



## Infrastructure Report

### ROCKHAMPTON REGIONAL COUNCIL

#### **APPROVED PLANS**

These plans are approved subject to the current conditions of approval associated with

**Development Permit No.: D/84-2014**

**Dated: 15 September 2015**

### **Riverside Estate**

Belmont Road, Parkhurst

Revision C

December 2014

R12394

Prepared for Glenmore Holding (AUST) Pty Ltd

Urban Development - Rockhampton



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2014

### DOCUMENT CONTROL

Infrastructure Report – December 2014

Issue	Date	Issue Details	Author	Checked	Approved
A	11/13	Infrastructure Report	PJ	JD	Jeff Davey - RPEQ 8386
B	12/13	Infrastructure Report	PJ	JD	Jeff Davey - RPEQ 8386
C	12/14	Infrastructure Report	MD	KL	Graham Scott - RPEQ 2412



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## 1. Introduction/Background

*Brown Consulting (QLD) Pty Ltd* has been engaged to prepare the following Infrastructure Services Report which will address the Civil Engineering Infrastructure associated with the proposed development of Lot 102 RP 860099, Lot 129 PL 4021 and Lot 2 RP 609985 known as Belmont Road, Parkhurst.

The total area of the site is approximately 59 hectares and currently exists as undeveloped parcels of land.

The existing site conditions and proposed stages are detailed on the **CSG Drawing No. 5892-01-CPT** and are included as Appendix A.

This report will present a general overview on the Infrastructure that exists in the immediate area and where any upgrading or augmenting needs to be undertaken to ensure that the development can be a logical and sequential extension of the suburban area, especially the existing developed stages of Riverside Estate, which will enhance the existing residential area of Rockhampton City, without causing any adverse effects to existing and future infrastructure.

This report will address Bulk Earthworks, Stormwater Drainage, Water Supply and Sewerage Reticulation, Proposed Road Hierarchy, Roundabout Details, Road Longsections and Cross-Section Details; as well as Electrical and Telecommunication Services.

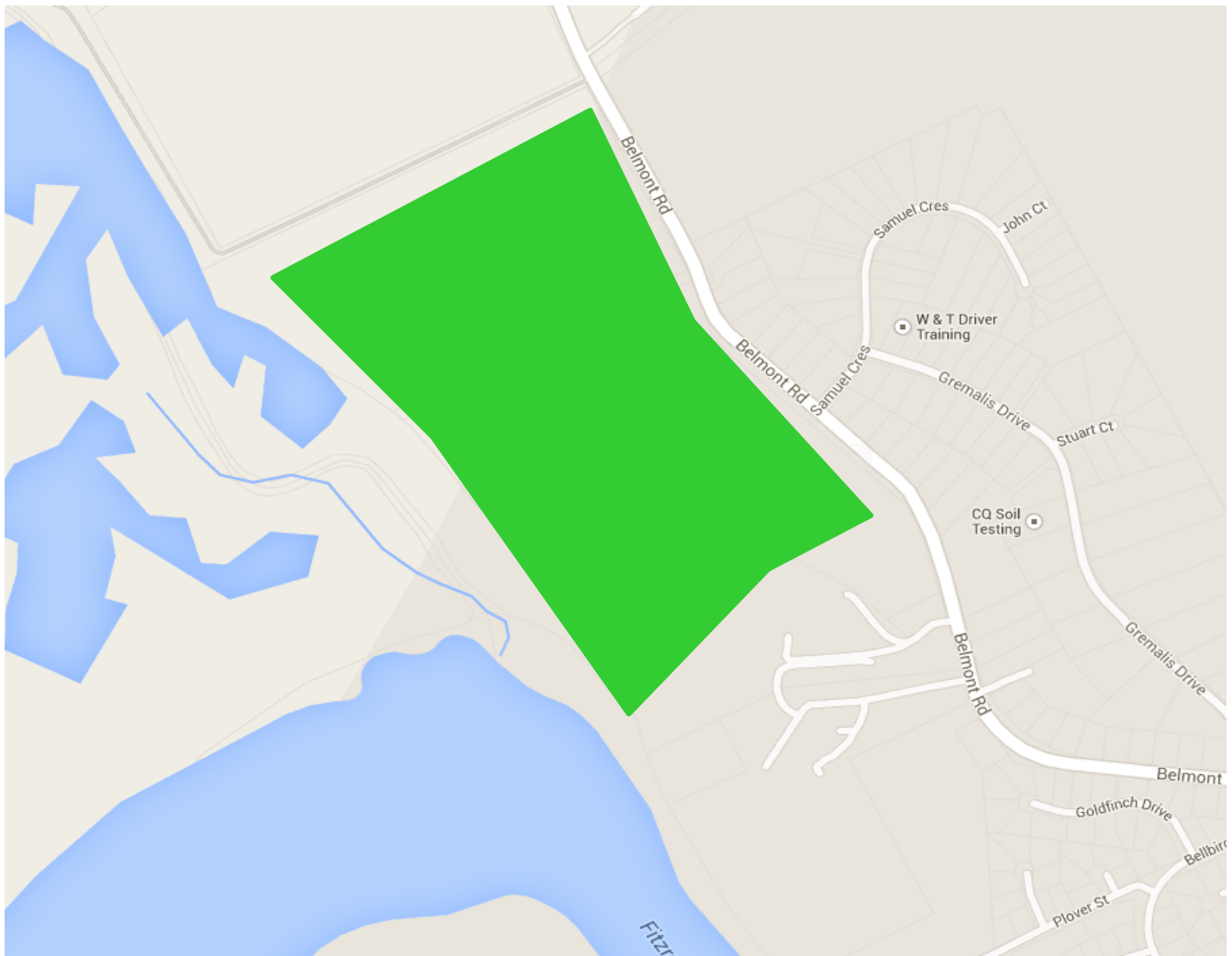




## 2. Site Characteristics and Staging

The proposed development will be an extension of the existing Riverside Estate along the western side of Belmont Road and is located on the northern side of Rockhampton and abuts Ramsey Creek and the Fitzroy River.

**Figure.1** below shows the approximate location of the proposed development.



**Figure.1: Approximate Site Location (Source Google Maps)**

As previously discussed, the development site is best described by the Real Property Descriptions, Lot 102 RP 860099, Lot 129 PL 4021 and Lot 2 RP 609985.

The area consists of approximately 59 ha of potential urban residential development.

The proposal is for a 201 lot residential development to be over 14 stages (please refer to Appendices A and B). These stages comprise of different sized residential allotments, with an average size of 1500m<sup>2</sup>. This reflects the



lot size of the existing Riverside Estate and will provide a community development catering for the diverse family environment.

### 3. Good Practice Urban Design Principles

The proposed development has been master-planned to incorporate best practices for urban developments, which are as follows:

- A mixture of gentle grade blocks, sloping allotments and elevated allotments will be incorporated into the proposed development. This ensures that the majority of the community is catered for from first home owners, to investors to luxury dwellings.
- Two accesses to Belmont Road (which will be upgraded to a Major Collector Road) for the entire development with suitable approaches and sight distances. No allotments in the proposed subdivision will gain direct access from Belmont Road.
- Loop/ring and short cul-de-sac's roads are used throughout the layout providing short, safe access and manoeuvrability around the development.
- Pedestrian links are strategically positioned throughout the development joining roadways, while providing good access to amenities within the development and also to external roadway networks.
- Stormwater drainage strategies will be incorporated and consist of natural vegetated swales and channels and bio-retention systems, providing low maintenance stormwater polishing and ensuring runoff is managed and discharged with minimal impact to the environment, whilst adding to the appearance of the development.



## 4. Proposed Development and Preliminary Bulk Earthwork Levels

The proposed development is to establish a combination of 201 Residential lots with a generous area of 14.12 hectares of Public Use Land (PUL).

The proposed Plan of Development (POD) has been illustrated on CSG Drawing No. 5892-01-CPT and is included as Appendix B.

In considering this POD, preliminary surface levels throughout the site have been determined to blend in, as much as possible, with the natural surface level.

Preliminary surface levels have been illustrated on Brown Consulting Sketches R12394 - Earthworks Plans (Sheets 1 and 2) and has been included as Appendix C.

Siteworks for the development will consist of the following stages:

- Clearing and grubbing
- Bulk earthworks
- Underground services installation
- Roadworks and stormwater drainage works
- Final detailed works
- Vegetation establishment and landscaping

All stockpiles are to be segregated into topsoil, construction soils, pavements and protected with appropriate silt traps and fences. All stockpiles are to be accessed from the upstream side to reduce erosion and maintain consistency throughout the project construction phase.

Erosion control measures are to be implemented during construction in accordance with the Capricorn Municipal Development Guidelines requirements. All erosion control measures are to be closely monitored by the Principal Contractor and re-established after all rain events or due to any vandalism.



## 5. Wastewater Treatment/Sewerage Reticulation

Following discussions with Fitzroy River Water, existing “As Constructed” information was obtained pertaining to the sewerage reticulation in the Parkhurst area.

There is an existing sewerage pump station (SP038) on the north-eastern side Belmont Road. A rising main then transfers the sewage to a receiving manhole in parkland along Belmont Road.

A Ø150mm uPVC gravity main then transfers the sewage from this manhole into Fitzroy River Water’s sewerage network.

Stages 9A, 9B and 10 of the development (ie. 45 Lots) propose to generate approximately 48.6 ET. This sewage is intended to gravitate into the existing infrastructure, with no upgrading proposed. However, to minimise Bulk Earthworks and to eliminate the requirement of a lift station, or to construct the internal sewage pump station in the initial stage of development, only Stages 9A, 9B and 10 can discharge into the existing infrastructure.

To cater for Stages 11A to 16B; a Sewerage Pump Station is proposed to be constructed, within the downstream portions of the Public Use Land complemented with a rising sewerage main connecting this pump station with the “wet well”.

The proposed internal sewerage network has been illustrated on Brown Consulting Sketches R12394 – Sewerage Reticulation Plans (Sheets 1 and 2). Please refer to Appendix D.

A detailed Wastewater Management Report has been prepared and is included separately, to assist with this Development Application.

Following the approval of this Development Application, a more detailed design will be undertaken in conjunction with detailed discussions with Fitzroy River Water (FRW) officers to confirm existing capacity of sewerage network required to service the staged development of Riverside Estate.



## 6. Water Supply

There is an existing Ø100mm AC main located in the eastern verge of Belmont Road, which services the existing residential developments, in close proximity to the subject site.

The proposed development does not intend to connect to this water main.

It is proposed to extend a Ø300mm uPVC water main from the Parkhurst water supply, which is approximately 550m downstream of the proposed entrance to the development. From there, a Ø200mm uPVC water main will service the development, generally in accordance with the proposed internal water reticulation network that has been prepared for the development of the properties. This network has been illustrated on Brown Consulting Sketches R12394 – Water Reticulation Plan Sheets 1 and 2 (please refer to Appendix E).

The ultimate building designs which will be submitted to Council, at a later date, are to comply with Council's Water Supply Policy.

All internal allotments will be serviced by new reticulation mains situated in all new road reserves and designed to provide good loop connections throughout the site. Internal fire hydrants will be installed on all new watermain at 80m centres and in accordance with the requirements of the Capricorn Municipal Development Guidelines.

In accordance with RRC policy for water supply to development's Class 1-10, the maximum water draw-off from Council's system will be in accordance with Council's policy.

Similar to the Wastewater report, a detailed Water Report has been written and is included separately.

## 7. Stormwater Management

The aim of the stormwater strategy is to try to maintain the natural flowpaths that flow through the development site with minimal realignment. Water quantity and quality objectives are to be met in accordance with the QUDM, CMDG & Healthy Waterways ensuring the surrounding environment, allotments and infrastructure are not adversely affected due to this residential subdivision.

Please refer to the Stormwater Management Report and Stormwater Quality Report for details regarding water quantity and quality measures to be implemented in the development works.





The Stormwater Management Report will deal with compensatory “cut and fill” measures, that are to be undertaken for the development of the site.

The sub-catchments for the management of stormwater is illustrated on Brown Consulting Sketch R12394 – Stormwater Catchments and is included as Appendix F.

## 8. Waste and Recycling Collection

Waste and Recycling collection for the proposed development is to occur in accordance with the Rockhampton Regional Council Planning Scheme, through a minimum of the following service frequencies:

- » Weekly collections for general domestic waste, and
- » Fortnightly connections for recyclable wastes.

These services are currently existing for adjacent residential allotments situated along the eastern side of Belmont Road.

## 9. Traffic Report, Access and Internal Road Network

A separate Traffic Report has been undertaken for this proposed development. This report, which will be included as part of the Development Application, will address background traffic conditions near the site, the likely traffic generation of the development proposal, existing and future traffic conditions, internal road configuration and proposed access arrangements.

Access into the proposed development will be via two intersections with Belmont Road. The main intersection access will be via a four leg roundabout, located at the junction of the existing Belmont Road / Samuel Crescent “T” Intersection. This upgrading to Belmont Road will provide a traffic calming device and a more efficient entry and exit from both the proposed development and existing residential dwellings within Samuel Crescent. As well as this new four leg roundabout, access into the development will be made available through a T intersection between Road I and Belmont Road, located approximately 735m North-West along Belmont Road from Samuel Crescent.

In addition, the four leg roundabout access point has suitable approaches and sight distances in both directions for the proposed development and existing residences in Samuel Crescent. These sight distances meet the requirements for a 60km/hr major collector roadway for Belmont Road. All sight distance requirements are in accordance with the Road Planning Design Manual (RPDM). The intersection of Road I and Belmont Road is to be located in a similar location to the former William Palfrey Drive and Belmont Road intersection which had suitable sight distance which will be maintained for this new intersection.

A proposed internal road hierarchy is included as Brown Consulting Sketch R12394 – Road Hierarchy (please refer to Appendix G).



The proposed internal road network has been designed in accordance with Rockhampton Regional Council's requirements, widths specified within the Capricorn Municipal Development Guidelines (CMDG) and recommendations contained within Queensland Streets.

Belmont Road currently has a varying road reserve width, which is anticipated to be upgraded to a Major Urban Collector road as part of additional residential subdivisions being constructed north of this development site (ie. Eden Brook).

Road A of this proposed residential subdivision will be constructed as a Minor Urban Collector road from the intersection of Belmont Road to the intersection of Road I within the development. For this portion of the road, Road A will be constructed at 7.5m wide carriageway (invert to invert) in an 18.0m wide road reserve. One 1.2m pedestrian pathway will be constructed for the Minor Urban Collector section of Road A in accordance with the Capricorn Municipal Development Guidelines. To ensure good connectivity and suitable links to external road networks, Road I from chainage 0.000 to chainage 164.940 (Road A intersection) will also be constructed as a Minor Urban Collector road which links the development to Belmont Road. This portion of Road I will be 7.5m wide (invert to invert) in a 20.0m wide road reserve with a 1.2m pedestrian pathway to provide suitable amenities for pedestrian traffic.

Road B has been designed as an Urban Access Street and to a standard as per the requirements of the Capricorn Municipal Development Guidelines (CMDG). It will be constructed as a 7.5m wide (invert to invert) in a 16.0m wide road reserve. No pedestrian pathways will be constructed between these chainages in accordance with the Capricorn Municipal Development Guidelines.

As an Urban Access Street has the capacity to service up to 75 allotments, this will allow future stages to connect into the proposed road network for this development with no issues relating to traffic volumes generated from this development.

Roads C and G have been designed as both an Urban Access Street and an Urban Access, dependent upon the catchment that it serves and is compliant with the requirements of the Capricorn Municipal Development Guidelines (CMDG). Initially Road C will be constructed as a 7.5m wide (invert to invert) in a 16.0m wide road reserve. Road C will transition to an Urban Access Place until it intersects with Road A. No pedestrian pathways will be constructed in accordance with the Capricorn Municipal Development Guidelines.

Roads F and H will be constructed as an Urban Access Streets in accordance with the Capricorn Municipal Development Guidelines. Road F will be constructed at 7.5m wide (invert to invert) in a minimum 16.0m wide road reserve and Road H will be 7.5m wide (invert to invert) in a 20.0m wide road reserve. No pathway is required for these streets. Road I from chainage 164.940 (Road A intersection) to the end cul-de-sac will also be constructed as an Urban Access Street as 7.5m wide (invert to invert) within a 20.0m wide road reserve.

Roads D and E will be constructed as an Urban Access Places in accordance with the Capricorn Municipal Development Guidelines. All of these aforementioned roadways service under 25 allotments and have a traffic flow no greater than 250 AADT. Road D and E will be constructed at 5.5m wide (invert to invert) with Road D having a minimum 16.0m wide road reserve and Road E a 20.0m wide road reserve. No pathway is required for these road carriageways.

The longsections and cross-sections of these streets are also included in Appendix G.

In addition, the proposed roundabout to be constructed at the intersection of Belmont Road and Samuel Crescent, is also illustrated in Appendix G.



## 10. Electrical and Telecommunication

Existing overhead electrical and underground telecommunication services are currently available along the Eastern side of Belmont Road, which can provide appropriate connections for the proposed development.

The electrical services will need a new pole constructed in between the existing vegetation within the Belmont Road verge and a turret constructed near the new vehicular ingress/egress.

The telecommunication services for the entire development will be via an underground conduit, that emanates from a telecommunications pit, just outside the north east corner of the property.

Proposed connections to the units have been illustrated on Brown Consulting Sketch R12394 and included as Appendix H.

## 11. Conclusion

There appears to be no engineering infrastructure difficulties with the proposed extension of Riverside Estate along Belmont Road, Parkhurst. A review of the services proposed for this development and their impact on surrounding services, indicate that there is no impediment to development.

There is a workable design strategy for traffic and access, stormwater drainage, sewerage reticulation, water supply, electricity and telecommunications. Minor alterations in design may eventuate from future applications, however the fundamentals of the design strategy ensures that service provisions will not pose a serious constraint to development.

Preliminary analyses of the Water Supply confirm that they can service Stages 9A, 9B and 10 of the proposed development.

A preliminary review of the existing sewerage network confirms that they can only service Stages 9A, 9B and 10 of the proposed development; due to proposed bulk earthwork levels and grades throughout the development, without constructing an internal sewage pump station. To cater for the ultimate 201 lot development, a sewerage pump station will need to be constructed within the development, accompanied by a “wet well” for storage. A rising sewerage main will then transport the sewage to the “wet well” that was constructed as part of the initial stages of development.

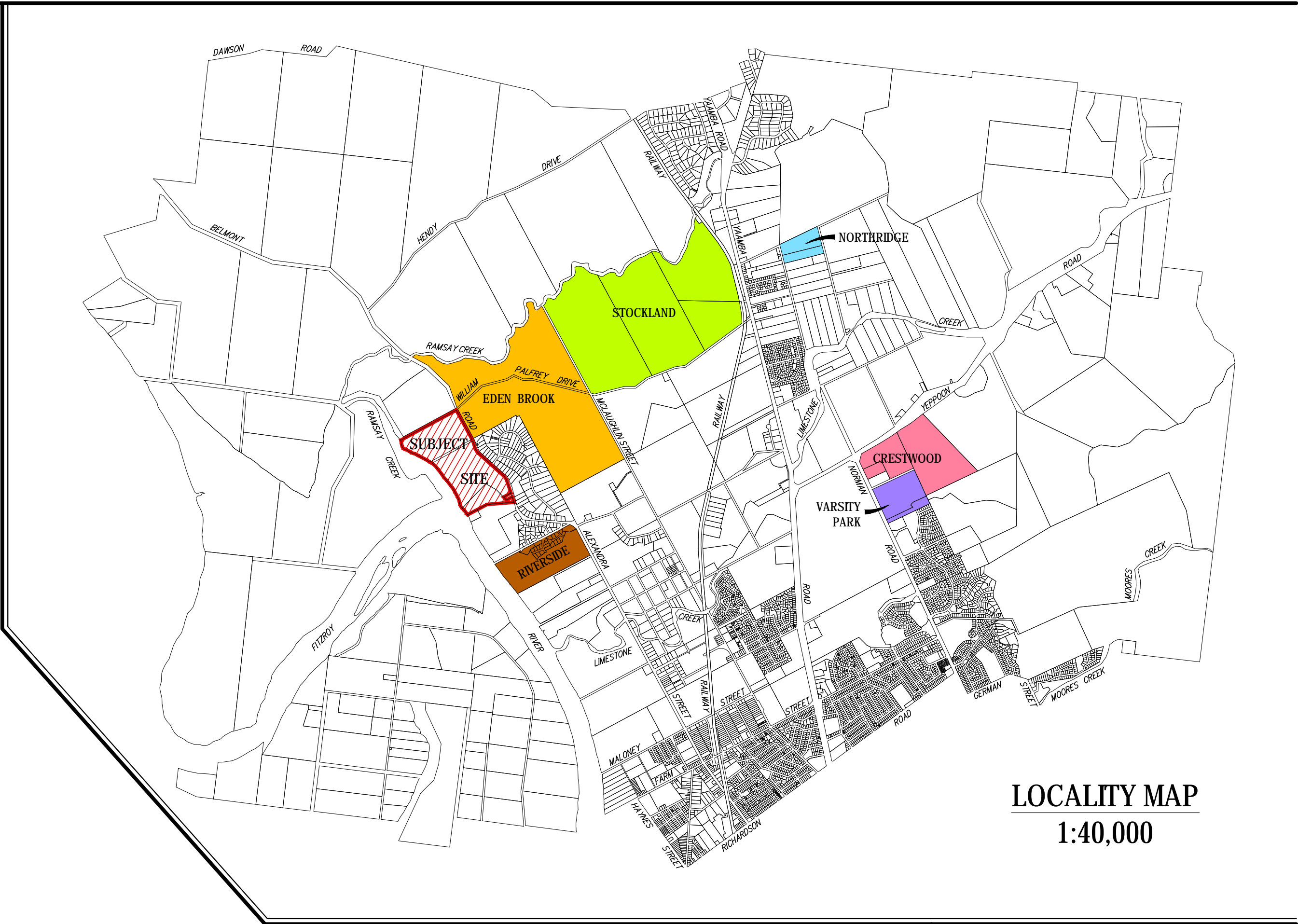
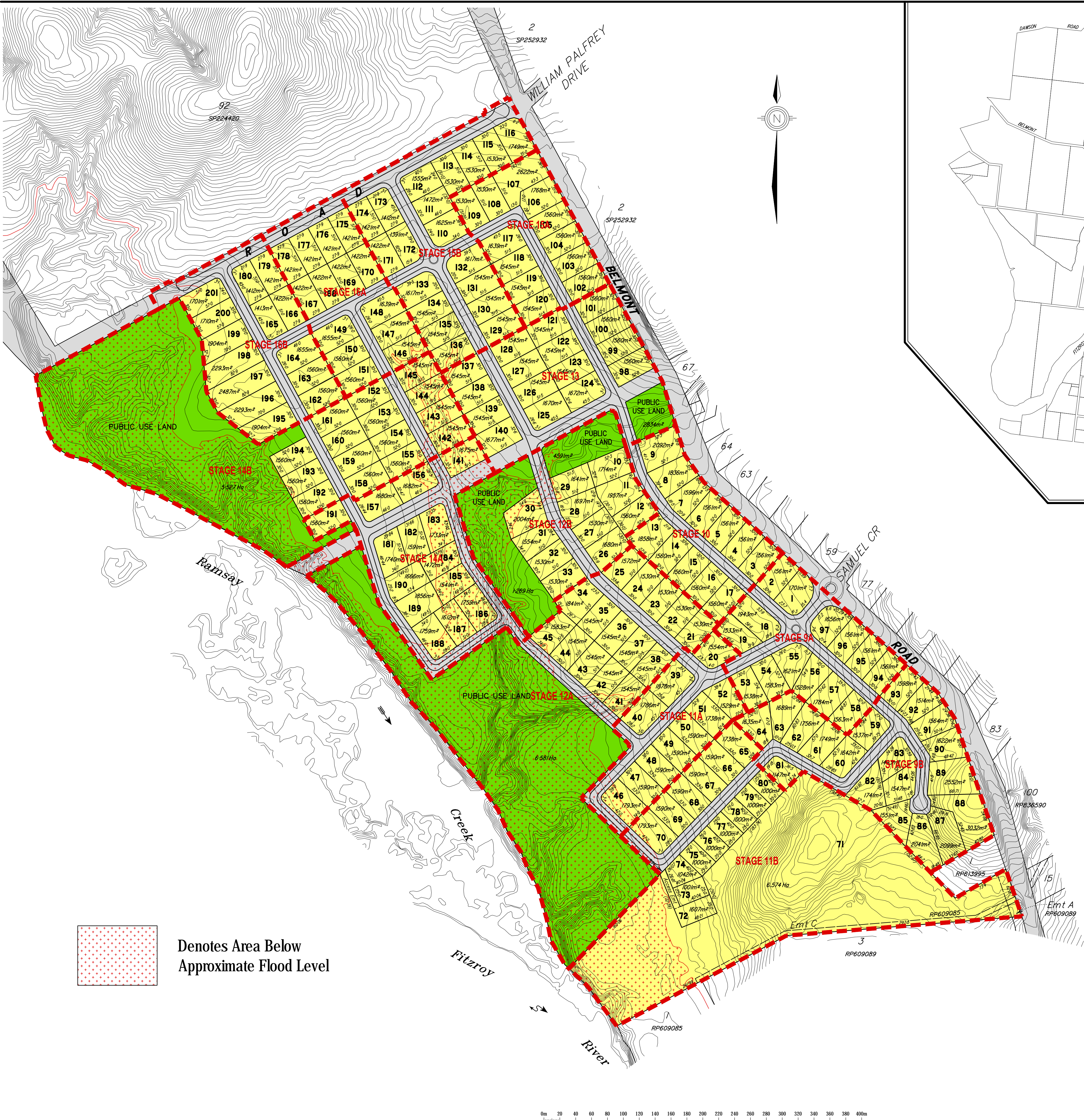


## Appendices



## Appendix A Existing Site Conditions and Proposed Stages





client

M. Birkbeck

project  
**Belmont Road  
Parkhurst  
Riverside Estate  
Stages 9-16**

plan of  
**Concept Plan  
(201 Lots + Public Use Land)**

rp  
**Lot 102 on RP860099,  
Lot 129 on PL4021 & Lot 2 on RP609985  
Parish of Murchison  
County of Livingstone**

lga  
**Rockhampton Regional Council**

rev	date	details	authorised
A	16-05-2013	Initial Issue	RJKF
B	13-08-2013	Image underlay added	RJKF
C	30-08-2013	Layout amended, underlay removed	RJKF
D	12-10-2013	Whole lot layout amended	RJKF
E	13-11-2013	Stage boundaries added	RJKF
F	6-12-2013	Layout and stage boundaries amended	RJKF
G	10-12-2013	Staging amended	RJKF

created

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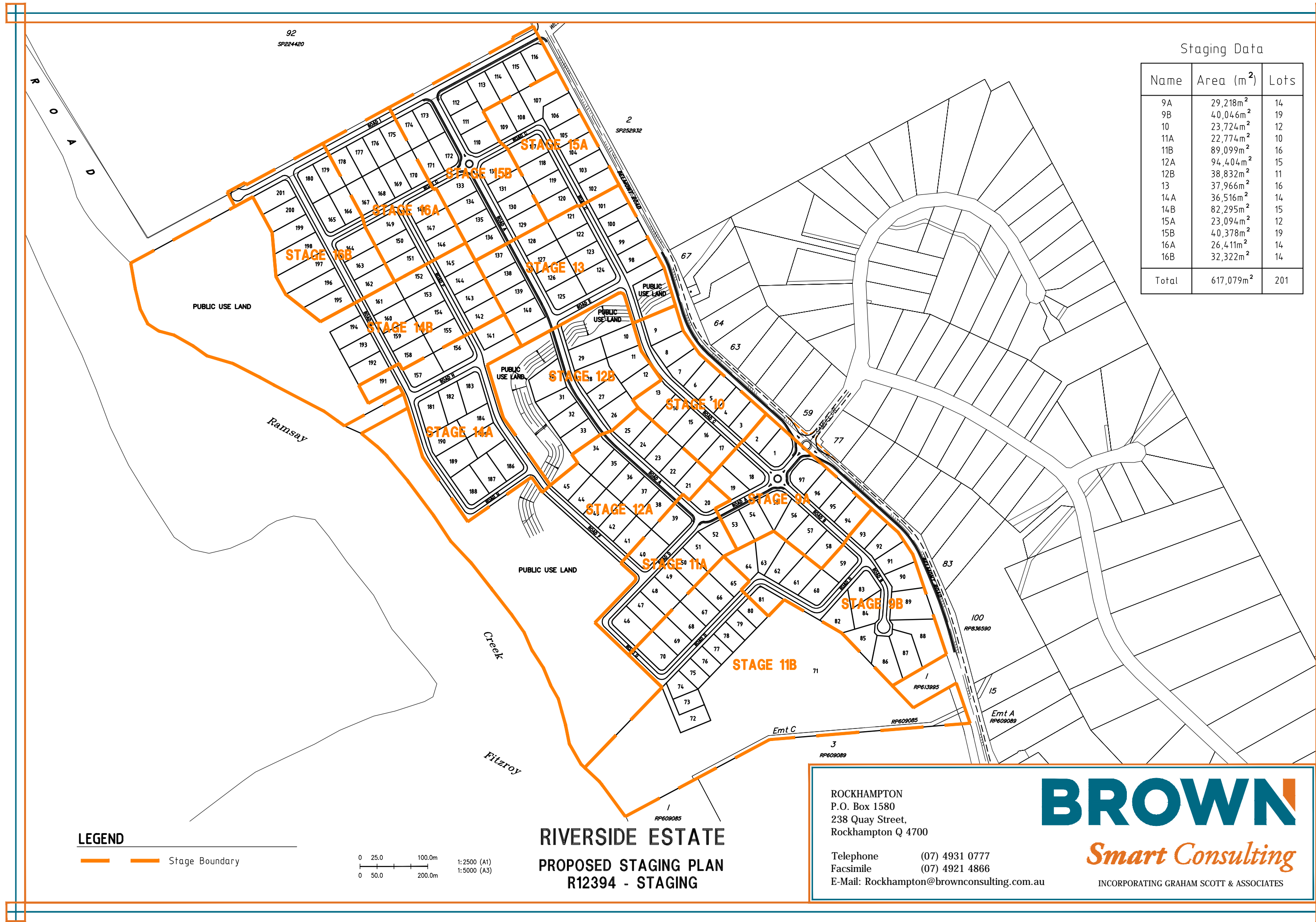
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sheet no.  
**1 of 1**  
plan no.  
**5892-01-CPT**

datum  
**RRC 0.5m Contours**  
cad file  
**5892-01-CPT-G**  
revision  
**G**





## Appendix B Proposed Plan of Development with Stages



Staging Data		
Name	Area (m <sup>2</sup> )	Lots
9A	29,218m <sup>2</sup>	14
9B	40,046m <sup>2</sup>	19
10	23,724m <sup>2</sup>	12
11A	22,774m <sup>2</sup>	10
11B	89,099m <sup>2</sup>	16
12A	94,404m <sup>2</sup>	15
12B	38,832m <sup>2</sup>	11
13	37,966m <sup>2</sup>	16
14A	36,516m <sup>2</sup>	14
14B	82,295m <sup>2</sup>	15
15A	23,094m <sup>2</sup>	12
15B	40,378m <sup>2</sup>	19
16A	26,411m <sup>2</sup>	14
16B	32,322m <sup>2</sup>	14
Total	617,079m <sup>2</sup>	201

LEGEND  
— Stage Boundary

0 25.0 100.0m  
0 50.0 200.0m  
1:2500 (A1)  
1:5000 (A3)

RIVERSIDE ESTATE  
PROPOSED STAGING PLAN  
R12394 - STAGING

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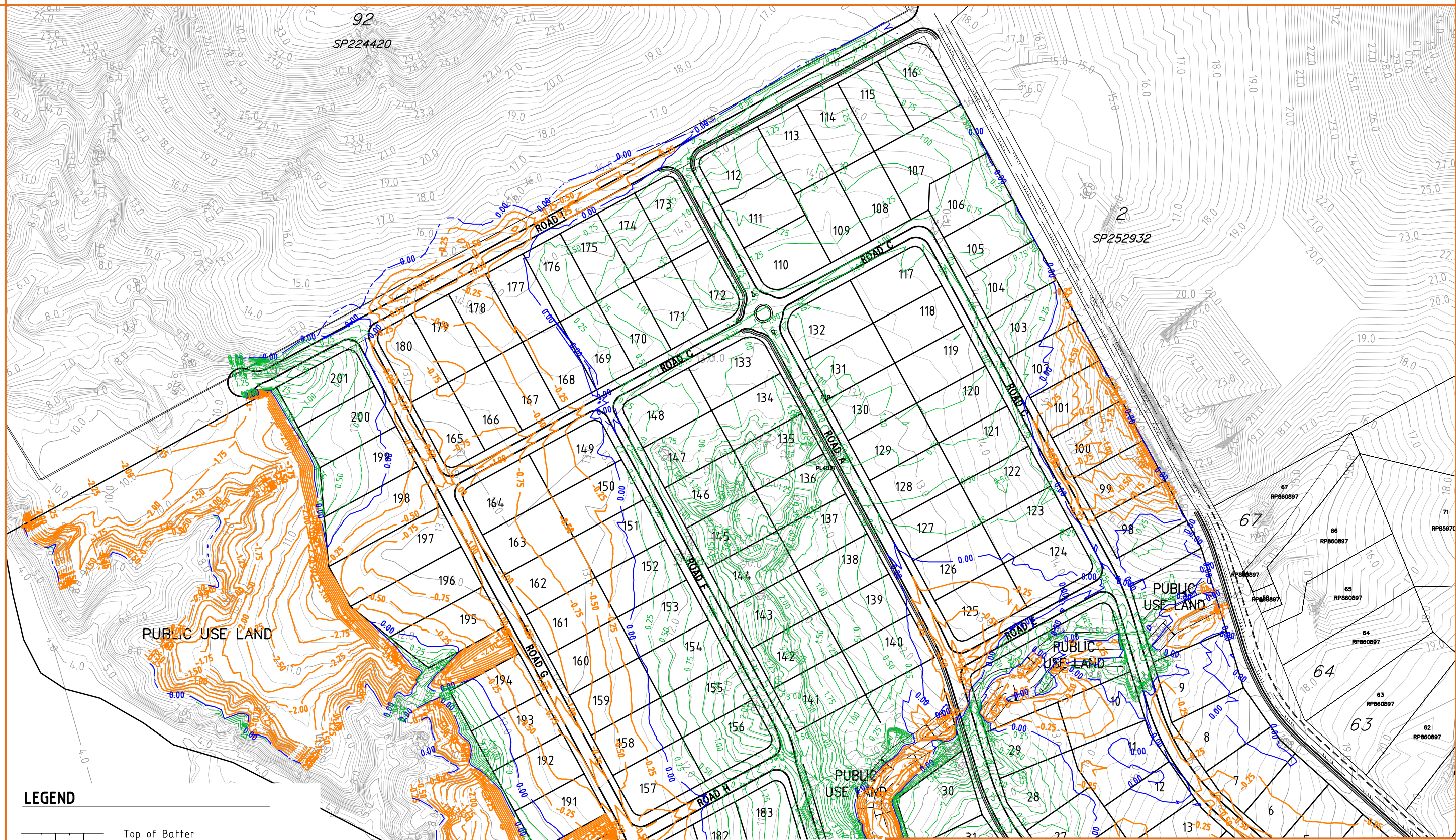
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## Appendix C Preliminary Bulk Earthworks Surface Levels





# LEGEND

- Top of Batter
- Toe of Batter
- 0.0 Balance contours
- 1.0 Fill contours
- 1.0 Cut contours
- 12.0 Existing Contours

## RIVERSIDE ESTATE EARTHWORKS PLAN SHEET 1 OF 2 R12394 - EARTHWORKS

0 6.25 25.0m  
1:1250 (A1)  
1:2500 (A3)

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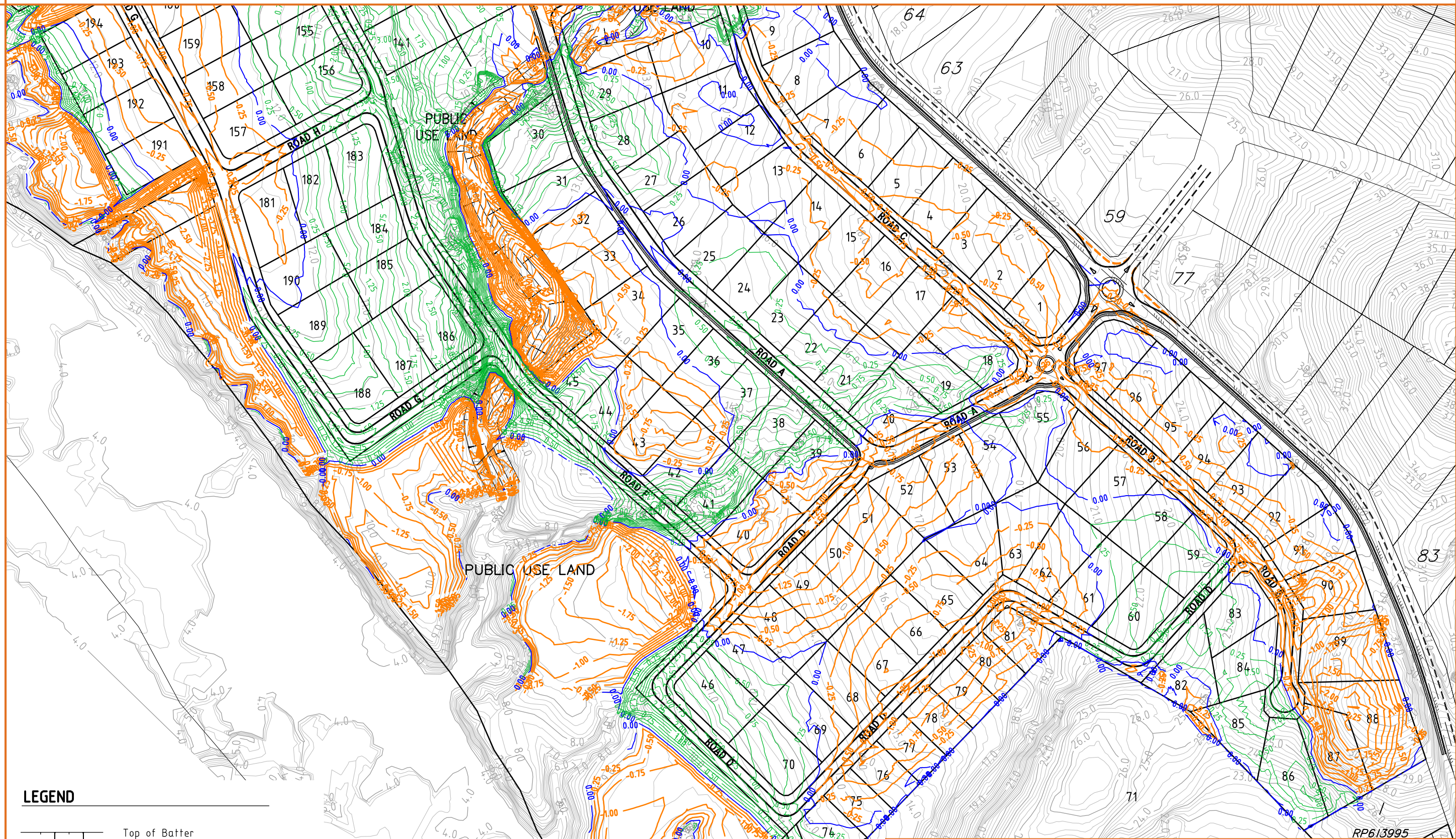
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# LEGEND

- Top of Batter
- Toe of Batter
- Balance contours
- Fill contours
- Cut contours
- Existing Contours

## RIVERSIDE ESTATE EARTHWORKS PLAN SHEET 2 OF 2 R12394 - EARTHWORKS

0 6.25 25.0m  
0 12.5 50.0m  
1:1250 (A1)  
1:2500 (A3)

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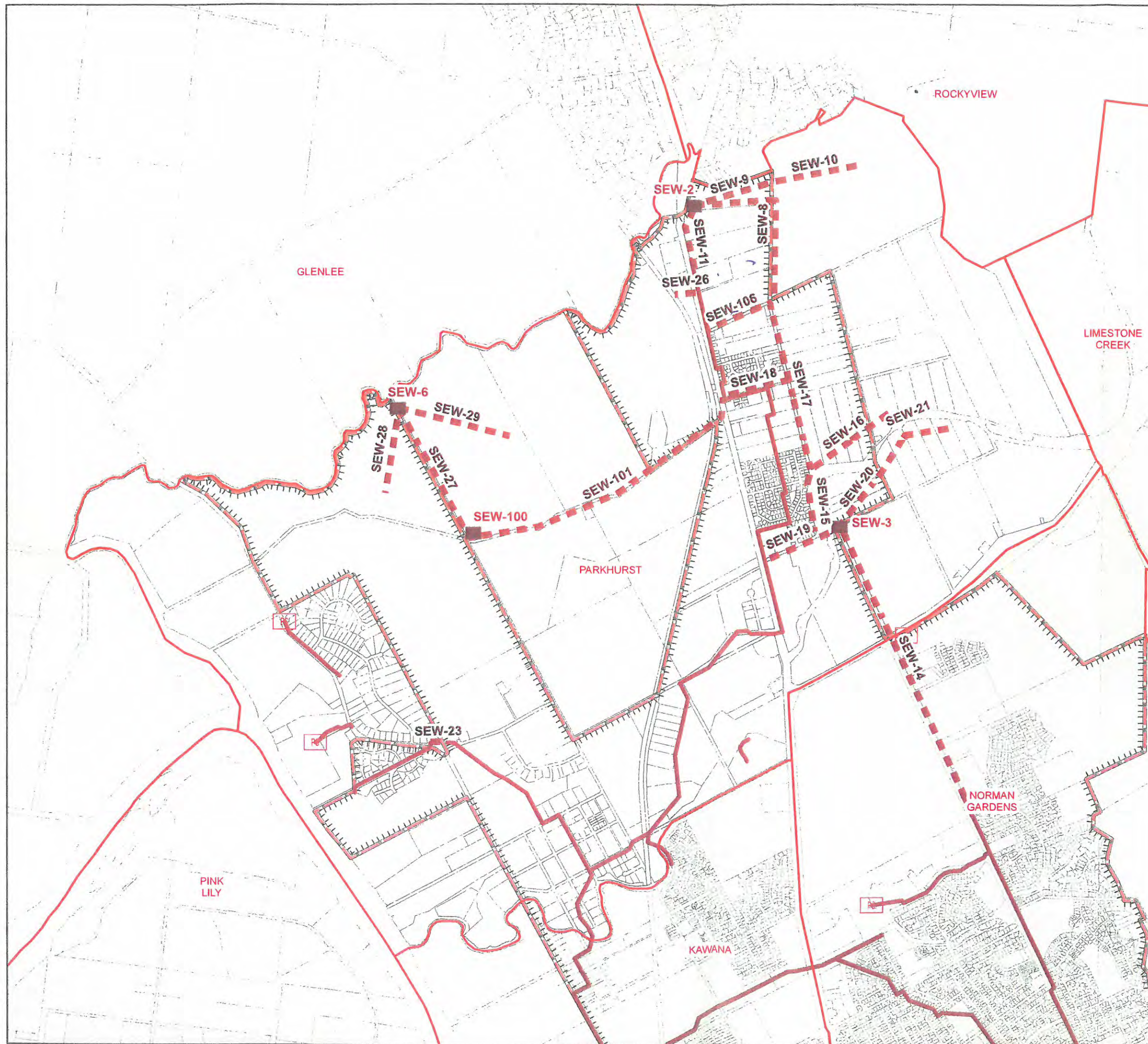
## Appendix D Existing and Proposed Sewerage Reticulation Plan



### Legend

- Lot 129 on PL4021
- Sewer Treatment Plant
- Sewer Pump Stations
- Rising Mains
- Reticulation Main
- Trunk Main





## Trunk Infrastructure - Sewerage

Locality Boundaries

### Future Sewerage Trunk Infrastructure

Future Pump Station

Future Treatment Plant

Future Sewerage Main

### Existing Sewerage Trunk Infrastructure

Existing Pump Station

Existing Treatment Plant

Existing Sewerage Trunk Main

Cadastral Parcels

Priority Infrastructure Area

Note: Priority Infrastructure Area located inside hashed boundary.

Approx Scale @A3 1:25,000

0 380 760 1,520 Metres

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## Map 86-2 PARKHURST Sewerage Network Infrastructure Map

December 2012





#### LEGEND

- Proposed Sewer & Manhole (Gravity to Existing Pump Station)
- Proposed Sewer & Manhole (Gravity to Proposed Pump Station)
- Proposed Rising Sewer Main
- Proposed Ultimate Sewer Pump Station

### RIVERSIDE ESTATE SEWER RETICULATION PLAN - SHEET 1 OF 2 R12394 - SEWER

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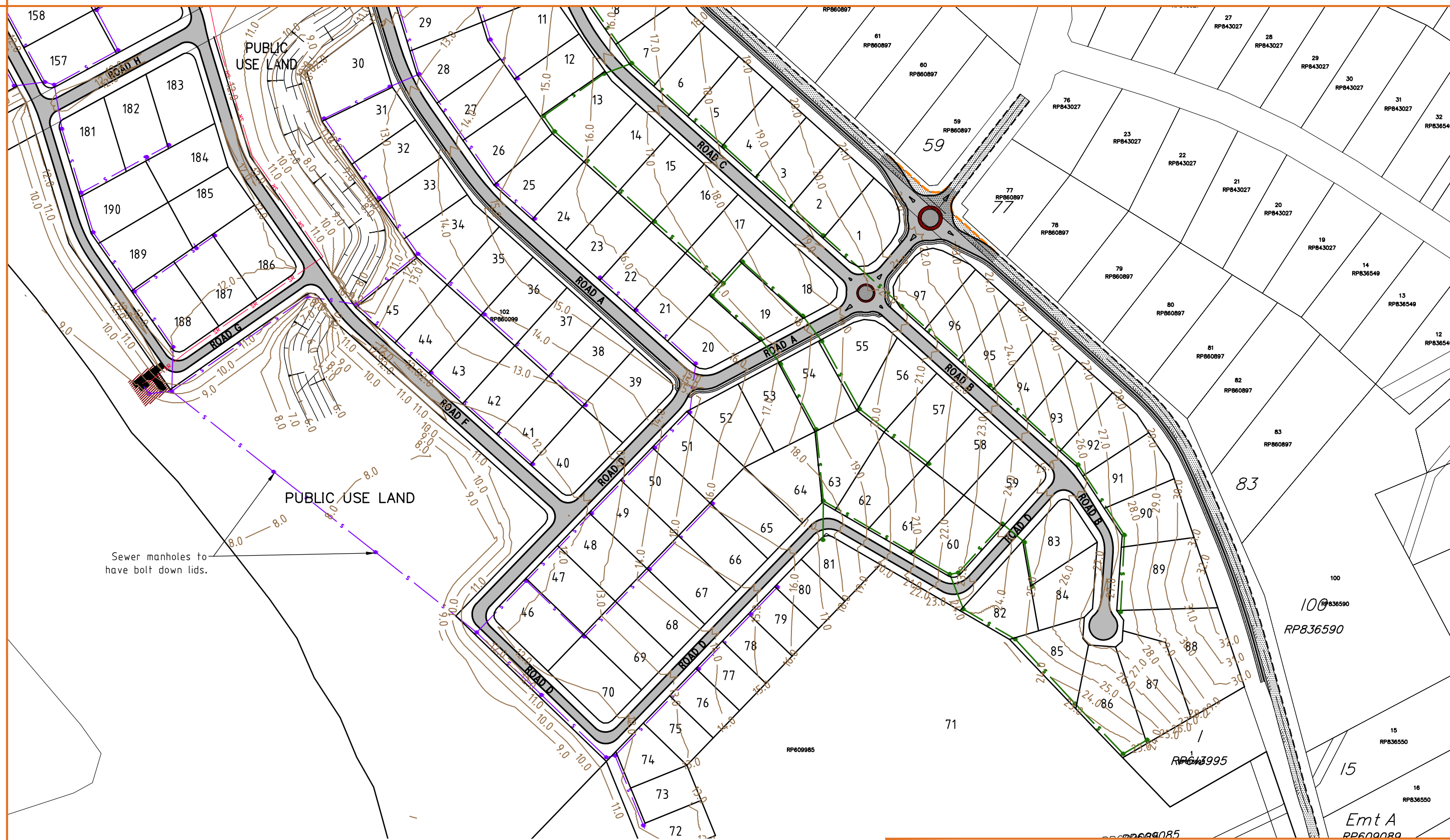
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**LEGEND**

- Proposed Sewer & Manhole (Gravity to Existing Pump Station)
- Proposed Sewer & Manhole (Gravity to Proposed Pump Station)
- Proposed Rising Sewer Main
- Proposed Ultimate Sewer Pump Station

**RIVERSIDE ESTATE**  
**SEWER RETICULATION PLAN - SHEET 2 OF 2**  
**R12394 - SEWER 2**

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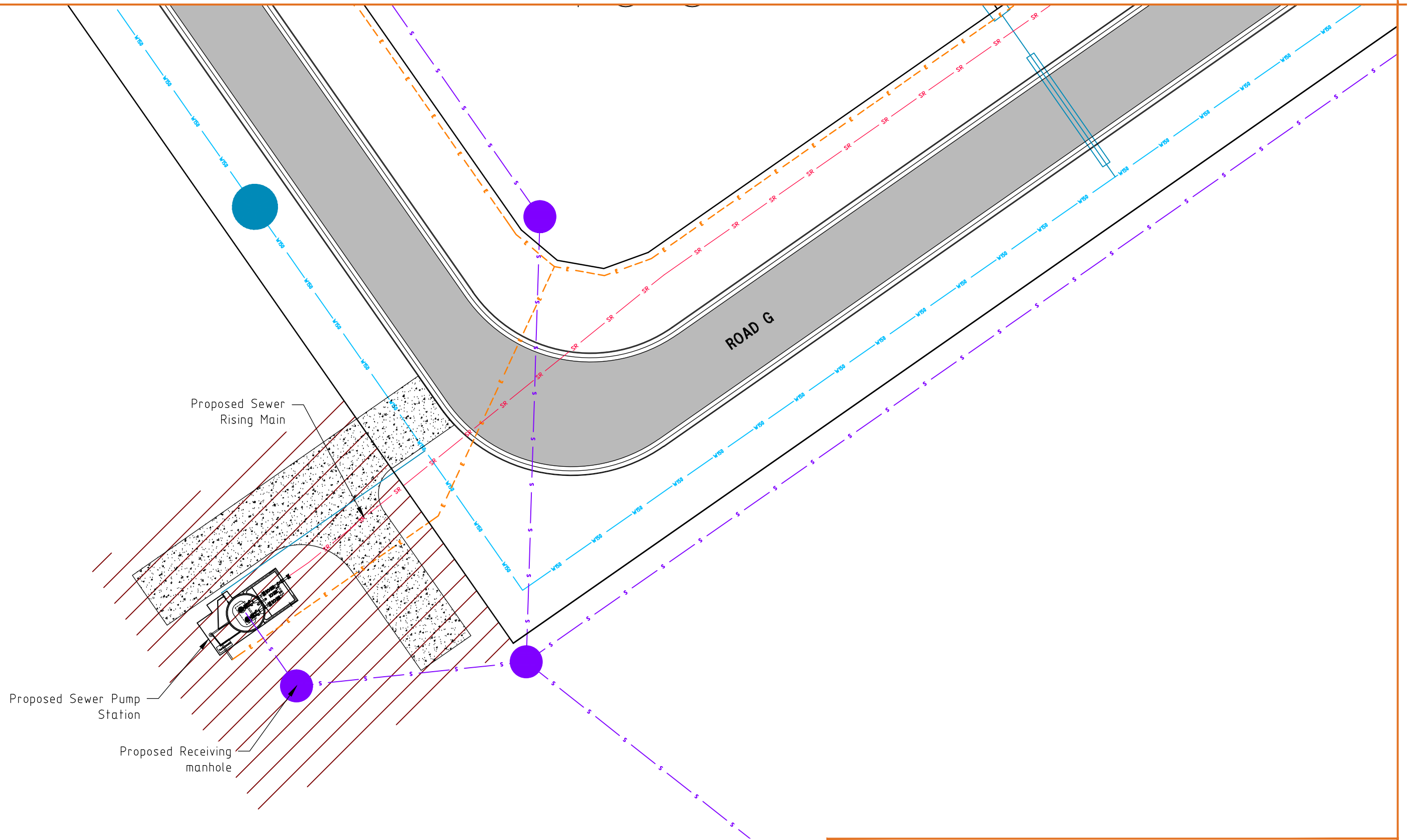
**RIVERSIDE ESTATE**  
**SEWERAGE PUMP STATION PLAN**  
**R12394 - EXISTING SEWERAGE PUMP STATION**

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**RIVERSIDE ESTATE**  
**SEWERAGE PUMP STATION PLAN**  
**R12394 - SEWERAGE PUMP STATION**

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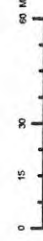


## Appendix E Existing and Proposed Water Supply Plan



## Water Network Map 8

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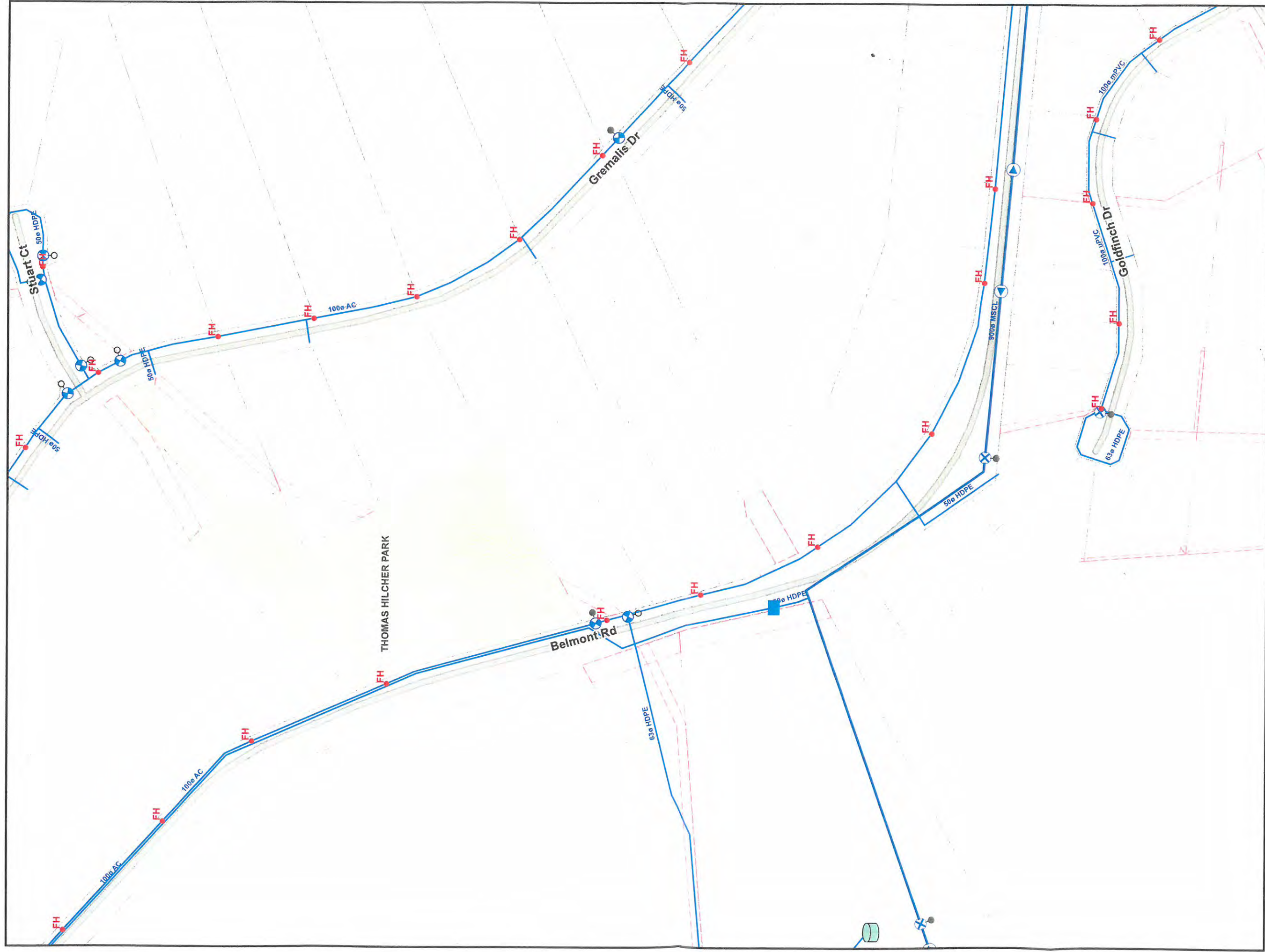




# Water Network Map 11

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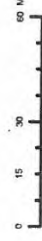
0 15 30 60 M  
1:2,100 at A3



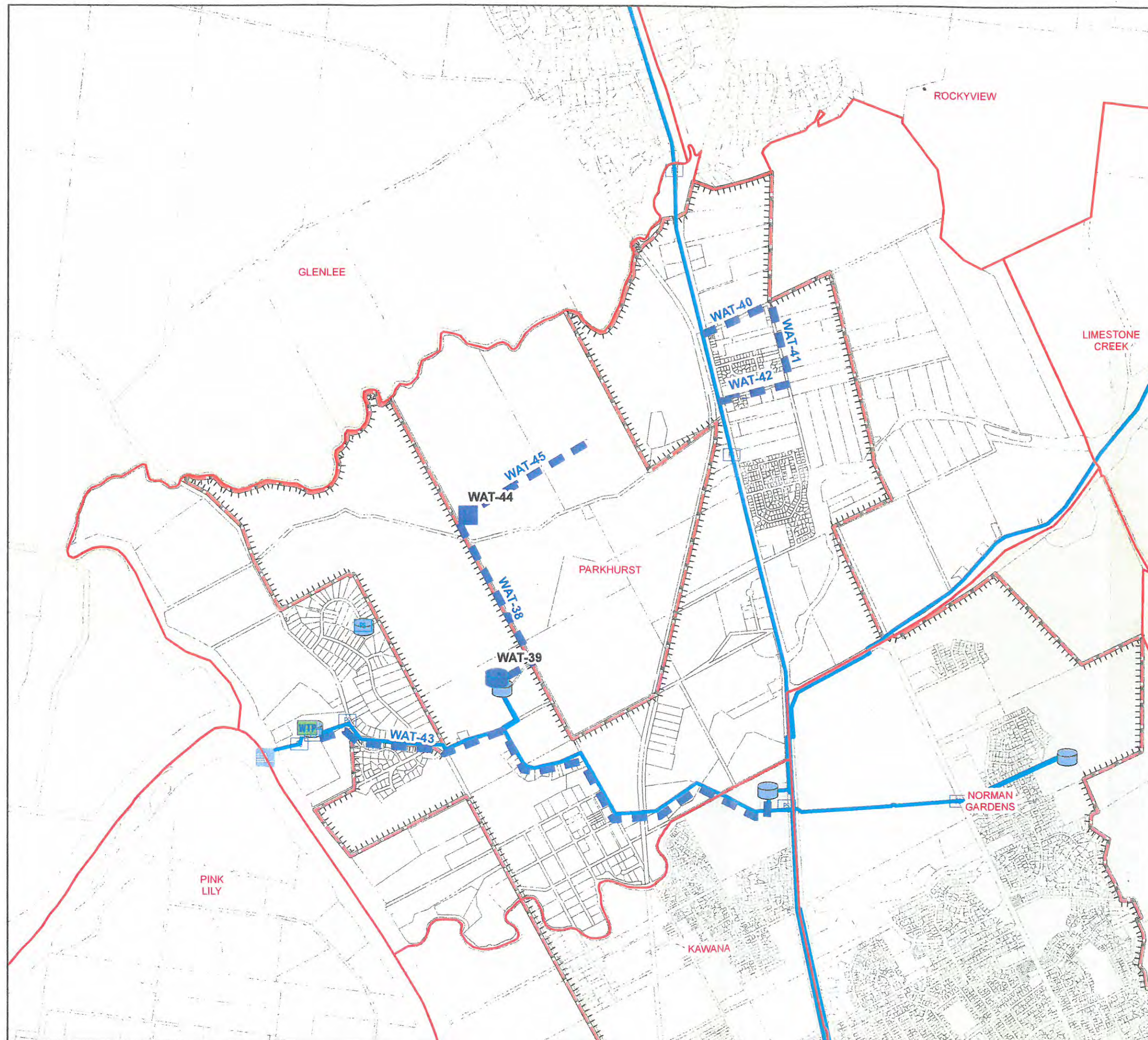
## Water Network Map 12

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1:2,100 at A3







## Trunk Infrastructure - Water

- Locality Boundaries
- Future Water Trunk Infrastructure**
  - Future Pump Station
  - Future Treatment Plant
  - Future Water Reservoir
  - Future Water Trunk Main
- Existing Water Trunk Infrastructure**
  - Existing Pump Station
  - Existing Treatment Plant
  - Existing Water Reservoir
  - Existing Water Trunk Main
  - Existing Dams or Bores
  - Cadastral Parcels
  - Priority Infrastructure Area

Note: Priority Infrastructure Area located inside hashed boundary.

Approx Scale @A3 1:25,000

0 380 760 1,520 Metres

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**Map 86-1**  
**PARKHURST**  
Water Network  
Infrastructure Map

December 2012



92  
SP224420

2  
SP252932








PUBLIC USE LAND

PUBLIC USE LAND

PUBLIC USE LAND

PUBLIC USE LAND

## LEGEND

-  New 300ØmPVC Class 16 Watermain
-  New 200ØmPVC Class 16 Watermain
-  New 150ØmPVC Class 16 Watermain
-  New 100ØmPVC Class 16 Watermain
-  Water Service Conduit
-  Fire Hydrant - Sluice Valve/Gate Valve
- 

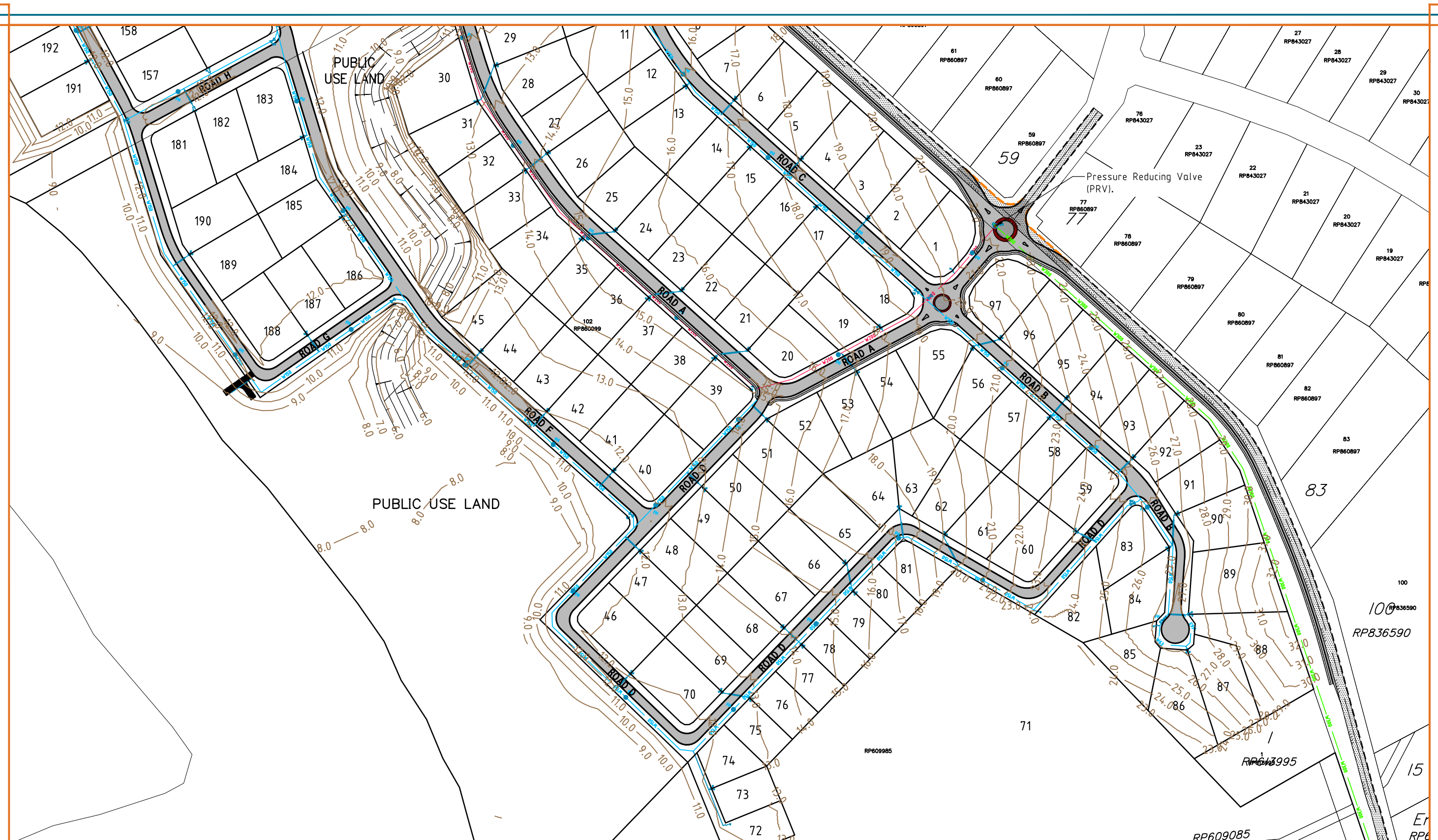
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0 25.0 100.0m  
0 50.0 200.0m  
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1:5000 (A3)

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**LEGEND**

- New 300ØmPVC Class 16 Watermain
- New 200ØmPVC Class 16 Watermain
- New 150ØmPVC Class 16 Watermain
- New 100ØmPVC Class 16 Watermain
- Water Service Conduit
- Fire Hydrant - Sluice Valve/Gate Valve

**RIVERSIDE ESTATE**  
**WATER RETICULATION PLAN - SHEET 2 OF 2**  
**R12394 - WATER 2**

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0 50.0 200.0m

1:2500 (A1)  
1:5000 (A3)

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## Appendix F      Proposed Stormwater Catchments

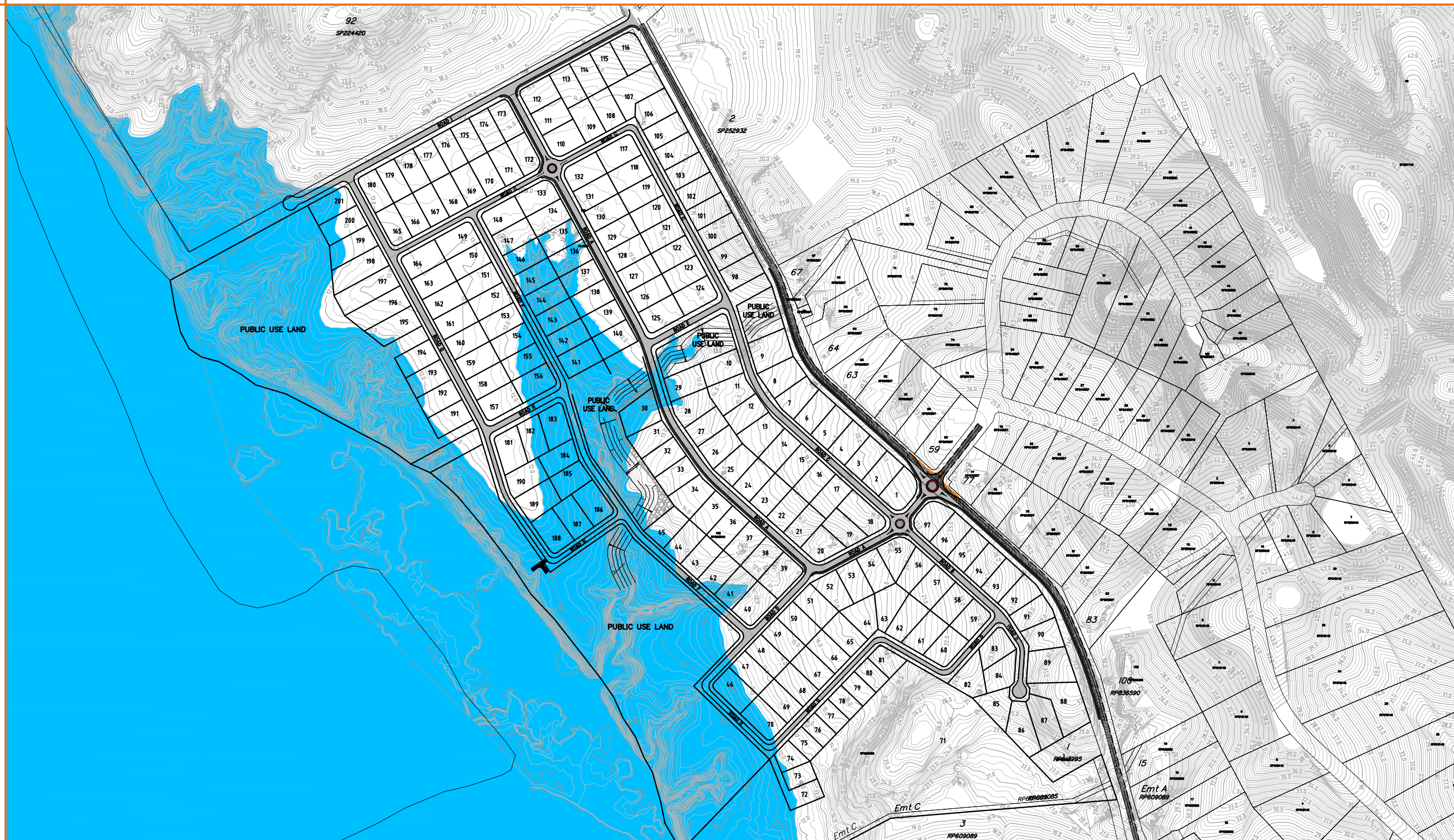












# RIVERSIDE ESTATE PRE DEVELOPMENT INUNDATION PLAN R12394 - PRE INUNDATION

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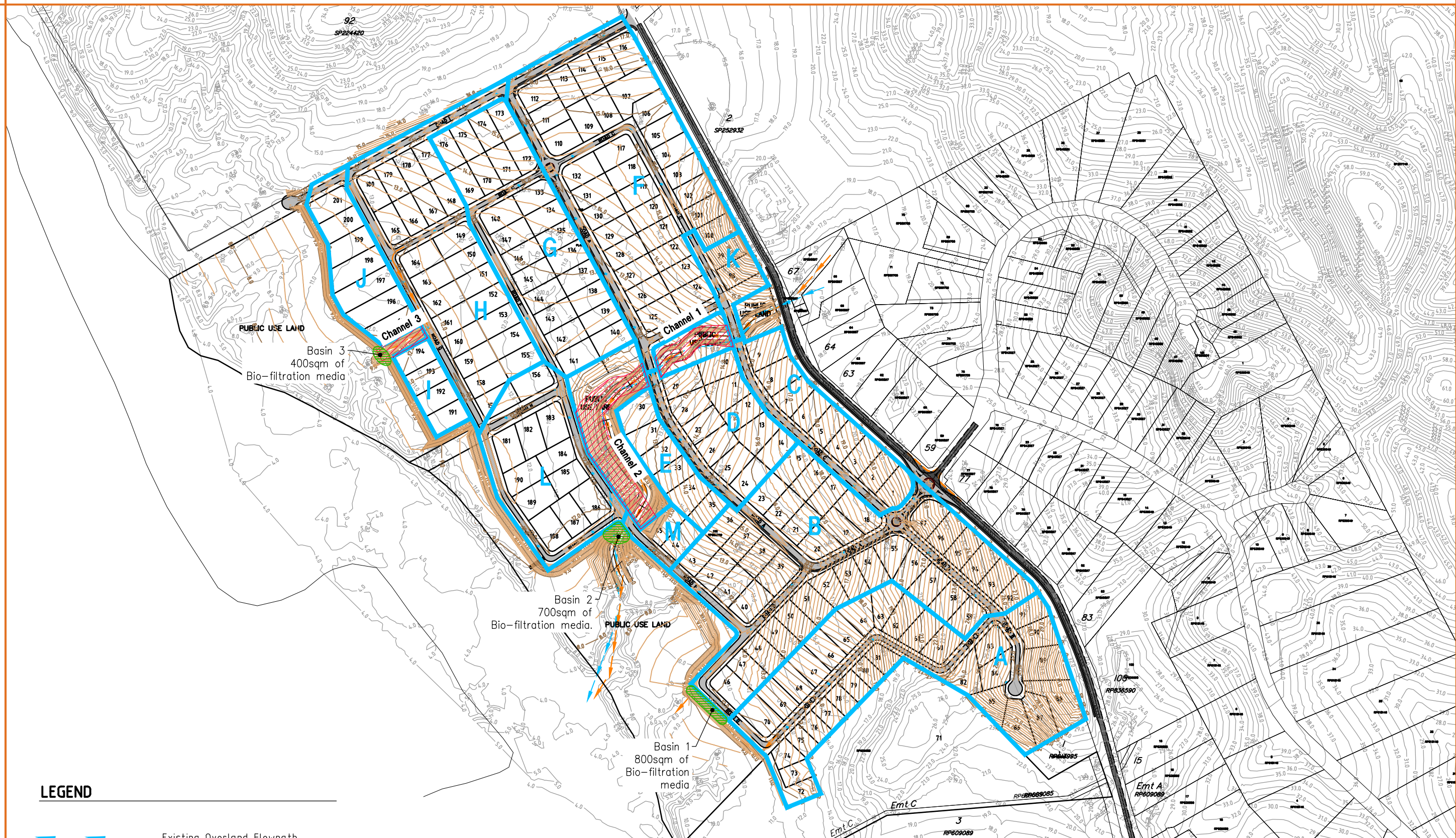
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# LEGEND

- Existing Overland Flowpath
- Proposed Overland Flowpath
- Existing Contours
- Proposed Culvert System
- Proposed Bio-retention Basins
- Proposed Rock Protection / Rock Retaining wall

## RIVERSIDE ESTATE STORMWATER QUALITY PLAN R12394 - STORMWATER QUALITY

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1:5000 (A3)

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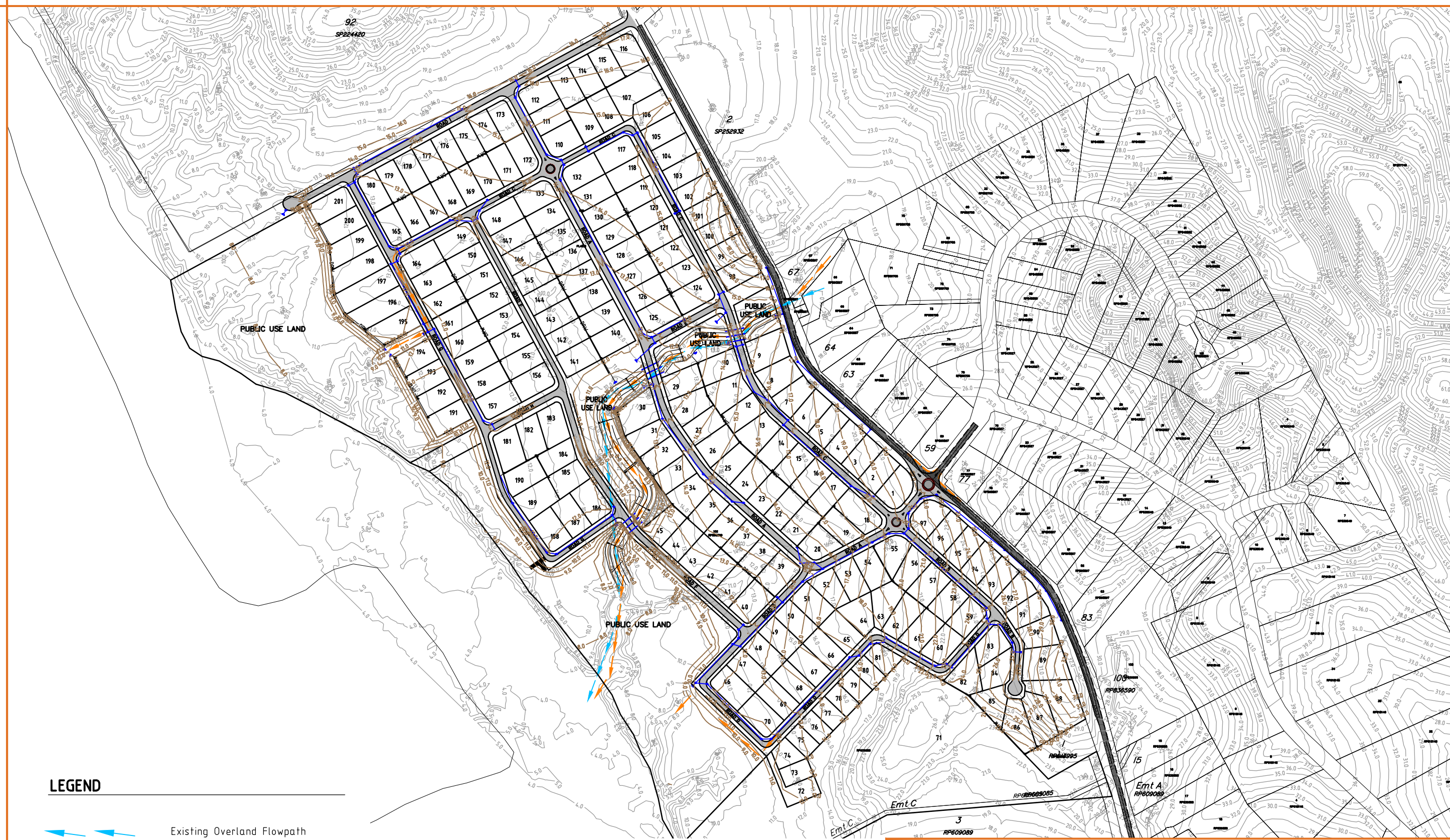
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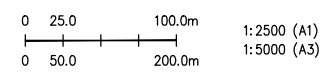




**LEGEND**

-  Existing Overland Flowpath
-  Proposed Overland Flowpath
-  Existing Contours
-  Proposed Culvert System
-  Proposed Bio-retention Basins
-  Proposed Rock Protection / Rock Retaining wall

**RIVERSIDE ESTATE**  
**STORMWATER**  
**R12394 - STORMWATER**



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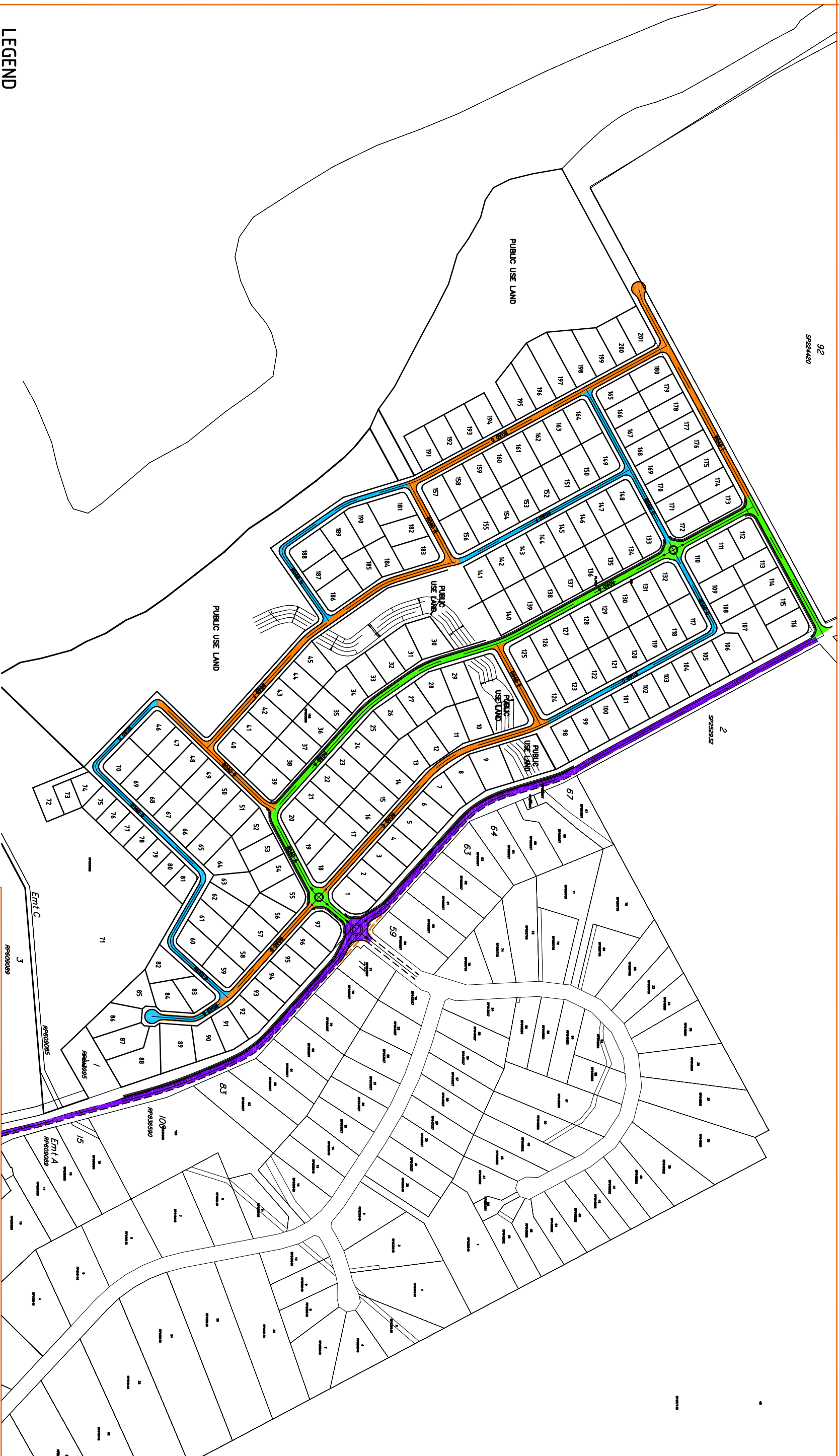
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## **Appendix G    Proposed Road Hierarchy Plan, Roundabout Details, Road Longsections and Cross-section Details**



LEGEND

- Minor Urban Collector
- Urban Access Street
- Urban Access Place
- Half Width Major Collector (Belmont Road)

RIVERSIDE ESTATE  
ROAD HIERARCHY PLAN  
R12394 - ROAD HEIRARCHY

0 25.0 100.0m  
0 50.0 200.0m  
1:2500 (A1)  
1:5000 (A2)

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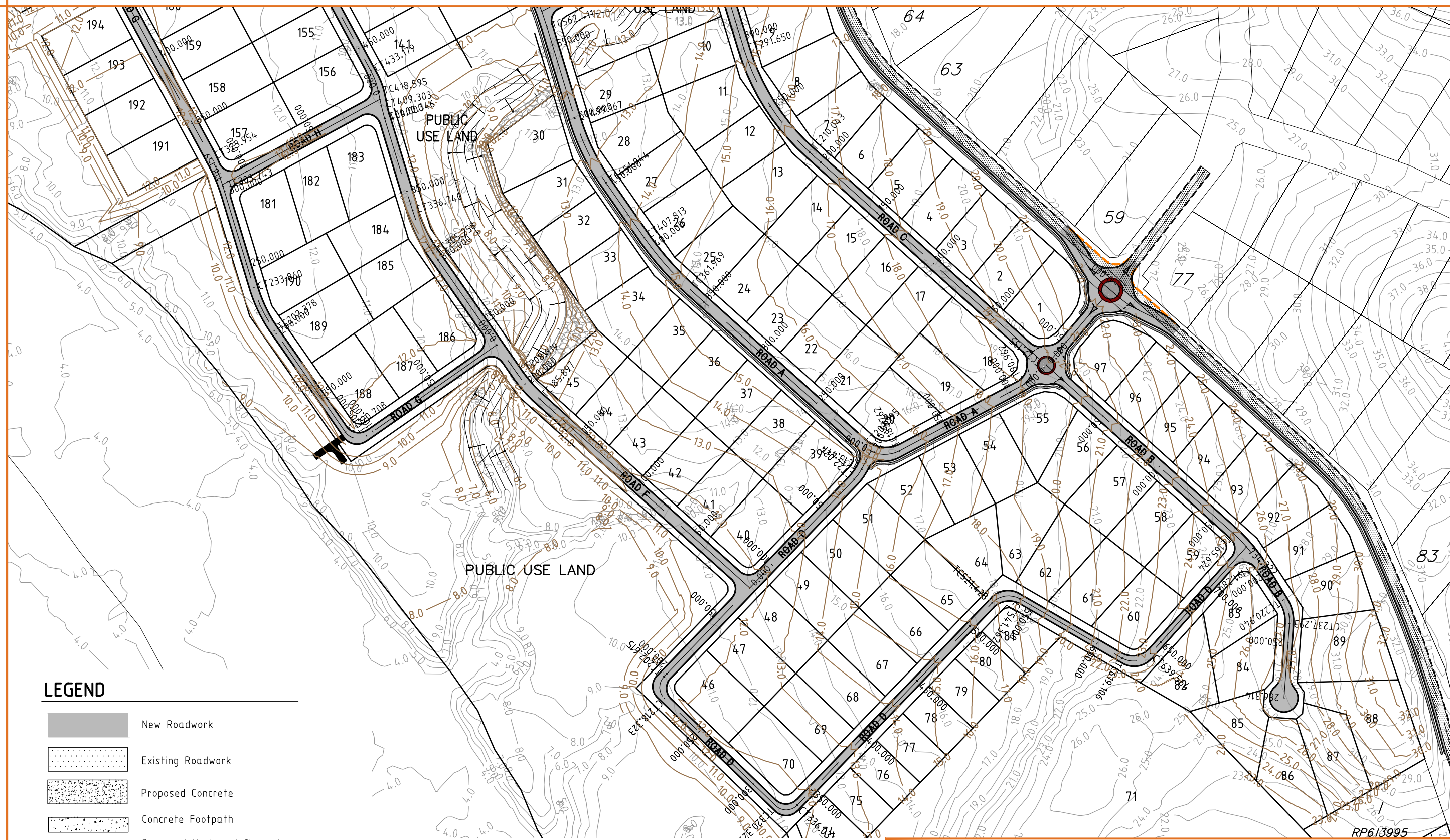


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# LEGEND

- New Roadwork
- Existing Roadwork
- Proposed Concrete
- Concrete Footpath
- Proposed Kerb and Channel
- Existing Kerb and Channel
- Existing Contours
- Finished Surface Contours

## RIVERSIDE ESTATE ROADWORKS PLAN SHEET 2 OF 2 R12394 - ROADWORKS

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0 12.5 50.0m  
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1:2500 (A3)

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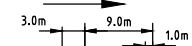
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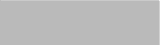
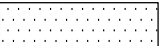


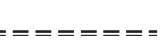



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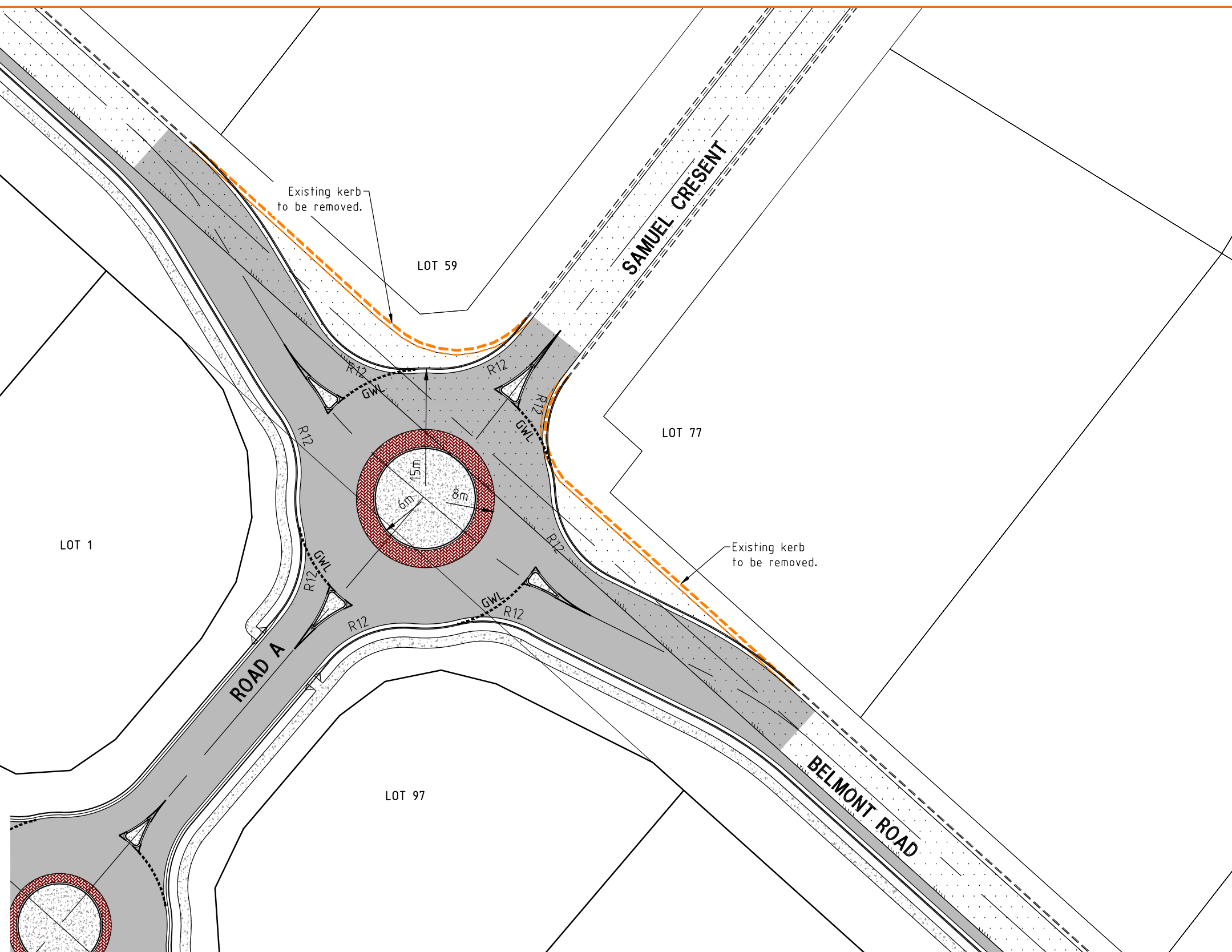


# PAVEMENT MARKING LEGEND

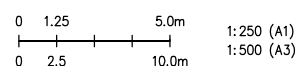
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EL	Edge Line	100mm
CL	Continuity Line L=1000, G=3000	100mm
GWL	Give Way Line L=600, G=600	300mm
ULL	Unbroken Lane Line	80mm
SL	Stop Line	300mm
OL	OUT LINE	100mm

# LEGEND

	New Roadwork
	Existing Roadwork
	Proposed Concrete
	Concrete Footpath
	Proposed Kerb and Channel
	Existing Kerb and Channel
	Existing Contours
	Finished Surface Contours



## RIVERSIDE ESTATE BELMONT ROAD INTERSECTION LAYOUT PLAN R12394 - INTERSECTION LAYOUT



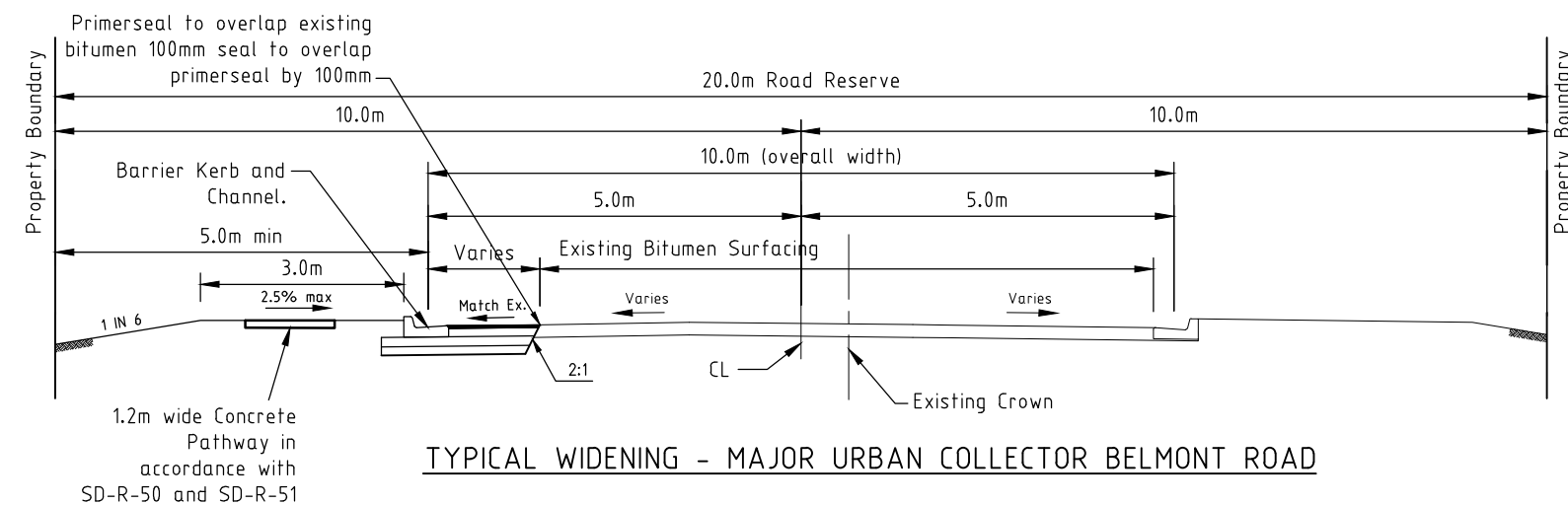
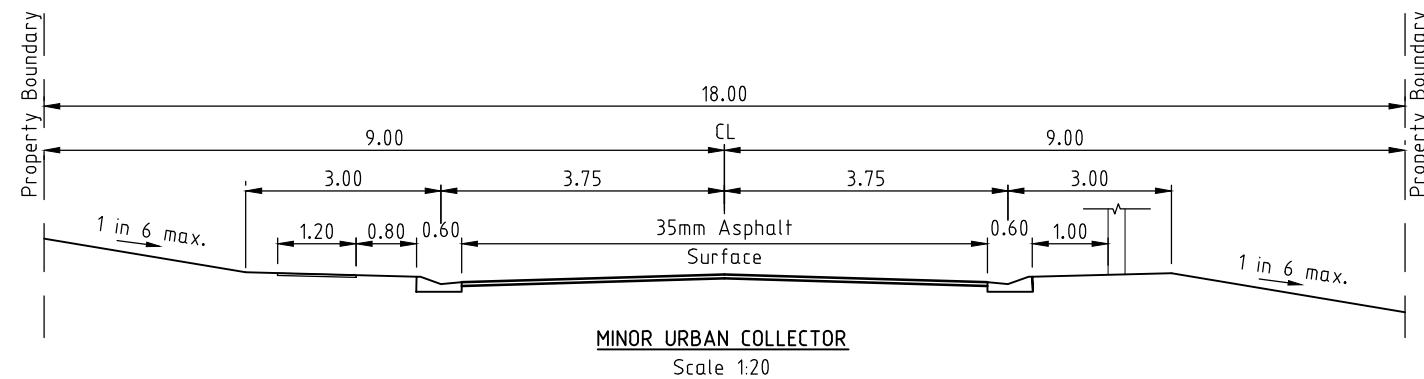
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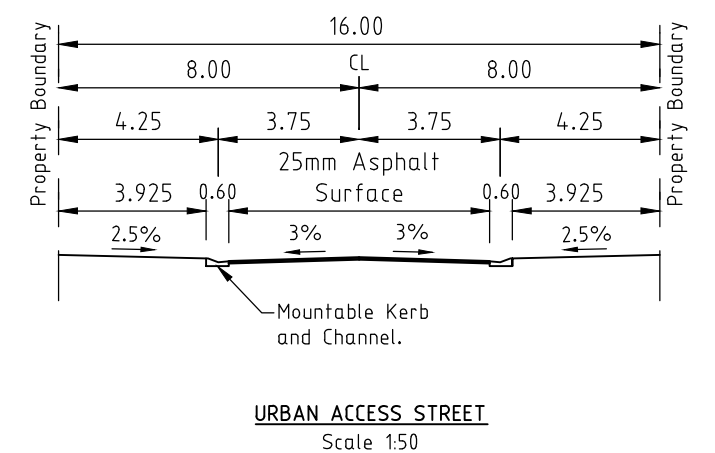
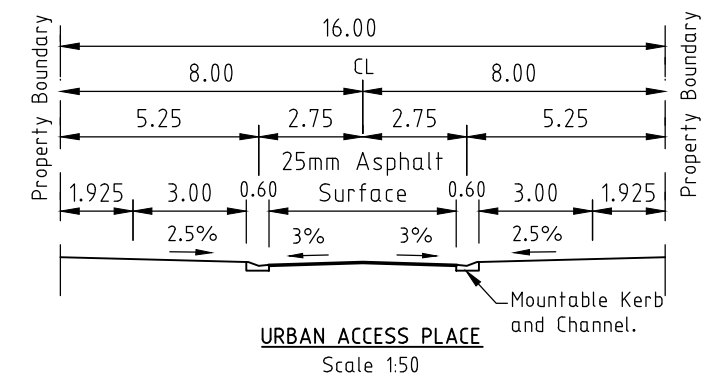
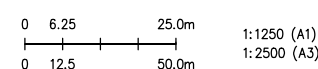
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NOTE: Please refer to Riverside Estate road hierarchy plan.

## RIVERSIDE ESTATE ROADWORKS DETAILS PLAN R12394 - ROADWORKS DETAILS

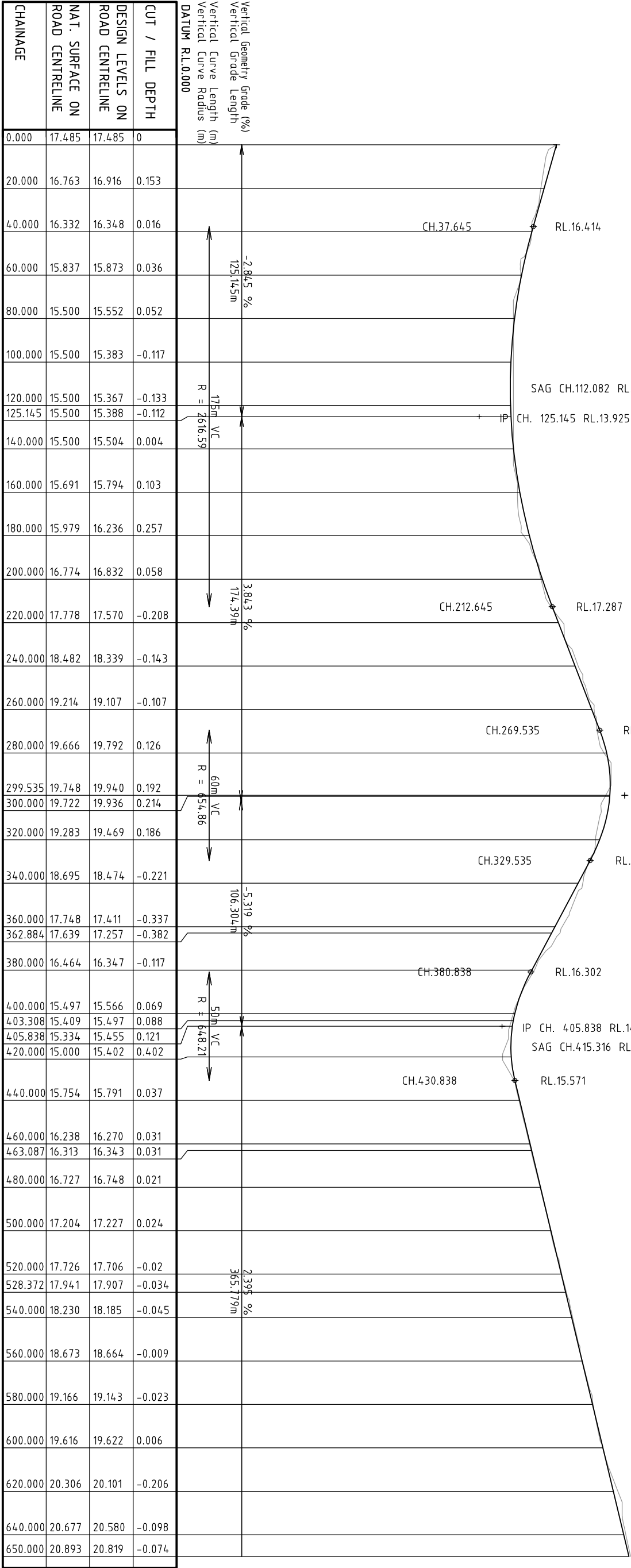


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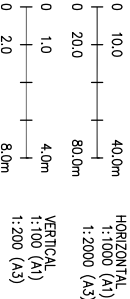




LONGITUDINAL SECTION Belmont Road

RIVERSIDE ESTATE

ROAD LONGSECTIONS PLAN SHEET 1 OF 14  
R12394 - ROAD LONGSECTIONS



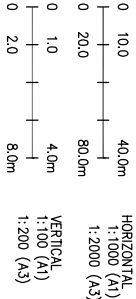
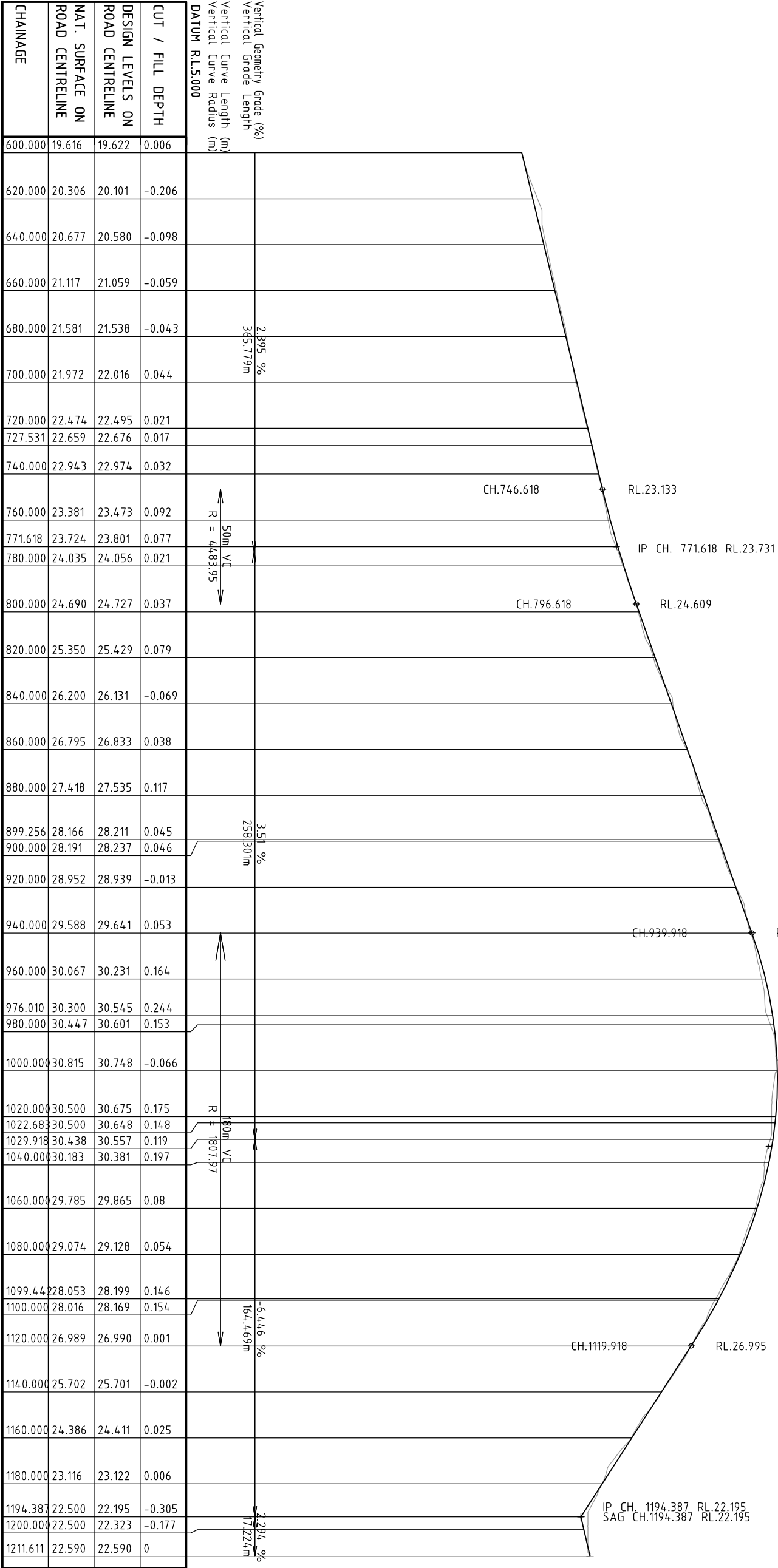
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RIVERSIDE ESTATE

ROAD LONGSECTIONS PLAN SHEET 2 OF 14

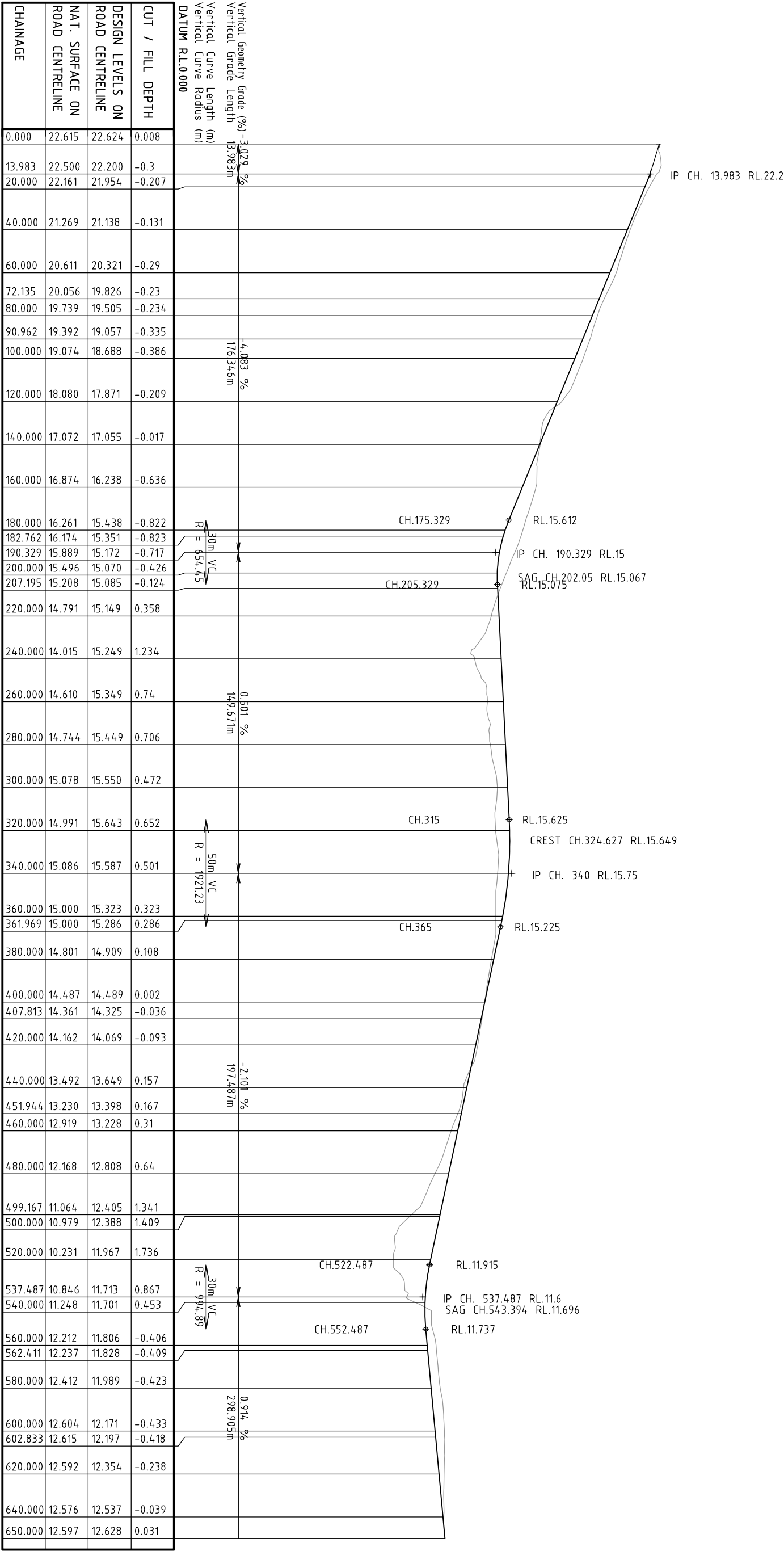
R12394 - ROAD LONGSECTIONS

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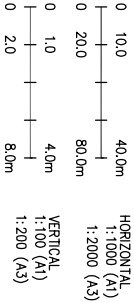
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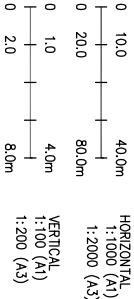
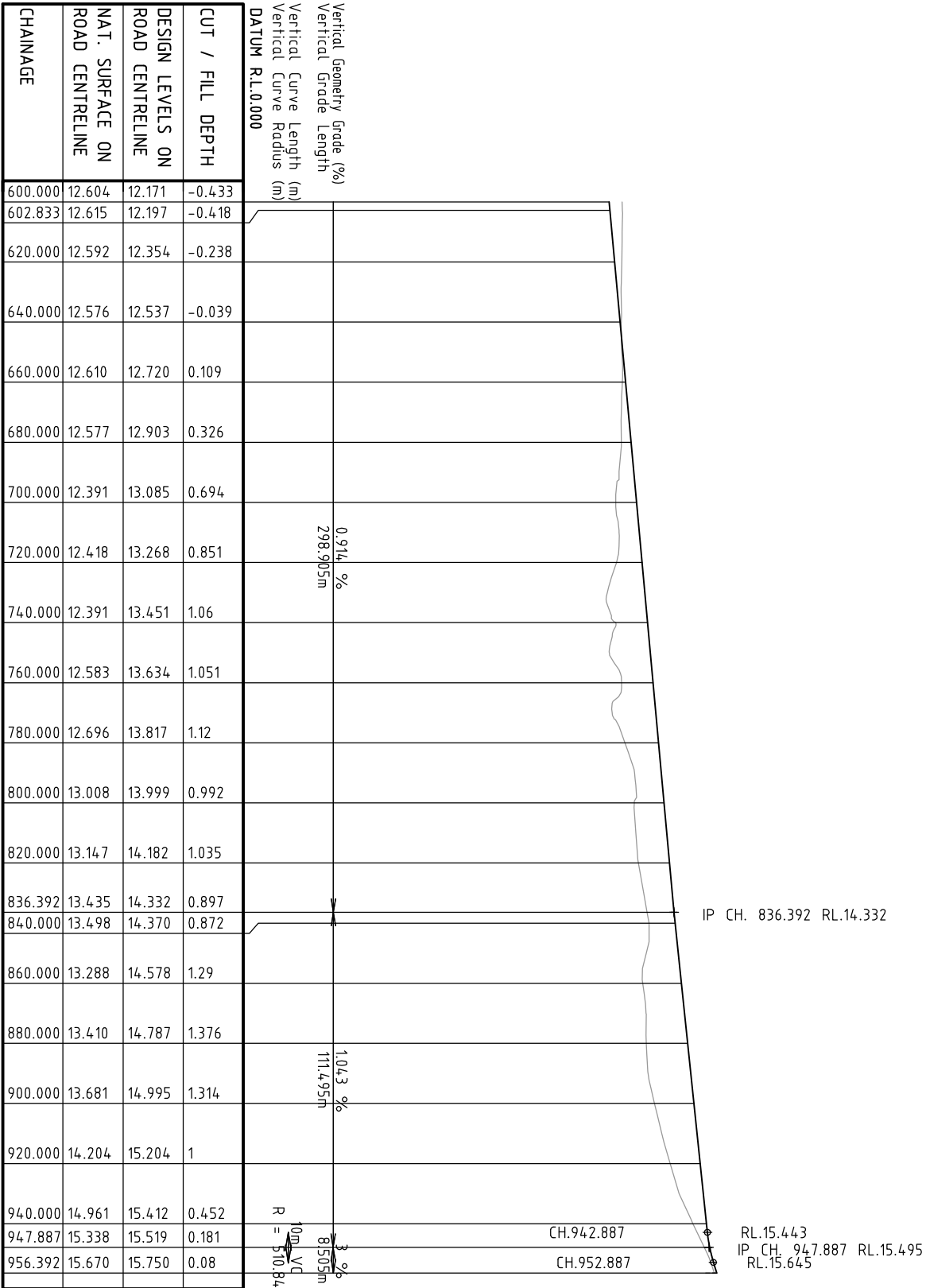






LONGITUDINAL SECTION Road A





RIVERSIDE ESTATE

ROAD LONGSECTIONS PLAN SHEET 4 OF 14

R12394 - ROAD LONGSECTIONS

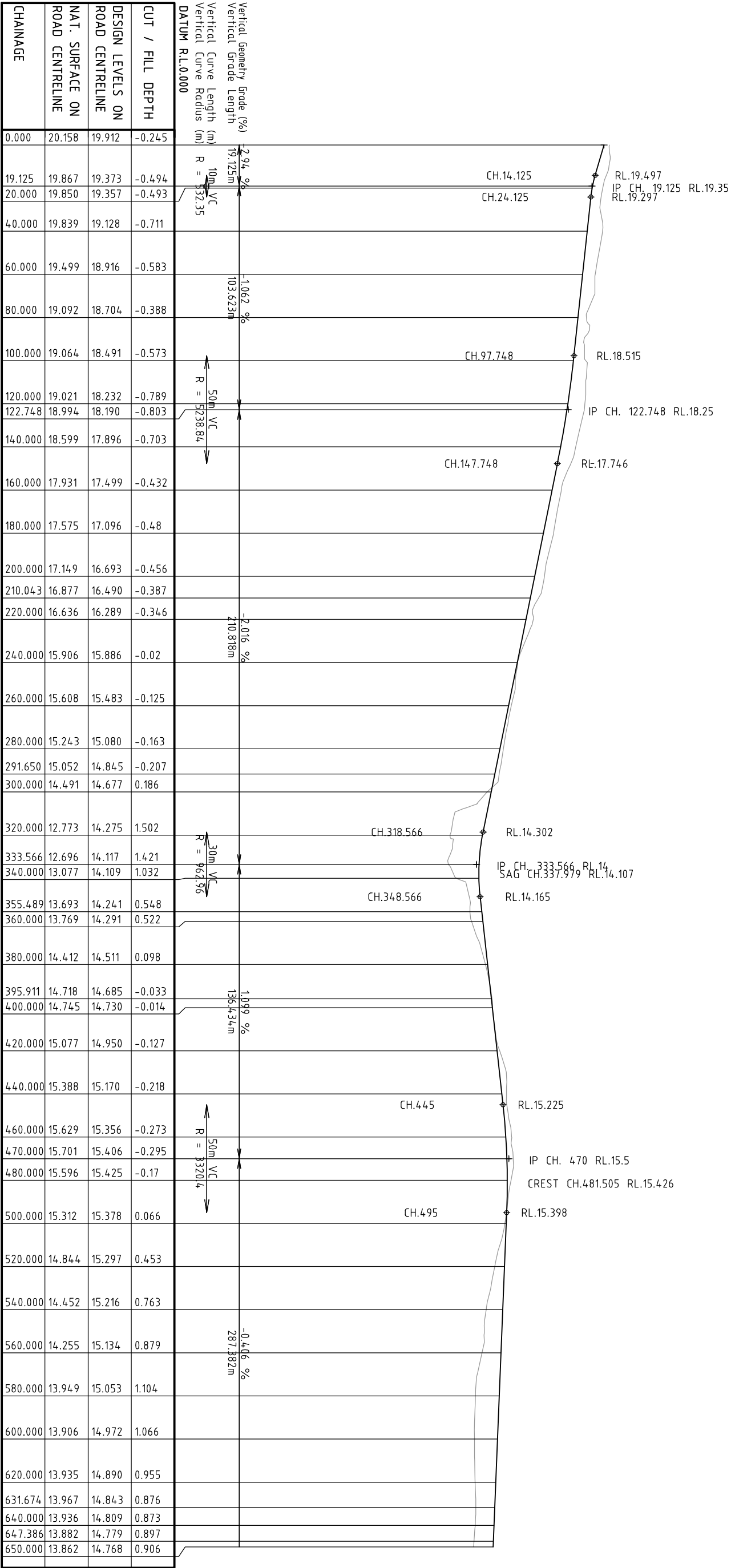
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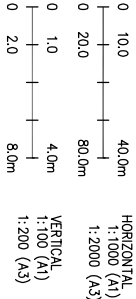








LONGITUDINAL SECTION Road C



RIVERSIDE ESTATE

ROAD LONGSECTIONS PLAN SHEET 6 OF 14

R12394 - ROAD LONGSECTIONS

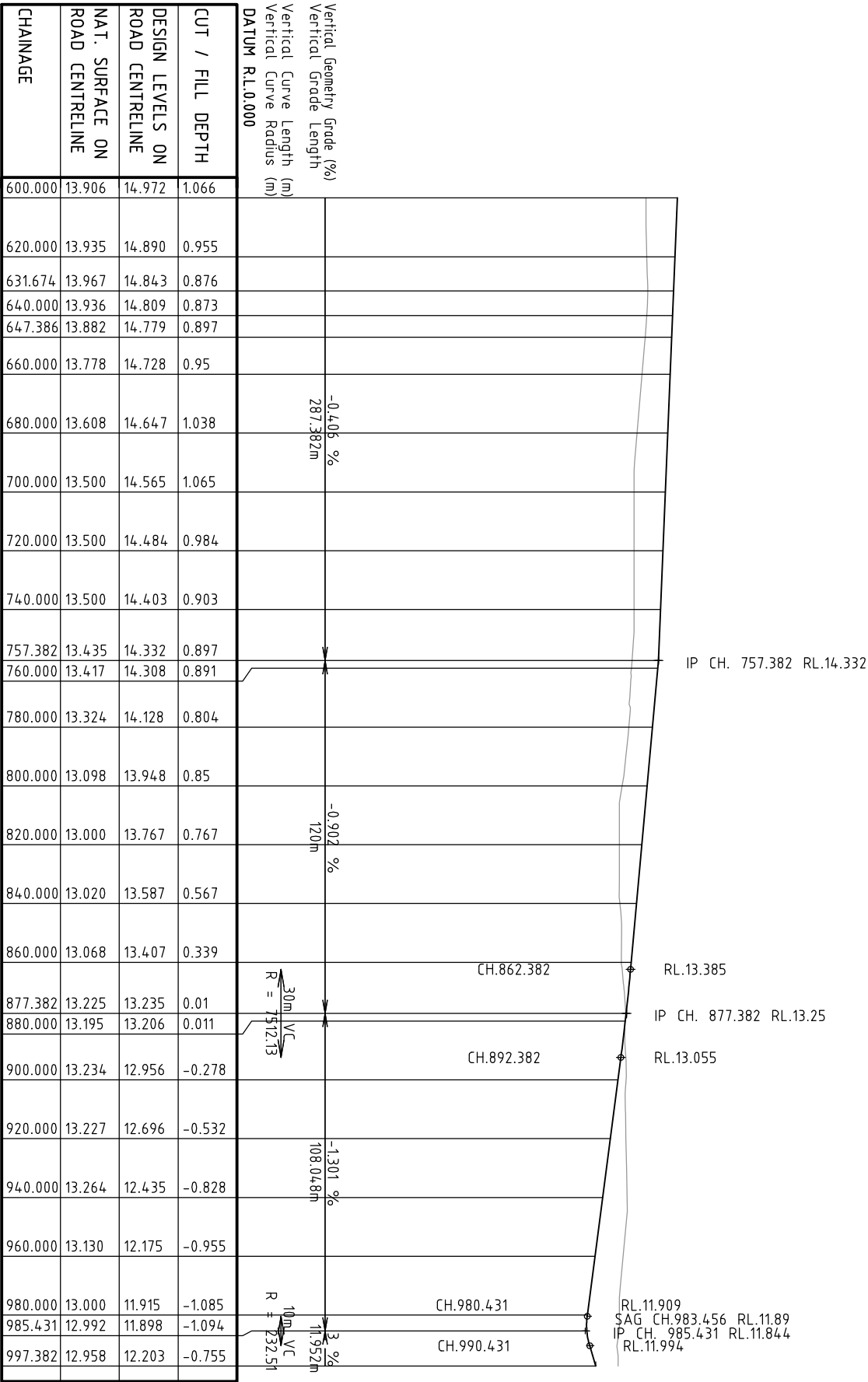
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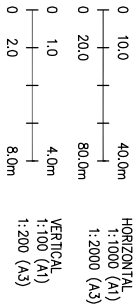


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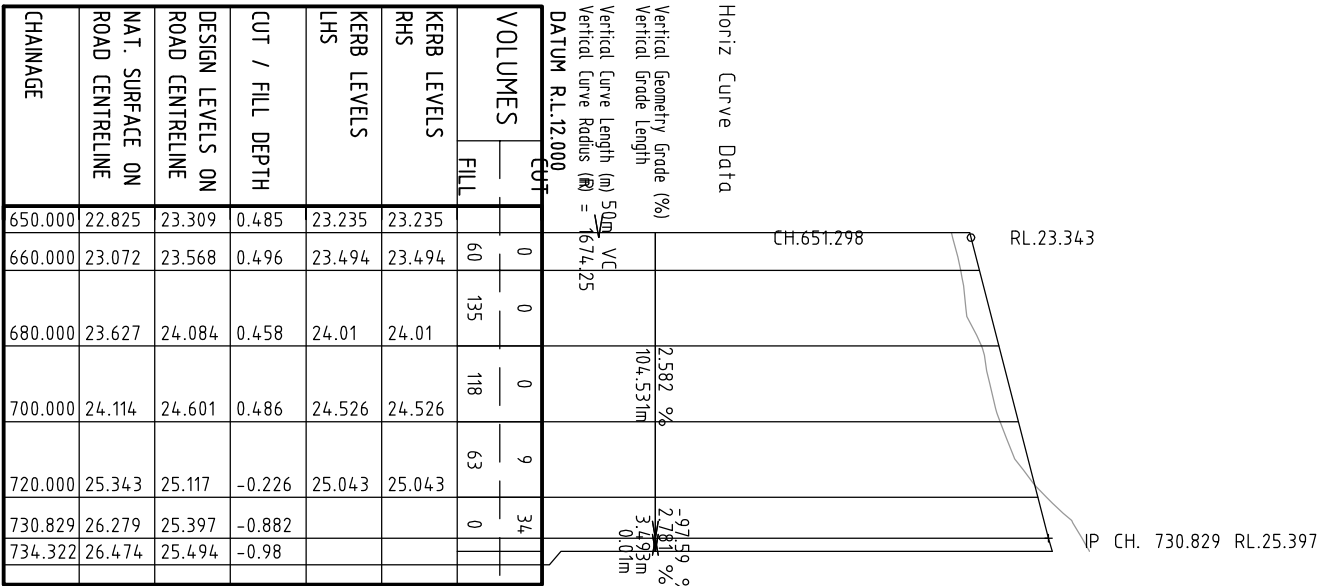


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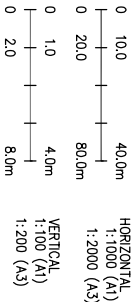








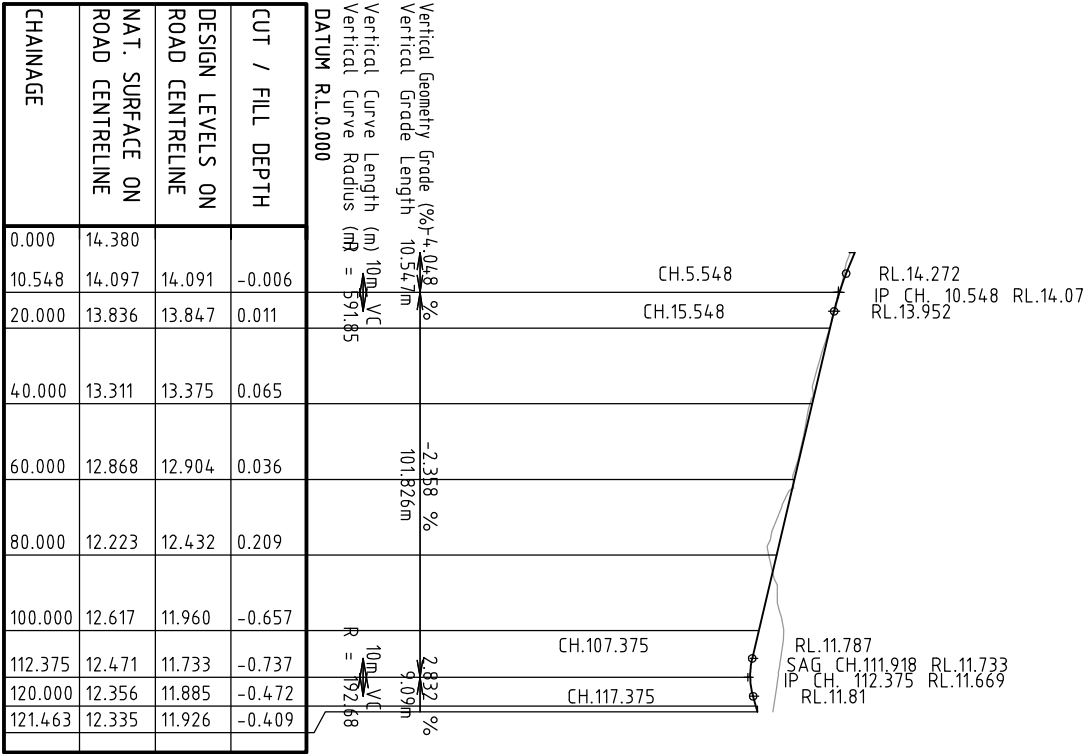
LONGITUDINAL SECTION Road D



RIVERSIDE ESTATE

ROAD LONGSECTIONS PLAN SHEET 9 OF 14

R12394 - ROAD LONGSECTIONS



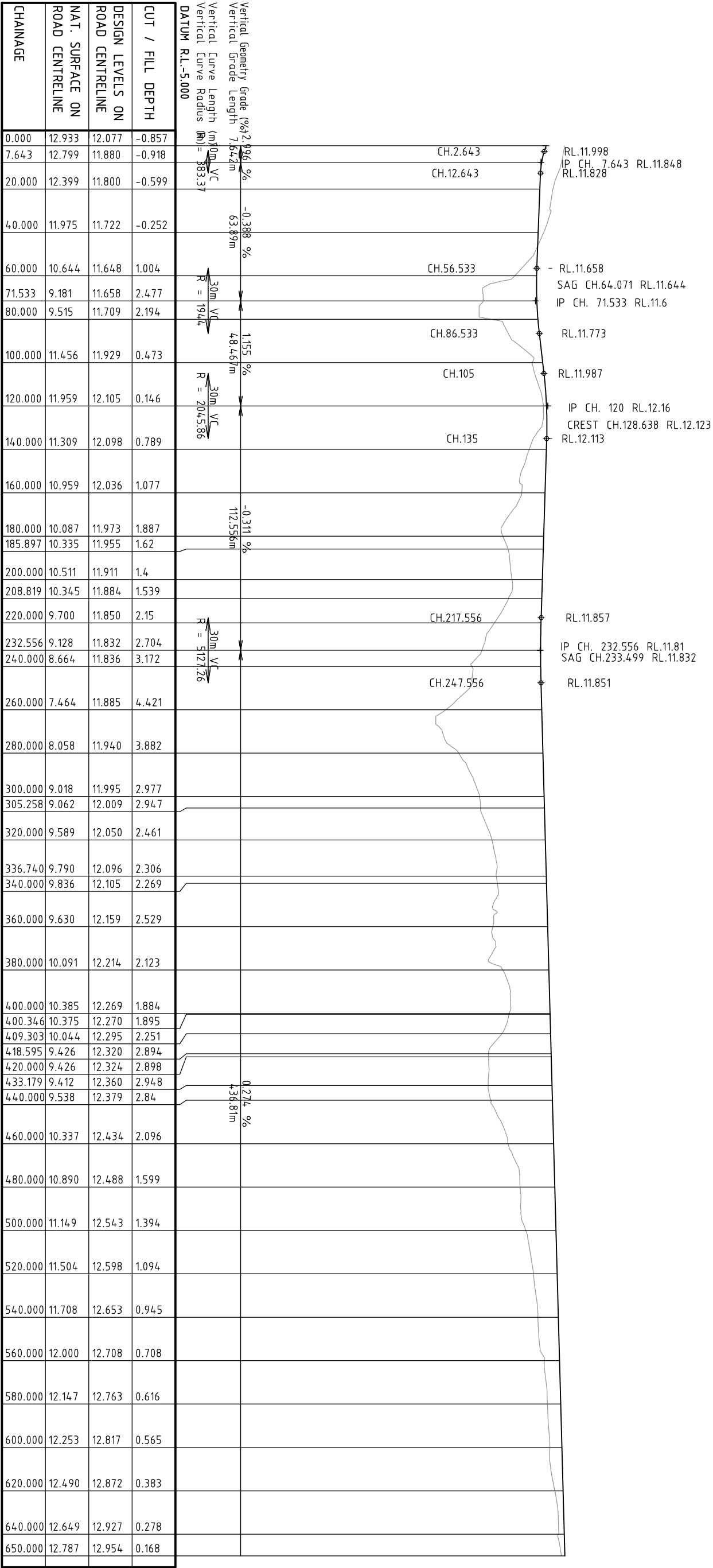
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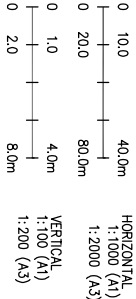
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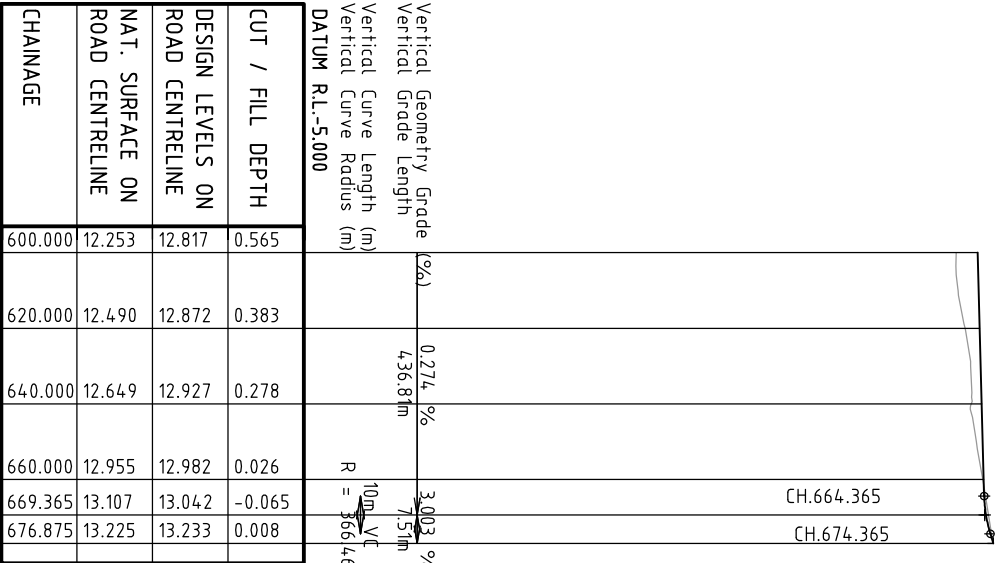


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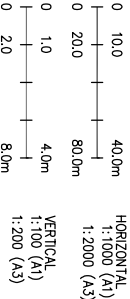




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RL.13.158



LONGITUDINAL SECTION Road F

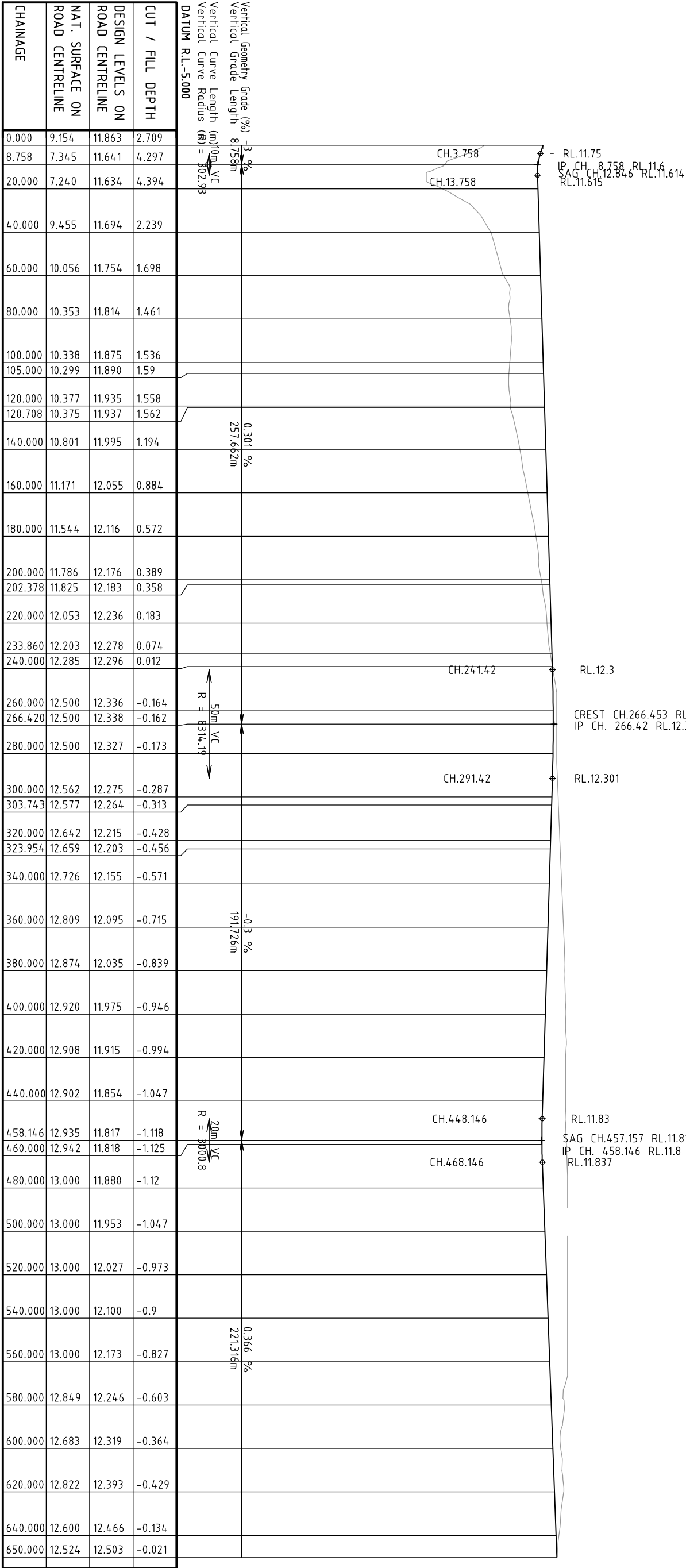


RIVERSIDE ESTATE  
ROAD LONGSECTIONS PLAN SHEET 11 OF 14  
R12394 - ROAD LONGSECTIONS

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LONGITUDINAL SECTION Road G

0.000

8.758

20.000

40.000

60.000

80.000

100.000

105.000

120.000

120.708

140.000

160.000

180.000

200.000

202.378

220.000

233.860

240.000

260.000

266.420

280.000

300.000

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320.000

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340.000

360.000

380.000

400.000

420.000

440.000

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460.000

480.000

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520.000

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7.345

7.240

9.455

10.056

10.353

10.338

10.299

10.377

10.375

10.801

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20.000

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80.000

100.000

105.000

120.000

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220.000

233.860

240.000

260.000

266.420

280.000

300.000

303.743

320.000

323.954

340.000

360.000

380.000

400.000

420.000

440.000

458.146

460.000

480.000

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11.825

12.053

12.203

12.285

12.500

12.500

12.500

12.562

12.577

12.642

12.659

12.726

12.809

12.874

12.920

12.908

12.902

12.935

12.942

13.000

13.000

13.000

13.000

12.849

12.683

12.822

12.600

12.524

11.863

11.641

11.634

11.694

11.754

11.814

11.875

11.890

11.935

11.937

11.995

12.055

12.116

12.176

12.183

12.236

12.278

12.296

12.336

12.338

12.327

12.275

12.264

12.215

12.203

12.155

12.095

12.035

11.975

11.915

11.854

11.817

11.818

11.880

11.953

12.027

12.100

12.173

12.246

12.319

12.393

12.466

12.503

2.709

4.297

4.394

2.239

1.698

1.461

1.536

1.59

1.558

1.562

1.194

0.884

0.572

0.389

0.358

0.183

0.074

0.012

-0.164

-0.162

-0.173

-0.287

-0.313

-0.428

-0.456

-0.571

-0.715

-0.839

-0.946

-0.994

-1.047

-1.118

-1.125

-1.12

-1.047

-0.973

-0.9

-0.827

-0.603

-0.364

-0.429

-0.134

-0.021

Vertical Geometry Grade (%)

-3.9%

Vertical Grade Length

87.56m

Vertical Curve Length (m)

10m VC

Vertical Curve Radius (m)

302.93

DATUM R.L.-5.000

CUT / FILL DEPTH

2.709

DESIGN LEVELS ON ROAD CENTRELINE

11.863

NAT. SURFACE ON ROAD CENTRELINE

9.154

CHAINAGE

0.000

LONGITUDINAL SECTION Road G

0.000

8.758

20.000

40.000

60.000

80.000

100.000

105.000

120.000

120.708

140.000

160.000

180.000

200.000

202.378

220.000

233.860

240.000

260.000

266.420

280.000

300.000

303.743

320.000

323.954

340.000

360.000

380.000

400.000

420.000

440.000

458.146

460.000

480.000

500.000

520.000

540.000

560.000

580.000

600.000

620.000

640.000

650.000

9.154

7.345

7.240

9.455

10.056

10.353

10.338

10.299

10.377

10.375

10.801

11.171

11.544

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11.825

12.053

12.203

12.285

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12.500

12.500

12.562

12.577

12.642

12.659

12.726

12.809

12.874

12.920

12.908

12.902

12.935

12.942

13.000

13.000

13.000

13.000

12.849

12.683

12.822

12.600

12.524

11.863

11.641

11.634

11.694

11.754

11.814

11.875

11.890

11.935

11.937

11.995

12.055

12.116

12.176

12.183

12.236

12.278

12.296

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12.155

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12.246

12.319

12.393

12.466

12.503

2.709

4.297

4.394

2.239

1.698

1.461

1.536

1.59

1.558

1.562

1.194

0.884

0.572

0.389

0.358

0.183

0.074

0.012

-0.164

-0.162

-0.173

-0.287

-0.313

-0.428

-0.456

-0.571

-0.715

-0.839

-0.946

-0.994

-1.047

-1.118

-1.125

-1.12

-1.047

-0.973

-0.9

-0.827

-0.603

-0.364

-0.429

-0.134

-0.021

Vertical Geometry Grade (%)

-3.9%

Vertical Grade Length

87.56m

Vertical Curve Length (m)

10m VC

Vertical Curve Radius (m)

302.93

DATUM R.L.-5.000

CUT / FILL DEPTH

2.709

DESIGN LEVELS ON ROAD CENTRELINE

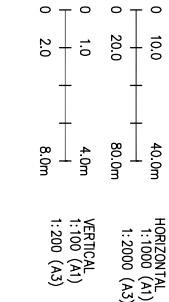
11.863

NAT. SURFACE ON ROAD CENTRELINE

9.154

CHAINAGE

0.000



RIVERSIDE ESTATE

ROAD LONGSECTIONS PLAN SHEET 12 OF 14

R12394 - ROAD LONGSECTIONS

ROCKHAMPTON  
P.O. Box 1580  
238 Quay Street,  
Rockhampton Q 4700

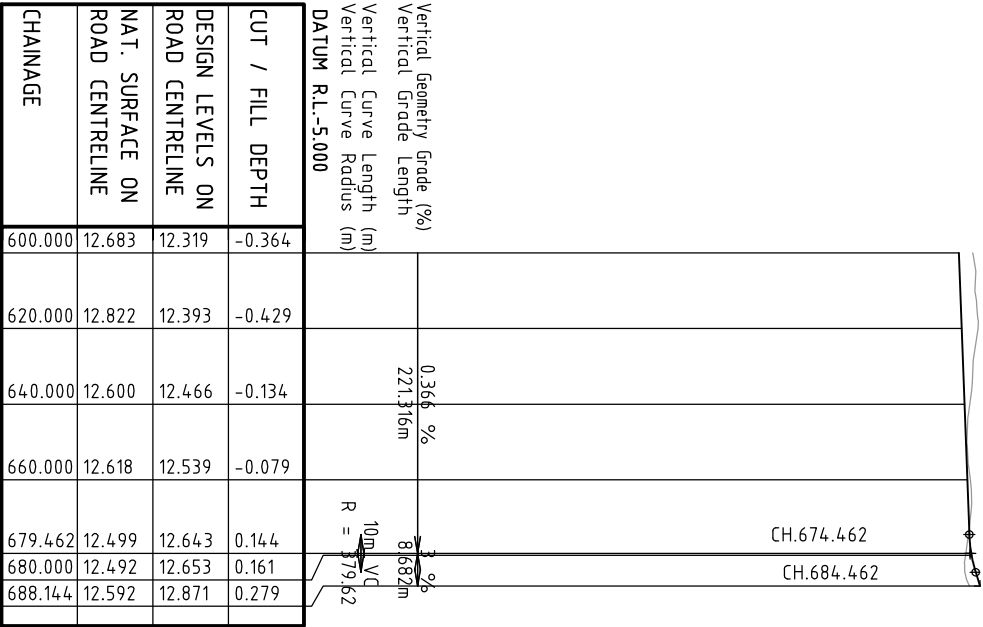
Telephone (07) 4931 0777  
Facsimile (07) 4921 4866  
E-Mail: Rockhampton@brownconsulting.com.au



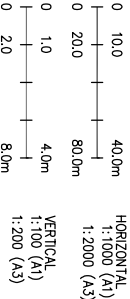
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RL.12.592  
IP CH. 679.462 RL.12.61  
RL.12.76

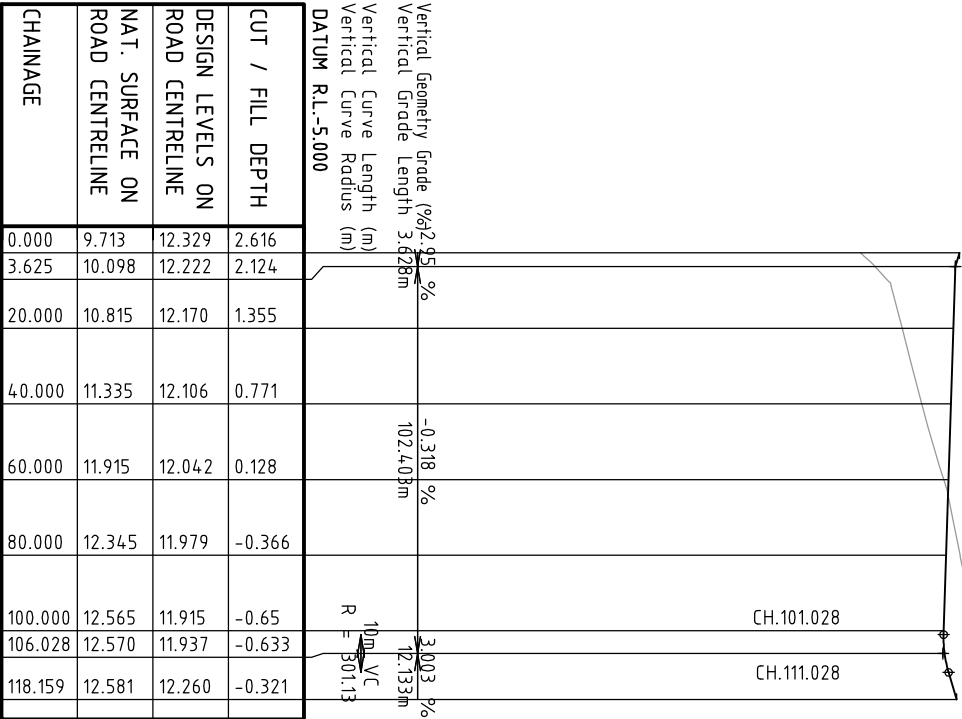


LONGITUDINAL SECTION Road G



RIVERSIDE ESTATE  
ROAD LONGSECTIONS PLAN SHEET 13 OF 14  
R12394 - ROAD LONGSECTIONS

IP CH. 3.625 RL.12.222



RL.11.912  
SAG CH.101.987 RL.11.91  
IP CH. 106.028 RL.11.896  
RL.12.046

LONGITUDINAL SECTION Road H

ROCKHAMPTON  
P.O. Box 1580  
238 Quay Street,  
Rockhampton Q 4700

Telephone (07) 4931 0777  
Facsimile (07) 4921 4866  
E-Mail: Rockhampton@brownconsulting.com.au

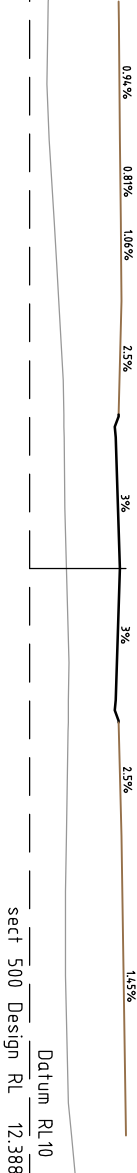


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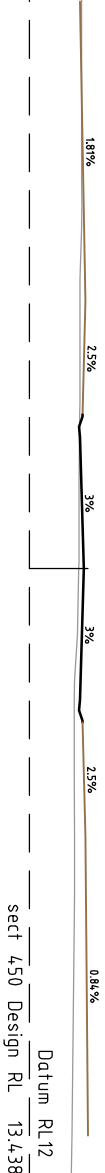




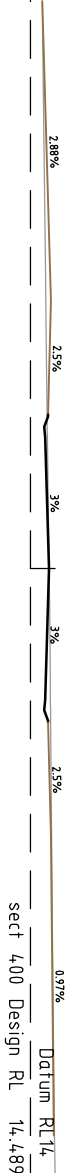
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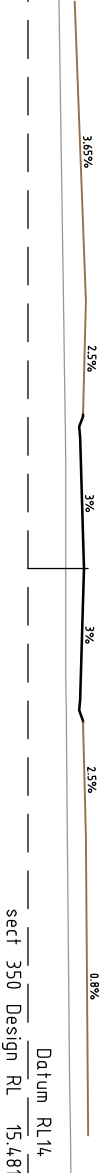
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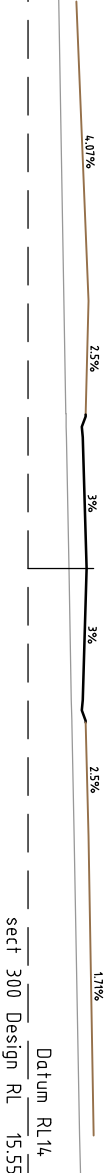
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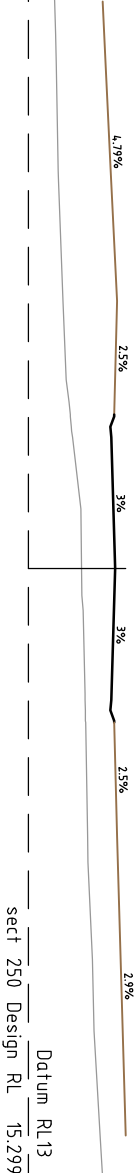
Ch 350



Ch 300



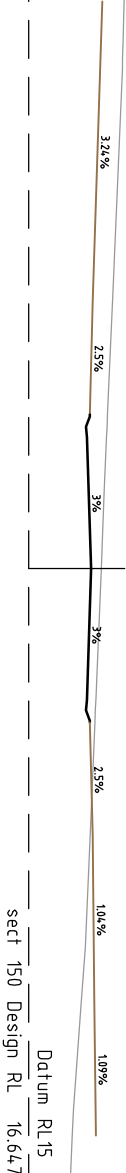
Ch 250



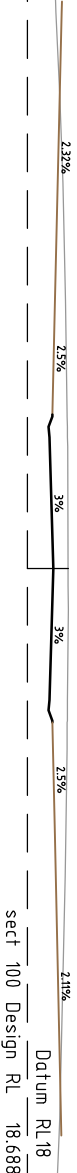
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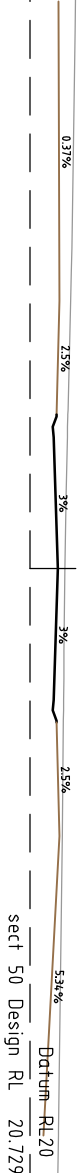
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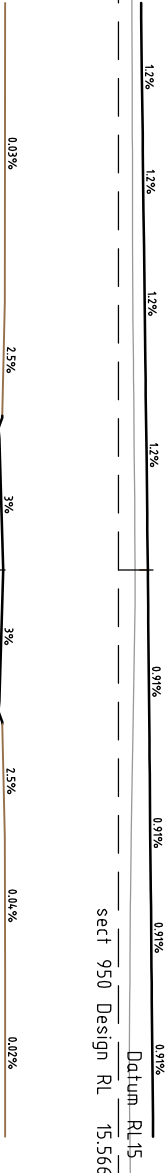
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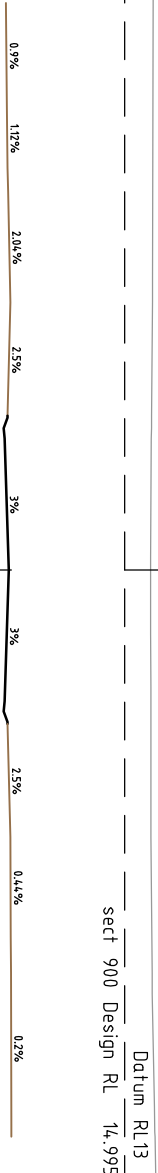
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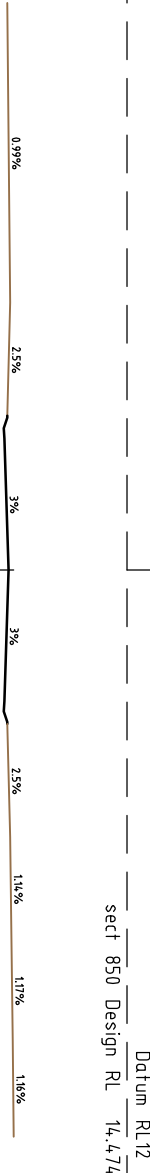
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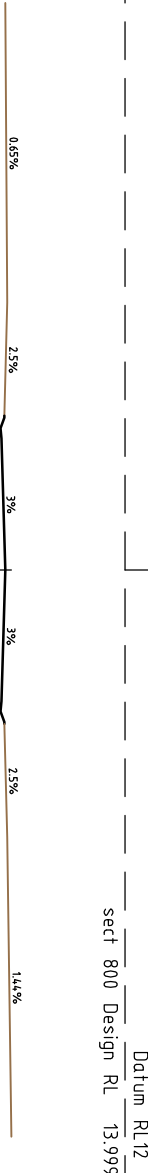
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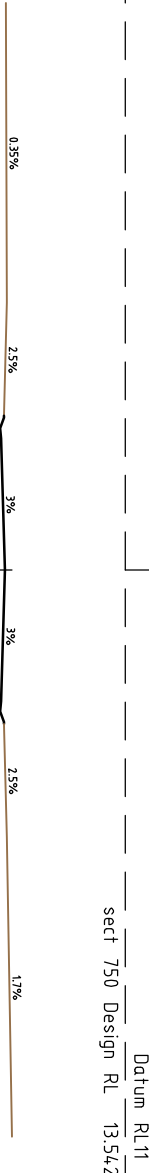
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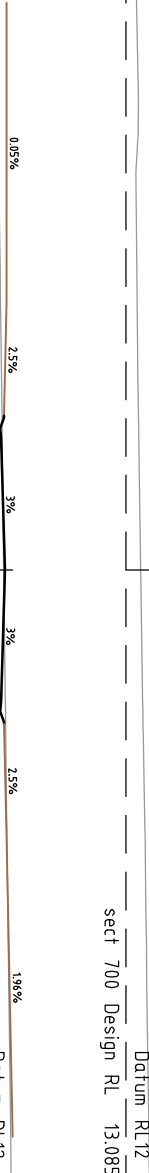
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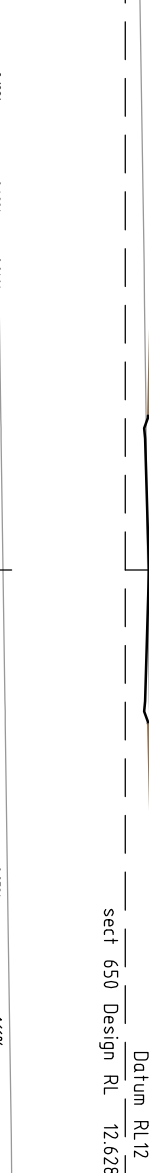
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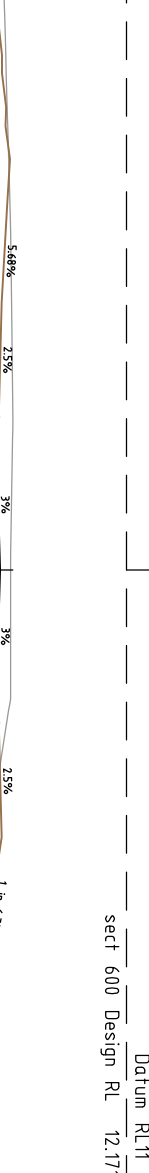
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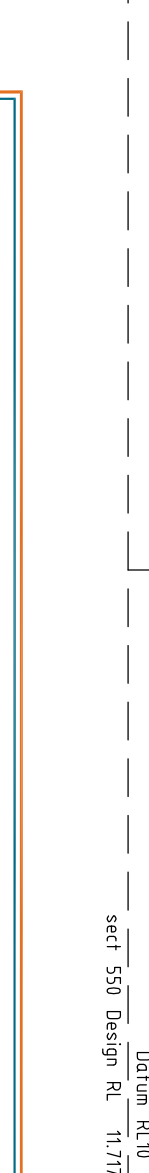
Ch 650



Ch 600

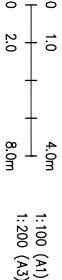


Ch 550



RIVERSIDE ESTATE

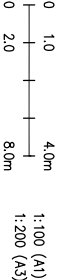
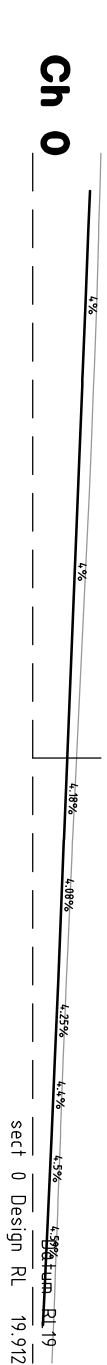
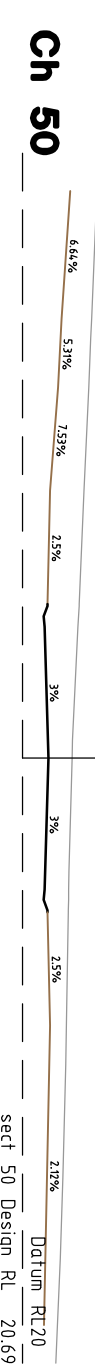
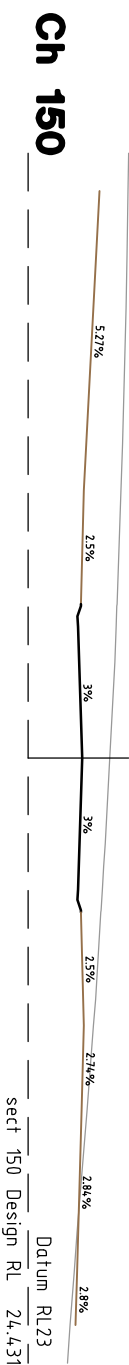
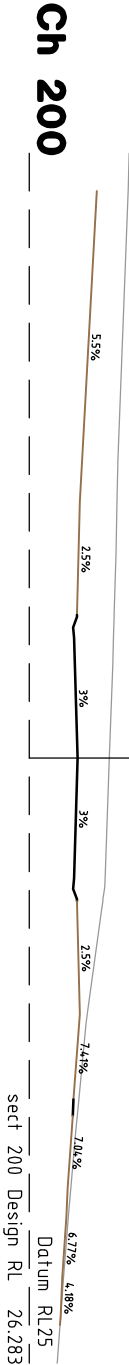
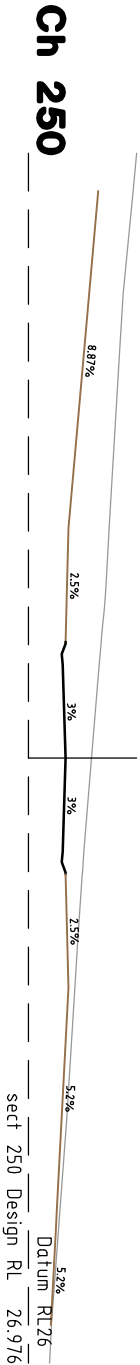
ROAD CROSS SECTION ROAD A  
R12394 - ROAD CROSS SECTION 1



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P.O. Box 1580  
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**RIVERSIDE ESTATE**  
**ROAD CROSS SECTION ROAD B**  
**R12394 - ROAD CROSS SECTIONS 2**

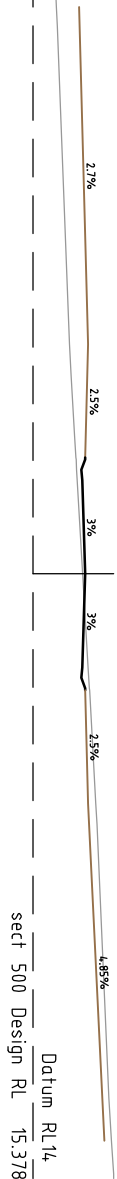
ROCKHAMPTON  
P.O. Box 1580  
238 Quay Street,  
Rockhampton Q 4700

Telephone (07) 4931 0777  
Facsimile (07) 4921 4866  
E-Mail: [Rockhampton@brownconsulting.com.au](mailto:Rockhampton@brownconsulting.com.au)

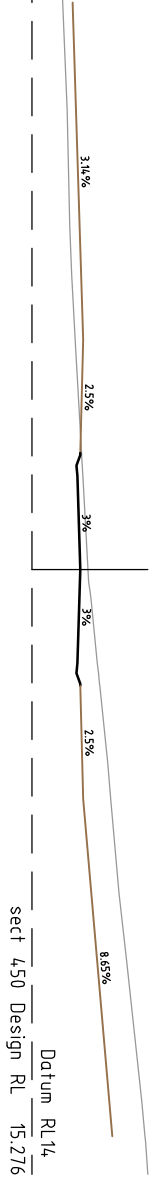




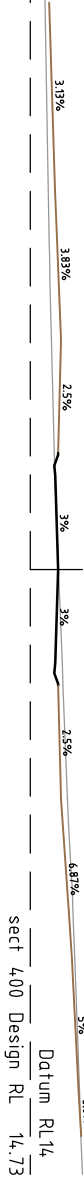
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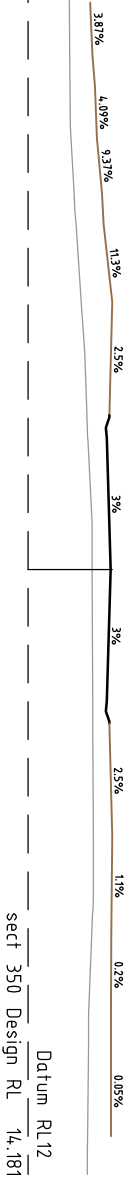
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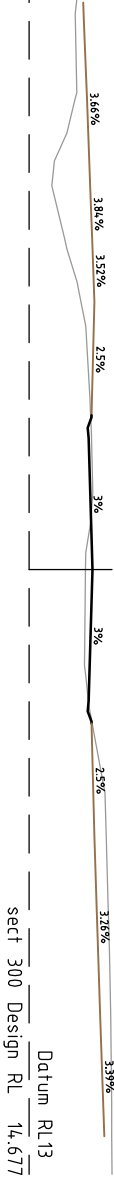
Ch 400



Ch 350



Ch 300



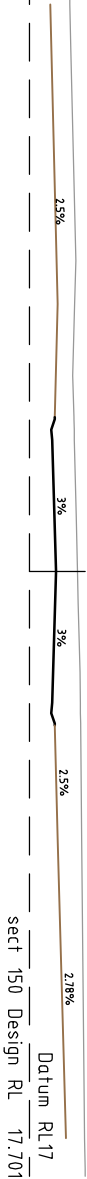
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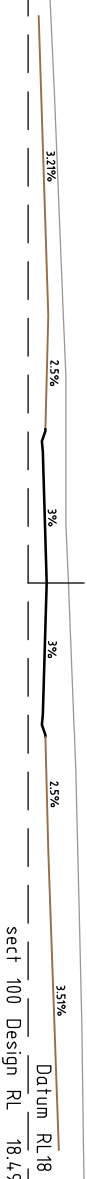
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Ch 150



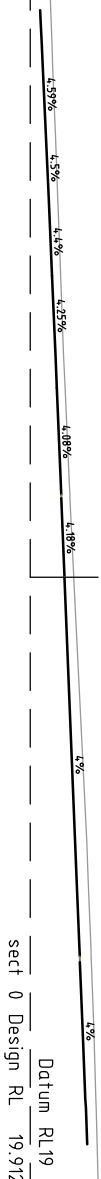
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Ch 50



Ch 0



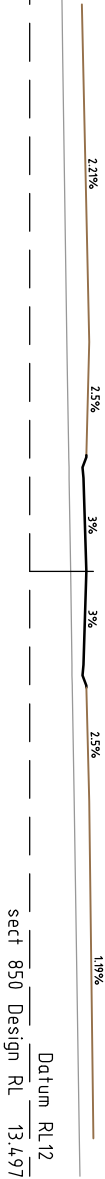
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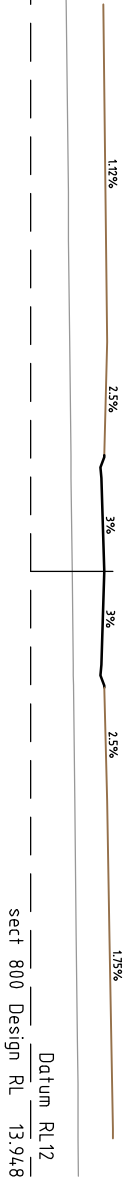
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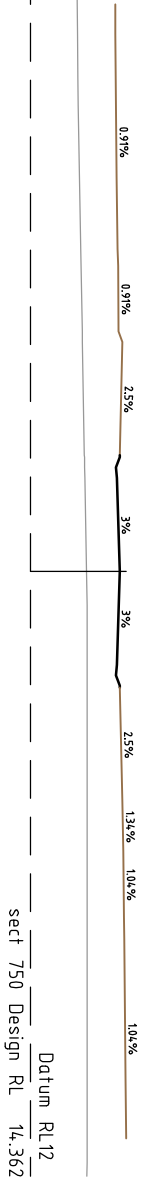
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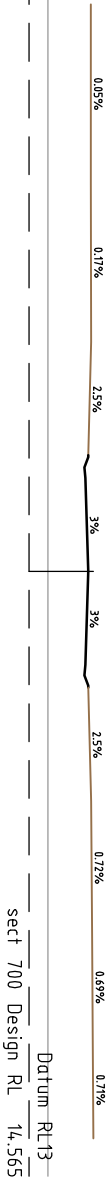
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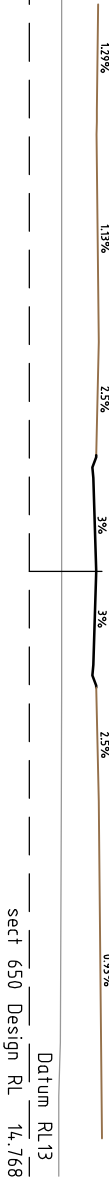
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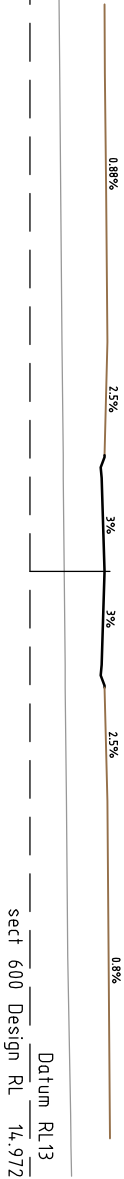
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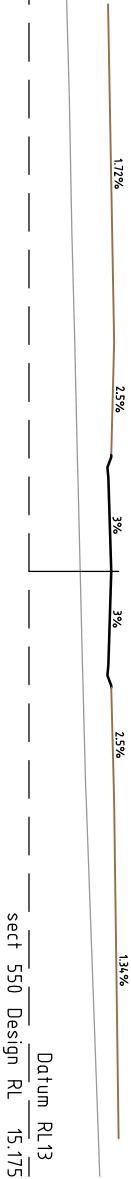
Ch 650



Ch 600



Ch 550



# RIVERSIDE ESTATE

ROAD CROSS SECTION ROAD C  
R12394 - ROAD CROSS SECTIONS 3

0 1.0 4.0m  
0 2.0 8.0m  
1:100 (A1)  
1:200 (A3)

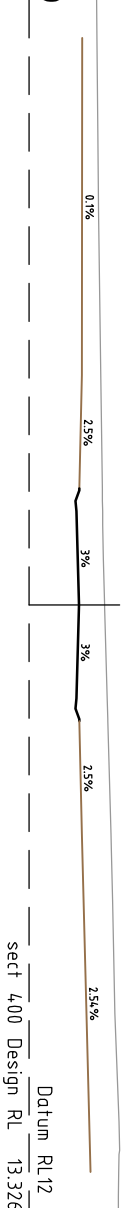


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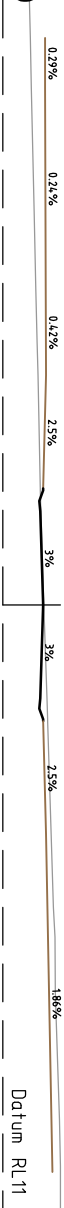
ROCKHAMPTON  
P.O. Box 1580  
238 Quay Street,  
Rockhampton Q 4700  
Telephone (07) 4931 0777  
Facsimile (07) 4921 4866  
E-Mail: Rockhampton@brownconsulting.com.au

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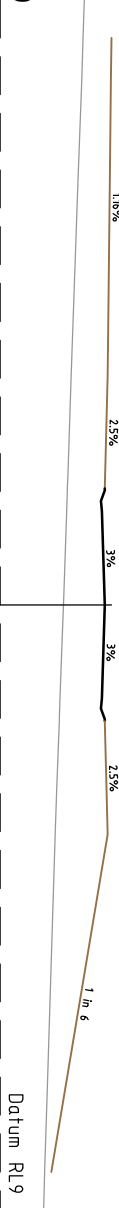
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Ch 350



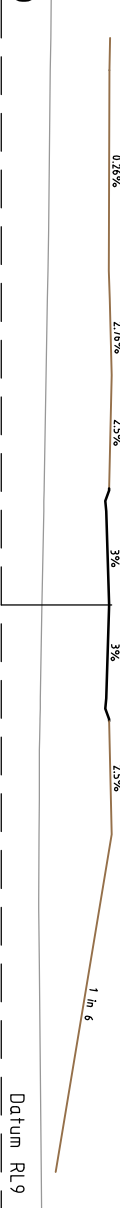
Ch 300



Ch 250



Ch 200



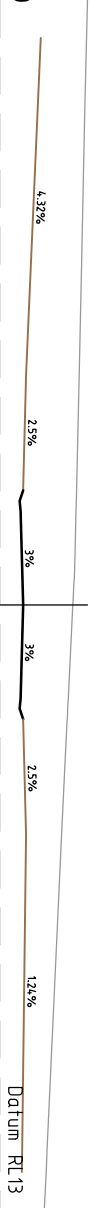
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Ch 100



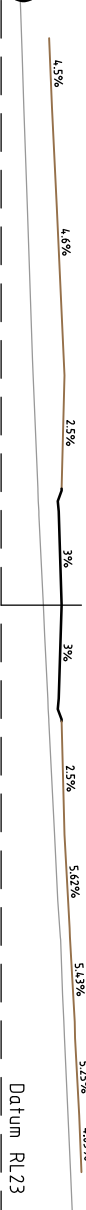
Ch 50



Ch 0



Ch 700



Ch 650



Ch 600



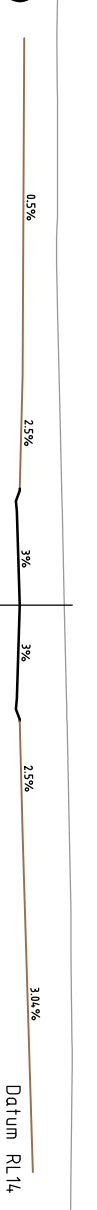
Ch 550



Ch 500



Ch 450



RIVERSIDE ESTATE

ROAD CROSS SECTION ROAD D  
R12394 - ROAD CROSS SECTIONS 4

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Facsimile (07) 4921 4866  
E-Mail: [Rockhampton@brownconsulting.com.au](mailto:Rockhampton@brownconsulting.com.au)

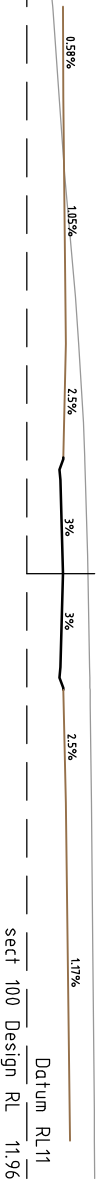


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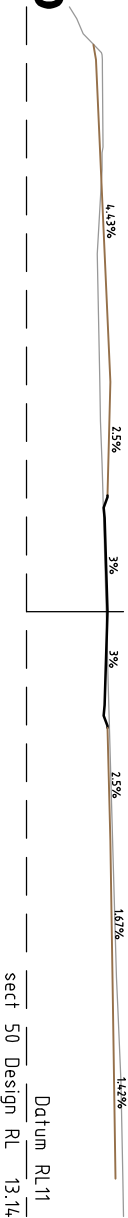
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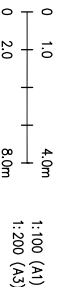
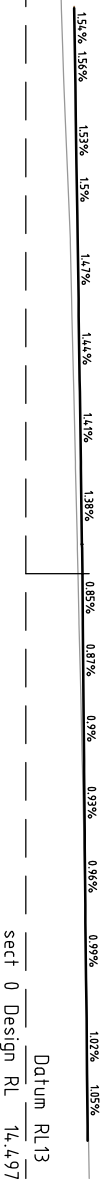
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Ch 50



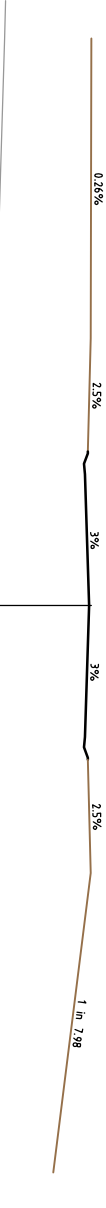
Ch 0



RIVERSIDE ESTATE  
ROAD CROSS SECTION ROAD E  
R12394 - ROAD CROSS SECTIONS 5

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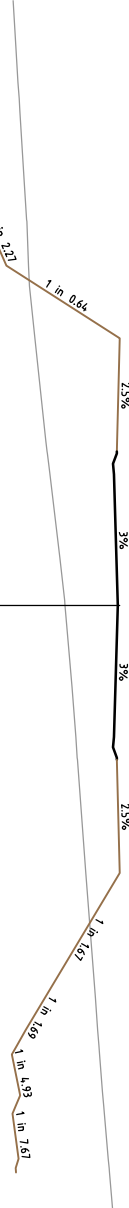
Ch 300

Datum RL 7  
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Ch 250

Datum RL 6  
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Ch 200

Datum RL 7  
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Ch 150

Datum RL 10  
sect 150 Design RL 12.067



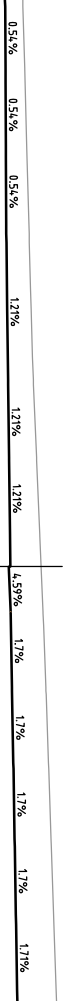
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Datum RL 9  
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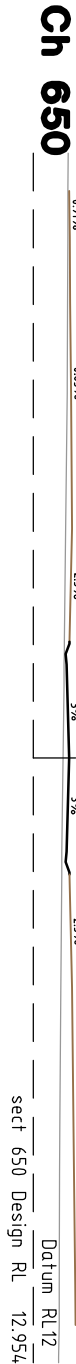
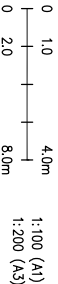
Ch 50

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Ch 0

Datum RL 11  
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Ch 600

Datum RL 12  
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Ch 550

Datum RL 11  
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Ch 500

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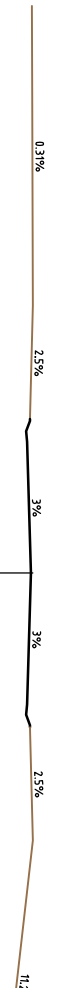
Ch 450

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Ch 400

Datum RL 9  
sect 450 Design RL 12.406



Ch 350

Datum RL 8  
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## RIVERSIDE ESTATE

ROAD CROSS SECTION ROAD F  
R12394 - ROAD CROSS SECTIONS 6

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E-Mail: [Rockhampton@brownconsulting.com.au](mailto:Rockhampton@brownconsulting.com.au)

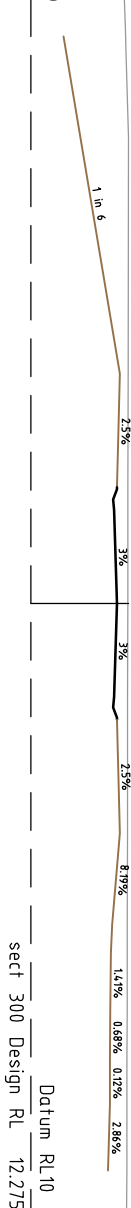


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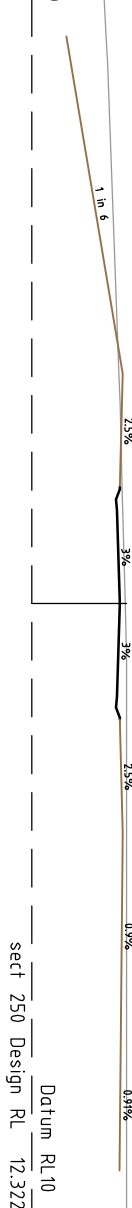
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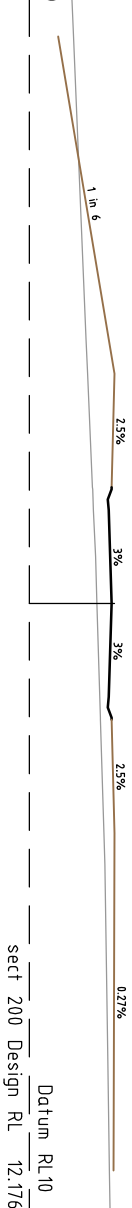
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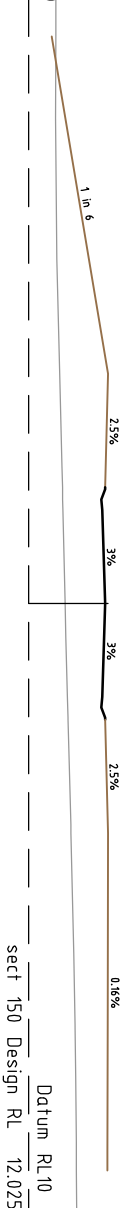
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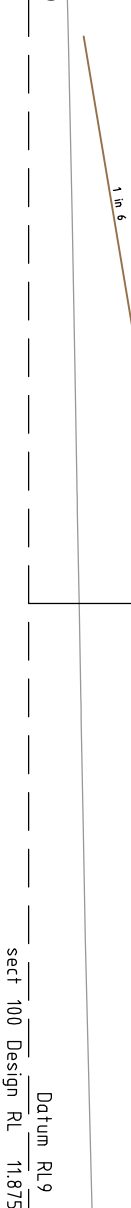
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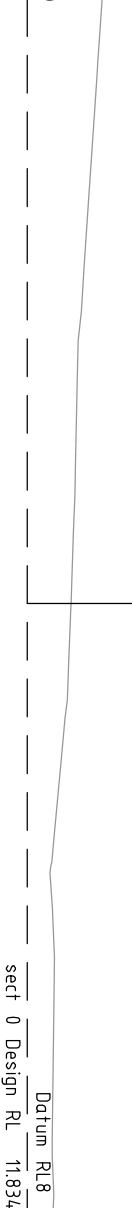
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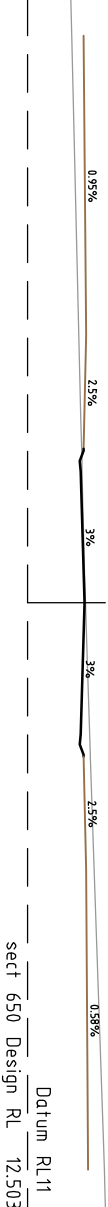
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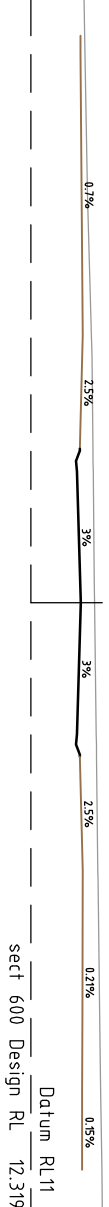
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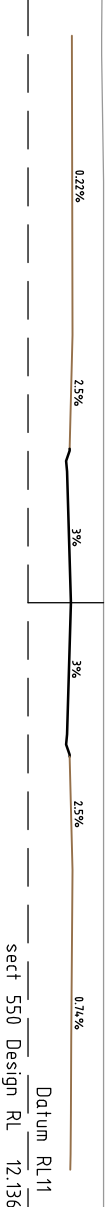
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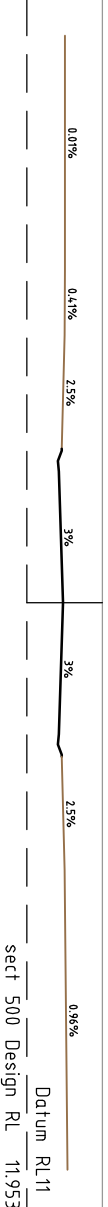
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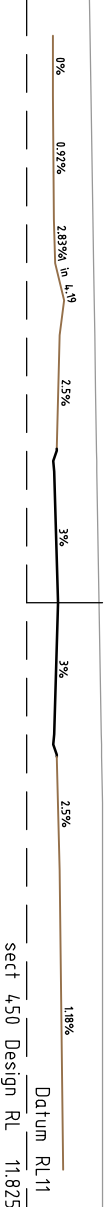
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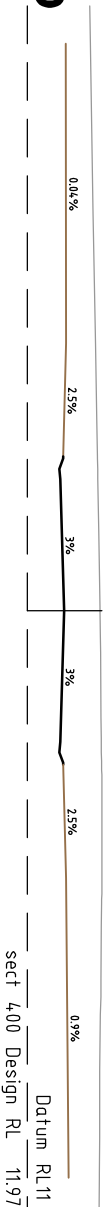
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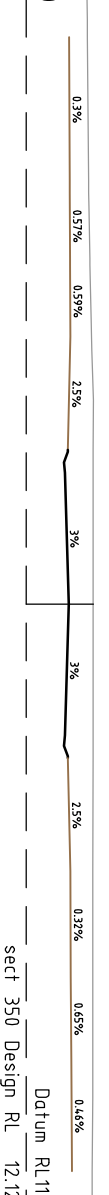
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Ch 400



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RIVERSIDE ESTATE

ROAD CROSS SECTION ROAD G  
R12394 - ROAD CROSS SECTIONS 7

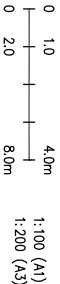
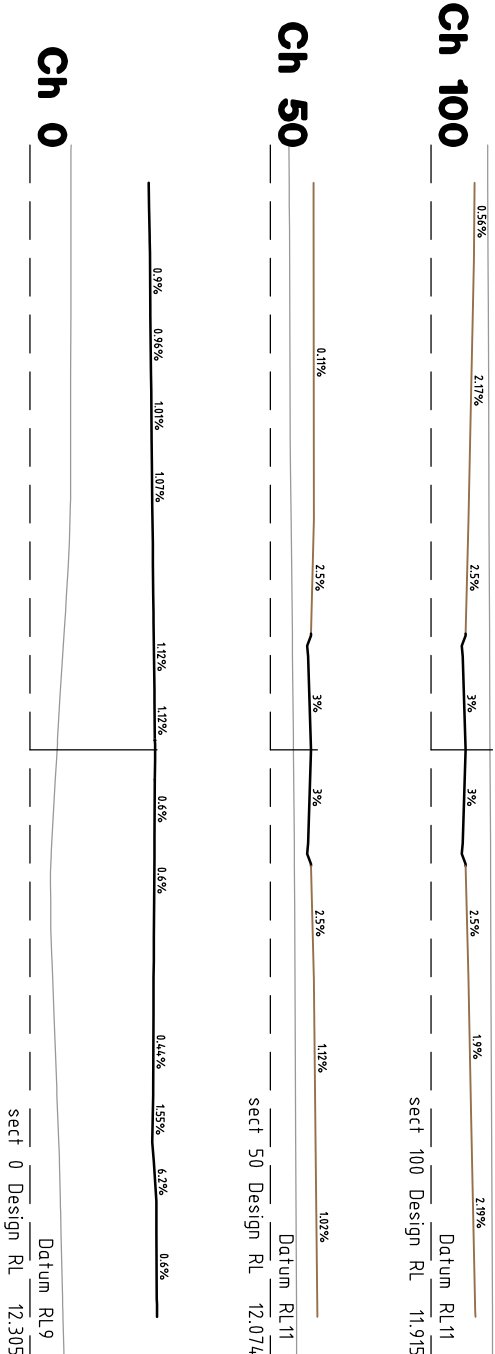
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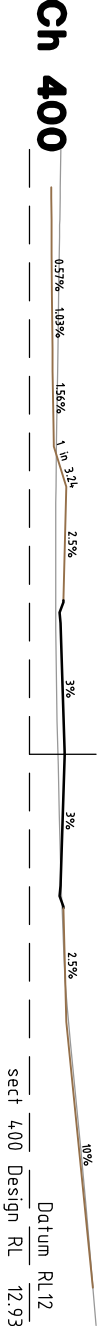
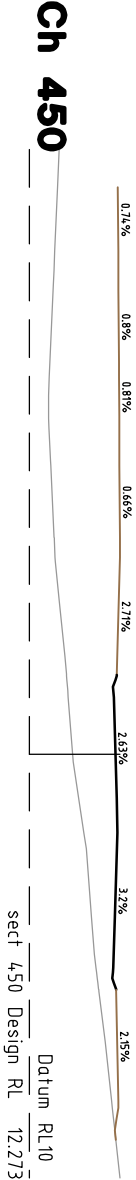
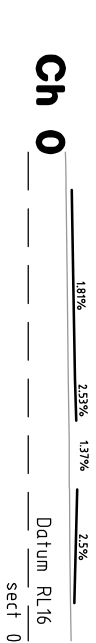
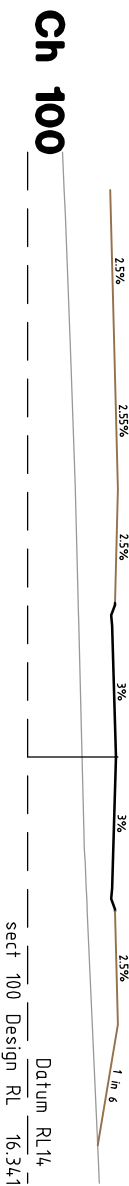
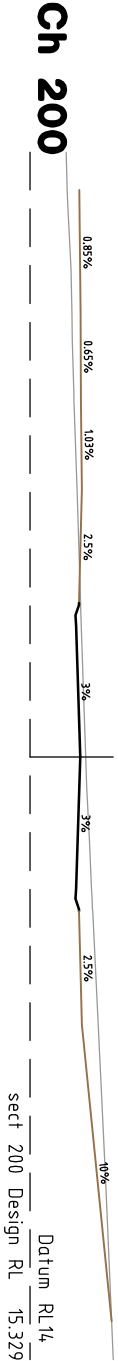
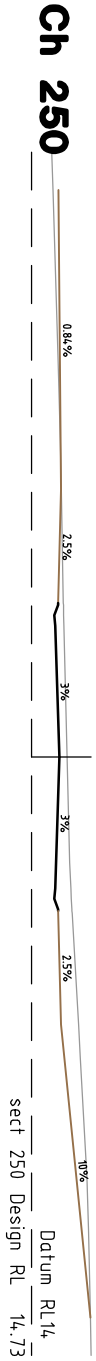
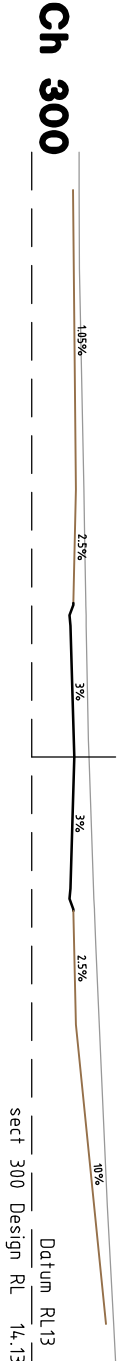
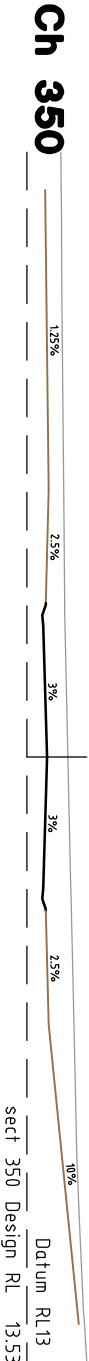


RIVERSIDE ESTATE  
ROAD CROSS SECTION ROAD H  
R12394 - ROAD CROSS SECTIONS 8

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# RIVERSIDE ESTATE

ROAD CROSS SECTION ROAD 1  
R12394 - ROAD CROSS SECTIONS 9

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## Appendix H Proposed Electrical Plan



92  
SP224420

2  
SP252932



PUBLIC USE LAND

PUBLIC  
USE LAND

PUBLIC  
USE LAND

PUBLIC  
USE LAND

## LEGEND

-  New Electrical Cable with Pillar Box (Preliminary Only)
-  Finished Surface Contours

## RIVERSIDE ESTATE

### ELECTRICAL PLAN - SHEET 1 OF 2 R12394 - ELECTRICAL

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0 50.0 200.0m  
1:2500 (A1)  
1:5000 (A3)

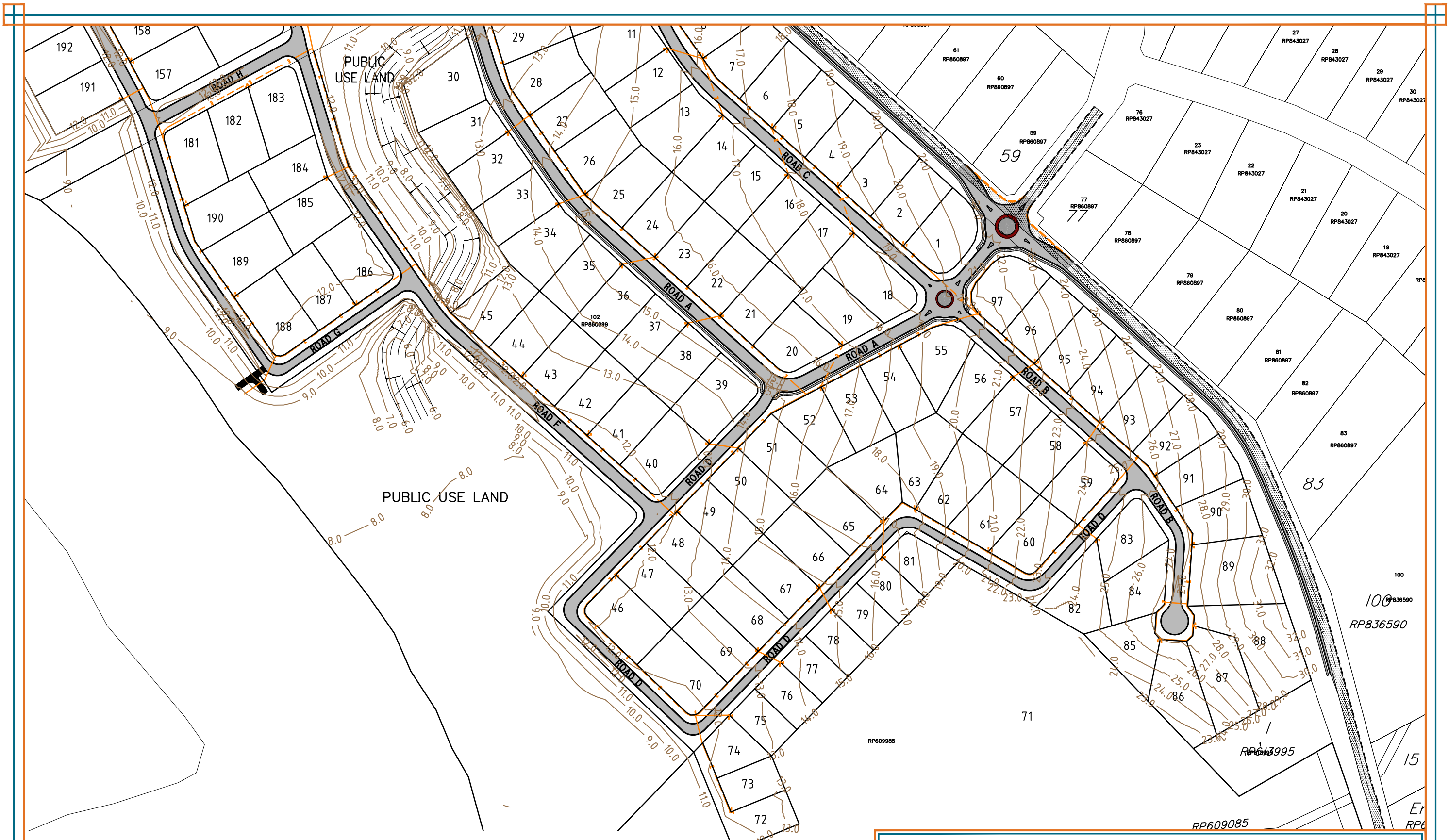
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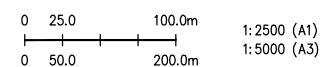
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**LEGEND**

-  New Electrical Cable with Pillar Box (Preliminary Only)
-  Finished Surface Contours

**RIVERSIDE ESTATE**  
**ELECTRICAL PLAN - SHEET 2 OF 2**  
**R12394 - ELECTRICAL 2**



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