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CIVIL

Infrastructure Servicing Assessment

for

Proposed Land Lease Community, Anambah

for Thirdi Anambah Pty Ltd

NL222055-02 / 3 November 2025 / Revision B

Report Document Control

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A	Issued for Approval	15/12/2024	AK	LM
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Prepared:

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Reviewed:

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Principal | Senior Civil & Environmental Engineer

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Appendices

1. Introduction

Northrop Consulting Engineers has been engaged by Thirdi Anambah Pty Ltd to prepare an infrastructure servicing assessment to support a development application (DA) for a proposed Land Lease Community (LLC) at Anambah. This report provides an overview of the servicing requirements for sewer, water, electrical, and road access for the development site.

1.1 The Development

The proposed LLC is situated within Lot 177 DP874171, approximately 3.5km north of the New England Highway. The proponent seeks to release approximately 263 relocatable home sites along with associated community facilities across an ultimate development footprint of approximately 22.5 hectares.

The proposed development adjoins a proposed residential subdivision also to be developed by Thirdi, which forms part of the broader Anambah Urban Release Area (AURA). At time of writing, development applications for this development are currently before Maitland City Council (MCC) (DA/2024/763). It is understood that the proponent intends for the LLC to be serviced via lead in infrastructure consistent with the utility and road alignments proposed for the adjoining subdivision, but potentially constructed independently, dependent on timing. As such, consideration has been given to interim servicing arrangements where required. The location and extent of the LLC development and adjoining Thirdi residential subdivision are illustrated in Figure 1.

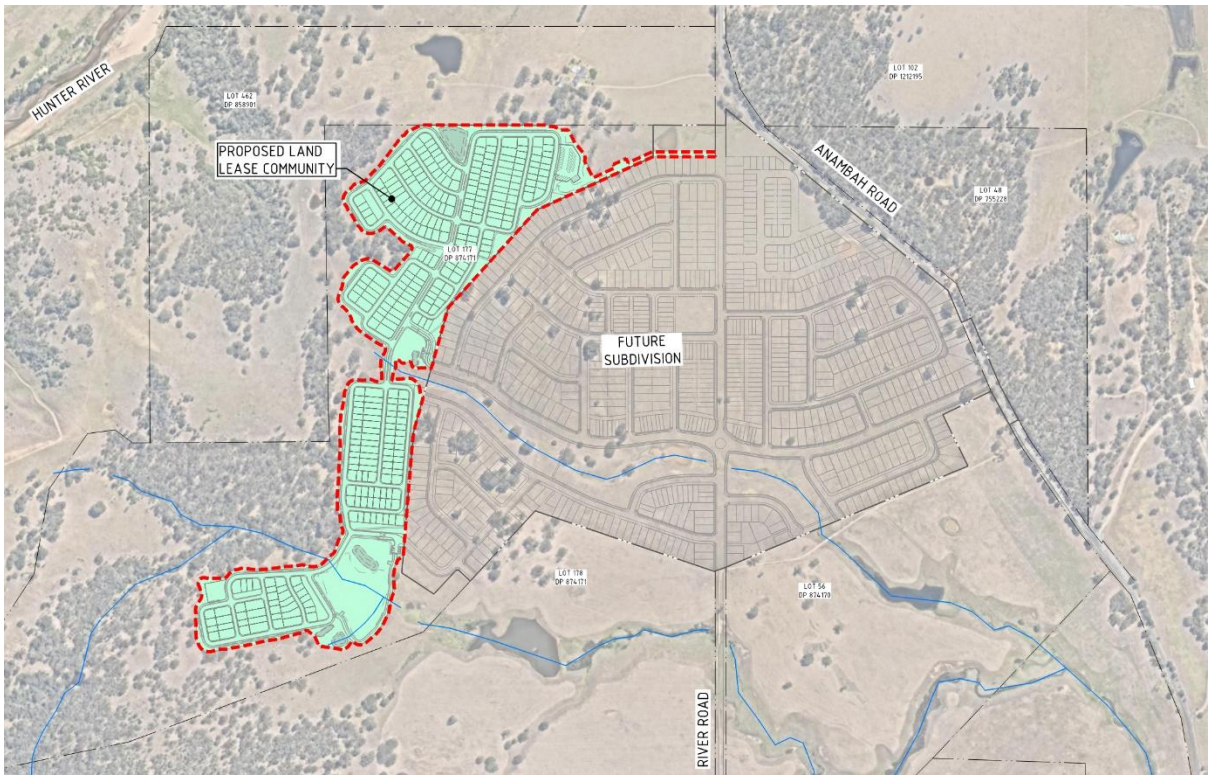


Figure 1 – Subject Site.

1.2 Site Description

The subject site is located within rural land west of Anambah Road. The natural landform slopes moderately at grades between 5 and 10%. The site is traversed by two watercourses at the southern end and through the centre of the site and a ridgeline dividing the northern portion of the development. Existing elevations range from RL65.0 at the western and south-western development boundary to

RL35.0 within the watercourses. Existing vegetation consists primarily of cleared pastureland with scattered vegetation with some remnant bushland along the western boundary.

2. Potable Water

2.1 Existing and Proposed Infrastructure

The development is currently remote from water infrastructure. The nearest supply infrastructure is located within the Wyndella Estate, approximately 2km to the south. The Wyndella Estate network is supplied from a booster water pump station (WPS), known as WPS Wyndella 1, located on River Road, which in turn is supplied from trunk watermains along the New England Highway.

A water servicing strategy has been prepared for the broader AURA (ADWJ, dated October 2023). Due to varying elevation within the AURA, two supply zones are ultimately proposed, a low-level zone (LLZ) supplying lots below RL41.0 and boosted high-level zone (HLZ) serving higher elevations. Due to asset age and provide adequate capacity for the AURA HLZ, the existing Windella 1 WPS is proposed to be replaced.

In its correspondence dated 22 May 2025 relating to DA/2024/763, Hunter Water Corporation confirmed that it "*will ensure water and wastewater assets are delivered to service staged development of the Third.i Anambah Pty Ltd site prior to issuing a Compliance Certificate under Section 50 of the Hunter Water Act 1991*" and raised no objection to Maitland City Council issuing development consent subject to the standard Section 50 Certificate condition. Correspondence from HWC is included in Appendix F.

Northrop have subsequently prepared a water servicing addendum to the original strategy addressing earlier staging of the Thirdi residential development and LLC. Copies of the water and wastewater addendums are provided in Appendix C.

The water strategy addendum proposes resequencing initial infrastructure delivery through provision of the following:

- Construction of dual DN375 trunk water mains along River Road as per the approved AURA strategy;
- Extension of DN250 and DN200 lead in mains approximately 2.3km along the River Road corridor, with interconnection for security of supply;
- Earlier construction of the booster WPS to service higher level lots within the Thirdi development. It is understood Stage 1 of the residential development will require servicing of lots above RL41.0 which will trigger construction of the booster.

2.2 Estimated Water Demand

Water demands for the proposed LLC development have been estimated in accordance with the Water Supply Code of Australia (WSA03) Hunter Water Edition. For this assessment, individual relocatable home sites were assumed to have an annual demand consistent with residential flats/units. Calculated design water demands are summarised in Table 1.

Table 1 – Design Water Demands.

Demand Category	Per site, average day demand assumed equivalent to residential flats/units
Average Annual Demand Rate	130 kL/year/site
Sites	263
Peak Hour on Average Day Demand*	2.31 L/s

Peak Hour on Peak Day Demand*	7.92 L/s
Peak Hour on Extreme Day Demand*	9.08 L/s
95th Percentile Peak Hour Demand*	6.37 L/s
Firefighting Allowance	Excluded – fire flows are assumed to be managed on site.

* Includes allowance for unaccounted water equivalent to 15% of average day demand.

2.3 Proposed Servicing

The LLC will incorporate a private reticulation and fire hydrant network internally, with a single metered point of connection to reticulation network. The nature of this connection will be dependent on timing of the adjoining Thirdi subdivision development. In the most likely case, the LLC would connected to the River Road lead in supply mains constructed under Stage 1 of the residential subdivision.

In the event the LLC proceeds prior to the residential development and associated trunk infrastructure, a separate lead in watermain would need to be extended along River Road, connecting to the existing DN150 water main at the River Road culdesac. Noting the length of main required and potential difficulties managing water age a reduced-size main utilised for potable water only. Onsite tanks would then be utilised for firefighting and would be required until a dedicated fire connection to the subdivision supply network can be made.

Based on the concept earthworks design for the development, the lowest relocatable home site is situated at approximately RL44.0 and the highest at RL64.0. All relocatable home sites are therefore above the RL41.0 threshold and will require boosting to meet HWC's minimum servicing pressures. In the event the upgraded Wyndella 1 booster pump station has not been completed, onsite pressure boosting measures such as break tanks will be required. Alternatively, if the HLZ supply main has been completed, the LLC can be supplied directly from that main. Final sizing of lead in watermains will be undertaken as part of the detailed design. Hunter Water's minimum pressure requirements are summarised in Table 2. The proposed water servicing arrangement is illustrated in Appendix A, Exhibit 1.

Table 2 – HWC water servicing pressure requirements.

Parameter	Pressure (m)
Maximum pressure all applications.	60
Minimum Pressure for a peak hour flow on a peak day.	20
Minimum Pressure for a peak hour flow on an extreme day.	12
Minimum Pressure for a peak hour flow on an 95th percentile peak day plus fire-fighting flow (at location of fire flow).	15
Minimum Pressure for a peak hour flow on an 95th percentile peak day plus fire-fighting flow (other than location of fire flow).	3

3. Wastewater

3.1 Existing and Proposed Infrastructure

The development site is currently remote from sewer services.

A wastewater servicing strategy has been prepared for the broader AURA (ADWJ, dated 11/01/2024). Ultimately, the AURA will be serviced via a network of 5 wastewater pump stations pumping to a

barometric loop and gravity main near the intersection of Anambah Road and Cagney Road, Rutherford. Completion of these works are dependent on significant development occurring within the adjoining land to the south and as such, an interim servicing arrangement has been developed for the Thirdi-owned portion of the AURA.

The interim arrangement involves construction of two of the five wastewater pump stations within the Thirdi site. In the absence of a downstream wastewater network, the downstream pump station will pump along River Road via a temporary rising main, discharging to existing trunk gravity sewer mains near the intersection of River Road and the New England Highway.

Northrop have subsequently prepared a wastewater servicing addendum to the original strategy addressing earlier staging of the Thirdi residential development and LLC. Copies of the water and wastewater addendums are provided in Appendix C.

3.2 Estimated Sewer Loading

Due to topography, the proposed LLC will be split into 4 wastewater sub-catchments, delineated in Appendix A, Exhibit 2. All sub-catchments are proposed to discharge to a single point of connection to the subdivision sewer network.

Sewer loadings for the combined development have been estimated in accordance with the Gravity Sewerage Code of Australia Hunter Water Edition (WSA02). The primary parameters used to estimate sewer flows are as follows:

- Equivalent tenements (ET) = 0.67 ET/relocatable home site
- Average dry weather flow (ADWF) = 0.011 L/s/ET
- Storm allowance (SA) = 0.029 L/s/relocatable home site

Estimated sewer loadings are summarised in Table 3.

Table 3 – Estimated Sewer Loading.

Total Sites	ET	ADWF	Peaking Ratio 'r'	PDWF	Storm Allowance	PWWF
263	176	1.9 L/s	2.97	5.8 L/s	7.6 L/s	13.4 L/s

3.3 Proposed Sewer Servicing

Lead-in gravity sewer mains to the development will extend from the proposed WWPS to a point of connection along the east-west entry road.

Individual relocatable home sites will be serviced via a private sanitary sewer network. Sub-catchments 2, 3 and 4 will drain to private pump stations pumping to a single point of connection to the subdivision gravity sewer network, whereas sub-catchment 1 will drain directly via gravity. Proposed sewer servicing is illustrated in Appendix A, Exhibit 2.

4. Electricity

A preliminary review of electrical infrastructure for the broader subdivision and LLC is included in Appendix B with summary provided below.

Gosforth and Anambah are currently serviced by the Rutherford Zone Substation. There are two 11kV feeders from this substation that approach the subject site. Feeder 29878 extends along the New England Highway, via Lochinvar and then along Windermere Road. From there the feeder crosses the Hunter River in two locations, before looping back around and following Anambah Road,

terminating just south of the Thirdi subdivision site. Preliminary advice from Ausgrid has indicated this feeder has no spare capacity and is unable to facilitate new connections. In addition, the section of high voltage feeders bordering the site is only in 2-phase configuration and will require approximately 1km of new 11kV conductors to provide a 3-phase supply.

A second feeder, 29876 extends north along Anambah Road from the New England Highway, terminating just north of Anambah House. The two ends are connected by overhead power without high voltage lines.

For a new development with underground reticulation, Ausgrid will require an 11kV interconnection so that customer supply can be maintained during feeder maintenance and unplanned outages, known as N-1 contingency. There is a risk that if a supply is sought from feeder 29876, Ausgrid may not consider feeder 29878 as a suitable N-1 interconnection due to the limited capacity and may request a new feeder be installed from the Rutherford zone substation. The approximate length of this feeder would be approximately 7km.

Preliminary discussions with Ausgrid have also highlighted the Rutherford Zone substation is approaching full capacity, necessitating future augmentation with an additional substation somewhere between Rutherford and Branxton. The timing for this substation is unknown, however design and planning may take up to 10 years.

In the event there is insufficient capacity within either feeder and/or the zone substation, more extensive upgrades will be required, which are outlined further in Appendix B. A further enquiry with Ausgrid is strongly recommended to determine up to date capacity to cater for the development. It should be noted that capacity is allocated on a “first come first served” basis and other developments have the potential to use up spare capacity.

5. Road Access

5.1 Lead-in Roads

Primary vehicular access for the LLC will be via dedicated public roads extending from a new intersection on Anambah Road. The access roads are intended to align with the subdivision roads proposed under DA/2024/763. Secondary access to the LLC will be provided by River Road, discussed in further detail below.

Plans and longitudinal sections of the proposed lead in roads are provided in Appendix A Exhibit 3 with a brief summary provided in Table 4.

Table 4 – Lead in road infrastructure summary.

Road	Road Description	Proposed Tenure
Main entry road between Anambah Road and 3 x LLC entry points.	Minimum 10 metre-wide sealed carriageway, kerb and gutter	Public
River Road flood access road	6 metre-wide sealed carriageway	Public with controlled access
Access track from River Road to HWC wastewater pump station	Minimum 4 metre-wide all-weather access track	Private

The proposed internal road network has been designed generally in accordance with

- Austroads Guide to Road Design (AGRD).
- Maitland City Council Manual of Engineering Standards Part 4 – Road Design
- Austroads Design Vehicles and Turning Path Templates Guide.

Carriageway and lane widths have generally been adopted in accordance with Council's DCP on the basis on expected design traffic and intended bus routes consistent with the residential DA/2024/763.

5.2 Anambah Road

Consistent with the proposal for DA/2024/763, intersection upgrade works are proposed to facilitate the connection of the entry road with Anambah Road and will be constructed concurrently with Stage 1 of the development.

The design of the intersection has been undertaken based on a 80 km/h signposted speed limit, reduced from the existing 100 km/h signposted speed limit, resulting in a design speed of 90 km/h. It is noted this reduction in speed limit has been discussed with TfNSW who, in correspondence dated 30th April 2025, have advised in-principal support to this reduction.

The proposed intersection configuration is as follows:

- Basic left turn BAL treatment for north-bound, left turning traffic.
- Short lane channelised right turn CHR(S) treatment for south-bound, right turning vehicles.

A concept arrangement of the proposed intersection is shown in Figure 2.

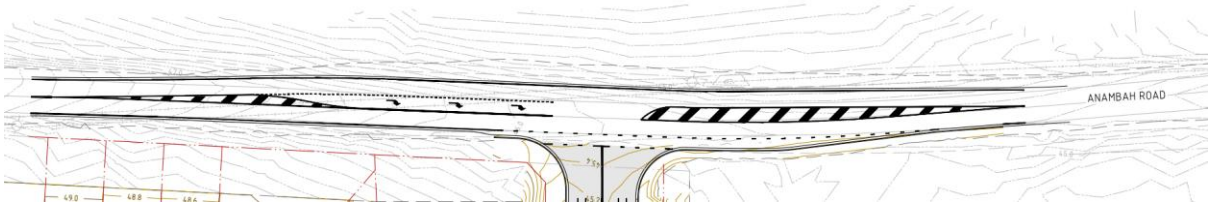


Figure 2 – Concept Anambah Road intersection treatments.

An existing case Road Safety Audit has been completed for Anambah Road (PDC Consultants, 12/09/2025). This report has informed a proposed targeted works program of safety improvements to be delivered as part of a Voluntary Planning Agreement for the residential development (DA/2024/763). A plan showing proposed RSA mitigation measures is provided in Appendix D (GSE, 10/10/2025).

5.3 River Road

Anambah Road is subject to flood inundation between the 39% AEP (2-year ARI) AND 18% AEP (5-year ARI). Based on the Lochinvar Flood Study (WMA Water 2019), elevating Anambah Road above the 5% AEP Hunter River flood level significant fill (~6.0m) in multiple locations between the proposed intersection and the New England Highway.

As an alternative, controlled flood access is proposed be provided via the River Road corridor, consistent with the proposal for the residential subdivision (DA/2024/763). Prior to the release of Stage 1 of either the residential of LLC development, River Road would be formalised to function both as a secondary access to the development during flood events and to accommodate lead in utilities. The proposed access road will extend from the current end of River Road within the Windella Estate to the limit of permanent road works within Stage 1.

An Emergency Access Traffic Management Strategy has been prepared for the LLC by SCT Consulting (03/11/2025) to assess flood emergency to assess safe and appropriate flood access in the event of Anambah Road inundation. Under normal circumstances, it is intended that public access to the River Road access will be controlled via a gated entry. When there is a flood emergency, the access gate will be opened and utilised for vehicular access for the duration of the flood emergency. The proposed flood entry point is shown indicatively in Figure 3. Previous engagement with SES regarding River Road undertaken as part of DA/2024/763 is included in Appendix E.

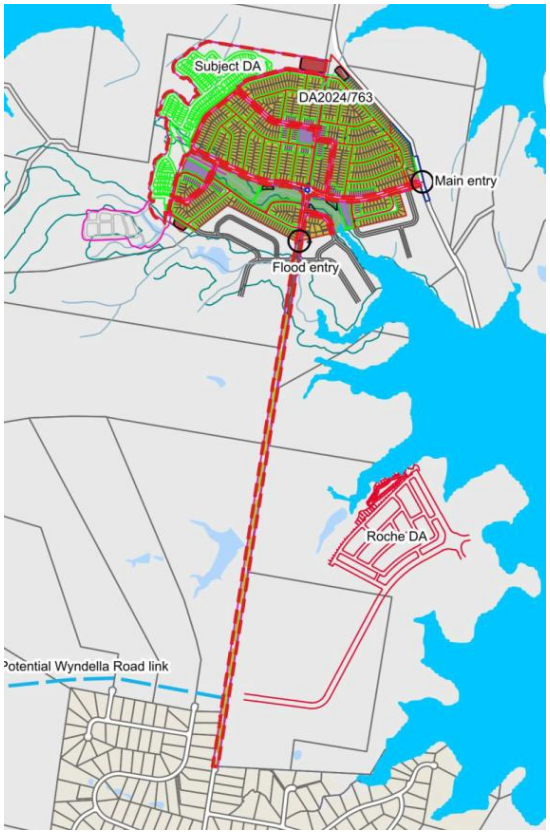


Figure 3 – Proposed River Road flood entry (SCT Consulting, 03/11/2025).

In addition to providing a secondary vehicular access route to/from the subdivision, the road will contain lead in water and wastewater infrastructure. A conceptual design for River Road including longitudinal sections and typical cross sections has been included in Appendix A.

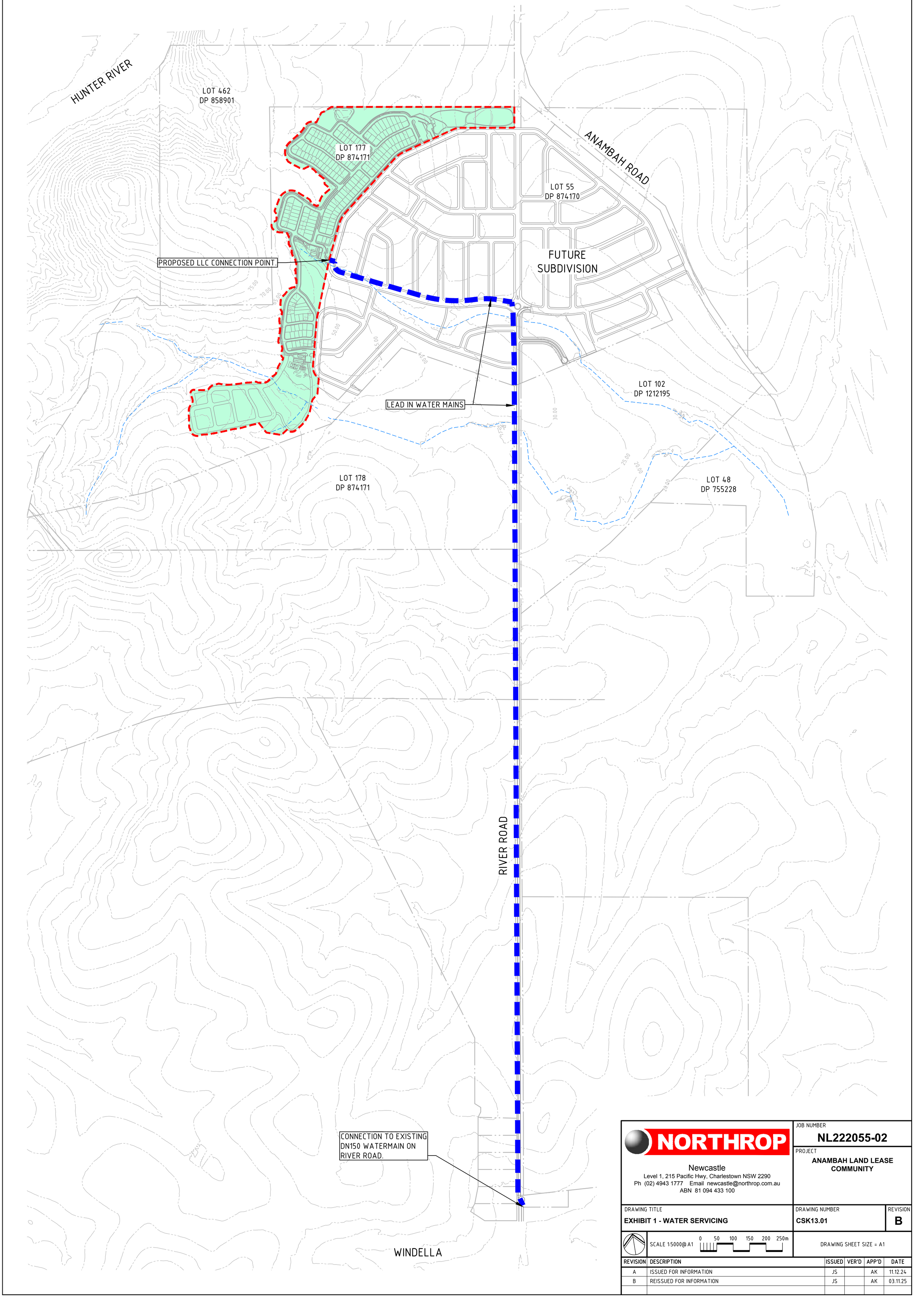
5.4 Access Tracks

An all-weather access track is proposed to serve as an access road from River Road to the HWC wastewater pump station and along the easement for water and wastewater infrastructure. As above, these accesses are intended to be constructed on a consistent horizontal and vertical alignment to the future subdivision roads and will be progressively reconstructed to a public road standard as the residential subdivision is developed. Water and wastewater infrastructure would be located to be compatible with the future road alignment

6. Conclusion

A preliminary assessment of water, sewer, electricity and road access has been undertaken to support a development application for a proposed land lease community at Anambah. It is considered there is sufficient ability to deliver infrastructure to the development either prior to or in conjunction with the adjoining residential development. Detailed assessment of infrastructure capacity to cater for the LLC will be required post-DA to determine the final extent of lead in works.

Appendix A – Exhibits



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JOB NUMBER
NL222055-02

PROJECT
ANAMBAH LAND LEASE COMMUNITY

DRAWING TITLE
EXHIBIT 1 - WATER SERVICING

DRAWING NUMBER
CSK13.01

REVISION
B

SCALE 1:5000@A1 0 50 100 150 200 250m

DRAWING SHEET SIZE = A1

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B	REISSUED FOR INFORMATION	JS		AK	03.11.25

LEGEND

- PROPOSED BOUNDARY LINE
- EXISTING BOUNDARY LINE
- PROPOSED SEWER CATCHMENT BOUNDARY
- RM — PROPOSED PRIVATE SEWER RISING MAIN
- PROPOSED PRIVATE GRAVITY SEWER MAIN
- PROPOSED PRIVATE SEWER PUMP STATION
- RM — PROPOSED HWC SEWER RISING MAIN
- PROPOSED HWC GRAVITY SEWER MAIN
- PROPOSED HWC SEWER PUMP STATION
- XX.XX — EXISTING CONTOURS (1m INTERVALS)

SEWER CATCHMENT 2
10.85 ha
153 LOTS

PROPOSED PRIVATE PUMP STATION.

ANAMBAH ROAD

LOT 55
DP 874170

LOT 462
DP 858901

SEWER CATCHMENT 1
1.55 ha
35 LOTS

PRIVATE GRAVITY SEWER MAIN.

PROPOSED LLC SEWER CONNECTION.

HWC GRAVITY SEWER MAIN WITHIN EASEMENT.

LOT 177
DP 874171

SEWER CATCHMENT 3
1.55 ha
33 LOTS

PROPOSED PRIVATE PUMP STATION.

LOT 102
DP 1212195

PROPOSED HWC WWPS.

SEWER CATCHMENT 4
5.07 ha
(FUTURE STAGE)

RIVER ROAD

LOT 178
DP 874171

PROPOSED HWC SEWER RISING MAIN VIA RIVER ROAD.

PROPOSED PRIVATE PUMP STATION.

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JOB NUMBER: NL222055-02

PROJECT: ANAMBAH LAND LEASE COMMUNITY

DRAWING TITLE: EXHIBIT 2 - SEWER SERVICING

DRAWING NUMBER: CSK13.02

REVISION: B

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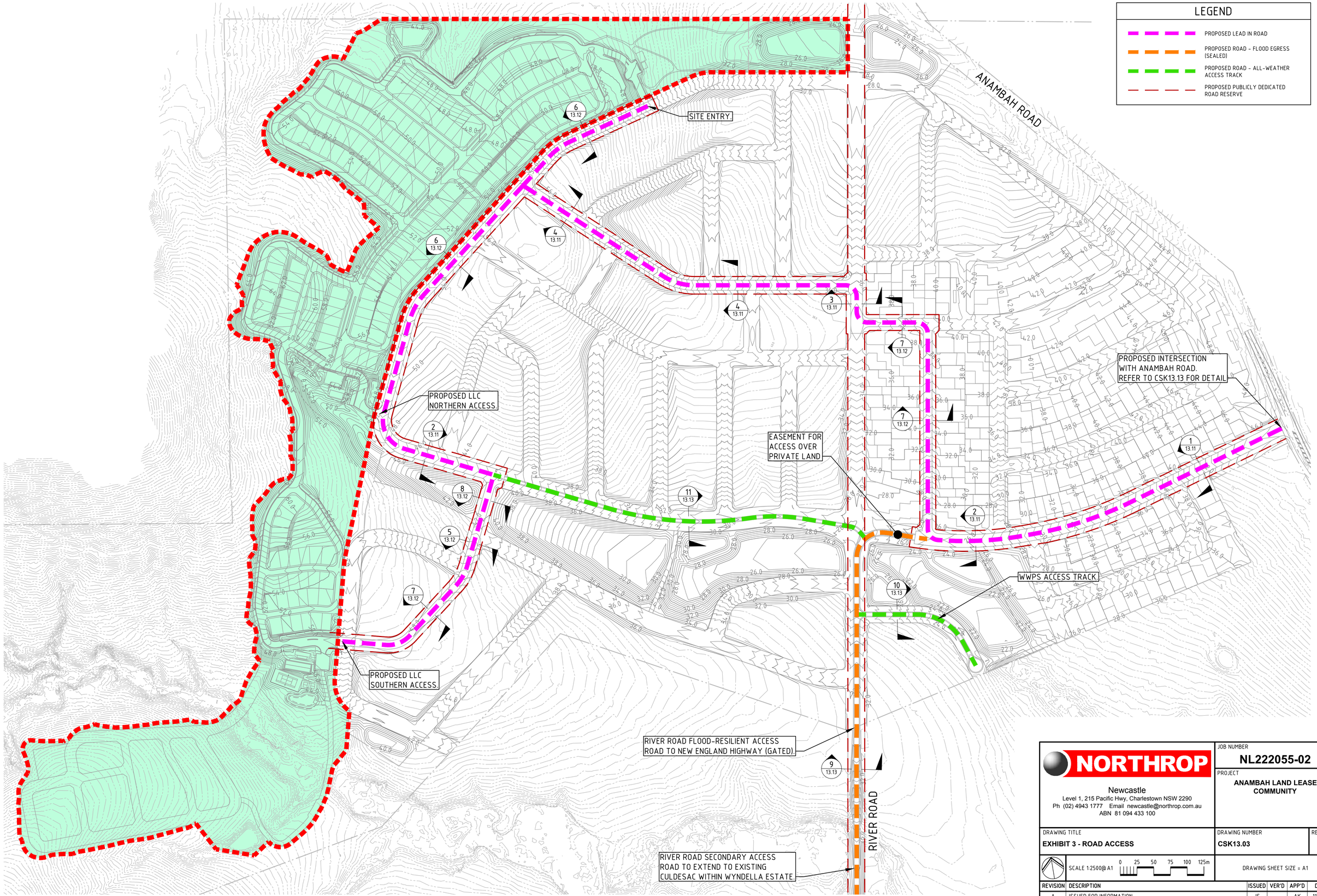
B	REISSUED FOR INFORMATION	JS		AK	03.11.25



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JOB NUMBER **NL222055-02**

PROJECT **ANAMBAH LAND LEASE COMMUNITY**

DRAWING TITLE **EXHIBIT 3 - ROAD ACCESS**

DRAWING NUMBER **CSK13.03**

REVISION **B**

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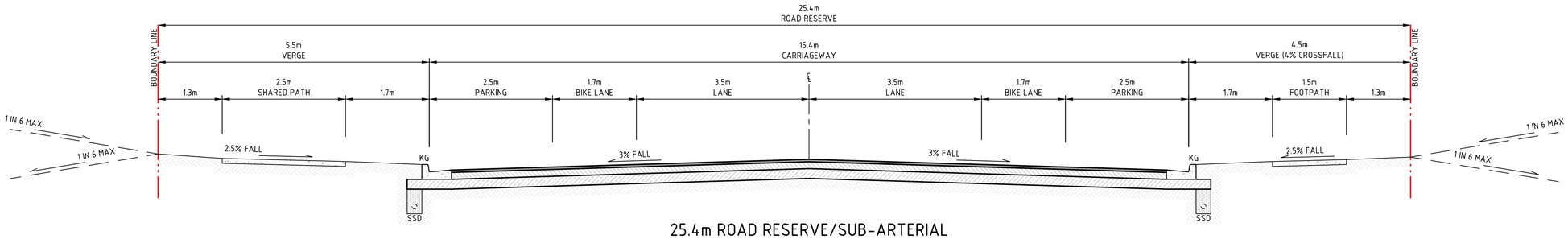
B	REISSUED FOR INFORMATION	JS		AK	03.11.25



25.4m ROAD RESERVE/SUB-ARTERIAL

SECTION 1 / C05.01

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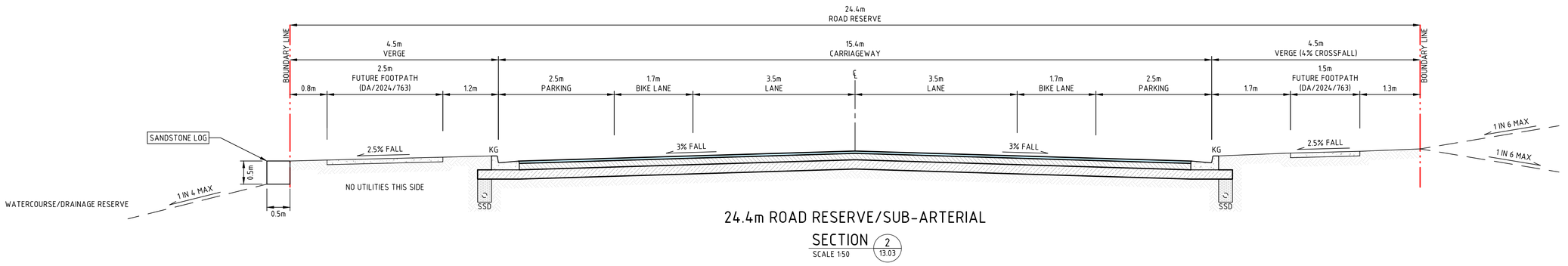

24.4m ROAD RESERVE/SUB-ARTERIAL

SECTION 2 / 13.03

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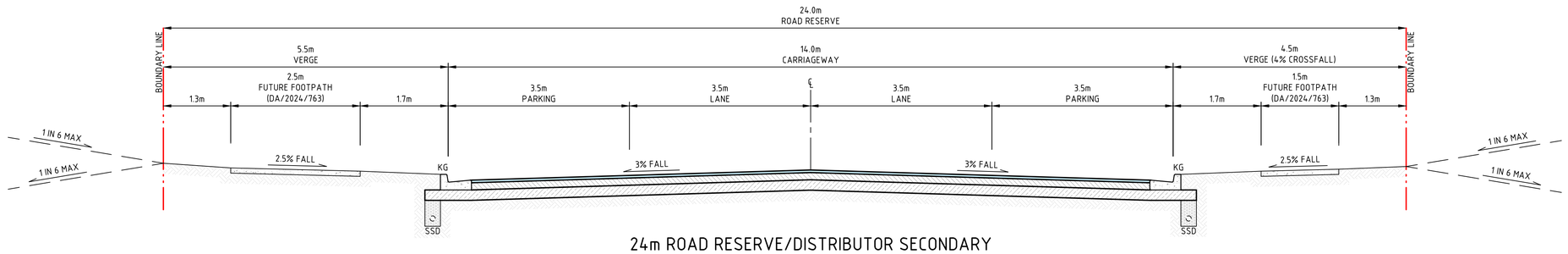

24m ROAD RESERVE/DISTRIBUTOR SECONDARY

SECTION 3 / 13.03

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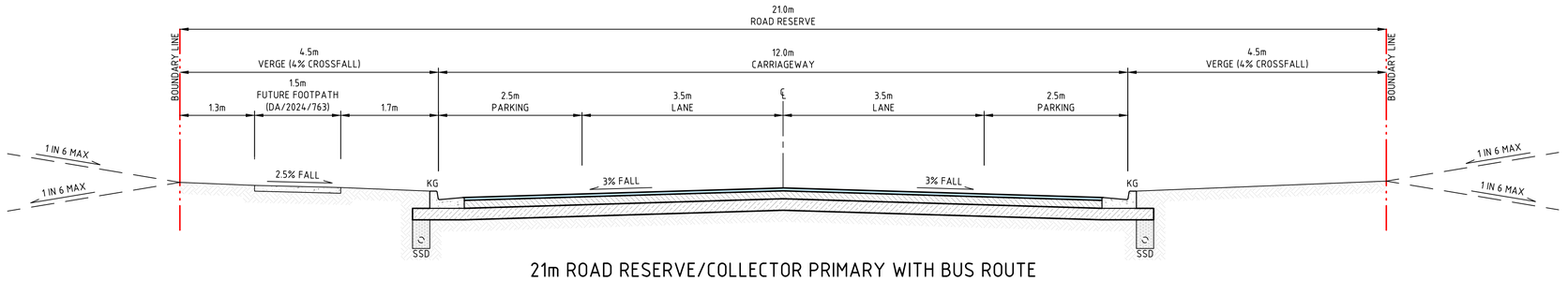

21m ROAD RESERVE/COLLECTOR PRIMARY WITH BUS ROUTE

SECTION 4 / 13.03

SCALE 1:50

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JOB NUMBER **NL222055-02**

PROJECT **ANAMBAH LAND LEASE COMMUNITY**

DRAWING TITLE **EXHIBIT 3(a) - ROAD ACCESS - TYPICAL ROAD CROSS-SECTIONS**

DRAWING NUMBER **CSK13.11**

REVISION **C**

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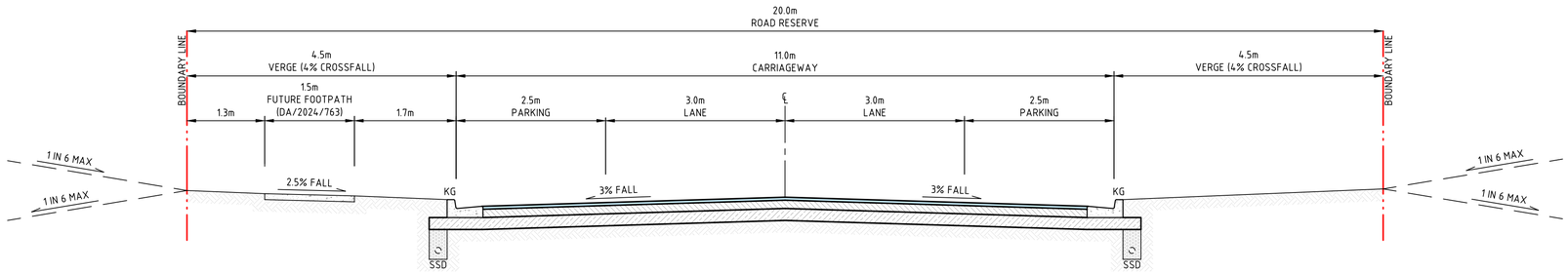

20m ROAD RESERVE/COLLECTOR PRIMARY WITHOUT BUS ROUTE

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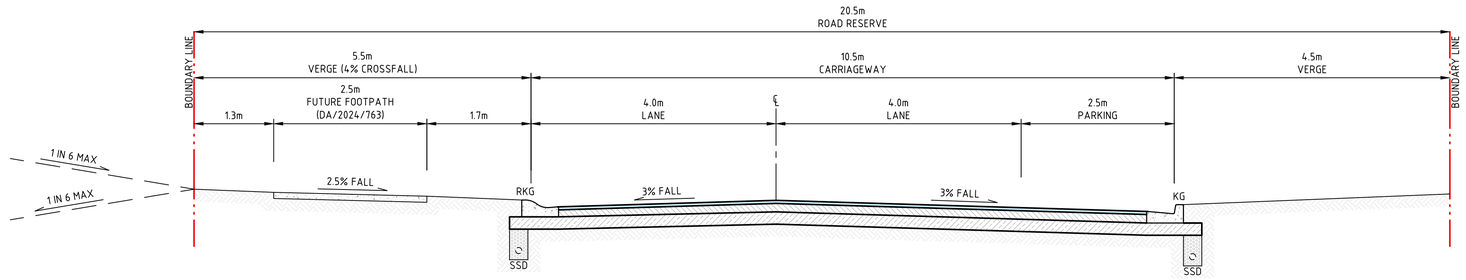

20.5m ROAD RESERVE - PERIMETER ROAD

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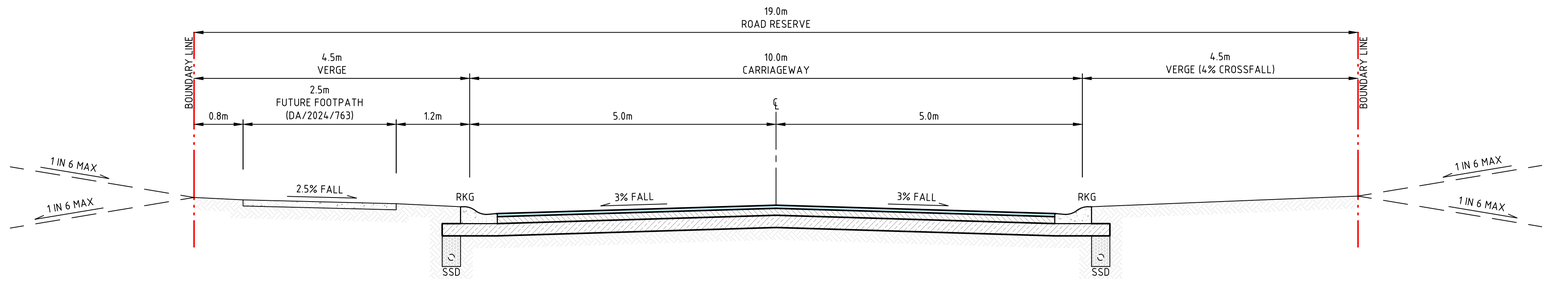

19m ROAD RESERVE

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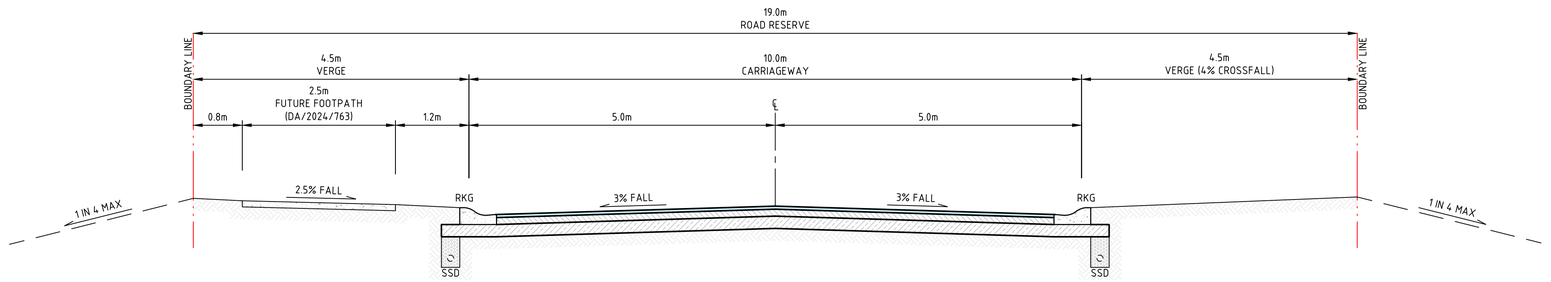

19m ROAD RESERVE - CREEK CROSSING

SECTION 8
SCALE 1:50 13.03

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PROJECT
ANAMBAH LAND LEASE COMMUNITY

DRAWING TITLE
EXHIBIT 3(b) - ROAD ACCESS - TYPICAL ROAD CROSS-SECTIONS

DRAWING NUMBER
CSK13.12

REVISION
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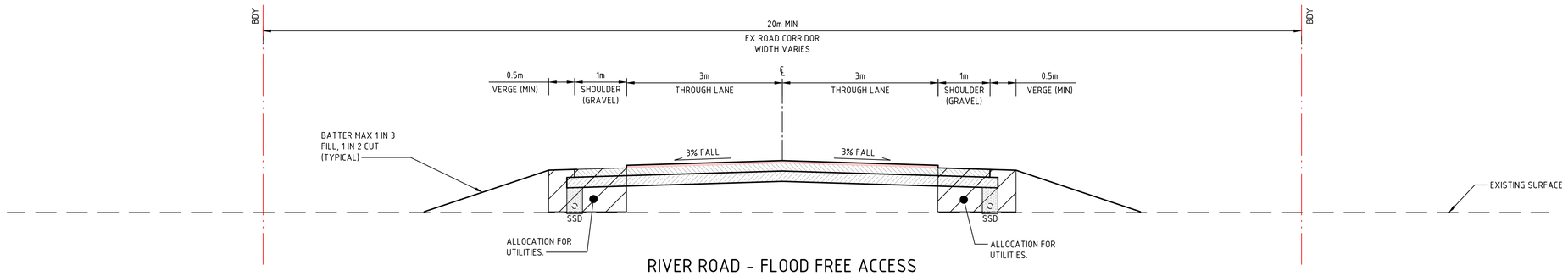
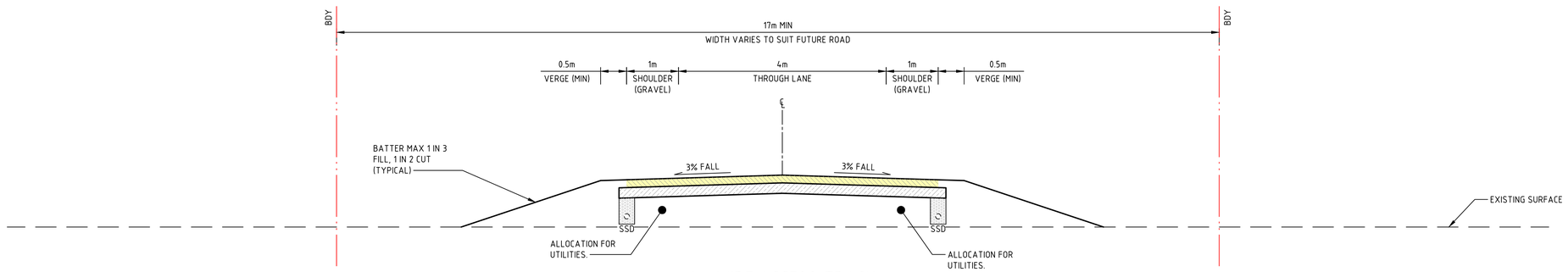


RIVER ROAD - FLOOD FREE ACCESS

SECTION 9 / 13.03

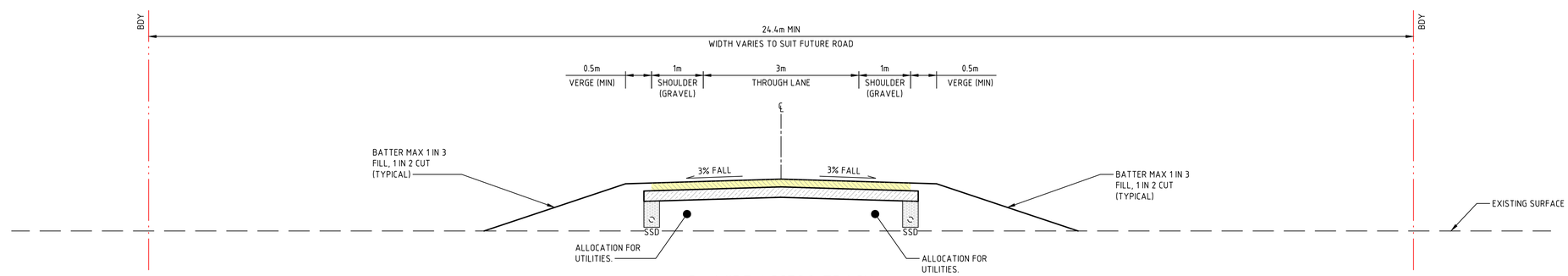
SCALE 1:50



4m WIDE ACCESS TRACK

SECTION 10 / 13.03

SCALE 1:50



3m WIDE ACCESS TRACK

SECTION 11 / 13.03

SCALE 1:50

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JOB NUMBER **NL222055-02**

PROJECT **ANAMBAH LAND LEASE COMMUNITY**

DRAWING TITLE **EXHIBIT 3(c) - ROAD ACCESS - TYPICAL ROAD CROSS-SECTIONS**

DRAWING NUMBER **CSK13.13**

REVISION **A**

SCALE 1:2500@ A1 0 25 50 75 100 125m

DRAWING SHEET SIZE = A1

REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE
A	ISSUED FOR INFORMATION	JS		AK	03.11.25

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JOB NUMBER
NL222055-02

PROJECT
ANAMBAH LAND LEASE COMMUNITY

DRAWING TITLE
EXHIBIT 3(d) - ROAD SETOUT PLAN

DRAWING NUMBER
CSK13.21

REVISION
B

SCALE 1:1000 @ A1 0 10 20 30 40 50m

DRAWING SHEET SIZE = A1

REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE
A	ISSUED FOR INFORMATION	JS		AK	11.12.24
B	REISSUED FOR INFORMATION	JS		AK	03.11.25

LEND LEASE COMMUNITY

MC03

MC01

BATTER INTERFACE TO EXISTING (TYPICAL).

ROAD CONNECTION TO INTERNAL LLC ROAD NETWORK.

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JOB NUMBER
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PROJECT
ANAMBAH LAND LEASE COMMUNITY

DRAWING TITLE
EXHIBIT 3(e) - ROAD SETOUT PLAN

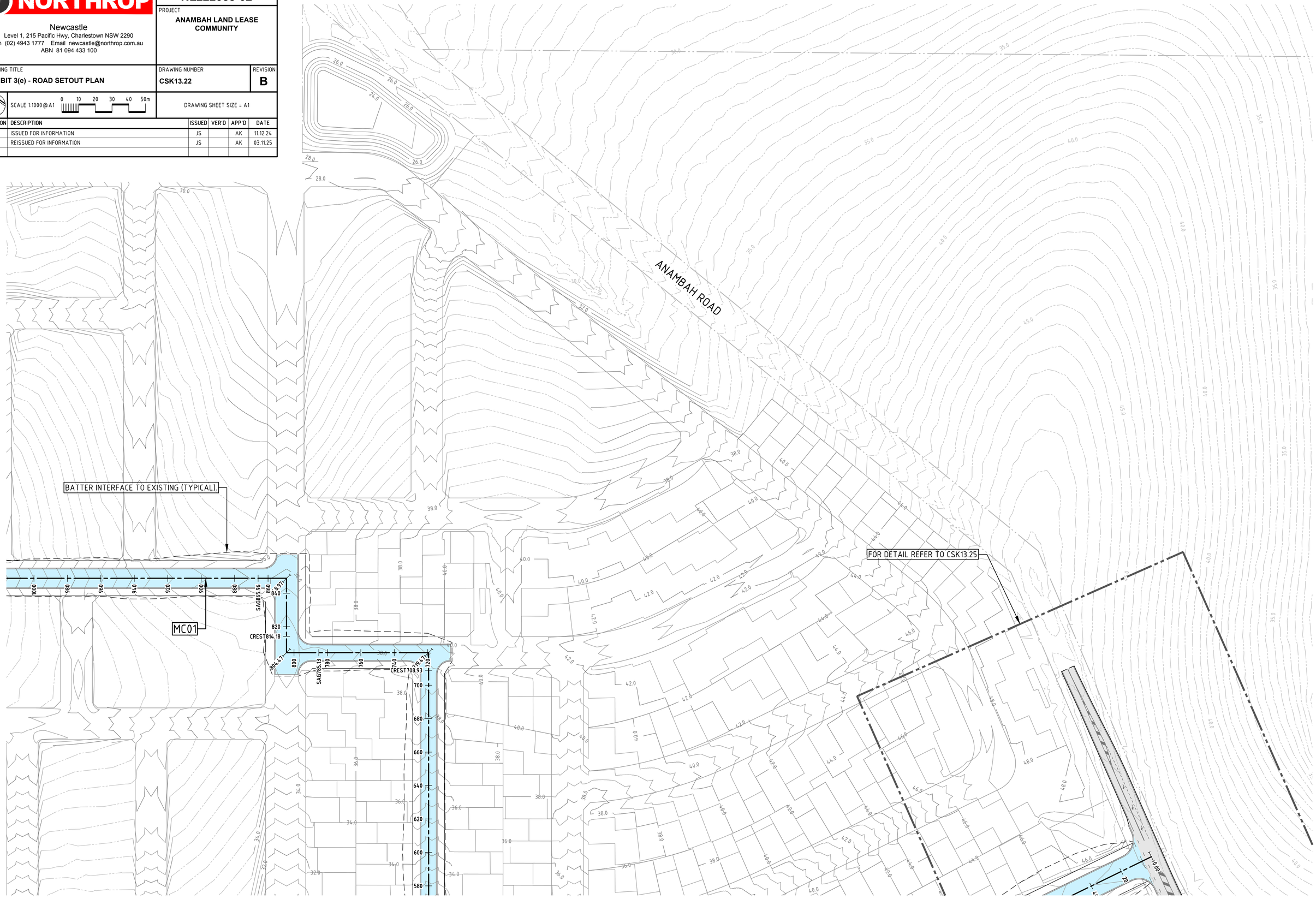
DRAWING NUMBER
CSK13.22

REVISION
B

SCALE 1:1000 @ A1 0 10 20 30 40 50m

DRAWING SHEET SIZE = A1

REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE
A	ISSUED FOR INFORMATION	JS		AK	11.12.24
B	REISSUED FOR INFORMATION	JS		AK	03.11.25



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JOB NUMBER
NL222055-02

PROJECT
ANAMBAH LAND LEASE COMMUNITY

DRAWING TITLE
EXHIBIT 3(f) - ROAD SETOUT PLAN

DRAWING NUMBER
CSK13.23

REVISION
B

SCALE 1:1000 @ A1 0 10 20 30 40 50m

DRAWING SHEET SIZE = A1

REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE
A	ISSUED FOR INFORMATION	JS		AK	11.12.24
B	REISSUED FOR INFORMATION	JS		AK	03.11.25

BATTER INTERFACE TO EXISTING (TYPICAL).

REALIGNMENT OF WATERCOURSE AS PART OF ROAD WORKS.

MC01

PROPOSED CULVERT CROSSING.

CREEK CORRIDOR

LEND LEASE COMMUNITY

ROAD CONNECTION TO INTERNAL LLC ROAD NETWORK.

LOT 178
DP 874171

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JOB NUMBER: NL222055-02

PROJECT: ANAMBAH LAND LEASE COMMUNITY

DRAWING TITLE: EXHIBIT 3(g) - ROAD SETOUT PLAN

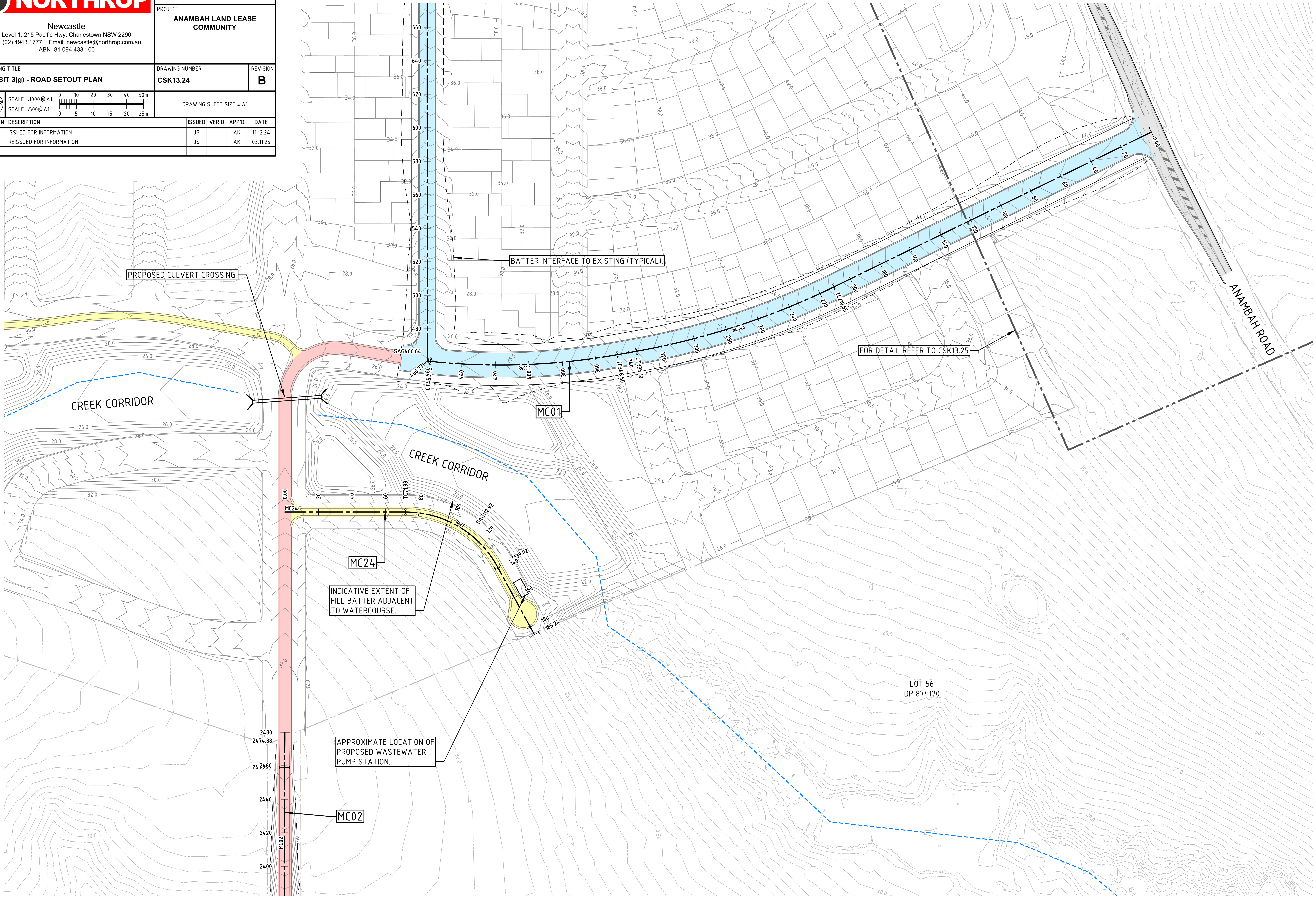
DRAWING NUMBER: CSK13.24

REVISION: B

SCALE 1:1000 @ A1 (0 10 20 30 40 50m)
SCALE 1:500 @ A1 (0 5 10 15 20 25m)

DRAWING SHEET SIZE = A1

REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE
A	ISSUED FOR INFORMATION	JS		AK	11.12.24
B	REISSUED FOR INFORMATION	JS		AK	03.11.25



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ABN 81 094 433 100

JOB NUMBER
NL222055-02

PROJECT
ANAMBAH LAND LEASE COMMUNITY

DRAWING TITLE
EXHIBIT 3(h) - ANAMBAH ROAD INTERSECTION

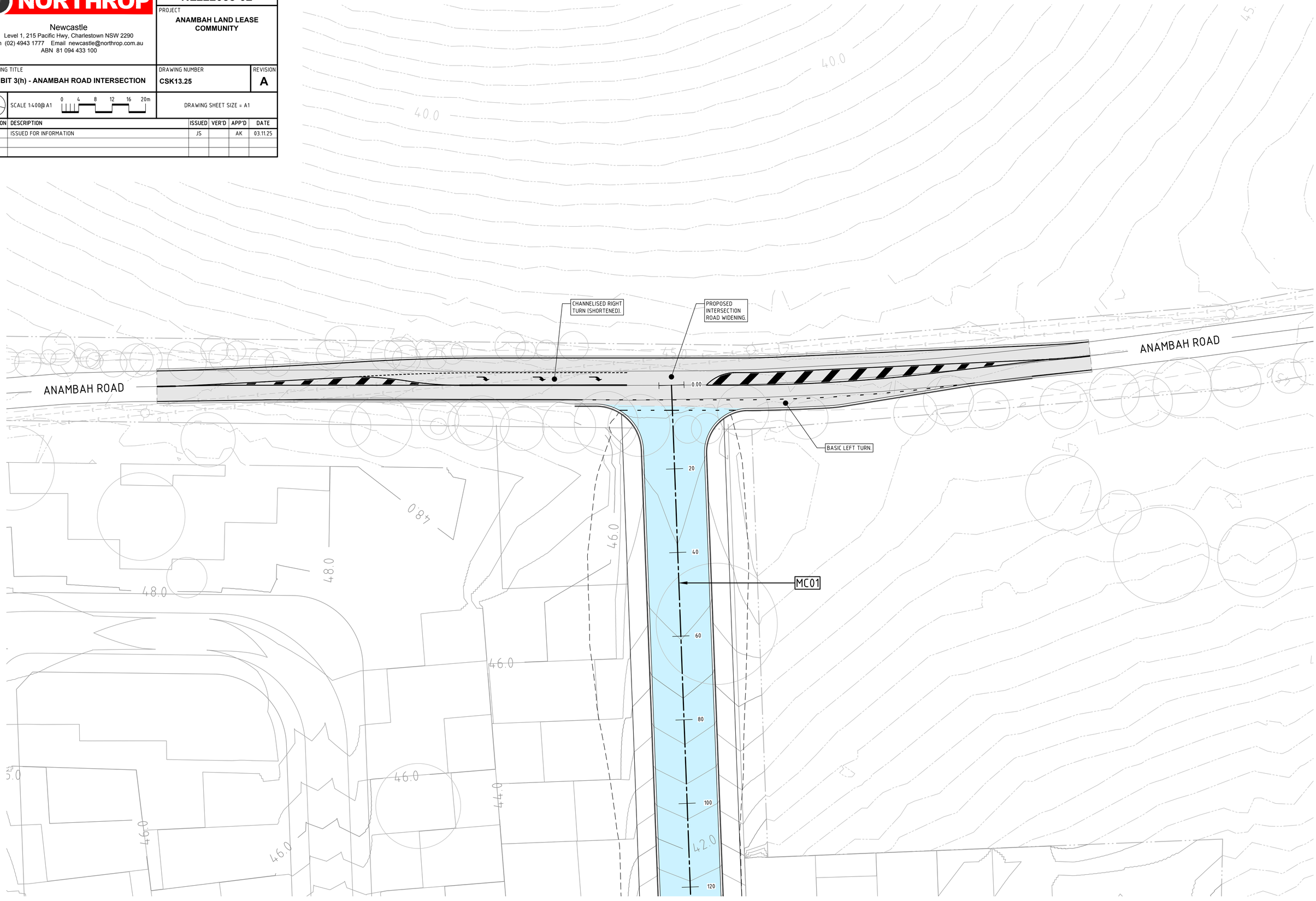
DRAWING NUMBER
CSK13.25

REVISION
A

SCALE 1:400@ A1 0 4 8 12 16 20m

DRAWING SHEET SIZE = A1

REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE
A	ISSUED FOR INFORMATION	JS		AK	03.11.25



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JOB NUMBER **NL222055-02**

PROJECT **ANAMBAH LAND LEASE COMMUNITY**

DRAWING TITLE **EXHIBIT 3(i) - ROAD LONGITUDINAL SECTIONS - SHEET 1**

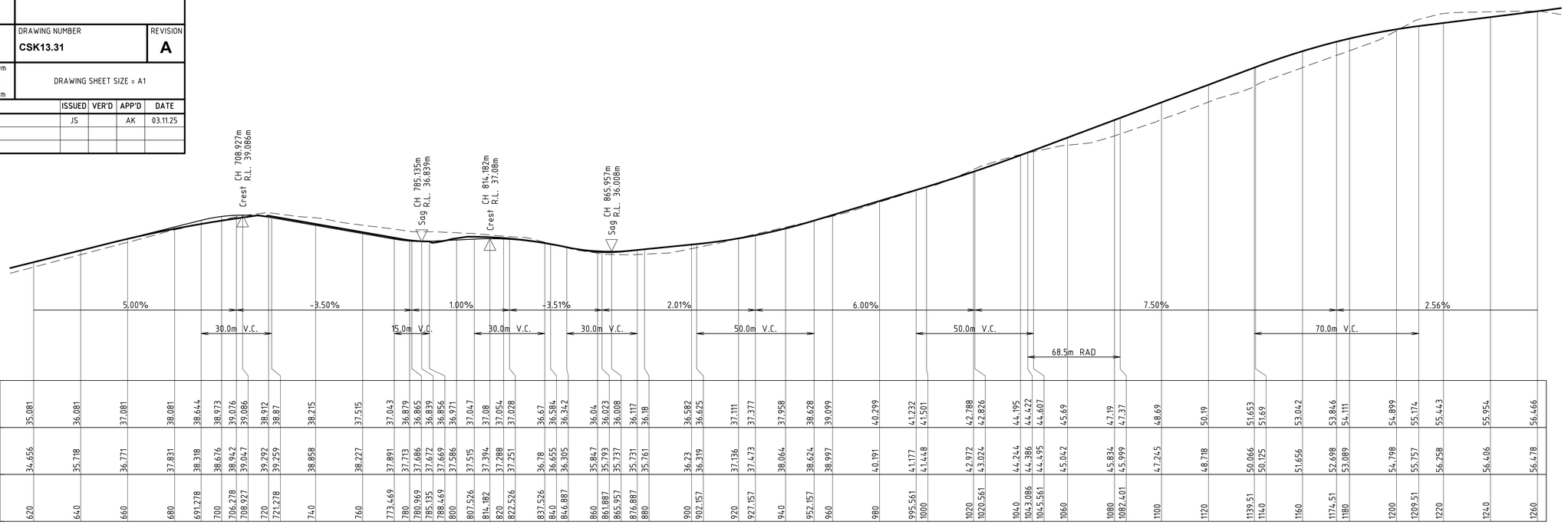
DRAWING NUMBER **CSK13.31**

REVISION **A**

SCALE 1:1000@A1 0 10 20 30 40 50m
SCALE 1:200@A1 0 2 4 6 8 10m

DRAWING SHEET SIZE = A1

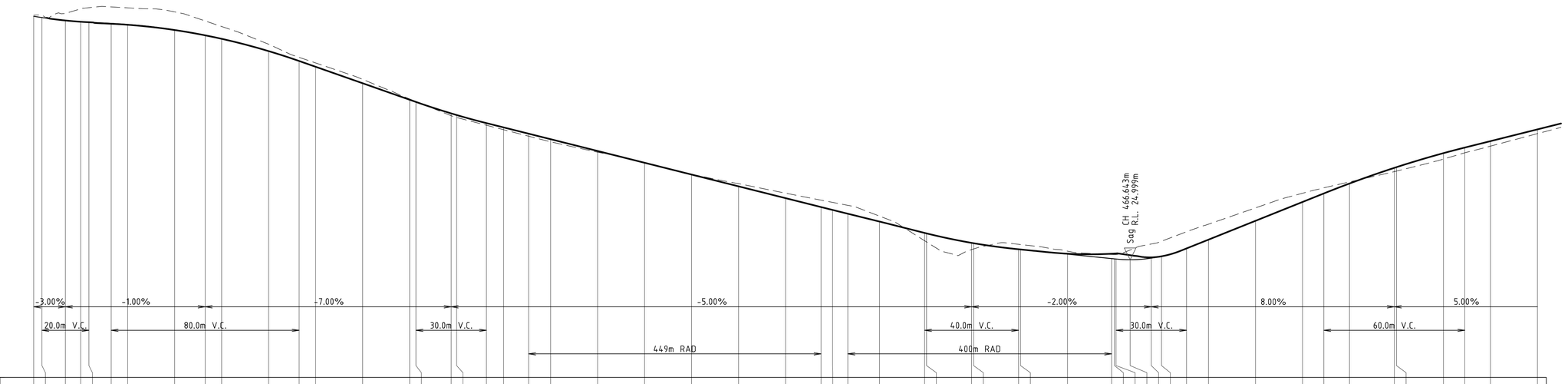
REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE
A	ISSUED FOR INFORMATION	JS		AK	03.11.25



CHAINAGE	FINISHED SURFACE	EXISTING SURFACE
620	35.081	34.656
640	36.081	35.718
660	37.081	36.771
680	38.081	37.831
691.278	38.644	38.318
700	38.973	38.676
706.278	38.942	39.047
708.927	39.086	39.047
720	38.912	39.292
721.278	38.87	39.259
740	38.215	38.858
760	37.515	38.227
773.469	37.043	37.891
780	36.879	37.713
780.969	36.865	37.686
785.135	36.839	37.672
788.469	36.856	37.669
800	36.971	37.586
807.526	37.047	37.515
814.182	37.08	37.394
820	37.054	37.288
822.526	37.028	37.251
837.526	36.67	36.78
840	36.584	36.655
846.887	36.342	36.305
860	36.04	35.847
861.887	36.023	35.793
865.957	36.008	35.737
876.887	36.117	35.731
880	36.18	35.761
900	36.582	36.23
902.157	36.625	36.319
920	37.111	37.136
927.157	37.377	37.473
940	37.958	38.064
952.157	38.628	38.624
960	39.099	38.997
980	40.299	40.191
995.561	41.232	41.177
1000	41.501	41.448
1020	42.788	42.972
1020.561	42.826	43.024
1040	44.195	44.244
1043.086	44.422	44.386
1045.561	44.607	44.495
1060	45.69	45.042
1080	47.19	45.834
1082.401	47.37	45.999
1100	48.69	47.245
1120	50.19	48.718
1139.51	51.653	50.066
1140	51.69	50.125
1160	53.042	51.656
1174.51	53.846	52.698
1180	54.111	53.089
1200	54.899	54.798
1209.51	55.174	55.757
1220	55.443	56.258
1240	55.954	56.406
1260	56.466	56.478

LONGITUDINAL SECTION ALONG MC01

HORIZONTAL SCALE 1:1000@A1
VERTICAL SCALE 1:200@A1



CHAINAGE	FINISHED SURFACE	EXISTING SURFACE
0	45.692	45.783
3.5	45.587	45.788
13.5	45.337	45.939
20	45.228	46.325
23.5	45.187	46.425
32.981	45.092	46.493
40	45.004	46.411
60	44.548	46.067
72.981	44.092	45.298
80	43.793	44.824
100	42.738	43.319
112.981	41.892	42.202
120	41.401	41.726
140	40.001	40.33
160	38.601	38.666
162.685	38.413	38.449
177.685	37.438	37.242
180	37.301	37.091
192.685	36.613	36.433
200	36.247	36.054
210.648	35.715	35.502
220	35.247	35.028
240	34.247	34.14
260	33.247	33.234
280	32.247	32.267
300	31.247	31.468
320	30.247	30.659
335.098	29.492	30.065
340	29.247	29.876
346.497	28.923	29.624
360	28.247	28.704
379.174	27.289	26.614
380	27.248	26.51
399.174	26.439	25.863
400	26.41	25.914
419.174	25.889	26.307
420	25.872	26.289
440	25.472	25.729
458.758	25.097	25.447
460	25.072	25.436
460.643	25.059	25.43
466.643	24.999	25.828
475.643	25.134	26.334
480	25.297	26.572
490.643	25.959	27.379
500	26.708	28.021
520	28.308	29.407
540	29.908	30.65
549.081	30.635	31.12
560	31.478	31.613
579.081	32.81	32.488
580	32.869	32.533
600	34.06	33.558
609.081	34.535	34.092
620	35.081	34.656
640	36.081	35.718

LONGITUDINAL SECTION ALONG MC01

HORIZONTAL SCALE 1:1000@A1
VERTICAL SCALE 1:200@A1

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JOB NUMBER **NL222055-02**

PROJECT **ANAMBAH LAND LEASE COMMUNITY**

DRAWING TITLE **EXHIBIT 3(j) - ROAD LONGITUDINAL SECTIONS - SHEET 2**

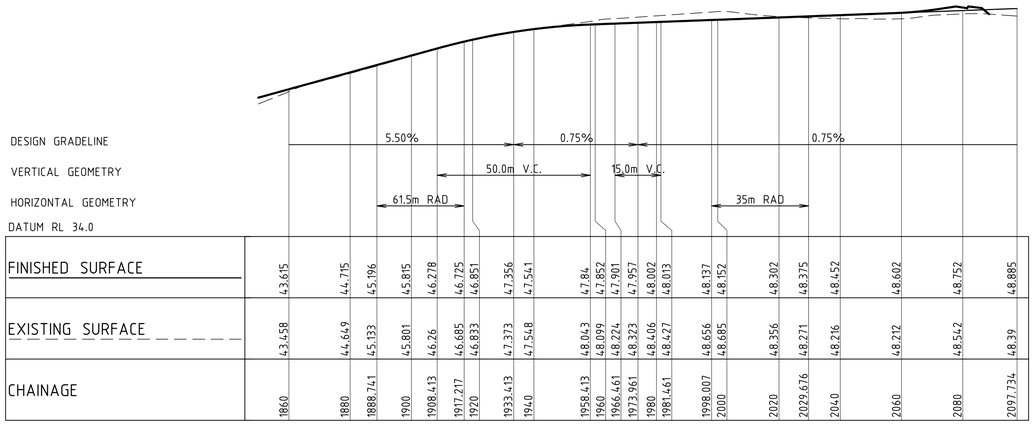
DRAWING NUMBER **CSK13.32**

REVISION **A**

SCALE 1:1000@A1 0 10 20 30 40 50m
SCALE 1:200@A1 0 2 4 6 8 10m

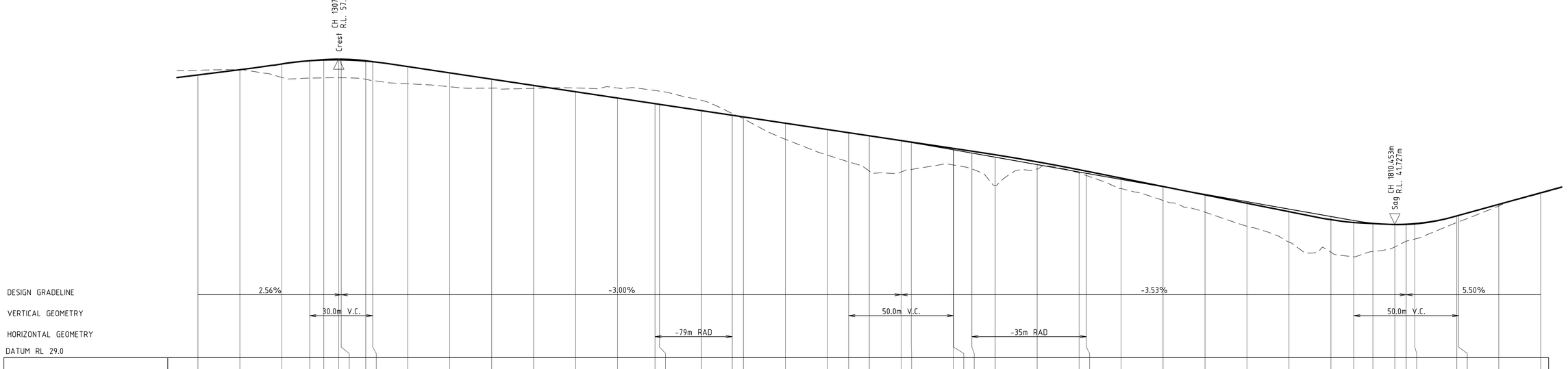
DRAWING SHEET SIZE = A1

REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE
A	ISSUED FOR INFORMATION	JS		AK	03.11.25



LONGITUDINAL SECTION ALONG MC01

HORIZONTAL SCALE 1:1000@A1
VERTICAL SCALE 1:200@A1



LONGITUDINAL SECTION ALONG MC01

HORIZONTAL SCALE 1:1000@A1
VERTICAL SCALE 1:200@A1

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JOB NUMBER
NL222055-02

PROJECT
ANAMBAH LAND LEASE COMMUNITY

DRAWING TITLE
EXHIBIT 3(k) - ROAD LONGITUDINAL SECTIONS - SHEET 3

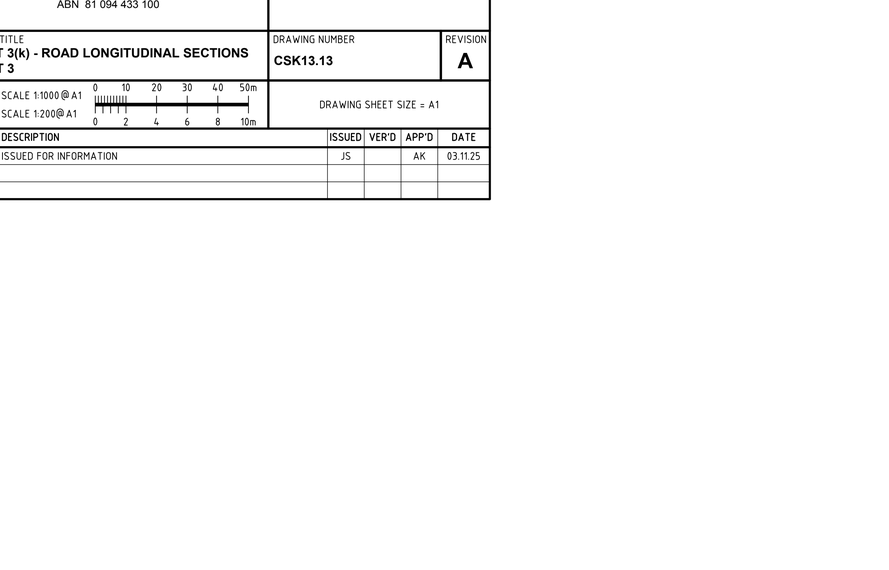
DRAWING NUMBER
CSK13.13

REVISION
A

SCALE 1:1000@A1 0 10 20 30 40 50m
SCALE 1:200@A1 0 2 4 6 8 10m

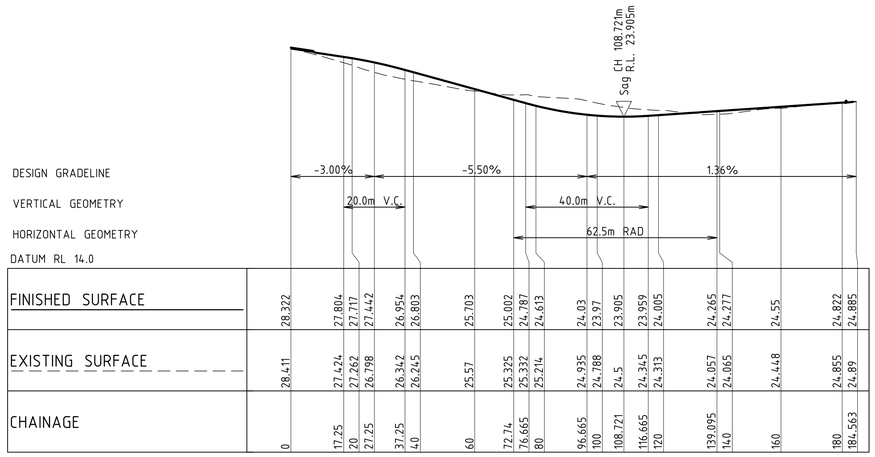
DRAWING SHEET SIZE = A1

REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE
A	ISSUED FOR INFORMATION	JS		AK	03.11.25



LONGITUDINAL SECTION ALONG MC03

HORIZONTAL SCALE 1:1000@A1
VERTICAL SCALE 1:200@A1



LONGITUDINAL SECTION ALONG MC24

HORIZONTAL SCALE 1:1000@A1
VERTICAL SCALE 1:200@A1

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JOB NUMBER: **NL222055-02**

PROJECT: **ANAMBAH LAND LEASE COMMUNITY**

DRAWING TITLE: **EXHIBIT 3(I) - RIVER ROAD SETOUT AND LONGITUDINAL SECTION - SHEET 1**

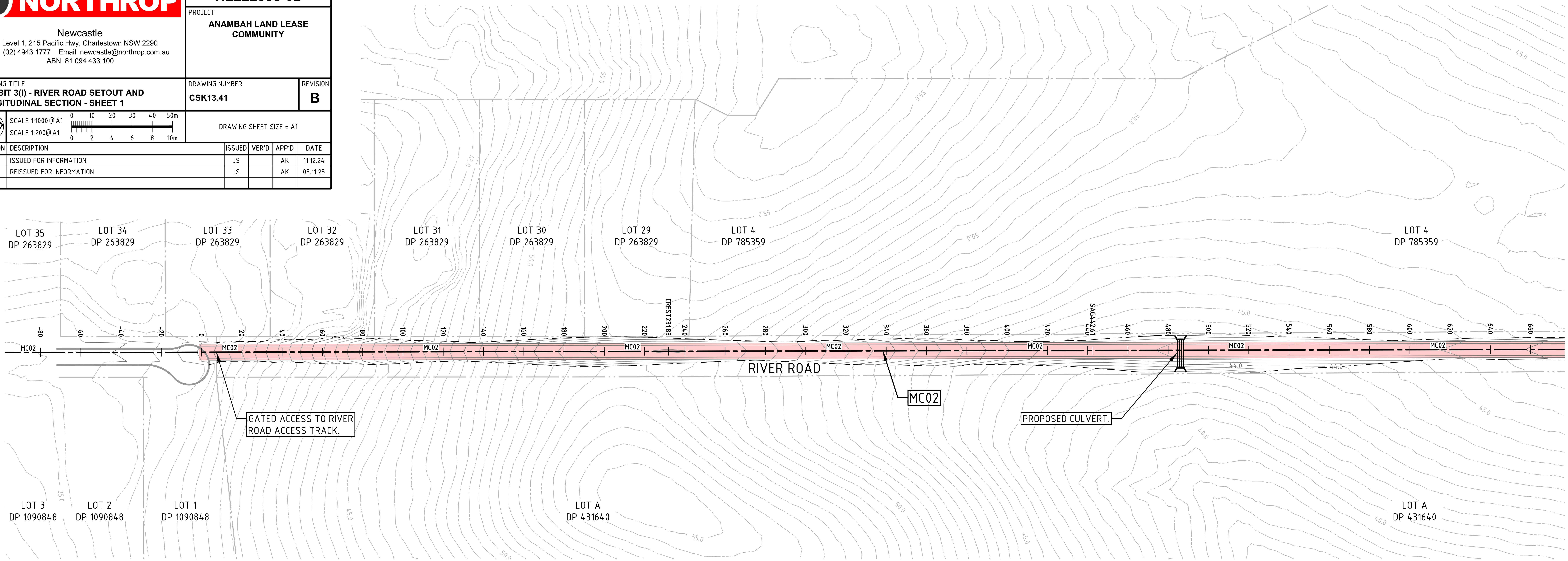
DRAWING NUMBER: **CSK13.41**

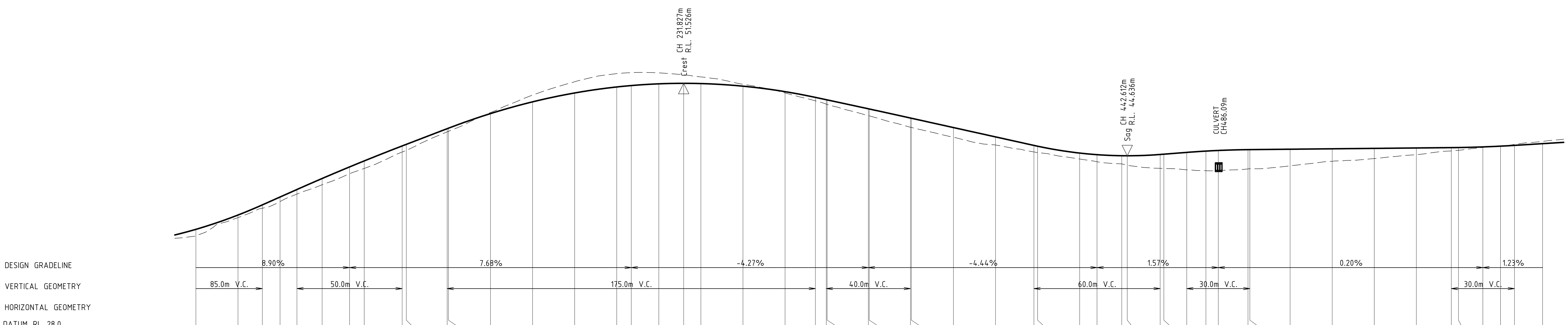
REVISION: **B**

SCALE 1:1000 @ A1 (0 10 20 30 40 50m)
SCALE 1:200 @ A1 (0 2 4 6 8 10m)

DRAWING SHEET SIZE = A1

REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE
A	ISSUED FOR INFORMATION	JS		AK	11.12.24
B	REISSUED FOR INFORMATION	JS		AK	03.11.25





CHAINAGE	FINISHED SURFACE	EXISTING SURFACE
0	37.636	37.023
20	38.997	38.752
31.582	39.962	39.647
40	40.711	40.281
48.027	41.425	40.993
60	42.473	41.879
73.027	43.574	42.925
80	44.146	43.431
98.027	45.569	44.99
100	45.721	45.149
119.409	47.211	46.909
120	47.256	46.958
140	48.647	48.745
160	49.765	50.409
180	50.609	51.675
200	51.18	52.449
206.909	51.314	52.543
220	51.479	52.519
231.827	51.526	52.339
240	51.503	52.136
260	51.255	51.432
280	50.734	50.609
294.409	50.189	49.865
299.583	49.968	49.55
300	49.95	49.519
319.583	49.105	48.454
320	49.087	48.431
339.583	48.225	47.349
340	48.207	47.329
360	47.319	46.392
380	46.431	45.66
398.254	45.621	44.999
400	45.545	44.941
420	44.892	44.325
428.254	44.739	44.069
440	44.639	43.861
442.612	44.636	43.747
458.254	44.759	43.441
460	44.786	43.426
470.88	44.956	43.296
480	45.08	43.214
485.88	45.14	43.213
500	45.219	43.385
500.88	45.221	43.404
520	45.258	43.678
540	45.298	44.115
560	45.337	44.37
580	45.377	44.739
596.607	45.41	45.094
600	45.419	45.156
611.607	45.478	45.421
620	45.55	45.575
626.607	45.624	45.71
640	45.788	46.002

LONGITUDINAL SECTION ALONG MC02

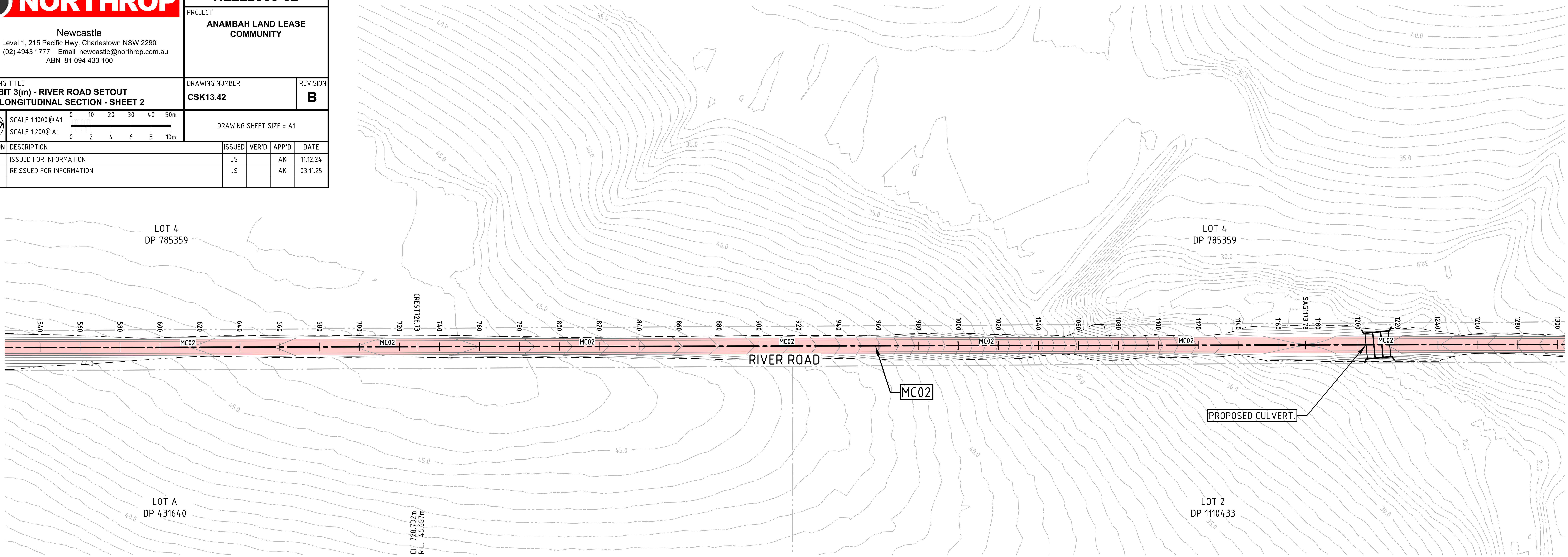
HORIZONTAL SCALE 1:1000@A1
VERTICAL SCALE 1:200@A1

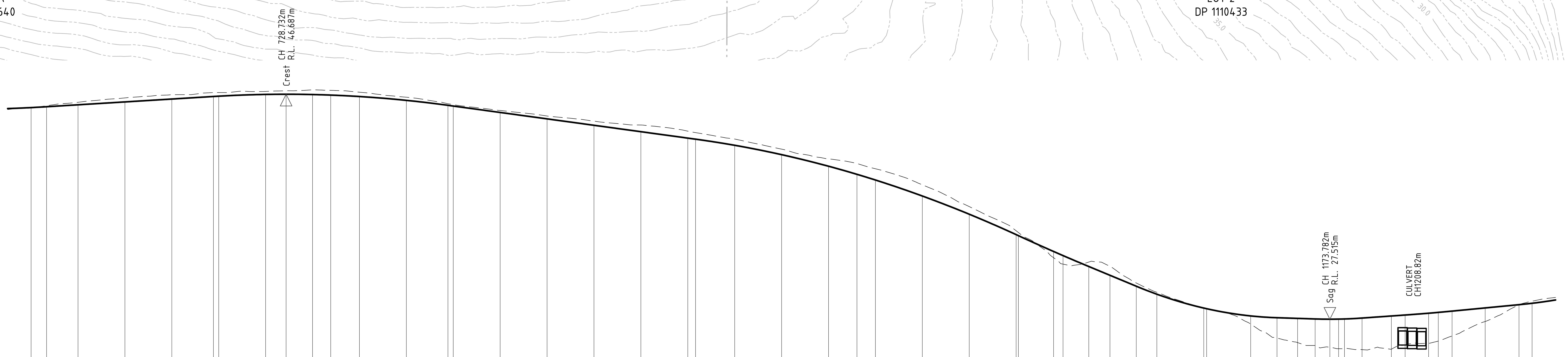
NORTHROP	JOB NUMBER NL222055-02
Newcastle Level 1, 215 Pacific Hwy, Charlestown NSW 2290 Ph (02) 4943 1777 Email newcastle@northrop.com.au ABN 81 094 433 100	PROJECT **ANAMBAH LAND LEASE COMMUNITY**

DRAWING TITLE	DRAWING NUMBER	REVISION
EXHIBIT 3(m) - RIVER ROAD SETOUT AND LONGITUDINAL SECTION - SHEET 2	**CSK13.42**	**B**

SCALE 1:1000 @ A1 (0 10 20 30 40 50m)
SCALE 1:200 @ A1 (0 2 4 6 8 10m)
DRAWING SHEET SIZE = A1

REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE
A	ISSUED FOR INFORMATION	JS		AK	11.12.24
B	REISSUED FOR INFORMATION	JS		AK	03.11.25





DESIGN GRADELINE: 1.23% | -2.73% | -9.21% | -8.30% | -0.65% | 1.41% | 1.92%

VERTICAL GEOMETRY: 30.0m V.C. | 100.0m V.C. | 137.7m V.C. | 30.0m V.C. | 60.0m V.C. | 20.0m V.C. | 20.0m V.C. | 30.0m V.C.

HORIZONTAL GEOMETRY

DATUM RL 15.0

CHAINAGE	FINISHED SURFACE	EXISTING SURFACE
620	45.55	45.575
626.607	45.624	45.71
640	45.788	46.002
660	46.034	46.375
680	46.279	46.648
697.74	46.497	46.83
700	46.524	46.832
720	46.672	46.928
728.732	46.687	46.986
740	46.662	47.059
747.74	46.615	47.019
760	46.493	46.86
780	46.167	46.435
797.74	45.744	45.882
800	45.682	45.804
820	45.136	45.309
840	44.589	44.833
860	44.042	44.395
880	43.496	44.066
900	42.949	43.543
903.312	42.858	43.417
920	42.337	42.867
940	41.539	42.009
960	40.552	41.179
972.137	39.862	40.785
980	39.378	40.337
1000	38.015	38.969
1020	36.463	37.112
1040	34.724	35.052
1040.962	34.635	34.904
1055.962	33.287	32.757
1060	32.936	32.208
1070.962	32.008	32.384
1080	31.257	32.02
1091.23	30.325	30.599
1100	29.646	29.805
1120	28.465	28.442
1121.23	28.409	28.404
1140	27.794	27.098
1151.23	27.641	25.914
1160	27.584	25.521
1167.497	27.536	25.276
1173.782	27.515	25.126
1177.497	27.522	25.001
1180	27.535	25.004
1187.497	27.612	24.92
1200	27.788	24.96
1205.87	27.871	25.327
1215.87	28.025	25.448
1220	28.096	25.647
1225.87	28.204	26.085
1240	28.475	27.318
1254.409	28.751	28.742
1260	28.872	29.056

LONGITUDINAL SECTION ALONG MC02

HORIZONTAL SCALE 1:1000@A1
VERTICAL SCALE 1:200@A1

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JOB NUMBER: **NL222055-02**

PROJECT: **ANAMBAH LAND LEASE COMMUNITY**

DRAWING TITLE: **EXHIBIT 3(n) - RIVER ROAD SETOUT AND LONGITUDINAL SECTION - SHEET 3**

DRAWING NUMBER: **CSK13.43**

REVISION: **B**

SCALE 1:1000 @ A1 (0 10 20 30 40 50m)
SCALE 1:200@ A1 (0 2 4 6 8 10m)

DRAWING SHEET SIZE = A1

REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE
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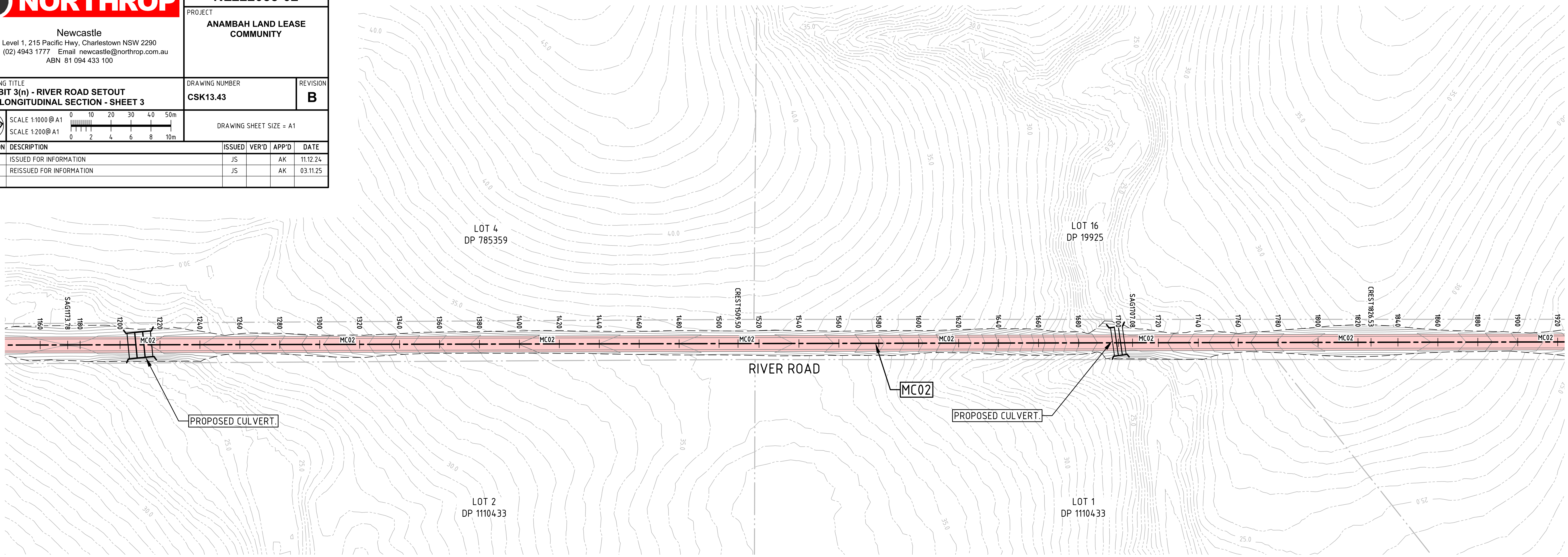
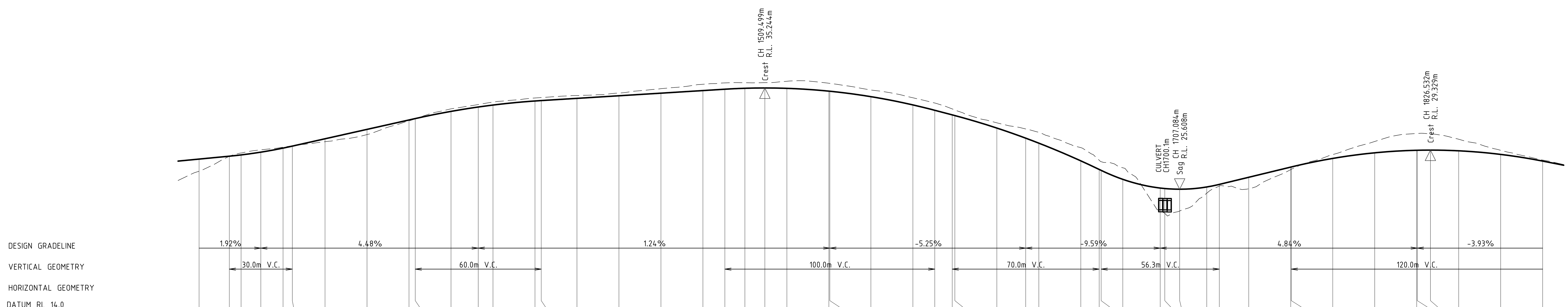
B	REISSUED FOR INFORMATION	JS		AK	03.11.25





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1269.409	29.135	29.356
1280	29.521	29.609
1284.409	29.711	29.754
1300	30.408	30.131
1320	31.304	30.81
1340	32.199	32.118
1342.976	32.332	32.301
1360	33.016	33.257
1372.976	33.432	33.668
1380	33.619	33.898
1400	34.006	34.291
1402.976	34.046	34.33
1420	34.256	34.522
1440	34.503	34.76
1460	34.75	35.177
1480	34.997	35.597
1490.442	35.126	35.729
1500	35.215	35.744
1509.499	35.244	35.752
1520	35.208	35.885
1540	34.943	35.695
1540.442	34.934	35.683
1560	34.417	35.051
1580	33.633	34.311
1590.442	33.12	33.813
1598.747	32.684	33.251
1600	32.618	33.142
1620	31.428	31.928
1633.747	30.467	31.343
1640	29.991	31.026
1660	28.306	29.567
1668.747	27.491	28.368
1669.69	27.4	28.228
1680	26.548	27.647
1697.827	25.718	23.532
1700	25.672	23.312
1707.084	25.608	23.533
1720	25.822	25.228
1725.964	26.065	25.902
1740	26.744	25.652
1760	27.712	27.476
1760.266	27.725	27.504
1780	28.538	28.906
1800	29.072	30.151
1820	29.314	30.909
1820.266	29.315	30.912
1826.532	29.329	30.879
1840	29.263	30.364
1860	28.92	29.311
1880	28.285	28.381

LONGITUDINAL SECTION ALONG MC02

HORIZONTAL SCALE 1:1000@A1
VERTICAL SCALE 1:200@A1

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Ph (02) 4943 1777 Email newcastle@northrop.com.au
ABN 81 094 433 100

JOB NUMBER
NL222055-02

PROJECT
ANAMBAH LAND LEASE COMMUNITY

DRAWING TITLE
EXHIBIT 3(o) - RIVER ROAD SETOUT AND LONGITUDINAL SECTION - SHEET 4

DRAWING NUMBER
CSK13.44

REVISION
B

SCALE 1:1000@A1 (0 10 20 30 40 50m)
SCALE 1:200@A1 (0 2 4 6 8 10m)

DRAWING SHEET SIZE = A1

REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE
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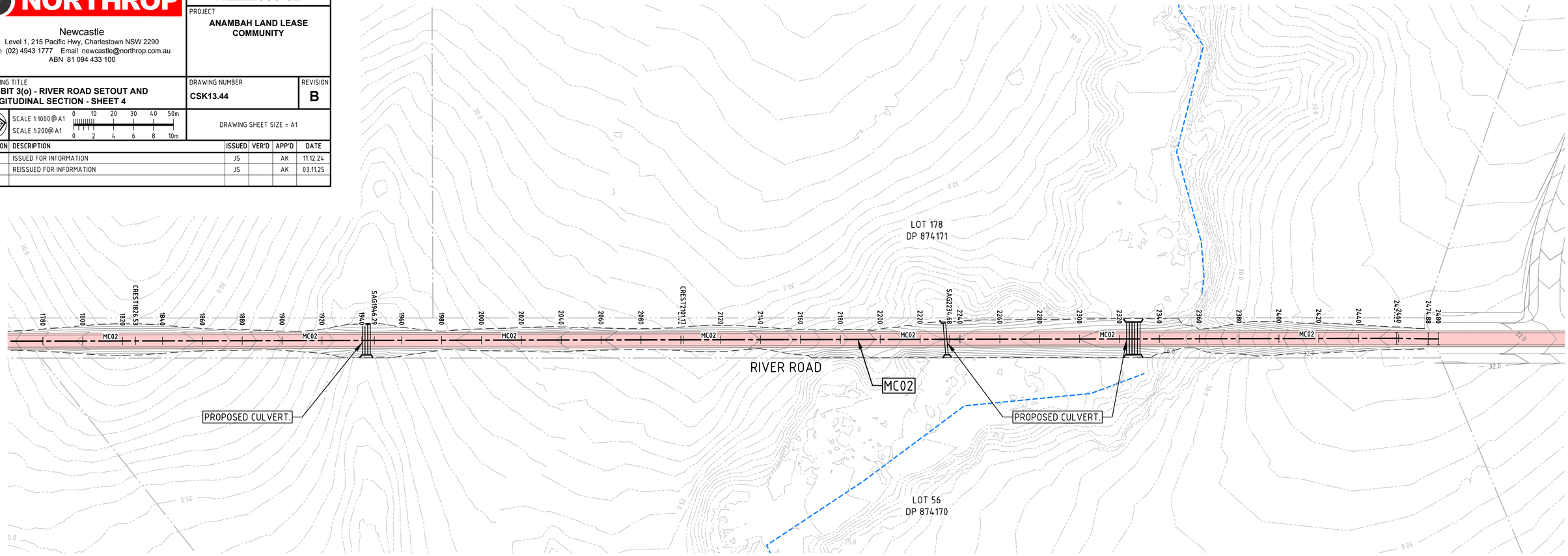
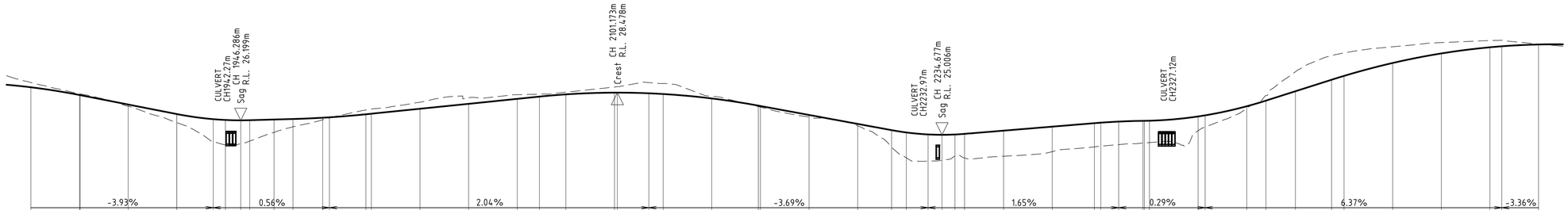
B	REISSUED FOR INFORMATION	JS		AK	03.11.25





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VERTICAL GEOMETRY: 120.0m V.C. | 30.0m V.C. | 30.0m V.C. | 90.0m V.C. | 30.0m V.C. | 20.0m V.C. | 50.0m V.C. | 140.0m V.C.

HORIZONTAL GEOMETRY

DATUM RL 13.0

CHAINAGE	FINISHED SURFACE	EXISTING SURFACE
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1940	26.228	24.27
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1950.004	26.209	25.206
1960	26.265	25.661
1962.775	26.308	26.242
1980	26.413	26.39
1982.775	26.447	27.05
1997.775	26.697	27.123
2000	26.742	27.689
2020	27.15	28.069
2040	27.558	28.311
2060	27.965	28.349
2069.127	28.151	28.516
2080	28.336	28.939
2100	28.478	28.964
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2114.127	28.425	29.235
2120	28.365	28.176
2140	27.999	27.33
2159.127	27.41	27.286
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2180	26.64	25.749
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2220	25.198	22.836
2228.944	25.036	22.908
2234.677	25.006	23.252
2240	25.032	23.096
2243.944	25.083	23.24
2260	25.347	23.617
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2297.336	25.963	24.07
2300	26.004	24.198
2307.336	26.094	24.323
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2317.897	26.158	24.366
2320	26.166	25.34
2340	26.518	25.651
2342.897	26.609	27.196
2360	27.357	28.239
2367.897	27.822	30.199
2380	28.593	31.528
2394.878	29.541	31.744
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2420	30.922	32.601
2440	31.708	32.775
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2464.878	32.297	32.486
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LONGITUDINAL SECTION ALONG MC02

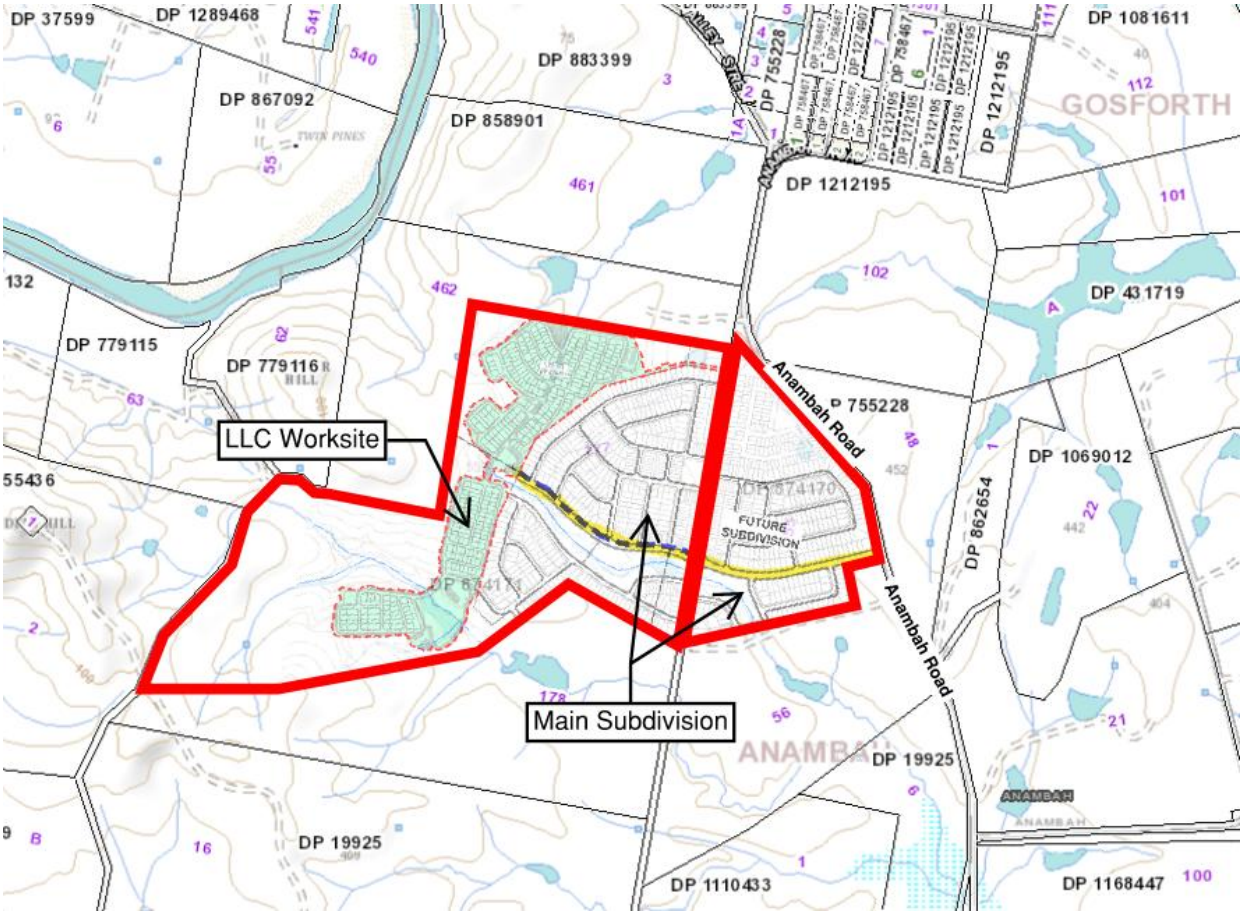
HORIZONTAL SCALE 1:1000@A1
VERTICAL SCALE 1:200@A1

Appendix B – Electrical Supply Advice

Electrical Supply Investigation for "The Vision"

559 Anambah Rd Gosforth

December 2024



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DOCUMENT CONTROL

Version	Date	Author	Reviewer	Revision Details
1	25/03/2024	Ben Dennis	Steve Goman	Initial Issue
2	22/08/2024	Ben Dennis	Steve Goman	Updated for Preliminary Enquiry Submission
3	26/08/2024	Ben Dennis	Steve Goman	Updated number of lots as per client comments
4	11/12/2024	Thomas de Jager	Jamie Antonuccio	Inclusion of additional LCC development and Ausgrid prelim enquiry response

CONTENTS

1) EXECUTIVE SUMMARY

Power Solutions were engaged to investigate supply options for the development of 559 Anambah Rd, Gosforth. It is intended that the area be development for a maximum of 900 lots. Following a review of the existing network it was determined there is limited spare capacity on the HV network in the area and there is a strong possibility of requiring significant upgrades if the capacity is not secured soon. Capacity can be secured by negotiating a contract with Ausgrid.

Four supply options were identified, depending on the amount of available capacity and the timeline of the development:

1. Upgrade existing feeders 29876 and 29878 (approx. 1 year and $1.5M)
2. Install a new feeder from Rutherford Zone Substation to the development site (approx. 1.5 years and $5M)
3. Upgrade Rutherford Zone Substation (approx. 5 years and $25M)
4. Wait for Ausgrid's new zone sub and install new feeder (approx. 12 years and $8M). Zone sub timing and location unconfirmed.

Cost and time may differ greatly from the estimates provided.

Power Solutions has lodged a Preliminary Enquiry to Ausgrid to confirm how much capacity is available and which option/s will be realistic. Ausgrid responded and advised that there is limited capacity on feeder 29876 and no spare capacity on 29878. Ausgrid recommends installing a new U/G 11kV feeder from Rutherford zone substation to supply the development.

2) BACKGROUND

The site is to be redeveloped as a residential subdivision of maximum 900 lots. To facilitate this development, it will be necessary to determine if the existing electrical distribution network in the area can be augmented to allow for the additional load or if significant High Voltage upgrades will be required.

From preliminary discussions with regarding many new development projects around the Lochinvar area, Ausgrid are aware of the limited spare capacity of Rutherford Zone Substation.

Ausgrid have advised in the past 6-12 months that Rutherford Zone Substation is approaching full capacity, and they are planning to install a new Zone Substation somewhere between Rutherford and Branxton. The planning, design and construction of a Zone Substation may around 10 years.

A Preliminary Enquiry to Ausgrid will provide an up-to-date confirmation of the capacity available and feeder loading. Lodging a connection application and negotiating a contract with Ausgrid will allow the developer to secure some of the spare capacity to supply at least some of the development.

It needs to be noted here that other developers in the area will be subject to the same limitations and Ausgrid traditionally allocate capacity in a "first come first served" order. Any delays before submitting an application and negotiating a contract with Ausgrid could dramatically impact the capacity available.

3) SCOPE

Power Solutions Pty Ltd have been engaged by Northrop Pty Ltd to complete the following:

- Assess the current site infrastructure and services (electrical)
- Provide a summary of likely connection and infrastructure augmentation requirements to support the development (including spatial allowances that should be made if any)
- Submit a Preliminary Enquiry to Ausgrid to confirm the available capacity and necessary upgrades

This report presents the findings for this scope of works.

4) ASSESSMENT OF EXISTING ELECTRICAL INFRASTRUCTURE

After a review of the existing infrastructure via WebGIS, the following assessment was determined.

Gosforth and Anambah are currently serviced by 11kV feeder 29878 that originates at Rutherford Zone Substation and runs via Lochinvar and Windermere. This feeder crosses the Hunter River twice to come into Gosforth and feed south to Anambah where it terminates. This is a very long feeder that tees off multiple times and services a large area. It reaches as far as Lovedale and Lamb's Valley.

There is a second feeder (29876) that runs from Rutherford Zone Substation and turns up Anambah Road from the New England Highway. There is approximately 1.5-2.0km of Anambah Rd without HV powerlines between the ends of the two feeders. Spare capacity on these two feeders appears to be limited.

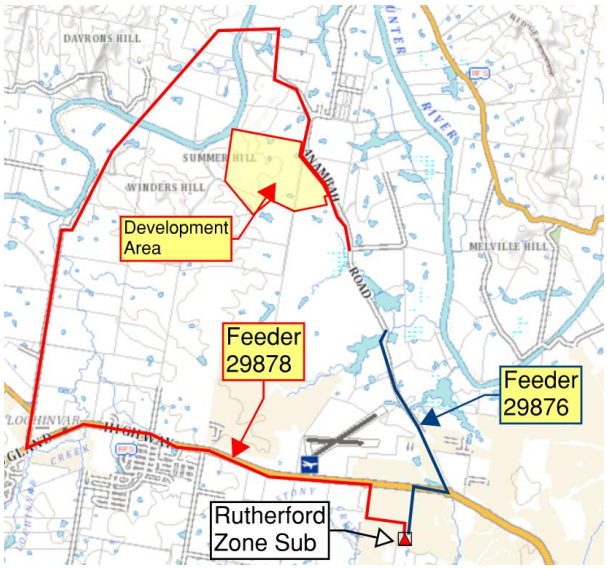
The existing feeder 29876 is bordering the development lot but is only in a 2-phase configuration. Approximately 1km of new 11kV overhead conductor is required to provide a 3-phase supply.

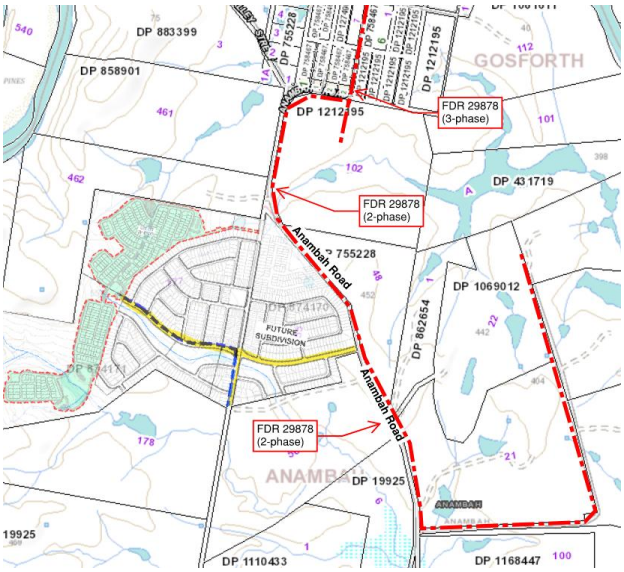
Note that a development of 900 residential lots will need approximately 3.5 MVA of power, which equates to approximately 184 amps at 11kV. Adding commercial lots will increase this load.

For a new development like this, Ausgrid will require two alternative supplies in the area so that customer supply can be maintained during feeder maintenance and unplanned outages.

Rutherford Zone Substation is a 33/11kV substation with two 30MVA transformers and 11kV switchgear with spaces for 12 feeders, of which only one is spare (feeder 29881). The substation yard appears to have space to allow a third transformer and additional 33kV bus if required. The two existing 33kV feeders supplying Rutherford Zone Substation are overhead lines from Kurri Kurri Sub-Transmission Substation.

Simplified feeder routes sketch is shown in the figure below. This sketch shows indictive routes from Rutherford Zone Sub to the investigation area only and does not include tee-offs servicing other areas.





5) LLC SUPPLY OPTION (EXCLUDING MAIN SUBDIVISION SUPPLY)

Based on review of the existing Ausgrid 11kV network in the area around the development, it is unlikely that the existing network can facilitate any new connections without significant network augmentation.

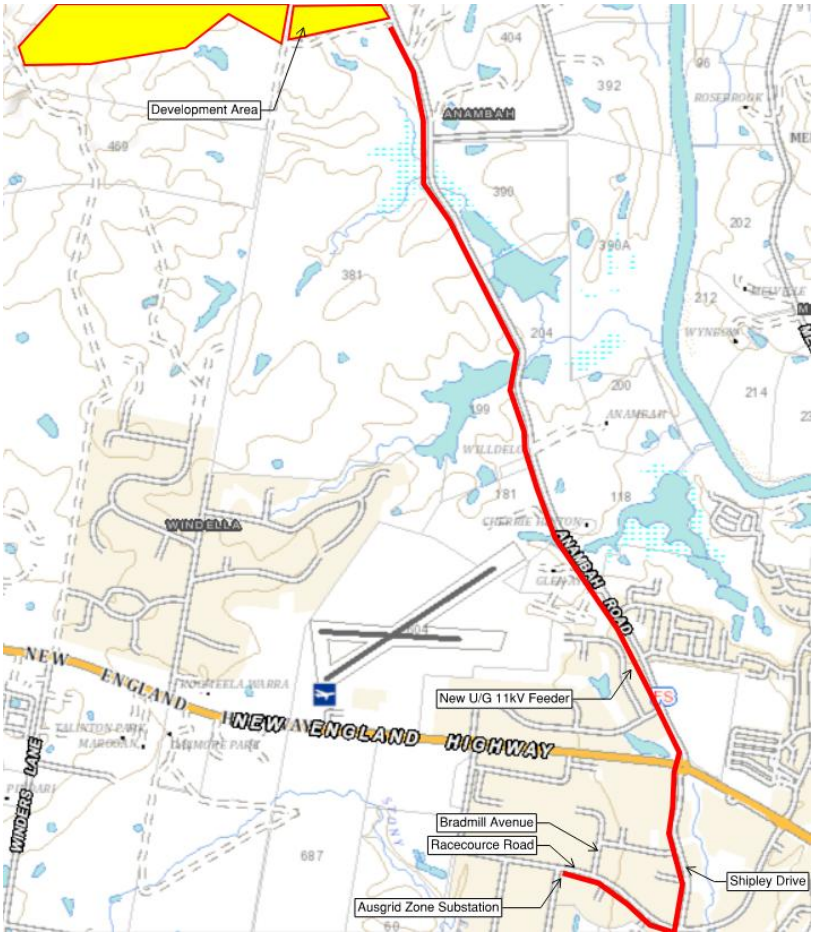
As mentioned in the Ausgrid preliminary enquiry response, 11kV feeder 29878 has no spare capacity and is unable to facilitate new connections.

The alternative 11kV feeder 29876 is approximately 2km South of the LLC site. This feeder has approximately 3MVA of spare capacity available. It may be possible to supply up to 850 residential lots with this supply. An N-1 connection will still be required to “loop in” the new connection to the existing 11kV network.

For a new development with underground reticulation Ausgrid will require an 11kV interconnection. This interconnection is generally made so that in the event of a fault, the secondary feeder can provide supply. This is known as N-1 contingency.

For this development, if an 11kV supply is sought from feeder 29876, Ausgrid may not approve 11kV feeder 29878 as a suitable N-1 interconnection. Ausgrid may request that a new feeder be installed from Rutherford zone substation.

A new 11kV U/G feeder could be installed from the zone substation on Racecource Rd, East along Racecource Rd to Shipley Drive. North along Shiple Drive to the roundabout with New England HWY and Anambah Road. Then along Anambah Road to the development. This will be approx. 7km.



6) AUSGRID PRELIMINARY ENQUIRY RESPONSE

Ausgrid has provided a response to the preliminary enquiry on 22/10/2024.

In summary:

- The existing 11kV feeder 29876 has approximately 3MVA of available capacity.
- The existing 11kV feeder 29878 has no spare capacity.
- Ausgrid recommends installing a new 11kV U/G feeder from Rutherford Zone Substation to supply the development.
- Rutherford only has 1 spare 11kV feeder circuit breaker available.
- Ausgrid is planning to construct another zone substation in the Rutherford/Telarah area sometime between 2030 and 2040.

7) ELECTRICAL SUPPLY OPTIONS

7.1 OPTION 1 – Upgrade existing 11kV Feeders

If there is sufficient capacity available on the existing 11kV feeders 29878 and 29876, these can be utilised to service the development. This will likely mean upgrading overhead conductors along sections of both feeders as well as extending feeder 29876 along Anambah Rd to connect to 29878. This will provide the alternative supply for maintenance.

Note that Ausgrid need to confirm capacity on both feeders before this option can be confirmed.

7.2 OPTION 2 – Install New 11kV Feeder

If there is insufficient capacity on the existing feeders, Ausgrid may determine the development needs a new feeder to be installed from Rutherford Zone Substation. This will likely involve installing approximately 5.5km of underground cable to the site, following a similar route to feeder 29876. There will likely be some smaller upgrades required to one or both existing feeders in the area to allow interconnection.

Note that Ausgrid need to confirm capacity on existing feeders and Rutherford Zone Substation before this option can be confirmed.

7.3 OPTION 3 – Zone Substation Upgrades

If Ausgrid determine there is insufficient spare capacity on the feeders and the zone sub, the next option will be to upgrade the Rutherford Zone Substation. This will involve installing a new 33kV feeder from Kurri Kurri Sub-Transmission Substation to Rutherford Zone Substation, adding a transformer and associated switchgear. This will add capacity to allow connection of a new 11kV feeder per Option 2 above.

This option will come at significant cost to the developer and will have a long lead time for design and construction. The implications for this option should be closely considered before progressing. If some capacity can be secured using either of the first two options above, it may be beneficial to wait for Ausgrid to complete construction of their new Zone Substation. This will depend on things like development staging timeline, amount of existing capacity available etc.

7.4 OPTION 4 – Wait for New Zone Substation

This option will best suit a development timeline that is in the infancy of planning that can wait 10 years for Stage 1 to be energised, or when the cost implications of the other options make the development unfeasible.

This option will still come with some 11kV network installation/augmentation work, but at a significantly reduced scope from Option 3.

Some risks of this is option are:

- New Zone Substation timeline is currently unconfirmed. Expecting approximately 2035
- New Zone Substation location unconfirmed. There may still be large costs in running a new feeder from Lochinvar, Harpers Hill, or Greta if required.

8) OPTIONS COST AND TIME ESTIMATES

Note that the costs below are based on market data and are only estimates. The fees listed below are combined estimates of design fess, Ausgrid fees, construction fees. For budgeting purposes, it is advisable to add 50% to these figures.

COST AND LEAD TIME ESTIMATES		
Description	**Years**	**Cost**
Option 1 – Upgrade existing feeders	1	$1,500,000
Option 2 – Install new feeder	1.5	$5,000,000
Option 3 – Zone Substation upgrades	5	$25,000,000
Option 4 – Wait for new zone substation (incl new 11kV feeder)	12	$8,000,000

9) CONCLUSIONS

There is limited spare capacity on the 11kV feeders coming from Rutherford Zone Sub. The two existing feeders in the area (29876 & 29878) can be upgraded to use all remaining capacity, which is unlikely to supply the whole development.

If more power is required, Rutherford Zone Substation has one spare circuit breaker for connection of a new 11kV feeder. This would involve installing approximately 5.5km of 11kV cable from Rutherford to the development site. This new 11kV connection will be dependent on the maximum capacity of the substation.

A preliminary enquiry has been submitted to Ausgrid to determine the capacity of the network and the upgrades required. Ausgrid responded and advised that there is limited capacity on feeder 29876 and no spare capacity on 29878. Ausgrid recommends installing a new U/G 11kV feeder from Rutherford zone substation to supply the development.

Appendix C – Water and Sewer Servicing Addendums

NORTHROP

CIVIL

Wastewater Servicing Strategy Addendum

for

559 Anambah Road Residential Subdivision

for Thirdi Anambah Pty Ltd

NL222055 / 10 October 2025 / Revision C

Report Document Control

Project: 559 Anambah Road Development Subdivision

Project Ref: NL222055

Document Ref: E02

File Name: NL222055_E02 Wastewater Servicing Addendum [D].docx

Client: Thirdi Anambah Pty Ltd

Title: Wastewater Servicing Strategy Addendum

Revision History

Revision	Report Status	Issue Date	Prepared	Reviewed
A	Draft Issue	07/03/2025	AK	LM
B	Issue to HWC	02/04/2025	AK	LM
C	Amendments	11/09/2025	AK	LM
D	Reissue to HWC	10/10/2025	AK	LM

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Reviewed:

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MIEAust CPEng NER (Civil)

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Northrop Consulting Engineers Pty Ltd (Northrop) has been retained to prepare this report based on specific instructions, scope of work and purpose pursuant to a contract with its client. It has been prepared in accordance with the usual care and thoroughness of the consulting profession for the use by Thirdi Anambah Pty Ltd. The report is based on generally accepted practices and standards applicable to the scope of work at the time it was prepared. No other warranty, express or implied, is made as to the professional advice included in this report.

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Executive Summary

Northrop Consulting Engineers has been engaged by Thirdi Anambah Pty Ltd to prepare a wastewater servicing addendum for a proposed residential subdivision at 559 Anambah Road, Anambah. The proposed subdivision forms part of the Anambah Urban Release Area (AURA), a 490-hectare parcel of land zoned for general residential development. Thirdi are seeking to release approximately 820 residential lots over several stages. In addition, Thirdi are preparing a development application for a proposed Land Lease Community located within land to the west of the AURA.

Wastewater servicing of the broader AURA has previously been reviewed as part of a Wastewater Servicing Strategy prepared by ADW Johnson on behalf of Roche Group. Under the approved strategy, development of the subject land is currently reliant on delivery of 3 wastewater pump stations, known as 1A, 3B and 5, along with associated gravity mains, dual DN400 rising mains along Anambah Road and a barometric loop. It is understood full delivery of these assets is not projected until at least 2040.

This addendum investigates interim servicing arrangements to permit development to proceed within the subject land concurrently with other development within the AURA. Following a review of technical constraints and development timeframes the following servicing arrangement is proposed:

- Relocation of WWPS 5 approximately 400 metres north-west to be situated within the subject land.
- Construction of an interim DN250 rising main along River Road, approximately 3.7 km in length, along with approximately 300 metres of new gravity mains connecting to existing DN375/DN450 trunk sewers at the intersection of River Road and the New England Highway. This interim rising main has capacity to service up to approximately 860 ET.
- Following completion of WWPS 3B and adjoining gravity networks, which is expected to occur concurrently with the River Road rising main approaching capacity, WWPS 5 would be reconnected to the WWPS 3B network in accordance with the approved strategy. This will permit full servicing of the WWPS 5 and 6 catchments.

In the event the capacity of the River Road rising main is reached prior to completion of required downstream wastewater infrastructure, the following scenarios would be investigated to enable ultimate servicing of the Thirdi development, in order of preference:

- Shortening the River Road rising via connection to the WWPS 1A gravity network. The resulting reduction in static head and head losses will allow transport of ultimate wastewater loads from the full WWPS 5 and 6 catchments, provided sufficient capacity is allowed for in the receiving gravity network.
- In the unlikely event that WWPS 1A is not available for connection, the River Road rising main may be upsized to DN300 to cater for the full WWPS 5 and 6 catchments, provided sufficient capacity is available in the receiving trunk gravity sewer mains.

The proposed amendments to the wastewater servicing arrangement aligns with Hunter Water's design criteria and enables independent operation should neighbouring development be delayed, while remaining compatible with the ultimate AURA network.

Contents

Appendices

1. Background

Northrop Consulting Engineers have been engaged by Thirdi Anambah Pty Ltd (Thirdi) to prepare a Wastewater Servicing Addendum for proposed residential land located at 559 Anambah Road, Gosforth NSW 2320 or Lot 55 DP8741070 and Lot 177 DP87417169 (the subject land).

The subject land forms part of the broader Anambah Urban Release Area (AURA) which comprises approximately 490 hectares of land zoned primarily as R1 General Residential with areas of C4 Environmental living and R5 Large Lot residential.

Within the subject land, Thirdi is seeking to develop approximately 820 residential lots within the R1 zoned portion. In addition, Thirdi are preparing a development application for a proposed Land Lease Community (LLC) located within land to the west zoned RU2 Rural Landscape.

Previously, two Wastewater Servicing Studies have been prepared for the area by ADW Johnson. The first was prepared on behalf of Stockland and approved by Hunter Water (HWC) in July 2012. This approval has since lapsed and Stockland's majority landholdings have been acquired by Roche Group who are now seeking to develop approximately 228 hectares of residential land within the AURA. ADW Johnson have subsequently prepared a revised water strategy encompassing the broader AURA, final version dated 11/01/2024.

Under the latest approved strategy, the Thirdi development is reliant on delivery of 3 wastewater pump stations and associated gravity and rising main infrastructure, referred to in the strategy as 1A, 3B and 5. Delivery of these assets is not projected to occur until after 2040, which does not align with Thirdi's development program.

The intent of this addendum is to review specific wastewater servicing arrangements for the proposed Thirdi development in the scheme of the ultimate AURA servicing. As such, this document should be read in conjunction with the approved Wastewater Servicing Strategy.

1.1 Liaison with Hunter Water

HWC have previously issued preliminary servicing advice for the Thirdi development on 02/05/2024. The letter requested preparation of this strategy addendum if deviation from the approved strategy is required.

An initial progress meeting was held with HWC, Northrop and Thirdi personnel on 15/07/2024 to discuss potential methodologies to service the Thirdi site. Minutes of this discussion are included in Appendix A.

HWC advised that both the timing and locations of proposed pump stations could be reviewed as part of the addendum. Additionally, a temporary rising main along River Road could be considered subject to technical feasibility. HWC have subsequently issued a Notice of Formal requirements for Stage 1 of the Thirdi development (HWC ref 2024-1462, dated 25/10/2024).

1.2 Study Area

The AURA generally borders the existing Windella rural residential estate to the south, farmland to the north and west and Anambah Road to the east. The majority of the AURA consists of cleared pastureland with sparse remnant vegetation. Various unnamed watercourses traverse the site, generally east to west with portions to the eastern and south-eastern boundaries of the AURA being flood affected.

The subject land is located at the northern extremity of the AURA and is bounded by Anambah Road to the east and north-east and pastureland to the remainder. A watercourse extends east to west through the site. Existing elevations within the subject land range from RL20.0 at the lower reaches of the watercourse and up to RL58.0 at the north-western boundary. A prominent ridgeline extends east to west approximately through the centre of the site, dividing the developable land into two distinct wastewater catchments. The proposed Land Lease Community is situated along the western edge of the AURA within RU2 zoned land.

The subject land and current land zoning is illustrated in Figure 1.

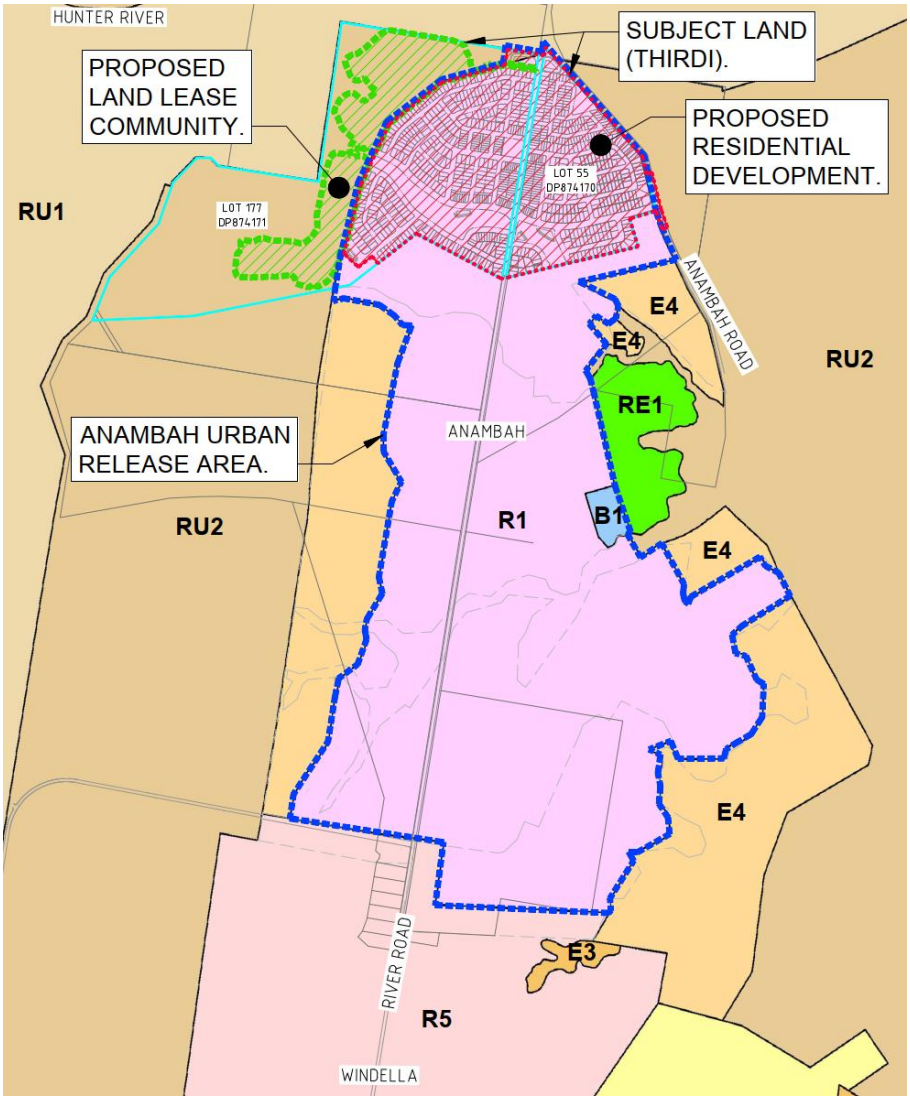

Figure 1 – Study area and current land zoning.

1.3 Approved Wastewater Servicing Strategy

Under the approved strategy the broader AURA has been divided into 6 wastewater catchments based on existing topography. Due to the undulating terrain and numerous creek crossings, various wastewater servicing options were explored to achieve internal servicing of the AURA. The recommended servicing option, described as “Option 3B” proposes a total of 5 wastewater pump stations numbered 1A, 2, 3B, 5A and 6, arranged in a daisy chain configuration. WWPS 1A and 3B act as primary collection stations pumping in common to the nominated discharge point along Anambah Road via dual DN400 rising mains, terminating at a barometric loop at the discharge point.

Gravity sewer catchment extents and proposed WWPS locations proposed under the current strategy are illustrated in Figure 2.

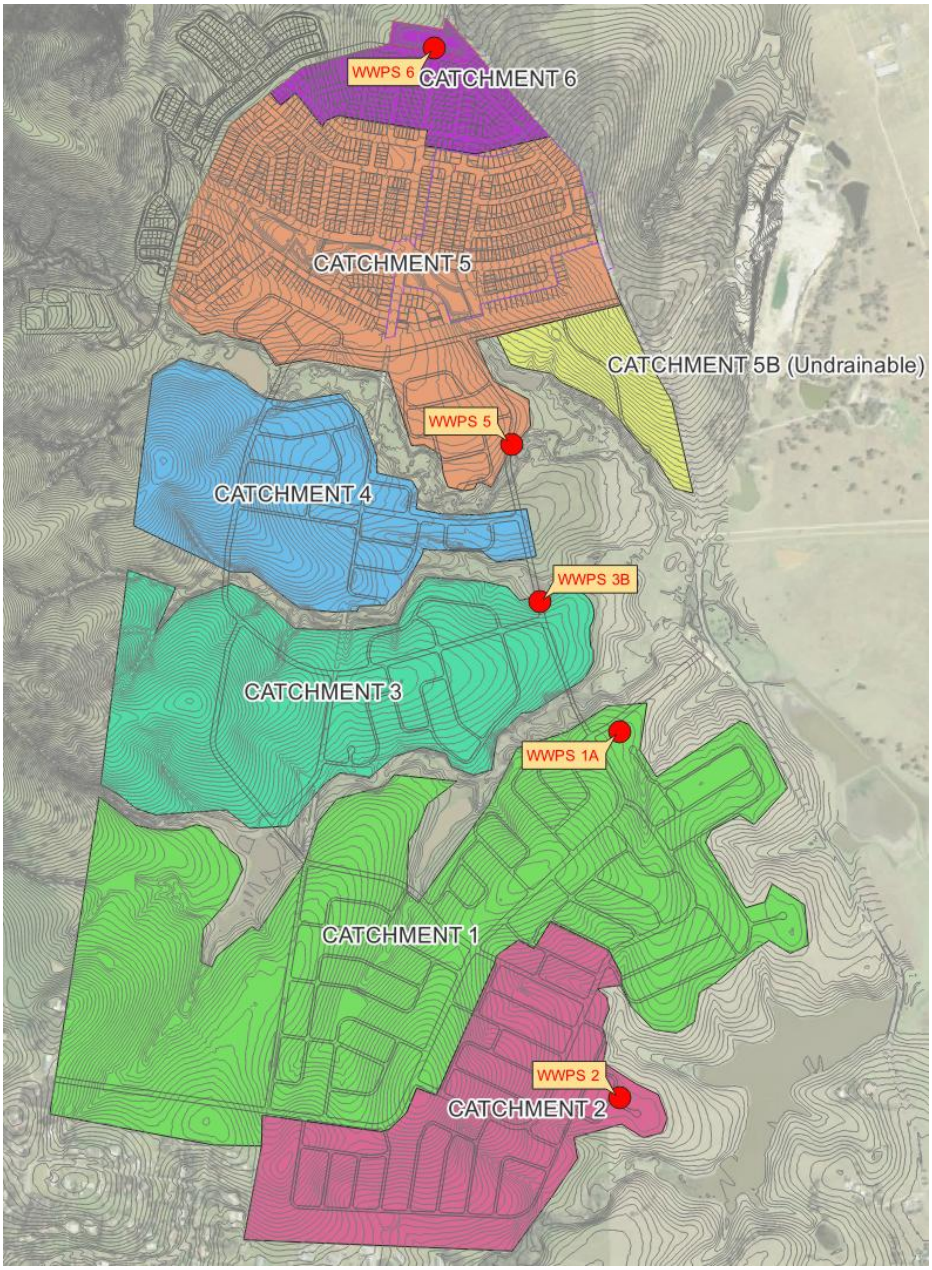

Figure 2 – AURA wastewater catchments and proposed WWPS locations (Roche catchments approximated from ADWJ Wastewater Servicing Strategy, dated 11/01/2024).

The majority of the subject land will gravitate to WWPS 5. The remainder will drain to WWPS 6 which will ultimately pump to the WWPS 5 gravity network. The following wastewater infrastructure will therefore be required to enable development to commence within the subject land:

1. Construction of WWPS 1A, along with dual DN400 rising mains and barometric loop along Anambah Road.
2. Construction of WWPS 3B and associated rising main connecting to WWPS1A common rising main.
3. Construction of gravity sewer network within Catchments 3 and 4 to enable connection of WWPS 5 to WWPS 3B.
4. Construction of WWPS 5 and associated rising main connecting to Catchment 3 & 4 gravity network.
5. Extension of Catchment 5 gravity sewer network to Thirdi land.

2. Proposed Development

Thirdi's proposed residential development currently comprises staged release of 820 residential lots. The proposed Land Lease Community comprises 263 relocatable home sites and associated community facilities.

The first stages of the Thirdi residential development are proposed to commence within Catchment 5 near the Anambah Road frontage and extend westward. To ensure the neighbouring land to the south is not burdened and avoid the need for relocation of assets in future, WWPS 5 is therefore proposed to be relocated to the subject land. The impacts of this are discussed further in Section 5.

It is understood the LLC development is intended to be developed over multiple stages commencing in the northern portion. The timing of the stages is subject to confirmation however for the purposes of this strategy, it has been assumed development will commence concurrently with Stage 1 of the main residential development.

To reflect the revised development staging, wastewater catchment 5 has been broken down into sub-catchments reflecting the following:

- Catchments 5A and 5C denote the Thirdi and Roche-developable portions AURA respectively.
- Catchment 5B denotes an area of land intended to be developed by Roche as 20 large lot environment living allotments. This area is currently noted as undrainable land under the current strategy.
- Catchment 5D comprises the proposed Thirdi LLC.

Revised sub-catchment and proposed Thirdi development staging are illustrated in Figure 3.

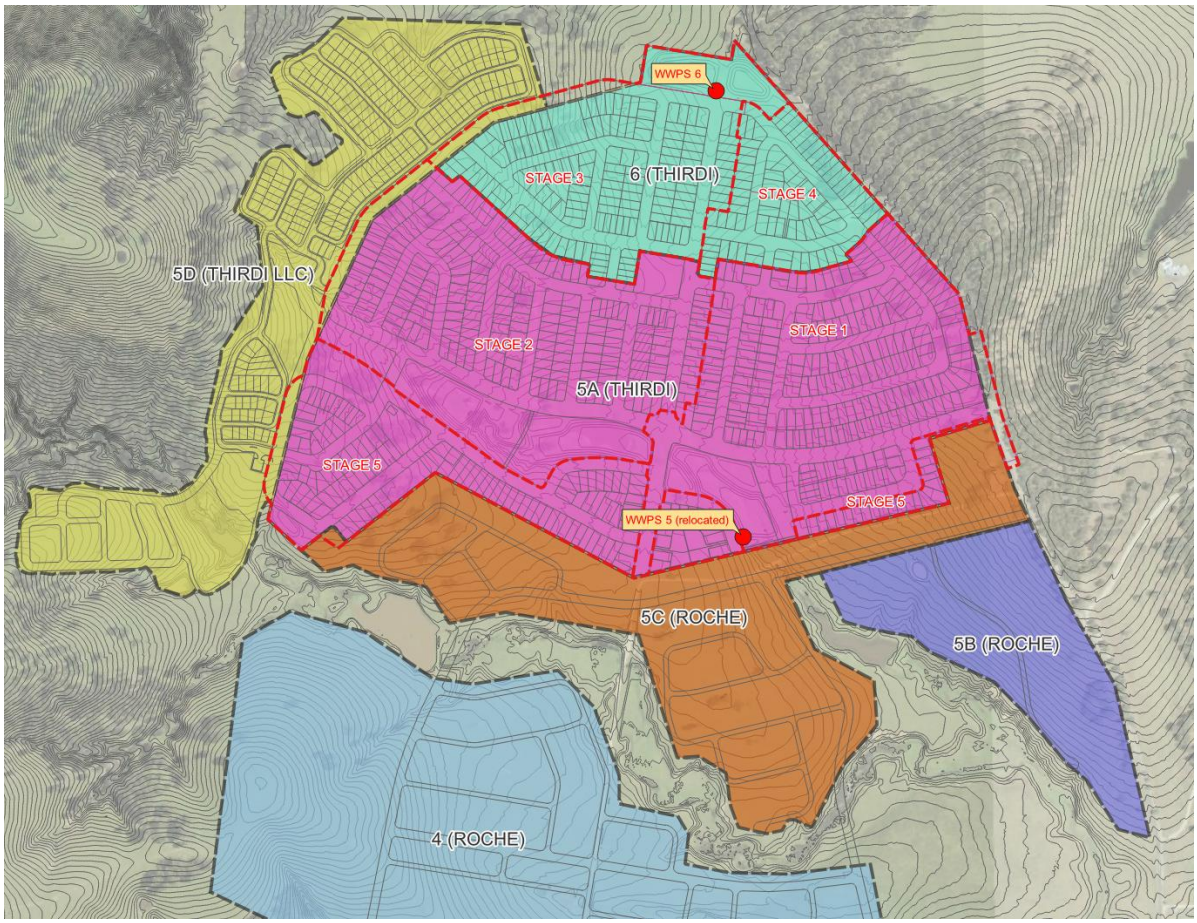

Figure 3 – Wastewater Catchment 5 sub-catchments and Thirdi proposed staging.

Projected timeframes for the Roche development have been sourced from the current wastewater strategy. The first stages are indicated to commence within Catchment 1 at the south-eastern portion of the AURA before proceeding outwards within Catchment 1 and 2, followed by Catchment 3 and 4 after approximately 8 years and then Catchment 5 after approximately 16 years. An approximate release rate of 200 lots per year is currently expected for Roche development.

Updated wastewater loading timeframes based on the above assumptions have been compiled in Table 1.

Table 1 – Projected wastewater loadings within Catchment 5 and 6.

Year	Catchment Connected ET				Total	Cumulative Total ET	Thirdi Stage [3]
	5A (Thirdi)	5B & 5C (Roche) [1]	5D (Thirdi LLC) [2]	6 (Thirdi)			
2026	65		59		124	124	Stage 1
2027	42		59		101	225	Stage 1
2028	24		58		82	307	Stage 1
2029	53				53	360	Stage 1
2030	42				42	402	Stage 1
2031	51				51	453	Stage 2
2032	40				40	493	Stage 2
2033	40				40	533	Stage 2
2034	40				40	573	Stage 2
2035	40				40	613	Stage 2
2036				40	40	653	Stage 3
2037				40	40	693	Stage 3
2038				40	40	733	Stage 3
2039				29	29	762	Stage 3
2040				40	40	802	Stage 4
2041		132		41	173	975	Stage 4
2042	49	200			249	1224	Stage 5
2043	40	44			84	1308	Stage 5
2044	40				40	1348	Stage 5
2045	24				24	1372	Stage 5
TOTAL	**590**	**376**	**176**	**230**			

Notes:

1. Annual yield and timing adapted from ADWJ Wastewater Servicing Strategy, Table 1.
2. Individual LLC relocatable home sites assumed to be equivalent to 0.67 ET (two-thirds standard residential lots). Assumes all sites occupied.
3. Stage numbering subject to change.

3. Design Wastewater Loads

Revised wastewater loadings for Catchments 5 and 6 have been calculated in accordance with the Gravity Sewerage Code of Australia WSA02-2014-3.1 Hunter Water Edition. Sewer loadings for the Thirdi development have been based on the masterplan layout current at time of writing. For the remainder of the AURA, area-based wastewater loadings consistent with the approved strategy have been utilised without modification.

The Thirdi development proposes a mix of low and medium density residential lots consistent with the R1 zoning. For the purposes of this assessment, it has been assumed that all proposed lots equate to 1 ET with a storm allowance of 0.058 L/s per dwelling. For the LLC, wastewater loads for each relocatable home site was assumed to be two-thirds that of a standard residential lot and stormwater allowance halved to 0.029 L/s per site.

A summary of ultimate wastewater loads for Catchments 5 and 6 are provided in Table 2 and Table 3 respectively.

Table 2 – Ultimate wastewater loading estimate Catchment 5.

Land Use	Unit	No.	Total ET	SA (L/s)
Residential - R1 (Roche)	Gross Ha	15	198	11.5
Residential - E4 (Roche)	Gross Ha	10	20	1.2
Seniors Living (Roche)	Gross Ha	7	158	9.2
Residential – R1 (Thirdi)	Lot	590	590	34.2
Land Lease Community (Thirdi)	Site	263	176	7.6

Total ET	1143
ADWF (L/s)	12.6
r	2.26
PDWF (L/s)	28.4
SA (L/s)	63.7
PWWF (L/s)	92.0

Table 3 – Ultimate wastewater loading estimate Catchment 6.

Land Use	Unit	No.	Total ET	SA (L/s)
Residential - R1 (Thirdi)	Lot	230	230	13.3

Total ET	230
ADWF (L/s)	2.5
r	2.85
PDWF (L/s)	7.2
SA (L/s)	13.3
PWWF (L/s)	20.5

4. Interim Servicing Options

4.1 Options Assessment

To enable development to commence within the subject land, a review of interim servicing options was undertaken. As noted above, all options assume relocation of WWPS 5 into the subject land will be required.

4.1.1 Rising Main along Anambah Road

This option investigated extending a rising main from WWPS 5 along Anambah Road. Key challenges with this alignment included an immediate high point near the entry to the Thirdi site at approximately RL46 mAHD. The elevation of WWPS 5 relative to the discharge point would also result in pumping downhill or a significant length of variable grade sewer (VGS).

To avoid this the addition of an additional WWPS located near the low point on Anambah Road was also investigated. This option would resolve the issue of downhill pumping, however there would still be the challenge of navigating another intermediate high point on Anambah Road. Similar to the constraints outlined in the approved strategy for the ultimate dual DN400 rising mains, navigating this high point would require either a significant length of horizontal directional drilling, a barometric loop at the discharge point or significant earthworks to construct an elevated point of discharge.

Due to construction costs associated with each of these options along with the added cost of the intermediate WWPS, this option was not considered further. A longitudinal profile of the sewer alignment along Anambah Road highlighting the various constraints is illustrated in Figure 4.

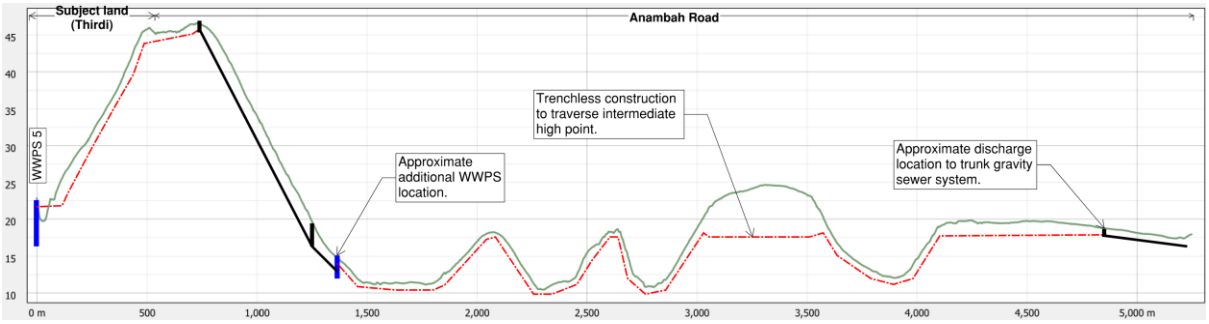

Figure 4 – Anambah Road indicative sewer alignment.

4.1.2 Gravity Main Along Anambah Road and Connection to WWPS 1A

An alternative arrangement to the above was reviewed which involved pumping to the high point at the Thirdi site entry and then gravitating directly to WWPS 1A.

The primary challenge with this alignment is the main would need to traverse low-lying, flood prone land between Anambah Road and WWPS 1A, likely leading to significant construction and operational difficulties. It is understood WWPS 1A is proposed to be constructed at approximately RL 20.0 for flooding reasons, significantly higher than the current low point on Anambah Road at RL 11.0. This results in both the incoming gravity sewer and wet well becoming excessively deep. Due to these constraints, this option was not considered further.

4.2 Preferred Option – Interim Rising Main Along River Road

The preferred option proposes pump from the relocated WWPS 5 location along River Road via an interim rising main. The rising main would then discharge via a proposed gravity main to existing trunk gravity mains at the intersection of River Road and the New England Highway. River Road was selected for the following reasons:

- River Road is proposed to be formalised as a sealed, secondary road access connecting the Thirdi development to the New England Highway. The road alignment includes several culvert crossings to elevate the roadway above the 1% AEP flood event.
- Locating lead in infrastructure within the River Road corridor negates the need for this infrastructure to burden the adjoining land, minimising impacts to adjoining developments as well as providing convenient maintenance access for HWC personnel.
- The River Road corridor is currently the most direct route to existing wastewater infrastructure, minimising the overall length of the interim rising main.

The proposed rising and gravity main alignment along River Road is shown in Appendix B Exhibit 2. With typical cross-sections of the proposed River Road access illustrated in Figure 5.

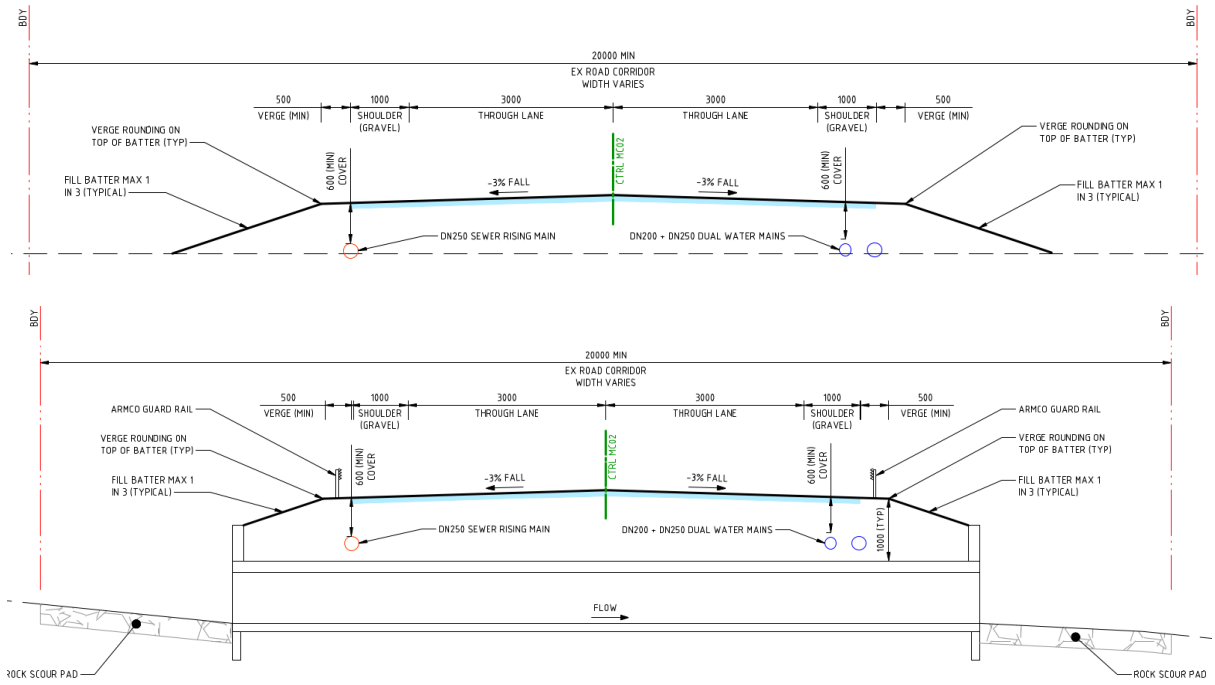

Figure 5 – River Road typical cross-sections.

While the future subdivision layout to the south is currently under development at time of writing, it is acknowledged that the developer may seek to realign the River Road corridor to suit the future development layout, which may occur prior to the River Road lead in services becoming redundant. If full or partial closure of River Road is approved by Council and an easement is not maintained for the proposed lead in services, those services would need to be relocated at that developer's cost and in accordance with HWC requirements.

4.2.1 Relocated WWPS 5

Based on the expected catchment footprint presented in the approved strategy, relocation of WWPS 5 will result in a worst-case gravity sewer reach as illustrated in Figure 6 with a longitudinal section of the alignment provided in Figure 7.

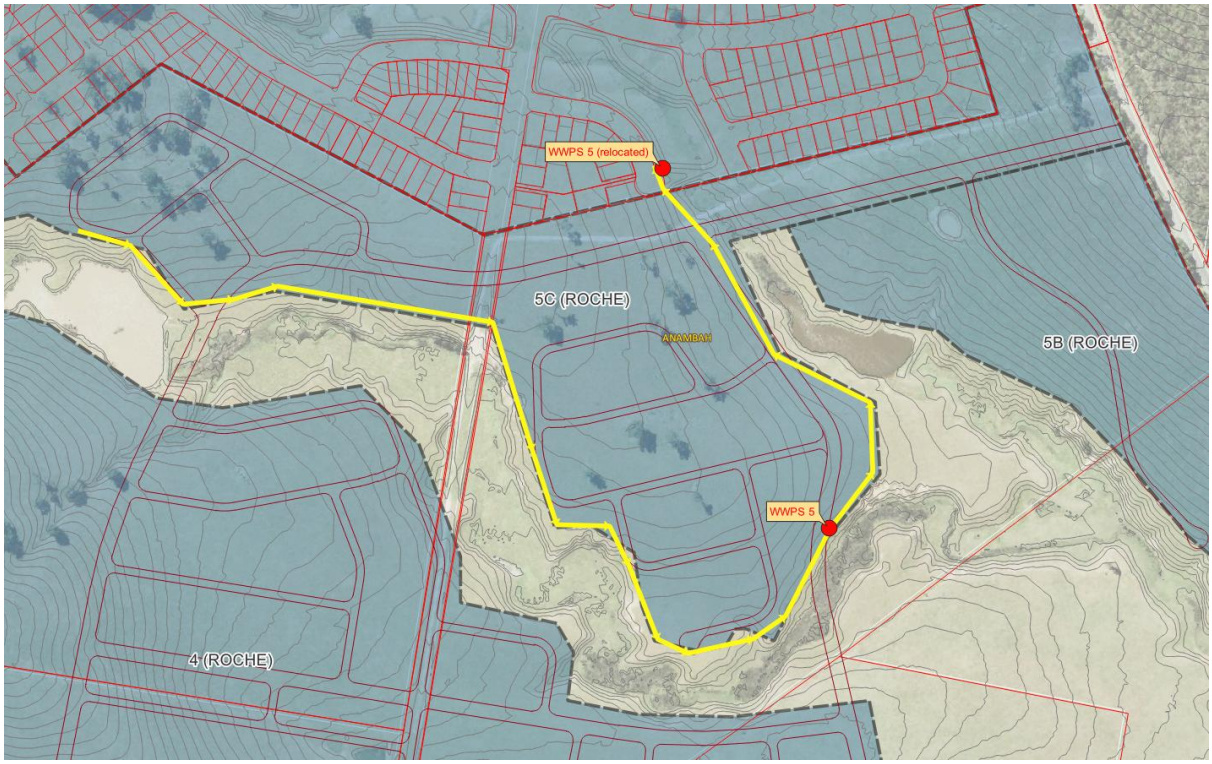

Figure 6 – WWPS 5 worst case gravity sewer reach.

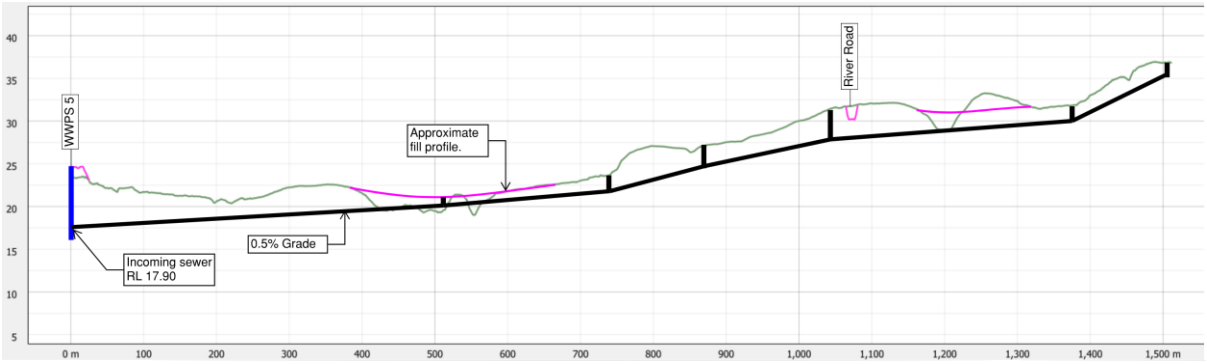

Figure 7 – Long section along critical gravity sewer reach to relocated WWPS 5.

Based on preliminary flood levels presented within the approved strategy, surface levels through the low point are expected to be approximately RL 21 mAHD, resulting in a final connection level of approximately RL 17.9 mAHD at WWPS 5, which is slightly higher than the RL 17.5 mAHD level quoted in the approved strategy. Based on a proposed higher finished surface level of RL24.0 mAHD at the new connection location, the maximum connecting gravity sewer depth will be 6.1m and overall wet well depth approximately 7.7m. It is noted however the gravity network traversing the land to the south will be shallower, as previously that network was driven deeper by the watercourse crossings to the north. Locating WWPS 5 closer to the watercourse crossing generally reduces the adjoining network depth.

A secondary benefit of relocating WWPS 5 closer to the watercourse is improved drainability of Catchment 5B. A plan and long-section of a revised gravity sewer alignment servicing Catchment 5B is provided in Figure 8 and Figure 9 respectively.

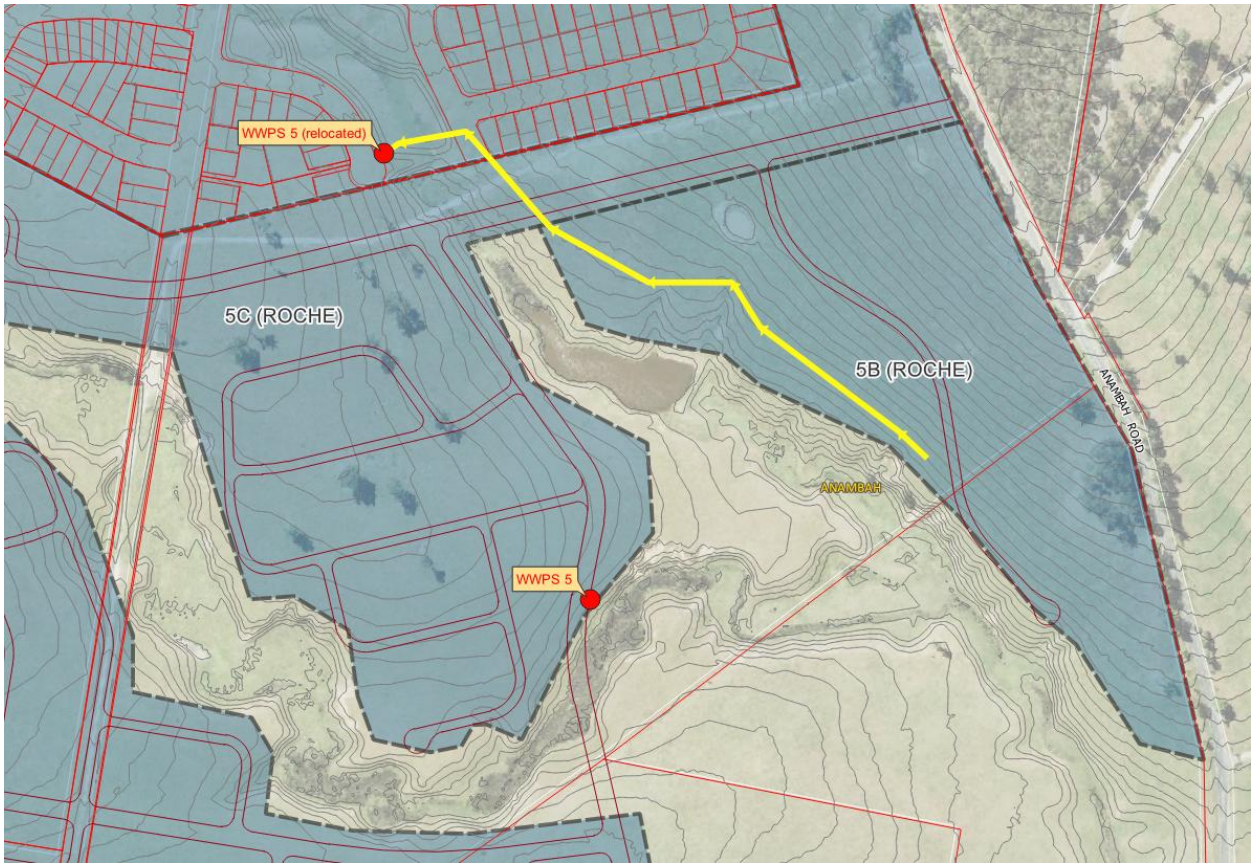

Figure 8 – Gravity sewer alignment from Catchment 5B to relocated WWPS 5.

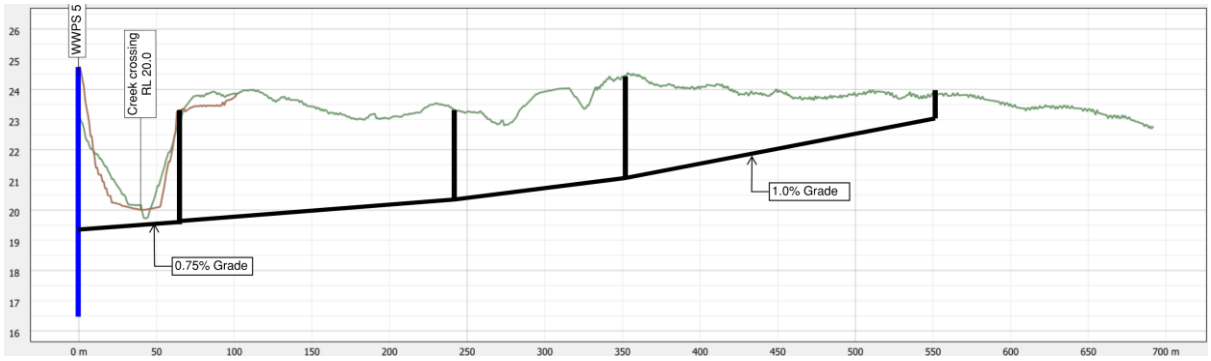

Figure 9 – Long section along gravity sewer reach from Catchment 5B.

Due to the topography of Catchment 5B and practical limitations on overall sewer depth, drainability of the full catchment area may not be possible. However, the provision of a gravity sewer to this land will potentially avoid the need for an authority-owned pressure sewer network.

4.2.2 River Road Rising Main

The proposed interim River Road rising main alignment is shown in Appendix B Exhibit 1. Noting the significant pipe length required, management of rising main head losses and detention times across the range of generated flows from the Thirdi development will be critical.

The proposed discharge arrangement would comprise approximately 3,700 m of DN250 rising main discharging to approximately 300 m of new gravity sewer mains. The gravity sewer would connect to the existing DN375/DN450 trunk gravity mains near the intersection of River Road and the New England Highway, which is discussed in further detail below. Details of WWPS 5 with the interim River Road rising main configuration are provided in Table 4.

Table 4 – WWPS 5 details, interim River Road rising main configuration.

Parameter	
Pump duty	70 L/s @ 72 m
Approx. Equivalent Tenements	860 ET
Wet well diameter	DN3800
Surface level	24.0 mAHD (approx.)
Incoming sewer invert	17.9 mAHD (approx.)
Wet well invert	16.35 m
Operating depth	0.9 m
Total wet well depth	7.65 m
Rising Main Size	DN250
Rising Main Length	3700 m
Rising Main Velocity	1.4 m/s
Detention Time	5.5 hours

An example pump selection for the above configuration is provided in Appendix D.

A diameter of DN250 was selected for the interim configuration to achieve both acceptable head losses up to the target sewer loading and minimise detention time. As per Table 4, a DN250 rising main will support 860 ET or just over 60% of the ultimate Catchment 5 wastewater load. Based on the adopted development timeframes presented in Table 1, this loading is expected to be reached by approximately year 16, at which point Roche Group are projected to commence development within Catchment 5. At that time, WWPS 5 would then be reconnected to the WWPS 3B gravity network as per the approved strategy, enabling ultimate wastewater servicing of Catchment 5 and 6. Ultimate WWPS 5 and 6 configurations are discussed further in Section 4.2.3. Alternative servicing arrangements in the event developer timeframes do not align are discussed further in Section 4.2.2.2.

4.2.2.1 Gravity Sewer Connection

The initial proposed connection point for the River Road rising main is a gravity sewer extension along River Road which connects to parallel DN375 and DN450 gravity carrier mains along the New England Highway.

HWC have advised that these mains convey flows from Lochinvar 1 WWPS, with current pump duty of 90 L/s directed to the DN375 main and the DN450 temporarily not in use. Under Stage 2 upgrades to Lochinvar 1, duty flow increases to 175 L/s, with flows diverted to the DN450 main, and the DN375 temporarily disused. Ultimate duty flows from Lochinvar 1 are 360 L/s, utilising both carrier mains. Timeframes for these upgrades is currently unknown. Selection of connection location will require consideration of upgrade timing at detailed design, however connection to the DN450 main is considered the most likely scenario.

Total capacity of both mains combined has not been confirmed by HWC, however has been estimated to be approximately 400 L/s based on a minimum grade of 0.6%. While less than the combined ultimate flows from Lochinvar 1 and WWPS5, it is considered unlikely both operating conditions will occur concurrently.

4.2.2.2 AURA Staging Considerations

As noted above, upon completion of WWPS 3B and the adjoining gravity network, WWPS 5 would be reconnected to that gravity catchment as per the ultimate arrangement presented in the approved strategy. Until this time, the rising main would need to remain within the River Road corridor.

Noting the significant development timeframes considered, there is some uncertainty regarding the timing that this final connection will occur. As per Table 4, the initial 3.7km rising main will be sufficient to cater for up to approximately 60% of the ultimate catchment yield, so there is a risk that delays in development to the south may restrict full development of the northern portion of the AURA. To address this, two alternative scenarios were considered, which are discussed in further detail below:

- Scenario A – Shorten the River Road rising main via interim connection to the WWPS 1A gravity network.
- Scenario B – Upsize the River Road rising main.

Scenario A

Under this scenario, WWPS 1A and associated rising mains are assumed to have been constructed, along with the trunk gravity sewer up to River Road. Based on the approved strategy it is understood that Catchment 1 is projected to be fully developed by year 10, with gravity sewer infrastructure likely be extended to the River Road corridor some time prior to this. A proposed point of connection for the River Road Rising main is illustrated in Figure 10 based on the preliminary trunk gravity network illustrated in the approved strategy.

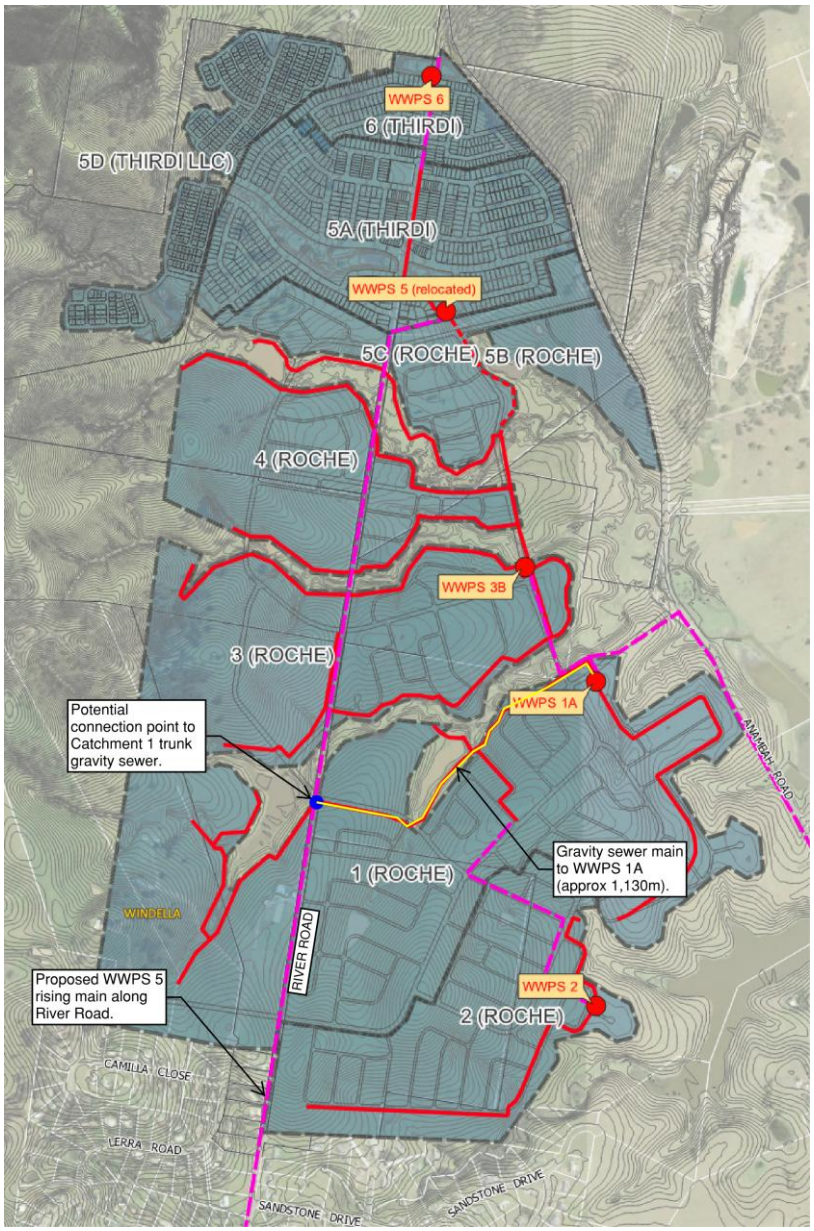

Figure 10 – Proposed connection of River Road rising main to future WWPS 1A gravity network.

Connection of the River Road rising main to the WWPS1A gravity network will shorten the rising main by approximately 2 km, achieving a significant reduction in total head losses and enabling additional pumped capacity. A comparison of the initial and shortened rising main configurations are provided in Table 5, based on the nominal maximum pump duty flow rate adopted in Table 4.

Table 5 – Comparison of WWPS 5 pump head and detention time with reduced length River Road rising main.

Parameter	Initial Rising Main	Shortened Rising Main
Rising Main Length	3,700 m	1,700 m
Rising Main Diameter	DN250	DN250
Pump Duty	70 L/s @ 72m	70 L/s @ 28m
Discharge RL (approx.)	54.0 mAHD	36.0 mAHD
Static Head	38 m	12 m
Pump Head	72 m	28 m
Detention Time	5.5 hours	2.6 hours

Shortening the rising main will therefore result in a significant decrease in required pump head as well as a reduction in detention time.

Provided sufficient capacity is allowed for within the future WWPS 1A gravity network, the shortened rising main would allow sufficient capacity for the ultimate wastewater loads from Catchment 5 and 6. Details of WWPS 5 in this scenario under ultimate loading conditions are provided in Table 6.

Table 6 – WWPS 5 configuration details – interim connection to WWPS 1A.

Parameter	WWPS 5 – interim configuration
Gravity catchment flow	92.0 L/s
Incoming flow from WWPS 6	20.5 L/s
Pump duty	112.6 L/s @ 46 m
Rising Main Size	DN250
Rising Main Length	1700 m
Rising Main Velocity	2.3 m/s
Detention Time	1.7 hours

It is noted the above ultimate pump duty with reduced length rising main may be achievable using the same pumps as the initial 3.7km rising main configuration via a reduction in impellor size. Example pump details for both configurations are provided in Appendix D.

The scenario in Table 6 would require appropriately sized gravity infrastructure downstream of the connection location, highlighted in Figure 10. Based on the wastewater loadings and catchment extents provided in the approved strategy, it has been estimated that the gravity catchment west of River Road accounts for approximately 30% of the Stage 1 catchment, or 425 ET. Combined with the ultimate pump duty from WWPS 5, total PWWF just downstream of the proposed connection point would be approximately 151 L/s.

The approved strategy does not provide pipe sizing or longitudinal sections for this gravity reach, however a preliminary review of topography along the proposed alignment has been undertaken to identify likely pipe sizing requirements. West of River Road it has been assumed that the gravity main along the watercourse will be grade-limited and likely DN300 or larger where it crosses River Road. Topography immediately east of River Road is steeper, up to 6%, which is likely to allow sufficient capacity for additional pumped flows from WWPS 5 without main upsizing, subject to final main alignment. Further west, the final sections of gravity sewer are again likely to be graded relatively flat along the watercourse. Assuming a minimum pipe grade of 0.5% along this reach, a minimum pipe size of DN525 would be required to accommodate combined flows from the Stage 1 catchment, WWPS 2 and WWPS 5. Following

disconnection of WWPS 5, there would still be sufficient inflow from these networks to achieve self-cleansing flows. A full assessment of sewer capacity and pipe grading would be required at detailed design stage to determine appropriate sizing for the downstream reaches.

If in future WWPS 5 is disconnected from the WWPS 1A gravity network, there would still be sufficient wastewater loads within the gravity network west of River Road to achieve self-cleansing flows in the network.

Regarding staging of WWPS 1A and associated rising main infrastructure, it is understood that the initial configuration is intended to service Catchment 1 and 2 initially, or approximately 1800 ET. Flows exceeding this would trigger the ultimate upgrade of the station, including activation of the second DN400 rising main along Anambah Road. It is noted that Roche Group are projected to commence development within Catchment 3 and 4 from year 8 onwards, compared to the River Road rising main not reaching capacity until year 16. It is therefore not expected that interim connection of WWPS 5 to the WWPS1A network will require accelerated timing of that pump station's upgrade.

Scenario B – Upsized Rising Main

Scenario B proposes construction of an additional 3.7 km DN300 rising main along River Road parallel to the DN250 main, once the latter reaches capacity. The costs associated with this Scenario are significantly higher than Scenario A and therefore would only be considered in the unlikely event development to the south was significantly delayed such that both WWPS 1A and 3B were not available for connection.

Following duplication of the rising main, the original DN250 main would then be made redundant but may be retained as a backup. Ultimate WWPS 5 details with the upsized rising main configuration are provided in Table 7.

Table 7 – WWPS 5 configuration details – upsized River Road rising main.

Parameter	WWPS 5 – ultimate flows
Gravity catchment flow	92.0 L/s
Incoming flow from WWPS 6	20.5 L/s
Pump duty	112.6 L/s @ 71 m
Rising Main Size	DN300
Rising Main Length	3700 m
Rising Main Velocity	1.6 m/s
Detention Time	5.0 hours

The upsized rising main would provide sufficient capacity to cater for the ultimate WWPS 5 and 6 wastewater loading, however would require upsized pumps – an example configuration is provided in Appendix D. It is noted that detention time in the upsized rising main will be longer than 4 hours at ultimate capacity and odour control measures may be required.

4.2.3 WWPS 5 Ultimate Configuration

It is intended that WWPS 5 will ultimately connect to WWPS 3B as soon as the necessary gravity sewer infrastructure becomes available, as per the ultimate arrangement presented in the approved strategy. It is expected these works would be funded by the lead developer through an agreed contribution or bond with HWC.

To reflect the proposed relocation of WWPS 5, along with revised sewer loadings and proposed finished surface level design, updated WWPS details for this configuration have been provided in Table 8.

Table 8 – WWPS 5 configuration details – ultimate connection to WWPS 3B.

Parameter	WWPS 5 – ultimate configuration
Gravity catchment flow	92.0 L/s
Incoming flow from WWPS 6	20.5 L/s
Pump duty	112.6 L/s @ 7 m
Wet well diameter	DN3800
Surface level	RL 24.0 mAHD (approx.)
Incoming sewer invert	RL 17.9 mAHD (approx.)
Wet well invert	16.35 m
Operating depth	0.9 m
Total wet well depth	7.65 m
Rising Main Size	DN300
Rising Main Length	600 m
Rising Main Velocity	1.6 m/s
Detention Time	1.0 hour
Emergency Storage Requirement (4 hours ADWF plus 3 minutes received pumped flow)	221 m^3

In the ultimate configuration, rising main detention times are less than 4 hours and septicity management would not be required. Estimated emergency storage within the wet well is 56 m^3, requiring 165 m^3 of online storage within the gravity network.

As the above pump duty represents an increase over the approved strategy, a preliminary assessment of rising main velocity has been undertaken for WWPS 3B and the common rising main with updated velocities provided in Table 9.

Table 9 – Rising main velocity impacts WWPS 1A and 3B.

RM Segment	Rising main configuration	Approved strategy velocity	With additional flows from WWPS 5 *
3B -> Common rising main	1 x DN400 HDPE, 470m	2.47 m/s	2.67 m/s
Common rising main	2 x DN400 HDPE, 3360 m	2.12 m/s	2.23 m/s

* Based on increase in duty flow rate from WWPS 5 of 16.6 L/s.

The increase in velocity resulting in additional flows is generally considered minor and are unlikely to result in significant impact on system performance. A full assessment of system performance will need to be undertaken at detailed design stage.

4.2.4 WWPS 6 Ultimate Configuration

To reflect the updated sewer loadings for the subject land and proposed finished surface level design, revised WWPS details have been summarised in Table 10. As per the current strategy, WWPS 6 would be constructed to ultimate capacity with emergency storage provided within the wet well and adjoining gravity network.

Table 10 – WWPS 6 details.

Parameter	WWPS 6 – ultimate configuration
Pump duty	20.5 L/s @ 14 m
Wet well diameter	DN1800
Surface level	26.0 mAHD (approx.)
Incoming sewer invert	23.0 mAHD (approx.)
Wet well invert	21.55 m
Control depth	0.8 m
Total wet well depth	4.45 m
Rising Main Size	DN150
Rising Main Length	285 m
Rising Main Velocity	1.2 m/s
Detention Time	0.8 hours
Emergency Storage Requirement (based on 4 hours ADWF)	36 m^3

5. Conclusion and Recommendations

Northrop have reviewed several alternative options for interim servicing of the subject land. Following a review of technical constraints and development timeframes, the following servicing option is recommended:

- Relocation of WWPS 5 approximately 400 metres north-west to be situated within the subject land.
- Construction of approximately 3700 metres of DN250 rising main along the River Road corridor, along with to 300 metres of new gravity mains, ultimately connecting to an existing DN375 trunk sewer along the New England Highway.

Following completion of WWPS 1A and 3B along with respective gravity networks, WWPS 5 will be reconnected to discharge to the WWPS 3B catchment in accordance with the approved strategy.

In the event that the interim River Road rising main reaches capacity and the WWPS 3B network is not available for connection, the following servicing arrangements may be considered:

- Shortening the River Road rising main through connection into the WWPS 1A gravity network, or;
- In the event that the WWPS 1A gravity network is unavailable, upsize the River Road rising main to DN300.

The proposed amendments to the wastewater servicing arrangements aligns with Hunter Water's design criteria and enables independent operation should neighbouring development be delayed, whilst remaining compatible with the ultimate AURA network.

A draft wastewater reticulation layout for the proposed subdivision is included in Appendix C.

Appendix A – Hunter Water Correspondence

Lach McRae

From: Lach McRae
Sent: Tuesday, 16 July 2024 4:51 PM
To: Barry Calderwood (barry.calderwood@hunterwater.com.au)
Cc: Brian Swaine; Jason McIntosh
Subject: 559 Anambah Road - wastewater servicing HWC inception meeting

Hi Barry, thanks for organising our meeting yesterday to review wastewater servicing at the proposed subdivision of 559 Anambah Road. Please find below minutes from our meeting.

Meeting held online. 11.30am 15 July 2024

Attendees:
HWC Barry Calderwood
HWC Wes Jones
HWC Nigel Chenery
HWC Orod Zarrin
HWC Nathan Hays
HWC Subhan Das
Thirdi Brian Swaine
Vara Jason McIntosh
Northrop Lach McRae

Minutes:

- HWC noted under the approved strategy three WWPS's (1A, 3B and 5) would need to be delivered to enable development of the Thirdi lot.
- Thirdi would need to prepare an addendum if it seeks to deviate from the approved strategy.
- HWC noted that an addendum to the approved strategy had been requested to consider rezoning in Lochinvar "fringe" (west of URA) including a gravity catchment that would be pumped over the hill and into the Anambah URA.
- HWC confirmed that a barometric loop on the twin 400 rising mains was proceeding as the alternative for an underbore along Anambah Road was cost prohibitive.
- HWC noted that GCA is currently reviewing the rising main and gravity main alignments from WWPS 1A and were expecting a 15% detailed design that addressed this.
- Northrop requested HWC provide advice on the extent and timing for lead in assets being delivered for Stage 1 of Roche development so that this could be considered in the addendum.
- Northrop noted that the development within gravity catchments WWPS 5 and 6 as presented in Table 5 of the strategy was not until after 2040 and this does not reflect Thirdi's development program.
- HWC noted additional pump stations had been reviewed in preparation of the approved strategy however found increasing the depth of gravity sewers and minimise pump stations was favoured.
- HWC noted both timing and the locations of proposed pump stations could be reviewed in the Northrop addendum. HWC requested that any option be reviewed in terms of technical viability, cost and community benefit.
- Northrop noted one option being considered was pumping from Thirdi land up to the crest on Anambah Road and then gravitating down Anambah Road to WWPS1A. Both options would need further review however it may be possible to relocate WWPS 5 onto Thirdi land. Alternatively, the addition of a new pump station on the north eastern side of creek D may mean the large area of non drainable land shown in the strategy (or part of) could be sewered.
- Northrop noted that WWPS #1A seemed to be at a higher elevation than expected and may be better shifted towards Anambah Road. HWC noted the pump station location could be reviewed however it would need to be above the 1% AEP flood level.
- HWC noted that CAF would likely be available to WWPS 1A as well as 3B and 5. Ie any asset that needed to be upsized.
- HWC noted a possible temporary rising main along the River Road extension could be considered however it would likely be costly and would not attract CAF. Northrop noted this option would need to be reviewed further both in terms of cost and technical feasibility.
- HWC advised that there is no issue with plan stamping for a Concept masterplan and Stage 1 DA. Will need an application for stamping.

Please let me know if you would like to add to / amend the above. Thanks again for your time.

Kind regards,
Lach McRae
Principal | Civil & Environmental Engineer

Northrop Consulting Engineers
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M 0448 831 345

Appendix B – Exhibits

NORTHROP

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ABN 81 094 433 100

JOB NUMBER
NL222055-01

PROJECT
PROPOSED SUBDIVISION

WASTEWATER SERVICING ADDENDUM

DRAWING TITLE
SEWER STAGING PLAN

DRAWING NUMBER
CSK14.01

REVISION
C

SCALE 1:8000@A1 0 80 160 240 320 400m

DRAWING SHEET SIZE = A1

REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE
A	ISSUED FOR INFORMATION	JS		AK	07.03.25
B	REISSUED FOR INFORMATION	JS		AK	02.04.25
C	REISSUED FOR INFORMATION	JS		AK	10.10.25

EXHIBIT 1

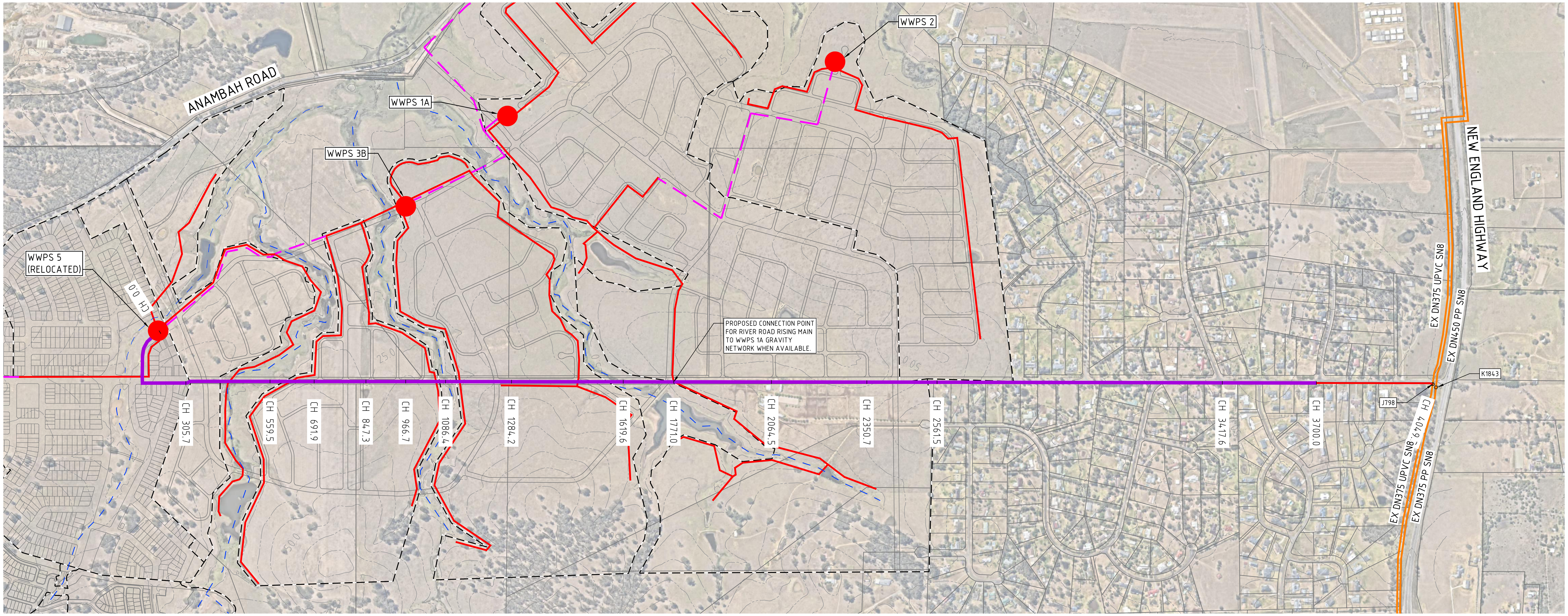
LEGEND

- BOUNDARY LINE
- PROPOSED SEWER GRAVITY MAIN
- PROPOSED SEWER RISING MAIN
- PROPOSED INTERIM SEWER RISING MAIN
- EXISTING SEWER GRAVITY MAIN
- PROPOSED WASTEWATER PUMP STATION (WWPS)
- SEWER CATCHMENT EXTENTS
- EXISTING WATERCOURSE
- EXISTING CONTOURS (5.0m INTERVALS) XX.XX

NOTES

1. PROJECTED CONSTRUCTION TIMEFRAMES ARE INDICATIVE ONLY AND SUBJECT TO CHANGE.
2. DEVELOPMENT LAYOUT AND SEWER ARRANGEMENT FOR ROCHE-OWNED LAND ADAPTED FROM ADWJ WASTEWATER SERVICING STRATEGY DATED 11/01/2024.
3. CATCHMENT DELINEATION FOR ROCHE LAND SHOWN FOR ILLUSTRATIVE PURPOSES ONLY. REFER TO ADWJ STRATEGY FOR FINAL EXTENTS.

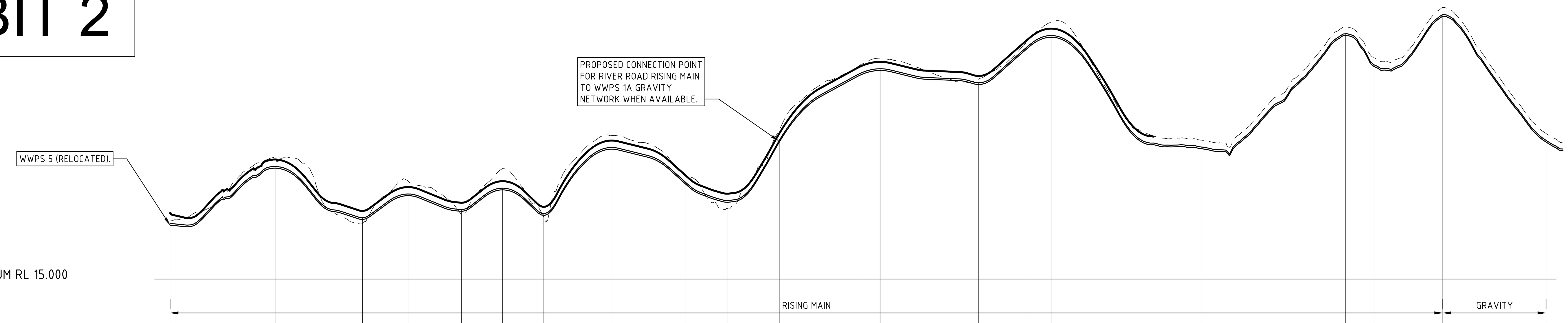
WWPS 6
CATCHMENT 5D (THIRDI) 2026-2028
CATCHMENT 6 (THIRDI) 2036-2041
CATCHMENT 5A (THIRDI) 2026-2045
WWPS 5 (RELOCATED)
CATCHMENT 5B (ROCHE) 2041-2043
CATCHMENT 5C (ROCHE) 2041-2043
CATCHMENT 4 (ROCHE) 2039-2041
INDICATIVE ALIGNMENT OF ULTIMATE CONNECTION OF WWPS 5 TO WWPS 3B GRAVITY NETWORK.
WWPS 3B
CATCHMENT 3 (ROCHE) 2033-2039
WWPS 1A
ANAMBAH ROAD
PROPOSED CONNECTION POINT FOR RIVER ROAD RISING MAIN TO WWPS 1A GRAVITY NETWORK WHEN AVAILABLE.
RIVER ROAD
CATCHMENT 1 (ROCHE) 2025-2035
CATCHMENT 2 (ROCHE) 2029-2033
WWPS 2
PROPSOED DUAL DN400 RISING MAINS.
PROPOSED INTERIM RISING MAIN ALIGNMENT ALONG RIVER ROAD. REFER DRAWING CSK14.02 FOR LONGITUDINAL SECTION.
PROPOSED GRAVITY SEWER.
MH J798
MH K1843
EX DN375 UPVC SN8
EX DN375 PP SN8
EX DN375 UPVC SN8
EX DN450 PP SN8
NEW ENGLAND HIGHWAY
TO RUTHERFORD 2 WWPS.



LEGEND

- BOUNDARY LINE
- PROPOSED SEWER GRAVITY MAIN
- PROPOSED SEWER RISING MAIN
- PROPOSED INTERIM SEWER RISING MAIN
- EXISTING SEWER GRAVITY MAIN
- PROPOSED WASTEWATER PUMP STATION (WWPS)
- EXISTING WATERCOURSE
- EXISTING CONTOURS (5.0m INTERVALS)

EXHIBIT 2



DESIGN SURFACE	24.6	32.4	25.8	24.9	28.4	26.1	29.2	25.5	35.1	30.0	27.4
EXISTING SURFACE	23.6	32.7	24.1	23.0	29.3	24.4	31.1	24.0	35.9	30.2	25.3
PIPE OBVERT	23.1	31.4	24.8	23.9	27.4	25.1	28.2	24.5	34.1	29.0	26.4
CHAINAGE	0	305.7	500	559.5	691.9	847.3	966.7	1086.4	1284.2	1500	1619.6

DESIGN SURFACE	36.2	45.8	46.6	44.5	50.1	51.4					
EXISTING SURFACE	36.7	45.9	47.0	44.0	50.0	52.4	35.2	51.7	47.2	54.5	36.2
PIPE OBVERT	35.1	44.8	45.6	43.5	49.1	50.4	34.2	50.7	46.2	53.5	35.2
CHAINAGE	1771	2000	2064.5	2350.7	2500	2561.5	3000	3417.6	3500	3700	4000

RM01 - LONGITUDINAL SECTION

HORIZONTAL SCALE 1:8000@A1
VERTICAL SCALE 1:400@A1

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ABN 81 094 433 100

JOB NUMBER: NL222055-01

PROJECT: PROPOSED SUBDIVISION — WASTEWATER SERVICING ADDENDUM

DRAWING TITLE: INTERIM RISING MAIN - RIVER ROAD

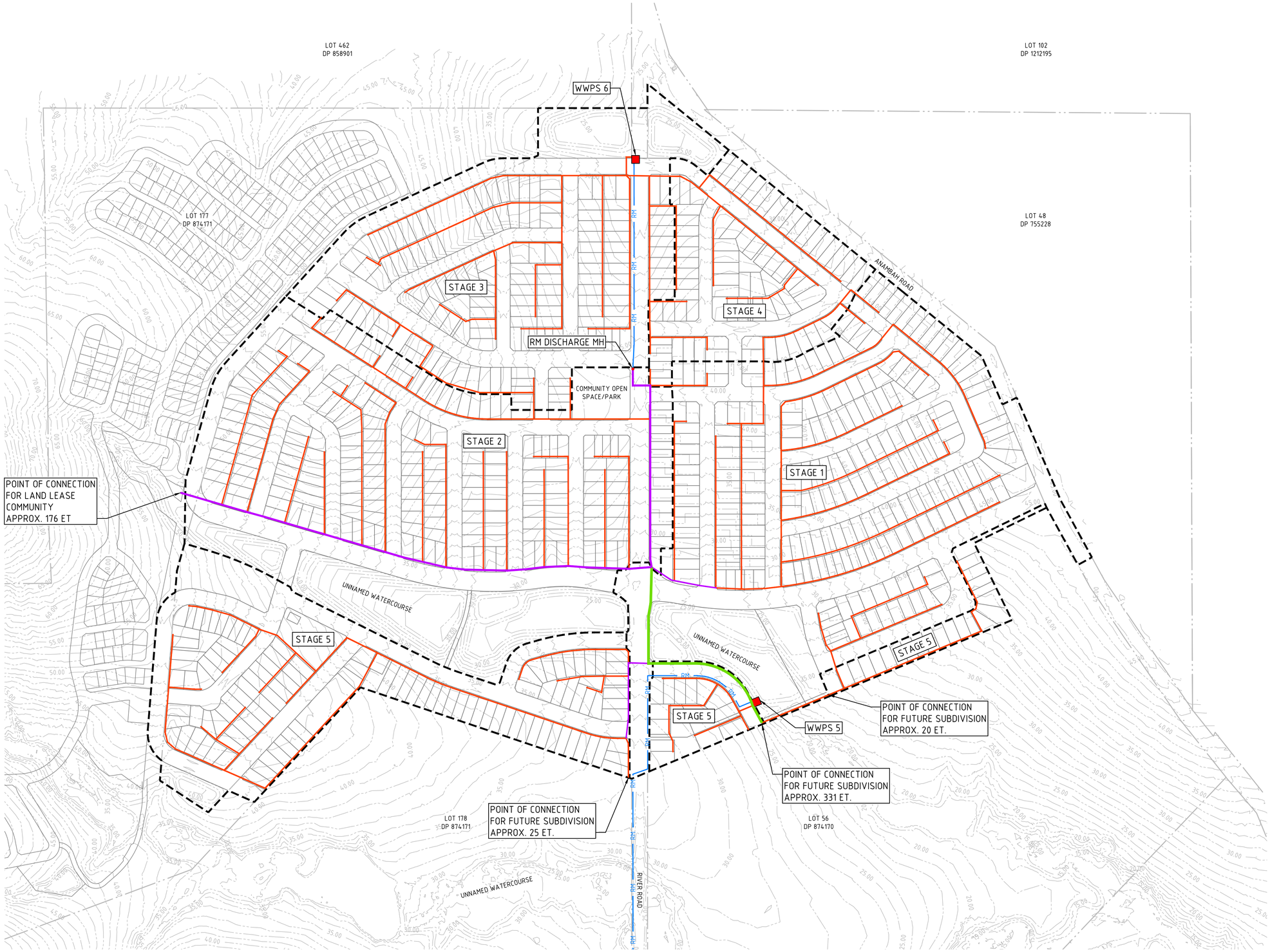
DRAWING NUMBER: CSK14.02 REVISION: B

SCALE 1:6000@ A1 0 60 120 180 240 300m

DRAWING SHEET SIZE = A1

REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE
A	ISSUED FOR INFORMATION	JS		AK	07.03.25
B	REISSUED FOR INFORMATION	JS		AK	10.10.25

Appendix C – Draft Reticulation Layout



LEGEND

- PROPOSED BOUNDARY LINE
- EXISTING BOUNDARY LINE
- STAGE BOUNDARY LINE
- RM — PROPOSED RISING MAIN
- PROPOSED DN150 GRAVITY SEWER
- PROPOSED DN225 GRAVITY SEWER
- PROPOSED DN300 GRAVITY SEWER
- PROPOSED SEWER PUMP STATION
- XX.XX — EXISTING CONTOURS (1m INTERVALS)

DRAWN: J.STAUB DESIGNED: A.KILLEN JOB MANAGER: L.MCRAE VERIFIER:

BEFORE YOU DIG www.byda.com.au

NOT FOR CONSTRUCTION

REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE
A	ISSUED FOR INFORMATION	JS		AK	07.03.25
B	REISSUED FOR INFORMATION	JS		AK	10.10.25

CLIENT: Third.i COMMUNITIES

DRAWING NOT TO BE USED FOR CONSTRUCTION UNLESS VERIFICATION SIGNATURE HAS BEEN ADDED

COUNCIL

ALL DIMENSIONS TO BE VERIFIED ON SITE BEFORE COMMENCING WORK.
NORTHROP ACCEPTS NO RESPONSIBILITY FOR THE USABILITY, COMPLETENESS OR SCALE OF DRAWINGS TRANSFERRED ELECTRONICALLY.
THIS DRAWING MAY HAVE BEEN PREPARED USING COLOUR, AND MAY BE INCOMPLETE IF COPIED TO BLACK & WHITE.

SCALE 1:2500@ A1 — 0 25 50 75 100 125m

NORTHROP
Newcastle
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PROJECT: **PROPOSED SUBDIVISION 559 ANAMBAH ROAD GOSFORTH NSW 2320**

SEWER MASTERPLAN

DRAWING TITLE: **CIVIL ENGINEERING PACKAGE**

SEWER MASTERPLAN

JOB NUMBER: **NL222055-01**

DRAWING NUMBER: **CSK11.01** REVISION: **B**

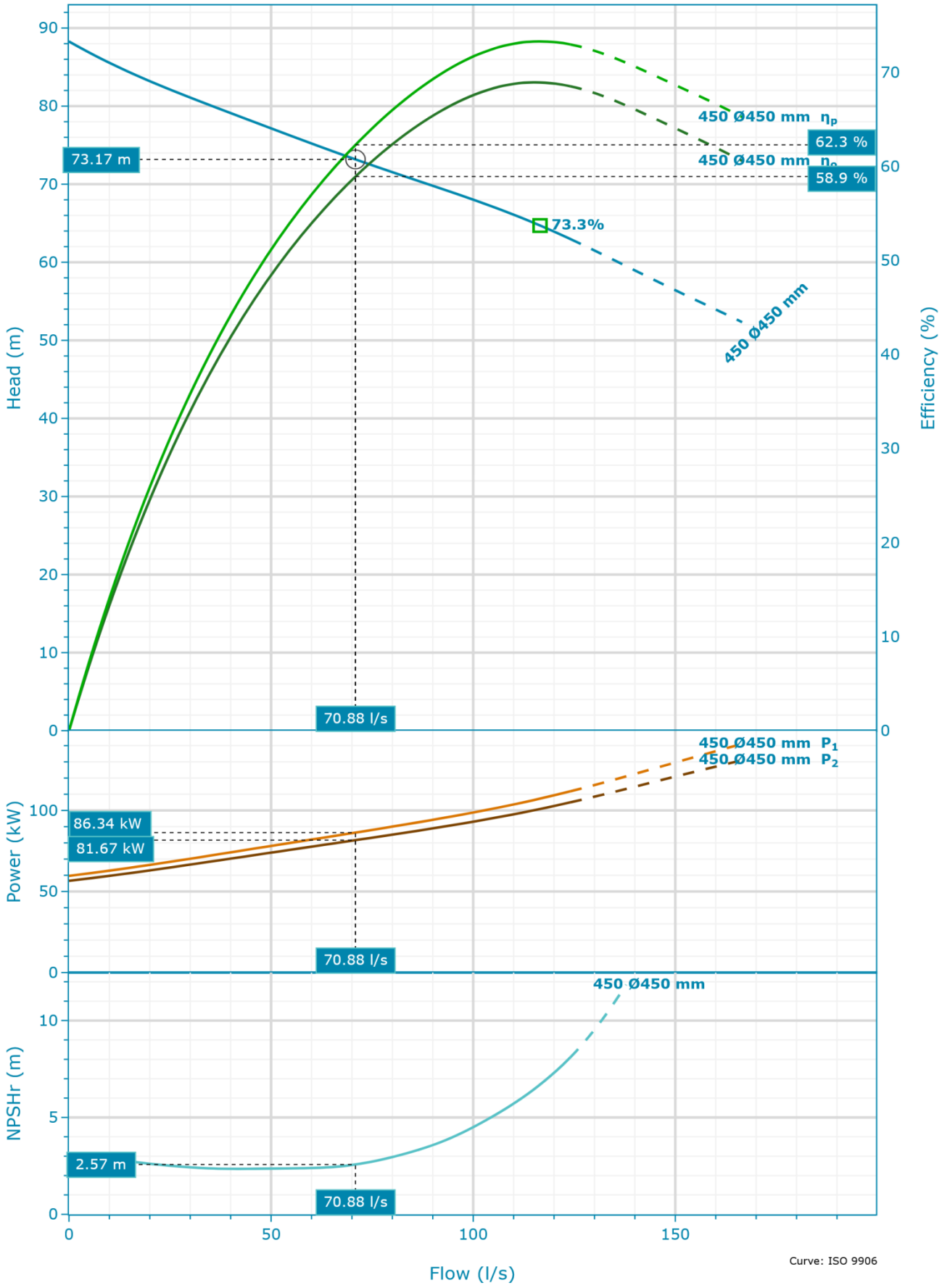
DRAWING SHEET SIZE = A1

Date : 10.10.2025 2:23 PM Plotted By : ANDREW KILLEN Found : O:\5 Pre-July 24 Projects\Newcastle\YEAR 2022 Jobs\NL222055-01 - 559 Anambah Road, Gosforth\O - Drawings\CIVIL\02-SKETCH\CSK11-01-SEWER DR\NL222055-01-CSK11-01-SEWER MASTERPLAN.dwg

Appendix D – Pump Details

Pump Configuration #1:
3.7 km DN250 rising main, River Road

NP 3315 HT 3~ 450 | Hydraulic Data & Performance Curve



Nominal (mean) data shown. Under- and over-performance from this data should be expected due to standard manufacturing tolerances. Please consult your local Flygt representative for performance guarantees.

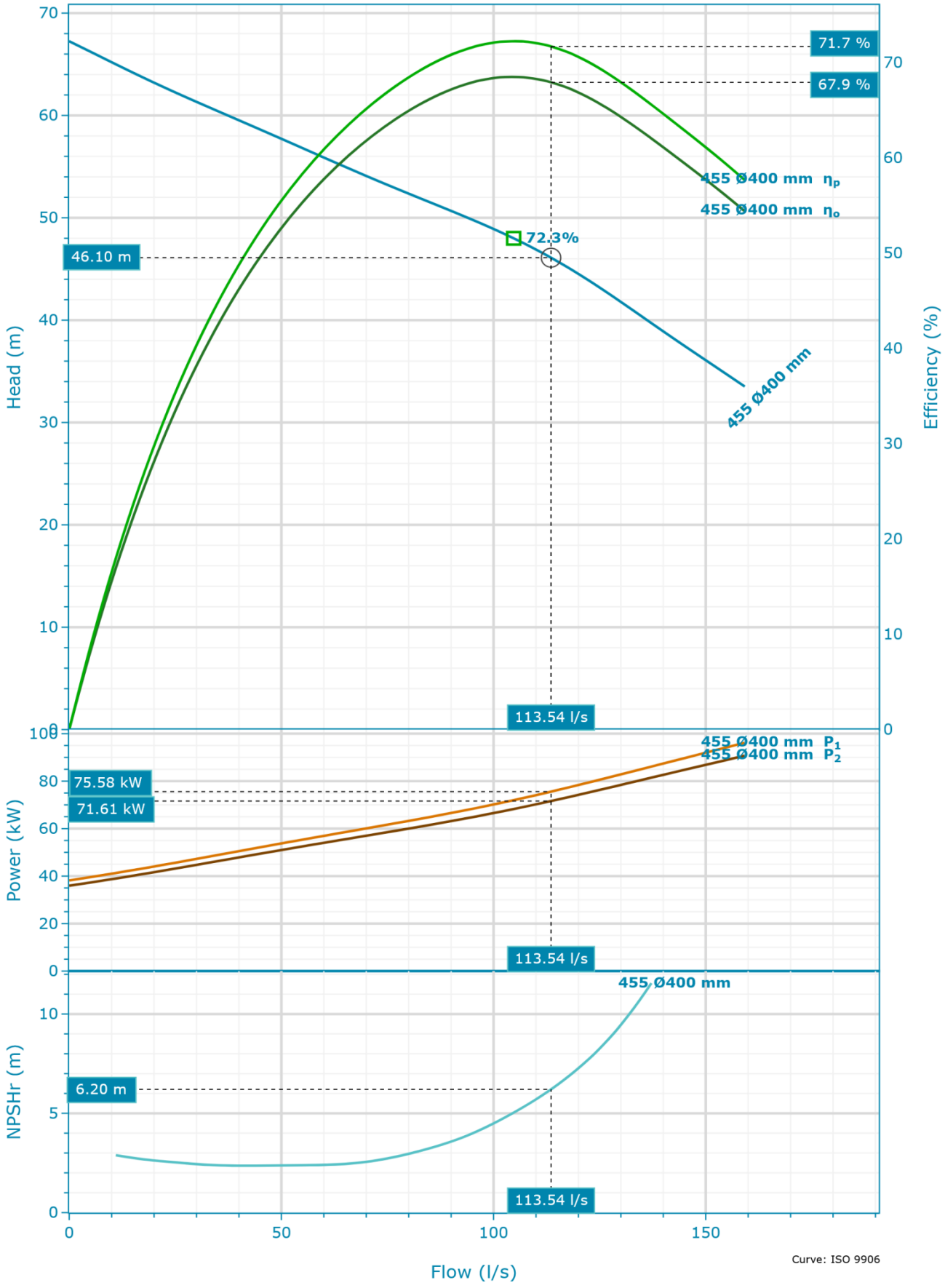
Selection

Series	Curve Code
N 3000	450
Name	Impeller Diameter

Fluid

Fluid Type	Density
Water	1,000 kg/m³
Fluid Temperature	Dynamic Viscosity

NP 3315 HT 3~ 455 | Hydraulic Data & Performance Curve



Nominal (mean) data shown. Under- and over-performance from this data should be expected due to standard manufacturing tolerances. Please consult your local Flygt representative for performance guarantees.

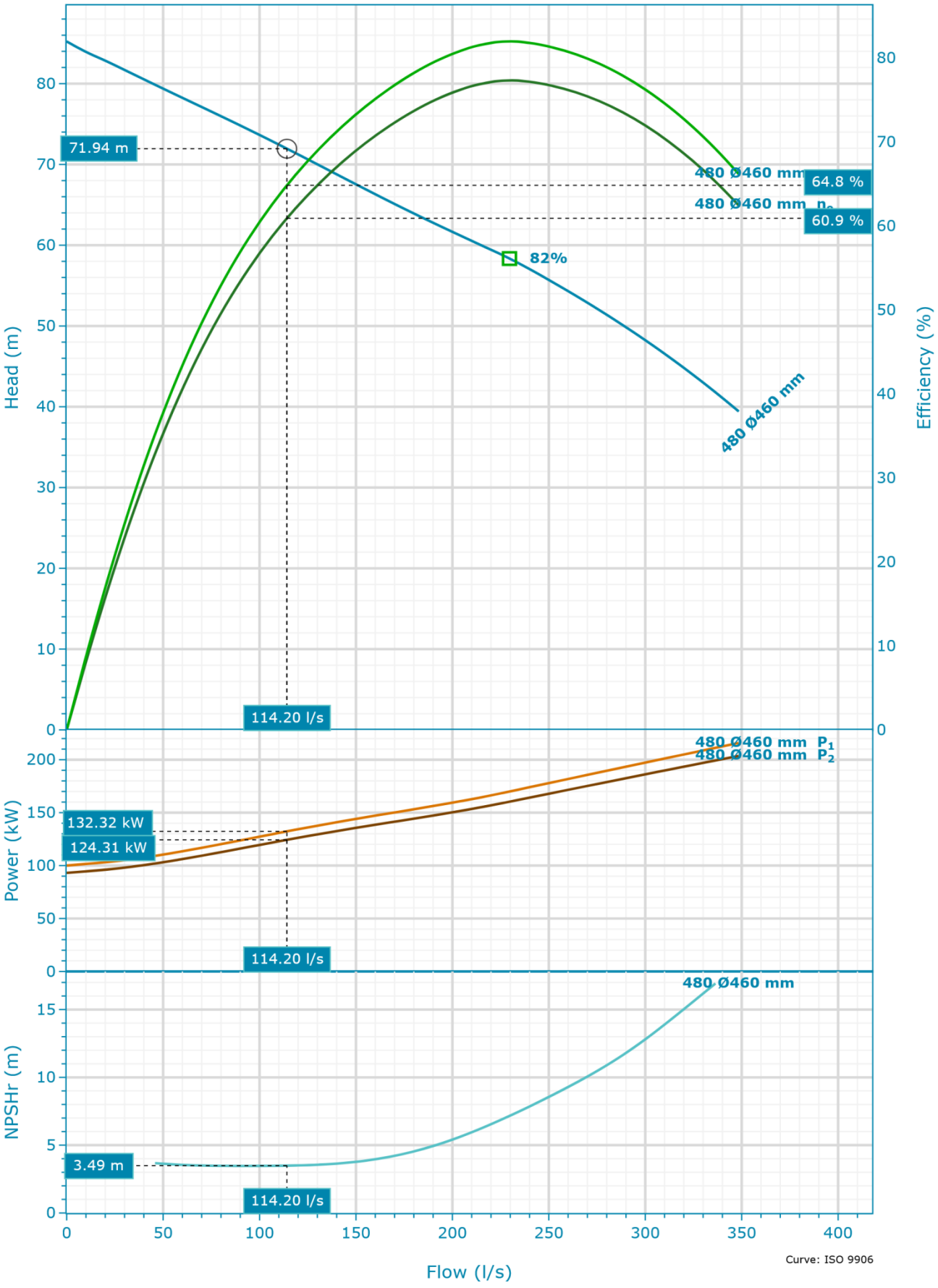
Selection

Series	Curve Code
N 3000	455
Name	Impeller Diameter

Fluid

Fluid Type	Density
Water	1,000 kg/m³
Fluid Temperature	Dynamic Viscosity

NP 3231/765 3~ 480 | Hydraulic Data & Performance Curve



Nominal (mean) data shown. Under- and over-performance from this data should be expected due to standard manufacturing tolerances. Please consult your local Flygt representative for performance guarantees.

Selection

Series	Curve Code
N 3000	480
Name	Impeller Diameter

Fluid

Fluid Type	Density
Water	1,000 kg/m³
Fluid Temperature	Dynamic Viscosity

CIVIL

Water Servicing Strategy Addendum

for

559 Anambah Road Residential Subdivision

for Thirdi Anambah Pty Ltd

NL222055 / 10 October 2025 / Revision D

Report Document Control

Project: 559 Anambah Road Development Subdivision

Project Ref: NL222055

Document Ref: E03

File Name: NL222055_E03 Water Servicing Addendum [D].docx

Client: Thirdi Anambah Pty Ltd

Title: Water Servicing Strategy Addendum

Revision History

Revision	Report Status	Issue Date	Prepared	Reviewed
A	Draft Issue	07/03/2025	AK	LM
B	Issue to HWC	03/04/2025	AK	LM
C	Amendments	04/09/2025	AK	LM
D	Reissue to HWC	10/10/2025	AK	LM

Prepared:

Andrew Killen
Civil Engineer
BEng (Civil) (Hons)

Reviewed:

Lach McRae
Principal | Senior Civil & Environmental Engineer
BEng (Civil & Environmental) (Hons)
MIEAust CPEng NER (Civil)

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Northrop Consulting Engineers Pty Ltd (Northrop) has been retained to prepare this report based on specific instructions, scope of work and purpose pursuant to a contract with its client. It has been prepared in accordance with the usual care and thoroughness of the consulting profession for the use by Thirdi Anambah Pty Ltd. The report is based on generally accepted practices and standards applicable to the scope of work at the time it was prepared. No other warranty, express or implied, is made as to the professional advice included in this report.

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Executive Summary

Northrop Consulting Engineers has been engaged by Thirdi Anambah Pty Ltd to prepare a water servicing addendum for a proposed residential subdivision at 559 Anambah Road, Anambah. The proposed subdivision forms part of the Anambah Urban Release Area (AURA), a 490-hectare parcel of land zoned for general residential development. Thirdi are proposing to release 820 residential lots over several stages. Thirdi are also preparing a development application for a proposed Land Lease Community located within RU2 zoned land to the west of the AURA.

Water servicing of the broader AURA has previously been reviewed as part of an approved Water Servicing Strategy prepared by ADW Johnson on behalf of Roche Group. The proposed servicing arrangement comprises extending dual DN375 mains from an existing DN375 trunk main on the New England Highway approximately 1.6 km along River Road. The mains would then reduce in size and diverge, one travelling east towards Anambah Road to service the first stages of the Roche development and the other extending northward as required, both mains ultimately forming a ring main in the final configuration. Due to topography, lots above RL 41.0 would require construction of a booster pump station. This booster, located just north of the existing River Road culdesac would replace the existing Wyndella 1 WPS.

To enable development to proceed within the subject land, the following servicing arrangement is proposed:

- Construction of the dual DN375 trunk mains along River Road, interconnected to achieve looped circulation through the mains as per the approved strategy.
- Extend 1 x DN250 and 1 x DN200 supply mains from the DN375 mains approximately 2.3 km along River Road to reach the development site. These mains would be similarly interconnected for security of supply.
- At such time that development above RL 41.0 is required, construction of the booster WPS would occur as per the approved strategy. The DN200 main would then be connected to the booster to supply the high-level lots.

The proposed amendments to the water servicing arrangements aligns with Hunter Water's design criteria and enables independent servicing of the subject site, whilst remaining compatible with the ultimate AURA network.

Contents

Appendices

1. Background

Northrop Consulting Engineers have been engaged by Thirdi Anambah Pty Ltd (Thirdi) to prepare a Water Servicing Addendum for a proposed residential development located at 559 Anambah Road, Gosforth NSW 2320 or Lot 55 DP8741070 and Lot 177 DP87417169 (the subject land).

The subject land forms part of the broader Anambah Urban Release Area (AURA) which comprises approximately 490 hectares of land zoned primarily as R1 General Residential with areas of C4 Environmental living and R5 Large Lot residential.

Within the subject land, Thirdi is seeking to develop approximately 845 residential lots within the R1 zoned portion. In addition, Thirdi are preparing a development application for a proposed Land Lease Community (LLC) located within land to the west zoned RU2 Rural Landscape.

Previously, two Water Servicing Studies have been prepared for the area by ADW Johnson. The first was prepared on behalf of Stockland and approved by Hunter Water (HWC) in July 2012. This approval has since lapsed and Stockland's majority landholdings have been acquired by Roche Group who are now seeking to develop approximately 228 hectares of residential land within the AURA. ADW Johnson have subsequently prepared a revised water strategy encompassing the broader AURA, final version dated 04/10/2023.

The intent of this addendum is to review specific water servicing arrangements for the proposed Thirdi development in the scheme of the ultimate AURA servicing. As such this document should be read in conjunction with the approved Water Servicing Strategy.

1.1 Liaison with Hunter Water

HWC have previously issued preliminary servicing advice for the Thirdi development on 02/05/2024. The letter requested preparation of this strategy addendum if deviation from the approved strategy is required.

An initial progress meeting was held with HWC, Northrop and Thirdi personnel on 15/07/2024. Minutes of this discussion are included in Appendix A and summarised below.

In absence of development to the south, an option was raised where additional lead in mains would be extended along the River Road corridor to service the Thirdi site. This alignment would be subject to a technical assessment to confirm feasibility. Dual mains would be required to service the low level and high-level zones respectively and for security of supply purposes. HWC also advised that the new booster pump station would be required upon development occurring within the high-level zone.

HWC have subsequently issued a Notice of Formal requirements for Stage 1 of the Thirdi development (HWC ref 2024-1462, dated 25/10/2024).

1.2 Study Area

The AURA borders the existing Windella rural residential estate to the south, farmland to the north and west and Anambah Road to the east. The majority of the AURA consists of cleared pastureland with localised areas of remnant vegetation. Various unnamed watercourses traverse the site, generally east to west with portions to the eastern and south-eastern areas of the AURA being flood affected.

The Thirdi land is located at the northern extremity of the AURA and is bounded by Anambah Road to the east and north-east and pastureland to the remainder. A watercourse extends east to west through the site. Existing elevations within the Thirdi land range from RL20.0 at the lower reaches of the watercourse and up to RL58.0 at the north-western boundary.

The study area and current land zoning is illustrated in Figure 1.

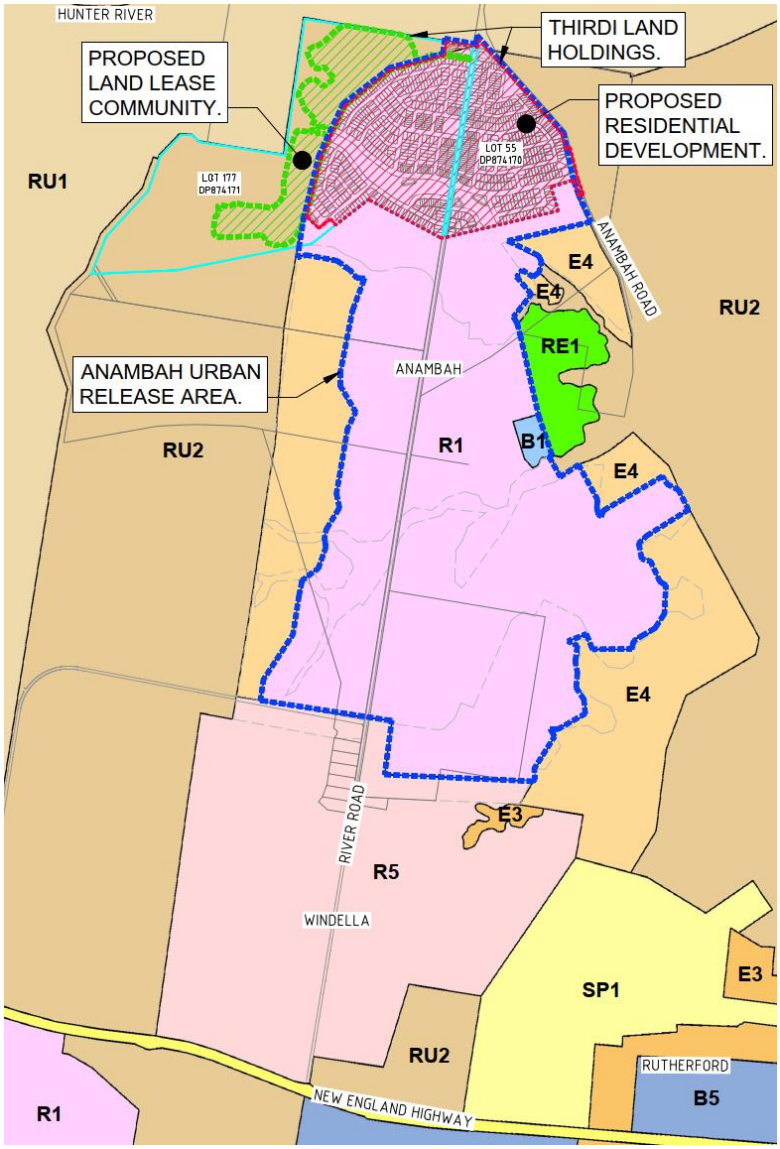

Figure 1 – Study area and current land zoning.

1.3 Existing Water Servicing Strategy

1.3.1 Existing Infrastructure

The water supply network for the local area consists of an elongated trunk supply route along the New England Highway, extending as far west as Branxton and Rothbury. During average day demand (ADD) conditions Four Mile Creek reservoir dominates supply of the area, with trunk mains along the New England Highway supplying water east to west to a series of reservoirs.

The closest water reservoir to the AURA is Lochinvar 2 reservoir, located south of the New England Highway. This reservoir is supplied via an automatic inlet valve (AIV) located to the east, near the intersection of the New England Highway and Mirage Road. Under ADD conditions the AIV is open, allowing Lochinvar 2 to fill to maximum operating level from Four Mile Creek reservoir. During peak day demand (PDD) conditions, the HGL from Four Mile Creek reservoir falls below the Lochinvar 2 reservoir operating levels, at which point the AIV closes resulting in the local system being supplied from Lochinvar 2 only.

Higher elevation lots within the Windella rural residential estate are currently serviced from the Windella 1 WPS, located along River Road, approximately 200 metres north of the New England Highway.

1.3.2 Proposed Servicing

Due to topography, the AURA will be serviced by two pressure zones, with the high-level zone servicing lots located above RL 41.0 mAHD.

For the low-level zone, the preferred option proposes extending dual DN375 trunk mains along River Road from an existing DN375 trunk main along the New England Highway. The dual mains will connect to existing blanked stop valves AA086 and AA087 located within Lot 1 DP1159523.

The dual DN375 mains would then extend for approximately 1.6 km along the River Road verge, terminating just north of the existing River Road culdesac. The mains would then reduce in size and diverge, one travelling east towards Anambah Road to service the initial stages of the Roche development and the other extending northward, with both legs ultimately forming a large ring main in the final configuration.

A key constraint with this servicing arrangement is the management of water age, particularly in the early stages of development. To address this, it has been proposed to locate an automated control valve on the existing DN375 mains between the proposed DN375 offtakes to achieve looped circulation. It is understood when the AIV is open, incoming flows from the east would be looped along the dual DN375 mains effectively flushing the trunk mains. According to the approved strategy a flow rate within the loop of approximately 34.6 L/s is expected resulting in additional 2.2 hours water age. When the AIV is closed, the demand rate from the AURA would dictate flow within the trunk mains, which will initially be very low. The strategy notes however that the AIV operates daily, therefore extended periods of minimal flow should not be experienced. Once sufficient development has occurred within the AURA, closure of the automated control valve between DN375 offtakes will be required less frequently.

For the high-level zone, a new booster pump station is proposed, located near the termination of the dual DN375 trunk mains. It is understood the new booster is proposed to replace the Wyndella 1 WPS and be sized to service both high level lots as well as approximately 650 existing lots within the Windella Estate.

1.4 Development Staging

Thirdi's proposed residential development currently comprises staged release of approximately 820 lots. Projected development staging for the Thirdi residential portion of the AURA is provided in Table 1.

Table 1 – Projected development within Thirdi site grouped by supply zone.

Year	Low Level Zone	High Level Zone	Cumulative Total LLZ	Cumulative Total HLZ	Total All Zones [1]	Thirdi Stage [2]
2026	65		65		65	Stage 1
2027	42		107		107	Stage 1
2028	24		131		131	Stage 1
2029		53	131	53	184	Stage 1
2030	5	37	136	90	226	Stage 1
2031	51		187	90	277	Stage 2
2032	40		227	90	317	Stage 2
2033	9	31	236	121	357	Stage 2
2034		40	236	161	397	Stage 2
2035		40	236	201	437	Stage 2
2036	15	25	251	226	477	Stage 3
2037		40	251	266	517	Stage 3
2038	40		291	266	557	Stage 3
2039	29		320	266	586	Stage 3
2040	40		360	266	626	Stage 4
2041	41		401	266	667	Stage 4
2042	49		450	266	716	Stage 5
2043	40		490	266	756	Stage 5
2044		40	490	306	796	Stage 5
2045		24	490	330	820	Stage 5

Notes:

1. Excludes Land Lease Community.
2. Stage numbering subject to change.

The proposed Land Lease Community comprises 280 leasable lots and associated community facilities across a 22.5-hectare footprint. Timing of this development is currently subject to confirmation, however it is expected the LLC will ultimately be supplied as part of the high-level zone to minimise the size of onsite boosting measures.

Beyond the Thirdi land, it is understood the initial stages of Roche's development are likely to commence in the south-eastern portion of the AURA, largely due to wastewater servicing constraints. Development will then generally progress westward, with an initial target rate of approximately 200 lots per year.

1.5 Hunter Water Design Requirements

The pressure requirements outlined in the HWC water design manual (WSA 03-2011 Hunter Water Edition Version 2) are provided in Table 2.

Table 2 – Service pressure requirements.

Parameter	Pressure (m)
Maximum pressure all applications.	60
Minimum Pressure for a peak hour flow on a peak day.	20 / 25 *
Minimum Pressure for a peak hour flow on an extreme day.	12
Minimum Pressure for a peak hour flow on an 95th percentile peak day plus firefighting flow (at location of fire flow).	15
Minimum Pressure for a peak hour flow on an 95th percentile peak day plus firefighting flow (other than location of fire flow).	3

* 25 m required for boosted supply.

2. Design Water Demands

Design water demands have been calculated in accordance with the Water Supply Code of Australia Hunter Water Edition Version 2 (WSA 03 – 2011-3.1). For the purposes of this addendum, design water demands have been calculated for the Thirdi residential land only, broken up into low level and high-level zones. Adopted parameters and flowrates are provided in Table 3.

Table 3 – Water Demand Assessment (Thirdi development only).

Parameter	Low Level Zone - Residential	High Level Zone - Residential	High Level Zone – Land Lease Community
Total Lots	490	330	263
Average Day Demand (kL/year/lot)	285	285	130
Peak Day Factor	2.25	2.25	2.20
Extreme Day Factor	1.15	1.15	1.15
Diversity Factor	1.37	1.43	1.53
Diurnal Diversity Factor	1.0	1.0	1.0
Maximum Diurnal Demand Factor [1]	2.02	2.02	2.02
Firefighting Allowance (L/s)	10	10	20
Average Day Demand (L/s)	5.1	3.4	1.3
Peak hour flow on a peak day of a peak week (L/s)	28.2	19.8	7.9
Peak hour flow on an extreme day of an extreme week (L/s)	32.3	22.7	9.1
Peak hour flow on a 95th percentile with fire flow (L/s)	32.3	25.9	26.4

3. Interim Servicing Options

3.1 Points of Connection and Available Capacity

The following boundary conditions for the DN375 trunk main on the New England Highway and the existing Windella 1 WPS have been adopted from the approved strategy and are summarised in Table 4.

Table 4 – Boundary Conditions.

Location	Supply Zone	Elevation (m AHD)	HGL ADD (m AHD)	HGL PDD (m AHD)	HGL PDD + 10 L/s Fire Flow (m AHD)	HGL PDD + 20 L/s Fire Flow (m AHD)
New England Highway	Four Mile Creek / Lochinvar 2	35.4	79	75	76	76
River Road	Windella 1 WPS	36.9	136	104	76	65

3.2 Preferred Option – River Road

No water infrastructure currently exists in the vicinity of the subject land. Similar to the broader AURA, servicing will therefore be contingent on construction of lead in mains from supply infrastructure on the New England Highway. As per the approved strategy, the preferred servicing option proposes to extend watermains along River Road to service the subject land. The following infrastructure will be required:

- Constructing dual DN375 trunk mains along River Road at year 0, approximately 1.5 km in length, as per Option C of the approved strategy.
- From the end of the dual DN375 trunk mains, construction of 1 x DN250 low level and 1 x DN200 temporary mains, approximately 2.3 km in length along River Road to ultimately service the low level and high level zones respectively. The mains would be connected for security of supply. Prior to the booster being constructed, both mains will be supplied from the low-level zone.

River Road is proposed to be formalised as a sealed, secondary road access connecting the Thirdi development to the New England Highway. The road alignment includes several culvert crossings to elevate the roadway above the 1% AEP flood event.

Locating the lead in infrastructure within River Road therefore avoids the need to locate infrastructure within adjoining private land, minimising impacts on future development within the remainder of the AURA. Typical cross-sections of the proposed River Road access are provided in Figure 2. Further discussion on AURA staging is provided in Section 3.3.

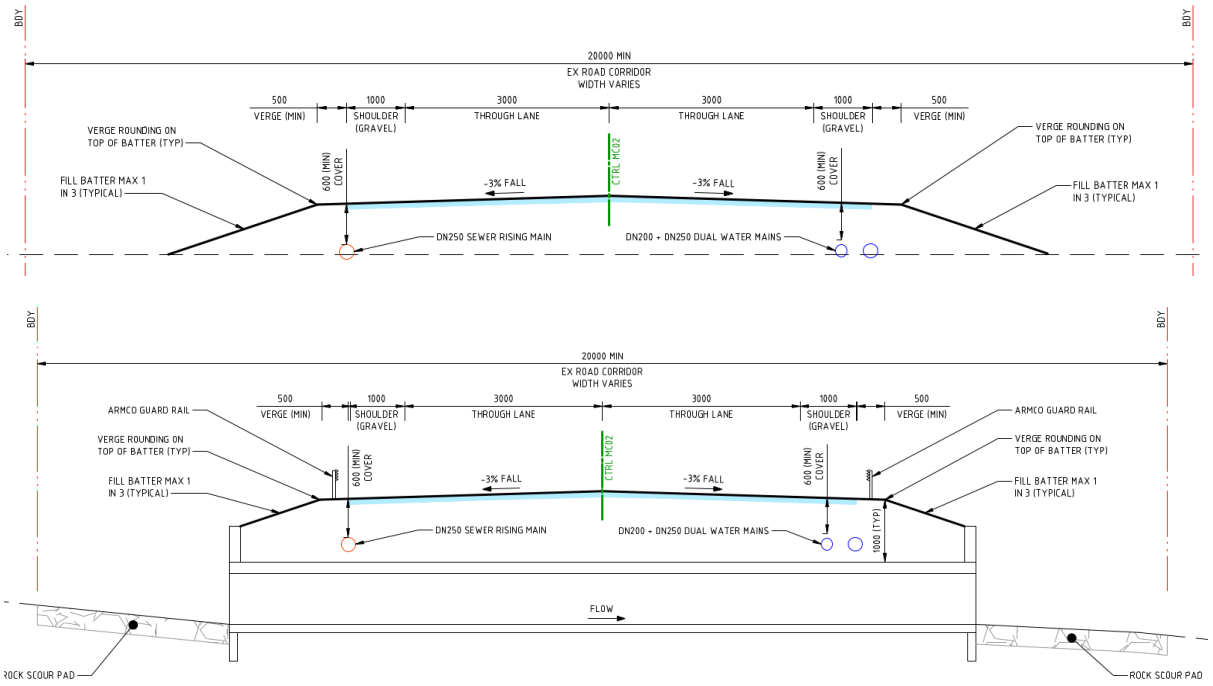

Figure 2 – River Road typical cross-sections.

3.2.1 Low Level Zone

Based on the ultimate demands from the Thirdi site, a main size of DN250 was selected to achieve a head loss rate less than 3 m/km. A review of total head losses was then undertaken to determine the ability of the low level main to supply lots within the subject land up to RL 41.0. Under PDD conditions (HGL of 75 mAHD) and assuming a worst-case head loss rate of 3 m/km, the HGL within the Thirdi land will be approximately 65 m AHD, sufficient to supply 20 m pressure to lots up to RL 45.0 mAHD.

As noted in the approved strategy water age within the dual DN375 trunk mains at the initial stages of development will be addressed through construction of a remotely automated control valve located between each offtake, allowing circulation of flow while the AIV is open. For the proposed DN200/DN250 mains, while these mains will similarly be interconnected for security of supply purposes, circulation due to operation of the AIV will likely not reach this loop with most flows circulating through the DN375 mains only. As such, it is expected that circulation through the DN250/DN200 loop would be driven entirely by demands from the Thirdi site.

Based on a preliminary volumetric assessment, the initial release of 65 lots in the low-level zone will provide sufficient flow under ADD conditions to cycle water through the DN250 main in under 48 hours. In practice, it is expected water age will be further reduced due to additional demands resulting from ongoing subdivision construction activities e.g. water cart filling, irrigation for establishment of landscaping and potentially flushing of the wastewater pump station.

At the completion of Stage 1, 136 lots will be released within the low-level zone. Assuming no other offtakes, ADD flow in the low-level main will be 1.4 L/s, resulting in a circulation time of approximately 22 hours in the DN250 main.

The proposed lead in main arrangement is illustrated in Appendix B Exhibit 1 with a Draft Reticulation Layout provided in Appendix C.

3.2.2 High Level Zone

As noted previously a booster pump station is proposed under the approved strategy to supply lots above RL41.0 mAHD. Within the Thirdi development, the booster would be required to service higher elevation lots within Stage 1, estimated to be released from year 4 onwards.

Based on the options assessment undertaken within the approved strategy, it is understood the new booster would replace Windella 1 WPS and therefore supply both the existing Windella Estate and the AURA high level zone.

The approved strategy proposes an ultimate pump duty of 49 L/s at 10m head. Based on the boundary conditions provided in Table 4, under PDD conditions this would result in a HGL of approximately RL 85.0 mAHD at the delivery pipework, assuming minimal losses within the DN375 trunk mains. Existing surface elevations within the AURA are up to approximately RL 71 mAHD at the south-western boundary of the Roche-held land and approximately RL 58.0 mAHD within the Thirdi development. Within the LLC, lots up to RL 65 mAHD are proposed, noting the proposed meter location is located at RL 46.0 mAHD.

Noting these elevations, to achieve a minimum supply pressure to the highest lots of 25 m under PDD conditions, an increased pump head of approximately 30 m would be required, resulting in a HGL of 105 mAHD at the delivery pipework. This revised pump head includes an allowance for head losses at a rate of 3 m/km. A detailed review of system performance for both the proposed and existing Windella reticulation systems will be required at detailed design stage.

Regarding water age, a minimum of 41 lots would be required to achieve water turnover in the DN200 main in under 48 hours, which would be achieved within the proposed staging.

Assuming no other offtakes from the boosted main, at completion of Stage 1 comprising 90 lots in the high-level zone, circulation time in the DN200 main will be approximately 21 hours. It is noted this excludes any additional demands from the LLC, however it is understood this development is likely to be constructed concurrently with Stage 1.

The proposed lead in main arrangement is illustrated in Appendix B Exhibit 1 with a Draft Reticulation Layout provided in Appendix C

3.2.3 Failure Scenarios

An estimate of minimum and maximum supply pressures has been undertaken to assess the potential impact of failure of the low-level and high-level mains respectively.

Low-level main failure (maximum pressure check)

Supply HGL = 105 mAHD

Lowest lot RL = 25 mAHD

Maximum supply pressure at lowest lot = **80 m**

High-level main failure (minimum pressure check)

Supply HGL = 75 mAHD (PDD)

Highest lot RL = 57 mAHD

Assumed head loss rate 3 m/km over 3000 m = 9 m

Minimum supply pressure at highest lot = **9 m**

3.3 AURA Staging Considerations

While the future subdivision layout to the south is not currently known, full or partial relocation of the rising main may be required to suit the future development layout or future road widening. Based on the estimated timeframes in the approved strategy, development in the south is not expected to extend beyond River Road until at least the mid-2030s. If at this time River Road is approved by Council to be formally closed and an easement is not maintained for the lead in services, those impacted services would need to be relocated at that developer's cost in accordance with HWC requirements. Should the developer wish to retain the water infrastructure in the current alignment, it is considered there is sufficient scope to do this by widening the pavement on the opposing side to the mains.

4. Conclusion and Recommendations

Northrop have reviewed interim water servicing arrangements servicing of the subject land. Following a review of technical constraints and development timeframes the following servicing option is recommended:

- Construction of 1.6 km of dual DN375 trunk mains along River Road as per Option C of the approved strategy.
- Construction of approximately 2.3 km of DN250 low level and DN200 high level supply mains along River Road to provide interim supply to the Thirdi development until completion of ultimate internal reticulation mains as part of the AURA.
- At such time that development above RL 41.0 is required, construction of the booster WPS.

The proposed amendments to the water servicing arrangements aligns with Hunter Water's design criteria and enables independent servicing of the subject site, whilst remaining compatible with the ultimate AURA network.

A draft reticulation layout for the proposed subdivision is included in Appendix C.

Appendix A – Hunter Water Correspondence

Lach McRae

From: Lach McRae
Sent: Tuesday, 16 July 2024 4:51 PM
To: Barry Calderwood (barry.calderwood@hunterwater.com.au)
Cc: Brian Swaine; Jason McIntosh
Subject: 559 Anambah Road - water servicing HWC inception meeting

Hi Barry, thanks for organising our meeting yesterday to review the water servicing at the proposed subdivision of 559 Anambah Road. Please find below minutes from our meeting.

Meeting held online. 11.00am 15 July 2024

Attendees:
HWC Barry Calderwood
HWC Wes Jones
HWC Orod Zarrin
HWC Archie Tuffour
HWC Stephanie Hayes
Thirdi Brian Swaine
Vara Jason McIntosh
Northrop Lach McRae

Minutes:

- HWC noted expectation is the lead in twin 375mm watermains proposed along existing formed section of River Road would be delivered together and interconnected so that water could be flushed through the mains periodically. HWC noted that ADW was requested to provide modelling on this.
- HWC noted the proposed water booster would replace the existing Windella 1 WPS.
- HWC noted the two pressure zones in the Thirdi land would mean delivery of the proposed water booster would be required if development in both pressure zones is proposed in Stage 1.
- HWC were not able to provide advice regarding Roche staging however noted that the location of WWPS1A would dictate Roche's staging location and it is possible that the water booster will not be delivered by Roche early in the development.
- Vara noted that the proposed Thirdi development may be ahead of the delivery of assets within the Roche land and on this basis an addendum would be prepared on this basis with watermain/s following the River Road road reserve between existing the northern end of formed section (proposed 2 x 375's) River Road and the Thirdi development.
- HWC advised a CAF application had been made and included the 2 x 375's. **HWC to review and advise whether the water booster is included.** HWC noted funding would be available for booster even if not in the existing application.
- Northrop noted HWC had advised in the prelim servicing advice that detailed design was underway. HWC noted ADWJ were managing the Roche development and GCA are designing the CAF works.
- **Northrop requested HWC provide advice on design and timing for delivery of the lead in assets / extent of trunk assets being delivered for Stage 1 of Roche development so this could be considered in the addendum.**
- In order to address security of supply and the two pressure zones it may be possible to run parallel mains within the road reserve between existing River Road and the Thirdi development and cross connect these with a normally closed valve.
- As part of the addendum Northrop will review the split between high and low pressure zones out of the initial 200-240 lots and the ultimate circa 900 lots.
- HWC noted a DRL would be needed with the addendum.

Please let me know if you would like to add to / amend the above. Thanks again for your time.

Kind regards,
Lach McRae
Principal | Civil & Environmental Engineer

Northrop Consulting Engineers
Level 1, 215 Pacific Highway Charlestown NSW 2290
T 02 4943 1777
D 02 4074 6842
M 0448 831 345

Appendix B – Exhibits

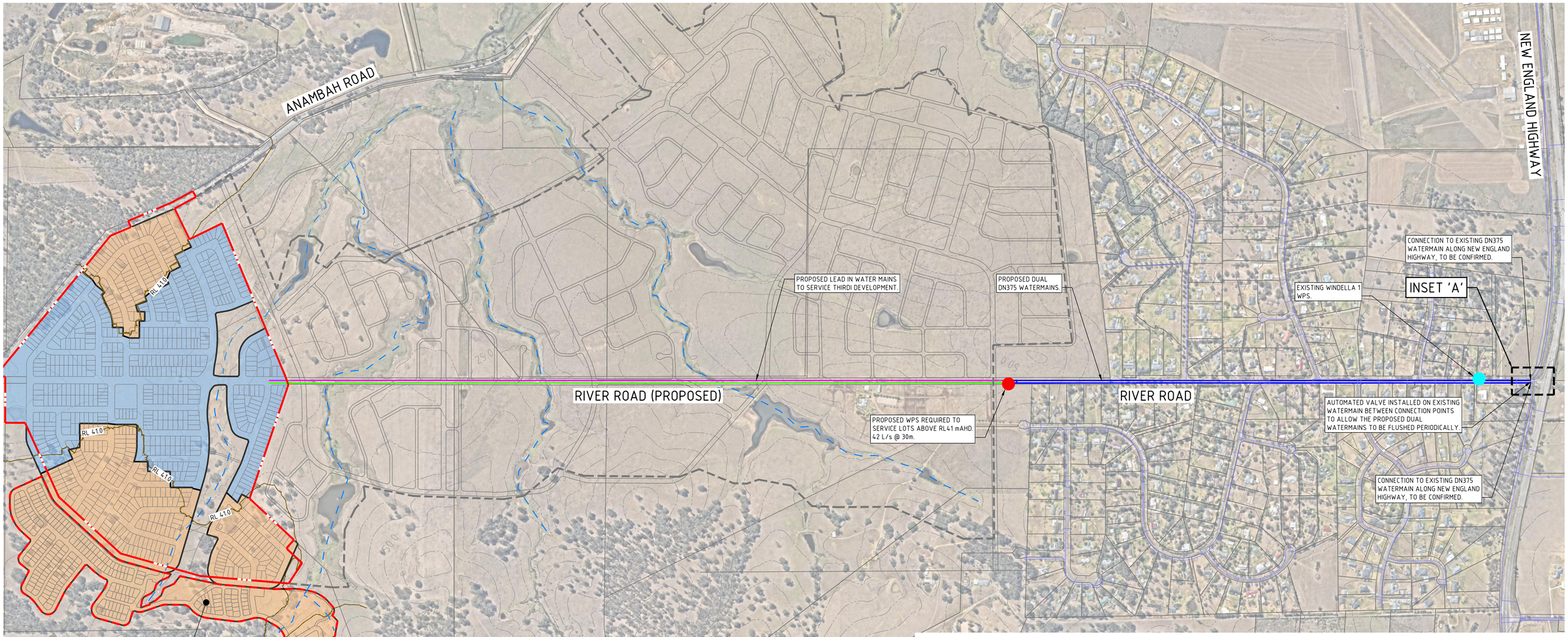

EXHIBIT 1

NORTHROP

Newcastle
Level 1, 215 Pacific Hwy, Charlestown NSW 2290
Ph (02) 4943 1777 Email newcastle@northrop.com.au
ABN 81 094 433 100

JOB NUMBER **NL222055-01**

PROJECT **PROPOSED SUBDIVISION**

WATER SERVICING ADDENDUM

DRAWING TITLE **PROPOSED WATER SERVICING**

DRAWING NUMBER **CSK15.01**

REVISION **C**

SCALE 1:6000@ A1 0 60 120 180 240 300m

DRAWING SHEET SIZE = A1

REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE
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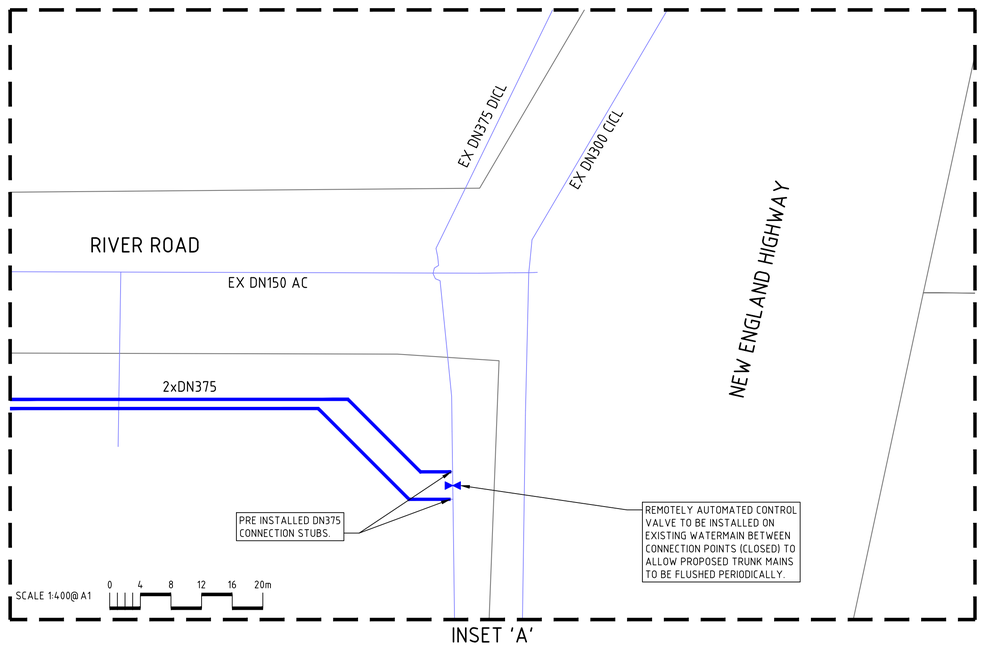
B	REISSUED FOR INFORMATION	JS		AK	25.05.25
C	REISSUED FOR INFORMATION	JS		AK	10.10.25

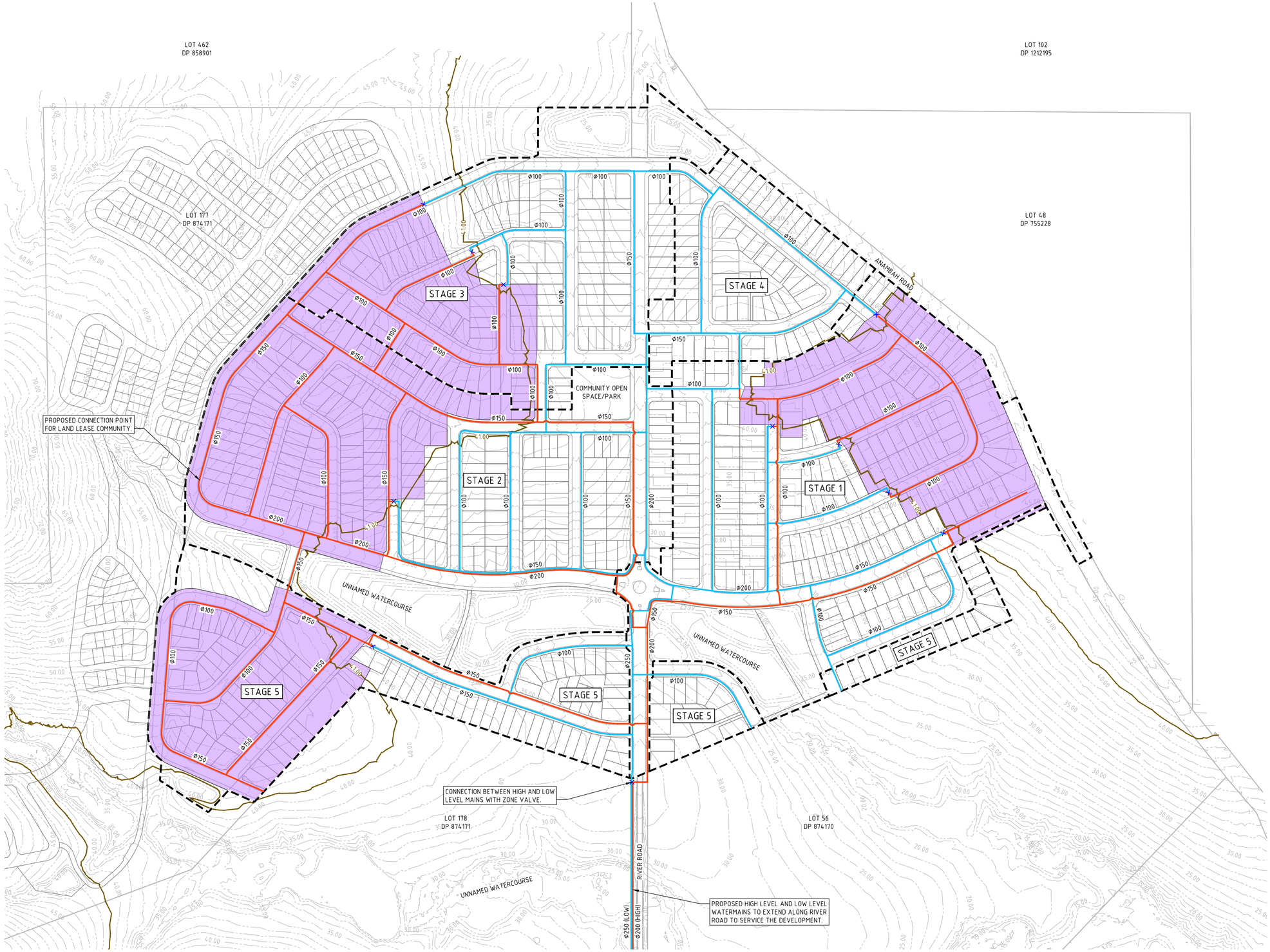
LEGEND

- EXISTING BOUNDARY LINE
- AURA BOUNDARY
- THIRDI SITE BOUNDARY
- LAND LEASE COMMUNITY BOUNDARY
- PROPOSED DN200 WATERMAIN (HLZ)
- PROPOSED DN250 WATERMAIN (LLZ)
- PROPOSED DN375 WATERMAIN
- EXISTING WATERMAIN
- LOW LEVEL SUPPLY ZONE
- HIGH LEVEL SUPPLY ZONE
- PROPOSED WATER PUMP STATION
- EXISTING WATER PUMP STATION
- WATERCOURSE
- EXISTING CONTOURS (5.0m INTERVALS)



INSET 'A'

Appendix C – Draft Reticulation Layout



LEGEND

- PROPOSED BOUNDARY LINE
- EXISTING BOUNDARY LINE
- STAGE BOUNDARY LINE
- LOW LEVEL WATER MAIN
- HIGH LEVEL WATER MAIN
- HIGH LEVEL SUPPLY ZONE
- DENOTES ZONE VALVE BETWEEN LOW AND HIGH LEVEL ZONES
- EXISTING CONTOURS (1.0m INTERVALS)

STAGE	LOW LEVEL LOTS	HIGH LEVEL LOTS
1	136	90
2	100	111
3	84	65
4	81	-
5	89	64
TOTAL	490	330

NOTE: WATER MAIN SIZES SHOWN ON THIS PLAN ARE ESTIMATES ONLY. FINAL PIPE SIZES TO CONFIRMED AT DETAILED DESIGN STAGE BY PRESSURE MODELLING OF BROADER URBAN RELEASE AREA NETWORK.

DRAWN: J.STAUB DESIGNED: A.KILLEN JOB MANAGER: L.MCRAE VERIFIER:

BEFORE YOU DIG www.byda.com.au

NOT FOR CONSTRUCTION

REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE
A	ISSUED FOR INFORMATION	JS		AK	07.03.25
B	RE-ISSUED FOR INFORMATION	JS		AK	25.08.25
C	RE-ISSUED FOR INFORMATION	JS		AK	10.10.25

CLIENT: Third.i COMMUNITIES

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SCALE 1:2500@ A1 — 0 25 50 75 100 125m

NORTHROP
Newcastle
Level 1, 215 Pacific Hwy, Charlestown NSW 2290
Ph (02) 4943 1777 Email newcastle@northrop.com.au
ABN 81 094 433 100

PROJECT: **PROPOSED SUBDIVISION 559 ANAMBAH ROAD GOSFORTH NSW 2320**

DRAWING TITLE: **CIVIL ENGINEERING PACKAGE**

WATER MASTERPLAN

JOB NUMBER: **NL222055-01**

DRAWING NUMBER: **CSK12.01** REVISION: **C**

DRAWING SHEET SIZE = A1

Date: 10.10.2025 3:22 PM Plotted By: ANDREW KILLEN Found: O:\5 Pre-July 24 Projects\Newcastle\YEAR 2022 Jobs\NL222055-01 - 559 Anambah Road, Gosforth\D - Drawings\CIVIL\02-SKETCH\CSK12.01-WATER DRL\NL222055-01-CSK12.01-WATER MASTERPLAN.dwg

Appendix D – Anambah Road RSA Mitigations

LEGEND

- SITE BOUNDARY LINE
- EXISTING BOUNDARY LINE
- APPROXIMATE ANAMBAH ROAD CENTRELINE
- CH1000 — APPROXIMATE ANAMBAH ROAD CHAINAGE

NOTE

ITEM 6 - VERGE VEGETATION IMPACTS ON PAVEMENT

THERE ARE SEGMENTS OF ROAD WHERE THE EDGE OF BITUMEN HAS EVIDENCE OF GRASS / WEED GROWTH AND OVER TIME THIS GROWTH MAY IMPACT THE STRUCTURAL INTEGRITY OF THE PAVEMENT THROUGH DEGRADATION OF THE EDGE OF BITUMEN. DETAILED SURVEILLANCE OF THE EAST AND WESTERN SIDES OF ANAMBAH ROAD SHOULD BE UNDERTAKEN AND WHERE VEGETATION IS OBSERVED GROWING IN TO THE EDGE OF THE PAVEMENT THEN IT SHALL BE REMOVED (PHYSICAL REMOVAL, SPRAYING, ETC) TO REDUCE THE POTENTIAL EROSIVE DEGRADATION PROCESS.

ITEM 8 - GUIDE POST REFLECTIVITY

MISSING OR DAMAGED GUIDE POSTS WERE OBSERVED. DETAILED SURVEILLANCE OF THE EAST AND WESTERN SIDES OF ANAMBAH ROAD SHOULD BE UNDERTAKEN AND WHERE DAMAGE TO EXISTING GUIDE POSTS IS OBSERVED THEY SHALL BE RECTIFIED OR REPLACED, AND WHERE MISSING GUIDE POSTS ARE OBSERVED THEY SHALL BE REPLACED WITH NEW.

REV	DESCRIPTION	ISSD	APP	DATE
A	ISSUED FOR REVIEW	AB	AB	10/10/2025

PROJECT MANAGER: A. BROWN
DESIGNED: C. WALKER-HEALION
DRAFTED: C. WALKER-HEALION
VERIFIED: TBD

CLIENT: Third.i COMMUNITIES

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SETOUT TBD

GROUNDSWELL ENGINEERS
54 HUDSON STREET, HAMILTON NSW 2303

PROJECT TITLE: ANAMBAH RESIDENTIAL COMMUNITY

DRAWING TITLE: ANAMBAH ROAD - ROAD SAFETY AUDIT FINDINGS OVERVIEW PLAN

STATUS: FOR INFORMATION ONLY
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PROJECT - SET - DRAWING - SHEET: 250055-SK-009-00

REVISION: A

Date : 10.10.2025 5:05 PM Plotted By : CIARAN WALKER HEALION Found : C:\Users\CiaranWalkerHealion\Groundswell Engineering\Intranet - Documents\Projects\250055 Anambah Rd Land Release\G Drawings\Civil\1. Sketches\SK-009 Anambah Road - Road Safety Audit\250055-SK-009.dwg

LEGEND

- EXISTING BOUNDARY LINE
- EXISTING VEHICULAR BARRIER
- PROPOSED VEHICULAR BARRIER
- PROPOSED ROAD SIGN POST

AUDIT FINDING REFERENCE	ROAD SAFETY AUDIT FINDING (SEE RSA REPORT REPARED BY PDC CONSULTANTS FOR FULL DESCRIPTION)	INITIAL RISK (AS IDENTIFIED IN RSA REPORT BY OTHERS)			DESIGN ACTION / REMEDIATION	RESIDUAL RISK			PERSON RESPONSIBLE FOR CONTROLS
		LIKELIHOOD	SEVERITY	LEVEL OF RISK		LIKELIHOOD	SEVERITY	LEVEL OF RISK	
1	OVERTAKING AT CHAINAGE 1800 TO 2000	RARE	SERIOUS	MEDIUM (FSI)	REPLACE BROKEN CENTRELINE MARKINGS WITH UNBROKEN BARRIER LINES	RARE	SERIOUS	MEDIUM (FSI)	DEVELOPER
3	WIRE ROPE BARRIER POINT OF NEED	UNLIKELY	SERIOUS	HIGH (FSI)	EXTEND EXISTING WIRE ROPE BARRIER TO FULL EXTENT OF HORIZONTAL CURVE	RARE	MODERATE	LOW	DEVELOPER
13	STOCKPILE DRIVEWAY SIGHT LINES	RARE	SERIOUS	MEDIUM (FSI)	PROVIDE LEFT ONLY SIGNAGE TO AVOID CONFLICTS WITH SOUTHBOUND TRAFFIC	RARE	SERIOUS	MEDIUM (FSI)	DEVELOPER

TABLE PRODUCED WITH REFERENCE TO AND TO BE READ IN CONJUNCTION WITH ROAD SAFETY AUDIT PREPARED BY PDC CONSULTANTS, REF#25.224R01V02, DATED 18/09/2025

REV	DESCRIPTION	ISSD	APP	DATE
A	ISSUED FOR REVIEW	AB	AB	10/10/2025

PROJECT MANAGER: A. BROWN
DESIGNED: C. WALKER-HEALION
DRAFTED: C. WALKER-HEALION
VERIFIED: TBD

CLIENT: Third.i COMMUNITIES

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SETOUT TBD

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PROJECT TITLE: ANAMBAH RESIDENTIAL COMMUNITY

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PROJECT - SET - DRAWING - SHEET: 250055-SK-009-01

REVISION: A

Date : 10.10.2025 5:05 PM Plotted By : CIARAN WALKER HEALION Found : C:\Users\CiaranWalkerHealion\Groundswell Engineering\Intranet - Documents\Projects\250055 Anambah Rd Land Release\G Drawings\Civil\1. Sketches\SK-009 Anambah Road - Road Safety Audit\250055-SK-009.dwg

ITEM 14 - UNPROTECTED EMBANKMENT (CH0-100)

SCALE 1:250

ITEM 2 - CULVERT LOCATION ON STRAIGHT ALIGNMENT (CH1500)

SCALE 1:250

LEGEND

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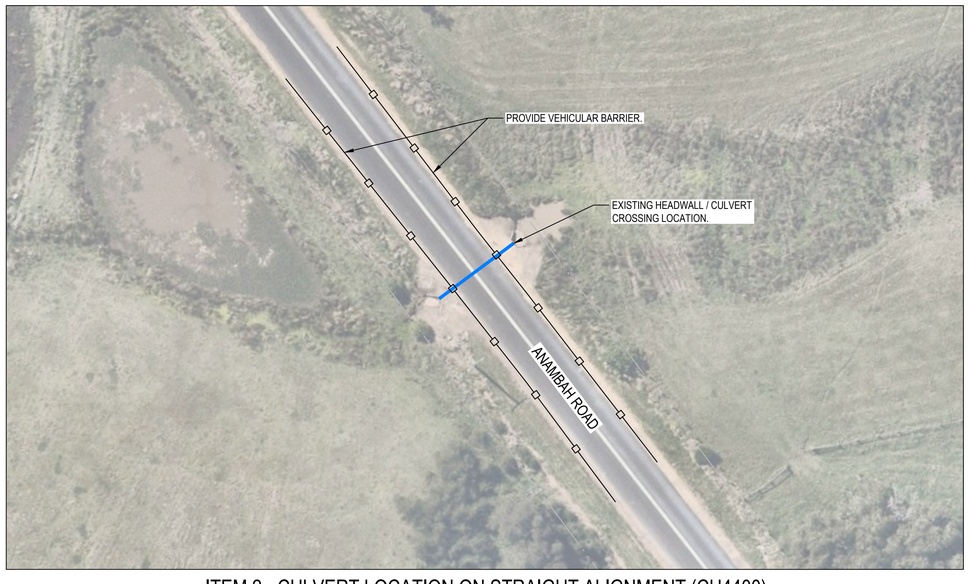
- PROPOSED VEHICULAR BARRIER
- EXISTING CULVERT CROSSING

ITEM 2 - CULVERT LOCATION ON STRAIGHT ALIGNMENT (CH2800)

SCALE 1:250



ITEM 2 - CULVERT LOCATION ON STRAIGHT ALIGNMENT (CH4400)

SCALE 1:250

AUDIT FINDING REFERENCE	ROAD SAFETY AUDIT FINDING (SEE RSA REPORT REPARED BY PDC CONSULTANTS FOR FULL DESCRIPTION)	INITIAL RISK (AS IDENTIFIED IN RSA REPORT BY OTHERS)			DESIGN ACTION / REMEDIATION	RESIDUAL RISK			PERSON RESPONSIBLE FOR CONTROLS
		LIKELIHOOD	SEVERITY	LEVEL OF RISK		LIKELIHOOD	SEVERITY	LEVEL OF RISK	
2	CULVERT LOCATION ON STRAIGHT ALIGNMENT (CH1500, CH2800, CH4400)	RARE	SERIOUS	MEDIUM (FSI)	PROVIDE VEHICULAR BARRIER AT CULVERT LOCATIONS	RARE	MODERATE	LOW	DEVELOPER
14	UNPROTECTED EMBANKMENTS	RARE	SERIOUS	MEDIUM (FSI)	PROVIDE VEHICULAR BARRIER AT CULVERT LOCATIONS	RARE	MODERATE	LOW	DEVELOPER

TABLE PRODUCED WITH REFERENCE TO AND TO BE READ IN CONJUNCTION WITH ROAD SAFETY AUDIT PREPARED BY PDC CONSULTANTS, REF#25.224R01V02, DATED 18/09/2025

REV	DESCRIPTION	ISSD	APP	DATE
A	ISSUED FOR REVIEW	AB	AB	10/10/2025

PROJECT MANAGER: A. BROWN
DESIGNED: C. WALKER-HEALION
DRAFTED: C. WALKER-HEALION
VERIFIED: TBD

CLIENT: Third.i COMMUNITIES

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SCALE: 0 2.5 5 7.5 10m — 1:250

NORTH

SHEET SIZE A1
SETOUT TBD

GROUNDSWELL ENGINEERS
54 HUDSON STREET, HAMILTON NSW 2303

PROJECT TITLE: ANAMBAH RESIDENTIAL COMMUNITY

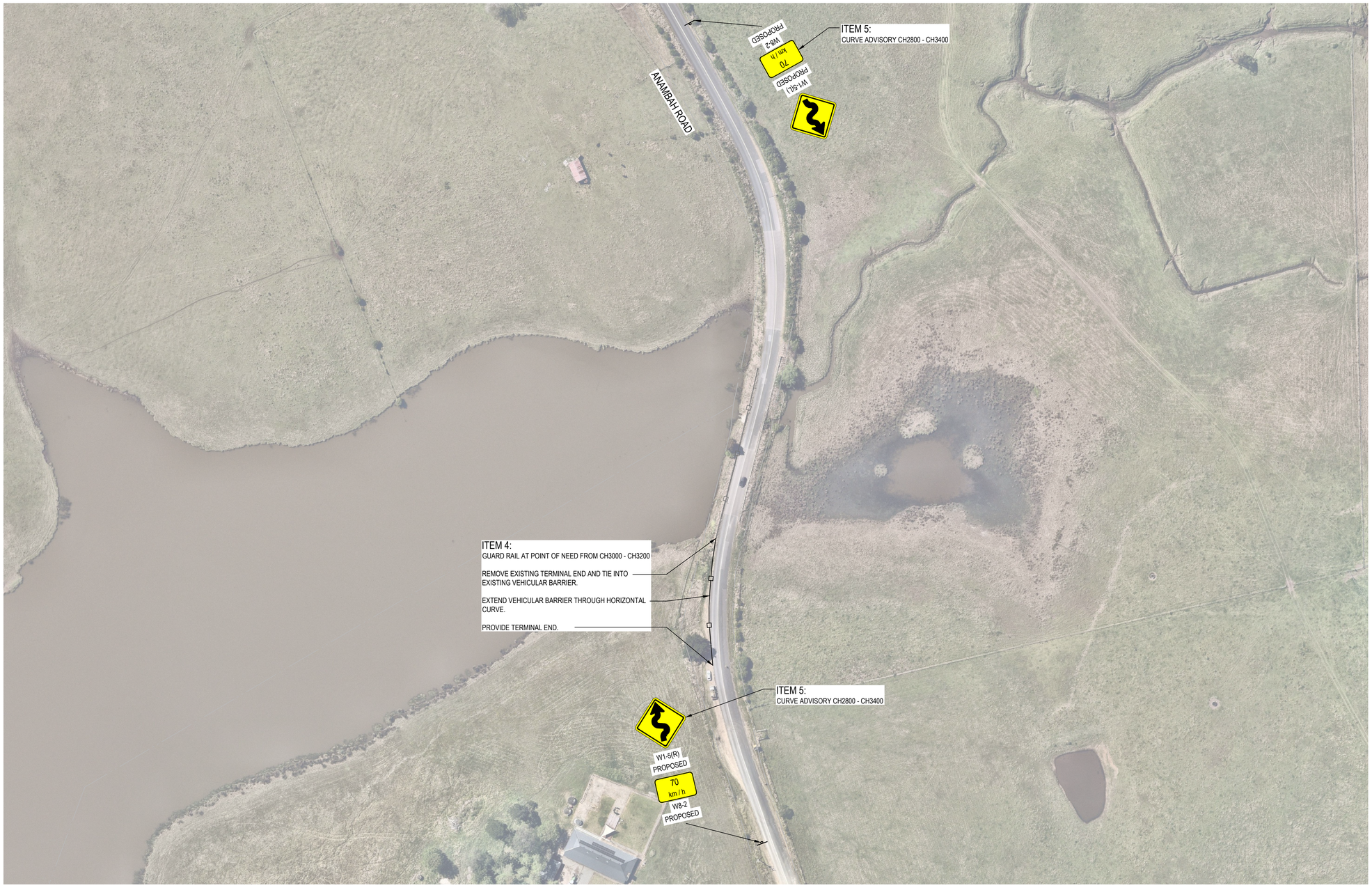
STATUS: FOR INFORMATION ONLY
NOT TO BE USED FOR CONSTRUCTION

DRAWING TITLE: ANAMBAH ROAD - ROAD SAFETY AUDIT FINDINGS INSET PLAN 07

PROJECT - SET - DRAWING - SHEET: 250055-SK-009-02

REVISION: A

Date : 10.10.2025 5:05 PM Plotted By : CIARAN WALKER HEALION Found : C:\Users\CiaranWalkerHealion\Groundswell Engineering\Intranet - Documents\Projects\250055 Anambah Rd Land Release\G Drawings\Civil\1. Sketches\SK-009 Anambah Road - Road Safety Audit\250055-SK-009.dwg



LEGEND

- EXISTING BOUNDARY LINE
- EXISTING VEHICULAR BARRIER
- PROPOSED VEHICULAR BARRIER
- PROPOSED ROAD SIGN POST

AUDIT FINDING REFERENCE	ROAD SAFETY AUDIT FINDING (SEE RSA REPORT REPARED BY PDC CONSULTANTS FOR FULL DESCRIPTION)	INITIAL RISK (AS IDENTIFIED IN RSA REPORT BY OTHERS)			DESIGN ACTION / REMEDIATION	RESIDUAL RISK			PERSON RESPONSIBLE FOR CONTROLS
		LIKELIHOOD	SEVERITY	LEVEL OF RISK		LIKELIHOOD	SEVERITY	LEVEL OF RISK	
4	GUARDRAIL POINT OF NEED	UNLIKELY	SERIOUS	HIGH (FSI)	EXTEND GUARDRAIL TO FULL EXTENT OF HORIZONTAL CURVE	RARE	MODERATE	LOW	DEVELOPER
5	CURVE ADVISORY	RARE	SERIOUS	MEDIUM (FSI)	PROVIDE WARNING SIGNAGE AHEAD OF HORIZONTAL CURVES IN BOTH DIRECTIONS OF TRAVEL	RARE	SERIOUS	MEDIUM (FSI)	DEVELOPER

TABLE PRODUCED WITH REFERENCE TO AND TO BE READ IN CONJUNCTION WITH ROAD SAFETY AUDIT PREPARED BY PDC CONSULTANTS, REF#25.224R01V02, DATED 18/09/2025

REV	DESCRIPTION	ISSD	APP	DATE
A	ISSUED FOR REVIEW	AB	AB	10/10/2025

PROJECT MANAGER: A. BROWN
DESIGNED: C. WALKER-HEALION
DRAFTED: C. WALKER-HEALION
VERIFIED: TBD

CLIENT: Third.i COMMUNITIES

ARCHITECT

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SCALE: 0 10 20 30 40m — 1:1000

NORTH

SHEET SIZE A1
SETOUT TBD

GROUNDSWELL ENGINEERS
54 HUDSON STREET, HAMILTON NSW 2303

PROJECT TITLE: ANAMBAH RESIDENTIAL COMMUNITY

STATUS: FOR INFORMATION ONLY
NOT TO BE USED FOR CONSTRUCTION

DRAWING TITLE: ANAMBAH ROAD - ROAD SAFETY AUDIT FINDINGS INSET PLAN 03

PROJECT - SET - DRAWING - SHEET: 250055-SK-009-03

REVISION: A

Date : 10.10.2025 5:05 PM Plotted By : CIARAN WALKER HEALION Found : C:\Users\CiaranWalkerHealion\Groundswell Engineering\Intranet - Documents\Projects\250055 Anambah Rd Land Release\G Drawings\Civil\1. Sketches\SK-009 Anambah Road - Road Safety Audit\250055-SK-009.dwg

LEGEND

EXISTING BOUNDARY LINE

AUDIT FINDING REFERENCE	ROAD SAFETY AUDIT FINDING (SEE RSA REPORT REPARED BY PDC CONSULTANTS FOR FULL DESCRIPTION)	INITIAL RISK (AS IDENTIFIED IN RSA REPORT BY OTHERS)			DESIGN ACTION / REMEDIATION	RESIDUAL RISK			PERSON RESPONSIBLE FOR CONTROLS
		LIKELIHOOD	SEVERITY	LEVEL OF RISK		LIKELIHOOD	SEVERITY	LEVEL OF RISK	
7	VERGE VEGETATION IMPACTS ON DELINEATION	RARE	MINOR	NEGLIGIBLE	GENERAL VERGE MAINTENANCE TO CLEAR UNWANTED VEGETATION	RARE	MINOR	NEGLIGIBLE	DEVELOPER
10	INSUFFICIENT ACCELERATION LANE	RARE	MODERATE	MEDIUM	SPEED LIMIT TO BE REDUCED TO 80km/h ALONG ANAMBAH ROAD REDUCING RISK OF CONFLICT WITH SOUTHBOUND TRAFFIC	RARE	MODERATE	MEDIUM	DEVELOPER
TABLE PRODUCED WITH REFERENCE TO AND TO BE READ IN CONJUNCTION WITH ROAD SAFETY AUDIT PREPARED BY PDC CONSULTANTS, REF#25.224R01V02, DATED 18/09/2025									

REV	DESCRIPTION	ISSD	APP	DATE
A	ISSUED FOR REVIEW	AB	AB	10/10/2025

PROJECT MANAGER: A. BROWN
DESIGNED: C. WALKER-HEALION
DRAFTED: C. WALKER-HEALION
VERIFIED: TBD

CLIENT: Third.i COMMUNITIES

ARCHITECT

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SCALE: 0 10 20 30 40m — 1:1000

NORTH

SHEET SIZE A1
SETOUT TBD

GROUNDSWELL ENGINEERS
54 HUDSON STREET, HAMILTON NSW 2303

PROJECT TITLE: ANAMBAH RESIDENTIAL COMMUNITY

STATUS: FOR INFORMATION ONLY
NOT TO BE USED FOR CONSTRUCTION

DRAWING TITLE: ANAMBAH ROAD - ROAD SAFETY AUDIT FINDINGS INSET PLAN 04

PROJECT - SET - DRAWING - SHEET: 250055-SK-009-04

REVISION: A

Date : 10.10.2025 5:05 PM Plotted By : CIARAN WALKER HEALION Found : C:\Users\CiaranWalkerHealion\Groundswell Engineering\Intranet - Documents\Projects\250055 Anambah Rd Land Release\G Drawings\Civil\1. Sketches\SK-009 Anambah Road - Road Safety Audit\250055-SK-009.dwg

AUDIT FINDING REFERENCE	ROAD SAFETY AUDIT FINDING (SEE RSA REPORT REPARED BY PDC CONSULTANTS FOR FULL DESCRIPTION)	INITIAL RISK (AS IDENTIFIED IN RSA REPORT BY OTHERS)			DESIGN ACTION / REMEDIATION	RESIDUAL RISK			PERSON RESPONSIBLE FOR CONTROLS
		LIKELIHOOD	SEVERITY	LEVEL OF RISK		LIKELIHOOD	SEVERITY	LEVEL OF RISK	
9	SPEED SIGNAGE	RARE	MODERATE	LOW	PROVIDE SPEED SIGNAGE ON LEFT HAND SIDE OF NORTHBOUND LANE AT SPEED LIMIT CHANGE	RARE	MODERATE	LOW	DEVELOPER
TABLE PRODUCED WITH REFERENCE TO AND TO BE READ IN CONJUNCTION WITH ROAD SAFETY AUDIT PREPARED BY PDC CONSULTANTS, REF#25.224R01V02, DATED 18/09/2025									

REV	DESCRIPTION	ISSD	APP	DATE
A	ISSUED FOR REVIEW	AB	AB	10/10/2025

PROJECT MANAGER: A. BROWN
DESIGNED: C. WALKER-HEALION
DRAFTED: C. WALKER-HEALION
VERIFIED: TBD

CLIENT: Third.i COMMUNITIES

ARCHITECT

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SCALE: 0 2.5 5 7.5 10m — 1:250

NORTH

SHEET SIZE A1
SETOUT TBD

GROUNDSWELL ENGINEERS
54 HUDSON STREET, HAMILTON NSW 2303

PROJECT TITLE: ANAMBAH RESIDENTIAL COMMUNITY

STATUS: FOR INFORMATION ONLY
NOT TO BE USED FOR CONSTRUCTION

DRAWING TITLE: ANAMBAH ROAD - ROAD SAFETY AUDIT FINDINGS INSET PLAN 05

PROJECT - SET - DRAWING - SHEET: 250055-SK-009-05

REVISION: A

Date : 10.10.2025 5:05 PM Plotted By : CIARAN WALKER HEALION Found : C:\Users\CiaranWalkerHealion\Groundswell Engineering\Intranet - Documents\Projects\250055 Anambah Rd Land Release\G Drawings\Civil\1. Sketches\SK-009 Anambah Road - Road Safety Audit\250055-SK-009.dwg

LEGEND

EXISTING BOUNDARY LINE

AUDIT FINDING REFERENCE	ROAD SAFETY AUDIT FINDING (SEE RSA REPORT REPARED BY PDC CONSULTANTS FOR FULL DESCRIPTION)	INITIAL RISK (AS IDENTIFIED IN RSA REPORT BY OTHERS)			DESIGN ACTION / REMEDIATION	RESIDUAL RISK			PERSON RESPONSIBLE FOR CONTROLS
		LIKELIHOOD	SEVERITY	LEVEL OF RISK		LIKELIHOOD	SEVERITY	LEVEL OF RISK	
11	BASIC AUXILIARY RIGHT TURN LANES	RARE	MODERATE	LOW	FORMALISE RIGHT TURN LANE LINEMARKING, PROVIDE ADVANCED WARNING SIGNAGE	RARE	MODERATE	LOW	DEVELOPER
12	OVERTAKING NEAR INTERSECTIONS	RARE	MODERATE	LOW	PROVIDE UNBROKEN CENTRELINE MARKINGS TO RESTRICT OVERTAKING MOVEMENTS 100m NORTH OF ANAMBAH ROAD / NIVEN PARADE INTERSECTION	RARE	MODERATE	LOW	DEVELOPER
TABLE PRODUCED WITH REFERENCE TO AND TO BE READ IN CONJUNCTION WITH ROAD SAFETY AUDIT PREPARED BY PDC CONSULTANTS, REF#25.224R01V02, DATED 18/09/2025									

REV	DESCRIPTION	ISSD	APP	DATE
A	ISSUED FOR REVIEW	AB	AB	10/10/2025

PROJECT MANAGER: A. BROWN
DESIGNED: C. WALKER-HEALION
DRAFTED: C. WALKER-HEALION
VERIFIED: TBD

CLIENT: Third.i COMMUNITIES

ARCHITECT

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SCALE: 0 5 10 15 20m — 1:500

NORTH

SHEET SIZE A1
SETOUT TBD

GROUNDSWELL ENGINEERS
54 HUDSON STREET, HAMILTON NSW 2303

PROJECT TITLE: ANAMBAH RESIDENTIAL COMMUNITY

STATUS: FOR INFORMATION ONLY
NOT TO BE USED FOR CONSTRUCTION

DRAWING TITLE: ANAMBAH ROAD - ROAD SAFETY AUDIT FINDINGS INSET PLAN 06

PROJECT - SET - DRAWING - SHEET: 250055-SK-009-06

REVISION: A

Date : 10.10.2025 5:05 PM Plotted By : CIARAN WALKER HEALION Found : C:\Users\CiaranWalkerHealion\Groundswell Engineering\Intranet - Documents\Projects\250055 Anambah Rd Land Release\G Drawings\Civil\1. Sketches\SK-009 Anambah Road - Road Safety Audit\250055-SK-009.dwg

Appendix E – SES Correspondence (DA/2024/763)

Our Ref: ID 3288
Your Ref: DA/2024/763

5 August 2025

Jason McIntosh
VARA Consulting
Suite 9a, 172-178 Pacific Highway
Swansea NSW 2281

Via email

email: jason@varaconsulting.com.au; emmilia.marshall@maitland.nsw.gov.au;
Shakira.Muldoon@maitland.nsw.gov.au
CC: lisa.ignatavicius1@ses.nsw.gov.au

Dear Maitland Council team,

Development Application for 559 Anambah Road Gosforth

Vara Consulting have requested additional advice regarding the proposed alternative flood access along River Road to support the Development Application for 559 Anambah Road Gosforth. We understand that the proposed road is:

- proposed to be fully funded by Thirdi, with no cost to local or state government.
- proposed to provide alternative access during flood events for existing and future residents, when Anambah Road is flooded.
- described as "temporary," however we are not aware of any funding confirmed for the Western Link Road which is proposed to supersede the proposed alternative access route.
- able to support up to 249 Lots from Anambah before failure[1], and therefore would not support the 900 potential lots across the urban subdivision.

We refer to our previous advice letters dated 04 November 2024 and 27 June 2025. As outlined in our previous advice, all proposed dwelling lots are located on land above the Probable Maximum Flood (PMF) event for both riverine and local catchment flooding[2]. However, the site is currently frequently isolated (approximately 20% AEP) when Anambah Road, the current access route, becomes flooded by high hazard flood water for several days[3], as occurred in May 2025.

We therefore **support** the introduction of an access and egress route, proposed to be along River Road, to reduce the frequency and duration of isolation of the proposed community.

[1] Barr Planning. 2025. Response to Request for Additional Information, page 9
[2] Northrop. 2025. Flood Impact and Risk Assessment – Revision B, Figure BC6-1
[3] WMA Water. 2010. Hunter River Branxton to Green Rocks Flood Study

We **appreciate the consideration of alternative solutions** to "locked gates" to restrict general use while enabling timely access for emergency services and the community when required. However, we recommend:

- That the gates can be opened and closed remotely or in person by Council when Anambah Road is flooded (and /or closed as a consequence of flooding).
- That the gates have an emergency override to open when there is no power (for example during a severe weather event, power is often lost).
- That the road is maintained to an appropriate standard.
- That the road is able to withstand local flooding up to the 1 in 500 year event, if feasible.
- Ensuring the road is in place prior to development occurring to avoid placing a large number of people at risk of frequent and potentially long duration isolation.

As the authority under the *Roads Act 1993* to close and maintain local roads, Council must be satisfied with any proposed emergency access arrangements for the development at 559 Anambah Road, Gosforth.

Please feel free to contact our team via email at rra@ses.nsw.gov.au should you wish to discuss any of the matters raised in this correspondence. The NSW SES would also be interested in receiving future correspondence regarding the outcome of this referral via this email address.

Yours sincerely,

Peter Cinque
Senior Manager, Emergency Risk Management
NSW State Emergency Service

Emmilia Marshall

From: NSW SES Risk Reduction <rra@ses.nsw.gov.au>
Sent: Wednesday, 6 August 2025 9:12 AM
To: Jason McIntosh
Cc: Florian Caillon; Robert Huxley; Brian Swaine; NSW SES Risk Reduction; Emmilia Marshall; Shakira Muldoon; Lisa Ignatavicius; Northern Zone Ops; Carolyn Storrie
Subject: Response ID 3288 RE: RESPONSE TO SES COMMENTARY – DA/2024/763 – 559 ANAMBAH ROAD, GOSFORTH (Your Ref: ID2702 & ID3159)
Attachments: 20250805 NSW SES ID 3288 Response DA 559 Anambah Road Gosforth.pdf

Good morning Jason,

Thank you for your email.

Please find attached response.

Kind regards.
Daniela

Daniela Mitreski
Program Support Officer | Emergency Risk Assessment Branch | Emergency Management Directorate
NSW State Emergency Service – State Headquarters
E rra@ses.nsw.gov.au

93-99 Burelli Street Wollongong, NSW 2500
PO Box 6126 Wollongong, NSW 2500
www.ses.nsw.gov.au

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FOR EMERGENCY HELP IN FLOODS, STORMS AND TSUNAMI CALL THE NSW SES ON 132 500

The NSW SES acknowledges the traditional custodians of the lands on which we walk, work and live. We recognise their continuing connection to land, waters and culture and pay respect to Elders, past and present.

From: Jason McIntosh <jason@varaconsulting.com.au>
Sent: Monday, 4 August 2025 2:33 PM
To: NSW SES Risk Reduction <rra@ses.nsw.gov.au>
Cc: Florian Caillon <florian@thirdigroup.com.au>; Robert Huxley <robert@thirdigroup.com.au>; Brian Swaine <brian@thirdigroup.com.au>

Subject: RE: RESPONSE TO SES COMMENTARY – DA/2024/763 – 559 ANAMBAH ROAD, GOSFORTH (Your Ref: ID2702 & ID3159)

Hi Elspeth,

Thank you again for your time on the phone earlier today.

As discussed, I'd like to confirm the following key points from our prior correspondence regarding the proposed upgrades to River Road:

- The upgraded River Road connection will provide alternate access for existing residents of Gosforth and future residents in Anambah when Anambah Road is cut off due to flooding.

- The upgrades are fully funded by Thirdi, with no financial contribution from local or state government or other agencies.

- While this connection is described as "temporary," that term refers only to its eventual superseding by the Western Link Road (currently under design and environmental assessment by Council). Thirdi's proposal, however, enables River Road to remain a functional alternate access route indefinitely should the Western Link Road be delayed or not delivered.

Regarding the use of the term "locked gates", I'd like to clarify that this was used only to express the intent for controlled access. Controlled access is necessary for two reasons:

i. The application received community objections from residents in the Windella Estate based on perceived traffic concerns.

ii. The existing River Road reserve is only 20.115 m wide. Under Maitland City Council's MOES (Manual of Engineering Standards), this would typically support no more than 300 lots under normal access conditions.

Accordingly, access to River Road is proposed to be restricted and activated only during flood events when Anambah Road is impassable.

To address SES's concerns about the limitations of locked gates, we have explored a range of alternative access control measures that would restrict general use while enabling timely access for emergency services and the community when required:

1. **Automated Boom Gates with Emergency Override**

Normally closed; can be opened remotely by SES or Council. May be integrated with flood warning systems or emergency service keycards.

e.g. Bungarribee Park, Blacktown (below)

2. **<u>Retractable Bollards (Hydraulic or Electric)</u>**

Remain raised under normal conditions; retract via remote activation or flood alerts.

3. **<u>Traffic Control Barrier with Surveillance & Intercom</u>**

Monitored gate with CCTV and intercom, enabling live access approval during emergencies.

4. **<u>Swing Gate with Flood-Sensor Triggered Activation</u>**

Automatic activation of access point when Anambah Road reaches flood thresholds.

5. **<u>Traffic Lights with Emergency Phase Activation</u>**

Remain inactive/red under normal conditions; activate to allow directional flow during flood events.

We would greatly appreciate SES's feedback on the viability of these alternatives, and respectfully request that SES provides a formal response confirming:

A. That NSW SES recognises the public benefit of the proposed River Road access in providing connectivity during flood events; and

B. That while SES does not support the use of locked gates, it is open to working with Council and the proponent to identify a suitable alternative access control mechanism. As I mentioned, we are happy for Council to condition the consent to this effect but note your point regarding SES's role as a non-integrated referral agency.

We remain committed to working collaboratively to find a practical, safe, and operationally acceptable solution.

Thanks,

JASON MCINTOSH | 0417 689 270
Suite 9a, 172-178 Pacific Highway
Swansea NSW 2281
jason@varaconsulting.com.au

VARA
CONSULTING

From: NSW SES Risk Reduction <rra@ses.nsw.gov.au>
Sent: Friday, 1 August 2025 12:58 PM
To: Jason McIntosh <jason@varaconsulting.com.au>
Cc: NSW SES Risk Reduction <rra@ses.nsw.gov.au>
Subject: RE: RESPONSE TO SES COMMENTARY – DA/2024/763 – 559 ANAMBAH ROAD, GOSFORTH (Your Ref: ID2702 & ID3159)

Thank you Jason, I have forwarded your email to Elspeth.

Kind regards.
Daniela

Daniela Mitreski
Program Support Officer | Emergency Risk Assessment Branch | Emergency Management Directorate
NSW State Emergency Service – State Headquarters
E rra@ses.nsw.gov.au

93-99 Burelli Street Wollongong, NSW 2500
PO Box 6126 Wollongong, NSW 2500
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FOR EMERGENCY HELP IN FLOODS, STORMS AND TSUNAMI CALL THE NSW SES ON 132 500

The NSW SES acknowledges the traditional custodians of the lands on which we walk, work and live. We recognise their continuing connection to land, waters and culture and pay respect to Elders, past and present.

From: Jason McIntosh <jason@varaconsulting.com.au>
Sent: Friday, 1 August 2025 12:50 PM
To: NSW SES Risk Reduction <rra@ses.nsw.gov.au>
Cc: Lisa Ignatavicius <lisa.ignatavicius1@ses.nsw.gov.au>; Brian Swaine <brian@thirdigroup.com.au>; Robert Huxley <robert@thirdigroup.com.au>; Florian Caillon <florian@thirdigroup.com.au>
Subject: RE: RESPONSE TO SES COMMENTARY – DA/2024/763 – 559 ANAMBAH ROAD, GOSFORTH (Your Ref: ID2702 & ID3159)

Good afternoon Daniela,

Thank you for your response and for forwarding my email to Elspeth.

Given the time-sensitive nature of the matter, I would very appreciative if you could please ask Elspeth to return my call as soon as Elspeth is available next week.

Thanks,

JASON MCINTOSH | 0417 689 270
Suite 9a, 172-178 Pacific Highway
Swansea NSW 2281
jason@varaconsulting.com.au

VARA
CONSULTING

From: NSW SES Risk Reduction <rra@ses.nsw.gov.au>
Sent: Friday, 1 August 2025 10:08 AM
To: Jason McIntosh <jason@varaconsulting.com.au>
Cc: Lisa Ignatavicius <lisa.ignatavicius1@ses.nsw.gov.au>; Brian Swaine <brian@thirdigroup.com.au>; Robert Huxley <robert@thirdigroup.com.au>; Florian Caillon <florian@thirdigroup.com.au>; NSW SES Risk Reduction <rra@ses.nsw.gov.au>
Subject: RE: RESPONSE TO SES COMMENTARY – DA/2024/763 – 559 ANAMBAH ROAD, GOSFORTH (Your Ref: ID2702 & ID3159)

Good morning Jason,

Thank you for your email.

Elspeth O'Shannessy is the Manager of the Emergency Risk Assessment Team and unfortunately is unavailable today to return your call and will return to the office next week.

I have forwarded your email to Elspeth.

Please continue to use the RRA email address as the centralised contact method to get in touch with our Team.

Thank you for your understanding.

Kind regards.

Daniela

Daniela Mitreski
Program Support Officer | Emergency Risk Assessment Branch | Emergency Management Directorate
NSW State Emergency Service – State Headquarters
E rra@ses.nsw.gov.au

93-99 Burelli Street Wollongong, NSW 2500
PO Box 6126 Wollongong, NSW 2500
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FOR EMERGENCY HELP IN FLOODS, STORMS AND TSUNAMI CALL THE NSW SES ON 132 500

The NSW SES acknowledges the traditional custodians of the lands on which we walk, work and live. We recognise their continuing connection to land, waters and culture and pay respect to Elders, past and present.

From: Jason McIntosh <jason@varaconsulting.com.au>
Sent: Friday, 1 August 2025 9:34 AM
To: NSW SES Risk Reduction <rra@ses.nsw.gov.au>
Cc: Lisa Ignatavicius <lisa.ignatavicius1@ses.nsw.gov.au>; Brian Swaine <brian@thirdigroup.com.au>; Robert Huxley <robert@thirdigroup.com.au>; Florian Caillon <florian@thirdigroup.com.au>
Subject: RE: RESPONSE TO SES COMMENTARY – DA/2024/763 – 559 ANAMBAH ROAD, GOSFORTH (Your Ref: ID2702 & ID3159)

Hi Daniela,

Thanks for the response. I had a missed call from someone of NSW SES on Wednesday afternoon - the person identified themselves as Elle in a voicemail message. I have tried to return the call a few times since but have been unable to get through. Is there a number I can call to talk with someone that is familiar with the application?

Thanks,

JASON MCINTOSH | 0417 689 270
Suite 9a, 172-178 Pacific Highway
Swansea NSW 2281
jason@varaconsulting.com.au

VARA
CONSULTING

From: NSW SES Risk Reduction <rra@ses.nsw.gov.au>
Sent: Wednesday, 30 July 2025 9:36 AM
To: Jason McIntosh <jason@varaconsulting.com.au>
Cc: Lisa Ignatavicius <lisa.ignatavicius1@ses.nsw.gov.au>; Brian Swaine <brian@thirdigroup.com.au>; Robert Huxley <robert@thirdigroup.com.au>; Florian Caillon <florian@thirdigroup.com.au>; NSW SES Risk Reduction <rra@ses.nsw.gov.au>
Subject: RE: RESPONSE TO SES COMMENTARY – DA/2024/763 – 559 ANAMBAH ROAD, GOSFORTH (Your Ref: ID2702 & ID3159)

Good morning Jason,

Thank you for your emails, I've forwarded both to Ana for her information.

Kind regards.
Daniela

Daniela Mitreski
Program Support Officer | Emergency Risk Assessment Branch | Emergency Management Directorate
NSW State Emergency Service – State Headquarters
E rra@ses.nsw.gov.au

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The NSW SES acknowledges the traditional custodians of the lands on which we walk, work and live. We recognise their continuing connection to land, waters and culture and pay respect to Elders, past and present.

From: Jason McIntosh <jason@varaconsulting.com.au>
Sent: Wednesday, 30 July 2025 8:52 AM
To: NSW SES Risk Reduction <rra@ses.nsw.gov.au>
Cc: Lisa Ignatavicius <lisa.ignatavicius1@ses.nsw.gov.au>; Brian Swaine <brian@thirdigroup.com.au>; Robert Huxley

<robert@thirdigroup.com.au>; Florian Caillon <florian@thirdigroup.com.au>
Subject: RE: RESPONSE TO SES COMMENTARY – DA/2024/763 – 559 ANAMBAH ROAD, GOSFORTH (Your Ref: ID2702 & ID3159)

Hi Ana Maria,

I tried giving you a call this morning on (02) 4251 6111, but the helpdesk wasn't able to find your direct number. They kindly put me through to another line, and I've left a voicemail message - though I'm not sure if it will make its way to you.

If you're available, would you mind giving me a quick call after 11:00am today? We think a short chat might be the easiest way to clarify a few things about the application, rather than going back and forth over email.

Looking forward to hearing from you.

Thanks,

JASON MCINTOSH | 0417 689 270
Suite 9a, 172-178 Pacific Highway
Swansea NSW 2281
jason@varaconsulting.com.au

VARA
CONSULTING

From: Jason McIntosh
Sent: Tuesday, 29 July 2025 5:11 PM
To: NSW SES Risk Reduction <rra@ses.nsw.gov.au>
Cc: Lisa Ignatavicius <lisa.ignatavicius1@ses.nsw.gov.au>; Emmilia Marshall <emmilia.marshall@maitland.nsw.gov.au>; Shakira Muldoon <shakira.muldoon@maitland.nsw.gov.au>; Brian Swaine <brian@thirdigroup.com.au>; Robert Huxley <robert@thirdigroup.com.au>; Florian Caillon <florian@thirdigroup.com.au>; Steve Barr (sbarr@barrpandp.com.au) <sbarr@barrpandp.com.au>; Samuel Liu <sliu@barrplanning.com.au>
Subject: RE: RESPONSE TO SES COMMENTARY – DA/2024/763 – 559 ANAMBAH ROAD, GOSFORTH (Your Ref: ID2702 & ID3159)

Dear Ana,

Thank you again for your detailed response and ongoing engagement.

We wish to clearly clarify a critical point regarding the function of River Road within our proposal for 559 Anambah Road.

River Road is not being proposed as an "emergency access" or "evacuation route". These terms are not appropriate in the context of our application and may lead to misunderstanding. The proposed use of River Road is simply to enable safe and practical day-to-day movement for existing and future residents during flood events, when Anambah Road is inundated and cut off. This ensures people can continue their normal lives during such events—accessing work, school, medical care, etc.

Importantly, River Road will also provide reliable access for emergency service providers *to* residents in the area (including the existing Gosforth community) who may otherwise be isolated during a flood. It is not intended as a conduit for evacuation, nor is it promoted as part of any formal evacuation strategy. The flood constraints on the subject site simply do not warrant the need for evacuation, even in the most severe Hunter River or local catchment flood events.

We appreciate SES's constructive role in this process and remain available to collaborate further on the design and communication of the access strategy to ensure alignment with broader flood resilience objectives.

Thanks,

JASON MCINTOSH | 0417 689 270
Suite 9a, 172-178 Pacific Highway
Swansea NSW 2281
jason@varaconsulting.com.au

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From: NSW SES Risk Reduction <rra@ses.nsw.gov.au>
Sent: Tuesday, 29 July 2025 2:46 PM
To: Jason McIntosh <jason@varaconsulting.com.au>
Cc: Lisa Ignatavicius <lisa.ignatavicius1@ses.nsw.gov.au>; Emmilia Marshall <emmilia.marshall@maitland.nsw.gov.au>; Shakira Muldoon <shakira.muldoon@maitland.nsw.gov.au>; Brian Swaine <brian@thirdigroup.com.au>; Robert Huxley <robert@thirdigroup.com.au>; Florian Caillon <florian@thirdigroup.com.au>; Steve Barr (sbarr@barrpandp.com.au) <sbarr@barrpandp.com.au>; Samuel Liu <sliu@barrplanning.com.au>; NSW SES Risk Reduction <rra@ses.nsw.gov.au>
Subject: RE: RESPONSE TO SES COMMENTARY – DA/2024/763 – 559 ANAMBAH ROAD, GOSFORTH (Your Ref: ID2702 & ID3159)

Dear Jason,

Good afternoon and thank you for your email.

We appreciate you clarifying the proposed access strategy for the development proposal at 559 Anambah Road.

I just wanted to clarify that while the NSW SES support the alternate access, for the safety of the community we do not support this access being restricted/conditioned by any factors that may impede/delay evacuation during a flood event. This can become particularly dangerous in a flash flooding environment such as the local catchment, providing very limited warning time for the community to take protective action. Restricted/controlled access could potentially introduce another vulnerable link in the evacuation process and, as touched on in our previous email, can become problematic in large scale flooding events when emergency services resources are already in high demand. That's why, from an emergency management perspective, the NSW SES support that the proposed access via River Road remains publicly accessible and that is maintained to an appropriate standard for use in wet weather to support existing and future communities.

We also recommend careful consideration of cumulative impacts of future development on evacuation capacity for the broader Anambah Urban Release Area (AURA), and strongly advise working with Council as the consent authority to consider the evacuation capability for future development in the broader context ensuring it can provide for safe evacuation of future communities, while maintaining that of existing communities.

I hope this helps.

Warm regards,

Ana Maria Chitu
Planning and Research Officer | Emergency Risk Assessment

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Land of the Wangal Clan of the Eora Nation,
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From: Jason McIntosh <jason@varaconsulting.com.au>
Sent: Tuesday, 29 July 2025 11:14 AM
To: NSW SES Risk Reduction <rra@ses.nsw.gov.au>
Cc: Lisa Ignatavicius <lisa.ignatavicius1@ses.nsw.gov.au>; Emmilia Marshall <emmilia.marshall@maitland.nsw.gov.au>; Brian Swaine <brian@thirdigroup.com.au>; Robert Huxley <robert@thirdigroup.com.au>; Florian Caillon <florian@thirdigroup.com.au>; Steve Barr (sbarr@barrpandp.com.au) <sbarr@barrpandp.com.au>; Samuel Liu <sliu@barrplanning.com.au>
Subject: RE: RESPONSE TO SES COMMENTARY – DA/2024/763 – 559 ANAMBAH ROAD, GOSFORTH (Your Ref: ID2702 & ID3159)

Dear Ana Maria,

Thank you for your considered response and for acknowledging our approach to flood access and the function of River Road as part of the broader Anambah Urban Release Area (AURA) access strategy.

We are pleased that SES supports River Road as a valuable alternate flood access route, and we agree with the benefit to the broader community.

To clarify two key aspects of the proposed strategy for 559 Anambah Road:

1. Interim Use of River Road
River Road is described as a "interim" flood access solution only in the context that it may be superseded by the Western Link Road (Windella Road), if and when it is delivered. Should the Western Link Road not proceed within a reasonable timeframe - or at all - River Road remains available in perpetuity. In that sense, it is a fully viable long-term flood access solution unless and until it is replaced by the Western Link Road.

2. Purpose of Controlled Access
The controlled access arrangement for River Road is not intended to restrict use by emergency services in any way. Rather, it is a deliberate and measured response to ongoing community concerns from existing Windella Estate residents about the permanent opening of River Road to general traffic. These controls aim to manage day-to-day vehicle movement while ensuring that alternate access remains unfettered during flood events. We note SES's advice regarding the potential operational challenges of restricted access during large-scale flood events. To address this, the access control system will be designed with SES-compatible solutions (e.g., automated gates with remote override, signage, and a clearly defined Emergency Access Management Plan), to ensure reliability and ease of use by emergency services. We are happy to engage further with SES to ensure the final design aligns with emergency services management requirements.

In relation to SES' comment regarding consent conditions, we also wish to provide further context around the Western Link Road. While it is identified in the strategic access framework for the AURA, Council is currently leading the design and approvals process for that road in collaboration with another landowner. This work has occurred independently of Thirdi, who has not been involved in the planning or funding discussions to date, nor has Council sought Thirdi's input. As such, and critically, our application for 559 Anambah Road does not rely on the delivery of the Western Link Road to proceed. Our access strategy is fully functional based on existing road infrastructure, with River Road forming the basis for alternate flood access.

We appreciate the collaborative approach taken by NSW SES in reviewing this proposal, and we remain available to further discuss the details of the Emergency Access Management Plan or broader development access strategy as required.

Thanks,

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From: NSW SES Risk Reduction <rra@ses.nsw.gov.au>
Sent: Monday, 28 July 2025 1:10 PM
To: Jason McIntosh <jason@varaconsulting.com.au>
Cc: Lisa Ignatavicius <lisa.ignatavicius1@ses.nsw.gov.au>; Emmilia Marshall <emmilia.marshall@maitland.nsw.gov.au>; Brian Swaine <brian@thirdigroup.com.au>; Robert Huxley <robert@thirdigroup.com.au>; Florian Caillon <florian@thirdigroup.com.au>; Steve Barr (sbarr@barrpandp.com.au) <sbarr@barrpandp.com.au>; Samuel Liu <sliu@barrplanning.com.au>; NSW SES Risk Reduction <rra@ses.nsw.gov.au>
Subject: RE: RESPONSE TO SES COMMENTARY – DA/2024/763 – 559 ANAMBAH ROAD, GOSFORTH (Your Ref: ID2702 & ID3159)

Dear Jason,

Thank you for reaching out and we appreciate your considered response to our advice letter, along with clarifying the function of River Road.

We note that the use of River Road is intended to be a temporary alternate access route engineered to provide improved flood resilience, and that consistent with Council's views for the Anambah Urban Release Area (AURA), the long-term access strategy is to deliver a western road link through to Windella Road and the New England Highway. However, understanding the flooding constraints in the broader area, any additional alternative emergency access route that can be used long-term (as opposed to a temporary basis) during a flooding event would benefit the community, particularly noting the potential for future expansion of the population within the AURA.

In this context, it is important to consider if the western road link is confirmed and funded, and the timeframe until completion of this road. We understand that the applicant for Anambah DA1 at 381 Anambah Road, Anambah is engaging *"in delivering the Wyndella Road upgrades and subsequent lead-in road (western road link) upfront. The western road link will be the main access point for the applicant's land holding. The applicant acknowledged that the development application would need to be conditioned to ensure the western road link is delivered prior to the issue of a subdivision certificate for the first allotment."* **(Ethos Urban, 2025, Statement of Environmental Effects, page**

12) We suggest a similar condition may be explored and put in place for this proposal at 559 Anambah Road to mitigate risk by having the appropriate infrastructure in place prior to development occurring.

It is understood that the aim of providing controlled access via River Road is to manage any negative traffic impacts to Windella Estate residents in non-flood periods. We note that SES-compatible lockboxes, remote access systems, or automated gates, supported by signage and a clear Emergency Access Management Plan, are being proposed to manage this. In relation to this approach, the NSW SES advise that generally locked gates/restricted access can add complexities for warnings, emergency response and evacuation and could cause delays; this becomes particularly problematic during flooding events of large scale when resource demands are already quite high, therefore this is a less desirable solution from an emergency management perspective.

Please don't hesitate to reach out should there be any questions.

Warm regards,

Ana Maria Chitu
Planning and Research Officer | Emergency Risk Assessment

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From: Jason McIntosh <jason@varaconsulting.com.au>
Sent: Wednesday, 23 July 2025 5:09 PM
To: NSW SES Risk Reduction <rra@ses.nsw.gov.au>
Cc: Lisa Ignatavicius <lisa.ignatavicius1@ses.nsw.gov.au>; Emmilia Marshall <emmilia.marshall@maitland.nsw.gov.au>; Brian Swaine <brian@thirdigroup.com.au>; Robert Huxley <robert@thirdigroup.com.au>; Florian Caillon <florian@thirdigroup.com.au>; Steve Barr (sbarr@barrpandp.com.au) <sbarr@barrpandp.com.au>; Samuel Liu <sliu@barrplanning.com.au>
Subject: RESPONSE TO SES COMMENTARY – DA/2024/763 – 559 ANAMBAH ROAD, GOSFORTH (Your Ref: ID2702 & ID3159)

Att: Mr Peter Cinque

Dear Peter,

Please find attached response to correspondence received from NSW SES via Maitland City Council on the above project. Note I will also upload a copy of this to the Planning Portal.

Feel free to call me directly if you wish to discuss.

Thanks,

JASON MCINTOSH | 0417 689 270
Suite 9a, 172-178 Pacific Highway
Swansea NSW 2281

jason@varaconsulting.com.au

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Appendix F – HWC Correspondence

Andrew Killen

To: Andrew Killen
Subject: FW: 559 Anambah Road, Gosforth

From: Barry Calderwood <barry.calderwood@hunterwater.com.au>
Sent: Thursday, 22 May 2025 9:39 AM
To: Jason McIntosh <jason@varaconsulting.com.au>
Cc: Lach McRae <LMcRae@northrop.com.au>; Brian Swaine <brian@thirdigroup.com.au>
Subject: RE: 559 Anambah Road, Gosforth

Hi Jason

Hunter Water's Strategy review response comments will be sent by close of business tomorrow.

In regards to Clause 6.2(1) of the Maitland LEP,

> ***6.2 Public utility infrastructure***
> *(1) Development consent must not be granted for development on land in an urban release area unless the Council is satisfied that any public utility infrastructure that is essential for the proposed development is available or that adequate arrangements have been made to make that infrastructure available when it is required.*

I can confirm that Hunter Water will ensure water and wastewater assets are delivered to service staged development of the Thirdi Anambah Pty Ltd site prior to issuing a Compliance Certificate under Section 50 of the Hunter Water act 1991.

Hunter Water has no objection to Maitland City Council issuing DA Consent Conditions provided the following condition is included:

Section 50 Certificate
Evidence must be submitted to Council that the registered proprietors of the land on whose behalf the application was made have complied with the requirements of Section 50 of the Hunter Water Act 1991 for the supply of water and sewer infrastructure for this development. Such evidence must be submitted to Council prior to the release of the Subdivision Certificate.

Council can give me a call if further advice is required.

Regards

Barry Calderwood
Account Manager Major Development | Hunter Water Corporation
36 Honeysuckle Drive Newcastle NSW 2300 | PO BOX 5171 HRMC NSW 2310
T 02 4979 9721 | Twitter: @hunterwater
barry.calderwood@hunterwater.com.au | hunterwater.com.au

From: Jason McIntosh <jason@varaconsulting.com.au>
Sent: Wednesday, 21 May 2025 8:22 AM

To: Barry Calderwood <barry.calderwood@hunterwater.com.au>
Cc: Lach McRae <LMcRae@northrop.com.au>; Brian Swaine <brian@thirdigroup.com.au>
Subject: 559 Anambah Road, Gosforth

Hi Barry,

I tried to call on Monday but was unable to reach you. I was hoping to discuss the following:

1. Could you please provide an update on Hunter Water's review of the two addendums to the ADWJ Servicing Strategy?
2. Given we are required to submit our response to Council's RFI by 30 May (next Friday), is Hunter Water in a position where it could provide written advice that satisfies Clause 6.2(1) of Maitland LEP:
   6.2 Public utility infrastructure
   (1) Development consent must not be granted for development on land in an urban release area unless the Council is satisfied that any public utility infrastructure that is essential for the proposed development is available or that adequate arrangements have been made to make that infrastructure available when it is required.
   In my view, this is already satisfied by the fact that there are already approved servicing strategies for both sewer and water across the entire URA and all we are doing with the addendums is proposing an alternate sequencing. However, I know that Council will want this confirmed by Hunter Water.

Happy to discuss.

Thanks,

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