

APPENDIX F - INFRASTRUCTURE NETWORK ASSESSMENT

ADG Engineers

Proposed 52 Lot Subdivision Development

7 Meringandan-Shirley Road, Meringandan West

Infrastructure Network Assessment

McNamara Healy Holdings

1 September 2026

DOCUMENT VERIFICATION

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APPROVAL FOR ISSUE

Name	Signature	Date
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Brian Lamb (RPEQ 22950)		11.09.2026

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EXECUTIVE SUMMARY

ADG Engineers (Aust.) Pty Ltd were engaged by McNamara-Healy Holdings to prepare an Infrastructure Network Assessment Report suitable for submission to Toowoomba Regional Council 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 Engineering Report is to provide advice on the proposed development as detailed on the attached drawings by ADG. ADG has sought advice from Toowoomba Regional Council's Water and Wastewater Department with regard to obtaining background and supporting information to facilitate the preparation of the requested infrastructure network assessment report. Council has provided ADG with the below reports:

- Highfields & Meringandan Sewerage Catchment Study Planning Report (Dated April 2021, REF:DM#9667037)
- Highfields & Rosalie Water Supply Study Planning Report (Dated June 2018, REF:DM#8063689)
- Hydraulic Model Pressure & Flow Results

The purpose of this assessment is to determine the impact on the water and sewer networks that results from the anticipated development, as detailed in the attached drawings, and to assess the ability of the existing networks to service the overall proposed development.

The existing sewer network was found to have adequate capacity, and the existing water network was also found to supply adequate pressures and flows to support the proposed development, in accordance with the Desired Standards of Service as defined by Toowoomba Regional Council. Additional emergency storage will need to be provide at HIPS8 in the future, to cater for the proposed development.

Information discussed in this report is inferred from BYDA records and information gathered via site investigation and survey.

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

- Toowoomba Regional Council Planning Scheme Policies;
- Gravity Sewerage Code of Australia (WSA 02-2014);
- Department of Energy and Water Supply – Planning Guidelines for Water Supply and Sewerage;
- Plumbing and Drainage Code AS3500.3; and
- Gold Coast City Council – Water and Sewage demand table (previously advised as suitable by Toowoomba Regional Council).

1 INTRODUCTION

1.1 Background

ADG Engineers (Aust.) Pty Ltd was engaged by McNamara-Healey Holdings to carry out a Infrastructure Network Assessment Report (INA) suitable for submission to Toowoomba Regional Council (TRC) 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, henceforth referred to as *the site*.

The purpose of this INA is to provide advice on the proposed development with regard to sewerage and water supply. The required infrastructure will be subject to the conditions attached to the Development Approval to be provided by TRC and any nominated referral agencies.

1.2 Property Detail

The details of the property for the proposed development can be seen in Table 1 below.

Table 1: Summary of Existing Land Title

Title Details	Lot 11 SP247510 & 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
Residential Subdivision Area Including Drainage Reserve	9.7657 Ha

The location and details of the proposed development is demonstrated in Figure 1.



Figure 1: Site Location (Source: ADG Markup)

2 EXISTING SITE

2.1 Existing Site Features

The site is currently vacant, has good grass coverage and has several large trees within the subject site.

▶ 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.

The site slopes from west to east at a grade of approximately 5%

The existing site features can be seen in Figure 2.

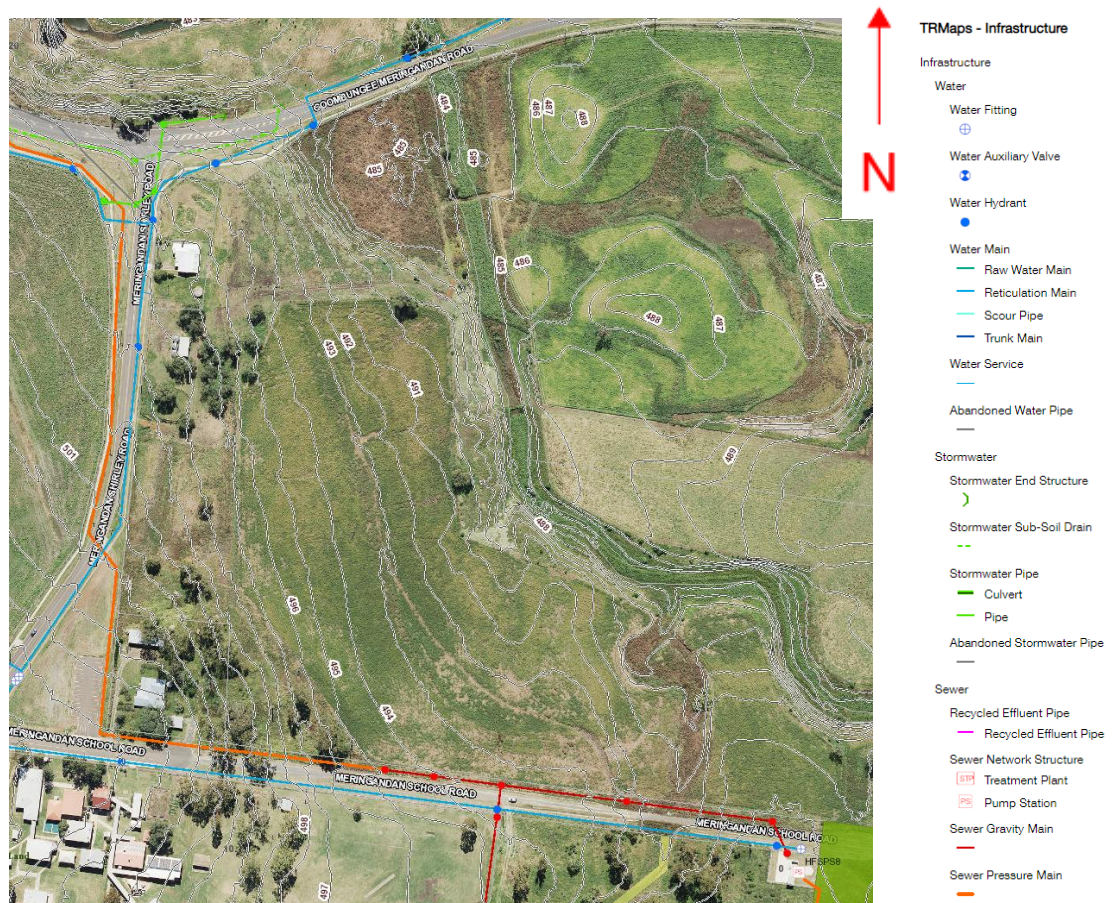


Figure 2: Nearby Site Features (TRC Mapping dated 04.08.2022)

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

3 SEWERAGE & WATER DEMAND

Under the current TRC Planning Scheme, the entire site is zoned for Emerging Community, as shown in Figure 3.

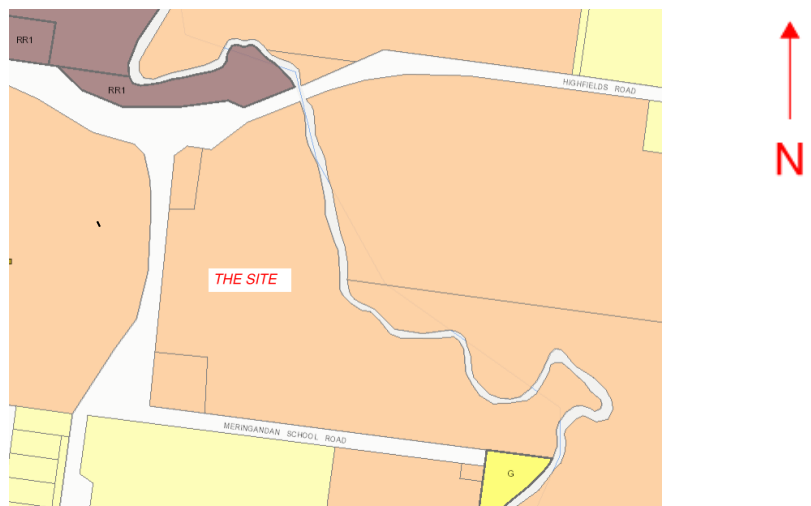


Figure 3: TRC Planning Scheme Current Zoning

The number of Equivalent Persons (EP) generated by the proposed 52-lot residential subdivision was estimated to determine the anticipated demand and loading on the existing Council water supply and sewerage networks. EP calculations were undertaken using demand generation rates sourced from Table SC3.1:3 (*Planned Density and Demand Generation Rate for a Trunk Infrastructure Network*) of the Toowoomba Regional Council Planning Scheme, the *Highfields and Rosalie Water Supply Study Planning Report*, and the *Department of Energy and Water Supply Planning Guidelines for Water Supply and Sewerage*.

The EP for the proposed residential subdivision was calculated using the demand rates identified within the *Highfields and Rosalie Water Supply Study Planning Report*. These demand rates were applied to the proposed residential allotments to estimate the total water demand and sewer generation attributable to the development. The resulting EP values were then adopted to assess the capacity of the existing Council water and sewerage networks to service the proposed development.

Table 2 provides a summary of the EP calculations explained above.

Table 2: Proposed EP

Land Use Category	Conversion Rate	Units	EP
Water			
Residential	3.1EP/ Lot (water)	52 lots	52x3.1 = 161.2
Sewerage			
Residential	2.9EP/ Lot (water)	52 lots	52x2.9 = 150.8
Total EP (water)			161.2
Total EP (sewerage)			150.8

4 WATER SUPPLY

4.1 Existing Infrastructure

A TRC Interactive Mapping Portal search identified the following water infrastructure relevant to the subject site:

- ▶ A 150mm PVC-O main in Meringandan Shirley Road adjacent to the western boundary of the subject site; and
- ▶ A Pressure Reducing Valve (PRV) on the above main, separating the higher pressure zone to the north from the lower pressure zone to the south.

Refer to the TRC Interactive Mapping Portal information in Appendix C for further information regarding the existing water infrastructure.

4.2 Point Of Connection

ADG Engineers anticipate that the proposed residential development will connect to the future water main extension proposed as part of the approved childcare centre development fronting Meringandan Shirley Road (MCUI/2022/154/C). The childcare centre development includes a new road and water main extension, from which a further water main extension will be constructed to service the proposed residential development. This servicing approach has been advised by Toowoomba Regional Council (TRC) to ensure the development is not subjected to excessive water pressures associated with the existing network.

For more information on the proposed connection, refer to the Preliminary Civil Drawings Appendix B.

4.3 Desired Standards of Service

The development demand will be compared against the TRC Desired Standards of Service (DSS) as per the Planning Guidelines for Water Supply and Sewerage, April 2010 (PGWSS), the TRC Schedule 6, SC6.3 - Planning Scheme Policy No.3 - Engineering Standards - Water and Wastewater Infrastructure and the Department of Energy and Water Supply – Planning Guidelines for Water Supply and Sewerage. The DSS outlined in these documents is summarised in Table 3.

Table 3: Water DSS

Desired Standard of Service	Potable Water Supply
Residential Average Day (AD) Demand (Toowoomba Region)	200 L/EP/Day (TRC SC6.3 Section 2.3)
Non-Revenue Water	34.5 L/EP/ Day (TRC SC6.3 Section 2.3)
Mean Day Maximum Month (MDMM)	1.50 x AD (TRC SC6.3 Section 2.3)
Peak Day (PD)	2.25 x AD (TRC SC6.3 Section 2.3)
Peak Hour (PH)	4.50 x AD (TRC SC6.3 Section 2.3)
Minimum Residual Pressure	Residential: 30m (TRC SC6.3 Section 2.5.3.3)
Absolute Minimum Service Pressure	Residential: 22m (TRC SC6.3 Section 2.5.3.3)
Maximum Residual Pressure	80m Maximum (TRC SC6.3 Section 2.5.3.2)
Residential Fire Flow Demand (Urban)	15 L/s total for 2 hours from up to 2 hydrants (PGWSS, Section 6.6.5)
High Density Residential / Commercial / Industrial Fire Flow Demand (Urban)	30 L/s total for 4 hours from up to 3 hydrants (PGWSS, Section 6.6.5)
Minimum Pressure under Fire Flow Conditions (at the fire flow hydrant)	12m (PGWSS, Table 4)
Minimum Pressure under Fire Flow conditions (all other hydrants in the network)	6m (PGWSS, Table 4)
Fire Flow Background Demand	Larger of 2/3 PH and AD for predominantly residential areas Worst case scenario of 2/3 PH (total zone) and PH (locally) for predominantly commercial / industrial areas (PGWSS, Section 6.6.4)

4.4 Flow Estimation

In accordance with the TRC PSP, SC6.3 PSP No. 3 – Engineering Standards – Water and Waste Water Infrastructure and the Department of Energy and Water Supply – Planning Guidelines for Water Supply and Sewerage, the expected water loading from the proposed development is provided in Table 4 below.

Table 4: Estimated Water Demand

Development Type	EP	AD (L/s)	MDMM (L/s)	PD (L/s)	PH (L/s)
Residential	161.2	0.438	0.656	0.984	1.969

4.5 Flow and Pressure Test Results and Requirements

The suitability of the existing water mains that front the site to act as connection point has been assessed based on flow and pressure testing conducted by TRC on the 9th of December 2021 and from information contained within the Highfields & Rosalie Water Supply Study Planning Report. The testing was undertaken on the closest two upstream hydrants from the Pressure Reduction Valve 40. The results of this flow and pressure testing are recorded in Appendix E and reproduced in Table 5 and Table 6.

This modelling confirmed that the development does not trigger any major bring forward of augmentation works.

Table 5: Flow and Pressure Test Results

Flow Rate (L/s)	Pressure
0 L/s	780 kpa
5 L/s	740 kpa
10 L/s	700 kpa
15 L/s	655 kpa
20 L/s	620 kpa
23 L/s	620 kpa (Testing stopped)

Table 6: Flow and Pressure Test Results

Flow Rate (L/s)	Pressure
0 L/s	900 kpa
5 L/s	850 kpa
10 L/s	800 kpa
15 L/s	760 kpa
20 L/s	740 kpa
25 L/s	700 kpa
30 L/s	650 kpa
35 L/s	600 kpa
37 L/s	580 kpa (Testing stopped)

From Table 5 and Table 6, static pressures on the high-pressure side of the PRV are in the order of 780 kpa (79.5m). As previously noted, TRC has requested that connection to their existing network is made to the south (low pressure side) of PRV 40. From Table 5-10 and Appendix D from the Highfields & Rosalie Water Supply Study Planning Report, PRV 40 has a pressure setting of 56.1m or 550 kpa. Considering the close proximity of the two tested upstream hydrants from PRV 40, it can be inferred that pressures on the low-pressure side of PRV 40 will be in the order of 550 kpa. As pressures on the high-pressure side of the PRV were not observed to fall below this pressure during the testing, it is anticipated that this 550 kpa figure will remain fairly constant.

As outlined in Table 3, the required fire flow demand for the site is 30 L/s at a minimum residual head of 12 m, in accordance with the Planning Guidelines for Water Supply and Sewerage (PGWSS). To service the development, it is proposed to extend the DN150 water main from the existing duckfoot hydrant located at the termination of the approved Childcare Centre water main (MCUI/2022/154/C).

Given the approximately 700 m length of the proposed water main extension between the existing network and the development site, some pressure loss is expected under peak demand and fire flow conditions. Based on the Hazen-Williams equation and an adopted pipe roughness coefficient (C) of 120, pressure losses within the proposed DN150 water main are estimated to be less than 120 kPa under the design fire flow scenario. Final operating pressures throughout the development will be confirmed during detailed design following completion of the internal water reticulation layout and verification of network demands.

Accordingly, no augmentation of the existing water supply network is anticipated to service the proposed 52-lot residential subdivision. The existing network is considered to have sufficient capacity to provide the required levels of service for the development as per council requirements. Details of the final connection point remain subject to Council network modelling and approval, while the internal reticulation network layout will be confirmed during detailed design and Operational Works approval.

4.6 Infrastructure Requirements

To service the proposed development a 700m long 150mm diameter watermain extension will be necessary, as described above and detailed on the attached conceptual services plan. The estimated cost of works for this watermain extension is \$200,000 excluding GST. This costing estimate is an approximation based on a per metre rate observed from recently received industry costings on similar projects.

This is the most cost-effective method to extend the existing water infrastructure to the site from the Priority Infrastructure Area (PIA).

5 SEWERAGE RETICULATION

5.1 Existing Infrastructure

A TRC Interactive Mapping Portal search identified the following sewerage infrastructure relevant to the subject site:

- › A 150mm PVC-O rising main located beneath Meringandan Shirley Road on the development side of the road, this continues onto Meringandan School Road discharging into the maintenance hole described below;
- › A 300mm PVC-U gravity main flowing east along the north side of Meringandan School Road to the south of the development; and
- › A 1050mm dia maintenance hole located at the western (upstream) end of the DN300 main, which acts as the discharge maintenance hole for the above mentioned rising main.

Refer to the TRC Interactive Mapping Portal information in Appendix C for further information regarding the existing sewerage infrastructure.

5.2 Point Of Connection

ADG Engineers anticipate that the proposed development will be connected to the existing manhole along Meringandan School Road. Details of the proposed connection is provided in the Concept Services Layout plan in Appendix B.

5.3 Desired Standards of Service

Information was taken from TRC Planning Scheme Policy No. 3 Engineering Standards – Water and Wastewater Infrastructure, Table 5.15 of the Planning Guidelines for Water Supply and Sewerage, April 2010 (PGWSS) and the Department of Energy and Water Supply – Planning Guidelines For Water Supply and Sewerage, summarised in Table 7 below to demonstrate the DDS.

Table 7: Sewage DSS

Desired Standards of Service	Sewer Loading
Residential Average Dry Weather Flow (ADWF)	180L/EP/day (TRC SC6.3 Section 2.4)
Peak Dry Weather Flow (PDWF)	ADWF x C ₂ (TRC SC6.3 Section 3)
C ₂	4.7 x (EP) ^{-0.105} (TRC SC6.3 Section 3)
Peak Wet Weather Flow (PWWF)	The larger of 5 x ADWF and C ₁ x ADWF (TRC SC6.3 Section 3)
C ₁	The larger of 15 x EP ^(-0.1587) and 3.5 (TRC SC6.3 Section 3)
Maximum depth of flow in gravity mains	75% pipe diameter (PGWSS, Table 5.15)
Minimum velocity of flow in gravity mains	0.7m/s at PDWF + GWI (PGWSS, Table 5.15)

5.4 Flow Estimation

The estimated wastewater flow generated from the proposed 52 lot residential subdivision has been calculated below and is presented in Table 8.

Residential

- EP = 52 Lots * 2.9 EP/Lot
- ADWF = 180 L/EP/day × 150.8 EP ÷ (60 × 60 × 24) = 0.314 L/s
- PDWF = C₂ * ADWF = 0.87 L/s, where: [C₂ = 4.7 * (EP)^{-0.105}] = 2.78L/s
- PWWF = maximum of (5 × ADWF) and (C₁ × ADWF), where:

$$C_1 = 15 * (EP)^{-0.1587} = 6.77$$

$$\text{Therefore, PWWF} = 2.13 \text{ L/s}$$

Table 8 provides a summary of the sewerage discharge calculations based on the DSS presented in Table 7.

Table 8: Sewerage Discharge Summary

Development Type	EP	ADWF (L/EP/day)	ADWF (L/s)	C ₁	C ₂	PDWF (L/s)	PWWF (L/s)
Residential	150.8	180	0.314	6.767	2.776	0.872	2.126

5.5 Infrastructure Capacity Check

This site is located upstream of Sewer Pump Station (SPS) HIPS8, which discharges to a dedicated rising main and ultimately to the Wetalla Water Reclamation Facility.

The 2061 planning horizon demand for HIPS8 is 3,482.6 EP and the available pump station capacity is 3,730 EP. The proposed 52 lot residential subdivision generates an additional 150.8 EP. The resulting total demand of 3,633.4 EP remains below the adopted pump station capacity and therefore HIPS8 has sufficient capacity to service the proposed development. Similarly, HIPS13 has an adopted 2061 planning horizon demand of 19,195.4 EP and a future capacity of 19,734 EP. When the proposed development demand of 150.8 EP is added to the adopted planning demand, the resulting total demand is 19,346.2 EP, which remains below the available capacity.

A summary of the pump station capacity assessment is provided in Table 9.

It is therefore considered that both HIPS8 and HIPS13 have sufficient capacity to accommodate the additional demand generated by the proposed 52 lot residential subdivision.

Table 9: Pump Station Capacity Summary

Pump Station		Capacity	Demand (EP)					
		EP	2020	2026	2031	2036	2041	2061
HIPS8	Existing	3,730	484.7	1,727.1	1,932.6	2,156.0	2,364.6	3,482.6
HIPS13	Existing	12,017	4,497.6	8,810.3	10,287.3	11,704.2	12,965.1	19,195.4
	Proposed 2061	19,734						19,195.4

Highfields & Meringandan Sewerage Catchment Study Planning Report provided the spare capacity in the most critical portion of gravity main leading to HIPS8. This section of pipe is identified in Figure 4 below. The spare capacity is 44L/s in the 2061 planning horizon, as referenced from this report.

Therefore, no upgrade of the existing gravity sewer pipework is necessary to facilitate the development.



Figure 4: Existing Sewer Gravity Main Check (TRC Mapping dated 08.08.2022)

Table 10 below provides the Pump Station capacity in the 2061 planning horizon. The information was sourced from the Highfields & Meringandan Sewerage Catchment Study Planning Report.

Table 10: Pump Capacity Summary

Pump Station 2061 Planning Horizon	Pump Spare Capacity (2061 Planning Horizon)				
	Planned EP	Proposed Site EP	Total EP	Pump Capacity	Capacity (Yes/No)
HIPS8	3,482.6	150.8	3,633.4	3,730	Yes*
HIPS13	19,195.4		19,346.2	19,734	Yes*

The existing pump stations have sufficient capacity to service the proposed 52 lot residential subdivision. The proposed development generates 150.8 EP of additional sewer demand. When added to the adopted 2061 planning horizon demand, the total load at HIPS8 is 3,633.4 EP, which remains below the adopted pump station capacity of 3,730 EP. Similarly, the total load at HIPS13 is 19,346.2 EP, which remains below the adopted capacity of 19,734 EP. Therefore, both pump stations have sufficient capacity to service the proposed development.

Table 11 includes available emergency storage and planned required emergency storage along with the additional emergency storage made necessary by the proposed development. This information was sourced from the Highfields & Meringandan Sewerage Catchment Study Planning Report and required additional emergency storage was calculated in accordance with the requirements of the PGWSS.

Table 11: Emergency Storage Capacity Summary

Pump Station	2061 Planning Horizon	Planned Storage Required (kL)	Emergency Storage (2061 Planning Horizon)					
			Site ADWF (L/s)	4 Hours x Site ADWF (kL)	Total Storage Required (kL)	Available Storage (kL)	Capacity (Yes/No)	Minimum additional Storage required (kL)
HIPS8	52 Lot Residential Subdivision	23.6	0.314	4.52	28.12	24.4	No	3.72

Assessment of the downstream sewer network indicates that additional emergency storage will ultimately be required at Pump Station HIPS8 prior to the adopted 2061 planning horizon. Based on the proposed 52-lot residential subdivision, the development generates an Average Dry Weather Flow (ADWF) of 0.314 L/s, resulting in an additional four-hour emergency storage requirement of approximately 4.52 kL. This increases the total emergency storage requirement at HIPS8 to 28.12 kL. Given the available storage volume of 24.4 kL, an additional 3.72 kL of emergency storage would be required to accommodate ultimate planning horizon demands.

Accordingly, the only identified augmentation of the existing sewer network associated with the proposed 52-lot residential subdivision is the provision of approximately 3.72 kL of additional emergency storage at HIPS8. This augmentation is required to satisfy the adopted 2061 planning horizon requirements; however, based on the projected growth assumptions, additional emergency storage is not expected to be required prior to the 2041 planning horizon.

Therefore, no upgrades to Pump Station HIPS8 are required to service the proposed western subdivision at this time. The existing pump station is considered to have sufficient capacity and emergency storage provision to accommodate the development in the interim. This conclusion is based on the current planning assumptions and remains subject to Council sewer network modelling and the detailed design of the proposed development.

5.6 Infrastructure Requirements

To service the proposed subdivision, approximately 400 m of 150 mm diameter sewer main will be required to connect to the new trunk sewer approved under Trunk Works Approval OW/2025/856, as shown on the Conceptual Services Plan provided in Appendix B.

The estimated construction cost of the sewer main extension is approximately \$210,000 (excluding GST). This estimate has been developed based on recent industry pricing for comparable projects, together with information contained within the *Highfields & Meringandan Sewerage Catchment Study Plan Report*, and should be considered indicative at this stage of planning.

6 CONCLUSION

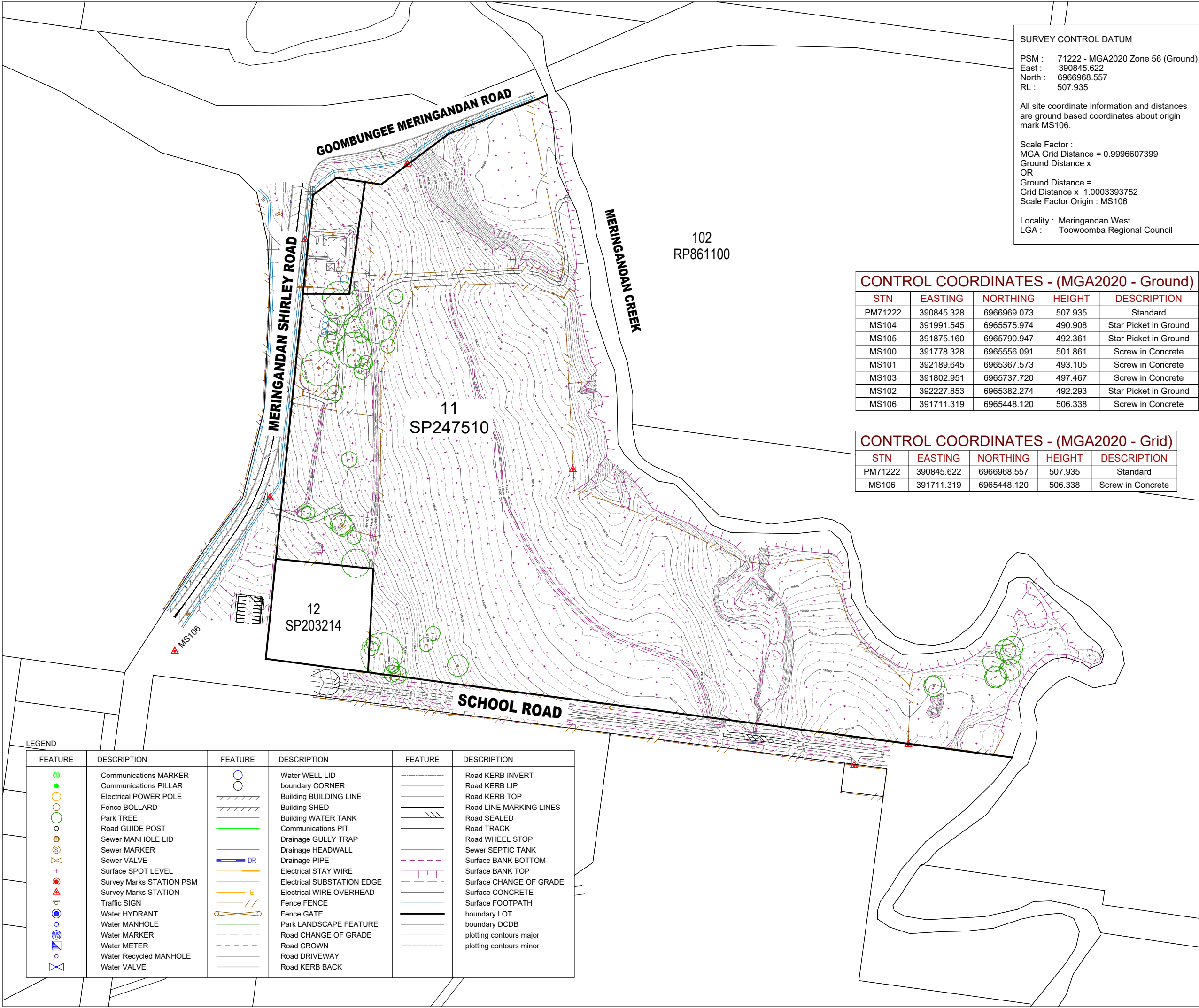
Based on the assessment undertaken, the existing Council water supply and sewerage networks have sufficient capacity to service the proposed 52-lot residential subdivision at 7 Meringandan-Shirley Road, Meringandan West.

The development is expected to generate an additional demand of approximately 161.2EP for water supply and 150.8EP for sewerage. Servicing of the development will require the extension of approximately 700m of DN150 water main and 400m of DN150 sewer main to connect to existing and approved trunk infrastructure.

No upgrades to the existing water supply network, gravity sewer network, or downstream pump stations are required to facilitate the development. While additional emergency storage will ultimately be required at HIPS8 to satisfy the adopted 2061 planning horizon, this does not represent a current constraint to development.

Accordingly, the proposed subdivision can be serviced by Council's existing infrastructure, subject to detailed design, Operational Works approval, and Council acceptance of the final connection arrangements.

Appendix A: 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.

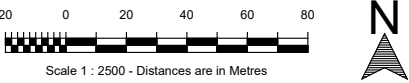
Scale Factor :
MGA Grid Distance = 0.9996607399
Ground Distance x
OR
Ground Distance =
Grid Distance x 1.0003393752
Scale Factor Origin : MS106

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



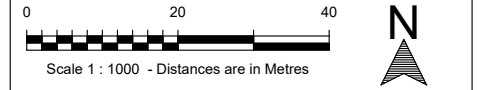
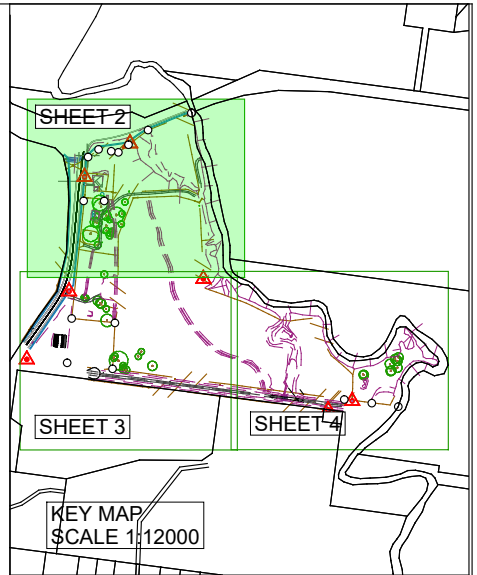
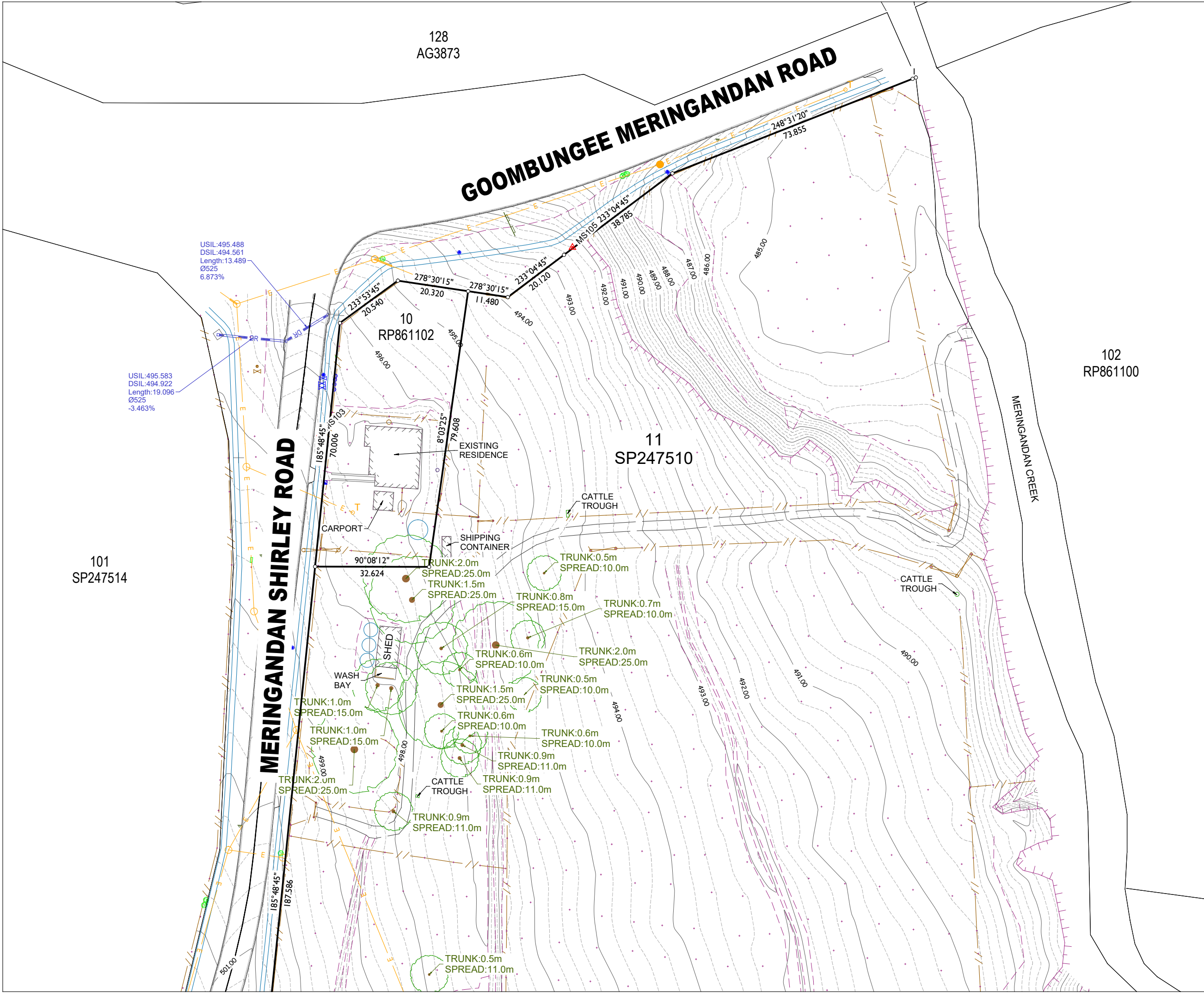
PROJECT
**7 Meringandan Shirley Road,
Meringandan West**
Lot 11 on SP247510
7 Meringandan Shirley Road
Meringandan West, QLD, 4352

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	
A	02/09/21 Issue to Client
Rev	Date
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



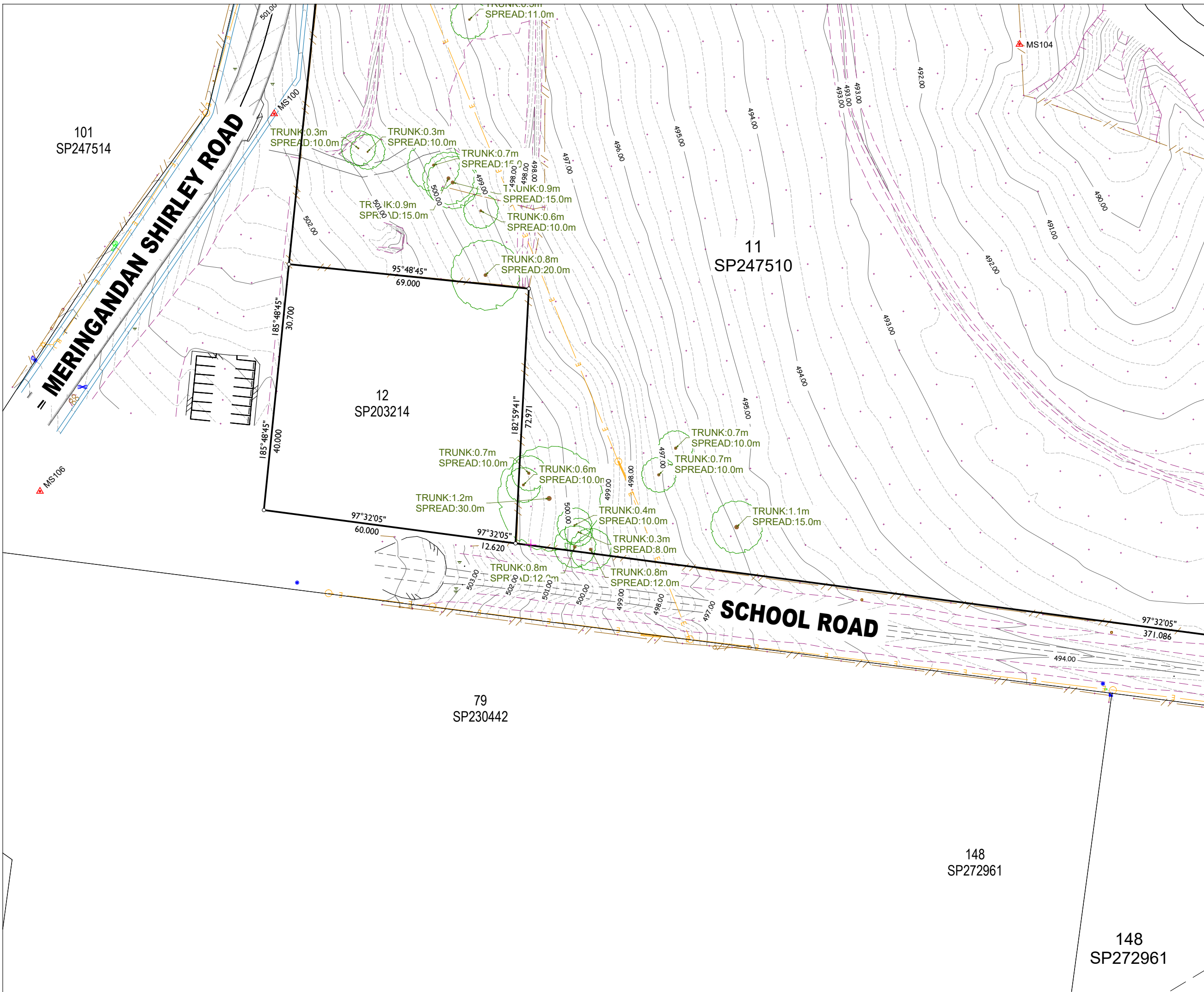
PROJECT
**7 Meringandan Shirley Road,
Meringandan West**
Lot 11 on SP247510
7 Meringandan Shirley Road
Meringandan West, QLD, 4352

DESCRIPTION
**Contour and Detail
Survey Plan - 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

020

20

40

Scale 1 : 1000 - Distances are in Metres

N

ISSUE/REVISION

A

02/09/21

Issue to Client

Rev

Date

Revision Details

MINSTAFF SURVEY

CONSULTING CADASTRAL ENGINEERING AND MINING SURVEYORS

ABN 35 609 674 875

TOOWOOMBA

319 Margaret Street
Toowoomba QLD 4350
(07) 4637 9790

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

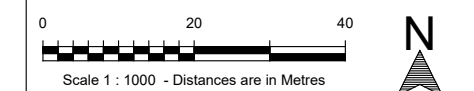
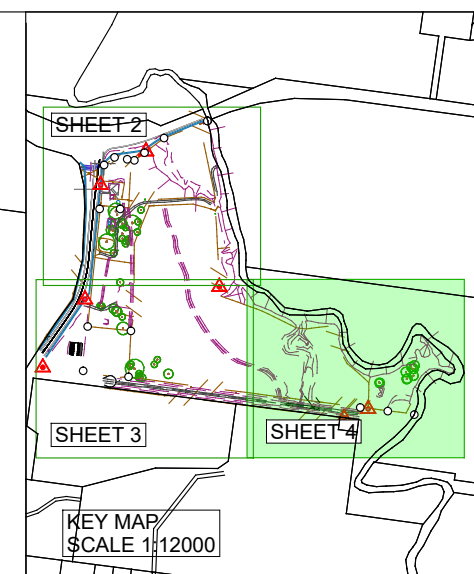
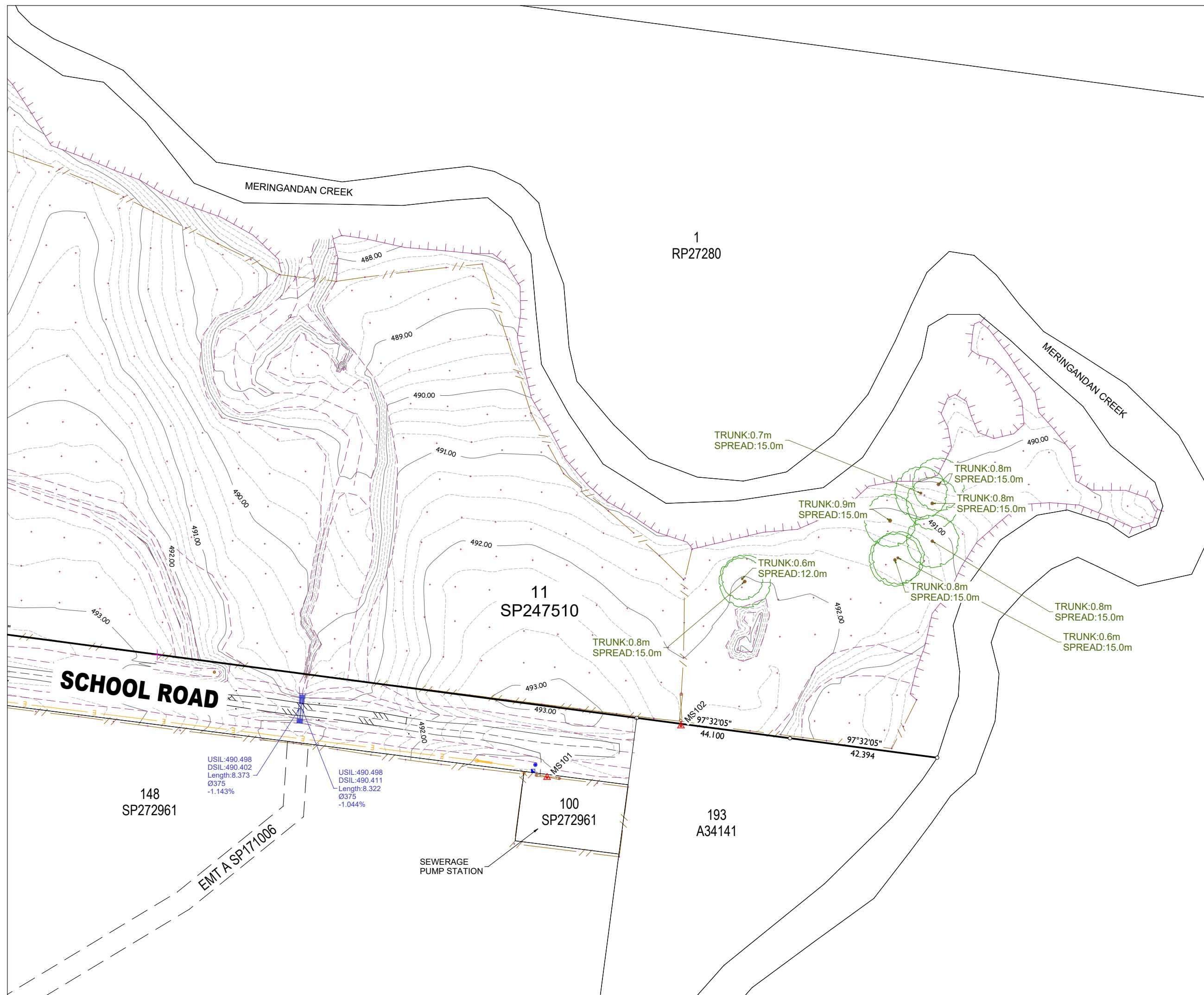
CONTOURS

DRAWING NUMBER

M3885 3000 001

Sheet No. 3 of 4

Revision : A



ISSUE/REVISION

A	02/09/21	Issue to Client
Rev	Date	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

CLIENT



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	Project No :	M3885
Drawn :	SJM	Ref No :	3000-DS-4
Checked :	SMM	Date of Survey :	26/08/2021

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

DRAWING NUMBER

M3885 3000 001

Sheet No. 4 of 4

Revision : A

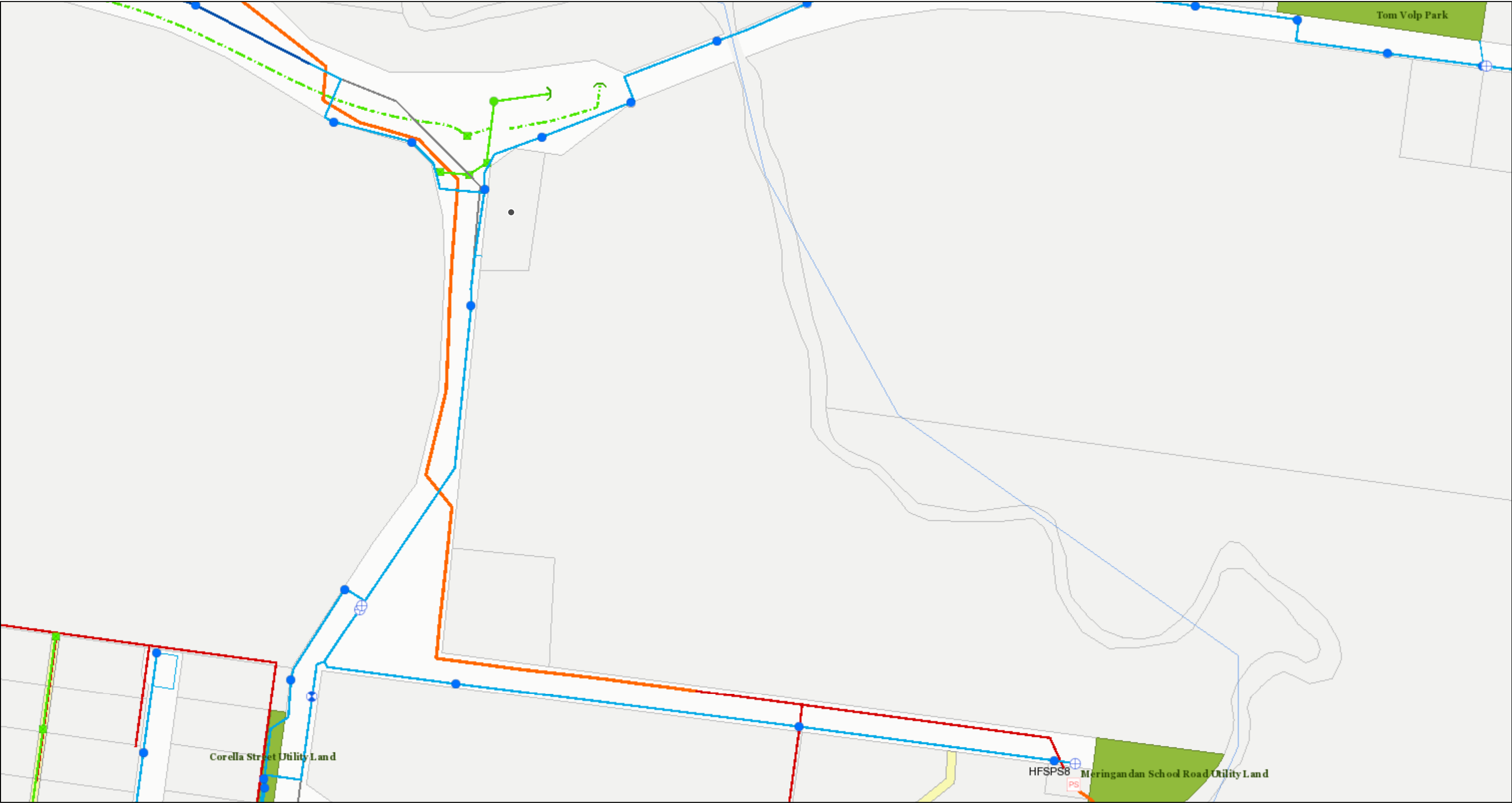
Appendix B – ADG Preliminary Civil Drawings

[illegible]

Full Size on Original 0 10 20 30 40 50 60 70 80 90 100mm

Appendix C - TRC Interactive Mapping

TRC Existing Infrastructure



12/6/2021, 11:14:21 AM

1:2,540

0 0.03 0.06 0.12 km

	Water Fitting		Trunk Main		Roofwater Outlet		Recycled Effluent Fitting		Sewer Manhole		Property Address
	Water Auxiliary Valve		Water Service		Stormwater End Structure		Irrigation Hydrant		Sewer Gravity Main		Parks
	Water Hydrant		Abandoned Water Pipe		Stormwater Sub-Soil Drain		Recycled Effluent Pipe		Sewer Pressure Main		
Water Main		Stormwater Pit		Stormwater Pipe		Sewer Network Structure					
	Raw Water Main		Pit		Culvert		Treatment Plant		Abandoned Sewer Pipe		Easments
	Reticulation Main		Stormwater Manhole		Pipe		Pump Station				
	Scour Pipe		Roofwater Inspection Chamber		Abandoned Stormwater Pipe						

Existing Infrastructure

Toowoomba Regional Planning Scheme - Legend

Land Use

Land Use Zones

Zone, Precinct

O	Community Facilities, Other Community Purposes
E	Community Facilities, Education
G	Community Facilities, Government
HE	Community Facilities, Higher Education
H	Community Facilities, Hospital
P	Mixed Use, Parkland Living
CS	Mixed Use, City South
W	Mixed Use, West Creek
RY	Mixed Use, Railyards
HS2	Mixed Use, Health Support
	Principal Centre
	Major Centre
HC	Major Centre, Highfields Town Centre Core
F	Major Centre, Highfields Town Centre Frame
M	Major Centre, Medium Density Residential
	District Centre
	Local Centre
CC	Local Centre, Commercial / Centre
	Emerging Community
	Low Impact Industry
WLI	Low Impact Industry - Welcamp Low Impact Industry
	Medium Impact Industry
IM	Medium Impact Industry, Intermodal Facility
W	Medium Impact Industry, Transport & Warehousing
GI	Medium Impact Industry, General Industry
	High Impact Industry
HI	High Impact Industry, Heavy Industry
QP	High Impact Industry, Quarry
	Extractive Industry
	Limited Development (Constrained Land)
	Open Space
C	Open Space, Conservation
CF	Open Space, State Govt Conservation and Forestry
	Sport and Recreation
	Low Density Residential, General
PR	Low Density Residential, Park Residential
S	Low Density Residential, Clifford Park Stables
REG	Low-Medium Density Residential, Regional Residential
HS1	Low-Medium Density Residential, Hospital Support
U	Low-Medium Density Residential, Urban Residential
UC	Low-Medium Density Residential, Urban Consolidation
OR	Low-Medium Density Residential, Office Residential
Q	Specialised Centre, Qld Govt Research Facility
A	Specialised Centre, Toowoomba Airport
D	Specialised Centre, Defence Facilities
R	Specialised Centre, Specialist Retail Centre
RR1	Rural Residential, 4000m ²
RR2	Rural Residential, 1 ha
RR3	Rural Residential, 2 ha
H	Rural Residential, Highway
	Township
R1	Rural, 100 ha
R2	Rural, 200 ha
H	Rural, Heinemann Road Transport

 Local Plan Areas

Overlays

Airport Environs Overlay

	Runway
	Approach and Departure Limitation Surface
	Runway Centreline
	Conical Limitation Surface
	Bird and Bat Strike Zone
	3 km
	8 km
	13 Km
	Obstacle Height Restriction Zones (Oakey) Height Zone
	Area A - 0m
	Area B - 7.5m
	Area C - 15m
	Area D - 45m
	Area E - 90m
	Defence Owned Land
	Airport Public Safety
	Runway
	Public Safety Area
	ANEF Contour
	ANF>40
	ANF>35
	ANF>30
	ANF>25
	ANF>20
	Light Restriction Zone
	Zone A
	Zone B
	Zone C
	Zone D
	Lighting Area Buffer (6 km)

Scenic Amenity Overlay

	Scenic Amenity
---	----------------

Bushfire Hazard Overlay

	High Fire Risk
	Medium Fire Risk

Extractive Resources Overlay

	Haulage Route
	Extractive Resource
	Separation Area

Regional Infrastructure Corridors and Substations Overlay

	Crows Nest Army Signals Base Buffer
	Petroleum / Natural Gas Pipeline

Agricultural Land Overlay

	Good Quality Agricultural Land
---	--------------------------------

Heritage Overlay

	Heritage Place
---	----------------

Neighbourhood Character Overlay

	Neighbourhood Character Place
---	-------------------------------

Landslide Hazard Overlay

	High Risk
---	-----------

Flood Hazard Overlay

	High Flood Hazard
	Medium Flood Hazard

Water Resources Overlay

	Water Resource Catchment
	Dam High Water Level

Ecological Significance Overlay

	Waterways and Wetlands
	Category 2 Wetland
	Category 3 Stream
	Waterways and Wetlands Buffer
	Biodiversity Corridors
	Areas of Ecological Significance
	Areas of Ecological Significance Buffer

Strategic Framework

Settlement Pattern

	Cabarliah Defence Facility
	District Centre
	Local Centre
	Major Centre
	Oakey Airbase
	Principal Centre
	Specialised Activity Centre
	Specialist Urban Retail Centre
	Toowoomba Airport
	Future Railway
	Railway
	Highway
	Major Road
	Other Road
	Bushland and Corridors
	Charlton Welcamp Enterprise Area
	Dam High Water Level
	Extractive Industry
	Nature Conservation and Open Spaces
	Rural Residential
	SEQRP
	Sport and Recreation
	Urban Extent
	Future Urban Area
	New Urban Area

Natural Environment

	Ecological Corridor
	Areas of Ecological Significance
	Dam High Water Level
	Plantation
	Waterways and Wetlands

Natural Resources

	Agricultural Land
	Key Resource Areas
	Stock Routes
	Water Supply Catchment

Natural Resources - Mining Tenements

	Petroleum Pipeline (Operational)
	Mineral Development Licence (Granted)
	Mining Lease (Granted)

Access and Mobility

	Future Major Road
	Heavy Vehicle Route
	Other Cycle and Pedestrian Paths
	Principle Cycle Network

Infrastructure and Services

	Electricity Generation
	Electricity Substations
	Waste Management Site
	Waste Water Treatment Plant
	Water Treatment Plant
	Bulk Water Lines
	Electricity Corridor
	Gas Pipeline Corridor
	Petroleum Pipeline Corridor
	Toowoomba Bypass
	Water Supply Catchment
	Water Supply Dams

Economic Development

	Charlton Wellcamp Enterprise Area
	District Centres
	Local Centres
	Major Centres
	Principal Centres
	University of Southern Queensland

Local Government Infrastructure Plan

	Priority Infrastructure Area
	Net Developable Area
	Projection Areas

	Water Service Catchment
---	-------------------------

	Future Trunk Infrastructure
	Trunk Water Main
	Flow Control Valve
	Bore
	Pressure Reducing Valve
	Pump Station
	Reservoir
	Water Treatment Plant

	Existing Trunk Infrastructure
	Trunk Water Main
	Flow Control Valve
	Pressure Reducing Valve
	Production Bore
	Pump Station
	Reservoir
	Treatment Plant

Wastewater

	Sewer Service Catchment
	Future Trunk Infrastructure
	Gravity Main
	Pressure Main
	Pump Station
	Existing Trunk Infrastructure
	Holding Tank
	Sewage Pump Station
	Water Reclamation Facility
	Gravity Sewer
	Pressure Main

Transport

	Transport Service Catchment
	Future Trunk Infrastructure
	New Road
	Upgrade To Existing Road
	Intersection
	Existing Trunk Infrastructure
	Signalised intersections on trunk roads
	Federal Roads
	State Roads
	Local Trunk Roads
	Toowoomba Second Range Crossing

Stormwater

	Stormwater Service Catchment
	Future Trunk Infrastructure
	Stormwater Pipe
	Trunk Detention Basin
	Existing Trunk Infrastructure
	Detention Basin
	Stormwater Pipe (>=750mm)

Parks

	Parks Service Catchment
	Future Trunk Infrastructure
	Trunk Park (Location Undetermined)
	Trunk Park (Location Identified)
	Existing Trunk Infrastructure
	Existing Trunk Parks
	Other Open Space

Road Hierarchy

Road Hierarchy Description

	Collector
	Collector, Proposed
	Distributor
	Distributor, Investigation
	Distributor, Proposed
	Highway
	Highway Proposed
	Highway, Proposed Upgrade
	Highway, Proposed Upgrade from Distributor
	Local
	Proposed Upgrade from Distributor
	Regional Arterial
	Regional Arterial, Proposed
	Regional Arterial, Proposed Downgrade
	Sub-Arterial
	Sub-Arterial, Investigation
	Sub-Arterial

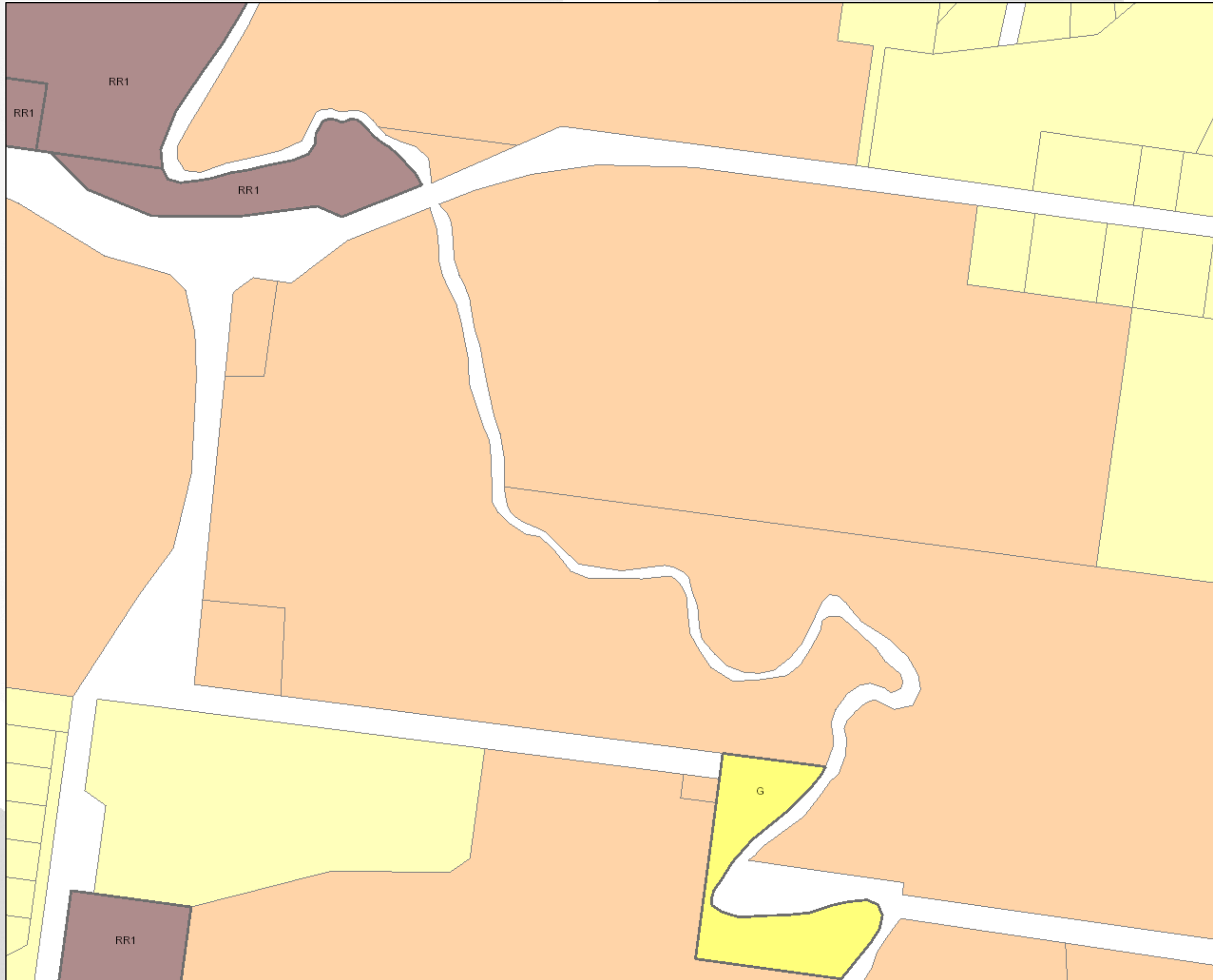
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Geocentric Datum of Australia 1994 (GDA94) Zone 56



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Resource Management Queensland
Geocentric Datum of Australia 1994 (GDA94) Zone 56

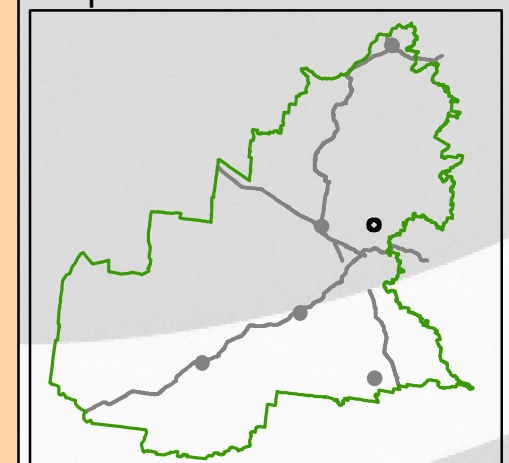
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Map Sheet Index



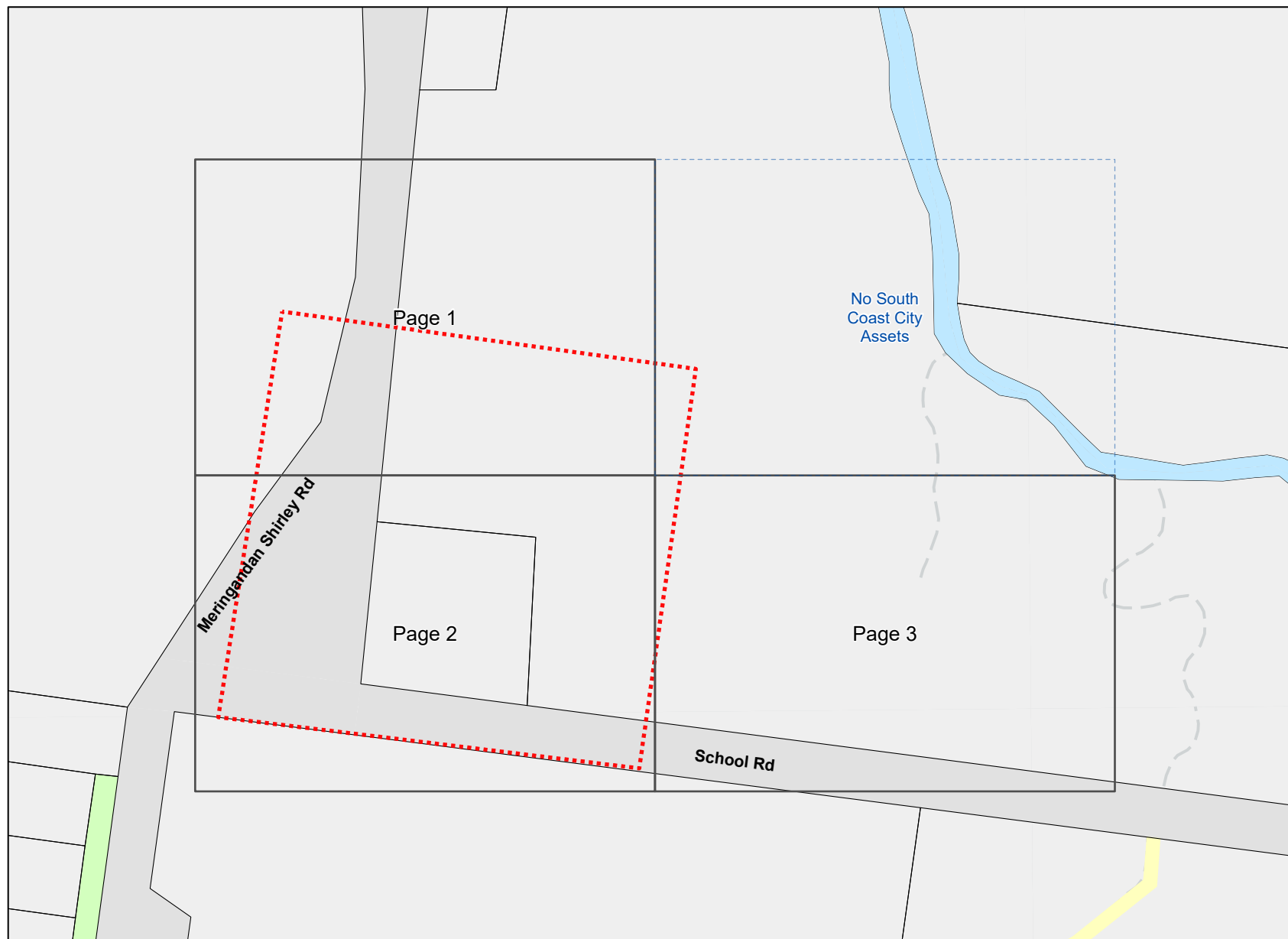
Final map sheet boundaries to be confirmed.



Appendix D - BYDA Information

Legend

-  DBYD Enquiry Area
-  Detailed Map Page
-  No Assets

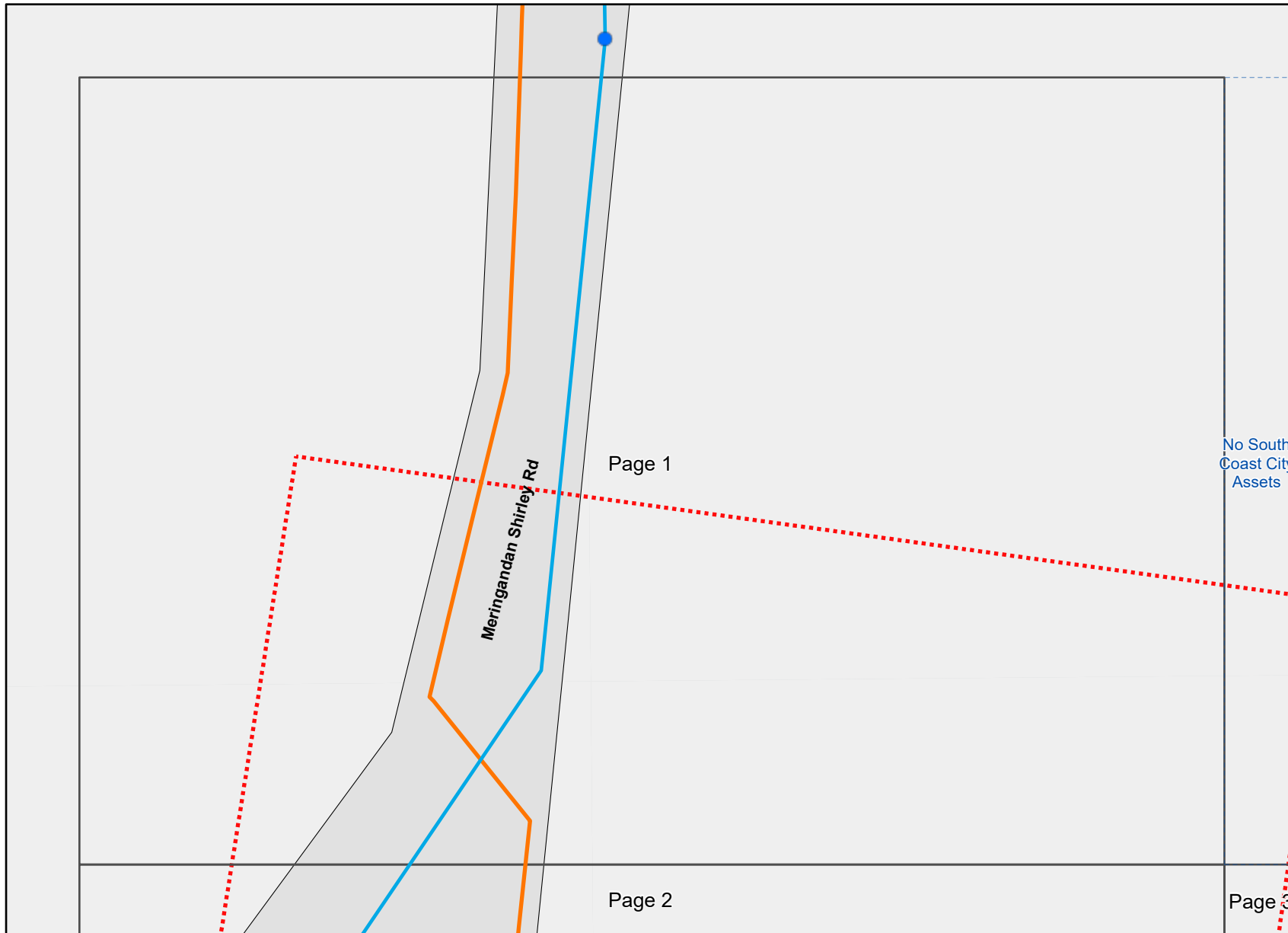


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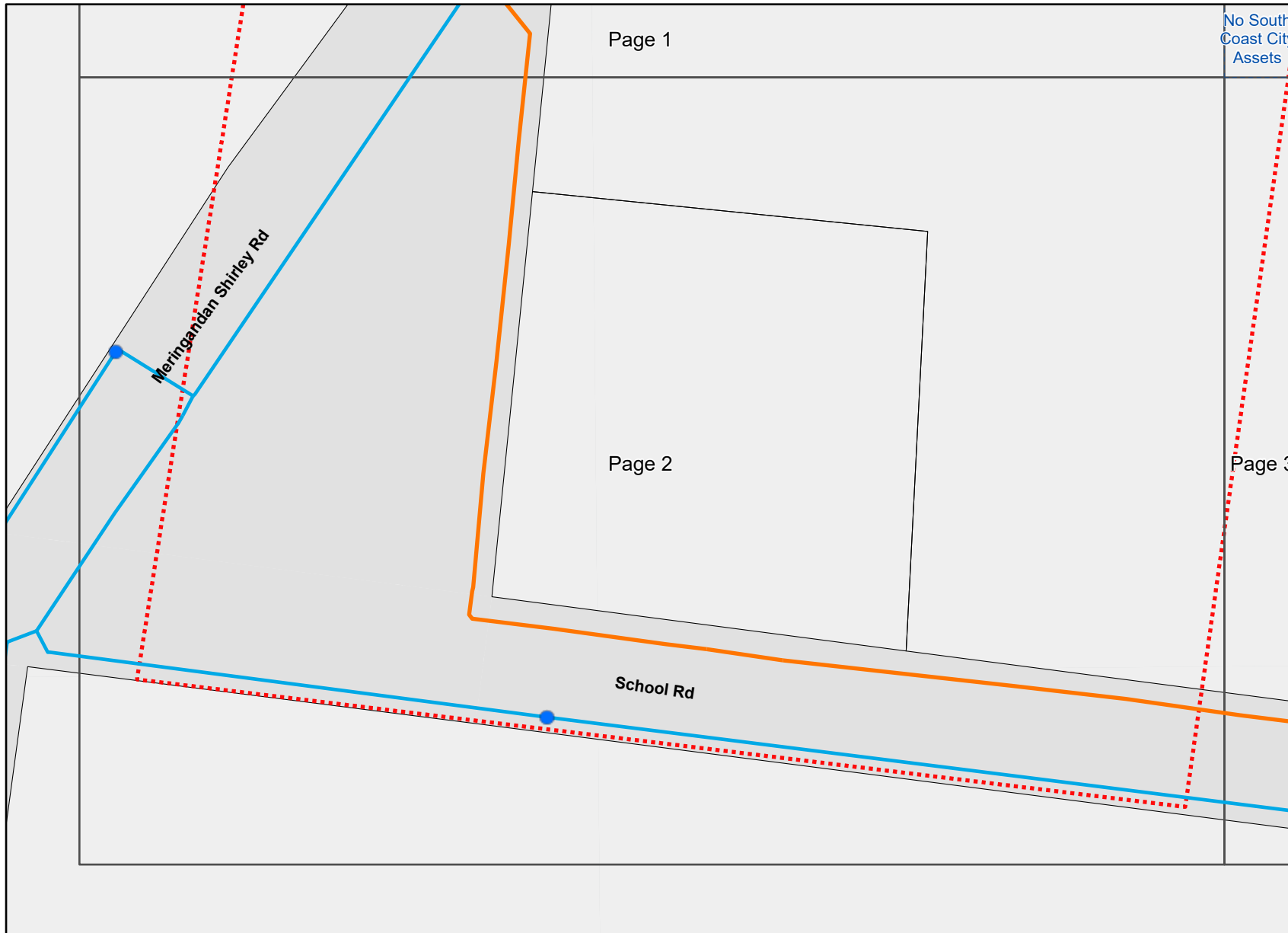
- Legend**
- ⋯ DBYD Enquiry Area
 - Water Hydrant
 - Reticulation Main
 - Sewer Pressure Main

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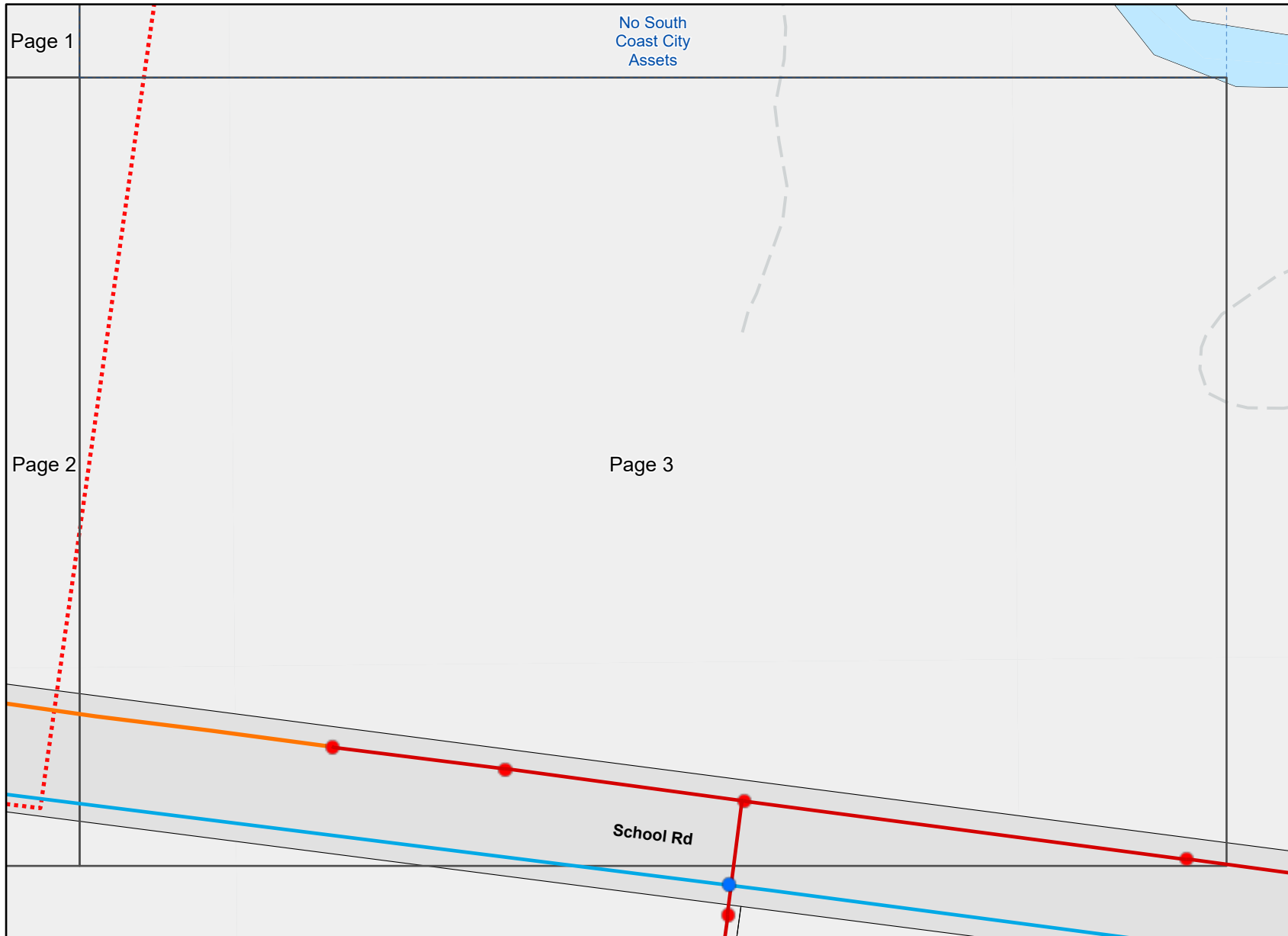
- Legend**
- ⋯ DBYD Enquiry Area
 - Water Hydrant
 - Reticulation Main
 - Sewer Pressure Main

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- Legend**
- DBYD Enquiry Area
 - Water Hydrant
 - Reticulation Main
 - Sewer Gravity Main
 - Sewer Manhole
 - Sewer Pressure Main

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Appendix E - Hydrant Test Results and Modelling

Pressure and Flow Test

Applicant/Owners Details							
Full Name	Brian lamb						
Postal Address	Tenancy 8, 158 Margaret Street, Toowoomba City						
Signature/s						Date	12/11/2021
Contact Person	Brian Lamb						
Phone	07 4595 1720						
Mobile							
Email Address	blamb@adgce.com						
Property Details – Lot & plan details are shown on title documents and rates notice.							
Number	7	Street	Meringandan Shirley Rd				
Suburb/Town	Meringandan	Lot #	11	Plan #	SP247510		
Pressure and Flow Test Type							
Test Details	☒ Single		☐ Two Point		☐ Three Point		
Plan Provided	☒						
Hydrant(s) Marked	☒						
APPLICATION CHECKLIST							
Applicable Fee as Per Current Fees and Charges						☒	
PAYMENT OPTIONS (Cashiers RC_8465)							
Customer Request Number: _____				Processing Officer: _____			
☐	In person at TRC Service Centre by Cash, Cheque, Visa, Mastercard, or EFTPOS debit card (Diners and AMEX are not accepted)			Receipt Number			
☒	Credit Card by Phone (BPoint) – Contact 131 872 (Diners and AMEX are not accepted) Note: Please do not record credit card details on this form			Receipt Number			
☐	Invoice (Request Type: ACDRNW) – for approved accounts only			Account Name			
				Account Number			
				Debt Type		890/24	
				Amount			

WATER SERVICES USE ONLY					
Date Test Completed	9-12-21	Time Test Completed	1:35	Diameter of Main	150mm
Foot Path	✓	Roadway		Type of Main (PVC etc.)	PVC
Hydrant Condition Good/Poor	GOOD				
MERINGANDAN - SHIRLEY RD NEAR SCHOOL RD.	Hydrant 1	Hydrant 2	Hydrant 3		
Static Pressure - KPA	780				
KPA. @ 5L/S Flow	740				
KPA. @ 10L/S Flow	700				
KPA. @ 15L/S Flow	655				
KPA. @ 20L/S Flow	620				
KPA. @ 25L/S Flow					
KPA. @ 30L/S Flow					
KPA. @ 35L/S Flow					
KPA. @ 40L/S Flow					
KPA. @ Full Flow	620				
23 L/S					

Pressure and Flow Test

Applicant/Owners Details

Full Name	Brian lamb		
Postal Address	Tenancy 8, 158 Margaret Street, Toowoomba City		
Signature/s		Date	12/11/2021
Contact Person	Brian Lamb		
Phone	07 4595 1720		
Mobile			
Email Address	blamb@adgce.com		

Property Details – Lot & plan details are shown on title documents and rates notice.

Number	7	Street	Meringandan Shirley Rd		
Suburb/Town	Meringandan	Lot #	11	Plan #	SP247510

Pressure and Flow Test Type

Test Details	☒ Single	☐ Two Point	☐ Three Point
Plan Provided	☒		
Hydrant(s) Marked	☒		

APPLICATION CHECKLIST

Applicable Fee as Per Current Fees and Charges	☒
--	-------------------------------------

PAYMENT OPTIONS (Cashiers RC_8465)

Customer Request Number: _____		Processing Officer: _____	
☐	In person at TRC Service Centre by Cash, Cheque, Visa, Mastercard, or EFTPOS debit card (Diners and AMEX are not accepted)	Receipt Number	
☒	Credit Card by Phone (BPoint) – Contact 131 872 (Diners and AMEX are not accepted) Note: Please do not record credit card details on this form	Receipt Number	
☐	Invoice (Request Type: ACDRNW) – for approved accounts only	Account Name	
		Account Number	
		Debt Type	890/24
		Amount	

WATER SERVICES USE ONLY					
Date Test Completed	9-12-21	Time Test Completed	1:20 PM	Diameter of Main	150mm
Foot Path	✓	Roadway		Type of Main (PVC etc.)	PVC
Hydrant Condition Good/Poor	Good				
NO 7 MERINGANDAN SHIRLEY RD	Hydrant 1	Hydrant 2	Hydrant 3		
Static Pressure - KPA	900				
KPA. @ 5L/S Flow	850				
KPA. @ 10L/S Flow	800				
KPA. @ 15L/S Flow	760				
KPA. @ 20L/S Flow	740				
KPA. @ 25L/S Flow	700				
KPA. @ 30L/S Flow	650				
KPA. @ 35L/S Flow	600				
KPA. @ 40L/S Flow					
KPA. @ Full Flow 378/s	580				

Brisbane

596 Milton Road
Toowong, QLD 4066

Postal: PO Box 1492 Toowong
BC QLD 4066

Phone: 1300 657 402

Email: info@adgce.com

Darwin

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Darwin, NT 0800

Phone: 1300 657 402

Email: info@adgce.com

Gold Coast

Suite 201, Level 1, 1 Short Street
Southport, QLD 4215

Postal: PO Box 208
Southport, QLD 4215

Phone: 1300 657 402

Email: info@adgce.com

Hobart

92-96 Argyle Street
Hobart TAS 7000

Phone: 1300 657 402

Email: info@adgce.com

Melbourne

321 / 838 Collins Street
Docklands, VIC 3008

Phone: 1300 657 402

Email: info@adgce.com

Perth

Level 3, Suite 15, 23 Railway Road
Subiaco, WA 6008

Phone: 1300 657 402

Email: info@adgce.com

Sunshine Coast

Level 3, 2 Emporio Place
Maroochydore, QLD 4558

Postal: PO Box 5014
Maroochydore BC,
QLD 4558

Phone: 1300 657 402

Email: info@adgce.com

Sydney

13/20 Berry Street
North Sydney, NSW 2060

Phone: 1300 657 402

Email: info@adgce.com



Toowoomba

Tenancy 8, 158 Margaret Street
Toowoomba QLD 4350, Australia

Phone: 1300 657 402

Email: info@adgce.com

Ever-mindful of the role we play in shaping places, people, and communities, we are proud to lead strong, best-practice solutions that create a positive legacy for the future.

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