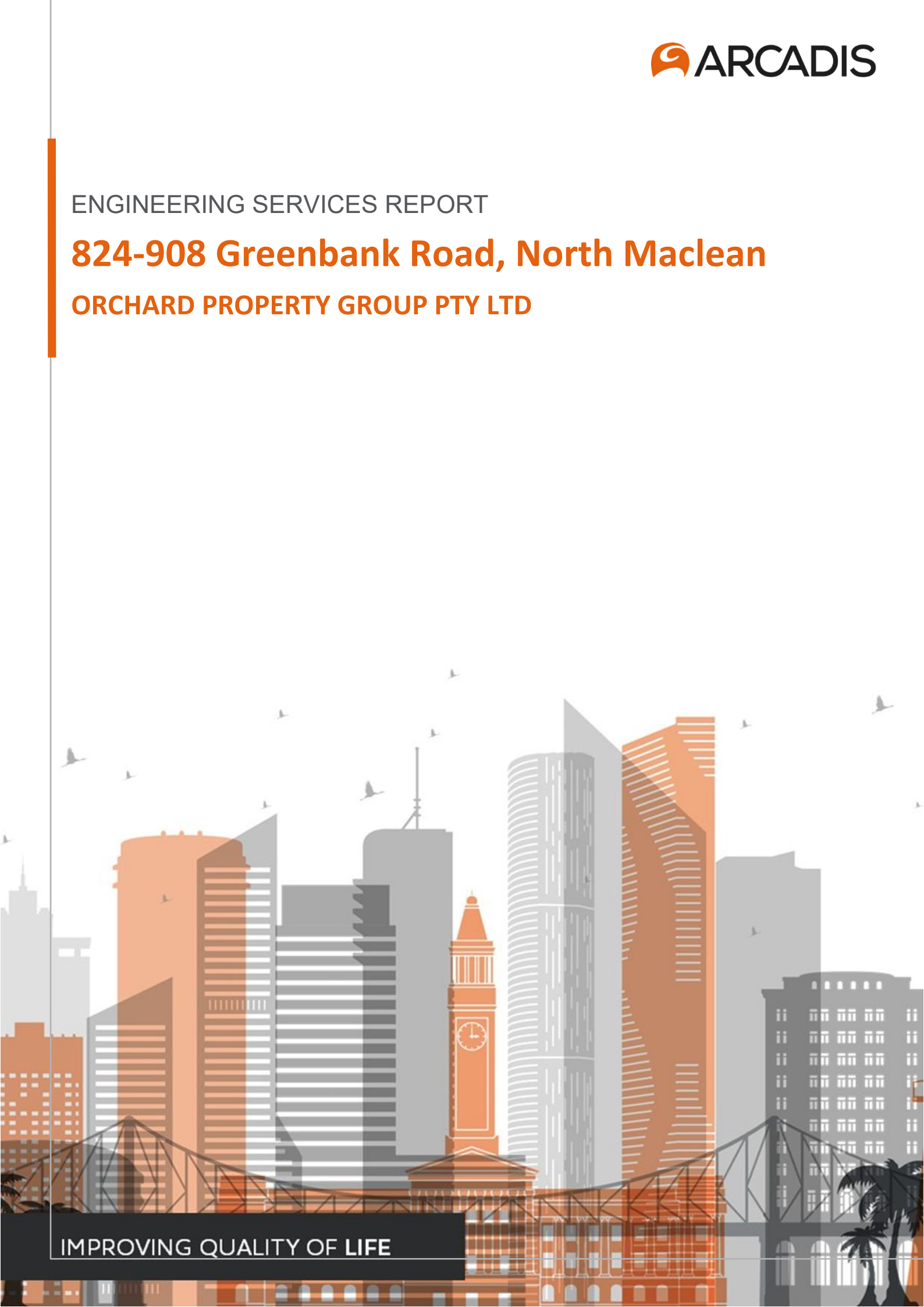


ENGINEERING SERVICES REPORT

824-908 Greenbank Road, North Maclean

ORCHARD PROPERTY GROUP PTY LTD



IMPROVING QUALITY OF LIFE

824-908 Greenbank Road, North Maclean – Stage 1

ENGINEERING SERVICES REPORT

Author Laura Wilemsen



Checker Laura Willemsen

Approver Mohamed Elnahas



RPEQ 35926

Project No 30340582

Report No GA0001

Revision 01

Date 13/08/2026

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Revision	Date	Description
01	13/08/2026	Issue for Approval

Should you require any further information, please contact our Brisbane office and ask to speak to the report author denoted above.

Reception – Brisbane: +61 (0) 7 3337 0000

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1 EXECUTIVE SUMMARY

Orchard Property Group Pty Ltd has commissioned Arcadis Australia Pacific Pty Limited to prepare an Engineering Services Report in support of a development application over Lot 1 on RP121663 (824–908 Greenbank Road, North Maclean QLD 4280).

The proposed development comprises a combined Reconfiguration of a Lot and Material Change of Use application for an industrial subdivision.

This report supports the proposed Stage 1 development, comprising 16 industrial allotments, the corresponding section of the proposed internal road network and a temporary turnaround at the eastern extent of the development. The remainder of the site will be retained as a balance lot under the current application.

The site is located within the Greater Flagstone Priority Development Area (PDA). The proposed development has been planned having regard to the broader planning and infrastructure framework applicable to the North Maclean locality.

The proposed Stage 1 development has been designed to support the orderly provision of infrastructure and future development of the balance lot and surrounding catchment

- This report assesses the engineering servicing strategy for Stage 1, including:
 - earthworks and grading;
 - stormwater drainage;
 - potable water;
 - sewerage;
 - utility services; and
 - roads and access.

The proposed engineering strategy has been developed at a conceptual level to demonstrate that Stage 1 can be appropriately serviced, subject to the delivery of planned external infrastructure, authority approvals and subsequent detailed design.

Earthworks and Grading

Conceptual grading will be undertaken to provide suitable industrial allotment platforms and road grades while generally maintaining the existing northern and southern drainage directions. Final earthworks levels, batters, retaining structures and cut-and-fill requirements will be confirmed during detailed design.

Drainage

The site currently drains towards two lawful points of discharge:

- the existing drainage corridor along the northern and north-eastern site boundary; and
- the existing Greenbank Road roadside table drain to the south.

The proposed development will generally maintain this existing drainage split.

Runoff from the northern industrial allotments will be managed by individual on-site detention systems prior to discharge towards the northern drainage corridor. Runoff from the southern industrial allotments will similarly be managed by individual on-site detention systems before discharging directly to the existing Greenbank Road roadside table drain.

Runoff from the Stage 1 road network will be collected by the proposed road drainage system and treated through distributed Biopod bioretention systems before being conveyed to the northern lawful point of discharge.

The Site Based Stormwater Management Plan, Arcadis report **30340582-GA0002**, should be referred to for further details.

Potable Water

The proposed development is intended to connect to the planned trunk water infrastructure associated with future development in the North Maclean area, including the proposed Willowbrook Road corridor.

An internal reticulation main will be constructed within the Stage 1 road reserve to service the proposed allotments. Final connection arrangements, pipe sizing, metering, hydrant provision and network capacity will be confirmed in consultation with Logan Water and the relevant infrastructure delivery parties during detailed design.

Sewerage

The proposed Stage 1 allotments will be serviced via property connections to a proposed DN225 gravity sewer main located within the proposed road corridor. The conceptual sewer servicing strategy has been developed to facilitate future servicing of the balance lot and the broader upstream development catchment, with ultimate discharge to the proposed SPS006 sewer pump station as per the DCOP plans. Final sewer classification, sizing, capacity, alignment, staging, easements and delivery arrangements remain subject to further coordination and detailed design.

Network Loading

The proposed Stage 1 water and sewer demands have been calculated using the medium-industrial conversion rates adopted in Logan Water's planning for the North Maclean PDA.

- The calculated Stage 1 demands are:
 - potable water demand: approximately **184 EP**; and
 - wastewater demand: approximately **147 EP**.

These demands represent a portion of the broader planned NM2 catchment demand. Final capacity and connection requirements remain subject to confirmation by Logan Water and EDQ.

Vehicular Access and Roadworks

Vehicular access to Stage 1 will be provided by the proposed internal road connecting to future Willowbrook Road. A temporary turnaround will be provided at the Stage 1 interface

The road and verge configuration will be refined during detailed design to accommodate the proposed sewer, water, stormwater drainage, Biopods and other utility infrastructure.

2 SITE CHARACTERISTICS

2.1 Location Details

The subject site is located at 824–908 Greenbank Road, North Maclean, Queensland, and comprises:

- Lot 1 on RP121663.

Stage 1 generally occupies the western portion of the subject site and has an area of approximately 55,731 m². The eastern portion of the site has potential to accommodate future development but is excluded from the current application, though allowance is provided for potential infrastructure connections and staging interfaces.

The site is generally bounded by:

- Greenbank Road to the south and south-west;
- Willowbrook Road to the north;
- the future balance lot to the east; and
- surrounding rural, industrial and undeveloped land.

The site is located within a Priority Development Area. Logan City Council acts as assessment manager and undertakes relevant functions on behalf of the Minister for Economic Development Queensland.

2.2 Land Usage

In its current state, the project site has been cleared. Figure 2-1 below provides a current locality plan of the site.



Figure 2-1 Site Locality Plan (Aerial Imagery Courtesy of QLD Globe)

2.3 Topography and Features

The site is characterised by moderate slopes adjacent to the Greenbank Road frontage and a ridgeline extending through the development area. The ridgeline divides the existing site into northern and southern drainage catchments.

The southern portion generally falls towards Greenbank Road at gradients of approximately 5%, while the northern portion generally grades towards the existing drainage corridor along the northern and north-eastern site boundary. Land further east, near the existing dam, is comparatively flat.

Existing site elevations generally range from approximately RL 36 m AHD at the western extent to approximately RL 27 m AHD towards the eastern site boundary.

2.4 Flood Constraints

The site has been reviewed with regard to the flood information available through the City of Logan Property Flood Report (Appendix E). The site is affected by areas identified as Moderate and Low Flood Risk. The Flood levels applicable to the site are summarised in Table 1 below.

Table 1 Flood Levels Applicable to the Site

Flood Event	Flood Level (RL m AHD)
1% AEP	27.7
0.5% AEP	28.2
0.2% AEP	28.9

Concept development envelopes and proposed pad levels have been established above the applicable flood planning levels and are capable of accommodating future industrial development in accordance with the Flood Hazard Overlay Code (Appendix B)

2.5 Planning Context and Development Scheme Alignment

The subject site is located within the Greater Flagstone Priority Development Area (PDA) and is intended to support the ongoing development of employment-generating industrial land within the North Maclean locality.

The proposed Stage 1 development has been planned having regard to the Greater Flagstone Development Scheme and the broader infrastructure-planning framework established by Economic Development Queensland (EDQ).

The proposed road, water, sewer and stormwater infrastructure has been conceptually configured to support the orderly delivery of development within the site whilst facilitating future servicing of the balance lot and integration with surrounding development areas.

Planned trunk water and sewer infrastructure identified within the North Maclean PDA servicing framework has informed the development of the proposed servicing strategy contained within this report.

3 PROPOSED DEVELOPMENT

The proposed Stage 1 development comprises:

- 16 industrial allotments;
- a section of the proposed internal road;
- a temporary turnaround at the Stage 1 interface;
- internal stormwater, potable water and sewerage reticulation;
- utility servicing; and
- associated earthworks and grading.

The remainder of the site will be retained as a **balance lot** under the current application and may be subject to future development. The demand assessment presented in this report relates to the Stage 1 development. However, calculations have also been undertaken to confirm that the proposed water and sewer networks have sufficient capacity to accommodate the potential future development of the balance lot. The proposed Stage 1 infrastructure has therefore been conceptually configured to facilitate future servicing of the balance lot, should development proceed.

A plan extract of the proposed Stage 1 development is provided in Figure 3-1.

3.1 Earthworks and Grading

Conceptual earthworks and grading have been developed to create suitable industrial allotment platforms, establish a practical road profile and facilitate the proposed servicing infrastructure while responding to the site's existing topography. The proposed grading strategy has been developed to:

- Provide suitable development platforms for the Stage 1 allotments;
- achieve practical road grades and lot access;
- generally maintain the existing north-south drainage split;
- direct road runoff towards nominated drainage low points;
- maintain suitable interfaces with the balance lot;
- allow future water and sewer connections; and
- minimise unnecessary retaining structures where practical.

The conceptual earthworks design generally adopts batters around the perimeter of the development to provide stable and maintainable earthworks interfaces while minimising the extent of retaining structures. Batter treatments have been selected having regard to the proposed development layout, adjoining land, servicing requirements and long-term maintenance considerations.

The proposed levels are conceptual and will be refined during detailed design. Final earthworks quantities, batter extents, retaining structures and interfaces with adjoining land will be confirmed as part of the Operational Works application.

Retaining structures may be required in localised areas to facilitate development platforms, road infrastructure and servicing requirements where site constraints prevent the use of batter slopes. The location, extent, height and treatment of any retaining structures will be determined during detailed design.

Geotechnical investigations are recommended prior to detailed design to confirm subsurface conditions, material excavability and the suitability of site-won materials for reuse within the proposed earthworks

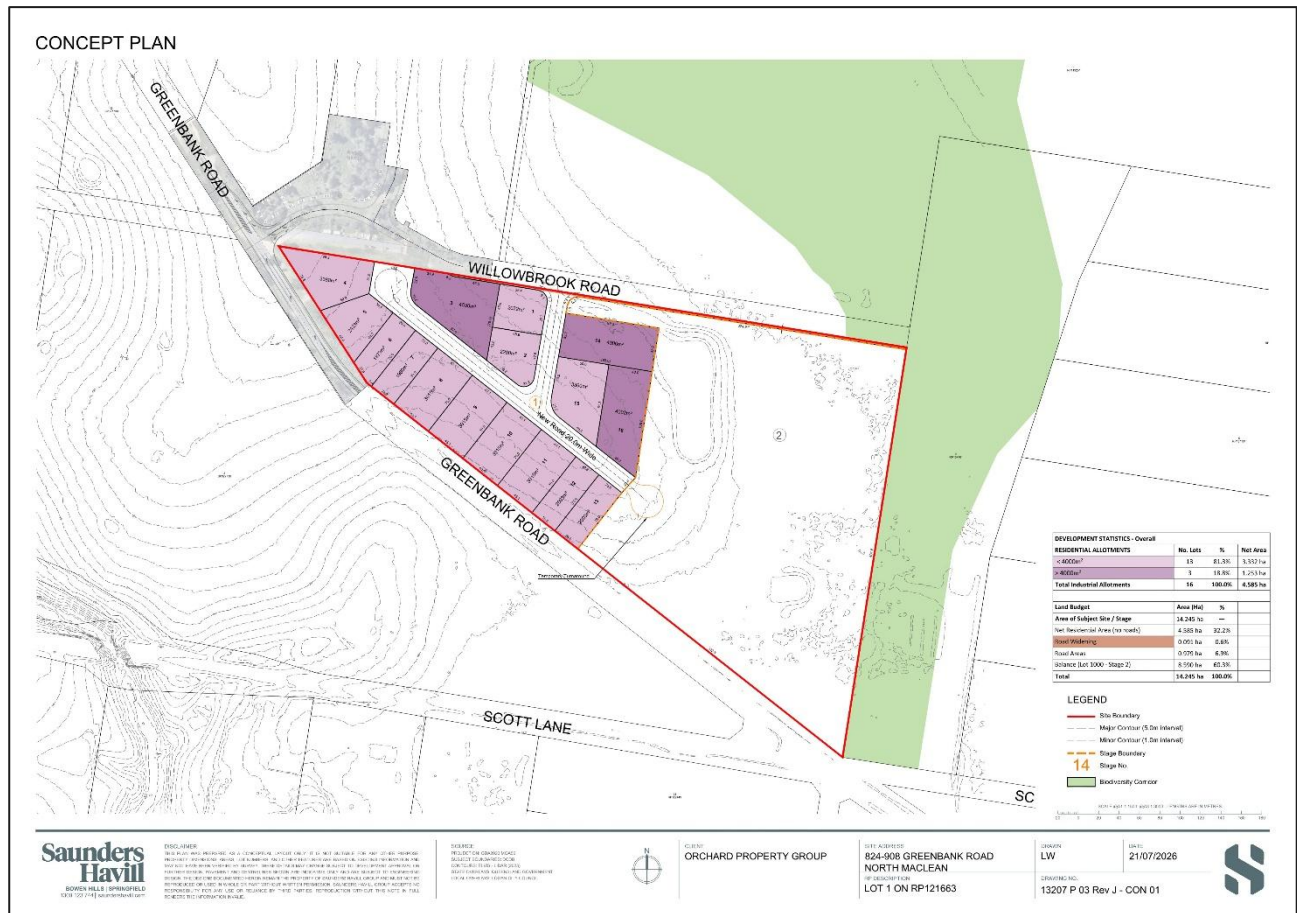


Figure 3-1 Proposed Development Ground Floor

4 INFRASTRUCTURE SERVICES

4.1 Stormwater Drainage

A separate Site Based Stormwater Management Plan, Arcadis report **30340582-GA0002**, has been prepared for the Stage 1 development. The SBSMP should be referred to for the detailed stormwater quantity and quality assessment.

4.1.1 Existing Stormwater Drainage

Existing runoff from the site generally drains in two directions in response to the natural topography.

Runoff from the southern portion of the site drains towards the existing roadside table drain along Greenbank Road. The roadside drain conveys flows towards the existing downstream culvert system.

Runoff from the northern portion of the site follows the existing surface grades towards the drainage corridor along the northern and north-eastern site boundary.

No significant external catchments are currently understood to discharge through the Stage 1 development area.

4.1.2 Proposed Stormwater Drainage

The site will maintain its discharge locations being the local drainage network within Greenbank Road to the south and overland flow paths to the north.

The SBSMP prepared by Arcadis should be referred to for further details on the exact methodology used to achieve Council objectives.

Refer to the Engineering Drawings included in Appendix A for further details.

4.2 Water Network

4.2.1 Existing Potable Water

The following existing water mains and fittings have been identified adjacent to the development site from both LCC ArcGIS asset mapping (online) and BYDA (Before You Dig Australia) searches.

- Potable water main along the southern verge of Greenbank Road to the south of the development site.

The suitability and capacity of the existing Greenbank Road infrastructure have not been relied upon as the primary servicing solution for Stage 1.

4.2.2 Planned Potable Water

- During the EDQ pre-lodgement meeting held on 23 June 2026, it was advised that trunk water infrastructure is planned within the broader North Maclean PDA to support future development of the area.
- Figure 4- 1 identifies the planned water infrastructure servicing the broader catchment, including the planned water mains located north of the subject site.
- The subject site is located adjacent to the planned trunk water network and is intended to be serviced as part of the broader North Maclean PDA servicing strategy.
- The timing, final alignment and delivery of the planned water infrastructure remain subject to ongoing coordination with EDQ, Logan Water and adjoining developments.

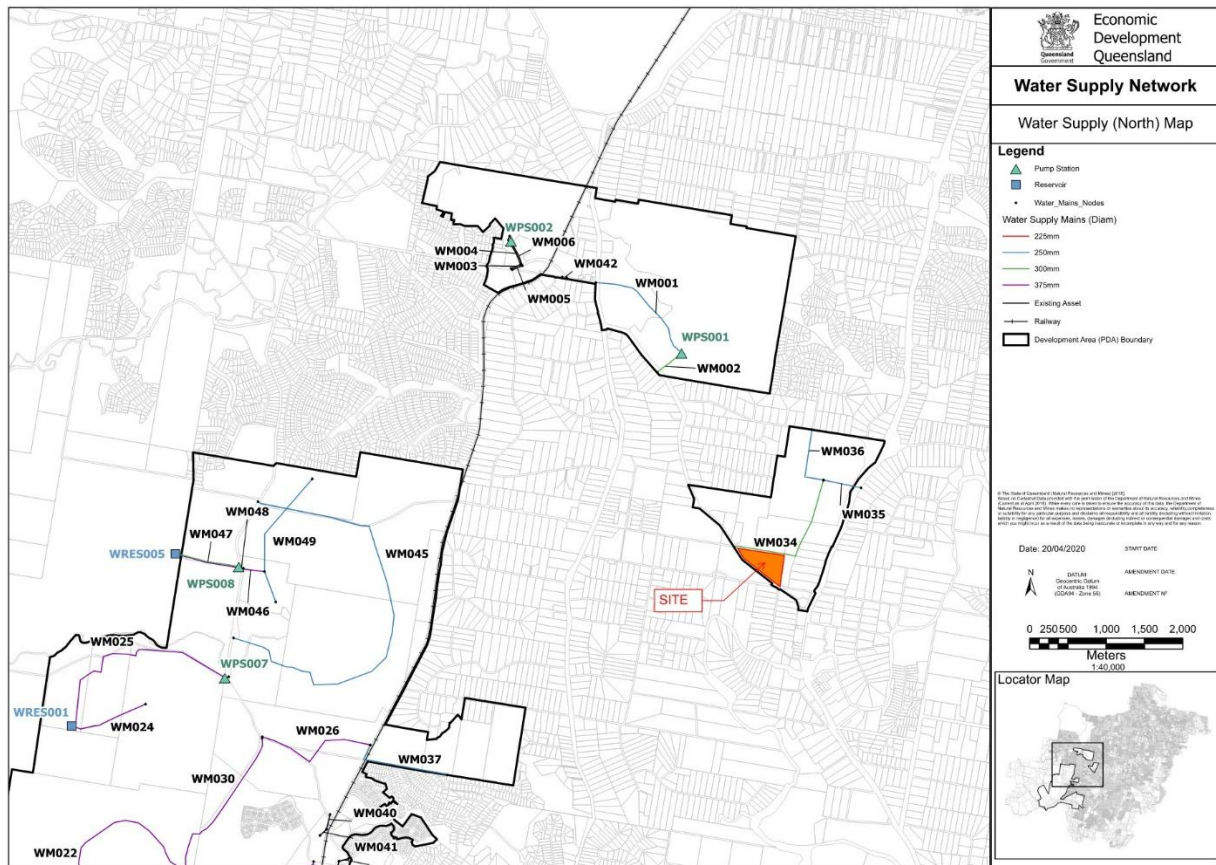


Figure 4- 1 Planned Flagstone PDA Water Infrastructure

4.2.3 Proposed Potable Water

The proposed Stage 1 development will connect to the planned trunk water main at an indicative connection point near Willowbrook Road.

An internal water reticulation network is proposed within the Stage 1 road reserve and will generally loop through the proposed road network to service all Stage 1 allotments.

The conceptual water strategy includes:

- an internal looped water-reticulation network;
- an indicative connection to the future trunk water main (by others);
- individual potable-water and fire-service connections for each allotment;
- hydrants in accordance with the relevant authority requirements; and
- provision for future extension of the water-reticulation network to service future development of the balance lot.

Road crossings should generally be arranged perpendicular to the road where practical. Final pipe sizing, alignment, meter requirements, hydrant spacing and fire-flow performance will be confirmed during detailed design and authority assessment.

The proposed water-reticulation strategy is shown in the Engineering Drawings included in Appendix A.

4.2.4 Projected Development Loadings

The demand generation for the proposed Stage 1 development has been calculated using the non-residential conversion rates contained in Logan Water's Load Projections for North Maclean PDA Technical Memorandum, dated 21 July 2022 (Appendix C).

Medium industrial development has been adopted for the assessment. A gross floor area equal to 70% of the Stage 1 developable area has been assumed.

Table 2 Potable Water Demand

Category	Assumed GFA	Conversion Rate	Water Demand
Medium industrial	3.90 ha	47.25 EP/ha GFA	184 EP

The Stage 1 development forms part of the broader NM2 servicing catchment considered in Logan Water's infrastructure planning. The calculated Stage 1 demand represents a portion of the planned catchment demand.

No separate network model has been undertaken as part of this ESR. Final network capacity, connection conditions and infrastructure requirements remain subject to confirmation by Logan Water and EDQ.

4.3 Sewer Network

4.3.1 Existing Sewer

Available Logan Water asset information and Before You Dig Australia searches do not identify an existing gravity sewer network capable of servicing the proposed Stage 1 development.

The broader North Maclean area is intended to be serviced by planned wastewater infrastructure identified within the PDA servicing framework. This includes a future sewer catchment and the proposed sewer pump station SPS006, which are intended to facilitate servicing of future development within the surrounding catchment areas.

4.3.2 Planned Sewer

The North Maclean PDA sewer servicing strategy identifies a future sewer catchment intended to support the planned industrial development of the broader area.

The subject site forms part of a broader planned sewer catchment which is intended to ultimately discharge to the proposed sewer pump station (SPS006) identified within the PDA infrastructure planning framework.

The planned sewer servicing strategy generally provides for:

- collection of wastewater generated within the broader North Maclean catchment;
- servicing of future industrial development areas;
- conveyance of wastewater to the proposed sewer pump station (SPS006); and
- integration with the broader wastewater network servicing the Greater Flagstone PDA.

Figure 4- 2 illustrates the planned sewer infrastructure identified within the PDA planning framework, including the proposed NM2 sewer pump station and associated sewer catchment.

The ultimate timing, staging, alignment and delivery of sewer infrastructure required to service the broader catchment will be subject to ongoing coordination with EDQ, Logan Water and adjoining developments.

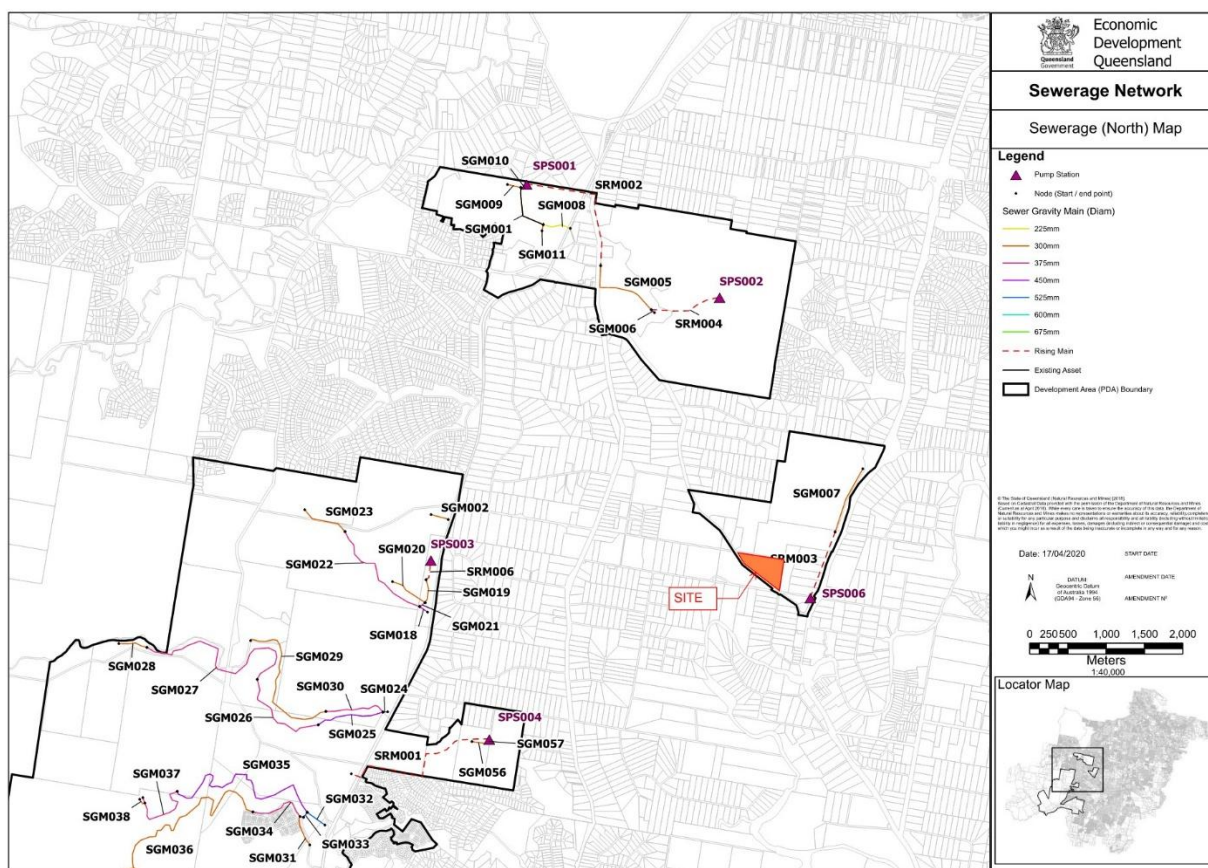


Figure 4- 2 Planned Flagstone PDA Sewer Infrastructure

4.3.3 Proposed Sewer

- An indicative DN225 gravity sewer network is proposed within the Stage 1 road corridor.
- The proposed gravity sewer network is generally located on both sides of the road where required to service the industrial allotments and minimise individual road crossings. Each Stage 1 allotment will be provided with an indicative property connection.
- The Stage 1 gravity sewer network is proposed to connect to a broader planned gravity sewer network. The conceptual servicing strategy has been developed to facilitate servicing of the Stage 1 development, the balance lot and adjoining upstream development areas
- Provision has been made at the eastern extent of the Stage 1 development to facilitate the future extension of the gravity sewer network into the balance lot. The indicative future connection level shown on the Engineering Drawings is subject to confirmation during detailed design, having regard to the final earthworks grading, sewer depth and longitudinal sewer design.
- The external gravity sewer infrastructure shown on the Engineering Drawings is indicative only and has been included to demonstrate a feasible overall sewer servicing strategy. Final alignments, infrastructure classification, extent of works, staging, design, delivery responsibilities, ownership and approval requirements remain subject to further coordination and detailed design.
- Indicative sewer easements are shown on the Engineering Drawings. Final easement locations and widths will be confirmed during detailed design based on the adopted sewer alignment, diameter, depth, maintenance-access requirements and relevant authority standards.

Refer to the Engineering Drawings included in Appendix A for further details

4.3.4 Projected Development Loadings

Wastewater demand has been calculated using the medium-industrial conversion rates adopted in Logan Water's *Load Projections for North Maclean PDA Technical Memorandum*.

A gross floor area equal to 70% of the Stage 1 developable area has been assumed.

Table 3 Sewer Demand

Category	Quantity	Conversion Rate	Demand (EP)
Assumed GFA (70%)	3.90	37.80 EP/ha	147

The calculated wastewater demand forms part of the broader planned NM2 catchment demand. Final capacity and connection requirements remain subject to confirmation by Logan Water and EDQ.

4.3.5 Internal Sewer Network

The stage 1 development is proposed to include an internal gravity sewer network to service the proposed industrial allotments.

The final sewer design will be required to confirm:

- gravity connection levels;
- maintenance-hole locations;
- property connections;
- pipe sizing and grades;
- sewer depth;
- easement requirements;
- earthworks interfaces;
- stormwater and utility clearances; and
- provision for future Stage 2.

4.4 Other Services

Before You Dig Australia searches have identified telecommunications infrastructure and overhead electrical infrastructure within the broader Greenbank Road area.

Electrical and telecommunications servicing will be designed by the relevant specialist consultants in accordance with the requirements of the applicable asset owners and approval authorities.

The proposed utility arrangements will be coordinated with the road, stormwater, sewer and water networks during detailed design.

5 ROADS AND ACCESS

Vehicular access to the Stage 1 development will be provided by the proposed internal road connecting to planned Willowbrook Road Extension.

The Stage 1 road is proposed within a 20 m wide road reserve and will provide access to all proposed Stage 1 industrial allotments. A temporary turnaround will be incorporated at the eastern extent of the Stage 1 road pending the future development of the balance lot and completion of the ultimate road connection.

The detailed road design will be required to confirm:

- horizontal and vertical road geometry;
- intersection and access arrangements;
- temporary turnaround geometry;
- allotment driveway locations;
- earthworks and retaining requirements;
- pedestrian and verge infrastructure;
- stormwater pits and Biopod locations;
- utility-service allocation within the verges; and
- the interfaces with adjoining land and the balance lot.

The temporary turnaround and Stage 1 interface will also require coordination with existing vegetation, future allotment boundaries and the proposed earthworks.

The timing and availability of the future Willowbrook Road extension must be coordinated with the adjoining development and relevant approval authorities.

Further details are shown on the Engineering Drawings included in Appendix A.

6 CONCLUSION

This Engineering Services Report has assessed the conceptual engineering servicing requirements for the proposed Stage 1 industrial development at 824-908 Greenbank Road, North Maclean.

The assessment demonstrates that the proposed Stage 1 development can be appropriately serviced, subject to the delivery of planned external infrastructure, further authority coordination and detailed design. The proposed servicing strategy has also been conceptually configured to facilitate the future servicing of the **balance lot**, should the remainder of the site be developed under a separate development application.

Earthworks and Grading

Conceptual grading will provide suitable industrial allotment platforms and road grades while generally maintaining the existing northern and southern drainage directions. Final levels, earthworks quantities, batters, retaining structures and flood-storage considerations will be confirmed during detailed design.

Stormwater

The proposed development will generally maintain the existing lawful points of discharge:

- the existing northern and north-eastern drainage corridor; and
- the existing Greenbank Road roadside table drain.

Individual industrial allotments will provide on-site detention and operational stormwater-quality treatment. Stage 1 road runoff will be collected and treated through distributed Biopod systems before discharging to the northern drainage corridor.

The separate SBSMP establishes the stormwater quantity and quality requirements that will form the basis for future lot-specific Operational Works applications.

Potable Water

Potable-water servicing will be provided through a connection to the planned trunk water main associated with future Willowbrook Road and the adjoining development. An internal looped reticulation network will service the Stage 1 allotments. Final connection, capacity, sizing, metering and fire-flow requirements remain subject to Logan Water and EDQ approval.

Sewer

Stage 1 will be serviced by an internal gravity sewer network connecting to the broader planned external gravity sewer network. The proposed servicing strategy has been conceptually configured to facilitate the future servicing of the **balance lot** and the adjoining upstream development catchment. Final infrastructure arrangements, easements, construction timing and delivery responsibilities remain subject to ongoing coordination and detailed design.

Roads and Access

Access to Stage 1 will be provided by the proposed internal road connecting to the planned Willowbrook Road extension. A temporary turnaround will be provided at the eastern extent of Stage 1, with provision for the future extension of the road network into the **balance lot**, should the remainder of the site be developed.

This ESR establishes the conceptual engineering servicing strategy for the proposed Stage 1 development and will form the basis for subsequent Operational Works applications and detailed design.



APPENDIX A

Engineering Drawings

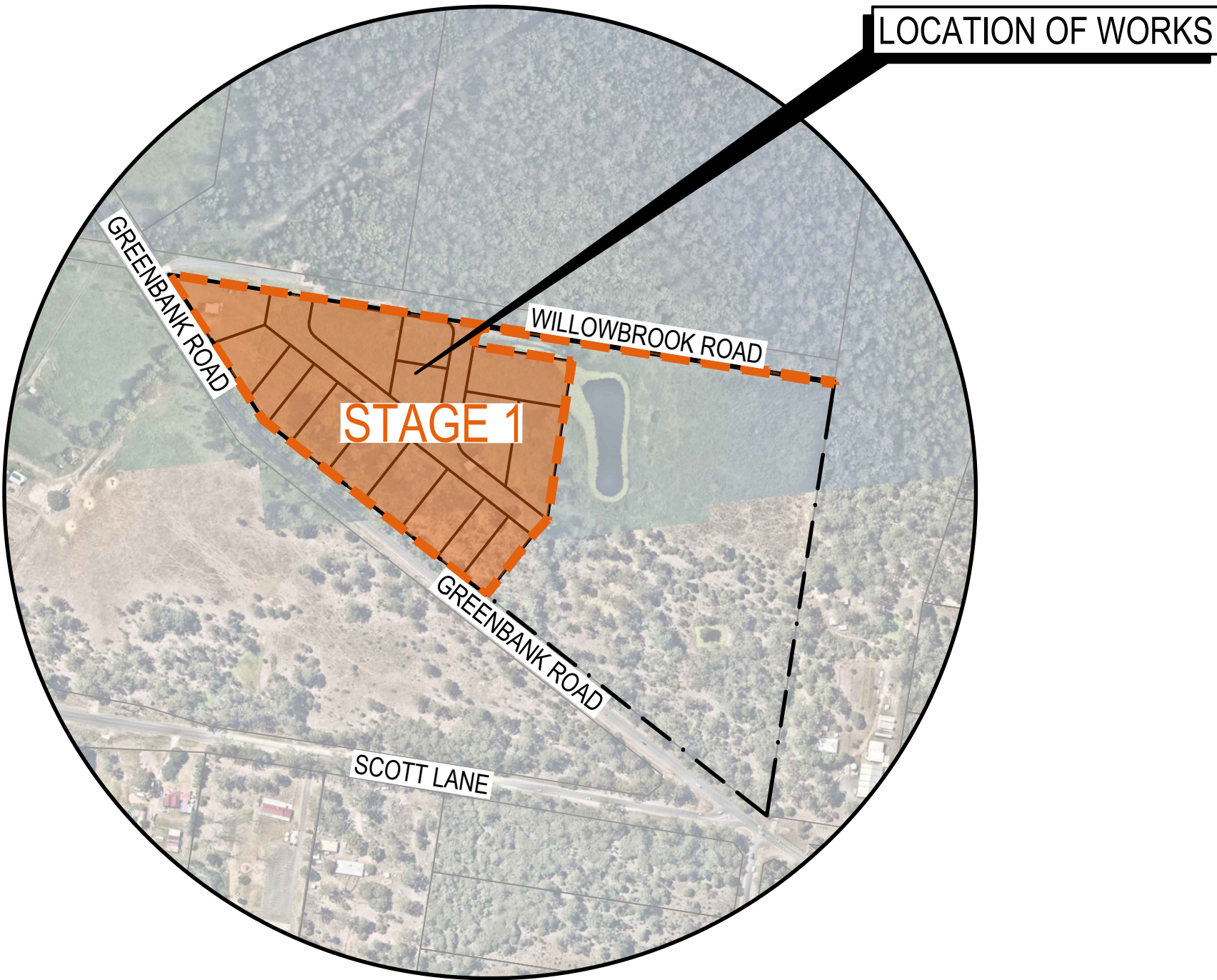
824-908 GREENBANK ROAD, NORTH MACLEAN - STAGE 1

DEVELOPMENT APPLICATION - PRELIMINARY ONLY

LOGAN CITY COUNCIL

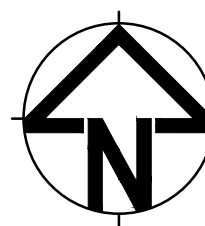
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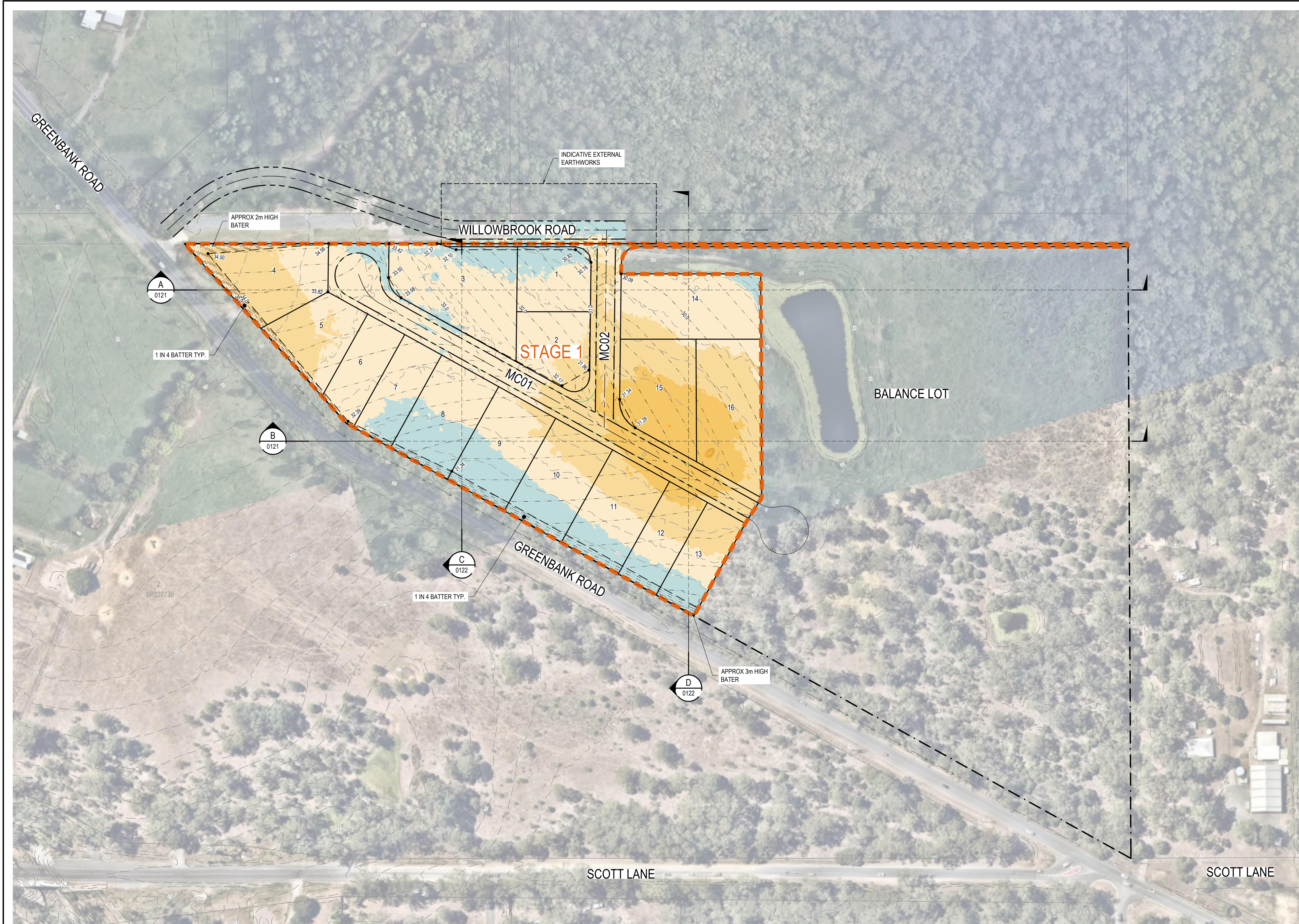
DRAWING NUMBER	DESCRIPTION
GENERAL	
GBR-AAP-DA-01-DRG-CI-0001	COVER SHEET, LOCALITY PLAN AND DRAWING SCHEDULE
EARTHWORKS	
GBR-AAP-DA-01-DRG-CI-0101	EARTHWORKS PLAN
GBR-AAP-DA-01-DRG-CI-0121	EARTHWORKS SITE SECTIONS SHEET 1
GBR-AAP-DA-01-DRG-CI-0122	EARTHWORKS SITE SECTIONS SHEET 2
ROADWORKS AND DRAINAGE	
GBR-AAP-DA-01-DRG-CI-0201	ROADWORKS LAYOUT PLAN
GBR-AAP-DA-01-DRG-CI-0421	EXISTING STORMWATER CATCHMENT PLAN
GBR-AAP-DA-01-DRG-CI-0422	DEVELOPED STORMWATER CATCHMENT PLAN
GBR-AAP-DA-01-DRG-CI-0423	STORMWATER QUALITY MANAGEMENT PLAN
SERVICES	
GBR-AAP-DA-01-DRG-CI-0521	SEWER RETICULATION LAYOUT PLAN
GBR-AAP-DA-01-DRG-CI-0621	WATER RETICULATION LAYOUT PLAN



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						Scales   1 : 5000		Surveyor		Client		Status PRELIMINARY NOT TO BE USED FOR CONSTRUCTION © Copyright reserved Original Issue Signatures <table><tr><td>Drawn</td><td>J. VARGAS</td><td>Original Size</td><td>A1</td></tr><tr><td>Designed</td><td>S. BERRY</td><td>Height Datum</td><td>AHD</td></tr><tr><td>Project Manager</td><td>L. WILLEMSSEN</td><td>Grid</td><td>MGA/20-56</td></tr><tr><td>Verified</td><td>M. ELNAHAS</td><td></td><td></td></tr></table>		Drawn	J. VARGAS	Original Size	A1	Designed	S. BERRY	Height Datum	AHD	Project Manager	L. WILLEMSSEN	Grid	MGA/20-56	Verified	M. ELNAHAS			Project 824-908 GREENBANK ROAD NORTH MACLEAN STAGE 1 DEVELOPMENT APPLICATION		 Arcadis Australia Pacific Pty Limited Level 7, Seabank Building, 12-14 Marine Parade SOUTHPORT QLD 4215 ABN 76 104 485 289 Tel No: +61 7 5503 4800 www.arcadis.com/au <table><tr><td>Project Number</td><td>30340582</td></tr><tr><td>Drawing No.</td><td>GBR-AAP-DA-01-DRG-CI-0001</td></tr><tr><td>Issue</td><td>02</td></tr></table>		Project Number	30340582	Drawing No.	GBR-AAP-DA-01-DRG-CI-0001	Issue	02
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<table><tr><td>02</td><td>ISSUE FOR APPROVAL</td><td>JV</td><td>SB</td><td>DC</td><td>13.08.26</td></tr><tr><td>01</td><td>DRAFT ISSUE</td><td>JV</td><td>SB</td><td>DC</td><td>11.08.26</td></tr><tr><td>Issue</td><td>Description</td><td>DR</td><td>CH</td><td>VE</td><td>Date</td></tr></table>						02	ISSUE FOR APPROVAL	JV	SB	DC	13.08.26	01	DRAFT ISSUE	JV	SB	DC	11.08.26	Issue	Description	DR	CH	VE	Date	Planner															
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01	DRAFT ISSUE	JV	SB	DC	11.08.26																																		
Issue	Description	DR	CH	VE	Date																																		



LEGEND

- 2.0--- DESIGN SURFACE CONTOUR
- 2.0--- EXISTING SURFACE CONTOUR
- - - SITE BOUNDARY
- PROPOSED STAGE BOUNDARY

NOTES

CUT/FILL VOLUMES

TOTAL CUT -53,714m³
TOTAL FILL 50,296m³
TOTAL BALANCE (IMPORT) -3,418m³

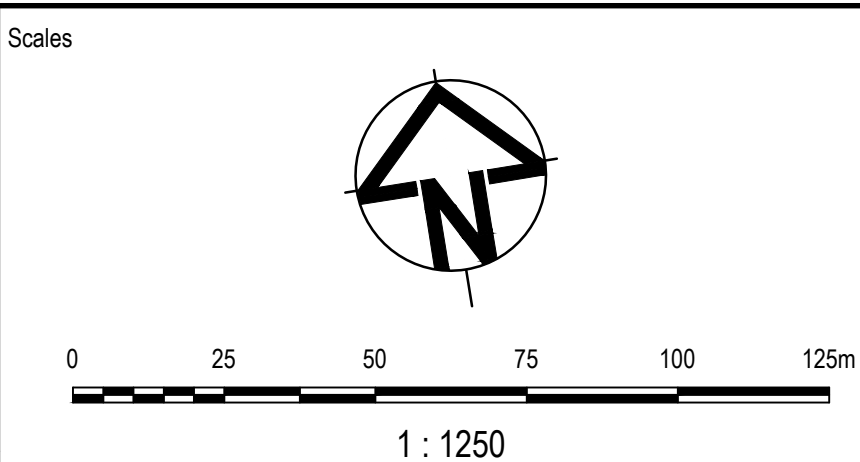
EARTHWORKS NOTES/ASSUMPTIONS

- PROPOSED CONTOURS REPRESENT BULK EARTHWORKS LEVELS.
- HATCHING AND ESTIMATED VOLUMES SHOWN REPRESENTS DEPTH RANGE BETWEEN EXISTING TOPO / SURVEY INFORMATION AND DESIGN SURFACE.
- THE CUT AND FILL VOLUMES DO NOT INCLUDE THE PAVEMENT MATERIALS REQUIRED.
- NO ALLOWANCE HAS BEEN MADE FOR
 - RETAINING WALLS
 - UTILITIES TRENCHING
 - BUILDING SLABS
 - BRIDGE FOOTINGS, WALLS, SLABS AND FOUNDATION MATERIAL
- NO COMPACTION OR BULKING FACTORS HAVE BEEN APPLIED.

CUT FILL DEPTH RANGE

Lower_value	Upper_value	Colour
-999	to -6	m
-6	to -5	m
-5	to -4	m
-4	to -3	m
-3	to -2	m
-2	to -1	m
-1	to 0.00	m
0.000	to 1	m
1	to 2	m
2	to 3	m
3	to 4	m
4	to 5	m
5	to 6	m
6	to 999	m

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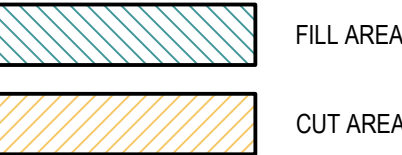
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Title	EARTHWORKS PLAN		

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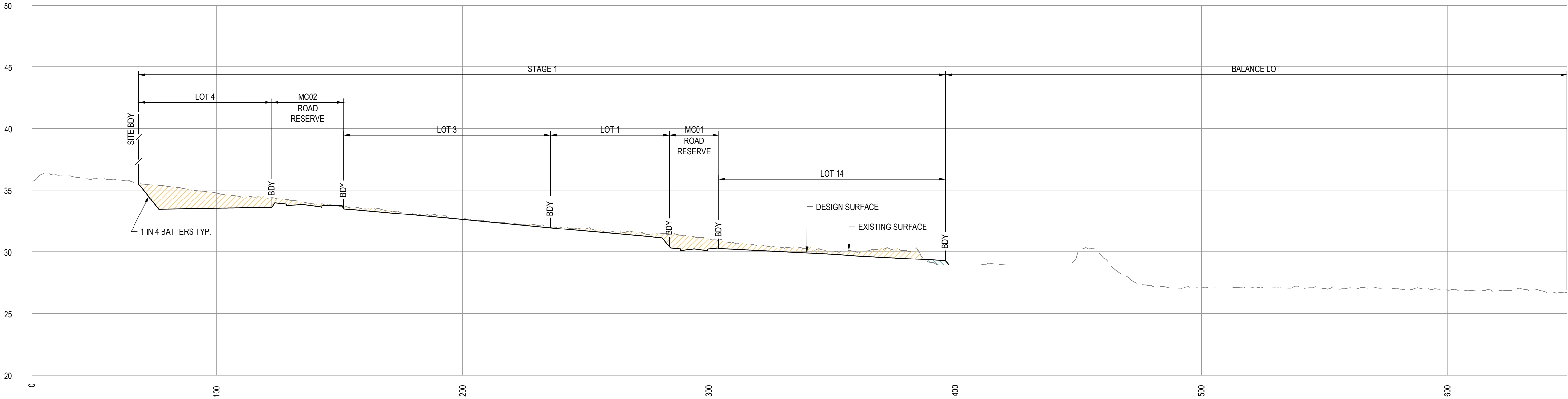
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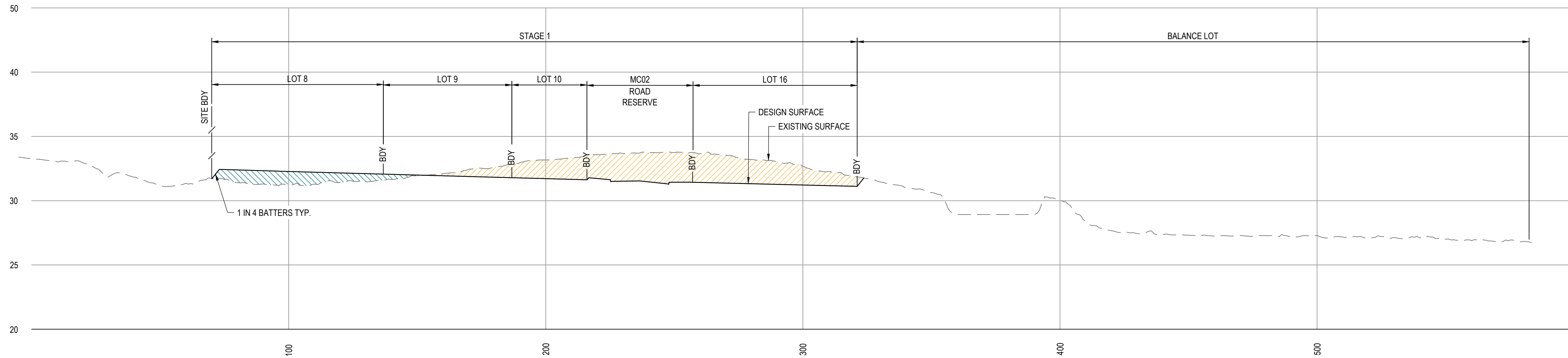
LEGEND



NOTE:
SECTIONS HAVE 5 TO 1 VERTICAL EXAGGERATION

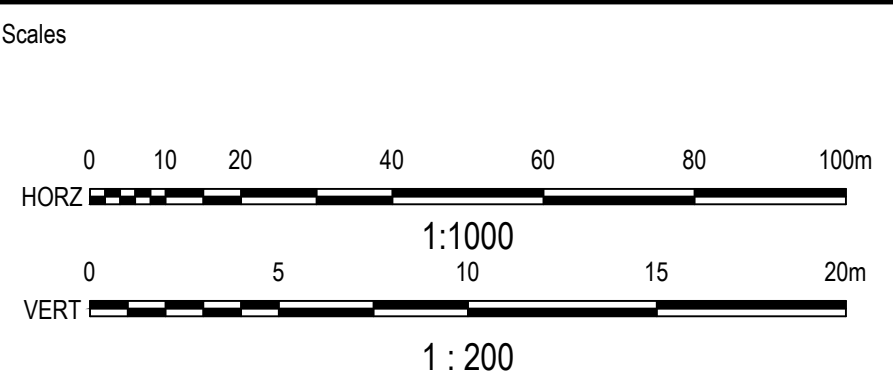


SECTION A
H - 1 : 1000
V - 1 : 200



SECTION B
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V - 1 : 200

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Project 824-908 GREENBANK ROAD
NORTH MACLEAN
STAGE 1
DEVELOPMENT APPLICATION

Title

EARTHWORKS
SITE SECTIONS
SHEET 1

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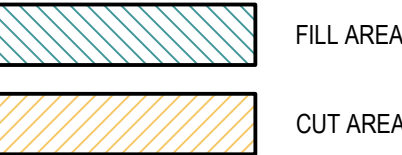
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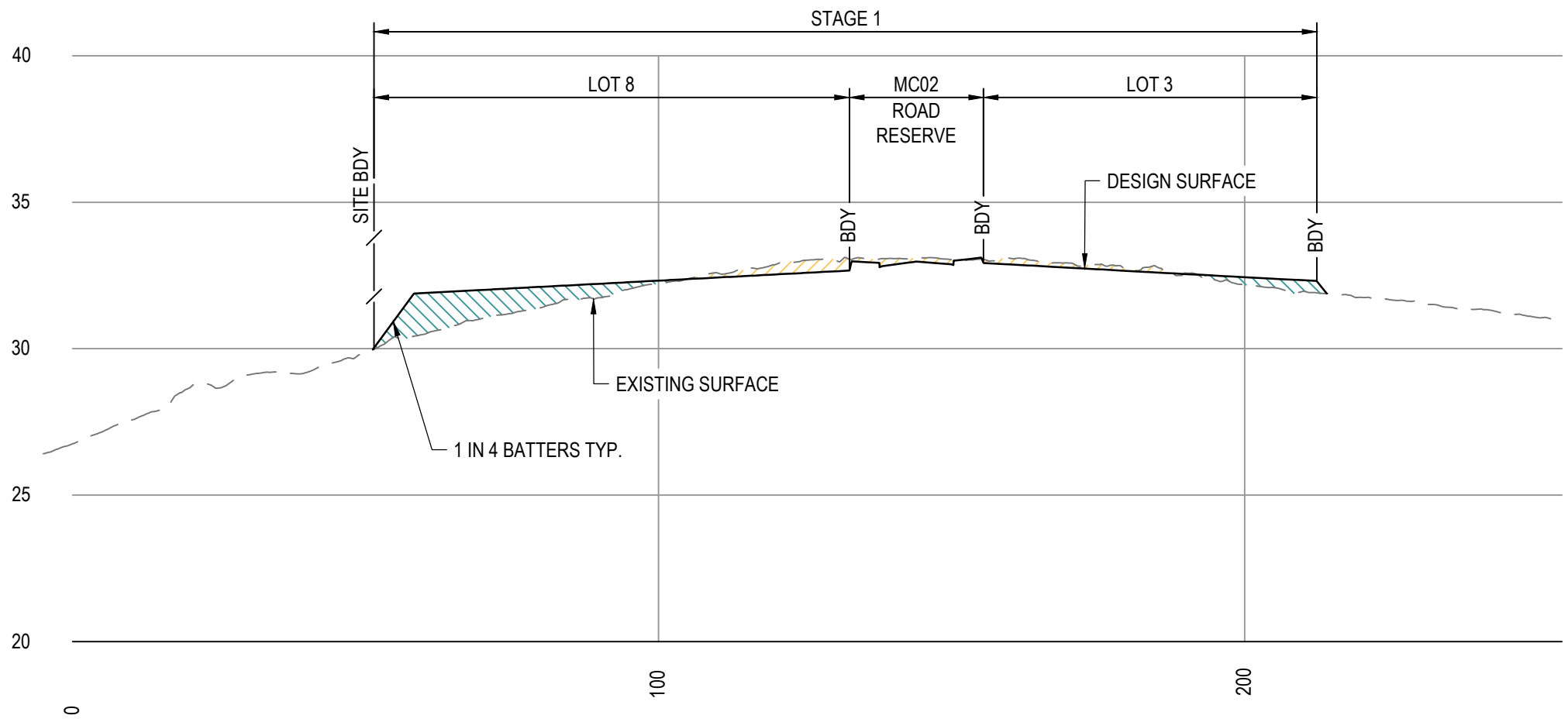
Issue 02

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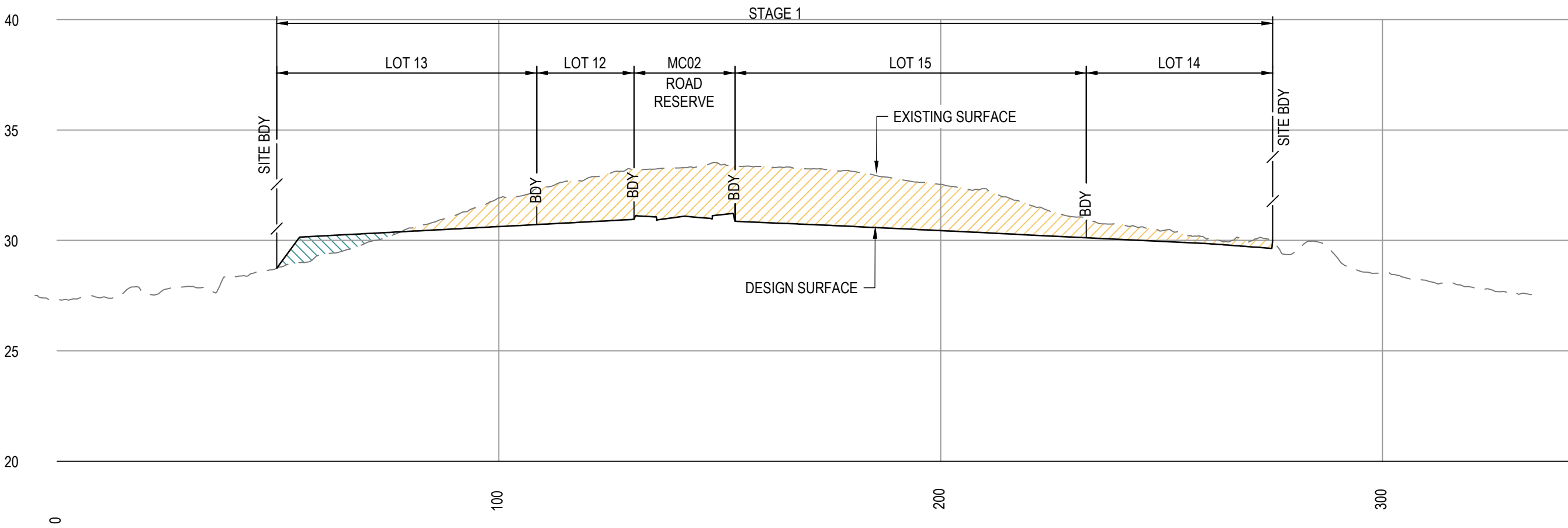
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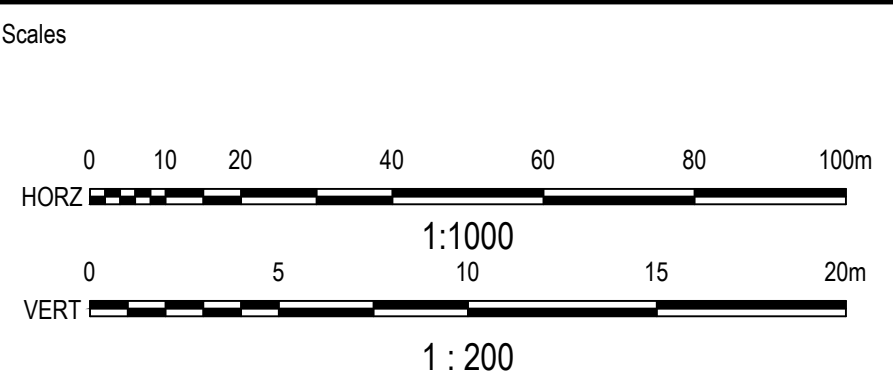


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SECTION D
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NORTH MACLEAN
STAGE 1
DEVELOPMENT APPLICATION

Title

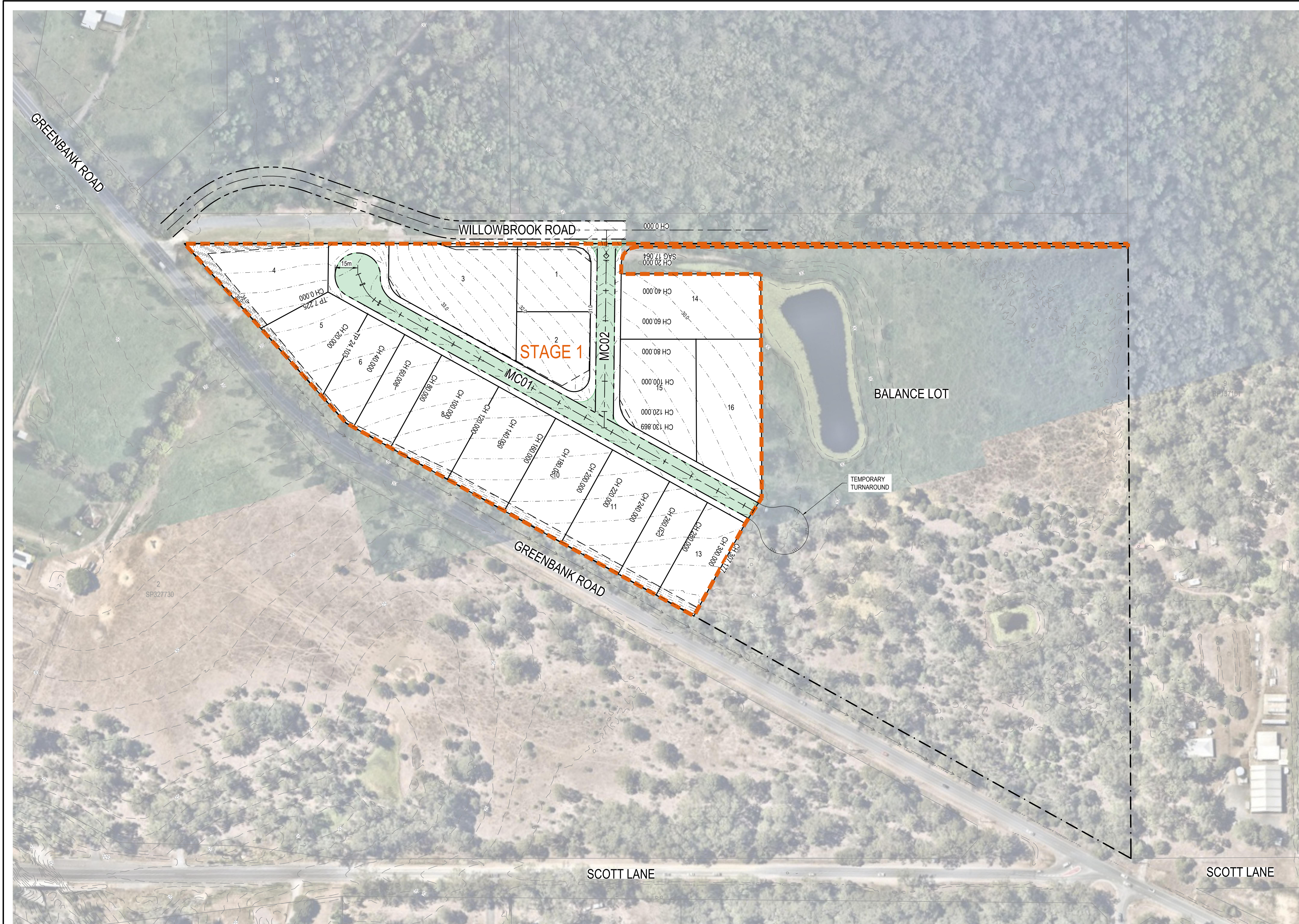
EARTHWORKS
SITE SECTIONS
SHEET 2

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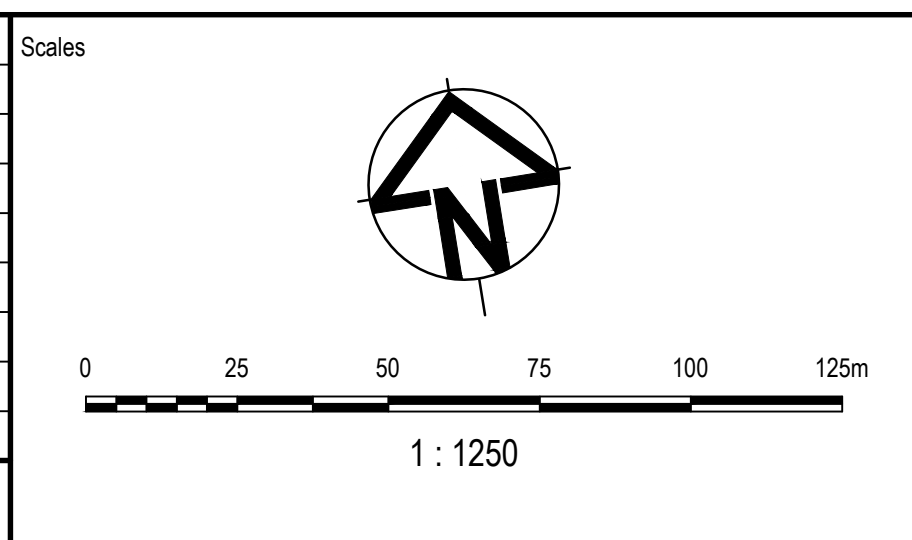
Project Number	30340582
Issue	02

GBR-AAP-DA-01-DRG-CI-0122



LEGEND	
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	EXISTING SURFACE CONTOUR
	SITE BOUNDARY
	PROPOSED STAGE BOUNDARY
	CHAINAGE AND CONTROL LINE
	NOMINAL KERB LINE
	EXISTING SWALE

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Verified	M. ELNAHAS		

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Title	ROADWORKS LAYOUT PLAN		

		Project Number	30340582
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Drawing No.		GBR-AAP-DA-01-DRG-CI-0201	



LEGEND

2.0

DESIGN SURFACE CONTOUR

2.0

EXISTING SURFACE CONTOUR

SITE BOUNDARY

PROPOSED STAGE BOUNDARY

DIRECTION OF OVERLAND FLOW

N-EXISTING

S-EXISTING

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Scales

N

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Project

824-908 GREENBANK ROAD
NORTH MACLEAN
STAGE 1
DEVELOPMENT APPLICATION

Title

EXISTING STORMWATER
CATCHMENT PLAN

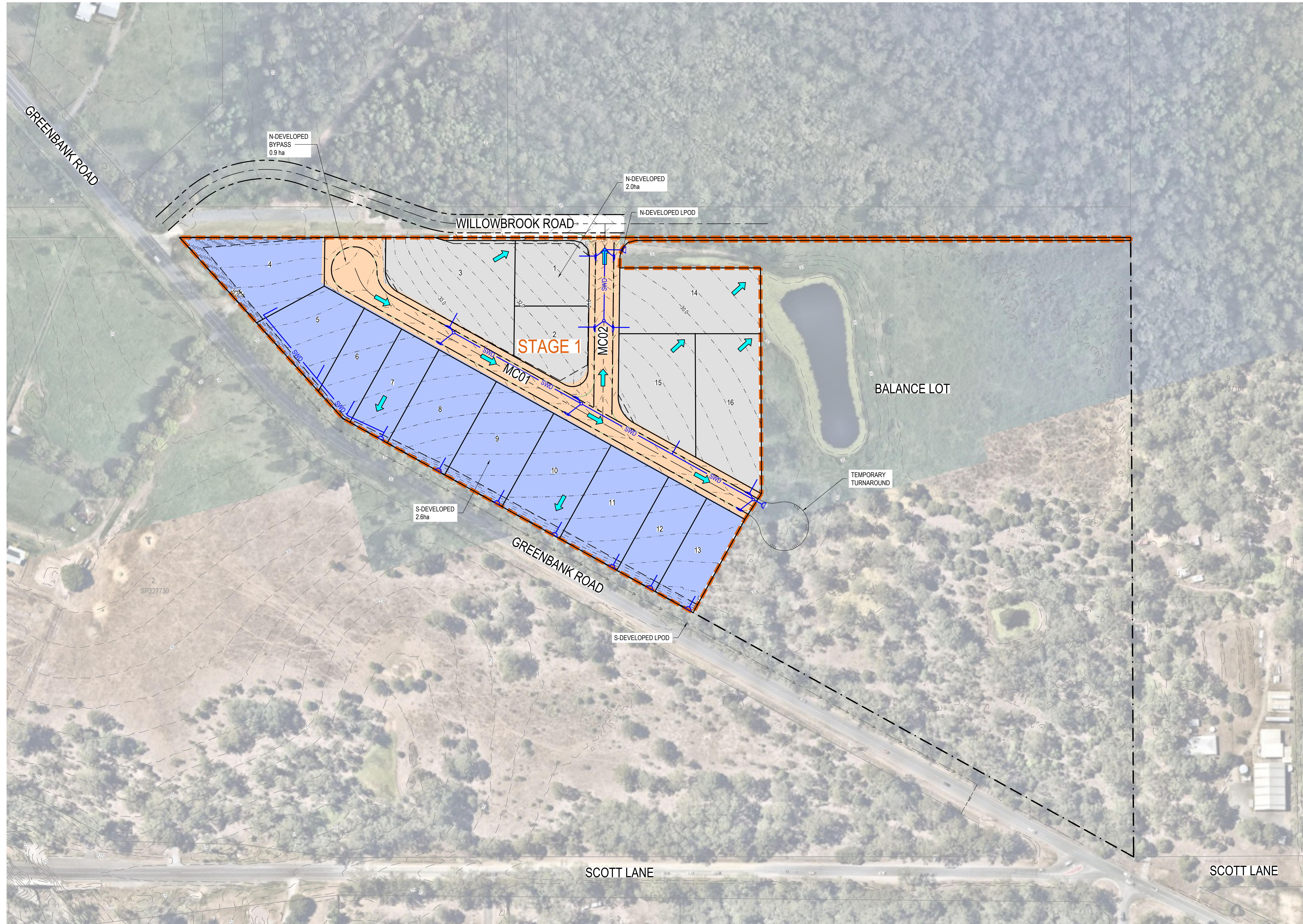
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File Name: C:\Users\ymn0894\Documents\Arcadis ACC AU\AAU-30340582-North Maclean 3 And 4\Project Files\10_WIP\10_Civil\STG_01\DRG\GBR-AAP-DA-01-DRG-CI-0421-PreDevCatchPlan.dwg



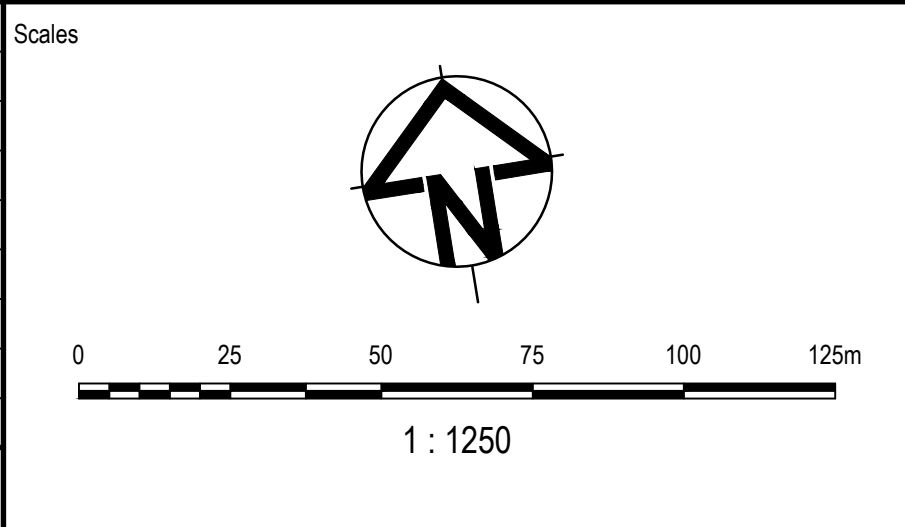
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- 2.0--- DESIGN SURFACE CONTOUR
- 2.0--- EXISTING SURFACE CONTOUR
- - - - SITE BOUNDARY
- - - - PROPOSED STAGE BOUNDARY
- ← DIRECTION OF OVERLAND FLOW
- SWD PROPOSED STORMWATER RETICULATION AND STRUCTURE
- - - - NOMINAL KERB LINE
- N-DEVELOPED
- N-DEVELOPED BYPASS
- S-DEVELOPED

NOTES

1. DETAILS SHOWN ARE CONCEPTUAL ONLY, AND SUBJECT TO DETAILED DESIGN AND AUTHORITY APPROVAL.
2. REFER STORMWATER MANAGEMENT REPORT FOR QUALITY DETAILS.

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NORTH MACLEAN
STAGE 1
DEVELOPMENT APPLICATION

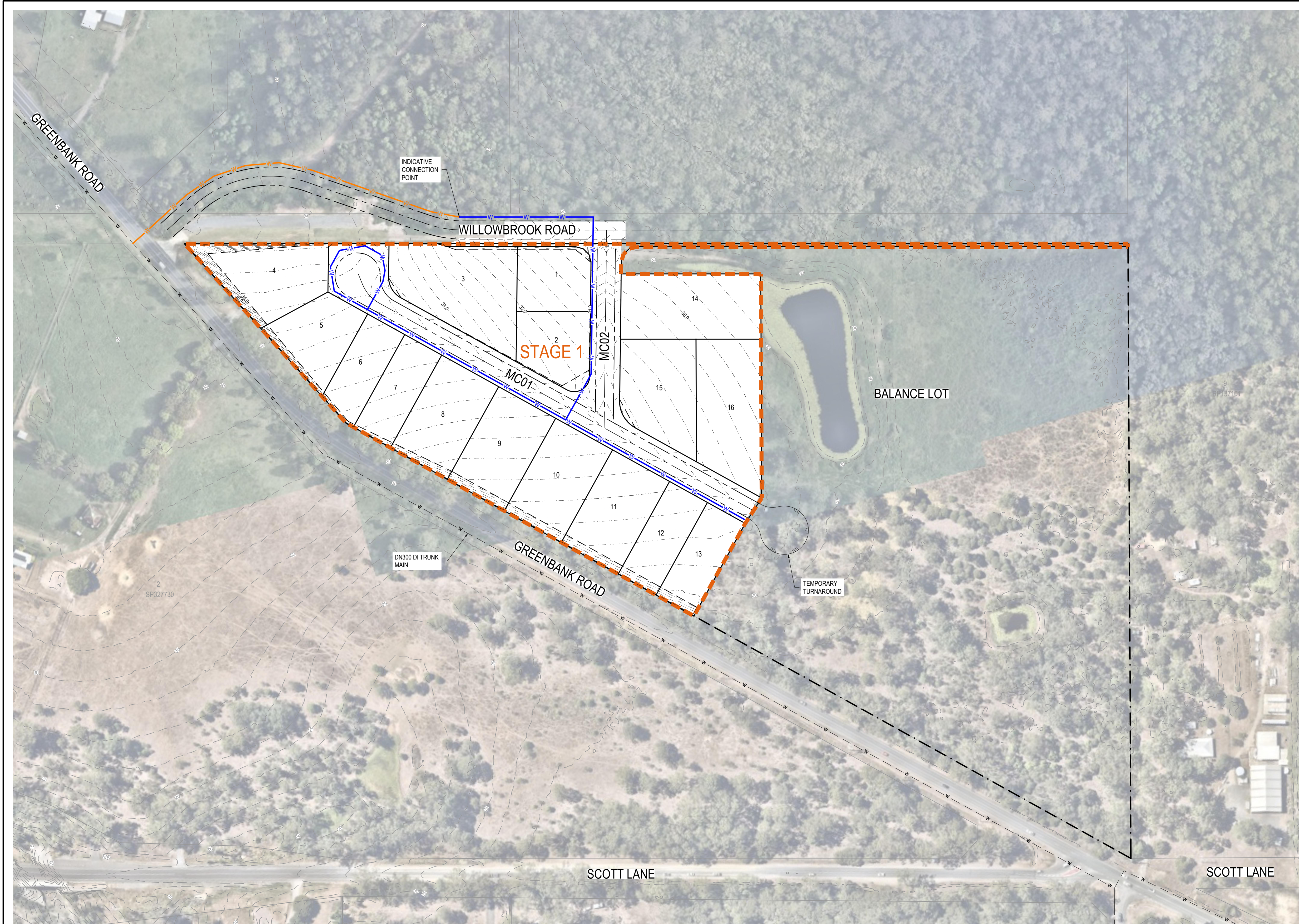
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DEVELOPED STORMWATER
CATCHMENT PLAN

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LEGEND

- 2.0--- DESIGN SURFACE CONTOUR
- 2.0--- EXISTING SURFACE CONTOUR
- - - - SITE BOUNDARY
- PROPOSED STAGE BOUNDARY
- - - - NOMINAL KERB LINE
- W--- PROPOSED WATER
- W--- PROPOSED WATER (BY OTHERS)
- w--- EXISTING POTABLE WATER

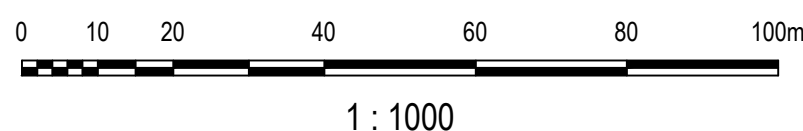
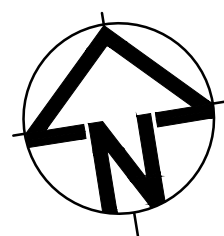
NOTES

INDICATIVE PROPERTY WATER SERVICE CONNECTIONS TO BE PROVIDED DURING DETAILED DESIGN.

POTABLE WATER NETWORK SHOWN CONCEPTUALLY FOR DEVELOPMENT APPLICATION PURPOSES ONLY. FINAL PIPE SIZING, VALVE LOCATIONS, HYDRANTS AND SERVICE CONNECTIONS WILL BE CONFIRMED DURING DETAILED DESIGN.

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Scales



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Grid

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MG/20-56

Project

824-908 GREENBANK ROAD
NORTH MACLEAN
STAGE 1
DEVELOPMENT APPLICATION

Title

WATER RETICULATION
LAYOUT PLAN



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GBR-AAP-DA-01-DRG-CI-0621

Project Number

30340582

Issue

02



APPENDIX B

TPLI Response Flood Hazard Overlay

8.2.5 Flood hazard overlay code

8.2.5.1 Application

1. This code applies to all development for which the Flood hazard overlay code is identified as an assessment benchmark in Part 5 - Tables of assessment.
2. When using this code, reference should be made to section 5.3.2 - Determining the category of development and category of assessment and, where applicable, section 5.3.3 - Determining the requirements for accepted development and assessment benchmarks and other matters for assessable development, in Part 5 - Tables of assessment.

Note - The following purpose, overall outcomes, performance outcomes and acceptable outcomes comprise the assessment benchmarks of this code.

Note - Pursuant to section 32(a) of the *Building Act 1975* and part 3, section 8(1)(a) of the *Building Regulation 2021*, land identified in a High flood risk area, Moderate flood risk area, Low flood risk area or Flood investigation area on Flood hazard overlay map OM-05.04 is the 'designated flood hazard area' for the National Construction Code and Queensland Development Code.

Note - For the purposes of section 32(a) of *Building Act 1975* and part 3, section 8(1)(b) of the *Building Regulation 2021*, where in the designated flood hazard area:

- a. the defined flood level is the level of the defined flood event, unless otherwise specified in Table 8.2.5.3.3 of 8.2.5 Flood hazard overlay code or Table 9.3.2.3.3 of 9.3.2 Dual occupancy and Dwelling house code;
- b. a freeboard greater than 300mm as identified in Table 8.2.5.3.3 of 8.2.5 Flood hazard overlay code or Table 9.3.2.3.3 of 9.3.2 Dual occupancy and Dwelling house code;
- c. the finished floor level for class 1 buildings as identified in Table 8.2.5.3.3 of 8.2.5 Flood hazard overlay code or Table 9.3.2.3.3 of 9.3.2 Dual occupancy and Dwelling house code.

8.2.5.2 Purpose

1. The purpose of the Flood hazard overlay code is to ensure development:
 - a. avoids flood risk or where not possible to avoid, mitigates the exposure of people, property, infrastructure and the environment to a tolerable level of flood risk;
 - b. maintains the accessibility and functionality of Essential community infrastructure activities and Vulnerable use activities during and after all flood events;
 - c. improves the resilience of buildings to flood risk, while maintaining built form and amenity expectations;
 - d. supports safe, self-evacuation and does not increase the emergency management response or recovery burden;
 - e. increases the community's resilience to flood risk and minimises flood recovery time;
 - f. does not result in unacceptable flood risk to people, property, infrastructure and the environment;

- g. minimises the exposure of people to isolation during flood events;
 - h. maintains the natural functions of the floodplain for the storage and conveyance of floodwaters and avoids adverse impacts on overland flow paths.
2. The purpose of the Flood hazard overlay code will be achieved through the following overall outcomes:
- a. Development in a High flood risk area identified on Flood hazard overlay map OM-05.04 does not expose people, property, infrastructure and the environment to intolerable flood risk by:
 - i. limiting development to the following compatible land uses where consistent with the intent of the underlying zone:
 - A. Rural activities other than Rural industry, Intensive animal industry or Intensive horticulture; or
 - B. Nature-based tourism and where involving accommodation, development is located outside of areas impacted by flash flooding and there are no habitable buildings permanently attached to the land; or
 - C. where in the Environmental management and conservation zone or Recreation and open space zone, a use other than an accommodation land use and, if involving Nature-based tourism, meets overall outcome 2(a)(i)(B); or
 - D. a use other than an accommodation land use or Vulnerable use activities, and there is no increase to the existing lawful building footprint; or
 - E. where associated with an existing lawful accommodation land use, there is no increase to the number of persons on the premises and there is no increase to the existing lawful building footprint;
 - ii. limiting reconfiguring a lot to:
 - A. realignment of boundaries where not materially increasing the exposure of new lots to a High flood risk area, unless for the purpose of a drainage or environmental reserve; or
 - B. creating an additional lot where the development envelope area is located outside of a High flood risk area, or the additional lot is only for the purpose of a drainage or environmental reserve;
 - iii. increasing the resilience of development to flood risk through building location, design and operations;
 - iv. maintains the existing conveyance function of the High flood risk area.
 - b. Development in a Moderate flood risk area identified on Flood hazard overlay map OM-05.04 incorporates building location, design and operations that mitigate flood risk to people, property, infrastructure and the environment to a tolerable or acceptable level.
 - c. Development involving an accommodation land use located in a Low flood island identified on Flood hazard overlay map OM-05.01 does not expose people to an unacceptable level of risk.
 - d. Other than for a Hospital located in the Meadowbrook flood assessment area identified on Flood hazard overlay map OM-05.03, Vulnerable use activities:
 - i. are located outside of a Moderate flood risk area, High flood risk area or a High flood island identified on Flood hazard overlay map OM-05.04 and OM-05.01;
 - ii. are located in a Low flood risk area identified on Flood hazard overlay map OM-05.04 only where:
 - A. if people reside on the premises, buildings have a flood planning level above the probable maximum flood to protect vulnerable members of the community;

- B. buildings are designed to be resilient to all flood events and reduce flood recovery time;
- C. there is a low flood hazard vehicle evacuation route that leads outside the floodplain to a suitable area that supports the needs of evacuees;
- iii. maintain functionality and accessibility during and after all flood events;
- iv. do not increase the exposure of people to isolation during all flood events up to and including the probable maximum flood.
- e. A Hospital in the Meadowbrook flood assessment area identified on Flood hazard overlay map OM-05.03 advances the intended health centre services while mitigating flood risk to people, property, infrastructure and the environment through:
 - i. incorporating a building location, design and operations that are resilient to flood events;
 - ii. maintaining functionality during and after all flood events, including the probable maximum flood;
 - iii. not exposing people or property to unacceptable risk during a defined flood event.
- f. Essential community infrastructure activities are not located in the floodplain, unless:
 - i. there is an overriding planning need for the use that cannot be met in a location outside of the floodplain;
 - ii. development incorporates building location, design and operations that reduce the potential impacts of flooding;
 - iii. development maintains functionality during and after all flood events, including the probable maximum flood;
 - iv. where for Emergency services, development is accessible during and after all flood events up to and including the probable maximum flood.
- g. Development in a Flood investigation area identified on Flood hazard overlay map OM-05.04:
 - i. does not increase exposure of people, property and infrastructure to flood risk; or
 - ii. demonstrates the development is compatible with the level of flood risk, including achieving the outcomes as relevant for a:
 - A. High flood risk area;
 - B. Moderate flood risk area;
 - C. Low flood risk area and High flood island where involving Essential community infrastructure activities or Vulnerable use activities.

Note - Planning scheme policy 10 - Flood provides guidelines on how to prepare a detailed localised flood risk assessment to assist with achieving Overall Outcome g(ii).

- h. Development does not locate buildings or structures in a High flow area.
- i. Development is able to function safely during flood events up to and including the defined flood event.
- j. Development minimises flood recovery time, rebuilding costs and disruption to residents, businesses and the community.
- k. Development does not compromise amenity, environmental, parks and open space outcomes in delivering flood risk mitigation strategies.
- l. Development protects personal health, safety and the environment from the release of hazardous materials during a flood event.
- m. Development does not add to emergency management or the evacuation burden during or after a flood event.
- n. Development:

- i. involving an accommodation land use or new lots intended for a future dual occupancy (auxiliary unit), dwelling house or accommodation land use, has safe vehicle access to a low flood hazard road and road network that supports safe and efficient access to a suitable flood-free area that contains essential goods;
- ii. not involving an accommodation land use (or new lots intended for a future accommodation land use) or Vulnerable use activities, has safe vehicle access to a low flood hazard road that supports safe and efficient self-evacuation, or is only isolated for a short duration from creek or overland flow flooding and has safe refuge available during flood events;
- iii. plans for the orderly and safe evacuation of people, including being supported by a flood emergency management plan in particular circumstances;
- iv. does not rely upon flood emergency management plans to alter land use tolerability to flood risk.

Editor’s note - Flood emergency management plans should be utilised to assist in managing residual risk of development and should be implemented as a tool to plan for safe evacuation where an active management entity exists for the development.

- o. Development does not directly, indirectly or cumulatively adversely impact the function of the floodplain and overland flow paths on the premises and off-site, including adjoining premises, infrastructure and the environment.
- p. Development does not change the flood storage capacity or alter flood characteristics outside of a premises in a way that would result in:
 - i. loss of flood storage;
 - ii. loss or change to flow paths;
 - iii. alteration in the speed of water flows;
 - iv. reduction in flood warning times elsewhere in the floodplain.

8.2.5.3 **Assessment benchmarks for assessment development and requirements for accepted development**

Part A - Requirements for accepted development (subject to requirements) and assessment benchmarks for assessable development

Table 8.2.5.3.1 - Flood hazard overlay code: accepted development (subject to requirements) and assessable development

Performance outcomes	Acceptable outcomes	Comments
For accepted development (subject to requirements) and assessable development		
Part A - Risk compatibility (other than a Home-based business)		
Material change of use		

PO1 A development envelope area is located outside of a High flood risk area identified on Flood hazard overlay map OM-05.04 unless complying with the requirements identified in Table 8.2.5.3.2 - Land use compatibility in a high flood risk area. Note - Planning scheme policy 10 - Flood includes guidance on demonstrating the qualifying criteria in Table 8.2.5.3.2 - Land use compatibility in a high flood risk area.	AO1 Development is contained in a development envelope area located outside of a High flood risk area identified on Flood hazard overlay map OM-05.04.	The proposed industrial development is not located within a High Flood Risk Area. Development envelopes are proposed above the adopted flood planning levels. Refer to the Engineering Services Report and flood assessment information. Approximate Stage 1 Earthworks extent is shown below in orange. 
PO2 Vulnerable use activities: a. are not located in a High flood island identified on Flood hazard overlay map OM-05.01; b. are located outside of the floodplain unless located in: i. a Low flood risk area identified on Flood hazard overlay map OM-05.04; or ii. the Meadowbrook flood assessment area identified on Flood hazard overlay map OM-05.03 and involving a Hospital.	AO2 No acceptable outcome provided.	Proposed land uses are industrial and not classified as vulnerable uses as defined by Logan City Council Planning Scheme 2015 Administrative Definitions.

PO3 Essential community infrastructure activities are not located in the floodplain unless: a. there is an overriding planning need for the use; b. there is no alternative site located outside of the floodplain that would address the identified need; c. development maintains functionality during and after all flood events, including the probable maximum flood; d. where for Emergency services, the development remains accessible during and after all flood events, including the probable maximum flood. Note - Planning scheme policy 10 - Flood provides guidance on how to demonstrate compliance with this performance outcome.	AO3 No acceptable outcome provided.	Proposed land uses are industrial and not classified as essential community infrastructure activities as defined by Logan City Council Planning Scheme 2015 Administrative Definitions.
PO4 Development is located outside of a Flood investigation area identified on Flood hazard overlay map OM-05.04, unless it: is demonstrated to be compatible with the level of flood risk; delivers the relevant outcomes for the flood risk area, including a: High flood risk area; Moderate flood risk area; Low flood risk area and High flood island where involving Essential community infrastructure activities or Vulnerable use activities. Note - Planning scheme policy 10 - Flood provides guidelines on how to prepare a detailed localised	AO4 No acceptable outcome provided.	

flood risk assessment to assist with achieving this performance outcome. It also includes guidance on how to demonstrate compliance with this performance outcome.	The site is not located within a Flood Investigation Area. The development has been designed having regard to the identified flood risks applicable to the site.	
Reconfiguring a lot		
PO5 Development provides a development envelope area that is: a. above the flood level during the defined flood event; b. of an area and dimensions to accommodate the activities associated with the intended use.	AO5 Development provides a development envelope area above the flood level during the defined flood event with a minimum size and dimension specified in Table 8.2.5.3.4 - Development envelope area.	Development envelopes are proposed above the adopted flood planning level and are of sufficient size to accommodate the intended industrial land use.
PO6 Each lot has a development envelope area located outside a High flood risk area identified on Flood hazard overlay map OM-05.04, except where limited to: a. the rearrangement of boundaries and flood risk is not materially increased on new lots; or b. creating an additional lot for the purpose of a drainage or environmental reserve.	AO6 No acceptable outcome provided.	Each proposed lot contains a development envelope located outside identified High Flood Risk Areas
PO7 Reconfiguring a lot involving a development envelope area located in a Flood investigation	AO7 Each lot has a development envelope area located outside of a Flood investigation area	The site is not located within a Flood Investigation Area in accordance with the Logan Flood Portal Property Flood Report. Development envelopes

area identified on Flood hazard overlay map OM-05.04 is limited to: a. the realignment of boundaries where the development envelope area is located outside a High flow area identified on Flood hazard overlay map OM-05.02; or b. the development is demonstrated to be compatible with the level of flood risk, including delivering the relevant outcomes for a: i. High flood risk area; ii. Moderate flood risk area; iii. Low flood risk area and High flood island where involving Essential community infrastructure activities or Vulnerable use activities. Note - Planning scheme policy 10 - Flood provides guidelines on how to prepare a detailed localised flood risk assessment to assist with achieving Performance Outcome 7(b).	identified on Flood hazard overlay map OM-05.04.	have been planned having regard to the applicable flood risks identified for the site. 
Part B - Resilient building location, design and operations (other than a Home-based business)		
PO8 Buildings and structures are located outside of a High flow area. Note - Planning scheme policy 10 - Flood provides guidance on how to demonstrate compliance with this performance outcome where located in a Flood investigation area and it is proposed to undertake a detailed localised flood risk assessment.	AO8.1 New buildings and structures, other than fences, are located outside of a High flow area identified on Flood hazard overlay map OM-05.02. AO8.2 Enclosure of existing structures or areas underneath an existing building, such as an undercroft, does not occur in a High flow area	No buildings are proposed as part of the current application. Future building development will be required to demonstrate compliance with flood planning requirements and any applicable High Flow Area constraints.

	identified on Flood hazard overlay map OM-05.02.	
PO9 A Hospital in the Meadowbrook flood assessment area identified on Flood hazard overlay map OM-05.03 ensures that the location, design and operation of development: a. mitigates the risk of flooding to buildings and structures; b. minimises risk of injury to life and damage to property and infrastructure; c. maintains functionality during and after all flood events, including the probable maximum flood. Note - Planning scheme policy 10 - Flood provides guidance on achieving this performance outcome.	AO9 No acceptable outcome provided.	Proposed land uses do not include a hospital and is not located in the Meadowbrook flood assessment area.
PO10 Buildings are designed to account for the potential risk of inundation during flood events by complying with the Minimum flood planning levels identified in Table 8.2.5.3.3 - Minimum flood planning levels. Editor's note - Planning scheme policy 10 - Flood provides guidance on obtaining available flood level information for a property from Council, and resilient design.	AO10 No acceptable outcome prescribed.	The Logan Flood Portal Property Flood Report identifies a 1% AEP flood level of RL 27.7 m AHD, a 0.5% AEP flood level of RL 28.2 m AHD and a 0.2% AEP flood level of RL 28.9 m AHD. Development envelopes and proposed pad levels are located above the applicable flood planning levels and are capable of accommodating future industrial development in accordance with the minimum flood planning level requirements of Table 8.2.5.3.3 of the Flood Hazard Overlay Code.
PO11 Vehicle manoeuvring areas and car parking (other than a Parking station) are only located below the defined flood event where there is no increase in risk to: a. pedestrian and vehicular safety; b. a building or other structure.	AO11 Vehicle manoeuvring areas and car parking (other than a Parking station) are located above the defined flood event.	Vehicle access and manoeuvring areas are proposed to be provided above the applicable flood planning levels identified for the site. Detailed design will confirm final flood immunity requirements.

Note - Planning scheme policy 10 - Flood provides guidance on achieving this performance outcome.		
PO12 Basement access and openings are designed and located to: a. ensure safety during a flood event; b. improve resilience to flood events; c. reduce recovery time after flooding; d. minimise economic loss to individual and public assets stored in the basement. Note - Planning scheme policy 10 - Flood provides guidance on achieving this performance outcome.	AO12 All entry points and openings to a basement are located at or above the Minimum flood planning levels identified in Table 8.2.5.3.3 - Minimum flood planning levels.	No basement structures are proposed as part of this application
PO13 Essential building services and infrastructure is located or designed to ensure their continued function during and immediately after flood events that are up to and including the: a. defined flood event for uses other than Essential community infrastructure activities or Vulnerable use activities; or b. probable maximum flood for Essential community infrastructure activities or Vulnerable use activities. Note - Essential building services and infrastructure may include air conditioning ducts, communication equipment, charging units, pumps, motors, sensitive electrical equipment such as transformers, low voltage switch gear, high voltage switch gear, battery charges, and communal assets and materials (such as waste bins or chemicals). Note - Planning scheme policy 10 - Flood provides guidance on achieving this performance outcome.	AO13 The function of essential building services and infrastructure is maintained during a flood event by: a. locating the services and infrastructure outside of a High flood risk area identified on Flood hazard overlay map OM-05.04; b. locating the services and infrastructure above the flood planning level in accordance with Table 8.2.5.3.3 - Minimum flood planning levels; or c. designing and constructing essential services and infrastructure to exclude water infiltration for flood events up to and including: i. the defined flood event where not involving Essential community infrastructure activities or Vulnerable use activities;	The Logan Flood Portal Property Flood Report identifies a 1% AEP flood level of RL 27.7 m AHD, a 0.5% AEP flood level of RL 28.2 m AHD and a 0.2% AEP flood level of RL 28.9 m AHD. Development envelopes and proposed pad levels are located above the applicable flood planning levels identified in Table 8.2.5.3.3 of the Flood Hazard Overlay Code. Future essential building services and infrastructure will be located above the relevant flood planning levels to maintain functionality during and immediately following flood events.

	ii. the probable maximum flood where for Essential community infrastructure activities or Vulnerable use activities.	
PO14 Screening the understorey of a building: a. does not impede the passage of floodwater or overland flow in a High flood risk area identified on Flood hazard overlay map OM-05.04; b. maintains an attractive streetscape interaction and interface as intended by the zone, precinct or local plan. Note - Planning scheme policy 10 - Flood provides guidance on achieving this performance outcome.	AO14 No acceptable outcome provided.	No proposed building understorey for development areas/lots.
Storage, manufacturing or handling of hazardous materials		
PO15 Development protects public safety and the environment from release of hazardous materials into floodwaters by: a. locating hazardous materials and chemicals outside of a High flood risk area or High flow area identified on Flood hazard overlay map OM-05.04 and OM-05.02; b. ensuring hazardous materials are stored to prevent the release or hazardous reaction of hazardous materials during flood events, including events rarer than the defined flood event.	AO15.1 Development involving the manufacturing or storage of hazardous materials, or involving hazardous chemicals at a hazardous chemical facility is located outside of a: a. High flood risk area identified on Flood hazard overlay map OM-05.04; b. High flow area identified on Flood hazard overlay map OM-05.02. AO15.2 Development in a Moderate flood risk area identified on Flood hazard overlay map OM-05.04: a. does not involve the manufacturing or storage of hazard materials or	Should hazardous materials be proposed in future, storage will be located above the applicable flood planning level, including the 0.2% AEP flood level where required by Table 8.2.5.3.3. The Property Flood Report identifies the 0.2% AEP flood level as RL 28.9 m AHD.

	hazardous chemicals at a hazardous chemical facility; or b. ensures the storage of hazardous materials is located above the 0.2% AEP at 2100 flood event.	
Part C - Access and evacuation (other than a Home-based business)		
PO16 Development involving Vulnerable use activities, other than a Hospital in the Meadowbrook flood assessment area identified on Flood hazard overlay map OM-05.03, has a low flood hazard vehicle evacuation route that leads outside the floodplain to a suitable area that supports the needs of evacuees. Note - Planning scheme policy 10 - Flood provides guidance on achieving this performance outcome.	AO16 No acceptable outcome provided.	Proposed land uses are industrial and are not classified as Vulnerable Use Activities under the Logan Planning Scheme
PO17 Development involving an accommodation land use has a low flood hazard vehicle route to a suitable flood-free area that contains essential goods to serve the needs of people. Note - Planning scheme policy 10 - Flood provides guidance on achieving this performance outcome.	AO17 During the defined flood event, development for an accommodation land use has a: a. flood-free vehicle access to a road above the flood level; b. flood-free vehicle route that leads to a suitable flood-free area that contains essential goods.	Not applicable. The proposed development comprises industrial land uses only and does not include accommodation land uses. Notwithstanding this, a Flood Emergency Management Plan (FEMP) will be prepared prior to occupation to address the potential isolation of the site resulting from flooding of Greenbank Road, including procedures for early site closure and departure before the access route becomes unsafe.
PO18 Development has a low flood hazard vehicle route from dwellings to a flood-free or low flood hazard road.	AO18 During the defined flood event, development involving a new dwelling or an increase in bedrooms, has a flood-free vehicle route from dwellings to the flood-free road. Editor's note - Figure 8.2.5.3.1 - Compliant dwelling with flood-free vehicle route illustrates an example of a	Not applicable. The proposed development comprises industrial land uses only and does not include accommodation land uses. Notwithstanding this, a Flood Emergency Management Plan (FEMP) will be prepared prior to occupation to address the potential isolation of the site resulting from flooding of Greenbank Road, including procedures for early

	development complying with this acceptable outcome. Figure 8.2.5.3.2 - Non-compliant dwelling with no flood-free vehicle route illustrates an example of a development that does not comply with this acceptable outcome.	site closure and departure before the access route becomes unsafe.
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Figure 8.2.5.3.1 - Compliant dwelling with flood-free vehicle route

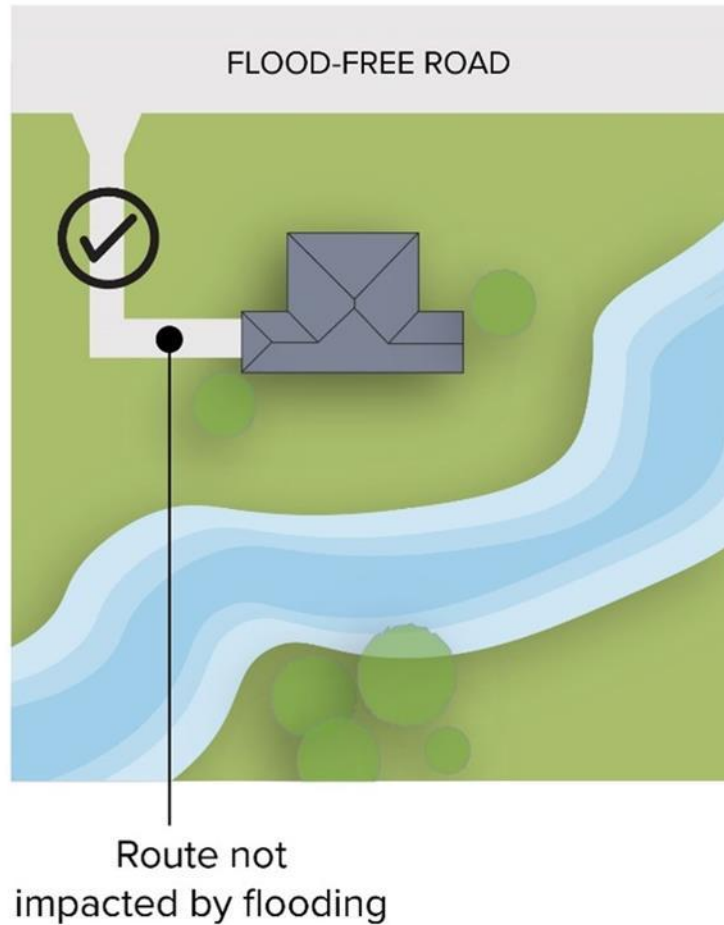
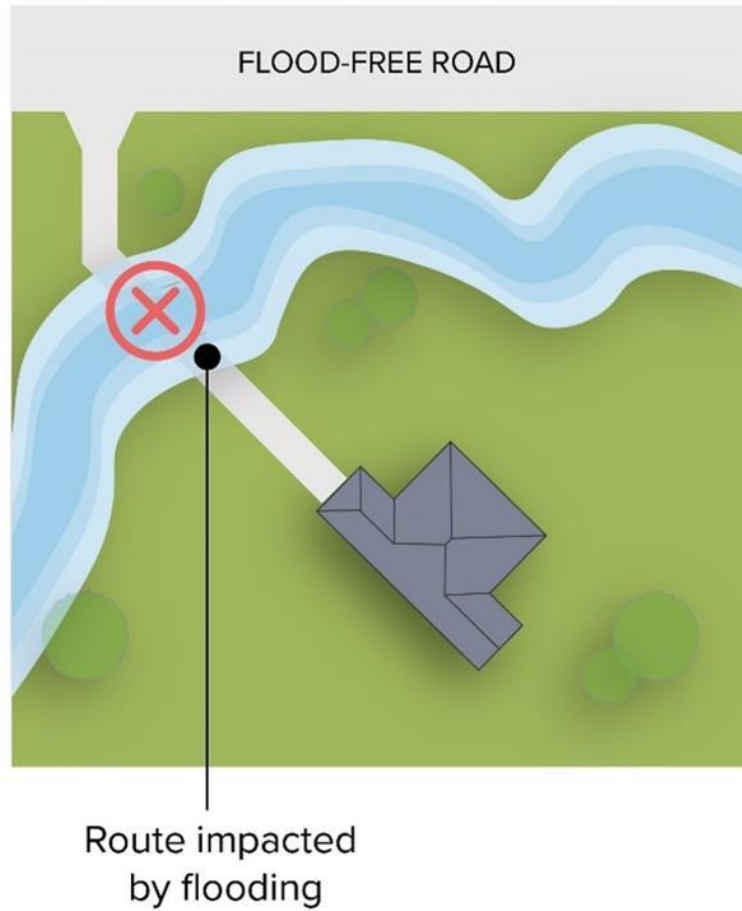


Figure 8.2.5.3.2 - Non-compliant dwelling with no flood-free vehicle route



PO19 Reconfiguring of a lot intended for a future dual occupancy (auxiliary unit), dwelling house or accommodation land use ensures each lot has internal low flood hazard vehicle access to a road and a low flood hazard vehicle route to a suitable flood-free area that contains essential goods to serve the needs of people. Note - Planning scheme policy 10 - Flood provides guidance on achieving this performance outcome.	AO19 Reconfiguring of a lot in a residential zone category or Emerging community zone, or intended for a future dual occupancy (auxiliary unit), dwelling house or accommodation land use, ensures each lot during the defined flood event has a: a. flood-free vehicle access to a road above the flood level; b. flood-free vehicle route that leads to a suitable flood-free area that contains essential goods.	The proposed reconfiguration of lot is for industrial development and does not create lots intended for future residential or accommodation land uses.
PO20 Development, other than where PO16-PO19 is applicable: a. ensures safe self-evacuation by having, for a period of at least 10 hours, low flood hazard vehicle access to a low flood hazard road; or b. is only isolated for a period of less than 4 hours from a low flood hazard road and there is a suitable area on site that is: i. above the defined flood event; ii. not a Low flood island identified on Flood hazard overlay map OM-05.01 or an area impacted by flash flooding during the defined flood event. Note - Planning scheme policy 10 - Flood provides guidance on achieving this performance outcome.	AO20 Where AO16-AO19 is not applicable, development has flood-free vehicle access to a road that is above the flood level during the defined flood event.	The proposed development will provide vehicle access to the existing road network. Detailed design will confirm compliance with applicable flood access requirements.
PO21	AO21 No acceptable outcome provided.	

Development identified in Table 8.2.5.3.5 - Development requiring a flood emergency management plan appropriately plans for its safe operation and evacuation during a flood event to ensure there is no burden on emergency services, including during a probable maximum flood where involving Vulnerable use activities. Note - Planning scheme policy 10 - Flood provides guidance preparing a flood emergency management plan to achieve this performance outcome. Note - Flood emergency management plans do not alter the land use tolerability to a flood risk area, nor act as an alternative to achieving other specified mitigation measures required to ensure risk is mitigated to a tolerable or acceptable level. Flood emergency management plans should be utilised to assist in managing residual risk of development and should be implemented as a tool to plan for safe evacuation where an active management entity exists for the development.		Complies. A site-specific Flood Emergency Management Plan (FEMP) will be prepared prior to occupation to manage residual flood risk associated with potential site isolation resulting from flooding of Greenbank Road. The FEMP will include procedures for monitoring flood conditions, early site closure and the safe evacuation of occupants prior to floodwaters affecting the access route, thereby avoiding reliance on emergency services.
Part D - Preservation of floodplain function and overland flow paths (other than a Home-based business)		
PO22 Filling and excavation ensures the conveyance function of a High flood risk area and Flood investigation area identified on Flood hazard overlay map OM-05.04 is maintained. Note - Planning scheme policy 10 - Flood provides guidance on achieving this performance outcome.	AO22 Where located in a High flood risk area or Flood investigation area identified on Flood hazard overlay map OM-05.04, filling and excavation, other than for stormwater quantity and quality infrastructure, does not exceed: a. a total volume of 20m³; b. a total area of 2,000m².	The detailed earthworks design will demonstrate that floodplain function is maintained and that compensatory flood storage is provided where required.
PO23 Development does not involve earthworks that would either directly, indirectly or cumulatively	AO23 The total volume of fill is equal to or less than the total volume of cut where earthworks are	Concept earthworks have been developed having regard to flood constraints affecting the site. Detailed design will confirm compliance with floodplain storage requirements.

cause a loss of floodplain storage below the defined flood event. Note - Planning scheme policy 10 - Flood provides guidance on achieving this performance outcome.	below the level of the defined flood event in a Moderate flood risk area identified on Flood hazard overlay map OM-05.04.	
PO24 Development does not involve works that would either directly, indirectly or cumulatively: a. concentrate, intensify or divert floodwater or overland flow paths onto upstream, downstream or adjacent properties; b. result in an increase in flood levels or flood hazard on upstream, downstream or adjacent properties; c. result in a loss of floodplain storage up to and including the defined flood event; d. adversely impact the role and function of waterways and areas of ecological significance; e. adversely affect adjoining premises, infrastructure and the environment. Note - Planning scheme policy 10 - Flood provides guidance on how to demonstrate compliance with this performance outcome.	AO24 No acceptable outcome provided.	Development has been planned having regard to the flood constraints affecting the site. Detailed design and supporting assessments, where required, will confirm compliance with the flood behaviour outcomes of the Flood Hazard Overlay Code.
PO25 Development does not adversely change the following flood characteristics for all flood events up to and including the defined flood event: a. peak flow; b. flow of any part of the flood before the peak; c. flood flow velocity;	AO25 No acceptable outcome provided.	The proposed development is located outside the regional 1% AEP flood extent. Detailed design and any supporting flood assessment will confirm that the proposed development does not adversely affect flood behaviour, including flood levels, velocities, conveyance and flood storage, up to and including the defined flood event.

d. level of flooding; e. flood time to peak. Note - Planning scheme policy 10 - Flood provides guidance on how to demonstrate compliance with this performance outcome.		
PO26 Development does not cause a rapid or unexpected increase in safety risks or flood damage during a flood event larger than the defined flood event, including flood events up to and including the probable maximum flood. Note - Planning scheme policy 10 - Flood provides guidance on how to demonstrate compliance with this performance outcome.	AO26 No acceptable outcome provided.	The proposed development has been planned having regard to the identified flood risks affecting the site. Detailed design and supporting flood assessment, where required, will confirm that the development does not result in an increase in flood risk or flood damage. Refer to Arcadis Prepared SBSMP 30340582-GA0002-02 - SBSMP
PO27 A stormwater quality improvement device is located to retain existing floodplain storage capacity and ensure functionality of the stormwater quality improvement device. Note - Planning scheme policy 10 - Flood provides guidance on how to demonstrate compliance with this performance outcome.	AO27 A stormwater quality improvement high flow outlet device is located: a. above the 5% AEP flood event caused by local flooding; b. above the 5% AEP flood event caused by regional flooding.	Refer to Arcadis Prepared SBSMP 30340582-GA0002-02 - SBSMP
PO28 A stormwater quantity management device is located to retain existing floodplain storage capacity and ensure functionality of the stormwater quantity management device. Note - Planning scheme policy 10 - Flood provides guidance on how to demonstrate compliance with this performance outcome.	AO28 A stormwater quantity management outlet device is located above the 2% AEP flood event.	Refer to Arcadis Prepared SBSMP 30340582-GA0002-02 - SBSMP
PO29	AO29 Filling and excavation associated with stormwater quantity and quality infrastructure	Stormwater infrastructure requirements will be addressed during detailed design. Any stormwater infrastructure will be designed to maintain floodplain storage capacity and floodplain function.

Stormwater infrastructure does not result in a loss of floodplain storage below the defined flood event.	has a total volume of fill equal to or less than the total volume of cut where below the defined flood event. Note - Planning scheme policy 10 - Flood provides guidance on stormwater management detention basins.	
Part E - A Home-based business		
PO30 A Home-based business does not put additional people at risk of flooding during the defined flood event. Note - Where detailed flood information does not exist to determine the defined flood event, a Registered Professional Engineer of Queensland with expertise in flood studies may be required to determine the relevant defined flood event and demonstrate compliance with this outcome. Planning scheme policy 10 - Flood provides guidance on how to demonstrate compliance with this performance outcome.	AO30.1 In a High flood risk area or Flood investigation area identified on Flood hazard overlay map OM-05.04, a Home-based business does not involve: a. non-resident staff or visitors to the premises; b. new buildings or structures associated with the home-based business. AO30.2 Buildings, structures and storage of items associated with a Home-based business are located outside of a High flow area identified on Flood hazard overlay map OM-05.02.	Proposed land uses are industrial and are not classified as Home-based Business activities.
PO31 A Home-based business being a bed and breakfast or farm stay has: a. low flood hazard vehicle manoeuvring areas; b. low flood hazard vehicle access to a low flood hazard road.	AO31 A Home-based business being Short-term accommodation where a bed and breakfast or farm stay has: a. flood-free vehicle manoeuvring areas during a defined flood event; b. flood-free vehicle access to a road above the flood level during a defined flood event.	Proposed land uses are industrial and do not include bed and breakfast, farm stay or other Home-based Business accommodation activities.

Table 8.2.5.3.2 - Land use compatibility in a high flood risk area

Zone	Land use (where consistent with the intent of the underlying zone)	Qualifying criteria
Environmental management and conservation zone or Recreation and open space zone	A use other than an accommodation land use	N/A
	Nature-based tourism other than involving accommodation	N/A
	Nature-based tourism involving accommodation	If - a. located outside an area of flash flooding; b. there are no permanent habitable buildings or structures attached to the land in a High flood risk area
Any zone other than Environmental management and conservation zone or Recreation and open space zone	Rural activities other than Rural industry, Intensive animal industry or Intensive horticulture	N/A
	Nature-based tourism other than involving accommodation	N/A
	Nature-based tourism involving accommodation	If - a. located outside an area of flash flooding; b. there are no permanent habitable buildings or structures attached to the land in a High flood risk area
	A use other than: a. accommodation land use; or b. Vulnerable use activities	If there is no increase to the existing building footprint
	An existing lawful accommodation land use	If - a. there is no increase to the existing building footprint; b. there is no increase in the number of persons on the premises in a High flood risk area

Table 8.2.5.3.3 - Minimum flood planning levels

Column 1 Use	Column 2 Minimum flood planning level
Uses other than Essential community infrastructure activities and Vulnerable use activities (building floor level and essential building services)	
Where in a High flood risk area, Moderate flood risk area or Flood investigation area on Flood hazard overlay map OM-05.04 Note - Where located in a Flood investigation area, a Registered Professional Engineer of Queensland with expertise in flood studies is to determine the level of the flood event identified in Column 2 corresponding to the applicable use identified in Column 1.	
Accommodation land use	Habitable rooms and essential building services - defined flood event + 500mm freeboard Non-habitable rooms - above the defined flood event Basement Entry/Exit - defined flood event + 300mm freeboard
An industry activity involving the manufacture or storage of noxious or hazardous materials (e.g. a regional fuel storage facility)	0.2% AEP flood level at 2100
Educational establishment where for vocational trade training only	Building floor level - defined flood event + 500mm freeboard Essential building services - defined flood event + 500mm freeboard
Transport infrastructure as defined by the Regulation	No specific recommended level but development proponents should ensure that the infrastructure is optimally located and designed to achieve suitable levels of service, having regard to the processes and policies of the administering government agency
Warehouse, being a food storage warehouse	0.5% AEP flood level at 2100
Where involving the storage of valuable records or items of historic or cultural significance (e.g. galleries and libraries)	0.5% AEP flood level at 2100
Development involving the use of a Class 5, 6 & 9b building other than specified above	Defined flood event + 500mm freeboard
Development involving the use of Class 7(b) or 8 building other than specified above	Building floor level - defined flood event Essential building services - defined flood event + 500mm freeboard

Any other use other than listed above	Defined flood event + 500mm freeboard
Essential community infrastructure activities (building floor level and essential building services)	
Emergency services	0.2% AEP flood level at 2100 + 500mm freeboard
Major electricity infrastructure	0.2% AEP flood level at 2100 + 500mm freeboard
Renewable energy facility	0.2% AEP flood level at 2100 + 500mm freeboard
Substation	0.5% AEP flood level at 2100 + 500mm freeboard
Telecommunications facility Utility installation where not otherwise listed in this table	No specific recommended level but development proponents should ensure that the infrastructure is optimally located and designed to achieve suitable levels of service, having regard to the processes and policies of the administering government agency
Utility installation being power station	0.2% AEP flood level at 2100 + 500mm freeboard
Utility installation, being a sewage treatment plant or water treatment plant	0.2% AEP flood level at 2100 + 500mm freeboard
Vulnerable uses activities (building floor level and essential building services)	
Where located in Meadowbrook flood assessment area on Flood hazard overlay map OM-05.03	
Vulnerable use activities, being a Hospital	0.2% AEP flood level at 2100 + 500mm freeboard
Where located in the Low flood risk area on Flood hazard overlay map OM-05.04	
Vulnerable use activities	Above the flood level of the probable maximum flood

Table 8.2.5.3.4 - Development envelope area

Zone or precinct	Development envelope area specification	
	Minimum area	Minimum dimension (length and width)
Rural zone	2,000m ²	30m
Rural residential zone		
Environmental management and conservation zone - Environmental management precinct		
Environmental management and conservation zone - Rural environmental management precinct		
All other zones	The entire lot	-

Table 8.2.5.3.5 - Development requiring a flood emergency management plan

Use	Qualifier
Vulnerable use activities	Where involving an active management entity and in a Low flood risk area identified on OM-05.04
Nature-based tourism	Where involving accommodation and an active management entity
Resort complex	Where involving an active management entity
Tourist park	Where involving an active management entity
Multiple dwelling	Where involving an active management entity and in a: a. Moderate flood risk area identified on OM-05.04 and the premises or vehicle route during evacuation is inundated during the defined flood event; or b. Flood investigation area identified on OM-05.04
Rooming accommodation	
Rural workers' accommodation	
Short-term accommodation	
Any development	Where involving an active management entity and development involves an access easement to provide flood-free or low flood hazard vehicle access to a flood-free or low flood hazard road

Note - There may be other circumstances in which development will require a flood emergency management plan to manage the residual flood risk to the development.

Note - Flood emergency management plans do not alter the land use tolerability to a flood risk area, nor act as an alternative to achieving other specified mitigation measures required to ensure risk is mitigated to a tolerable or acceptable level. Flood emergency management plans should be utilised to assist in managing residual risk of development and should be implemented as a tool to plan for safe evacuation where an active management entity exists for the development.

APPENDIX C
**Load Projections for North
Maclean PDA**

Technical Memorandum

To: Water Infrastructure Project Development Program Leader

From: M Seymour (Planning Engineer)

Actioned by: Click or tap here to enter text.

Date: 21 July 2022

Reference: DD8001 North Maclean

Subject: Load Projections for North Maclean PDA

1. Overview

The purpose of this memo is to confirm the estimated loads associated with the North Maclean PDA based on the best available current information as provided by developers.

1.1 Developer Information

The developer of “Charter Hall – Industrial Subdivision”, 4499-4651 Mount Lindesay Highway, North Maclean is represented by Arcadis who have provided several plans showing the extent of the development that they are proposing. These are included in Attachment A. The development areas within the North Maclean PDA are shown in Figure 1.

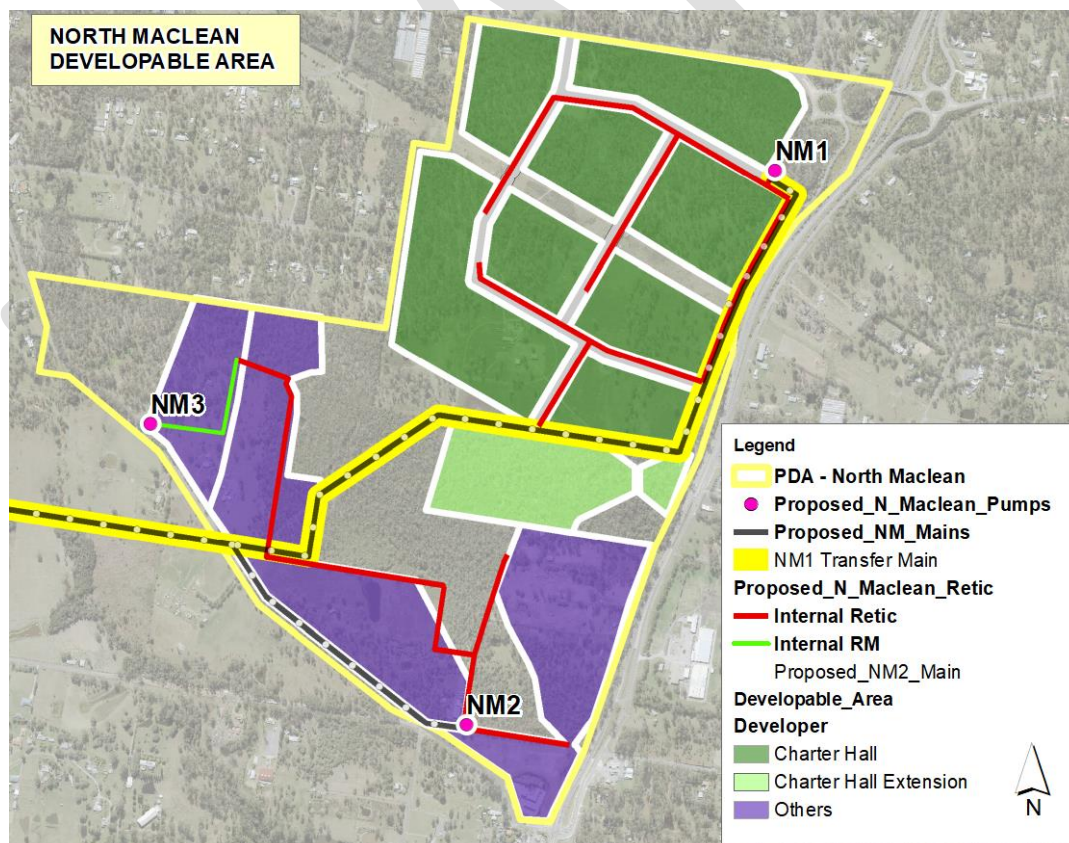


Figure 1: Development areas

The development areas include:

- Charter Hall subdivision which is the main focus for development (represented by Arcadis)

- Charter Hall extension immediately south of the main focus of development (also represented by Arcadis)
- Development areas draining to NM2 and NM3 (number of individual property owners)

Preliminary development plans have been submitted by Arcadis (developer's representative) for areas draining to NM1 transfer pump station.

The North Maclean PDA has been designated as an industrial precinct. The Charter Hall sub-division has not indicated the type of development (i.e. light, medium or heavy industry) and this will depend on the individual lot sales.

1.1.1 Development Constraints

The main constraint within the North Maclean PDA is flooding and Arcadis is proposing significant earthworks to raise the area above the Q100 flood level shown in Figure 2. They will also be installing stormwater basins and drainage channels.

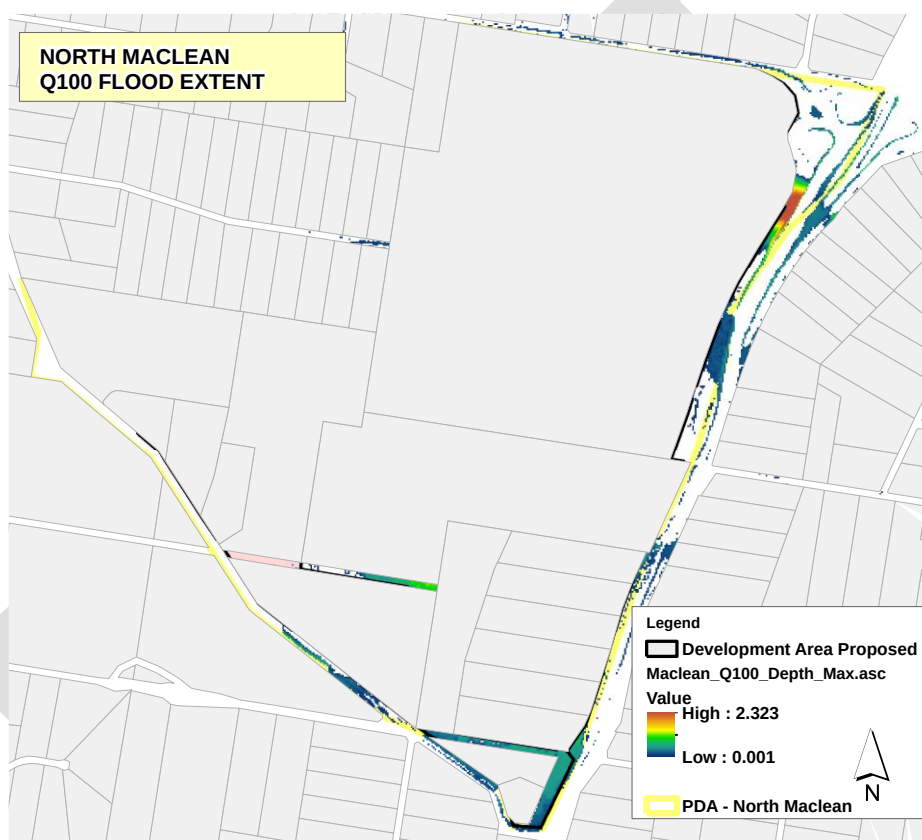


Figure 2: Q100 Flood Constraints

Arcadis have submitted bulk earthworks plans for the areas proposed for development. These are shown in Figure 3 and Figure 4.



Figure 3: Bulk Earthworks in Charter Hall Subdivision

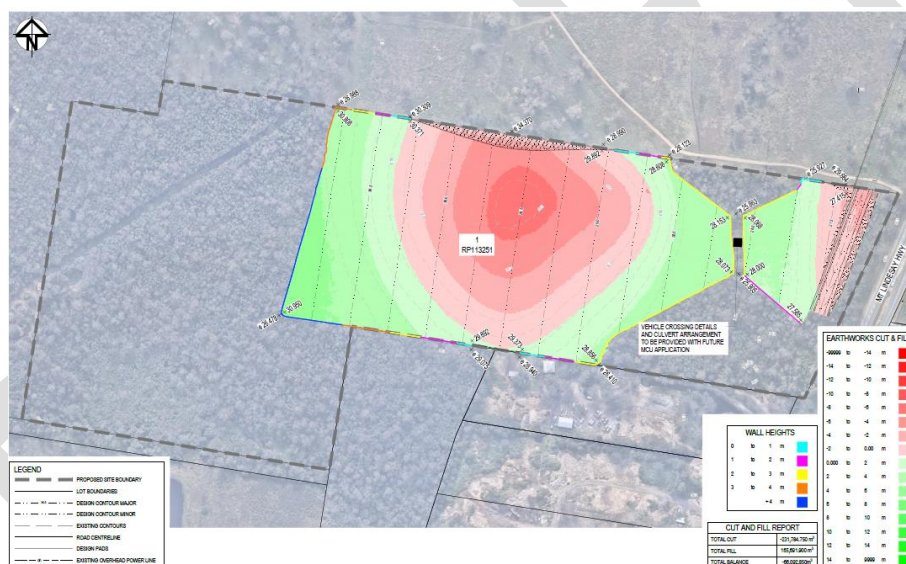


Figure 4: Bulk Earthworks in Charter Hall extension area.

2. Load assumptions

The North Maclean PDA is a designated industrial use precinct. The load estimates have been based on the following table extract from the task report “Infrastructure Demand Model 2020 (IP0017), September 2021. The industrial conversion rates were based on typical water consumption rates associated with several non-residential uses along with a return to sewer factor.

Table 4-2: Non-residential conversion rates – Base Year and/or growth years*

IDM Development Type	Average Water Consumption Method Adopted	Conversion Rates - Water		Return to Sewer (%)	Conversion Rates - Sewage	
		Gross Site Area Water EP/HA (Density Gross)	Gross Floor Area Water EP/HA (Density GFA)		Gross Site Area Water EP/HA (Density Gross)	Gross Floor Area Water EP/HA (Density GFA)
Commercial	GFA, 5 th -95 th %ile	-	55.90	0.90	-	50.31
Office	As per Commercial		55.90	0.90		50.31
Warehouse Distribution	As per Commercial		55.90	0.90		50.31
Education	GFA, 5 th -95 th %ile	-	105.30	0.80	-	84.24
Health	GFA, 5 th -95 th %ile	-	226.50	0.90	-	203.85
Industry Heavy	50% above Light Industrial	-	56.60	0.80	-	45.28
Industry Medium	25% above Light Industrial	-	47.25	0.80	-	37.80
Industry Light	GFA, 5 th -95 th %ile	-	37.80	0.80	-	30.24
Sport Recreation	Gross, 10 th -90 th %ile	1.05	-	0.90	0.945	-
Rural	Based on Water Meter Consumption	-	-	-	-	-
Retail Services	GFA, 5 th -95 th %ile	-	97.60	0.90	-	87.84
Showroom Bulk Goods	GFA, 5 th -95 th %ile	-	110.80	0.90	-	99.72
Accommodation	GFA, 5 th -95 th %ile	-	233.90	0.90	-	210.51

Reference: Table 7.2 Development of Infrastructure Demand Model, LWIA 2018 (PI-181).

Table 1: Non-residential conversion rates

Industrial use was subdivided into consumption rates for light, medium and heavy industry. It should be noted that these are averages and in the case of very high users such as bottling plants, abattoirs, concrete manufacturers, etc individual assessments of load will be necessary.

The consumption rates have been based on GFA and it has been assumed that this is equal to 70% of the developable area that excludes roads, public open space and stormwater lagoons and drainage channels, etc.

The ultimate loads were determined for the developable areas assuming light, medium and heavy industrial uses.

In the absence of any growth rate assumptions from the developer it has been assumed that.

- North Maclean 1 Pump Station catchment
 - 10% of the ultimate load in 2023
 - 90% of ultimate load in 2051
- North Maclean 2 and 3 pump station catchments
 - 10 % of the ultimate load in 2026
 - 90% of the ultimate load in 2051

Ultimate development is assumed in 2081 and linear growth has been assumed between 2023 / 2026 and 2051.

It should be noted that the growth rates are unlikely to have any impact on the transfer infrastructure which has been sized on ultimate loads.

3. Load Estimates and Projection

Figure 5 includes the pump stations servicing the North Maclean PDA.

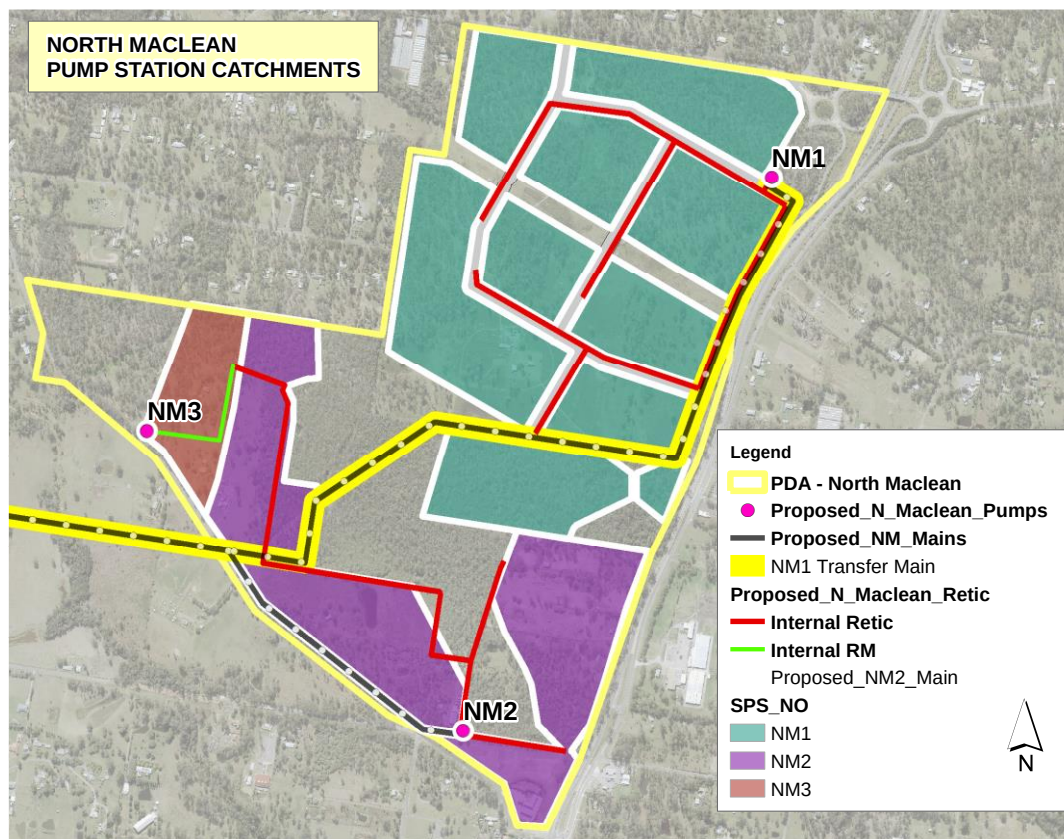


Figure 5: North Maclean pump station catchments

There are three pump stations, NM1 and NM2 are transfer pump stations and inject into a common rising main. NM3 is an internal pump station, and it transfers load to NM2 pump station via internal reticulation.

The ultimate loads have been estimated for the three pump stations and these are included in Table 2.

Table 2: Ultimate Loads

SPS NO	Developable Lot Area Ha	GFA Ha (1)	Light Ind EP (2)	Med Ind EP (3)	Heavy Ind EP (4)	IDM EP ULT
NM1	105	74	2,228	2,785	3,336	3,460
NM2	55	38	1,164	1,455	1,743	1,880
NM3	11	8	230	288	345	255
NM2 Total	66	46	1,394	1,743	2,088	2,135
Totals:	171	120	3,623	4,528	5,424	5,595

Note:

1. GFA assumed 70% of Developable Area
2. Light Industry: 30.24 EP / HA (based on GFA)
3. Medium Industry: 37.80 EP / HA (based on GFA)
4. Heavy Industry: 45.28 EP / HA (based on GFA)

Table 2 also includes ultimate loads for light, medium and heavy industry along with IDM2020 assumptions. The IDM_2020 load assumed in earlier studies was 5,595 EP.

The loads based on industrial use along with projections are included in Table 3.

Table 3: North Maclean PDA – Projected Loads

Medium Industry (3)

SPS NO	Sum of Sewer EP 2023	Sum of Sewer EP 2026	Sum of Sewer EP 2031	Sum of Sewer EP 2036	Sum of Sewer EP 2041	Sum of Sewer EP 2051	Sum of Sewer EP ULT	Developabl e Lot Area Ha	GFA Ha (1)
NM1	279	517	915	1,313	1,711	2,507	2,785	105	74
NM2		146	349	553	757	1,164	1,455	55	38
NM3		29	69	109	150	230	288	11	8
NM2 Total		174	418	662	906	1,394	1,743	66	46
Totals:	279	692	1,333	1,975	2,617	3,901	4,528	171	120

Light Industry (2)

SPS NO	Sum of Sewer EP 2023	Sum of Sewer EP 2026	Sum of Sewer EP 2031	Sum of Sewer EP 2036	Sum of Sewer EP 2041	Sum of Sewer EP 2051	Sum of Sewer EP ULT	Developabl e Lot Area Ha	GFA Ha (1)
NM1	223	414	732	1,050	1,369	2,005	2,228	105	74
NM2		116	279	442	605	931	1,164	55	38
NM3		23	55	87	120	184	230	11	8
NM2 Total		139	335	530	725	1,115	1,394	66	46
Totals:	223	553	1,067	1,580	2,094	3,121	3,623	171	120

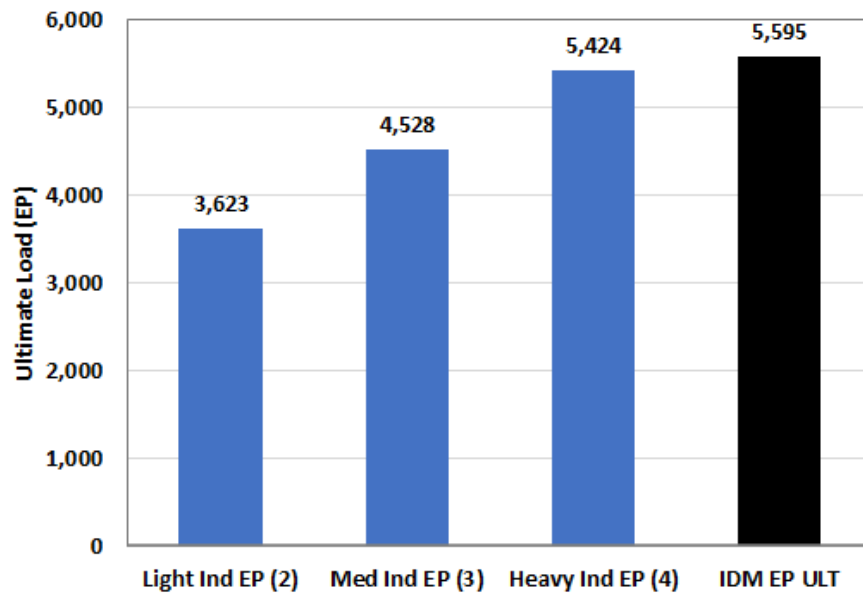
Heavy Industry (4)

SPS NO	Sum of Sewer EP 2023	Sum of Sewer EP 2026	Sum of Sewer EP 2031	Sum of Sewer EP 2036	Sum of Sewer EP 2041	Sum of Sewer EP 2051	Sum of Sewer EP ULT	Developabl e Lot Area Ha	GFA Ha (1)
NM1	334	620	1,096	1,573	2,050	3,003	3,336	105	74
NM2		174	418	662	906	1,395	1,743	55	38
NM3		34	83	131	179	276	345	11	8
NM2 Total		209	501	793	1,086	1,670	2,088	66	46
Totals:	334	828	1,597	2,366	3,135	4,673	5,424	171	120

Note:

1. GFA assumed 70% of Developable Area
2. Light Industry: 30.24 EP / HA (based on GFA)
3. Medium Industry: 37.80 EP / HA (based on GFA)
4. Heavy Industry: 45.28 EP / HA (based on GFA)

The following Figure 6 compares the ultimate loads based on the industrial use and the IDM_2020 assumption.



Note:

- 1 GFA assumed 70% of Developable Area
- 2 Light Industry 30.24 EP / HA (based on GFA)
- 3 Medium Industry 37.80 EP / HA (based on GFA)
- 4 Heavy Industry 45.28 EP / HA (based on GFA)

Figure 6: Ultimate Loads based on Industrial Use

The growth rates included in Table 3 are shown in the following Figure 7, Figure 8 and Figure 9 for the NM1 and NM2 transfer pump stations and the total North Maclean PDA load.

NM1 Pump Station

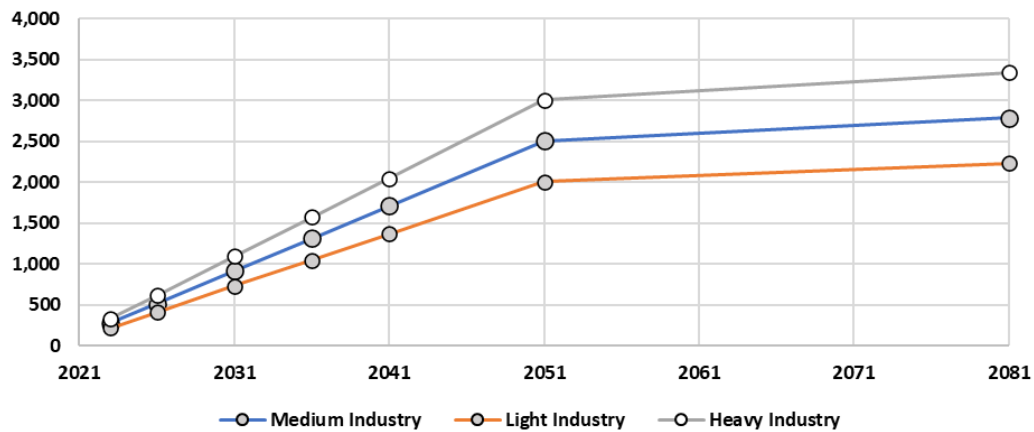


Figure 7: North Maclean 1 Pump Station – Growth Projections

NM2 Pump Station

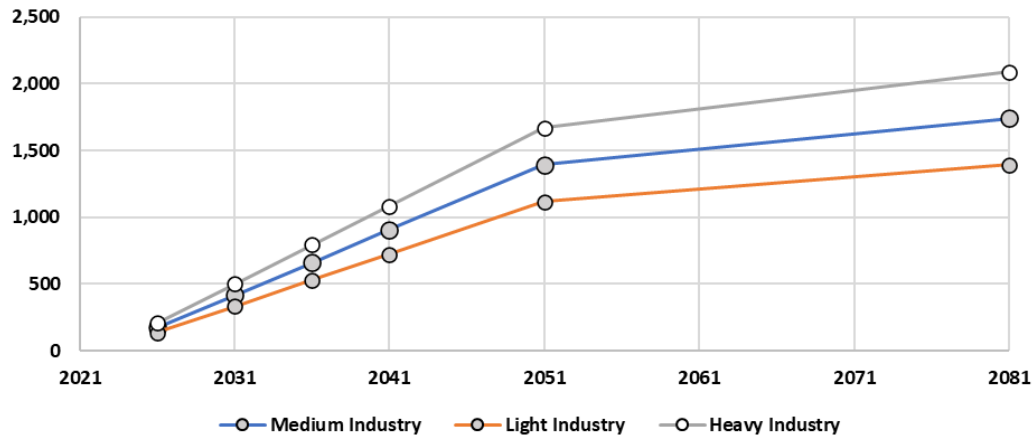


Figure 8: North Maclean 2 Pump Station – Growth Projections

North Maclean PDA Total

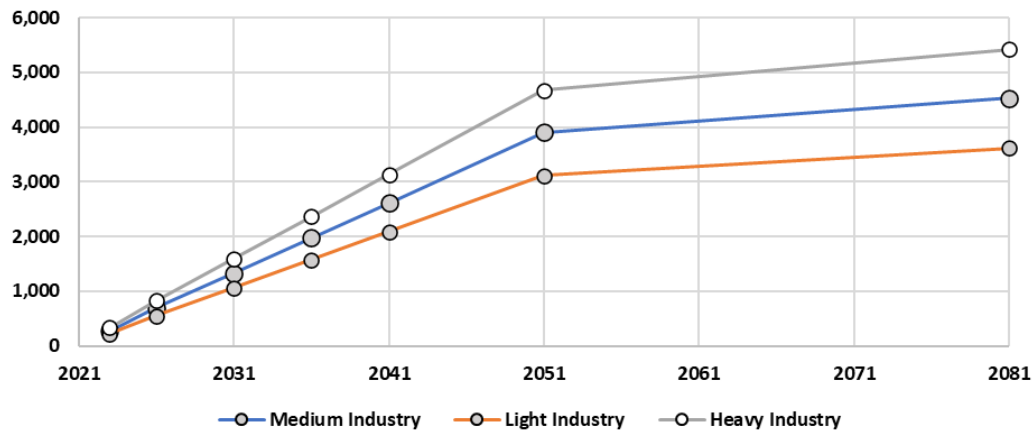


Figure 9: North Maclean PDA – Growth Projections

The type of industry will impact on the loads

- Light Industry 3,623 EP or 65% of IDM 2020 load (5,595 EP)
- Medium Industry 4,528 EP or 81% of IDM 2020 load (5,595 EP)
- Heavy industry 5,424 EP or 97% of IDM 2020 load (5,595 EP)

Indications are that the industrial development is unlikely to be heavy industrial use and will be a mix of light and medium industry.

4. Conclusions

In the absence of more accurate indication of uses it is proposed to adopt the loads based on medium industrial loads. It is unlikely to result in any significant reduction in infrastructure sizing and will allow for some flexibility if there is a need to service any industry with high sewage loads.

5. Recommendations

It is recommended that Logan Water adopt the loads included in Table 4 for development within the North Maclean PDA:

Table 4: Recommended Loads for North Maclean PDA (based on Medium Industrial use)

SPS NO	Sum of Sewer EP 2023	Sum of Sewer EP 2026	Sum of Sewer EP 2031	Sum of Sewer EP 2036	Sum of Sewer EP 2041	Sum of Sewer EP 2051	Sum of Sewer EP ULT
NM1	279	517	915	1,313	1,711	2,507	2,785
NM2		146	349	553	757	1,164	1,455
NM3		29	69	109	150	230	288
NM2 Total		174	418	662	906	1,394	1,743
Totals:	279	692	1,333	1,975	2,617	3,901	4,528

Signed by

Choose an item.

Choose an item.

Date:

Choose an item.

Supported by

Choose an item.

Choose an item.

Date:

Choose an item.

Attachment 1: Developer Drawings

DRAFT

APPENDIX D

Greater Flagstone ICOP Maps



Water Supply Network

Water Supply (North) Map

Legend

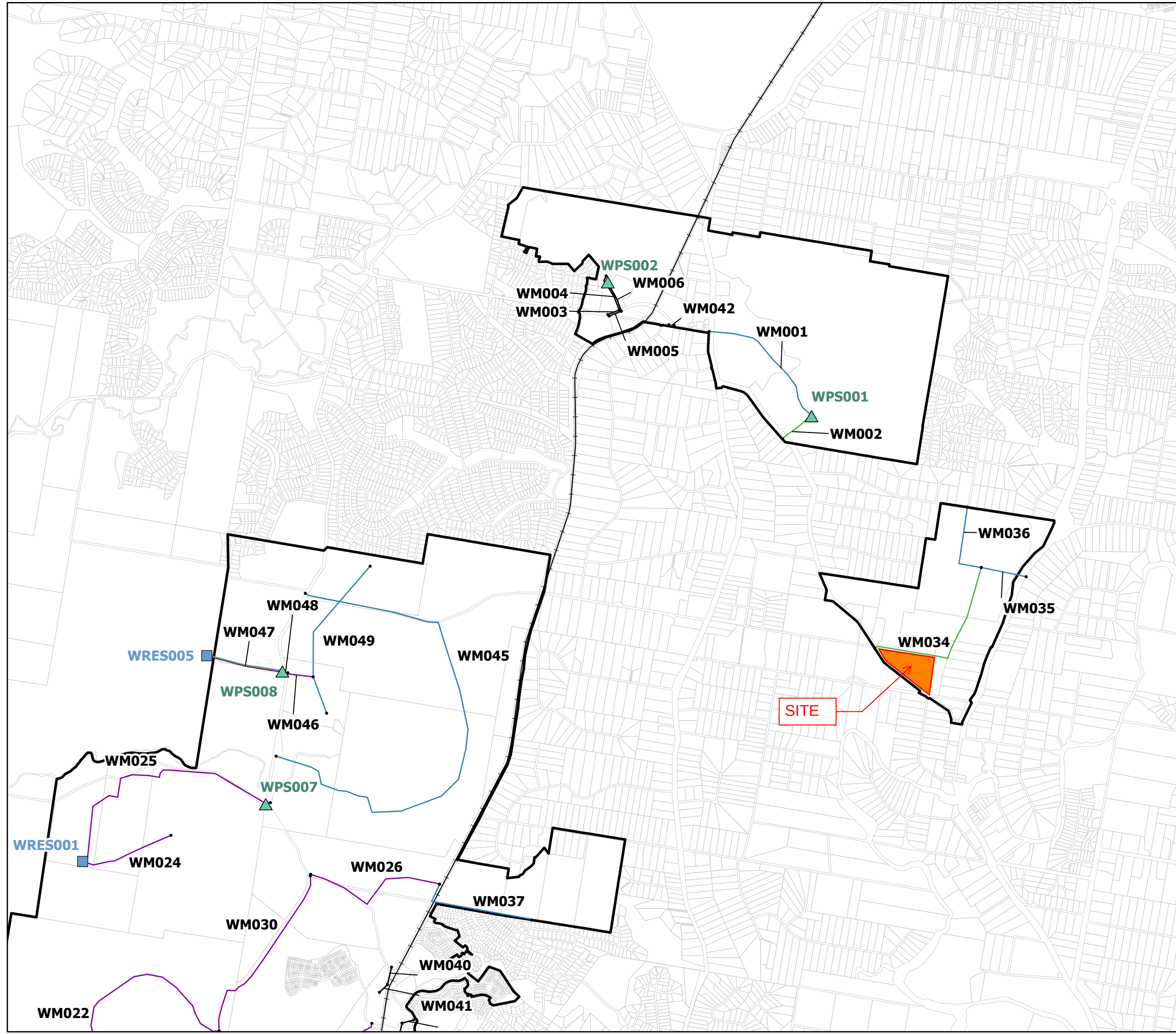
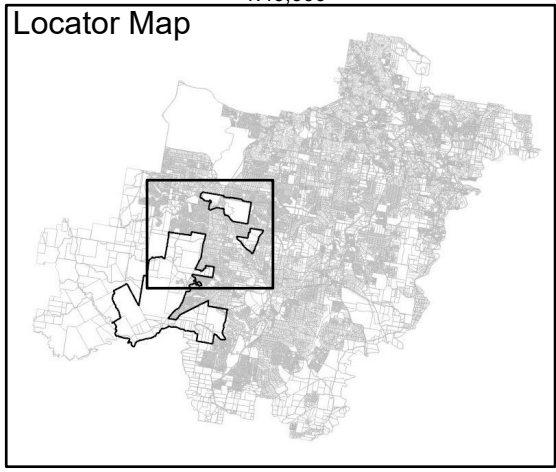
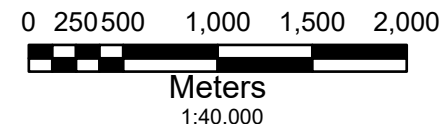
- Pump Station
- Reservoir
- Water_Mains_Nodes

Water Supply Mains (Diam)

- 225mm
- 250mm
- 300mm
- 375mm
- Existing Asset
- Railway
- Development Area (PDA) Boundary

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N	DATUM: Geocentric Datum of Australia 1994 (GDA94 - Zone 56)
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	AMENDMENT N°





Water Supply Network

Water Supply (South) Map

Legend

- Pump Station
- Reservoir
- Water_Mains_Nodes

Water Supply Mains (Diam)

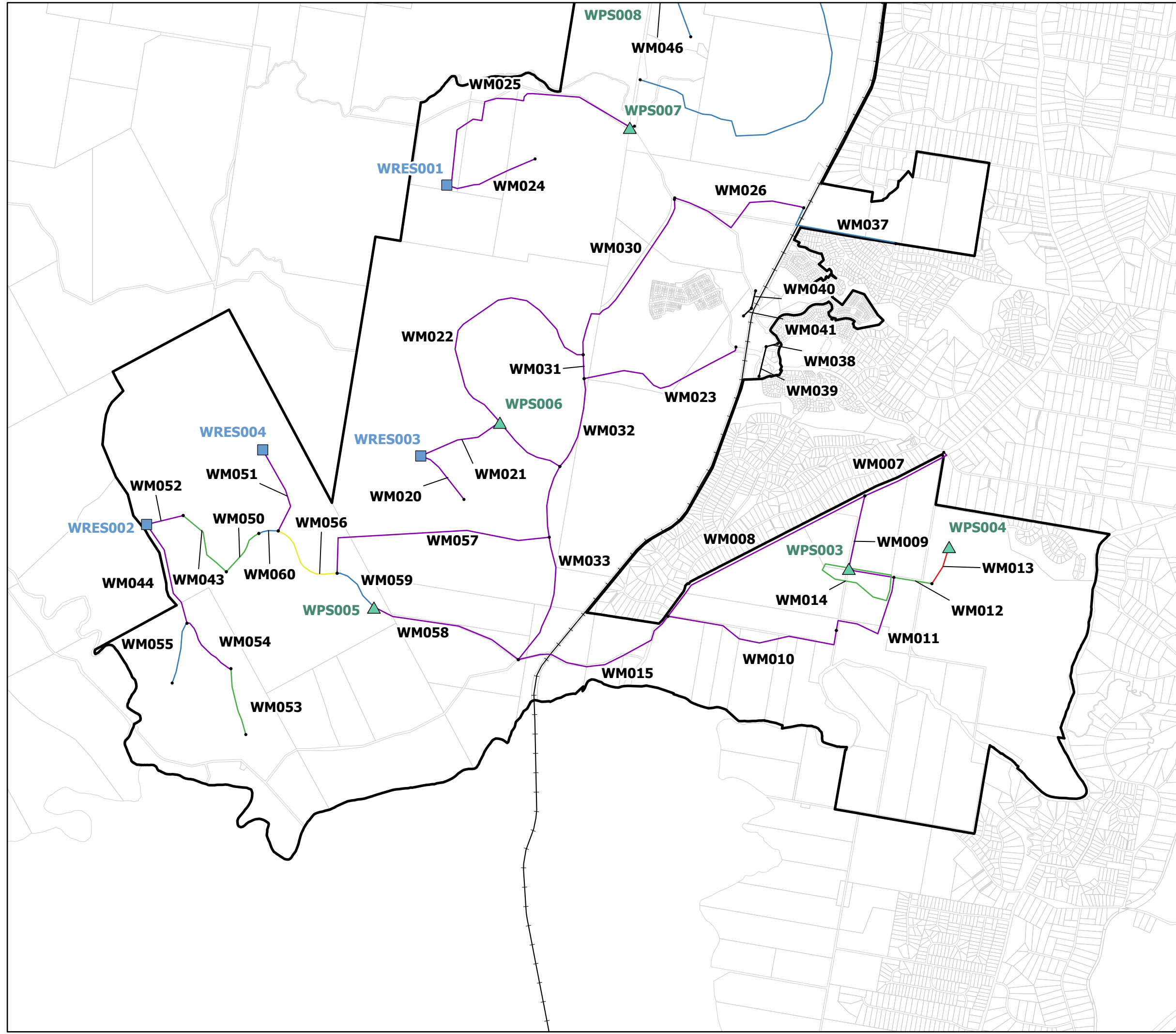
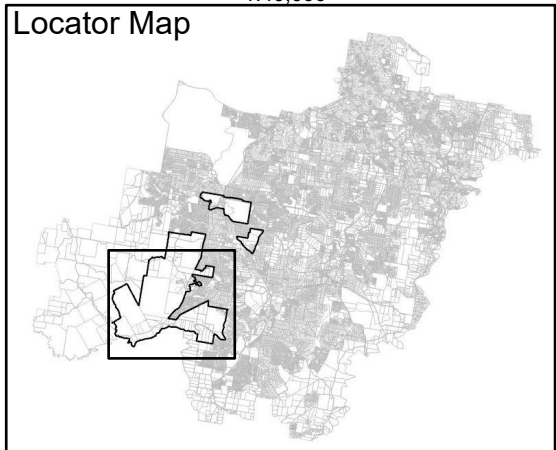
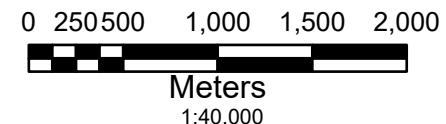
- 225mm
- 250mm
- 300mm
- 375mm
- 450mm

- Existing Asset
- Railway
- Development Area (PDA) Boundary

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 DATUM: AMENDMENT DATE
Geocentric Datum AMENDMENT N°
of Australia 1994
(GDA94 - Zone 56)





Sewerage Network

Sewerage (North) Map

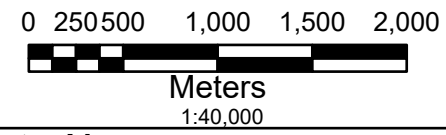
Legend

- Pump Station
- Node (Start / end point)
- Sewer Gravity Main (Diam)**
 - 225mm
 - 300mm
 - 375mm
 - 450mm
 - 525mm
 - 600mm
 - 675mm
- Rising Main
- Existing Asset
- Development Area (PDA) Boundary

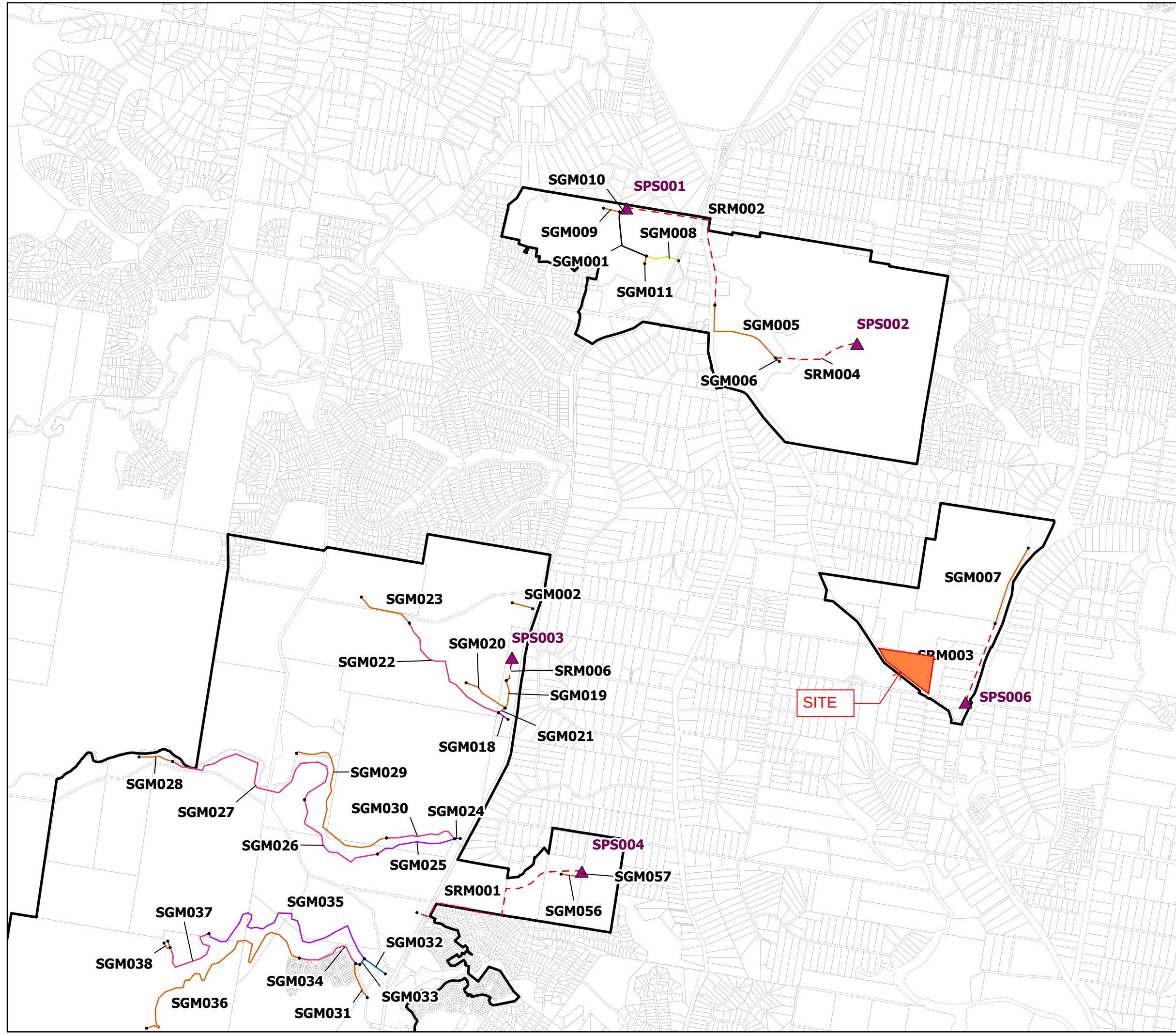
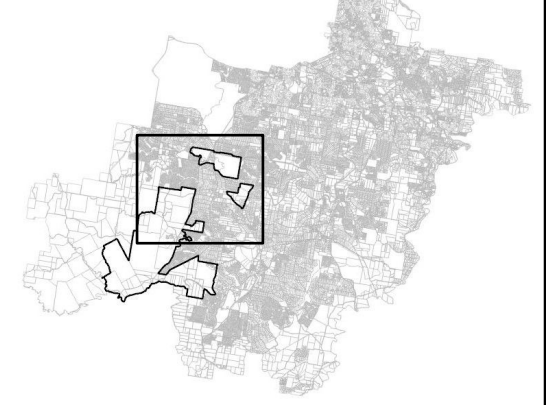
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(GDA94 - Zone 56) AMENDMENT DATE
AMENDMENT N°



Locator Map





Sewerage Network

Sewerage (South) Map

Legend

- Pump Station
- Node (Start / end point)
- Sewer Gravity Main (Diam)**
 - 300mm
 - 375mm
 - 450mm
 - 525mm
 - 600mm
 - 675mm
- Rising Main
- Development Area (PDA) Boundary

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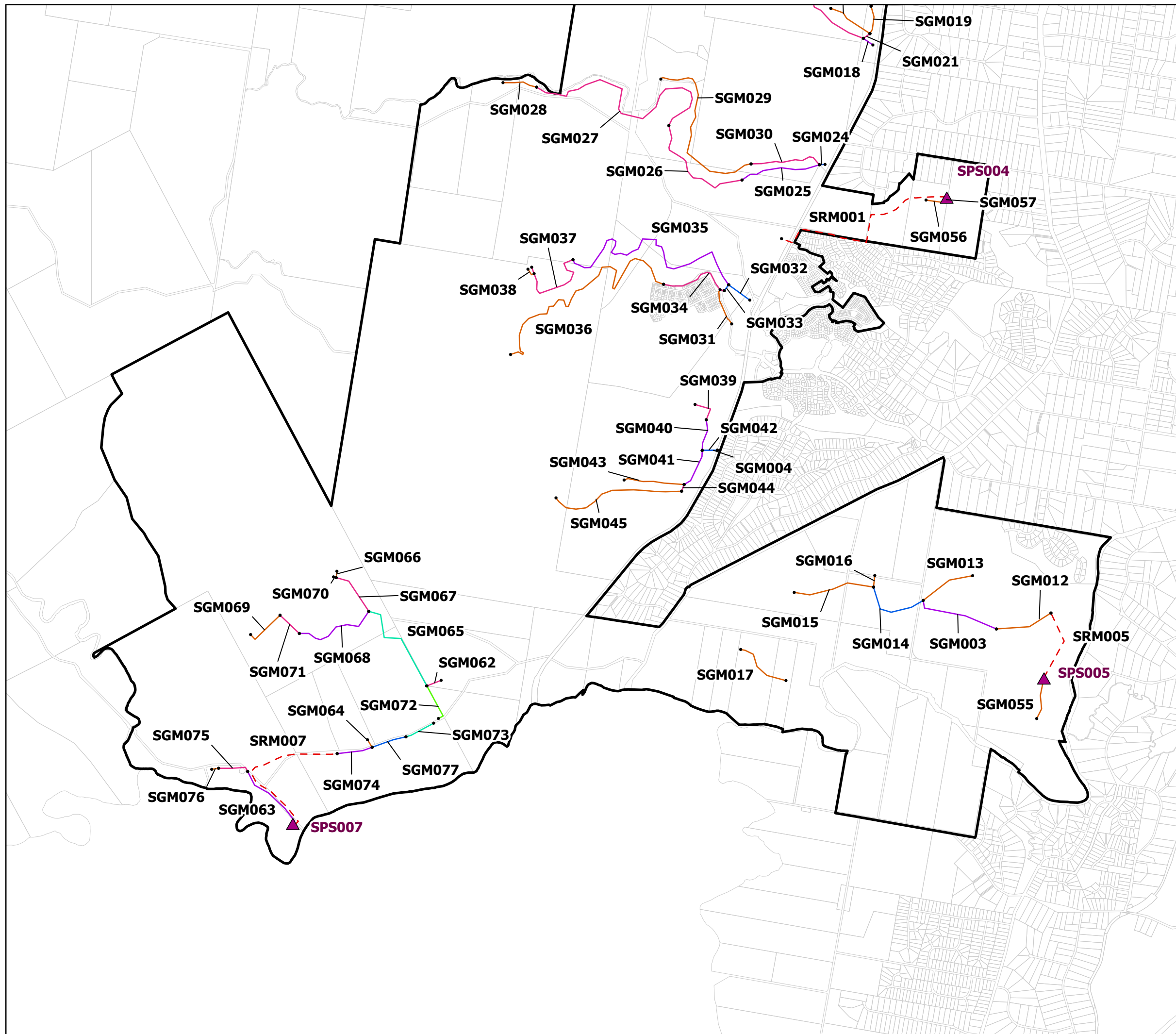
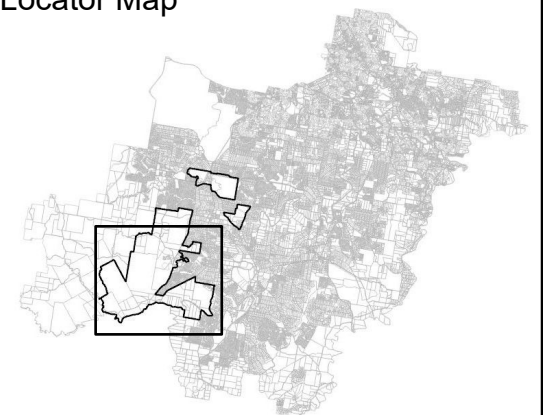
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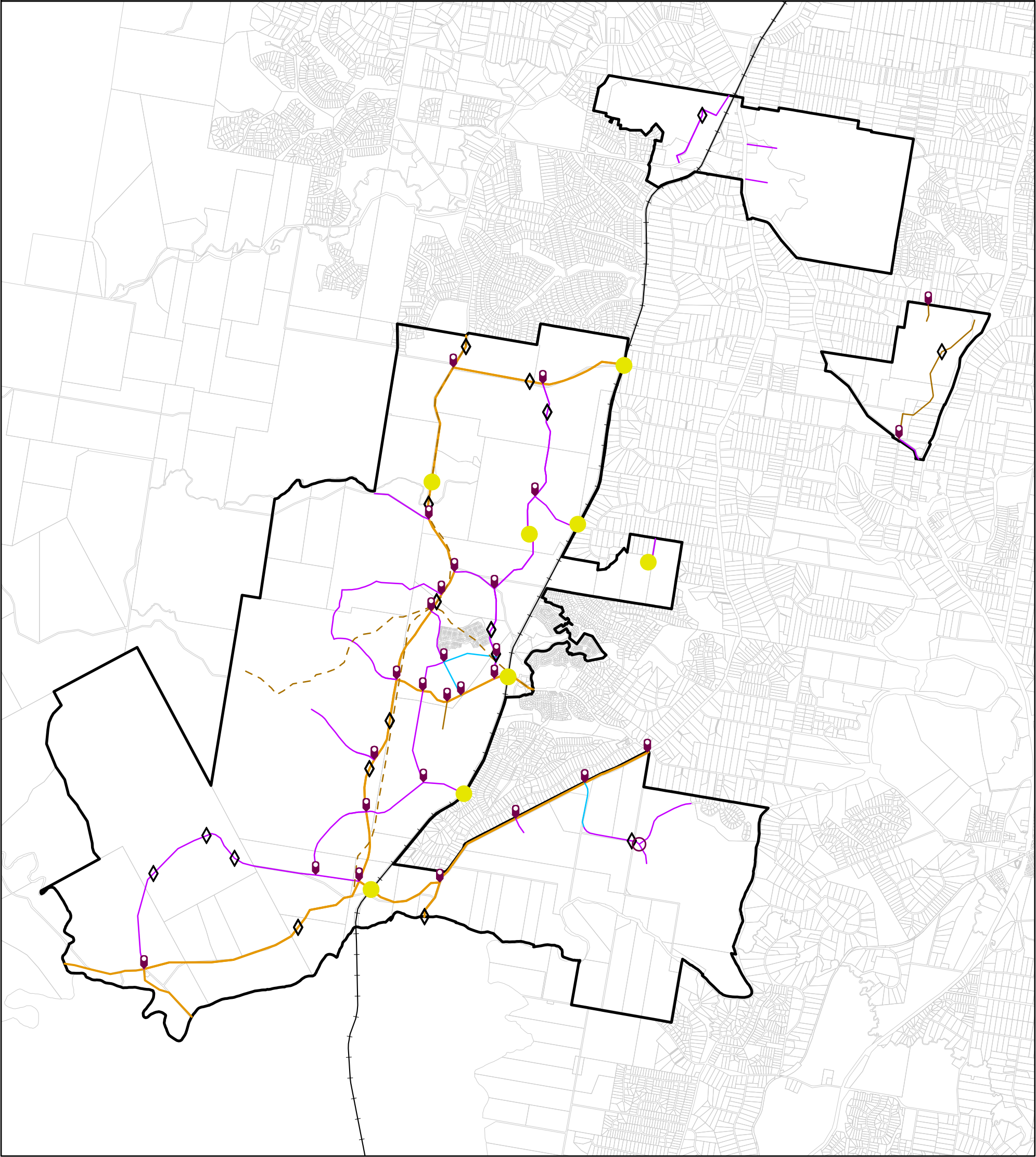
0 250 500 1,000 1,500 2,000

Meters

1:40,000

Locator Map





Legend

Intersections

- Roundabout
- Signal

Bridges & Culverts

- Bridge
- Culvert

Hierarchy

- Urban Arterial
- Trunk Connector
- Centre Connector
- Industrial Connector
- Off Road / Shared Path
- Railway
- Development Area (PDA) Boundary

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Date: 17/04/2020

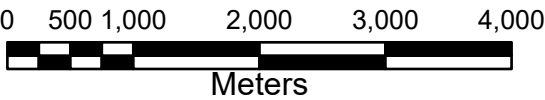


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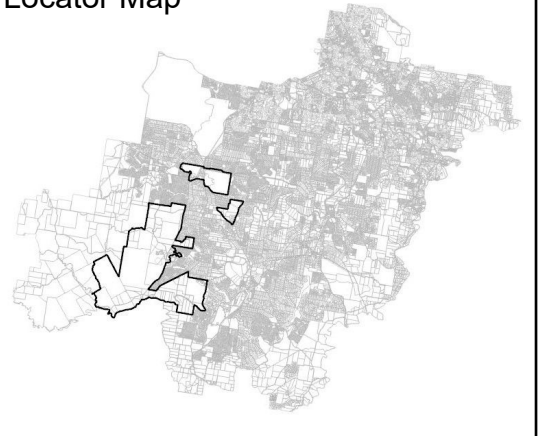
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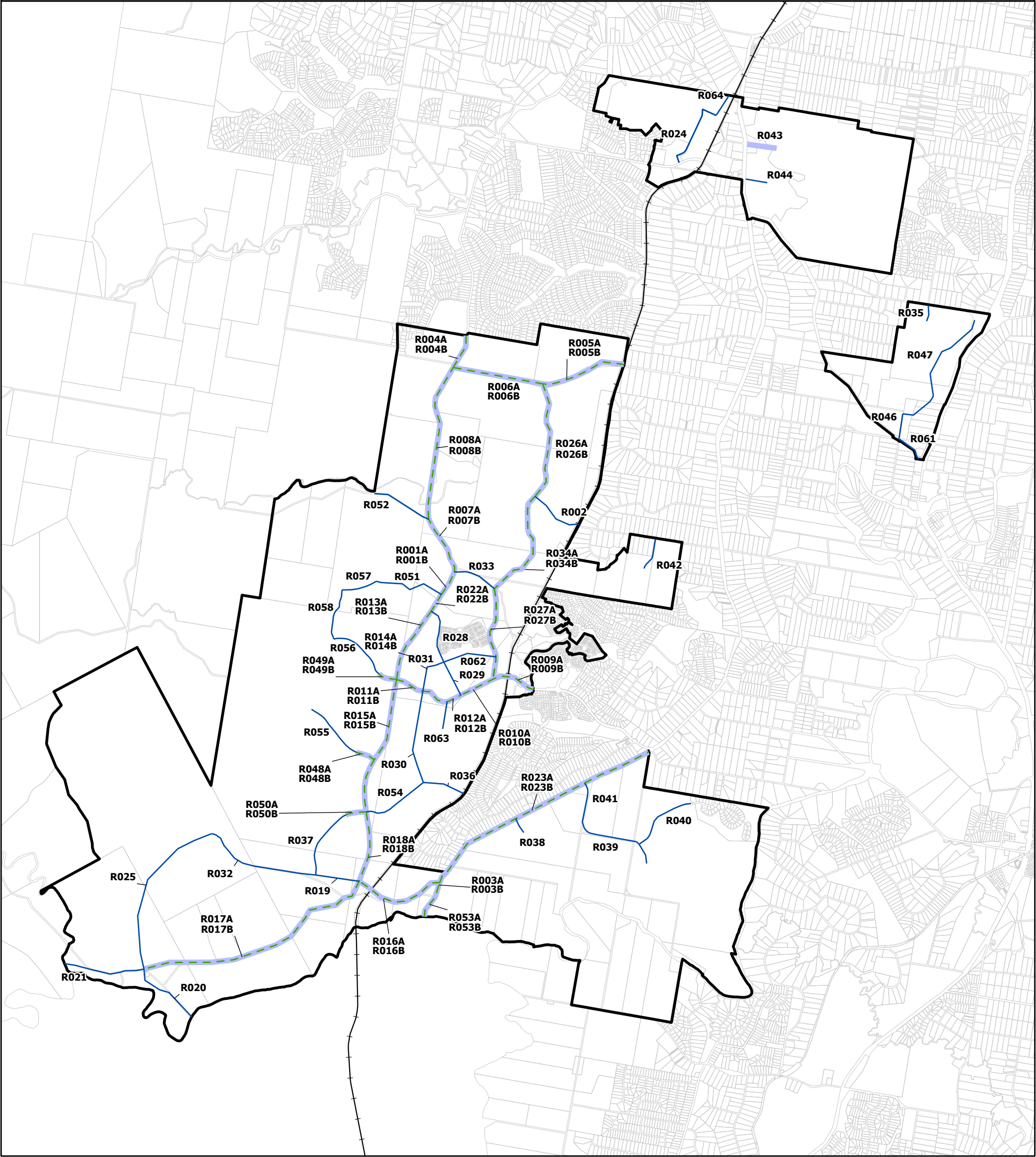


Locator Map





Transport Network



Legend

- 2 Lane (Ultimate)
- 2 Lane (Interim)
- 4 Lane (Ultimate)
- 4 Lane + Bus (Ultimate)
- Railway
- Development Area (PDA) Boundary

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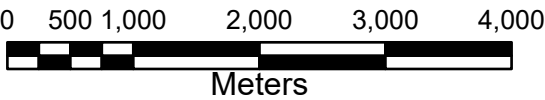
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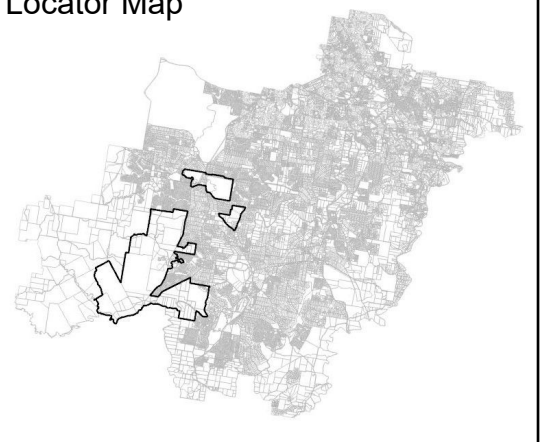
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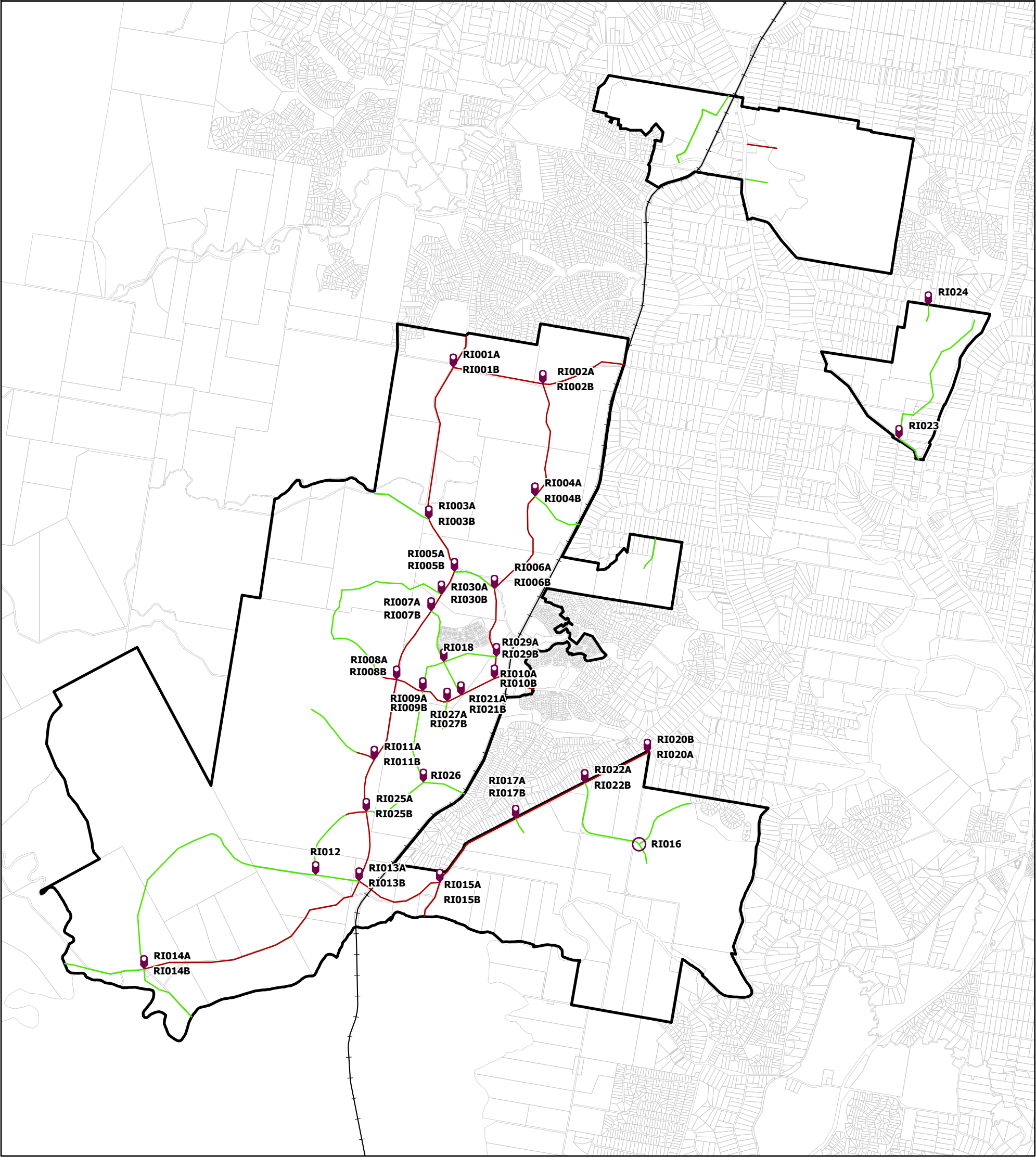


Locator Map





Intersections Map



- Roundabout
- Signal
- 2 Lane
- 4 Lane
- Railway
- Development Area (PDA) Boundary

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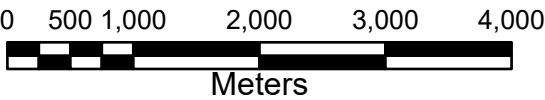
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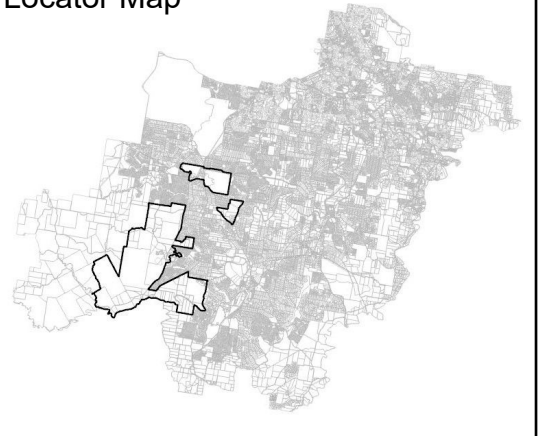
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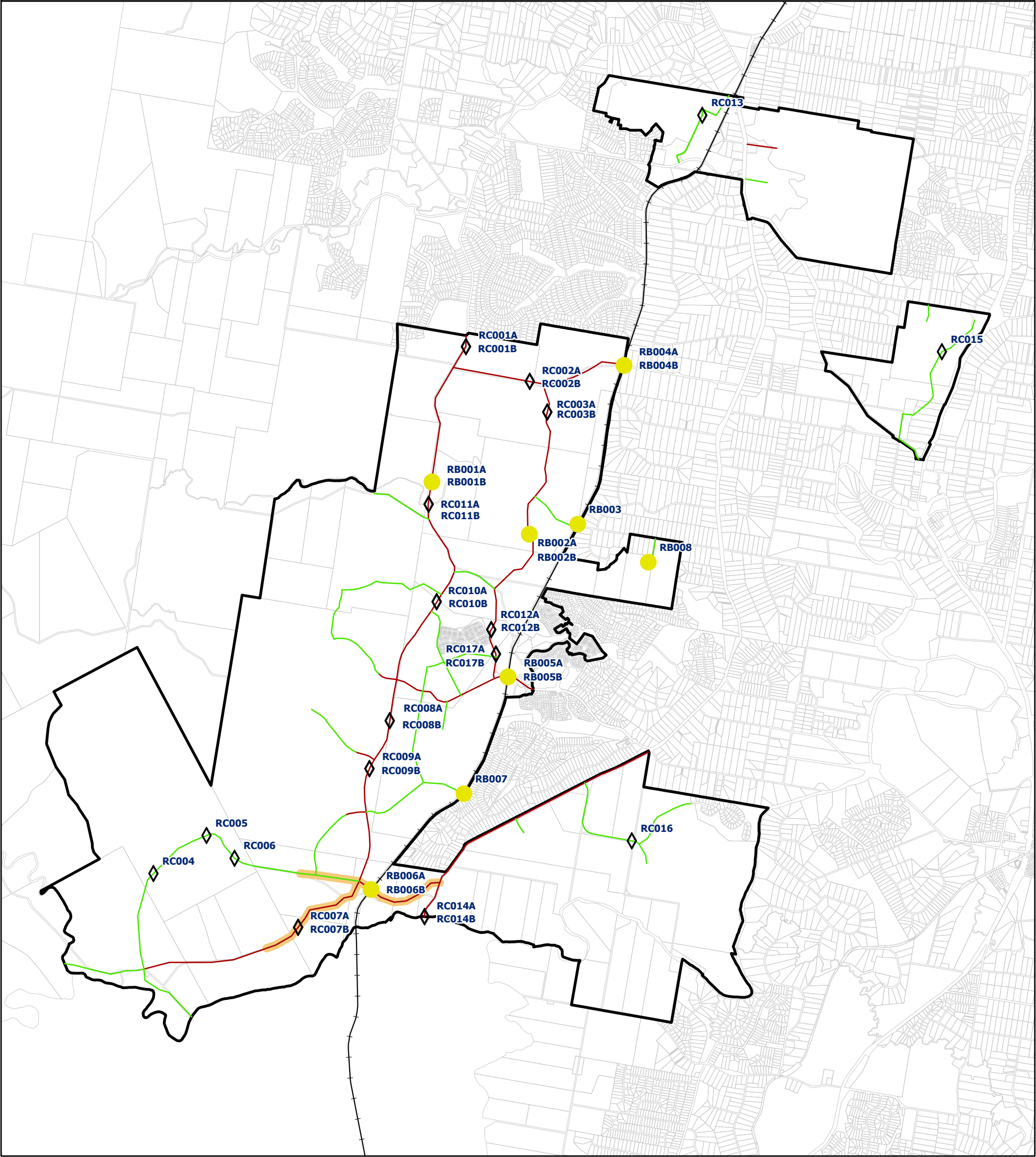


DATUM:
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of Australia 1994
(GDA94 - Zone 56)



Locator Map





Legend

- Bridge
- Culvert
- 2 Lane
- 4 Lane
- Earthworks
- Railway
- Development Area (PDA) Boundary

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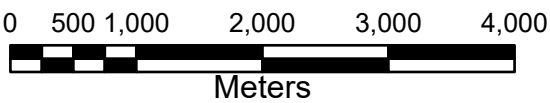
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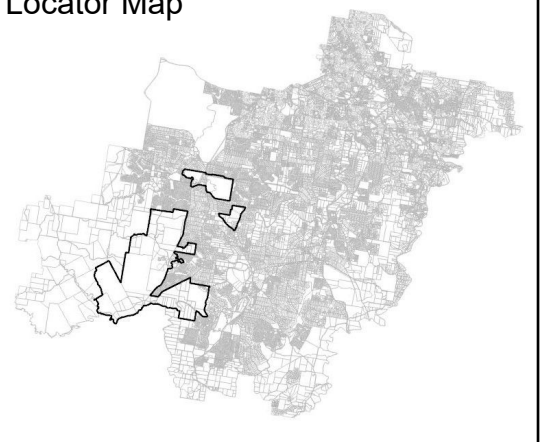
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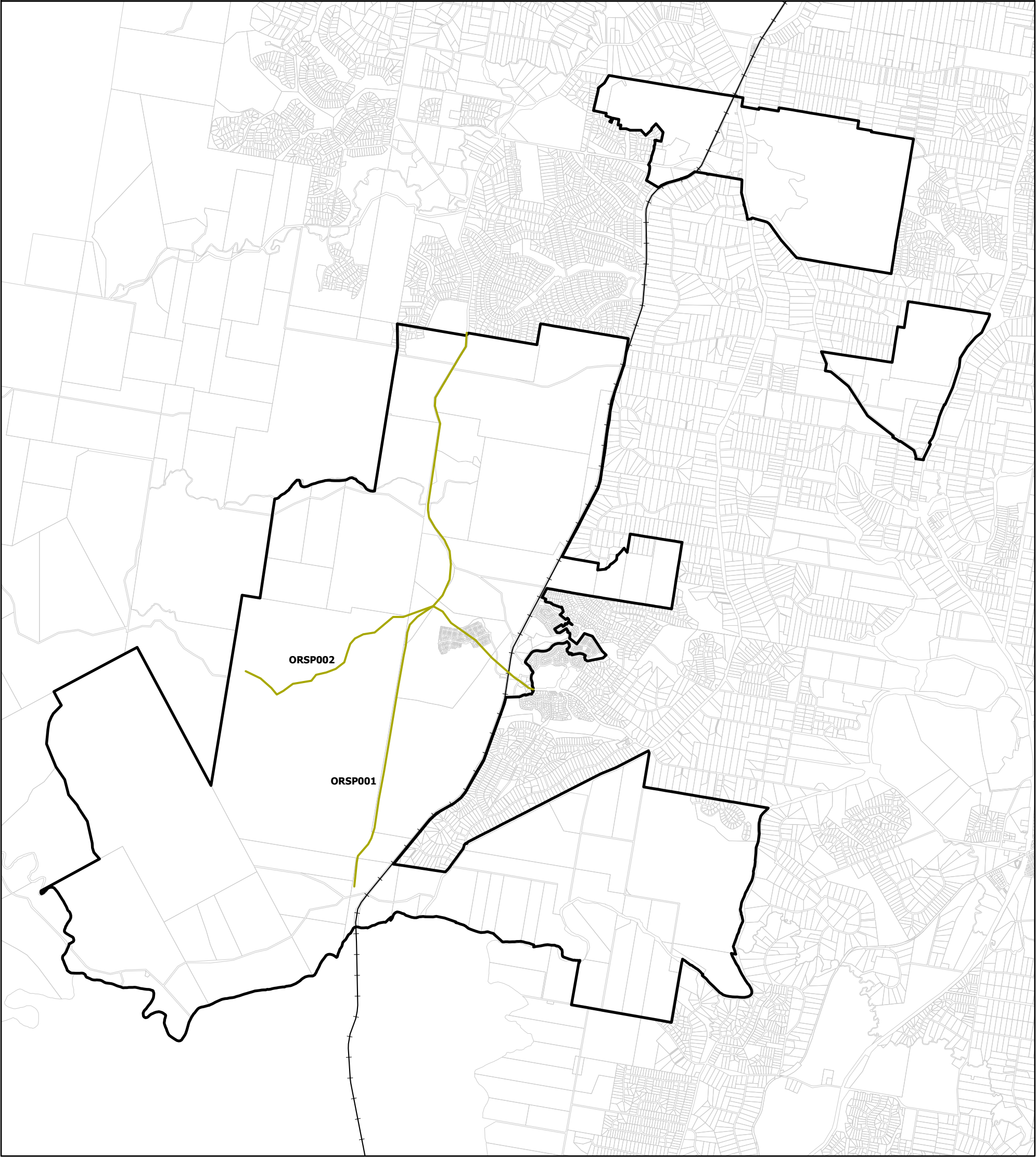
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Locator Map





Legend

- Off Road Shared Path
- Railway
- Development Area (PDA) Boundary

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Date: 17/04/2020

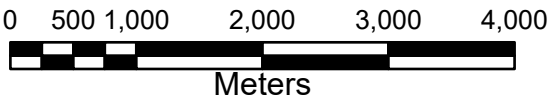
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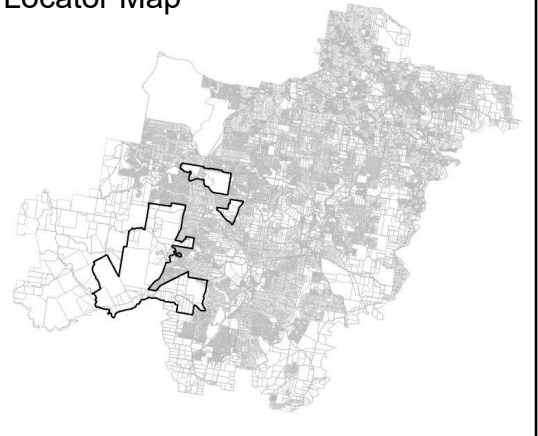
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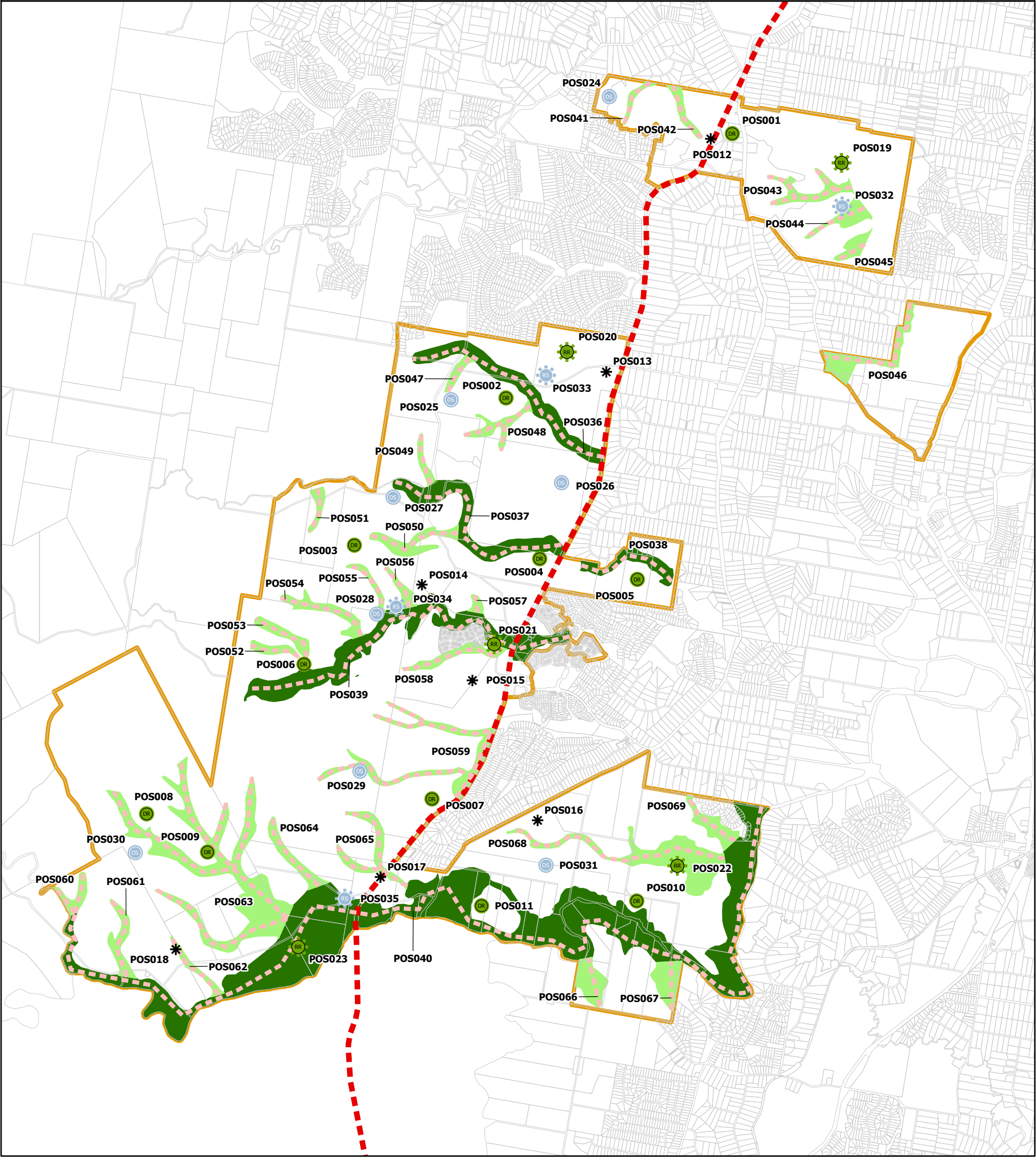


Locator Map





Parks & Open Space Network



Legend

- Parks**

 - * Civic Park
 - DR District Recreation Park
 - DS District Sport Park
 - RR Regional Recreation Park
 - RS Regional Sport Park
- Major Linear Park
 - Local Linear Park
 - Linear Pathway
 - Railway
 - Development Area (PDA) Boundary

Linear Parks and Pathways layer drawn for cost estimation only - further investigation required for accurate representation of these assets.

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Date: 1/05/2020

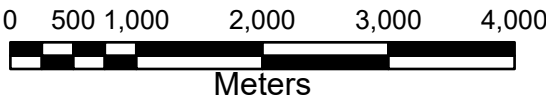


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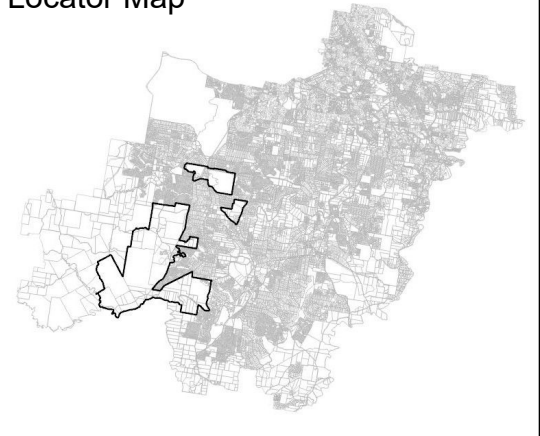
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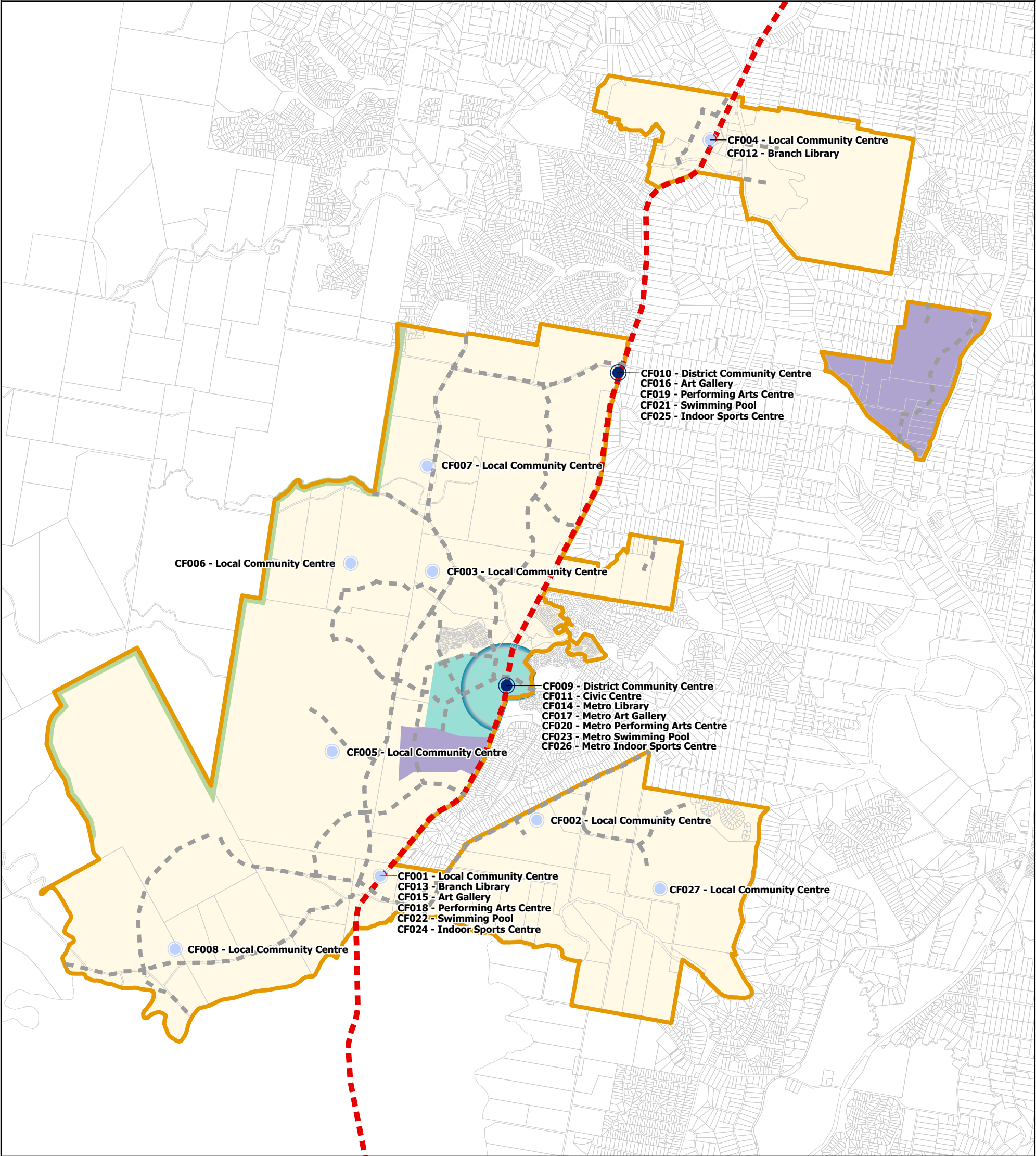


Locator Map





Community Facilities Network



Legend

- District Community Centre
- Local Community Centre
- Railway
- ICOP Road
- Zones**
 - Urban Living
 - Major Centre Core
 - Major Centre
 - Industry & Business
 - Environmental Protection
 - Development Area (PDA) Boundary

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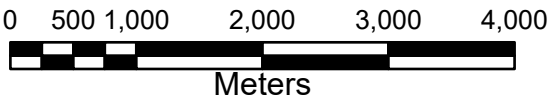


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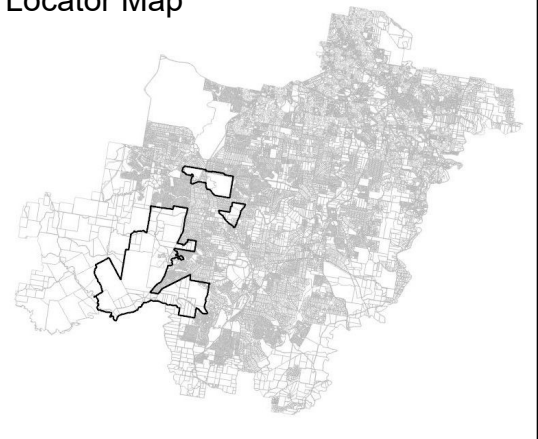
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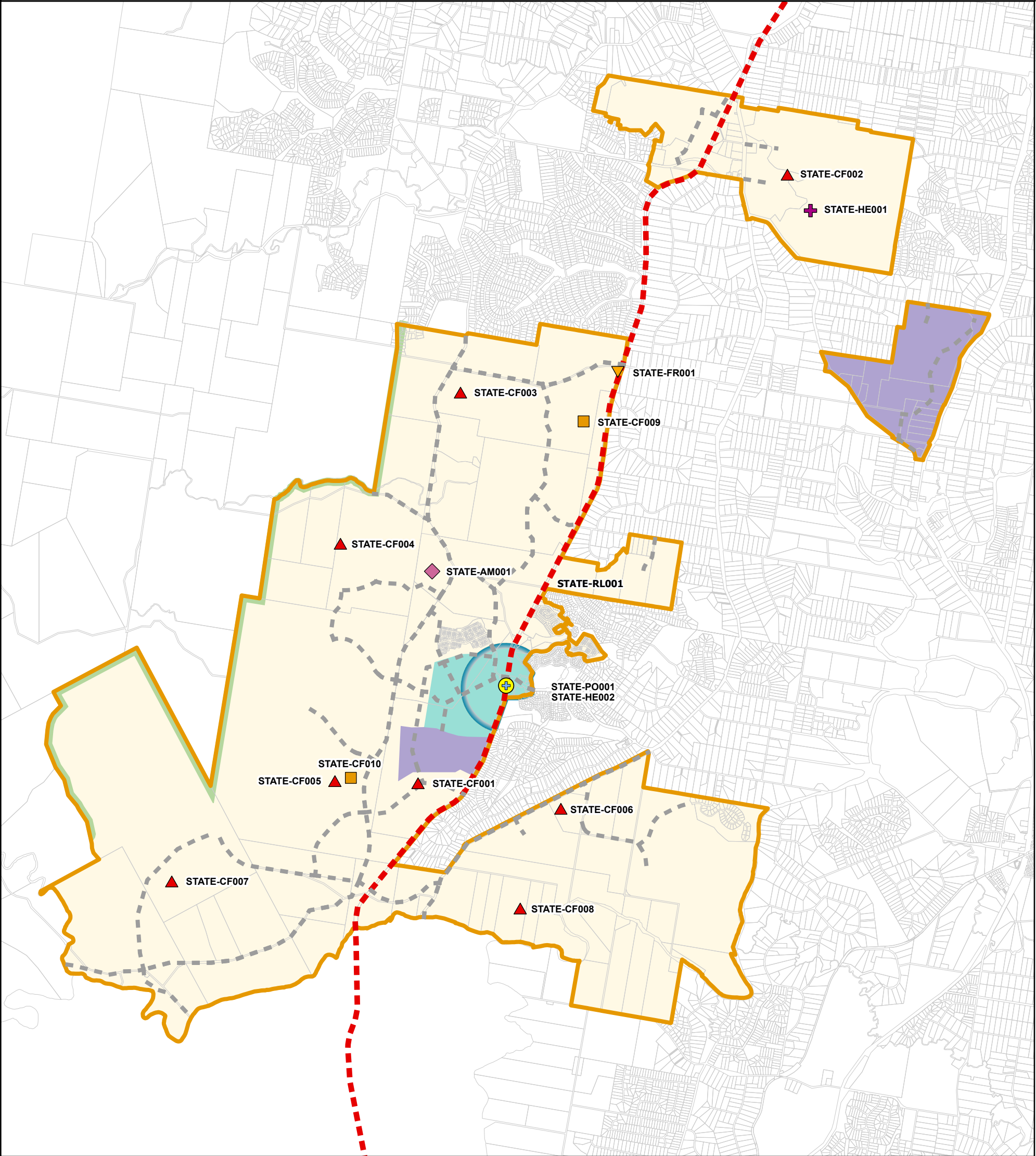


Locator Map





Community Facilities Network



Legend

- District Police Station
- Fire & rescue station
- Health Centre
- Health Precinct
- Ambulance station
- State High School
- State Primary School
- Railway

 ICOP Road Urban Living Major Centre Core Major Centre Industry & Business Environmental Protection Development Area (PDA) Boundary

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Date: 17/04/2020

0 500 1,000 2,000 3,000 4,000

Meters

DATUM:
Geocentric Datum
of Australia 1994
(GDA94 - Zone 56)

START DATE

AMENDMENT N°

AMENDMENT DATE

Locator Map

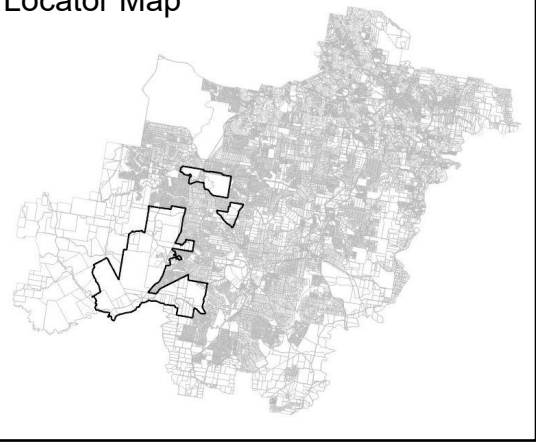
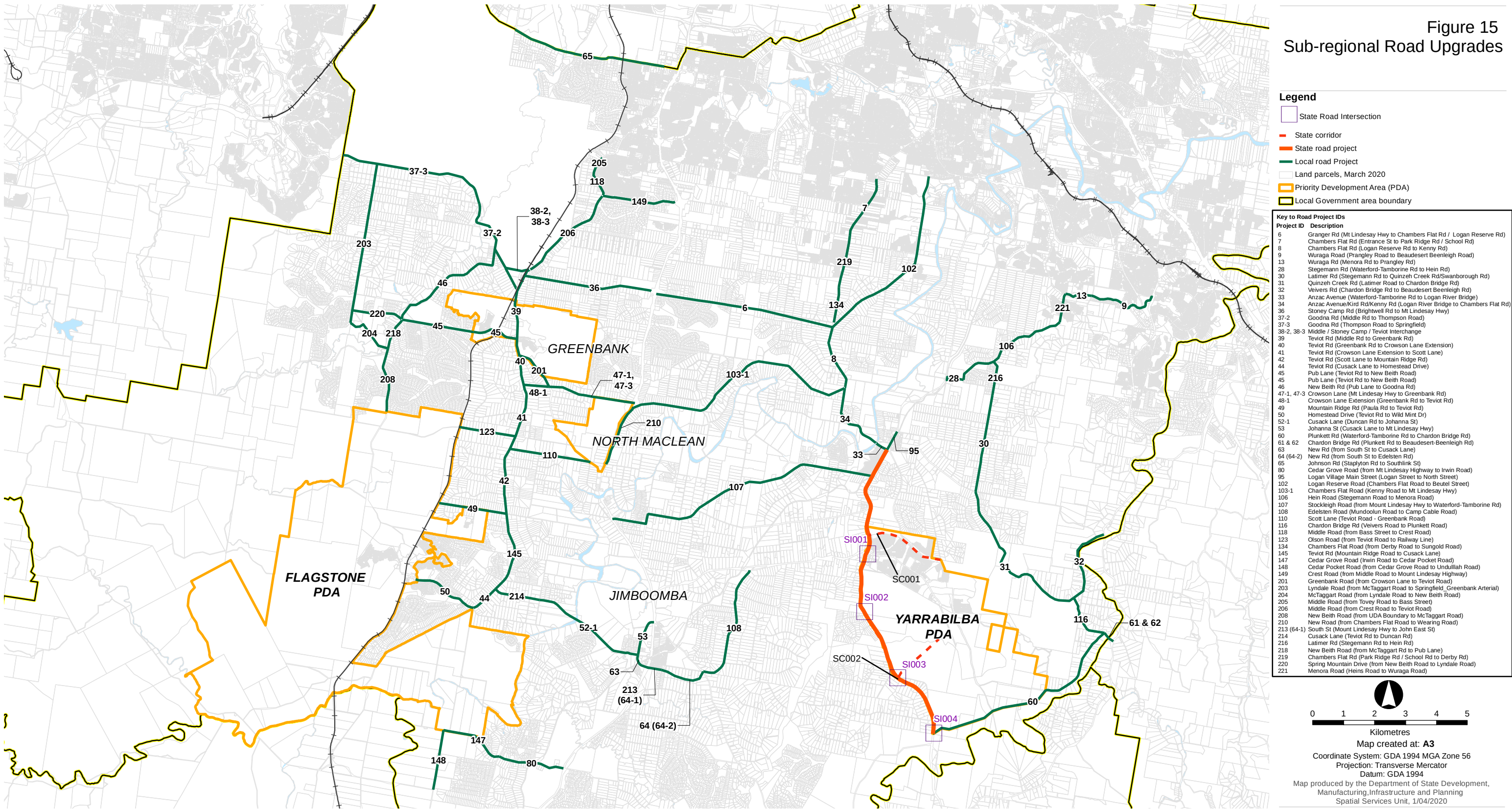
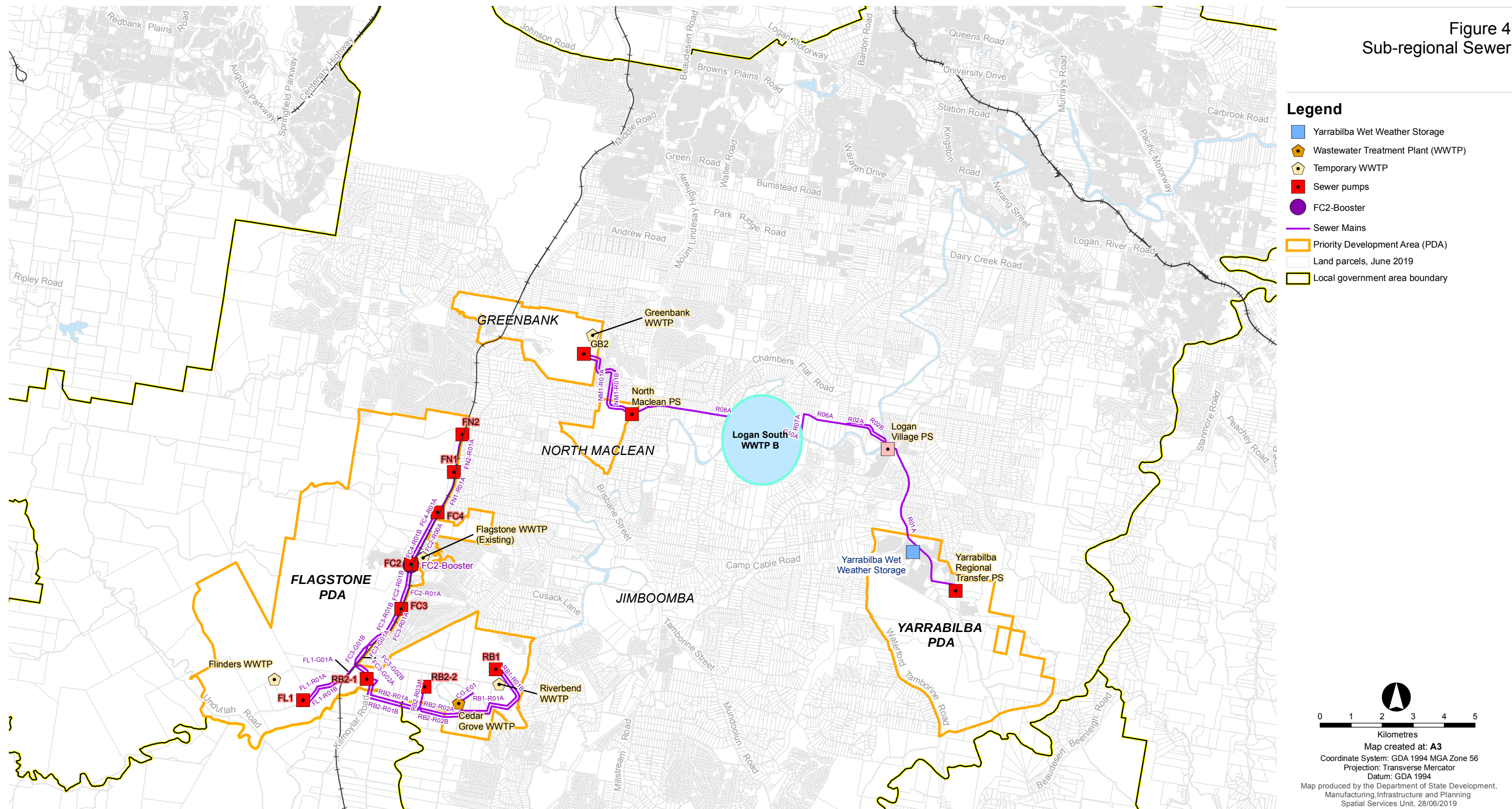


Figure 15
Sub-regional Road Upgrades



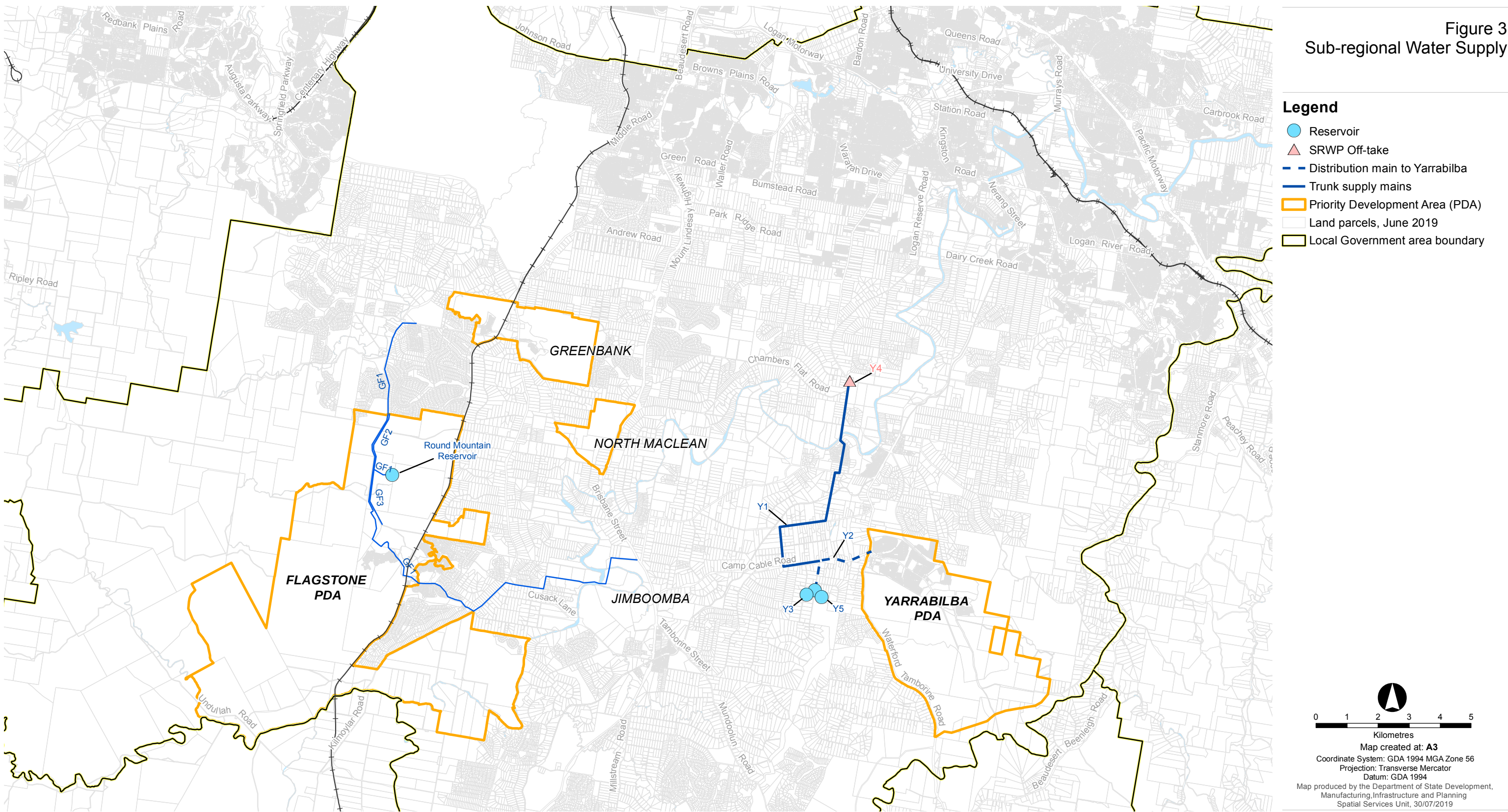
Economic Development Queensland

Figure 4
Sub-regional Sewer



Queensland
Government

Figure 3
Sub-regional Water Supply



APPENDIX E
LCC Property Flood Report

PROPERTY FLOOD REPORT

 PRINT

Property Details

Address: 824-908 Greenbank Road NORTH MACLEAN QLD 4280

Lot/Plan: Lot 1 RP 121663

Size/Area: 142,229 m²

Property Key: 281828

Catchment(s): Logan River, Unnamed_27, Unnamed_29

View Logan's [catchments and waterways map](#) (PDF)



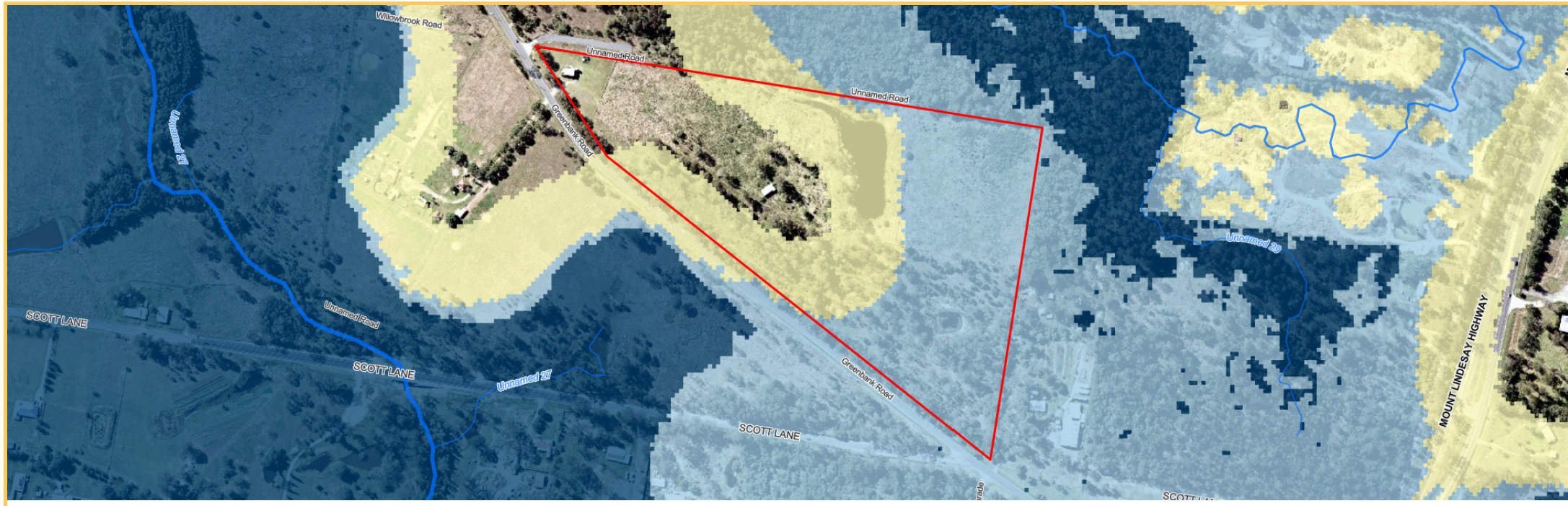
Summary Flood Assessment

The table below presents the flood risks applicable to the selected property. There may be multiple studies and flood scenarios affecting the property, particularly for larger sites.

Assessment	Details
Other information	GREATER FLAGSTONE - This property is in the Greater Flagstone Priority Development Area (PDA). Please contact Economic Development Queensland Development for advice about development. This report is for flood risk awareness only. EDQ PDA - Greater Flagstone
Risk area(s)	Moderate, Low
Investigation area	Not applicable
Isolation risk	Not applicable
River flooding	1% chance of a flood this size or larger happening in any given year
Creek flooding	May apply - subject to further study
Overland flow	Applies. It is possible that flooding from a local waterway which has not yet been studied may also impact the property. Please contact Council for further advice. Overland flow is water (stormwater run-off) that travels over land during heavy rainfall events. It generally occurs quickly and for short durations.

Latest Flood Risk

The extract below comes from the flood risk map based on the latest (most recent) flood studies accepted by Council applicable for this property.



LEGEND

	High	Floodwaters may be deep or fast flowing, or have a relatively high chance of occurrence (e.g. 80% chance in 30 years). Conditions may pose a risk to life and cause damage to buildings, possibly severe. Limited development may be considered if not increasing the flood risk exposure for people or property. These areas are generally better suited to environmental, recreational and some agricultural uses.
	Moderate	Less frequently affected by flooding or if more frequent, with shallow or slower moving floodwater. Conditions may pose an unacceptable risk to people or property if not mitigated. Development may be tolerable if measures are taken to address flood impacts, protect people and limit damage.
	Low	Extremely unlikely chance of flooding (1% chance or less over a 30 year period) and/or relatively shallow or benign flooding conditions. Development is generally acceptable except for essential community infrastructure (e.g. emergency services). Vulnerable uses (e.g. childcare, aged care) may be ok subject to building, site access and safe shelter mitigation measures. Shows the full floodplain under the largest flood that could conceivably occur.
	Investigation area	Locations where a current flood study has not been delivered and information to determine flood risk is not available. The approximation of the floodplain in these areas is based on a citywide overland flow study. Development should avoid these areas until further investigation (updated flood study or localised risk assessment) is completed.



The flood studies this map is based on consider the impacts of climate change, as required by Queensland's planning legislation and policies. The map considers the whole floodplain for Logan and reflects a risk-based approach that takes into account:

- How likely a flood of a given size is in any given year, and
- What the impact or level of danger of that flood is.

Flood Levels

The table below displays flood levels from the most recently accepted flood studies affecting this property. To view the flood study documents please see the [Flood page](#) on Council's website.

The levels are measured in Australian Height Datum (AHD), where sea level is approximately zero (0) metres. The level displayed in the table below is the maximum flood level on the property for that event (likelihood). For some properties, particularly large properties or those on a significant slope, flood levels can vary significantly.

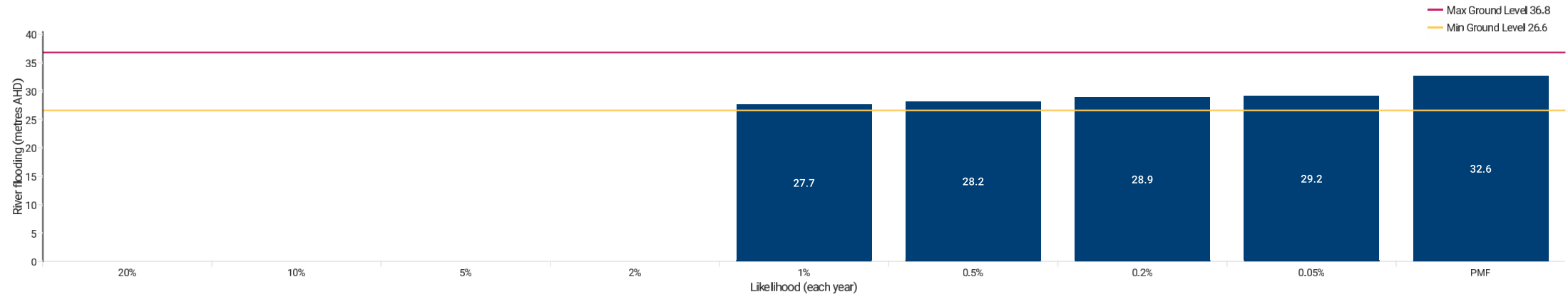
The most likely flood scenarios is shown at the top of the table, with the Probable Maximum Flood (PMF) at the bottom, being the least likely but most serious flood scenario.

Some properties may be impacted by only river flooding or only creek flooding, and some may be impacted by both. There may also be other sources of inundation that may impact the property and affect flood levels, based on overland flow or local creeks where studies have not yet been completed.

Study: Logan and Albert Rivers Flood Study 2023

Likelihood (each year)	River flooding
20% chance	Not applicable
10% chance	Not applicable
5% chance	Not applicable
2% chance	Not applicable
1% chance	27.7 metres AHD
0.5% chance	28.2 metres AHD
0.2% chance	28.9 metres AHD
0.05% chance	29.2 metres AHD
PMF	32.6 metres AHD

Flood and Ground Levels in metres AHD



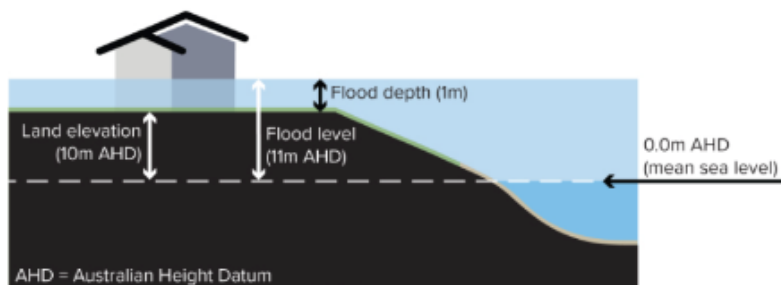
Ground Levels

Ground levels are based on an aerial LiDAR (Light Detection and Ranging) survey, which uses millions of laser point measurements to build a model of the ground surface. The source of the data is displayed in the table below so that you know when the survey was conducted.

Ground level	Details
Minimum ground level	26.6 metres AHD
Maximum ground level	36.8 metres AHD

Source: 2021 Digital elevation model (1 metre grid)

The projected flood depth (how deep the water may be above ground, in metres) is the difference between the flood levels in the section above and the ground levels in this table. The diagram below provides an example (land elevation is ground level).



Overland Flow

Overland flow is water (stormwater/rainfall run-off) that exceeds the capacity of drains, pipes and channels during heavy rainfall events and travels over land towards waterways. It generally occurs quickly and for shorter periods of time. The impact of overland flow is dependent on local conditions, so the mapping is a guide only. It is possible that flooding from a local waterway which has not yet been studied may also impact the property. Please contact Council for further advice.

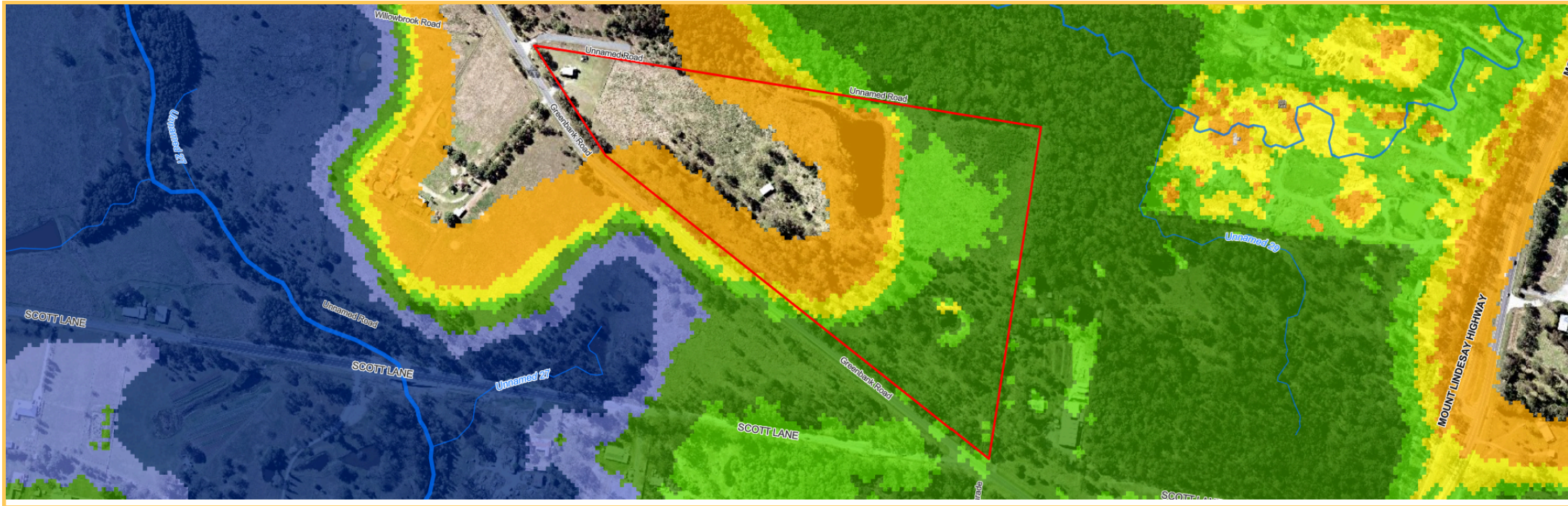


LEGEND

 Overland flow extent (areas possibly impacted)

Future Climate Scenarios

This extract comes from the map showing the projected extent of flooding (affected areas) for multiple flood scenarios for all relevant flood studies, **including the projected impacts of climate change**. This map corresponds with the flood levels provided in the table above for the 5%, 2%, 1%, 0.5%, 0.05% and Probable Maximum Flood (PMF) scenarios.

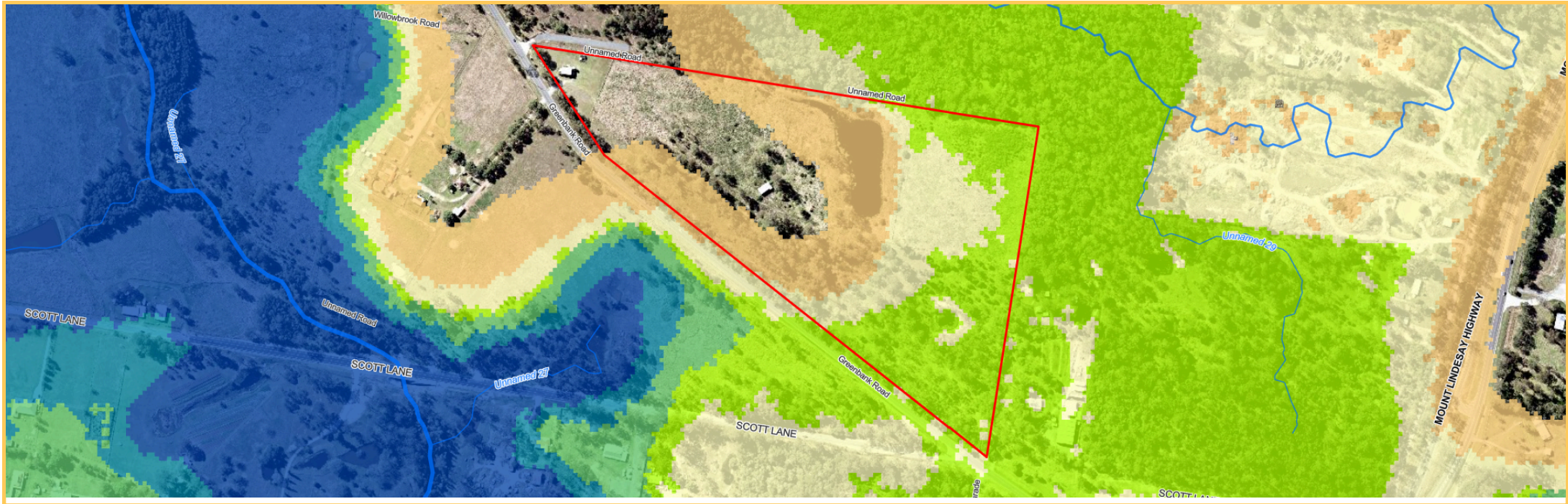


LEGEND

	5% chance	The areas modelled to be impacted by a flood that has a 5% (or 1 in 20) chance of happening in any given year, or 80% chance over a 30 year period, which is the common term of a mortgage. This modelling includes the impacts of climate change and represents our understanding of future risk.
	2% chance	The areas modelled to be impacted by a flood that has a 2% (or 1 in 50) chance of happening in any given year, or 45% chance over a 30 year period, which is the common term of a mortgage. This modelling includes the impacts of climate change and represents our understanding of future risk.
	1% chance	The areas modelled to be impacted by a flood that has a 1% (or 1 in 100) chance of happening in any given year, or 25% chance over a 30 year period, which is the common term of a mortgage. This modelling includes the impacts of climate change and represents our understanding of future risk.
	0.5% chance	The areas modelled to be impacted by a flood that has a 0.5% (or 1 in 200) chance of happening in any given year, or 15% chance over a 30 year period, which is the common term of a mortgage. This modelling includes the impacts of climate change and represents our understanding of future risk.
	0.05% chance	The areas modelled to be impacted by a flood that has a 0.05% (or 1 in 2000) chance of happening in any given year. This is an extremely unlikely flood event with a 1% chance of happening over a 30 year period, not including the impacts of climate change.
	PMF	The PMF or probable maximum flood scenario represents the full extent of the floodplain, or the most serious flood that could be expected to occur. This is usually estimated based on the probable maximum rainfall, not including the impacts of climate change.
	Investigation area	Locations where a current flood study has not been delivered and information to determine flood risk is not available. The approximation of the floodplain in these areas is based on a citywide overland flow study. Further investigation is needed.

Current Climate Scenarios

This extract comes from the map showing flood affected areas **without** considering the impacts of climate change. This map represents modelled flooding under current conditions, and can be used for insurance purposes.



LEGEND

 5% chance	The areas modelled to be impacted by a flood that has a 5% (or 1 in 20) chance of happening in any given year, or 80% chance over a 30 year period, which is the common term of a mortgage. This modelling is based on current (present day) conditions and does not take into account the impacts of climate change.
 2% chance	The areas modelled to be impacted by a flood that has a 2% (or 1 in 50) chance of happening in any given year, or 45% chance over a 30 year period, which is the common term of a mortgage. This modelling is based on current (present day) conditions and does not take into account the impacts of climate change.
 1% chance	The areas modelled to be impacted by a flood that has a 1% (or 1 in 100) chance of happening in any given year, or 25% chance over a 30 year period, which is the common term of a mortgage. This modelling is based on current (present day) conditions and does not take into account the impacts of climate change.
 0.5% chance	The areas modelled to be impacted by a flood that has a 0.5% (or 1 in 200) chance of happening in any given year, or 15% chance over a 30 year period, which is the common term of a mortgage. This modelling is based on current (present day) conditions and does not take into account the impacts of climate change.
 0.05% chance	The areas modelled to be impacted by a flood that has a 0.05% (or 1 in 2000) chance of happening in any given year. This is an extremely unlikely flood event with a 1% chance of happening over a 30 year period, not including the impacts of climate change.
 PMF	The PMF or probable maximum flood scenario represents the full extent of the floodplain, or the most serious flood that could be expected to occur. This is usually estimated based on the probable maximum rainfall, not including the impacts of climate change
 Investigation area	Locations where a current flood study has not been delivered and information to determine flood risk is not available. The approximation of the floodplain in these areas is based on a citywide overland flow study. Further investigation is needed.

Historic Flood Events

Based on the best information available to Council, the table below indicates whether or not the selected property may have been impacted by significant historic flood events. It is possible that other creek flooding or overland flow, which is not included in Council's mapping of these events, may have impacted the property.

Flood event	Property impacted
1974	No
2017 (after ex Tropical Cyclone Debbie)	No
2022 (late February / early March)	No

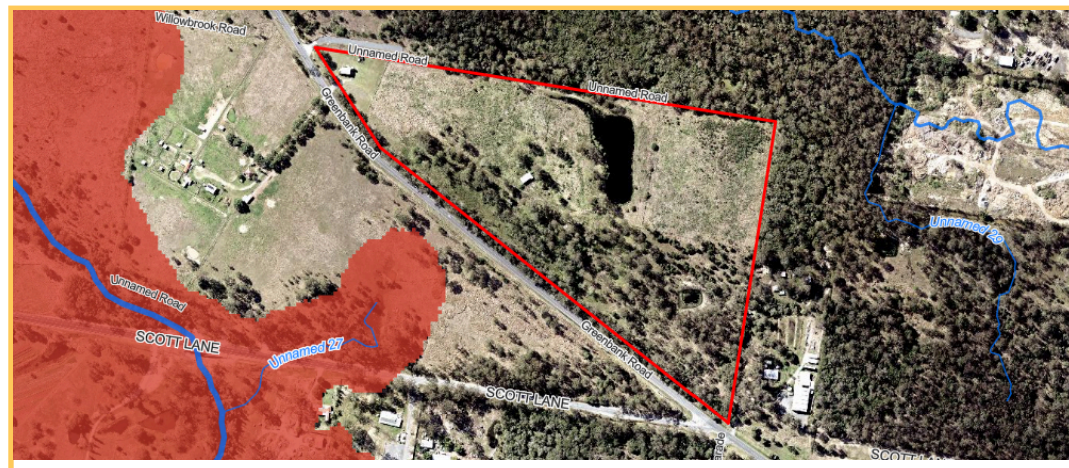
Planning Scheme Maps

The selected property is shown below on an extract of the Flood Overlay Maps from the Logan Planning Scheme 2015 V9.2 with TLPI No. 1/2024. Various provisions of the planning scheme which refer to properties affected by the Flood Overlay Maps will apply to the flood affected areas for the purposes of planning and development. This may include, for example, raised building floor levels and achieving safe vehicle access to the road network.

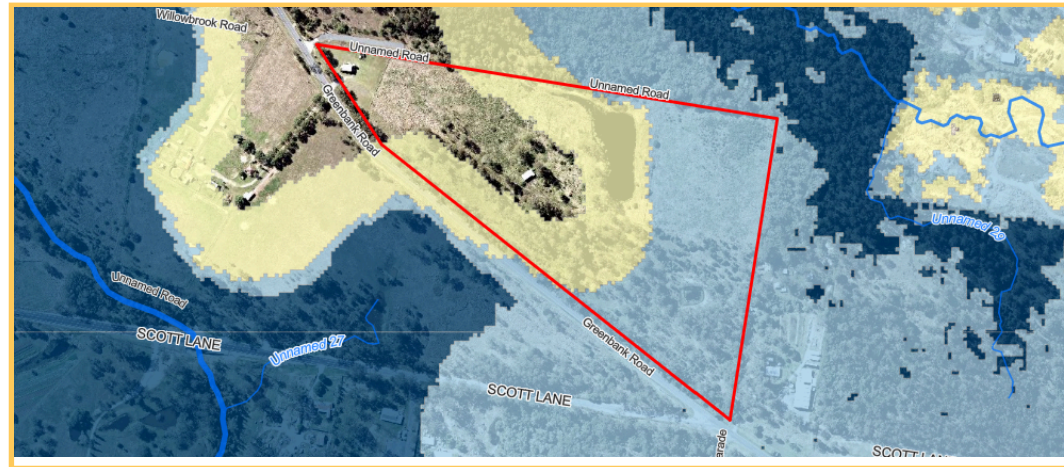
OM-05.01 Isolated islands



OM-05.02 High flow area



OM-05.04 Flood risk areas



MAP LEGEND

	High	Floodwaters may be deep or fast flowing, or have a relatively high chance of occurrence (e.g. 80% chance in 30 years). Conditions may pose a risk to life and cause damage to buildings, possibly severe. Limited development may be considered if not increasing the flood risk exposure for people or property. These areas are generally better suited to environmental, recreational and some agricultural uses.
	Moderate	Less frequently affected by flooding or if more frequent, with shallow or slower moving floodwater. Conditions may pose an unacceptable risk to people or property if not mitigated. Development may be tolerable if measures are taken to address flood impacts, protect people and limit damage.
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	Investigation area	Locations where a current flood study has not been delivered and information to determine flood risk is not available. The approximation of the floodplain in these areas is based on a citywide overland flow study. Development should avoid these areas until further investigation (updated flood study or localised risk assessment) is completed.

MAP LEGEND

	High flow area	High hazard areas of flooding where significant (deeper, faster) flow of water occurs and in which a building is vulnerable to structural damage or failure from floodwater. Classified as H5 or H6 in the Australian Institute of Disaster Resilience (AIDR) Guideline 7-3 'Flood Hazard'.
	High flood island	Areas which are isolated from flood-free land (surrounded by floodwater) but retain a portion of the area as flood free in a probable maximum flood (PMF).
	Low flood island	Areas which are surrounded by floodwater and at first isolated from flood-free land, then completely inundated by floodwater (submerged) as the flood continues to rise.
	Meadowbrook flood assessment area	Area where the function of important community infrastructure needs to be maintained. Flood mitigation measures and comprehensive emergency management planning is required to adequately manage the risk for flood events.



If more recent flood studies have been completed and accepted by Council, the Latest Flood Risk Map shown at the top of this report may be different from the planning scheme map. The latest flood information should be used to inform development decisions and will be incorporated into the planning scheme in a future amendment.

Further Information

1. Floods are highly unpredictable and variable, and properties may be affected by other sources of potential flooding. Each flood and its impact is different. Areas that were not flooded previously may be affected by future events. Areas that have been previously flooded may be impacted in different ways. This online report cannot take all of this into account.
2. The flood mapping and levels in this report are based on data from flood studies undertaken at a particular time and are subject to change. For example, if the method for calculating flood levels is updated, industry guidelines are updated or more recent information becomes available, this may result in changes to the information in this report. In areas where development is ongoing, the flood mapping and levels may not reflect developed conditions.
3. Flood studies do not create risk. They help us to understand the risk, based on relevant legislation and Queensland Government policies and guidelines. Flood studies also consider a range of other factors such as rainfall and river level information from recent events, climate change and trends, the impacts of development, changes to catchment conditions, new technologies and industry best practice (which help to improve accuracy).
4. Flood studies and models are developed from the best information available at the time. They do not tell you how the flood waters might behave, how quickly they may rise, or how dangerous the flooding will be. The models also cannot represent changes that have occurred since they were developed which may impact flood behaviour, such as earthworks, new developments or road infrastructure.
5. This report is not a substitute for independent professional advice. You should engage the services of a Registered Professional Engineer of Queensland (RPEQ) to get site specific information regarding the flood risk to your property, and how that might affect any proposed building or development work.
6. While Logan City Council takes reasonable care in producing this report, it does not guarantee that the information is accurate, complete or current. Logan City Council does not accept any responsibility for any loss or damage (however it was caused) in connection with the use of or reliance on the information in this report.

Contact Information

Where to go for further information depends on the type of information you need. Please refer to the [Flood Risk Fact Sheet](#) or contact Council using the details below.

Topic	Contact Details
Flood studies and modelling information, and the flood risk on your property	Contact Council on 07 3412 3412 or email council@logan.qld.gov.au . Further information about flooding and flood studies is available on the Flood page on Council's website.
Planning and development enquiries or proposals	Contact Council on 07 3412 3412 or email development@logan.qld.gov.au . Before lodging a development application, pre-lodgement advice is recommended.
Building information	Contact Council on 07 3412 3412 or email council@logan.qld.gov.au . You can also contact a private building certifier .
Properties in Priority Development Areas	Contact Economic Development Queensland . Council is not the planning authority for these properties.
Independent advice about flooding on your property	Contact a registered engineer through the Board of Professional Engineers of Queensland: Phone: 07 3210 3100 Email: admin@bpeq.qld.gov.au Web: Home - Board of Professional Engineers Queensland (bpeq.qld.gov.au)