

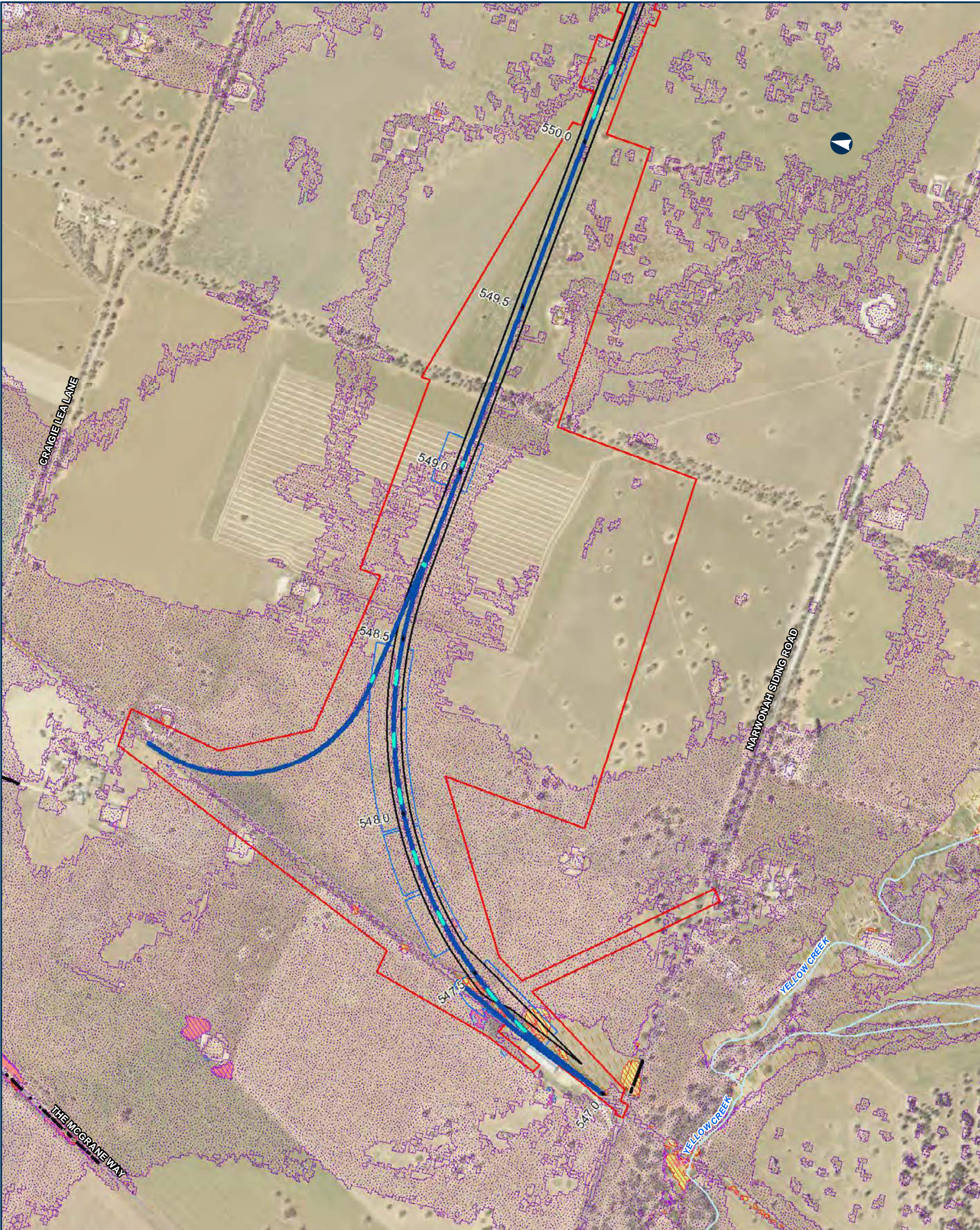
TECHNICAL REPORT 03

Updated flooding and hydrology assessment

Appendix I5 QDL compliance (scour/erosion 20% AEP)

NARROMINE TO NARRABRI PROJECT





NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 20% AEP

Appendix I - Figure 2.1.1

0 200 400 Metres

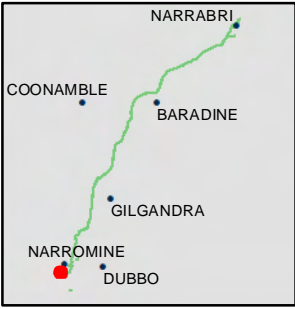
Coordinate System: GDA 1994 MGA Zone 55

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Date: 9/08/2022 Paper: A3
Author: JacobsGHD Scale: 1:10,000
Data Sources: Basemap layers: NSWSS; all other layers: JacobsGHD

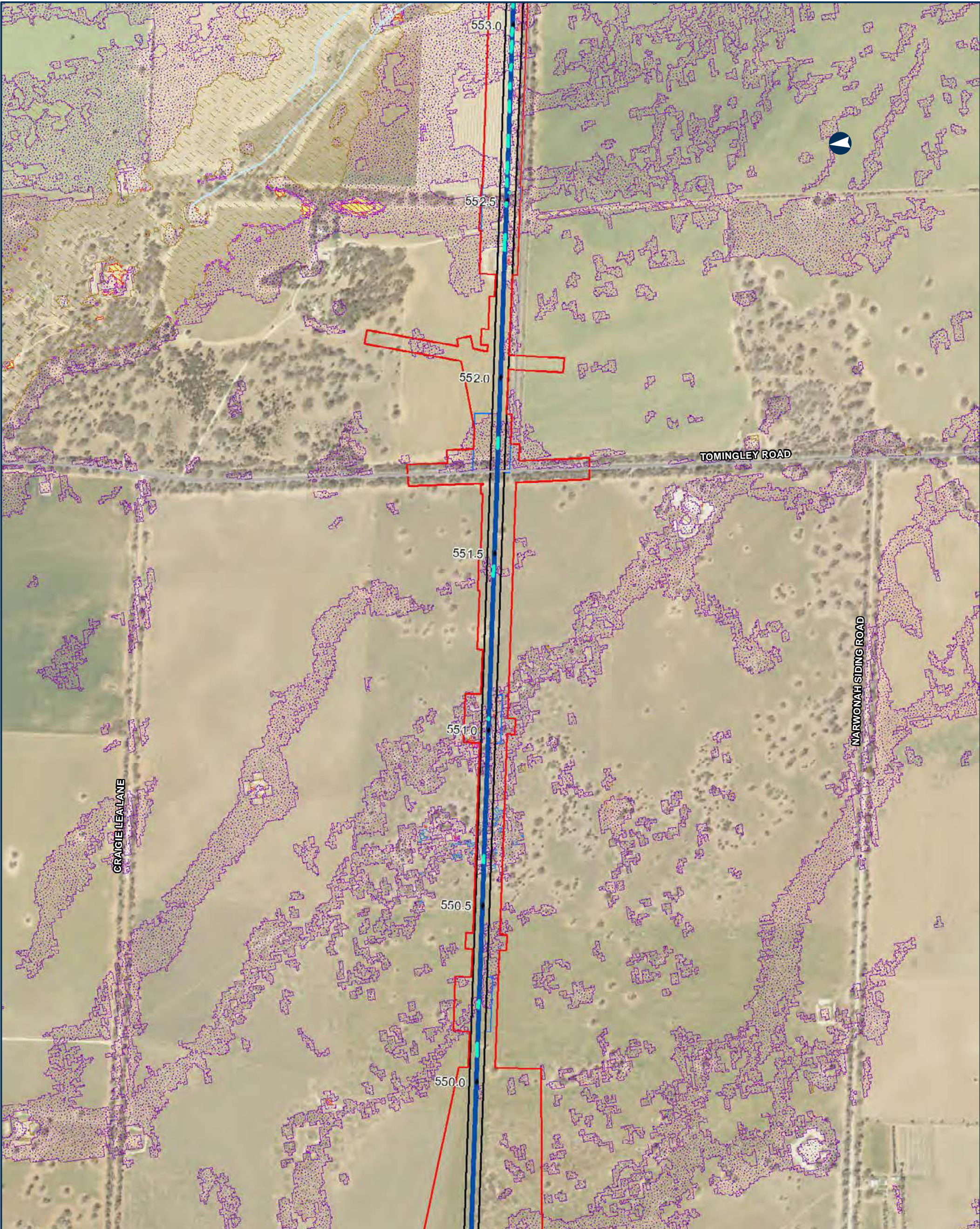
- Road ODL departure
 - Culvert
 - Road ODL departure
 - Alignment
 - The proposal
 - Drainage Control Area
 - Rail Corridor
 - Design Velocity Contour (m/s)
 - 1
- Design Velocity < 0.5m/s
 - Design Velocity > 0.5m/s, Velocity Increase limited to 0.025m/s
 - <10% Increase
 - 10% to 20% Increase
 - Greater than 20% Increase
 - Protected Surfaces
 - Existing velocity <1m/s, design velocity > 1.2m/s

- Unprotected Surfaces
- Existing not flooded, design velocity > 0.5m/s
- Existing velocity < 0.5m/s, design velocity > 0.5m/s
- Existing velocity > 0.5m/s (AETV), Design Velocity > Existing Velocity + 0.025m/s



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NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 20% AEP

Appendix I - Figure 2.1.2

0 200 400 Metres

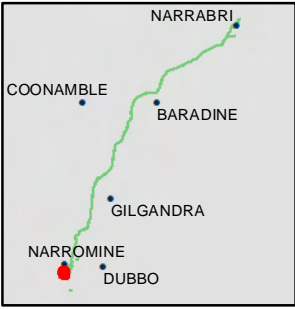
Coordinate System: GDA 1994 MGA Zone 55

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Author: JacobsGHD Scale: 1:10,000
Data Sources: Basemap layers: NSWSS; all other layers: JacobsGHD

- Culvert
- Road QDL departure
- Alignment
- The proposal
- Drainage Control Area
- Rail Corridor
- Design Velocity Contour (m/s)
- 1
- Design Velocity < 0.5m/s
- Design Velocity > 0.5m/s, Velocity Increase limited to 0.025m/s
- <10% Increase
- 10% to 20% Increase
- Greater than 20% Increase
- Unprotected Surfaces
- Existing not flooded, design velocity > 0.5m/s

- Existing velocity < 0.5m/s, design velocity > 0.5m/s
- Existing velocity > 0.5m/s (AETV), Design Velocity > Existing Velocity + 0.025m/s



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NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 20% AEP

Appendix I - Figure 2.1.3

0 200 400 Metres

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Data Sources: Basemap layers: NSWSS; all other layers: JacobsGHD

Paper: A3
Scale: 1:10,000

Design Velocity Contour (m/s)

- 1
- Design Velocity < 0.5m/s
- Design Velocity > 0.5m/s, Velocity increase limited to 0.025m/s
- <10% Increase
- 10% to 20% Increase
- Greater than 20% Increase

Unprotected Surfaces

- Existing not flooded, design velocity > 0.5m/s
- Existing velocity < 0.5m/s, design velocity > 0.5m/s
- Existing velocity > 0.5m/s (AETV), Design Velocity > Existing Velocity + 0.025m/s

NARRABRI
COONAMBLE
BARADINE
GILGANDRA
NARROMINE
DUBBO

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NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 20% AEP

Appendix I - Figure 2.1.4

0 200 400 Metres

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Author: JacobsGHD Scale: 1:10,000
Data Sources: Basemap layers: NSWSS; all other layers: JacobsGHD

- Road ODL departure
- Culvert
- Road ODL departure
- Alignment
- The proposal
- Drainage Control Area
- Rail Corridor

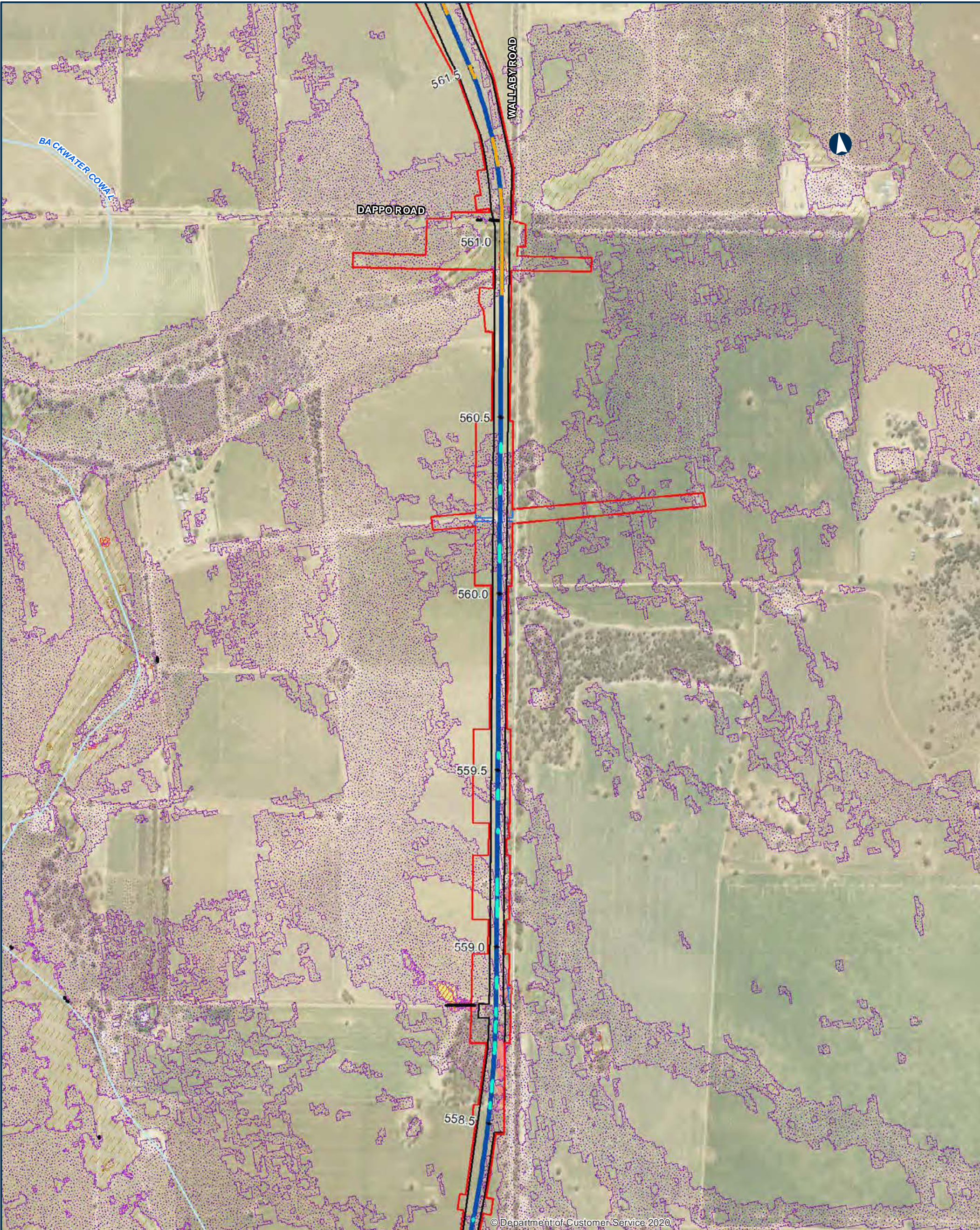
- Design Velocity Contour (m/s)
- 1
 - Design Velocity < 0.5m/s
 - Design Velocity > 0.5m/s, Velocity increase limited to 0.025m/s
 - <10% Increase
 - 10% to 20% Increase
 - Greater than 20% Increase

- Unprotected Surfaces
- Existing not flooded, design velocity > 0.5m/s
 - Existing velocity < 0.5m/s, design velocity > 0.5m/s
 - Existing velocity > 0.5m/s (AETV), Design Velocity > Existing Velocity + 0.025m/s



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NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 20% AEP

Appendix I - Figure 2.1.5

0 200 400 Metres

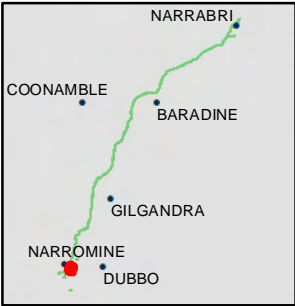
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Author: JacobsGHD Scale: 1:10,000
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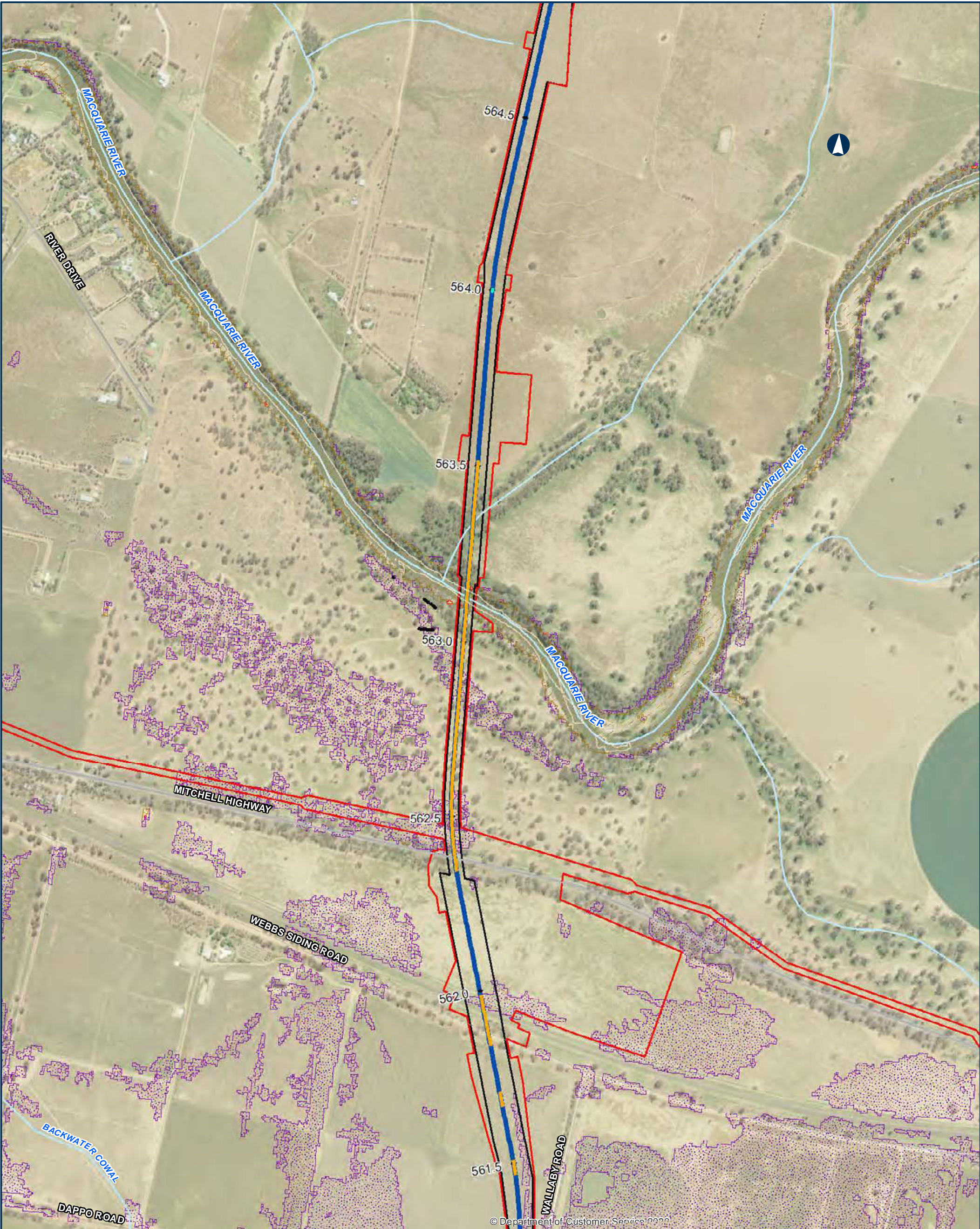
- Road ODL departure
 - Bridge
 - Culvert
 - Road ODL departure
 - Alignment
 - The proposal
 - Drainage Control Area
 - Rail Corridor
- Design Velocity Contour (m/s)
- 1
 - Design Velocity < 0.5m/s
 - Design Velocity > 0.5m/s, Velocity increase limited to 0.025m/s
 - <10% Increase
 - 10% to 20% Increase
 - Greater than 20% increase

- Unprotected Surfaces
- Existing not flooded, design velocity > 0.5m/s
 - Existing velocity < 0.5m/s, design velocity > 0.5m/s
 - Existing velocity > 0.5m/s (AETV), Design Velocity > Existing Velocity + 0.025m/s



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NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 20% AEP

Appendix I - Figure 2.1.6

0 200 400 Metres

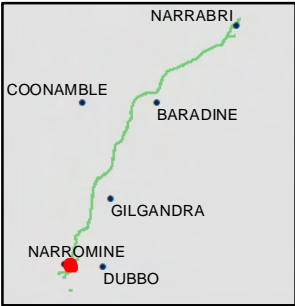
Coordinate System: GDA 1994 MGA Zone 55

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Author: JacobsGHD Scale: 1:10,000
Data Sources: Basemap layers: NSWSS; all other layers: JacobsGHD

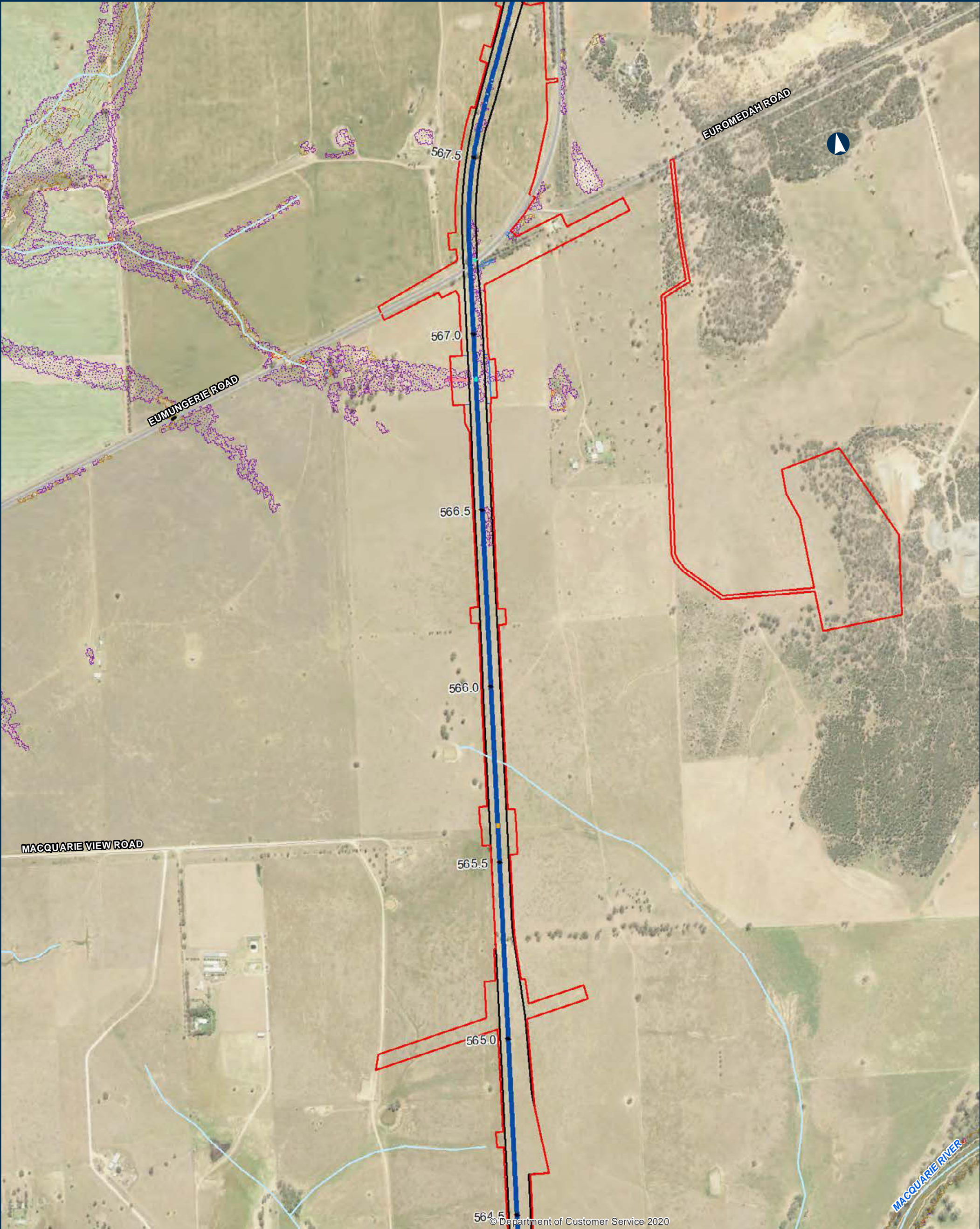
- | | |
|----------------------|---|
| — Road ODL departure | Design Velocity Contour (m/s) |
| — Bridge | 1 |
| — Culvert | 2 |
| — Road ODL departure | Design Velocity < 0.5m/s |
| — Alignment | Design Velocity > 0.5m/s, Velocity increase limited to 0.025m/s |
| — The proposal | <10% Increase |
| — Rail Corridor | 10% to 20% Increase |

- Unprotected Surfaces
- Existing not flooded, design velocity > 0.5m/s
 - Existing velocity < 0.5m/s, design velocity > 0.5m/s
 - Existing velocity > 0.5m/s (AETV), Design Velocity > Existing Velocity + 0.025m/s



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NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 20% AEP

Appendix I - Figure 2.1.7

0200400Metres

Coordinate System: GDA 1994 MGA Zone 55

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Date: 9/08/2022
Author: JacobsGHD
Data Sources: Basemap layers: NSWSS; all other layers: JacobsGHD

Paper: A3
Scale: 1:10,000

Road ODL departure

Bridge

Culvert

Road ODL departure

Alignment

The proposal

Drainage Control Area

Rail Corridor

Design Velocity Contour (m/s)

1

2

Design Velocity < 0.5m/s

Design Velocity > 0.5m/s, Velocity increase limited to 0.025m/s

<10% Increase

10% to 20% Increase

Greater than 20% Increase

Unprotected Surfaces

Existing not flooded, design velocity > 0.5m/s

Existing velocity < 0.5m/s, design velocity > 0.5m/s

Existing velocity > 0.5m/s (AETV), Design Velocity > Existing Velocity + 0.025m/s

NARRABRI

COONAMBLE

BARADINE

GILGANDRA

NARROMINE

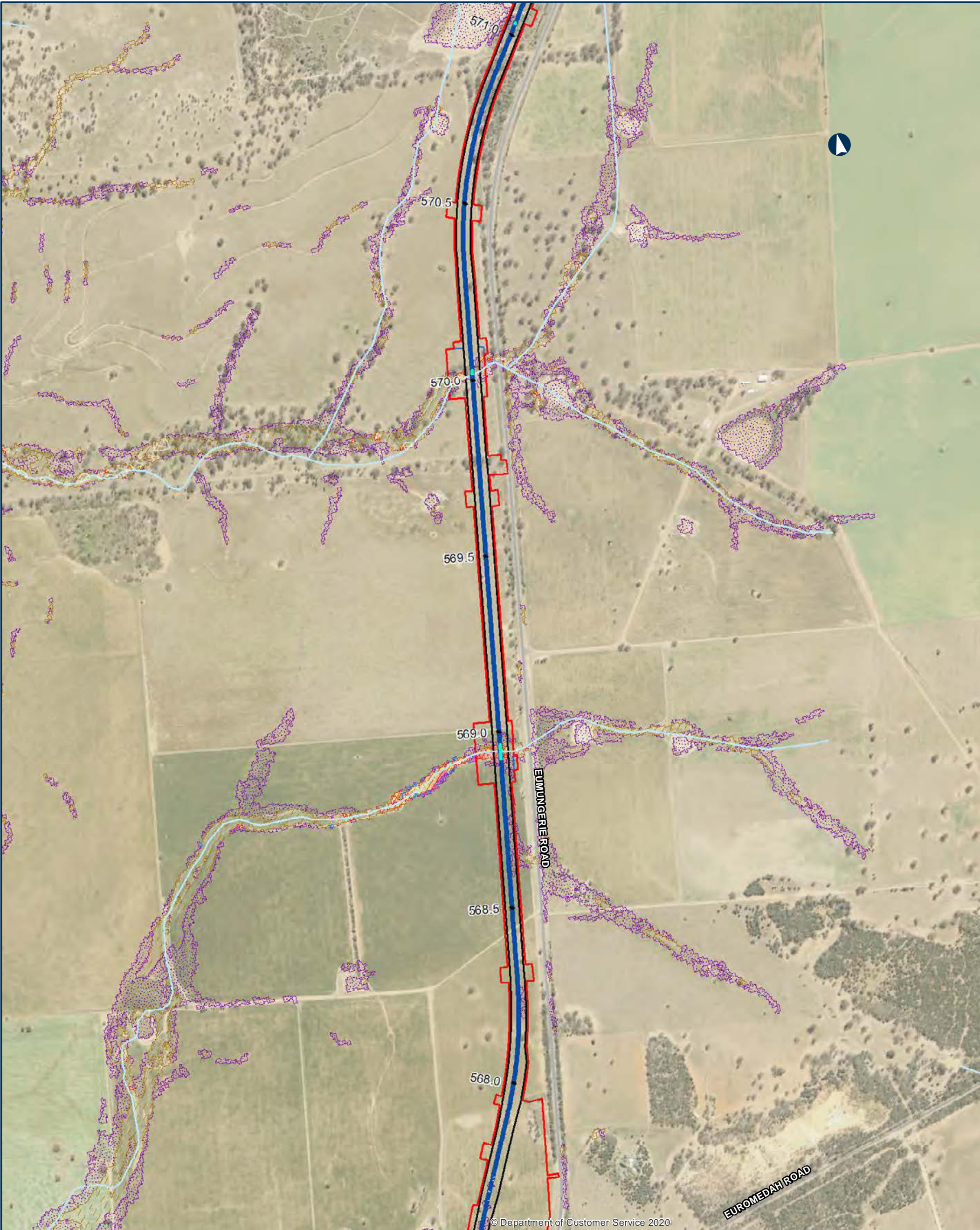
DUBBO

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NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 20% AEP

Appendix I - Figure 2.1.8

0 200 400 Metres

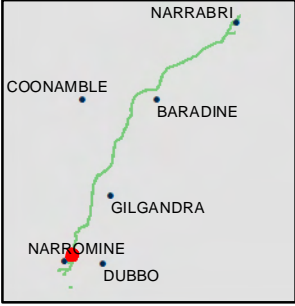
Coordinate System: GDA 1994 MGA Zone 55

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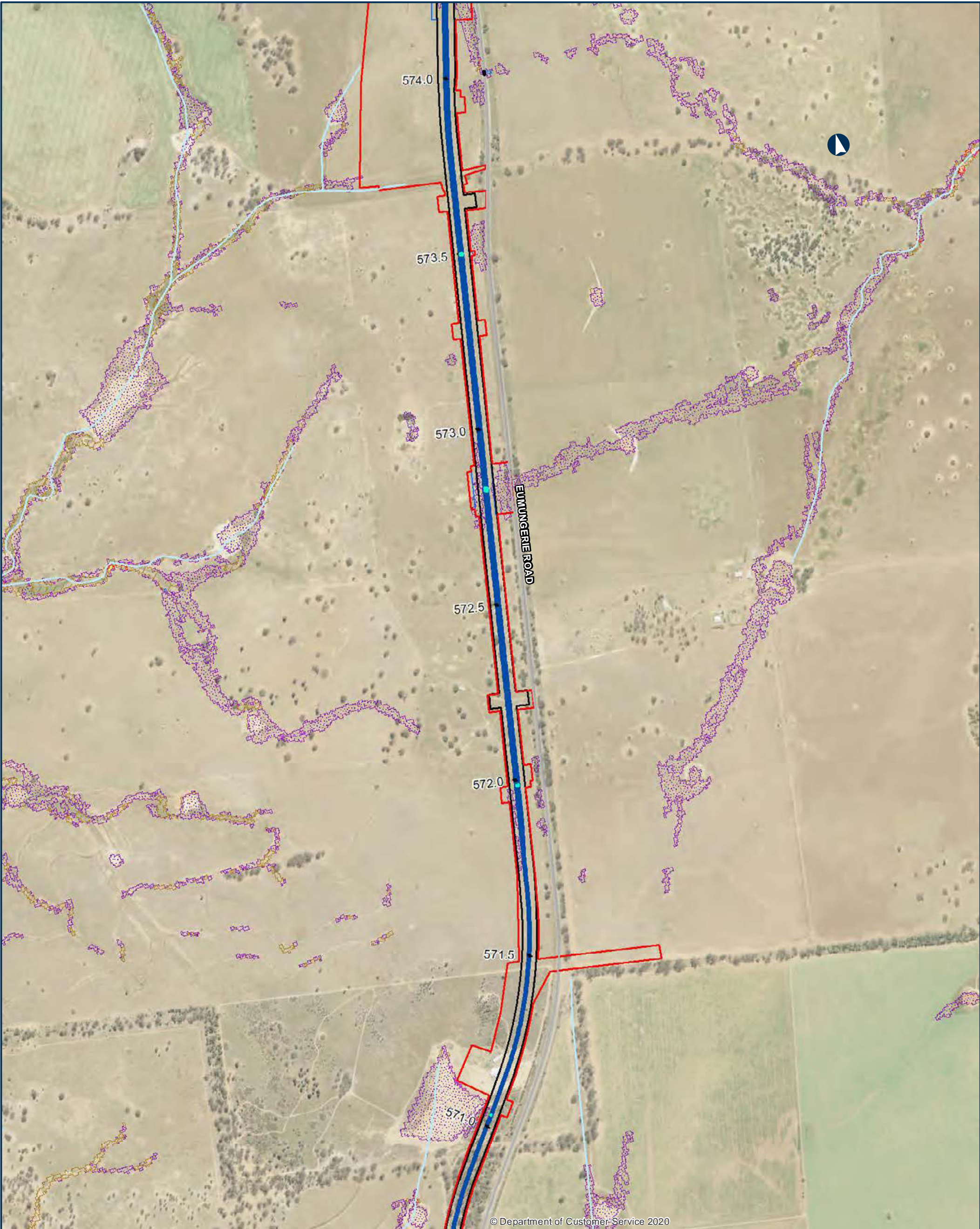
- Culvert
- Road QDL departure
- Alignment
- The proposal
- Drainage Control Area
- Rail Corridor
- Design Velocity Contour (m/s)
- 1
- 2
- Design Velocity < 0.5m/s
- Design Velocity > 0.5m/s, Velocity increase limited to 0.025m/s
- <10% Increase
- 10% to 20% increase
- Greater than 20% increase

- Unprotected Surfaces
- Existing not flooded, design velocity > 0.5m/s
- Existing velocity < 0.5m/s, design velocity > 0.5m/s
- Existing velocity > 0.5m/s (AETV), Design Velocity > Existing Velocity + 0.025m/s



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NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 20% AEP

Appendix I - Figure 2.1.9

0200400Metres

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Date: 9/08/2022
Author: JacobsGHD
Data Sources: Basemap layers: NSWSS; all other layers: JacobsGHD

Paper: A3
Scale: 1:10,000

Road ODL departure

Culvert

Road ODL departure

Alignment

The proposal

Drainage Control Area

Rail Corridor

Design Velocity Contour (m/s)

1

Design Velocity < 0.5m/s

Design Velocity > 0.5m/s, Velocity increase limited to 0.025m/s

<10% Increase

10% to 20% Increase

Greater than 20% Increase

Unprotected Surfaces

Existing not flooded, design velocity > 0.5m/s

Existing velocity < 0.5m/s, design velocity > 0.5m/s

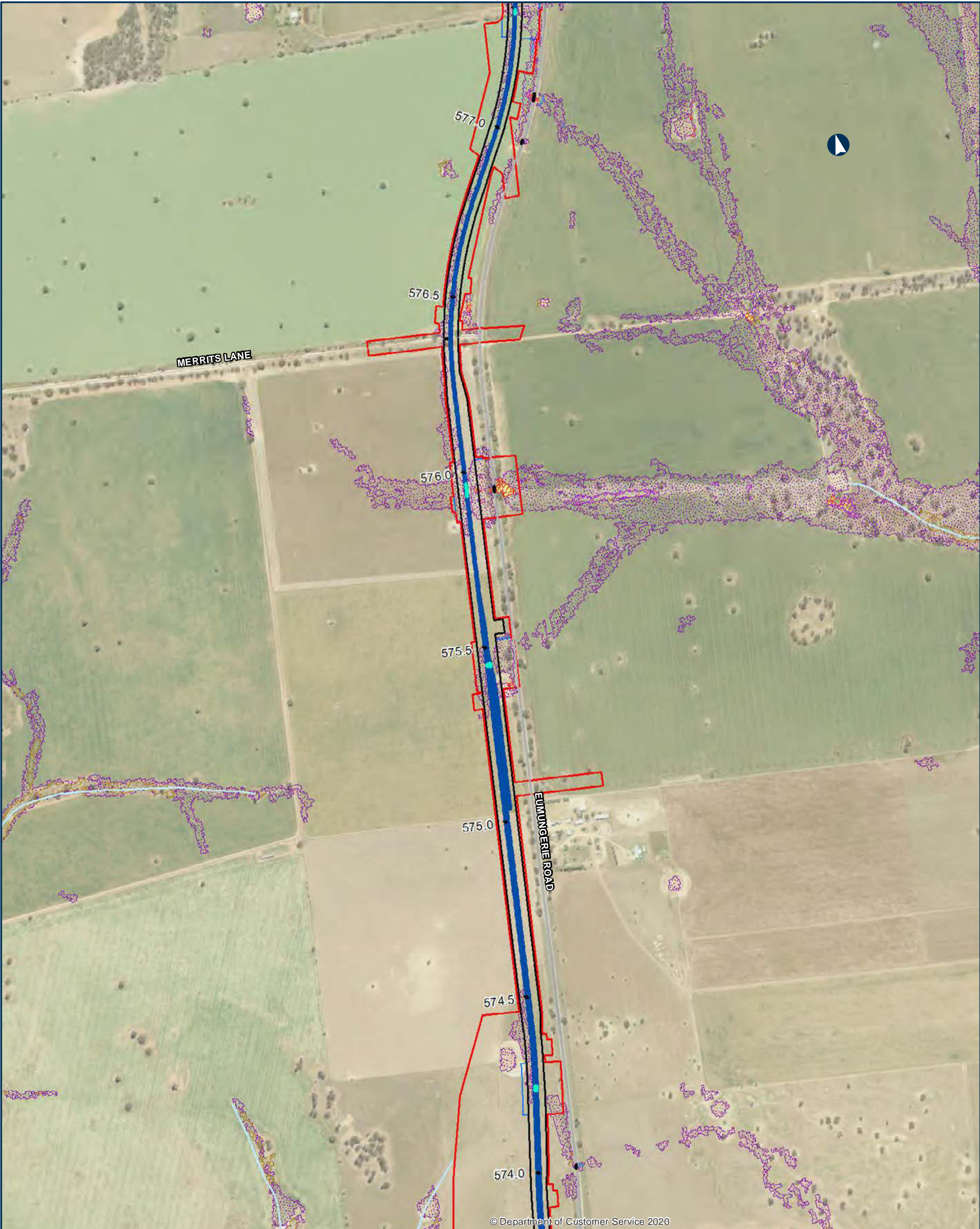
Existing velocity > 0.5m/s (AETV), Design Velocity > Existing Velocity + 0.025m/s



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NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 20% AEP

Appendix I - Figure 2.1.10

0 200 400 Metres

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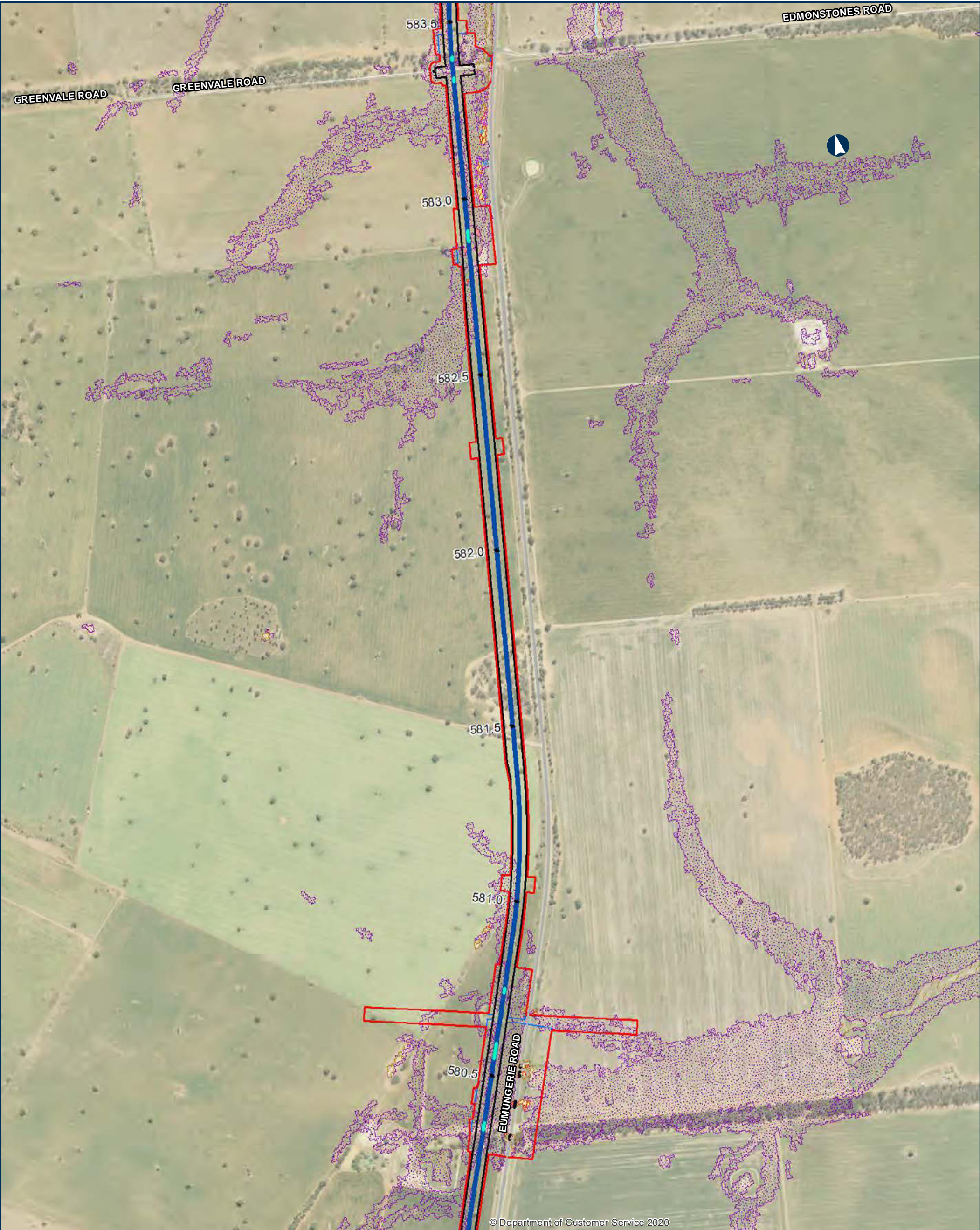
- Road ODL departure
— Culvert
— Road ODL departure
— Alignment
— The proposal
— Drainage Control Area
— Rail Corridor
- Design Velocity Contour (m/s)
1
Design Velocity < 0.5m/s
Design Velocity > 0.5m/s, Velocity increase limited to 0.025m/s
<10% Increase
10% to 20% Increase
Greater than 20% Increase

- Unprotected Surfaces
Existing not flooded, design velocity > 0.5m/s
Existing velocity < 0.5m/s, design velocity > 0.5m/s
Existing velocity > 0.5m/s (AETV), Design Velocity > Existing Velocity + 0.025m/s



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NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 20% AEP

Appendix I - Figure 2.1.12

0 200 400 Metres

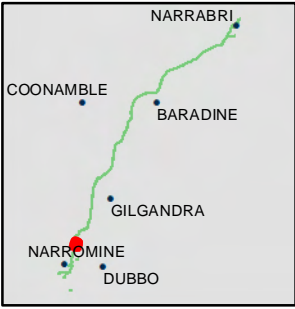
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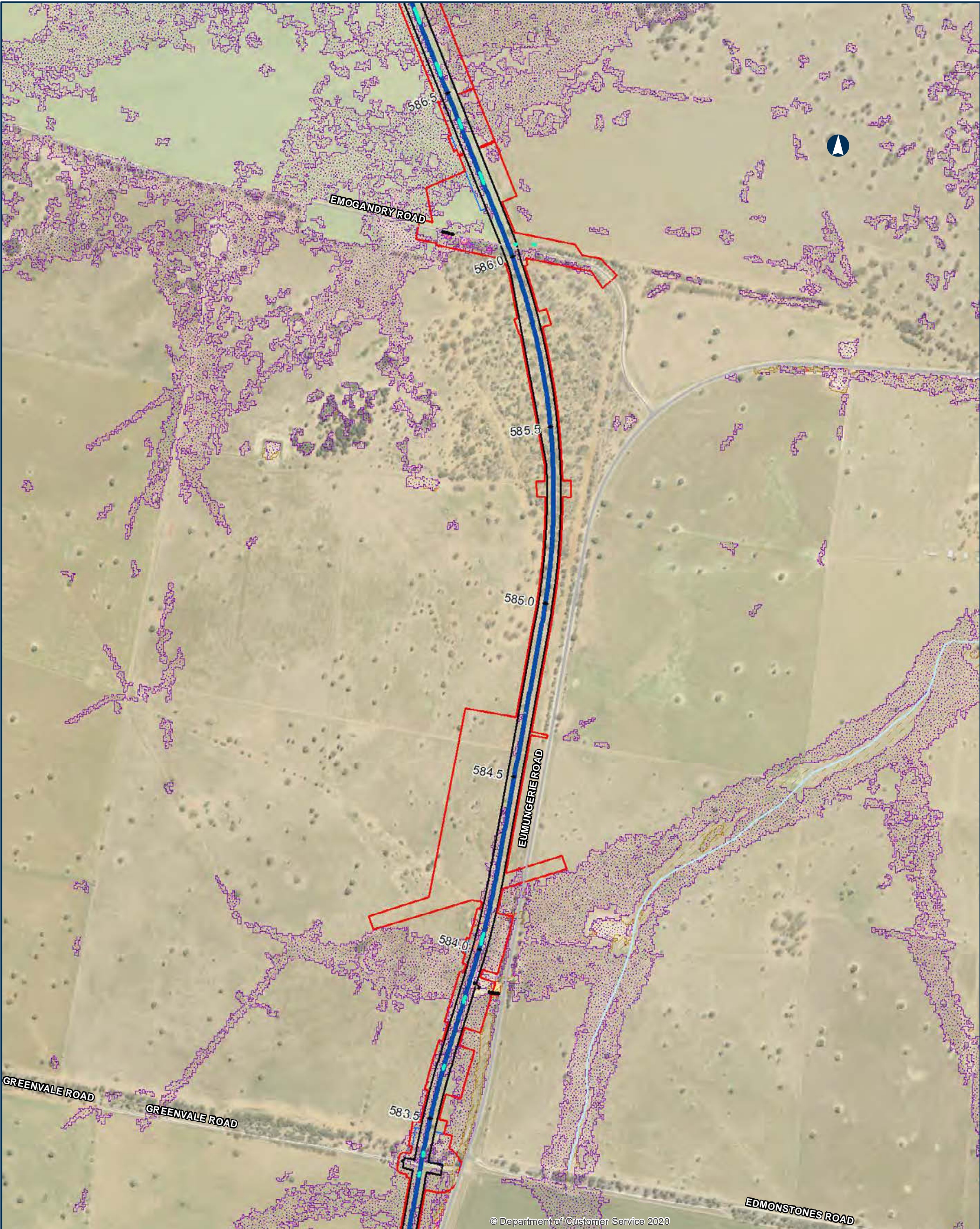
- Road ODL departure
— Culvert
— Road ODL departure
— Alignment
— The proposal
— Drainage Control Area
— Rail Corridor
- Design Velocity Contour (m/s)
1
Design Velocity < 0.5m/s
Design Velocity > 0.5m/s, Velocity increase limited to 0.025m/s
<10% Increase
10% to 20% Increase
Greater than 20% Increase

- Unprotected Surfaces
Existing not flooded, design velocity > 0.5m/s
Existing velocity < 0.5m/s, design velocity > 0.5m/s
Existing velocity > 0.5m/s (AETV), Design Velocity > Existing Velocity + 0.025m/s



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NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 20% AEP

Appendix I - Figure 2.1.13

0 200 400 Metres

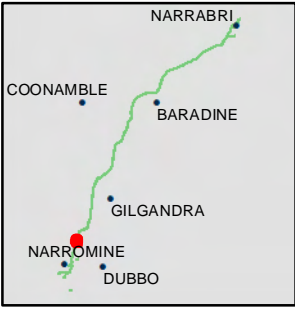
Coordinate System: GDA 1994 MGA Zone 55

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Author: JacobsGHD Scale: 1:10,000
Data Sources: Basemap layers: NSWSS; all other layers: JacobsGHD

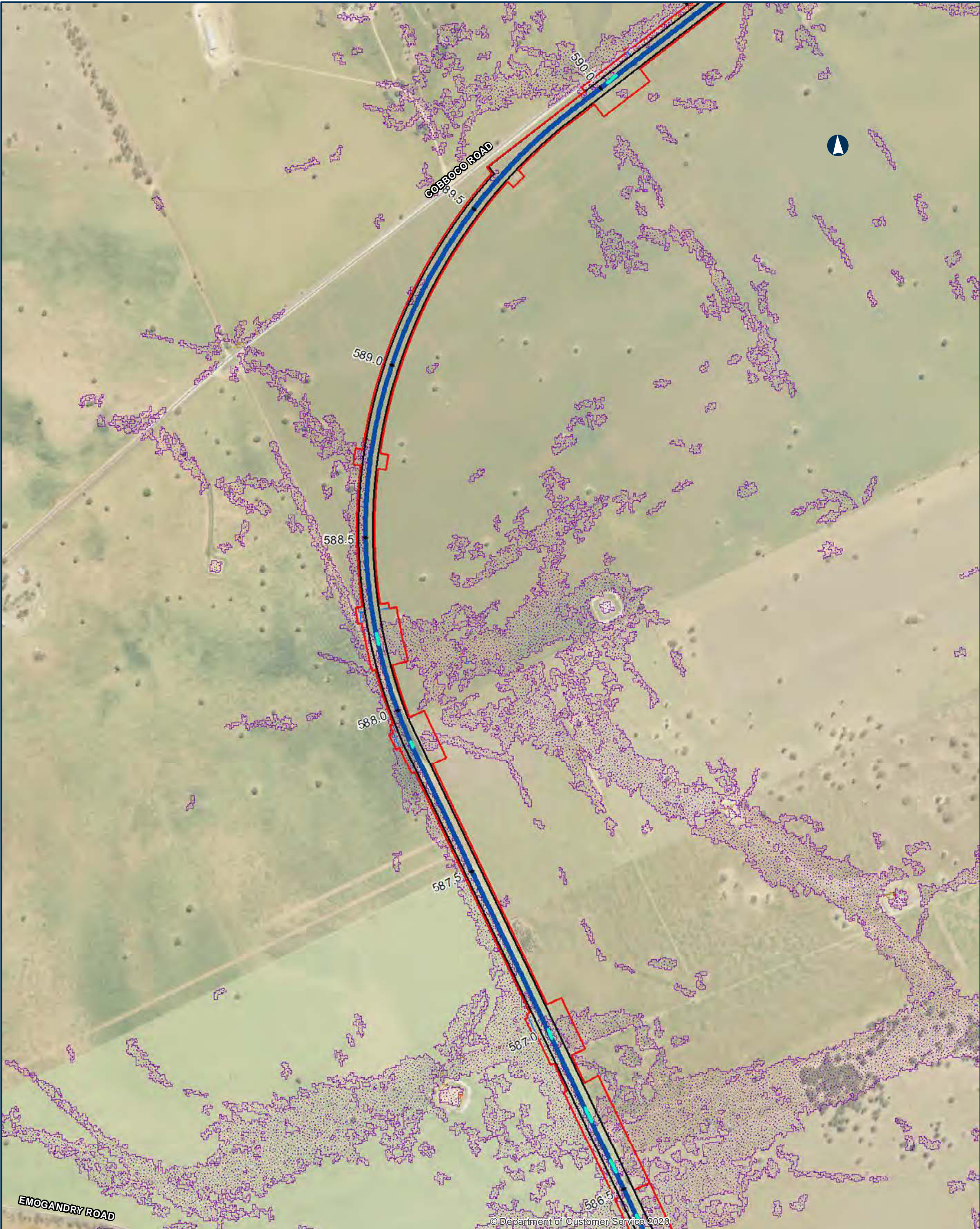
- Road ODL departure
 - Culvert
 - Road ODL departure
 - Alignment
 - The proposal
 - Drainage Control Area
 - Rail Corridor
- Design Velocity Contour (m/s)
- 1
 - Design Velocity < 0.5m/s
 - Design Velocity > 0.5m/s, Velocity increase limited to 0.025m/s
 - <10% Increase
 - 10% to 20% Increase
 - Greater than 20% Increase

- Unprotected Surfaces
- Existing not flooded, design velocity > 0.5m/s
 - Existing velocity < 0.5m/s, design velocity > 0.5m/s
 - Existing velocity > 0.5m/s (AETV), Design Velocity > Existing Velocity + 0.025m/s



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NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 20% AEP

Appendix I - Figure 2.1.14

0 200 400 Metres

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Data Sources: Basemap layers: NSWSS; all other layers: JacobsGHD

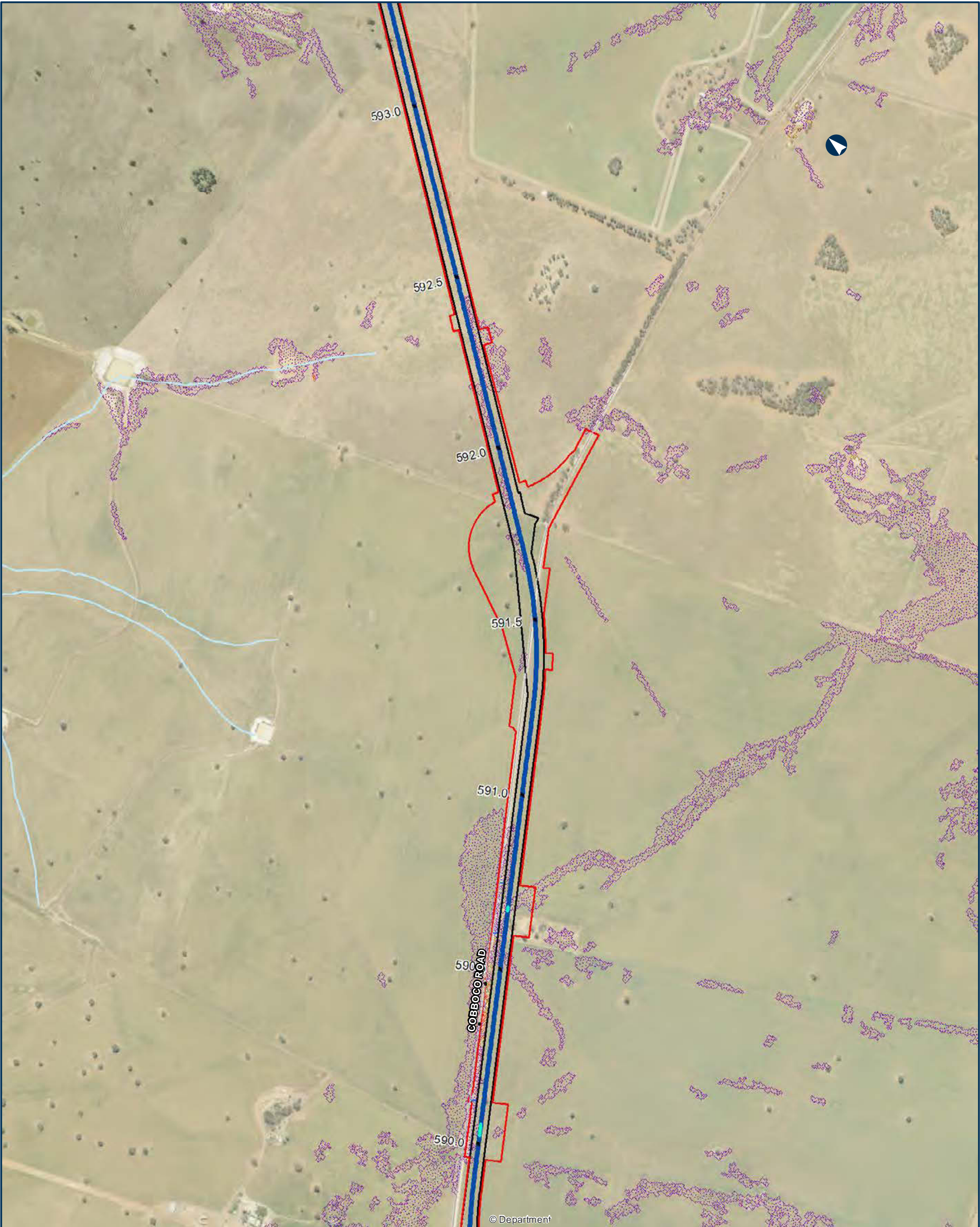
- Road ODL departure
 - Culvert
 - Road ODL departure
 - Alignment
 - The proposal
 - Drainage Control Area
 - Rail Corridor
- Design Velocity Contour (m/s)
- 1
 - Design Velocity < 0.5m/s
 - Design Velocity > 0.5m/s, Velocity increase limited to 0.025m/s
 - <10% Increase
 - 10% to 20% Increase
 - Greater than 20% Increase

- Unprotected Surfaces
- Existing not flooded, design velocity > 0.5m/s
 - Existing velocity < 0.5m/s, design velocity > 0.5m/s
 - Existing velocity > 0.5m/s (AETV), Design Velocity > Existing Velocity + 0.025m/s



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NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 20% AEP

Appendix I - Figure 2.1.15

0200400Metres

Coordinate System: GDA 1994 MGA Zone 55

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Date: 9/08/2022
Author: JacobsGHD
Data Sources: Basemap layers: NSWSS; all other layers: JacobsGHD

Paper: A3
Scale: 1:10,000

Road QDL departure

Culvert

Road QDL departure

Alignment

The proposal

Drainage Control Area

Rail Corridor

Design Velocity Contour (m/s)

1

Design Velocity < 0.5m/s

Design Velocity > 0.5m/s, Velocity increase limited to 0.025m/s

<10% Increase

10% to 20% increase

Greater than 20% increase

Unprotected Surfaces

Existing velocity < 0.5m/s, design velocity > 0.5m/s

Existing velocity > 0.5m/s (AETV), Design Velocity > Existing Velocity + 0.025m/s

NARRABRI

COONAMBLE

BARADINE

GILGANDRA

NARROMINE

DUBBO

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NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 20% AEP

Appendix I - Figure 2.1.16

0 200 400 Metres

Coordinate System: GDA 1994 MGA Zone 55

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Date: 9/08/2022 Paper: A3
Author: JacobsGHD Scale: 1:10,000
Data Sources: Basemap layers: NSWSS; all other layers: JacobsGHD

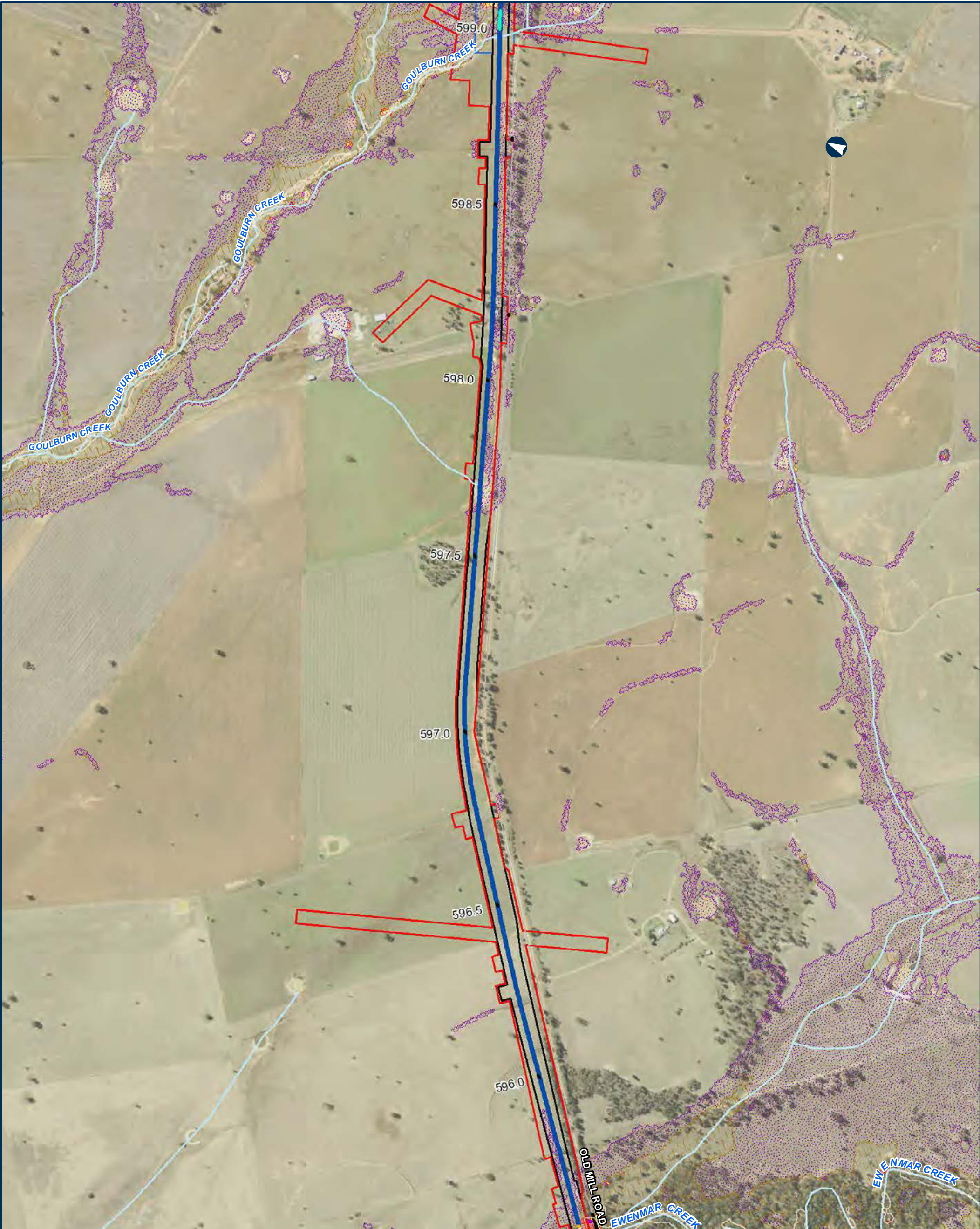
- Road ODL departure
- Bridge
- Road ODL departure
- Alignment
- The proposal
- Rail Corridor
- Design Velocity Contour (m/s)
 - 1
 - 2
- Design Velocity < 0.5m/s
- Design Velocity > 0.5m/s, Velocity Increase limited to 0.025m/s
 - <10% Increase
 - 10% to 20% Increase
 - Greater than 20% Increase
- Protected Surfaces
 - Existing velocity <1m/s, design velocity > 1.2m/s

- Existing velocity >1m/s, velocity change > 20%
- Unprotected Surfaces
 - Existing not flooded, design velocity > 0.5m/s
 - Existing velocity < 0.5m/s, design velocity > 0.5m/s
 - Existing velocity > 0.5m/s (AETV), Design Velocity > Existing Velocity + 0.025m/s



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NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 20% AEP

Appendix I - Figure 2.1.17

0 200 400 Metres

Coordinate System: GDA 1994 MGA Zone 55

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Author: JacobsGHD Scale: 1:10,000
Data Sources: Basemap layers: NSWSS; all other layers: JacobsGHD

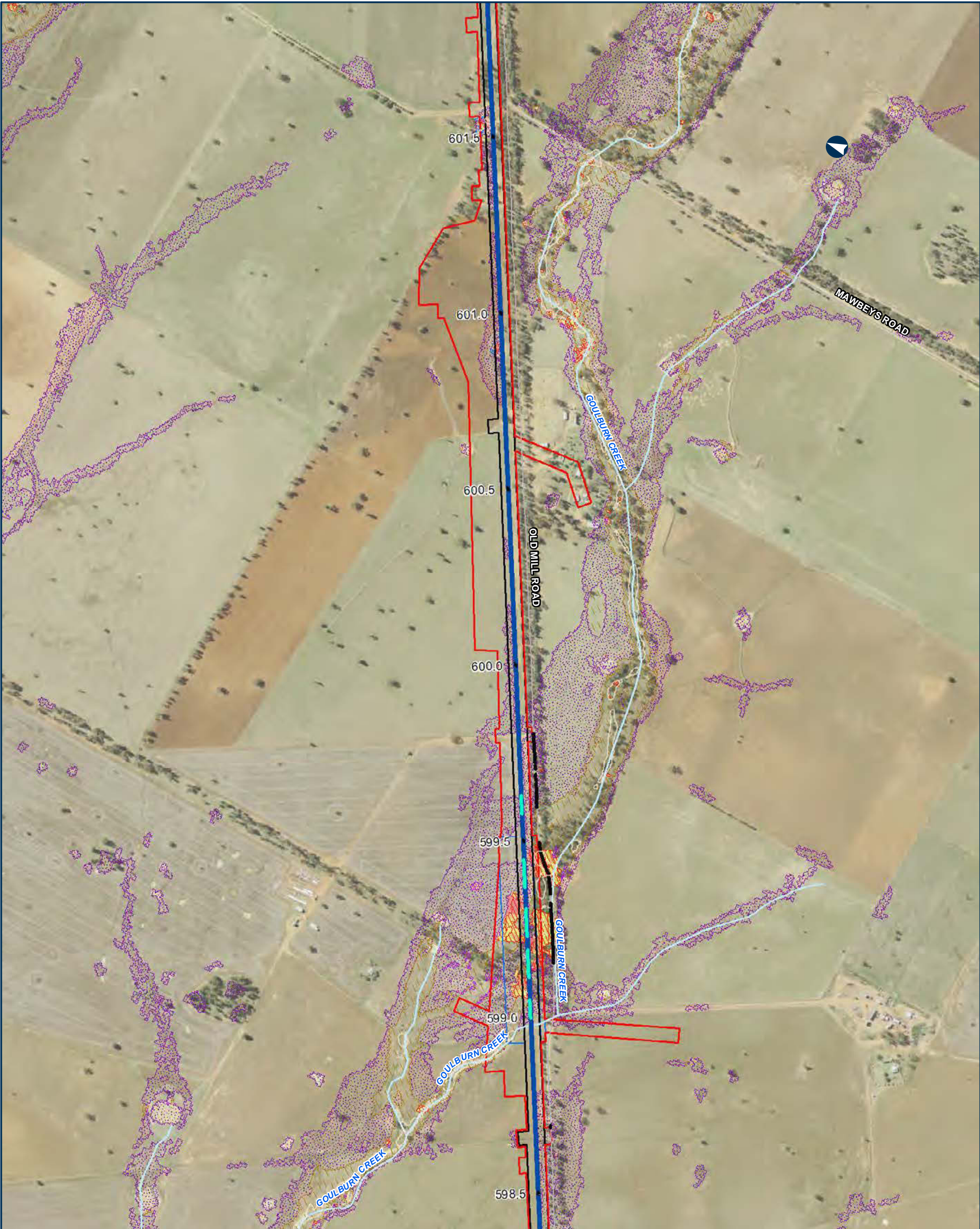
- Road ODL departure
— Bridge
— Culvert
— Road ODL departure
— Alignment
— The proposal
— Drainage Control Area
— Rail Corridor
- Design Velocity Contour (m/s)
1
2
Design Velocity < 0.5m/s
Design Velocity > 0.5m/s, Velocity increase limited to 0.025m/s
<10% Increase
10% to 20% Increase
Greater than 20% Increase

- Protected Surfaces
Existing velocity <1m/s, design velocity > 1.2m/s
Unprotected Surfaces
Existing not flooded, design velocity > 0.5m/s
Existing velocity < 0.5m/s, design velocity > 0.5m/s
Existing velocity > 0.5m/s (AETV), Design Velocity > Existing Velocity + 0.025m/s



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NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 20% AEP

Appendix I - Figure 2.1.18

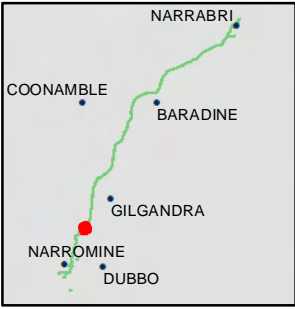
0 200 400 Metres

Coordinate System: GDA 1994 MGA Zone 55

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Date: 9/08/2022 Paper: A3
Author: JacobsGHD Scale: 1:10,000
Data Sources: Basemap layers: NSWSS; all other layers: JacobsGHD

- Road ODL departure
 - Culvert
 - Road ODL departure
 - Alignment
 - The proposal
 - Drainage Control Area
 - Rail Corridor
- Design Velocity Contour (m/s)
- 1
 - 2
 - Design Velocity < 0.5m/s
 - Design Velocity > 0.5m/s, Velocity increase limited to 0.025m/s
 - <10% Increase
 - 10% to 20% Increase
- Greater than 20% increase
 - Unprotected Surfaces
 - Existing not flooded, design velocity > 0.5m/s
 - Existing velocity < 0.5m/s, design velocity > 0.5m/s
 - Existing velocity > 0.5m/s (AETV), Design Velocity > Existing Velocity + 0.025m/s



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NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 20% AEP

Appendix I - Figure 2.1.19

0200400

Metres

Coordinate System: GDA 1994 MGA Zone 55

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Date: 9/08/2022
Author: JacobsGHD
Data Sources: Basemap layers: NSWSS; all other layers: JacobsGHD

Paper: A3
Scale: 1:10,000

Road ODL departure

Bridge

Culvert

Road ODL departure

Alignment

The proposal

Drainage Control Area

Rail Corridor

Design Velocity Contour (m/s)

1

2

Design Velocity < 0.5m/s

Design Velocity > 0.5m/s, Velocity increase limited to 0.025m/s

<10% Increase

10% to 20% Increase

Greater than 20% increase

Protected Surfaces

Existing not flooded, design velocity > 1.2m/s

Unprotected Surfaces

Existing not flooded, design velocity > 0.5m/s

Existing velocity < 0.5m/s, design velocity > 0.5m/s

Existing velocity > 0.5m/s (AETV), Design Velocity > Existing Velocity + 0.025m/s

NARRABRI

COONAMBLE

BARADINE

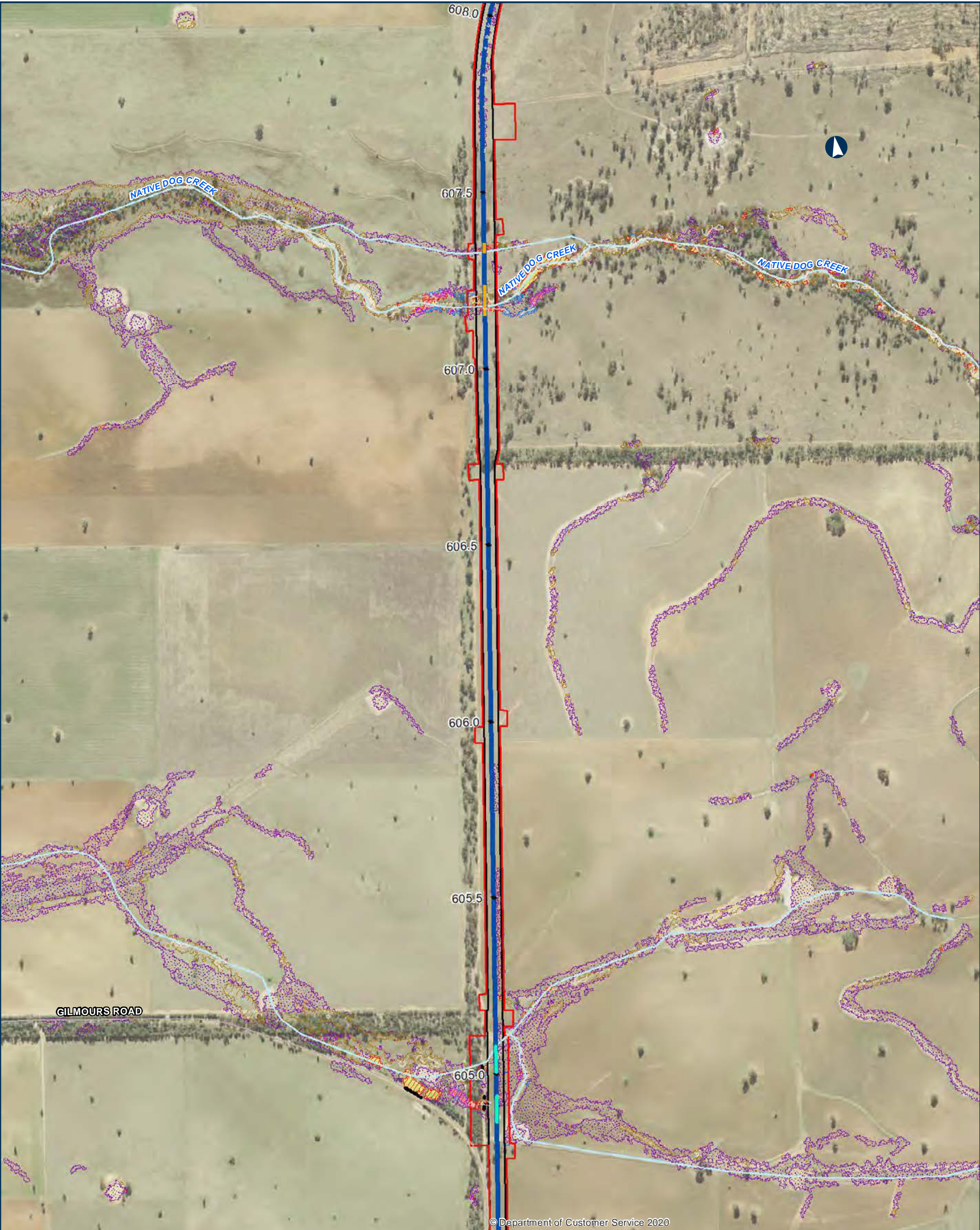
GILGANDRA

NARROMINE

DUBBO

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NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 20% AEP

Appendix I - Figure 2.1.20

0 200 400 Metres

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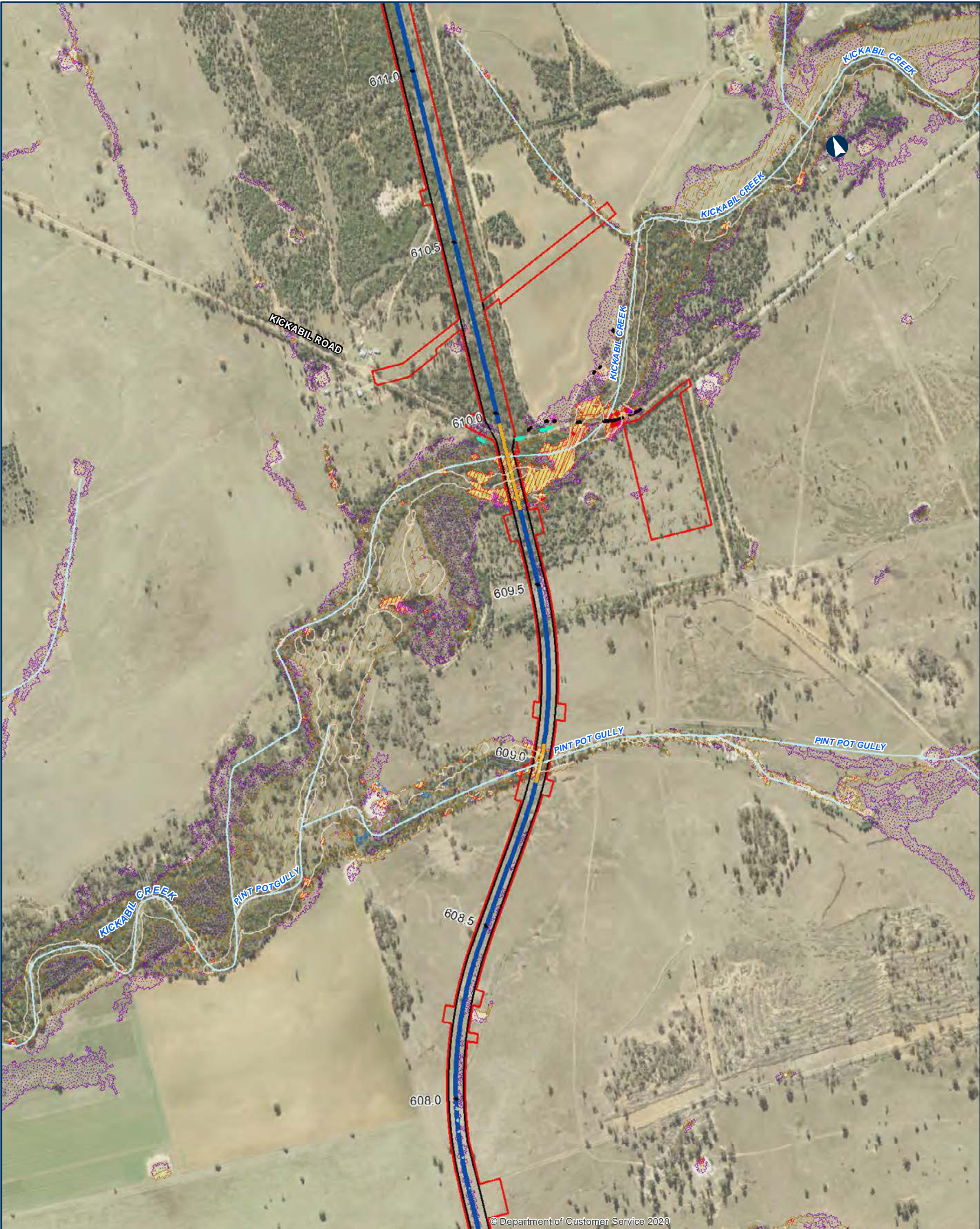
- Road ODL departure
 - Bridge
 - Culvert
 - Road ODL departure
 - Alignment
 - The proposal
 - Drainage Control Area
 - Rail Corridor
- Design Velocity Contour (m/s)
- 1
 - 2
 - Design Velocity < 0.5m/s
 - Design Velocity > 0.5m/s, Velocity increase limited to 0.025m/s
 - <10% Increase
 - 10% to 20% Increase
 - Greater than 20% Increase

- Unprotected Surfaces
- Existing not flooded, design velocity > 0.5m/s
 - Existing velocity < 0.5m/s, design velocity > 0.5m/s
 - Existing velocity > 0.5m/s (AETV), Design Velocity > Existing Velocity + 0.025m/s



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NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 20% AEP

Appendix I - Figure 2.1.21

0 200 400 Metres

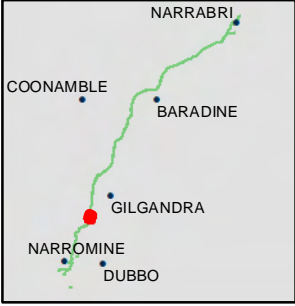
Coordinate System: GDA 1994 MGA Zone 55

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Date: 9/08/2022 Paper: A3
Author: JacobsGHD Scale: 1:10,000
Data Sources: Basemap layers: NSWSS; all other layers: JacobsGHD

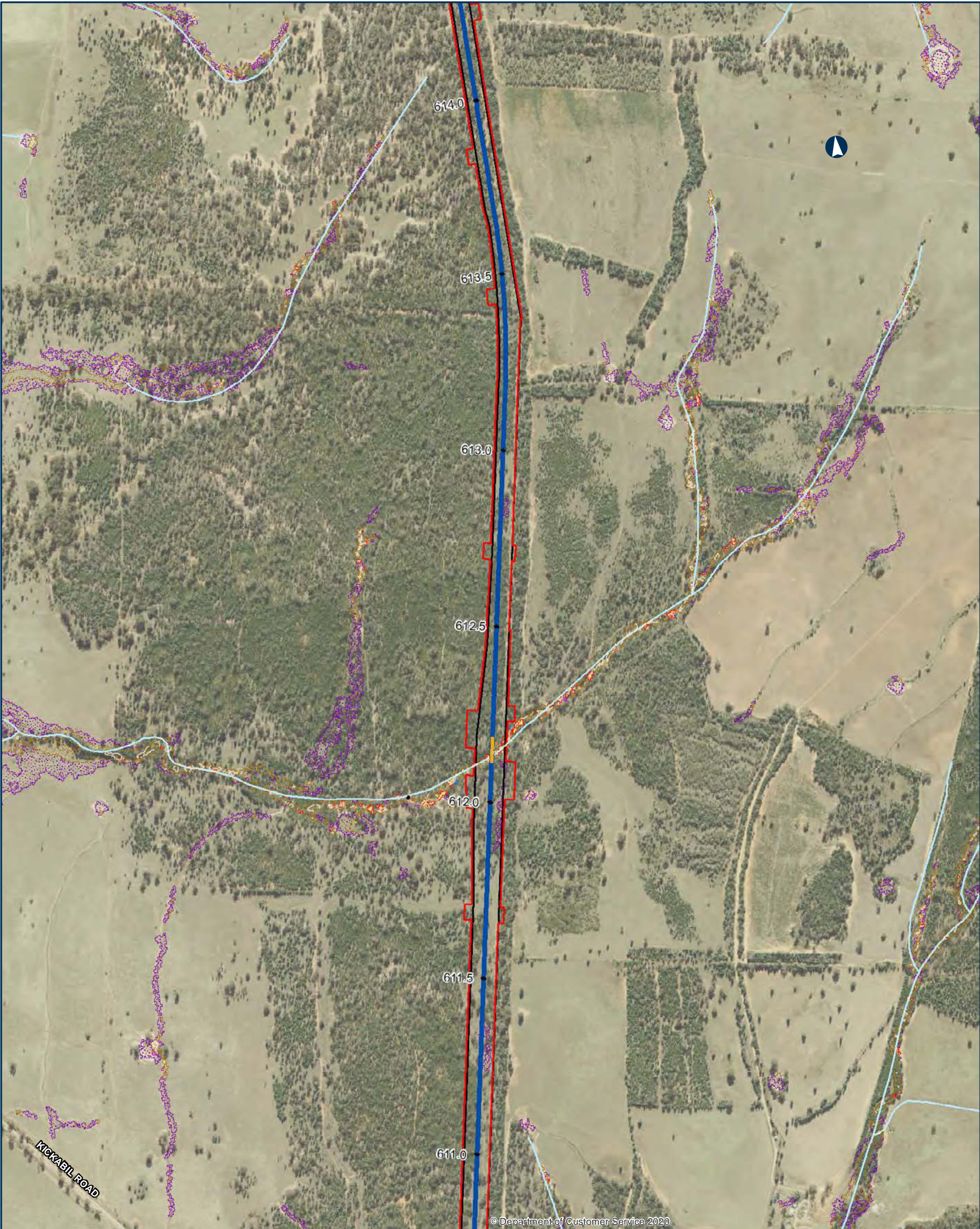
- Road ODL departure
- Bridge
- Culvert
- Road ODL departure
- Alignment
- The proposal
- Rail Corridor
- Design Velocity Contour (m/s)
- 1
- 2
- Design Velocity < 0.5m/s
- Design Velocity > 0.5m/s, Velocity increase limited to 0.025m/s
- <10% Increase
- 10% to 20% increase
- Greater than 20% increase
- Protected Surfaces
- Existing velocity <1m/s, design velocity > 1.2m/s

- Existing velocity >1m/s, velocity change > 20%
- Unprotected Surfaces
- Existing not flooded, design velocity > 0.5m/s
- Existing velocity < 0.5m/s, design velocity > 0.5m/s
- Existing velocity > 0.5m/s (AETV), Design Velocity > Existing Velocity + 0.025m/s



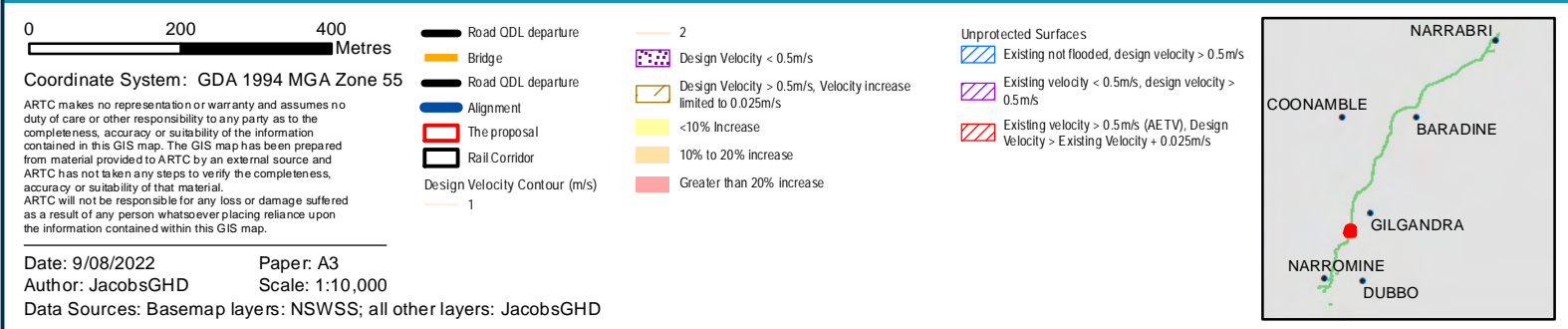
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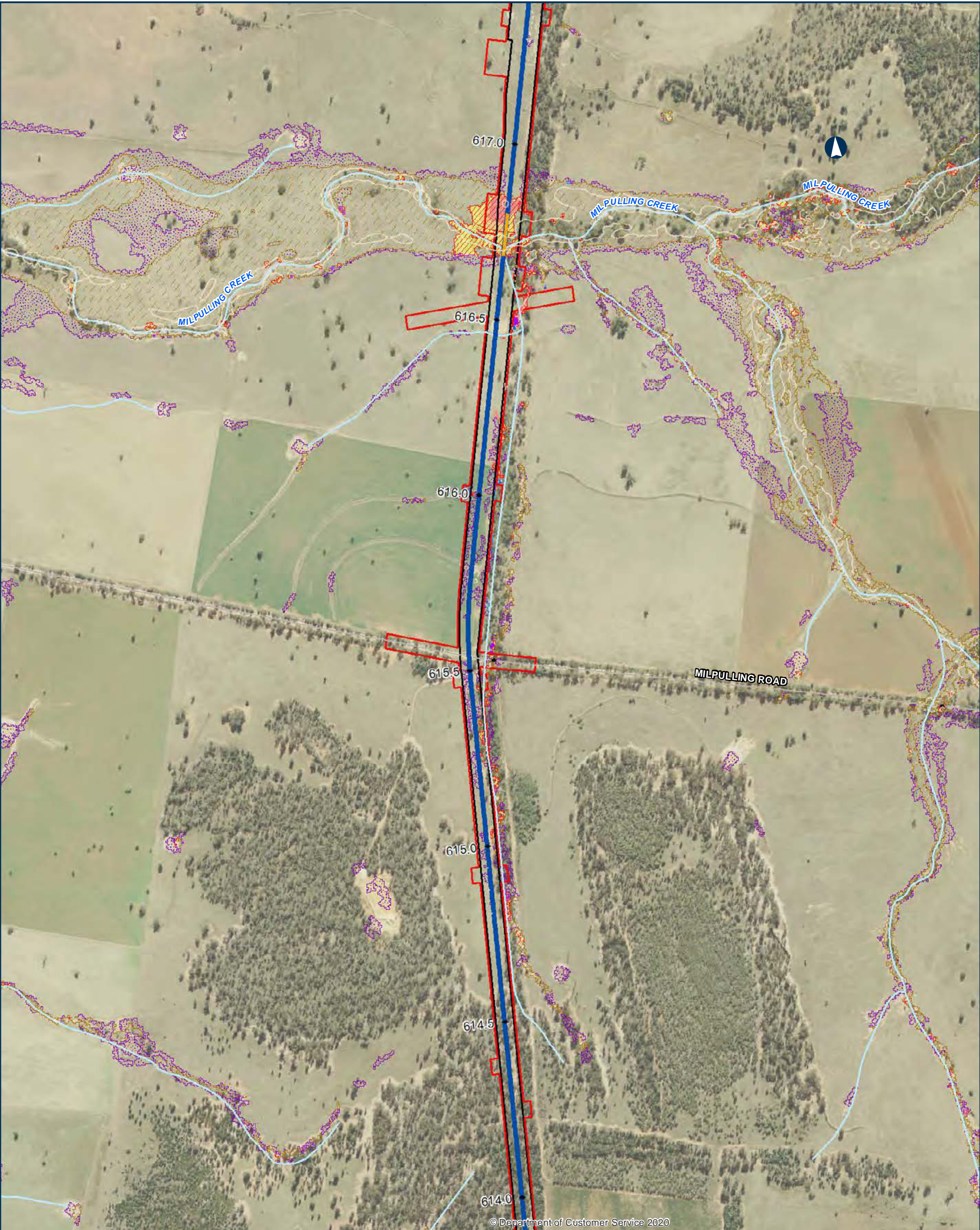
NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 20% AEP

Appendix I - Figure 2.1.22



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NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 20% AEP

Appendix I - Figure 2.1.23

0 200 400 Metres

Coordinate System: GDA 1994 MGA Zone 55

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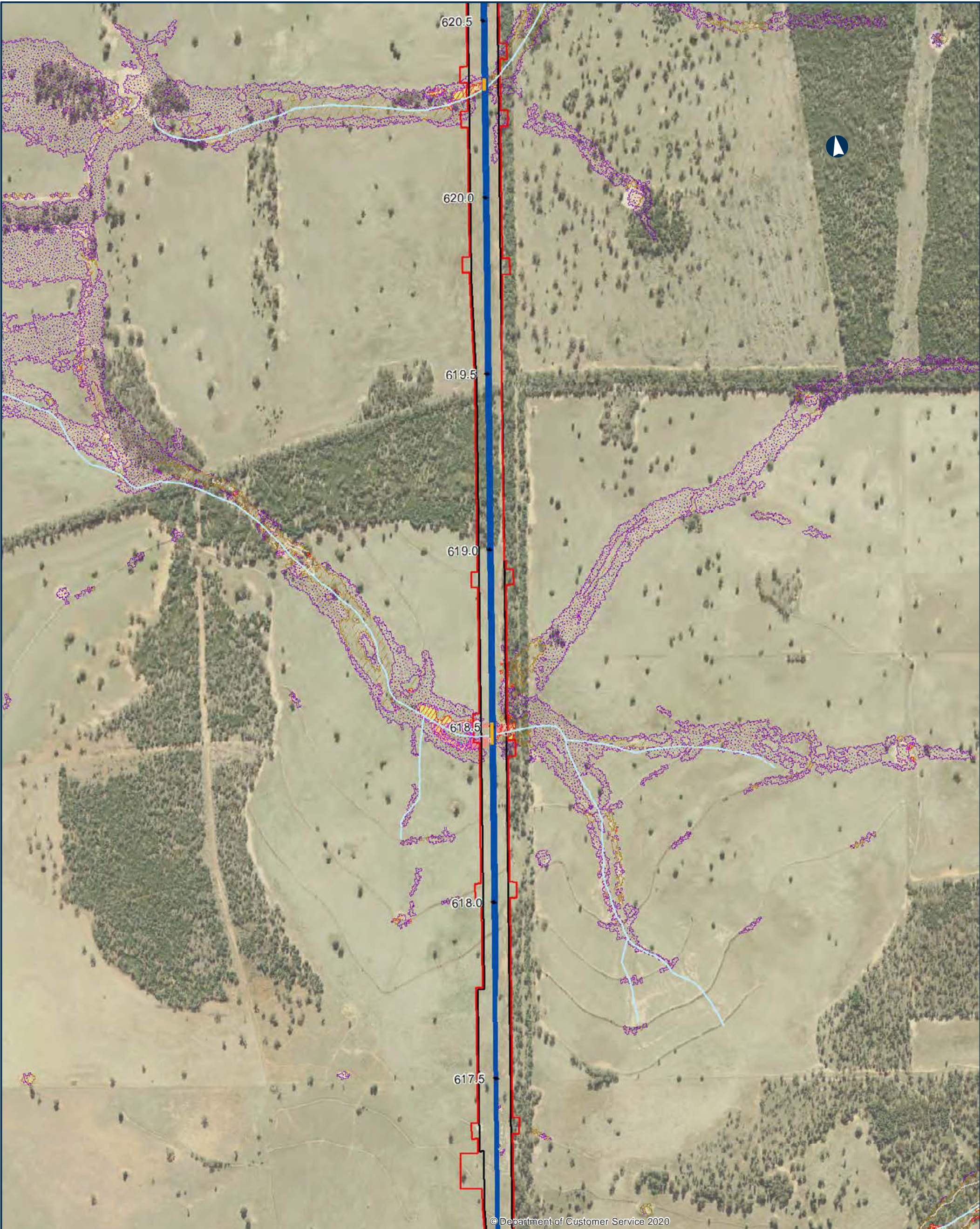
Date: 9/08/2022 Paper: A3
Author: JacobsGHD Scale: 1:10,000
Data Sources: Basemap layers: NSWSS; all other layers: JacobsGHD

- Bridge
- Road QDL departure
- Alignment
- The proposal
- Rail Corridor
- Design Velocity Contour (m/s)
 - 1
 - 2
- Design Velocity < 0.5m/s
- Design Velocity > 0.5m/s, Velocity increase limited to 0.025m/s
- <10% Increase
- 10% to 20% Increase
- Greater than 20% Increase
- Protected Surfaces
 - Existing not flooded, design velocity > 1.2m/s
 - Existing velocity < 1m/s, design velocity > 1.2m/s
- Existing velocity > 1m/s, velocity change > 20%
- Unprotected Surfaces
 - Existing not flooded, design velocity > 0.5m/s
 - Existing velocity < 0.5m/s, design velocity > 0.5m/s
 - Existing velocity > 0.5m/s (AETV), Design Velocity > Existing Velocity + 0.025m/s



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NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 20% AEP

Appendix I - Figure 2.1.24

0 200 400 Metres

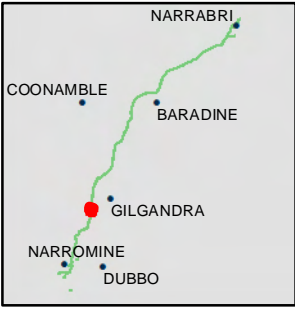
Coordinate System: GDA 1994 MGA Zone 55

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Author: JacobsGHD Scale: 1:10,000
Data Sources: Basemap layers: NSWSS; all other layers: JacobsGHD

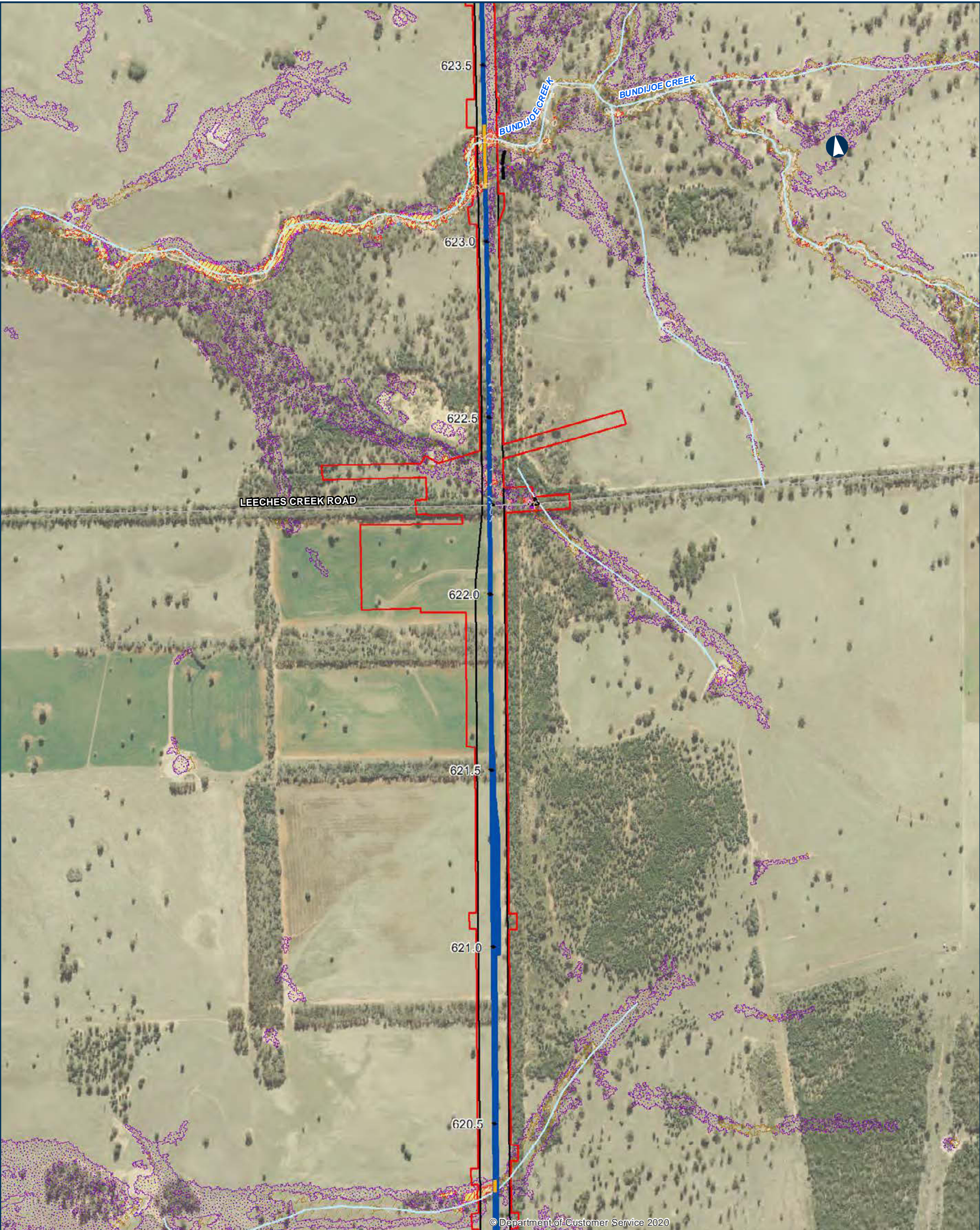
- Bridge
- Road QDL departure
- Alignment
- The proposal
- Rail Corridor
- Design Velocity Contour (m/s)
 - 1
 - 2
- Design Velocity < 0.5m/s
- Design Velocity > 0.5m/s, Velocity Increase limited to 0.025m/s
- <10% Increase
- 10% to 20% Increase
- Greater than 20% Increase
- Unprotected Surfaces
- Existing not flooded, design velocity > 0.5m/s

- Existing velocity < 0.5m/s, design velocity > 0.5m/s
- Existing velocity > 0.5m/s (AETV), Design Velocity > Existing Velocity + 0.025m/s



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NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 20% AEP

Appendix I - Figure 2.1.25

0 200 400 Metres

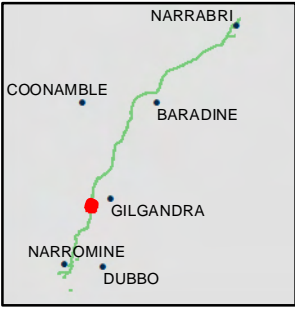
Coordinate System: GDA 1994 MGA Zone 55

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Data Sources: Basemap layers: NSWSS; all other layers: JacobsGHD

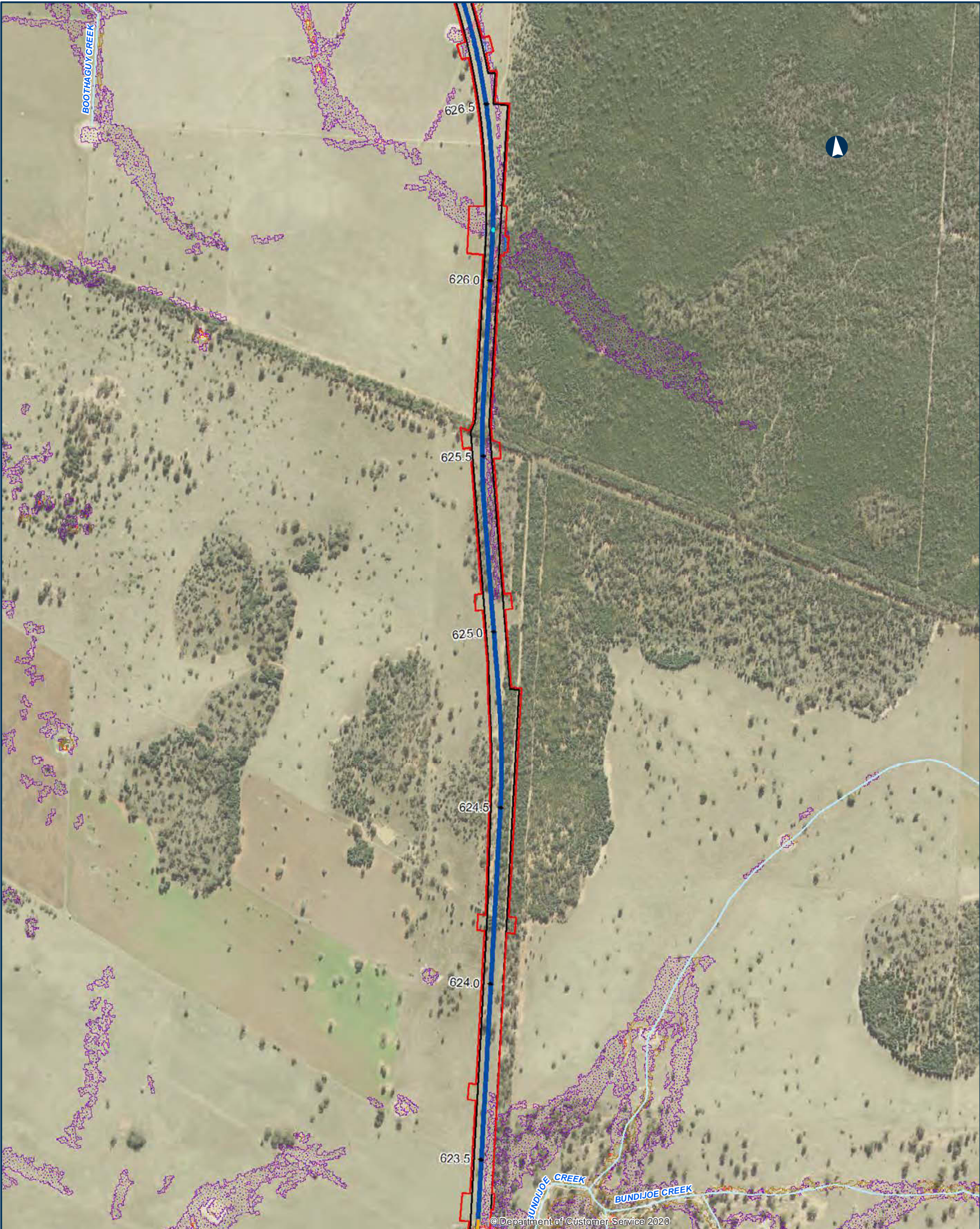
- Road ODL departure
- Bridge
- Road ODL departure
- Alignment
- The proposal
- Rail Corridor
- Design Velocity Contour (m/s)
 - 1
 - 2
- Design Velocity < 0.5m/s
- Design Velocity > 0.5m/s, Velocity increase limited to 0.025m/s
- <10% Increase
- 10% to 20% Increase
- Greater than 20% Increase
- Protected Surfaces
 - Existing velocity <1m/s, design velocity > 1.2m/s

- Unprotected Surfaces
 - Existing not flooded, design velocity > 0.5m/s
 - Existing velocity < 0.5m/s, design velocity > 0.5m/s
 - Existing velocity > 0.5m/s (AETV), Design Velocity > Existing Velocity + 0.025m/s



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NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 20% AEP

Appendix I - Figure 2.1.26

0 200 400 Metres

Coordinate System: GDA 1994 MGA Zone 55

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Date: 9/08/2022 Paper: A3
Author: JacobsGHD Scale: 1:10,000
Data Sources: Basemap layers: NSWSS; all other layers: JacobsGHD

- Bridge

Culvert

Road QDL departure

Alignment

The proposal

Drainage Control Area

Rail Corridor
- Design Velocity Contour (m/s)

1

2

Design Velocity < 0.5m/s

Design Velocity > 0.5m/s, Velocity increase limited to 0.025m/s

<10% Increase

10% to 20% Increase
- Greater than 20% increase

Unprotected Surfaces

Existing not flooded, design velocity > 0.5m/s

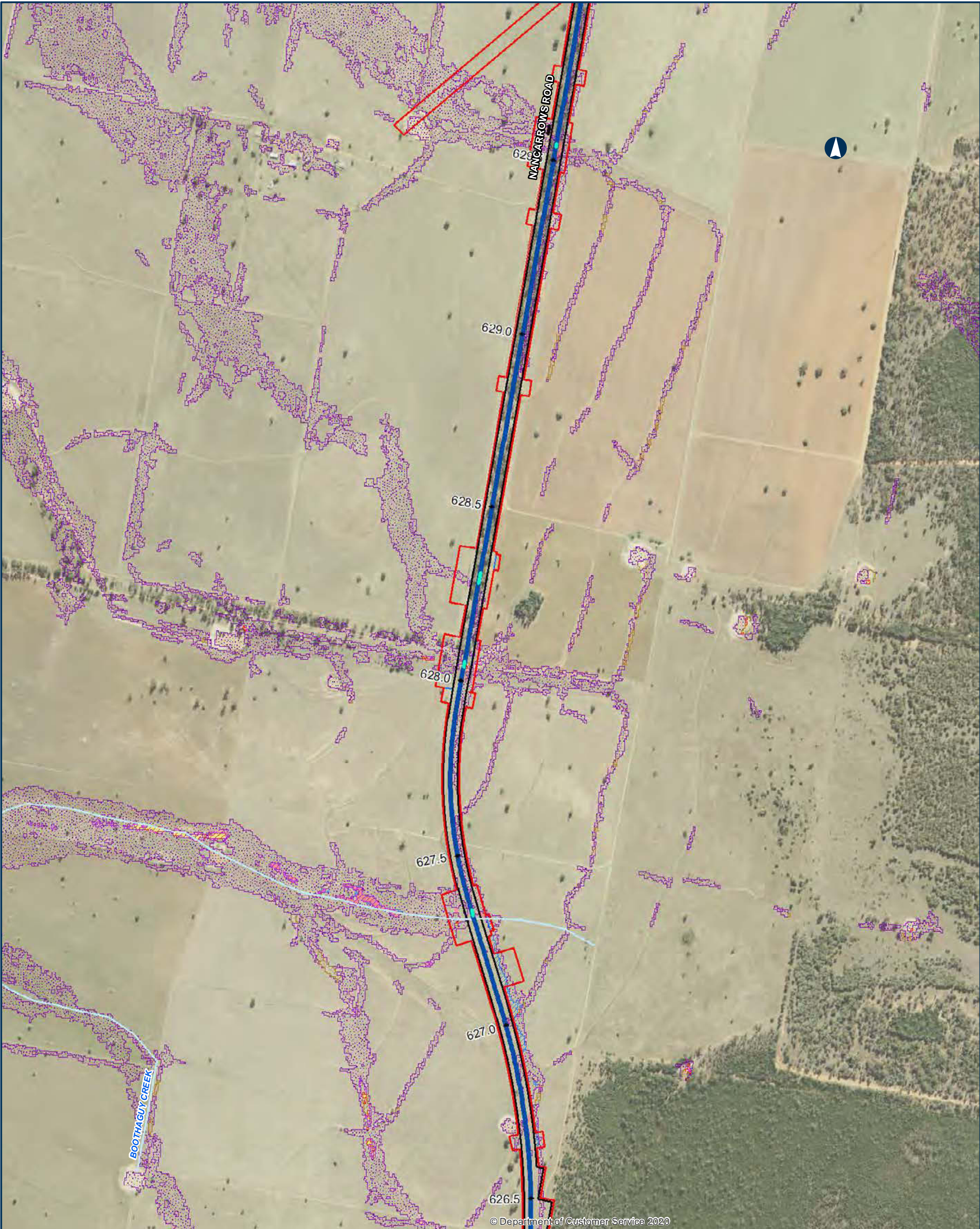
Existing velocity < 0.5m/s, design velocity > 0.5m/s

Existing velocity > 0.5m/s (AETV), Design Velocity > Existing Velocity + 0.025m/s



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NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 20% AEP

Appendix I - Figure 2.1.27

0200400Metres

Coordinate System: GDA 1994 MGA Zone 55

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Date: 9/08/2022
Author: JacobsGHD
Data Sources: Basemap layers: NSWSS; all other layers: JacobsGHD

Paper: A3
Scale: 1:10,000

Road ODL departure

Culvert

Road ODL departure

Alignment

The proposal

Drainage Control Area

Rail Corridor

Design Velocity Contour (m/s)

1

Design Velocity < 0.5m/s

Design Velocity > 0.5m/s, Velocity increase limited to 0.025m/s

<10% Increase

10% to 20% Increase

Greater than 20% Increase

Unprotected Surfaces

Existing not flooded, design velocity > 0.5m/s

Existing velocity < 0.5m/s, design velocity > 0.5m/s

Existing velocity > 0.5m/s (AETV), Design Velocity > Existing Velocity + 0.025m/s

NARRABRI

COONAMBLE

BARADINE

GILGANDRA

NARROMINE

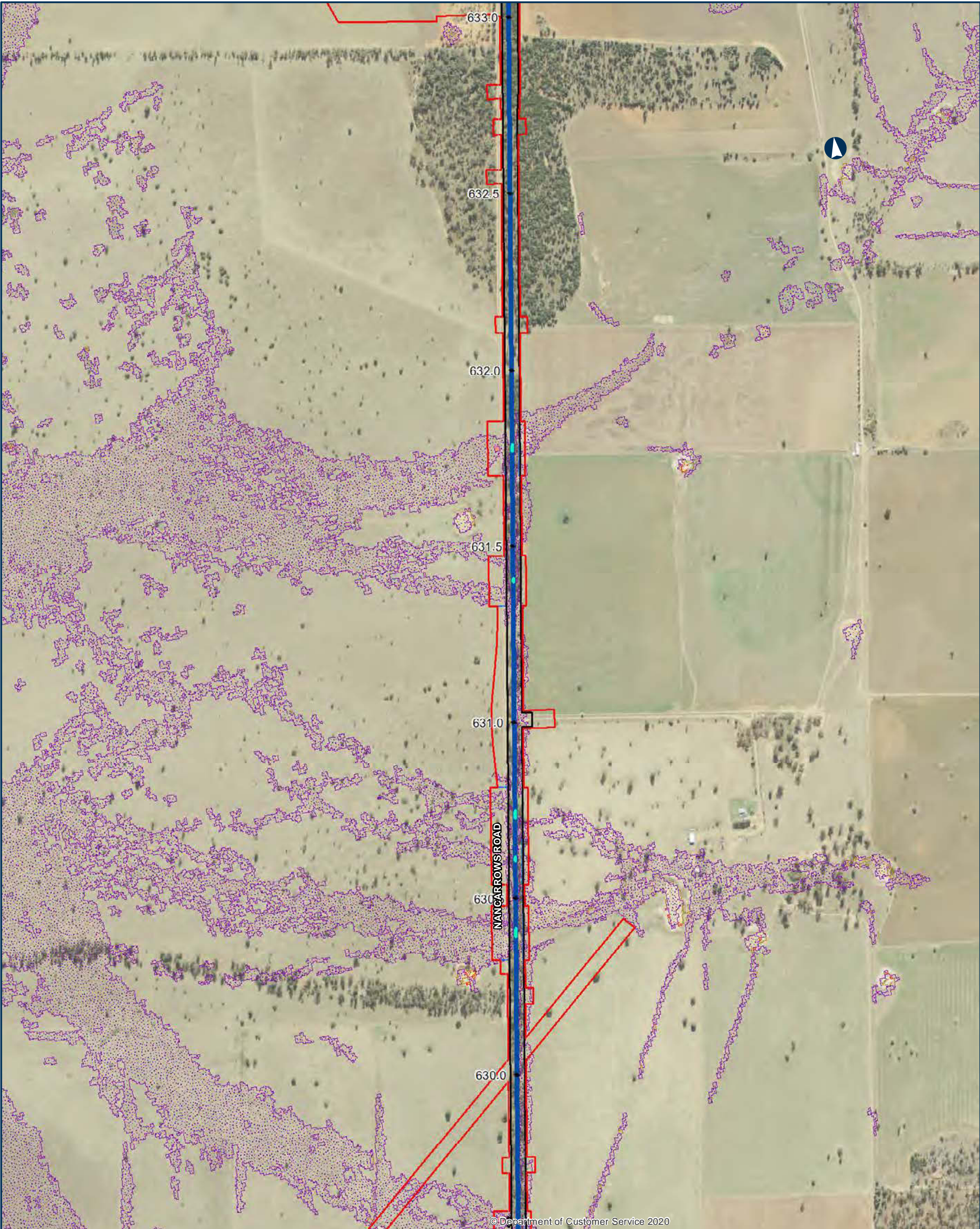
DUBBO

INLAND RAIL

ARTC

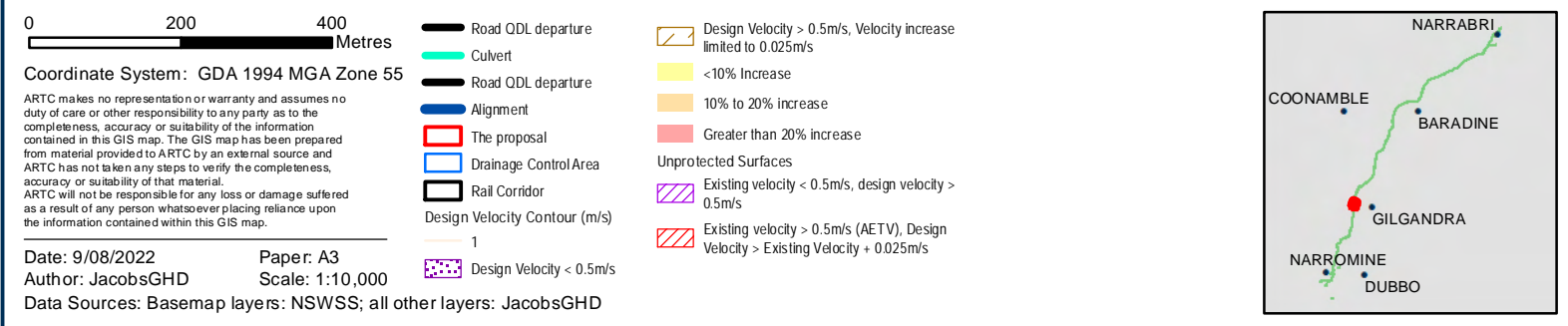
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NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 20% AEP

Appendix I - Figure 2.1.28





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NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 20% AEP

Appendix I - Figure 2.1.29

0 200 400 Metres

Coordinate System: GDA 1994 MGA Zone 55

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Data Sources: Basemap layers: NSWSS; all other layers: JacobsGHD

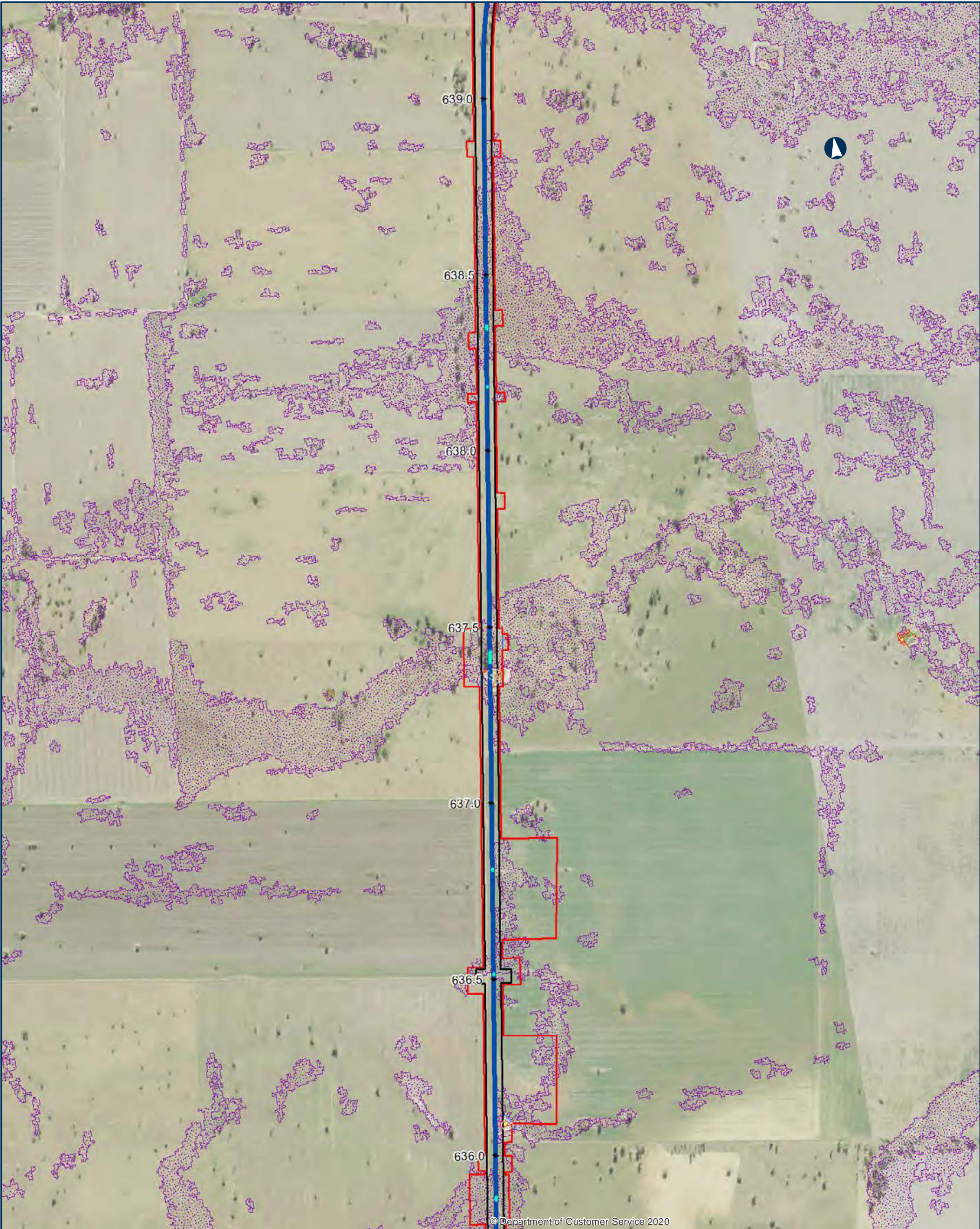
- Bridge
- Culvert
- Road ODL departure
- Alignment
- The proposal
- Drainage Control Area
- Rail Corridor
- Design Velocity Contour (m/s)
- 1
- 2
- Design Velocity < 0.5m/s
- Design Velocity > 0.5m/s, Velocity increase limited to 0.025m/s
- <10% Increase
- 10% to 20% increase
- Greater than 20% increase

- Protected Surfaces
- Existing velocity <1m/s, design velocity > 1.2m/s
- Unprotected Surfaces
- Existing not flooded, design velocity > 0.5m/s
- Existing velocity < 0.5m/s, design velocity > 0.5m/s
- Existing velocity > 0.5m/s (AETV), Design Velocity > Existing Velocity + 0.025m/s



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NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 20% AEP

Appendix I - Figure 2.1.30

0 200 400 Metres

Coordinate System: GDA 1994 MGA Zone 55

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Date: 9/08/2022 Paper: A3
Author: JacobsGHD Scale: 1:10,000
Data Sources: Basemap layers: NSWSS; all other layers: JacobsGHD

- Culvert
- Road QDL departure
- Alignment
- The proposal
- Drainage Control Area
- Rail Corridor
- Design Velocity Contour (m/s)
- 1
- 2
- Design Velocity < 0.5m/s
- Design Velocity > 0.5m/s, Velocity increase limited to 0.025m/s
- <10% Increase
- 10% to 20% increase
- Greater than 20% increase

- Unprotected Surfaces
- Existing not flooded, design velocity > 0.5m/s
- Existing velocity < 0.5m/s, design velocity > 0.5m/s
- Existing velocity > 0.5m/s (AETV), Design Velocity > Existing Velocity + 0.025m/s



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NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 20% AEP

Appendix I - Figure 2.1.31

0 200 400 Metres

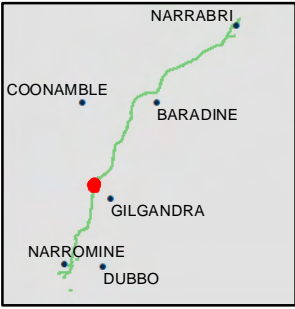
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Author: JacobsGHD Scale: 1:10,000
Data Sources: Basemap layers: NSWSS; all other layers: JacobsGHD

- Culvert
- Road QDL departure
- Alignment
- The proposal
- Drainage Control Area
- Rail Corridor
- Design Velocity Contour (m/s)
- 1
- 2
- Design Velocity < 0.5m/s
- Design Velocity > 0.5m/s, Velocity increase limited to 0.025m/s
- <10% Increase
- 10% to 20% increase
- Greater than 20% increase

- Unprotected Surfaces
- Existing not flooded, design velocity > 0.5m/s
- Existing velocity < 0.5m/s, design velocity > 0.5m/s
- Existing velocity > 0.5m/s (AETV), Design Velocity > Existing Velocity + 0.025m/s



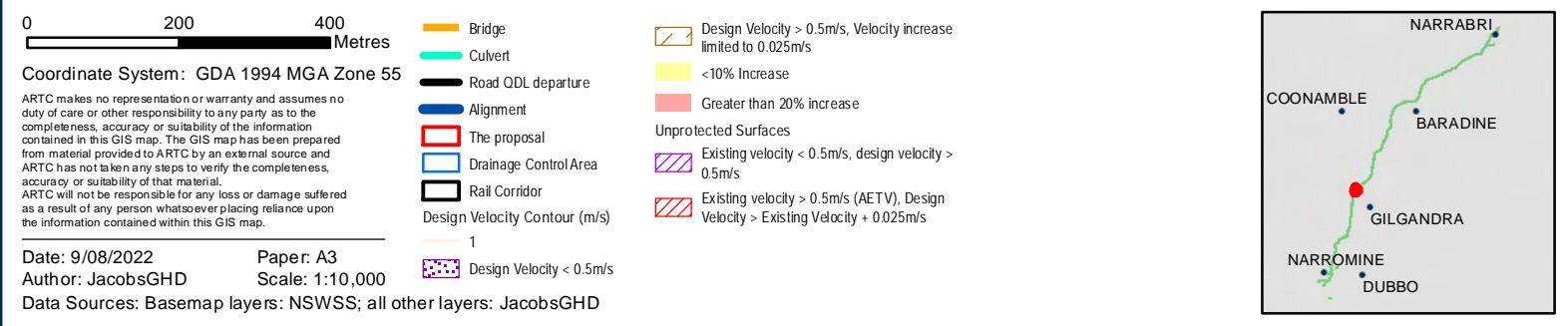
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NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 20% AEP

Appendix I - Figure 2.1.32

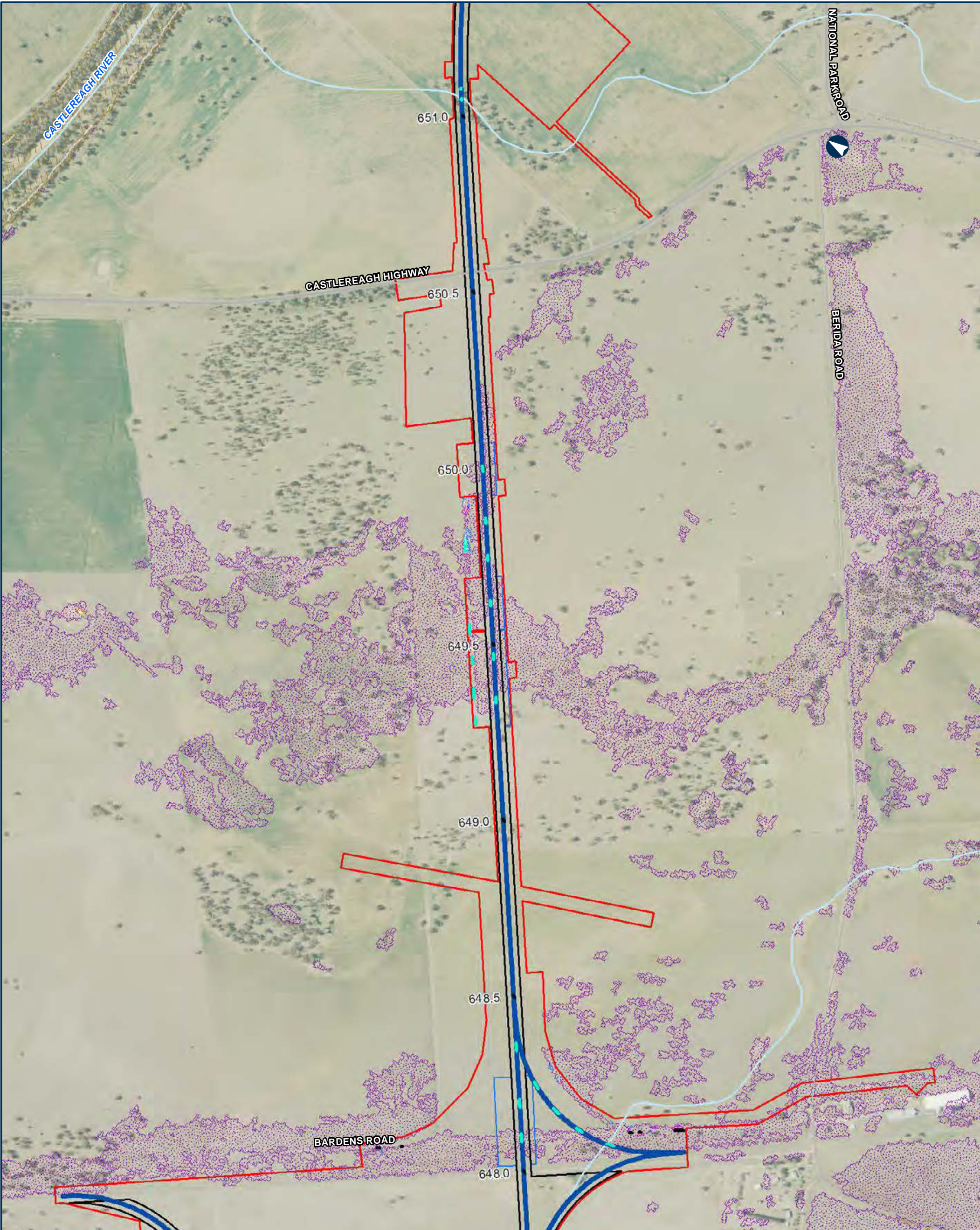




Appendix I - Figure 2.1.33



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NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 20% AEP

Appendix I - Figure 2.1.34

0200400

Metres

Coordinate System: GDA 1994 MGA Zone 55

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Date: 9/08/2022

Paper: A3

Author: JacobsGHD

Scale: 1:10,000

Data Sources: Basemap layers: NSWSS; all other layers: JacobsGHD

Culvert

Road ODL departure

Alignment

The proposal

Drainage Control Area

Rail Corridor

Design Velocity Contour (m/s)

1

2

Design Velocity < 0.5m/s

Design Velocity > 0.5m/s, Velocity increase limited to 0.025m/s

<10% Increase

Greater than 20% increase

Unprotected Surfaces

Existing not flooded, design velocity > 0.5m/s

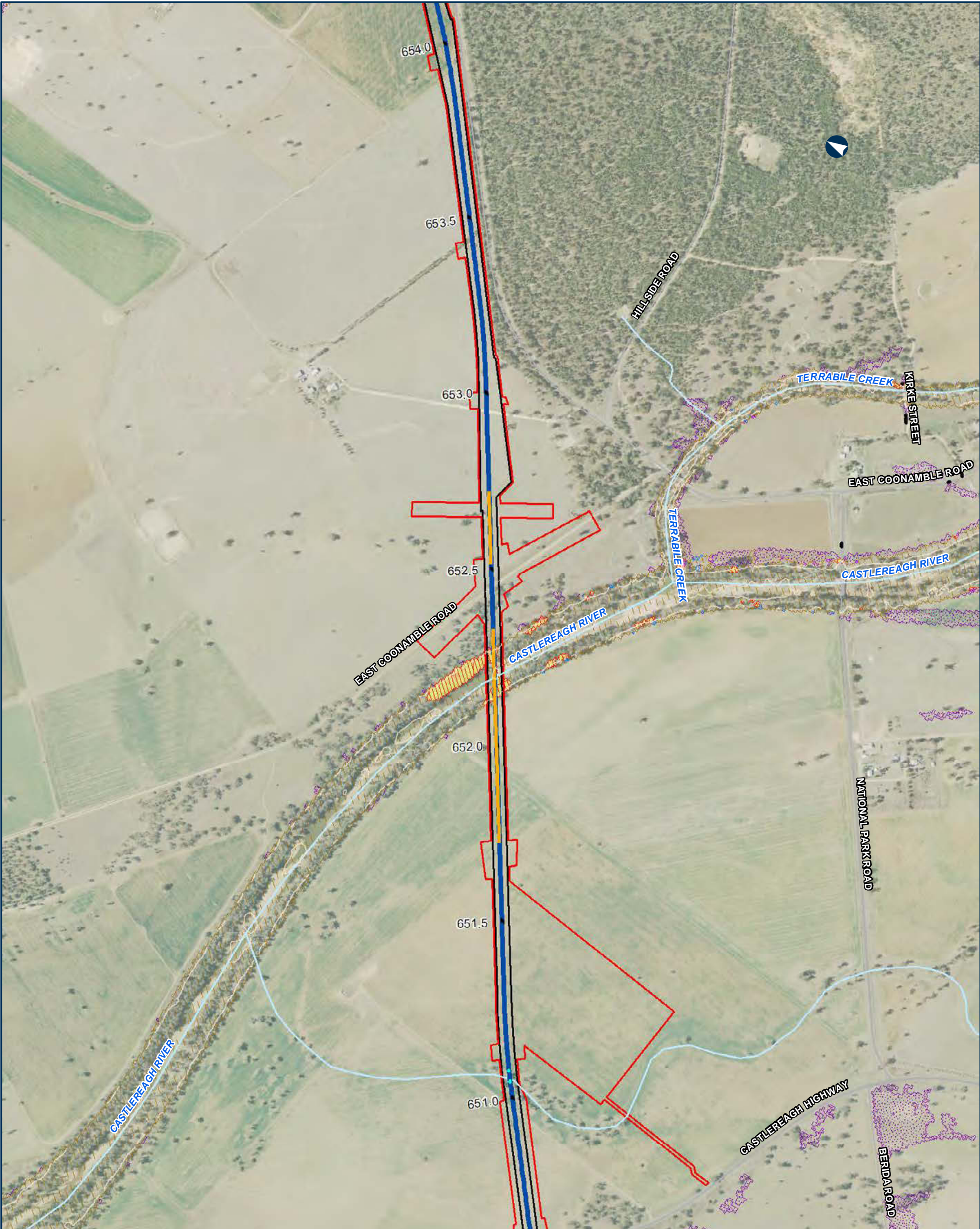
Existing velocity < 0.5m/s, design velocity > 0.5m/s

Existing velocity > 0.5m/s (AETV), Design Velocity > Existing Velocity + 0.025m/s

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NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 20% AEP

Appendix I - Figure 2.1.35

0 200 400 Metres

Coordinate System: GDA 1994 MGA Zone 55

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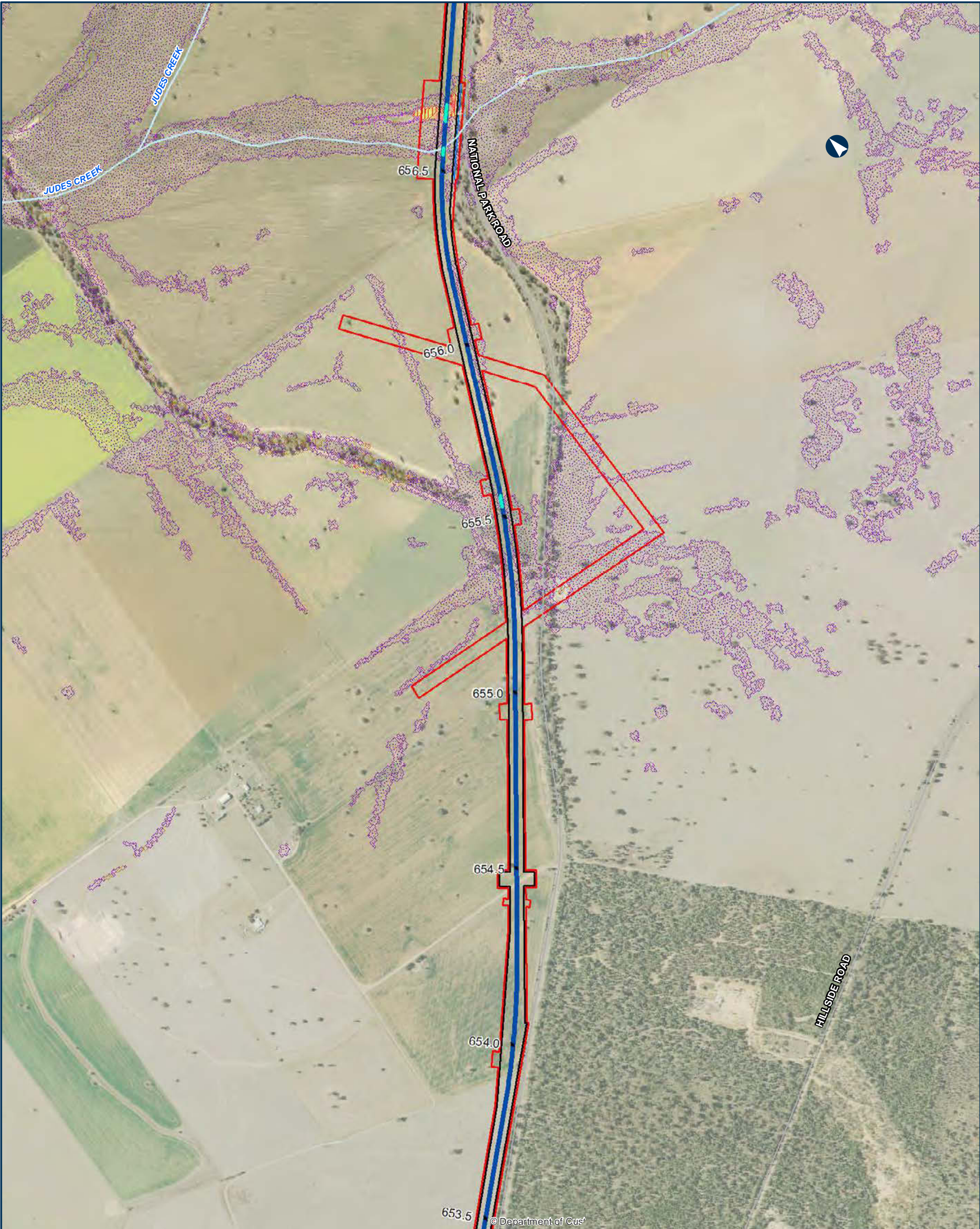
Date: 9/08/2022 Paper: A3
Author: JacobsGHD Scale: 1:10,000
Data Sources: Basemap layers: NSWSS; all other layers: JacobsGHD

- | | | |
|----------------------|---|---|
| — Road ODL departure | Design Velocity Contour (m/s) | Greater than 20% increase |
| — Bridge | 1 | Unprotected Surfaces |
| — Culvert | 2 | Existing not flooded, design velocity > 0.5m/s |
| — Road ODL departure | Design Velocity < 0.5m/s | Existing velocity < 0.5m/s, design velocity > 0.5m/s |
| — Alignment | Design Velocity > 0.5m/s, Velocity increase limited to 0.025m/s | Existing velocity > 0.5m/s (AETV), Design Velocity > Existing Velocity + 0.025m/s |
| — The proposal | <10% Increase | |
| — Rail Corridor | 10% to 20% Increase | |



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NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 20% AEP

Appendix I - Figure 2.1.36

0200400

Metres

Coordinate System: GDA 1994 MGA Zone 55

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Date: 9/08/2022

Paper: A3

Author: JacobsGHD

Scale: 1:10,000

Data Sources: Basemap layers: NSWSS; all other layers: JacobsGHD

Culvert

Road QDL departure

Alignment

The proposal

Drainage Control Area

Rail Corridor

Design Velocity Contour (m/s)

1

Design Velocity < 0.5m/s

Design Velocity > 0.5m/s, Velocity Increase limited to 0.025m/s

<10% Increase

10% to 20% Increase

Greater than 20% Increase

Unprotected Surfaces

Existing not flooded, design velocity > 0.5m/s

Existing velocity < 0.5m/s, design velocity > 0.5m/s

Existing velocity > 0.5m/s (AETV), Design Velocity > Existing Velocity + 0.025m/s

NARRABRI

COONAMBLE

BARADINE

GILGANDRA

NARROMINE

DUBBO

INLAND RAIL

ARTC

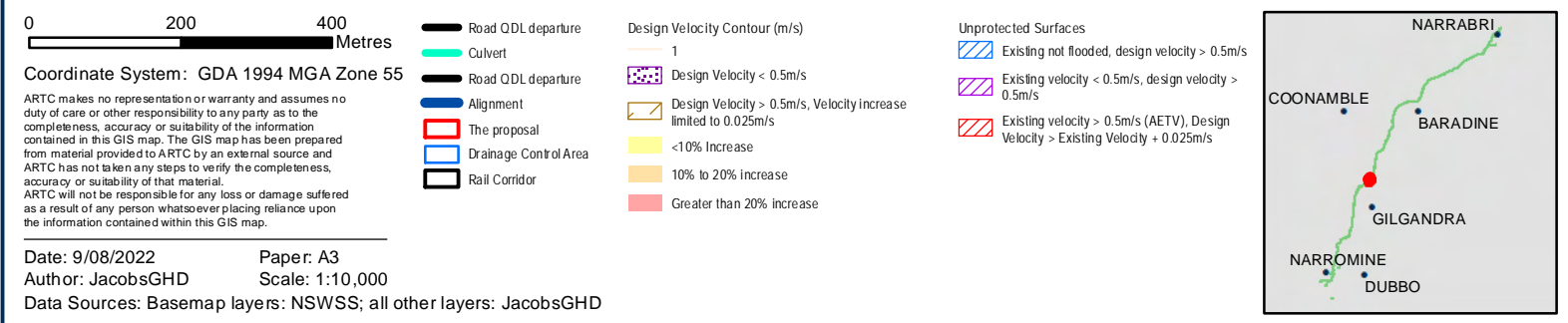
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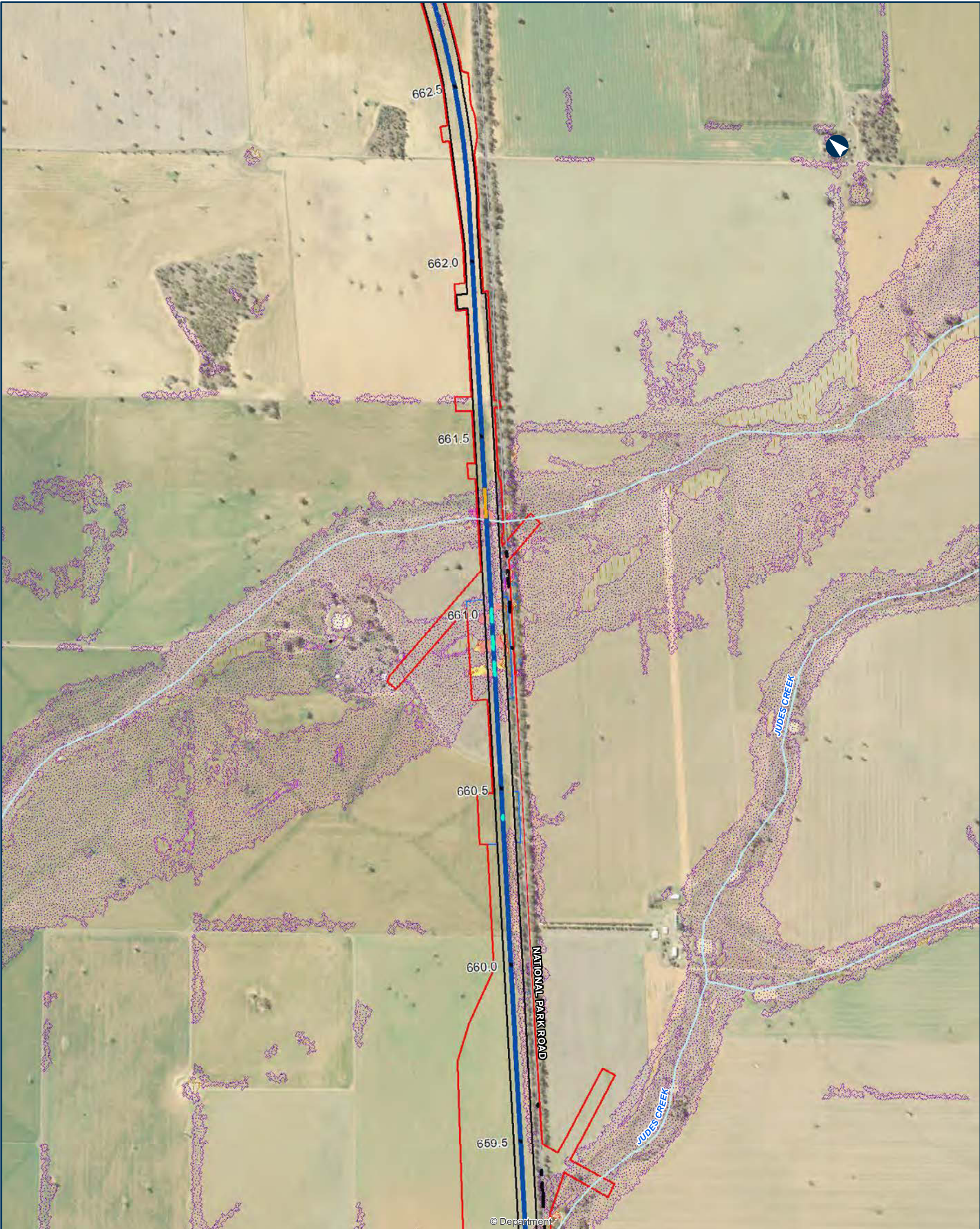
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NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 20% AEP

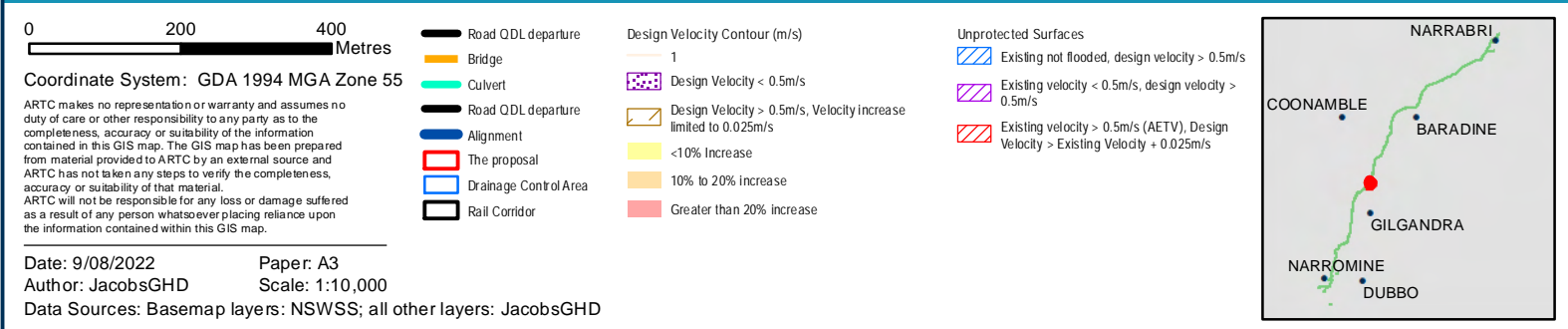
Appendix I - Figure 2.1.37





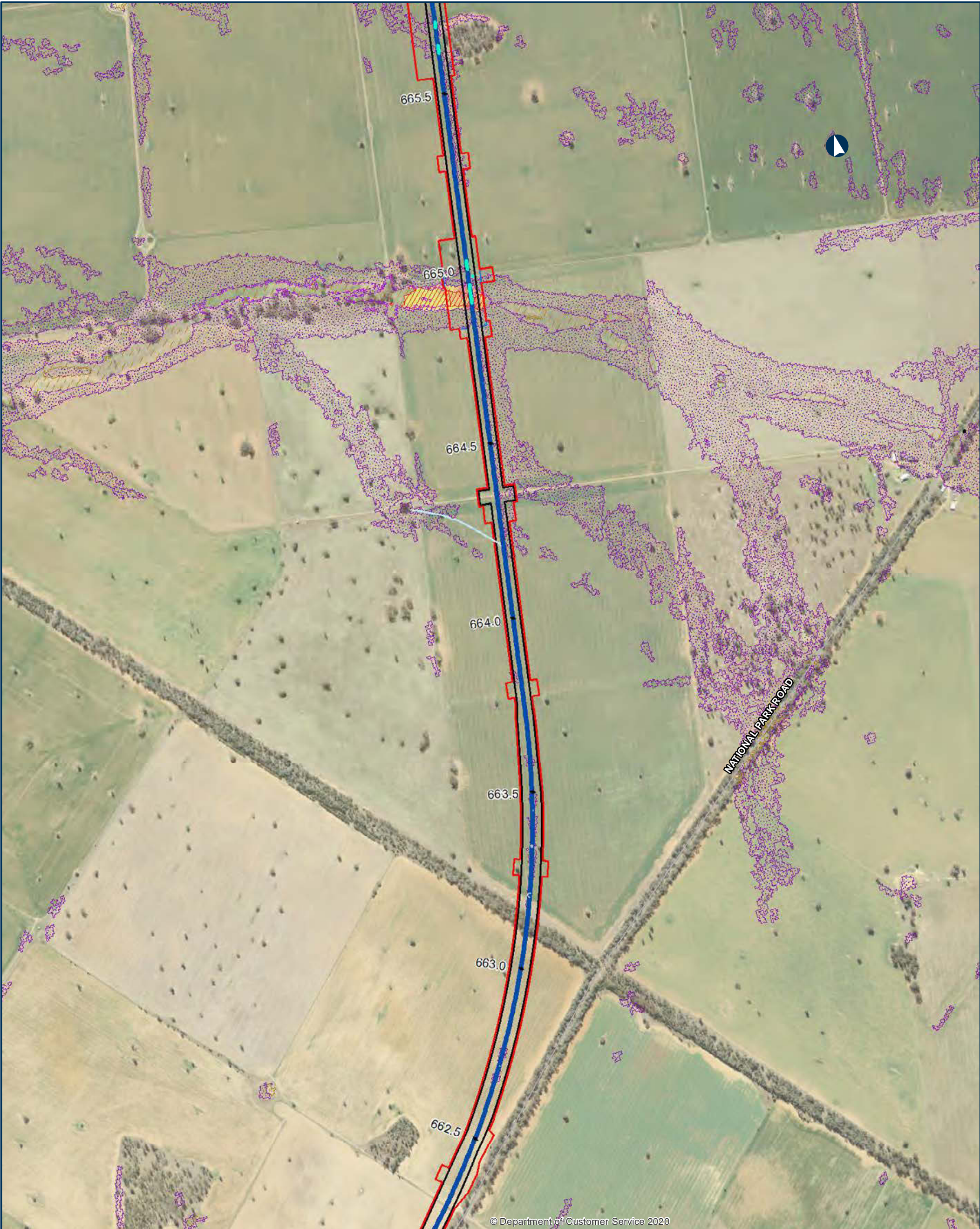
NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 20% AEP

Appendix I - Figure 2.1.38



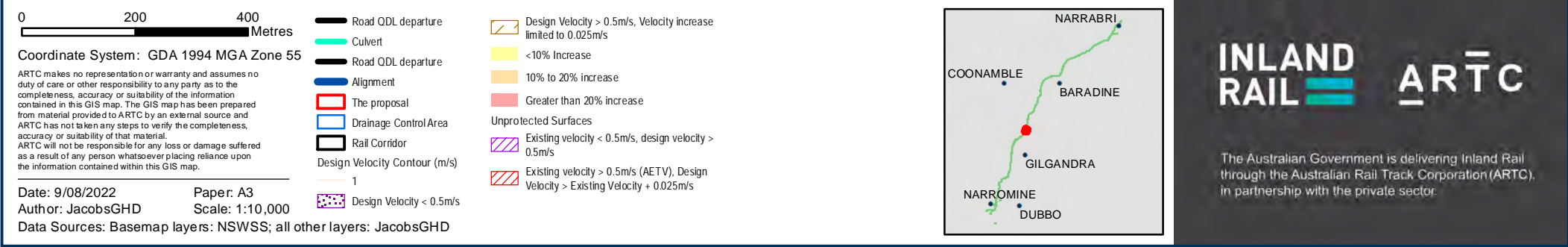
INLAND RAIL ARTC

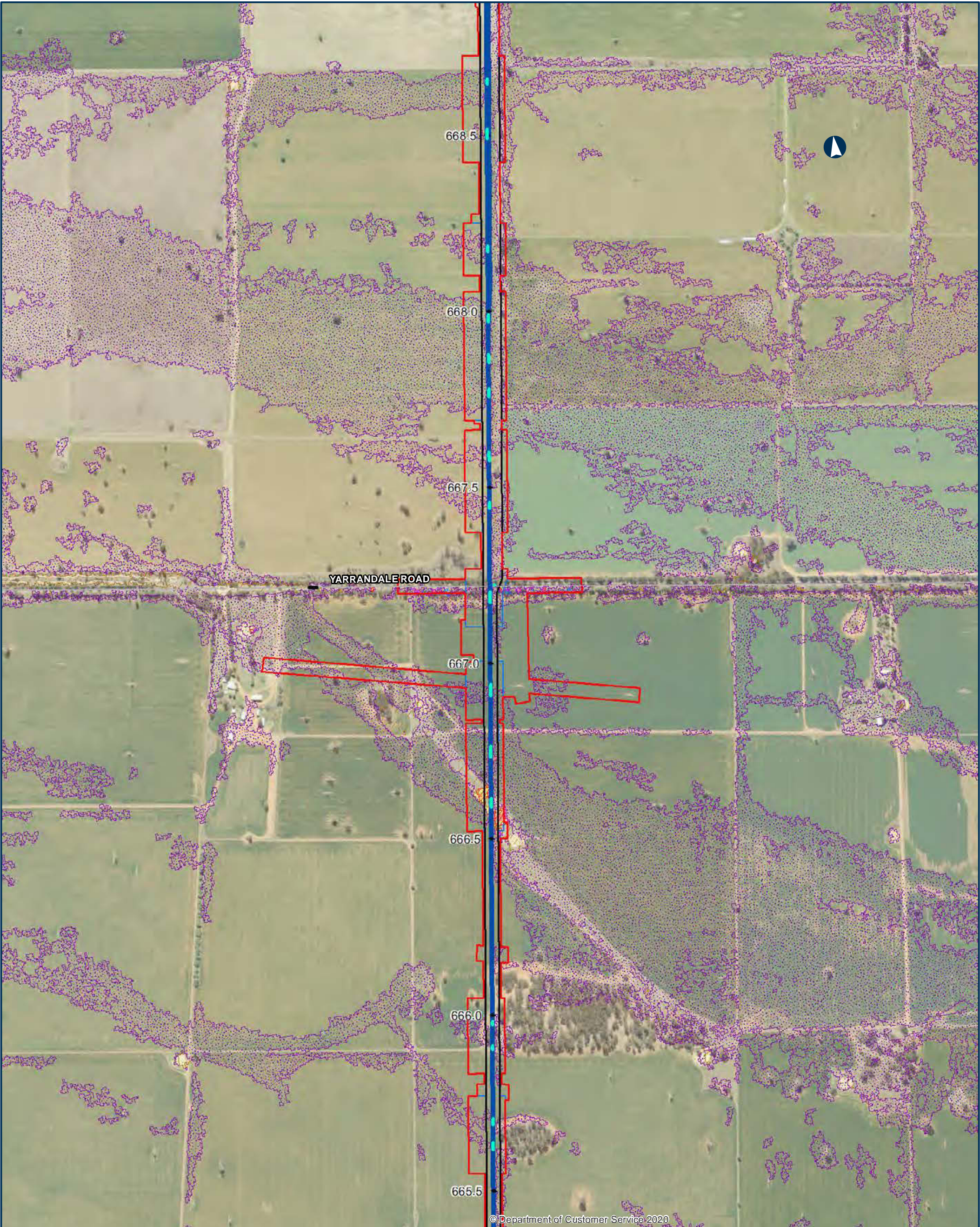
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NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 20% AEP

Appendix I - Figure 2.1.39





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NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 20% AEP

Appendix I - Figure 2.1.40

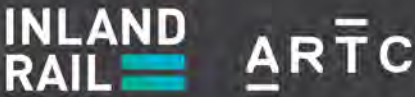
0 200 400 Metres

Coordinate System: GDA 1994 MGA Zone 55

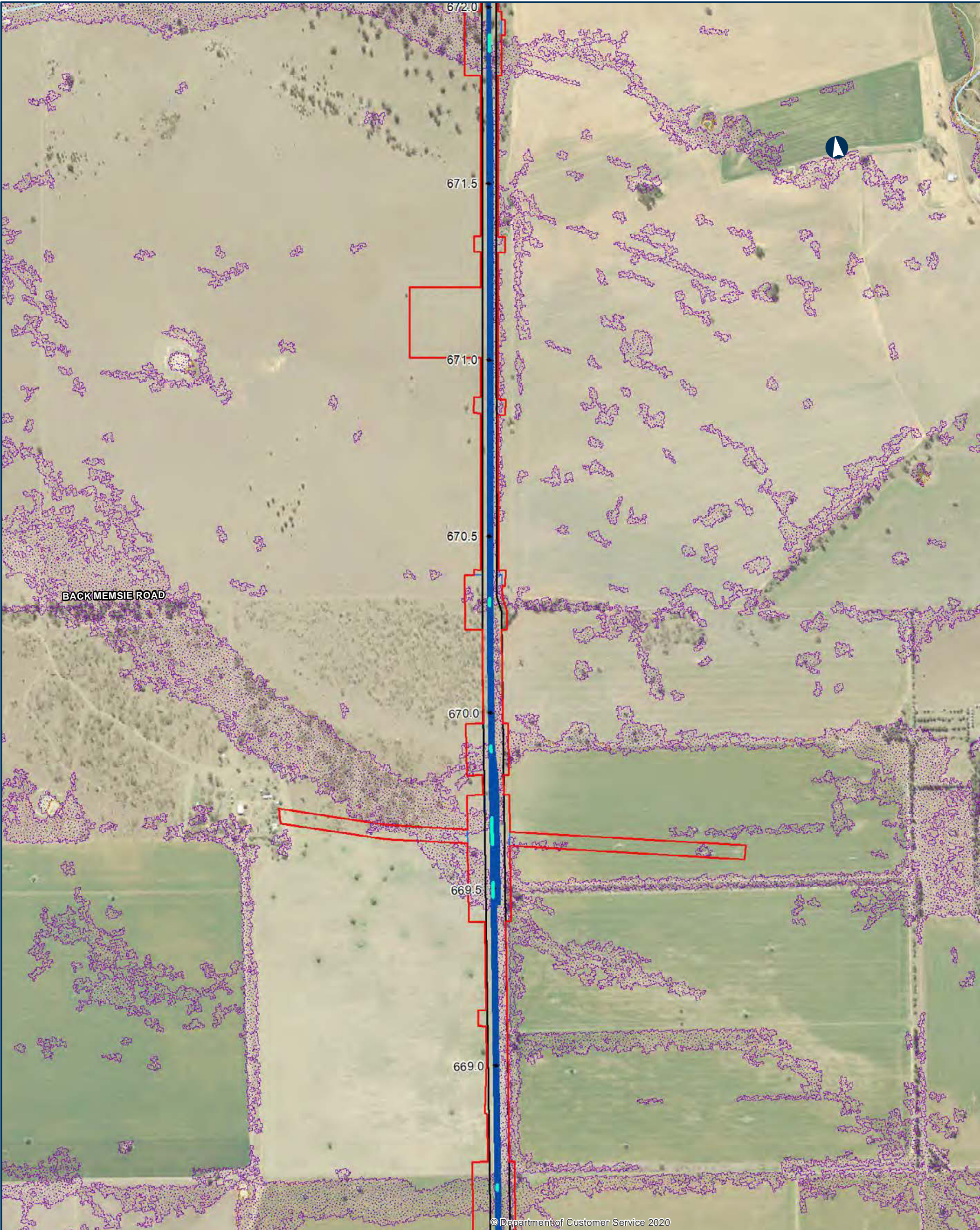
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Date: 9/08/2022 Paper: A3
Author: JacobsGHD Scale: 1:10,000
Data Sources: Basemap layers: NSWSS; all other layers: JacobsGHD

— Road ODL departure	Design Velocity Contour (m/s)	Greater than 20% increase
— Culvert	1	Unprotected Surfaces
— Road ODL departure	2	Existing not flooded, design velocity > 0.5m/s
— Alignment	Design Velocity < 0.5m/s	Existing velocity < 0.5m/s, design velocity > 0.5m/s
— The proposal	Design Velocity > 0.5m/s, Velocity increase limited to 0.025m/s	Existing velocity > 0.5m/s (AETV), Design Velocity > Existing Velocity + 0.025m/s
— Drainage Control Area	<10% Increase	
— Rail Corridor	10% to 20% increase	



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NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 20% AEP

Appendix I - Figure 2.1.41

0 200 400 Metres

Coordinate System: GDA 1994 MGA Zone 55

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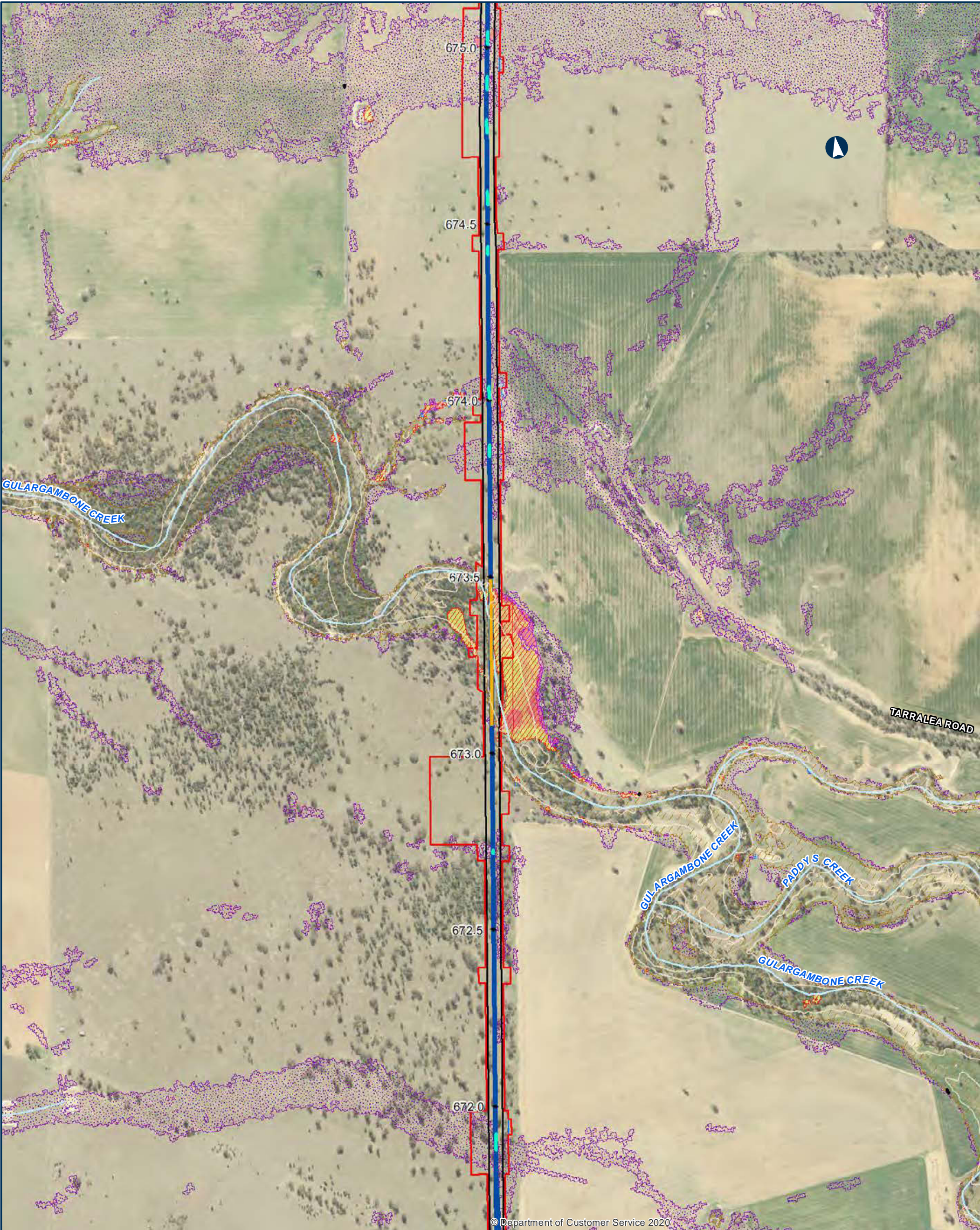
Date: 9/08/2022 Paper: A3
Author: JacobsGHD Scale: 1:10,000
Data Sources: Basemap layers: NSWSS; all other layers: JacobsGHD

- Culvert
- Road QDL departure
- Alignment
- The proposal
- Drainage Control Area
- Rail Corridor
- Design Velocity Contour (m/s)
 - 1
 - 2
 - Design Velocity < 0.5m/s
- Design Velocity > 0.5m/s, Velocity increase limited to 0.025m/s
- <10% Increase
- Greater than 20% increase
- Unprotected Surfaces
 - Existing not flooded, design velocity > 0.5m/s
 - Existing velocity < 0.5m/s, design velocity > 0.5m/s
 - Existing velocity > 0.5m/s (AETV), Design Velocity > Existing Velocity + 0.025m/s



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NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 20% AEP

Appendix I - Figure 2.1.42

0 200 400 Metres

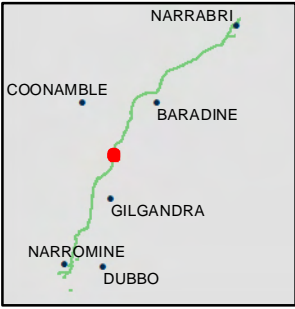
Coordinate System: GDA 1994 MGA Zone 55

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Date: 9/08/2022 Paper: A3
Author: JacobsGHD Scale: 1:10,000
Data Sources: Basemap layers: NSWSS; all other layers: JacobsGHD

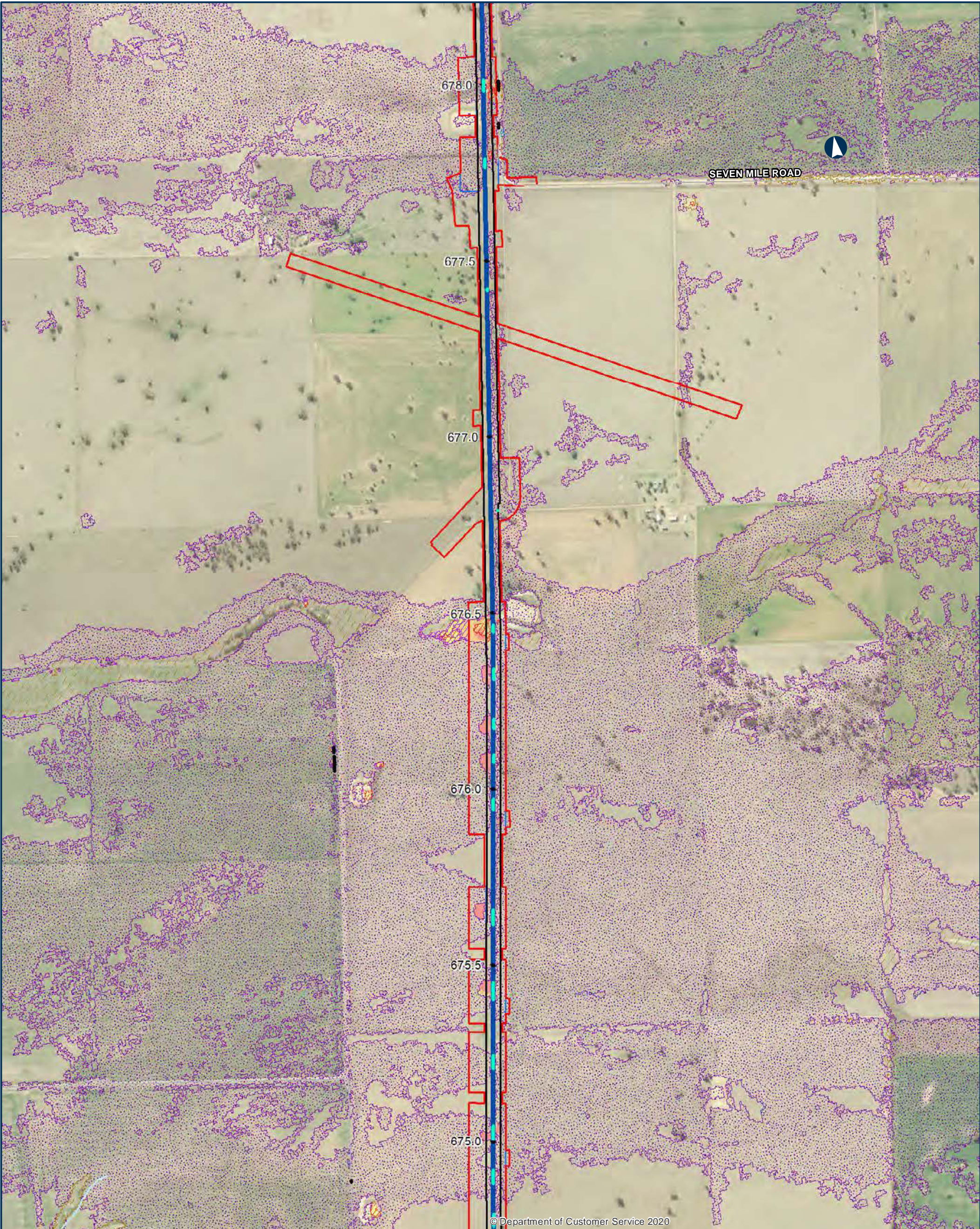
- Road ODL departure
 - Bridge
 - Culvert
 - Road ODL departure
 - Alignment
 - The proposal
 - Drainage Control Area
 - Rail Corridor
- Design Velocity Contour (m/s)
- 1
 - 2
 - Design Velocity < 0.5m/s
 - Design Velocity > 0.5m/s, Velocity increase limited to 0.025m/s
 - <10% Increase
 - 10% to 20% Increase
 - Greater than 20% increase

- Unprotected Surfaces
- Existing not flooded, design velocity > 0.5m/s
 - Existing velocity < 0.5m/s, design velocity > 0.5m/s
 - Existing velocity > 0.5m/s (AETV), Design Velocity > Existing Velocity + 0.025m/s



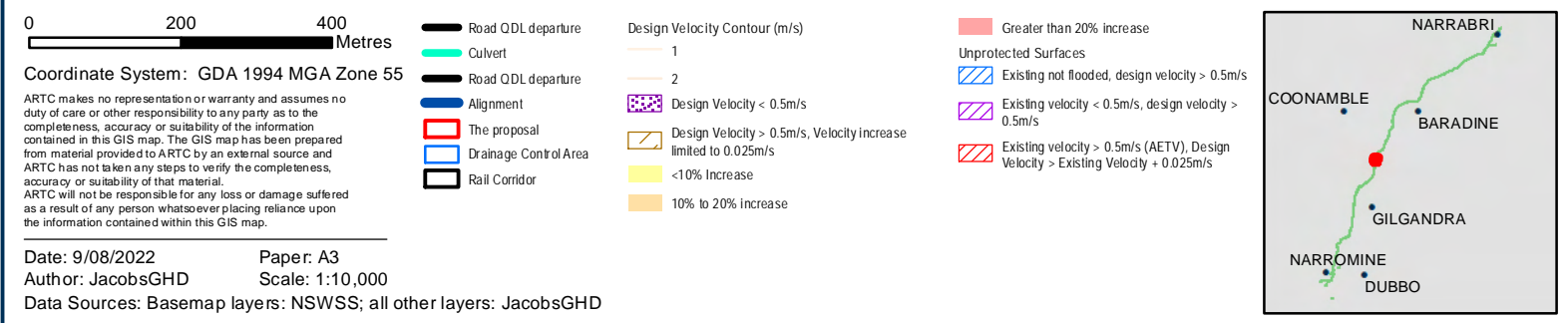
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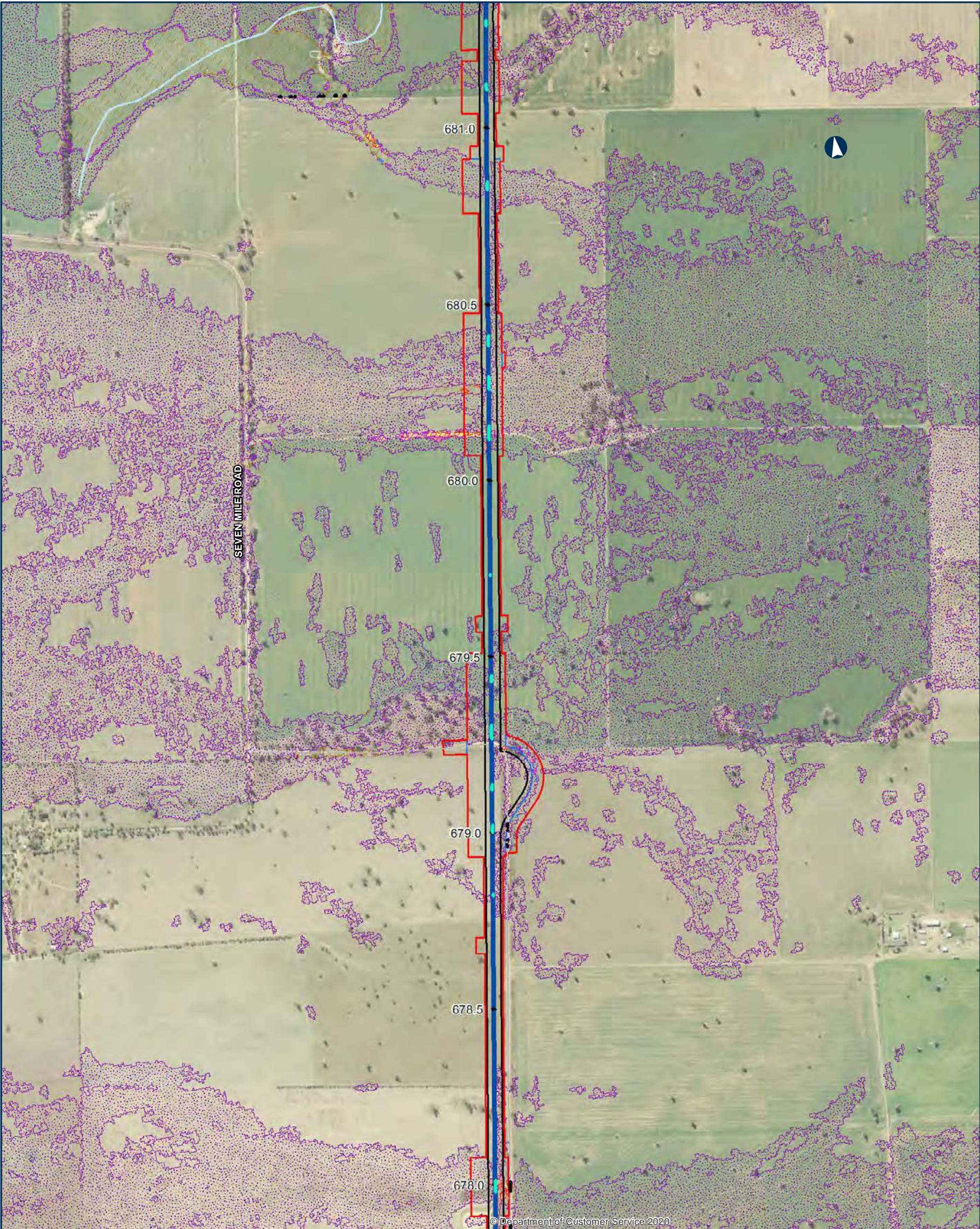
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NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 20% AEP

Appendix I - Figure 2.1.43





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NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 20% AEP

Appendix I - Figure 2.1.44

0 200 400 Metres

Coordinate System: GDA 1994 MGA Zone 55

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Date: 9/08/2022 Paper: A3
Author: JacobsGHD Scale: 1:10,000
Data Sources: Basemap layers: NSWSS; all other layers: JacobsGHD

- Road ODL departure
- Culvert
- Road ODL departure
- Alignment
- The proposal
- Drainage Control Area
- Rail Corridor

- Design Velocity Contour (m/s)
- 1
 - Design Velocity < 0.5m/s
 - Design Velocity > 0.5m/s, Velocity increase limited to 0.025m/s
 - <10% Increase
 - 10% to 20% Increase
 - Greater than 20% Increase

- Unprotected Surfaces
- Existing not flooded, design velocity > 0.5m/s
 - Existing velocity < 0.5m/s, design velocity > 0.5m/s
 - Existing velocity > 0.5m/s (AETV), Design Velocity > Existing Velocity + 0.025m/s



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NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 20% AEP

Appendix I - Figure 2.1.45

0 200 400 Metres

Coordinate System: GDA 1994 MGA Zone 55

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Date: 9/08/2022 Paper: A3
Author: JacobsGHD Scale: 1:10,000
Data Sources: Basemap layers: NSWSS; all other layers: JacobsGHD

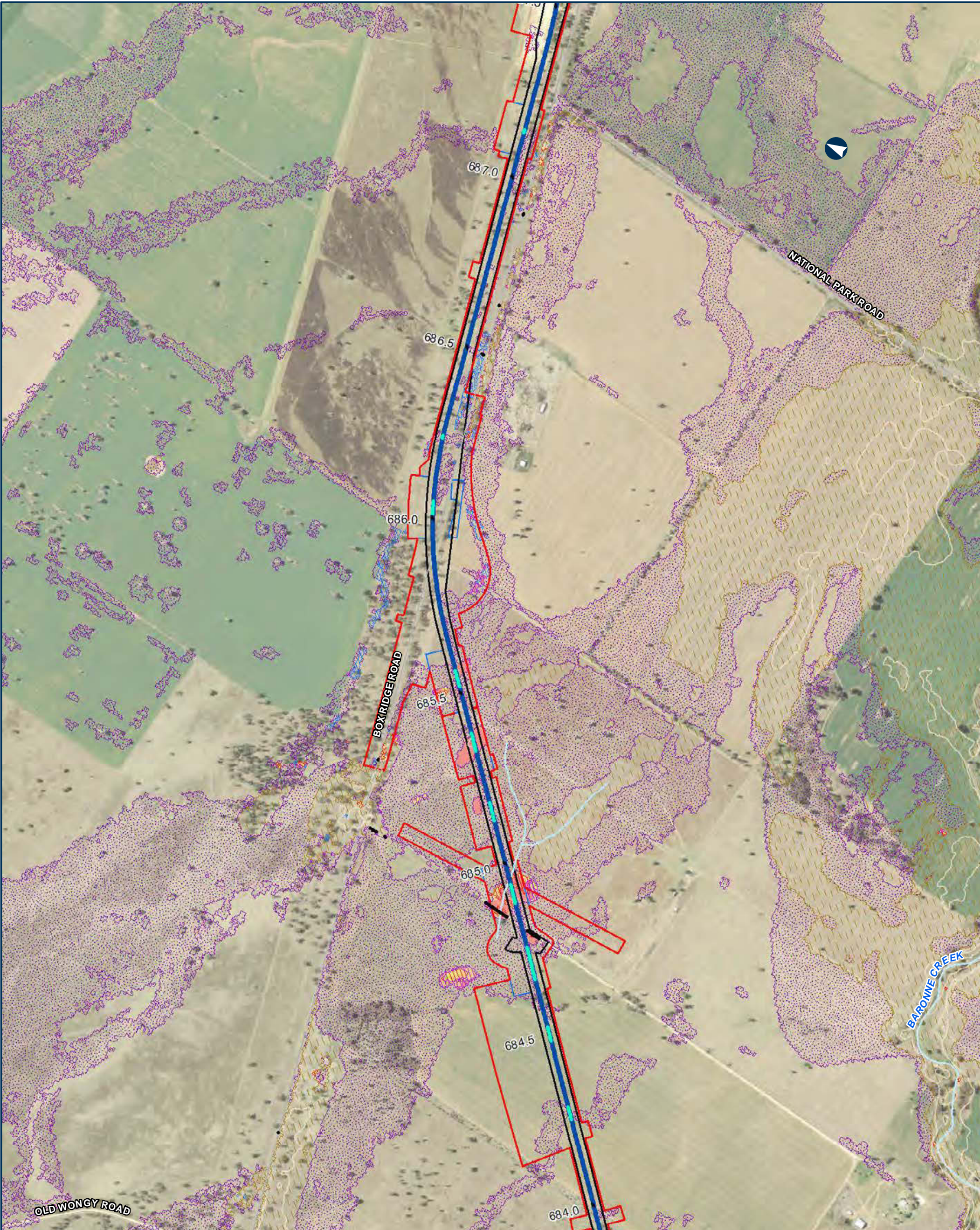
- | | |
|-------------------------|---|
| — Road ODL departure | Design Velocity Contour (m/s) |
| — Bridge | 1 |
| — Culvert | 2 |
| — Road ODL departure | Design Velocity < 0.5m/s |
| — Alignment | Design Velocity > 0.5m/s, Velocity increase limited to 0.025m/s |
| — The proposal | <10% Increase |
| — Drainage Control Area | 10% to 20% Increase |
| — Rail Corridor | Greater than 20% increase |

- Unprotected Surfaces
- Existing not flooded, design velocity > 0.5m/s
 - Existing velocity < 0.5m/s, design velocity > 0.5m/s
 - Existing velocity > 0.5m/s (AETV), Design Velocity > Existing Velocity + 0.025m/s



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NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 20% AEP

Appendix I - Figure 2.1.46

0 200 400 Metres

Coordinate System: GDA 1994 MGA Zone 55

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Date: 9/08/2022 Paper: A3
Author: JacobsGHD Scale: 1:10,000
Data Sources: Basemap layers: NSWSS; all other layers: JacobsGHD

- | | | |
|-------------------------|---|---|
| — Road ODL departure | Design Velocity Contour (m/s) | Greater than 20% increase |
| — Culvert | 1 | Unprotected Surfaces |
| — Road ODL departure | 2 | Existing not flooded, design velocity > 0.5m/s |
| — Alignment | Design Velocity < 0.5m/s | Existing velocity < 0.5m/s, design velocity > 0.5m/s |
| — The proposal | Design Velocity > 0.5m/s, Velocity increase limited to 0.025m/s | Existing velocity > 0.5m/s (AETV), Design Velocity > Existing Velocity + 0.025m/s |
| — Drainage Control Area | <10% Increase | |
| — Rail Corridor | 10% to 20% Increase | |



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NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 20% AEP

Appendix I - Figure 2.1.47

0 200 400 Metres

Coordinate System: GDA 1994 MGA Zone 55

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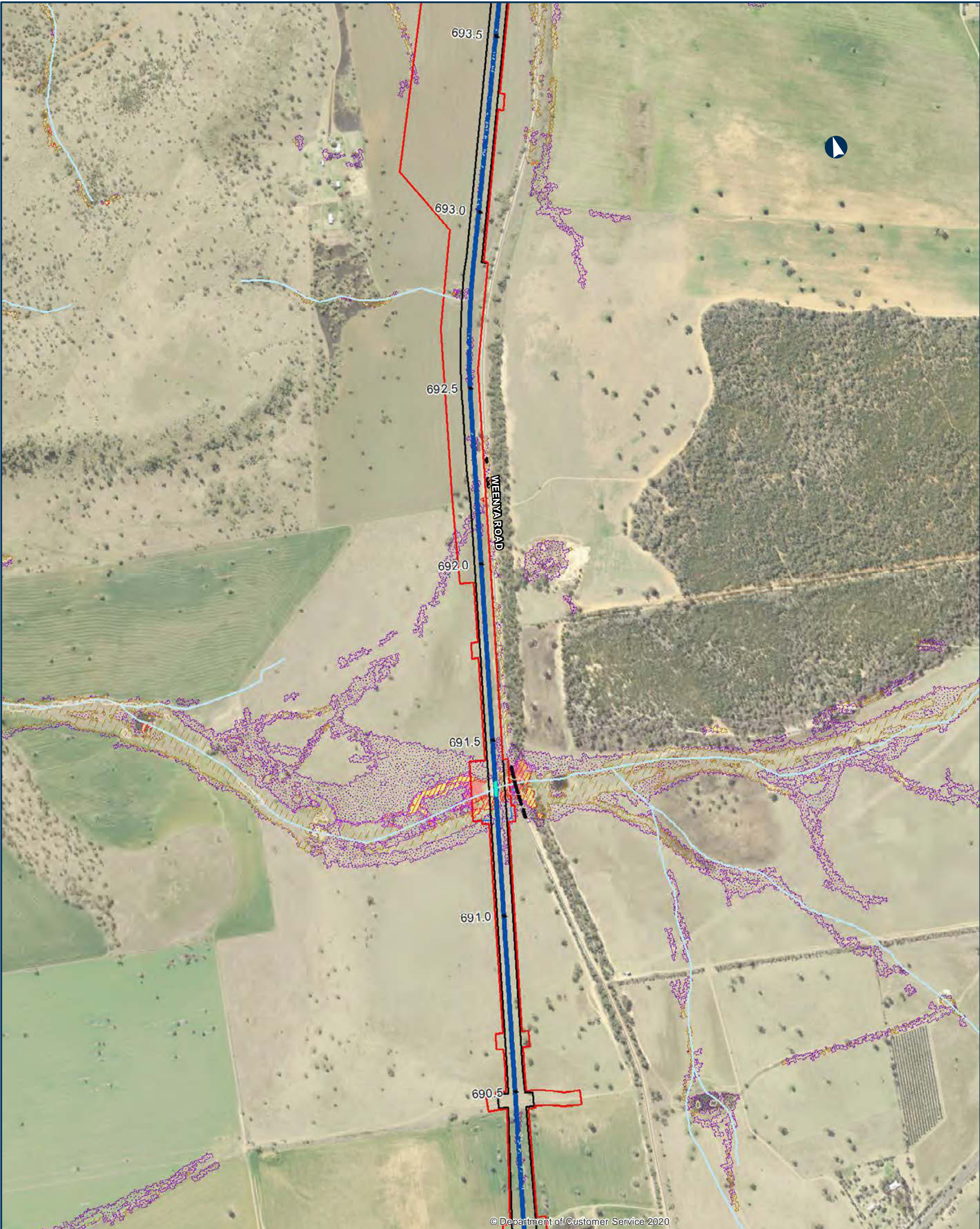
Date: 9/08/2022 Paper: A3
Author: JacobsGHD Scale: 1:10,000
Data Sources: Basemap layers: NSWSS; all other layers: JacobsGHD

- | | | |
|-------------------------|---|---|
| — Road ODL departure | Design Velocity Contour (m/s) | Greater than 20% increase |
| — Culvert | 1 | Unprotected Surfaces |
| — Road ODL departure | 2 | Existing not flooded, design velocity > 0.5m/s |
| — Alignment | Design Velocity < 0.5m/s | Existing velocity < 0.5m/s, design velocity > 0.5m/s |
| — The proposal | Design Velocity > 0.5m/s, Velocity increase limited to 0.025m/s | Existing velocity > 0.5m/s (AETV), Design Velocity > Existing Velocity + 0.025m/s |
| — Drainage Control Area | <10% Increase | |
| — Rail Corridor | 10% to 20% Increase | |



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NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 20% AEP

Appendix I - Figure 2.1.48

0 200 400 Metres

Coordinate System: GDA 1994 MGA Zone 55

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Date: 9/08/2022 Paper: A3
Author: JacobsGHD Scale: 1:10,000
Data Sources: Basemap layers: NSWSS; all other layers: JacobsGHD

- Road ODL departure

Culvert

Road ODL departure

Alignment

The proposal

Drainage Control Area

Rail Corridor
- Design Velocity Contour (m/s)

1

2

Design Velocity < 0.5m/s

Design Velocity > 0.5m/s, Velocity increase limited to 0.025m/s

<10% Increase

10% to 20% Increase
- Greater than 20% increase

Unprotected Surfaces

Existing not flooded, design velocity > 0.5m/s

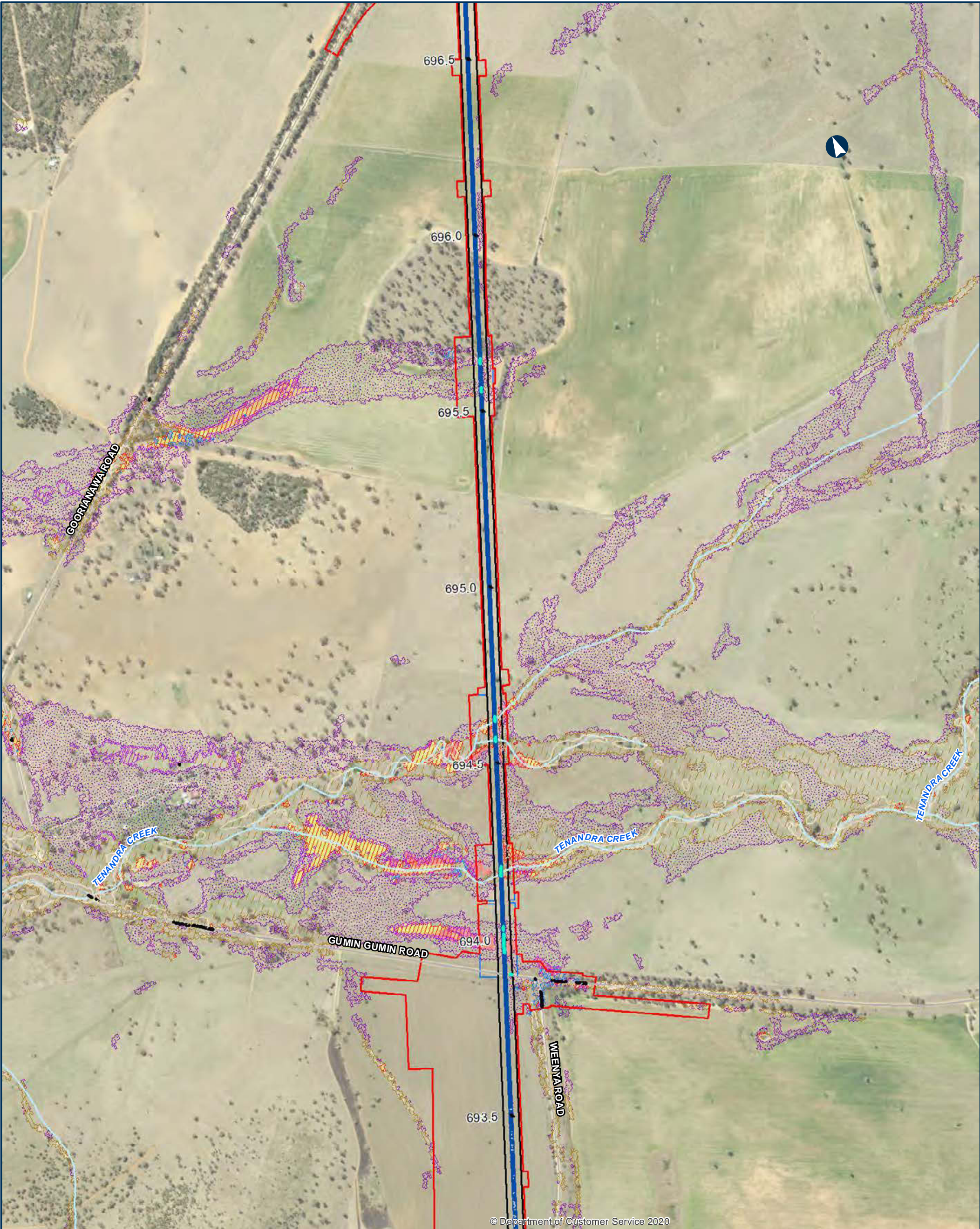
Existing velocity < 0.5m/s, design velocity > 0.5m/s

Existing velocity > 0.5m/s (AETV), Design Velocity > Existing Velocity + 0.025m/s



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NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 20% AEP

Appendix I - Figure 2.1.49

0 200 400 Metres

Coordinate System: GDA 1994 MGA Zone 55

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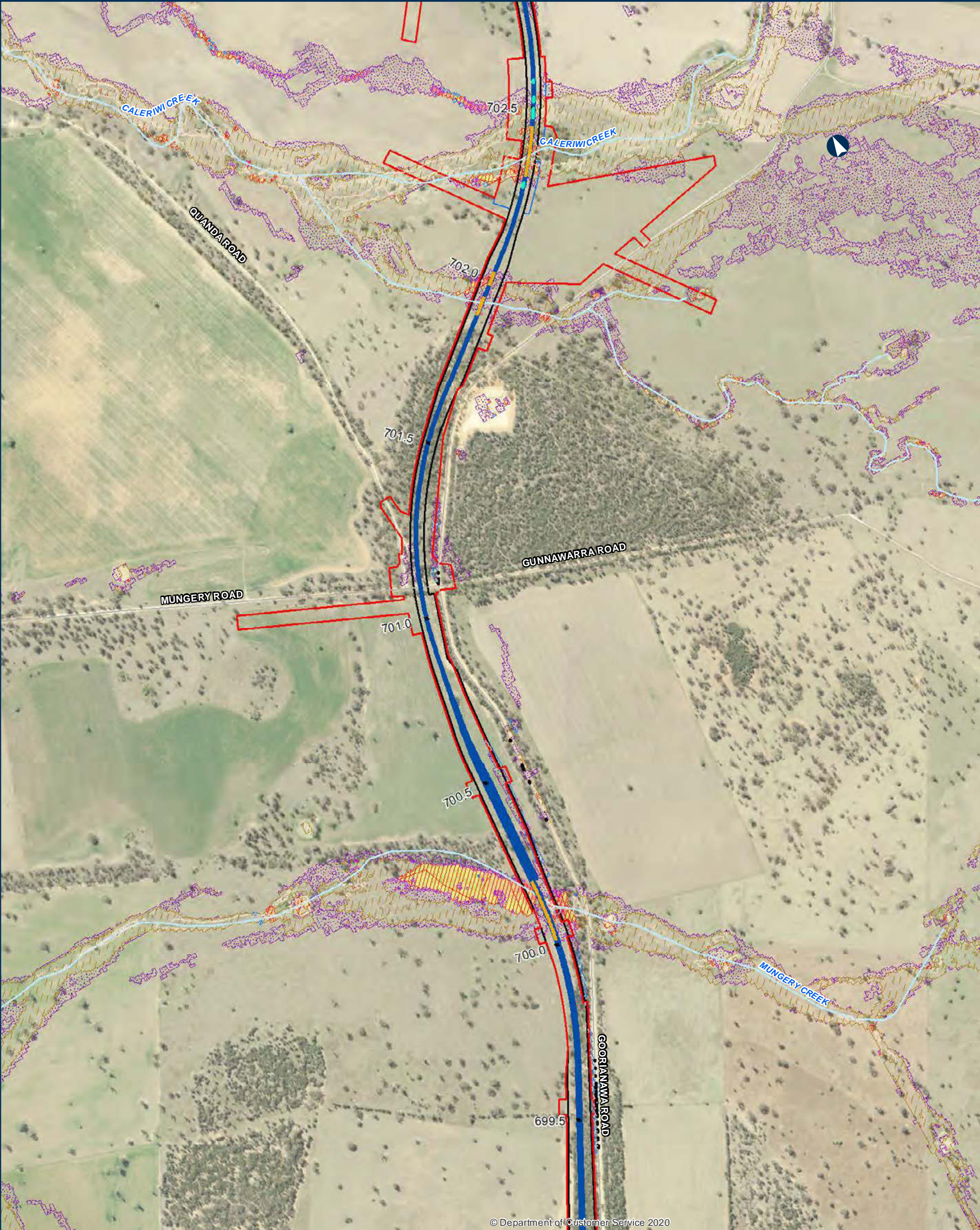
Date: 9/08/2022 Paper: A3
Author: JacobsGHD Scale: 1:10,000
Data Sources: Basemap layers: NSWSS; all other layers: JacobsGHD

- Road ODL departure
 - Culvert
 - Road ODL departure
 - Alignment
 - The proposal
 - Drainage Control Area
 - Rail Corridor
- Design Velocity Contour (m/s)
- 1
 - 2
 - Design Velocity < 0.5m/s
 - Design Velocity > 0.5m/s, Velocity increase limited to 0.025m/s
 - <10% Increase
 - 10% to 20% Increase
- Greater than 20% increase
 - Unprotected Surfaces
 - Existing not flooded, design velocity > 0.5m/s
 - Existing velocity < 0.5m/s, design velocity > 0.5m/s
 - Existing velocity > 0.5m/s (AETV), Design Velocity > Existing Velocity + 0.025m/s



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NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 20% AEP

Appendix I - Figure 2.1.51

0 200 400 Metres

Coordinate System: GDA 1994 MGA Zone 55

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Date: 9/08/2022 Paper: A3
Author: JacobsGHD Scale: 1:10,000
Data Sources: Basemap layers: NSWSS; all other layers: JacobsGHD

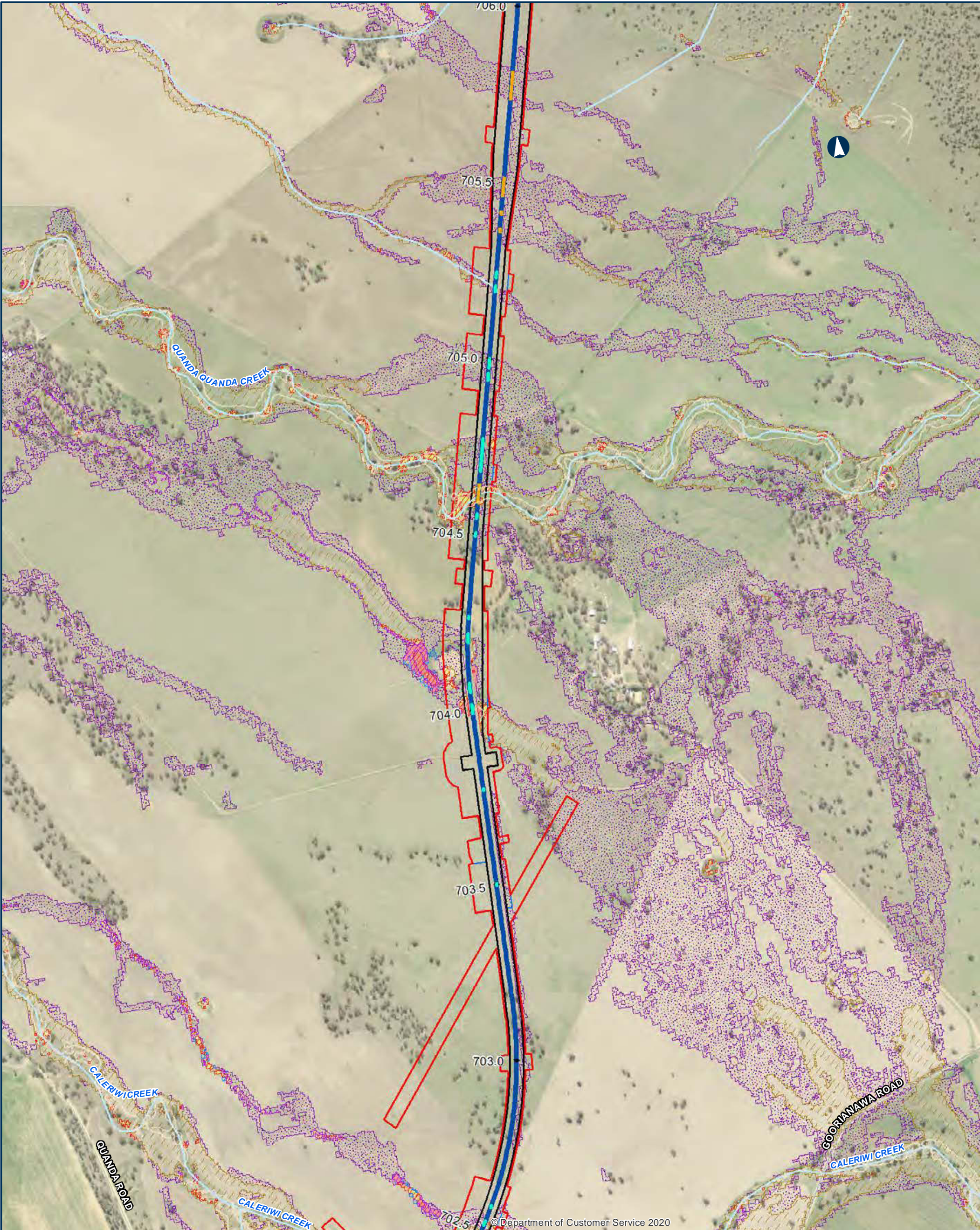
- Road ODL departure
— Bridge
— Culvert
— Road ODL departure
— Alignment
— The proposal
— Drainage Control Area
— Rail Corridor
- Design Velocity Contour (m/s)
1
2
Design Velocity < 0.5m/s
Design Velocity > 0.5m/s, Velocity increase limited to 0.025m/s
<10% Increase
10% to 20% Increase
Greater than 20% Increase

- Unprotected Surfaces
Existing not flooded, design velocity > 0.5m/s
Existing velocity < 0.5m/s, design velocity > 0.5m/s
Existing velocity > 0.5m/s (AETV), Design Velocity > Existing Velocity + 0.025m/s



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NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 20% AEP

Appendix I - Figure 2.1.52

0 200 400 Metres

Coordinate System: GDA 1994 MGA Zone 55

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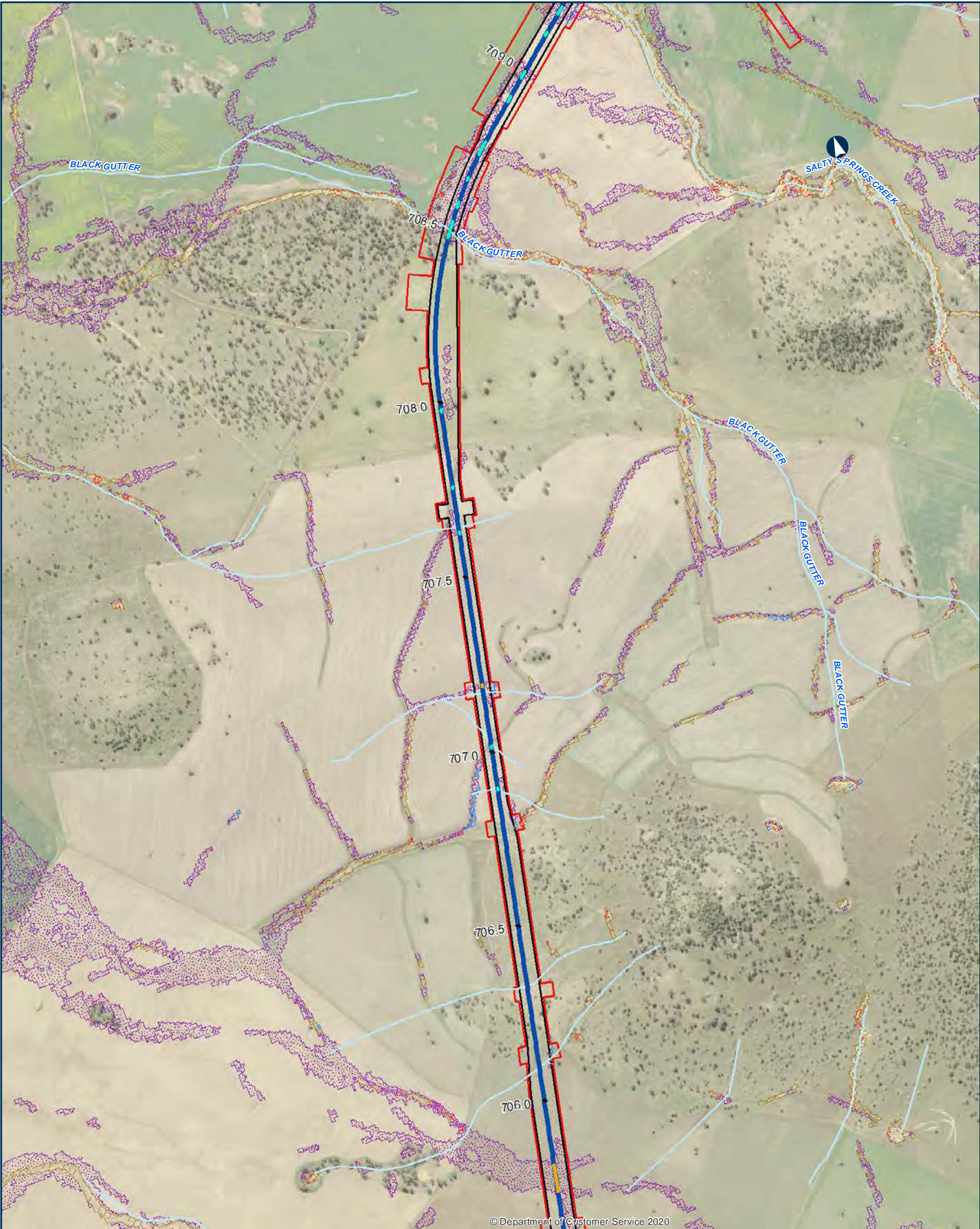
Date: 9/08/2022 Paper: A3
Author: JacobsGHD Scale: 1:10,000
Data Sources: Basemap layers: NSWSS; all other layers: JacobsGHD

- Bridge
 - Culvert
 - Road QDL departure
 - Alignment
 - The proposal
 - Drainage Control Area
 - Rail Corridor
- Design Velocity Contour (m/s)
- 1
 - 2
 - Design Velocity < 0.5m/s
 - Design Velocity > 0.5m/s, Velocity increase limited to 0.025m/s
 - <10% Increase
 - 10% to 20% Increase
- Greater than 20% Increase
 - Unprotected Surfaces
 - Existing not flooded, design velocity > 0.5m/s
 - Existing velocity < 0.5m/s, design velocity > 0.5m/s
 - Existing velocity > 0.5m/s (AETV), Design Velocity > Existing Velocity + 0.025m/s



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NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 20% AEP

Appendix I - Figure 2.1.53

0 200 400 Metres

Coordinate System: GDA 1994 MGA Zone 55

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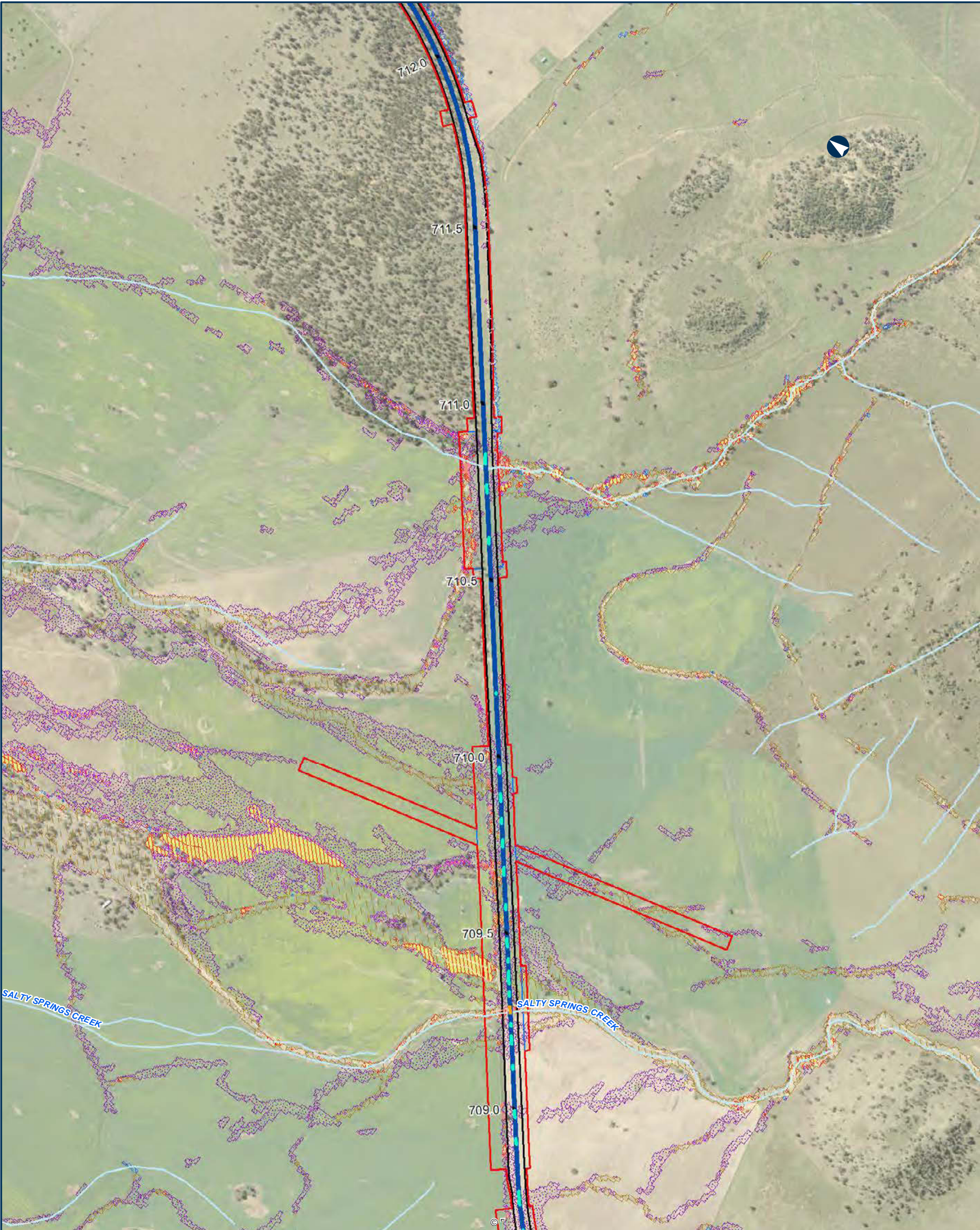
Date: 9/08/2022 Paper: A3
Author: JacobsGHD Scale: 1:10,000
Data Sources: Basemap layers: NSWSS; all other layers: JacobsGHD

- | | | |
|-----------------------|---|---|
| Bridge | Design Velocity Contour (m/s) | Greater than 20% increase |
| Culvert | 1 | Unprotected Surfaces |
| Road QDL departure | 2 | Existing not flooded, design velocity > 0.5m/s |
| Alignment | Design Velocity < 0.5m/s | Existing velocity < 0.5m/s, design velocity > 0.5m/s |
| The proposal | Design Velocity > 0.5m/s, Velocity increase limited to 0.025m/s | Existing velocity > 0.5m/s (AETV), Design Velocity > Existing Velocity + 0.025m/s |
| Drainage Control Area | <10% Increase | |
| Rail Corridor | 10% to 20% Increase | |



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NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 20% AEP

Appendix I - Figure 2.1.54

0 200 400 Metres

Coordinate System: GDA 1994 MGA Zone 55

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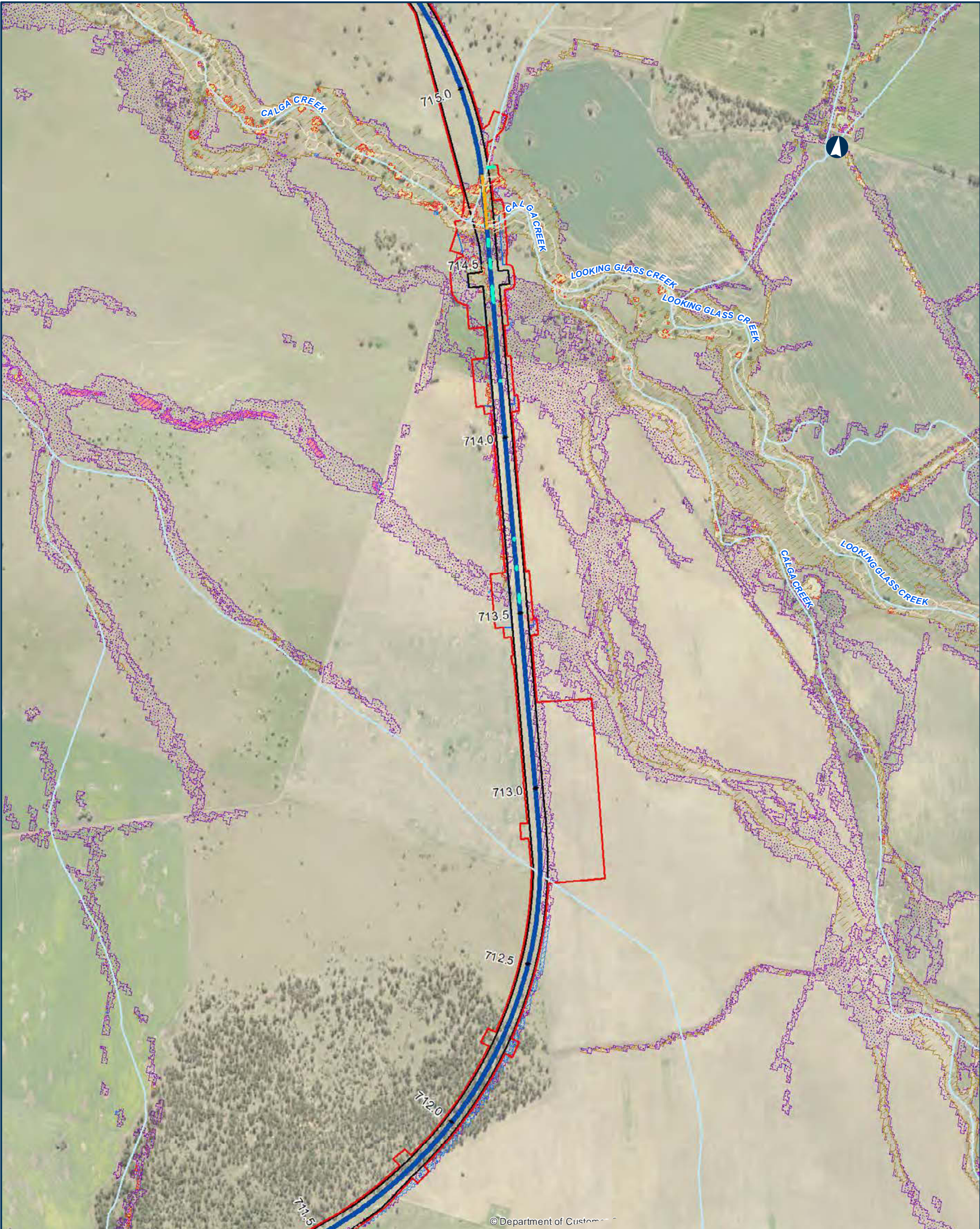
Date: 9/08/2022 Paper: A3
Author: JacobsGHD Scale: 1:10,000
Data Sources: Basemap layers: NSWSS; all other layers: JacobsGHD

- | | | |
|-----------------------|---|---|
| Bridge | Design Velocity Contour (m/s) | Greater than 20% increase |
| Culvert | 1 | Unprotected Surfaces |
| Road QDL departure | 2 | Existing not flooded, design velocity > 0.5m/s |
| Alignment | Design Velocity < 0.5m/s | Existing velocity < 0.5m/s, design velocity > 0.5m/s |
| The proposal | Design Velocity > 0.5m/s, Velocity increase limited to 0.025m/s | Existing velocity > 0.5m/s (AETV), Design Velocity > Existing Velocity + 0.025m/s |
| Drainage Control Area | <10% Increase | |
| Rail Corridor | 10% to 20% Increase | |



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NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 20% AEP

Appendix I - Figure 2.1.55

0200400Metres

Coordinate System: GDA 1994 MGA Zone 55

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Date: 9/08/2022
Author: JacobsGHD
Data Sources: Basemap layers: NSWSS; all other layers: JacobsGHD

Bridge

Culvert

Road QDL departure

Alignment

The proposal

Drainage Control Area

Rail Corridor

Design Velocity Contour (m/s)

1

2

Design Velocity < 0.5m/s

Design Velocity > 0.5m/s, Velocity increase limited to 0.025m/s

<10% Increase

10% to 20% Increase

Greater than 20% increase

Unprotected Surfaces

Existing not flooded, design velocity > 0.5m/s

Existing velocity < 0.5m/s, design velocity > 0.5m/s

Existing velocity > 0.5m/s (AETV), Design Velocity > Existing Velocity + 0.025m/s

NARRABRI

COONAMBLE

BARADINE

GILGANDRA

NARROMINE

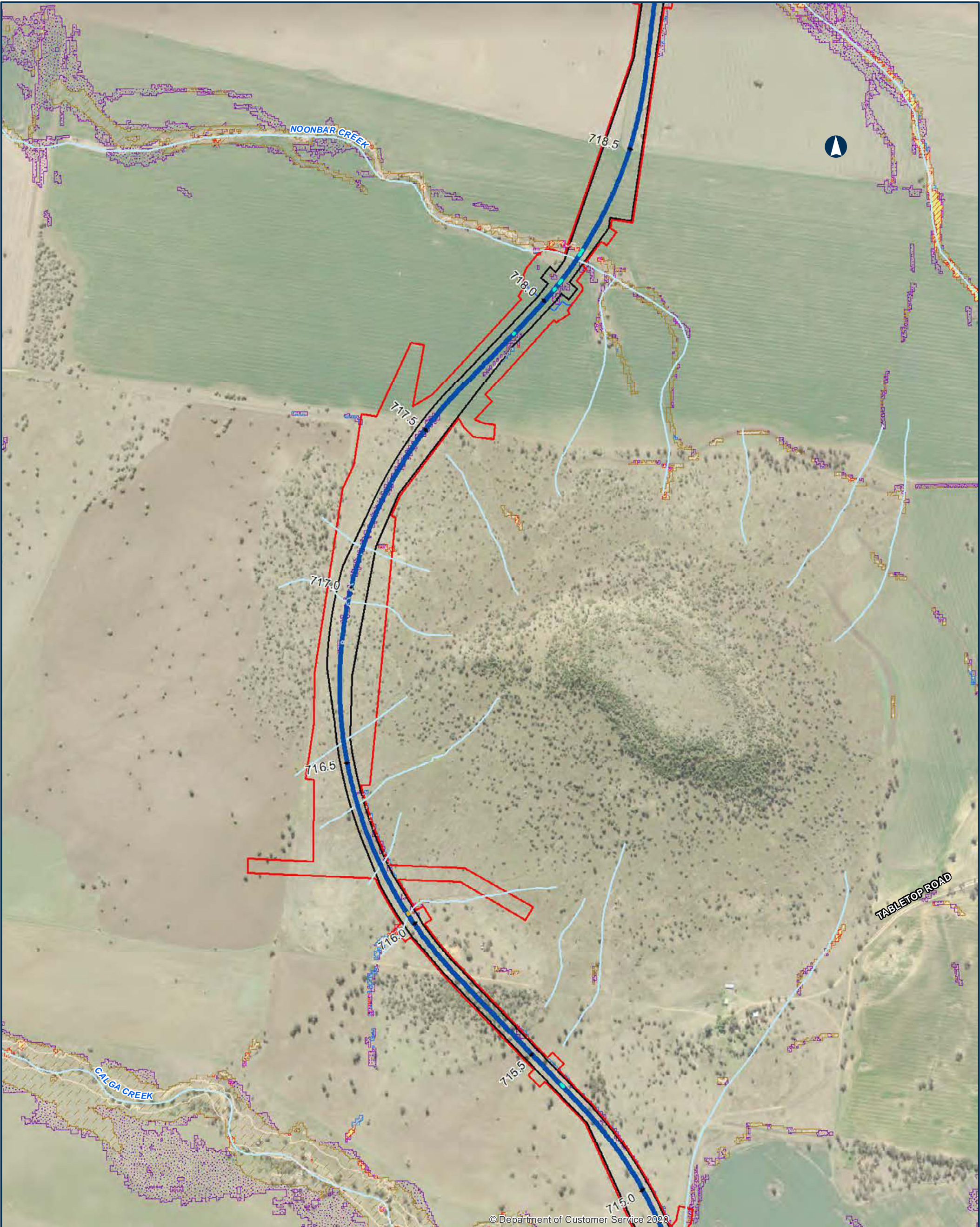
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INLAND RAIL

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NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 20% AEP

Appendix I - Figure 2.1.56

0 200 400 Metres

Coordinate System: GDA 1994 MGA Zone 55

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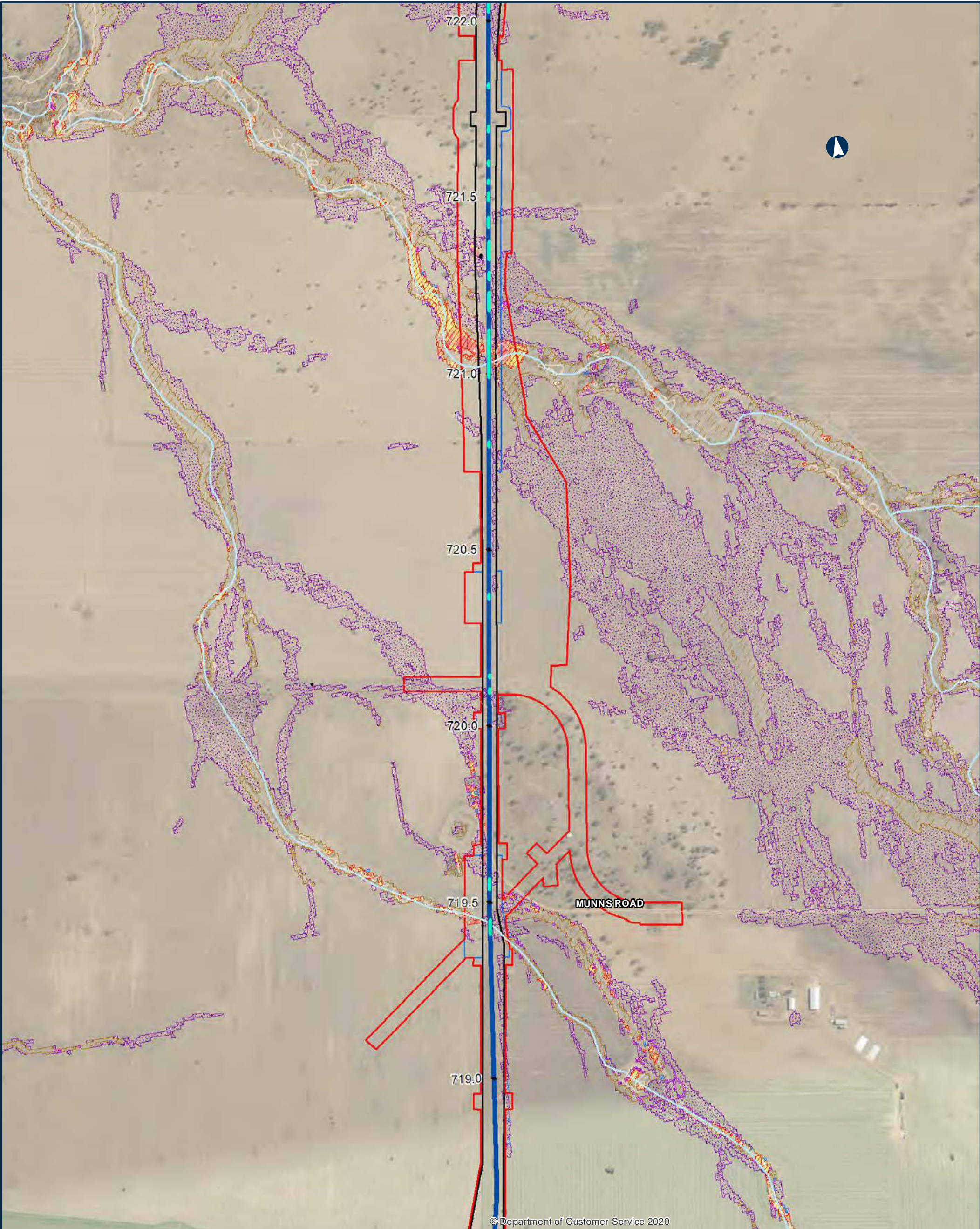
Date: 9/08/2022 Paper: A3
Author: JacobsGHD Scale: 1:10,000
Data Sources: Basemap layers: NSWSS; all other layers: JacobsGHD

- | | | |
|-----------------------|---|---|
| Bridge | Design Velocity Contour (m/s) | Greater than 20% increase |
| Culvert | 1 | Unprotected Surfaces |
| Road QDL departure | 2 | Existing not flooded, design velocity > 0.5m/s |
| Alignment | Design Velocity < 0.5m/s | Existing velocity < 0.5m/s, design velocity > 0.5m/s |
| The proposal | Design Velocity > 0.5m/s, Velocity increase limited to 0.025m/s | Existing velocity > 0.5m/s (AETV), Design Velocity > Existing Velocity + 0.025m/s |
| Drainage Control Area | <10% Increase | |
| Rail Corridor | 10% to 20% Increase | |



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NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 20% AEP

Appendix I - Figure 2.1.57

0200400Metres

Coordinate System: GDA 1994 MGA Zone 55

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Date: 9/08/2022

Author: JacobsGHD

Data Sources: Basemap layers: NSWSS; all other layers: JacobsGHD

Paper: A3

Scale: 1:10,000

Road ODL departure

Culvert

Road ODL departure

Alignment

The proposal

Drainage Control Area

Rail Corridor

Design Velocity Contour (m/s)

1

2

Design Velocity < 0.5m/s

Design Velocity > 0.5m/s, Velocity increase limited to 0.025m/s

<10% Increase

10% to 20% Increase

Greater than 20% increase

Unprotected Surfaces

Existing not flooded, design velocity > 0.5m/s

Existing velocity < 0.5m/s, design velocity > 0.5m/s

Existing velocity > 0.5m/s (AETV), Design Velocity > Existing Velocity + 0.025m/s

NARRABRI

COONAMBLE

BARADINE

GILGANDRA

NARROMINE

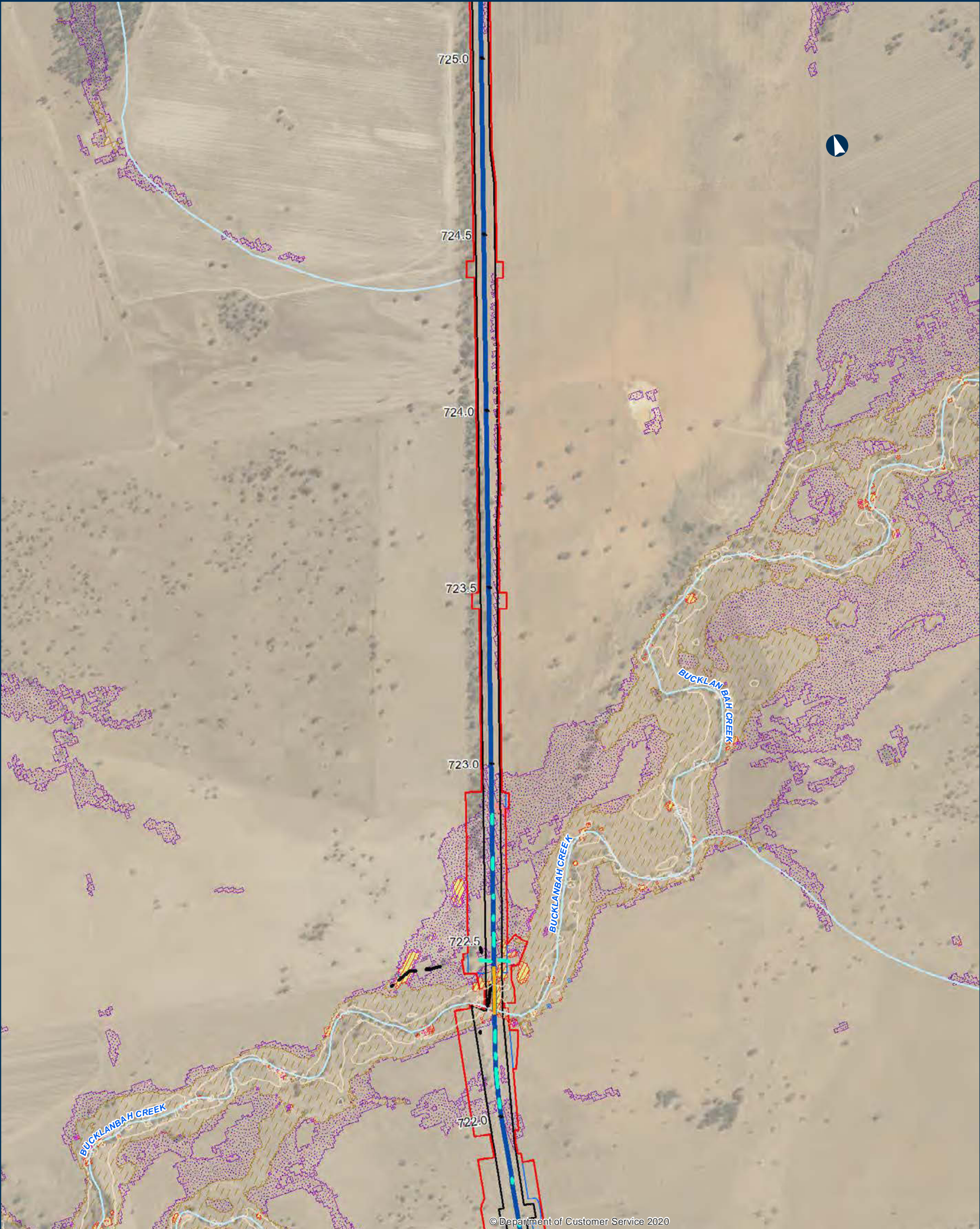
DUBBO

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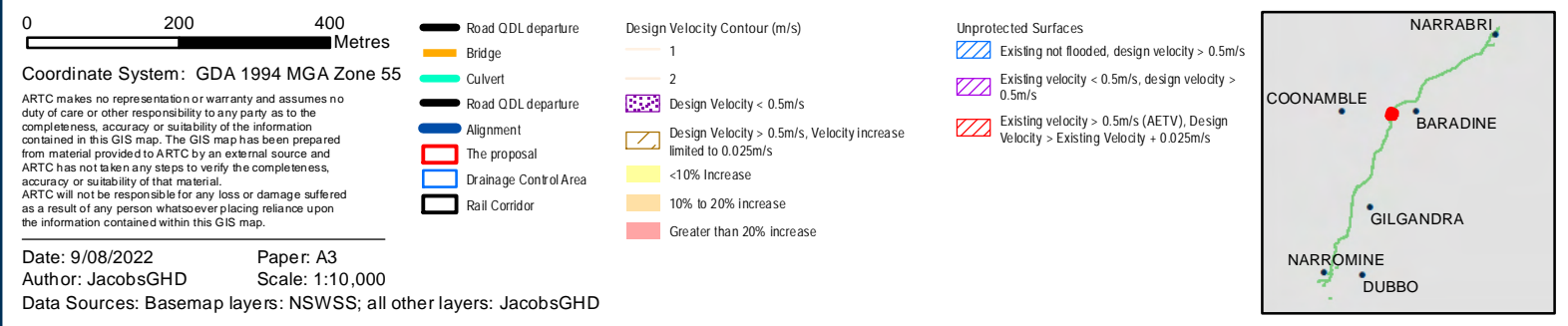
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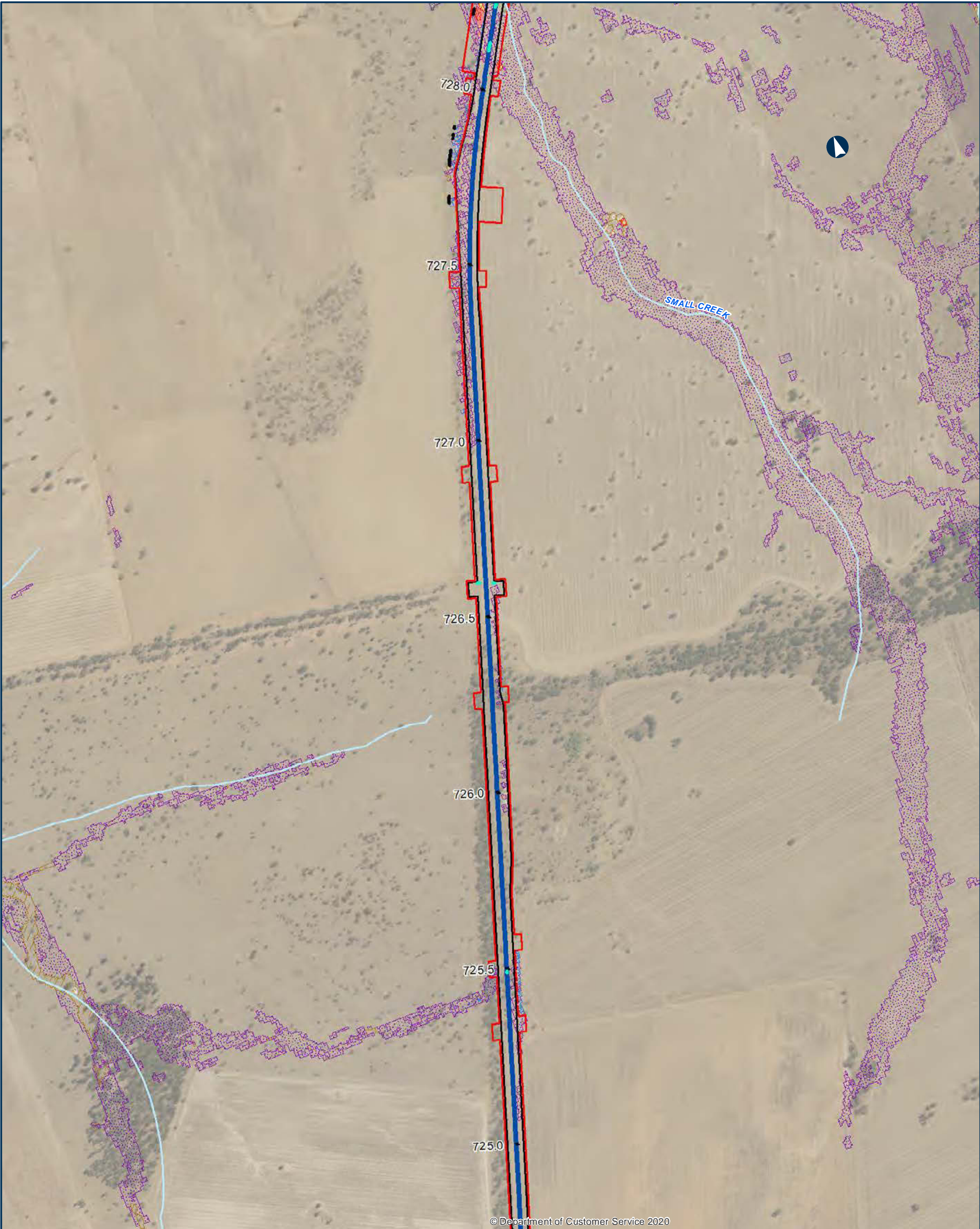
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NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 20% AEP

Appendix I - Figure 2.1.58





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NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 20% AEP

Appendix I - Figure 2.1.59

0 200 400 Metres

Coordinate System: GDA 1994 MGA Zone 55

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Date: 9/08/2022 Paper: A3
Author: JacobsGHD Scale: 1:10,000
Data Sources: Basemap layers: NSWSS; all other layers: JacobsGHD

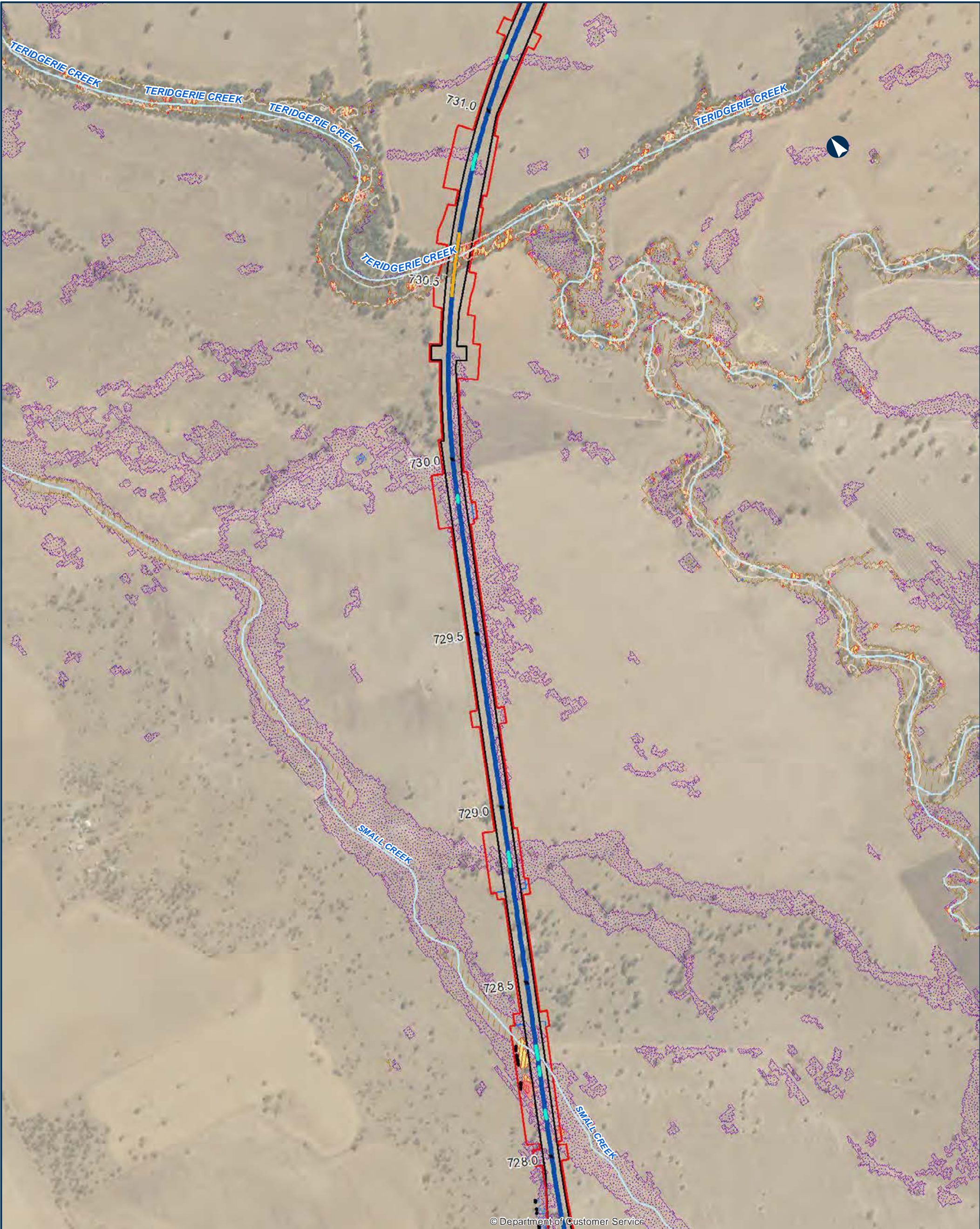
- Road ODL departure
— Culvert
— Road ODL departure
— Alignment
— The proposal
— Drainage Control Area
— Rail Corridor
- Design Velocity Contour (m/s)
1
Design Velocity < 0.5m/s
Design Velocity > 0.5m/s, Velocity increase limited to 0.025m/s
<10% Increase
10% to 20% Increase
Greater than 20% Increase

- Unprotected Surfaces
Existing not flooded, design velocity > 0.5m/s
Existing velocity < 0.5m/s, design velocity > 0.5m/s
Existing velocity > 0.5m/s (AETV), Design Velocity > Existing Velocity + 0.025m/s



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NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 20% AEP

Appendix I - Figure 2.1.60

0 200 400 Metres

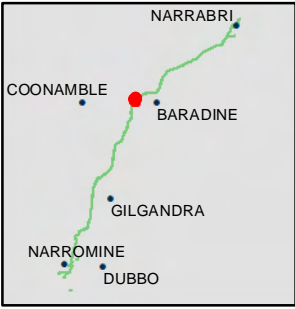
Coordinate System: GDA 1994 MGA Zone 55

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Date: 9/08/2022 Paper: A3
 Author: JacobsGHD Scale: 1:10,000
 Data Sources: Basemap layers: NSWSS; all other layers: JacobsGHD

- Road ODL departure
 - Bridge
 - Culvert
 - Road ODL departure
 - Alignment
 - The proposal
 - Drainage Control Area
 - Rail Corridor
- Design Velocity Contour (m/s)
- 1
 - 2
 - Design Velocity < 0.5m/s
 - Design Velocity > 0.5m/s, Velocity increase limited to 0.025m/s
 - <10% Increase
 - 10% to 20% Increase
 - Greater than 20% Increase

- Unprotected Surfaces
- Existing not flooded, design velocity > 0.5m/s
 - Existing velocity < 0.5m/s, design velocity > 0.5m/s
 - Existing velocity > 0.5m/s (AETV), Design Velocity > Existing Velocity + 0.025m/s



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NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 20% AEP

Appendix I - Figure 2.1.61

0 200 400 Metres

Coordinate System: GDA 1994 MGA Zone 55

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Date: 9/08/2022 Paper: A3
Author: JacobsGHD Scale: 1:10,000
Data Sources: Basemap layers: NSWSS; all other layers: JacobsGHD

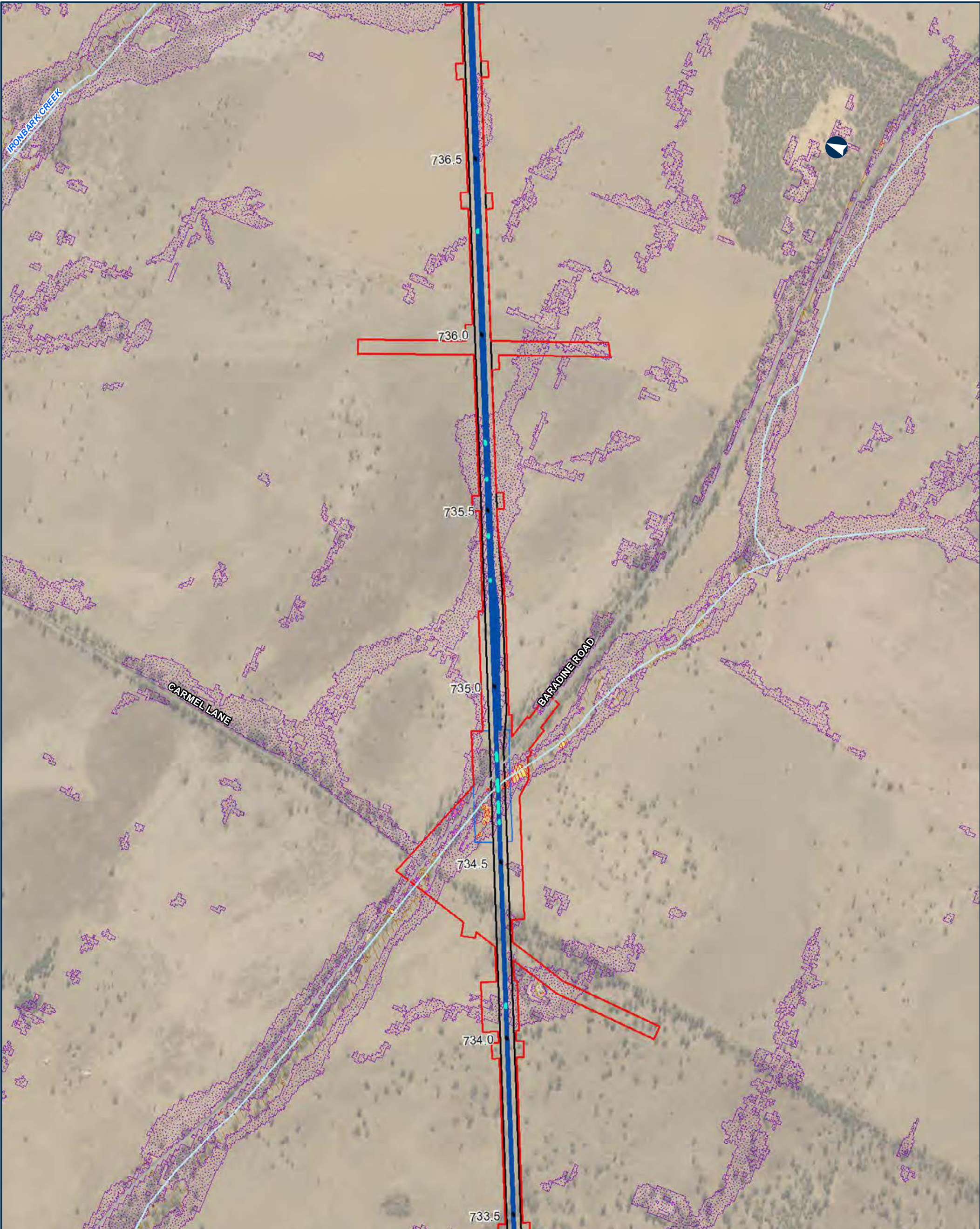
- Culvert
- Road ODL departure
- Alignment
- The proposal
- Drainage Control Area
- Rail Corridor
- Design Velocity Contour (m/s)
- 1
- 2
- Design Velocity < 0.5m/s
- Design Velocity > 0.5m/s, Velocity increase limited to 0.025m/s
- <10% Increase
- 10% to 20% increase
- Greater than 20% increase

- Unprotected Surfaces
- Existing not flooded, design velocity > 0.5m/s
- Existing velocity < 0.5m/s, design velocity > 0.5m/s
- Existing velocity > 0.5m/s (AETV), Design Velocity > Existing Velocity + 0.025m/s



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NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 20% AEP

Appendix I - Figure 2.1.62

0 200 400 Metres

Coordinate System: GDA 1994 MGA Zone 55

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Author: JacobsGHD Scale: 1:10,000
Data Sources: Basemap layers: NSWSS; all other layers: JacobsGHD

- Culvert
- Road QDL departure
- Alignment
- The proposal
- Drainage Control Area
- Rail Corridor
- Design Velocity Contour (m/s)
1
- Design Velocity < 0.5m/s
- Design Velocity > 0.5m/s, Velocity Increase limited to 0.025m/s
- <10% Increase
- 10% to 20% Increase
- Greater than 20% Increase
- Unprotected Surfaces
- Existing not flooded, design velocity > 0.5m/s

- Existing velocity < 0.5m/s, design velocity > 0.5m/s
- Existing velocity > 0.5m/s (AETV), Design Velocity > Existing Velocity + 0.025m/s



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NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 20% AEP

Appendix I - Figure 2.1.63

0200400

Metres

Coordinate System: GDA 1994 MGA Zone 55

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Date: 9/08/2022
Author: JacobsGHD
Data Sources: Basemap layers: NSWSS; all other layers: JacobsGHD

Paper: A3
Scale: 1:10,000

Culvert

Road ODL departure

Alignment

The proposal

Drainage Control Area

Rail Corridor

Design Velocity Contour (m/s)

1

2

Design Velocity < 0.5m/s

Design Velocity > 0.5m/s, Velocity increase limited to 0.025m/s

<10% Increase

10% to 20% increase

Greater than 20% increase

Unprotected Surfaces

Existing velocity < 0.5m/s, design velocity > 0.5m/s

Existing velocity > 0.5m/s (AETV), Design Velocity > Existing Velocity + 0.025m/s

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NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 20% AEP

Appendix I - Figure 2.1.64

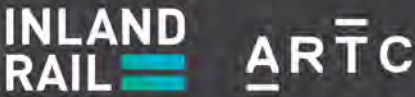
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Coordinate System: GDA 1994 MGA Zone 55

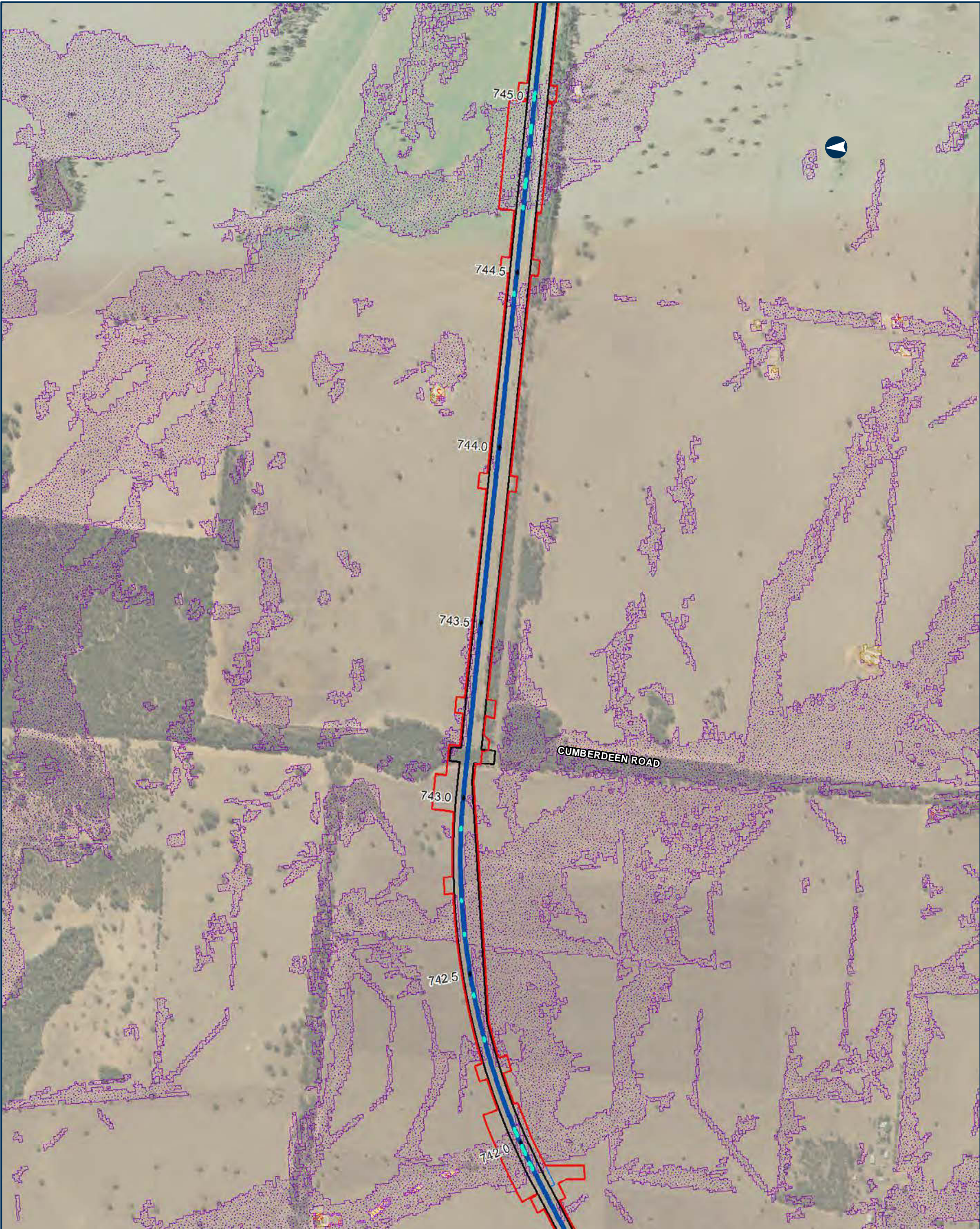
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- Culvert
- Road QDL departure
- Alignment
- The proposal
- Drainage Control Area
- Rail Corridor
- Design Velocity Contour (m/s)
1
- Design Velocity < 0.5m/s
- Design Velocity > 0.5m/s, Velocity Increase limited to 0.025m/s
- <10% Increase
- 10% to 20% Increase
- Greater than 20% Increase
- Unprotected Surfaces
- Existing not flooded, design velocity > 0.5m/s
- Existing velocity < 0.5m/s, design velocity > 0.5m/s
- Existing velocity > 0.5m/s (AETV), Design Velocity > Existing Velocity + 0.025m/s



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NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 20% AEP

Appendix I - Figure 2.1.65

0200400

Metres

Coordinate System: GDA 1994 MGA Zone 55

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Date: 9/08/2022

Author: JacobsGHD

Data Sources: Basemap layers: NSWSS; all other layers: JacobsGHD

Paper: A3

Scale: 1:10,000

Culvert

Road ODL departure

Alignment

The proposal

Drainage Control Area

Rail Corridor

Design Velocity Contour (m/s)

1

Design Velocity < 0.5m/s

Design Velocity > 0.5m/s, Velocity increase limited to 0.025m/s

<10% Increase

10% to 20% increase

Greater than 20% increase

Unprotected Surfaces

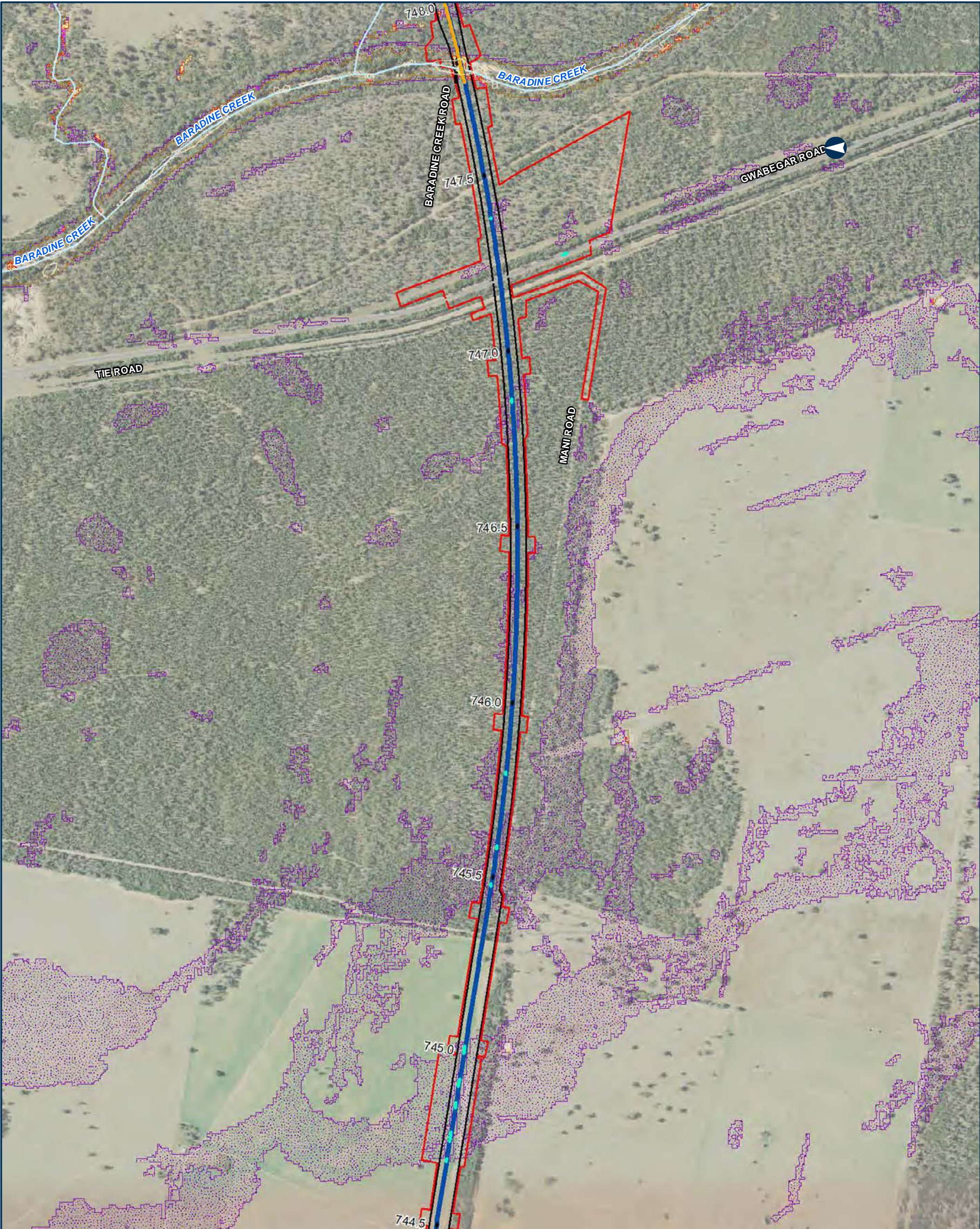
Existing velocity < 0.5m/s, design velocity > 0.5m/s

Existing velocity > 0.5m/s (AETV), Design Velocity > Existing Velocity + 0.025m/s

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NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 20% AEP

Appendix I - Figure 2.1.66

0 200 400 Metres

Coordinate System: GDA 1994 MGA Zone 55

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Author: JacobsGHD Scale: 1:10,000
Data Sources: Basemap layers: NSWSS; all other layers: JacobsGHD

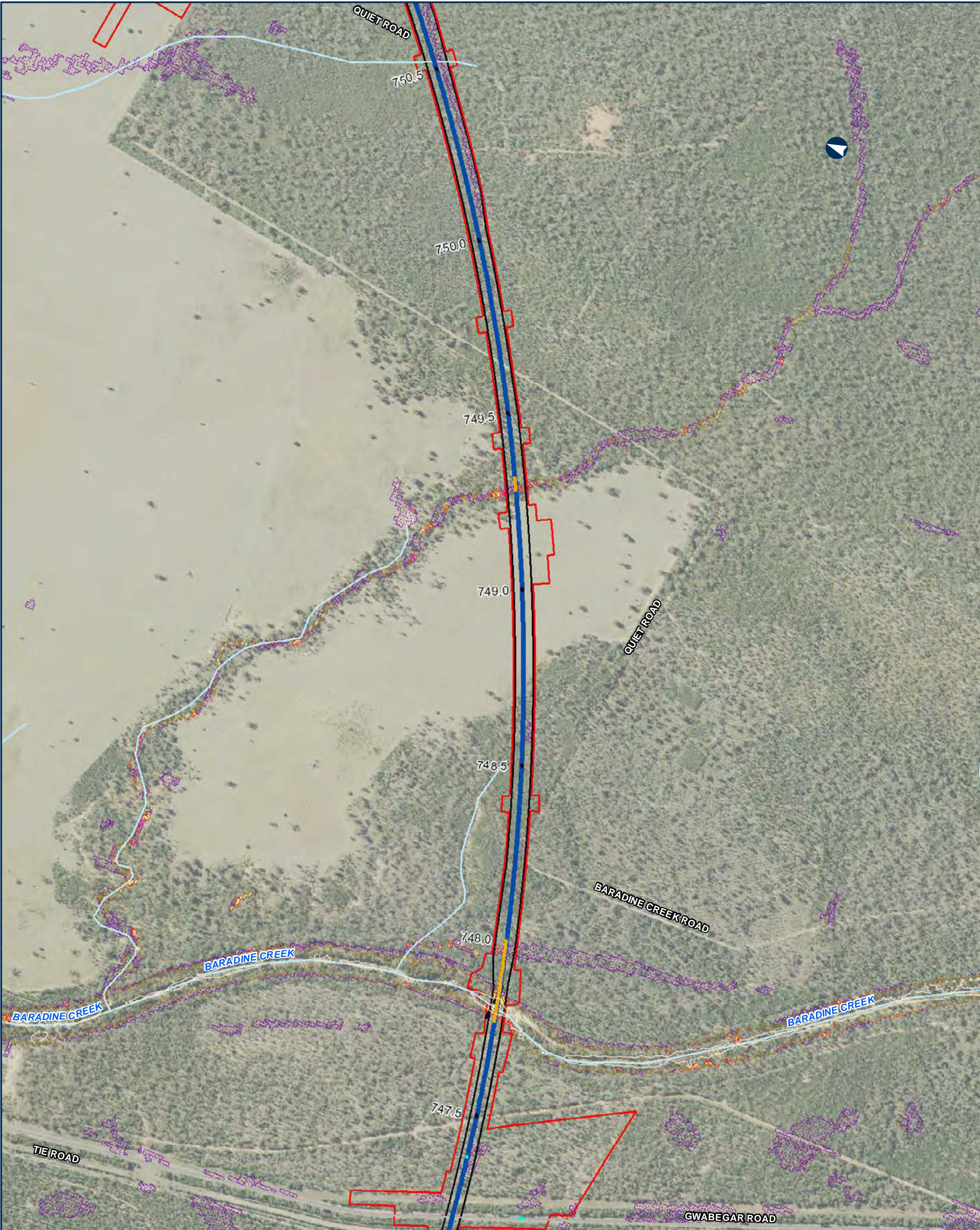
- Road ODL departure
 - Bridge
 - Culvert
 - Road ODL departure
 - Alignment
 - The proposal
 - Drainage Control Area
 - Rail Corridor
- Design Velocity Contour (m/s)
- 1
 - 2
 - Design Velocity < 0.5m/s
 - Design Velocity > 0.5m/s, Velocity increase limited to 0.025m/s
 - <10% Increase
 - 10% to 20% Increase
 - Greater than 20% increase

- Unprotected Surfaces
- Existing not flooded, design velocity > 0.5m/s
 - Existing velocity < 0.5m/s, design velocity > 0.5m/s
 - Existing velocity > 0.5m/s (AETV), Design Velocity > Existing Velocity + 0.025m/s



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NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 20% AEP

Appendix I - Figure 2.1.67

0 200 400 Metres

Coordinate System: GDA 1994 MGA Zone 55

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Date: 9/08/2022 Paper: A3
Author: JacobsGHD Scale: 1:10,000
Data Sources: Basemap layers: NSWSS; all other layers: JacobsGHD

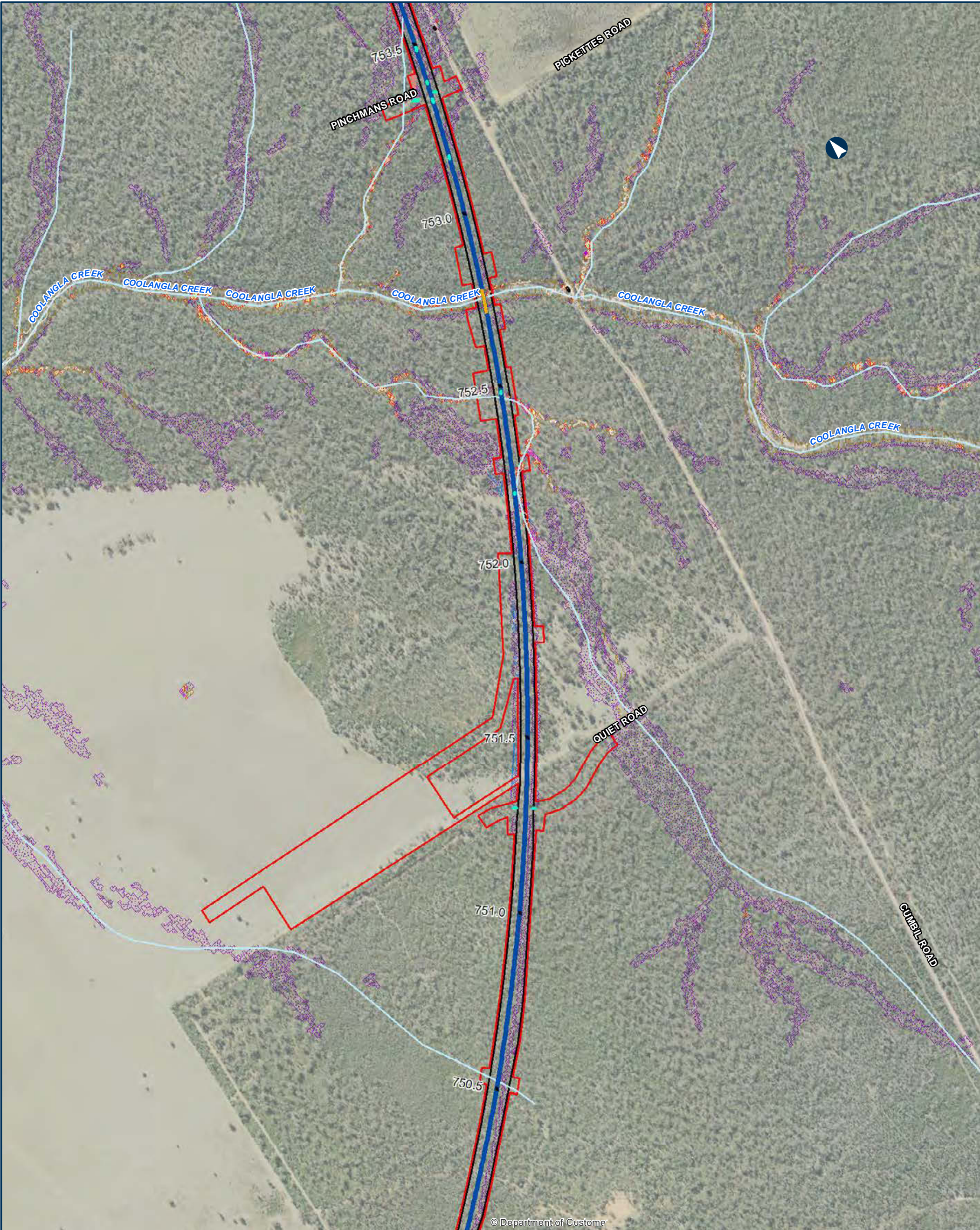
- | | |
|----------------------|---|
| — Road ODL departure | Design Velocity Contour (m/s) |
| — Bridge | 1 |
| — Culvert | 2 |
| — Road ODL departure | Design Velocity < 0.5m/s |
| — Alignment | Design Velocity > 0.5m/s, Velocity increase limited to 0.025m/s |
| — The proposal | <10% Increase |
| — Rail Corridor | 10% to 20% Increase |

- | |
|---|
| Greater than 20% increase |
| Unprotected Surfaces |
| Existing not flooded, design velocity > 0.5m/s |
| Existing velocity < 0.5m/s, design velocity > 0.5m/s |
| Existing velocity > 0.5m/s (AETV), Design Velocity > Existing Velocity + 0.025m/s |



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NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 20% AEP

Appendix I - Figure 2.1.68

0 200 400 Metres

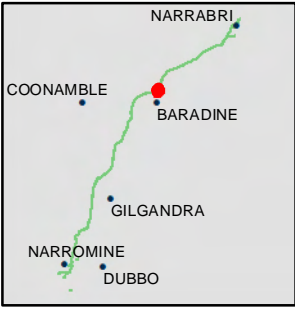
Coordinate System: GDA 1994 MGA Zone 55

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Author: JacobsGHD Scale: 1:10,000
Data Sources: Basemap layers: NSWSS; all other layers: JacobsGHD

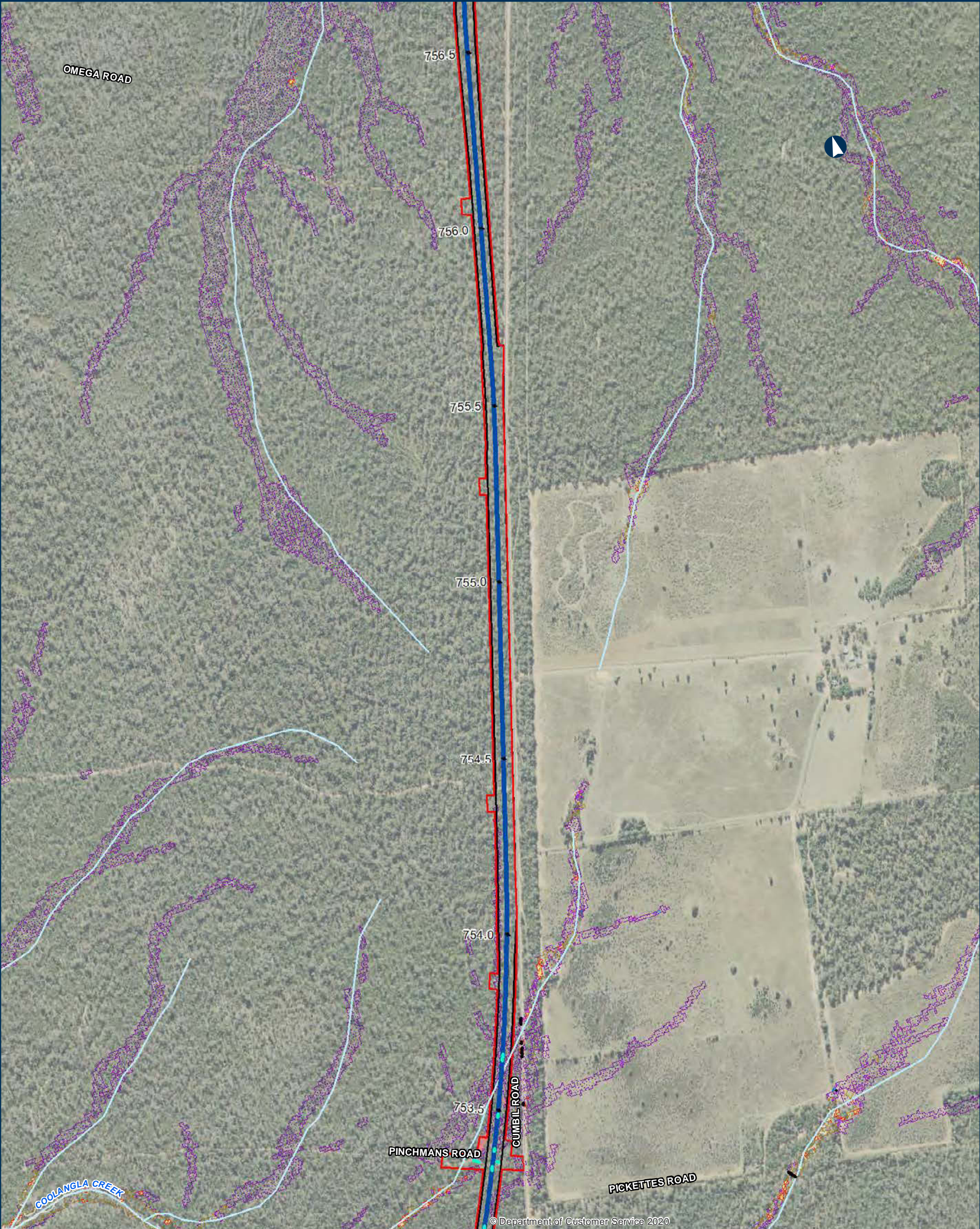
- Road ODL departure
- Bridge
- Culvert
- Road ODL departure
- Alignment
- The proposal
- Drainage Control Area
- Rail Corridor
- Design Velocity Contour (m/s)
- 1
- 2
- Design Velocity < 0.5m/s
- Design Velocity > 0.5m/s, Velocity increase limited to 0.025m/s
- <10% Increase
- 10% to 20% increase
- Greater than 20% increase
- Protected Surfaces
- Existing velocity <1m/s, design velocity > 1.2m/s

- Existing velocity >1m/s, velocity change > 20%
- Unprotected Surfaces
- Existing not flooded, design velocity > 0.5m/s
- Existing velocity < 0.5m/s, design velocity > 0.5m/s
- Existing velocity > 0.5m/s (AETV), Design Velocity > Existing Velocity + 0.025m/s



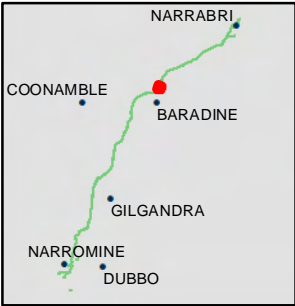
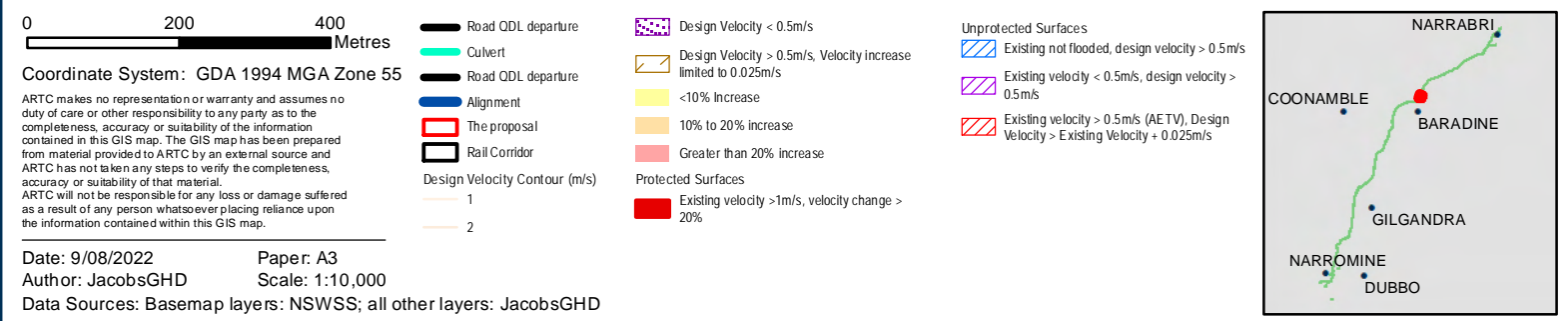
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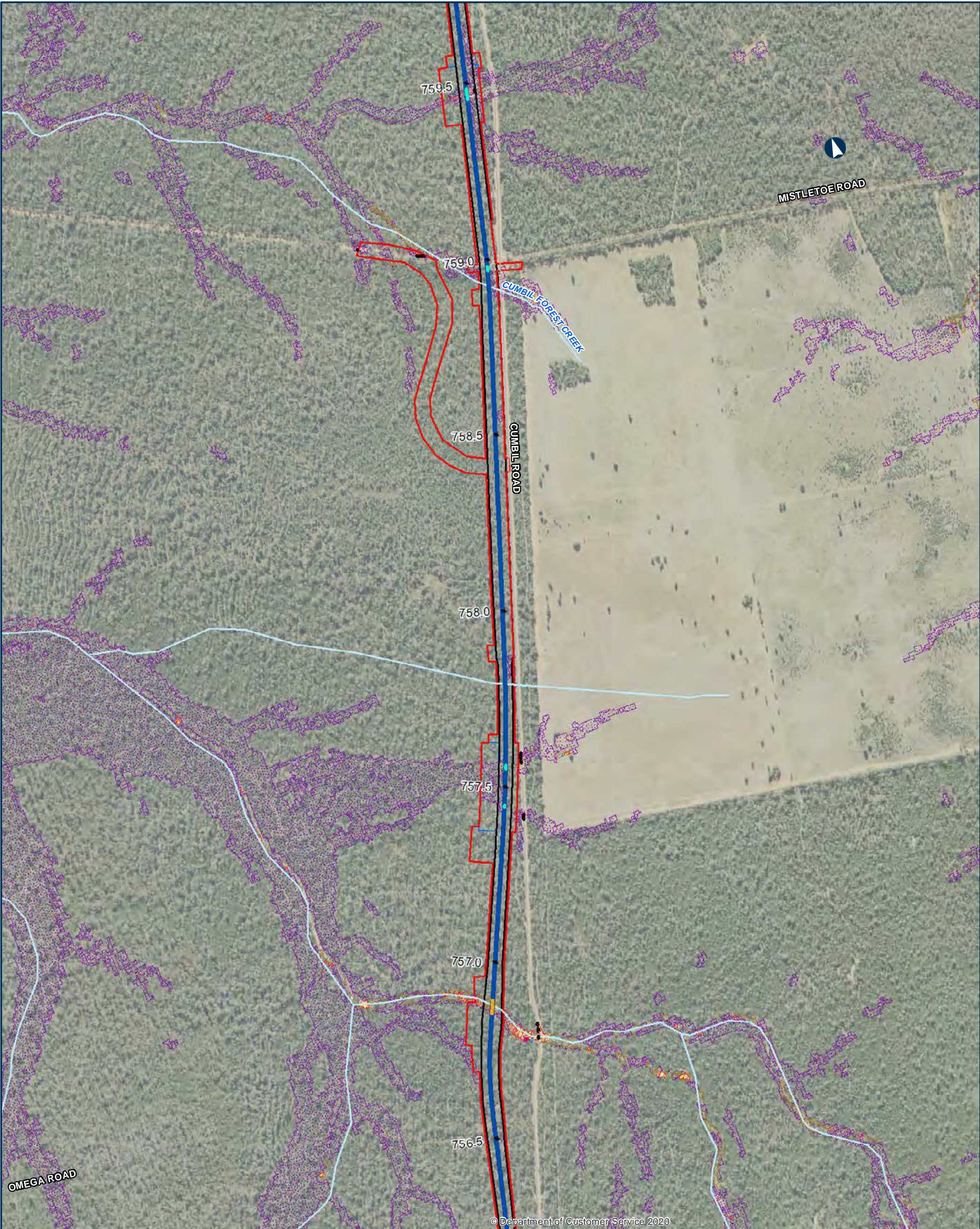
NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 20% AEP

Appendix I - Figure 2.1.69



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NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 20% AEP

Appendix I - Figure 2.1.70

0 200 400 Metres

Coordinate System: GDA 1994 MGA Zone 55

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Date: 9/08/2022 Paper: A3
Author: JacobsGHD Scale: 1:10,000
Data Sources: Basemap layers: NSWSS; all other layers: JacobsGHD

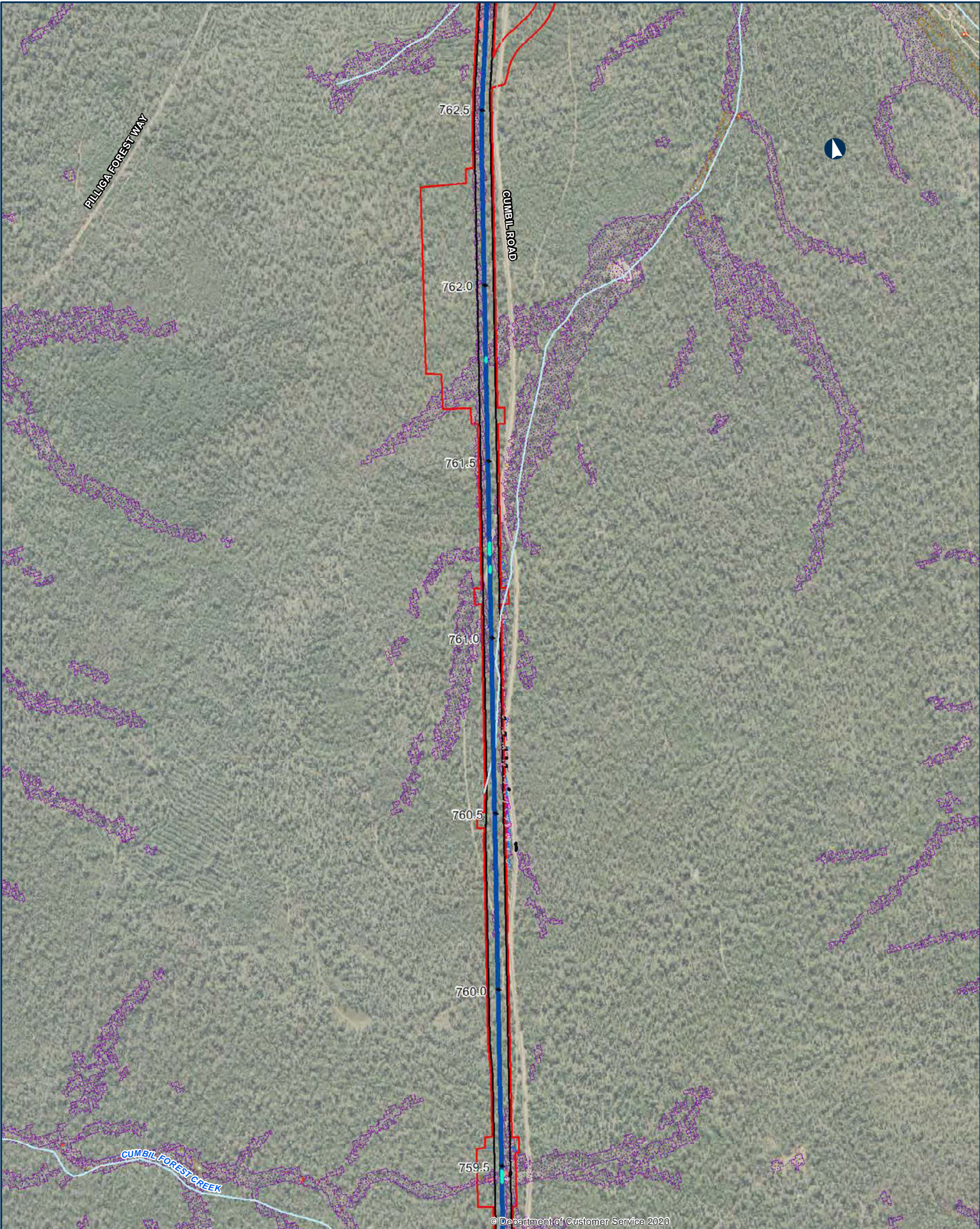
- Road ODL departure
- Bridge
- Culvert
- Road ODL departure
- Alignment
- The proposal
- Drainage Control Area
- Rail Corridor
- Design Velocity Contour (m/s)
- 1
- 2
- Design Velocity < 0.5m/s
- Design Velocity > 0.5m/s, Velocity increase limited to 0.025m/s
- <10% Increase
- 10% to 20% increase
- Greater than 20% increase
- Protected Surfaces
- Existing velocity <1m/s, design velocity > 1.2m/s

- Existing velocity >1m/s, velocity change > 20%
- Unprotected Surfaces
- Existing not flooded, design velocity > 0.5m/s
- Existing velocity < 0.5m/s, design velocity > 0.5m/s
- Existing velocity > 0.5m/s (AETV), Design Velocity > Existing Velocity + 0.025m/s



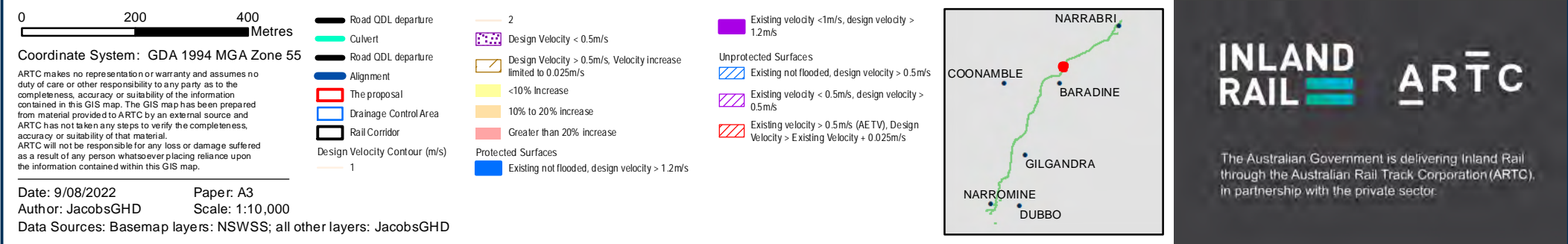
INLAND RAIL **ARTC**

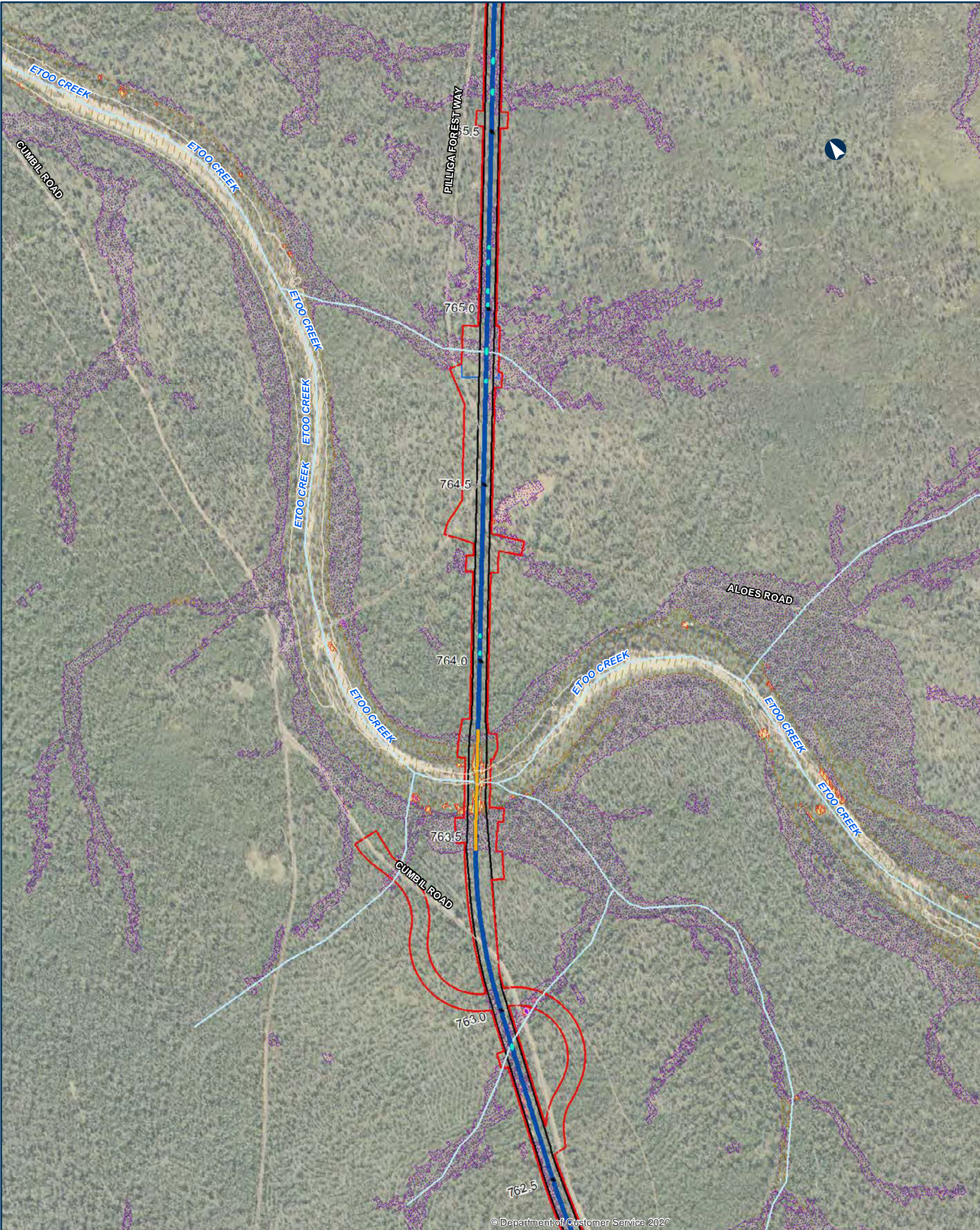
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NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 20% AEP

Appendix I - Figure 2.1.71





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NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 20% AEP

Appendix I - Figure 2.1.72

0 200 400 Metres

Coordinate System: GDA 1994 MGA Zone 55

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Date: 9/08/2022 Paper: A3
Author: JacobsGHD Scale: 1:10,000
Data Sources: Basemap layers: NSWSS; all other layers: JacobsGHD

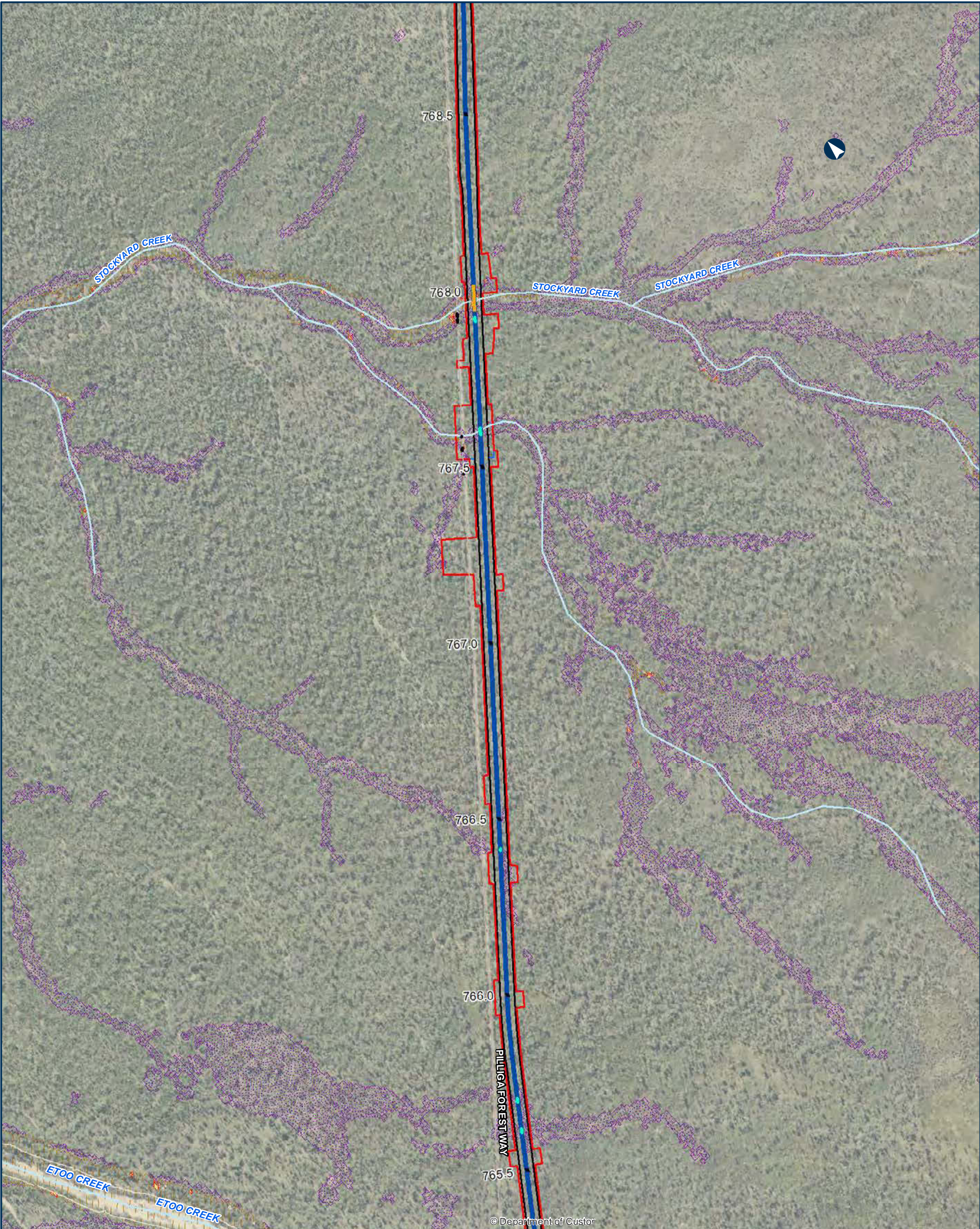
- Bridge
Culvert
Road QDL departure
Alignment
The proposal
Drainage Control Area
Rail Corridor
- Design Velocity Contour (m/s)
1
Design Velocity < 0.5m/s
Design Velocity > 0.5m/s, Velocity increase limited to 0.025m/s
<10% Increase
10% to 20% Increase
Greater than 20% Increase

- Protected Surfaces
Existing velocity <1m/s, design velocity > 1.2m/s
- Unprotected Surfaces
Existing velocity < 0.5m/s, design velocity > 0.5m/s
Existing velocity > 0.5m/s (AETV), Design Velocity > Existing Velocity + 0.025m/s



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NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 20% AEP

Appendix I - Figure 2.1.73

0 200 400 Metres

Coordinate System: GDA 1994 MGA Zone 55

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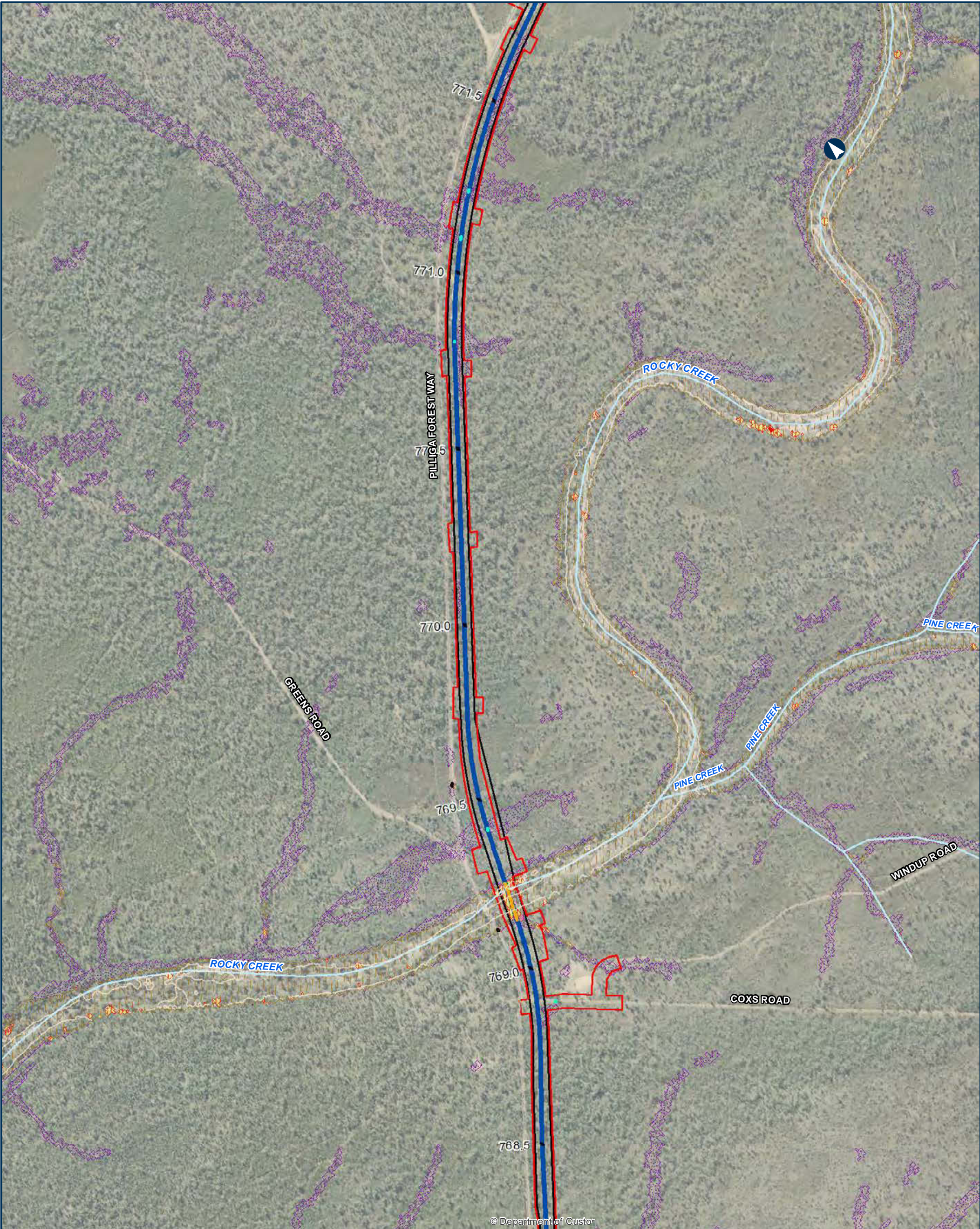
Date: 9/08/2022 Paper: A3
Author: JacobsGHD Scale: 1:10,000
Data Sources: Basemap layers: NSWSS; all other layers: JacobsGHD

- | | |
|-------------------------------|---|
| — Road ODL departure | Design Velocity < 0.5m/s |
| — Bridge | Design Velocity > 0.5m/s, Velocity increase limited to 0.025m/s |
| — Culvert | <10% Increase |
| — Road ODL departure | 10% to 20% increase |
| — Alignment | Greater than 20% increase |
| — The proposal | Existing velocity > 0.5m/s (AETV), Design Velocity > Existing Velocity + 0.025m/s |
| — Drainage Control Area | |
| — Rail Corridor | |
| Design Velocity Contour (m/s) | |
| 1 | |



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NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 20% AEP

Appendix I - Figure 2.1.74

0 200 400 Metres

Coordinate System: GDA 1994 MGA Zone 55

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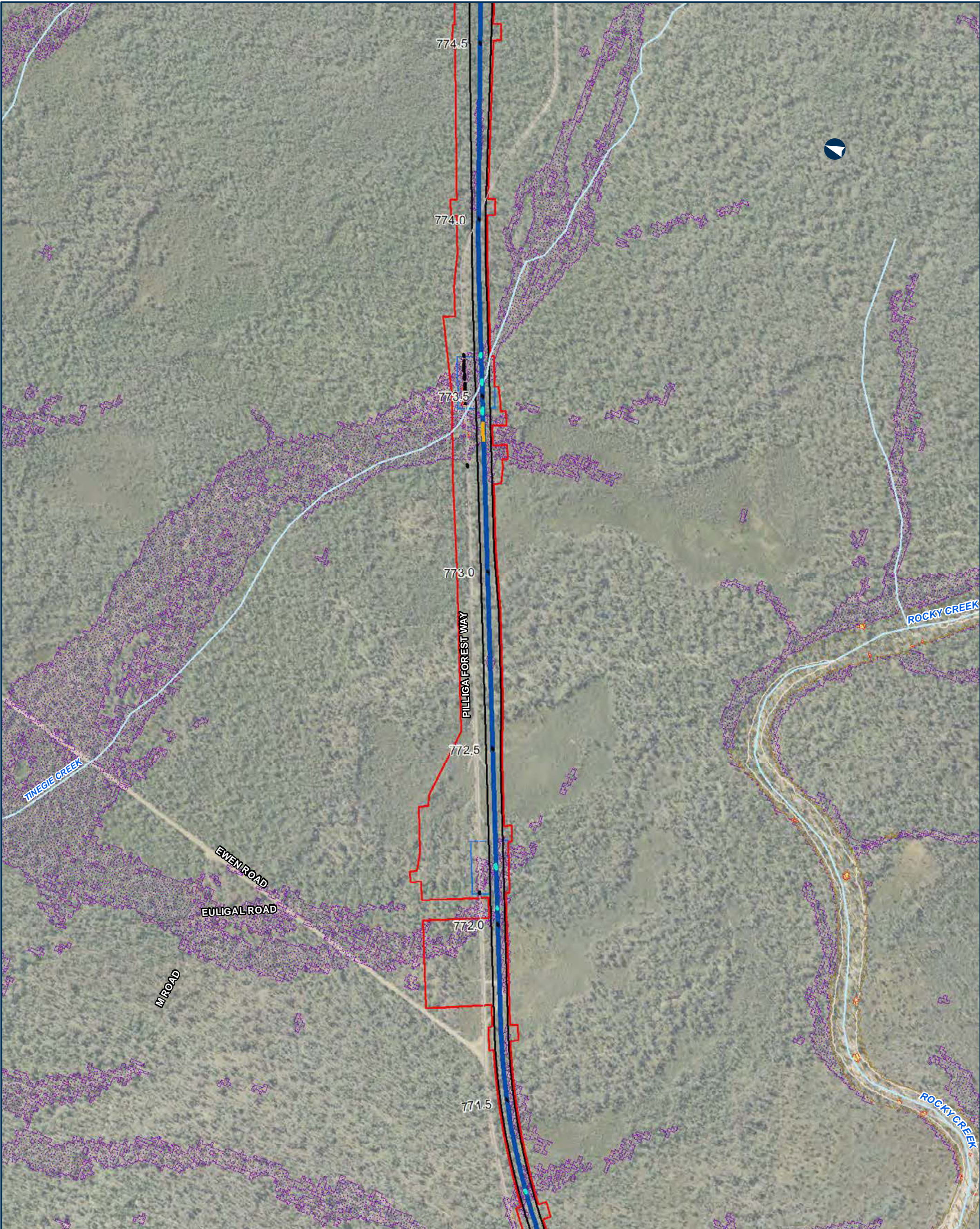
Date: 9/08/2022 Paper: A3
Author: JacobsGHD Scale: 1:10,000
Data Sources: Basemap layers: NSWSS; all other layers: JacobsGHD

- | | | |
|----------------------|---|---|
| — Road ODL departure | Design Velocity Contour (m/s) | Greater than 20% increase |
| — Bridge | 1 | Protected Surfaces |
| — Culvert | 2 | Existing velocity > 1m/s, velocity change > 20% |
| — Road ODL departure | Design Velocity < 0.5m/s | Existing velocity > 0.5m/s (AETV), Design Velocity > Existing Velocity + 0.025m/s |
| — Alignment | Design Velocity > 0.5m/s, Velocity increase limited to 0.025m/s | |
| — The proposal | <10% Increase | |
| — Rail Corridor | 10% to 20% Increase | |



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NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 20% AEP

Appendix I - Figure 2.1.75

0 200 400 Metres

Coordinate System: GDA 1994 MGA Zone 55

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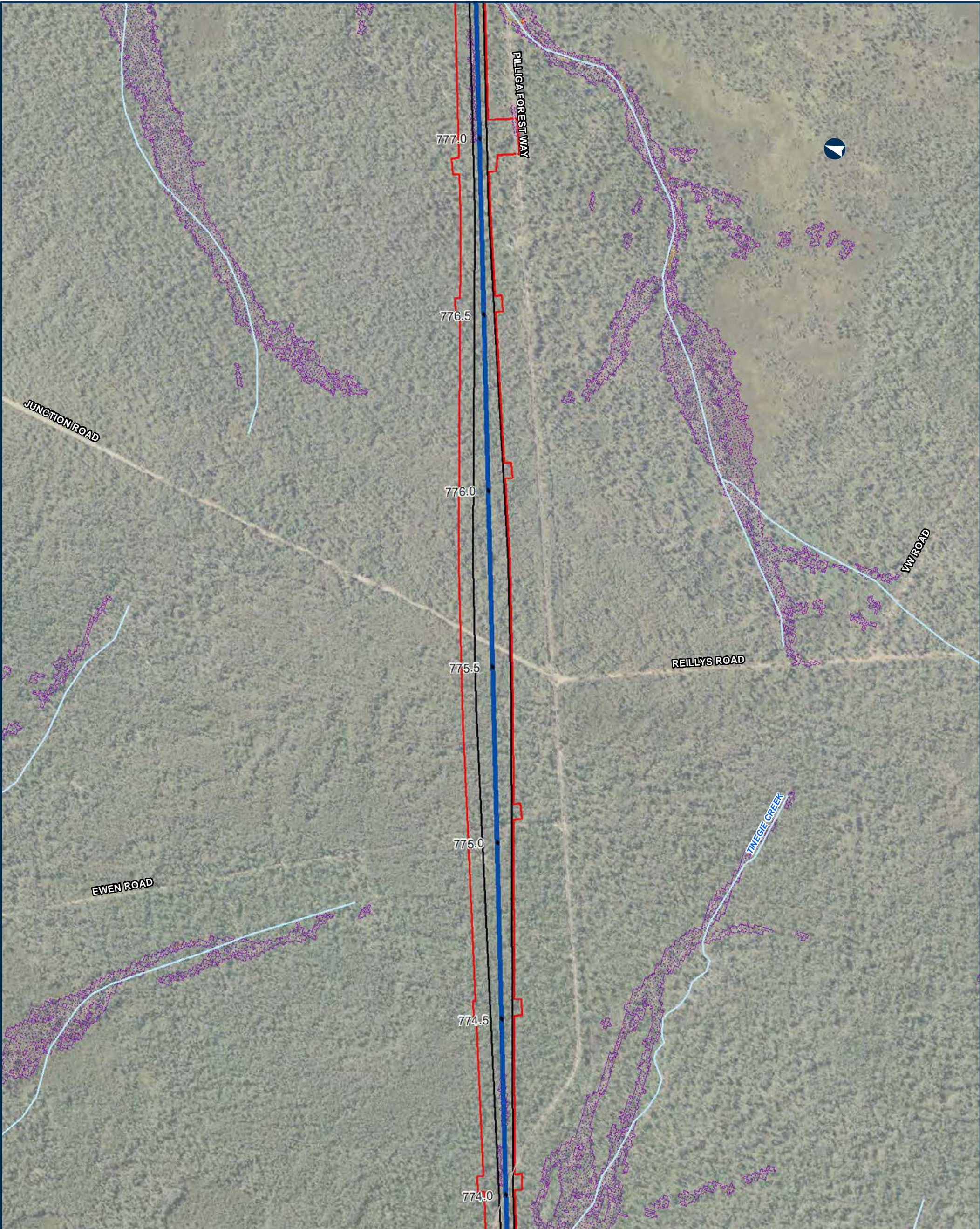
Date: 9/08/2022
Author: JacobsGHD
Data Sources: Basemap layers: NSWSS; all other layers: JacobsGHD

- Road ODL departure
 - Bridge
 - Culvert
 - Road ODL departure
 - Alignment
 - The proposal
 - Drainage Control Area
 - Rail Corridor
 - Design Velocity Contour (m/s)
 - 1
- Design Velocity < 0.5m/s
 - Design Velocity > 0.5m/s, Velocity increase limited to 0.025m/s
 - <10% Increase
 - 10% to 20% increase
 - Greater than 20% increase
 - Existing velocity > 0.5m/s (AETV), Design Velocity > Existing Velocity + 0.025m/s



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NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 20% AEP

Appendix I - Figure 2.1.76

0200400

Metres

Coordinate System: GDA 1994 MGA Zone 55

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Date: 9/08/2022

Author: JacobsGHD

Data Sources: Basemap layers: NSWSS; all other layers: JacobsGHD

Paper: A3

Scale: 1:10,000

—

Road ODL departure

—

Alignment

—

The proposal

—

Rail Corridor

—

Design Velocity < 0.5m/s

—


Design Velocity > 0.5m/s, Velocity increase limited to 0.025m/s

—

<10% Increase

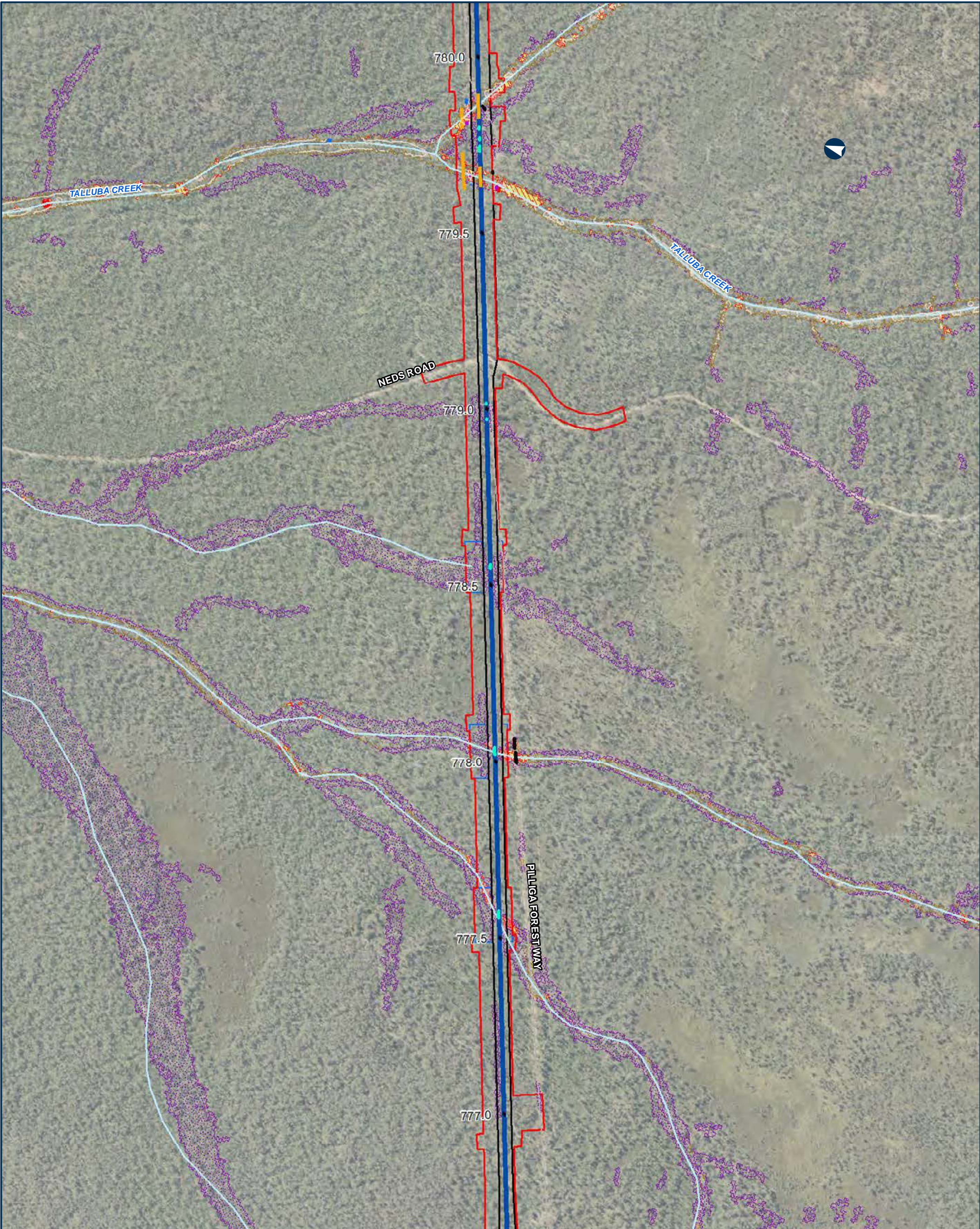
—

Existing velocity > 0.5m/s (AETV), Design Velocity > Existing Velocity + 0.025m/s

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N:\AU\Newcastle\Projects\22\19593\GIS\GIS_2500_N2N_v2\Maps\Deliverables_SPIR\EIS\Flooding_Hydrology\Appendices\2500_EISFWPAPP093_QDL_ScourErosion_20pc_revD.mxd



NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 20% AEP

Appendix I - Figure 2.1.77

0 200 400 Metres

Coordinate System: GDA 1994 MGA Zone 55

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Date: 9/08/2022 Paper: A3
Author: JacobsGHD Scale: 1:10,000
Data Sources: Basemap layers: NSWSS; all other layers: JacobsGHD

- Road ODL departure

Bridge

Culvert

Road ODL departure

Alignment

The proposal

Drainage Control Area

Rail Corridor
- Design Velocity Contour (m/s)

1

2

Design Velocity < 0.5m/s

Design Velocity > 0.5m/s, Velocity increase limited to 0.025m/s

<10% Increase

10% to 20% Increase
- Greater than 20% increase

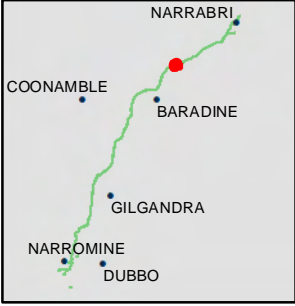
Protected Surfaces

Existing not flooded, design velocity > 1.2m/s

Existing velocity <1m/s, design velocity > 1.2m/s

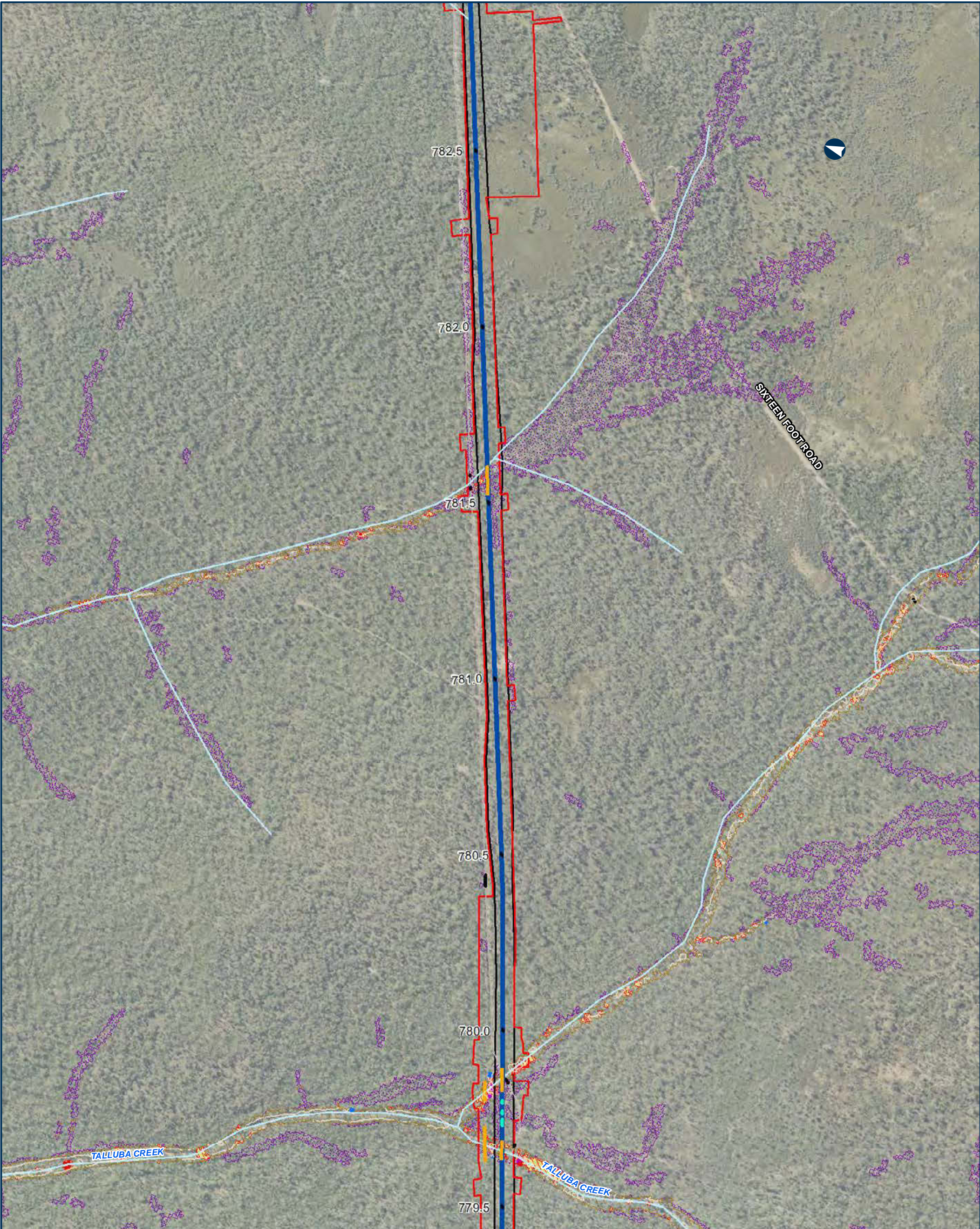
Existing velocity >1m/s, velocity change > 20%

Existing velocity > 0.5m/s (AETV), Design Velocity > Existing Velocity + 0.025m/s



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NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 20% AEP

Appendix I - Figure 2.1.78

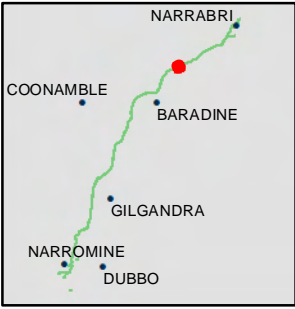
0 200 400 Metres

Coordinate System: GDA 1994 MGA Zone 55

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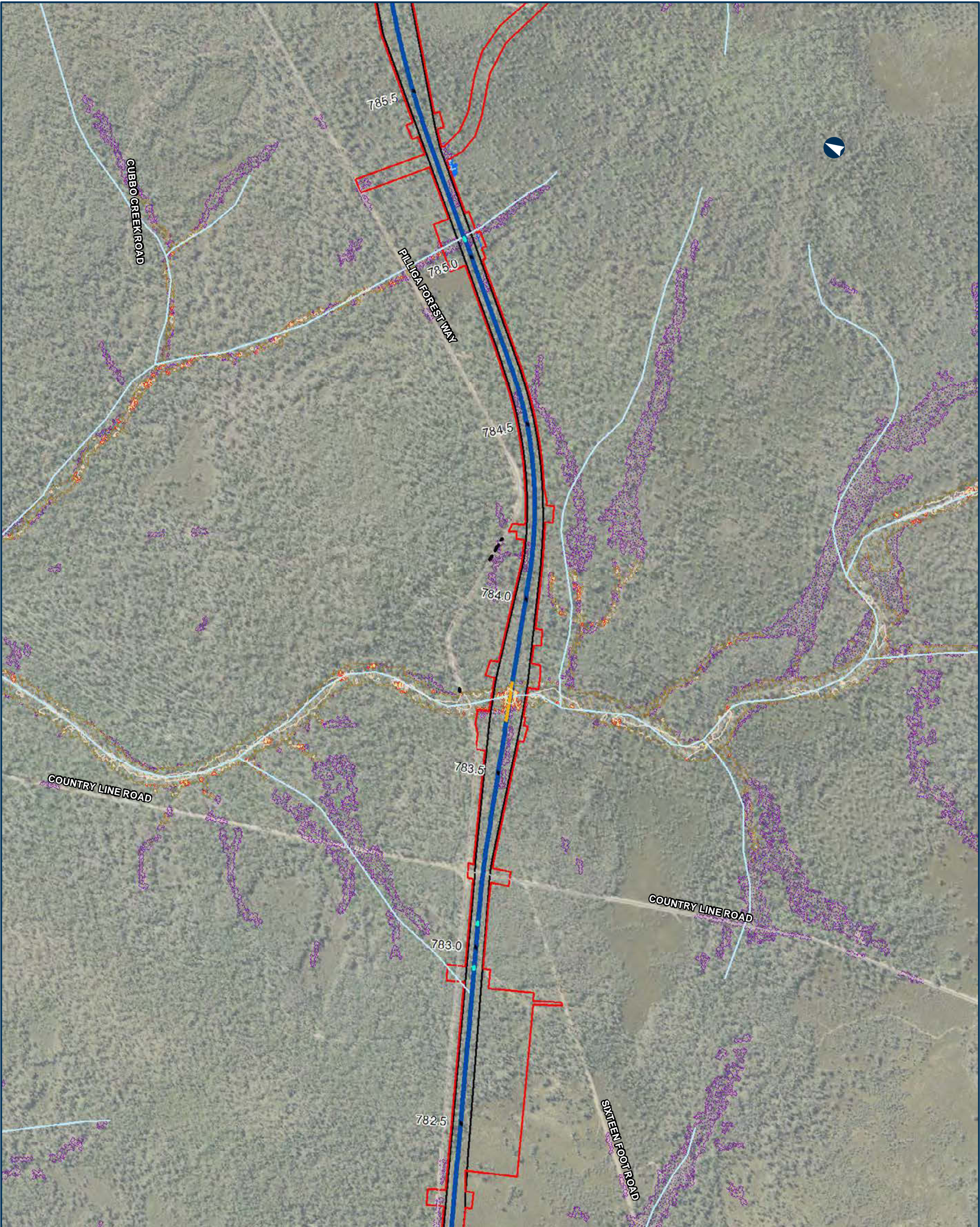
Date: 9/08/2022 Paper: A3
Author: JacobsGHD Scale: 1:10,000
Data Sources: Basemap layers: NSWSS; all other layers: JacobsGHD

- Road QDL departure
 - Bridge
 - Culvert
 - Road QDL departure
 - Alignment
 - The proposal
 - Rail Corridor
 - Design Velocity Contour (m/s)
 - 1
 - 2
 - Design Velocity < 0.5m/s
 - Design Velocity > 0.5m/s, Velocity increase limited to 0.025m/s
- <10% Increase
 - 10% to 20% Increase
 - Greater than 20% Increase
 - Protected Surfaces
 - Existing not flooded, design velocity > 1.2m/s
 - Existing velocity < 1m/s, design velocity > 1.2m/s
 - Existing velocity > 1m/s, velocity change > 20%
 - Existing velocity > 0.5m/s (AETV), Design Velocity > Existing Velocity + 0.025m/s



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NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 20% AEP

Appendix I - Figure 2.1.79

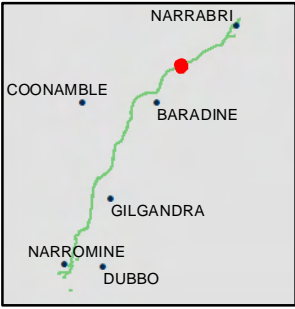
0 200 400 Metres

Coordinate System: GDA 1994 MGA Zone 55

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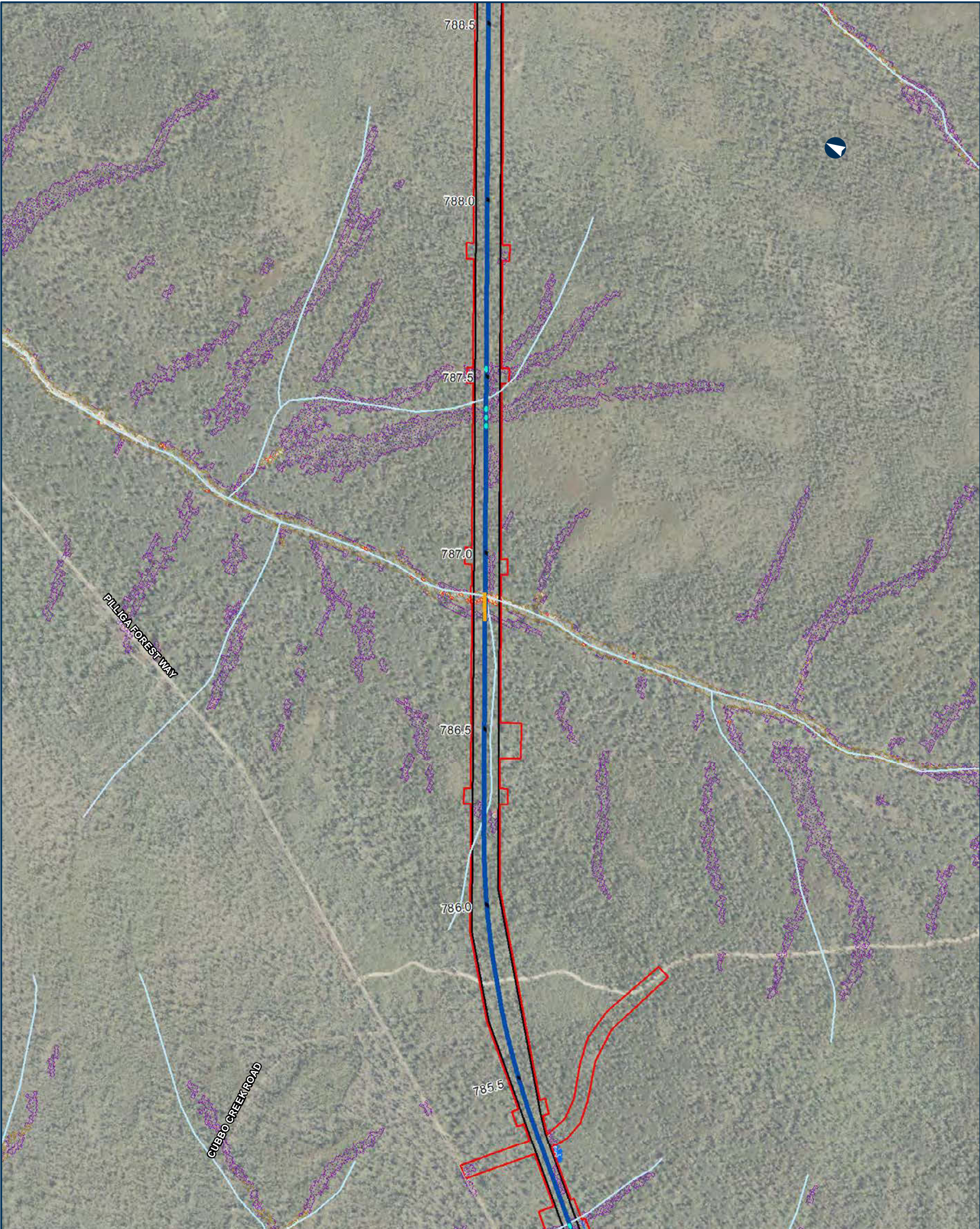
Date: 9/08/2022 Paper: A3
Author: JacobsGHD Scale: 1:10,000
Data Sources: Basemap layers: NSWSS; all other layers: JacobsGHD

- Road ODL departure
- Bridge
- Culvert
- Road ODL departure
- Alignment
- The proposal
- Drainage Control Area
- Rail Corridor
- Design Velocity Contour (m/s)
 - 1
 - 2
- Design Velocity < 0.5m/s
- Design Velocity > 0.5m/s, Velocity Increase limited to 0.025m/s
- <10% Increase
- 10% to 20% increase
- Greater than 20% increase
- Protected Surfaces
 - Existing not flooded, design velocity > 1.2m/s
 - Existing velocity > 0.5m/s (AETV), Design Velocity > Existing Velocity + 0.025m/s



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NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 20% AEP

Appendix I - Figure 2.1.80

0200400

Metres

Coordinate System: GDA 1994 MGA Zone 55

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Date: 9/08/2022

Paper: A3

Author: JacobsGHD

Scale: 1:10,000

Data Sources: Basemap layers: NSWSS; all other layers: JacobsGHD

Bridge

Culvert

Road QDL departure

Alignment

The proposal

Drainage Control Area

Rail Corridor

Design Velocity Contour (m/s)

1

2

Design Velocity < 0.5m/s

Design Velocity > 0.5m/s, Velocity increase limited to 0.025m/s

<10% Increase

10% to 20% increase

Greater than 20% increase

Protected Surfaces

Existing not flooded, design velocity > 1.2m/s

Existing velocity > 0.5m/s (AETV), Design Velocity > Existing Velocity + 0.025m/s

NARRABRI

COONAMBLE

BARADINE

GILGANDRA

NARROMINE

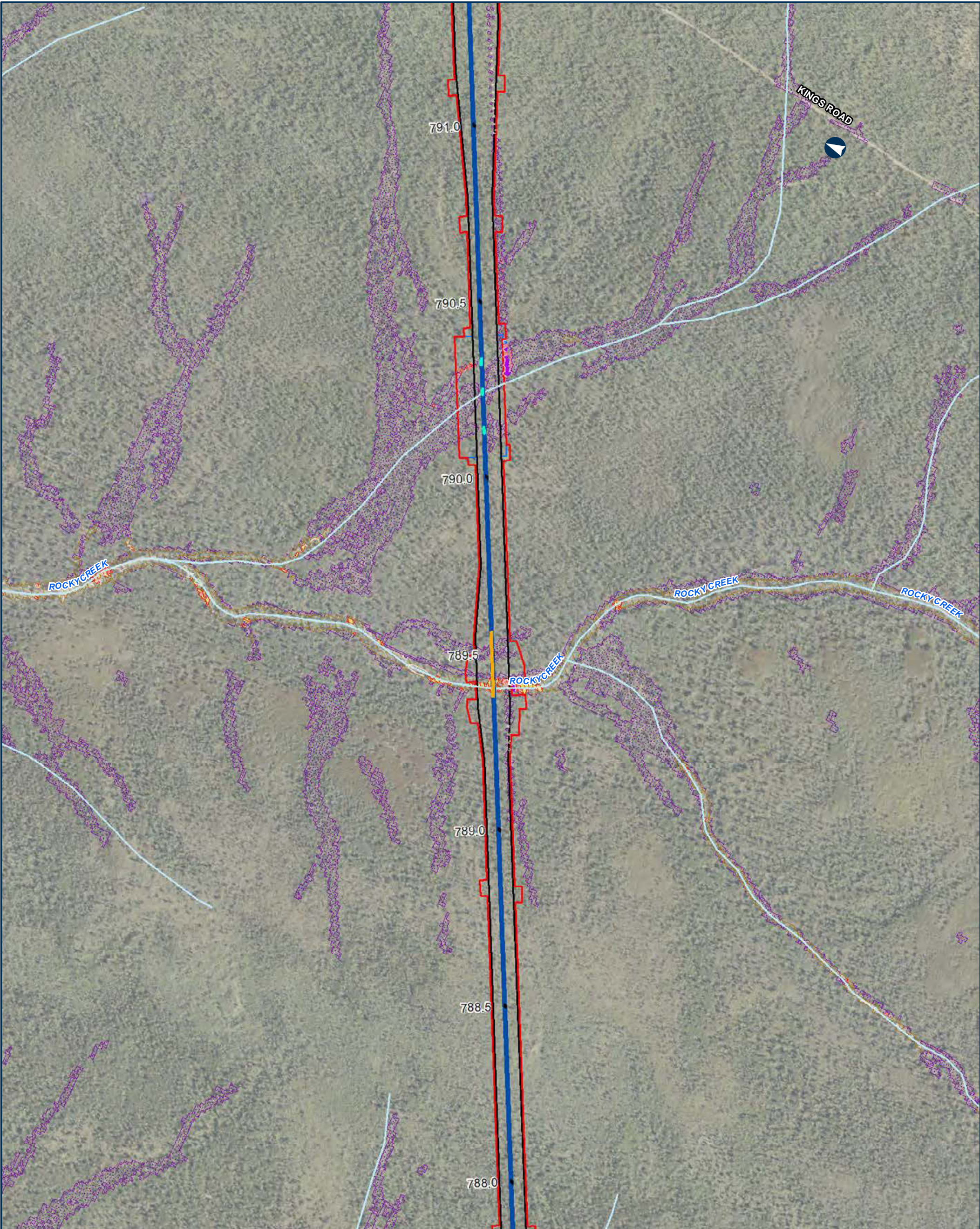
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N:\AU\Newcastle\Projects\22\19593\GIS\GIS_2500_N2N_v2\Maps\Deliverables_SPIR\EIS\Flooding_Hydrology\Appendices\2500_EISFWAPP093_QDL_ScourErosion_20pc_revD.mxd



NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 20% AEP

Appendix I - Figure 2.1.81

0 200 400 Metres

Coordinate System: GDA 1994 MGA Zone 55

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Date: 9/08/2022 Paper: A3
Author: JacobsGHD Scale: 1:10,000
Data Sources: Basemap layers: NSWSS; all other layers: JacobsGHD

- Bridge

Culvert

Road QDL departure

Alignment

The proposal

Drainage Control Area

Rail Corridor
- Design Velocity Contour (m/s)

1

2

Design Velocity < 0.5m/s

Design Velocity > 0.5m/s, Velocity increase limited to 0.025m/s

<10% Increase

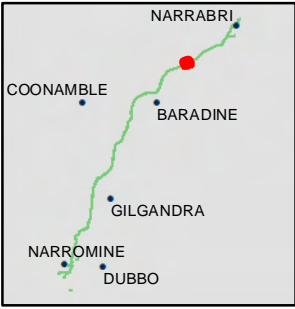
10% to 20% Increase
- Greater than 20% increase

Protected Surfaces

Existing not flooded, design velocity > 1.2m/s

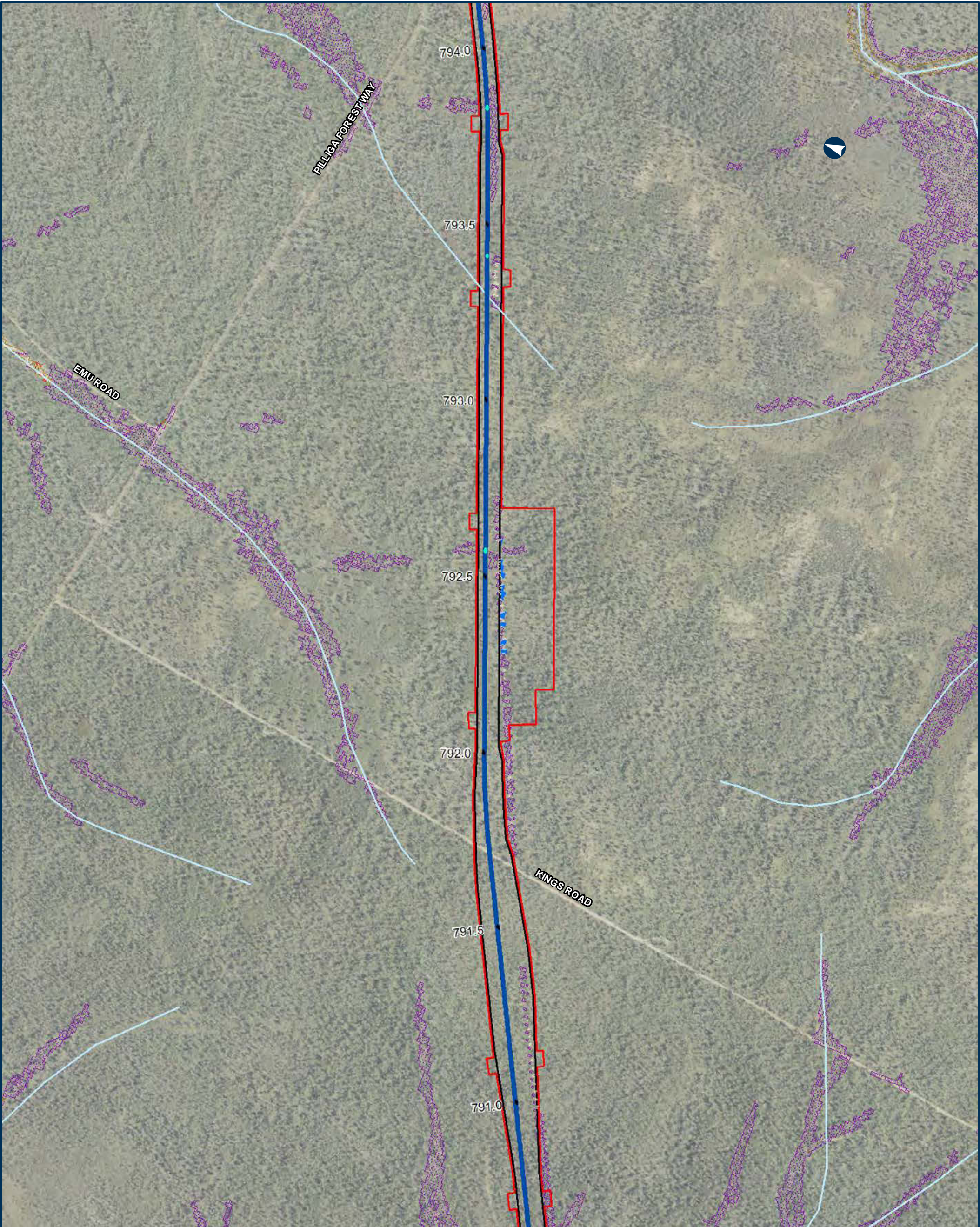
Existing velocity <1m/s, design velocity > 1.2m/s

Existing velocity > 0.5m/s (AETV), Design Velocity > Existing Velocity + 0.025m/s



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NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 20% AEP

Appendix I - Figure 2.1.82

0200400

Metres

Coordinate System: GDA 1994 MGA Zone 55

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Date: 9/08/2022

Paper: A3

Author: JacobsGHD

Scale: 1:10,000

Data Sources: Basemap layers: NSWSS; all other layers: JacobsGHD

Culvert

Road ODL departure

Alignment

The proposal

Rail Corridor

Design Velocity Contour (m/s)

1

2

Design Velocity < 0.5m/s

Design Velocity > 0.5m/s, Velocity increase limited to 0.025m/s

<10% Increase

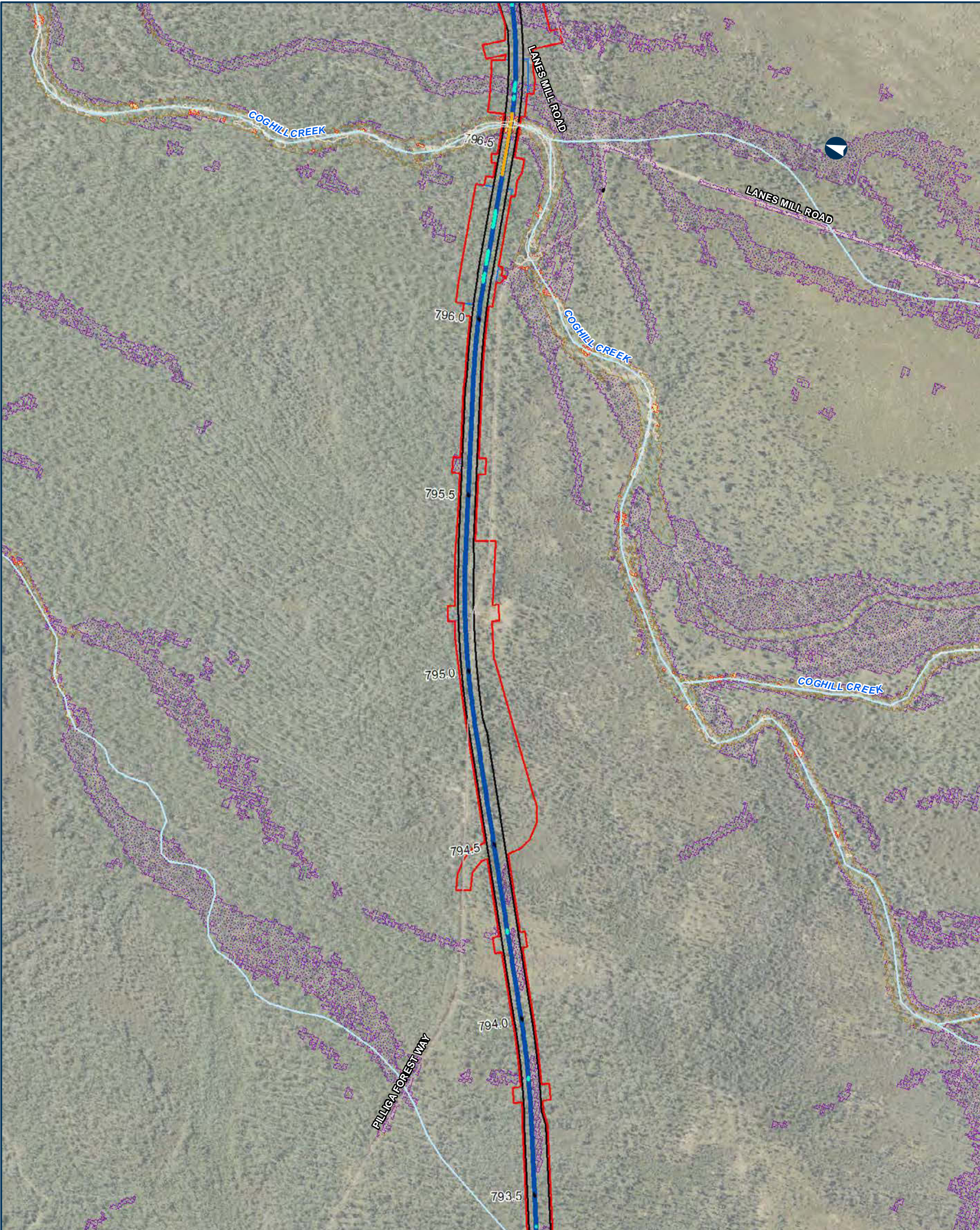
Protected Surfaces

Existing not flooded, design velocity > 1.2m/s

Existing velocity > 0.5m/s (AETV), Design Velocity > Existing Velocity + 0.025m/s

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NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 20% AEP

Appendix I - Figure 2.1.83

0 200 400 Metres

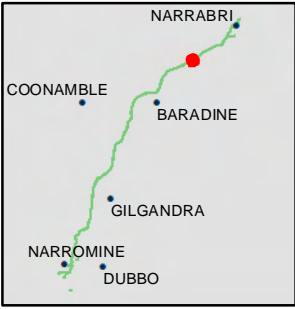
Coordinate System: GDA 1994 MGA Zone 55

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Date: 9/08/2022 Paper: A3
Author: JacobsGHD Scale: 1:10,000
Data Sources: Basemap layers: NSWSS; all other layers: JacobsGHD

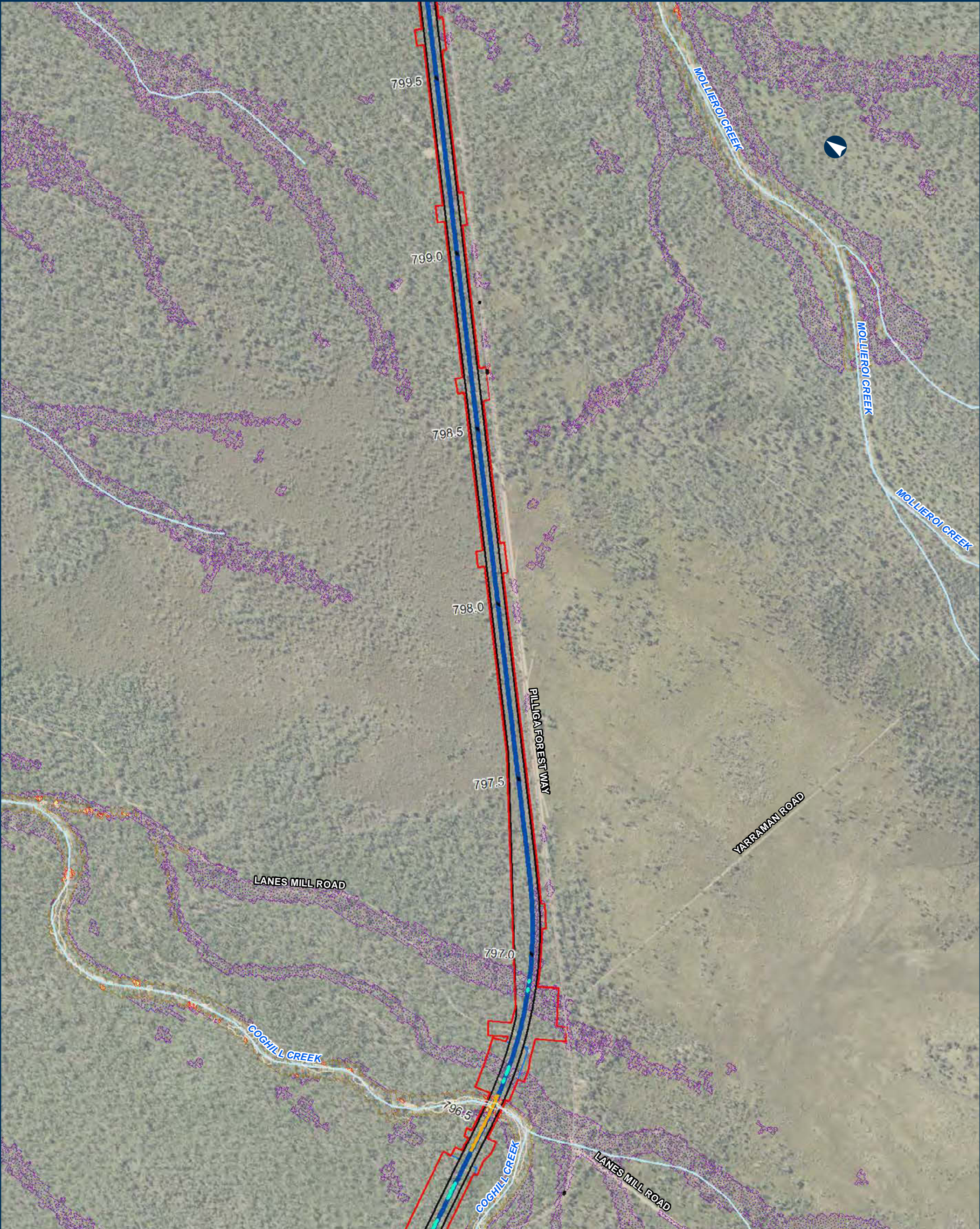
- Road ODL departure
— Bridge
— Culvert
— Road ODL departure
— Alignment
— The proposal
— Drainage Control Area
— Rail Corridor
- Design Velocity Contour (m/s)
1
Design Velocity < 0.5m/s
Design Velocity > 0.5m/s, Velocity increase limited to 0.025m/s
<10% Increase
10% to 20% Increase
Greater than 20% Increase

- Protected Surfaces
Existing velocity >1m/s, velocity change > 20%
Existing velocity > 0.5m/s (AETV), Design Velocity > Existing Velocity + 0.025m/s



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NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 20% AEP

Appendix I - Figure 2.1.84

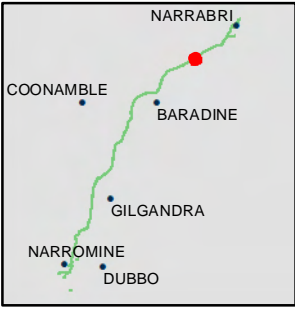
0 200 400 Metres

Coordinate System: GDA 1994 MGA Zone 55

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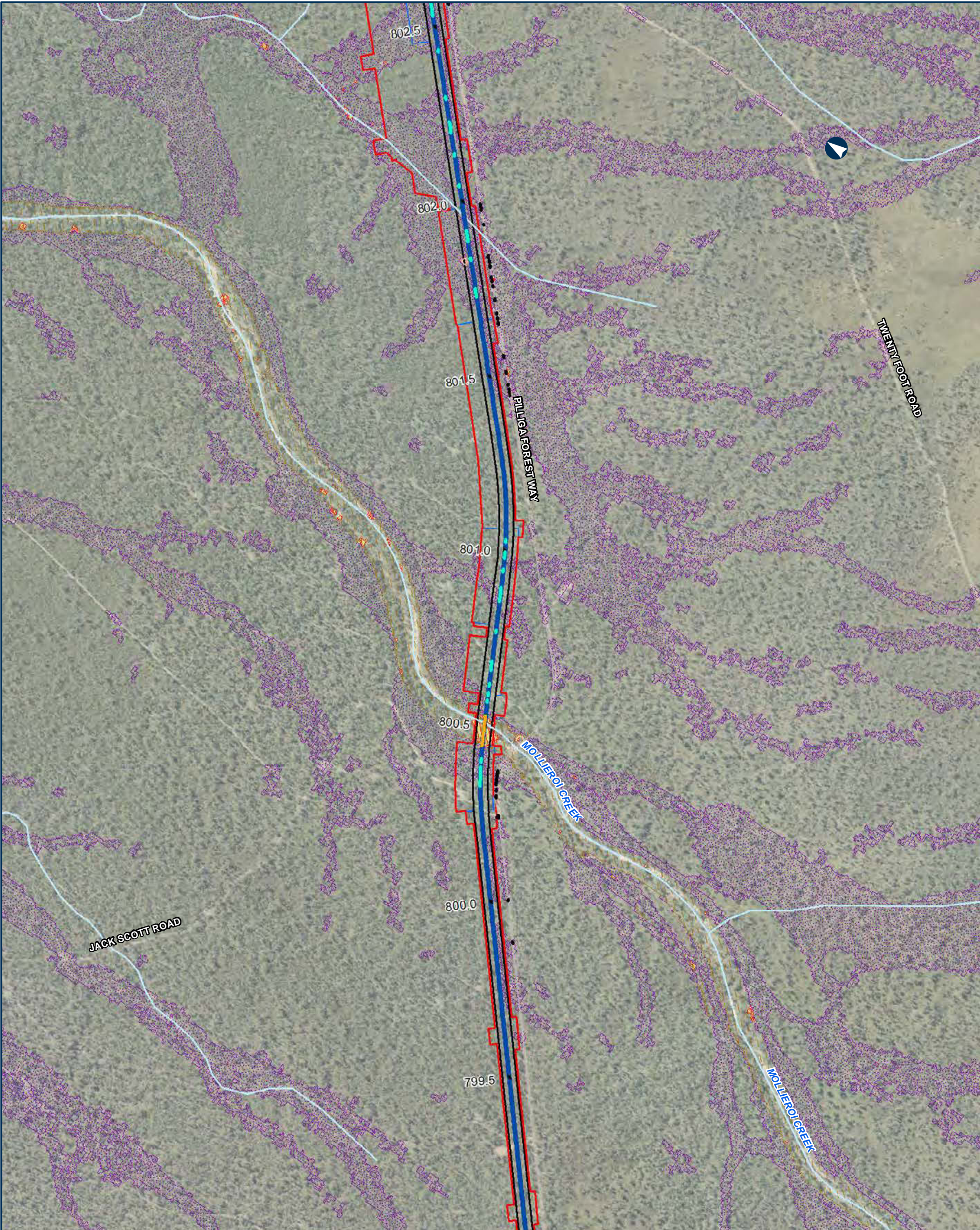
Date: 9/08/2022
Author: JacobsGHD
Data Sources: Basemap layers: NSWSS; all other layers: JacobsGHD

- Road ODL departure
 - Bridge
 - Culvert
 - Road ODL departure
 - Alignment
 - The proposal
 - Drainage Control Area
 - Rail Corridor
 - Design Velocity Contour (m/s)
 - 1
- Design Velocity < 0.5m/s
 - Design Velocity > 0.5m/s, Velocity increase limited to 0.025m/s
 - <10% Increase
 - 10% to 20% increase
 - Greater than 20% increase
 - Existing velocity > 0.5m/s (AETV), Design Velocity > Existing Velocity + 0.025m/s



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NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 20% AEP

Appendix I - Figure 2.1.85

0 200 400 Metres

Coordinate System: GDA 1994 MGA Zone 55

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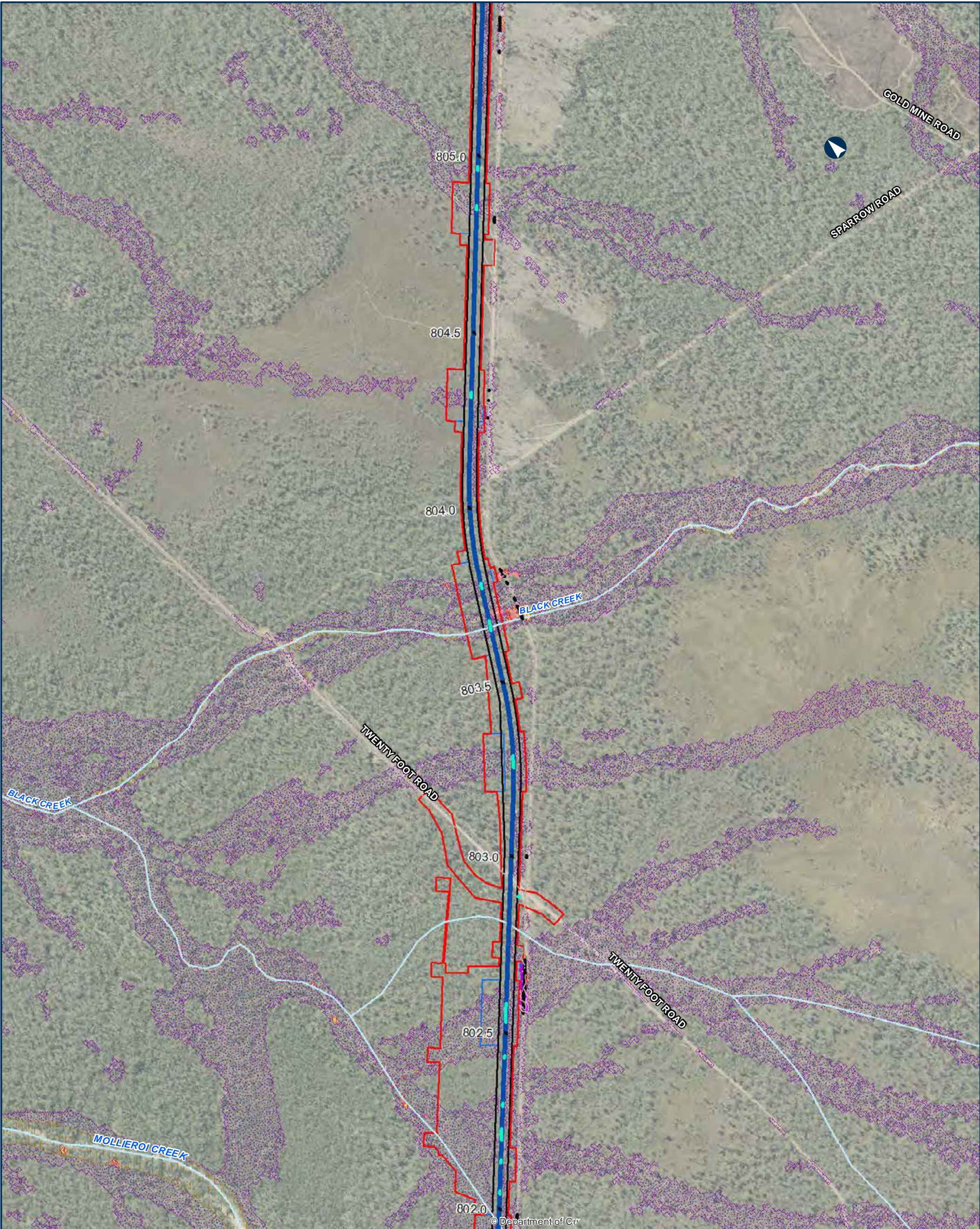
Date: 9/08/2022 Paper: A3
Author: JacobsGHD Scale: 1:10,000
Data Sources: Basemap layers: NSWSS; all other layers: JacobsGHD

- | | | |
|-------------------------|---|---|
| — Road ODL departure | Design Velocity Contour (m/s) | Greater than 20% increase |
| — Bridge | 1 | Protected Surfaces |
| — Culvert | 2 | Existing velocity <1m/s, design velocity > 1.2m/s |
| — Road ODL departure | Design Velocity < 0.5m/s | Existing velocity > 0.5m/s (AETV), Design Velocity > Existing Velocity + 0.025m/s |
| — Alignment | Design Velocity > 0.5m/s, Velocity increase limited to 0.025m/s | |
| — The proposal | <10% Increase | |
| — Drainage Control Area | 10% to 20% Increase | |
| — Rail Corridor | | |



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NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 20% AEP

Appendix I - Figure 2.1.86

0 200 400 Metres

Coordinate System: GDA 1994 MGA Zone 55

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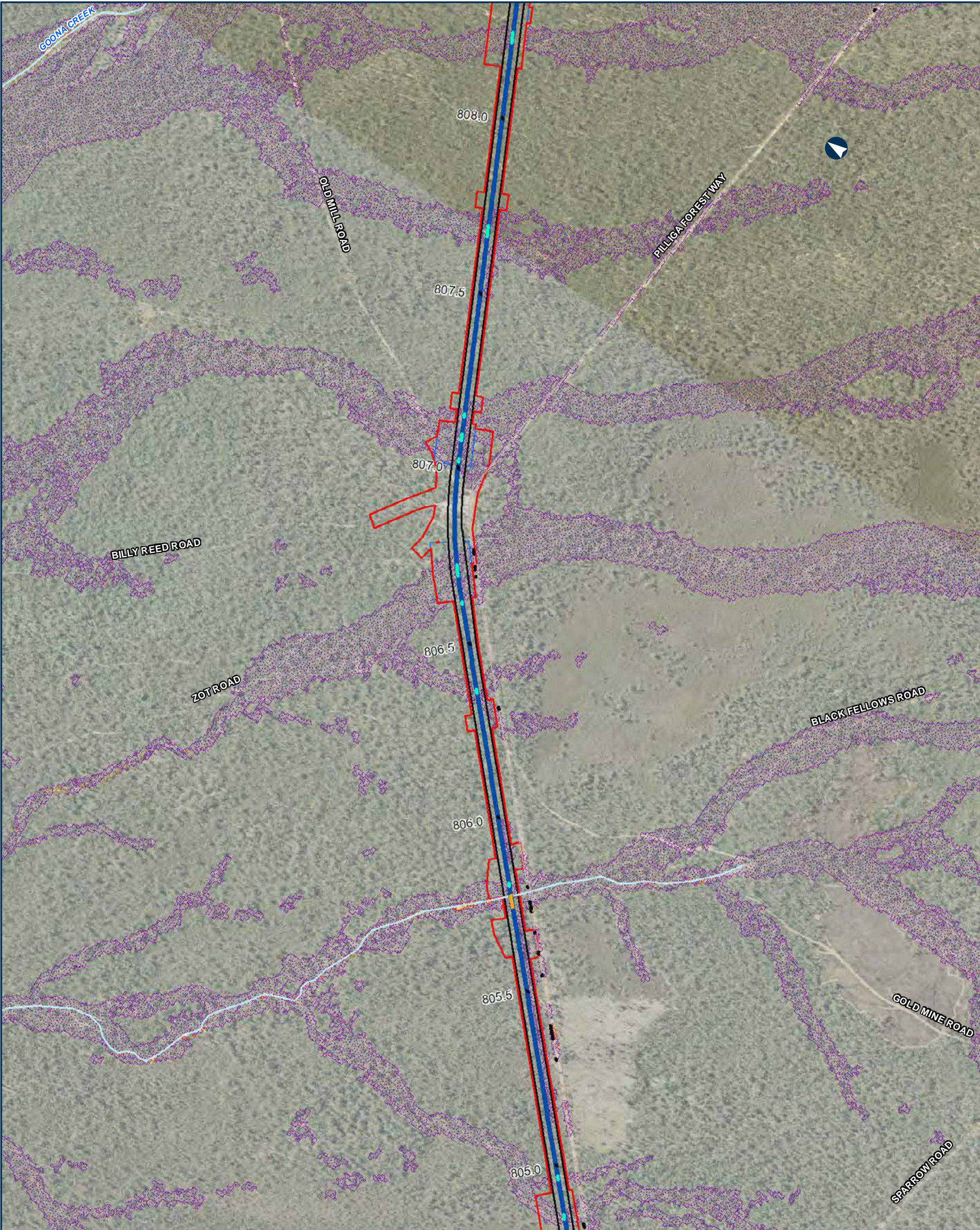
Date: 9/08/2022 Paper: A3
Author: JacobsGHD Scale: 1:10,000
Data Sources: Basemap layers: NSWSS; all other layers: JacobsGHD

- | | | |
|-------------------------|---|---|
| — Road ODL departure | Design Velocity Contour (m/s) | Greater than 20% increase |
| — Culvert | 1 | Protected Surfaces |
| — Road ODL departure | 2 | Existing not flooded, design velocity > 1.2m/s |
| — Alignment | Design Velocity < 0.5m/s | Existing velocity <1m/s, design velocity > 1.2m/s |
| — The proposal | Design Velocity > 0.5m/s, Velocity increase limited to 0.025m/s | Existing velocity > 0.5m/s (AETV), Design Velocity > Existing Velocity + 0.025m/s |
| — Drainage Control Area | <10% Increase | |
| — Rail Corridor | 10% to 20% Increase | |



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NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 20% AEP

Appendix I - Figure 2.1.87

0 200 400 Metres

Coordinate System: GDA 1994 MGA Zone 55

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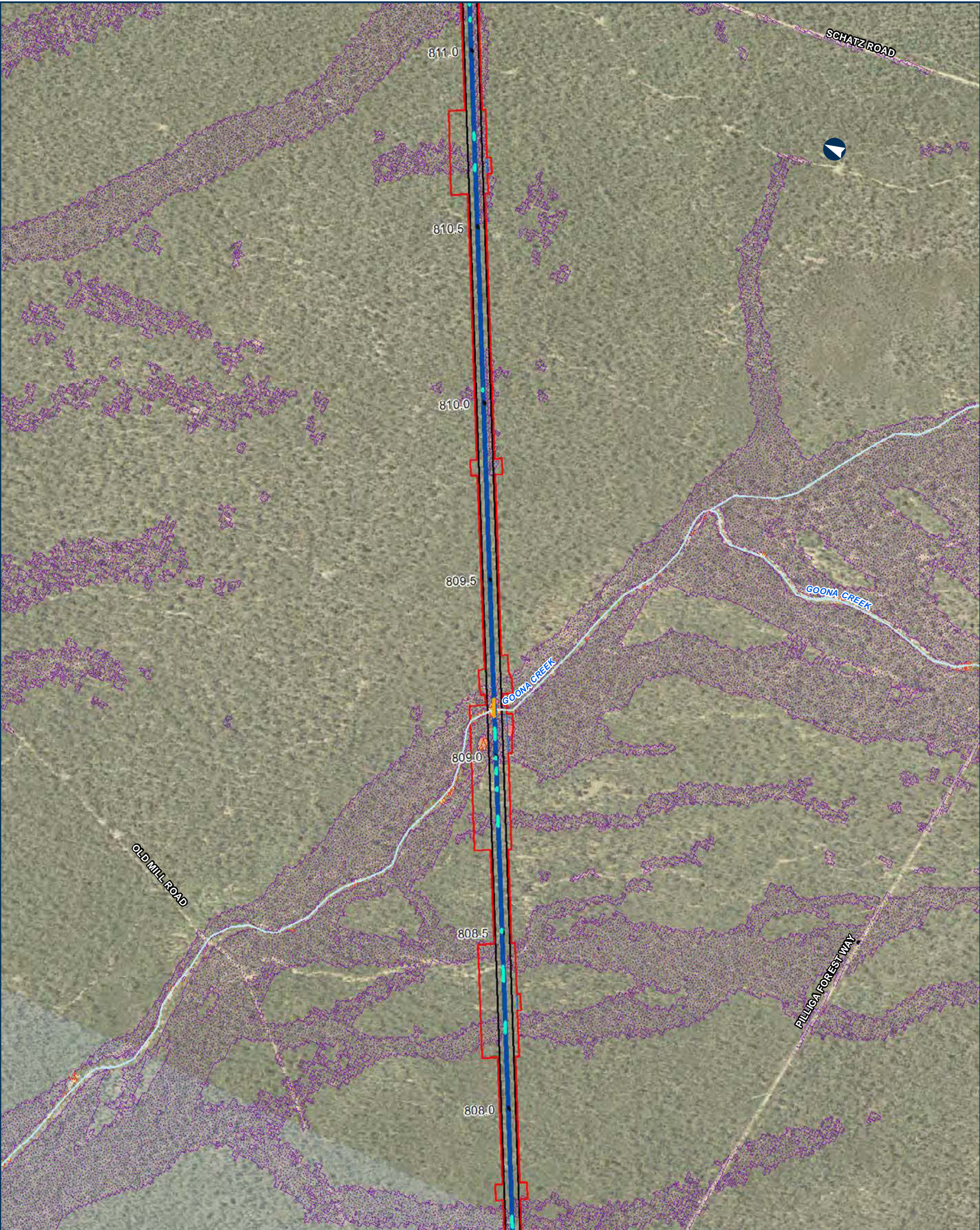
Date: 9/08/2022
Author: JacobsGHD
Data Sources: Basemap layers: NSWSS; all other layers: JacobsGHD

- Road ODL departure
- Bridge
- Culvert
- Road ODL departure
- Alignment
- The proposal
- Drainage Control Area
- Rail Corridor
- Design Velocity Contour (m/s)
- 1
- Design Velocity < 0.5m/s
- Design Velocity > 0.5m/s, Velocity increase limited to 0.025m/s
- <10% Increase
- 10% to 20% increase
- Greater than 20% increase
- Existing velocity > 0.5m/s (AETV), Design Velocity > Existing Velocity + 0.025m/s



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NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 20% AEP

Appendix I - Figure 2.1.88

0200400

Metres

Coordinate System: GDA 1994 MGA Zone 55

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Date: 9/08/2022
Author: JacobsGHD
Data Sources: Basemap layers: NSWSS; all other layers: JacobsGHD

Bridge

Culvert

Road QDL departure

Alignment

The proposal

Drainage Control Area

Rail Corridor

Design Velocity Contour (m/s)

1

Design Velocity < 0.5m/s

Design Velocity > 0.5m/s, Velocity increase limited to 0.025m/s

<10% Increase

10% to 20% increase

Greater than 20% increase

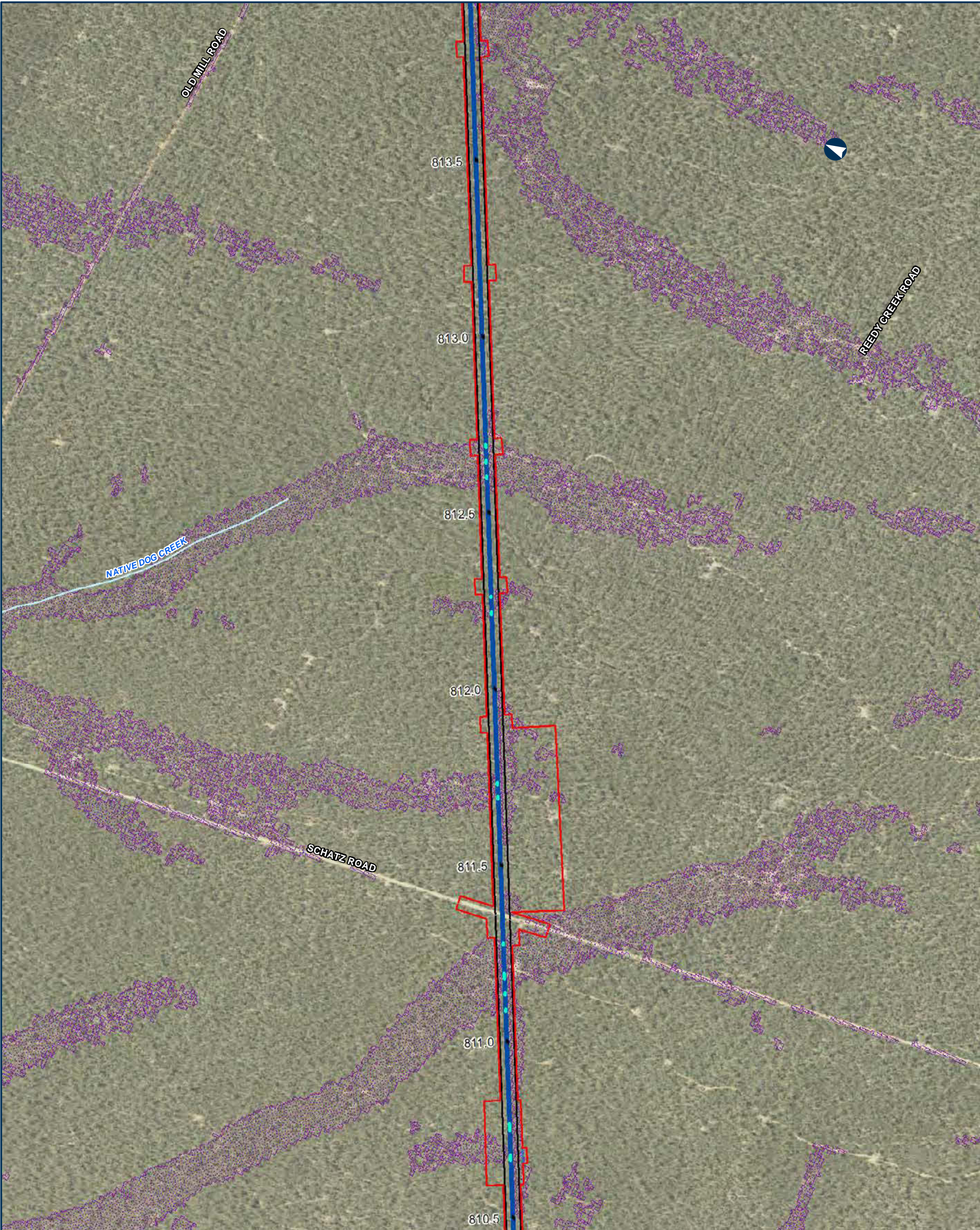
Existing velocity > 0.5m/s (AETV), Design Velocity > Existing Velocity + 0.025m/s

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NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 20% AEP

Appendix I - Figure 2.1.89

0200400Metres

Coordinate System: GDA 1994 MGA Zone 55

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Date: 9/08/2022
Author: JacobsGHD
Data Sources: Basemap layers: NSWSS; all other layers: JacobsGHD

Culvert

Road ODL departure

Alignment

The proposal

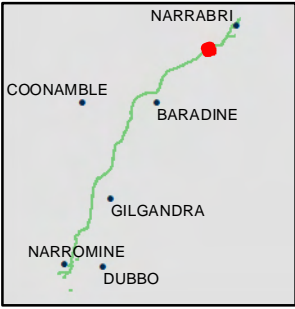
Drainage Control Area

Rail Corridor

Design Velocity < 0.5m/s

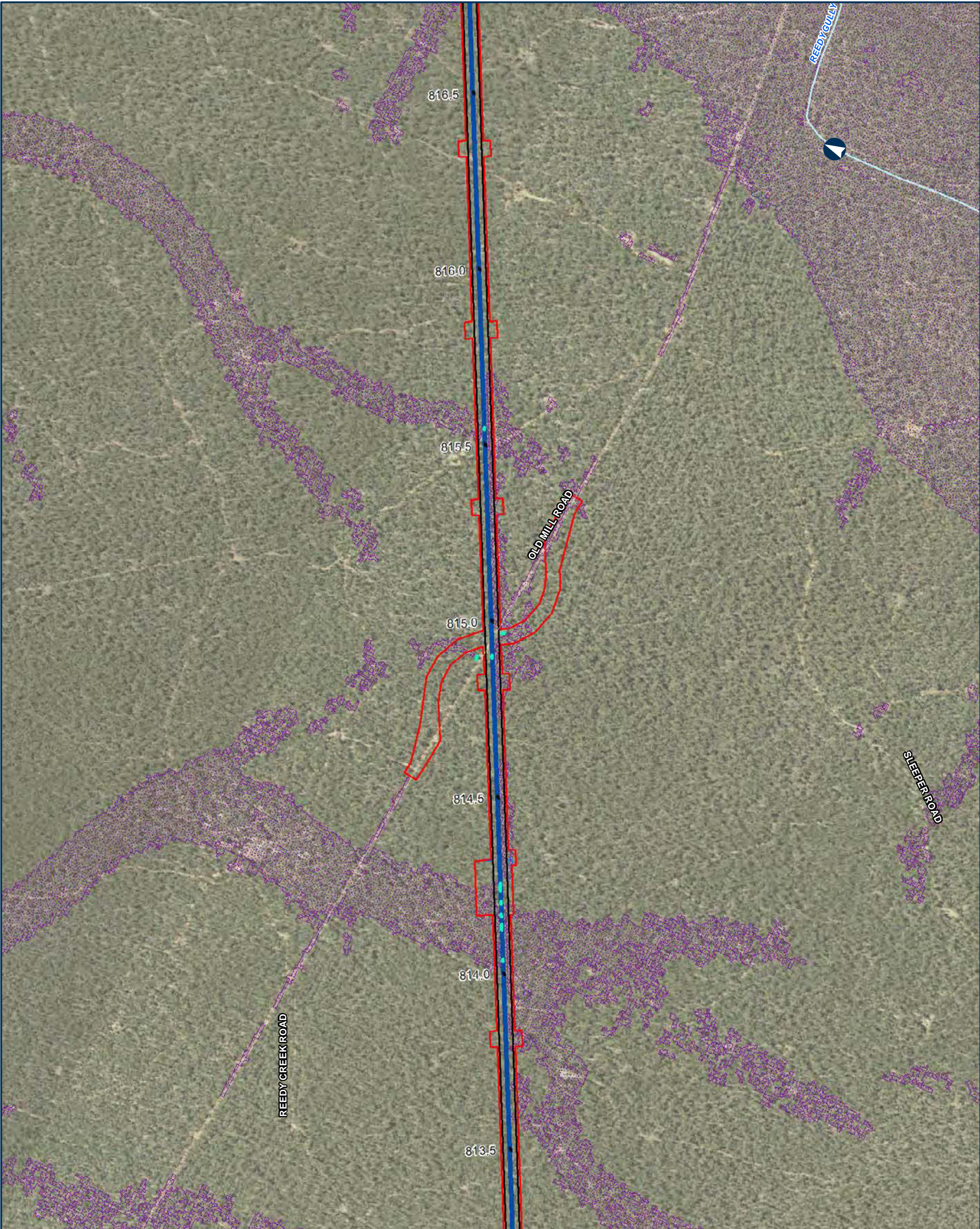
Paper: A3

Scale: 1:10,000



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NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 20% AEP

Appendix I - Figure 2.1.90

0200400

Metres

Coordinate System: GDA 1994 MGA Zone 55

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Date: 9/08/2022

Paper: A3

Author: JacobsGHD

Scale: 1:10,000

Data Sources: Basemap layers: NSWSS; all other layers: JacobsGHD

Culvert

Road QDL departure

Alignment

The proposal

Drainage Control Area

Rail Corridor

Design Velocity < 0.5m/s

Design Velocity > 0.5m/s, Velocity increase limited to 0.025m/s

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NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 20% AEP

Appendix I - Figure 2.1.91

0 200 400 Metres

Coordinate System: GDA 1994 MGA Zone 55

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Date: 9/08/2022 Paper: A3
Author: JacobsGHD Scale: 1:10,000
Data Sources: Basemap layers: NSWSS; all other layers: JacobsGHD

- Bridge

Culvert

Road QDL departure

Alignment

The proposal

Drainage Control Area

Rail Corridor
- Design Velocity Contour (m/s)

1

2

Design Velocity < 0.5m/s

Design Velocity > 0.5m/s, Velocity increase limited to 0.025m/s

<10% Increase

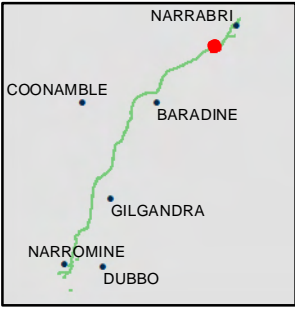
10% to 20% Increase
- Greater than 20% increase

Protected Surfaces

Existing velocity <1m/s, design velocity > 1.2m/s

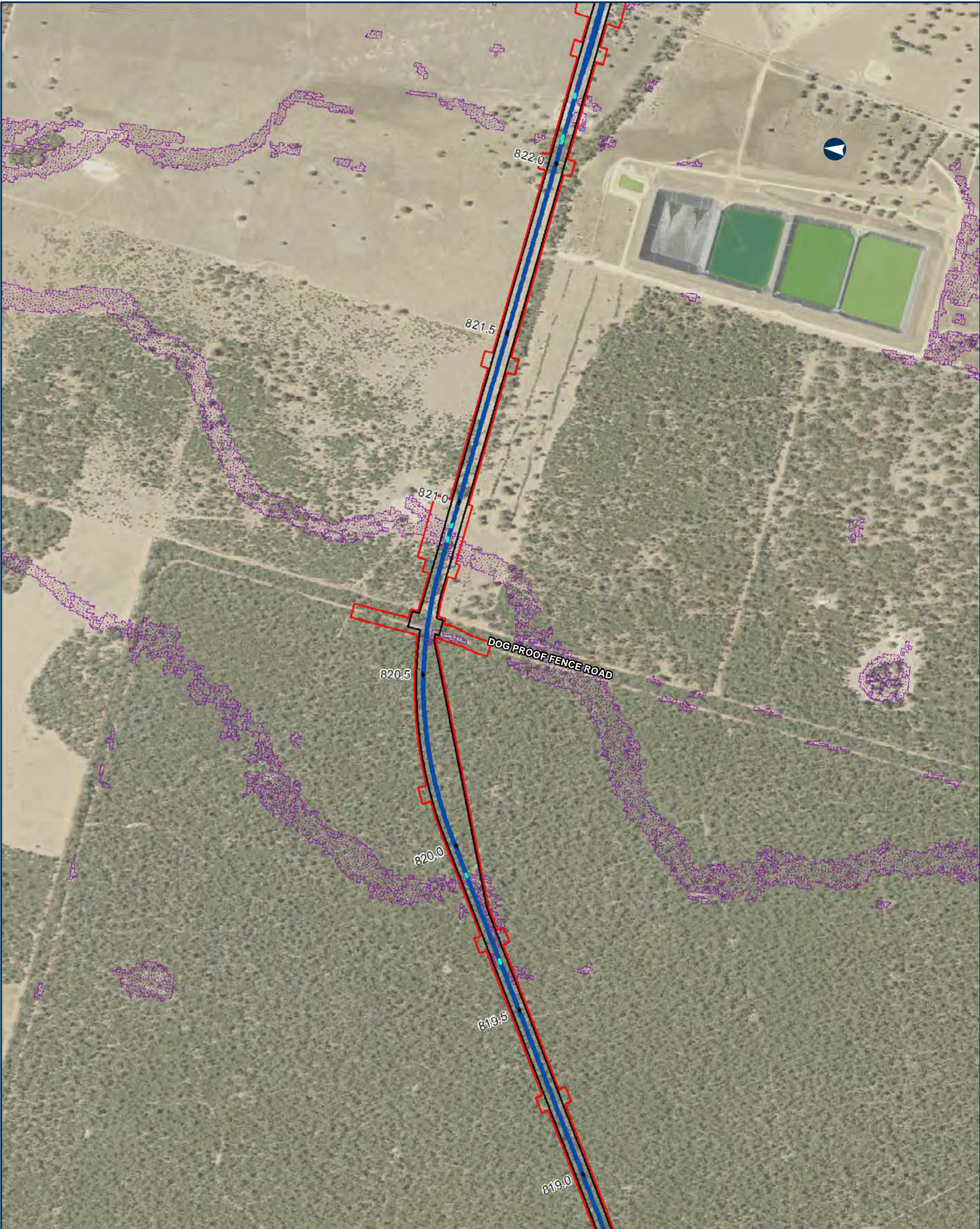
Existing velocity >1m/s, velocity change > 20%

Existing velocity > 0.5m/s (AETV), Design Velocity > Existing Velocity + 0.025m/s



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NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 20% AEP

Appendix I - Figure 2.1.92

0200400

Metres

Coordinate System: GDA 1994 MGA Zone 55

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Date: 9/08/2022

Paper: A3

Author: JacobsGHD

Scale: 1:10,000

Data Sources: Basemap layers: NSWSS; all other layers: JacobsGHD

Culvert

Road ODL departure

Alignment

The proposal

Drainage Control Area

Rail Corridor

Design Velocity < 0.5m/s

Design Velocity > 0.5m/s, Velocity increase limited to 0.025m/s

<10% Increase

10% to 20% increase

Unprotected Surfaces

Existing not flooded, design velocity > 0.5m/s

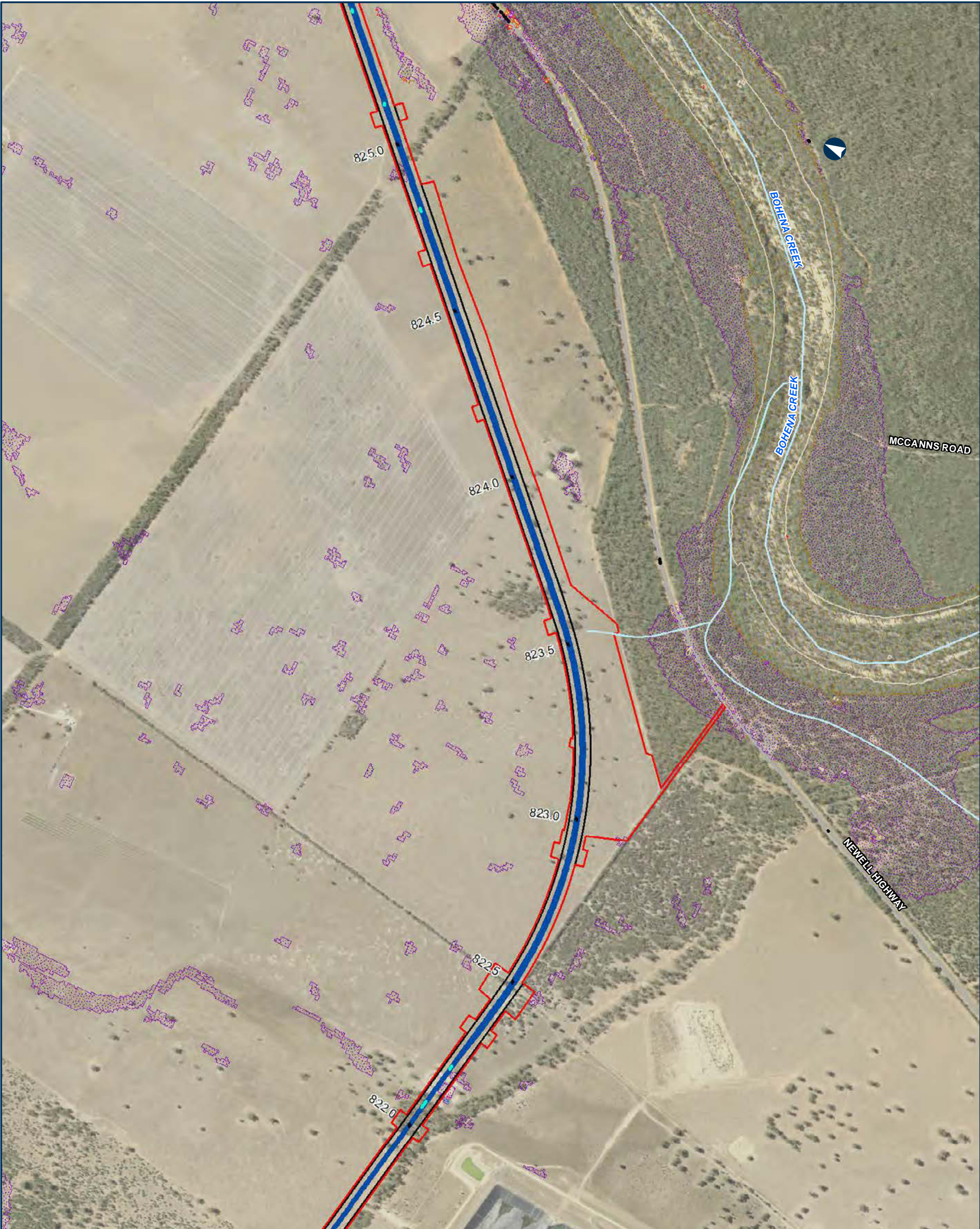
Existing velocity < 0.5m/s, design velocity > 0.5m/s

Existing velocity > 0.5m/s (AETV), Design Velocity > Existing Velocity + 0.025m/s

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NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 20% AEP

Appendix I - Figure 2.1.93

0 200 400 Metres

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Date: 9/08/2022 Paper: A3
Author: JacobsGHD Scale: 1:10,000
Data Sources: Basemap layers: NSWSS; all other layers: JacobsGHD

- Road ODL departure

Culvert

Road ODL departure

Alignment

The proposal

Rail Corridor

Design Velocity Contour (m/s)

1
- Design Velocity < 0.5m/s

Design Velocity > 0.5m/s, Velocity increase limited to 0.025m/s

<10% Increase

10% to 20% increase

Greater than 20% Increase
- Protected Surfaces

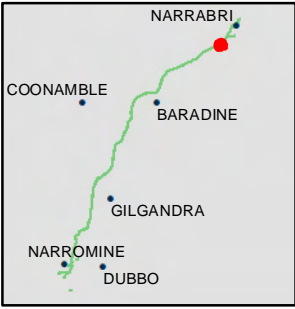
Existing velocity <1m/s, design velocity > 1.2m/s

Unprotected Surfaces

Existing not flooded, design velocity > 0.5m/s

Existing velocity < 0.5m/s, design velocity > 0.5m/s

Existing velocity > 0.5m/s (AETV), Design Velocity > Existing Velocity + 0.025m/s



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NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 20% AEP

Appendix I - Figure 2.1.94

0 200 400 Metres

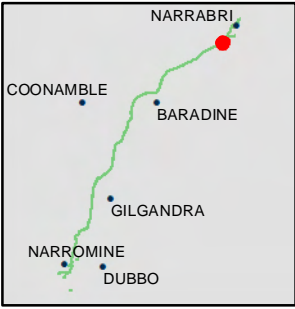
Coordinate System: GDA 1994 MGA Zone 55

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Data Sources: Basemap layers: NSWSS; all other layers: JacobsGHD

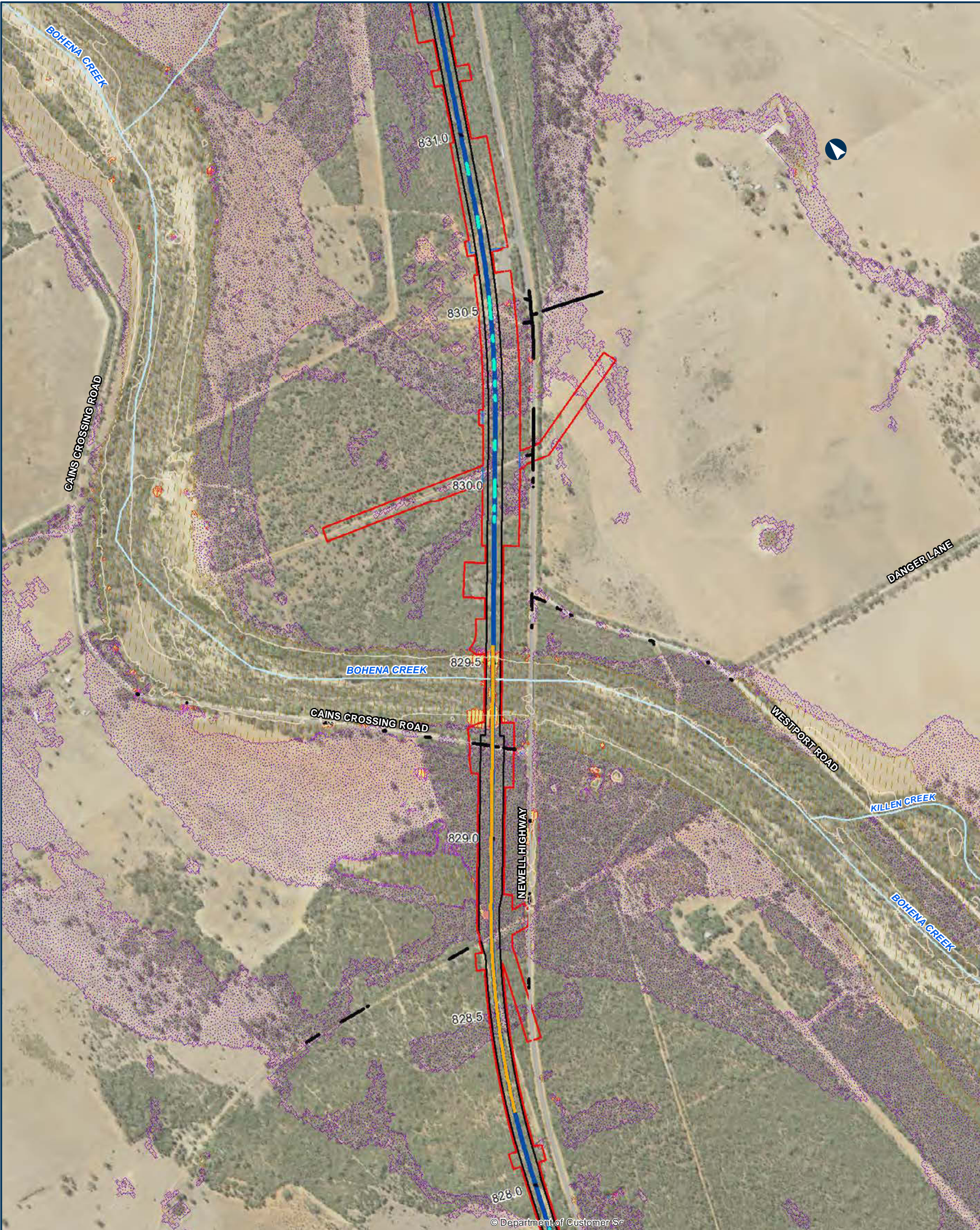
- Road ODL departure
- Bridge
- Culvert
- Road ODL departure
- Alignment
- The proposal
- Rail Corridor
- Design Velocity Contour (m/s)
- 1
- 2
- Design Velocity < 0.5m/s
- Design Velocity > 0.5m/s, Velocity increase limited to 0.025m/s
- <10% Increase
- 10% to 20% increase
- Greater than 20% increase

- Protected Surfaces
- Existing velocity <1m/s, design velocity > 1.2m/s
- Unprotected Surfaces
- Existing not flooded, design velocity > 0.5m/s
- Existing velocity < 0.5m/s, design velocity > 0.5m/s
- Existing velocity > 0.5m/s (AETV), Design Velocity > Existing Velocity + 0.025m/s



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NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 20% AEP

Appendix I - Figure 2.1.95

0200400

Metres

Coordinate System: GDA 1994 MGA Zone 55

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Date: 9/08/2022
Author: JacobsGHD
Data Sources: Basemap layers: NSWSS; all other layers: JacobsGHD

Paper: A3
Scale: 1:10,000

Road ODL departure

Bridge

Culvert

Road ODL departure

Alignment

The proposal

Drainage Control Area

Rail Corridor

1

Design Velocity Contour (m/s)

2

Design Velocity < 0.5m/s

Design Velocity > 0.5m/s, Velocity increase limited to 0.025m/s

<10% Increase

10% to 20% Increase

Greater than 20% Increase

Existing not flooded, design velocity > 1.2m/s

Existing velocity <1m/s, design velocity > 1.2m/s

Existing not flooded, design velocity > 0.5m/s

Existing velocity < 0.5m/s, design velocity > 0.5m/s

Existing velocity > 0.5m/s (AETV), Design Velocity > Existing Velocity + 0.025m/s

Unprotected Surfaces

Existing not flooded, design velocity > 0.5m/s

Existing velocity < 0.5m/s, design velocity > 0.5m/s

Existing velocity > 0.5m/s (AETV), Design Velocity > Existing Velocity + 0.025m/s

NARRABRI

COONAMBLE

BARADINE

GILGANDRA

NARROMINE

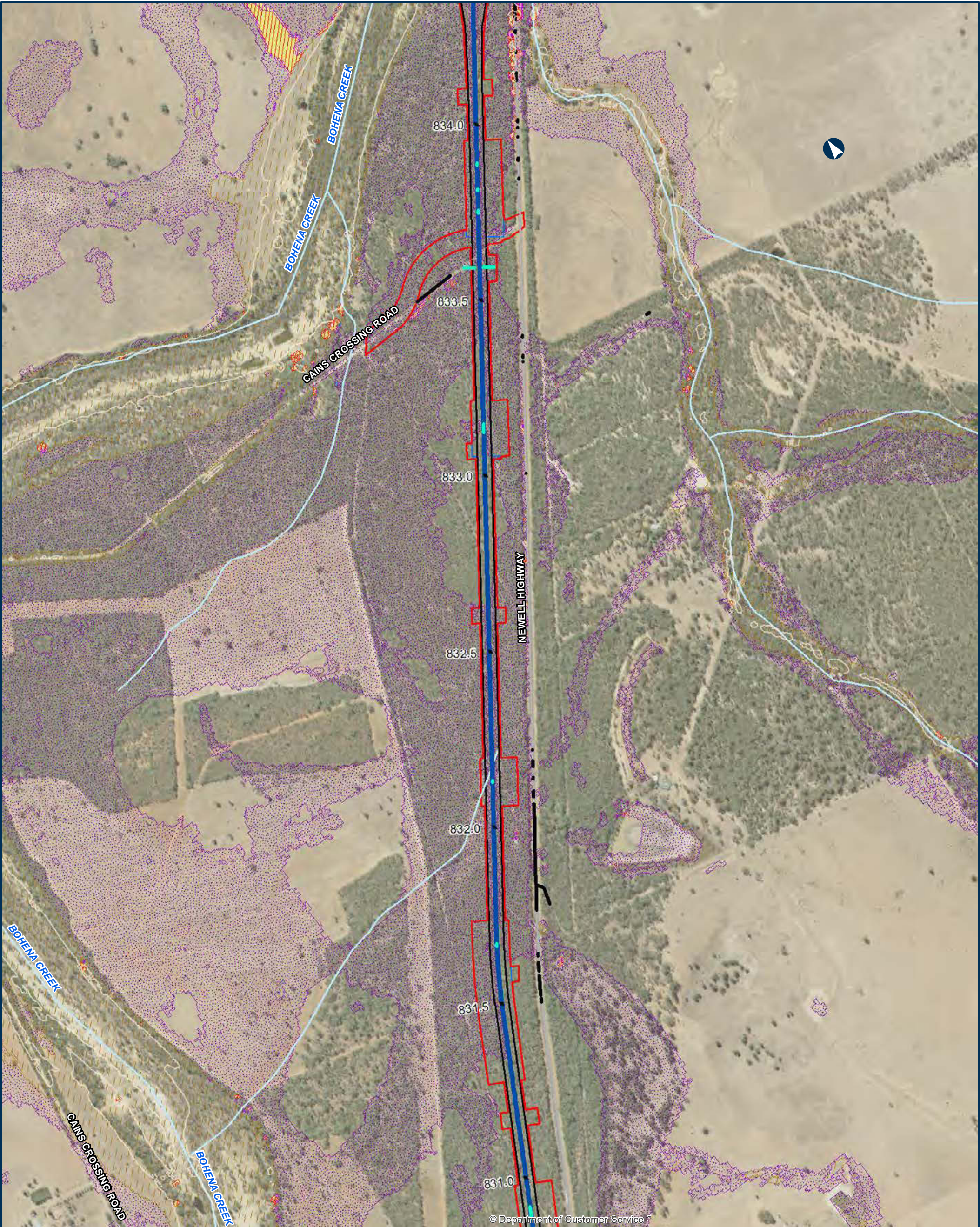
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NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 20% AEP

Appendix I - Figure 2.1.96

0200400Metres

Coordinate System: GDA 1994 MGA Zone 55

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Date: 9/08/2022
Author: JacobsGHD
Data Sources: Basemap layers: NSWSS; all other layers: JacobsGHD

Paper: A3
Scale: 1:10,000

Road ODL departure

Culvert

Road ODL departure

Alignment

The proposal

Drainage Control Area

Rail Corridor

Design Velocity Contour (m/s)

1

2

Design Velocity < 0.5m/s

Design Velocity > 0.5m/s, Velocity increase limited to 0.025m/s

<10% Increase

10% to 20% increase

Greater than 20% increase

Protected Surfaces

Existing velocity <1m/s, design velocity > 1.2m/s

Existing velocity >1m/s, velocity change > 20%

Unprotected Surfaces

Existing not flooded, design velocity > 0.5m/s

Existing velocity < 0.5m/s, design velocity > 0.5m/s

Existing velocity > 0.5m/s (AETV), Design Velocity > Existing Velocity + 0.025m/s

NARRABRI

COONAMBLE

BARADINE

GILGANDRA

NARROMINE

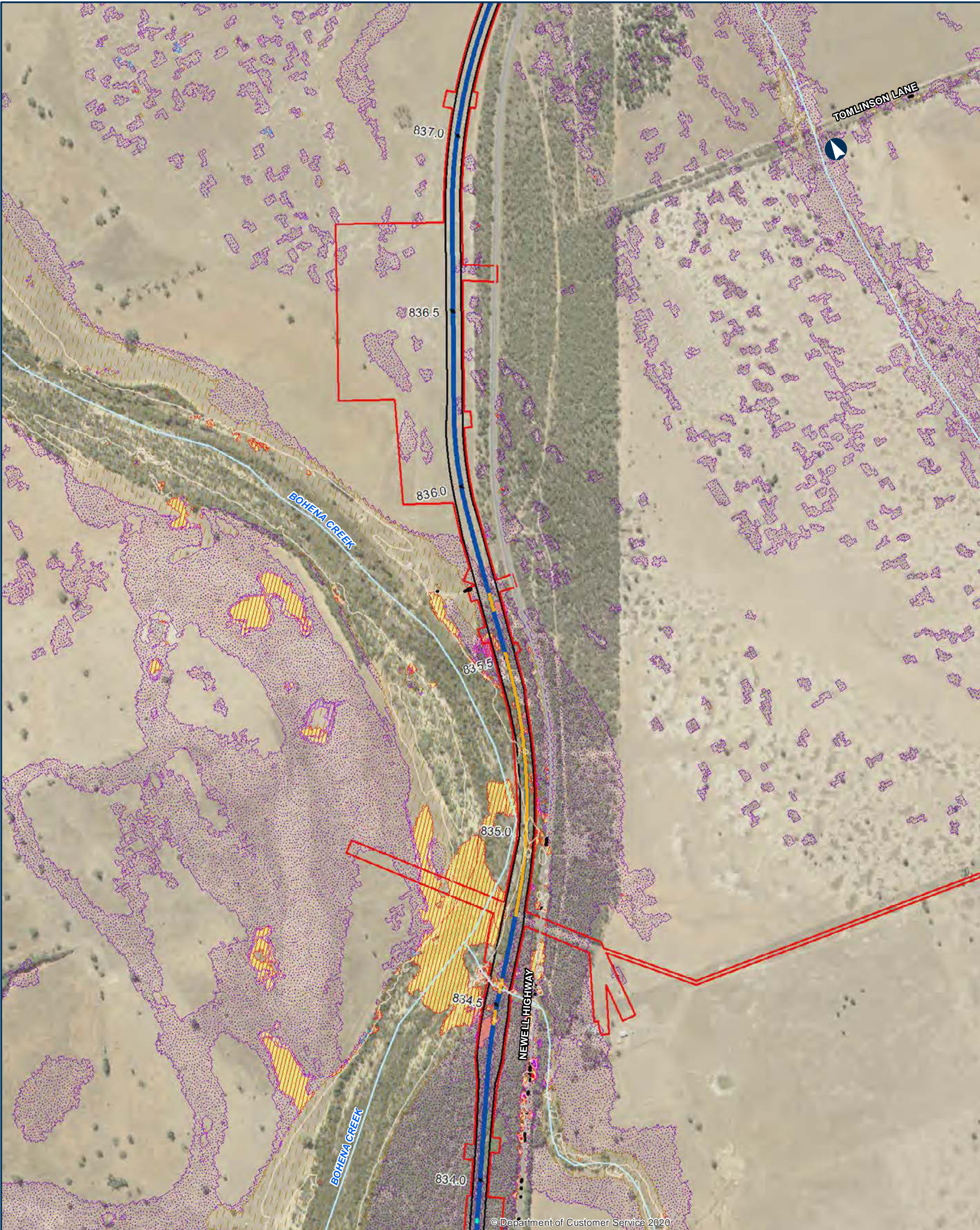
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NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 20% AEP

Appendix I - Figure 2.1.97

0 200 400 Metres

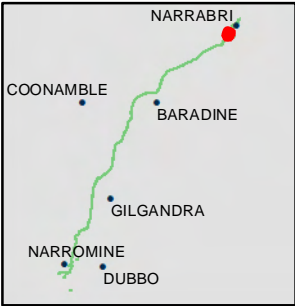
Coordinate System: GDA 1994 MGA Zone 55

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Date: 9/08/2022 Paper: A3
Author: JacobsGHD Scale: 1:10,000
Data Sources: Basemap layers: NSWSS; all other layers: JacobsGHD

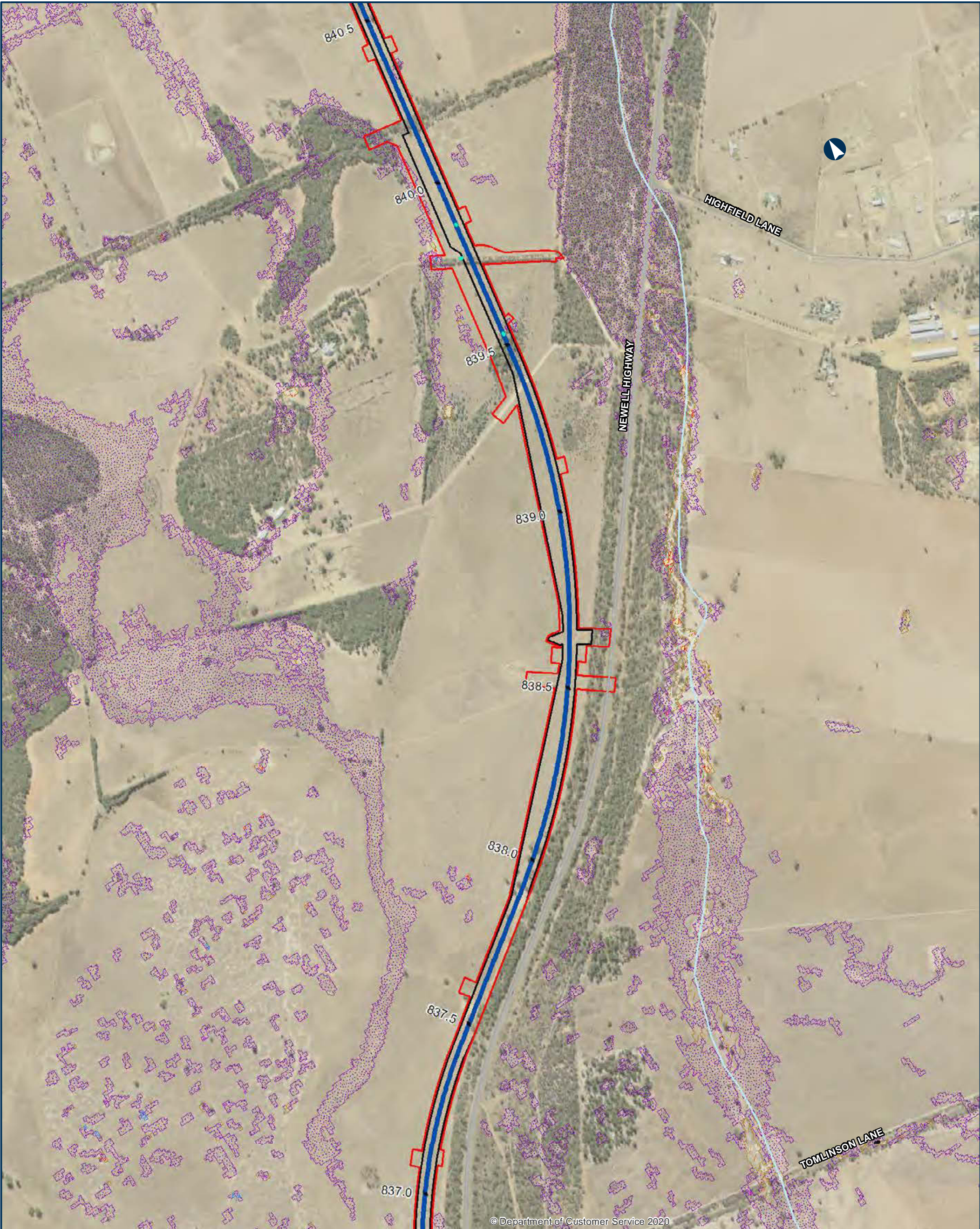
- Road ODL departure
 - Bridge
 - Culvert
 - Road ODL departure
 - Alignment
 - The proposal
 - Drainage Control Area
 - Rail Corridor
 - Design Velocity Contour (m/s)
 - 1
- 2
 - Design Velocity < 0.5m/s
 - Design Velocity > 0.5m/s, Velocity increase limited to 0.025m/s
 - <10% Increase
 - 10% to 20% increase
 - Greater than 20% increase
 - Protected Surfaces
 - Existing velocity <1m/s, design velocity > 1.2m/s

- Existing velocity >1m/s, velocity change > 20%
- Unprotected Surfaces
- Existing not flooded, design velocity > 0.5m/s
- Existing velocity < 0.5m/s, design velocity > 0.5m/s
- Existing velocity > 0.5m/s (AETV), Design Velocity > Existing Velocity + 0.025m/s



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NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 20% AEP

Appendix I - Figure 2.1.98

0 200 400 Metres

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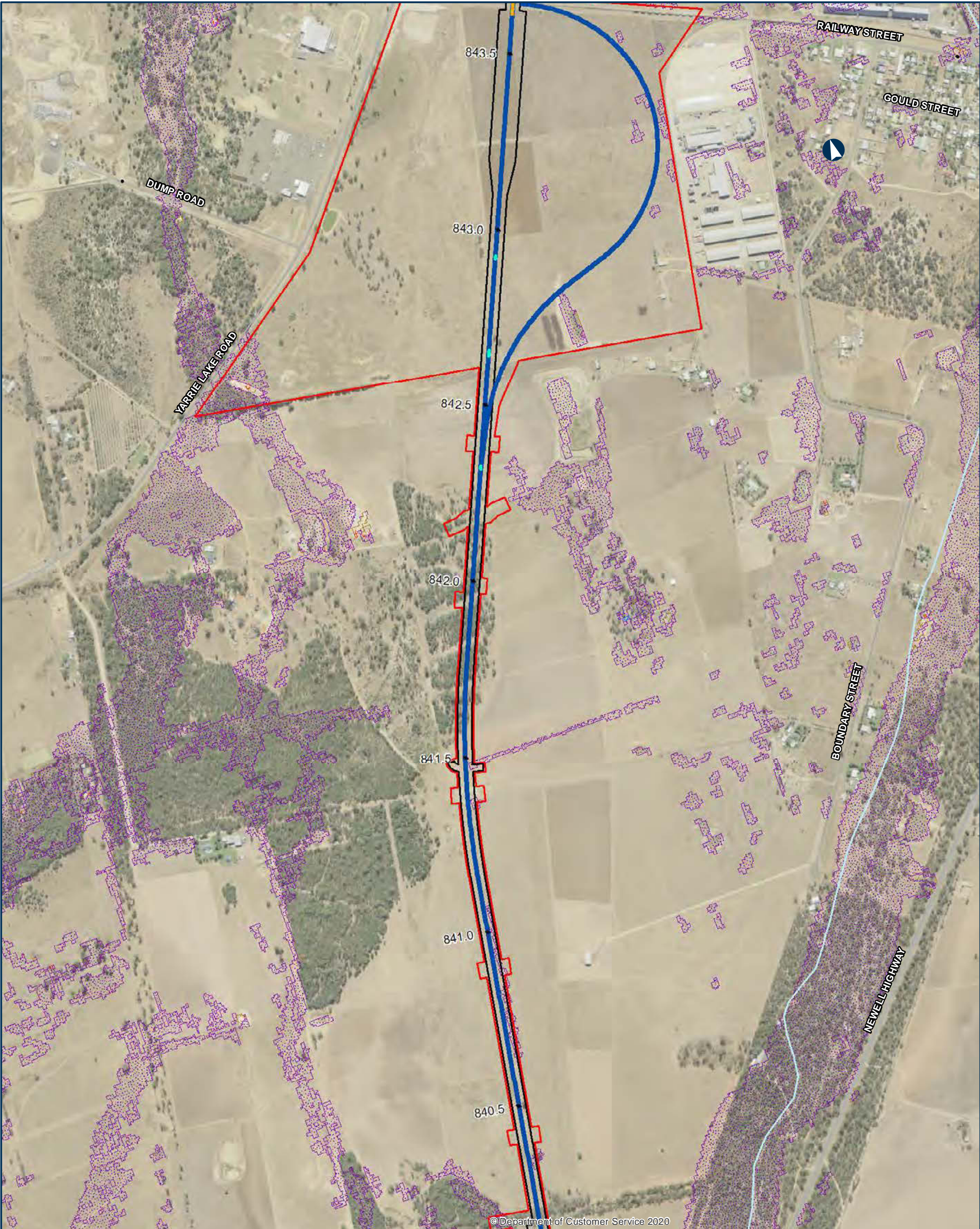
- Road ODL departure
- Culvert
- Road ODL departure
- Alignment
- The proposal
- Rail Corridor
- Design Velocity Contour (m/s)
- 1
- 2
- Design Velocity < 0.5m/s
- Design Velocity > 0.5m/s, Velocity increase limited to 0.025m/s
- <10% Increase
- 10% to 20% increase
- Greater than 20% increase

- Unprotected Surfaces
- Existing not flooded, design velocity > 0.5m/s
- Existing velocity < 0.5m/s, design velocity > 0.5m/s
- Existing velocity > 0.5m/s (AETV), Design Velocity > Existing Velocity + 0.025m/s



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NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 20% AEP

Appendix I - Figure 2.1.99

0 200 400 Metres

Coordinate System: GDA 1994 MGA Zone 55

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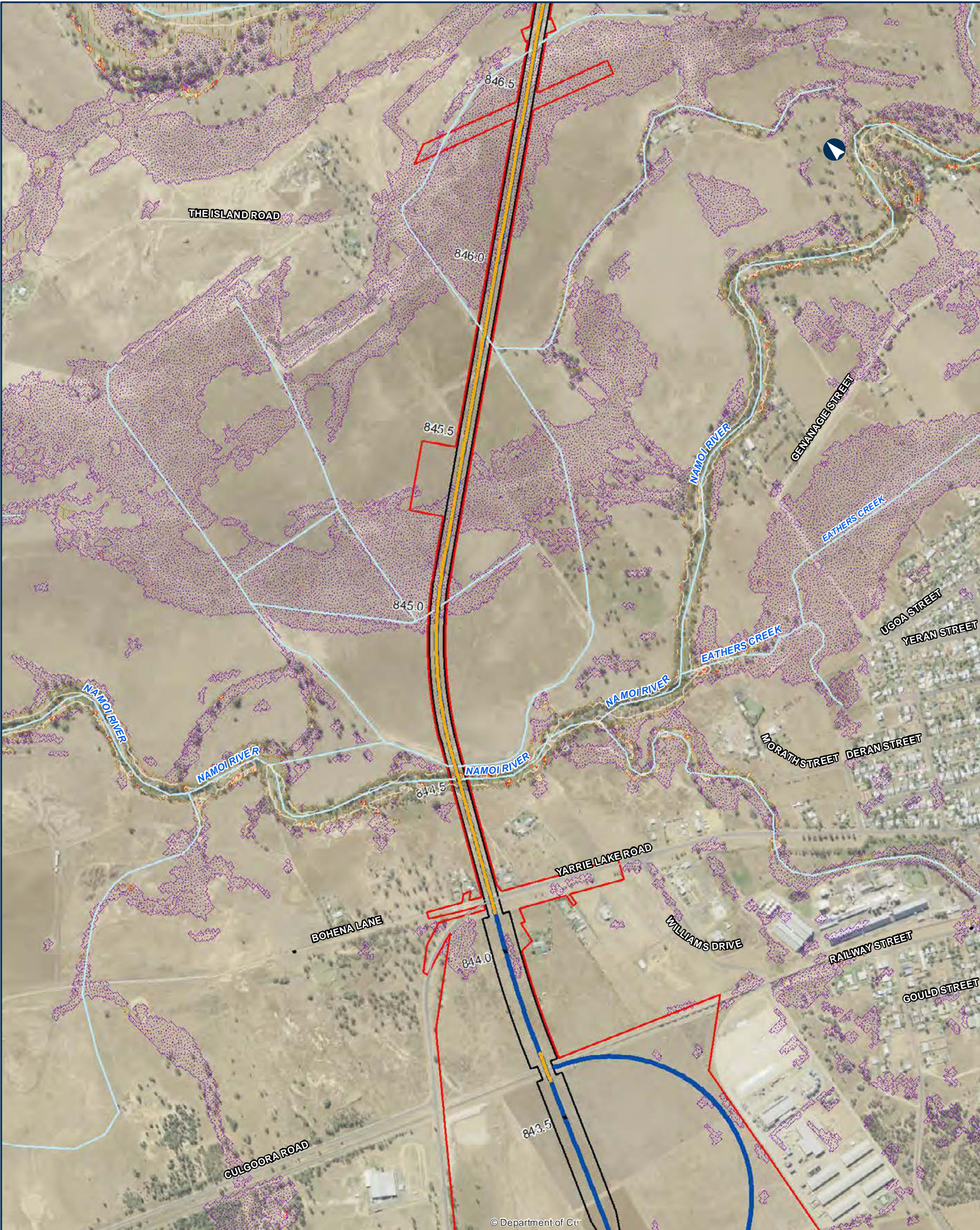
Date: 9/08/2022 Paper: A3
Author: JacobsGHD Scale: 1:10,000
Data Sources: Basemap layers: NSWSS; all other layers: JacobsGHD

- | | | |
|----------------------|---|---|
| — Road ODL departure | Design Velocity Contour (m/s) | Greater than 20% increase |
| — Bridge | 1 | Unprotected Surfaces |
| — Culvert | 2 | Existing not flooded, design velocity > 0.5m/s |
| — Road ODL departure | Design Velocity < 0.5m/s | Existing velocity < 0.5m/s, design velocity > 0.5m/s |
| — Alignment | Design Velocity > 0.5m/s, Velocity increase limited to 0.025m/s | Existing velocity > 0.5m/s (AETV), Design Velocity > Existing Velocity + 0.025m/s |
| — The proposal | <10% Increase | |
| — Rail Corridor | 10% to 20% Increase | |



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NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 20% AEP

Appendix I - Figure 2.1.100

0 200 400 Metres

Coordinate System: GDA 1994 MGA Zone 55

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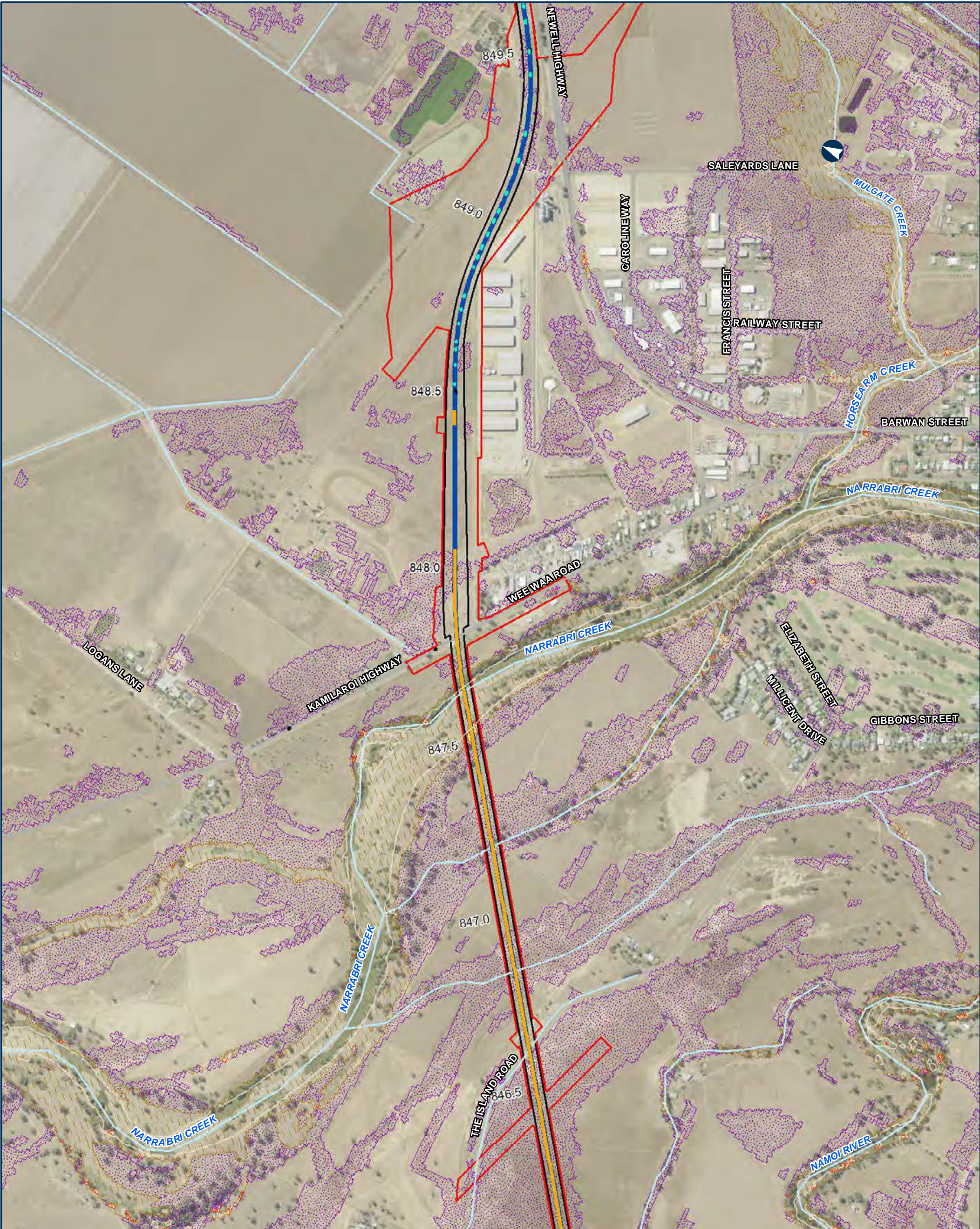
- Road ODL departure
- Bridge
- Road ODL departure
- Alignment
- The proposal
- Rail Corridor
- Design Velocity Contour (m/s)
- 1
- 2
- Design Velocity < 0.5m/s
- Design Velocity > 0.5m/s, Velocity increase limited to 0.025m/s
- <10% Increase
- 10% to 20% increase
- Greater than 20% increase

- Unprotected Surfaces
- Existing not flooded, design velocity > 0.5m/s
- Existing velocity < 0.5m/s, design velocity > 0.5m/s
- Existing velocity > 0.5m/s (AETV), Design Velocity > Existing Velocity + 0.025m/s



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Appendix I - Figure 2.1.101

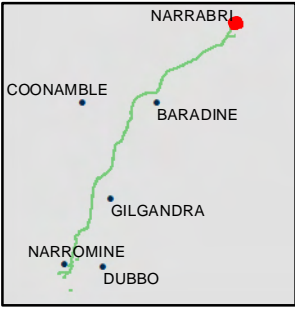
0 200 400 Metres

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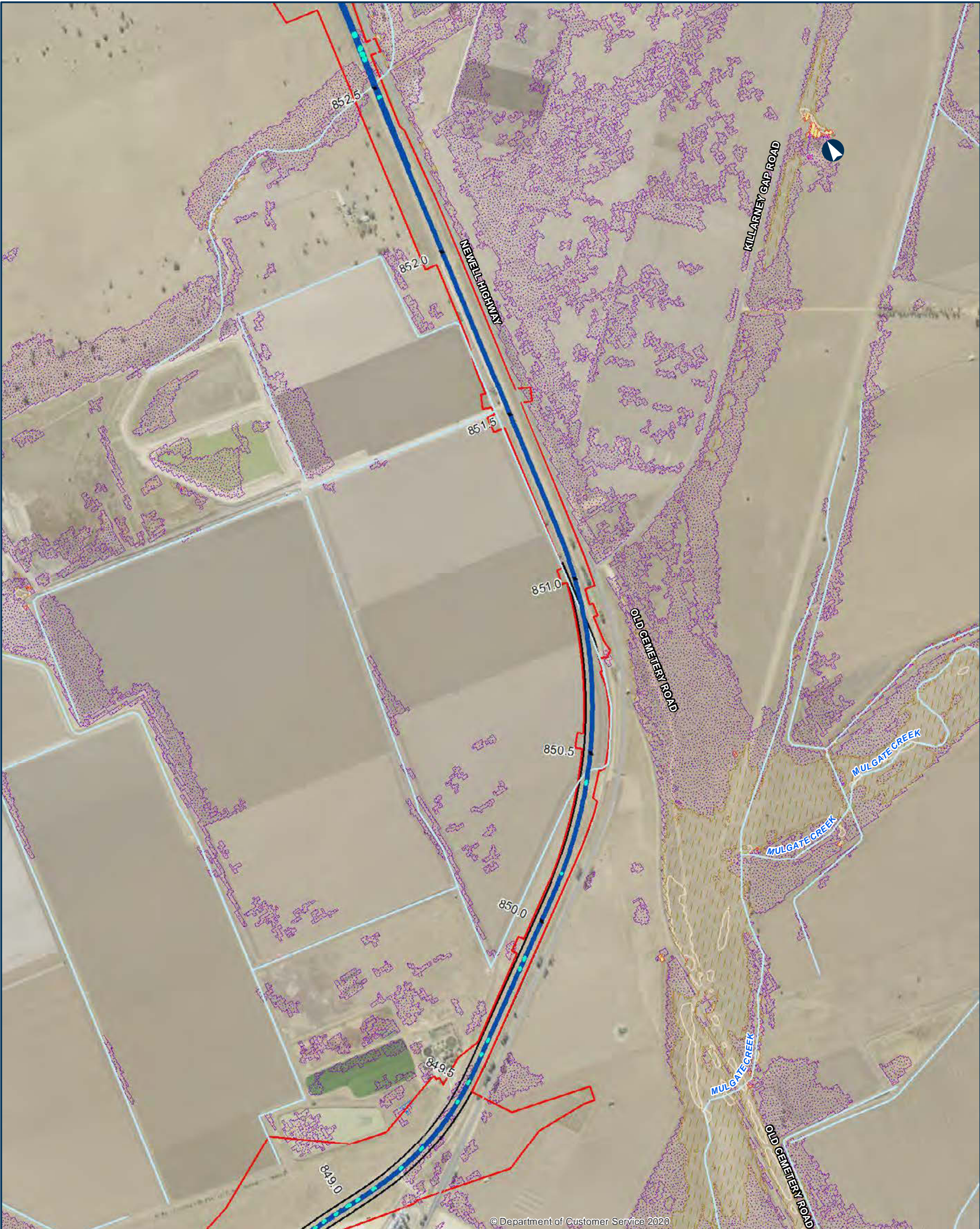
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Data Sources: Basemap layers: NSWSS; all other layers: JacobsGHD

- | | | |
|----------------------|---|---|
| — Road ODL departure | Design Velocity Contour (m/s) | Greater than 20% increase |
| — Bridge | 1 | Unprotected Surfaces |
| — Culvert | 2 | Existing not flooded, design velocity > 0.5m/s |
| — Road ODL departure | Design Velocity < 0.5m/s | Existing velocity < 0.5m/s, design velocity > 0.5m/s |
| — Alignment | Design Velocity > 0.5m/s, Velocity increase limited to 0.025m/s | Existing velocity > 0.5m/s (AETV), Design Velocity > Existing Velocity + 0.025m/s |
| — The proposal | <10% Increase | |
| — Rail Corridor | 10% to 20% Increase | |



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NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 20% AEP

Appendix I - Figure 2.1.102

0 200 400 Metres

Coordinate System: GDA 1994 MGA Zone 55

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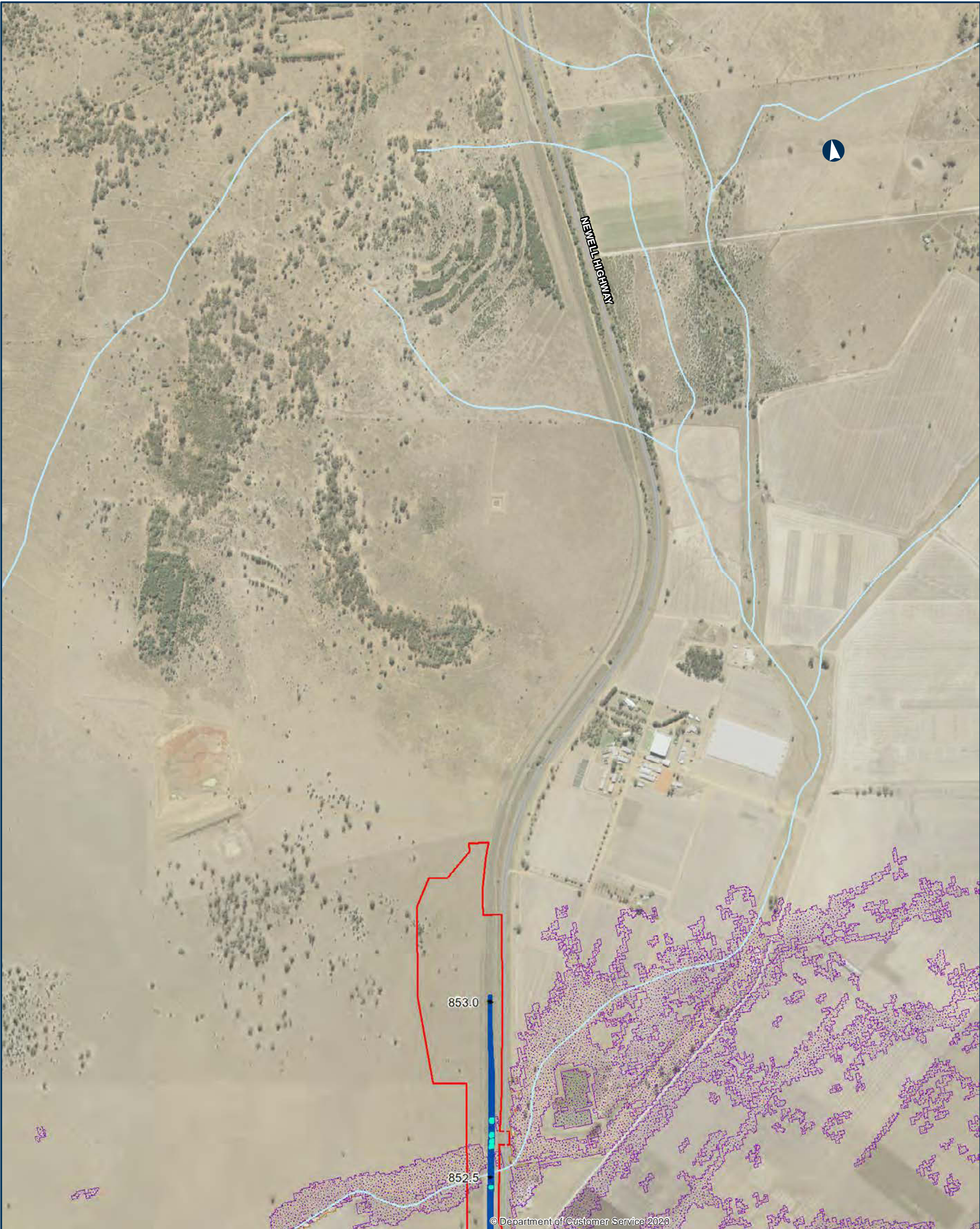
Date: 9/08/2022 Paper: A3
Author: JacobsGHD Scale: 1:10,000
Data Sources: Basemap layers: NSWSS; all other layers: JacobsGHD

- Culvert
- Road ODL departure
- Alignment
- The proposal
- Rail Corridor
- Design Velocity Contour (m/s)
 - 1
 - 2
- Design Velocity < 0.5m/s
- Design Velocity > 0.5m/s, Velocity Increase limited to 0.025m/s
- <10% Increase
- 10% to 20% Increase
- Greater than 20% Increase
- Unprotected Surfaces
 - Existing not flooded, design velocity > 0.5m/s
- Existing velocity < 0.5m/s, design velocity > 0.5m/s
- Existing velocity > 0.5m/s (AETV), Design Velocity > Existing Velocity + 0.025m/s



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Appendix I - Figure 2.1.103

0200400Metres

Coordinate System: GDA 1994 MGA Zone 55

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Paper: A3
Scale: 1:10,000

Culvert

Road ODL departure

Alignment

The proposal

Design Velocity Contour (m/s)

1

Design Velocity < 0.5m/s

Design Velocity > 0.5m/s, Velocity increase limited to 0.025m/s

<10% Increase

Existing velocity > 0.5m/s (AETV), Design Velocity > Existing Velocity + 0.025m/s

NARRABRI

COONAMBLE

BARADINE

GILGANDRA

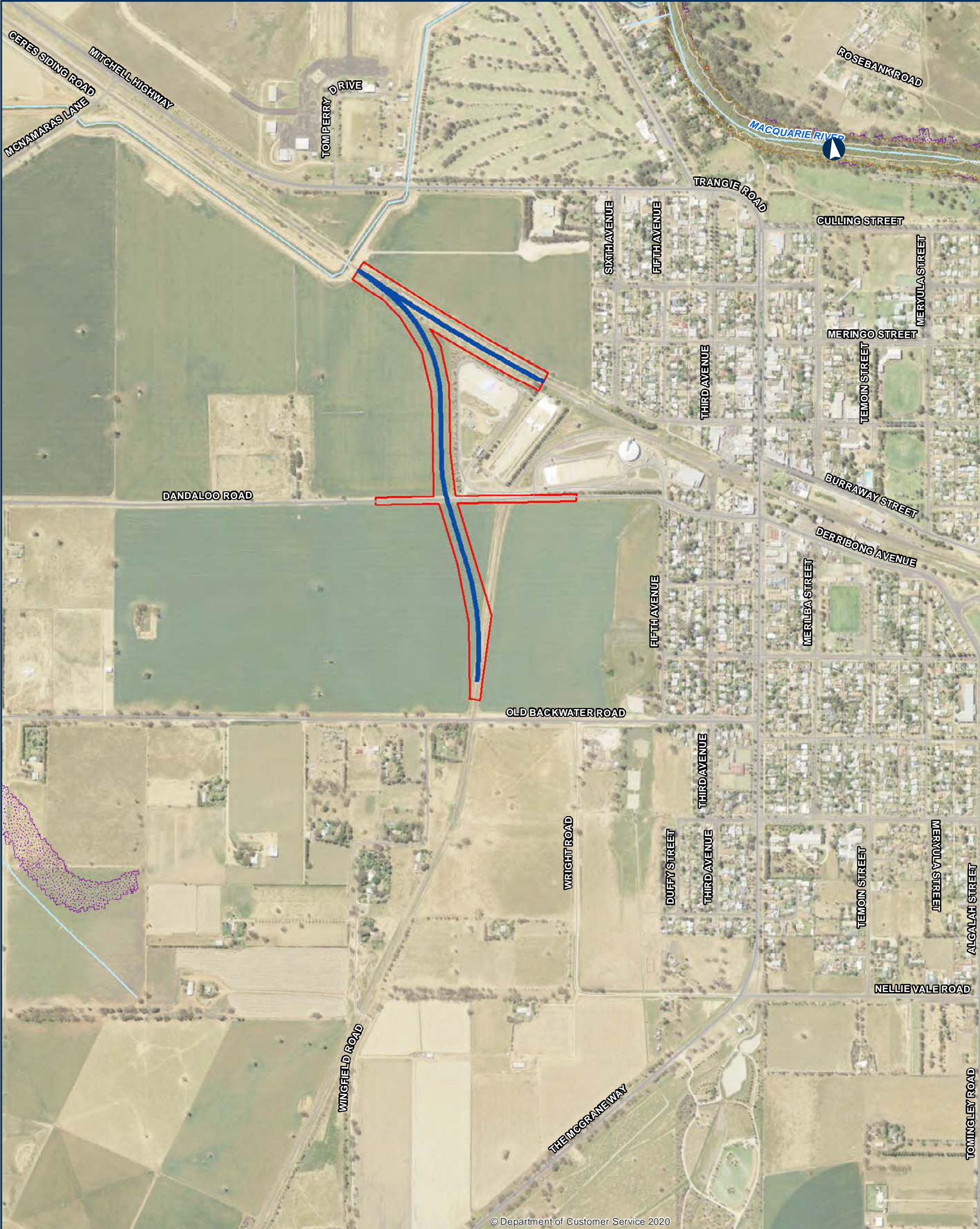
NARROMINE

DUBBO

INLAND RAIL

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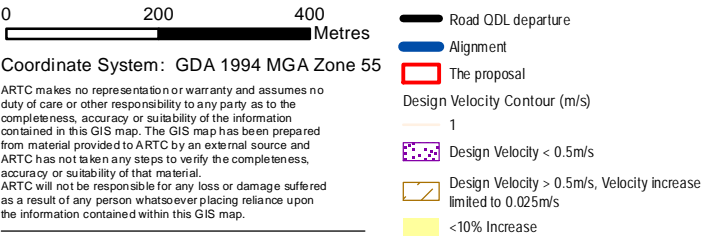
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NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 20% AEP

Appendix I - Figure 2.1.104



Existing velocity > 0.5m/s (AETV), Design Velocity > Existing Velocity + 0.025m/s



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