Our Ref: CE18119 **CGRC Water Main – Response to RFI dated 23 January 2024**
Contact: Lloyd Moloney/Derek Arrowsmith

Att: Brendan Price
The Dott Developments Pty Ltd
Level 6 161 London Circuit
Canberra ACT 2601

12 March 2024

Dear Brendan,

RE: Request for Information to aid the design process to extend and expand the provision of the Gundagai potable water supply to the DOTT development proposal at Lot 529B DP230601 and Lot 2 DP160191 – 37 Annie Pyers Drive, Gundagai

Cootamundra-Gundagai Regional Council Request.

To support your proposed development CGRC have requested the following information to be provided in regard to water supply to DOTT for each stage (both individual and cumulative):

a) Maximum flow rate required at any given time in litres per second.
b) Maximum volume of water required over a 3, 6, 12, and 24 hour timeframe and a seven day timeframe. This information must include peak business time (Christmas Holiday Period). Such information is to be provided as litres per hour over each timeframe.
c) Water demand and pressure requirements for Fire (Safety) Services. This information will need to be undertaken by an accredited Fire Service Engineer.

Moloney & Sons Engineering (MSE) Response

Reference Documents

Water System Planning for demand is completed in accordance with the Water Supply Code of Australia (WSCA). The relevant sections of the various relevant codes are:

1. WSCA , Part 1: Planning and Design, Section 2.2 Demands.
2. WSCA, Sydney Water Edition, Section 2 Water System Planning Guideline. This section directs designers to:
   a. Sydney Water, Water System Planning Guideline, Section 2 Water Demand and Growth. (SW-WSDG)
3. WSCA, Regional New South Wales Edition, Section 2.3 Demands. (WSC-REG)
4. Moloney and Sons Hydraulic Design Report *CE18119 Hydraulic Design Report_001 Rev A*, Attachment 3

The order of precedence for use of the design codes is 3, 2, 1.

DOTT Development Area

The subject properties are:

- Lot 2 DP 160191 with an area of 0.785ha
- Lot 529B DP 203601 with and area of 1.891ha
- Total Property Area 2.676ha the area used in this letter is rounded to 2.7ha

Demand Calculation

In accordance with WSC-REG Section 2.3.3.2 the system hydraulic design is for the total future demand based on land zoning for the required water supply. Water system design is not based on the estimated demand for staged development growth.

In accordance with WSC-REG Section 2.3.3.1 the demand rates for each type of development in the design area are to be obtained from the Water Agency. In the case of the DOTT the Water Agency is Goldenfields Water (GWCC) and Cootamundra Gundagai Regional Council (CGRC). GWCC do not provide demand rates for each local authority, the average day demand rate provided by CGRC for use in the MSE design report Attachment 3 was 0.81kL/ET/day at a rate of 2.5 EP/ET the demand rate is 0.324L/EP/day. The subject properties in isolation were assigned, by CGRC to have a future residential population of 17ET (42.5 EP). The annual demand for the subject properties is 13,770L/dy. The maximum day and maximum hour (peak hour) are calculated in accordance with Table 2 in Attachment 3, as 27,540L/day and 5,738L/hr respectively. This equates to 1.59L/s for the full development area or 0.59L/s/ha.

The basis of demands adopted in Attachment 3 was that all demand would be residential to give a conservative design.

To provide some validation of this demand rate reference was made to SW-WSDG section 3.3.2 Growth Demand Forecasting which requires the determination of the per capita consumption by demand category. Section 3.3.2 directs to Appendix C in SW-WSDG which provides demand categories but no demand rates. From Appendix C it is determined that the proposed land use will be either b) Commercial, or c) Special uses. The validation for the demand rate falls to WSCA Section 2.2.2, Table 2.1 Typical Peak Hour Demand Rates. There are no rates provided for Gundagai, it is therefore reasonable to assume that the Gundagai demand will be similar to either Canberra (without irrigation) or Sydney; 0.6L/s/ha and 0.9L/s/ha respectively; the average of these rates 0.75L/s/ha is adopted for the typical commercial peak hour demand rate. The land area of the subject properties is ~2.7ha, the total peak hour commercial demand is 2.025L/s.

The commercial demand rate, to be adopted, is 0.75L/s compared to the previously adopted residential demand rate of 0.59L/s.

Design Usage

Figure 2 in the MSE design report Attachment 3 provided a typical diurnal demand curve based on 30 minute usage periods for the entirety of the DOTT area subject to water supply. The development area is a small portion of this water supply area. The peak hour usage data for the development area in isolation, as residential (0.59L/s) and commercial (0.75L/s), are summarised in *Table 1*. In comparison with the usage data for the entire DOTT area from Attachment 3.

Period / Units	Calculation	Residential	Commercial	Trunk Main Design Report
Peak Hour L/s	None	1.59	2.025	10.875
Peak Hour L/h	Peak Hour L/s x 3600	5738	7290	39,150
Peak Day Demand L/day	Peak Hour L/h x 24	27,540	34,992	187,920
Consumption day L/day	Peak Day / 2	13,770	17,496	93,960
Consumption hour L/h	Consumption day / 24	573.8	729.0	3915.0
Consumption ½ hour L/30 min	Consumption hour / 2	286.9	364.5	1957.5

Table 1: Usage Calculations

Adjusting the usage of development area from the originally assumed basis of residential use to commercial use there is altered diurnal usage and demand patterns. The updated 30 minute diurnal usage pattern shows that the consumption occurs during differing time periods. As a result of the altered diurnal pattern there is a nett 17 % decrease in overall demand from the development site. The Diurnal curve for the development site based on residential and commercial along with the total daily demand curves are included in Attachment 1.

The results from the altered development site diurnal patterns have been applied to those previously reported Figure 2 in the MSE design report Attachment 3 adjusted to show either the demand in L/30 min or cumulative volume as opposed to the usage factors. The Diurnal and cumulative supply curves are included in Attachment 2.

Response to Points Raised

Item a) Maximum flow rate required at any given time in litres per second.

The peak hour flow rate for the DOTT Development Area as a commercial development is 2.025L/s.

Item b) Maximum volume of water required over a 3, 6, 12, and 24 hour timeframe and a seven day timeframe. This information must include peak business time (Christmas Holiday Period). Such information is to be provided as litres per hour over each timeframe.

The diurnal curves provided demonstrate the peak hour demand and usage over a 24 hour period, in ½ hourly increments, the peak hour takes account of the increased usage of holiday periods.

Item c) Water demand and pressure requirements for Fire (Safety) Services. This information will need to be undertaken by an accredited Fire Service Engineer.

WSC-REG requires no design allowance for fire flows unless the water agency specifies and allowance.

SW-WSDG advises there is no requirement placed on Sydney Water for provision of water for fire fighting.

WSCA Table 2.1 notes no requirement for fire demand allowance in either Sydney or Canberra regional areas.

MSE design report CE18119 Hydraulic Design Report_001 Rev A, Attachment C, included a 15L/s allowance for hydrant demand in the pumping calculations. The pumped supply is based on delivery usage at 2.175L/s plus a hydrant demand of 15L/s . The total pumped supply for the entire DOTT area is based on 18L/s.
The water demand and fire pressure supply have been provided in excess of the requirements for the New South Wales area outlined under the Water Supply Code of Australia. This does not void the site/facility specific necessary building code regulation requirements for wet & dry fire, which will be required by the applicant upon Building Approval application.

NOTE: All data and design calculations are provided for the full proposed development area as required by the Water Supply Code of Australia.

Conclusion

The development site when fully developed as a commercial site will cause an alteration of the diurnal demand patterns previously reported. The alteration to diurnal demand patterns is not detrimental to the currently designed water supply for the DOTT area, the alteration would not support reduction in pipe size or pumping capacity.

The development site when fully developed as a commercial site will reduce the cumulative volume of water supply required from the cumulative volumes upon which the current trunk water main design is based. The alteration to the cumulative supply volumes is not detrimental to the currently designed water supply for the DOTT area, the alteration would not support reduction in pipe size or pumping capacity.

Yours sincerely

Lloyd Moloney
Managing Director
for & on behalf of
MOLONEY & SONS™
ENGINEERING

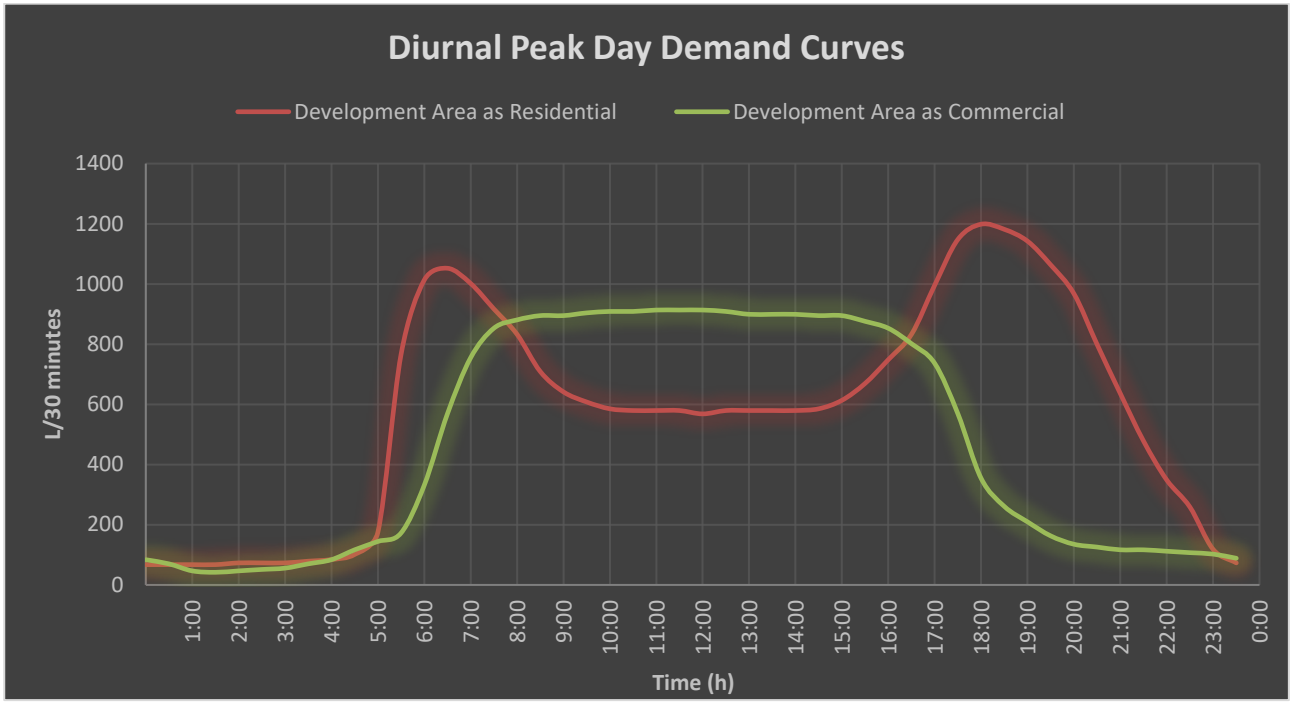
Derek Arrowsmith
Principal Engineer
for & on behalf of
MOLONEY & SONS™
ENGINEERING

Encl.

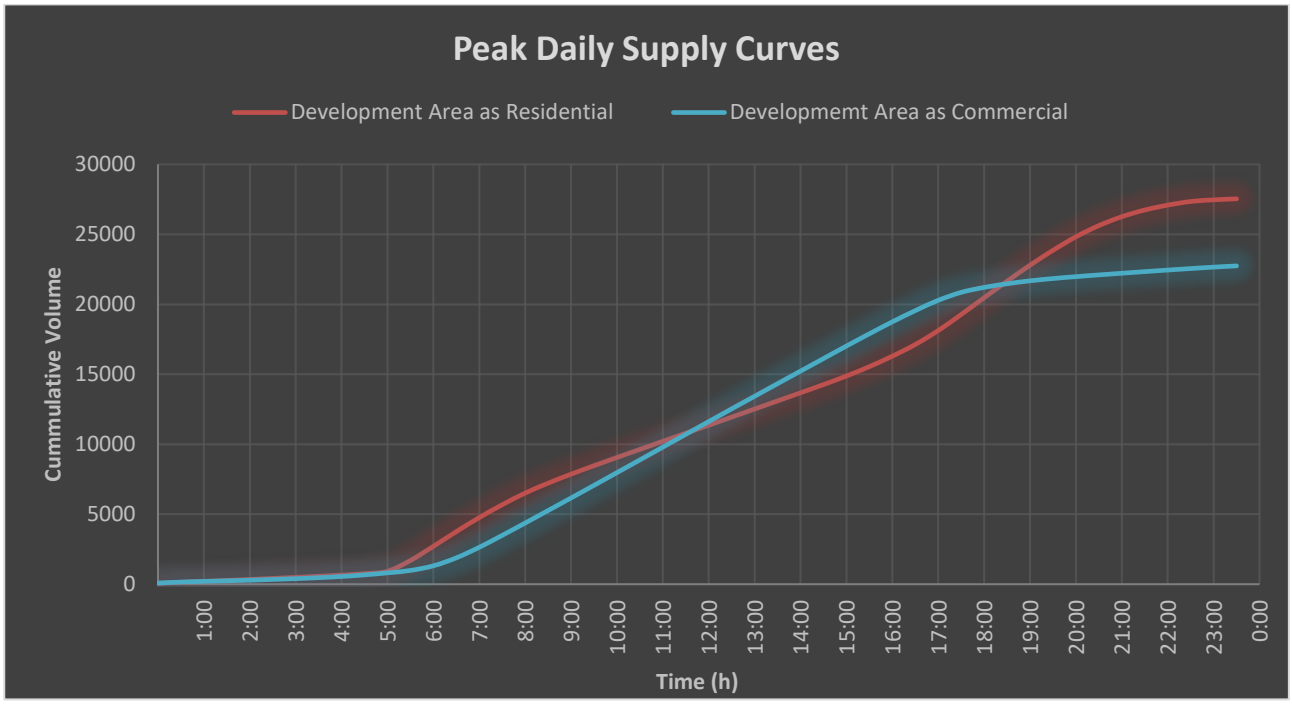
Cc via email:
Attachment: 1 – Development site diurnal and demand curves
2 – MSE full report and adjusted diurnal and demand curves
3 – MSE Hydraulic Design Report CE18119 Hydraulic Design Report_001 Rev A

Attachment 1

Diurnal Peak Day Demand Curves comparing development site as residential with development site as commercial.

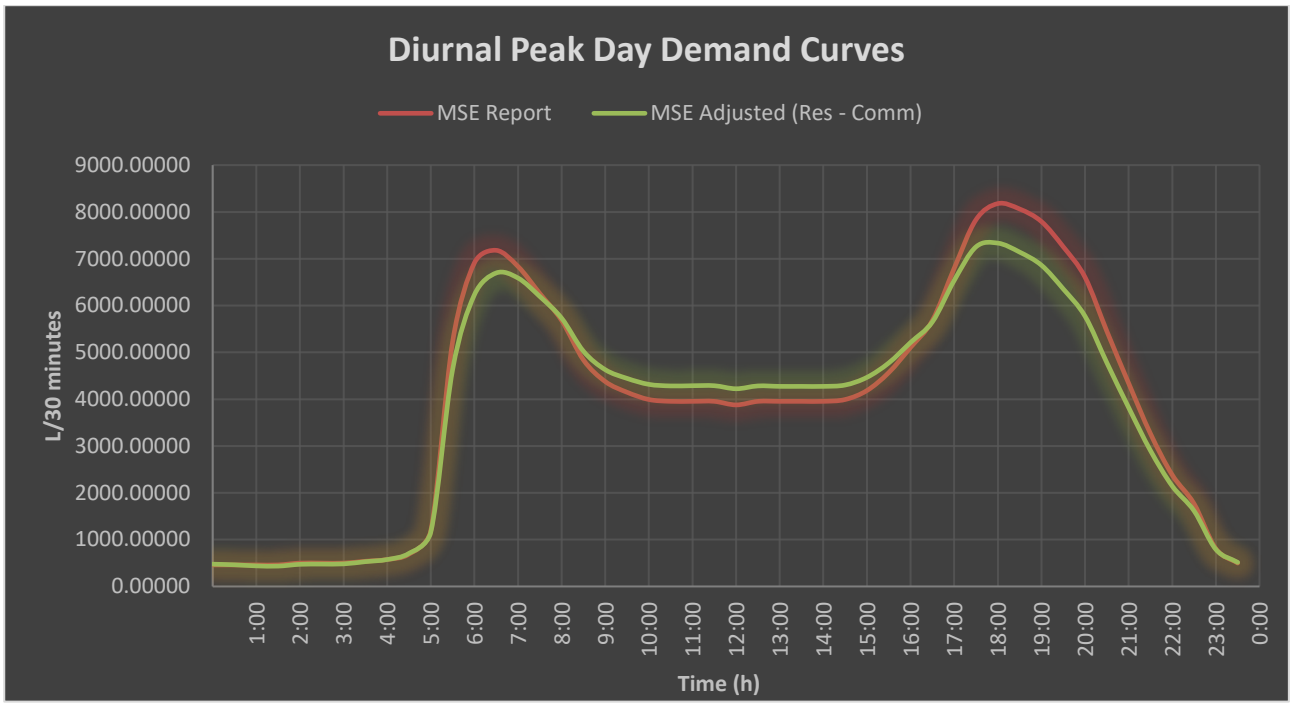


Total Demand Curves comparing development site as residential with development site as commercial.

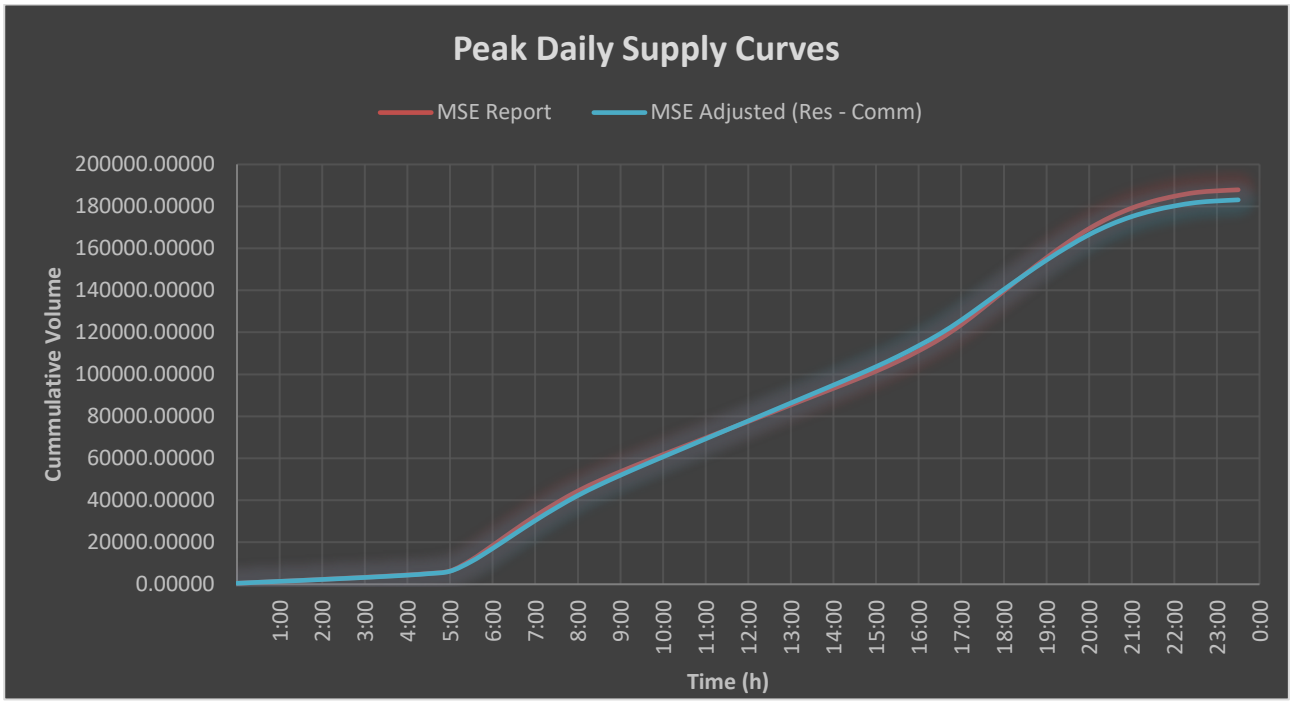


Attachment 2

Diurnal Curves comparing the full scope of the MSE report with the development site as residential and with development site as commercial.



Total Demand Curves comparing the full scope of the MSE report with the development site as residential and with development site as commercial.



Attachment 3

MSE design report CE18119 Hydraulic Design Report_001 Rev A

MOLONEY & SONS™

ENGINEERING

Cootamundra Gundagai regional Council

Trunk Water Main – Springflat Drive to Coolac via The Dog on the Tuckerbox

Hydraulic Design Report

22 May 2020

CE18119 Hydraulic Design Report_001 Rev A

Contract No. CE19099

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1. INTRODUCTION

1.1. Project Commission

Moloney & Sons Engineering has been engaged by Cootamundra Gundagai Regional Council (CGRC) to provide detailed design for the construction of a trunk watermain from Gundagai to The Dog on the Tuckerbox (DoTB) and concept design for a trunk watermain from DoTB to the proposed Coolac Service Station and wider community.

1.1.1. Limitations

This report is limited to providing a Hydraulic design that will provide suitable water supply to both the DoTB area and the Coolac community.

1.2. Project Overview

1.2.1. Background

CGRC provides water supply to the townships of Cootamundra and Gundagai. At present part of the DoTB area is supplied with partially treated water, pumped from Murrumbidgee River and stored in a concrete reservoir on the eastern side of the Hume Highway. The Coles Express, Shell Service station and the restaurants nearby are supplied with potable water from Gundagai town supply system by pumping water from Gundagai water system at the existing DN100 watermain located along Springflat Drive, Gundagai. This pump station and pipe work is privately owned and operated by the owners of premises.

CGRC has determined that population growth potential in the DoTB and Coolac areas will require potable water supply either in the short term (DoTB) or the long term (Coolac). This project has been established to confirm that the design of trunk watermain from Gundagai to DoTB will be capable of being extended to Coolac in the future.

1.2.2. Locality

Figure 1 following provides a location context for the project.

Figure 1 Site Locality (Source: Google 2020)

1.3. Design Standards and Requirements

1.3.1. Design Standards

The design standards and order of precedence for the project are as follows:

- WSA 03-2011-3.1 Water Supply Code of Australia (Sydney Water Edition);
- Goldenfields Water Standards; and
- Cootamundra Gundagai Regional Council Requirements.

1.3.2. Design Requirements

Following is a summary of the design requirements that have specific relevance to the project.

- Water supply is provided from Springflat Drive, Gundagai to the DoTB general area sufficient to service the current and potential future population (refer CGRC Population and Water Demand Estimation included in Appendix A).
- Ensure there is hydraulic capability and capacity in the main to provide future service and supply to the Coolac population area (refer CGRC Population and Water Demand Estimation included in Appendix A).
- The concept design alignments for stages 1 and 2 are included in Appendix B.

2. HYDRAULIC DESIGN

2.1. Design Assumptions

The proposed infrastructure demand has been based on CGRC's "Population and Water Demand Estimation" Report dated 15/04/20. Refer figure extract below.

Table 1 Equivalent Tenement Estimation (CGRC Population & Water Demand Estimation EXTRACT)

Area	ET
DoTB Tourist Zone	96
Outer area at the DoTB	20
En-route Coolac	15
Coolac Village	250
Total	**381**

Therefore, adopting a **116 ET**, with 2.5 EP/ET for the Gundagai to DoTB supply and **265 ET**, with 2.5 EP/ET for the DoTB to Coolac supply.

For the purposes of this study, the WSA demand criteria's have been adopted in order to achieve a preferred economical option. As it Moloney & Son's understanding adopting the CGRC Demands would result in excessive Reservoir Storage sizing, considering the current and planned Rural Zoning of the region therein.

Please refer below table for adopted parameters and demand.

Table 2 Water Supply Demand Flow Criteria

Parameter	CGRC Design Criteria (kL/ET/d)	WSA Design Criteria (kL/ET/d)	Adopted Criteria (kL/ET/d)
Average Day Demand	0.81	-	0.81
Max Day Demand	4	2*AD[1]	2*AD
Max Hour Demand	7	5*AH (*on Max Day*)[1]	5*AH (*on Max Day*)

[1]*In accordance with WSA Part 1 for populations below 2,000.*

Table 3 Estimated Average Demands

	Average Daily Consumption (L/d)	Max Day (2*AD) (L/d)	Max Hour (5*AH) (L/h)
DoTB Supply	93,960	187,920	39,150
Coolac Supply	214,650	429,300	89,438

2.2. Storage Design

For the purposes of this analysis and in order to establish an anticipated daily diurnal demand pattern for the subject infrastructure, the below typical demand pattern has been adopted and represented below.

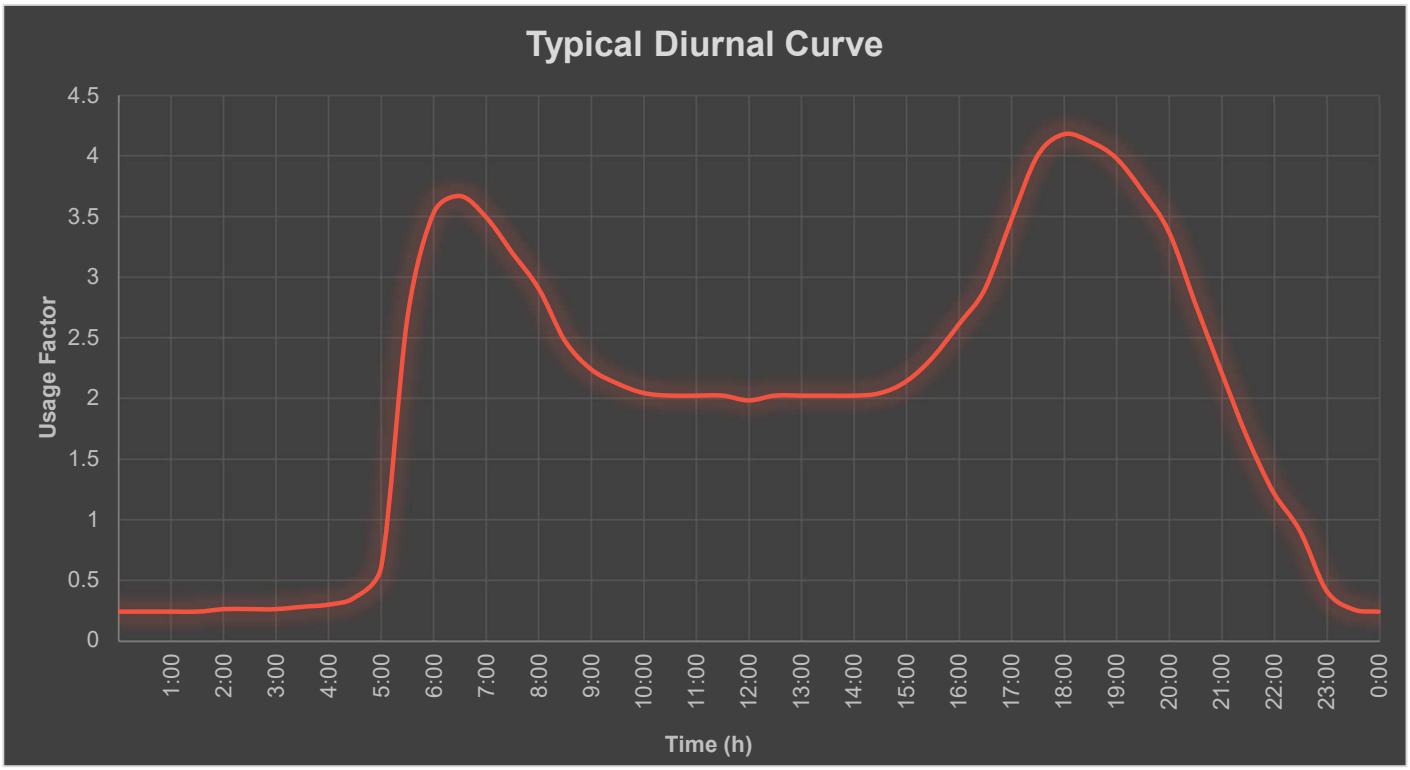


Figure 2 Typical MD Diurnal Demand Pattern

However, as the Diurnal Pattern is based upon the average 30-minute consumption. This curve/demand pattern has been corrected to account for a total daily consumption.

Refer APPENDIX C for the corrected interpreted table, converting the original factors in establishing an 8hr & 24hr pumping rate. The initial factors were required to be corrected as they did not account for the full use of the full 24hr cycle.

2.2.1. DoTB Estimated Storage

Derived from the above diurnal pattern, the below Figure 3 illustrates the expected 8hr & 24hr pumping rates with the associated daily consumption volumes.

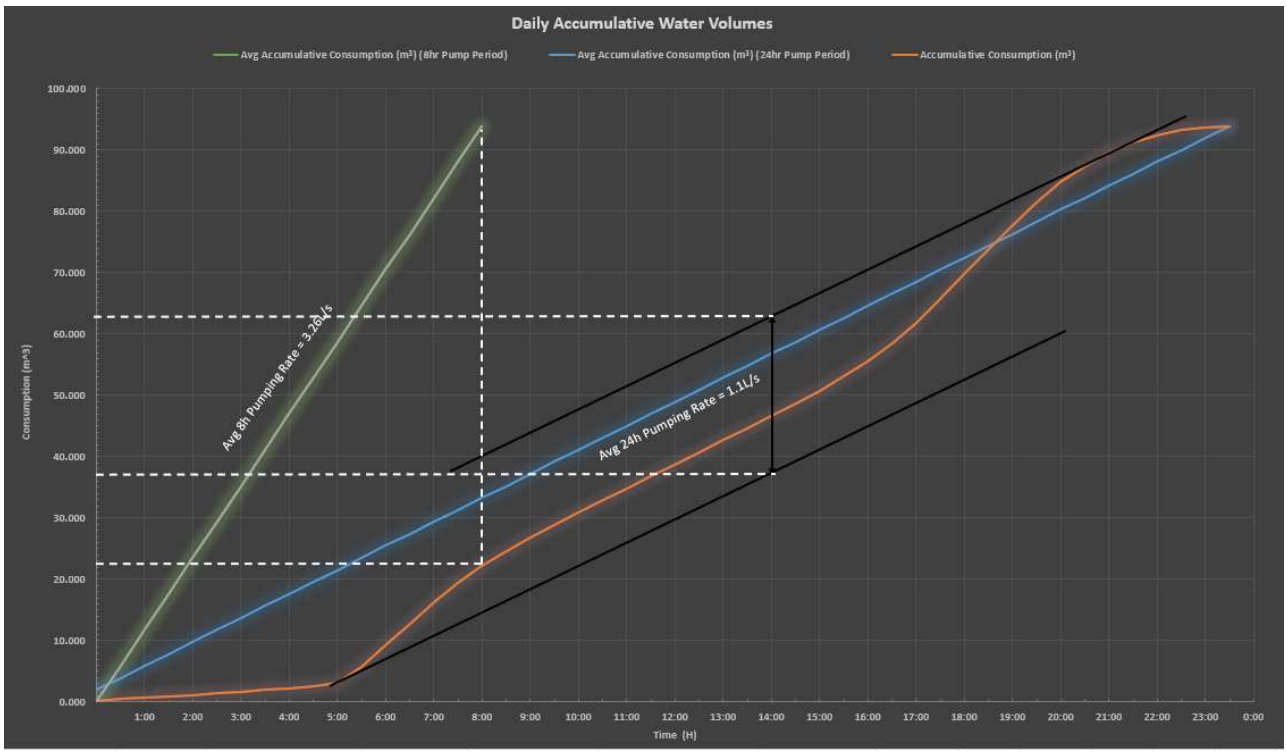


Figure 3 DoTB Daily Accumulative Consumption

Service Storage for pumping between 0000 hrs & 0800hrs:

$V_{eq} = 93.96 – 22.5 = 71.46m^3$

Service Storage for pumping over 2400 hrs:

$V_{eq} = 63 – 37 = 26m^3$

The required storage requirements are estimated from the $\sum V_{eq}$ (equalising storage) + V_f (fire service) + V_{res} (reserve storage).

Where:

V_{res} = 1/3 of the Peak/Max Day Demand as per WSA Part 1 Section 2.7

V_{eq} = Max Day Demand

V_f = 15L/s from one hydrant for a 2-hr period, assumed under operation for purposes of this study

2.2.2. Coolac Estimated Storage

Please refer below expected 8hr & 24hr pumping rates with the associated daily consumption volumes.

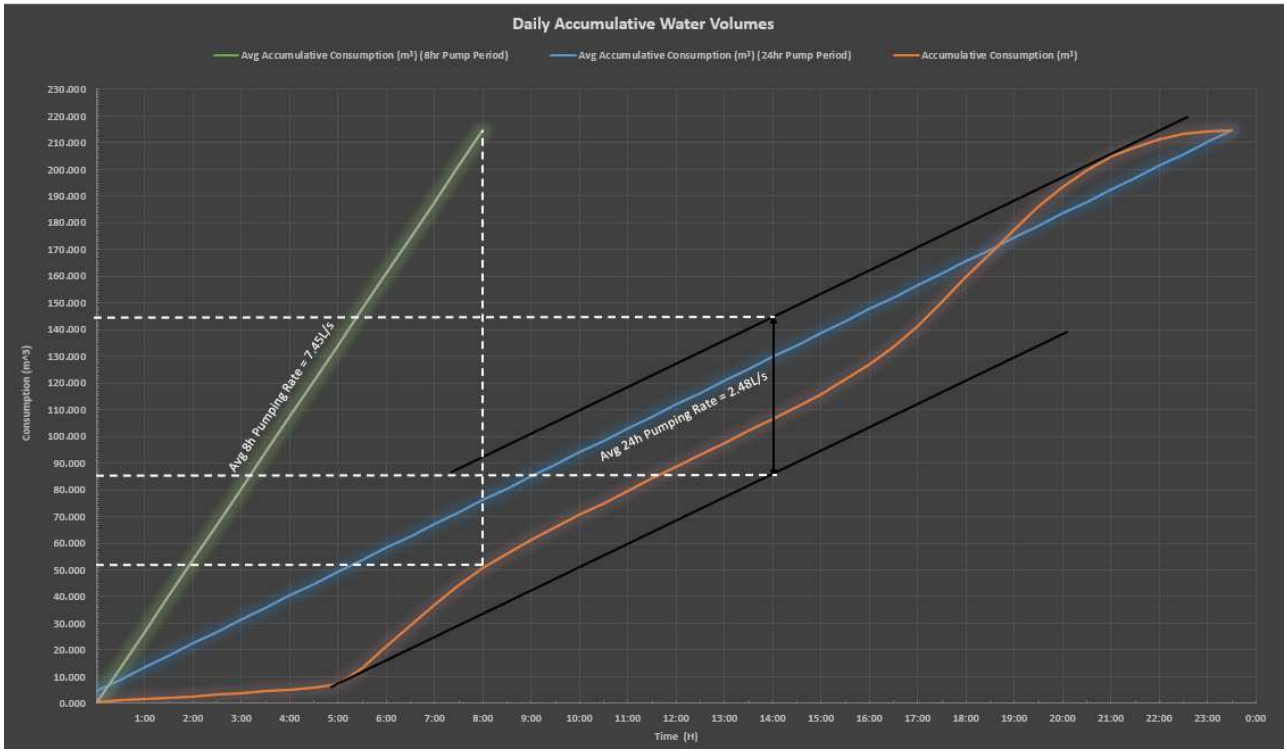


Figure 4 Coolac Daily Accumulative Consumption

Service Storage for pumping between 0000 hrs & 0800hrs:

V_{eq} = 214.650 - 52 = 162.65m^3

Service Storage for pumping over 2400 hrs:

V_{eq} = 145 - 85 = 60m^3

The required storage requirements are estimated from the $\sum V_{eq}$ (equalising storage) + V_f (fire service) + V_{res} (reserve storage).

Where:

V_{res} = 1/3 of the Peak/Max Day Demand as per WSA Part 1 Section 2.7

V_{eq} = Max Day Demand

V_f = 15L/s from one hydrant for a 2-hr period, assumed under operation for purposes of this study

Therefore, anticipated Service Storage Required is:

Table 4 Estimated Service Storage Requirements

Parameter	V_{res}	V_f	V_{eq}	V_{eq}	Vreq'd Vol	
Unit	*1/3*MD* (m^3)	*15L/s for 2hrs* (m^3)	V_8 (m^3)	V_{24} (m^3)	$V_{8\,hrs}$ (m^3)	$V_{24\,hrs}$ (m^3)
DoTB Res.	62.640	108.000	71.460	26.000	242.100	196.640
Coolac Res.	143.100	108.000	162.650	60.000	413.750	311.100

2.3. Pumping Requirements

2.3.1. Springflat Dr to DoTB

The adopted required flow of the pump will be considered under a Maximum Daily Demand (L/s) condition plus an emergency Hydrant under use.

Therefore, as previously shown MD is given for L/d, whereas the pump will require the **2.175 L/s MD + 15 L/s** for a hydrant demand, therefore requiring a total flow of **17.175 L/s or ~18L/s.**

The Pump head will be required to be:

$$h_p = \Delta z + \frac{fLV^2}{2gD}$$

Table 5 Springflat Dr Pump System Head Curve

Pump System Head Curve													
Length (m)	Flow (m^3/s)	ks	ø (mm)	A (m^2)	V (m/s)	Re	ks/3.7D	5.74/Re^0.9	log(ks/3.7D+5.74/Re^0.9)^2	f	ΔZ (m AHD)	hL=FLV2/2gD	hp = Δz + hL
3800	0.0172	0.0015	200	0.0314	0.547	1.09E+05	2.027E-06	1.674E-04	14.2201	0.017581	50.9	5.093	56.0

Assumptions:

- Considering the lowest (*Springflat Dr @ 249.1m AHD*) & highest-pressure (STG 1 *CH 2750 @ 300m AHD*) location conditions.
- Length is total length from the Springflat Dr Pump to lowest pressure node @ DoTB Service Station.
- Flow is under the Max Daily Demand plus one (1) Hydrant rate in use

Therefore, the minimum required head at Springflat Dr will be **56.0 m.**

2.3.2. DoTB (Annie Pyers Dr) to Coolac Service Reservoir

The adopted required flow of the pump will be considered under a Maximum Daily Demand (L/s) condition plus an emergency Hydrant under use.

Therefore, as previously shown MD is given for L/d, whereas the pump will require the **4.969 L/s MD + 15 L/s** for a hydrant demand, therefore requiring a total flow of **19.969 L/s or ~20L/s.**

The Pump head will be required to be:

$$h_p = \Delta z + \frac{fLV^2}{2gD}$$

Table 6 Annie Pyers Dr Pump System Head Curve

Pump System Head Curve													
Length (m)	Flow (m^3/s)	ks	ø (mm)	A (m^2)	V (m/s)	Re	ks/3.7D	5.74/Re^0.9	log(ks/3.7D+5.74/Re^0.9)^2	f	ΔZ (m AHD)	hL=FLV2/2gD	hp = Δz + hL
11000	0.0200	0.0015	200	0.0314	0.636	1.27E+05	2.027E-06	1.462E-04	14.6621	0.017051	40.0	19.330	59.3

Assumptions:

- Considering the lowest (*Annie Pyers Dr @ 250m AHD*) & highest-pressure (STG 2 *CH 950 @ 290m AHD*) location conditions.
- Length is total length from the Annie Pyers Dr Pump to lowest pressure node @ Coolac Service Reservoir.
- Flow is under the Max Daily Demand plus one (1) Hydrant rate in use

Therefore, the minimum required head at Annie Pyers Dr will be **60.0 m.**

2.4. Trunk Main Design

The proposed Trunk Main delivery line has been designed to cater for the Max Day Demand, which is to be pumped in the first 0800hrs, in accordance with WSA Guidelines and "Typical Capacities of Water Supply Systems", Water Resources Engineering (Chin, 2013).

In order to reduce pressure heads and pump loads, it is proposed that Stage 1 will consist of a ø200mm PE Trunk Main extension from the existing dead-end water supply connection at Springflat Dr through to the vicinity of Five Mile Creek Rd & Annie Pyers Dr intersection at the DoTB. Where it is proposed Stage 2 will later connect and continue to the proposed Coolac Service Reservoir and village community.

It is further proposed that a ø100 PE reticulation line will service the DoTB Community and businesses, in accordance with above-mentioned and adopted EP demands.

2.4.1. Pressure limits

The networks design pressures have been adopted in accordance Water Supply Code of Australia Part 1 Section 2.4, please refer below for adopted pressure limits:

Table 7 Service Pressure Limit (WSA Part 1 EXTRACT)

SERVICE PRESSURE (SP) LIMITS

SP Limit	Application	
	Domestic	Industrial / Commercial
Maximum	Licence or Water Agency requirement	Licence or Water Agency requirement
Desirable Maximum	800 kPa (80 m)	800 kPa (80 m)
Minimum (Note 1)	Licence requirement e.g. in the range 6-15 m	Licence requirement e.g. in the range 6-15 m
Desirable Minimum	200 kPa (20 m)	250 kPa (25 m)

Therefore, the adopted design **Abs. Max Pressure** is 80m x 9.79 =**783.2 KPa and Min Pressure** is 20m x 9.79 = **195.8 KPa**, as per STD SI unit conversion rates.

Table 8 DoTB Available Pressure Limits

Locality	Conditions	SP Limit	Domestic	Industrial/ Commercial	ΔZ (m AHD)	h_L = fLV2/2gD	Available Pressure
DoTB Lowest Pressure Point	MD+HYD	Des Min	200 kPa (20m)	250kPa (25m)	300.0m – 257.0m = 43.0m	5.093	371 kPa (37.9m)

Assumptions:

- Considering the lowest (*DoTB Service Station @ 257m AHD*) & highest-pressure (STG 1 *CH 2750 @ 300m AHD*) location conditions.
- Length is total length from the Springflat Dr Pump to lowest pressure node @ DoTB Service Station.
- Flow is under the Max Daily Demand plus one (1) Hydrant rate in use

Therefore, Table 8 above demonstrates adequate available pressures at the DoTB to sufficiently service the community without additional elevated storage, provided the Gundagai network can meet the specified supply demands.

Table 9 Coolac Available Pressure Limits

Locality	Conditions	SP Limit	Domestic	Industrial/ Commercial	ΔZ (m AHD)	h_L = fLV2/2gD	Available Pressure
Coolac Lowest Pressure Point	MD+HYD	Des Min	200 kPa (20m)	250 kPa (25m)	261.0m – 244.0m = 17.0m	1.003	156 kPa (16m)

Assumptions:

- Considering the lowest (*Coolac Service Station @ 244m AHD*) & highest-pressure (STG 2 *Coolac Service Reservoir @ 261m AHD*) location conditions.
- Length is total length from the future Coolac Service Reservoir to lowest pressure node @ Coolac Service Station.
- Flow is under the Max Daily Demand plus one (1) Hydrant rate in use

As shown in the above Table 9, there is insufficient pressure head available at the proposed Coolac Service Station (lowest pressure node) if the normal operating level where to be @ 261m.

Table 10 Head Loss

	Springflat Dr to DoTB Service Station (Low Pressure Elevation)						
	Length (m)	Flow (m^3/s)	ks	ø (mm)	V (m/s)	f	h_L = fLV2/2gD
MD+HYD Conditions	571	0.0200	0.0015	200	0.636	0.017	1.003

Thus, giving rise to a z_0 of:

$$z_0 = \frac{p_{min}}{y} + z_{min} + h_L$$

$$\therefore \boldsymbol{z_0 = 20 + 244 + 1.003} = 265 \text{ m}$$

This consequentially suggests the future Service Reservoir must achieve a normal operating base level of 265m AHD as a minimum or CGRC have the alternative option of opting for a Pumped pressurised supply to Coolac from the Service Reservoir.

3. SUMMARY

The purpose of this report is to provide a hydraulic analysis for the provision of a trunk watermain to service both the Dog on the Tuckerbox and the Coolac local community areas. The primary potable water supply will be provided from the existing Gundagai water network at Springflat Dr. The analysis indicates that a 200mm diameter PE trunk main will provide for all future development when supported by local supply networks.

The analysis makes the assumption that there is sufficient supply capacity in the Gundagai water network to support supply via Dog on the Tuckerbox to Coolac.

Construction of the watermain is proposed to be over more than one stage with the first stage being the supply from Gundagai to the Dog on the Tuckerbox. The hydraulic analysis for this stage shows that once the water supply has been pumped past the highest point of the alignment there would be no requirement for additional service supply storage. Future consideration could be given to providing an emergency standby supply reservoir on the western side of the Hume Highway, but this would not be able to provide potable water without turnover of water usage.

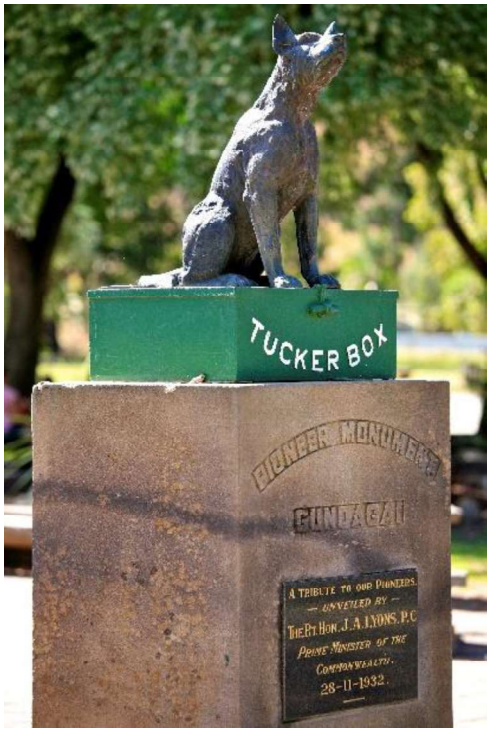
The following stage will extend the trunk main from Dog on the Tuckerbox to Coolac. The hydraulic analysis for this stage shows that a pumped network is required, however, the pumping should not exceed the maximum allowable pressure for service supply to the 15 properties that the main will be required to supply. The necessary pump will be sufficient to provide supply to a storage reservoir at Coolac, currently located on the highest point close to the Coolac Service Station to the west of the Hume Highway. This reservoir, unless elevated, will not provide sufficient pressure to service the community without supply pumping.

4. RECOMMENDATION

Following are the recommendations resulting from this analysis report:

1. The trunk main should be 200mm diameter PE.
2. The trunk main should be extended from Gundagai directly to Dog on the Tuckerbox without the use of a storage reservoir.
3. The water supply at Springflat Drive will require pumping to maintain supply pressure.
4. Water supply to the Dog on the Tuckerbox community will be via a 100mm diameter PE distribution network tapped to the trunk main.
5. The trunk main from Dog on the Tuckerbox to Coolac will require pumping at Annie Pyers Drive to maintain supply pressure to Coolac.
6. Water supply for Coolac will require a Service Reservoir.
7. The water storage reservoir at Coolac will require either elevation or pumping to the distribution network.

APPENDIX A – CGRC POPULATION AND WATER DEMAND ESTIMATION



DOG ON THE TUCKER BOX & COOLAC WATER SUPPLY

Population and Water Demand Estimation

Water Supply Extension from Gundagai to Dog on Tucker the Box and Coolac

Document Control

Version	Author	Reviewer	Comments	Date
Draft				18/03/2020
Revision 1			Revised using Planning Proposal No.4	15/04/2020

Acronyms

AC	Asbestos Cement
DICL	Ductile Iron
DPIE	Department of Planning, Infrastructure and Environment
EP	Equivalent Population
ET	Equivalent Tenement
GL	Giga litre
GWCC	Golden Water County Council
LWU	Local Water Utility
ML	Million Litres
MPVC	Modified Poly vinyl Chloride
OPVC	Oriented Poly vinyl Chloride

Contents

1 Introduction

1.1 Background

Cootamundra Gundagai Regional Council provides water supply to the townships of Cootamundra and Gundagai and part of the Dog on the Tucker Box (DOTB). At present, part of the DOTB area is supplied with partially treated water, pumped from Murrumbidgee River and stored in a concrete reservoir and distributed. The Coles Express, Shell Service station and the restaurants nearby are supplied with potable water from Gundagai town supply system by pumping water from Gundagai water system by accessing the exiting DN100 watermain located along Springflat Drive, Gundagai. This pump station and pipe work is privately owned and operated by the owners of premises.

Figure 1 - Dead End Water Main Springflat Drive

This document deals with the potential population projection which will be served by the proposed scheme and the water demand.

1.2 Project objectives

The objectives of this projects includes;

- Estimate the population and water demands for the proposed water supply extension to Dog on Tucker Box area and extension to Coolac Village.
- Concept design and detailed design of transmission pipe lines, storage reservoirs and reticulation system with the all associated hydraulic calculations to DOTB
- Concept design and asset sizing including pipe lines and storage reservoirs including hydraulic calculations for the future extension of the water supply system to Coolac village
- Develop technical specification and tender documents to invite tenders for water supply to DOTB.

2 Existing Water Supply Scheme

2.1 Gundagai Town Water Supply Scheme

Gundagai Town has a water supply system serving approximately 2500 EP both domestic, commercial and institutions. The raw water source for the Gundagai Water Supply System is the Murrumbidgee River and the extraction point is downstream of Burrinjuck Dam and the junction with Tumut River. The Gundagai Local Water Utility (GLWU) has a high security town water supply licence for 1,250 ML/yr.

The existing water treatment plant is a conventional plant consisting of with chemical dosing (alum) / flash missing, sedimentation, sand filtration, disinfection fluoridation and pH correction unit processes. The Water Treatment Plant has a rated output of 0.25 ML per hour and capable of producing 5 MLD.

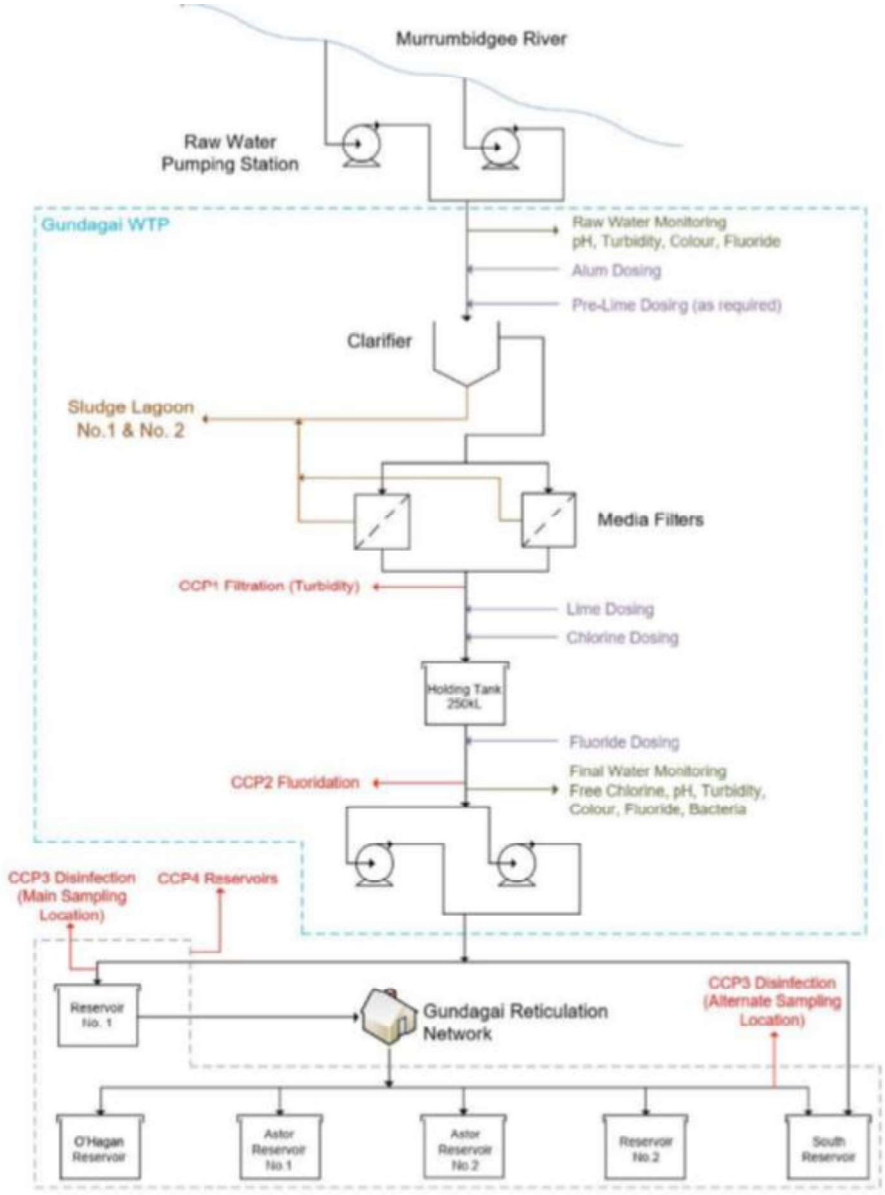
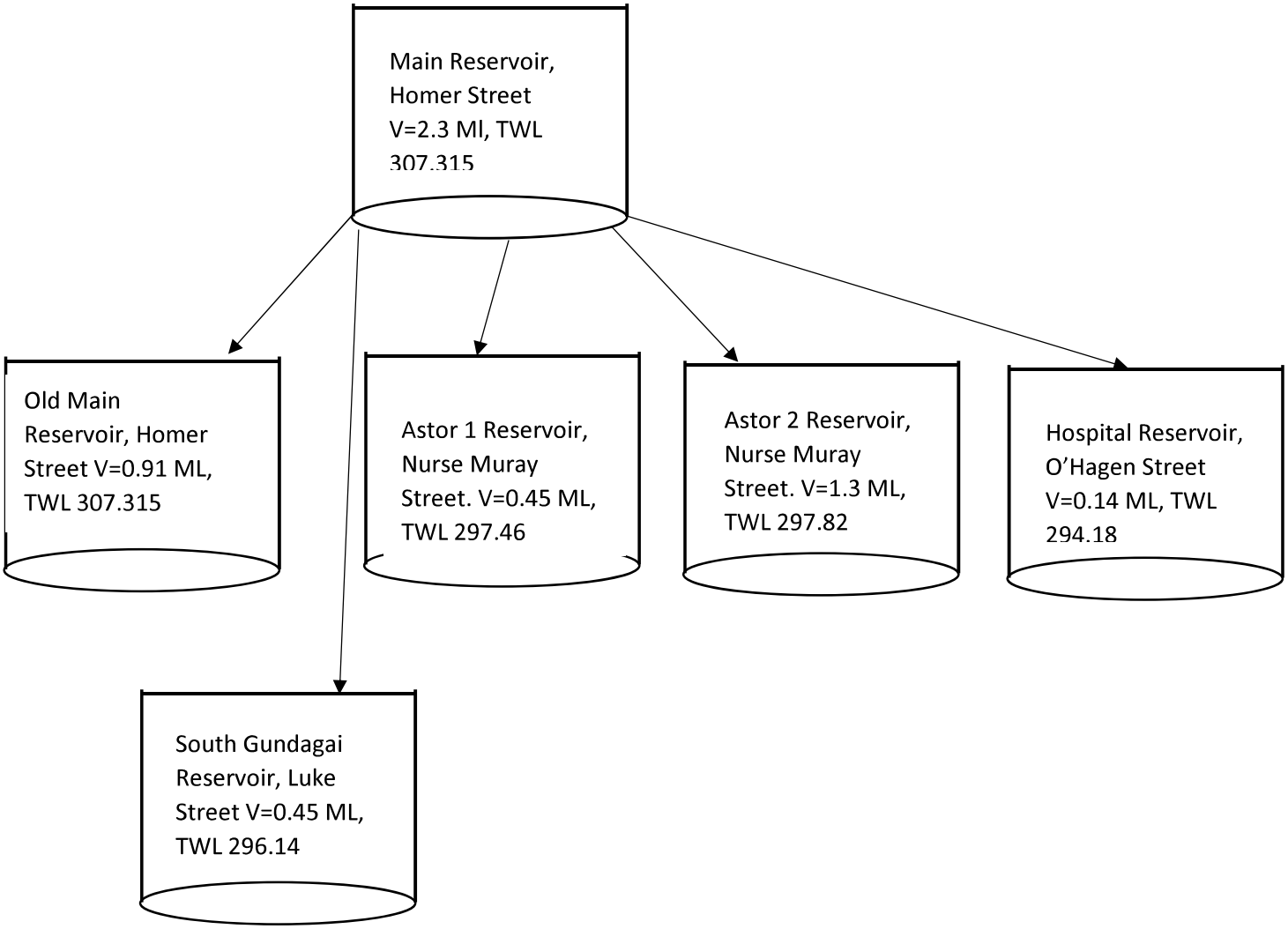


Figure 2 - Gundagai Water Supply system

2.1 Gundagai Town Water Supply Reservoir Capacities

Gundagai water supply system reticulation reservoirs has a combined capacity of 5.5 ML and the details are given below;



2.2 DOTB Water Supply Scheme

There are two separate water supply system at the Dog on Tucker Box and surrounding businesses.

A private water supply scheme which supplies to the Service station, cafes and restaurants by pumping water from the Gundagai Town Water Supply system. This water supply systems taps the dead end DN100 pipe along Springflat Drive, Gundagai and pumps it through a rising main to supply the service station, restaurants and cafes.

A water supply systems exists for the Dog on Tucker Box tourist premises and souvenir shop. Raw water is pumped from the Murrumbidgee River and stored in concrete reservoir and delivers through a DN90 pipe laid across Hume Highway to the premises with some partial treatment and the details of the treatment is not fully known.

3 Planning and Land Zoning

3.1 Current Planning and Land Zoning

3.1.1 DOTB and surrounds

Gundagai Planning identifies the area where the Dog on Tucker Box and other services Shell Service Station and restaurants a as SP3 Tourist with minimum lot size of 1500 Sq.m and area perimeter of the Dog on the Tucker Box as RU1 Primary Production with minimum Lot size AB2 40 Ha.

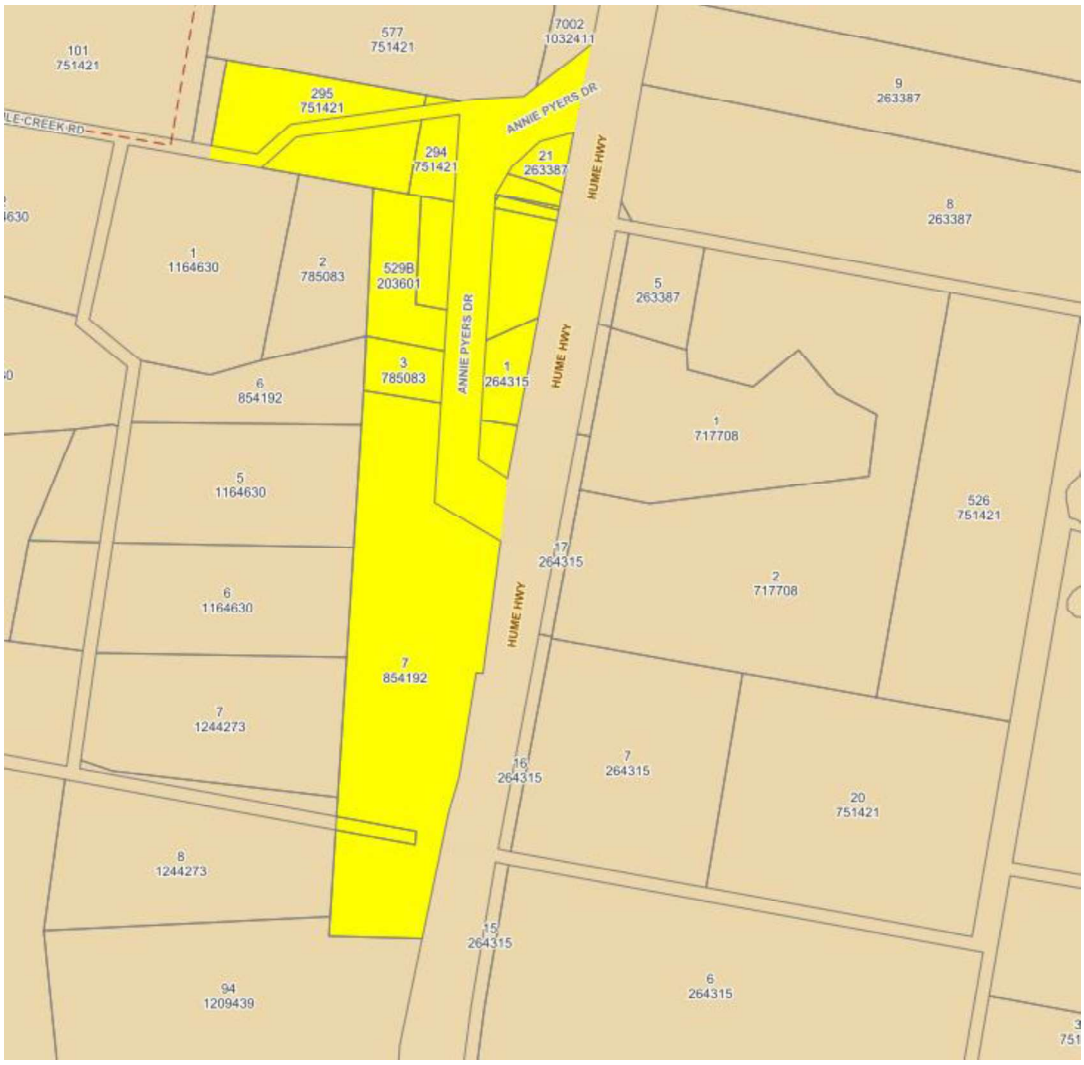


Figure 3- Land Zoning at Dog on the Tucker Box

	RU1 Primary Production
	SP3 - Tourist

3.1.2 Coolac

Coolac is zoned mostly SP3 and RU1

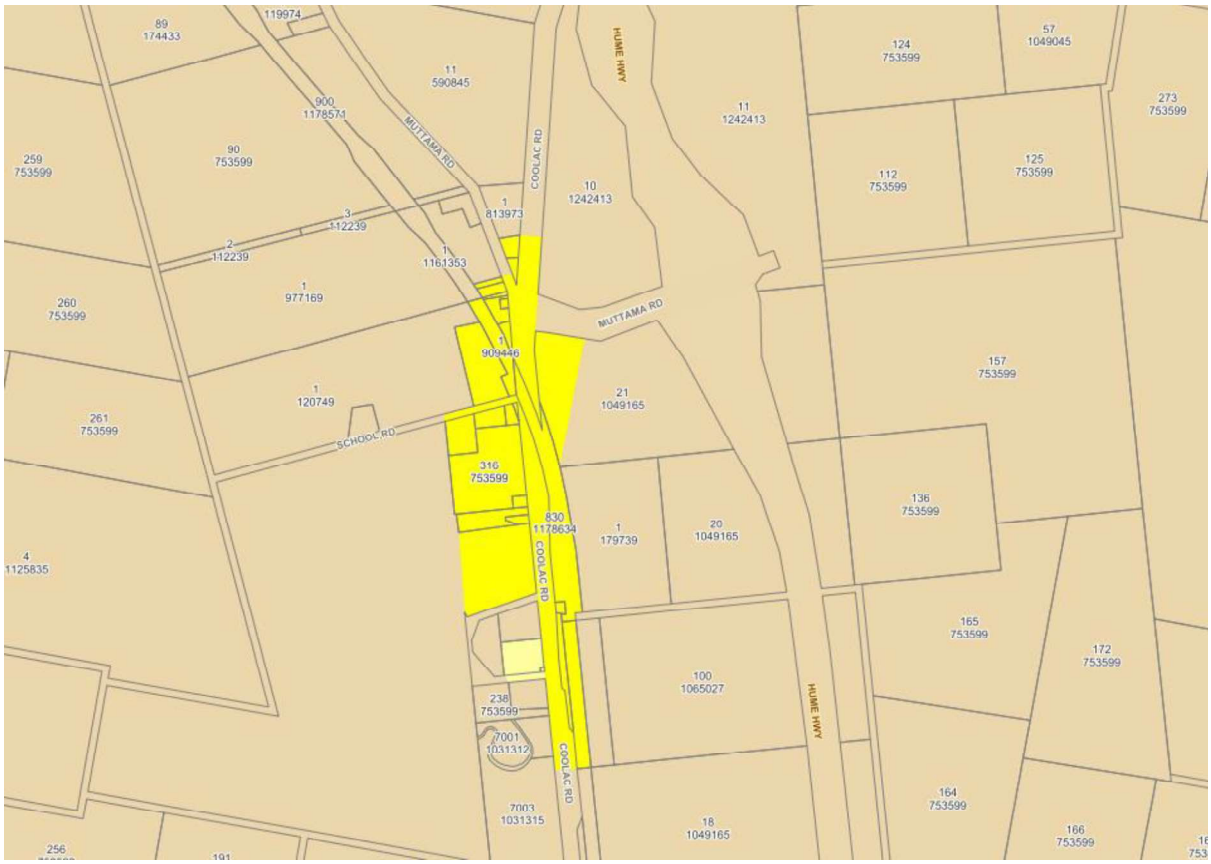


Figure 4- Zoning Coolac Village

RU1 Primary Production

SP3 Tourist

3.1 Proposed Planning and Land Zoning

Cootamundra Gundagai Regional Council's Planning Policy No. 4, proposes to change the zoning around Coolac village. Details of this proposal and the potential impact on future Lot numbers (ET) are given in Appendix B.

3 Population and Water Demands

3.1 Cootamundra Gundagai LGA

The population projections details are provided in Appendix A of this documents.

Department of Planning NSW figures shows the following population for Cootamundra Gundagai Regional Council

Table 1 - Population Forecast Cootamundra Gundagai Regional Council

Year	CGRC Population
21 (2036)2011	11,300
2016	11,250
2021	11,100
2026	10,800
2031	10500,
2036	10,100

During this period the average household size reduces from 2.33 (2011) to 2.21 (2031). The above data represents the entire Council and the town centres tend to have denser population. Therefore for Water supply demand estimation a house hold size of 2.5 is used.

3.2 Dog on the Tucker Box and Coolac

The proposed area comes under zoning SP3 – Tourist and RU1 Primary Production. On the basis of proposed lot sizes the following potential ET is estimated. The details are given in Appendix A.;

Table 2 - Equivalent Tenement Estimation

Area	ET
Dog on the Tucker Box	96
Outer area at the DOTB	20
En- route Coolac	15
Coolac Village	250
Total	**381 (say 400)**

Assumed population of 2.5 EP per ET

Table 3- Equivalent Population Estimate

Area	ET
Dog on the Tucker Box Tourist Zone	96
Outer area at the DOTB	20
En- route Coolac	15
Coolac Village	250
Total	**381 (say 400)**

Future rezoning could impact on the ET and water demand which need to be funded by the developer charges. The above ET calculation takes into account of Council's Planning Proposal No. 4 which identified the following (refer Appendix B for detail)

- Rezone the SP3 – Tourism to RU5 Village 19ha in area with a Minimum Lot Size (MLS) of 2,000m^2 to the proposed RU5 area, Potential lot yield of 95 lots of 2,000m^2

- Rezone some RU1 – Primary Production close to the village to RU4 Primary Production Small Lots as shown below in green approximately 190ha in area with a Minimum Lot Size (MLS) of 2ha to the proposed RU4 area, Potential lot yield of 95 lots of 2ha

- Rezone some RU1 – Primary Production close to the village to IN1 – General Industrial as shown below in purple approximately 16.5ha in area; no minimum lot size for IN1 area. 60 lots allowed for ET and water demand calculation.

Total ET for Coolac Village used in this report is e water demand estimate is 250.

3.3 Water Demand

Based on the above population predication the proposed water supply scheme will serve for 1000 EP with 400 ET in the future. This could allow for potential growth in the foreseeable future.

3.3.1 Demand Estimation using Golden field County Council criteria

The design average daily demand (ADD) and Maximum Daily Demand (MDD) for the proposed water supply extension is given in the Table below. The design criteria are taken from the GWCC Drinking Water Management System. ADD is given as 294 kL/y/ET which is equal to 0.81 kL/d/ET in the Table.

It is possible there will be rural property connections in the future and it is assumed that 10 rural property connections will be made along the route of the pipe line.

Table 4 - Water Demand Peak Flow Estimation

Parameter	Design Criteria(kL/d/ET)	Total Demand (kL/d)	Potential Rural Demand along the Route of the proposed pipe line		
			Design Criteria for Rural Connection(kL/d)	Rural Demand (kL/d)	Total Demand (KL/d)
Average Day Demand	0.81	324	5	50	374
Maximum Daily Demand	4	1,600	25	250	1,850
Maximum Hour Demand	7	2,800 (32.4 L/s)	45	450	3,250 (37.6 L/s)

A typical residential diurnal patter is applied to determine the maximum hour requirements. The diurnal patter has a peaking factor of 1.8 which occurs around 6 pm.

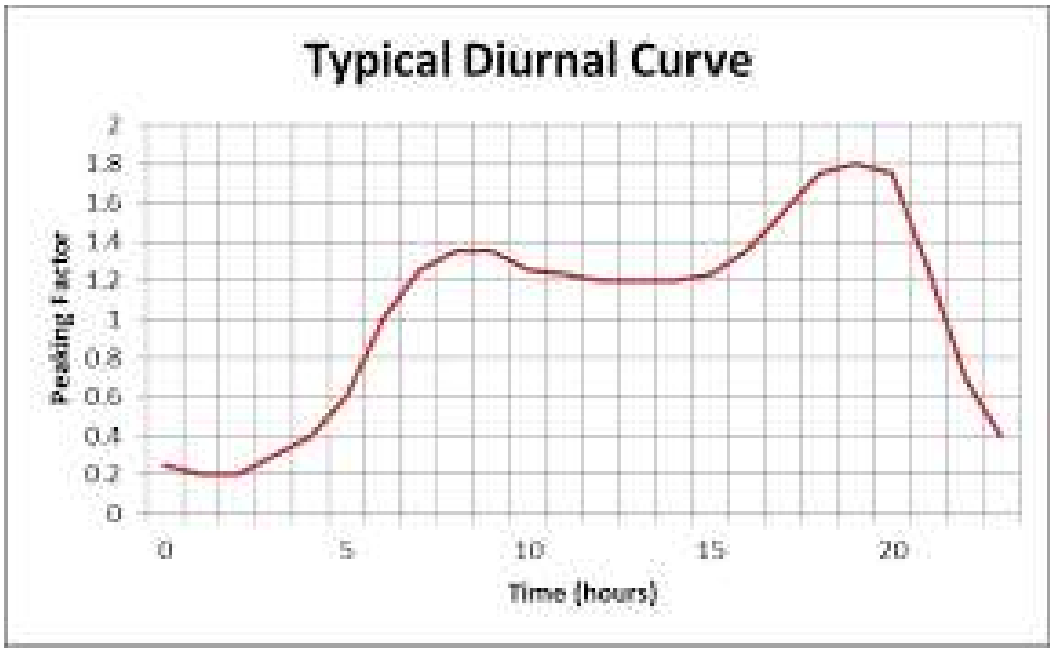


Figure 5 - Diurnal Water Us Pattern

3.3.1 Demand Estimation using Gundagai Town Centre Consumption

Gundagai Consumption

Gundagai town water consumption patter indicate daily consumption of 400 L/ET with a peak daily consumption of 2,960 L. A figure of 3,000 L is used.

Table 5 - Water Demand Estimation Gundagai

Parameter	**Design Criteria(kL/d/ET)**	**Total Demand (kL/d)**	**Potential Rural Demand along the Route of the proposed pipe line**		
			Design Criteria for Rural Connection(kL/d)	**Rural Demand (kL/d)**	**Total Demand (KL/d)**
Average Day Demand	0.40	160	5	50	210
Maximum Daily Demand	3	1,200	25	250	1450
Maximum Hour Demand	6	2,400 (27.8 L/s)	45	450	2,850 (33.L/s)

3.4 Preliminary Hydraulic Calculation

The following table provides velocities in various sizes of pipes at 33 L/s flow rate which would be peak hourly demand. Transmission pipe line can be designed for a lower flow rate of peak daily demand provided the supply zone storage reservoirs have adequate capacity which will enable to meet peak hourly demand. The following table provides velocities in various types of pipe line at 30 L/s and 35 L/s.

Table 6- Velocities and Pipe sizes

Pipe Type	size	Grade	Internal Dia.(mm)	Velocity (m/s)	
				At 30 L/s	At 35 L/s
OPVC	DN150	PN18	166.9	1.37	1.6
	DN200		218.8	0.80	0.93
mPVC	DN150		158.2	1.53	1.8
	DN200		207.3	0.9	1.05
DICL	DN150	PN35	167	1.37	16
	DN200		222	0.77	0.9

Based on the initial assessment it appears that DN150 pipe would be adequate to meet peak flows. However, detailed calculations must be done to limit the head loss and velocities within the acceptable range. DN200 would allow for future high growth.

3.5 Treatment Plant Capacity Constraints

The capacity of the Gundagai Water Treatment Plant of 5 MLD comes into consideration. Based on the available records 1.3 ML/ day has been the average production. However a peak demand occurred in January 2014 with a record daily production of 4.1 ML/day which is just 14% below the capacity of Gundagai Water Treatment Plant.

Additionally, the plant has limited redundancy with only one clarifier and limited land availability for expansion.

Appendix A – Population Data

Table 7 - Department of Planning Information

COOTAMUNDRA GUNDAGA REGIONAL COUNCILI

TOTALS:	**2011**	**2016**	**2021**	**2026**	**2031**	**2036**
Total Population	11,300	11,250	11,100	10,800	10,500	10,100
Total Households	4,800	4,800	4,800	4,700	4,600	4,450
Average Household Size	2.33	2.30	2.27	2.24	2.23	2.21
Implied Dwellings	5,600	5,650	5,600	5,500	5,350	5,200
CHANGE:		**2011-16**	**2016-21**	**2021-26**	**2026-31**	**2031-36**
Total Population Change		-50	-200	-250	-350	-400
Average Annual Population Growth		-0.1%	-0.3%	-0.5%	-0.6%	-0.7%
Total Household Change		50	-50	-100	-100	-150
Average Annual Household Growth		0.2%	-0.1%	-0.4%	-0.5%	-0.6%
AGE GROUPS:	**2011**	**2016**	**2021**	**2026**	**2031**	**2036**
0-4	650	650	650	650	600	550
5-9	800	650	700	650	650	600
10-14	750	750	650	650	650	650
15-19	700	650	650	550	550	550
20-24	500	550	500	450	400	350
25-29	500	550	550	500	450	400
30-34	500	550	550	550	500	450
35-39	600	500	550	550	550	500
40-44	650	600	550	600	600	550
45-49	800	650	600	550	600	600
50-54	800	800	650	600	550	600
55-59	800	800	750	650	600	550
60-64	850	750	800	750	650	600
65-69	700	800	750	750	750	650
70-74	650	650	750	700	700	700
75-79	400	550	550	650	600	650
80-84	350	350	450	450	550	500
85+	300	350	400	500	550	650
HOUSEHOLD TYPES:	**2011**	**2016**	**2021**	**2026**	**2031**	**2036**
Couple only	1,550	1,600	1,600	1,600	1,500	1,450
Couple with children	1,250	1,200	1,150	1,100	1,100	1,050
Single parent	450	450	400	400	400	400
Other family households	50	50	50	50	50	50

Multiple-family households	50	50	50	50	50	50
Total family households	*3,300*	*3,300*	*3,250*	*3,150*	*3,050*	*2,950*
Lone person	1,400	1,450	1,450	1,450	1,450	1,450
Group	100	100	100	50	50	50
Total non-family households	*1,500*	*1,500*	*1,550*	*1,550*	*1,500*	*1,500*
Total	4,800	4,800	4,800	4,700	4,600	4,450

Disclaimer

While every reasonable effort has been made to ensure that these projections are correct at the time of release, the State of New South Wales, its agents and employees, disclaim any and all liability to any person in respect of anything or the consequences of anything done or omitted to be done in reliance upon the whole or any part of these projections.

Table 8 - Land Details near DOTB zoning SP3

Land Parcel Title	Address	Lot Size(Sq.m)	Potential ET	Comments
Lot: 7 DP: 854192	11 Annie Pyers Drive. Gundagai	133,994	40	Commercial Coles express
Lot: 3 DP: 785083	31 Annie Pyers Drive, Gundagai	9,352	6	
Lot: 529B DP: 203601	37 Annie Pyers Drive	18,792	12	
Lot: 2 DP: 160191	37 Annie Pyers Drive	7,798	5	
Lot: 294 DP: 751421	12 Five Mile Creek Road	7.993	5	
Lot: 295 DP: 751421	0 Five Mile Creek Road	38.648	14	
Lot: 2 DP: 264315	0 Annie Pyers Drive	3,523	2	
Lot: 1 DP: 264315	34 Annie Pyers Drive	9,039	6	Caltex
Lot: 5 DP: 263387	0 Annie Pyers Drive	31,699		Caltex Oil
Lot: 1 DP: 1191344	50 Annie Pyers Driv	1,655	1	
Lot: 7 DP: 263387	0 Annie Pyers Drive	2.665	2	
Lot: 21 DP: 263387	0 Hume Highway	4.765	3	
	Total		**96**	

Table9 - Land Details near DOTB zoning RU1 – Primary Production

These lots are not the minimum size 40Ha as specified and subdivided into smaller lots. It is assumed that these lot will not be subjected to further subdivision and 1 ET per lot is assumed.

Land Parcel Title	Address	Lot Size(Sq.m)	Potential ET	Comments
Lot: 8 DP: 1244273	0 Five Mile Creek Road. Gundagai	80,556	1	
Lot: 94 DP: 1209439	9546 Hume Highway, Gundagai	331,110	1	
Lot: 7 DP: 1244273	0 Five Mile Creek Road	72,230	1	
Lot: 6 DP: 1164630	108 Five Mile Creek Road	77,183	1	
Lot: 4 DP: 1164630	0 Five Mile Creek Road	77,936	1	
Lot: 6 DP: 854192	0 Five Mile Creek Road	32,995	1	
Lot: 2 DP: 785083	0 Gundagai Shire Parish	33,107	1	
Lot: 1 DP: 1164630	0 Hume Highway	79,226	1	
Lot: 2 DP: 1164630	79 Five Mile Creek Road	72,614	1	
Lot: 3 DP: 1164630	0 Hume Highway	71.380	1	
Lot: 101 DP: 751421	95 Five Mile Creek Road	164,593	1	
Lot: 183 DP: 751421	118 Five Mile Creek Road	170,822	1	
Lot: 577 DP: 751421	2 Five Mile Creek Road	246,709	1	
Lot: 11 DP: 263387	0 Hume Highway	155,717	1	
Lot: 10 DP: 263387	0 Hume Highway	196,736	1	
Lot: 9 DP: 263387	0 Hume Highway	157,459	1	
Lot: 8 DP: 263387		208,587	1	
Lot: 1 DP: 717708	9321 Hume Highway	77,991	**1**	
Lot: 2 DP: 717708	0 Hume Highway	205,714	**1**	
Lot: 7 DP: 264315	0 Hume Highway	95,121	1	
	Total		**20**	

Table 10 - Land Details near Colac zoning SP3

Land Parcel Title	Address	Zoning	Lot Size(Sq.m)	Potential ET	Comments
Lot 1DP119876	Coolac Road	SP3	15394	10	
Lot 7304	Hume Highway, Coolac	SP1	32,814	21	Special activity

PLT: 830 DP: 1178634			36,069	25	
Lot: 1 DP: 1124311	Coolac Road, Coolac	RU1	10,126	2	AB2 40 Ha
Lot: 4 DP: 1125835		RU1 and SP3	1.843,536	5	Large lot section facing Coolac Rd. is zoned SP3
PLT: 830 DP: 1178634	Coolac Road, Coolac	SP3	36.069	24	
Lot: 21 DP: 1049165	Coolac Road	RU1 and SP3	225,834	27	Large lot section facing Coolac Rd. is zoned SP3
Lot: 3 DP: 1125835	427 Coolac Road, Coolac	SP3	8.073	5	
Lot: 2 DP: 591526	427 Coolac Road	SP3	1312	1	
Lot: 237 DP: 753599	431 Coolac Road, Coolac	SP3	1257	2	Coolac Hall
PLT: 316 DP: 753599	437 Coolac Road	SP3	39,160	26	
Lot: 127 DP: 753599	17 School Road. Coolac	SP3	8086	7	
Lot: 263 DP: 753599	School Road, Coolac	SP3	4060	2	Church Coolac
Lot: 262 DP: 665914	453 Coolac Road, Coolac	SP3	1701	2	
Lot: 1 DP: 409642	6 School Road. Coolac	SP3	20214	14	
Lot: 22 DP: 1187297	477 Coolac Road, Coolac	SP3	1573	2	Coolac Motel
Lot: 21 DP: 1187297	479 Coolac Road, Coolac	SP3	3047	2	Coolac Hotel
Lot: B DP: 394628	Muttama Road	SP3	562	1	
Lot: A DP: 394628	Muttama Road	SP3	593	1	
Lot: E DP: 411988	Muttama Road	SP3	2097	1	
Lot: D DP: 411988	Muttama Road	SP3	1178	1	
Lot: 1 DP: 384612	495 Coolac Road, Coolac	SP3	1242	1	
Lot: 2 DP: 813973	503 Coolac Road, Coolac	SP3	2648	1	
Lot: 10 DP: 1242413	Coolac Road, Coolac	RU1	166,350	5	New Service statin
	Total			187	

Refer Appendix B for revised Lot numbers for Coolac village.

Table 12 - Along the route of the Proposed Pipeline

Land Parcel Title	Address	Lot Size(Sq.m)	Zoning	Potential ET	Comments
Lot10 DP748275	9086 Hume Highway	50,827	RU1	3	AB2 40 Ha
Mingay Rest Area				5	RMS Truck stopping station
Vehicle Inspection Station				2	
Residences			RU1	5	
	Total			15	

Appendix B – Impact of Council's Planning Policy Proposal No.4

Council's Planning Proposal No. 4 will increase the potential lot numbers and water demand. The following is the extract from the Planning Proposal No. 4 (PP 4). It must be noted that, at this stage this is being a proposal and not yet approved.

However, if approval is granted this would be the ultimate ET numbers which will

Part 2 – Explanations of Provisions

The proposed outcomes are to be achieved via the following methods:

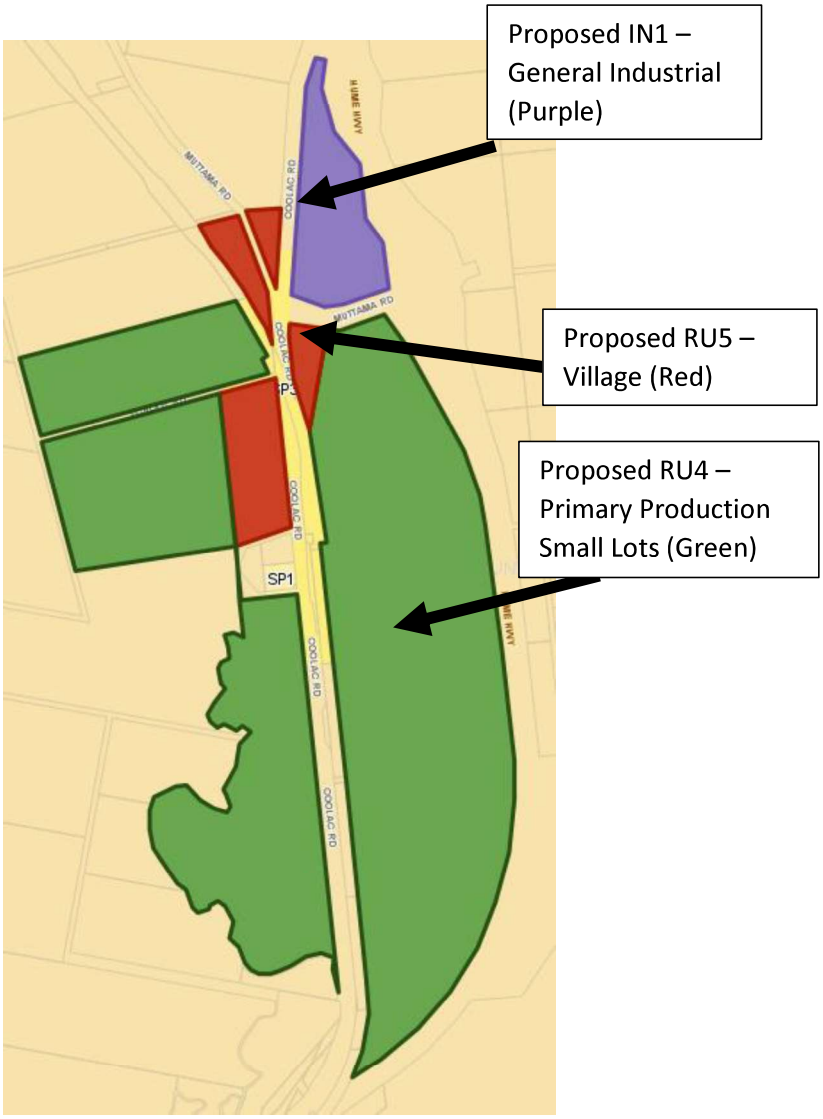
1A. COOLAC

- Rezone the SP3 – Tourism to RU5 Village as shown below in red approximately 19ha in area;
  - Provide a Minimum Lot Size (MLS) of 2,000m^2 to the proposed RU5 area
  - Potential lot yield of 95 lots of 2,000m^2
- Rezone some RU1 – Primary Production close to the village to RU4 Primary Production Small Lots as shown below in green approximately 190ha in area;
  - Provide a Minimum Lot Size (MLS) of 2ha to the proposed RU4 area
  - Potential lot yield of 95 lots of 2ha
- Rezone some RU1 – Primary Production close to the village to IN1 – General Industrial as shown below in purple approximately 16.5ha in area;
  - no minimum lot size for IN1 area

Existing Zones (SP3 Tourist & RU1 Primary Production)

Map 1A

Proposed Zoning



Map 1B

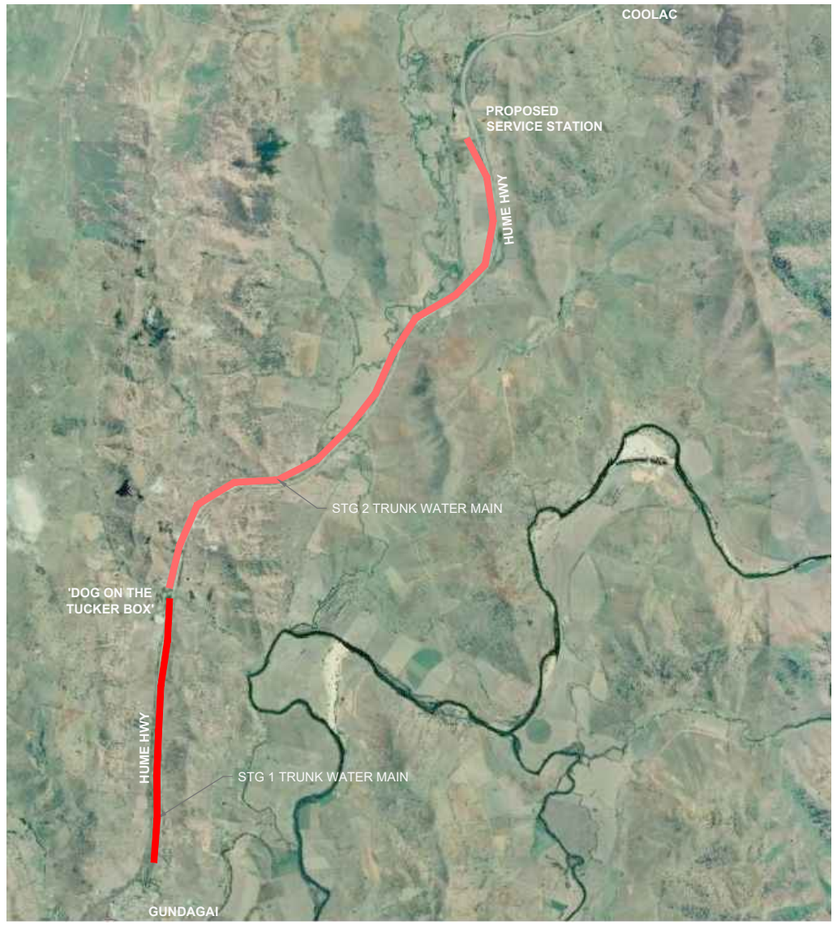
Approximate location of proposed change

Proposed LEP

APPENDIX B – CONCEPT DRAWINGS

COOTAMUNDRA-GUNDAGAI REGIONAL COUNCIL

GUNDAGAI TO FIVE MILE TRUNK WATER MAIN
STAGE 1



LOCALITY PLAN
NOT TO SCALE

DETAIL SURVEY BY:
ALLSPEC & PARTNERS - DATE SURVEYED 11/07/18
SURVEY: MGA94 ZONE 55
STANDARD DRAWINGS:
CGRC STANDARD DESIGN DRAWINGS, SYDNEY WATER STD DRAWINGS & SPECIFICATIONS, RMS GUIDELINES & INSTITUTE OF PUBLIC WORKS ENGINEERING AUSTRALIA (IPWEA)

PROPOSED TRUNK WATER MAIN - 2019

DESIGN FILE No: CE18119
DESIGN STANDARD: CGRC STD DRGS, AUSTROADS & RMS DESIGN GUIDELINES

GENERAL

1. THESE DRAWINGS SHALL BE READ IN CONJUNCTION WITH ALL OTHER CONSULTANTS DRAWINGS AND SPECIFICATIONS.
2. BEFORE PROCEEDING WITH THE WORK ANY DISCREPANCIES IN THE CONTRACT DOCUMENTS SHALL BE REFERRED FOR DECISION TO THE SUPERINTENDENT.
3. DO NOT SCALE FROM DRAWINGS.
4. CONTRACTOR SHALL VERIFY ALL LOCATIONS OF SERVICES, ALL DIMENSIONS AND LEVELS PRIOR TO CONSTRUCTION.
5. ALL MATERIALS/CONSTRUCTION & WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE CONTRACT SPECIFICATIONS AND THE LOCAL AUTHORITY'S STANDARD DRAWINGS AND BY-LAWS.
6. THE CONTRACTOR IS RESPONSIBLE TO OBTAIN ALL RELEVANT APPROVALS PRIOR TO COMMENCEMENT OF WORKS.
7. UNDERGROUND SERVICE LOCATIONS SHOWN ON THIS PLAN HAVE BEEN DETERMINED BY FIELD SURVEY AND/OR OFFICE RECORDS, AND MAY NOT REPRESENT ALL SERVICES OR EXACT LOCATIONS. THE CONTRACTOR MUST ACCURATELY LOCATE AND DEPTH ALL SERVICES LIKELY TO BE ENCOUNTERED DURING CONSTRUCTION, PRIOR TO COMMENCING ANY EXCAVATION WORKS.
8. DISPERSIVE SOILS ARE NOT TO BE USED AS FILL/EMBANKMENT MATERIAL. ALL CONSTRUCTION TO BE DONE IN ACCORDANCE WITH CURRENT RMS SPECIFICATIONS AND TECHNICAL STANDARDS.

WATER & WASTE WATER

GENERAL:
1. CONSTRUCTION AND MATERIALS SHALL BE UNDERTAKEN AND PROVIDED IN ACCORDANCE WITH THE WSAA SUPPLY CODE.
2. THESE DRAWINGS SHALL BE READ IN CONJUNCTION WITH THE WSAA SUPPLY CODE & DRAWINGS AND WITH SUCH OTHER WRITTEN INSTRUCTIONS AS MAY BE ISSUED DURING THE COURSE OF THE CONTRACT. ALL DISCREPANCIES SHALL BE REFERRED TO THE SUPERINTENDENT FOR DIRECTION BEFORE PROCEEDING WITH WORK.
3. DIMENSIONS SHALL NOT BE SCALED FROM DRAWINGS.
4. SET-OUT DIMENSIONS AND LEVELS, INCLUDING ANY SHOWN ON THE DRAWING ARE TO BE VERIFIED ON SITE BY THE CONTRACTOR BEFORE FABRICATION AND CONSTRUCTION.
5. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF PIPES AND PITS AGAINST FLOATATION DURING CONSTRUCTION.
6. NO SUBSTITUTE MATERIAL SHALL BE USED WITHOUT APPROVAL OF THE SUPERINTENDENT.
7. HEIGHT DATUM IS TO AHD AND COORDINATES ARE RELATIVE TO MGA94 (ZONE56).
8. SURVEY EXTENTS ARE GENERALLY LIMITED TO THE PROPOSED WATER MAIN ALIGNMENT AND DO NOT NECESSARILY INCLUDE ALL EXISTING FEATURES WITHIN THE PROJECT AREA.
9. UNDERGROUND SERVICE UTILITIES HAVE BEEN PLOTTED USING SERVICE AUTHORITY RECORDS AND MAY NOT REPRESENT THE ACTUAL SERVICE LOCATION. WHERE REQUIRED, THE PLOTTED LOCATION OF THESE SERVICES MAY HAVE BEEN ALTERED TO FIT ACTUAL SURVEYED SERVICES.

PIPE WORKS:
1. WHERE CONNECTING TO EXISTING PIPEWORK, THE LEVEL AND DIAMETER OF THE EXISTING PIPEWORK SHALL BE CONFIRMED BY THE CONTRACTOR PRIOR TO CONNECTION.
2. CHANGES IN HORIZONTAL AND VERTICAL ALIGNMENT, OTHER THAN THROUGH FABRICATED BENDS, SHALL BE ACHIEVED BY DEFLECTION AT PIPE JOINTS WHERE SHOWN. MAXIMUM DEFLECTION SHALL BE AS PER MANUFACTURER'S SPECIFICATIONS.
3. PROVIDE SUFFICIENT TRENCH DEPTH AND WIDTH TO ALLOW FOR DEFLECTION OF PIPES AT JOINTS.
4. PRESSURE MAIN CLEARANCE FROM ALL EXISTING SERVICES SHALL BE IN ACCORDANCE WITH THE WSAA SUPPLY CODE. IF CLEARANCE BETWEEN SERVICES IS LESS THAN THAT SPECIFIED, REFER TO THE SUPERINTENDENT FOR DIRECTION BEFORE PROCEEDING WITH WORK.
5. MINIMUM PRESSURE MAIN COVER FROM FINISHED GROUND LEVEL TO THE OBVERT OF THE MAIN SHALL BE: NON-TRAFFICABLE AREAS: GENERAL - 600mm COVER TRAFFICABLE AREAS: SEALED - 1500mm COVER
6. UNLESS STATED OTHERWISE, DECOMMISSIONED PIPES THAT ARE NOT REMOVED AS PART OF THE WORKS SHALL BE CAPPED AND GROUTED IN ACCORDANCE WITH THE WSAA SUPPLY CODE. WHERE THE DISTURBANCE, REMOVAL AND/OR CUTTING OF AC PIPE IS REQUIRED, THE CONTRACTOR SHALL REFER TO SWMS FOR THE SAFE MANAGEMENT AND DISPOSAL OF AC PIPE.
7. DECOMMISSIONING OF ALL SURFACE FITTINGS/ FIXTURES SHALL INCLUDE THE REMOVAL AND DISPOSAL OF HYDRANTS, VALVE STEMS, BOXES AND MARKERS, AND REINSTATEMENT TO MATCH SURROUNDING AREA.
8. ALL EXISTING WATER SERVICES SHALL BE REPLACED UNLESS SHOWN OTHERWISE. SHORT WATER SERVICE CONNECTIONS OMITTED FOR CLARITY.

SOIL:
1. TOPSOIL AND SUBSOIL SHALL BE STOCKPILED SEPARATELY.
2. CARE SHALL BE TAKEN TO PREVENT SEDIMENT FROM ENTERING THE STORMWATER SYSTEM. THIS MAY INVOLVE PLACING APPROPRIATE SEDIMENT CONTROLS AROUND STOCKPILES.
3. WHERE ACID SULFATE SOILS HAVE BEEN IDENTIFIED WITHIN THE PROJECTED AREA THE CONTRACTOR SHALL BE RESPONSIBLE FOR COMPLIANCE WITH ALL RELATED STATUTORY REQUIREMENTS AND SHALL REFER TO SWMS FOR MANAGEMENT AND TREATMENT OF ACID SULFATE SOILS.

ENVIRONMENT:
1. THE CONTRACTOR IS RESPONSIBLE FOR ENSURING THAT CONSTRUCTION WORKS DO NOT RESULT IN THE CONTAMINATION OF ADJACENT WATERWAYS, WETLANDS AND/OR ECOSYSTEMS.
2. THE CONSTRUCTION WORKS WILL BE IMPLEMENTED IN ACCORDANCE WITH EMP AND CONSTRUCTION EMP (C). THIS EMP(C) SHOULD ADDRESS ISSUES AS, BUT NOT LIMITED TO; WATER QUALITY, EROSION AND SEDIMENTATION, CULTURAL HERITAGE, NOISE, VIBRATION AIR QUALITY, ACID SULFATE SOILS. CONTAMINATED SITES, FLORA AND FAUNA, VEGETATION, PEST MANAGEMENT, WASTE, AND CHEMICALS AND FUELS.

CONSTRUCTION SPECIFICATIONS

RMS CONSTRUCTION SPECIFICATIONS:
G001 JOB SPECIFIC REQUIREMENTS
G002 GENERAL REQUIREMENTS
G010 TRAFFIC MANAGEMENT
G022 WORK HEALTH AND SAFETY
G036 ENVIRONMENTAL PROTECTION
G038 SOIL AND WATER MANAGEMENT
G040 CLEARING AND GRUBBING
G071 CONSTRUCTION SURVEY
Q03 QUALITY MANAGEMENT SYSTEM
R053 CONCRETE (FOR GENERAL USE)
R044 EARTHWORKS
R11 STORMWATER DRAINAGE
R15 KERB AND GUTTERS
R71 UNBOUND & MODIFIED PAVEMENT COURSE
R75 INSITU PAVEMENT SATABILISATION
R106 SPRAYED BITUMINOUS SURFACING (CUTBACK)
R107 SPRAYED BITUMINOUS SURFACING (PMB)
R143 SIGNPOSTING
R151 STREET LIGHTNING
R173 GENERAL CONCRETE PAVING
R201 FENCING
3051 GRANULAR BASE & SUB-BASE MATERIALS FOR SURFACED ROAD PAVEMENT
3071 SELECTED MATERIAL FOR FORMATION LAYERS
3151 COVER AGGREGATE FOR SPRAYED BITUMINOUS SURFACING
3252 POLYMER MODIFIED BINDER FOR PAVEMENTS
3268 AGGREGATE PRE-COATING AGENT
3269 BITUMEN ADHESION AGENT
TS106 ITS VIDEO SURVEILLANCE CAMERA SITE

WATER SERVICES ASSOCIATION OF AUSTRALIA:
WSA 02 SEWERAGE CODE OF AUSTRALIA
WSA 03 WATER SUPPLY CODE OF AUSTRALIA
WSA 04 SEWERAGE PUMPING STATION CODE OF AUSTRALIA

NAT-SPEC CONSTRUCTION SPECIFICATIONS:
0292 MASONRY WALLS
0344 STEEL - HDG
0702 MECHANICAL - DESIGN & INSTALL
0802 HYDRAULIC - DESIGN & INSTALL
0902 ELECTRICAL - DESIGN & INSTALL
1391 SERVICE CONDUITS
1392 TRENCHLESS CONDUIT INSTALLATION

STANDARD DRAWINGS

W-0040 BEDDING AND BACKFILL FOR WATER MAIN CONSTRUCTION.
S-0090 SEWER CONSTRUCTION - PIPELINE CONSTRUCTION TYPES
S-0057 LIFT STATION - SUBMERSIBLE 1800mm DIA.
S-0058 PUMP STATION OVERFLOW
G-0041 FENCING - CHAIN WIRE SECURITY FENCING
DS-050 DRAINAGE PITS FIELD INLET - TYPE 1 & 2
R-0100-07 TEMPORARY EROSION CONTROL SILT FENCE
R-0210-01 CONCRETE HEADWALLS SINGLE CELL 300mm TO 900mm DIA WITH CONCRETE APRON. (2 to 1 BATTER OR STEEPER)
R-0240-01 INSTALLATION OF BURIED CONCRETE PIPES TYPE HS3 SUPPORT
R-0300-01 STANDARD KERB AND CHANNEL SHAPES
R-0800-04 RURAL ROAD BOUNDARY FENCING - GATE PANEL AND GATE FITTING DETAILS
SEQ G-042 FENCING LOG BARRIER AND ALTERNATIVE HARDWOOD TIMBER BOLLARD
SEQ R-051 DRIVEWAYS - HEAVY DUTY VEHICLE CROSSING

www.dialbeforeyoudig.com.au
ALL UNDERGROUND SERVICES SHOULD BE LOCATED ON SITE BEFORE ANY WORK IS COMMENCED
DIAL 1100 BEFORE YOU DIG

AMENDMENTS	FIRST ISSUE	CALCS	DRAWN	DATE	AMENDMENT DETAILS
		LM	DA	11/19	
	A	LM	JO	29/11/19	CONCEPT DESIGN ISSUE
	B	LM	JO	25/05/20	PRELIMINARY DESIGN ISSUE

DESIGN CHECK
DRAWN CHECK

DATUM
PROJECT No.
CE18119.1

ISSUED FOR APPROVAL
APPROVED
FOR & ON BEHALF OF MOLONEY & SONS ENGINEERING

CLIENT
COOTAMUNDRA-GUNDAGAI REGIONAL COUNCIL
PROJECT
GUNDAGAI - FIVE MILE
HUME HIGHWAY NSW
PROP. TRUNK WATER MAIN STG 1

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DRAWING TITLE
COVER SHEET & LOCALITY PLAN
DRAWING NUMBER
CE18119.1-001-CO
ISSUE
B

DRAWING SCHEDULE

Document Title	Document No.
COVER SHEET & LOCALITY PLAN	CE18119.1-001-CO
DRG. SCHEDULE	CE18119.1-002-CO
LEGEND & GENERAL NOTES	CE18119.1-101-GE
GENERAL ARRANGEMENT SHEET 1 OF 9	CE18119.1-201-GA
GENERAL ARRANGEMENT SHEET 2 OF 9	CE18119.1-202-GA
GENERAL ARRANGEMENT SHEET 3 OF 9	CE18119.1-203-GA
GENERAL ARRANGEMENT SHEET 4 OF 9	CE18119.1-204-GA
GENERAL ARRANGEMENT SHEET 6 OF 9	CE18119.1-206-GA
GENERAL ARRANGEMENT SHEET 7 OF 9	CE18119.1-207-GA
GENERAL ARRANGEMENT SHEET 8 OF 9	CE18119.1-208-GA
GENERAL ARRANGEMENT SHEET 9 OF 9	CE18119.1-209-GA

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DRAWING TITLE
DRG. SCHEDULE

DRAWING NUMBER
CE18119.1-002-CO

ISSUE
B

LEGEND

PROPOSED

- Proposed Trunk Water Main (W — W)
- Proposed Water Service Line (WS — WS)
- Proposed Fire Hydrant (FH)
- Proposed Flushing Point (FP)
- Proposed Valve (SV)

EXISTING SURVEY

- Existing Lot Boundary
- Permanent Survey Mark
- Existing Edge of Bitumen
- Existing Fence Line
- Existing Overhead Communications (T — O/H)
- Existing Overhead Electrical (E — O/H)
- Existing Stormwater Line (D)
- Existing Water Main (DBYD Location Only) (W)
- Existing Sewer Main (DBYD Location Only) (S)
- Existing Underground NBN (NBN)
- Existing Telstra Pit
- Existing Power Pole
- Existing Bitumen Surface
- Existing Surface Contours

12.0

GENERAL:

1. CONSTRUCTION AND MATERIAL SHALL BE UNDERTAKEN AND PROVIDED IN ACCORDANCE WITH THE SYDNEY WATER/WSAA & RMS GUIDELINES.
2. THESE DRAWINGS SHALL BE READ IN CONJUNCTION WITH SYDNEY WATER/WSAA DESIGN & CONSTRUCTION GUIDELINES AND WITH SUCH OTHER WRITTEN INSTRUCTIONS AS MAY BE ISSUED DURING THE COURSE OF THE CONTRACT. ALL DISCREPANCIES SHALL BE REFEREED TO THE SUPERINTENDENT FOR DIRECTION BEFORE PROCEEDING WITH WORKS.
3. DIMENSIONS SHALL NOT BE SCALED FROM DRAWINGS.
4. SET-OUT DIMENSIONS & LEVELS, INCLUDING ANY SHOWN ON THE DRAWINGS ARE TO BE VERIFIED ON SITE BY THE CONTRACTOR BEFORE FABRICATION & CONSTRUCTION.
5. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF PIPES AND PITS AGAINST FLOATATION DURING CONSTRUCTION.
6. NO SUBSTITUTE MATERIALS SHALL BE USED WITHOUT THE APPROVAL OF THE SUPERINTENDENT.
7. HEIGHT DATUM IS TO AHD & COORDINATES ARE RELATIVE TO MGA94 (ZONE 55).
8. SURVEY EXTENTS ARE GENERALLY LIMITED TO THE PROPOSED WATER MAIN ALIGNMENT & DO NOT NECESSARILY INCLUDE ALL EXISTING FEATURES WITHIN THE PROJECT AREA.
9. UNDERGROUND SERVICE UTILITIES HAVE BEEN PLOTTED USING SERVICE AUTHORITY RECORDS & MAY NOT REPRESENT THE ACTUAL SERVICE LOCATION. WHERE REQUIRED, THE PLOTTED LOCATION OF THESE SERVICES MAY HAVE BEEN ALTERED TO FIT ACTUAL SURVEYED SERVICES.
10. BEDDING TO CONFORM TO AUS-SPEC, 1341 WATER SUPPLY & 1361 SEWER SYSTEM SPECIFICATIONS;
11. SPECIAL BEDDING CONDITIONS TO BE SPECIFIED BY THE PRINCIPALS AUTHORIZED PERSON TO SUIT THE CONDITIONS IF THE TRENCH FLOOR HAS:
- IRREGULAR OUTCROPS OF ROCK,
- AHBP OF <50kPa (SEE SEW-1200), OR
- BEEN DISTURBED BY UNCONTROLLED GROUND WATER.
4. COMPACT AND EVENLY GRADE FINISHED TRENCH FLOOR.
5. EMBEDMENT, TRENCH FILL AND COMPACTION TO MEET THE REQUIREMENT OF AUS-SPEC 1341, 1362, DESIGN DRAWINGS & WSA 02 PART 3.
6. USE GEOTEXTILE FILTER FABRIC WHERE SPECIFIED.
7. SIDES OF EXCAVATION TO BE KEPT VERTICAL TO AT LEAST 150 ABOVE THE PIPE

PROPOSED WATER WORKS:

1. WHERE CONNECTION TO EXISTING PIPEWORK, THE LEVEL & DIAMETER OF THE EXISTING PIPEWORK SHALL BE CONFIRMED BY THE CONTRACTOR PRIOR TO CONNECTION.
2. CHANGES IN HORIZONTAL & VERTICAL ALIGNMENT, OTHER THAN THROUGH FABRICATED BENDS, SHALL BE ACHIEVED BY DEFLECTION AT PIPE JOINTS WHERE SHOWN. MAXIMUM DEFLECTION SHALL BE AS PER MANUFACTURERS SPECIFICATIONS.
3. PROVIDE SUFFICIENT TRENCH DEPTH AND WIDTH TO ALLOW FOR DEFLECTION OF PIPES AT JOINT'S.
4. TEST PRESSURE SHALL BE 1200kpa AT THE LOWEST POINT ON THE PIPELINE.
5. ALL PIPE FITTINGS SHALL BE PE100 MIN.
6. PRESSURE MAIN CLEARANCE FROM ALL EXISTING SERVICES SHALL B EIN ACCORDANCE WITH SYDNEY WATER/WSA GUIDELINES. IF CLEARANCE BETWEEN SERVICES IS LESS THAN THAT SPECIFIED, REFER TO THE SUPERINTENDENT FOR DIRECTION BEFORE PROCEEDING WITH WORK.
7. MIN. PRESSURE MAIN COVER FROM FINISHED GROUND LEVEL TO THE OBVERT OF THE MAIN SHALL BE;
   - 7.1. 600mm Cover - Non-trafficable areas; &
   - 7.2. 600mm Cover - Trafficable areas.
8. UNLESS STATED OTHERWISE, DECOMMISSIONED PIPES THAT ARE NOT REMOVED AS PART OF THE WORKS SHALL BE CAPPED AND GROUTED IN ACCORDANCE WITH THE SYDNEY WATER/WSAA GUIDELINES. WHERE THE DISTURBANCE, REMOVAL AND/OR CUTTING OF AC PIPE IS REQUIRED, THE CONTRACTOR SHALL REFER TO SWMS FOR THE SAFE MANAGEMENT AND DISPOSAL OF AC PIPE.
9. DECOMMISSIONG OF ALL SURFACE FITTING/FIXTURES SHALL INCLUDE THE REMOVAL AND DISPONAL OF HYDRANTS, VALVE STEMS, BOXES AND MARKERS AND REINSTATEMENT TO MATCH SURROUNDING AREA.
10. ALL EXISTING WATER SERVICES SHALL BE REPLACED UNLESS SHOWN OTHERWISE. **SHORT WATER SERVICE CONNECTION OMITTED FOR CLARITY.**

EARTHWORKS:

1. TOPSOIL AND SUBSOIL SHALL BE STOCKPILED SEPARATELY.
2. CARE SHALL BE TAKEN TO PREVENT SEDIMENT FROM ENTERING THE SYSTEM. THIS MAY INVOLVE PLACING APPROPRIATE SEDIMENT CONTROLS AROUND STOCKPILES.
3. WHERE ACID SULPHATE SOILS HAVE BEEN IDENTIFIED WITHIN THE PROJECT AREA, THE CONTRACTOR SHALL BE RESPONSIBLE FOR COMPLIANCE WITH ALL RELATED STATUTORY REQUIREMENTS AND SHALL REFER TO SWMS FOR MANAGEMENT AND TREATMENT OF ACID SULPHATE SOILS.

ENVIRONMENT:

1. THE CONTRACTOR IS RESPONSIBLE FOR ENSURING THAT CONSTRUCTION WORKS DO NOT RESULT IN THE CONTAMINATION OF ADJACENT WATERWAYS, WETLANDS AND/OR ECOSYSTEMS.
2. THE CONSTRUCTION WORKS WILL BE IMPLEMENTED IN ACCORDANCE WITH EMP & CONSTRUCTION EMP(C). THIS EMP(C) SHOULD ADDRESS ISSUES SUCH AS, BUT NOT LIMITED TO; WATER QUALITY, EROSION AND SEDIMENTATION, CULTURAL HERITAGE, NOISE, VIBRATION, AIR QUALITY, ACID SULPHATE SOILS, CONTAMINATED SITES, FLORA & FAUNA, VEGETATION, PEST MANAGEMENT, WASTE AND CHEMICAL/FUELS.

REINSTATEMENT:

1. UNLESS STATED OTHERWISE ALL EXISTING INFRASTRUCTURE AFFECTED BY THESE WORKS SHALL BE REINSTATED IN ACCORDANCE WITHE THE RELEVANT STANDARD SPECIFIED IN THE COOTAMUNDRA-GUNDAGAI REGIONAL COUNCIL GUIDELINES. THE FOLLOWING REINSTATEMENT REQUIREMENTS SHALL BE READ IN CONJUNCTION WITH THE PROJECT SPECIFICATIONS.

0 2.5 10.0m — 1:500 (A1)
0 5.0 20.0m — 1:1000 (A3)

AMENDMENTS	FIRST ISSUE	CALCS	DRAWN	DATE	AMENDMENT DETAILS
		LM	DA	11/19	
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DESIGN CHECK

DRAWN CHECK

DATUM

PROJECT No.
CE18119.1

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FOR & ON BEHALF OF MOLONEY & SONS ENGINEERING

CLIENT
COOTAMUNDRA-GUNDAGAI REGIONAL COUNCIL

PROJECT
GUNDAGAI - FIVE MILE
HUME HIGHWAY NSW
PROP. TRUNK WATER MAIN STG 1

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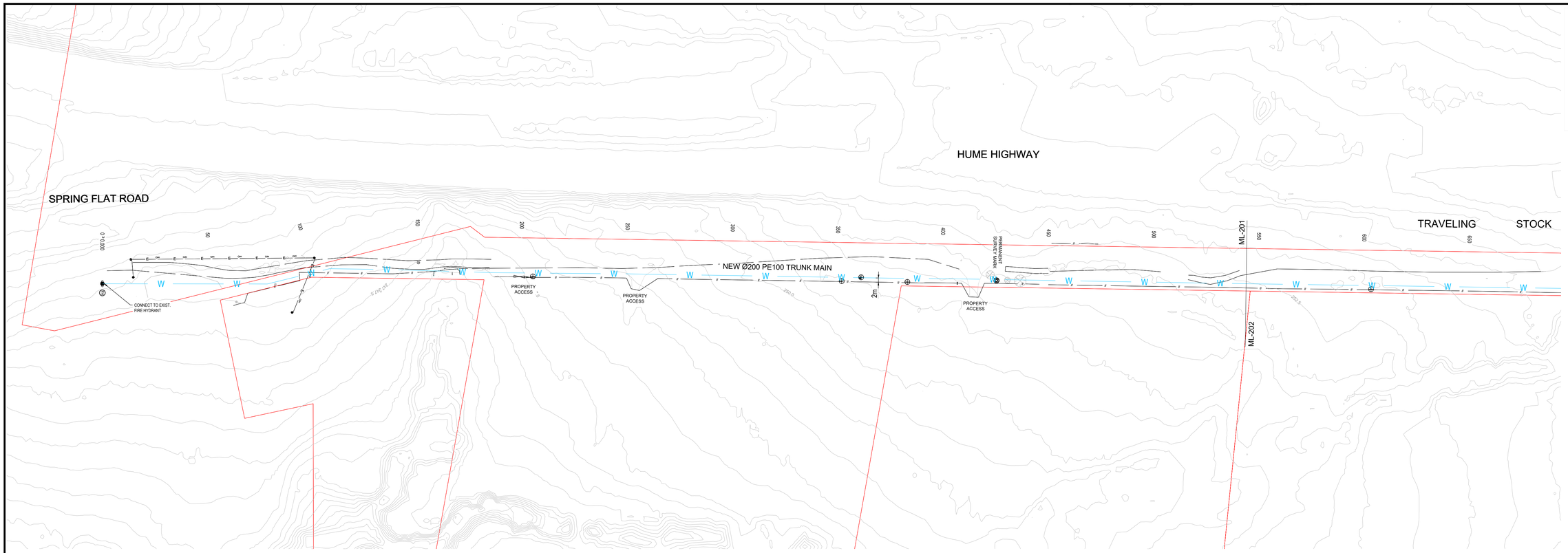
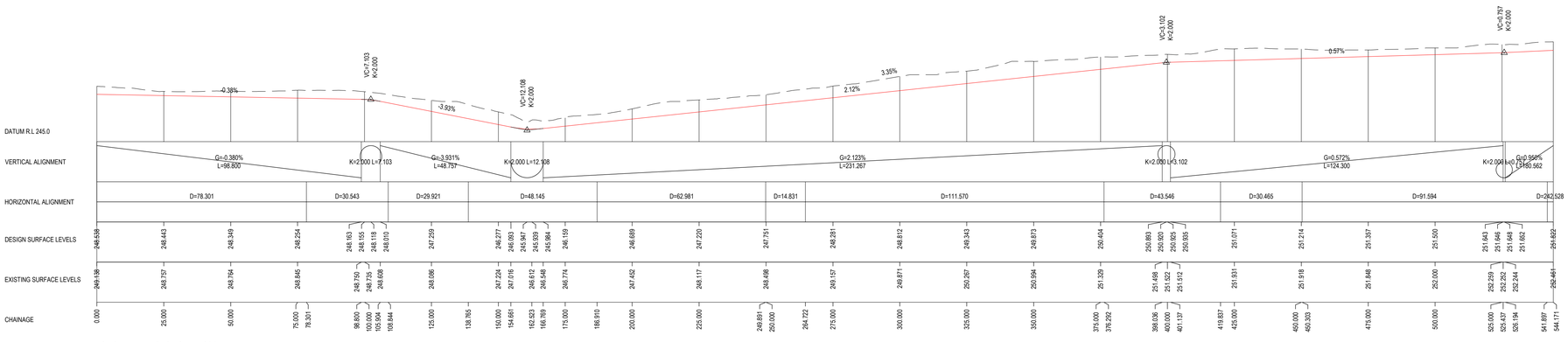
DRAWING TITLE
LEGEND & GENERAL NOTES

DRAWING NUMBER
CE18119.1-101-GE

ISSUE
B





GENERAL:

1. VERTICAL ALIGNMENT IS INDICATIVELY SHOWN ONLY AND WILL GENERALLY COMPLY WITH 600mm COVER AND 1500mm COVER BENEATH SEALED TRAFFICED AREAS AS A MINIMUM CONSIDERATION IN THE DESIGN BEEN GIVEN TO THE MITIGATION OF SAG/CREST POINTS IN THE LINE.
2. MAINTAIN ALL WATER SERVICES DURING CONSTRUCTION, MAKE PROVISION OF TEMP. CONNECTION WHERE/IF REQUIRED.
3. THESE DRAWINGS SHALL BE READ IN CONJUNCTION WITH SYDNEY WATER/WSAA DESIGN & CONSTRUCTION GUIDELINES AND WITH SUCH OTHER WRITTEN INSTRUCTIONS AS MAY BE ISSUED DURING THE COURSE OF THE CONTRACT. ALL DISCREPANCIES SHALL BE REFEREED TO THE SUPERINTENDENT FOR DIRECTION BEFORE PROCEEDING WITH WORKS.
4. DIMENSIONS SHALL NOT BE SCALED FROM DRAWINGS.
5. SET-OUT DIMENSIONS & LEVELS, INCLUDING ANY SHOWN ON THE DRAWINGS ARE TO BE VERIFIED ON SITE BY THE CONTRACTOR BEFORE FABRICATION & CONSTRUCTION.
6. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF PIPES AND PITS AGAINST FLOATATION DURING CONSTRUCTION.
7. NO SUBSTITUTE MATERIALS SHALL BE USED WITHOUT THE APPROVAL OF THE SUPERINTENDENT.
8. HEIGHT DATUM IS TO AHD & COORDINATES ARE RELATIVE TO MGA94 (ZONE 55).
9. SURVEY EXTENTS ARE GENERALLY LIMITED TO THE PROPOSED WATER MAIN ALIGNMENT & DO NOT NECESSARILY INCLUDE ALL EXISTING FEATURES WITHIN THE PROJECT AREA.
10. UNDERGROUND SERVICE UTILITIES HAVE BEEN PLOTTED USING SERVICE AUTHORITY RECORDS & MAY NOT REPRESENT THE ACTUAL SERVICE LOCATION. WHERE REQUIRED, THE PLOTTED LOCATION OF THESE SERVICES MAY HAVE BEEN ALTERED TO FIT ACTUAL SURVEYED SERVICES.

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JAS-ANZ CERTIFIED ISO 9001

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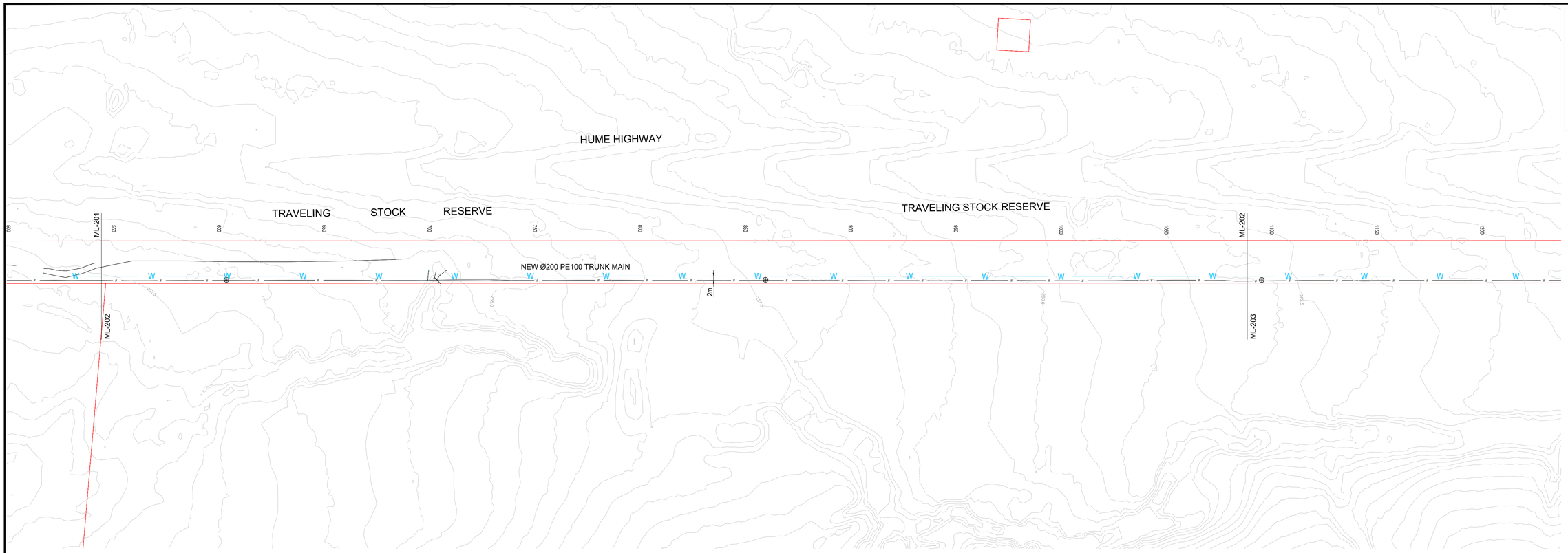
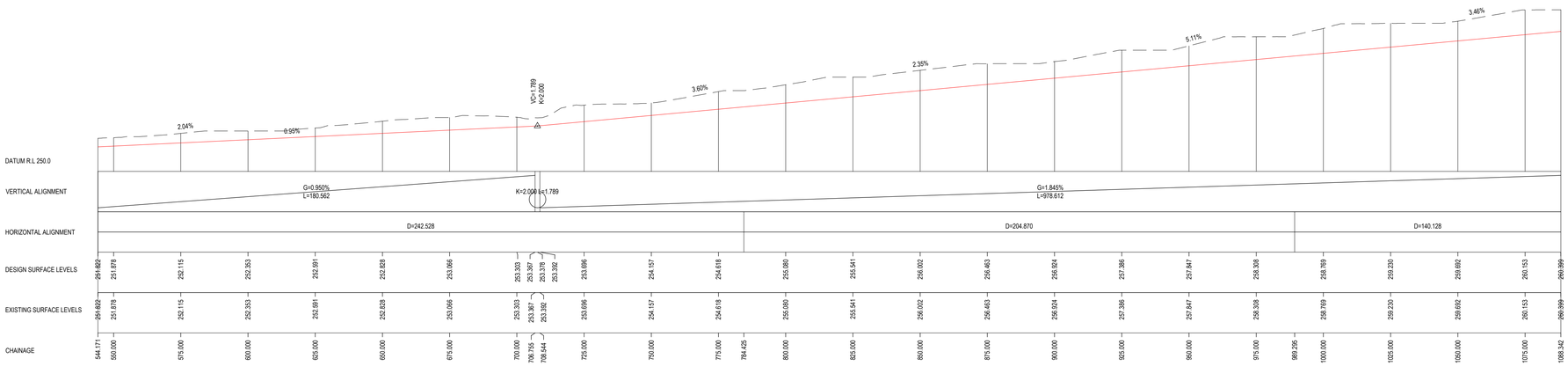
DRAWING TITLE
GENERAL ARRANGEMENT
SHEET 1 OF 9

DRAWING NUMBER
CE18119.1-201-GA

ISSUE
B





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DRAWING TITLE

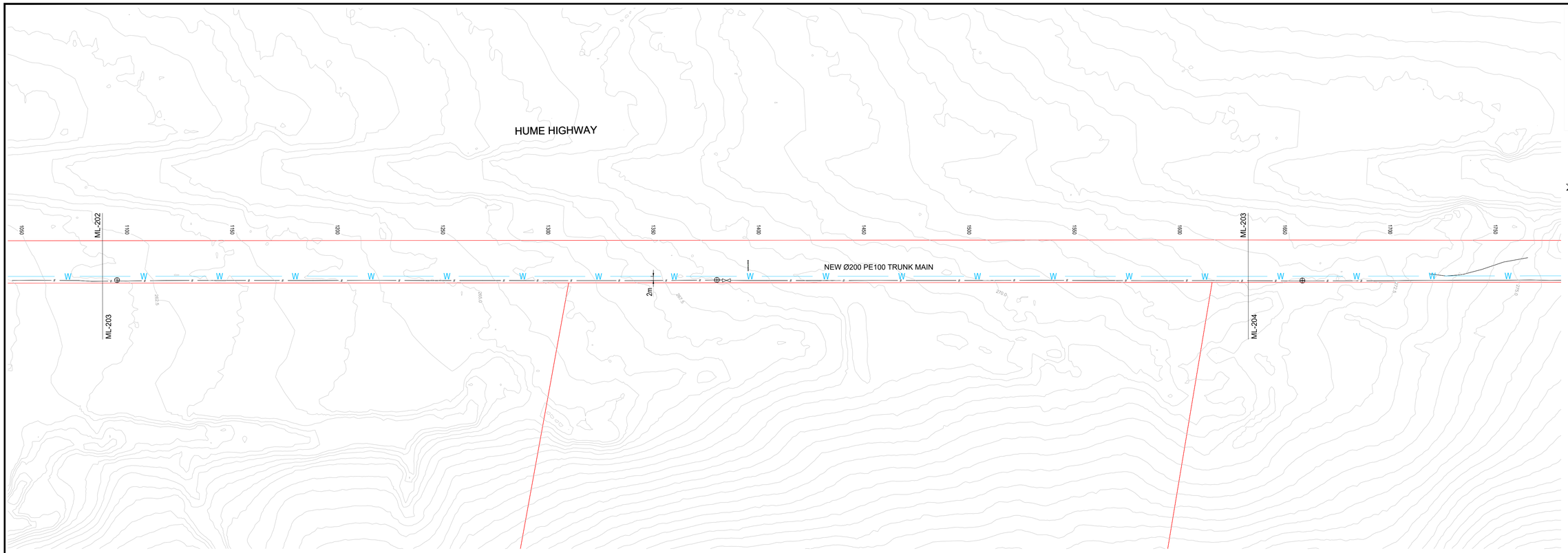
GENERAL ARRANGEMENT
SHEET 2 OF 9

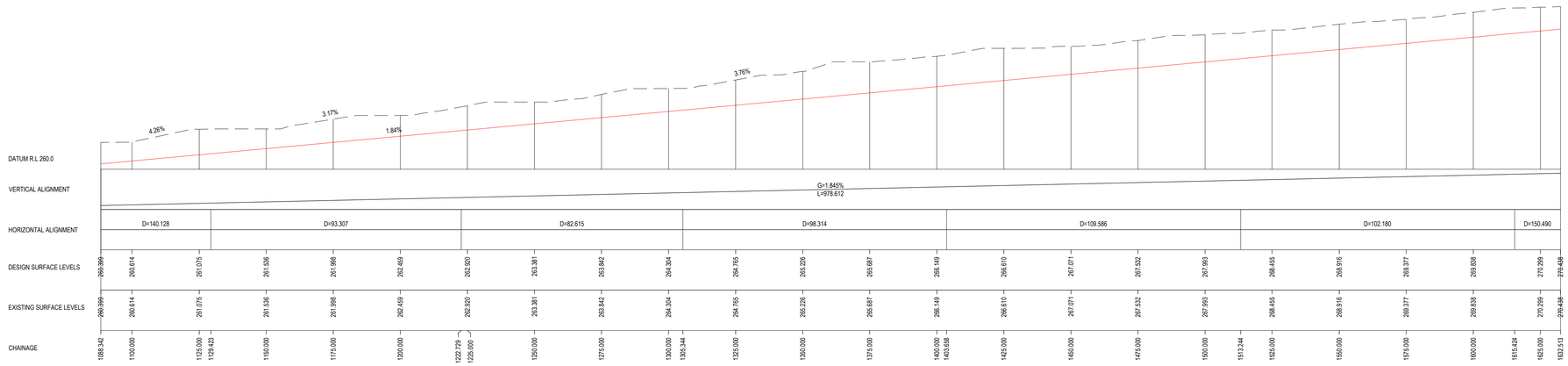
DRAWING NUMBER

CE18119.1-202-GA

ISSUE

B





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10. UNDERGROUND SERVICE UTILITIES HAVE BEEN PLOTTED USING SERVICE AUTHORITY RECORDS & MAY NOT REPRESENT THE ACTUAL SERVICE LOCATION. WHERE REQUIRED, THE PLOTTED LOCATION OF THESE SERVICES MAY HAVE BEEN ALTERED TO FIT ACTUAL SURVEYED SERVICES.

AMENDMENTS	FIRST ISSUE	CALCS	DRAWN	DATE	AMENDMENT DETAILS
		LM	DA	11/19	
	A	LM	JO	29/11/19	CONCEPT DESIGN ISSUE
	B	LM	JO	25/05/20	PRELIMINARY DESIGN ISSUE

DESIGN CHECK

DRAWN CHECK

DATUM

PROJECT No.
CE18119.1

ISSUED FOR APPROVAL

APPROVED
FOR & ON BEHALF OF MOLONEY & SONS ENGINEERING

CLIENT
COOTAMUNDRA-GUNDAGAI REGIONAL COUNCIL

PROJECT
GUNDAGAI - FIVE MILE
HUME HIGHWAY NSW
PROP. TRUNK WATER MAIN STG 1

MOLONEY & SONS
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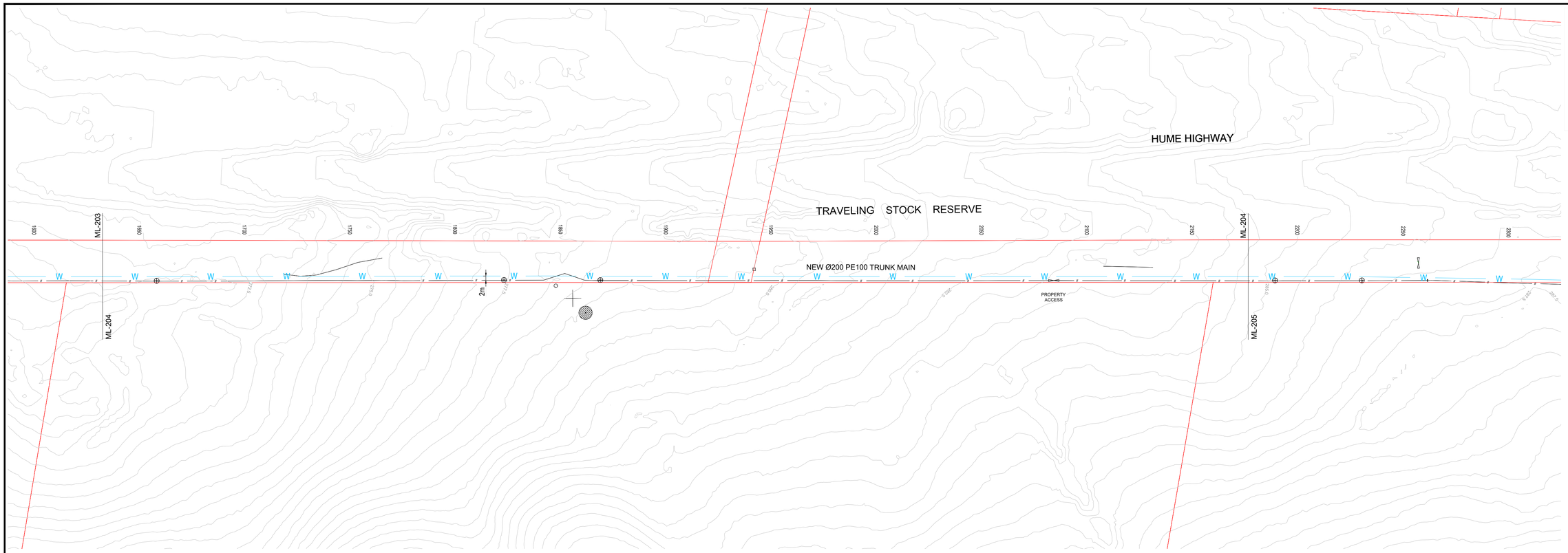
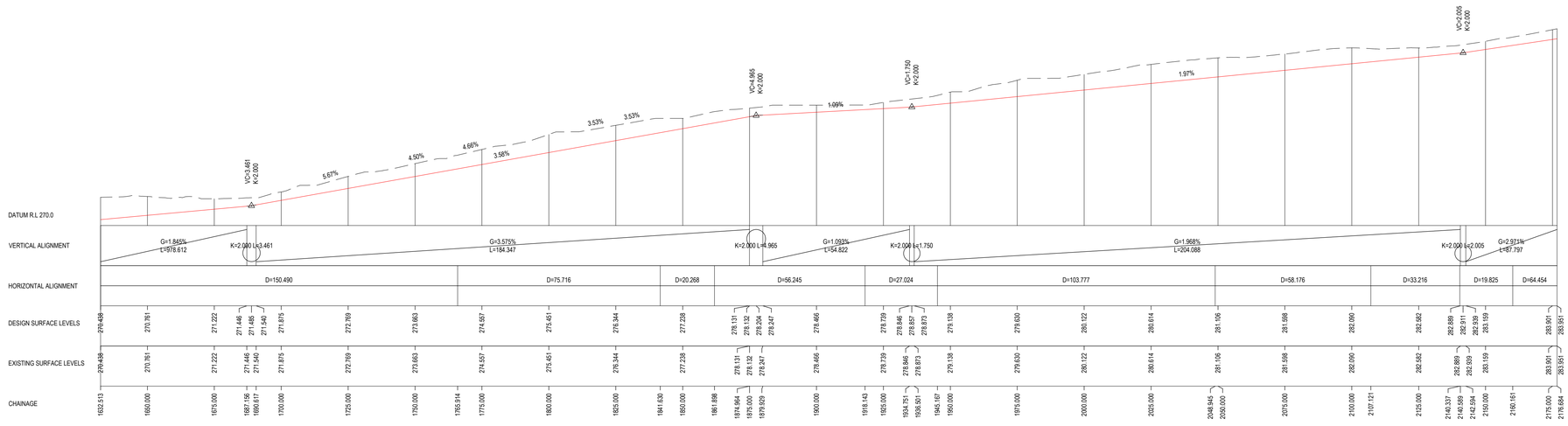
GOLD COAST • COFFS HARBOUR • SYDNEY

DRAWING TITLE
GENERAL ARRANGEMENT
SHEET 3 OF 9

DRAWING NUMBER
CE18119.1-203-GA

ISSUE
B





0 1000 2000

GENERAL:

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AMENDMENTS

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DATUM

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COOTAMUNDRA-GUNDAGAI REGIONAL COUNCIL

PROJECT
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PROP. TRUNK WATER MAIN STG 1

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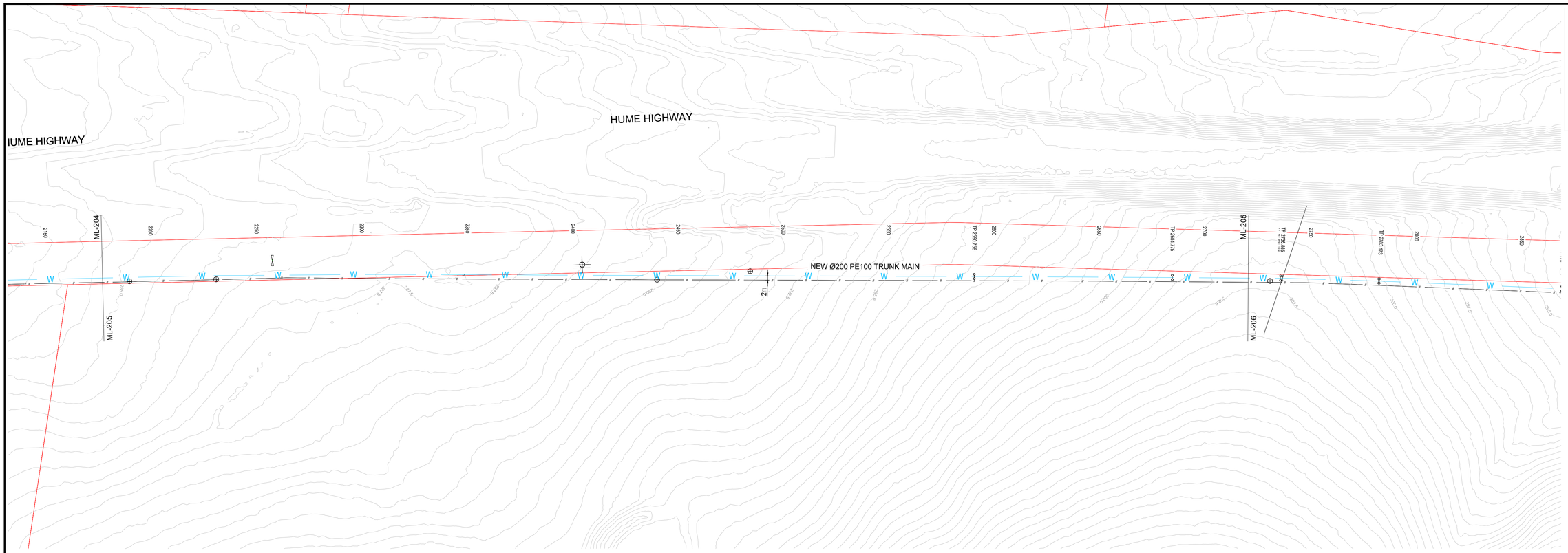
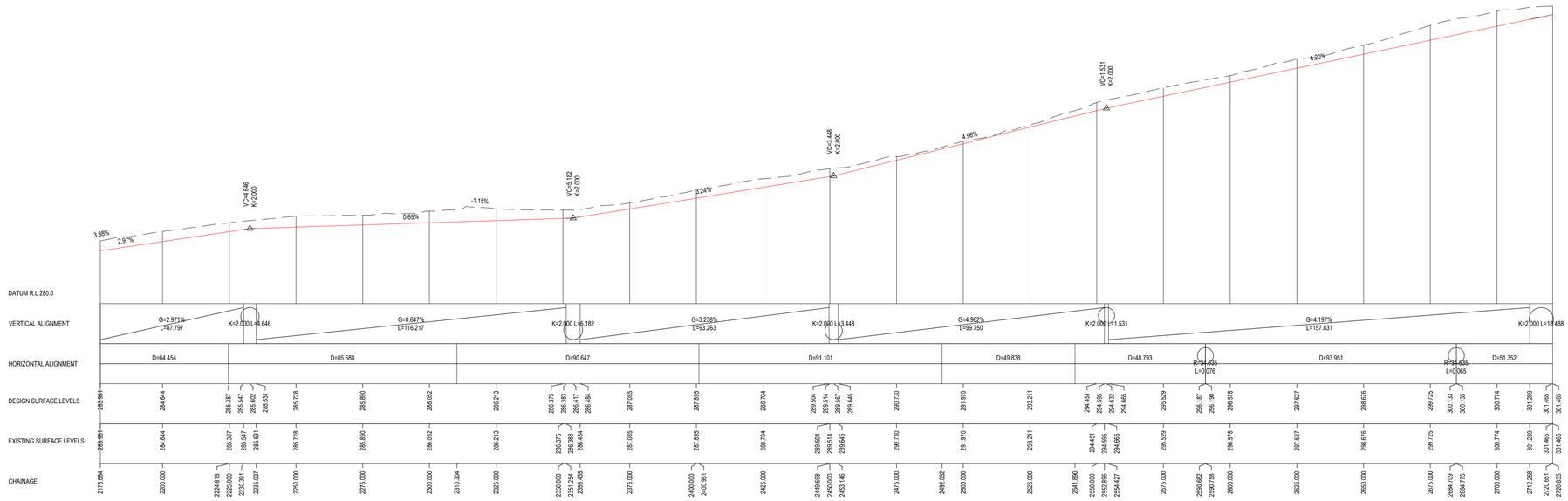
DRAWING TITLE
GENERAL ARRANGEMENT
SHEET 4 OF 9

DRAWING NUMBER
CE18119.1-204-GA

ISSUE
B





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AMENDMENTS

DESIGN CHECK

DRAWN CHECK

DATUM

PROJECT No.

CE18119.1

ISSUED FOR APPROVAL

APPROVED

FOR & ON BEHALF OF MOLONEY & SONS ENGINEERING

CLIENT

COOTAMUNDRA-GUNDAGAI REGIONAL COUNCIL

PROJECT

GUNDAGAI - FIVE MILE
HUME HIGHWAY NSW
PROP. TRUNK WATER MAIN STG 1

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DRAWING TITLE

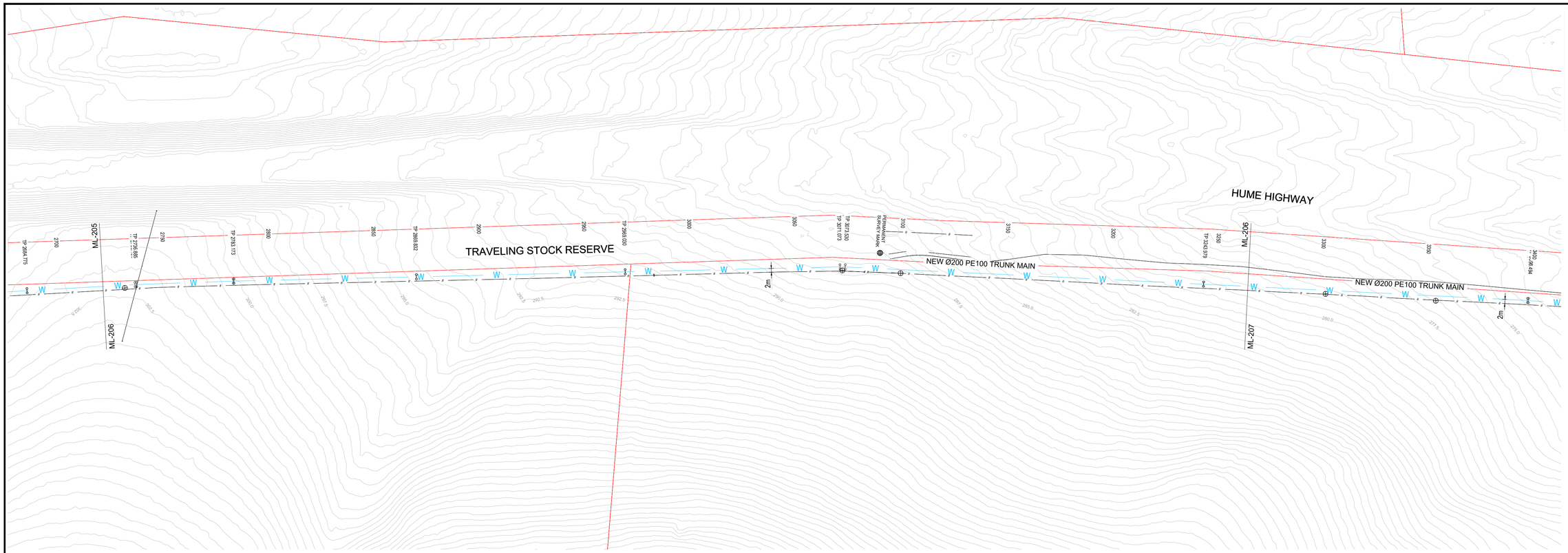
GENERAL ARRANGEMENT
SHEET 5 OF 9

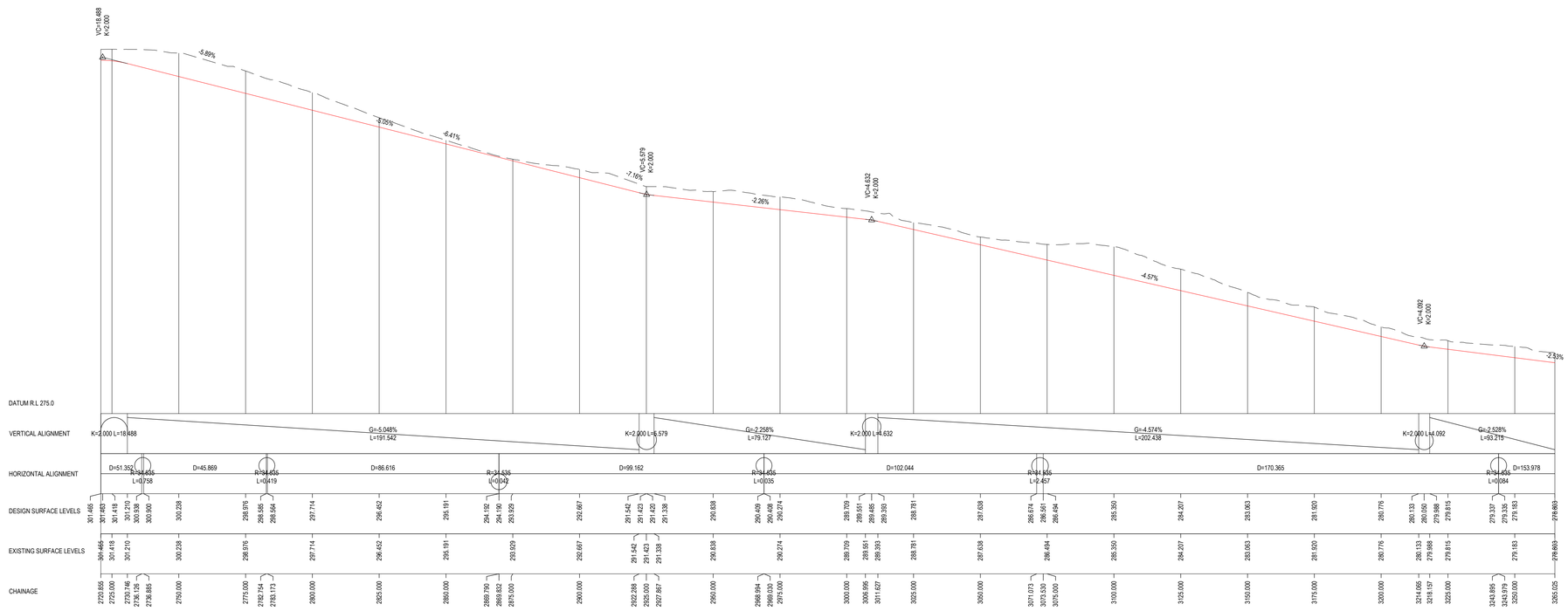
DRAWING NUMBER

CE18119.1-205-GA

ISSUE

B





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DATUM

PROJECT No.

CE18119.1

ISSUED FOR APPROVAL

APPROVED

FOR & ON BEHALF OF MOLONEY & SONS ENGINEERING

CLIENT

COOTAMUNDRA-GUNDAGAI REGIONAL COUNCIL

PROJECT

GUNDAGAI - FIVE MILE
HUME HIGHWAY NSW
PROP. TRUNK WATER MAIN STG 1

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DRAWING TITLE

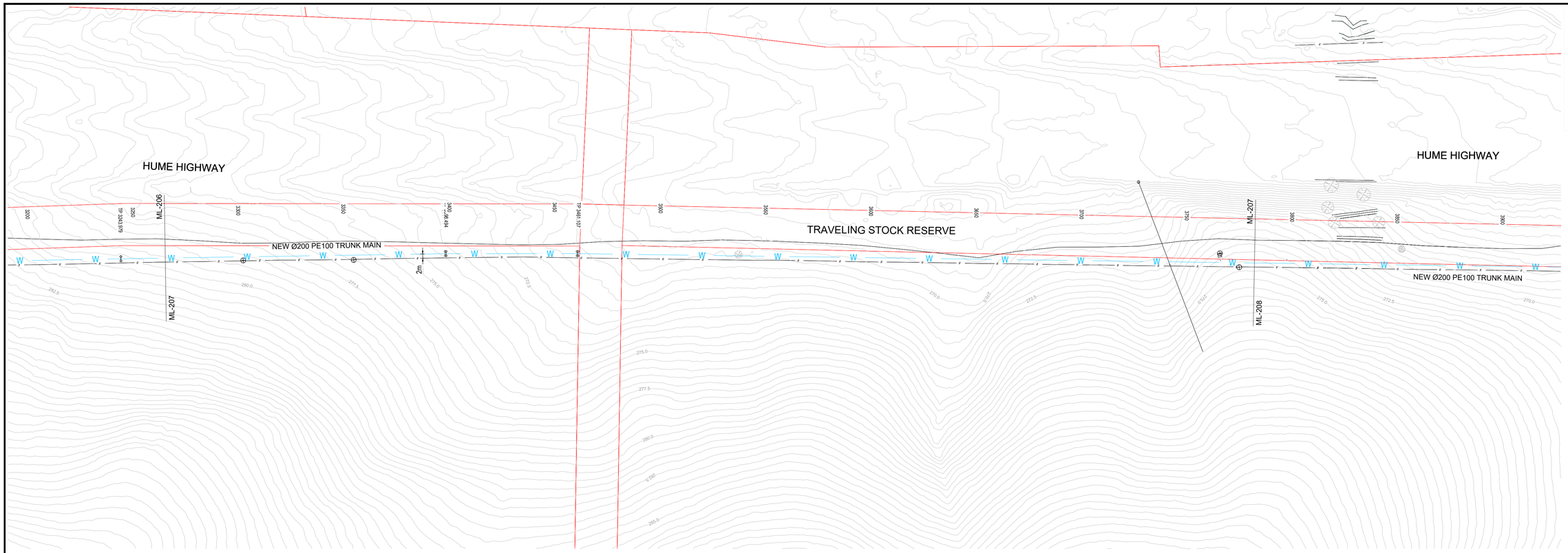
GENERAL ARRANGEMENT
SHEET 6 OF 9

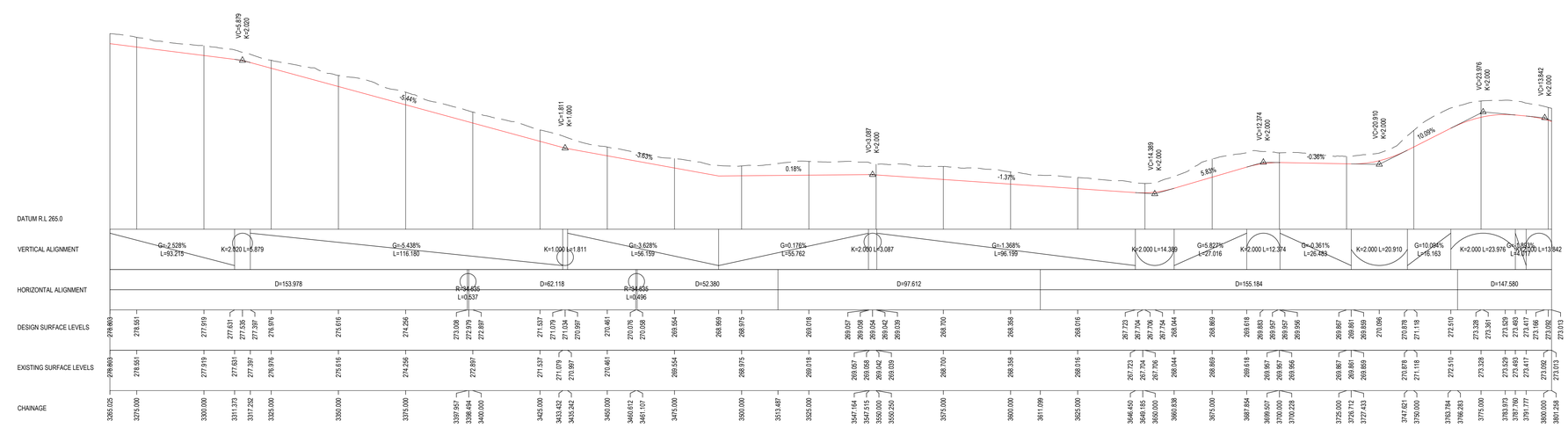
DRAWING NUMBER

CE18119.1-206-GA

ISSUE

B





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AMENDMENTS

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DATUM

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CLIENT
COOTAMUNDRA-GUNDAGAI REGIONAL COUNCIL

PROJECT
GUNDAGAI - FIVE MILE
HUME HIGHWAY NSW
PROP. TRUNK WATER MAIN STG 1

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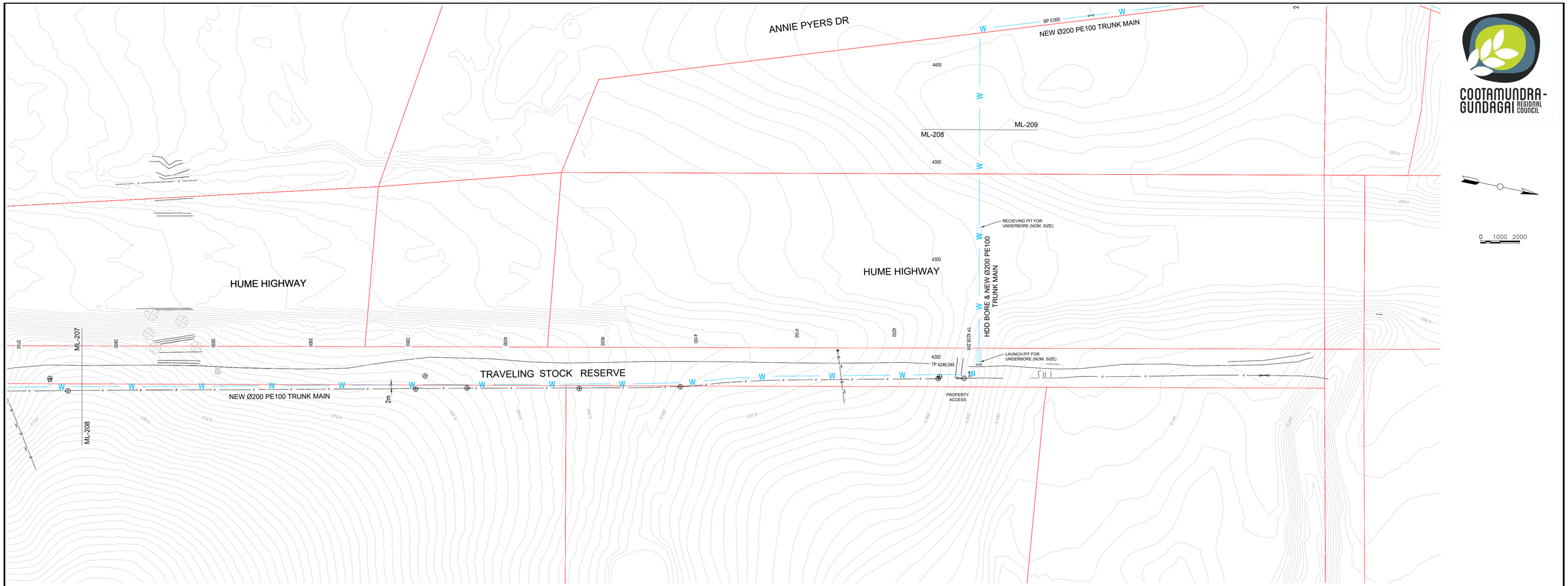
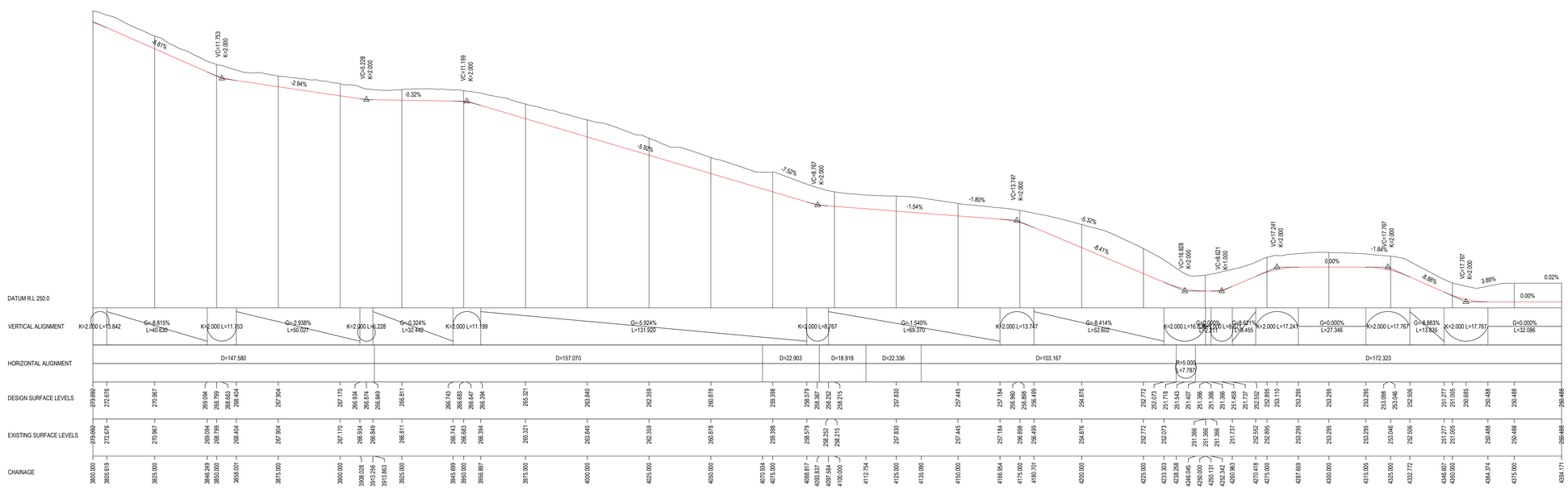
DRAWING TITLE
GENERAL ARRANGEMENT
SHEET 7 OF 9

DRAWING NUMBER
CE18119.1-207-GA

ISSUE
B





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DESIGN CHECK

DRAWN CHECK

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ISSUED FOR APPROVAL

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FOR & ON BEHALF OF MOLONEY & SONS ENGINEERING

CLIENT
COOTAMUNDRA-GUNDAGAI REGIONAL COUNCIL

PROJECT
GUNDAGAI - FIVE MILE
HUME HIGHWAY NSW
PROP. TRUNK WATER MAIN STG 1

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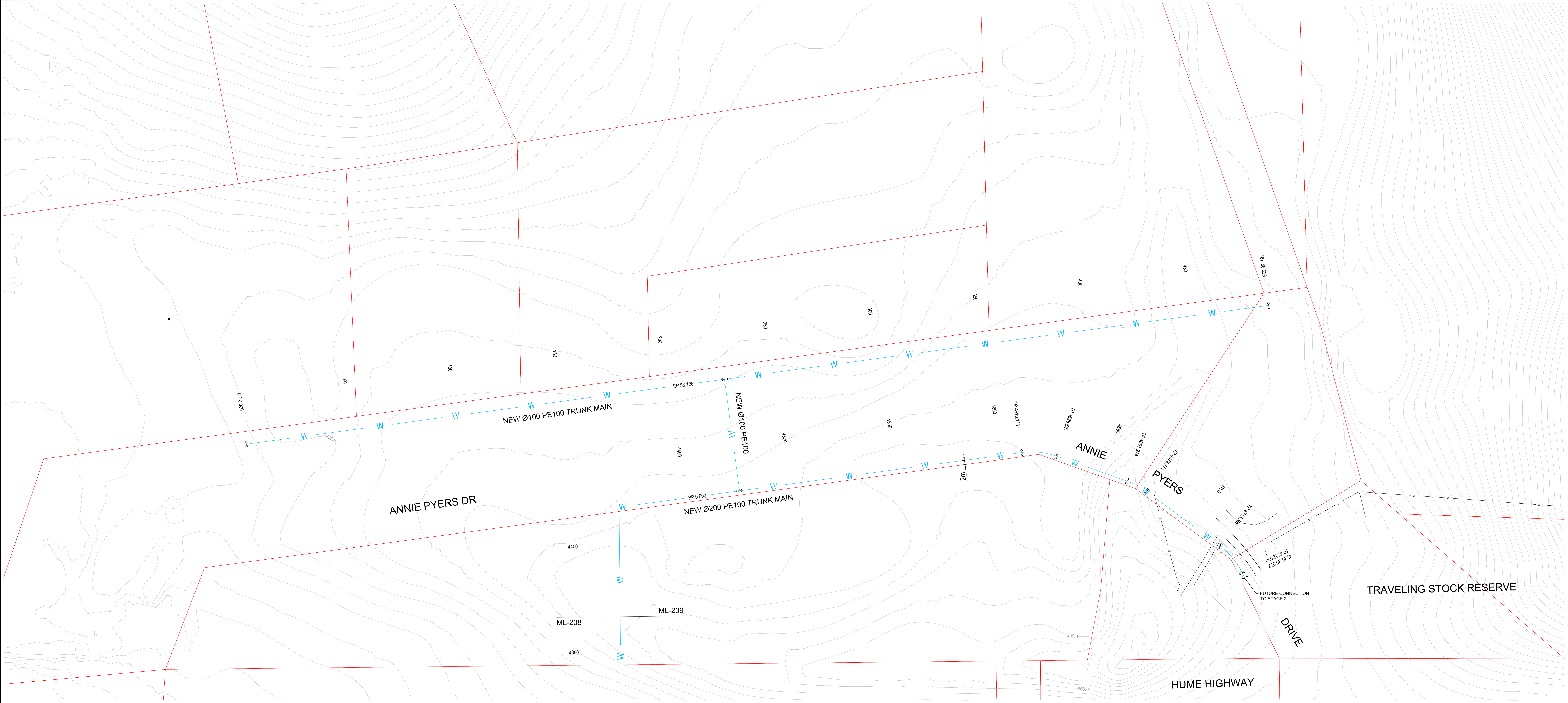
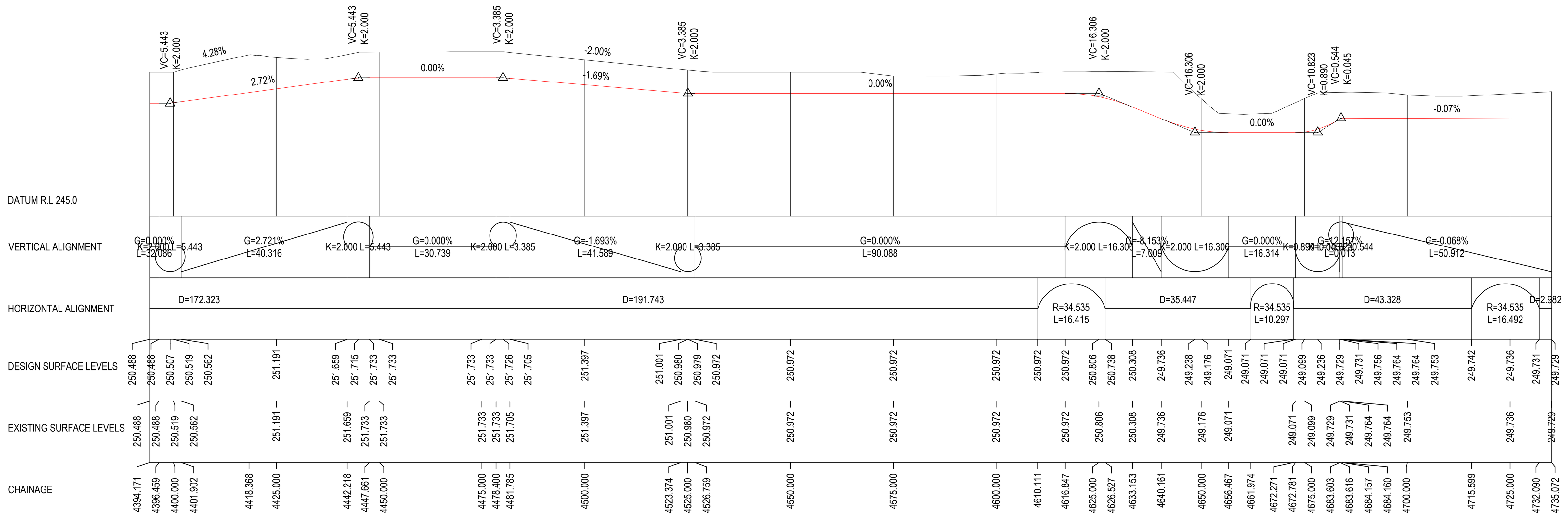
DRAWING TITLE
GENERAL ARRANGEMENT
SHEET 8 OF 9

DRAWING NUMBER
CE18119.1-208-GA

ISSUE
B





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AMENDMENTS

DESIGN CHECK

DRAWN CHECK

JAS-ANZ ISO 9001 CERTIFIED

DATUM

PROJECT No.
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APPROVED

FOR & ON BEHALF OF MOLONEY & SONS ENGINEERING

CLIENT
COOTAMUNDRA-GUNDAGAI REGIONAL COUNCIL

PROJECT
GUNDAGAI - FIVE MILE
HUME HIGHWAY NSW
PROP. TRUNK WATER MAIN STG 1

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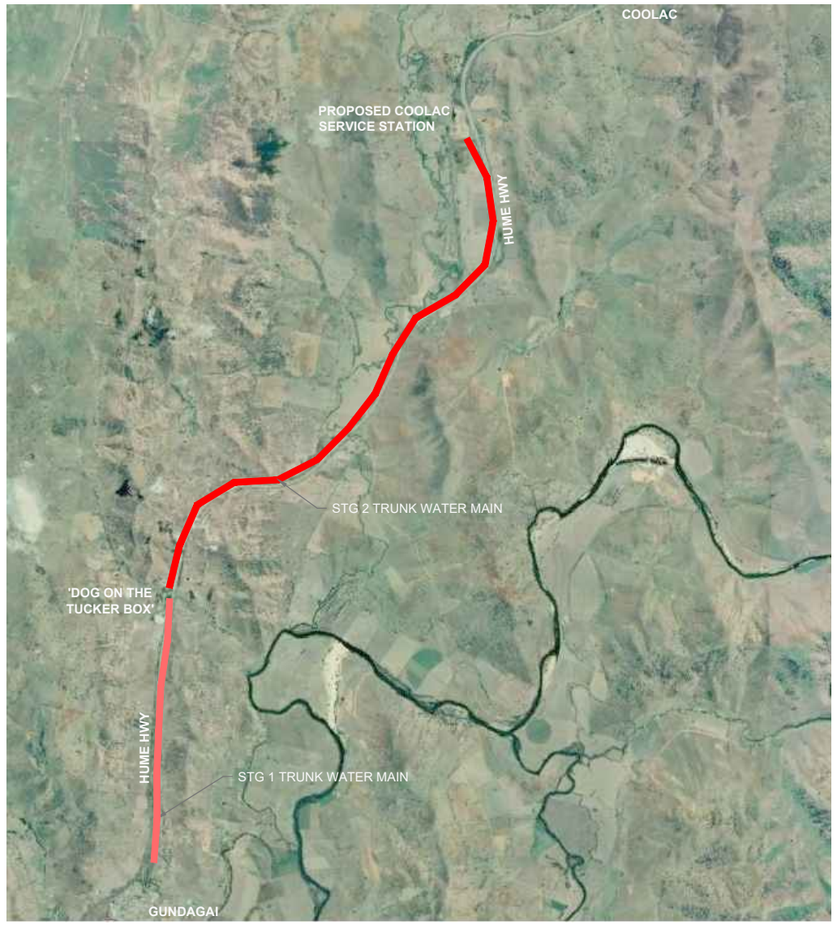
DRAWING TITLE
GENERAL ARRANGEMENT
SHEET 9 OF 9

DRAWING NUMBER
CE18119.1-209-GA

ISSUE
B

COOTAMUNDRA-GUNDAGAI REGIONAL COUNCIL

'DTB' FIVE MILE TO COOLAC TRUNK WATER MAIN STAGE 2



LOCALITY PLAN
NOT TO SCALE

DETAIL SURVEY BY:
ALLSPEC & PARTNERS - DATE SURVEYED 11/07/18
SURVEY: MGA94 ZONE 55
STANDARD DRAWINGS:
CGRC STANDARD DESIGN DRAWINGS, SYDNEY WATER STD DRAWINGS & SPECIFICATIONS, RMS GUIDELINES & INSTITUTE OF PUBLIC WORKS ENGINEERING AUSTRALIA (IPWEA)

PROPOSED TRUNK WATER MAIN - 2019

DESIGN FILE No: CE18119
DESIGN STANDARD: CGRC STD DRGS, AUSTROADS & RMS DESIGN GUIDELINES

GENERAL

1. THESE DRAWINGS SHALL BE READ IN CONJUNCTION WITH ALL OTHER CONSULTANTS DRAWINGS AND SPECIFICATIONS.
2. BEFORE PROCEEDING WITH THE WORK ANY DISCREPANCIES IN THE CONTRACT DOCUMENTS SHALL BE REFERRED FOR DECISION TO THE SUPERINTENDENT.
3. DO NOT SCALE FROM DRAWINGS.
4. CONTRACTOR SHALL VERIFY ALL LOCATIONS OF SERVICES, ALL DIMENSIONS AND LEVELS PRIOR TO CONSTRUCTION.
5. ALL MATERIALS/CONSTRUCTION & WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE CONTRACT SPECIFICATIONS AND THE LOCAL AUTHORITY'S STANDARD DRAWINGS AND BY-LAWS.
6. THE CONTRACTOR IS RESPONSIBLE TO OBTAIN ALL RELEVANT APPROVALS PRIOR TO COMMENCEMENT OF WORKS.
7. UNDERGROUND SERVICE LOCATIONS SHOWN ON THIS PLAN HAVE BEEN DETERMINED BY FIELD SURVEY AND/OR OFFICE RECORDS, AND MAY NOT REPRESENT ALL SERVICES OR EXACT LOCATIONS. THE CONTRACTOR MUST ACCURATELY LOCATE AND DEPTH ALL SERVICES LIKELY TO BE ENCOUNTERED DURING CONSTRUCTION, PRIOR TO COMMENCING ANY EXCAVATION WORKS.
8. DISPERSIVE SOILS ARE NOT TO BE USED AS FILL/EMBANKMENT MATERIAL. ALL CONSTRUCTION TO BE DONE IN ACCORDANCE WITH CURRENT RMS SPECIFICATIONS AND TECHNICAL STANDARDS.

WATER & WASTE WATER

GENERAL:
1. CONSTRUCTION AND MATERIALS SHALL BE UNDERTAKEN AND PROVIDED IN ACCORDANCE WITH THE WSAA SUPPLY CODE.
2. THESE DRAWINGS SHALL BE READ IN CONJUNCTION WITH THE WSAA SUPPLY CODE & DRAWINGS AND WITH SUCH OTHER WRITTEN INSTRUCTIONS AS MAY BE ISSUED DURING THE COURSE OF THE CONTRACT. ALL DISCREPANCIES SHALL BE REFERRED TO THE SUPERINTENDENT FOR DIRECTION BEFORE PROCEEDING WITH WORK.
3. DIMENSIONS SHALL NOT BE SCALED FROM DRAWINGS.
4. SET-OUT DIMENSIONS AND LEVELS, INCLUDING ANY SHOWN ON THE DRAWING ARE TO BE VERIFIED ON SITE BY THE CONTRACTOR BEFORE FABRICATION AND CONSTRUCTION.
5. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF PIPES AND PITS AGAINST FLOATATION DURING CONSTRUCTION.
6. NO SUBSTITUTE MATERIAL SHALL BE USED WITHOUT APPROVAL OF THE SUPERINTENDENT.
7. HEIGHT DATUM IS TO AHD AND COORDINATES ARE RELATIVE TO MGA94 (ZONE56).
8. SURVEY EXTENTS ARE GENERALLY LIMITED TO THE PROPOSED WATER MAIN ALIGNMENT AND DO NOT NECESSARILY INCLUDE ALL EXISTING FEATURES WITHIN THE PROJECT AREA.
9. UNDERGROUND SERVICE UTILITIES HAVE BEEN PLOTTED USING SERVICE AUTHORITY RECORDS AND MAY NOT REPRESENT THE ACTUAL SERVICE LOCATION. WHERE REQUIRED, THE PLOTTED LOCATION OF THESE SERVICES MAY HAVE BEEN ALTERED TO FIT ACTUAL SURVEYED SERVICES.

PIPE WORKS:
1. WHERE CONNECTING TO EXISTING PIPEWORK, THE LEVEL AND DIAMETER OF THE EXISTING PIPEWORK SHALL BE CONFIRMED BY THE CONTRACTOR PRIOR TO CONNECTION.
2. CHANGES IN HORIZONTAL AND VERTICAL ALIGNMENT, OTHER THAN THROUGH FABRICATED BENDS, SHALL BE ACHIEVED BY DEFLECTION AT PIPE JOINTS WHERE SHOWN. MAXIMUM DEFLECTION SHALL BE AS PER MANUFACTURER'S SPECIFICATIONS.
3. PROVIDE SUFFICIENT TRENCH DEPTH AND WIDTH TO ALLOW FOR DEFLECTION OF PIPES AT JOINTS.
4. PRESSURE MAIN CLEARANCE FROM ALL EXISTING SERVICES SHALL BE IN ACCORDANCE WITH THE WSAA SUPPLY CODE. IF CLEARANCE BETWEEN SERVICES IS LESS THAN THAT SPECIFIED, REFER TO THE SUPERINTENDENT FOR DIRECTION BEFORE PROCEEDING WITH WORK.
5. MINIMUM PRESSURE MAIN COVER FROM FINISHED GROUND LEVEL TO THE OBVERT OF THE MAIN SHALL BE: NON-TRAFFICABLE AREAS: GENERAL - 600mm COVER TRAFFICABLE AREAS: SEALED - 1500mm COVER
6. UNLESS STATED OTHERWISE, DECOMMISSIONED PIPES THAT ARE NOT REMOVED AS PART OF THE WORKS SHALL BE CAPPED AND GROUTED IN ACCORDANCE WITH THE WSAA SUPPLY CODE. WHERE THE DISTURBANCE, REMOVAL AND/OR CUTTING OF AC PIPE IS REQUIRED, THE CONTRACTOR SHALL REFER TO SWMS FOR THE SAFE MANAGEMENT AND DISPOSAL OF AC PIPE.
7. DECOMMISSIONING OF ALL SURFACE FITTINGS/ FIXTURES SHALL INCLUDE THE REMOVAL AND DISPOSAL OF HYDRANTS, VALVE STEMS, BOXES AND MARKERS, AND REINSTATEMENT TO MATCH SURROUNDING AREA.
8. ALL EXISTING WATER SERVICES SHALL BE REPLACED UNLESS SHOWN OTHERWISE. SHORT WATER SERVICE CONNECTIONS OMITTED FOR CLARITY.

SOIL:
1. TOPSOIL AND SUBSOIL SHALL BE STOCKPILED SEPARATELY.
2. CARE SHALL BE TAKEN TO PREVENT SEDIMENT FROM ENTERING THE STORMWATER SYSTEM. THIS MAY INVOLVE PLACING APPROPRIATE SEDIMENT CONTROLS AROUND STOCKPILES.
3. WHERE ACID SULFATE SOILS HAVE BEEN IDENTIFIED WITHIN THE PROJECTED AREA THE CONTRACTOR SHALL BE RESPONSIBLE FOR COMPLIANCE WITH ALL RELATED STATUTORY REQUIREMENTS AND SHALL REFER TO SWMS FOR MANAGEMENT AND TREATMENT OF ACID SULFATE SOILS.

ENVIRONMENT:
1. THE CONTRACTOR IS RESPONSIBLE FOR ENSURING THAT CONSTRUCTION WORKS DO NOT RESULT IN THE CONTAMINATION OF ADJACENT WATERWAYS, WETLANDS AND/OR ECOSYSTEMS.
2. THE CONSTRUCTION WORKS WILL BE IMPLEMENTED IN ACCORDANCE WITH EMP AND CONSTRUCTION EMP (C). THIS EMP(C) SHOULD ADDRESS ISSUES AS, BUT NOT LIMITED TO; WATER QUALITY, EROSION AND SEDIMENTATION, CULTURAL HERITAGE, NOISE, VIBRATION AIR QUALITY, ACID SULFATE SOILS. CONTAMINATED SITES, FLORA AND FAUNA, VEGETATION, PEST MANAGEMENT, WASTE, AND CHEMICALS AND FUELS.

CONSTRUCTION SPECIFICATIONS

RMS CONSTRUCTION SPECIFICATIONS:
G001 JOB SPECIFIC REQUIREMENTS
G002 GENERAL REQUIREMENTS
G010 TRAFFIC MANAGEMENT
G022 WORK HEALTH AND SAFETY
G036 ENVIRONMENTAL PROTECTION
G038 SOIL AND WATER MANAGEMENT
G040 CLEARING AND GRUBBING
G071 CONSTRUCTION SURVEY
Q03 QUALITY MANAGEMENT SYSTEM
R053 CONCRETE (FOR GENERAL USE)
R044 EARTHWORKS
R11 STORMWATER DRAINAGE
R15 KERB AND GUTTERS
R71 UNBOUND & MODIFIED PAVEMENT COURSE
R75 INSITU PAVEMENT SATABILISATION
R106 SPRAYED BITUMINOUS SURFACING (CUTBACK)
R107 SPRAYED BITUMINOUS SURFACING (PMB)
R143 SIGNPOSTING
R151 STREET LIGHTNING
R173 GENERAL CONCRETE PAVING
R201 FENCING
3051 GRANULAR BASE & SUB-BASE MATERIALS FOR SURFACED ROAD PAVEMENT
3071 SELECTED MATERIAL FOR FORMATION LAYERS
3151 COVER AGGREGATE FOR SPRAYED BITUMINOUS SURFACING
3252 POLYMER MODIFIED BINDER FOR PAVEMENTS
3268 AGGREGATE PRE-COATING AGENT
3269 BITUMEN ADHESION AGENT
TS106 ITS VIDEO SURVEILLANCE CAMERA SITE

WATER SERVICES ASSOCIATION OF AUSTRALIA:
WSA 02 SEWERAGE CODE OF AUSTRALIA
WSA 03 WATER SUPPLY CODE OF AUSTRALIA
WSA 04 SEWERAGE PUMPING STATION CODE OF AUSTRALIA

NAT-SPEC CONSTRUCTION SPECIFICATIONS:
0292 MASONRY WALLS
0344 STEEL - HDG
0702 MECHANICAL - DESIGN & INSTALL
0802 HYDRAULIC - DESIGN & INSTALL
0902 ELECTRICAL - DESIGN & INSTALL
1391 SERVICE CONDUITS
1392 TRENCHLESS CONDUIT INSTALLATION

STANDARD DRAWINGS

W-0040 BEDDING AND BACKFILL FOR WATER MAIN CONSTRUCTION.
S-0090 SEWER CONSTRUCTION - PIPELINE CONSTRUCTION TYPES
S-0057 LIFT STATION - SUBMERSIBLE 1800mm DIA.
S-0058 PUMP STATION OVERFLOW
G-0041 FENCING - CHAIN WIRE SECURITY FENCING
DS-050 DRAINAGE PITS FIELD INLET - TYPE 1 & 2
R-0100-07 TEMPORARY EROSION CONTROL SILT FENCE
R-0210-01 CONCRETE HEADWALLS SINGLE CELL 300mm TO 900mm DIA WITH CONCRETE APRON. (2 to 1 BATTER OR STEEPER)
R-0240-01 INSTALLATION OF BURIED CONCRETE PIPES TYPE HS3 SUPPORT
R-0300-01 STANDARD KERB AND CHANNEL SHAPES
R-0800-04 RURAL ROAD BOUNDARY FENCING - GATE PANEL AND GATE FITTING DETAILS
SEQ G-042 FENCING LOG BARRIER AND ALTERNATIVE HARDWOOD TIMBER BOLLARD
SEQ R-051 DRIVEWAYS - HEAVY DUTY VEHICLE CROSSING

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ALL UNDERGROUND SERVICES SHOULD BE LOCATED ON SITE BEFORE ANY WORK IS COMMENCED
DIAL 1100 BEFORE YOU DIG

AMENDMENTS	FIRST ISSUE	CALCS	DRAWN	DATE	AMENDMENT DETAILS
		LM	DA	11/19	
	A	LM	JO	24/04/20	CONCEPT DESIGN ISSUE

DESIGN CHECK
DRAWN CHECK

DATUM
PROJECT No.
CE18119.2

ISSUED FOR APPROVAL
APPROVED
FOR & ON BEHALF OF MOLONEY & SONS ENGINEERING

CLIENT
COOTAMUNDRA-GUNDAGAI REGIONAL COUNCIL
PROJECT
FIVE MILE - COOLAC SERVICE STN
HUME HIGHWAY NSW
PROP. TRUNK WATER MAIN STG 2

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DRAWING TITLE
COVER SHEET & LOCALITY PLAN
DRAWING NUMBER
CE18119.2-001-CO
ISSUE
A

DRAWING SCHEDULE

Document Title	Document No.
COVER SHEET & LOCALITY PLAN	CE18119.2-001-CO
DRG. SCHEDULE	CE18119.2-002-CO
LEGEND & GENERAL NOTES	CE18119.2-101-GE
GENERAL ARRANGEMENT SHEET 1 OF 20	CE18119.2-201-GA
GENERAL ARRANGEMENT SHEET 2 OF 20	CE18119.2-202-GA
GENERAL ARRANGEMENT SHEET 3 OF 20	CE18119.2-203-GA
GENERAL ARRANGEMENT SHEET 4 OF 20	CE18119.2-204-GA
GENERAL ARRANGEMENT SHEET 5 OF 20	CE18119.2-205-GA
GENERAL ARRANGEMENT SHEET 6 OF 20	CE18119.2-206-GA
GENERAL ARRANGEMENT SHEET 7 OF 20	CE18119.2-207-GA
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GENERAL ARRANGEMENT SHEET 9 OF 20	CE18119.2-209-GA
GENERAL ARRANGEMENT SHEET 10 OF 20	CE18119.2-210-GA
GENERAL ARRANGEMENT SHEET 11 OF 20	CE18119.2-211-GA
GENERAL ARRANGEMENT SHEET 12 OF 20	CE18119.2-212-GA
GENERAL ARRANGEMENT SHEET 13 OF 20	CE18119.2-213-GA
GENERAL ARRANGEMENT SHEET 14 OF 20	CE18119.2-214-GA
GENERAL ARRANGEMENT SHEET 15 OF 20	CE18119.2-215-GA
GENERAL ARRANGEMENT SHEET 16 OF 20	CE18119.2-216-GA
GENERAL ARRANGEMENT SHEET 17 OF 20	CE18119.2-217-GA
GENERAL ARRANGEMENT SHEET 18 OF 20	CE18119.2-218-GA
GENERAL ARRANGEMENT SHEET 19 OF 20	CE18119.2-219-GA
GENERAL ARRANGEMENT SHEET 20 OF 20	CE18119.2-220-GA

FIRST ISSUE		CALCS	DRAWN	DATE	AMENDMENT DETAILS
	A	LM	DA	11/19	
AMENDMENTS	A	LM	JO	24/04/20	CONCEPT DESIGN ISSUE

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PROJECT
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HUME HIGHWAY NSW
PROP. TRUNK WATER MAIN STG 2

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DRAWING TITLE
DRG. SCHEDULE

DRAWING NUMBER
CE18119.2-002-CO

ISSUE
A

LEGEND

PROPOSED

- Proposed Trunk Water Main (W — W)
- Proposed Water Service Line (WS — WS)
- Proposed Fire Hydrant (FH)
- Proposed Flushing Point (FP)
- Proposed Valve (SV)

EXISTING SURVEY

- Existing Lot Boundary
- Permanent Survey Mark
- Existing Edge of Bitumen
- Existing Fence Line
- Existing Overhead Communications (T — O/H)
- Existing Overhead Electrical (E — O/H)
- Existing Stormwater Line (D)
- Existing Water Main (DBYD Location Only) (W)
- Existing Sewer Main (DBYD Location Only) (S)
- Existing Underground NBN (NBN)
- Existing Telstra Pit
- Existing Power Pole
- Existing Bitumen Surface
- Existing Surface Contours

12.0

GENERAL:

1. CONSTRUCTION AND MATERIAL SHALL BE UNDERTAKEN AND PROVIDED IN ACCORDANCE WITH THE SYDNEY WATER/WSAA & RMS GUIDELINES.
2. THESE DRAWINGS SHALL BE READ IN CONJUNCTION WITH SYDNEY WATER/WSAA DESIGN & CONSTRUCTION GUIDELINES AND WITH SUCH OTHER WRITTEN INSTRUCTIONS AS MAY BE ISSUED DURING THE COURSE OF THE CONTRACT. ALL DISCREPANCIES SHALL BE REFEREED TO THE SUPERINTENDENT FOR DIRECTION BEFORE PROCEEDING WITH WORKS.
3. DIMENSIONS SHALL NOT BE SCALED FROM DRAWINGS.
4. SET-OUT DIMENSIONS & LEVELS, INCLUDING ANY SHOWN ON THE DRAWINGS ARE TO BE VERIFIED ON SITE BY THE CONTRACTOR BEFORE FABRICATION & CONSTRUCTION.
5. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF PIPES AND PITS AGAINST FLOATATION DURING CONSTRUCTION.
6. NO SUBSTITUTE MATERIALS SHALL BE USED WITHOUT THE APPROVAL OF THE SUPERINTENDENT.
7. HEIGHT DATUM IS TO AHD & COORDINATES ARE RELATIVE TO MGA94 (ZONE 55).
8. SURVEY EXTENTS ARE GENERALLY LIMITED TO THE PROPOSED WATER MAIN ALIGNMENT & DO NOT NECESSARILY INCLUDE ALL EXISTING FEATURES WITHIN THE PROJECT AREA.
9. UNDERGROUND SERVICE UTILITIES HAVE BEEN PLOTTED USING SERVICE AUTHORITY RECORDS & MAY NOT REPRESENT THE ACTUAL SERVICE LOCATION. WHERE REQUIRED, THE PLOTTED LOCATION OF THESE SERVICES MAY HAVE BEEN ALTERED TO FIT ACTUAL SURVEYED SERVICES.
10. BEDDING TO CONFORM TO AUS-SPEC, 1341 WATER SUPPLY & 1361 SEWER SYSTEM SPECIFICATIONS;
11. SPECIAL BEDDING CONDITIONS TO BE SPECIFIED BY THE PRINCIPALS AUTHORIZED PERSON TO SUIT THE CONDITIONS IF THE TRENCH FLOOR HAS:
- IRREGULAR OUTCROPS OF ROCK,
- AHBP OF <50kPa (SEE SEW-1200), OR
- BEEN DISTURBED BY UNCONTROLLED GROUND WATER.
4. COMPACT AND EVENLY GRADE FINISHED TRENCH FLOOR.
5. EMBEDMENT, TRENCH FILL AND COMPACTION TO MEET THE REQUIREMENT OF AUS-SPEC 1341, 1362, DESIGN DRAWINGS & WSA 02 PART 3.
6. USE GEOTEXTILE FILTER FABRIC WHERE SPECIFIED.
7. SIDES OF EXCAVATION TO BE KEPT VERTICAL TO AT LEAST 150 ABOVE THE PIPE

PROPOSED WATER WORKS:

1. WHERE CONNECTION TO EXISTING PIPEWORK, THE LEVEL & DIAMETER OF THE EXISTING PIPEWORK SHALL BE CONFIRMED BY THE CONTRACTOR PRIOR TO CONNECTION.
2. CHANGES IN HORIZONTAL & VERTICAL ALIGNMENT, OTHER THAN THROUGH FABRICATED BENDS, SHALL BE ACHIEVED BY DEFLECTION AT PIPE JOINTS WHERE SHOWN. MAXIMUM DEFLECTION SHALL BE AS PER MANUFACTURERS SPECIFICATIONS.
3. PROVIDE SUFFICIENT TRENCH DEPTH AND WIDTH TO ALLOW FOR DEFLECTION OF PIPES AT JOINT'S.
4. TEST PRESSURE SHALL BE 1200kpa AT THE LOWEST POINT ON THE PIPELINE.
5. ALL PIPE FITTINGS SHALL BE PE100 MIN.
6. PRESSURE MAIN CLEARANCE FROM ALL EXISTING SERVICES SHALL B EIN ACCORDANCE WITH SYDNEY WATER/WSA GUIDELINES. IF CLEARANCE BETWEEN SERVICES IS LESS THAN THAT SPECIFIED, REFER TO THE SUPERINTENDENT FOR DIRECTION BEFORE PROCEEDING WITH WORK.
7. MIN. PRESSURE MAIN COVER FROM FINISHED GROUND LEVEL TO THE OBVERT OF THE MAIN SHALL BE;
   - 7.1. 600mm Cover - Non-trafficable areas; &
   - 7.2. 600mm Cover - Trafficable areas.
8. UNLESS STATED OTHERWISE, DECOMMISSIONED PIPES THAT ARE NOT REMOVED AS PART OF THE WORKS SHALL BE CAPPED AND GROUTED IN ACCORDANCE WITH THE SYDNEY WATER/WSAA GUIDELINES. WHERE THE DISTURBANCE, REMOVAL AND/OR CUTTING OF AC PIPE IS REQUIRED, THE CONTRACTOR SHALL REFER TO SWMS FOR THE SAFE MANAGEMENT AND DISPOSAL OF AC PIPE.
9. DECOMMISSIONG OF ALL SURFACE FITTING/FIXTURES SHALL INCLUDE THE REMOVAL AND DISPONAL OF HYDRANTS, VALVE STEMS, BOXES AND MARKERS AND REINSTATEMENT TO MATCH SURROUNDING AREA.
10. ALL EXISTING WATER SERVICES SHALL BE REPLACED UNLESS SHOWN OTHERWISE. **SHORT WATER SERVICE CONNECTION OMITTED FOR CLARITY.**

EARTHWORKS:

1. TOPSOIL AND SUBSOIL SHALL BE STOCKPILED SEPARATELY.
2. CARE SHALL BE TAKEN TO PREVENT SEDIMENT FROM ENTERING THE SYSTEM. THIS MAY INVOLVE PLACING APPROPRIATE SEDIMENT CONTROLS AROUND STOCKPILES.
3. WHERE ACID SULPHATE SOILS HAVE BEEN IDENTIFIED WITHIN THE PROJECT AREA, THE CONTRACTOR SHALL BE RESPONSIBLE FOR COMPLIANCE WITH ALL RELATED STATUTORY REQUIREMENTS AND SHALL REFER TO SWMS FOR MANAGEMENT AND TREATMENT OF ACID SULPHATE SOILS.

ENVIRONMENT:

1. THE CONTRACTOR IS RESPONSIBLE FOR ENSURING THAT CONSTRUCTION WORKS DO NOT RESULT IN THE CONTAMINATION OF ADJACENT WATERWAYS, WETLANDS AND/OR ECOSYSTEMS.
2. THE CONSTRUCTION WORKS WILL BE IMPLEMENTED IN ACCORDANCE WITH EMP & CONSTRUCTION EMP(C). THIS EMP(C) SHOULD ADDRESS ISSUES SUCH AS, BUT NOT LIMITED TO; WATER QUALITY, EROSION AND SEDIMENTATION, CULTURAL HERITAGE, NOISE, VIBRATION, AIR QUALITY, ACID SULPHATE SOILS, CONTAMINATED SITES, FLORA & FAUNA, VEGETATION, PEST MANAGEMENT, WASTE AND CHEMICAL/FUELS.

REINSTATEMENT:

1. UNLESS STATED OTHERWISE ALL EXISTING INFRASTRUCTURE AFFECTED BY THESE WORKS SHALL BE REINSTATED IN ACCORDANCE WITHE THE RELEVANT STANDARD SPECIFIED IN THE COOTAMUNDRA-GUNDAGAI REGIONAL COUNCIL GUIDELINES. THE FOLLOWING REINSTATEMENT REQUIREMENTS SHALL BE READ IN CONJUNCTION WITH THE PROJECT SPECIFICATIONS.

0 2.5 10.0m
0 5.0 20.0m
1:500 (A1)
1:1000 (A3)

FIRST ISSUE	CALCS	DRAWN	DATE	AMENDMENT DETAILS
	LM	DA	11/19	
A	LM	JO	24/04/20	CONCEPT DESIGN ISSUE

AMENDMENTS

DESIGN CHECK

DRAWN CHECK

DATUM

PROJECT No.
CE18119.2

ISSUED FOR APPROVAL

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FOR & ON BEHALF OF MOLONEY & SONS ENGINEERING

CLIENT
COOTAMUNDRA-GUNDAGAI REGIONAL COUNCIL

PROJECT
FIVE MILE - COOLAC SERVICE STN
HUME HIGHWAY NSW
PROP. TRUNK WATER MAIN STG 2

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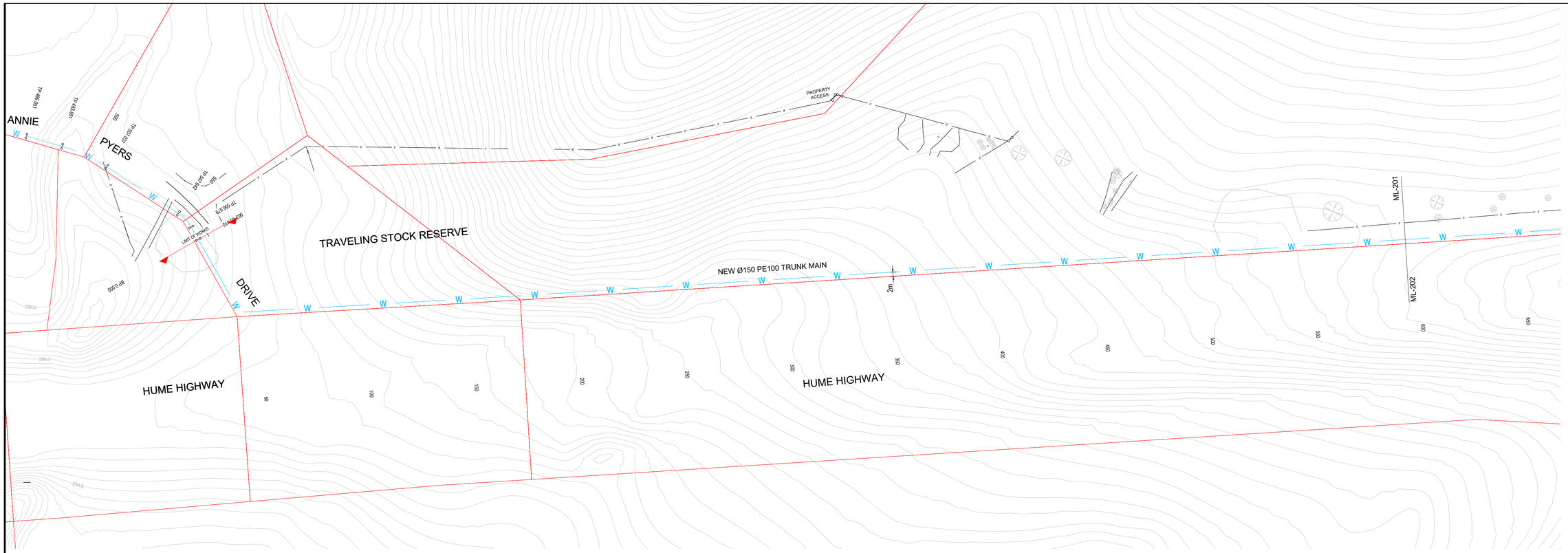
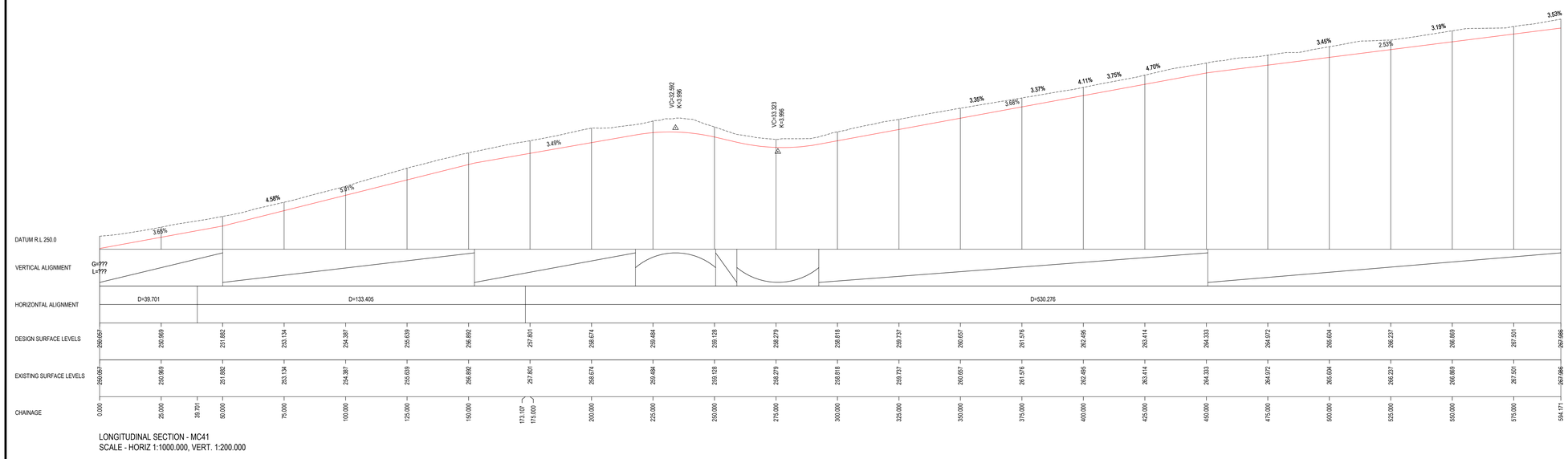
DRAWING TITLE
LEGEND & GENERAL NOTES

DRAWING NUMBER
CE18119.2-101-GE

ISSUE
A





LONGITUDINAL SECTION - MC41
SCALE - HORIZ 1:1000.000, VERT. 1:200.000

GENERAL:

1. VERTICAL ALIGNMENT IS INDICATIVELY SHOWN ONLY AND WILL GENERALLY COMPLY WITH 600mm COVER AND 1500mm COVER BENEATH SEALED TRAFFICED AREAS AS A MINIMUM CONSIDERATION IN THE DESIGN BEEN GIVEN TO THE MITIGATION OF SAG/CREST POINTS IN THE LINE.
2. MAINTAIN ALL WATER SERVICES DURING CONSTRUCTION, MAKE PROVISION OF TEMP. CONNECTION WHERE/IF REQUIRED.
3. THESE DRAWINGS SHALL BE READ IN CONJUNCTION WITH SYDNEY WATER/WSAA DESIGN & CONSTRUCTION GUIDELINES AND WITH SUCH OTHER WRITTEN INSTRUCTIONS AS MAY BE ISSUED DURING THE COURSE OF THE CONTRACT. ALL DISCREPANCIES SHALL BE REFEREED TO THE SUPERINTENDENT FOR DIRECTION BEFORE PROCEEDING WITH WORKS.
4. DIMENSIONS SHALL NOT BE SCALED FROM DRAWINGS.
5. SET-OUT DIMENSIONS & LEVELS, INCLUDING ANY SHOWN ON THE DRAWINGS ARE TO BE VERIFIED ON SITE BY THE CONTRACTOR BEFORE FABRICATION & CONSTRUCTION.
6. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF PIPES AND PITS AGAINST FLOATATION DURING CONSTRUCTION.
7. NO SUBSTITUTE MATERIALS SHALL BE USED WITHOUT THE APPROVAL OF THE SUPERINTENDENT.
8. HEIGHT DATUM IS TO AHD & COORDINATES ARE RELATIVE TO MGA94 (ZONE 55).
9. SURVEY EXTENTS ARE GENERALLY LIMITED TO THE PROPOSED WATER MAIN ALIGNMENT & DO NOT NECESSARILY INCLUDE ALL EXISTING FEATURES WITHIN THE PROJECT AREA.
10. UNDERGROUND SERVICE UTILITIES HAVE BEEN PLOTTED USING SERVICE AUTHORITY RECORDS & MAY NOT REPRESENT THE ACTUAL SERVICE LOCATION. WHERE REQUIRED, THE PLOTTED LOCATION OF THESE SERVICES MAY HAVE BEEN ALTERED TO FIT ACTUAL SURVEYED SERVICES.

FIRST ISSUE	CALCS	DRAWN	DATE	AMENDMENT DETAILS
A	LM	JO	24/04/20	CONCEPT DESIGN ISSUE

DESIGN CHECK

DRAWN CHECK

DATUM

PROJECT No.
CE18119.2

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FOR & ON BEHALF OF MOLONEY & SONS ENGINEERING

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COOTAMUNDRA-GUNDAGAI REGIONAL COUNCIL

PROJECT
FIVE MILE - COOLAC SERVICE STN
HUME HIGHWAY NSW
PROP. TRUNK WATER MAIN STG 2

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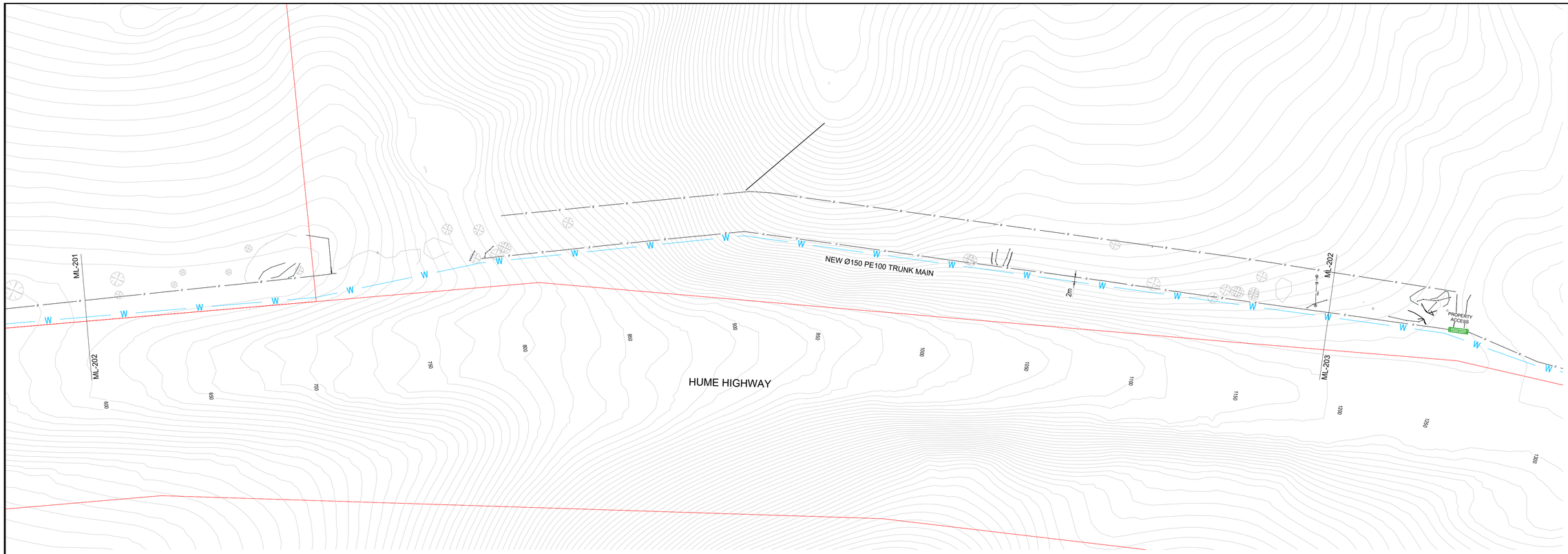
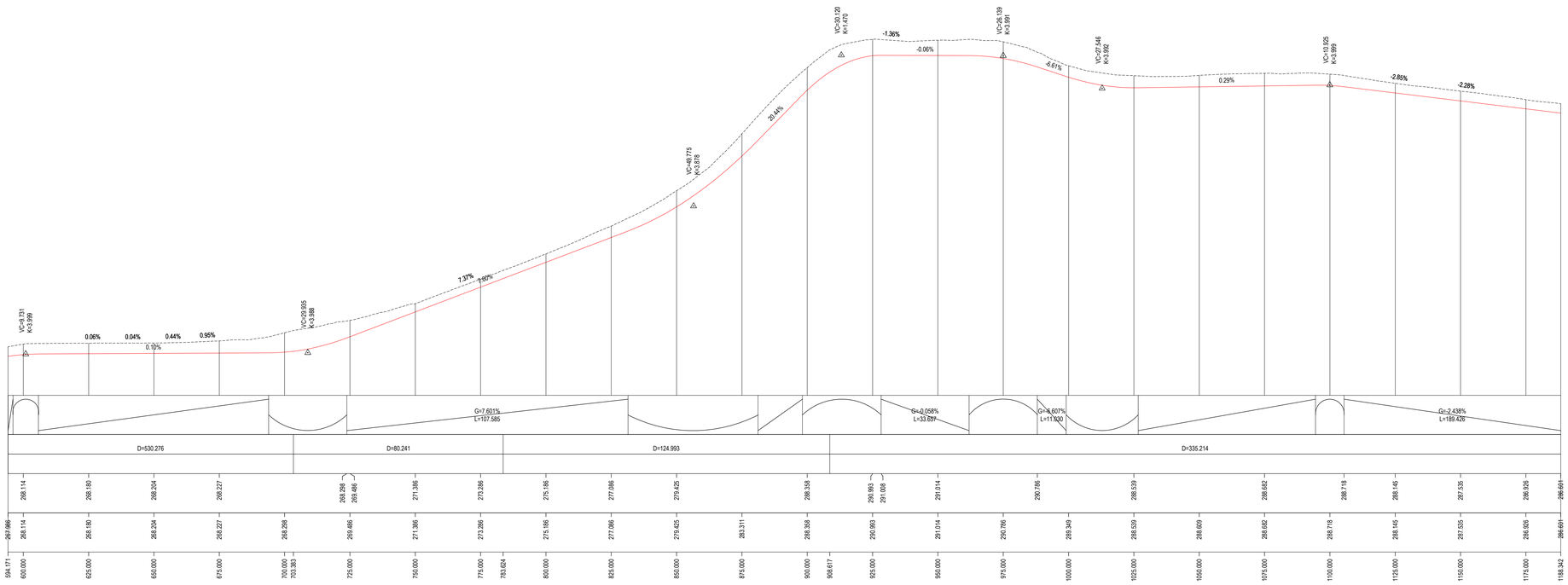
DRAWING TITLE
GENERAL ARRANGEMENT
SHEET 1 OF 20

DRAWING NUMBER
CE18119.2-201-GA

ISSUE
A





LONGITUDINAL SECTION - MC41
SCALE - HORIZ 1:1000.000, VERT. 1:200.000

COOTAMUNDRA-GUNDAGAI REGIONAL COUNCIL

0 1000 2000

GENERAL:

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2. MAINTAIN ALL WATER SERVICES DURING CONSTRUCTION, MAKE PROVISION OF TEMP. CONNECTION WHERE/IF REQUIRED.
3. THESE DRAWINGS SHALL BE READ IN CONJUNCTION WITH SYDNEY WATER/WSAA DESIGN & CONSTRUCTION GUIDELINES AND WITH SUCH OTHER WRITTEN INSTRUCTIONS AS MAY BE ISSUED DURING THE COURSE OF THE CONTRACT. ALL DISCREPANCIES SHALL BE REFEREED TO THE SUPERINTENDENT FOR DIRECTION BEFORE PROCEEDING WITH WORKS.
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AMENDMENTS

DESIGN CHECK

DRAWN CHECK

JAS-ANZ CERTIFIED ISO 9001

DATUM

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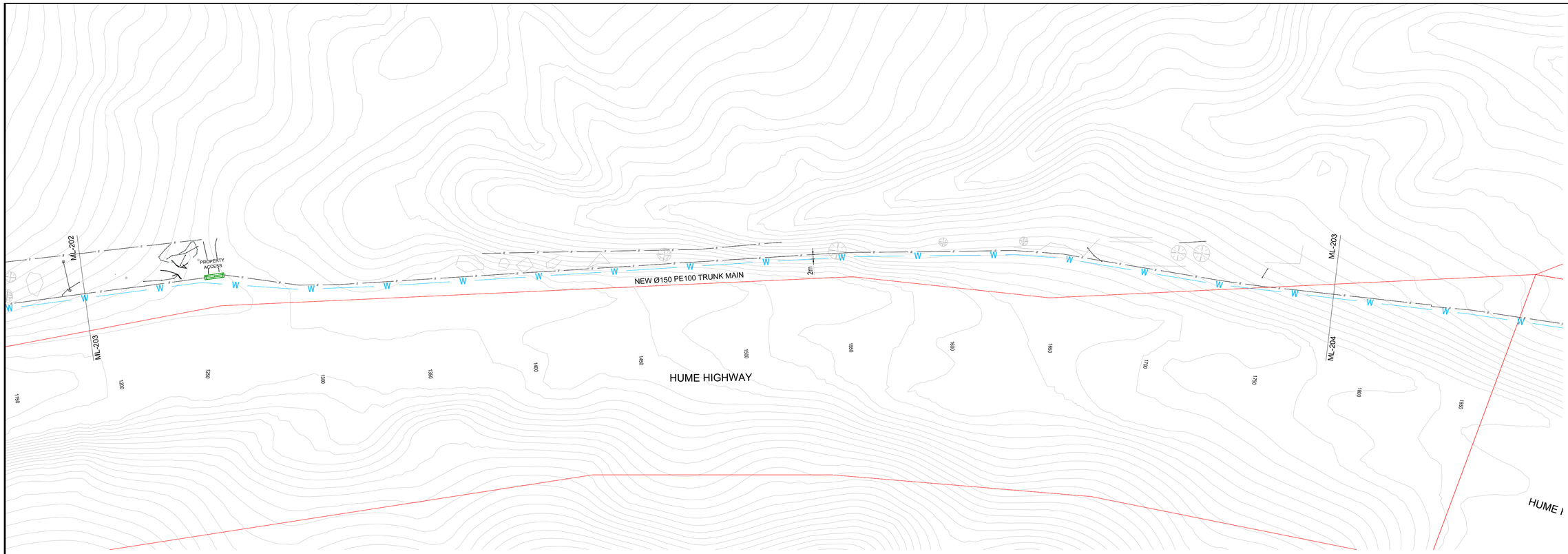
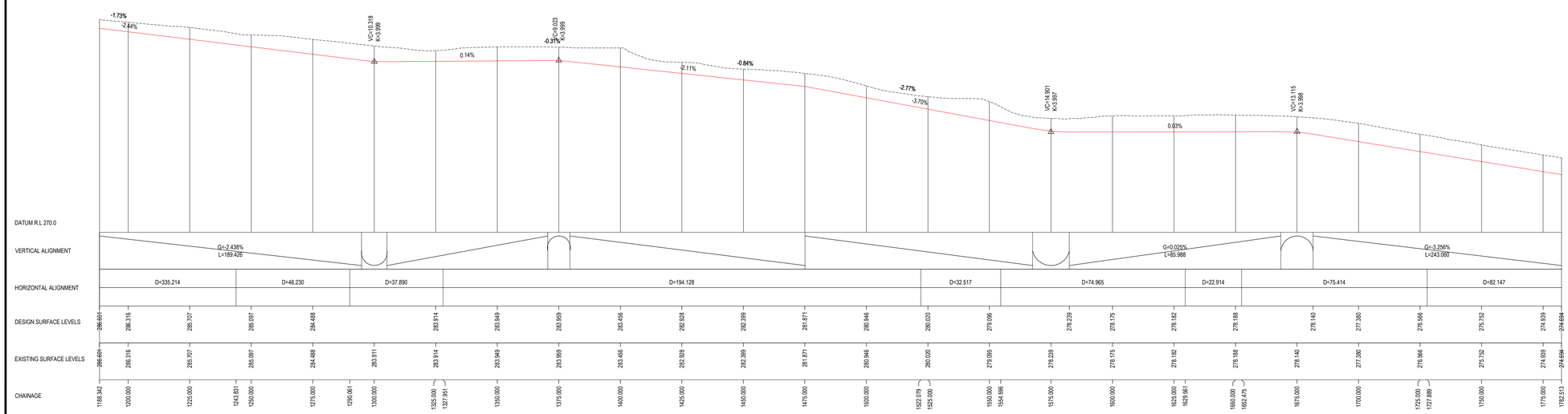
DRAWING TITLE
GENERAL ARRANGEMENT
SHEET 2 OF 20

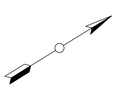
DRAWING NUMBER
CE18119.2-202-GA

ISSUE
A





LONGITUDINAL SECTION - MC41
SCALE - HORIZ 1:1000.000, VERT. 1:200.000



GENERAL:

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AMENDMENTS	FIRST ISSUE	CALCS	DRAWN	DATE	AMENDMENT DETAILS
	A	LM	JO	24/04/20	CONCEPT DESIGN ISSUE

DESIGN CHECK

DRAWN CHECK

DATUM

PROJECT No.
CE18119.2

ISSUED FOR APPROVAL

APPROVED

FOR & ON BEHALF OF MOLONEY & SONS ENGINEERING

CLIENT
COOTAMUNDRA-GUNDAGAI REGIONAL COUNCIL

PROJECT
FIVE MILE - COOLAC SERVICE STN
HUME HIGHWAY NSW
PROP. TRUNK WATER MAIN STG 2

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DRAWING TITLE
GENERAL ARRANGEMENT
SHEET 3 OF 20

DRAWING NUMBER
CE18119.2-203-GA

ISSUE
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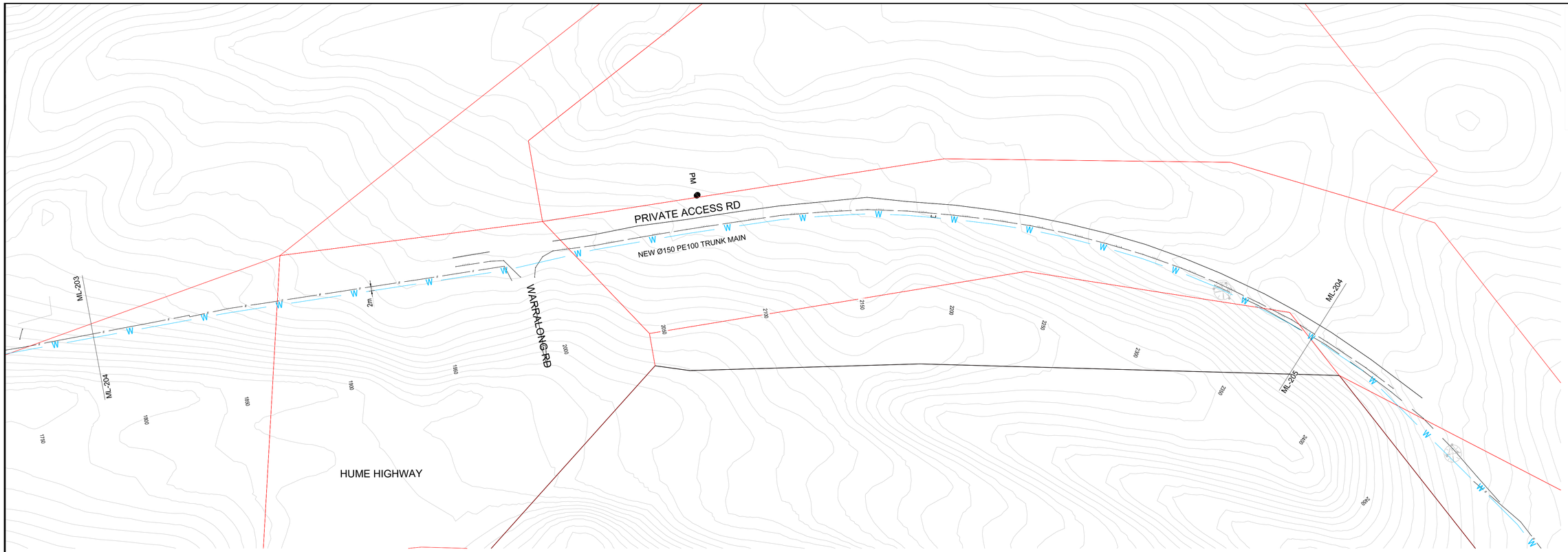

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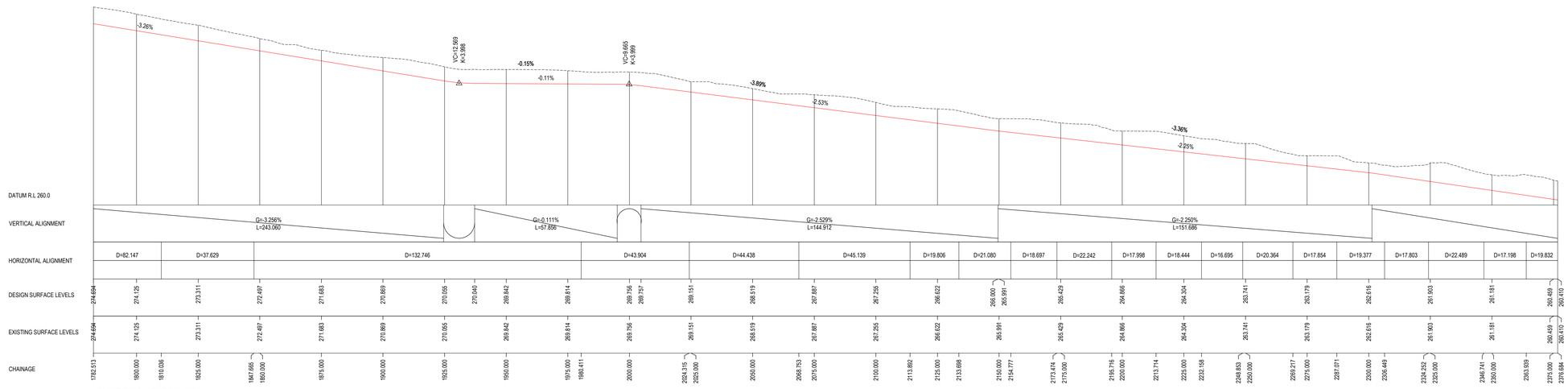

LONGITUDINAL SECTION - MC41
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A	LM	JO	24/04/20	CONCEPT DESIGN ISSUE

AMENDMENTS

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JAS-ANZ CERTIFIED ISO 9001

DATUM

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CLIENT
COOTAMUNDRA-GUNDAGAI REGIONAL COUNCIL

PROJECT
FIVE MILE - COOLAC SERVICE STN
HUME HIGHWAY NSW
PROP. TRUNK WATER MAIN STG 2

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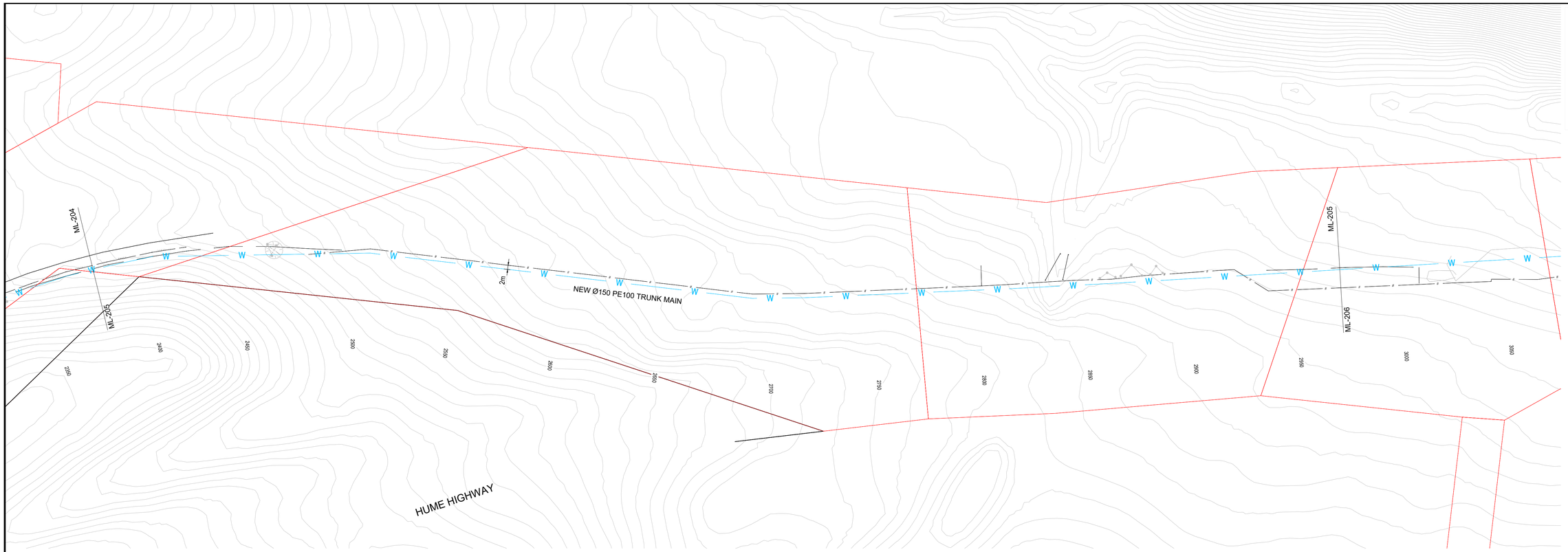
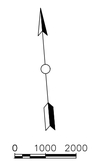
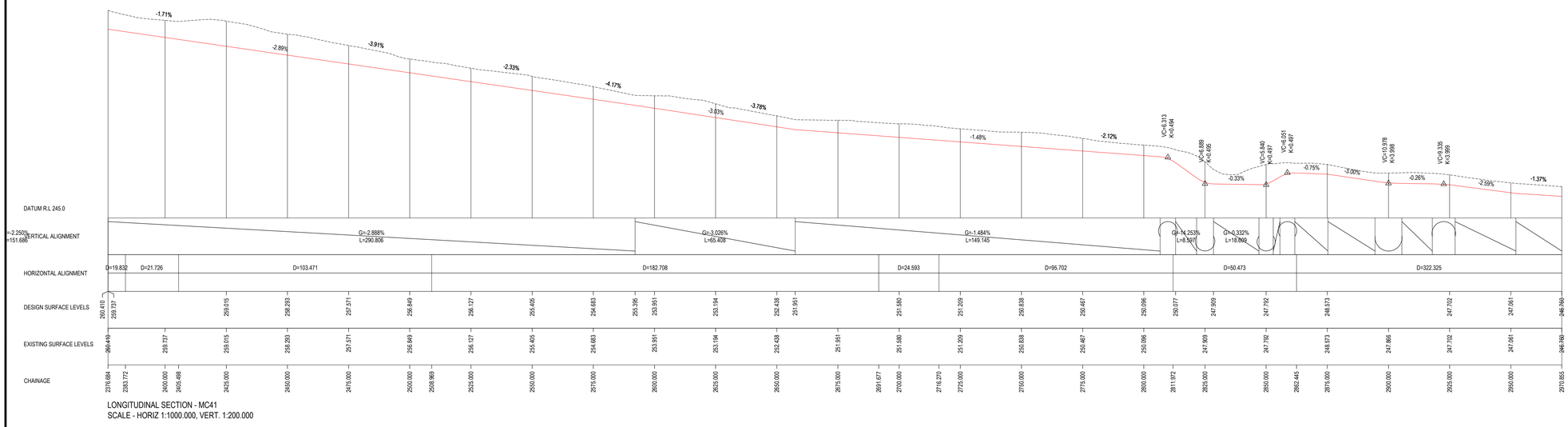
DRAWING TITLE
GENERAL ARRANGEMENT
SHEET 4 OF 20

DRAWING NUMBER
CE18119.2-204-GA

ISSUE
A







LONGITUDINAL SECTION - MC41
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DRAWN CHECK

JAS-ANZ CERTIFIED ISO 9001

DATUM

PROJECT No.
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APPROVED

FOR & ON BEHALF OF MOLONEY & SONS ENGINEERING

CLIENT
COOTAMUNDRA-GUNDAGAI REGIONAL COUNCIL

PROJECT
FIVE MILE - COOLAC SERVICE STN
HUME HIGHWAY NSW
PROP. TRUNK WATER MAIN STG 2

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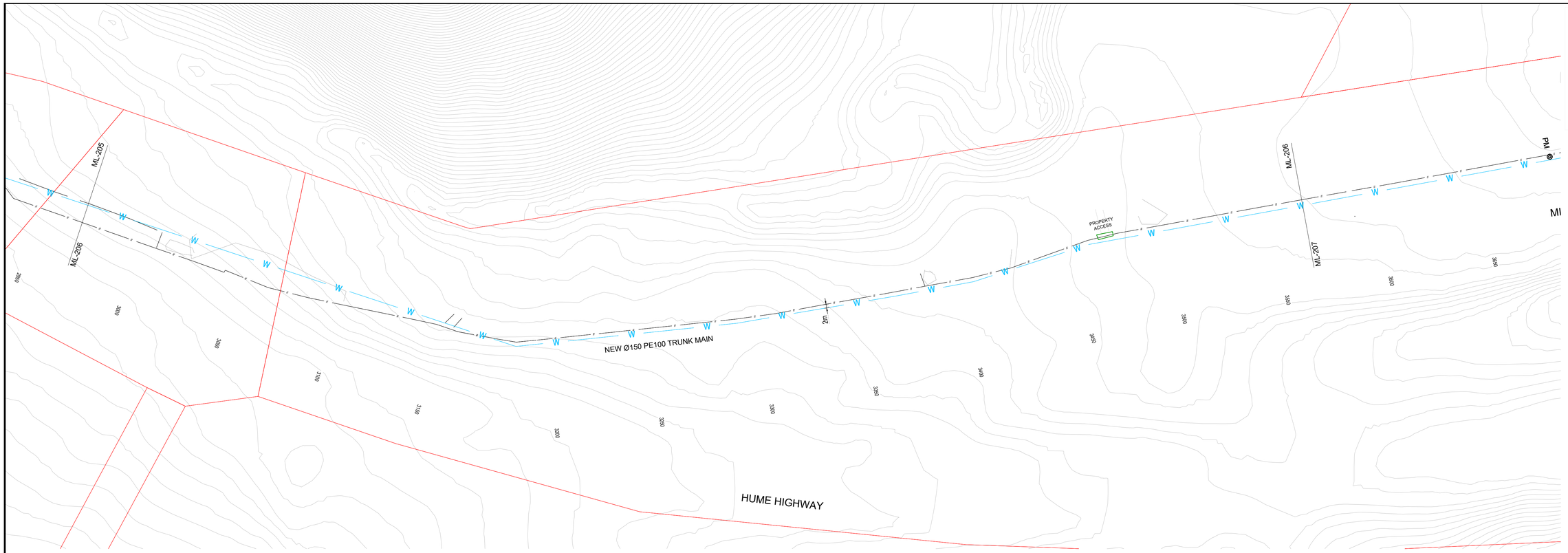
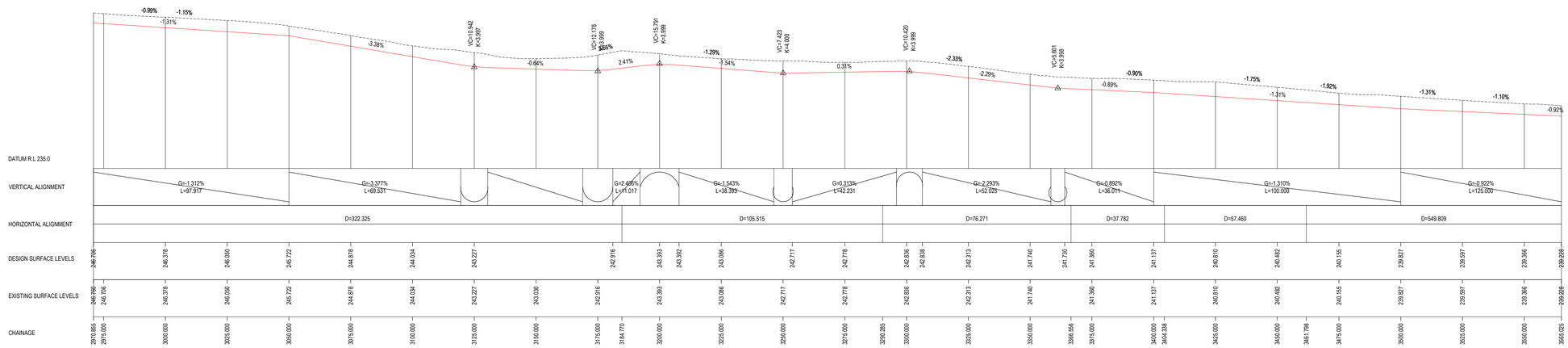
DRAWING TITLE
GENERAL ARRANGEMENT
SHEET 5 OF 20

DRAWING NUMBER
CE18119.2-205-GA

ISSUE
A





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JAS-ANZ ISO 9001 CERTIFIED

DATUM

PROJECT No.
CE18119.2

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APPROVED

FOR & ON BEHALF OF MOLONEY & SONS ENGINEERING

CLIENT
COOTAMUNDRA-GUNDAGAI REGIONAL COUNCIL

PROJECT
FIVE MILE - COOLAC SERVICE STN
HUME HIGHWAY NSW
PROP. TRUNK WATER MAIN STG 2

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DRAWING TITLE
GENERAL ARRANGEMENT
SHEET 6 OF 20

DRAWING NUMBER
CE18119.2-206-GA

ISSUE
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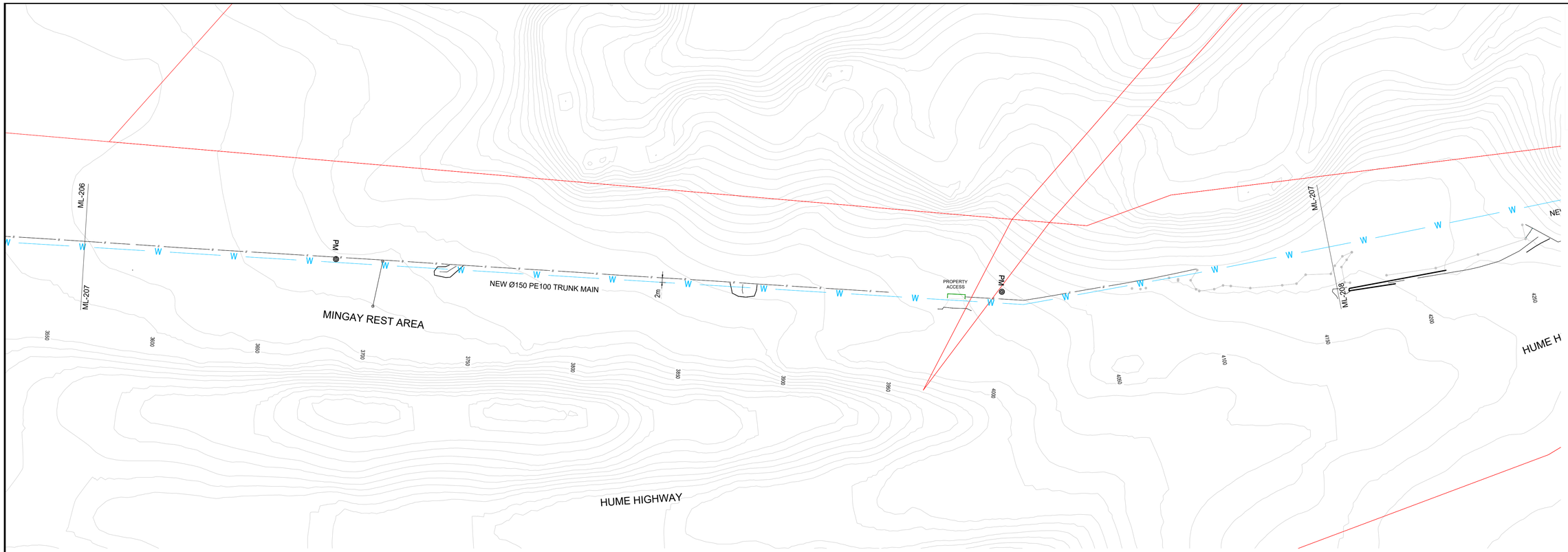

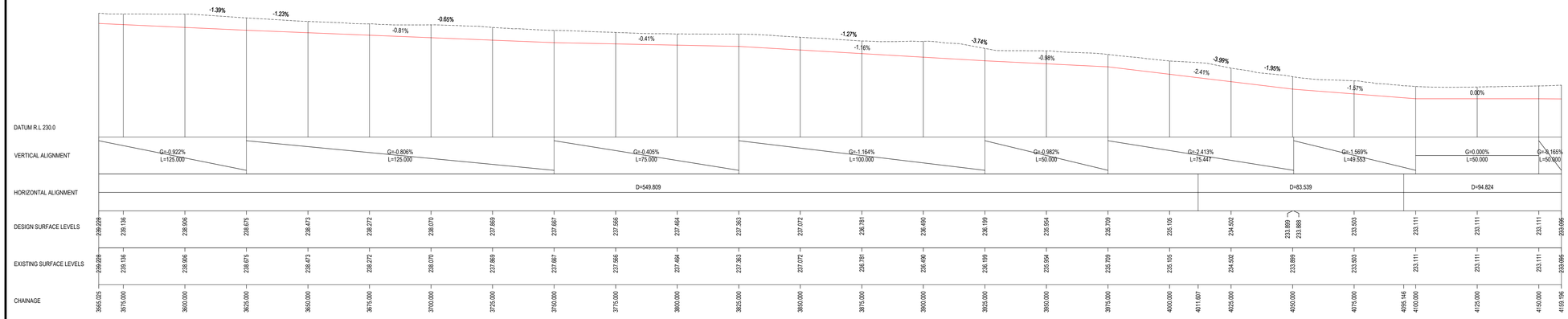

LONGITUDINAL SECTION - MC41
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DESIGN CHECK

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FOR & ON BEHALF OF MOLONEY & SONS ENGINEERING

CLIENT
COOTAMUNDRA-GUNDAGAI REGIONAL COUNCIL

PROJECT
FIVE MILE - COOLAC SERVICE STN
HUME HIGHWAY NSW
PROP. TRUNK WATER MAIN STG 2

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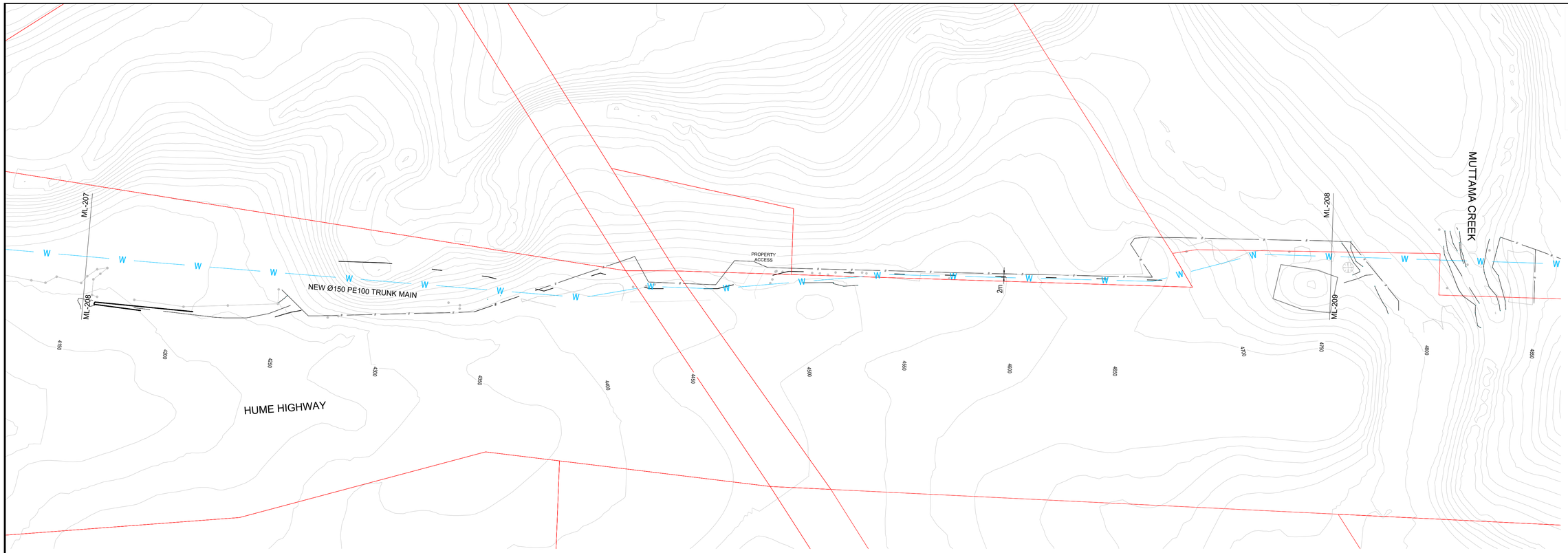
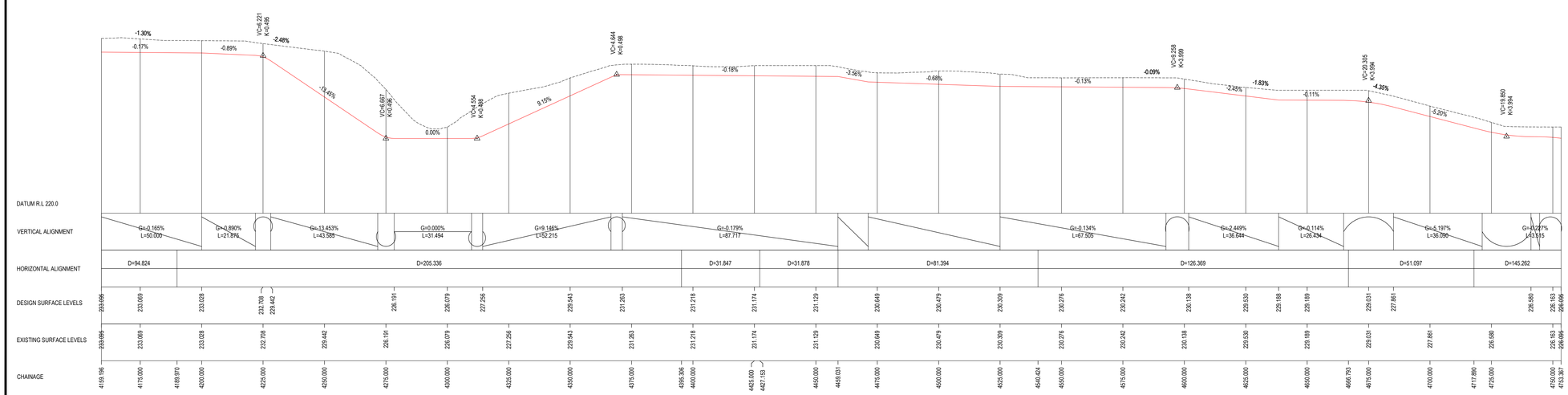
DRAWING TITLE
GENERAL ARRANGEMENT
SHEET 7 OF 20

DRAWING NUMBER
CE18119.2-207-GA

ISSUE
A





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CLIENT
COOTAMUNDRA-GUNDAGAI REGIONAL COUNCIL

PROJECT
FIVE MILE - COOLAC SERVICE STN
HUME HIGHWAY NSW
PROP. TRUNK WATER MAIN STG 2

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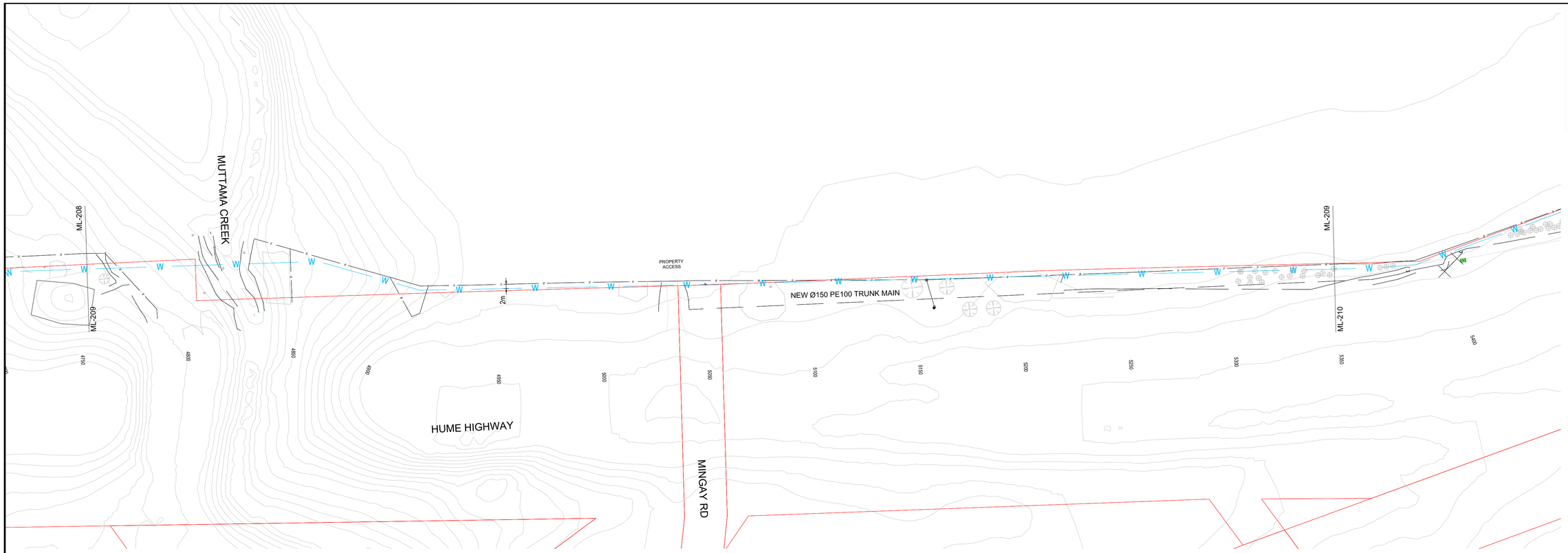
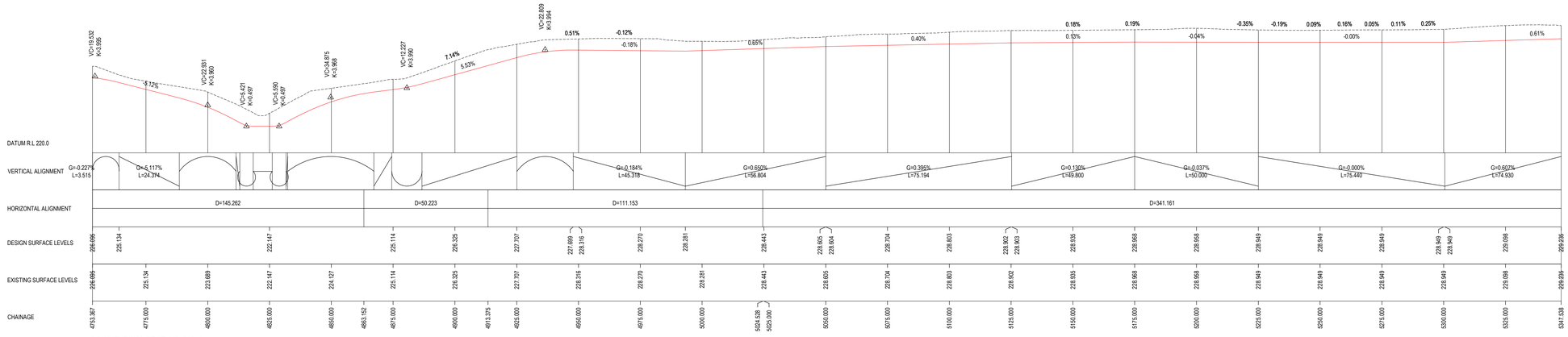
DRAWING TITLE
GENERAL ARRANGEMENT
SHEET 8 OF 20

DRAWING NUMBER
CE18119.2-208-GA

ISSUE
A





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FIVE MILE - COOLAC SERVICE STN
HUME HIGHWAY NSW
PROP. TRUNK WATER MAIN STG 2

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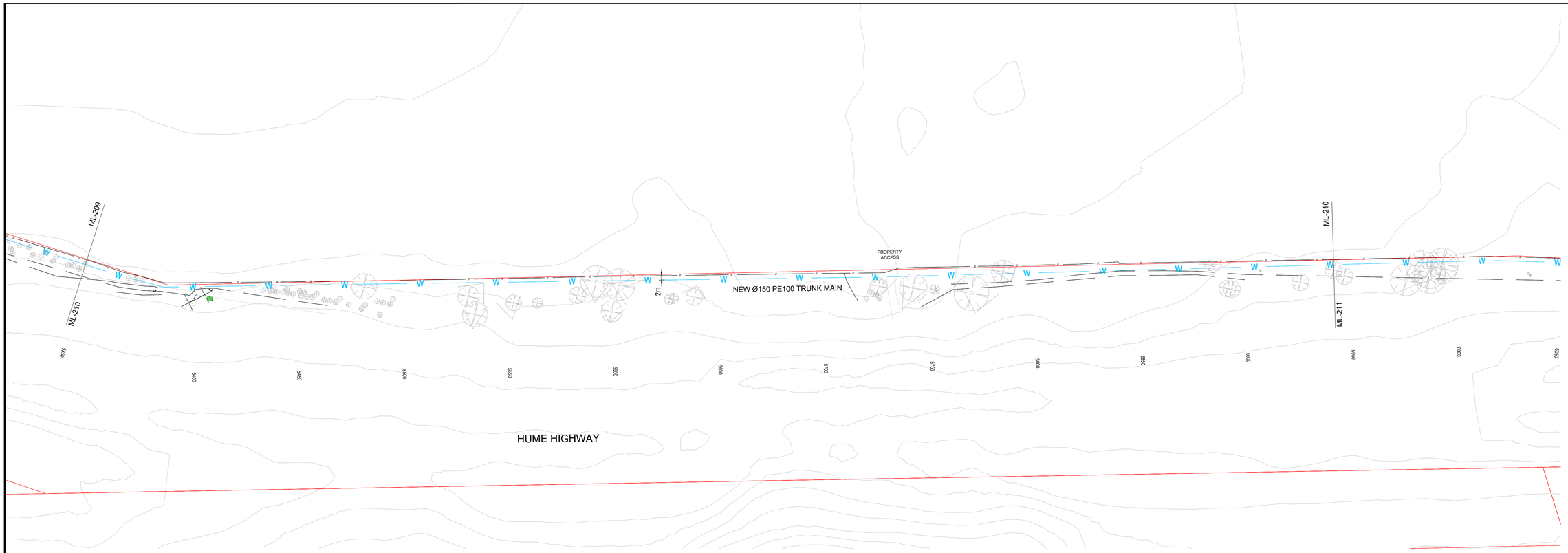
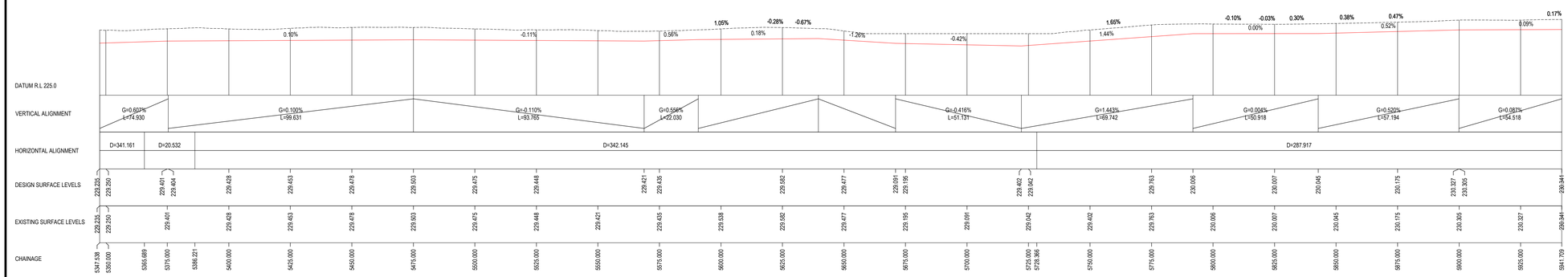
GOLD COAST • COFFS HARBOUR • SYDNEY

DRAWING TITLE
GENERAL ARRANGEMENT
SHEET 9 OF 20

DRAWING NUMBER
CE18119.2-209-GA

ISSUE
A





LONGITUDINAL SECTION - MC41
SCALE - HORIZ 1:1000.000, VERT. 1:200.000

COOTAMUNDRA-GUNDAGAI REGIONAL COUNCIL

0 1000 2000

GENERAL:

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FIRST ISSUE	CALCS	DRAWN	DATE	AMENDMENT DETAILS
A	LM	JO	24/04/20	CONCEPT DESIGN ISSUE

DESIGN CHECK

DRAWN CHECK

DATUM

PROJECT No.
CE18119.2

ISSUED FOR APPROVAL

APPROVED

FOR & ON BEHALF OF MOLONEY & SONS ENGINEERING

CLIENT
COOTAMUNDRA-GUNDAGAI REGIONAL COUNCIL

PROJECT
FIVE MILE - COOLAC SERVICE STN
HUME HIGHWAY NSW
PROP. TRUNK WATER MAIN STG 2

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DRAWING TITLE
GENERAL ARRANGEMENT
SHEET 10 OF 20

DRAWING NUMBER
CE18119.2-210-GA

ISSUE
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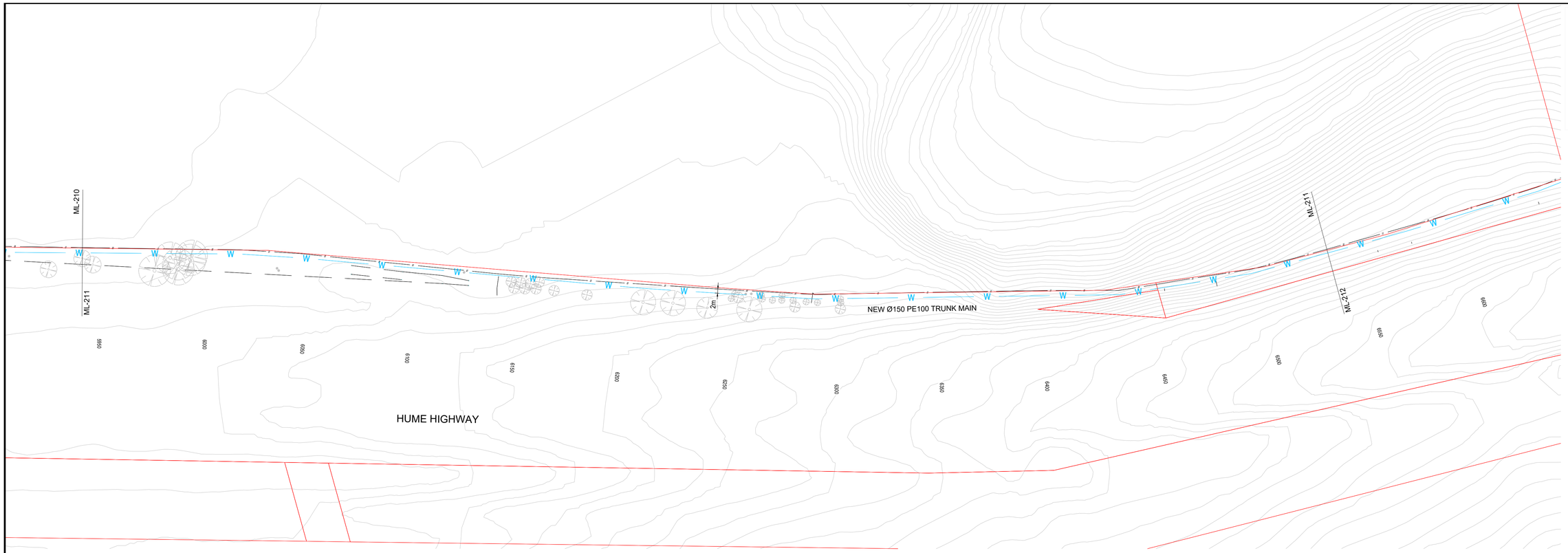

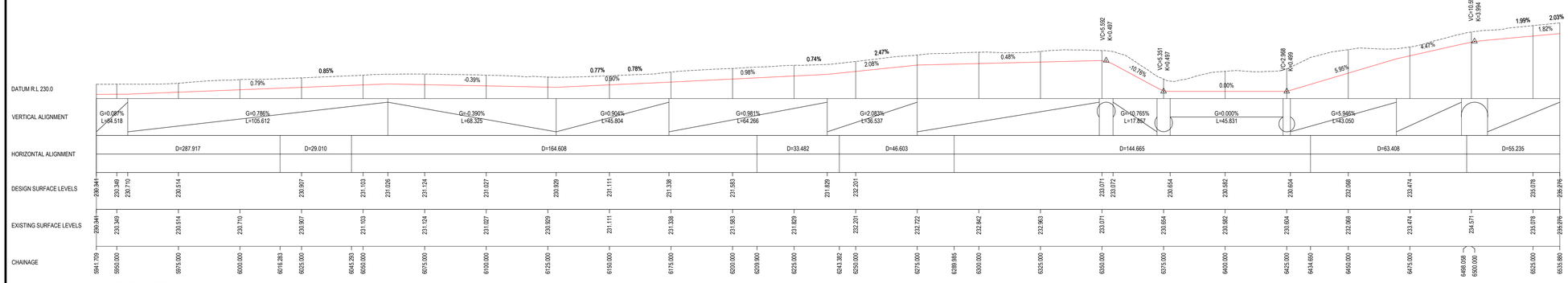

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JAS-ANZ CERTIFIED ISO 9001

DATUM

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COOTAMUNDRA-GUNDAGAI REGIONAL COUNCIL

PROJECT
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DRAWING TITLE
GENERAL ARRANGEMENT
SHEET 11 OF 20

DRAWING NUMBER
CE18119.2-211-GA

ISSUE
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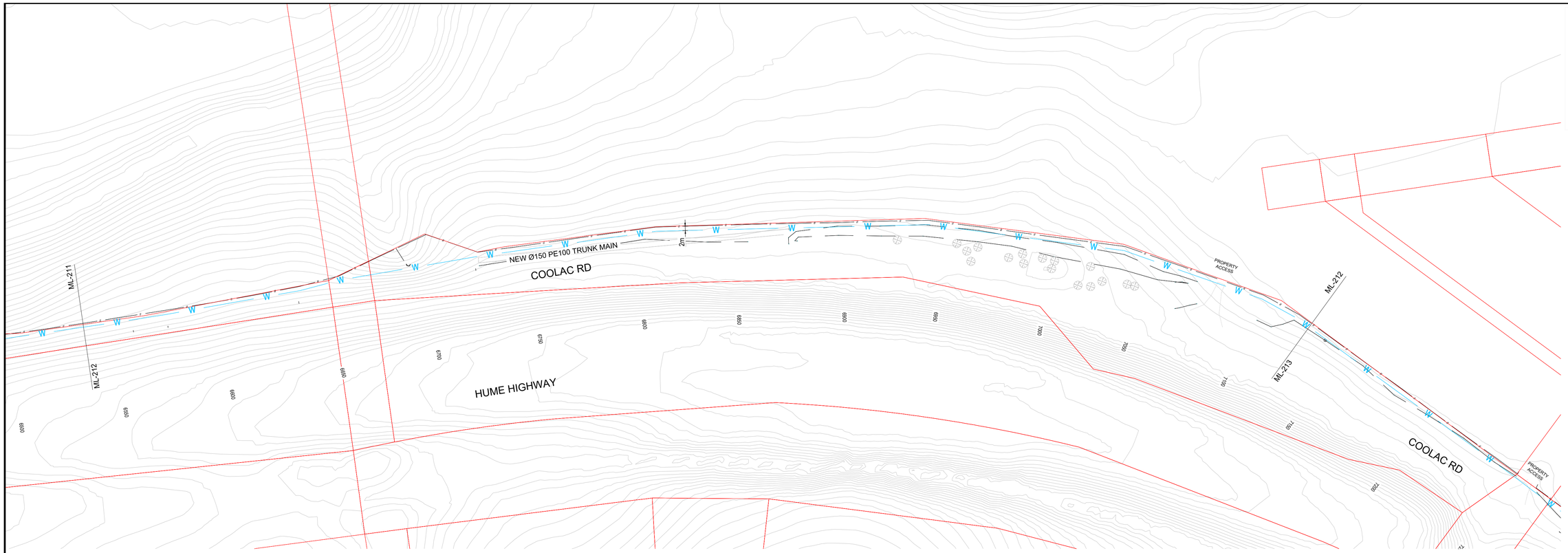

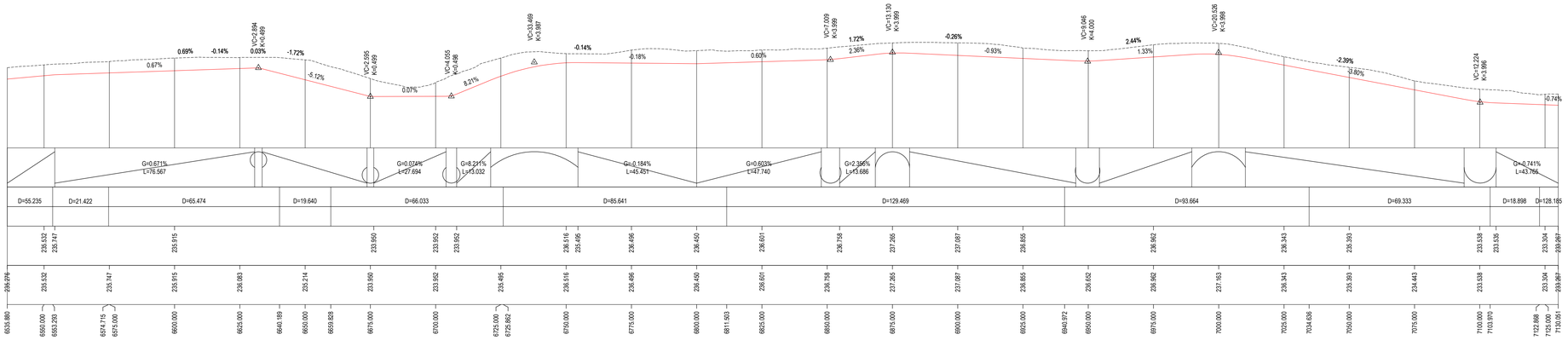

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COOTAMUNDRA-GUNDAGAI REGIONAL COUNCIL

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HUME HIGHWAY NSW
PROP. TRUNK WATER MAIN STG 2

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DRAWING TITLE
GENERAL ARRANGEMENT
SHEET 12 OF 20

DRAWING NUMBER
CE18119.2-212-GA

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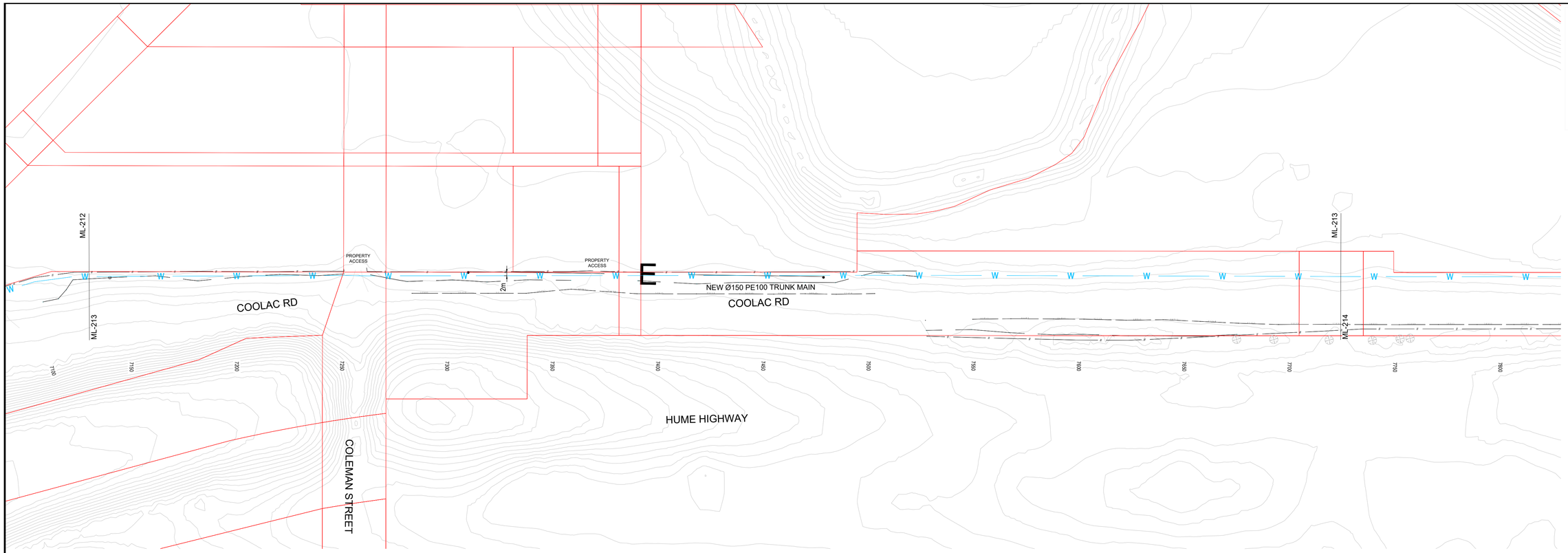

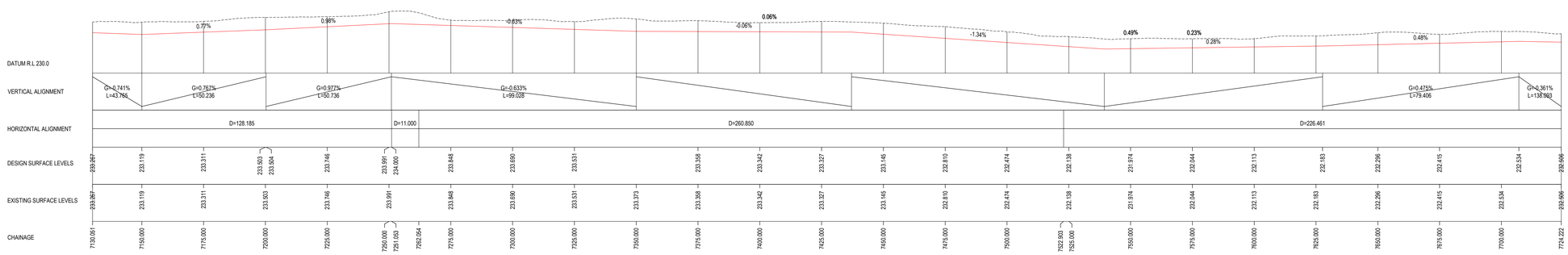

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COOTAMUNDRA-GUNDAGAI REGIONAL COUNCIL

PROJECT
FIVE MILE - COOLAC SERVICE STN
HUME HIGHWAY NSW
PROP. TRUNK WATER MAIN STG 2

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SHEET 13 OF 20

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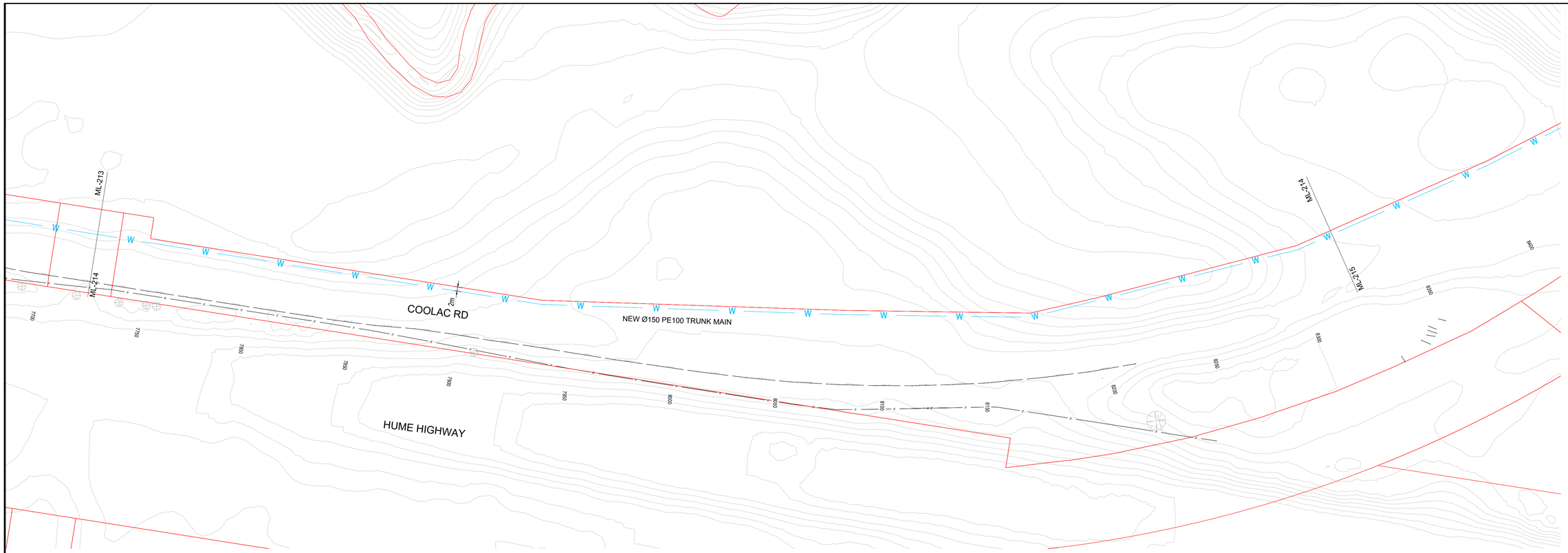

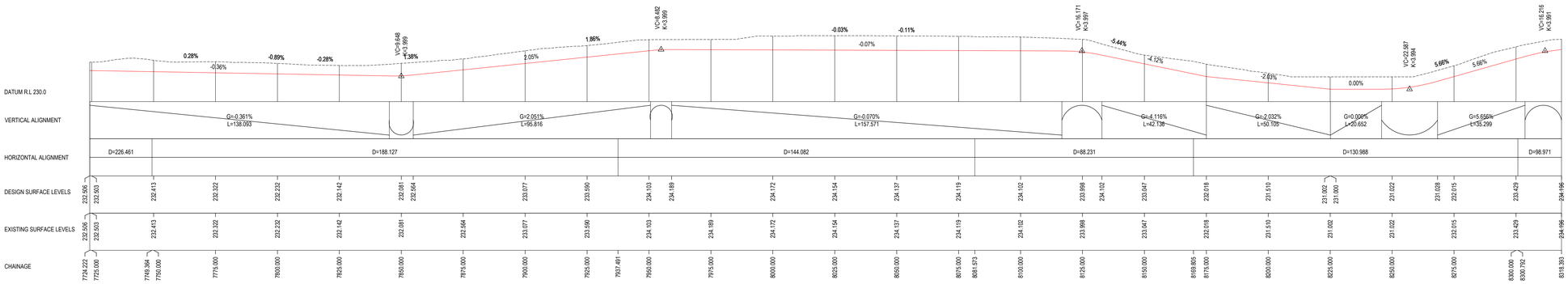

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CLIENT
COOTAMUNDRA-GUNDAGAI REGIONAL COUNCIL

PROJECT
FIVE MILE - COOLAC SERVICE STN
HUME HIGHWAY NSW
PROP. TRUNK WATER MAIN STG 2

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SHEET 14 OF 20

DRAWING NUMBER
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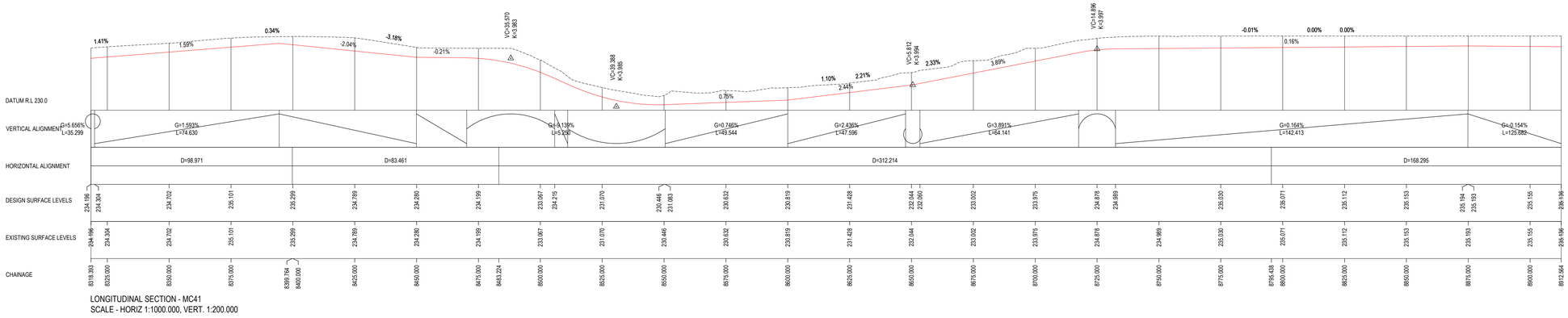

LONGITUDINAL SECTION - MC41
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COOTAMUNDRA-GUNDAGAI REGIONAL COUNCIL

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JAS-ANZ IQ RECEIVED ISO 9001

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COOTAMUNDRA-GUNDAGAI REGIONAL COUNCIL

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SHEET 15 OF 20

DRAWING NUMBER
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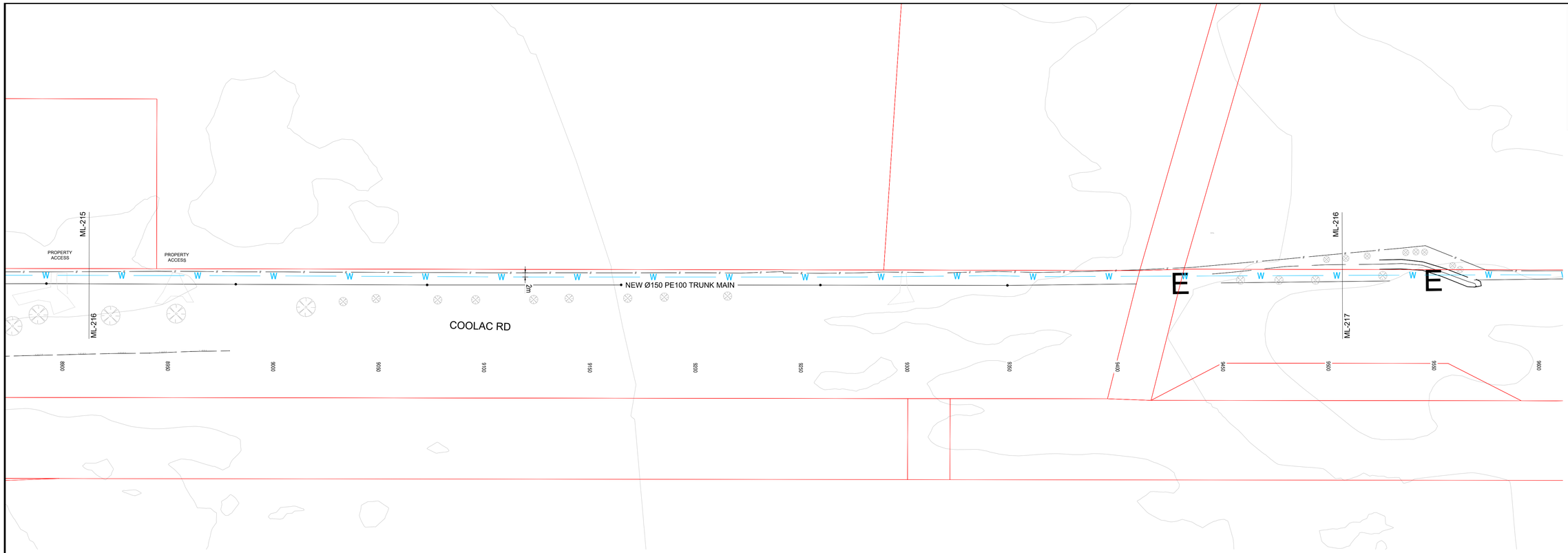

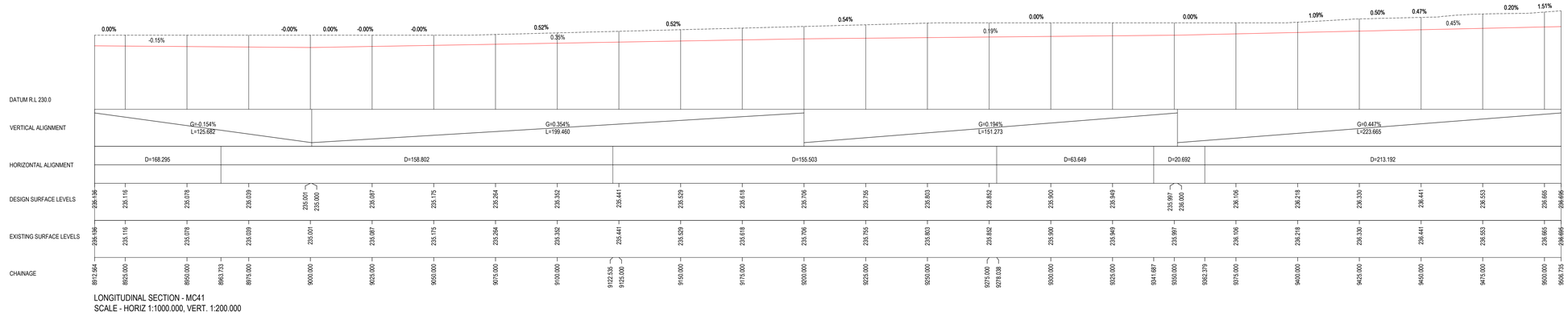

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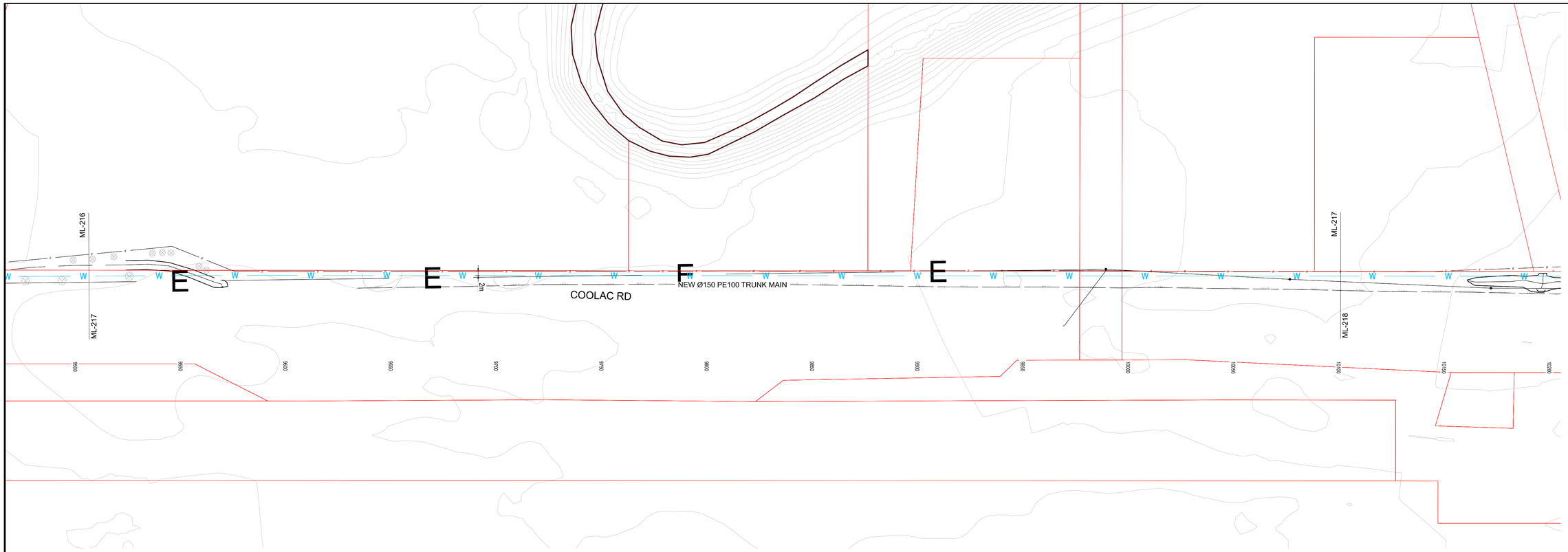
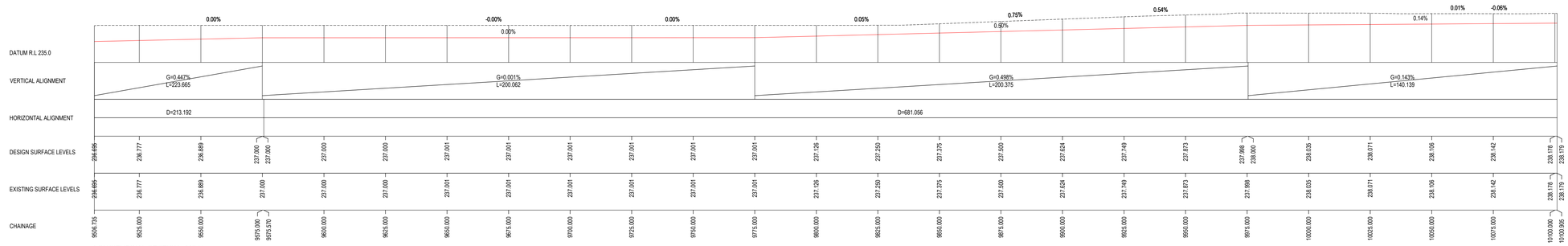
GOLD COAST • COFFS HARBOUR • SYDNEY

DRAWING TITLE
GENERAL ARRANGEMENT
SHEET 16 OF 20

DRAWING NUMBER
CE18119.2-216-GA

ISSUE
A





LONGITUDINAL SECTION - MC41
SCALE - HORIZ 1:1000.000, VERT. 1:200.000

COOTAMUNDRA-GUNDAGAI REGIONAL COUNCIL

0 1000 2000

GENERAL:

1. VERTICAL ALIGNMENT IS INDICATIVELY SHOWN ONLY AND WILL GENERALLY COMPLY WITH 600mm COVER AND 1500mm COVER BENEATH SEALED TRAFFICED AREAS AS A MINIMUM CONSIDERATION IN THE DESIGN BEEN GIVEN TO THE MITIGATION OF SAG/CREST POINTS IN THE LINE.
2. MAINTAIN ALL WATER SERVICES DURING CONSTRUCTION, MAKE PROVISION OF TEMP. CONNECTION WHERE/IF REQUIRED.
3. THESE DRAWINGS SHALL BE READ IN CONJUNCTION WITH SYDNEY WATER/WSAA DESIGN & CONSTRUCTION GUIDELINES AND WITH SUCH OTHER WRITTEN INSTRUCTIONS AS MAY BE ISSUED DURING THE COURSE OF THE CONTRACT. ALL DISCREPANCIES SHALL BE REFEREED TO THE SUPERINTENDENT FOR DIRECTION BEFORE PROCEEDING WITH WORKS.
4. DIMENSIONS SHALL NOT BE SCALED FROM DRAWINGS.
5. SET-OUT DIMENSIONS & LEVELS, INCLUDING ANY SHOWN ON THE DRAWINGS ARE TO BE VERIFIED ON SITE BY THE CONTRACTOR BEFORE FABRICATION & CONSTRUCTION.
6. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF PIPES AND PITS AGAINST FLOATATION DURING CONSTRUCTION.
7. NO SUBSTITUTE MATERIALS SHALL BE USED WITHOUT THE APPROVAL OF THE SUPERINTENDENT.
8. HEIGHT DATUM IS TO AHD & COORDINATES ARE RELATIVE TO MGA94 (ZONE 55).
9. SURVEY EXTENTS ARE GENERALLY LIMITED TO THE PROPOSED WATER MAIN ALIGNMENT & DO NOT NECESSARILY INCLUDE ALL EXISTING FEATURES WITHIN THE PROJECT AREA.
10. UNDERGROUND SERVICE UTILITIES HAVE BEEN PLOTTED USING SERVICE AUTHORITY RECORDS & MAY NOT REPRESENT THE ACTUAL SERVICE LOCATION. WHERE REQUIRED, THE PLOTTED LOCATION OF THESE SERVICES MAY HAVE BEEN ALTERED TO FIT ACTUAL SURVEYED SERVICES.

FIRST ISSUE	CALCS	DRAWN	DATE	AMENDMENT DETAILS
A	LM	DA	11/19	
A	LM	JO	24/04/20	CONCEPT DESIGN ISSUE

AMENDMENTS

DESIGN CHECK

DRAWN CHECK

JAS-ANZ CERTIFIED ISO 9001

DATUM

PROJECT No.
CE18119.2

ISSUED FOR APPROVAL

APPROVED

FOR & ON BEHALF OF MOLONEY & SONS ENGINEERING

CLIENT
COOTAMUNDRA-GUNDAGAI REGIONAL COUNCIL

PROJECT
FIVE MILE - COOLAC SERVICE STN
HUME HIGHWAY NSW
PROP. TRUNK WATER MAIN STG 2

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DRAWING TITLE
GENERAL ARRANGEMENT
SHEET 17 OF 20

DRAWING NUMBER
CE18119.2-217-GA

ISSUE
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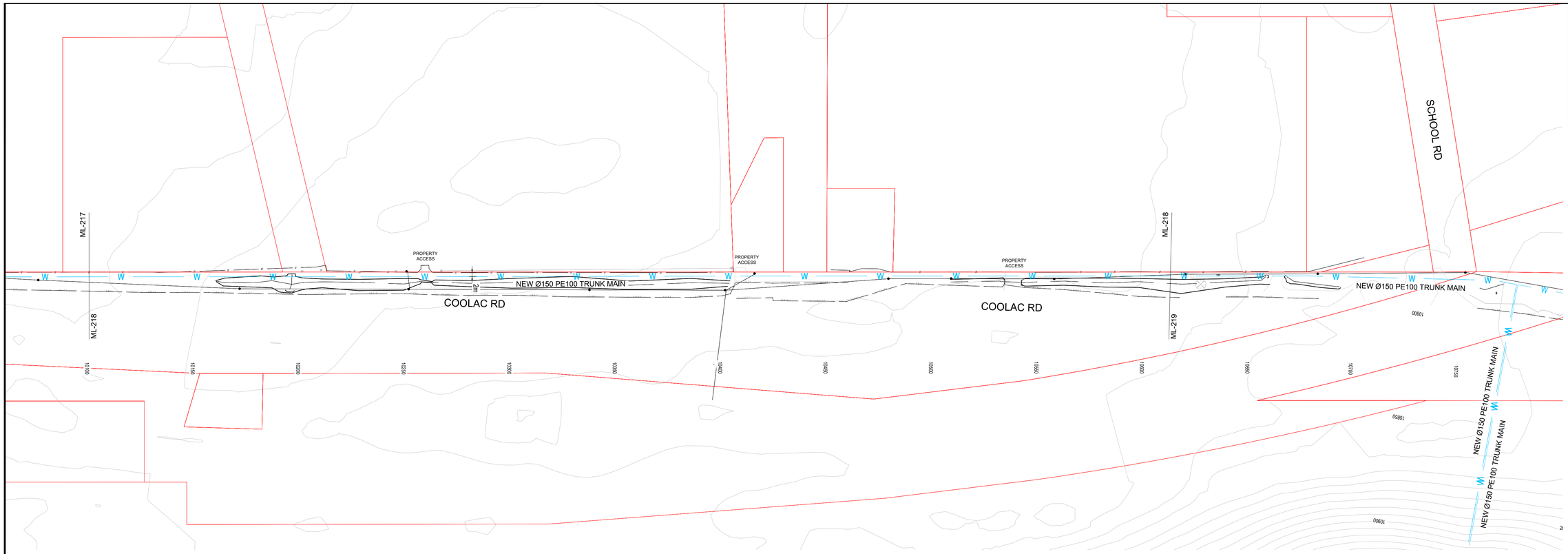

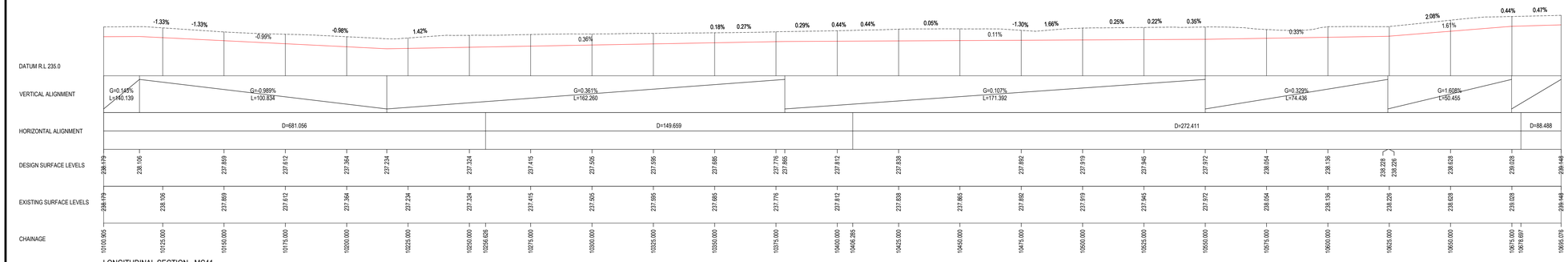

LONGITUDINAL SECTION - MC41
SCALE - HORIZ 1:1000.000, VERT. 1:200.000

COOTAMUNDRA-GUNDAGAI REGIONAL COUNCIL

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COOTAMUNDRA-GUNDAGAI REGIONAL COUNCIL

PROJECT
FIVE MILE - COOLAC SERVICE STN
HUME HIGHWAY NSW
PROP. TRUNK WATER MAIN STG 2

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DRAWING TITLE
GENERAL ARRANGEMENT
SHEET 18 OF 20

DRAWING NUMBER
CE18119.2-218-GA

ISSUE
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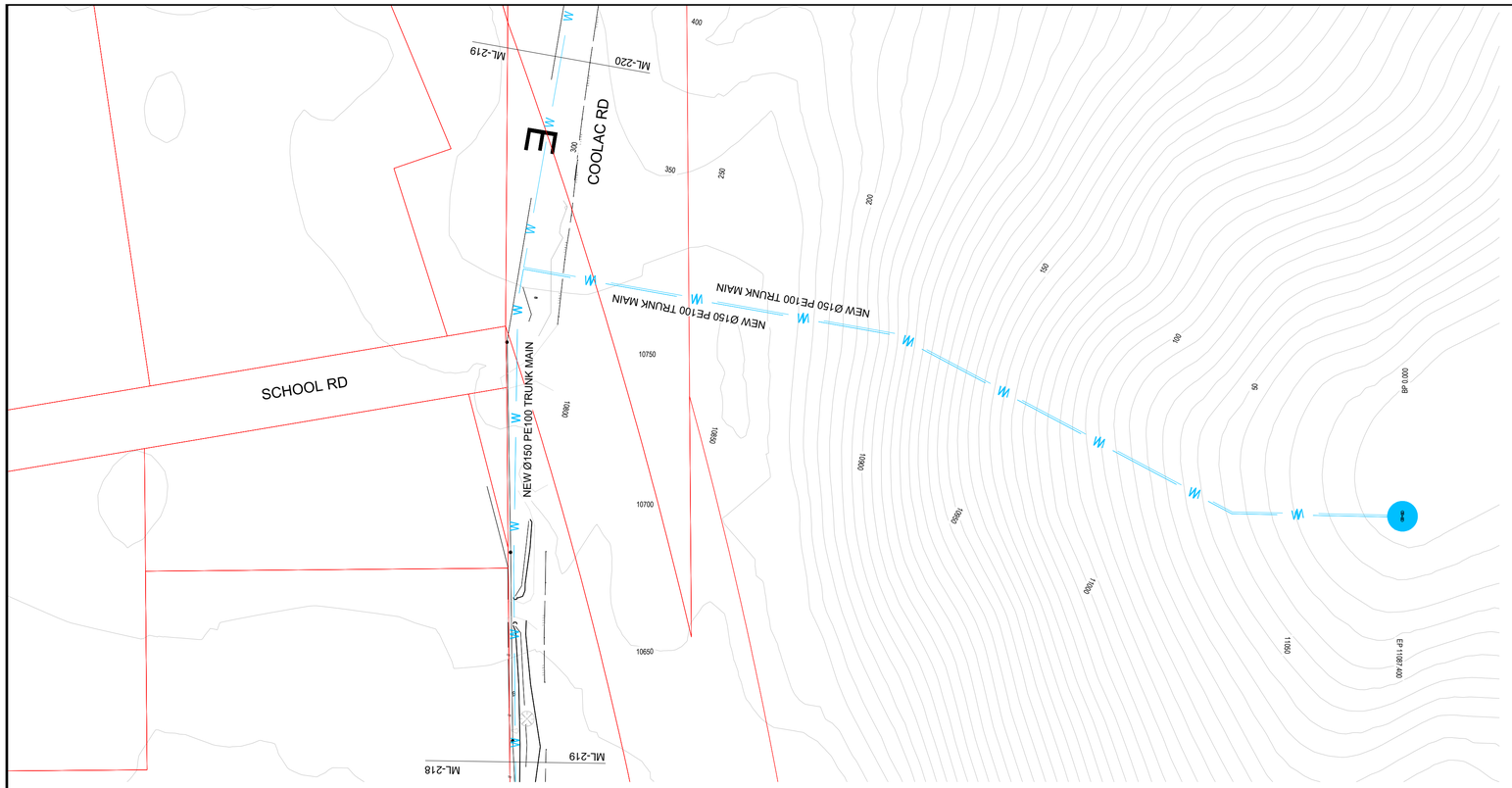

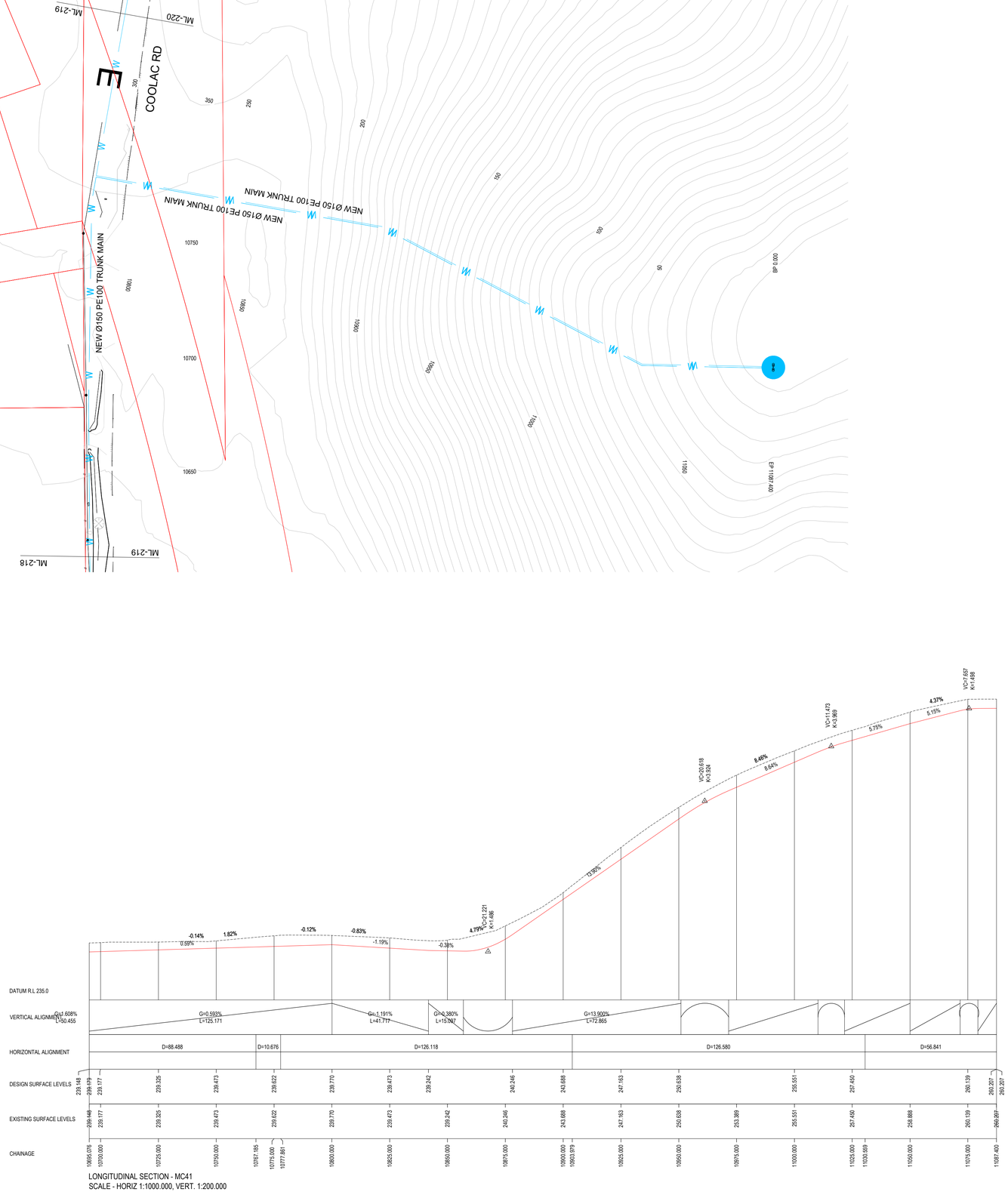

LONGITUDINAL SECTION - MC41
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FOR & ON BEHALF OF MOLONEY & SONS ENGINEERING

CLIENT
COOTAMUNDRA-GUNDAGAI REGIONAL COUNCIL

PROJECT
FIVE MILE - COOLAC SERVICE STN
HUME HIGHWAY NSW
PROP. TRUNK WATER MAIN STG 2

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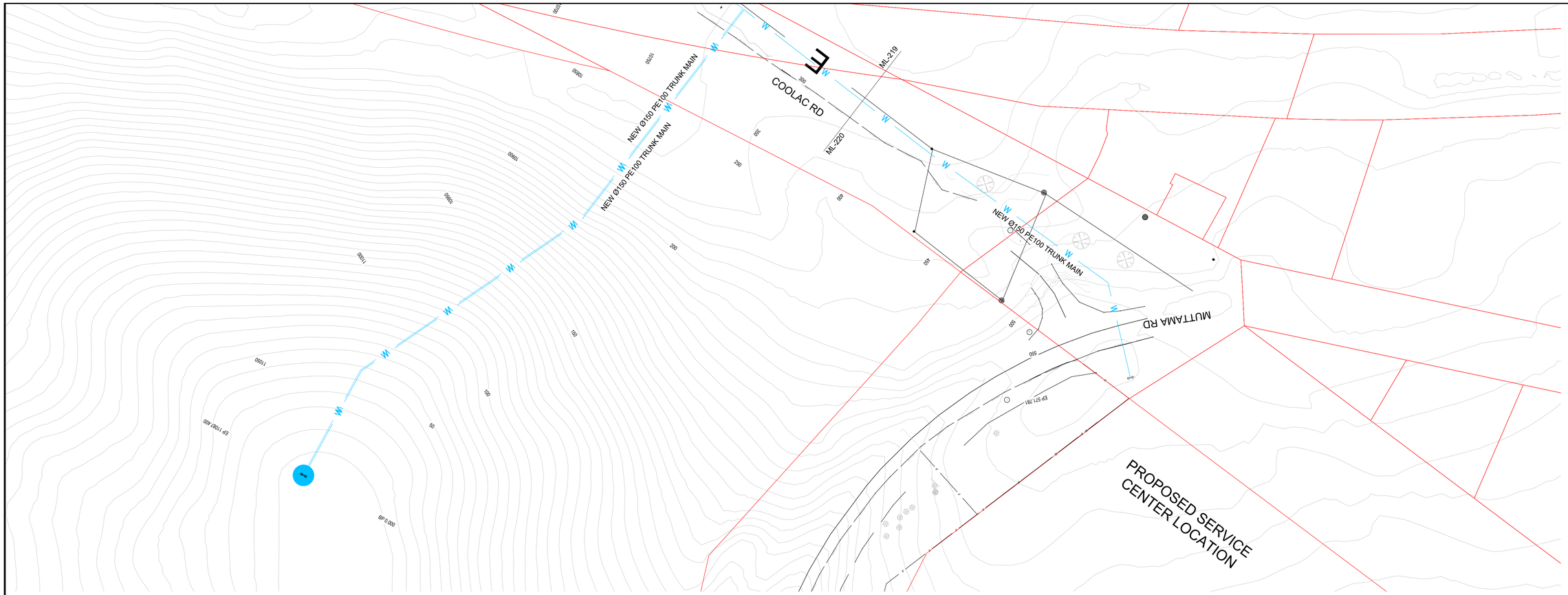
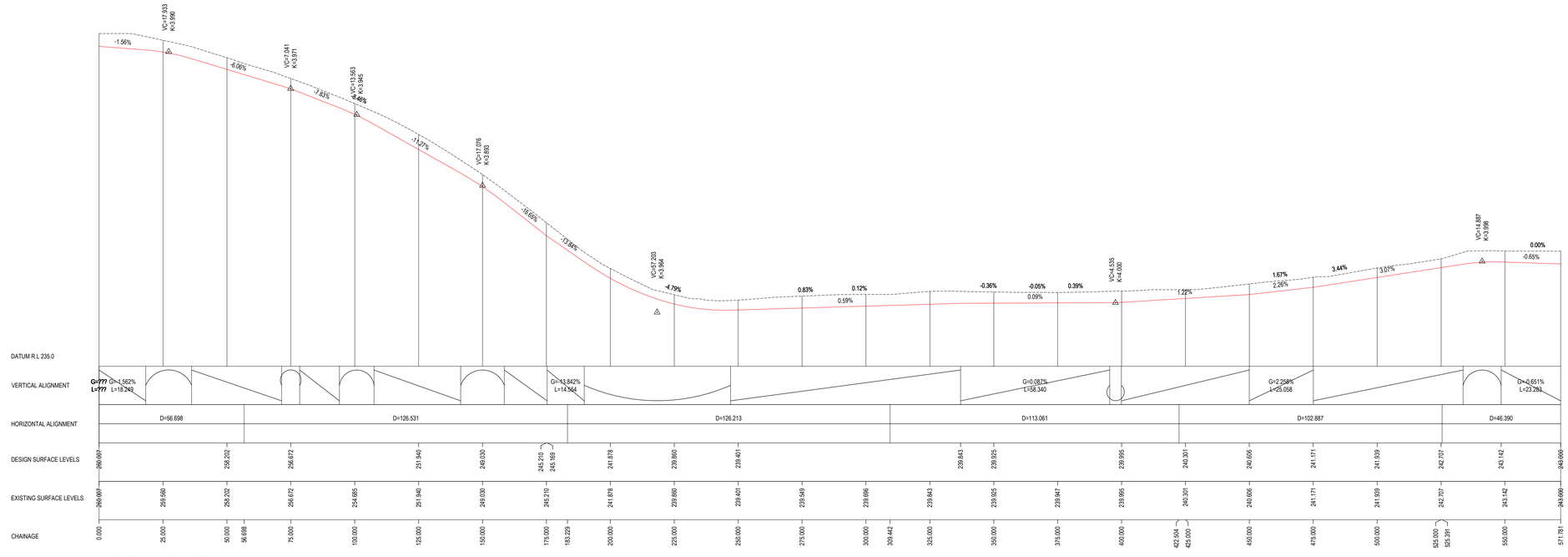
DRAWING TITLE
GENERAL ARRANGEMENT
SHEET 19 OF 20

DRAWING NUMBER
CE18119.2-219-GA

ISSUE
A





LONGITUDINAL SECTION - MC51
SCALE - HORIZ 1:1000.000, VERT. 1:200.000

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COOTAMUNDRA-GUNDAGAI REGIONAL COUNCIL

PROJECT
FIVE MILE - COOLAC SERVICE STN
HUME HIGHWAY NSW
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DRAWING TITLE
GENERAL ARRANGEMENT
SHEET 20 OF 20

DRAWING NUMBER
CE18119.2-220-GA

ISSUE
A

APPENDIX C – INTERPRETED DIURNAL TABLES

Time step	Time	Residential	Corrected Factor	30 minute Consumption	Accumulative Consumption (L)	Accumulative Consumption (m^3)	Avg Accumulative Consumption (L)	Avg Accumulative Consumption (m^3) (24hr Pump Period)	Pump Rate m^3/30min	Avg Accumulative Consumption (m^3) (8hr Pump Period)
1	0:00	0.235	0.00244807	755.499	755.499	0.755	6429.375	6.429	19.288	0.000
2	0:30	0.235	0.00244807	755.499	1510.998	1.511	12858.750	12.859	19.288	19.288
3	1:00	0.235	0.00244807	755.499	2266.496	2.266	19288.125	19.288	19.288	38.576
4	1:30	0.235	0.00244807	755.499	3021.995	3.022	25717.500	25.718	19.288	57.864
5	2:00	0.255	0.002656416	819.797	3841.792	3.842	32146.875	32.147	19.288	77.153
6	2:30	0.255	0.002656416	819.797	4661.588	4.662	38576.250	38.576	19.288	96.441
7	3:00	0.255	0.002656416	819.797	5481.385	5.481	45005.625	45.006	19.288	115.729
8	3:30	0.275	0.002864762	884.094	6365.479	6.365	51435.000	51.435	19.288	135.017
9	4:00	0.294	0.003062691	945.177	7310.656	7.311	57864.375	57.864	19.288	154.305
10	4:30	0.353	0.003677313	1134.856	8445.512	8.446	64293.750	64.294	19.288	173.593
11	5:00	0.608	0.006333729	1954.652	10400.164	10.400	70723.125	70.723	19.288	192.881
12	5:30	2.668	0.027793404	8577.322	18977.486	18.977	77152.500	77.153	19.288	212.169
13	6:00	3.531	0.036783549	11351.771	30329.257	30.329	83581.875	83.582	19.288	231.458
14	6:30	3.668	0.038210722	11792.211	42121.468	42.121	90011.250	90.011	19.288	250.746
15	7:00	3.492	0.036377274	11226.390	53347.859	53.348	96440.625	96.441	19.288	270.034
16	7:30	3.197	0.033304165	10277.998	63625.857	63.626	102870.000	102.870	19.288	289.322
17	8:00	2.903	0.030241473	9332.821	72958.678	72.959	109299.375	109.299	19.288	308.610
18	8:30	2.472	0.025751609	7947.204	80905.882	80.906	115728.750	115.729		
19	9:00	2.236	0.023293122	7188.491	88094.373	88.094	122158.125	122.158		
20	9:30	2.119	0.022074296	6812.349	94906.721	94.907	128587.500	128.588		
21	10:00	2.04	0.021251328	6558.372	101465.094	101.465	135016.875	135.017		
22	10:30	2.02	0.021042982	6494.075	107959.168	107.959	141446.250	141.446		
23	11:00	2.02	0.021042982	6494.075	114453.243	114.453	147875.625	147.876		
24	11:30	2.02	0.021042982	6494.075	120947.318	120.947	154305.000	154.305		
25	12:00	1.981	0.020636706	6368.694	127316.012	127.316	160734.375	160.734		
26	12:30	2.02	0.021042982	6494.075	133810.086	133.810	167163.750	167.164		
27	13:00	2.02	0.021042982	6494.075	140304.161	140.304	173593.125	173.593		
28	13:30	2.02	0.021042982	6494.075	146798.236	146.798	180022.500	180.023		
29	14:00	2.02	0.021042982	6494.075	153292.310	153.292	186451.875	186.452		
30	14:30	2.04	0.021251328	6558.372	159850.683	159.851	192881.250	192.881		
31	15:00	2.138	0.022272225	6873.431	166724.114	166.724	199310.625	199.311		
32	15:30	2.334	0.02431402	7503.550	174227.664	174.228	205740.000	205.740		
33	16:00	2.609	0.027178782	8387.644	182615.308	182.615	212169.375	212.169		
34	16:30	2.903	0.030241473	9332.821	191948.129	191.948	218598.750	218.599		
35	17:00	3.472	0.036168927	11162.093	203110.221	203.110	225028.125	225.028		
36	17:30	4.002	0.041690106	12865.983	215976.205	215.976	231457.500	231.458		
37	18:00	4.178	0.043523554	13431.804	229408.009	229.408	237886.875	237.887		
38	18:30	4.119	0.042908932	13242.125	242650.134	242.650	244316.250	244.316		
39	19:00	3.982	0.041481759	12801.686	255451.820	255.452	250745.625	250.746		
40	19:30	3.707	0.038616997	11917.591	267369.411	267.369	257175.000	257.175		
41	20:00	3.374	0.03514803	10847.034	278216.445	278.216	263604.375	263.604		
42	20:30	2.785	0.02901223	8953.464	287169.909	287.170	270033.750	270.034		
43	21:00	2.217	0.023095193	7127.408	294297.317	294.297	276463.125	276.463		
44	21:30	1.667	0.017365669	5359.219	299656.536	299.657	282892.500	282.893		
45	22:00	1.216	0.012667458	3909.304	303565.840	303.566	289321.875	289.322		
46	22:30	0.902	0.009396421	2899.829	306465.669	306.466	295751.250	295.751		
47	23:00	0.412	0.004291935	1324.534	307790.203	307.790	302180.625	302.181		
48	23:30	0.255	0.002656416	819.797	308610.000	308.610	308610.000	308.610		
Total		95.994	1	308610.000						