

# TECHNICAL REPORT 03

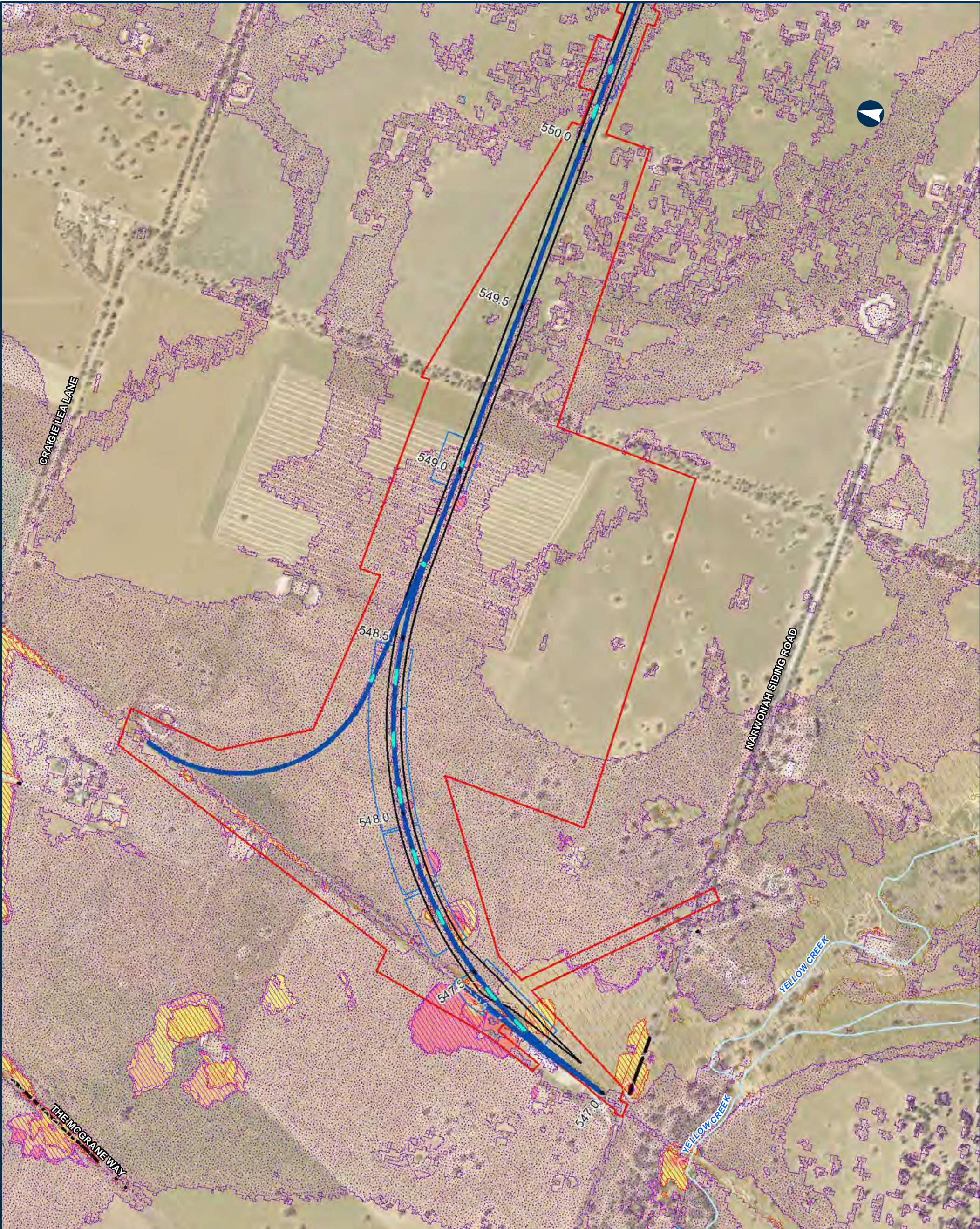
Updated flooding and hydrology assessment

## **Appendix I7** QDL compliance (scour/erosion 2% AEP)

NARROMINE TO NARRABRI PROJECT







NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 2% AEP

Appendix I - Figure 2.3.1

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

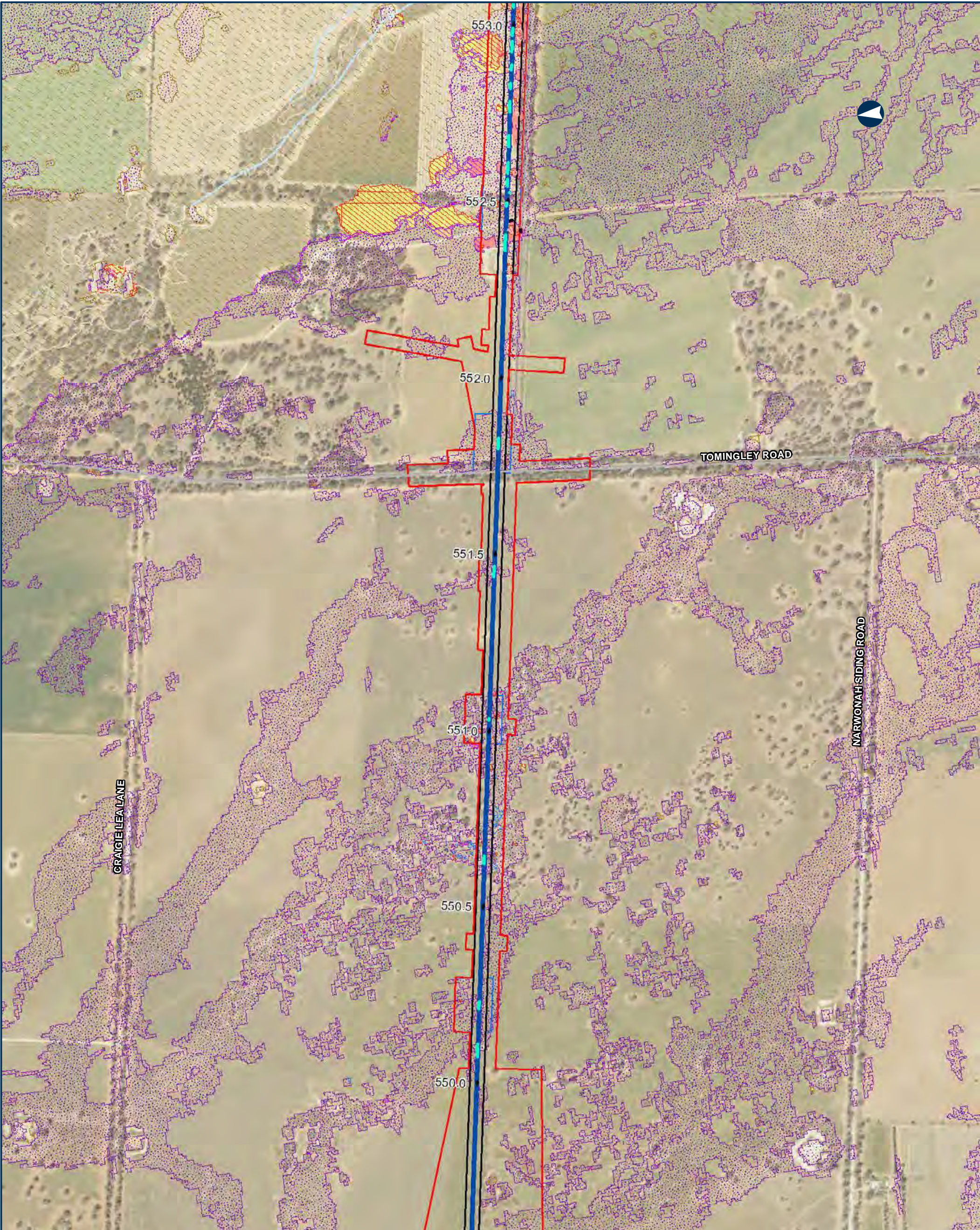
- Culvert
- Road QDL departure
- Alignment
- The proposal
- Drainage Control Area
- Rail Corridor
- Design Velocity Contour (m/s)
- 1
- Design Velocity < 0.5m/s
- Design Velocity > 0.5m/s, Velocity Increase limited to 0.025m/s
- <10% Increase
- 10% to 20% Increase
- Greater than 20% Increase
- Protected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



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NARROMINE TO NARRABRI

QDL departures - Scour / Erosion - 2% AEP

Appendix I - Figure 2.3.2

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 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 (ETV), Design Velocity > Existing Velocity + 0.025m/s

NARRABRI

COONAMBLE

BARADINE

GILGANDRA

NARROMINE

DUBBO

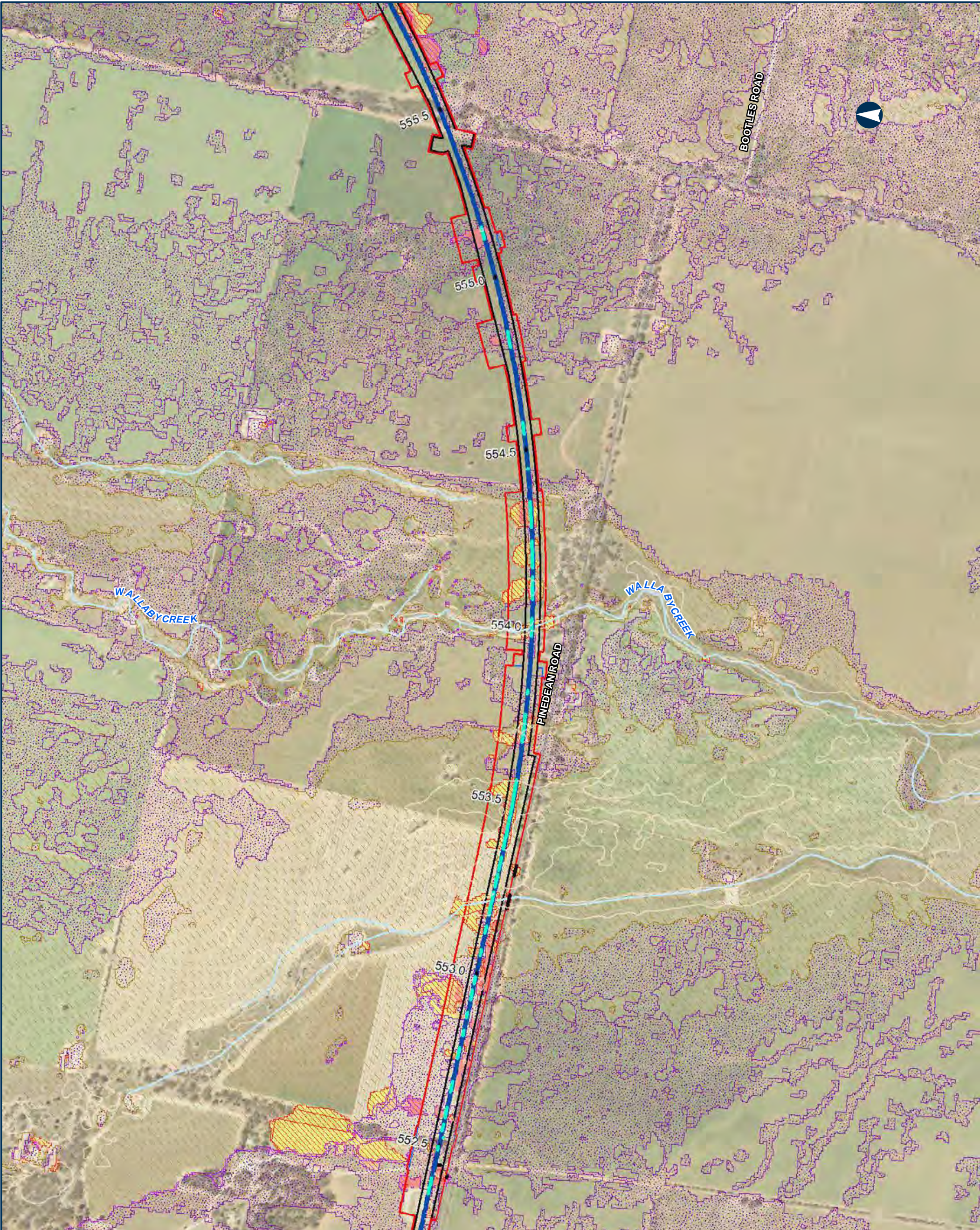
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N:\AU\Newcastle\Projects\22\19593\GIS\GIS\_2500\_N2N\_v2\Maps\Deliverables\_SP\IR\EIS\Flooding\_Hydrology\Appendices\2500\_EISFWAPP101\_QDL\_ScourErosion\_2pc\_revD.mxd





NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 2% AEP

Appendix I - Figure 2.3.3

0200400

Metres

Coordinate System: GDA 1994 MGA Zone 55

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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 (ETV), Design Velocity > Existing Velocity + 0.025m/s

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NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 2% AEP

Appendix I - Figure 2.3.4

0 200 400 Metres

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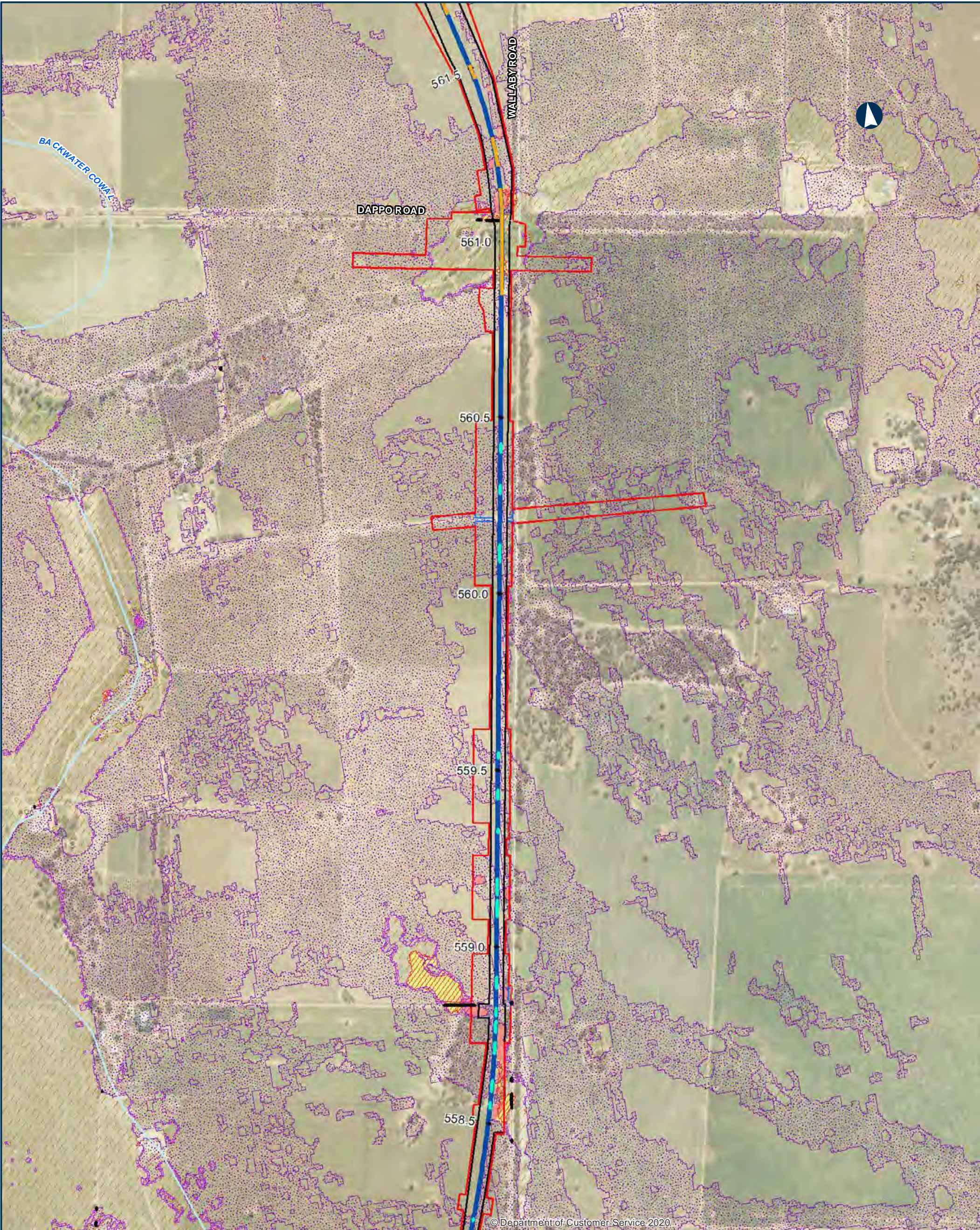
- Culvert
- Road QDL departure
- Alignment
- The proposal
- Drainage Control Area
- Rail Corridor
- Design Velocity Contour (m/s)
  - 1
  - Design Velocity < 0.5m/s
- Design Velocity > 0.5m/s, Velocity increase limited to 0.025m/s
- <10% Increase
- 10% to 20% increase
- Greater than 20% increase
- Unprotected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



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**NARROMINE TO NARRABRI** QDL departures - Scour / Erosion - 2% AEP

Appendix I - Figure 2.3.5

0 200 400 Metres

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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
- 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 (ETV), Design Velocity > Existing Velocity + 0.025m/s



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**NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 2% AEP**

Appendix I - Figure 2.3.6

0 200 400 Metres

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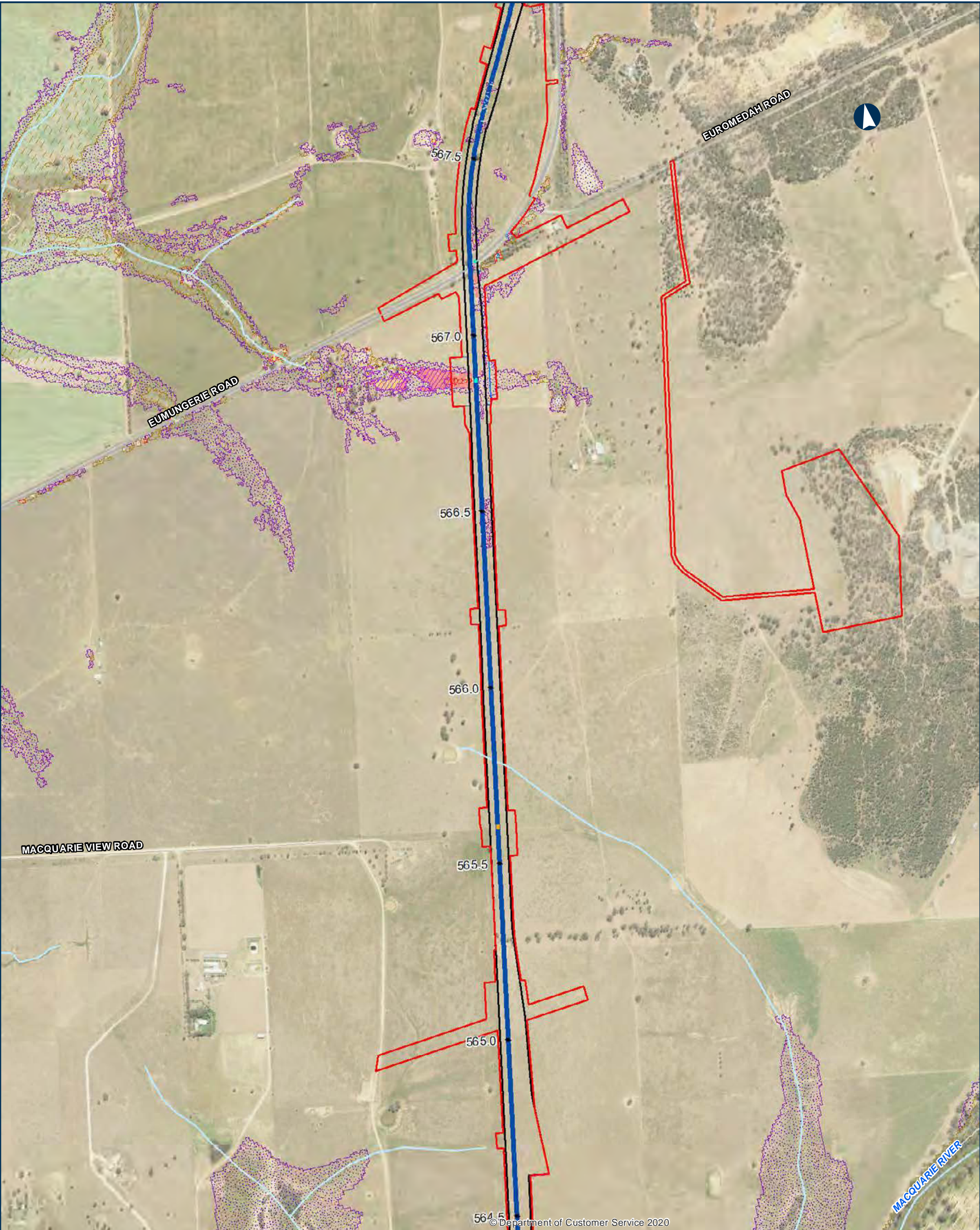
- Bridge
- Culvert
- Road QDL departure
- Alignment
- The proposal
- Rail Corridor
- Design Velocity Contour (m/s)
  - 1
  - 2
- Design Velocity < 0.5m/s
- Design Velocity > 0.5m/s, Velocity increase limited to 0.025m/s
- <10% Increase
- 10% to 20% increase
- Greater than 20% increase
- Unprotected Surfaces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



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NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 2% AEP

Appendix I - Figure 2.3.7

0200400Metres

Coordinate System: GDA 1994 MGA Zone 55

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Paper: A3  
Scale: 1:10,000

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 (ETV), Design Velocity > Existing Velocity + 0.025m/s

NARRABRI

COONAMBLE

BARADINE

GILGANDRA

NARROMINE

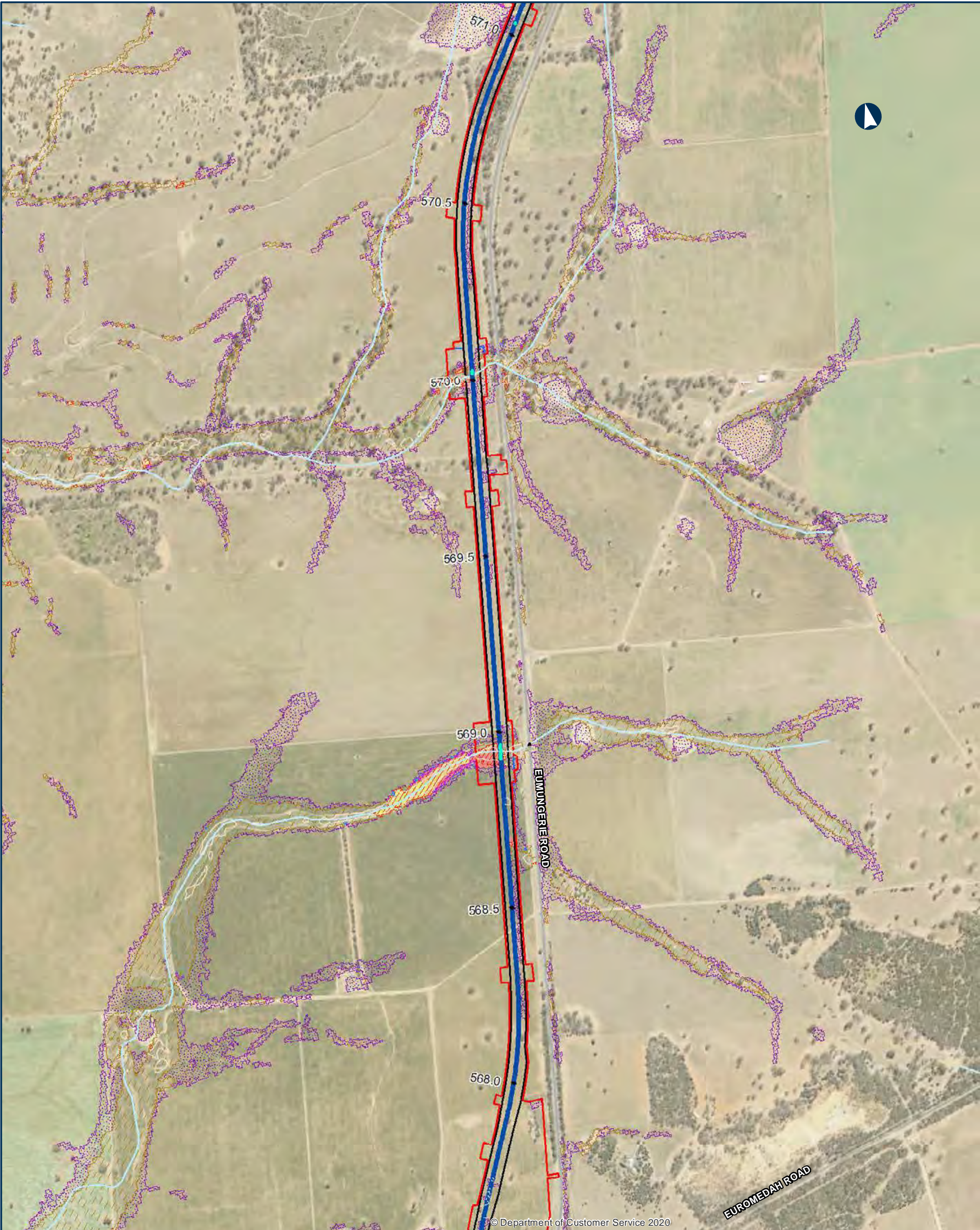
DUBBO

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**NARROMINE TO NARRABRI** QDL departures - Scour / Erosion - 2% AEP

Appendix I - Figure 2.3.8

0 200 400 Metres

Coordinate System: GDA 1994 MGA Zone 55

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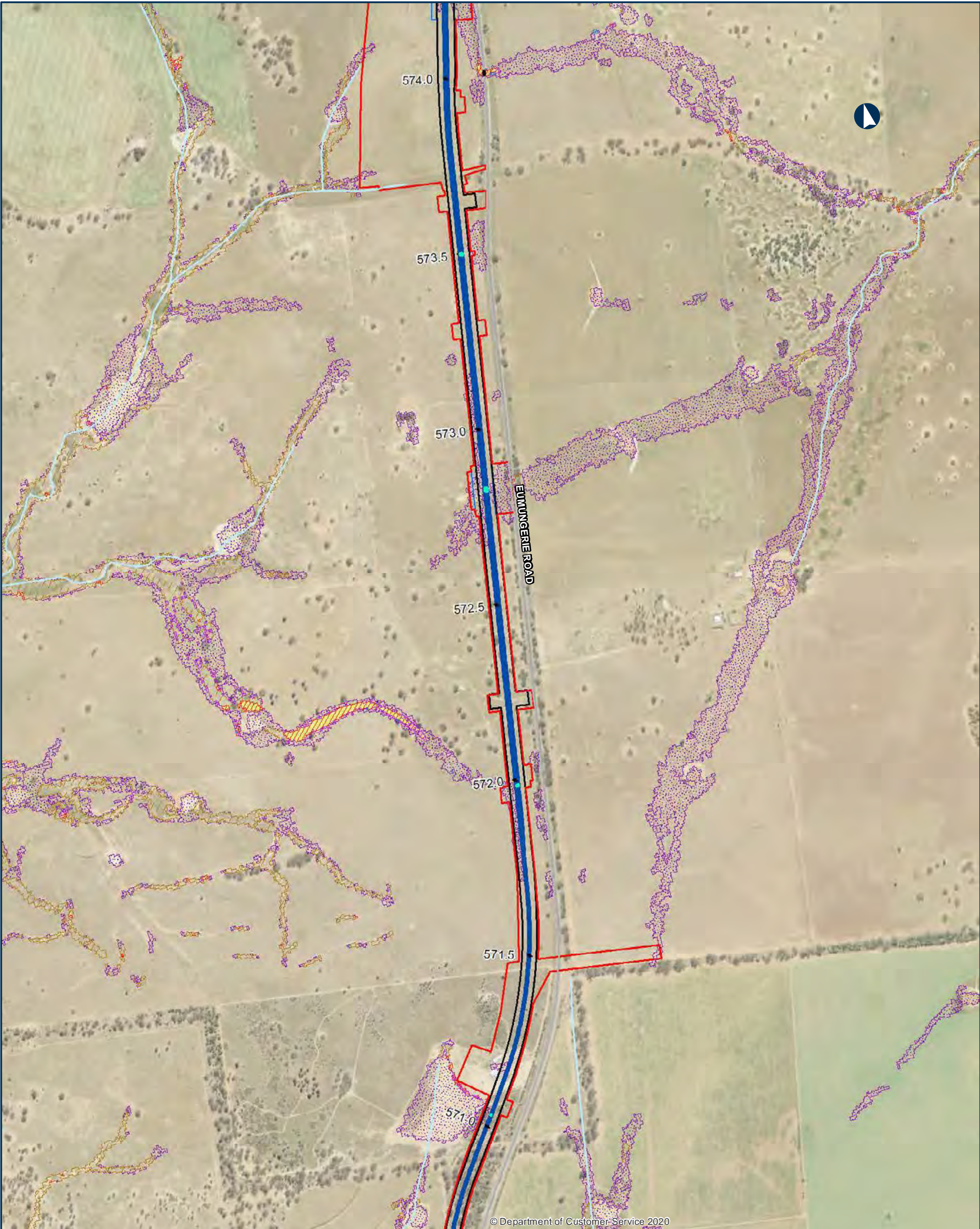
- Culvert
- Road QDL departure
- Alignment
- The proposal
- Drainage Control Area
- Rail Corridor
- Design Velocity Contour (m/s)
  - 1
  - 2
  - Design Velocity < 0.5m/s
- Design Velocity > 0.5m/s, Velocity increase limited to 0.025m/s
- <10% Increase
- 10% to 20% increase
- Greater than 20% increase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



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**NARROMINE TO NARRABRI** QDL departures - Scour / Erosion - 2% AEP

Appendix I - Figure 2.3.9

0 200 400 Metres

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

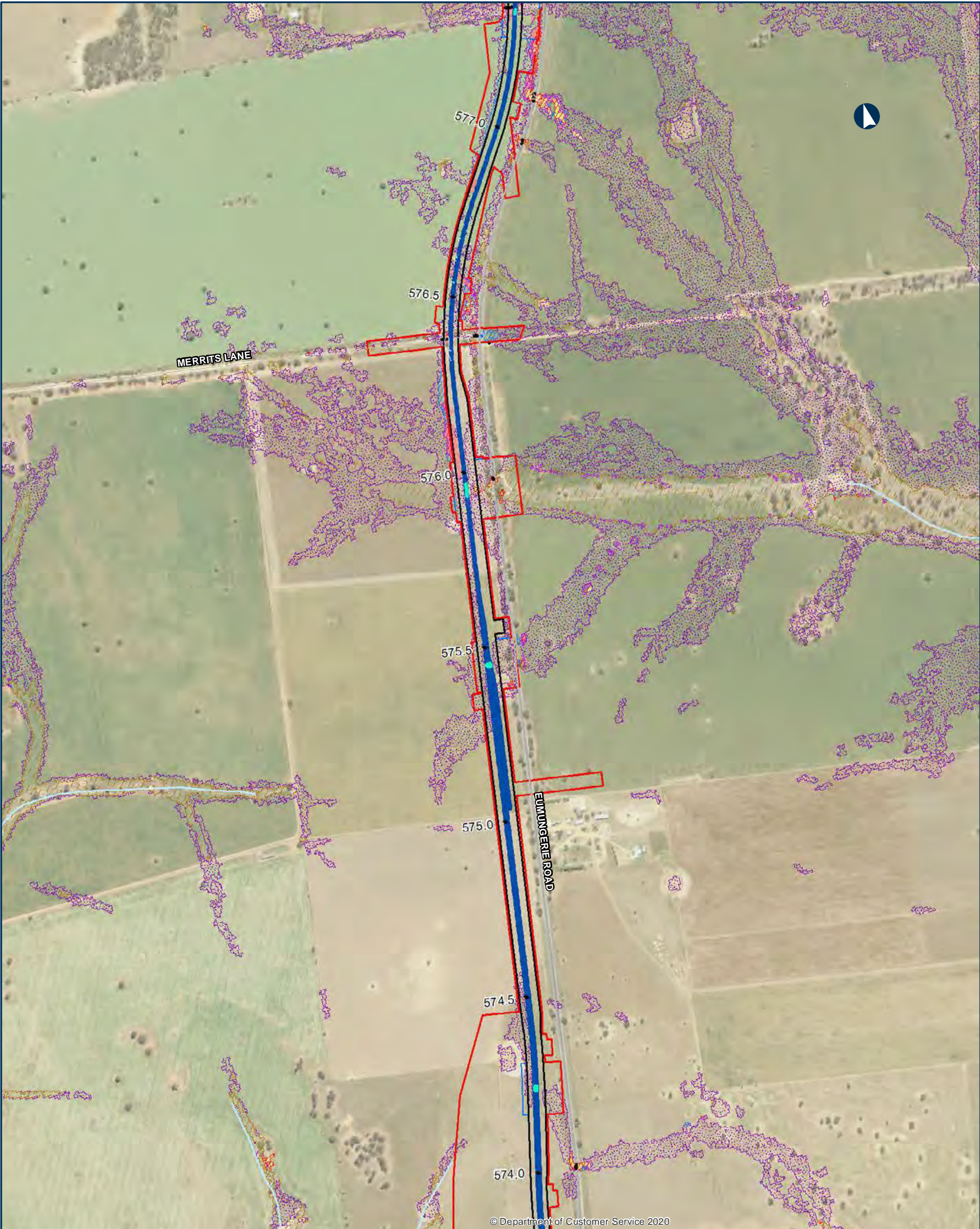
- Culvert
- Road QDL departure
- Alignment
- The proposal
- Drainage Control Area
- Rail Corridor
- Design Velocity Contour (m/s)
  - 1
  - Design Velocity < 0.5m/s
- Design Velocity > 0.5m/s, Velocity increase limited to 0.025m/s
- <10% Increase
- 10% to 20% increase
- Greater than 20% increase
- Unprotected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



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**NARROMINE TO NARRABRI** QDL departures - Scour / Erosion - 2% AEP

Appendix I - Figure 2.3.10

0 200 400 Metres

Coordinate System: GDA 1994 MGA Zone 55

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Author: JacobsGHD  
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

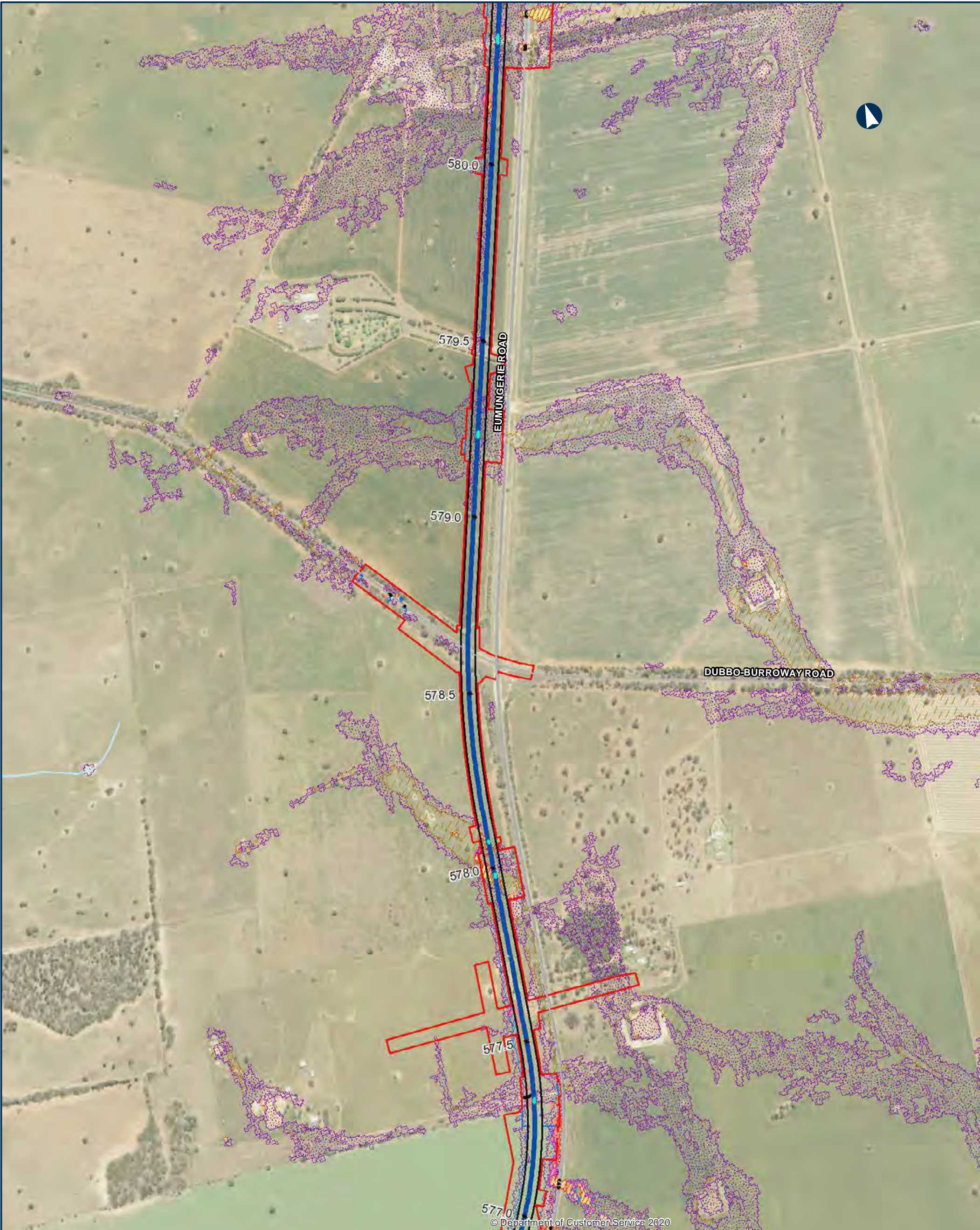
- <10% Increase
- 10% to 20% increase
- Greater than 20% increase
- Protected Surfaces
  - Existing not flooded, design velocity > 1.2m/s
- Unprotected Surfaces
  - Existing not flooded, design velocity > 0.5m/s
  - Existing velocity < 0.5m/s, design velocity > 0.5m/s
  - Existing velocity > 0.5m/s (ETV), Design Velocity > Existing Velocity + 0.025m/s



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**NARROMINE TO NARRABRI** QDL departures - Scour / Erosion - 2% AEP

Appendix I - Figure 2.3.11

0 200 400 Metres

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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 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 (ETV), Design Velocity > Existing Velocity + 0.025m/s



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**NARROMINE TO NARRABRI** QDL departures - Scour / Erosion - 2% AEP

Appendix I - Figure 2.3.12

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
  - 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 (ETV), Design Velocity > Existing Velocity + 0.025m/s



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NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 2% AEP

Appendix I - Figure 2.3.13

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

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

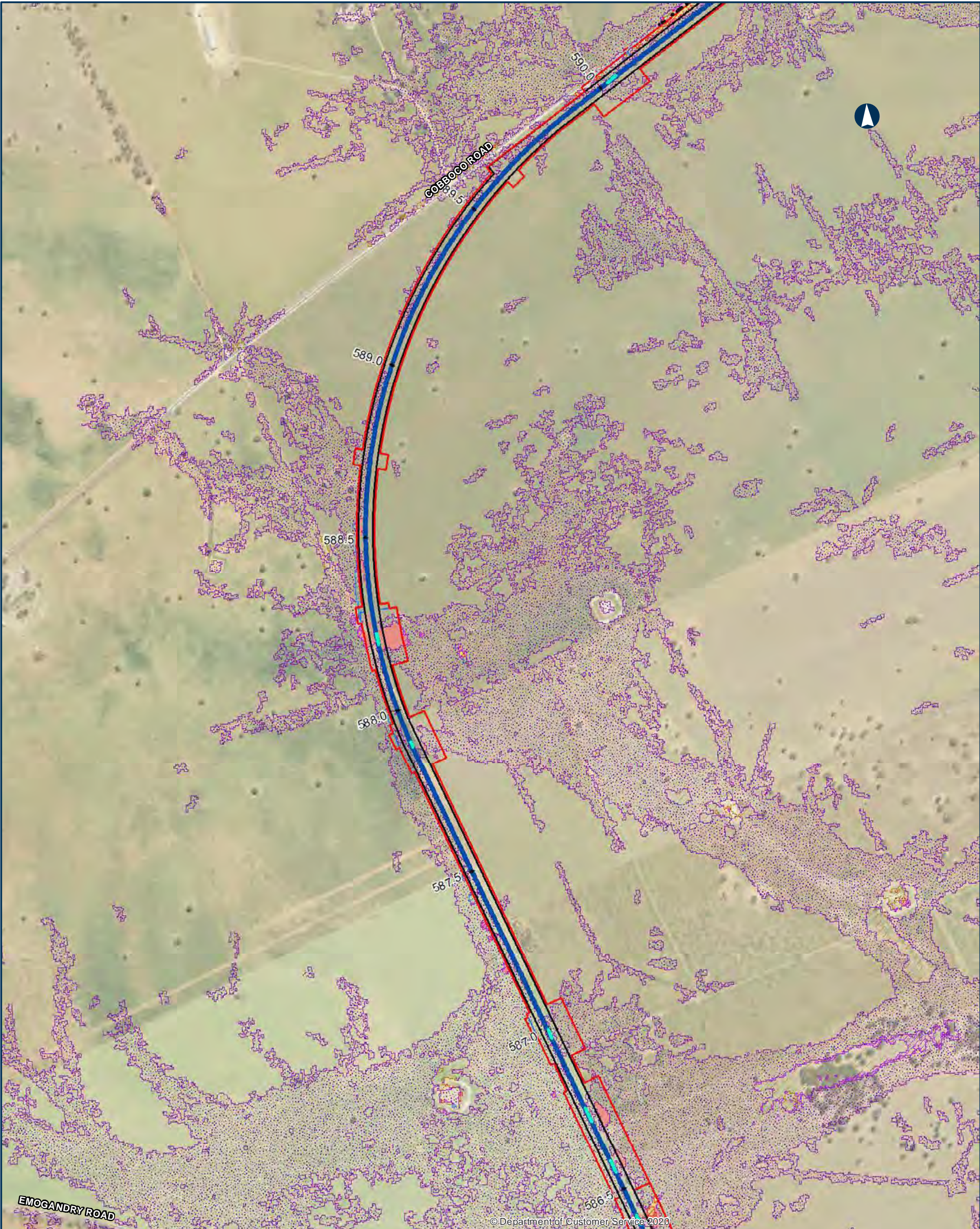
Existing velocity > 0.5m/s (ETV), Design Velocity > Existing Velocity + 0.025m/s

The inset map shows the rail route from Narromine to Narrabri, passing through Coonamble, Baradine, Gilgandra, and Dubbo.

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**NARROMINE TO NARRABRI** QDL departures - Scour / Erosion - 2% AEP

Appendix I - Figure 2.3.14

0 200 400 Metres

Coordinate System: GDA 1994 MGA Zone 55

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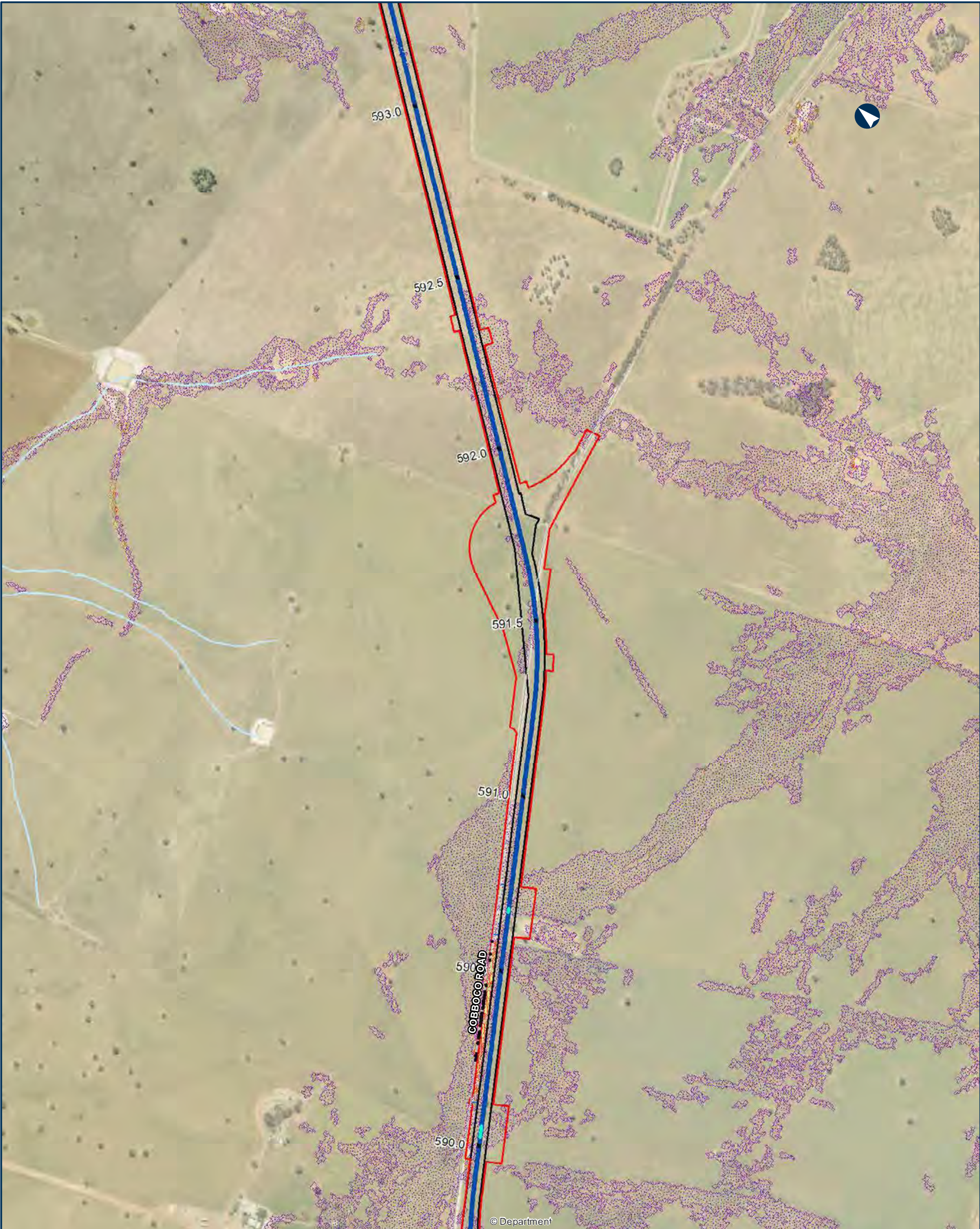
- Culvert
- Road QDL departure
- Alignment
- The proposal
- Drainage Control Area
- Rail Corridor
- Design Velocity Contour (m/s)
  - 1
  - Design Velocity < 0.5m/s
- Design Velocity > 0.5m/s, Velocity increase limited to 0.025m/s
- <10% Increase
- 10% to 20% increase
- Greater than 20% increase
- Unprotected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



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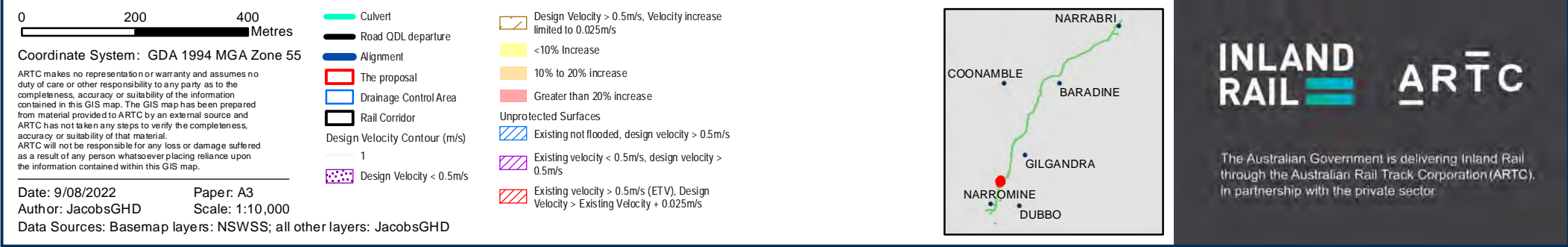
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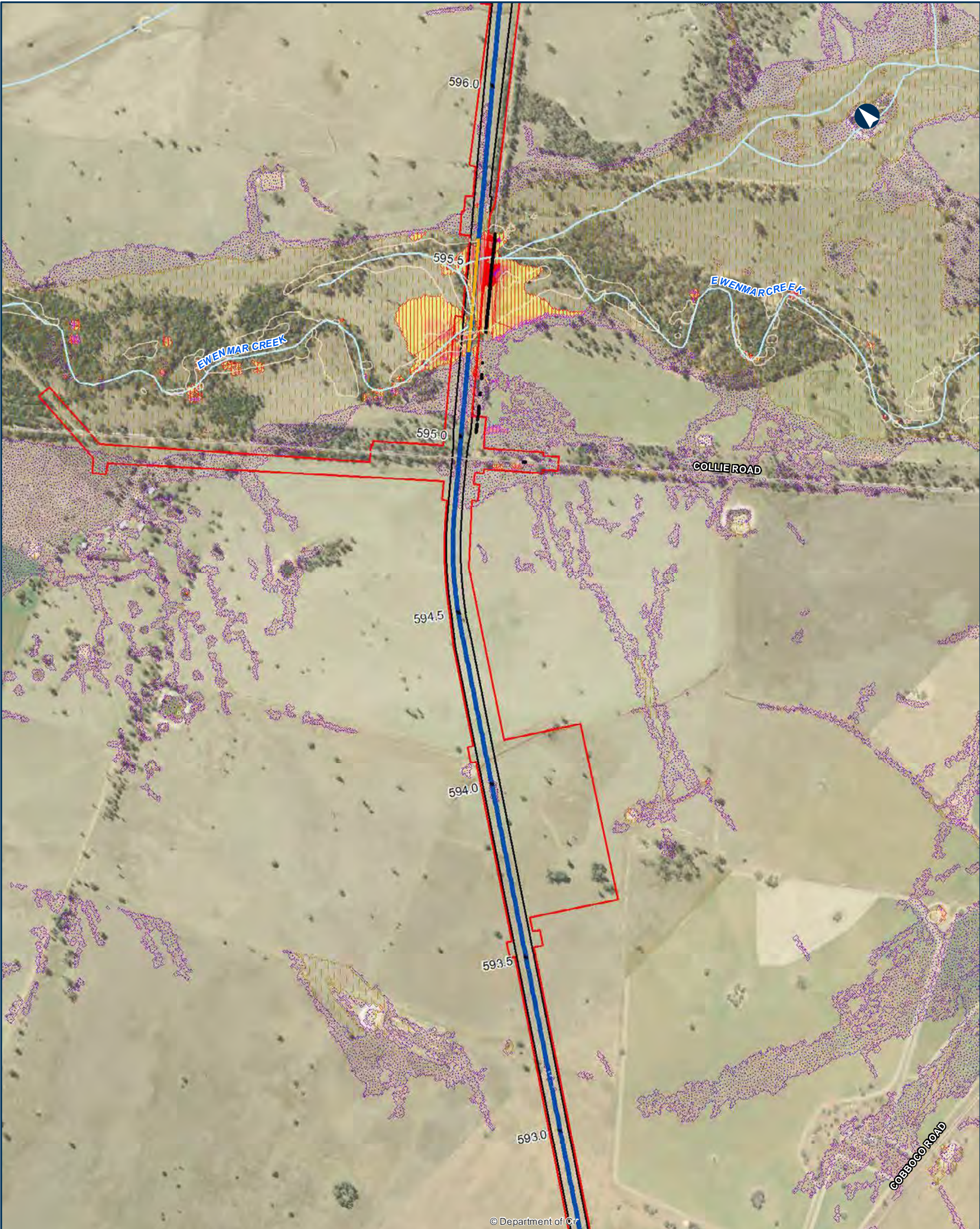


NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 2% AEP

Appendix I - Figure 2.3.15







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**NARROMINE TO NARRABRI** QDL departures - Scour / Erosion - 2% AEP

Appendix I - Figure 2.3.16

0 200 400 Metres

Coordinate System: GDA 1994 MGA Zone 55

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- 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 velocity <1m/s, design velocity > 1.2m/s
  - Existing velocity >1m/s, velocity change > 20%

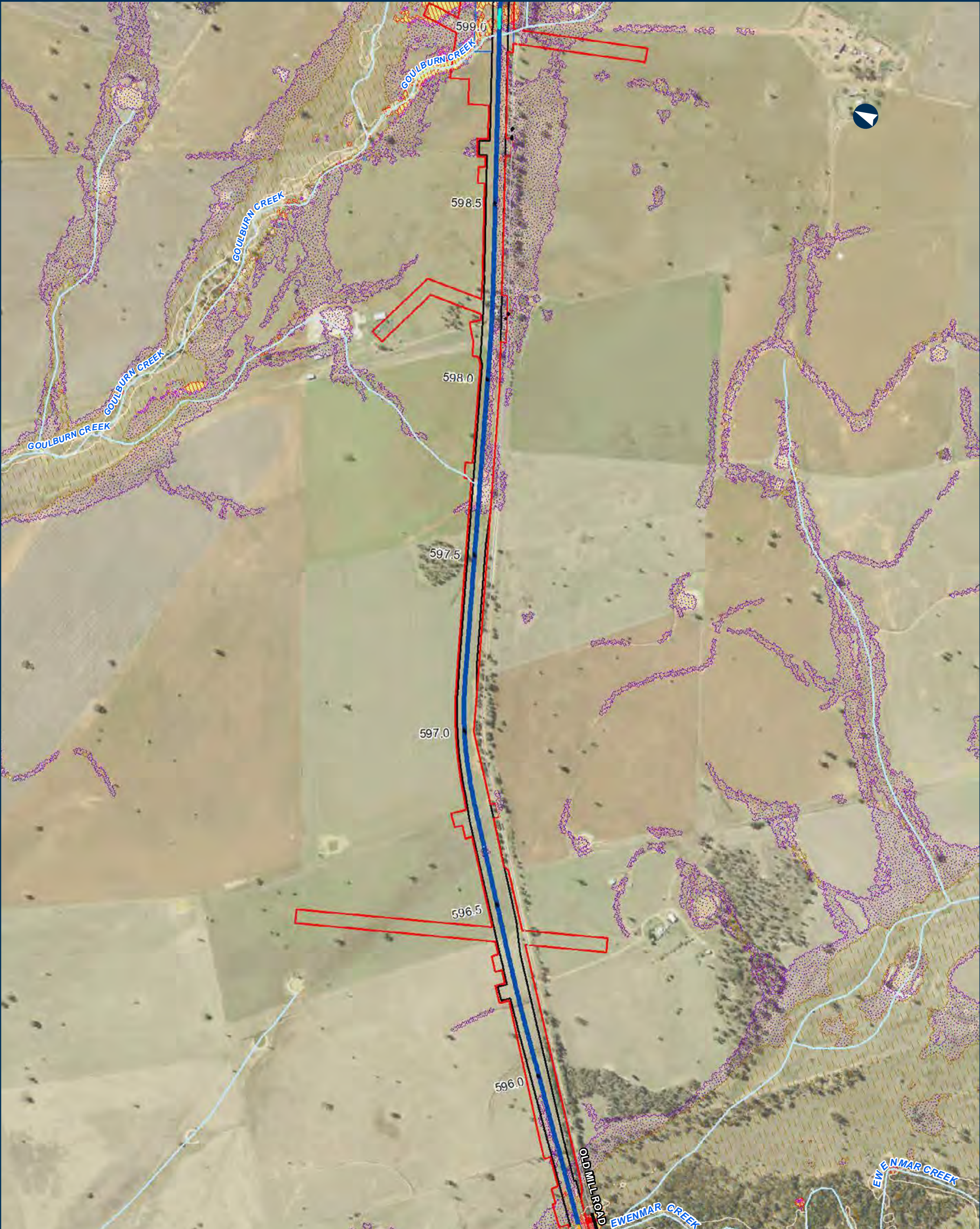
- Unprotected Surfaces
  - Existing not flooded, design velocity > 0.5m/s
  - Existing velocity < 0.5m/s, design velocity > 0.5m/s
  - Existing velocity > 0.5m/s (ETV), Design Velocity > Existing Velocity + 0.025m/s



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NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 2% AEP

Appendix I - Figure 2.3.17

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 > 12m/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 (ETV), Design Velocity > Existing Velocity + 0.025m/s



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NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 2% AEP

Appendix I - Figure 2.3.18

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

- 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%
- 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 (ETV), Design Velocity > Existing Velocity + 0.025m/s



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**NARROMINE TO NARRABRI** QDL departures - Scour / Erosion - 2% AEP

Appendix I - Figure 2.3.19

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 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 (ETV), Design Velocity > Existing Velocity + 0.025m/s

NARRABRI

COONAMBLE

BARADINE

GILGANDRA

NARROMINE

DUBBO

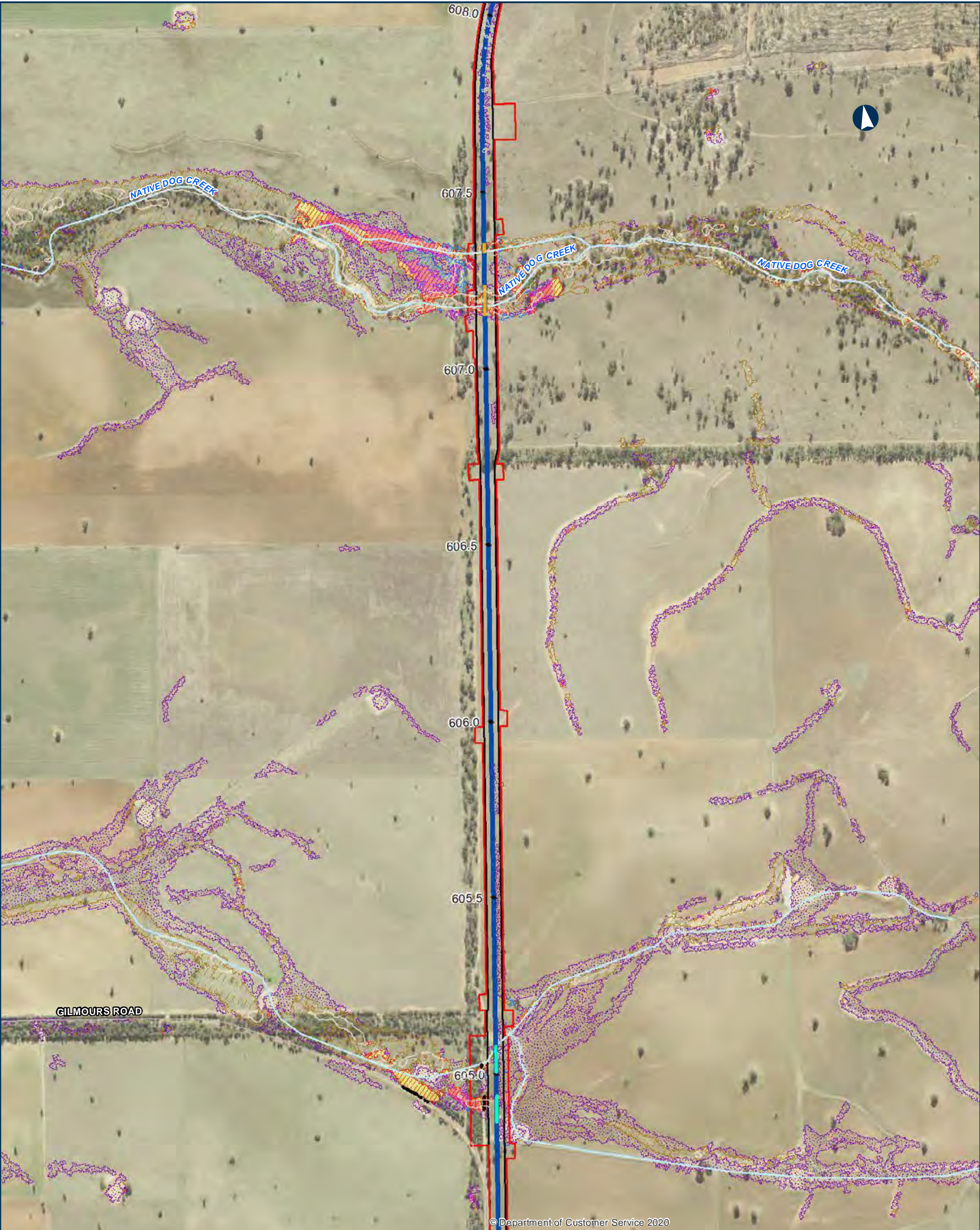
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**NARROMINE TO NARRABRI** QDL departures - Scour / Erosion - 2% AEP

Appendix I - Figure 2.3.20

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 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

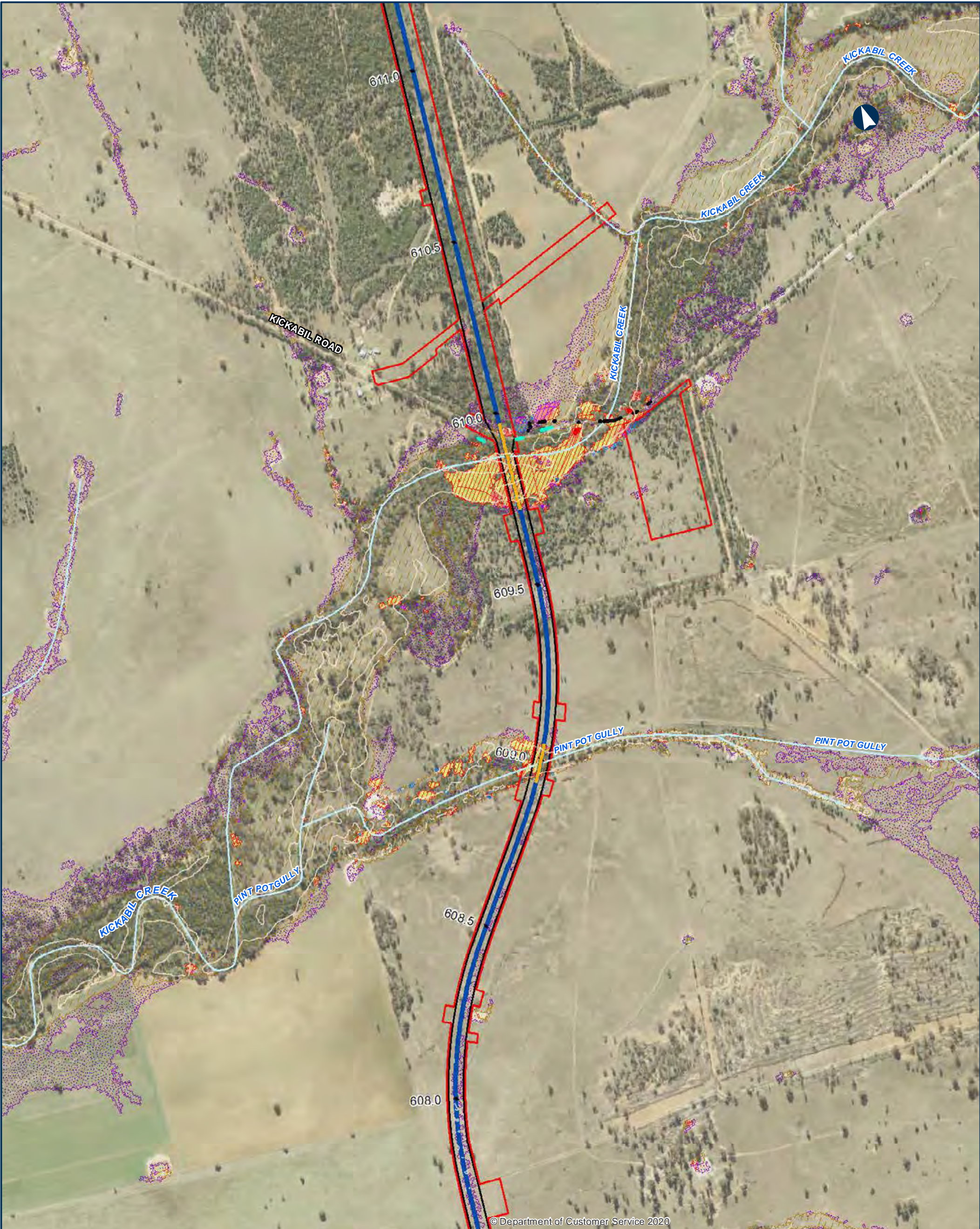
- Greater than 20% Increase
- Unprotected Surfaces
- Existing not flooded, design velocity > 0.5m/s
- Existing velocity < 0.5m/s, design velocity > 0.5m/s
- Existing velocity > 0.5m/s (ETV), Design Velocity > Existing Velocity + 0.025m/s



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**NARROMINE TO NARRABRI** QDL departures - Scour / Erosion - 2% AEP

Appendix I - Figure 2.3.21

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

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

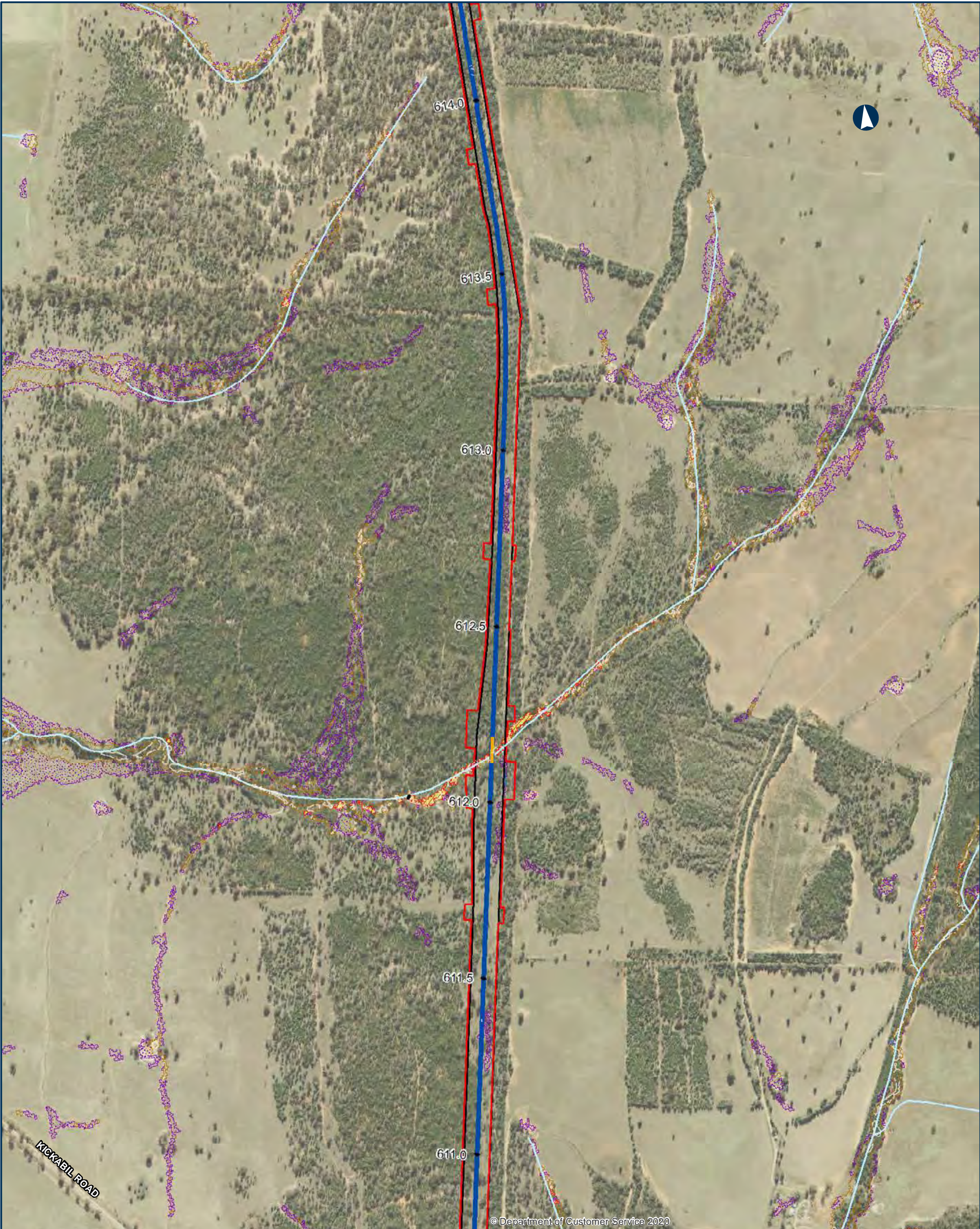
- Existing velocity >1m/s, velocity change > 20%
- Unprotected Surfaces
  - Existing not flooded, design velocity > 0.5m/s
  - Existing velocity < 0.5m/s, design velocity > 0.5m/s
  - Existing velocity > 0.5m/s (ETV), Design Velocity > Existing Velocity + 0.025m/s



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NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 2% AEP

Appendix I - Figure 2.3.22

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

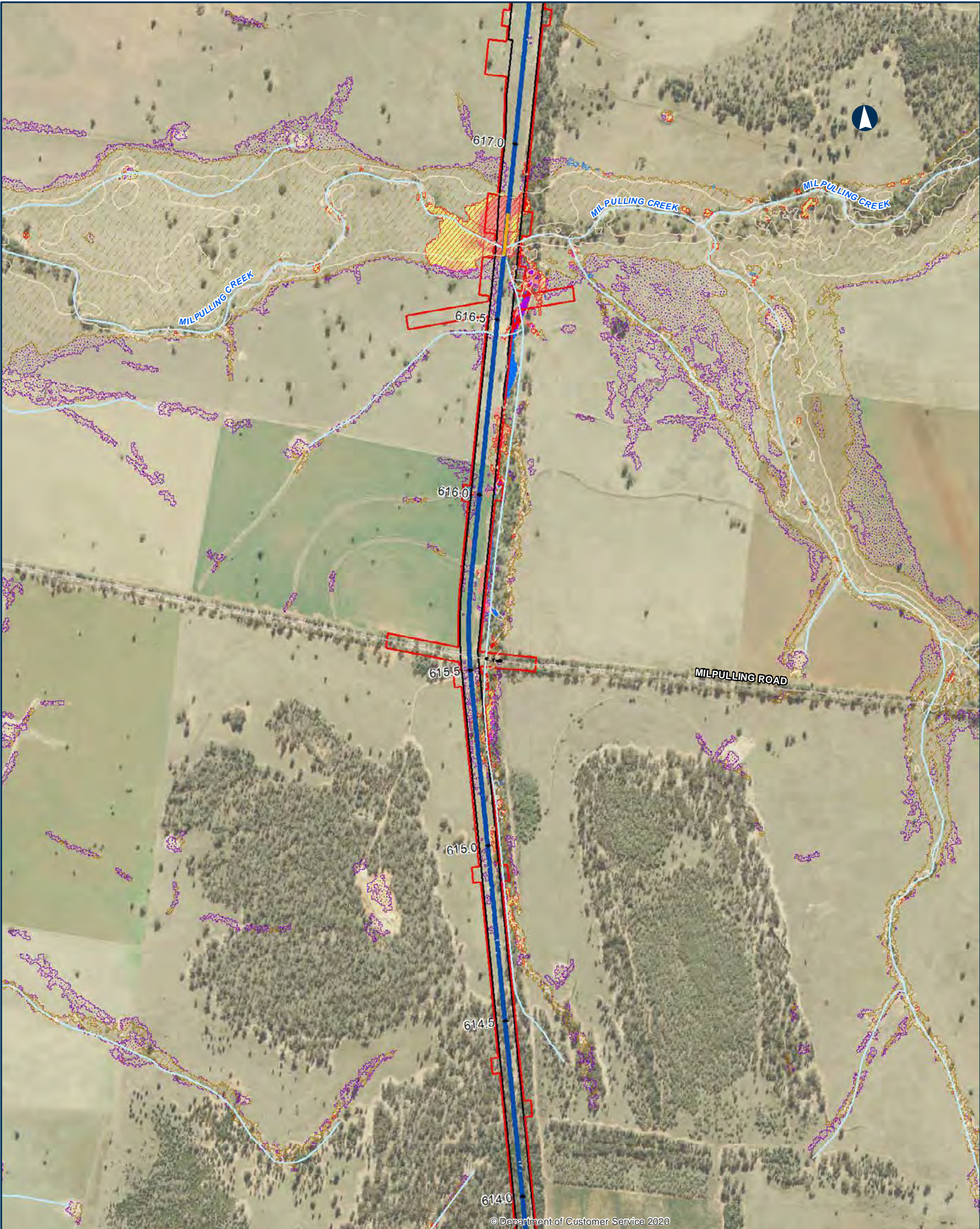
- Bridge
- Road QDL departure
- Alignment
- The proposal
- Rail Corridor
- Design Velocity Contour (m/s)
  - 1
  - 2
- Design Velocity < 0.5m/s
- Design Velocity > 0.5m/s, Velocity increase limited to 0.025m/s
- <10% Increase
- 10% to 20% increase
- Greater than 20% increase
- Unprotected Surfaces
 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



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**NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 2% AEP**

Appendix I - Figure 2.3.23

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

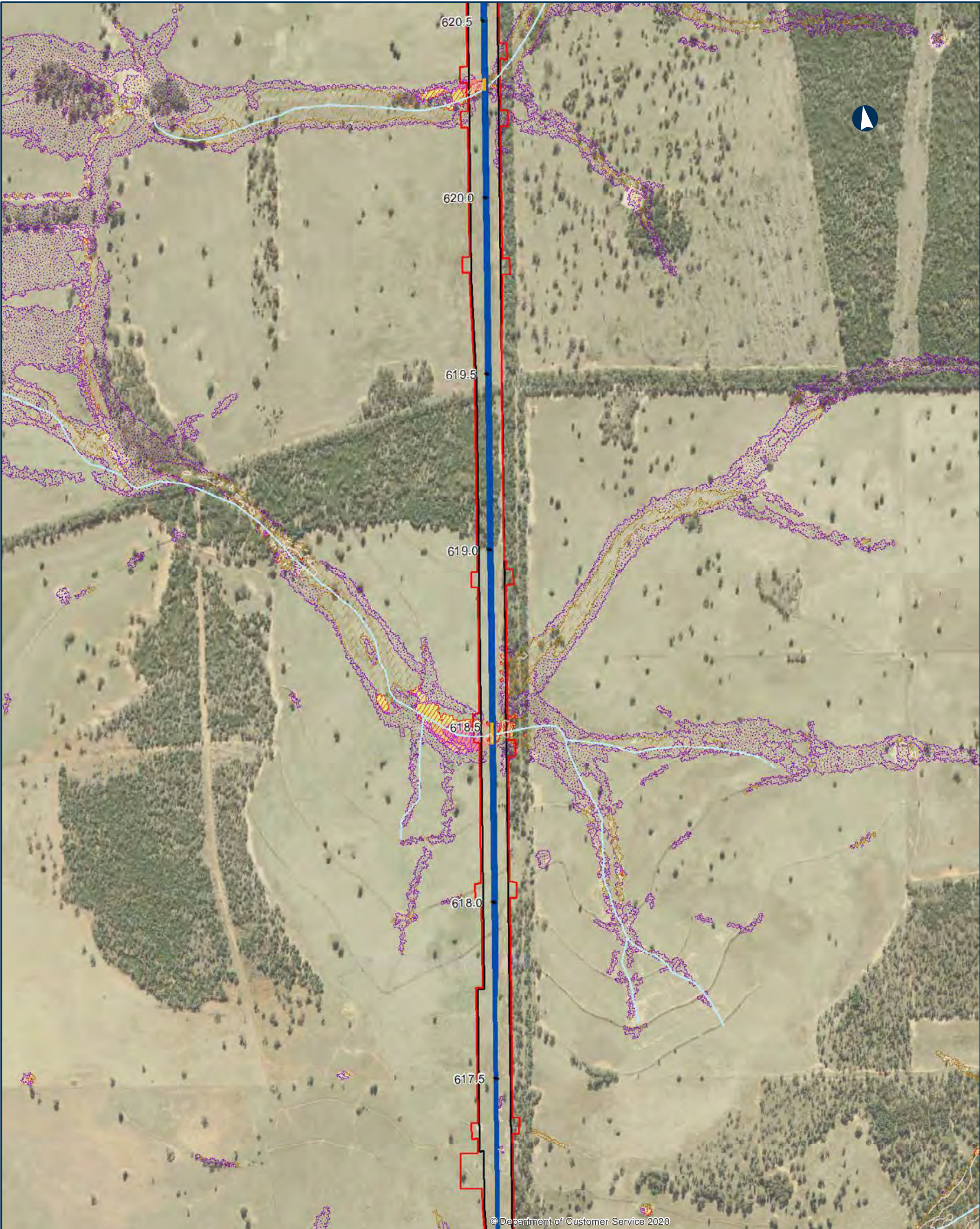
- Bridge
- Road QDL departure
- Alignment
- The proposal
- Rail Corridor
- Design Velocity Contour (m/s)
  - 1
  - 2
- Design Velocity < 0.5m/s
- Design Velocity > 0.5m/s, Velocity Increase limited to 0.025m/s
- <10% Increase
- 10% to 20% Increase
- Greater than 20% Increase
- Protected Surfaces
  -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



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**NARROMINE TO NARRABRI** QDL departures - Scour / Erosion - 2% AEP

Appendix I - Figure 2.3.24

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

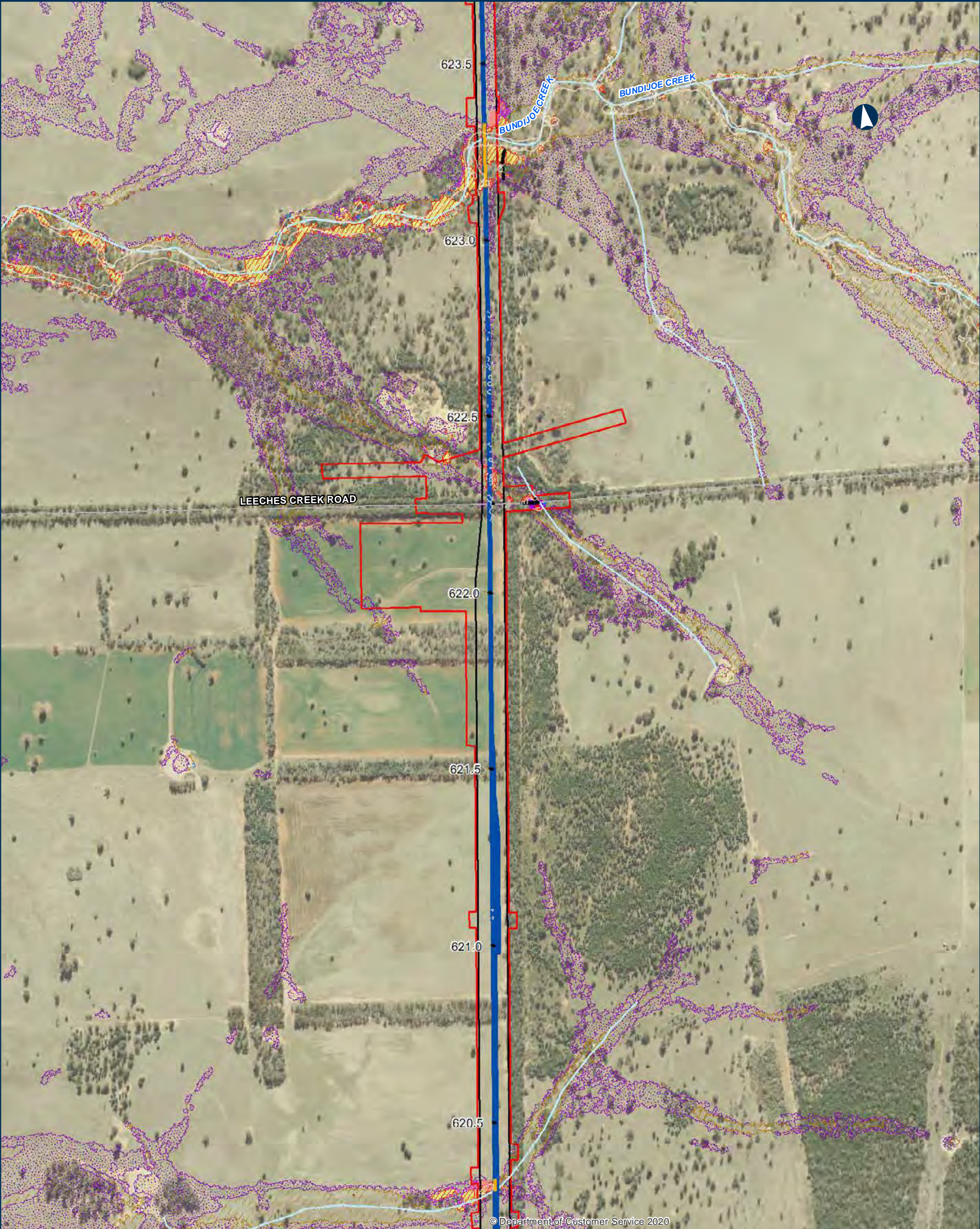
- Bridge
- Road QDL departure
- Alignment
- The proposal
- Rail Corridor
- Design Velocity Contour (m/s)
  - 1
  - 2
- Design Velocity < 0.5m/s
- Design Velocity > 0.5m/s, Velocity increase limited to 0.025m/s
- <10% Increase
- 10% to 20% increase
- Greater than 20% increase
- Unprotected Surfaces
 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



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NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 2% AEP

Appendix I - Figure 2.3.25

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

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 (ETV), Design Velocity > Existing Velocity + 0.025m/s

NARRABRI

COONAMBLE

BARADINE

GILGANDRA

NARROMINE

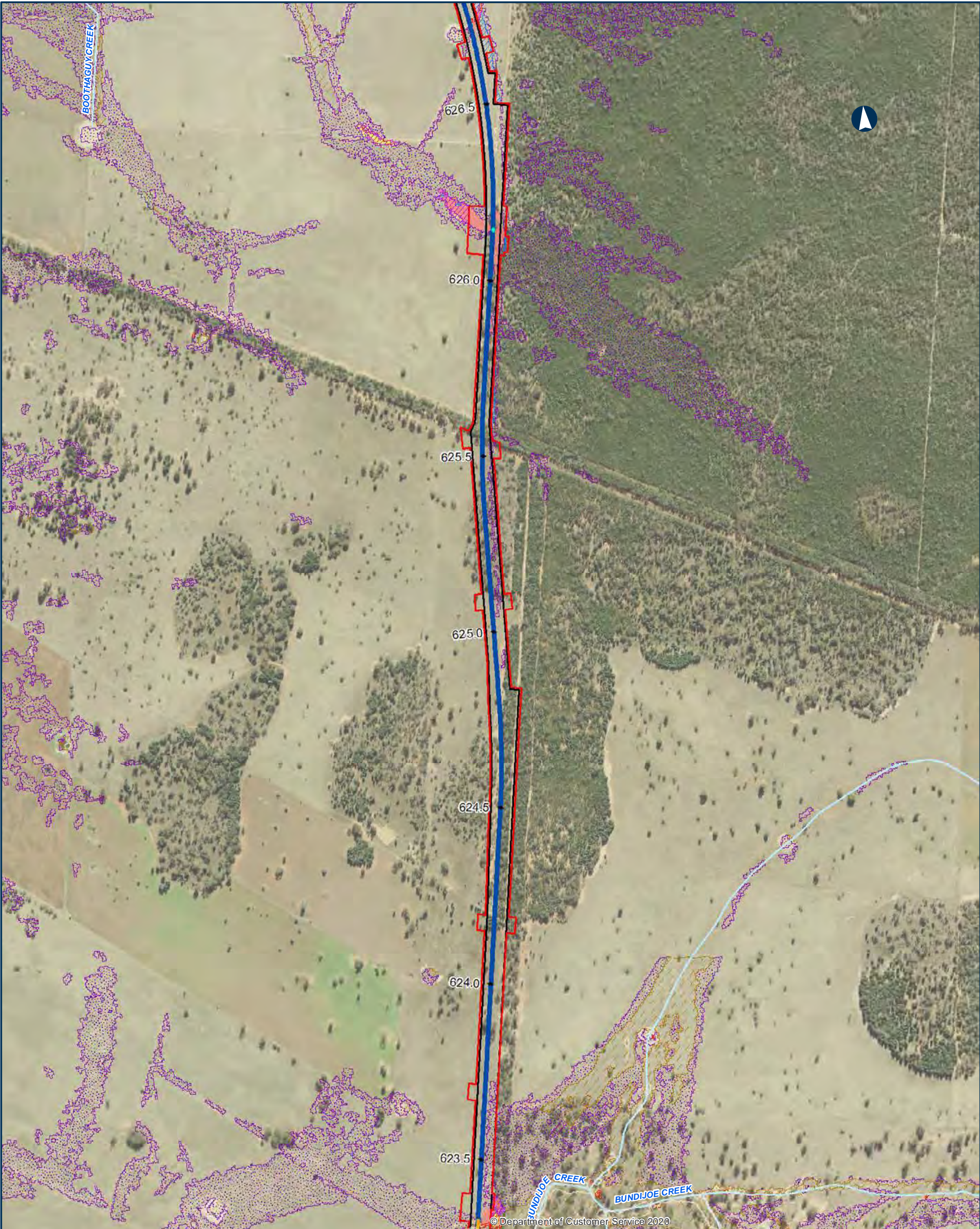
DUBBO

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NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 2% AEP

Appendix I - Figure 2.3.26

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

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 (ETV), Design Velocity > Existing Velocity + 0.025m/s

NARRABRI

COONAMBLE

BARADINE

GILGANDRA

NARROMINE

DUBBO

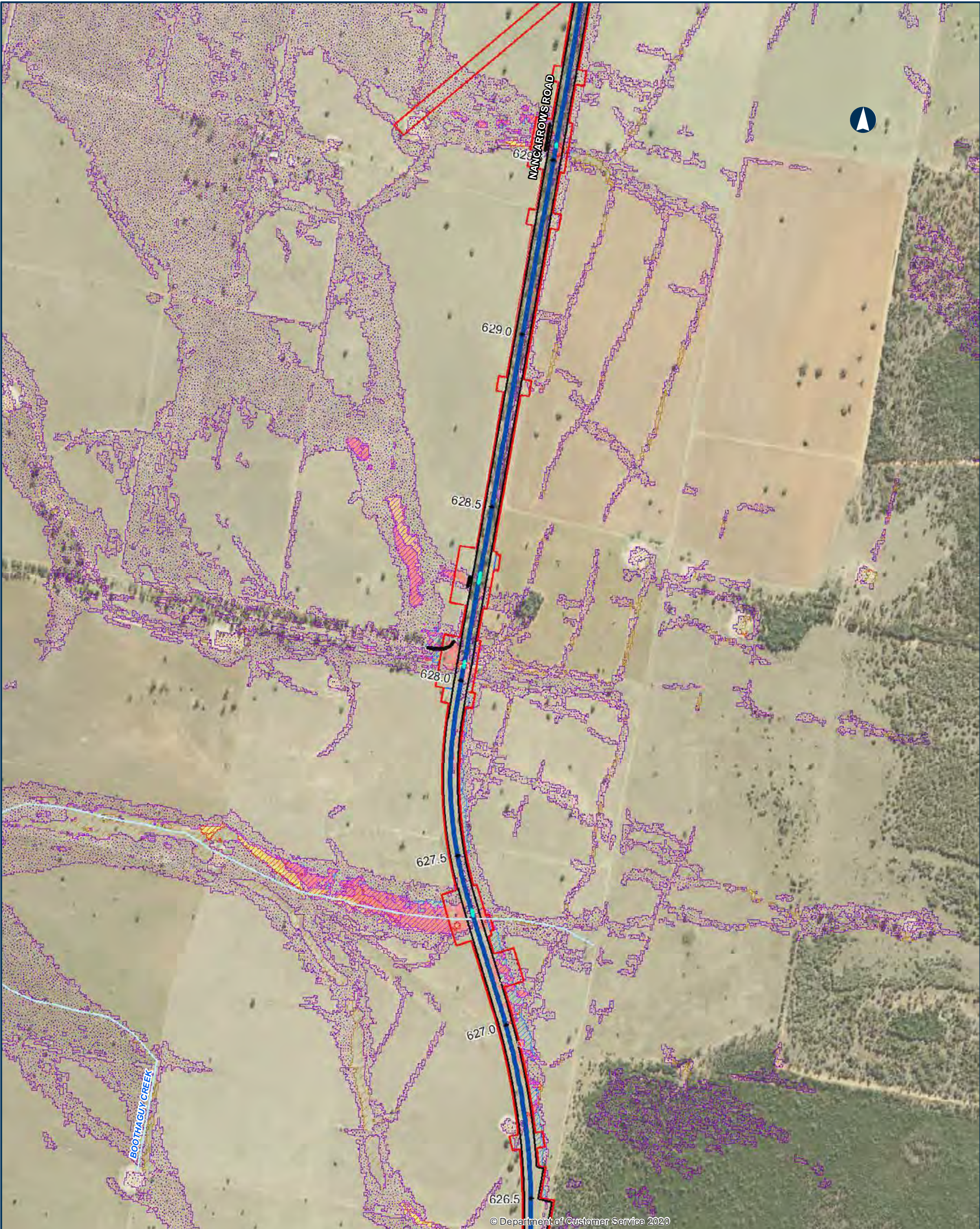
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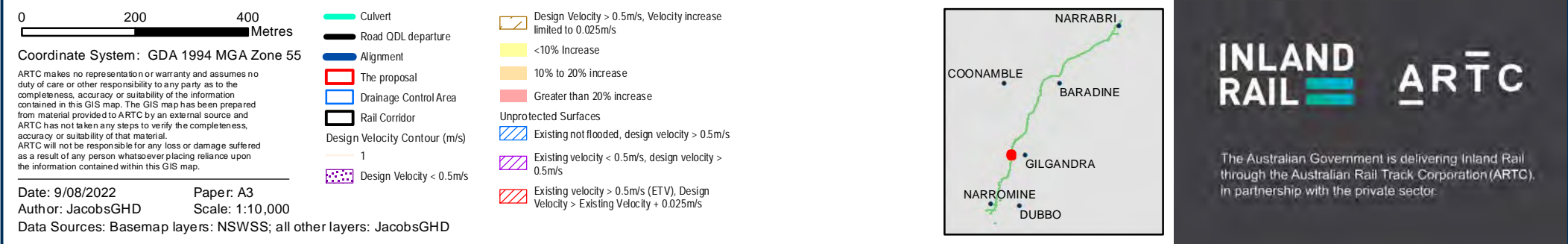
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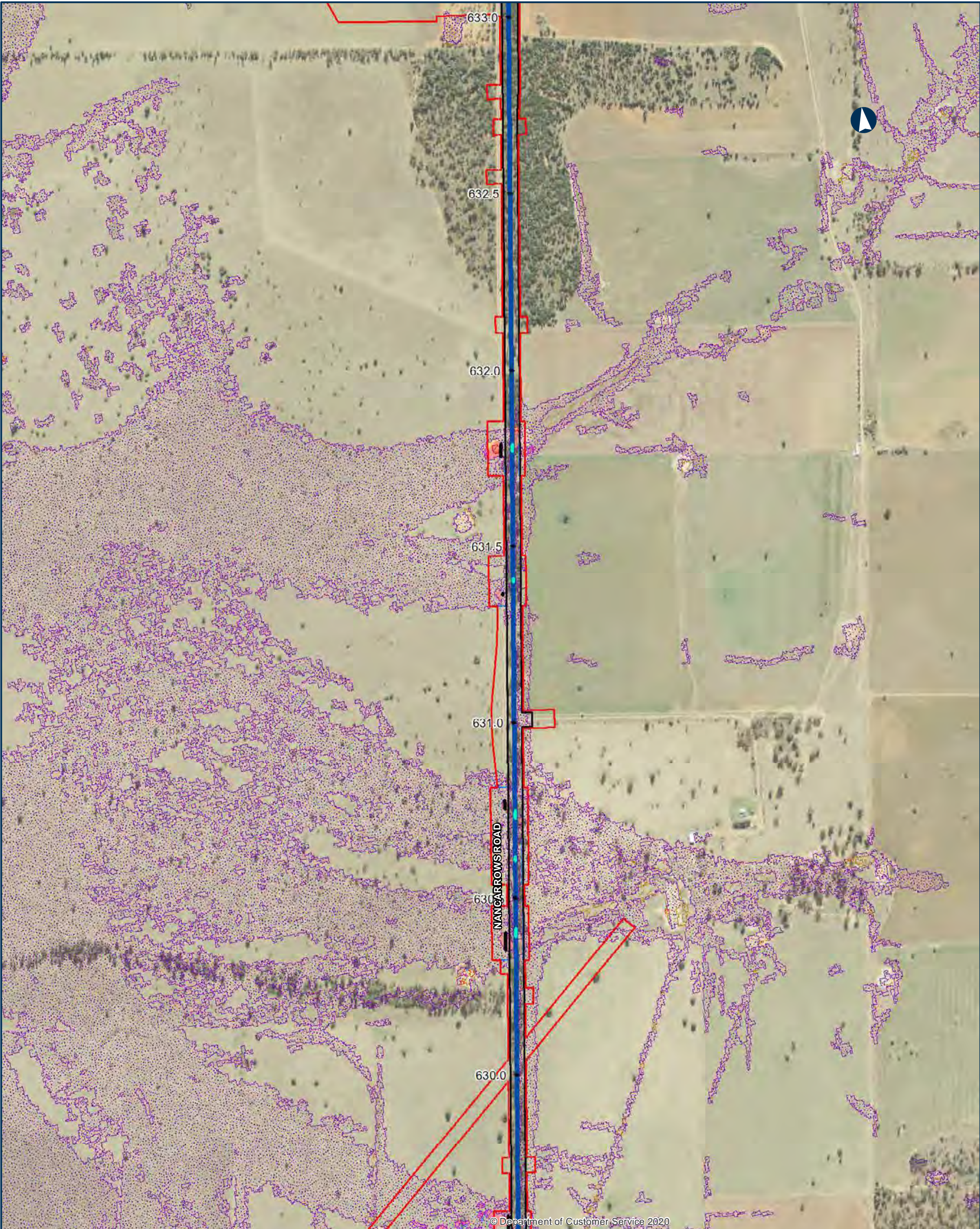


NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 2% AEP

Appendix I - Figure 2.3.27







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**NARROMINE TO NARRABRI** QDL departures - Scour / Erosion - 2% AEP

Appendix I - Figure 2.3.28

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

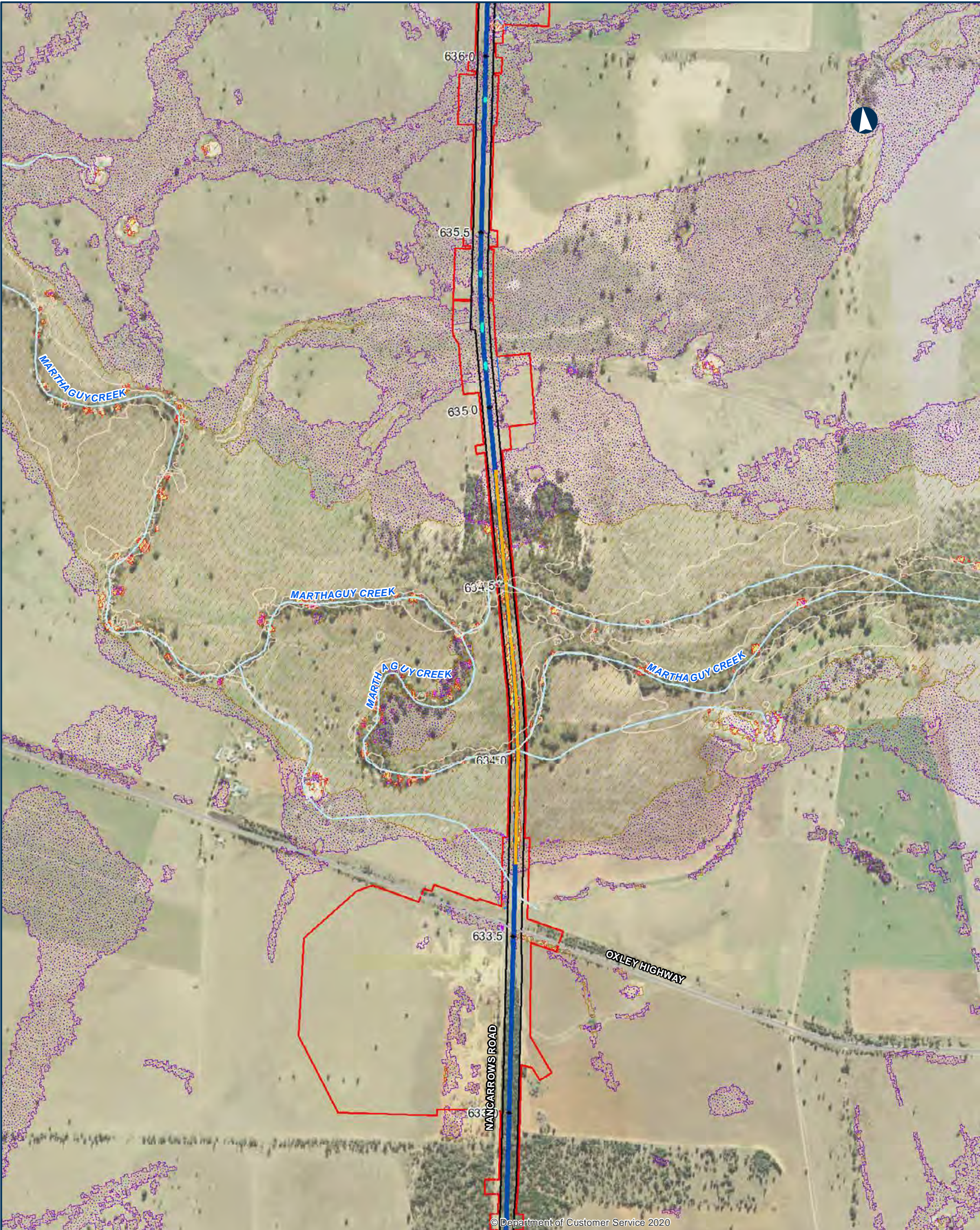
- Culvert
- Road QDL departure
- Alignment
- The proposal
- Drainage Control Area
- Rail Corridor
- Design Velocity Contour (m/s)
  - 1
  - Design Velocity < 0.5m/s
- Design Velocity > 0.5m/s, Velocity increase limited to 0.025m/s
- <10% Increase
- 10% to 20% increase
- Greater than 20% increase
- Unprotected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



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**NARROMINE TO NARRABRI** QDL departures - Scour / Erosion - 2% AEP

Appendix I - Figure 2.3.29

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

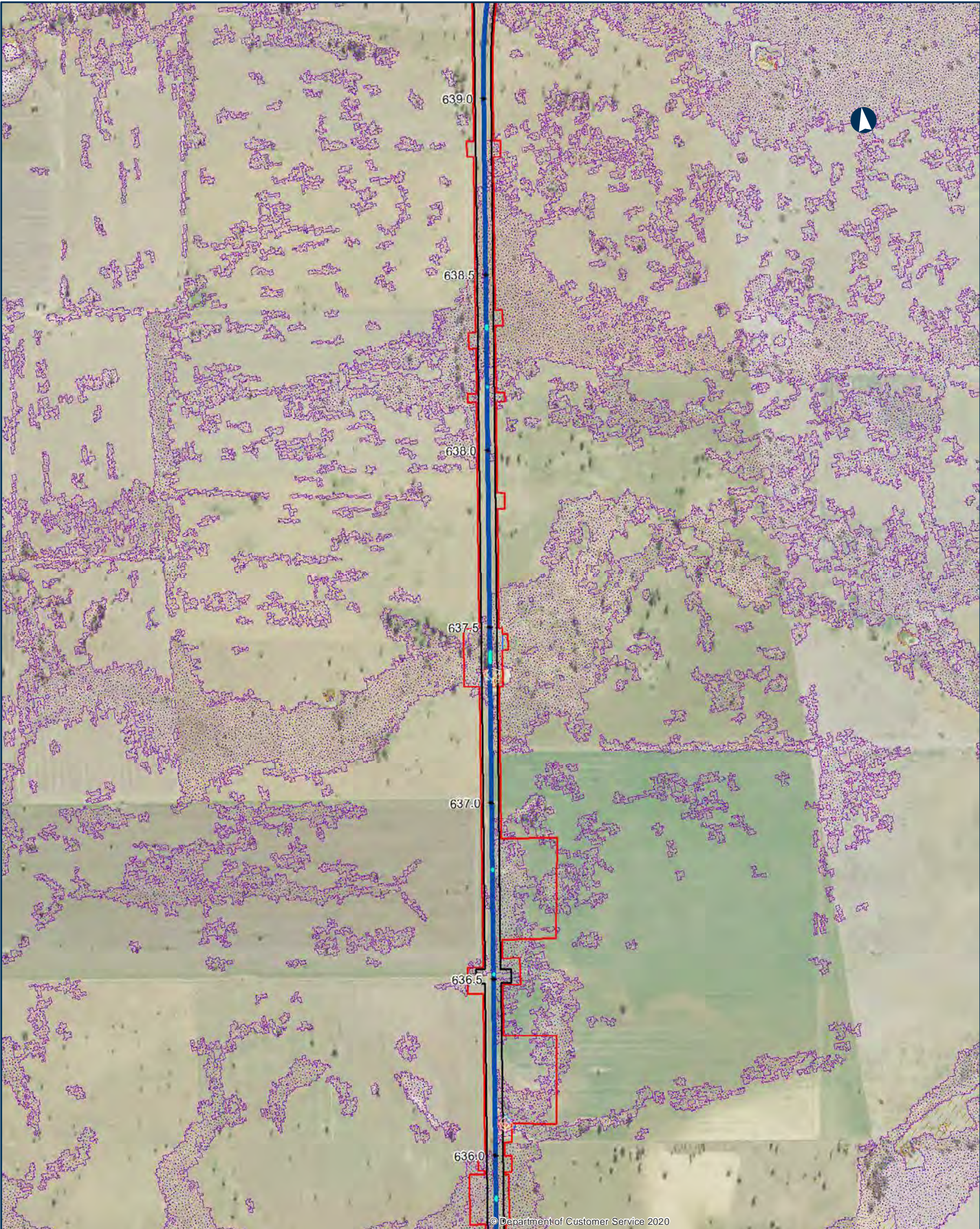
- Protected Surfaces
- Existing velocity <1m/s, design velocity > 1.2m/s
- Unprotected Surfaces
- Existing not flooded, design velocity > 0.5m/s
  - Existing velocity < 0.5m/s, design velocity > 0.5m/s
  - Existing velocity > 0.5m/s (ETV), Design Velocity > Existing Velocity + 0.025m/s



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**NARROMINE TO NARRABRI** QDL departures - Scour / Erosion - 2% AEP

Appendix I - Figure 2.3.30

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

- 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 (ETV), Design Velocity > Existing Velocity + 0.025m/s



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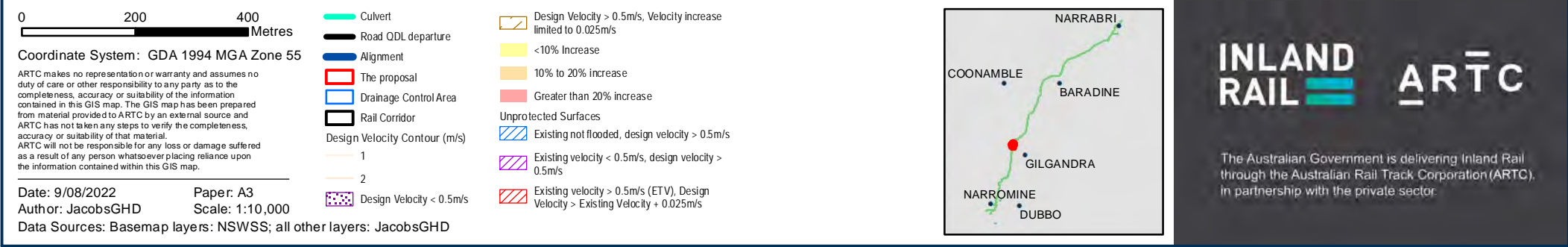
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NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 2% AEP

Appendix I - Figure 2.3.31







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**NARROMINE TO NARRABRI** QDL departures - Scour / Erosion - 2% AEP

Appendix I - Figure 2.3.32

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

Design Velocity < 0.5m/s

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

<10% Increase

Unprotected Surfaces

Existing not flooded, design velocity > 0.5m/s

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

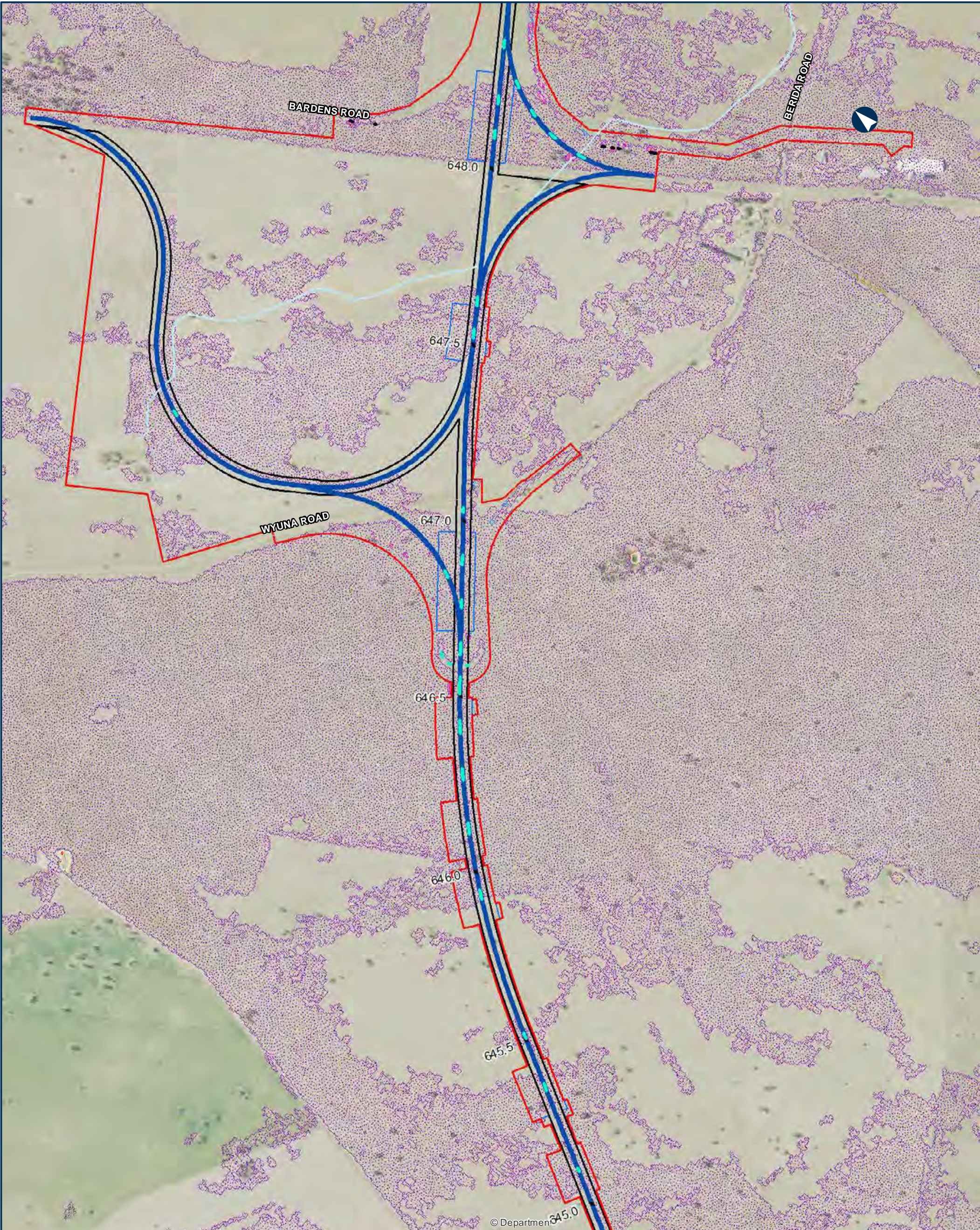
Existing velocity > 0.5m/s (ETV), Design Velocity > Existing Velocity + 0.025m/s

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**NARROMINE TO NARRABRI** QDL departures - Scour / Erosion - 2% AEP

Appendix I - Figure 2.3.33

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

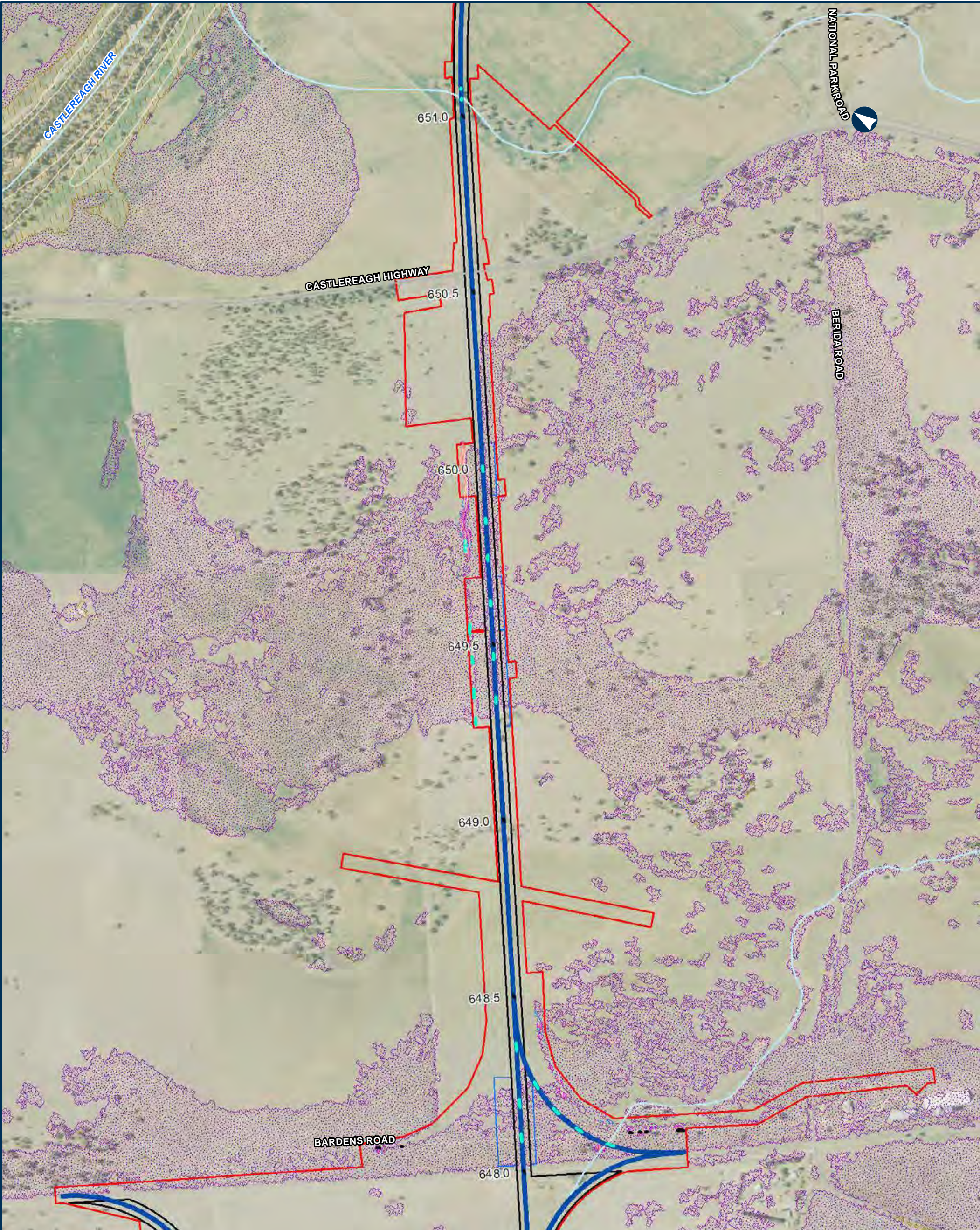
- Culvert
- Road QDL departure
- Alignment
- The proposal
- Drainage Control Area
- Rail Corridor
- Design Velocity Contour (m/s)  
1
- Design Velocity < 0.5m/s
- Design Velocity > 0.5m/s, Velocity increase limited to 0.025m/s
- <10% Increase
- 10% to 20% increase
- Greater than 20% increase
- Unprotected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



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NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 2% AEP

Appendix I - Figure 2.3.34

0 200 400 Metres

Coordinate System: GDA 1994 MGA Zone 55

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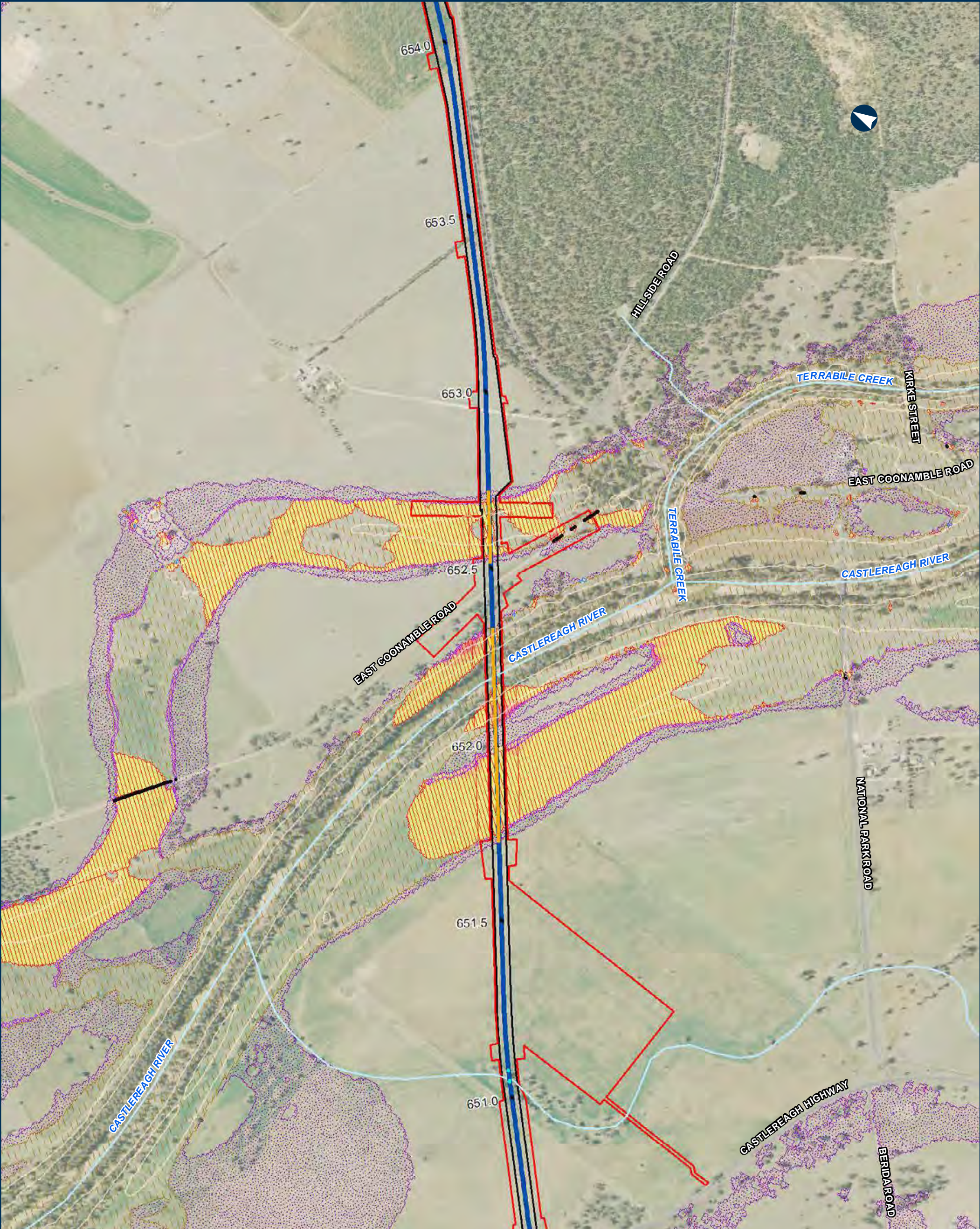
- Culvert
- Road QDL departure
- Alignment
- The proposal
- Drainage Control Area
- Rail Corridor
- Design Velocity Contour (m/s)
  - 1
  - 2
- Design Velocity < 0.5m/s
- Design Velocity > 0.5m/s, Velocity increase limited to 0.025m/s
- <10% Increase
- 10% to 20% increase
- Greater than 20% increase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



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NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 2% AEP

Appendix I - Figure 2.3.35

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

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

Unprotected Surfaces

Existing not flooded, design velocity > 0.5m/s

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

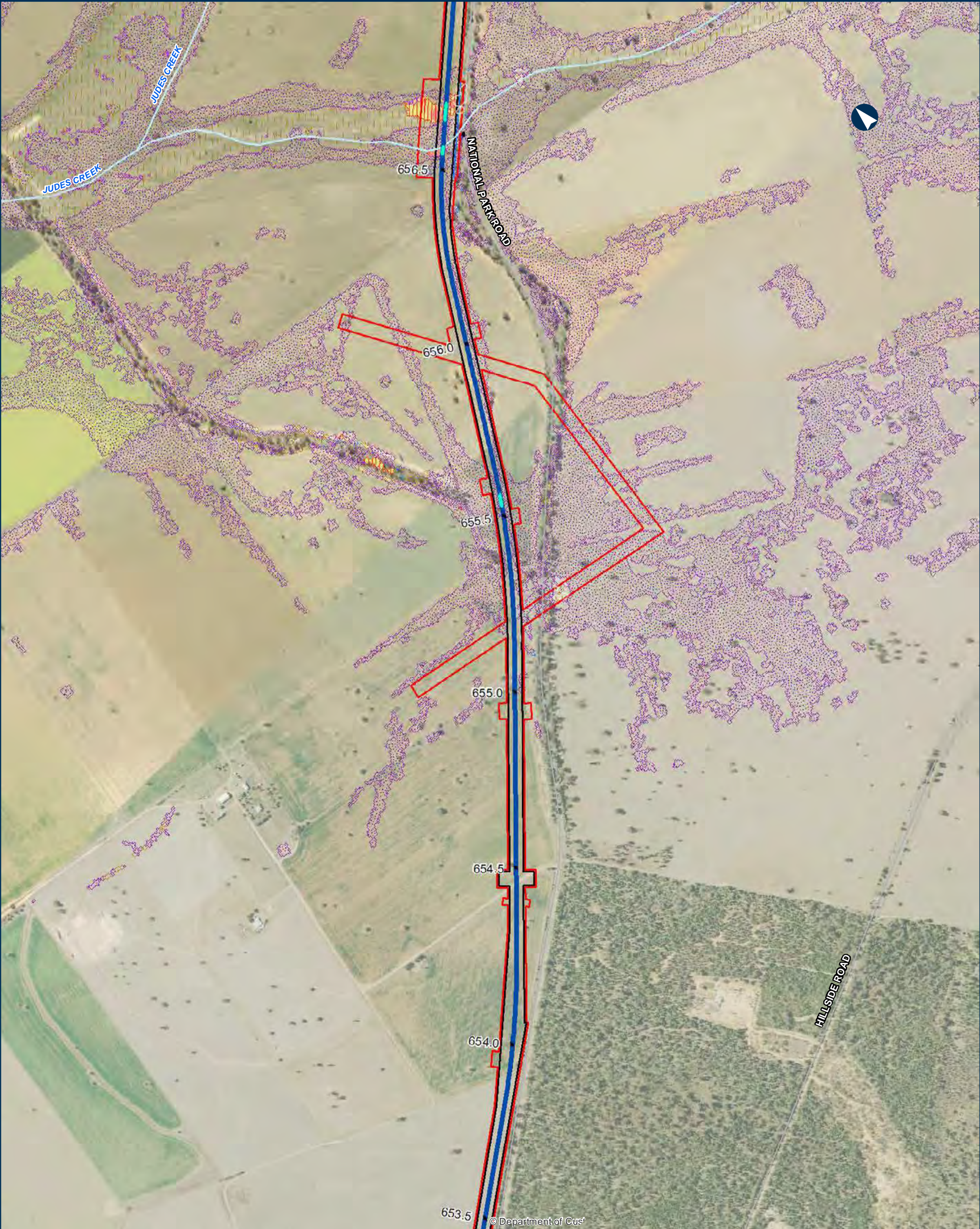
Existing velocity > 0.5m/s (ETV), Design Velocity > Existing Velocity + 0.025m/s

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NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 2% AEP

Appendix I - Figure 2.3.36

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 (ETV), Design Velocity > Existing Velocity + 0.025m/s

NARRABRI

COONAMBLE

BARADINE

GILGANDRA

NARROMINE

DUBBO

INLAND RAIL

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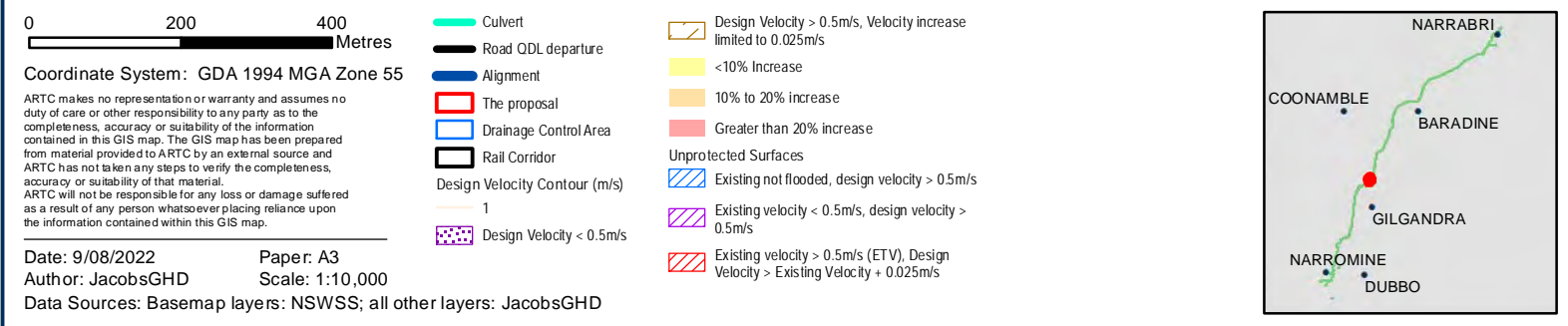
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NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 2% AEP

Appendix I - Figure 2.3.37







NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 2% AEP

Appendix I - Figure 2.3.38

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 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 (ETV), Design Velocity > Existing Velocity + 0.025m/s

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BARADINE

GILGANDRA

NARROMINE

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**NARROMINE TO NARRABRI** QDL departures - Scour / Erosion - 2% AEP

Appendix I - Figure 2.3.39

0 200 400 Metres

Coordinate System: GDA 1994 MGA Zone 55

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

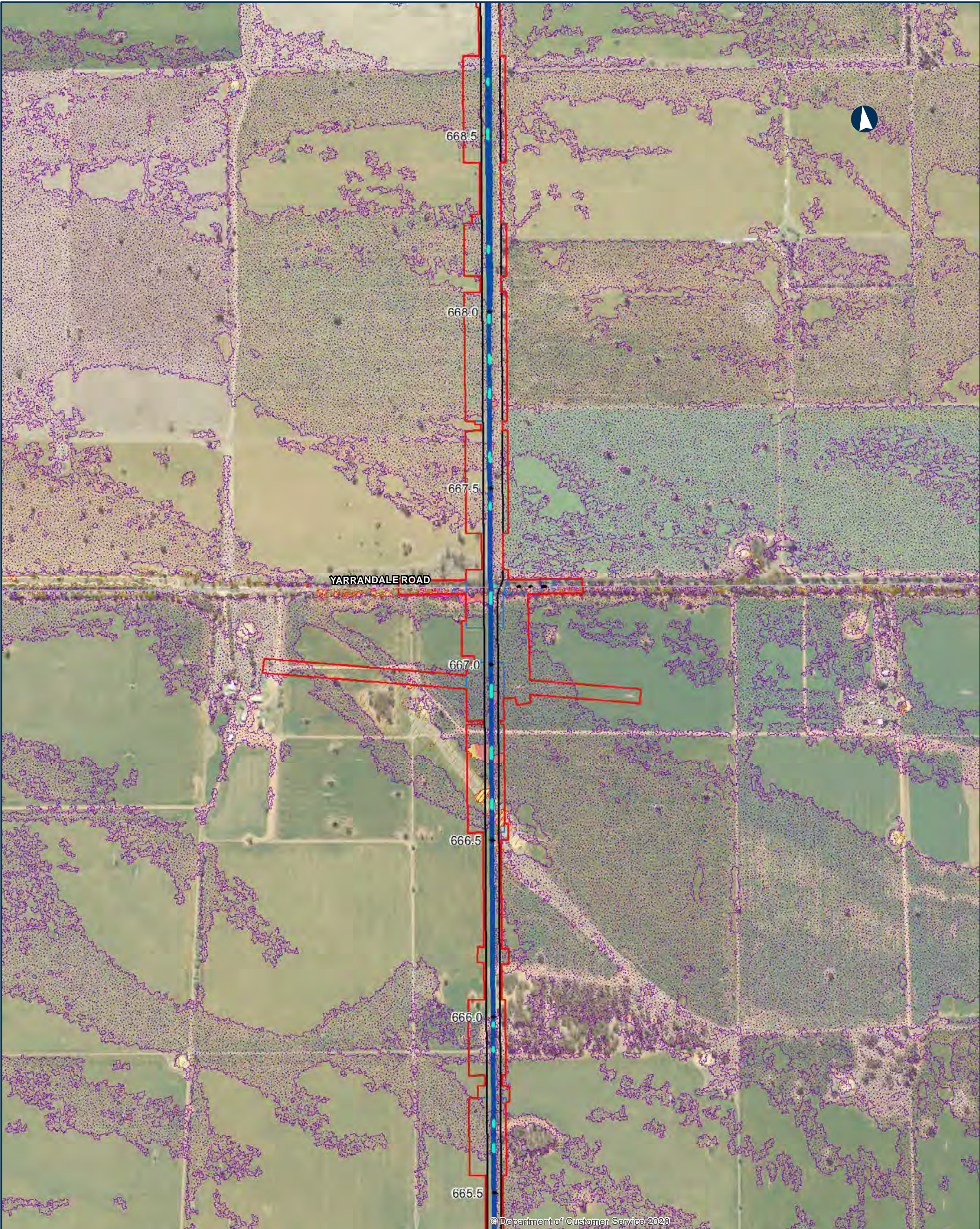
- Culvert
- Road QDL departure
- Alignment
- The proposal
- Drainage Control Area
- Rail Corridor
- Design Velocity Contour (m/s)
  - 1
  - 2
- Design Velocity < 0.5m/s
- Design Velocity > 0.5m/s, Velocity increase limited to 0.025m/s
- <10% Increase
- 10% to 20% increase
- Greater than 20% increase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



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**NARROMINE TO NARRABRI** QDL departures - Scour / Erosion - 2% AEP

Appendix I - Figure 2.3.40

0 200 400 Metres

Coordinate System: GDA 1994 MGA Zone 55

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

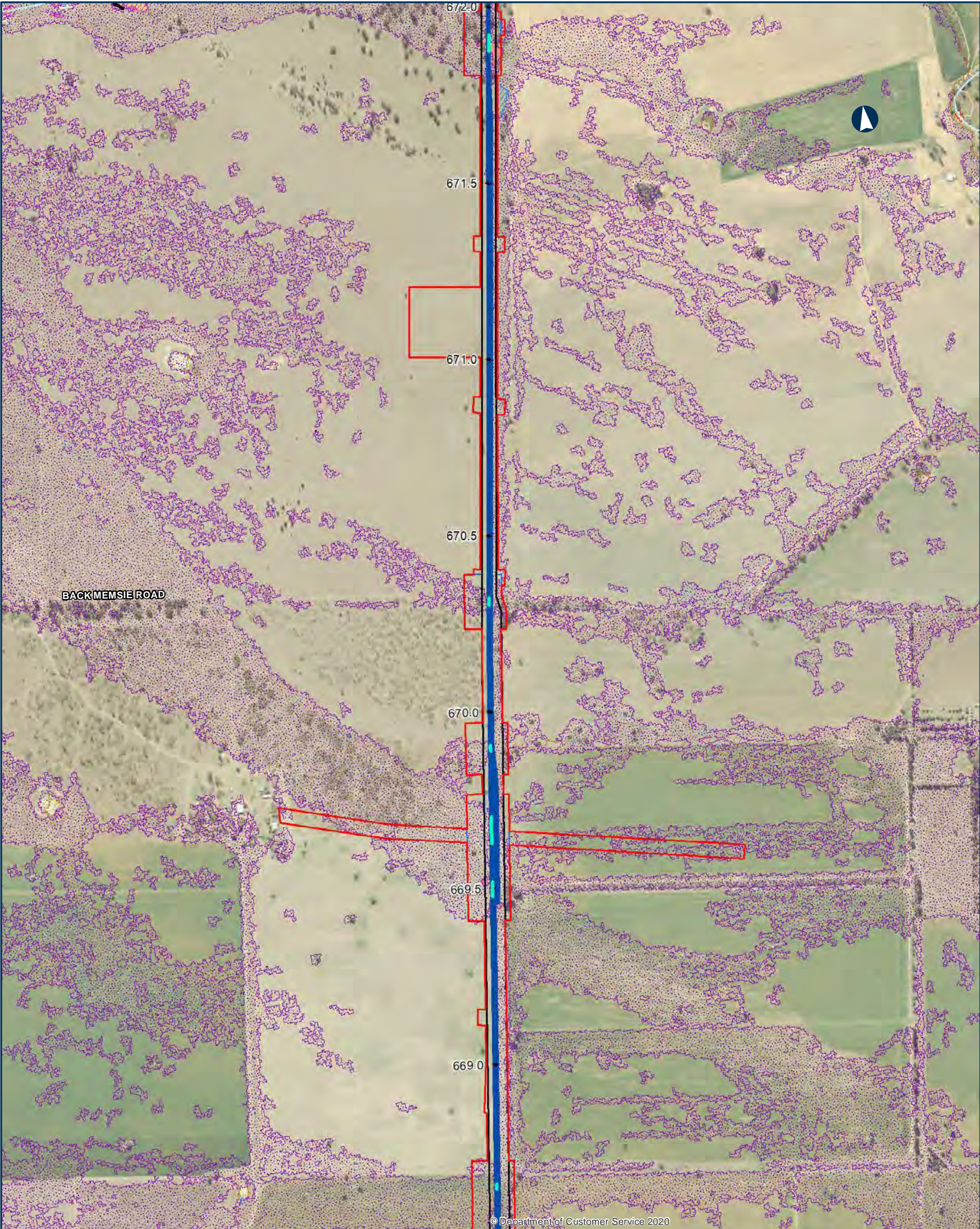
- Culvert
- Road QDL departure
- Alignment
- The proposal
- Drainage Control Area
- Rail Corridor
- Design Velocity Contour (m/s)
  - 1
  - 2
  - Design Velocity < 0.5m/s
- Design Velocity > 0.5m/s, Velocity increase limited to 0.025m/s
- <10% Increase
- 10% to 20% increase
- Greater than 20% increase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



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**NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 2% AEP**

Appendix I - Figure 2.3.41

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

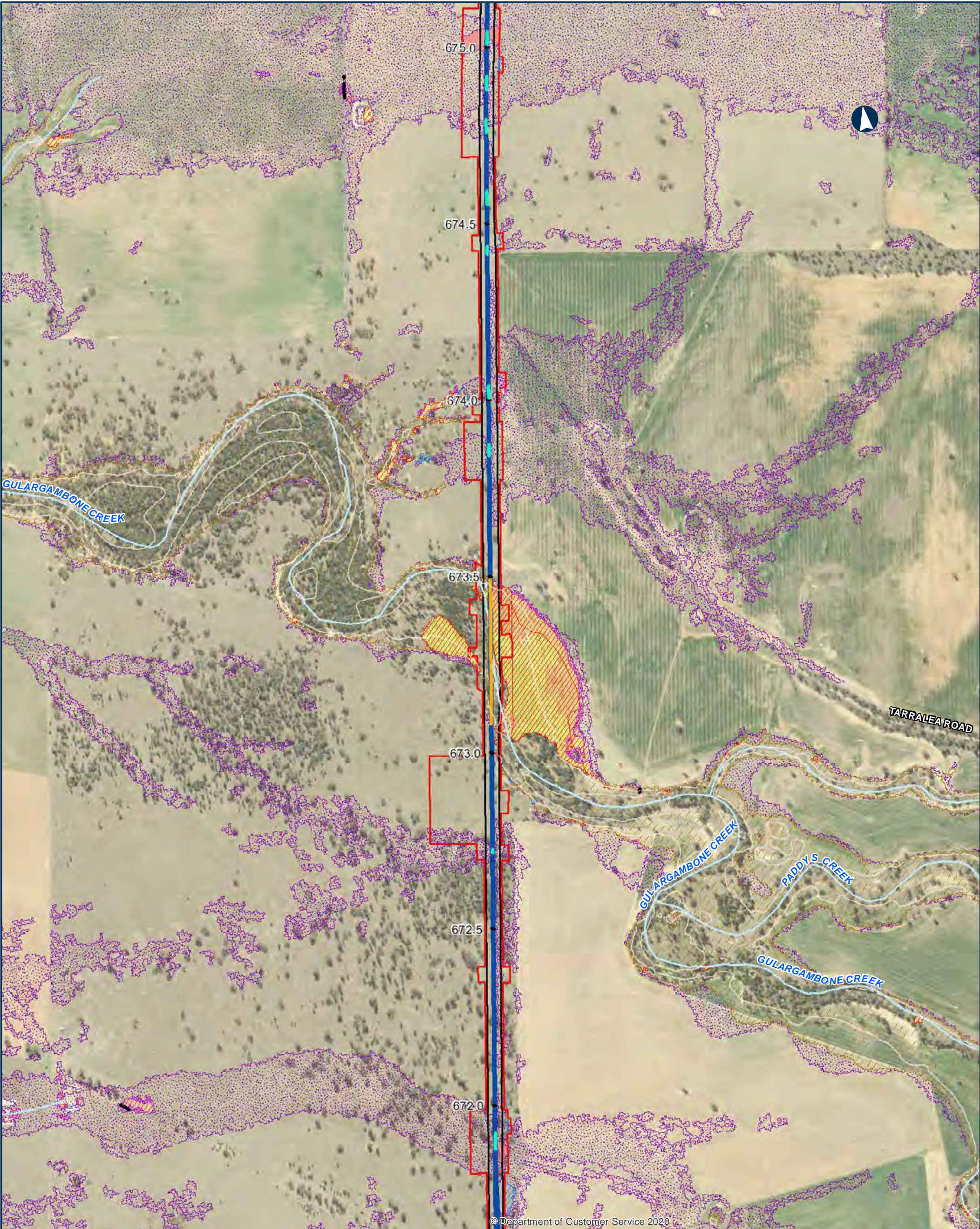
- Culvert
- Road QDL departure
- Alignment
- The proposal
- Drainage Control Area
- Rail Corridor
- Design Velocity Contour (m/s)
  - 1
  - 2
- Design Velocity < 0.5m/s
- Design Velocity > 0.5m/s, Velocity increase limited to 0.025m/s
- <10% Increase
- 10% to 20% increase
- Greater than 20% increase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



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**NARROMINE TO NARRABRI** QDL departures - Scour / Erosion - 2% AEP

Appendix I - Figure 2.3.42

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

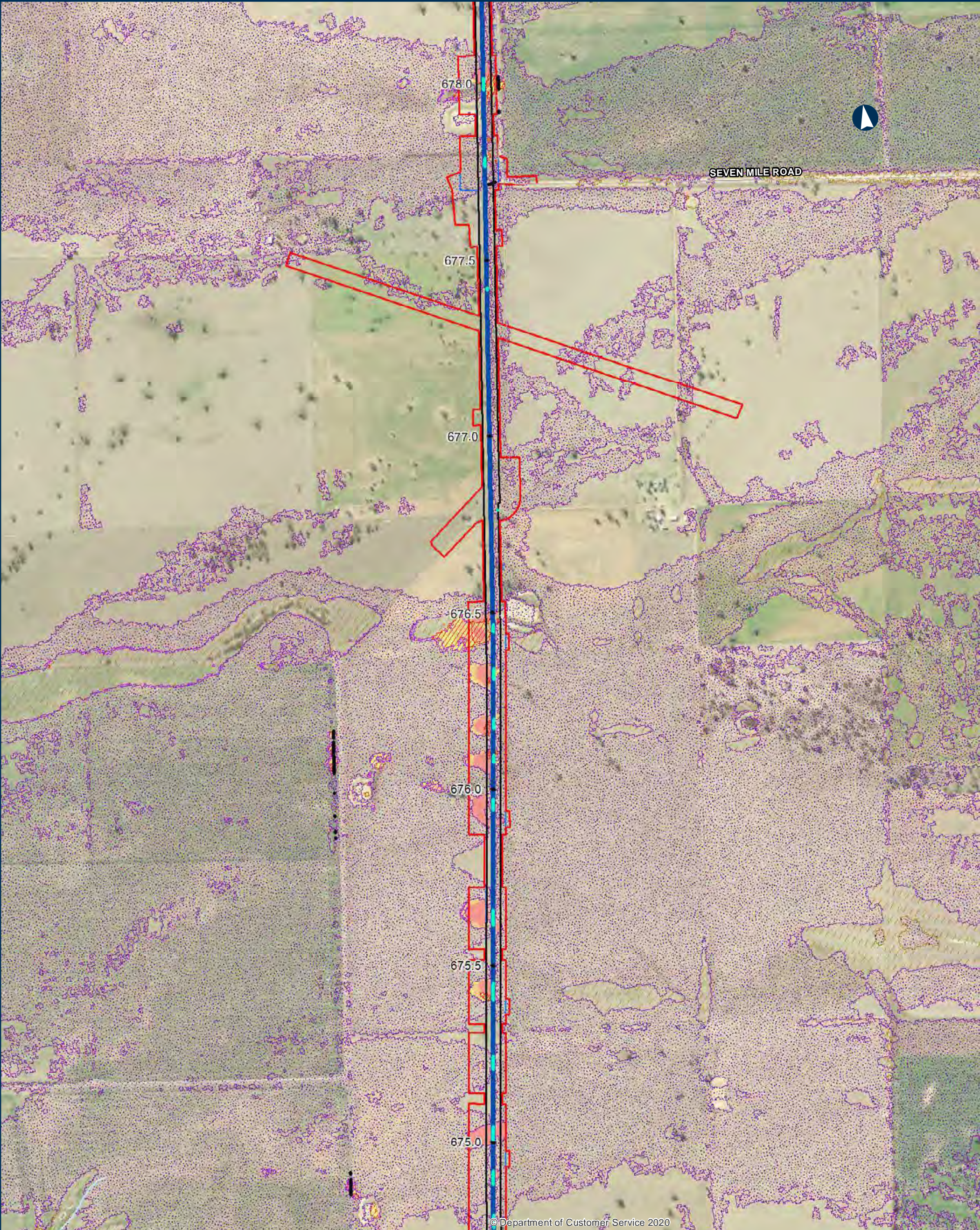
- |                       |   |  |
|-----------------------|---|--|
| Bridge                | Design Velocity Contour (m/s)                                   | Greater than 20% increase  |
| Culvert               | 1   | Unprotected Surfaces   |
| Road ODL departure    | 2   | Existing not flooded, design 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 (ETV), 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 - 2% AEP

Appendix I - Figure 2.3.43

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

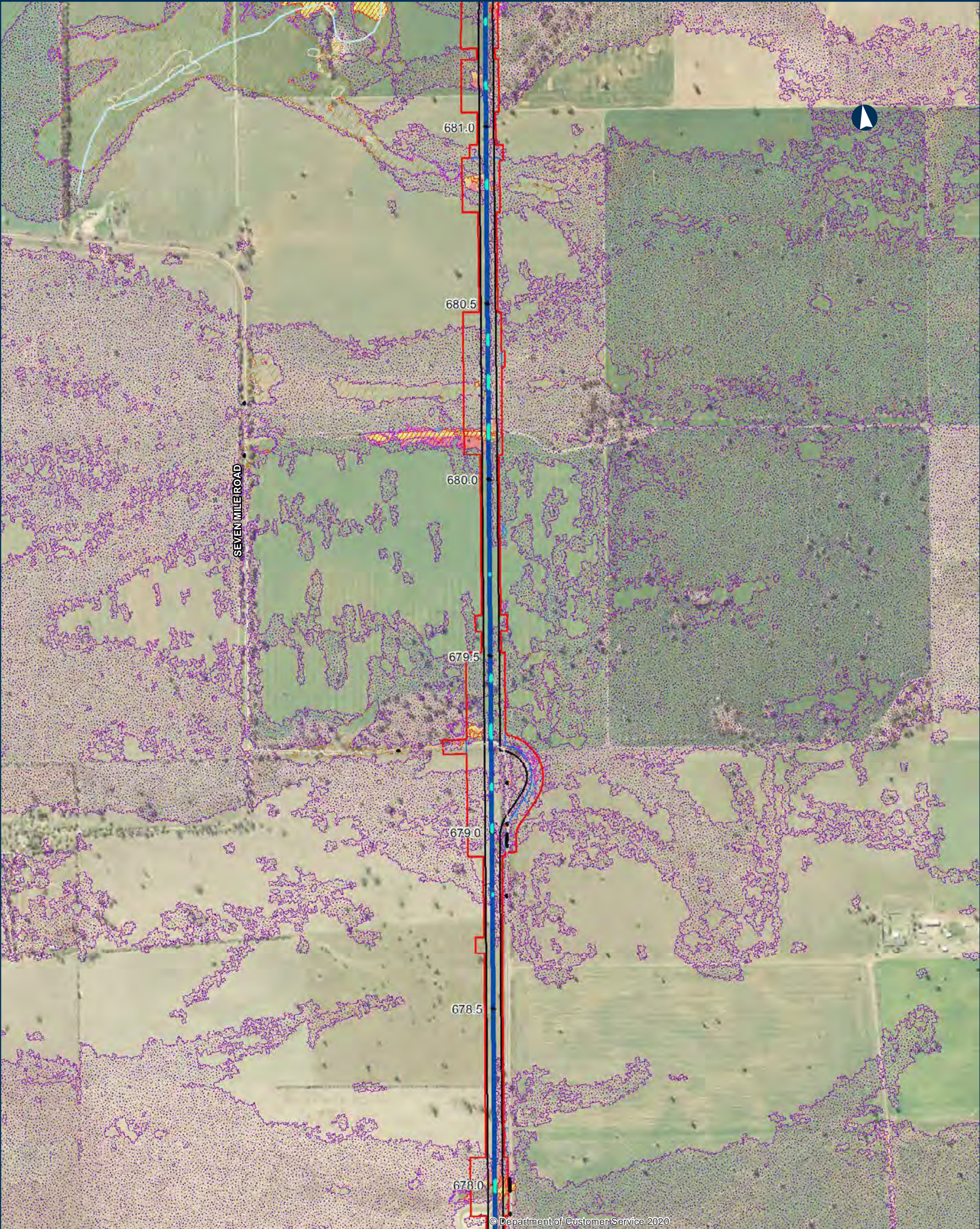
- Culvert
- Road QDL departure
- Alignment
- The proposal
- Drainage Control Area
- Rail Corridor
- Design Velocity Contour (m/s)
  - 1
  - 2
- Design Velocity < 0.5m/s
- Design Velocity > 0.5m/s, Velocity increase limited to 0.025m/s
- <10% Increase
- 10% to 20% increase
- Greater than 20% increase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



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**NARROMINE TO NARRABRI** QDL departures - Scour / Erosion - 2% AEP

Appendix I - Figure 2.3.44

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

- 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 (ETV), Design Velocity > Existing Velocity + 0.025m/s



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**NARROMINE TO NARRABRI** QDL departures - Scour / Erosion - 2% AEP

Appendix I - Figure 2.3.45

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

- 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 (ETV), Design Velocity > Existing Velocity + 0.025m/s



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NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 2% AEP

Appendix I - Figure 2.3.46

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 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 (ETV), Design Velocity > Existing Velocity + 0.025m/s

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NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 2% AEP

Appendix I - Figure 2.3.47

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

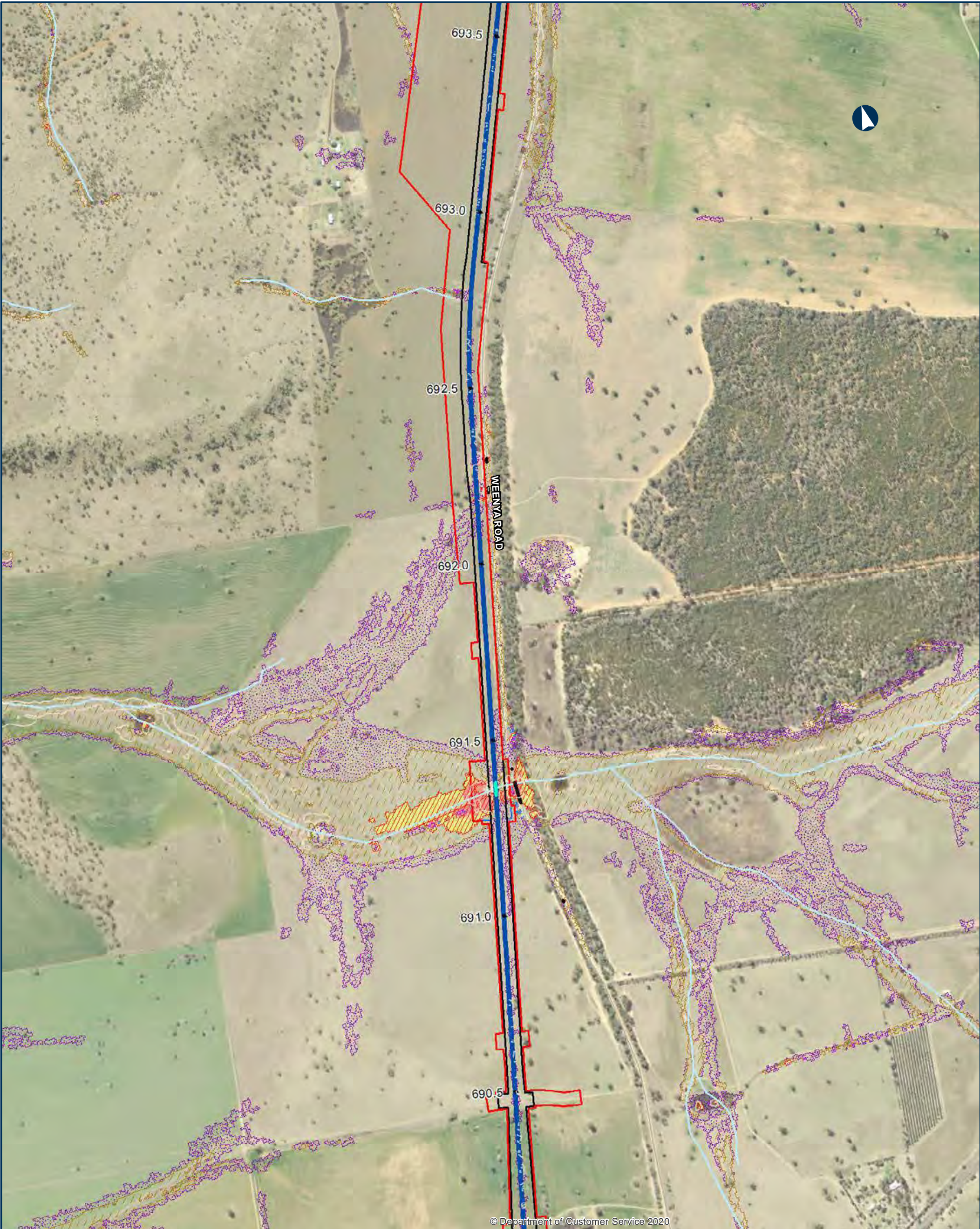
- Culvert
- Road QDL departure
- Alignment
- The proposal
- Drainage Control Area
- Rail Corridor
- Design Velocity Contour (m/s)
  - 1
  - 2
- Design Velocity < 0.5m/s
- Design Velocity > 0.5m/s, Velocity increase limited to 0.025m/s
- <10% Increase
- 10% to 20% increase
- Greater than 20% increase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



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**NARROMINE TO NARRABRI** QDL departures - Scour / Erosion - 2% AEP

Appendix I - Figure 2.3.48

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

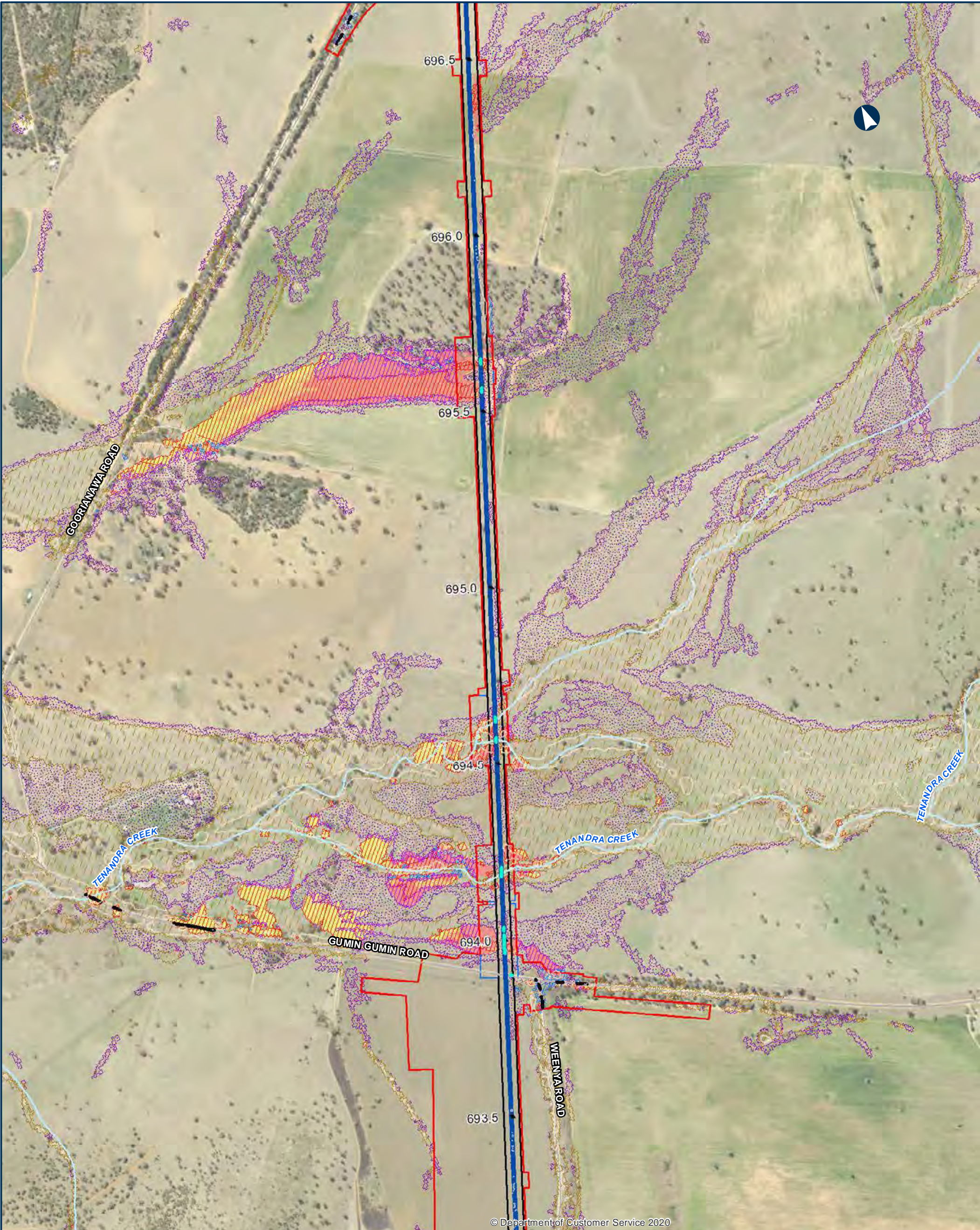
- Culvert
- Road QDL departure
- Alignment
- The proposal
- Drainage Control Area
- Rail Corridor
- Design Velocity Contour (m/s)
  - 1
  - 2
- Design Velocity < 0.5m/s
- Design Velocity > 0.5m/s, Velocity increase limited to 0.025m/s
- <10% Increase
- 10% to 20% increase
- Greater than 20% increase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



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**NARROMINE TO NARRABRI** QDL departures - Scour / Erosion - 2% AEP

Appendix I - Figure 2.3.49

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

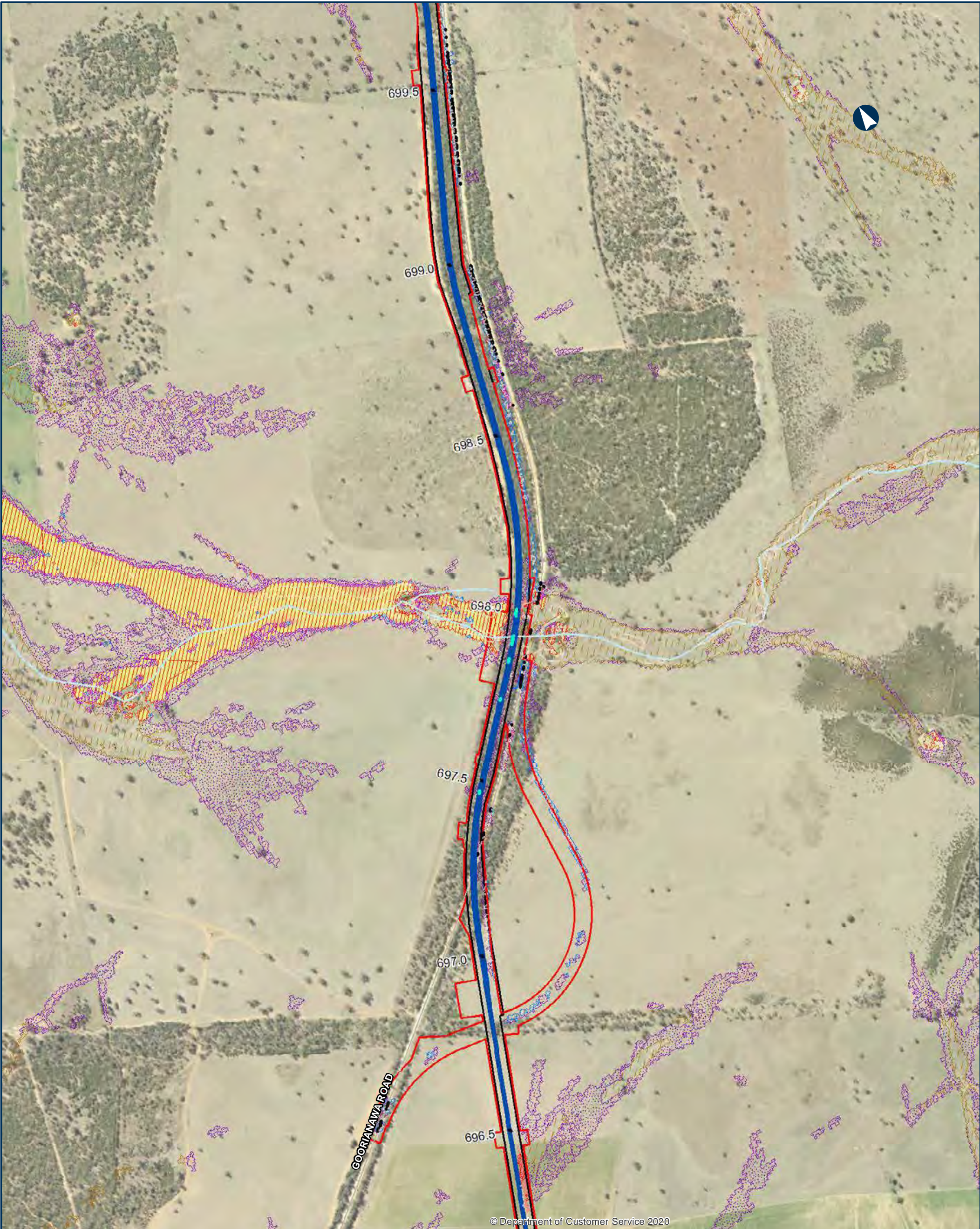
- Culvert
- Road QDL departure
- Alignment
- The proposal
- Drainage Control Area
- Rail Corridor
- Design Velocity Contour (m/s)
  - 1
  - 2
- Design Velocity < 0.5m/s
- Design Velocity > 0.5m/s, Velocity increase limited to 0.025m/s
- <10% Increase
- 10% to 20% increase
- Greater than 20% increase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



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**NARROMINE TO NARRABRI** QDL departures - Scour / Erosion - 2% AEP

Appendix I - Figure 2.3.50

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

Paper: A3  
Scale: 1:10,000

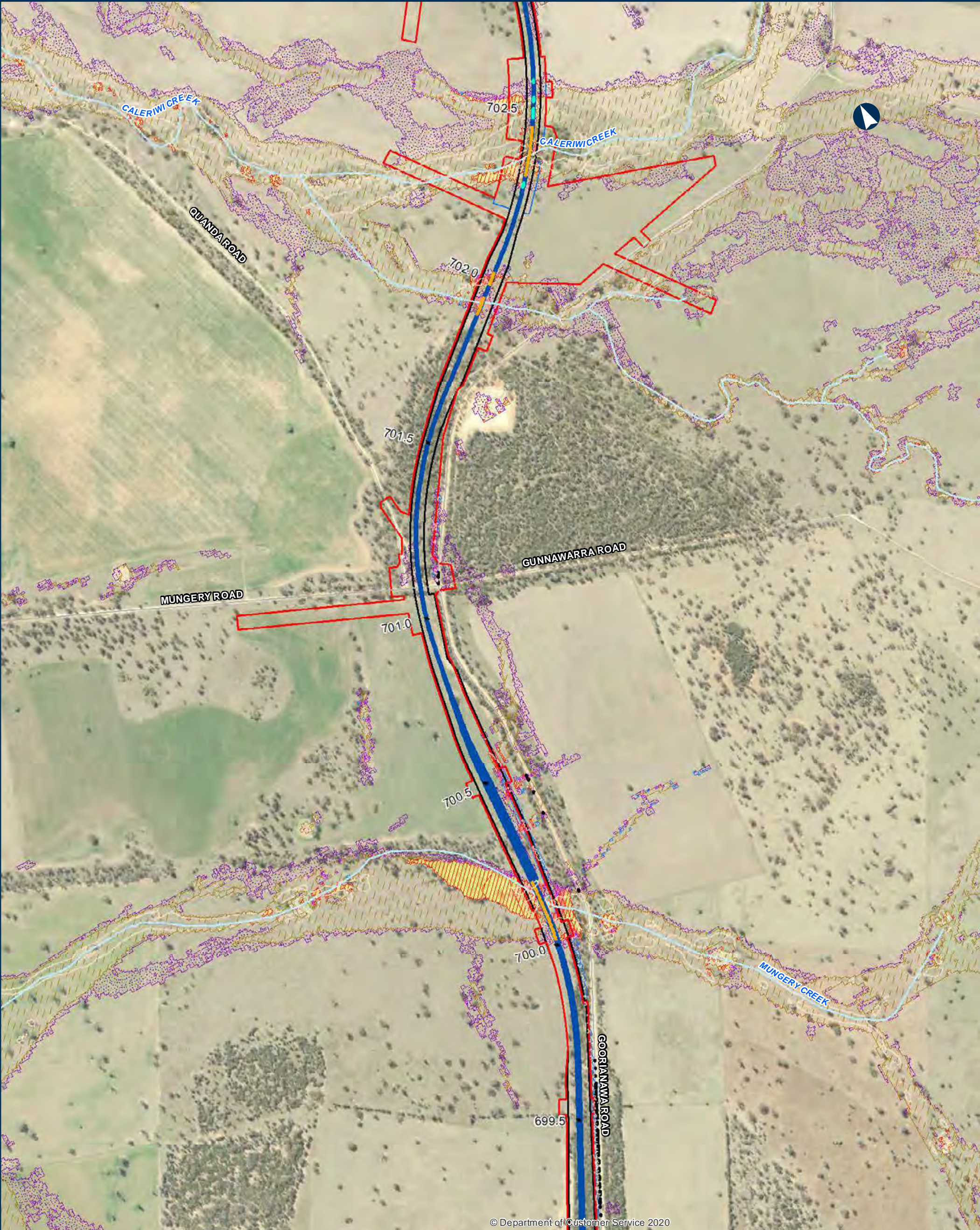
- Culvert
- Road QDL departure
- Alignment
- The proposal
- Drainage Control Area
- Rail Corridor
- Design Velocity Contour (m/s)
  - 1
  - 2
- Design Velocity < 0.5m/s
- Design Velocity > 0.5m/s, Velocity increase limited to 0.025m/s
- <10% Increase
- 10% to 20% increase
- Greater than 20% increase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



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**NARROMINE TO NARRABRI** QDL departures - Scour / Erosion - 2% AEP

Appendix I - Figure 2.3.51

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

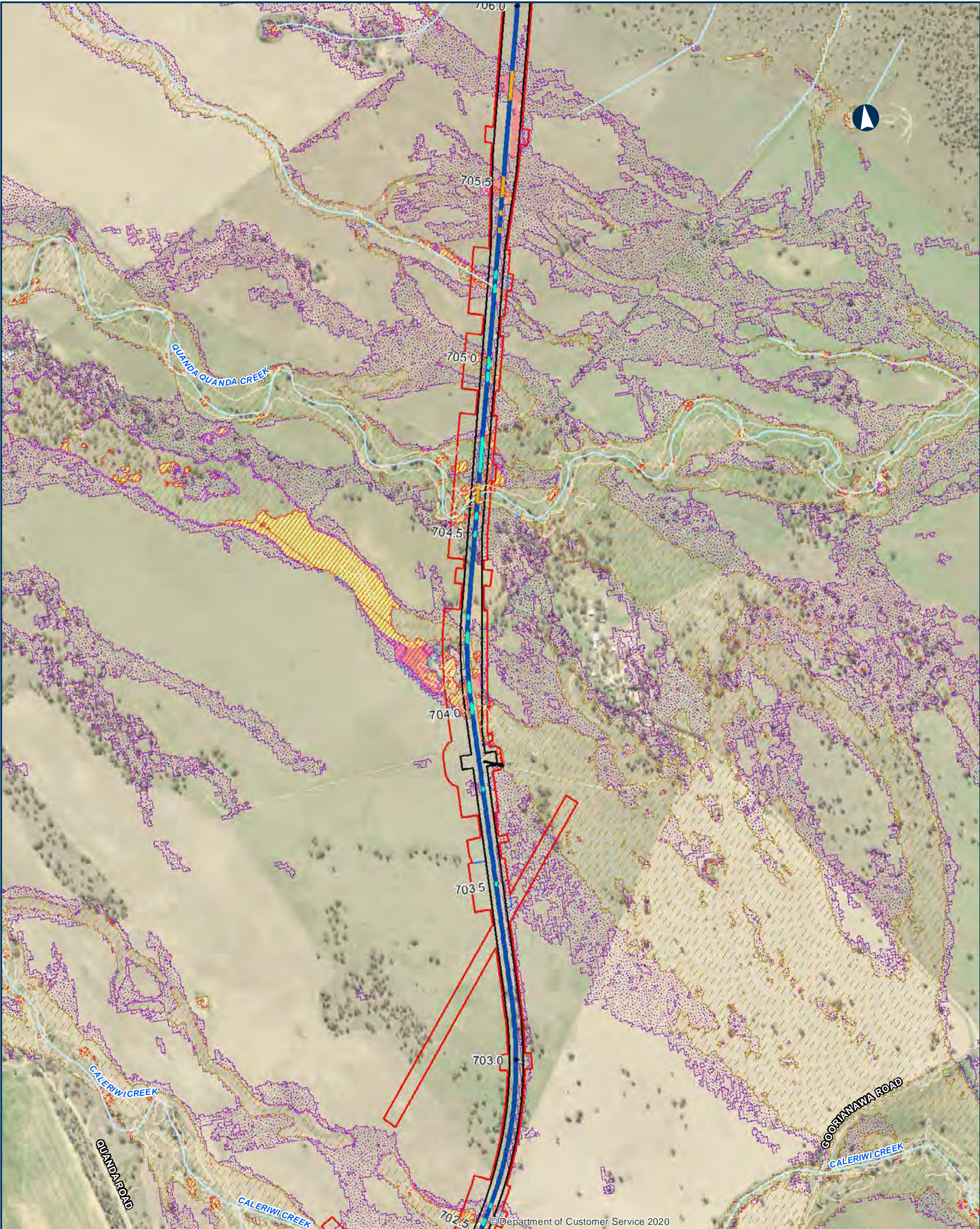
- |                       |   |  |
|-----------------------|---|--|
| Bridge                | Design Velocity Contour (m/s)                                   | Greater than 20% increase  |
| Culvert               | 1   | Unprotected Surfaces   |
| Road ODL departure    | 2   | Existing not flooded, design 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 (ETV), 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 - 2% AEP

Appendix I - Figure 2.3.52

0 200 400 Metres

Coordinate System: GDA 1994 MGA Zone 55

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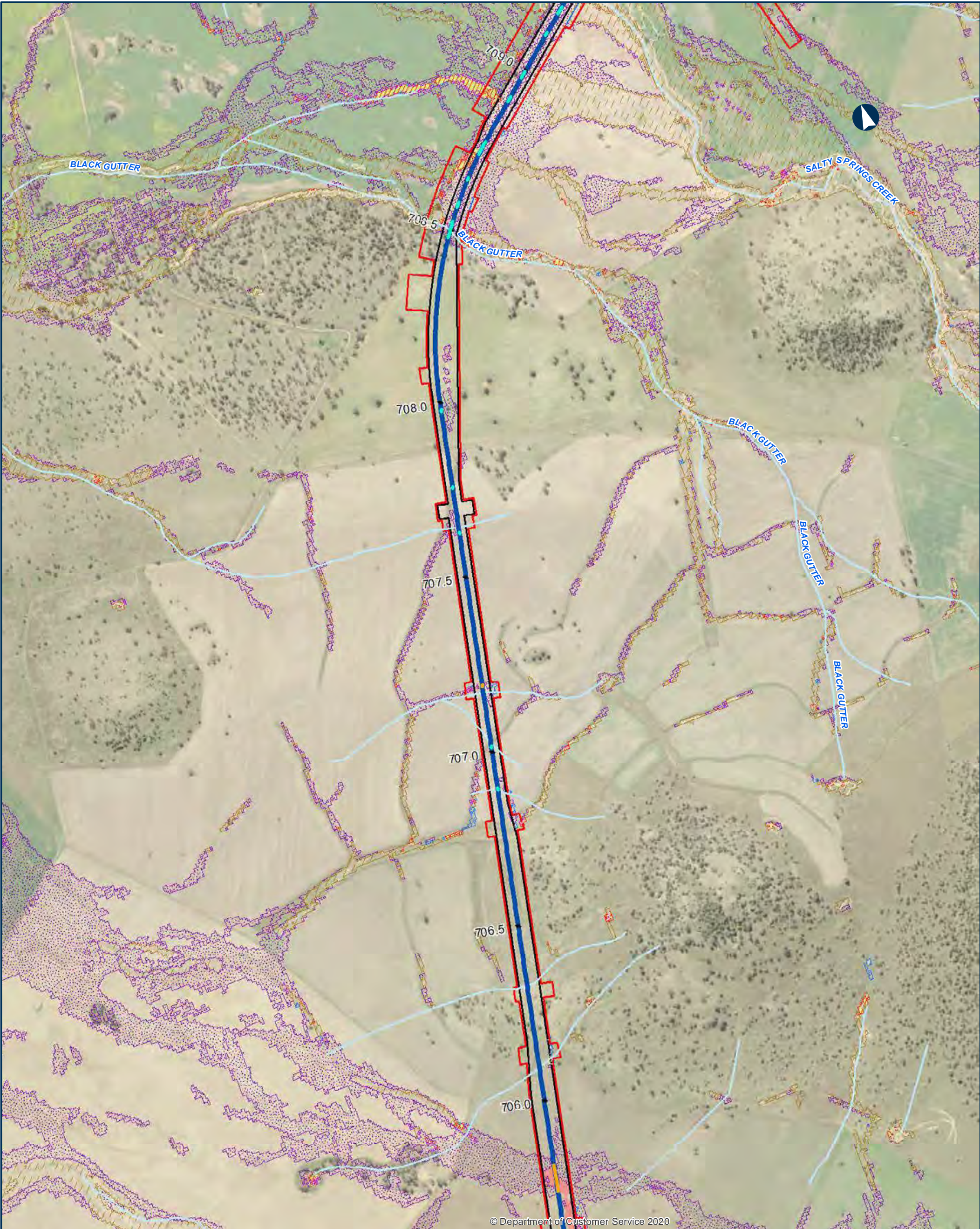
- |                       |   |  |
|-----------------------|---|--|
| Bridge                | Design Velocity Contour (m/s)                                   | Greater than 20% Increase  |
| Culvert               | 1   | Unprotected Surfaces   |
| Road ODL departure    | 2   | Existing not flooded, design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



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**NARROMINE TO NARRABRI** QDL departures - Scour / Erosion - 2% AEP

Appendix I - Figure 2.3.53

0 200 400 Metres

Coordinate System: GDA 1994 MGA Zone 55

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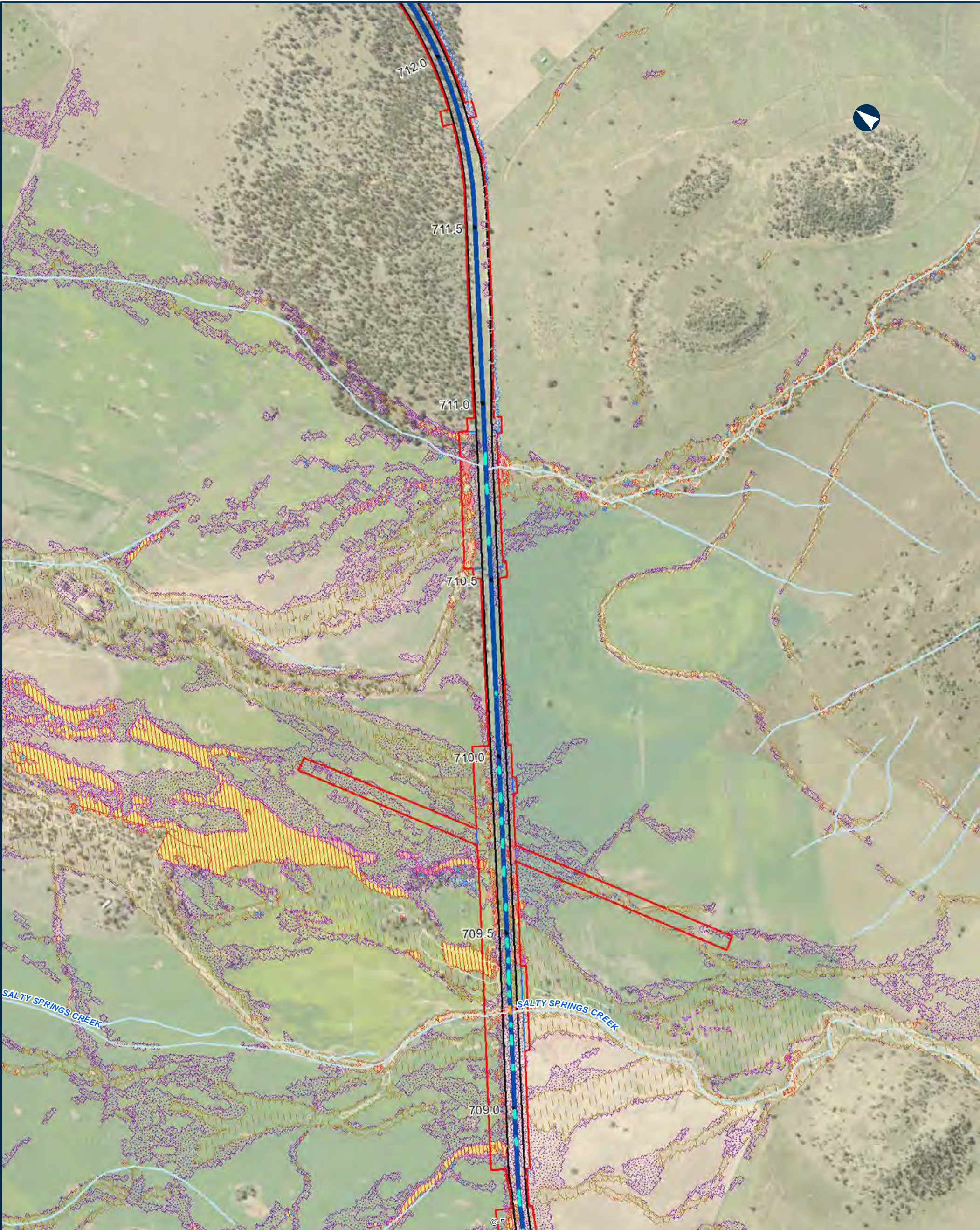
- |                       |   |  |
|-----------------------|---|--|
| Bridge                | Design Velocity Contour (m/s)                                   | Greater than 20% Increase  |
| Culvert               | 1   | Unprotected Surfaces   |
| Road ODL departure    | 2   | Existing not flooded, design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



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NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 2% AEP

Appendix I - Figure 2.3.54

0 200 400 Metres

Coordinate System: GDA 1994 MGA Zone 55

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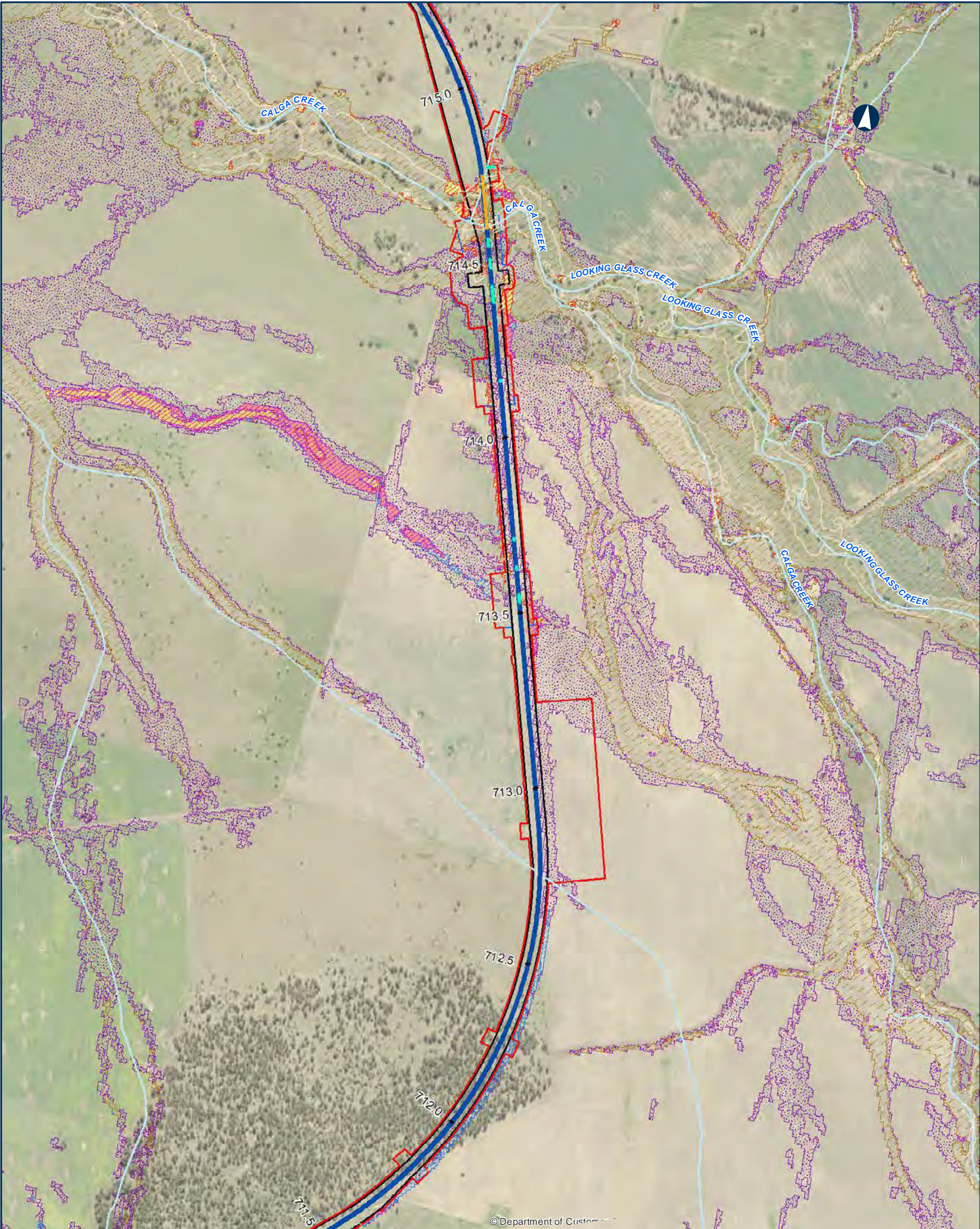
- Bridge
  - Culvert
  - Road ODL departure
  - Alignment
  - The proposal
  - Drainage Control Area
  - Rail Corridor
- Design Velocity Contour (m/s)
- 1
  - 2
  - Design Velocity < 0.5m/s
  - Design Velocity > 0.5m/s, Velocity increase limited to 0.025m/s
  - <10% Increase
  - 10% to 20% increase
-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



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NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 2% AEP

Appendix I - Figure 2.3.55

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

- 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 (ETV), Design Velocity > Existing Velocity + 0.025m/s



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**NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 2% AEP**

Appendix I - Figure 2.3.56

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

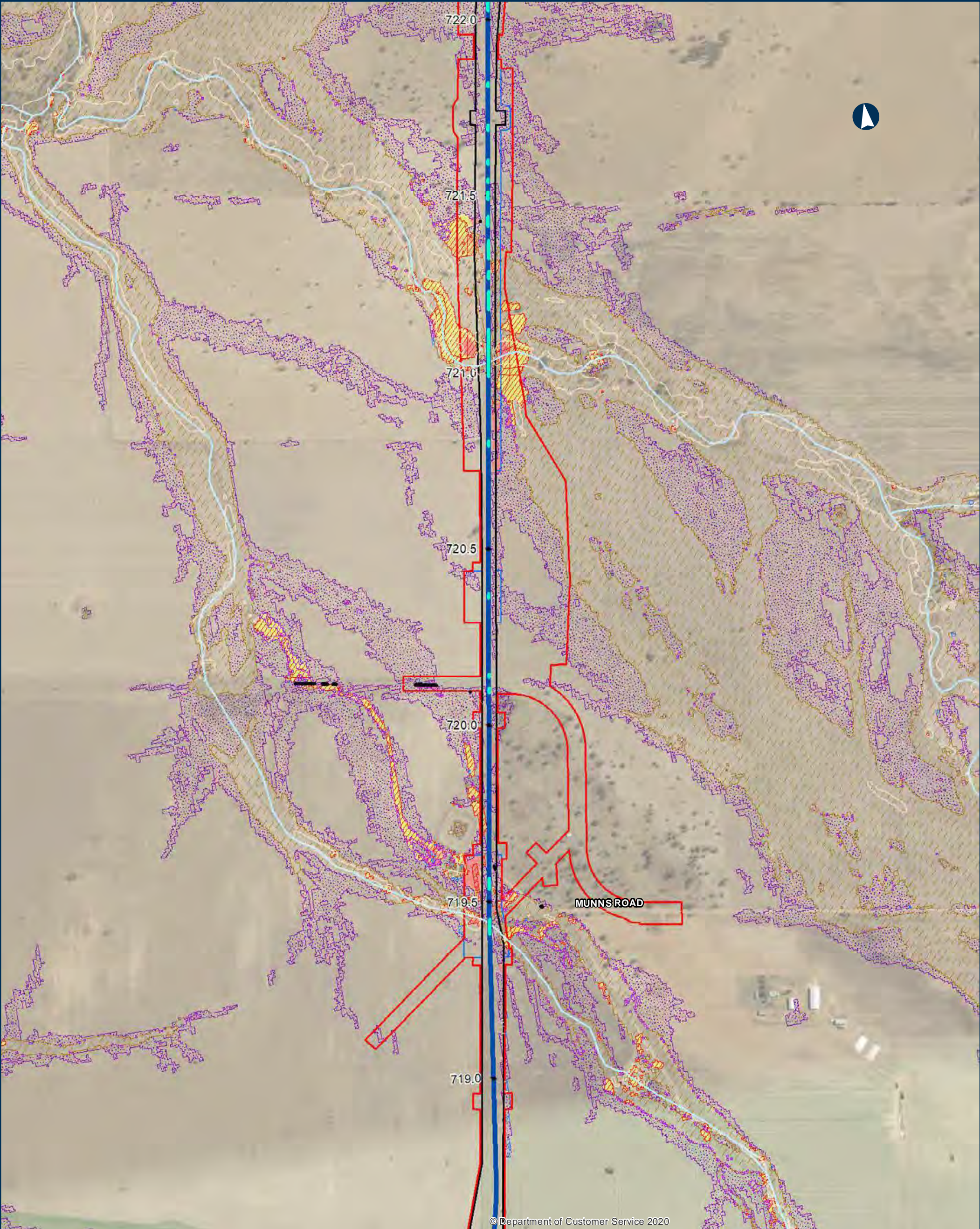
- |                       |   |  |
|-----------------------|---|--|
| Bridge                | Design Velocity Contour (m/s)                                   | Greater than 20% increase  |
| Culvert               | 1   | Unprotected Surfaces   |
| Road ODL departure    | 2   | Existing not flooded, design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



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**NARROMINE TO NARRABRI** QDL departures - Scour / Erosion - 2% AEP

Appendix I - Figure 2.3.57

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

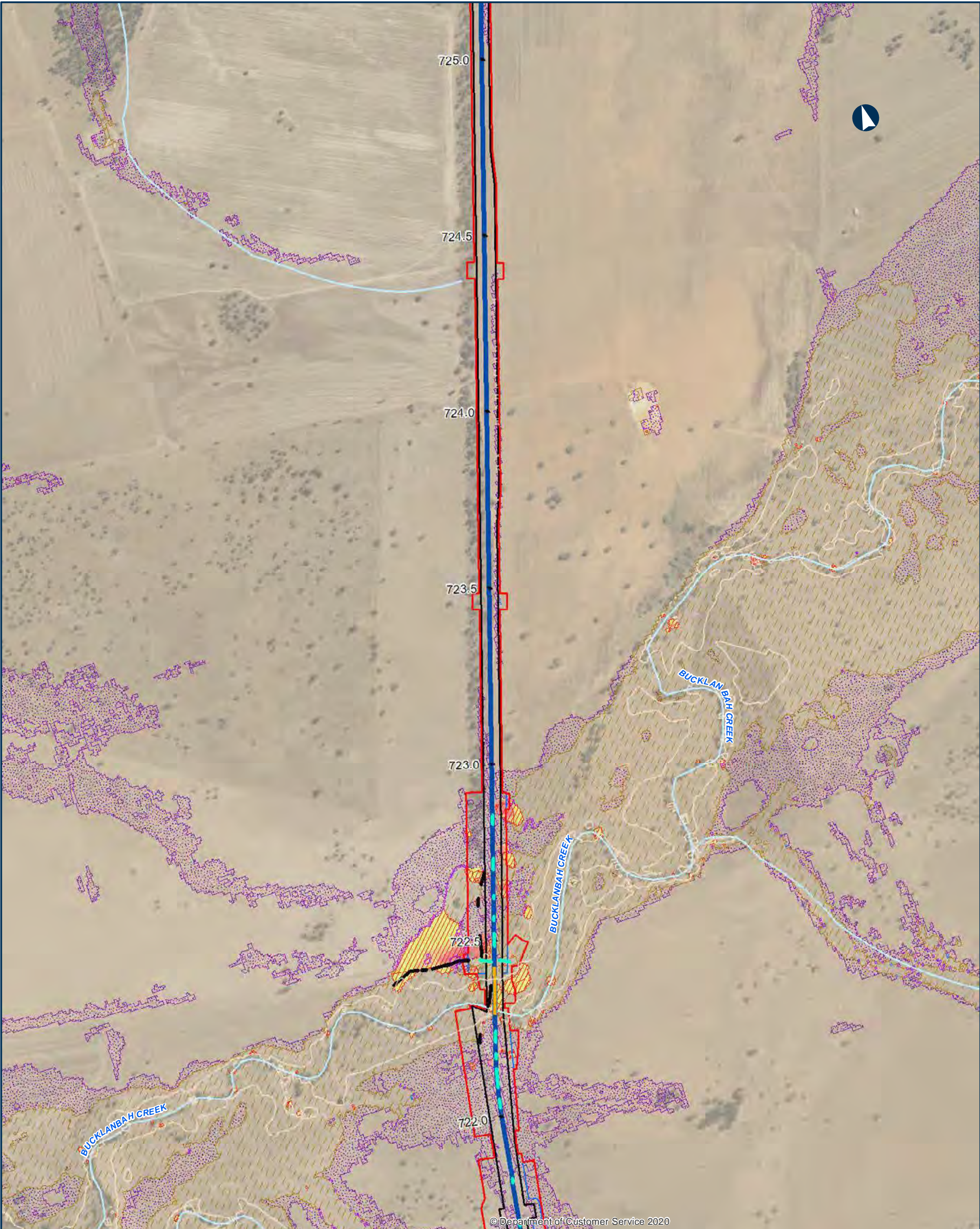
- Culvert
- Road QDL departure
- Alignment
- The proposal
- Drainage Control Area
- Rail Corridor
- Design Velocity Contour (m/s)
  - 1
  - 2
- Design Velocity < 0.5m/s
- Design Velocity > 0.5m/s, Velocity increase limited to 0.025m/s
- <10% Increase
- 10% to 20% increase
- Greater than 20% increase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



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**NARROMINE TO NARRABRI** QDL departures - Scour / Erosion - 2% AEP

Appendix I - Figure 2.3.58

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

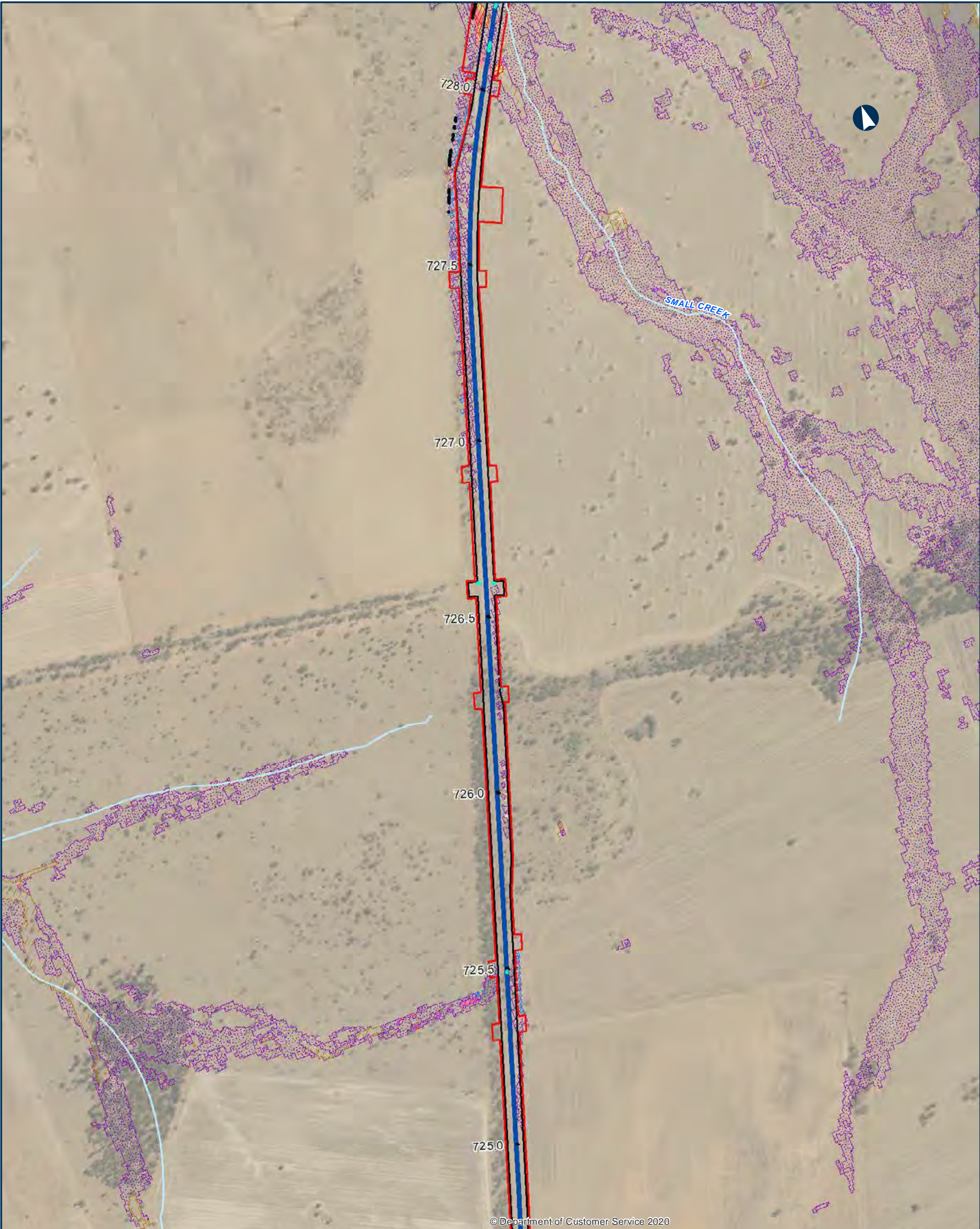
- Bridge
  - Culvert
  - Road ODL departure
  - The proposal
  - Drainage Control Area
  - Rail Corridor
- Design Velocity Contour (m/s)
- 1
  - 2
  - Design Velocity < 0.5m/s
  - Design Velocity > 0.5m/s, Velocity increase limited to 0.025m/s
  - <10% Increase
  - 10% to 20% Increase
- Greater than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



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**NARROMINE TO NARRABRI** QDL departures - Scour / Erosion - 2% AEP

Appendix I - Figure 2.3.59

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

Paper: A3  
Scale: 1:10,000

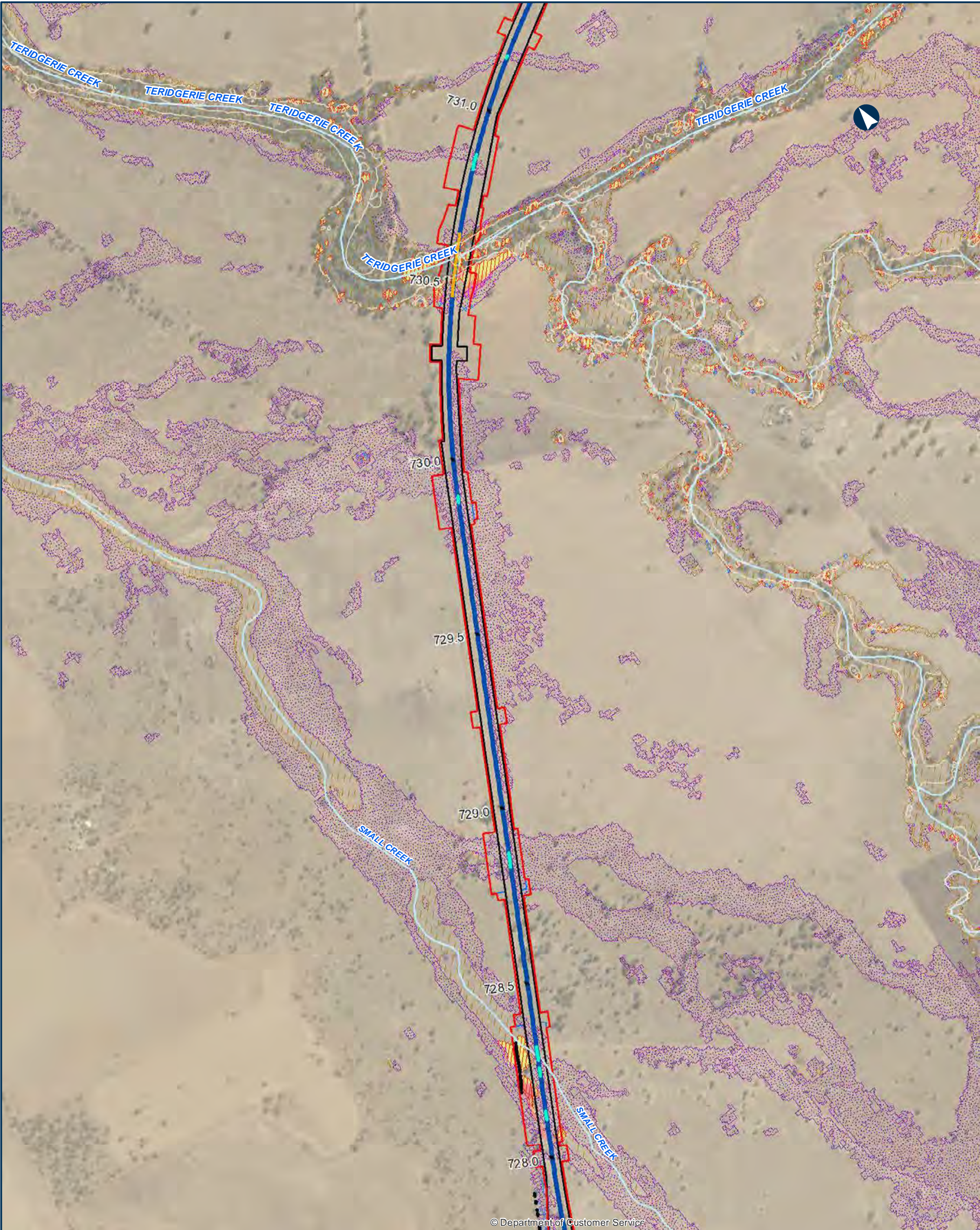
- Culvert
- Road QDL departure
- Alignment
- The proposal
- Drainage Control Area
- Rail Corridor
- Design Velocity Contour (m/s)
  - 1
  - 2
- Design Velocity < 0.5m/s
- Design Velocity > 0.5m/s, Velocity increase limited to 0.025m/s
- <10% Increase
- 10% to 20% increase
- Greater than 20% increase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



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**NARROMINE TO NARRABRI** QDL departures - Scour / Erosion - 2% AEP

Appendix I - Figure 2.3.60

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

- |                       |   |  |
|-----------------------|---|--|
| Bridge                | 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 (ETV), 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 - 2% AEP

Appendix I - Figure 2.3.61

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

Design Velocity Contour (m/s)

1

2

Design Velocity < 0.5m/s

Culvert

Road QDL departure

Alignment

The proposal

Drainage Control Area

Rail Corridor

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 (ETV), Design Velocity > Existing Velocity + 0.025m/s

NARRABRI

COONAMBLE

BARADINE

GILGANDRA

NARROMINE

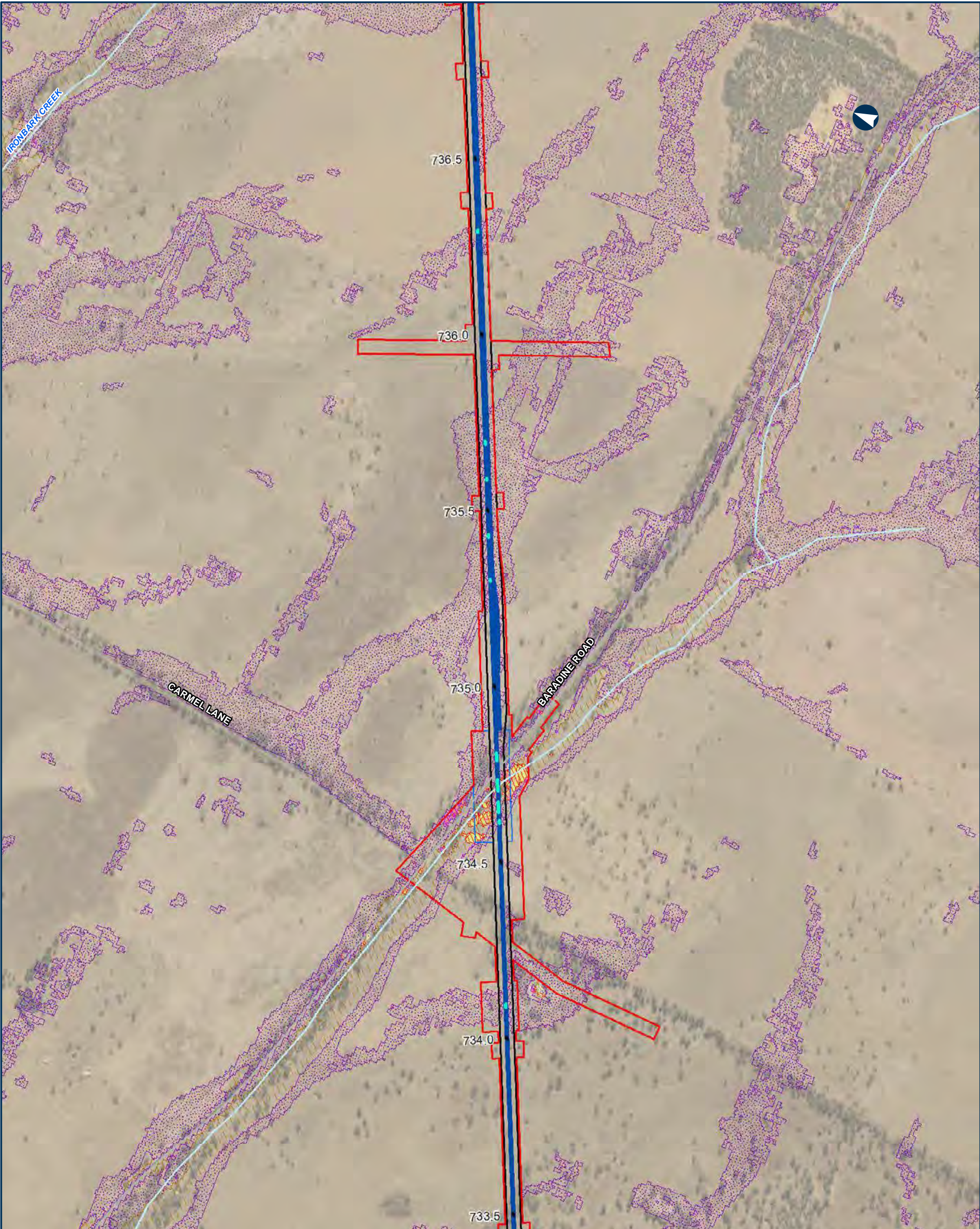
DUBBO

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NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 2% AEP

Appendix I - Figure 2.3.62

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

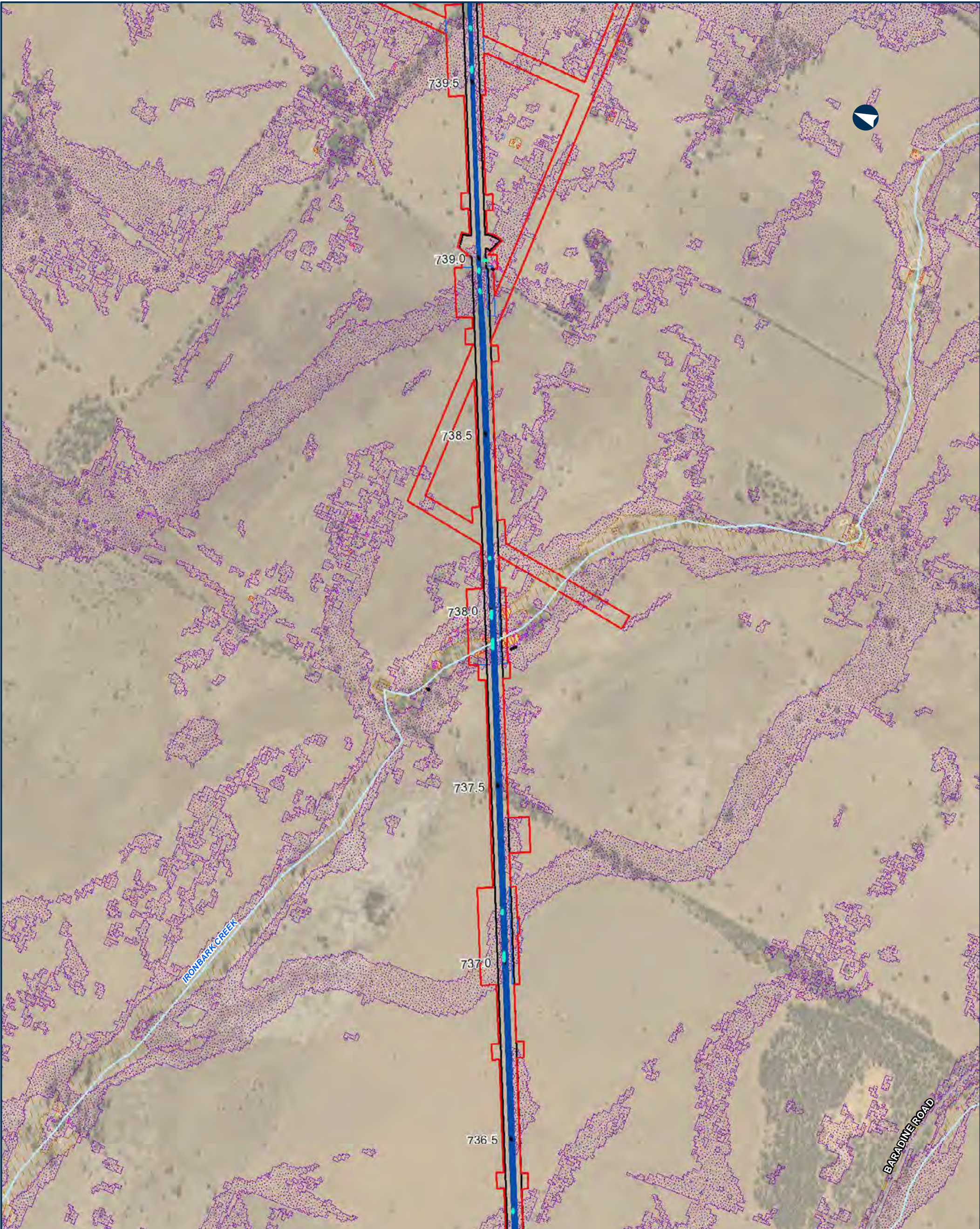
Existing velocity < 0.5m/s, design velocity > 0.5m/s

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

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NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 2% AEP

Appendix I - Figure 2.3.63

0 200 400 Metres

Coordinate System: GDA 1994 MGA Zone 55

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Paper: A3  
Scale: 1:10,000

- 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 (ETV), Design Velocity > Existing Velocity + 0.025m/s



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NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 2% AEP

Appendix I - Figure 2.3.64

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

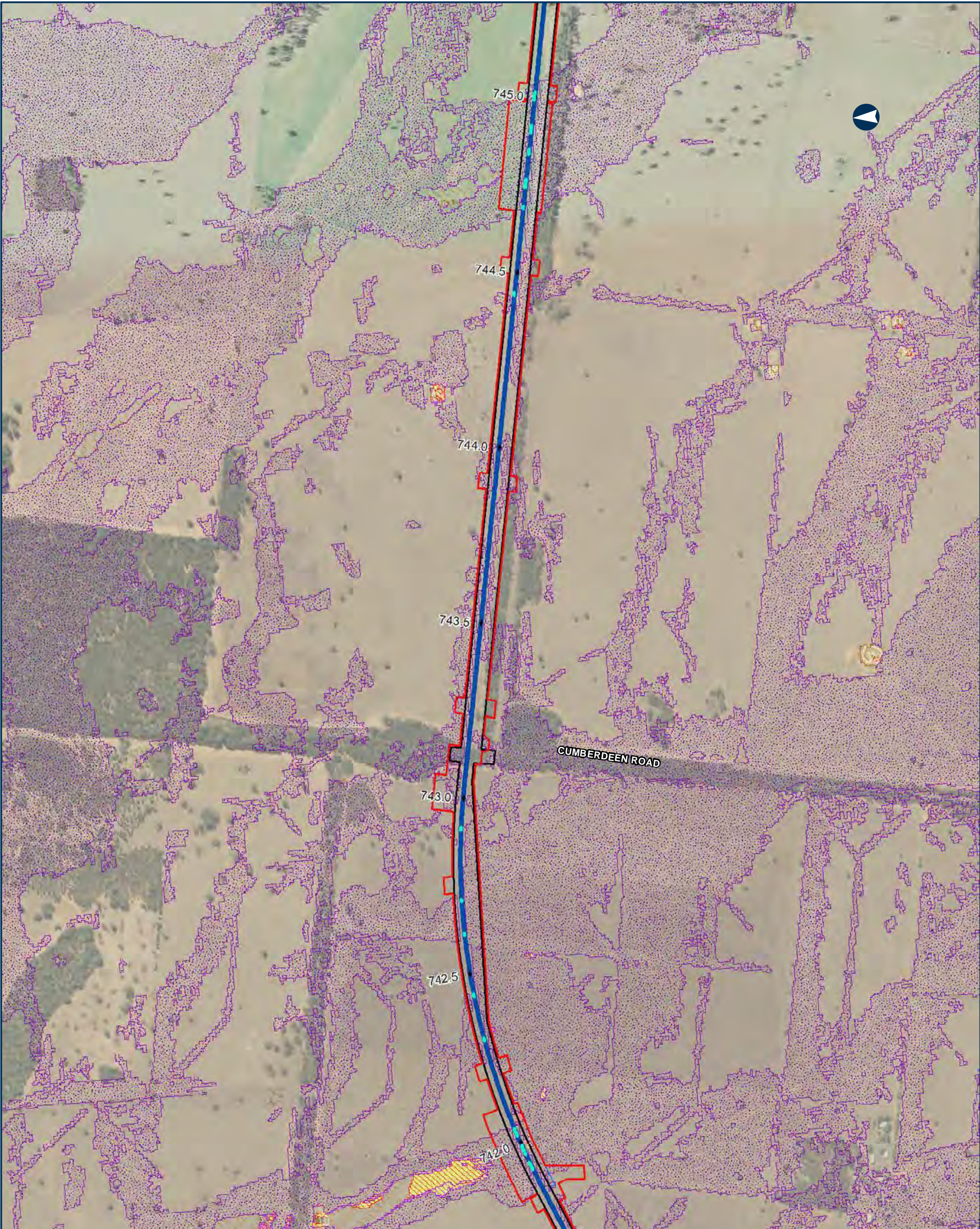
- Culvert
- Road QDL departure
- Alignment
- The proposal
- Drainage Control Area
- Rail Corridor
- Design Velocity Contour (m/s)
  - 1
  - Design Velocity < 0.5m/s
- Design Velocity > 0.5m/s, Velocity increase limited to 0.025m/s
- <10% Increase
- 10% to 20% increase
- Greater than 20% increase
- Unprotected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



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NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 2% AEP

Appendix I - Figure 2.3.65

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

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

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NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 2% AEP

Appendix I - Figure 2.3.66

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, 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 (ETV), Design Velocity > Existing Velocity + 0.025m/s



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NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 2% AEP

Appendix I - Figure 2.3.67

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

- 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

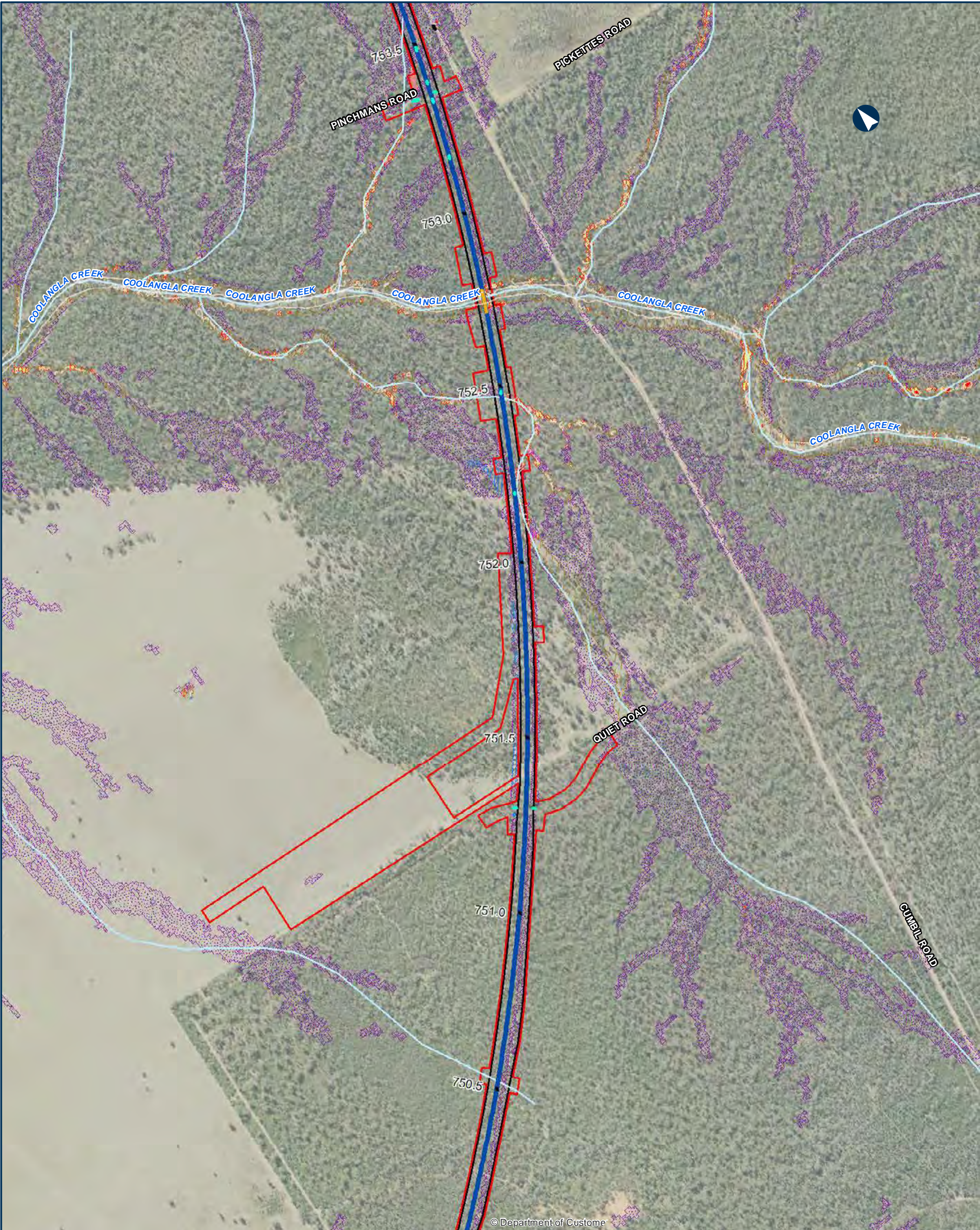
- Existing velocity >1m/s, velocity change > 20%
- Unprotected Surfaces
  - Existing not flooded, design velocity > 0.5m/s
  - Existing velocity < 0.5m/s, design velocity > 0.5m/s
  - Existing velocity > 0.5m/s (ETV), Design Velocity > Existing Velocity + 0.025m/s



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**NARROMINE TO NARRABRI** QDL departures - Scour / Erosion - 2% AEP

Appendix I - Figure 2.3.68

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 >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 (ETV), Design Velocity > Existing Velocity + 0.025m/s



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NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 2% AEP

Appendix I - Figure 2.3.69

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 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 (ETV), Design Velocity > Existing Velocity + 0.025m/s

NARRABRI

COONAMBLE

BARADINE

GILGANDRA

NARROMINE

DUBBO

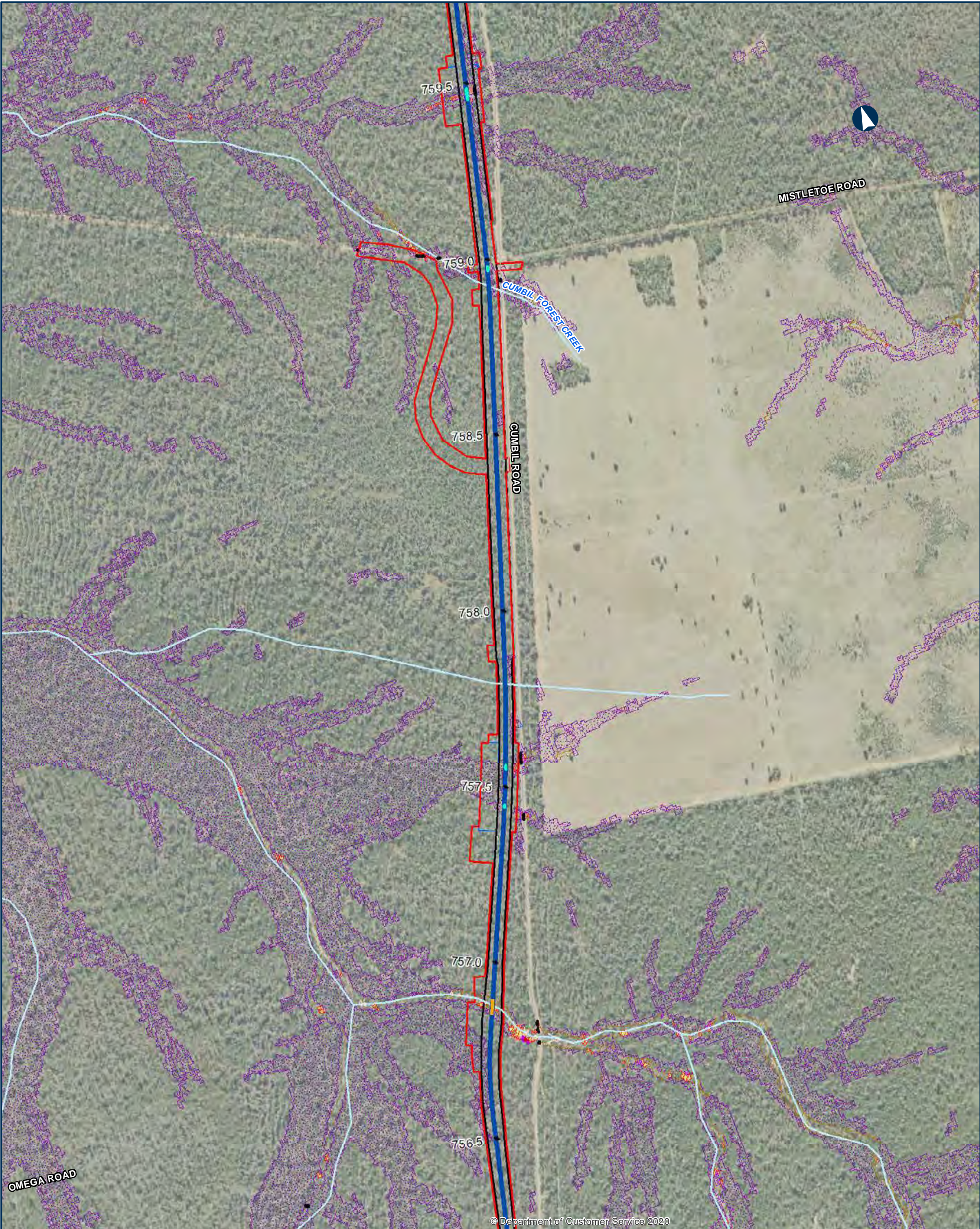
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**NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 2% AEP**

Appendix I - Figure 2.3.70

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

- Bridge
- Culvert
- Road QDL departure
- 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 (ETV), Design Velocity > Existing Velocity + 0.025m/s



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NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 2% AEP

Appendix I - Figure 2.3.71

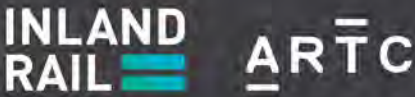
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Coordinate System: GDA 1994 MGA Zone 55

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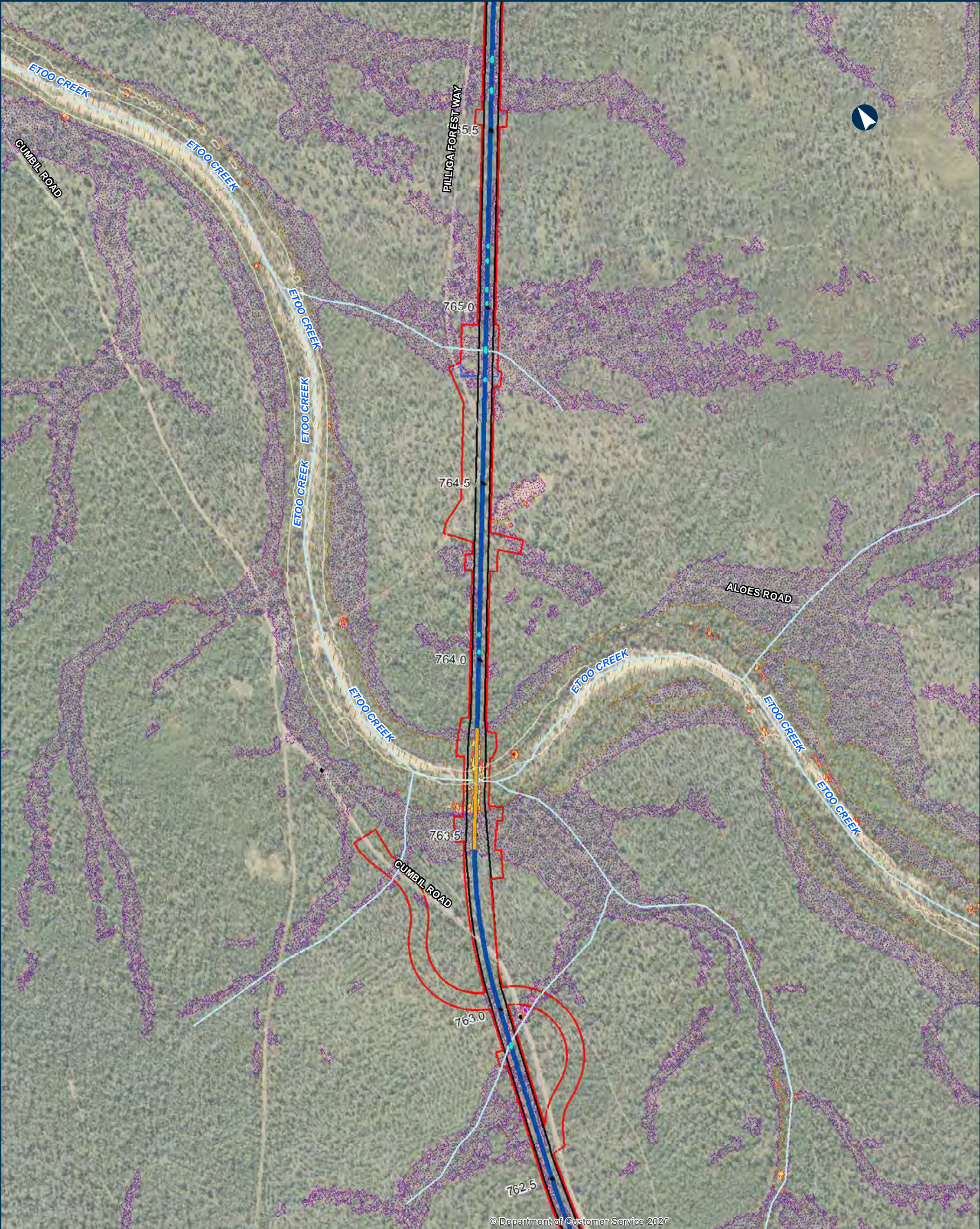
Date: 9/08/2022 Paper: A3  
Author: JacobsGHD Scale: 1:10,000  
Data Sources: Basemap layers: NSWSS; all other layers: JacobsGHD

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



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**NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 2% AEP**

Appendix I - Figure 2.3.72

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
- 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 (ETV), Design Velocity > Existing Velocity + 0.025m/s



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**NARROMINE TO NARRABRI** QDL departures - Scour / Erosion - 2% AEP

Appendix I - Figure 2.3.73

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

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



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NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 2% AEP

Appendix I - Figure 2.3.74

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

Paper: A3  
Scale: 1:10,000

- 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

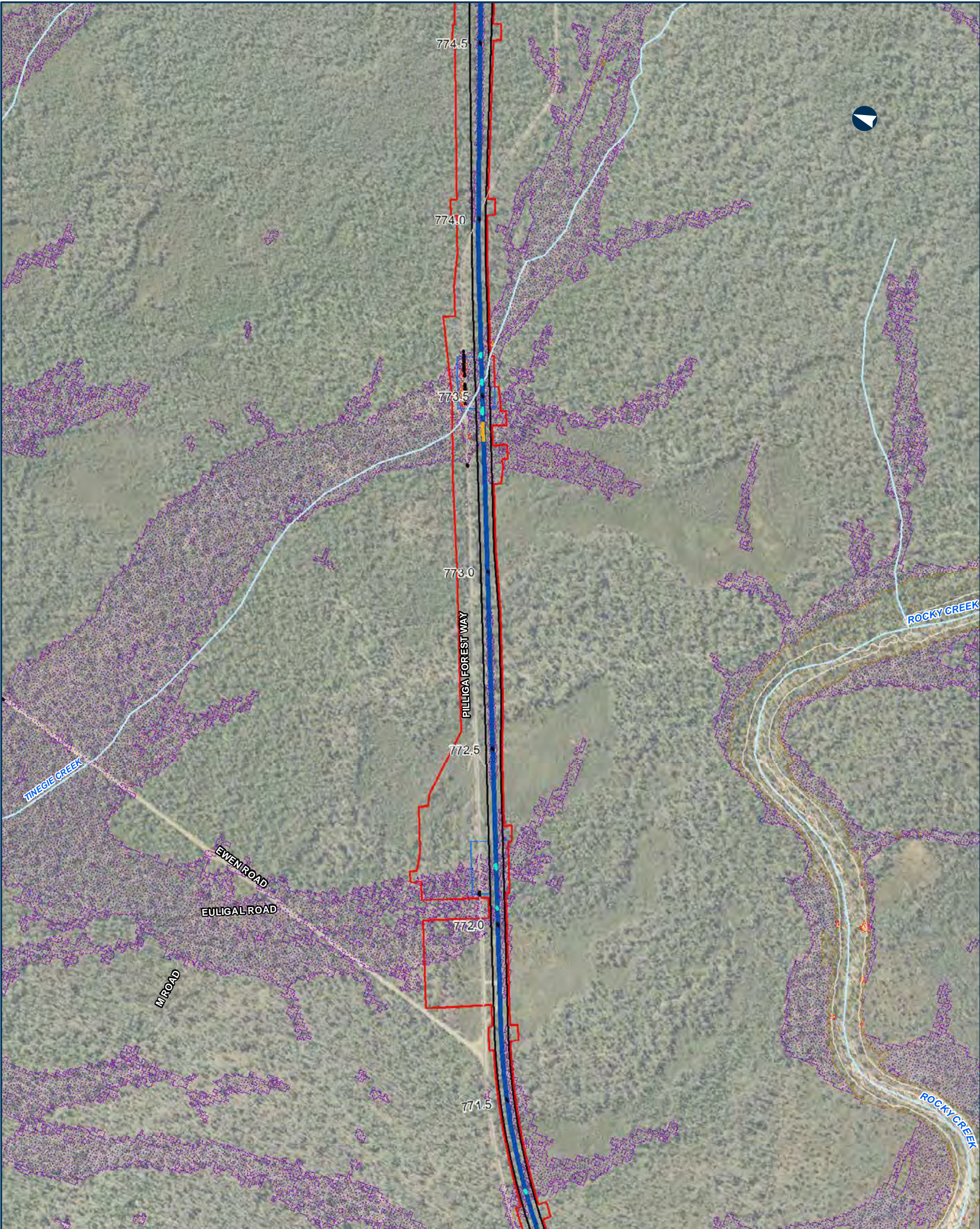
- <10% Increase
- 10% to 20% increase
- Greater than 20% increase
- Protected Surfaces
- Existing velocity <1m/s, design velocity > 1.2m/s
- Existing velocity >1m/s, velocity change > 20%
- Existing velocity > 0.5m/s (ETV), Design Velocity > Existing Velocity + 0.025m/s



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NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 2% AEP

Appendix I - Figure 2.3.75

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

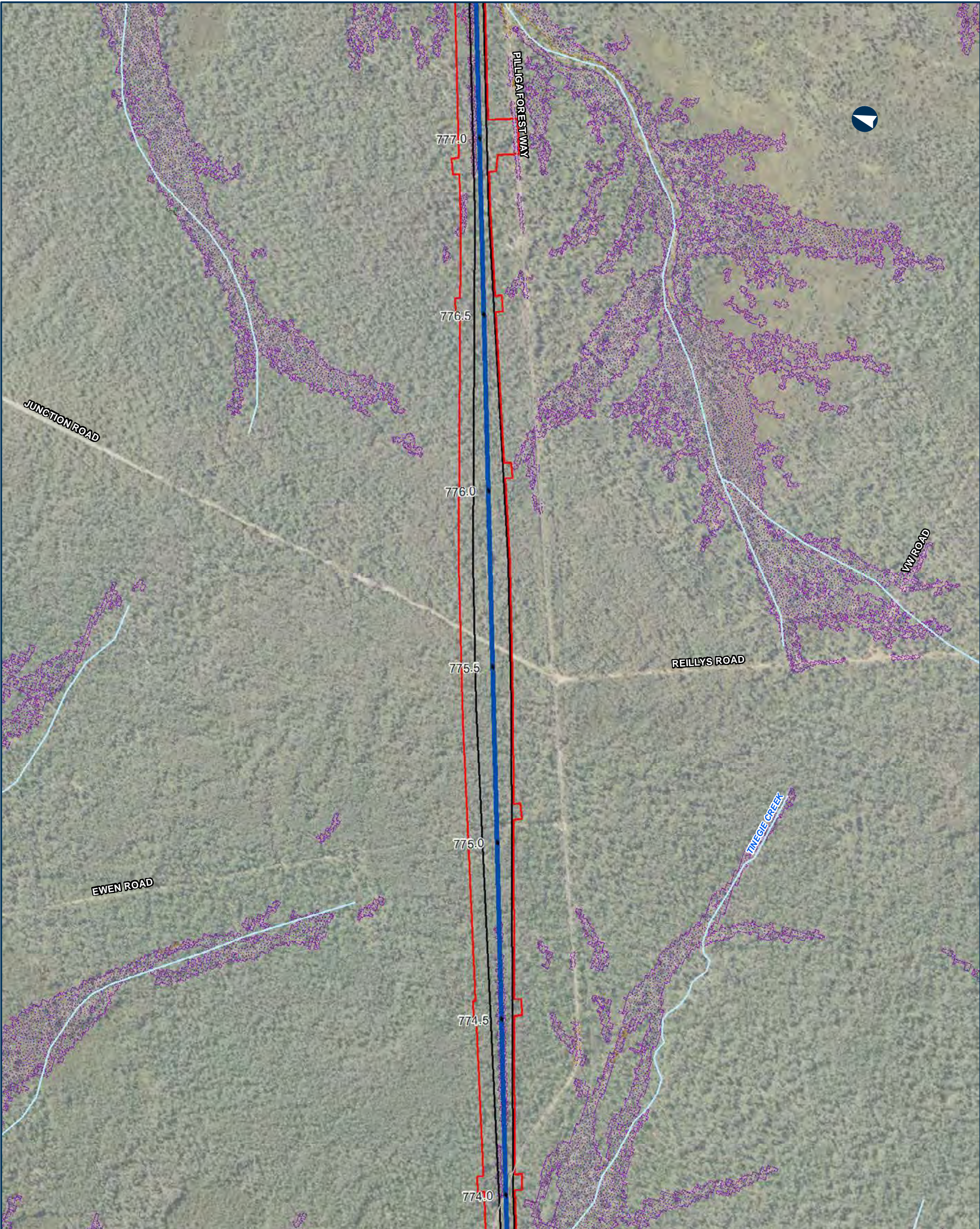
Existing velocity > 0.5m/s (ETV), Design Velocity > Existing Velocity + 0.025m/s

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NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 2% AEP

Appendix I - Figure 2.3.76

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

Road QDL 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

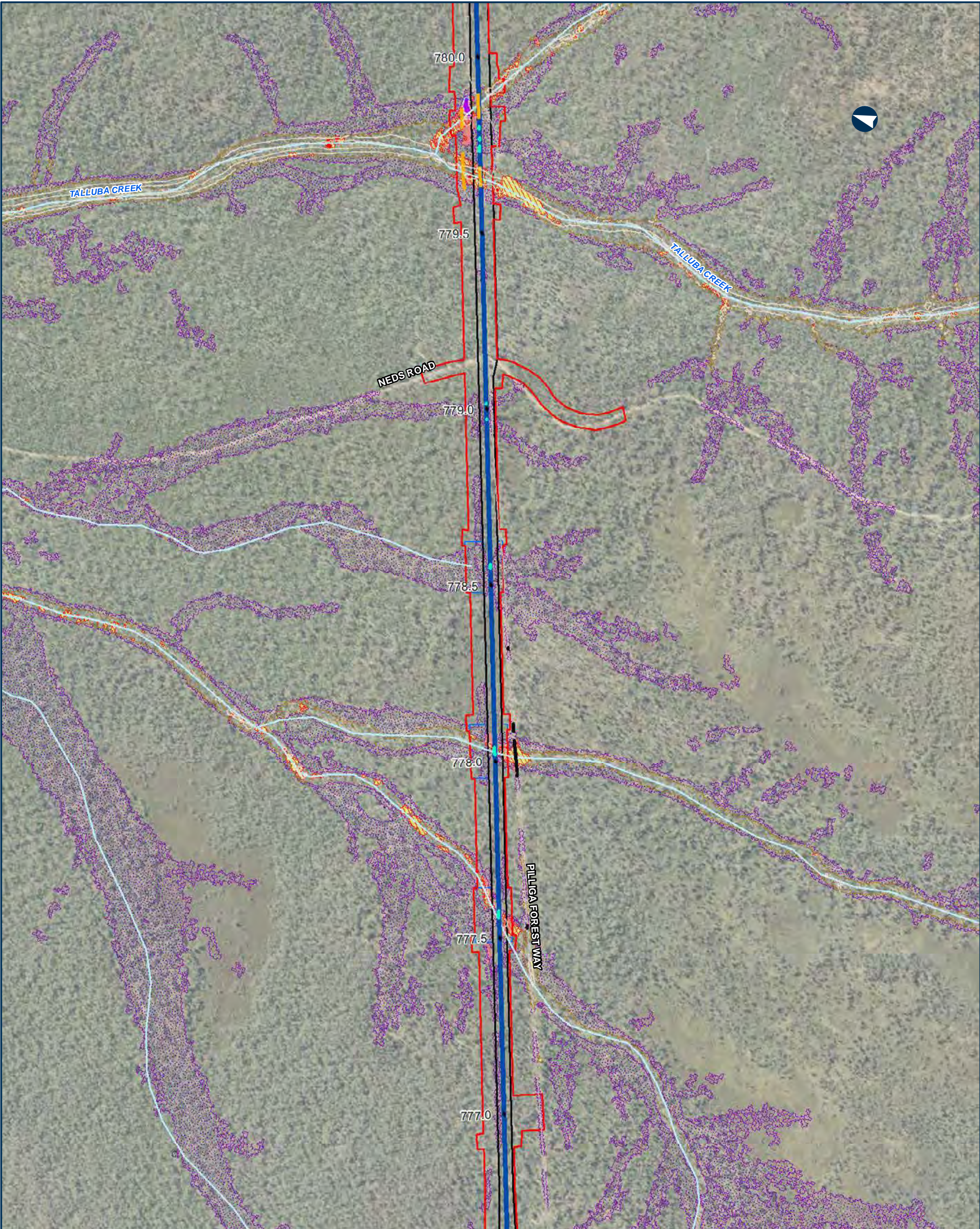
Greater than 20% increase



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NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 2% AEP

Appendix I - Figure 2.3.77

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

- 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

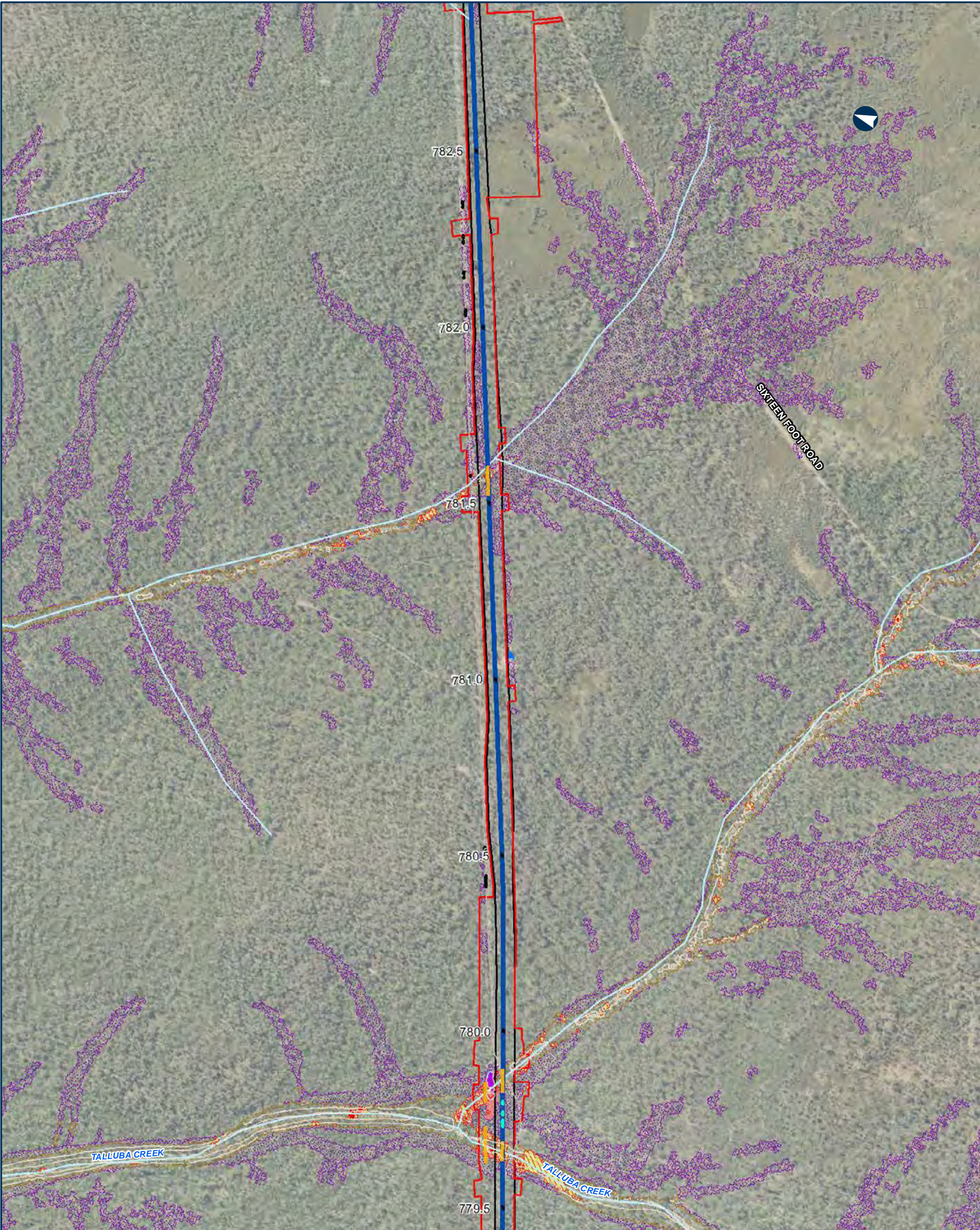
- <10% Increase
- 10% to 20% increase
- Greater than 20% increase
- Protected Surfaces
  - Existing not flooded, design velocity > 1.2m/s
  - Existing velocity < 1m/s, design velocity > 1.2m/s
  - Existing velocity > 1m/s, velocity change > 20%
  - Existing velocity > 0.5m/s (ETV), Design Velocity > Existing Velocity + 0.025m/s



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NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 2% AEP

Appendix I - Figure 2.3.78

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

- 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

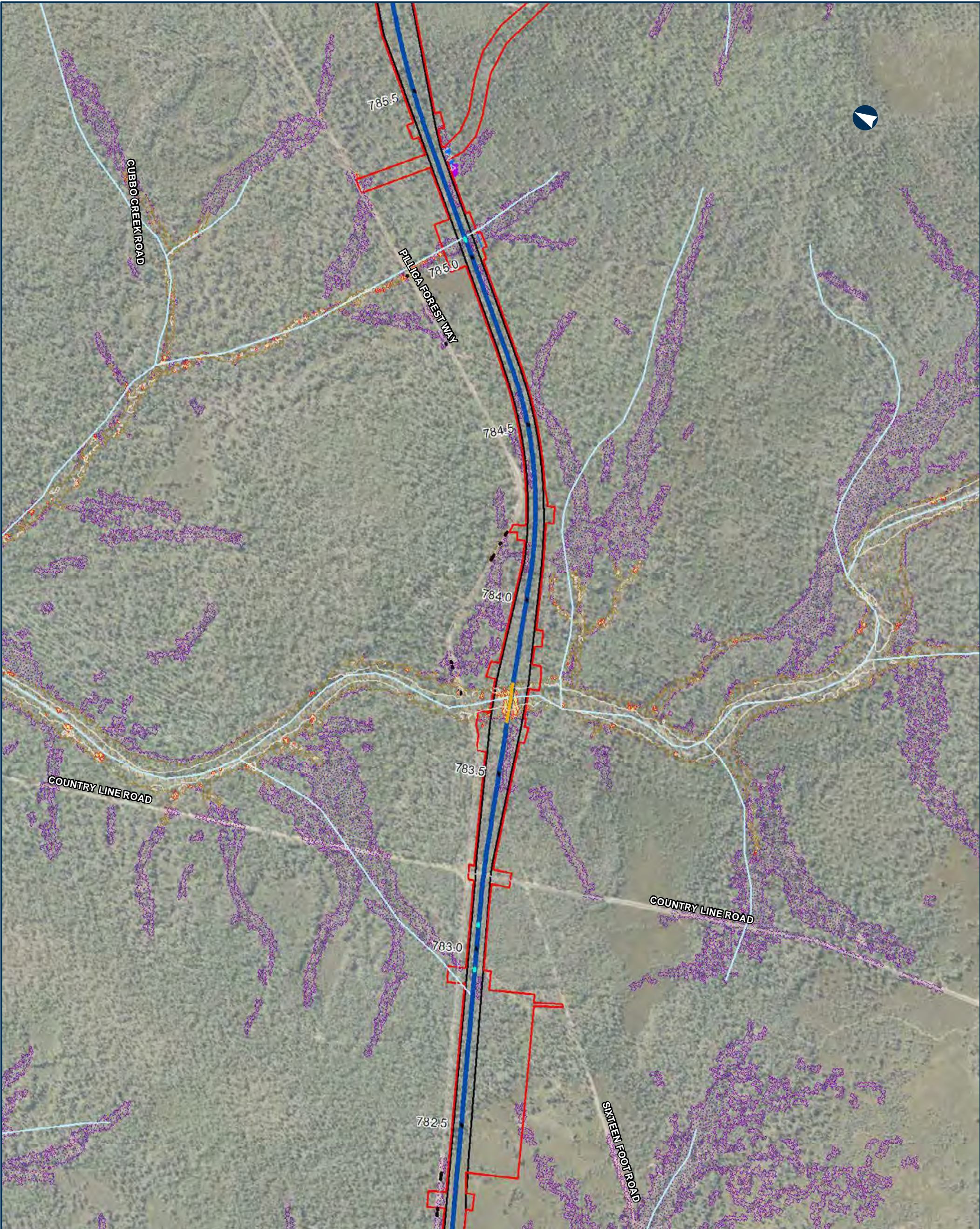
- Protected Surfaces
- Existing not flooded, design velocity > 1.2m/s
  - Existing velocity <1m/s, design velocity > 1.2m/s
  - Existing velocity >1m/s, velocity change > 20%
  - Existing velocity > 0.5m/s (ETV), Design Velocity > Existing Velocity + 0.025m/s



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NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 2% AEP

Appendix I - Figure 2.3.79

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

- Bridge

Culvert

Road ODL departure

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

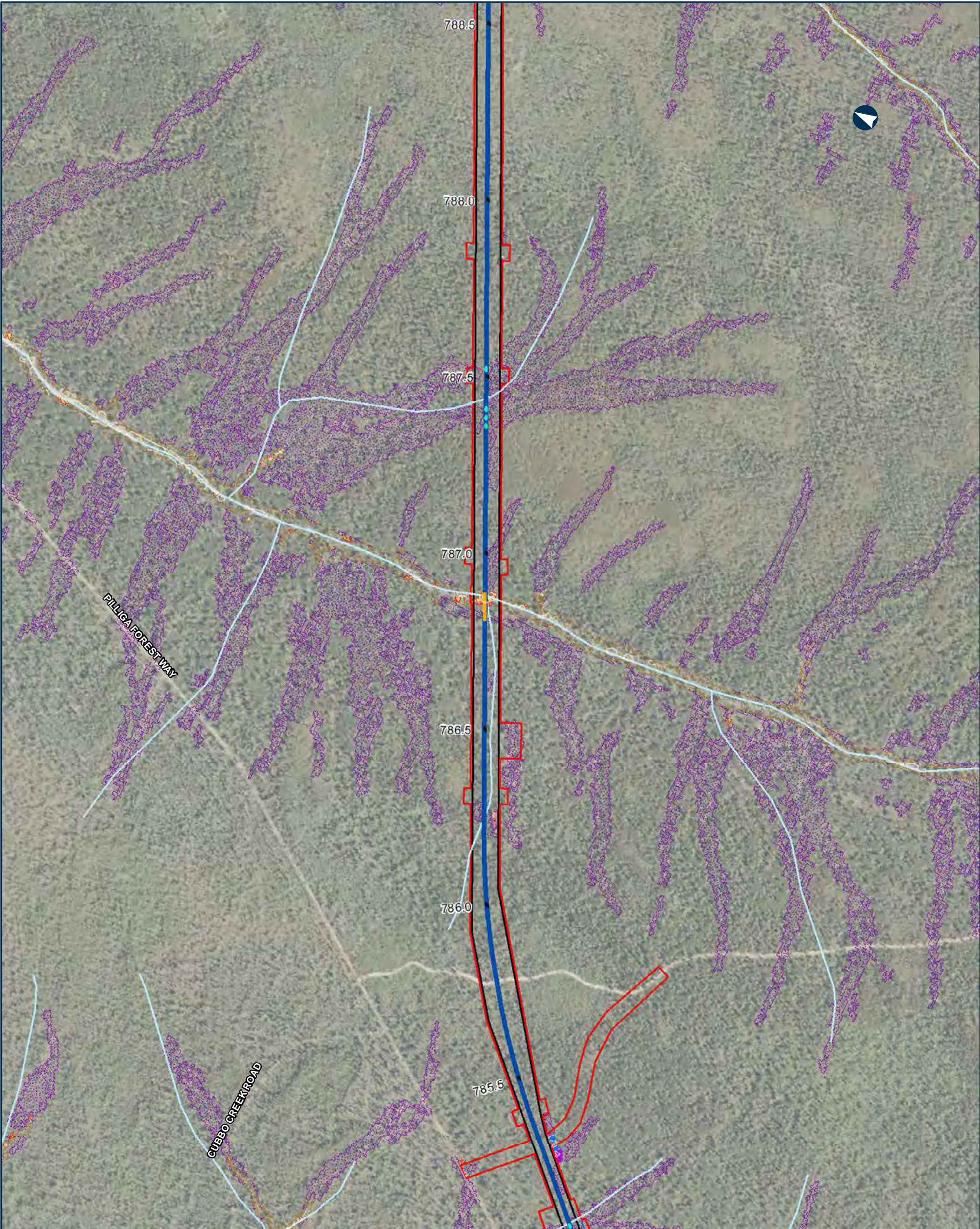
Existing velocity > 0.5m/s (ETV), Design Velocity > Existing Velocity + 0.025m/s



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NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 2% AEP

Appendix I - Figure 2.3.80

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

Culvert

Road ODL departure

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

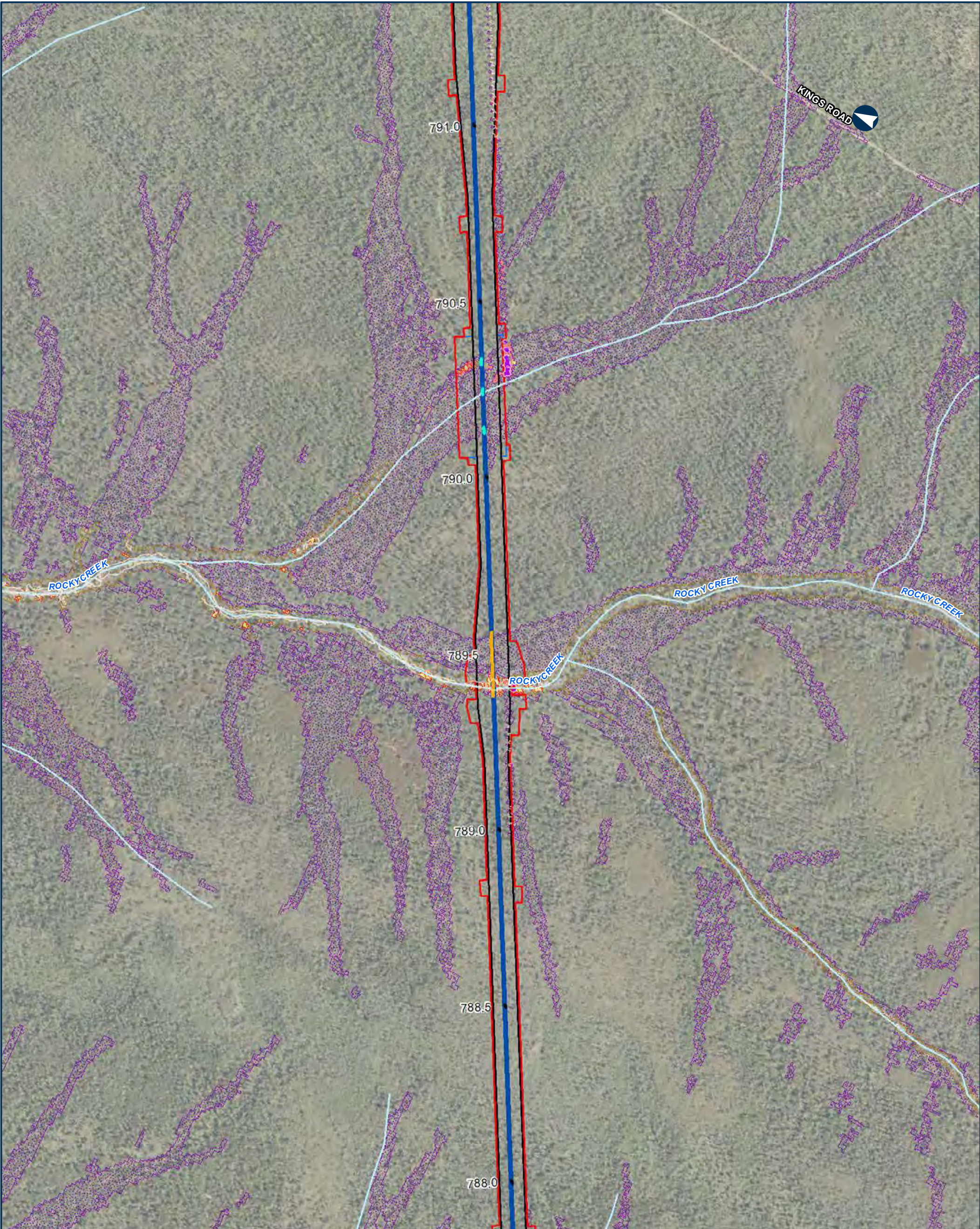
Existing velocity > 0.5m/s (ETV), Design Velocity > Existing Velocity + 0.025m/s



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NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 2% AEP

Appendix I - Figure 2.3.81

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

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



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NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 2% AEP

Appendix I - Figure 2.3.82

0 200 400 Metres

Coordinate System: GDA 1994 MGA Zone 55

ARTC makes no representation or warranty and assumes no duty of care or other responsibility to any party as to the completeness, accuracy or suitability of the information contained in this GIS map. The GIS map has been prepared from material provided to ARTC by an external source and ARTC has not taken any steps to verify the completeness, accuracy or suitability of that material. ARTC will not be responsible for any loss or damage suffered as a result of any person whatsoever placing reliance upon the information contained within this GIS map.

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

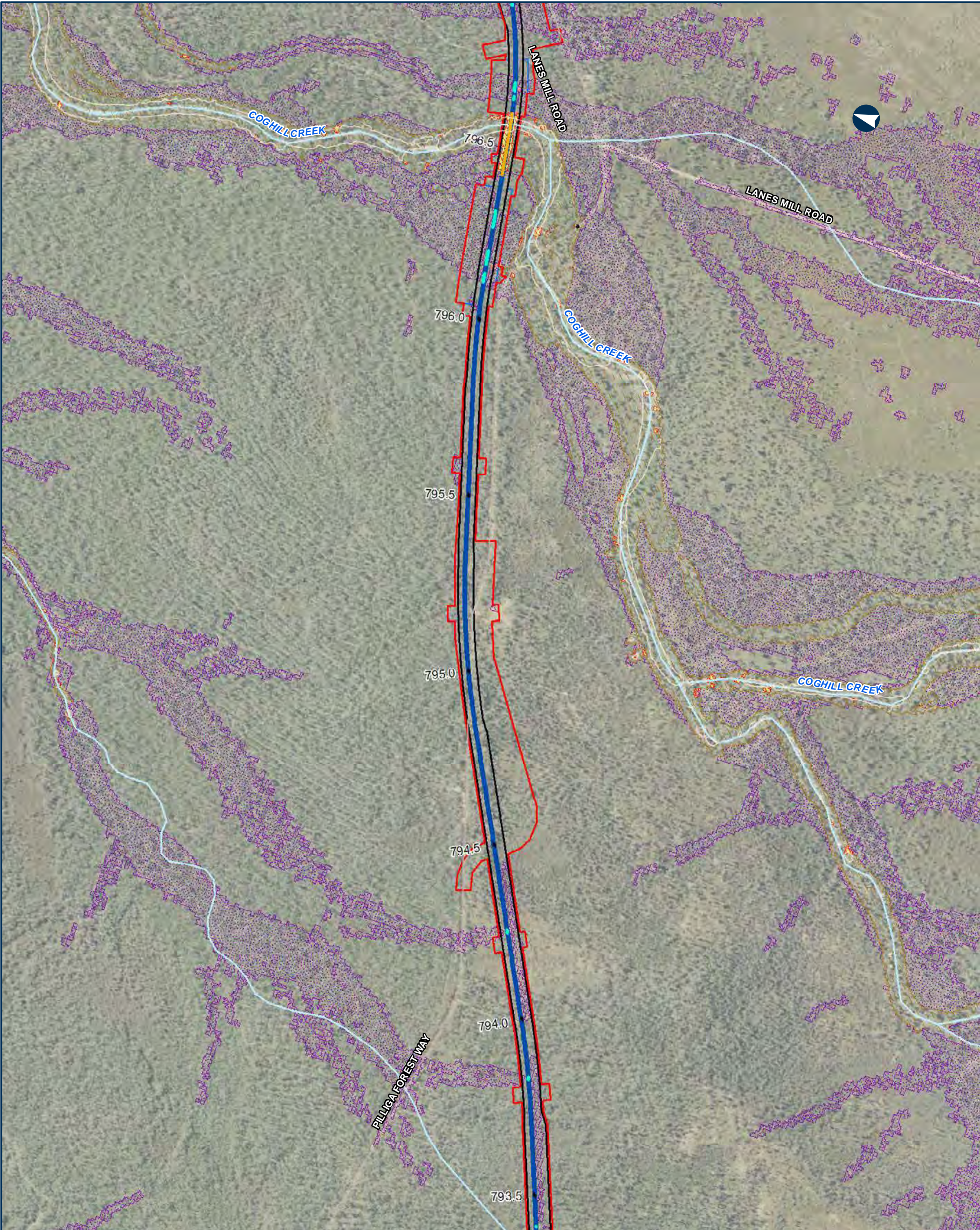
- Culvert
- Road QDL departure
- Alignment
- The proposal
- Rail Corridor
- Design Velocity Contour (m/s)
  - 1
  - 2
  - Design Velocity < 0.5m/s
- Design Velocity > 0.5m/s, Velocity increase limited to 0.025m/s
- <10% Increase
- 10% to 20% increase
- Greater than 20% increase
- Protected Surfaces
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



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NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 2% AEP

Appendix I - Figure 2.3.83

0200400

Metres

Coordinate System: GDA 1994 MGA Zone 55

ARTC makes no representation or warranty and assumes no duty of care or other responsibility to any party as to the completeness, accuracy or suitability of the information contained in this GIS map. The GIS map has been prepared from material provided to ARTC by an external source and ARTC has not taken any steps to verify the completeness, accuracy or suitability of that material. ARTC will not be responsible for any loss or damage suffered as a result of any person whatsoever placing reliance upon the information contained within this GIS map.

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

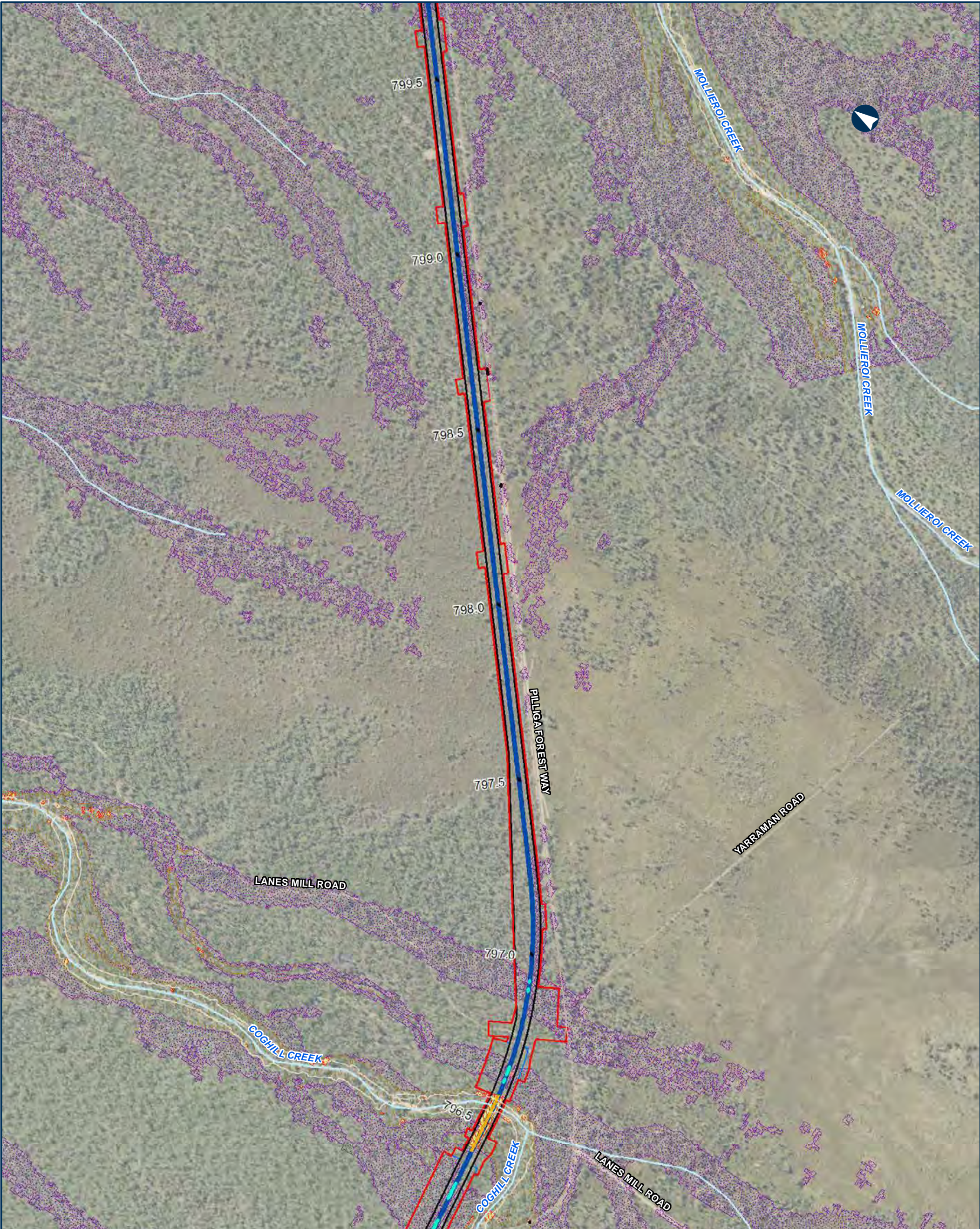
Existing velocity > 0.5m/s (ETV), Design Velocity > Existing Velocity + 0.025m/s

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NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 2% AEP

Appendix I - Figure 2.3.84

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

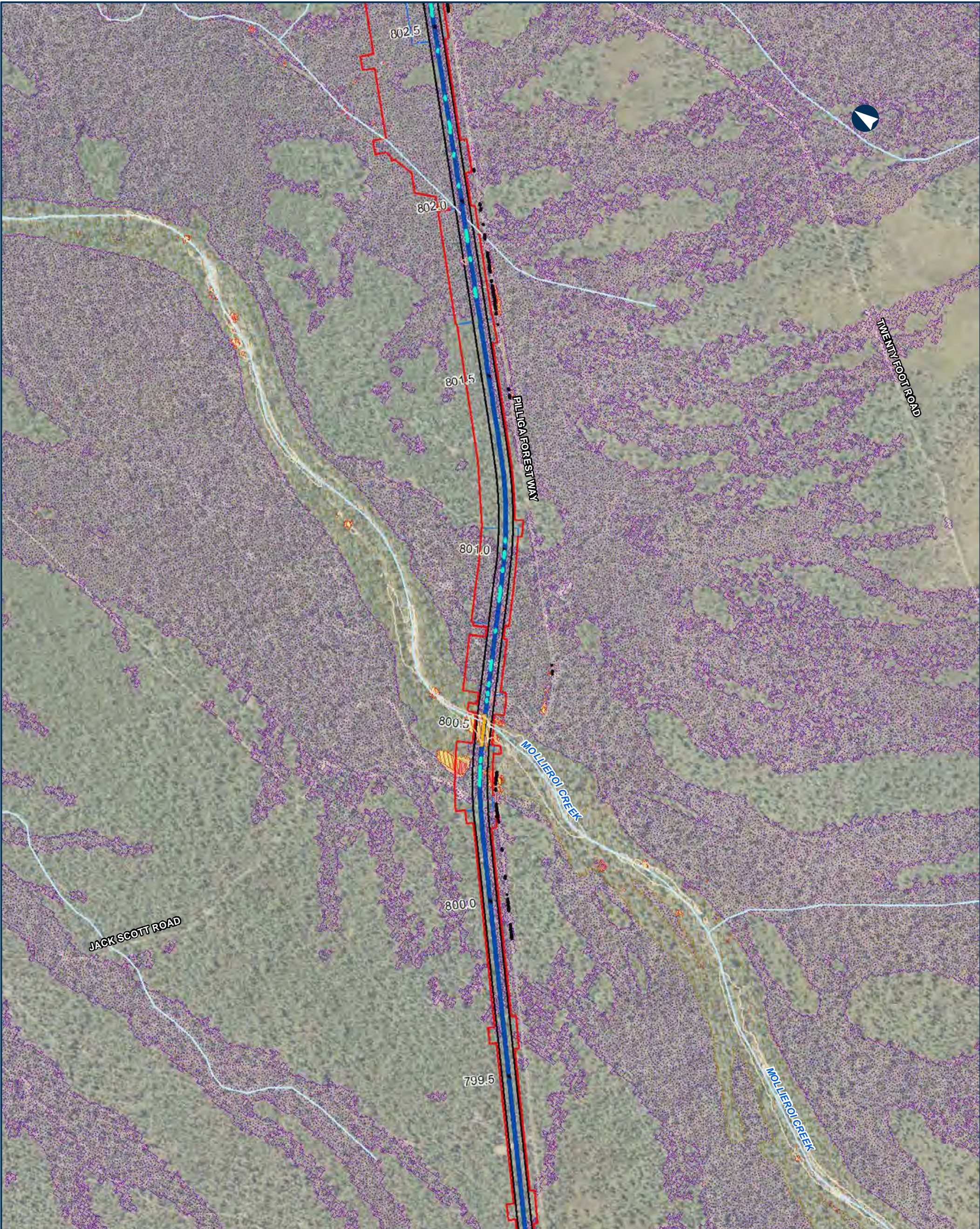
- Bridge
- Culvert
- Road ODL departure
- Alignment
- The proposal
- Drainage Control Area
- Rail Corridor
- Design Velocity Contour (m/s)
- 1
- 2
- Design Velocity < 0.5m/s
- Design Velocity > 0.5m/s, Velocity increase limited to 0.025m/s
- <10% Increase
- 10% to 20% increase
- Greater than 20% increase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



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NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 2% AEP

Appendix I - Figure 2.3.85

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

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

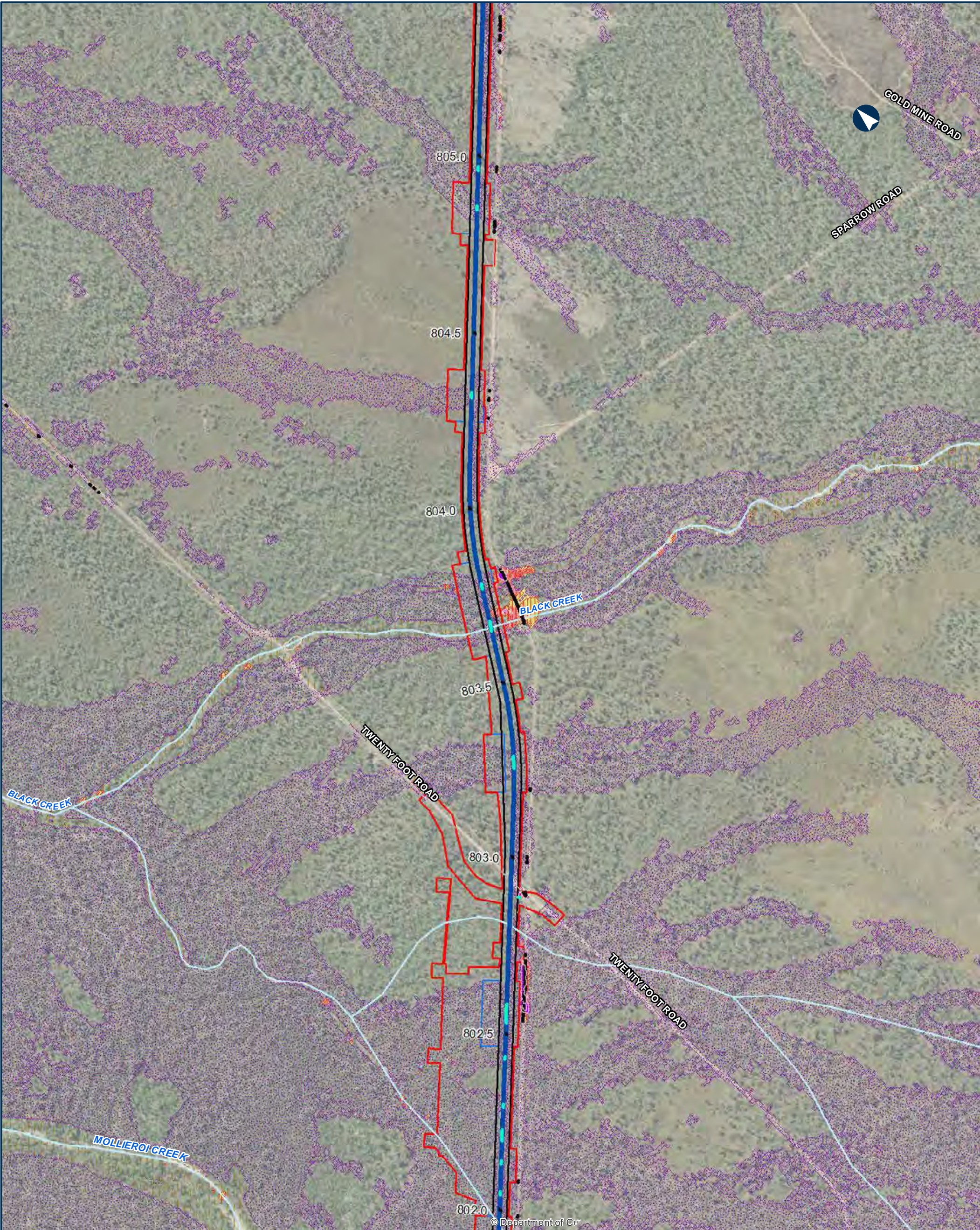
Existing velocity > 0.5m/s (ETV), Design Velocity > Existing Velocity + 0.025m/s

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NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 2% AEP

Appendix I - Figure 2.3.86

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

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

NARRABRI

COONAMBLE

BARADINE

GILGANDRA

NARROMINE

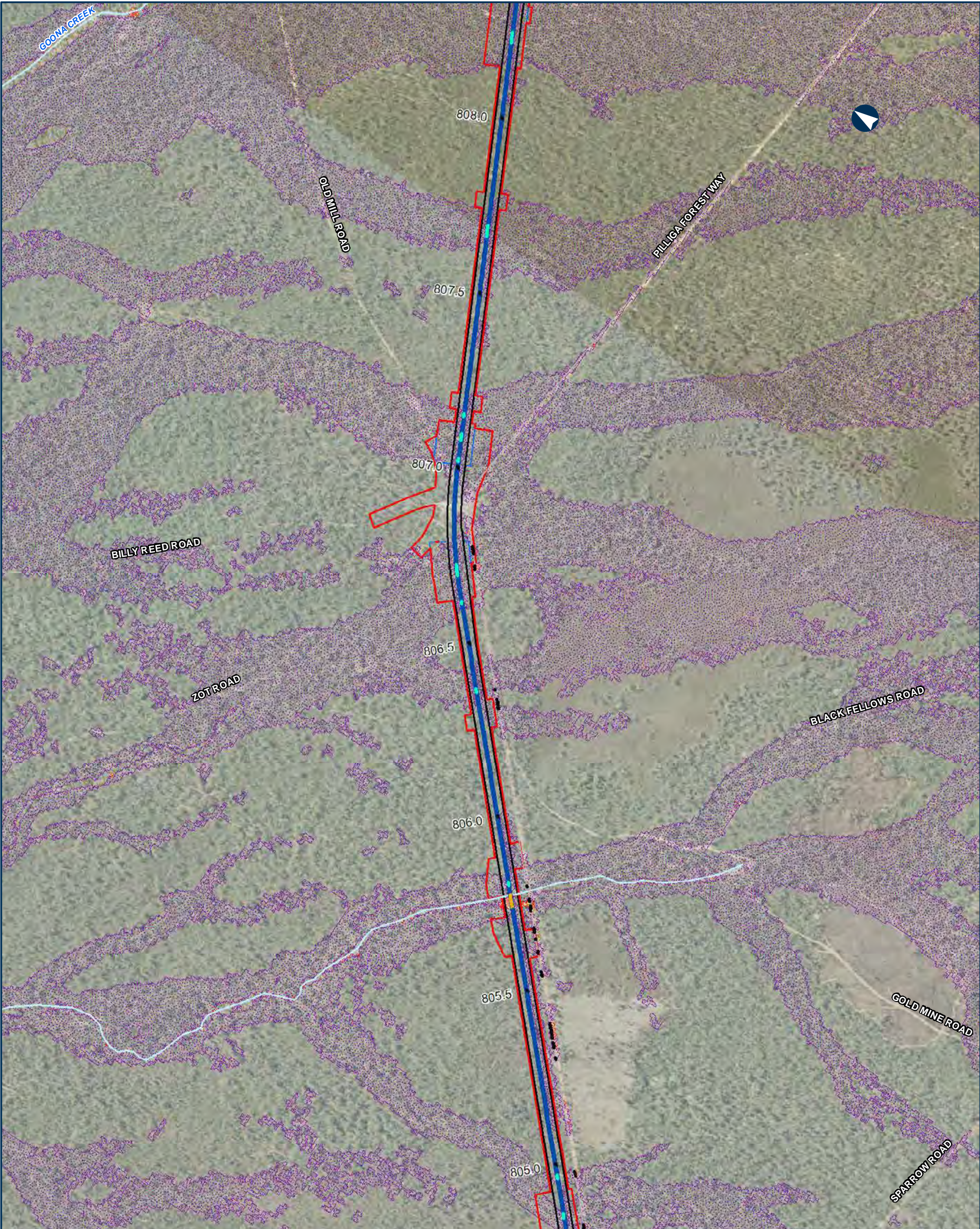
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NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 2% AEP

Appendix I - Figure 2.3.87

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

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

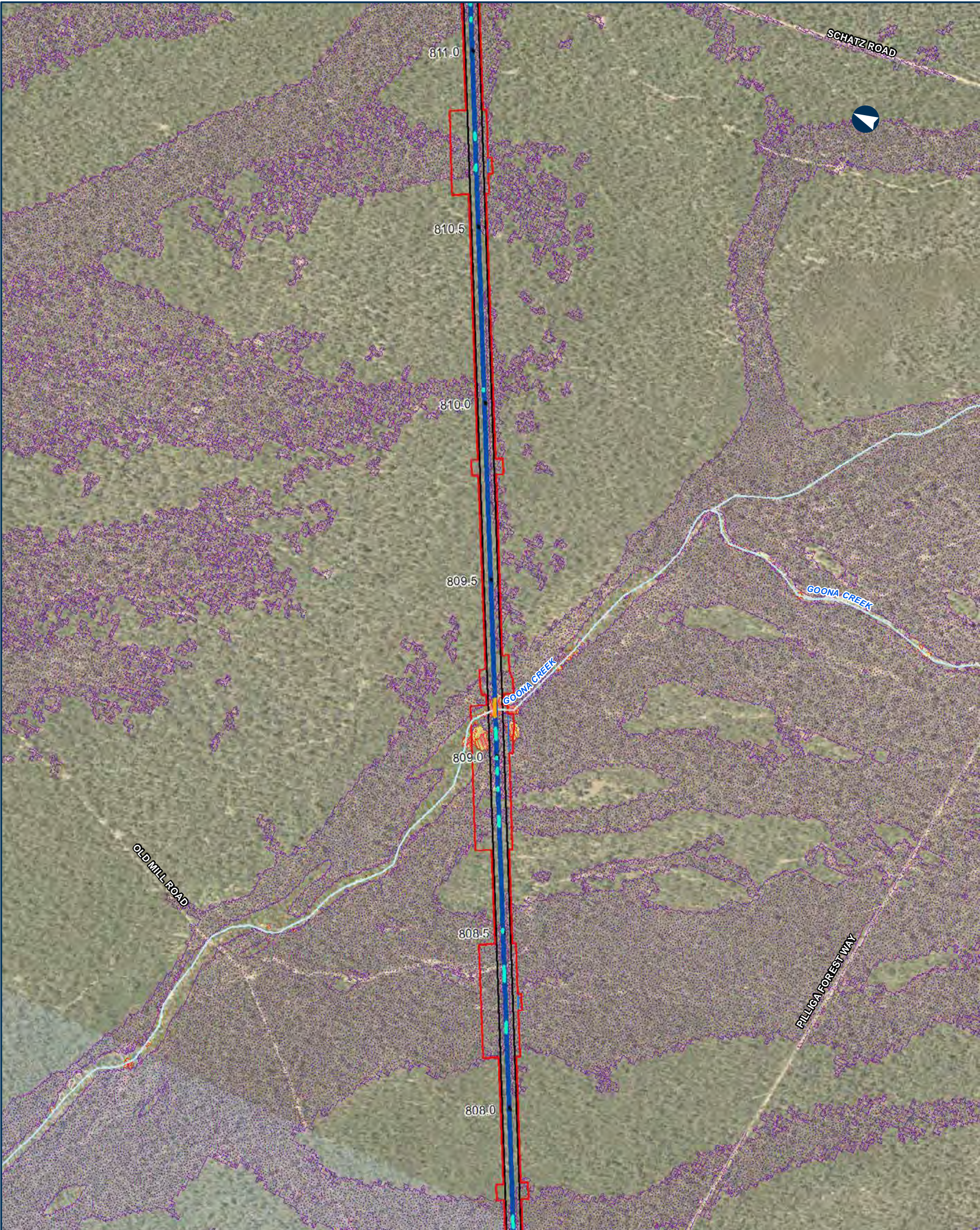
Existing velocity > 0.5m/s (ETV), Design Velocity > Existing Velocity + 0.025m/s

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NARROMINE TO NARRABRI

QDL departures - Scour / Erosion - 2% AEP

Appendix I - Figure 2.3.88

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

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 (ETV), Design Velocity > Existing Velocity + 0.025m/s

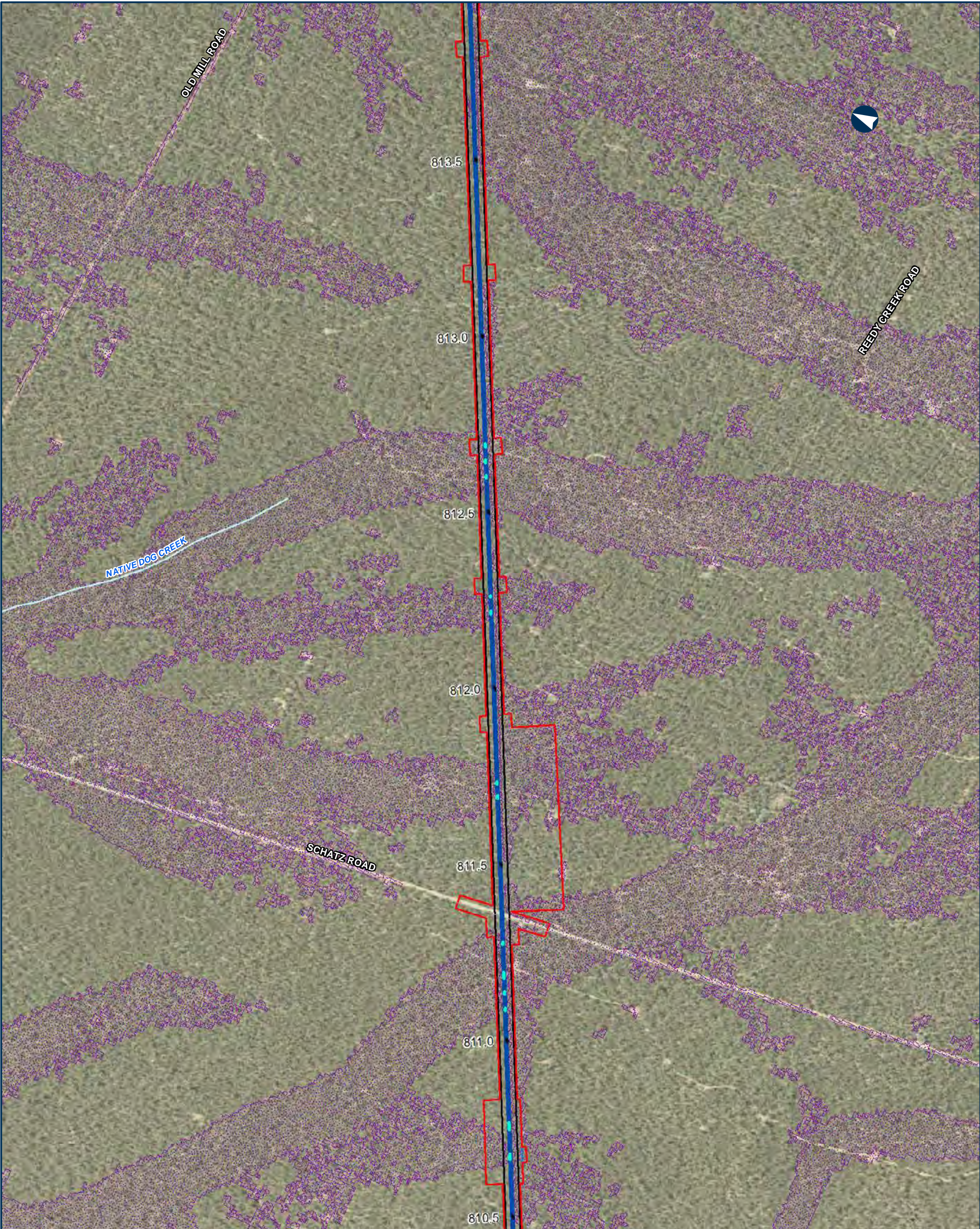


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NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 2% AEP

Appendix I - Figure 2.3.89

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 QDL departure

Alignment

The proposal

Drainage Control Area

Rail Corridor

Design Velocity < 0.5m/s

Paper: A3

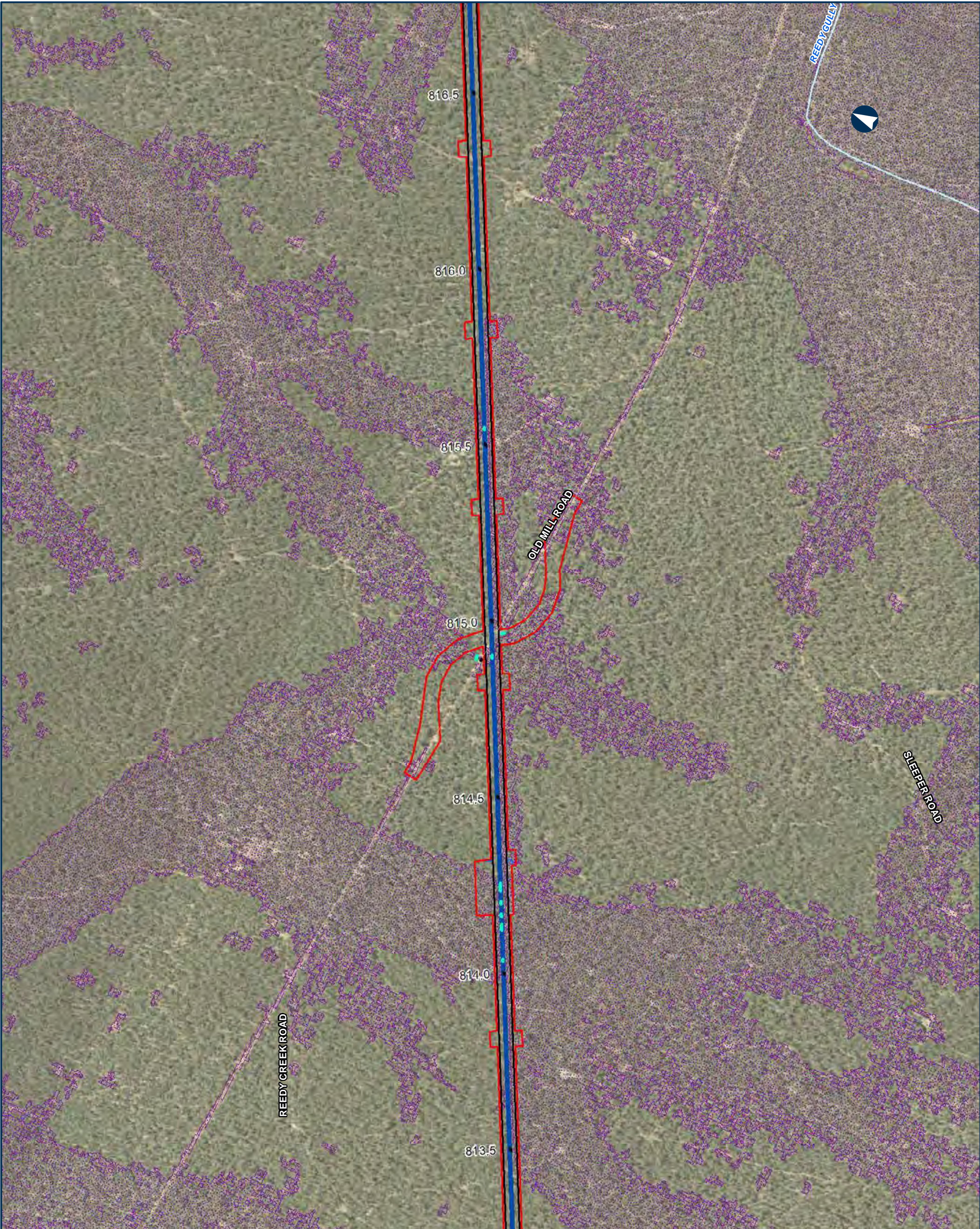
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NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 2% AEP

Appendix I - Figure 2.3.90

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 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

Greater than 20% increase

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NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 2% AEP

Appendix I - Figure 2.3.91

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

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

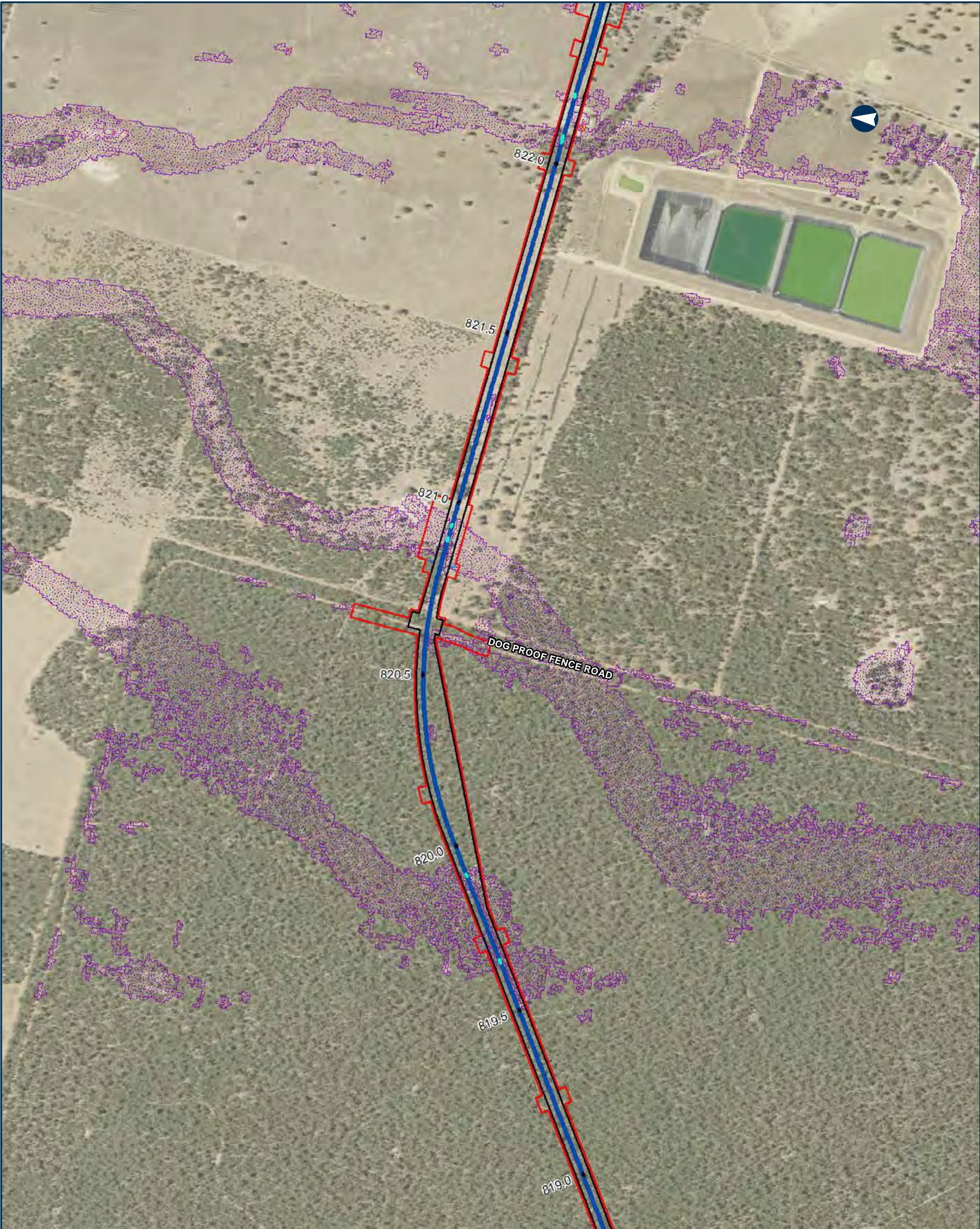
Existing velocity > 0.5m/s (ETV), Design Velocity > Existing Velocity + 0.025m/s

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**NARROMINE TO NARRABRI** QDL departures - Scour / Erosion - 2% AEP

Appendix I - Figure 2.3.92

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
  - 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 (ETV), Design Velocity > Existing Velocity + 0.025m/s



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**NARROMINE TO NARRABRI** QDL departures - Scour / Erosion - 2% AEP

Appendix I - Figure 2.3.93

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

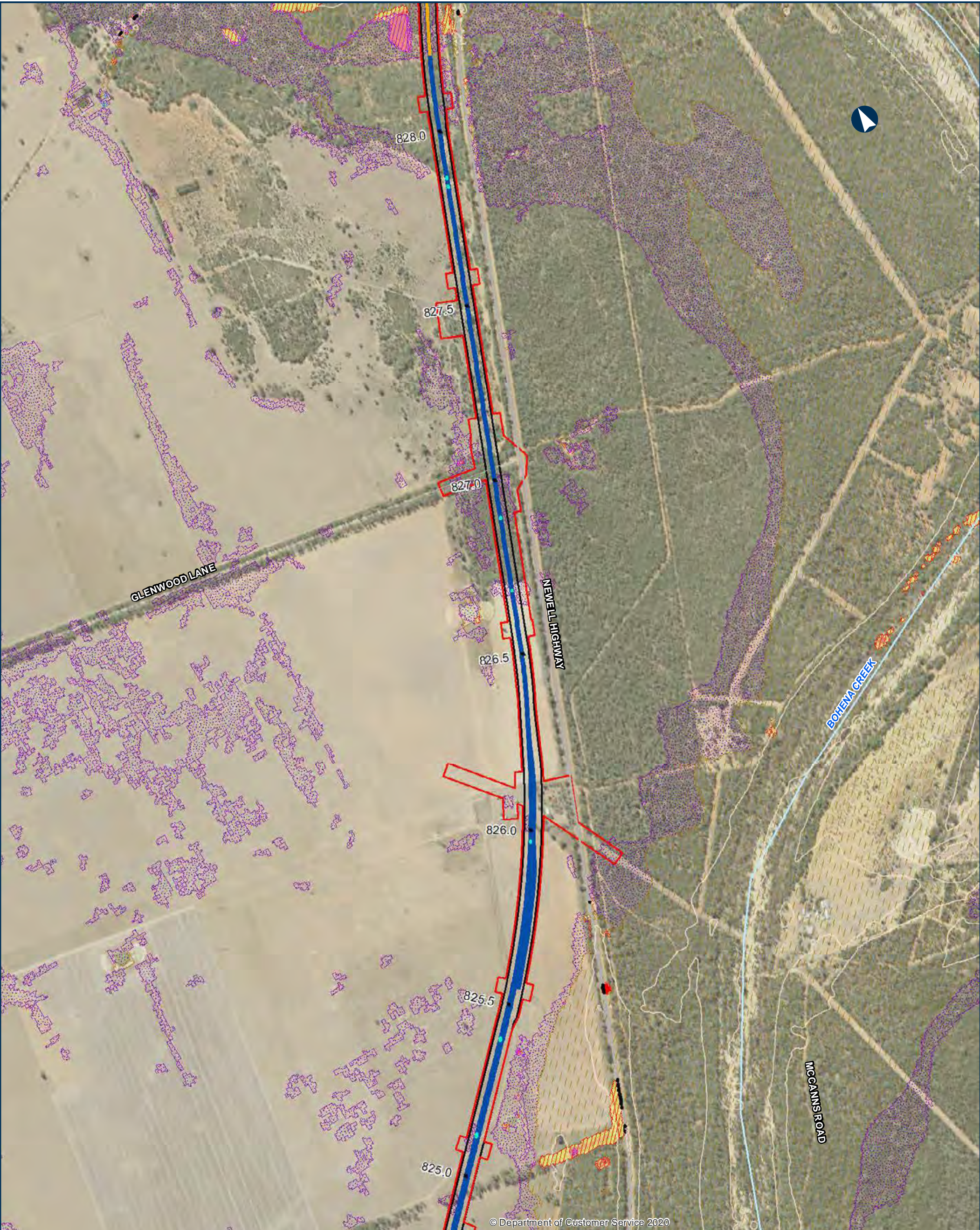
- Culvert
- Road QDL departure
- Alignment
- The proposal
- Rail Corridor
- Design Velocity Contour (m/s)
  - 1
  - 2
- Design Velocity < 0.5m/s
- Design Velocity > 0.5m/s, Velocity increase limited to 0.025m/s
- <10% Increase
- 10% to 20% increase
- Greater than 20% increase
- Unprotected Surfaces
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



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NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 2% AEP

Appendix I - Figure 2.3.94

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
- 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, 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 (ETV), Design Velocity > Existing Velocity + 0.025m/s



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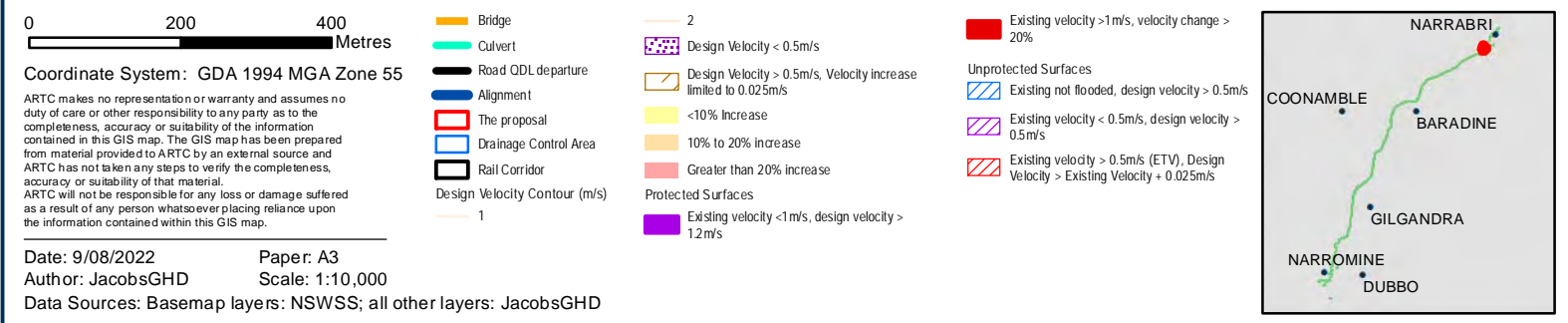
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NARROMINE TO NARRABRI QDL departures - Scour / Erosion - 2% AEP

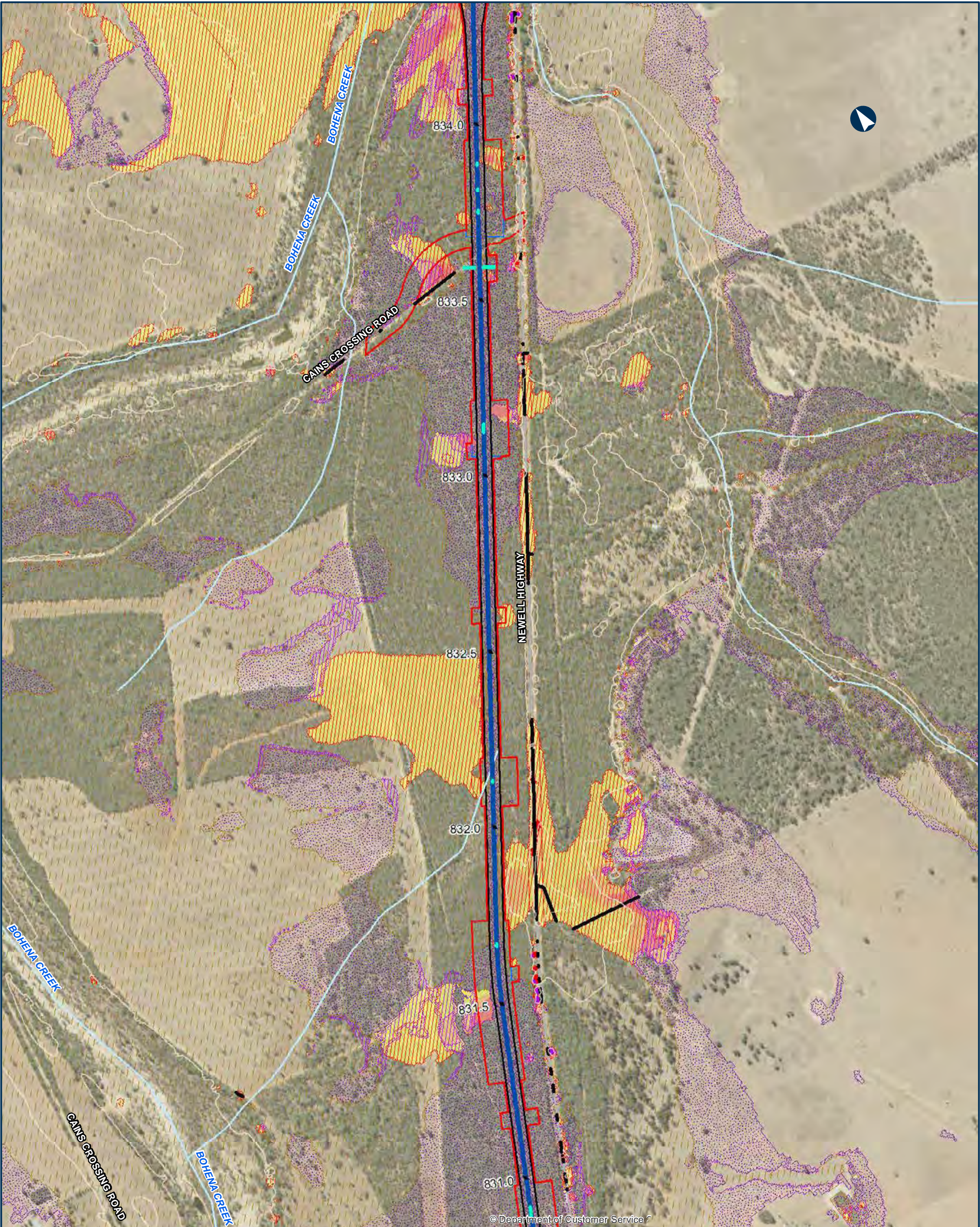
Appendix I - Figure 2.3.95



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**NARROMINE TO NARRABRI** QDL departures - Scour / Erosion - 2% AEP

Appendix I - Figure 2.3.96

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

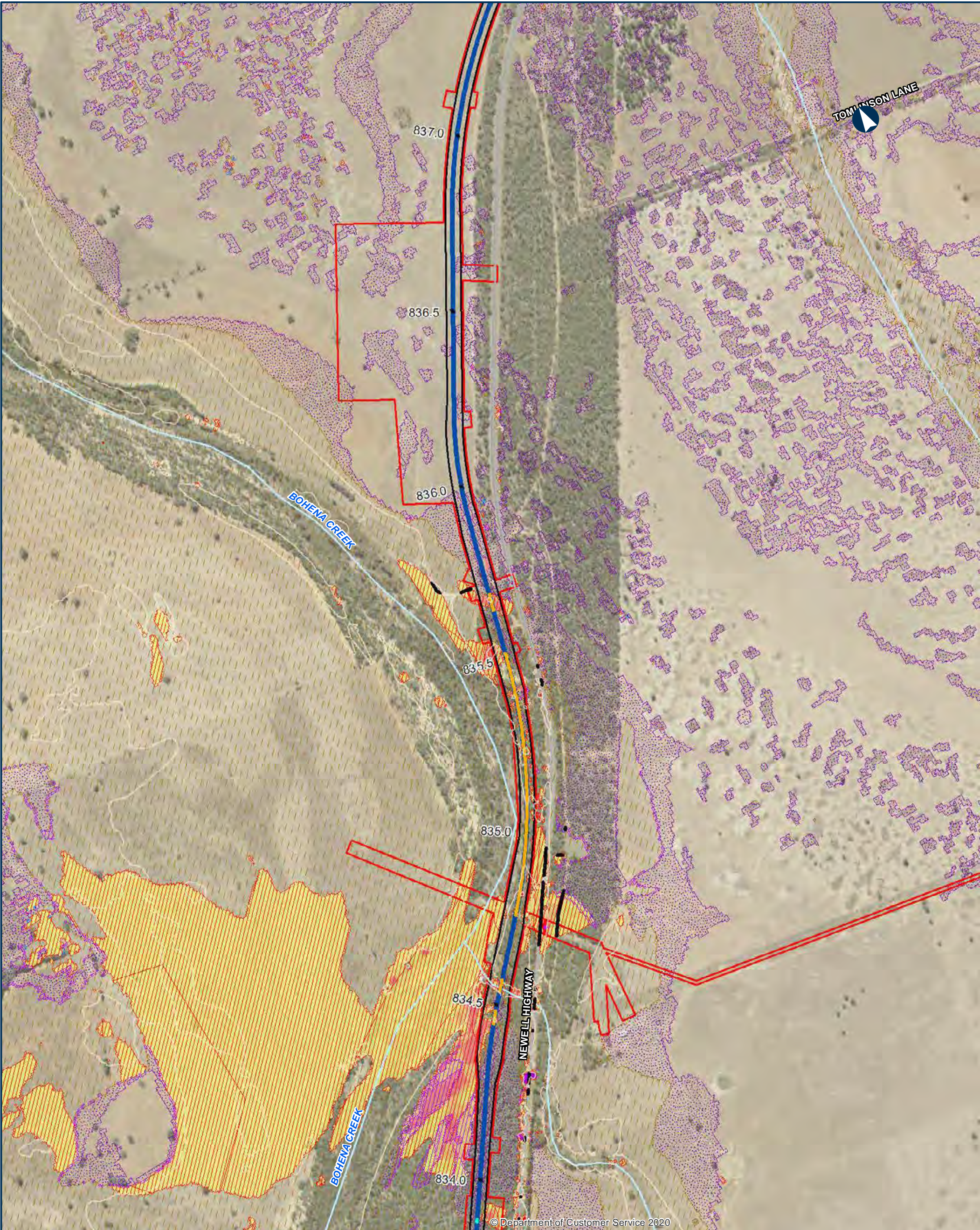
- |                               |   |  |
|-------------------------------|---|--|
| Culvert                       | Design Velocity < 0.5m/s  | Existing velocity > 1m/s, velocity change > 20%                                  |
| Road QDL departure            | Design Velocity > 0.5m/s, Velocity increase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



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**NARROMINE TO NARRABRI** QDL departures - Scour / Erosion - 2% AEP

Appendix I - Figure 2.3.97

0 200 400 Metres

Coordinate System: GDA 1994 MGA Zone 55  
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- 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%
- 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 (ETV), Design Velocity > Existing Velocity + 0.025m/s



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**NARROMINE TO NARRABRI** QDL departures - Scour / Erosion - 2% AEP

Appendix I - Figure 2.3.98

0 200 400 Metres

Coordinate System: GDA 1994 MGA Zone 55

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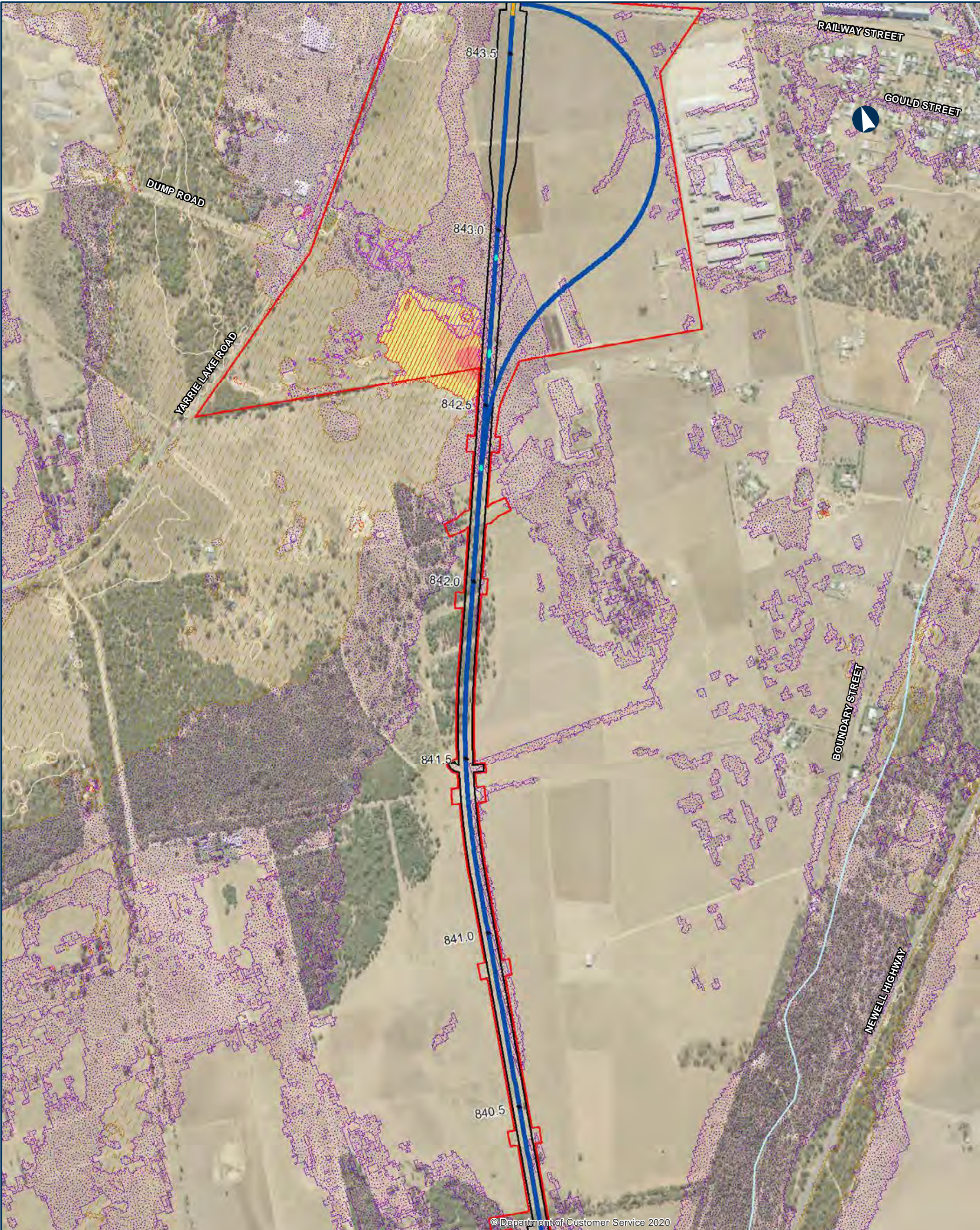
- Culvert
- Road QDL departure
- Alignment
- The proposal
- Rail Corridor
- Design Velocity Contour (m/s)
  - 1
  - 2
- Design Velocity < 0.5m/s
- Design Velocity > 0.5m/s, Velocity increase limited to 0.025m/s
- <10% Increase
- 10% to 20% increase
- Greater than 20% increase
- Unprotected Surfaces
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



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**NARROMINE TO NARRABRI** QDL departures - Scour / Erosion - 2% AEP

Appendix I - Figure 2.3.99

0200400

Metres

Coordinate System: GDA 1994 MGA Zone 55

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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

Unprotected Surfaces

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

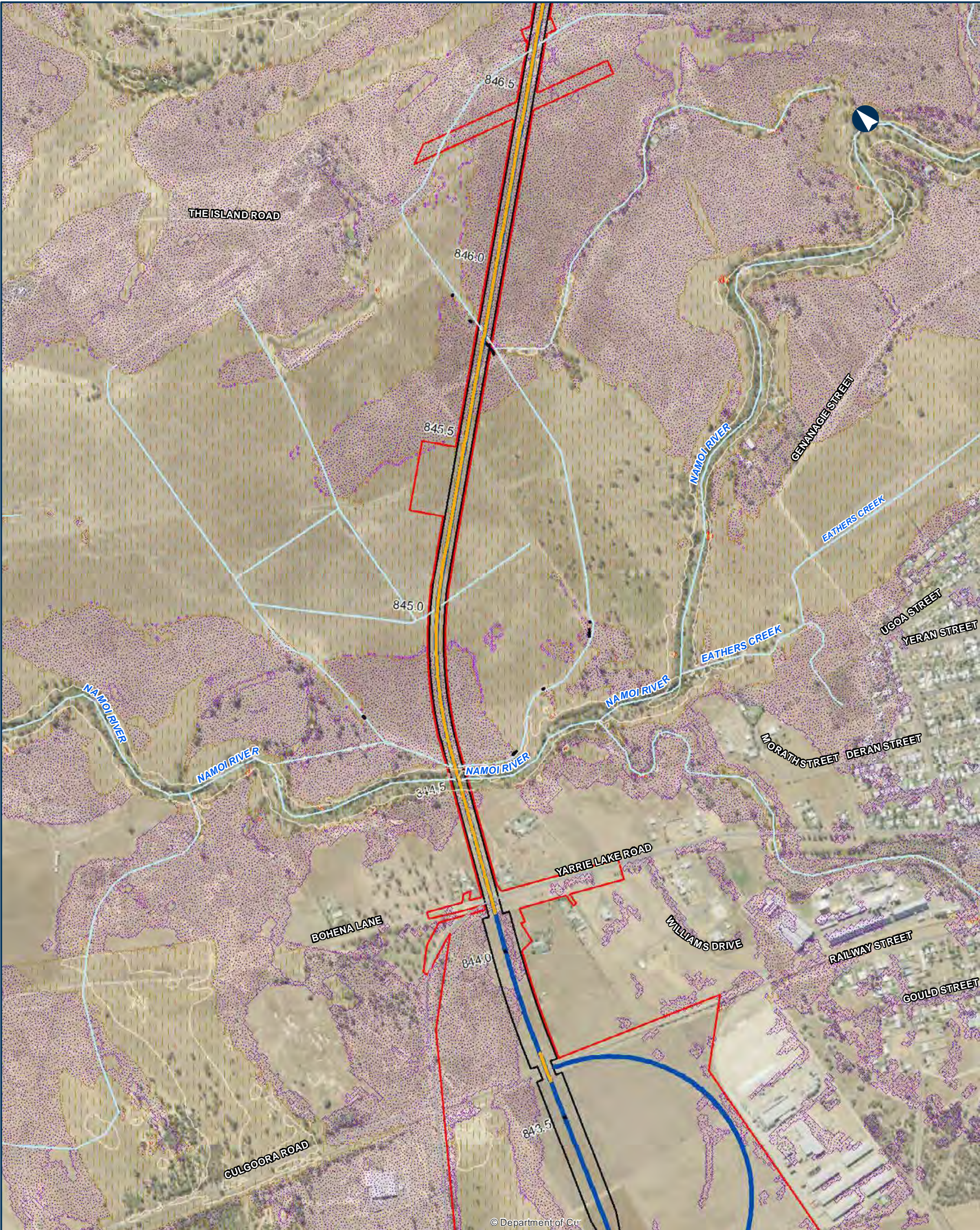
Existing velocity > 0.5m/s (ETV), Design Velocity > Existing Velocity + 0.025m/s

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Appendix I - Figure 2.3.100

0 200 400 Metres

Coordinate System: GDA 1994 MGA Zone 55

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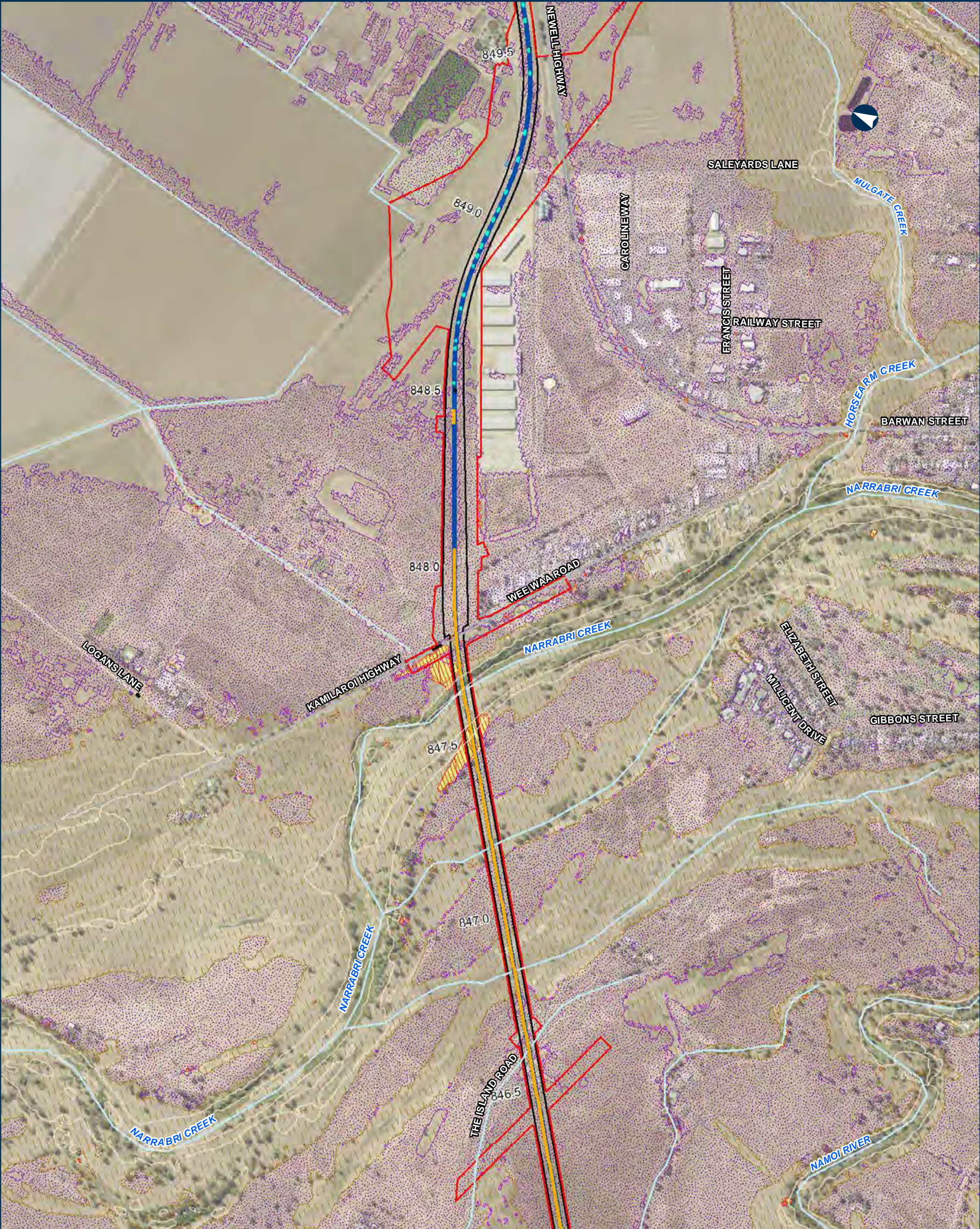
- Bridge
- Road QDL departure
- Alignment
- The proposal
- Rail Corridor
- Design Velocity Contour (m/s)
  - 1
  - 2
- Design Velocity < 0.5m/s
- Design Velocity > 0.5m/s, Velocity increase limited to 0.025m/s
- <10% Increase
- 10% to 20% increase
- Greater than 20% increase
- Unprotected Surfaces
 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



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Appendix I - Figure 2.3.101

0200400

Metres

Coordinate System: GDA 1994 MGA Zone 55

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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

Unprotected Surfaces

Existing not flooded, design velocity > 0.5m/s

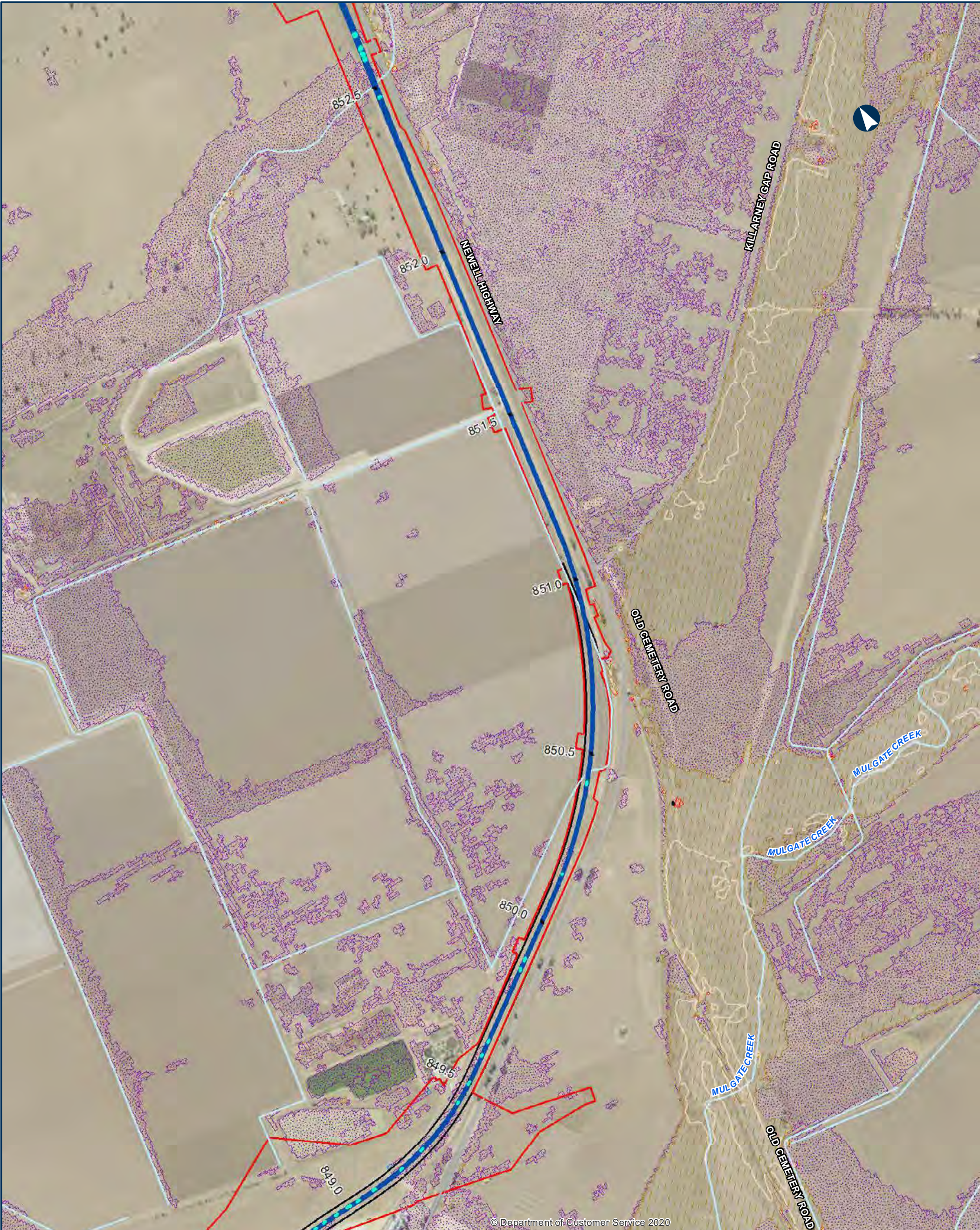
Existing velocity < 0.5m/s, design velocity > 0.5m/s

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

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Appendix I - Figure 2.3.102

0 200 400 Metres

Coordinate System: GDA 1994 MGA Zone 55

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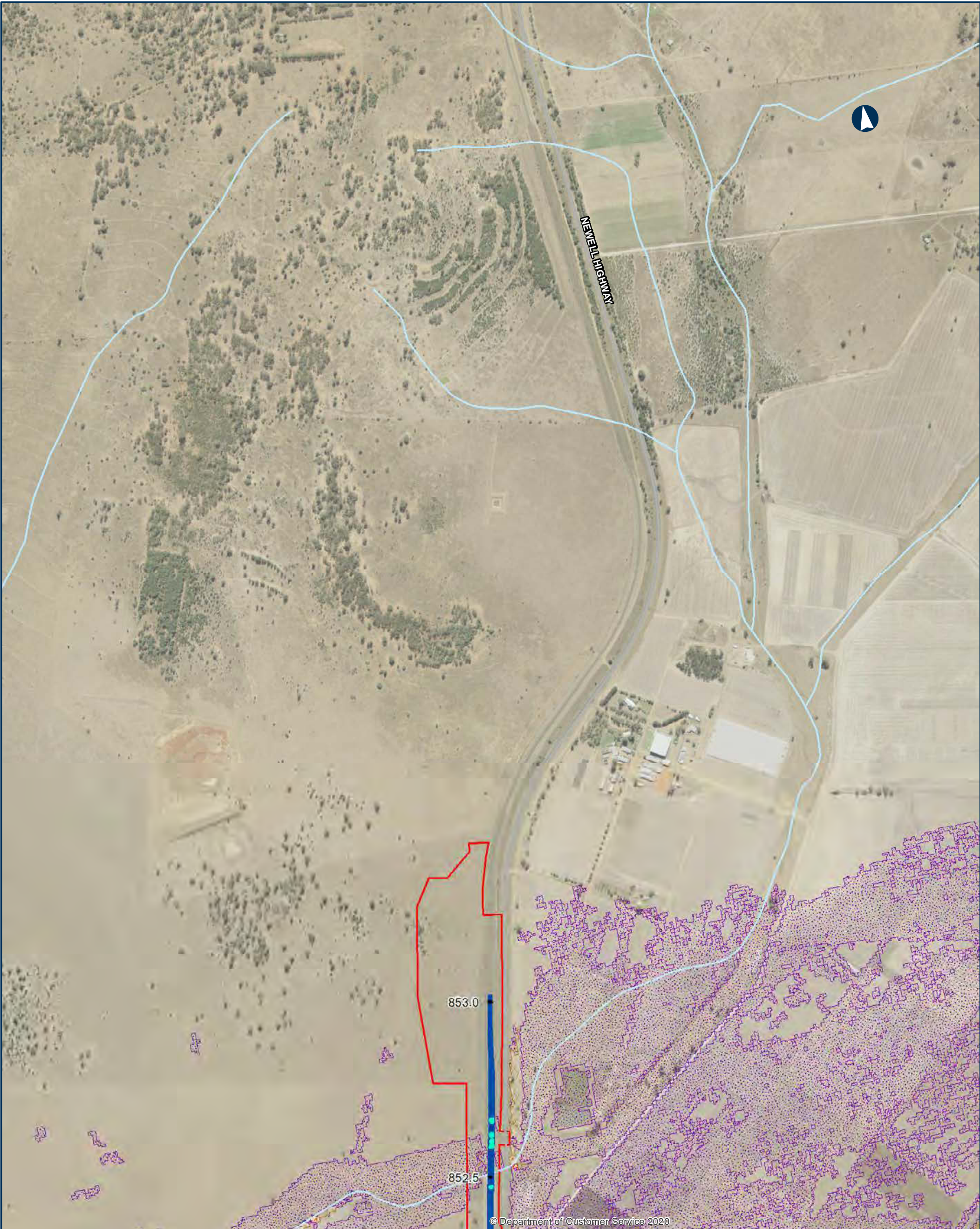
- Culvert
- Road QDL departure
- Alignment
- The proposal
- Rail Corridor
- Design Velocity Contour (m/s)
  - 1
  - 2
- Design Velocity < 0.5m/s
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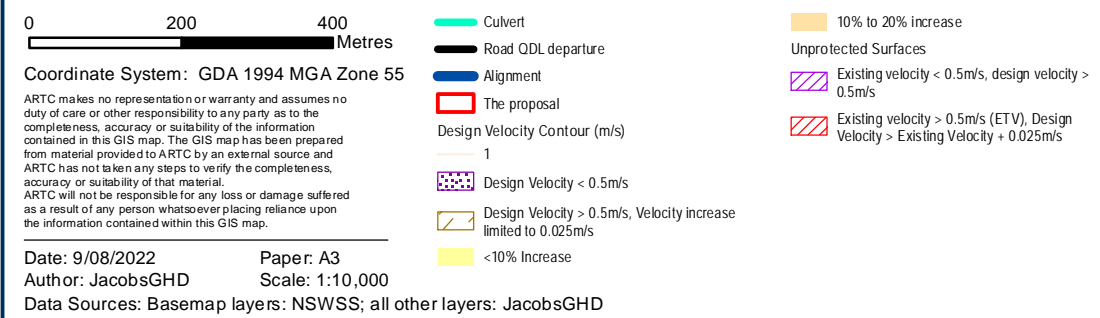
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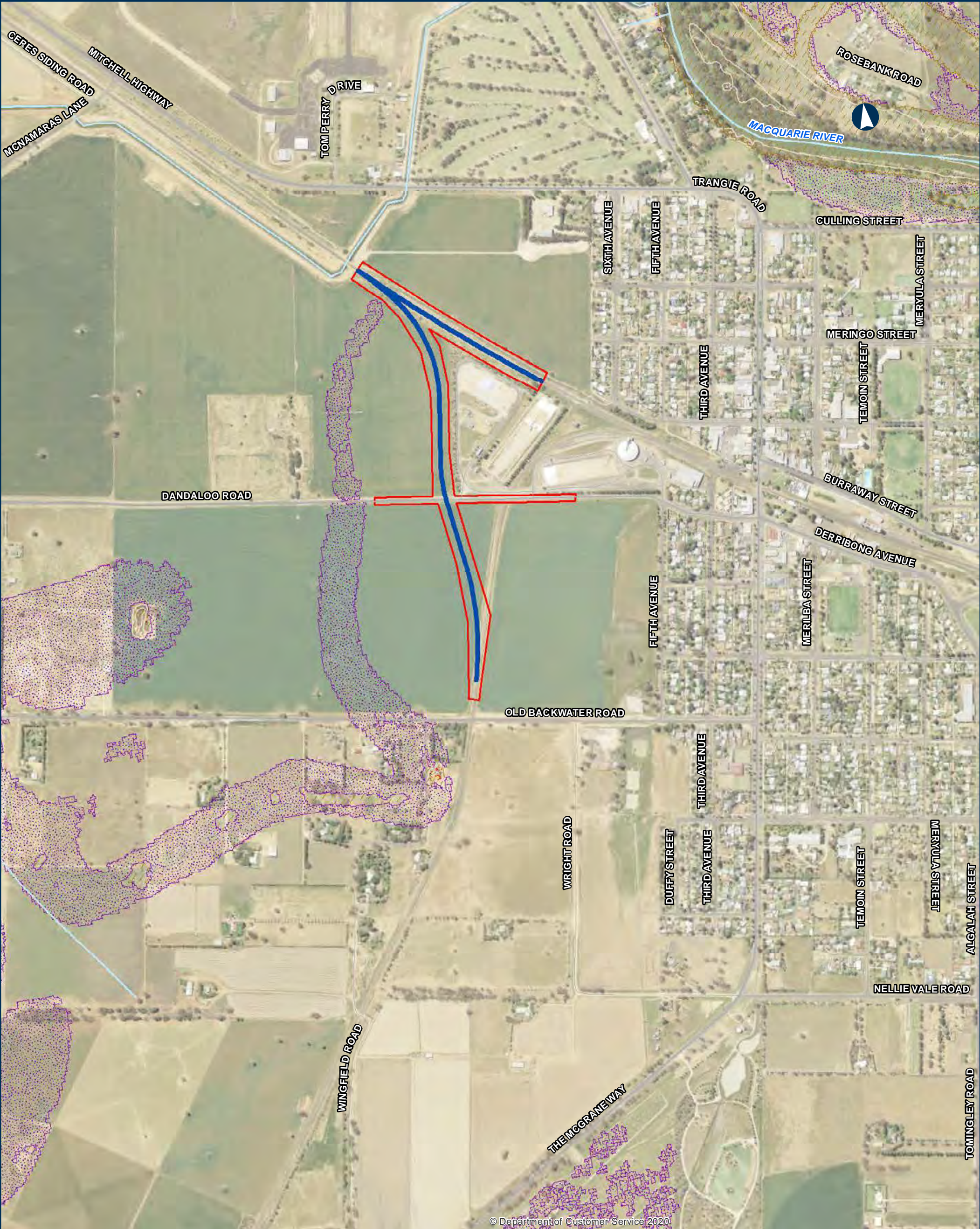
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Appendix I - Figure 2.3.104

0200400

Metres

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Road QDL departure

Alignment

The proposal

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

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

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