

APPENDIX G - SITE BASED STORMWATER MANAGEMENT PLAN
ADG Engineers

Western Residential Subdivision

7 Meringandan-Shirley Road, Meringandan West

Site Based Stormwater Management Plan

McNamara Healey Holdings

28 August 2026

DOCUMENT VERIFICATION

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Job Number 25195
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DOCUMENT CONTROL

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APPROVAL FOR ISSUE

Authority	Name	Signature	Date
Author	James Le		28.08.2026
Reviewer	Brian lamb (RPEQ 22950)		11.09.2026

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EXECUTIVE SUMMARY

ADG Engineers (Aust.) Pty Ltd was engaged by McNamara Healey Holdings to carry out a Stormwater Management Report suitable for submission to Toowoomba Regional Council and any required referral agencies for a site located at 7 Meringandan-Shirley Road, Meringandan West Qld 4352. The proposed development is for a 52 Lot Subdivision.

The purpose of this Stormwater Management Report is to provide advice on the development proposal as detailed in the proposed development plans prepared by ADG. The works described herein are subject to further approvals and cover works required to service the proposed development including stormwater quality and quantity measures, flooding, and drainage.

No detention for stormwater runoff is proposed for the development, as runoff from the site is able to be immediately discharged to Meringandan Creek. It is also noted that this approach aligns with the recommendations outlined within the Meringandan Urban Stormwater Master Plan. Noting that Meringandan Urban Stormwater Master Plan recommends stormwater associated with the developments within this catchment area is discharged without onsite detention so that the developments peak stormwater discharges do not coincide with the upstream catchment's peak stormwater discharge.

Stormwater quality objectives under the State Planning Policy (SPP) 2017 are not triggered for the proposed development, as Meringandan West is located within a population centre of less than 25,000 persons. Accordingly, compliance with the SPP Water Quality Management Design Objectives is not required.

All relevant standards and guidelines are addressed in this report including criteria from:

- Toowoomba Regional Council Planning Scheme Policies
- State Planning Policy (SPP) 2017
- Queensland Urban Drainage Manual (QUDM) 2017
- Plumbing and Drainage Code AS3500.3, and;
- Australian Rainfall and Runoff Guideline (ARR)

1 INTRODUCTION

1.1 Background

ADG Engineers (Aust.) Pty Ltd was engaged by McNamara Healey Holdings to carry out a Site Based Stormwater Management Report suitable for submission to Toowoomba Regional Council and any required referral agencies for a site located at 7 Meringandan-Shirley Road, Meringandan West Qld 4352. The proposed development is for a 52 Lot Subdivision as shown in Appendix A of this report.

The purpose of this Site Based Stormwater Management Report is to provide advice on the development proposal with regards to stormwater quality and quantity measures, flooding, and drainage. The required infrastructure will be subject to the conditions attached to the Operational Works Approval to be provided by Toowoomba Regional Council and any nominated referral agencies.

1.2 Property Detail

The proposed development is the 52 Lot Subdivision as shown in Appendix A, and the property details for the proposed development are shown in Table 1 below.

Table 1 Property Details

Title	Lot 11 SP247510 and Lot 10 RP861102
Street Address	7 Meringandan-Shirley Road, Meringandan West QLD 4352
Total Site Area	11.3833 ha Obtained by Minstaff Survey Drawing Number: M3885 3000 001 Date: 02/09/2021
Approved Childcare Area	0.2695 ha
Local Centre Stage 1 Area	0.8504 ha
Future Local Centre Stage 2 Area	0.4977 ha
52 Lot Residential Subdivision Area Including Drainage Reserve	9.7657 ha

The location of the proposed development is illustrated in Figure 1.

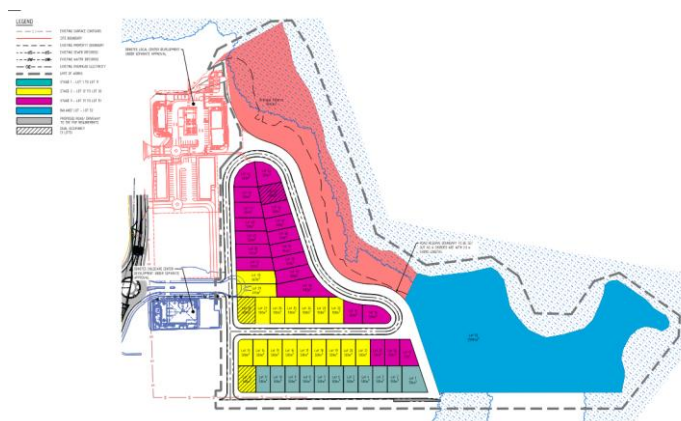


Figure 1 - Site Location (Source: ADG Markup)

2 EXISTING SITE

2.1 Existing Site Features

The subject site Lot 11 SP247510 is currently vacant, has good grass coverage and has several large trees located within the subject site. The existing site features can be seen below in Figure 2. The site is bound by:

- Meringandan-Shirley Road along the western boundary of the development, and;
- School Road lies to the south of the development.
- Meringandan Creek aligns with the eastern boundary of the development.
- Goombungee Meringandan Road along the northern boundary of the development.



Figure 2 - Site Layout Lot 11 SP247510 (as accessed from Queensland Globe 20.07.26)

The existing contours, surface levels and the location of the existing buildings are identified on the survey plan drawing as attached in Appendix B of this report.

2.2 Lawful Point of Discharge (LPD)

2.2.1 Existing LPD

Based on information gathered via survey data, aerial imagery and site investigation, it has been determined that the subject site currently discharges flows from the site as sheet flow across the site's north-eastern boundary. These flows ultimately discharge to the existing waterway corridor to the north-east of the subject site.

2.2.2 Proposed LPD

It is proposed to maintain the existing waterway corridor to the East of the subject site as the lawful point of discharge.

3 STORMWATER QUANTITY ASSESSMENT

The aim of the stormwater quantity assessment is to ensure that the development shall impose no adverse effects on existing downstream properties or receiving water bodies, and that the conveyance of flows will be in a safe manner with minimal risk of human endangerment as well as the following objectives:

- Address the need for stormwater quantity control measures; and
- Check for increase in peak discharge from the subject site for events up to and including the 1 in 100 year ARI event, and;
- Ascertain if any increase in flow is acceptable.

3.1 Pre-Development and Associated Issues

Table 2 below provides a summary of the adopted catchment parameters for the pre-developed site.

Table 2 Catchment Details

Catchment	Size
Local Centre	
Pervious (E1, E2)	0.0816 ha
Impervious (E1, E2)	1.2069 ha
Childcare Centre	
Pervious (E3)	0.2657 ha
Impervious (E3)	0.014 ha
Lot Subdivision Including Drainage Reserve	
Pervious (E4)	9.6899 ha
Impervious (E4)	0.00 ha
Existing Catchment	
Pervious (ET1)	1.4568 ha
Impervious (ET1)	0.3198 ha
Pervious (ET2)	0.0301 ha
Impervious (ET2)	0.00 ha

3.2 Proposed Development and Associated Issues

The overall developed site consists of the following:

- A development for a 52 Lot subdivision.

Table 3 below provides a summary of the adopted catchment parameters.

Table 3 Catchment Details

Catchment	Size
Lot Subdivision Including Drainage Reserve	
Pervious (C1)	2.423 ha
Impervious (C1)	7.268 ha

3.3 Upstream Catchment

There are external catchments that contributes flows to the subject site. Aerial imaging indicates that an upstream lot contributes sheet flow, as seen in Figure 3. Aerial imaging indicates that the external catchments consist of roofed, sealed and landscaped areas.

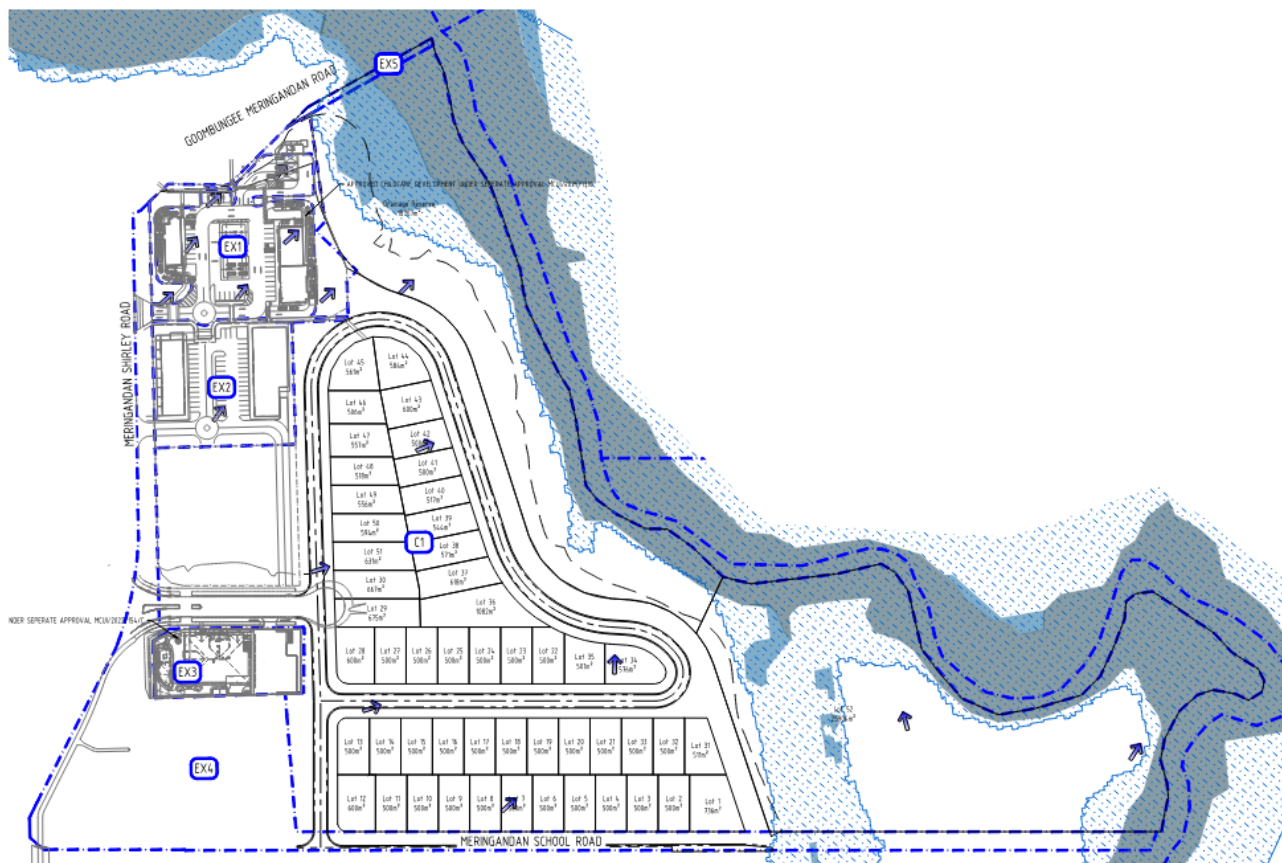


Figure 3 – External Catchments

The adopted upstream catchment parameters are summarised below in Table 4.

Table 4 Upstream Catchment Details

Catchment	Size
EX4	
Pervious	1.3820 ha
Impervious	0.3946 ha
EX5	
Pervious	0.0301 ha
Impervious	0.00 ha
CHILDCARE	
Pervious (EX3)	0.0867 ha
Impervious (EX3)	0.1930 ha
LOCAL CENTRE	
Pervious (EX1, EX2)	0.3143 ha
Impervious (EX1, EX2)	0.9742 ha

3.4 Flow Rate Methodology

3.4.1 Design Storm Events

Based on recommendations within QUDM 2017, AS/NZ 3500.3 and Council standards, the major and minor storm events were selected as follows:

- Minor Event: 10% AEP
 - Surface drainage infrastructure sized for a 10% AEP to point of discharge.
 - Captured within pit and pipe drainage infrastructure through to point of discharge.
- Major Event: 1% AEP
 - Surface drainage overflows in events up to and including the 1% AEP will not present a hazard to people or cause significant damage to property.

3.5 Stormwater Quantity Calculations

The stormwater quantity of the pre-developed and post-developed areas has been assessed in accordance with Section 4.0 of QUDM 2017 using the Rational Method. The theoretical calculated peak discharge for storm events ranging from 63% to 1% AEP have been calculated and a summary of the results obtained is presented in Tables 4 and 5.

The pre and post developed catchment areas used for the stormwater quantity calculations are shown in Appendices C and D. These drawings also show the fraction impervious percentages calculated.

The time of concentration for each catchment was calculated using QUDM 2017 Section 4.6. For this particular site, a combination of methods were used to determine the time of concentration for the catchments including overland flow travel times, standard inlet times, travel times from roof to main system connection and initial estimates of kerb, pipe and channel flow time were used where applicable to determine the time of concentration.

The Coefficient of discharge (C10) value for each catchment was derived from QUDM 2017 Tables 4.5.3 and 4.5.4. Frequency factors were applied to determine runoff coefficients for various annual exceedance probability (AEP) storm events in accordance with QUDM 2017 Table 4.5.2.

The Rational Method equation 4.2 from QUDM 2017 was then used to calculate the peak flows. The results obtained can be noticed in Tables 5 and 6.

Please refer to Appendix F for further details.

Table 5 Pre Development 63% to 1% AEP Peak Discharge Rates

Catchment	Q1 (m ³ /s) 63% AEP	Q2 (m ³ /s) 39% AEP	Q5 (m ³ /s) 18% AEP	Q10 (m ³ /s) 10% AEP	Q20 (m ³ /s) 5% AEP	Q50 (m ³ /s) 2% AEP	Q100 (m ³ /s) 1% AEP
E3	0.013	0.017	0.024	0.029	0.036	0.046	0.053
ET1	0.079	0.106	0.150	0.183	0.222	0.286	0.332
E1	0.046	0.062	0.087	0.106	0.128	0.164	0.190
E4	0.433	0.579	0.817	1.000	1.211	1.559	1.813
E2	0.024	0.032	0.045	0.055	0.067	0.086	0.100
ET2	0.002	0.003	0.004	0.005	0.006	0.008	0.009

Table 6 Post Development 63% to 1% AEP Peak Discharge Rates

Catchment	Q1 (m ³ /s) 63% AEP	Q2 (m ³ /s) 39% AEP	Q5 (m ³ /s) 18% AEP	Q10 (m ³ /s) 10% AEP	Q20 (m ³ /s) 5% AEP	Q50 (m ³ /s) 2% AEP	Q100 (m ³ /s) 1% AEP
EX3	0.032	0.043	0.060	0.073	0.088	0.113	0.131
EX4	0.095	0.127	0.179	0.219	0.265	0.342	0.397
EX1	0.101	0.134	0.188	0.230	0.277	0.355	0.412
C1	0.701	0.939	1.325	1.622	1.964	2.531	2.945
EX2	0.060	0.080	0.113	0.137	0.166	0.212	0.246
EX5	0.002	0.003	0.004	0.005	0.006	0.008	0.009

3.6 Peak Stormwater Results

A comparison between the peak discharge values between the pre and post development scenarios is presented in Table 7.

Table 7 Pre and Post Development Peak Discharge Comparison

Design Storm (AEP)	Pre-Development (m ³ /s)	Post-Development (m ³ /s)	Flow Change (m ³ /s)	% Increase
63% (Q1)	0.597	0.991	+0.394	65.99%
39% (Q2)	0.799	1.326	+0.527	65.96%
18% (Q5)	1.127	1.869	+0.742	65.84%
10% (Q10)	1.378	2.286	+0.908	65.89%
5% (Q20)	1.670	2.766	+1.096	65.63%
2% (Q50)	2.149	3.561	+1.412	65.70%
1% (Q100)	2.497	4.140	+1.643	65.80%

3.7 Recommendation

As demonstrated in Table 7, the proposed development will result in an increase in peak discharge rates relative to pre-development conditions across all assessed storm events. This increase is attributable to the reduction in initial and continuing losses associated with the substantial pre-development pervious areas that will be replaced by impervious surfaces as part of the proposed development.

Although post-development peak discharge rates are predicted to increase, the provision of on-site detention is not considered appropriate given the site's location within the broader catchment. In accordance with the recommendations of the *Meringandan Urban Stormwater Master Plan*, it is proposed that stormwater runoff from the site remains unattenuated. This approach allows peak flows from the development to occur independently of peak flows from the upstream catchment, thereby reducing the likelihood of coincident peak discharges and the associated cumulative downstream impacts.

4 STORMWATER QUALITY ASSESSMENT

4.1 Treatment Objectives

This assessment identifies issues relating to stormwater quality runoff and assesses possible methods of treatment required for the proposed local centre development. The aim of this section of the report is to determine practical approaches to achieving improvements in the quality of the stormwater run-off for the local centre development that can be readily implemented.

The SPP 2017 proposes criteria which apply to 'high-risk' development for stormwater. The criteria include one or more of the following:

- A Material Change of Use (MCU) for an urban purpose which involves greater than 2,500m² of land that will result in an impervious area greater than 25% of the net developable area; or will result in six (6) or more dwellings; or
- A Reconfiguration of a Lot (ROL) for urban purposes that involves a land area greater than 2,500m² and will result in six (6) or more lots; or
- Operational works for urban purposes that involve disturbing more than 2,500m² of land.

The above provisions are only applicable to developments located within population centres greater than 25,000 persons. Based on the Australian Bureau of Statistics (ABS) 2021 Census, Meringandan West has a resident population of approximately 2,392 persons, which is significantly below the 25,000-person threshold specified in the State Planning Policy Water Quality Management Design Objectives. Accordingly, the above provisions do not apply to the proposed development. Notwithstanding this, stormwater quality management has been considered as part of the development design, and best practice stormwater management measures have been incorporated to provide an appropriate level of stormwater quality treatment and minimise potential impacts on downstream receiving environments.

4.2 Erosion and Sediment Control

4.2.1 Pre-Development Phase

Prior to construction commencing, the following erosion and sediment control measures will need to be installed around the subject site to minimise disturbance and ensure the quality of runoff discharging from the site is of an acceptable standard:

- Sediment barriers to be installed on all entrances to downstream stormwater infrastructure (i.e. gully pits);
- Designation of transport routes through the site to minimise vegetation disturbance;
- Maximise retention of existing vegetation to reduce soil disturbance and provide filter strip treatment for runoff;
- Install construction entry and exit shakedown areas;
- Sediment fences are to be installed on the downstream boundaries of the subject site; and
- Install dust control measures as required.

All erosion and sediment control measures are to be designed and installed in accordance with IECA Guidelines. Further details regarding the proposed erosion and sediment control measures will be provided during the detailed design phase of the development.

4.2.2 Bulk Earthworks Phase

During the bulk earthworks phase, the following erosion and sediment control measure will need to be installed in addition to the aforementioned measures (Pre-Development Phase) to ensure there is minimal disturbance to downstream receiving water bodies:

- Construction chutes to control runoff over earthworks batters;
- Construction of temporary bunds at the top of all earthworks batters to ensure runoff is directed away from exposed batters;
- Sediment basins to be constructed at low points within each stage of the proposed development;
- Construction of temporary diversion drains to divert water to sediment basins and around any stockpiles;
- Sediment fences to be installed on the downstream side of any stockpiles; and
- Stabilisation of all batters upon reaching the finished earthworks levels.

All erosion and sediment control measures are to be designed and installed in accordance with IECA Guidelines. Further details regarding the proposed erosion and sediment control measures will be provided during the detailed design phase of the development.

4.2.3 Construction Phase

During the construction phase of the development, there is a risk of sedimentation transport due to large areas of disturbed land. The following erosion and sediment control measure will need to be installed in addition to the aforementioned measures (Pre-Development and Bulk Earthworks Phases) to ensure there is minimal disturbance and the quality of runoff is maintained to an acceptable standard:

- Construction of temporary diversion drains to divert water to sediment basins;
- Construction of temporary diversion drains to divert water to protect bioretention and treatment devices as required;
- Sediment barriers to be installed on all entrances to newly constructed stormwater infrastructure (i.e. gully pits);
- Sediment fences to be installed on the downstream side of any stockpiles and batters; and
- Re-vegetation of all disturbed areas within two (2) weeks of completion.

All erosion and sediment control measures are to be designed and installed in accordance with IECA Guidelines. Further details regarding the proposed erosion and sediment control measures will be provided during the detailed design phase of the development.

4.2.4 Maintenance

All erosion and sediment control devices are to be maintained through the entire phase of the development leading up to the operational phase. Erosion and sediment control devices will need to be monitored closely throughout the entire project to ensure they are operating correctly and efficiently. No erosion and sediment control devices are to be removed unless otherwise authorised by a suitably qualified engineer or the site superintendent.

5 CONCLUSION

The purpose of this Stormwater Management Report was to provide advice on the proposed development submission for 52 Lot subdivision within the Meringandan site as detailed in the ADG drawings.

As outlined in Section 3 of this report, no detention for stormwater runoff is proposed, as runoff from the site can immediately discharge to Meringandan Creek. This is beneficial during any storm event, as the short time of concentration will allow the runoff from the site to quickly dissipate from the area before the onset of the upstream peak stormwater flows as referenced in the Meringandan Urban Stormwater Master Plan.

Stormwater quality objectives under the State Planning Policy (SPP) 2017 are not triggered for the proposed development, as Meringandan West is located within a population centre of less than 25,000 persons. Accordingly, compliance with the SPP Water Quality Management Design Objectives is not required.

In preparing this report, ADG has achieved all requirements for Stormwater Management Plans as described in QUDM 2017 standards to suit the requirements of TRC for this development.

Appendix A

Proposed Development Plan



Site plan for Lot 52, showing a large blue area (Lot 52, 25904m²) and a surrounding residential development. The development includes a central road reserve and various lots. A red hatched area indicates a drainage reserve (18767m²). A dashed line shows the road reserve boundary to be set out as a chorded arc with 2.0 m chord lengths. A note indicates that the local center development and childcare center development are under separate approval.

LOT 52: 25904m²

Drainage Reserve: 18767m²

ROAD RESERVE BOUNDARY TO BE SET OUT AS A CHORDED ARC WITH 2.0 m CHORD LENGTHS.

LOT 45: 561m²

LOT 44: 584m²

LOT 46: 506m²

LOT 43: 600m²

LOT 47: 557m²

LOT 42: 500m²

LOT 48: 518m²

LOT 41: 500m²

LOT 49: 556m²

LOT 40: 517m²

LOT 50: 594m²

LOT 39: 544m²

LOT 51: 631m²

LOT 38: 571m²

LOT 30: 667m²

LOT 37: 618m²

LOT 29: 675m²

LOT 36: 1082m²

LOT 28: 600m²

LOT 27: 500m²

LOT 26: 500m²

LOT 25: 500m²

LOT 24: 500m²

LOT 23: 500m²

LOT 22: 500m²

LOT 35: 501m²

LOT 34: 576m²

LOT 13: 500m²

LOT 14: 500m²

LOT 15: 500m²

LOT 16: 500m²

LOT 17: 500m²

LOT 18: 500m²

LOT 19: 500m²

LOT 20: 500m²

LOT 21: 500m²

LOT 33: 500m²

LOT 32: 500m²

LOT 31: 511m²

LOT 12: 600m²

LOT 11: 500m²

LOT 10: 500m²

LOT 9: 500m²

LOT 8: 500m²

LOT 7: 500m²

LOT 6: 500m²

LOT 5: 500m²

LOT 4: 500m²

LOT 3: 500m²

LOT 2: 500m²

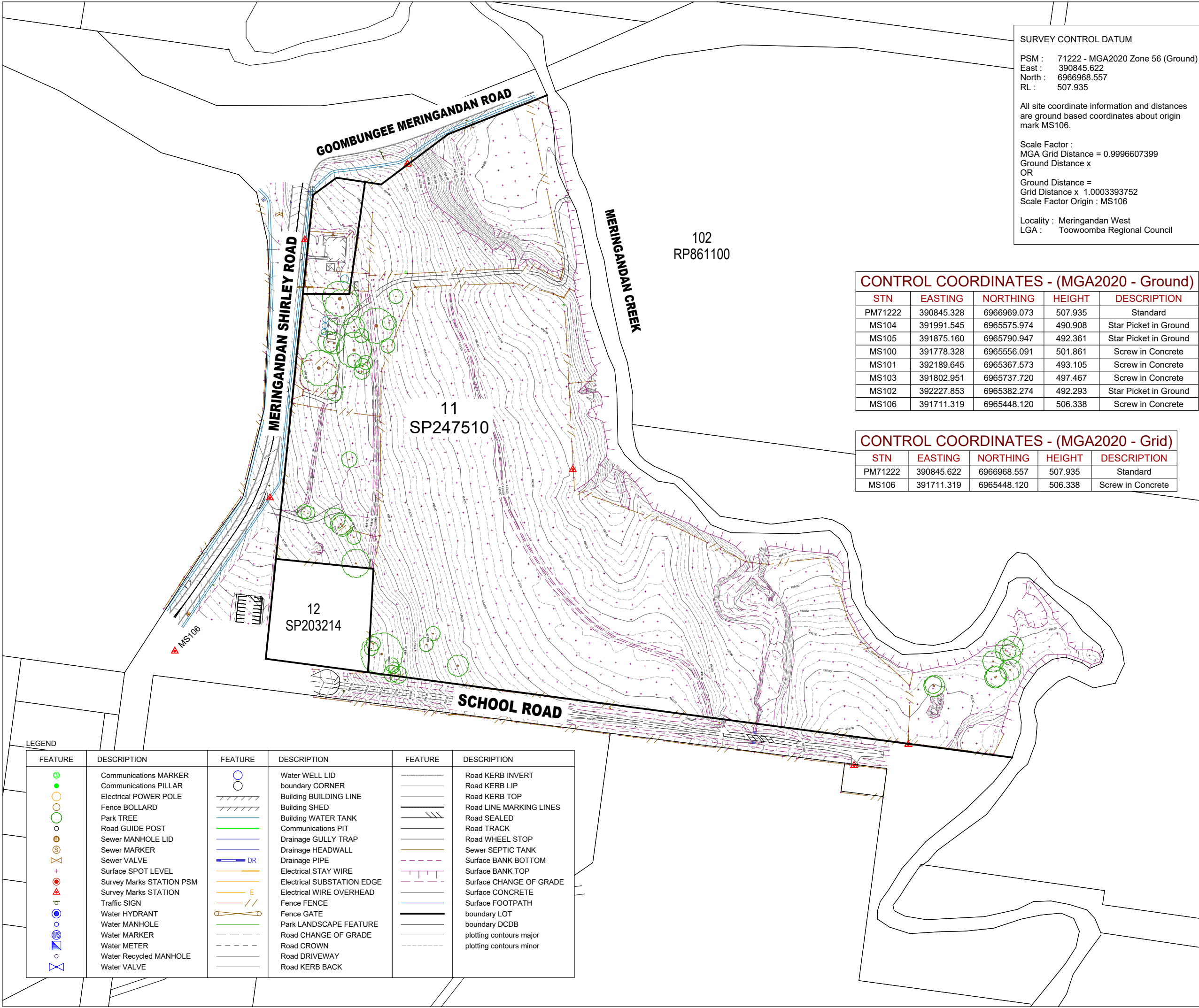
LOT 1: 736m²

LOCAL CENTER DEVELOPMENT UNDER SEPARATE APPROVAL.

CHILD CARE CENTER DEVELOPMENT UNDER SEPARATE APPROVAL.

Full size on original 0 10 20 30 40 50 60 70 80 90 100mm

Appendix B Site Survey Plan



SURVEY CONTROL DATUM

PSM : 71222 - MGA2020 Zone 56 (Ground)
East : 390845.622
North : 6966968.557
RL : 507.935

All site coordinate information and distances are ground based coordinates about origin mark MS106.

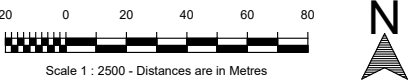
Scale Factor :
MGA Grid Distance = 0.9996607399
Ground Distance x
OR
Ground Distance =
Grid Distance x 1.0003393752
Scale Factor Origin : MS106

Locality : Meringandan West
LGA : Toowoomba Regional Council

CONTROL COORDINATES - (MGA2020 - Ground)				
STN	EASTING	NORTHING	HEIGHT	DESCRIPTION
PM71222	390845.328	6966969.073	507.935	Standard
MS104	391991.545	6965575.974	490.908	Star Picket in Ground
MS105	391875.160	6965790.947	492.361	Star Picket in Ground
MS100	391778.328	6965556.091	501.861	Screw in Concrete
MS101	392189.645	6965367.573	493.105	Screw in Concrete
MS103	391802.951	6965737.720	497.467	Screw in Concrete
MS102	392227.853	6965382.274	492.293	Star Picket in Ground
MS106	391711.319	6965448.120	506.338	Screw in Concrete

CONTROL COORDINATES - (MGA2020 - Grid)				
STN	EASTING	NORTHING	HEIGHT	DESCRIPTION
PM71222	390845.622	6966968.557	507.935	Standard
MS106	391711.319	6965448.120	506.338	Screw in Concrete

Note:
This plan was prepared as a site contour and detail survey of 7 Meringandan Shirley Road, Meringandan West, QLD, 4352 and it should not be used for any other purpose.
Lot boundaries were not marked at the time of survey and have been derived from survey plan SP247510 (Swing Plan to MGA2020 =7°33'45") and the Digital Cadastral Data Base (DCDB) held by Department of Resources (DoR)Accurate boundary locations can only be determined by completing a cadastral survey as defined by the Survey and Mapping Infrastructure Act 2003 and Surveyors Act 2003. The property boundaries and dimensions shown on this plan must not be relied upon when designing services, buildings or other structures that will be constructed within 2.0m to them. Design of services, buildings or structures that require criticalboundary offsets will require accurate boundary locations determined by completing a cadastral survey. Services shown hereon have been located by field survey where possible. Prior to any excavation, demolition or construction the relevant authorities should be contacted for locations of underground services if applicable.
For detailed information please refer to digital models. Survey File: M3885 3000 001 A.12da & .dwg
This note is an integral part of the plan.



ISSUE/REVISION

A	02/09/21	Issue to Client
Rev	Date	Revision Details



TOOWOOMBA	SUNSHINE COAST	BRISBANE
319 Margaret Street Toowoomba QLD 4350 (07) 4637 9790	22/2 Innovation Parkway Birtinya, QLD 4575 (07) 5327 3900	4/8 Navigator Place Hendra, QLD 4011 (07) 3198 2462



PROJECT

7 Meringandan Shirley Road,
Meringandan West

Lot 11 on SP247510
7 Meringandan Shirley Road
Meringandan West, QLD, 4352

DESCRIPTION

Contour and Detail
Survey Plan - Cover Sheet

PROJECT DATUM

Horizontal Datum : Vide: MGA2020 z56 (Ground)
Vide PM712222

Level Datum : Vide: AHD D PM71222
RL: 507.935m

Local Authority : Toowoomba Regional Council

DRAWING INFORMATION

Surveyed : SJM/SMM	Project No : M3885
Drawn : SJM	Ref No : 3000-DS-1
Checked : SMM	Date of Survey : 26/08/2021

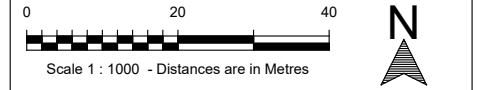
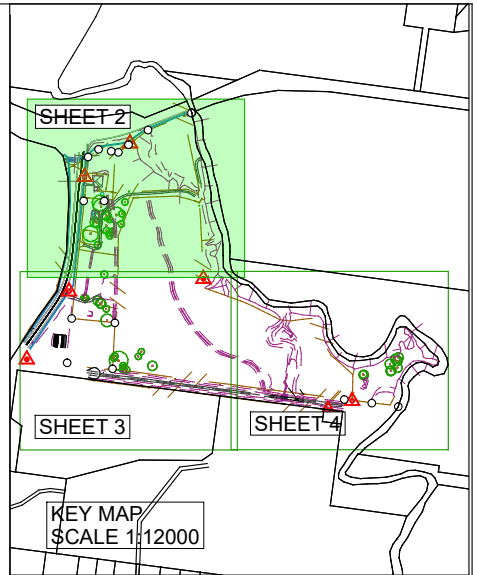
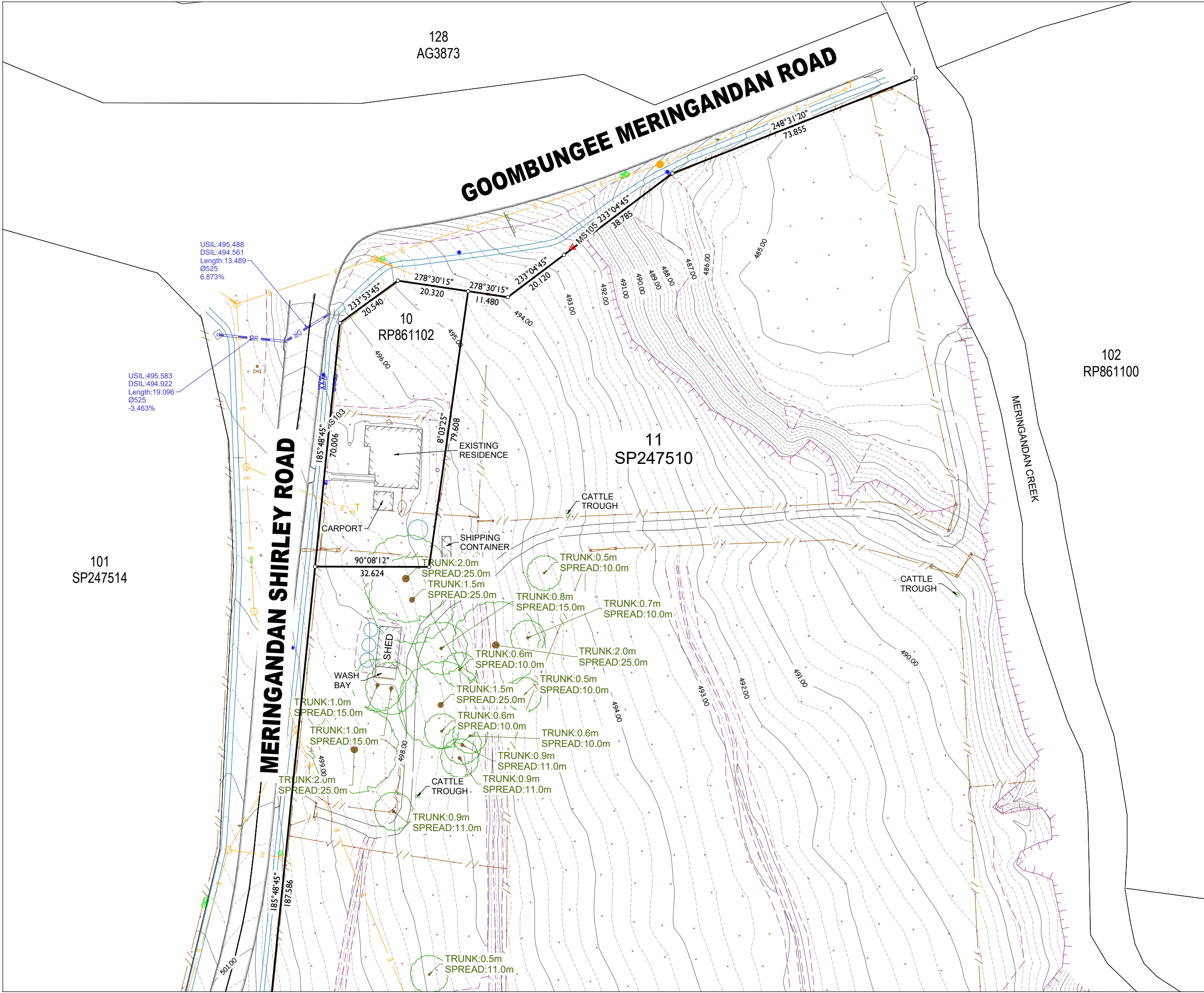
CONTOURS

Major : 1.000m	Scale @ A3 : 1 : 2500
Minor : 0.250m	Date: 02/09/2021

DRAWING NUMBER

M3885 3000 001

Sheet No. 1 of 4 Revision : A



ISSUE/REVISION

Rev	Date	Revision Details
A	02/09/21	Issue to Client



MINSTAFF SURVEY

CONSULTING CADASTRAL ENGINEERING AND MINING SURVEYORS
ABN 35 609 674 875

TOOWOOMBA	SUNSHINE COAST	BRISBANE
319 Margaret Street Toowoomba QLD 4350 (07) 4637 9790	22/2 Innovation Parkway Birtinya, QLD 4575 (07) 5327 3900	4/8 Navigator Place Hendra, QLD 4011 (07) 3198 2462

CLIENT



PPA
PROPERTY
PROJECTS
AUSTRALIA

PROJECT

**7 Meringandan Shirley Road,
Meringandan West**

Lot 11 on SP247510
7 Meringandan Shirley Road
Meringandan West, QLD, 4352

DESCRIPTION

**Contour and Detail
Survey Plan - Sheet 2**

PROJECT DATUM

Horizontal Datum : Vide: MGA2020 z56 (Ground)
Vide PM712222

Level Datum : Vide: AHD D PM71222
RL: 507.935m

Local Authority : Toowoomba Regional Council

DRAWING INFORMATION

Surveyed : SJM/SMM	Project No : M3885
Drawn : SJM	Ref No : 3000-DS-2
Checked : SMM	Date of Survey : 26/08/2021

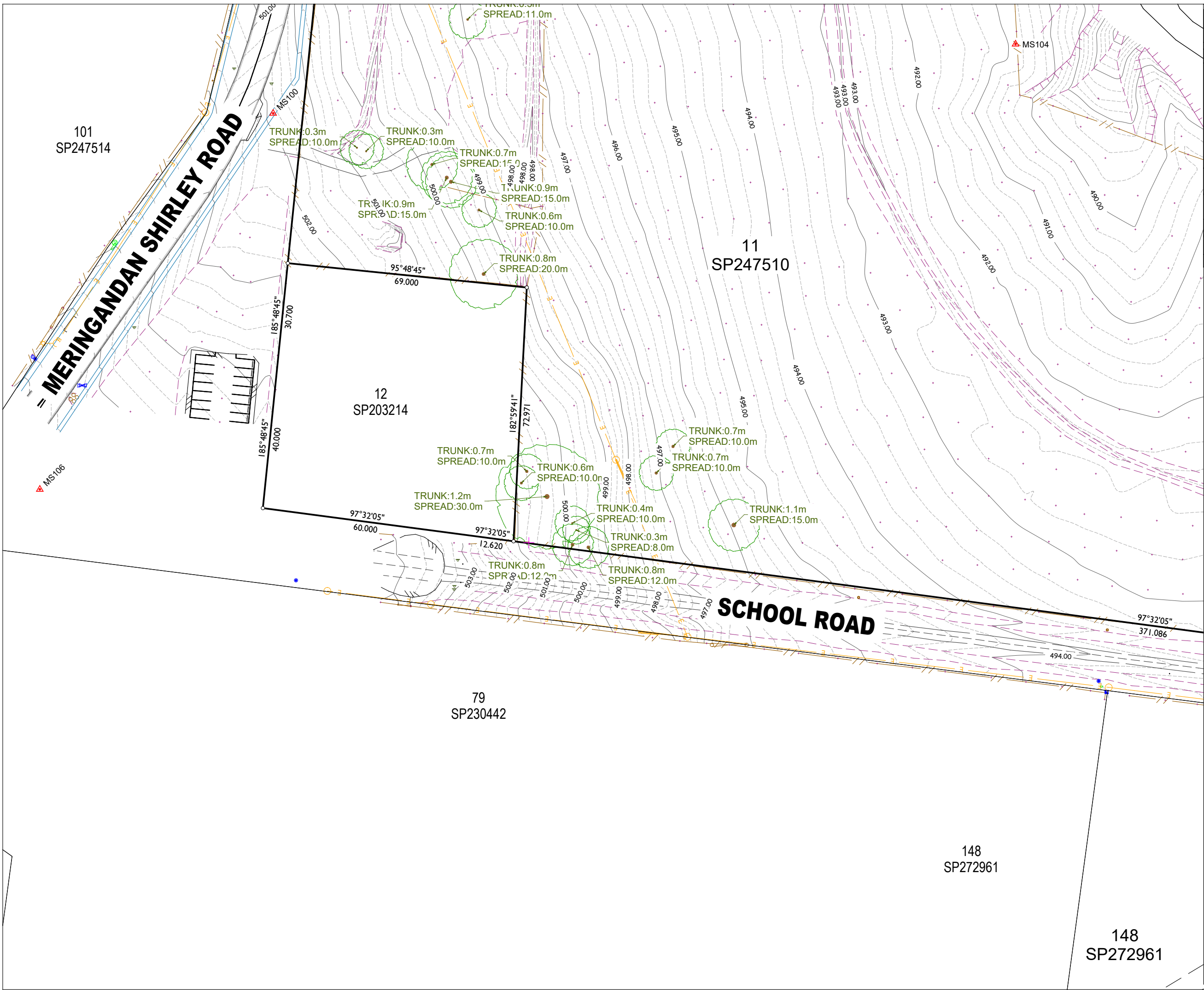
CONTOURS

Major : 1.000m	Scale @ A3 : 1 : 1000
Minor : 0.250m	Date : 02/09/2021

DRAWING NUMBER

M3885 3000 001

Sheet No. 2 of 4 Revision : A



SHEET 2

SHEET 3

SHEET 4

KEY MAP
SCALE 1:12000

02040

Scale 1 : 1000 - Distances are in Metres

N

ISSUE/REVISION

A 02/09/21 Issue to Client

Rev Date Revision Details



CONSULTING
CADASTRAL
ENGINEERING
AND MINING
SURVEYORS
ABN 35 609 674 875

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Toowoomba QLD 4350
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SUNSHINE COAST

22/2 Innovation Parkway
Birtinya, QLD 4575
(07) 5327 3900

BRISBANE

4/8 Navigator Place
Hendra, QLD 4011
(07) 3198 2462

CLIENT

PPA

PROPERTY
PROJECTS
AUSTRALIA

PROJECT

7 Meringandan Shirley Road,
Meringandan West

Lot 11 on SP247510
7 Meringandan Shirley Road
Meringandan West, QLD, 4352

DESCRIPTION

Contour and Detail
Survey Plan - Sheet 3

PROJECT DATUM

Horizontal Datum : Vide: MGA2020 z56 (Ground)
Vide PM712222

Level Datum : Vide: AHD D PM71222
RL: 507.935m

Local Authority : Toowoomba Regional Council

DRAWING INFORMATION

Surveyed : SJM/SMM

Drawn : SJM

Checked : SMM

Major : 1.000m

Minor : 0.250m

Project No : M3885

Ref No : 3000-DS-3

Date of Survey : 26/08/2021

Scale @ A3 : 1 : 1000

Date: 02/09/2021

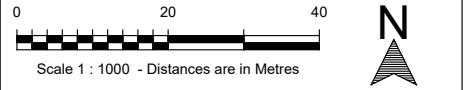
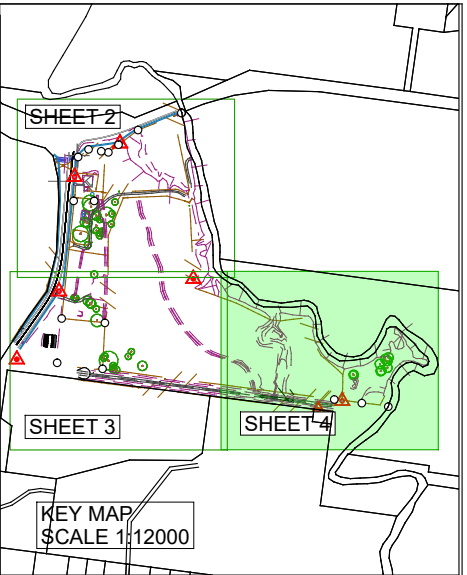
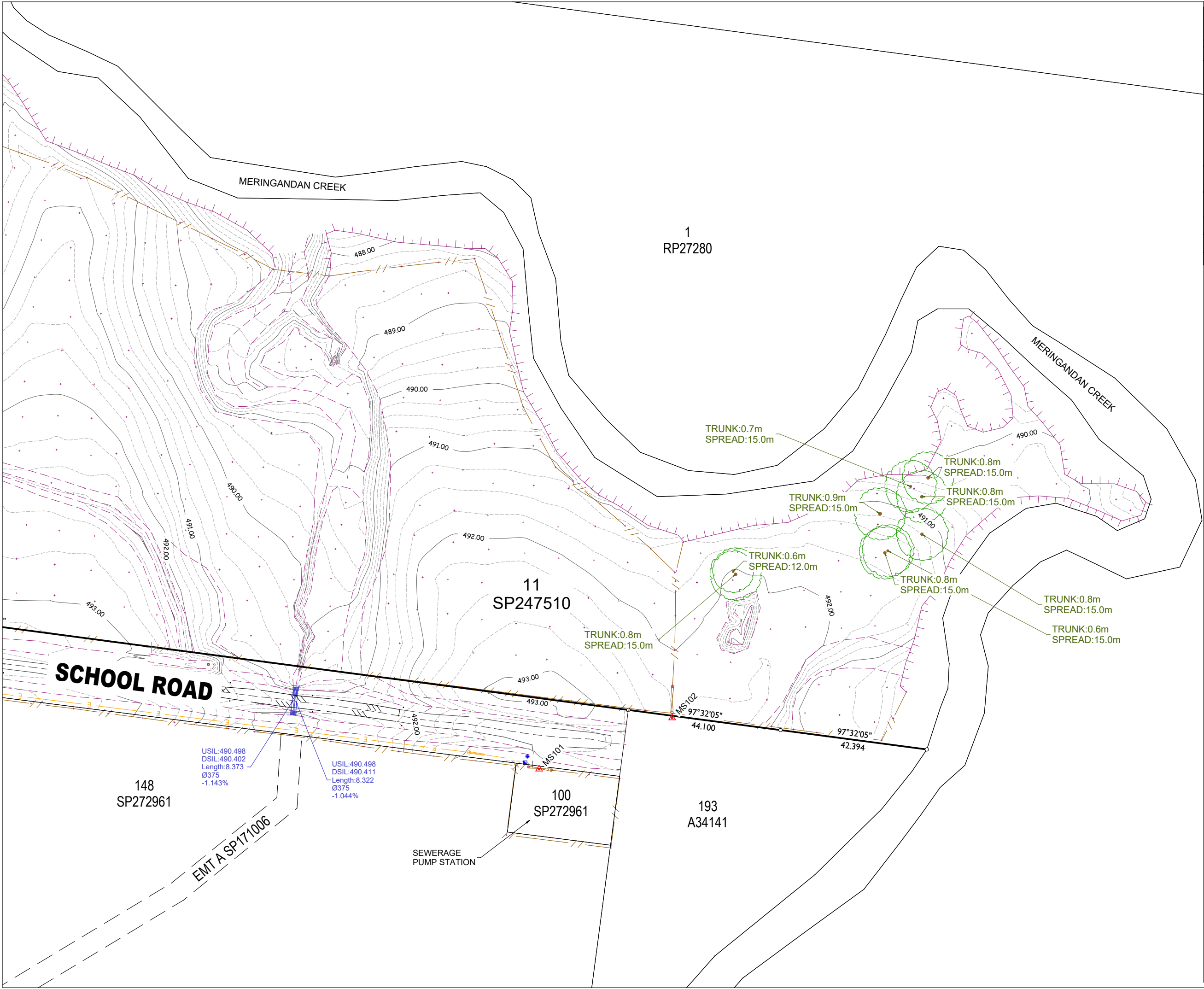
CONTOURS

DRAWING NUMBER

M3885 3000 001

Sheet No. 3 of 4

Revision : A



ISSUE/REVISION	
A	02/09/21 Issue to Client
Rev	Date
Date	Revision Details



MINSTAFF SURVEY

**CONSULTING
CADASTRAL
ENGINEERING
AND MINING
SURVEYORS**

ABN 35 609 674 875

TOOWOOMBA	SUNSHINE COAST	BRISBANE
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CLIENT



PPA
**PROPERTY
PROJECTS
AUSTRALIA**

PROJECT

**7 Meringandan Shirley Road,
Meringandan West**

Lot 11 on SP247510
7 Meringandan Shirley Road
Meringandan West, QLD, 4352

DESCRIPTION

**Contour and Detail
Survey Plan - Sheet 4**

PROJECT DATUM	
Horizontal Datum :	Vide: MGA2020 z56 (Ground) Vide PM712222
Level Datum :	Vide: AHD D PM71222 RL: 507.935m
Local Authority :	Toowoomba Regional Council

DRAWING INFORMATION	
Surveyed :	SJM/SMM
Drawn :	SJM
Checked :	SMM
Project No :	M3885
Ref No :	3000-DS-4
Date of Survey :	26/08/2021
CONTOURS	
Major :	1.000m
Minor :	0.250m
Scale @ A3 :	1 : 1000
Date:	02/09/2021

DRAWING NUMBER

M3885 3000 001

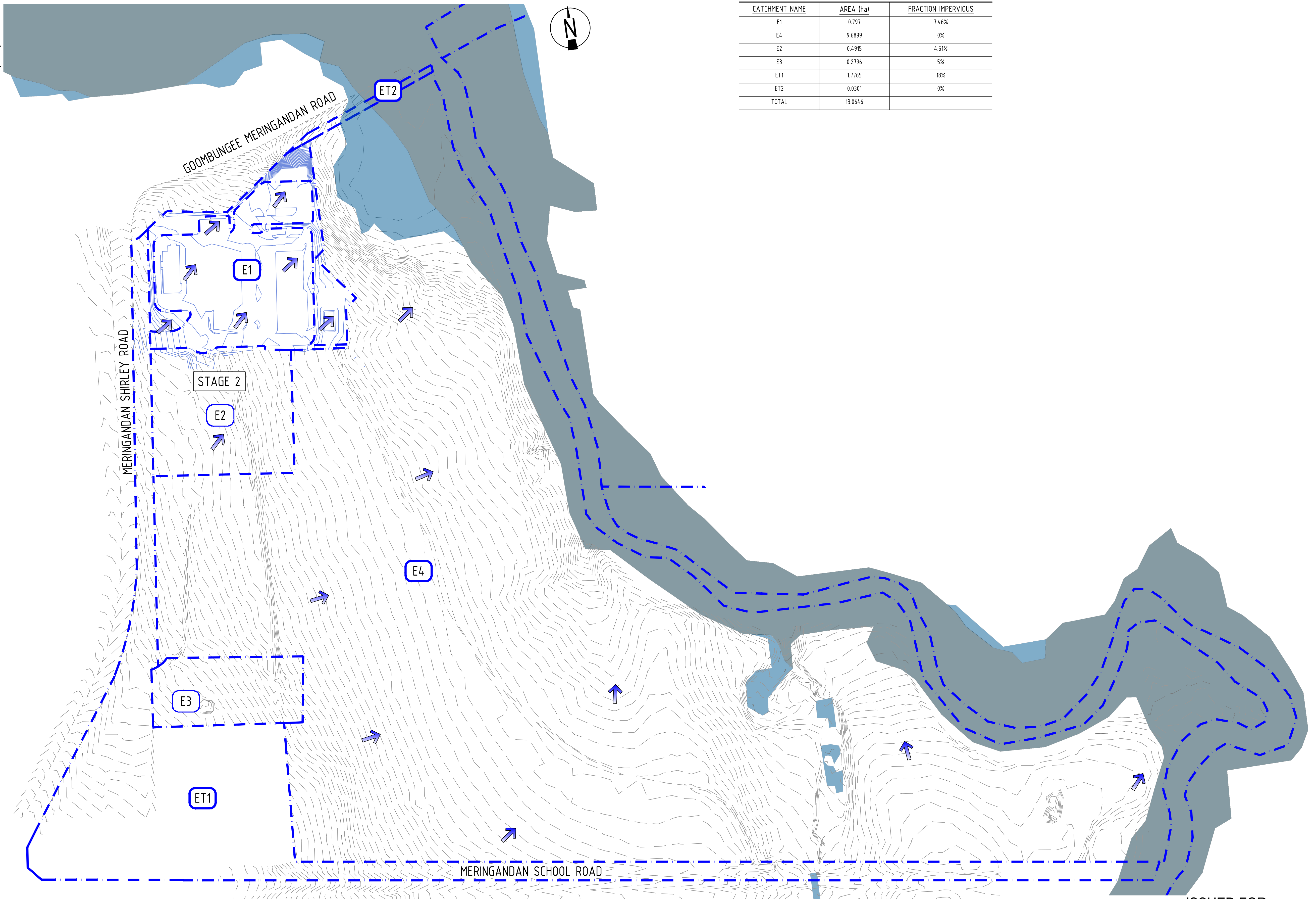
Sheet No. 4 of 4 Revision: A

Appendix C

Pre-Development Catchment Plan

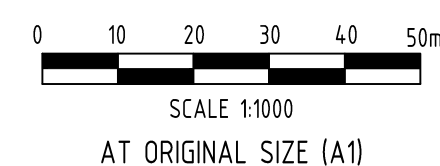
	SITE BOUNDARY
	EXISTING SURFACE CONTOURS
	DESIGN SURFACE CONTOURS
	TRC FLOOD HAZARD MAPPING OVERLAY EXTREME RISK
	TRC FLOOD HAZARD MAPPING OVERLAY MEDIUM RISK
	MINOR CATCHMENT BOUNDARY
	CATCHMENT FLOW DIRECTION
	CATCHMENT LABEL

<u>CATCHMENT NAME</u>	<u>AREA (ha)</u>	<u>FRACTION IMPERVIOUS</u>
E1	0.797	7.46%
E4	9.6899	0%
E2	0.4915	4.51%
E3	0.2796	5%
ET1	1.7765	18%
ET2	0.0301	0%
TOTAL	13.0646	



ISSUED FOR
APPROVAL

01	31.07.26	PRELIMINARY ISSUE			
Rev	Date	Description		By	Chk



Client J & R MCNAMARA INVESTMENT TRUST	Discipline CIVIL		Status PRELIM	Title PRELIMINARY PRE-DEVELOPMENT CATCHMENT PLAN
Project Name WESTERN SUBDIVISION 7 MERINGANDAN SHIRLEY ROAD, MERINGANDAN WEST	Designed By JLE	Checked By BL	Approved By BL	
	Project No. 25195.006	Drawn By JH	Scale at A1 1:250	
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			Drawing No. DA01	Revision 01

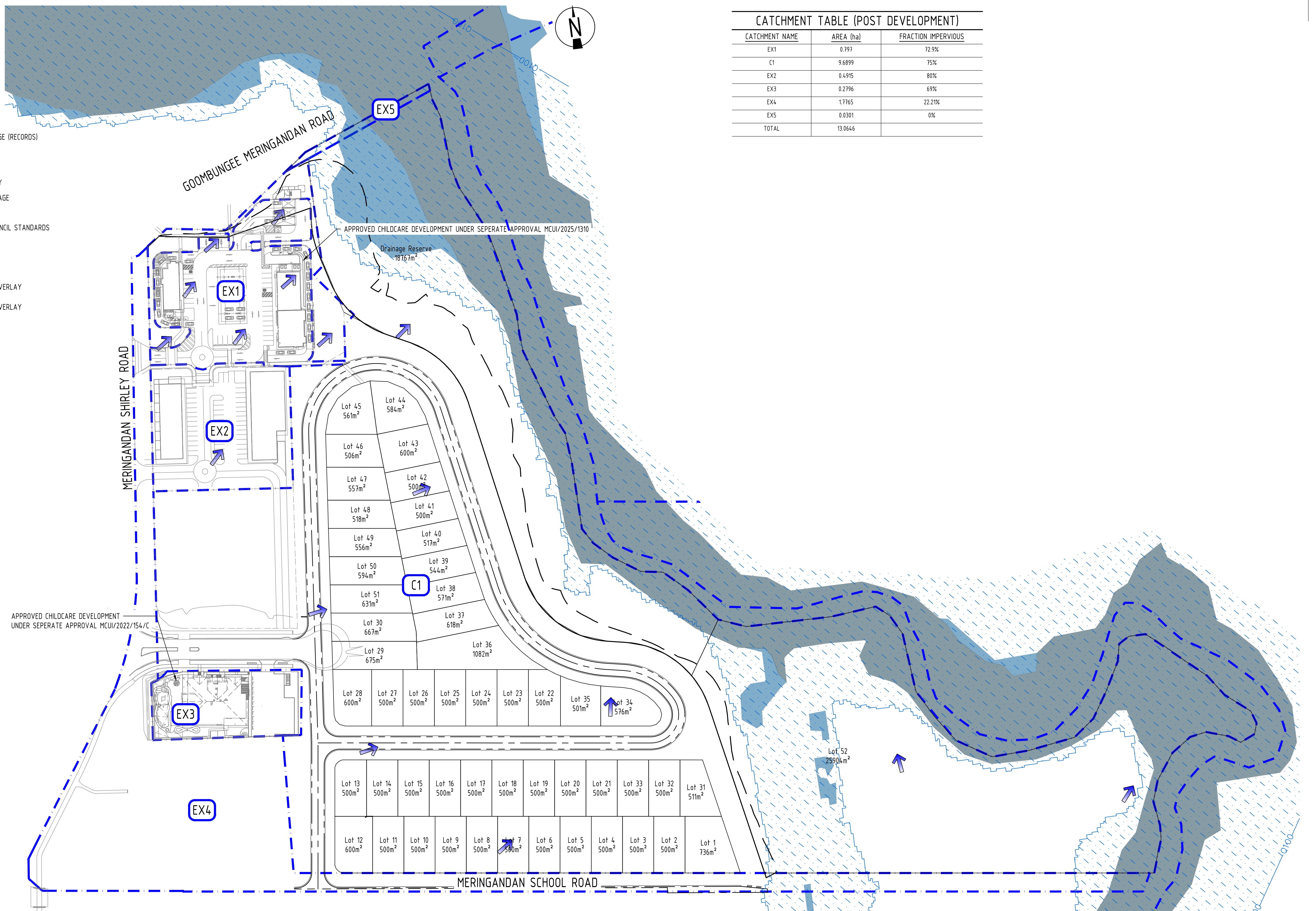
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FULL SIZE ON ORIGINAL 0 10 20 30 40 50 60 70 80 90 100mm

Appendix D

Post-Development Catchment Plan

	SITE BOUNDARY
	EXISTING SURFACE CONTOURS
	DESIGN SURFACE CONTOURS
	EXISTING PROPERTY BOUNDARY
	EXISTING NOMINAL KERB LINE
	EXISTING EDGE OF BITUMEN
	EXISTING ROAD CENTERLINE
dSWD	EXISTING STORMWATER DRAINAGE (RECORDS)
dS	EXISTING SEWER (RECORDS)
dW	EXISTING WATER (RECORDS)
OE	EXISTING OVERHEAD ELECTRICITY
SWD	PROPOSED STORMWATER DRAINAGE
S	PROPOSED SEWER RETICULATION
W	PROPOSED WATER MAIN TO COUNCIL STANDARDS
	PROPOSED BARRIER KERB
	PROPOSED ROAD CENTRE LINE
	EXISTING ROAD
	TRC FLOOD HAZARD MAPPING OVERLAY EXTREME RISK
	TRC FLOOD HAZARD MAPPING OVERLAY MEDIUM RISK
	MINOR CATCHMENT BOUNDARY
	CATCHMENT FLOW DIRECTION
	CATCHMENT LABEL



<u>CATCHMENT NAME</u>	<u>AREA (ha)</u>	<u>FRACTION IMPERVIOUS</u>
EX1	0.797	72.9%
C1	9.6899	75%
EX2	0.4915	80%
EX3	0.2796	69%
EX4	1.7765	22.21%
EX5	0.0301	0%
TOTAL	13.0646	

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APPROVAL

[illegible]

PLOT DATE: 11/9/2026 5:10 PM FILENAME: P:\25000\25195\CM\DWG\SCHOOL ROAD LOTS\25195.006.DWG2 PRELIMINARY POST-DEVELOPMENT CATCHMENT PLAN.DWG

FULL SIZE ON ORIGINAL 0 10 20 30 40 50 60 70 80 90 100mm

Appendix E

Proposed Stormwater Drainage Layout



LEGEND

- | | |
|-----|-----------------|
| HW: | HEADWALL |
| MH: | MANHOLE |
| GP: | GULLY PIT |
| CS: | CONNECTION STUB |



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APPROVAL

			0 10 20 30 40 50m SCALE 1:1000 AT ORIGINAL SIZE (A1)			ADG T:1300 657 402 E: info@adgcoe.com W: www.adgcoe.com Quality Assurance ISO 9001:2015 Work Health Safety ISO 45001:2018 Environmental Management ISO 14001:2015 			Client J & R MCNAMARA INVESTMENT TRUST Discipline CIVIL Designed By JLE Project No. 25195.006 Checked By BL Approved By SC Drawn By KO Scale at A1 1:1000 The concepts and information contained in this document are the copyright of ADG Engineers (Aust) Pty Ltd. Use or copying of the document in whole or in part without the written permission of ADG Engineers (Aust) Pty Ltd constitutes an infringement of copyright. Do not scale drawings. If in doubt, ask!			Status APPROVAL Title ROADWORKS AND STORMWATER DRAINAGE LAYOUT PLAN Drawing No. DA06 Revision 01					
01 27.08.26 ISSUE FOR APPROVAL KO JLE Rev Date Description By Chk																	
PLOT DATE: 27/8/2026 11:44 AM FILENAME: \\FQW07SRV\F\PROJECTS\25000\25195\DW\WMS\SCHEM1 ROAD LOTS\25195.DWG DWG: ROADWORKS AND STORMWATER DRAINAGE LAYOUT PLAN.DWG																	

PLOT DATE: 27/8/2026 11:44 AM FILENAME: \\EGNYTDRIVE\PROJECTS\25000\25195\DWG\DWG\SCHOOL ROAD LOTS\25195.006.DWG ROADWORKS AND STORMWATER DRAINAGE LAYOUT PLAN.DWG

Full size on original 0 10 20 30 40 50 60 70 80 90 100mm

Appendix F

Rational Method Calculations

PROJECT DATA

Project number	25195.004	Designer	JH
Date	28.08.26	Verifier	BL
Client	Jeremy Mc Namara		
Project area	7 Meringandan Shirley Road		
Description			

CALCULATIONS

Rational Method Based on ARR 2016 IFD Data

Catchment			Fraction Impervious		Coefficient of Discharge, C_y		Coefficient of Discharge, C_y (ARR 2016)										Rainfall Intensity, i_{1h} (mm/h) (ARR 2016 IFD)										Peak Discharge Rate, Q_p (m ³ /s) (ARR 2016 IFD)											
Catchment Label	Catchment Area A (ha)	Time of Concentration t_c (min)	Fraction Impervious f_i (decimal)	Rainfall Intensity, i_{10} (mm/h) ARR 2016	Coefficient of Discharge, C_{y0} ARR 2016	Urban or Rural Catchment	ARR 2016 C_1 ($F_y = 0.80$)	ARR 2016 $C_{1.44}$ ($F_y = 0.822$ interpolated)	ARR 2016 C_2 ($F_y = 0.85$)	ARR 2016 $C_{2.48}$ ($F_y = 0.933$ interpolated)	ARR 2016 C_3 ($F_y = 0.95$)	ARR 2016 C_{10} ($F_y = 1.00$)	ARR 2016 C_{20} ($F_y = 1.05$)	ARR 2016 C_{50} ($F_y = 1.15$)	ARR 2016 C_{100} ($F_y = 1.20$)	i_{1h} (mm/h) 63% AEP	i_{10Y} (mm/h) 50% AEP	i_{1h} (mm/h) 39% AEP	i_{1h} (mm/h) 20% AEP	i_{1h} (mm/h) 18% AEP	i_{1h} (mm/h) 10% AEP	i_{1h} (mm/h) 5% AEP	i_{1h} (mm/h) 2% AEP	i_{1h} (mm/h) 1% AEP	Q_1 (m ³ /s) 63% AEP	$Q_{1.44}$ (m ³ /s) 50% AEP	Q_2 (m ³ /s) 39% AEP	$Q_{2.48}$ (m ³ /s) 20% AEP	Q_3 (m ³ /s) 18% AEP	Q_{10} (m ³ /s) 10% AEP	Q_{50} (m ³ /s) 5% AEP	Q_{100} (m ³ /s) 2% AEP	Q_{1000} (m ³ /s) 1% AEP					
E3	0.2796	29	0.05	51.5	0.46	Rural	0.368	0.378	0.391	0.429	0.437	0.460	0.483	0.529	0.552	44.6	50.6	56.2	69.5	70.9	82.4	95.0	111.6	124.4	0.013	0.015	0.017	0.023	0.024	0.029	0.036	0.046	0.053					
ET1	1.7765	30	0.18	51.5	0.46	Rural	0.368	0.378	0.391	0.429	0.437	0.460	0.483	0.529	0.552	43.7	49.6	55.1	68.1	69.5	80.7	93.1	109.5	122.0	0.079	0.093	0.106	0.144	0.150	0.183	0.222	0.286	0.332					
E1	0.7970	19	0.07	51.5	0.46	Rural	0.368	0.378	0.391	0.429	0.437	0.460	0.483	0.529	0.552	56.5	64.1	71.2	87.8	89.6	103.8	119.4	140.0	155.7	0.046	0.054	0.062	0.083	0.087	0.106	0.128	0.164	0.190					
E4	9.6899	30	0.00	51.5	0.46	Rural	0.368	0.378	0.391	0.429	0.437	0.460	0.483	0.529	0.552	43.7	49.6	55.1	68.1	69.5	80.7	93.1	109.5	122.0	0.433	0.505	0.579	0.787	0.817	1.000	1.211	1.559	1.813					
E2	0.4915	26	0.05	51.5	0.46	Rural	0.368	0.378	0.391	0.429	0.437	0.460	0.483	0.529	0.552	47.6	54.0	59.9	74.1	75.6	87.7	101.1	118.7	132.2	0.024	0.028	0.032	0.043	0.045	0.055	0.067	0.086	0.100					
ET2	0.0301	12	0.00	51.5	0.46	Rural	0.368	0.378	0.391	0.429	0.437	0.460	0.483	0.529	0.552	70.2	79.6	88.3	108.7	110.9	128.4	147.5	172.7	192.0	0.002	0.003	0.003	0.004	0.004	0.005	0.006	0.008	0.009					
EX3	0.2796	13	0.69	51.5	0.76	Urban	0.608	0.625	0.646	0.709	0.722	0.760	0.798	0.874	0.912	67.8	76.9	85.3	105.1	107.2	124.1	142.6	167.0	185.6	0.032	0.037	0.043	0.058	0.060	0.073	0.088	0.113	0.131					
EX4	1.7765	30	0.22	51.5	0.55	Urban	0.440	0.452	0.468	0.513	0.523	0.550	0.578	0.633	0.660	43.7	49.6	55.1	68.1	69.5	80.7	93.1	109.5	122.0	0.095	0.111	0.127	0.173	0.179	0.219	0.265	0.342	0.397					
EX1	0.7970	11	0.73	51.5	0.78	Urban	0.624	0.641	0.663	0.728	0.741	0.780	0.819	0.897	0.936	72.8	82.5	91.5	112.6	114.9	133.0	152.8	179.0	198.9	0.101	0.117	0.134	0.181	0.188	0.230	0.277	0.355	0.412					
C1	9.6899	33	0.75	51.5	0.79	Urban	0.632	0.649	0.672	0.737	0.751	0.790	0.830	0.909	0.948	41.2	46.8	51.9	64.3	65.6	76.3	88.0	103.5	115.4	0.701	0.818	0.939	1.276	1.325	1.622	1.964	2.531	2.945					
EX2	0.4915	13	0.80	51.5	0.81	Urban	0.648	0.666	0.689	0.756	0.770	0.810	0.851	0.932	0.972	67.8	76.9	85.3	105.1	107.2	124.1	142.6	167.0	185.6	0.060	0.070	0.080	0.108	0.113	0.137	0.166	0.212	0.246					
EX5	0.0301	12	0.00	51.5	0.46	Rural	0.368	0.378	0.391	0.429	0.437	0.460	0.483	0.529	0.552	70.2	79.6	88.3	108.7	110.9	128.4	147.5	172.7	192.0	0.002	0.003	0.003	0.004	0.004	0.005	0.006	0.008	0.009					

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