12-20 Berry Road & 11-19 Holdsworth Avenue St Leonards South NSW 2065 Australia

Development Application

Stormwater Management Report

FOR / Civil Engineering Services

CLIENT / Aqualand St Leonards Development 3 Pty Ltd

DOCUMENT NO / S21268-RPT-CI-0001 REV / C DATE / 16/06/2022

bgeeng.com—

CONTENTS

Appendices

Document *Control*

Revision	Date	Description	Prepared	Reviewed	Approved
A	10/06/2022	Draft	AM	SH	SH
B	15/06/2022	Issued For Approval	AM	SH	SH
C	16/06/2022	Issued For Approval	AM	SH	SH

Relevant Documentation

The following documentation has been used as a reference in the preparation of this report and the stormwater concept plans:

- Architectural Plans by SilvesterFuller June 2022
- Detailed Survey by SDG Land Development Solutions April 2016
- Landscape Concept by RPS Australia East June 2022
- Lane Cove Council Stormwater Concept plan for work in Berry Rd and Holdsworth Ave

1 INTRODUCTION

BG&E Pty Ltd (BG&E) has been engaged by Aqualand St Leonards Development 3 Pty Ltd (Aqualand) to prepare a Stormwater Management Report for the proposed development of residential apartment buildings at 12-20 Berry Road & 11-19 Holdsworth Avenue St Leonards South NSW 2065 Australia (Site).

This report will outline the methodology adopted and associated results of:

- Requirement of a detention tank; and
- Water sensitive urban design.

It is understood that this report will be utilised in the Development Application submission and will also inform the basis of the next phases of design works to ensure continuity through the project.

2 EXISTING SCENARIO

2.1 Existing Scenario

St Leonards is a suburb on the lower North Shore of Sydney. St Leonards is located 5 km north-west of the Sydney central business district, and approximately 500m from St Leonards Station. The suburb lies across the local government areas of Municipality of Lane Cove, North Sydney Council and the City of Willoughby. The site is located within the Lane Cove Council. The site is bounded by Berry Road on the Eastern boundary and Holdsworth Avenue on the Western Boundary and consist of 10 separate existing lots.

The site is currently 10 separate residential lots consisting of single dwelling and some attached dual-dwelling houses. Refer to Figure 1 and Figure 2 for images of the existing Site.

Figure 1- Site Aerial Image (Nearmaps, 06.10.2021)

Figure 2 - Site Image – looking from 20 Berry Road to 12 Berry Road (Google Street View, Mar 2021)

2.2 Existing Stormwater Pipe Infrastructure

A review of the Dial Before You Dig (DBYD) information and survey prepared by SDG Land Development Solutions dated 14/04/2016 (refer to Appendix A and Figure 3). There is currently no stormwater drainage in either Holdsworth Ave and Berry Road. Currently property's fronting both of street discharge to kerb. The stormwater is currently collected by grated inlet pits at the end of both of these streets. Council is currently in the process of designing new stormwater drainage in both Holdsworth and Berry but the detailed inverts and locations are yet to be confirmed.

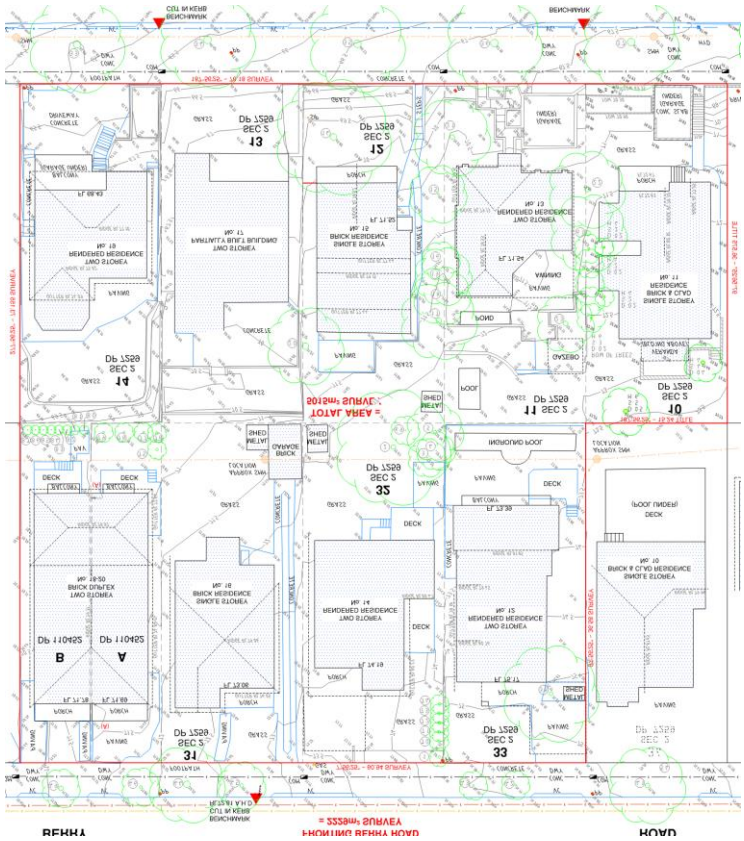


Figure 3: Survey Information by SDG Land Development Solutions

2.3 Existing Site Drainage Description

A survey of the site was completed by SDG Land Development Solutions dated 14/04/2016 but was not able to capture the internal drainage of the site due to the nature of the existing building. A review of the survey data shows the site slopes very steeply towards Holdsworth Street from Berry Road at an approximate slope of 8%. We make note of no existing easements shown on the survey to assist in the drainage of the existing lots.

3 PROPOSED DEVELOPMENT

The purposed development of the Site will consist of two multi-story buildings comprising private apartments, also known as flat residential buildings, 450m^2 childcare and 150m^2 community hall. Refer to Figure 4, which is indicated by the plans below.

Figure 4: Proposed Residential Flat Building – Ground Floor - (Silverster Fuller)

As a part of this development Aqualand will be constructing a portion of the proposed Pedestrian through site link as per the St Leonards South Landscape Master Plan dated October 2020.

Figure 5 below shows an overview of the plan and the section that will be dedicated to Council after construction. This portion has been treated separately from the proposed development with the through site link having a drainage system and WSUD infrastructure independent to the residential apartment.

Figure 5: St Leonards Landscaping Plan

4 DESIGN CRITERIA

4.1 Stormwater Policies and Objectives

An integrated stormwater management and water sensitive urban design concept has been prepared for the development. The strategy has been developed to meet the following objectives and comply with:

- Lane Cove Council DCP Part O: Stormwater Management
- Lane Cove Council DCP Part C: Residential Development

4.2 Proposed Drainage Design - Overview

On-Site Detention (OSD) is required as a part this development as outlined by the Lane Cove Council DCP Part O: Stormwater Management. Lave Cove Council requires new developments to comply with PSD (Permissable Site Discharge) and SSR (Site Storage Requirements) to restrict flow to pre-development conditions for all storms between 20% AEP (1 in 5 year) and 1% AEP (1 in 100 year). We have been advised by council that there will be a new, council owned, stormwater drainage pipe located under Holdsworth Avenue. We have designed in anticipation of this pipe line and may need to be reviewed once detailed information on the proposed line is acquired from council.

As per council recommendation, we will be discharging the lots containing the building independently from the lot dedicated to council's through site link. The residential building and its corresponding lots will drain to an OSD which will limit the discharge as per Lane Cove Council DCP Part O: Stormwater Management and improve the quality of the water discharged to be better than predevelopment quality using OceanGuards and stormfilter (discussed in a later section).

The through site link will discharge to the proposed stormwater pipe using an independent pit and pipe network. As per council advice, an OSD will not be provided for this lot but the quality of the water discharge from the site will be improved using OceanGuards (discussed in a later section).

4.3 Existing Development

As per the Council requirement the existing condition is required to determine the OSD requirements and the WSUD requirements. Below, figure 6, is an image of the pre-existing catchment plan used to calculate the impervious area in the pre-developed state.

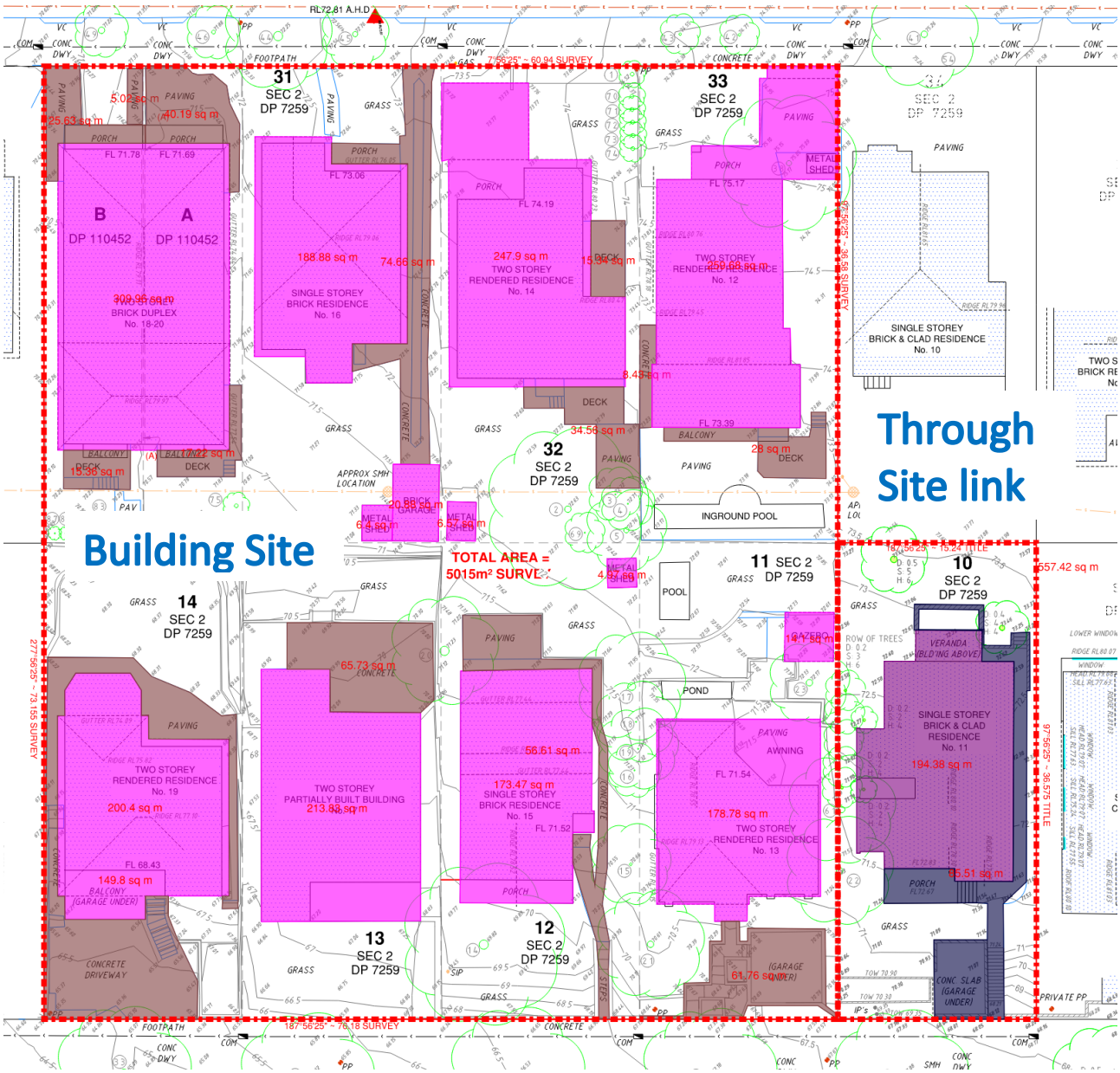


Figure 6: Pre-Development Catchment

Table 2: Summary of pre-development catchment plan areas

Building Lots	m^2		Through Site Link	m^2
Roof	1826		Roof	195
Pervious Landscaping	599		Pervious Landscaping	276
Paved	2034		Paved	85.5

Due to the nature of the Site there us a portion of area that is not able to drain to the OSD Tank via Gravity. This requires the PSD from the OSD tank to be adjusted to make sure the overall Site PSD is complaint. To calculate the bypassing PSD rate the rational method was used.

Below is a summarised table of areas in the post developed state;

Building Lots	m2		Through Site Link	m2
Roof	1629		Roof	0
Landscaping (Treated)	1349		Landscaping (Treated)	157.5
Paved (Treated)	1215.6		Paved	400
Driveway	26			
Landscape (Untreated)	62.4			
Paved (Untreated)	176			

4.4 Proposed Drainage Design – Building

Council requires in there DCP Part O Stormwater Management states that permissible Site Discharge (PSD) and Site Storage Requirement (SSR) is based on per Site area.

PSD: 140 l/s/ha

SSR: 0.0255m^3/m^2

The PSD and SSR where calculated based on Council's On-Site Detention Calculations Sheet refer to Appendix C.

The results of the Council's On-Site Detention Calculations sheet were as follows:

PSD = 54.54 L/s

SSR = 112.14 m^2

4.5 Proposed Drainage Design – Through Site Link

As per council's recommendation we have not provided an OSD for this site as the flow does not need to be restricted and can be allowed to flow fully to council systems. We have proposed to install a pit and pipe system to collect the water from the site to limit uncontrolled overland flow and discharge this water to councils proposed stormwater system in a controlled manner.

4.6 Water sensitive Urban Design

The main objectives for stormwater quality are indicated in Lane Cove Council DCP Part O: Stormwater Management. The design is required to improve the quality of the discharge from the site from its pre-developed state. Methods to achieve the above treatment targets can include the use of proprietary products, rainwater reuse, raingardens, detention basins or treatment further downstream within the external stormwater network.

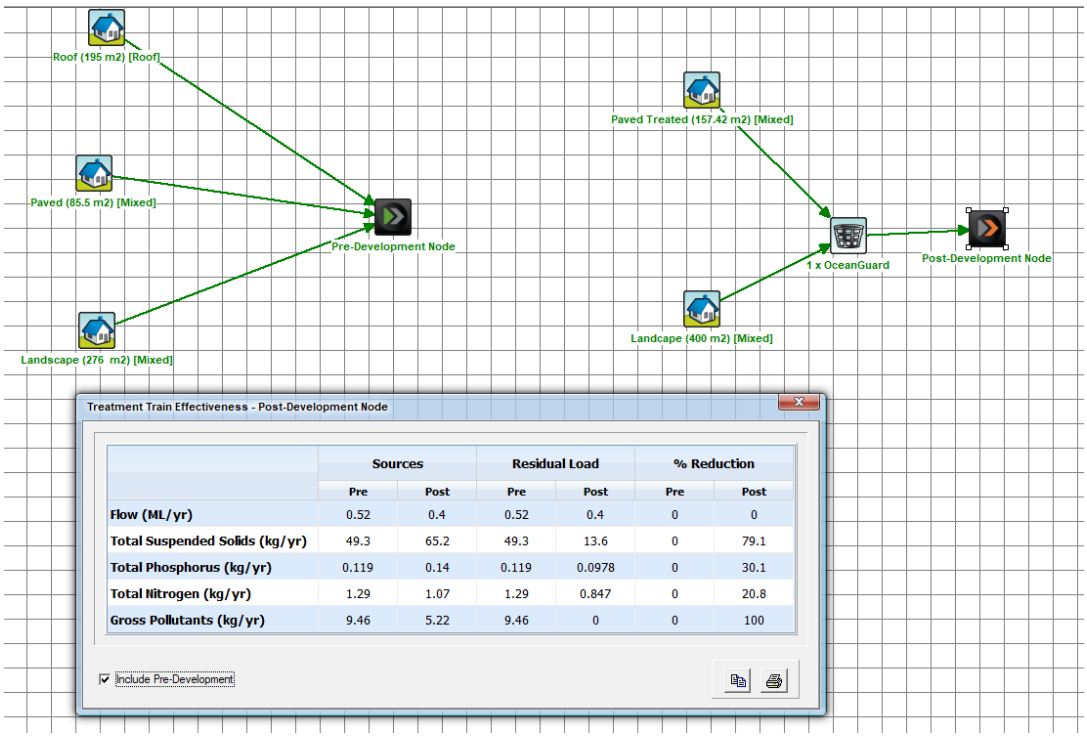
5 ANALYSIS RESULTS

5.1 On-Site Detention Design

Stormwater runoff from the development is required to be discharged at a controlled rate. The design is governed by the requirement set out in Lane Cove Council DCP Part O: Stormwater Management

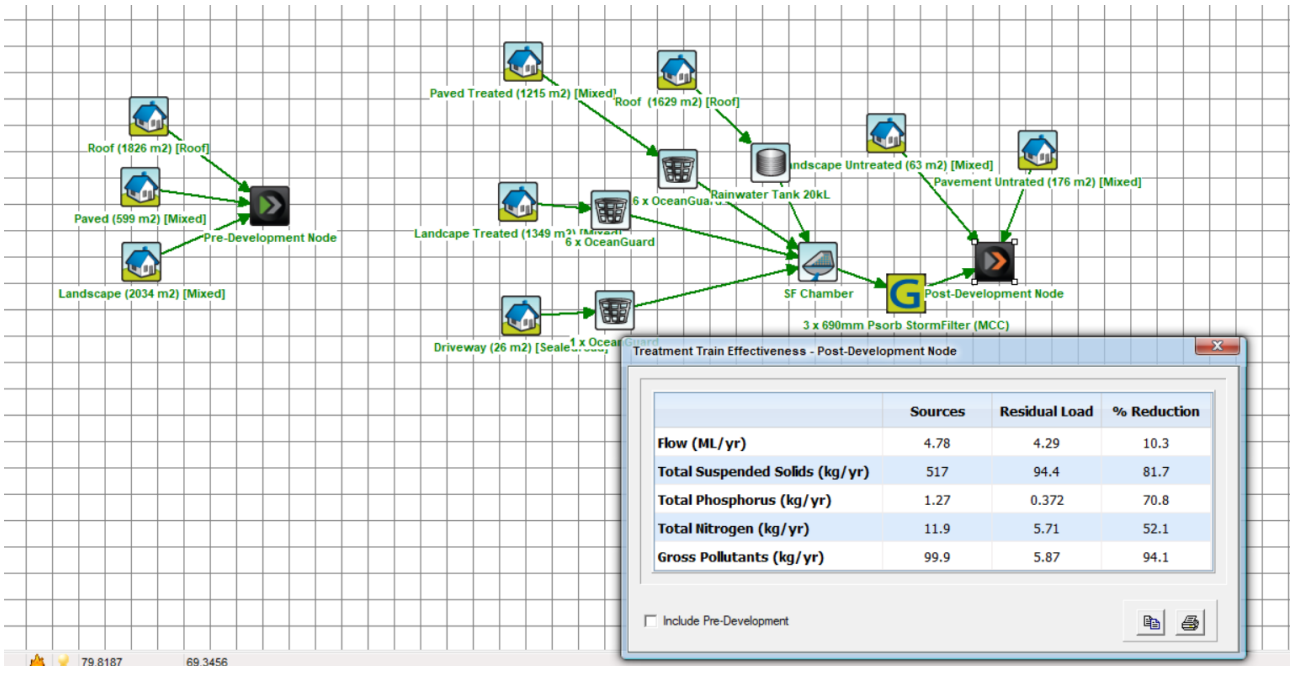
5.2 Water Sensitive Urban Design Implementation

The water quality modelling software MUSIC v6.3 was used to analyse the performance of the treatment train. Figure 6 below shows the MUSIC node and link diagram used to describe the proposed treatment train. The model has been built to assess the adequacy of the proposed stormwater treatment measure and ensure that stormwater quality meets the objectives prior to stormwater runoff leaving the Site.



	Sources		Residual Load		% Reduction	
	Pre	Post	Pre	Post	Pre	Post
Flow (ML/yr)	0.52	0.4	0.52	0.4	0	0
Total Suspended Solids (kg/yr)	49.3	65.2	49.3	13.6	0	79.1
Total Phosphorus (kg/yr)	0.119	0.14	0.119	0.0978	0	30.1
Total Nitrogen (kg/yr)	1.29	1.07	1.29	0.847	0	20.8
Gross Pollutants (kg/yr)	9.46	5.22	9.46	0	0	100

Figure 7: Music Model and Results – Through Site Link



	Sources	Residual Load	% Reduction
Flow (ML/yr)	4.78	4.29	10.3
Total Suspended Solids (kg/yr)	517	94.4	81.7
Total Phosphorus (kg/yr)	1.27	0.372	70.8
Total Nitrogen (kg/yr)	11.9	5.71	52.1
Gross Pollutants (kg/yr)	99.9	5.87	94.1

Figure 8: Music Model and Results - Building Only

The results of the analysis showed the treatment train would achieve the water quality targets set out in Council's DCP. Table 3 and 4 below displays the effectiveness of the treatment train for the primary and secondary treatment. To meet the requirements set out by Council, the following treatment devices were implemented 3 x 690 Psorb (MCC) StormFilter, 13 OceanGuard from Ocean Protect in the building lots and 1 x OceanGuard in the through site link.

The water quality model created using MUSIC software provides an indication of the pollutant removal rates expected when a treatment train of water quality measures is applied to the proposed layout of the development.

Table 3: MUSIC Model Results – Through Site link

Pollutant	Pre-Development Loads (kg/yr)	Post Development Loads (kg/yr)	Water Quality Objective (Pre < Post)	Percentage Reduction Achieved (%)
Gross Pollutants (GP)	9.46	0	YES	100
Total Suspended Solids (TSS)	49.3	13.6	YES	79.1
Total Phosphorus (TP)	0.119	0.0978	YES	30.1
Total Nitrogen (TN)	1.29	0.847	YES	20.8

Table 3: MUSIC Model Results – Building Only

Pollutant	Pre-Development Loads (kg/yr)	Post Development Loads (kg/yr)	Water Quality Objective (Pre < Post)	Percentage Reduction Achieved (%)
Gross Pollutants (GP)	79.3	5.87	YES	94.1
Total Suspended Solids (TSS)	258	93.7	YES	80.4
Total Phosphorus (TP)	0.913	0.377	YES	70.1
Total Nitrogen (TN)	9.3	6.07	YES	48.6

5.3 Proposed Stormwater Treatment Train

5.3.1 Ocean Protect 690 PSORB Stormfilter Cartridges (MCC)

A total of three (3) cartridges are to be introduced to the design as a major filter device located within the WSUD tank at the end of the treatment train. The capture rates provided by the manufacturer, Stormwater360:

- TSS 73.5%
- TN 32%
- TP 49%
- Litter 95%

5.3.2 Ocean Protect OceanGuard

A total of one (1) OceanGuard inserts will be used as a pre-treatment for stormwater runoff to capture litter and coarse sediment surface flows on the Site. OceanGuard inserts are to be installed on all surface inlet pits across the Site. The following capture rates have been adopted for the MUSIC model, based on information provided by Stormwater360:

- TSS 54%
- TN 21%
- TP 30%
- Litter 100%

5.3.3 20kL Rainwater Tank

A 20kL rainwater tank will be implemented to capture stormwater runoff generated off the roof of the residential flat buildings. The collected rainwater will be used for irrigation of the landscaped areas across the Site.

6 CONCLUSION

BG&E has been engaged by Aqualand to prepare a Stormwater Management Report for the proposed development of residential apartment buildings at 12-20 Berry Road & 11-19 Holdsworth Avenue St Leonards South NSW 2065 Australia

This report has outlined the methodology adopted and associated results of:

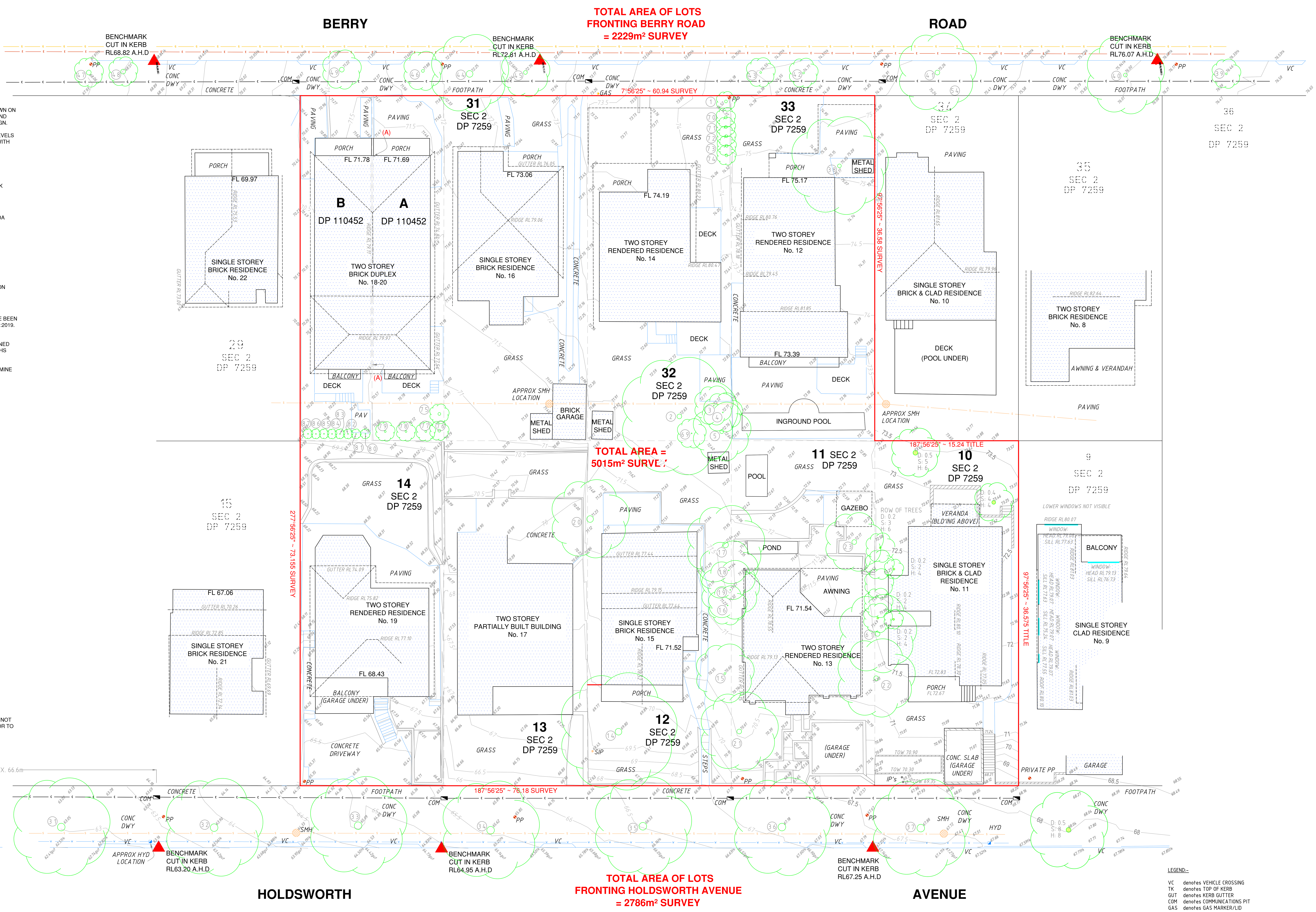
- Requirement of a detention tank; and
- Water sensitive urban design.

As outlined in this report, the following key items have been identified:

- The Site previously was connected to the road, discharging all water from the separate lots to the kerb;
- The proposed stormwater discharge line from the Site has been design to allow for a future connection into Council proposed stormwater line to run along Holdsworth Ave;
- A detention tank is required and will provide 123.4m3 of storage; and
- The building site is expected to discharge approximately 54.54 L/s from the Site during a 1 in 100 Year ARI Storm Event;
- The discharge from the through site link has not been controlled as per council's suggestion but the water quality has been treated to be better than pre-development conditions;
- Water Sensitive Urban Design is required as part of the development of the building site and through site link. This has been achieved using proprietary products. The building site requires 3 x 690 Psorb(MCC) StormFilter and 13 OceanGuard from Ocean Protect in the building space and 3 x OceanGuards separately in the through site link.

APPENDIX A

Site Survey



GENERAL NOTES:-

1. THIS SURVEY IS NOT A 'LAND SURVEY' AS DEFINED BY THE SURVEYING AND SPATIAL INFORMATION ACT, 2002.
2. ONLY TREES GREATER THAN 3.5 METRES IN HEIGHT ARE SHOWN ON THIS PLAN AND THEIR POSITIONS ARE DIAGRAMMATIC ONLY AND MAY REQUIRE ADDITIONAL SURVEY WHERE CRITICAL TO DESIGN.
3. CONTOURS ARE INDICATIVE AT GROUND FORM ONLY. SPOT LEVELS ONLY SHOULD BE USED FOR CALCULATIONS OF QUANTITIES WITH CAUTION.
4. LEVELS ARE ON AUSTRALIAN HEIGHT DATUM (A.H.D.)
5. THE CONTOUR INTERVAL IS 0.5m
6. ALL SETOUT LEVELS MUST BE REFERRED TO THE BENCH MARK SHOWN ON THIS PLAN.

BOUNDARY NOTES:-

7. A BASIC BOUNDARY SURVEY HAS BEEN DONE SUITABLE FOR DA LODGEMENT PURPOSES.
8. BOUNDARIES HAVE NOT BEEN MARKED.

SURVEY INFORMATION NOTES:-

9. THE SURVEY NOT ON A DEFINED COORDINATE SYSTEM.
10. THE ORIGIN OF LEVELS COMES FROM SSM74341 RL76.437
11. THE ORIENTATION OF THIS PLAN IS MGA NORTH. THE VARIATION FROM MGA NORTH TO TRUE NORTH IS APPROXIMATELY 1°06'.

SERVICES NOTES:-

12. ONLY THOSE SERVICES VISIBLE AT THE TIME OF SURVEY HAVE BEEN LOCATED AND ARE QUALITY LEVEL A AS DEFINED BY AS 5488.1:2019.
13. UNDERGROUND SERVICES HAVE BEEN PLOTTED FROM 'DIAL-BEFORE'YOU-DIG' PLANS, ARE QUALITY LEVEL D AS DEFINED BY AS 5488.1:2019 AND ARE ONLY CURRENT FOR THREE MONTHS FROM THE DATE OF SUREVY
14. ALL RELEVANT AUTHORITIES MUST BE CONTACTED TO DETERMINE THE FULL EXTENT OF SERVICES PRIOR TO ANY PLANNING OR WORKS NEAR THE SITE.

CERTIFICATE OF TITLE NOTES:-

15. LOT A IN DP 110452 IS AFFECTED BY:
× CROSS EASEMENTS AFFECTING THE PARTY WALL(S) SHOWN ON THE COMMON BOUNDARY OF LOTS A AND B IN DP 110452. SHOWN AS 'A'
× COVENANT (658032)
× COVENANT (A72305)

16. LOT B IN DP 110452 IS AFFECTED BY:
× CROSS EASEMENTS AFFECTING THE PARTY WALL(S) SHOWN ON THE COMMON BOUNDARY OF LOTS A AND B IN DP 110452. SHOWN AS 'A'.
× COVENANT (658032)
× COVENANT (A72305)

17. LOT 11 OF SEC 2 IN DP 7259 IS AFFECTED BY:
× COVENANT (658032)
× COVENANT (A325065)

18. LOT 12 OF SEC 2 IN DP 7259 IS AFFECTED BY:
× COVENANT (658032)
× COVENANT (A331244)

19. LOT 13 OF SEC 2 IN DP 7259 IS AFFECTED BY:
× COVENANT (658032)
× COVENANT (A330101)

20. LOT 14 OF SEC 2 IN DP 7259 IS AFFECTED BY:
× COVENANT (658032)
× COVENANT (A241721)

21. LOT 15 OF SEC 2 IN DP 7259 IS AFFECTED BY:
× COVENANT (A241721)

22. LOT 29 OF SEC 2 IN DP 7259 IS AFFECTED BY:
× COVENANT (A241721)

23. LOT 31 OF SEC 2 IN DP 7259 IS AFFECTED BY:
× COVENANT (658032)
× COVENANT (A72305)

24. LOT 32 OF SEC 2 IN DP 7259 IS AFFECTED BY:
× COVENANT (A265905)

25. LOT 33 OF SEC 2 IN DP 7259 IS AFFECTED BY:
× COVENANT (A265905)

26. LOT 35 OF SEC 2 IN DP 7259 IS AFFECTED BY:
× COVENANT (A265905)

27. COVENANTS AND RESTRICTIONS NOTED ON THE TITLE HAVE NOT BEEN INVESTIGATED. THESE SHOULD BE INVESTIGATED PRIOR TO DESIGN TO ENSURE ANY FUTURE DEVELOPMENT COMPLIES.

UNDERGROUND SERVICES LEGEND - QUALITY LEVEL D (AS 5488-2013)

W	POTABLE WATER MAIN
S	SEWER MAIN
C	COMMUNICATIONS CABLES
E	ELECTRICITY CABLES
G	GAS MAIN

APPROXIMATE POSITION ONLY VIDE 'DIAL-BEFORE-YOU-DIG' PLANS JOB No. 10487981. WHERE CRITICAL TO DESIGN, UNDERGROUND SERVICES SHOULD BE LOCATED BY MORE ACCURATE METHODS.

CAUTION: FIBRE OPTIC CABLES ARE PRESENT IN THIS AREA

LEGEND:-

VC	denotes VEHICLE CROSSING
TK	denotes TOP OF KERB
GUT	denotes KERB GUTTER
COM	denotes COMMUNICATIONS PIT
GAS	denotes GAS MARKER/LID
PP	denotes POWER POLE
HYD	denotes HYDRANT
SWP	denotes STORMWATER PIT
SL	denotes SURFACE LEVEL
IL	denotes INVERT LEVEL
IP	denotes INSPECTION PIT
SMH	denotes SEWER MANHOLE
SIP	denotes SEWER INSPECTION PIT
FL	denotes FLOOR LEVEL
D:S:H	denote DIAMETER, SPREAD and HEIGHT of TREE

2 4 6 8 10 20
1:200

DIAL BEFORE YOU DIG www.1100.com.au

ISSUE	DATE	AMENDMENT
A	14/04/16	ORIGINAL ISSUE
B	22/10/20	DETAIL AND LEVEL SURVEY OF LOT 10 ADDED
C	28/10/20	SURVEY AREA AMMENDED TO REFLECT DEVELOPMENT AREA

CLIENT: SJD PROPERTY GROUP PTY LTD

SCALE 1:200
ORIGIN OF LEVELS: SSM 74341 RL 76.437
DATUM: A.H.D.
REF.: 7025
DATE: 14/04/2016
SURV/CHK: SW/AT/BE/BJ
SHEET 1 OF 2 SHEETS
PLAN A1
ISSUE C

DETAIL AND LEVEL SURVEY OF LOTS 10-14, 31-33 IN SEC 2 OF DP 4259, & LOTS A & B IN DP 110452
12-20 BERRY ROAD & 11-19 HOLDSWORTH AVENUE
ST LEONARDS

SDG LAND DEVELOPMENT SOLUTIONS
A.B.N. 85 213 523 621
Suite 1 3 Railway Street
BAULKHAM HILLS 2153
P.O.Box 2572
NORTH PARRAMATTA 1750
t: (02) 9630 7955
e: office@sdg.net.au
w: www.sdg.net.au

APPENDIX B

Stormwater Plan

12-20 BERRY RD & 11-19 HOLDSWORTH AVENUE, ST LEONARDS SOUTH NSW 2065, AUSTRALIA

LGA: NORTH SYDNEY COUNCIL
DEVELOPMENT APPLICATION ISSUE

N

SOURCE: NEARMAP

LOCALITY PLAN
SCALE 1:1000

DRAWING INDEX

DRAWING No.	SHEET DESCRIPTION
CI-0000	COVER SHEET, LOCALITY PLAN AND DRAWING INDEX
CI-0200	SITEWORKS AND DRAINAGE BASEMENT 1
CI-0201	SITEWORKS AND DRAINAGE GROUND FLOOR
CI-0270	DRIVEWAY SECTIONS
CI-0300	DRAINAGE CATCHMENT PLAN
CI-0340	DRAINAGE DETAILS
CI-0350	OSD PLAN
CI-0351	OSD SECTIONS AND DETAILS
CI-0700	EROSION AND SEDIMENT CONTROL PLAN
CI-0710	EROSION AND SEDIMENT CONTROL DETAILS

DIAL BEFORE YOU DIG www.1100.com.au

0 10 20 30 40 50 60m
SCALE 1:1000 AT A1 SIZE

NSW

REV	DATE	DESCRIPTION	RVD
A	09.06.22	ISSUED FOR DEVELOPMENT APPROVAL	SH

REVISIONS

CLIENT: AQUALAND

ARCHITECT: SILVESTER FULLER

Sydney *Office*—
L2, 8 Windmill St
Sydney NSW 2000
P / +61 2 9770 3300 *E* / info@bgeeng.com
bgeeng.com—

PROJECT: 12-20 BERRY ROAD & 11-19 HOLDWORTH AVENUE
ST LEONARDS SOUTH NEW 2065
AUSTRALIA

STATUS: ISSUED FOR APPROVAL
NOT TO BE USED FOR CONSTRUCTION

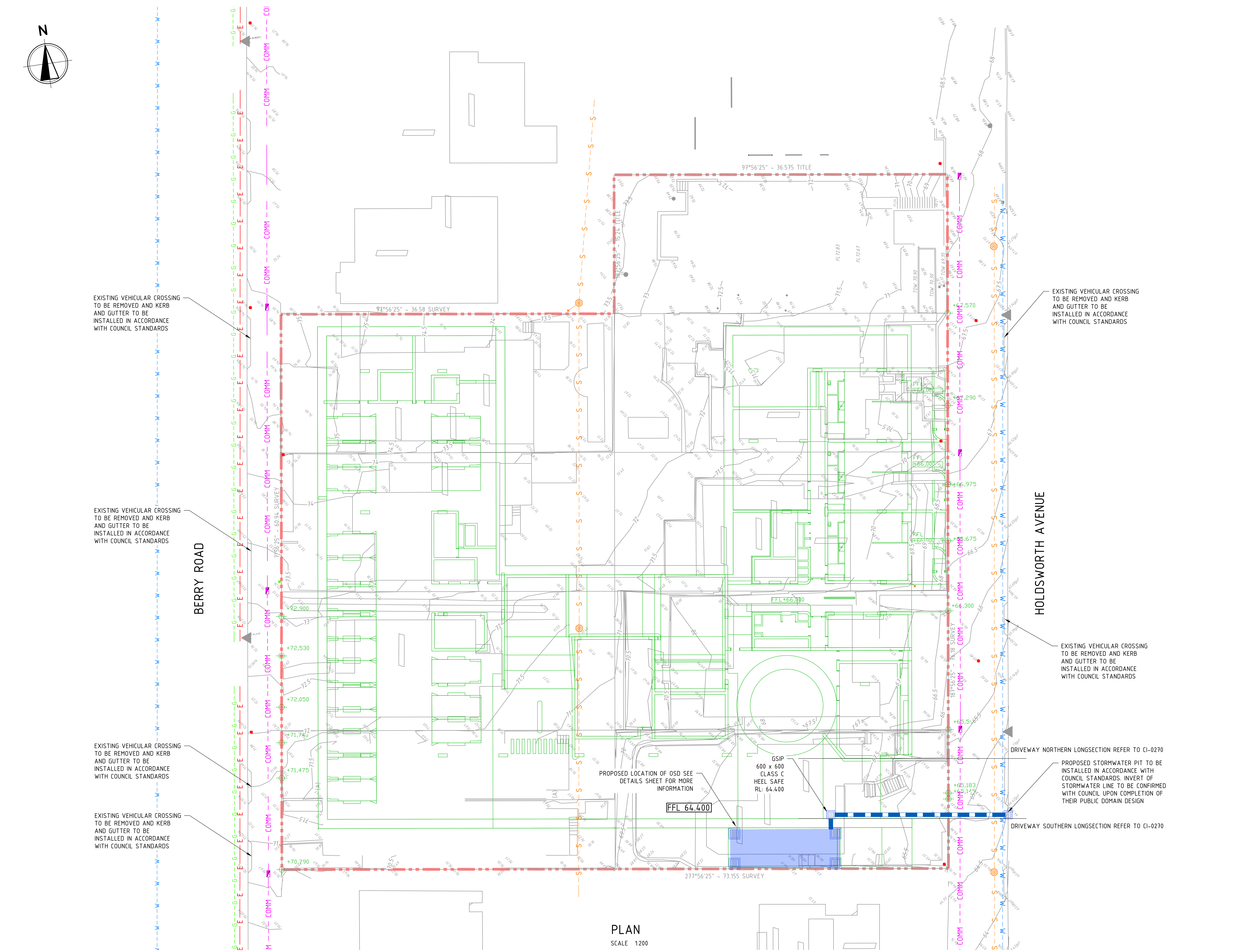
DRAWN	DESIGNED	CHECKED	APPROVED
FM	AM	SH	

DATUM	GRID	SCALE	
AHD	GDA2020 MGA-56	1:1000	AT A1 SIZE

TITLE: COVER SHEET, LOCALITY PLAN AND DRAWING INDEX

PROJECT No.	DRAWING No.	REV.
S21268	CI-0000	A

P:\BGE\SYD\S21268\100 DRAW\100.2 CIVIL\AUTOCAD\S21268-DRG-CI-0000.DWG
9/06/2022 4:07:21 PM



LEGEND

- SITE BOUNDARY
- Ø150 uPVC — PROPOSED STORMWATER (SIZE AND TYPE)
- PROPOSED GRATED INLET/JUNCTION PIT
- GD — PROPOSED GRATED DRAIN
- ARCHITECTURAL
- NEIGHBOURING DEVELOPMENT

EXISTING SERVICES

- E — EXISTING ELECTRICITY UNDERGROUND EXISTING ELECTRICITY
- OH — EXISTING ELECTRICITY OVERHEAD
- S — EXISTING SEWER
- COMM — EXISTING COMMS
- W — EXISTING WATER
- G — EXISTING GAS
- SW — EXISTING STORMWATER

NOTES

1. OCEAN PROTECT OCEANGUARD OR EQUIVALENT PRODUCT TO BE INSTALLED TO ALL GRATED INLET PITS.
2. ALL GRATED TRENCH DRAINS TO BE 100(D)x100(W) EXCEPT FOR THE DRIVEWAY GRATED TRENCH DRAINS TO BE 200(W)x200(D).

0 2 4 6 8 10 12m
SCALE 1:200 AT A1 SIZE

REV	DATE	DESCRIPTION	RVD
A	09.06.22	ISSUED FOR DEVELOPMENT APPROVAL	SH

REVISIONS

REV	DATE	DESCRIPTION	RVD

REVISIONS

CLIENT: AQUALAND

ARCHITECT: SILVESTER FULLER

Sydney *Office* —
L2, 8 Windmill St
Sydney NSW 2000
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bgeeng.com—

BG&E

PROJECT
12-20 BERRY ROAD &
11-19 HOLDWORTH AVENUE
ST LEONARDS SOUTH NEW 2065
AUSTRALIA

STATUS
ISSUED FOR APPROVAL
NOT TO BE USED FOR CONSTRUCTION

DRAWN	DESIGNED	CHECKED	APPROVED
FM	AM	SH	

DATUM	GRID	SCALE	
AHD	GDA2020 MGA-56	1:1000	A1 SIZE

TITLE
SITEWORKS AND DRAINAGE
BASEMENT 1

PROJECT No	DRAWING No	REV
S21268	CI-0200	A

P:\BGE\SYD\S21268\100 DRAW\100.2 CIVIL\AUTOCAD\S21268-DRG-CI-0200.DWG
9/06/2022 4:23:56 PM

N

BERRY ROAD

HOLDSWORTH AVENUE

GRATED PIT 600 X 600 CLASS C HEEL SAFE RL: 71.400

GRATED PIT 600 X 600 CLASS C HEEL SAFE RL: 71.400

GRATED PIT 600 X 600 CLASS C HEEL SAFE RL: 69.000

GRATED PIT 600 X 600 CLASS C HEEL SAFE RL: 69.000

PROPOSED STORMWATER PIT TO BE INSTALLED IN ACCORDANCE WITH COUNCIL STANDARDS. INVERT OF STORMWATER LINE TO BE CONFIRMED WITH COUNCIL UPON COMPLETION OF THEIR PUBLIC DOMAIN DESIGN

GRATED PIT 600 X 600 CLASS B HEEL SAFE RL: 69.950

GRATED PIT 600 X 600 CLASS C HEEL SAFE RL: 69.850

GRATED PIT 600 X 600 CLASS 'B' HEEL SAFE RL: 70.000

GRATED PIT 600 X 600 CLASS 'B' HEEL SAFE RL: 69.720

GRATED PIT 600 X 600 CLASS 'B' HEEL SAFE RL: 70.000

GRATED PIT 900 X 900 CLASS 'B' HEEL SAFE RL: 69.620

FFL 70.00

FFL 70.00

GRATED PIT 600 X 600 CLASS 'B' HEEL SAFE RL: 69.950

GRATED PIT 900 X 900 CLASS 'B' HEEL SAFE RL: 69.950

GRATED PIT 600 X 600 CLASS 'B' HEEL SAFE RL: 69.950

GRATED PIT 900 X 900 CLASS 'B' HEEL SAFE RL: 69.320

GRATED PIT 600 X 600 CLASS 'B' HEEL SAFE RL: 69.950

GRATED PIT 600 X 600 CLASS 'B' HEEL SAFE RL: 69.950

GRATED PIT 600 X 600 CLASS 'B' HEEL SAFE RL: 69.950

GRATED PIT 900 X 900 CLASS C HEEL SAFE RL: 70.700

PROPOSED LOCATION OF OSD SEE DETAILS SHEET FOR MORE INFORMATION

GRATED PIT 900 X 900 CLASS 'B' HEEL SAFE RL: 70.000

GRATED PIT 900 X 900 CLASS 'B' HEEL SAFE RL: 69.200

97°56'25" ~ 36.575 TITLE

277°56'25" ~ 73.155 SURVEY

187°56'25" ~ 76.18 SURVEY

PLAN

SCALE 1:200

LEGEND

- SITE BOUNDARY
- 150 uPVC — PROPOSED STORMWATER (SIZE AND TYPE)
- PROPOSED GRATED INLET/JUNCTION PIT
- GD — PROPOSED GRATED DRAIN
- ARCHITECTURAL
- NEIGHBOURING DEVELOPMENT

EXISTING SERVICES

- EXISTING ELECTRICITY UNDERGROUND
- EXISTING ELECTRICITY
- EXISTING ELECTRICITY OVERHEAD
- EXISTING SEWER
- EXISTING COMMS
- EXISTING WATER
- EXISTING GAS
- EXISTING STORMWATER

NOTES

1. OCEAN PROTECT OCEANGUARD OR EQUIVALENT PRODUCT TO BE INSTALLED TO ALL GRATED INLET PITS.
2. ALL GRATED TRENCH DRAINS TO BE 100(D)x100(W) EXCEPT FOR THE DRIVEWAY GRATED TRENCH DRAINS TO BE 200(W)x200(D).

0 2 4 6 8 10 12m
SCALE 1:200 AT A1 SIZE

REV	DATE	DESCRIPTION	RVD
D	16.06.22	ISSUED FOR DEVELOPMENT APPROVAL	SH
C	14.06.22	ISSUED FOR DEVELOPMENT APPROVAL	SH
B	14.06.22	ISSUED FOR DEVELOPMENT APPROVAL	SH
A	09.06.22	ISSUED FOR DEVELOPMENT APPROVAL	SH

REVISIONS

REVISIONS

CLIENT: AQUALAND

ARCHITECT: SILVESTERFULLER

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PROJECT: 12-20 BERRY ROAD & 11-19 HOLDSWORTH AVENUE
ST LEONARDS SOUTH NEW 2065
AUSTRALIA

STATUS: ISSUED FOR APPROVAL
NOT TO BE USED FOR CONSTRUCTION

DRAWN	DESIGNED	CHECKED	APPROVED
FM	AM	SH	

DATUM	GDA2020	SCALE	AT	SIZE
AHD	MGA-56	1:200	A1	

TITLE: SITEWORKS AND DRAINAGE GROUND FLOOR

PROJECT No.	DRAWING No.	REV.
S21268	CI-0201	D

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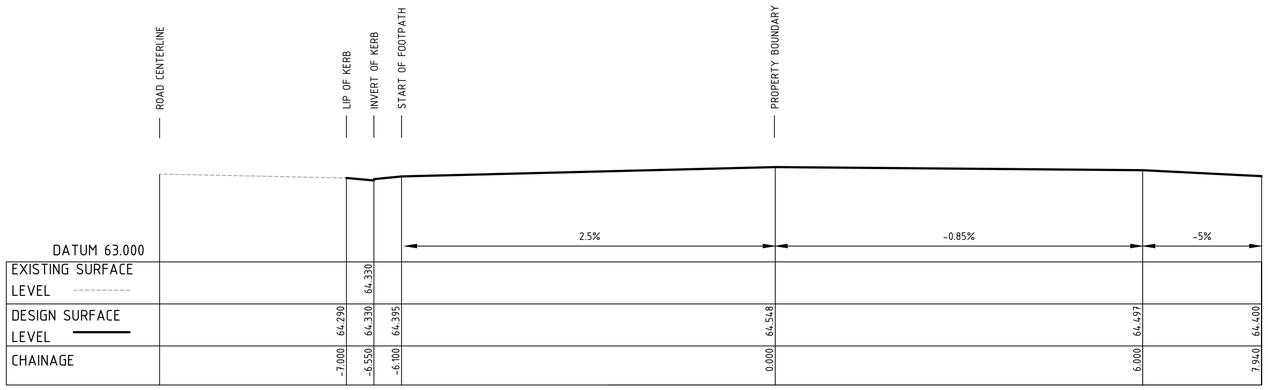
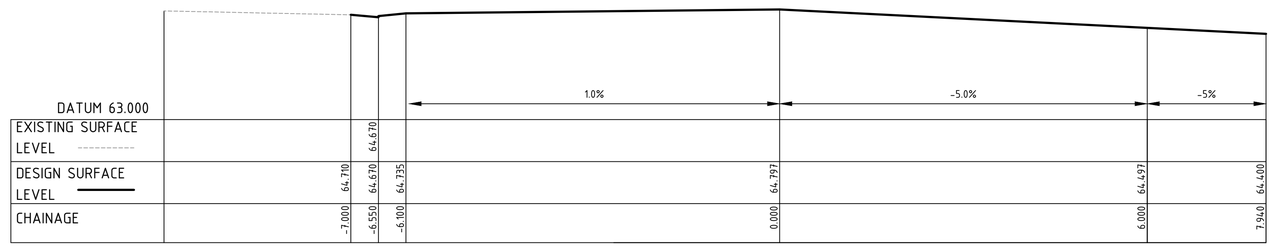


DATUM 63.000						
EXISTING SURFACE LEVEL		64.330				
DESIGN SURFACE LEVEL	64.290	64.330	64.395	64.548	64.497	64.400
CHAINAGE	-7.000	-6.550	-6.100	0.000	6.000	7.940

DRIVEWAY SOUTHERN LONGITUDINAL SECTION



DATUM 63.000						
EXISTING SURFACE LEVEL		64.670				
DESIGN SURFACE LEVEL	64.710	64.670	64.735	64.797	64.497	64.400
CHAINAGE	-7.000	-6.550	-6.100	0.000	6.000	7.940

DRIVEWAY NORTHERN LONGITUDINAL SECTION

0 0.5 1.0 1.5 2.0 2.5 3.0m
SCALE 1:50 AT A1 SIZE

REV	DATE	DESCRIPTION	RVD
A	08.06.22	ISSUED FOR DEVELOPMENT APPROVAL	SH

REVISIONS

REV	DATE	DESCRIPTION	RVD

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PROJECT: 12-20 BERRY ROAD & 11-19 HOLDWORTH AVENUE
ST LEONARDS SOUTH NEW 2065
AUSTRALIA

STATUS: ISSUED FOR APPROVAL
NOT TO BE USED FOR CONSTRUCTION

DRAWN	DESIGNED	CHECKED	APPROVED
FM	AM	SH	

DATUM	GRID	SCALE	
AHD	GDA2020 MGA-56	AS SHOWN	AT A1 SIZE

TITLE: DRIVEWAY SECTIONS

PROJECT No.	DRAWING No.	REV.
S21268	CI-0270	A

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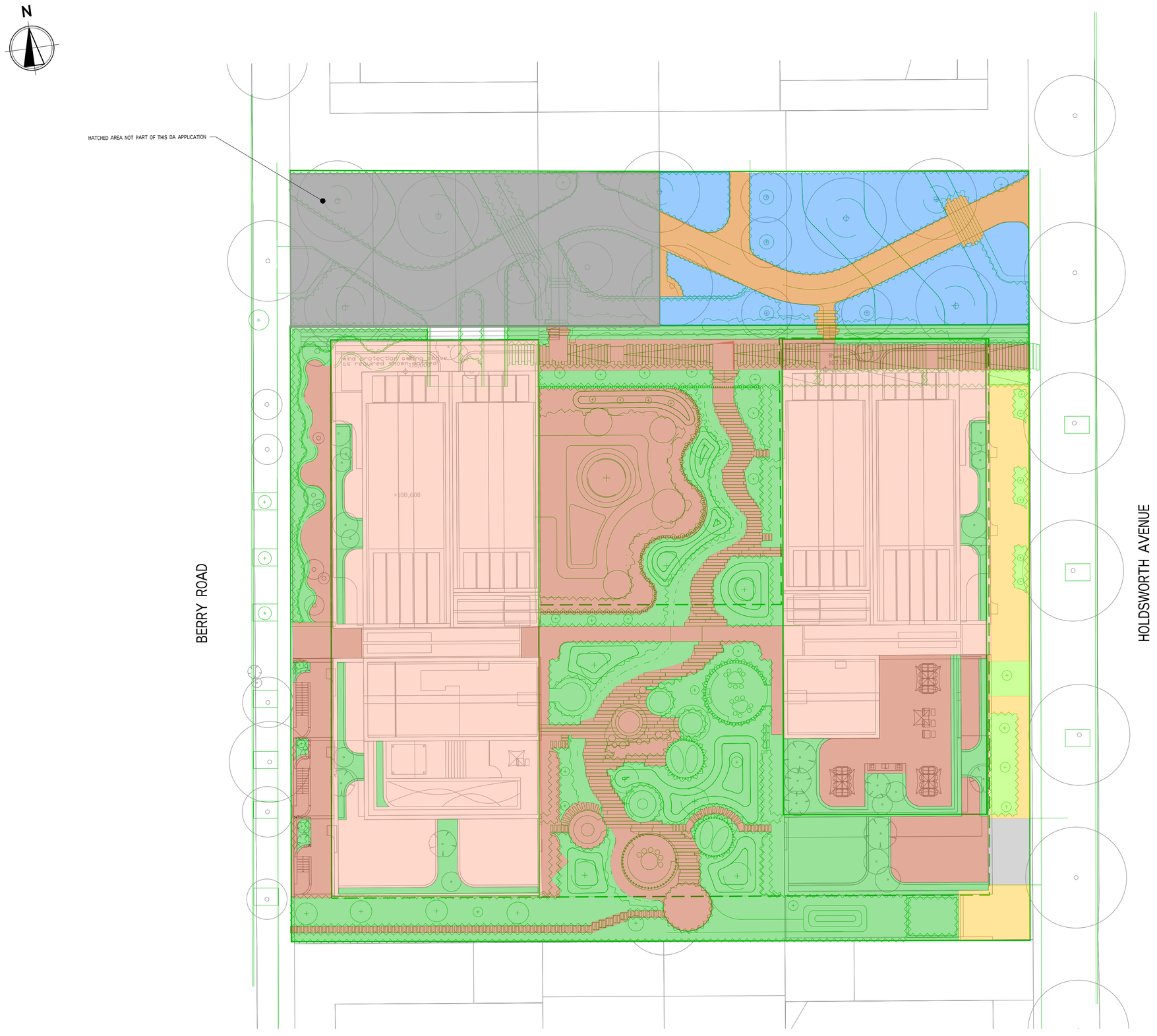

LEGEND

- ROOF CATCHMENT 1629 m²
- PAVED AREA (UNTREATED) CATCHMENT 176 m²
- PAVED AREA (TREATED) CATCHMENT 1215 m²
- PAVED AREA (PARK) CATCHMENT 157 m²
- LANDSCAPE (TREATED) CATCHMENT 1349 m²
- LANDSCAPE (UNTREATED) CATCHMENT 63 m²
- LANDSCAPE (PARK) CATCHMENT 400 m²
- DRIVEWAY CATCHMENT 26 m²

WATER QUALITY FOR DEVELOPMENT

4458 m²

TREATMENT DEVICES:
- WATER QUALITY CHAMBER WITH 3 OCEAN PROTECT 690 PSORB (MCC) STORMFILTER CARTRIDGES
- 13 X OCEANGUARD

TREATMENT STANDARDS			
POLLUTANT	PRE	POST	COUNCIL REQUIREMENT REDUCTION FROM PRE TO POST BY:
GROSS POLLUTANTS	79.3	5.87	OK
TOTAL SUSPENDED SOLIDS	258	93.7	OK
TOTAL PHOSPHORUS	0.913	0.377	OK
TOTAL NITROGEN	9.3	6.07	40

STORMWATER DRAINAGE REQUIREMENTS HAVE BEEN CALCULATED IN ACCORDANCE WITH LANE COVE COUNCIL DCP SECTION O: STORMWATER MANAGEMENT

WATER QUALITY FOR THE THROUGH SITE LINK

557.4 m²

TREATMENT DEVICES:
- 1 x OCEANGUARD

TREATMENT STANDARDS			
POLLUTANT	PRE	POST	COUNCIL REQUIREMENT REDUCTION FROM PRE TO POST BY:
GROSS POLLUTANTS	9.46	0	OK
TOTAL SUSPENDED SOLIDS	49.3	13.6	OK
TOTAL PHOSPHORUS	0.119	0.0978	OK
TOTAL NITROGEN	1.29	0.847	OK

STORMWATER DRAINAGE REQUIREMENTS HAVE BEEN CALCULATED IN ACCORDANCE WITH LANE COVE COUNCIL DCP SECTION O: STORMWATER MANAGEMENT

0 2 4 6 8 10 12m
SCALE 1:200 AT A1 SIZE

REV	DATE	DESCRIPTION	RVD
B	16.06.22	ISSUED FOR DEVELOPMENT APPROVAL	SH
A	09.06.22	ISSUED FOR DEVELOPMENT APPROVAL	SH

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CLIENT: AQUALAND

ARCHITECT: SILVESTER FULLER

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PROJECT: 12-20 BERRY ROAD & 11-19 HOLDSWORTH AVENUE
ST LEONARDS SOUTH NEW 2065
AUSTRALIA

STATUS: ISSUED FOR APPROVAL
NOT TO BE USED FOR CONSTRUCTION

DRAWN	DESIGNED	CHECKED	APPROVED
FM	AM	SH	

DATUM: AHD | GRID: GDA2020 MGA-56 | SCALE: AS SHOWN AT A1 SIZE

TITLE: DRAINAGE CATCHMENT PLAN

PROJECT No. S21268 | DRAWING No. CI-0300 | REV. B

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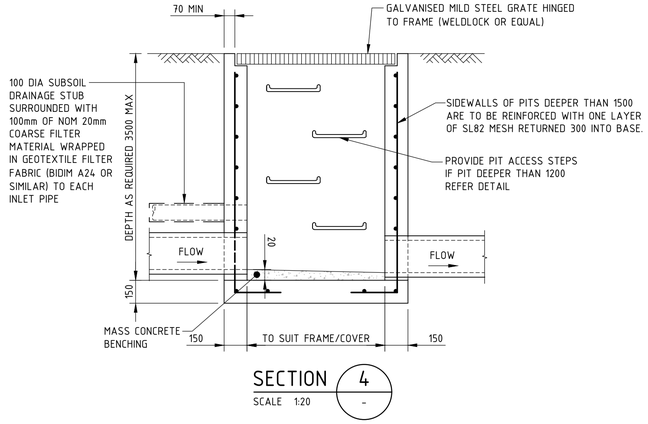
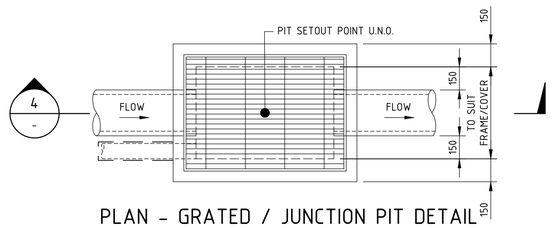
NOTES

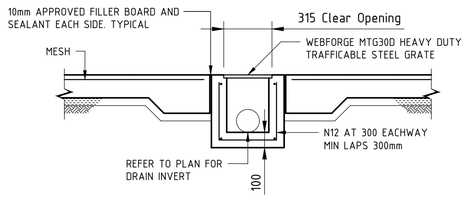
1. ALL DIMENSIONS ARE IN MILLIMETRES U.N.O.



SECTION 4/-
SCALE 1:20



PLAN - GRATED / JUNCTION PIT DETAIL
SCALE 1:20



GRATED TRENCH DETAIL
SCALE : N.T.S

0 0.2 0.4 0.6 0.8 1.0 1.2m
SCALE 1:20 AT A1 SIZE

0 100 200 300 400 500 600mm
SCALE 1:10 AT A1 SIZE

REV	DATE	DESCRIPTION	RVD
A	09.06.22	ISSUED FOR DEVELOPMENT APPROVAL	SH

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PROJECT: 12-20 BERRY ROAD & 11-19 HOLDWORTH AVENUE
ST LEONARDS SOUTH NEW 2065
AUSTRALIA

STATUS: ISSUED FOR APPROVAL
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TITLE: DRAINAGE DETAILS

DRAWN	DESIGNED	CHECKED	APPROVED
FM	AM	SH	

DATUM	GRID	SCALE	PROJECT No.	DRAWING No.	REV.
AHD	GDA2020 MGA-56	AS SHOWN AT A1 SIZE	S21268	CI-0340	A

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NOTES

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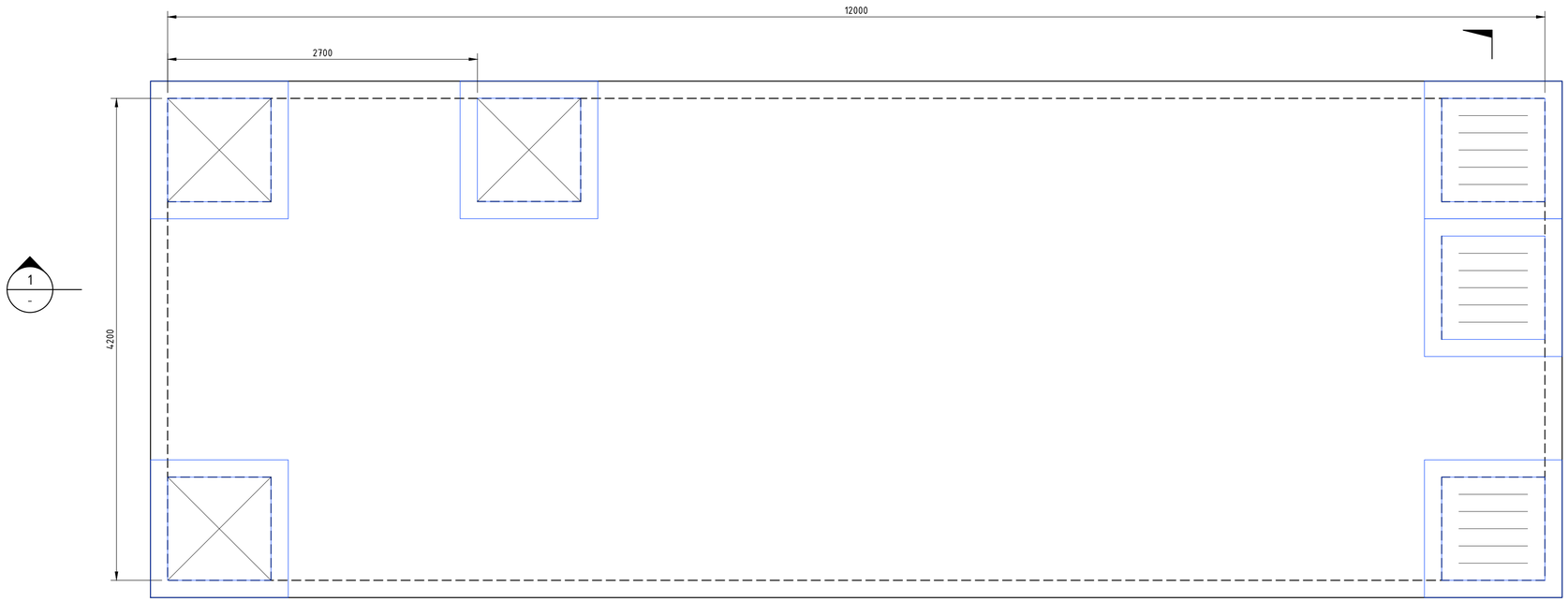
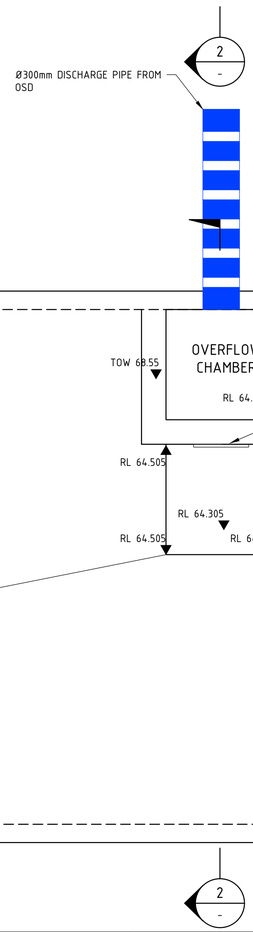


OSD TANK PLAN

SCALE 1:25



OSD TANK BASE PLAN

SCALE 1:25

0 0.25 0.5 0.75 1.0 1.25 1.5m

SCALE 1:25 AT A1 SIZE

REV	DATE	DESCRIPTION	RVD
B	14.06.22	ISSUED FOR DEVELOPMENT APPROVAL	SH
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PROJECT: 12-20 BERRY ROAD & 11-19 HOLDWORTH AVENUE
ST LEONARDS SOUTH NEW 2065
AUSTRALIA

STATUS: ISSUED FOR APPROVAL
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DRAWN	DESIGNED	CHECKED	APPROVED
FM	AM	SH	

DATUM	GRID	SCALE	
AHD	GDA2020 MGA-56	AS SHOWN	AT A1 SIZE

TITLE: OSD PLAN

PROJECT No.	DRAWING No.	REV.
S21268	CI-0350	B

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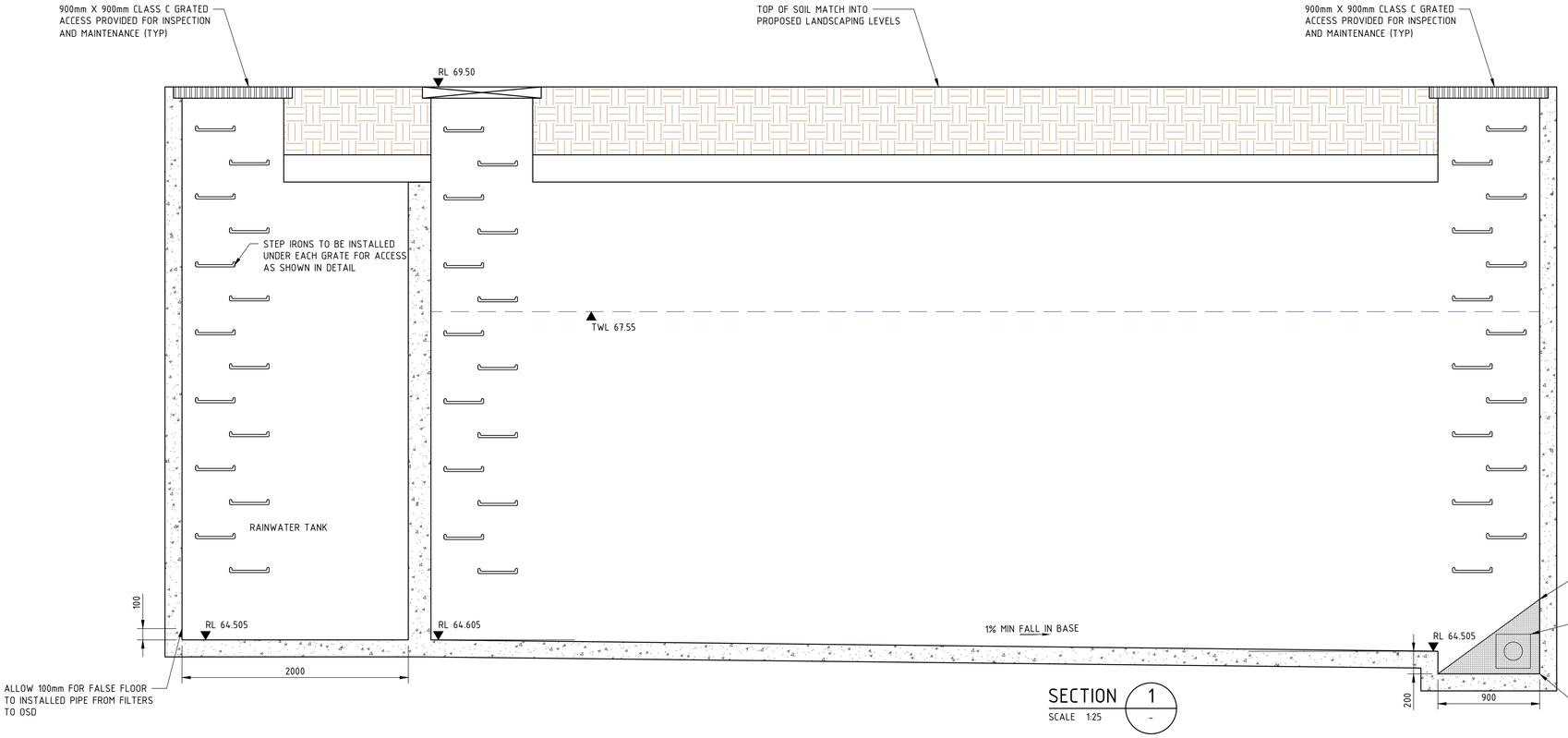
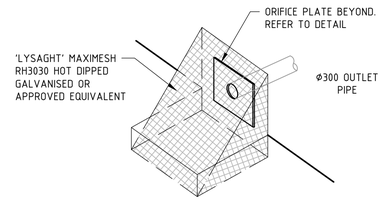


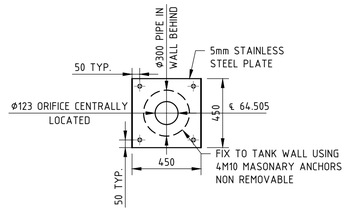
SECTION 1
SCALE 1:25

NOTES

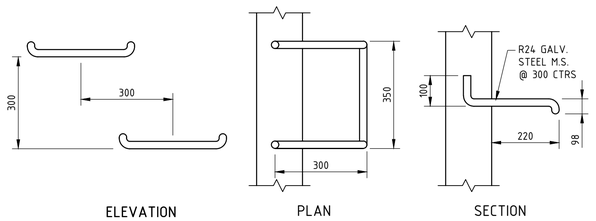
1. ALL DIMENSIONS ARE IN MILLIMETRES U.N.O.



TRASH SCREEN DETAIL
N.T.S

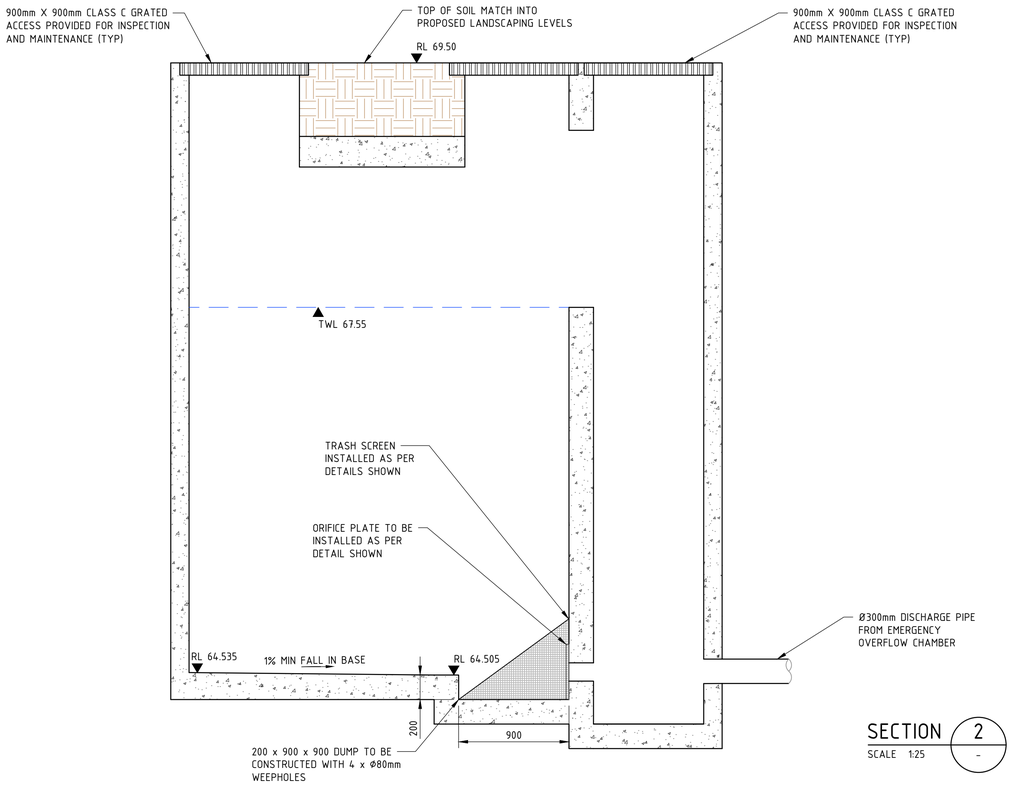


ø150 ORIFICE PLATE DETAIL
SCALE 1:20



ELEVATION PLAN SECTION

TYPICAL STEP IRON DETAILS
N.T.S.



SECTION 2
SCALE 1:25

0 0.2 0.4 0.6 0.8 1.0 1.2m
SCALE 1:20 AT A1 SIZE

0 0.25 0.5 0.75 1.0 1.25 1.5m
SCALE 1:25 AT A1 SIZE

REV	DATE	DESCRIPTION	RVD
B	14.06.22	ISSUED FOR DEVELOPMENT APPROVAL	SH
A	09.06.22	ISSUED FOR DEVELOPMENT APPROVAL	SH

REVISIONS

REV	DATE	DESCRIPTION	RVD

REVISIONS

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DRAWN	DESIGNED	CHECKED	APPROVED
FM	AM	SH	

DATUM	GRID	SCALE	
AHD	GDA2020 MGA-56	AS SHOWN	AT A1 SIZE

TITLE: OSD SECTIONS AND DETAILS

PROJECT No.	DRAWING No.	REV.
S21268	CI-0351	B

N

BERRY ROAD

HOLDSWORTH AVENUE

35 SEC 2 DP 7259

34 SEC 2 DP 7259

29 SEC 2 DP 7259

15 SEC 2 P 7259

INSTALL AND MAINTAIN SANDBAG SEDIMENT FILTERS ACROSS ALL PAVEMENT INTERFACES (TYP)

INDICATIVE LOCATION OF STABILIESED SITE ACCESS (FINAL LOCATION TO BE DETERMINED ON SITE BY SUPERINTENDENT)

INSTALL AND MAINTAIN SECURITY FENCE AROUND SITE. INSTALL DUST CONTROL HESSIAN ALONG SECURITY FENCE.

LOT BOUNDARY

INDICATIVE LOCATION OF SITE STOCKPILE (FINAL LOCATION TO BE DETERMINED ON SITE BY SUPERINTENDENT). INSTALL SEDIMENT FENCE TO DOWNSTREAM SIDE OF STOCKPILE. COVER STOCKPILE WHEN NOT IN USE.

BASEMENT EXTENT

INSTALL AND MAINTAIN SEDIMENT FENCE ALONG DOWNSTREAM SIDE IF SITE (TYP).

INSTALL AND MAINTAIN WIRE MESH AND GRAVEL SEDIMENT FILTERS TO ALL KERB INLET PITS (TYP).

PLAN
SCALE 1:200

LEGEND

- SITE BOUNDARY
- LOT BOUNDARY
- PROPOSED GRATED INLET PIT
- GEOTEXTILE INLET FILTER
- STABILISED SITE ACCESS
- SEDIMENT FENCE
- SECURITY FENCE
- SUGGESTED TEMPORARY STOCKPILE LOCATION
- MESH & GRAVEL INLET FILTER

EXISTING SERVICES

- E — EXISTING ELECTRICITY
- OH — EXISTING ELECTRICITY OVERHEAD
- UG — EXISTING ELECTRICITY UNDERGROUND
- S — EXISTING SEWER
- COMM — EXISTING COMMS
- W — EXISTING WATER
- G — EXISTING GAS
- SW — EXISTING STORMWATER
- X — EXISTING SERVICE TO BE REMOVED

NOTES

1. REFER DRAWING CI-0710 FOR EROSION AND SEDIMENT CONTROL DETAILS.
2. CONTRACTOR TO ENSURE SITE DRAINAGE IS NOT ADVERSELY IMPACTED DURING CONSTRUCTION.
3. CONTRACTOR TO PROVIDE 'SANDBAG SEDIMENT TRAP' TO ALL PAVED / ROAD AREAS (BOTH PROPOSED AND EXISTING) IN ACCORDANCE WITH THE 'BLUE BOOK'.
4. CONTRACTOR TO PROVIDE 'GEOTEXTILE INLET FILTER TRAPS' TO ALL STORMWATER DRAINAGE INLETS (BOTH PROPOSED AND EXISTING) IN ACCORDANCE WITH THE 'BLUE BOOK'.
5. INSTALL AND MAINTAIN SANDBAG FILTERS ACROSS ALL PAVEMENT INTERFACES.

0 2 4 6 8 10 12m
SCALE 1:200 AT A1 SIZE

REV	DATE	DESCRIPTION	RVD
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PROJECT: 12-20 BERRY ROAD & 11-19 HOLDWORTH AVENUE
ST LEONARDS SOUTH NEW 2065
AUSTRALIA

STATUS: ISSUED FOR APPROVAL
NOT TO BE USED FOR CONSTRUCTION

DRAWN	DESIGNED	CHECKED	APPROVED
FM	AM	SH	

DATUM	GRID	SCALE	
AHD	GDA2020 MGA-56	1:200	AT A1 SIZE

TITLE: EROSION AND SEDIMENT CONTROL PLAN

PROJECT No.	DRAWING No.	REV.
S21268	CI-0700	B

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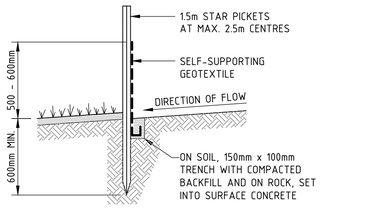
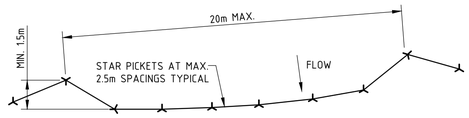
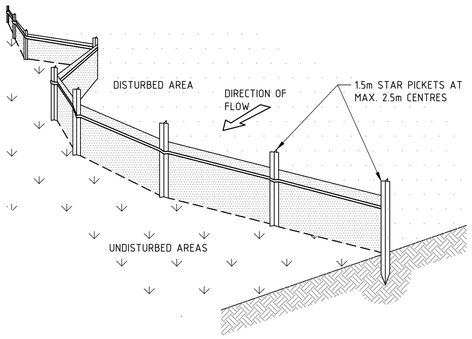


SECTION DETAIL



PLAN

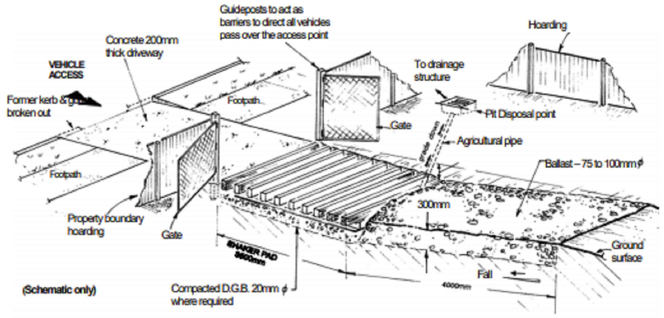


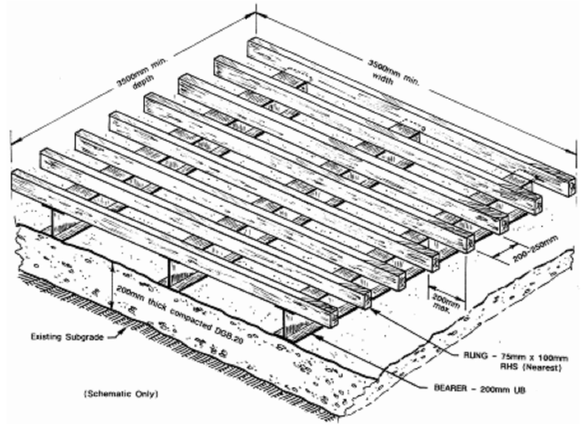
SEDIMENT FENCE CONSTRUCTION NOTES:

1. CONSTRUCT SEDIMENT FENCES AS CLOSE AS POSSIBLE TO BEING PARALLEL TO THE CONTOURS OF THE SITE, BUT WITH SMALL RETURNS AS SHOWN IN THE DRAWING TO LIMIT THE CATCHMENT AREA OF ANY ONE SECTION. THE CATCHMENT AREA SHOULD BE SMALL ENOUGH TO LIMIT WATER FLOW IF CONCENTRATED AT ONE POINT TO 50 LITRES PER SECOND IN THE DESIGN STORM EVENT, USUALLY THE 10-YEAR EVENT.
2. CUT A 150mm DEEP TRENCH ALONG THE UPSLOPE LINE OF THE FENCE FOR THE BOTTOM OF THE FABRIC TO BE ENTRENCHED.
3. DRIVE 1.5m LONG STAR PICKETS INTO GROUND AT 2.5m INTERVALS (MAX.) AT THE DOWNSLOPE EDGE OF THE TRENCH. ENSURE ANY STAR PICKETS ARE FITTED WITH SAFETY CAPS.
4. FIX SELF-SUPPORTING GEOTEXTILE TO THE UPSLOPE SIDE OF THE POSTS ENSURING IT GOES TO THE BASE OF THE TRENCH. FIX THE GEOTEXTILE WITH WIRE TIES OR AS RECOMMENDED BY THE MANUFACTURER. ONLY USE GEOTEXTILE SPECIFICALLY PRODUCED FOR SEDIMENT FENCING. THE USE OF SHADE CLOTH FOR THIS PURPOSE IS NOT SATISFACTORY.
5. JOIN SECTIONS OF FABRIC AT A SUPPORT POST WITH A 150mm OVERLAP.
6. BACKFILL THE TRENCH OVER THE BASE OF THE FABRIC AND COMPACT IT THOROUGHLY OVER THE GEOTEXTILE.

SEDIMENT FENCE

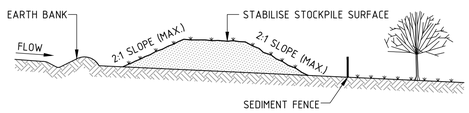
SCALE N.T.S





STABILISED SITE ACCESS - SHAKER GRID

SCALE N.T.S.

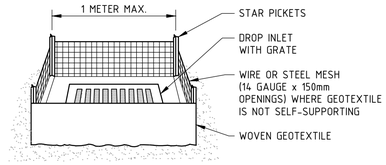


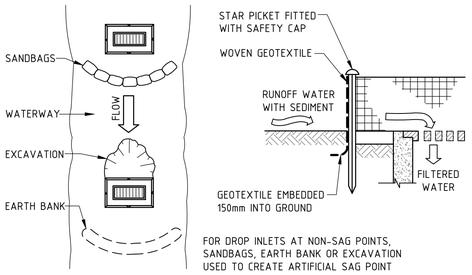
STOCKPILE CONSTRUCTION NOTES:

1. PLACE STOCKPILES MORE THAN 2 (PREFERABLY 5) METRES FROM EXISTING VEGETATION, CONCENTRATED WATER FLOW, ROADS AND HAZARD AREAS.
2. CONSTRUCT ON THE CONTOUR AS LOW, FLAT, ELONGATED MOUNDS.
3. WHERE THERE IS SUFFICIENT AREA, TOPSOIL STOCKPILES SHALL BE LESS THAN 2 METRES IN HEIGHT.
4. WHERE THEY ARE TO BE PLACE FOR MORE THAN 10 DAYS, STABILISE FOLLOWING THE APPROVED ESCP OR SWMP TO REDUCE THE C-FACTOR TO LESS THAN 0.10.
5. CONSTRUCT EARTH BANKS ON THE UPSLOPE SIDE TO DIVERT WATER AROUND STOCKPILES AND SEDIMENT FENCES 1 TO 2 METRES DOWNSLOPE.

STOCKPILES

SCALE N.T.S





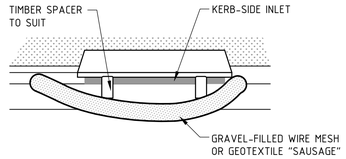
FOR DROP INLETS AT NON-SAG POINTS, SANDBAGS, EARTH BANK OR EXCAVATION USED TO CREATE ARTIFICIAL SAG POINT

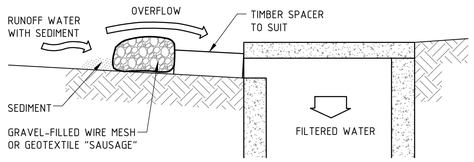
GEOTEXTILE INLET FILTER CONSTRUCTION NOTES:

1. FABRICATE A SEDIMENT BARRIER MADE FROM GEOTEXTILE OR STRAW BALES.
2. PICKET SPACING TO BE A MAXIMUM 1.0m CENTRES.
3. IN WATERWAYS, ARTIFICIAL SAG POINTS CAN BE CREATED WITH SANDBAGS OR EARTH BANKS AS SHOWN IN THE DRAWING.
4. DO NOT COVER THE INLET WITH GEOTEXTILES UNLESS THE DESIGN IS ADEQUATE TO ALLOW FOR ALL WATERS TO BYPASS IT.

GEOTEXTILE INLET FILTER

SCALE N.T.S





MESH & GRAVEL INLET FILTER CONSTRUCTION NOTES:

1. INSTALL FILTERS TO KERB INLETS ONLY AT SAG POINTS.
2. FABRICATE A SLEEVE MADE FROM GEOTEXTILE OR WIRE MESH LONGER THAN THE LENGTH OF THE INLET PIT AND FILL IT WITH 25mm TO 50mm GRAVEL.
3. FORM AN ELLIPTICAL CROSS-SECTION ABOUT 150mm HIGH x 400mm WIDE.
4. PLACE THE FILTER AT THE OPENING LEAVING AT LEAST A 100mm SPACE BETWEEN IT AND THE KERB INLET. MAINTAIN THE OPENING WITH SPACER BLOCKS.
5. FORM A SEAL WITH THE KERB TO PREVENT SEDIMENT BYPASSING THE FILTER.
6. SANDBAGS FILLED WITH GRAVEL CAN SUBSTITUTE FOR THE MESH OR GEOTEXTILE PROVIDING THEY ARE PLACED SO THAT THEY CAN FIRMLY ABUT EACH OTHER AND SEDIMENT-LADEN WATERS CANNOT PASS BETWEEN.

MESH & GRAVEL INLET FILTER

SCALE N.T.S

REV	DATE	DESCRIPTION	RVD
A	09.06.22	ISSUED FOR DEVELOPMENT APPROVAL	SH

REVISIONS

REVISIONS

CLIENT: AQUALAND

ARCHITECT: SILVESTERFULLER

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PROJECT: 12-20 BERRY ROAD & 11-19 HOLDWORTH AVENUE
ST LEONARDS SOUTH NEW 2065
AUSTRALIA

STATUS: ISSUED FOR APPROVAL
NOT TO BE USED FOR CONSTRUCTION

DRAWN	DESIGNED	CHECKED	APPROVED
FM	AM	SH	

DATUM	GRID	SCALE	
AHD	GDA2020 MGA-56	NOT TO SCALE	AT A1 SIZE

TITLE: EROSION AND SEDIMENT CONTROL DETAILS

PROJECT No.	DRAWING No.	REV.
S21268	CI-0710	A

P:\BGE\SYD\S21268\300 DRAW\100.2 CIVIL\AUTOCAD\S21268-DRG-CI-0710.DWG
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APPENDIX C

Council OSD Tank Detention Calculation Sheet

Appendix 13 – OSD Checklist for DA Submission

ON-SITE STORMWATER DETENTION CHECKLIST

This form is to be used to determine if OSD will be required for residential developments and must be completed before the submission of any application.

PART A. Address and type of proposed development

Street No……..Street Name 12-20 Berry Road & 11-19 Holdsworth Ave……
Lot No…….. DP No…….. Suburb St Leonards South……

Type of development (tick relevant box).

- ☐ Duplex Residential Building
- ☑ Multiple Occupancy Residential (villa, flats etc)
- ☐ Extensions
- ☐ Single Residential
- ☐ Commercial
- ☐ Garages
- ☐ Other……

PART B. Exemption for discharge directly to Lane Cove River

Is the site within the designated exclusion zone along the foreshore of the Lane Cove River. (tick one only). (Confirm with Council's Urban Services Division).

- ☑ No
- ☐ Yes

If yes, OSD is not required, If no go to part C

PART C. Exemption for minimum allowable size of site impervious area

(a) Site Area …… m^2
(b) Existing impervious area to be removed …… m^2
(c) Existing impervious to be retained …… m^2
(d) Proposed new impervious area:
  (d1) Roof area …… m^2
  (d2) Driveways …… m^2
  (d3) Other paved area …… m^2
  (d4) Supplementary areas (i.e Pervious paving area x 25%) …… m^2
(e) Total proposed NEW impervious area (d1) + (d2) + (d3) + (d4) – (b) = …… m^2
(f) Total post development impervious area (c) + (d1) + (d2) +(d3) + (d4) =…… m^2
(g) Post development impervious area (f) x 100 / (a) = …… %

OSD will not be required if one or more of the following are satisfied

- ☐ (e) is less than $50m^2$ increase in site cover and (f) is less than 65% of the total site area. (only applicable for alterations and additions)
- ☐ (g) is less than 35% of site area

Note: If OSD is not required, then the collected stormwater runoff is to be directed to a 600x600mm environmental pollution control pit with sediment collection sump and drainage filter, prior to discharging to an approved outlet. The control pit is to be designed as a gross pollutant trap to remove pollutants from the stormwater flow.

PART D. Special Consideration

Where the applicant believes that special consideration should be given for exemption from OSD, even though Parts A, B, C, or D are not satisfied, they may request exemption from OSD. Consideration may only be given on reasonable grounds and should be discussed with Council's Development Engineer.

Appendix 14 – OSD Calculation Sheet

ON-SITE DETENTION CALCULATION SHEET

DEVELOPMENT TYPE: Residential Flat Building

ADDRESS: 12-20 Berry Road & 11-19 Holdsworth Ave, St Leonards South

Site Area (m²)	4,457.6	(A)
Total Impervious Area (roofs, driveways, hardstand etc) (m²)	3020	(B)
Total Area draining to the Storage Facility (m²) (impervious and pervious areas)	4,218.6	(C)
New Impervious Area bypassing the Storage Facility	176	(D)
$\frac{(B)+(D)}{(B)} =$	1.06	(E)

cannot be greater than 1.25.

Permitted Site Discharge (PSD) rate per m²

If (D) = 0 then PSD = 0.014 l/sec/m²

If (D) ≠ 0 then PSD = $0.014x(E)^{-1.37}$ l/sec/m² — 0.01293 (F)

PERMITTED SITE DISCHARGE (l/s) (C) x (F) — 54.54 l/s

Storage Volume per m²
(G) = 0.0255 m³/m² for all Catchments — ***0.0255*** (G)

SITE STORAGE REQUIREMENT (m³) ((C) + (D)) x (G) — 112.14 m³

OUTLET CONTROL - using a Sharp Edged Orifice Plate

Height Difference between top water level and Centre of Orifice (m) 3 (H)

ORIFICE DIAMETER (mm)

123 mm = $21.9\sqrt{\frac{PSD}{\sqrt{(H)}}}$

Should pipe and pit losses be used to control outflow, the calculations are to be attached.