Engineering Services Report

Development Application for
Multi-Dwelling Housing

Upon:

Lot 101 DP 1228576

8 Park Avenue
Yamba

ON BEHALF OF:

Hometown Australia

Our Reference: 210217

Date: October 2021

Newton Denny Chapelle
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Revision History

REVISION #	DATE	DESCRIPTION	ORIGINATOR	APPROVED
B	06/07/2021	Issued for Development Application	CP	AZ
C	01/10/2021	Layout Updated	CP	AZ

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contents

Table of Contents

Executive Summary 1

1 Introduction 2

2 Report Scope 2

2.1 Reference Documents 3

3 Site Description 3

4 Bulk Earthworks 3

5 Stormwater Management 4

5.1 Catchment Areas 4

5.2 Stormwater Quality 4

5.3 Stormwater Attenuation 5

5.4 Summary of Stormwater Devices 6

6 Sewer Services 6

7 Water Reticulation 7

8 Sediment and Erosion Control 7

Appendices

Appendix A **Concept Engineering Plans**

Plan Number	Plan Name
210217-DA-BE-01	Bulk Earthworks Plan
210217-DA-BE-02	Site Earthworks Sections
210217-DA-BE-03	Site Earthworks Sections
210217-DA-CI-01	Road Network Plan
210217-DA-CI-02	Services Plan
210217-DA-CI-10	Roads 1 and 2 Longsection
210217-DA-CI-11	Road 3 Longsection
210217-DA-SW-01	Stormwater Plan

Appendix B **Drains Model**

Appendix C **MUSIC-Link Report**

Executive Summary

This Engineering Services Report is to accompany the Development Application seeking approval for a Multi-Dwelling Housing development at 8 Park Avenue, Yamba (Lot 101 DP1228576). The proposed development includes 136 dwellings, Clubhouse, Pool and Bowling Green.

This report details the engineering design elements required for the development to comply with the relevant polices, standards and regulations required for a residential development in the Clarence Valley Council Local Government Area. The following components have been assessed:

- Bulk Earthworks – The extent of the earthworks is dictated by the minimum floor level required for flooding and need to locally drain stormwater within the site. The earthworks will require fill to be imported and retaining walls to be constructed.
- Stormwater Quality – The stormwater quality objectives for the site can be achieved. The proposed treatment train includes primary and secondary treatment devices and an underground stormwater tank.
- Stormwater Attenuation – suitable attenuation for the 5 (0.2EY), 20 (5% AEP) and 100 (1% AEP) year storm events can be provided to ensure post development flows do not exceed predevelopment flows. Attenuation will be provided via an underground tank beneath the bowling green.
- Water Reticulation – Water connections will be supplied to all lots from an extension of the water main in Park Avenue. An internal fire coverage will be provided and designed as part of the construction certificate stage.
- Sewer Reticulation – The majority of the site will be provided with gravity sewer connections. Five lots in the north east corner will be require pressure sewer systems that will be connected to the internal gravity sewer network. A new gravity main will be constructed along Park Avenue to connect to the existing pump station to the west of the site. This is in keeping with that approved for a residential subdivision on the site.

1 Introduction

Newton Denny Chapelle has been engaged to prepare an Engineering Services Report to accompany the application for a Multi-Dwelling Housing development at 8 Park Avenue, Yamba (Lot 101 DP1228576). The site is approximately 6.652ha in size and consists of cleared land that has been previously filled for residential development, refer Figure 1-1.

Figure 1-1 - Site Location (Source: Nearmap)

The proposed development consists of Multi-Dwelling Housing (136 dwellings), Resident Clubhouse, Pool, Bowling Green, Exhibition Home, Associated Infrastructure and Retaining Walls. The development is proposed to be managed as a private "land lease" residential community for over-50s. The proposal does not involve subdivision of land or dedication of land, ie all new internal infrastructure will not become Councils Asset. External sewer and stormwater connections will be required with these to be dedicated to Council. No dwellings are proposed as part of this application and will be subject to a separate approval.

The site enjoys an existing approval for a residential subdivision (Construction Certificate CC2016/0660). This report relates to the bulk earthworks, traffic, stormwater and servicing requirements of the site. Additional investigations and design will be needed prior to the issue of Construction Certificate plans.

2 Report Scope

This report focuses on providing sufficient concept engineering design details to facilitate a thorough understanding of the proposed works. The works covered by this report include new infrastructure for traffic, stormwater (quality and attenuation) and servicing provisions for the proposed development.

It is recognised that a subsequent submission of detailed engineering design plans and specifications are required to be made before final approval for the construction of the development. At this stage, any minor amendments of the design elements proposed will be addressed to meet any matters raised throughout the approvals process. The concepts and calculations outlined in this report and associated plans shall not be used for construction without the written permission of Newton Denny Chapelle.

2.1 Reference Documents

The following documents have been used in the preparation of this plan:

- Northern Rivers Local Government 2013, *Handbook of Stormwater Drainage Design (NRHSDD),* Version 13 - August 2013
- Clarence Valley Council, *Development Control Plan 2011 – Residential Zones*
- Clarence Valley Council, *Sustainable Water Requirements, Information for Applicants, 2004*
- Clarence Valley Council, *Handbook for Stormwater Drainage Design, 2006*
- Landcom, *Soils and Construction*, Volume 1 - 4th Edition, March 2004
- Water by Design, *MUSIC Modelling Guidelines (2010)*

3 Site Description

The development lot consists of cleared land that has previously been filled to an RL of approximately 2.8m AHD. The site is surrounded by existing residential development with the area surrounding the site can be described as:

- Northern Boundary – Is formed with existing residential development fronting The Halyard. The adjacent residential development is approximately the same level as the development site
- Eastern Boundary – Is formed with existing residential development. The development to the south of Park Avenue is set higher than the adjacent development with a retaining wall located within the site. A low-level catch is located at the base of the wall and provides drainage for the adjacent properties.
- Southern Boundary – Is formed with existing residential development fronting Yamba Road. The development site is set higher than the adjacent development with a retaining wall located within the site. A low-level catch is located at the base of the wall and provides drainage for the adjacent properties.
- Western Boundary – Is formed with two residential properties adjacent to the south east corner of the site. The remainder of the boundary is formed with Wattle Park. The site is set higher than the adjoining land with a retaining wall located within the boundary.

Access to the site is via the eastern end of Park Avenue.

4 Bulk Earthworks

The site has been previously filled to an RL of approximately 2.8m AHD. Additional filling will be required to achieve the minimum flood level and stormwater drainage. A minimum floor level of 3.01m for flooding has been adopted as detailed by Council (Pre-DA Lodgement Meeting Minutes 12 April 2021). It is anticipated that the proposed development will result in a maximum fill height of 1.6m above the current surface levels in the south east corner of the site. The works are expected to

require an additional 32,850m³ of fill to be imported and necessitate retaining walls up to 1.4m around the southern eastern corner of the site.

5 Stormwater Management

5.1 Catchment Areas

The catchment areas and characteristics have been determined from the proposed layout plan and are summarised in Table 5-1:

Table 5-1 - Developed Catchment Areas

Catchment Name	Catchment Area (m²)	Total Roof Area (m²)	Total Hardstand Area (m²)	Road Area (m²)	EIA (%)	RIA (%)	PA (%)
North West	1896	0	0		0.00	0.00	1.00
North	3177	0	0		0.00	0.00	1.00
Central	43220	18900	3150	6808	0.53	0.13	0.33
East	14231	5580	930	3263	0.55	0.14	0.31
Entry	3185	0	0	1026	0.26	0.06	0.68

The following discharge points have been identified for the site:

- Park Avenue – The majority of the site will drain into this catchment. Discharge into Park Avenue will require the installation of a stormwater culvert along Park Avenue with the discharge point on the eastern side of Shores Drive. This is in keeping with the existing approval CC2016/0660. Provision will be made for the drainage of the external catchment running along the eastern side of the site in keeping with CC2016/0660.
- North West – A small catchment including the van parking area will be drained into the existing IAD line installed along the north western boundary.
- Northern – A small adverse catchment consisting of backyards along the northern boundary will be drained through the existing IAD system installed along the northern boundary. This will be discharged into Councils existing stormwater line running south to north through the site.

5.2 Stormwater Quality

Stormwater from the majority of the site (the central and eastern catchments) will be treated prior to discharge. The proposed treatment train consists of a primary (Humegard) and secondary (Humeceptor) devices working in conjunction with the detention tanks. All devices are inside the site and will be maintained by the owner of the site. To ensure the quality reduction targets are achieved the MUSIC model has been developed for the site:

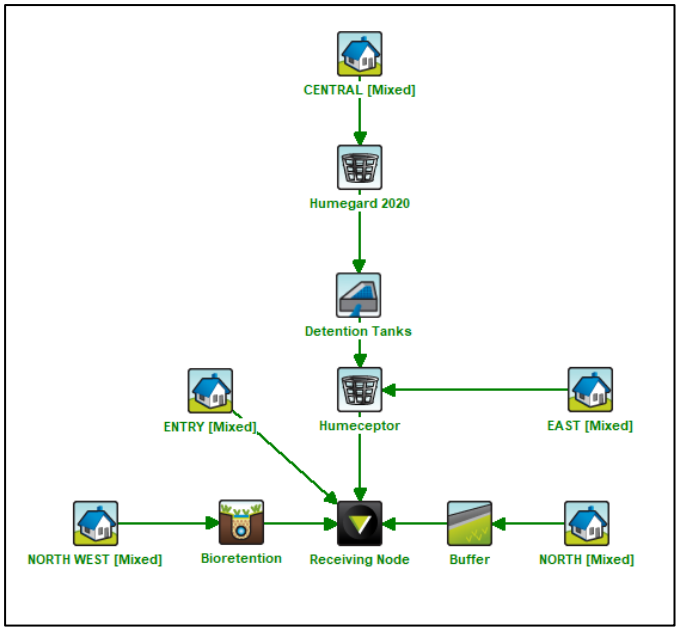

Figure 5-1 - MUSIC Model

The MUSIC-link report is attached and demonstrates that the proposed stormwater treatment train achieves the required pollutant reduction targets. The MUSIC-link report notes the only failing parameter as the evaporative loss in the detention tank. As these tanks are underground this has been set to 0 instead of Councils default of 100.

5.3 Stormwater Attenuation

Stormwater attenuation storage for a range of storm events up to the 100 year ARI can be provided in accordance with Northern Rivers Local Government – Handbook for Stormwater Drainage Design (NRHSDD). For the residential component of the development, it is proposed to provide onsite attenuation. As the site is greater than 2,500m² attenuation modelling has been undertaken in the Drains software package using the ARR 2019 methods. The Initial Loss – Continuing Loss (IL-CL) Hydrological Model has been adopted with Temporal Patterns obtained from the ARR data hub and IFD data from the Bureau of Meteorology. Due to the lack of good quality local data the ARR datahub Probability Neutral Burst Initial Loss values have been adopted. Initial loss and continuing losses have been configured in accordance with the recommended Drains defaults. Standard inlet times for the developed catchments have been adopted in accordance with QUDM 2016. A copy of the drains model is shown in Figure 5-2 below:

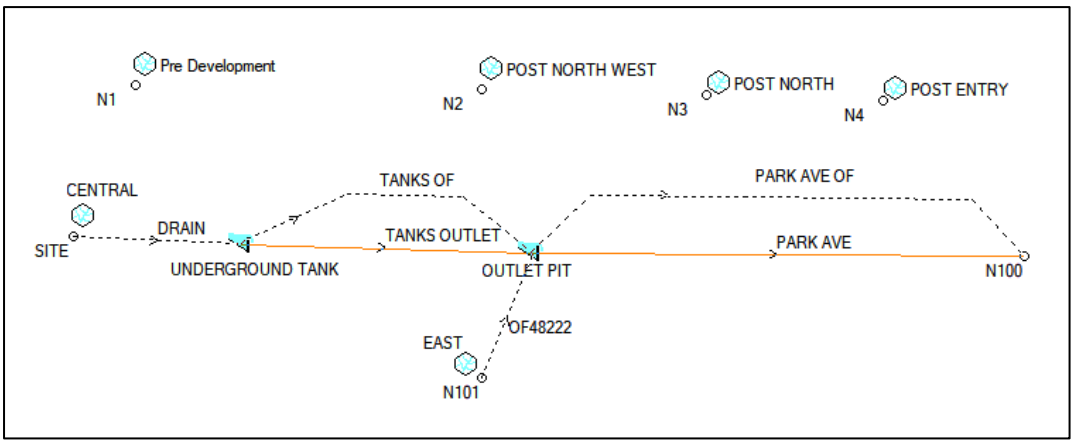

Figure 5-2 - Drains Model

The model results are attached in Appendix B and are summarised in Table 5-2;

Table 5-2 - Drains Results

Catchment	Storm event		
	0.2EY	5% AEP	1% AEP
PRE DEV	**2.08**	**2.73**	**3.57**
POST DEV	**1.689**	**2.239**	**2.834**
North West	0.059	0.078	0.102
North	0.099	0.13	0.17
Central + East	1.53	2.03	2.56
Entry	0.001	0.001	0.002

As shown above the proposed detention tanks are sufficient to ensure the post-developed peak flows do not exceed the pre-developed peak flows for the site. A copy of the Drains model is available upon request.

5.4 Summary of Stormwater Devices

The proposed treatment train outlined above are sufficient to achieve the attenuation and quality treatment requirements of the site. The stormwater devices required for the site are summarised in Table 5-3:

Table 5-3 - Stormwater Management Devices

Location	Quality	Attenuation
Public Devices		
None proposed		
Private Devices		
Primary Treatment - Gross Pollutant Trap	Humegard	-
Secondary Treatment – Hydrodynamic Separator	HumeCeptor	-
Underground Stormwater Tanks	750m²	865m³

6 Sewer Services

In keeping with the previously approved residential subdivision (CC2016/0660) it is proposed to construct a new gravity sewer connection along the western arm of Park Avenue to connect to Councils existing sewer pump station. The majority of the lots will be connected to gravity sewer

where possible. Five lots in the north east corner of the site have been identified as requiring pressure sewer systems. These pump-up systems will be connected to the internal gravity sewer network.

The existing rising main running through the south west corner of the site will be realigned to match the development layout with a setback allowed to the existing gravity sewer located along the southern boundary. The sewer demand created by the proposed development has been calculated in accordance with the Water Directorates Section 64 Determination of Equivalent Tenements Guidelines 2017 and is outlined in Table 6-1 below:

Table 6-1 – Existing Sewer Demand

Type of Development	Quantity	Units	Rate	Equivalent Tenements
Multi-Residential Lots (unit 3 bedroom)	136	Lot	1.00	136
Existing Entitlement	1	Lot	-1.00	-1
			Total ET:	**135**

7 Water Reticulation

Each lot will be provided with a potable water connection. This will be achieved via the extension of the existing water main in Park Avenue. The expected demand from the proposed development is outlined in Table 7-1:

Table 7-1 - Expected Water Demand

Type of Development	Quantity	Units	Rate	Equivalent Tenements
Multi-Residential Lots (unit 3 bedroom)	136	Lot	0.80	108.8
Existing Entitlement	1	Lot	-1.00	-1
			Total ET:	**107.8**

A fire service main will be run internally within the site with this will be designed as part of the construction certificate stage.

8 Sediment and Erosion Control

During construction sediment and erosion control measures will be installed to ensure the loss of soil from the site is minimised. All control measures will be installed prior to the commencement of construction and be in accordance with Managing Urban Stormwater-Soils & Construction Volume 1 (2004) by Landcom.

Appendix A Concept Engineering Plans

REV	DESCRIPTION	BY	APP.	DATE
B	LOT LAYOUT & REVISION TO SOUTHERN INTERFACE			30.09.21
A	FIRST ISSUE			30.06.21

REVISIONS

SCALES SHOWN ARE FOR AN A1 SIZE ORIGINAL DRAWING

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1cm = 6m
1:600

SCALES

HORIZ. DATUM	MGA
VERT. DATUM	AHD
SURVEY	NDC
DRAWN	PS
DESIGN	PS
APPROVED	
DATE	

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HOMETOWN AUSTRALIA COMMUNITIES

PARK AVENUE, YAMBA LOT 101 DP 1228576
BULK EARTHWORKS PLAN

Client	Reference No.	DRAWING No.	REVISION
HOMETOWN AUSTRALIA	210217	210217-DA-BE-01	B

Plot Date: 01 Oct, 2021 CAD File Name: K:\Jobs\2021\210217 - Hometown Australia\Engineering\Drawings\210217-DA-BE-01.dwg

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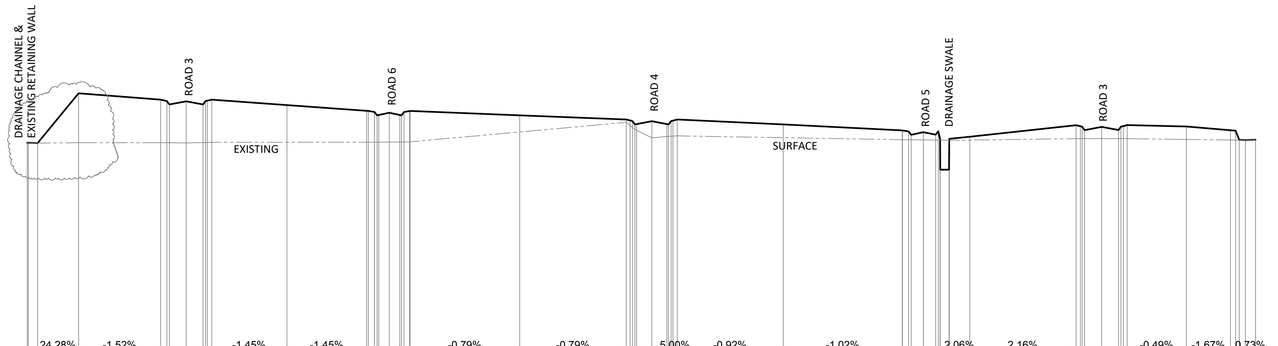
DRAINAGE CHANNEL & EXISTING RETAINING WALL
ROAD 3
ROAD 6
ROAD 4
ROAD 5
DRAINAGE SWALE
ROAD 3
EXISTING
SURFACE
24.28%
-1.52%
-1.45%
-1.45%
-0.79%
-0.79%
5.00%
-0.92%
-1.02%
2.06%
2.16%
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-1.67%
-0.73%

Datum R.L. -5.00

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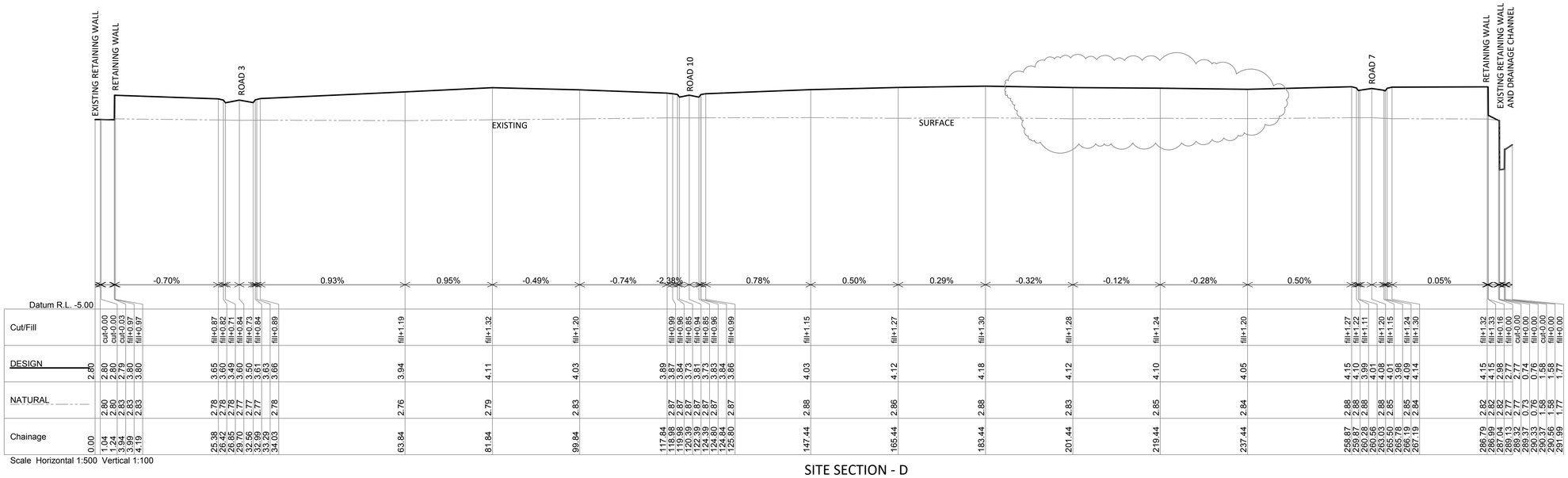

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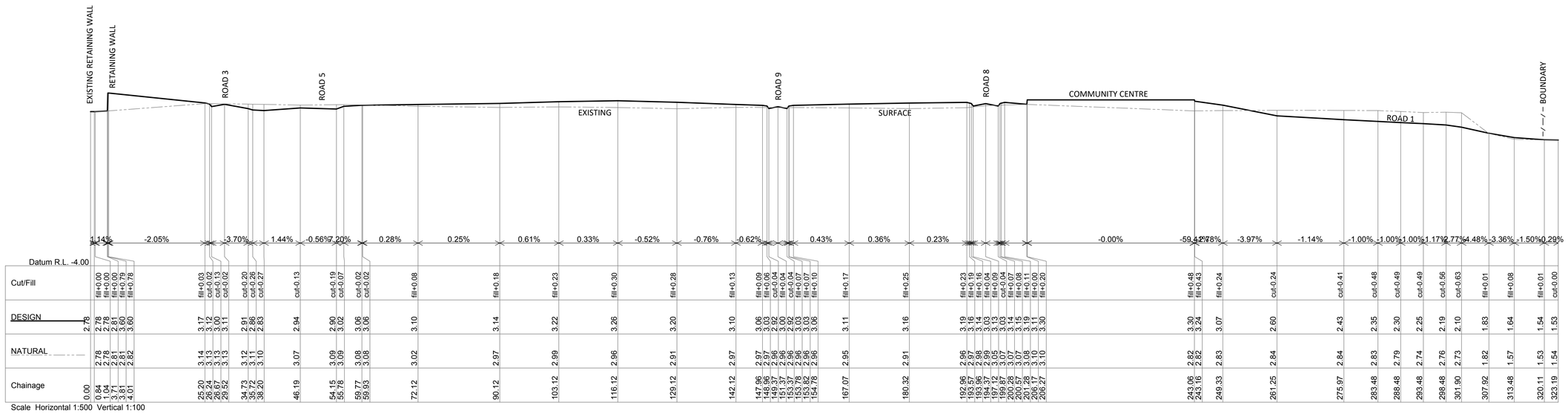

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REV	DESCRIPTION	BY	APP.	DATE
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A	FIRST ISSUE			30.06.21

REVISIONS

SCALES SHOWN ARE FOR AN A1 SIZE ORIGINAL DRAWING

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0 1 2 3 4 5 — 1cm = 1m 1:100

SCALES

HORIZ. DATUM	MGA
VERT. DATUM	AHD
SURVEY	NDC
DRAWN	PS
DESIGN	PS
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DATE	

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Client: HOMETOWN AUSTRALIA

PARK AVENUE, YAMBA LOT 101 DP 1228576
SITE EARTHWORKS SECTIONS

Reference No. 210217

DRAWING No. 210217-DA-BE-03

REVISION B

Plot Date: 30 Sep, 2021 CAD File Name: K:\Jobs\2021\210217 - Hometown Australia\Engineering\Drawings\210217-DA-BE-03.dwg

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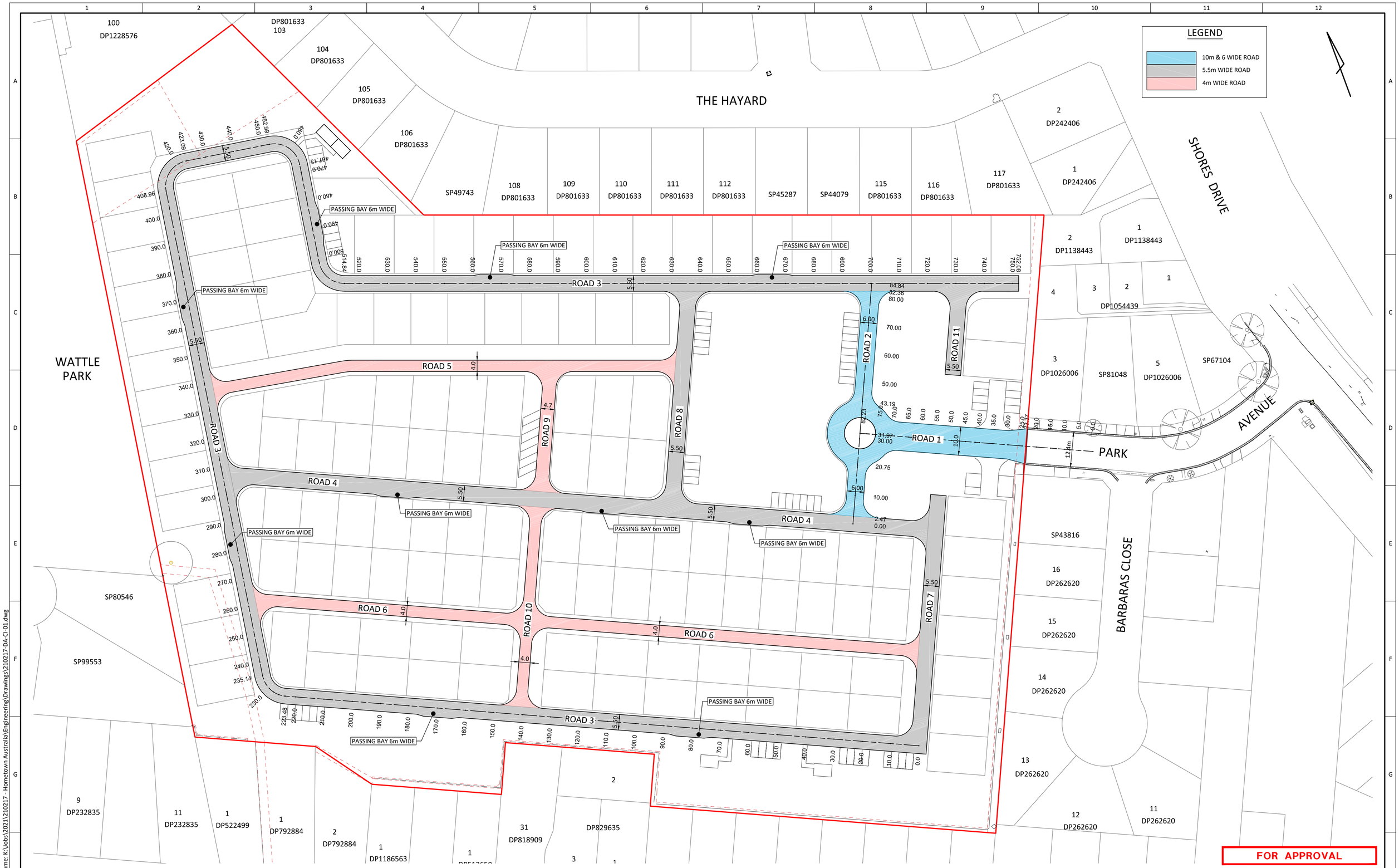

REV	DESCRIPTION	BY	APP.	DATE
B	LOT LAYOUT REVISED			30.09.21
A	FIRST ISSUE			30.06.21

REVISIONS

SCALES SHOWN ARE FOR AN A1 SIZE ORIGINAL DRAWING

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SCALES

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VERT. DATUM	AHD
SURVEY	NDC
DRAWN	PS
DESIGN	PS
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HOMETOWN AUSTRALIA COMMUNITIES

PARK AVENUE, YAMBA ROAD NETWORK PLAN

LOT 101 DP 1228576

Client	Reference No.	DRAWING No.	REVISION
HOMETOWN AUSTRALIA	210217	210217-DA-CI-01	B

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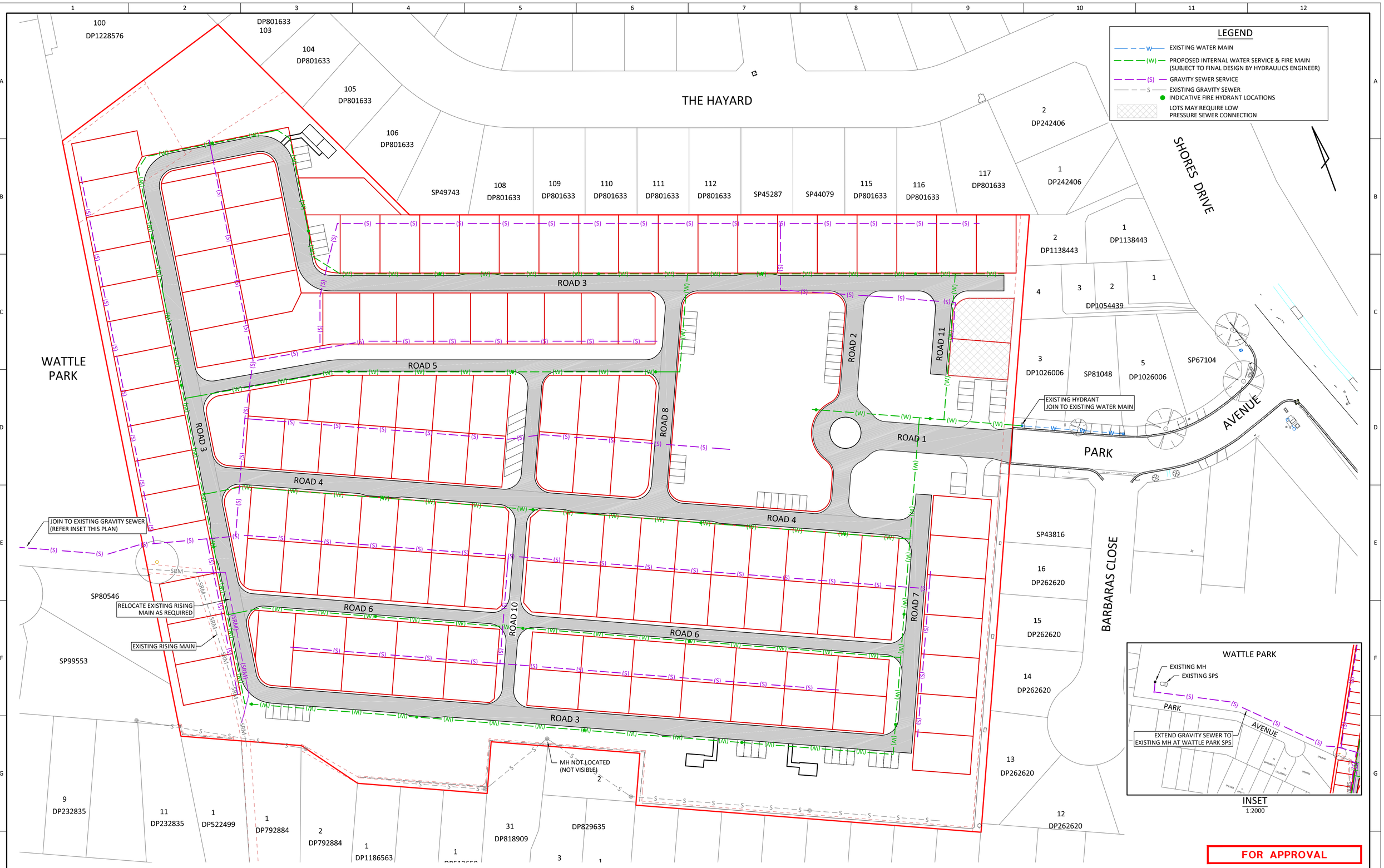

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A	FIRST ISSUE			30.06.21

REVISIONS

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SCALES

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VERT. DATUM	AHD
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HOMETOWN AUSTRALIA COMMUNITIES

PARK AVENUE, YAMBA SERVICES PLAN

LOT 101 DP 1228576

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HOMETOWN AUSTRALIA	210217	210217-DA-CI-02	B

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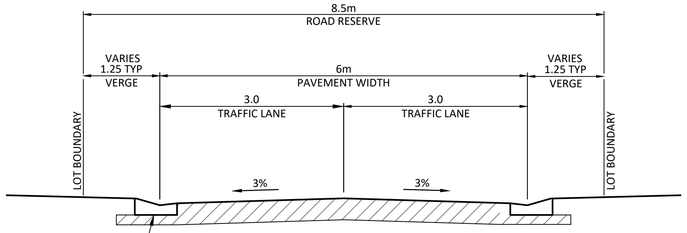

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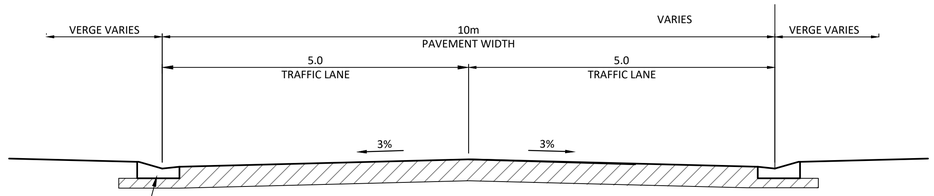

PROPOSED LAYBACK KERB IN ACCORDANCE WITH NRLG STD DRG R-03.TYPICAL

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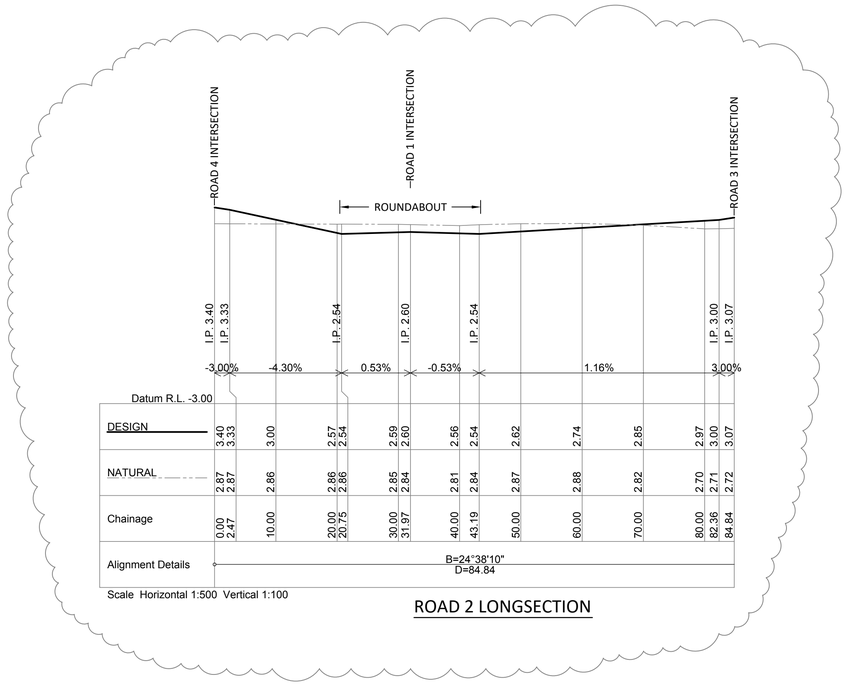

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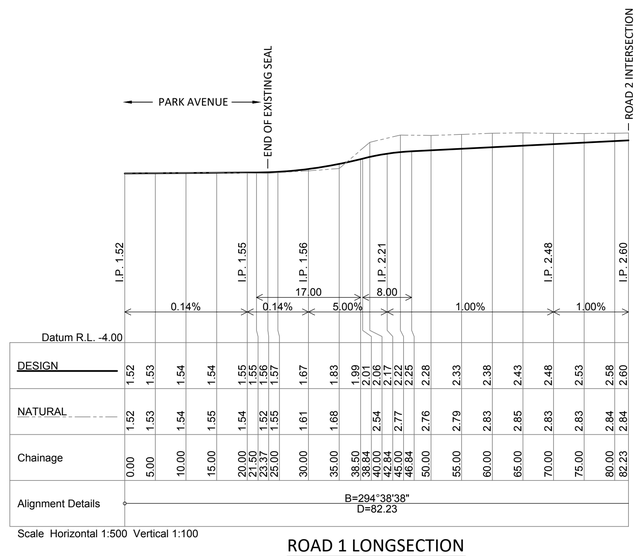

ROAD 1 LONGSECTION

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A	FIRST ISSUE			30.06.21

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SCALES

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HOMETOWN AUSTRALIA COMMUNITIES

PARK AVENUE, YAMBA LOT 101 DP 1228576
ROADS 1 AND 2 LONGSECTION

Client	Reference No.	DRAWING No.	REVISION
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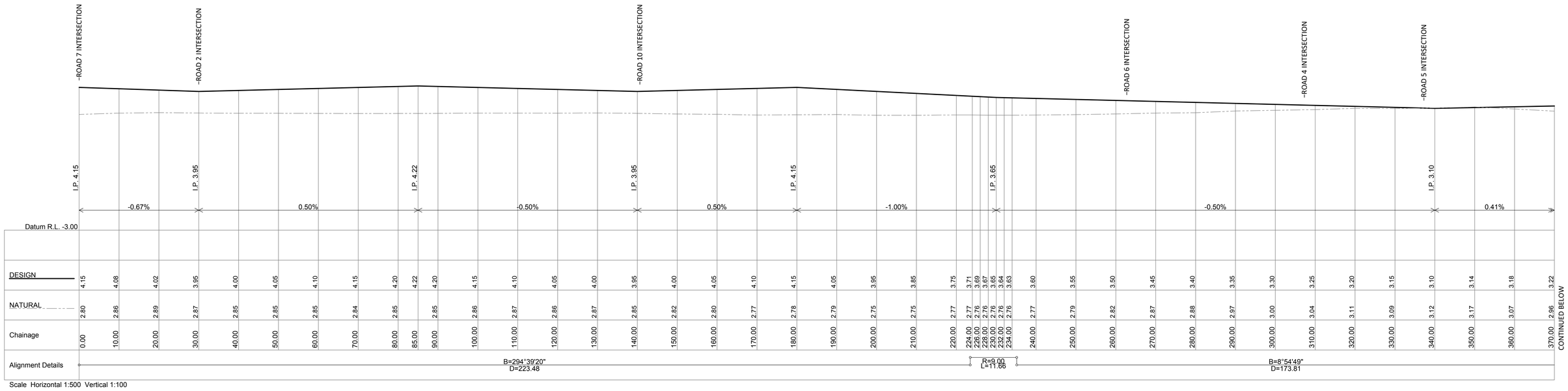

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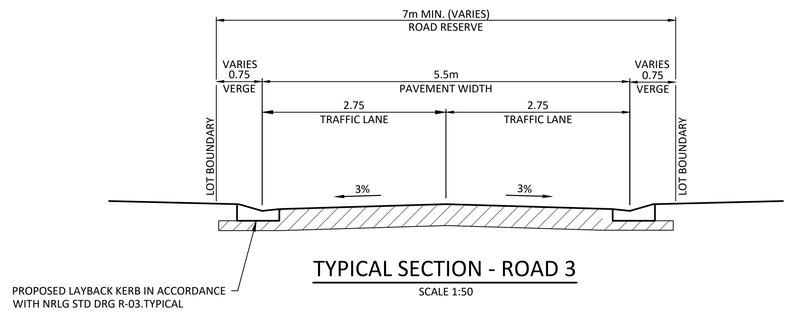
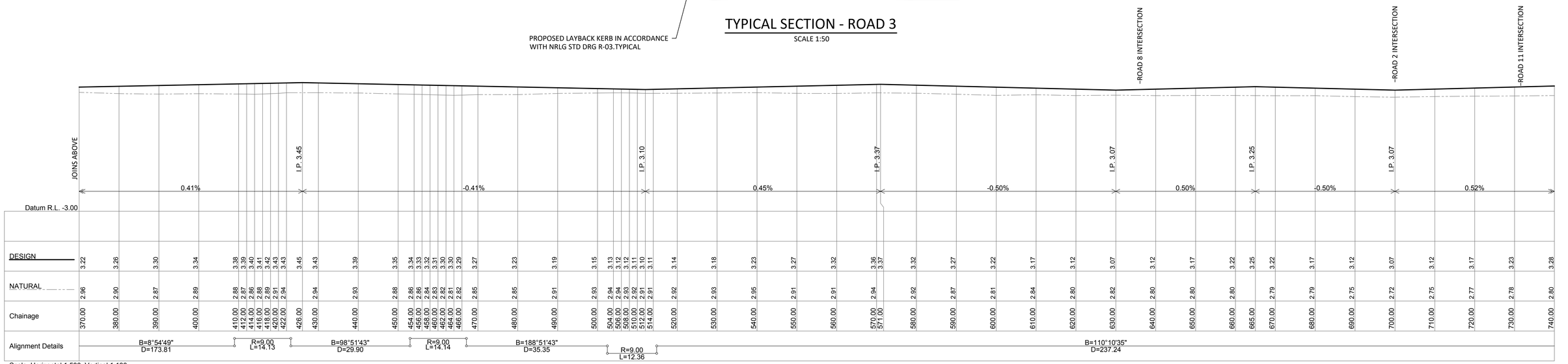


TYPICAL SECTION - ROAD 3

SCALE 1:50



Scale Horizontal 1:500 Vertical 1:100

ROAD 3 LONGSECTION -CONTINUED

FOR APPROVAL

REV	DESCRIPTION	BY	APP.	DATE
A	FIRST ISSUE			30.06.21

REVISIONS

SCALES SHOWN ARE FOR AN A1 SIZE ORIGINAL DRAWING

0 5 10 15 20 25 — 1cm = 5m 1:500

0 1 2 3 4 5 — 1cm = 1m 1:100

SCALES

HORIZ. DATUM	MGA
VERT. DATUM	AHD
SURVEY	NDC
DRAWN	PS
DESIGN	PS
APPROVED	
DATE	

APPROVALS

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HOMETOWN AUSTRALIA COMMUNITIES

PARK AVENUE, YAMBA
ROAD 3 LONGSECTION

LOT 101 DP 1228576

Client	Reference No.	DRAWING No.	REVISION
HOMETOWN AUSTRALIA	210217	210217-01-DA-CI-11	A

Plot Date: 30 Jun, 2021 CAD File Name: K:\Jobs\2021\210217 - Hometown Australia\Engineering\Drawings\210217-DA-CI-11-A.dwg

THIS PLAN IS NOT FOR CONSTRUCTION UNLESS STAMPED BY THE PRINCIPAL CERTIFYING AUTHORITY AND ISSUED WITH A NUMERICAL REVISION

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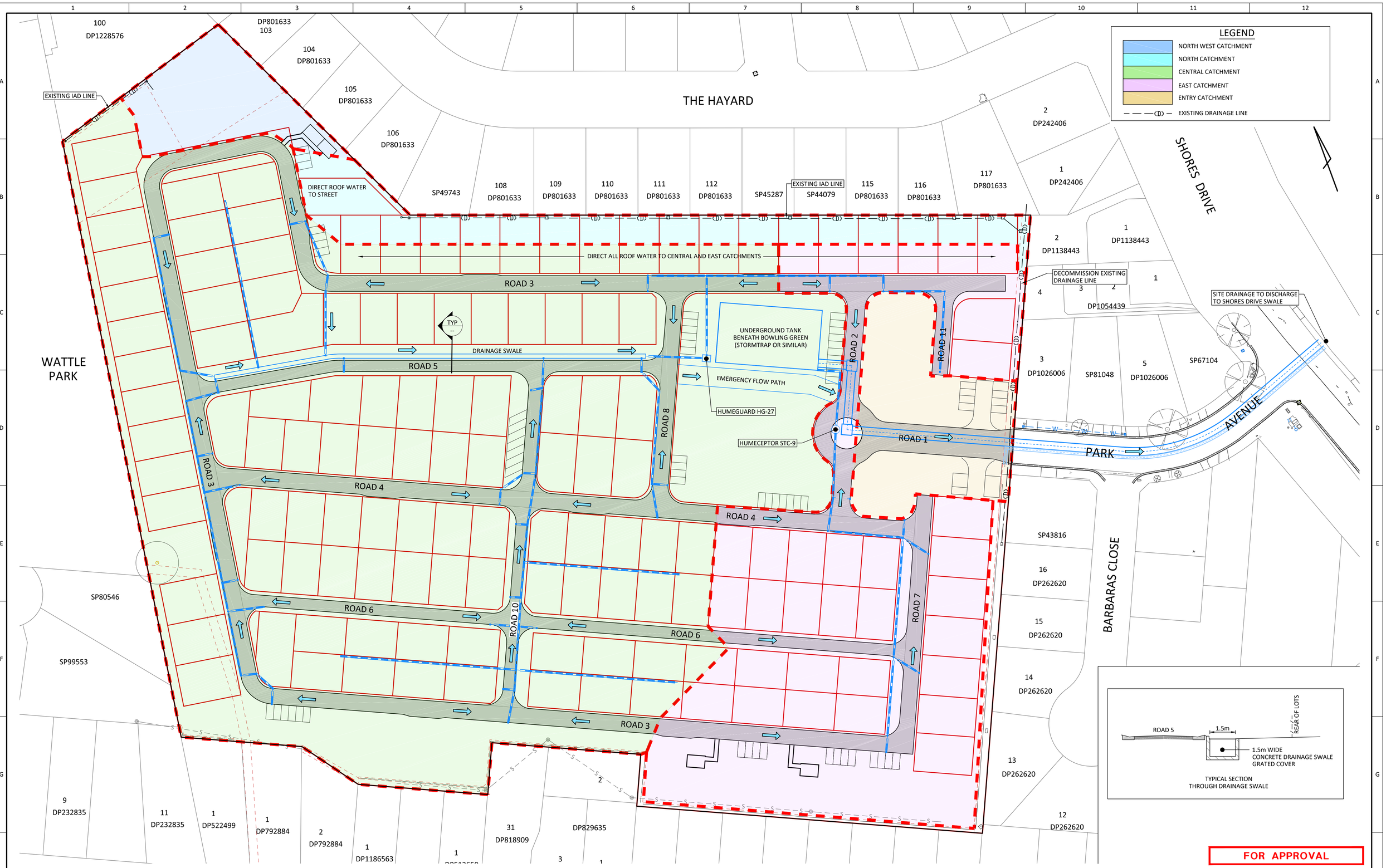

REV	DESCRIPTION	BY	APP.	DATE
B	LOT LAYOUT			30.09.21
A	FIRST ISSUE			30.06.21

REVISIONS

SCALES SHOWN ARE FOR AN A1 SIZE ORIGINAL DRAWING

0 6 12 18 24 30

1cm = 6m
1:600

SCALES

HORIZ. DATUM	MGA
VERT. DATUM	AHD
SURVEY	NDC
DRAWN	PS
DESIGN	PS
APPROVED	
DATE	

APPROVALS

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HOMETOWN AUSTRALIA COMMUNITIES

PARK AVENUE, YAMBA STORMWATER PLAN

LOT 101 DP 1228576

Client	Reference No.	DRAWING No.	REVISION
HOMETOWN AUSTRALIA	210217	210217-DA-SW-01	B

Plot Date: 01 Oct, 2021 CAD File Name: K:\Jobs\2021\210217 - Hometown Australia\Engineering\Drawings\210217-DA-SW-01.dwg

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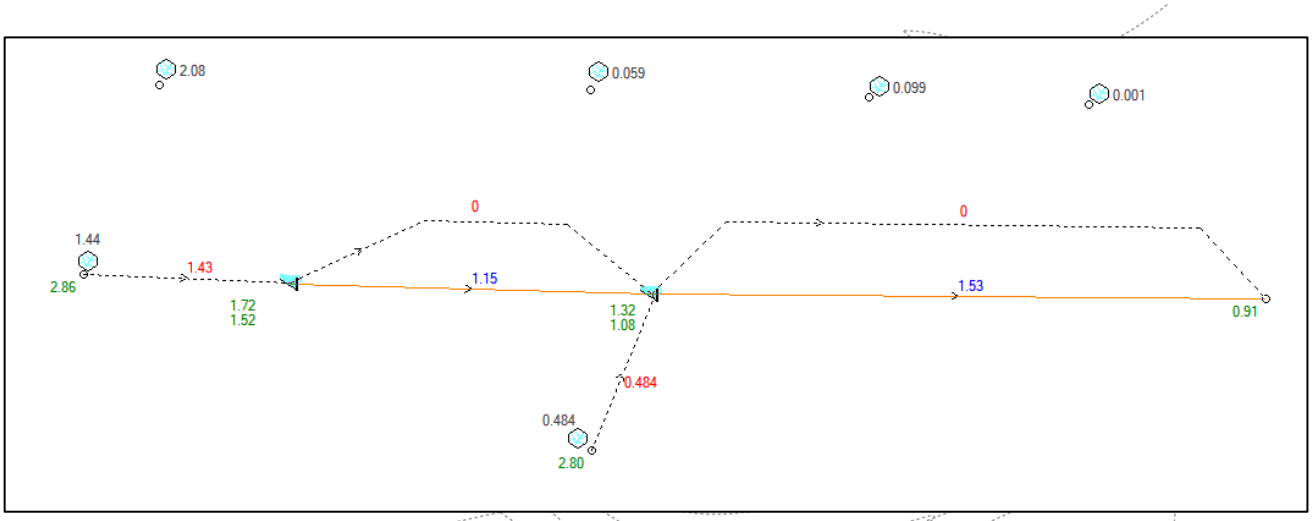
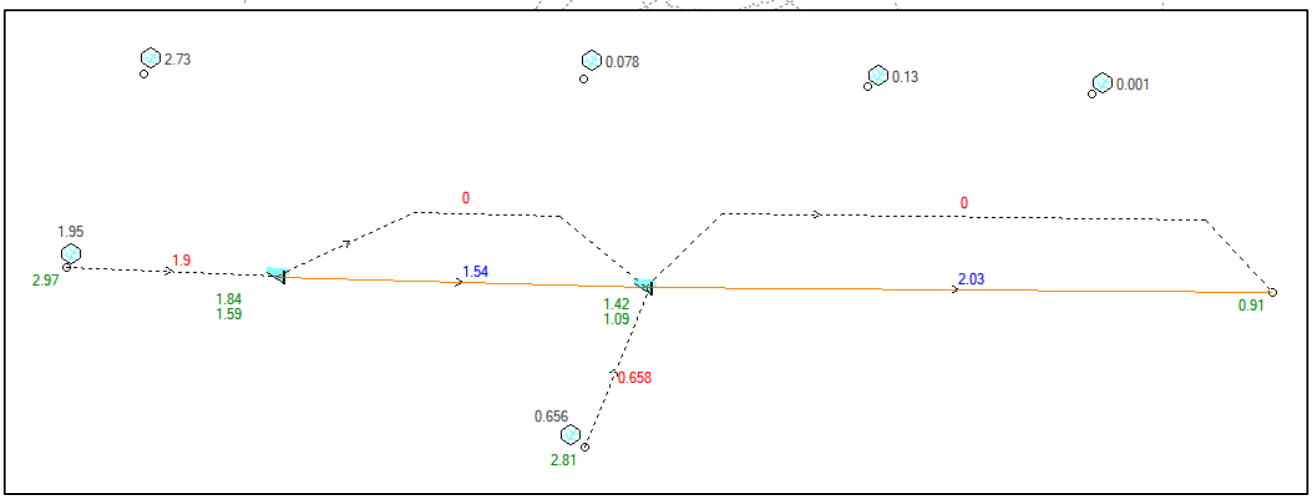
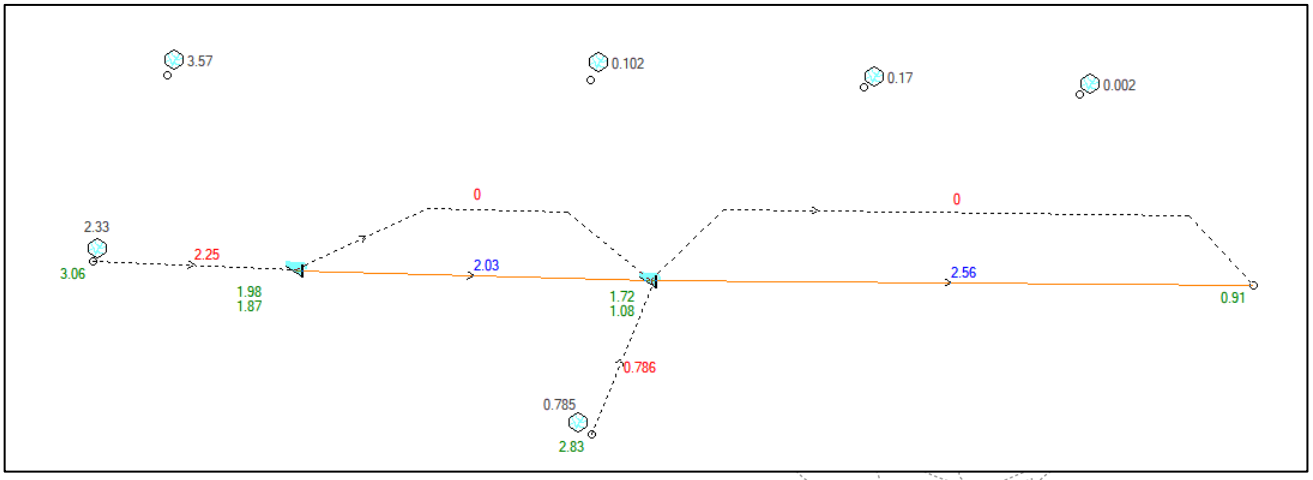
Appendix B Drains Model Results



0.2EY Results



5% AEP Results



1% AEP Results

Appendix C MUSIC-Link Report

CLARENCE VALLEY COUNCIL

MUSIC-*link* Report

Project Details		Company Details	
Project:	210217 - Hometown	**Company:**	NDC
Report Export Date:	1/10/2021	**Contact:**	Chris Pickford
Catchment Name:	210217-MUS-REVD	**Address:**	
Catchment Area:	6.568ha	**Phone:**	66221011
Impervious Area*:	65.73%	**Email:**	cpickford@ndc.com.au
Rainfall Station:	58076 GRAFTON		
Modelling Time-step:	6 Minutes		
Modelling Period:	1/01/1972 - 31/12/1976 11:54:00 PM		
Mean Annual Rainfall:	1160mm		
Evapotranspiration:	1327mm		
MUSIC Version:	6.3.0		
MUSIC-link data Version:	6.33		
Study Area:	North		
Scenario:	CVC Development		

* takes into account area from all source nodes that link to the chosen reporting node, excluding Import Data Nodes

Treatment Train Effectiveness		Treatment Nodes		Source Nodes	
Node: Receiving Node	**Reduction**	**Node Type**	**Number**	**Node Type**	**Number**
Flow	0.131%	Detention Basin Node	1	Urban Source Node	5
TSS	88.5%	Bio Retention Node	1		
TP	60.5%	Buffer Node	1		
TN	45.7%	GPT Node	2		
GP	90.3%				

Comments

Evaporative Loss node of detention basin set to 0 instead of 100 because ther will be no evaporation from the underground tanks

Passing Parameters

Node Type	Node Name	Parameter	Min	Max	Actual
Bio	Bioretention	Exfiltration Rate (mm/hr)	None	None	0
Bio	Bioretention	Extended detention depth (m)	None	None	0.2
Bio	Bioretention	Filter depth (m)	None	None	0.5
Bio	Bioretention	Hi-flow bypass rate (cum/sec)	None	None	1
Bio	Bioretention	Orthophosphate Content in Filter (mg/kg)	50	50	50
Bio	Bioretention	PET Scaling Factor	2.1	2.1	2.1
Bio	Bioretention	Saturated Hydraulic Conductivity (mm/hr)	100	100	100
Bio	Bioretention	Total Nitrogen Content in Filter (mg/kg)	800	800	800
Buffer	Buffer	Proportion of upstream impervious area treated	None	None	1
Detention	Detention Tanks	% Reuse Demand Met	None	None	0
GPT	Humeceptor	Hi-flow bypass rate (cum/sec)	None	99	5
GPT	Humegard 2020	Hi-flow bypass rate (cum/sec)	None	99	5
Receiving	Receiving Node	% Load Reduction	None	None	0.131
Receiving	Receiving Node	GP % Load Reduction	90	None	90.3
Receiving	Receiving Node	TN % Load Reduction	45	None	45.7
Receiving	Receiving Node	TP % Load Reduction	60	None	60.5
Receiving	Receiving Node	TSS % Load Reduction	85	None	88.5
Urban	CENTRAL	Area Impervious (ha)	None	None	3.007
Urban	CENTRAL	Area Pervious (ha)	None	None	1.314
Urban	CENTRAL	Total Area (ha)	None	None	4.322
Urban	EAST	Area Impervious (ha)	None	None	0.998
Urban	EAST	Area Pervious (ha)	None	None	0.421
Urban	EAST	Total Area (ha)	None	None	1.42
Urban	ENTRY	Area Impervious (ha)	None	None	0.104
Urban	ENTRY	Area Pervious (ha)	None	None	0.214
Urban	ENTRY	Total Area (ha)	None	None	0.319
Urban	NORTH	Area Impervious (ha)	None	None	0.017
Urban	NORTH	Area Pervious (ha)	None	None	0.300
Urban	NORTH	Total Area (ha)	None	None	0.318
Urban	NORTH WEST	Area Impervious (ha)	None	None	0.189
Urban	NORTH WEST	Area Pervious (ha)	None	None	0
Urban	NORTH WEST	Total Area (ha)	None	None	0.189

Only certain parameters are reported when they pass validation

Failing Parameters

Node Type	Node Name	Parameter	Min	Max	Actual
Detention	Detention Tanks	Evaporative Loss as % of PET	100	100	0

Only certain parameters are reported when they pass validation