



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.

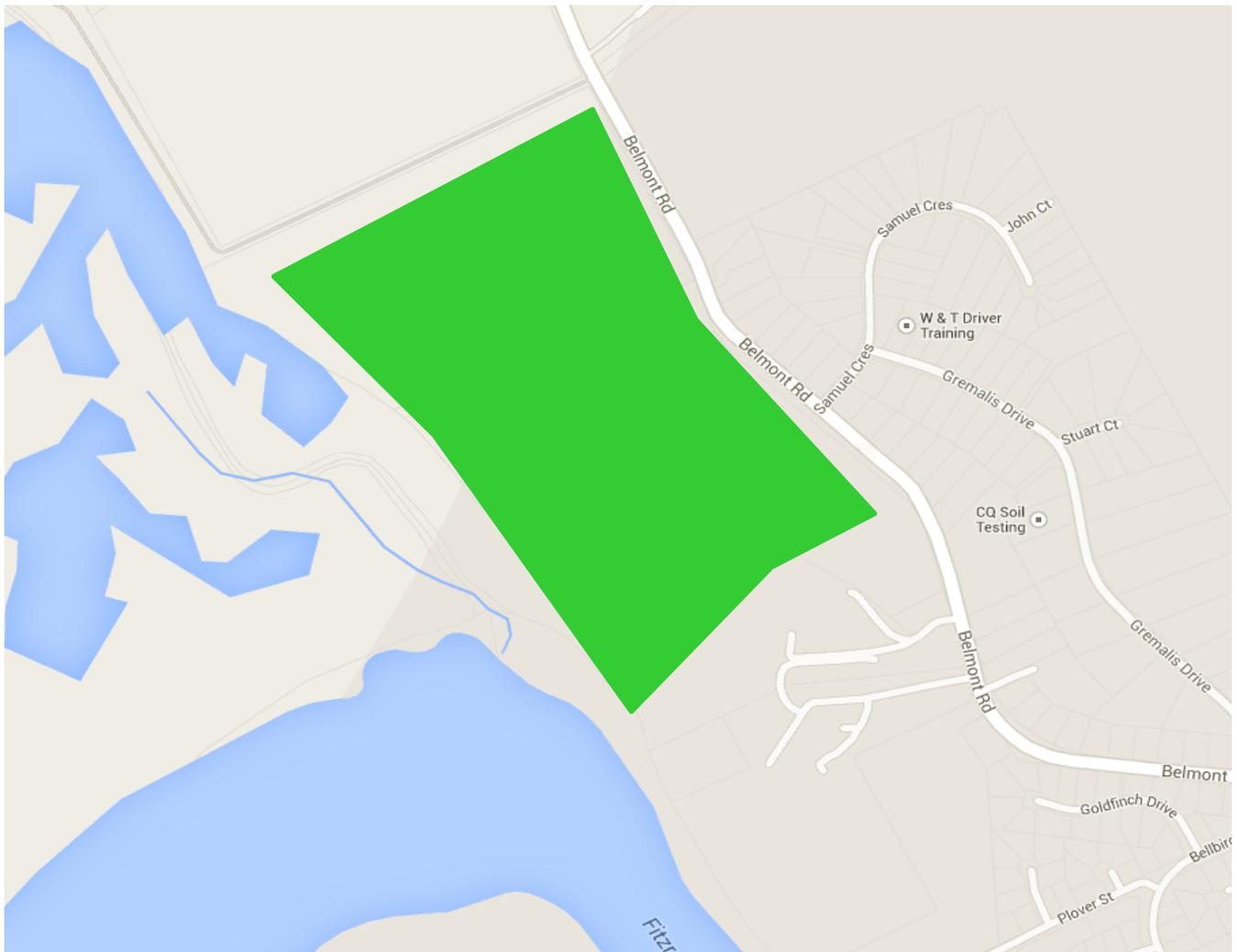


Figure.1: Approximate Site Location (Source Google Maps)

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 1500m². 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 $\varnothing 100\text{mm}$ 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 $\varnothing 300\text{mm}$ uPVC water main from the Parkhurst water supply, which is approximately 550m downstream of the proposed entrance to the development. From there, a $\varnothing 200\text{mm}$ 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 watermains 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.

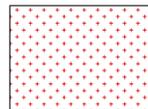
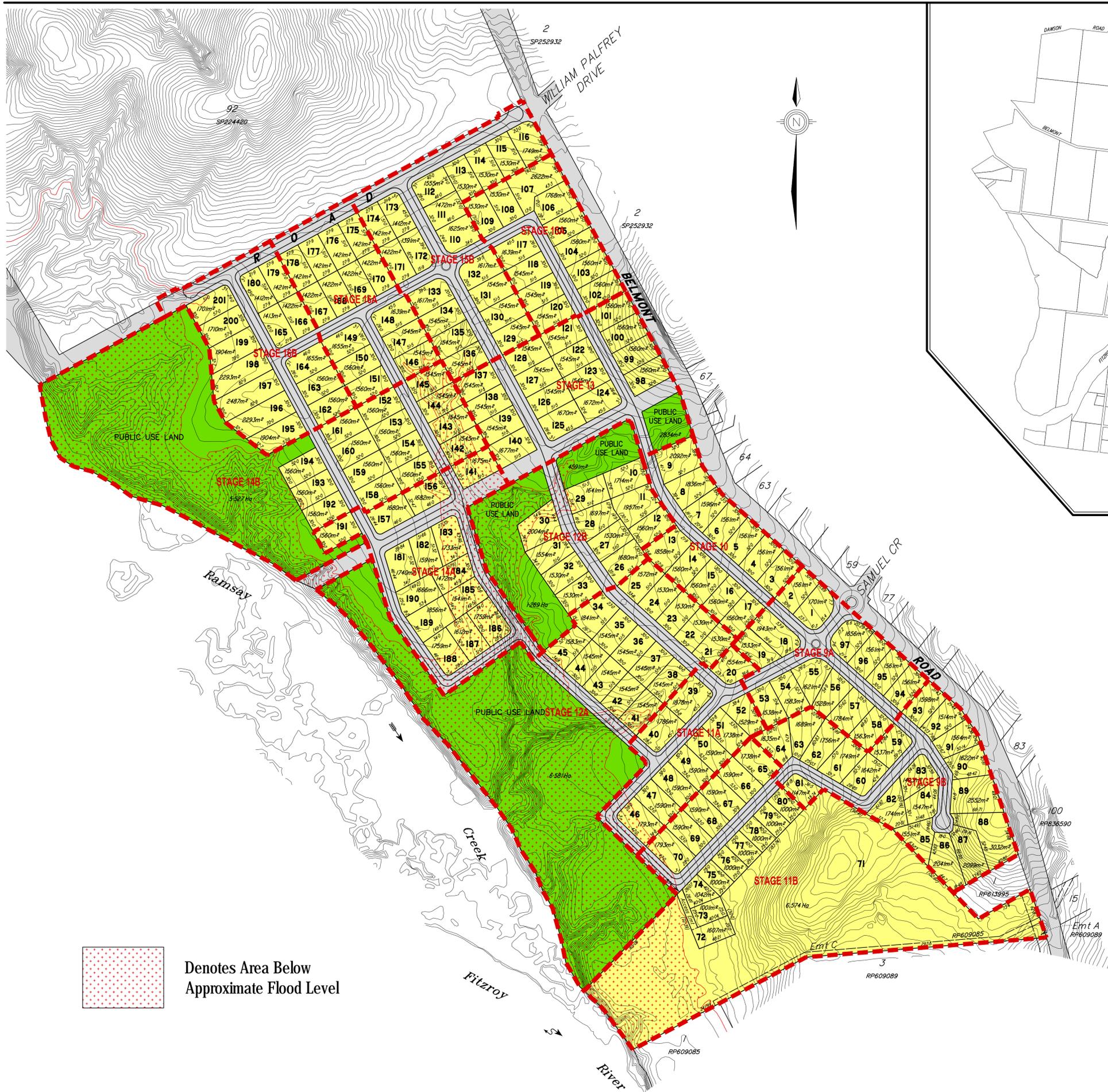
A preliminary review of the existing sewerage network confirms that they can only service Stages 9A, 9B and 10 of the proposed development; due to proposed bulk earthwork levels and grades throughout the development, without constructing an internal sewage pump station. To cater for the ultimate 201 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

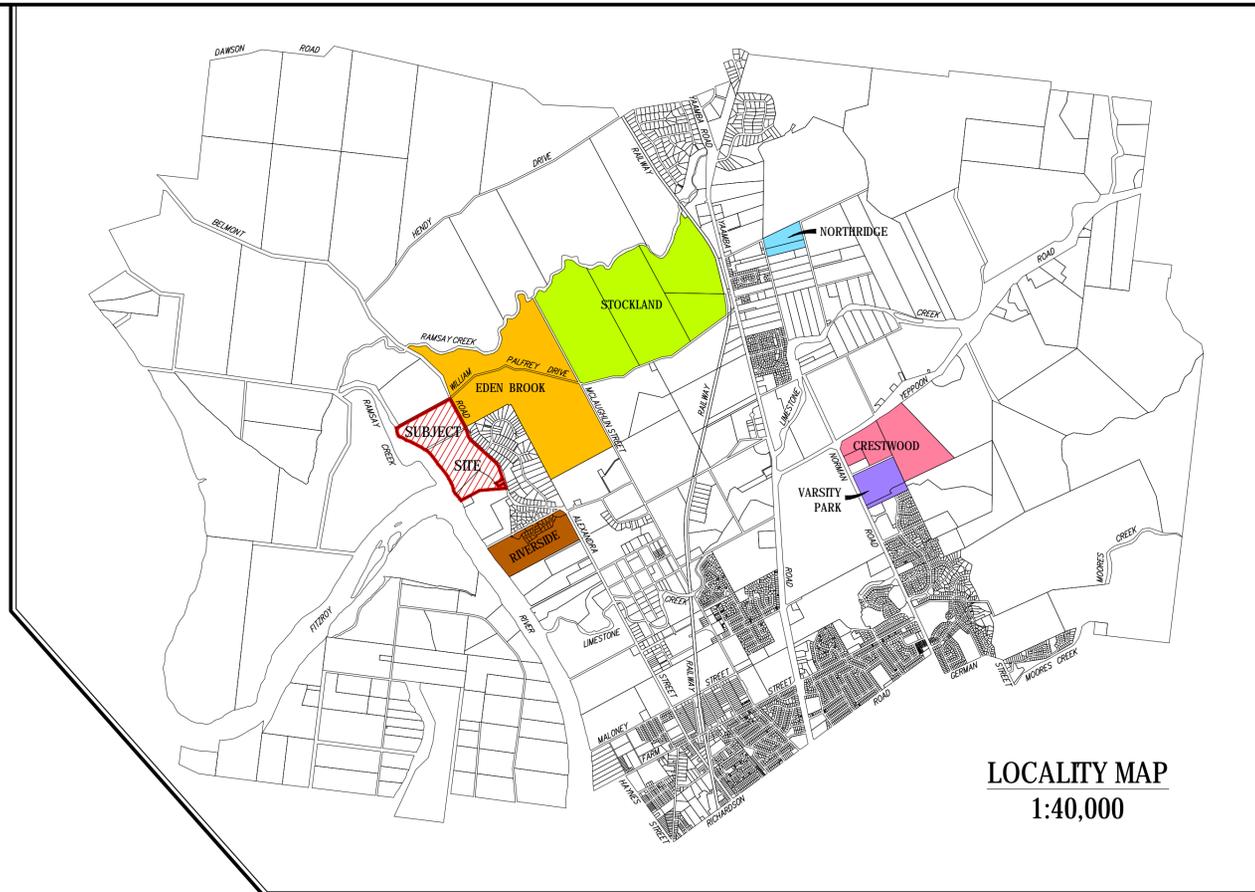


Appendix A Existing Site Conditions and Proposed Stages



Denotes Area Below
Approximate Flood Level

0m 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300 320 340 360 380 400m



LOCALITY MAP
1:40,000

client

M. Birkbeck

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

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

pid **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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scale **1:2500 @ A1** datum
sheet no. **RRC 0.5m Contours**
1 of 1 **5892-01-CPT-G** cad file
plan no. **5892-01-CPT** revision
G

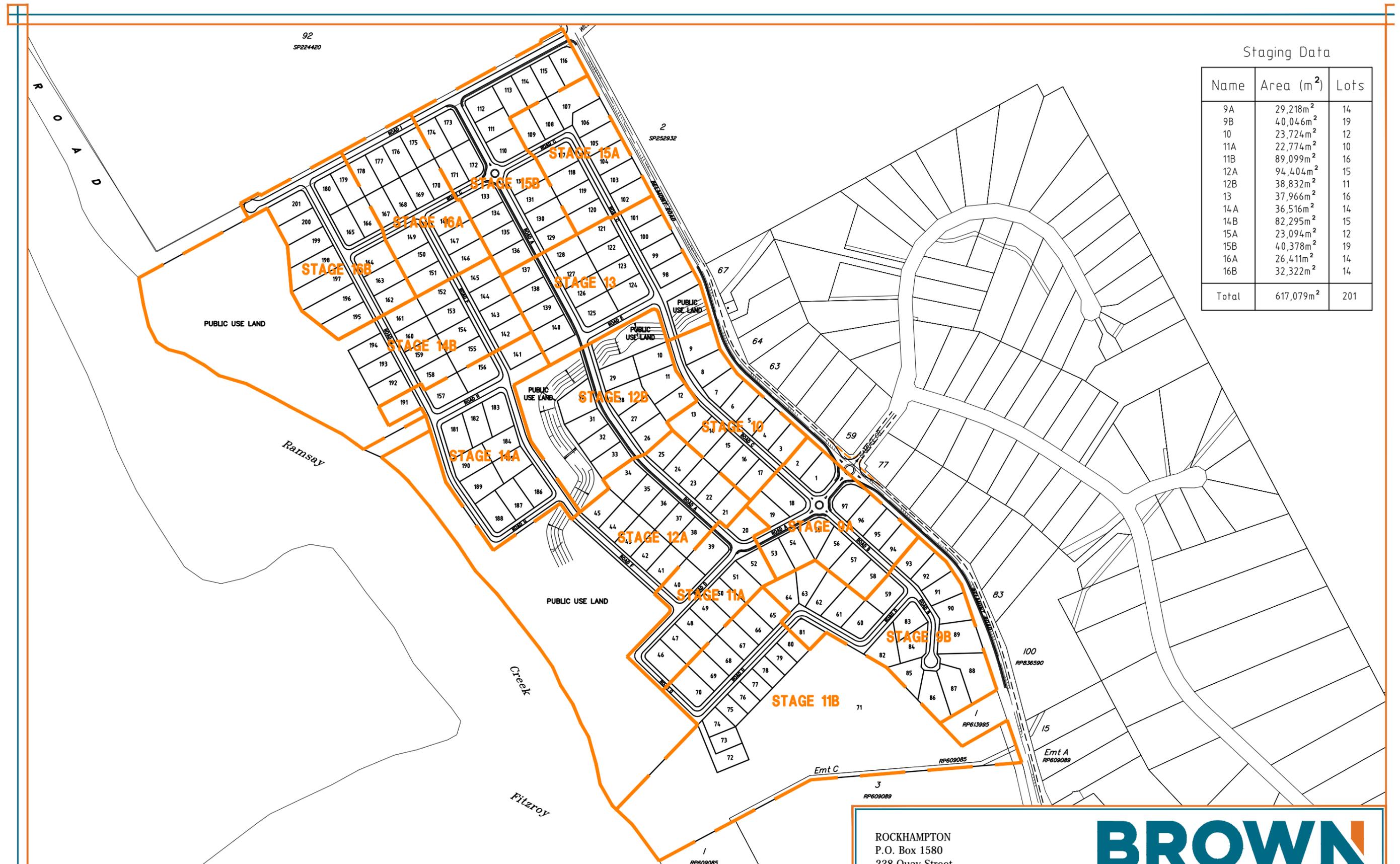
IMPORTANT NOTE
This plan was prepared exclusively for M. Birkbeck for discussion purposes only and should not be used for any other purpose.
The areas shown herein are subject to field survey and also to the requirements of council and any other authority which may have requirements under any relevant legislation.
In particular, no reliance should be placed on the information on this plan for any financial dealings involving the land.
This note is an integral part of this plan.



Appendix B Proposed Plan of Development with Stages

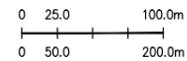
Staging Data

Name	Area (m ²)	Lots
9A	29,218m ²	14
9B	40,046m ²	19
10	23,724m ²	12
11A	22,774m ²	10
11B	89,099m ²	16
12A	94,404m ²	15
12B	38,832m ²	11
13	37,966m ²	16
14A	36,516m ²	14
14B	82,295m ²	15
15A	23,094m ²	12
15B	40,378m ²	19
16A	26,411m ²	14
16B	32,322m ²	14
Total	617,079m²	201



LEGEND

— Stage Boundary



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

**RIVERSIDE ESTATE
PROPOSED STAGING PLAN
R12394 - STAGING**

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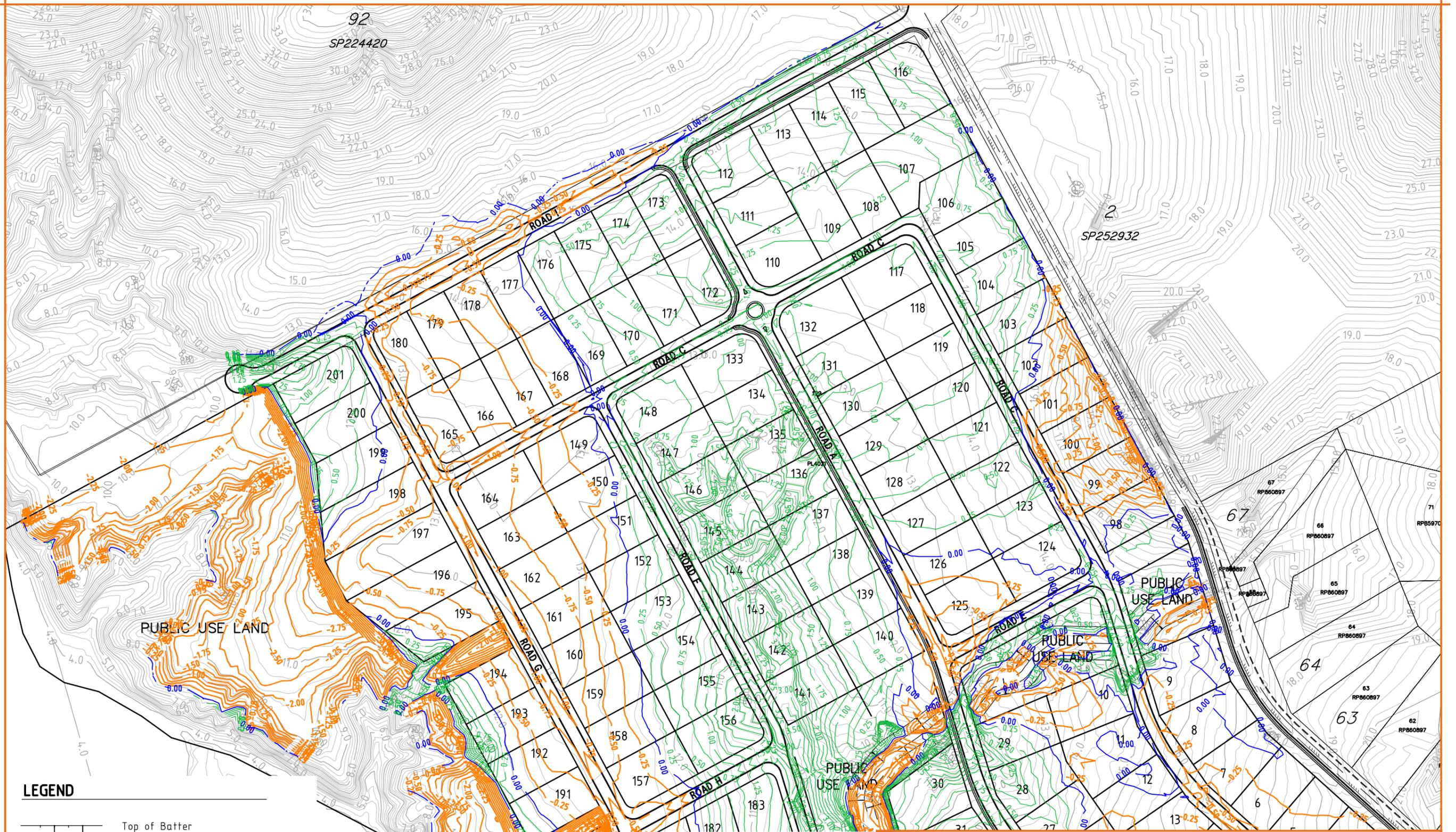
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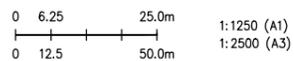
Appendix C Preliminary Bulk Earthworks Surface Levels



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



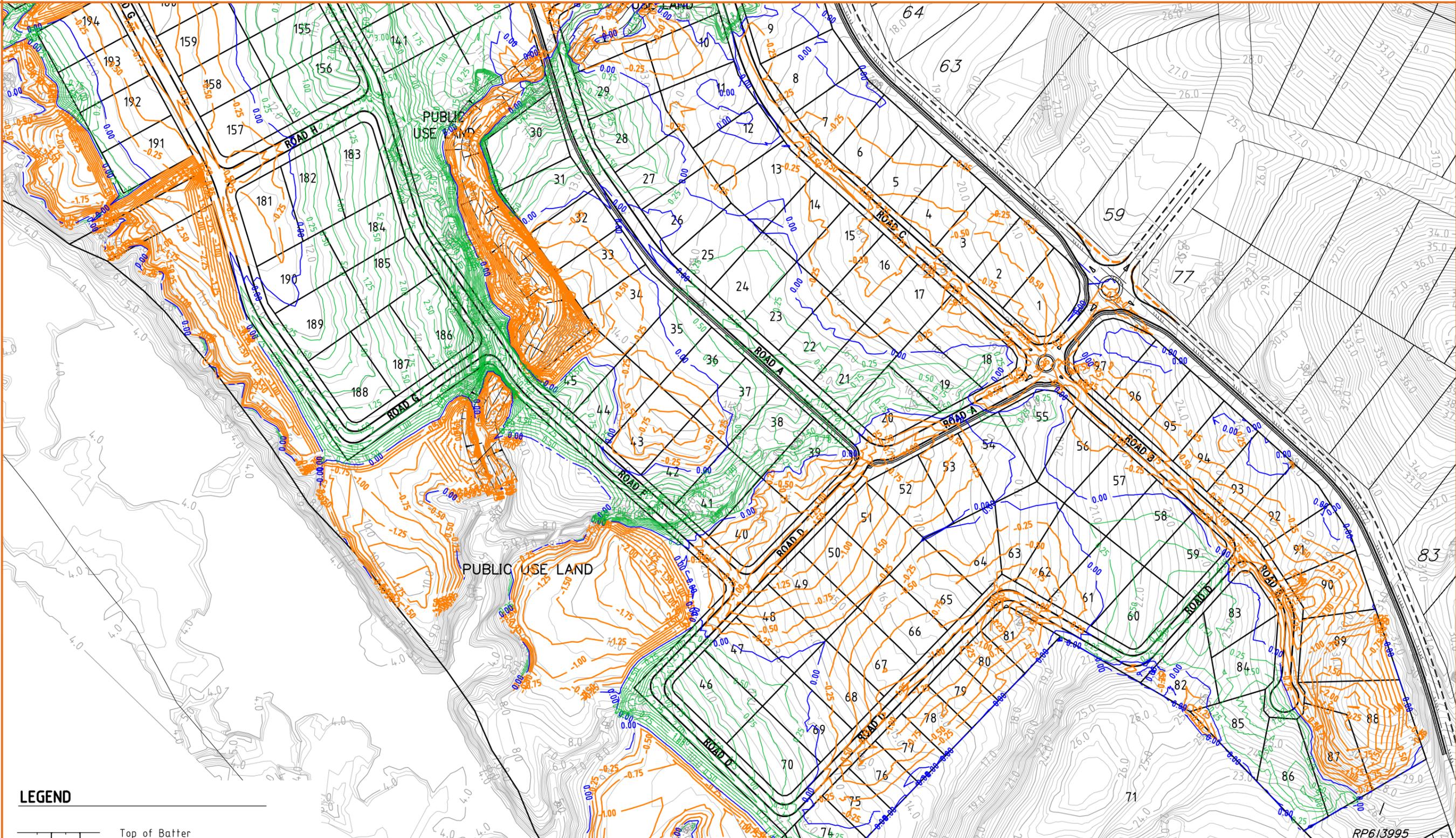
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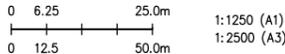
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LEGEND

-  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 2 OF 2
R12394 - EARTHWORKS



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RP613995



Appendix D Existing and Proposed Sewerage Reticulation Plan

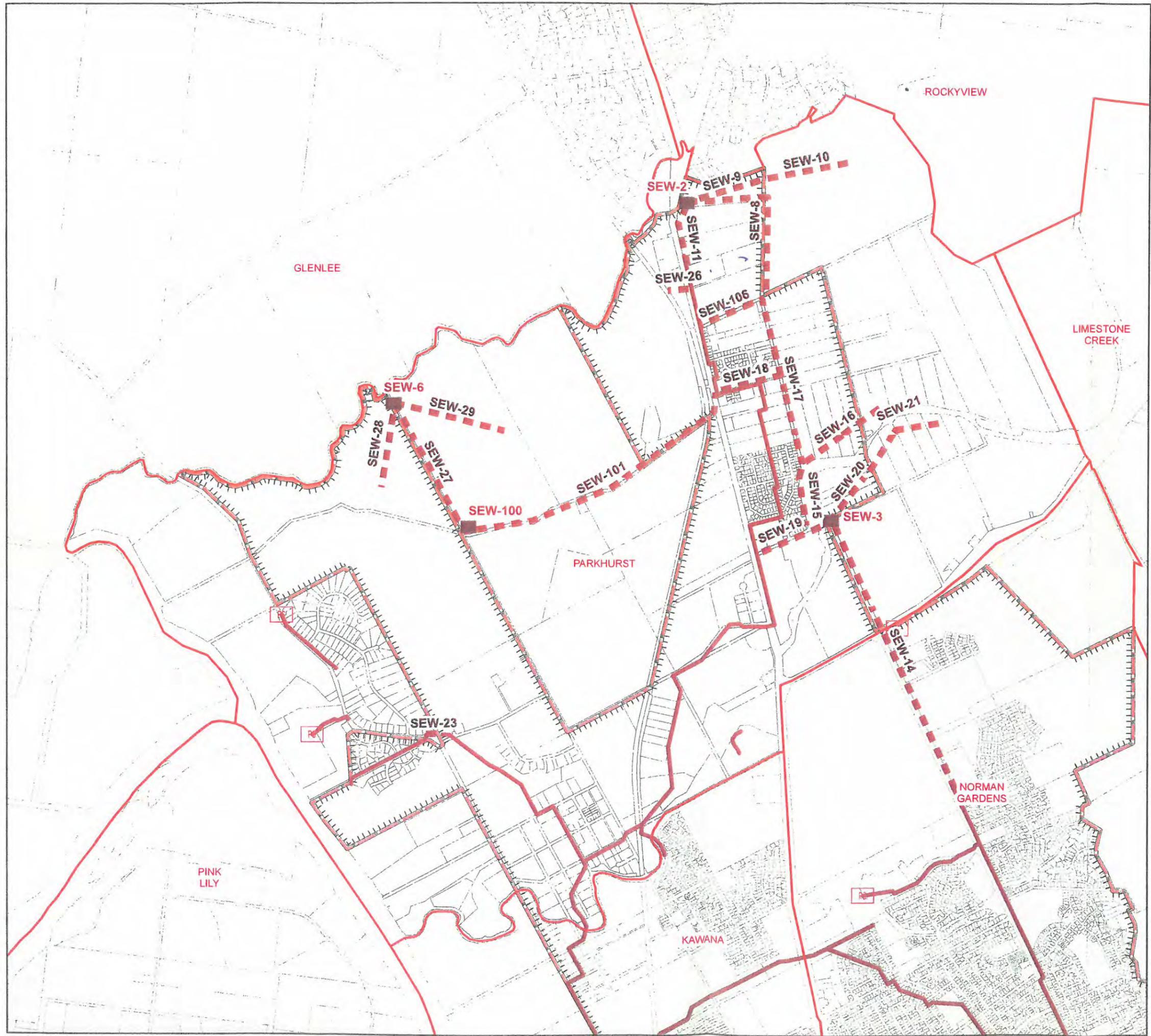


Sewer

Legend

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

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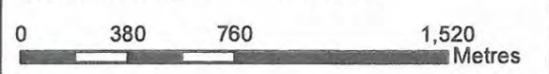


Trunk Infrastructure - Sewerage

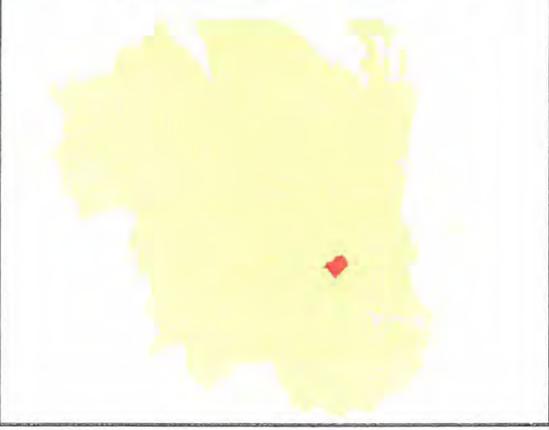
- Locality Boundaries
- Future Sewerage Trunk Infrastructure**
- Future Pump Station
- Future Treatment Plant
- Future Sewerage Main
- Existing Sewerage Trunk Infrastructure**
- Existing Pump Station
- Existing Treatment Plant
- Existing Sewerage Trunk Main
- Cadastral Parcels
- Priority Infrastructure Area

Note: Priority Infrastructure Area located inside hashed boundary.

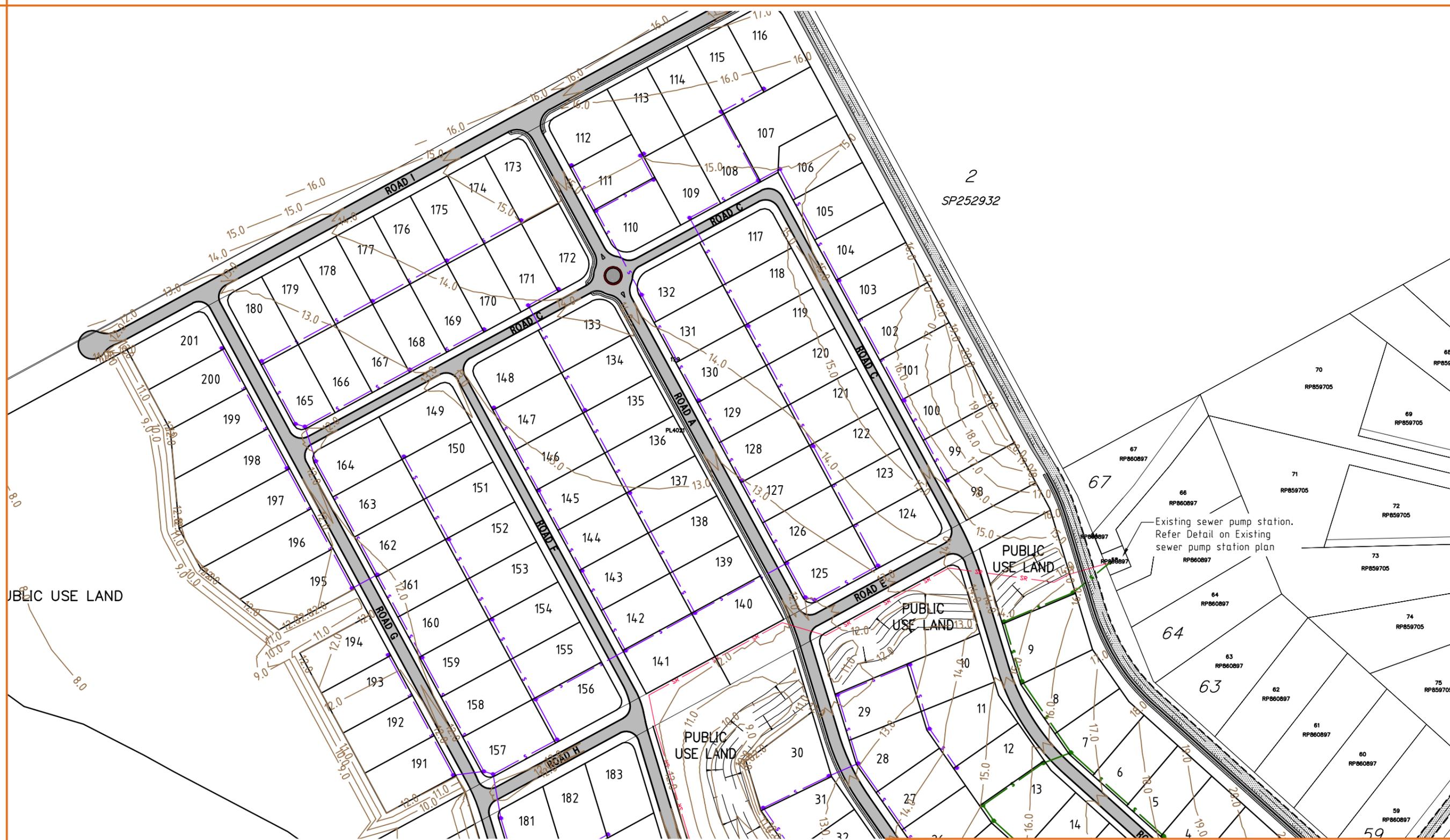
Approx Scale @A3 1:25,000



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**Map 86-2
PARKHURST
Sewerage Network
Infrastructure Map**



2
SP252932

PUBLIC USE LAND

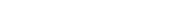
PUBLIC USE LAND

PUBLIC USE LAND

PUBLIC USE LAND

Existing sewer pump station.
Refer Detail on Existing
sewer pump station plan
RP860897

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

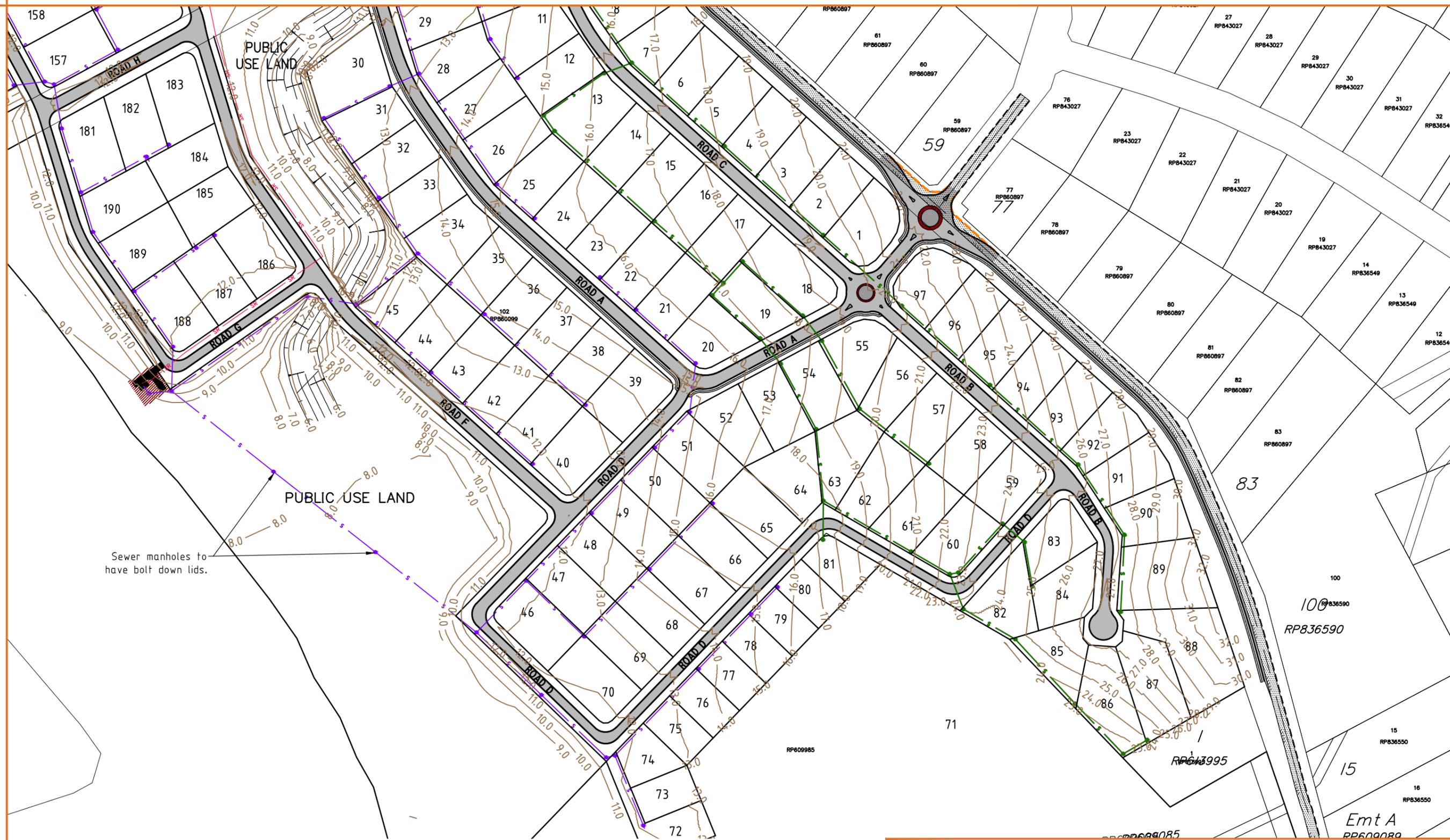
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LEGEND

- Proposed Sewer & Manhole (Gravity to Existing Pump Station)
- Proposed Sewer & Manhole (Gravity to Proposed Pump Station)
- SR— 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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Proposed Sewer Rising main
from proposed Pump Station

Belmont Road

Connect to existing receiving manhole for existing sewer
pump station SP038.

Proposed Gravity Main
(Stage 1 Construction)

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

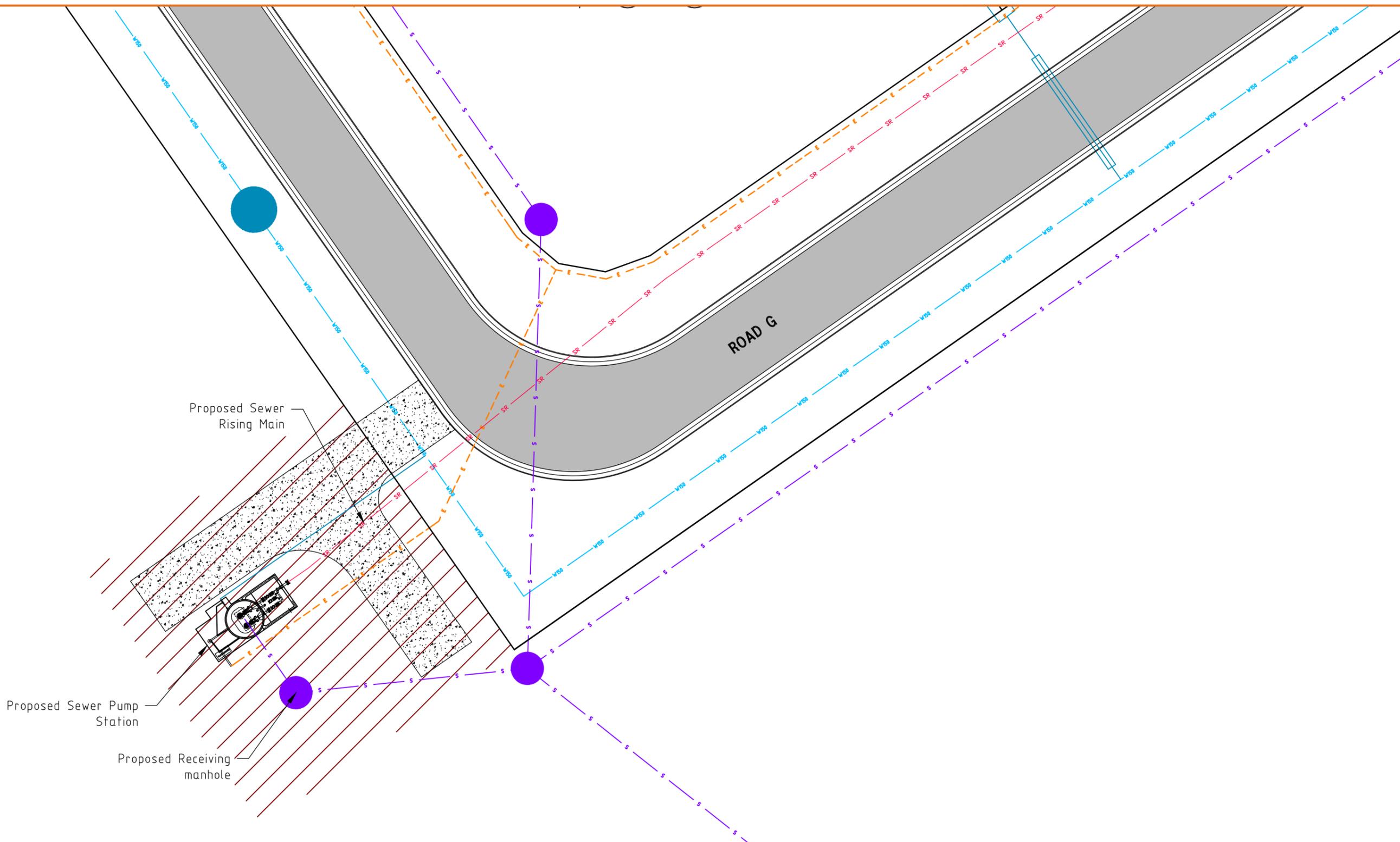
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Proposed Sewer Rising Main

Proposed Sewer Pump Station

Proposed Receiving manhole

RIVERSIDE ESTATE
SEWERAGE PUMP STATION PLAN
R12394 - SEWERAGE PUMP STATION

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



Appendix E Existing and Proposed Water Supply Plan



Water Network Map 8

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



Water Network Map 11

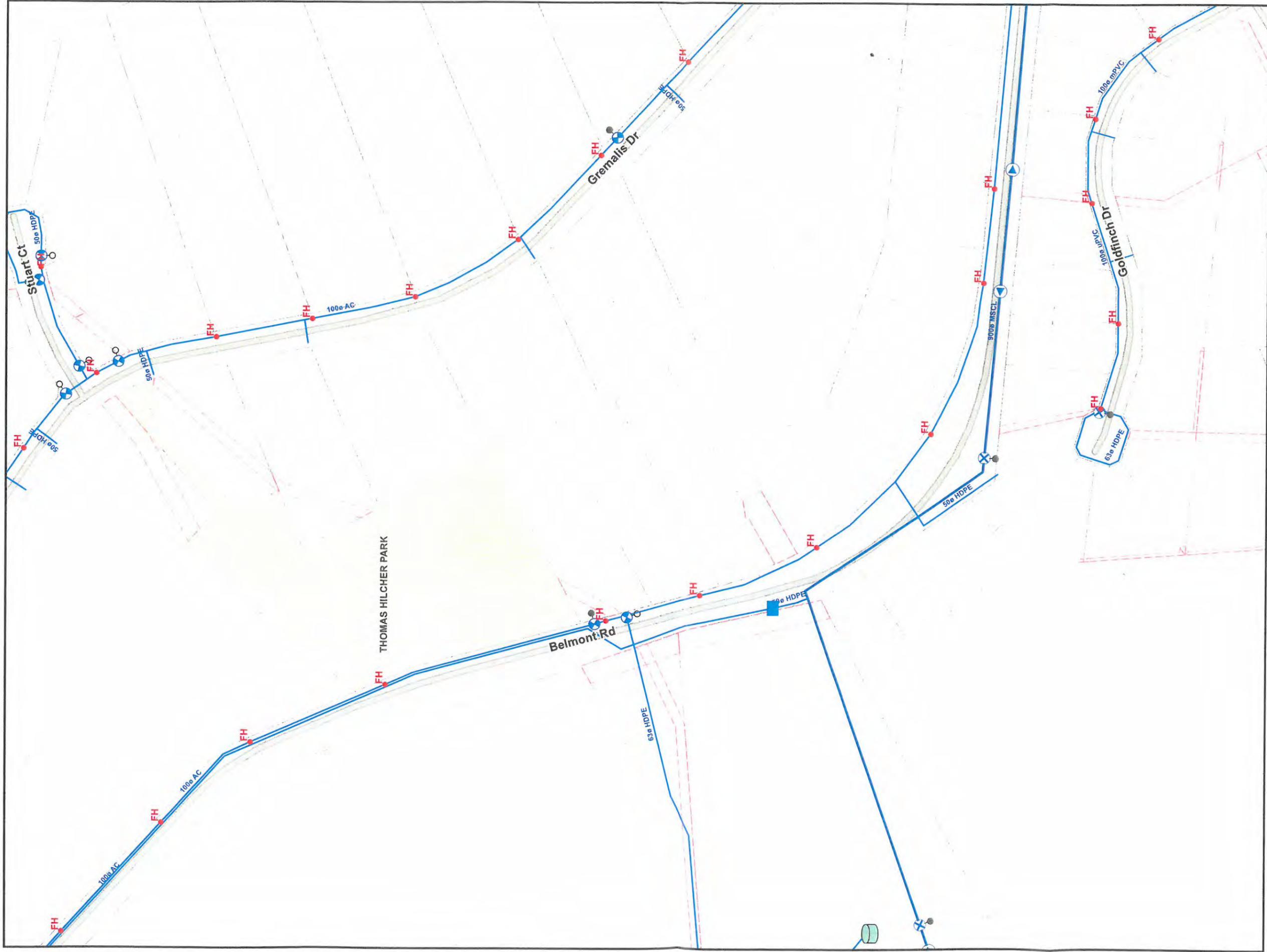


1:2,100 at A3



Date: 3/09/2013

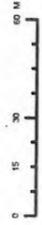
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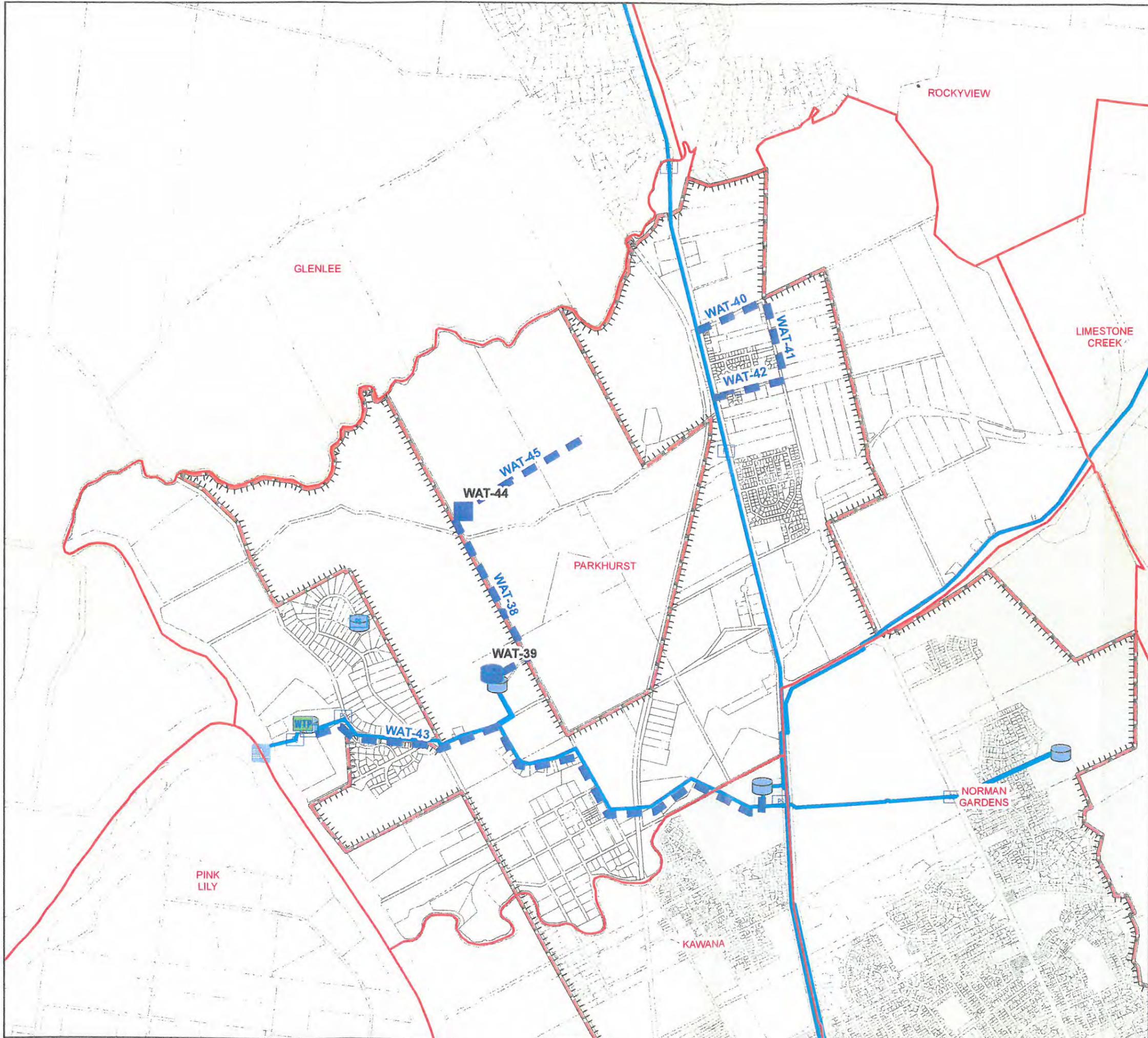


Water Network Map 12

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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**

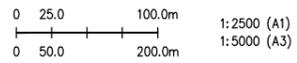
92
SP224420

2
SP252932



- LEGEND**
- W300 New 300ØmPVC Class 16 Watermain
 - W200 New 200ØmPVC Class 16 Watermain
 - W150 New 150ØmPVC Class 16 Watermain
 - W100 New 100ØmPVC Class 16 Watermain
 - W Water Service Conduit
 - Fire Hydrant - Sluice Valve/Gate Valve
 - FH SV

RIVERSIDE ESTATE
WATER RETICULATION PLAN - SHEET 1 OF 2
R12394 - WATER



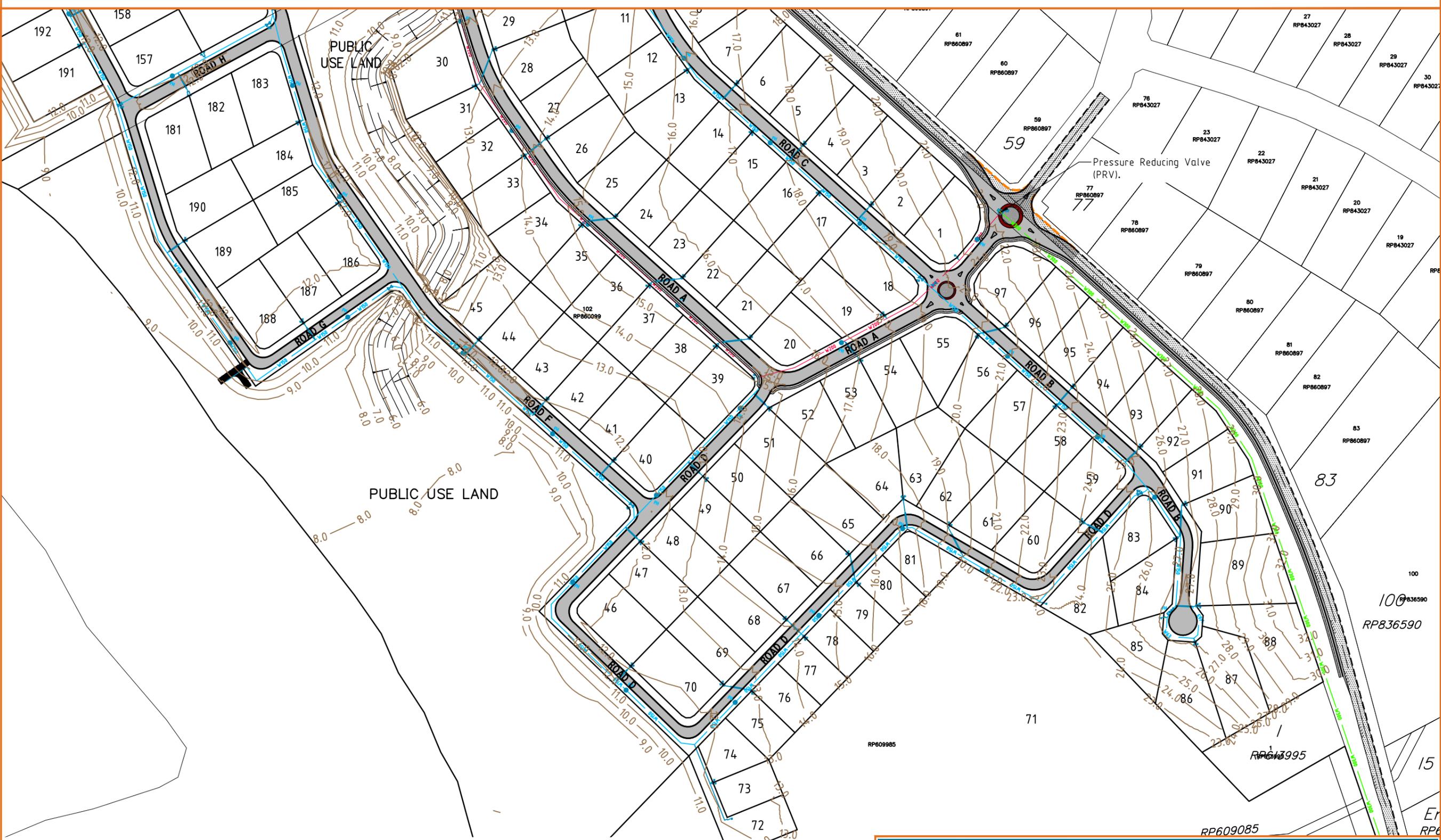
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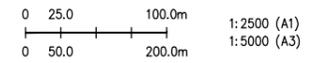
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- LEGEND**
- W300 New 300ØmPVC Class 16 Watermain
 - W200 New 200ØmPVC Class 16 Watermain
 - W150 New 150ØmPVC Class 16 Watermain
 - W100 New 100ØmPVC Class 16 Watermain
 - W Water Service Conduit
 - Fire Hydrant - Slucice Valve/Gate Valve
 - FH SV

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



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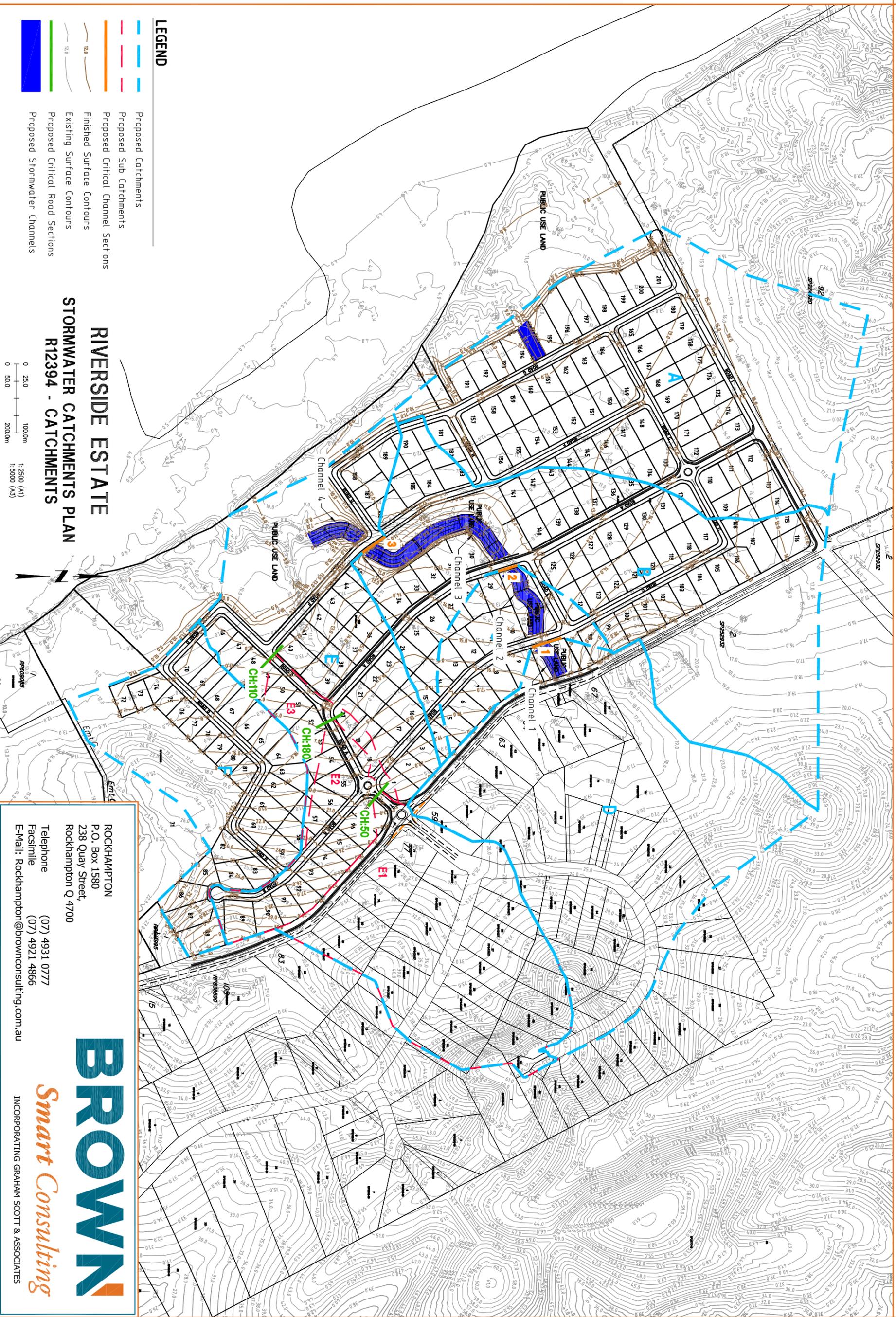
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Appendix F Proposed Stormwater Catchments



- LEGEND**
- Proposed Catchments
 - Proposed Sub Catchments
 - Proposed Critical Channel Sections
 - Finished Surface Contours
 - Existing Surface Contours
 - Proposed Critical Road Sections
 - Proposed Stormwater Channels

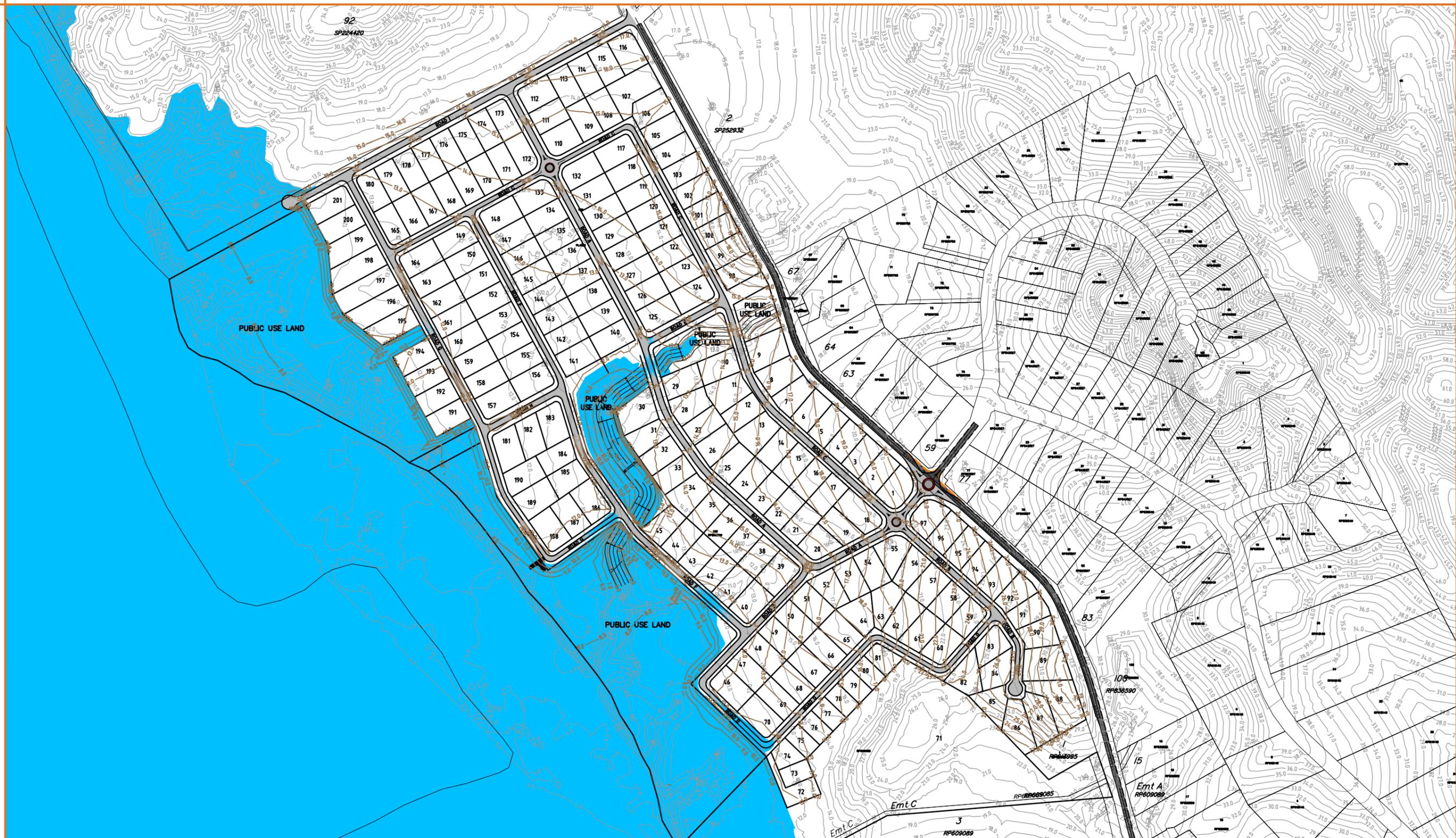
RIVERSIDE ESTATE
STORMWATER CATCHMENTS PLAN
R12394 - CATCHMENTS

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

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RIVERSIDE ESTATE
POST DEVELOPMENT INUNDATION PLAN
R12394 - POST INUNDATION

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 1:5000 (A3)

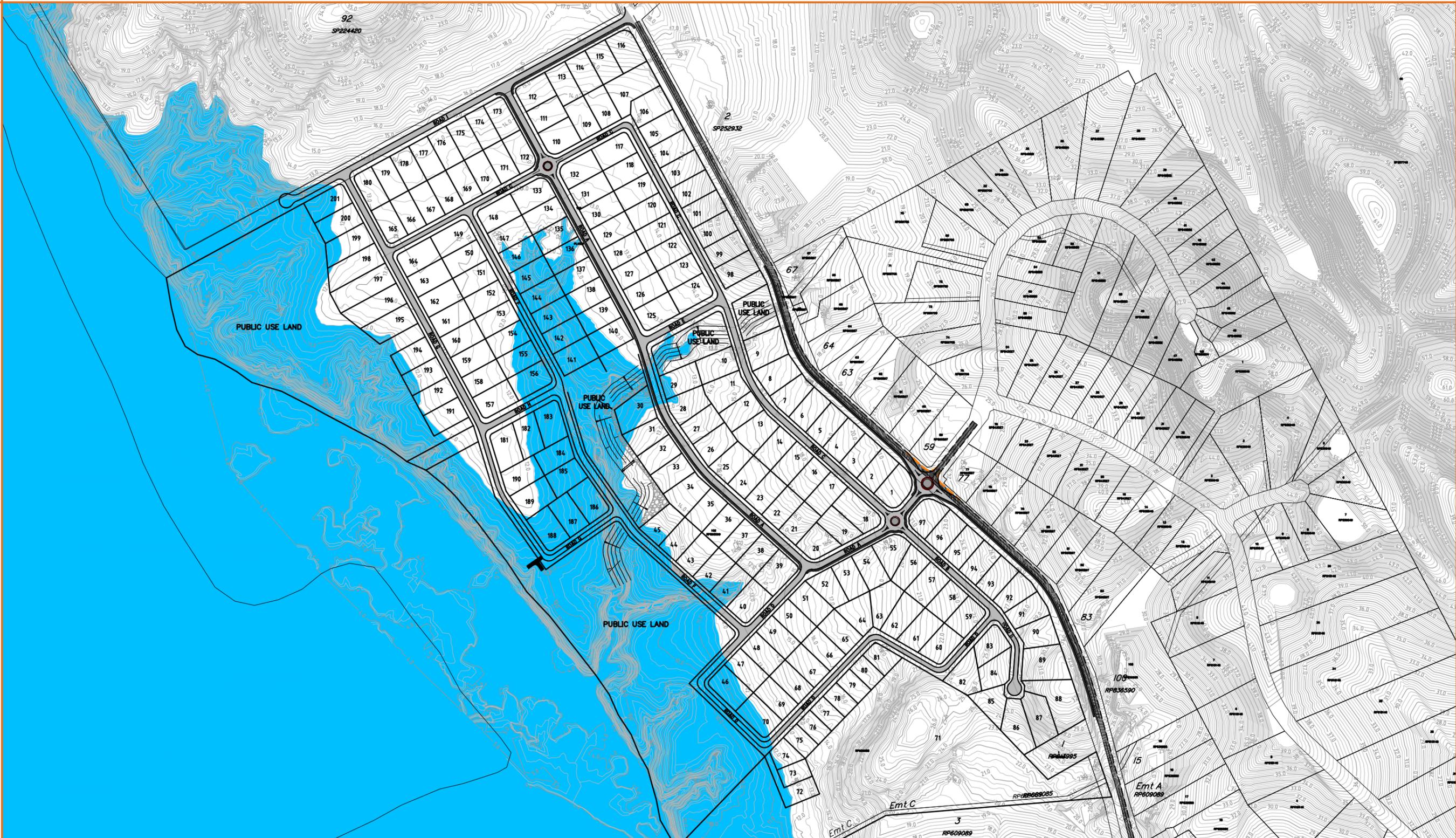
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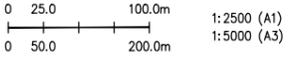
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PRE DEVELOPMENT INUNDATION PLAN
R12394 - PRE INUNDATION



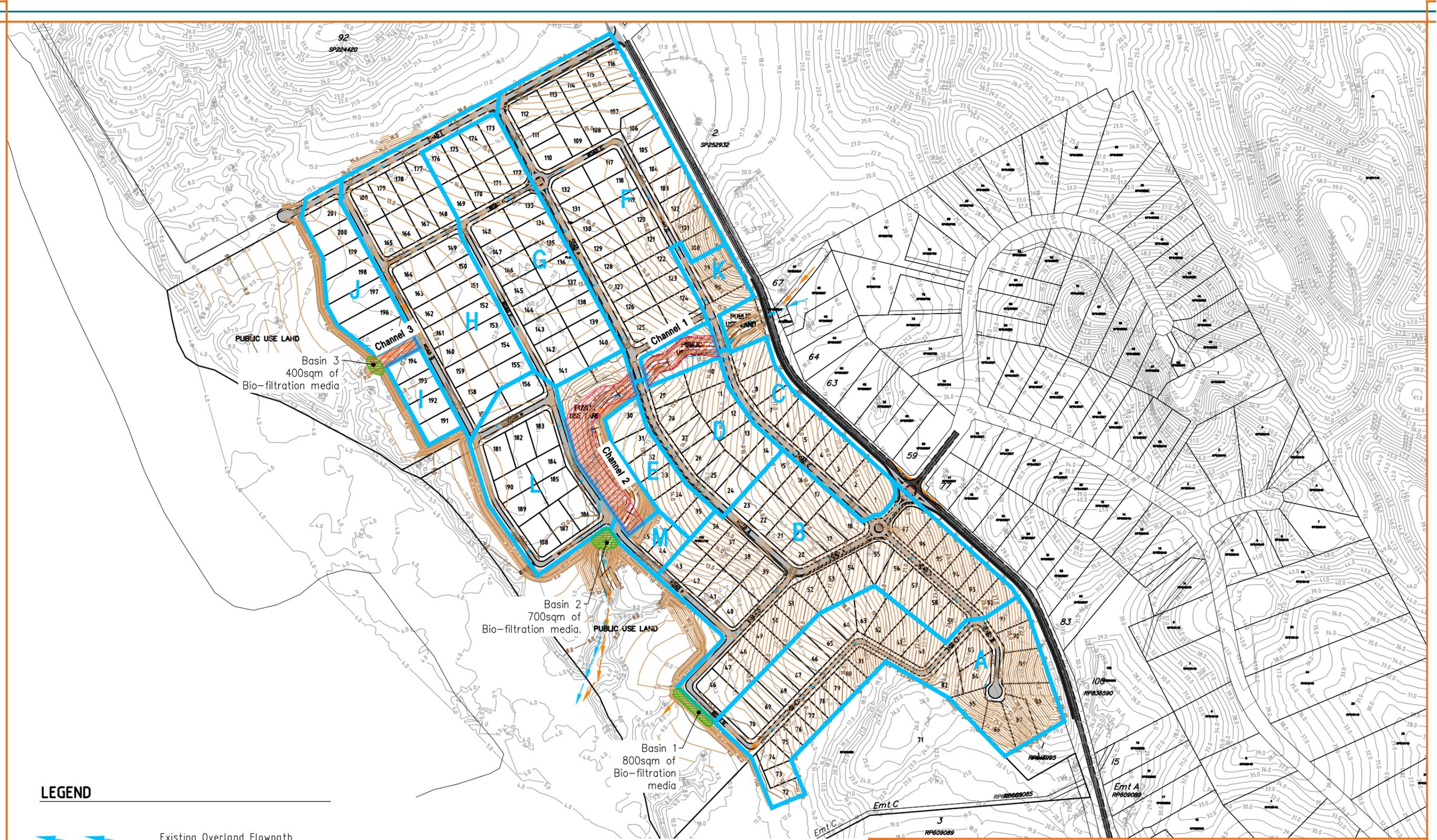
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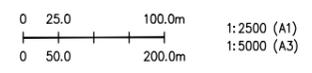
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LEGEND

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

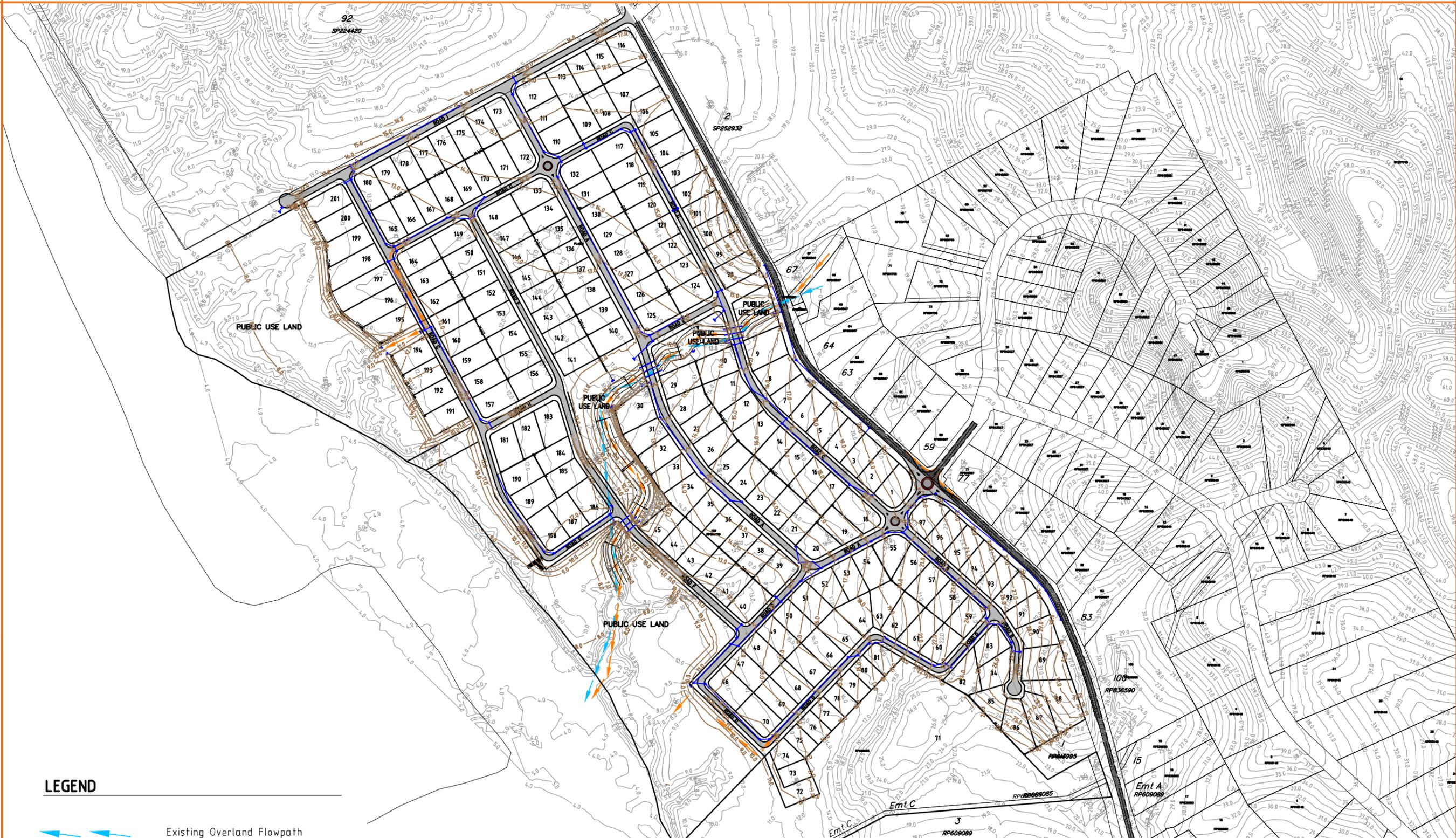
**RIVERSIDE ESTATE
STORMWATER QUALITY PLAN
R12394 - STORMWATER QUALITY**



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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**

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

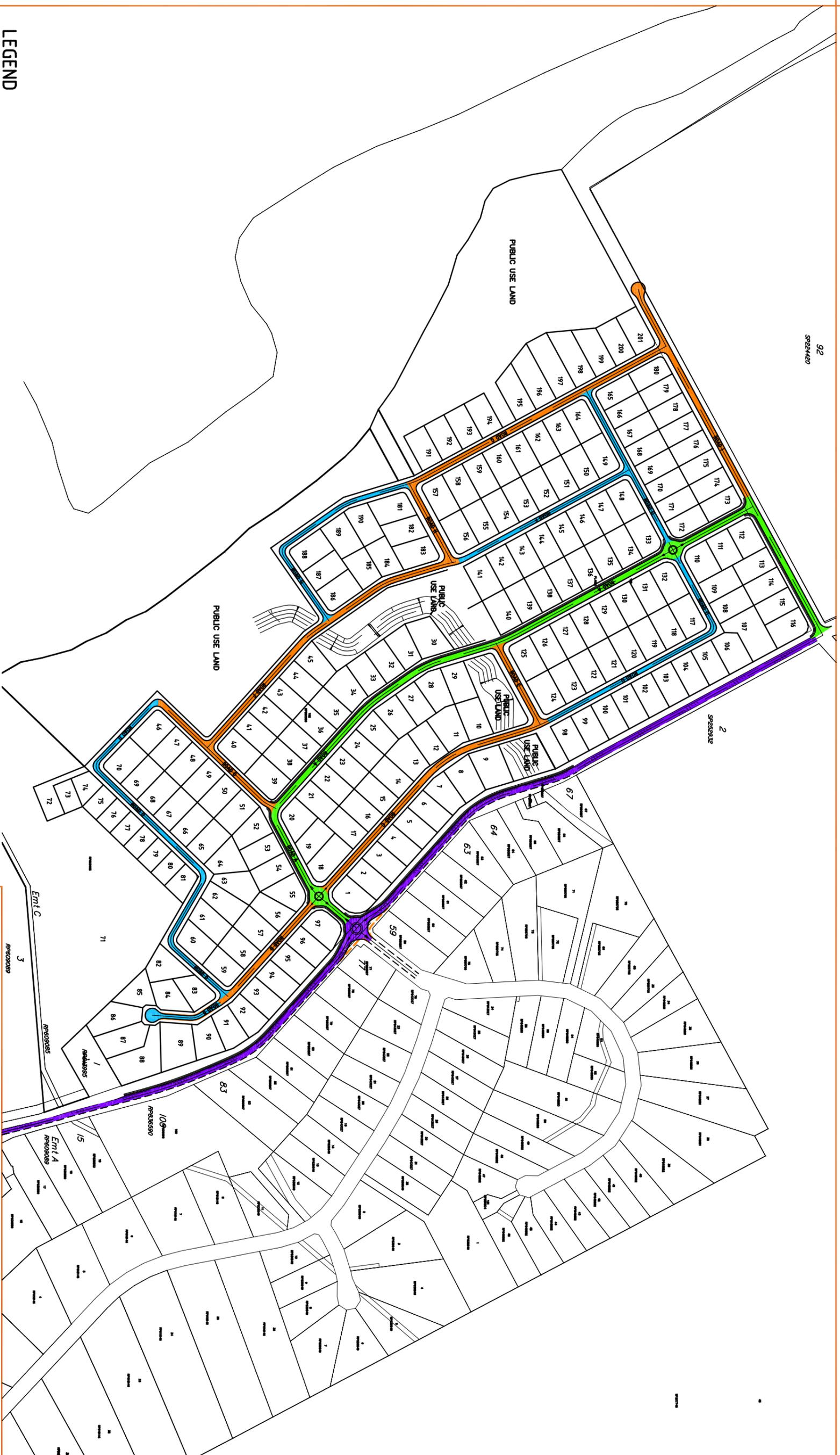
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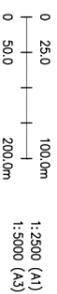
Appendix G Proposed Road Hierarchy Plan, Roundabout Details, Road Longsections and Cross-section Details



LEGEND

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

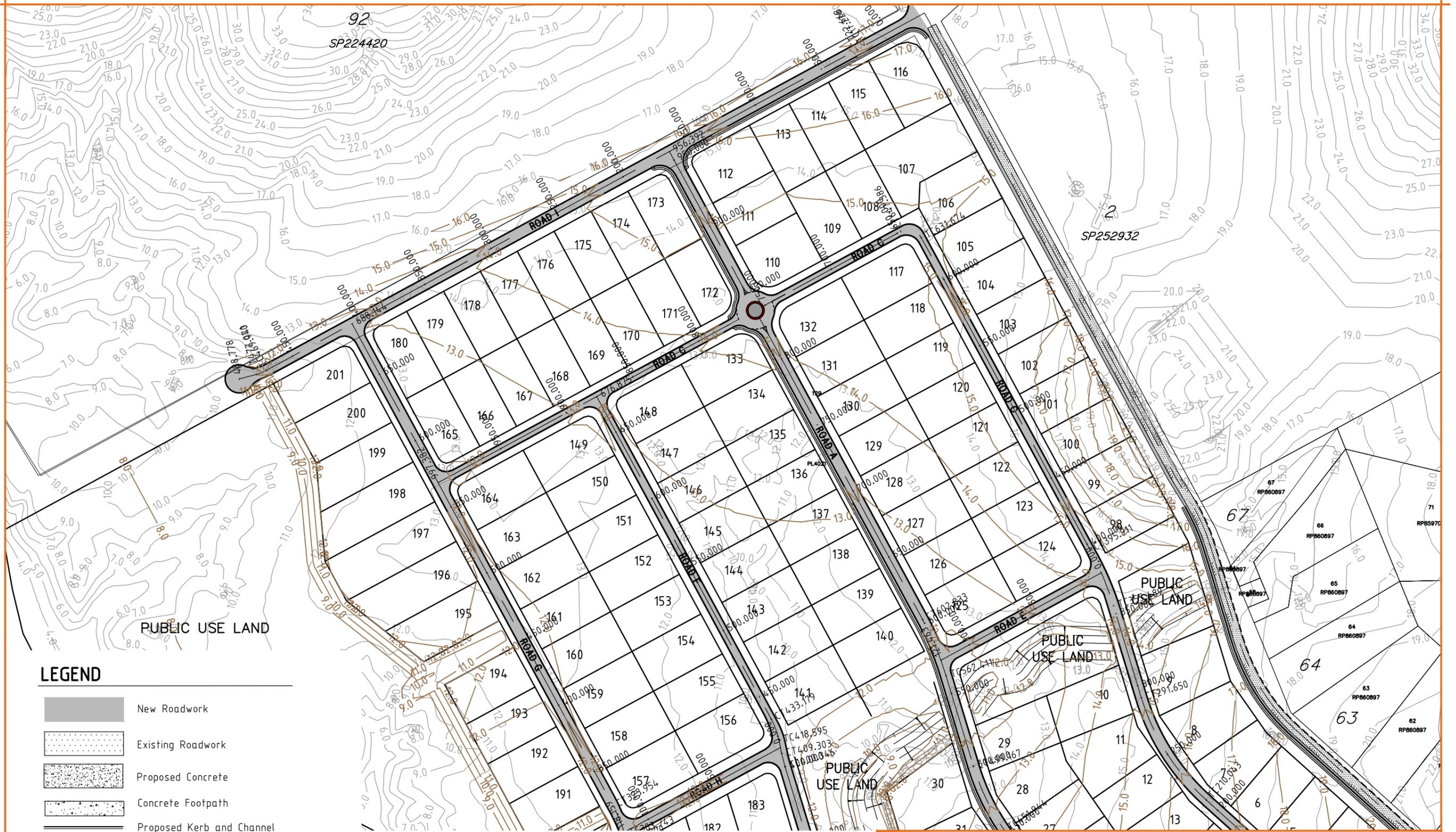
**RIVERSIDE ESTATE
ROAD HIERARCHY PLAN
R12394 - ROAD HIERARCHY**



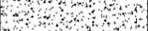
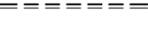
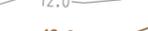
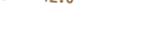
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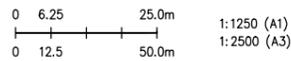




LEGEND

-  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 1 OF 2
R12394 - ROADWORKS



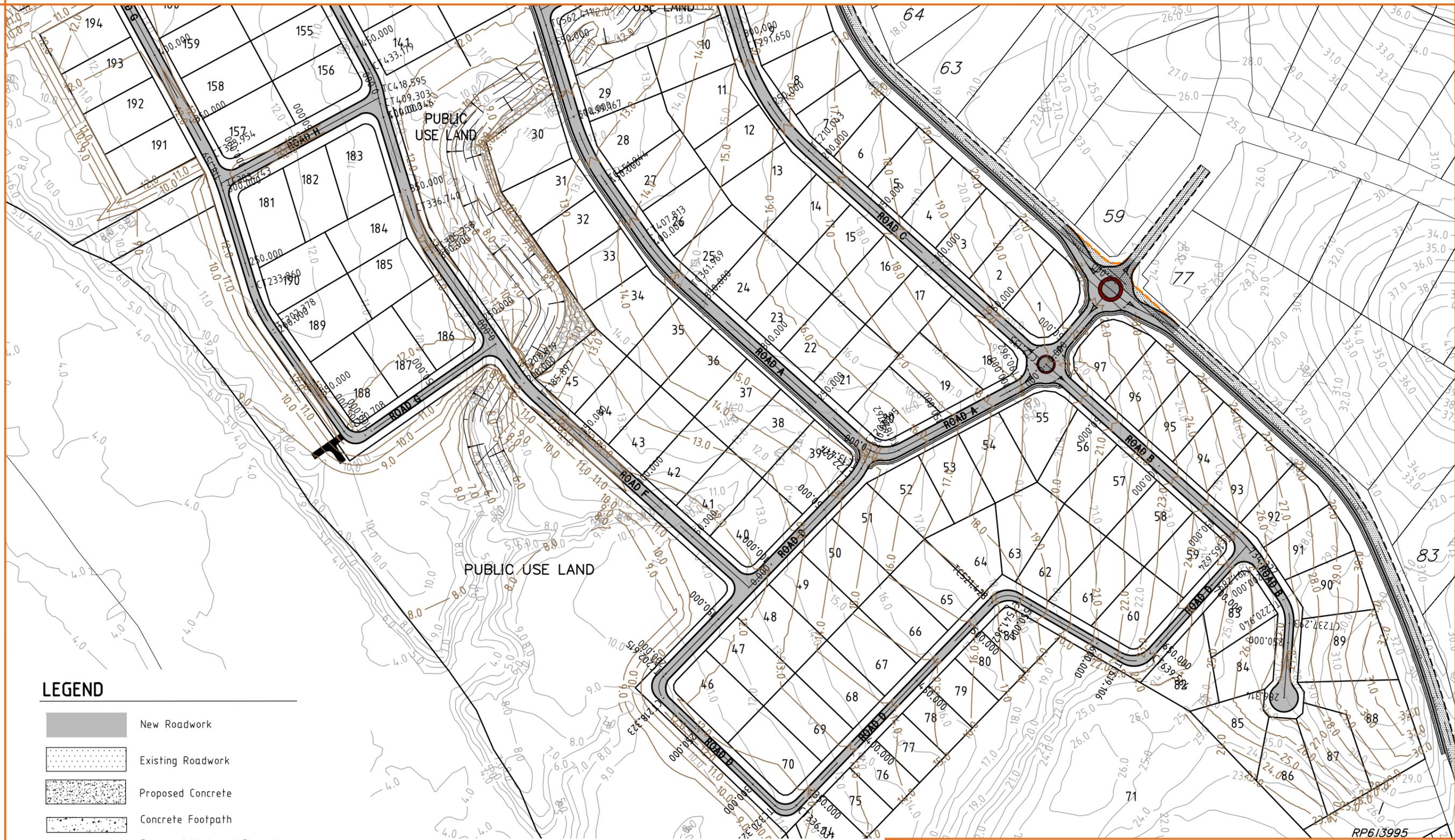
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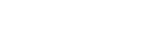
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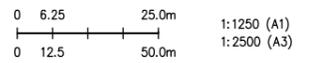
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LEGEND

-  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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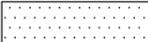
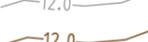
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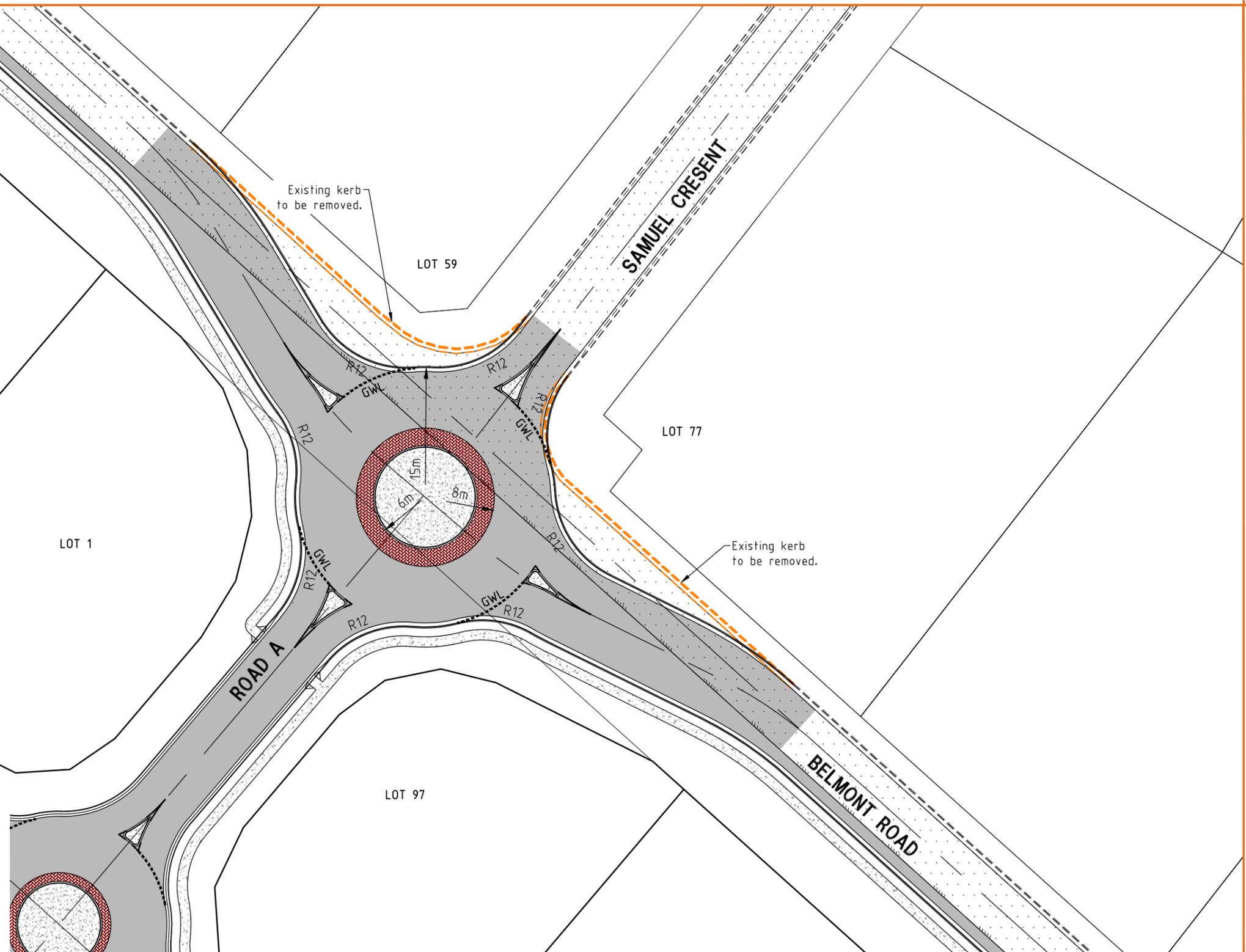
RP613995

PAVEMENT MARKING LEGEND

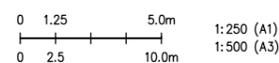
CODE	DESCRIPTION	LINE WIDTH
BLL	Edge Line Traffic Flow 3.0m 9.0m 1.0m	80mm
EL	Edge Line	100mm
CL	Continuity Line L=1000, G=3000	100mm
GWL	Give Way Line L=600, G=600	300mm
ULL	Unbroken Lane Line	80mm
SL	Stop Line	300mm
OL	OUT LINE	100mm

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**



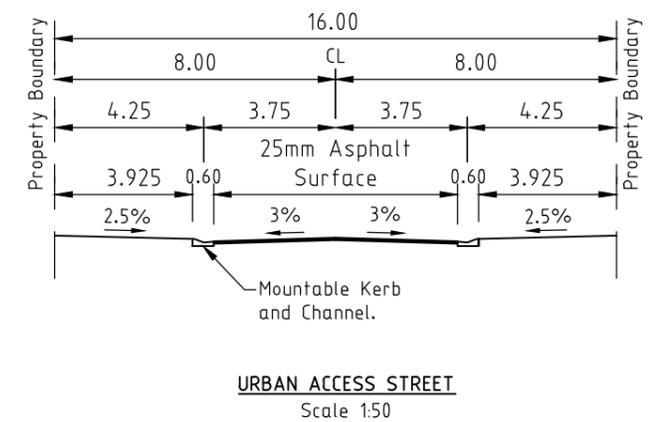
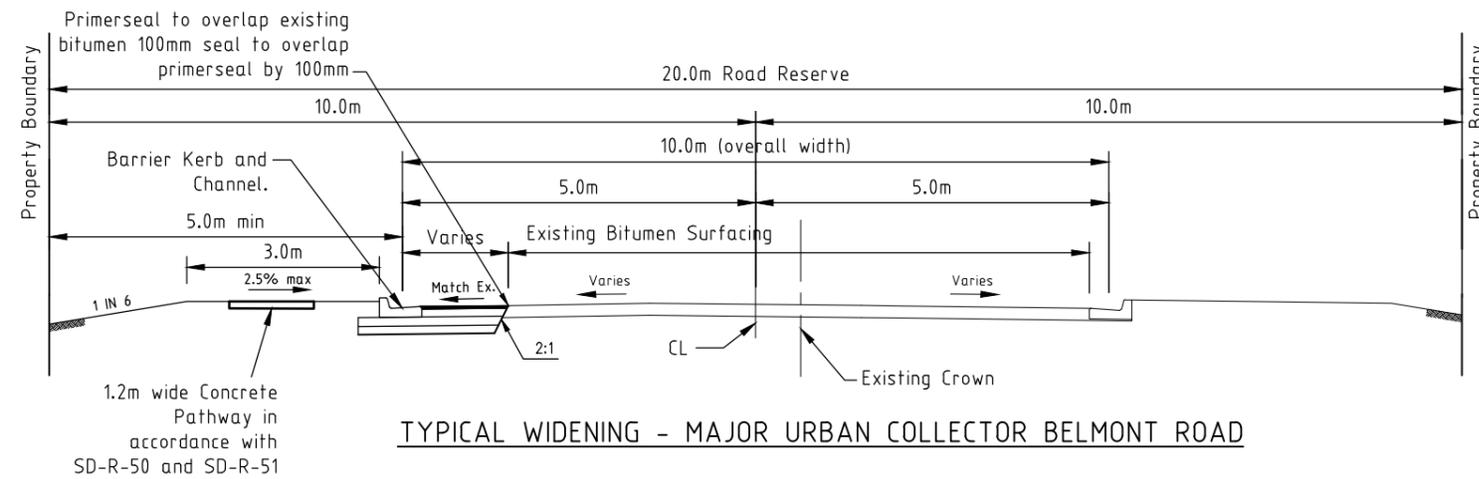
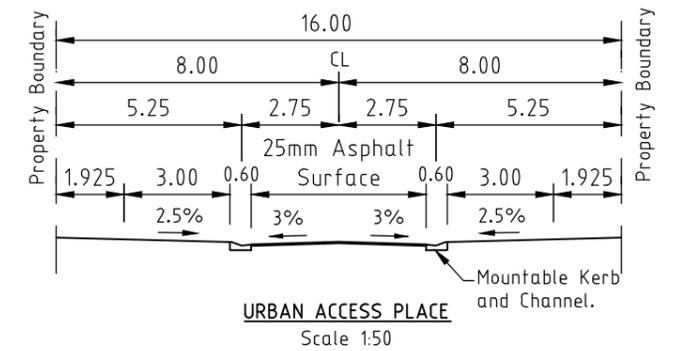
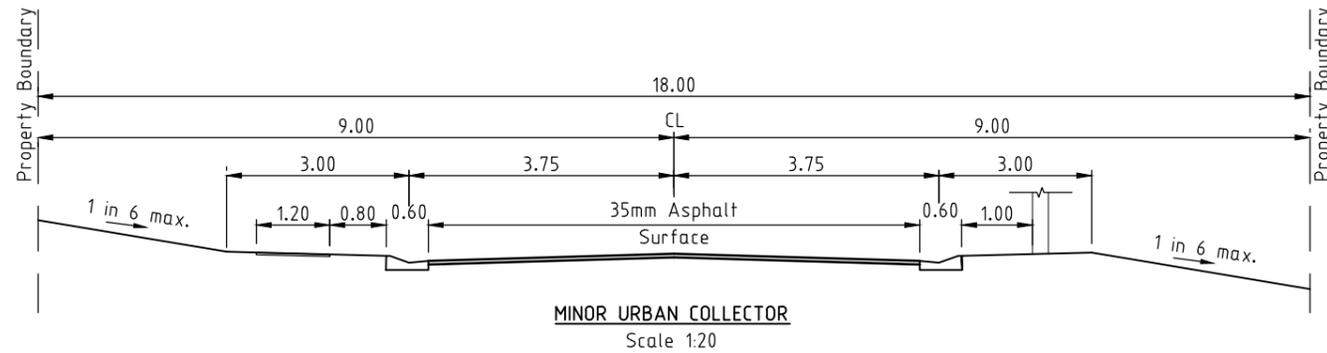
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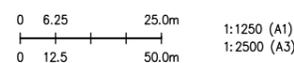
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NOTE: Please refer to Riverside Estate road hierarchy plan.

**RIVERSIDE ESTATE
ROADWORKS DETAILS PLAN
R12394 - ROADWORKS DETAILS**



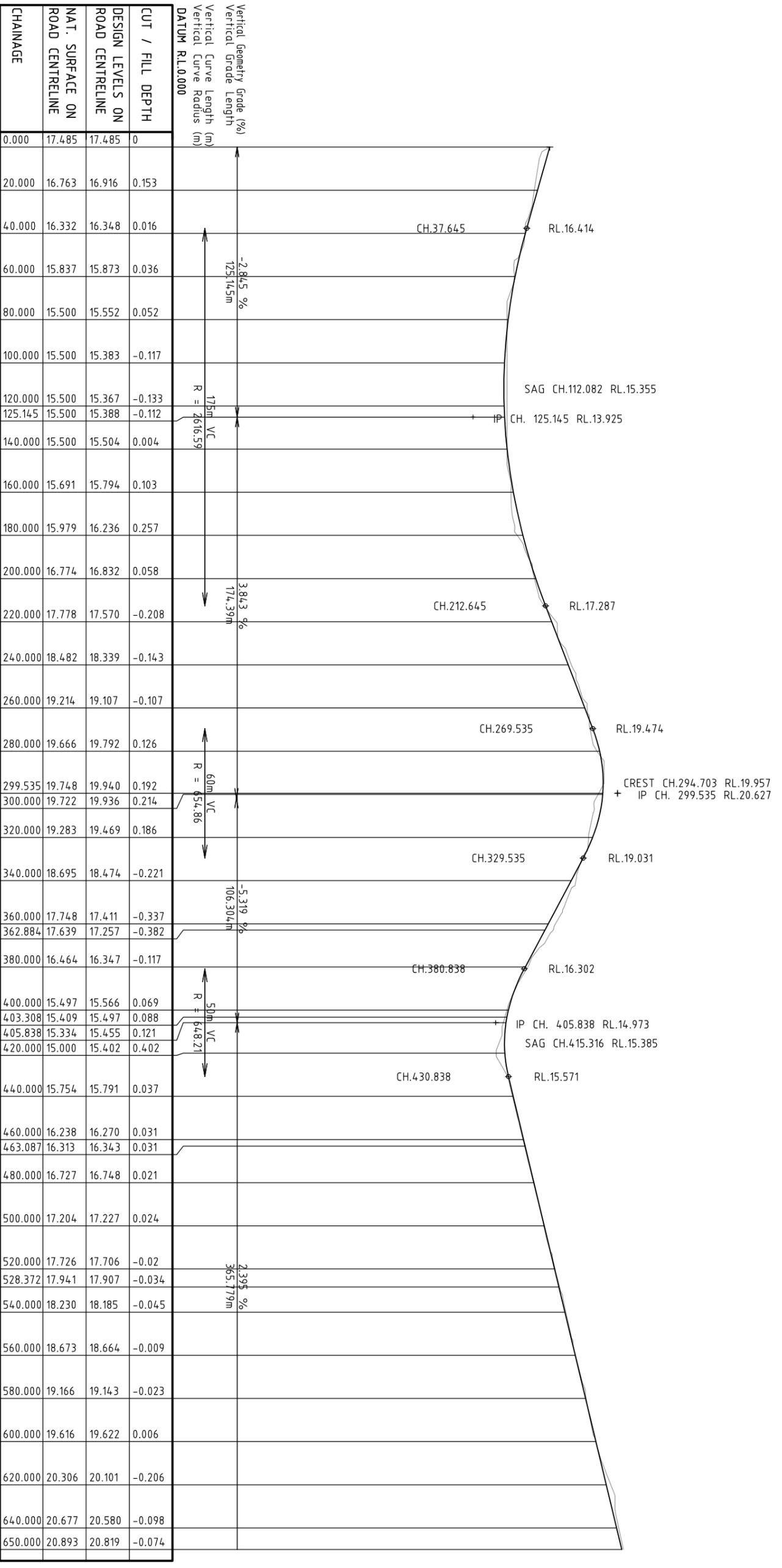
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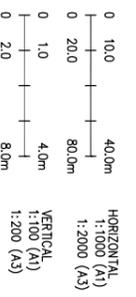
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LONGITUDINAL SECTION Belmont Road

RIVERSIDE ESTATE

ROAD LONGSECTIONS PLAN SHEET 1 OF 14
R12394 - ROAD LONGSECTIONS

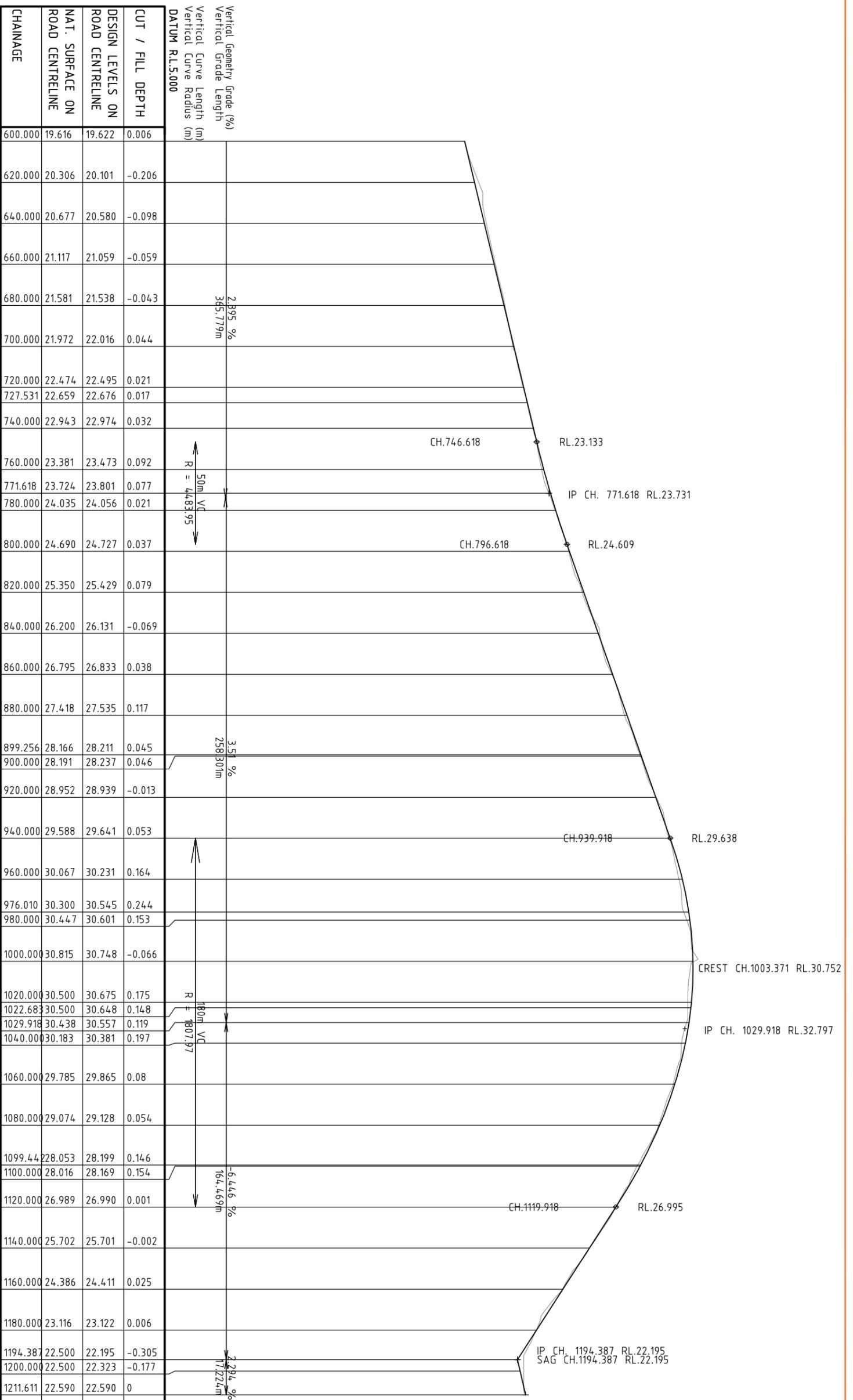


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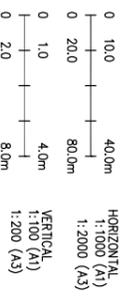


CHAINAGE	NAT. SURFACE ON ROAD CENTRELINE	DESIGN LEVELS ON ROAD CENTRELINE	CUT / FILL DEPTH	Vertical Geometry Grade (%)	Vertical Curve Length (m)	Vertical Curve Radius (m)	DATUM R.L.5.000
600.000	19.616	19.622	0.006				
620.000	20.306	20.101	-0.206				
640.000	20.677	20.580	-0.098				
660.000	21.117	21.059	-0.059				
680.000	21.581	21.538	-0.043				
700.000	21.972	22.016	0.044	2.395 %	365.779m		
720.000	22.474	22.495	0.021				
727.531	22.659	22.676	0.017				
740.000	22.943	22.974	0.032				
760.000	23.381	23.473	0.092				
771.618	23.724	23.801	0.077				
780.000	24.035	24.056	0.021				
800.000	24.690	24.727	0.037				
820.000	25.350	25.429	0.079				
840.000	26.200	26.131	-0.069				
860.000	26.795	26.833	0.038				
880.000	27.418	27.535	0.117				
899.256	28.166	28.211	0.045				
900.000	28.191	28.237	0.046	3.51 %	258.301m		
920.000	28.952	28.939	-0.013				
940.000	29.588	29.641	0.053				
960.000	30.067	30.231	0.164				
976.010	30.300	30.545	0.244				
980.000	30.447	30.601	0.153				
1000.000	30.815	30.748	-0.066				
1020.000	30.500	30.675	0.175				
1022.683	30.500	30.648	0.148				
1029.918	30.438	30.557	0.119				
1040.000	30.183	30.381	0.197				
1060.000	29.785	29.865	0.08				
1080.000	29.074	29.128	0.054				
1099.44	228.053	28.199	0.146				
1100.000	28.016	28.169	0.154				
1120.000	26.989	26.990	0.001	-6.446 %	164.469m		
1140.000	25.702	25.701	-0.002				
1160.000	24.386	24.411	0.025				
1180.000	23.116	23.122	0.006				
1194.387	22.500	22.195	-0.305				
1200.000	22.500	22.323	-0.177				
1211.611	22.590	22.590	0	2.294 %	172.27m		

LONGITUDINAL SECTION Belmont Road

RIVERSIDE ESTATE

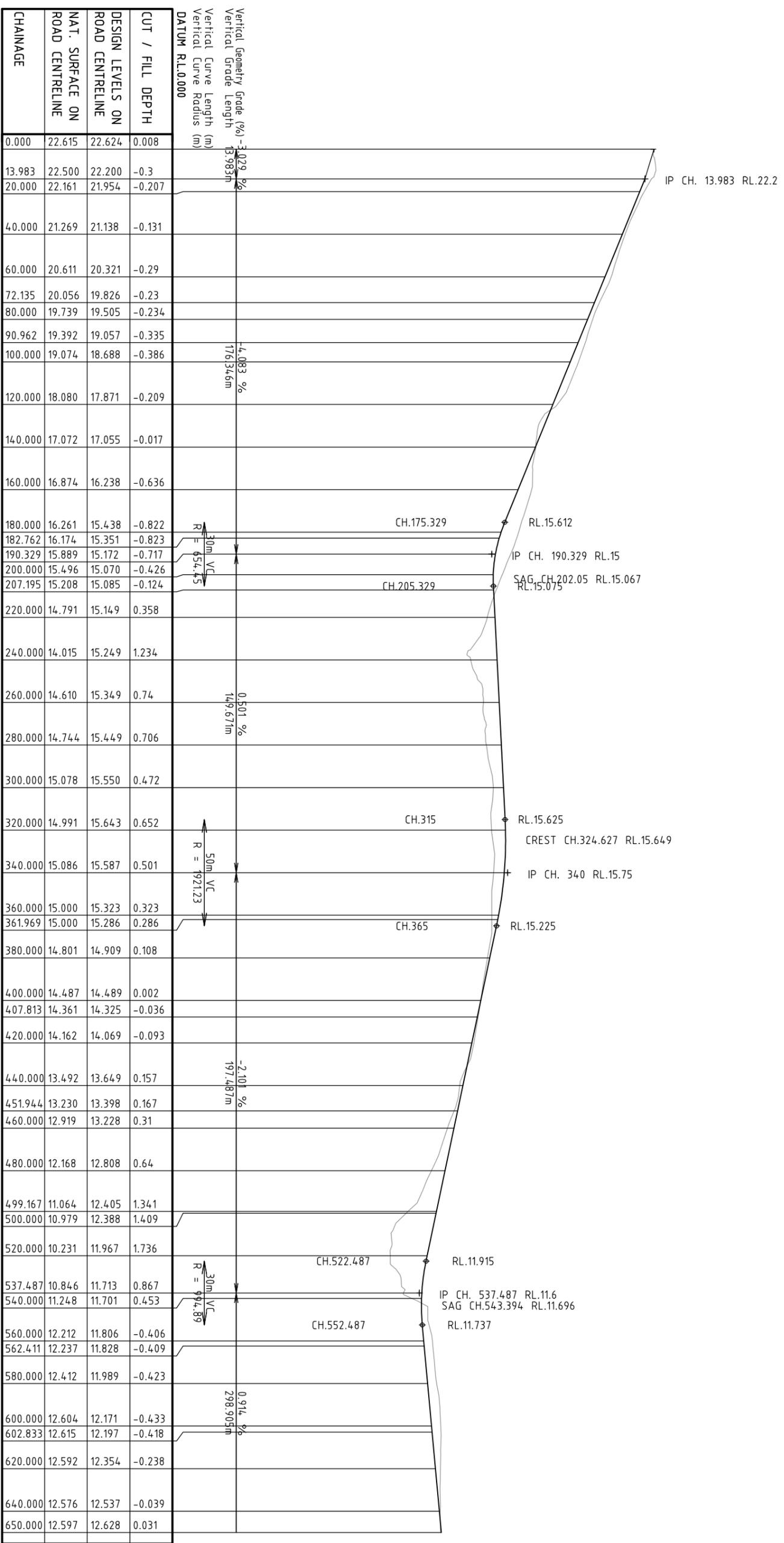
ROAD LONGSECTIONS PLAN SHEET 2 OF 14
R12394 - ROAD LONGSECTIONS



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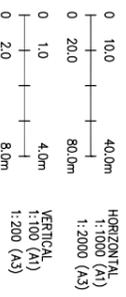




LONGITUDINAL SECTION Road A

RIVERSIDE ESTATE

ROAD LONGSECTIONS PLAN SHEET 3 OF 14
R12394 - ROAD LONGSECTIONS

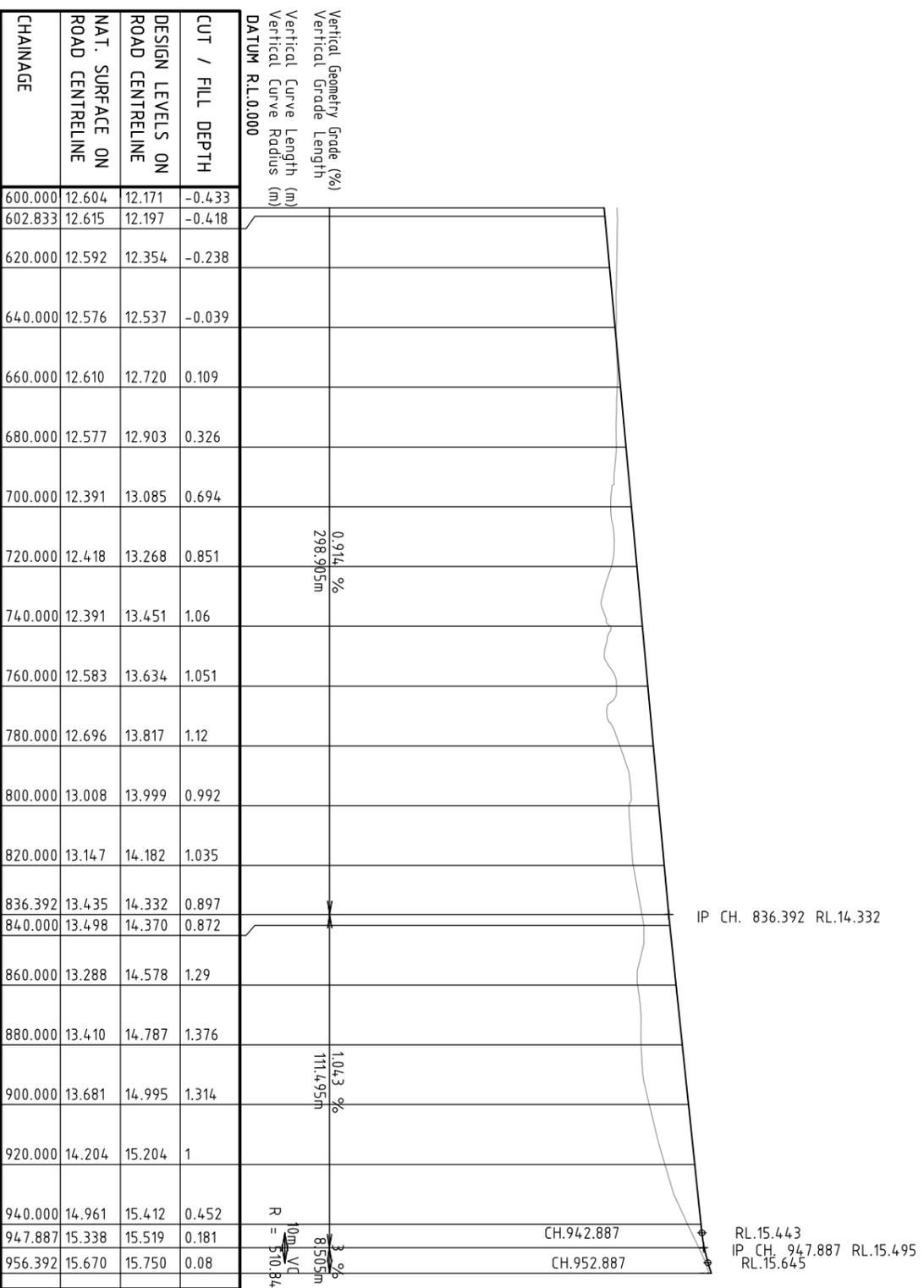


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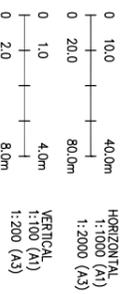
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LONGITUDINAL SECTION Road A

RIVERSIDE ESTATE

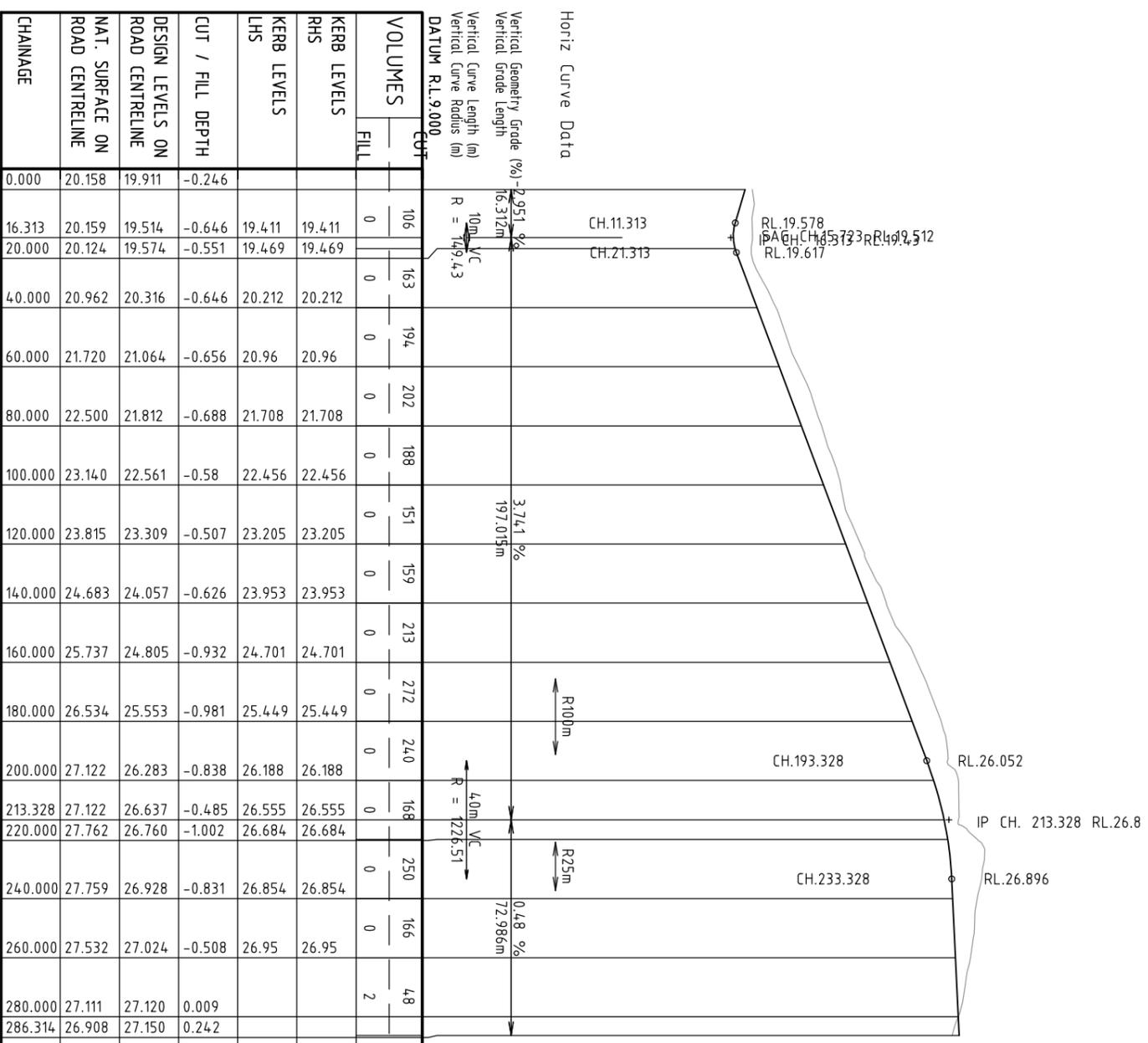
ROAD LONGSECTIONS PLAN SHEET 4 OF 14
 R12394 - ROAD LONGSECTIONS



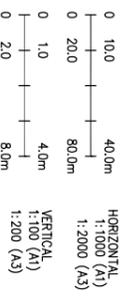
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CHAINAGE	VOLUMES		CUT / FILL DEPTH	DESIGN LEVELS ON ROAD CENTRELINE	NAT. SURFACE ON ROAD CENTRELINE	KERB LEVELS LHS	KERB LEVELS RHS
	CUT	FILL					
0.000	106	0	-0.246	19.911	20.158		
16.313	0	0	-0.646	19.514	20.159	19.411	19.411
20.000	0	0	-0.551	19.574	20.124	19.469	19.469
40.000	163	0	-0.646	20.316	20.962	20.212	20.212
60.000	194	0	-0.656	21.064	21.720	20.96	20.96
80.000	202	0	-0.688	21.812	22.500	21.708	21.708
100.000	188	0	-0.58	22.561	23.140	22.456	22.456
120.000	151	0	-0.507	23.309	23.815	23.205	23.205
140.000	159	0	-0.626	24.057	24.683	23.953	23.953
160.000	213	0	-0.932	24.805	25.737	24.701	24.701
180.000	272	0	-0.981	25.553	26.534	25.449	25.449
200.000	240	0	-0.838	26.283	27.122	26.188	26.188
213.328	168	0	-0.485	26.637	27.122	26.555	26.555
220.000	250	0	-1.002	26.760	27.762	26.684	26.684
240.000	166	0	-0.831	26.928	27.759	26.854	26.854
260.000	48	2	-0.508	27.024	27.532	26.95	26.95
280.000			0.009	27.120	27.111		
286.314			0.242	27.150	26.908		

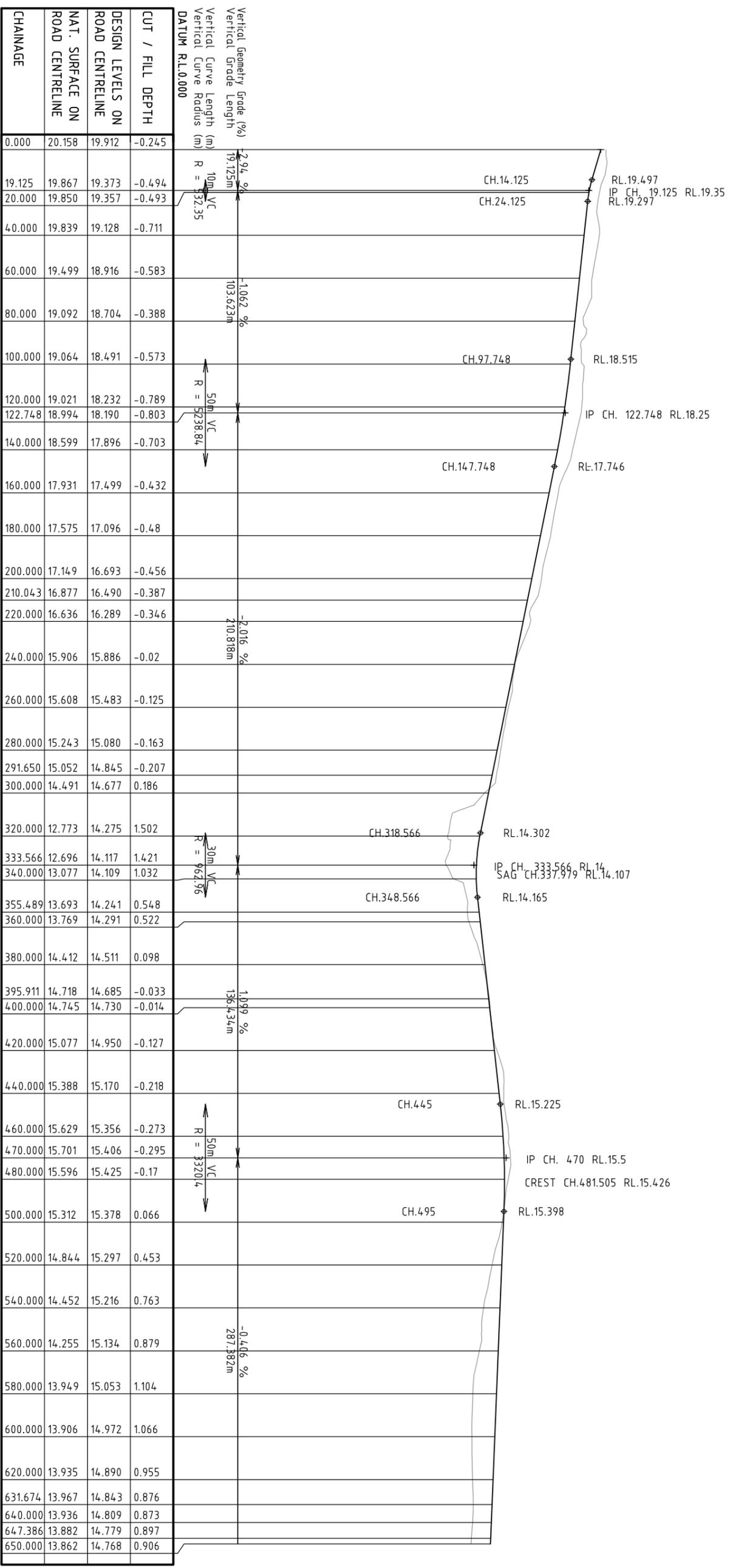


RIVERSIDE ESTATE
ROAD LONGSECTIONS PLAN SHEET 5 OF 14
R12394 - ROAD LONGSECTIONS

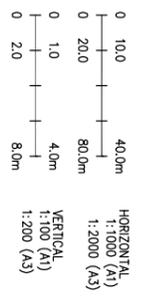
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LONGITUDINAL SECTION Road C

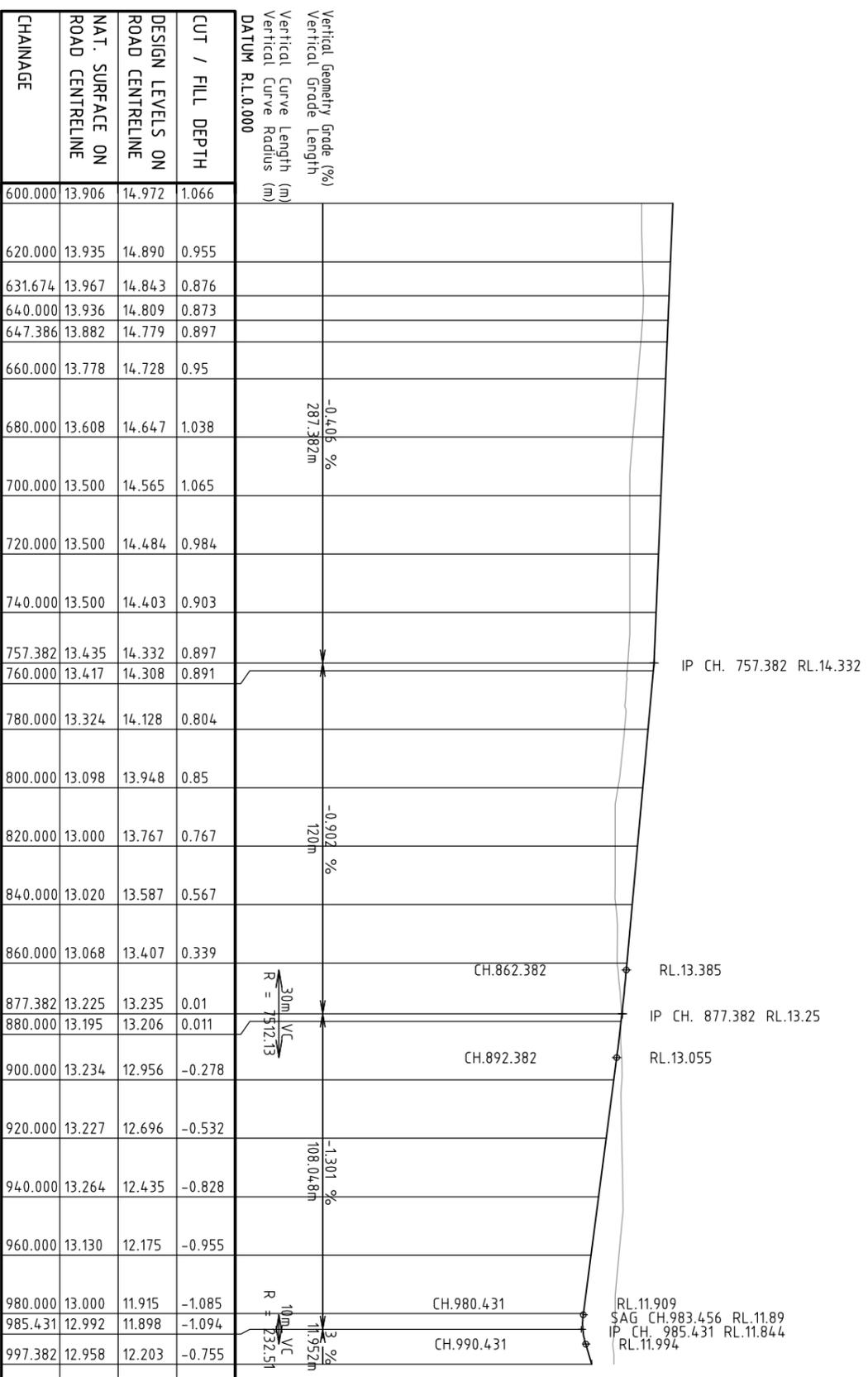


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ROAD LONGSECTIONS PLAN SHEET 6 OF 14
R12394 - ROAD LONGSECTIONS

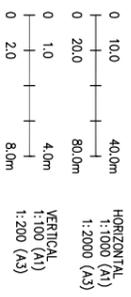
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LONGITUDINAL SECTION Road C

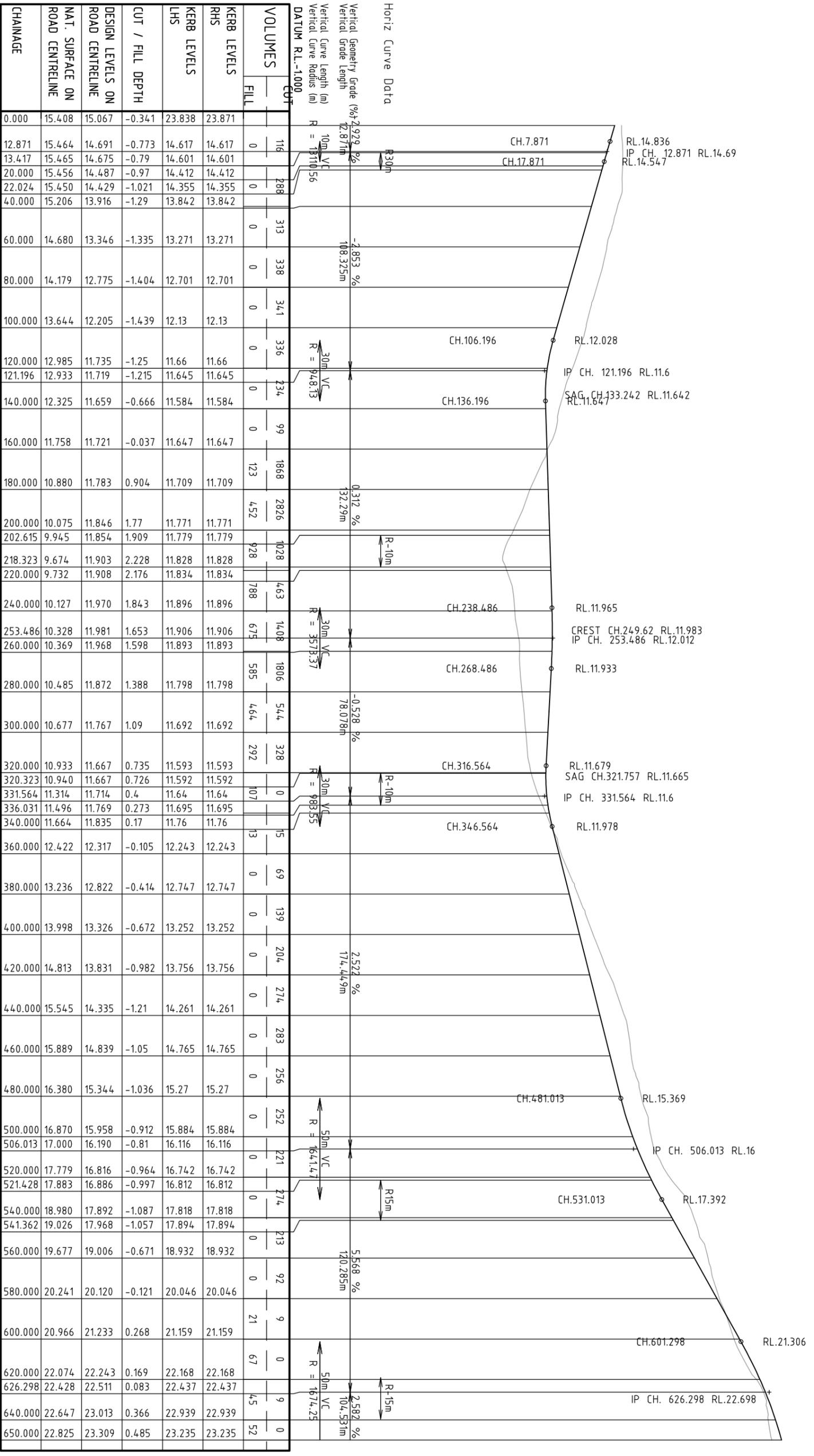


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 R12394 - ROAD LONGSECTIONS

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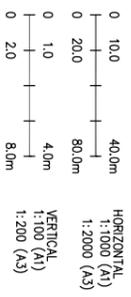
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CHAINAGE	NAT. SURFACE ON ROAD CENTRELINE		DESIGN LEVELS ON ROAD CENTRELINE	CUT / FILL DEPTH	KERB LEVELS LHS	KERB LEVELS RHS	VOLUMES	
	CH	RL					CUT	FILL
0.000	15.408	15.067	-0.341	23.838	23.871			
12.871	15.464	14.691	-0.773	14.617	14.617	116	0	
13.417	15.465	14.675	-0.79	14.601	14.601	288	0	
20.000	15.456	14.487	-0.97	14.412	14.412	0	0	
22.024	15.450	14.429	-1.021	14.355	14.355	0	0	
40.000	15.206	13.916	-1.29	13.842	13.842	0	0	
60.000	14.680	13.346	-1.335	13.271	13.271	313	0	
80.000	14.179	12.775	-1.404	12.701	12.701	338	0	
100.000	13.644	12.205	-1.439	12.13	12.13	341	0	
120.000	12.985	11.735	-1.25	11.66	11.66	336	0	
121.196	12.933	11.719	-1.215	11.645	11.645	234	0	
140.000	12.325	11.659	-0.666	11.584	11.584	99	0	
160.000	11.758	11.721	-0.037	11.647	11.647	1868	123	
180.000	10.880	11.783	0.904	11.709	11.709	2826	452	
200.000	10.075	11.846	1.77	11.771	11.771	1028	928	
202.615	9.945	11.854	1.909	11.779	11.779	463	788	
218.323	9.674	11.903	2.228	11.828	11.828	1408	675	
220.000	9.732	11.908	2.176	11.834	11.834	1806	585	
240.000	10.127	11.970	1.843	11.896	11.896	544	464	
253.486	10.328	11.981	1.653	11.906	11.906	328	292	
260.000	10.369	11.968	1.598	11.893	11.893	0	107	
280.000	10.485	11.872	1.388	11.798	11.798	15	13	
300.000	10.677	11.767	1.09	11.692	11.692	69	0	
320.000	10.933	11.667	0.735	11.593	11.593	139	0	
320.323	10.940	11.667	0.726	11.592	11.592	204	0	
331.564	11.314	11.714	0.4	11.64	11.64	274	0	
336.031	11.496	11.769	0.273	11.695	11.695	283	0	
340.000	11.664	11.835	0.17	11.76	11.76	256	0	
360.000	12.422	12.317	-0.105	12.243	12.243	252	0	
380.000	13.236	12.822	-0.414	12.747	12.747	221	0	
400.000	13.998	13.326	-0.672	13.252	13.252	274	0	
420.000	14.813	13.831	-0.982	13.756	13.756	283	0	
440.000	15.545	14.335	-1.21	14.261	14.261	256	0	
460.000	15.889	14.839	-1.05	14.765	14.765	252	0	
480.000	16.380	15.344	-1.036	15.27	15.27	221	0	
500.000	16.870	15.958	-0.912	15.884	15.884	274	0	
506.013	17.000	16.190	-0.81	16.116	16.116	213	0	
520.000	17.779	16.816	-0.964	16.742	16.742	92	21	
521.428	17.883	16.886	-0.997	16.812	16.812	9	67	
540.000	18.980	17.892	-1.087	17.818	17.818	0	45	
541.362	19.026	17.968	-1.057	17.894	17.894	0	52	
560.000	19.677	19.006	-0.671	18.932	18.932	0	0	
580.000	20.241	20.120	-0.121	20.046	20.046	0	0	
600.000	20.966	21.233	0.268	21.159	21.159	0	0	
620.000	22.074	22.243	0.169	22.168	22.168	0	0	
626.298	22.428	22.511	0.083	22.437	22.437	0	0	
640.000	22.647	23.013	0.366	22.939	22.939	0	0	
650.000	22.825	23.309	0.485	23.235	23.235	0	0	

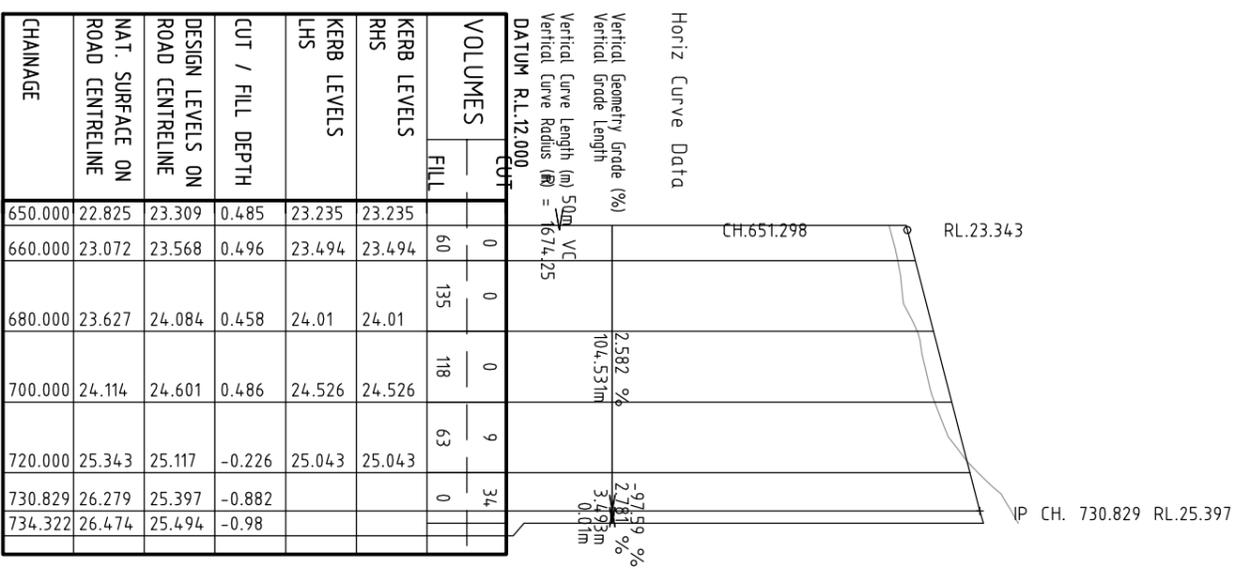
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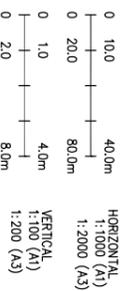
RIVERSIDE ESTATE
 ROAD LONGSECTIONS PLAN SHEET 8 OF 14
 R12394 - ROAD LONGSECTIONS

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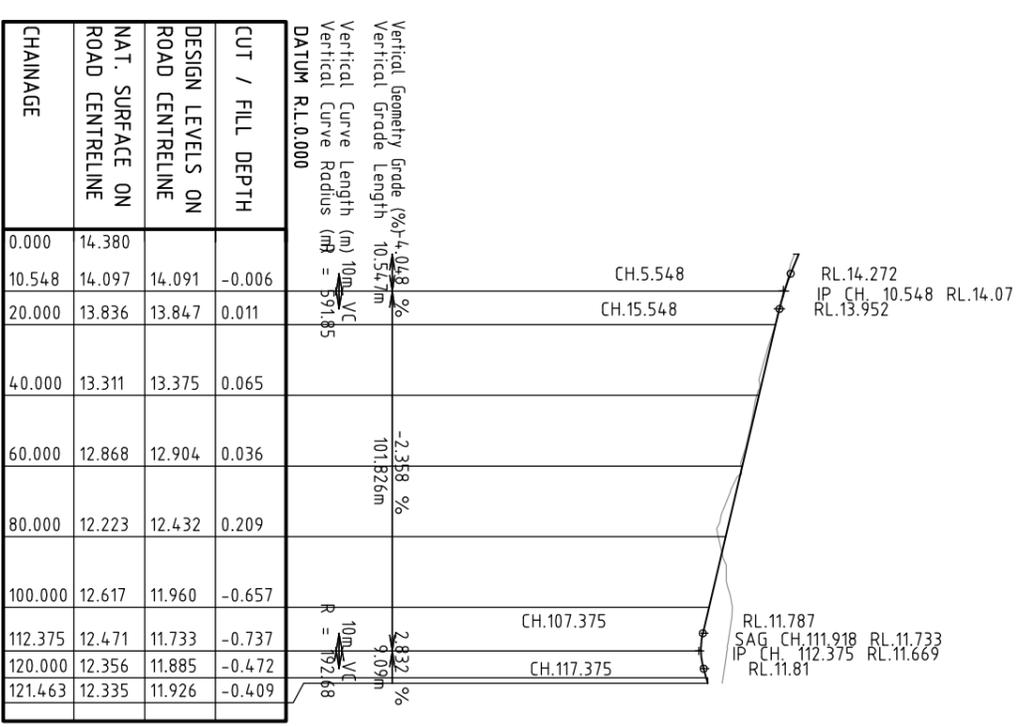




LONGITUDINAL SECTION Road D



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ROAD LONGSECTIONS PLAN SHEET 9 OF 14
R12394 - ROAD LONGSECTIONS



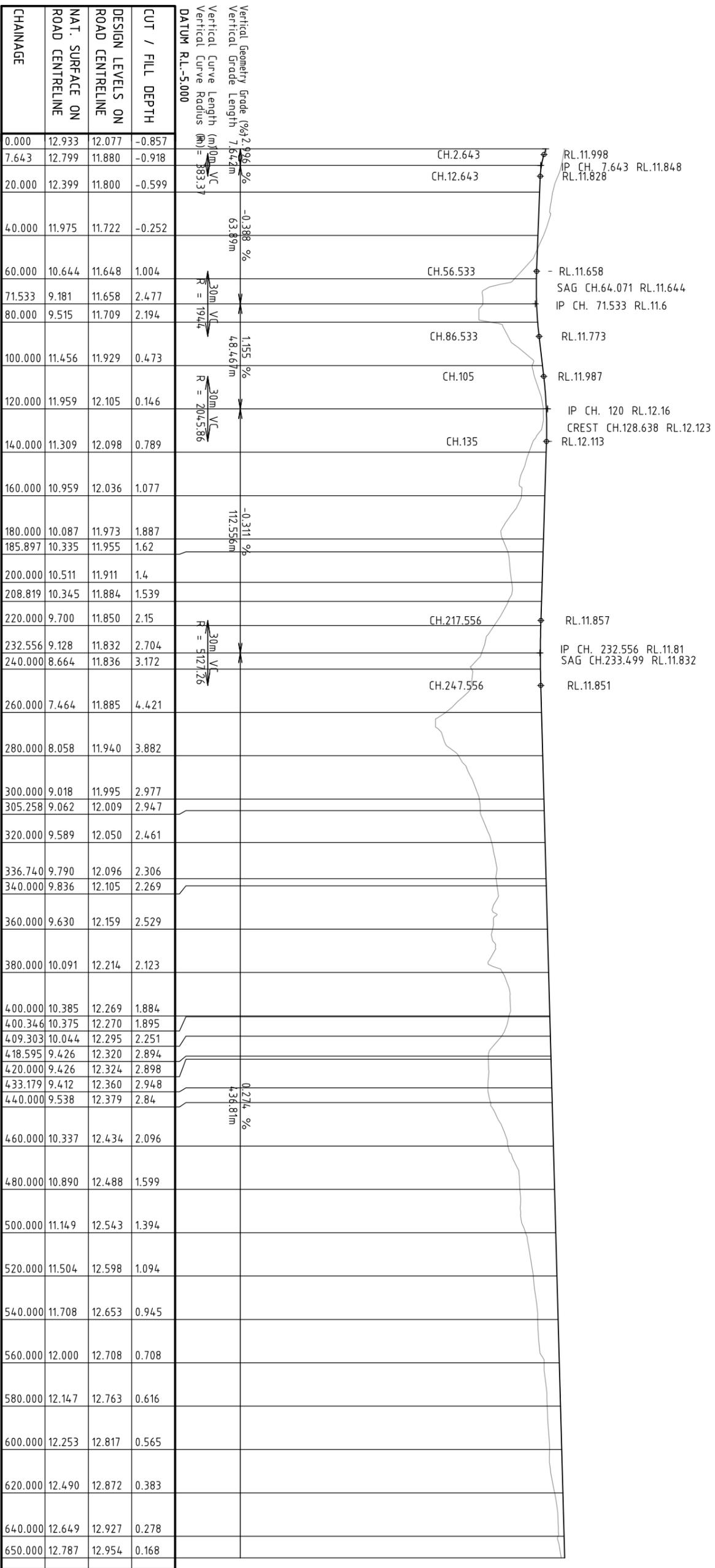
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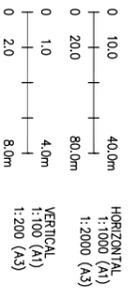
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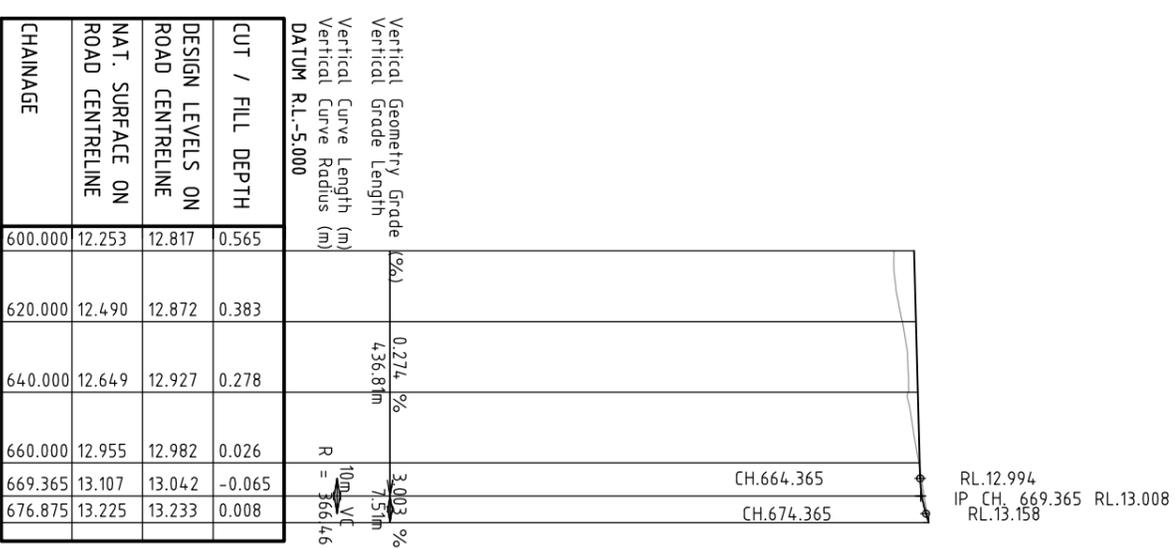


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R12394 - ROAD LONGSECTIONS

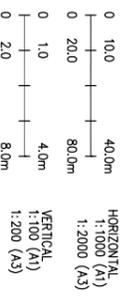
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LONGITUDINAL SECTION Road F

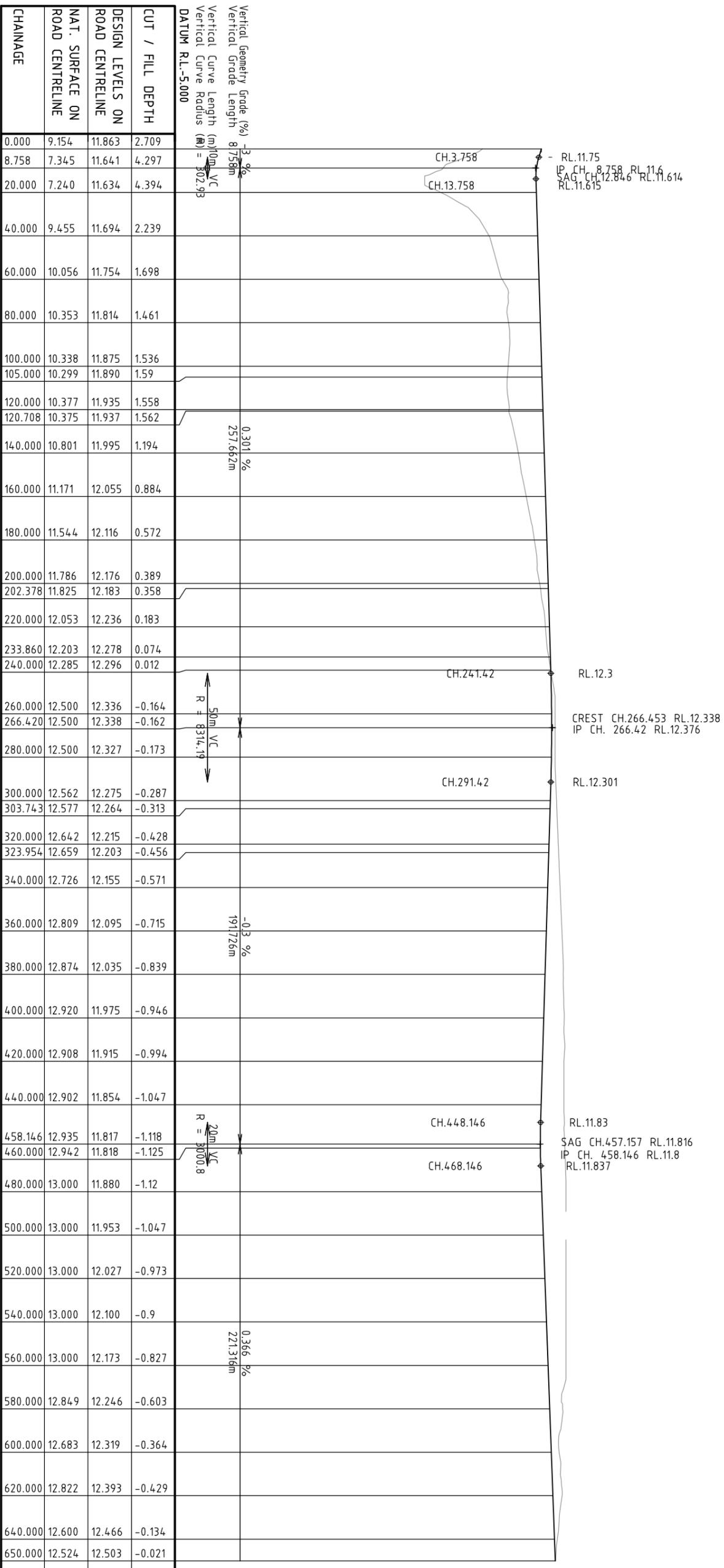


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R12394 - ROAD LONGSECTIONS

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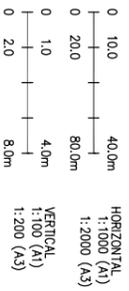
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LONGITUDINAL SECTION Road G

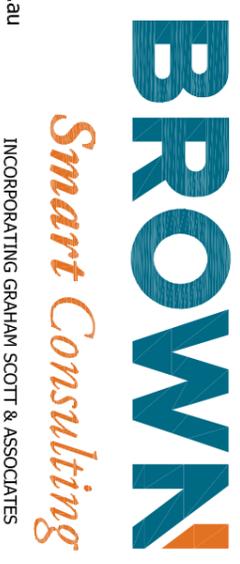
CHAINAGE	NAT. SURFACE ON ROAD CENTRELINE	DESIGN LEVELS ON ROAD CENTRELINE	CUT / FILL DEPTH
0.000	9.154	11.863	2.709
8.758	7.345	11.641	4.297
20.000	7.240	11.634	4.394
40.000	9.455	11.694	2.239
60.000	10.056	11.754	1.698
80.000	10.353	11.814	1.461
100.000	10.338	11.875	1.536
105.000	10.299	11.890	1.59
120.000	10.377	11.935	1.558
120.708	10.375	11.937	1.562
140.000	10.801	11.995	1.194
160.000	11.171	12.055	0.884
180.000	11.544	12.116	0.572
200.000	11.786	12.176	0.389
202.378	11.825	12.183	0.358
220.000	12.053	12.236	0.183
233.860	12.203	12.278	0.074
240.000	12.285	12.296	0.012
260.000	12.500	12.336	-0.164
266.420	12.500	12.338	-0.162
280.000	12.500	12.327	-0.173
300.000	12.562	12.275	-0.287
303.743	12.577	12.264	-0.313
320.000	12.642	12.215	-0.428
323.954	12.659	12.203	-0.456
340.000	12.726	12.155	-0.571
360.000	12.809	12.095	-0.715
380.000	12.874	12.035	-0.839
400.000	12.920	11.975	-0.946
420.000	12.908	11.915	-0.994
440.000	12.902	11.854	-1.047
458.146	12.935	11.817	-1.118
460.000	12.942	11.818	-1.125
480.000	13.000	11.880	-1.12
500.000	13.000	11.953	-1.047
520.000	13.000	12.027	-0.973
540.000	13.000	12.100	-0.9
560.000	13.000	12.173	-0.827
580.000	12.849	12.246	-0.603
600.000	12.683	12.319	-0.364
620.000	12.822	12.393	-0.429
640.000	12.600	12.466	-0.134
650.000	12.524	12.503	-0.021

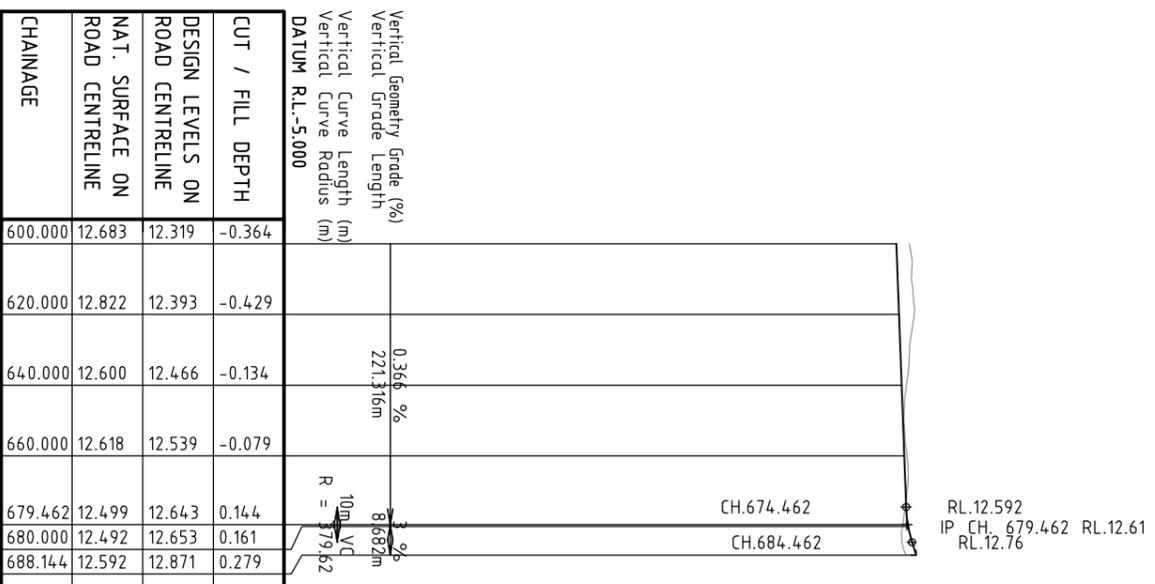


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ROAD LONGSECTIONS PLAN SHEET 12 OF 14
R12394 - ROAD LONGSECTIONS

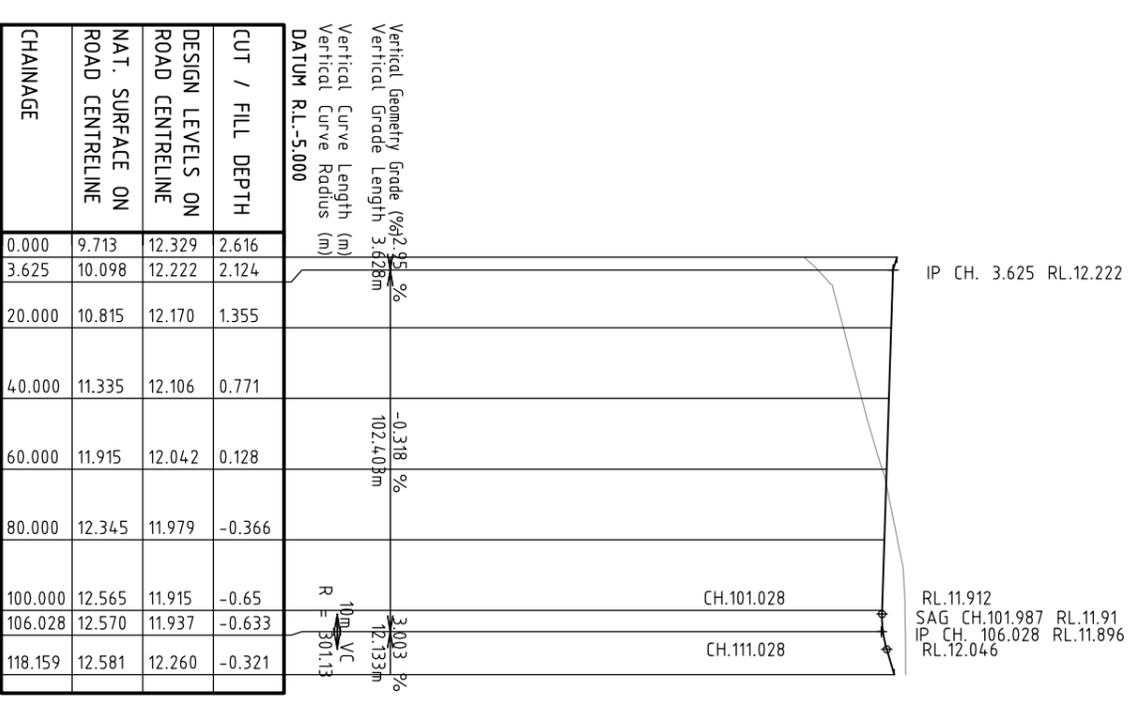
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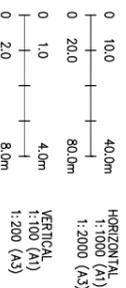




LONGITUDINAL SECTION Road G



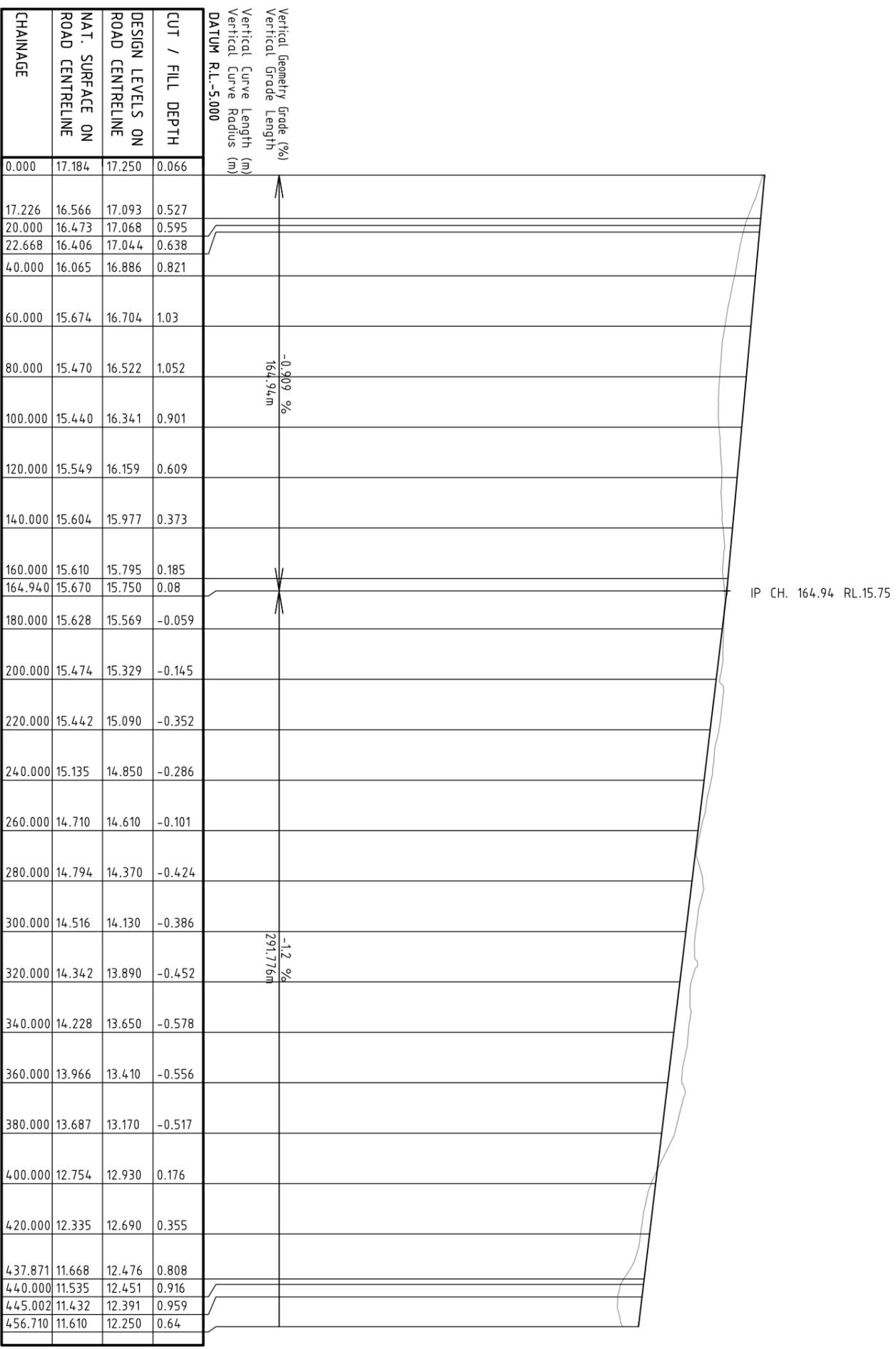
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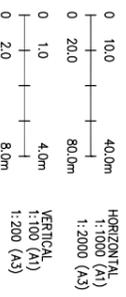
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R12394 - ROAD LONGSECTIONS

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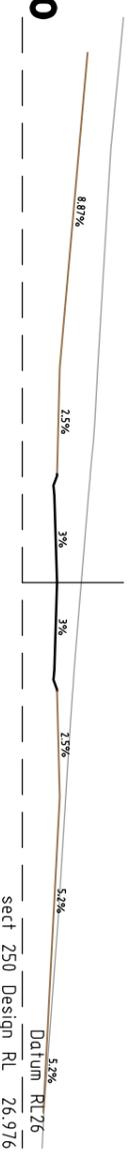
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R12394 - ROAD LONGSECTIONS

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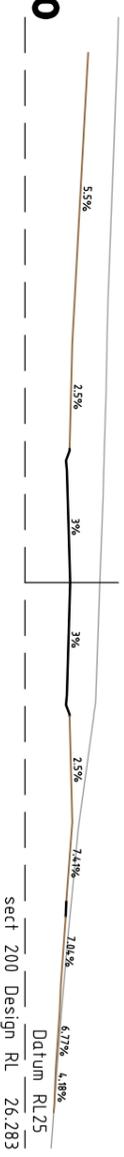
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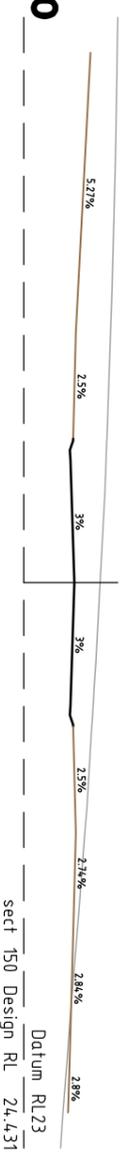
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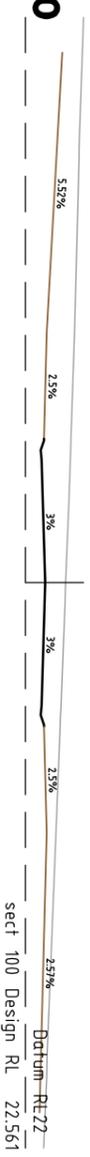
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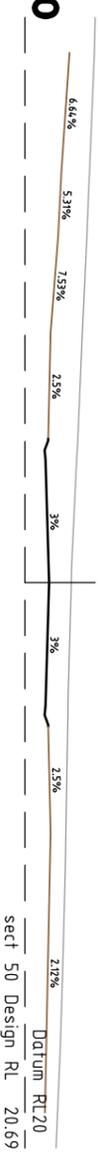
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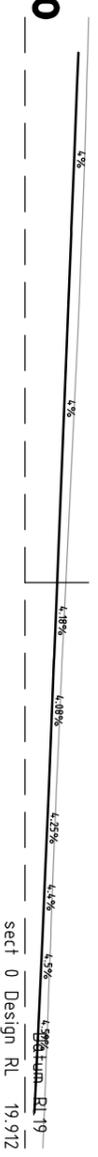
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Ch 50



Ch 0



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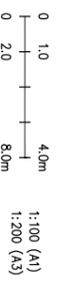
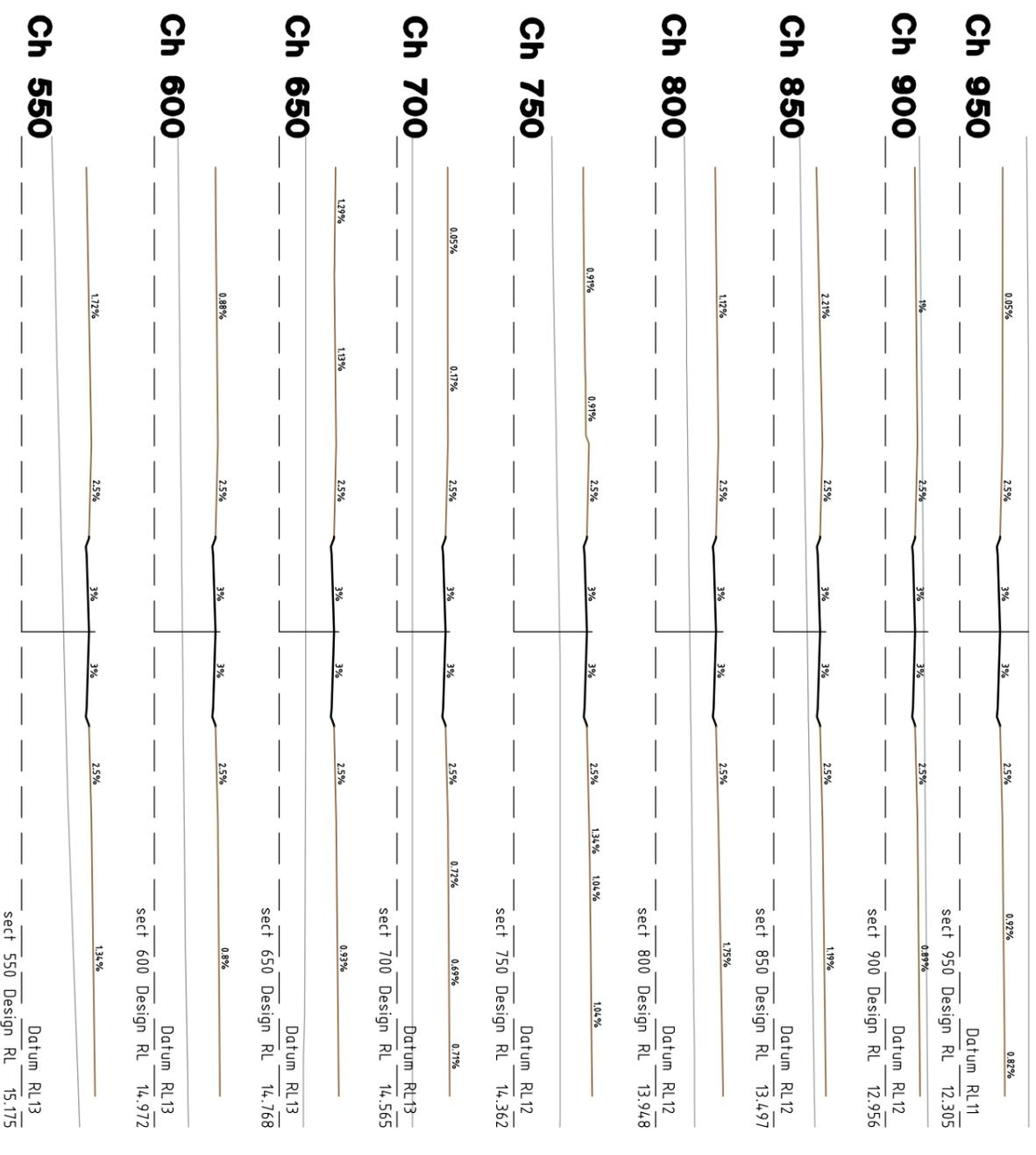
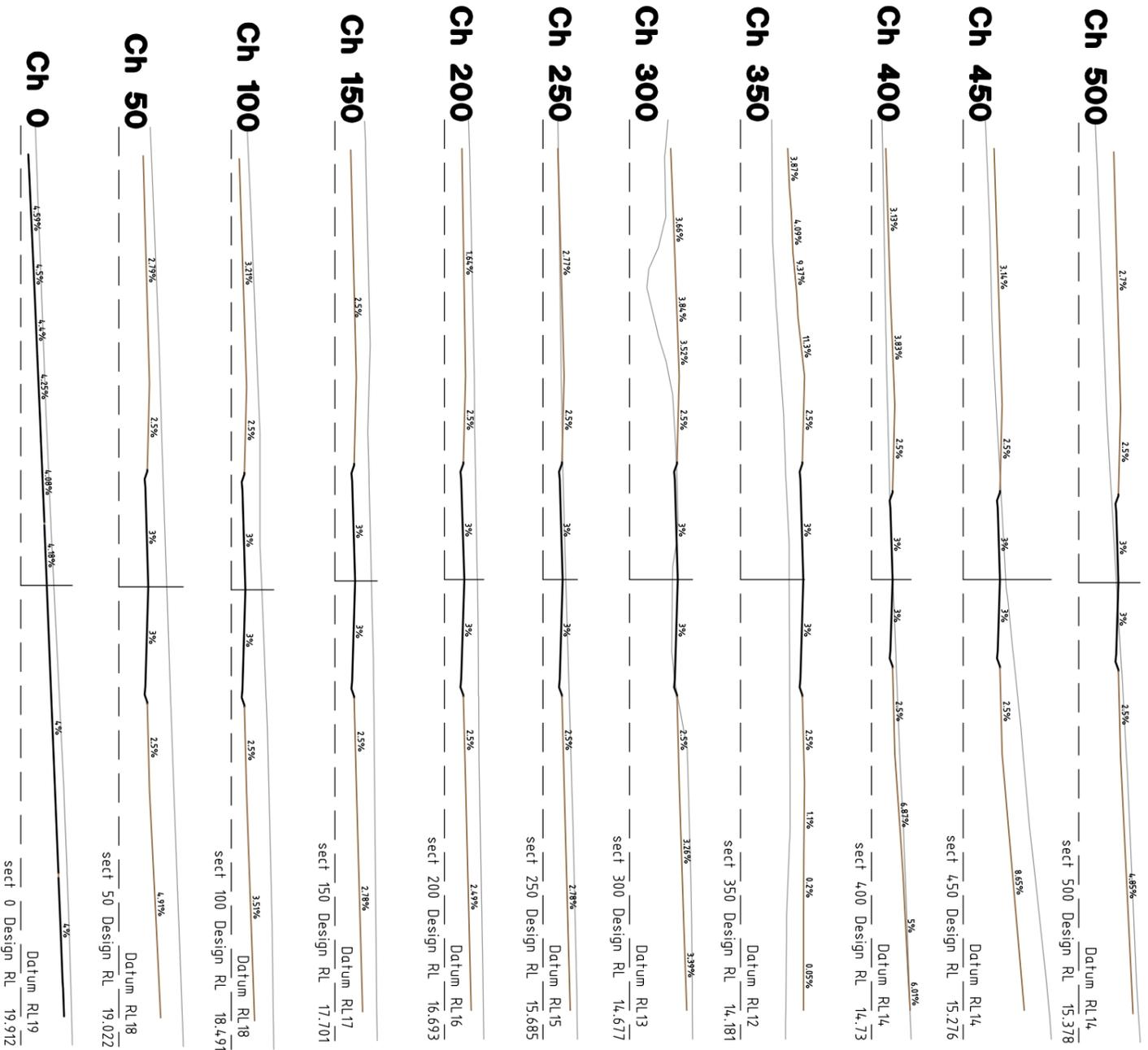
ROAD CROSS SECTION ROAD B
R12394 - ROAD CROSS SECTIONS 2

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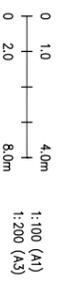
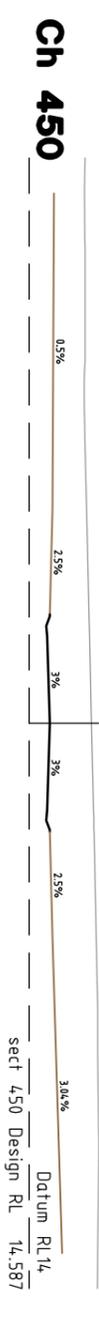
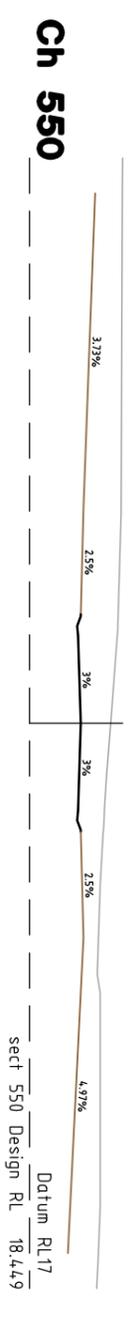
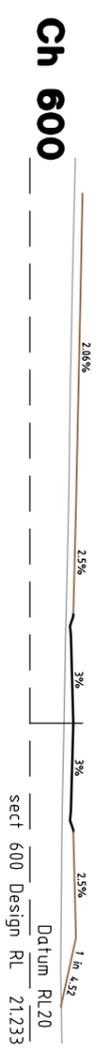
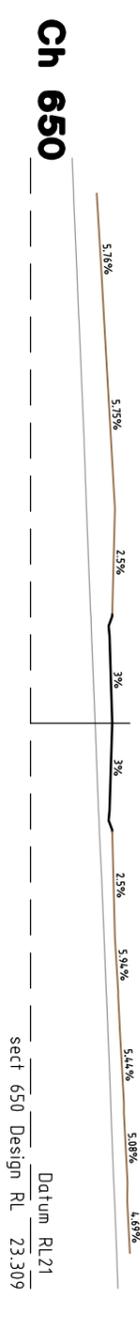
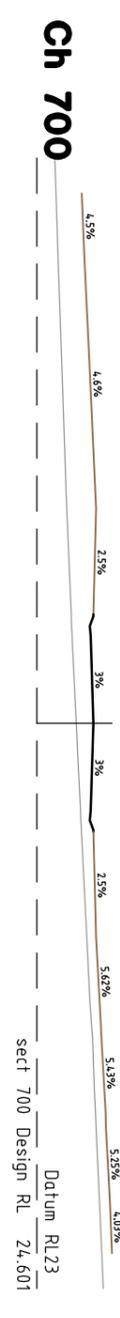
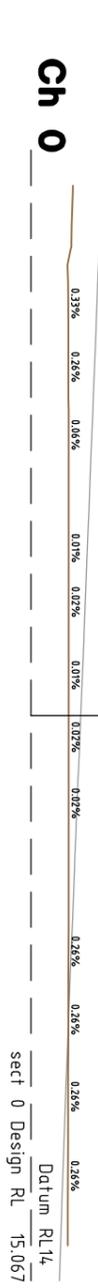
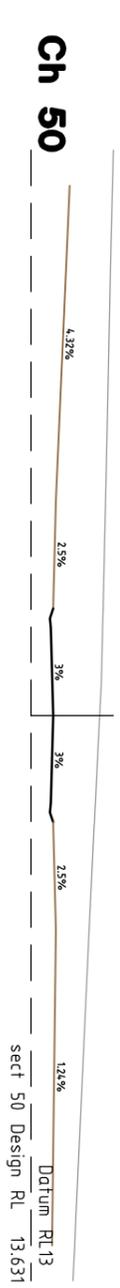
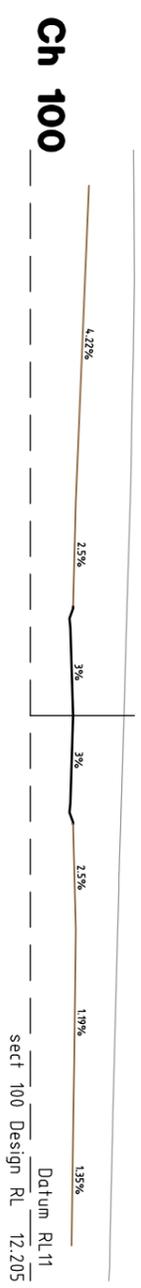
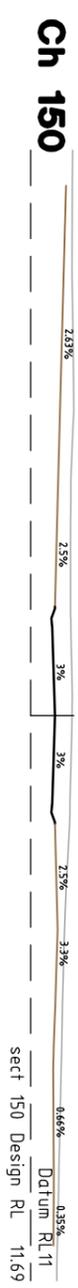
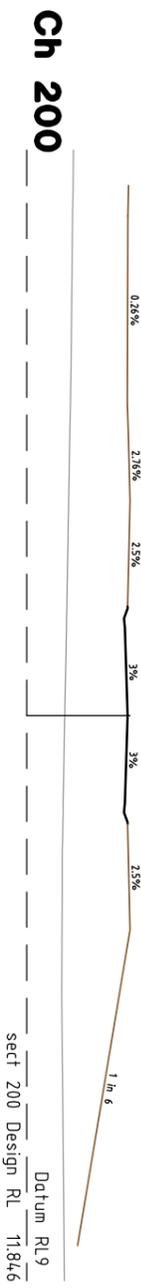
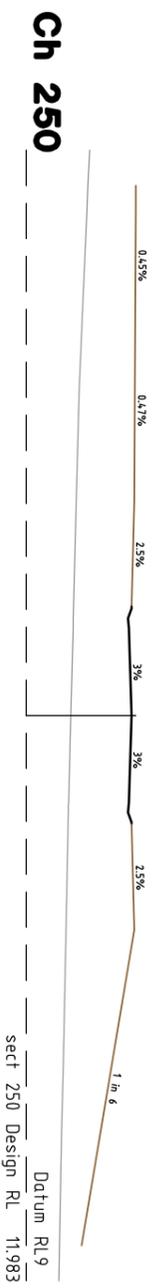
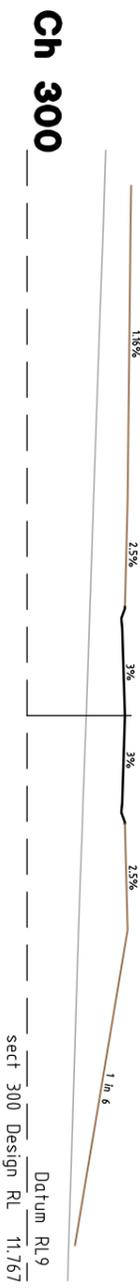
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RIVERSIDE ESTATE
ROAD CROSS SECTION ROAD C
R12394 - ROAD CROSS SECTIONS 3

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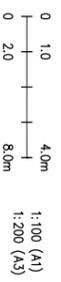
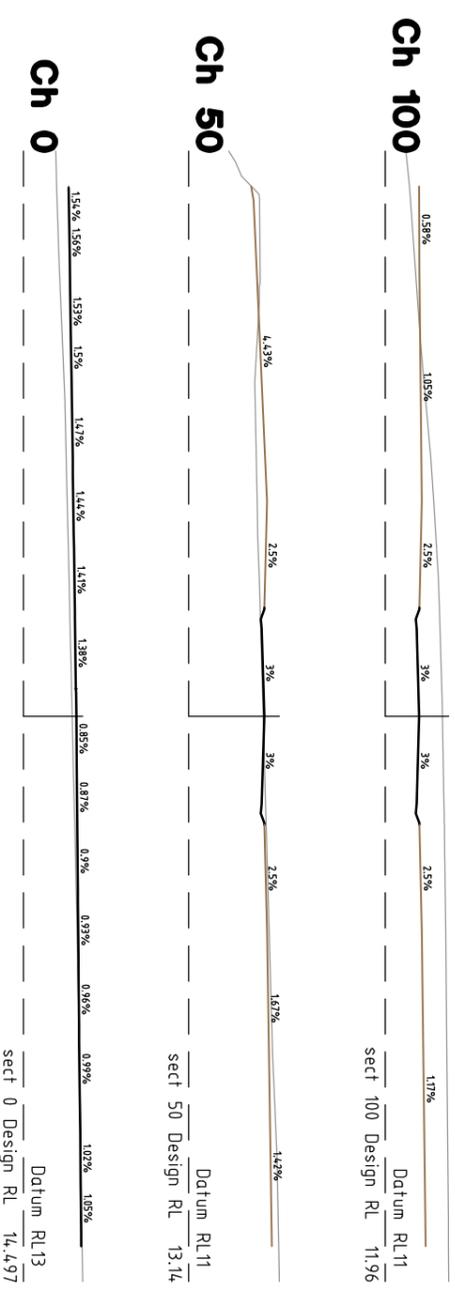
RIVERSIDE ESTATE
ROAD CROSS SECTION ROAD D
R12394 - ROAD CROSS SECTIONS 4

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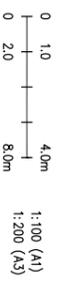


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ROAD CROSS SECTION ROAD E
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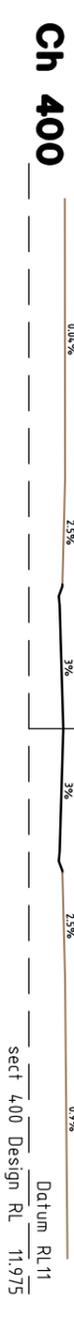
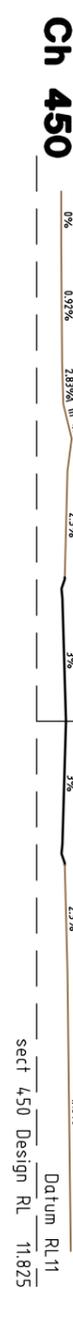
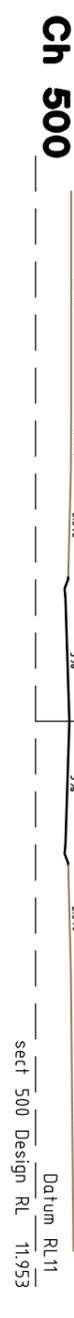
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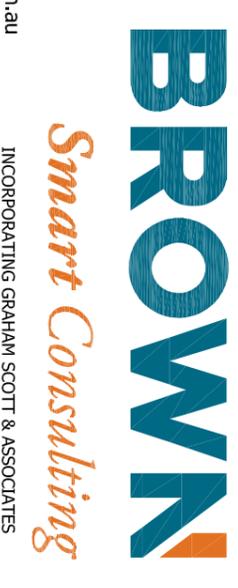


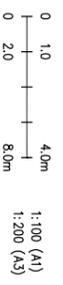
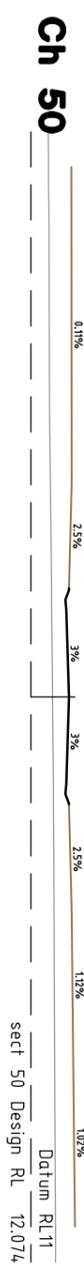


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ROAD CROSS SECTION ROAD G
R12394 - ROAD CROSS SECTIONS 7



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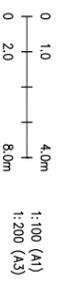
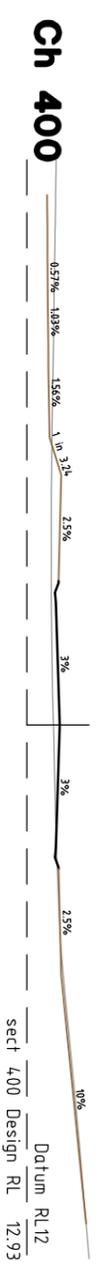
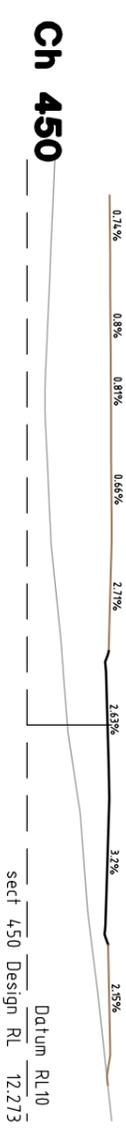
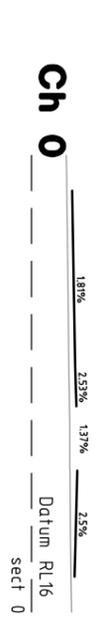
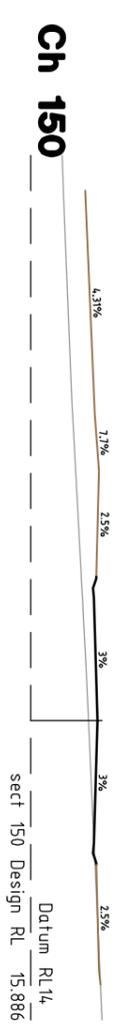
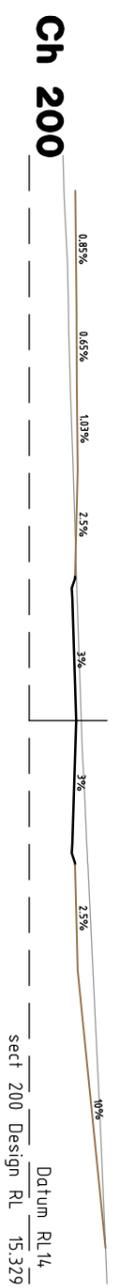
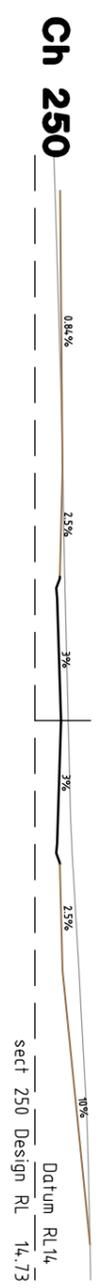
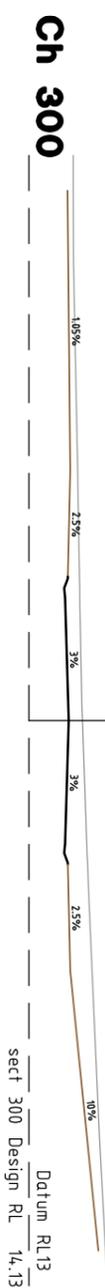
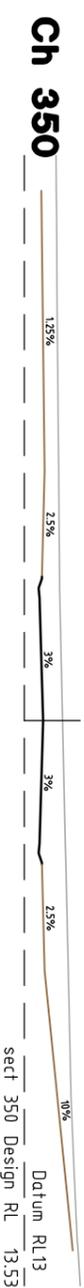


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Appendix H Proposed Electrical Plan

92
SP224420

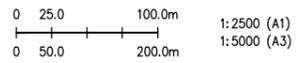
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SP252932



LEGEND

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

RIVERSIDE ESTATE
ELECTRICAL PLAN - SHEET 1 OF 2
R12394 - ELECTRICAL



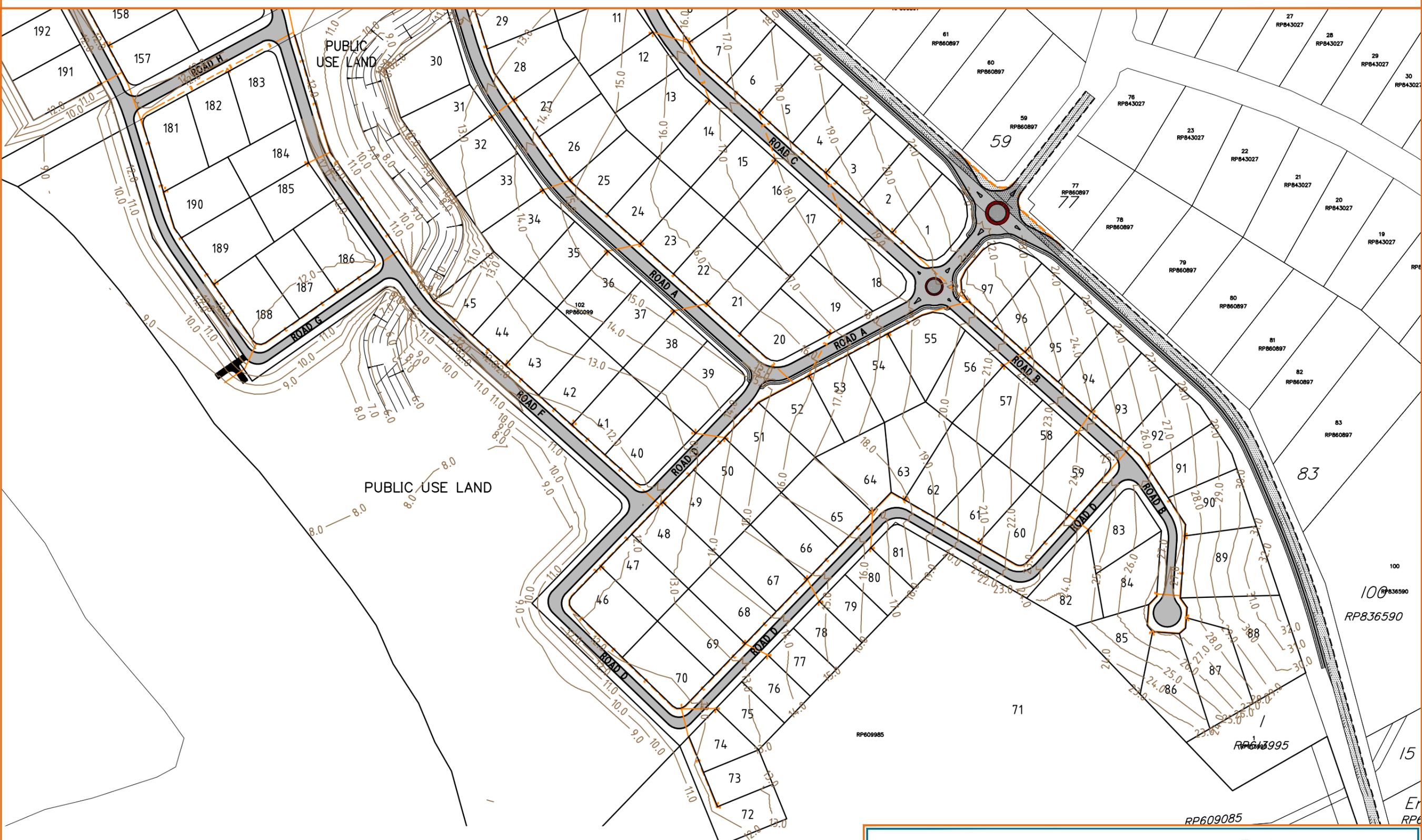
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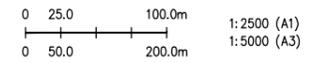
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LEGEND

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-  Finished Surface Contours

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



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