PLANS AND DOCUMENTS
referred to in the PDA
DEVELOPMENT APPROVAL

Approval no: DEV2020/1118

Date: 02 September 2020

Queensland Government

Report

Carseldine Village – Stage 2

Prepared for Economic Development Queensland

13 May 2020

Calibre Professional Services Pty Ltd
55 070 683 037

QUALITY ASSURANCE STATEMENT

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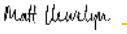
Project Manager	Matt Llewelyn	
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DOCUMENT CONTROL

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Abbreviations

AD	Average Day
ADWF	Average Dry Weather Flow
AHD	Australian Height Datum
DA	Development Application
DN	Nominal Diameter
DBYD	Dial Before You Dig
EP	Equivalent Person
ICC	Ipswich City Council
kL	Kilolitre
L/s	Litres per Second
MDMM	Mean Day Maximum Month
PD	Peak Day
PDWF	Peak Dry Weather Flow
PH	Peak Hour
PWWF	Peak Wet Weather Flow
QUDM	Queensland Urban Drainage Manual
QUU	Queensland Urban Utilities
SAN	Services Advice Notice
SEQ Code	South East Queensland Water Supply & Sewerage Design & Construction Code

1. Introduction

Calibre Professional Services Pty Ltd has been commissioned by Economic Development Queensland to prepare an Engineering Services Report for the proposed Carseldine Village located at 532 Beams Road, Carseldine. The proposed development is located within the Brisbane City Council (BCC) local government area with Queensland Urban Utilities (QUU) the responsible distributor−retail water authority.

This report identifies civil infrastructure required to service the proposed development. The civil infrastructure identified within this report includes water and wastewater reticulation, stormwater and flooding matters, and information on other utilities. This report provides response to the relevant *Economic Development Queensland (MEDQ)* codes.

The objective of this report is to demonstrate that the proposed development can be supported by the existing and/or proposed civil infrastructure in compliance with the *Economic Development Act (2012)* and the relevant standards outlined within the *EDQ Engineering Standards PDA Guideline No. 13*.

2. Site Description

The proposed development is located at 532 Beams Road, Carseldine within the BCC local government area. The proposed development has the real property description of Lot 322 on SP172124 and has a total site area of 44.96 hectares. The subject site is bound by Dorville Road to the west, Beams Road to the north, Cabbage Tree Creek to the south and the North Coast Railway Line to the east. For clarity and consistency, the location of the aforementioned development will herein be referred to in this report as 'the site'.

The site is currently occupied by QUT Carseldine Campus on state land and is located within the Fitzgibbon Priority Development Area (PDA) under Economic Development Queensland Fitzgibbon Development Scheme (2011).

Figure 1: Site Location (Source: Google Earth)

The site falls south towards Cabbage Tree Creek at a grade of approximately 2.5%.

3. Development Density

3.1 Population Projections

A population projection has been undertaken to identify the increased demands on water and wastewater infrastructure associated with the proposed development. Ultimate development demands for the proposed site have been estimated based on the RPS Overall Masterplan 128180-37O included within **Appendix A**. Equivalent Persons (EP) were estimated in accordance with the South East Queensland Water Supply and Sewerage Design & Construction Code (SEQ Code).

The estimated ultimate EP for the proposed development is outlined within **Table 1**. The proposed masterplan site is an Urban Village with a total footprint area of 25.2 Ha including Rear Loaded Terrace, Apartment, Vertical Retirement, Mixed Use, Local Centre and Commercial developments.

Table 1: Load Projection Estimate

Development Type or Use	GFA, Ha	Dwellings	Unit	EP/Ha GFA	EP Projection
Residential	-	606	Dwelling	-	1085
Commercial	1.51	-	Ha, GFA	21	32
Retail	0.4	-	Ha, GFA	21	9
Child Care	0.3		Ha, GFA	60	18
TOTAL (excluding existing dwelling)					1,144
TOTAL + 10% (including existing dwelling)					1,259

Notes: 1) EP demand projections based on RPS Concept Plan 128180-37O;
2) EP per detached dwelling adopted in accordance with Attachment A4 within the SEQ Code;
3) The yield projections are in accordance with the SEQ Code and generally in accordance with the QUU SAN.

The proposed masterplan development will have an ultimate yield of 1,144 EP. For purpose of these hydraulic analyses, a 10% contingency has been applied. The adopted equivalent population for design is 1,259 EP.

The proposed development yield for Stage 2 nominated in RPS drawing *128180-73B* included within **Appendix B** is within the allowances previously determined for flow projections as a part of the Engineering Services Report for the Carseldine Village Masterplan dated 5 August 2019.

4. Code Compliance

This report provides a response to the following Brisbane City Plan (2014) codes for the proposed development site:

- Filling & Excavation Code; and
- Infrastructure Design Code;

Responses to the relevant Brisbane City Plan (2014) codes are provided within **Appendix C** of this report.

5. Earthworks and Retaining Walls

5.1 Bulk Earthworks Objectives

Earthworks will be constructed to enable the development of the site, whilst generally complying with the following objectives:

- Facilitate the Material Change of Use application;
- Achieve engineering outcomes acceptable to EDQ and Council;
- Be in accordance with codes, standards and guidelines as specified within the *EDQ Engineering Standards PDA Guideline No. 13*;
- Satisfy Water Sensitive Urban Design objectives;
- Optimise the use of the developable area through efficient design; and
- Be economical and cost effective.

Bulk earthworks operations will be undertaken to the developable areas in accordance with *Economic Development Act (2012)*. It is anticipated that unsuitable spoil generated from earthworks operations will be exported as necessary. It is expected that earthworks operations will follow the natural topography as much as possible in order to minimise impacts to adjoining properties.

Conceptual earthworks design will need to consider several civil engineering disciplines including roads, traffic, electrical, communications, water supply, wastewater and stormwater quality and quantity.

All filling works will be undertaken during the construction phase in accordance with AS3798 – Guidelines for Commercial and Residential Developments. This may include Level 1 certification.

5.2 Bulk Earthworks Design

Preliminary earthworks modelling has been undertaken using 12d design software to develop a three-dimensional bulk earthworks design over the application area. Lidar survey has been utilised for the purpose of the conceptual bulk earthworks design. Further development of the model will occur at the detailed design stage based on detailed survey data.

Natural and design surface levels are represented to the Australian Height Datum (AHD). The natural surface levels range from approximately 13.25 m AHD at the northern-western end of the site to 12.25 m AHD at the south-eastern corner enclosed by the north-coast line and Cabbage Tree Creek. The site generally grades to the southeast from the north-west of the development.

The bulk earthworks design will maintain the natural grades as far as practicable. The site will be in fill and graded to maintain appropriate vertical alignments on the proposed access roads in accordance with Brisbane City Council's requirements, to provide suitably graded allotments and to comply with flood planning levels. The proposed lot layout, as shown on RPS drawing *128180-73B* included within **Appendix B**, has been developed to work with the existing topography of the land to reduce as much as possible the need for and height of retaining walls. The design surface levels range from approximately 15.25m AHD to 14.50m AHD. Preliminary site-specific bulk earthworks calculations have been undertaken by Calibre. The conceptual earthworks strategy is aimed to balance the cut and fill operations. The allotments generally slope at grades of up to 1%.

The conceptual bulk earthworks strategy is outlined on Calibre drawings *20-000258-EW-01, 02 & 03* within **Appendix G.**

It is anticipated that bulk earthworks will need to be undertaken to the developable areas in accordance with the *Brisbane City Plan (2014)*. The general earthworks strategy will be to minimise the change in existing topography whilst reducing the need for retaining walls and disturbance to overall land hydrology.

5.3 Proposed Erosion and Sediment Control Strategy

The erosion and sediment control strategy will identify potential environmental risks associated with the development. Specifically, water quality, erodible soils, and environmental impacts to adjoining land and existing roads will be addressed. These risks will be mitigated by designing in accordance with the Healthy Waterways design guidelines and through the implementation of approved site management measures at the time of construction.

Erosion and sediment control measures will be provided as appropriate during construction activities. These measures can consist of diversion drains, temporary sediment basins, silt fences and check dams. Diversion drains would be designed to separate 'dirty water' from 'clean water' and appropriately manage the stormwater discharge during construction to minimise sediment-laden runoff into the surrounding waterways. Sediment fences would serve to trap sediment in minor storm events while rock check dams would act to reduce the velocity of stormwater runoff therefore reducing the transportation of 'dirty water'.

It is noted that the Geotechnical Report, Acid Sulfate Soils Assessment and Dispersive Soils Management Plans have been prepared for the site and are attached within **Appendix F**. These reports identify that it is a low likelihood of dispersive soils and acid sulfate soils being encountered through the site for both earthworks and service trenching works.

It is proposed that, during construction, disturbed areas would be stabilised as soon as practical during civil works to minimise exposure of these areas to 'dirty water' runoff. Regular stormwater discharge locations will be incorporated to reduce the volume of concentrated flow, facilitating easier site management during construction. Sediment basins will be constructed at appropriate locations in accordance with best practice standards at the time of the engineering design so that sediment laden water can be captured and treated prior to discharge.

An Erosion and Sediment Control Program and Plan will be prepared by an RPEQ or CPESC during the Operational Works phase to confirm the site−specific ESC requirements. All erosion and sediment control measures will be designed and implemented in accordance with the requirements of the EDQ Engineering Standards PDA Guideline No. 13. The plans and program will need to be certified by a CPESC.

5.4 Summary of Earthworks Strategy

The concept bulk earthworks design has been undertaken in accordance with the *Economic Development Act (2012)*. Detailed earthworks design calculations will be developed during the detailed engineering design phase. Earthworks design and construction will be in accordance with the *AS3798*.

6. Road Access and Drainage

Conceptual planning analyses have been undertaken to confirm the road and traffic requirements. The proposed infrastructure includes the following:

- An internal road functional layout plan.
- Site access from existing roads constructed with Stage 1 to the east and south and connecting to the future development to the west.

A conceptual internal drainage network is shown on Calibre drawing *20-000258-RF-01, RF-02, SW-01 & SW-02* included within **Appendix G**. The proposed layout was developed in accordance with the EDQ *Engineering Standards PDA Guideline No. 13* and the *Queensland Urban Drainage Manual (2017)* (QUDM) to ensure safety and design criteria are met.

6.1 Existing Road Infrastructure

The proposed development for Stage 2 is expected to have limited impact on the existing road infrastructure. The development is accessed from Beams Rd with a new intersection opposite Balcara Avenue at the completion of Stage 1 works. Stage 2 will connect to the internal road network provided within Stage 1 to the east and south of the Stage 2 footprint.

6.2 Site Access

The proposed layout provides a vehicular access point from the road network to be constructed with Stage 1 works with access from the west and south of the proposed development. An internal road network is proposed to service the site as shown on RPS drawing *128180-73B* included within **Appendix B**. The vertical grades of internal roads are generally between 0.5% and 2% to reduce as much as possible the volume of import material required.

It is considered that the proposed access road provides adequate ingress and egress to and from the site in accordance with the relevant BCC and AUSTROADS design criteria.

The proposed internal road layout was developed in accordance with the EDQ *Engineering Standards PDA Guideline No. 13*.

6.3 Summary of Road Access and Drainage Strategy

The conceptual road access design has been undertaken in accordance with the relevant codes as specified within the EDQ *Engineering Standards PDA Guideline No. 13*. It is considered that the proposed development may be serviced with existing road access from Beams Road without significantly influencing existing road infrastructure or future development servicing.

7. Utilities

The following provides general information in regard to existing utilities within the vicinity of the proposed development as well as proposed water and wastewater servicing strategies. Existing utilities have been identified through Dial Before You Dig (DBYD) information presented within **Appendix D**. Servicing strategies proposed within this report have been prepared in accordance with this information and will be confirmed prior to detailed engineering design analyses.

The information contained within this report and accompanying plans demonstrate that the proposed development is in accordance with EDQ's code requirements. With respect to civil engineering matters, we therefore request EDQ approve the proposal subject to reasonable and relevant conditions.

7.1 Wastewater Services

7.1.1 Existing Wastewater Infrastructure

The site is currently serviced via a connection to the existing DN900 trunk sewer main adjacent Cabbage Tree Creek which is being constructed as a part of Stage 1 works and providing future internal mains up to the southern development boundary for the proposed Stage 2 works.

7.1.2 Wastewater Flow Projections

The proposed development yield nominated in RPS drawing *128180-73B* included within **Appendix B** is within the allowances previously determined for flow projections as a part of the Engineering Services Report for the Carseldine Village Masterplan dated 5 August 2019.

7.1.3 Proposed Wastewater Service Connection

Existing network capacity information was obtained from QUU through the SAN process. The SAN provided by QUU dated 2 March 2017 has been included within **Appendix E**.

It is proposed that the internal reticulation network will consist of DN160 gravity mains, which will convey wastewater to the connection point to the south within Road 05 (works to be completed with Stage 1). The alignment and configuration of the concept internal network is illustrated in Calibre drawing *20-000258-W-S-01* included within **Appendix G** which demonstrates the proposed development can be serviced via gravity to the existing wastewater infrastructure.

7.2 Potable Water Service

7.2.1 Existing Water Infrastructure

The site is currently serviced via a connection to the existing DN300 water main in Beams Road which is being constructed as a part of Stage 1 works and providing future internal mains up to the southern and eastern development boundary for the proposed Stage 2 works.

7.2.2 Water Demand Projections

The proposed development yield nominated in RPS drawing *128180-73B* included within **Appendix B** is within the allowances previously determined for flow projections as a part of the Engineering Services Report for the Carseldine Village Masterplan dated 5 August 2019.

7.2.3 Proposed Water Service Connection

Existing network capacity information was obtained from QUU through the SAN process. The SAN provided by QUU dated 2 March 2017 has been included within **Appendix E**.

It is proposed that the internal reticulation network will consist of DN125 water mains, which will connect the network to the existing mains to the south within Road 05 and west within Road 06 (works to be completed with Stage 1). The alignment and configuration of the concept internal network is illustrated in Calibre drawing *20-000258-W-S-01* included within **Appendix G** which demonstrates the proposed development can be serviced via gravity to the existing wastewater infrastructure.

7.3 Electrical Services

DBYD search maps supplied indicate that there are underground electrical cables bordering the site along Dorville Road to the west and Beams Road to the north, which extend into the northern portion of the site. DBYD search maps have been provided within Appendix C.

7.4 Communications Services

DBYD search maps supplied indicate that there is existing communication infrastructure servicing the site along the North Coast Railway Line as well as from north of Beams Road. DBYD search maps have been provided within **Appendix C**.

7.5 Gas Services

DBYD search maps supplied indicate that there is an underground gas line through the south-east section of the site along Cabbage Tree Creek. There are additional gas services east of Dorville Road and north of Beams Road. DBYD search maps have been provided within **Appendix C**.

8. Stormwater Management

8.1 Stormwater Quantity Management

The proposed stormwater network for is generally in accordance with the overarching masterplan strategies prepared by DesignFlow.

Please refer to the following DesignFlow documents for the detailed stormwater management strategy:

- Updated Stormwater Management Plan – Version 4 October 2019
- Technical memorandum - Carseldine Urban Village – Local flood assessment to support Stage 1 development (10 October, 2019)
- Technical memorandum Carseldine Urban Village – Updated flood assessments to support Stage 1 development (DesignFlow 15 May 2020)

9. Conclusion

The information presented in this report demonstrates that the proposed development may be constructed in accordance with the *Economic Development Act (2012)* with respect to civil engineering matters. The engineering investigation has confirmed the following:

- Detailed earthworks design will be undertaken during the detailed design phase;
- Erosion and sediment control measures will be implemented, as appropriate during construction activities, in accordance with the requirements of the Infrastructure Design Planning Scheme Policy;
- Internal servicing strategy is consistent with that masterplan strategies advised in the Engineering Services Report dated 5 August 2019; and
- Presence and alignments of existing electrical, telecommunications and gas services infrastructure have been adopted in accordance with BCC eBimap2 and Dial Before You Dig information.

It is considered that the site may be serviced with civil infrastructure generally in accordance with the *Economic Development Act (2012)* and the relevant standards, guidelines and manuals outlined within the *EDQ Engineering Standards PDA Guideline No. 13*.

10. Recommendations

Based on the preliminary engineering investigations, it is recommended that:

- The conceptual servicing strategies are confirmed prior to the commencement of detailed design analyses; and,
- The Minister for Economic Development Queensland approve the proposal with respect to civil engineering matters subject to reasonable and relevant conditions.

11. References

- Economic Development Act (2012), Fitzgibbon Development Scheme 2011;
- Brisbane City Council (2014), Brisbane City Plan 2014, Planning Scheme (ePlan);
- Department of State Development (2014), Infrastructure and Planning, State Planning Policy 2014;
- Queensland Government (2009), SEQ Regional Plan 2009−2031 Implementation Guideline No.7; and
- SEQ Code (2013), SEQ Water Supply and Sewerage Design & Construction Code (SEQ Code).

Carseldine Village – Stage 2

Appendix A RPS Overall Masterplan

Economic Development Queensland

Development Yield (Maximum Density)	
Residential Dwellings	606 dwellings
Commercial (sq.m)	15,050 sq.m GFA ^
Retail (sq.m)	4,000 sq.m GFA
Childcare	100 children

^ Includes existing commercial and community uses.

Legend

- Site Boundary
- Proposed Stage Boundary
- Mixed Use - Village Heart
- Mixed Use
- (3) Height Limit (Storeys)
- Indicative Civic Plaza and Pocket Park
- Special Purpose
- Civic and Open Space
- Bushland and Open Space
- Vegetation Within Road Reserve
- Future Busway Corridor
- Existing Driveway and Carpark (Retention)
- Existing Lease Boundary
- Temporary Turnaround Easement
- Investigation Area (Beams Road Railway Overpass)
- Investigation Area (Potential Road Layout Subject to Future Applications)

Beams Road

Balcara Avenue

Dorville Road

STAGE 1

STAGE V
7
1.156ha
(3)

STAGE 4
12
1.250ha

Existing Child Care
(5)

Existing Facility
(Carparking and Bushland to remain - excluded from this Masterplan Application)

Lease C on SP172124
2959m²

STG 3
6
0.432ha
(8)

1
0.405ha
(5)

11
0.249ha
(8)

8
0.131ha
(8)

STAGE 4
10
0.159ha
(8)

9
0.114ha
(8)

STAGE 1
2
0.581ha
(8)

STAGE 2
4
0.581ha
(8)

STAGE 3
5
0.841ha
(8)

3
0.911ha
(8)

STAGE S
9000
4.395ha

Existing Facility

Lease D on SP172124
8378m²

16.75m Wide
19m Wide New Road
20m Wide New Road
23m Wide New Road
23.5m Wide New Road
Vegetation Buffer Within Road Reserve

0 10 20 30 40 50 1 : 1,500 @ A1

CARSELDINE URBAN VILLAGE
OVERALL MASTERPLAN

PLAN REF: 128180 – 37O
DATE: 03 October 2019
CLIENT: EDQ
DRAWN BY: MD
CHECKED BY: MD/DG

Note:
All Lot Numbers, Dimensions and Areas are approximate only, and are subject to survey and Council approval.

Dimensions have been rounded to the nearest 0.1 metres.

Areas have been rounded down to the nearest 5m².

The boundaries shown on this plan should not be used for final detailed engineers design.

Source Information:
Site boundaries: Registered Survey Plans.
Adjoining information: DCDB.
Contours: QUT.

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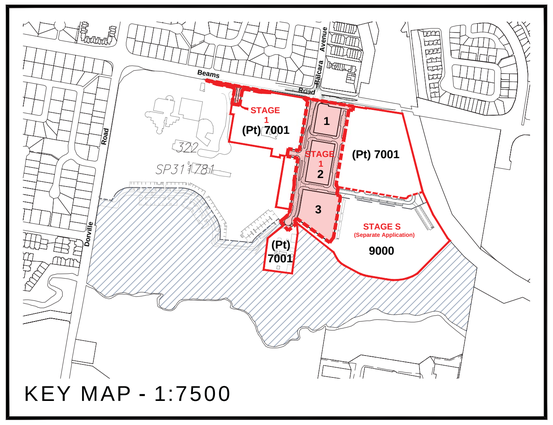

KEY MAP - 1:7500

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CARSELDINE URBAN VILLAGE

RECONFIGURATION OF LOT - STAGE 1 MASTER SUBDIVISION OVER LOT 1 ON SP311781

PLAN REF:	**128180 – 31L**
DATE:	01 August 2019
CLIENT:	EDQ
DRAWN BY:	MD
CHECKED BY:	MD / DG

Legend

- Site Boundary
- Proposed Stage Boundary
- Sport and Recreation Park
- Buffer Within Road Reserve
- Existing Driveway and Carparking
- Temporary Turnaround Easement
- Approved Easement V (Access and Future Works) over Lot 322 on SP311781 - DEV2019/1032

Yield Breakdown	
Lot Type	**Stage 1**
	Number of Lots
Master Lot	3
Total Allotments	**3**

Land Budget		
Land Use	**Stage 1**	
	Area	**Percentage**
Area of Stage	**3.650 ha**	**100.0%**
Master Lots		
Master Lot	1.897 ha	52.0%
Total Area of Master Lots	**1.897 ha**	**52.0%**
Road		
Village Main Street (27m Wide)	0.589 ha	16.1%
Western Access Road (23m Wide)	0.274 ha	7.5%
Loop Road (20m Wide)	0.166 ha	4.5%
Access Place (19m Wide)	0.662 ha	18.1%
Pedestrian Link Within Road Reserve	0.062 ha	1.7%
Total Area of New Road	**1.753 ha**	**48.0%**

Note:
All Lot Numbers, Dimensions and Areas are approximate only, and are subject to survey and Council approval.

Dimensions have been rounded to the nearest 0.1 metres.

Areas have been rounded down to the nearest 5m².

The boundaries shown on this plan should not be used for final detailed engineers design.

Source Information:
Site boundaries: Registered Survey Plans & Land Partners.
Adjoining information: DCDB.

Revision:
A: 12/07/17 - Amend Access Easement
B: 27/07/17 - Amend Lot 9000 Boundary
C: 31/07/17 - Amend Access Easement
D: 03/08/17 - Incorporation of Drainage
E: 04/08/17 - Removal of Drainage
F: 07/03/18 - Amend Lot 9000 Boundary
G: 19/03/18 - Road Pavement Amendments
H: 18/04/18 - Amend Access Easement
I: 19/10/18 - Road Width Amendments
J: 01/11/18 - Stage S Amendments
K: 17/07/19 - Subject Parcel Amendments
L: 01/08/19 - Amend Road Width 22m to 19m

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Beams Road

Balcara Avenue

Road

Dorville

Indicative alignment only. Future works to be undertaken if required in conjunction with the delivery of the busway.

Legend

- Site Boundary
- Indicative Civic Plaza and Pocket Park
- Special Purpose
- Civic and Open Space
- Bushland and Open Space
- Vegetation Within Road Reserve
- Existing Driveway and Carpark (Retention)

Road Network

- Village Main Street - 27m
- Western Access Road / Shared Busway - 23m
- Residential Park Esplanade - 23.5m
- Railway Esplanade - 23.5m + 10.5m Buffer
- Loop Road - 20m
- Access Place - 19m
- Access Place (No Parking) - 16.75m

Future Road Network

- Indicative Future Busway Corridor and Alignment

0 10 20 30 40 50 **1 : 1,500 @ A1**

CARSELDINE URBAN VILLAGE

ROAD HIERARCHY PLAN

PLAN REF:	**128180 – 38J**
DATE:	03 October 2019
CLIENT:	EDQ
DRAWN BY:	MD
CHECKED BY:	MD/DG

Note:
All Lot Numbers, Dimensions and Areas are approximate only, and are subject to survey and Council approval.

Dimensions have been rounded to the nearest 0.1 metres.

Areas have been rounded down to the nearest 5m².

The boundaries shown on this plan should not be used for final detailed engineers design.

Source Information:
Site boundaries: Registered Survey Plans.
Adjoining information: DCDB.
Contours: QUT.

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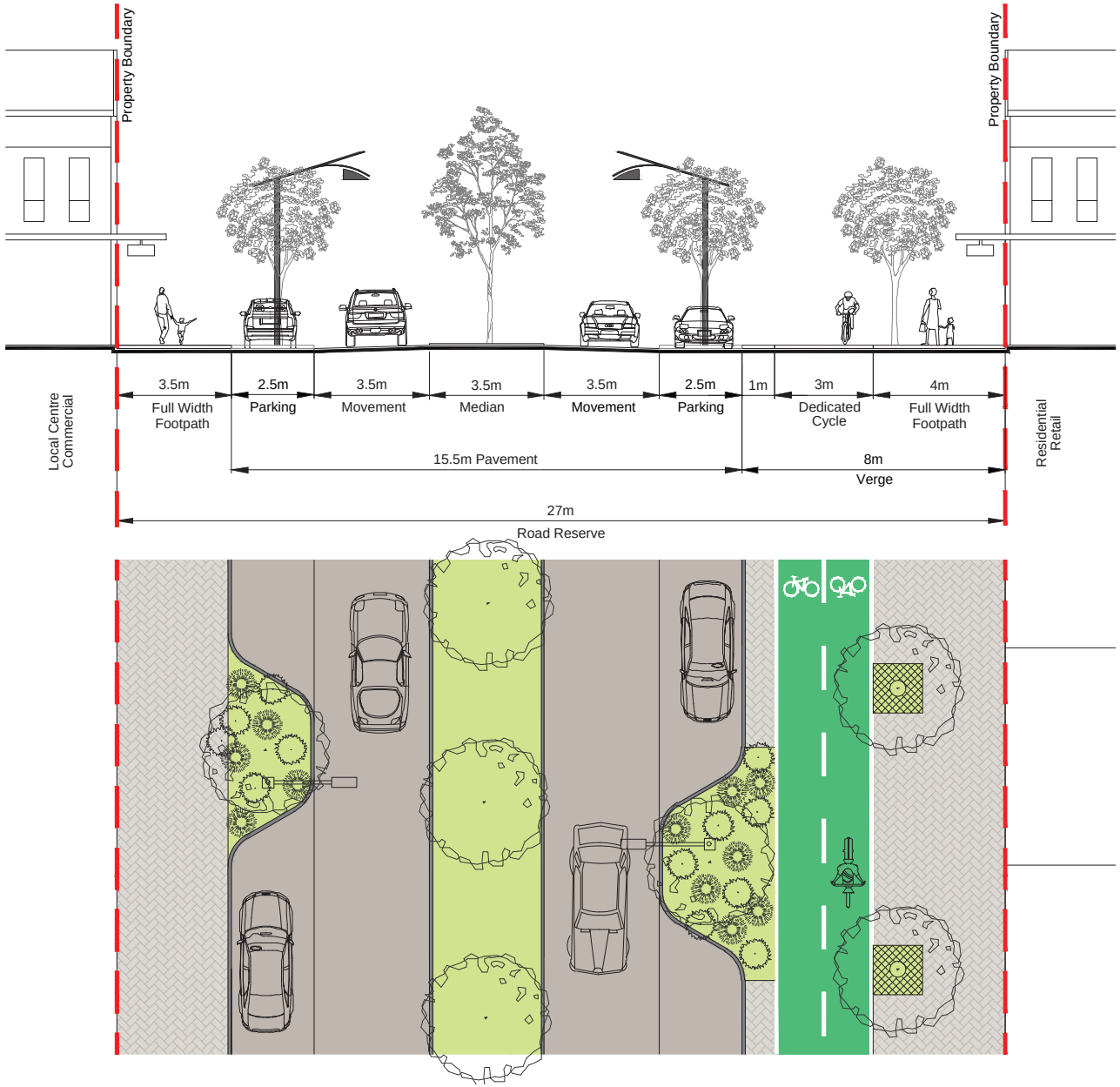
Village Main Street - 27m Wide Road Reserve



Disclaimer: Cross Sections are indicative only and subject to detail design. Location of pavement subject to change through detailed design of landscape and servicing.

PLAN REF: **128180 – 39D**
DATE: 09 SEPTEMBER 2019
CLIENT: EDQ
DRAWN BY: MD
CHECKED BY: MD / DG

0 2 4 6 8 10 **1 : 200 @ A4**

CARSELDINE URBAN VILLAGE
VILLAGE MAIN STREET
27m WIDE

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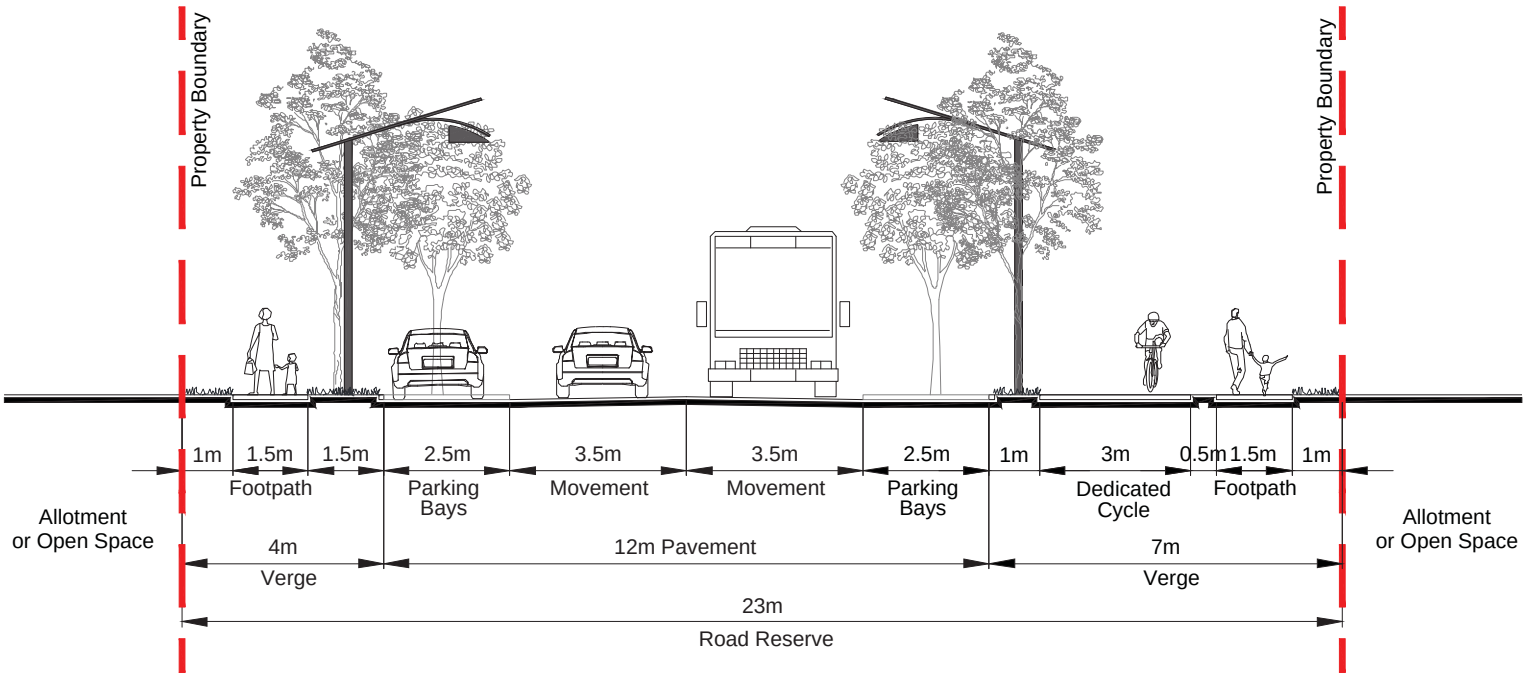
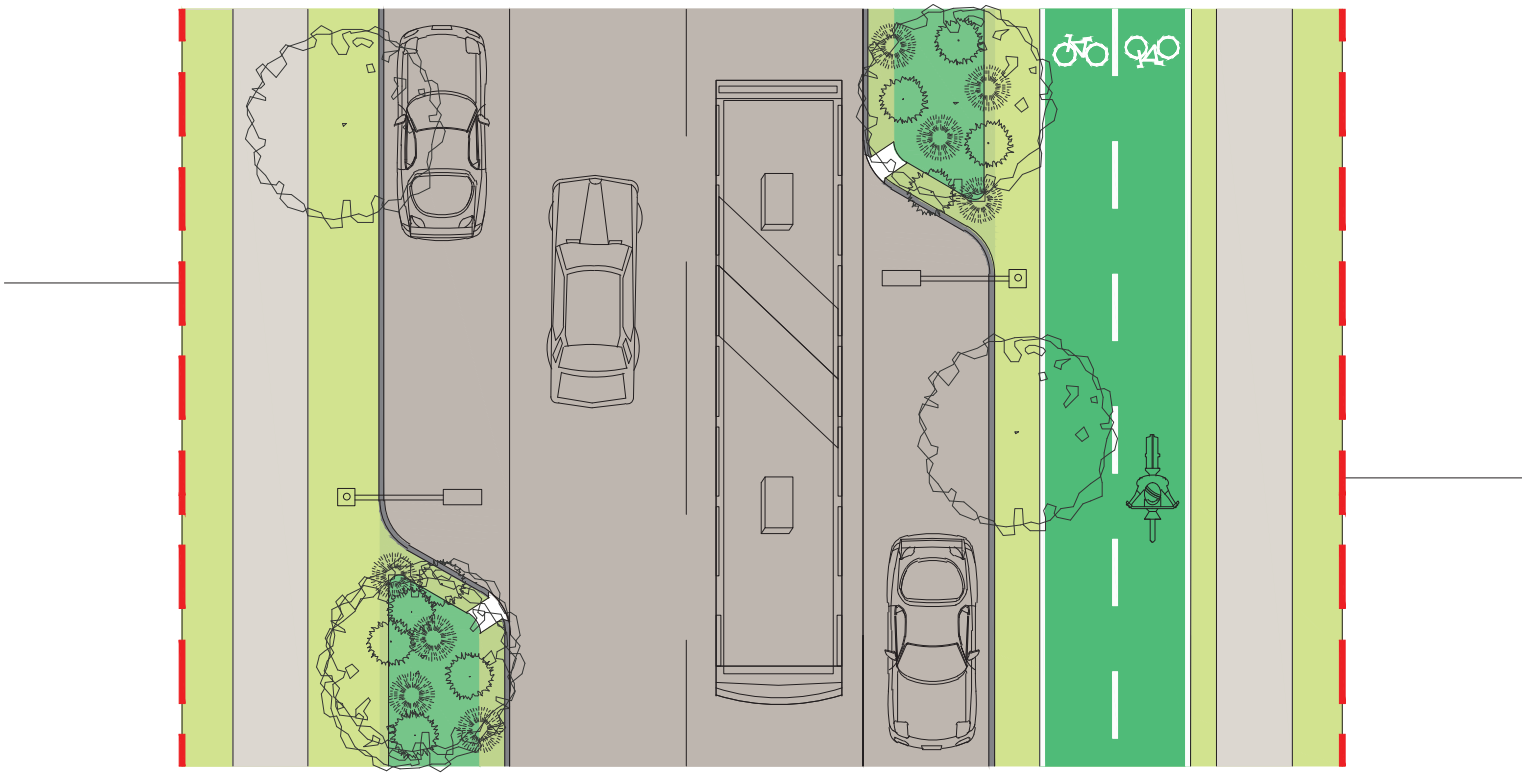
Western Access Road / Shared Busway - 23m





Disclaimer: Cross Sections are indicative only and subject to detail design. Location of pavement subject to change through detailed design of landscape and servicing.

PLAN REF:	**128180 – 39D**
DATE:	09 SEPTEMBER 2019
CLIENT:	EDQ
DRAWN BY:	MD
CHECKED BY:	MD / DG

0 1 2 3 4 5 **1 : 150 @ A4**

CARSELDINE URBAN VILLAGE
WESTERN ACCESS ROAD / SHARED BUSWAY - 23m WIDE

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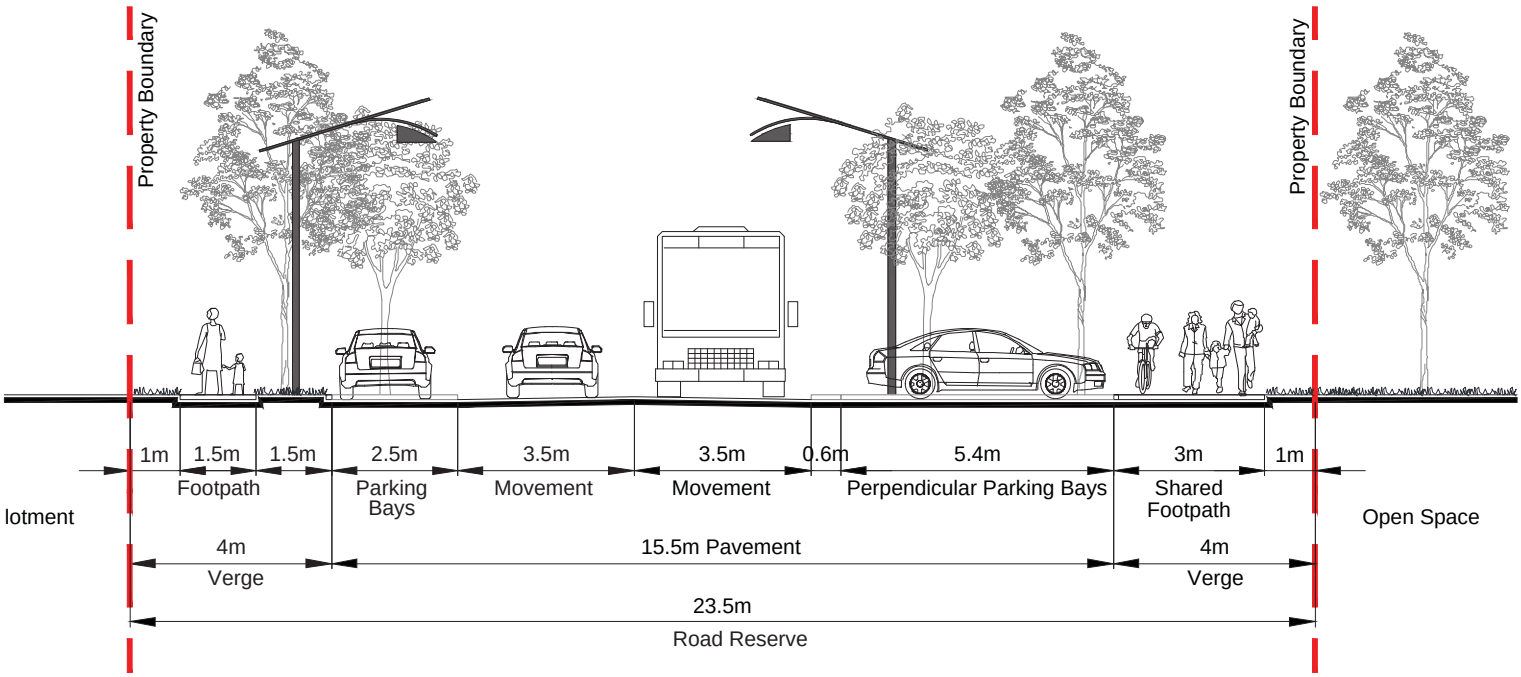
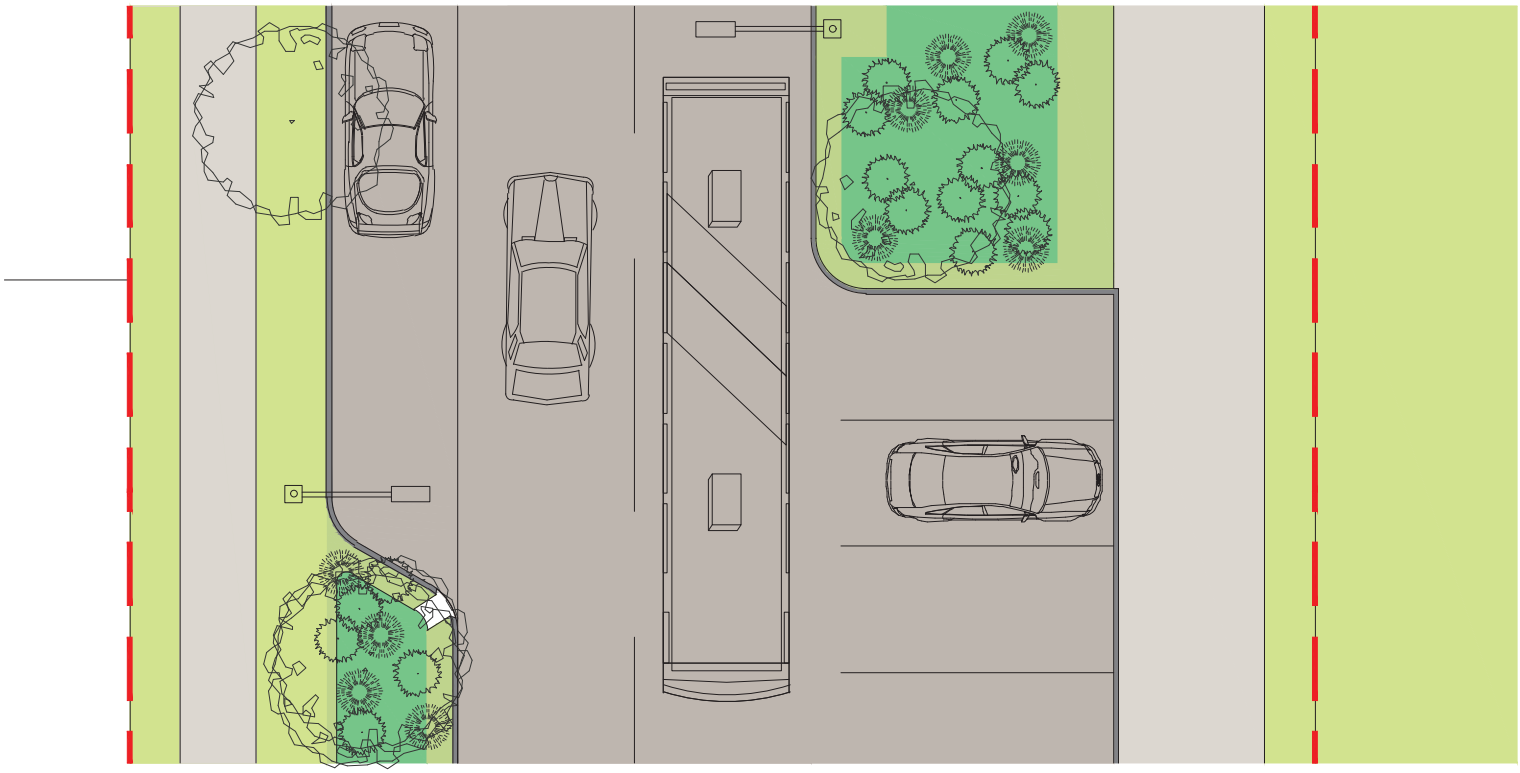
Residential Park Esplanade - 23.5m





Disclaimer: Cross Sections are indicative only and subject to detail design. Location of pavement subject to change through detailed design of landscape and servicing.

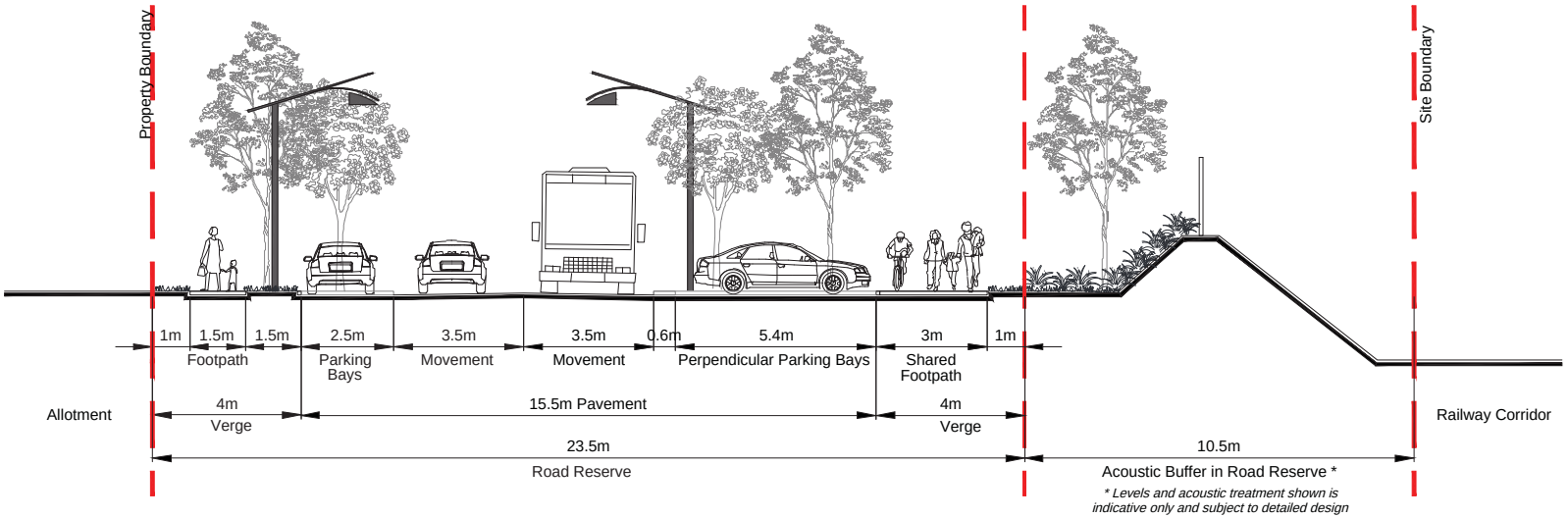
PLAN REF: 128180 – 39D
DATE: 09 SEPTEMBER 2019
CLIENT: EDQ
DRAWN BY: MD
CHECKED BY: MD / DG

0 1 2 3 4 5 **1 : 150 @ A4**

CARSELDINE URBAN VILLAGE
RESIDENTIAL PARK ESPLANADE
23.5m WIDE

URBAN DESIGN
Level 4 HQ South
520 Wickham Street
PO Box 1559
Fortitude Valley QLD 4006
T +61 7 3539 9500
W rpsgroup.com

Railway Esplanade - 23.5m + 10.5m Buffer



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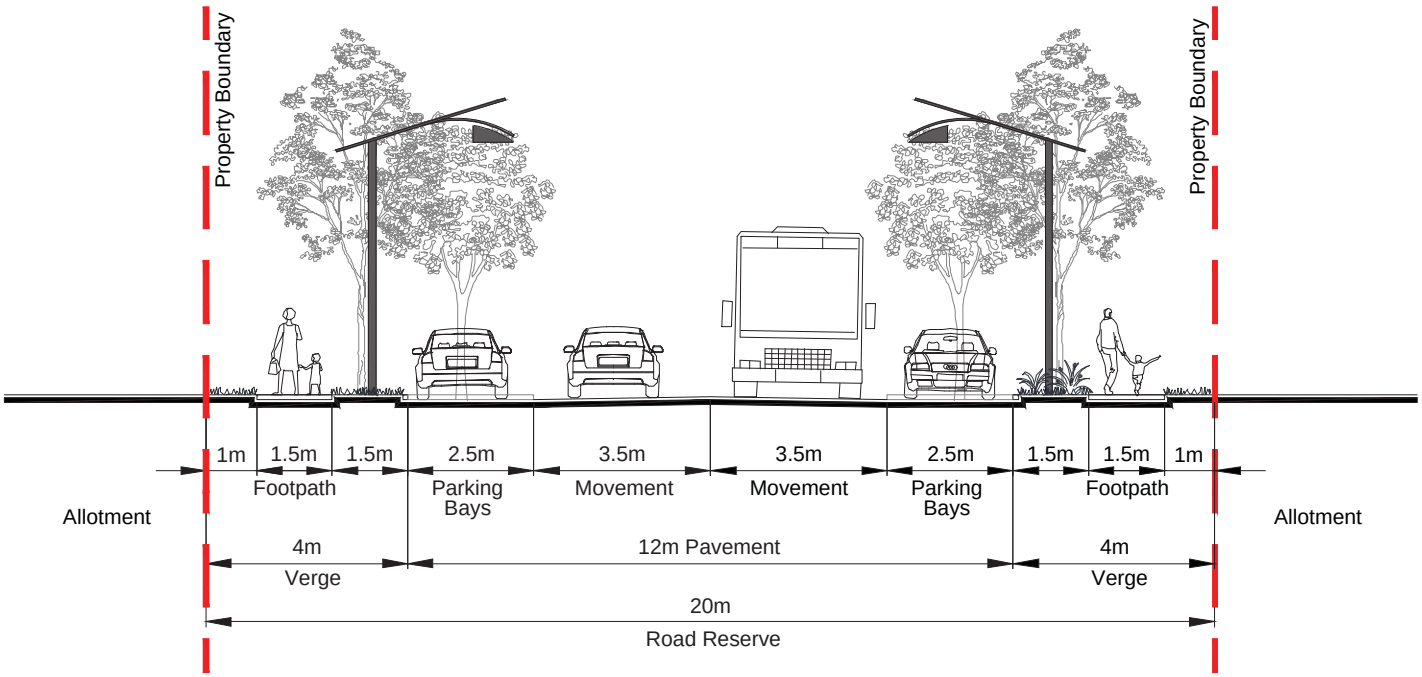
PLAN REF: **128180 – 39D**
DATE: 09 SEPTEMBER 2019
CLIENT: EDQ
DRAWN BY: MD
CHECKED BY: MD / DG

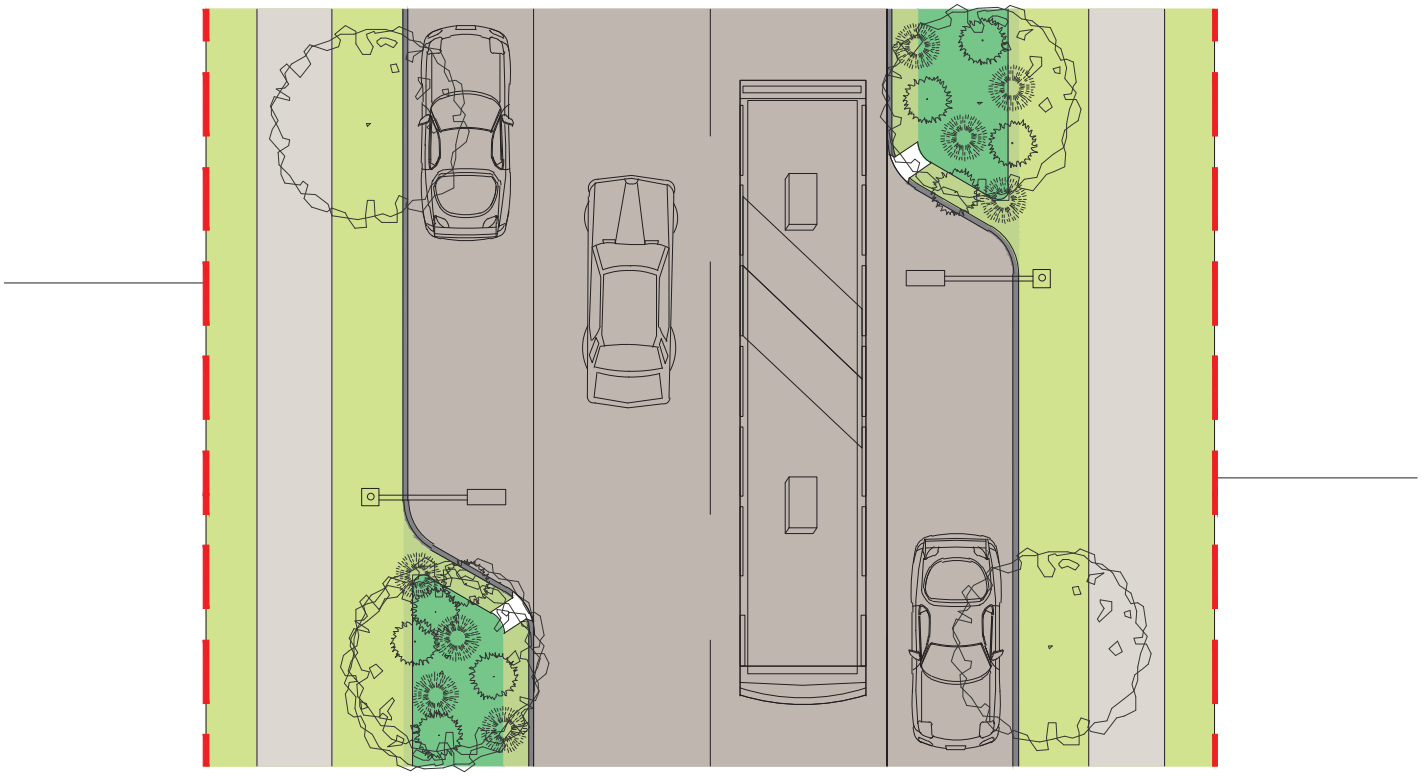
0 2 4 6 8 10 **1 : 200 @ A4**

CARSELDINE URBAN VILLAGE
RAILWAY ESPLANADE
23.5m WIDE + 10.5m BUFFER

URBAN DESIGN
Level 4 HQ South
520 Wickham Street
PO Box 1559
Fortitude Valley QLD 4006
T +61 7 3539 9500
W rpsgroup.com

Loop Road - 20m





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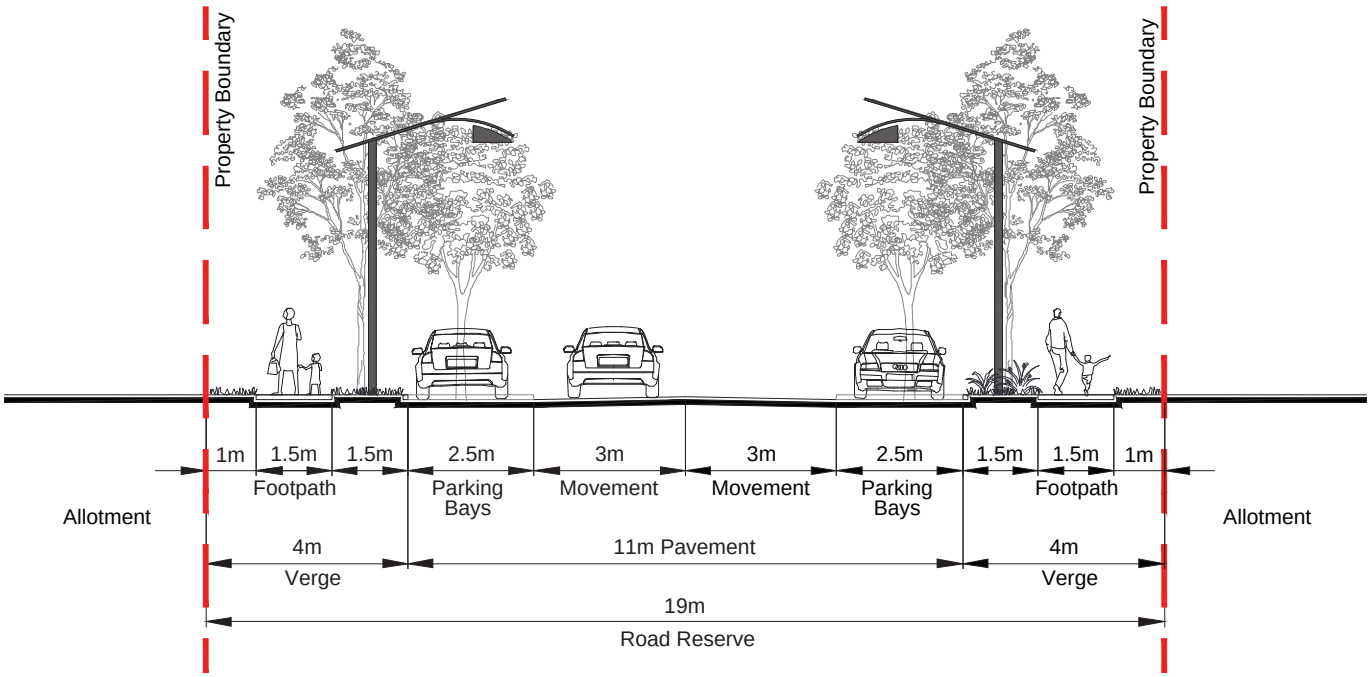
PLAN REF:	**128180 – 39D**
DATE:	09 SEPTEMBER 2019
CLIENT:	EDQ
DRAWN BY:	MD
CHECKED BY:	MD / DG

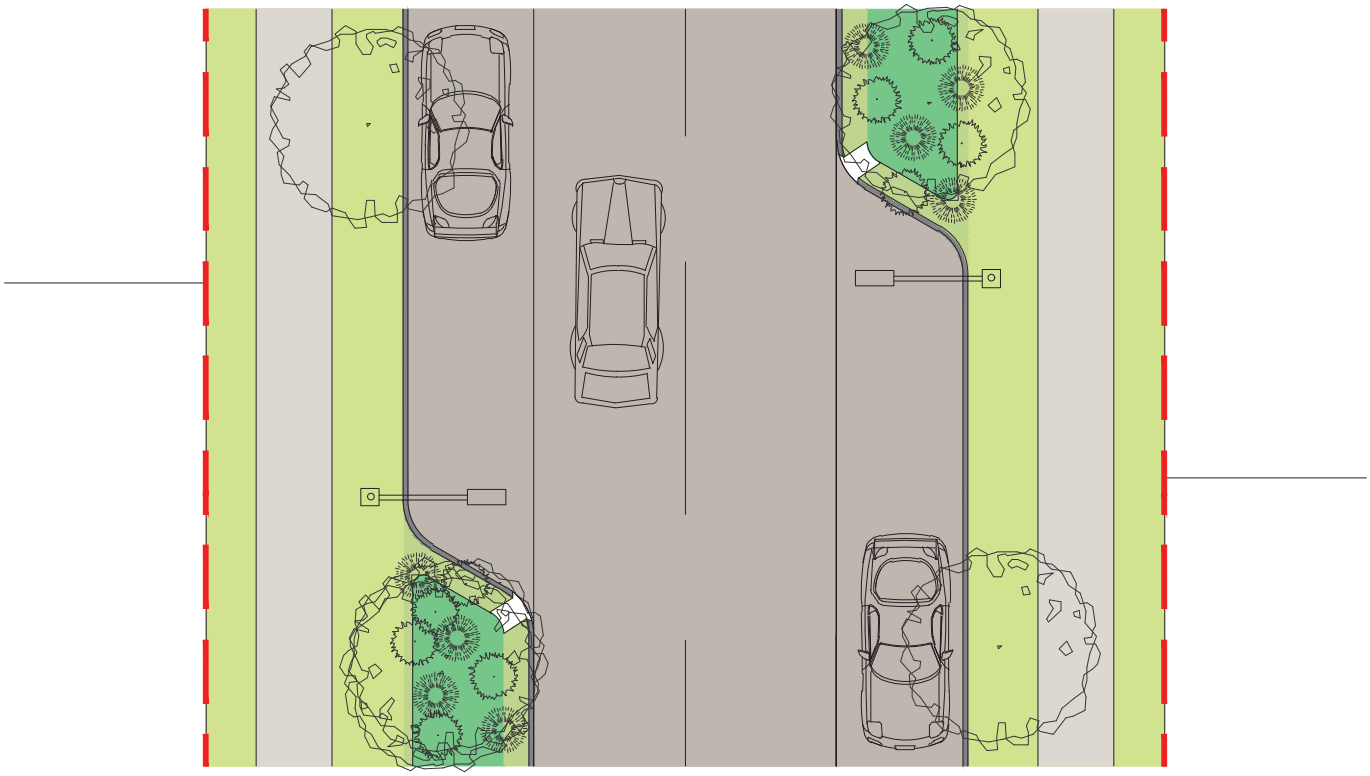
0 1 2 3 4 5 **1 : 150 @ A4**

CARSELDINE URBAN VILLAGE
LOOP ROAD
20m WIDE

URBAN DESIGN
Level 4 HQ South
520 Wickham Street
PO Box 1559
Fortitude Valley QLD 4006
T +61 7 3539 9500
W rpsgroup.com

Access Place - 19m





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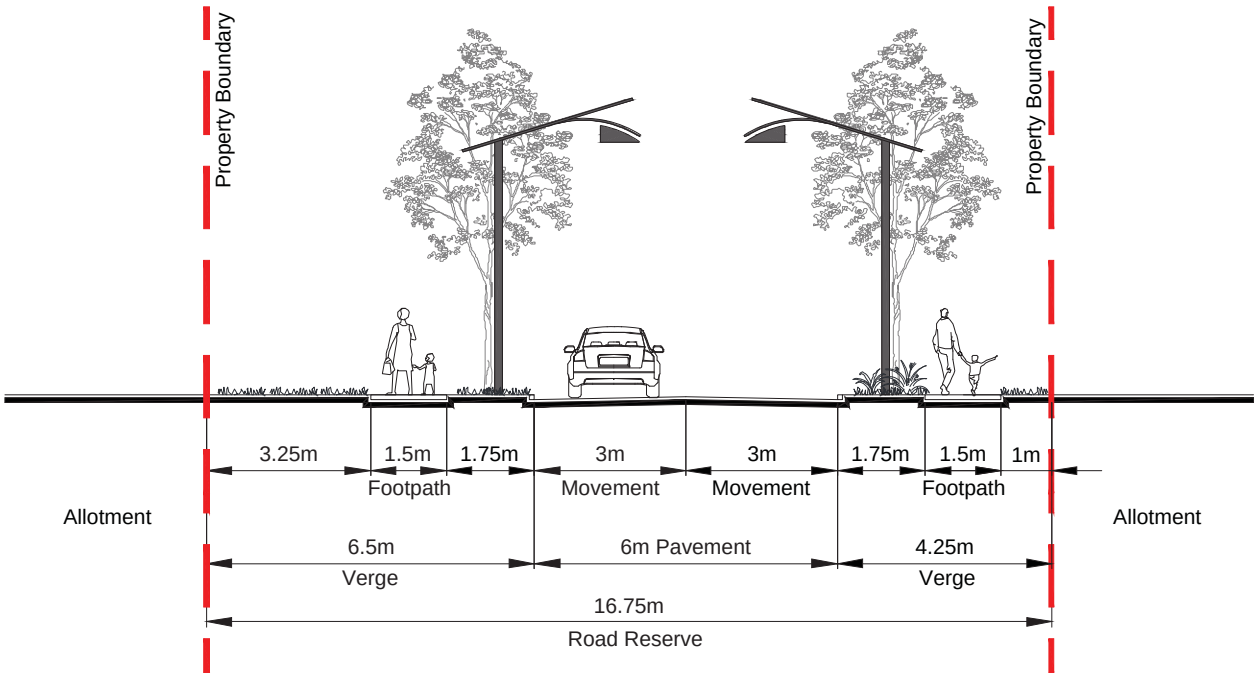
PLAN REF: 128180 – 39D
DATE: 09 SEPTEMBER 2019
CLIENT: EDQ
DRAWN BY: MD
CHECKED BY: MD / DG

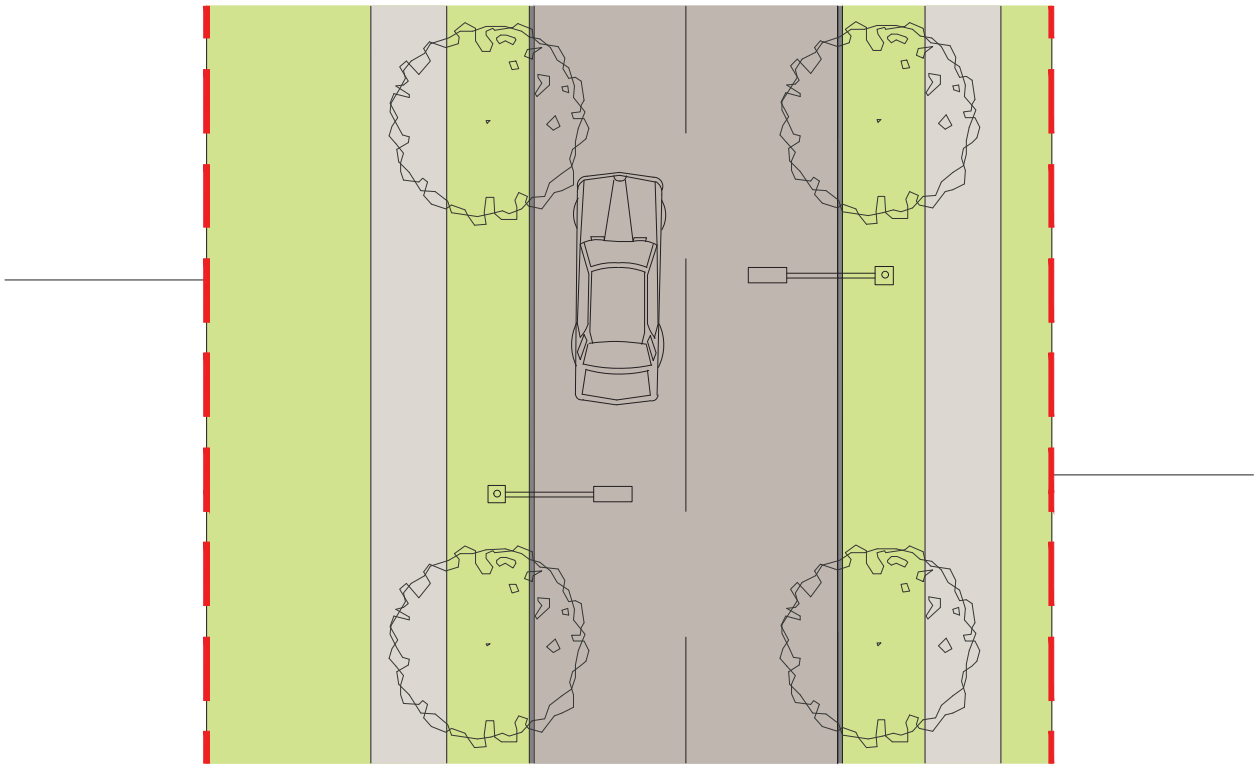
0 1 2 3 4 5 **1 : 150 @ A4**

CARSELDINE URBAN VILLAGE
ACCESS PLACE
19m WIDE

URBAN DESIGN
Level 4 HQ South
520 Wickham Street
PO Box 1559
Fortitude Valley QLD 4006
T +61 7 3539 9500
W rpsgroup.com

Access Place (No Parking) - 16.75m





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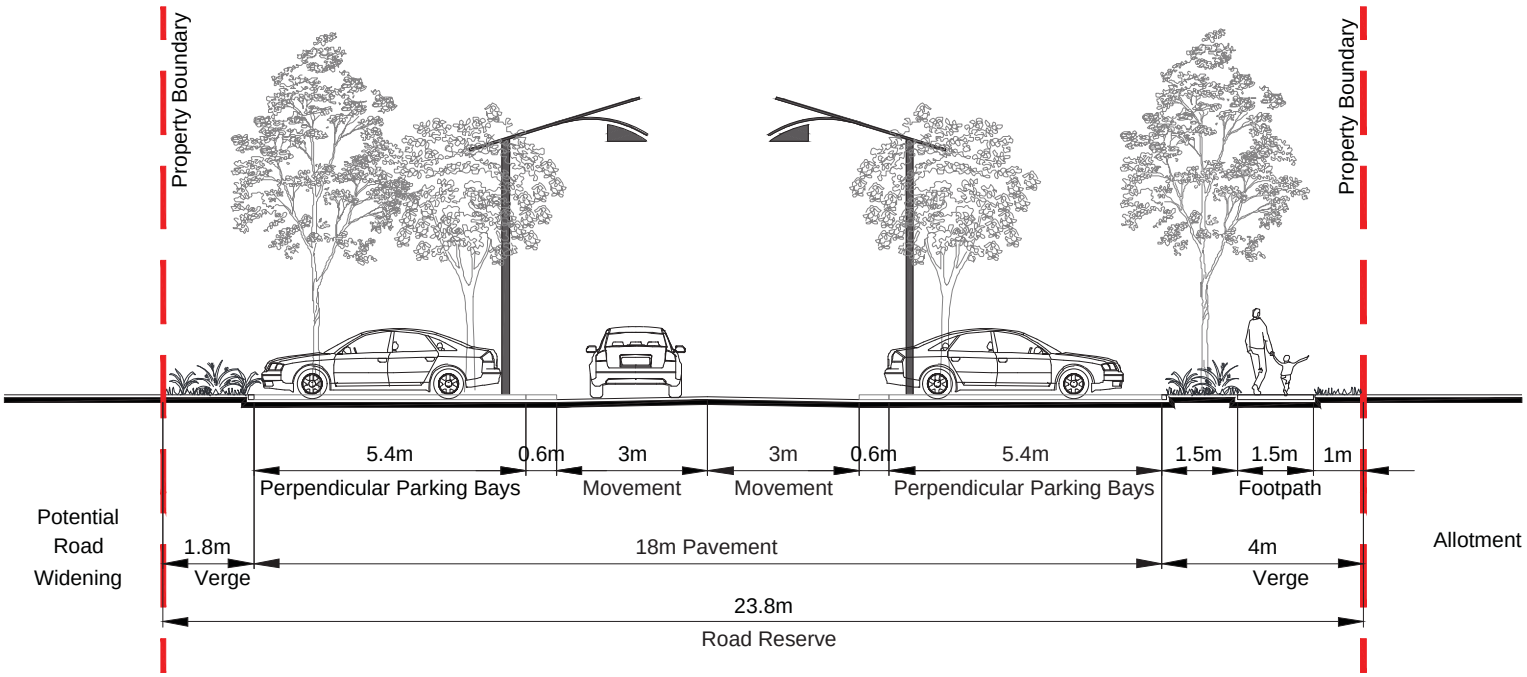
PLAN REF: 128180 – 39D
DATE: 09 SEPTEMBER 2019
CLIENT: EDQ
DRAWN BY: MD
CHECKED BY: MD / DG

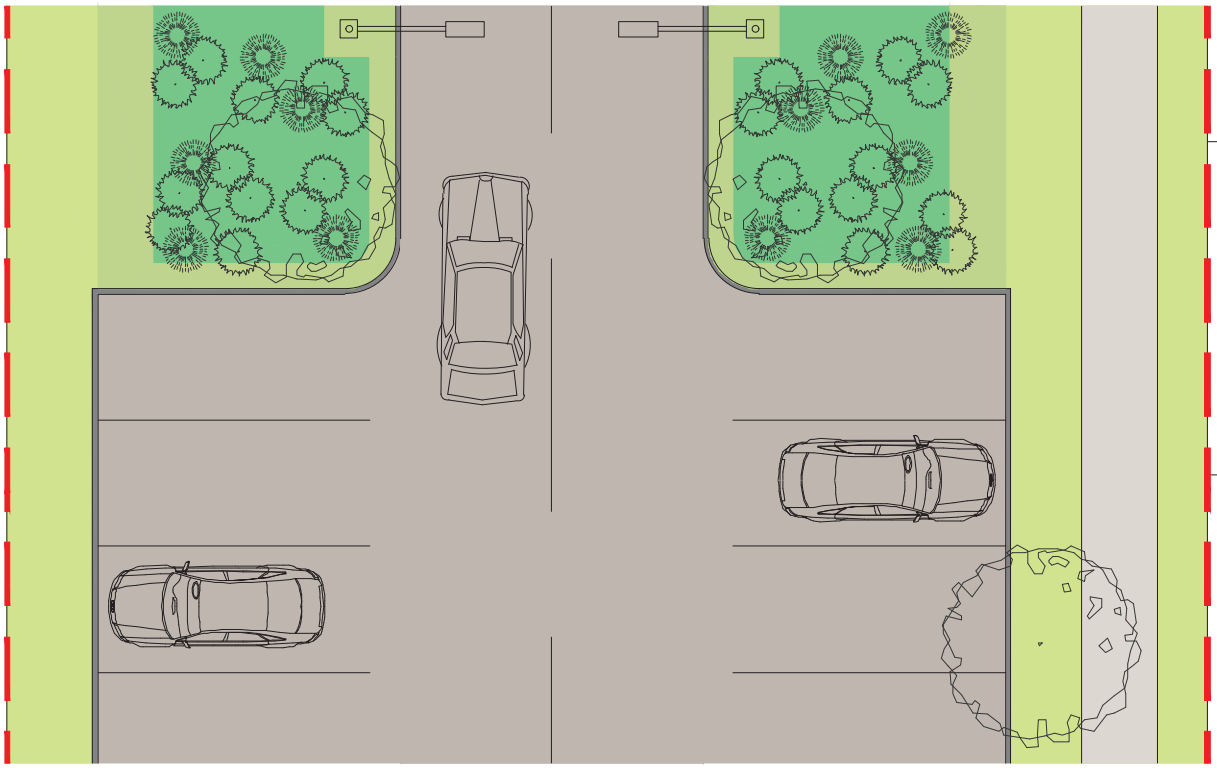
0 1 2 3 4 5 1 : 150 @ A4

CARSELDINE URBAN VILLAGE
ACCESS PLACE (NO PARKING)
16.75m WIDE

URBAN DESIGN
Level 4 HQ South
520 Wickham Street
PO Box 1559
Fortitude Valley QLD 4006
T +61 7 3539 9500
W rpsgroup.com

Access Place (Parking) - 23.8m





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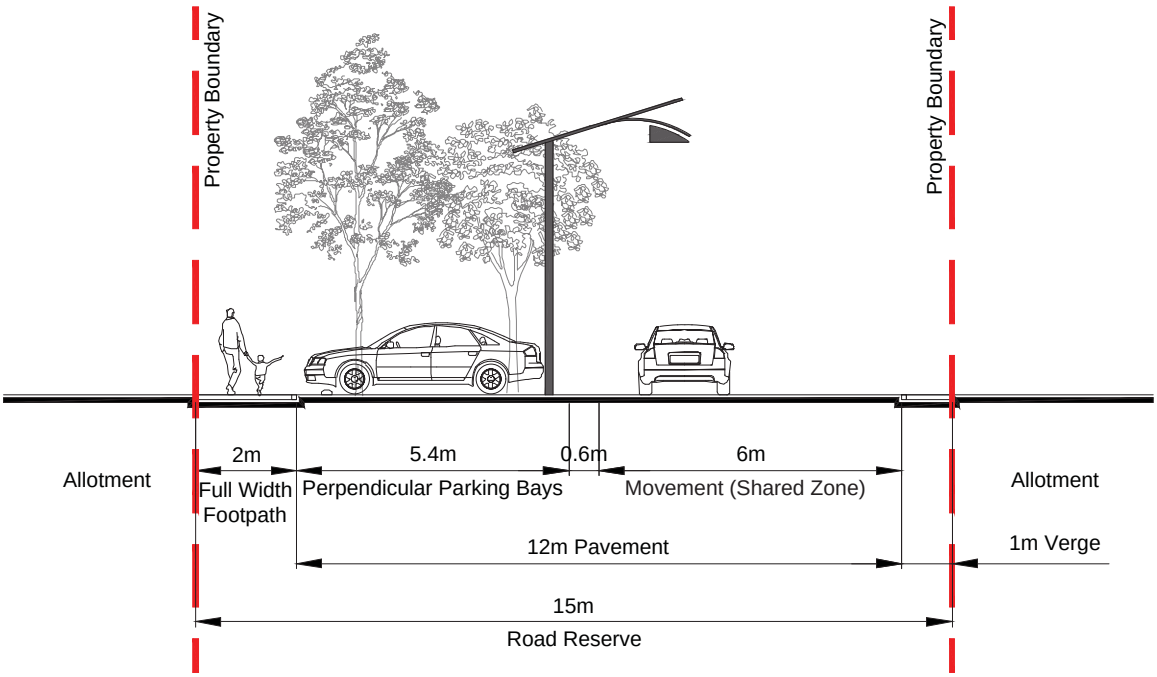
DATE: 09 SEPTEMBER 2019
CLIENT: EDQ
DRAWN BY: MD
CHECKED BY: MD / DG

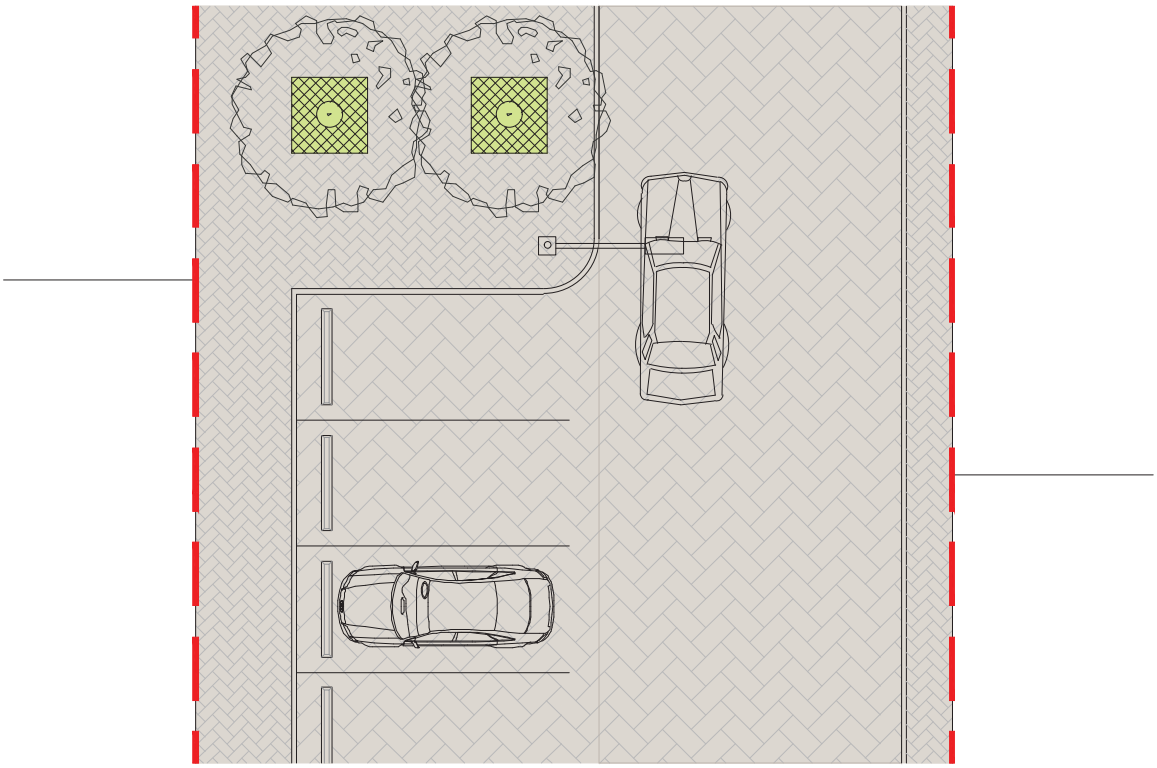
0 1 2 3 4 5 **1 : 150 @ A4**

CARSELDINE URBAN VILLAGE
ACCESS PLACE (PARKING)
23.8m WIDE

URBAN DESIGN
Level 4 HQ South
520 Wickham Street
PO Box 1559
Fortitude Valley QLD 4006
T +61 7 3539 9500
W rpsgroup.com

Shared Access Lane (Parking One Side) - 15m





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PLAN REF:	**128180 – 39D**
DATE:	09 SEPTEMBER 2019
CLIENT:	EDQ
DRAWN BY:	MD
CHECKED BY:	MD / DG

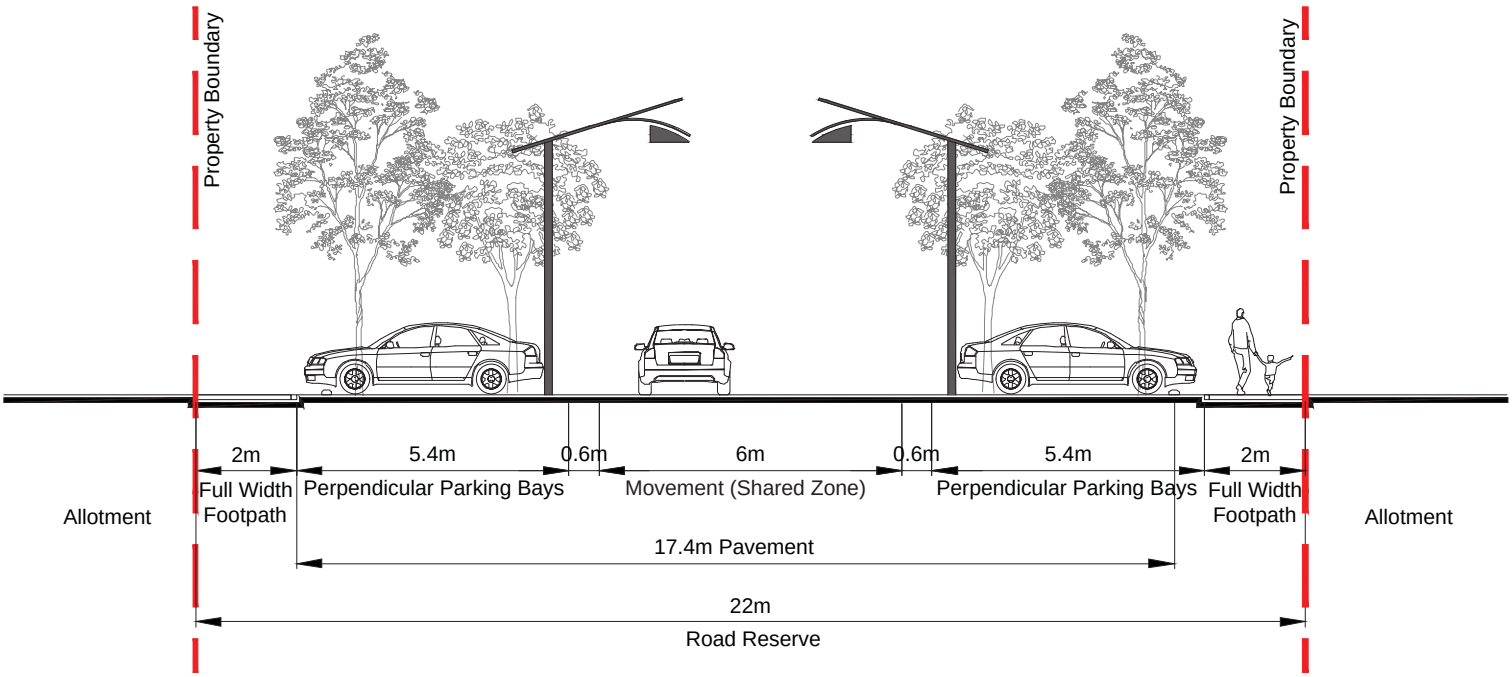
0 1 2 3 4 5 **1 : 150 @ A4**

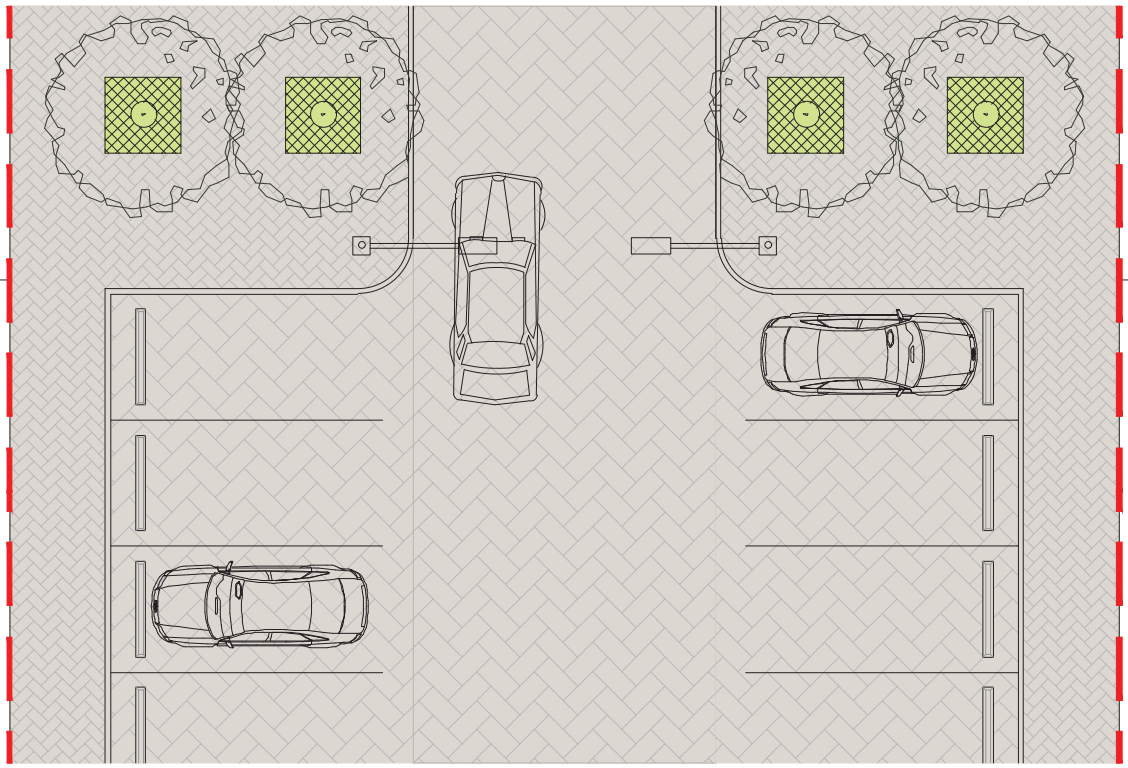
CARSELDINE URBAN VILLAGE

SHARED ACCESS LANE (PARKING ONE SIDE) - 15m WIDE

URBAN DESIGN
Level 4 HQ South
520 Wickham Street
PO Box 1559
Fortitude Valley QLD 4006
T +61 7 3539 9500
W rpsgroup.com

Shared Access Lane (Parking Two Sides) - 22m





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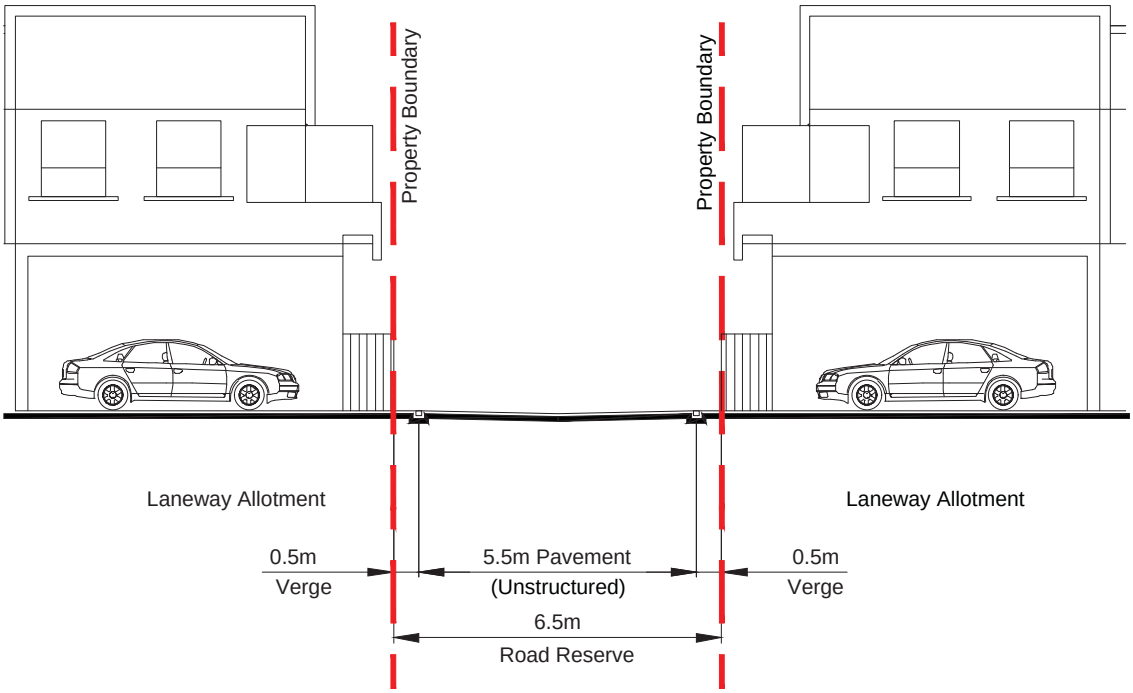
PLAN REF: 128180 – 39D
DATE: 09 SEPTEMBER 2019
CLIENT: EDQ
DRAWN BY: MD
CHECKED BY: MD / DG

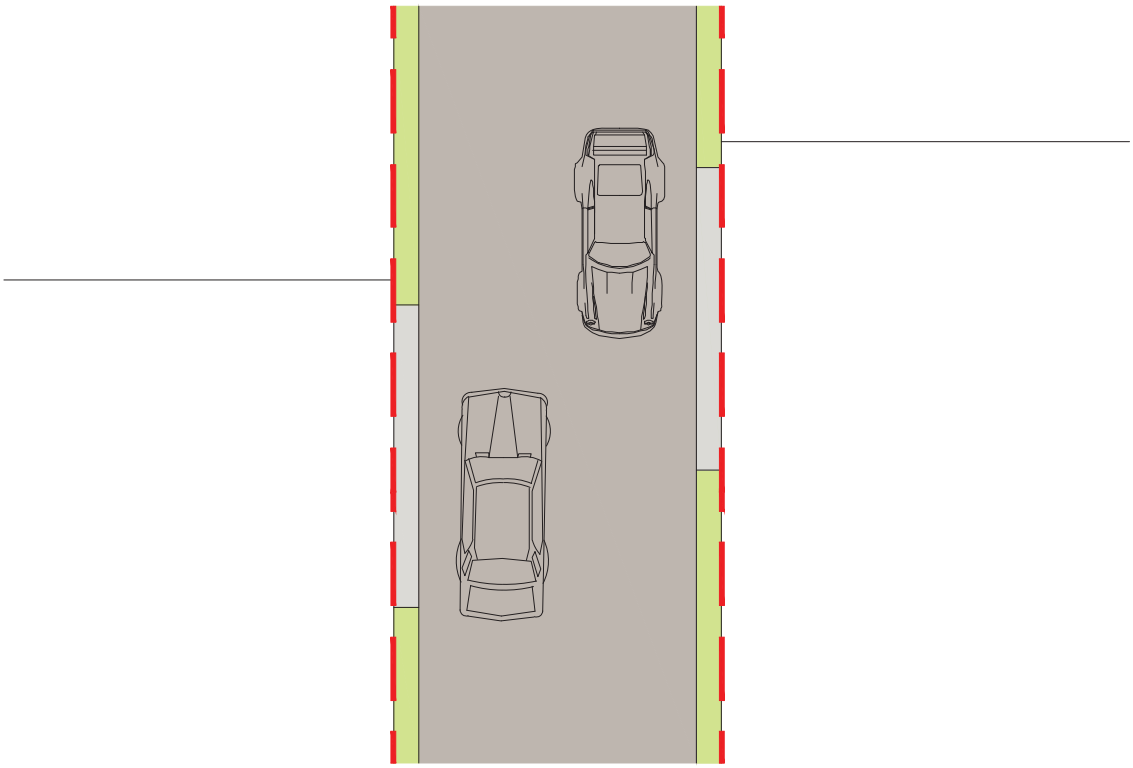
0 1 2 3 4 5 **1 : 150 @ A4**

CARSELDINE URBAN VILLAGE
SHARED ACCESS LANE (PARKING TWO SIDES) - 22m WIDE

URBAN DESIGN
Level 4 HQ South
520 Wickham Street
PO Box 1559
Fortitude Valley QLD 4006
T +61 7 3539 9500
W rpsgroup.com

Access Lane - 6.5m





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PLAN REF: **128180 – 39D**
DATE: 09 SEPTEMBER 2019
CLIENT: EDQ
DRAWN BY: MD
CHECKED BY: MD / DG

0 1 2 3 4 5 **1 : 150 @ A4**

CARSELDINE URBAN VILLAGE
ACCESS LANE
6.5m WIDE

URBAN DESIGN
Level 4 HQ South
520 Wickham Street
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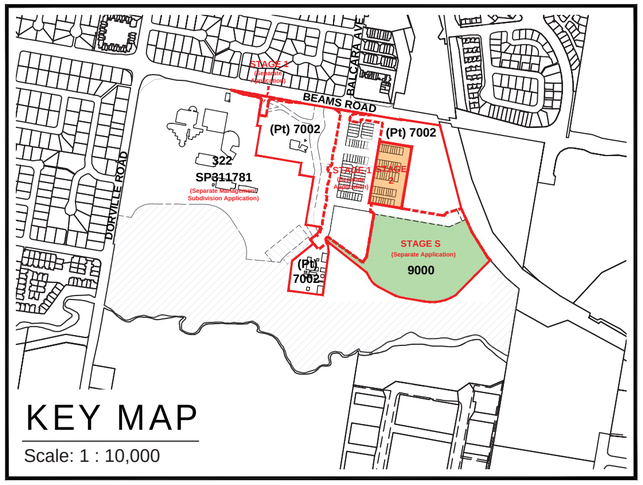
Fortitude Valley QLD 4006
T +61 7 3539 9500
W rpsgroup.com

Carseldine Village – Stage 2

Appendix B RPS Stage 2 Plan of Subdivision

Economic Development Queensland



Legend

- Site Boundary
- Proposed Stage Boundary
- Existing Easements

Note:
All Lot Numbers, Dimensions and Areas are approximate only, and are subject to survey and Council approval.

Dimensions have been rounded to the nearest 0.1 metres.

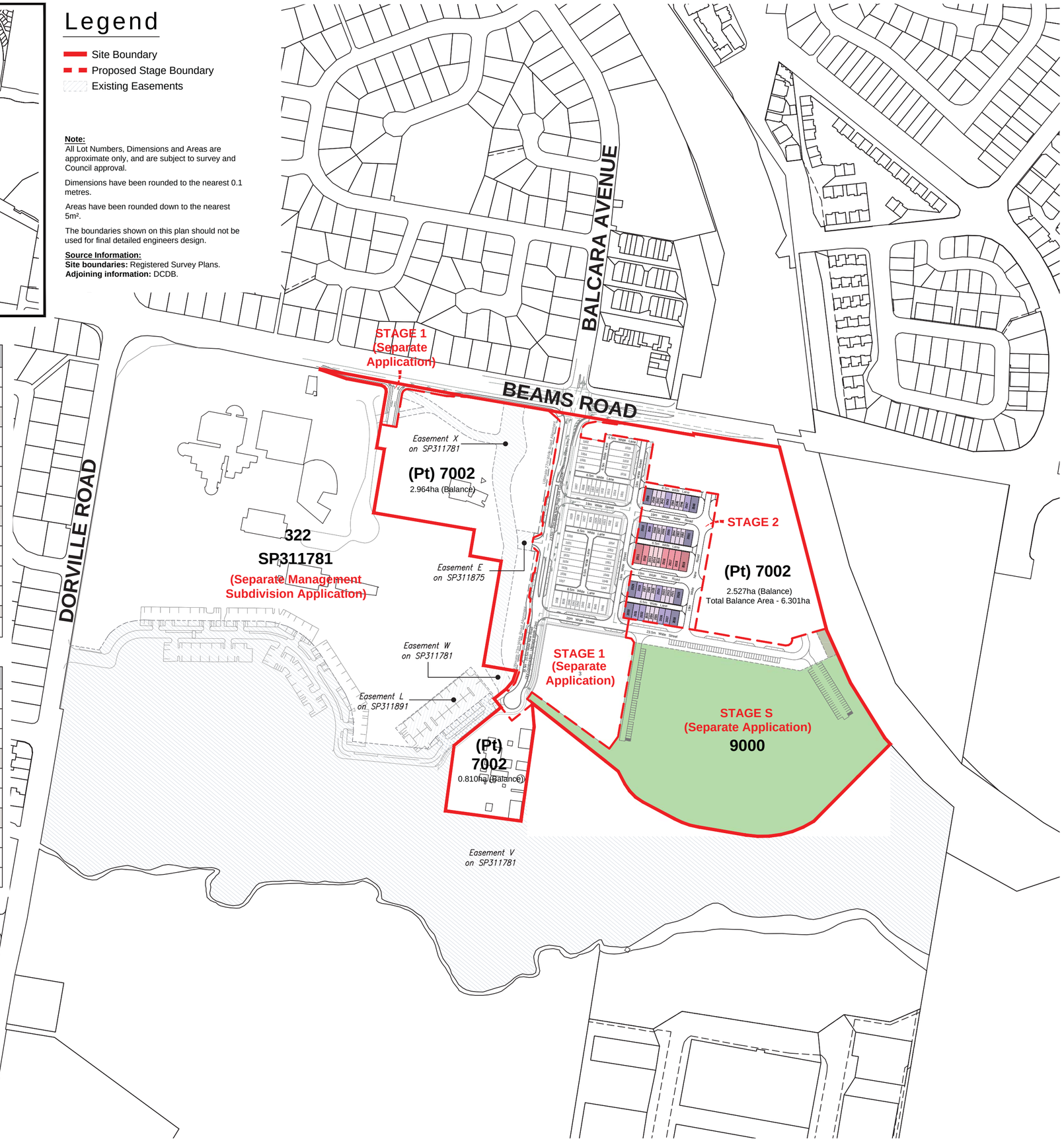
Areas have been rounded down to the nearest 5m².

The boundaries shown on this plan should not be used for final detailed engineers design.

Source Information:
Site boundaries: Registered Survey Plans.
Adjoining information: DCDB.

Yield Breakdown		
Allotment Details	**Stage 2**	
	Lots	**Percentage**
16.5m Deep Terrace Allotments		
4.6m x 16.5m Terrace	21	43.8%
6.6m x 16.5m Terrace	10	20.8%
8.1m-8.4m x 16.5m Terrace	8	16.7%
Sub-total	**39**	**81.3%**
20.5m Deep Terrace Allotments		
4.6m x 20.5m Terrace	3	6.3%
6.6m x 20.5m Terrace	4	8.3%
8.4m x 20.5m Terrace	2	4.2%
Sub-total	**9**	**18.8%**
Total Allotments	**48**	**100.0%**

Land Budget		
Land Use	**Stage 2**	
	Area	**Percentage**
Area of Stage	**1.094 ha**	**100.0%**
Saleable Land		
Residential Allotments	0.493 ha	45.1%
Total Area of Saleable Land	**0.493 ha**	**45.1%**
Road		
Access Place (19m Wide)	0.490 ha	44.8%
Access Lane (6.5m Wide)	0.111 ha	10.1%
Total Area of New Road	**0.601 ha**	**54.9%**



0 15 30 45 60 90 1 : 3,000 @ A2

CARSELDINE URBAN VILLAGE

PLAN OF SUBDIVISON STAGE 2 - OVERALL

PLAN REF:	**128180-73**
Rev No:	**B**
DATE:	12 MAY 2020
CLIENT:	EDQ
DRAWN BY:	LZ./MD
CHECKED BY:	MD

URBAN DESIGN
Level 4 HQ South
520 Wickham Street
PO Box 1559
Fortitude Valley QLD 4006
T +61 7 3539 9500
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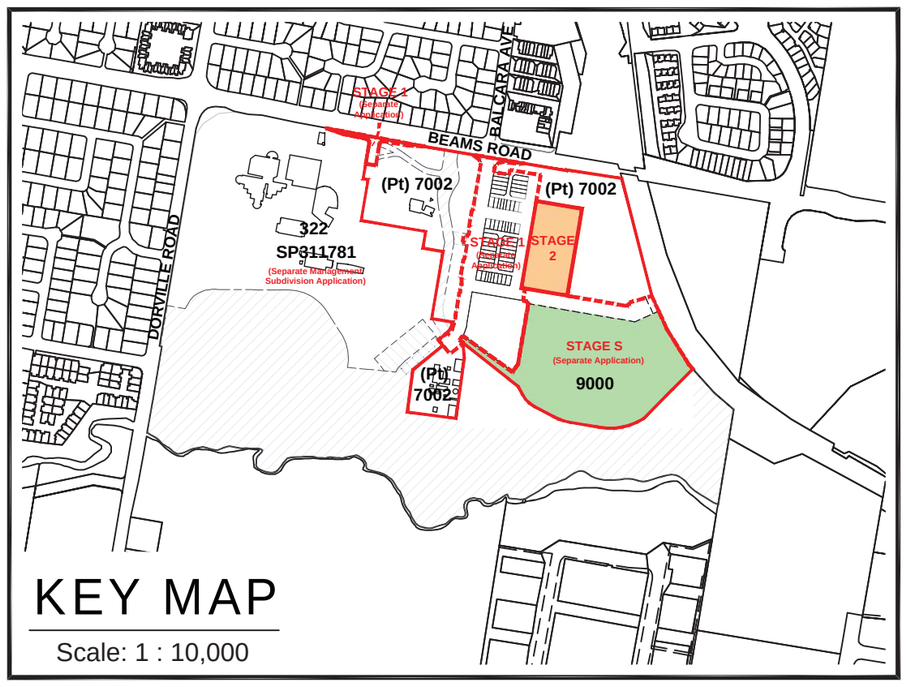

Yield Breakdown		
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	Lots	**Percentage**
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Sub-total	**39**	**81.3%**
20.5m Deep Terrace Allotments		
4.6m x 20.5m Terrace	3	6.3%
6.6m x 20.5m Terrace	4	8.3%
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Sub-total	**9**	**18.8%**
Total Allotments	**48**	**100.0%**

Land Budget		
Land Use	**Stage 2**	
	Area	**Percentage**
Area of Stage	**1.094 ha**	**100.0%**
Saleable Land		
Residential Allotments	0.493 ha	45.1%
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Road		
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Total Area of New Road	**0.601 ha**	**54.9%**

Note:
All Lot Numbers, Dimensions and Areas are approximate only, and are subject to survey and Council approval.

Dimensions have been rounded to the nearest 0.1 metres.

Areas have been rounded down to the nearest 5m².

The boundaries shown on this plan should not be used for final detailed engineers design.

Source Information:
Site boundaries: Registered Survey Plans.
Adjoining information: DCDB.

PLAN REF: 128180 – 74
Rev No: B
DATE: 12 MAY 2020
CLIENT: EDQ
DRAWN BY: LZ/JC
CHECKED BY: MD

0 5 10 15 20 25 **1 : 500 @ A2**

CARSELDINE URBAN VILLAGE
PLAN OF SUBDIVISION
STAGE 2

URBAN DESIGN
Level 4 HQ South
520 Wickham Street
PO Box 1559
Fortitude Valley QLD 4006
T +61 7 3539 9500
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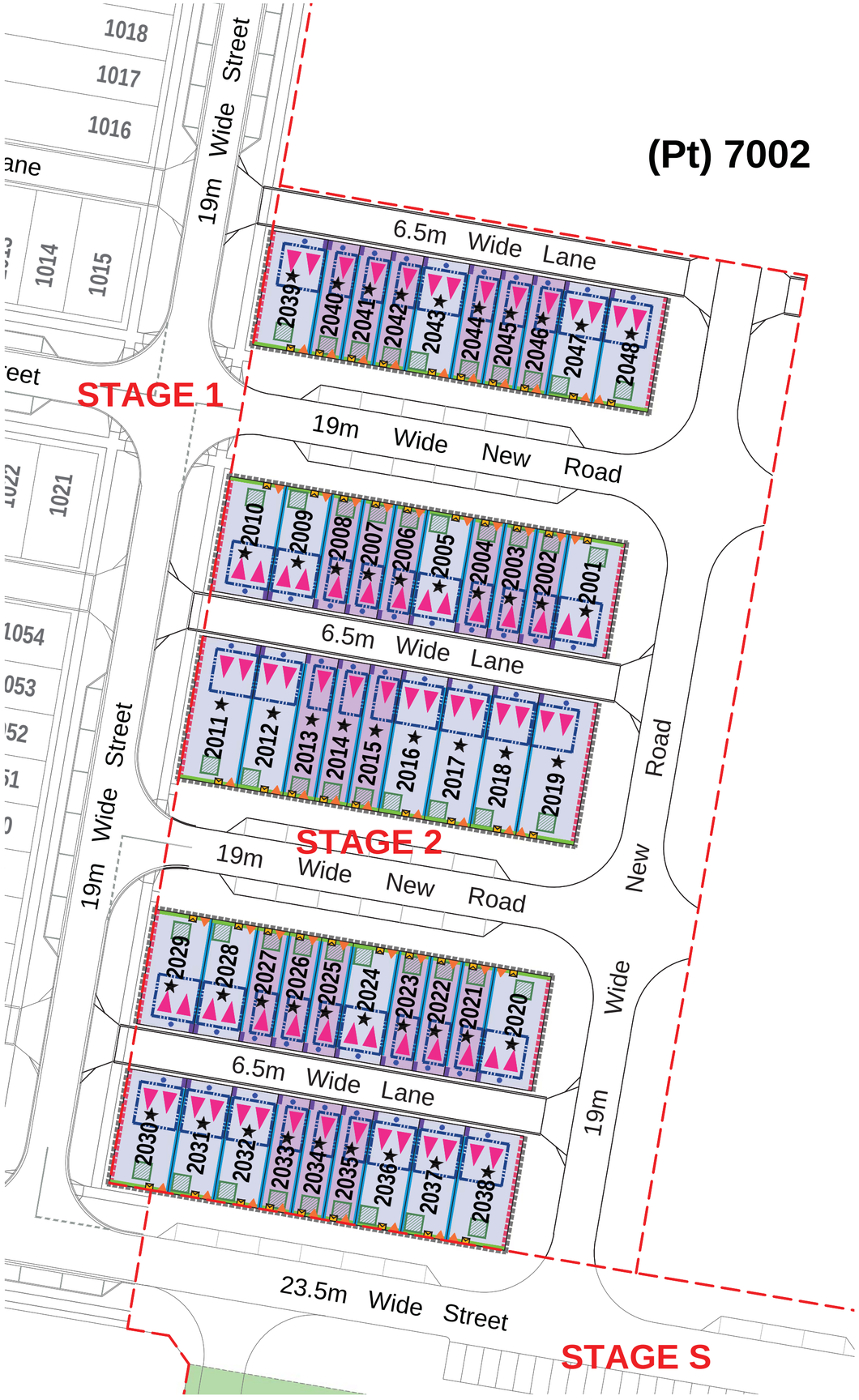

Plan of Development Table	Terrace Allotment < 99m²		Terrace Allotment 100m² - 170m²	
	Ground Floor	First / Second Floor	Ground Floor	First / Second Floor
Setback Requirements				
Primary Frontage (minimum)	1.5m *	1.0m *	1.5m *	1.0m *
Garage / Carport (minimum)	1.5m	n/a	1.5m	n/a
Rear (minimum)	1.5m	0.0m	1.5m	0.0m
Side				
Built to Boundary (maximum)	0.05m	0.05m	0.05m	0.05m
Mandatory BTB Wall Length (maximum) (% of boundary length)	100%		100%	
Non Built to Boundary (minimum)	0.9m	0.9m	0.9m	0.9m
Corner Lots - Secondary Frontage to Street (minimum)	n/a	n/a	1.2m *	1.2m *
Other Requirements				
Site Cover (maximum)	95%		90%	
Primary Private Open Space Requirements (minimum)	Studio / 1 Bedroom - 5m² (minimum dimension of 1.2m); 2 Bedroom - 9m² (minimum dimension of 2.4m); 3+ Bedroom - 12m² (minimum dimension of 2.4m).			
Street Frontage Landscape Requirements (minimum)	1% of lot area; vertical solution at front entry required.		5% of lot area; minimum 1.5% on ground at Street frontage, vertical solutions encouraged for remaining 3.5%.	

Notes: * 0.0 metres to verandah/balcony

Notes:

General

1. All development is to be undertaken in accordance with the Development Approval.
2. All Class 1A dwellings are mandated to achieve a minimum Silver Final Certification under the Australian *Liveable Housing Design Guidelines*.
3. A home based business up to 50m² is allowed within each dwelling. A gross floor area (GFA) in excess of 50m² will require additional EDQ approval.
4. The relevant Bushfire Report must be considered and mitigation strategies adopted where deemed necessary by the Building Certifier.
5. Carseldine Village does not have a reticulated gas supply. Gas bottles serving a dwelling are strictly prohibited.
6. Refer to *Stage 2 Landscape Plans* for locations and extent of footpaths.
7. High-density Development Easements (HDEs) will be registered by Economic Development Queensland on mandatory built to boundary walls on lots under 250m². HDEs are not shown on this Plan of Development.
8. The minimum building height is two (2) storeys.
9. The maximum building height is three (3) storeys.
10. Ground floor height (finished floor level to ceiling) must be a minimum of 2.7m and subsequent floor heights (finished floor level to ceiling) must be a minimum of 2.55m.

Setbacks

11. Setbacks are as per the Plan of Development Table unless otherwise dimensioned.
12. Setbacks are measured to the wall of the structure.
13. The location of built to boundary walls are indicated on the Plan of Development.
14. Feature end treatment of the built to boundary wall is required where abutting the site boundary at the primary frontage.
15. Where optional built to boundary walls are not adopted, the following applies:
    - side setbacks shall be in accordance with the Plan of Development Table;
    - to provide privacy for residents, only high level linear windows are permitted;
    - EDQ approved solid fencing is installed where providing privacy for residents in their private open space areas, and must positively contribute to the streetscape.
16. Mandatory built to boundary walls must have a maximum setback of 50mm to facilitate a gutter overhang.
17. Where two neighbouring build to boundary walls are not adopted, EDQ approved privacy screening must be erected.

Building Articulation

18. All Primary Frontages must be articulated to provide diversity in building form and respond to the local climate. This must be achieved through the incorporation of two of the following design elements:
    - verandahs / balconies;
    - roof overhangs;
    - window hoods / screens;
    - awnings and/or shade structures.
19. All dwellings must include a clearly identifiable and addressed front door. Front door must be visible from the Street. Front door access must not be via a Lane. Sliding doors do not constitute a front door.
20. Front door must be sufficiently sheltered from the elements, preferably utilising the structure of the first floor.
21. Buildings must be designed to ensure the privacy of occupants, but also allow for overlooking of the Street and Lane to promote casual surveillance.
22. Secondary frontages must be orientated to provide casual surveillance of the Street and articulated to reduce the mass of the building. This must be achieved by the incorporation of verandahs / porches or the inclusion of window openings, plus one more of the following design elements:
    - awning and shade structures;
    - variation to roof and building lines;
    - use of varying building materials.
23. If provided, privacy screening must be either of solid material (e.g. timber, steel), opaque screens, perforated panels, or trellises that are permanently fixed, and are to have a maximum of 50 per cent openings.
24. Carports and garages are to be compatible with the main building design in terms of height, roof form, detailing, materials and colours.
25. For carports, the facade construction, appearance and treatment must be visually consistent with that of a garage, and must be compatible with the main building design. No prefabricated facades permitted.
26. All building materials must be suitably coloured, stained or painted, including retaining, fences, walls and roofs. Untreated materials, such as zinc coated steel, bare metal, concrete block or masonry panels are not permitted.
27. Dwellings must include landscaping along the Street frontage to reinforce the dwelling entry, and to positively contribute to the streetscape. Turf is prohibited; ground covers are required where turf would typically be installed.
28. Air-conditioners, hot water systems, clothes lines and other household services must be screened and/or located to minimise visual impact to the Street. Services may be visible from the lane, but must be screened.
29. Bin storage is to be provided where identified on the Plan of Development. Bin storage must be screened from the lane, and be visually compatible with the main building design.

Private Open Space

30. Primary private open space must be provided in accordance with the Plan of Development Table. This area may be roofed and take the form of an upper floor balcony or rooftop terrace.
31. Primary private open space must be directly accessible from a living space. There must be adequate space to accommodate a table and chairs, planting and a BBQ. Shade should also be provided.
32. Secondary private open space may be accessed off a bedroom, multi-purpose area or a home-based business

On-site Car Parking and Driveways

33. On-site car parking is to be provided in accordance with the following minimum requirements:
    a. Studio, 1 and 2 Bedrooms - 1 space per dwelling;
    b. 3 or more Bedrooms - 2 spaces per dwelling.
34. Car parking may only be provided in tandem on lots 25m deep or greater.
35. At least one car park per dwelling must be covered. Carports are permitted.
36. Garages / carports are to be located as indicated on this Plan of Development.
37. Single car garage / carports must achieve a minimum garage door opening of 2.4m when open.
38. Double garages must feature a singular garage door and opening; two separate garage doors are not permitted.
39. Vehicle access to a dwelling is only permitted from a Lane; vehicle access from a Street is prohibited.

Fencing

40. Fencing erected by Economic Development Queensland must not be altered, modified or removed without prior written approval from Economic Development Queensland.
41. Feature fencing identified on the Plan of Development is mandatory.
42. Fencing on Street frontages must be in the form of planter boxes and/or privacy screening for residents, in particular where there is a front open space.
43. Fencing on Lane frontages must be solid fencing and be compatible with the main building design in terms of height, form, detailing, materials and colour.

Acoustics

44. The relevant Acoustic Report must be considered and mitigation strategies adopted where deemed necessary by the Building Certifier. Lots 2001 - 2048 are subject to acoustic constraints. Information regarding building form treatments required to habitable rooms to ensure compliance is outlined under the *TTM Acoustic Report*, Section 9. Noise categories for each lot are outlined in Table 11 within the *TTM Acoustic Report*. Associated sound reduction requirements and acceptable forms of construction have been outlined within the *TTM Acoustic Report* (Table 12 and Appendix D) and can also be found within *QDC MP4.4* Schedules 1 and 2.

Definitions

Street - A public road (generally 14m wide or greater) providing vehicle access and services to the wider community and open space.

Lane (or Laneway) - A narrow public road (6.5m wide) providing vehicle access and services to the wider community and open space.

0 2 4 6 8 10 12 14 1:500 @ A2

CARSELDINE URBAN VILLAGE

PLAN OF DEVELOPMENT STAGE 2

PLAN REF: 128180-75
Rev No: B
DATE: 12 MAY 2020
CLIENT: EDQ
DRAWN BY: LZ./MD
CHECKED BY: MD

Legend

- Site Boundary
- Stage Boundary
- Sports Park

Allotment Controls

- Mandatory Built to Boundary Wall
- No Vehicle Access
- Primary Frontage
- Feature Fencing
- Indicative Double Garage / Carport Location
- Indicative Single Garage / Carport Location
- Preferred Primary Private Open Space Location (Upper Levels)
- Indicative Letterbox Location
- Indicative Front Door Location
- Bin Storage Location
- Proposed Sewer Access Point
- ★ Acoustic Treatment may be required - refer TTM Acoustic Report

Note:
All Lot Numbers, Dimensions and Areas are approximate only, and are subject to survey and Council approval.

Dimensions have been rounded to the nearest 0.1 metres.

Areas have been rounded down to the nearest 5m².

The boundaries shown on this plan should not be used for final detailed engineers design.

URBAN DESIGN
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T +61 7 3539 9500
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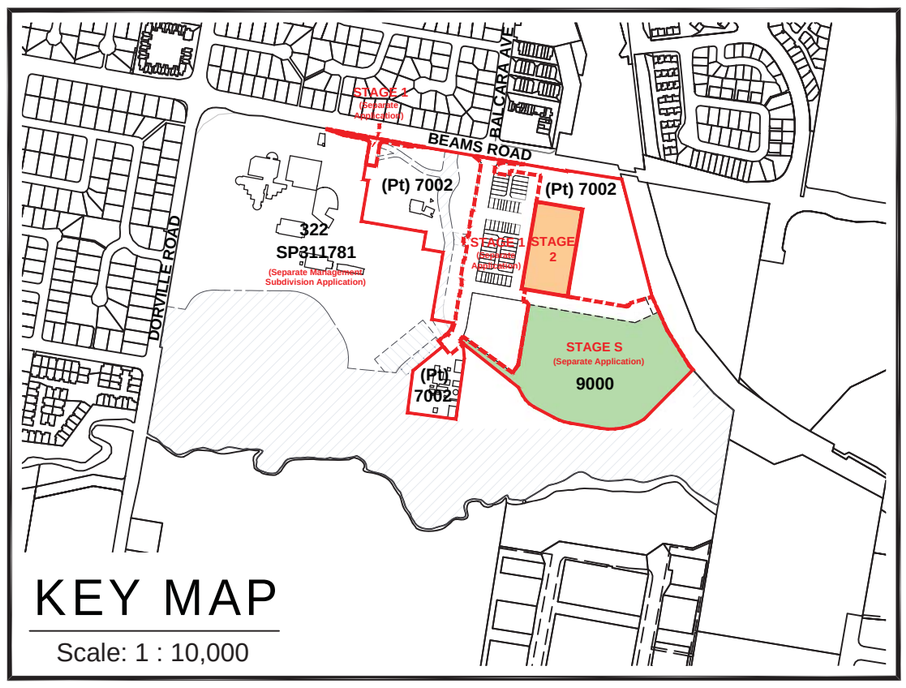

KEY MAP

Scale: 1 : 10,000

BEAMS ROAD

Easement X on SP311781

Ultimate 27m Wide Road Alignment

23.5m - 25m Wide New Road (3/4 Construction - Ultimate Width 27m)

(Pt) 7002

Proposed Temporary Access Easement E (346m²)

6.5m Wide Lane
1002
1003
1004
1005
1006
1020
1019
1018
1017
1016
1007
1008
1009
1010
1011
1012
1013
1014
1015
19m Wide Street
1029
1028
1027
1026
1025
1024
1023
1022
1021
1030
1031
1032
1033
1034
1035
1036
1037
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1052
1051
1050
1049
1048
1047
1038
1039
1040
1041
1042
1043
1044
1045
1046
20m Wide Street
STAGE 1
2039
2040
2041
2042
2043
2044
2045
2046
2047
2048
19m Wide New Road
2010
2009
2008
2007
2006
2005
2004
2003
2002
2001
2011
2012
2013
2014
2015
2016
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2018
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2029
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2024
2023
2022
2021
2020
2030
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2032
2033
2034
2035
2036
2037
2038
23.5m Wide Street
STAGE 2
(Pt) 7002
STAGE S
9000

Ultimate 23m Wide Road Alignment

19.5m - 20.5m Wide New Road (3/4 Construction - Ultimate Width 23m)

Note:
All Lot Numbers, Dimensions and Areas are approximate only, and are subject to survey and Council approval.

Dimensions have been rounded to the nearest 0.1 metres.

Areas have been rounded down to the nearest 5m².

The boundaries shown on this plan should not be used for final detailed engineers design.

Source Information:
Site boundaries: Registered Survey Plans.
Adjoining information: DCDB.

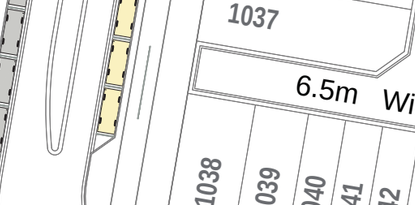
3

Legend

- Site Boundary
- Proposed Stage Boundary
- Existing Easements
- Sports Park
- Visitor Parking for Stage 2 Dwellings
- Visitor Parking for Stage 1 Dwellings
- Visitor Parking - Additional Parking

Parking Bay Diagram

Scale 1 : 100



Parking Breakdown - Stage 2

Total Dwellings Stage 2..... 48

Total Visitor Parking Spaces Required Stage 2
(0.75 per dwelling)..... 36
Total Visitor Parking Spaces Provided Stage 2..... 37

Parking Breakdown - Stage 1 & 2 Combined

Total Dwellings Stage 1 & 2.....101

Total Visitor Parking Spaces Required Stage 1 & 2
(0.75 per dwelling) 76
Total Visitor Parking Spaces Provided Stage 1 & 2.....80

Additional Visitor Parking 20
** To be utilised as visitor parking for future Stage subdivision(s).*

PLAN REF: 128180 – 76
Rev No: B
DATE: 12 MAY 2020
CLIENT: EDQ
DRAWN BY: LZ/JC
CHECKED BY: MD

0 10 20 30 40 50 **1 : 750 @ A2**

CARSELDINE URBAN VILLAGE
CAR PARKING ANALYSIS PLAN
STAGE 2

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Carseldine Village – Stage 2

Appendix C Code Responses

Economic Development Queensland

PERFORMANCE CRITERIA	ACCEPTABLE SOLUTIONS	SOLUTIONS[1]	COMMENTS	COUNCIL USE ONLY
P01 Development for filling or excavation minimises visual impacts from retaining walls and earthworks.	**A01** Development ensures that the total height of any cut and fill, whether or not retained, does not exceed: (a) 2.5m in a zone in the Industry zones category; (b) 1m in all other zones, or if adjoining a sensitive zone.	✓	**S01** The development will minimise visual impacts from retaining walls if they are provided and earthworks.	
P02 Development of a retaining wall proposed as a result of filling or excavation: (a) is designed and constructed to be fit for purpose; (b) does not impact adversely on significant vegetation; (c) is capable of easy maintenance. Editor's note—A retaining wall also needs to comply with the Building Regulation and embankment gradients will need to comply with the Building Regulation. Note—Guidance on the protection of native vegetation is included in the Biodiversity areas planning scheme policy.	**A02.1** Development of a retaining structure, including footings, surface drainage and subsoil drainage: (a) is wholly contained within the site; (b) if the total height to be retained is greater than 1m, then: i. the retaining wall at the property boundary is no greater than 1m above the ground level; ii. all further terracing from the 1m high boundary retaining wall is 1 vertical unit:1 horizontal unit; iii. the distance between each successive retaining wall (back of lower wall to face of higher wall) is no less than 1m horizontally to incorporate planting areas.	✓	**S02.1** All retaining walls, if provided, will be wholly contained within the site and the total height of the retaining wall will be less than 1m.	
	A02.2 Development of a retaining wall over 1m in height protects significant vegetation on the site and on adjoining land and is designed and constructed in accordance with the structures standards in the Infrastructure design planning scheme policy and certified by a Registered Professional Engineer Queensland.	N/A	**S02.2** The retaining walls, if provided over 1m will ensure that protection to significant vegetation in accordance with the structures standards in the Infrastructure design planning scheme policy and will be certified by a RPEQ.	

Solution: ✓ = Acceptable Solution
A/S = Alternative Solution
N/A = Not Applicable to this Proposal

PERFORMANCE CRITERIA	ACCEPTABLE SOLUTIONS	SOLUTIONS[1]	COMMENTS	COUNCIL USE ONLY
	A02.3 Development provides a retaining wall finish that presents to adjoining land that is maintenance free if the setback is less than 750mm from the boundary.	✓	**S02.3** The retaining wall, if provided, finish will be presented to the adjoining land free of maintenance.	
	A02.4 Development for filling only uses clean fill that does not include any construction rubble or debris.	✓	**S02.4** Clean fill will be used for any on site filling.	
P03 Development ensures that a rock anchor is designed and constructed to be fit for purpose.	**A03** Development ensures that a rock anchor: (a) is constructed in accordance with the standards in the Infrastructure design planning scheme policy; (b) where it extends beyond the property boundary, is supported by a letter of consent from the adjoining land and building owners	✓	**S03** Where rock anchors are proposed for use they will be appropriately designed and approved by a certified RPEQ.	
P04 Development protects all services and public utilities.	**A04** Development protects services and public utilities and ensures that any alteration or relocation of services or public utilities meets the standard design specifications of the responsible service authorities.	✓	**S04** The alteration or relocation of services and public utilities will be in accordance with the standard design specifications of the responsible service authorities.	
P05 Development provides surface and sub-surface drainage to prevent water seepage, concentration of run-off or ponding of stormwater on adjacent land.	**A05** Development ensures all flows and subsoil drainage are directed to a lawful point of discharge of a surface water diversion drain, including to the top or toe of a retaining wall in accordance with the stormwater drainage section of the Infrastructure design planning scheme policy.	✓	**S05** All drainage will be directed to the lawful point of discharge in accordance with the stormwater drainage section of the Infrastructure design planning scheme policy. Refer to Stormwater Management Plan prepared by Design Flow for the stormwater strategy	

Solution: ✓ = Acceptable Solution
A/S = Alternative Solution
N/A = Not Applicable to this Proposal

P06 Development ensures that the design and construction of all open drainage works is undertaken in accordance with natural channel design principles, being the development of a stormwater conveyance system for major flows, by using a vegetated open channel or drain that approximates the features and functions of a natural waterway to enhance or improve riparian values of those stormwater conveyance systems. Editor's note—Guidance on natural channel design principles can be found in the Council's publication Natural channel design guidelines.	**A06** No acceptable outcome is prescribed.	N/A	**S06** No open drainage is proposed as part of the development.	
P07 Development for filling or excavation: (a) does not degrade water quality or adversely affect environmental values in receiving waters; (b) ensures site sediment and erosion control standards are best practice.	**A07.1** Development for filling or excavation provides water quality treatment that complies with the stormwater drainage section of the Infrastructure design planning scheme policy.	✓	**S07.1** Proposed filling or excavation complies with the **Stormwater Management Code** and the **Infrastructure Design Planning Scheme Policy**. Refer to the *Site Based Stormwater Management Plan* 15-003002-WCSMP-01 prepared by Calibre Consulting (Qld) Pty Ltd for details regarding flooding and stormwater management.	
	A07.2 Development provides erosion and sediment control standards that are in accordance with the stormwater drainage section of the Infrastructure design planning scheme policy.	✓	**S07.2** Proposed filling or excavation complies with the Sedicment Control Standards within Council's **Infrastructure Design Planning Scheme Policy..** Refer to Stormwater Management Plan prepared by Design Flow for the stormwater strategy	

Solution: ✓ = Acceptable Solution
A/S = Alternative Solution
N/A = Not Applicable to this Proposal

P08 Development for filling or excavation is conducted such that adverse impacts at a sensitive use due to noise and dust are prevented or minimised. *Note—A noise and dust impact management plan prepared in accordance with the Management plans planning scheme policy can assist in demonstrating achievement of this performance outcome.*	**A08.1** Development ensures that no dust emissions extend beyond the boundary of the site, including dust from construction vehicles entering and leaving the site.	✓	**S08.1** Construction and demolition works will occur during work times in accordance with the relevant planning scheme policies and guidelines. A Construction Management Plan will be provided prior to commencement of site works.	
	A08.2 Development for filling or excavation activity only occurs between the hours of 6:30am and 6:30pm Monday to Saturday, excluding public holidays.	✓	**S08.2** Filling or excavation activities will be undertaken between the hours of 6:30am and 6:30pm Monday to Saturday, excluding public holidays.	
P09 Development ensures that vibration generated by the filling or excavation operation does not exceed the vibration criteria in Table 9.4.3.3.D, Table 9.4.3.3.E, Table 9.4.3.3.F and Table 9.4.3.3.G. Note—A noise management report prepared in accordance with the Noise impact assessment planning scheme policy can assist in demonstrating achievement of this performance outcome.	**A09** Development involving filling or excavation does not cause a ground-borne vibration beyond the boundary of the site.	✓	**S09** Filling or excavation will be undertaken using methods which do not cause a ground-borne vibration beyond the boundary of the site.	
P010 Development ensures that heavy trucks hauling material to and from the site do not affect the amenity of established areas and limits environmental nuisance impact on adjacent land.	**A010** Development ensures that heavy trucks hauling material to and from the site: (a) occur for a maximum of 3 weeks; (b) use a major road to access the site; (c) only use a minor road for the shortest-most-direct route that has the least amount of environmental nuisance if there is no major road alternative.	✓	**S010** Haulage of material will be undertaken with consideration to the local environment with appropriate mitigation measures implemented to prevent nuisance. All works will be undertaken during acceptable construction hours. The routes used for transportation of earthworks will be decided and agreed upon with Council prior to commencement of construction.	

Solution: ✓ = Acceptable Solution
A/S = Alternative Solution
N/A = Not Applicable to this Proposal

P011 Development for filling or excavation protects the environment and community health and wellbeing from exposure to contaminated land and contaminated material.	**A011** Development does not involve: (a) excavation on land previously occupied by a notifiable activity or on land listed on the Environmental Management Register or the Contaminated Land Register; (b) filling with material containing a contaminant..	N/A	**S011** The site is not on the Environmental Management Register or Contaminated Land Register.	
P012 Development provides for: (a) landscaping for water conservation purposes; (b) water sensitive urban design measures which are employed within the landscape design to maximise stormwater use and to reduce any adverse impacts on the landscape; (c) stormwater harvesting to be maximised and any adverse impacts of stormwater minimised.	**A012.1** Development provides landscaping which is designed using the standards in the Landscape design guidelines for water conservation planning scheme policy.	✓	**S012.1** See landscape Schematic Design and response to Landscape Code.	
	A012.2 Development ensures that the design and requirements for irrigation are in compliance with the standards in Landscape design guidelines for water conservation planning scheme policy.	✓	**S012.2** There is no irrigation proposed for the development.	
	A012.3 Development provides areas of pavement, turf and mulched garden beds which are drained. Note—This may be achieved through the provision and/or treatment of swales, spoon drains, field gullies, sub-surface drainage and stormwater connections.	✓	**S012.3** Areas of pavement, turf and mulched garden beds are drained through the provision of stormwater connections.	

Solution: ✓ = Acceptable Solution
A/S = Alternative Solution
N/A = Not Applicable to this Proposal

PERFORMANCE OUTCOME	ACCEPTABLE OUTCOME	OUTCOME	COMMENTS	COUNCIL USE ONLY
P01 Development provides roads, pavement, edging and landscaping which: (a) are designed and constructed in accordance with the road hierarchy; (b) provide for safe travel for pedestrians, cyclists and vehicles; (c) provide access to properties for all modes; (d) provide utilities; (e) provide high levels of aesthetics and amenity, improved liveability and future growth; (f) provide for the amelioration of noise and other pollution; (g) provide a high-quality streetscape; (h) provide a low-maintenance asset with a minimal whole-of-life cost. *Note—This can be demonstrated in an engineering report prepared and certified by a Registered Professional Engineer Queensland in accordance with the Infrastructure design planning scheme policy.*	**A01** Development provides roads and associated pavement, edging and landscaping which are designed and constructed in compliance with the road corridor design standards in the Infrastructure design planning scheme policy.	✓	**S01** The development will provide roads and associated pavement, edging and landscaping designed in accordance with the Infrastructure Design Planning Scheme Policy.	
P02 Development provides road pavement surfaces which: (a) are well designed and constructed; (b) durable enough to carry the wheel loads of the intended types and numbers of travelling and parked vehicles; (c) ensures the safe passage of vehicles, pedestrians and cyclists, the discharge of stormwater run-off and the preservation of all-weather access; (d) allows for reasonable travel comfort.	**A02** Development provides road pavement surfaces which are designed and constructed in compliance with the road corridor design standards in the Infrastructure design planning scheme policy.	✓	**S02** The development will provide road pavement surfaces which are designed and constructed in compliance with the Infrastructure Design Planning Scheme.	

1. Outcome: ✓ = Acceptable Outcome
A/S = Alternative Outcome
N/A = Not applicable to this proposal

PERFORMANCE OUTCOME	ACCEPTABLE OUTCOME	OUTCOME	COMMENTS	COUNCIL USE ONLY
P03 Development provides a pavement edge which is designed and constructed to: (a) control vehicle movements by delineating the carriageway for all users; (b) provide for people with disabilities by allowing safe passage of wheelchairs and other mobility aids.	**A03** Development provides pavement edges which are designed and constructed in compliance with the road corridor design standards in the Infrastructure design planning scheme policy.	✓	**S03** The development will provide road pavement edges in accordance with the Infrastructure Design Planning Scheme. Any damage to road verge during site construction activities, including damage to the kerb and channel, will be rectified to its existing condition.	
P04 Development provides verges which are designed and constructed to: (a) provide safe access for pedestrians clear of obstructions and access areas for vehicles onto properties; (b) provide a sufficient area for public utility services; (c) be maintainable by the Council.	**A04** Development provides verges which are designed and constructed in compliance with the road corridor design and streetscape locality advice standards in the Infrastructure design planning scheme policy.	✓	**S04** If provided, verges will be designed and constructed in accordance with the Infrastructure Design Planning Scheme Policy. Safe pedestrian access and sufficient area for public utility services provided. Verges will be maintainable by Council.	
P05 Development provides a lane or laneway identified in a neighbourhood plan which: (a) allows equitable access for all modes; (b) is safe and secure; (c) has 24-hour access; (d) is a low-speed shared zone environment; (e) has a high-quality streetscape.	**A05** Development provides a lane or laneway identified in a neighbourhood plan which is embellished in compliance with the streetscape locality advice standards in the Infrastructure design planning scheme policy.	✓	**S05** If provided, lane or laneway will be designed in accordance with the Infrastructure Design Planning Scheme Policy.	

1. Outcome: ✓ = Acceptable Outcome
A/S = Alternative Outcome
N/A = Not applicable to this proposal

P06 Development of an existing premises provides at the frontage to the site, if not already provided, the following infrastructure to an appropriate urban standard: (a) an effective, high-quality paved roadway; (b) an effective, high-quality roadway kerb and channel; (c) safe, high-quality vehicle crossings over channels and verges; (d) safe, accessible, high-quality verges compatible and integrated with the surrounding environment; (e) safe vehicle access to the site that enables ingress and egress in a forward gear; (f) provision of and required alterations to public utilities; (g) effective drainage; (h) appropriate conduits to facilitate the provision of required street-lighting systems and traffic signals.	**A06** Development of an existing premises provides at the frontage of the site, if not already existing, the following infrastructure to the standard that would have applied if the development involved new premises as stated in the road corridor design standards in the Infrastructure design planning scheme policy: (a) concrete kerb and channel; (b) forming and grading to verges; (c) crossings over channels and verges; (d) a constructed bikeway; (e) a constructed verge or reconstruction of any damaged verge; (f) construction of the carriageway; (g) payment of costs for required alterations to public utility mains, services or installations; (h) construction of and required alterations to public utility mains, services or installations; (i) drainage works; (j) installation of electrical conduits.	✓	**S06** All surrounding roads are currently in good condition. No external road works are required. High-quality verges proposed which integrate with existing environment. Safe vehicular access proposed.	
P07 Development provides both cycle and walking routes which: (a) are located, designed and constructed to their network classification (where applicable); (b) provide safe and attractive travel routes for pedestrians and cyclists for commuter and recreational purposes; (c) provide safe and comfortable access to properties for pedestrians and cyclists; (d) incorporate water sensitive urban design into stormwater drainage; (e) provide for utilities;	**A07** Development provides cycle and walking routes which are located, designed and constructed in compliance with the road corridor design and off-road pathway design standards in the Infrastructure design planning scheme policy.	✓	**S07** Existing cycle and walking routes are to be maintained on road and verge. New roads are adequately proposed to have pathways and cycle paths as required under the infrastructure design planning scheme policy.	

1. Outcome: ✓ = Acceptable Outcome
A/S = Alternative Outcome
N/A = Not applicable to this proposal

(f) provide for a high level of aesthetics and amenity, improved liveability and future growth; (g) are a low-maintenance asset with a minimal whole-of-life cost; (h) minimise the clearing of significant native vegetation. Note—This can be demonstrated in an engineering report prepared and certified by a *Registered Professional Engineer Queensland* in accordance with the *Infrastructure design planning scheme policy.*				
P08 Development provides refuse and recycling collection, separation and storage facilities that are located and managed so that adverse impacts on building occupants, neighbouring properties and the public realm are minimised.	**A08.1** Development provides refuse and recycling collection and storage facilities in accordance with the Refuse planning scheme policy.	✓	**S08.1** Refuse and recycling collection and storage will be as per the current arrangements. No changes are proposed.	
	A08.2 Development ensures that refuse and recycling collection and storage location and design do not have any adverse impact including odour, noise or visual impacts on the amenity of land uses within or adjoining the development. Note—Refer to the Refuse planning scheme policy for further guidance.	✓	**S08.2** Refuse and recycling collection and storage will be as per the current arrangements. No changes are proposed.	
P09 Development ensures that: (a) land used for an urban purpose is serviced adequately with regard to water supply and waste disposal; (b) the water supply meets the stated standard of service for the intended use and fire-fighting purposes.	**A09.1** Development ensures that the reticulated water and sewerage distribution system for all services is in place before the first use is commenced.	✓	**S09.1** The development has allocations for sewer and water networks to service the development yield in accordance with QUU requirements.	
	A09.2 Development provides the lot with reticulated water supply and sewerage to a standard acceptable to the distributor–retailer.	✓	**S09.2** Refer to S09.1.	

1. Outcome: ✓ = Acceptable Outcome
A/S = Alternative Outcome
N/A = Not applicable to this proposal

P010 Development provides public utilities and street lighting which are the best current or alternative technology and facilitate accessibility, easy maintenance, minimal whole-of-life costs, and minimal adverse environmental impacts.	**A010.1** Development provides public utilities and street lighting which are located and aligned to: (a) avoid significant native vegetation and areas identified within the Biodiversity areas overlay map; (b) minimise earthworks; (c) avoid crossing waterways, waterway corridors and wetlands or if a crossing is unavoidable, tunnel-boring techniques are used to minimise disturbance, and a disturbed area is reinstated and restored on completion of the work. Note—Guidance on the restoration of habitat is included in the Biodiversity areas planning scheme policy.	✓	**S010.1** Provision of public utilities and street lighting will be determined at detailed design stage and incorporated as required.	
	A010.2 Development provides compatible public utility services and street-lighting services which are co-located in common trenching for underground services.	✓	**S010.2** Provision of public utilities and street lighting will be determined at detailed design stage and incorporated as required. Common trenching will be implemented where practicable.	
	A010.3 Development provides public utilities and street lighting which are designed and constructed in compliance with the public utilities standards in the Infrastructure design planning scheme policy.	✓	**S010.3** Provision of public utilities and street lighting will be determined at detailed design stage and incorporated as required. They will be designed and constructed in compliance with the prescribed standards.	

1. Outcome: ✓ = Acceptable Outcome
A/S = Alternative Outcome
N/A = Not applicable to this proposal

P011 Development ensures that land used for urban purposes is serviced adequately with telecommunications and energy supply.	**A011** Development provides land with the following services to the standards of the approved supplier: (a) electricity; (b) telecommunications services; (c) gas service where practicable.	✓	**S011** Electrical and telecommunication services are available to service the site. Electrical and telecommunication servicing will be provided in accordance with Council requirements and agreements with the relevant service providers. Detailed design will be undertaken during the Operational Works stage.	
P012 Development ensures that major public projects promote the provision of affordable, high-bandwidth telecommunications services throughout the city.	**A012** Development provides conduits which are provided in all major Council and government works projects to enable the future provision of fibre optic cabling, if: (a) the additional expense is unlikely to be prohibitive; or (b) further major work is unlikely or disruption would be a major concern, such as where there is a limited capacity road; or (c) there is a clear gap in the telecommunications network; or (d) there is a clear gap in the bandwidth available to the area. Editor's note—An accurate, digital 'as built' three-dimensional location plan is to be supplied for all infrastructure provided in a road.	✓	**S012** The proposed development will be designed to provide for future telecommunications services and providers, in accordance with the relevant Building Codes and Australian Standards.	
P013 Development provides public art identified in a neighbourhood plan or park concept plan which: (a) is provided commensurate with the status and scale of the proposed development; (b) is sited and designed: (i) as an integrated part of the project design; (ii) as conceptually relevant to the context of the location;	**A013** Development provides public art identified in a neighbourhood plan or park concept plan which is sited and designed in compliance with the public art standards in the Infrastructure design planning scheme policy.	N/A	**S013** No public art is proposed at the development.	

1. Outcome: ✓ = Acceptable Outcome
A/S = Alternative Outcome
N/A = Not applicable to this proposal

(iii) to reflect and respond to the cultural values of the community; (iv) to promote local character in a planned and informed manner.				
P014 Development provides signage of buildings and spaces which promote legibility to help users find their way.	**A014** Development provides public signage: (a) at public transport interchanges and stops, key destinations, public spaces, pedestrian linkages and at entries to centre developments; (b) which details the location of the key destinations, public spaces and pedestrian linkages in the vicinity, the services available within the development and where they are located. Editor's note—Signage is to be in accordance with Local Law Number 1 (Control of Advertisements Local Law).	✓	**S014** Signage requirements to be addressed at detailed design stage.	
P015 Development that provides community facilities which form part of the development is functional, safe, low maintenance, and fit for purpose.	**A015** Development that provides community facilities which form part of the development is designed in compliance with the community facilities standards in the Infrastructure design planning scheme policy.	N/A	**S015** No community facilities to be provided at development.	
P016 Development provides public toilets which: (a) are required as part of a community facility or park; (b) are located, designed and constructed to be: (i) safe; (ii) durable; (iii) resistant to vandalism; (iv) able to service expected demand; (v) fit for purpose.	**A016** Development that provides public toilets is designed and constructed in compliance with the public toilets standards in the Infrastructure design planning scheme policy.	✓	**S016** All public toilets will be designed and constructed in accordance with the Public Toilets standards within the Infrastructure Design Planning scheme Policy.	

1. Outcome: ✓ = Acceptable Outcome
A/S = Alternative Outcome
N/A = Not applicable to this proposal

P017 Development provides bridges, tunnels, elevated structures and water access structures that are designed and constructed using proven methods, materials and technology to provide for: (a) safe movement of intended users; (b) an attractive appearance appropriate to the general surroundings and any adjacent structures; (c) functionality and easy maintenance; (d) minimal whole-of-life cost; (e) longevity; (f) current and future services. Note—All bridges and elevated and associated elements must be designed and certified by a Registered Professional Engineer Queensland in accordance with the Infrastructure design planning scheme policy.	**A017** Development that provides bridges, tunnels, elevated structures and water access structures is designed and constructed in compliance with the standards in the Infrastructure design planning scheme policy.	N/A	**S017** No bridges, tunnels, elevated structures and water access structures are proposed to be provided as part of the proposed development.	
P018 Development provides culverts which are designed and constructed using proven methods, materials and technology to provide for: (a) safety; (b) an attractive appearance appropriate to the general surroundings; (c) functionality and easy maintenance; (d) minimal whole-of-life cost; (e) longevity; (f) future widening; (g) current and future services; (h) minimal adverse impacts, such as increase in water levels or flow velocities, and significant change of flood patterns.	**A018** Development that provides culverts is designed and constructed in compliance with the structures standards in the Infrastructure design planning scheme policy.	N/A	**S018** No culverts are proposed for this development.	

1. Outcome: ✓ = Acceptable Outcome
A/S = Alternative Outcome
N/A = Not applicable to this proposal

Note—All culverts and associated elements are to be designed and certified by a Registered Professional Engineer Queensland in accordance with the applicable design standards.				
P019 Development provides batters, retaining walls, and seawalls and river walls which are designed and constructed using proven methods, materials and technology to provide for: (a) safety; (b) an attractive appearance appropriate to the surrounding area; (c) easy maintenance; (d) minimal whole-of-life cost; (e) longevity; (f) minimal water seepage. Note—All retaining walls and associated elements are to be designed and certified by a Registered Professional Engineer Queensland in accordance with the applicable design standards. If for development with a gross floor area greater than 1,000m2	**A019** Development that provides batters, retaining walls, seawalls and river walls is designed and constructed in compliance with the structures standards in the Infrastructure design planning scheme policy.	✓	**S019** Batters and retaining walls if applicable will be suitably designed and certified by an approved RPEQ at the detailed design stage.	
P020 Development ensures that construction is managed so that use of public spaces and movement on pedestrian, cyclist and other traffic routes is not unreasonably disrupted and existing landscaping is adequately protected from short- and long-term impacts. Note—The preparation of a construction management plan can assist in demonstrating achievement of this performance outcome. Note—The Transport, access, parking and servicing planning scheme policy provides advice on the management of vehicle parking	**A020** Development ensures that during construction: (a) the ongoing use of adjoining and surrounding parks and public spaces, such as malls and outdoor dining, is not compromised; (b) adjoining and surrounding landscaping is protected from damage; (c) safe, legible, efficient and sufficient pedestrian, cyclist and vehicular accessibility and connectivity to the wider network are maintained.	✓	**S020** Construction operations will be managed in accordance with the relevant planning scheme policies and guidelines. A Construction Management Plan will be provided prior to commencement of site works.	

1. Outcome: ✓ = Acceptable Outcome
A/S = Alternative Outcome
N/A = Not applicable to this proposal

and deliveries during construction				
P021 Development ensures that construction and demolition activities are guided by measures that prevent or minimise adverse impacts including sleep disturbance at a sensitive use, due to noise and dust, including dust from construction vehicles entering and leaving the site. Note—A noise and dust impact management plan prepared in accordance with the Management plans planning scheme policy can assist in demonstrating achievement of this performance outcome.	**A021.1** Development ensures that demolition and construction: (a) only occur between 6:30am and 6:30pm Monday to Saturday, excluding public holidays; (b) do not occur over periods greater than 6 months.	✓	**S021.1** Construction and demolition works will occur during work times in accordance with the relevant planning scheme policies and guidelines. A Construction Management Plan will be provided prior to commencement of site works.	
	A021.2 Development including construction and demolition does not release dust emissions beyond the boundary of the site.	✓	**S021.2** Appropriate dust suppression will be provided for the duration of construction and demolition works in accordance with the relevant planning scheme policies and guidelines. A Construction Management Plan will be provided prior to commencement of site works.	
	A021.3 Development construction and demolition does not involve asbestos-containing materials.	✓	**S021.3** Asbestos is not expected to exist on the site. If found to occur it will be removed in accordance with the appropriate handling and removal procedures prior to demolition works commencing. There is an Asbestos cement water main located in Dorville road, which is the proposed water supply connection point. No conditions have been proposed by Queensland Urban Utilities as part of the Service Advice Notice.	
P022 Development ensures that: (a) construction and demolition do not result in damage to surrounding property as a result of vibration; (b) vibration levels achieve the vibration criteria in Table 9.4.4.3.B, Table 9.4.4.3.C, Table 9.4.4.3.D and Table 9.4.4.3.E. Note—A vibration impact assessment report prepared in accordance with the Noise impact assessment planning scheme policy can assist in demonstrating achievement of this performance outcome.	**A022** Development ensures that the nature and scale of construction and demolition do not generate noticeable levels of vibration	✓	**S022** Construction operations are not expected to result in vibration levels that can damage surrounding properties. Vibration from site works will be managed in accordance with the relevant planning scheme policies and guidelines. A Construction Management Plan will be provided prior to commencement of site works.	

1. Outcome: ✓ = Acceptable Outcome
A/S = Alternative Outcome
N/A = Not applicable to this proposal

Carseldine Village – Stage 2

Appendix D DBYD Information

Economic Development Queensland

Indicative Plans

Issue Date:	17/08/2017
Location:	532 Beams Road,Carseldine,QLD-4034

DIAL BEFORE YOU DIG www.1100.com.au

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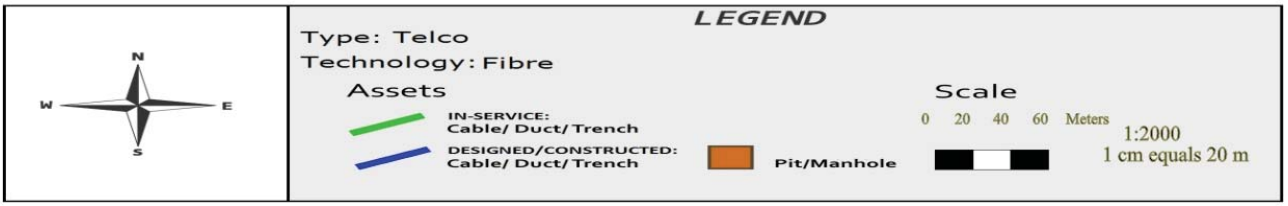

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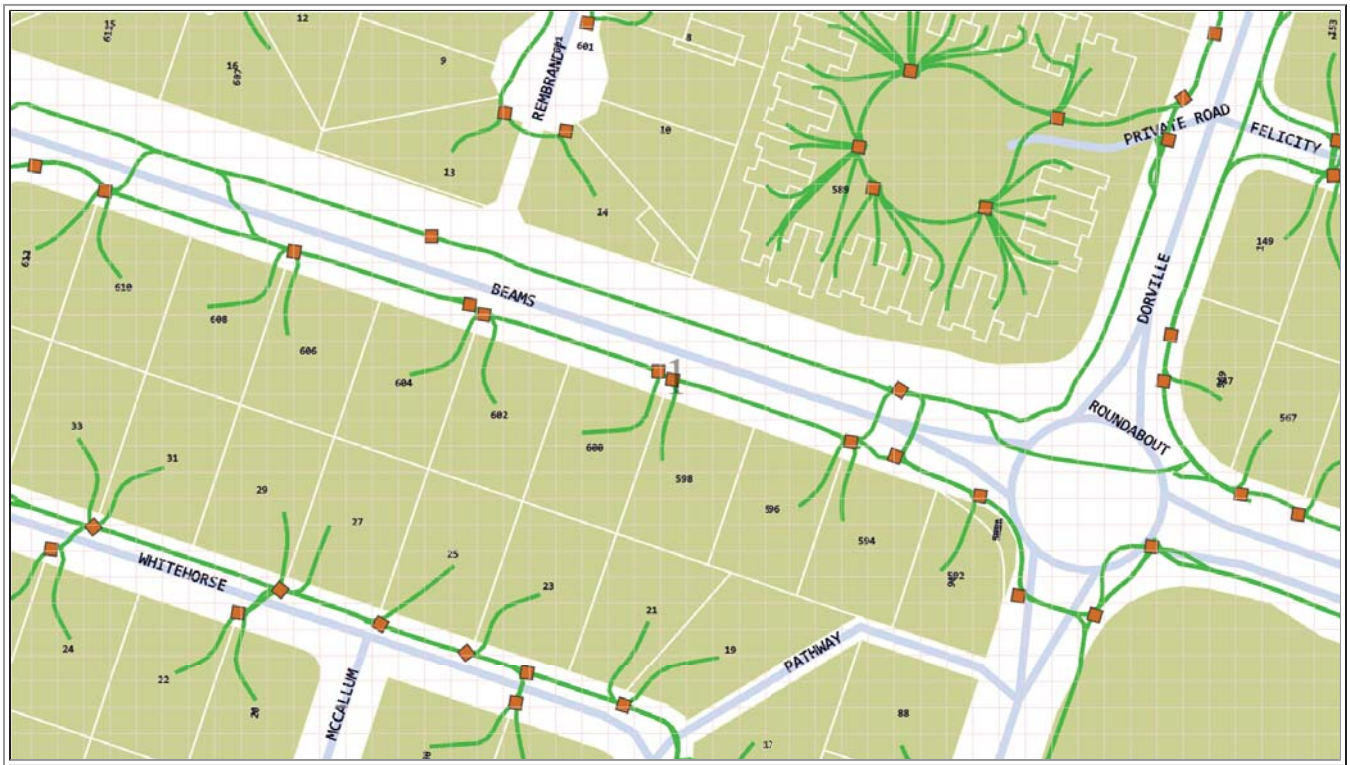

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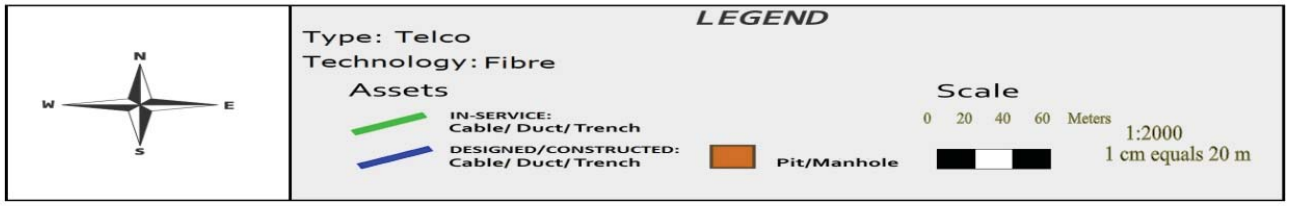

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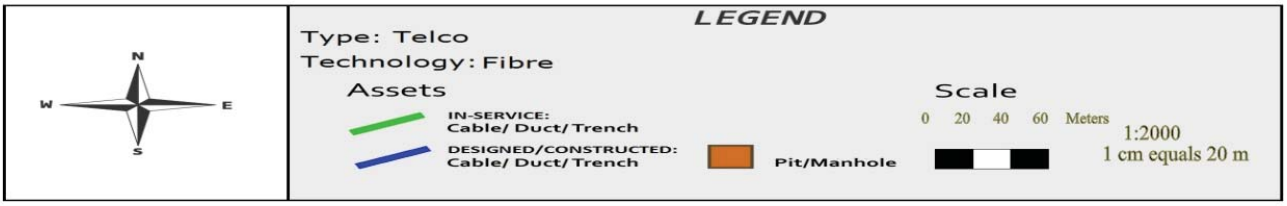

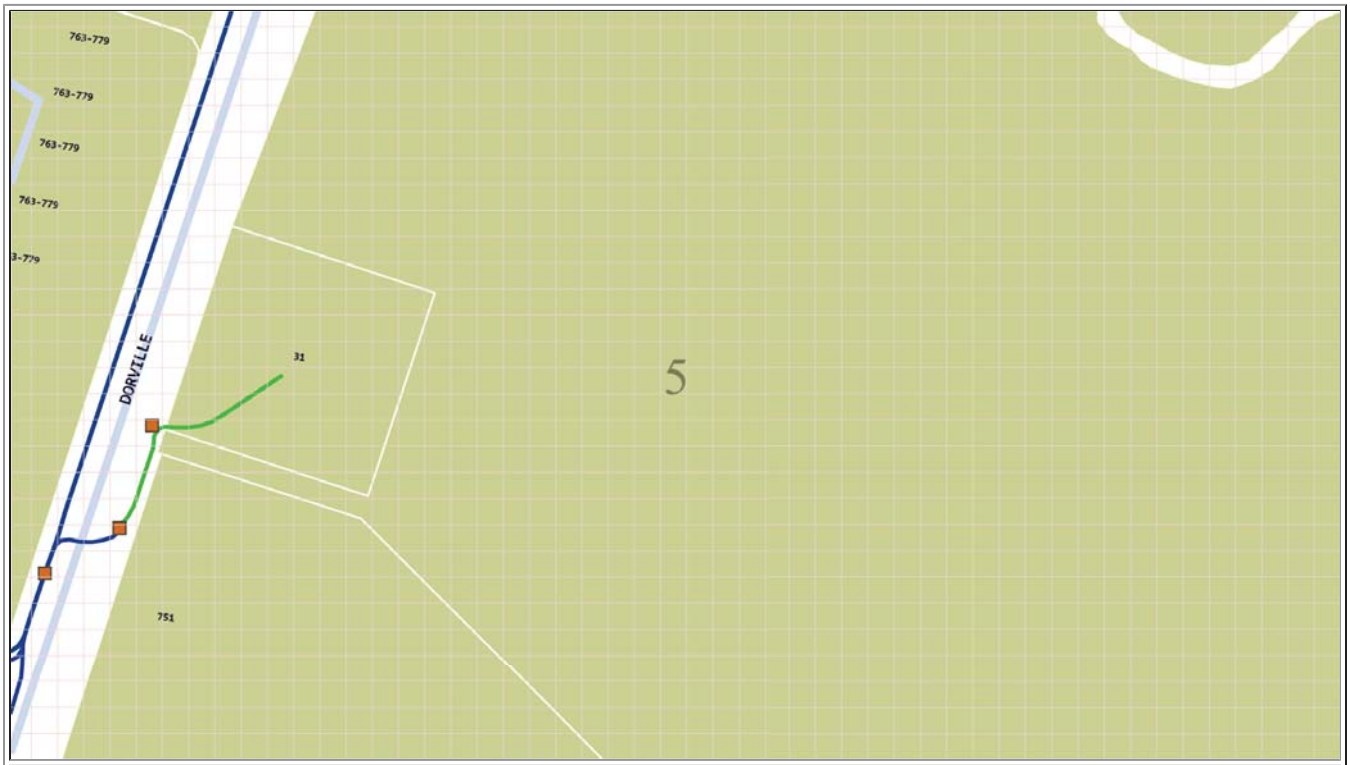

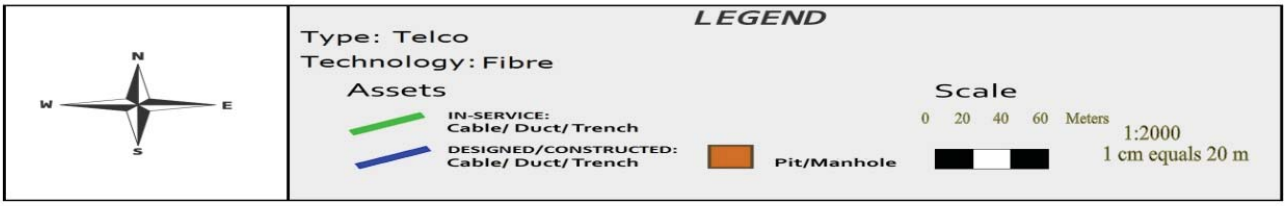

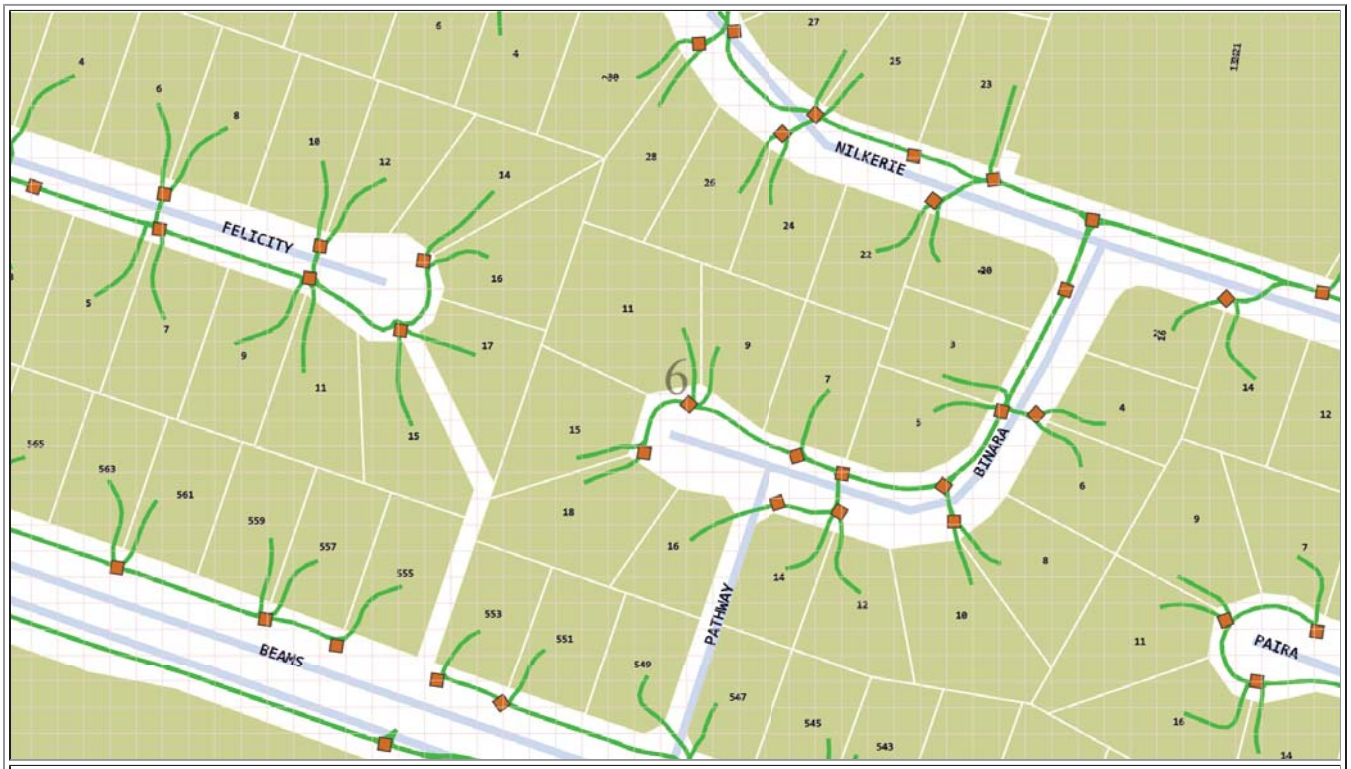

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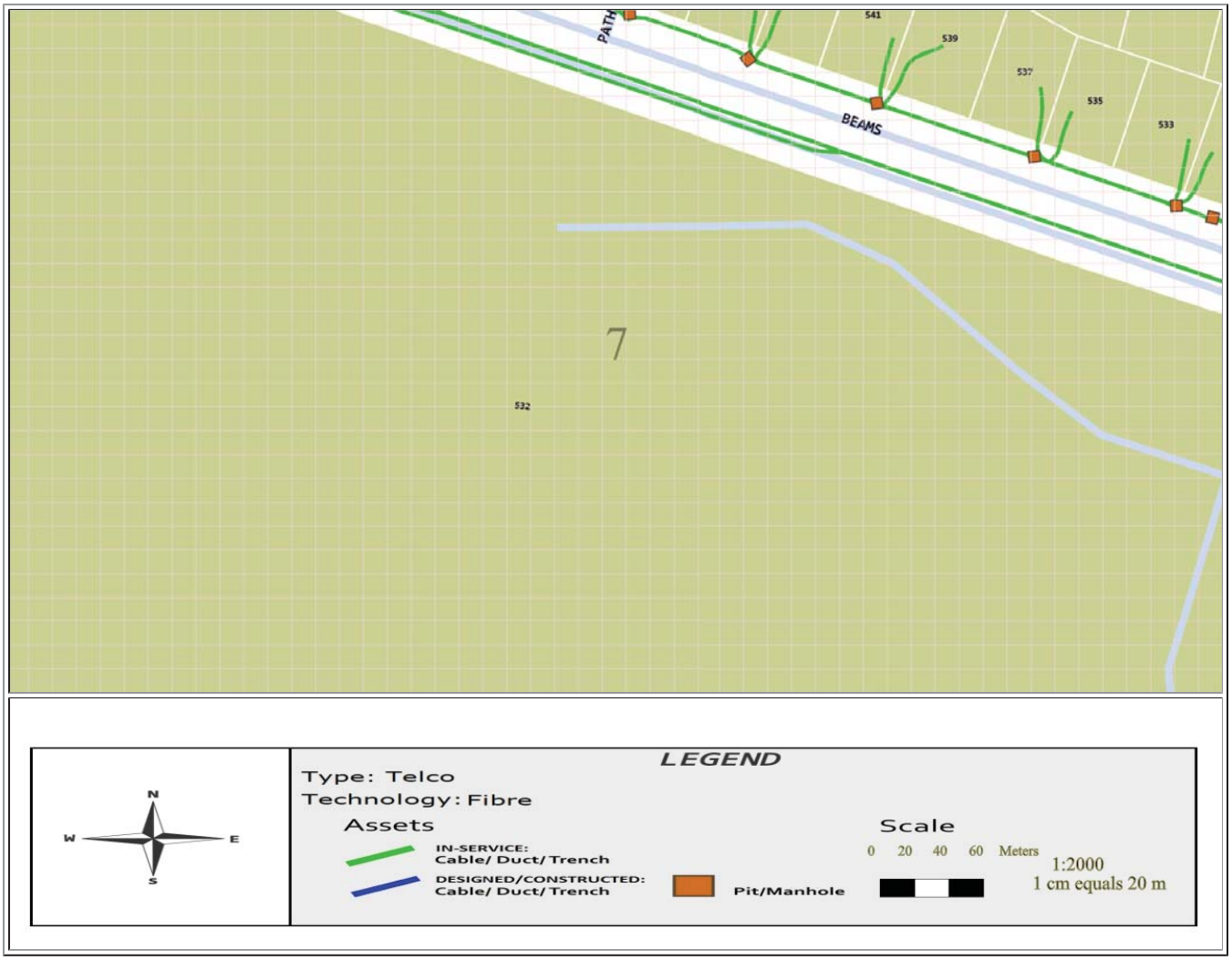

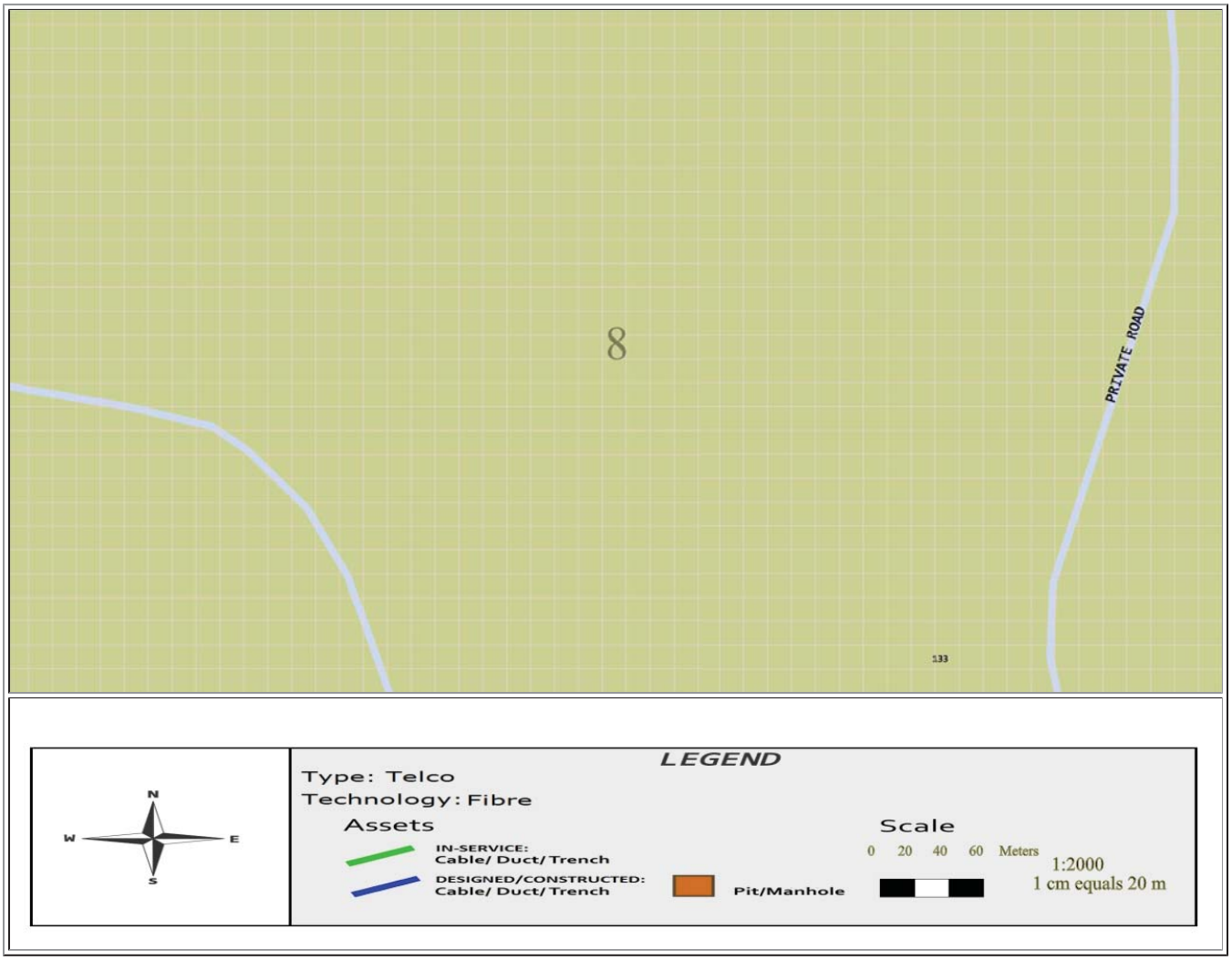

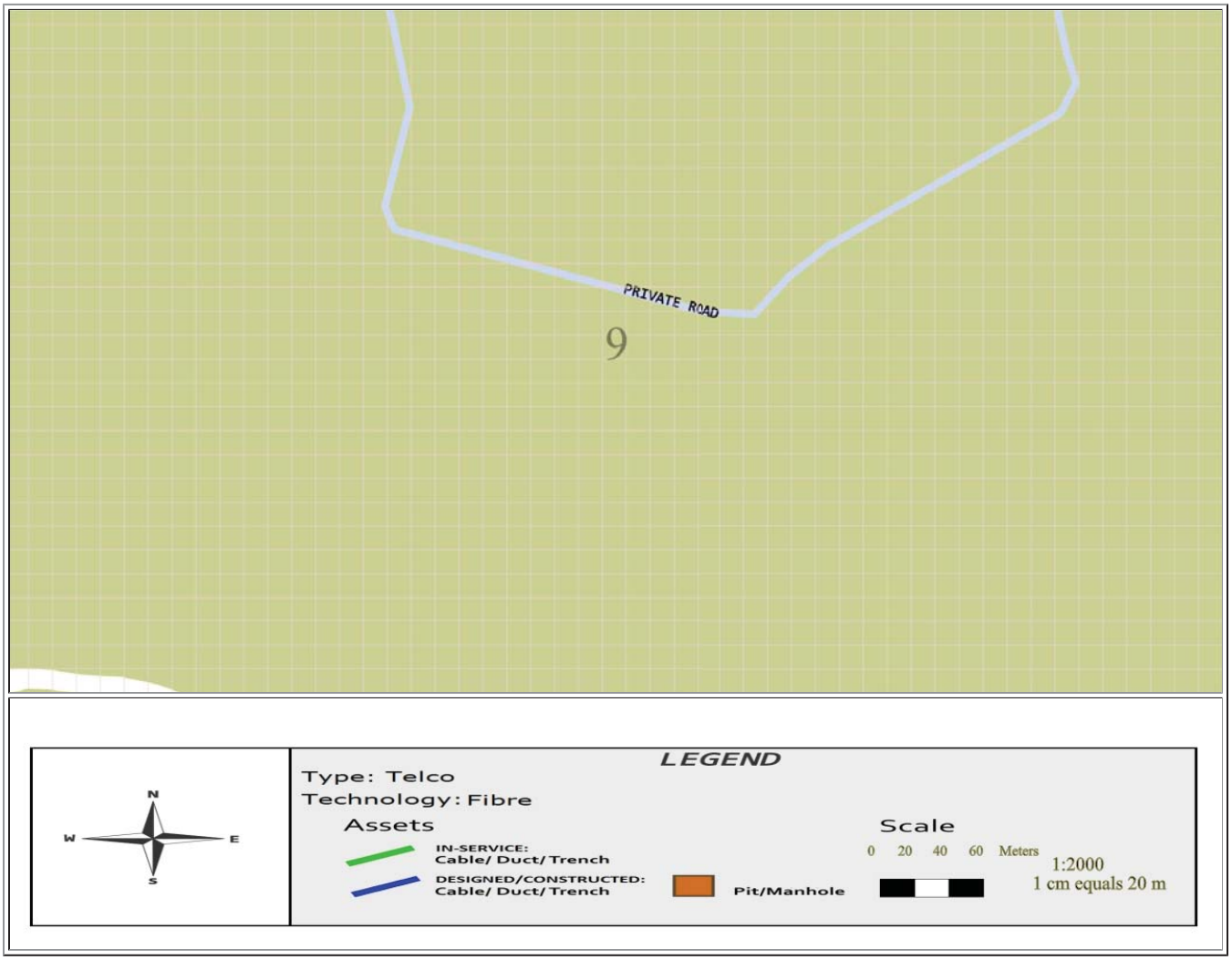

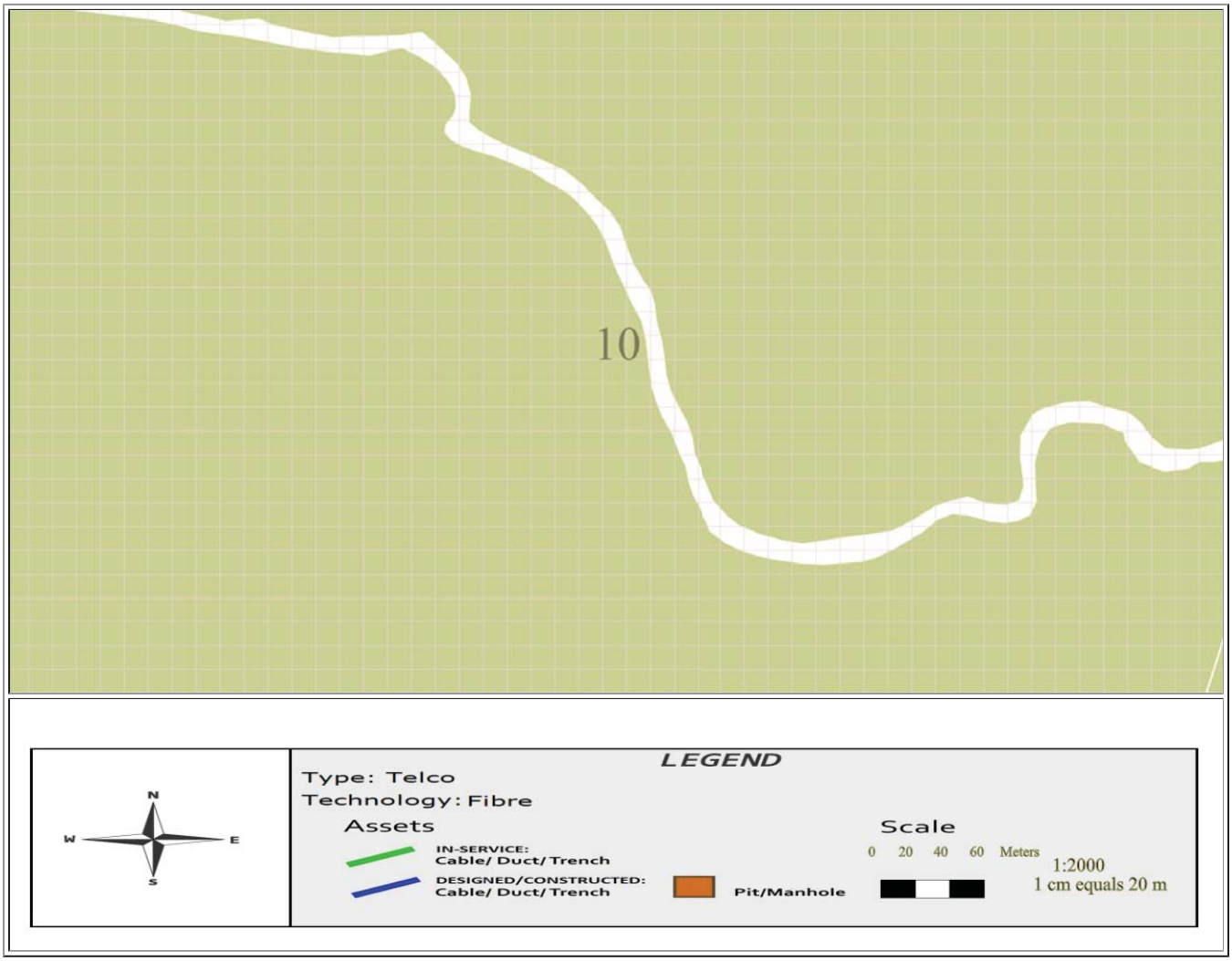

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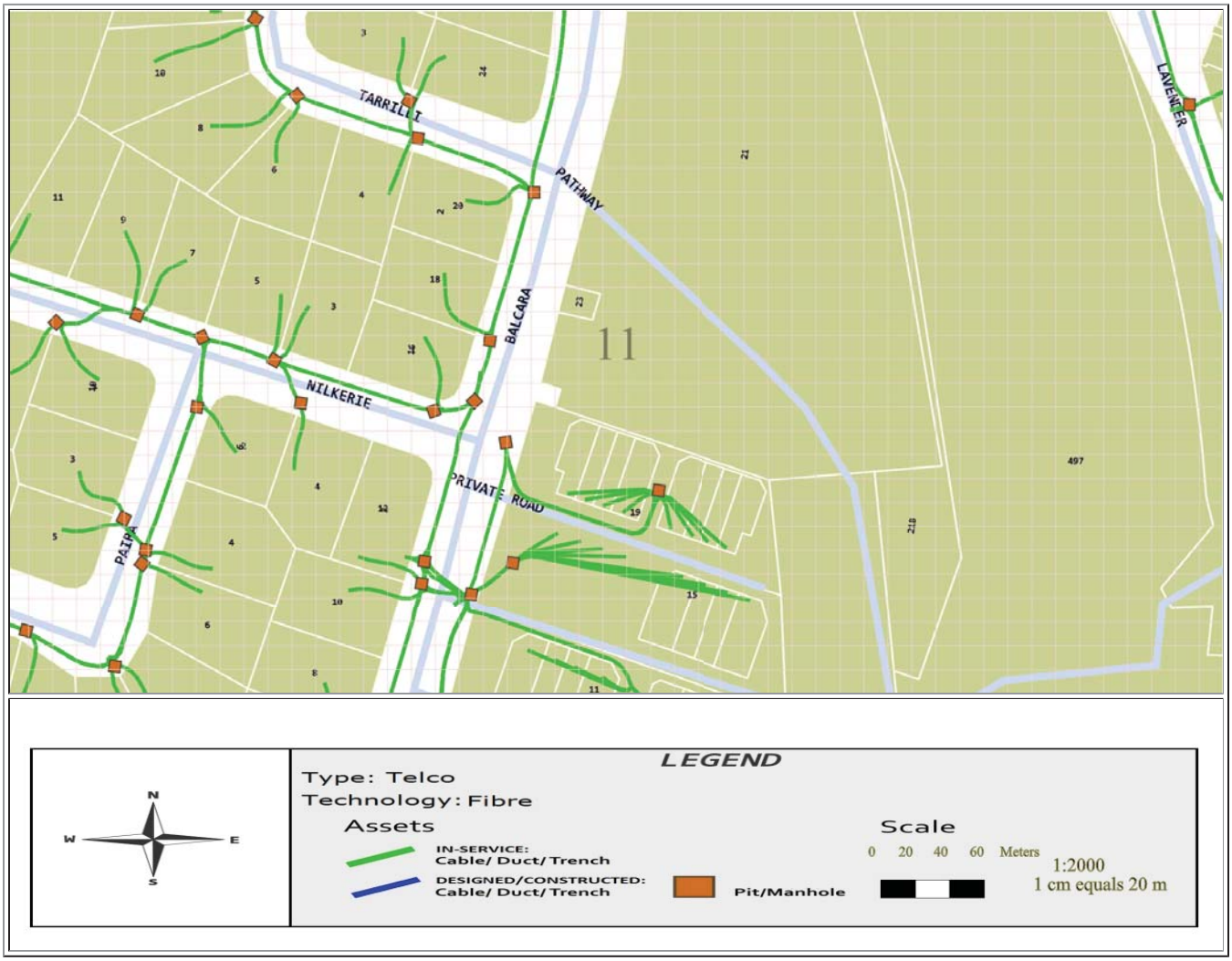

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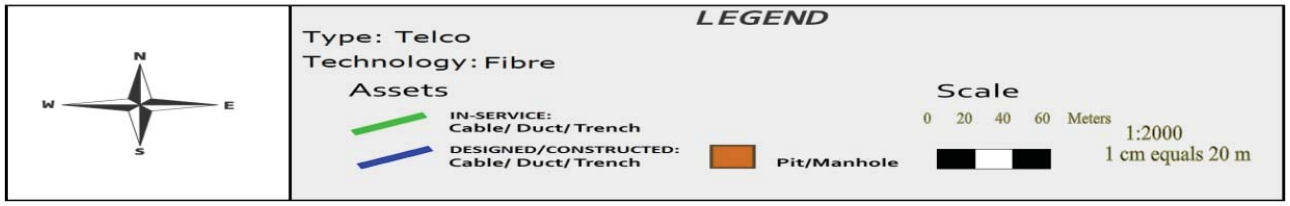
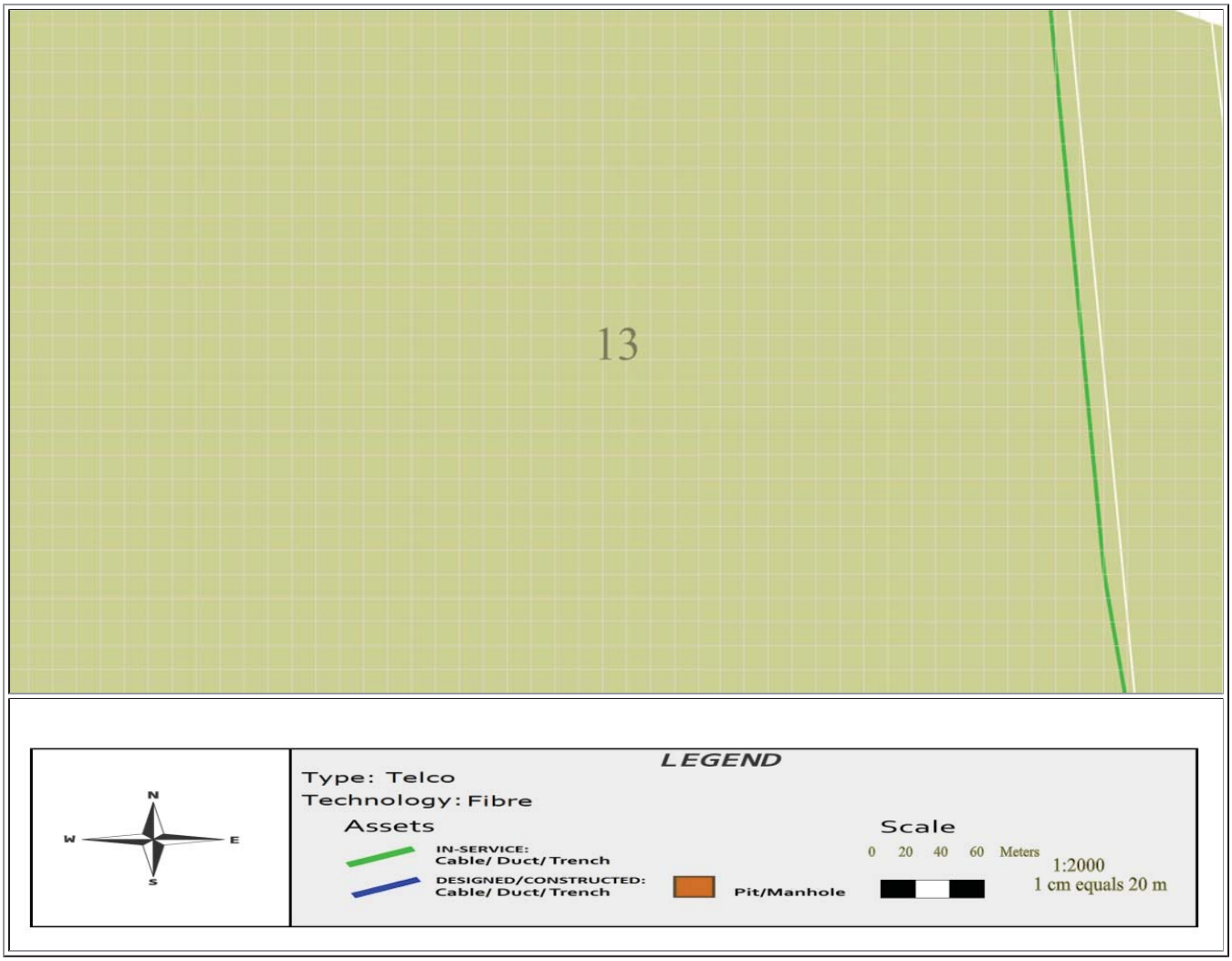
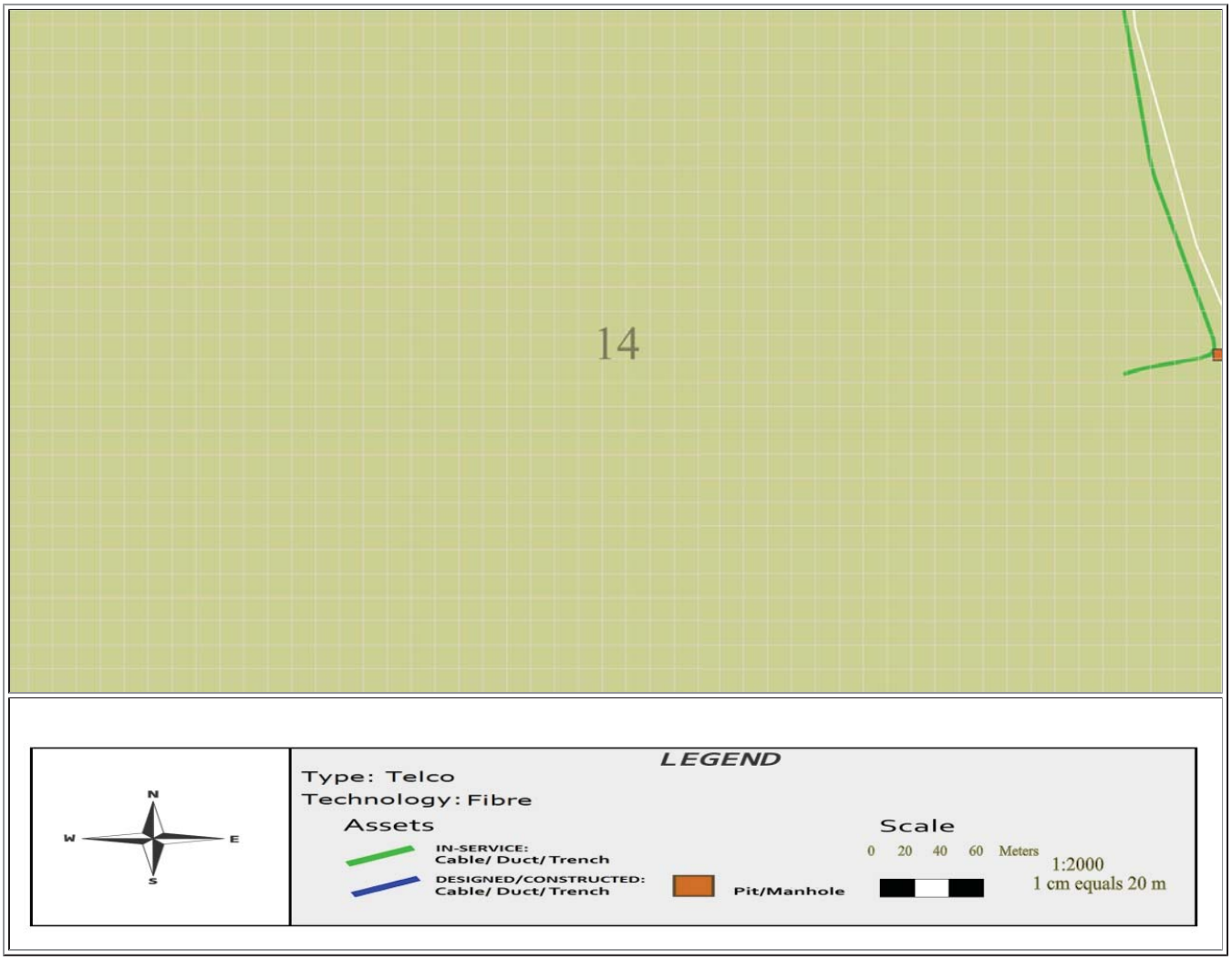
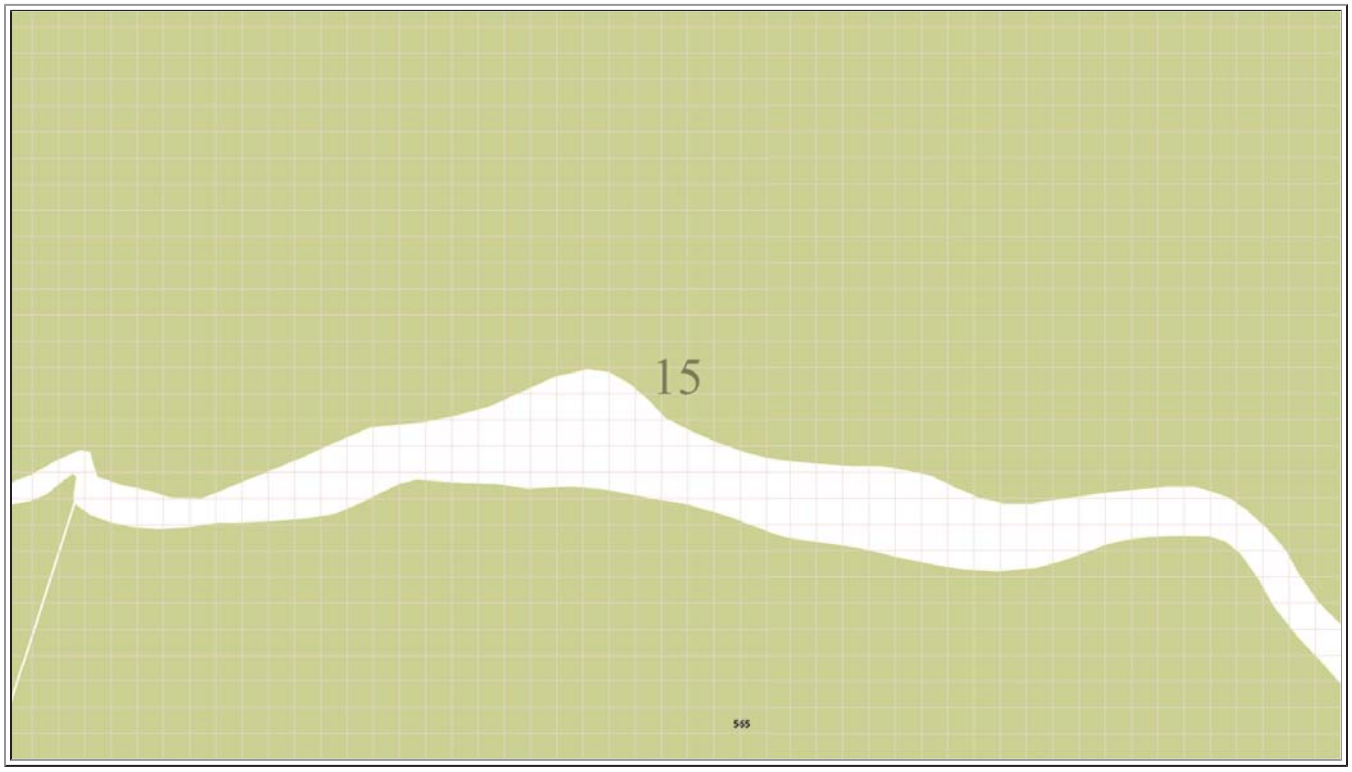








Emergency Contacts

You must immediately report any damage to **nbn™** network that you are/become aware of. Notification may be by telephone - 1800 626 329.

Powerlink Queensland
33 Harold Street,
Virginia, Qld, 4014
Phone: (07) 3866 1313
17/08/2017

To: ('Applicant')
Calibre Consulting - Mr Joshua Goman
545 Queen Street
Brisbane City QLD 4000

Email: joshua.goman@calibreconsulting.co **Phone:** 0738953444
Fax: Not Supplied **Mobile:** Not Supplied

Sequence No: 63691499
Enquiry Location: 532 Beams Road Carseldine
Enquiry Date: 17/08/2017 12:15

Dear Mr Joshua Goman

Thank you for your enquiry in relation to the Enquiry Location. Queensland Electricity Transmission Corporation Limited ACN 078 849 233 trading as Powerlink Queensland ("Powerlink") respond as follows:

Powerlink's records show that there **ARE** underground cables in the Enquiry Location.

A plan is attached showing the approximate location of Powerlink's assets in the vicinity of the Enquiry Location.

Should our response identify the presence of decommissioned Powerlink assets it should be noted that damage to these assets may result in an environmental hazard . As a precaution, all underground assets should be treated as live, and all necessary precautions should be taken to ensure that the cables are not damaged. Should damage occur, all work in the area surrounding the cables must be ceased immediately and Powerlink called on 07 3266 9410 to report the damage and get further advice.

Proposed works in close proximity to Powerlink's plant must undergo a detailed assessment by Powerlink. Please allow at least four to six weeks (more in complex situations) for Powerlink to process your application.

All work in close proximity to Powerlink's cables must be supervised by a Powerlink-appointed person and can be arranged by contacting Powerlink on (07) 3866 1313 at least seven days in advance.

The attached duty of care guidelines below must be observed at all times.

Yours faithfully,

Timothy Byrne
General Manager Community and Delivery Services
Powerlink Queensland

Dial Before You Dig Terms and Conditions

“Duty of Care” for Everyone

Responsibilities When Working in the Vicinity of POWERLINK’S Plant

Everyone has a legal duty of care that must be observed, particularly when working in the vicinity of electrical plant. “Electrical plant” includes underground cables, conduits and other associated underground equipment. It should be noted that the placing or removal of soil by excavation, digging or by any other means is not allowed in a Powerlink-easement without prior written consent from Powerlink. In most cases it is unlikely that consent will be granted.

When discharging this duty of care in relation to Powerlink’s plant, the following points must be considered:

1. It is the responsibility of the architect, consulting engineer, developer and head contractor in the project planning stages to design for minimal impact and adequate protection of Powerlink’s plant. Powerlink will provide free plans showing the presence of its underground plant to assist.

2. It is the developer or constructor’s responsibility to:

    - investigate whether Powerlink’s plant is present in a particular location and obtain the most up to date plans available from Powerlink before commencing construction.
    - visually locate Powerlink’s plant by hand digging where construction activities may be in close proximity to or interfere with Powerlink’s plant.
    - contact Powerlink’s Property Services Group on (07) 3866 1313 if Powerlink’s plant is wholly or partly affected by planned development and construction activities.

3. As the alignment and boundaries of road ways with other properties (and roads within road ways) frequently change, the alignments and boundaries contained within Powerlink’s plans and maps will frequently differ from present alignments and boundaries “on the ground”. Accordingly, in every case where it appears that alignments and boundaries have shifted, or new road ways have been added, the constructor should obtain confirmation of the actual position of Powerlink’s plant under or along the road ways. The constructor must never rely on statements made by third parties in relation to the position of Powerlink’s plant.

Important Points to Note – Please Read

• Plans and details provided by Powerlink are current for one month from the Response Date and should be disposed of by shredding or any other secure disposal method after use.

• Powerlink’s plans are diagrams only. They indicate the presence of underground plant in the general vicinity of the Enquiry Location. Exact ground cover and alignments cannot be given with any certainty, as such levels can change over time.

• To avoid damage or injury, Powerlink’s plant must be carefully located under the supervision of a Powerlink-appointed person before excavation work or similar activities are undertaken near Powerlink’s plant.

• Powerlink, its servants and agents will not be liable for any loss or damage caused or occasioned by the use of plans and or details so supplied to the applicant, its servants and agents, and the applicant agrees to indemnify Powerlink against any claim or demand for any such loss or damage.

• Where work commences prior to obtaining Powerlink’s plans, or Powerlink’s instructions are not followed, the developer/constructor is responsible for all damages sustained to Powerlink’s plant.

• Powerlink reserves all rights to recover compensation for loss or damage caused by interference or damage, including consequential loss and damages to its cable network, or other property.

• All underground conduits and cover slabs must be presumed to contain asbestos. Refer to “Code of Practice for the Management and Control of Asbestos in Workplaces [NOHSC: 2018 (2005).]

• PCB (polychlorinated biphenyl) contamination may exist in some cables.

Remote or On-Site Location Assistance

If requested, Powerlink may provide either remote over –the-phone or on-site location assistance with locating Powerlink's plant. This assistance may include guidance on visually locating and protecting Powerlink plant when excavating. Please note that any markings or pegs placed on the site by Powerlink during any such visit are indications of approximate cable locations only. The constructor is responsible for all hand digging (potholing) to visually locate and expose POWERLINK'S plant**.**

If the constructor is unable to locate Powerlink's plant within five metres of indicative plan locations, they must contact Powerlink's Regional Officer for Local Security for further advice. Contact details are as follows;

Officers for Local Security:

Region name	Contact's name	Telephone number	Mobile number	Facsimile number
Southern	Bruce Muhling	(07) 3860 2305	0417 294 210	(07) 3860 2225
Central	Shane Balchin	(07) 4931 2663	0419 741 899	(07) 4931 2391
Northern	John Dunn	(07) 4052 4602	0419 502 802	(07) 4052 4608

When working in the vicinity of Powerlink's plant, please observe the following conditions:

Records
The first step before any excavation commences is to obtain records of Powerlink's plant in the vicinity of the work. For new work, records should be obtained during the initial planning and design stage. The records provided by Powerlink must also be made available to all construction groups on site. Where plant information is transferred to plans for the proposed work, care must be exercised to ensure that important detail is not lost in the process.

Location of Cables
Examining the records is not sufficient, as reference points may change from the time of installation. Records must also be validated when working in close proximity to underground plant. The exact location of plant that maybe affected must be confirmed by use of an electronic cable locater followed by careful hand excavation to the level of cover slabs or conduits. Hand excavation must be used in advance of excavators. If doubt exists with respect to interpretation of cable records, Powerlink's Regional Officer for Local Security must be contacted. Refer to the contact details above.

Electrical Cable Covers
Powerlink's cables have underground cable warning tapes installed above the cables with the wording 'high voltage cable' and some may also have additional mechanical protection. Please note that some cables are known to be buried without covers.

Supervision
Any work in close proximity (within cable easement or five metres from the cable) to Powerlink's cables will always require on site supervision arranged by Powerlink.

Proposed works
No placing or removal of soil by excavation, digging or by any other means is allowed in Powerlink's easement without prior specific written consent from Powerlink.

Excavating Near Cables
For all work within five metres of where the plant is shown on Powerlink's plans, the constructor is required to hand dig (pothole) and expose the plant to confirm its exact location before work can commence.

Excavating Parallel to Cables
If construction work is parallel to Powerlink's cables, then hand digging (potholing) at least every four metres is required to establish the location of all cables to confirm the exact location of Powerlink's plant before work can commence. Generally, no restrictions are placed on excavations parallel to Powerlink's cables to a depth not exceeding that of the cable and the entire excavation is located outside Powerlink's easement. If an excavation exceeds the depth of the cables and is within five metres of the edge of the easement (or within ten metres of the cable) it is likely that the covers or bedding material around the cables or conduits will move, and Powerlink must be contacted. Design for the installation of parallel infrastructure will need to take into account electrical issues, including induction and transferred potential. Please note that cable depths may change suddenly.

Excavating Across Cables
A minimum clearance of 150 mm above, below, and to the sides of cables must be maintained. A standard clearance between services must be maintained as set down by the individual authorities. If the width or depth of the excavation is such that the cable warning tapes are exposed or the cables being unsupported, then Powerlink must be contacted to determine whether the cables should be taken out of service, or whether they need to be protected or supported. In the case of high voltage cables, it is unlikely that Powerlink will be able to take the cables out of service, and is definitely not an option without a lead time of at least 12 months. A cable cover must never be removed without prior specific written approval. A cable cover and the warning tapes may only be replaced under the supervision of a Powerlink officer. Protective cover strips must never be omitted to allow separation between Powerlink's cables and other services.

Directional Boring Near Cables
When boring parallel to cables, it is essential that trial holes are carefully hand dug at regular intervals to validate the actual location of the Powerlink's conduits or cables before using boring machinery. Where it is required to bore across the line of cables, the actual location of the cables must first be proven by hand digging. A trench must be excavated one metre from the side of the cables where the auger will approach to ensure a minimum clearance of 150 mm from cables can be maintained.

Heavy Machinery Operation over Cables
If a heavy "crawler" or "vibration" type machinery is proposed to be operated over the top of cables, detailed engineering plans and supporting information must be submitted to Powerlink for its approval, or otherwise (in writing) prior to any on site work commencing.

Hot Work in Proximity to Exposed POWERLINK'S Plant and Underground Cables
Exposed underground electrical cables must be protected against the effects of heat by shielding or covering cables with a suitable material. Heating of exposed insulation is dangerous and must be avoided at all costs.

Explosives
Before using explosives in the vicinity of POWERLINK'S cables, clearances should be obtained from Powerlink's Design Engineer. If explosives are proposed to be used within 100 metres of cables, an engineering report demonstrating that no damage will be sustained to Powerlink's plant must be provided to Powerlink prior to using such explosives.

Damage Reporting
All damage to Powerlink's cables, conduits and pipes must be reported to Powerlink no matter how insignificant the damage appears to be. Even very minor damage to cable protective coverings can lead to eventual failure of cables through corrosion of metal sheaths and moisture ingress. Some cables contain oil, and damage may result in an oil leak which will seriously impact the performance of the cable and will be treated as an environmental incident. All work in the vicinity of any of Powerlink's plant that has been damaged should cease and the area should be vacated until a clearance to continue work has been obtained from an authorised Powerlink officer.

Please note that high voltage electrical cables, if damaged, can cause serious injury, or fatality. Extreme caution needs to be exercised at all times when working in close proximity to these cables.

Electricity emergencies all areas or after hours enquiries
24 Hours **1800 353 031**

Plant Solutions and Assistance

If Powerlink's plant location plans or visual location of Powerlink's plant by hand digging reveals that the location of this plant is situated wholly or partly where the developer or constructor plans to work, then Powerlink's Property Services Team must be contacted on (07) 3866 1313 to discuss possible engineering solutions.

If detailed engineering assessment work, plant relocation, or protection works are part of the solution offered by Powerlink, then the cost of this work (the technical assessment and design, as well as the solution implementation cost) is recoverable by Powerlink from the principal developer or constructor. Powerlink will not commence work on the assessment and design until the developer or constructor provide a purchase order for these works. Powerlink will then provide a cost estimate for any proposed solution, and will not commence work on the solution until the developer or constructor provide a purchase order for the cost estimate.

Date: 17/08/2017

Overview Map

Enquiry No: 63691499

532 Beams Road Carseldine

Powerlink Queensland makes every effort that the information contained on this map is up to date and correct but accepts no responsibility for this information.

The information is provided as a guide only. For up to date and specific information you should contact our Virginia office on (07) 3866 1313.

N E S W

0 0.06km

Imagery sourced from Open StreetMaps

LEGEND:

- 1 Detail Map Area
- Powerlink Substation
- Other Substation
- Possible Comms
- High Voltage Cable
- Pilot Cable
- Optic Fibre
- Decommissioned

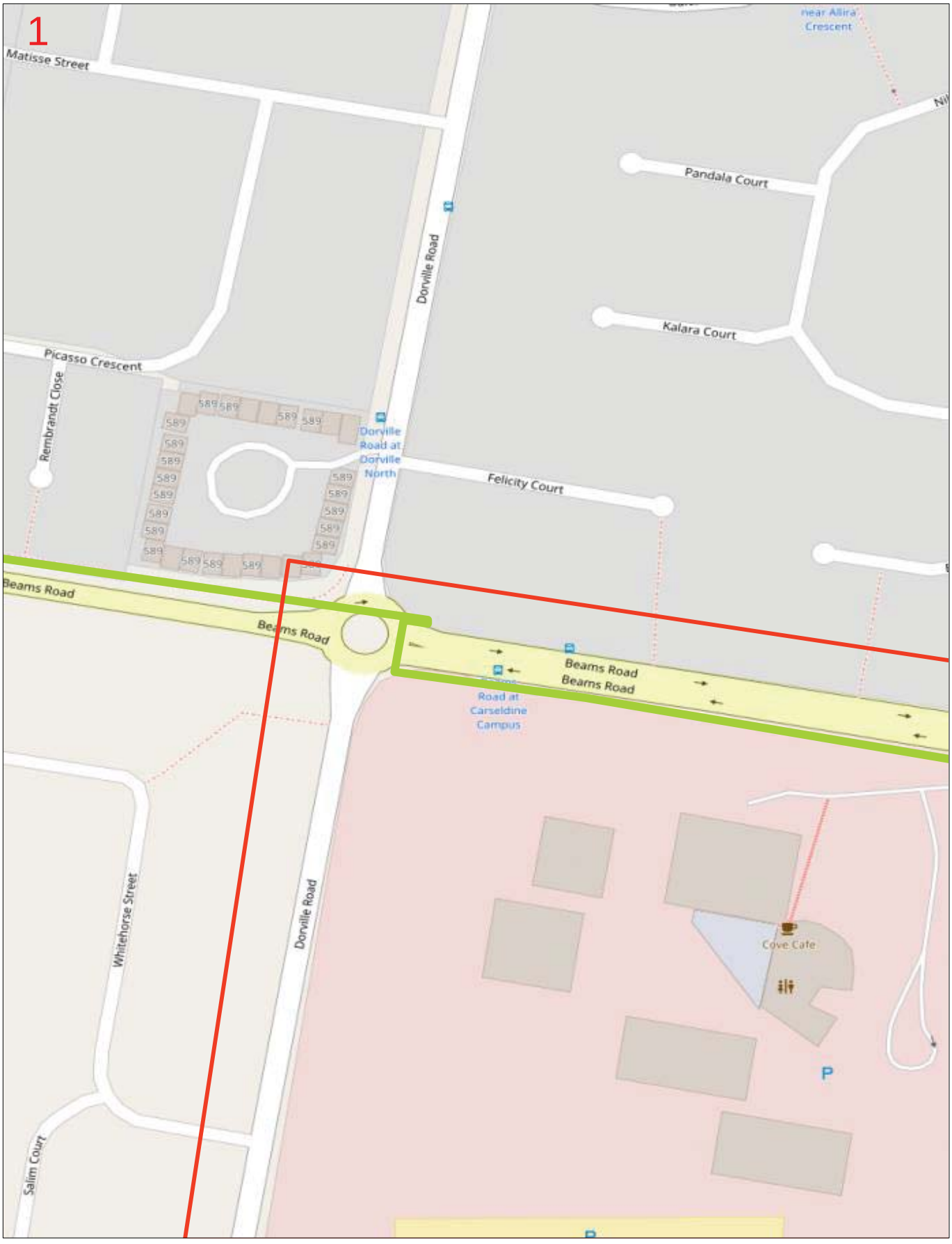
Affected DBYD Work Area Symbols

Date: 17/08/2017

Map 1

Enquiry No: 63691499

532 Beams Road Carseldine



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N W E S

0 0.02km

Imagery sourced from Open StreetMaps

LEGEND:

- Powerlink Substation
- Other Substation
- Possible Comms
- High Voltage Cable
- Pilot Cable
- Optic Fibre
- Decommissioned

Affected DBYD Work Area Symbols

Date: 17/08/2017

Map 2

Enquiry No: 63691499

532 Beams Road Carseldine

Powerlink Queensland makes every effort that the information contained on this map is up to date and correct but accepts no responsibility for this information.

The information is provided as a guide only. For up to date and specific information you should contact our Virginia office on (07) 3866 1313.

N W E S

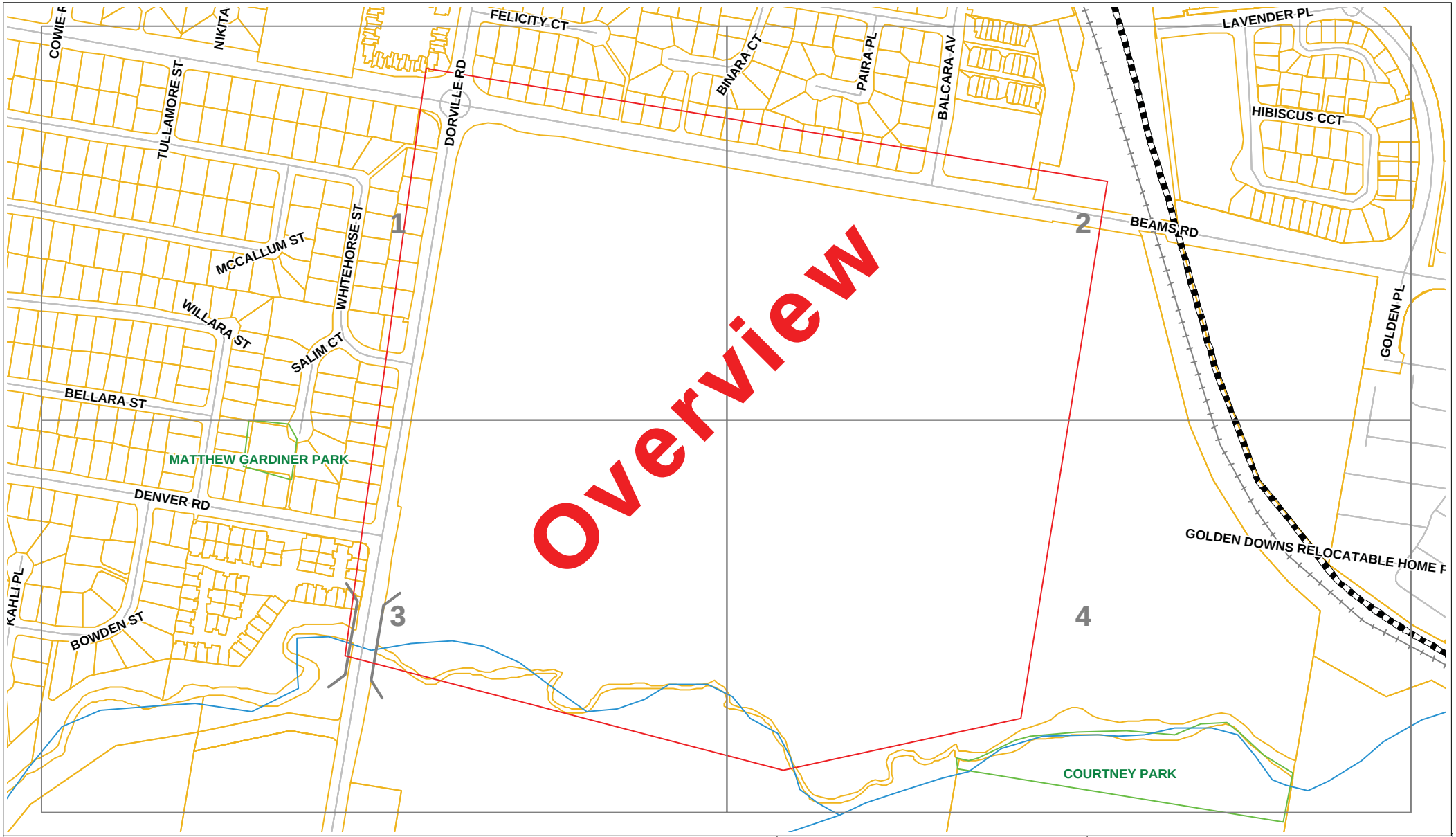
0 0.02km

Imagery sourced from Open StreetMaps

LEGEND:

- Powerlink Substation
- Other Substation
- Possible Comms
- High Voltage Cable
- Pilot Cable
- Optic Fibre
- Decommissioned

Affected DBYD Work Area Symbols



Sequence Number: 63691500

Date: 17/08/2017

DISCLAIMER: THIS DRAWING SHOULD NOT BE SCALED TO LOCATE CABLES. NO WARRANTY IS GIVEN THAT THE INFORMATION IS ACCURATE OR COMPLETE. IF YOU REQUIRE INFORMATION REGARDING LOCATING THE CABLE PLEASE CALL VISIONSTREAM. THIS DOCUMENT HAS BEEN PREPARED SOLELY FOR DIAL BEFORE YOU DIG USE. THIS PLAN CONTAINS COMMERCIALLY SENSITIVE INFORMATION AND IS TO BE TREATED ACCORDINGLY. NO SUCH INFORMATION IS TO BE PASSED ONTO OTHER PARTIES WITHOUT WRITTEN CONSENT FROM VISIONSTREAM PTY LTD.

Reef Networks

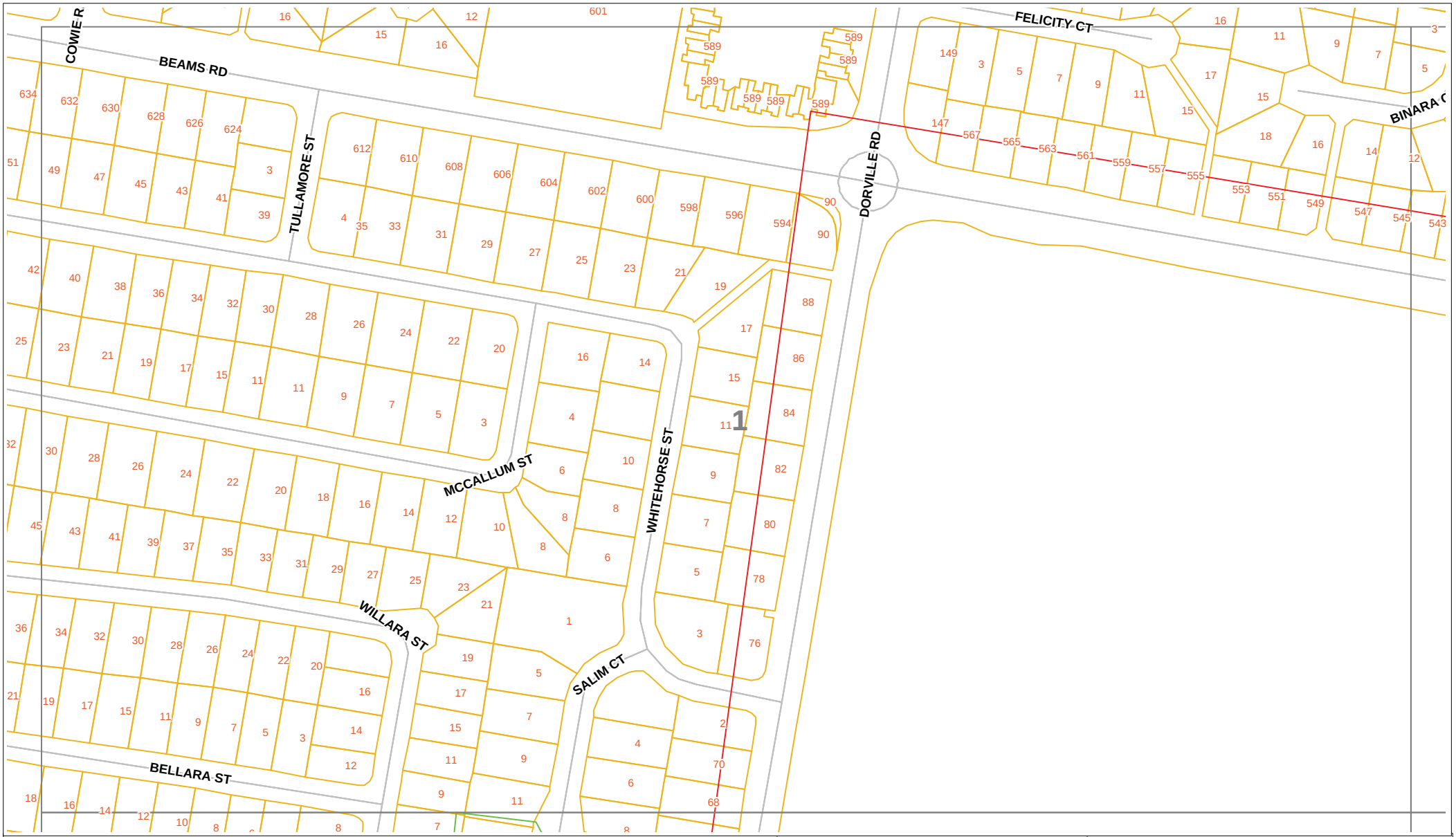
LEGEND

Digsite

- Point
- Line
- Area

Assets

- Cable



Sequence Number: 63691500

Date: 17/08/2017

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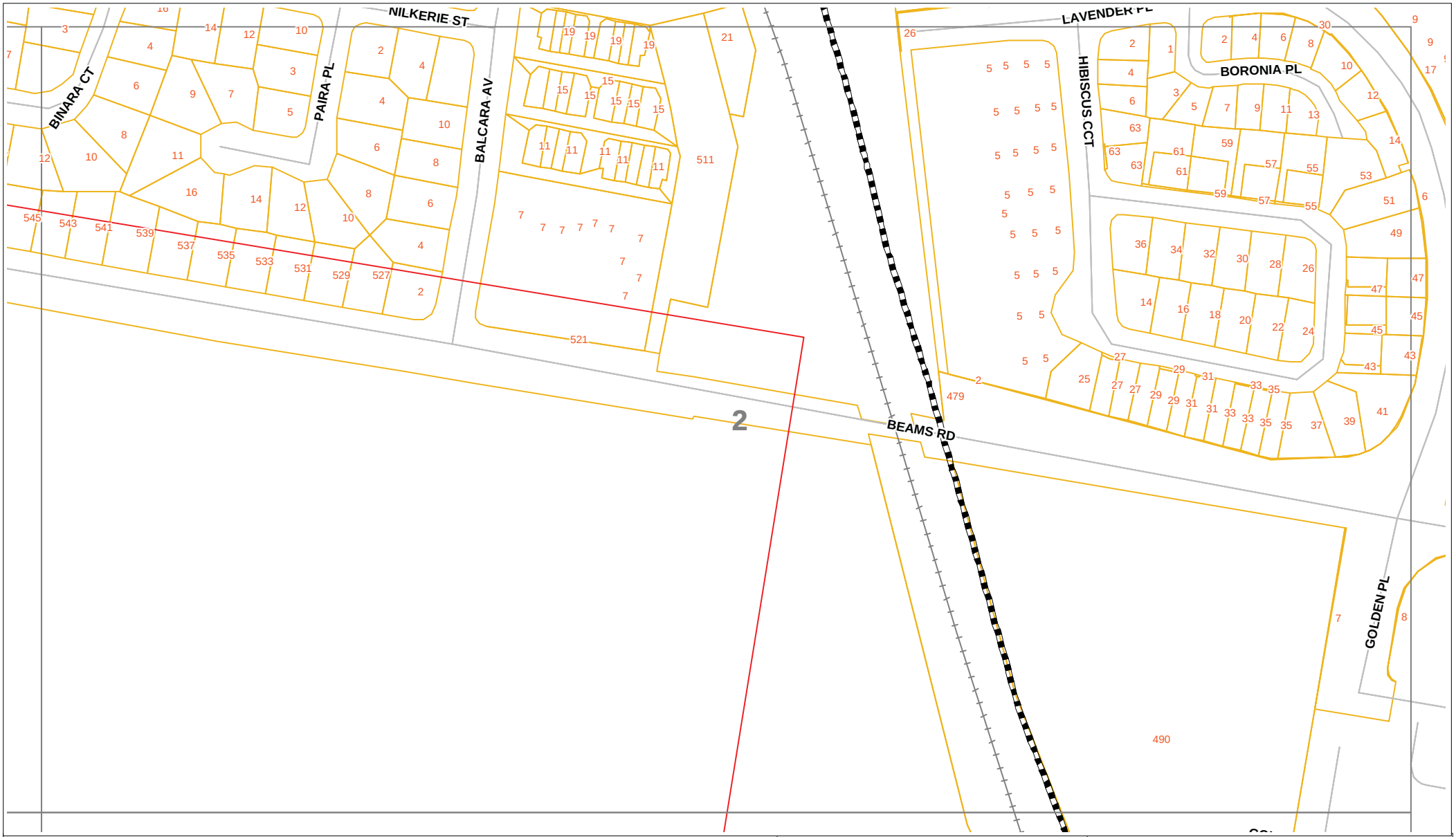
Reef Networks

LEGEND

Digsite	Assets
Point	Cable
Line	
Area	



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Reef Networks

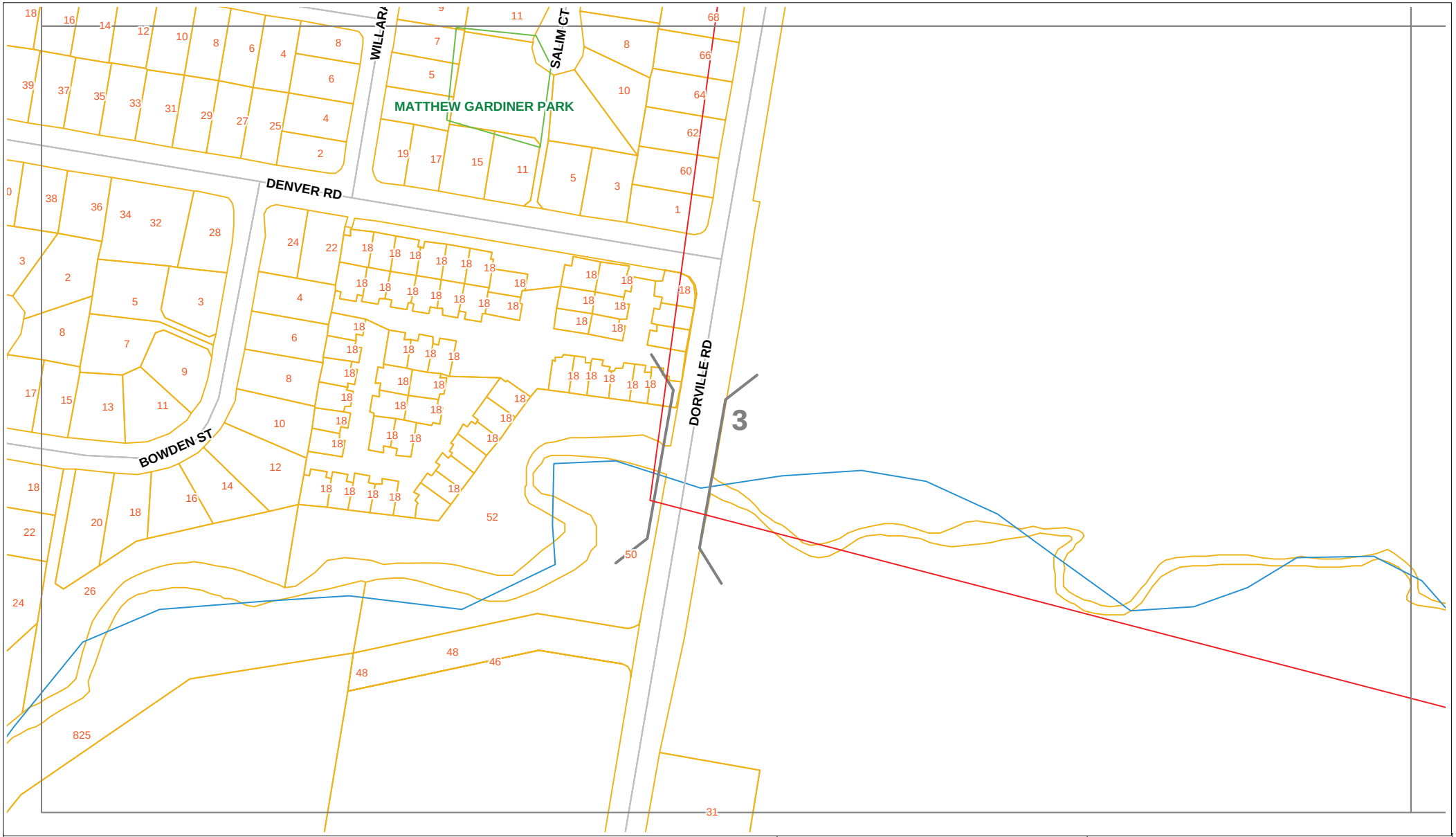
LEGEND

Digsite

- Point
- Line
- Area

Assets

- Cable



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Reef Networks

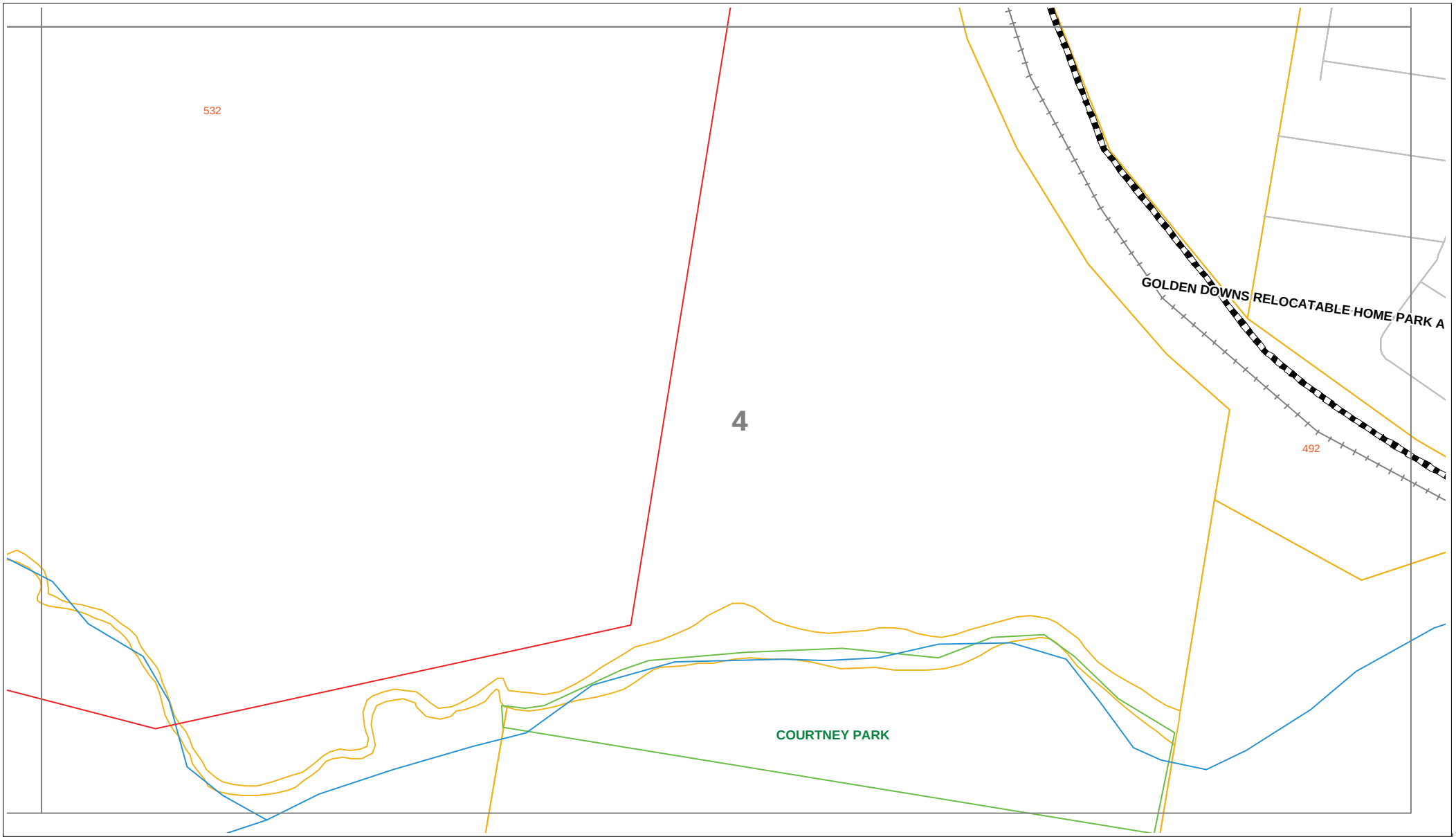
LEGEND

Digsite

- Point
- Line
- Area

Assets

- Cable



Sequence Number: 63691500

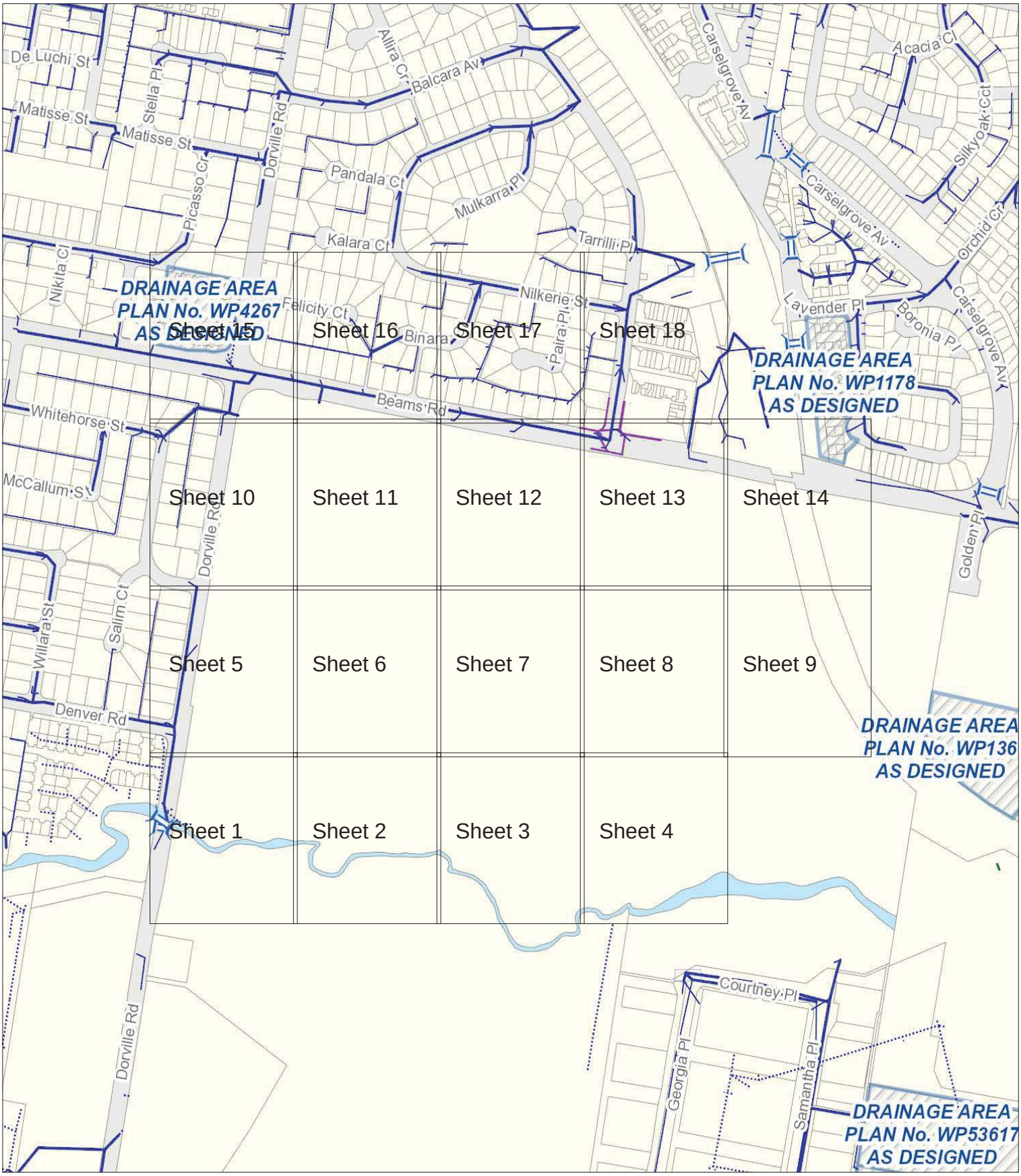
Date: 17/08/2017

DISCLAIMER: THIS DRAWING SHOULD NOT BE SCALED TO LOCATE CABLES. NO WARRANTY IS GIVEN THAT THE INFORMATION IS ACCURATE OR COMPLETE. IF YOU REQUIRE INFORMATION REGARDING LOCATING THE CABLE PLEASE CALL VISIONSTREAM. THIS DOCUMENT HAS BEEN PREPARED SOLELY FOR DIAL BEFORE YOU DIG USE. THIS PLAN CONTAINS COMMERCIALLY SENSITIVE INFORMATION AND IS TO BE TREATED ACCORDINGLY. NO SUCH INFORMATION IS TO BE PASSED ONTO OTHER PARTIES WITHOUT WRITTEN CONSENT FROM VISIONSTREAM PTY LTD.

Reef Networks

LEGEND

Digsite		Assets	
Point		Cable	
Line			
Area			



Sequence Number: 63691501

Map Sheet Overview

Date: Aug 17, 2017

BCC Stormwater and Cable Networks

6975526

501885 N 503195

6974091

Disclaimer:

BRISBANE CITY

BCC Stormwater and Cable Networks

Sequence Number: 63691501

Scale = 1:1000

Metres 20 40

Date: Aug 17, 2017

Location:

6974606

502074 N 502266

6974396

Sheet 1

Disclaimer:

BRISBANE CITY

BCC Stormwater and Cable Networks

Sequence Number: 63691501

Scale = 1:1000

Metres 20 40

Date: Aug 17, 2017

Location:

6974606

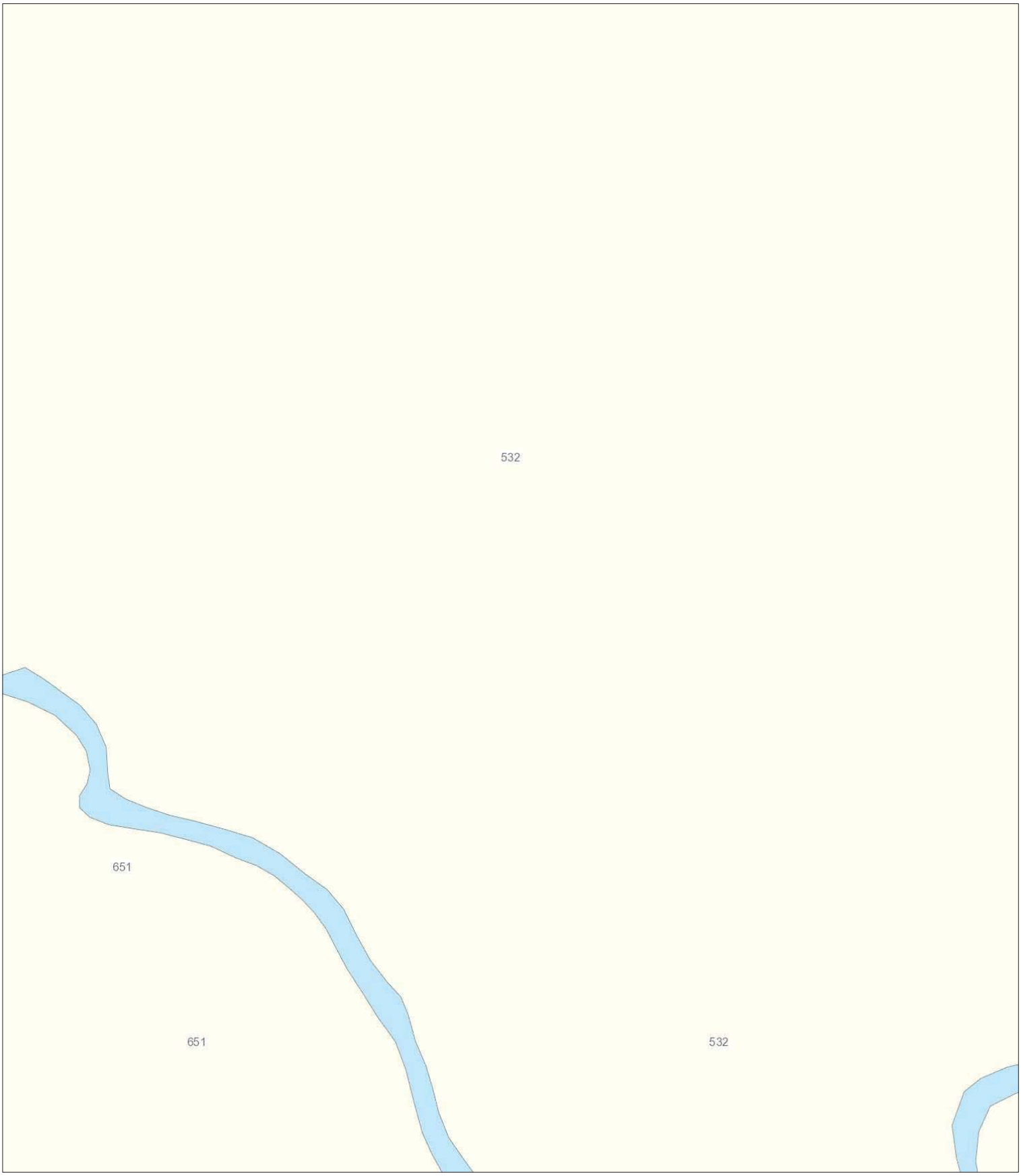
502259 N 502451

6974396

Sheet 2

Disclaimer:

BRISBANE CITY



BCC Stormwater and Cable Networks

Sequence Number: 63691501

Scale = 1:1000

Metres 20 40

Date: Aug 17, 2017

Location:

6974606

502444 N 502636

6974396

Sheet 3

Disclaimer:

BRISBANE CITY

BCC Stormwater and Cable Networks

Sequence Number: 63691501

Scale = 1:1000

Metres 20 40

Date: Aug 17, 2017

Location:

6974606

502629 N 502821

6974396

Sheet 4

Disclaimer:

BRISBANE CITY

BCC Stormwater and Cable Networks

Sequence Number: 63691501

Scale = 1:1000

Metres 20 40

Date: Aug 17, 2017

Location:

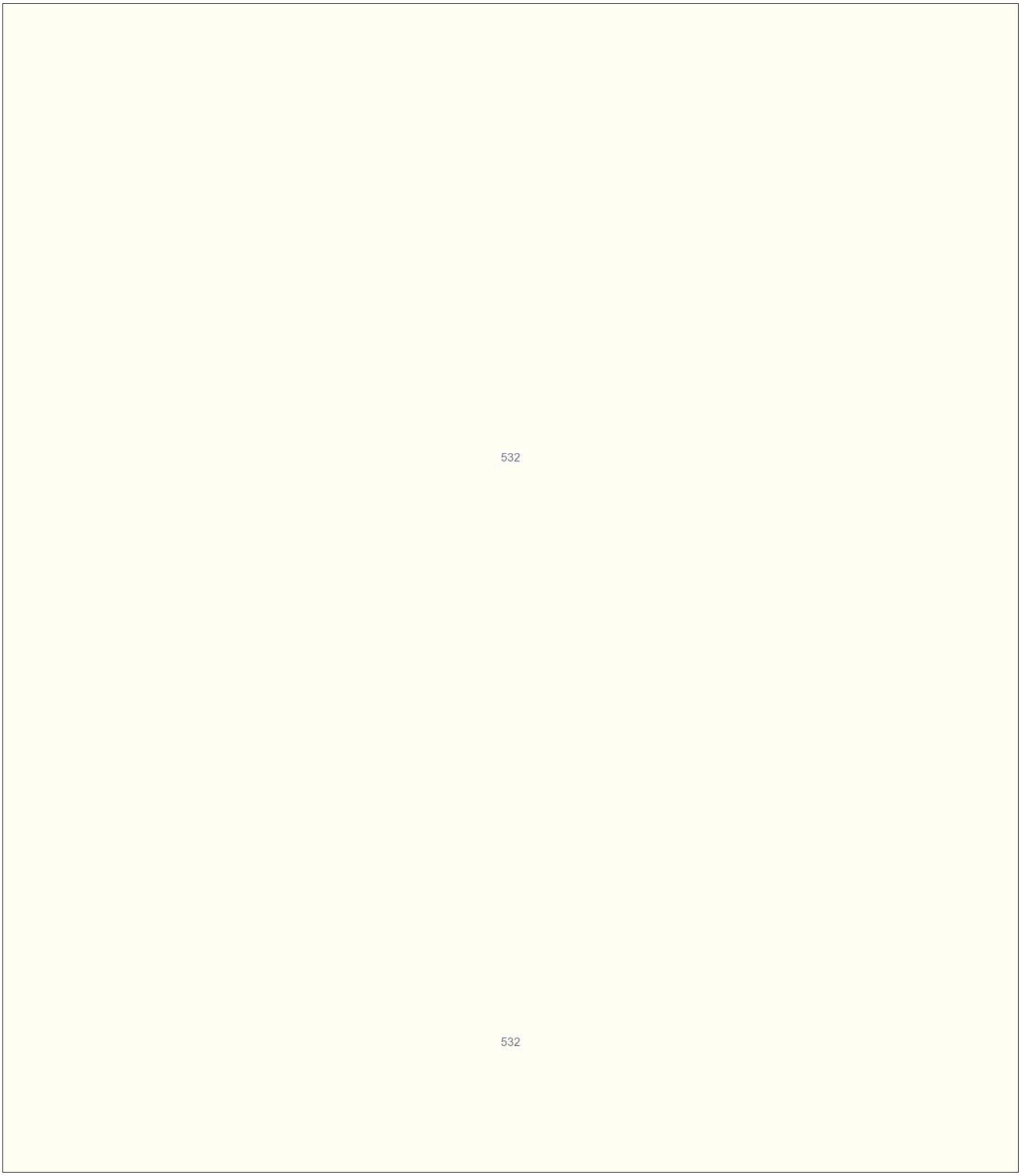
6974811

502074 N 502266

6974601

Sheet 5

Disclaimer:



BCC Stormwater and Cable Networks

Sequence Number: 63691501

Scale = 1:1000

Metres 20 40

Date: Aug 17, 2017

Location:

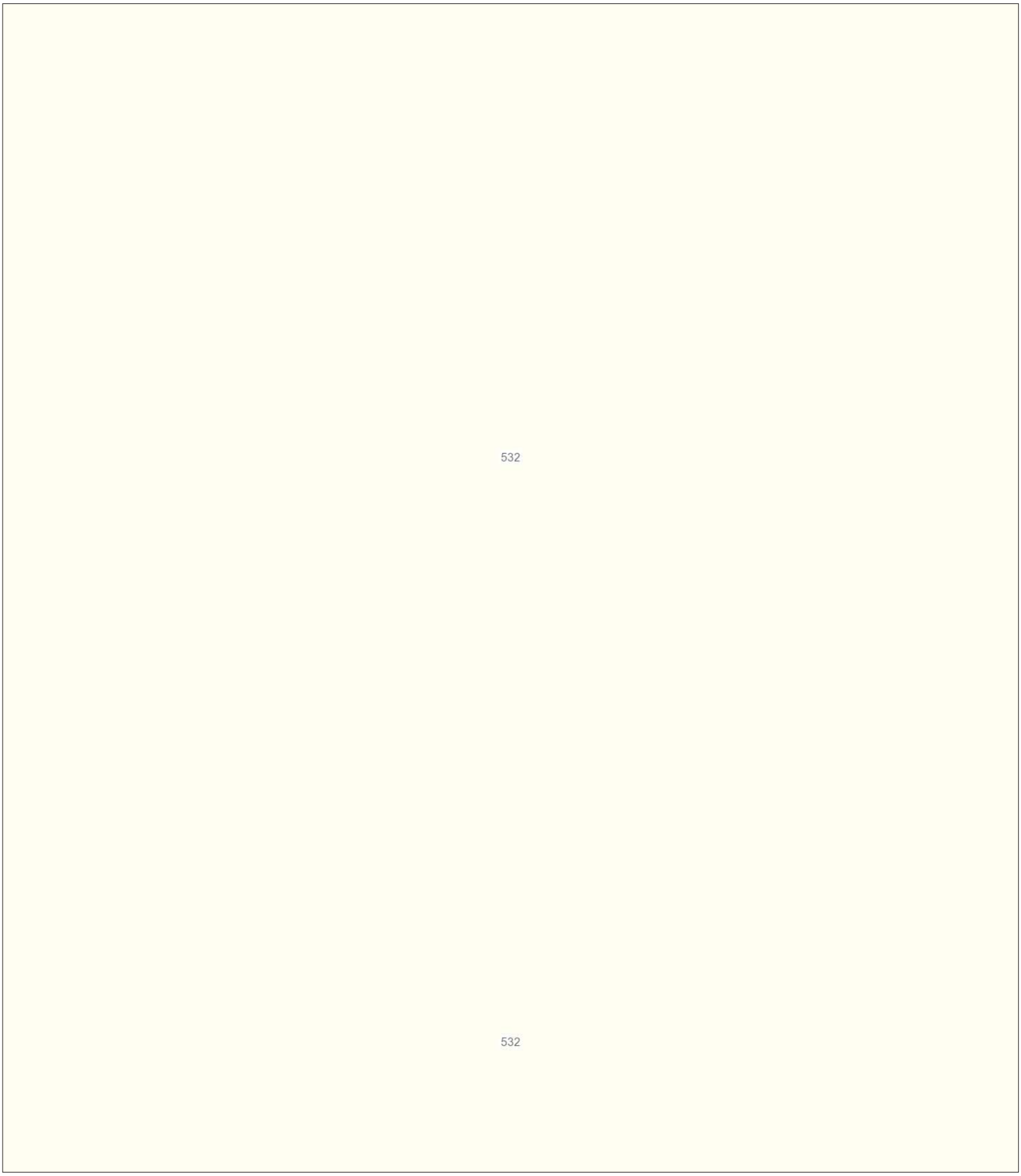
6974811

502259 N 502451

6974601

Sheet 6

Disclaimer:



BCC Stormwater and Cable Networks

Sequence Number: 63691501

Scale = 1:1000

Metres 20 40

Date: Aug 17, 2017

Location:

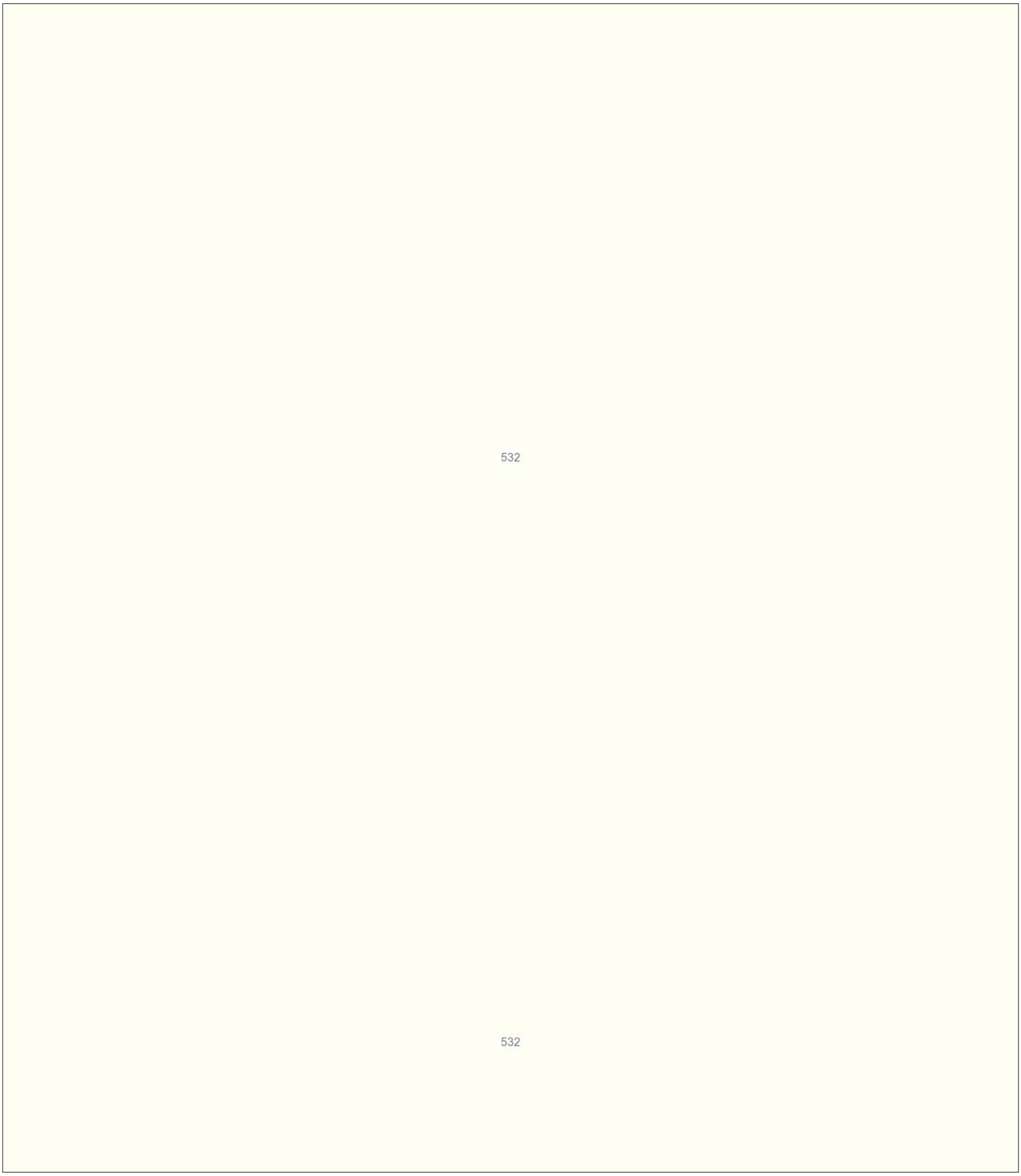
6974811

502444 N 502636

6974601

Sheet 7

Disclaimer:



BCC Stormwater and Cable Networks

Sequence Number: 63691501

Scale = 1:1000

Metres 20 40

Date: Aug 17, 2017

Location:

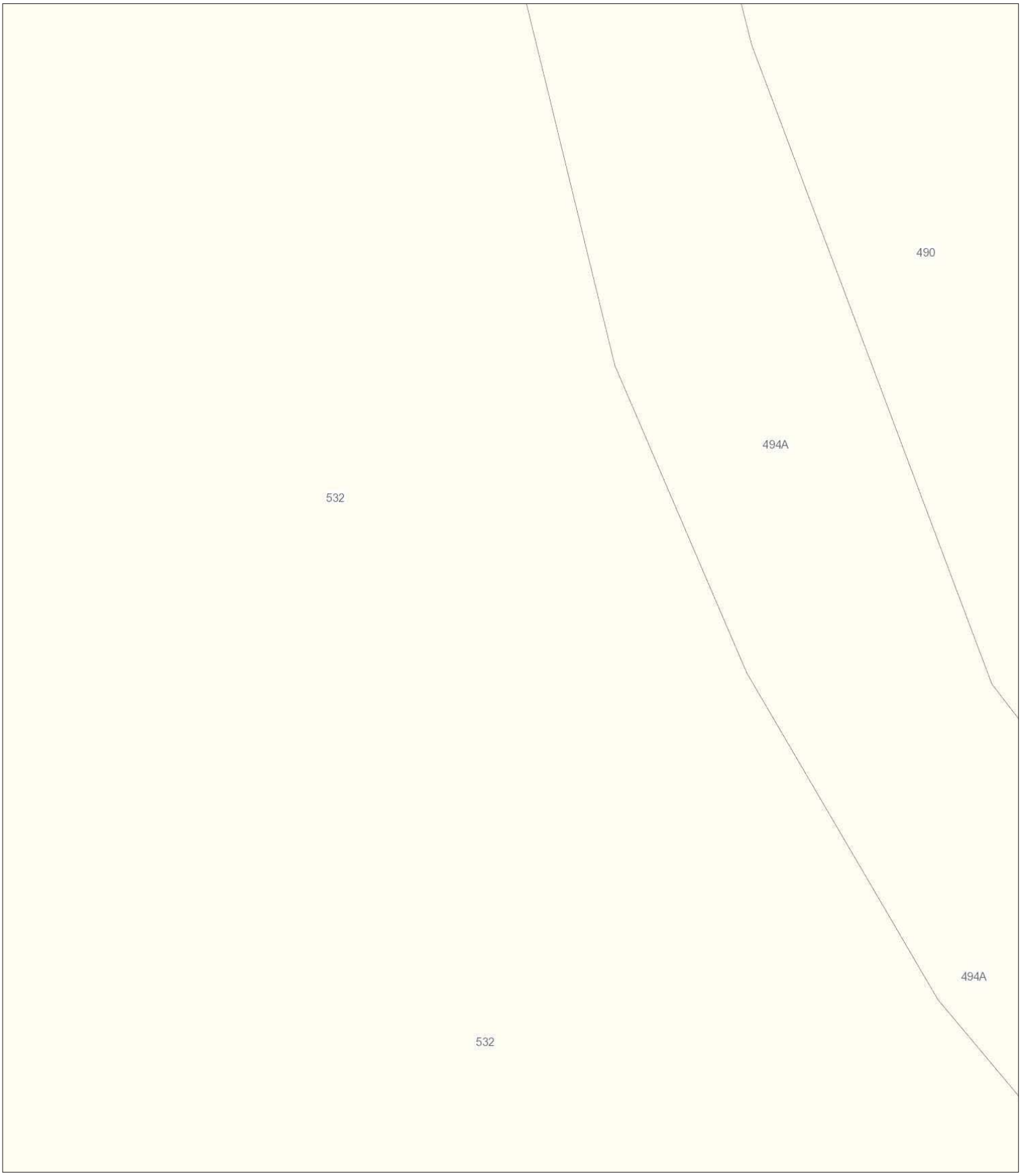
6974811

502629 N 502821

6974601

Sheet 8

Disclaimer:



BCC Stormwater and Cable Networks

Sequence Number: 63691501

Scale = 1:1000

Metres 20 40

Date: Aug 17, 2017

Location:

6974811

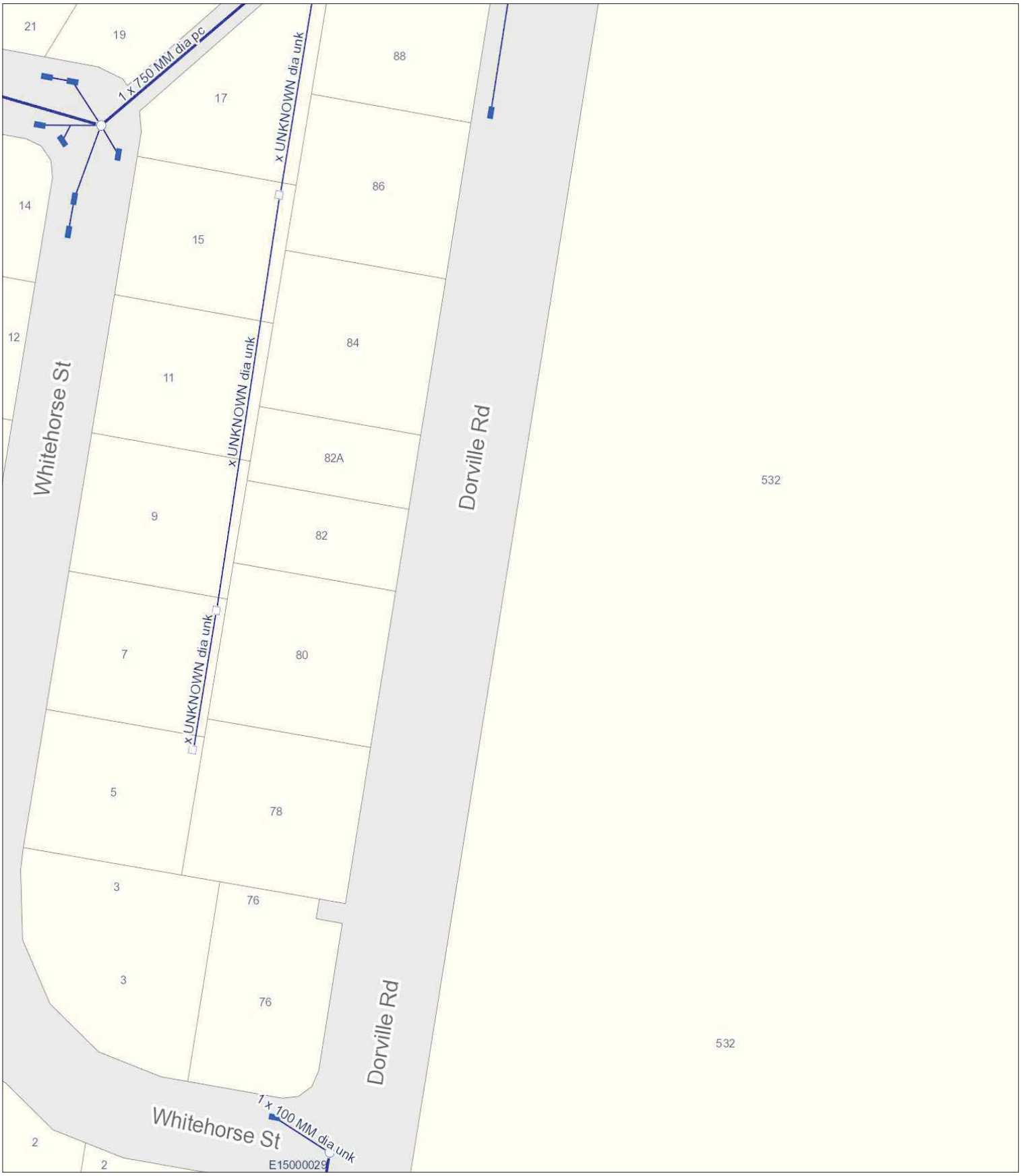
502814 N 503006

6974601

Sheet 9

Disclaimer:

BRISBANE CITY



BCC Stormwater and Cable Networks

Sequence Number: 63691501

Scale = 1:1000

Metres 20 40

Date: Aug 17, 2017

Location:

6975016

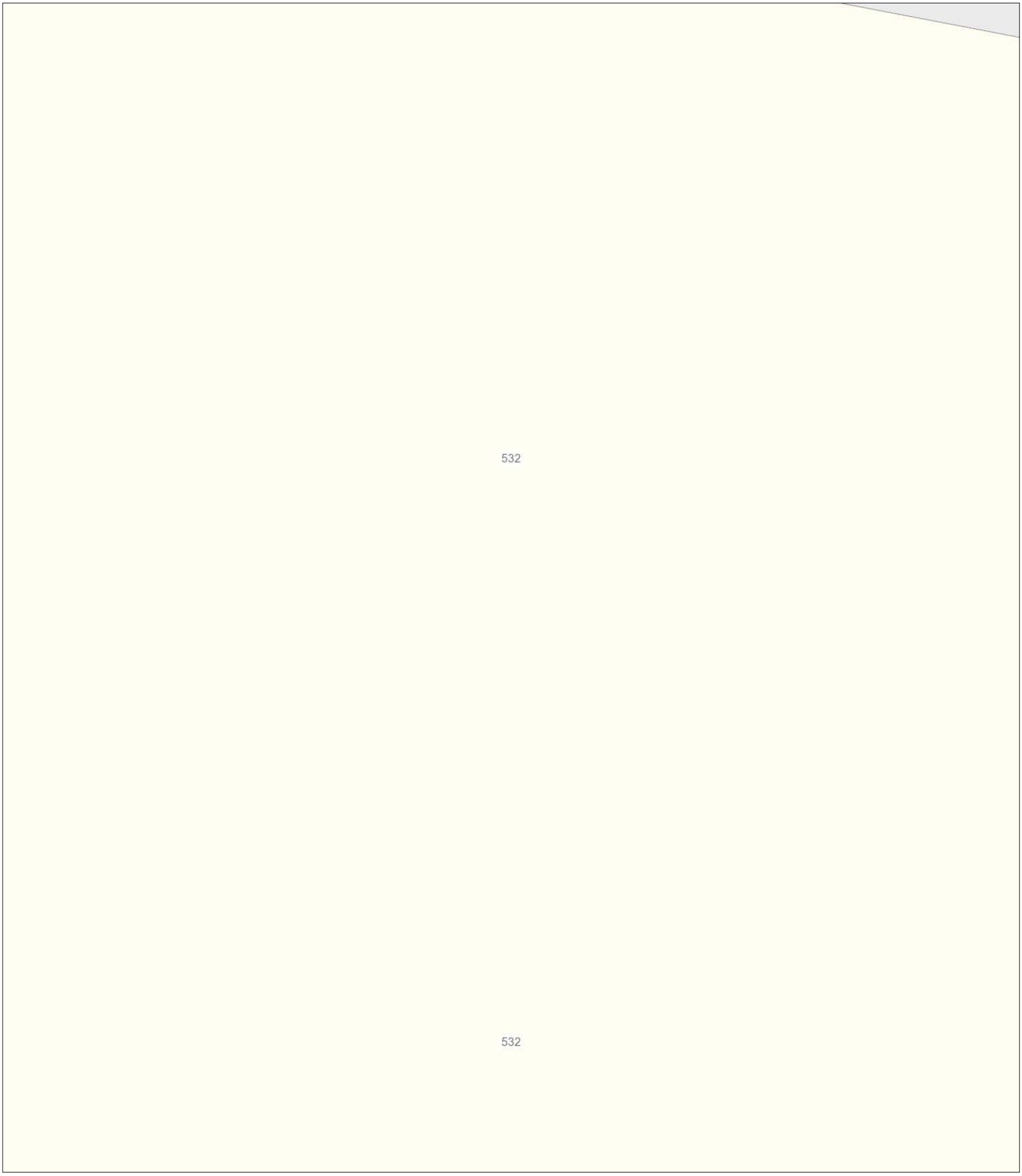
502074 N 502266

6974806

Sheet 10

Disclaimer:

BRISBANE CITY



BCC Stormwater and Cable Networks

Sequence Number: 63691501

Scale = 1:1000

Metres 20 40

Date: Aug 17, 2017

Location:

6975016

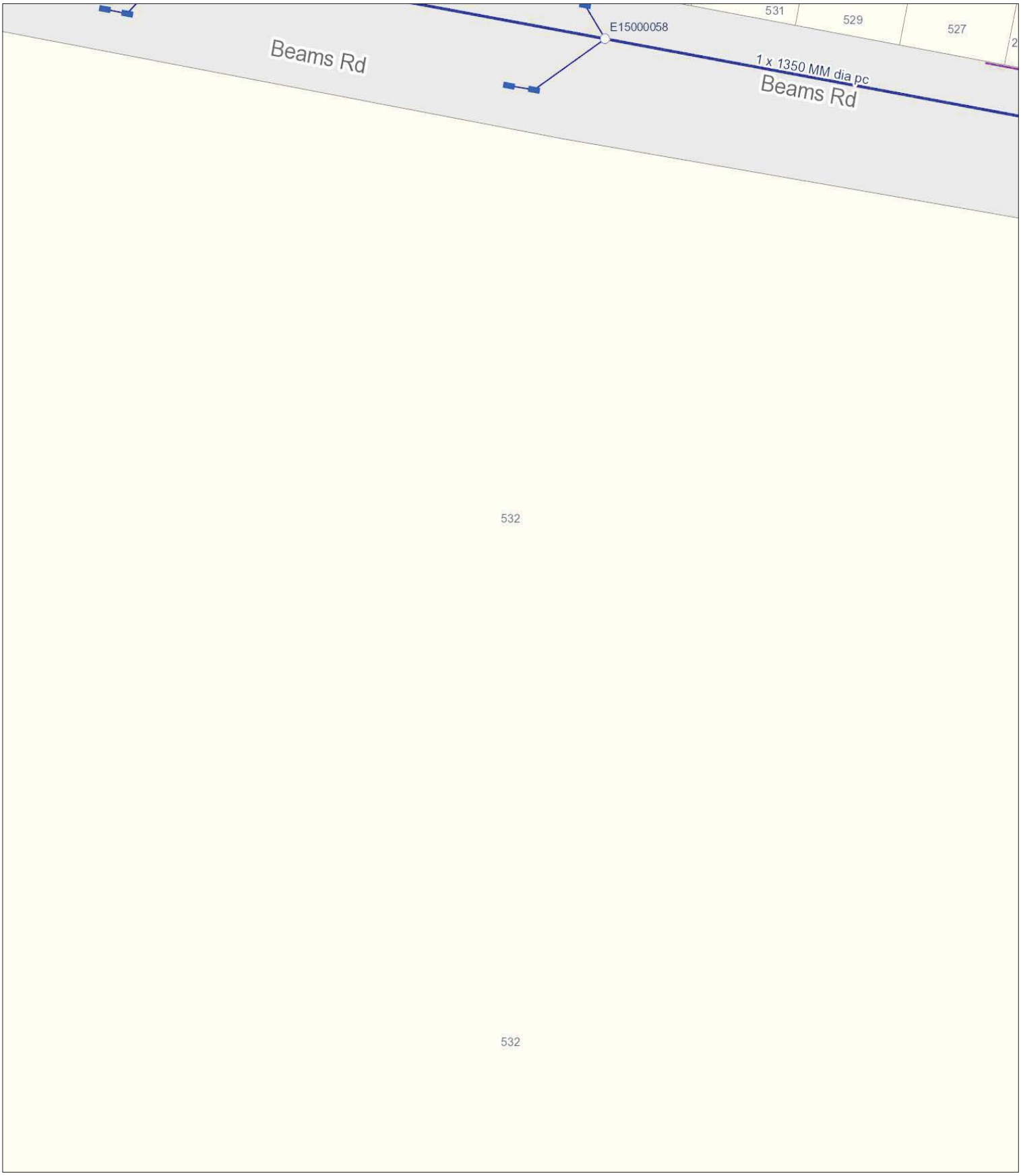
502259 N 502451

6974806

Sheet 11

Disclaimer:

BRISBANE CITY



BCC Stormwater and Cable Networks

Sequence Number: 63691501

Scale = 1:1000

Metres 20 40

Date: Aug 17, 2017

Location:

6975016

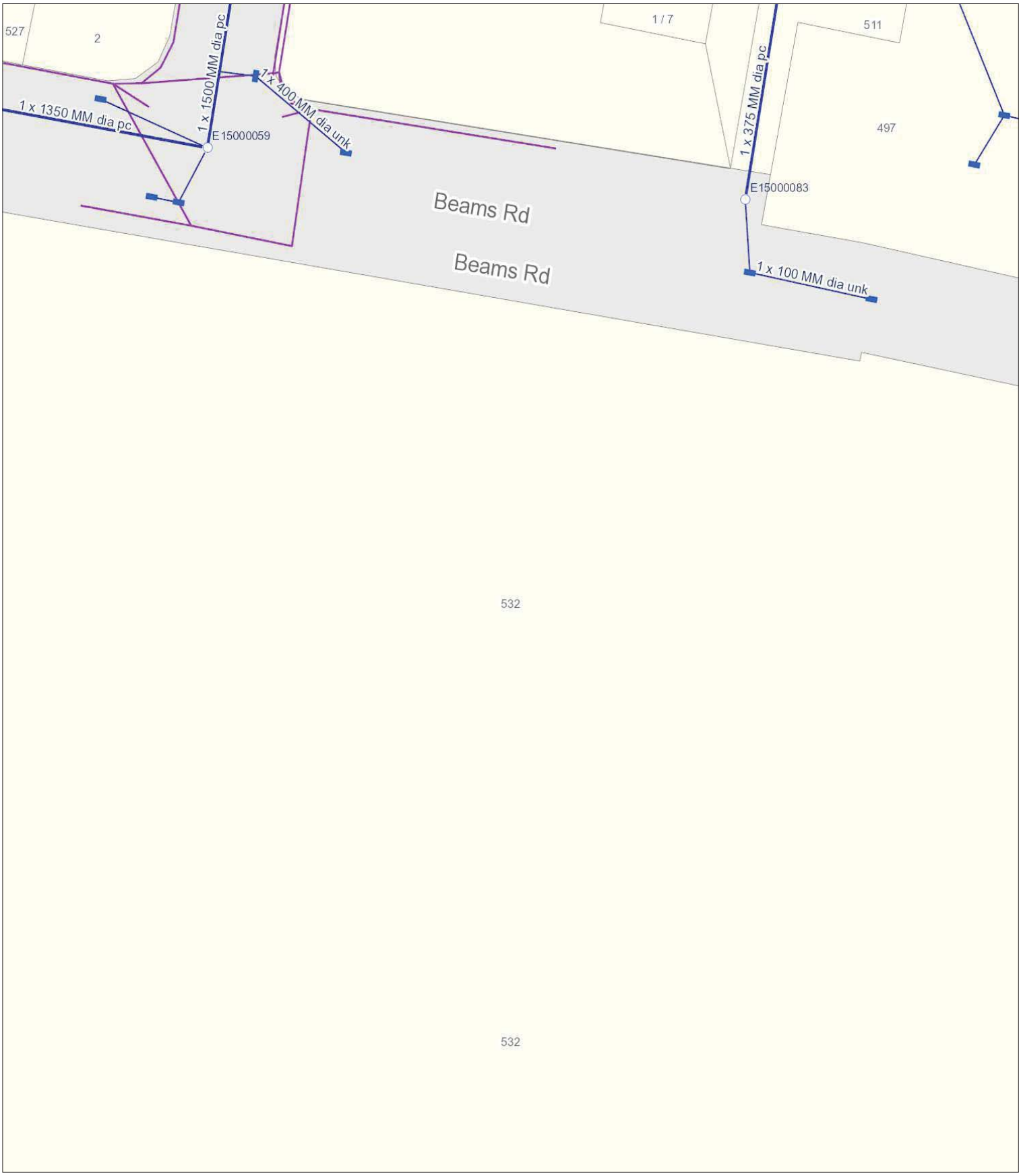
502444 N 502636

6974806

Sheet 12

Disclaimer:

BRISBANE CITY



BCC Stormwater and Cable Networks

Sequence Number: 63691501

Scale = 1:1000

Metres 20 40

Date: Aug 17, 2017

Location:

6975016

502629 N 502821

6974806

Sheet 13

Disclaimer:

BRISBANE CITY

BCC Stormwater and Cable Networks

Sequence Number: 63691501

Scale = 1:1000

Metres 20 40

Date: Aug 17, 2017

Location:

6975016

502814 503006

6974806

N

Sheet 14

Disclaimer:

BRISBANE CITY

BCC Stormwater and Cable Networks

Sequence Number: 63691501

Scale = 1:1000

Metres 20 40

Date: Aug 17, 2017

Location:

6975221

502074 N 502266

6975011

Sheet 15

Disclaimer:

BCC Stormwater and Cable Networks

Sequence Number: 63691501

Scale = 1:1000

Metres 20 40

Date: Aug 17, 2017

Disclaimer:

Location:

6975221

502259 N 502451

6975011

Sheet 16

BCC Stormwater and Cable Networks

Sequence Number: 63691501

Scale = 1:1000

Metres 20 40

Date: Aug 17, 2017

Location:

6975221

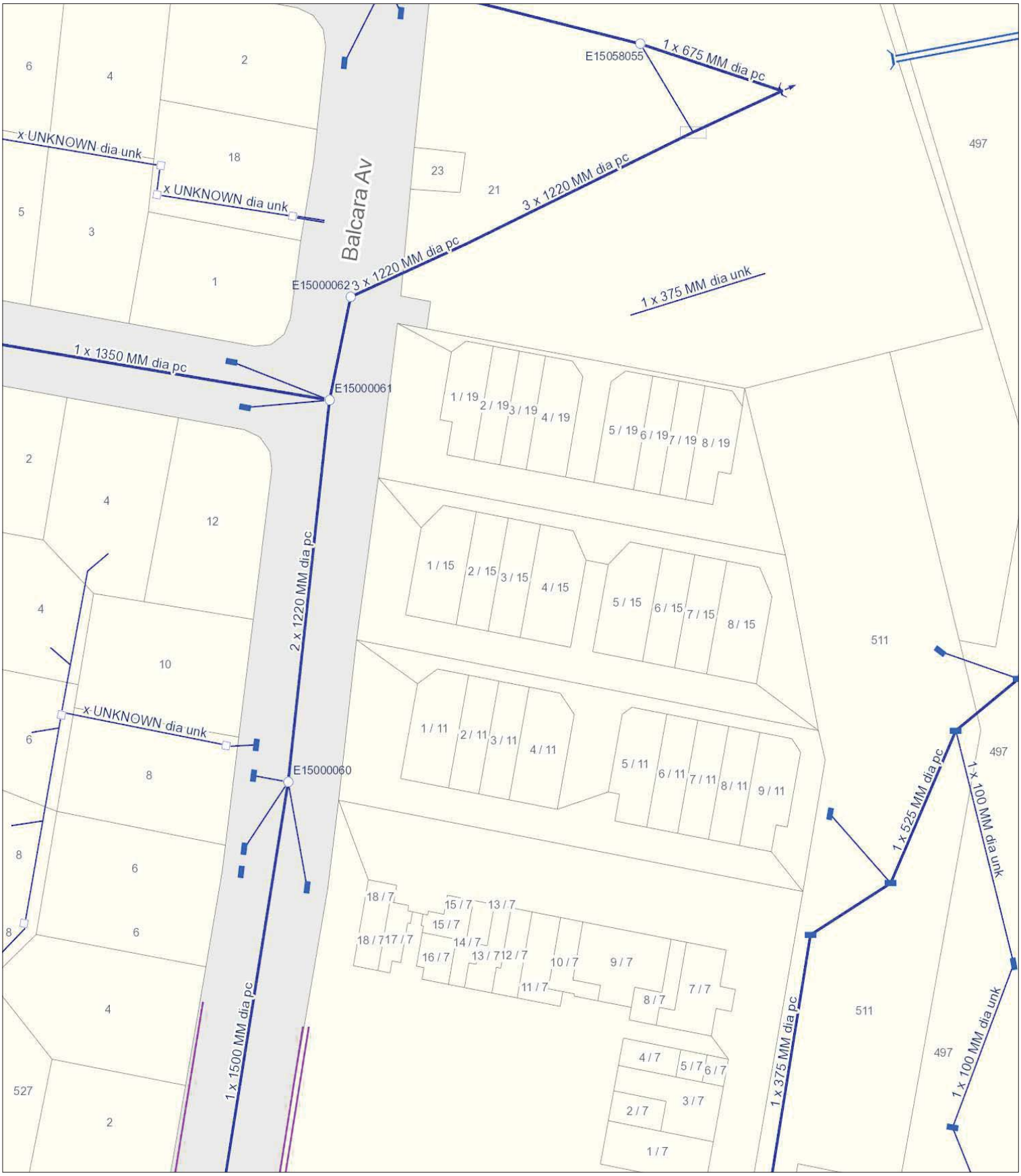
502444 N 502636

6975011

Sheet 17

Disclaimer:

BRISBANE CITY



BCC Stormwater and Cable Networks

Sequence Number: 63691501

Scale = 1:1000

Metres 20 40

Date: Aug 17, 2017

Location:

6975221

502629 N 502821

6975011

Sheet 18

Disclaimer:

BRISBANE CITY

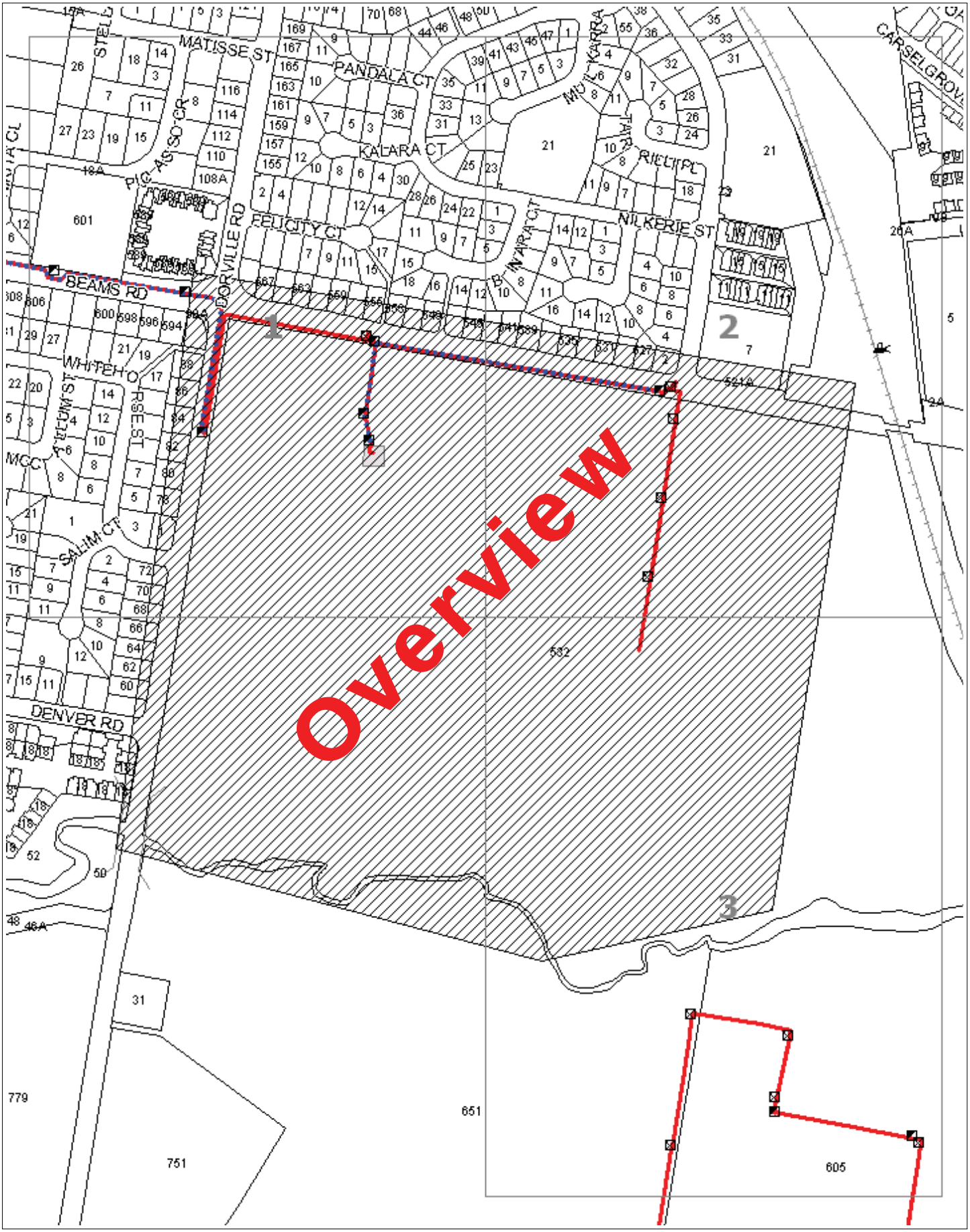
Legend

Stormwater Network

- Stormwater Drain
- Stormwater Gully / Roofwater Connection
- Future Stormwater Drain
- Stormwater Maintenance Hole
- Stormwater Roofwater Pit
- Stormwater Gully Pit
- Stormwater Field Inlet
- Stormwater Quality Improvement Device
- Stormwater Culvert

BCC Cable Network

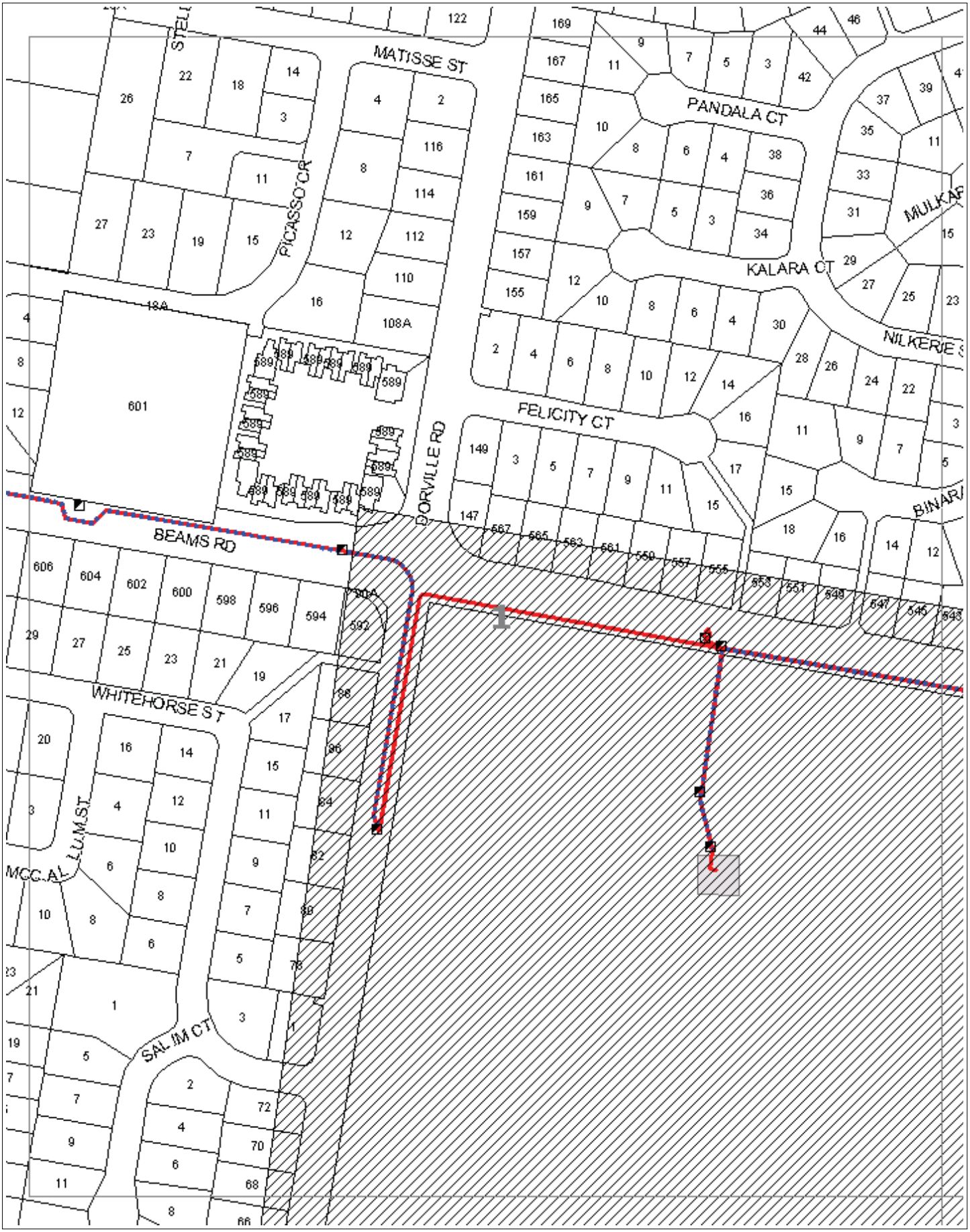
- Traffic System Cable
- Traffic Signal Ducting
- Traffic Light Conduit
- Fibre Optic Cable Location
- Flood Telemetry Conduit
- Parking Sensor Ducting
- Fibre Optic Pit Location



Sequence Number: 63691504

Date Generated: 17/08/2017

For all Optus DBYD plan enquiries –
Email: Fibre.Locations@optus.net.au
For urgent onsite assistance contact 1800 505 777
Optus Limited ACN 052 833 208



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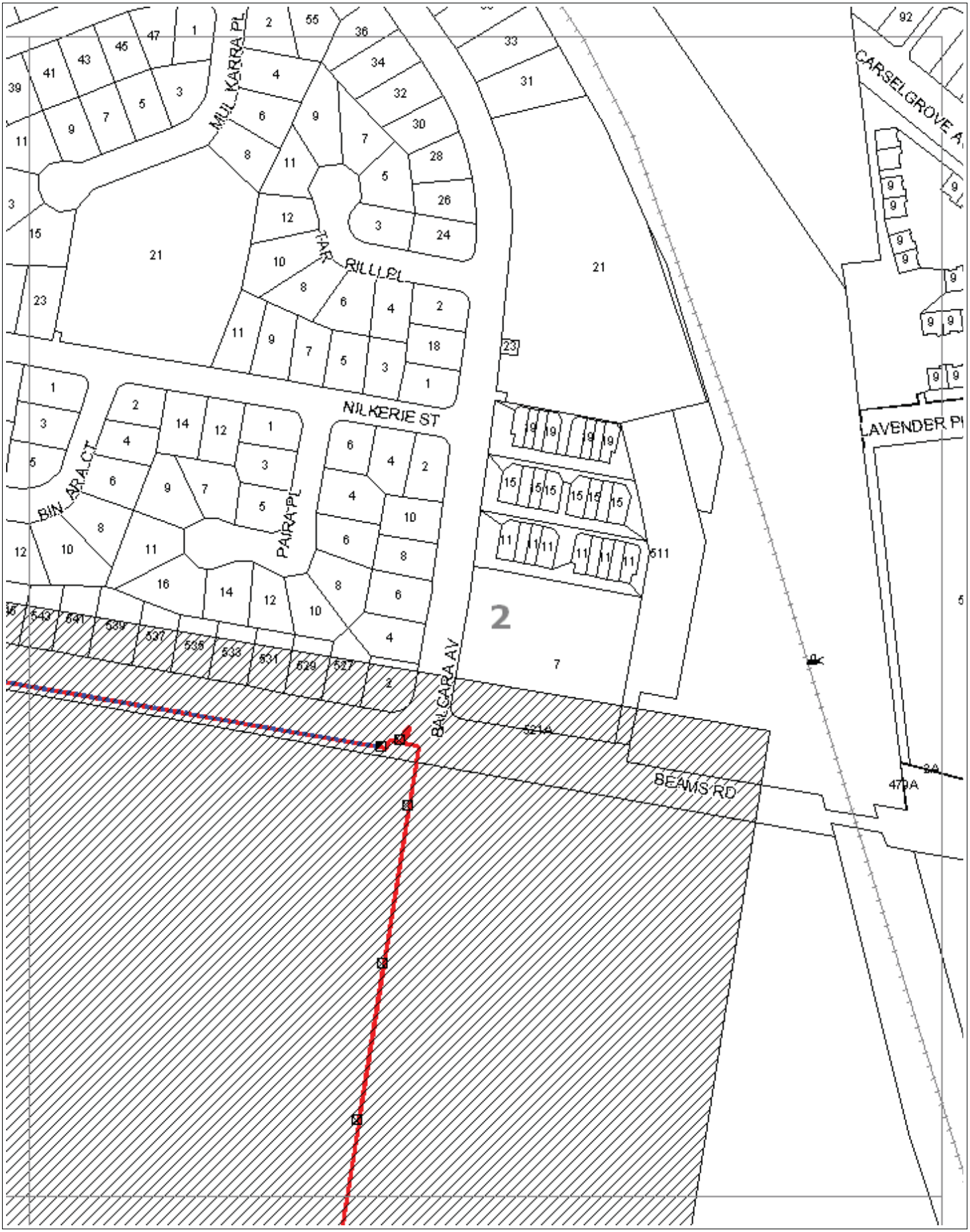

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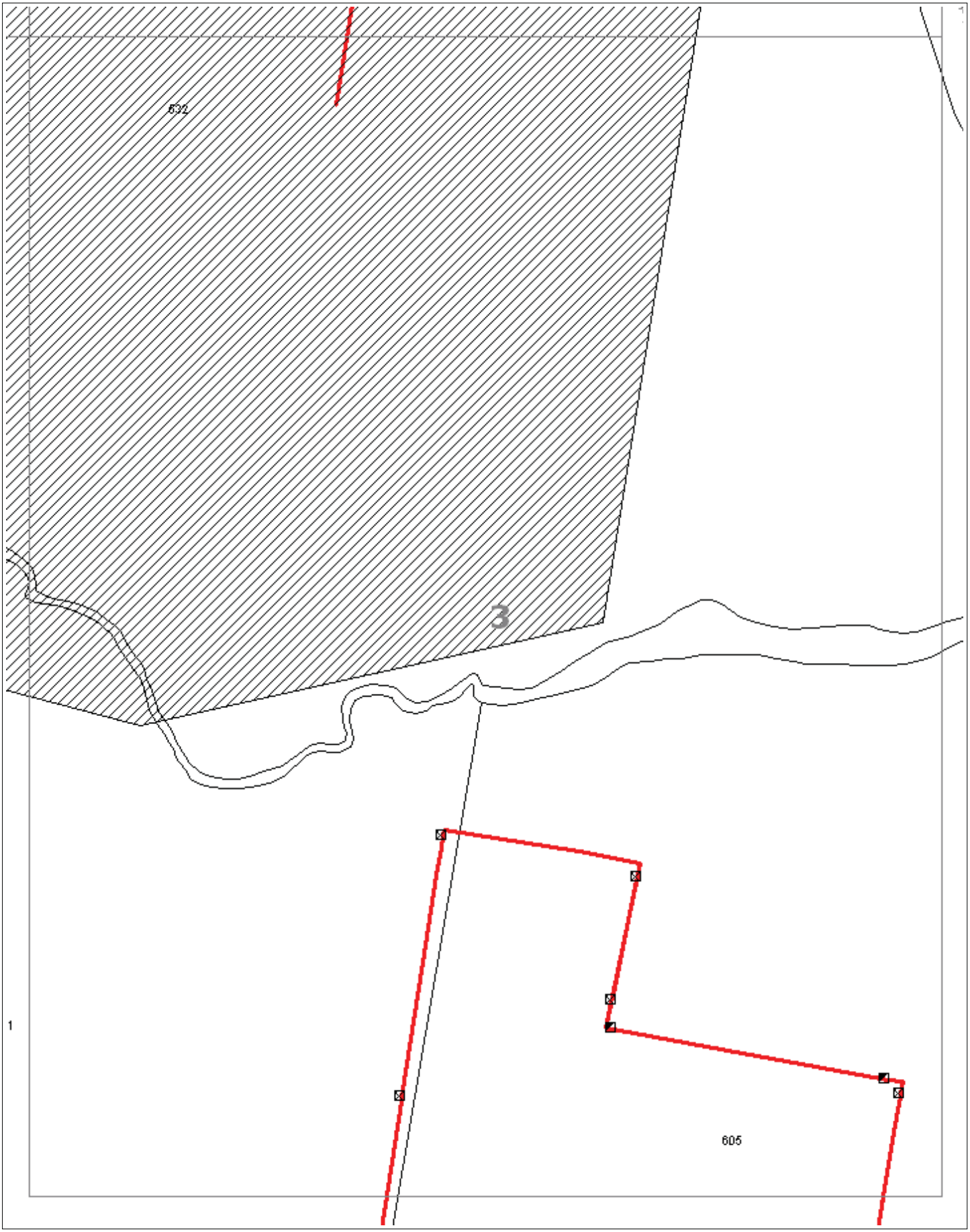

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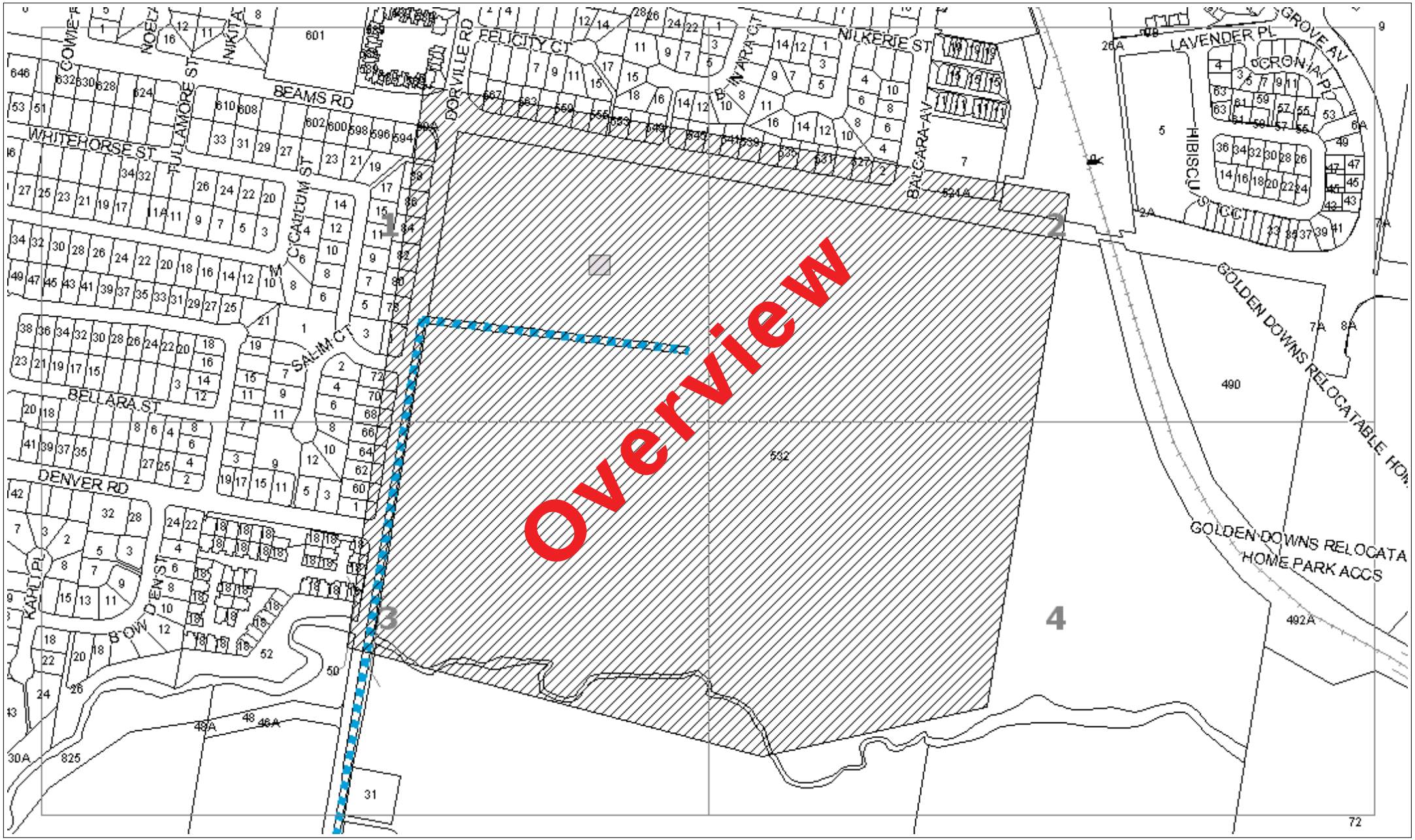


Uecomm

Cable Uecomm Underground

Scale: #INSERT MAP SCALE#

Printed On: 17/08/2017

Sequence Number: 63691504

Location: 532 Beams Road

Job Location: Line, Point, Area

Undergound Asset: Uecomm

Uecomm

Cable Uecomm Underground

Scale: #INSERT MAP SCALE#

Printed On: 17/08/2017

Sequence Number: 63691504

Location: 532 Beams Road

Job Location

Line

Point

Area

Undergound Asset

Uecomm

Uecomm

Cable Uecomm Underground

Scale: #INSERT MAP SCALE#

Printed On: 17/08/2017

Sequence Number: 63691504

Location: 532 Beams Road

Job Location

Line

Point

Area

Undergound Asset

Uecomm

Uecomm

Cable Uecomm Underground

Scale: #INSERT MAP SCALE#

Printed On: 17/08/2017

Sequence Number: 63691504

Location: 532 Beams Road

N
W
E
S

Job Location
Line
Point
Area

Undergound Asset
Uecomm

Uecomm

Cable Uecomm Underground

Scale: #INSERT MAP SCALE#

Printed On: 17/08/2017

Sequence Number: 63691504

Location: 532 Beams Road

N
W
E
S

Job Location
Line
Point
Area

Undergound Asset
Uecomm

APA Group
PO Box 6014 Halifax Street
South Australia 5000

17/08/2017

Company: Calibre Consulting
Mr Joshua Goman
545 Queen Street
Brisbane City
QLD 4000

joshua.goman@calibreconsulting.co

Dear Mr Joshua Goman

Sequence Number: 63691505
Worksite Address: 532 Beams Road
Carseldine
QLD 4034

Thank you for your Dial Before You Dig enquiry regarding the location of Gas Assets, we can confirm that the APA Group's Network's Division has **no** underground Gas Assets in the vicinity of the above location.

Please Note: For some DBYD enquiries, you might receive 2 responses from the APA Group. Please read both responses carefully as they will relate to different assets. It is your responsibility to action all requirements set out in APA Group responses.

You are hereby notified that the attached Duty of Care requirements apply to any activity in the vicinity of Gas Assets operated by APA, please ensure you read and comply with all the relevant requirements. Should you have any questions with **regards to the attached information** please contact our Dial Before You Dig officer - (08) 8115 4500.

Caution - Damage to gas assets could result in possible explosion and fire with the risk of personal injury.
For Gas Emergencies please call 1800 GAS LEAK (1800 427 532)

Please find enclosed the following information:-

- APA's Duty of Care, If you are unclear of your obligations under these requirements please contact the APA Representative listed above immediately
- An overview map with your requested area highlighted to assist in locating APA's Gas Assets
- A map(s) showing APA's Gas Assets in the requested area, this information is valid for 30 days from the date of this response, **please check this represents the area you requested**, if it does not, please contact the APA Representative listed above immediately

Please take some time to review the entire response document and check the information supplied and please let us have any feedback by sending an email to *DBYDNetworksAPA@apa.com.au* or contacting us direct on (08) 8115 4500.

Yours Faithfully,

Dial Before You Dig Officer
APA Group
Email: DBYDNetworksAPA@apa.com.au

Duty of Care - Working Around Gas Assets

General Conditions

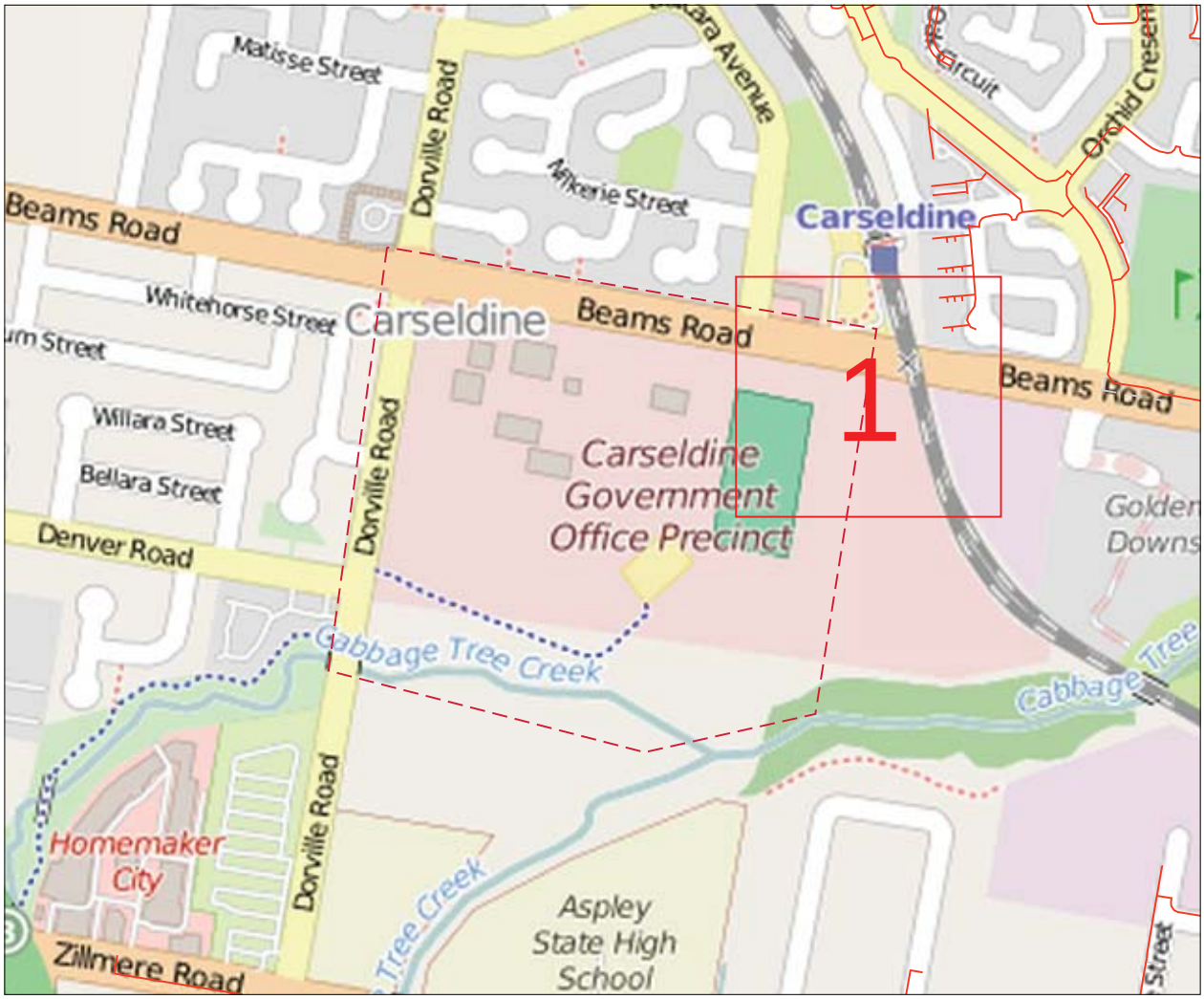
- This location enquiry is valid for 30 days from the date of this response
- Expired locations, i.e., over 30 days from the date of this response, require a new Dial Before You Dig request to validate location information
- The location information supplied in this document shall be used as a guide only. APA Group shall not be liable or responsible for the accuracy of any such information supplied pursuant to this request
- It is the responsibility of the excavator to expose all Gas Assets, including Gas Services pipelines (see below), **by hand** (Please Note: Do not use vacuum excavation systems as damage to Gas Assets may occur). Gas Asset depths may vary according to ground conditions
- Gas Service pipelines (inlet service) connecting Gas Assets in the street to the gas meter on the property are typically **not** marked on the map
- Generally, a map of the Gas Service pipeline (inlet service) connection can be found inside the gas meter box
- This information has been generated by an automated system based on the area highlighted in your DBYD request and has not been independently verified. **It is your responsibility** to ensure that the information supplied in this response matches the dig site you defined when submitting your Dial Before You Dig enquiry. If the information does not match the dig site or you have any question, please contact APA immediately using the details listed on the first page and / or please resubmit your enquiry
- For **Gas Emergencies** please call 1800 427 532

DIAL BEFORE YOU DIG www.1100.com.au The Essential First Step

operated by apa

17/08/2017 **SCALE: DO NOT SCALE** **REF NO**: 63691505

As work on APA underground plant is ongoing any drawing with an issue date of more than one month previous can no longer be considered valid. All persons planning civil works on any site are advised to contact APA to confirm location. All underground gas pipelines are the property of APA & are not to be accessed by unauthorised persons. All care is taken with preparation of the drawings & no responsibility is accepted for errors or omissions.



63691505

Scale: 1: 7500

0 0.1km

NORTH

Data Source

Pipeline Data Copyright APA Group, Property Parcels Copyright QLD Government, UBD Imagery – Copyright Sensis, DBYD Dig Location provided by DBYD.

operated by apa

This map is created in colour and shall be printed in colour

Legend

Distribution Main
- Class 900 Transmission
- Class 600 Transmission
- Class 300 Transmission
- High Pressure Steel
- High Pressure PE Trunk
- High Pressure/ Class 500 [1]
- Medium Pressure PE/ Nylon
- Medium Pressure (Allgas)
- Low Pressure
- LPG
- TLP
- Proposed/ Under Construction
- Idle Gas Pipe
- Abandoned Gas Pipe
- Sleeve

(1) Medium Pressure in AGN/ Nylon in Allgas

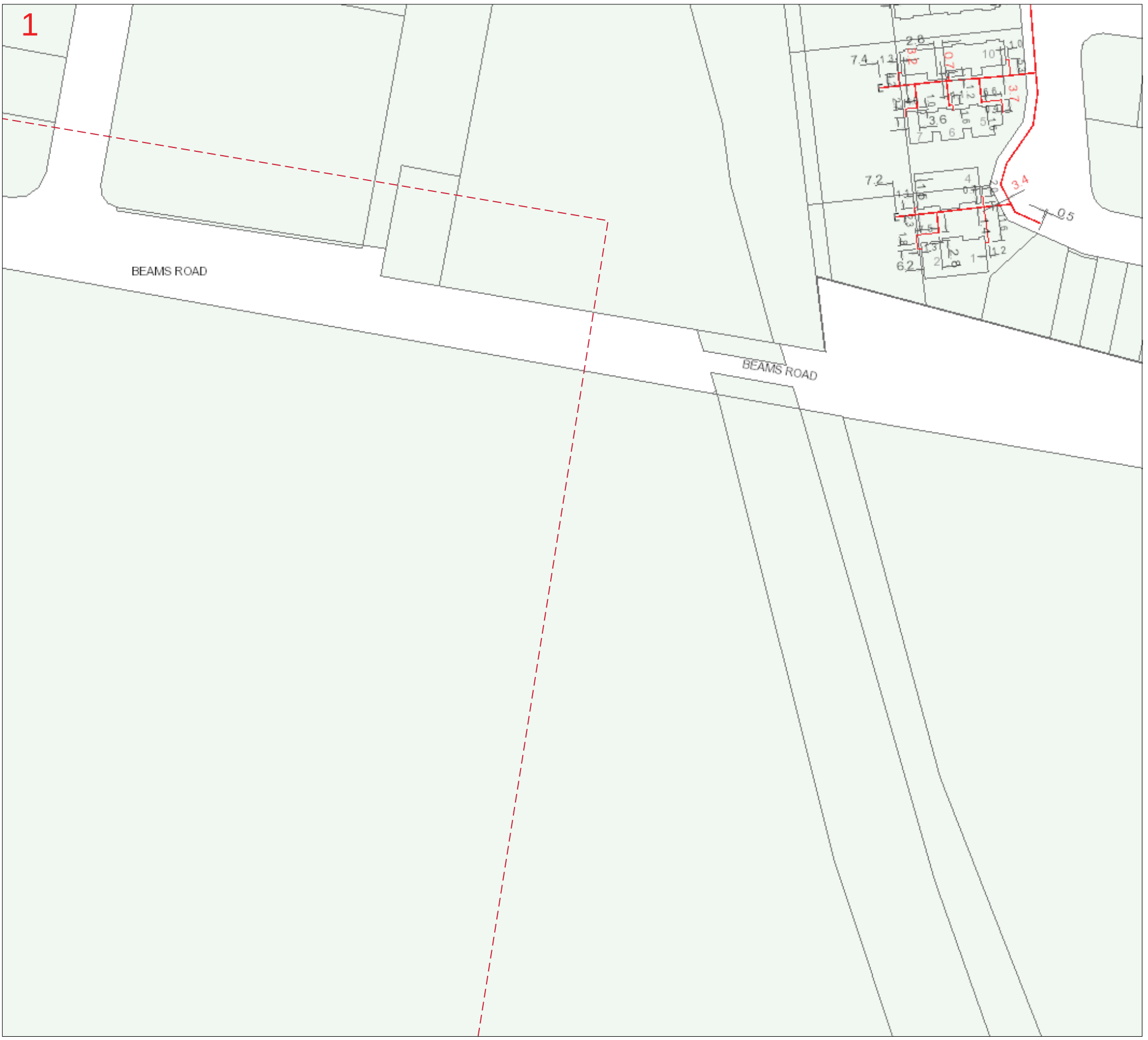
Gas Assets and Fittings
- Gate Station
- R Regulator Station
- V Block/ Emergency Valve
- V Isolation Valve
- CP T Test Point
- S Syphon
- A Anode
- M Pipeline Marker
- W Trace Wire Point
- Reducer
- Pipe Connector/ Tee
- Pipe Connector
- End Cap

Pipe Materials

CI	Cast Iron
CU	Copper
GAL	Wrought Galvanised Iron
PGAL	Poly Coated Wrought Galvanised Iron
ST	Steel
NY/ NY11	Nylon
PE	Polyethylene
MDPE	Medium Density Polyethylene
HDPE	High Density Polyethylene
DN	Nominal Diameter
OD	Outside Diameter

Examples:
- 40PE in DN80 CI — 40mm Polyethylene in an 80mm (Nominal Diameter) Cast Iron Sleeve
- 63PE INS — 63mm Polyethylene inserted in another pipe

Line/ Polygon Request



63691505 Map Sheet: 1

Scale: 1: 1000

0 0.01km

NORTH

Map Key:

1

This maps is created in colour and shall be printed in colour

Legend

Distribution Main

- Class 900 Transmission
- Class 600 Transmission
- Class 300 Transmission
- High Pressure Steel
- High Pressure PE Trunk
- High Pressure/ Class 500 (1)
- Medium Pressure PE/ Nylon
- Medium Pressure (Allgas)
- Low Pressure
- LPG
- TLP
- Proposed/ Under Construction
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- End Cap

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HDPE	High Density Polyethylene
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OD	Outside Diameter

Examples:

40PE in DN80 CI — 40mm Polyethylene in an 80mm (Nominal Diameter) Cast Iron Sleeve

63PE INS — 63mm Polyethylene inserted in another pipe

Line/ Polygon Request

Data Source

Pipeline Data Copyright APA Group, Property Parcels Copyright QLD Government, UBD Imagery – Copyright Sensis, DBYD Dig Location provided by DBYD.

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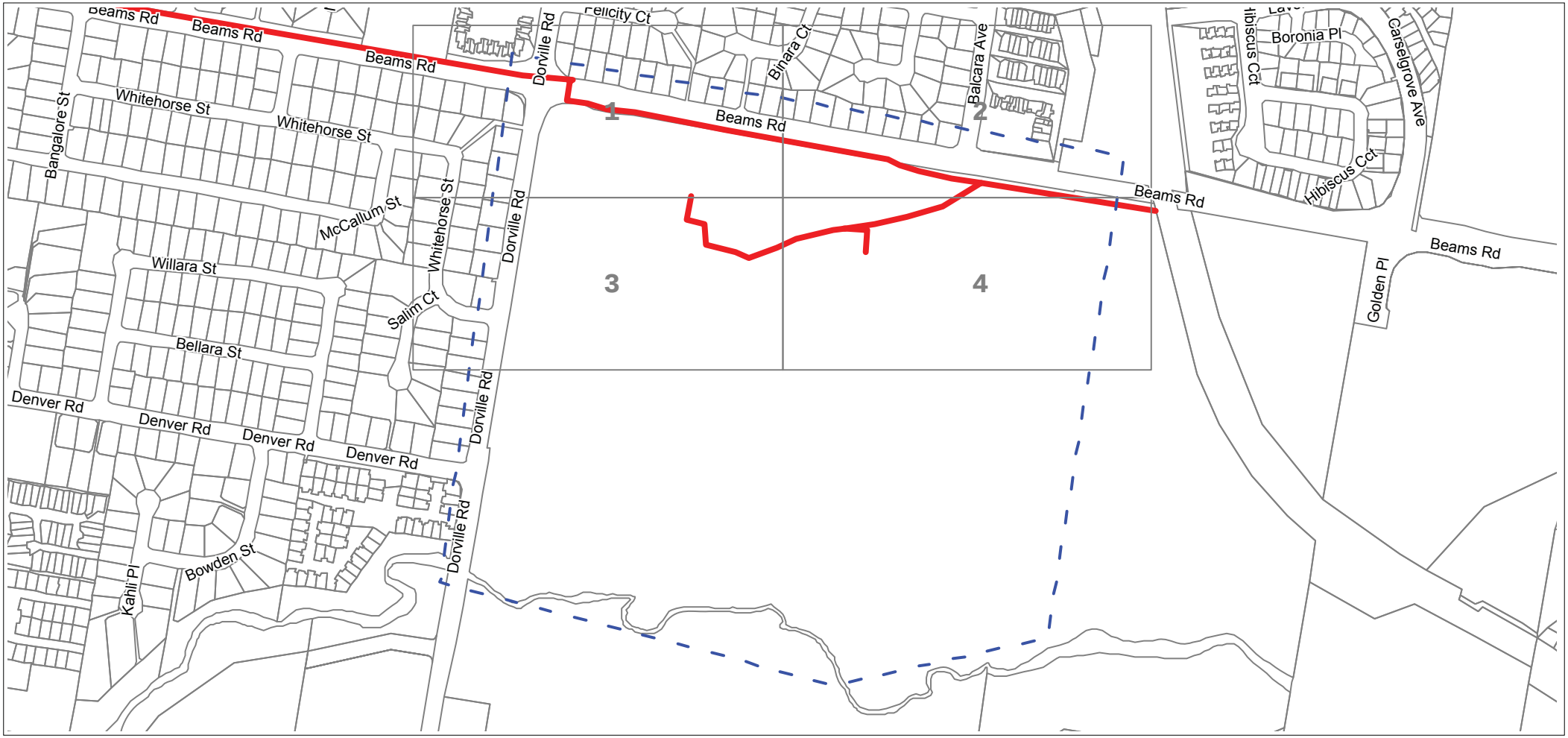
AARNet

Sequence Number: 63691506

Address:532 Beams Road, Carseldine, QLD, 4034



Create Date: 17/08/2017 **Scale** 1:1500

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Enquiry Area

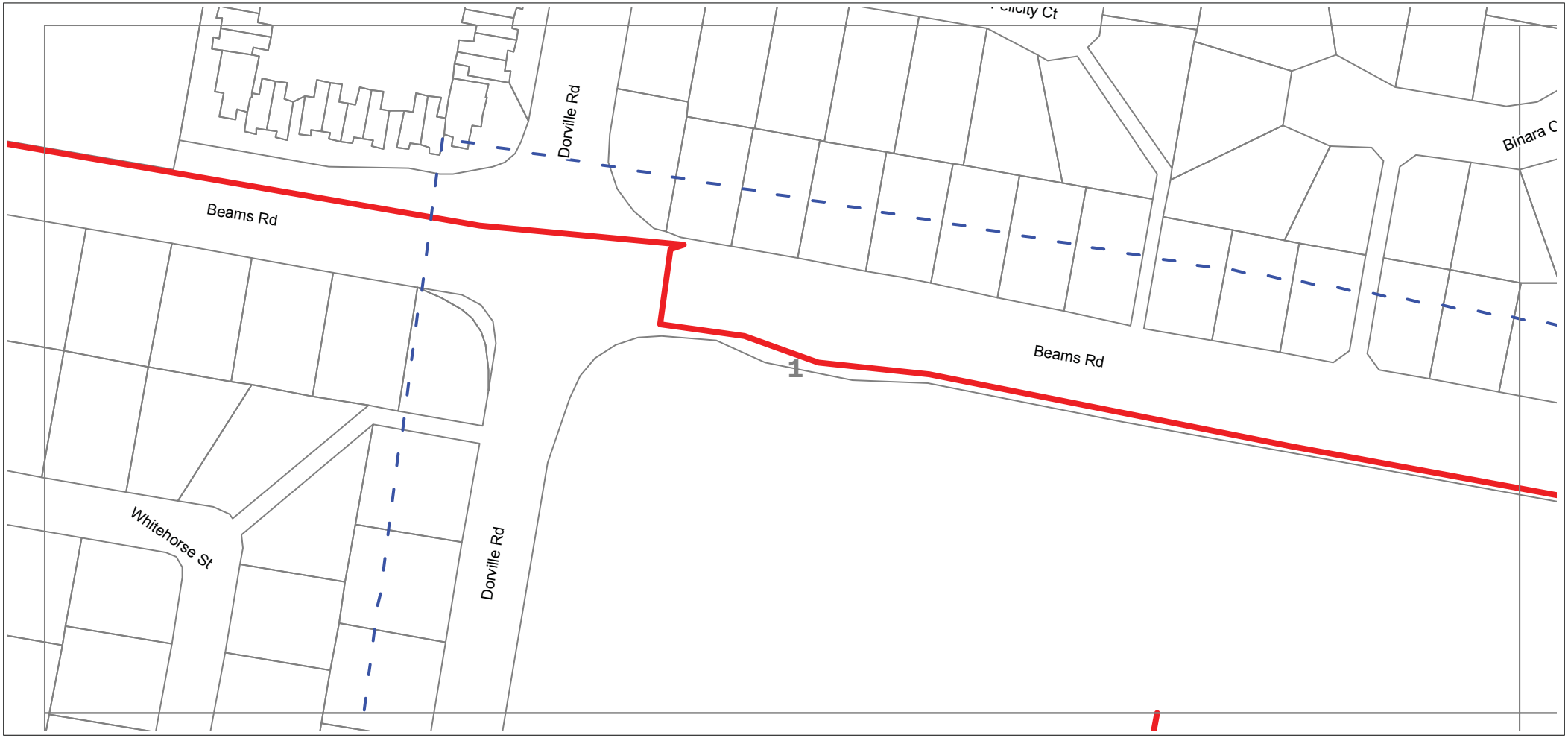
AARNet Fibre Optic Assets

Cadastre

AARNet

Sequence Number: 63691506

Address:532 Beams Road, Carseldine, QLD, 4034



Create Date: 17/08/2017 **Scale** 1:1500

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Enquiry Area

AARNet Fibre Optic Assets

Cadastre

AARNet

Sequence Number: 63691506

Address:532 Beams Road, Carseldine, QLD, 4034

Create Date: 17/08/2017 **Scale** 1:1500

N

Enquiry Area

AARNet Fibre Optic Assets

Cadastre

AARNet

Sequence Number: 63691506

Address:532 Beams Road, Carseldine, QLD, 4034

Create Date: 17/08/2017 **Scale** 1:1500

N

Enquiry Area

AARNet Fibre Optic Assets

Cadastre

AARNet

Sequence Number: 63691506

Address:532 Beams Road, Carseldine, QLD, 4034

Create Date: 17/08/2017 **Scale** 1:1500

N

Enquiry Area

AARNet Fibre Optic Assets

Cadastre

Queensland Urban Utilities - Water & Sewer Infrastructure

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QUEENSLAND UrbanUtilities

DBYD - Queensland Urban Utilities
Water & Sewer Infrastructure

DBYD Reference No: 63691508

Date DBYD Ref Recieved: 17/08/2017 12:15:00 PM
Date DBYD Job to Commence: 22/08/2017 12:00:00 AM
Date DBYD Map Produced: 17/08/2017
This Map is valid for 30 days

Produced By: Queensland Urban Utilities

GDA

Sewer
- Infrastructure
- Major Infrastructure
- Network Pipelines
- Recycled Water Pipelines
- Network Structures

Water
- Infrastructure
- Major Infrastructure
- Network Pipelines
- Network Structures

N

Map Scale

1:4100

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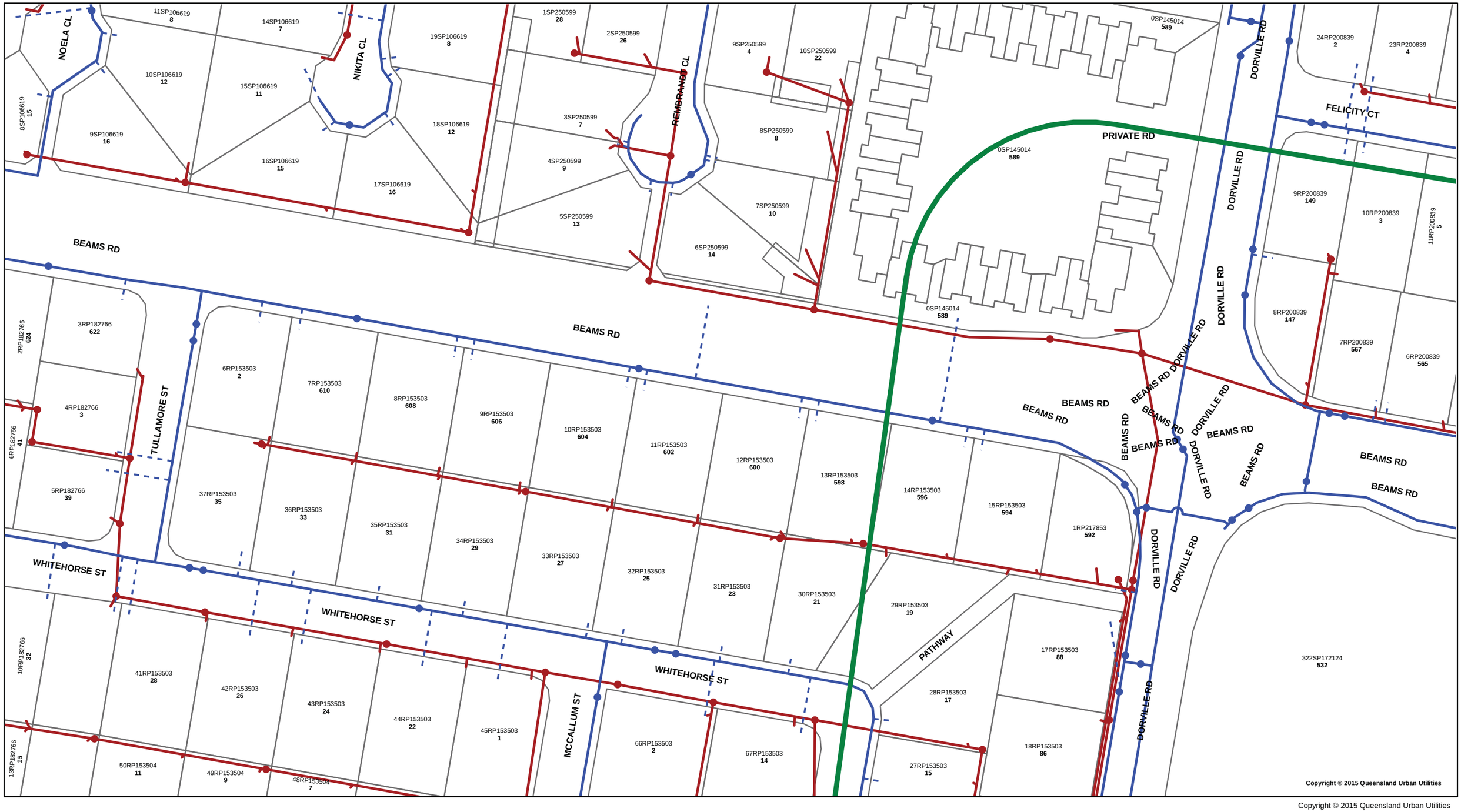
For further information, please call Queensland Urban Utilities on 13 26 57 (7am-7pm weekdays). Faults and emergencies 13 23 64 (24/7). www.urbanutilities.com.au ABN 86 673 835 011

Queensland Urban Utilities - Water & Sewer Infrastructure



QUEENSLAND UrbanUtilities

DBYD - Queensland Urban Utilities
Water & Sewer Infrastructure

DBYD Reference No: 63691508

Date DBYD Ref Recieved: 17/08/2017 12:15:00 PM
Date DBYD Job to Commence: 22/08/2017 12:00:00 AM
Date DBYD Map Produced: 17/08/2017
This Map is valid for 30 days

Produced By: Queensland Urban Utilities

GDA

Sewer
- Infrastructure
- Major Infrastructure
- Network Pipelines
- Recycled Water Pipelines
- Network Structures

Water
- Infrastructure
- Major Infrastructure
- Network Pipelines
- Network Structures

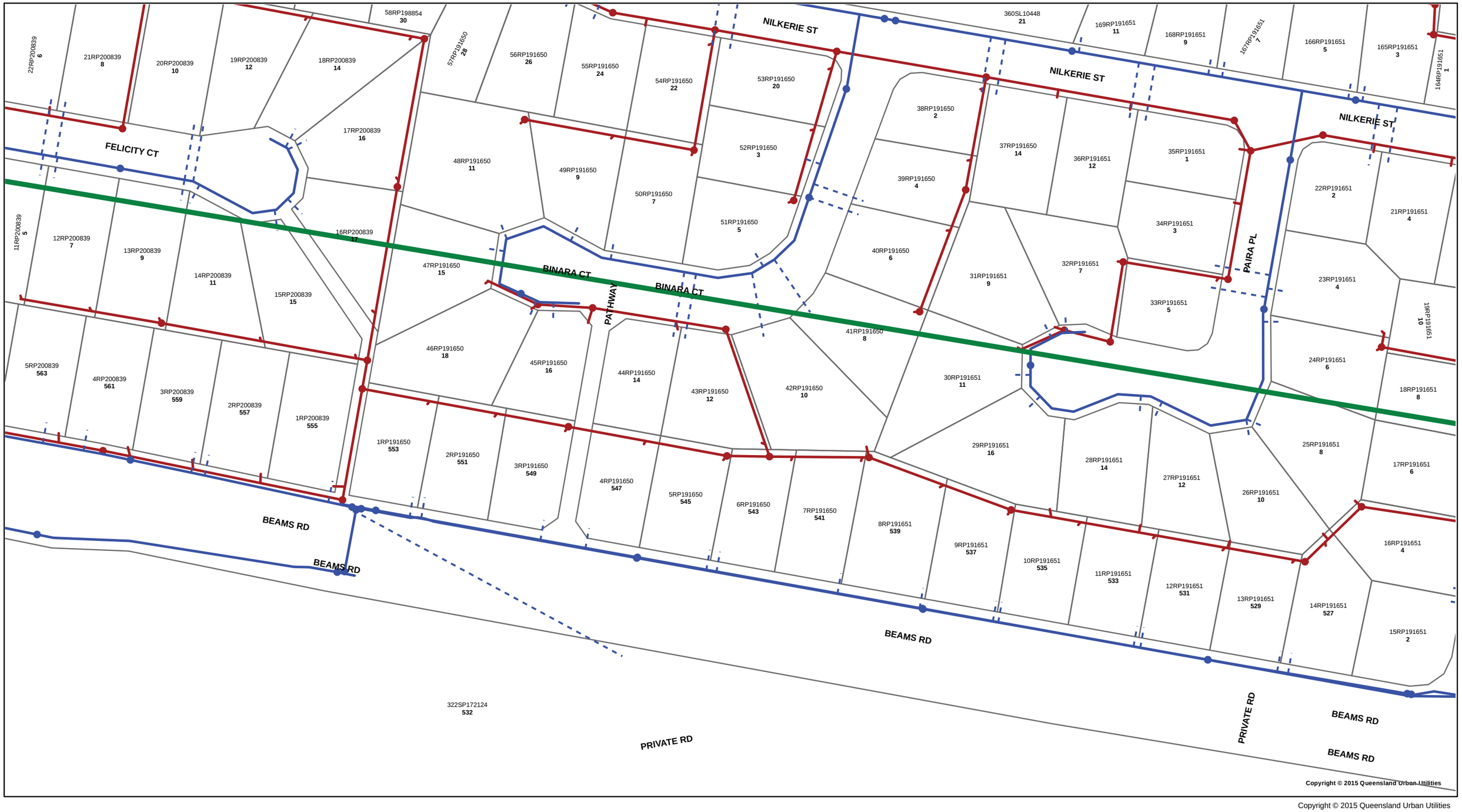
N

Map Scale

1:1000

For further information, please call Queensland Urban Utilities on 13 26 57 (7am-7pm weekdays). Faults and emergencies 13 23 64 (24/7). www.urbanutilities.com.au ABN 86 673 835 011

Queensland Urban Utilities - Water & Sewer Infrastructure



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DBYD - Queensland Urban Utilities
Water & Sewer Infrastructure

DBYD Reference No: 63691508

Date DBYD Ref Recieved: 17/08/2017 12:15:00 PM
Date DBYD Job to Commence: 22/08/2017 12:00:00 AM
Date DBYD Map Produced: 17/08/2017
This Map is valid for 30 days
Produced By: Queensland Urban Utilities

GDA

Sewer
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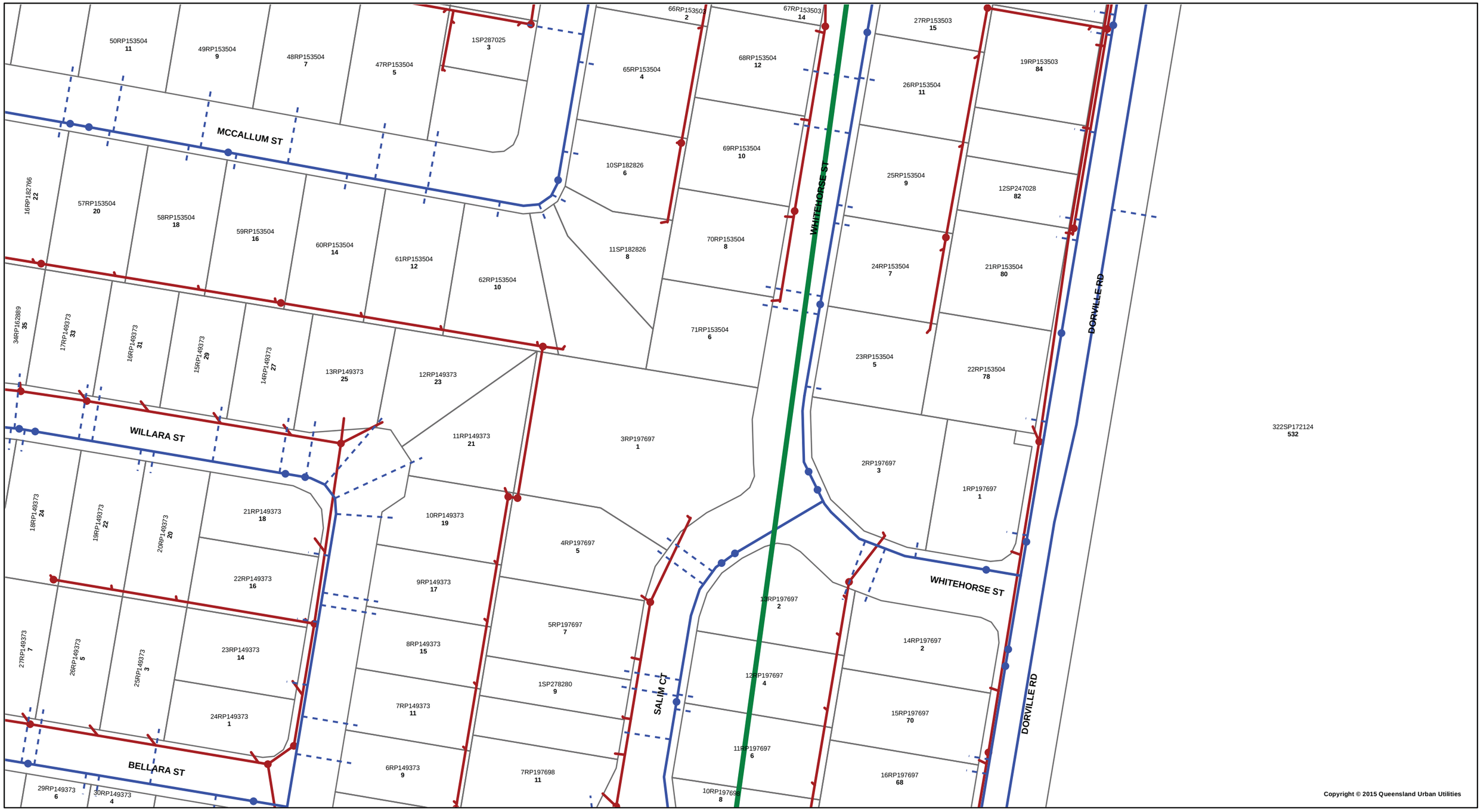

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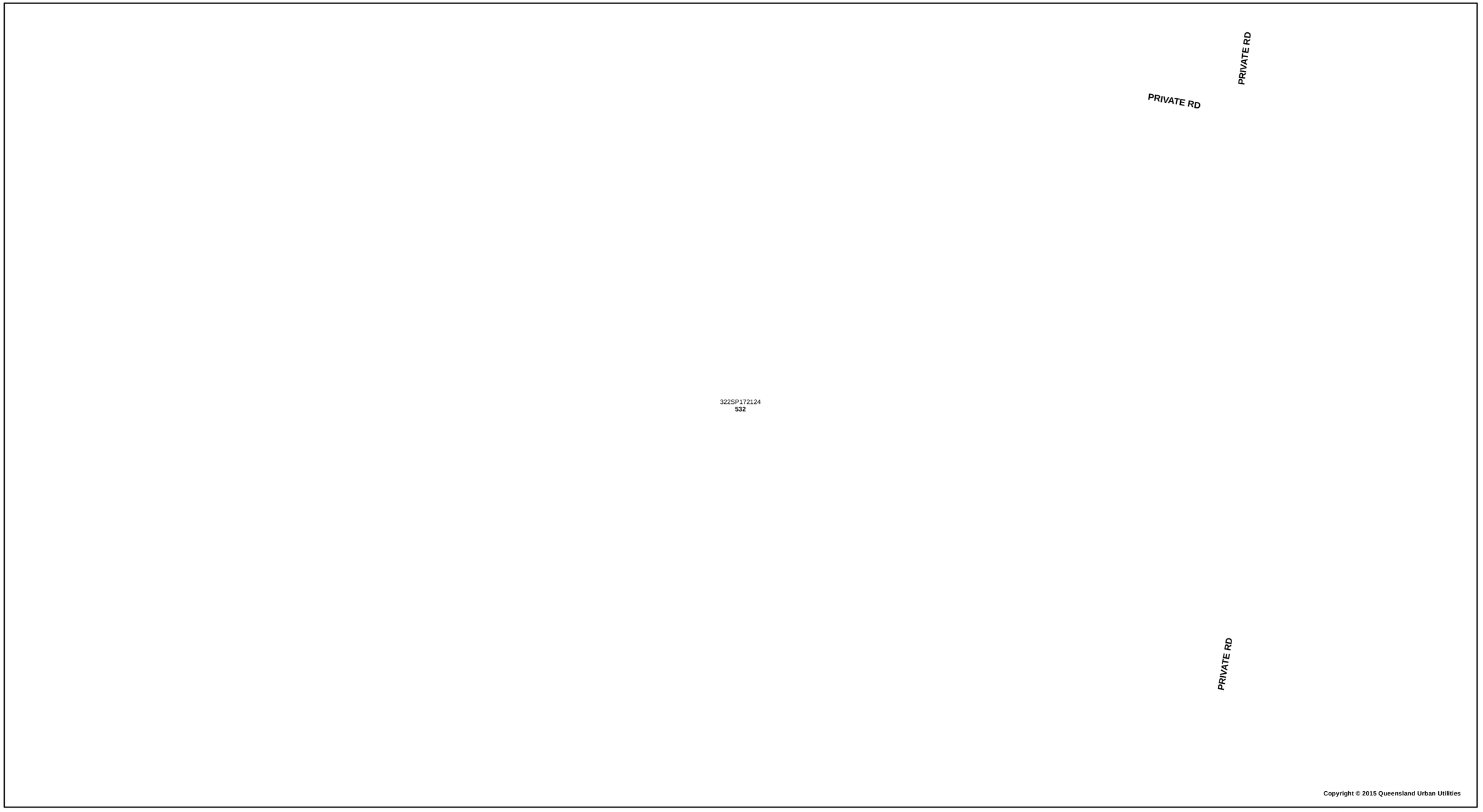

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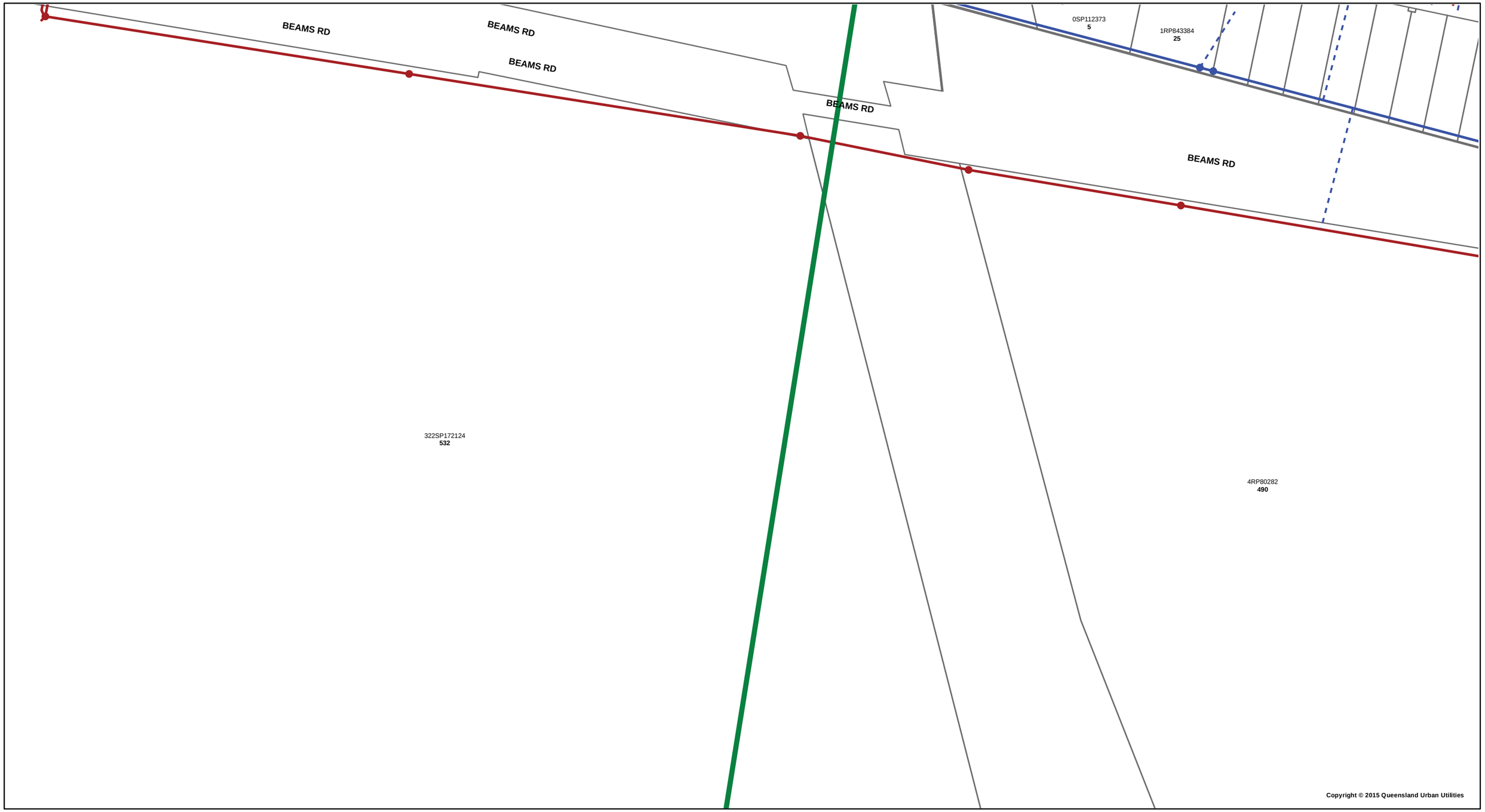

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532

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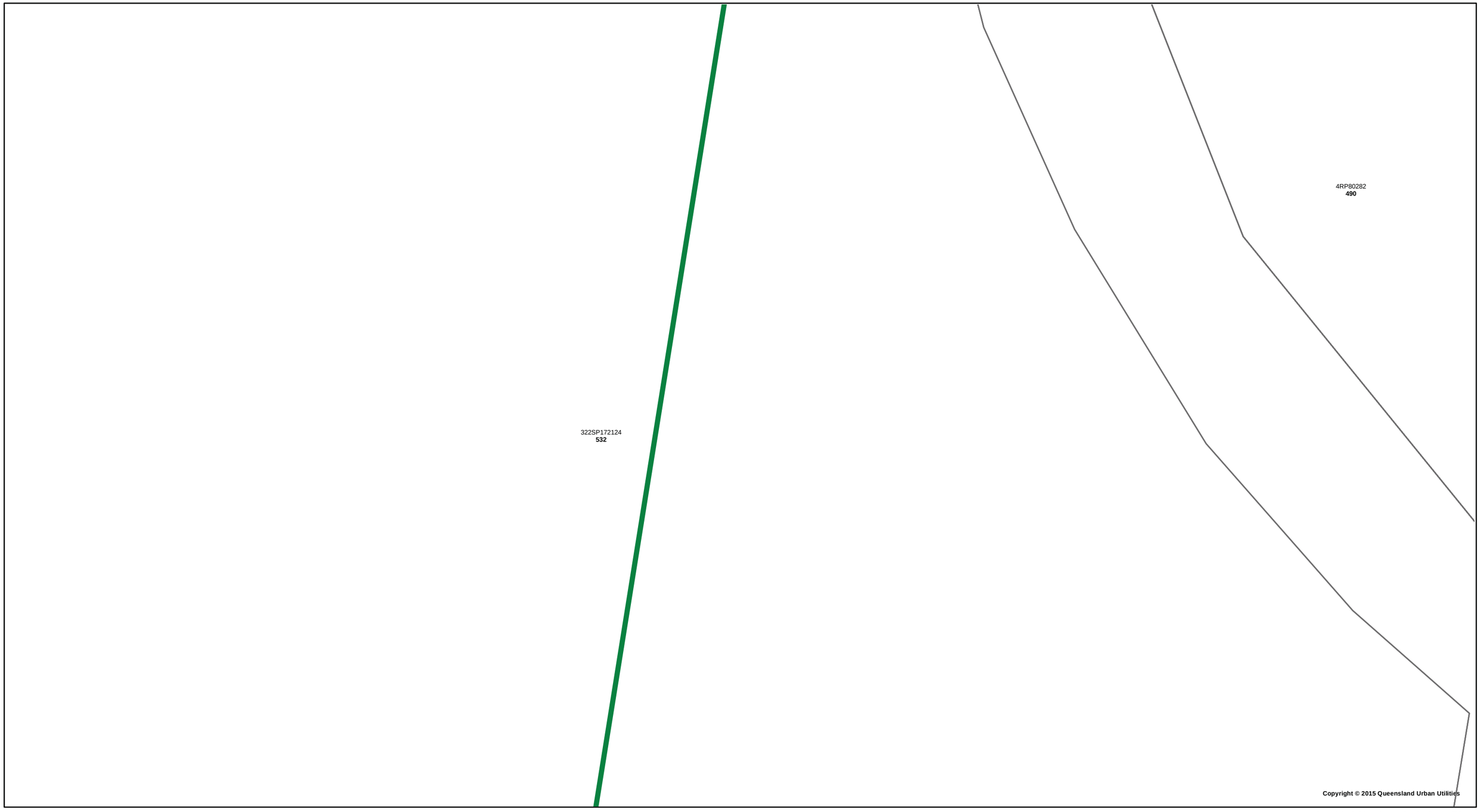

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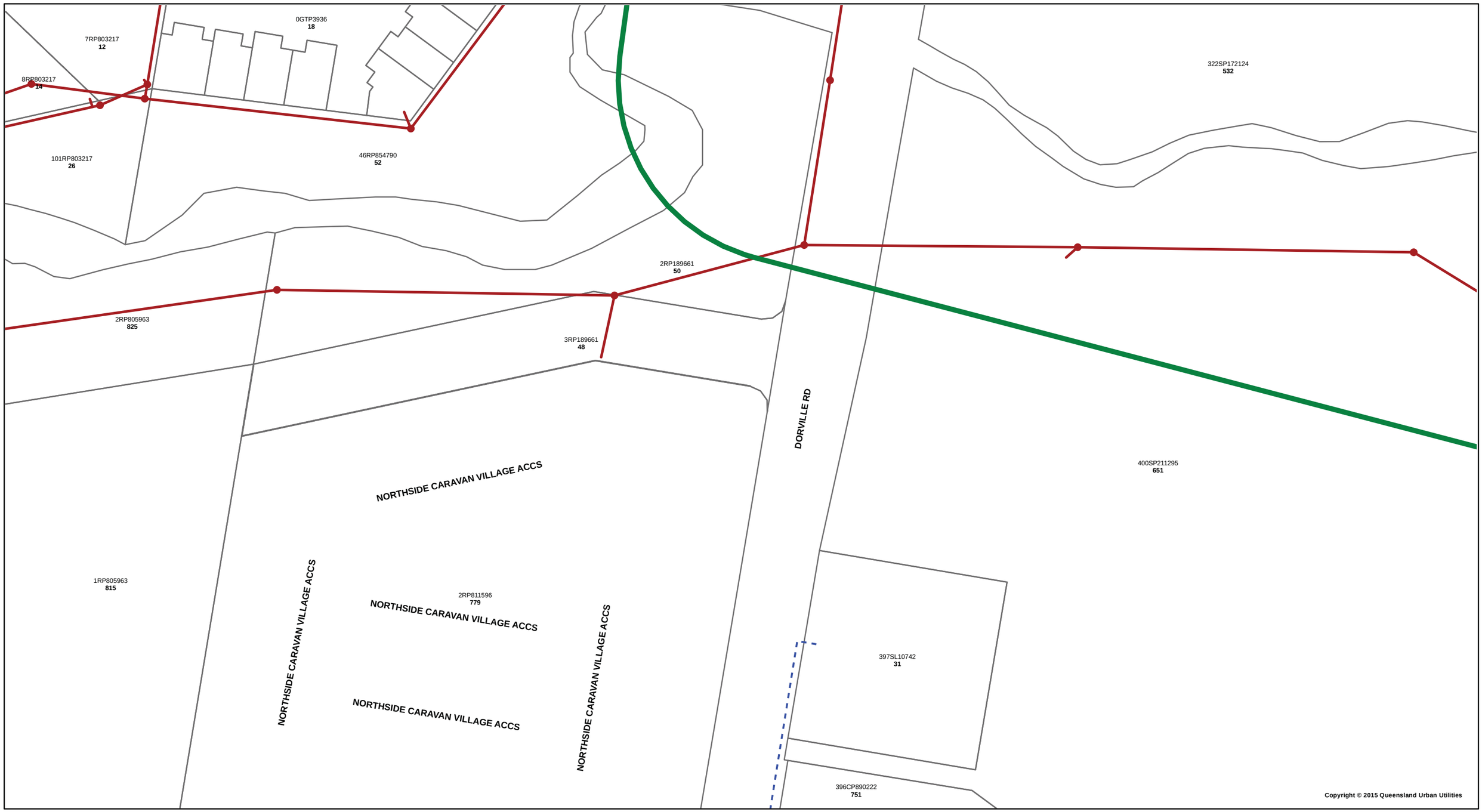

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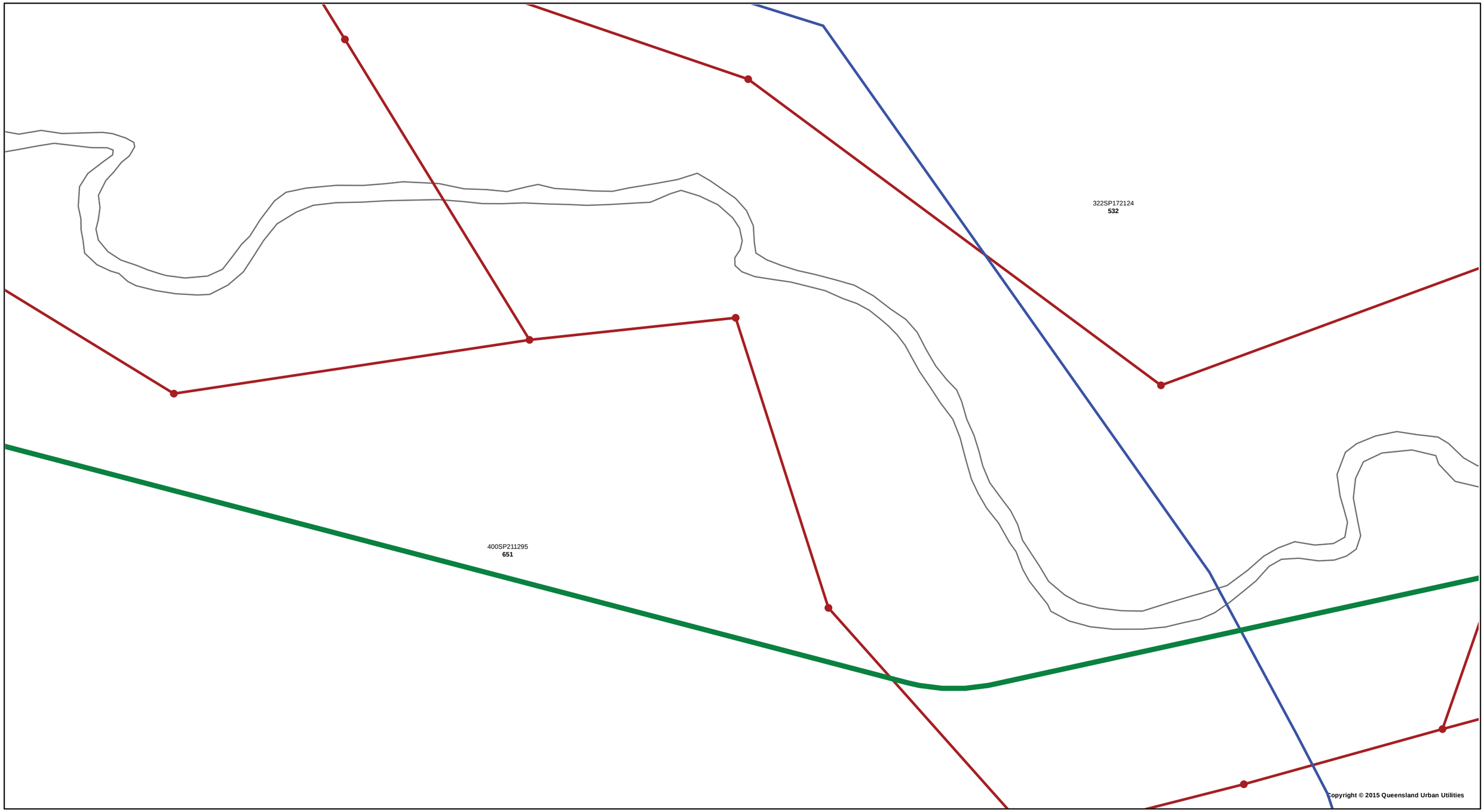

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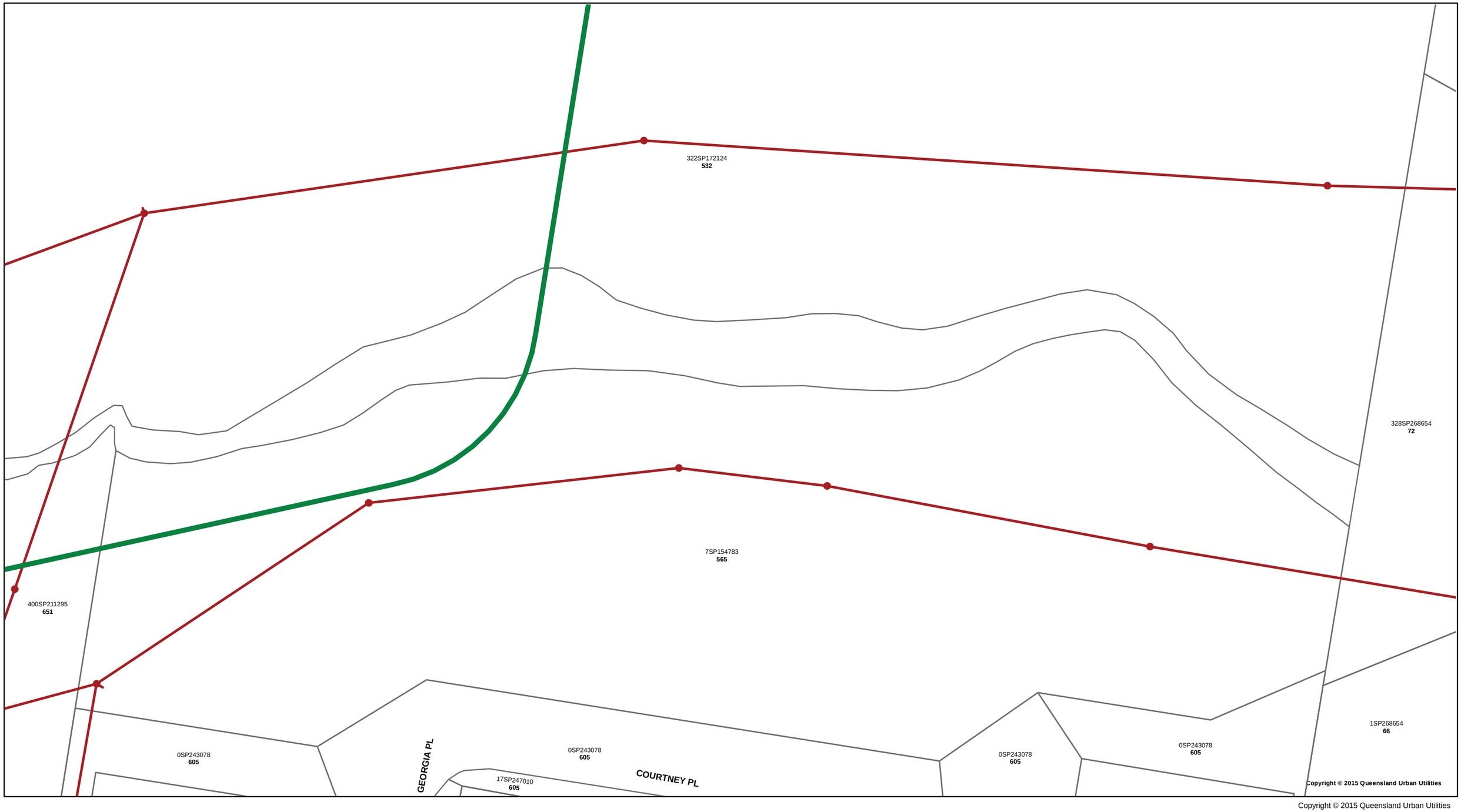

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PAPER SIZE A3

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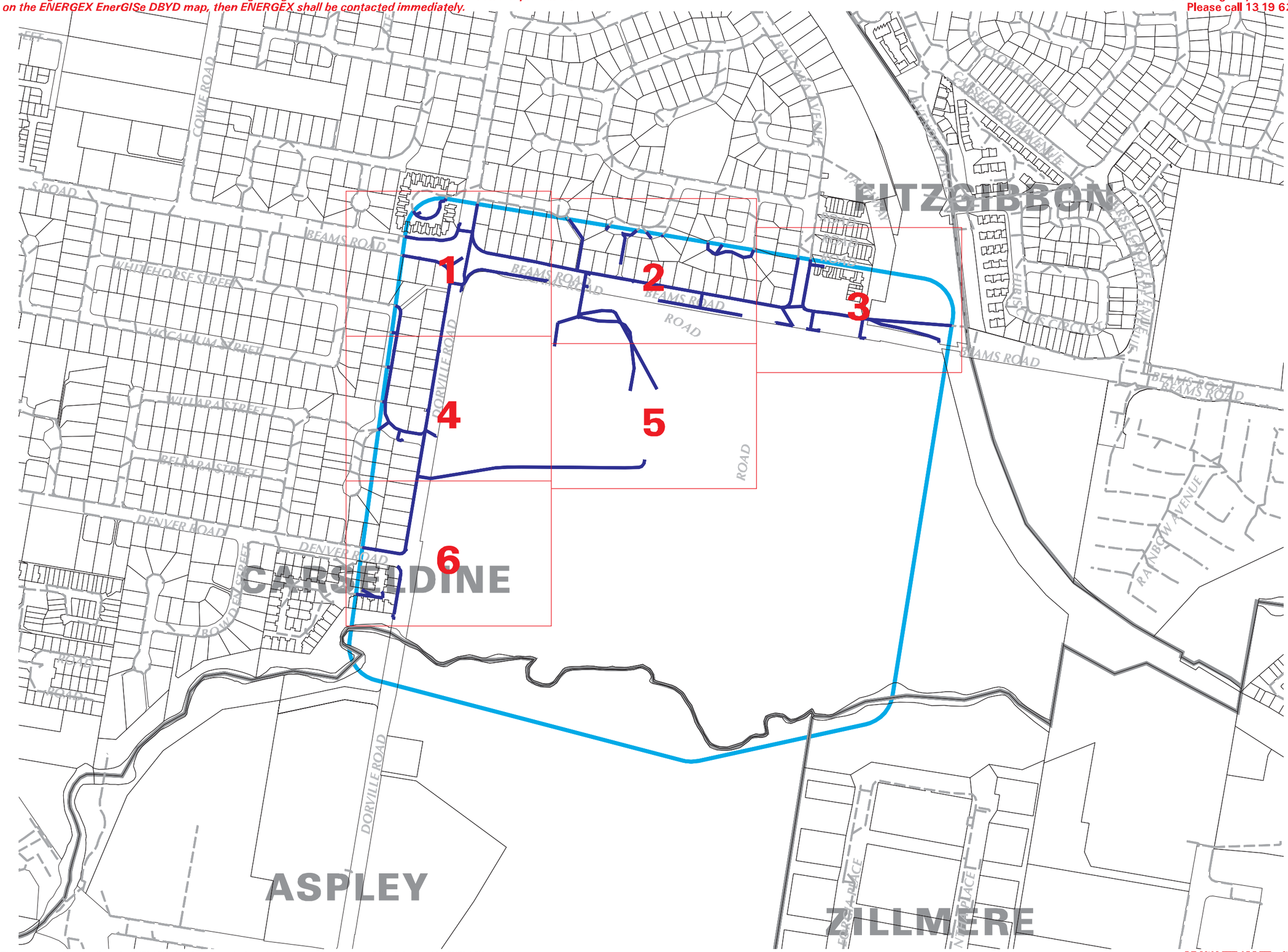
For Emergency Situations Please call 13 19 62



energex

EnerGISe
DBYD

Date: 17 Aug 17 Time: 12.19.26
Requested By: DBYD

NOT TO SCALE

0 200m

Enquiry No: 63691502
KEY MAP

Enquiry Area

LOCALITY DIAGRAM

This output provides details of the ENERGEX electrical network. As variations may exist no responsibility is incurred by ENERGEX for the accuracy or completeness of the information provided. Exact positions of cables and electrical connectivity should be confirmed on site.

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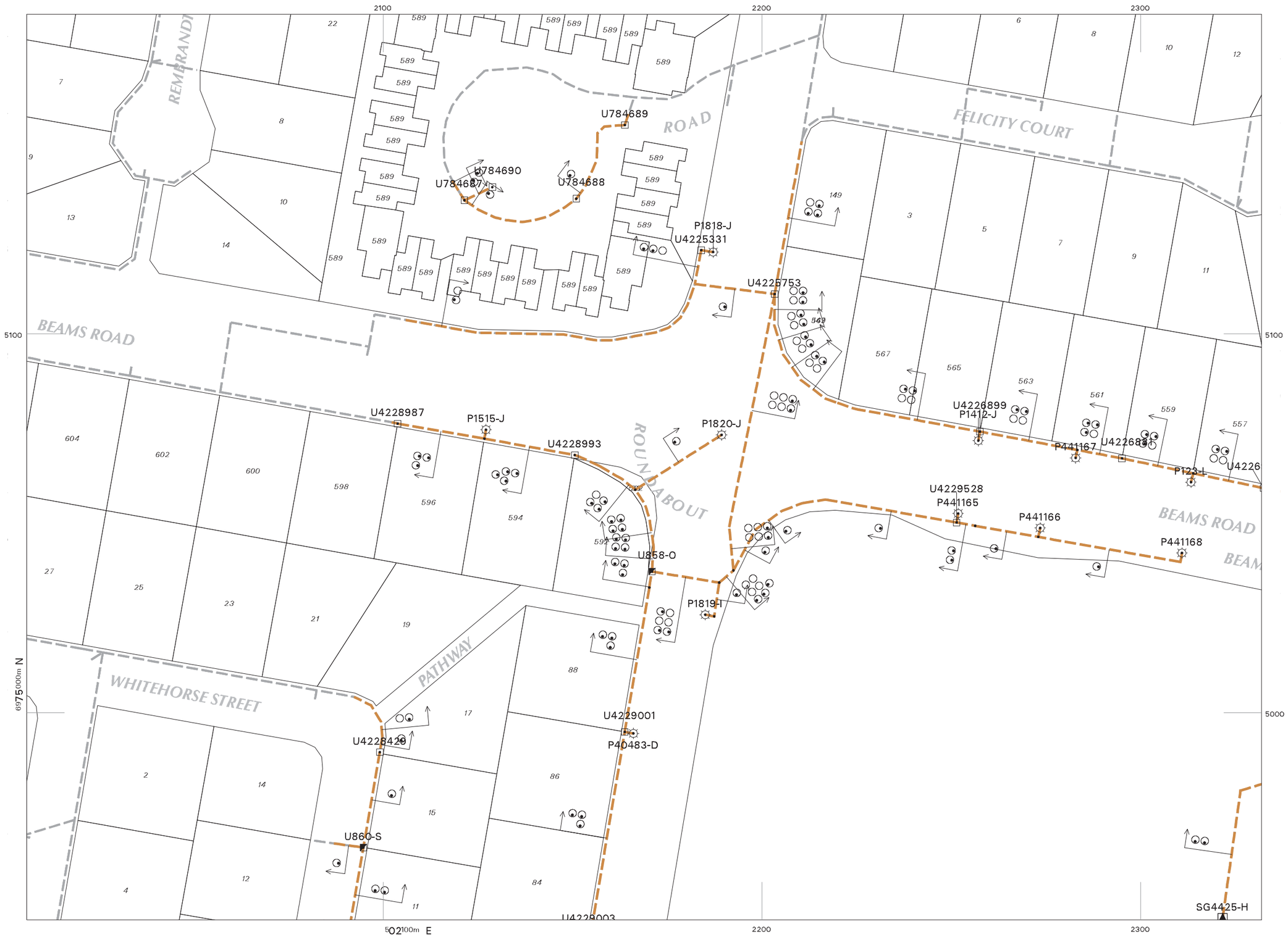

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energex

EnerGISe
DBYD

Date: 17 Aug 17 Time: 12.19.41
Requested By: DBYD

SCALE 1:1000

20 0 20m

Enquiry No: 63691502

STRIP No: 1

- Ground Transformer
- Cubicle Transformer
- Ring Main Unit
- Metering Unit
- Link Pillar
- Service Pillar
- Junction Pillar
- Pit
- Cable Joint
- Cable Termination
- Cable Marker
- Street Light Pole
- Earth
- Works Order Polygon
- Cable Voltage Less Than 33kV
- Cable Voltage 33kV or Higher
- Direct-Lay Cable
- Conduit
- Multi-Section Duct
- Trench
- Cable Tray
- Tunnel

N W E S

INDEX TO SHEETS

1	2	3
4	5	
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LOCALITY DIAGRAM

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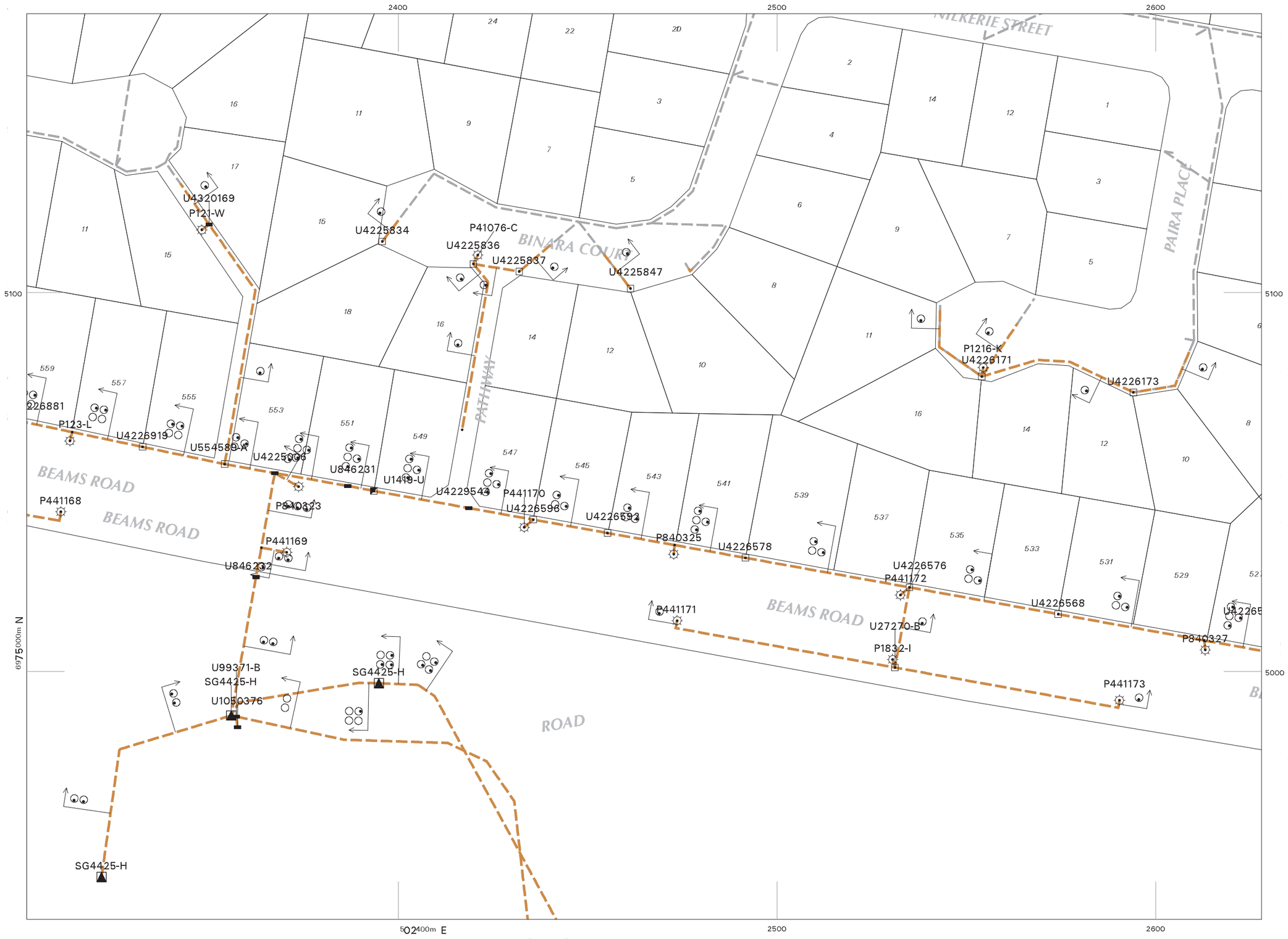

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energex

EnerGISe
DBYD

Date: 17 Aug 17 Time: 12.20.36
Requested By: DBYD

SCALE 1:1000

20 0 20m

Enquiry No: 63691502

STRIP No: 3

- Ground Transformer
- Cubicle Transformer
- Ring Main Unit
- Metering Unit
- Link Pillar
- Service Pillar
- Junction Pillar
- Pit
- Cable Joint
- Cable Termination
- Cable Marker
- Street Light Pole
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- Works Order Polygon
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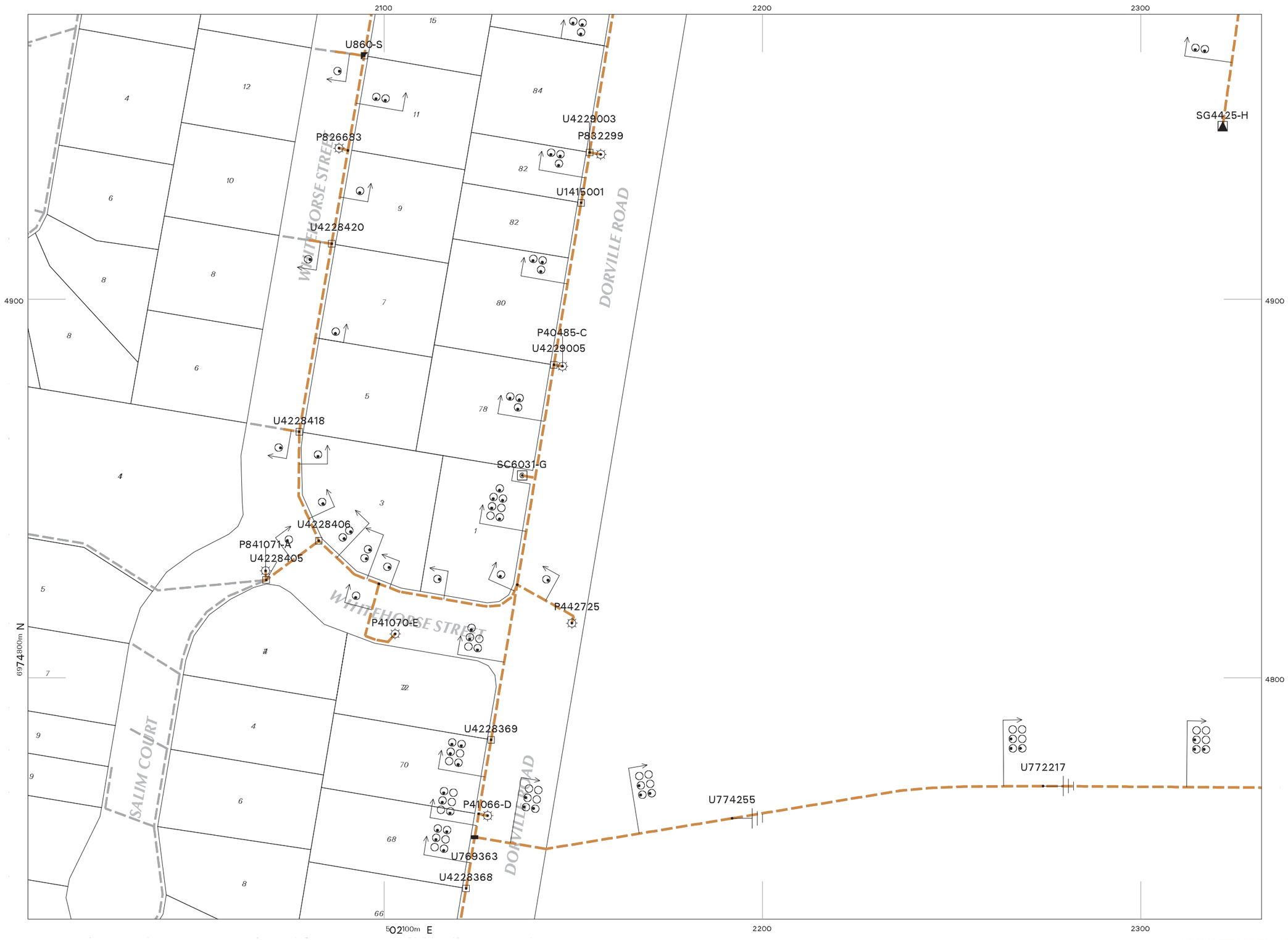

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energex

EnerGISe DBYD

Date: 17 Aug 17 Time: 12.21.05
Requested By: DBYD

SCALE 1:1000

20 0 20m

Enquiry No: 63691502

STRIP No: 4

- Ground Transformer
- Cubicle Transformer
- Ring Main Unit
- Metering Unit
- Link Pillar
- Service Pillar
- Junction Pillar
- Pit
- Cable Joint
- Cable Termination
- Cable Marker
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N W E S

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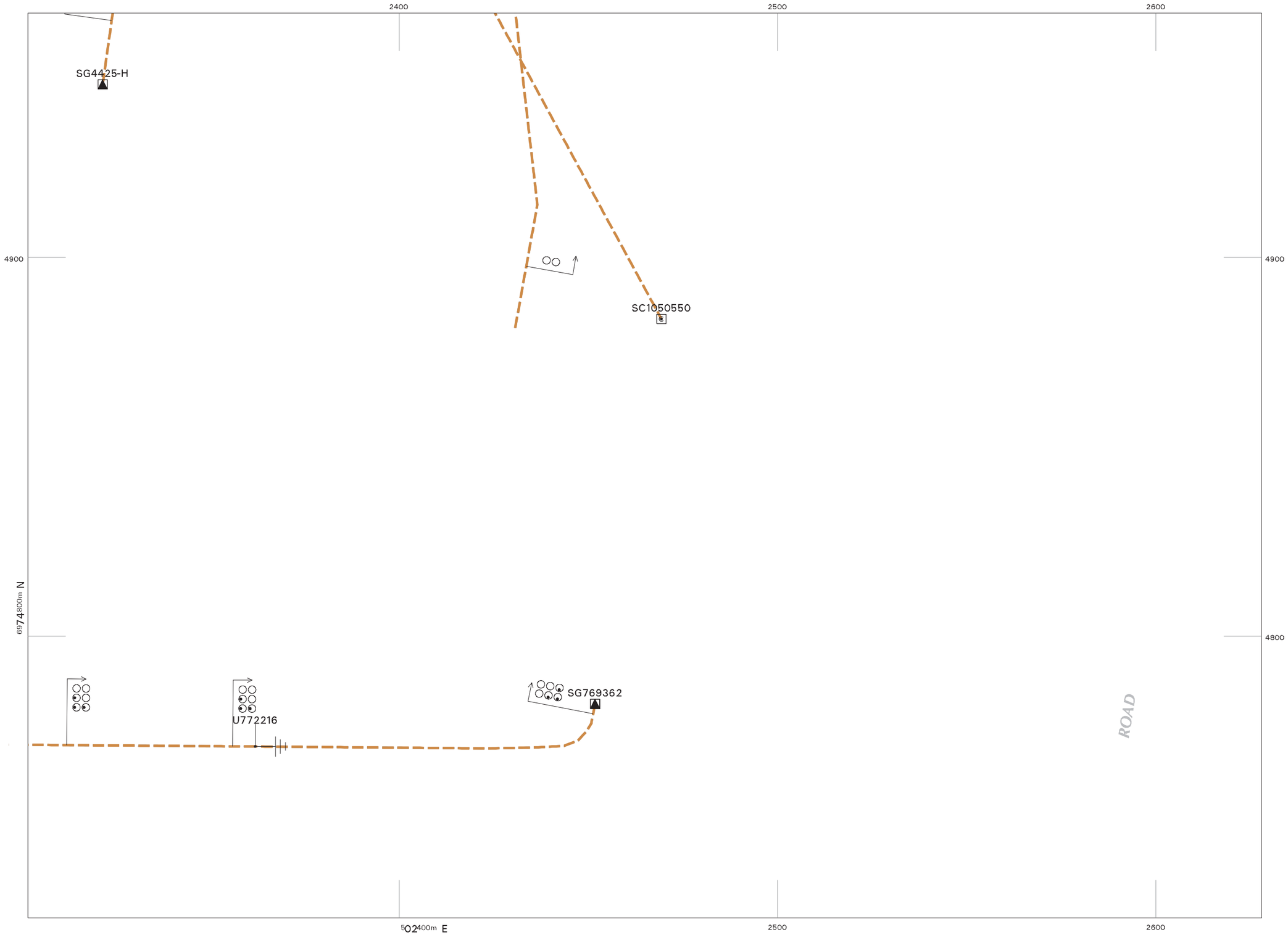

energex

EnerGISe
DBYD

Date: 17 Aug 17 Time: 12.21.32
Requested By: DBYD

SCALE 1:1000

20 0 20m

Enquiry No: 63691502

STRIP No: 5

- Ground Transformer
- Cubicle Transformer
- Ring Main Unit
- Metering Unit
- Link Pillar
- Service Pillar
- Junction Pillar
- Pit
- Cable Joint
- Cable Termination
- Cable Marker
- Street Light Pole
- Earth
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N W E S

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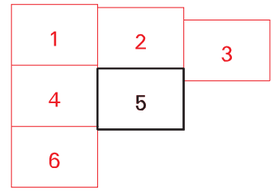

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DBYD

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Requested By: DBYD

SCALE 1:1000

20 0 20m

Enquiry No: 63691502

STRIP No: 6

- Ground Transformer
- Cubicle Transformer
- Ring Main Unit
- Metering Unit
- Link Pillar
- Service Pillar
- Junction Pillar
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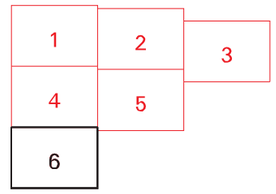

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LEGEND

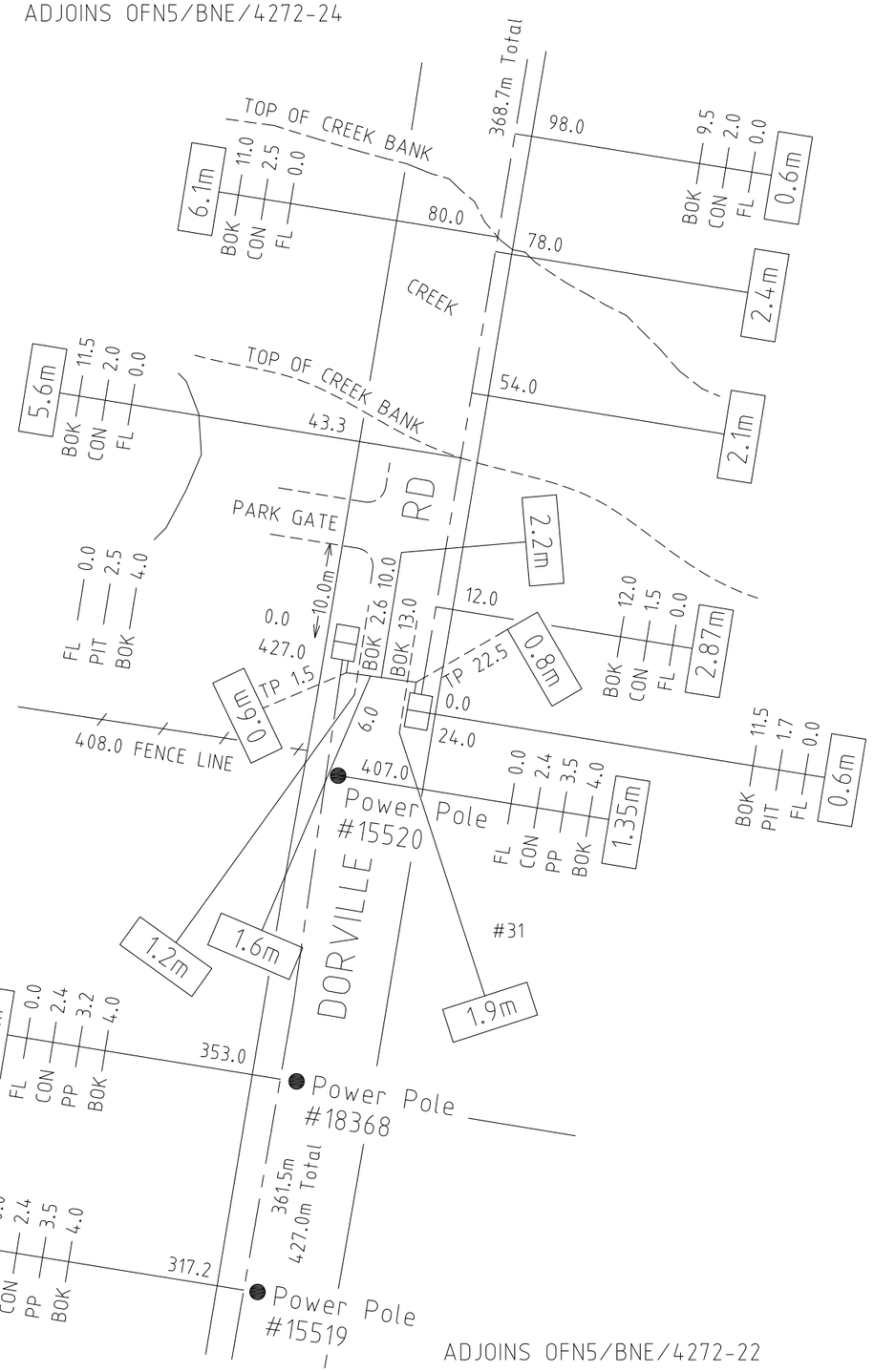
- ELECTRICITY POLE
- FIBRE OPTIC CABLE
- CABLE CONDUIT (TRENCHING)
- CABLE CONDUIT (BORE TUNNELLING)
- EXISTING CONDUIT
- UE P2 PIT
- UE P5 PIT
- UE P6 PIT
- UE P8 PIT
- UE P9 PIT

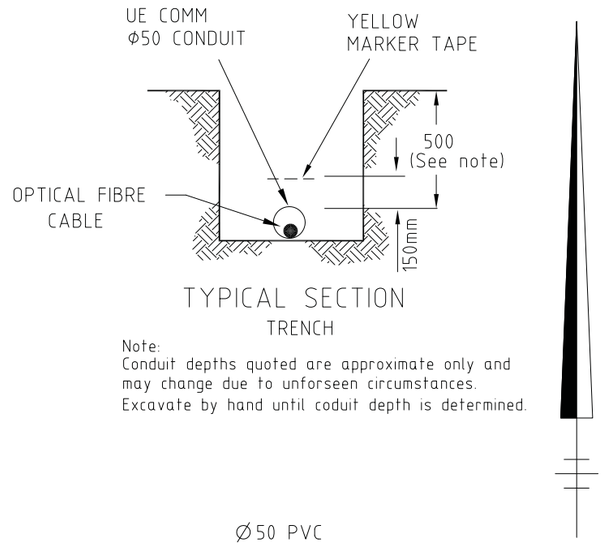
BL - BUILDING LINE
BOK - BACK OF KERB
CL - CENTRELINE OF CONDUIT
TP - TURNING POINT OF CONDUIT

- FENCE LINE, FL
- TELSTRA MANHOLE
- TELSTRA PIT
- OPTICAL FIBRE JOINT
- JOINT LOOP (m) - POLE / UNDERGROUND
- CABLE HEAD POLE

0.6m - CABLE DEPTH

ADJOINS OFN5/BNE/4272-24





TYPICAL SECTION
TRENCH

Note:
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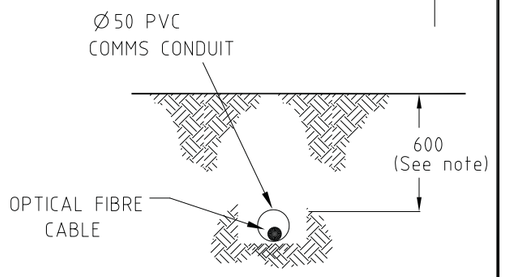
Excavate by hand until coduit depth is determined.



TYPICAL SECTION
BORE

ARA Contract Services
K.J. BLAIN SURVEYS
Land Development, Planning
& Surveying Consultants
PH: (07) 3821 2016 FAX: (07) 3821 2253

Note:
1. Conduit depths quoted are approximate only and may change due to unforseen circumstances.
2. In all instances it is recommended that the position of conduits & cables should be proved on site by hand, prior to commencement of works.
3. Yellow marker tape shall be installed at least 150mm above the uppermost surface of all conduits or cables.

ADJOINS OFN5/BNE/4272-22

SHEET 23 OF 26

DRAWING NOT TO SCALE

REVISION					
DATE	REV.	REVISION DESCRIPTION		CHECKED	APP'D.

CONTACT ARA OFFICER - TONY WILLIAMS / DENNIS GARDNER PH: - 07 3245 7771
PROJECT NUMBER UEC-QLUTB-105
PLAN No. 7405
MELWAY / UBD REF MAP 109 - M20 - M19

Uecomm MAKING THE CONNECTION ACN 079 083 195
UECOMM MEL/SYD/QLD

DRAWN KJBS 1/8/03
DESIGN CHECKED
APPROVED

DRG No. OFN5/BNE/4272-23

U/G OPTICAL FIBRE CABLE RUN
QUT CARSELDINE CAMPUS
HAMILTON RD TO DORVILLE RD
CARSELDINE QLD 4034

A3

LEGEND

- ○ - ELECTRICITY POLE
- —— - FIBRE OPTIC CABLE
- – – – - CABLE CONDUIT (TRENCHING)
- —·— - CABLE CONDUIT (BORE TUNNELLING)
- —o—o— - EXISTING CONDUIT
- ▣ - UE P2 PIT
- □ - UE P5 PIT
- ▣ - UE P6 PIT
- ⊠ - UE P8 PIT
- ▣ - UE P9 PIT
- BL - BUILDING LINE
- BOK - BACK OF KERB
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- TP - TURNING POINT OF CONDUIT
- \——\ - FENCE LINE, FL
- ◥ - TELSTRA MANHOLE
- (T) - TELSTRA PIT
- —▬— - OPTICAL FIBRE JOINT
- ◎ - JOINT LOOP (m) - POLE / UNDERGROUND
- ○▷ - CABLE HEAD POLE
- [0.6m] - CABLE DEPTH

ARA Contract Services

K.J. BLAIN SURVEYS
Land Development, Planning
& Surveying Consultants
PH: (07) 3821 2016 FAX: (07) 3821 2253

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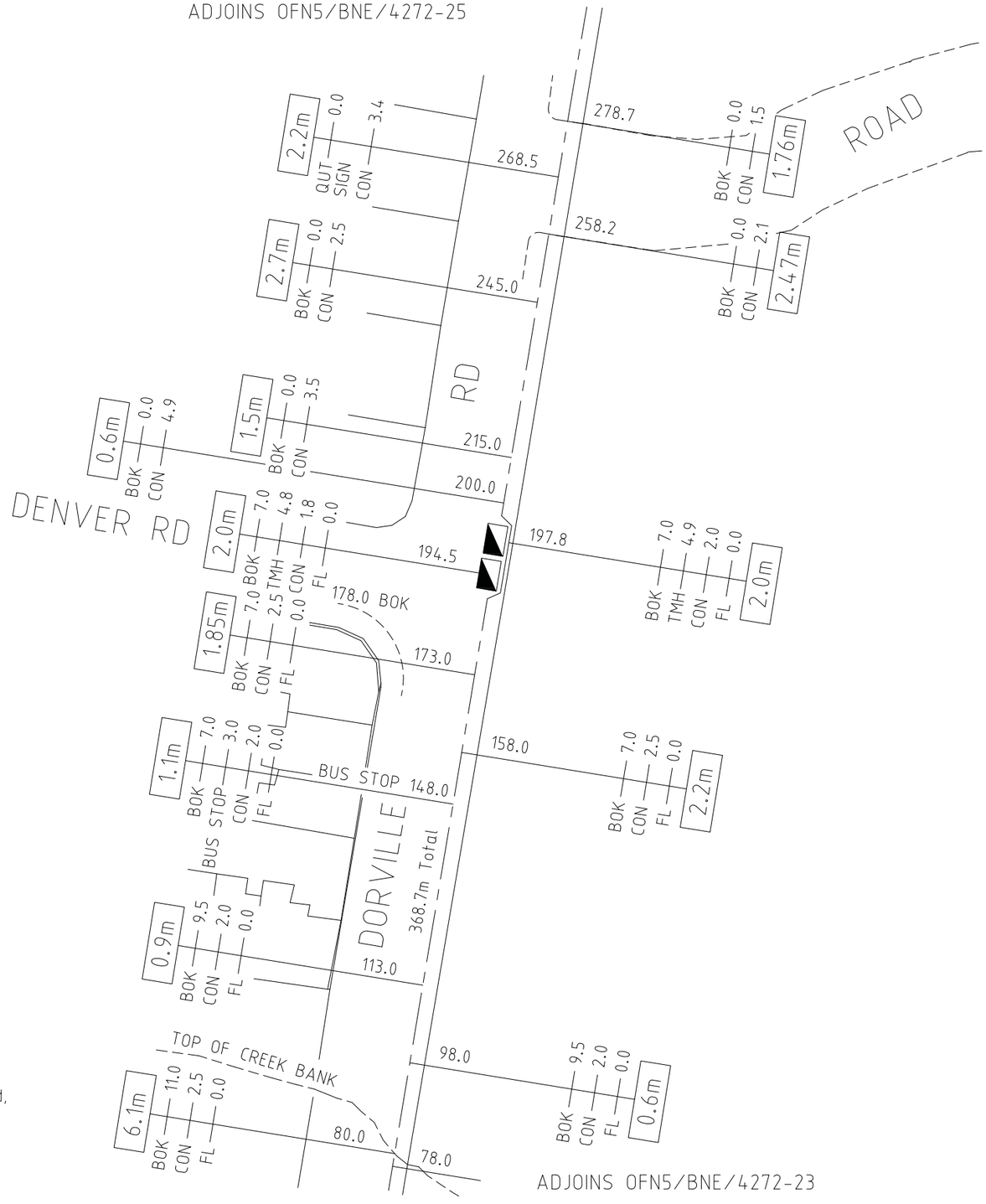

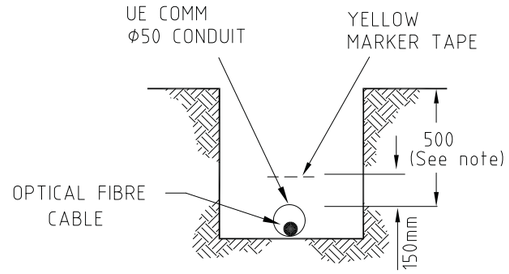

TYPICAL SECTION
TRENCH

Note:
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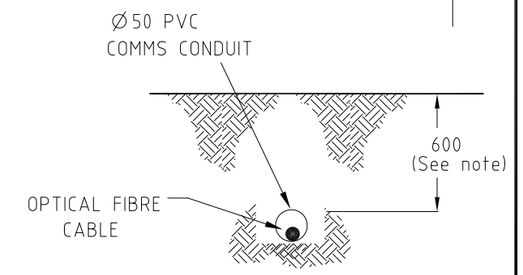

TYPICAL SECTION
BORE

SHEET 24 OF 26

DRAWING NOT TO SCALE

REVISION					
DATE	REV.	REVISION DESCRIPTION	CHECKED	APP'D.	

CONTACT ARA OFFICER - TONY WILLIAMS / DENNIS GARDNER PH: - 07 3245 7771

PROJECT NUMBER: UEC-QLUTB-105

PLAN No.: 7405

MELWAY / UBD REF: MAP 109 - M19 - M18

Uecomm™ MAKING THE CONNECTION ACN 079 083 195

UECOMM MEL/SYD/QLD

DRAWN KJBS 1/8/03

DESIGN CHECKED

APPROVED

DRG No. OFN5/BNE/4272-24

U/G OPTICAL FIBRE CABLE RUN
QUT CARSELDINE CAMPUS
HAMILTON RD TO DORVILLE RD
CARSELDINE QLD 4034

A3

LEGEND

- ELECTRICITY POLE
- FIBRE OPTIC CABLE
- CABLE CONDUIT (TRENCHING)
- CABLE CONDUIT (BORE TUNNELLING)
- EXISTING CONDUIT
- UE P2 PIT
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- OPTICAL FIBRE JOINT
- JOINT LOOP (m) - POLE / UNDERGROUND
- CABLE HEAD POLE
- 0.6m - CABLE DEPTH

ARA Contract Services

K.J. BLAIN SURVEYS
Land Development, Planning
& Surveying Consultants
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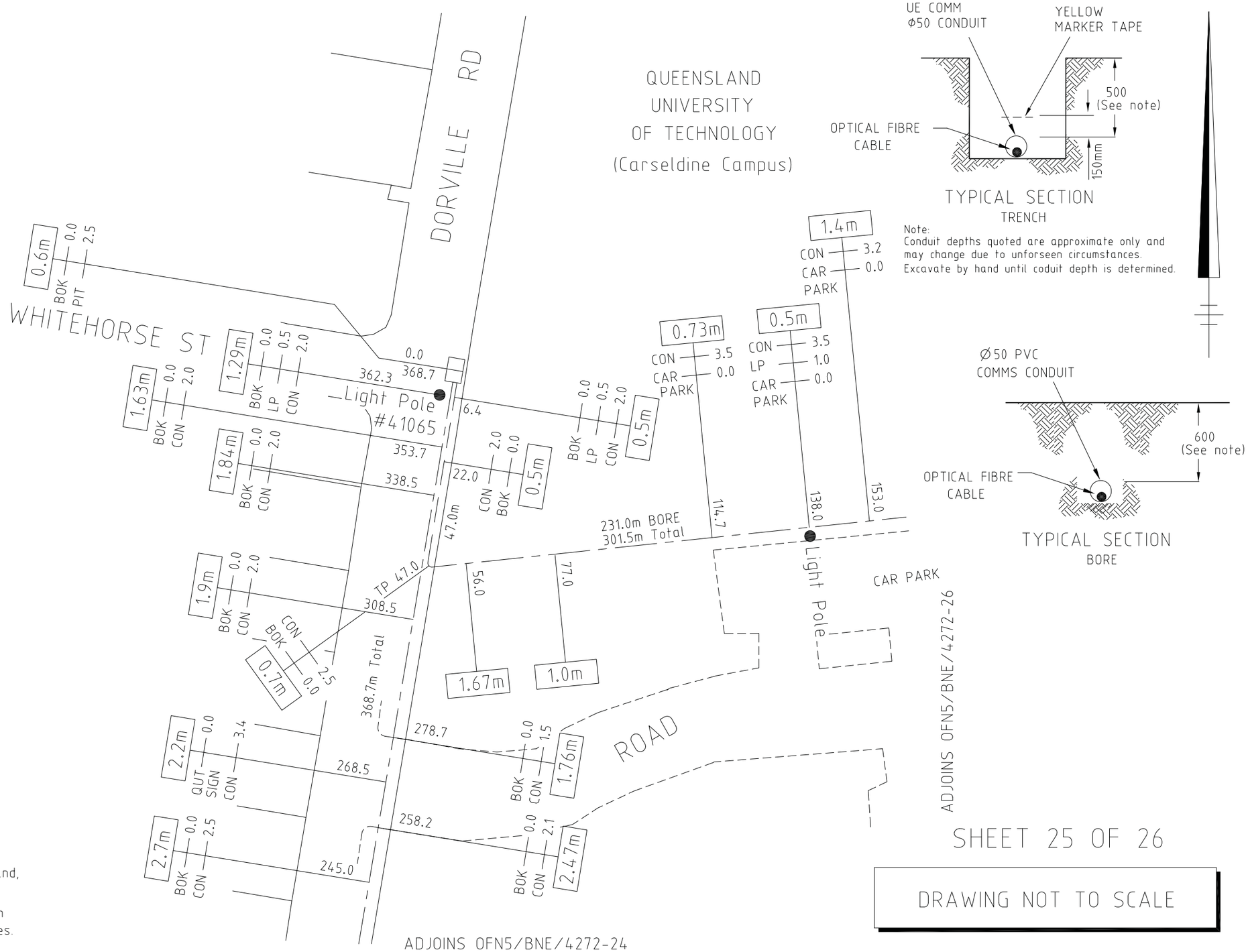

TYPICAL SECTION
TRENCH

Note:
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Excavate by hand until coduit depth is determined.

TYPICAL SECTION
BORE

SHEET 25 OF 26

DRAWING NOT TO SCALE

REVISION					
DATE	REV.	REVISION DESCRIPTION	CHECKED	APP'D.	

CONTACT ARA OFFICER - TONY WILLIAMS / DENNIS GARDNER PH: - 07 3245 7771

PROJECT NUMBER: UEC-QLUTB-105

PLAN No.: 7405

MELWAY / UBD REF: MAP 109 - M18 - N18

Uecomm MAKING THE CONNECTION ACN 079 083 195

UECOMM MEL/SYD/QLD

DRAWN KJBS 1/8/03

DESIGN CHECKED

APPROVED

DRG No. OFN5/BNE/4272-25

U/G OPTICAL FIBRE CABLE RUN
QUT CARSELDINE CAMPUS
HAMILTON RD TO DORVILLE RD
CARSELDINE QLD 4034

A3

LEGEND

- ○ - ELECTRICITY POLE
- —— - FIBRE OPTIC CABLE
- – – – - CABLE CONDUIT (TRENCHING)
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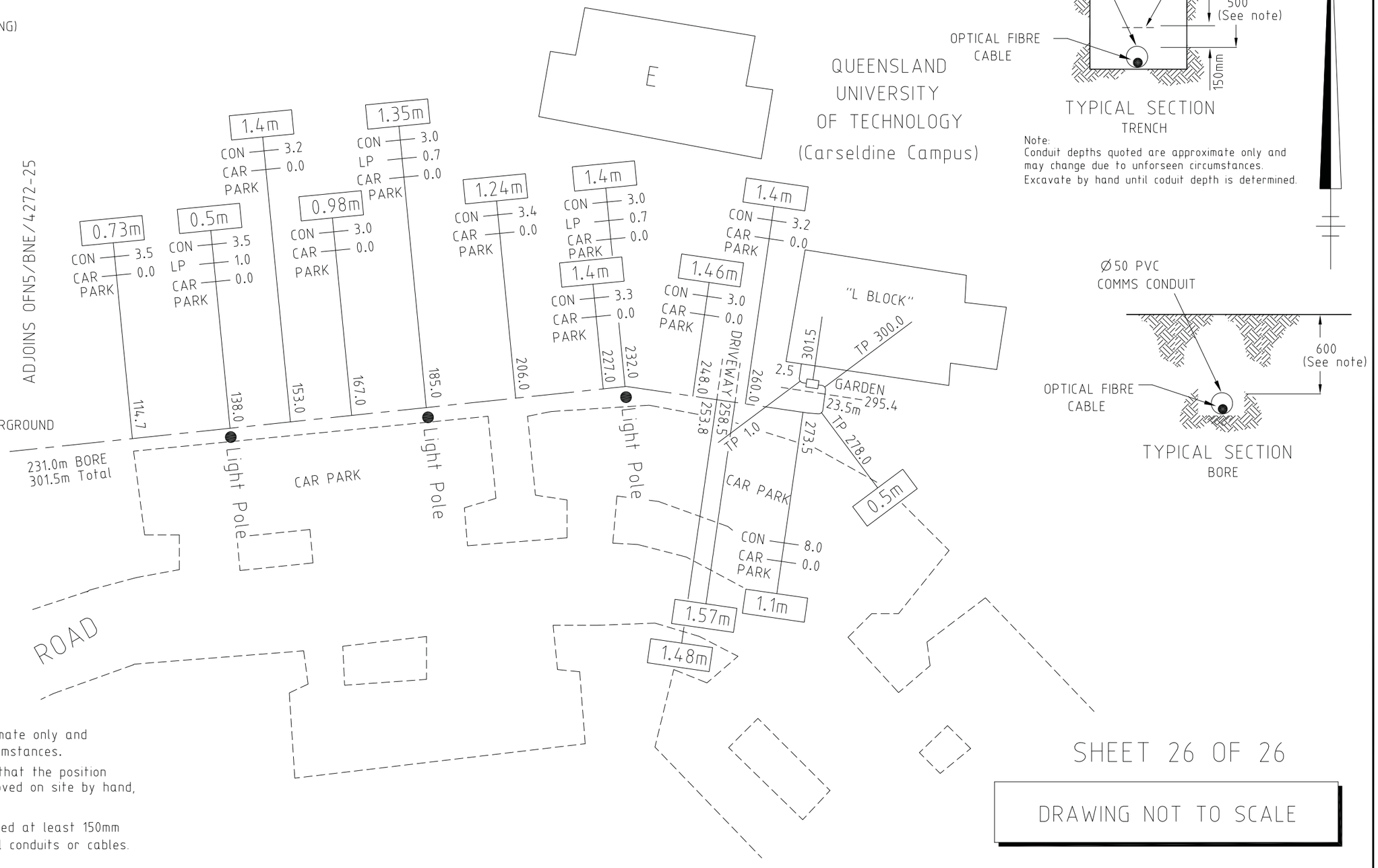

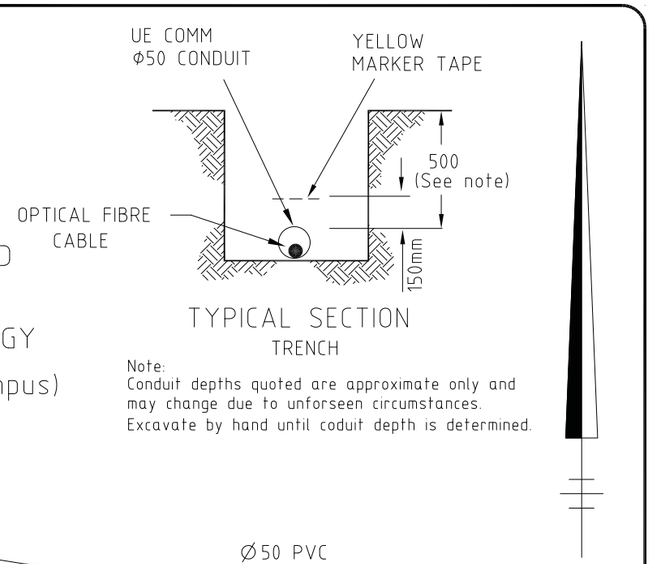

ARA Contract Services

K.J. BLAIN SURVEYS
Land Development, Planning
& Surveying Consultants
PH: (07) 3821 2016 FAX: (07) 3821 2253

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SHEET 26 OF 26

DRAWING NOT TO SCALE

REVISION					
DATE	REV.	REVISION DESCRIPTION	CHECKED	APP'D.	

CONTACT ARA OFFICER - TONY WILLIAMS / DENNIS GARDNER PH: - 07 3245 7771

PROJECT NUMBER: UEC-QLUTB-105

PLAN No.: 7405

MELWAY / UBD REF: MAP 109 - N18

Uecomm™ MAKING THE CONNECTION ACN 079 083 195

UECOMM MEL/SYD/QLD

DRAWN KJBS 1/8/03

DESIGN CHECKED

APPROVED

DRG No. OFN5/BNE/4272-26

U/G OPTICAL FIBRE CABLE RUN
QUT CARSELDINE CAMPUS
HAMILTON RD TO DORVILLE RD
CARSELDINE QLD 4034

A3

Carseldine Village – Stage 2

Appendix E QUU Service Advice Notice

Economic Development Queensland

Queensland Urban Utilities
GPO Box 2765
BRISBANE QLD 4001
Phone: 07 3432 2200 or 13 26 57
www.urbanutilities.com.au/development-services

2nd March 2017

Mr Joshua Goman
Calibre Consulting
545 Queen Street
Brisbane QLD 4000

Via Email: Joshua.goman@calibreconsulting.co

Dear Mr Goman,

Queensland Urban Utilities Services Advice Notice

QUU Application Number:	17-SRV-25519
Applicant Name:	Calibre Consulting
Street Address:	490, 511, 521 and 532 Beams Road, and 11, 15, 19, 1/21 and 21 Balcara Avenue, Carseldine
Real Property Description:	Lot 4 on RP80282, Lot 404 on SL12120, Lot 0 on BUP7414, Lot 322 on SP172124, Lot 0 on GTP 1964, Lot 0 on GTP1817, Lot 0 GTP1760 , Lot 4 on RP77418 and Lot 405 on SL12121.

Proposed service connection/alteration/disconnection type:

Drinking water	☑
Non-drinking water	☐
Wastewater	☑

Queensland Urban Utilities provides this Services Advice Notice in response to the request received on **6th February 2017**. In accordance with section 99BRAC(3) of the *South East Queensland Water (Distribution and Retail Restructuring) Act 2009,* this Services Advice Notice provides advice about the proposed connection having regard to the connections policy in the Queensland Urban Utilities Water Netserv Plan, the charges and conditions that may apply to the connection and other relevant matters about the connection. All terms used in this Services Advice Notice are defined by reference to the Queensland Urban Utilities Water Netserv Plan.

This Services Advice Notice does not constitute an application for connection, is not an approval to connect to the Queensland Urban Utilities network(s) and does not bind any future Queensland Urban Utilities' decision if the applicant applies for a connection.

Queensland Urban Utilities understands that the proposed development will consist of 900 residential dwellings and 70,000m^2 GFA of commercial and community use. As per the request for a Service Advice Notice submitted, a **material change of use** will be applied for as part of this development.

Based on your proposal and discussion with Queensland Urban Utilities officers, the following advice is provided:

Queensland Urban Utilities Services Advice

Infrastructure and Design

Water

The sites are serviced by the property connections from the following water mains:

- 532 Beams Road is serviced via the 300mm diameter mPVC water main on the far side of Beams Road;
- 490 Beams Road is serviced via the 300mm diameter ductile iron water main on the far side of Beams Road; and
- 521, 11, 15, 19 and 21 Balcara Avenue is serviced via the 225mm diameter ductile iron water main on the near side of Balcara Avenue.

There is also a 410mm diameter mild steel trunk water main which traverses the southern end of 532 Beams Road and onto Dorville Road.

Wastewater

The sites are serviced by property connections to the following wastewater catchments:

Northern catchment

- Properties to the north of the subject site (and west of Balcara Avenue) discharge eastwards and into the 225mm diameter wastewater main in Balcara Avenue.
- Flows from this wastewater main are discharged into manhole MH36964 and into the Balcara Ave Sewer Pump Station (SP217).
- Flow from the Balcara Ave Sewer Pump Station is discharged into manhole MH37153 at the intersection of Beams Road Balcara Avenue, and east via the 225mm diameter gravity trunk wastewater main on the south side of Beams Road (known as the Carseldine Branch sewer).
- Flows from the Carseldine Branch sewer are subsequently discharged into the 1050mm diameter Cabbage Tree Creek trunk wastewater main.

Southern catchment

- The subject site can also be serviced by the Cabbage Tree Creek trunk sewer network, which flows from west to east along the northern bank Cabbage Tree Creek and encumbers part of the subject site.

Note that the water and wastewater infrastructure required for the proposed development is to be provided in accordance with QUU requirements, including but not limited to, the *SEQ Water Supply and Sewerage Design and Construction Code* (SEQ WS&S D&C Code, 2013), or current equivalent. Easements will be sought for existing trunk assets contained within private land and not already protected by an easement.

Network Demand and Capacity

Water

An assessment of the water supply available at the site, including computational hydraulic modelling of the network under peak demand and fire flow conditions, has been completed.

The analysis assumes a Peak Hour Demand of 28.7 L/s (corresponding to the details of the proposed development).

The assessment indicates that the existing water supply has sufficient capacity to service the proposed development in accordance with the *SEQ Water Supply and Sewerage Design and Construction Code, 2013 (SEQ WS&S D&C Code).*

Indicative flow and pressure advice for the existing 300mm diameter water main on Beams Road is provided in Table 1, below.

Table 1: Indicative Flow and Pressure Advice

Assumed Connection Main	Estimated RL Connection (m AHD)	Hydraulic Grade Line (m AHD)			Pressure (kPa) [1]		
		0 L/s	10 L/s	20 L/s	0 L/s	10 L/s	20 L/s
300mm (mPVC) main as constructed in 2015	17.6	63.0	62.3	61.6	445	439	432

Notes: [1] Modelled pressure in supply main, relative to the estimated connection RL (m AHD).

[2] Designers are required to adjust the Hydraulic Grade Line/Pressure model results for site/building RL differences and calculate the extra hydraulic losses from point of connection with the main.

[3] Field performance of cast iron spun or cement lined mains can be variable. Field testing to ascertain actual pressure drops may be advisable.

Disclaimer

Information provided by Queensland Urban Utilities is based on hydraulic modelling ("Hydraulic Modelling Information"). Model results are for the anticipated performance. ***The Hydraulic Modelling Information has not been verified by field measurements and may be inaccurate due to field conditions.***

As such, users relying on Hydraulic Modelling Information do so at their own risk and should make their own independent investigations to verify model outputs.

The Hydraulic Modelling Information does not state nor imply a guaranteed level of service. Designers are referred to Queensland Urban Utilities' Customer Charter and Customer Service Standards for facility hydraulic service considerations. ***Queensland Urban Utilities does not provide a service of minimum flows and pressures to private fire-fighting systems.***

Due to changing operational circumstances, pressure and flows delivered to a service may vary. Designers are advised to make adequate provisions within the fire system installation for the pressure, flow and reliability requirements, for the life of the system.

Wastewater

A hydraulic assessment of the sewerage network servicing the site under peak wet weather flow conditions has been completed.

The analysis assumes a Peak Wet Weather Flow from the development of 36.09 L/s (corresponding to the details of the proposed development).

The assessment indicates that the Carseldine Branch sewer and Cabbage Tree Creek trunk sewers have sufficient capacity to service the proposed development.

Note that a portion of the proposed development area north of Beams Road may need to discharge into the gravity sewer catchment upstream of the Balcara Avenue pump station (SP217). At a preliminary planning stage, it is not known what extent of the development will discharge into this catchment.

- A further assessment of the pump station will be required to confirm that it has sufficient capacity to service the develop precinct which cannot discharge directly into the Carseldine Branch sewer (once the extent of this development area is known).

(Where existing sewer property connections are to be retained) - reuse of an existing property connection must be endorsed and signed off by a Registered Professional Engineer of Queensland (RPEQ). Where investigations determine that a property connection cannot be reused, a new

connection will be required. Queensland Urban Utilities recommends that investigations be undertaken as soon as practical in order to avoid delays at the end of the project.

Land and Easements

Sewer Main in Private Properties
Please refer to following link for easement requirements:
http://www.urbanutilities.com.au/development-services/our-services/building

Water Main in Private Properties
Please refer to table 5.2 and clause 5.4.4 of *SEQ WS&S D&C Code* for easement requirements.

Infrastructure Integration

No infrastructure integration is required in this instance.

Contributed Assets

No contributing assets are required in this instance.

Infrastructure Charges (as at 1 July 2016)

Infrastructure Charges will be levied in accordance with the Queensland Urban Utilities' Water Netserv Plan (Part A) Charges Schedule applicable at the time the water approval application is lodged.

The following infrastructure charges for water supply and Wastewater infrastructure would apply to the proposed development under the current version of Netserv:

Water
$3,300 per 1 or 2 bedroom dwelling (refer to charges schedule)
$4,620 per 3 bedroom dwelling (refer to charges schedule)
$12 per demand unit commercial (refer to charges schedule)

Wastewater
$6,700 per 1 or 2 bedroom dwelling (refer to charges schedule)
$9,380 per 3 bedroom dwelling (refer to charges schedule)
$24 per demand unit commercial (refer to charges schedule)

Trade Waste

The **proposed development** the subject of this Services Advice Notice has been identified as a potential generator of Trade Waste. Trade Waste is water-borne waste from business, trade or manufacturing premises excluding domestic sewerage, stormwater, and prohibited substances. It is an offence under section 193(1) of the ***Water Supply (Safety and Reliability) Act 2008*** to discharge trade waste into Queensland Urban Utilities' infrastructure without a Trade Waste Approval.

To obtain a Trade Waste Approval, the proponent for the proposed development must submit an application to Queensland Urban Utilities, who will assess and decide the application. Any Trade Waste Approval granted by Queensland Urban Utilities will be subject to Trade Waste Approval conditions and the Queensland Urban Utilities Trade Waste Environmental Management Plan (**TWEMP**).

The TWEMP and an online application form are available on the Queensland Urban Utilities website:

www.urbanutilities.com.au/business/business-services/trade-waste
For advice on the suitability of waste for discharge to sewer, and likely Trade Waste Approval conditions, you may contact Queensland Urban Utilities Trade Waste section on **13 26 57**.

Proposed trade waste drainage solutions will be assessed for compliance with plumbing and drainage regulations and the requirements of the TWEMP at the time of plumbing compliance assessment. Proposed trade waste solutions that do not meet the requirements in the TWEMP and plumbing and drainage regulations may result in delays to the plumbing compliance process and the issue of a Trade Waste Approval.

Further information is available at the following website:
https://www.urbanutilities.com.au/business/business-services/trade-waste

Connection Application Process

Based on the information provided, it is expected that the following applications will be required to assess the ability to connect to Queensland Urban Utilities networks:

1. Network and/or Property Service Connection – Major Works
The Water Approval will require connection works to be undertaken. You will be able to choose which consultants and contractors to appoint to design and construct the works, including live works (in most cases) and then maintain the works for a specified period (usually 12 months) in accordance with the conditions stated in your Water Approval.

Please note that the information provided within this section is subject to the specific aspects of the development and water application.

Fees and Charges

Queensland Urban Utilities fees and charges are stated in the Queensland Urban Utilities' Water Netserv Plan (Part A) Charges Schedule. The fees and charges that are likely to be associated with these applications are outlined below:

1. Application Phase
Base Application Fee – Property Services Connection $574 (per connection / disconnection / alteration)
Technical Report Review Fee $567 (per report)

2. Design, Construction and Maintenance Phases
Design Approval Fee (reticulation)
Property Service Connection Fee $2,006 (per connection / disconnection / alteration)

Re-checking Amended Plans Fee
Re-checking Amended Plans Fee $567 per plan

Works Inspection Fee (reticulation)
Works Inspection Fee Type A $344 (per inspection)
Works Re-inspection Fee Type A $516 (per inspection)

Notes:
1. The customer may incur additional fees and charges during the approval and works phase, including but not limited to, fees levied by the RPEQ and construction contractor, fees associated with the provision of maintenance / uncompleted works bond(s), re-checking amended plans fees, re-inspection of works fees and infrastructure agreement preparation fees;

2. The above estimates are indicative only and are subject to review of the detailed application upon lodgement; and
3. Please refer to the QUU *Water Netserv Plan* - for further details / clarifications on Fees and Charges.

Time Frames for Assessment

Connection Assessments (for applications other than Standard Connection)
To be completed within 20 business days of receipt of Properly Made Connection Application (including payment of the relevant assessment fee), or within a further 20 business days of receipt of requested information (unless extended by agreement).

Design Phase
Typically for an application classified as **major works**, the assessment of the design phase is to be completed within 20 business days of receipt of all designs.

Other Guidance

A Build Over Assets application (BOA) is required for this application based on the information supplied by the applicant.

This *Services Advice Notice* is current for a period of two (2) years from the date of issue. Should you wish to proceed with applying for a service connection please lodge your application via Queensland Urban Utilities Development Services Online Lodgement Portal at **http://www.urbanutilities.com.au/development-services**. Please include your Services Advice Notice reference number in your application.

Queensland Urban Utilities may, at its discretion, provide a reduced fee for a service connection application based on this Services Advice Notice if your application is received within 12 months of the date of issue and is substantially in accordance with the proposal upon which this advice was issued.

If you have any questions in relation to this Service Advice Notice, please do not hesitate to contact your account manager, Samantha Yeh, on 07 3855 6678 or Samantha.yeh@urbanutilities.com.au.

Alternatively, please email DCMTenquiries@urbanutilities.com.au.

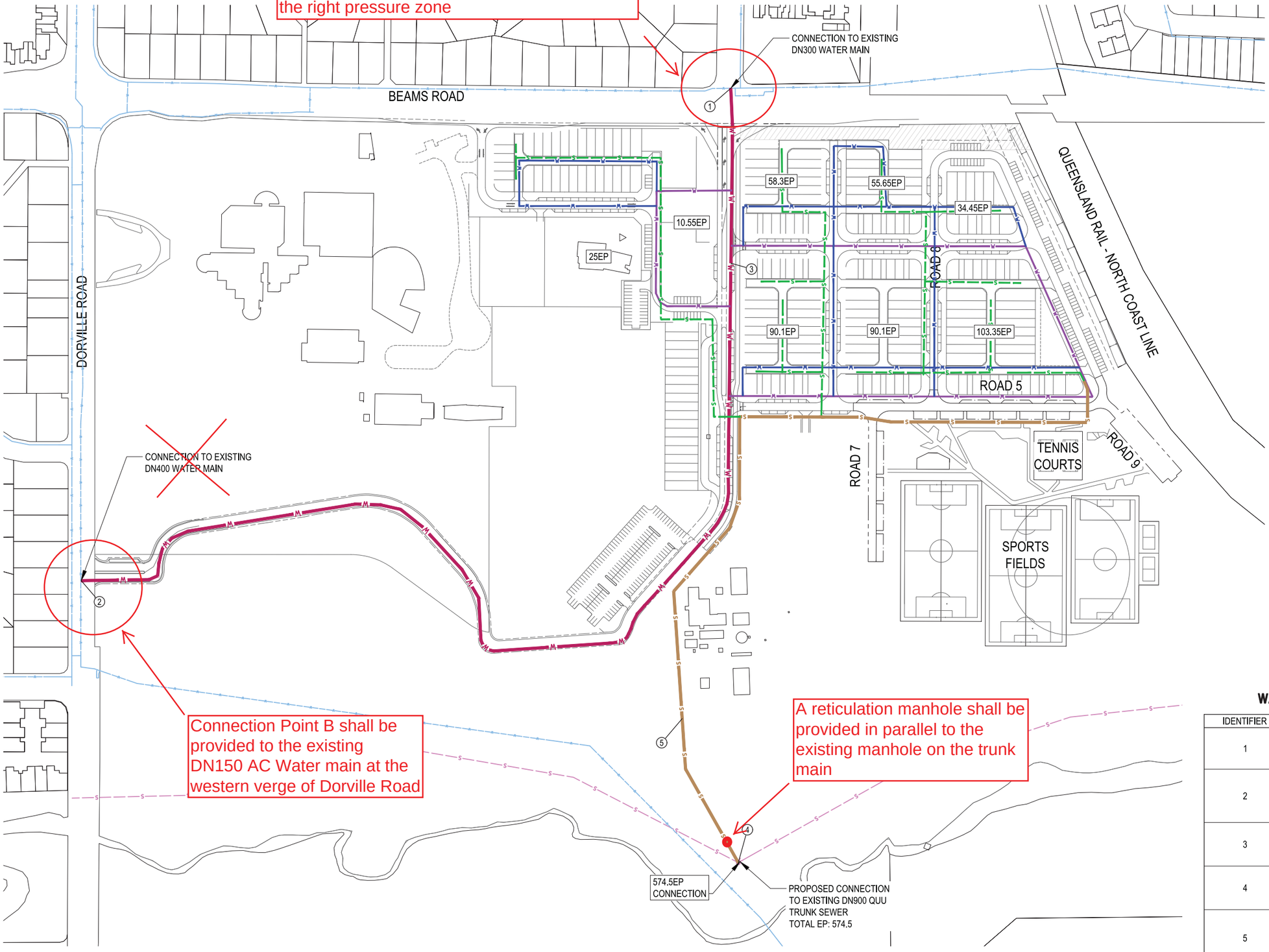
Yours sincerely

Toby Turner
Senior Engineer
Queensland Urban Utilities

ABN 86 673 835 011

ATTACHMENT 1

Connection point A shall be provided on the western side of Gate valve RV436569 to be at the right pressure zone



LEGEND

- EXISTING QUU WATER MAIN
- PROPOSED DN125 WATER MAIN
- PROPOSED DN180 WATER MAIN
- PROPOSED DN250 WATER MAIN
- EXISTING QUU WASTEWATER MAIN
- PROPOSED DN160 WASTEWATER MAIN
- PROPOSED DN250 WASTEWATER MAIN
- CADASTRE

N

NOTES:

1. ALL EXISTING SERVICES TO BE CONFIRMED ON SITE
2. REFER LANDSCAPE DRAWINGS FOR WATER FEED DETAILS & LOCATIONS
3. FOR EP DEMAND DETAILS REFER TO CALIBRE ENGINEERING SERVICES REPORT 15-003002-WER02

NOTE

NOTWITHSTANDING THAT EXISTING SERVICES MAY OR MAY NOT BE SHOWN ON THE PROJECT DRAWINGS, NO RESPONSIBILITY IS TAKEN BY THE SUPERINTENDENT OR THE PRINCIPAL FOR THIS INFORMATION WHICH HAS BEEN SUPPLIED BY OTHERS. THE DETAILS ARE PROVIDED FOR INFORMATION ONLY. THE CONTRACTOR SHALL ASCERTAIN THE POSITION OF ANY UNDERGROUND SERVICES IN THIS AREA AND SHALL BE RESPONSIBLE FOR MAKING GOOD ANY DAMAGE THERETO.

WATER AND WASTEWATER INFRASTRUCTURE

IDENTIFIER	DESCRIPTION
1	CONNECTION TO EXISTING DN300 QUU WATER MAIN IN BEAMS ROAD
2	CONNECTION EXISTING DN150 QUU WATER MAIN IN DORVILLE ROAD
3	NEW INTERNAL WATER NETWORK CONSISTING OF A COMBINATION OF DN200, DN150 AND DN100 WATER MAINS
4	CONNECTION TO EXISTING DN900 QUU TRUNK WASTEWATER MAIN ADJACENT CABBAGE TREE CREEK
5	NEW INTERNAL WASTEWATER NETWORK CONSISTING OF A COMBINATION OF DN225 AND DN150 WASTEWATER MAINS

PDA. REF NO. DEV2017/864

REVISION	DATE	ISSUE DETAILS	DRAWN	DESIGN
1	06.08.18	ISSUE FOR APPROVAL	JG	JG
2				
3				
4				
5				
6				
7				
8				

DRAWN CHECK

DESIGN CHECK

STATUS: FOR APPROVAL
NOT FOR CONSTRUCTION

APPROVED: DANIEL COLLINS RPEQ 18631
FOR & ON BEHALF OF CALIBRE CONSULTING (QLD) PTY LTD

SCALE: 1:1500 / 1:3000 — 30 20 10 0 30 60m — A1 / A3

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PROJECT: CARSELDINE URBAN VILLAGE STAGE S

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DRAWING TITLE: WATER AND SEWER MASTERPLAN

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Carseldine Village – Stage 2

Appendix F Geotechnical Reports

Economic Development Queensland

EOTECHNICAL INVESTIGATION REPORT

ECONOMIC DEVELOPMENT QUEENSLAND

CARSELDINE URBAN VILLAGE, BEAMS ROAD, CARSELDINE – PHASE 2

SGS/17/E184B

29 MAY 2018

DOCUMENT CONTROL SHEET

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Title:	Geotechnical Report – Due Diligence
Project Manager:	Robert Maxwell
Author:	Christopher Kosiek
Client:	Economic Development Queensland
Client Contact:	C/o: Calibre Consulting
Synopsis:	Phase 2 geotechnical investigation for proposed Urban Village off Beams Road, Carseldine.

REVISION AND CHECKING HISTORY

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LIMITATIONS

This report has been prepared for the sole use of the client and the client's immediate representatives and agents. It is fundamental in the application of this report that the report, including appendices, is read in its entirety and fully understood. Please contact SGS Australia Pty Ltd (Lawnton Office) for additional explanation if any of the report content is not fully understood.

This report is not a guarantee that the site ground conditions will behave in accordance with the interpretation set out herein, but rather our opinion as to the correct interpretations based on the results of site investigations, in situ testing and/or laboratory testing in accordance with generally accepted consulting practice. To the best of our knowledge, information contained in this report is accurate at the date of issue. The interpretation of scientific data, however, often involves both professional and subjective judgments. As such, interpretation is open to error. In addition, site conditions are subject to change in a limited time and there remains a risk that the site ground conditions will differ from these interpretations.

SUMMARY

The following section provides a summary of the Phase 2 geotechnical investigation carried out for the proposed Urban Village development at 152-158 Beams Road, Carseldine. This summary must be read in conjunction with the report and appendices.

1.	Typical Soil Profiles	-	Topsoil varying in depth to 100mm overlying surface silty sands
		-	Overlying silty and sandy clays of stiff to hard consistency and medium dense to dense clayey sands.
		-	Uncontrolled fill associated with playing fields, tennis/basketball courts and fill bund adjacent to the central road.
2.	Rock	-	A deeply weathered sandstone profile associated with the Petrie Formation may be encountered during earthworks.
2.	Groundwater	-	No groundwater was encountered during the Phase 2 investigation
		-	Groundwater seepage was encountered in the Phase 1 investigation and may develop in the more permeable layers after rainfall or adjacent other sources of water ingress.
		-	Seepage may develop elsewhere, forming perched water in the more permeable layers or adjacent to other sources of moisture ingress.
4.	Reactivity	-	Natural profile Y_s range 20mm to 50mm (Moderate to highly (M to H1) reactivity)
		-	Surface movements may increase by up to 60% post earthworks
5.	CBR values	-	CBR values ranged from 3.0% to 9%
6.	Site Issues/Problems	-	Numerous trees across site potentially creating abnormal moisture conditions and **'P'** site classifications.
		-	Presence of uncontrolled fill in the vicinity of playing fields, tennis/basketball courts, mounds, roadway and ancillary structures/shelters observed at the time of the investigation.
		-	Near surface silty sands susceptible to moisture and loss of strength.

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All appendices should be carefully read in conjunction with this report

1 INTRODUCTION

This report presents the results and interpretations of the Phase 2 geotechnical investigation carried out by SGS Australia for the proposed Urban Village development off Beams Road, Carseldine.

The investigation was commissioned by Dan Collins of Calibre Consulting acting on behalf of Economic Development Queensland and was carried out in general accordance with the SGS proposal (SGS/17P/E184-Phase 2) dated 8 May 2018.

It is understood that the proposed project will comprise a multi-staged development including road construction, sporting fields, recreation areas, bioretention basins and future 3-5 storey commercial and residential buildings.

SGS Australia has previously undertaken the Phase 1 geotechnical investigation focusing on the proposed bioretention basins and sporting complex / recreation areas of the proposed development.

The aim of the Phase 2 investigation was to assess the remaining areas of the development with particular focus on proposed roadways and commercial/residential building areas. The Phase 2 geotechnical report is intended to provide supplementary information and should be read in conjunction with the Phase 1 report.

The scope in terms of number and position of boreholes was nominated by Calibre Consulting in correspondence dated 8 May 2018.

The investigation and interpretation of results was carried out in general accordance with the following reference materials:

- AS 1726 "Geotechnical Site Investigations"
- AS 1289 "Testing of Soils for Engineering Purposes"
- AS 2870 "Residential Slabs and Footings"
- AS 2159 "Piling – Design and Installation"
- AS 3798 "Guidelines on earthworks for commercial and residential developments"

Relevant definitions and detailed site investigation procedures are provided in Appendix A.

2 INVESTIGATION PROCEDURE

The investigation was carried out on 14 May 2018 and comprised the following stages:

a) Site investigation in accordance with AS 1726 “Geotechnical Site Investigations”

* Drilling of nine (9) boreholes to various target depths of 6.0m (borehole locations are shown on the site sketch in Appendix B).
* Soil classification by qualified and experienced technician.
* Sampling of representative soils for laboratory analysis.
* Dynamic cone penetrometer (DCP) testing adjacent each borehole in order to assess the relative density and strength consistency of the subsurface soils.
* Pocket penetrometer (PP) in undisturbed samples to estimate the undrained shear strength (Cu).
* Site and landform mapping by a suitably qualified Geotechnical Engineer.

b) Laboratory testing in accordance with AS 1289 “Testing of Soils for Engineering Purposes” (where applicable)

* Shrink/swell index to allow ground surface movement predictions.
* Moisture/density relationship (standard compaction) and 4-day soaked CBR for preliminary pavement design.

3 INVESTIGATION RESULTS

3.1 SITE DESCRIPTION

The site is located within the former QUT Carseldine Campus, off Beams Road, Carseldine. The northern boundary of the site is bound by Beams Road, the western boundary by Dorville Road, the southern boundary by Cabbage Tree Creek and the eastern boundary by the Petrie Rail line.

Several existing multi storey buildings and car parks are located in the north western portion of the site and are currently occupied by the Queensland Department of Transport and Main Roads, with adjacent sporting grounds located in the lower eastern half of the site, open for public use.

The site topography typically falls from the north west at the corner of Beams and Dorville Roads towards the south east and generally levelling to the eastern sporting grounds. Bushland generally occupies the area along southern boundary and adjacent to Cabbage Tree Creek.

The site of the proposed urban village development shall be situated within the lower south eastern portion of the property in the location of the sporting grounds, as shown in Figure 1 below.

Figure 1 Location Plan

The majority of the site investigated during Phase 2 was occupied by two (2) playing grassed fields and a section of land occupied by a stormwater basin and internal roadways.

Surface drainage conditions across the site were reasonable with runoff controlled by a system of above and below ground stormwater drains. The stormwater basin adjacent the Beams Road entrance was bound by block retaining walls.

A large bund was observed adjacent to the western side of the sporting field (highlighted in orange above). The bund is approximately 2m in height and is assumed to be uncontrolled fill.

Tennis/netball/basketball courts with sealed surfaces were observed on the site. It is likely the courts were constructed by cut to fill earthworks and it is assumed all associated fill is uncontrolled.

Site photographs are provided in Appendix C of this report.

3.2 REGIONAL GEOLOGY

The regional geology as described by the Department of Mines 1:100,000 Geological Series Map for Brisbane (Sheet 9543) is as follows:

Site Geological Areas:	Upper North Western Area (Cnr Beams/Dorville Rd)	Lower Eastern Area (Sporting Fields)
Geological Unit / Rock Name:	Tp – Petrie Formation	Qpa – Alluvial Plains
Age:	Tertiary Period	Quaternary (Pleistocene) Period
Lithology:	Mudstone, shale, sandstone, oilshale, minor pebble and cobble conglomerate	Sand, silt, clay, gravel.
Additional Features:	Ferrunginised mottled and kaolinized rocks; Deep weathering profile.	

3.3 SUBSURFACE PROFILE

The natural soil profiles encountered in the boreholes were generally consistent with the regional geology and typically comprised high plasticity, stiff (or stronger) silty clays overlying sandy clays and clayey sands to the borehole termination depth.

Placed topsoil (fill) was noted in the boreholes and deeper fill was encountered in boreholes BH02-B, BH06-B, and BH07-B. In the absence of any compaction control documentation, the fill is assumed to be uncontrolled. There is a high probability that additional uncontrolled fill will be present across the site associated with the sporting fields, mounds, roadway and ancillary structures observed at the time of the investigation.

Detailed soil profiles are provided in the Engineering Borehole Logs in Appendix C and a summary of the borehole data is provided in the following table.

Table 1 Summary of Soil Profiles

B/hole No.	Topsoil (mm)	Fill (m)	Natural Ground			
			Silty CLAY		Clayey SAND	
			Stiff	Very Stiff	Medium Dense	Dense
BH01-B	90	0.0 – 0.1	0.1 – 0.7	0.7 – 1.7		1.7 – 6.0
BH02-B	90	0.0 – 1.8	1.8 – 3.1		3.1 – 6.0	
BH03-B	90	0.0 – 0.1		0.3 – 2.9	0.1 – 0.3 2.9 – 6.0	
BH04-B	100		0.1 – 1.6	1.6 – 2.2		2.2 – 6.0
BH05-B	100		0.1 – 1.1			1.1 – 6.0
BH06-B	90	0.0 – 0.5		0.5 – 2.7		2.7 – 6.0
BH07-B	100	0.0 – 0.3	0.3 – 0.5	0.5 – 6.0		
BH08-B	85	0.0 – 0.1	0.1 – 0.5	0.5 – 6.0		
BH09-B	90		1.1 – 4.1	0.3 – 1.1 4.1 – 6.0	0.1 – 0.3	

3.4 GROUNDWATER

Groundwater was not encountered in the boreholes at the time of the investigation however, seepage may develop forming perched water in the more permeable layers during/following extended wet weather periods or adjacent to other sources of moisture ingress (e.g. leaking services or irrigation systems).

3.5 LABORATORY TEST RESULTS

Laboratory testing was carried out on selected samples taken from the site. Test reports are provided in Appendix D and results are summarised in the following table.

Table 2 Summary of Laboratory Geotechnical Test Results

B/hole No.	Depth (m)	Moisture/Density Relationship (Standard)		Soaked CBR	Shrink-Swell Index
		MDD (t/m^3)	**OMC (%)**	**CBR (%)**	
BH01-B	0.2 – 1.0	1.75	17.6	7	
BH05-B	0.2 – 0.8	1.80	15.8	9	
BH09-B	0.3 – 1.0	1.69	19.2	3.0	
BH01-B	0.3				1.3
BH05-B	0.5				0.9
BH08-B	0.5				3.8

Moisture/Density Relationship: MDD – Maximum Dry Density, OMC – Optimum Moisture Content

4 ENGINEERING CONSIDERATIONS

4.1 REACTIVITY AND INDICATIVE SITE CLASSIFICATION

The predicted surface movement (Ys) that could occur on this site has been assessed in accordance with the methodology provided in AS 2870 "Residential Slabs and Footings".

It is understood that ultimately, standard residential buildings as described in AS 2870 will be constructed on the site, post subdivision development. It is therefore assessed that AS 2870 methodology and derived parameters would apply to this site for the purpose of providing preliminary reactivity and indicative site classification details.

Reactivity testing was undertaken on three samples taken at various depths across the site. Shrink-Swell Index Values (Iss) ranged from 0.9 to 3.8. Based on limited testing, it appears that the dark grey coloured silty clays exhibited a higher shrink/swell index value.

Considering a natural (pre earthworks)1.8m soil moisture change profile, the following would apply.

Existing Profile		
	Mean Iss (mm)	Maximum Iss (mm)
Predicted Surface Movement	20 -30	45 - 55
Equivalent Reactivity	Moderate	High (H1)

Consideration must be given to the effect that cut to fill earthwork operations will have on the soil profiles. The following table provides surface movement predictions considering a full 1.8m controlled filled profile at various shrink/swell index values.

1.8m Controlled Fill Profile			
	Iss= 1.0	**Iss= 2.0**	**Iss= 3.8**
Predicted Surface Movement	20 – 30	40 – 50	70 – 80
Equivalent Reactivity	Moderate	High (H1)	Extreme

Based on the observed soil profiles at the borehole locations it would be expected that the majority of the sites would fall within the moderate to high classification range.

The above reactivity parameters not consider the potential effects of trees (if applicable) and site outcomes post earthworks (refer to Section 4.2) .

4.2 EFFECTS OF VEGETATION

Trees can affect building foundation performance in reactive clay soils by removing soil moisture, which induces volume change (shrinkage) in the soil.

The effect of trees on a site classification (and subsequent footing design and performance) is assessed based on:

- the site soil reactivity;
- the distance between trees and the closest point to the dwelling; and
- the mature height of the trees.

The potential mature height of a particular tree species can vary with the condition of the tree, climate, soil types, drainage and other site-specific variables.

As part of the development civil design process careful consideration shall be given to the location and selection of any retained vegetation. Vegetation left in close proximity to proposed (or possible) building envelope locations may result in P site classifications at individual building application stage.

Any tree removal prior to building construction must also consider potential surface heave (rebound) associated with the re-establishment of soil moisture equilibrium conditions. This removal of trees will be pertinent across large portions of this development due to the presence of dense vegetation where it is expected that some thinning or complete removal will be required. Site classifiers and footing design engineers should consider the effects of this tree removal when assessing the individual allotments.

4.3 FOUNDATIONS

The type and depth of foundation system for the proposed structures will be dependent on the magnitude of structural loading, tolerance of the structures to movement (from both load induced settlement and shrink-swell movement) and the subsurface geotechnical conditions. The following table provides preliminary geotechnical strength parameters for both shallow (strip) and piled foundation alternatives.

Table 3 Preliminary Bearing Capacity Parameters

Material	Cu	Pad Footings		Strip Footings		Piled Foundations	
		q_u	q_a	q_u	q_a	f_b	f_s
Uncontrolled Fill	-	NR	NR	NR	NR	NR	NC
Controlled Fill(1)	75	450	150	375	125	600	30
NATURAL Silty SAND / SILT(2)	-	NR	NR	NR	NR	NR	NC
NATURAL Stiff Silty/Sandy CLAY and Medium Dense Clayey SAND	50	300	100	250	80	400	20
NATURAL Very Stiff (or stronger) Silty/Sandy CLAY and Dense Clayey SAND	100	600	200	510	170	800	40

(1) Based on the fill complying completely with the requirements in AS3798 and being placed under Level 1 conditions to 98% SDDR.

(2) *Silty Sand and Silt is not considered suitable founding material as it is subject to loss of strength when disturbed and/or moisture affected.*

where:

Cu = Estimated undrained shear strength (kPa)
q_u = Ultimate base bearing pressure – high level strip footings (kPa)
q_a = Allowable base bearing pressure (FOS = 3) – high level pad/strip footing (kPa)
f_b = Ultimate base bearing pressure – piles minimum 1.5m and 2.5 pile diameters deep (kPa)
f_s = Ultimate shaft adhesion/friction (adhesion factor (α) = 0.4) (kPa)
NR = Not recommended for founding
NC = Not considered in shaft adhesion / friction

4.4 PAVEMENTS

The California Bearing Ratio (CBR) value represents the "strength" of the material when nominally compacted to 100% Standard Dry Density Ratio (SDDR) at the Optimum Moisture Content (OMC) and soaked for four (4) days. It should be noted that the CBR value is simply an index of strength at that particular density and moisture condition. The same material at a different density and moisture condition is likely to yield a lower or higher CBR value depending on the density and moisture circumstances existing at the time of testing. The modulus of subgrade reaction is derived from the CBR value based on published correlations.

Laboratory testing was carried out on representative material types sampled across the site. The CBR results ranged from 3.0 to 9. Due to the variability of results across the site, it is recommended the following assumed worst-case CBR value be used in preliminary pavement design.

Table 4 CBR and Modulus of Reactivity

Material Type	Soaked CBR Value (%)	Modulus of Subgrade Reaction k (kPa/mm)
(CH) Silty CLAY	3.0	27

Further soaked CBR testing will be required when bulk earthworks have been completed and the subgrade material has been exposed to determine final soil type boundaries representing the CBR values.

NOTES:

- Use of the above values (in preliminary design) assumes that the subgrade will be compacted uniformly to a minimum SDDR of 100% and that the pavement will be well drained during construction and in-service.
- The attached "CBR Standard Notes and Performance Warnings" (Appendix F) must be considered and implemented during the design and construction phases as appropriate.

4.5 EARTHWORKS

Reference should be made to the Phase 1 geotechnical report for earthworks procedures and recommendations. The following sections of this report should be read in conjunction with the previously issued report.

4.5.1 TOPSOIL DEPTHS

Topsoil depths within the boreholes ranged from 85mm to 100mm across the site. A nominal topsoil stripping depth of 90mm is considered applicable. It is expected deeper topsoil depths may be encountered in the gullies and low-lying areas.

4.5.2 UNSUITABLE MATERIAL

Uncontrolled fill was identified in the large bund, on the tennis/netball/basketball court platforms and in areas on the playing fields. Additional uncontrolled fill may be present on the site. Consequently, It is strongly recommended to have the Geotechnical Inspection and Testing Authority (GITA) onsite at the time of topsoil stripping to identify any uncontrolled fill and instruct on any necessary ground preparation works.

Furthermore, soft, moisture effected material and uncontrolled fill may be encountered in the existing stormwater basin adjacent to the existing Beams Road entrance. This area will require treatment (removal of unsuitable material and/or moisture conditioning) prior to filling.

All uncontrolled fill and temporary unsuitable material should be removed to a sound natural base and stockpiled to assess suitability for reuse as structural fill.

4.5.3 EXCAVATION CHARACTERISTICS

The soil encountered in the borehole should be readily excavated by small to medium sized plant.

No groundwater was encountered within the boreholes for Phase 2 however, the development of seepage may be possible in the more permeable layers as identified in the Phase 1 investigation. Allowance should be made for dewatering of excavations if applicable.

5 COMMENTS AND LIMITATIONS

The development and any associated infrastructure should be designed to accommodate for the ground conditions reported and which otherwise may be encountered during construction.

The geotechnical parameters given in this report should be considered as preliminary only and subject to confirming inspections, and potentially additional testing by an experienced geotechnical professional at the construction stage. SGS offer inspection services and it is recommended that the client and their agents and contractors avail themselves of these services.

The interpretation of geotechnical reports and the preferred or proposed engineering outcomes are often compromised by the non-continuity of geotechnical consultants on a project. In addition, there is an inherent potential for a conflict of interest and therefore increased potential for inappropriate administration of the geotechnical specification when the GITA is commissioned by the contractor.

For these reasons, it is strongly recommended that:

1. SGS be commissioned as the Geotechnical Engineering Consultant and the GITA for all geotechnical related activities associated with this project; and
2. The Geotechnical Engineering Consultant and the GITA are commission independently of the contractor.

SGS cannot accept any responsibility for any interpretations and/or application of the contents of this report by any other Geotechnical Engineering Consultant or GITA.

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APPENDIX A: NOTES RELATING TO THIS REPORT

INTRODUCTION

The following notes are intended to complement the report and assist the reader in interpreting the report in regard to investigation procedures, definitions, terminology and limitations. Not all notes are necessarily relevant to this report.

The ground exhibits a variety of properties and characteristics which vary from place to place and can also change with time, weather patterns, changes in vegetation and human interaction. A geotechnical investigation puts into practice accepted methods and procedures to gather data relevant to the site and the proposed development. This report may contain such data obtained from drilling, excavation, inspection, sampling and testing. If so, the data are directly relevant to the ground at the place and time of the actual test sites. The client should be aware that in some cases soil conditions can change dramatically over short distances therefore conditions other than those represented in this report may occur on the site.

SITE INVESTIGATION PROCEDURES

a) Subsurface Investigations

Borehole/test locations are generally located to gain maximum coverage over the site giving consideration to contrasting topography. However, on occasions existing structures or other access restrictions do not permit ideal borehole locations.

Subsurface investigations may be carried out using one or more of the following methods:

- Test Pits: Test pits can be excavated by power equipment (backhoe, excavator etc) or in some cases by hand. Hand excavated test pits are usually limited to a maximum depth of about 1m.

- Hand Auger: Hand auger equipment is normally only used where drill rig access is unavailable. Hand auger refusal may occur on materials which could have otherwise been drilled if drill rig access was available.

- Drill Rig: Spiral Flight Auger: Spiral flight auger drilling is more economical and is usually adopted if ground conditions are suitable. Samples are returned to the surface by the flights or may otherwise be taken from the base of the borehole. Various drill bits may be attached to the auger during drilling. The depth of refusal of the different bit types can provide a useful indication of the strength of the material.

- Drill Rig Wash Drilling: Wash drilling is normally used below the water table when collapsing soils are encountered. Steel casing is pushed to support the collapsing soil and water is pumped through the drill rods to advance the borehole. The rods are withdrawn to allow sampling and testing at the base of the borehole.

b) Insitu Testing

- Dynamic Cone Penetrometer: The Dynamic Cone Penetrometer (DCP) test is carried out using a cone of 20mm diameter with a 30˚ tapered tip attached to steel rods of smaller diameter. The cone is driven by a 9kg hammer falling 510mm and results are recorded in blows per 100mm penetration. DCP test results can be used to estimate bearing capacity and insitu California Bearing Ratio. The test procedure is described in Australian Standard AS1289 6.3.2.

- Standard Penetration Test: The Standard Penetration Test (SPT) is carried out using a standard split steel tube sampler driven by a 63.5kg mass falling 760mm. Results are recorded in number of blows per 150mm penetration for a maximum depth of 450mm. The SPT "N" value is the sum of the blows for the 2nd and 3rd 150mm increments. The first 150mm is referred to as the seating penetration. In cases where the number of blows per 150mm exceeds 20, the result is recorded as 20/penetration (mm) and the 'N' value determined by linear interpolation. The SPT N value can be used to estimate allowable bearing pressure for foundations. The test procedure is detailed in Australian Standard AS1289 6.3.1.

- Pocket Penetrometer: The Pocket Penetrometer (PP) is used on undisturbed samples as a relatively simple and economical method of estimating the unconfined compressive strength of clay soils. The cohesive (undrained) shear strength (Cu) is generally taken as 0.5 of the PP value.

c) Sampling

The type and frequency of sampling and testing on a site is dependent on several issues including:

* number and depth of boreholes
* variability of soil types and conditions
* type and magnitude of the development

- Undisturbed Samples: Undisturbed samples are taken by pushing a thin walled steel tube, 50mm diameter (U50) into cohesive soils. U50 samples are necessary for laboratory testing such as shrink-swell index, consolidation, shear strength etc.

- Disturbed Samples: Disturbed samples (D) are taken from drill augers, hand auger or open test pits. Disturbed samples are generally used for laboratory testing such as Atterberg Limits, Moisture Content, California Bearing Ratio, Particle Size Distribution etc.

d) Site Description

Underground Services: If underground services (sewer, stormwater etc) were observed during the site investigation, a record of the observation will usually be made on the site description notes included in this report. It should be noted however that our commission **does not** typically extend to locating underground services.

As underground services can potentially affect a structure in the vicinity, it is important that any underground services are located and considered in the development of the site.

- Site Sketch: The site sketch is intended only as a general pictorial of relative locations of boreholes and site features. Any dimensions, slope directions, magnitudes, feature orientation, north point, etc are approximate and should be used as a guide only.

e) Soil and Rock Descriptions

Soil and rock descriptions contained in this report are in general accordance with Appendix A2 and A3 of AS1726 'Geotechnical Site Investigations". Details of the soil profiles provided in the Engineering Borehole Logs are based on visual descriptions of the soils and rock on site. Some soil descriptions may differ marginally from the format as described in AS1726, but this will in no way affect the results of this investigation.

- Controlled Fill: Controlled fill as described in this report refers to:

(1) sand fill up to 0.8m deep and non-sand fill up to 0.4m deep which has been placed in layers not more than 150mm thick and compacted with mechanical compaction equipment.

or

(2) fill which has been supervised and tested and for which a statement has been provided certifying compliance with Table 5.1 of AS3798 "Guidelines on Earthworks for Residential and Commercial Developments". The statement of compliance can only be provided by the Geotechnical Testing Authority under a Level 1 commission as defined in Appendix B of AS3798

and

(3) subject to the results of this investigation verifying the quality of the fill.

- Uncontrolled Fill: Uncontrolled fill is described as any fill not meeting the requirements of controlled fill as defined above.

SITE CLASSIFICATION

Site Classification as defined in AS2870 "Residential Slabs and Footings" is divided into various classes depending on the y_s (predicted surface movement) and other relevant ground conditions.

The classes are:

CLASS	SOIL TYPE	y_s (mm)
A	stable (sand or rock)	
S	slightly reactive clay	$0 < y_s \leq 20$
M	moderately reactive clay	$20 < y_s \leq 40$
H1	highly reactive clay	$40 < y_s \leq 60$
H2	(very) highly reactive clay	$60 < y_s \leq 75$
E	extremely reactive clay	$y_s > 75$
P	problem	

Problem Site: Problem sites include those which are filled, have soft and/or collapsing soils, have soils subject to erosion, subject to abnormal moisture conditions, have bearing pressure < 100kPa and any other sites which do not otherwise comply with class A, S, M, H or E requirements.

- Effect of Trees: Trees can have a significant drying effect resulting in abnormal moisture conditions of the soils in the vicinity of the tree(s). On reactive clay sites, this can have the effect of dramatically increasing the predicted surface movement (y_s) within the zone of influence of the tree(s). Past, present and future trees all potentially affect the site classification and subsequent footing and slab design. When it is known that large trees have been removed from a site, the site classifier or footing design engineer should be advised of the size, location and date of removal, so that appropriate consideration can be given to the footing design.

As recommended, and in accordance with AS2870, our preferred option for determination of Instability Index is by a combination of the shrink-swell index and identification of the soil profile. In some cases where shrink-swell index testing is not practicable, soil classification testing (Atterberg Limits and Particle Size Distribution) may have been used.

Values used in determination of the y_s value were:

* soil profiles - refer borehole logs
* shrinkage index - refer laboratory results
* extreme suction change - 1.2pF
* depth of suction change - 1.5 to 2.3
* cracked zone - 0.5Hs (zero for reactive clay on controlled filled sites < 5 years old)
* α cracked zone - 1.0
* α uncracked zone - $2.0 - {}^{z}/_{5}$

where z = depth from ground surface to the centroid of the layer under consideration.

Provision of y_s values and/or site classification is intended for use in residential applications only. Where this information has been provided in non-residential cases it is done so as supplementary information only and may not be suitable for application to AS2870 design principles.

EARTHWORKS

All earthworks should be carried out in strict accordance with the full requirements of Australian Standard AS 3798 "Guidelines on Earthworks for Commercial and Residential Developments". If local authority requirements apply to the earthworks and differ from AS 3798 the more stringent requirements should be adopted. Unless approved, the following materials are generally not suitable for use as structural filling:

* Organic Soils - topsoils, severely root affected soils and peat
* Materials which may be contaminated with toxic substances through past site usages.
* Filling which contains wood, metal, plastic, boulders and other deleterious materials.
* Any other materials which have deleterious engineering properties.

Any earthworks carried out after the site investigation will change the findings of the report. Particular care and consideration should be given to the site reactivity and classification which is likely to change with cutting and/or filling of the site.

On cut-and-fill sloping sites the fill shall be controlled and extend a minimum of 1m past the edge of any construction areas. Embankment slopes shall be protected from erosion and be not steeper than two horizontal to one vertical. The suitability of any such embankments shall be verified by an experienced geotechnical engineer prior to construction.

GROUNDWATER

Groundwater levels (where encountered) are provided on the borelog sheets.

Generally, groundwater or seepage tends to travel in the more permeable layers over less permeable materials (ie. along sand/clay interfaces, fill/natural interfaces, etc.) and in joints of rock.

Bulk earthworks (ie. cut/fill or fill operations) should not be carried out during wet periods and should be delayed sufficiently to ensure the moisture content of the materials approximates the optimum moisture content for compaction.

Should footing excavation commence during or following an extended wet period and where the soil profile comprises sandy soils or sandy soils overlying clays, the surface sands will tend to collapse during trench excavations requiring temporary shoring and the construction of a sump area from which groundwater can be pumped. Under no circumstances should softening of foundation soils be allowed to occur.

It is advised that a test pit be excavated to assess ground conditions prior to commencing trench excavations or earthworks if prevailing weather conditions are poor.

SITE MANAGEMENT

The short and long term serviceability of the development is largely dependent upon a responsible approach by the developer, builder and the owner/occupant towards drainage, landscaping and vegetation. The following basic requirements apply to most developments.

* Surface Drainage
  Site preparations should include provision for slopes of no less than 1 vertical in 20 horizontal away from structures for a distance of at least 2m where possible. Spoon drains and catch drains should be constructed where necessary to direct surface drainage away from the structure.
* Landscaping
  Landscaping should be planned to ensure excessive watering and/or water ponding areas do not occur. Landscaping areas should be considered in the design of site drainage systems.
* Vegetation
  To reduce (but not eliminate) the possibility of damage to structural elements, trees should be restricted to a distance of no closer than 1.5 times the mature height from the structure.

A more extensive discussion on site management is contained in the CSIRO document "Guides to Home Owners on Foundation Maintenance and Footing Performance" and its recommendations should be followed in full.

THE REPORT

This report was compiled in accordance with the relevant standards, sound geotechnical practices and general market requirements as appropriate.

Unless instructed otherwise, this investigation and report does not address the following issues:

* Existing and/or proposed mining influence
* Slope stability
* Specific site drainage requirements and potential effects
* Contamination and/or hazardous materials on the site
* Specific effects of post investigative works on the site
* Existing underground services

The client should understand that whilst our investigation and report has been conducted within appropriate guidelines and with suitable diligence to accurately determine the ground conditions, on occasion, construction (earthworks/excavations) may indicate ground conditions differing from those shown in this report. Should this occur, SGS, should be advised immediately for further advice.

The work undertaken and reported is intended for the sole use of the client named on this report for the specific purpose of determining the parameters necessary for the design and construction of the development outlined. It may not contain sufficient information for other purposes. It is intended that this report will provide advice on geotechnical and related issues only and that SGS **will not** accept any responsibility for any structural design which does not fully consider and correctly apply the findings of this report.

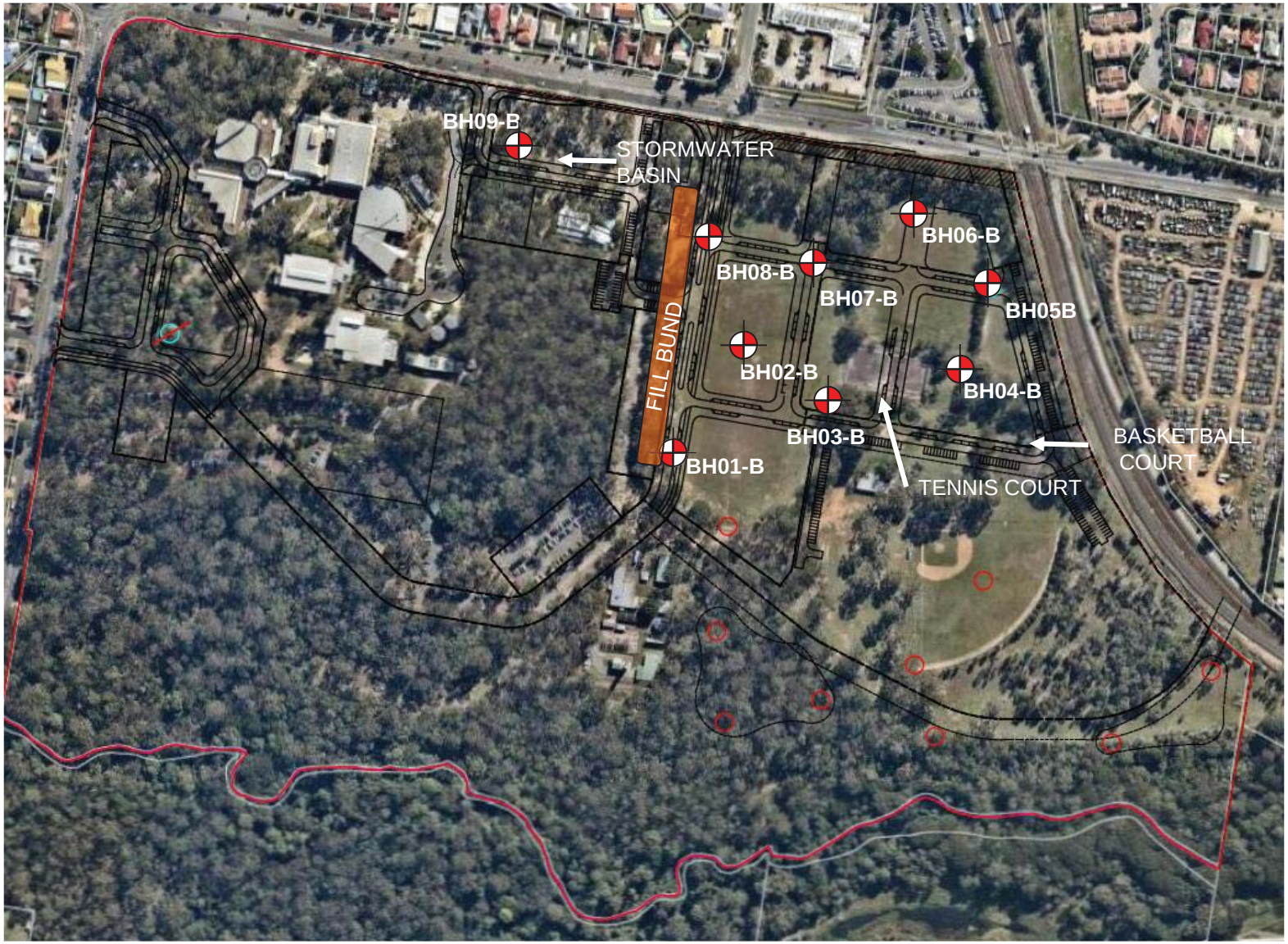
It is important for the client to understand that long term serviceability of the structure will require all the findings of this report to be considered and undertaken. No responsibility will be accepted where these are not put into effect prior to commencement or in conjunction with construction as required.

Any bearing capacity parameters provided in the report must be considered as preliminary only and should be confirmed by an experienced geotechnical engineer during construction.

INSPECTIONS

SGS provides inspection services for any geotechnical issues in relation to this report. We encourage the client, their designers and contractors, to make use of this service to verify the findings of the report, particularly if there is any doubt regarding the ground conditions being encountered during construction.

APPENDIX B: SITE PLAN – BOREHOLE LOCATIONS



Base plan supplied by Calibre consulting

SGS Australia Pty Ltd
ABN 44 000 964 278
Unit 1/ 18 Leanne Crescent
Lawnton, QLD 4501
t +61 (7) 3481 9444
www.sgs.com

TITLE: SITE PLAN – PHASE 2 IVNESTIGATION			DRAWING NO.: SGS.17.E184B.SP01
JOB LOCATION: **Carseldine Village**			SCALE: SCALE NOT SHOWN
CLIENT: Economic Development QLD	DATE: 14.05.18	DRAWN: CK	SIZE: A4

APPENDIX C: BOREHOLE RECORDS, SAMPLING AND INSITU TEST RESULTS

Engineering and Environmental Consultants
Ph 3481 9444
AU.IND.Lawnton@sgs.com

BOREHOLE LOG

BOREHOLE NO.: ***BH 01***
SHEET: 1 OF 1

CLIENT:	***ECONOMIC DEVELOPMENT QLD***	DATE COMMENCED:	***14.5.2016***
PROJECT:	***GEOTECHNICAL INVESTIGATION***	DATE COMPLETED:	***14.5.2016***
LOCATION:	***CARSELDINE VILLAGE, BEAMS RD, CARSELDINE***	LOGGED BY:	***J.SIPPEL***
JOB NUMBER:	***SGS/17/E184B***	CHECKED BY:	***C KOSIEK***

Drill Contractor: SGS AUSTRALIA **Bore Size:** 100mm **Hole Angle:** -90° **Easting:** 502626.00 **Surface R.L.:**

Drill Model: DTS 05 **Drill Fluid:** - **Bearing:** **Northing:** 6974733.00 **Datum:** 56J

Method	Casing	DCP	RL (m)	Depth (m)	Geological Unit	Graphic Log	Classification Symbol	Material Description	Moisture Condition	Consistency / Strength	Cementation / Weathering	Sample / Test	Field Records / Comments	Water
SA/TC	Open Hole	2					SM	FILL - Silty SAND, fine grained, dark grey, 90mm topsoil	M	L				
		3					CH	NATURAL - Silty CLAY, high plasticity, pale grey mottled orange	M	St				
		4												
		3												
		3										U_{50}	PP=450kPa REC=210mm	
		2												
		3												
		4					CH	Silty CLAY, high plasticity, pale grey mottled orange	M	VSt				
		5												
		5		1										
							SC	Clayey SAND, fine to medium grained, yellow, orange	M	D				
				2										
												D		
				3										
				4										
				5										
				6										

End of BH 01 at 6m

BOREHOLE LOG

BOREHOLE NO.: ***BH 02***
SHEET: 1 OF 1

Engineering and Environmental Consultants
Ph 3481 9444
AU.IND.Lawnton@sgs.com

CLIENT:	***ECONOMIC DEVELOPMENT QLD***	DATE COMMENCED:	***14.5.2016***
PROJECT:	***GEOTECHNICAL INVESTIGATION***	DATE COMPLETED:	***14.5.2016***
LOCATION:	***CARSELDINE VILLAGE, BEAMS RD, CARSELDINE***	LOGGED BY:	***J.SIPPEL***
JOB NUMBER:	***SGS/17/E184B***	CHECKED BY:	***C KOSIEK***

Drill Contractor: SGS AUSTRALIA **Bore Size:** 100mm **Hole Angle:** -90° **Easting:** 502675.00 **Surface R.L.:**

Drill Model: DTS 05 **Drill Fluid:** - **Bearing:** **Northing:** 6974818.00 **Datum:** 56J

Method	Casing	DCP	RL (m)	Depth (m)	Geological Unit	Graphic Log	Classification Symbol	Material Description	Moisture Condition	Consistency / Strength	Cementation / Weathering	Sample / Test	Field Records / Comments	Water
SA/TC	Open Hole	2					SM	FILL - Silty SAND, fine to medium grained, dark grey, 90mm topsoil	M	L				
		3					CH	FILL - Silty CLAY, high plasticity, red, grey, trace of fine to medium sized gravel	M	St		D		
		4												
		4												
		4												
		3												
		3												
		4												
		4												
		6		1			SC	FILL - Clayey SAND, fine to coarse grained, brown, grey, with fine to medium sized gravel	M	MD				
		8										D		
		9												
		8												
		6												
		7												
		7												
		7												
		6												
		4					CH	NATURAL - Silty CLAY, high plasticity, dark grey mottled red, orange	M	VSt				
		4		2										
		4												
		4												
		5												
		5												
		6												
												U_{50}	PP>600kPa REC=150mm	
				3										
							SC	Clayey SAND, fine to coarse grained, orange, grey, yellow	M	MD				
				4										
				5										
				6										

End of BH 02 at 6m

SGS
Engineering and Environmental Consultants
Ph 3481 9444
AU.IND.Lawnton@sgs.com

BOREHOLE LOG

BOREHOLE NO.: ***BH 03***
SHEET: 1 OF 1

CLIENT:	***ECONOMIC DEVELOPMENT QLD***	DATE COMMENCED:	***14.5.2016***
PROJECT:	***GEOTECHNICAL INVESTIGATION***	DATE COMPLETED:	***14.5.2016***
LOCATION:	***CARSELDINE VILLAGE, BEAMS RD, CARSELDINE***	LOGGED BY:	***J.SIPPEL***
JOB NUMBER:	***SGS/17/E184B***	CHECKED BY:	***C KOSIEK***

Drill Contractor: SGS AUSTRALIA **Bore Size:** 100mm **Hole Angle:** -90° **Easting:** 502737.00 **Surface R.L.:**

Drill Model: DTS 05 **Drill Fluid:** - **Bearing:** **Northing:** 6974760.00 **Datum:** 56J

Method	Casing	DCP	RL (m)	Depth (m)	Geological Unit	Graphic Log	Classification Symbol	Material Description	Moisture Condition	Consistency / Strength	Cementation / Weathering	Sample / Test	Field Records / Comments	Water
SA/TC	Open Hole	2					SM	FILL - Silty SAND, fine to medium grained, dark grey, 90mm topsoil	M	L				
		3					SC	NATURAL - Clayey SAND, fine to medium grained, grey, orange	M	MD				
		3												
		4					CH	Silty CLAY, high plasticity, pale grey mottled orange, yellow	M	VSt				
		4												
		4												
		4												
		5												
		4												
		4		1										
				2			CI	Sandy CLAY, medium plasticity, grey mottled orange, fine to medium grained		VSt				
				3			SC	Clayey SAND, fine to medium grained, grey mottled orange	M	MD				
				4										
				5										
				6										

End of BH 03 at 6m

Engineering and Environmental Consultants
Ph 3481 9444
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BOREHOLE LOG

BOREHOLE NO.: ***BH 04***
SHEET: 1 OF 1

CLIENT:	***ECONOMIC DEVELOPMENT QLD***	DATE COMMENCED:	***14.5.2016***
PROJECT:	***GEOTECHNICAL INVESTIGATION***	DATE COMPLETED:	***14.5.2016***
LOCATION:	***CARSELDINE VILLAGE, BEAMS RD, CARSELDINE***	LOGGED BY:	***J.SIPPEL***
JOB NUMBER:	***SGS/17/E184B***	CHECKED BY:	***C KOSIEK***

Drill Contractor: SGS AUSTRALIA **Bore Size:** 100mm **Hole Angle:** -90° **Easting:** 502849.00 **Surface R.L.:**

Drill Model: DTS 05 **Drill Fluid:** - **Bearing:** **Northing:** 6974798.00 **Datum:** 56J

Method	Casing	DCP	RL (m)	Depth (m)	Geological Unit	Graphic Log	Classification Symbol	Material Description	Moisture Condition	Consistency / Strength	Cementation / Weathering	Sample / Test	Field Records / Comments	Water
SA/TC	Open Hole	1					SM	NATURAL - Silty SAND, fine to medium grained, dark grey, 100mm topsoil	M	VL				
		2					CH	Silty CLAY, high plasticity, grey mottled orange	M	St				
		2												
		3												
		4												
		4												
		5												
		4												
		5												
		6		1										
							CI	Sandy CLAY, medium plasticity, grey mottled orange	M	VSt				
				2										
							SC	Clayey SAND, fine to medium grained, grey mottled orange	M	D				
				3										
				4										
				5										
				6										

End of BH 04 at 6m

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BOREHOLE LOG

BOREHOLE NO.: ***BH 05***
SHEET: 1 OF 1

CLIENT:	***ECONOMIC DEVELOPMENT QLD***	DATE COMMENCED:	***14.5.2016***
PROJECT:	***GEOTECHNICAL INVESTIGATION***	DATE COMPLETED:	***14.5.2016***
LOCATION:	***CARSELDINE VILLAGE, BEAMS RD, CARSELDINE***	LOGGED BY:	***J.SIPPEL***
JOB NUMBER:	***SGS/17/E184B***	CHECKED BY:	***C KOSIEK***

Drill Contractor: SGS AUSTRALIA **Bore Size:** 100mm **Hole Angle:** -90° **Easting:** 502880.00 **Surface R.L.:**

Drill Model: DTS 05 **Drill Fluid:** - **Bearing:** **Northing:** 6974869.00 **Datum:** 56J

Method	Casing	DCP	RL (m)	Depth (m)	Geological Unit	Graphic Log	Classification Symbol	Material Description	Moisture Condition	Consistency / Strength	Cementation / Weathering	Sample / Test	Field Records / Comments	Water
SA/TC	Open Hole	1					SM	NATURAL - Silty SAND, dark grey, fine to medium grained, 100mm topsoil	M	VL				
		2					CH	Silty CLAY, high plasticity, pale grey mottled orange, yellow	M	St				
		3												
		2												
		3										D	PP>600kPa	
		3										U_{50}	REC=200mm	
		4												
		4												
		5												
		6		1										
							SC	Clayey SAND, fine to medium grained, grey mottled orange	D-M	D				
				2			SC	Clayey SAND, fine to medium grained, red mottled orange and grey	D	D				
				3										
				4										
				5										
				6										

End of BH 05 at 6m

BOREHOLE LOG

BOREHOLE NO.: ***BH 06***
SHEET: 1 OF 1

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CLIENT:	***ECONOMIC DEVELOPMENT QLD***	DATE COMMENCED:	***15.5.2016***
PROJECT:	***GEOTECHNICAL INVESTIGATION***	DATE COMPLETED:	***15.5.2016***
LOCATION:	***CARSELDINE VILLAGE, BEAMS RD, CARSELDINE***	LOGGED BY:	***J.SIPPEL***
JOB NUMBER:	***SGS/17/E184B***	CHECKED BY:	***C KOSIEK***

Drill Contractor: SGS AUSTRALIA **Bore Size:** 100mm **Hole Angle:** -90° **Easting:** 502848.00 **Surface R.L.:**

Drill Model: DTS 05 **Drill Fluid:** - **Bearing:** **Northing:** 6974798.00 **Datum:** 56J

Method	Casing	DCP	RL (m)	Depth (m)	Geological Unit	Graphic Log	Classification Symbol	Material Description	Moisture Condition	Consistency / Strength	Cementation / Weathering	Sample / Test	Field Records / Comments	Water
SA/TC	Open Hole	2					SM	FILL - Silty SAND, fine to medium grained, dark grey, 90mm topsoil	M	L				
		4					CH	FILL - Silty CLAY, high plasticity, red, grey, brown	M	VSt				
		4												
		4												
		4												
		3					SM	NATURAL - Silty SAND, fine grained, grey-brown	M	MD				
		3												
		4					CH	Silty CLAY, high plasticity, pale grey mottled yellow, orange	M	VSt				
		4												
		5		1										
				2			CI	Sandy CLAY, medium to high plasticity, grey mottled orange, fine to coarse grained sand	M	VSt				
				3			SC	Clayey SAND, fine to coarse grained, grey mottled orange, red	M	MD				
				4										
				5										
				6										

End of BH 06 at 6m

SGS
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BOREHOLE LOG

BOREHOLE NO.: ***BH 07***
SHEET: 1 OF 1

CLIENT:	***ECONOMIC DEVELOPMENT QLD***	DATE COMMENCED:	***14.5.2016***
PROJECT:	***GEOTECHNICAL INVESTIGATION***	DATE COMPLETED:	***14.5.2016***
LOCATION:	***CARSELDINE VILLAGE, BEAMS RD, CARSELDINE***	LOGGED BY:	***J.SIPPEL***
JOB NUMBER:	***SGS/17/E184B***	CHECKED BY:	***C KOSIEK***

Drill Contractor: SGS AUSTRALIA **Bore Size:** 100mm **Hole Angle:** -90° **Easting:** 502744.00 **Surface R.L.:**

Drill Model: DTS 05 **Drill Fluid:** - **Bearing:** **Northing:** 6974894.00 **Datum:** 56J

Method	Casing	DCP	RL (m)	Depth (m)	Geological Unit	Graphic Log	Classification Symbol	Material Description	Moisture Condition	Consistency / Strength	Cementation / Weathering	Sample / Test	Field Records / Comments	Water
SA/TC	Open Hole	3					SM	FILL - Silty SAND, fine to medium grained, dark grey, 90mm topsoil	M	MD				
		4					CH	FILL - Silty CLAY, high plasticity, grey, red, yellow	M	VSt				
		4												
		3					CH	NATURAL - Silty CLAY, high plasticity, grey mottled yellow, orange	M	St				
		3												
		4					CH	Silty CLAY, high plasticity, pale grey mottled yellow, orange	M	VSt				
		4												
		4												
		5												
		4		1										
				2			CH	Silty CLAY, high plasticity, pale pale grey mottled yellow, orange	M	VSt				
				3										
				4										
				5										
				6										

End of BH 07 at 6m

BOREHOLE LOG

BOREHOLE NO.: ***BH 08***
SHEET: 1 OF 1

Engineering and Environmental Consultants
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CLIENT:	***ECONOMIC DEVELOPMENT QLD***	DATE COMMENCED:	***14.5.2016***
PROJECT:	***GEOTECHNICAL INVESTIGATION***	DATE COMPLETED:	***14.5.2016***
LOCATION:	***CARSELDINE VILLAGE BEAMS RD, CARSELDINE***	LOGGED BY:	***J.SIPPEL***
JOB NUMBER:	***SGS/17/E184B***	CHECKED BY:	***C KOSIEK***

Drill Contractor: SGS AUSTRALIA **Bore Size:** 100mm **Hole Angle:** -90° **Easting:** 502650.00 **Surface R.L.:**

Drill Model: DTS 05 **Drill Fluid:** - **Bearing:** **Northing:** 6974889.00 **Datum:** 56J

Method	Casing	DCP	RL (m)	Depth (m)	Geological Unit	Graphic Log	Classification Symbol	Material Description	Moisture Condition	Consistency / Strength	Cementation / Weathering	Sample / Test	Field Records / Comments	Water
SA/TC	Open Hole	2					SM	FILL - Silty SAND, fine to medium grained, dark grey, 85mm topsoil	M	L				
		2					CH	NATURAL - Silty CLAY, high plasticity, grey mottled red, orange	M	St				
		3												
		4												
		3												
		4					CH	Silty CLAY, high plasticity, dark grey mottled red, orange	M	VSt		U_{50}	PP=380kPa REC=150mm	
		4												
		4												
		5												
		5		1										
				2										
				3			CH	Silty CLAY, high plasticity, pale grey mottled orange and red,	M	VSt		U_{50}	PP=280-500kPa REC=300mm	
				4								U_{50}	PP=320kPa REC=370mm	
				5										
				6										

End of BH 08 at 6m

Engineering and Environmental Consultants
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BOREHOLE LOG

BOREHOLE NO.: ***BH 09***
SHEET: 1 OF 1

CLIENT:	***ECONOMIC DEVELOPMENT QLD***	DATE COMMENCED:	***14.5.2016***
PROJECT:	***GEOTECHNICAL INVESTIGATION***	DATE COMPLETED:	***14.5.2016***
LOCATION:	***CARSELDINE VILLAGE, BEAMS RD, CARSELDINE***	LOGGED BY:	***J.SIPPEL***
JOB NUMBER:	***SGS/17/E184B***	CHECKED BY:	***C KOSIEK***

Drill Contractor: SGS AUSTRALIA **Bore Size:** 100mm **Hole Angle:** -90° **Easting:** 5002500.00 **Surface R.L.:**

Drill Model: DTS 05 **Drill Fluid:** - **Bearing:** **Northing:** 6974973.00 **Datum:** 56J

Method	Casing	DCP	RL (m)	Depth (m)	Geological Unit	Graphic Log	Classification Symbol	Material Description	Moisture Condition	Consistency / Strength	Cementation / Weathering	Sample / Test	Field Records / Comments	Water
SA/TC	Open Hole	2					SM	NATURAL - Silty SAND, fine to medium grained, dark grey, 90mm topsoil	L	M				
		3					SC	Clayey SAND, fine to medium grained, brown, orange, grey	MD	M				
		4					CI	Sandy CLAY, medium plasticity, grey-brown mottled orange, red, fine to medium grained sand	VSt	M				
		4												
		5												
		5										U_{50}	PP>600kPa REC=120mm	
		6												
		5												
		6												
		6		1										
							CH	Silty CLAY, high plasticity, pale grey mottled orange	St	M				
												U_{50}	PP=310kPa REC=350mm	
				2										
				3										
				4										
							CH	Silty CLAY, high plasticity, pale grey mottled yellow	VSt	M				
												U_{50}	PP=390kPa REC=400mm	
				5										
				6										

End of BH 09 at 6m

SOIL CLASSIFICATION

CLASSIFICATION METHOD

The soils are classified based on Australian Standard AS 1726, Geotechnical Site Investigation Code and in accordance with the Unified Soil Classification (USC). Typically, the descriptions include classification group, soil name, grain size, plasticity, structure, colour, moisture, consistency, secondary components and other relevant information.

CLASSIFICATION GROUP

First and/or Second letter

Letter	Definition
G	Gravel
S	Sand
M	Silt
C	Clay
O	Organic
Pt	Peat

Second Letter

Letter	Definition
P	Poorly graded
W	Well Graded
H	High Plasticity
I	Medium Plasticity
L	Low Plasticity

SOIL TYPES

Major Divisions			Size (mm)
Coarse Grained	Boulders		>200
	Cobbles		63 – 200
	Gravel	coarse	19 – 63
		medium	6.7 – 19
		fine	2.36 – 6.7
	Sand	coarse	0.6 – 2.36
		medium	0.21 – 0.6
		fine	0.075 – 0.21
Fine Grained	Silt		0.002 – 0.075
	Clay		<0.002
	Peat		N/A – Peat and other highly organic soils

COMPOSITE SOIL TYPES

Most natural soils are a mixture of basic soil types. The primary soil is described and modified by secondary constituents as follows:

Fine Grained Soil		Coarse Grained Soil	
% Coarse grained	Modifier	% Fine grained	Modifier
≤ 15	Omit or use 'trace'	≤ 5	Omit or use 'trace'
15 – 30	Describe as 'with sand/gravel'	5 – 12	Describe as 'with clay/silt'
>30	Prefix soil as sandy/gravely	>12	Prefix soil as 'silty/clayey'

COHESIVE SOIL DESCRIPTION

Plasticity

Descriptive Terms	Liquid Limit (%)	
	CLAY	SILT
Low plasticity	≤ 35	≤ 50
Medium plasticity	> 35 ≤ 50	N/A
High plasticity	> 50	> 50

Consistency

Term	Undrained Strength C_U(kPa)	Field Guide
Very Soft (VS)	≤ 12	Exudes between the fingers when squeezed in hand
Soft (S)	12 – 25	Can be moulded by light finger pressure
Firm (F)	25 – 50	Can be moulded by strong finger pressure
Stiff (St)	50 – 100	Cannot be moulded by fingers.
Very Stiff (VSt)	100 – 200	Can be indented by thumb nail.
Hard (H)	≥ 200	Can be indented with difficulty by thumb nail.

NON-COHESIVE SOIL DESCRIPTIONS

Particle size distribution

- Well graded – a good representation of all particle sizes.
- Poorly graded – an excess or deficiency of one or more intermediate particle sizes.
- Gap graded – an absence of one or more intermediate particle sizes.
- Uniform – essentially of one particle size.

Particle Shape

- Equidimensional particles may be described as ***rounded, sub-rounded, sub-angular, or angular.***
- Two dimensional particles with third dimension small by comparison may be described as ***flaky or platy.***
- One dimensional particles with the other two dimensions small by comparison may be described as ***elongated.***

Consistency

TERM	DENSITY INDEX (%)	SPT N VALUE	DCP (Blows/100mm)
Very Loose (VL)	≤ 35	0 – 4	0 – 1
Loose (L)	15 – 35	4 – 10	1 – 3
Medium Dense (MD)	35 – 65	10 – 30	4 – 8
Dense (D)	65 – 85	30 – 50	9 – 15
Very Dense (VD)	> 85	> 50	> 15

MOISTURE CONDITION

Dry (D)	Cohesive soils; hard, friable or powdery, well dry of plastic limit. Granular soils; Cohesionless and free-running.
Moist (M)	Soil feels cool, darkened in colour. Cohesive soils can be moulded. Granular soils tend to cohere.
Wet (W)	Soil feels cool, darkened in colour. Cohesive soils usually weakened and free water form on hands when handling. Granular soils tend to cohere.

SOIL ORIGIN

Weathered Soils

Residual Soil	Soil developed on extremely weathered rock

Transported Soils

Aeolian	Deposited by wind.
Alluvium	Deposited by streams and rivers.
Colluvium	Deposited on slopes (transported downslope by gravity).
Lacustrine	Deposited by lakes.
Marine	Deposited in ocean basins, beaches and estuarine (tidal river)

Fill

Controlled Fill	Fill that has been placed under controlled conditions and certified by a Geotechnical Testing Authority
Uncontrolled Fill	Fill that does not comply with controlled fill requirements

TYPICAL REPRESENTATION AND TERMS

			USC	General Description
GRAVEL	Clean Gravels (Little or no Fines)		GW	Well graded gravels and gravel/sand mixtures
			GP	Poorly graded gravels and gravel/sand mixtures
	Gravel with Fines		GM	Silty Gravels, gravel/sand/silt mixtures
			GC	Clayey Gravels, gravel/sand/clay mixtures
SANDS	Clean Sands (Little or no Fines)		SW	Well graded sands, gravelly sands
			SP	Poorly graded sands, gravelly/sand mixtures
	Sands with Fines		SM	Silty sands
			SC	Clayey Sands
SILTS and CLAYS	Liquid Limit >50%		MH	High plasticity inorganic silts, silt mixtures
			CH	High plasticity inorganic clays, clay mixtures
			OH	High plasticity organic clays and silts
	Liquid Limit ≤ 35		ML	Low plasticity inorganic silts, silt mixtures
			CL	Low plasticity inorganic clays, clay mixtures
			OL	Low plasticity organic clays and silts
HIGHLY ORGANIC			PT	Peat, Humus, Swamp Soils with high organics
FILL				Fill

SYMBOLS AND ABBREVIATIONS

Drilling methods

SA	Solid Flight Auger
HS	Hollow Stem Auger
WB	Wash Boring
NMLC	Triple tube rotary core drilling
HA	Hand Auger
PHA	Hydraulic powered hand auger
CPT	Cone Penetrometer Testing

Drilling Bits and Attachments

TC	Tungsten Carbide bit
V	V bit
RR	Rock Roller (tricone)
BB	Blade Bit

Excavation Attachments

GP	General Purpose toothed bucket
Ba	Batter Bucket
TT	Tiger Teeth
RB	Hydraulic rock breaker
ST	Single Tine

Sampling and Testing

SPT	Standard Penetrometer Testing
N	SPT Blow Count
DCP	Dynamic Cone Penetrometer Testing
SV	Shear Vane Test
U50	Undisturbed 50mm tube sample
D	Disturbed Sample
W	Water Sample
PP	Pocket Penetrometer
Rec	Length of sample recovered
R	Refusal
RQD	Rock Quality Designation
PL	Point Load Test
A	Point Load Test (axial)
D	Point Load Test (diametral)
L	Point Load Test (irregular Lump)
BH	Borehole
TP	Test Pit

Water/Moisture

D	Dry
M	Moist
W	Wet
	First noted depth of water ground water inflow
	Steady Water Level

Soil Properties

C_u	Undrained Shear Strength
C’	Effective Shear Stress
Φu	Angle of friction – Undrained
Φ'	Angle of friction – Drained
γ	Unit Weight
G_s	Specific Gravity
MC	Moisture Content
LL	Liquid Limit
PL	Plastic Limit
PI	Plasticity Index
WPI	Weighted Plasticity Index
LS	Linear Shrinkage
PSD	Particle Size Distribution
D_n	n% of particles smaller than specified diameter
k	Hydraulic Conductivity
M_v	Coefficient of Volume Compressibility
C_α	Coefficient of Secondary Compression
C_c	Compression Index
C_v	Coefficient of consolidation
OCR	Over Consolidation Ratio
e	Void Ratio
n	Porosity
E	Elastic Modulus
CBR	California Bearing Ratio
UCS	Unconfined Compressive Strength
Is(50)	Point Load Strength Index
MDR	Moisture Density Relationship
DD	Dry Density
WD	Wet Density
MDD	Maximum Dry Density
OMC	Optimum Moisture Content
SDDR	Standard (compactive effort) dry density ratio
DOS	Degree of Saturation
APD	Apparent Particle Density
Y_s	Characteristic Surface Movement
Iss	Shrink/Swell Index
H_s	Depth of design soil suction change
H_t	Maximum drying depth close to a tree
σ	Total stress
σ'	Effective stress
u	Pore Water Pressure

Foundation Design

q_u	Ultimate soil bearing capacity (shallow foundations)
q_a	Allowable soil bearing capacity (shallow foundations)
f_s	Ultimate shaft friction (piled foundations)
f_b	Ultimate base bearing pressure (piled foundations)
R_{dg}	Ultimate geotechnical strength (Compression)
R_{ug}	Ultimate geotechnical strength (Uplift)
ϕ_g	Geotechnical Strength Reduction Factor
f'_c	Design characteristic strength of concrete

Standards and Specifications

AS	Australian Standards
MRD	Department of Transport and Main Roads
MRS	Main Roads Specification
MRTS	Main Roads Technical Specification
ISO	International Organization for Standardization

Miscellaneous

CTB	Cement treated base
RSS	Reinforced soil structure
CFA	Continuous flight auger
CH	Chainage

APPENDIX D: LABORATORY TEST RESULTS

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TEST CERTIFICATE

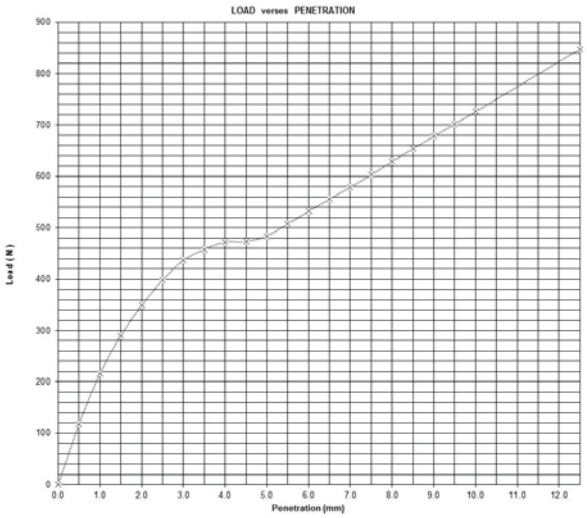
SGS Australia Pty Ltd
Lawnton Laboratory
Unit 1/18 Leanne Crescent
Lawnton QLD 4501
AUSTRALIA

Client:	SGS Australia Pty Ltd (Engineering & Environmental 5105.426)	Client Job No:	
Project:	SGS/17/184B	Order No:	
Location:	Beams Road, Carseldine	Tested Date:	24/05/2018
SGS Job Number:	18-55-376	Sample No:	18-LT-1403
Lab:	Lawnton Laboratory	Sample ID:	BH09 (300 - 1000)

CALIFORNIA BEARING RATIO

AS1289.6.1.1 (Soaked)

Sample Description:	(CH) CLAY - Brown
Date Sampled:	16/05/2018
Moisture Content Method:	AS1289.2.1.1
Sampling Method:	AS1289.1.2.1 cl 6.5.3 in-situ power auger
Compactive Effort Used:	AS1289.5.1.1 Standard Compaction
Test Type:	SOAKED
Retained on 19.0mm (%):	0
Retained Material Excluded:	Yes



	RESULT	RATIO (%)
TARGET RESULTS		
Moisture Content (%):	19.2	100.0
Dry Density (t/m3):	1.69	100.0
PLACEMENT RESULTS		
Moisture Content (%):	19.7	102.5
Dry Density (t/m3):	1.68	99.0
AFTER SOAKING RESULTS		
Moisture Content (%):	22.4	116.5
Dry Density (t/m3):	1.64	97.0
AFTER PENETRATION RESULTS		
Moisture Content of Top (%):	22.9	119.5
SOAKING DETAILS		
Soaking Period (days):	4	
Surcharge Applied (kg):	4.5	
Swell (%):	2.0	
CBR RESULTS		
Correction Applied (mm):	0.0	
CBR bearing ratio @ 2.5mm (%):	3.0	
CBR bearing ratio @ 5.0mm (%):	2.5	
CBR VALUE (%):	**3.0**	**@ 2.5mm Penetration**

Authorised Signatory: (Dave Gregson)

Date: 28/05/2018

Accreditation No.: 2418
Accredited for compliance with ISO/IEC 17025 - Testing

Client Address: 1/18 Leanne Crescent Lawnton Qld 4501

Site No.: 4984
Cert No.: 18-LT-1403-S500_auto
Form No.RP-AU-INDCMT-TE-S500_AUTO V5.0

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TEST CERTIFICATE

SGS Australia Pty Ltd
Lawnton Laboratory
Unit 1/18 Leanne Crescent
Lawnton QLD 4501
AUSTRALIA

Client:	SGS Australia Pty Ltd (Engineering & Environmental 5105.426)	Client Job No:	
Project:	SGS/17/184B	Order No:	
Location:	Beams Road, Carseldine	Tested Date:	17/05/2018
SGS Job Number:	18-55-376	Sample No:	18-LT-1404
Lab:	Lawnton Laboratory	Sample ID:	BH01 0.3

Shrink-Swell Index

AS 1289.7.1.1 Undisturbed

Sample Data

Sample Type:	U50
Depth (m):	0.3
Borehole Number:	1
Sample Description:	(CI) Sandy CLAY, Brown mottled Grey

SWELL TEST

Initial Moisture Content (%):	16.6
Final Moisture Content (%):	19.0
Total Swell (%):	0.99

SHRINKAGE TEST

Moisture Content (%):	19.0
Shrinkage (%):	1.8

SHRINK - SWELL

INDEX (Iss):	**1.3**
Estimated Inert Inclusions (%):	1
Extent of Crumbling:	Nil
Extent of Cracking:	Nil

Note: Sampled by SGS Australia Pty Ltd according to AS1289.1.3.1 (3.1.3.2)

Authorised Signatory: (Stephen Bird) Date: 28/05/2018

Site No.: 4984
Cert No.: 18-LT-1404-Z300
Form No.RP-AU-INDCMT-TE-Z300 V10.0

Client Address: 1/18 Leanne Crescent Lawnton Qld 4501

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TEST CERTIFICATE

SGS Australia Pty Ltd
Lawnton Laboratory
Unit 1/18 Leanne Crescent
Lawnton QLD 4501
AUSTRALIA

Client:	SGS Australia Pty Ltd (Engineering & Environmental 5105.426)	Client Job No:	
Project:	SGS/17/184B	Order No:	
Location:	Beams Road, Carseldine	Tested Date:	17/05/2018
SGS Job Number:	18-55-376	Sample No:	18-LT-1405
Lab:	Lawnton Laboratory	Sample ID:	BH05 0.5

Shrink-Swell Index

AS 1289.7.1.1 Undisturbed

Sample Data

Sample Type:	U50
Depth (m):	0.5
Borehole Number:	5
Sample Description:	(CI) Sandy CLAY, Brown mottled Grey, Yellow, Red

SWELL TEST

Initial Moisture Content (%):	18.3
Final Moisture Content (%):	20.2
Total Swell (%):	0.17

SHRINKAGE TEST

Moisture Content (%):	18.6
Shrinkage (%):	1.5

SHRINK - SWELL

INDEX (Iss):	**0.9**

Estimated Inert Inclusions (%):	1
Extent of Crumbling:	Nil
Extent of Cracking:	Low

Note: Sampled by SGS Australia Pty Ltd according to AS1289.1.3.1 (3.1.3.2)

Authorised Signatory: (Stephen Bird) Date: 28/05/2018

Site No.: 4984
Cert No.: 18-LT-1405-Z300
Form No.RP-AU-INDCMT-TE-Z300 V10.0

Client Address: 1/18 Leanne Crescent Lawnton Qld 4501

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TEST CERTIFICATE

SGS Australia Pty Ltd
Lawnton Laboratory
Unit 1/18 Leanne Crescent
Lawnton QLD 4501
AUSTRALIA

Client:	SGS Australia Pty Ltd (Engineering & Environmental 5105.426)	Client Job No:	
Project:	SGS/17/184B	Order No:	
Location:	Beams Road, Carseldine	Tested Date:	17/05/2018
SGS Job Number:	18-55-376	Sample No:	18-LT-1406
Lab:	Lawnton Laboratory	Sample ID:	BH08 0.5

Shrink-Swell Index

AS 1289.7.1.1 Undisturbed

Sample Data

Sample Type:	U50
Depth (m):	0.5
Borehole Number:	8
Sample Description:	(CH) CLAY, Brown mottled red, yellow

SWELL TEST

Initial Moisture Content (%):	28.2
Final Moisture Content (%):	31.2
Total Swell (%):	0.78

SHRINKAGE TEST

Moisture Content (%):	28.5
Shrinkage (%):	6.5

SHRINK - SWELL

INDEX (Iss):	**3.8**
Estimated Inert Inclusions (%):	5
Extent of Crumbling:	Nil
Extent of Cracking:	Low

Note: Sampled by SGS Australia Pty Ltd according to AS1289.1.3.1 (3.1.3.2)

Authorised Signatory: (Stephen Bird) Date: 28/05/2018

Site No.: 4984
Cert No.: 18-LT-1406-Z300
Form No.RP-AU-INDCMT-TE-Z300 V10.0

Client Address: 1/18 Leanne Crescent Lawnton Qld 4501

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TEST CERTIFICATE

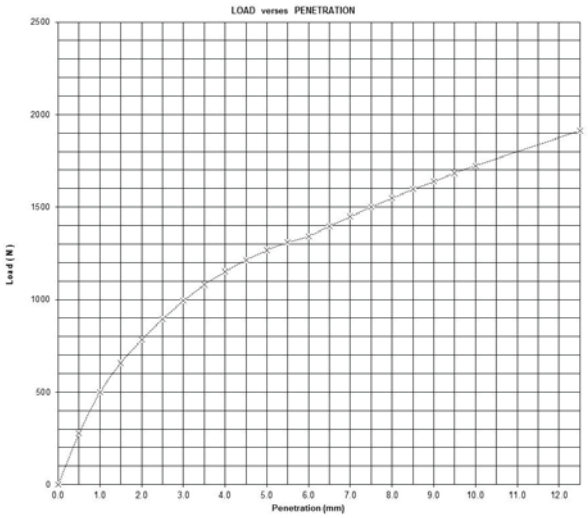
SGS Australia Pty Ltd
Lawnton Laboratory
Unit 1/18 Leanne Crescent
Lawnton QLD 4501
AUSTRALIA

Client:	SGS Australia Pty Ltd (Engineering & Environmental 5105.426)	Client Job No:	
Project:	SGS/17/184B	Order No:	
Location:	Beams Road, Carseldine	Tested Date:	24/05/2018
SGS Job Number:	18-55-376	Sample No:	18-LT-1401
Lab:	Lawnton Laboratory	Sample ID:	BH01 (200 - 1000)

CALIFORNIA BEARING RATIO

AS1289.6.1.1 (Soaked)

Sample Description:	(CI-CH) Sandy CLAY - Brown
Date Sampled:	14/05/2018
Moisture Content Method:	AS1289.2.1.1
Sampling Method:	AS1289.1.2.1 cl 6.5.3 in-situ power auger
Compactive Effort Used:	AS1289.5.1.1 Standard Compaction
Test Type:	SOAKED
Retained on 19.0mm (%):	0
Retained Material Excluded:	Yes



	RESULT	RATIO (%)
TARGET RESULTS		
Moisture Content (%):	17.6	100.0
Dry Density (t/m3):	1.75	100.0
PLACEMENT RESULTS		
Moisture Content (%):	17.3	98.0
Dry Density (t/m3):	1.76	100.0
AFTER SOAKING RESULTS		
Moisture Content (%):	18.9	107.5
Dry Density (t/m3):	1.74	99.5
AFTER PENETRATION RESULTS		
Moisture Content of Top (%):	19.7	112.0
SOAKING DETAILS		
Soaking Period (days):	4	
Surcharge Applied (kg):	4.5	
Swell (%):	1.0	
CBR RESULTS		
Correction Applied (mm):	0.0	
CBR bearing ratio @ 2.5mm (%):	7	
CBR bearing ratio @ 5.0mm (%):	6	
CBR VALUE (%):	**7**	**@ 2.5mm Penetration**

Authorised Signatory: (Dave Gregson)

Date: 28/05/2018

Accreditation No.: 2418
Accredited for compliance with ISO/IEC 17025 - Testing

Client Address: 1/18 Leanne Crescent Lawnton Qld 4501

Site No.: 4984
Cert No.: 18-LT-1401-S500_auto
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TEST CERTIFICATE

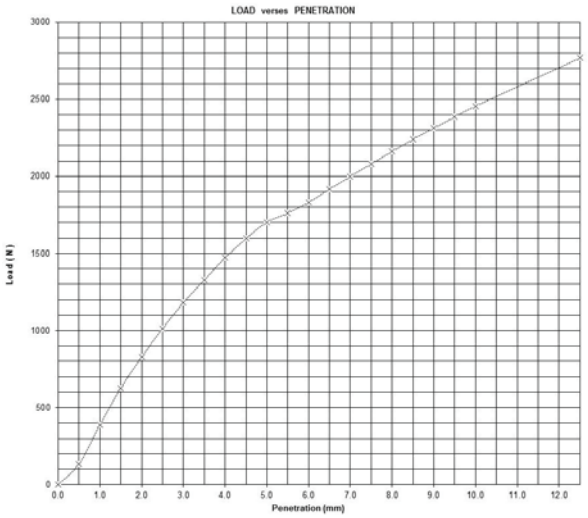
SGS Australia Pty Ltd
Lawnton Laboratory
Unit 1/18 Leanne Crescent
Lawnton QLD 4501
AUSTRALIA

Client:	SGS Australia Pty Ltd (Engineering & Environmental 5105.426)	Client Job No:	
Project:	SGS/17/184B	Order No:	
Location:	Beams Road, Carseldine	Tested Date:	24/05/2018
SGS Job Number:	18-55-376	Sample No:	18-LT-1402
Lab:	Lawnton Laboratory	Sample ID:	BH05 (200 - 800)

CALIFORNIA BEARING RATIO

AS1289.6.1.1 (Soaked)

Sample Description:	(CI) Sandy CLAY - Brown
Date Sampled:	16/05/2018
Moisture Content Method:	AS1289.2.1.1
Sampling Method:	AS1289.1.2.1 cl 6.5.3 in-situ power auger
Compactive Effort Used:	AS1289.5.1.1 Standard Compaction
Test Type:	SOAKED
Retained on 19.0mm (%):	0
Retained Material Excluded:	Yes



	RESULT	RATIO (%)
TARGET RESULTS		
Moisture Content (%):	15.8	100.0
Dry Density (t/m3):	1.80	100.0
PLACEMENT RESULTS		
Moisture Content (%):	15.8	100.0
Dry Density (t/m3):	1.79	99.5
AFTER SOAKING RESULTS		
Moisture Content (%):	18.1	114.5
Dry Density (t/m3):	1.78	99.0
AFTER PENETRATION RESULTS		
Moisture Content of Top (%):	18.5	117.5
SOAKING DETAILS		
Soaking Period (days):	4	
Surcharge Applied (kg):	4.5	
Swell (%):	1.0	
CBR RESULTS		
Correction Applied (mm):	0.2	
CBR bearing ratio @ 2.5mm (%):	8	
CBR bearing ratio @ 5.0mm (%):	9	
CBR VALUE (%):	**9**	**@5.0mm Penetration**

Authorised Signatory: (Dave Gregson)

Date: 28/05/2018

APPENDIX E: SITE PHOTOGRAPHS

Photos taken facing west over playing fields with uncontrolled fill batter in background

Photos taken facing north-east overlooking existing stormwater basin and Beams Road entrance

Photos facing north-east overlooking lower playing field and basketball courts

APPENDIX F: EARTHWORKS NOTES

PROJECT: LEVEL 1 EARTHWORKS CONTROL

These instructions apply to this project unless otherwise addressed in the job specifications or subsequently by the superintendent.

(A) PRIOR TO FILLING

(1) Topsoil and organic matter must be stripped to the nominated depth from the proposed cut and fill areas.

(2) The superintendent or GTA should be notified if the required stripping exceeds the nominated depth.

(3) Any existing (uncontrolled) fill must be either removed or investigated, approved and documented.

(4) The stripped natural surface (fill foundation) must be inspected, proof rolled and approved.

(5) Any unsound areas are subject to supplementary site instructions (in general, the fill foundation is subject to the same compaction requirements as the fill). The practice of "bridging" over soft, unstable and wet fill foundation is generally not acceptable.

(B) FILLING

(6) If necessary, the fill material must be moisture conditioned as required.

a) Too wet - dry fill to within a moisture range that the specified density can be achieved and the fill area is not deflecting (surface heaving) under construction traffic to the detriment of the fill in general.

b) Too dry - moisten the fill to within a moisture range that the specified density can be achieved.

c) The fill should be mixed to ensure reasonably uniform distribution of the moisture.

(7) Remove excessive vegetation (sticks, stumps, etc.) as required.

(8) Place fill in layers generally not exceeding 200mm thick and compact to specification (larger or more efficient compaction equipment may enable the placement of thicker fill layers).

(9) The fill must be tested at the rate of:

a) Minimum of one (1) test every 2nd layer (each 400mm lift)

b) Minimum of one (1) test/500m^3 of fill - large scale project

c) Minimum of one (1) test/200m^3 of fill - small scale project

or as directed by the GTA or superintendent

(10) Areas represented by a failed test must be reworked and retested and a positive result obtained prior to placing additional fill.

(11) Where fill abuts against sloping ground, benches should be cut in the ground generally to a depth of 200mm to 300mm.

(12) Fill should be placed in near horizontal layers of uniform thickness deposited systematically across the fill area.

(13) If topsoil is stockpiled adjacent to the fill area, care should be taken to ensure that structural fill does not encroach into the stockpile area.

(14) The maximum particle size of rocks within the layer after compaction should not exceed two-thirds of the compacted layer thickness.

(15) Equipment and haul roads should be selected to avoid the overloading (and development of surface heaving) of the fill areas.

(16) If the filling programme is interrupted (eg. by rainfall periods), the interrupted surface must be inspected and assessed prior to placing additional fill (i.e. in accordance with “(A)”.

PROJECT: LEVEL 1 EARTHWORKS CONTROL

These notes apply to this project unless otherwise instructed by the project superintendent.

(A) TEST PROCEDURES

Test procedures to be used on the site will be selected from the following:

- AS1289 5.1.1 Dry Density/Moisture Content Relationship (Standard Compaction)
- AS1289 5.2.1 Dry Density/Moisture Content Relationship (Modified Compaction)
- AS1289 5.3.1 Determination of the Field Density of a Soil (Sand Replacement)
- AS1289 5.4.1 Dry Density Ratio, Moisture Variation and Moisture Ratio
- AS1289 5.5.1 Determination of the Minimum and Maximum Dry Density of a Cohesionless Material
- AS1289 5.6.1 Density Index for a Cohesionless Material
- AS1289 5.7.1 Hilf Density Ratio and Moisture Variation
- AS1289 5.8.1 Determination of the Field Density of a Soil (Nuclear Gauge)

(B) CONTRACTORS RESPONSIBILITIES

Construction/Compaction Equipment
Careful consideration should be given to the selection of compaction equipment and the proportion of compaction equipment to incoming fill quantities. The plant should be capable of compacting all of the fill area including its edges, batters, irregular surfaces and junctions with the natural ground.

Construction Equipment Operators
It is the responsibility of the contractor to ensure that operators are adequately trained in the basic standard practices and requirements of earthwork construction (eg. rolling patterns, benching, appropriate layer thicknesses, etc.).

Notification of Filling
The Geotechnical Testing Authority relies on the Contractor, Constructor or Superintendent to advise when the filling operation will commence, or re-commence following delay periods. Level 1 certification cannot be given for fill placed without the knowledge of the Geotechnical Testing Authority.

Specification Compliance
Regardless of the role of the Geotechnical Testing Authority, the contractor is responsible for complying with all aspects of the specification including the quality, placement methods and compaction of the fill.

(C) UNSUITABLE MATERIALS

In relation to structural filling, unsuitable materials may be termed either “unsuitable” or “temporary unsuitable”.

1) Unsuitable

Unless otherwise approved by the superintendent, the following materials are not suitable for forming any part of structural filling. At the direction of the superintendent, unsuitable materials should either be removed to spoil or used in non-structural areas (eg. park areas, footpaths, etc.).

- organic soils - topsoils, severely root affected soils and peat
- materials which may be contaminated with toxic substances through past site usages
- filling which contains wood, metal, plastic, boulders and other deleterious materials
- any other materials which have deleterious engineering properties

2) Temporary Unsuitable

“Temporary unsuitable” refers to materials which are deemed unsuitable for use as structural fill in the present condition but may be rectified for subsequent use by some form of treatment.

Typical examples of temporary unsuitable materials and appropriate treatments are shown below:

Temporary Unsuitable Material	Possible Remedial Treatment
Material too wet	Spread and Dry
Excessive oversize	Screen/remove oversize
Excessive organics (sticks/stumps)	Remove sticks/stumps

(D) REACTIVE CLAYS

Soil reactivity is a term which refers to the volume change (shrinking and swelling) of clay soils undergoing moisture change. Reactive clay soils swell when wetted up and shrink when dried out. This characteristic is measured in the laboratory and used extensively for residential site classification and footing design. The following issues should be considered.

1) The site classification of a lot is not only affected by filling of the lot but also by the reactivity characteristics of the soils used to fill the lot.

2) Clay soils placed in a new environment (fill) will, over a period, adjust to equilibrium conditions (moisture and density). Clay soils which are over dried and over compacted (beyond equilibrium conditions) may result in a fill area with a high swell potential.

   A Modified Compaction specification will often necessitate the drying of clay soils well beyond the equilibrium conditions to meet the specification requirements. In temperate climates, the Standard Compaction Optimum Moisture Content is more likely to approximate the equilibrium moisture content (AS 3798 - 2007 Clause 5.3).

(E) SANDY SOILS (SILTY SANDS AND CLAYEY SANDS)

Sandy soils are generally prone to loss of strength and stability (heaving under load) as the moisture content approaches the standard optimum moisture content. The condition generally worsens as the moisture content increases above the optimum moisture content. This condition can develop and be evident on fill areas that may otherwise comply with the density requirement. As a general rule, the moisture content should be maintained approximately 1% to 3% dry of the optimum moisture content (standard compaction).

(F) TOPSOILING

Spreading of topsoil in excessive quantities over controlled fill may reduce the likelihood of a site being re-classified from a 'P' site. As a general rule, topsoil depth should be restricted to about 100mm in proposed building areas.

(G) COMPACTION STANDARDS

Unless otherwise notified, the compaction standard specified by the local authority will be adopted as the density acceptance/rejection criteria.

(H) CONTROLLED FILL ACCEPTANCE/REJECTION CRITERIA

Any combination of the following issues may influence an acceptance/rejection instruction on a section of fill presented for testing.

- density testing
- load testing - deflection/surface heaving
- quality of fill - organics/deleterious materials
- consistency of compaction

(I) EXCLUSIONS

Unless specifically requested Level 1 compaction control does not address the following issues:

- slope stability
- reactive soils
- soft natural soils and/or pre-existing (uncontrolled) fill on the site outside of the nominated controlled fill area
- soils which may be contaminated with toxic substances
- backfill to service trenches, subsequent to the controlled fill commission or when not included in the controlled fill commission
- site drainage
- topsoil placed subsequent to completion of controlled filling
- where the filling exceeds 5m, advice from a geotechnical professional should be sought

APPENDIX G: STANDARD CBR NOTES AND PERFORMANCE WARNINGS

SAMPLING

At the time of sampling, earthworks had not been carried out and the proposed subgrade had not been exposed.

As the subgrade was not exposed, and could not be viewed at the time of sampling, some of the samples may not be representative of predominant or worst case soil types.

Soil type boundaries (representing the soaked CBR samples) should be established when bulk earthworks is completed and the proposed subgrade is exposed.

Sampling frequency/location was in accordance with the instruction received from our client.

Unless otherwise instructed, samples are generally recovered from the zone of extreme pavement thickness, i.e. 00 - 500mm below design subgrade level.

TESTING

Testing was carried out in accordance with A.S. 1289 "Methods of Testing Soils for Engineering Purposes", A.S. 1289 6.1.1.

The test specimen was nominally placed at the Optimum Moisture Content and to the expected required density of the subgrade.

In accordance with the test procedure, the test specimen was soaked for a period of four (4) days with a surcharge mass of 4.5kg. This surcharge mass is approximately equivalent to the pressure applied by a 2.0 T/m^3 insitu density pavement thickness of 150mm (Refer to A.S. 1289 6.1.1, Figure 7 for full minimum pavement thickness requirements).

The minimum pavement thickness should be at least equivalent to the pavement thickness represented by the surcharge mass, refer to AS1289.6.1.1, Figure 7 for full minimum pavement thickness requirements

Test method A.S. 1289 6.1.1 allows for any +19.0mm material to be replaced in the test portion by –19.0mm + 4.75mm material. Unless otherwise instructed by our client, +19.0mm material will be excluded from the test portion.

PERFORMANCE WARNINGS

Sandy Soils (Sands, Silty Sands and Clayey Sands)

Sandy soils are generally prone to loss of strength, reduced insitu C.B.R. and stability (heaving under load) as the moisture content approaches the standard compaction optimum moisture content. The condition generally worsens proportionally with increasing moisture content (above the optimum moisture content).

The C.B.R. value obtained on the laboratory test specimen is only representative of the material at the nominated density and moisture content.

Serviceable drainage, both surface and sub-surface (side drains) and uniform conforming density is critical to the sound performance of sandy subgrades. Provided that this is achieved, the subgrade insitu C.B.R. value should approximate the laboratory C.B.R. value for the representative soil types.

Seepage zones are common in sandy soils, particularly following rainfall periods. Wet sandy soils and seepage within the depth zone affected by loading (eg. by construction traffic) can be highly detrimental to the trafficability, workability and performance on subgrades and road pavements.

The permeability of compacted Silty and Clayey Sand subgrades is generally low, ensuring good serviceability provided that the sub-surface drainage is adequate.

Clayey Soils (Clays, Sandy Clays and Silty Clays)

Clay soils generally have very low permeability and as a result, construction and performance problems associated with wet weather are usually confined to the exposed surface of the subgrade. However, workability problems can occur in poorly drained areas or after prolonged wet periods.

The C.B.R. value obtained on the laboratory test specimen is generally representative of the material in "the worst case", after four (4) days of continuous soaking. Most clay soils are reactive, to varying extents and swell when exposed to water. As a general rule, increasing swell is proportional to the decreasing C.B.R. value on most clay soils. Dry "baked out" clay subgrades can produce insitu C.B.R. values far in excess of the laboratory Soaked C.B.R. value.

Excessive drying and compaction of clay subgrades can be detrimental to the long term performance to some pavements. Upon wetting up to the "equilibrium moisture" some clay subgrades can swell resulting in deformation and weakening to the pavement.

CONSTRUCTION

Care should be taken when backfilling services (sewer/stormwater etc.) in the pavement area to ensure that materials in the top 500mm of backfill is not of lesser C.B.R. than the C.B.R. representing that section of pavement.

Should additional earthworks of any kind be carried out after the soil boundaries have been established, the boundaries may become invalid and should be re-confirmed.

Our Ref: GE20.025.L1

Date: 22nd April 2020

Calibre Group
Via email: Daniel.Collins@calibregroup.com

Attention: Mr. Daniel Collins

Dear Daniel,

RE: TECHNICAL MEMORANDUM - ACID SULFATE SOIL (ASS) REVIEW FOR PROPOSED 'CARSELDINE URBAN VILLAGE STAGE 1' DEVELOPMENT

Introduction & Background

Gallagher Environmental (GE) was commissioned care of Calibre Group to provide an acid sulfate soil (ASS) review of the proposed 'Carseldine Urban Village Stage 1' development located at Beams Road, Carseldine.

Acid Sulfate Soil Mapping

According to the Department of Environment & Heritage Protection (DEHP) 'Special Acid Soil Maps', the proposed development area has negligible probability of ASS occurrence. The nearest indication of ASS is associated with two (2) tributaries located to the north-east of the development with 'low probability of ASS occurrence'.

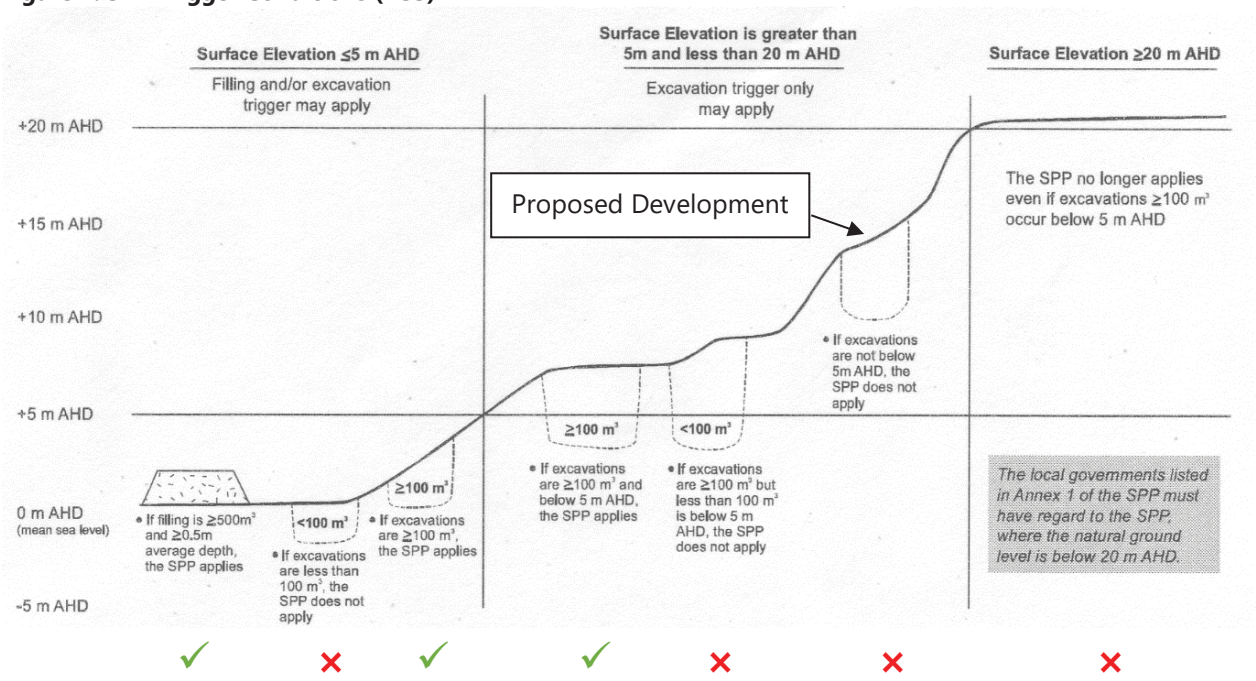
Plate 1: DEHP Acid Sulfate Soil Mapping

State Planning Policy (SPP)

The *State Planning Policy (2017)* and *State Planning Policy (SPP) State Interest Guideline "Water Quality" – Policy 9 (2016)* applies to all soil or sediment at or below 5m AHD (where the natural ground level is below 20m AHD), where the development would result in:

- The excavation of ≥100m^3 of soil or sediment situated below 5m AHD; or
- Filling of land situated below 5m AHD that involves ≥500m^3 of fill material with an average depth of ≥0.5m.

Figure 1: SPP Trigger Conditions (ASS)



Proposed Development

In accordance with the supplied engineering earthworks drawing set (15-003002.01) and from further consultation with Calibre Group, it is understood that the relevant proposed earthworks are summarised as follows:

- The surface level of the proposed development is essentially flat at approximately 14m AHD;
- The proposed maximum (i.e. topographically lowest) invert level associated with the proposed earthworks is **8.9m AHD**, within the proposed trunk sewer. All remaining invert levels of the proposed excavations are >10.0m AHD.

Therefore, no soil material at or below 5m AHD will be intercepted during the proposed construction and therefore the SPP is not invoked for the development. Consequently, the proposed development is considered to be free of any ASS disturbance and shall not require an Acid Sulfate Soil Management Plan (ASSMP) in accordance with the State Planning Policy (SPP) (2017) and QASSIT Soil Management Guidelines (2014).

For reference, acid sulfate soil (ASS) materials develop within former marine and estuarine sediments that were deposited as sea levels rose above the residual soil landscape during the Holocene Epoch (circa ~6500 years ago), and to a lesser extent, the Pleistocene Epoch (circa ~125,00 years ago). The relative sea levels during both these geological periods dictate the elevation (AHD) that ASS materials can generally be found: at or below 5m AHD, as adopted within the framework of the SPP, however more commonly below 2-3m AHD in coastal south-east Queensland.

We trust this is acceptable. Please feel free to contact me on 0438 724 929 or glen@genviro.com.au if you require further elaboration or wish to discuss anything further.

Yours faithfully,

Glen Gallagher BScApp(Env Sc)(Hons) MEIANZ CPESC
Principal Environmental Scientist | Gallagher Environmental

STANDARD LIMITATIONS

Gallagher Environmental

Dispersive Soil Management Plan (DSMP): Carseldine Urban Village: Stages 1- 4 & Stage V

Client: Economic Development Queensland
C/- Calibre Group

Report No: GE20.025.R1

Date: 22nd April 2020

CPESC ENVIROCERT

ENVIRONMENT INSTITUTE OF AUSTRALIA AND NEW ZEALAND

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DOCUMENT CONTROL

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Job No.	GE20.025
Document No:	GE20.025.R1.doc
Title:	Dispersive Soil Management Plan (DSMP): Carseldine Urban Village Stages 1 – 4 & Stage V
Project Manager:	Glen Gallagher
Qualifications:	BScApp(EnvSc)(Hons) MEIANZ CPESC
Client:	C/- Calibre Group
Client Contact:	Mr. Daniel Collins
Synopsis:	A detailed DSMP providing site-specific management protocols for the construction phase of the development.

REVISION & CHECKING HISTORY

Revision Number	Date	Issued by	Signature
Original	22 April 2020	G Gallagher	GGallagher

DISTRIBUTION

Destination	Revision		
	Original	-	-
Calibre Group	1		
GE Database	1		

LIMITATIONS

This report has been prepared for the sole use of the client and the client's immediate representatives and agents. Third parties (excluding regulatory agencies assessing an application in relation to the purpose) shall not rely on this report. It is fundamental in the application of this report that the report, including appendices, is read in its entirety and fully understood. Please contact Gallagher Environmental for additional explanation if any of the report content is not fully understood.

This report is not a guarantee that the site conditions will behave in accordance with the interpretation set out herein, but rather our opinion as to the correct interpretations based on the results of desktop review, site investigations, in situ testing and/or laboratory testing in accordance with generally accepted consulting practice. To the best of our knowledge, information contained in this report is accurate at the date of issue. The interpretation of scientific data, however, often involves both professional and subjective judgments. As such, interpretation is open to error. In addition, site conditions are subject to change in a limited time and there remains a risk that the site conditions will differ from these interpretations. Gallagher Environmental waives all responsibility for loss or damage where information provided by the Client (including third parties) used in the preparation of this report was inaccurate or in error.

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APPENDIX A: BORELOGS

APPENDIX B: LABORATORY RESULTS

1. INTRODUCTION

1.1 DSMP Overview

Gallagher Environmental (GE) was commissioned C/- Calibre Group to prepare a Dispersive Soil Management Plan (DSMP) for the proposed 'Carseldine Urban Village – Stages 1 – 4 & Stage V' development located at Beams Road, Carseldine.

The purpose of the assessment is to define the overall soil dispersion risk of the site soils and to provide appropriate management principles where required in order to ensure that earthworks do not cause land degradation, and to mitigate effects on the built environment from soil dispersion as a consequence of soil disturbance.

The report is divided into sections describing: the physical characteristics of the site; a review of detailed laboratory results, an assessment of the soil dispersion potential, and where required, subsequent management strategies to be employed during the construction phase of the development.

1.2 Scope of Study

The scope of the study included:

- The logging, sampling and laboratory analysis of samples recovered from five (5) boreholes and additional grab samples for the purposes of soil dispersion hazard testing;
- A detailed site inspection of the proposed development area by qualified GE staff;
- The detailed interpretation and analysis of the data obtained and comment on relevant recommendations.

Furthermore, the investigation, field and laboratory testing and interpretation were carried out in general accordance with the following documents and standards:

- 'Implementation Guideline No. 28 Dispersive Soils Management' (ICC, 2016);
- Best Practice Erosion & Sediment Control - Books 1, 2 & 3 (IECA, 2008);
- Australian Soil & Land Survey Field Handbook (McDonald et. al., 1998);
- AS1289 Testing of Soils for Engineering Purposes; and
- Australian Soil Classification (Isbell, 2016).

1.3 Objectives

The specific objectives of the assessment were as follows:

- To undertake field survey and establish the soil types within the investigation area;
- To define the overall soil dispersion hazard of the site soils using desktop, field and laboratory analysis; and
- To provide specific strategies for the management of dispersive soils during the construction phase of the development and for inclusion with bulk earthwork/engineering and ESC plans, where required.

1.4 DSMP Amendments

The DSMP is a flexible document that shall be modified in the event that site conditions change significantly from those considered within the DSMP and as site knowledge and site construction and engineering experience allows.

In the event that a monitoring program detects a notable failure to achieve the required DSMP objectives, the source of the failure shall be appropriately investigated, including engagement of a suitably-qualified professional (e.g. CPESC; RPEQ) where required, and the DSMP suitably modified to ensure incidents do not recur.

2. METHODOLOGY

A detailed field inspection was undertaken by a qualified Environmental Scientist on 7.04.20 and a total of five (5) boreholes drilled within the site area using solid flight hand auger equipment. Sampling from all examined profiles was undertaken within each major soil horizon (i.e. texture change) encountered and bore logging undertaken in accordance with the Australian Soil Classification (ASC, 2016). In addition, four (4) samples were taken from existing soil stockpiles on-site. The site plan detailing the sampling locations is provided in Drawing No. GE20.025.D1.

Laboratory analysis was subsequently undertaken on representative samples in order to define soil dispersion potential and soil electro-chemistry in accordance with the following Australian Standards:

- Emerson Class Number in accordance with AS1289 3.8.1; and
- pH and Electrical Conductivity (Raymont & Lyons, 2010).

Table 2.1 Testing Regime

Testing Regime	Number of tests
Soil Profile Assessment	5 profiles + 4 grab samples
Emerson Class	14
Soil pH	14
Soil Electrical Conductivity (EC)	14
Exchangeable Sodium Percentage (ESP)	2

Qualified GE staff undertook Emerson Class, pH and Electrical Conductivity testing on representative samples.

Two (2) representative samples were dispatched to ALS Laboratories, Stafford, Brisbane for the additional chemical analysis, including ESP. The laboratory certificates are contained in Appendix B.

3. SITE DESCRIPTION & PHYSICAL CHARACTERISTICS

3.1 General Overview

The site is located within the former QUT Carseldine Campus and contains several multi-storey buildings and sporting fields. The proposed residential and mixed-use development is approximately 11ha and shall include extensive cut to fill bulk earthworks, the construction of an internal road network and the installation of services (e.g. stormwater; sewer).

3.2 Slopes & Drainage

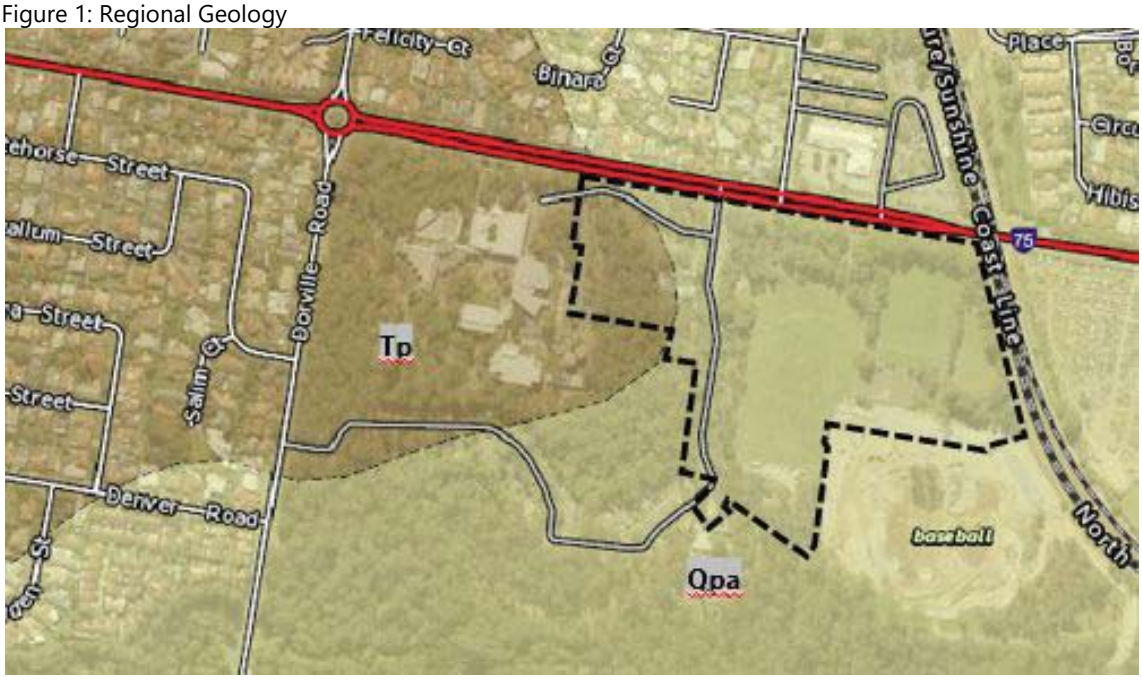
In accordance with the *'Australian Soil & Land Survey Field Handbook (1998)'*, the majority of the contains a flat to very gently inclined topography with slope magnitudes predominantly ranging between approximately 0% and 1%. However steeper slopes are located within the far western portion of the site, incusing slopes in the 5 – 15% range. The majority of the site grades towards the east and southeast of the development site.

3.3 Geology

Based on the Department of Mines 1:100,000 geological series maps, the site contains two (2) lithologies, detailed as follows and also displayed in Figure 1 below: :

- Qpa -'Quaternary (Pleistocene) Alluvial Plains' consisting of ' clay, silt, sand, gravel'; and
- Tp -'Petrie Formation' that comprises 'mudstone, shale, sandstone, oilshale and minor pebble/cobble conglomerate ' dating to Tertiary Period;

Figure 1: Regional Geology



3.4 Detailed Site Inspection

A site inspection was undertaken by GE staff on 8.04.20 in order to examine the site soils and investigate any areas of active erosion, or evidence of dispersive soils. The site inspection of the general areas of the site revealed a stable, generally non-eroded land surface with intact topsoil cover and moderate to profuse grass surface cover (refer Plate 1 & 2).

Plate 1: Stable land surface of the general site areas (i.e. intact topsoil cover)

Plate 2: Stable land surface of the general site areas (i.e. intact topsoil cover)

3.5 Soil Profiles

According to the ASRIS soil database, the development area is situated in the Dermosol soil order, in accordance with the Australian Soil Classification (ASC, 2016). Based on the GE field and laboratory assessment, the site confirmed the presence of Dermosols. For reference purposes, the general soil dispersion likelihood of the various soil orders contained within the Australian Soil Classification (ASC, 2016) is shown in Table 3.1 below.

Table 3.1 General Soil Dispersion Risk of ASC Soil Orders

ASC Soil Order	Soil Horizon	General Soil Dispersion Likelihood
Sodosol	A (topsoil)	Low
	B (subsoil)	Very High
Dermosol	**A (topsoil)**	**Low**
	B (subsoil)	**Low - Moderate**
Hydrosol	A (topsoil)	Low - Moderate
	B (subsoil)	Low - Moderate
Vertosol (sedimentary/alluvial)	A (topsoil)	Moderate
	B (subsoil)	Moderate - High
Vertosol (basalt)	A (topsoil)	Very Low
	B (subsoil)	Low
Kurosol	A (topsoil)	Very Low
	B (subsoil)	Low - Moderate
Chromosol	A (topsoil)	Very Low
	B (subsoil)	Low - Moderate
Kandosol / Tenosol / Rudosol / Podosol	A (topsoil)	Very Low
	B (subsoil)	Low

A brief description of the characteristics of the identified soil orders are also given below and bore logs are included in Appendix A.

3.5.1 Dermosols

Dermosols are soils that do not exhibit a clear or abrupt textural B horizon and also exhibits a structure grade in the B2 horizon that is greater than weak. These soils were associated with all boreholes and were generally characterised by a sandy loam to sandy clay loam A1 horizon overlying a clay loam to light clay B2 horizon.

4. LABORATORY RESULTS

Laboratory results undertaken in order to define soil dispersion potential are shown in the following table and discussed in the following sections. The laboratory certificates are attached in Appendix B.

Table 4.1 Dispersion Hazard Test Results

Soil Type	Sample #	Emerson Class	pH	ECe (dS/m)	ESP (%)	Interpretation
A Horizon (topsoil)	BH1 – 0.0m	7	5.6	0.3		Moderately Acidic pH Non-saline Non-sodic Emerson Class: – Very Low Risk **Overall Very Low Dispersion Risk**
	BH2 – 0.0m	7	5.5	0.4	4.9	
	BH3 – 0.0m	7	5.4	0.3		
	BH4 – 0.0m	7	5.6	0.5		
	BH5 – 0.0m	7	5.9	0.7		
B Horizon (subsoils)	BH1 – 0.7m	5	5.7	0.5		Moderately Acidic pH Non-saline Non-sodic Emerson Class: Low Risk **Overall Low Dispersion Risk**
	BH2 – 0.7m	6	5.9	0.5		
	BH3 – 0.8m	5	5.7	0.3	4.3	
	BH4 – 0.6m	5	5.7	0.3		
	BH5 – 0.5m	5	5.8	0.4		
Stockpiles (subsoils)	GS1	5	5.5	0.5		
	GS2	5	5.6	0.2		
	GS2	6	5.9	0.4		
	GS4	5	5.6	0.3		

Key - Subsoils

- Emerson Class 1 or 2 – High to Very High Risk
- Emerson Class 3 – Moderate Risk
- Emerson Class ≥4 – Very Low to Low Risk

Gallagher Environmental
Soil Water Environment
ABN 56 493 696 583
59 Cremorne Rd Kedron Qld 4031
glen@genviro.com.au

TITLE: Borehole/Sampling Locations			DRAWING NO.: GE20.025.D1
JOB LOCATION: Carseldine Urban Village – Stages 1 – 4 & Stage V			SCALE: As Shown
CLIENT: C/- Calibre Group	DATE: 22.04.20	DRAWN: GMG	SIGNED: GLEN GALLAGHER CPESC NO. 8346

4.1 Discussion

4.1.1 Emerson Class Tests

An Emerson number of 1 indicates a strongly dispersive soil, an Emerson number of 2 indicates a high risk of significant soil dispersion; an Emerson number of 3 indicates a moderate risk of significant soil dispersion (but low risk of tunneling); whilst an Emerson number ranging between 4 and 8 indicates a soil with low to negligible dispersion tendencies.

Emerson Class testing undertaken on five (5) topsoil (i.e. A horizon) samples revealed Class 7 characteristics indicating a very low soil dispersion risk.

Emerson Class testing undertaken on nine (9) subsoil (i.e. B horizon) samples revealed Class 5– 6 characteristics indicating a low soil dispersion risk. These results are also not considered to exhibit any significant risk of sub-surface tunneling.

4.1.2 Soil pH

Soil pH is a secondary indicator in the estimation of soil dispersion hazard; where significantly alkaline pH values (e.g. pH >8.0) can indicate a higher risk of soil sodicity and subsequent soil dispersion. Conversely, strongly acidic samples (i.e. pH <5.5) can indicate high bio-available aluminum that can help counter-act soil dispersion tendencies of sodium ions in the soil.

The obtained topsoil (i.e. A horizon) pH values of 5.4 – 5.9 (median of 5.6) and subsoil pH values of 5.5 – 5.9 (median of 5.7) are indicative of generally moderately acidic pH levels which do not indicate any significant increase or decrease in relative soil dispersion risk.

4.1.3 Soil Salinity

Soil salinity reflects the relationship between landscape hydrology, geology, soil properties and vegetation. Soil salinity is also secondary indicator in the estimation of soil dispersion hazard.

Soils with mildly saline values (or relatively higher values to comparison soils) can sometimes indicate higher levels of sodium and therefore can indicate a higher risk of soil sodicity and subsequent soil dispersion.

Conversely, significantly high salinity levels have a mitigating effect on soil dispersion, as the actual soil dispersion risk is determined by the relative balance of sodium in relation to chloride levels within saline soils. Saline soils can often be sodic, but these soils will not show indicators of sodicity. The salts in the soil prevent dispersion of soil particles in high enough concentrations. If this salt level falls below the requirement for soil stability even a small amount of sodium can produce adverse effects. A combination of high sodium levels and low salt will produce extremely poor physical conditions in soils.

Soils that exhibit an EC_E <4 mS/cm are considered to be non-saline. The soil salinity classes are shown in Table 4.2 below.

Table 4.2: Salinity classes of soils (after Richards, 1954)

Class		EC_e (dS/m)	Comments
Non-saline	None	<2	Salinity effects mostly negligible
	Slight	2 – 4	Yields of very sensitive crops may be affected
Saline	Moderate	4 – 8	Yields of many crops affected
	Very	8 – 16	Only tolerant crops yield satisfactorily
	High	>16	Only a few very tolerant crops yield satisfactorily

The calculated EC_e (saturated) values for the topsoil and subsoil materials ranged between 0.3 – 0.7 dS/m (median of 0.4 dS/m) indicating that these materials are non-saline and would not receive significant benefit from flocculation due to inherent salinity levels.

4.1.4 Soil Sodicity (ESP)

Soil Sodicity is a measure of exchangeable sodium in relation to other exchangeable cations. It is expressed as the Exchangeable Sodium Percentage (ESP). The common problems that may be encountered with sodic soils are synonymous with dispersive soils: lower hydraulic conductivity (i.e. water logging), higher susceptibility to tunnel erosion and severe gully erosion, poor aeration and reduction in plant-available water capacity and poor leaching (i.e. accumulation of salts).

The tendency for dispersion usually increases with increasing ESP. Sodic soil layers (ESP ≥6) may disperse and strongly sodic soils (ESP ≥15) usually do. The Australian sodicity classifications are provided in Table 4.3 below:

Table 4.3: Sodicity classes of soils

Sodicity Classification	ESP (%)
Non-sodic	≤6
Sodic	6 – 15
Strongly sodic	> 15

Source: DPI (1993)

The Exchangeable Sodium Percentage (ESP) of the representative topsoil and subsoil samples were 4.9% and 4.3% respectively, indicating non-sodic soils.

4.2 Overall Soil Dispersion Risk

On the basis of the site inspection, investigated soil profiles and detailed laboratory results, it is considered that the soil dispersion risk and subsequent management requirements for the proposed development can be defined as follows:

4.2.1 Topsoil (0 – 150mm below natural NSL) – Very Low Risk

It is considered that the topsoil materials exhibit an overall *very low* soil dispersion risk and shall not require specific soil amelioration to mitigate soil dispersion risk during the construction phase.

However, all topsoil materials used in landscaping/stabilisation areas shall be suitably ameliorated where required (e.g. fertiliser) to promote optimum grass establishment. As per standard practice, all landscaping/stabilisation areas shall be monitored for suitable strike/cover to ensure compliance with the site ESCP requirements and on-maintenance requirements.

4.2.2 Subsoil (>150mm below natural NSL) – Low Risk

It is considered that the subsoil materials exhibit an overall *low* dispersion risk and are also not considered to exhibit a significant risk of sub-surface tunneling. Consequently, these materials shall not require specific soil amelioration (e.g. gypsum treatment) during the construction phase to mitigate soil dispersion risk.

As per standard practice, all disturbed subsoils shall require soil compaction to the project geotechnical requirements and all subsoils exposed during the construction phase shall be covered with hardstand or non-dispersive topsoil materials and appropriately revegetated in accordance with a Landscape Management Plan (or similar).

5. DISPERSIVE SOIL MANAGEMENT PLAN

Responsibility	Civil Contractor; Developer

Operational Policy	• To mitigate the incidence of infrastructure damage and environmental harm resulting from tunnel and subsurface erosion. • To ensure the appropriate management of water quality in order to avoid impacts on the downstream environment.
Performance Criteria	All areas of landscaping/rehabilitation shall attain suitable grass strike/cover to ensure compliance with the site ESCP requirements and on-maintenance requirements. All fill materials shall be suitably compacted to geotechnical requirements.
Implementation Strategy	**Topsoil Materials** 1. A high level of care shall be required during delineation of the site topsoil and subsoil materials in areas of subsoil dispersion risk and in order to ensure the soil texture of stripped topsoil materials in all areas is of suitable texture (i.e. clay content <35%). 2. Topsoil shall be stripped prior to bulk earthworks within the immediate construction stages and shall be stockpiled and shaped in a free draining condition to avoid long-term soil saturation. 3. All topsoils materials used in landscaping/stabilisation shall be suitably ameliorated where required (e.g. fertiliser) to promote grass establishment. 4. All landscaping/stabilisation areas shall be visually monitored for suitable strike/cover to ensure compliance with the site ESCP requirements and on-maintenance requirements. **Subsoil Materials** ***General*** 1. All exposed subsoil materials during earthwork activities shall be covered with hardstand or topsoil materials to a minimum depth of 150mm and appropriately revegetated in accordance with a Landscape Management Plan (or similar). 2. All excavated subsoil materials used for site fill shall be adequately compacted to an appropriate Geotechnical Specification – with a minimum 95% compaction requirement in accordance with AS3798 and subsequently verified to project-specific geotechnical requirements. ***Trench Excavations*** 3. All excavated and backfilled materials associated with service excavations shall be adequately compacted to an appropriate Geotechnical Specification – with a minimum 95% compaction requirement in accordance with AS3798 and subsequently verified to project-specific geotechnical requirements.

<table>
<tr><td></td><td>Import Materials

4. Any import soil materials (fill or topsoil) shall be verified non-dispersive soils, as confirmed and appropriately documented by the supplier.

5. In the absence of the above, all import soil materials shall be tested and verified by a suitably qualified and experienced Environmental Consultant. If soil amelioration is required for import materials, an addendum DSMP Report shall be prepared by a suitably qualified and experienced Environmental Consultant.</td></tr>
<tr><td>Monitoring Requirements</td><td>Topsoil Materials

Topsoil materials ameliorated to promote revegetation/rehabilitation shall undergo testing at the following testing rates, with interpretation and recommendations provided from a qualified Environmental Consultant:

<table><tr><th>Material</th><th>Parameter</th><th>Validation Testing Frequency</th></tr><tr><td>Topsoil
(A horizon)</td><td>Soil pH;
Macro-nutrients
(N, P, K, Ca, Mg, S)</td><td>One (1) composite sample per development phase</td></tr></table></td></tr>
<tr><td>Reporting Requirements</td><td>All soil test results shall be made available to the Superintendent and Statutory Authorities upon request.</td></tr>
<tr><td>Incident Identification</td><td>Topsoil validation test results not meeting the specified criteria.

Failure to adhere to the prescribed treatment methods as stated above.

Evidence of sub-surface tunnelling/erosion.</td></tr>
<tr><td>Contingency Procedures</td><td>Review of control measures in consultation with Environmental Consultant.

The re-application of topsoil ameliorants in consultation with the Environmental Consultant.

The use of modified sand blocks/barriers or shrouds in trench excavations.</td></tr>
<tr><td>ESCP Integration</td><td>The soil dispersion results presented in the DSMP shall be utilised/considered to develop the Erosion and Sediment Control Plan (ESCP).</td></tr>
</table>

6. DSMP CERTIFICATION

This DSMP assessment has been prepared by Glen Gallagher, Environmental (Soil & Water) Scientist and Certified Professional in Erosion & Sediment Control (CPESC) No. 8346.

Please feel free to contact Gallagher Environmental on 0438 724 929 or glen@genviro.com.au for any queries or if further elaboration is required.

Yours faithfully,

Glen Gallagher BScApp(Env Sc)(Hons) MEIANZ CPESC
Principal | Gallagher Environmental

APPENDIX A:
BORE LOGS

Gallagher Environmental
Soil Water Environment

PROFILE: BH1

CLIENT :	C/- CALIBRE GROUP	ELEVATION :	-
ADDRESS :	BEAMS RD	DEPTH : 0.8m NSL	
SUBURB:	CARSELDINE	BIT TYPE: -	
JOB NO :	GE20.025	DRILLER : GG	
DATE :	8.04.20	LOGGER : GG	

Depth (m NSL)	Depth (m AHD)	Groundwater	Graphic Log	ASC CLASSIFICATION: DERMOSOLS SOIL /ROCK MATERIAL DESCRIPTION	Moisture	DCP (blows)	Emerson Class
0				**SANDY LOAM** - greyish brown, occ organics *- gradual change to:*	D		7
0.5				**CLAY LOAM** grey & orange, mod. structure	D		5
1.0				Observation Terminated			
1.5							

Steady Level Groundwater Groundwater During Drilling

Gallagher Environmental
Soil Water Environment

PROFILE: BH2

CLIENT :	C/- CALIBRE GROUP	ELEVATION :	-
ADDRESS :	BEAMS RD	DEPTH : 0.8m NSL	
SUBURB:	CARSELDINE	BIT TYPE: -	
JOB NO :	GE20.025	DRILLER : GG	
DATE :	8.04.20	LOGGER : GG	

Depth (m NSL)	Depth (m AHD)	Groundwater	Graphic Log	ASC CLASSIFICATION: DERMOSOLS SOIL /ROCK MATERIAL DESCRIPTION	Moisture	DCP (blows)	Emerson Class
0				**SANDY LOAM** - greyish brown, occ organics *- gradual change to:*	D		7
0.5				**SANDY LIGHT CLAY** grey & orange, mod. structure	D		6
1.0				Observation Terminated			
1.5							

Steady Level Groundwater Groundwater During Drilling

Gallagher Environmental
Soil Water Environment

PROFILE: BH3

CLIENT :	C/- CALIBRE GROUP	ELEVATION :	-
ADDRESS :	BEAMS RD	DEPTH : 0.8m NSL	
SUBURB:	CARSELDINE	BIT TYPE: -	
JOB NO :	GE20.025	DRILLER : GG	
DATE :	8.04.20	LOGGER : GG	

Depth (m NSL)	Depth (m AHD)	Groundwater	Graphic Log	ASC CLASSIFICATION: DERMOSOLS SOIL /ROCK MATERIAL DESCRIPTION	Moisture	DCP (blows)	Emerson Class
0				**LOAM** - greyish brown, occ organics *- gradual change to:*	D		7
0.5				**CLAY LOAM** grey & orange, mod. structure	D		5
1.0				Observation Terminated			
1.5							

Steady Level Groundwater Groundwater During Drilling

Gallagher Environmental
Soil Water Environment

PROFILE: BH4

CLIENT :	C/- CALIBRE GROUP	ELEVATION :	-
ADDRESS :	BEAMS RD	DEPTH : 0.7m NSL	
SUBURB:	CARSELDINE	BIT TYPE: -	
JOB NO :	GE20.025	DRILLER : GG	
DATE :	8.04.20	LOGGER : GG	

Depth (m NSL)	Depth (m AHD)	Groundwater	Graphic Log	ASC CLASSIFICATION: DERMOSOLS SOIL /ROCK MATERIAL DESCRIPTION	Moisture	DCP (blows)	Emerson Class
0				**LOAM** - greyish brown, occ organics *- gradual change to:*	D		7
0.5				**CLAY LOAM** grey & red/orange, mod. structure	D		5
				Observation Terminated			
1.0							
1.5							

Steady Level Groundwater Groundwater During Drilling

Gallagher Environmental
Soil Water Environment

PROFILE: BH5

CLIENT :	C/- CALIBRE GROUP	ELEVATION :	-
ADDRESS :	BEAMS RD	DEPTH : 0.7m NSL	
SUBURB:	CARSELDINE	BIT TYPE: -	
JOB NO :	GE20.025	DRILLER : GG	
DATE :	8.04.20	LOGGER : GG	

Depth (m NSL)	Depth (m AHD)	Groundwater	Graphic Log	ASC CLASSIFICATION: DERMOSOLS SOIL /ROCK MATERIAL DESCRIPTION	Moisture	DCP (blows)	Emerson Class
0				**SANDY CLAY LOAM** - greyish brown, occ organics *- gradual change to:*	D		7
0.5				**CLAY LOAM SANDY** grey & red/orange, mod. structure	D		5
				Observation Terminated			
1.0							
1.5							

Steady Level Groundwater Groundwater During Drilling

APPENDIX B:
LABORATORY RESULTS

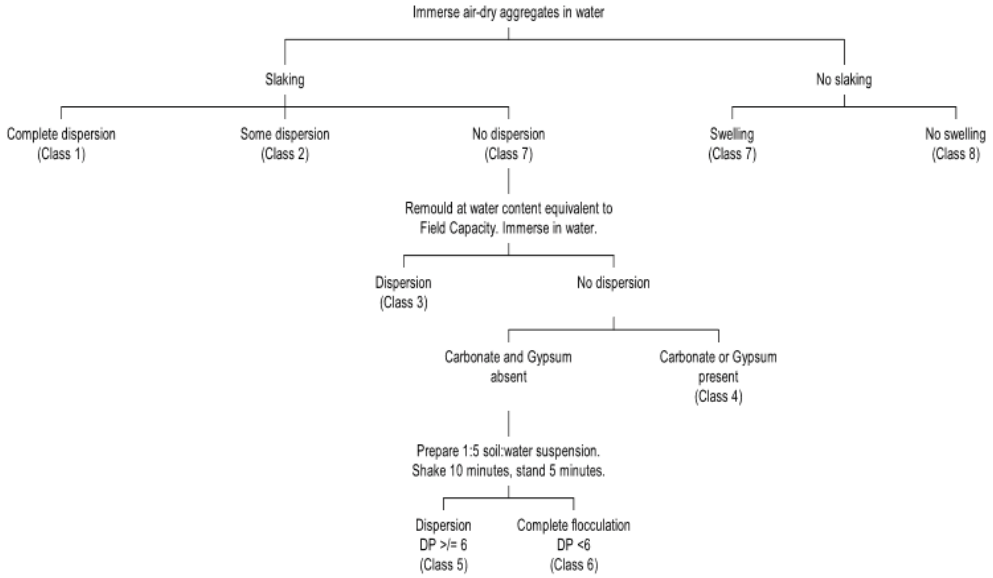
Gallagher Environmental
Soil Water Environment

CLIENT : C/- CALIBRE GROUP
ADDRESS : BEAMS RD CARSELDINE
JOB NO : GE20.025
TEST DATE: 10.04.20
WATER: DISTILLED

Emerson Class Test Certificate

(Method: AS1289 3.8.1)

Figure 1. Determining the Emerson Class Number of Aggregates



Sample	Emerson Class
BH1: 0.0m	7
BH2: 0.0m	7
BH3: 0.0m	7
BH4: 0.0m	7
BH5: 0.0m	7
BH1: 0.7m	5
BH2: 0.7m	5
BH3: 0.8m	6
BH4: 0.6m	5
BH5: 0.5m	5
GS1	5
GS2	5
GS3	6
GS4	5

Glen Gallagher CPESC No. 8346

Gallagher Environmental
Soil Water Environment

CLIENT : C/- CALIBRE GROUP
ADDRESS : BEAMS RD CARSELDINE
JOB NO : GE20.025
TEST DATE: 10.04.20
WATER: DISTILLED

pH & Electrical Conductivity (EC)
Test Certificate

(*Soil Chemical Methods - Rayment & Lyons, 2010*)

Sample	$pH_{1:5}$	$EC_{1:5}$ (dS/m)	Texture Factor	Estimated Ece
BH1: 0.0m	5.6	0.02	14	0.3
BH2: 0.0m	5.5	0.03	14	0.4
BH3: 0.0m	5.4	0.02	14	0.3
BH4: 0.0m	5.6	0.04	14	0.5
BH5: 0.0m	5.9	0.05	14	0.7
BH1: 0.7m	5.7	0.05	9	0.5
BH2: 0.7m	5.9	0.06	8	0.5
BH3: 0.8m	5.7	0.03	9	0.3
BH4: 0.6m	5.7	0.03	9	0.3
BH5: 0.5m	5.8	0.04	9	0.4
GS1	5.5	0.05	9	0.5
GS2	5.6	0.02	8	0.2
GS3	5.9	0.04	9	0.4
GS4	5.6	0.03	9	0.3

Glen Gallagher CPESC No. 8346

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **EB2009892**	Page	: 1 of 3
Client	: **GALLAGHER ENVIRONMENTAL**	Laboratory	: Environmental Division Brisbane
Contact	: MR GLEN GALLAGHER	Contact	: Customer Services EB
Address	: 59 CREMORNE ROAD KEDRON BRISBANE QUEENSLAND 4031	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: ----	Telephone	: +61-7-3243 7222
Project	: 20/025 CARSELDINE VILLAGE	Date Samples Received	: 08-Apr-2020 15:40
Order number	: ----	Date Analysis Commenced	: 14-Apr-2020
C-O-C number	: ----	Issue Date	: 20-Apr-2020 08:56
Sampler	: GLEN GALLAGHER		
Site	: ----		
Quote number	: EN/333		
No. of samples received	: 2		
No. of samples analysed	: 2		

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Kim McCabe	Senior Inorganic Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD
Satishkumar Trivedi	Senior Acid Sulfate Soil Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- ALS is not NATA accredited for the analysis of Exchangeable Aluminium and Exchange Acidity in soils when performed under ALS Method ED005.
- ALS is not NATA accredited for the analysis of Exchangeable Cations on Alkaline Soils when performed under ALS Method ED006.
- ED007 (Exchangeable Cations by ICP-AES): Unable to calculate Magnesium/Potassium Ratio for some samples as required Exchangeable Magnesium and/or Potassium results are less than the limit of reporting.
- ED007 and ED008: When Exchangeable Al is reported from these methods, it should be noted that Rayment & Lyons (2011) suggests Exchange Acidity by 1M KCl - Method 15G1 (ED005) is a more suitable method for the determination of exchange acidity (H+ + Al3+).

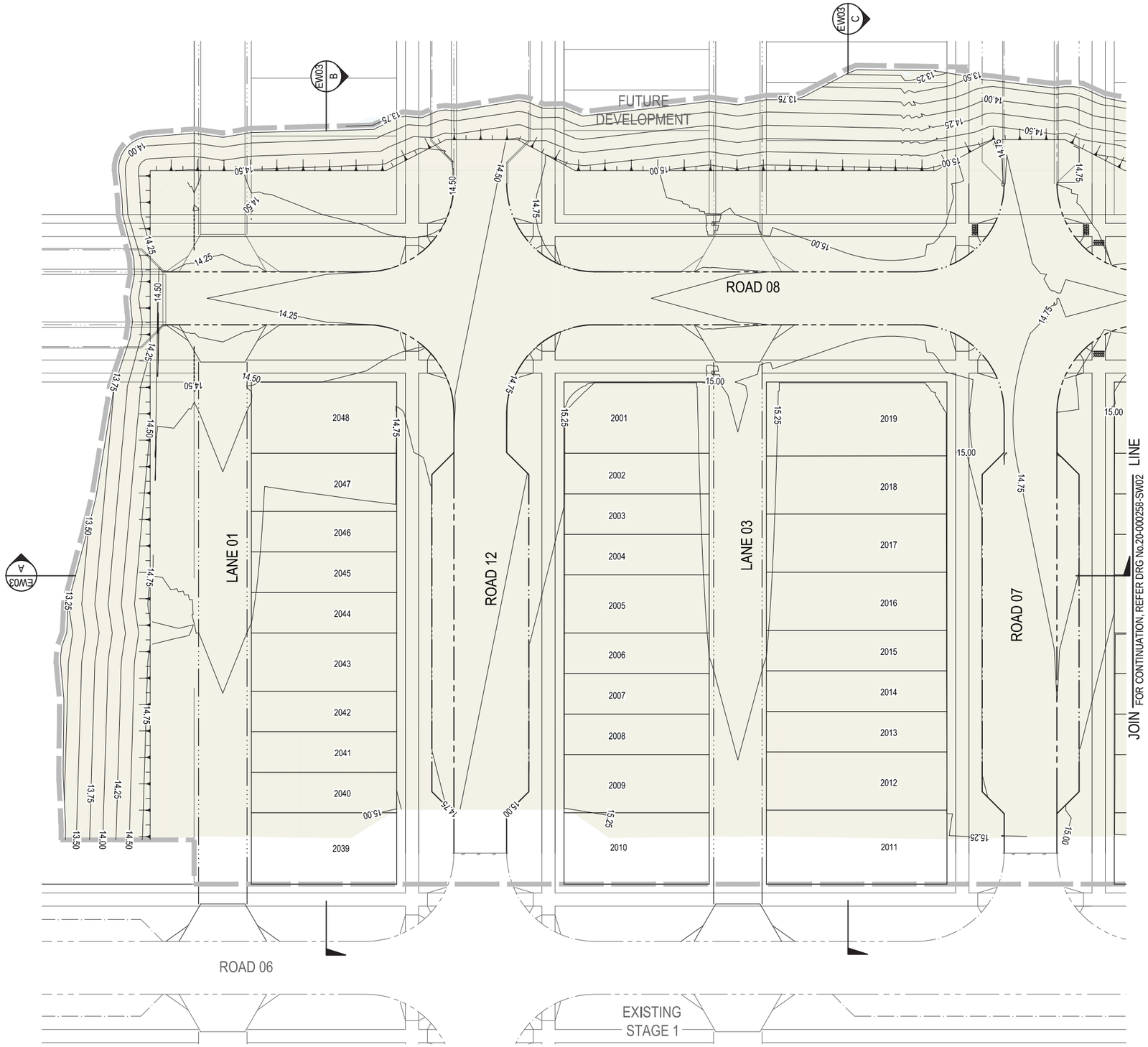
Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	BH2 0.0m	BH3 0.8m	----	----	----
			Client sampling date / time	08-Apr-2020 00:00	08-Apr-2020 00:00	----	----	----
Compound	CAS Number	LOR	Unit	EB2009892-001	EB2009892-002	--------	--------	--------
				Result	Result	----	----	----
EA002: pH 1:5 (Soils)								
pH Value	----	0.1	pH Unit	**5.4**	**5.7**	----	----	----
EA010: Conductivity (1:5)								
Electrical Conductivity @ 25°C	----	1	µS/cm	**30**	**22**	----	----	----
ED005: Exchange Acidity								
ø **Exchange Acidity**	----	0.1	meq/100g	**0.4**	**1.0**	----	----	----
ø **Exchangeable Aluminium**	----	0.1	meq/100g	**0.3**	**0.7**	----	----	----
ED007: Exchangeable Cations								
Exchangeable Calcium	----	0.1	meq/100g	**2.0**	<0.1	----	----	----
Exchangeable Magnesium	----	0.1	meq/100g	**1.5**	**2.1**	----	----	----
Exchangeable Potassium	----	0.1	meq/100g	**0.2**	<0.1	----	----	----
Exchangeable Sodium	----	0.1	meq/100g	**0.2**	**0.3**	----	----	----
Cation Exchange Capacity	----	0.1	meq/100g	**4.4**	**7.6**	----	----	----
Exchangeable Sodium Percent	----	0.1	%	**4.9**	**4.3**	----	----	----
Calcium/Magnesium Ratio	----	0.1	-	**1.3**	<0.1	----	----	----
Magnesium/Potassium Ratio	----	0.1	-	**6.6**	**----**	----	----	----

Carseldine Village – Stage 2

Appendix G Calibre Concept Design Plans

Economic Development Queensland



NOTE:
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ECONOMIC DEVELOPMENT QUEENSLAND

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PROJECT
CARSELDINE URBAN VILLAGE
STAGE 2

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BULK EARTHWORKS
LAYOUT PLAN
SHEET 1 OF 2

PROJECT No.	DRAWING No.	REVISION
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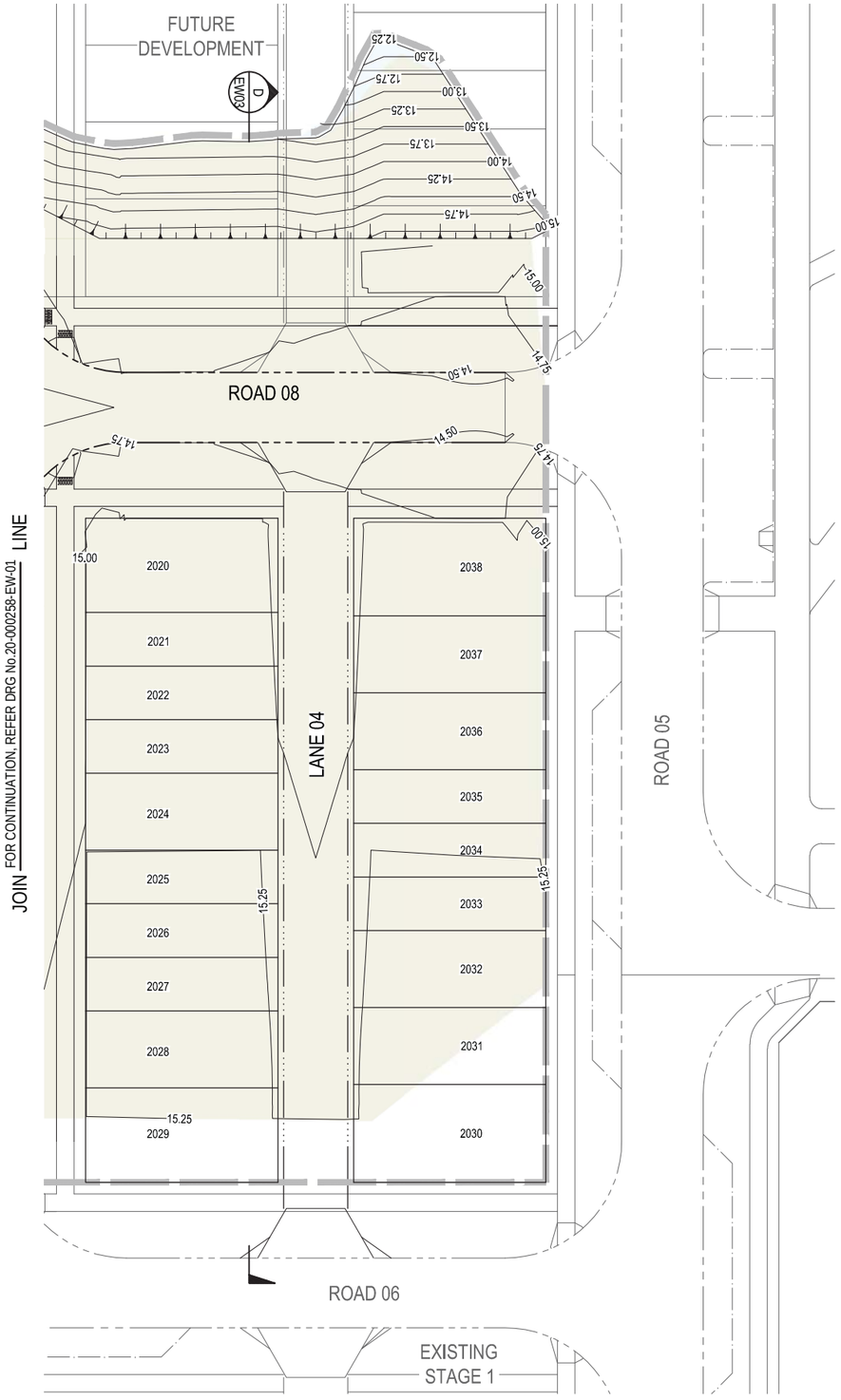

N

LEGEND

- PROPOSED STAGE BOUNDARY
- EXISTING LIDAR CONTOUR (0.50m INTERVALS) — 15.0
- DESIGN SURFACE CONTOUR (0.25m INTERVALS) — 15.0
- AREA OF CUT
- AREA OF FILL
- PROPOSED EARTHWORKS BATTER
- PROPOSED DRAIN FLOW DIRECTION
- PROPOSED BARRIER KERB ONLY TYPE 'E'
- PROPOSED BARRIER KERB & CHANNEL TYPE 'E'
- PROPOSED CONCRETE INVERT
- PROPOSED EDGE THICKENING
- PROPOSED MOUNTABLE WITH BACKING STRIP
- EXISTING TREES

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DRAWING TITLE: BULK EARTHWORKS LAYOUT PLAN SHEET 1 OF 2

PROJECT No.	DRAWING No.	REVISION
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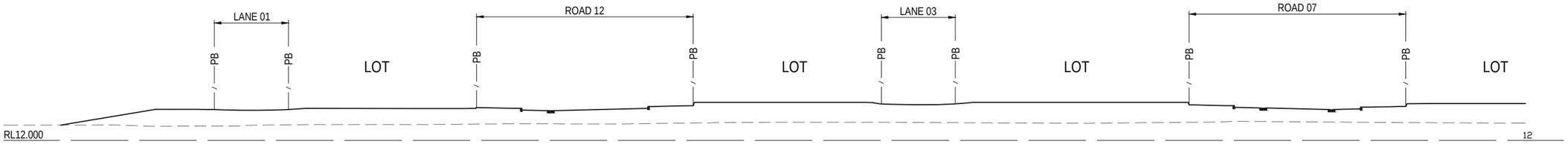

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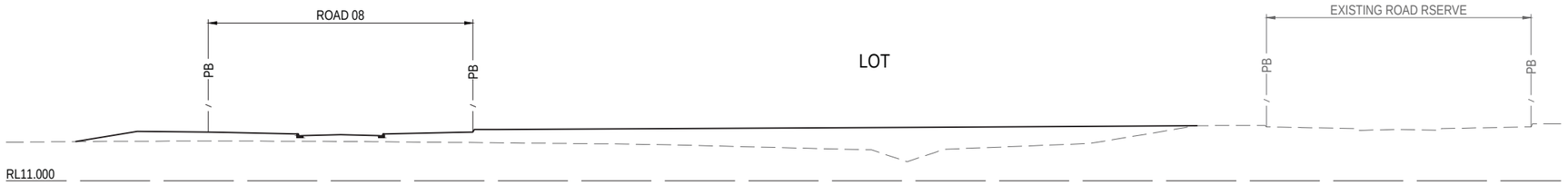

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EW01

SECTION C
SCALE (A1): 1:200
SCALE (A3): 1:400
EW01

SECTION D
SCALE (A1): 1:200
SCALE (A3): 1:400
EW01

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A1
A3

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BULK EARTHWORKS
TYPICAL SECTIONS

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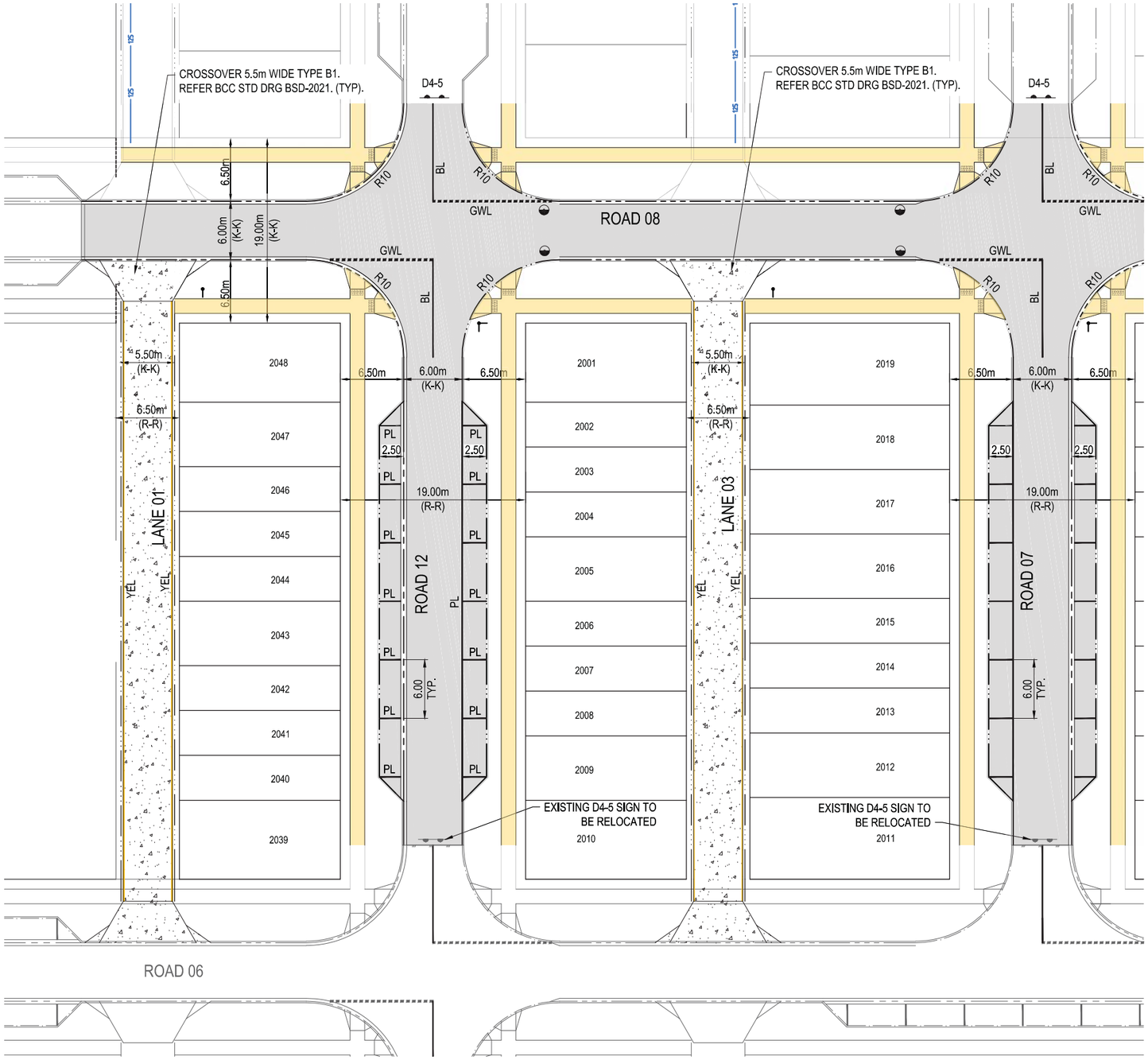

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ROAD FUNCTIONAL LAYOUT PLAN
SHEET 1 OF 2

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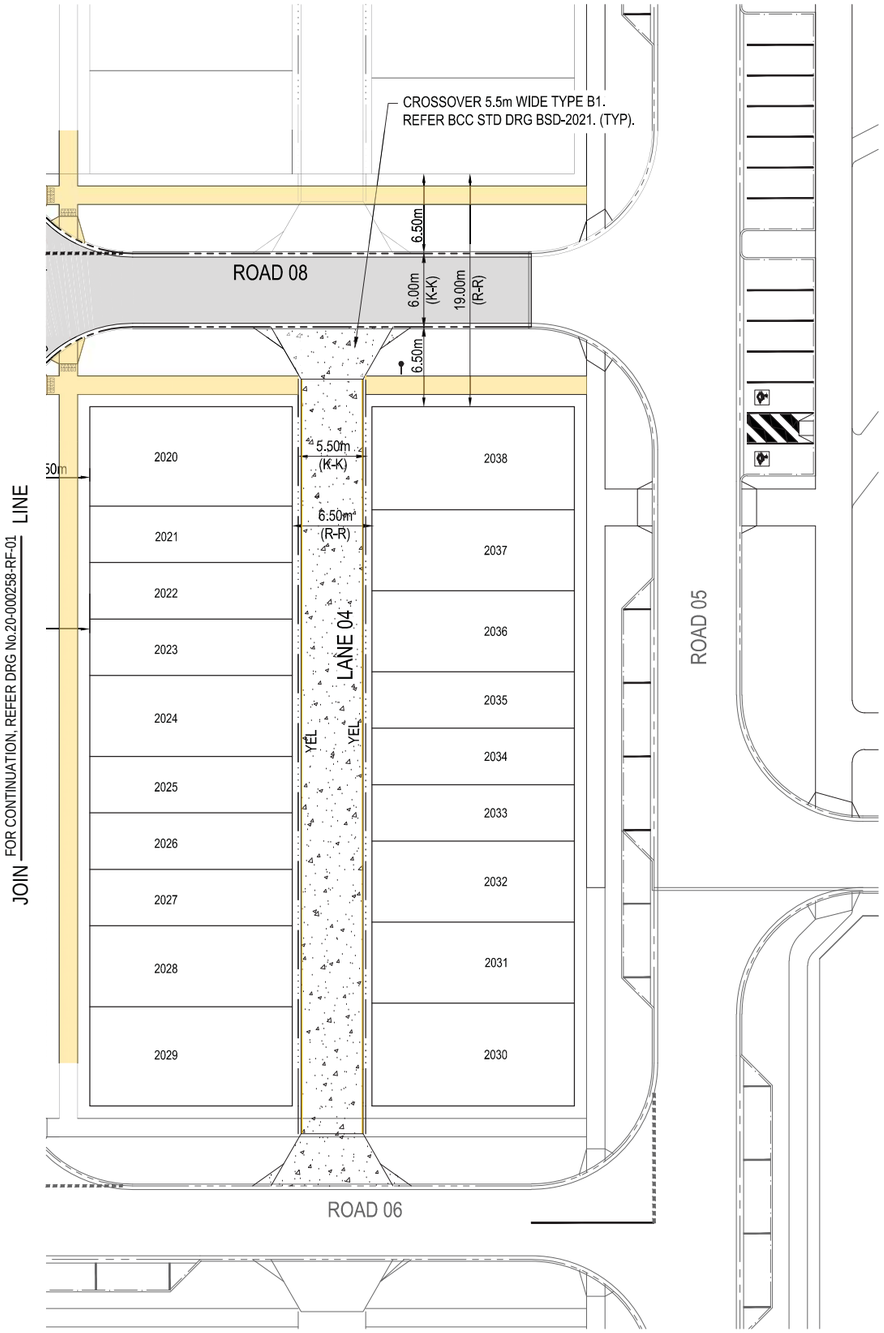

LEGEND

- PROPOSED BARRIER KERB ONLY TYPE 'E'
- PROPOSED BARRIER KERB & CHANNEL TYPE 'E'
- PROPOSED CONCRETE INVERT
- PROPOSED EDGE THICKENING
- PROPOSED MOUNTABLE WITH BACKING STRIP
- EXISTING EDGE OF BITUMEN
- KERB TRANSITION
- 25.00m (R-R) — (R-R) ROAD RESERVE
- 25.00m (K-K) — (K-K) KERB INVERT TO KERB INVERT
- PROPOSED AC SURFACING
- PROPOSED CONCRETE SURFACING
- PROPOSED 1.5m FOOTPATH
- PROPOSED TACTILE GROUND SURFACE INDICATORS

SIGN LEGEND

- SINGLE STREET NAME SIGN
- DOUBLE STREET NAME SIGN
- ROAD SIGN WITH SIGN IDENTIFIER
- DOUBLE POST SIGN

PAVEMENT MARKING LEGEND

PAVEMENT MARKINGS	LENGTH(m)	GAP(m)	WIDTH(mm)
PARKING BAY LINE (PL)	-	-	100
CONTINUITY LINE (CL)	1.0	3.0	200
UNBROKEN LANE LINE (ULL)	-	-	100
EDGE LINE (EL)	-	-	100
GIVE WAY LINE (GWL)	0.6	0.6	300
BARRIER LINE (BL)	-	-	80
SEPERATION LINE (SL)	3.0	9.0	80
YELLOW EDGE LINE (YEL)	-	-	100

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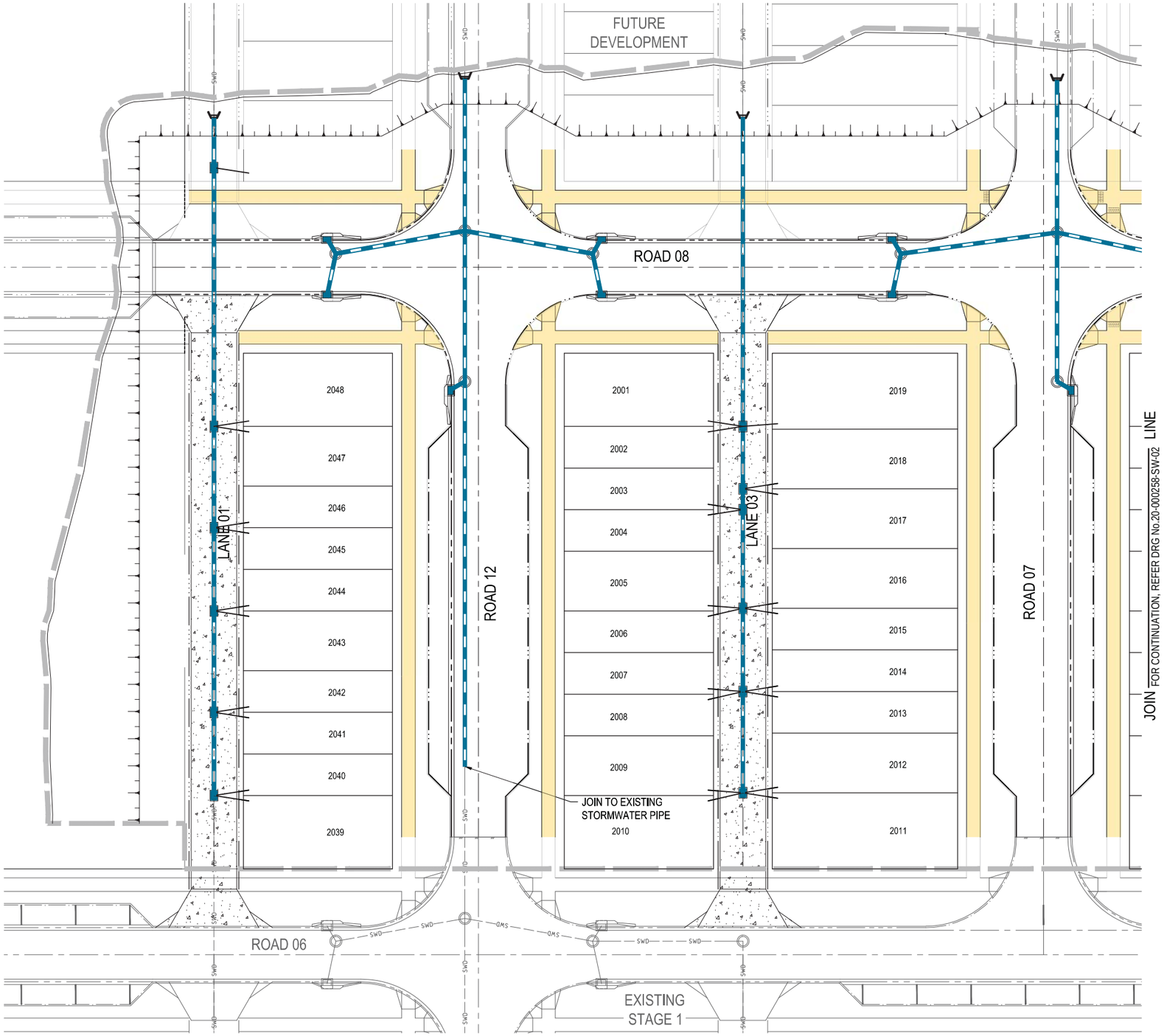

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SCALE
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5 0 5 10m
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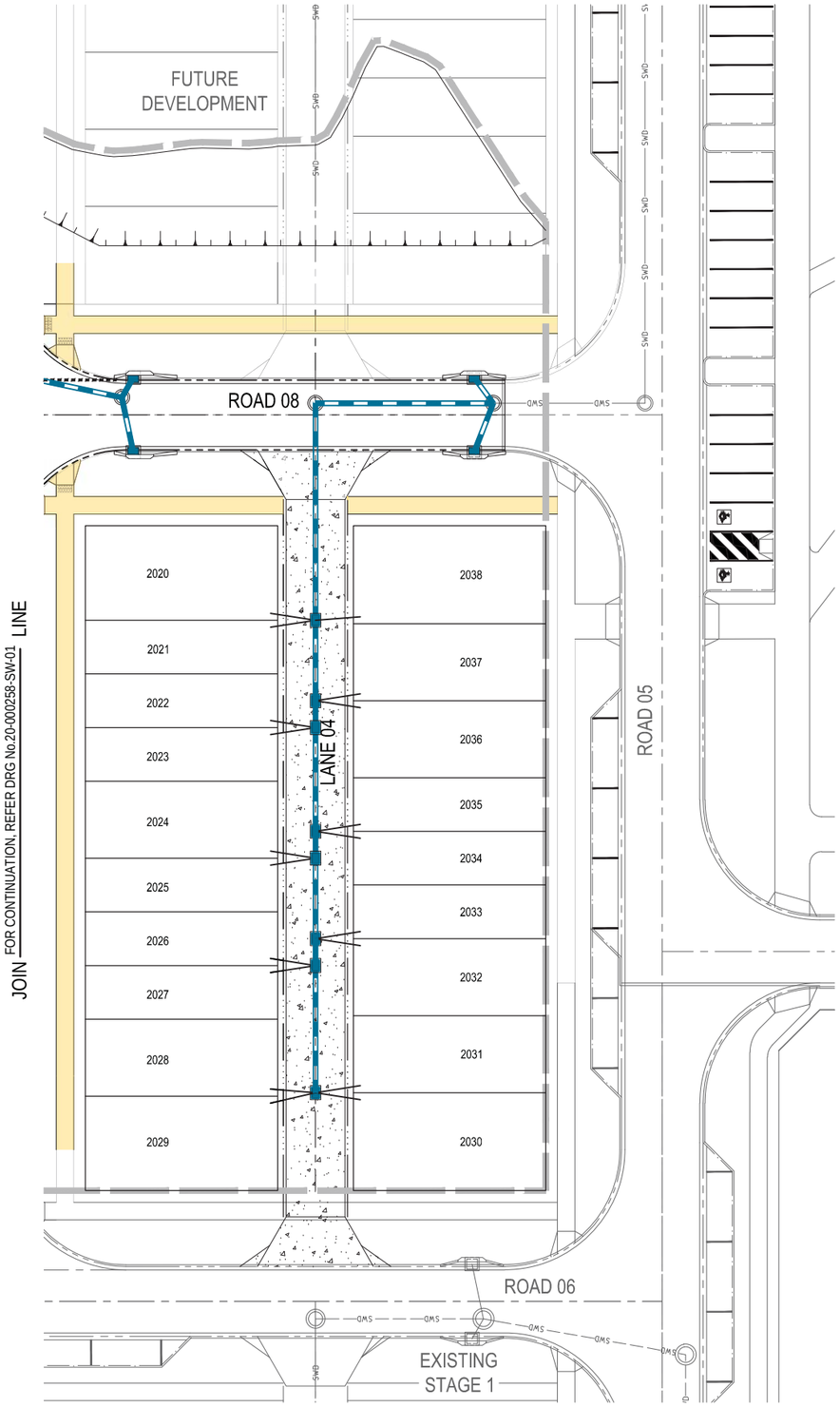
DRAWING TITLE
STORMWATER CONCEPT
LAYOUT PLAN
SHEET 1 OF 2

PROJECT No.	DRAWING No.	REVISION
20-000258	SW-01	1



LEGEND

- PROPOSED STAGE BOUNDARY
- PROPOSED STORMWATER DRAINAGE
- PROPOSED ROOFWATER DRAINAGE
- EXISTING STORMWATER DRAINAGE
- PROPOSED BARRIER KERB ONLY TYPE 'E'
- PROPOSED BARRIER KERB & CHANNEL TYPE 'E'
- PROPOSED CONCRETE INVERT
- PROPOSED EDGE THICKENING
- PROPOSED EDGE OF BITUMEN
- EXISTING EXISTING EDGE OF BITUMEN
- PROPOSED SEWERAGE RETICULATION
- PROPOSED WATER RETICULATION
- EXISTING WATER RETICULATION
- EXISTING SURFACE CONTOUR (0.5m INTERVALS)
- DESIGN SURFACE CONTOUR (0.25m INTERVALS)
- PROPOSED MAINTENANCE HOLE
- PROPOSED GULLY PIT
- PROPOSED OUTLET STRUCTURE
- PROPOSED CONCRETE FOOTPATH AND PRAM RAMPS
- PROPOSED CONCRETE SURFACING

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SCALE
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5 0 5 10m
A1 A3

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PROJECT
CARSELDINE URBAN VILLAGE
STAGE 2

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STORMWATER CONCEPT LAYOUT PLAN
SHEET 2 OF 2

PROJECT No.	DRAWING No.	REVISION
20-000258	SW-02	1

LEGEND

- PROPOSED DN125 WATER MAIN
- EXISTING DN125 WATER MAIN
- EXISTING DN180 WATER MAIN
- EXISITNG DN250 WATER MAIN
- PROPOSED DN160 WASTEWATER MAIN
- EXISTING DN250 WASTEWATER MAIN
- CADASTRE
- PROPOSED SEWER HOUSE CONNECTION
- PROPOSED WATER CONDUIT
- X PROPOSED WATER METER

NOTES:

1. ALL EXISTING SERVICES TO BE CONFIRMED ON SITE
2. FOR EP DEMAND DETAILS REFER TO CALIBRE ENGINEERING SERVICES REPORT 15-003002-WER02

NOTE

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PROJECT: CARSELDINE URBAN VILLAGE STAGE 2

DISCLAIMER
ALL DIMENSIONS TO BE CHECKED ON SITE BY CONTRACTOR PRIOR TO CONSTRUCTION. USE WRITTEN DIMENSIONS ONLY, DO NOT SCALE.

DRAWING TITLE: WATER AND SEWER MASTER PLAN

PROJECT No.	DRAWING No.	REVISION
20-000258	W-S-01	1

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