IN 200 MINIMUM. PROVIDE CAPPED CLEANING EYE (RODDING POINT) AT UPSTREAM END OF LINE AND AT 30m MAX. CTS. PROVIDE SUBSOIL LINES TO ALL PAVEMENT/ LANDSCAPED INTERFACES, TO REAR OF RETAINING WALLS (AS NOMINATED BY STRUCTURAL ENGINEER) AND AS SHOWN ON PLAN.
14. WHERE SUBSOIL DRAINAGE PASSES UNDER A PAVEMENT OR A SLAB, UNSLOTTED UPVC ARE TO BE PROVIDED UNLESS NOTED OTHERWISE.
15. ALL PIPE GRADES 1 IN 200 MINIMUM UNO.
16. PROVIDE STEP IRONS IN PITS DEEPER THAN 1000mm.
17. MIN. 600 COVER TO PIPE OBVERT BENEATH ROADS & MIN. 400 COVER BENEATH LANDSCAPED AND PEDESTRIAN AREAS.
18. PIT COVERS IN TRAFFICABLE PAVEMENT SHALL BE CLASS D 'HEAVY DUTY'. WHERE FORKLIFT USE IS REQUIRED EXTERNAL TO THE BUILDING PIT COVERS SHALL BE MIN. CLASS E. PIT COVERS IN CONTAINER PAVEMENTS ARE TO BE MIN. CLASS G. REFER TO ENGINEER FOR SPECIAL DETAILS. THOSE LOCATED IN NON-TRAFFICABLE AREAS SHALL BE CLASS B 'MEDIUM DUTY' U.N.O.
19. PROVIDE CLEANING EYES (RODDING POINTS) TO PIPES AT ALL CORNERS AND T-JUNCTIONS WHERE NO PITS ARE PRESENT.
20. DOWN PIPES (DP) TO BE AS PER HYDRAULIC ENGINEERS DETAILS WITH CONNECTOR TO MATCH DP SIZE U.N.O. ON PLAN. PROVIDE CLEANING EYE AT GROUND LEVEL.
21. PIPE LENGTHS NOMINATED ON PLAN OR LONGSECTIONS ARE MEASURED FROM CENTER OF PITS TO THE NEAREST 0.5m AND DO NOT REPRESENT ACTUAL LENGTH. THE CONTRACTOR IS TO ALLOW FOR THIS.
22. WHERE CONNECTION TO EXISTING INGROUND DRAINAGE SYSTEMS, OPEN SWALES, CHANNELS OR ANY OTHER EXISTING SYSTEM, IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY THE LOCATION AND INVERT ON SITE AT THE BEGINNING OF THE CONSTRUCTION PERIOD. REFER ANY VARIANCE FROM DOCUMENTATION OR SURVEYS TO THE ENGINEER FOR CLARIFICATION.

PIT SCHEDULE

PIT No.	GRATE RL	DEPTH	TYPE	GRATE SIZE
PIT A01	17.47	2000	SGGP	900X900
PIT B01	16.41	1800	SGGP	900X900
PIT B02	15.96	1470	SGGP	900X900
PIT C01	30.50	2600	SGGP	900X900

STORMWATER DRAINAGE PLAN
SCALE 1:250

2m 0 5 10 15 20 25m
SCALE 1:250 AT B1 SIZE SHEET

FOR DEVELOPMENT APPLICATION

AMENDMENTS	DATE	ISSUE
ISSUED FOR DEVELOPMENT APPLICATION	03.11.25	D
ISSUED FOR DEVELOPMENT APPLICATION	17.10.25	C
ISSUED FOR DEVELOPMENT APPLICATION	09.10.25	B
ISSUED FOR INFORMATION	23.09.25	A

AMENDMENTS	DATE	ISSUE

ARCHITECT: REID CAMPBELL
CLIENT: CENTENNIAL

PROJECT
PROPOOSED LAND SUBDIVISION FOR INDUSTRIAL DEVELEOPMENT
114-120 OLD PITTWATER ROAD, BROOKVALE, NSW 2100

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
TW	JB	AUG' 2025	XC	B1	AS SHOWN	C010628.01-DA400

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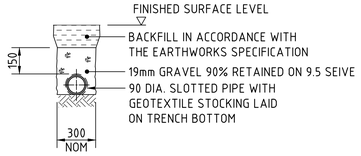
CIVIL & STRUCTURAL ENGINEERS

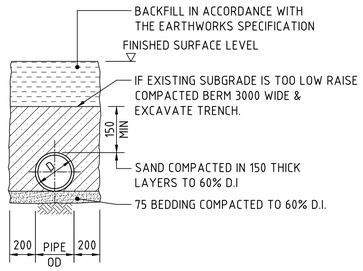
DRAWING TITLE
STORMWATER DRAINAGE PLAN

DRAWING No C010628.01-DA400
ISSUE D



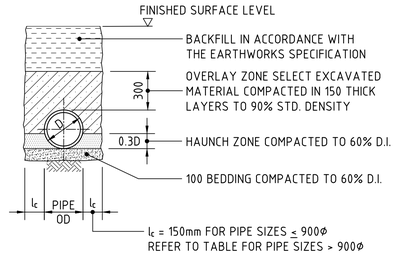
SUPPORT TO AGRICULTURAL DRAIN

SCALE 1:20



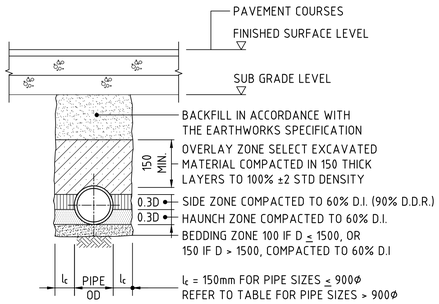
SUPPORT TO uPVC PIPES

SCALE 1:20



TYPE H1 SUPPORT TO CONCRETE PIPES AT LANDSCAPED AREAS

SCALE 1:20

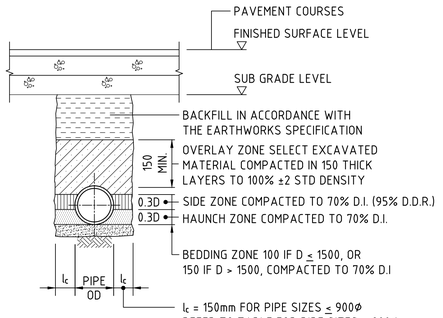


TYPE HS2 SUPPORT TO CONCRETE PIPES UNDER PAVEMENT

SCALE 1:20

D ≤ 1350, MAX FILL = 4.0m

D > 1350, MAX FILL = 3.0m



TYPE HS3 SUPPORT TO CONCRETE PIPES UNDER PAVEMENT

SCALE 1:20

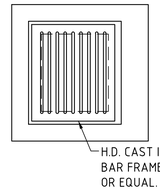
D ≤ 1050, MAX FILL = 6.0m

D > 1050, MAX FILL = 4.8m

BEDDING & HAUNCH MATERIAL GRADING	
SIEVE SIZE (mm)	WEIGHT PASSING (%)
19.0	100
2.36	100 TO 50
0.60	90 TO 50
0.30	60 TO 10
0.15	25 TO 0
0.075	10 TO 0

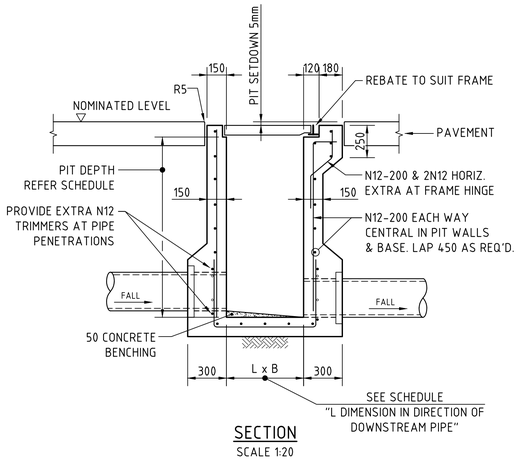
SIDE ZONE WIDTH	
PIPE SIZE (mm)	l_c (mm)
≤ 900ø	150
1050ø	175
1200ø	200
1350ø	225
1500ø	250
1650ø	275
1800ø	300
ENGINEER TO SPECIFY TRENCH WIDTHS FOR PIPE SIZES GREATER THAN 1800ø	

SIDE ZONE MATERIAL GRADING	
SIEVE SIZE (mm)	WEIGHT PASSING (%)
19.0	100
9.5	100 TO 50
2.6	100 TO 30
0.60	50 TO 15
0.075	25 TO 0
SELECT FILL MATERIAL IN ACCORDANCE WITH TABLE 1 AS 3725	



PLAN

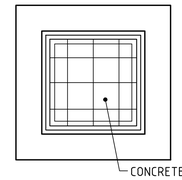
SCALE 1:20



SECTION

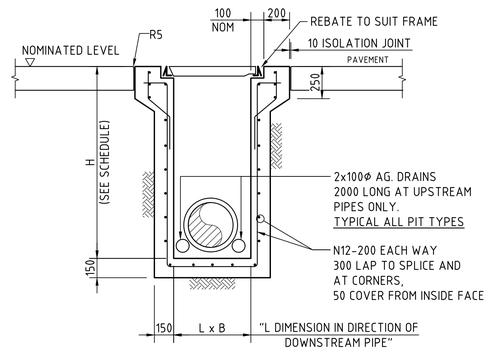
SCALE 1:20

SINGLE GRATED GULLY PIT - SGGP



PLAN

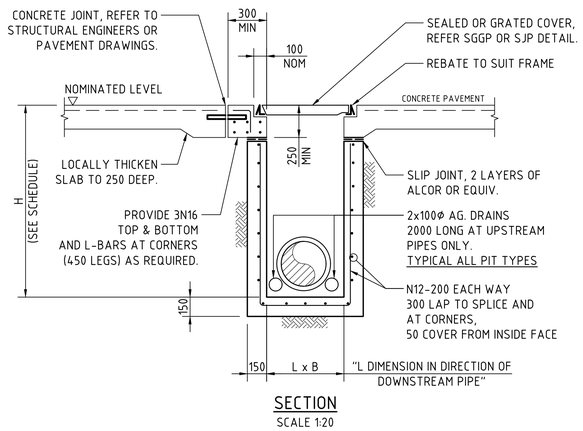
SCALE 1:20



SECTION

SCALE 1:20

SEALED JUNCTION PIT - SJP

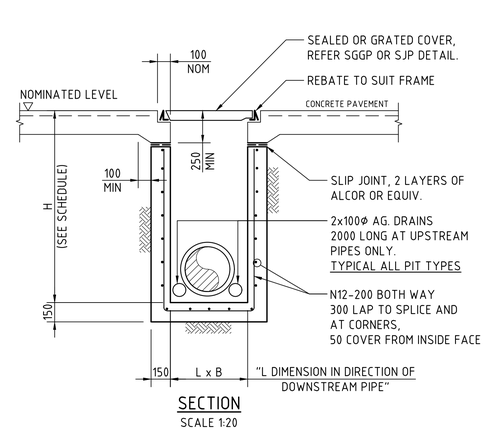


SECTION

SCALE 1:20

SJP/CIS & SGGP/CIS (CAST IN SLAB) PIT DETAIL
GRATE/COVER SUPPORT
CAST-INTO PAVEMENT SLAB

(ADOPT IN CONCRETE PAVEMENT FOR SGGP's & SJP's, WHERE PITS ARE LOCATED IN THE CORNER OF SLAB PANELS OR ADJACENT TO SLAB PANEL JOINTS)



SECTION

SCALE 1:20

SJP/CIS & SGGP/CIS (CAST IN SLAB) PIT DETAIL
GRATE/COVER SUPPORT
CAST-INTO PAVEMENT SLAB

(ADOPT IN CONCRETE PAVEMENTS FOR SGGP's & SJP's, WHERE JOINTS ARE NOT LOCATED WITHIN PROXIMITY OF THE GRATE)

200mm 0 500 1000 1500 2000mm

SCALE 1:20 AT B1 SIZE SHEET

FOR DEVELOPMENT APPLICATION

AMENDMENTS	DATE	ISSUE
ISSUED FOR DEVELOPMENT APPLICATION	09.10.25	B
ISSUED FOR INFORMATION	23.09.25	A

AMENDMENTS	DATE	ISSUE

ARCHITECT: REID CAMPBELL

CLIENT: CENTENNIAL

PROJECT: PROPOSED LAND SUBDIVISION FOR INDUSTRIAL DEVELEOPMENT
114-120 OLD PITTWATER ROAD, BROOKVALE, NSW 2100

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
TW	JB	AUG' 2025	XC	B1	AS SHOWN	C010628.01-DA451

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DRAWING TITLE: STORMWATER DRAINAGE DETAILS SHEET 1

DRAWING No: C010628.01-DA451

ISSUE: B

PROPOSED 3m WIDE EASEMENT FOR STORMWATER DRAINAGE.

SITE BOUNDARY

START OF WALL 1

END OF WALL 2

PROPOSED WALL TO BE ALIGNED NOMINAL 0.5m OFFSET FROM TOP OF ROCK WALL (AS SURVEYED). FINAL POSITION OF WALL TO BE CONFIRMED WITH GEOTECHNICAL INVESTIGATION AS NOTED.

SHARED SUBSTATION INFRASTRUCTURE

PROPOSED LOT A
6,579 m²

RETAINING WALL 1
REINFORCED EARTH WALL IN FILL
L = 126m
MAX H = 6.1m

PROPOSED LOT BOUNDARY

PROPOSED LOT C
8,372 m²

LOT C
STRATA DEVELOPMENT
9,540m²
RL 30.500

RETAINING WALL 2
PILE WALL IN CUT
L = 165m
MAX H = 14.5m

TOP OF ROCK WALL AS SURVEYED

BOTTOM OF RETAINING WALL REFER TO CIV. ENG. DETAIL

RETAINING WALL REFER TO CIV. ENG. DETAIL

END OF WALL 1

START OF WALL 2

EX ESCARPMENT EXCAVATED TO 2m FROM SIDE BOUNDARY

PROPOSED LOT B
6,817 m²

OLD PITTWATER ROAD

EXTENT OF WALL SUBJECT TO DETAILED DESIGN

START OF WALL 3

END OF WALL 3

NO. 122 - 126 RENDERED & GLASS

SHEET 12

SHEET 16

1 A009

LEGEND:

- DENOTES RETAINING WALL
- TREE TO BE RETAINED PER ARBORIST REPORT (REF:251016_1200PRB_AIA_R1)
- PROPOSED STORMWATER PIPE EASEMENT

WALL POSITION NOTE:

PROPOSED WALL TO BE ALIGNED NOMINAL 0.5m OFFSET FROM TOP OF ROCK WALL (AS SURVEYED) AND SHOWN ON PLAN. FINAL POSITION AND ARRANGEMENT OF THE RETAINING WALL TO BE CONFIRMED IN CONJUNCTION WITH A GEOTECHNICAL ENGINEER FOLLOWING A DETAILED GEOTECHNICAL INVESTIGATION THEN ON-SITE VERIFICATION DURING THE WORKS. THE ALIGNMENT SHOWN ON THIS PLAN IS PROVIDED FOR PLANNING AND INITIAL DESIGN PURPOSES ONLY.

RETAINING WALL SETOUT PLAN
SCALE 1:250

2m 0 5 10 15 20 25m
SCALE 1:250 AT B1 SIZE SHEET

FOR DEVELOPMENT APPLICATION

AMENDMENTS	DATE	ISSUE
ISSUED FOR DEVELOPMENT APPLICATION	03.11.25	D
ISSUED FOR DEVELOPMENT APPLICATION	17.10.25	C
ISSUED FOR DEVELOPMENT APPLICATION	09.10.25	B
ISSUED FOR INFORMATION	23.09.25	A

ARCHITECT: REID CAMPBELL

CLIENT: CENTENNIAL

PROJECT: PROPOSED LAND SUBDIVISION FOR INDUSTRIAL DEVELEOPMENT
114-120 OLD PITTWATER ROAD, BROOKVALE, NSW 2100

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
TW	JB	AUG' 2025	XC	B1	AS SHOWN	C010628.01-DA 600

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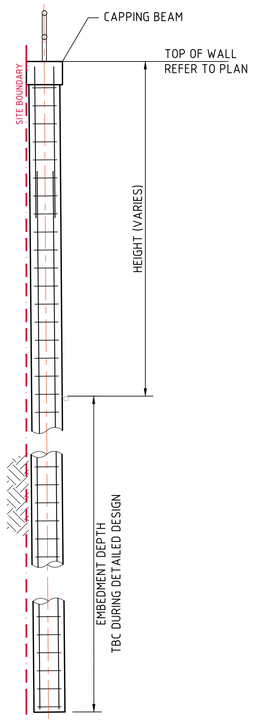
DRAWING TITLE: RETAINING WALL SETOUT PLAN

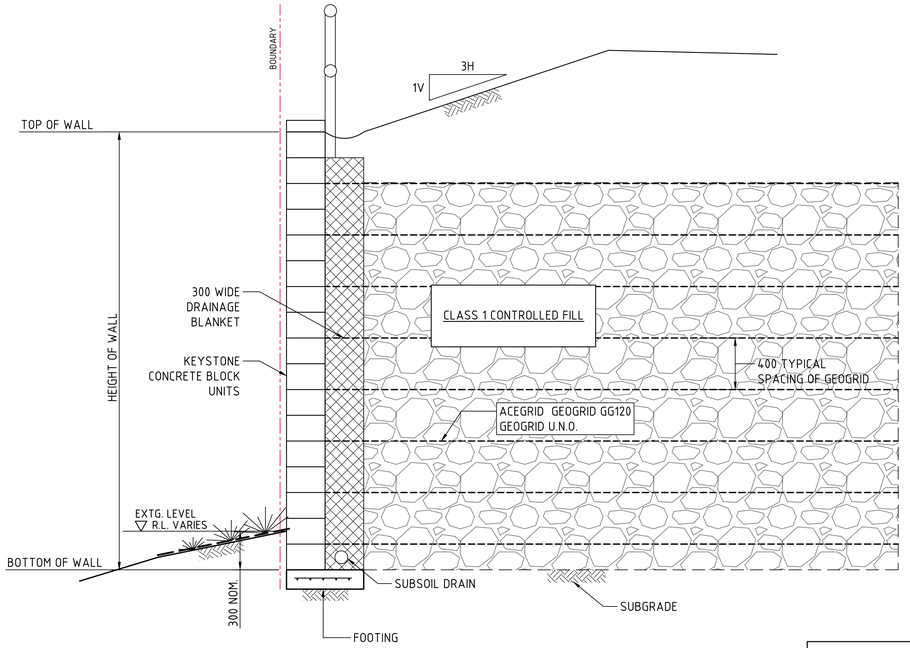
DRAWING No: C010628.01-DA 600 ISSUE: D



PILE RETAINING WALL

SCALE 1:50

SURCHARGE: 5kPa



REINFORCED EARTH KEYSTONE WALL

SCALE 1:20

SURCHARGE: 20kPa MIN

GEOGRID LENGTHS:
GEOGRID STRAP LENGTH TO BE EQUAL TO MIN 1.2x WALL HEIGHT.

NOTE :

INDICATIVE REINFORCEMENT LENGTHS SHOWN. DESIGN TO BE CONFIRMED IN DETAILED DESIGN

500mm 0 1 2 3 4 5m

SCALE 1:50 AT B1 SIZE SHEET

200mm 0 500 1000 1500 2000mm

SCALE 1:20 AT B1 SIZE SHEET

FOR DEVELOPMENT APPLICATION

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ISSUED FOR DEVELOPMENT APPLICATION	09.10.25	B
ISSUED FOR INFORMATION	23.09.25	A

AMENDMENTS	DATE	ISSUE

ARCHITECT: REID CAMPBELL

CLIENT: CENTENNIAL

PROJECT
PROPOSED LAND SUBDIVISION
FOR INDUSTRIAL DEVELOPMENT
114-120 OLD PITTWATER ROAD, BROOKVALE, NSW 2100

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
TW	JB	AUG' 2025	XC	B1	AS SHOWN	C010628.01-DA651

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DRAWING TITLE
RETAINING WALL DETAILS

DRAWING No C010628.01-DA651

ISSUE B

COSTIN ROE CONSULTING

APPENDIX B
EROSION CONTROL CHECKLIST

COSTIN ROE CONSULTING

EROSION AND SEDIMENT CONTROL
WEEKLY SITE INSPECTION SHEET

LOCATION . . . . . .
INSPECTION OFFICER . . . . . DATE . . . . . .
SIGNATURE . . . . . .

Legend: OK Not OK N/A Not applicable

Item	Consideration	Assessment
1	Public roadways clear of sediment.	. . . . .
2	Entry/exit pads clear of excessive sediment deposition.	. . . . .
3	Entry/exit pads have adequate void spacing to trap sediment.	. . . . .
4	The construction site is clear of litter and unconfined rubbish.	. . . . .
5	Adequate stockpiles of emergency ESC materials exist on site.	. . . . .
6	Site dust is being adequately controlled.	. . . . .
7	Appropriate drainage and sediment controls have been installed prior to new areas being cleared or disturbed.	. . . . .
8	Up-slope "clean" water is being appropriately diverted around/through the site.	. . . . .
9	Drainage lines are free of soil scour and sediment deposition.	. . . . .
10	No areas of exposed soil are in need of erosion control.	. . . . .
11	Earth batters are free of "rill" erosion.	. . . . .
12	Erosion control mulch is not being displaced by wind or water.	. . . . .
13	Long-term soil stockpiles are protected from wind, rain and stormwater flow with appropriate drainage and erosion controls.	. . . . .
14	Sediment fences are free from damage.	. . . . .
15	Sediment-laden stormwater is not simply flowing "around" the sediment fences or other sediment traps.	. . . . .
16	Sediment controls placed up-slope/around stormwater inlets are appropriate for the type of inlet structure.	. . . . .
17	All sediment traps are free of excessive sediment deposition.	. . . . .
18	The settled sediment layer within a sediment basin is clearly visible through the supernatant prior to discharge such water.	. . . . .
19	All reasonable and practicable measures are being taken to control sediment runoff from the site.	. . . . .
20	All soil surfaces are being appropriately prepared (i.e. pH, nutrients, roughness and density) prior to revegetation.	. . . . .
21	Stabilised surfaces have a minimum 70% soil coverage.	. . . . .
22	The site is adequately prepared for imminent storms.	. . . . .
23	All ESC measures are in proper working order.	. . . . .


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