

Long Reef SLSC

Stormwater Management Report

Prepared for: Adriano Pupilli Architects Pty Ltd

Northern Beaches Council

Attention: Adriano Pupilli

Date: 16 Oct 2019

Prepared by: Renata Tracey

Ref: 33241

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Revision

Site Address: Long Reef SLSC, Pittwater Road, Collaroy
Proposed Development: Long Reef SLSC

Client: Adriano Pupilli Architects Pty Ltd
Local Authority: Northern Beaches Council
Authority Reference #: N/A
Wood & Grieve Reference: 33241



Renata Tracey

For and on behalf of

Wood & Grieve Engineers

Revision	Date	Comment	Prepared By	Approved By
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1. Introduction

Wood & Grieve Engineers have been commissioned by the Northern Beaches Council to prepare this Stormwater Management Plan (SMP) in support of the Development Application for the proposed development at the existing Long Reef Surf Life Saving Club, Collaroy, NSW. The sites real address is LOT 11 DP1193189.

This SMP outlines the conceptual water management design for the proposed redevelopment of the site including a new two storey SLSC Building, Café and public amenities.

The purpose of this SMP is to evaluate the stormwater management methodology associated with the proposed development plan so as to demonstrate that the appropriate strategies have been adopted.

The SMP specifically addresses the following items for both the construction and operational phases of the development:

- Flood Impacts
- Stormwater runoff volumes and detention (Stormwater Quantity)
- Stormwater quality treatment measures (Stormwater Quality)
- Erosion and Sedimentation Control



2. Relevant Policies, Standards and Guidelines

The following listed policies, standards and guidelines were referred to in the preparation of this report:

- Warringah Council Water Management Policy
- Warringah Council On-site Stormwater Detention Technical Specification
- AS3500
- Australian Rainfall & Runoff 2016;
- AS3500 parts 0-5: 2013 Plumbing and Drainage
- AS2890 parts 1-6: 2009 Parking Facilities
- AS1428 parts 1-5: 2010 Design for Access and Mobility
- Landcom Managing Urban Stormwater: Soils and Construction Volume 1 2004
- NSW Floodplain Development Manual 2005
- Guidelines for development adjoining land and water managed by DECCW (OEH, 2013)



3. Existing Site Characteristics

3.1 Property Detail

Address: **Pittwater Road, Collaroy, NSW 2097**

Lot 11, DP1193189

Total Site Area: 0.286Ha

The proposed development can be seen on the concept design drawings in Appendix A of this report.

The proposed development will consist of the demolition of the existing surf club and construction of a new two storey building as well as the construction of a new café and public amenities block on the site and provision of various active and passive landscaped areas.

As can be seen in the site location aerial photo below (Figure 1), the site is located on beach frontage at Dee Why Beach and can be accessed via Pittwater road.



Figure 1 – Site Location Plan



3.2 Topography

The site currently falls primarily towards the centre. The image below (Figure 2) shows the existing site catchment area.

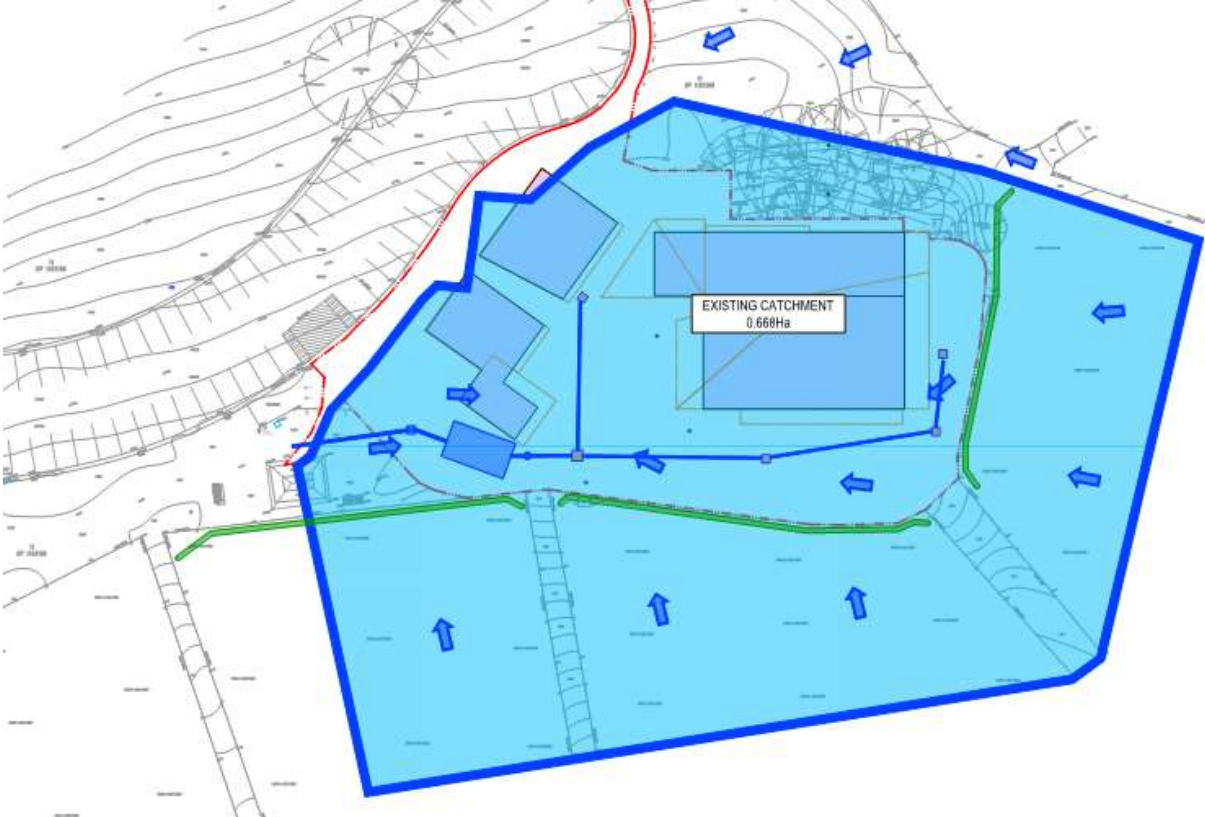


Figure 2 – Site Topography

3.3 Stormwater Catchments

3.3.1 External Catchments

The surrounding area has been investigated to determine the likely impact of existing external stormwater catchments on the proposed site. The existing land situated to the south and the east of the site discharges stormwater runoff to the development site along the southern and eastern boundaries which then drain toward the existing on-site stormwater pits.

To reduce the impact of external catchments on the onsite stormwater system, bunds have been proposed around the eastern and southern perimeters of the site. The bunds will prevent external stormwater from draining into the onsite stormwater system and instead allow external stormwater to drain directly into the sandbank.

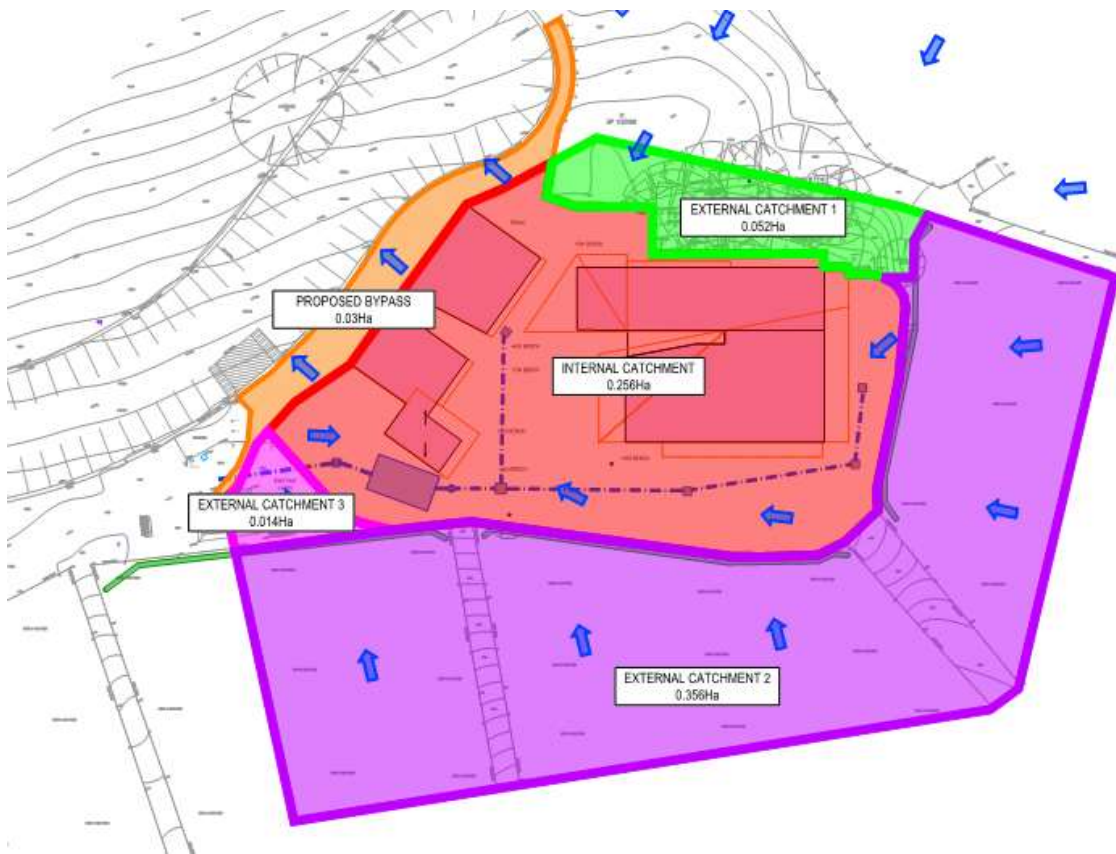


Figure 2: Externals

3.3.2 Internal Catchments

While most of the internal site catchment is processed through the on-site stormwater measures, a portion of the site catchment bypasses the new stormwater design and goes to the existing infrastructure in the carpark as can be seen in figure 2.

3.4 Existing Drainage Line

The site contains existing in-ground drainage lines which run from Pittwater Road, into the site and drain down towards the wetlands at the southwest of the site.

See below which shows the DBYD information received from Council.



Figure 5 - DBYD existing site stormwater drainage system

3.5 Existing Stormwater Discharge

The site discharges to the existing stormwater networks which ultimately outlets to the wetlands at the southwest of the site.

4. Local Authority Requirements

4.1 Local Council

Design requirements for water management on the site has been set in the Warringah Council Water Management Policy and the Warringah Council On-site Stormwater Detention Technical Specification. These requirements are summarised in the sections below.

4.1.1 Stormwater Conveyance Requirements

Warringah Council Water Management Policy and associated attachments state the minimum requirements for the design of stormwater conveyance infrastructure.

The table below summarises the requirements for the stormwater conveyance infrastructure.

Infrastructure	Design Parameter	Design Requirement	Conveyance Method
Formalised Drainage	Minor Drainage System	5 Year ARI	In Ground (Piped)
	Major Drainage System	100 Year ARI	Overland Flow

Table 1: Stormwater Drainage Serviceability

4.1.2 On Site Detention Requirements

The Warringah Council On-site Stormwater Detention Technical Specification state the minimum requirements for the design of stormwater detention infrastructure.

The Site Storage Requirements and Permissible Site Discharge rates are applied per hectare of impervious area, and are summarised in the table below:

- The total site run off for the 5 year ARI and the 100 year ARI storm event under the existing site conditions (pre-development) must be determined. A check of the 20 year ARI storm event must also be made when using the Full Computation Method.
- The direction of runoff from the site, which has to fall in the same direction of the catchment, must be maintained.
- For all developments, the runoff from the site after development is not to exceed the runoff from the total site prior to the development, for all storm durations for the 5 year, 20 year and the 100 year ARI storm event.
- The PSD is to be calculated on the maximum allowable impervious fraction of 0%
- Where alterations and additions are proposed, the PSD is to be calculated on the maximum allowable impervious fraction of 0% for the areas considered for the proposed alterations and additions only. Stormwater detention will be required for the extent of the proposed alterations and additions only.
- The total piped flow from the site must not exceed the maximum 5 year ARI pre-development runoff.
- The estimation of the time of concentration for the pre-developed site is to be assumed as grass for the entire site.



4.1.3 Stormwater Quality and Pollution Control

The Warringah Council Water Management Policy states the minimum requirements for the reduction of stormwater runoff pollutants. The guidelines state the following reduction targets:

Pollutant	Performance Requirements
Total Phosphorous	65% reduction in the post development mean annual load ¹
Total Nitrogen	45% reduction in the post development mean annual load ¹
Total Suspended Solids	85% reduction in the post development mean annual load ¹
Gross Pollutants	90% reduction in the post development mean annual load ¹ (for pollutants greater than 5mm in diameter)
pH	6.5 - 8.5
Hydrology	The post-development peak discharge must not exceed the pre-development peak discharge for flows up to the 2 year ARI

Note:

¹The percentage reduction in the post development mean annual loads are relative to the loads from the proposed development without treatment applied.

Figure 6 – Water Quality Targets (Source: The Warringah Council Water Management Policy – Table 3)

5. Flood Impact Assessment

When considering a new development, it is important to assess the impact of existing flooding on the proposed development and also the impact of the proposed development on existing or potential flooding both upstream and downstream of the development.

5.1 Flooding

Warringah Council's flood mapping shows that the site is not located within any flood risk planning precinct.

5.2 Development Flood Impacts

The proposed development will maintain existing overland flow paths and convey all overland flow away from habitable floor areas. Access to the site is not impeded by flooding.

Given that it can be confirmed that the development will not impact on any existing floodplain nor will flooding impact on the development there has been no further development specific flood modelling undertaken at this time.



6. Stormwater Conveyance

This section of the report discusses the systems proposed to allow for stormwater to be conveyed across the site to the legal point of discharge.

As discussed in section 4.1.1 of this report The Warringah Council Water Management Policy and associated attachments set the minimum design parameters for the design of stormwater conveyance infrastructure through the site.

6.1 Legal Point of Discharge

There will be one legal point of discharge for the development. The point of discharge is located at the existing pit to the west of the site as shown on the Civil Drawings provided in Appendix A.



7. Stormwater Attenuation

Warringah Council Water Management Policy requires that the post development stormwater discharge from the site be limited to the maximum predevelopment runoff.

The site has been calculated as having an area of 0.286Ha. Hydraulic modelling of the catchment was undertaken using DRAINS stormwater modelling software.

The table below summarises the pre and post development discharge flows in cubic meters per second for the critical 5 year, 20 year and 100 year ARI stormwater events.

ARI:	5 year	20 year	100 year
Pre-Development flows (m ³ /s)	0.092	0.134	0.171
Post-Development flows (m ³ /s)	0.087	0.126	0.163

Table 2 - Pre and Post Development Discharge Flows

As shown in the table above, the stormwater release rate is decreased post development due to a smaller impervious area. As shown in Section 4.1.2, the Council standards call for the model to account for 0% impervious area however, as per Council correspondence dated 14 Oct 2019, Council accept the approach with no proposed stormwater controls.

8. Stormwater Quality Treatment

As discussed in section 4.1.3 Warringah Council's Water Management Policy sets targets for the reduction of water borne pollution being conveyed from the site through the stormwater drainage system.

This section of the report demonstrates the Stormwater Quality Improvement Devices (SQID's) to be implemented and the Pollutant Export Modelling undertaken to demonstrate the effectiveness of the treatment system in achieving the reduction targets set by council.

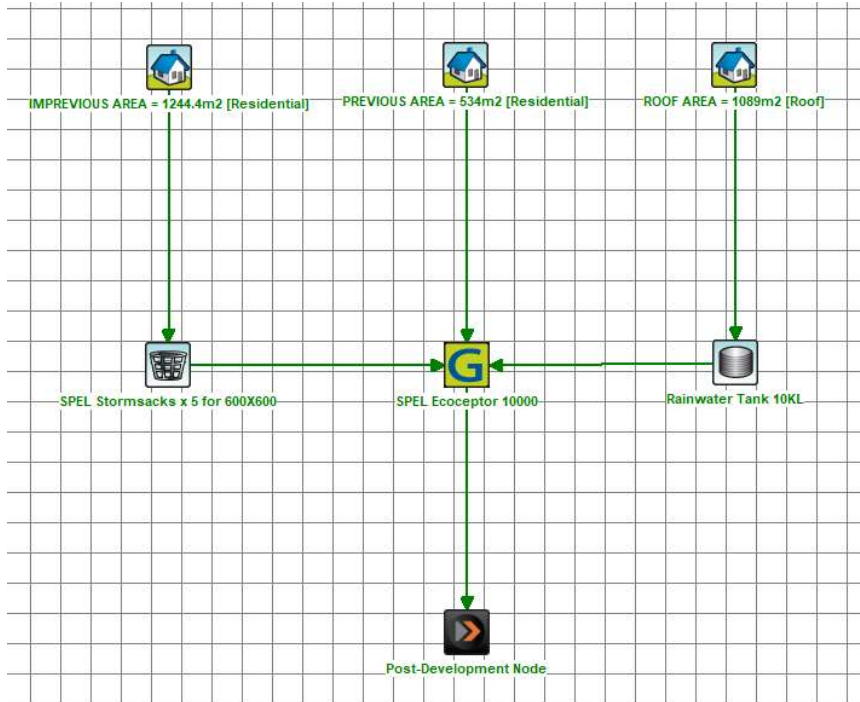


8.1 Pollutant Reduction System

In order to achieve the pollutant reduction targets specified in section 4.1.3 of this report a series of treatment devices are proposed which together form a treatment train. The proposed treatment train includes the following:

- Surface inlet pits fitted with pit traps (SPEL Stormsacks or equivalent)
- Gross pollutant trap at outlet to downstream existing system (SPEL Ecoceptor or equivalent)

The pollution reduction system for the site has been diagrammatically shown in the figure below.



The following are the treatment rates as determined by the MUSIC model.

	Sources	Residual Load	% Reduction
Flow (ML/yr)	3.45	3.45	0
Total Suspended Solids (kg/yr)	593	93.3	84.3
Total Phosphorus (kg/yr)	1	0.244	75.6
Total Nitrogen (kg/yr)	7.39	3	59.4
Gross Pollutants (kg/yr)	77.6	0	100

Indicator	Total Site Reduction	Site Targets	Target Achieved
Gross Pollutants	100%	90%	Yes
Total Suspended Solids (TSS)	84%	85%	No
Total Phosphorus (TP)	76%	65%	Yes
Total Nitrogen (TN)	59%	45%	Yes

As can be seen in the table above, the MUSIC model shows that the majority of stormwater treatment requirements are achieved except total suspended solids. It is noted that the outlet pit is proposed as an absorption pit with a large sump below the outlet pipe. This will help treat stormwater and gather sediment. It is likely that all targets will be achieved in the final case.

It is recommended that all stormwater pits on-site undergo regular maintenance to remove sand and sediment build-up to ensure proper functionality.

9. Erosion & Sedimentation Control

Landcom have published a design guide entitled "Managing Urban Stormwater - Soils and Construction" which is regarded as the standard to which erosion and sedimentation control should be designed to within NSW.

The control of erosion and sedimentation describes the measures incorporated during and following construction of a new development to prevent the pollution and degradation of the downstream watercourse.

Sediment and Erosion Control Plans have been prepared as part of the application documentation and are included in Appendix A of this report.

Common control measures adopted are:

- Sedimentation fences
- Sedimentation basins
- Stormwater drainage inlet protection
- Overland flow diversion swales
- Shaker Grids and wash downs for vehicles leaving the construction site
- Dust control measures

The maintenance of these control measures throughout their intended lifespan will ensure that the risk of erosion and sedimentation pollution of the downstream watercourse will be minimized.



Appendix A Civil Drawings

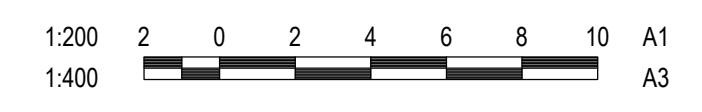
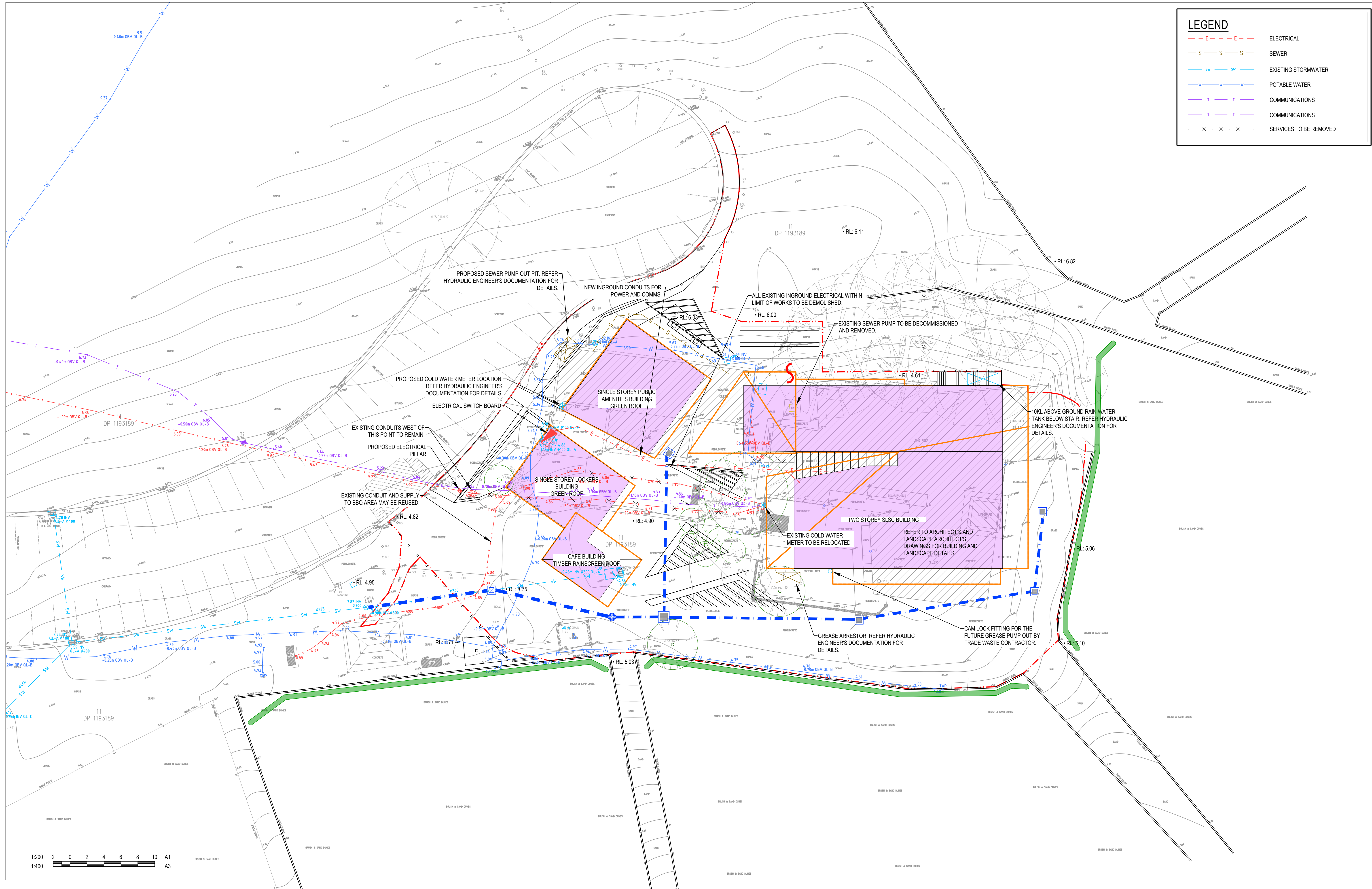


CIVIL ENGINEERING WORKS



Sheet List Table	
Sheet Number	Sheet Title
CI-000-01	COVER SHEET
CI-050-01	UTILITY SERVICES COORDINATION PLAN
CI-070-01	SEDIMENT & EROSION CONTROL PLAN
CI-076-01	SEDIMENT & EROSION CONTROL DETAILS
CI-500-01	EXISTING CATCHMENT PLAN
CI-500-02	PROPOSED CATCHMENT PLAN
CI-520-01	STORMWATER DRAINAGE PLAN
CI-526-01	STORMWATER DRAINAGE DETAILS

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	EXISTING STORMWATER
	POTABLE WATER
	COMMUNICATIONS
	COMMUNICATIONS
	SERVICES TO BE REMOVED



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LONG REEF SLSC
PROJECT

UTILITY SERVICES
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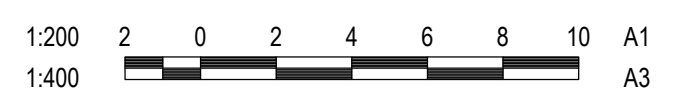
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LONG REEF SLSC

PROJECT

SEDIMENT & EROSION CONTROL PLAN

TITLE

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Stantec

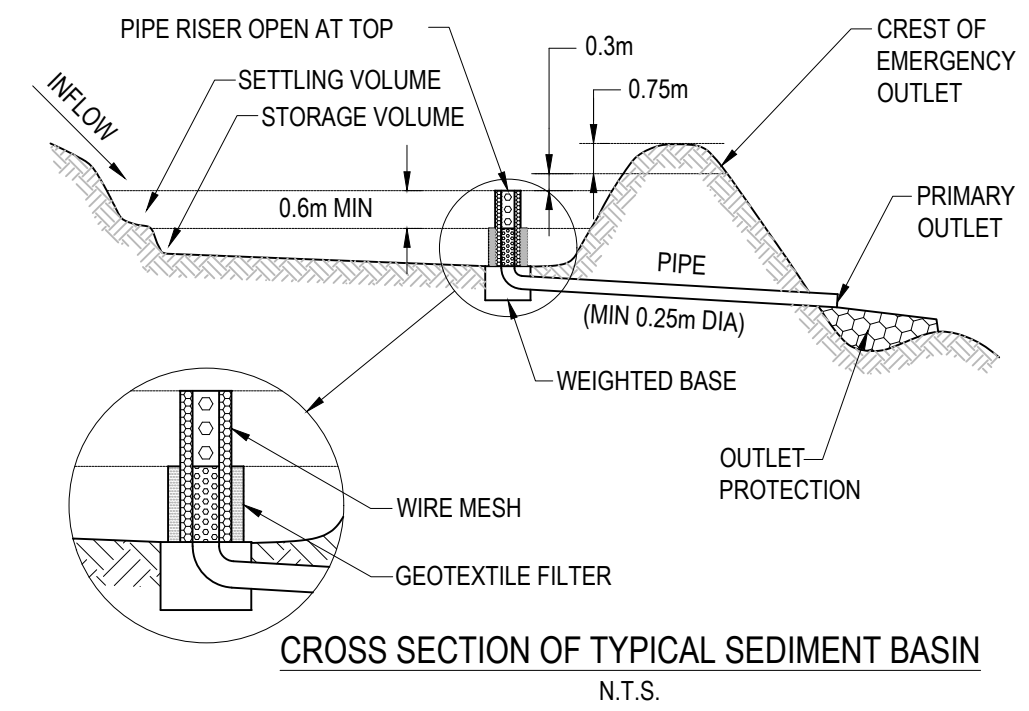
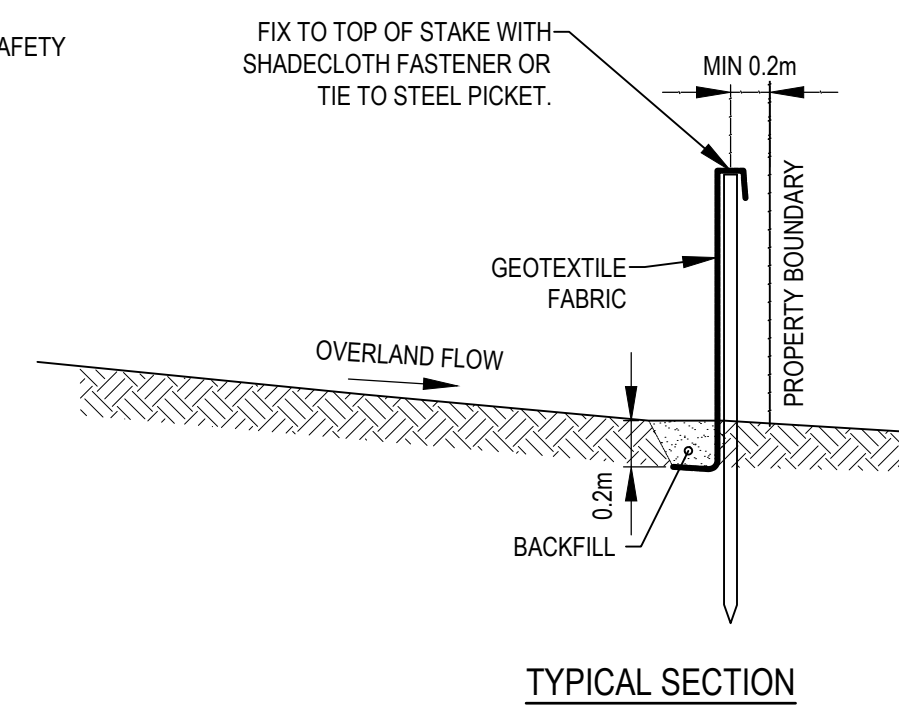
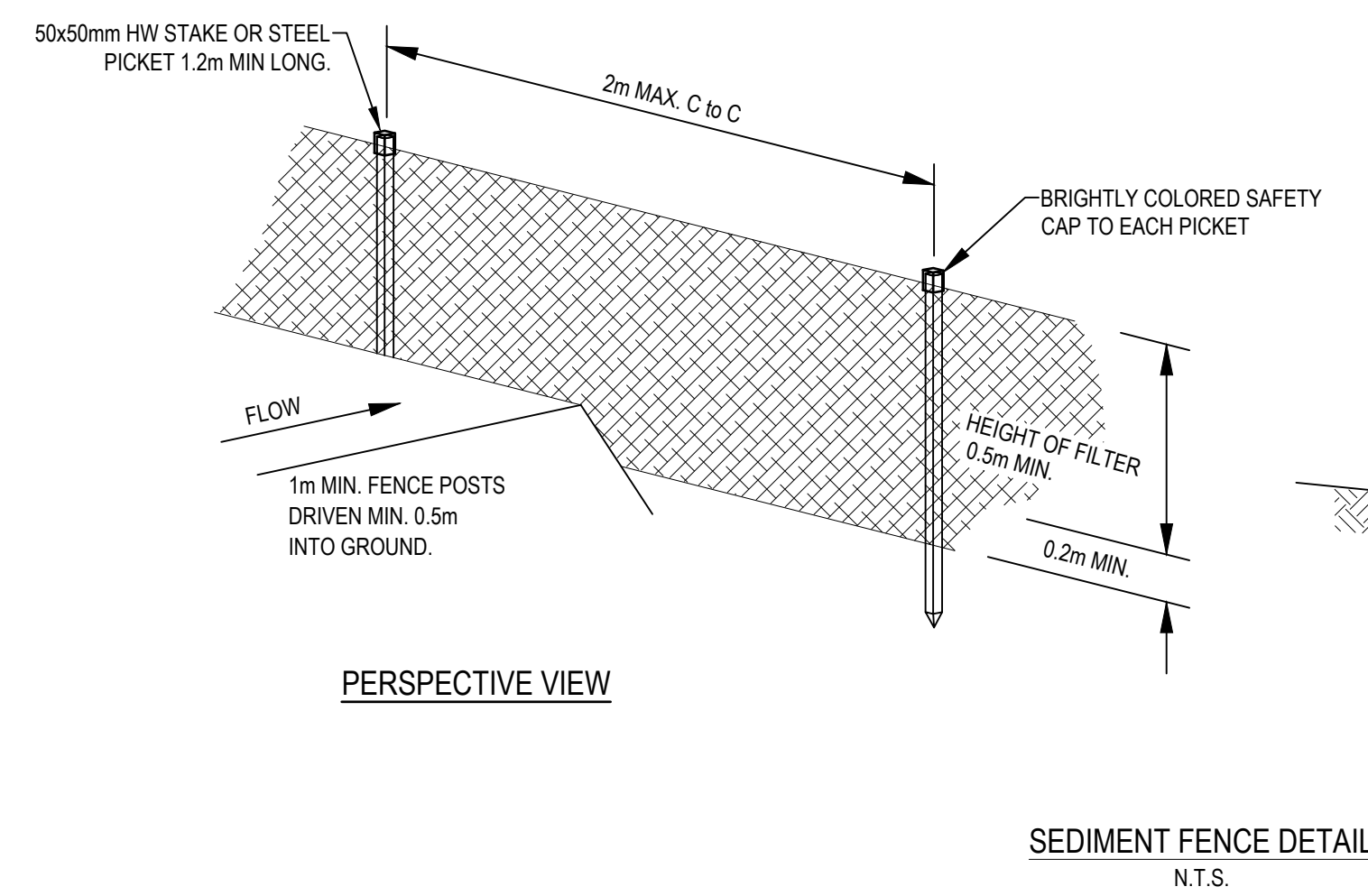
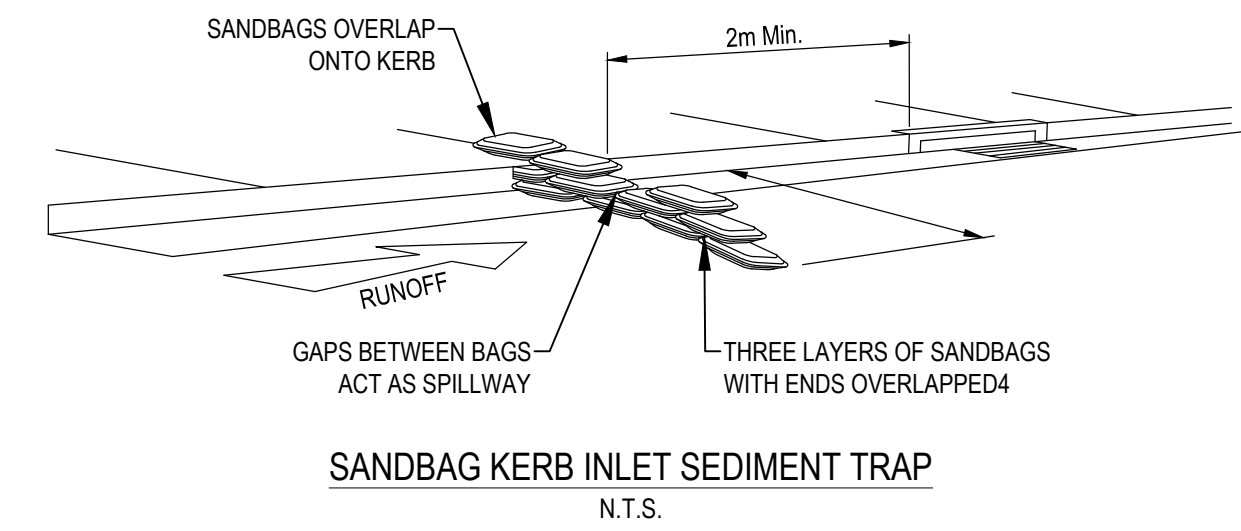
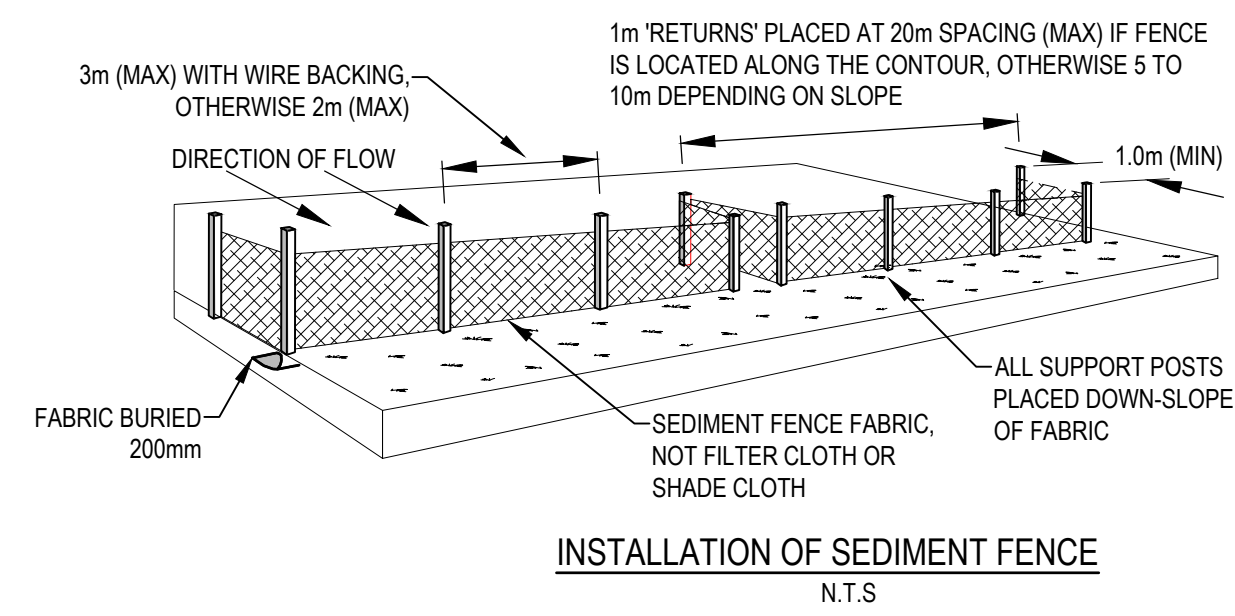
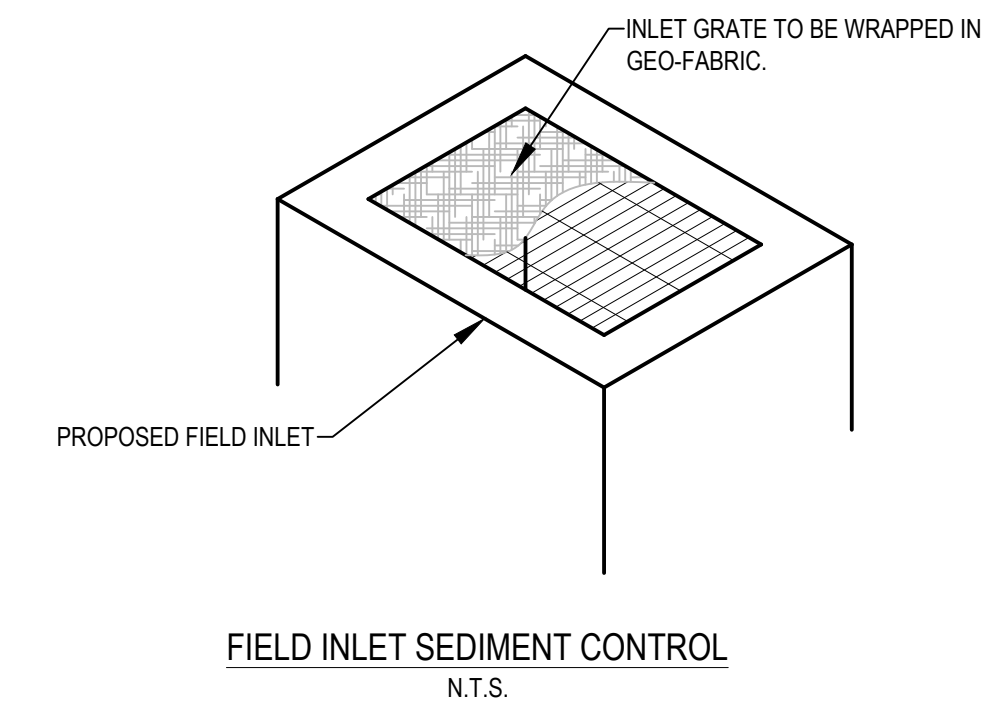
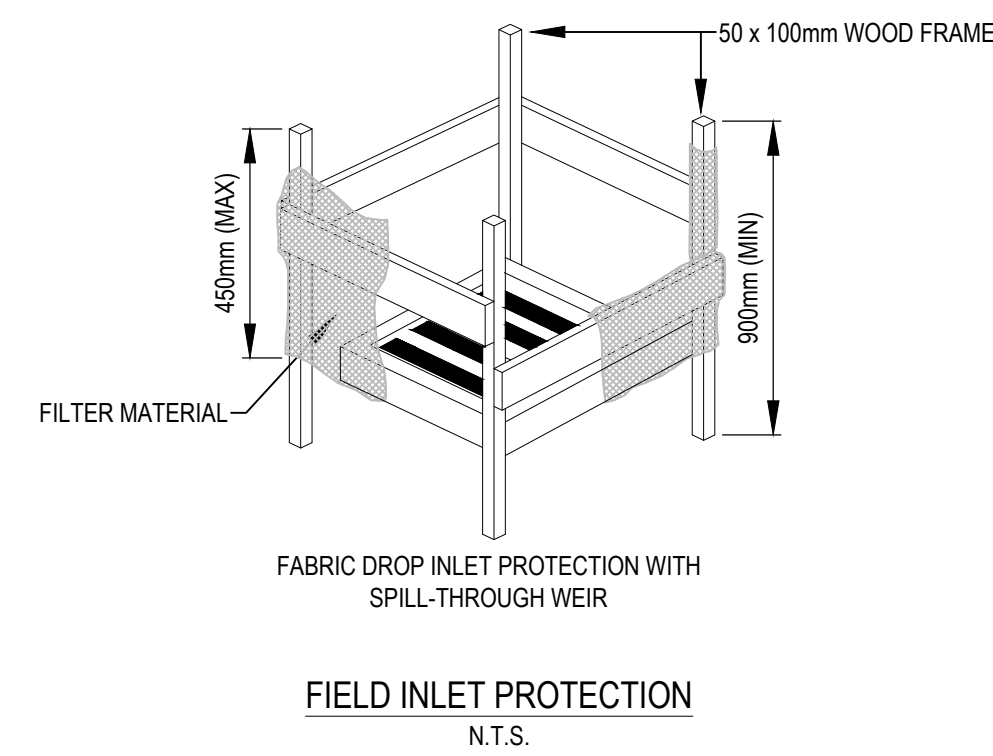
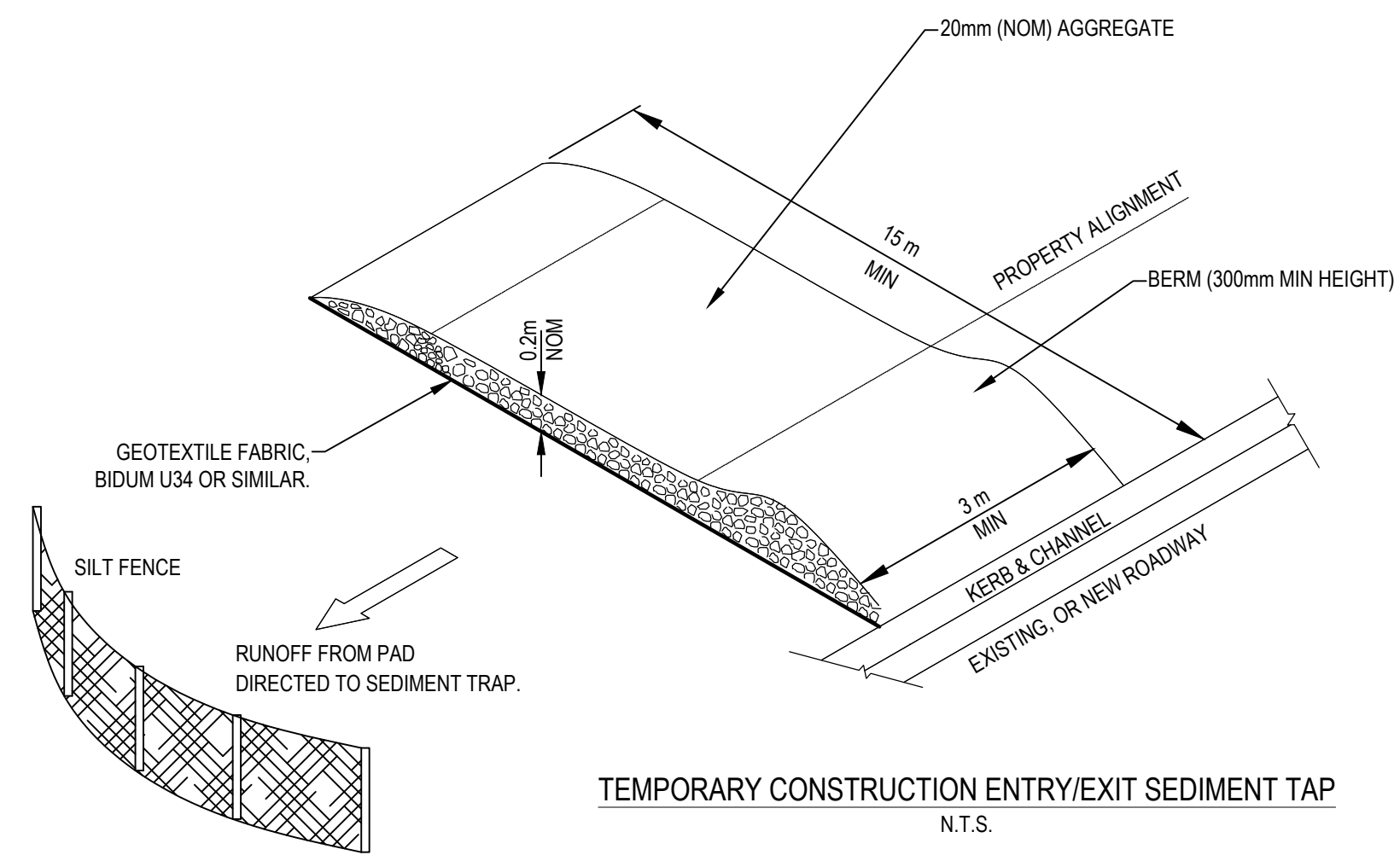
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LONG REEF SLSC

PROJECT

SEDIMENT & EROSION CONTROL
DETAILS

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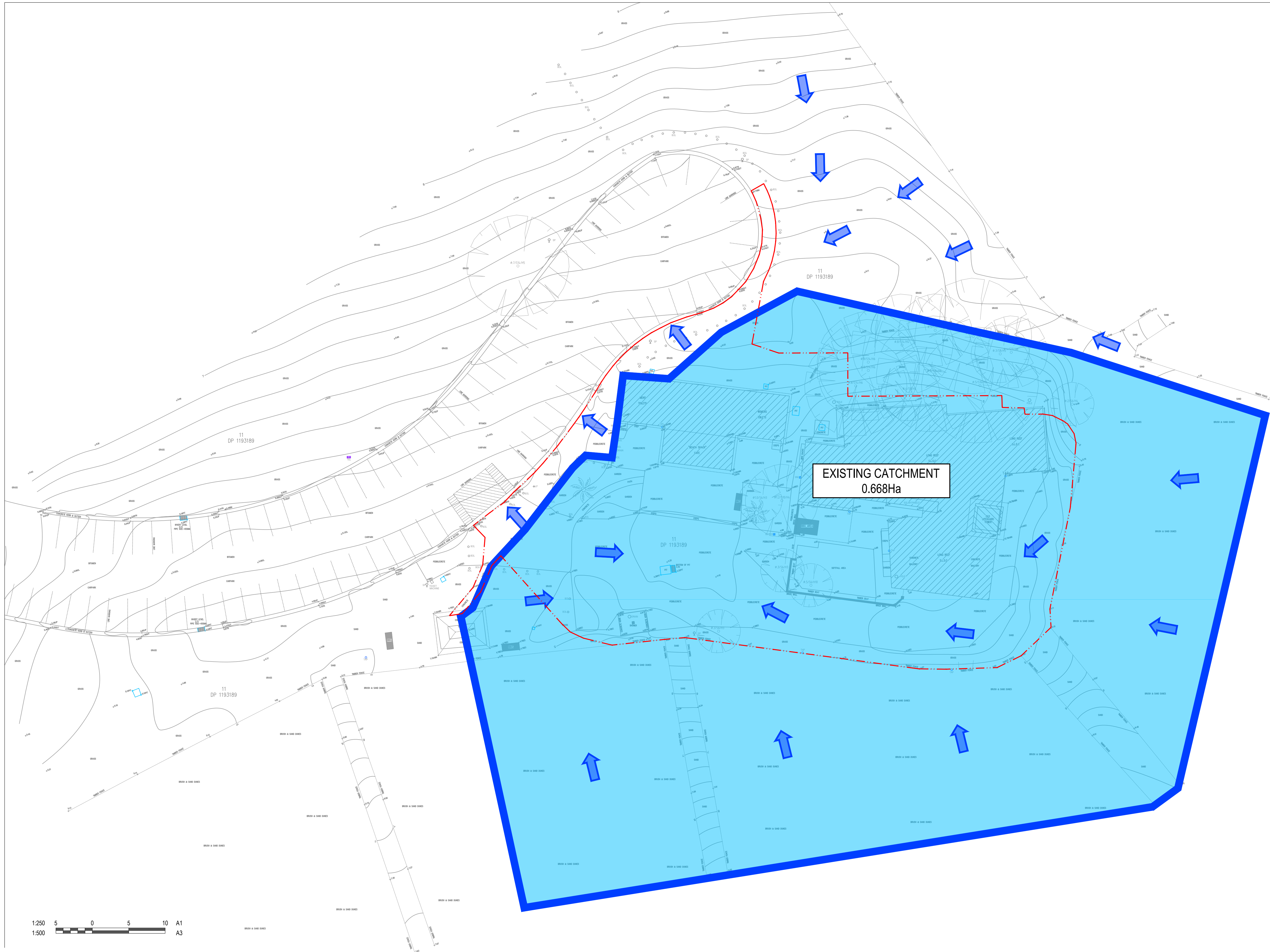
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EXISTING CATCHMENT
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EXISTING CATCHMENT PLAN










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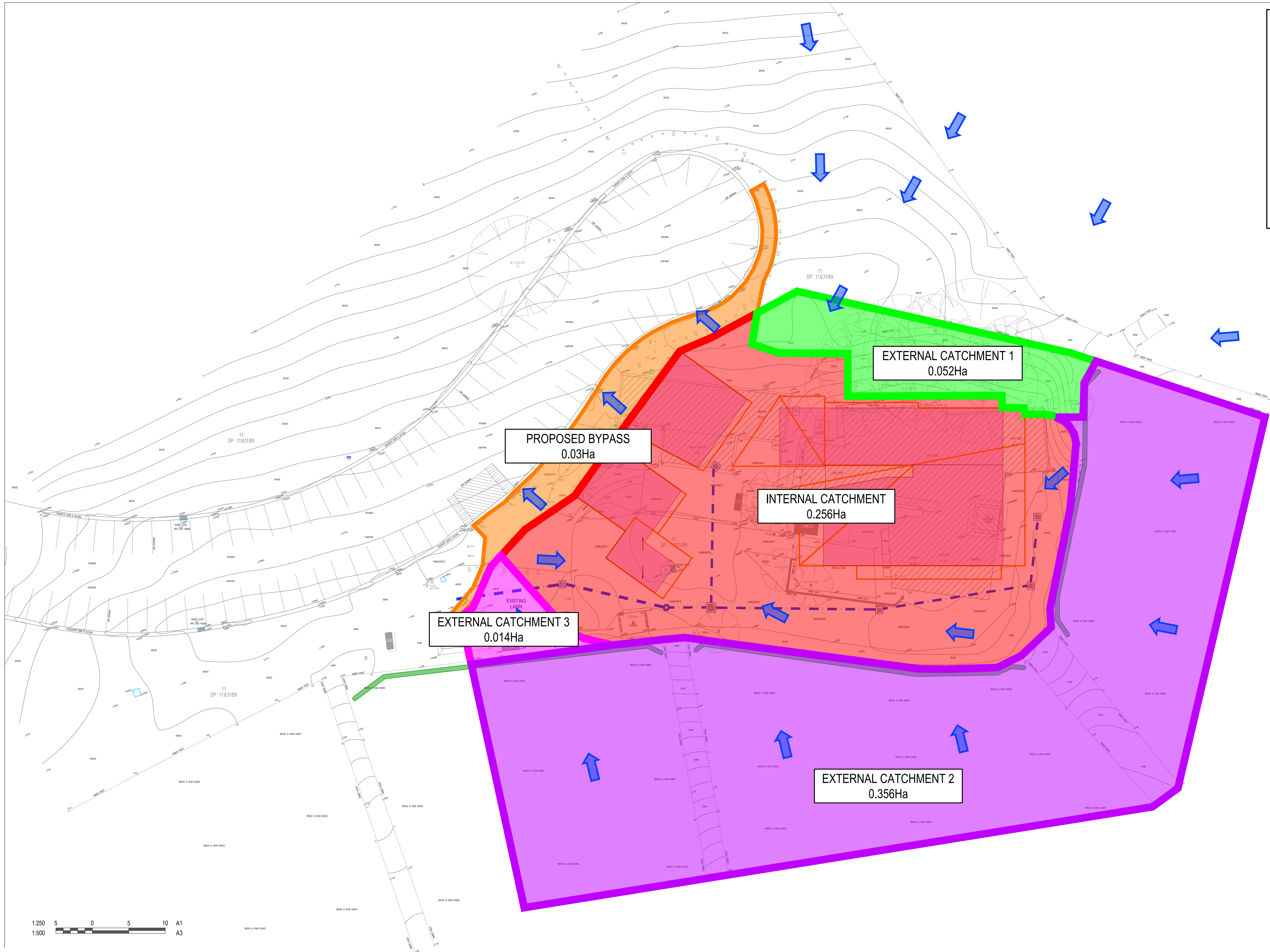
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-  PROPOSED GRATED PIT
-  PROPOSED JUNCTION PIT
-  PROPOSED GROSS POLLUTANT TRAP
-  PIT LABEL
-  OVERLAND FLOW DIRECTION



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PROPOSED CATCHMENT PLAN



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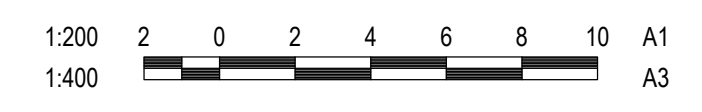
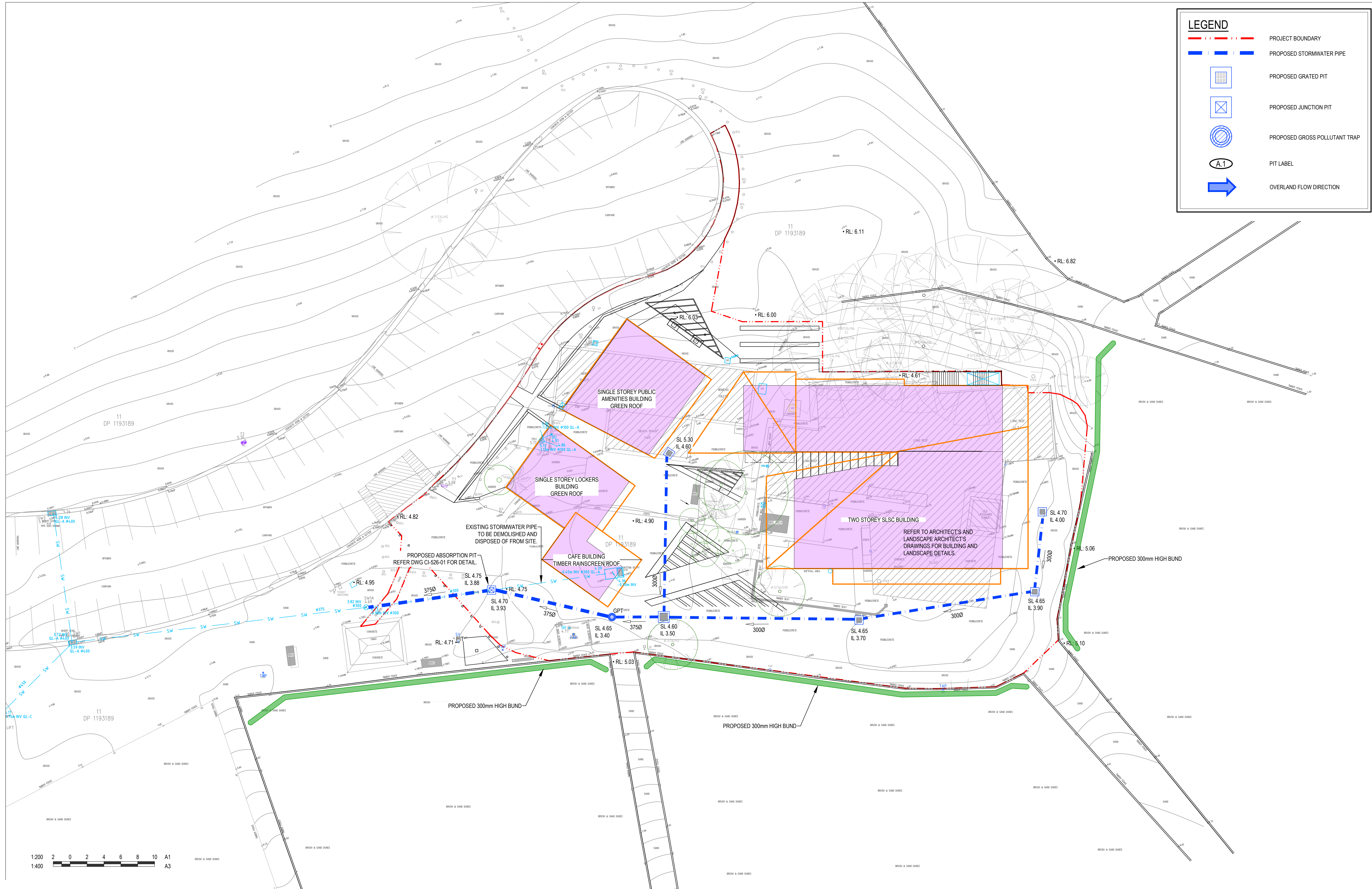
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- PROPOSED JUNCTION PIT
- PROPOSED GROSS POLLUTANT TRAP
- PIT LABEL
- OVERLAND FLOW DIRECTION



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ADRIANO PUPILLI ARCHITECTS
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LONG REEF SLSC
 PROJECT

STORMWATER DRAINAGE PLAN
 TITLE

WOOD & GRIEVE ENGINEERS

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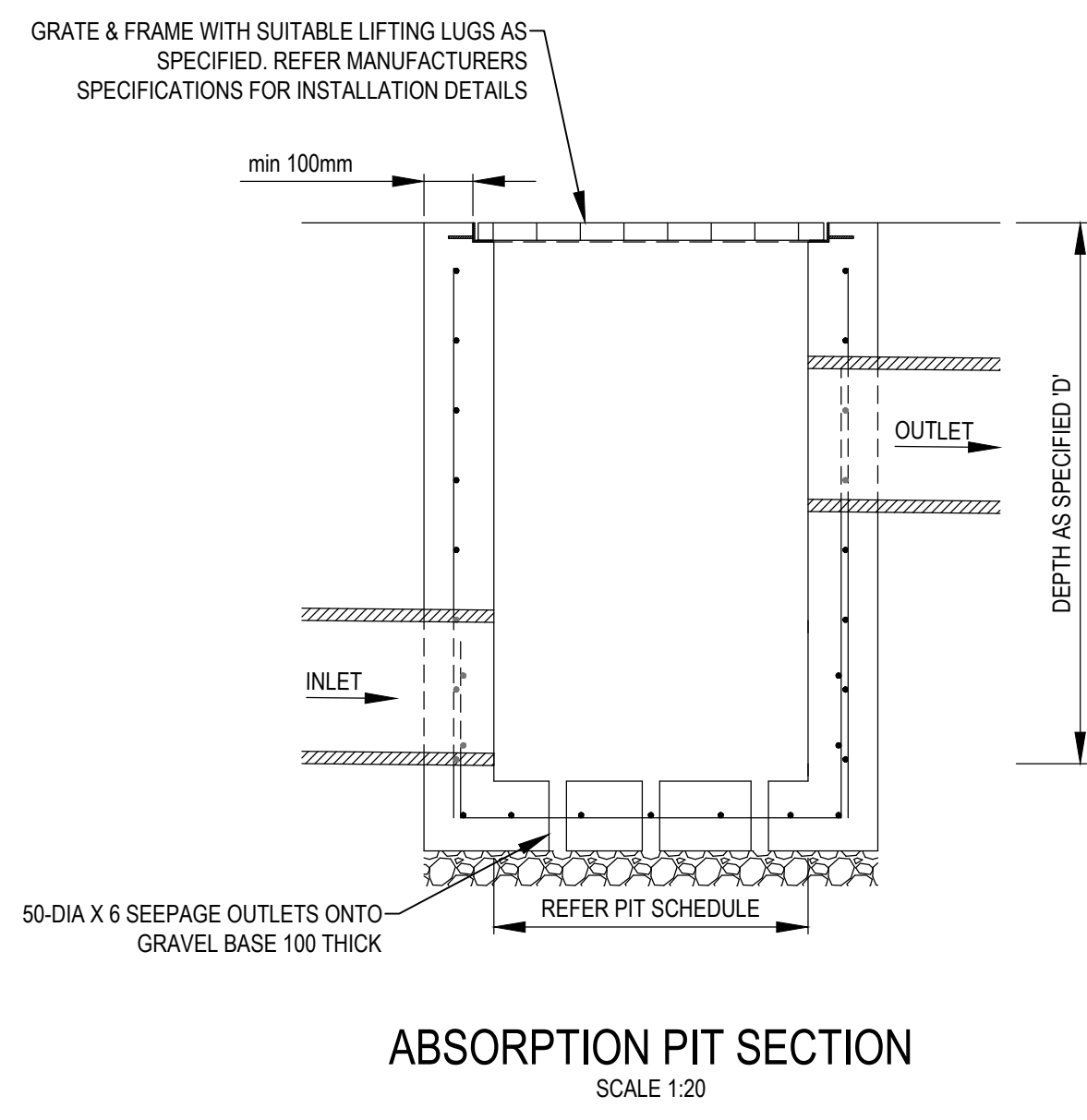
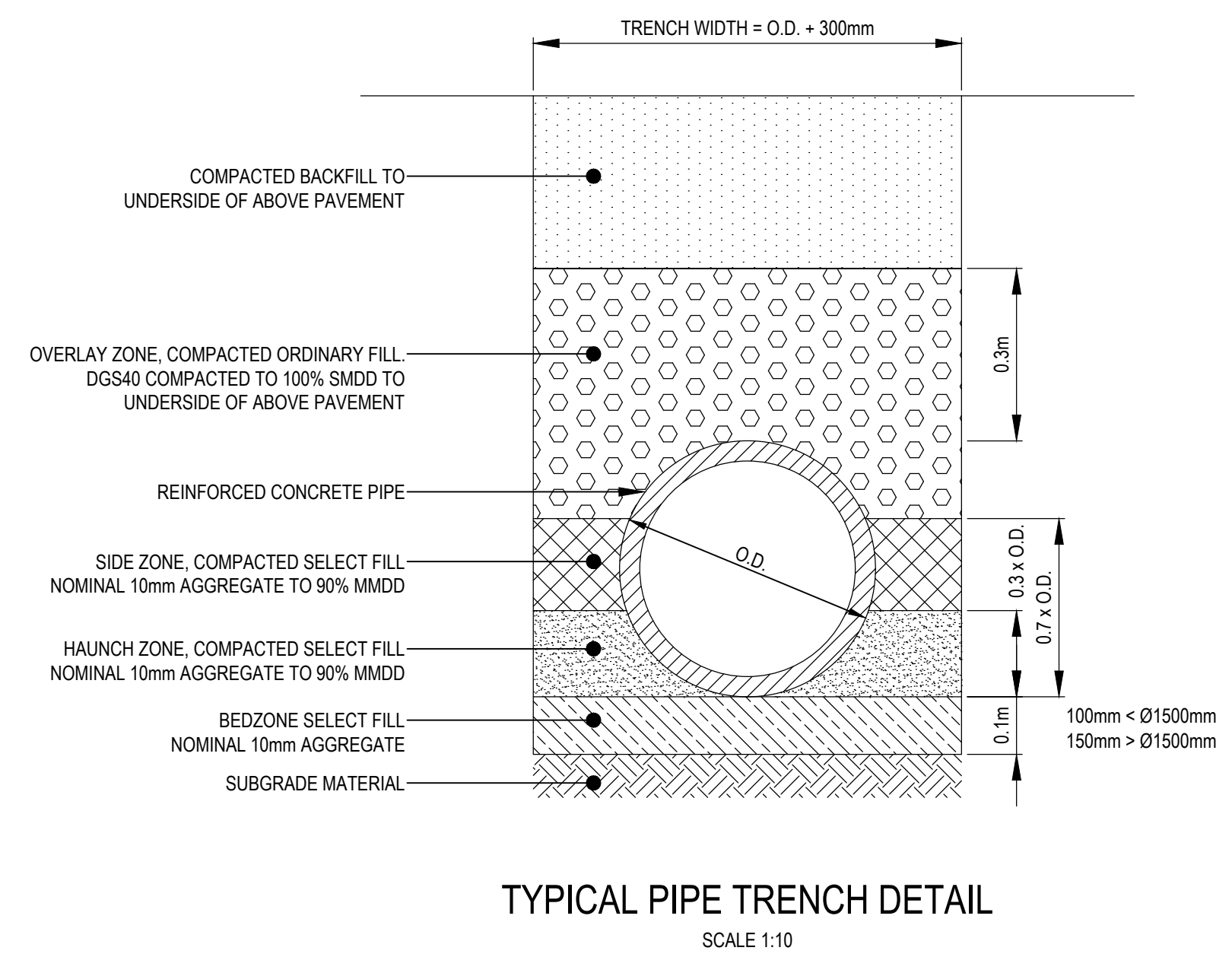
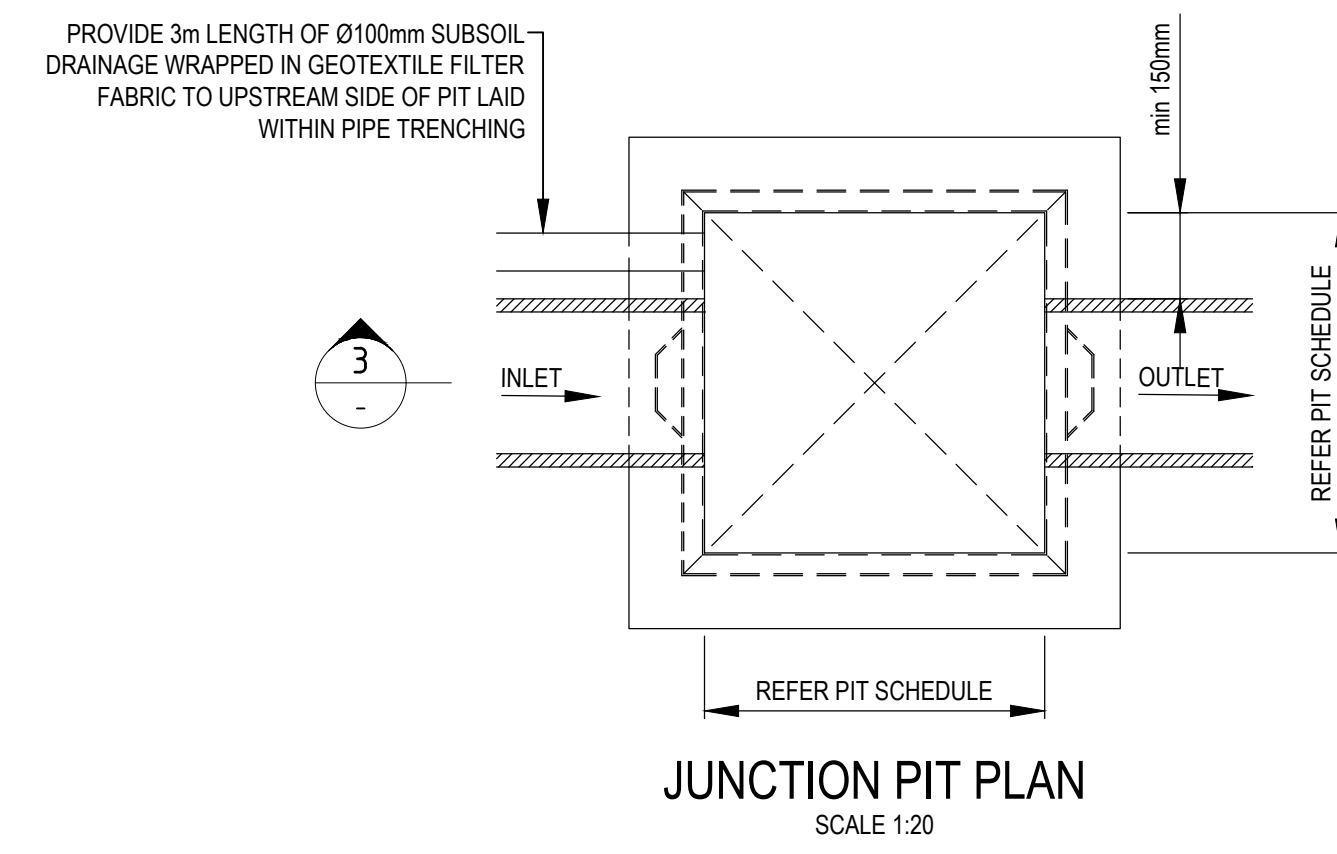
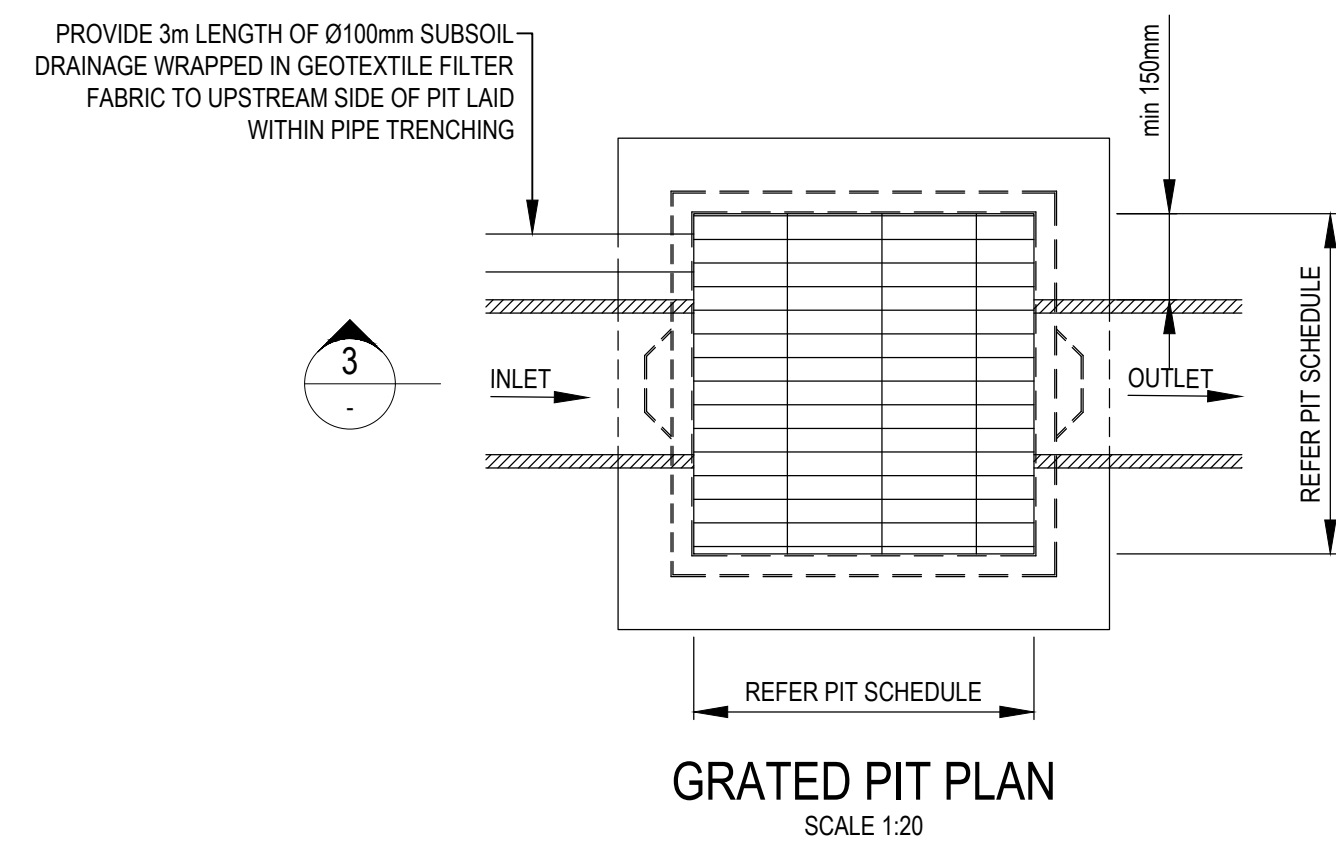
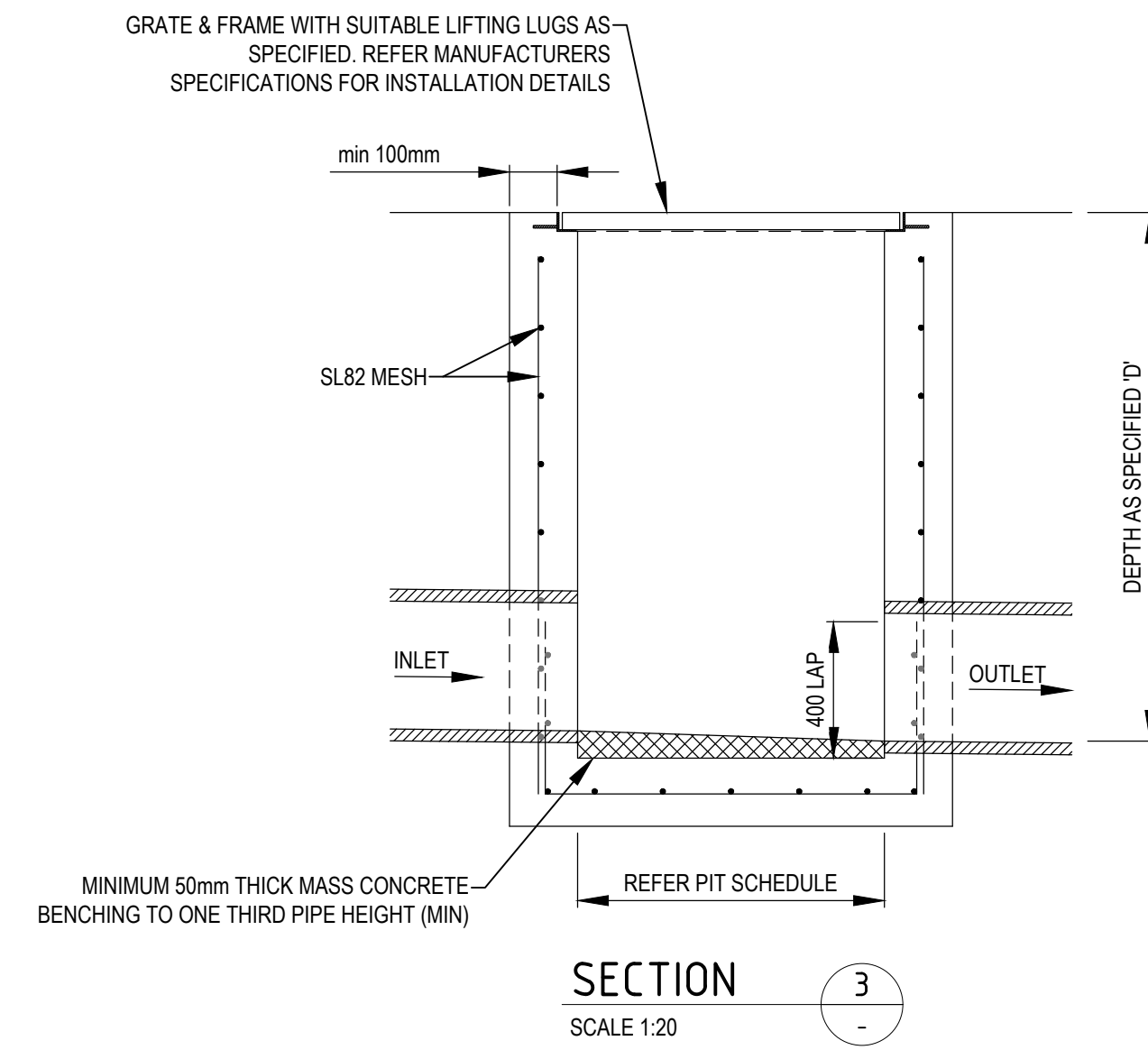
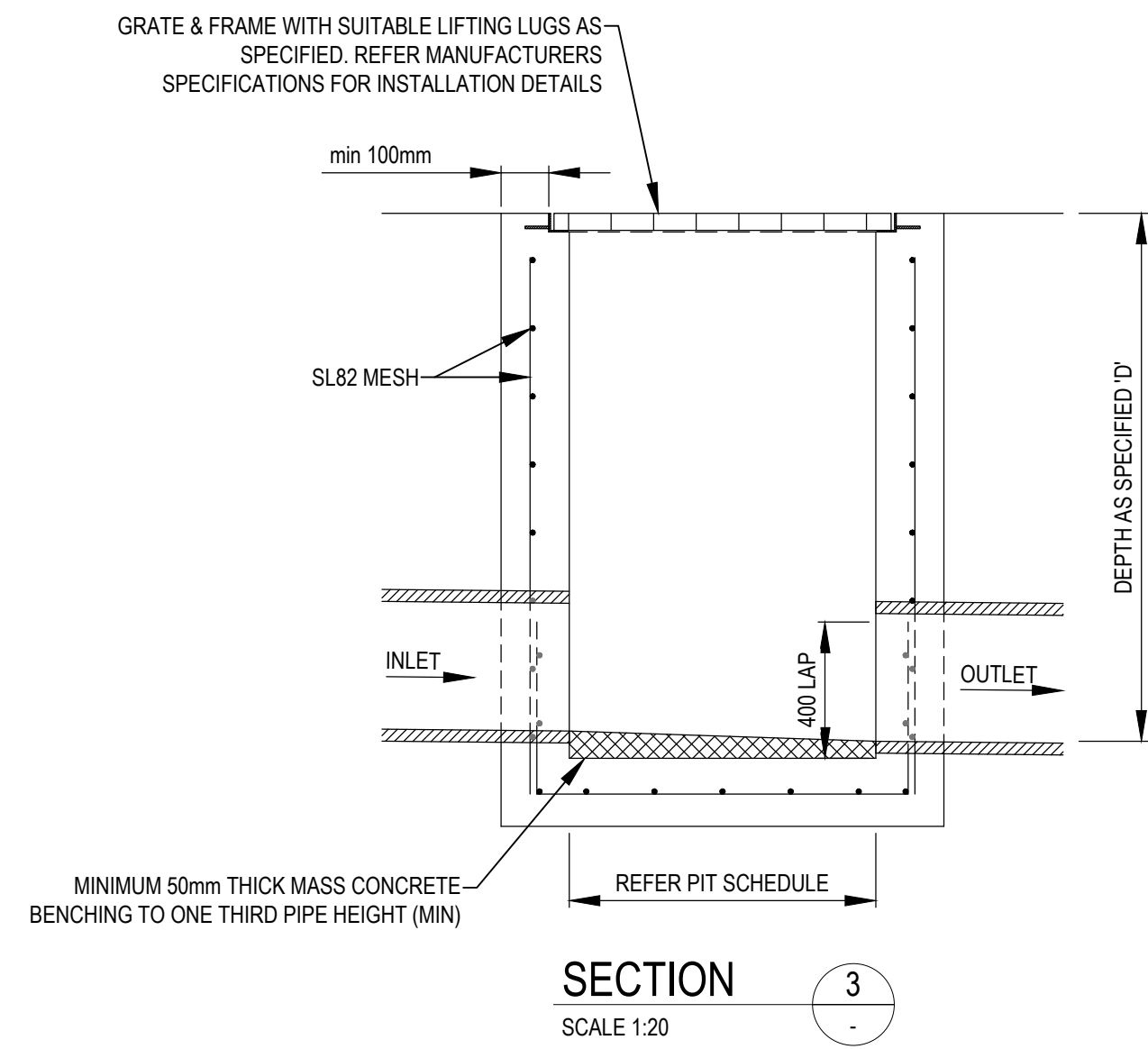
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PROJECT

STORMWATER DRAINAGE DETAILS

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NEW PART OF
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Design with
community in mind

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