MUSIC MODEL ASSESSMENT

Proposed Subdivision

Lots 117 & 118 DP 126140
292 Rosemont Road
BOXERS CREEK

Date: November 2023

Our Reference: 214480

Prepared on Behalf of: M. Taylor

LandTeam Australia Pty Ltd

Goulburn Office
36 Montague Street
Goulburn NSW 2580
PH 02 4821 1033
FAX 02 4821 7238
goulburn@landteam.com.au

Bowral Office
357 Bong Bong Street
Bowral NSW 2576
PH 02 4861 2467
FAX 02 4861 4975
bowral@landteam.com.au

Warilla Office
Unit 5/97 Shellharbour Road
Warilla NSW 2528
PH 02 4296 7055
FAX 02 4297 1163
wollongong@landteam.com.au

Document Control

Revision No.	Date	Description	Prepared By:	Reviewed by:
1	07/12/2021	Initial issue	T Murphy	D Ingenhoff
2	04/02/22	Updated layout	T Murphy	D Ingenhoff
3	28/02/23	Updated References	T Murphy	D Ingenhoff
4	16/11/2023	Updated Layout	T Murphy	D Ingenhoff

This MUSIC Model Assessment Report provides a fair and true assessment of the proposed development on the site and its likely effects on water quality.

The Report meets the requirements of *'Using Music in Sydney Drinking Water Catchment – WaterNSW Standard'* and is consistent with the currently available guidelines as produced by the WaterNSW.

This Report includes information on the proposed development and the catchment, an assessment of the potential impacts of the development and the proposed water quality controls that can be practically implemented on the site to ensure the development achieves a neutral or beneficial effect on water quality. The report is accompanied by modelling to validate the recommended treatment measures for the development.

This assessment relates only to the development and the site as described in the report. The recommendations are based on an honest appraisal of the opportunities and constraints that existed at the site at the time of investigation. Interpretations of the modelling and assessment information should not be made including changes in the scope of the development or application to other projects.

Within the confines of the above statements and to the best of my knowledge, this report does not contain any incomplete or misleading information.

Tim Murphy
BE Civil
November 2023

Contents

Tables and Figures

1 Assessment Summary and Recommendations

This report and accompanying development application has been prepared on behalf of M. Taylor in relation to the proposed subdivision development of the property located off Rosemont Road, Boxers Creek. The land is identified as Lots 117 and 118 in DP 126140.

The report details the assessment of the effect of the proposed development on water quality and provides recommendations to satisfy the requirements of the *State Environmental Planning Policy (Sydney Drinking Water Catchments) 2011* (SEPP). In accordance with the SEPP, the consent authority cannot grant development consent unless it is satisfied the development will achieve a neutral or beneficial effect on water quality.

This assessment report contains:

(a) a detailed description of the site and catchment area,
(b) a description of the proposed development,
(c) an investigation into how the proposed development will affect the site
(d) recommended treatment measures to offset the potential impacts and address any major existing issues, and
(e) modelling to validate the proposed treatment measures

The results of the assessment and modelling conceptually indicate that a Neutral or Beneficial Effect on Water Quality can be achieved for the proposed development if the following recommended treatment measures are implemented as part of the development:

1. Bioretention Basin for Driveway 1 – 40 m^2

2. Drainage Swales

2 Site and Development Summary

2.1 Site Description

The site is located on the Southern side of Rosemont Road, Boxers Creek and has a total area of approximately 32.6 ha. The site contains paddocks used for grazing.

The site slope varies between 1 - 6% and drains to the north east of the site. The soil landscape is shown on SCA soil mapping to be “Bullamalito” and located within the Southern Tablelands physiographical region. Bullamalito soil profile is characterized by sandy loam overlaying a silty clay loam.

The land is zoned RU6 under the Goulburn Mulwaree Council Local Environmental Plan 2009. The objective is to demonstrate that environmental controls can be achieved at the proposed lot density.

This report has been prepared in order to provide an assessment of the proposed development’s effect on water quality to satisfy the requirements of *State Environmental Planning Policy (Sydney Drinking Water Catchments) 2011* (SEPP).

2.2 Proposed Development

The site characteristics for this 5 lot subdivision are summarized below in Table 1.

A site plan of the proposed development is provided in Section 6 of this report.

Table 1 – Site Characteristics

Site Location	Boxers Creek
Drinking Water Sub Catchment	Mulwaree River
Rainfall and PET Zone	1
Total Site Area	32.6 ha
Developed Catchment Area	32.6 ha
Pre-development site gradient	1-6%
Soil Landscape	SCA Mapping identifies the soil Landscape as part of the “Bullamalito” soil landscape – (ERblz)
Existing Watercourse	Yes
Overland flow draining onto site	Yes
Soils suitable for infiltration	Limited potential

Pre Development Details	
Existing development characteristics	Large lot residential
Existing land uses and areas	Agricultural Grazing

Post Development Details	
Proposed development characteristics	4 lot Torrens Title subdivision, lot sizes 2 ha to 25.12 ha

2.3 Catchment Details

Catchment areas have been defined primarily considering the drainage flow paths, locations of proposed treatment measures and surface type distribution. The site has been defined as one sub-catchment for the pre-development and post-development scenario representing lots 1 to 4.

The sub-catchment was further divided or grouped based on the surface types and treatment measures proposed. Overland flow-paths will convey all run off from the site and the upstream catchment area. Hence all nodes have been directed to a single Post Development end node.

Table 2 – Site Development Summary

Land use / Surface type	**Total Area (ha)**		
Pre-Development			
Building roofs	N/A		
Impervious area	0.0		
Pervious area	32.6		
Total	**32.6**		
Post-Development		**Driveway 1**	**Rural Residential**
Building roofs		0.0	0.0
Impervious ground area		0.181	0.0
Pervious area		0.0	32.42
Total	**32.6**	**0.181**	**32.42**

2.4 Source Nodes and Associated Parameters for Pre and Post Development Cases

Parameters used for the input to MUSIC were determined for the site adopting the values outlined in Sydney Catchment Authority's MUSIC Guidelines.

For the pre-developed case, one source node was adopted to account for the existing cleared paddock areas to be developed.

For the post-development model it was assumed that the roof areas have 100% Effective Impervious Area (EIA). The remaining areas of the site were calculated as a percentage of impervious/pervious with the driveway and hardstand areas assumed to be completely "direct" impervious and the remaining areas to be assumed completely pervious. Nodes were determined by common treatments and flow paths.

Rainfall-runoff parameters for the impervious surfaces (rainfall threshold) were determined for each surface from Table 4.3. Pervious surface parameters were determined based on sandy loam adopting an average depth of 0.5m.

The pre-development and post development case stormwater pollutant concentration parameters were adopted from Table 4.6 & 4.7 for residential, roof and unsealed roads land uses. The post-development case was modelled by separating the site into individual surfaces and pollutant concentration parameters for each surface type were adopted from the Table.

2.5 Proposed Treatment Measures for Post Development Cases

A conceptual plan of the proposed layout of treatment measures is shown in section 5.

2.5.1 Bioretention Basin

A bioretention basin shall be constructed for the future driveway run-off. This bioretention shall have the following properties:

- Modelled surface area 40 m^2
- Filter surface area 40 m^2
- Extended detention depth 0.2 m
- Filter Media depth 0.5 m

It is intended that the rain garden would be constructed at the conclusion of the construction of the hardstand areas as applicable. Rain gardens are to be constructed in accordance with the *Adoption Guidelines for Stormwater Bio-Filtration Systems* Version 2 – CRC for Water sensitive Cities - published by Payne et al, 2015.

2.5.2 Drainage Swales

Drainage Swales are to be constructed to convey Driveway run off to the bioretention basin.

Drainage swales have been modelled with the following properties.

- Base width 0.5 m
- Top width 3.0 m
- Depth 0.3 m
- Vegetation height 0.250 m

3 Music Modelling & Assessment Results

3.1 Climate Data

Climate Template Data used for the MUSIC modelling was taken from SCA data for Zone 1 (REFER Figure 3.1 of the SCA Guide to the use of MUSIC)

3.2 MUSIC Model

The pre and post development MUSIC model is illustrated below in Figure 1.

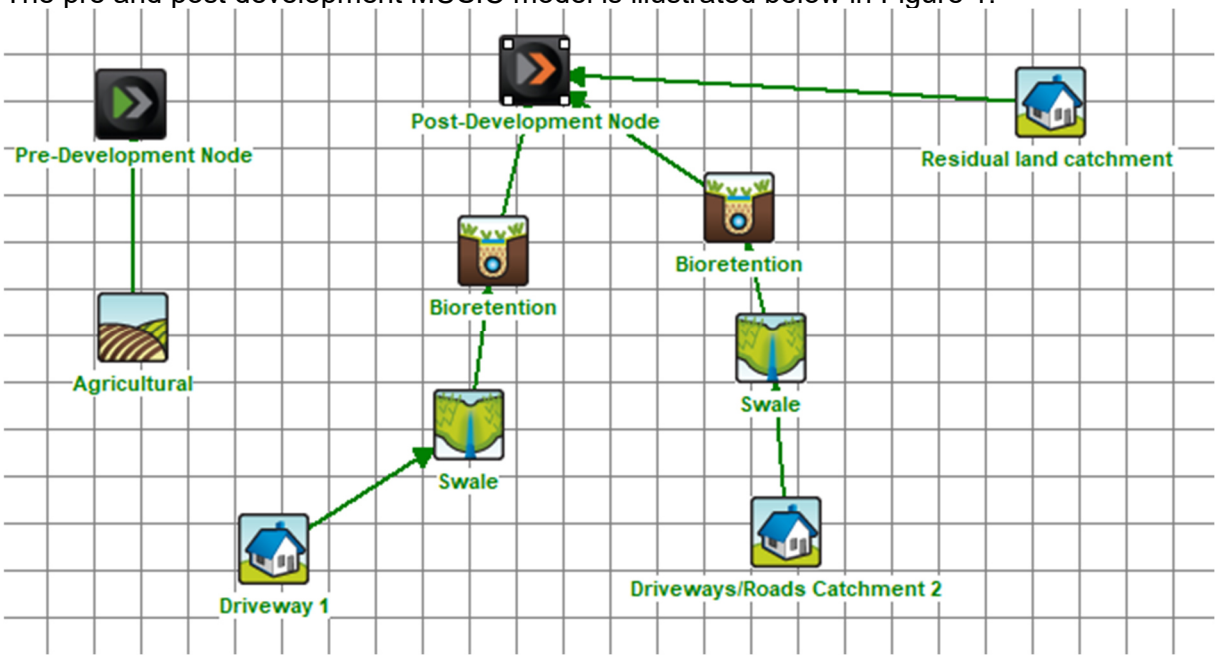


Figure 1 – MUSIC Model for pre and post development

3.3 Results

The model results for the pollutant loads are presented in Table 3 below.

Table 3: Results

Scenario/ Catchment	Annual Pollutant Loading (kg/yr)			
	TSS	TP	TN	GP
Pre-development (1)	2660	11.0	67.8	Na
Post-development (with Measures) (2)	1260	3.61	40.4	Na
Effect (2) – (1)	-1400	-7.39	-27.4	Na
% (2) – (1)	-52.6	-67.2	-40.4	Na
Neutral or beneficial effect? (Y/N)	Y	Y	Y	Na

The cumulative frequency graphs for the various pollutants are shown below in *Figures 2, 3 and 4.*

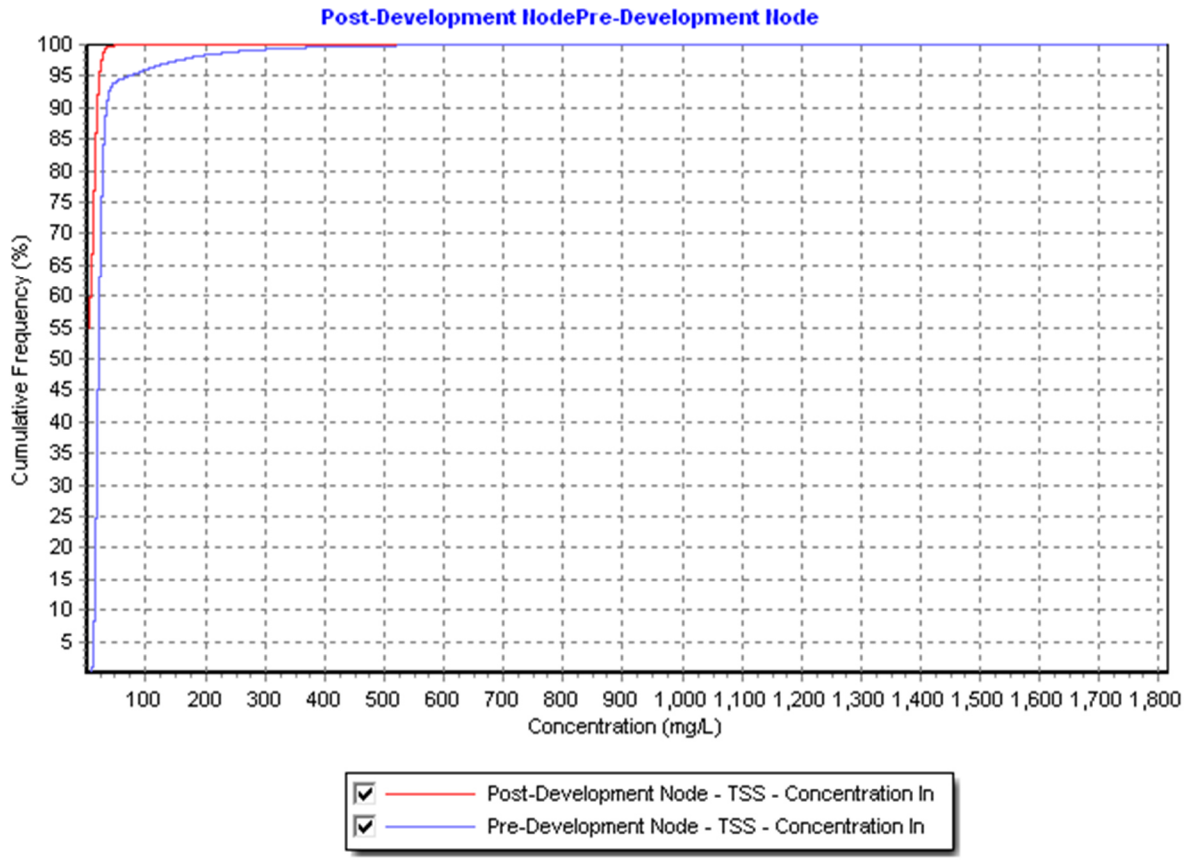


Figure 2 - Pre and Post development Cumulative Frequency Graphs Total Suspended Solids

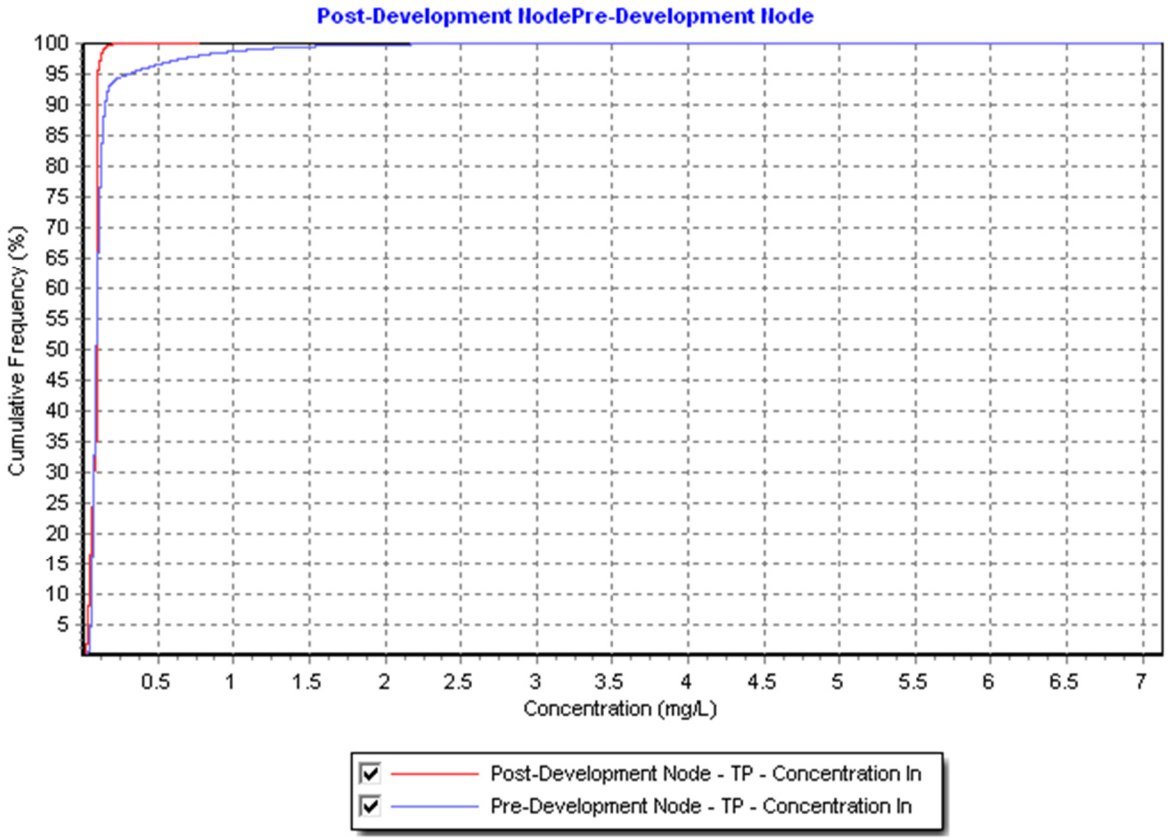


Figure 3 - Pre and Post development Cumulative Frequency Graphs Total Phosphorus

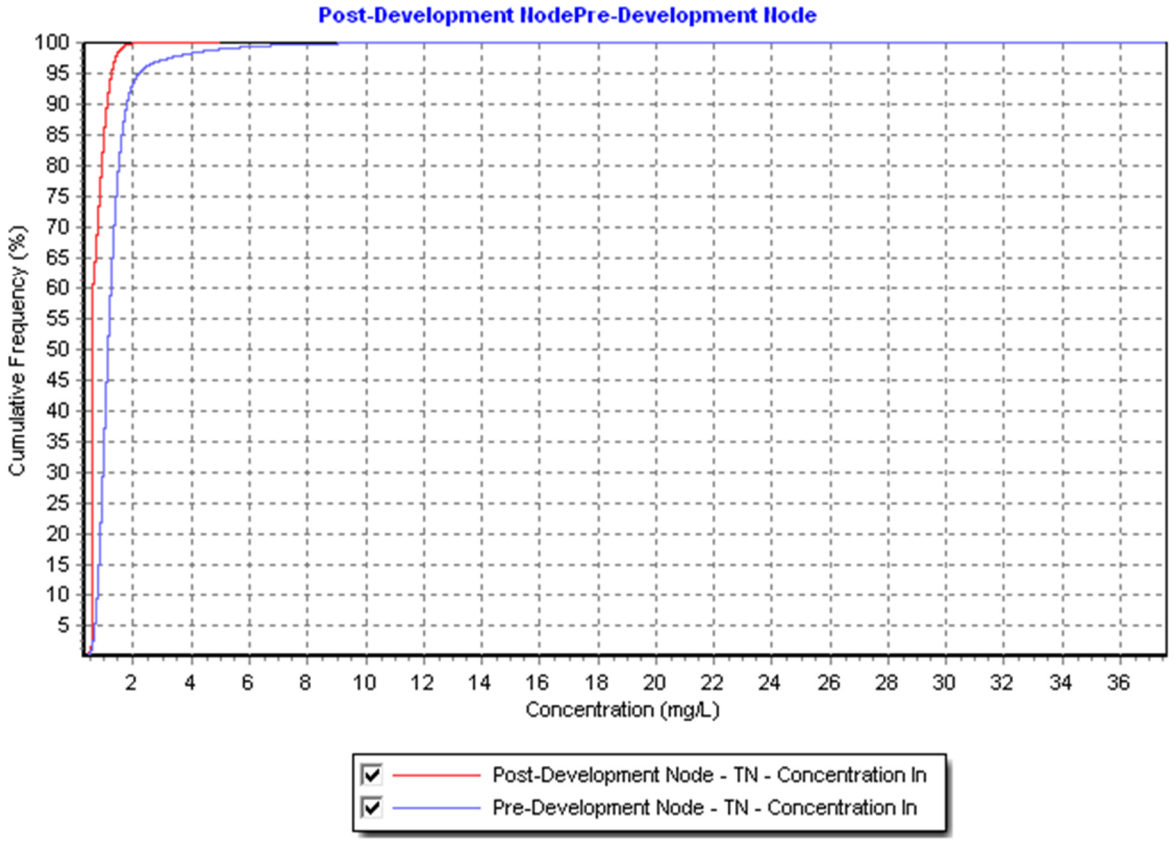


Figure 4 - Pre and Post development Cumulative Frequency Graphs Total Nitrogen

Conclusion

The MUSIC model results conceptually show the Neutral or Beneficial Effect criteria would be achieved for the proposed post development scenario given the treatment measures described in sections 2.5.

The modelled post development TSS, TP, TN and gross pollutant loads are a minimum 10% less than pre development conditions.

98th percentile TSS, TP, TN concentrations for the post development scenario are lower than the pre development conditions.

These results indicate conceptually that the overall water quality of this catchment will experience a Neutral or Beneficial Effect in accordance with the guidelines prepared by Water NSW.

4 References

Payne et al, 2015, *Adoption Guidelines for Stormwater Bio-Filtration Systems Version 2- CRC for Water Sensitive Cities.*

Landcom (2004). *Managing Urban Stormwater: Soils and Construction.* 4th Edition. NSW Government.

Water NSW, 2011, *Neutral or Beneficial Effects on Water Quality Guidelines*

Water NSW - *A Guide to the Use of MUSIC in Sydney's Drinking Water Catchments*

5 Supporting Plans and Information

Refer to LandTeam drawings:

Drawing No.	Issue:	Description:
214480TP02	E	Test Pit and Water Quality

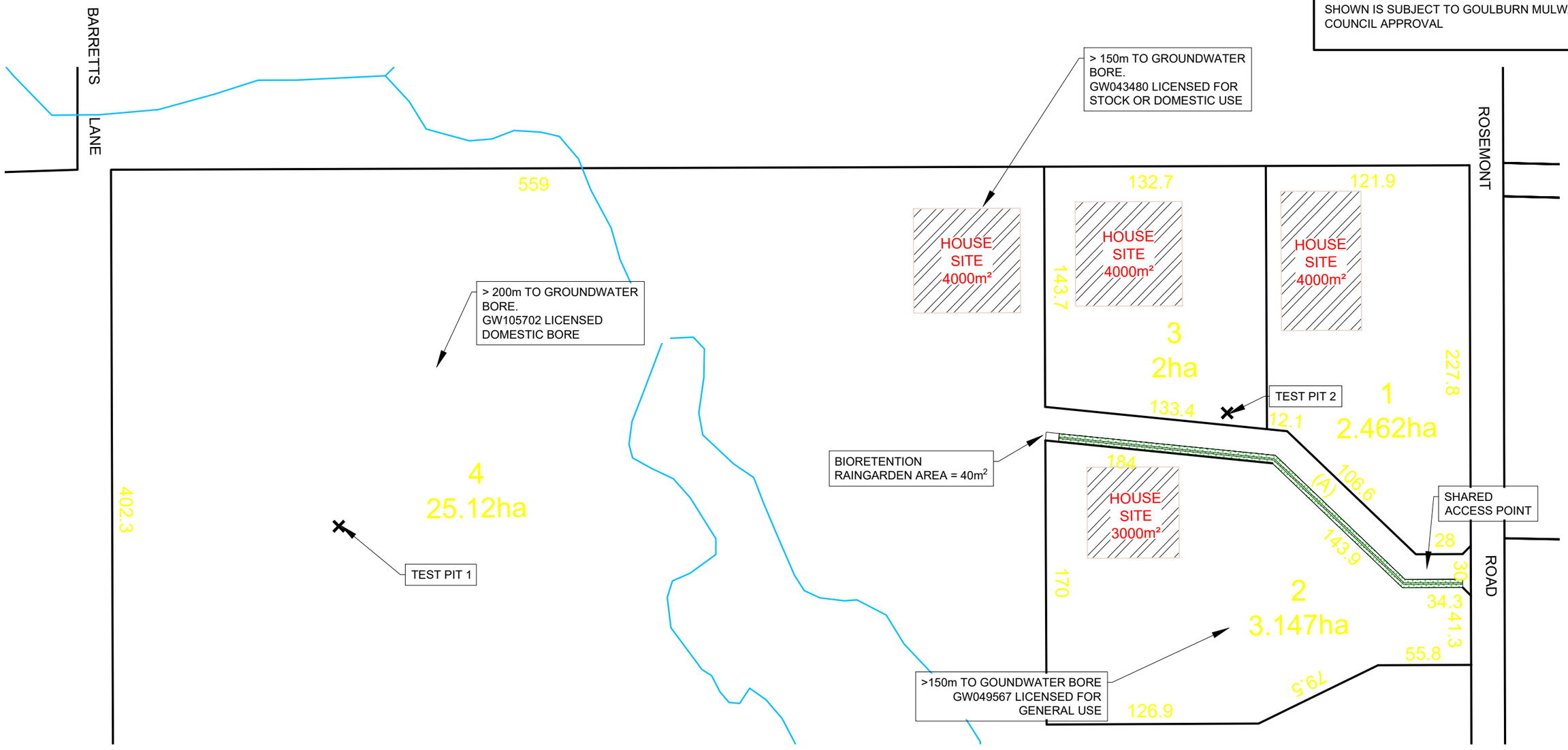
LEGEND

PROPOSED WATER QUALITY SWALE DRAIN

www.dialbeforeyoudig.com.au
DIAL 1100 BEFORE YOU DIG

NOTES:

THE INFORMATION DEPICTED IN THIS PLAN IS CONCEPTUAL ONLY AND IS PREPARED TO SUPPORT A PLANNING PROPOSAL. THE DETAIL SHOWN IS SUBJECT TO GOULBURN MULWAREE COUNCIL APPROVAL



\\BOWRAL.LANDTEAM.LOCAL\LT-BOWRAL\BOWRAL\JOBS\214000-214999\214480 - SHARED GOULBURN\3. CIVIL\DA DESIGN\DWGS\214480 ROSEMONT ROAD\214480 TP02_E.DWG

ISSUE	AMENDMENT	DRAWN	DATE
A	INITIAL ISSUE	BH	09.12.21
B	BOUNDARY ADJUSTMENT	BH	14.02.22
C	COMMENTS	BH	10.02.23
D	BORE HOLE LOCATION	BH	27.02.23
E	LOT LAYOUTS UPDATED	TJ	16.11.23

LandTeam Australia Pty Ltd
ABN 35 300 283 592
Southern Highlands Branch
357 Bong Bong Street,
BOWRAL NSW 2576
p: 4861-2467
f: 4861-4975
e: bowral@landteam.com.au
www.landteam.com.au

LandTeam

A3 SHEET

M.TAYLOR

PROPOSED SUBDIVISION
LOT 117 & 118 , DP126140
ROSEMONT ROAD, BOXERS CREEK

GOULBURN MULWAREE COUNCIL

TEST PITS AND WATER QUALITY LAYOUT PLAN

SCALE	1:2500@A3	DATUM	A.H.D.	DATE	16.11.2023

DESIGNED: TM
DRAWN: BH
CHECKED: TM
ISSUE E
DRAWING No. 214480-TP02

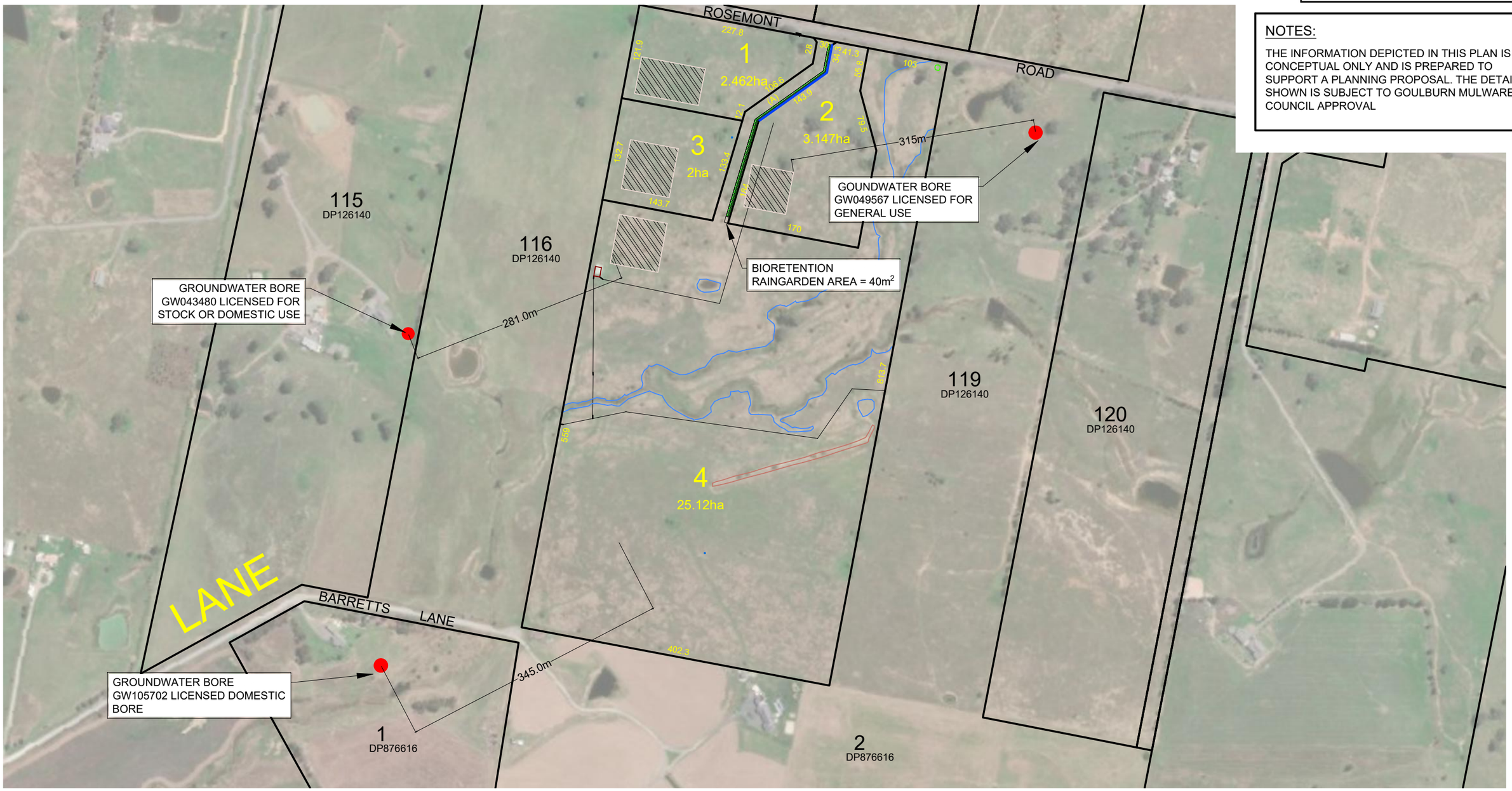
LEGEND

EXISTING BORE HOLE LOCATION

www.dialbeforeyoudig.com.au
DIAL 1100 BEFORE YOU DIG

NOTES:

THE INFORMATION DEPICTED IN THIS PLAN IS CONCEPTUAL ONLY AND IS PREPARED TO SUPPORT A PLANNING PROPOSAL. THE DETAIL SHOWN IS SUBJECT TO GOULBURN MULWAREE COUNCIL APPROVAL



\\BOWRAL.LANDTEAM.LOCAL\LT-BOWRAL\BOWRAL\JOBS\214000-214999\214480 - SHARED GOULBURN\3. CIVIL\DA DESIGN\DWGS\214480 ROSEMONT ROAD\214480 TP02_E.DWG

ISSUE	AMENDMENT	DRAWN	DATE
A	INITIAL ISSUE	BH	09.12.21
B	BOUNDARY ADJUSTMENT	BH	14.02.22
C	COMMENTS	BH	10.02.23
D	BORE HOLE LOCATION	BH	27.02.23
E	LOT LAYOUTS UPDATED	TJ	16.11.23

LandTeam Australia Pty Ltd
ABN 35 300 283 592
Southern Highlands Branch
357 Bong Bong Street,
BOWRAL NSW 2576
p: 4861-2467
f: 4861-4975
e: bowral@landteam.com.au
www.landteam.com.au

LandTeam

A3 SHEET

M.TAYLOR

PROPOSED SUBDIVISION
LOT 117 & 118 , DP126140
ROSEMONT ROAD, BOXERS CREEK

GOULBURN MULWAREE COUNCIL

BORE HOLE LOCATION PLAN

DESIGNED:	TM	ISSUE
DRAWN:	BH	E
CHECKED:	TM	

DRAWING No. 214480-TP03

SCALE	1:2500@A3	DATUM	A.H.D.	DATE	16.11.2023