

APPENDIX T2

Hydrology and Flooding Technical Report—Volume 2

Part 8 of 8

BORDER TO GOWRIE REVISED DRAFT ENVIRONMENTAL IMPACT STATEMENT

APPENDIX T2

Hydrology and Flooding Technical Report—Volume 2

Appendix P B2G flood-sensitive receptors

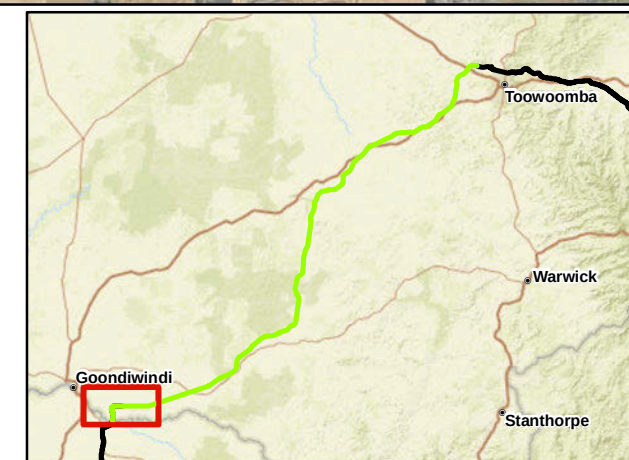
BORDER TO GOWRIE REVISED DRAFT ENVIRONMENTAL IMPACT STATEMENT

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\310-IHY-202005121245_SurfaceWater\5mxd_Appendix_P1\310-IHY-202005121245_FF_V_FigP1-X_SensitiveReceptors_v5.mxd Date: 20/06/2024 16:28



Legend

- 5 Chainage (km)
- Localities
- Existing rail (operational)
- Border to Gowrie alignment
- Minor roads
- NSW/QLD border
- Project flood sensitive receptors
- Project road design
- Project footprint
- 1:10,000 scale enlargement tile in series



A3 scale: 1:75,000
0 0.75 1.5 2.25 3 3.75 km

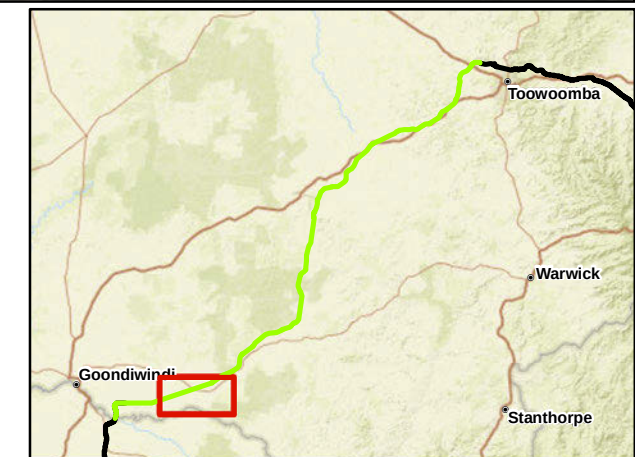


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Legend

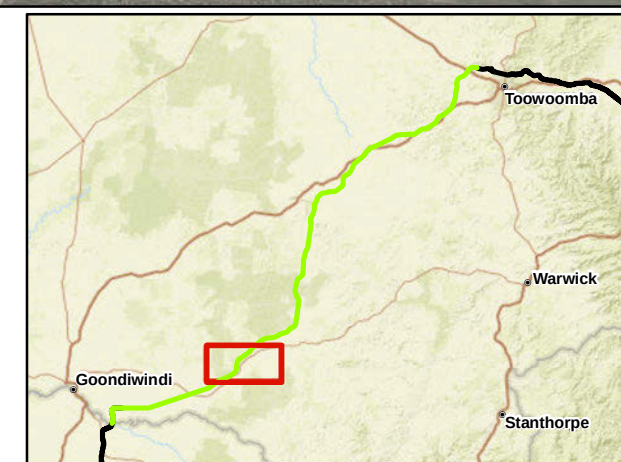
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|-------------------------------|---|
| 5 Chainage (km) | ● Project flood sensitive receptors |
| ● Localities | — Project road design |
| + Existing rail (operational) | □ Project footprint |
| — Border to Gowrie alignment | □ 1:10,000 scale enlargement tile in series |
| — Major roads | □ 1:2,500 scale enlargement tile in series |
| — Minor roads | |
| --- NSW/QLD border | |
| — Yelarbon levee | |
| □ Yelarbon town outline | |



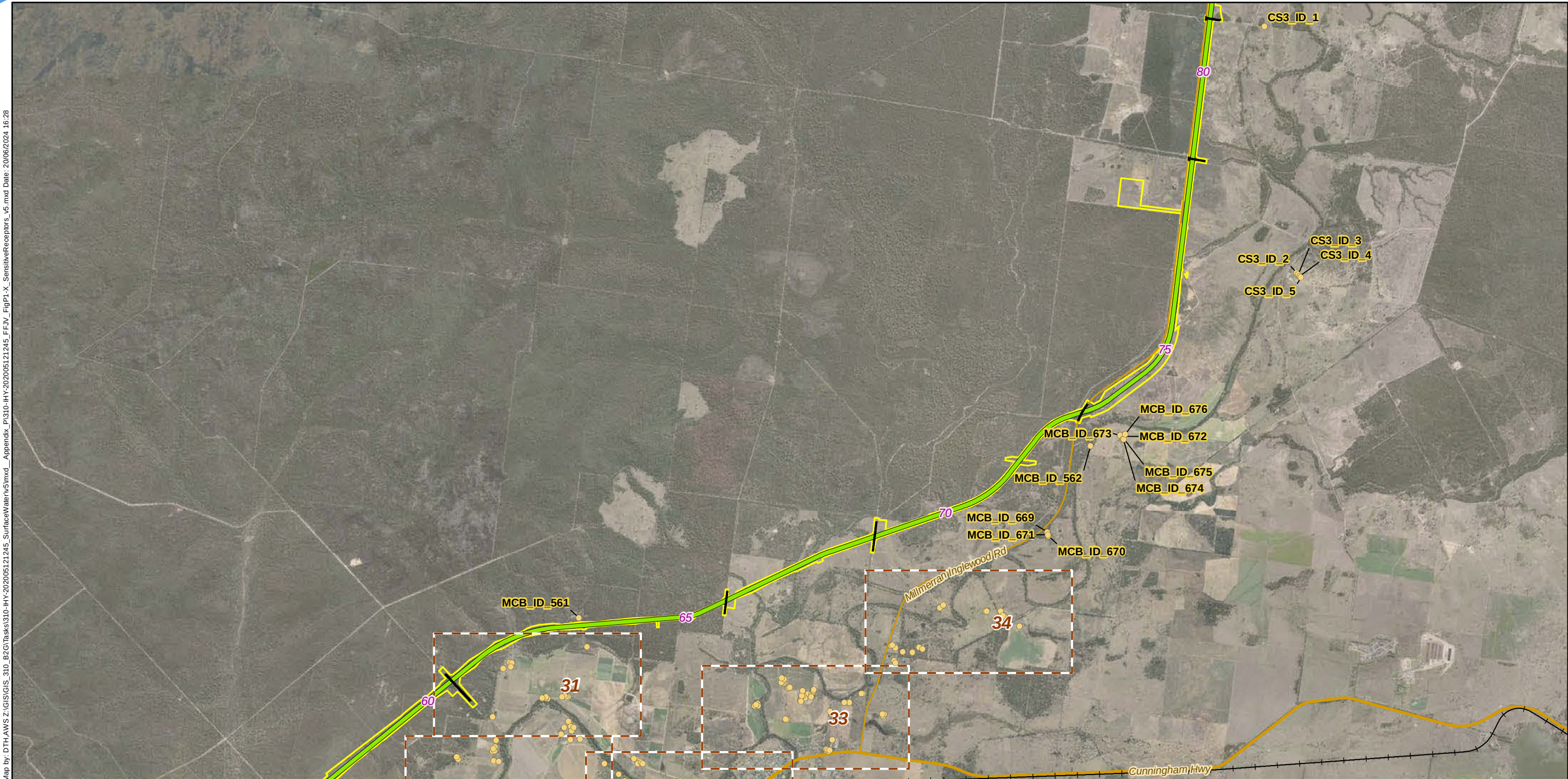
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- Chainage (km)
- Localities
- Existing rail (operational)
- Border to Gowrie alignment
- Major roads
- Minor roads
- Project flood sensitive receptors
- Project road design
- Project footprint
- 1:10,000 scale enlargement tile in series

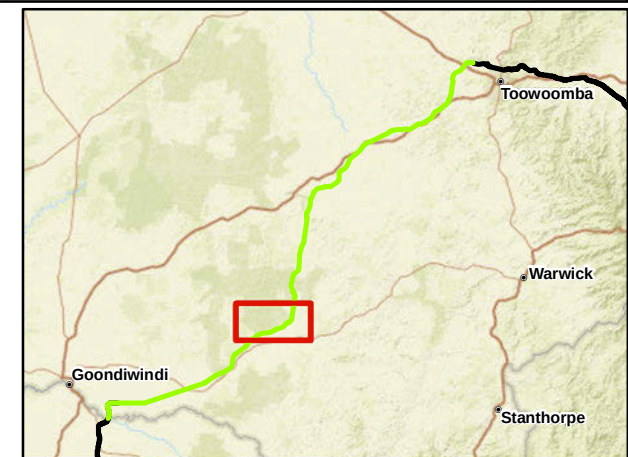


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Legend

- 5 Chainage (km)
- Existing rail (operational)
- Border to Gowrie alignment
- Major roads
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- 1:10,000 scale enlargement tile in series



A3 scale: 1:75,000
0 0.75 1.5 2.25 3 3.75 km



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Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\GIS_310_IHY\202005121245_SurfaceWater\5vmsd_Appendix_P1\310-IHY\202005121245_FF\FF_P1-X_SensitiveReceptors_v5.mxd Date: 20/06/2024 16:28



Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project flood sensitive receptors
- Project road design
- Project footprint
- 1:10,000 scale enlargement tile in series



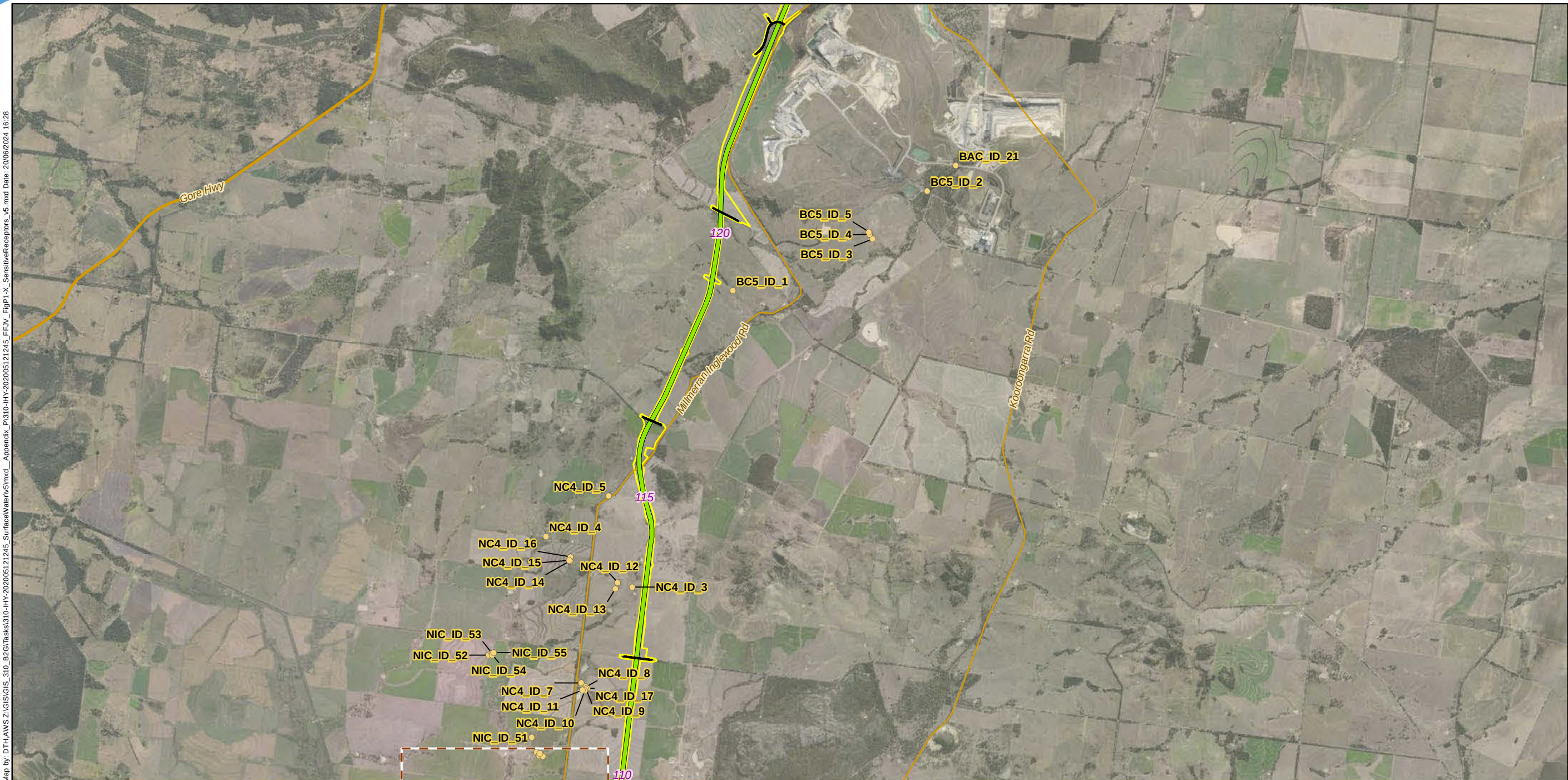
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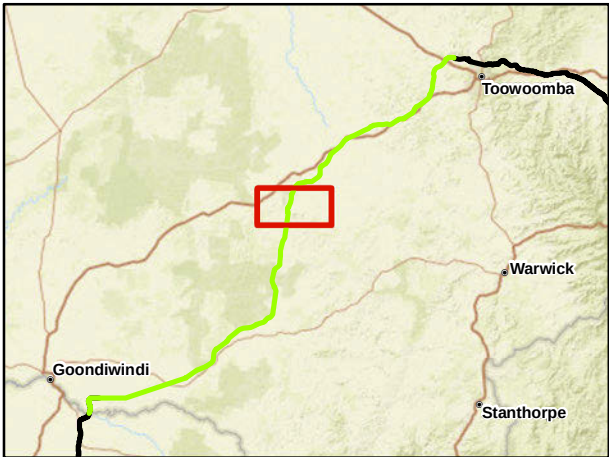
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Legend

- | | |
|----------------------------|---|
| 5 Chainage (km) | ● Project flood sensitive receptors |
| Border to Gowrie alignment | — Project road design |
| Major roads | □ Project footprint |
| Minor roads | □ 1:10,000 scale enlargement tile in series |



A3 scale: 1:75,000
0 0.75 1.5 2.25 3 3.75 km



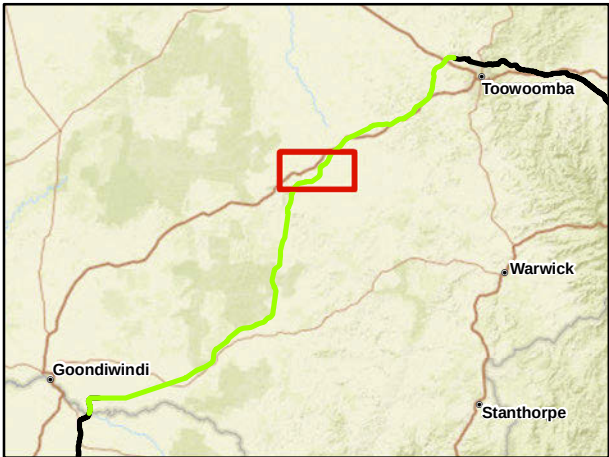
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Border to Gowrie
Figure P1 - Page 6 of 59:
Flood Sensitive Receptors



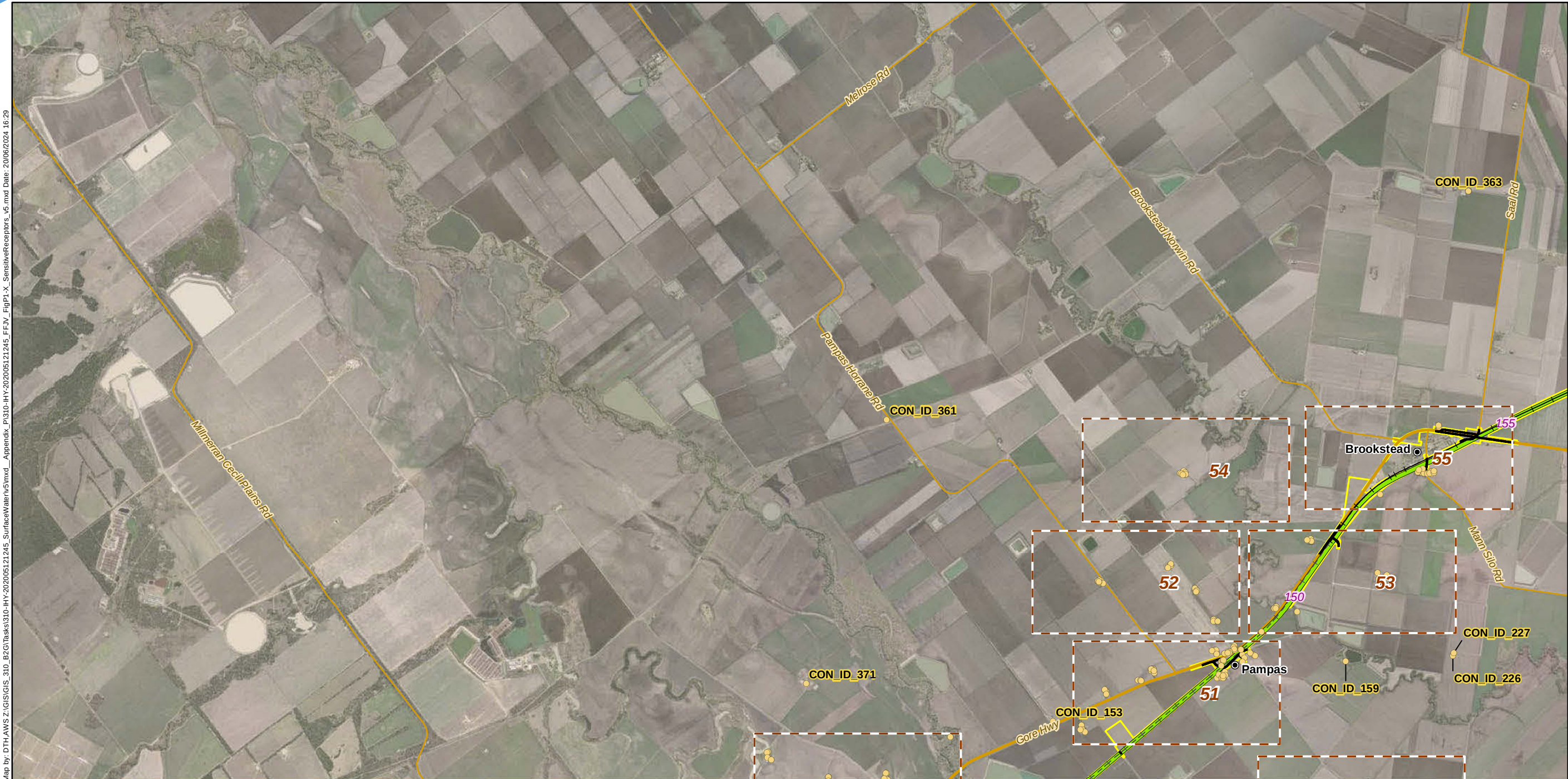
Legend

- 5 Chainage (km)
- Localities
- + - Existing rail (non-operational)
- Border to Gowrie alignment
- Major roads
- Minor roads
- Project flood sensitive receptors
- Project road design
- Project footprint
- 1:10,000 scale enlargement tile in series



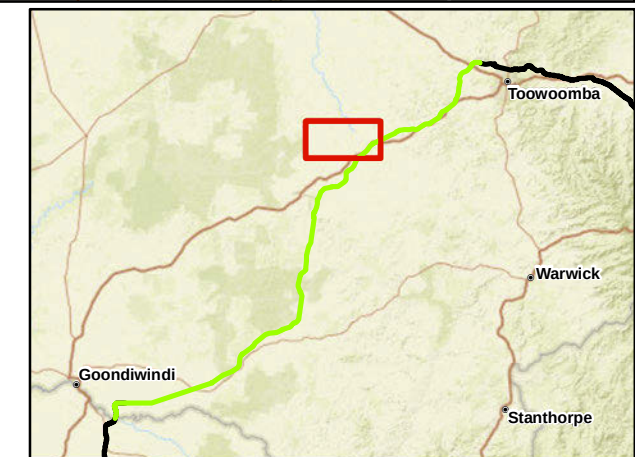
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Legend

- 5 Chainage (km)
- Localities
- Existing rail (operational)
- - - Existing rail (non-operational)
- Border to Gowrie alignment
- Major roads
- Minor roads
- Project flood sensitive receptors
- Project road design
- Project footprint
- 1:10,000 scale enlargement tile in series



A3 scale: 1:75,000
0 0.75 1.5 2.25 3 3.75 km

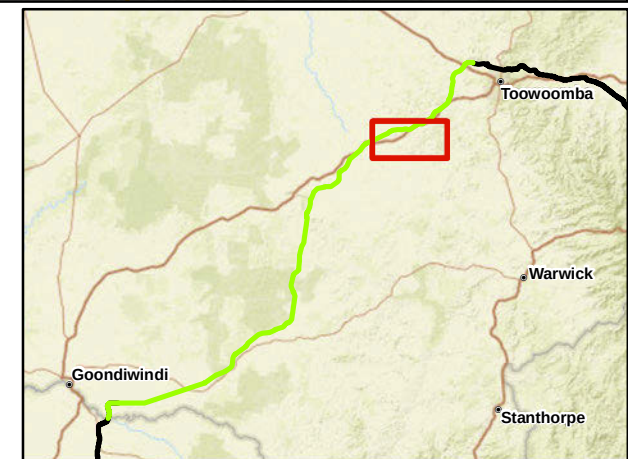


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Legend

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|-------------------------------|-------------------------------------|
| 5 Chainage (km) | ● Project flood sensitive receptors |
| ● Localities | — Project road design |
| — Existing rail (operational) | □ Project footprint |
| — Border to Gowrie alignment | |
| — Major roads | |
| — Minor roads | |



A3 scale: 1:75,000
0 0.75 1.5 2.25 3 3.75 km



Legend

- | | |
|-------------------------------|---|
| 5 Chainage (km) | ● Project flood sensitive receptors |
| ● Localities | — Project road design |
| + Existing rail (operational) | □ Project footprint |
| — Border to Gowrie alignment | □ 1:10,000 scale enlargement tile in series |
| — Major roads | |
| — Minor roads | |



A3 scale: 1:75,000
0 0.75 1.5 2.25 3 3.75 km



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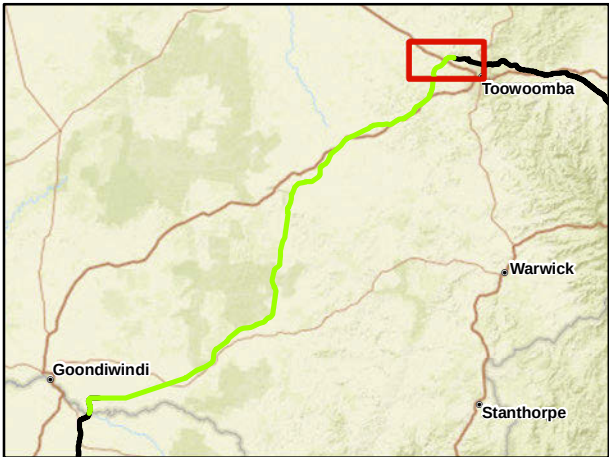
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Border to Gowrie
Figure P1 - Page 10 of 59:
Flood Sensitive Receptors



Legend

- 5 Chainage (km)
- Localities
- Existing rail (operational)
- Border to Gowrie alignment
- Gowrie to Helidon alignment
- Major roads
- Minor roads
- Project flood sensitive receptors
- Project road design
- Project footprint
- 1:10,000 scale enlargement tile in series



A3 scale: 1:75,000
0 0.75 1.5 2.25 3 3.75 km

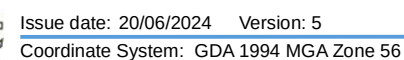


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Border to Gowrie
Figure P1 - Page 11 of 59:
Flood Sensitive Receptors



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**Figure P1 - Page 12 of 59:
Flood Sensitive Receptors**

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Legend

- | | |
|-------------------------------|-------------------------------------|
| 5 Chainage (km) | ● Project flood sensitive receptors |
| — Existing rail (operational) | — Project road design |
| — Border to Gowrie alignment | □ Project footprint |



A3 scale: 1:10,000
0 0.1 0.2 0.3 0.4 0.5km



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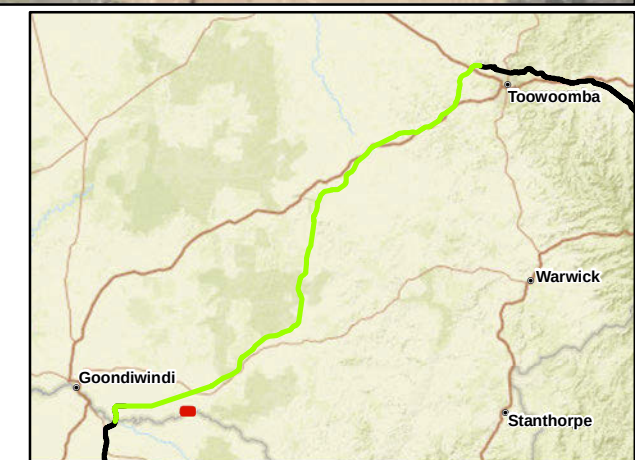
Border to Gowrie
Figure P1 - Page 13 of 59:
Flood Sensitive Receptors

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Legend

- 5 Chainage (km)
- Minor roads
- NSW/QLD border
- Project flood sensitive receptors
- Project road design
- Project footprint

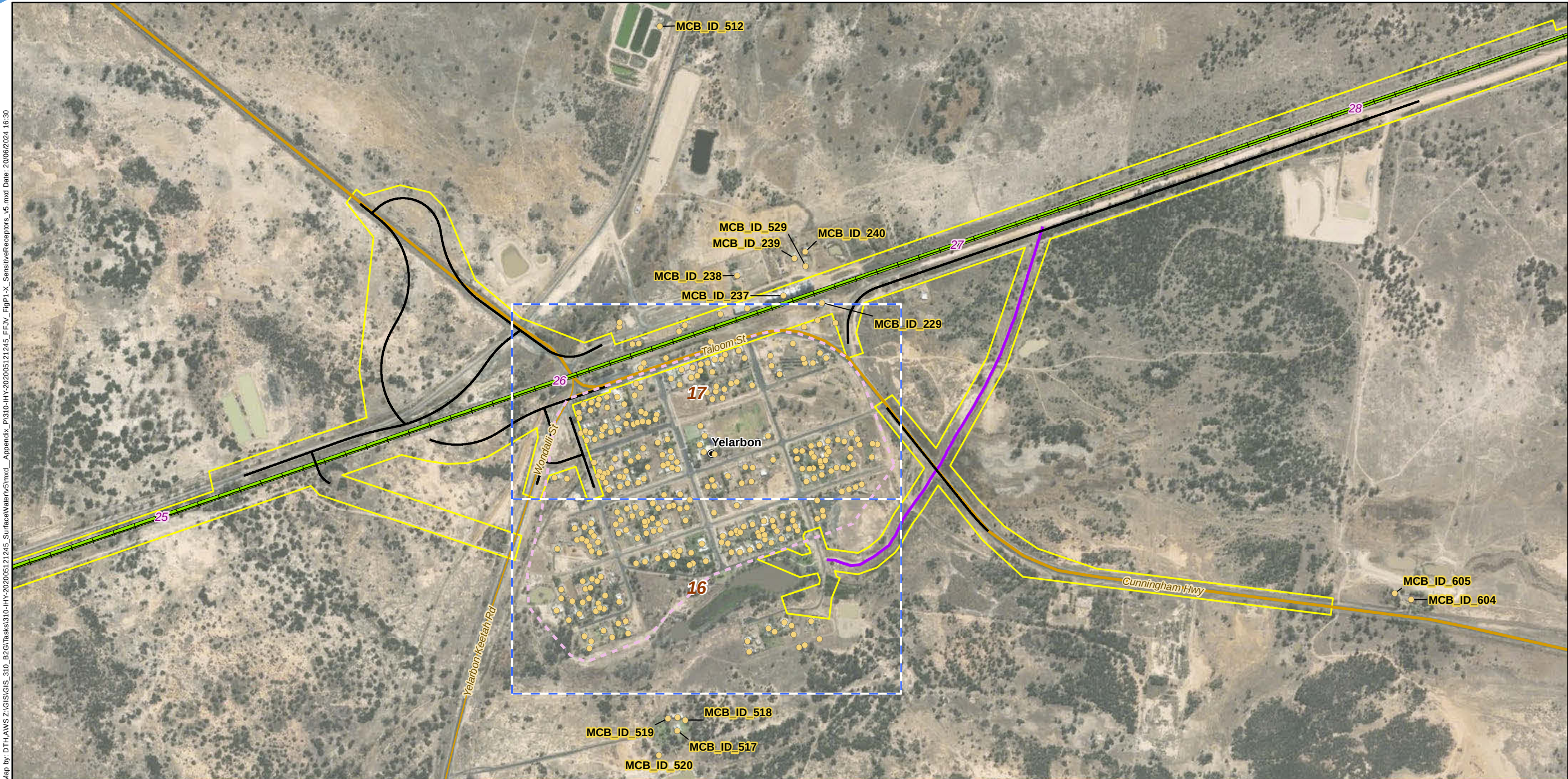


A3 scale: 1:10,000
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Legend

- 5 Chainage (km)
- Localities
- Existing rail (operational)
- Border to Gowrie alignment
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- Minor roads
- Yelarbon levee
- Yelarbon town outline
- Project flood sensitive receptors
- Project road design
- Project footprint
- 1:2,500 scale enlargement tile in series



A3 scale: 1:10,000
0 0.1 0.2 0.3 0.4 0.5km

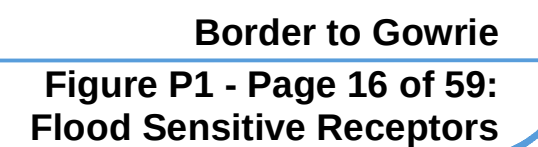
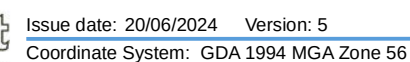


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Border to Gowrie
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Flood Sensitive Receptors



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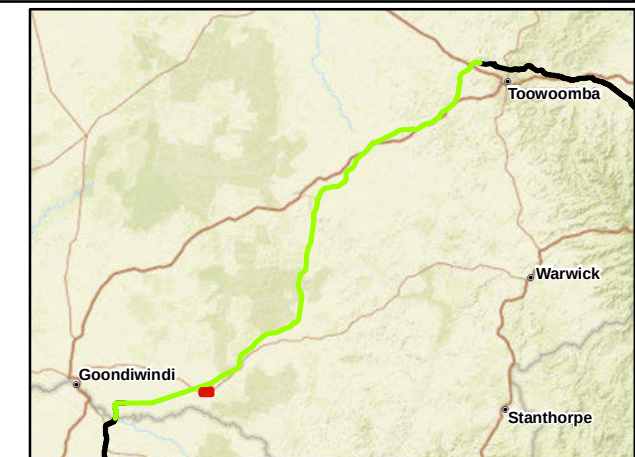


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Legend

- 5 Chainage (km)
- Major roads
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- Project footprint



A3 scale: 1:10,000
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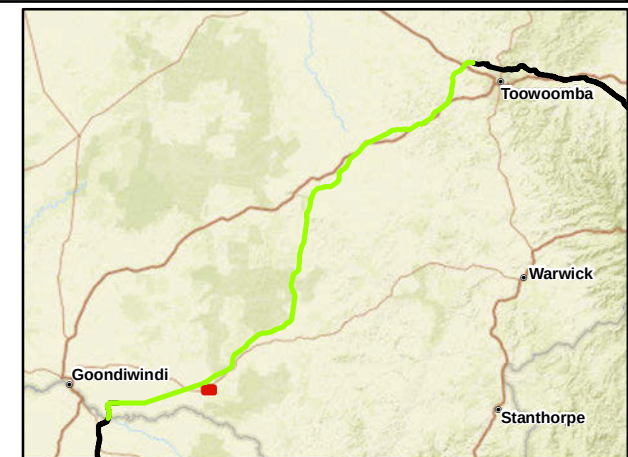
Border to Gowrie
Figure P1 - Page 18 of 59:
Flood Sensitive Receptors

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Legend

- 5 Chainage (km)
- Major roads
- Project flood sensitive receptors
- Project road design
- Project footprint



A3 scale: 1:10,000
0 0.1 0.2 0.3 0.4 0.5km

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\GIS_310_IHY\202005121245_SurfaceWater\5mxd_Appendix_P1\310-IHY\202005121245_FF\FF_P1-X_SensitiveReceptors_v5.mxd Date: 20/06/2024 16:31



Legend

- 5 Chainage (km)
- Major roads
- Project flood sensitive receptors
- Project road design
- Project footprint



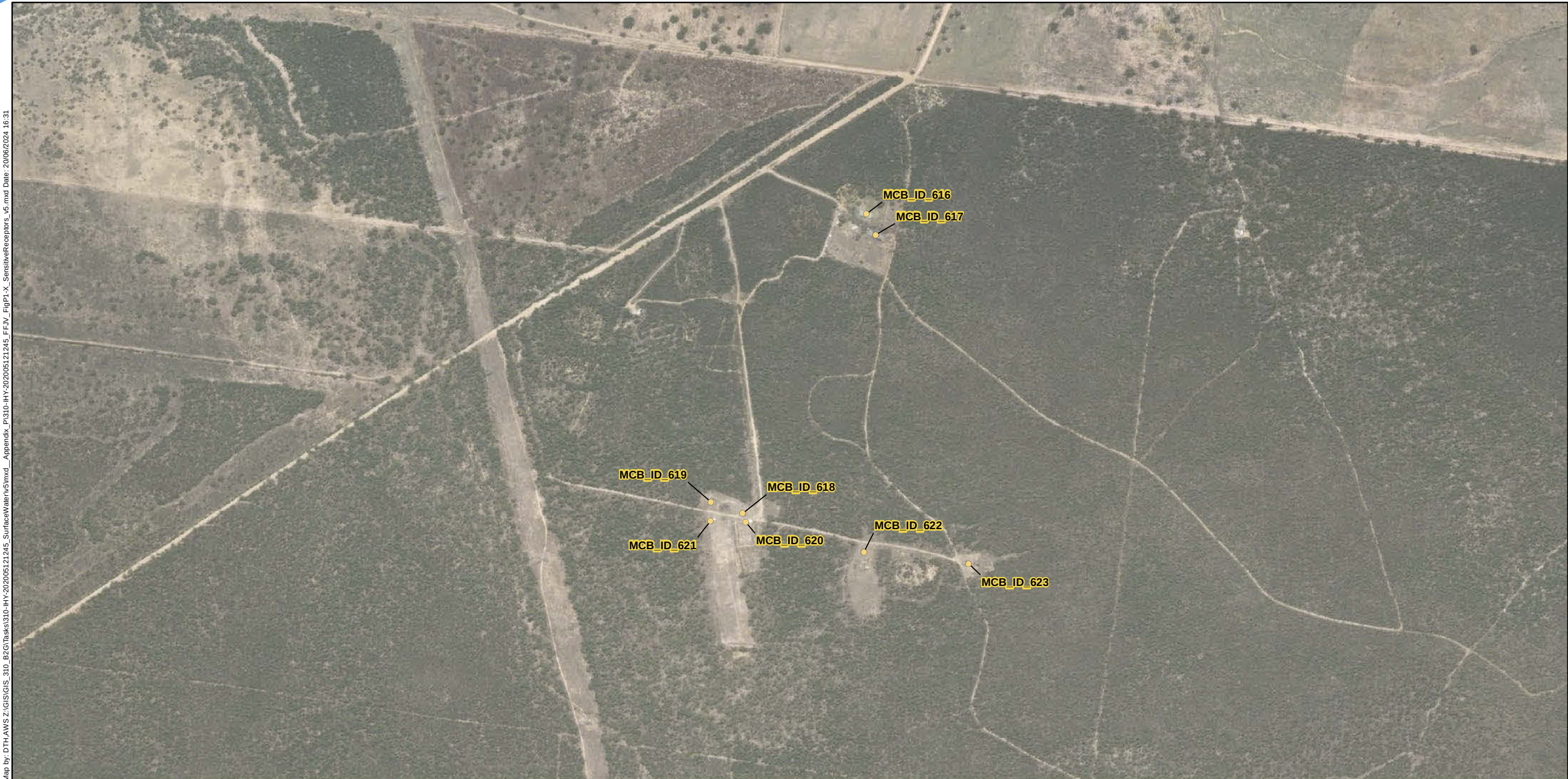
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Legend

- 5 Chainage (km)
- Project flood sensitive receptors
- Project road design
- Project footprint



A3 scale: 1:10,000
0 0.1 0.2 0.3 0.4 0.5km



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Border to Gowrie
Figure P1 - Page 21 of 59:
Flood Sensitive Receptors

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Legend

- 5 Chainage (km)
- Major roads
- Project flood sensitive receptors
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A3 scale: 1:10,000
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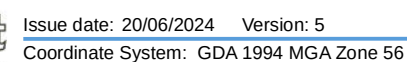
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Border to Gowrie
Figure P1 - Page 22 of 59:
Flood Sensitive Receptors



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**Figure P1 - Page 23 of 59:
Flood Sensitive Receptors**

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\GIS_310_IHY-202005121245_SurfaceWater\5mxd_Appendix_P1\310-IHY-202005121245_FFV_FigP1-X_SensitiveReceptors_v5.mxd Date: 20/06/2024 16:31



Legend

- 5 Chainage (km)
- Major roads
- Project flood sensitive receptors
- Project road design
- Project footprint



A3 scale: 1:10,000
0 0.1 0.2 0.3 0.4 0.5km



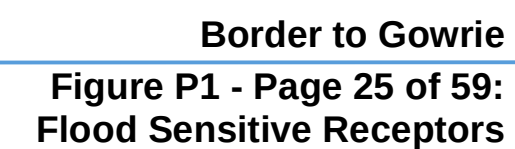
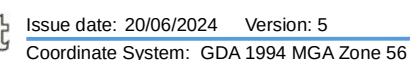
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Border to Gowrie
Figure P1 - Page 24 of 59:
Flood Sensitive Receptors



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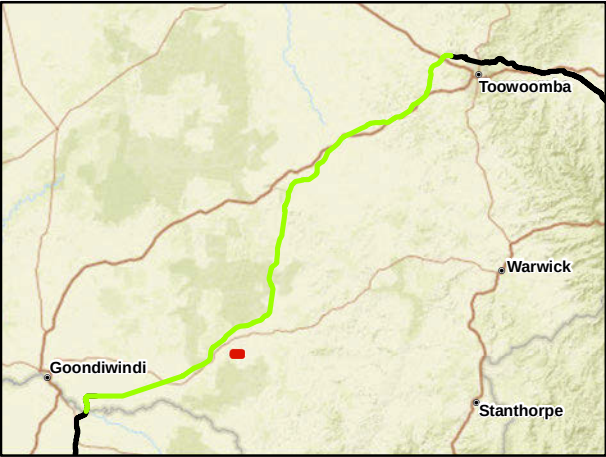


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Legend

- 5 Chainage (km)
- Project flood sensitive receptors
- Project road design
- Project footprint



A3 scale: 1:10,000
0 0.1 0.2 0.3 0.4 0.5km

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\310-IHY-202005121245_SurfaceWater\5mxd_Appendix_P\310-IHY-202005121245_FF\FF_P1-X_SensitiveReceptors_v5.mxd Date: 20/06/2024 16:32



Legend

- | | |
|----------------------------|-------------------------------------|
| 5 Chainage (km) | ● Project flood sensitive receptors |
| Border to Gowrie alignment | — Project road design |
| Major roads | □ Project footprint |



A3 scale: 1:10,000
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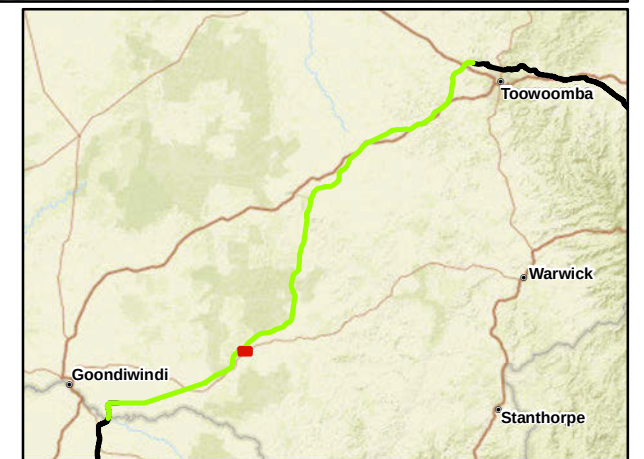
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Figure P1 - Page 27 of 59:
Flood Sensitive Receptors

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Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Major roads
- Project flood sensitive receptors
- Project road design
- Project footprint



A3 scale: 1:10,000
0 0.1 0.2 0.3 0.4 0.5km



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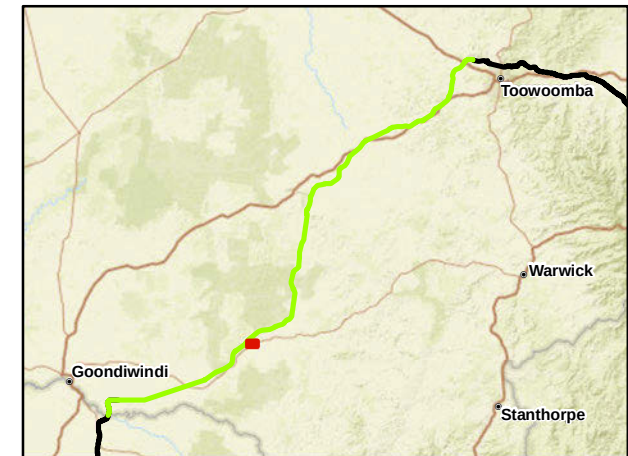
Border to Gowrie
Figure P1 - Page 28 of 59:
Flood Sensitive Receptors

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Legend

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|----------------------------|-------------------------------------|
| 5 Chainage (km) | ● Project flood sensitive receptors |
| Border to Gowrie alignment | — Project road design |
| Major roads | □ Project footprint |



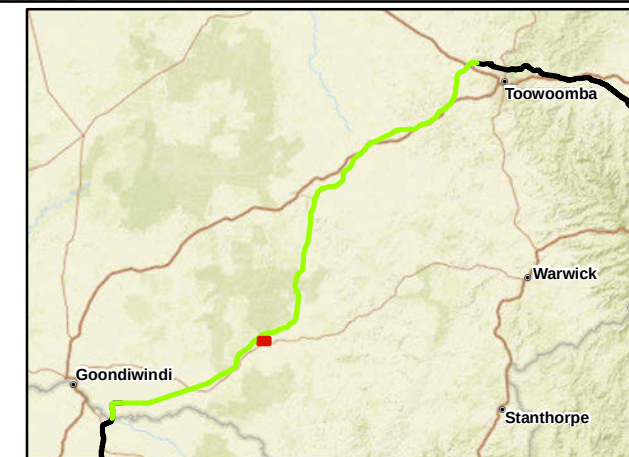
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Legend

- 5 Chainage (km)
- Major roads
- Project flood sensitive receptors
- Project road design
- Project footprint



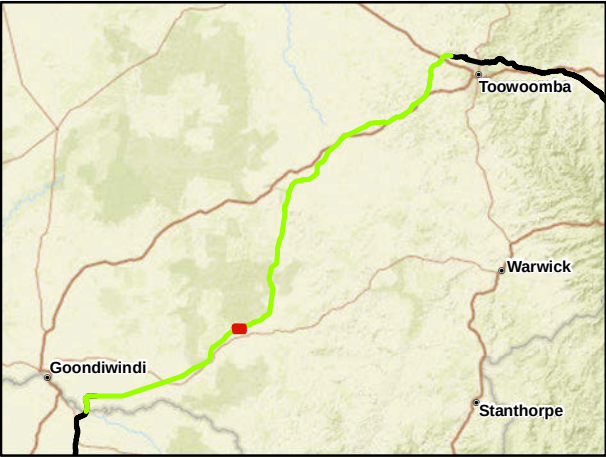
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Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Project flood sensitive receptors
- Project road design
- Project footprint



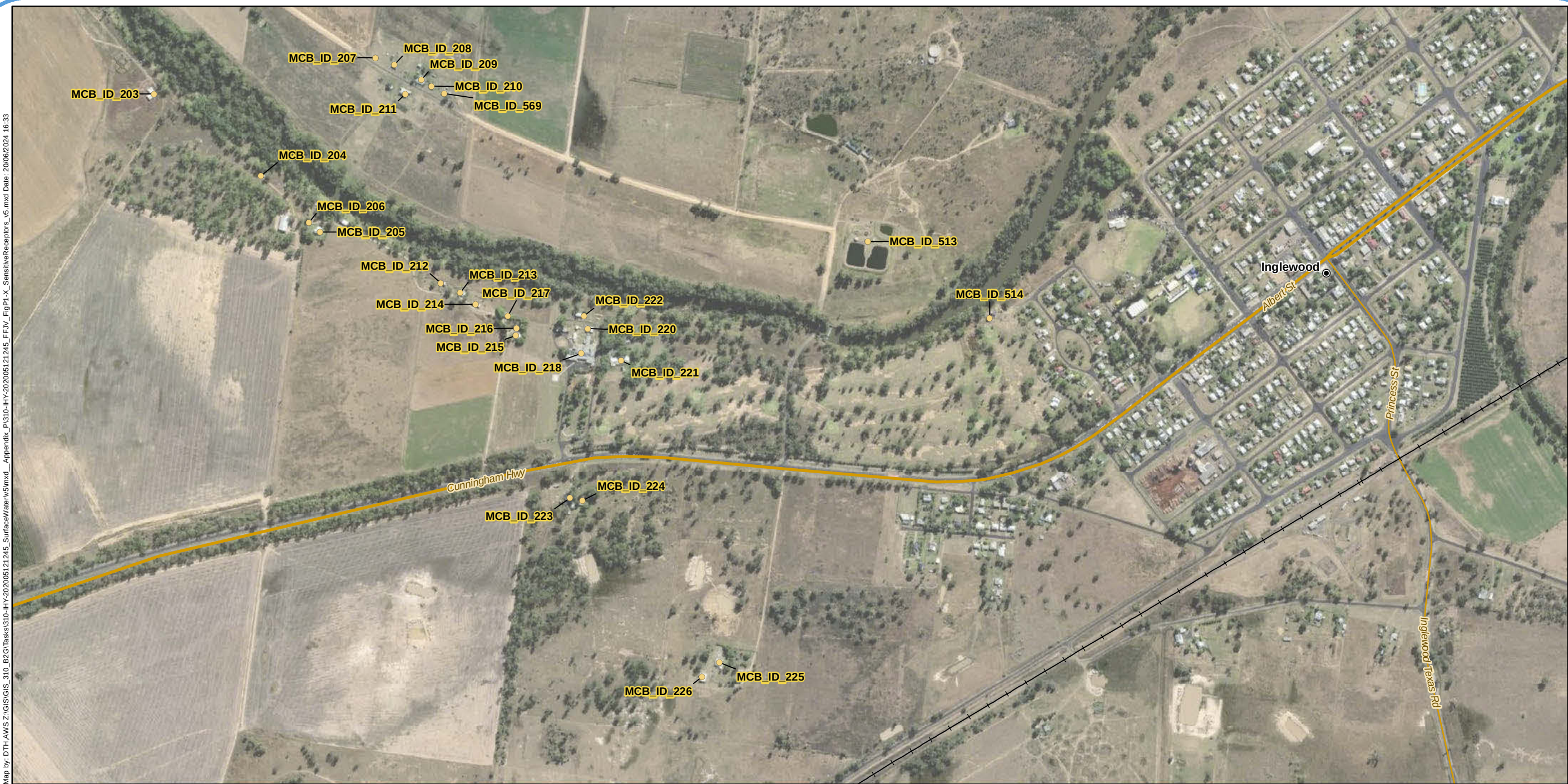
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Border to Gowrie
Figure P1 - Page 31 of 59:
Flood Sensitive Receptors



Legend

- 5 Chainage (km)
- Localities
- Existing rail (operational)
- Major roads
- Minor roads
- Project flood sensitive receptors
- Project road design
- Project footprint



A3 scale: 1:10,000
0 0.1 0.2 0.3 0.4 0.5km



Issue date: 20/06/2024 Version: 5
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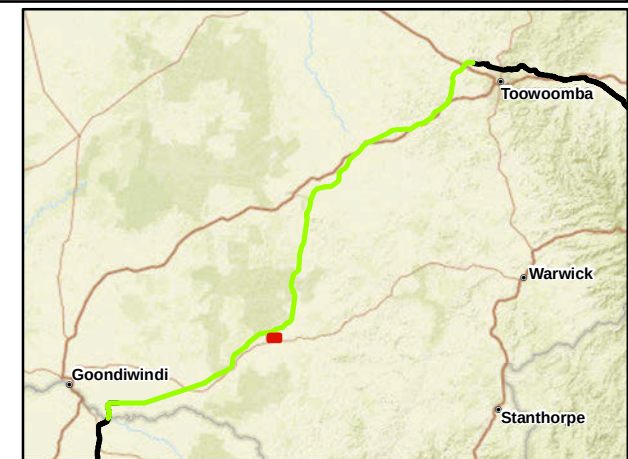
Border to Gowrie
Figure P1 - Page 32 of 59:
Flood Sensitive Receptors

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Legend

- 5 Chainage (km)
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- Minor roads
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- Project footprint



A3 scale: 1:10,000
0 0.1 0.2 0.3 0.4 0.5km



Issue date: 20/06/2024 Version: 5
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Legend

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- Project footprint



A3 scale: 1:10,000
0 0.1 0.2 0.3 0.4 0.5km



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Border to Gowrie
Figure P1 - Page 34 of 59:
Flood Sensitive Receptors

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\310-IHY-202005121245_SurfaceWater\5mxd_Appendix_P1\310-IHY-202005121245_FFV_FigP1-X_SensitiveReceptors_v5.mxd Date: 20/06/2024 16:33



Legend

- | | |
|----------------------------|-------------------------------------|
| 5 Chainage (km) | ● Project flood sensitive receptors |
| Border to Gowrie alignment | — Project road design |
| Minor roads | □ Project footprint |



A3 scale: 1:10,000
0 0.1 0.2 0.3 0.4 0.5km



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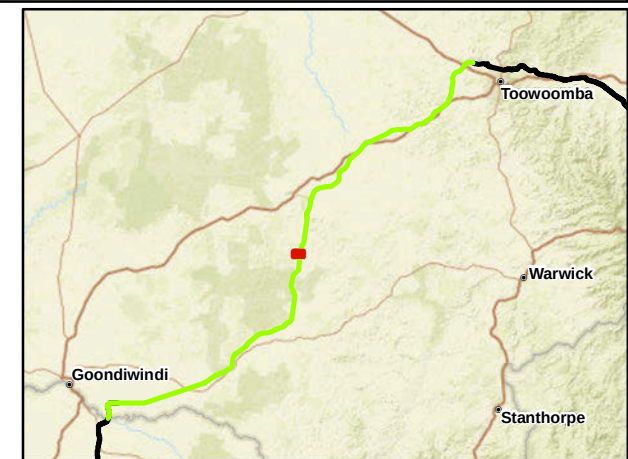
Border to Gowrie
Figure P1 - Page 35 of 59:
Flood Sensitive Receptors

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\Tasks\310-IHY-202005121245_SurfaceWater\5mxd_Appendix_P1\310-IHY-202005121245_FF_V_FigP1-X_SensitiveReceptors_v5.mxd Date: 20/06/2024 16:33



Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project flood sensitive receptors
- Project road design
- Project footprint



A3 scale: 1:10,000
0 0.1 0.2 0.3 0.4 0.5km



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Border to Gowrie
Figure P1 - Page 36 of 59:
Flood Sensitive Receptors

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\GIS_310_IHY\202005121245_SurfaceWater\5vmsd_Appendix_P1\310-IHY-202005121245_FFV_FigP1-X_SensitiveReceptors_v5.mxd Date: 20/06/2024 16:33



Legend

- | | |
|----------------------------|-------------------------------------|
| 5 Chainage (km) | ● Project flood sensitive receptors |
| Border to Gowrie alignment | — Project road design |
| Minor roads | □ Project footprint |



A3 scale: 1:10,000
0 0.1 0.2 0.3 0.4 0.5km



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Border to Gowrie
Figure P1 - Page 37 of 59:
Flood Sensitive Receptors

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\GIS_310-IHY-202005121245_SurfaceWater\5vmsd_Appendix_P1\310-IHY-202005121245_FF\FF_P1-X_SensitiveReceptors_v5.mxd Date: 20/06/2024 16:33



Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project flood sensitive receptors
- Project road design
- Project footprint



A3 scale: 1:10,000
0 0.1 0.2 0.3 0.4 0.5km



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Coordinate System: GDA 1994 MGA Zone 56

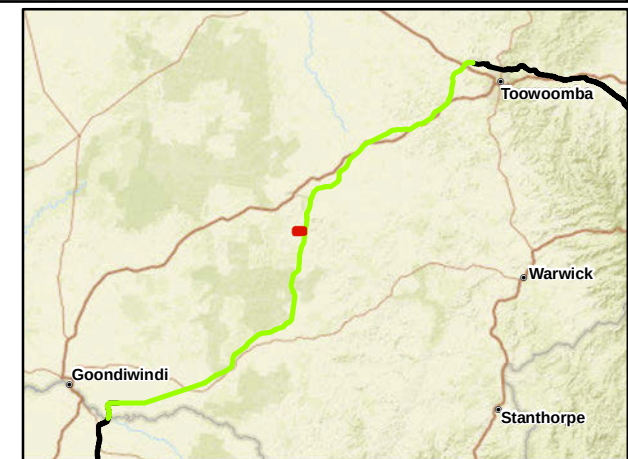
Border to Gowrie
Figure P1 - Page 38 of 59:
Flood Sensitive Receptors

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\310-IHY-202005121245_SurfaceWater\5vnxmxd_Appendix_P1\310-IHY-202005121245_FFV_FigP1-X_SensitiveReceptors_v5.mxd Date: 20/06/2024 16:34



Legend

- 5 Chainage (km)
- Minor roads
- Project flood sensitive receptors
- Project road design
- Project footprint

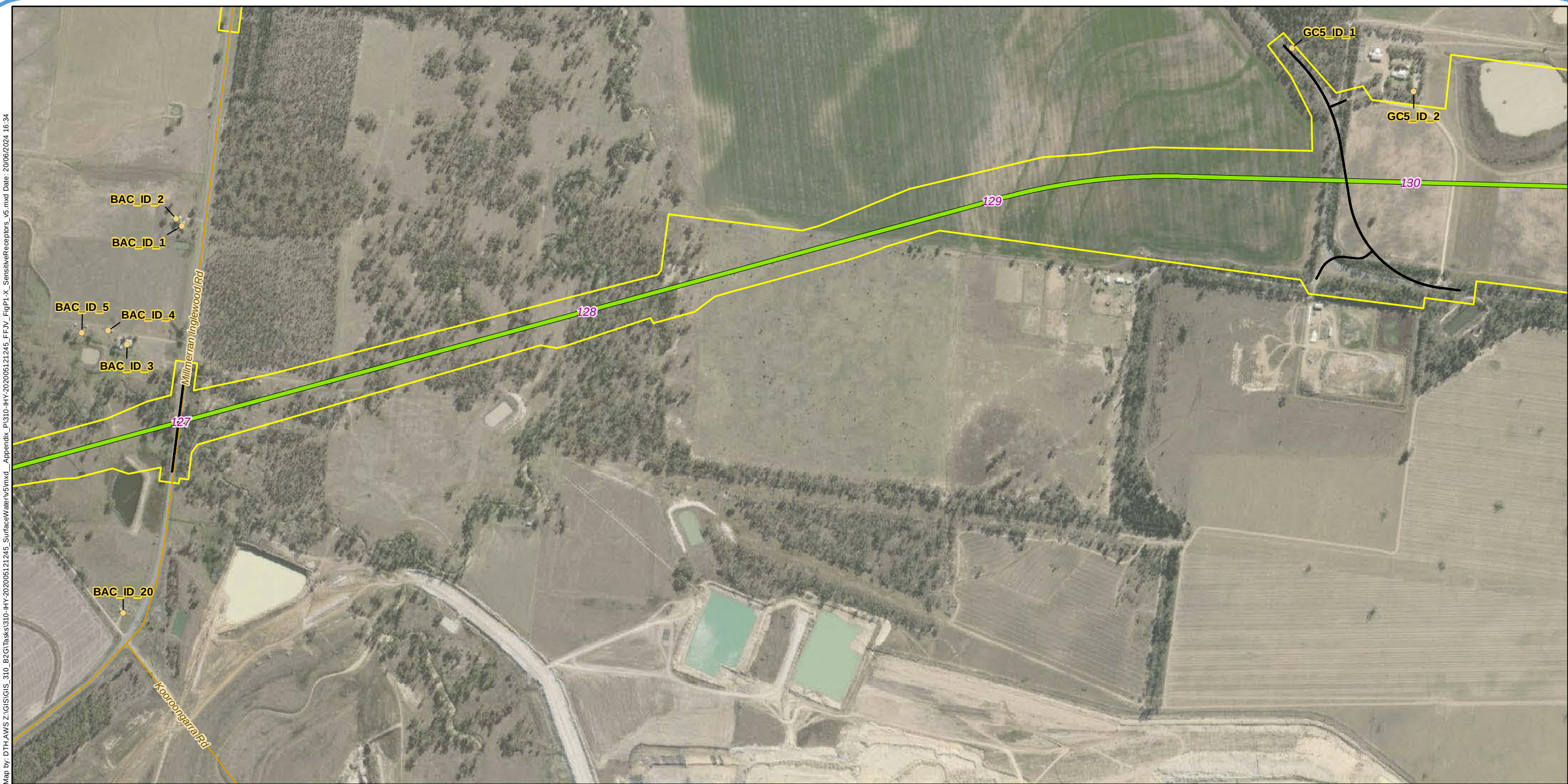


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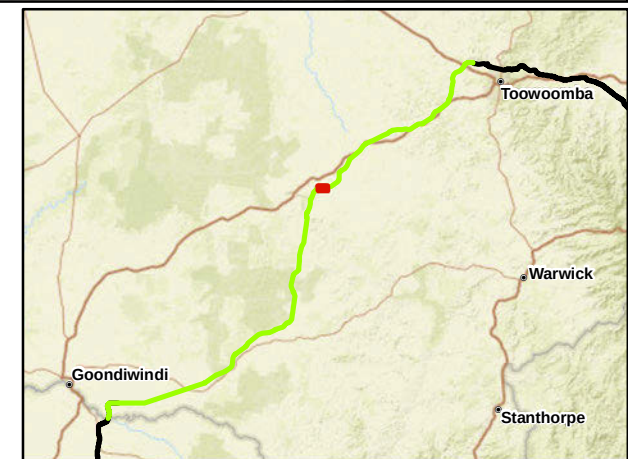
Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie
Figure P1 - Page 39 of 59:
Flood Sensitive Receptors



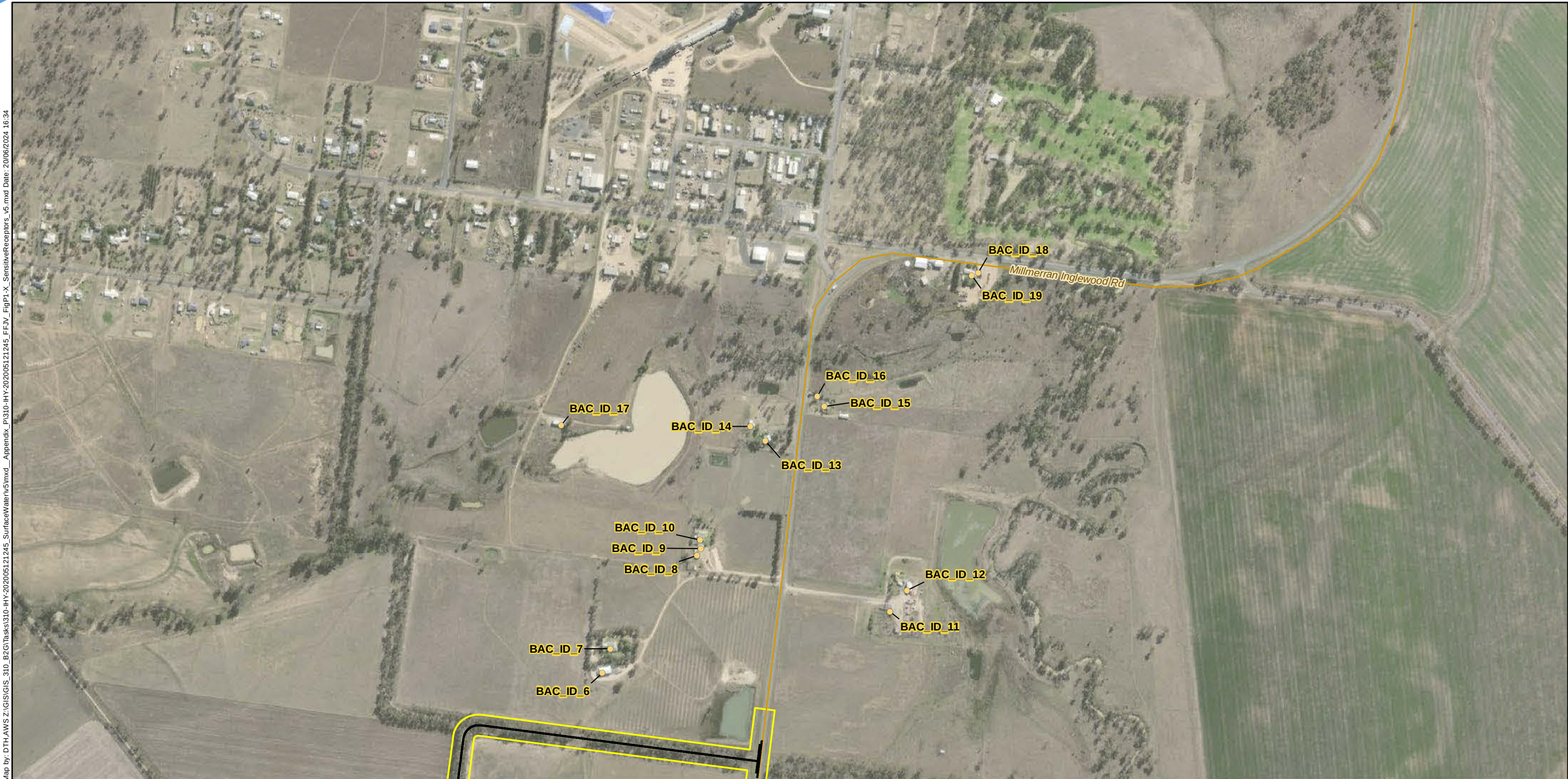
Legend

- | | |
|----------------------------|-----------------------------------|
| 5 Chainage (km) | Project flood sensitive receptors |
| Border to Gowrie alignment | Project road design |
| Minor roads | Project footprint |



A3 scale: 1:10,000
0 0.1 0.2 0.3 0.4 0.5km

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\GIS_310_IHY\202005121245_SurfaceWater\5vmsd_Appendix_P1\310-IHY-202005121245_FF_V_FigP1-X_SensitiveReceptors_v5.mxd Date: 20/06/2024 16:34



Legend

- 5 Chainage (km)
- Existing rail (non-operational)
- Minor roads
- Project flood sensitive receptors
- Project road design
- Project footprint



A3 scale: 1:10,000
0 0.1 0.2 0.3 0.4 0.5km



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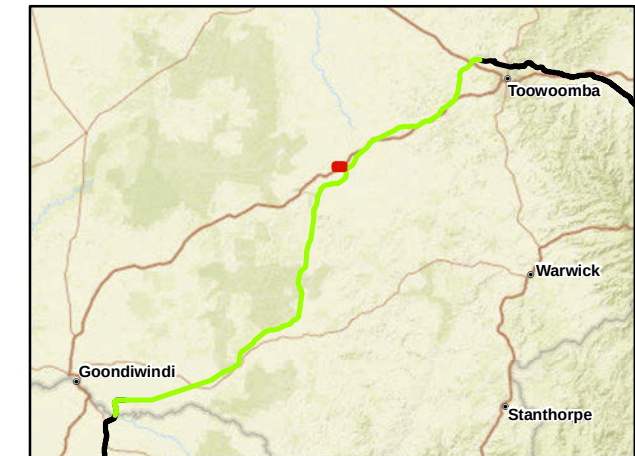
Border to Gowrie
Figure P1 - Page 41 of 59:
Flood Sensitive Receptors

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\GIS_310-IHY-202005121245_SurfaceWater\5mxd_Appendix_P1\310-IHY-202005121245_FF\FF_FigP1-X_SensitiveReceptors_v5.mxd Date: 20/06/2024 16:34



Legend

- 5 Chainage (km)
- Existing rail (non-operational)
- Major roads
- Project flood sensitive receptors
- Project road design
- Project footprint



A3 scale: 1:10,000
0 0.1 0.2 0.3 0.4 0.5km



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Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\310-IHY-202005121245_SurfaceWater\5mxd_Appendix_P1\310-IHY-202005121245_FFV_FigP1-X_SensitiveReceptors_v5.mxd Date: 20/06/2024 16:34



Legend

- 5 Chainage (km)
- Existing rail (non-operational)
- Border to Gowrie alignment
- Major roads
- Minor roads
- Project flood sensitive receptors
- Project road design
- Project footprint



A3 scale: 1:10,000
0 0.1 0.2 0.3 0.4 0.5km



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Border to Gowrie
Figure P1 - Page 43 of 59:
Flood Sensitive Receptors

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\GIS_310_IHY\202005121245_SurfaceWater\5mxd_Appldix_P\310-IHY\202005121245_FF\J_V_FigP1-X_SensitiveReceptors_v5.mxd Date: 20/06/2024 16:34



Legend

- 5 Chainage (km)
- Major roads
- Project flood sensitive receptors
- Project road design
- Project footprint



A3 scale: 1:10,000
0 0.1 0.2 0.3 0.4 0.5km



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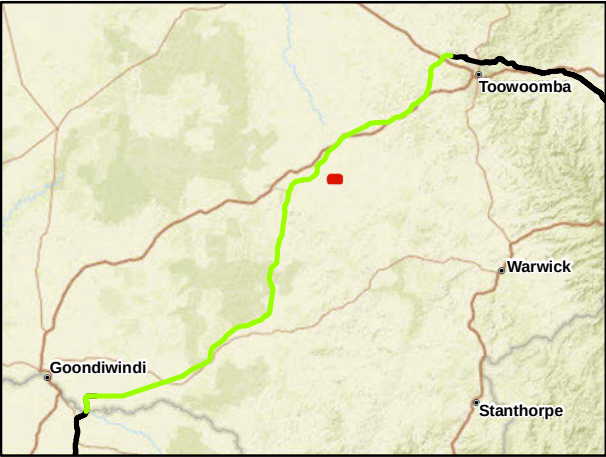
Border to Gowrie
Figure P1 - Page 44 of 59:
Flood Sensitive Receptors

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\GIS_310_IHY\202005121245_SurfaceWater\5vmsd_Appendix_P1\310-IHY\202005121245_FFV_FigP1-X_SensitiveReceptors_v5.mxd Date: 20/06/2024 16:34



Legend

- 5 Chainage (km)
- Minor roads
- Project flood sensitive receptors
- Project road design
- Project footprint



A3 scale: 1:10,000
0 0.1 0.2 0.3 0.4 0.5km



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Legend

- 5 Chainage (km)
- Minor roads
- Project flood sensitive receptors
- Project road design
- Project footprint



A3 scale: 1:10,000
0 0.1 0.2 0.3 0.4 0.5km



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Coordinate System: GDA 1994 MGA Zone 56

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\GIS_310_IHY\202005121245_SurfaceWater\5mxd_Appendix_P1\310-IHY\202005121245_FF\FF_P1-X_SensitiveReceptors_v5.mxd Date: 20/06/2024 16:35



Legend

- 5 Chainage (km)
- Minor roads
- Project flood sensitive receptors
- Project road design
- Project footprint



A3 scale: 1:10,000
0 0.1 0.2 0.3 0.4 0.5km



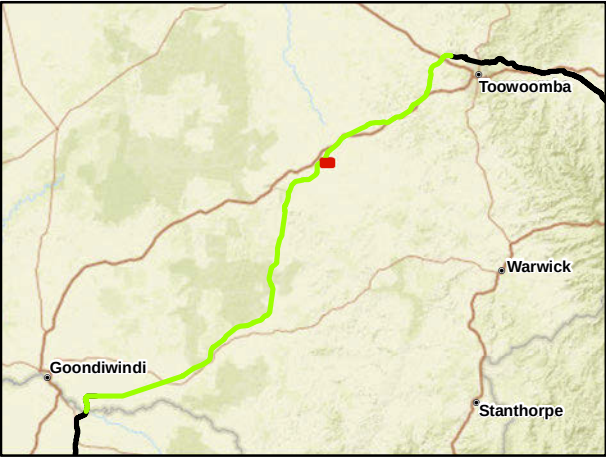
Future Freight
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Coordinate System: GDA 1994 MGA Zone 56



Legend

- 5 Chainage (km)
- Existing rail (non-operational)
- Border to Gowrie alignment
- Minor roads
- Project flood sensitive receptors
- Project road design
- Project footprint



A3 scale: 1:10,000
0 0.1 0.2 0.3 0.4 0.5km



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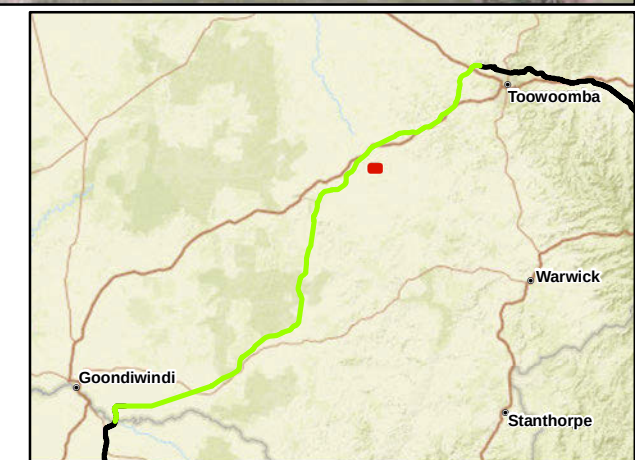
Border to Gowrie
Figure P1 - Page 48 of 59:
Flood Sensitive Receptors

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\Tasks\310-IHY-202005121245_SurfaceWater\5vmsxd_Appendix_P1\310-IHY-202005121245_FF_V_FigP1-X_SensitiveReceptors_v5.mxd Date: 20/06/2024 16:35



Legend

- 5 Chainage (km)
- Project flood sensitive receptors
- Project road design
- Project footprint



A3 scale: 1:10,000
0 0.1 0.2 0.3 0.4 0.5km



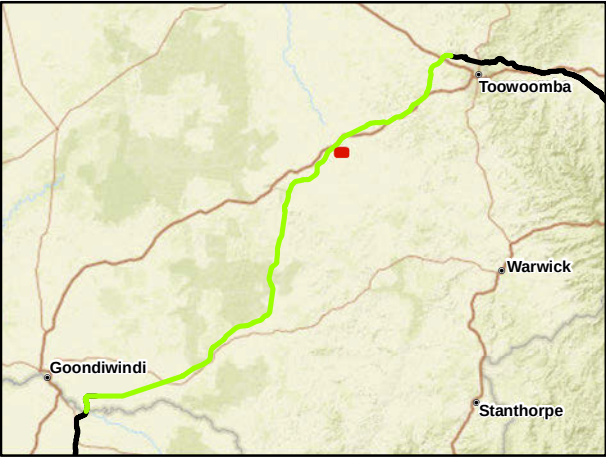
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Legend

- 5 Chainage (km)
- Project flood sensitive receptors
- Project road design
- Project footprint



A3 scale: 1:10,000
0 0.1 0.2 0.3 0.4 0.5km



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Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie
Figure P1 - Page 50 of 59:
Flood Sensitive Receptors



Legend

- 5 Chainage (km)
- Existing rail (non-operational)
- Border to Gowrie alignment
- Major roads
- Minor roads
- Project flood sensitive receptors
- Project road design
- Project footprint



A3 scale: 1:10,000
0 0.1 0.2 0.3 0.4 0.5km



Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie
Figure P1 - Page 51 of 59:
Flood Sensitive Receptors

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\GIS_310_IHY-202005121245_SurfaceWater\5mxd_Appendix_P\310-IHY-202005121245_FF\FF_P1-X_SensitiveReceptors_v5.mxd Date: 20/06/2024 16:35



Legend

- 5 Chainage (km)
- Minor roads
- Project flood sensitive receptors
- Project road design
- Project footprint



A3 scale: 1:10,000
0 0.1 0.2 0.3 0.4 0.5km



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Border to Gowrie
Figure P1 - Page 52 of 59:
Flood Sensitive Receptors



Legend

- | | |
|---------------------------------------|-------------------------------------|
| 5 Chainage (km) | ● Project flood sensitive receptors |
| — Existing rail (operational) | — Project road design |
| - - - Existing rail (non-operational) | □ Project footprint |
| — Border to Gowrie alignment | |
| — Major roads | |



A3 scale: 1:10,000
0 0.1 0.2 0.3 0.4 0.5km



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Border to Gowrie
Figure P1 - Page 53 of 59:
Flood Sensitive Receptors

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\GIS_310_IHY-202005121245_SurfaceWater\5mxd_Appendix_P1\310-IHY-202005121245_FF_V_FigP1-X_SensitiveReceptors_v5.mxd Date: 20/06/2024 16:36



Legend

- 5 Chainage (km)
- Project flood sensitive receptors
- Project road design
- Project footprint

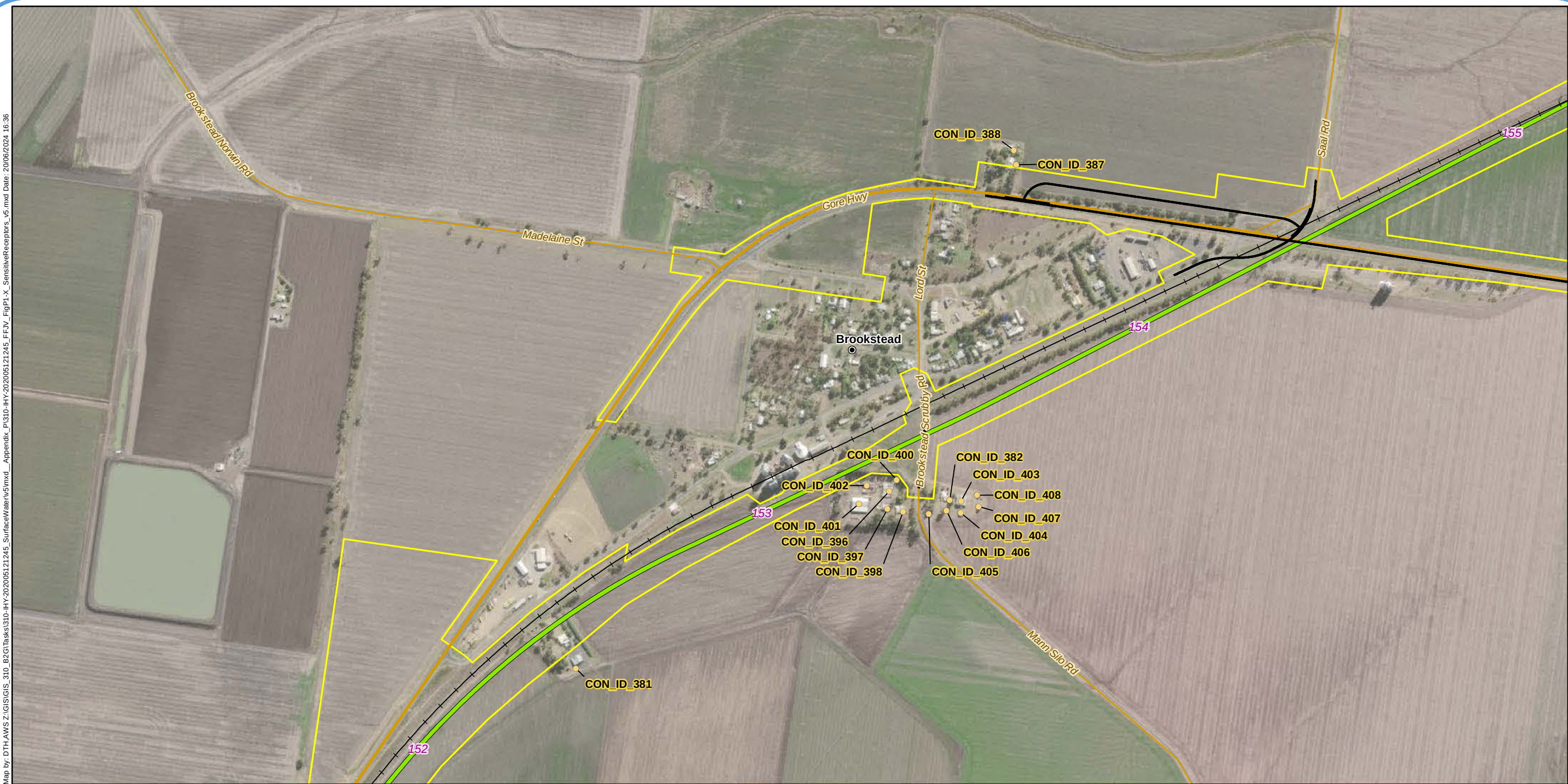


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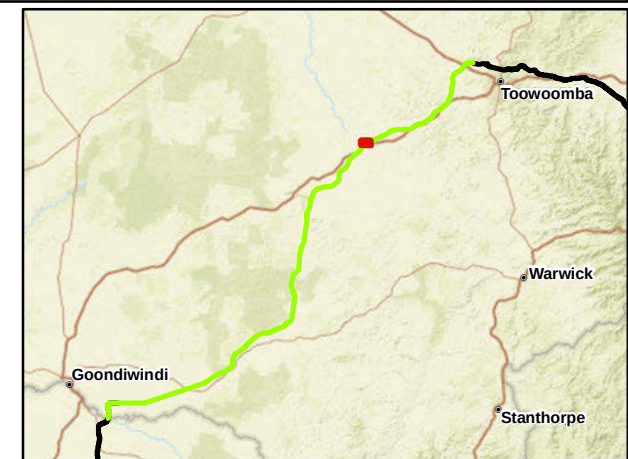
Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie
Figure P1 - Page 54 of 59:
Flood Sensitive Receptors



Legend

- 5 Chainage (km)
- Localities
- Existing rail (operational)
- Border to Gowrie alignment
- Major roads
- Minor roads
- Project flood sensitive receptors
- Project road design
- Project footprint



A3 scale: 1:10,000
0 0.1 0.2 0.3 0.4 0.5km



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Border to Gowrie
Figure P1 - Page 55 of 59:
Flood Sensitive Receptors

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\GIS_310-IHY-202005121245_SurfaceWater\5mxd_Appendix_P1\310-IHY-202005121245_FF_V_FigP1-X_SensitiveReceptors_v5.mxd Date: 20/06/2024 16:36



Legend

- | | |
|----------------------------|-----------------------------------|
| 5 Chainage (km) | Project flood sensitive receptors |
| Border to Gowrie alignment | Project road design |
| Major roads | Project footprint |
| Minor roads | |



A3 scale: 1:10,000
0 0.1 0.2 0.3 0.4 0.5km



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Border to Gowrie
Figure P1 - Page 56 of 59:
Flood Sensitive Receptors

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\GIS_310_IHY\202005121245_SurfaceWater\5vnxmxd_Appendix_P\310_IHY\202005121245_FF\FF_P1-X_SensitiveReceptors_v5.mxd Date: 20/06/2024 16:36



Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Project flood sensitive receptors
- Project road design
- Project footprint



A3 scale: 1:10,000
0 0.1 0.2 0.3 0.4 0.5km



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Border to Gowrie
Figure P1 - Page 57 of 59:
Flood Sensitive Receptors

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\GIS_310_IHY\202005121245_SurfaceWater\5mxd_Appendix_P1\310-IHY\202005121245_FF_V_FigP1-X_SensitiveReceptors_v5.mxd Date: 20/06/2024 16:36



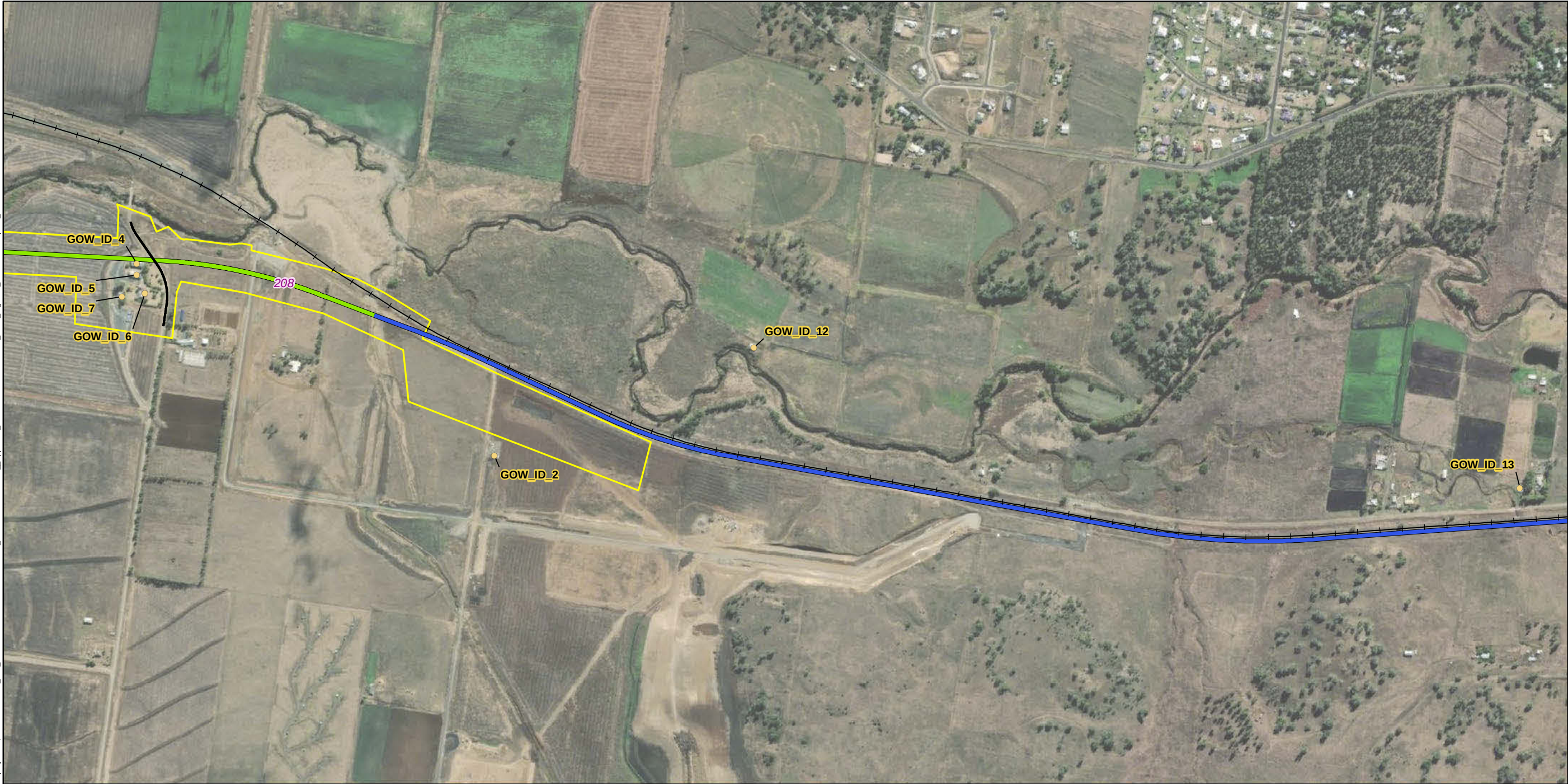
Legend

- 5 Chainage (km)
- Project flood sensitive receptors
- Project road design
- Project footprint



A3 scale: 1:10,000
0 0.1 0.2 0.3 0.4 0.5km

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\GIS_310_IHY\202005121245_SurfaceWater\5mxd_Appendix_P1\310-IHY\202005121245_FF_V_FigP1-X_SensitiveReceptors_v5.mxd Date: 20/06/2024 16:36



Legend

- | | |
|-------------------------------|-------------------------------------|
| 5 Chainage (km) | ● Project flood sensitive receptors |
| — Existing rail (operational) | — Project road design |
| — Border to Gowrie alignment | □ Project footprint |
| — Gowrie to Helidon alignment | |



A3 scale: 1:10,000
0 0.1 0.2 0.3 0.4 0.5km



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Border to Gowrie
Figure P1 - Page 59 of 59:
Flood Sensitive Receptors

APPENDIX T2

Hydrology and Flooding Technical Report—Volume 2

Appendix Q Flow distribution flood maps

BORDER TO GOWRIE REVISED DRAFT ENVIRONMENTAL IMPACT STATEMENT

Appendix Q

Flow Distribution Flood Maps

Figure Q1-1	Percentage Change in Flow Distribution - 20% AEP Event - Gowrie Creek
Figure Q1-2	Percentage Change in Flow Distribution - 10% AEP Event - Gowrie Creek
Figure Q1-3	Percentage Change in Flow Distribution - 5% AEP Event - Gowrie Creek
Figure Q1-4	Percentage Change in Flow Distribution - 2% AEP Event - Gowrie Creek
Figure Q1-5	Percentage Change in Flow Distribution - 1% AEP Event - Gowrie Creek
Figure Q1-6	Percentage Change in Flow Distribution - 1 in 2000 AEP Event - Gowrie Creek
Figure Q1-7	Percentage Change in Flow Distribution - 1 in 10000 Event - Gowrie Creek
Figure Q1-8	Percentage Change in Flow Distribution - PMF Event - Gowrie Creek
Figure Q2-1	Percentage Change in Flow Distribution - 20% AEP Event - Westbrook Creek
Figure Q2-2	Percentage Change in Flow Distribution - 10% AEP Event - Westbrook Creek
Figure Q2-3	Percentage Change in Flow Distribution - 5% AEP Event - Westbrook Creek
Figure Q2-4	Percentage Change in Flow Distribution - 2% AEP Event - Westbrook Creek
Figure Q2-5	Percentage Change in Flow Distribution - 1% AEP Event - Westbrook Creek
Figure Q2-6	Percentage Change in Flow Distribution - 1 in 2000 AEP Event - Westbrook Creek
Figure Q2-7	Percentage Change in Flow Distribution - 1 in 10000 Event - Westbrook Creek
Figure Q2-8	Percentage Change in Flow Distribution - PMF Event - Westbrook Creek
Figure Q3-1	Percentage Change in Flow Distribution - 20% AEP Event - Condamine River
Figure Q3-2	Percentage Change in Flow Distribution - 10% AEP Event - Condamine River
Figure Q3-3	Percentage Change in Flow Distribution - 5% AEP Event - Condamine River
Figure Q3-4	Percentage Change in Flow Distribution - 2% AEP Event - Condamine River
Figure Q3-5	Percentage Change in Flow Distribution - 1% AEP Event - Condamine River
Figure Q3-6	Percentage Change in Flow Distribution - 1 in 2000 AEP Event - Condamine River
Figure Q3-7	Percentage Change in Flow Distribution - 1 in 10000 Event - Condamine River
Figure Q3-8	Percentage Change in Flow Distribution - PMF Event - Condamine River
Figure Q4-1	Percentage Change in Flow Distribution - 20% AEP Event - Back Creek
Figure Q4-2	Percentage Change in Flow Distribution - 10% AEP Event - Back Creek
Figure Q4-3	Percentage Change in Flow Distribution - 5% AEP Event - Back Creek
Figure Q4-4	Percentage Change in Flow Distribution - 2% AEP Event - Back Creek
Figure Q4-5	Percentage Change in Flow Distribution - 1% AEP Event - Back Creek
Figure Q4-6	Percentage Change in Flow Distribution - 1 in 2000 AEP Event - Back Creek
Figure Q4-7	Percentage Change in Flow Distribution - 1 in 10000 Event - Back Creek
Figure Q4-8	Percentage Change in Flow Distribution - PMF Event - Back Creek
Figure Q5-1	Percentage Change in Flow Distribution - 20% AEP Event - Nicol Creek
Figure Q5-2	Percentage Change in Flow Distribution - 10% AEP Event - Nicol Creek
Figure Q5-3	Percentage Change in Flow Distribution - 5% AEP Event - Nicol Creek
Figure Q5-4	Percentage Change in Flow Distribution - 2% AEP Event - Nicol Creek
Figure Q5-5	Percentage Change in Flow Distribution - 1% AEP Event - Nicol Creek
Figure Q5-6	Percentage Change in Flow Distribution - 1 in 2000 AEP Event - Nicol Creek
Figure Q5-7	Percentage Change in Flow Distribution - 1 in 10000 Event - Nicol Creek
Figure Q5-8	Percentage Change in Flow Distribution - PMF Event - Nicol Creek
Figure Q6-1	Percentage Change in Flow Distribution - 20% AEP Event - Bringalily Creek
Figure Q6-2	Percentage Change in Flow Distribution - 10% AEP Event - Bringalily Creek
Figure Q6-3	Percentage Change in Flow Distribution - 5% AEP Event - Bringalily Creek
Figure Q6-4	Percentage Change in Flow Distribution - 2% AEP Event - Bringalily Creek
Figure Q6-5	Percentage Change in Flow Distribution - 1% AEP Event - Bringalily Creek
Figure Q6-6	Percentage Change in Flow Distribution - 1 in 2000 AEP Event - Bringalily Creek
Figure Q6-7	Percentage Change in Flow Distribution - 1 in 10000 Event - Bringalily Creek
Figure Q6-8	Percentage Change in Flow Distribution - PMF Event - Bringalily Creek

Figure Q7-1	Percentage Change in Flow Distribution - 20% AEP Event - Native Dog Creek
Figure Q7-2	Percentage Change in Flow Distribution - 10% AEP Event - Native Dog Creek
Figure Q7-3	Percentage Change in Flow Distribution - 5% AEP Event - Native Dog Creek
Figure Q7-4	Percentage Change in Flow Distribution - 2% AEP Event - Native Dog Creek
Figure Q7-5	Percentage Change in Flow Distribution - 1% AEP Event - Native Dog Creek
Figure Q7-6	Percentage Change in Flow Distribution - 1 in 2000 AEP Event - Native Dog Creek
Figure Q7-7	Percentage Change in Flow Distribution - 1 in 10000 Event - Native Dog Creek
Figure Q7-8	Percentage Change in Flow Distribution - PMF Event - Native Dog Creek
Figure Q8-1	Percentage Change in Flow Distribution - 20% AEP Event - Cattle Creek
Figure Q8-2	Percentage Change in Flow Distribution - 10% AEP Event - Cattle Creek
Figure Q8-3	Percentage Change in Flow Distribution - 5% AEP Event - Cattle Creek
Figure Q8-4	Percentage Change in Flow Distribution - 2% AEP Event - Cattle Creek
Figure Q8-5	Percentage Change in Flow Distribution - 1% AEP Event - Cattle Creek
Figure Q8-6	Percentage Change in Flow Distribution - 1 in 2000 AEP Event - Cattle Creek
Figure Q8-7	Percentage Change in Flow Distribution - 1 in 10000 Event - Cattle Creek
Figure Q8-8	Percentage Change in Flow Distribution - PMF Event - Cattle Creek
Figure Q9-1	Percentage Change in Flow Distribution - 20% AEP Event - Pariagara Creek
Figure Q9-2	Percentage Change in Flow Distribution - 10% AEP Event - Pariagara Creek
Figure Q9-3	Percentage Change in Flow Distribution - 5% AEP Event - Pariagara Creek
Figure Q9-4	Percentage Change in Flow Distribution - 2% AEP Event - Pariagara Creek
Figure Q9-5	Percentage Change in Flow Distribution - 1% AEP Event - Pariagara Creek
Figure Q9-6	Percentage Change in Flow Distribution - 1 in 2000 AEP Event - Pariagara Creek
Figure Q9-7	Percentage Change in Flow Distribution - 1 in 10000 Event - Pariagara Creek
Figure Q9-8	Percentage Change in Flow Distribution - PMF Event - Pariagara Creek
Figure Q10-1	Percentage Change in Flow Distribution - 20% AEP Event - Macintyre Brook
Figure Q10-2	Percentage Change in Flow Distribution - 10% AEP Event - Macintyre Brook
Figure Q10-3	Percentage Change in Flow Distribution - 5% AEP Event - Macintyre Brook
Figure Q10-4	Percentage Change in Flow Distribution - 2% AEP Event - Macintyre Brook
Figure Q10-5	Percentage Change in Flow Distribution - 1% AEP Event - Macintyre Brook
Figure Q10-6	Percentage Change in Flow Distribution - 1 in 2000 AEP Event - Macintyre Brook
Figure Q10-7	Percentage Change in Flow Distribution - 1 in 10000 Event - Macintyre Brook
Figure Q10-8	Percentage Change in Flow Distribution - PMF Event - Macintyre Brook
Figure Q11-1	Percentage Change in Flow Distribution - 20% AEP Event - Bybera Road
Figure Q11-2	Percentage Change in Flow Distribution - 10% AEP Event - Bybera Road
Figure Q11-3	Percentage Change in Flow Distribution - 5% AEP Event - Bybera Road
Figure Q11-4	Percentage Change in Flow Distribution - 2% AEP Event - Bybera Road
Figure Q11-5	Percentage Change in Flow Distribution - 1% AEP Event - Bybera Road
Figure Q11-6	Percentage Change in Flow Distribution - 1 in 2000 AEP Event - Bybera Road
Figure Q11-7	Percentage Change in Flow Distribution - 1 in 10000 Event - Bybera Road
Figure Q11-8	Percentage Change in Flow Distribution - PMF Event - Bybera Road
Figure Q12-1	Percentage Change in Flow Distribution - 20% AEP Event - Cremascos Road
Figure Q12-2	Percentage Change in Flow Distribution - 10% AEP Event - Cremascos Road
Figure Q12-3	Percentage Change in Flow Distribution - 5% AEP Event - Cremascos Road
Figure Q12-4	Percentage Change in Flow Distribution - 2% AEP Event - Cremascos Road
Figure Q12-5	Percentage Change in Flow Distribution - 1% AEP Event - Cremascos Road
Figure Q12-6	Percentage Change in Flow Distribution - 1 in 2000 AEP Event - Cremascos Road
Figure Q12-7	Percentage Change in Flow Distribution - 1 in 10000 Event - Cremascos Road
Figure Q12-8	Percentage Change in Flow Distribution - PMF Event - Cremascos Road

Figure Q13-1	Percentage Change in Flow Distribution - 20% AEP Event - Macintyre River
Figure Q13-2	Percentage Change in Flow Distribution - 10% AEP Event - Macintyre River
Figure Q13-3	Percentage Change in Flow Distribution - 5% AEP Event - Macintyre River
Figure Q13-4	Percentage Change in Flow Distribution - 2% AEP Event - Macintyre River
Figure Q13-5	Percentage Change in Flow Distribution - 1% AEP Event - Macintyre River
Figure Q13-6	Percentage Change in Flow Distribution - 1 in 2000 AEP Event - Macintyre River
Figure Q13-7	Percentage Change in Flow Distribution - 1 in 10000 Event - Macintyre River
Figure Q13-8	Percentage Change in Flow Distribution - PMF Event - Macintyre River

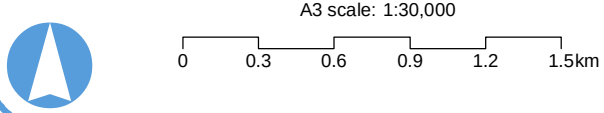


Legend

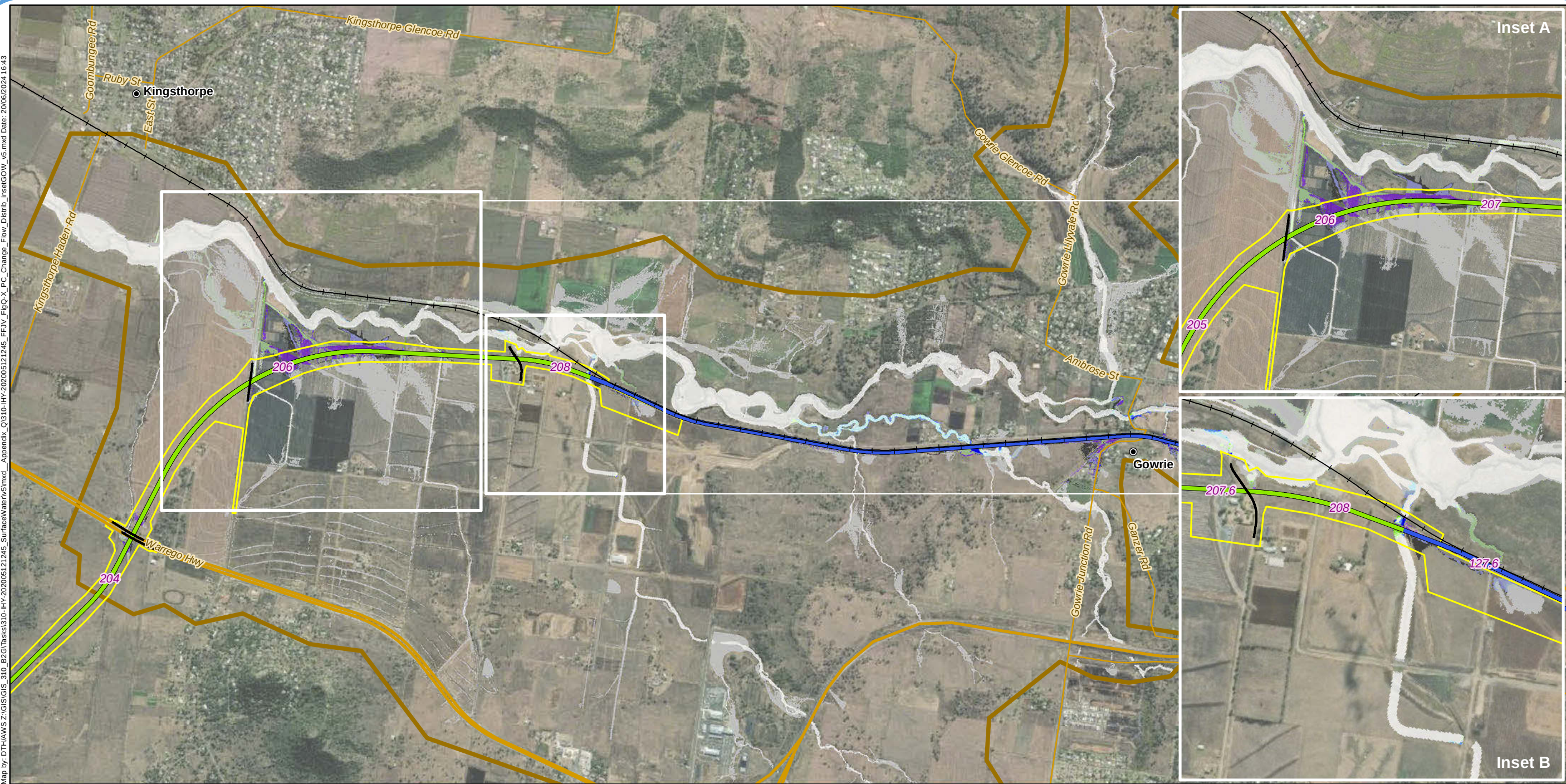
- 5 Chainage (km)
- Localities
- Existing rail (operational)
- Border to Gowrie alignment
- Gowrie to Helidon alignment
- Major roads
- Minor roads
- Project road design

- Regional hydraulic model extent
- Project footprint
- Decrease in inundation area
- Increase in inundation area

% Change in unit flow			
< -20%	2% to 5%	5% to 10%	15% to 20%
-20% to -15%	5% to 10%	10% to 15%	> 20%
-15% to -10%	10% to 15%	15% to 20%	< 0.15 m ³ /s/m
-10% to -5%	15% to 20%	> 20%	
-5% to -2%	> 20%		
-2% to 2%			



Border to Gowrie
Figure Q1-1:
20% AEP Event - Percentage Change in Flow Distribution - Gowrie Creek



Legend

- 5 Chainage (km)
- Localities
- Existing rail (operational)
- Border to Gowrie alignment
- Gowrie to Helidon alignment
- Major roads
- Minor roads
- Project road design

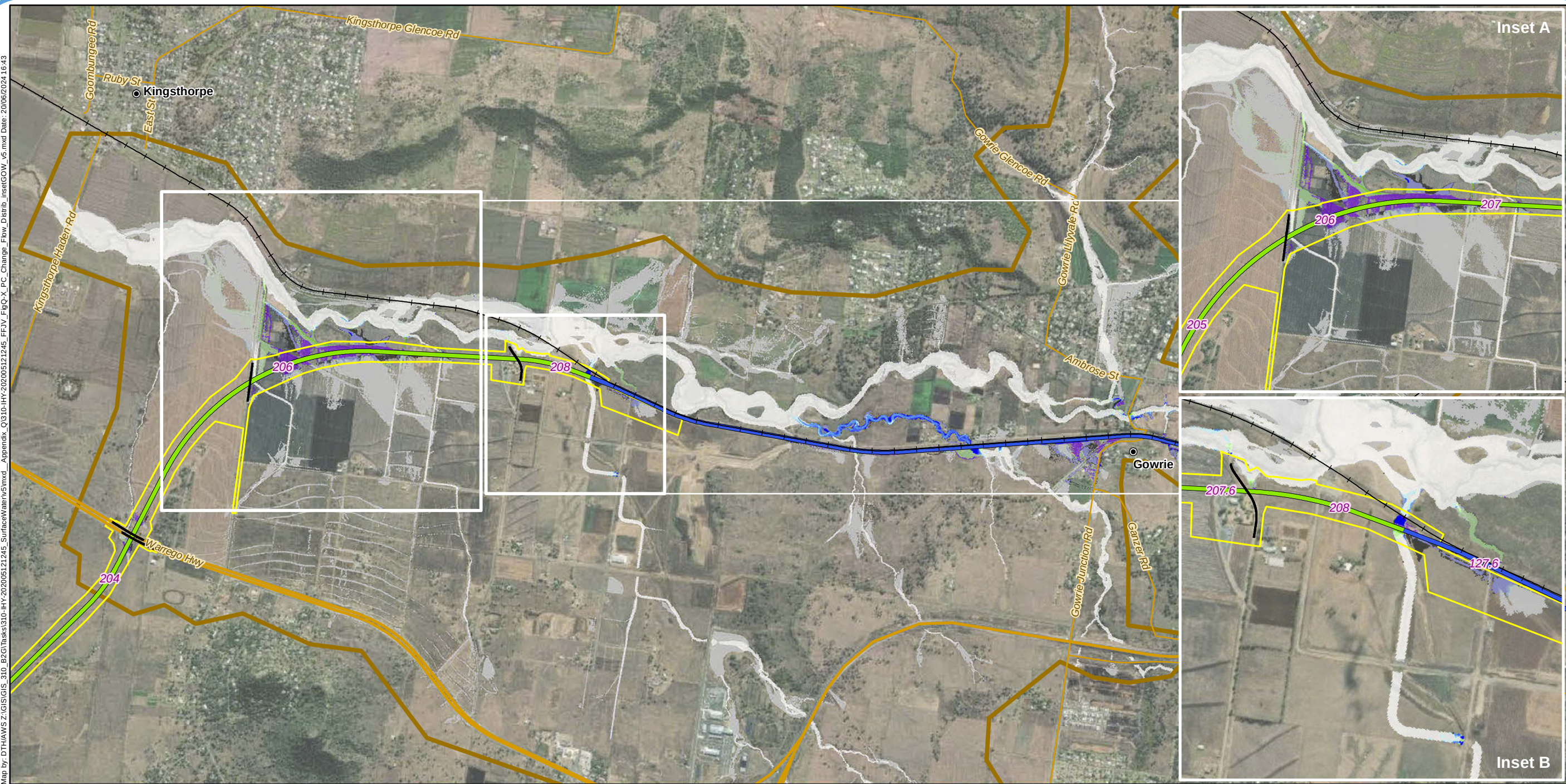
- Regional hydraulic model extent
- Project footprint
- Decrease in inundation area
- Increase in inundation area

% Change in unit flow			
< -20%	2% to 5%	5% to 10%	15% to 20%
-20% to -15%	5% to 10%	10% to 15%	> 20%
-15% to -10%	10% to 15%	15% to 20%	< 0.15 m ³ /s/m
-10% to -5%	15% to 20%	> 20%	
-5% to -2%	> 20%		
-2% to 2%			



A3 scale: 1:30,000
0 0.3 0.6 0.9 1.2 1.5km

Border to Gowrie
Figure Q1-2:
10% AEP Event - Percentage Change in Flow Distribution - Gowrie Creek



Legend

- 5 Chainage (km)
- Localities
- Existing rail (operational)
- Border to Gowrie alignment
- Gowrie to Helidon alignment
- Major roads
- Minor roads
- Project road design

- Regional hydraulic model extent
- Project footprint
- Decrease in inundation area
- Increase in inundation area

% Change in unit flow			
< -20%	2% to 5%		
-20% to -15%	5% to 10%		
-15% to -10%	10% to 15%		
-10% to -5%	15% to 20%		
-5% to -2%	> 20%		
-2% to 2%	< 0.15 m ³ /s/m		



A3 scale: 1:30,000
0 0.3 0.6 0.9 1.2 1.5km

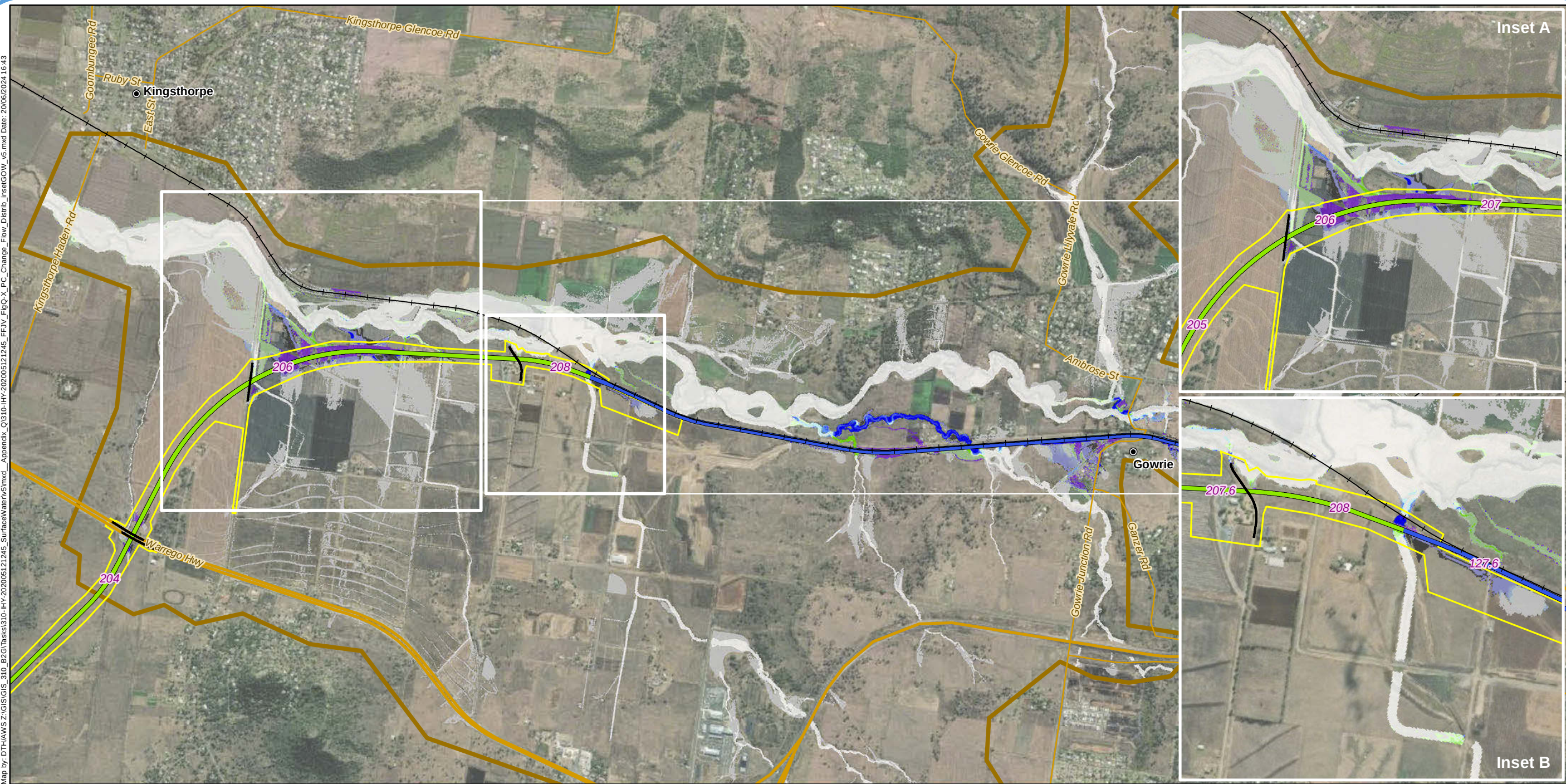


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Border to Gowrie

Figure Q1-3:

5% AEP Event - Percentage Change in Flow Distribution - Gowrie Creek



Legend

- 5 Chainage (km)
- Localities
- Existing rail (operational)
- Border to Gowrie alignment
- Gowrie to Helidon alignment
- Major roads
- Minor roads
- Project road design

- Regional hydraulic model extent
- Project footprint
- Decrease in inundation area
- Increase in inundation area

% Change in unit flow			
< -20%	2% to 5%		
-20% to -15%	5% to 10%		
-15% to -10%	10% to 15%		
-10% to -5%	15% to 20%		
-5% to -2%	> 20%		
-2% to 2%	< 0.15 m ³ /s/m		



A3 scale: 1:30,000
0 0.3 0.6 0.9 1.2 1.5km

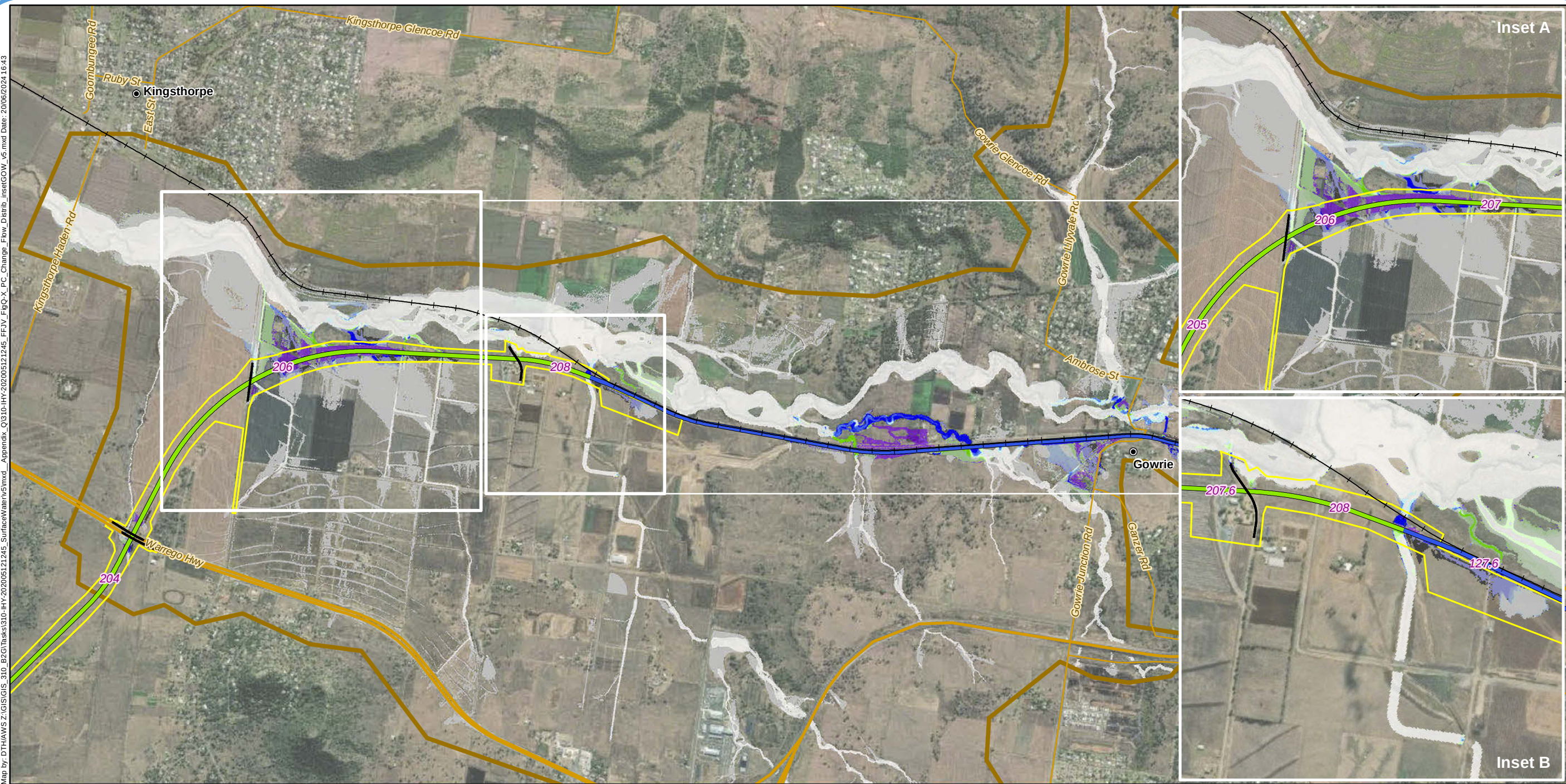


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Border to Gowrie

Figure Q1-4:

2% AEP Event - Percentage Change in Flow Distribution - Gowrie Creek



Legend

- 5 Chainage (km)
- Localities
- Existing rail (operational)
- Border to Gowrie alignment
- Gowrie to Helidon alignment
- Major roads
- Minor roads
- Project road design

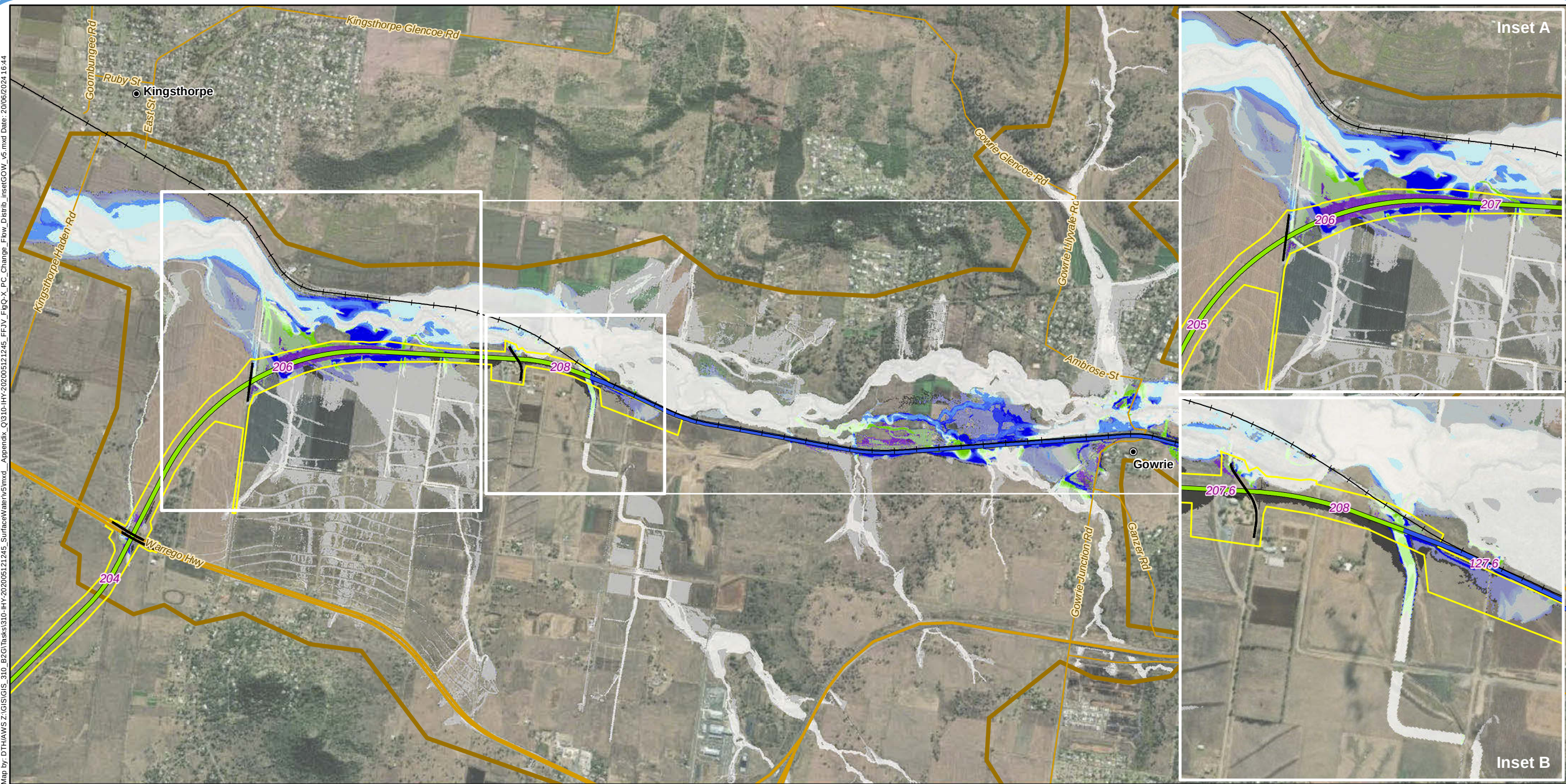
- Regional hydraulic model extent
- Project footprint
- Decrease in inundation area
- Increase in inundation area

% Change in unit flow			
< -20%	2% to 5%		
-20% to -15%	5% to 10%		
-15% to -10%	10% to 15%		
-10% to -5%	15% to 20%		
-5% to -2%	> 20%		
-2% to 2%	< 0.15 m ³ /s/m		



A3 scale: 1:30,000
0 0.3 0.6 0.9 1.2 1.5km

Border to Gowrie
Figure Q1-5:
1% AEP Event - Percentage Change in Flow Distribution - Gowrie Creek



Legend

- 5 Chainage (km)
- Localities
- Existing rail (operational)
- Border to Gowrie alignment
- Gowrie to Helidon alignment
- Major roads
- Minor roads
- Project road design

- Regional hydraulic model extent
- Project footprint
- Decrease in inundation area
- Increase in inundation area

% Change in unit flow	
< -20%	2% to 5%
-20% to -15%	5% to 10%
-15% to -10%	10% to 15%
-10% to -5%	15% to 20%
-5% to -2%	> 20%
-2% to 2%	< 0.15 m ³ /s/m



A3 scale: 1:30,000
0 0.3 0.6 0.9 1.2 1.5km



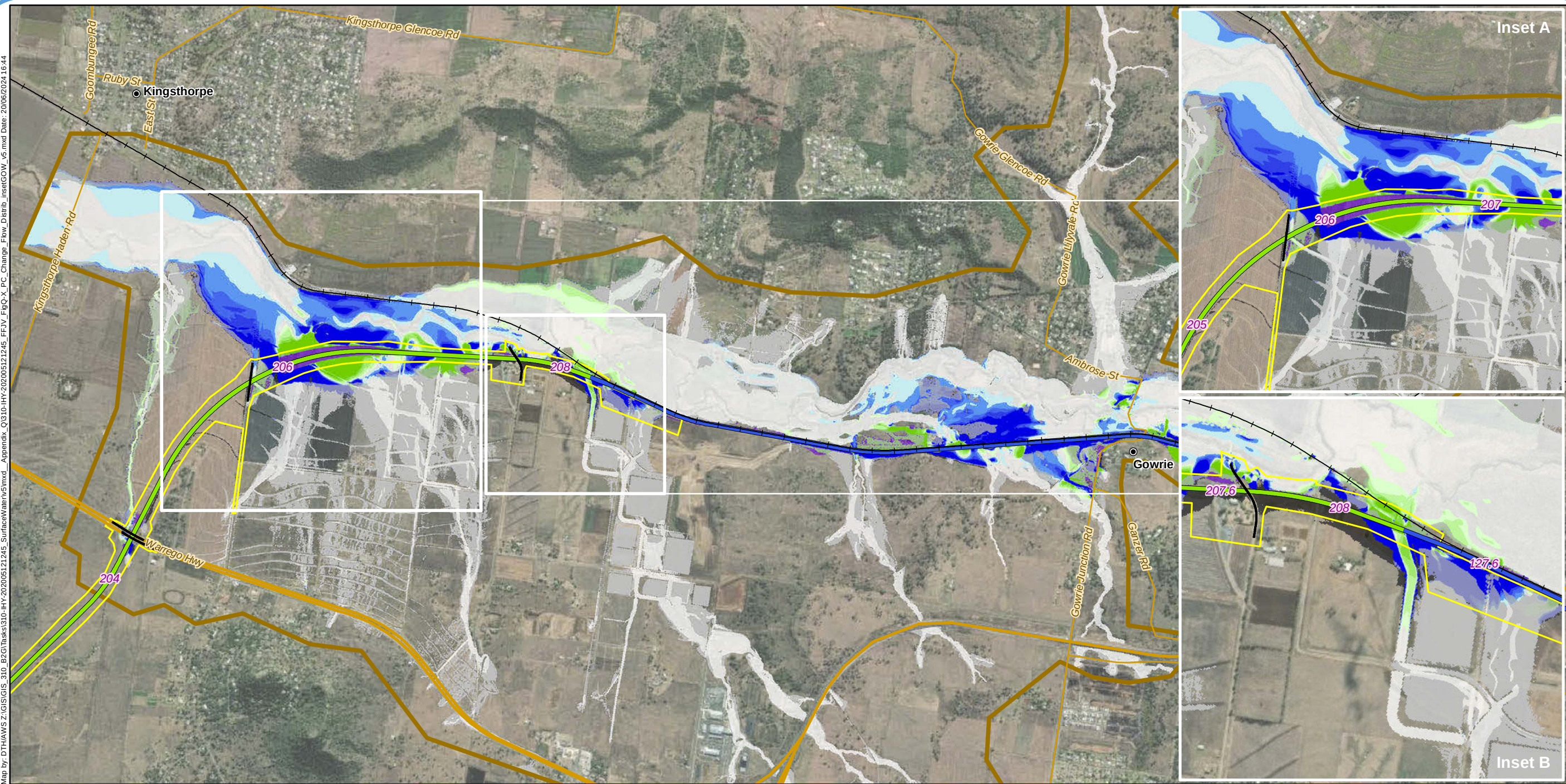
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Border to Gowrie

Figure Q1-6:

1 in 2,000 AEP Event - Percentage Change in Flow Distribution - Gowrie Creek



Legend

- 5 Chainage (km)
- Localities
- Existing rail (operational)
- Border to Gowrie alignment
- Gowrie to Helidon alignment
- Major roads
- Minor roads
- Project road design

- Regional hydraulic model extent
- Project footprint
- Decrease in inundation area
- Increase in inundation area

% Change in unit flow	
< -20%	2% to 5%
-20% to -15%	5% to 10%
-15% to -10%	10% to 15%
-10% to -5%	15% to 20%
-5% to -2%	> 20%
-2% to 2%	< 0.15 m ³ /s/m



A3 scale: 1:30,000
0 0.3 0.6 0.9 1.2 1.5km

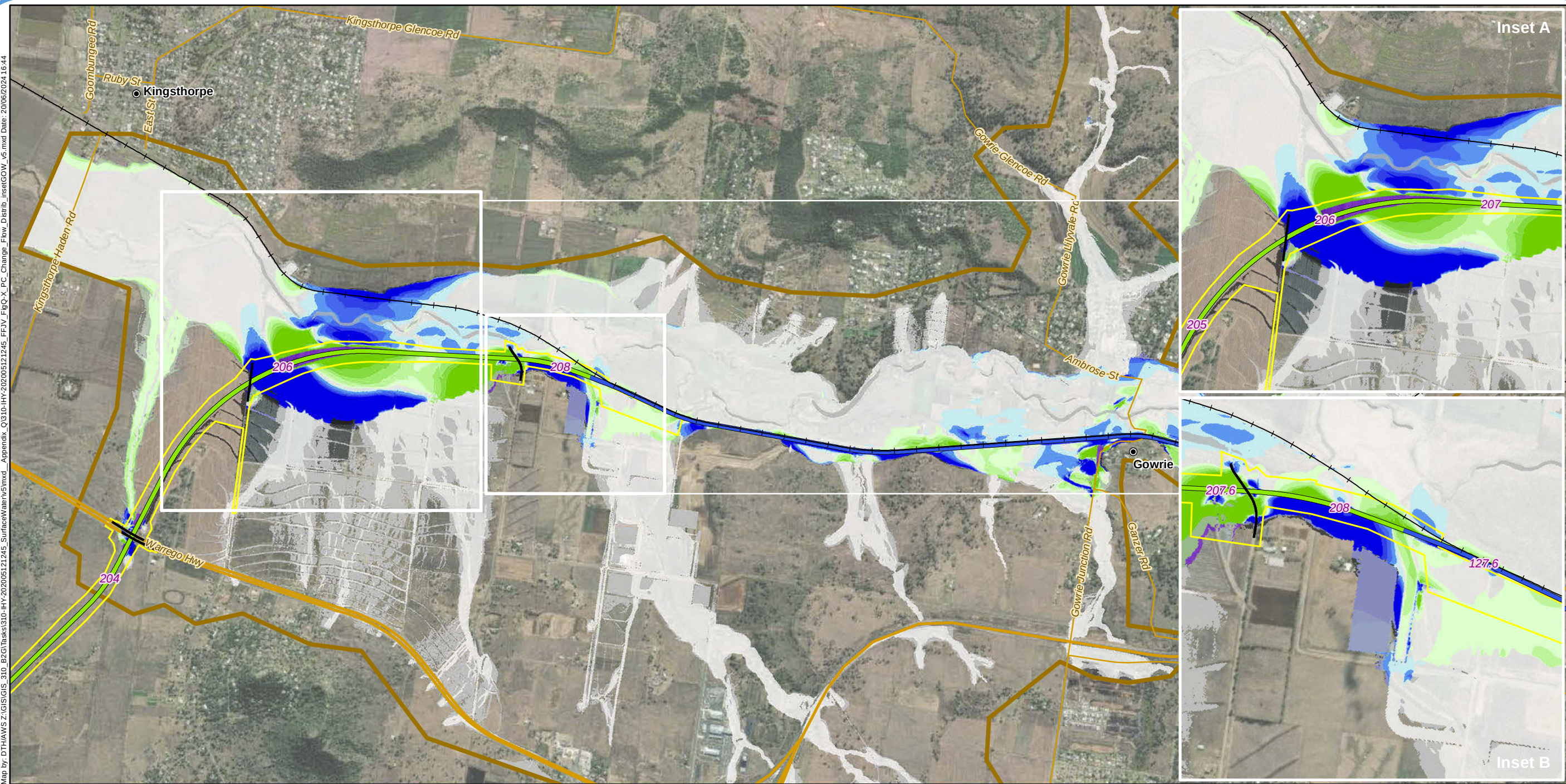


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Border to Gowrie

Figure Q1-7:

1 in 10,000 AEP Event - Percentage Change in Flow Distribution - Gowrie Creek

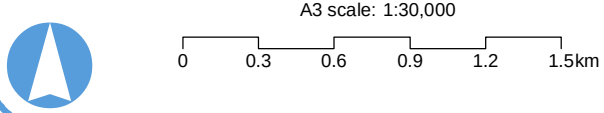


Legend

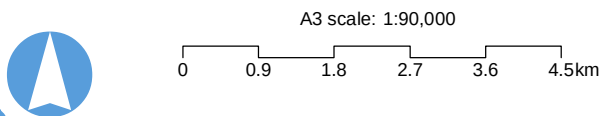
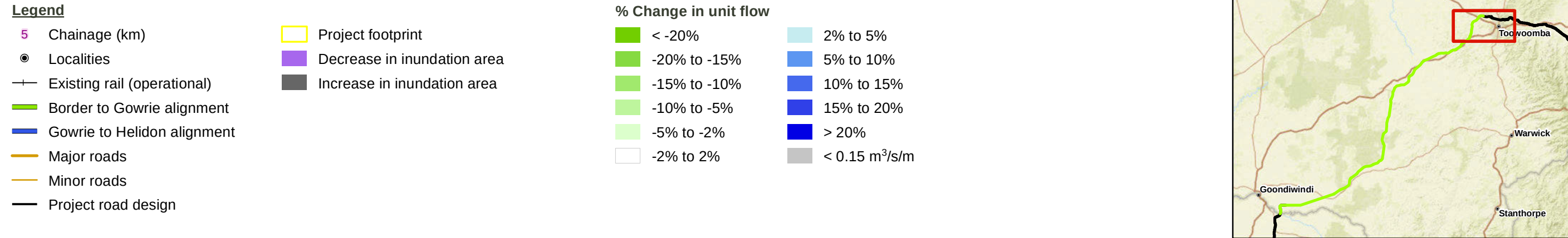
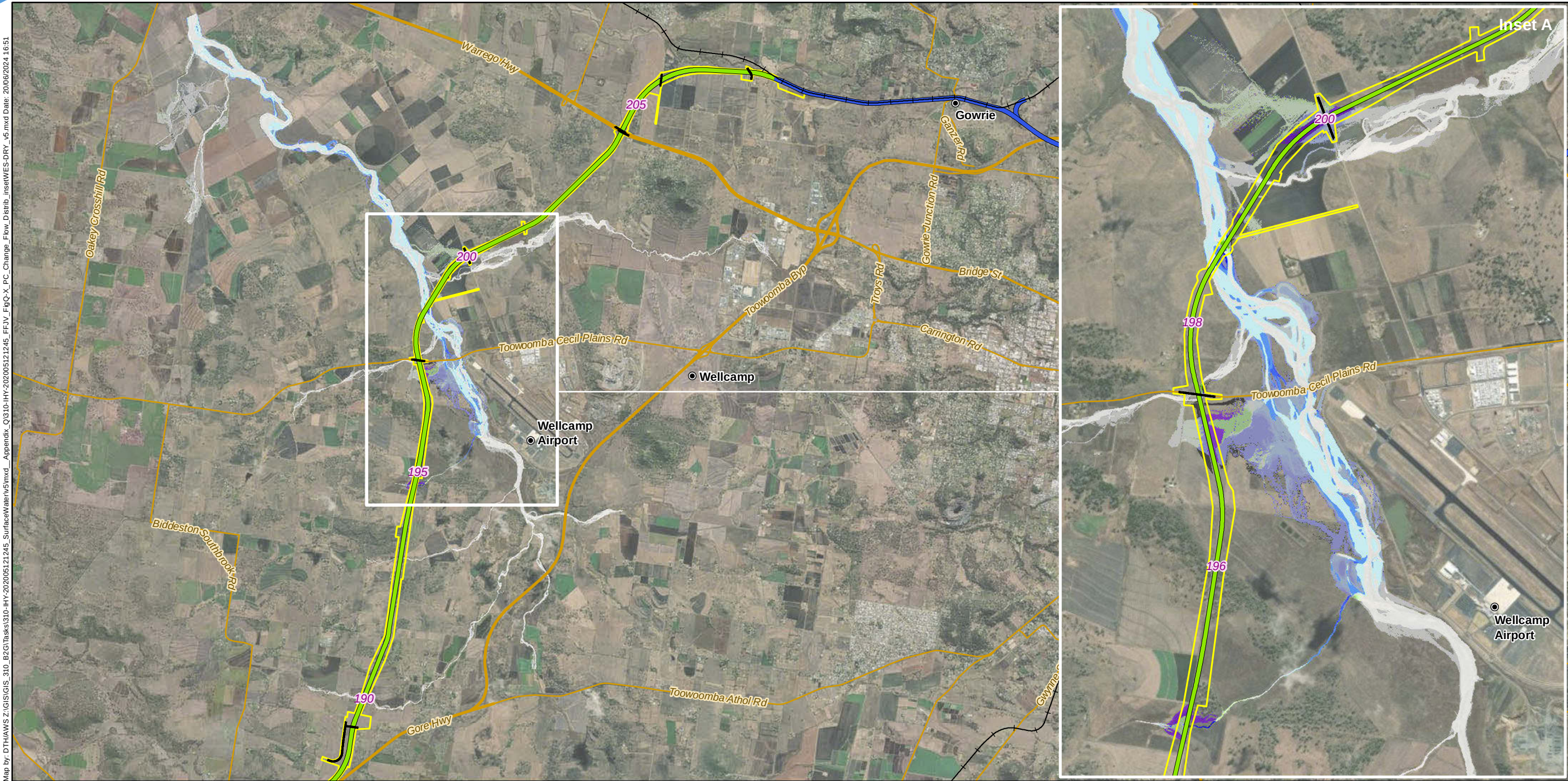
- 5 Chainage (km)
- Localities
- Existing rail (operational)
- Border to Gowrie alignment
- Gowrie to Helidon alignment
- Major roads
- Minor roads
- Project road design

- Regional hydraulic model extent
- Project footprint
- Decrease in inundation area
- Increase in inundation area

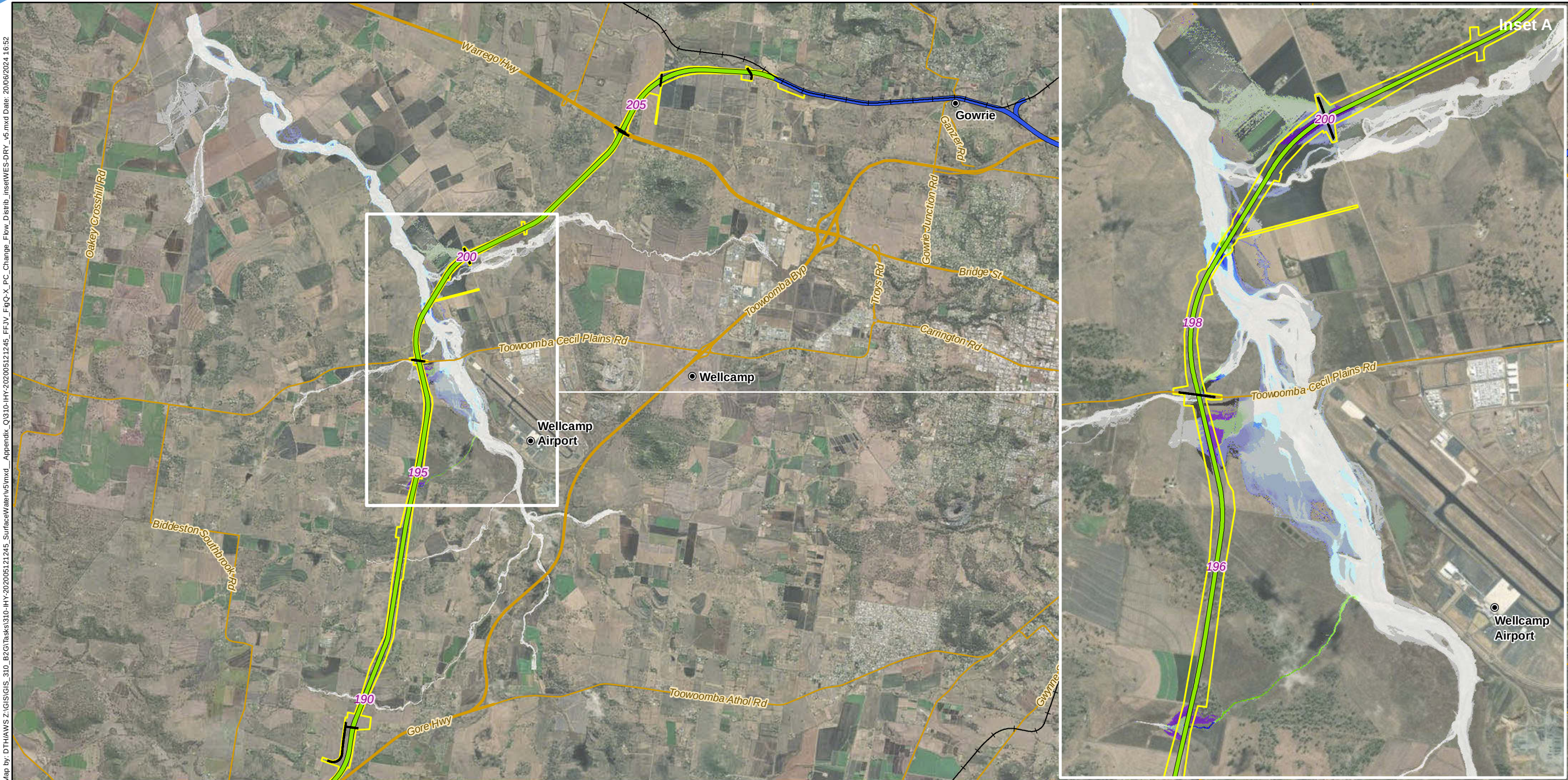
% Change in unit flow	
< -20%	2% to 5%
-20% to -15%	5% to 10%
-15% to -10%	10% to 15%
-10% to -5%	15% to 20%
-5% to -2%	> 20%
-2% to 2%	< 0.15 m ³ /s/m



Border to Gowrie
Figure Q1-8:
PMF Event - Percentage Change in Flow Distribution - Gowrie Creek



Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\GIS_310-HY-202005121245_SurfaceWater\5vmsd_Appendix_Q310-HY-202005121245_FF\V_FigQ-X_PC_Change_Flow_Distrib_InsetWES-DRY_v5.mxd Date: 20/06/2024 16:52



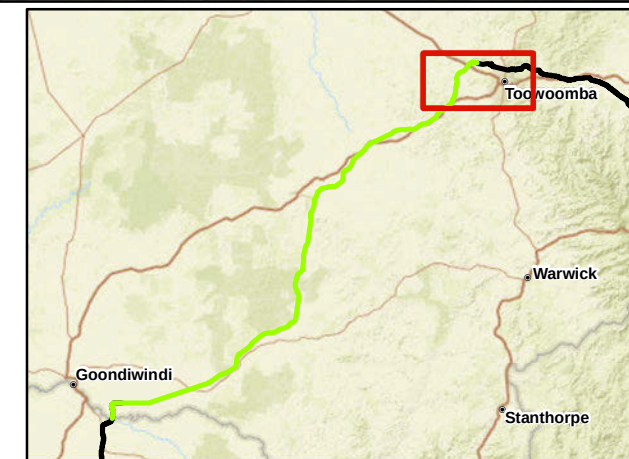
Legend

- 5 Chainage (km)
- Localities
- Existing rail (operational)
- Border to Gowrie alignment
- Gowrie to Helidon alignment
- Major roads
- Minor roads
- Project road design

- Project footprint
- Decrease in inundation area
- Increase in inundation area

% Change in unit flow

- | | |
|--------------|----------------------------|
| < -20% | 2% to 5% |
| -20% to -15% | 5% to 10% |
| -15% to -10% | 10% to 15% |
| -10% to -5% | 15% to 20% |
| -5% to -2% | > 20% |
| -2% to 2% | < 0.15 m ³ /s/m |



A3 scale: 1:90,000
0 0.9 1.8 2.7 3.6 4.5km



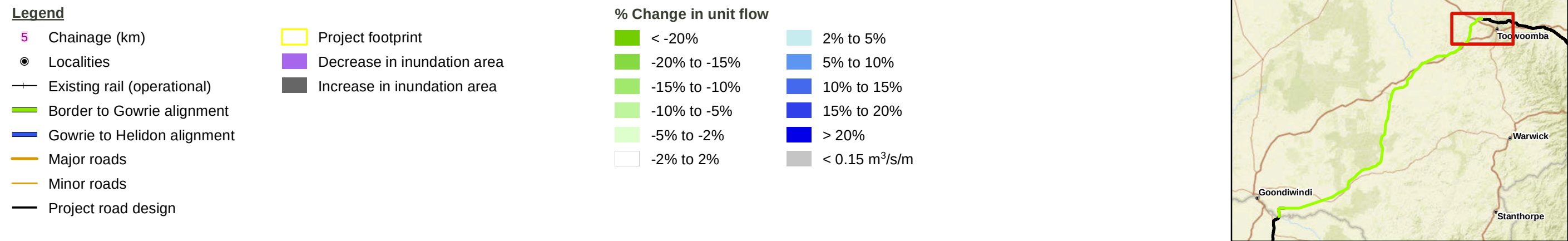
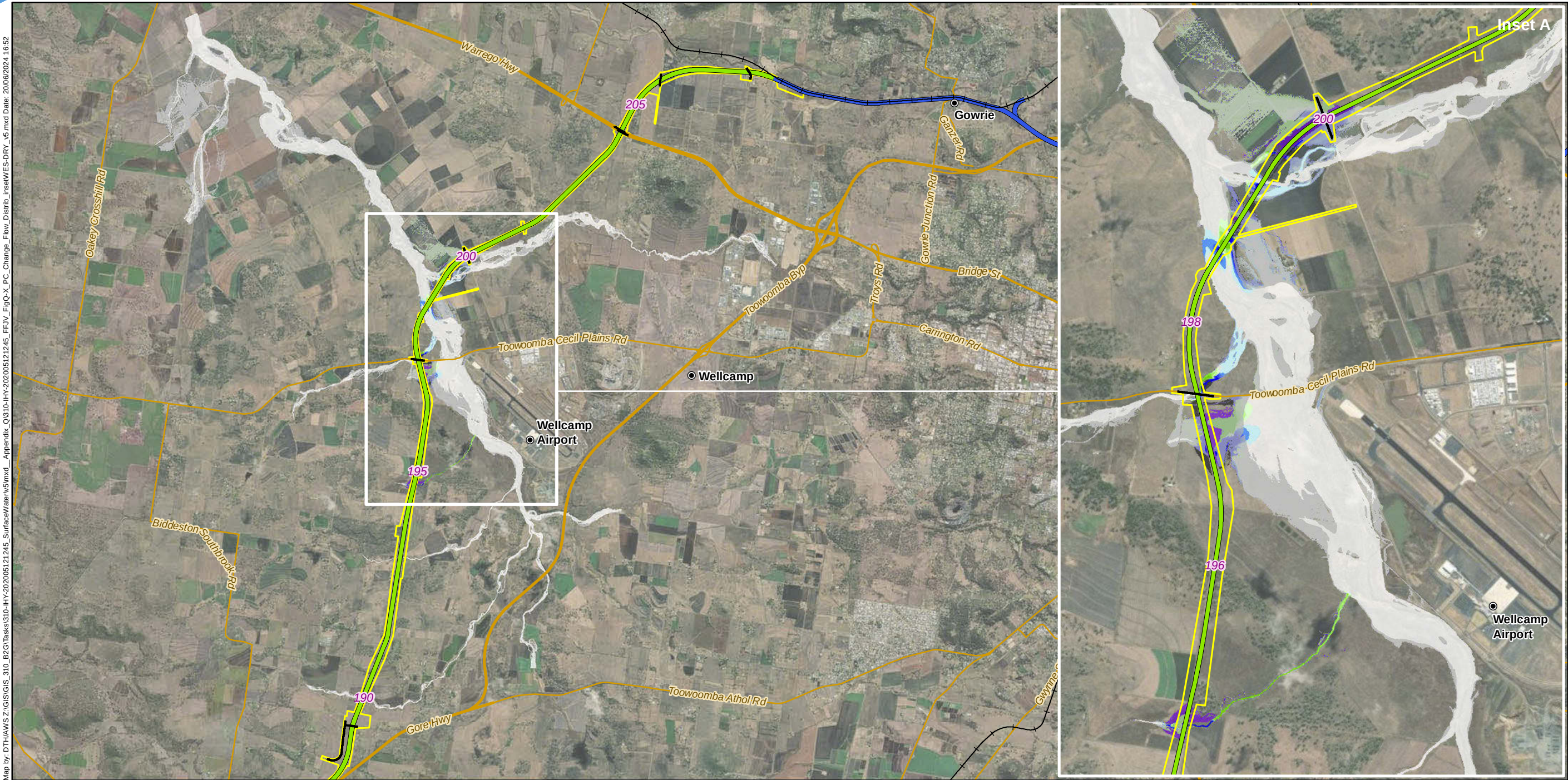
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Border to Gowrie

Figure Q2-2:

10% AEP Event - Percentage Change in Flow Distribution - Westbrook & Dry Creeks



A3 scale: 1:90,000

0 0.9 1.8 2.7 3.6 4.5km

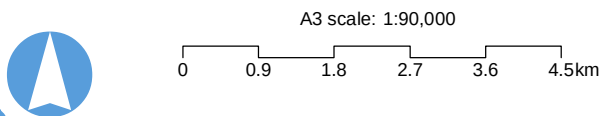
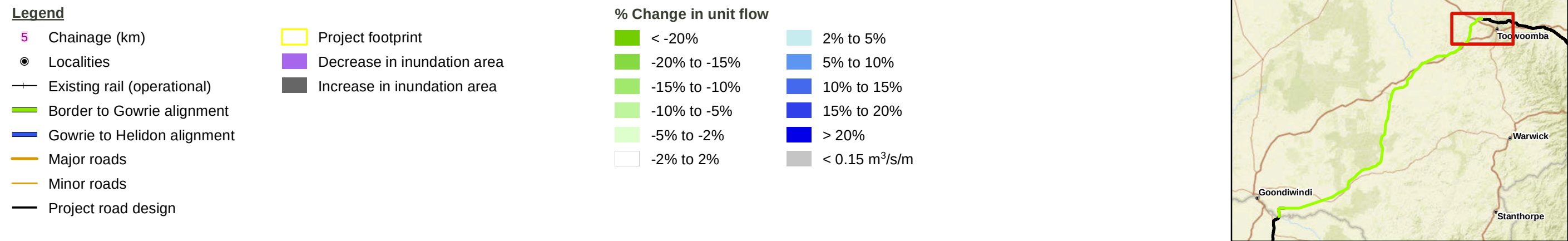
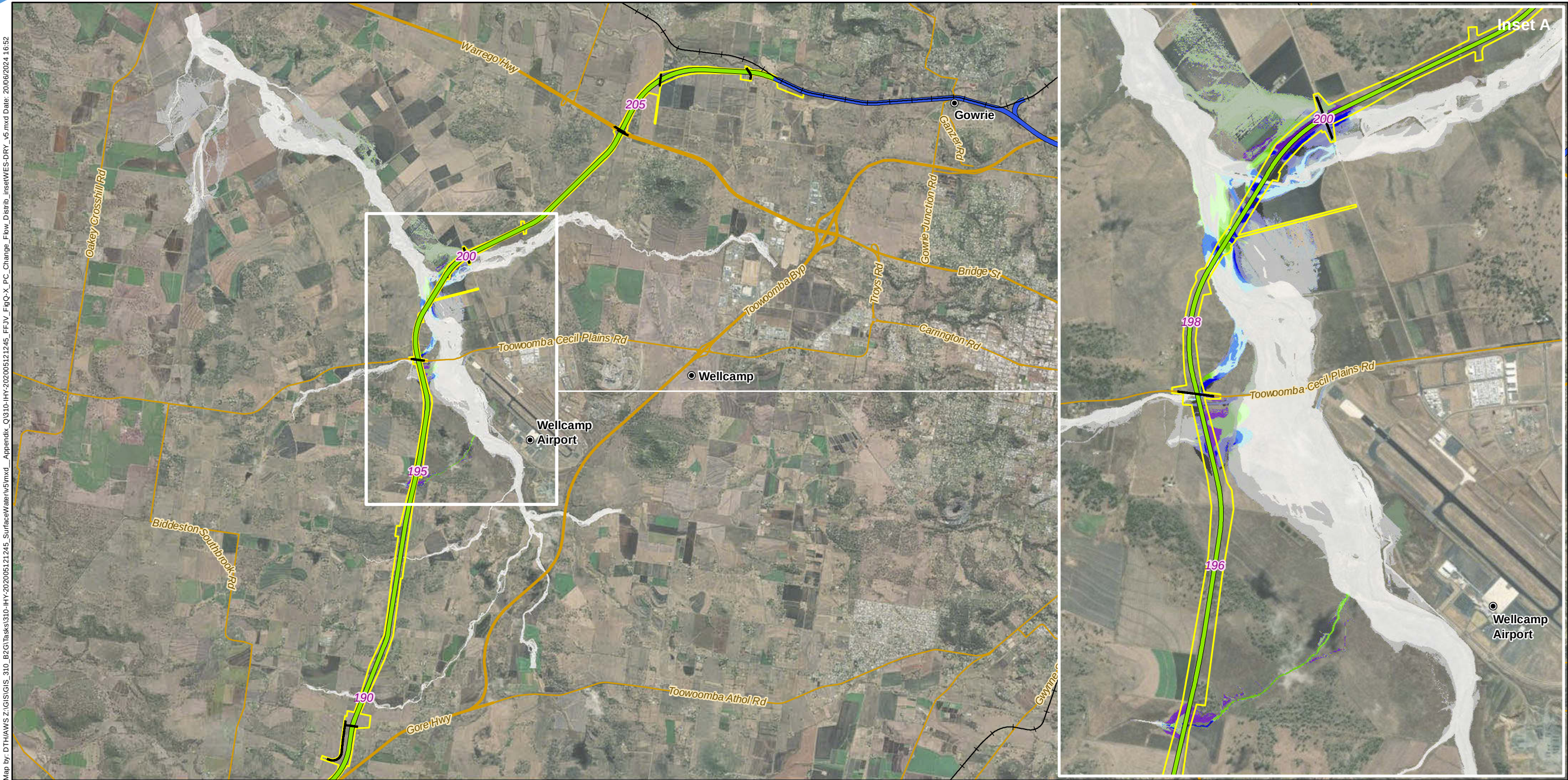


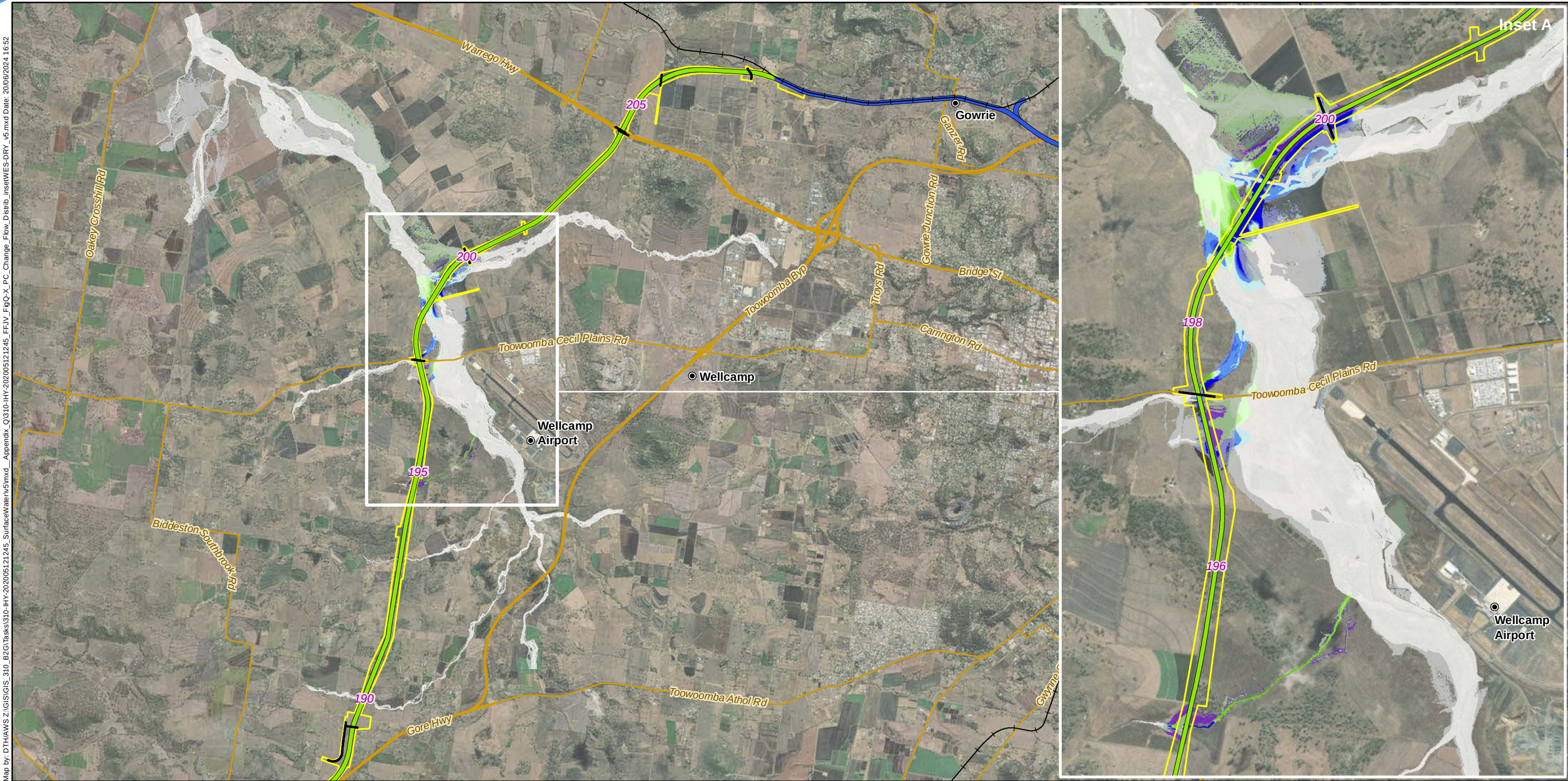
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Border to Gowrie

Figure Q2-3:

5% AEP Event - Percentage Change in Flow Distribution - Westbrook & Dry Creeks





Legend

- 5 Chainage (km)
- Localities
- Existing rail (operational)
- Border to Gowrie alignment
- Gowrie to Helidon alignment
- Major roads
- Minor roads
- Project road design

- Project footprint
- Decrease in inundation area
- Increase in inundation area

% Change in unit flow	
< -20%	2% to 5%
-20% to -15%	5% to 10%
-15% to -10%	10% to 15%
-10% to -5%	15% to 20%
-5% to -2%	> 20%
-2% to 2%	< 0.15 m ³ /s/m



A3 scale: 1:90,000
0 0.9 1.8 2.7 3.6 4.5km



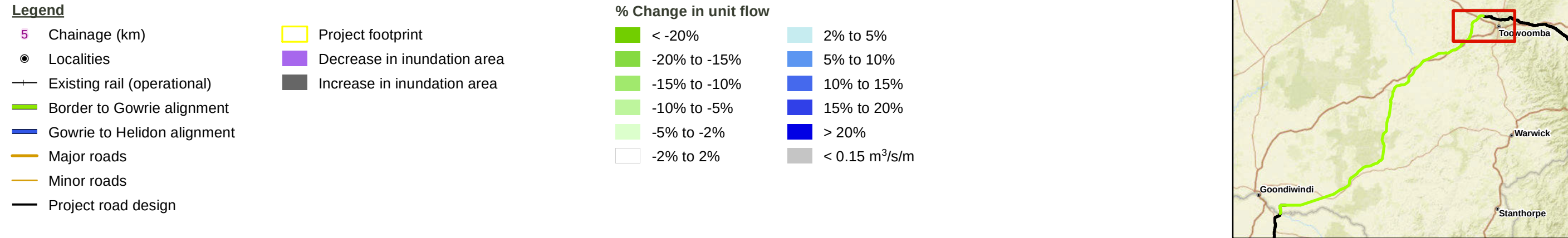
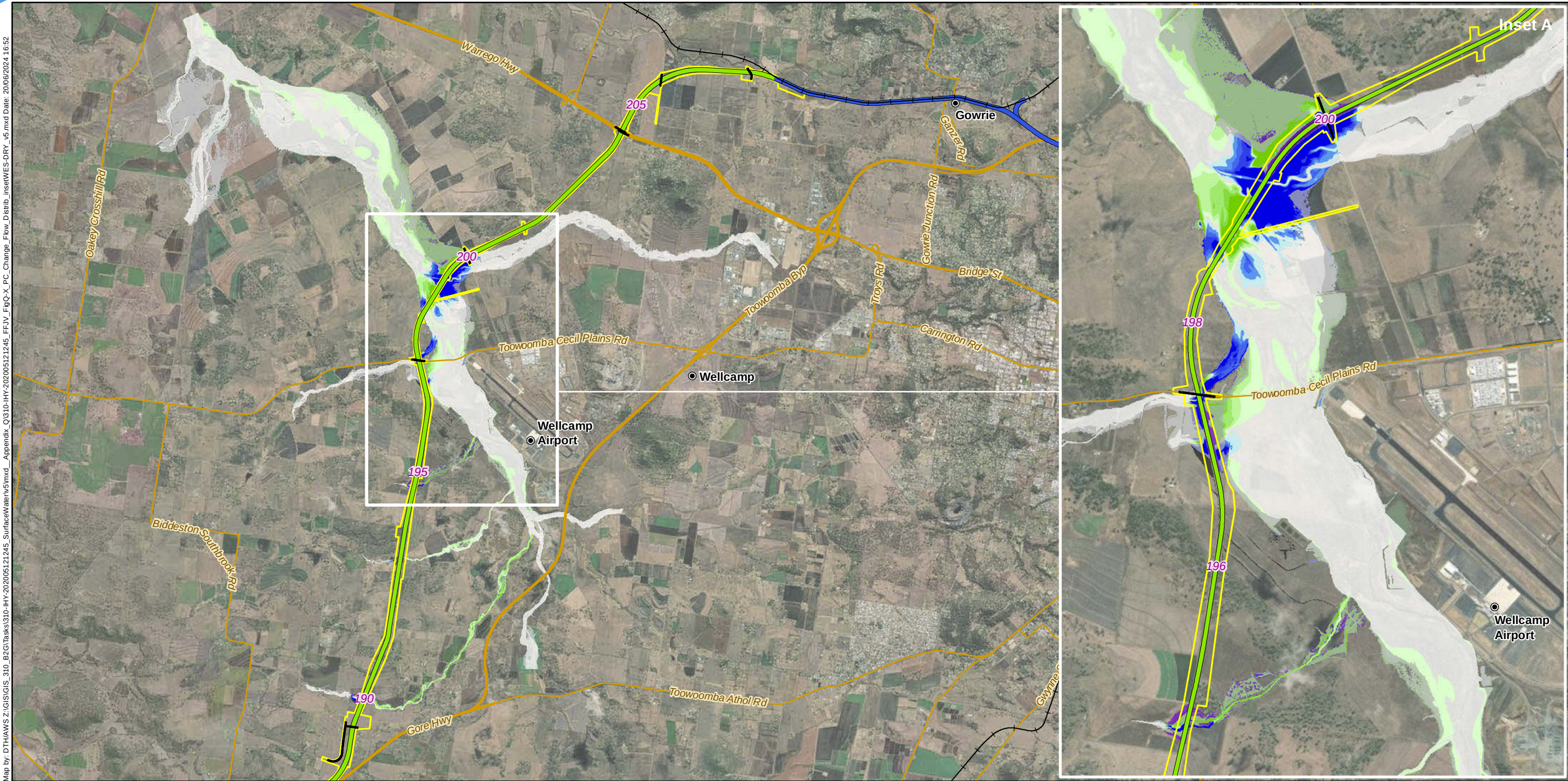
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Border to Gowrie

Figure Q2-5:

1% AEP Event - Percentage Change in Flow Distribution - Westbrook & Dry Creeks



A3 scale: 1:90,000
0 0.9 1.8 2.7 3.6 4.5km



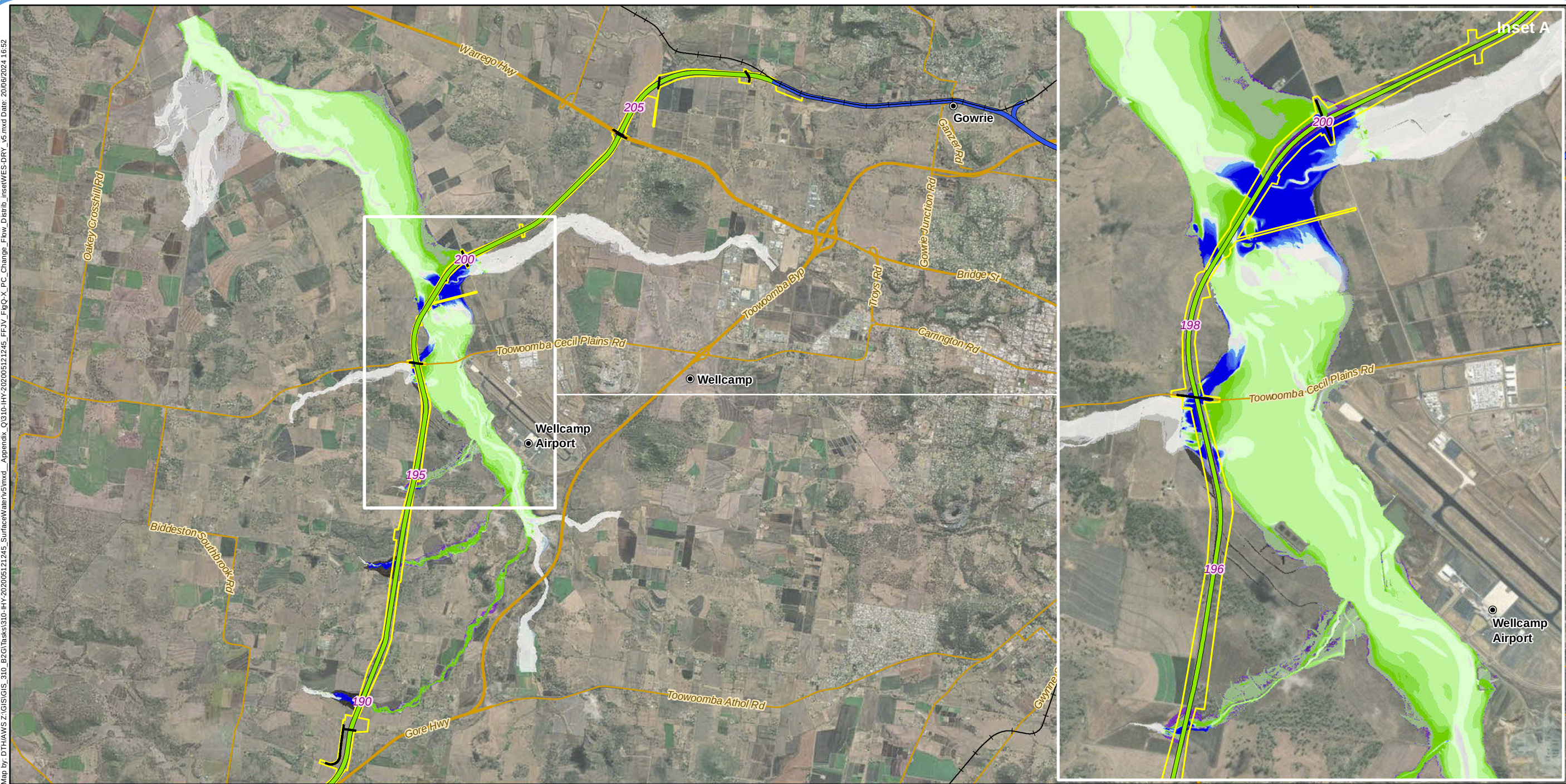
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Border to Gowrie

Figure Q2-6:

1 in 2,000 AEP Event - Percentage Change in Flow Distribution - Westbrook & Dry Creeks



Legend

- 5 Chainage (km)
- Localities
- Existing rail (operational)
- Border to Gowrie alignment
- Gowrie to Helidon alignment
- Major roads
- Minor roads
- Project road design

- Project footprint
- Decrease in inundation area
- Increase in inundation area

% Change in unit flow			
< -20%	-20% to -15%	-15% to -10%	-10% to -5%
-5% to -2%	-2% to 2%	2% to 5%	5% to 10%
10% to 15%	15% to 20%	> 20%	< 0.15 m ³ /s/m



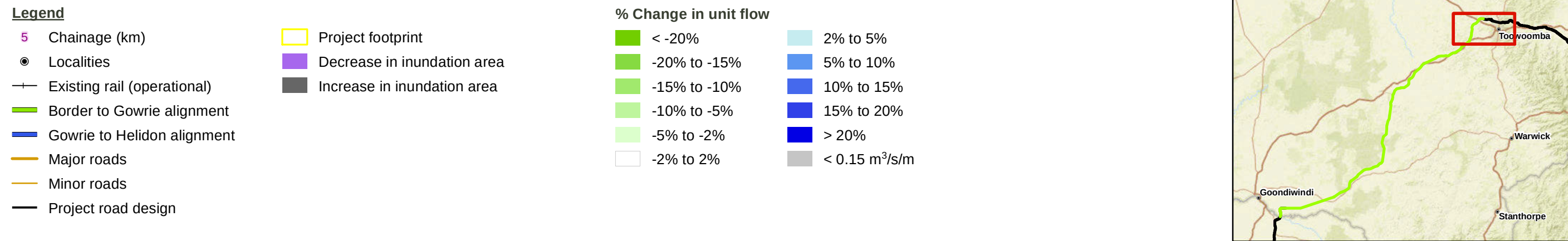
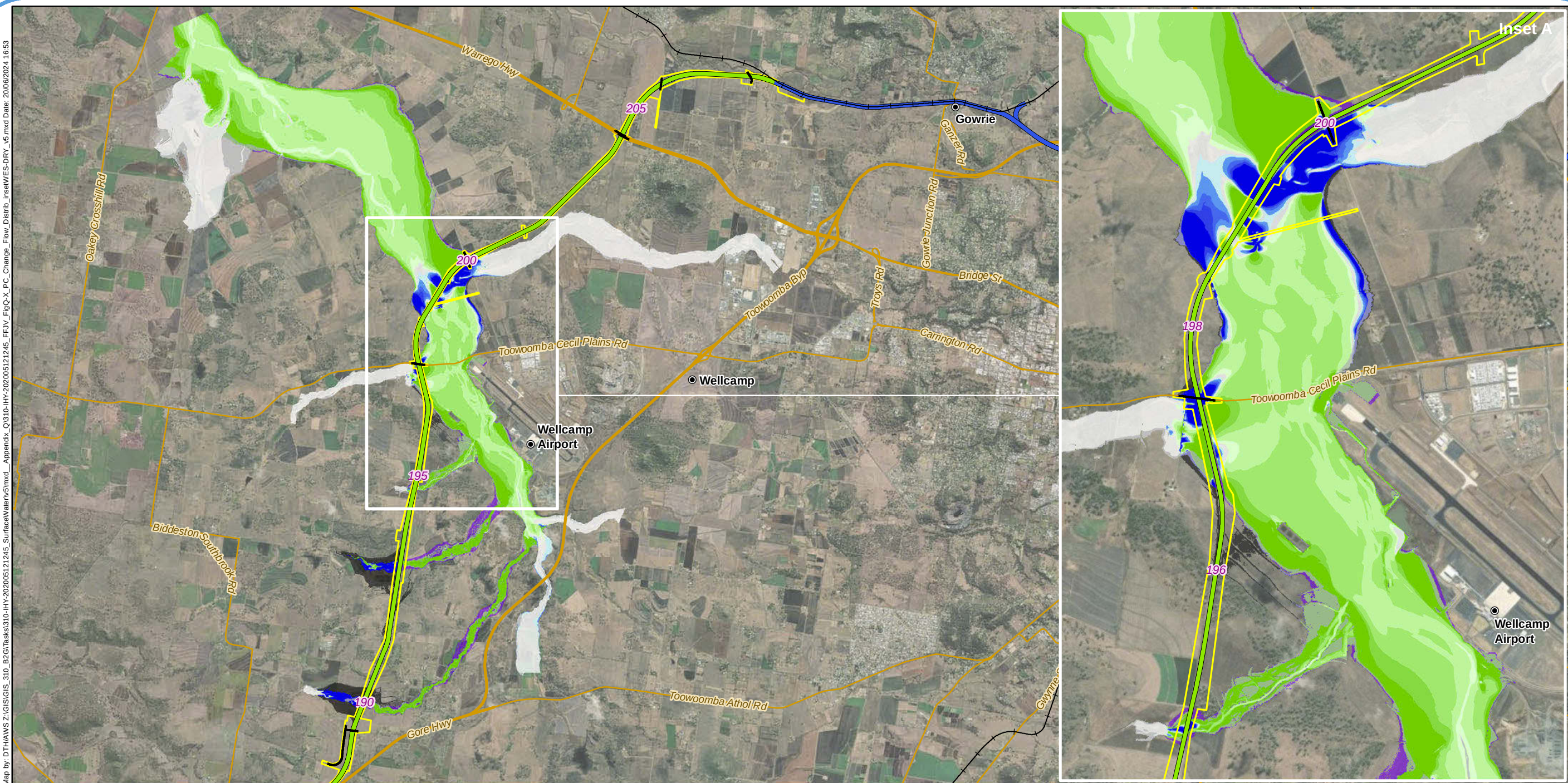
A3 scale: 1:90,000
0 0.9 1.8 2.7 3.6 4.5km



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Border to Gowrie
Figure Q2-7:
1 in 10,000 AEP Event - Percentage Change in Flow Distribution - Westbrook & Dry Creeks



A3 scale: 1:90,000
0 0.9 1.8 2.7 3.6 4.5km



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Border to Gowrie

Figure Q2-8:

PMF Event - Percentage Change in Flow Distribution - Westbrook & Dry Creeks



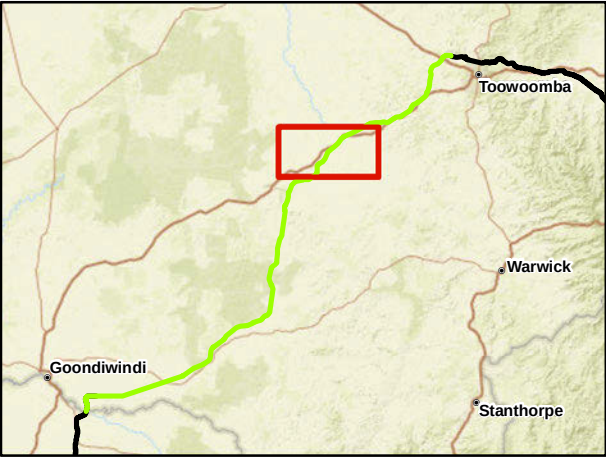
Legend

- 5 Chainage (km)
- Localities
- Existing rail (operational)
- - - Existing rail (non-operational)
- Border to Gowrie alignment
- Major roads
- Minor roads
- Project road design

- Regional hydraulic model extent
- Project footprint
- Decrease in inundation area
- Increase in inundation area

% Change in unit flow

- | | |
|--------------|----------------------------|
| < -20% | 2% to 5% |
| -20% to -15% | 5% to 10% |
| -15% to -10% | 10% to 15% |
| -10% to -5% | 15% to 20% |
| -5% to -2% | > 20% |
| -2% to 2% | < 0.15 m ³ /s/m |



A3 scale: 1:100,000

0 1 2 3 4 5km



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Border to Gowrie

Figure Q3-1:

20% AEP Event - Percentage Change in Flow Distribution - Condamine River



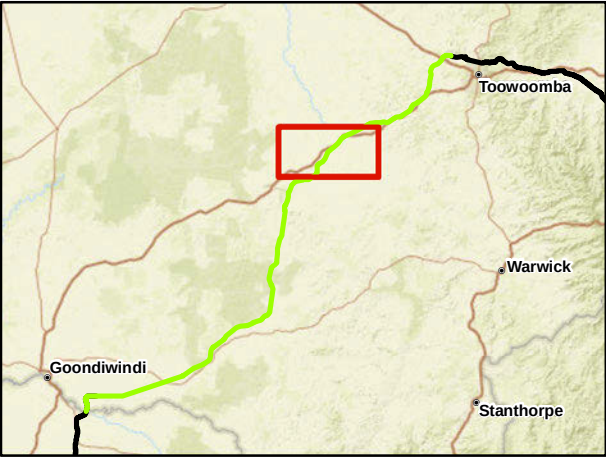
Legend

- 5 Chainage (km)
- Localities
- Existing rail (operational)
- - - Existing rail (non-operational)
- Border to Gowrie alignment
- Major roads
- Minor roads
- Project road design

- Regional hydraulic model extent
- Project footprint
- Decrease in inundation area
- Increase in inundation area

% Change in unit flow

- | | |
|--------------|----------------------------|
| < -20% | 2% to 5% |
| -20% to -15% | 5% to 10% |
| -15% to -10% | 10% to 15% |
| -10% to -5% | 15% to 20% |
| -5% to -2% | > 20% |
| -2% to 2% | < 0.15 m ³ /s/m |



A3 scale: 1:100,000

0 1 2 3 4 5km



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Border to Gowrie

Figure Q3-2:

10% AEP Event - Percentage Change in Flow Distribution - Condamine River

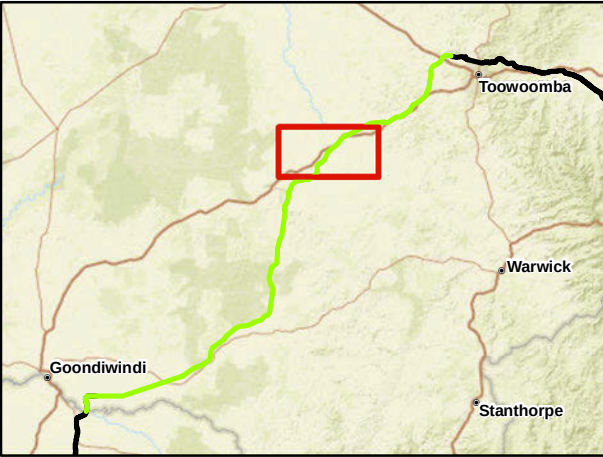


Legend

- 5 Chainage (km)
- Localities
- Existing rail (operational)
- - - Existing rail (non-operational)
- Border to Gowrie alignment
- Major roads
- Minor roads
- Project road design

- Regional hydraulic model extent
- Project footprint
- Decrease in inundation area
- Increase in inundation area

% Change in unit flow			
< -20%	2% to 5%		
-20% to -15%	5% to 10%		
-15% to -10%	10% to 15%		
-10% to -5%	15% to 20%		
-5% to -2%	> 20%		
-2% to 2%	< 0.15 m ³ /s/m		



A3 scale: 1:100,000
0 1 2 3 4 5km



Future Freight
Integrating Community, Environment and Engineering

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Border to Gowrie
Figure Q3-3:

5% AEP Event - Percentage Change in Flow Distribution - Condamine River

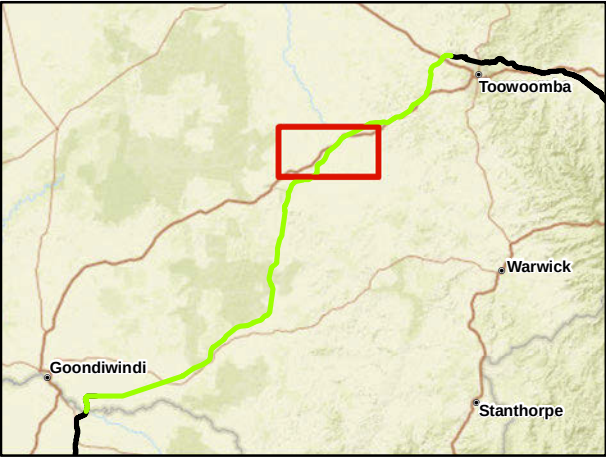


Legend

- 5 Chainage (km)
- Localities
- Existing rail (operational)
- Existing rail (non-operational)
- Border to Gowrie alignment
- Major roads
- Minor roads
- Project road design

- Regional hydraulic model extent
- Project footprint
- Decrease in inundation area
- Increase in inundation area

% Change in unit flow	
< -20%	2% to 5%
-20% to -15%	5% to 10%
-15% to -10%	10% to 15%
-10% to -5%	15% to 20%
-5% to -2%	> 20%
-2% to 2%	< 0.15 m³/s/m



A3 scale: 1:100,000
0 1 2 3 4 5km



Future Freight
Integrating Community, Environment and Engineering

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Border to Gowrie
Figure Q3-4:

2% AEP Event - Percentage Change in Flow Distribution - Condamine River

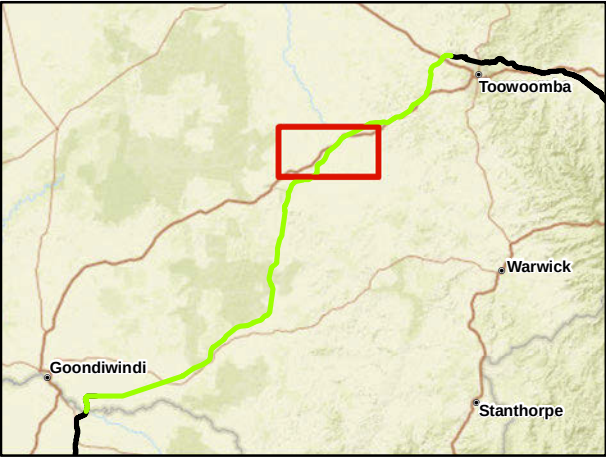


Legend

- 5 Chainage (km)
- Localities
- Existing rail (operational)
- - - Existing rail (non-operational)
- Border to Gowrie alignment
- Major roads
- Minor roads
- Project road design

- Regional hydraulic model extent
- Project footprint
- Decrease in inundation area
- Increase in inundation area

% Change in unit flow	
< -20%	2% to 5%
-20% to -15%	5% to 10%
-15% to -10%	10% to 15%
-10% to -5%	15% to 20%
-5% to -2%	> 20%
-2% to 2%	< 0.15 m ³ /s/m



A3 scale: 1:100,000

0 1 2 3 4 5km



Future Freight
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Border to Gowrie
Figure Q3-5:

1% AEP Event - Percentage Change in Flow Distribution - Condamine River

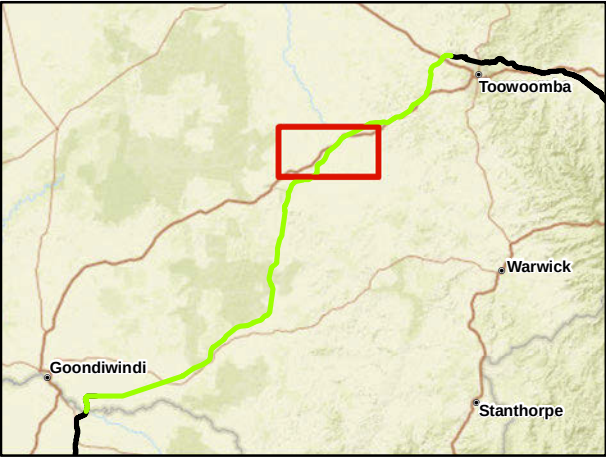


Legend

- 5 Chainage (km)
- Localities
- Existing rail (operational)
- Existing rail (non-operational)
- Border to Gowrie alignment
- Major roads
- Minor roads
- Project road design

- Regional hydraulic model extent
- Project footprint
- Decrease in inundation area
- Increase in inundation area

% Change in unit flow	
< -20%	2% to 5%
-20% to -15%	5% to 10%
-15% to -10%	10% to 15%
-10% to -5%	15% to 20%
-5% to -2%	> 20%
-2% to 2%	< 0.15 m ³ /s/m



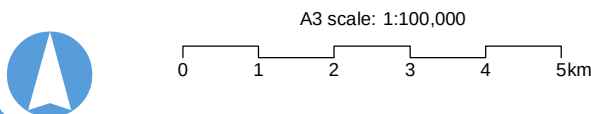
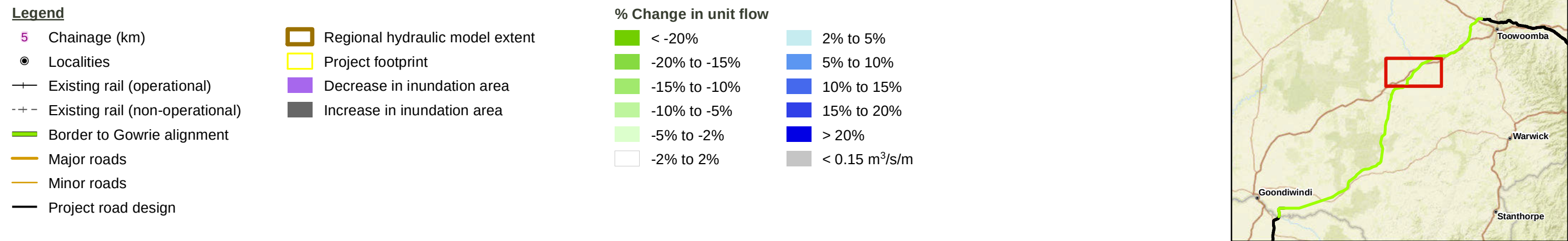
A3 scale: 1:100,000
0 1 2 3 4 5km



Future Freight
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Border to Gowrie
Figure Q3-6:
1 in 2,000 AEP Event - Percentage Change in Flow Distribution - Condamine River





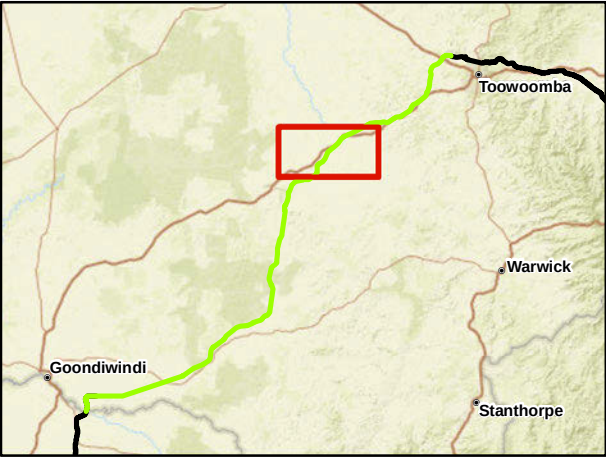
Legend

- 5 Chainage (km)
- Localities
- Existing rail (operational)
- Existing rail (non-operational)
- Border to Gowrie alignment
- Major roads
- Minor roads
- Project road design

- Regional hydraulic model extent
- Project footprint
- Decrease in inundation area
- Increase in inundation area

% Change in unit flow

- | | |
|--------------|----------------------------|
| < -20% | 2% to 5% |
| -20% to -15% | 5% to 10% |
| -15% to -10% | 10% to 15% |
| -10% to -5% | 15% to 20% |
| -5% to -2% | > 20% |
| -2% to 2% | < 0.15 m ³ /s/m |



A3 scale: 1:100,000

0 1 2 3 4 5km



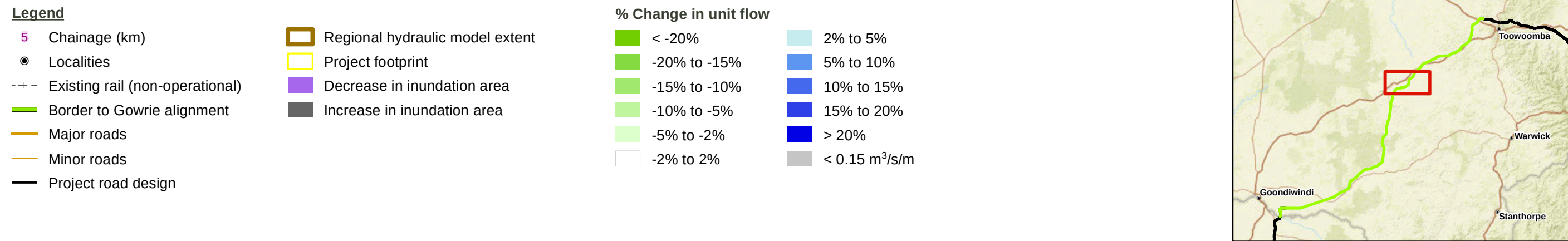
Future Freight
Integrating Community, Environment and Engineering

Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

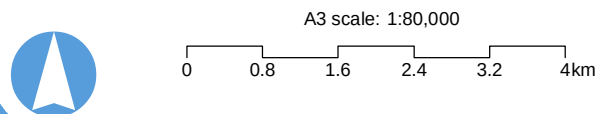
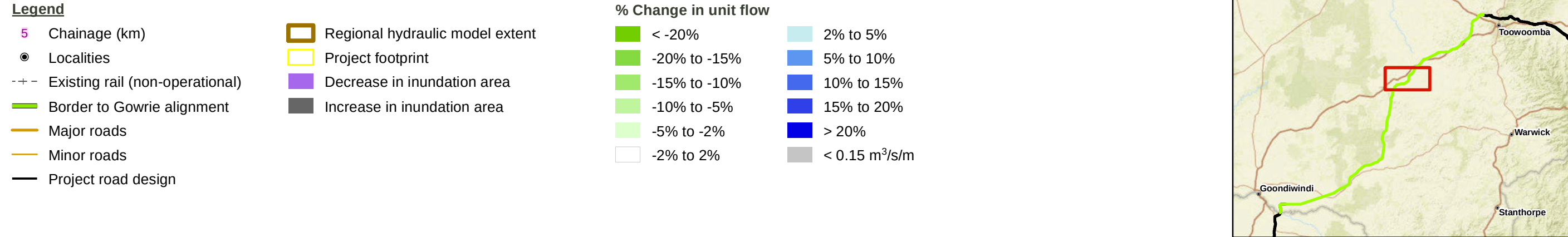
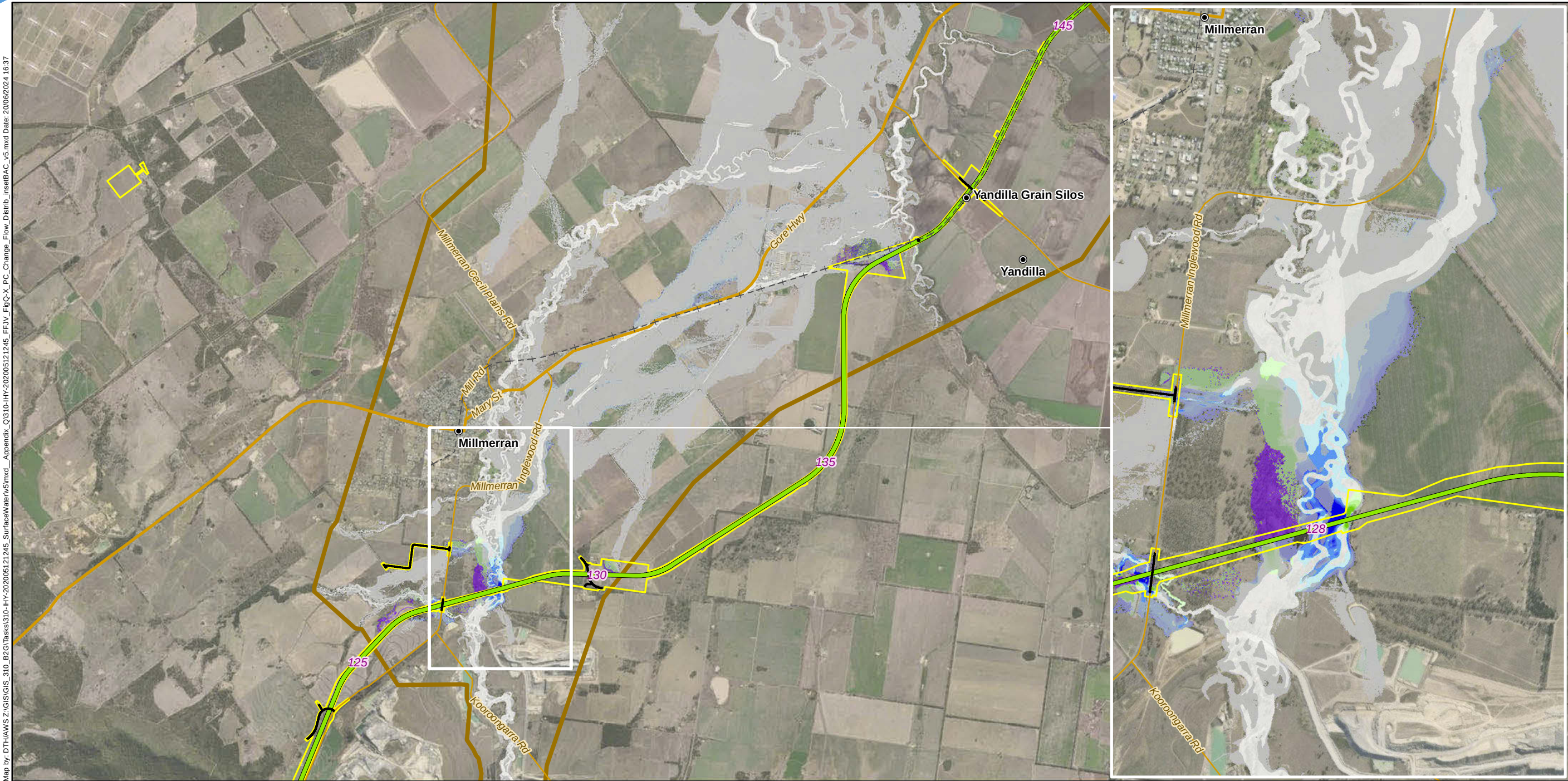
Border to Gowrie

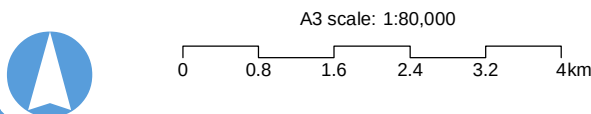
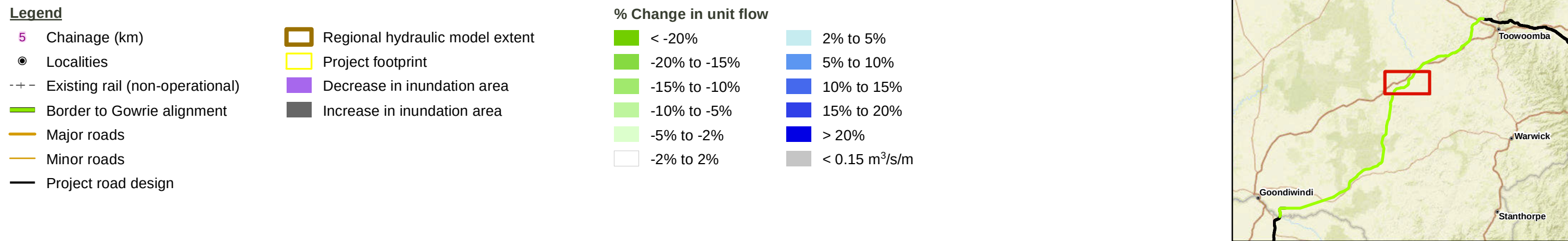
Figure Q3-8:

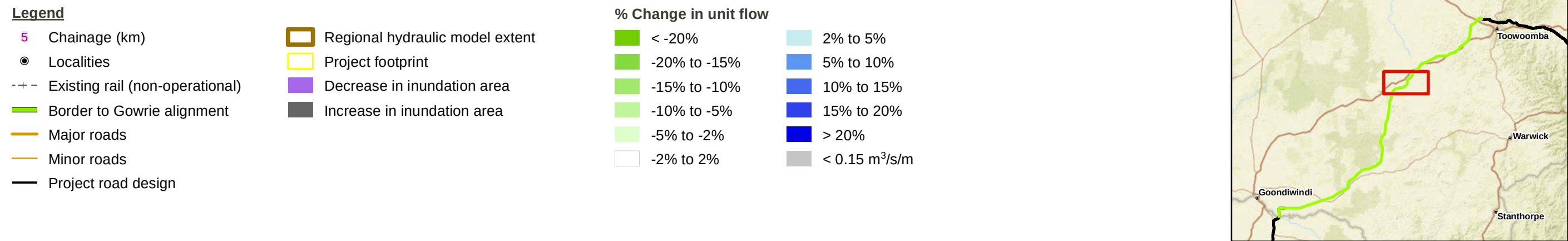
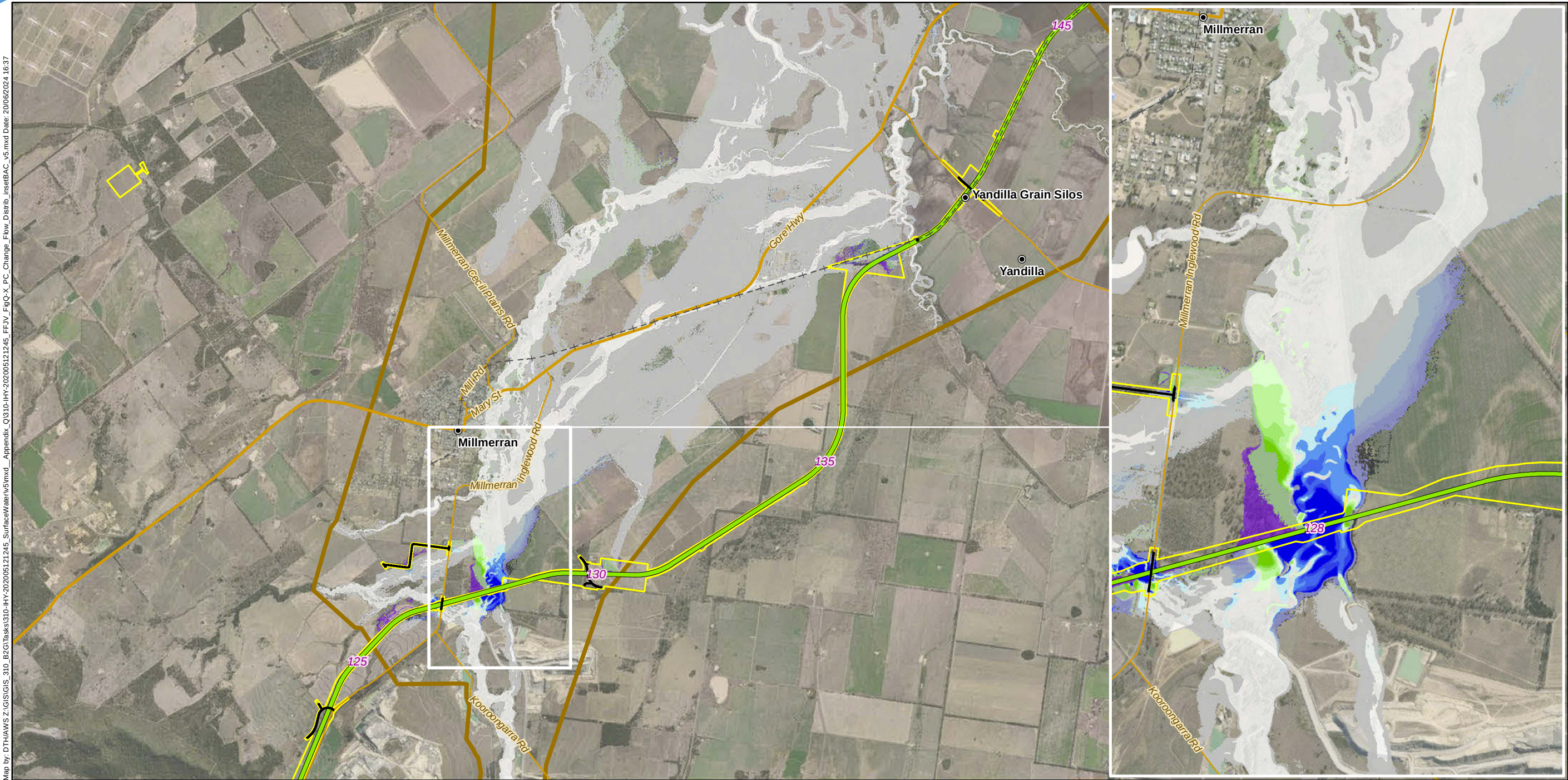
PMF Event - Percentage Change in Flow Distribution - Condamine River



A3 scale: 1:80,000
0 0.8 1.6 2.4 3.2 4km







A3 scale: 1:80,000
0 0.8 1.6 2.4 3.2 4km

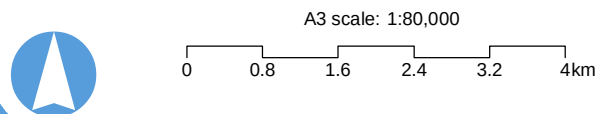
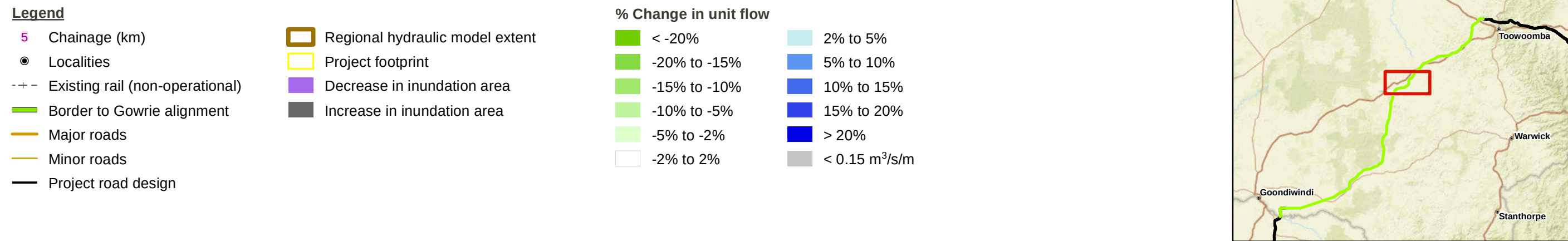
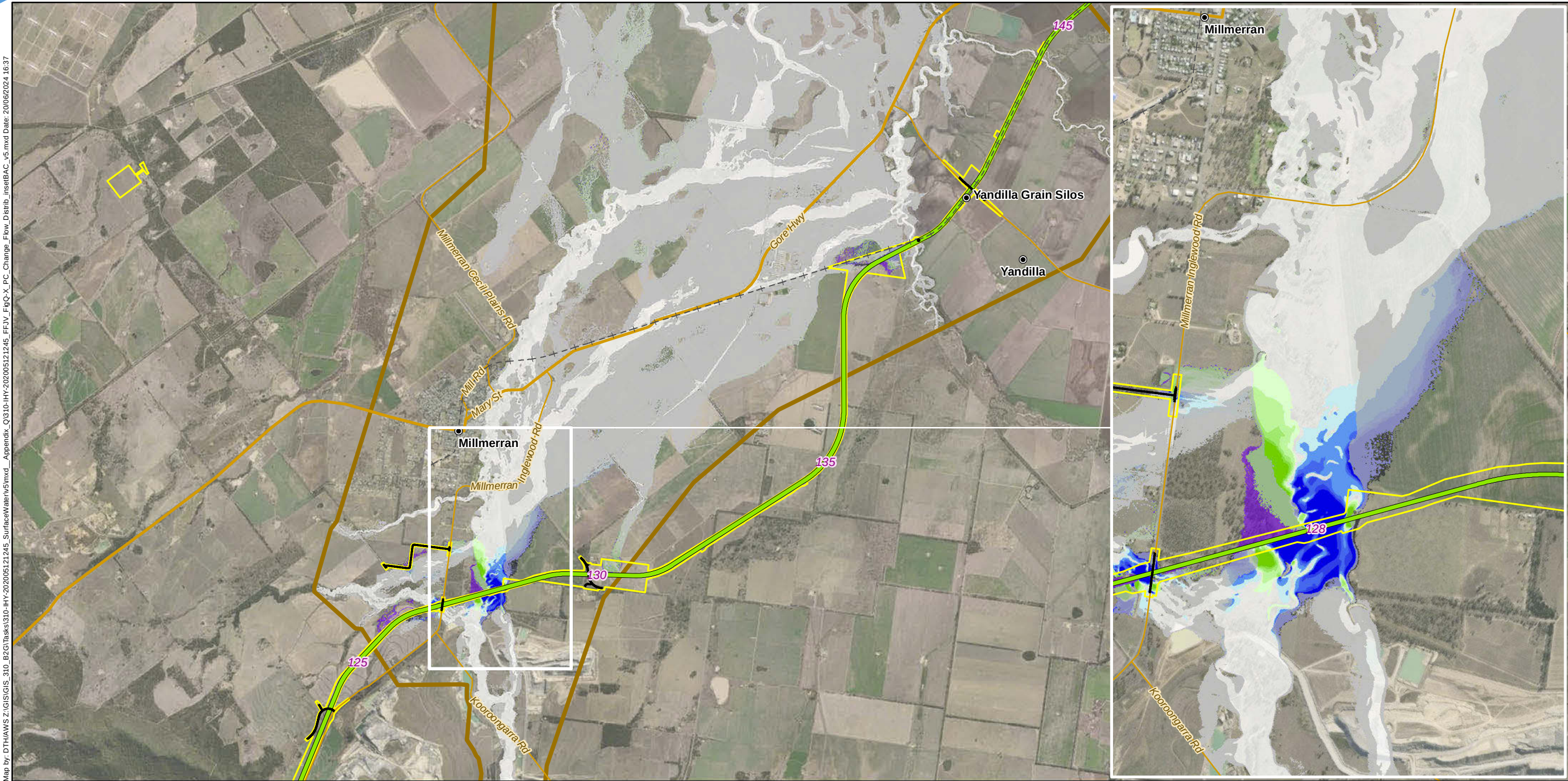


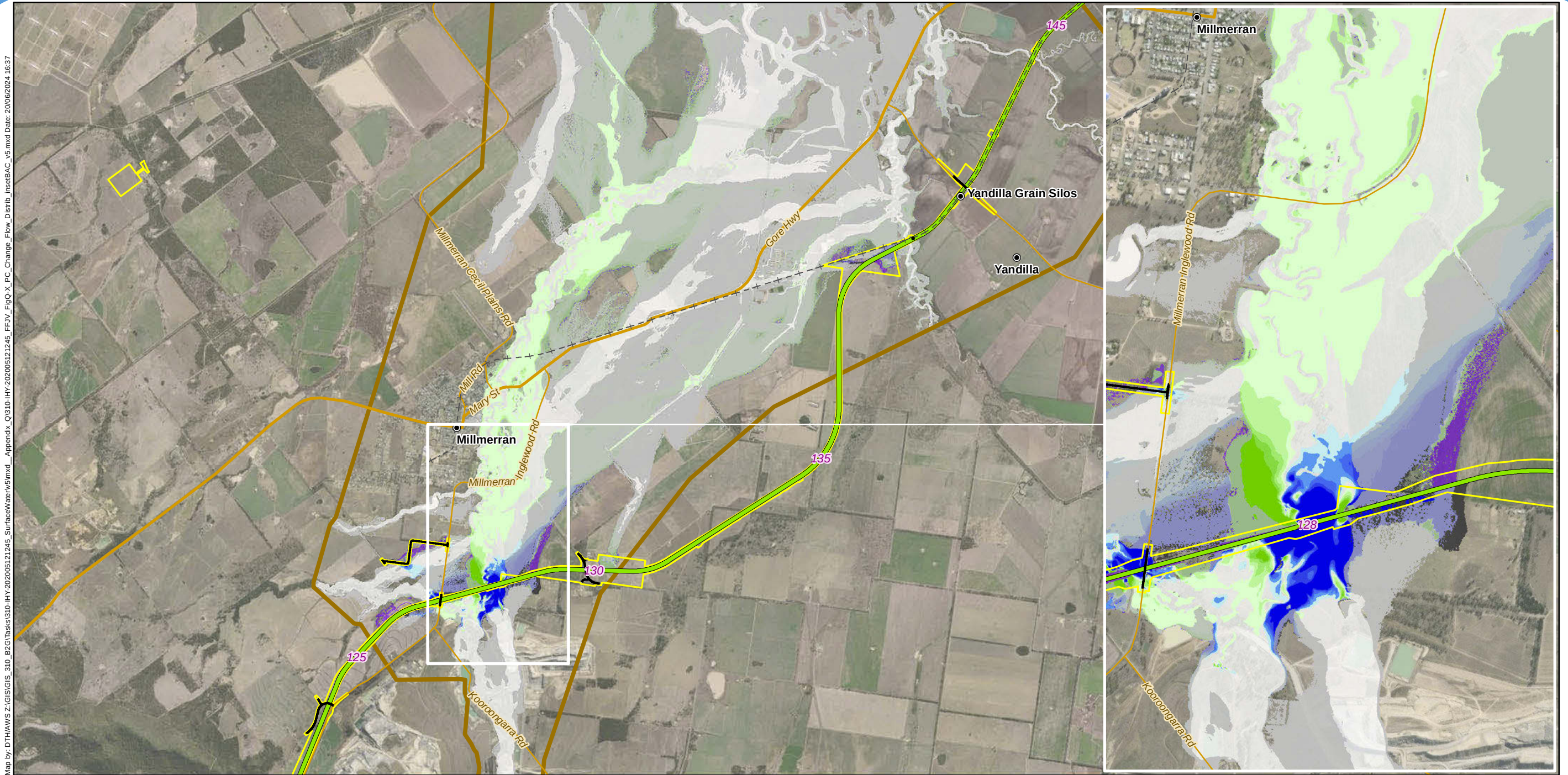
Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure Q4-4:

2% AEP Event - Percentage Change in Flow Distribution - Back Creek





Legend

- 5 Chainage (km)
- Localities
- Existing rail (non-operational)
- Border to Gowrie alignment
- Major roads
- Minor roads
- Project road design

- Regional hydraulic model extent
- Project footprint
- Decrease in inundation area
- Increase in inundation area

% Change in unit flow

- | | |
|--------------|----------------------------|
| < -20% | 2% to 5% |
| -20% to -15% | 5% to 10% |
| -15% to -10% | 10% to 15% |
| -10% to -5% | 15% to 20% |
| -5% to -2% | > 20% |
| -2% to 2% | < 0.15 m ³ /s/m |



A3 scale: 1:80,000
0 0.8 1.6 2.4 3.2 4km

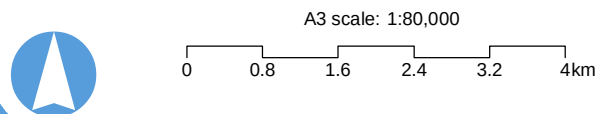
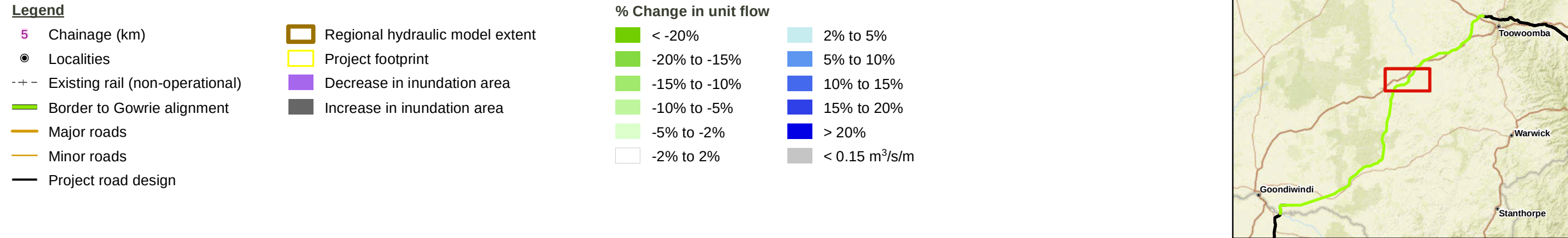
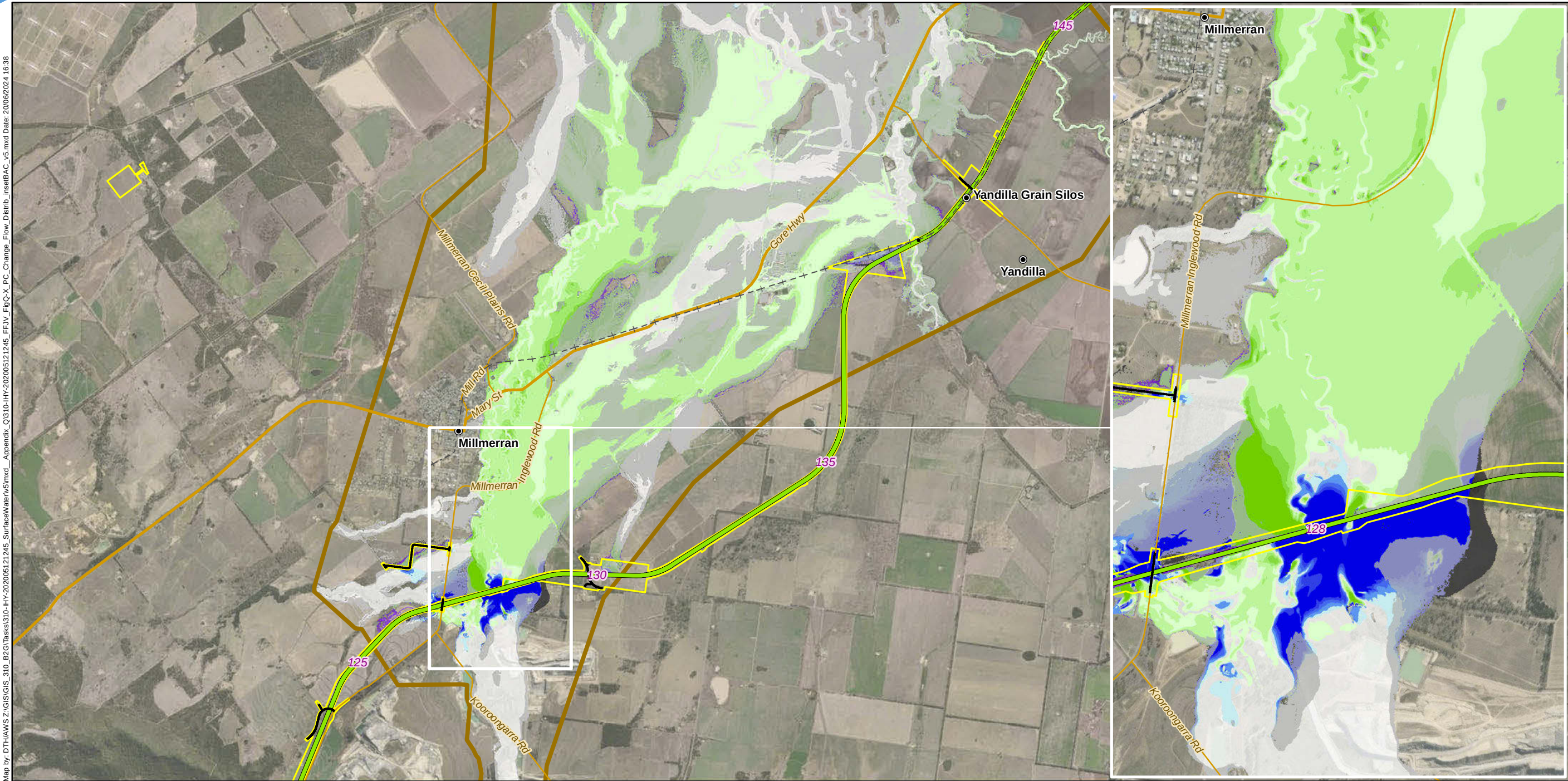


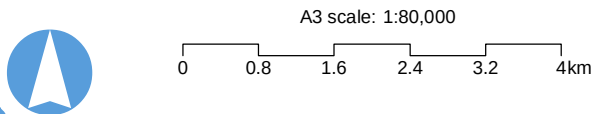
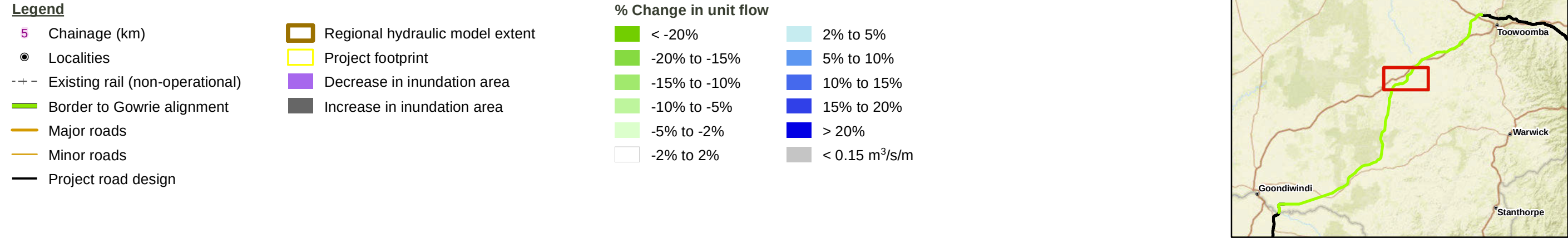
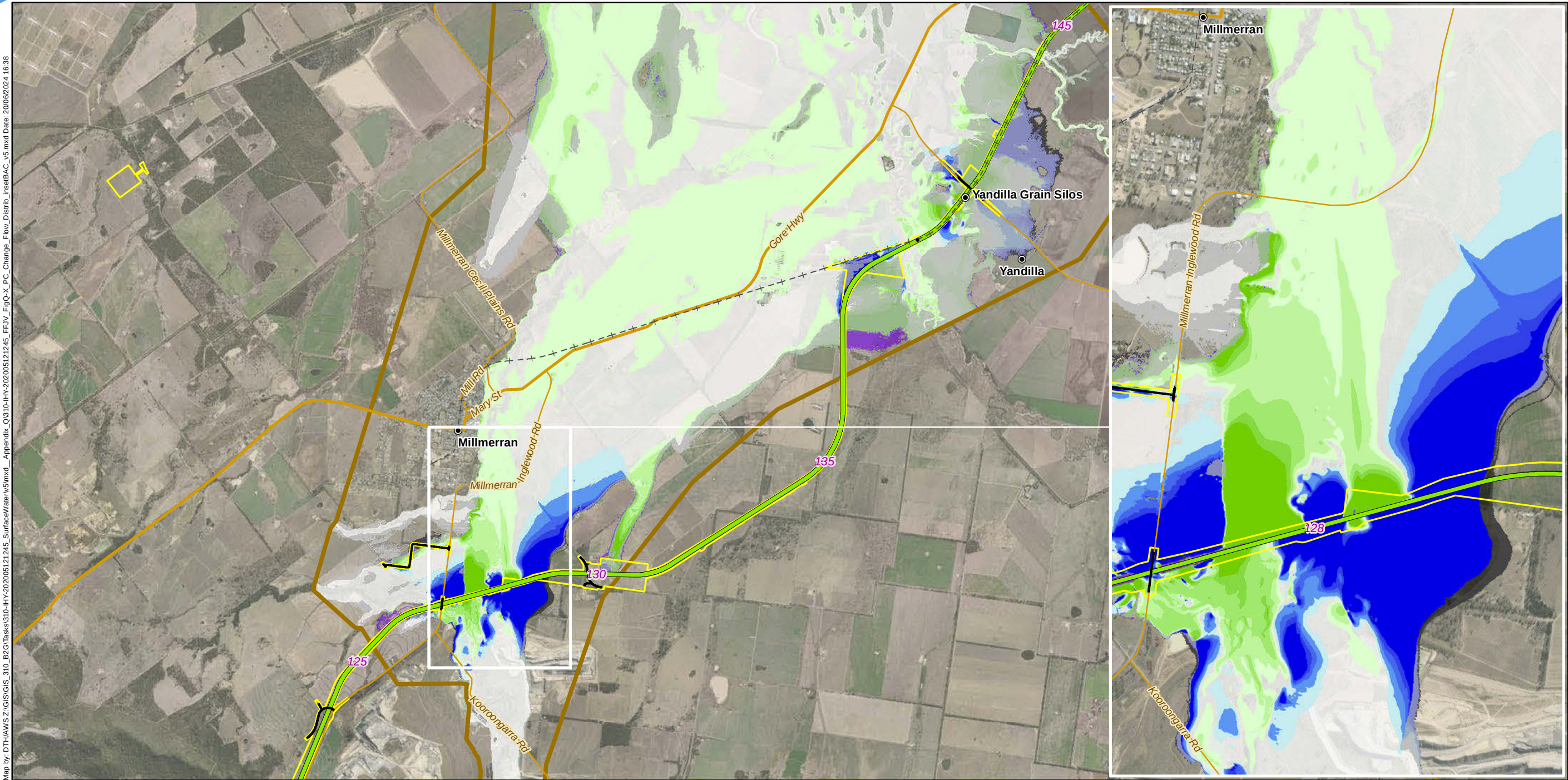
Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

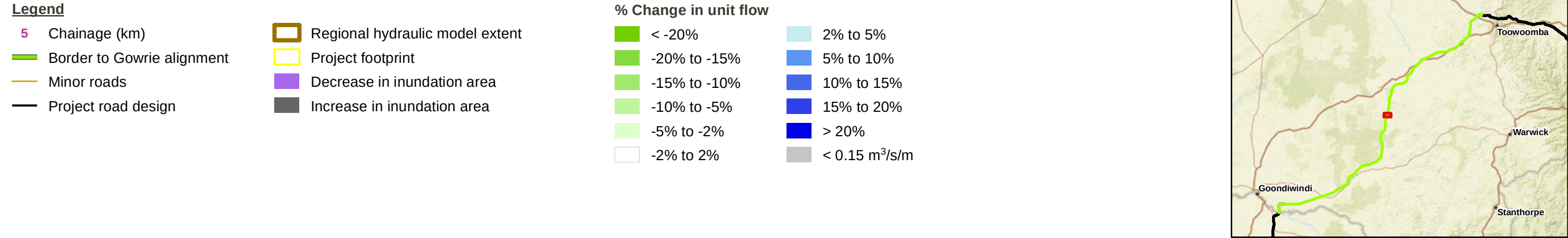
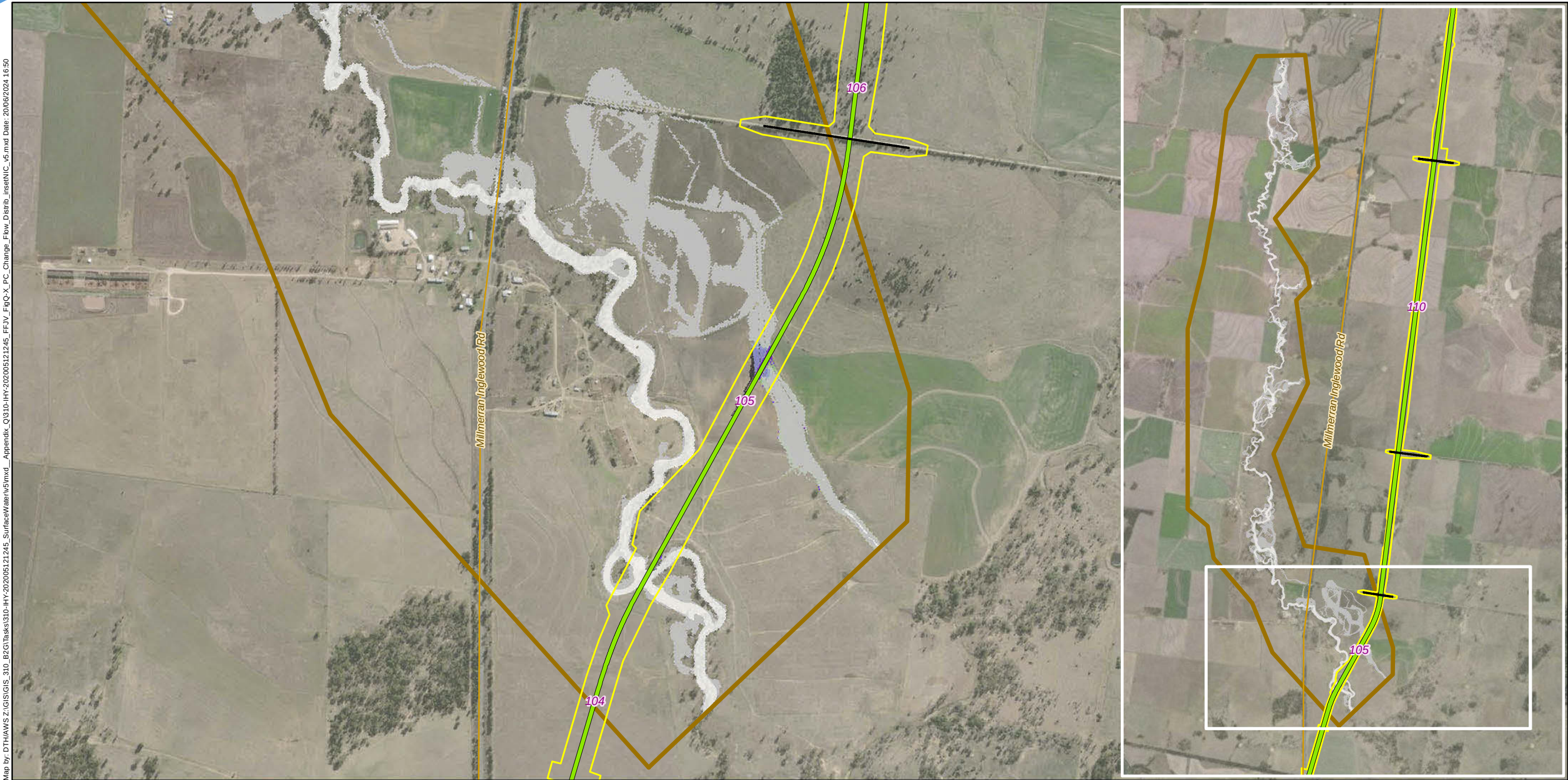
Border to Gowrie

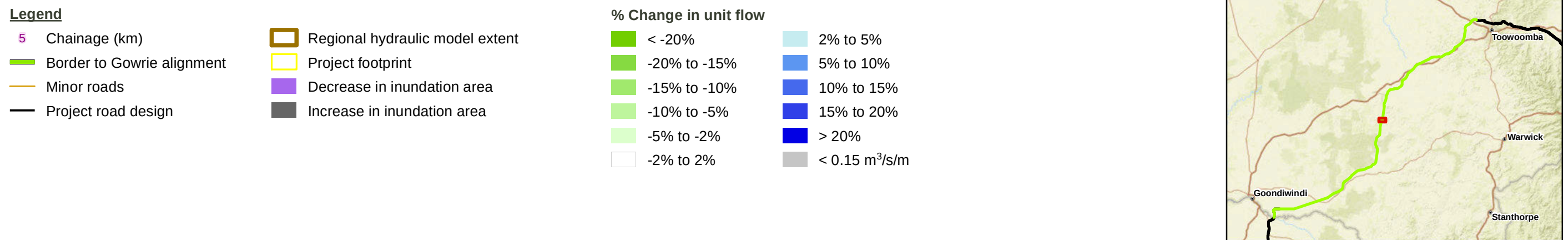
Figure Q4-6:

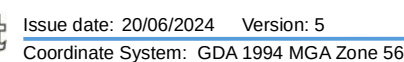
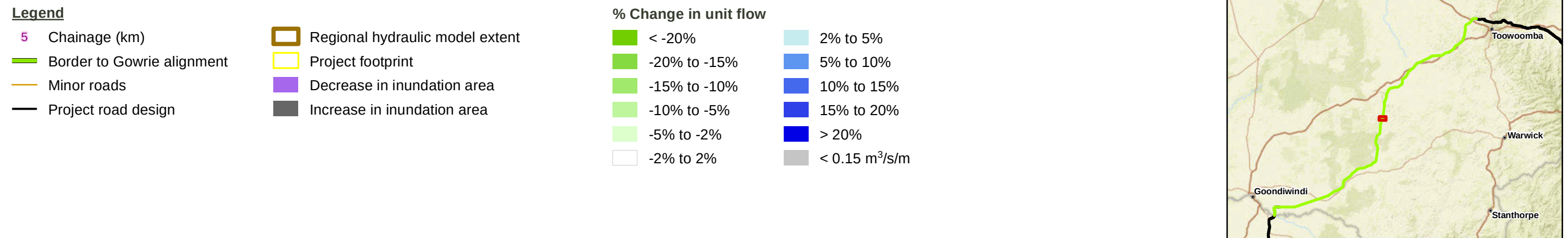
1 in 2,000 AEP Event - Percentage Change in Flow Distribution - Back Creek











5% AEP Event - Percentage Change in Flow Distribution - Nicol Creek



-  Regional hydraulic model extent
-  Project footprint
-  Decrease in inundation area
-  Increase in inundation area

	< -20%		2% to 5%
	-20% to -15%		5% to 10%
	-15% to -10%		10% to 15%
	-10% to -5%		15% to 20%
	-5% to -2%		> 20%
	-2% to 2%		< 0.15 m ³ /s/m

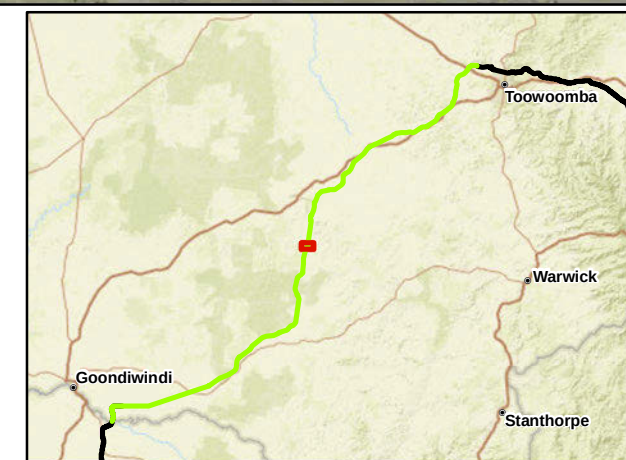


Figure Q5-4:

2% AEP Event - Percentage Change in Flow Distribution - Nicol Creek

Issue date: 20/06/2024 Version: 5

Coordinate System: GDA 1994 MGA Zone 56



-  Regional hydraulic model extent
-  Project footprint
-  Decrease in inundation area
-  Increase in inundation area

	< -20%		2% to 5%
	-20% to -15%		5% to 10%
	-15% to -10%		10% to 15%
	-10% to -5%		15% to 20%
	-5% to -2%		> 20%
	-2% to 2%		< 0.15 m ³ /s/m

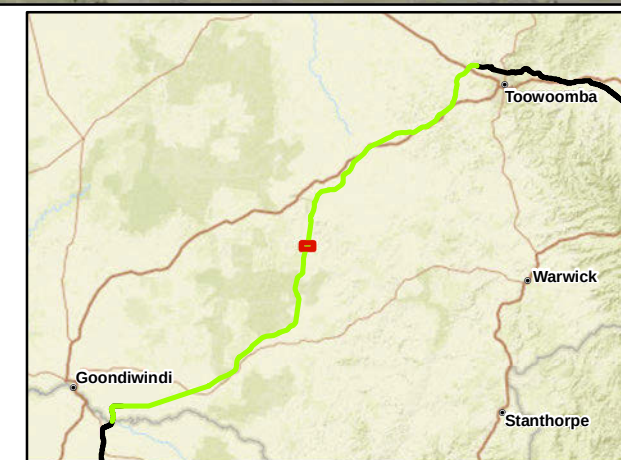


Figure Q5-5:

1% AEP Event - Percentage Change in Flow Distribution - Nicol Creek



-  Regional hydraulic model extent
-  Project footprint
-  Decrease in inundation area
-  Increase in inundation area

	< -20%		2% to 5%
	-20% to -15%		5% to 10%
	-15% to -10%		10% to 15%
	-10% to -5%		15% to 20%
	-5% to -2%		> 20%
	-2% to 2%		< 0.15 m³/s/m

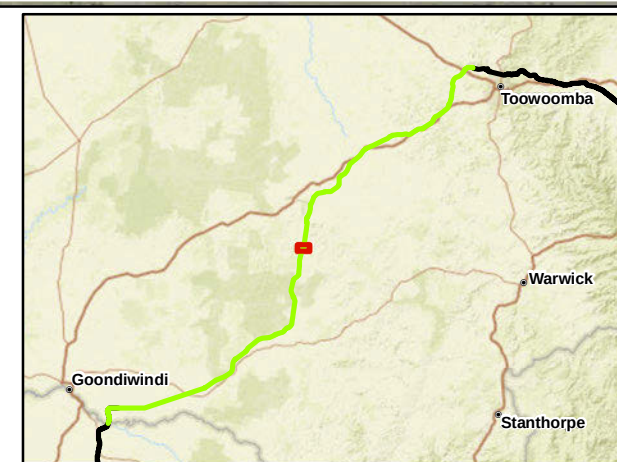


Figure Q5-6:

1 in 2,000 AEP Event - Percentage Change in Flow Distribution - Nicol Creek



-  Regional hydraulic model extent
-  Project footprint
-  Decrease in inundation area
-  Increase in inundation area

	< -20%		2% to 5%
	-20% to -15%		5% to 10%
	-15% to -10%		10% to 15%
	-10% to -5%		15% to 20%
	-5% to -2%		> 20%
	-2% to 2%		< 0.15 m³/s/m

 2% to 5%
 5% to 10%
 10% to 15%
 15% to 20%
 > 20%
 < 0.15 m³/s/m

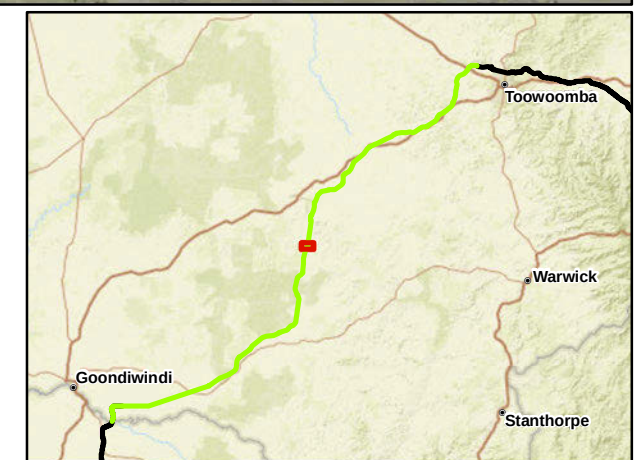
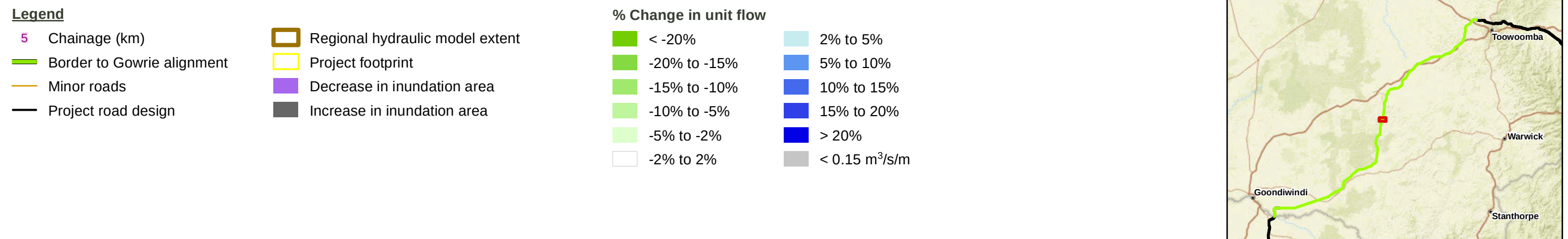


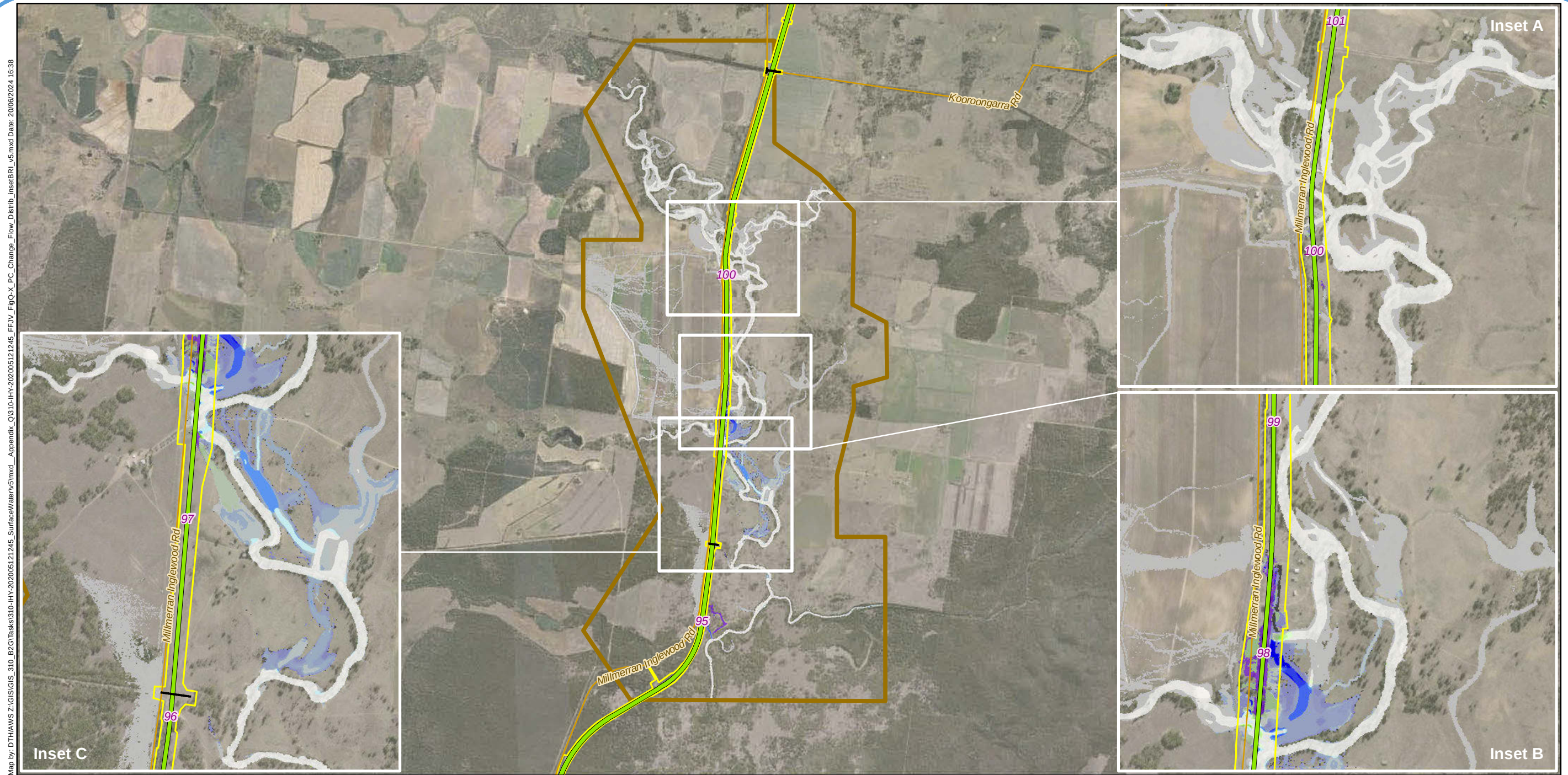
Figure Q5-7:

1 in 10,000 AEP Event - Percentage Change in Flow Distribution - Nicol Creek

A3 scale: 1:12,500

0 0.1 0.2 0.3 0.4 0.5km

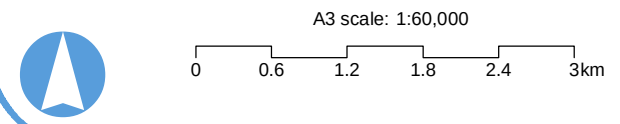
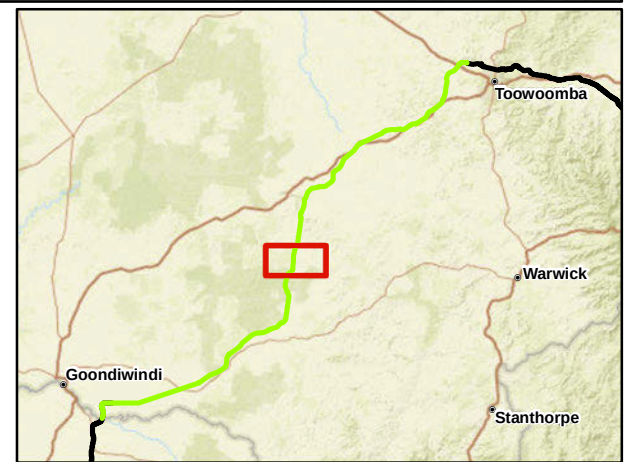




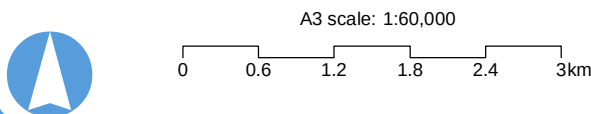
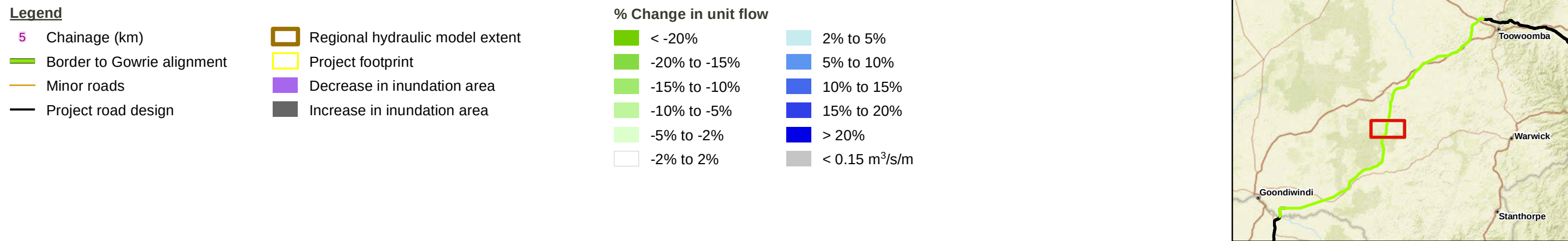
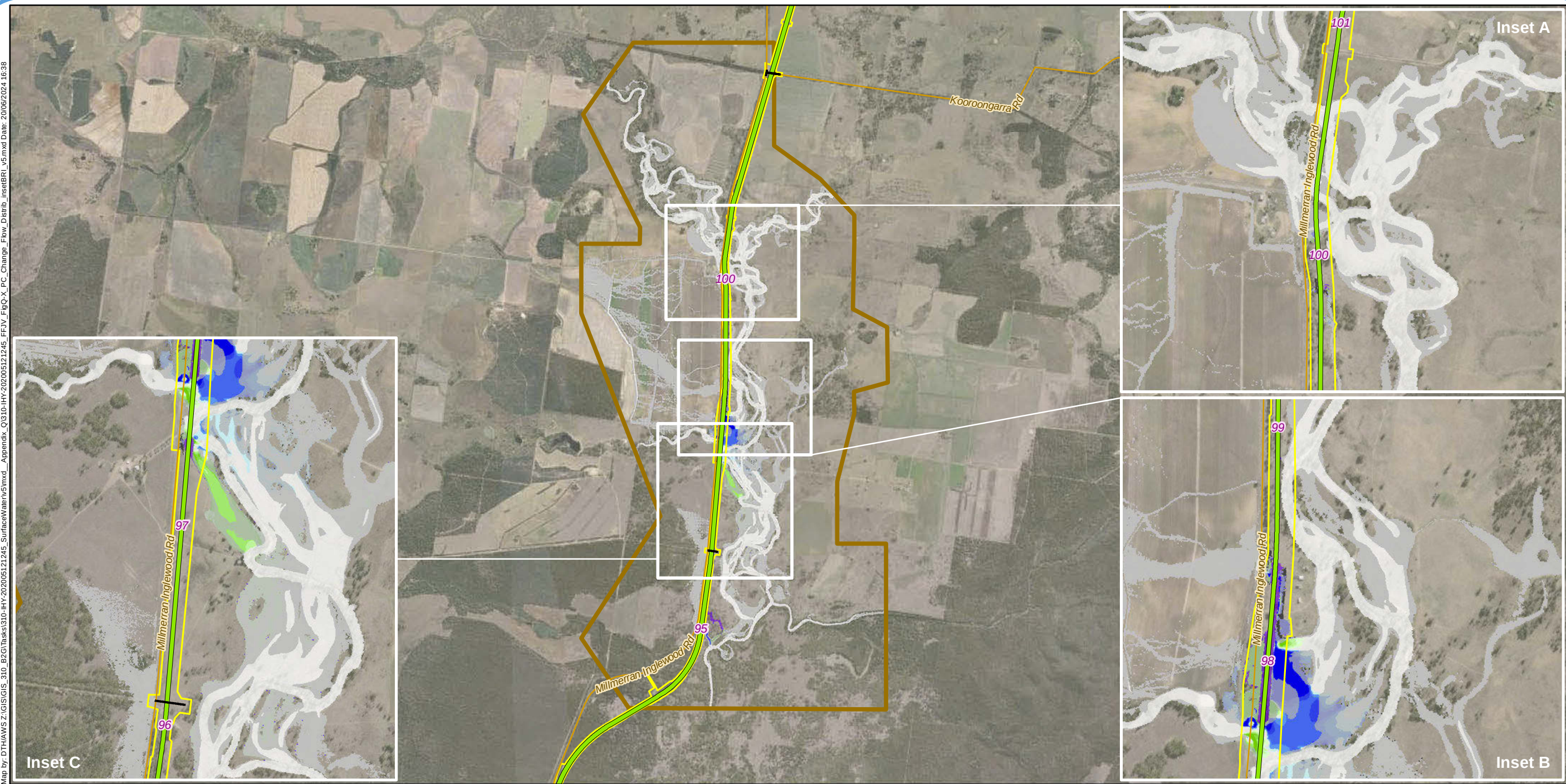
Legend

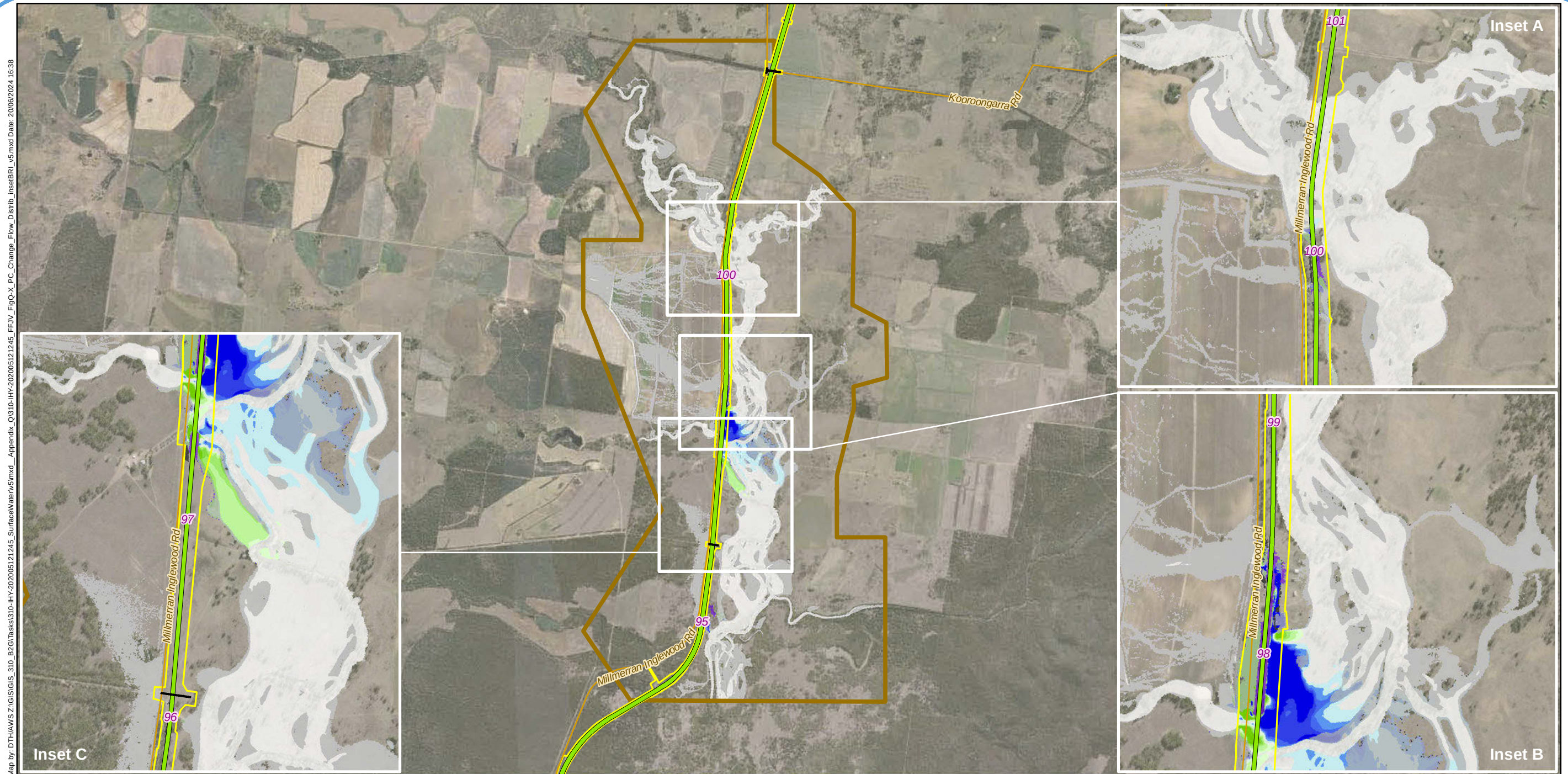
- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Regional hydraulic model extent
- Project footprint
- Decrease in inundation area
- Increase in inundation area

% Change in unit flow	
< -20%	2% to 5%
-20% to -15%	5% to 10%
-15% to -10%	10% to 15%
-10% to -5%	15% to 20%
-5% to -2%	> 20%
-2% to 2%	< 0.15 m ³ /s/m



Border to Gowrie
Figure Q6-1:
20% AEP Event - Percentage Change in Flow Distribution - Bringally Creek



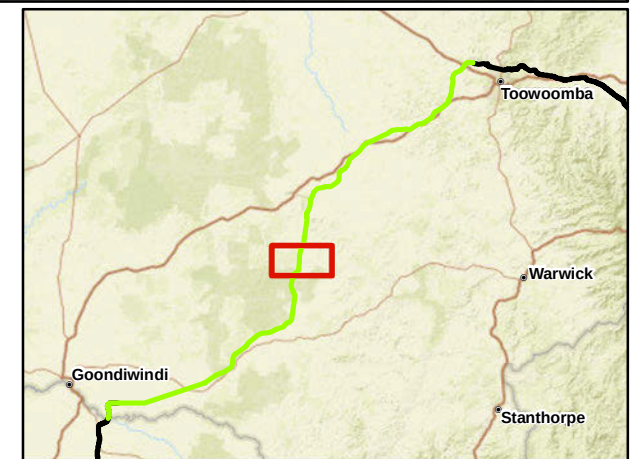


Legend

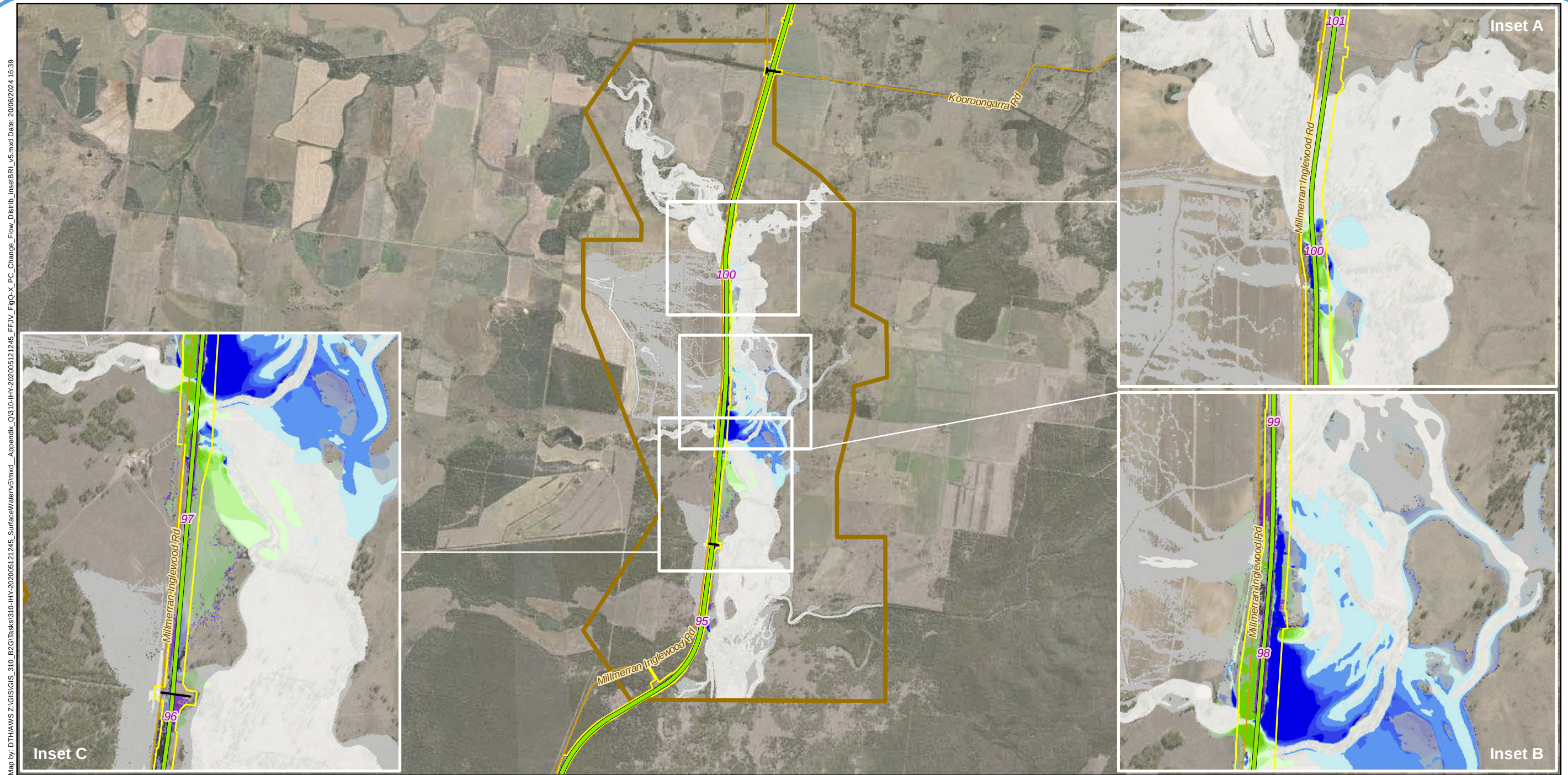
- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Regional hydraulic model extent
- Project footprint
- Decrease in inundation area
- Increase in inundation area

% Change in unit flow

- | | |
|--------------|----------------------------|
| < -20% | 2% to 5% |
| -20% to -15% | 5% to 10% |
| -15% to -10% | 10% to 15% |
| -10% to -5% | 15% to 20% |
| -5% to -2% | > 20% |
| -2% to 2% | < 0.15 m ³ /s/m |



A3 scale: 1:60,000
0 0.6 1.2 1.8 2.4 3km

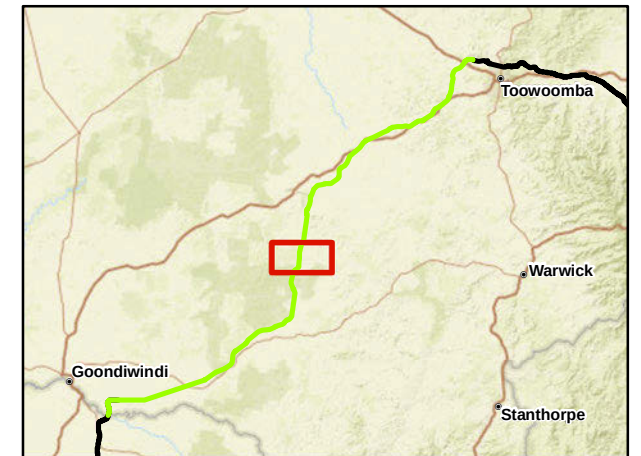


Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Regional hydraulic model extent
- Project footprint
- Decrease in inundation area
- Increase in inundation area

% Change in unit flow

- | | |
|--------------|----------------------------|
| < -20% | 2% to 5% |
| -20% to -15% | 5% to 10% |
| -15% to -10% | 10% to 15% |
| -10% to -5% | 15% to 20% |
| -5% to -2% | > 20% |
| -2% to 2% | < 0.15 m ³ /s/m |



A3 scale: 1:60,000
0 0.6 1.2 1.8 2.4 3km

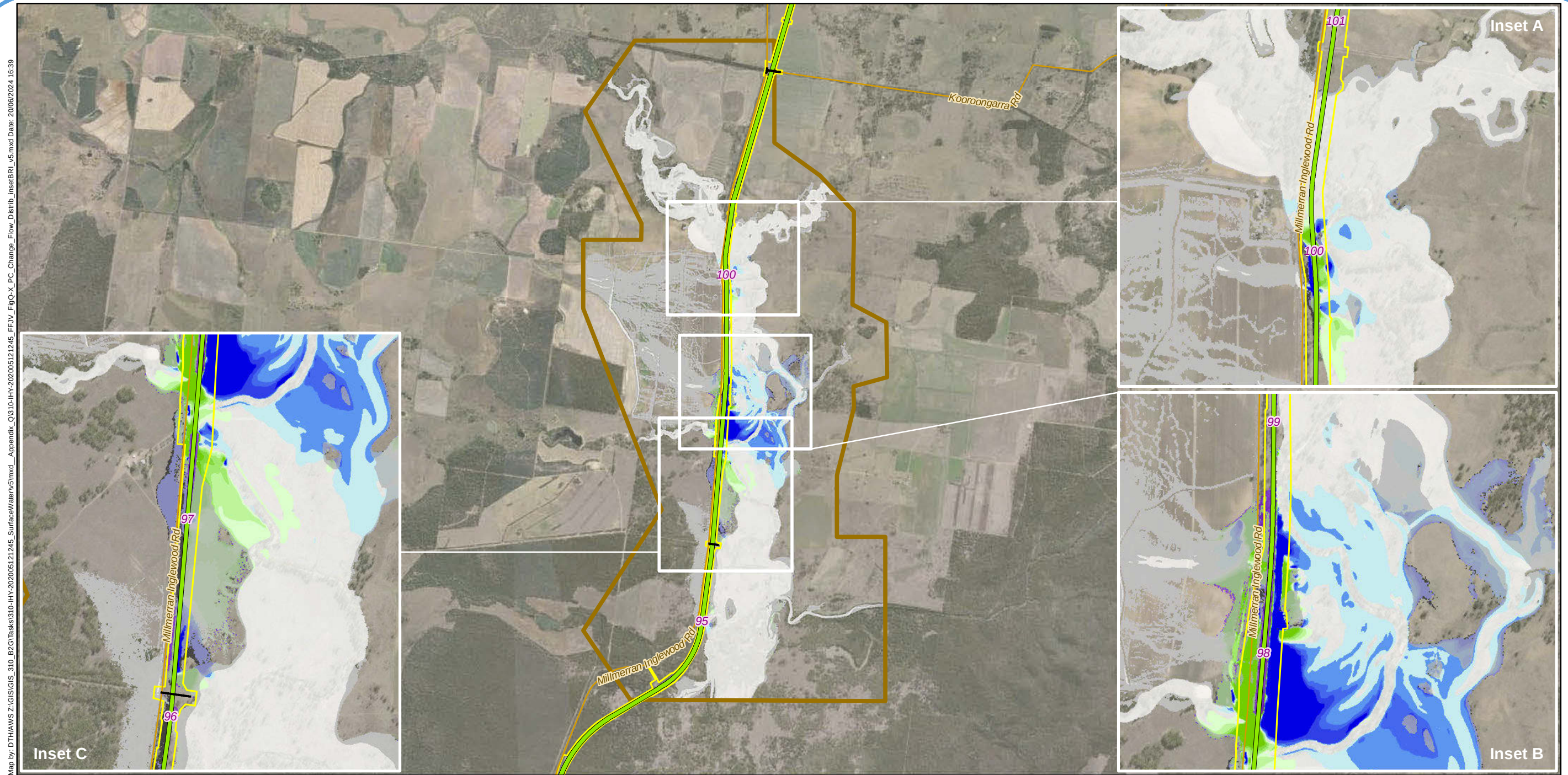


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Border to Gowrie

Figure Q6-4:

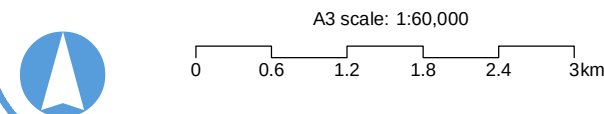
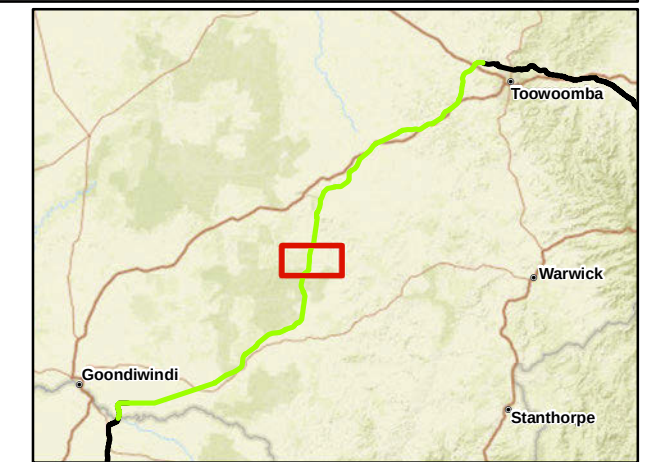
2% AEP Event - Percentage Change in Flow Distribution - Bringalily Creek



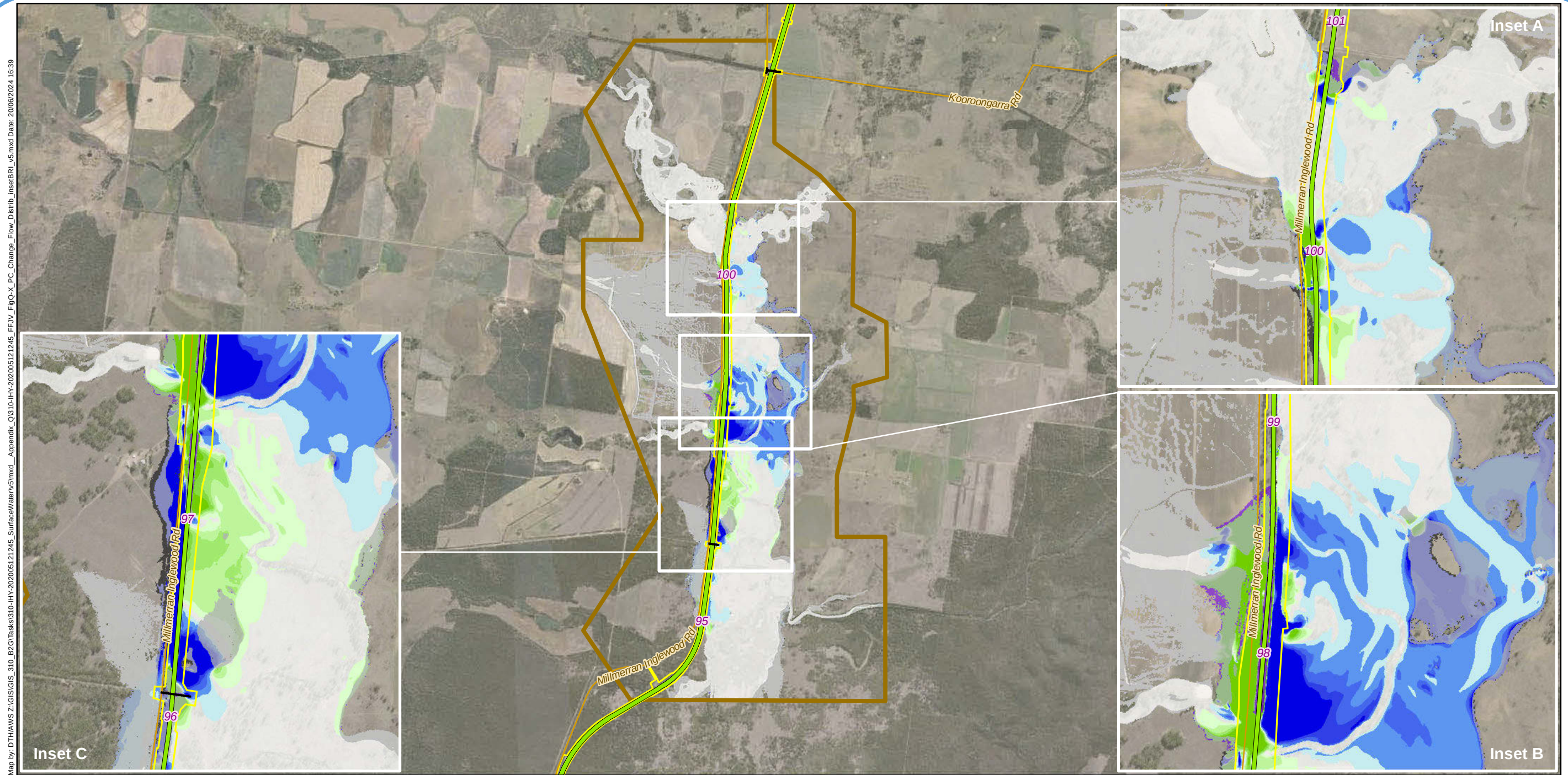
Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Regional hydraulic model extent
- Project footprint
- Decrease in inundation area
- Increase in inundation area

% Change in unit flow	
< -20%	2% to 5%
-20% to -15%	5% to 10%
-15% to -10%	10% to 15%
-10% to -5%	15% to 20%
-5% to -2%	> 20%
-2% to 2%	< 0.15 m³/s/m



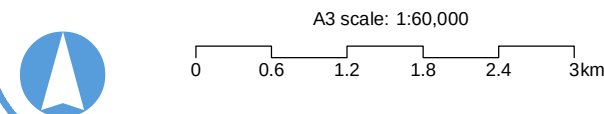
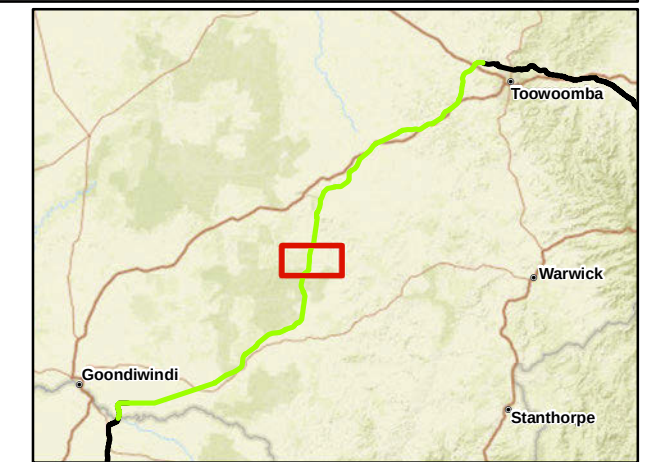
Border to Gowrie
Figure Q6-5:
1% AEP Event - Percentage Change in Flow Distribution - Bringalily Creek



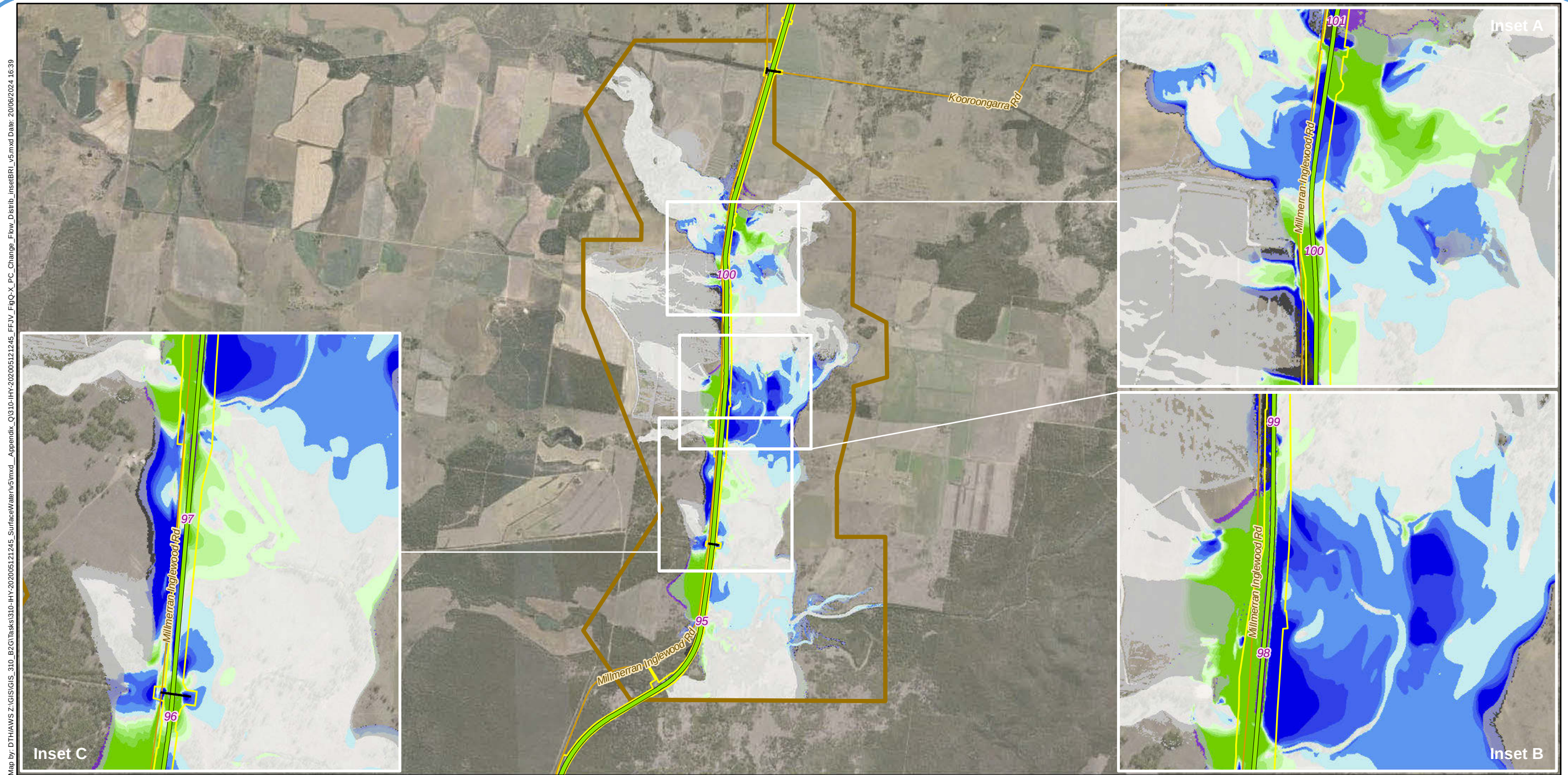
Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Regional hydraulic model extent
- Project footprint
- Decrease in inundation area
- Increase in inundation area

% Change in unit flow	
< -20%	2% to 5%
-20% to -15%	5% to 10%
-15% to -10%	10% to 15%
-10% to -5%	15% to 20%
-5% to -2%	> 20%
-2% to 2%	< 0.15 m ³ /s/m



Border to Gowrie
Figure Q6-6:
1 in 2,000 AEP Event - Percentage Change in Flow Distribution - Bringally Creek

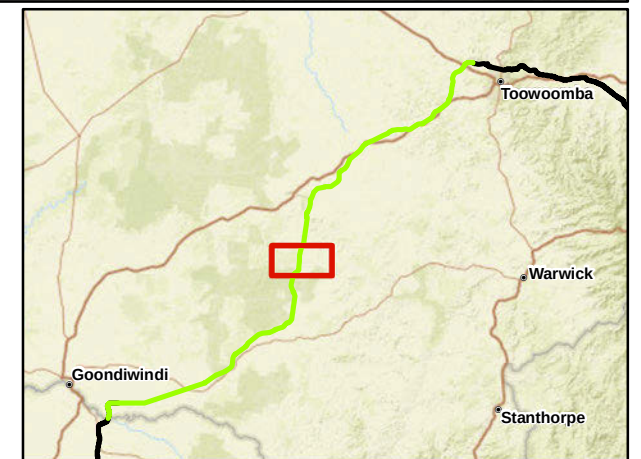


Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Regional hydraulic model extent
- Project footprint
- Decrease in inundation area
- Increase in inundation area

% Change in unit flow

- < -20%
- 20% to -15%
- 15% to -10%
- 10% to -5%
- 5% to -2%
- 2% to 2%
- 2% to 5%
- 5% to 10%
- 10% to 15%
- 15% to 20%
- > 20%
- < 0.15 m³/s/m



A3 scale: 1:60,000
0 0.6 1.2 1.8 2.4 3km



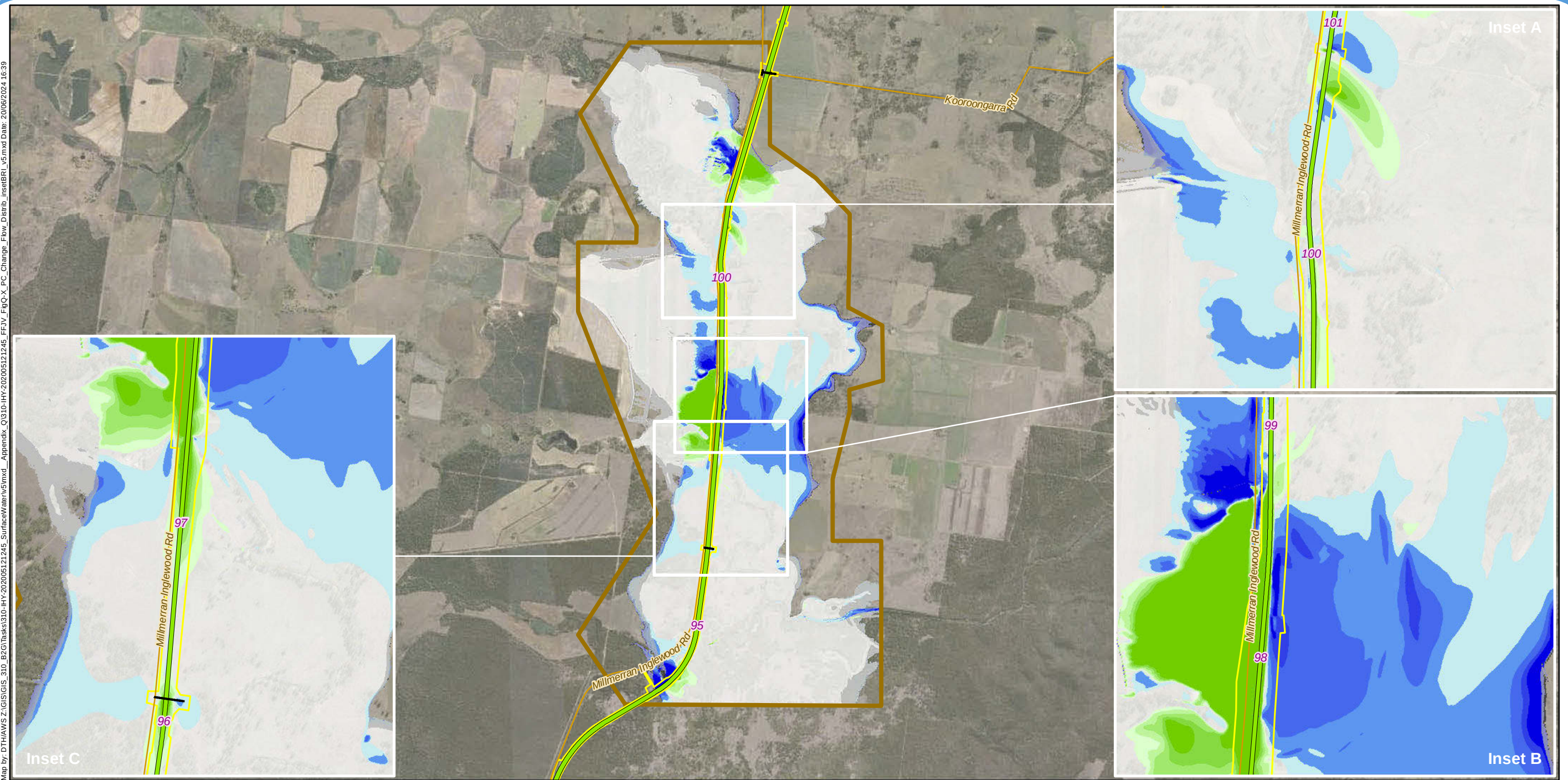
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Border to Gowrie

Figure Q6-7:

1 in 10,000 AEP Event - Percentage Change in Flow Distribution - Bringalily Creek

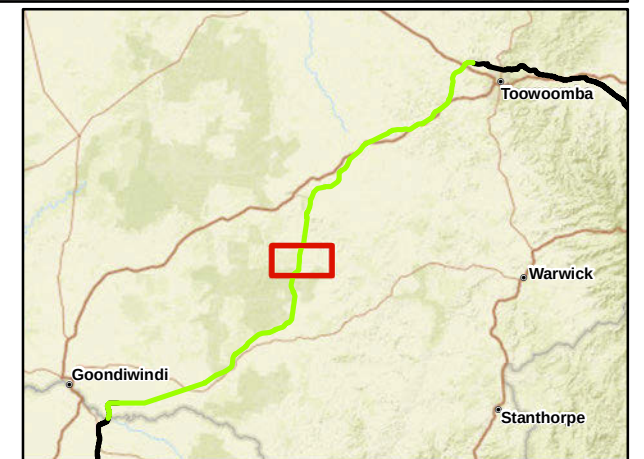


Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Regional hydraulic model extent
- Project footprint
- Decrease in inundation area
- Increase in inundation area

% Change in unit flow

- < -20%
- 20% to -15%
- 15% to -10%
- 10% to -5%
- 5% to -2%
- 2% to 2%
- 2% to 5%
- 5% to 10%
- 10% to 15%
- 15% to 20%
- > 20%
- < 0.15 m³/s/m



A3 scale: 1:60,000
0 0.6 1.2 1.8 2.4 3km



Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure Q6-8:

PMF Event - Percentage Change in Flow Distribution - Bringally Creek



-  Regional hydraulic model extent
-  Project footprint
-  Decrease in inundation area
-  Increase in inundation area

	< -20%		2% to 5%
	-20% to -15%		5% to 10%
	-15% to -10%		10% to 15%
	-10% to -5%		15% to 20%
	-5% to -2%		> 20%
	-2% to 2%		< 0.15 m ³ /s/m



Border to Gowrie

Figure Q7-1:

20% AEP Event - Percentage Change in Flow Distribution - Native Dog Creek



— Minor roads

■ Increase in inundation area

☐ -2% to 2%

■ $< 0.15 \text{ m}^3/\text{s}/\text{m}$



Figure Q7-2:

10% AEP Event - Percentage Change in Flow Distribution - Native Dog Creek



-  Regional hydraulic model extent
-  Project footprint
-  Decrease in inundation area
-  Increase in inundation area

	< -20%		2% to 5%
	-20% to -15%		5% to 10%
	-15% to -10%		10% to 15%
	-10% to -5%		15% to 20%
	-5% to -2%		> 20%
	-2% to 2%		< 0.15 m ³ /s/m

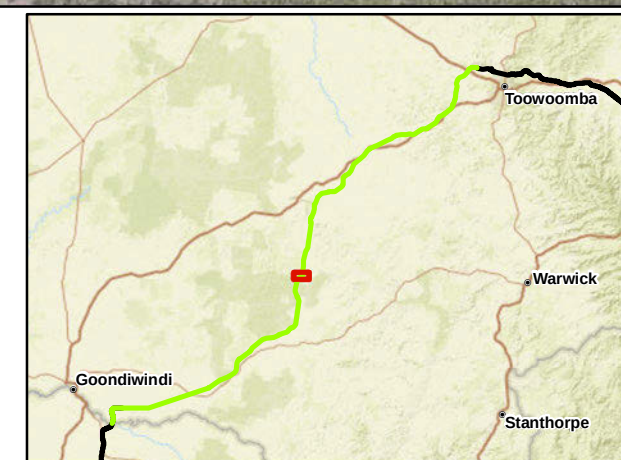


Figure Q7-3:

5% AEP Event - Percentage Change in Flow Distribution - Native Dog Creek

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\GIS_310_IHY-202005121245_SurfaceWater\5mxd_Appldix_Q310-IHY-202005121245_FF\JV_FigQ-X_PC_Change_Flow_Distrib_v5.mxd Date: 20/06/2024 16:53



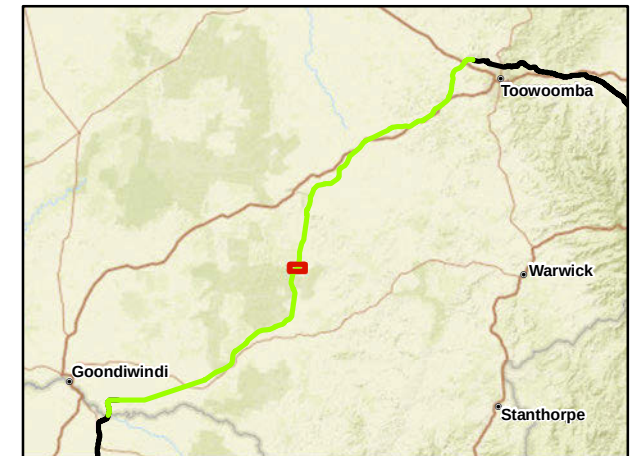
Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads

- Regional hydraulic model extent
- Project footprint
- Decrease in inundation area
- Increase in inundation area

% Change in unit flow

- | | |
|--------------|----------------------------|
| < -20% | 2% to 5% |
| -20% to -15% | 5% to 10% |
| -15% to -10% | 10% to 15% |
| -10% to -5% | 15% to 20% |
| -5% to -2% | > 20% |
| -2% to 2% | < 0.15 m ³ /s/m |



A3 scale: 1:15,000
0 0.15 0.3 0.45 0.6 0.75 km



Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

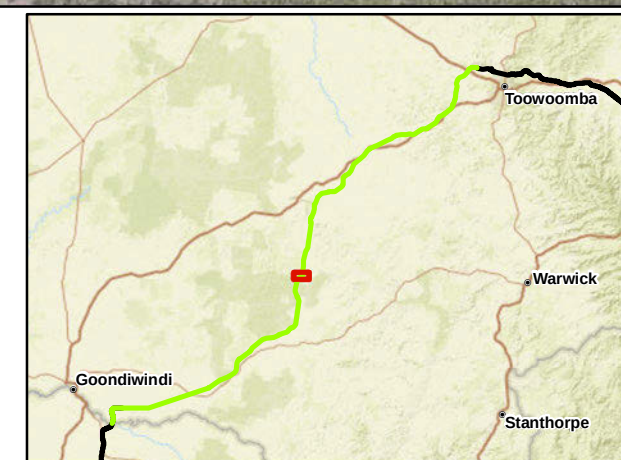
Figure Q7-4:

2% AEP Event - Percentage Change in Flow Distribution - Native Dog Creek



-  Regional hydraulic model extent
-  Project footprint
-  Decrease in inundation area
-  Increase in inundation area

	< -20%		2% to 5%
	-20% to -15%		5% to 10%
	-15% to -10%		10% to 15%
	-10% to -5%		15% to 20%
	-5% to -2%		> 20%
	-2% to 2%		< 0.15 m ³ /s/m



Border to Gowrie

Figure Q7-5:

1% AEP Event - Percentage Change in Flow Distribution - Native Dog Creek

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\GIS_310_IHY-202005121245_SurfaceWater\5mxd_Appldix_Q310-IHY-202005121245_FF\JV_FigQ-X_PC_Change_Flow_Distrib_v5.mxd Date: 20/06/2024 16:53



Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads

- Regional hydraulic model extent
- Project footprint
- Decrease in inundation area
- Increase in inundation area

% Change in unit flow	
< -20%	2% to 5%
-20% to -15%	5% to 10%
-15% to -10%	10% to 15%
-10% to -5%	15% to 20%
-5% to -2%	> 20%
-2% to 2%	< 0.15 m ³ /s/m



A3 scale: 1:15,000
0 0.15 0.3 0.45 0.6 0.75 km



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Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie
Figure Q7-6:
1 in 2,000 AEP Event - Percentage Change in Flow Distribution - Native Dog Creek



-  Regional hydraulic model extent
-  Project footprint
-  Decrease in inundation area
-  Increase in inundation area

	< -20%		2% to 5%
	-20% to -15%		5% to 10%
	-15% to -10%		10% to 15%
	-10% to -5%		15% to 20%
	-5% to -2%		> 20%
	-2% to 2%		< 0.15 m ³ /s/m



Figure Q7-7:

1 in 10,000 AEP Event - Percentage Change in Flow Distribution - Native Dog Creek



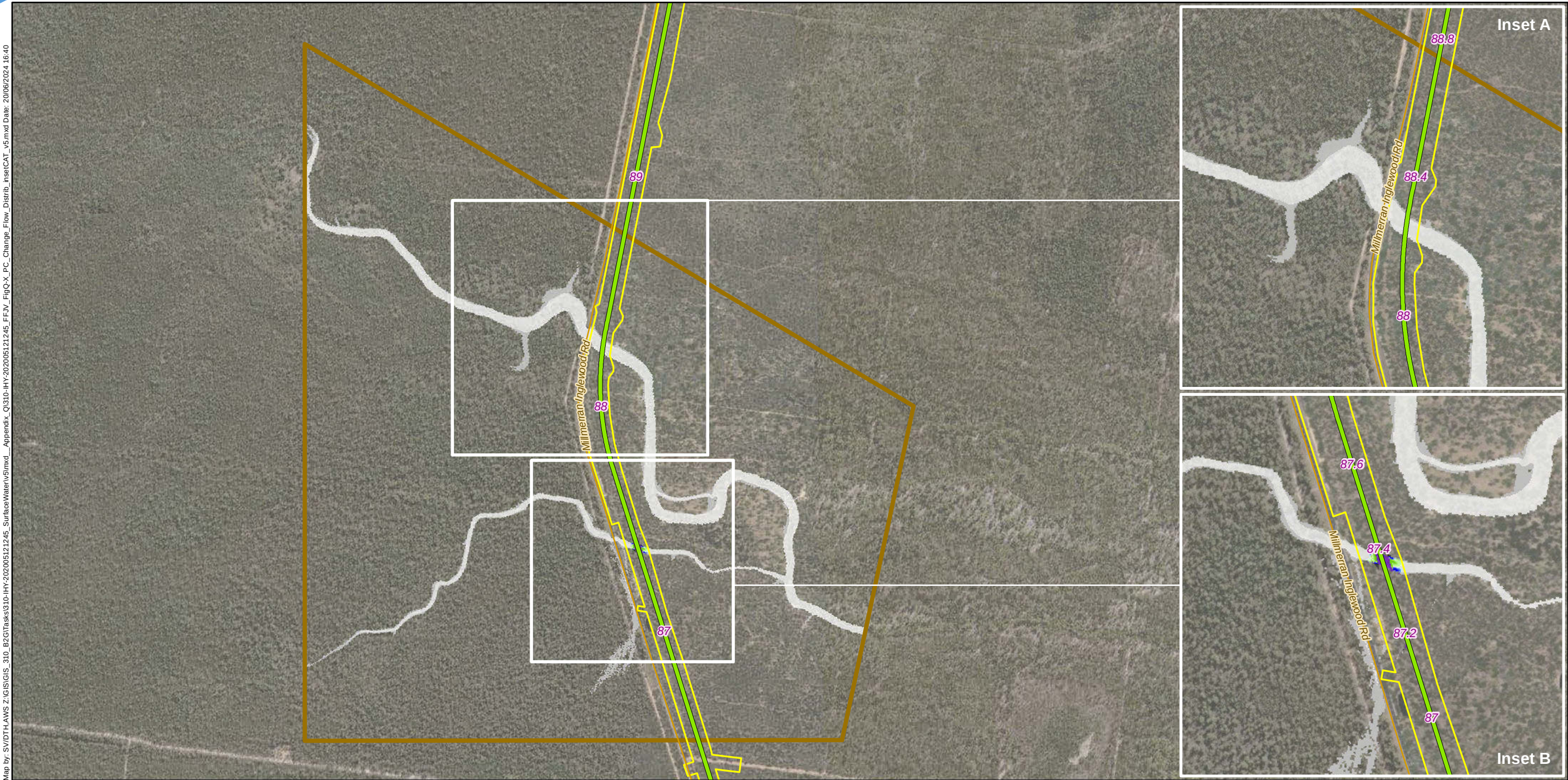
-  Regional hydraulic model extent
-  Project footprint
-  Decrease in inundation area
-  Increase in inundation area

	< -20%		2% to 5%
	-20% to -15%		5% to 10%
	-15% to -10%		10% to 15%
	-10% to -5%		15% to 20%
	-5% to -2%		> 20%
	-2% to 2%		< 0.15 m ³ /s/m



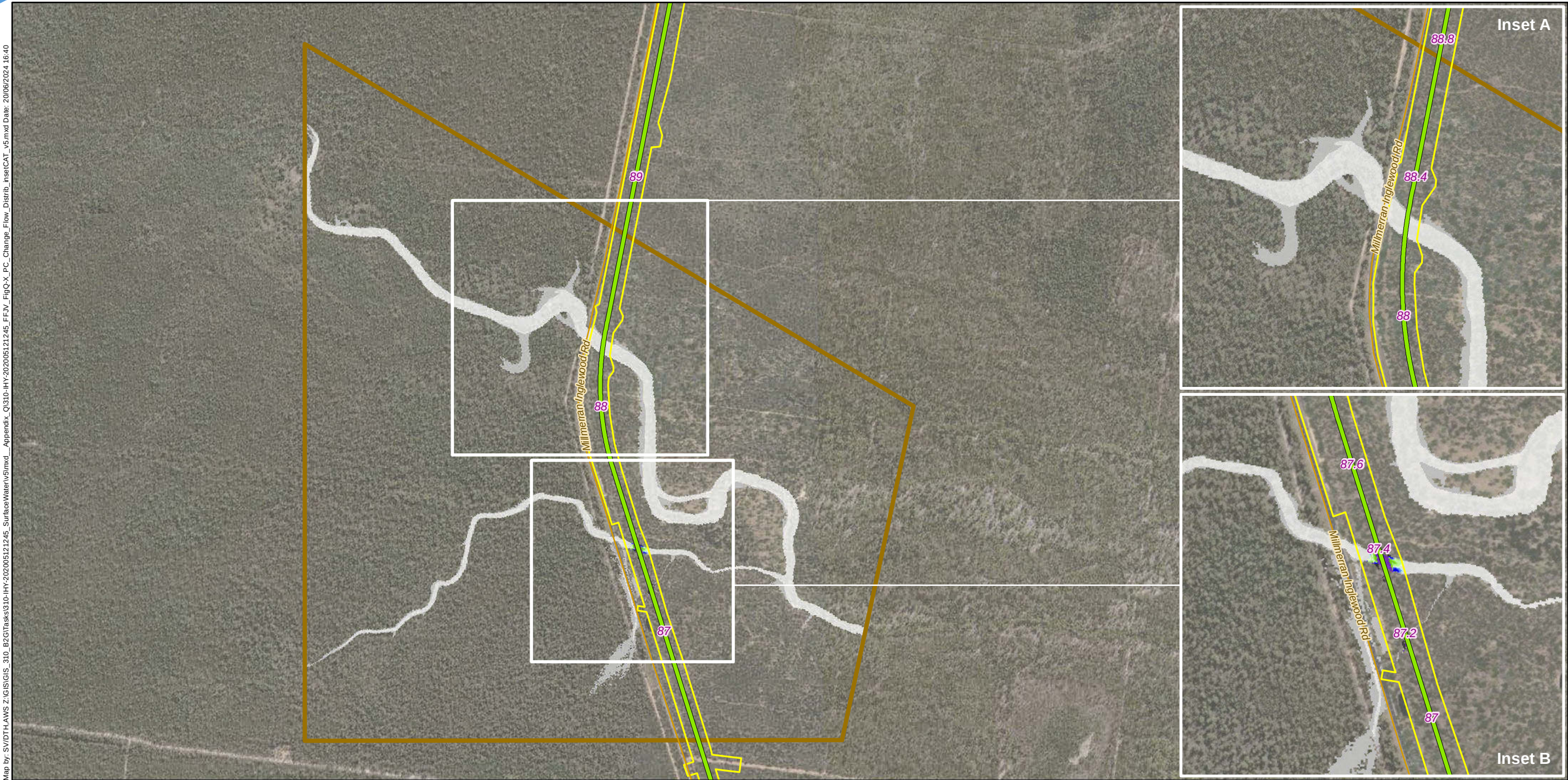
Figure Q7-8:

PMF Event - Percentage Change in Flow Distribution - Native Dog Creek



A3 scale: 1:18,000

0 0.15 0.3 0.45 0.6 0.75 km



Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads

- Regional hydraulic model extent
- Project footprint
- Decrease in inundation area
- Increase in inundation area

% Change in unit flow

- | | |
|--------------|----------------------------|
| < -20% | 2% to 5% |
| -20% to -15% | 5% to 10% |
| -15% to -10% | 10% to 15% |
| -10% to -5% | 15% to 20% |
| -5% to -2% | > 20% |
| -2% to 2% | < 0.15 m ³ /s/m |



A3 scale: 1:18,000

0 0.15 0.3 0.45 0.6 0.75km



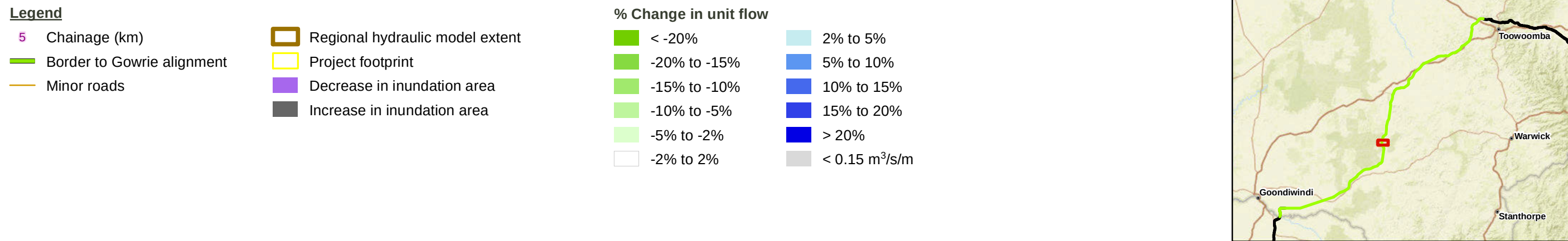
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Coordinate System: GDA 1994 MGA Zone 56

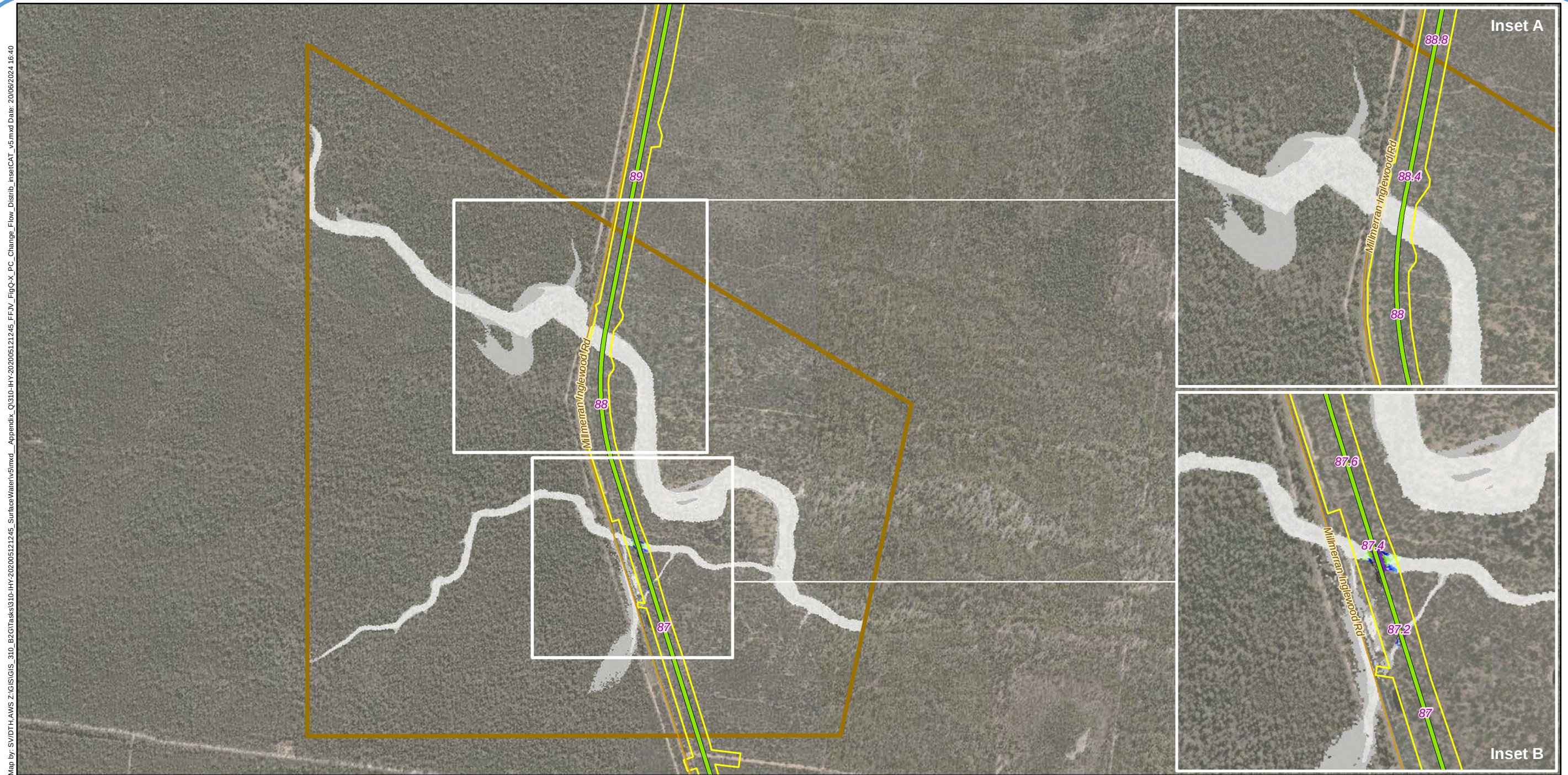
Border to Gowrie

Figure Q8-2:

10% AEP Event - Percentage Change in Flow Distribution - Cattle Creek

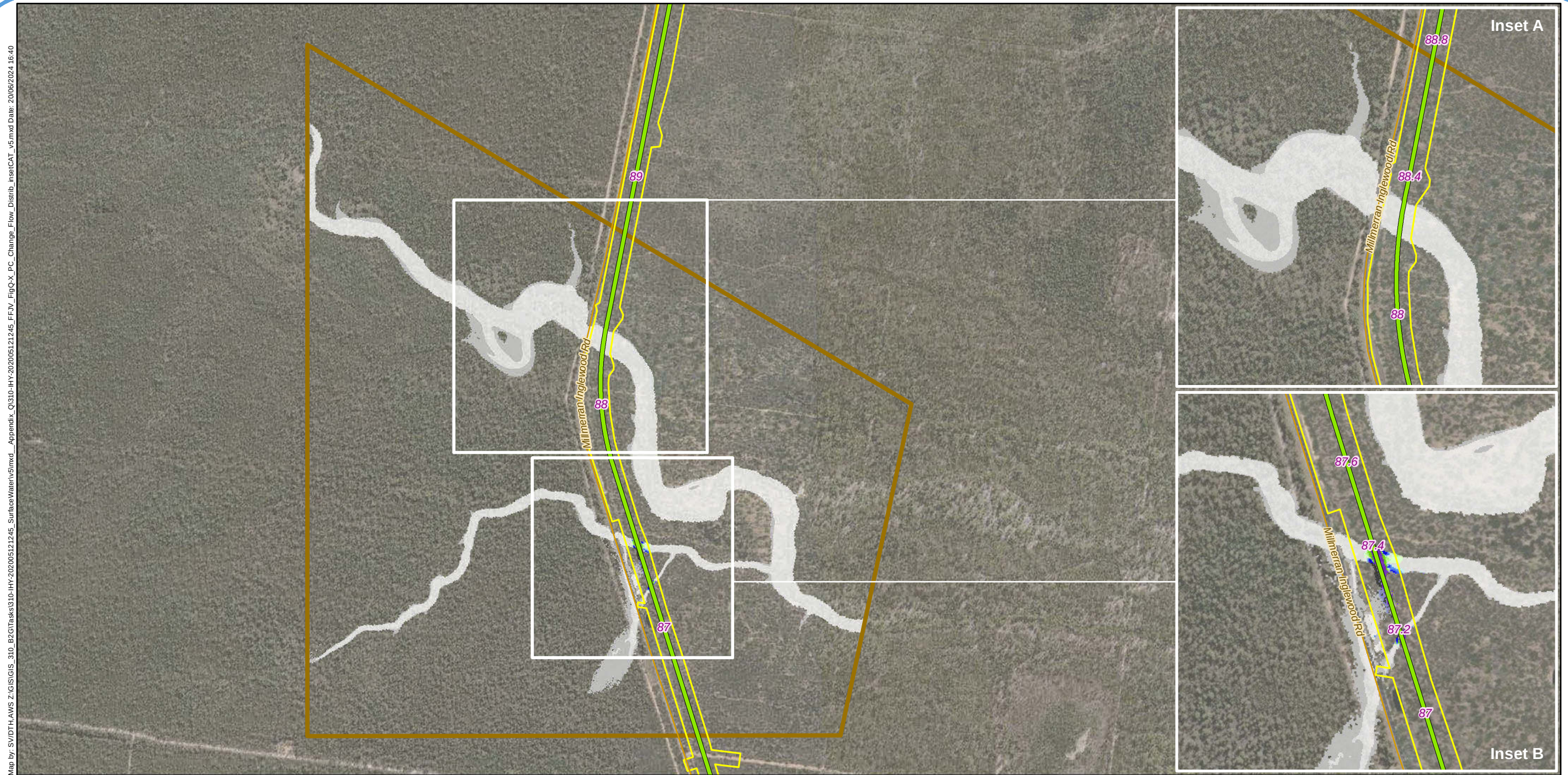


A3 scale: 1:18,000
0 0.15 0.3 0.45 0.6 0.75km



A3 scale: 1:18,000

0 0.15 0.3 0.45 0.6 0.75 km



Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads

- Regional hydraulic model extent
- Project footprint
- Decrease in inundation area
- Increase in inundation area

% Change in unit flow

- | | |
|--------------|----------------------------|
| < -20% | 2% to 5% |
| -20% to -15% | 5% to 10% |
| -15% to -10% | 10% to 15% |
| -10% to -5% | 15% to 20% |
| -5% to -2% | > 20% |
| -2% to 2% | < 0.15 m ³ /s/m |



A3 scale: 1:18,000
0 0.15 0.3 0.45 0.6 0.75km



Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure Q8-5:

1% AEP Event - Percentage Change in Flow Distribution - Cattle Creek



A3 scale: 1:18,000
0 0.15 0.3 0.45 0.6 0.75km



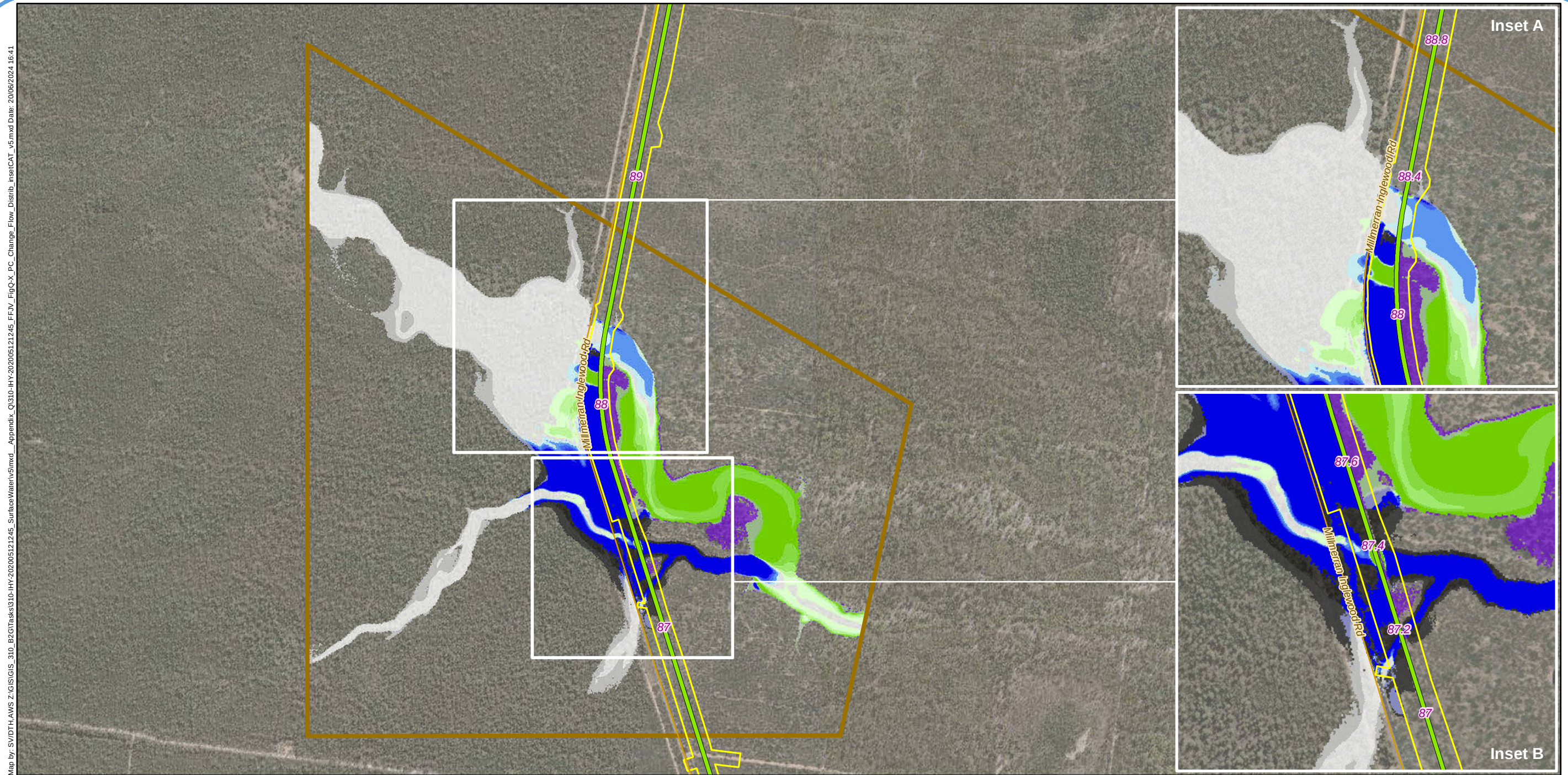
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Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure Q8-6:

1 in 2,000 AEP Event - Percentage Change in Flow Distribution - Cattle Creek



Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads

- Regional hydraulic model extent
- Project footprint
- Decrease in inundation area
- Increase in inundation area

% Change in unit flow

- | | |
|--------------|----------------------------|
| < -20% | 2% to 5% |
| -20% to -15% | 5% to 10% |
| -15% to -10% | 10% to 15% |
| -10% to -5% | 15% to 20% |
| -5% to -2% | > 20% |
| -2% to 2% | < 0.15 m ³ /s/m |



A3 scale: 1:18,000
0 0.15 0.3 0.45 0.6 0.75km

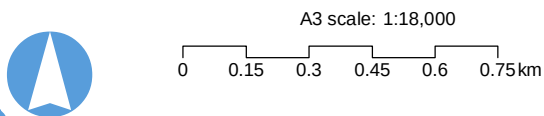
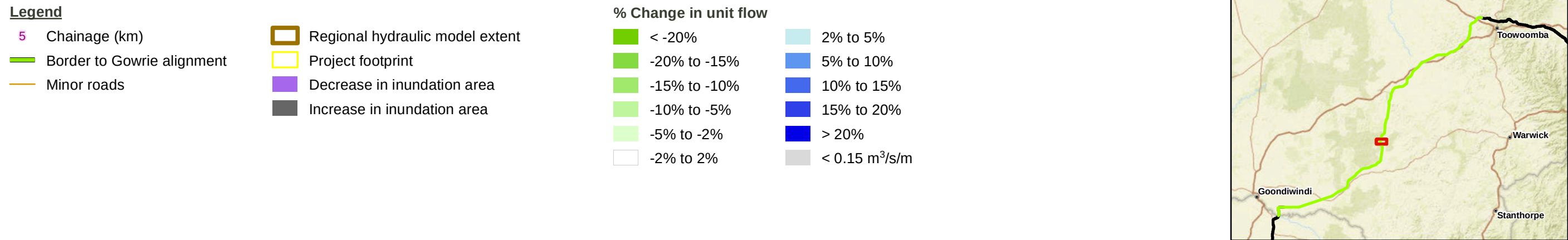
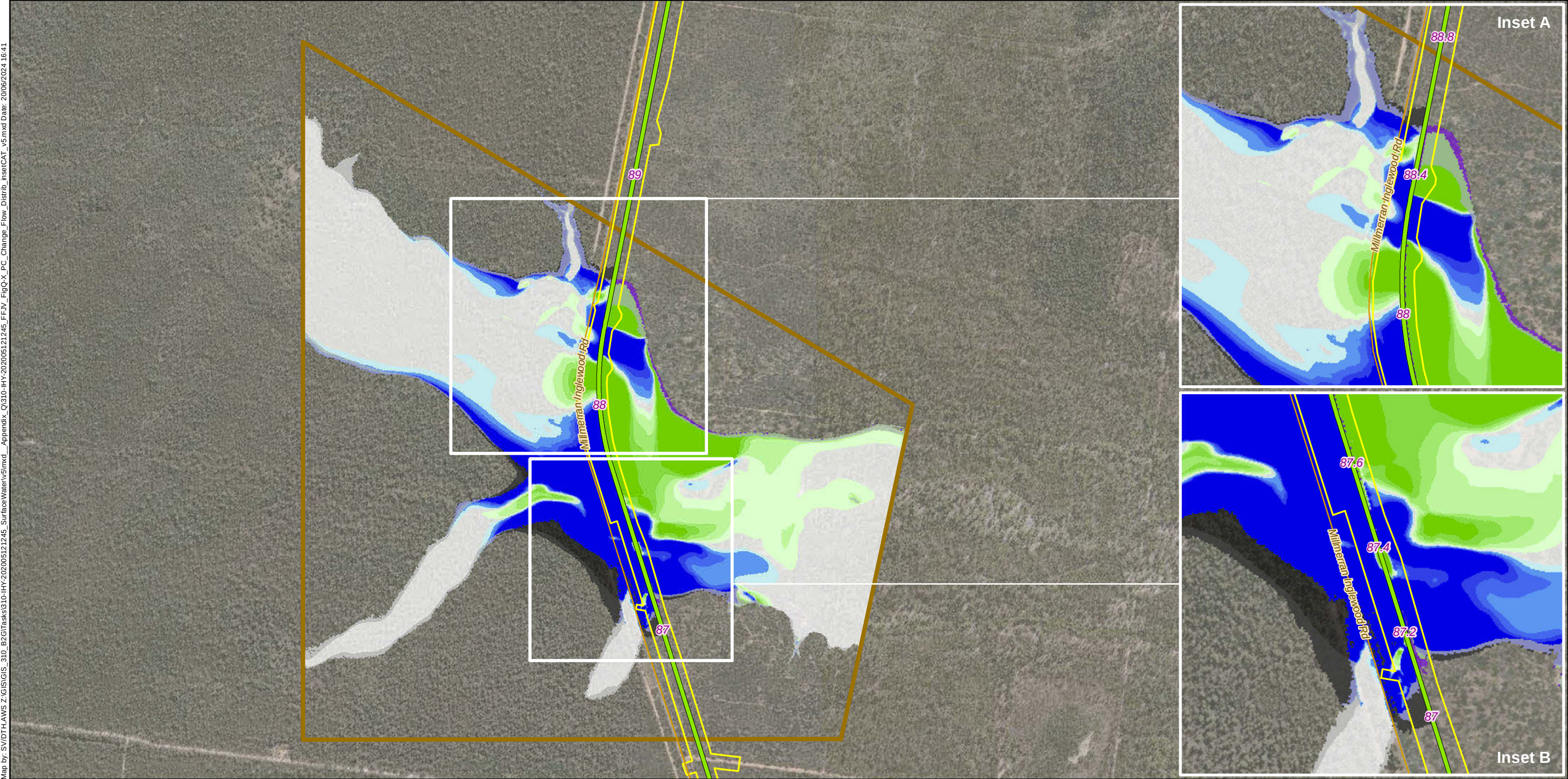


Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

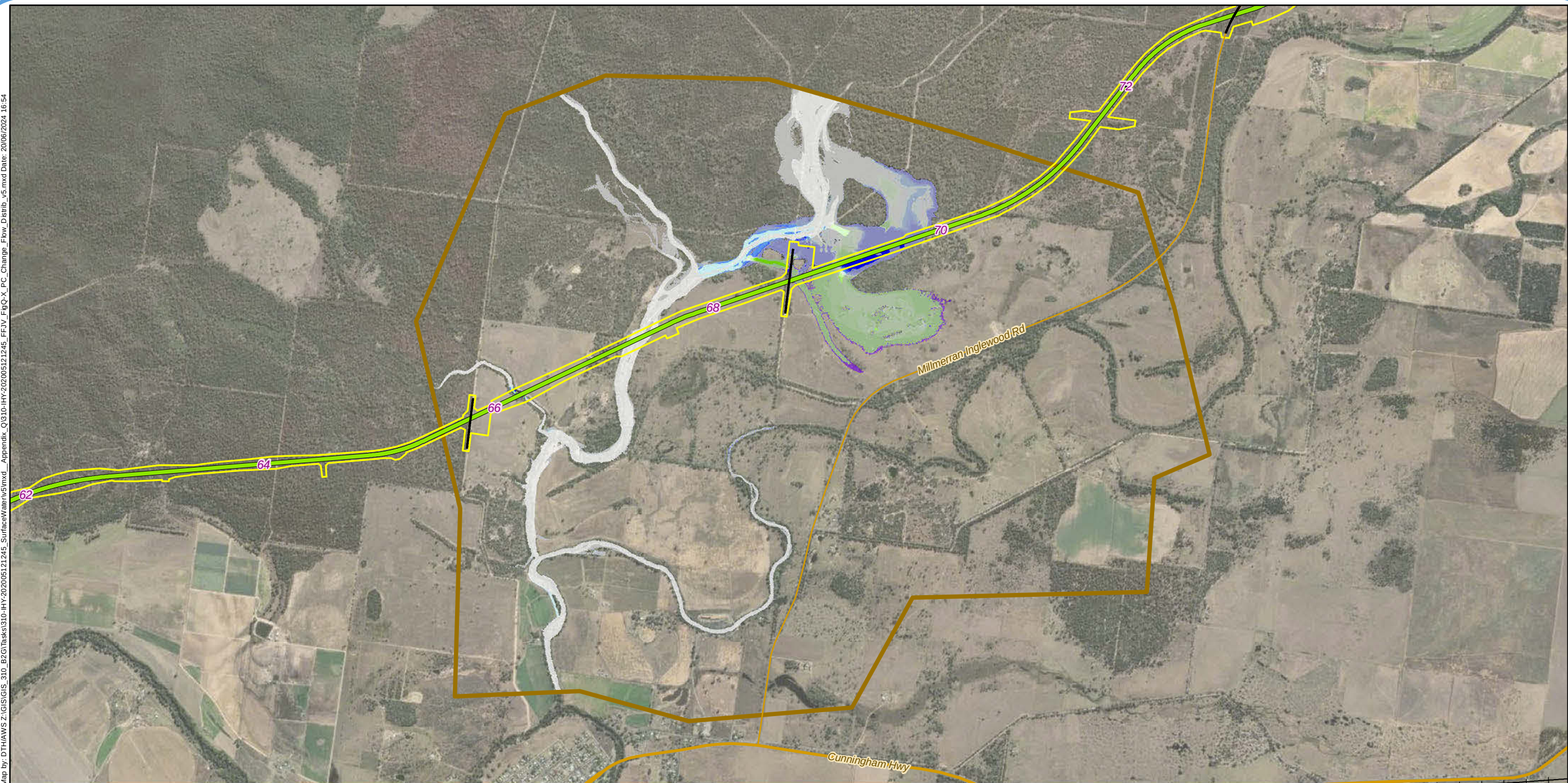
Border to Gowrie

Figure Q8-7:

1 in 10,000 AEP Event - Percentage Change in Flow Distribution - Cattle Creek



Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\GIS_310_IHY\202005121245_SurfaceWater\5mxd_Appendix_Q\310-IHY\202005121245_FF\JV_FigQ-X_PC_Change_Flow_Distrib_v5.mxd Date: 20/06/2024 16:54



Legend

- 5 Chainage (km)
- Existing rail (operational)
- Border to Gowrie alignment
- Major roads
- Minor roads
- Project road design
- Regional hydraulic model extent
- Project footprint
- Decrease in inundation area
- Increase in inundation area

% Change in unit flow	
< -20%	2% to 5%
-20% to -15%	5% to 10%
-15% to -10%	10% to 15%
-10% to -5%	15% to 20%
-5% to -2%	> 20%
-2% to 2%	< 0.15 m ³ /s/m



A3 scale: 1:35,000
0 0.35 0.7 1.05 1.4 1.75 km



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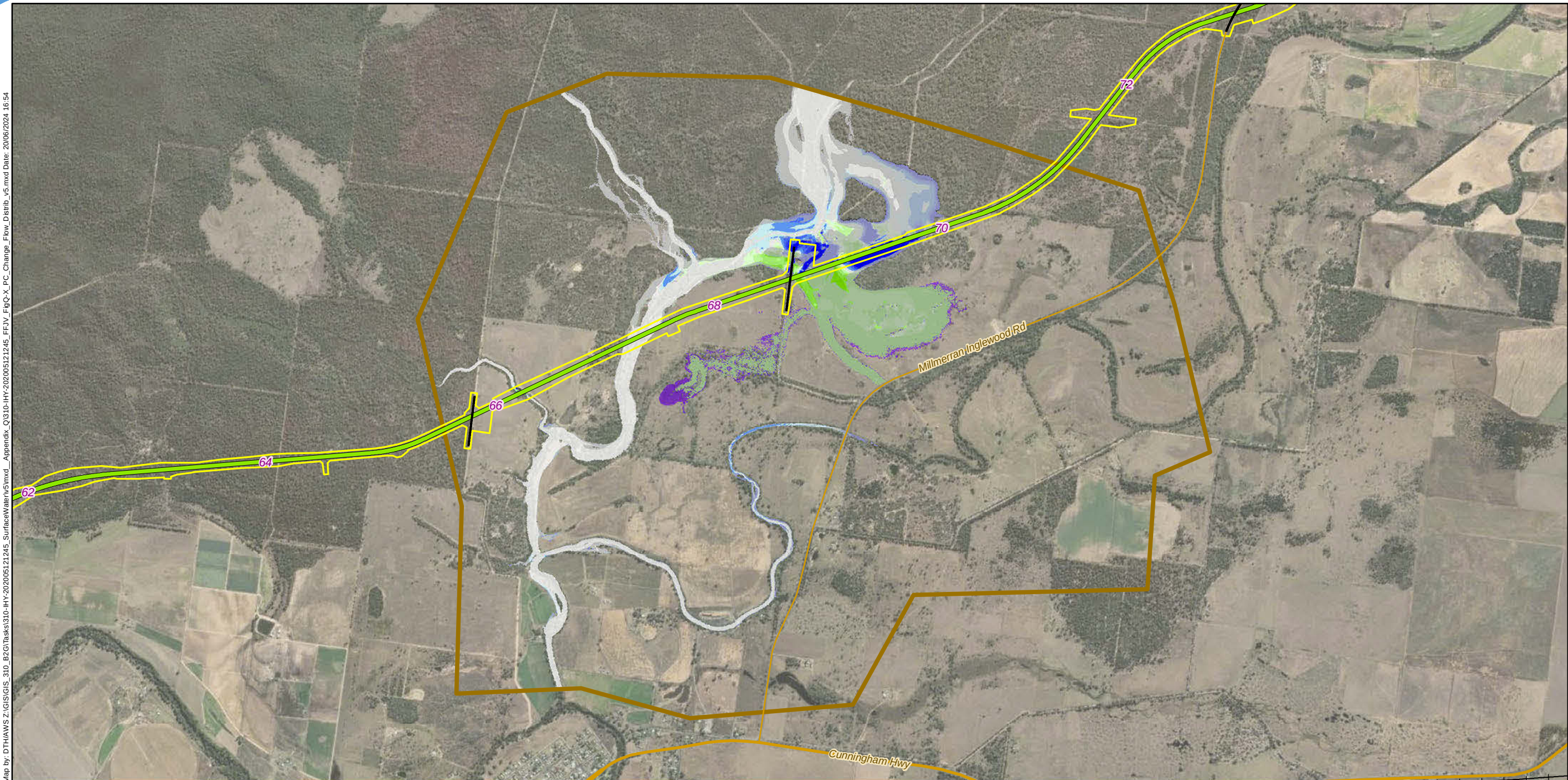
Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure Q9-1:

20% AEP Event - Percentage Change in Flow Distribution - Pariagara Creek

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\GIS_310_IHY\202005121245_SurfaceWater\5mxd_Appendix_Q\310-IHY\202005121245_FF\JV_FigQ-X_PC_Change_Flow_Distrib_v5.mxd Date: 20/06/2024 16:54



Legend

- 5 Chainage (km)
- Existing rail (operational)
- Border to Gowrie alignment
- Major roads
- Minor roads
- Project road design
- Regional hydraulic model extent
- Project footprint
- Decrease in inundation area
- Increase in inundation area

% Change in unit flow	
< -20%	2% to 5%
-20% to -15%	5% to 10%
-15% to -10%	10% to 15%
-10% to -5%	15% to 20%
-5% to -2%	> 20%
-2% to 2%	< 0.15 m ³ /s/m



A3 scale: 1:35,000
0 0.35 0.7 1.05 1.4 1.75 km

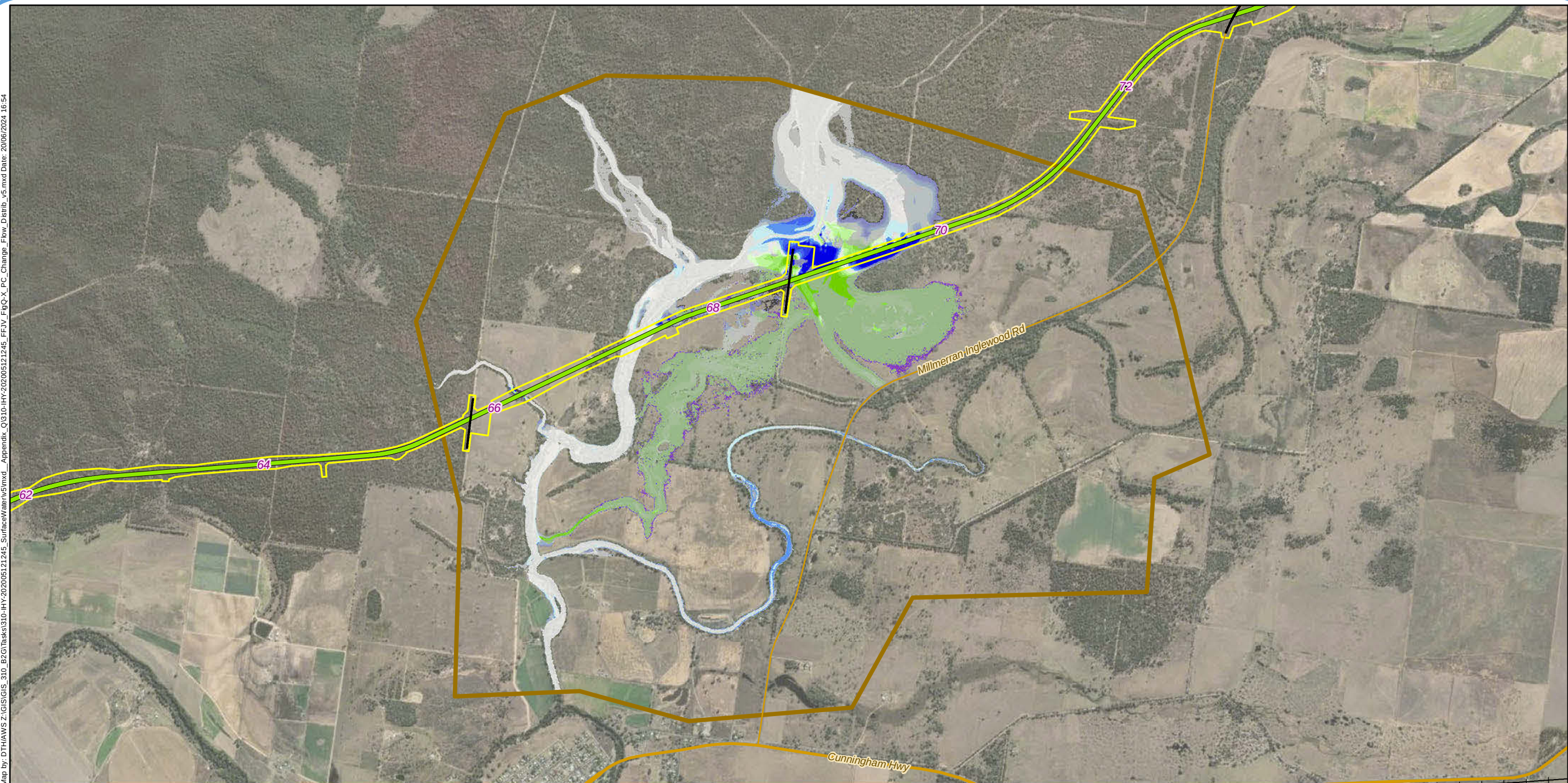


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Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie
Figure Q9-2:
10% AEP Event - Percentage Change in Flow Distribution - Pariagara Creek

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\GIS_310-IHY-202005121245_SurfaceWater\5vmsd_Appendix_Q\310-IHY-202005121245_FF\JV_FigQ-X_PC_Change_Flow_Distrib_v5.mxd Date: 20/06/2024 16:54



Legend

- 5 Chainage (km)
- Existing rail (operational)
- Border to Gowrie alignment
- Major roads
- Minor roads
- Project road design
- Regional hydraulic model extent
- Project footprint
- Decrease in inundation area
- Increase in inundation area

% Change in unit flow

- < -20%
- 20% to -15%
- 15% to -10%
- 10% to -5%
- 5% to -2%
- 2% to 2%
- 2% to 5%
- 5% to 10%
- 10% to 15%
- 15% to 20%
- > 20%
- < 0.15 m³/s/m



A3 scale: 1:35,000
0 0.35 0.7 1.05 1.4 1.75 km



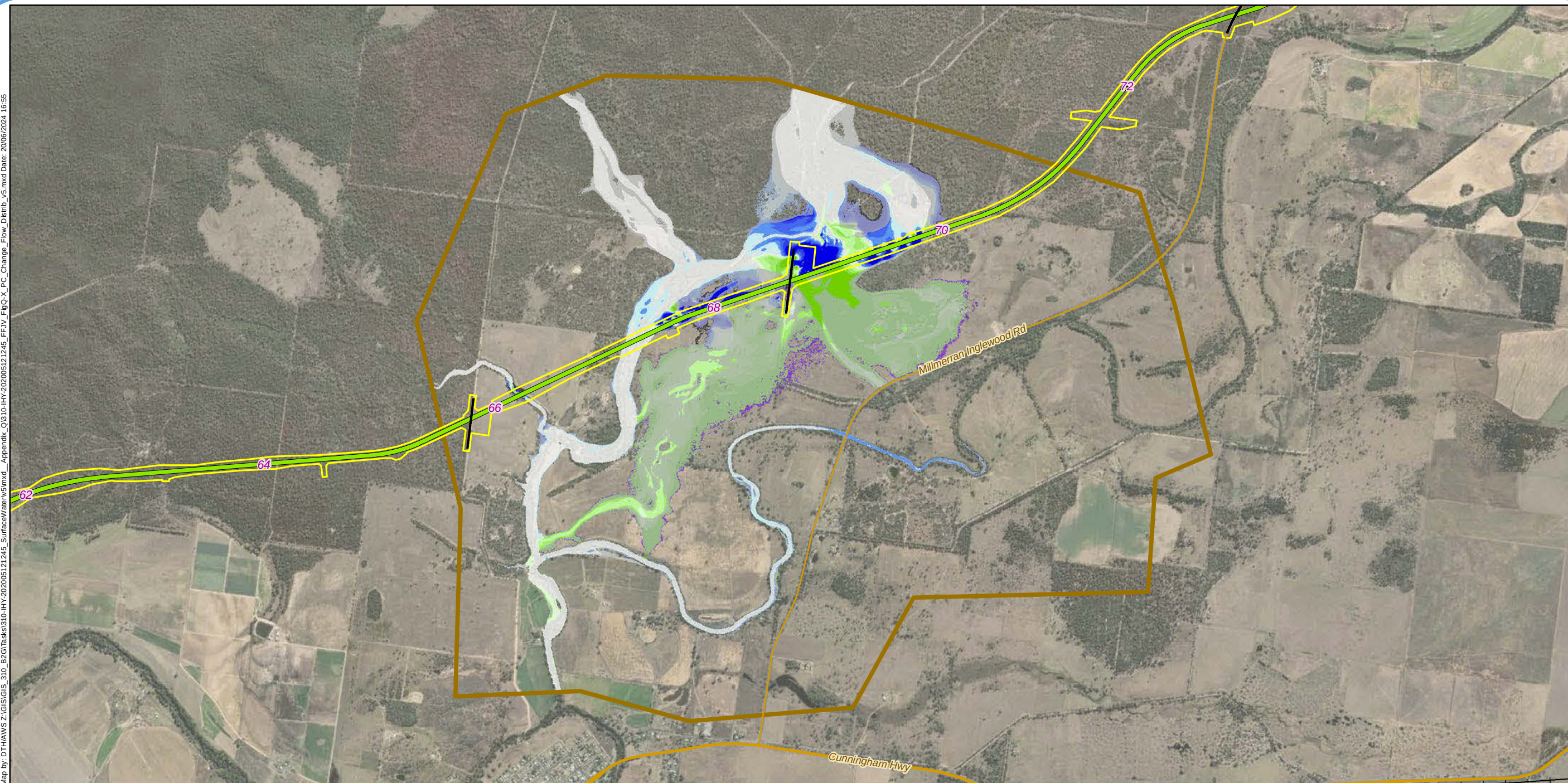
Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure Q9-3:

5% AEP Event - Percentage Change in Flow Distribution - Pariagara Creek

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\310-IHY-202005121245_SurfaceWater\5vmsd_Appendix_Q\310-IHY-202005121245_FF\JV_FigQ-X_PC_Change_Flow_Distrib_v5.mxd Date: 20/06/2024 16:55



Legend

- 5 Chainage (km)
- Existing rail (operational)
- Border to Gowrie alignment
- Major roads
- Minor roads
- Project road design
- Regional hydraulic model extent
- Project footprint
- Decrease in inundation area
- Increase in inundation area

% Change in unit flow	
< -20%	2% to 5%
-20% to -15%	5% to 10%
-15% to -10%	10% to 15%
-10% to -5%	15% to 20%
-5% to -2%	> 20%
-2% to 2%	< 0.15 m ³ /s/m



A3 scale: 1:35,000
0 0.35 0.7 1.05 1.4 1.75 km



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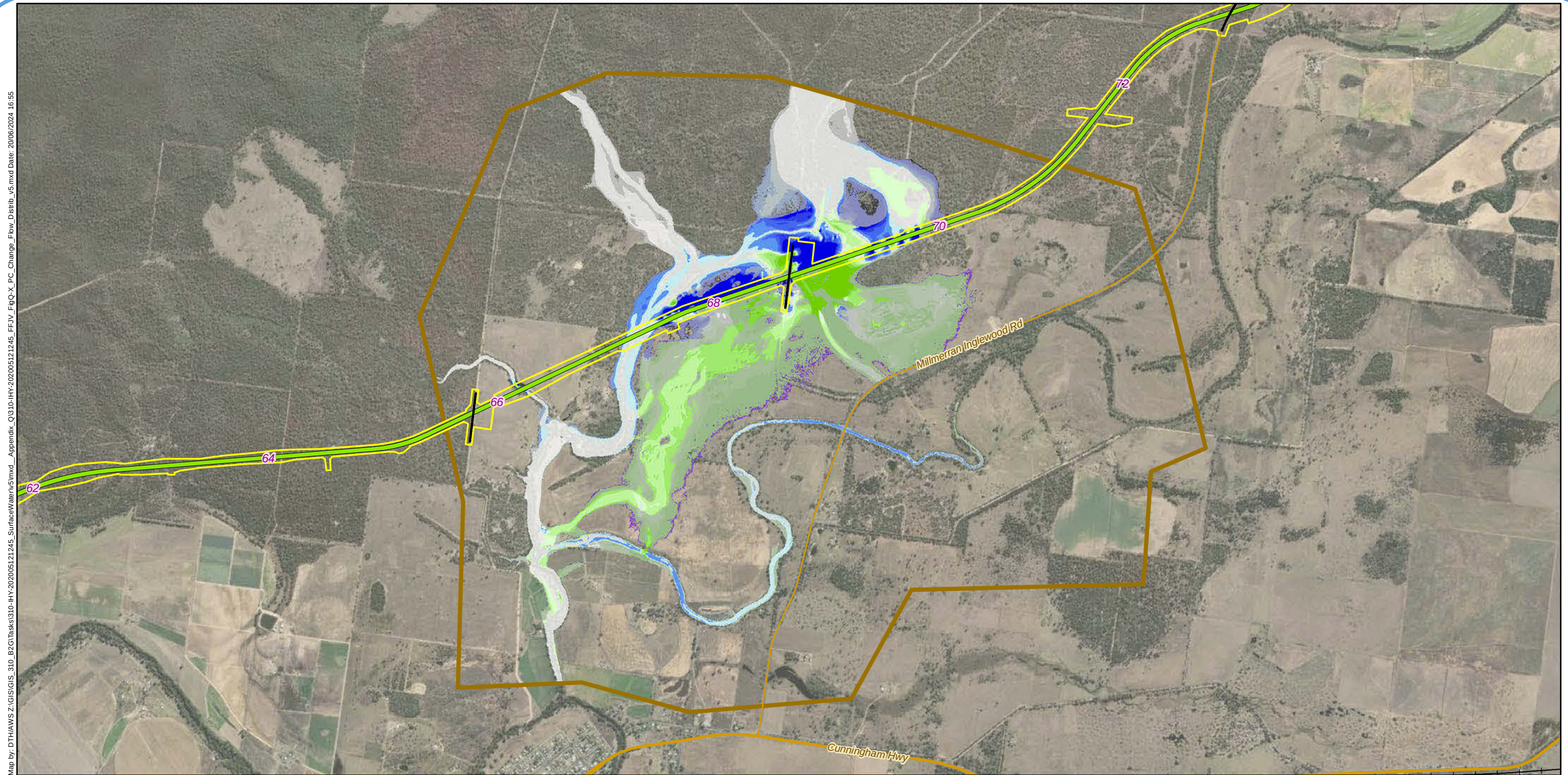
Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure Q9-4:

2% AEP Event - Percentage Change in Flow Distribution - Pariagara Creek

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\GIS_310-IHY-202005121245_SurfaceWater\5vmsd_Appendix_Q\310-IHY-202005121245_FF\JV_FigQ-X_PC_Change_Flow_Distrib_v5.mxd Date: 20/06/2024 16:55

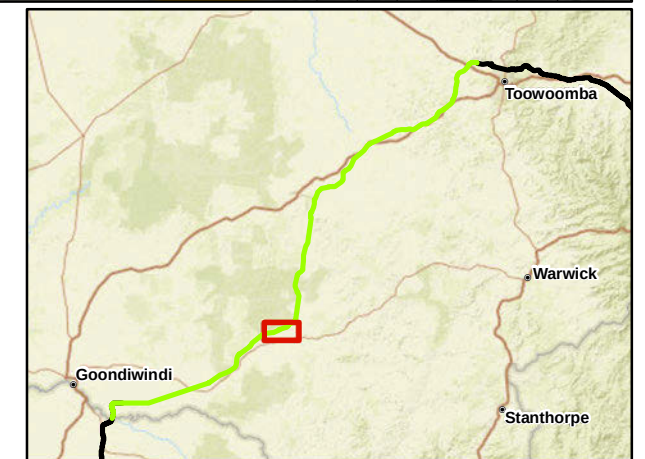


Legend

- | | |
|-----------------------------|---------------------------------|
| 5 Chainage (km) | Regional hydraulic model extent |
| Existing rail (operational) | Project footprint |
| Border to Gowrie alignment | Decrease in inundation area |
| Major roads | Increase in inundation area |
| Minor roads | |
| Project road design | |

% Change in unit flow

- | | |
|--------------|----------------------------|
| < -20% | 2% to 5% |
| -20% to -15% | 5% to 10% |
| -15% to -10% | 10% to 15% |
| -10% to -5% | 15% to 20% |
| -5% to -2% | > 20% |
| -2% to 2% | < 0.15 m ³ /s/m |



A3 scale: 1:35,000
0 0.35 0.7 1.05 1.4 1.75 km



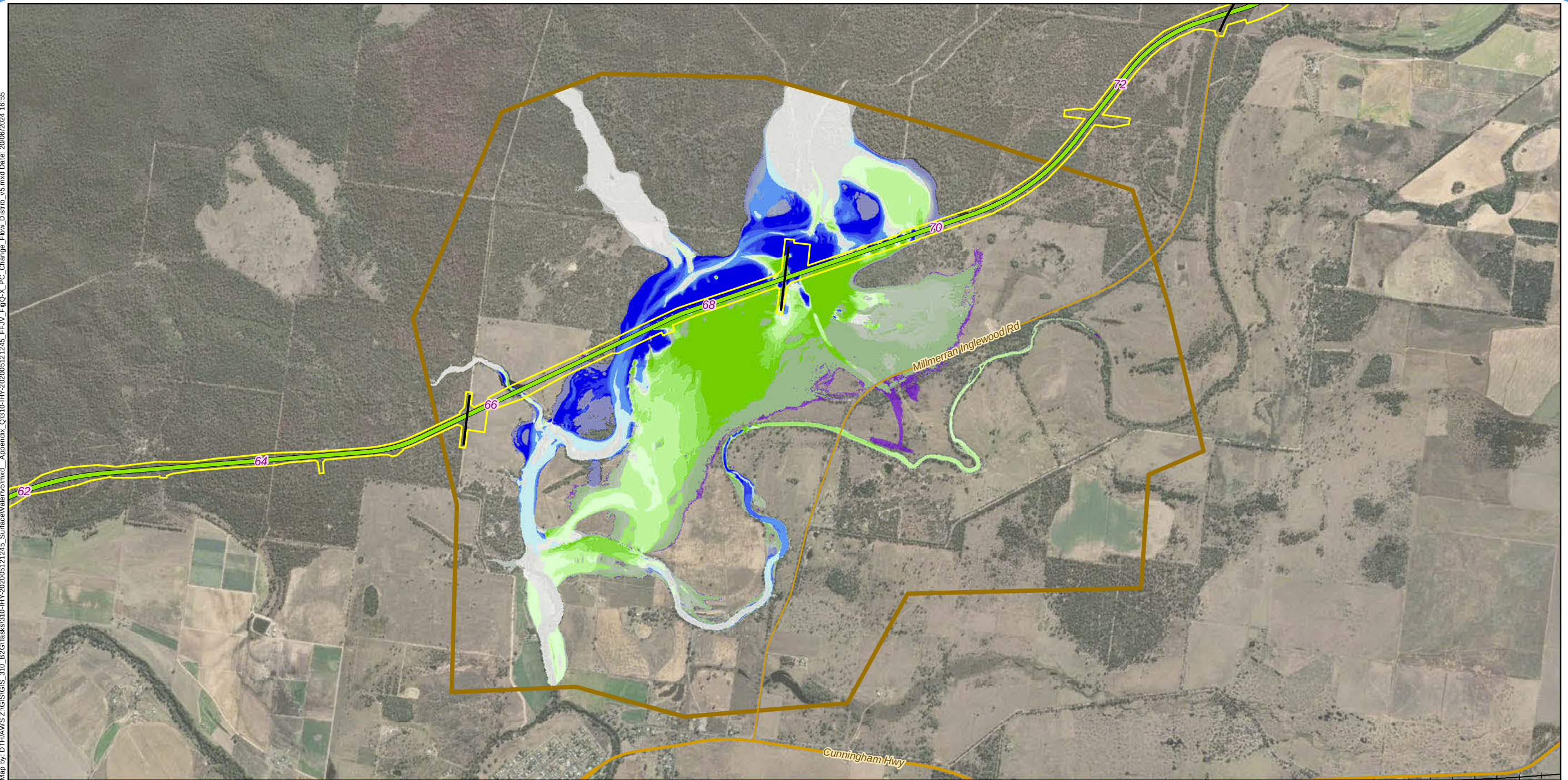
Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure Q9-5:

1% AEP Event - Percentage Change in Flow Distribution - Pariagara Creek

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\GIS_310-IHY-202005121245_SurfaceWater\5vmsd_Appendix_Q\310-IHY-202005121245_FF\JV_FigQ-X_PC_Change_Flow_Distrib_v5.mxd Date: 20/06/2024 16:55

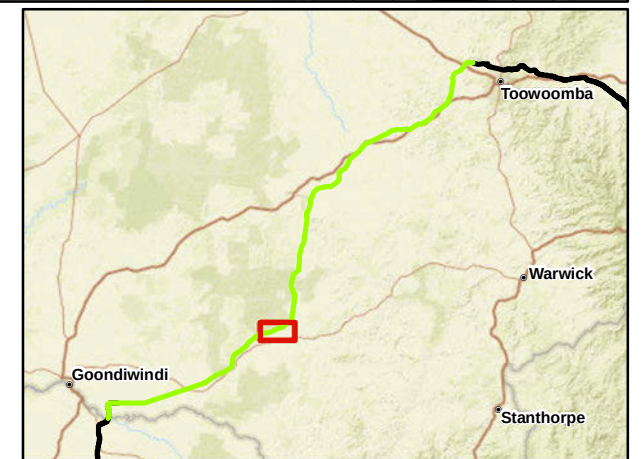


Legend

- 5 Chainage (km)
- Existing rail (operational)
- Border to Gowrie alignment
- Major roads
- Minor roads
- Project road design
- Regional hydraulic model extent
- Project footprint
- Decrease in inundation area
- Increase in inundation area

% Change in unit flow

- < -20%
- 20% to -15%
- 15% to -10%
- 10% to -5%
- 5% to -2%
- 2% to 2%
- 2% to 5%
- 5% to 10%
- 10% to 15%
- 15% to 20%
- > 20%
- < 0.15 m³/s/m



A3 scale: 1:35,000
0 0.35 0.7 1.05 1.4 1.75 km



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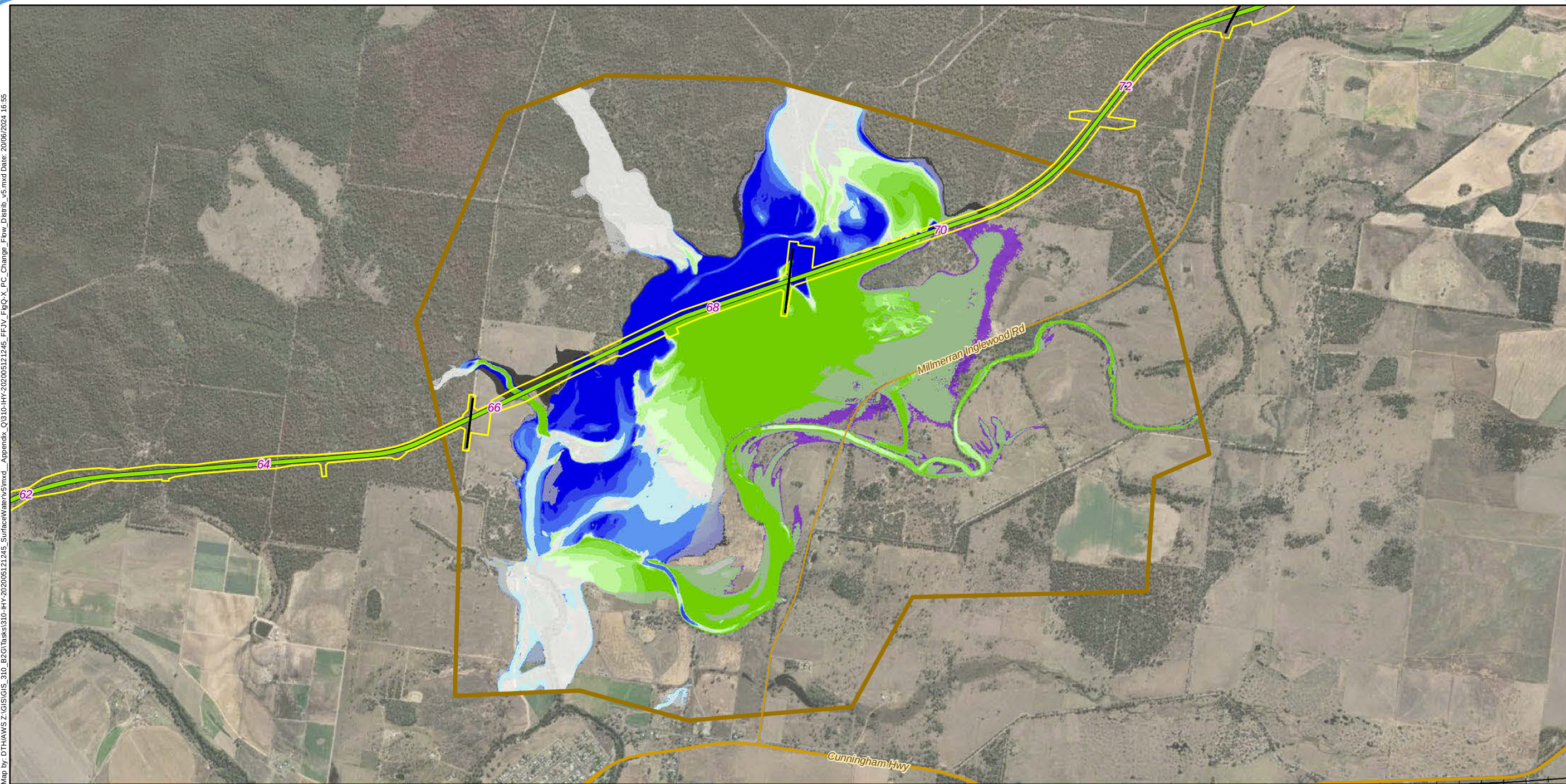
Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure Q9-6:

1 in 2,000 AEP Event - Percentage Change in Flow Distribution - Pariagara Creek

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\GIS_310_IHY-202005121245_SurfaceWater\5mxd_Appendix_Q\310-IHY-202005121245_FF\JV_FigQ-X_PC_Change_Flow_Distrib_v5.mxd Date: 20/06/2024 16:55

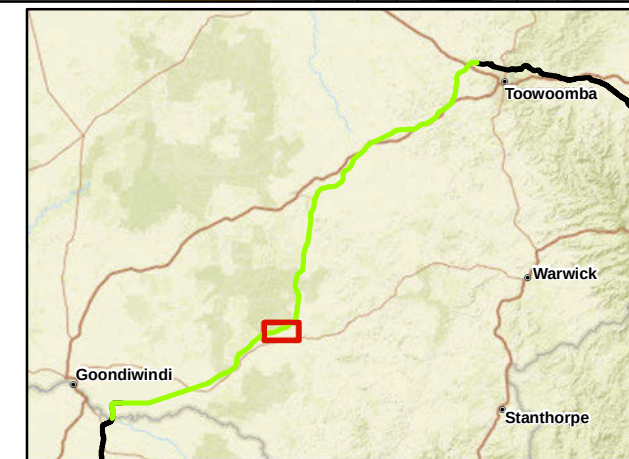


Legend

- 5 Chainage (km)
- Existing rail (operational)
- Border to Gowrie alignment
- Major roads
- Minor roads
- Project road design
- Regional hydraulic model extent
- Project footprint
- Decrease in inundation area
- Increase in inundation area

% Change in unit flow

- < -20%
- 20% to -15%
- 15% to -10%
- 10% to -5%
- 5% to -2%
- 2% to 2%
- 2% to 5%
- 5% to 10%
- 10% to 15%
- 15% to 20%
- > 20%
- < 0.15 m³/s/m



A3 scale: 1:35,000
0 0.35 0.7 1.05 1.4 1.75 km



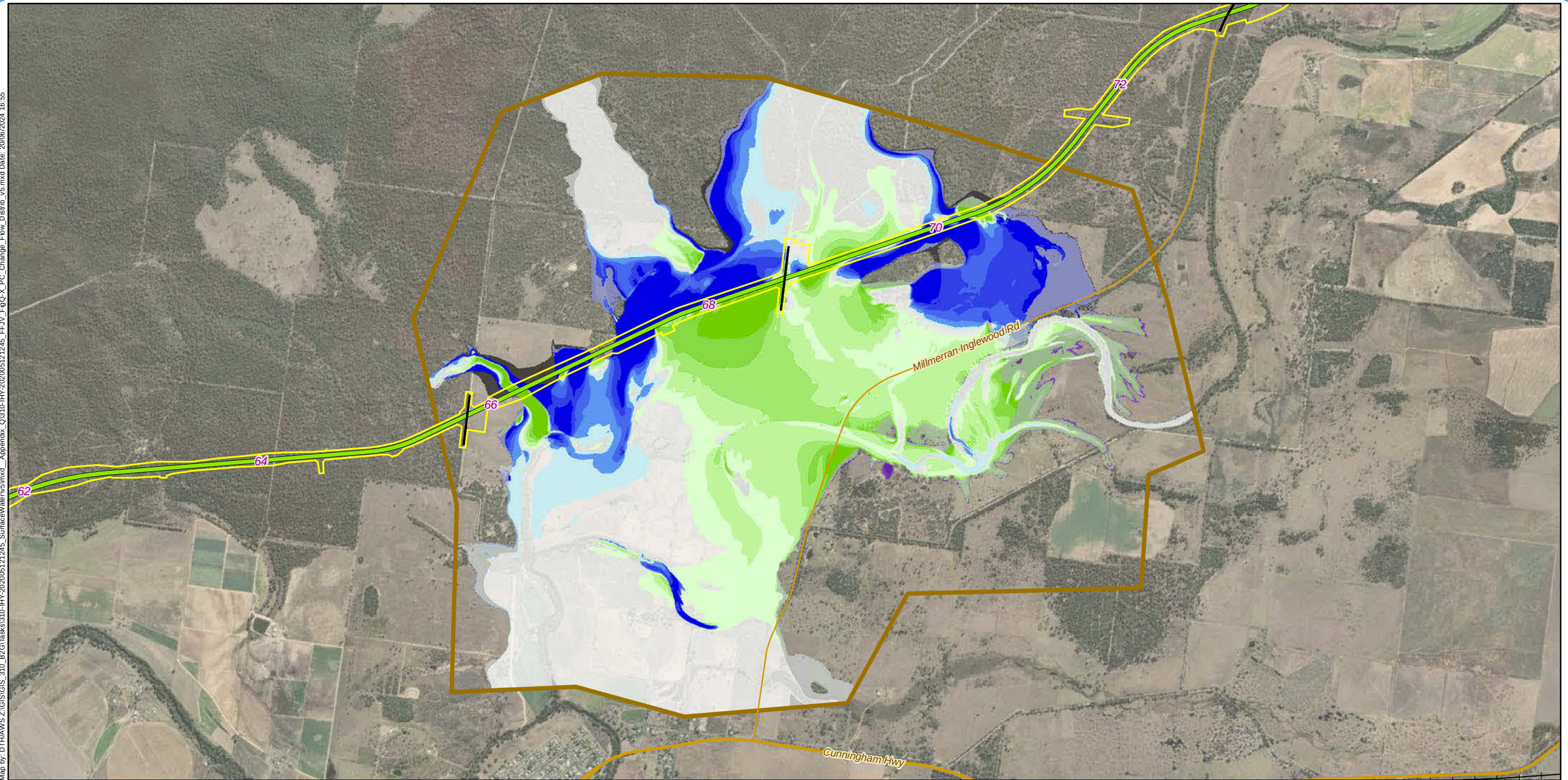
Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure Q9-7:

1 in 10,000 AEP Event - Percentage Change in Flow Distribution - Pariagara Creek

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\GIS_310-IHY-202005121245_SurfaceWater\5mxd_Appendix_Q\310-IHY-202005121245_FF\JV_FigQ-X_PC_Change_Flow_Distrib_v5.mxd Date: 20/06/2024 16:55

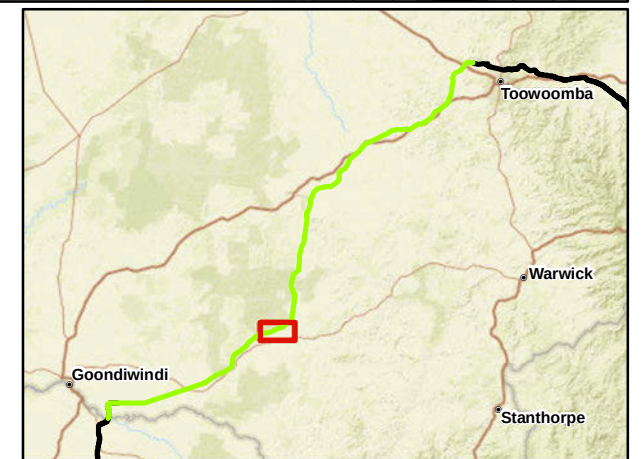


Legend

- 5 Chainage (km)
- Existing rail (operational)
- Border to Gowrie alignment
- Major roads
- Minor roads
- Project road design
- Regional hydraulic model extent
- Project footprint
- Decrease in inundation area
- Increase in inundation area

% Change in unit flow

- < -20%
- 20% to -15%
- 15% to -10%
- 10% to -5%
- 5% to -2%
- 2% to 2%
- 2% to 5%
- 5% to 10%
- 10% to 15%
- 15% to 20%
- > 20%
- < 0.15 m³/s/m



A3 scale: 1:35,000
0 0.35 0.7 1.05 1.4 1.75 km

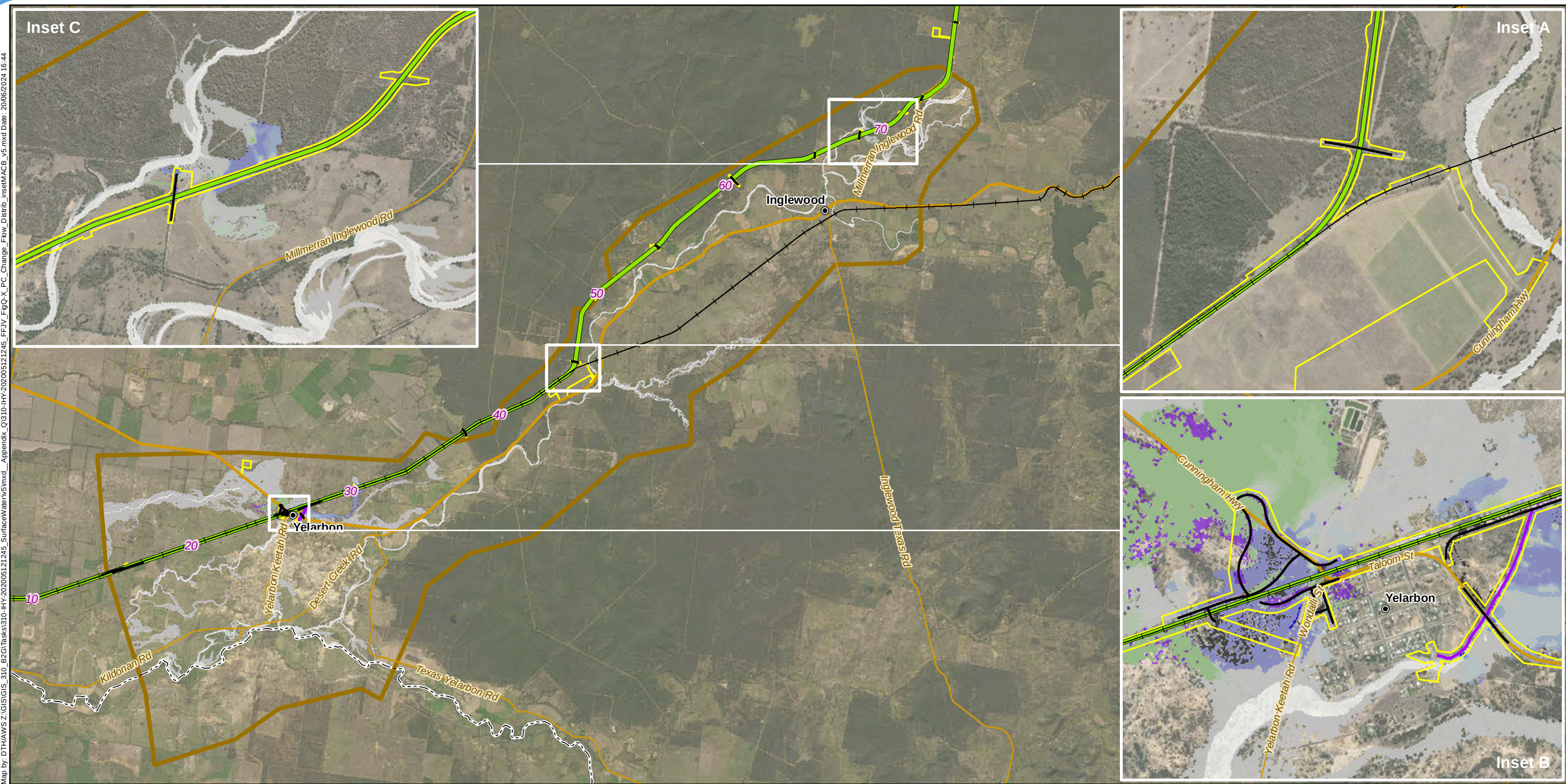


Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure Q9-8:

PMF Event - Percentage Change in Flow Distribution - Pariagara Creek

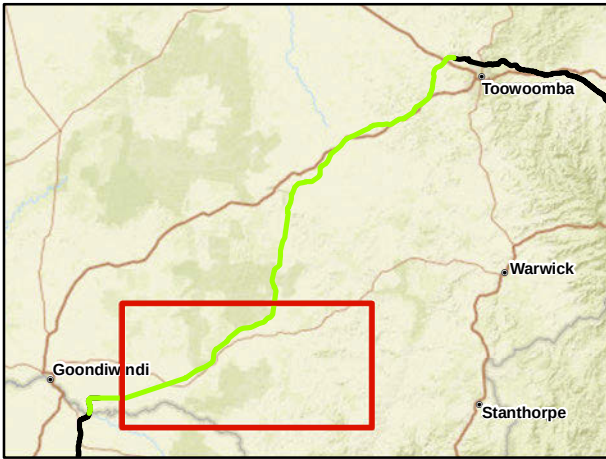


Legend

- 5 Chainage (km)
- Localities
- Existing rail (operational)
- Border to Gowrie alignment
- Major roads
- Minor roads
- Project road design
- NSW/QLD border
- Yelarbon levee
- Regional hydraulic model extent
- Project footprint
- Decrease in inundation area
- Increase in inundation area

% Change in unit flow

- < -20%
- 20% to -15%
- 15% to -10%
- 10% to -5%
- 5% to -2%
- 2% to 2%
- 2% to 5%
- 5% to 10%
- 10% to 15%
- 15% to 20%
- > 20%
- < 0.15 m³/s/m



A3 scale: 1:250,000
0 2.5 5 7.5 10 12.5 km



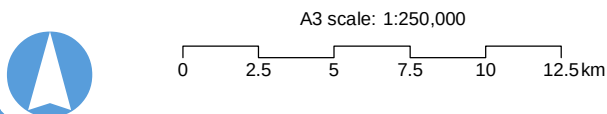
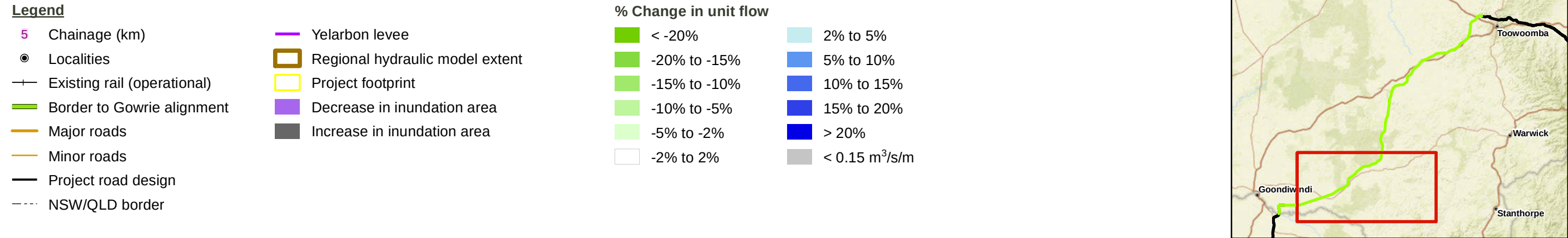
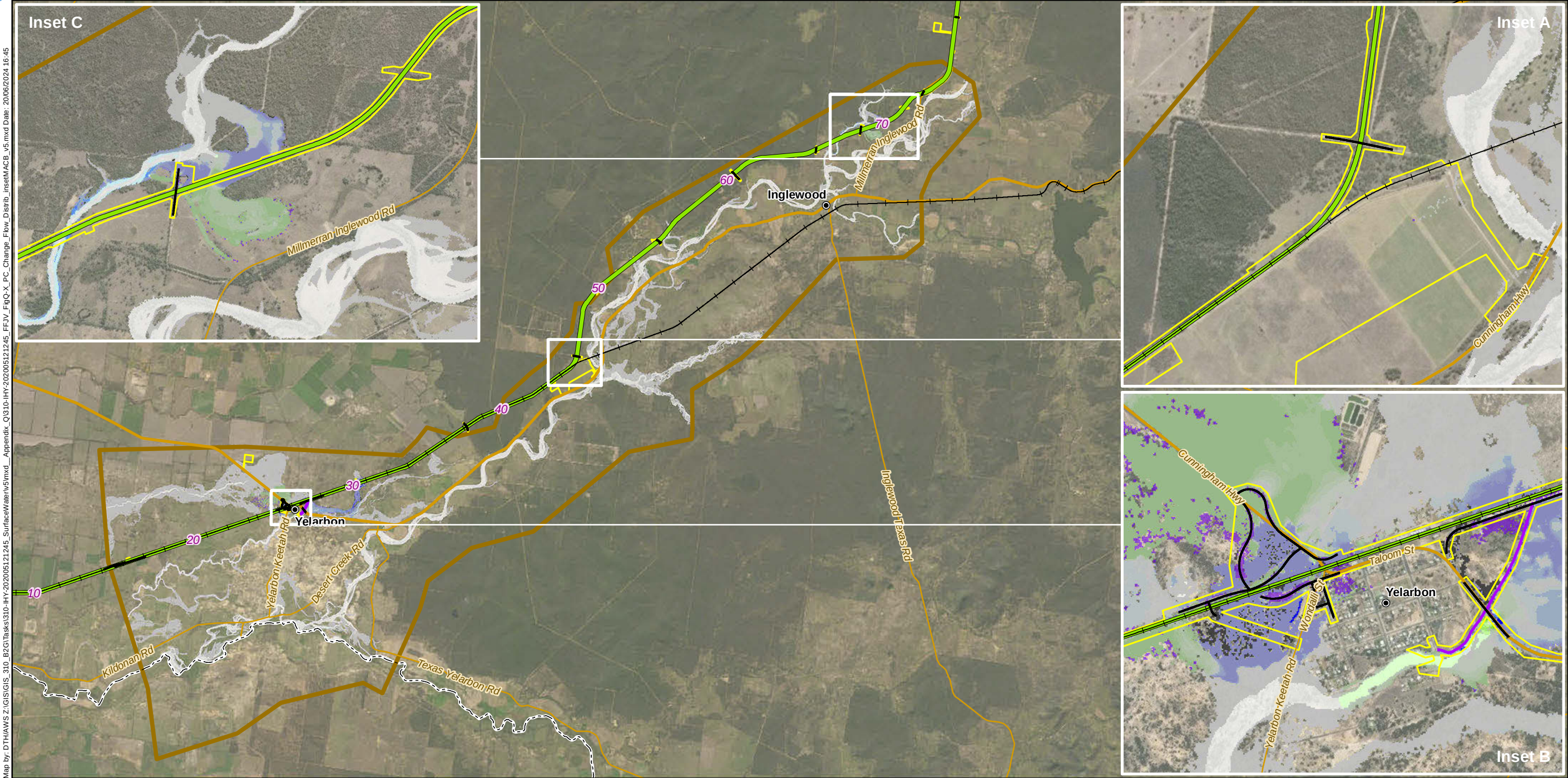
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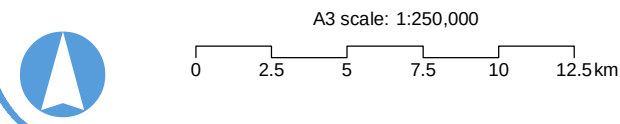
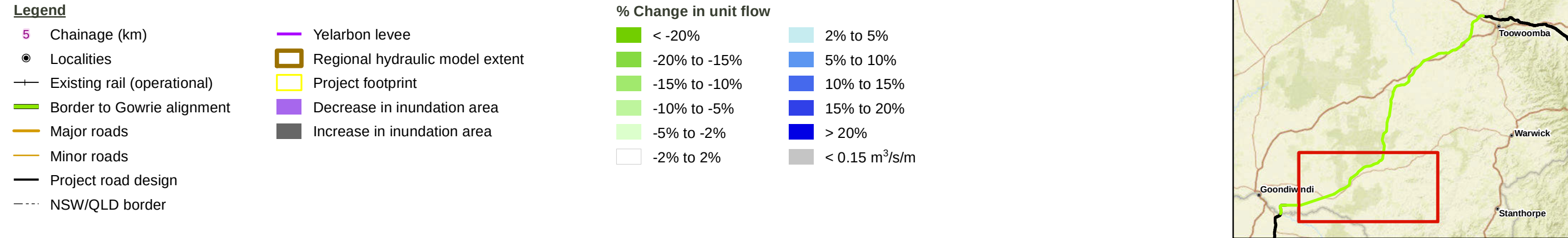
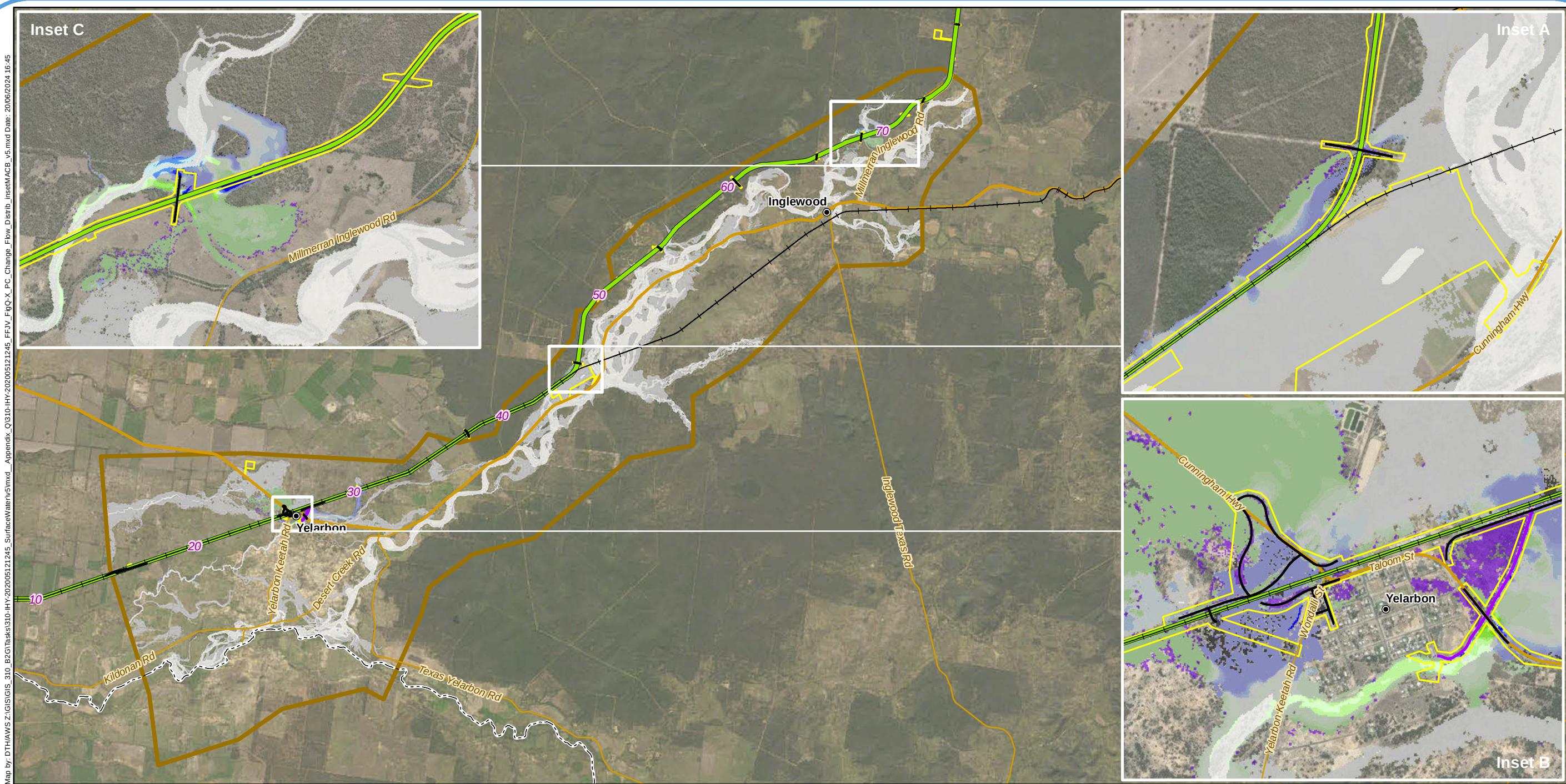
Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

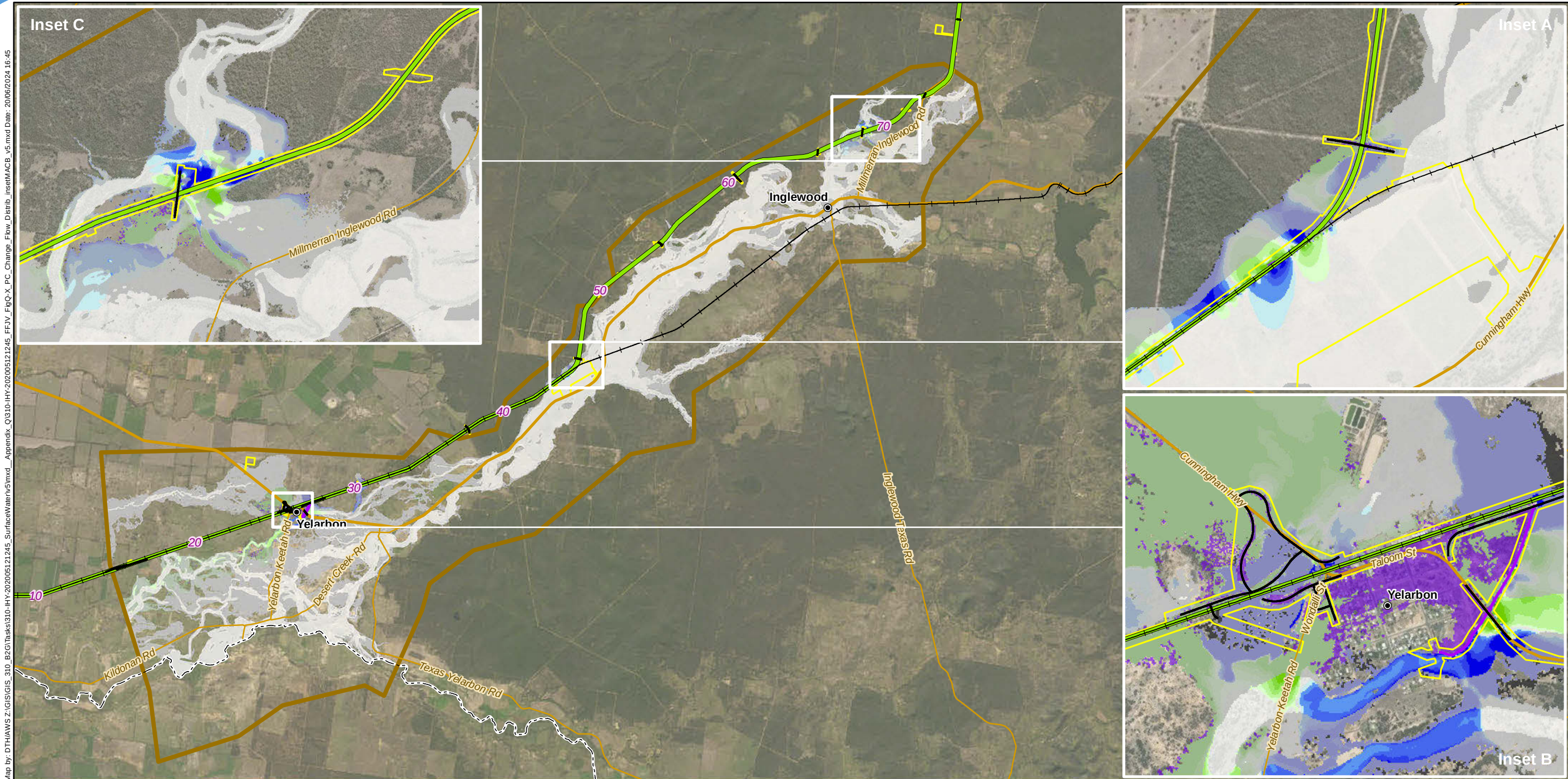
Border to Gowrie

Figure Q10-1:

20% AEP Event - Percentage Change in Flow Distribution - Macintyre Brook - Yelarbon to Inglewood





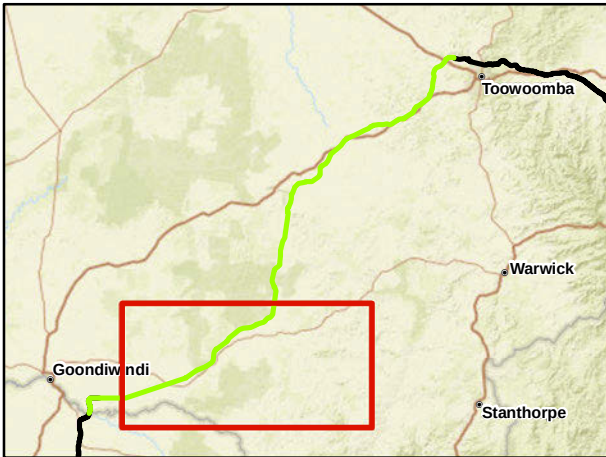


Legend

- 5 Chainage (km)
- Localities
- Existing rail (operational)
- Border to Gowrie alignment
- Major roads
- Minor roads
- Project road design
- NSW/QLD border
- Yelarbon levee
- Regional hydraulic model extent
- Project footprint
- Decrease in inundation area
- Increase in inundation area

% Change in unit flow

- < -20%
- 20% to -15%
- 15% to -10%
- 10% to -5%
- 5% to -2%
- 2% to 2%
- 2% to 5%
- 5% to 10%
- 10% to 15%
- 15% to 20%
- > 20%
- < 0.15 m³/s/m



A3 scale: 1:250,000
0 2.5 5 7.5 10 12.5 km



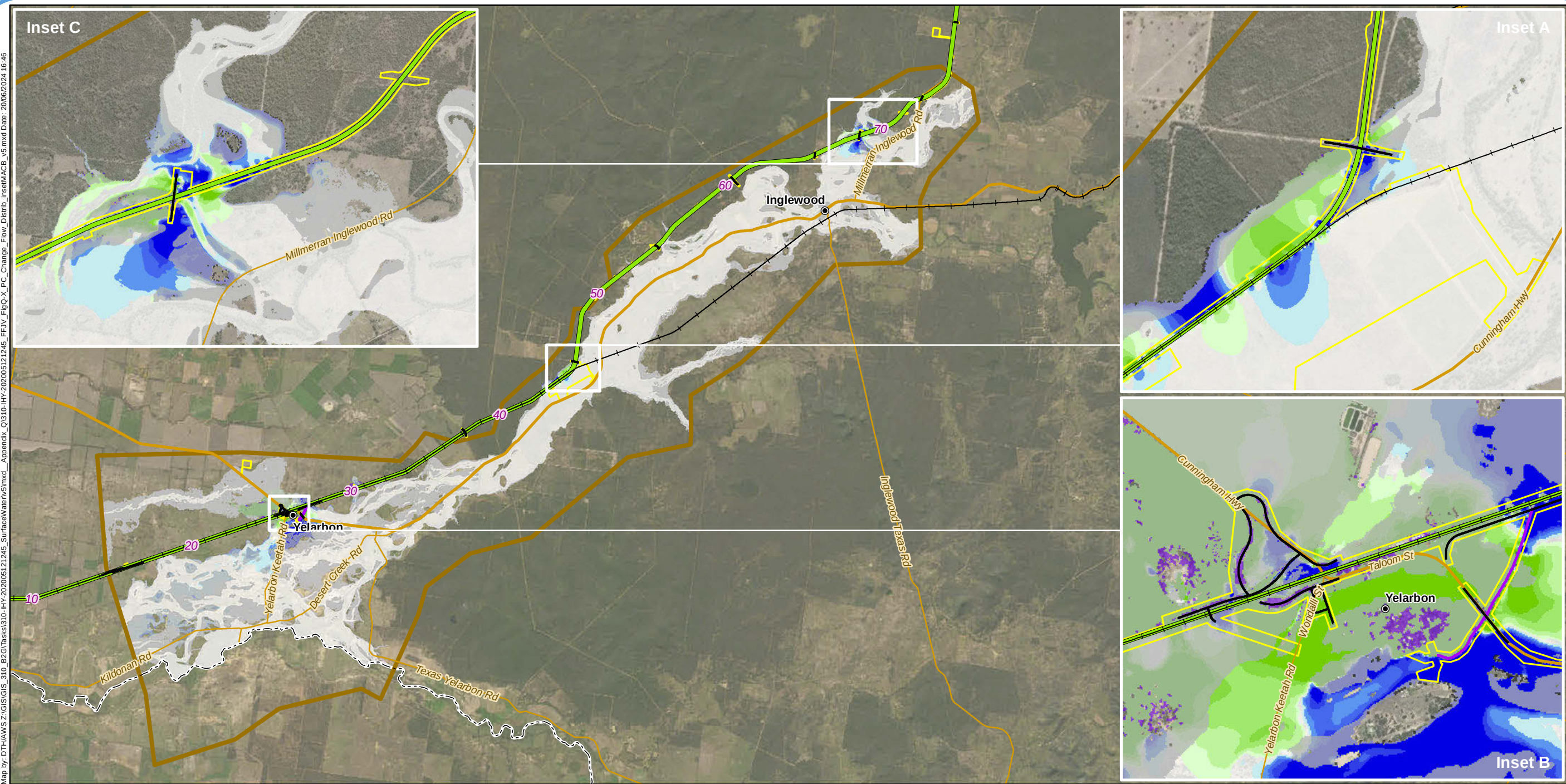
Future Freight
Integrating Community, Environment and Engineering

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Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure Q10-4:

2% AEP Event - Percentage Change in Flow Distribution - Macintyre Brook - Yelarbon to Inglewood

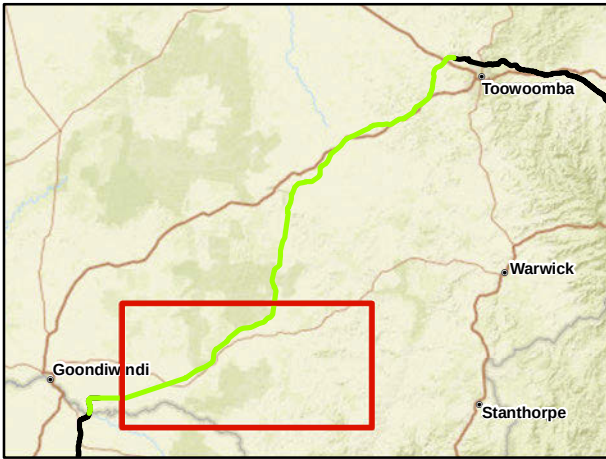


Legend

- 5 Chainage (km)
- Localities
- Existing rail (operational)
- Border to Gowrie alignment
- Major roads
- Minor roads
- Project road design
- NSW/QLD border
- Yelarbon levee
- Regional hydraulic model extent
- Project footprint
- Decrease in inundation area
- Increase in inundation area

% Change in unit flow

- < -20%
- 20% to -15%
- 15% to -10%
- 10% to -5%
- 5% to -2%
- 2% to 2%
- 2% to 5%
- 5% to 10%
- 10% to 15%
- 15% to 20%
- > 20%
- < 0.15 m³/s/m



A3 scale: 1:250,000
0 2.5 5 7.5 10 12.5 km



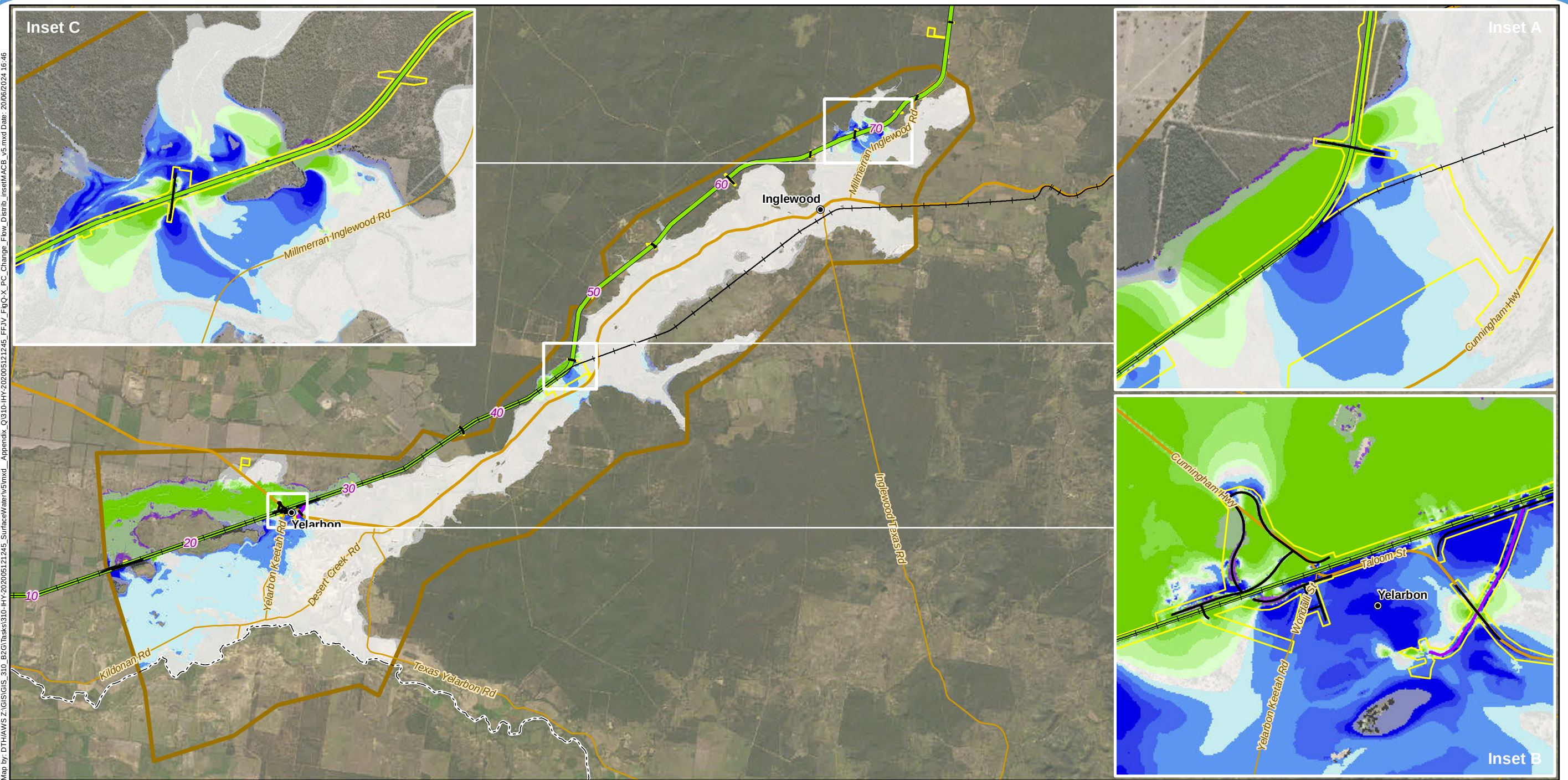
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Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure Q10-5:

1% AEP Event - Percentage Change in Flow Distribution - Macintyre Brook - Yelarbon to Inglewood

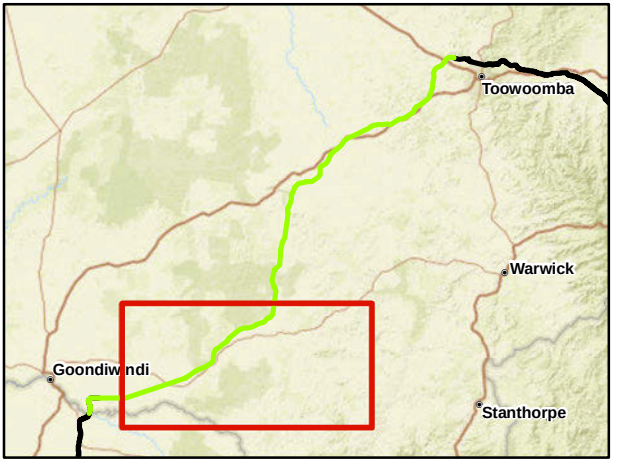


Legend

- 5 Chainage (km)
- Localities
- Existing rail (operational)
- Border to Gowrie alignment
- Major roads
- Minor roads
- Project road design
- NSW/QLD border
- Yelarbon levee
- Regional hydraulic model extent
- Project footprint
- Decrease in inundation area
- Increase in inundation area

% Change in unit flow

- < -20%
- 20% to -15%
- 15% to -10%
- 10% to -5%
- 5% to -2%
- 2% to 2%
- 2% to 5%
- 5% to 10%
- 10% to 15%
- 15% to 20%
- > 20%
- < 0.15 m³/s/m



A3 scale: 1:250,000
0 2.5 5 7.5 10 12.5 km



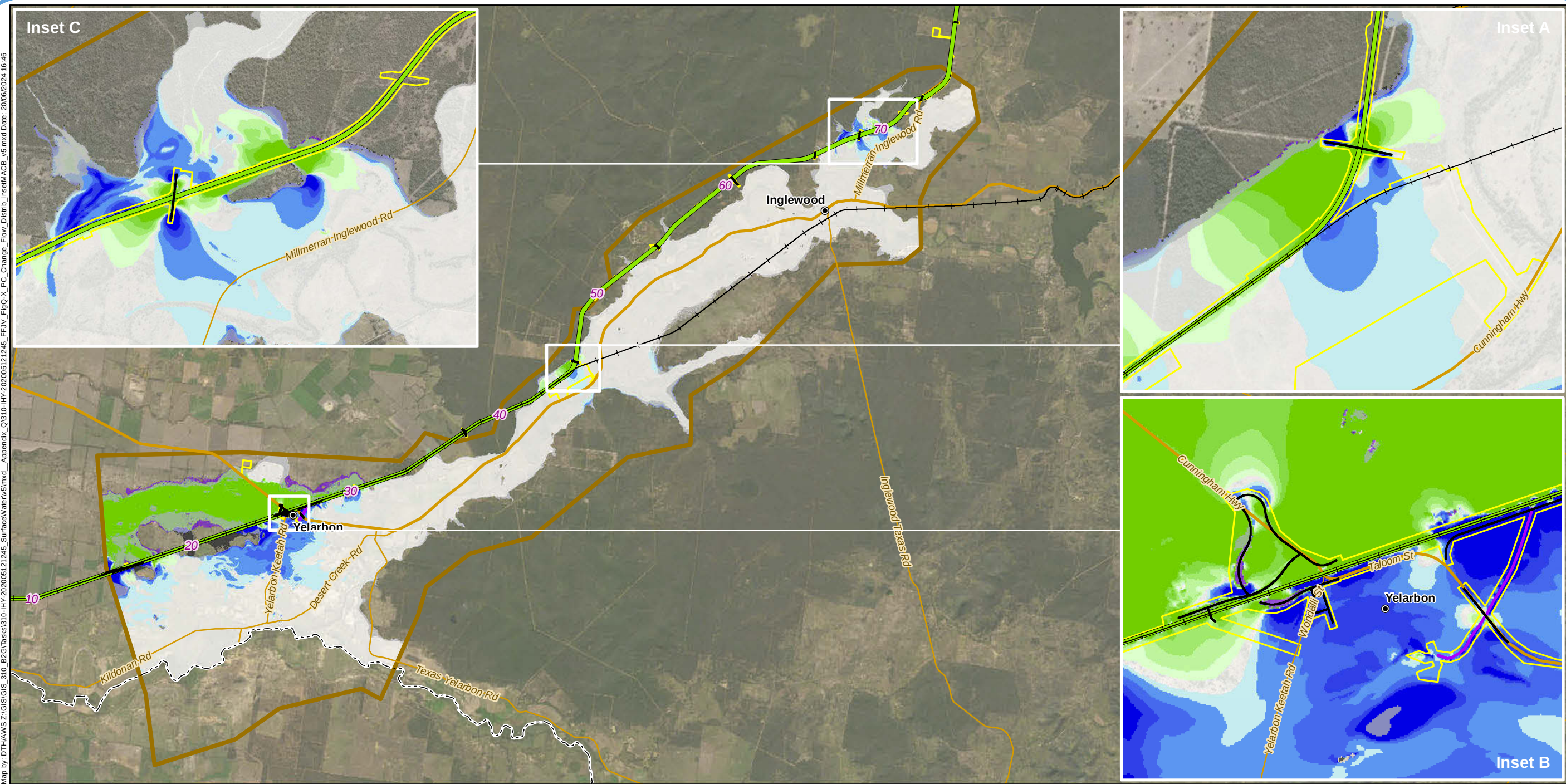
Future Freight
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Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure Q10-6:

1 in 2,000 AEP Event - Percentage Change in Flow Distribution - Macintyre Brook - Yelarbon to Inglewood

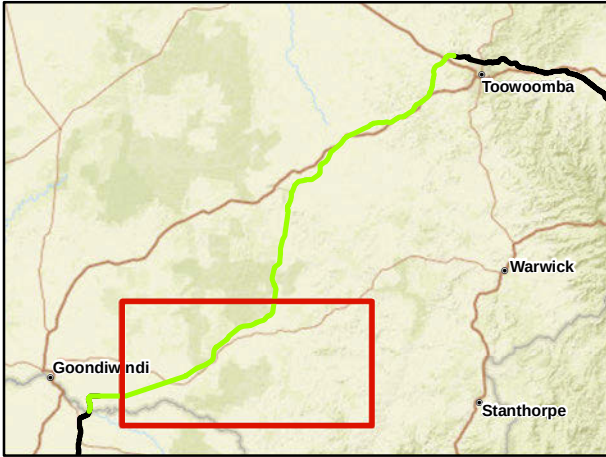


Legend

- 5 Chainage (km)
- Localities
- Existing rail (operational)
- Border to Gowrie alignment
- Major roads
- Minor roads
- Project road design
- NSW/QLD border
- Yelarbon levee
- Regional hydraulic model extent
- Project footprint
- Decrease in inundation area
- Increase in inundation area

% Change in unit flow

- < -20%
- 20% to -15%
- 15% to -10%
- 10% to -5%
- 5% to -2%
- 2% to 2%
- 2% to 5%
- 5% to 10%
- 10% to 15%
- 15% to 20%
- > 20%
- < 0.15 m³/s/m



A3 scale: 1:250,000

0 2.5 5 7.5 10 12.5 km



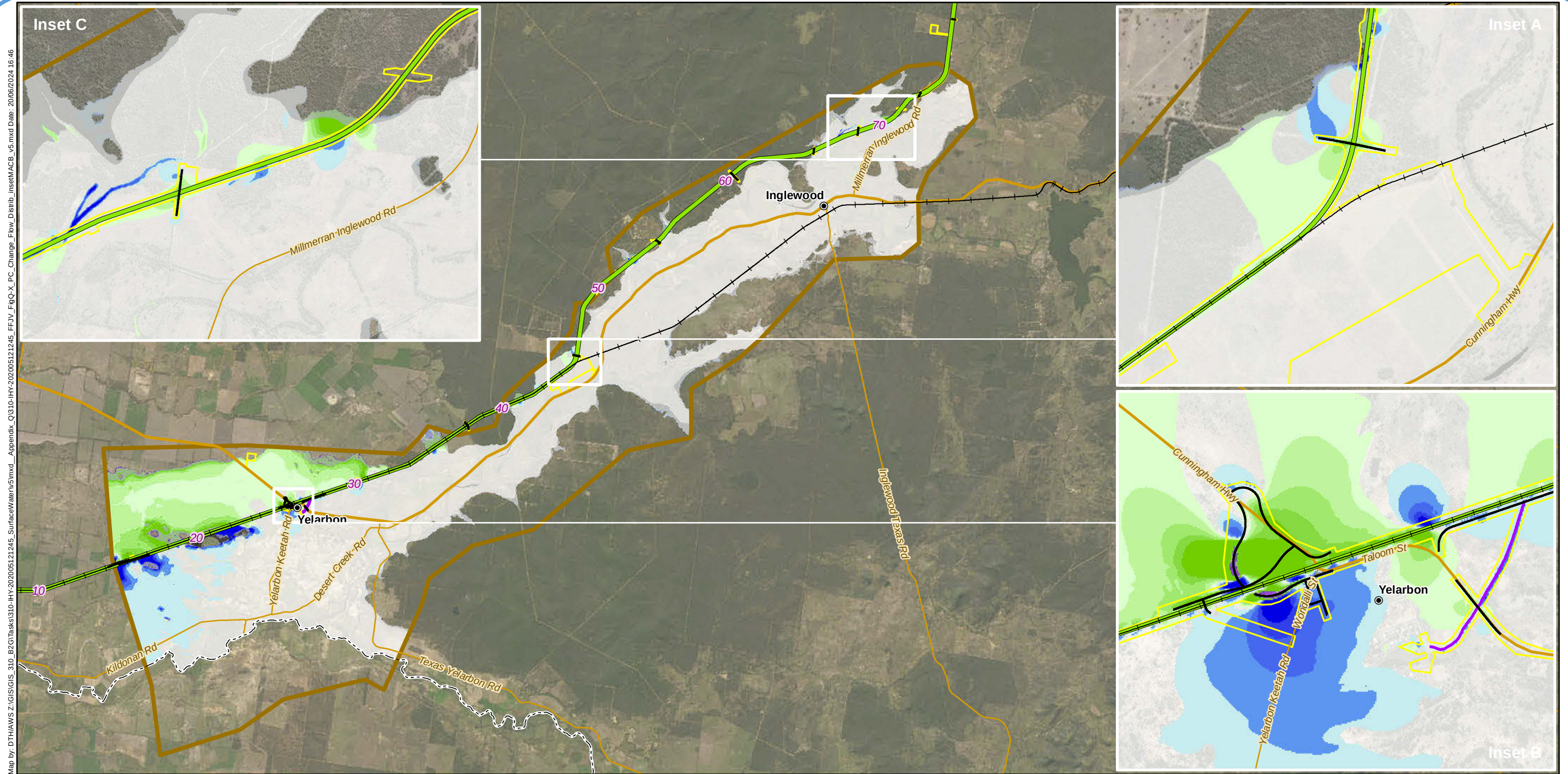
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Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure Q10-7:

1 in 10,000 AEP Event - Percentage Change in Flow Distribution - Macintyre Brook - Yelarbon to Inglewood

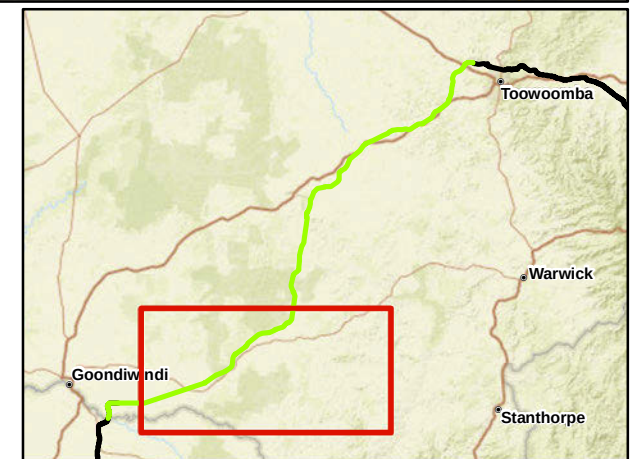


Legend

- 5 Chainage (km)
- Localities
- Existing rail (operational)
- Border to Gowrie alignment
- Major roads
- Minor roads
- Project road design
- NSW/QLD border
- Yelarbon levee
- Regional hydraulic model extent
- Project footprint
- Decrease in inundation area
- Increase in inundation area

% Change in unit flow

- < -20%
- 20% to -15%
- 15% to -10%
- 10% to -5%
- 5% to -2%
- 2% to 2%
- 2% to 5%
- 5% to 10%
- 10% to 15%
- 15% to 20%
- > 20%
- < 0.15 m³/s/m



A3 scale: 1:250,000
0 2.5 5 7.5 10 12.5 km



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Border to Gowrie

Figure Q10-8:

PMF Event - Percentage Change in Flow Distribution - Macintyre Brook - Yelarbon to Inglewood

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\Tasks\310-IHY-202005121245_SurfaceWater\5vmsd_Appendix_Q\Q11-IHY-202005121245_FF\JV_FigQ-X_PC_Change_Flow_Distrib_v5.mxd Date: 20/06/2024 16:55



Legend

- 5 Chainage (km)
- Existing rail (operational)
- Border to Gowrie alignment
- Major roads
- Project road design

- Regional hydraulic model extent
- Project footprint
- Decrease in inundation area
- Increase in inundation area

% Change in unit flow

- | | |
|--------------|----------------------------|
| < -20% | 2% to 5% |
| -20% to -15% | 5% to 10% |
| -15% to -10% | 10% to 15% |
| -10% to -5% | 15% to 20% |
| -5% to -2% | > 20% |
| -2% to 2% | < 0.15 m ³ /s/m |



A3 scale: 1:27,500

0 0.25 0.5 0.75 1 1.25 km



Future Freight
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Border to Gowrie

Figure Q11-1:

20% AEP Event - Percentage Change in Flow Distribution - Bybera Road

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\Tasks\310-HY-2020\5121245_SurfaceWater\5vmsd_Appendix_Q\Q11-HY-2020\5121245_FF\JV_FigQ-X_PC_Change_Flow_Distrib_v5.mxd Date: 20/06/2024 16:55



Legend

- 5 Chainage (km)
- Existing rail (operational)
- Border to Gowrie alignment
- Major roads
- Project road design

- Regional hydraulic model extent
- Project footprint
- Decrease in inundation area
- Increase in inundation area

% Change in unit flow

- | | |
|--------------|----------------------------|
| < -20% | 2% to 5% |
| -20% to -15% | 5% to 10% |
| -15% to -10% | 10% to 15% |
| -10% to -5% | 15% to 20% |
| -5% to -2% | > 20% |
| -2% to 2% | < 0.15 m ³ /s/m |



A3 scale: 1:27,500

0 0.25 0.5 0.75 1 1.25 km



Future Freight
Integrating Community, Environment and Engineering

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Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure Q11-2:

10% AEP Event - Percentage Change in Flow Distribution - Bybera Road

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\Tasks\310-HY-2020\5121245_SurfaceWater\5vmsd_Appendix_Q\Q11-HY-2020\5121245_FF\JV_FigQ-X_PC_Change_Flow_Distrib_v5.mxd Date: 20/06/2024 16:56



Legend

- 5 Chainage (km)
- Existing rail (operational)
- Border to Gowrie alignment
- Major roads
- Project road design
- Regional hydraulic model extent
- Project footprint
- Decrease in inundation area
- Increase in inundation area

% Change in unit flow	
< -20%	2% to 5%
-20% to -15%	5% to 10%
-15% to -10%	10% to 15%
-10% to -5%	15% to 20%
-5% to -2%	> 20%
-2% to 2%	< 0.15 m³/s/m



A3 scale: 1:27,500
0 0.25 0.5 0.75 1 1.25 km



Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie
Figure Q11-3:
5% AEP Event - Percentage Change in Flow Distribution - Bybera Road

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\Tasks\310-HY-2020\5121245_SurfaceWater\5vmsd_Appendix_Q\Q11-HY-2020\5121245_FF\JV_FigQ-X_PC_Change_Flow_Distrib_v5.mxd Date: 20/06/2024 16:56



Legend

- 5 Chainage (km)
- Existing rail (operational)
- Border to Gowrie alignment
- Major roads
- Project road design
- Regional hydraulic model extent
- Project footprint
- Decrease in inundation area
- Increase in inundation area

% Change in unit flow	
< -20%	2% to 5%
-20% to -15%	5% to 10%
-15% to -10%	10% to 15%
-10% to -5%	15% to 20%
-5% to -2%	> 20%
-2% to 2%	< 0.15 m ³ /s/m



A3 scale: 1:27,500
0 0.25 0.5 0.75 1 1.25 km



Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie
Figure Q11-4:
2% AEP Event - Percentage Change in Flow Distribution - Bybera Road

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\Tasks\310-HY-2020\5121245_SurfaceWater\5vmsd_Appendix_Q\Q11-HY-2020\5121245_FF\JV_FigQ-X_PC_Change_Flow_Distrib_v5.mxd Date: 20/06/2024 16:56



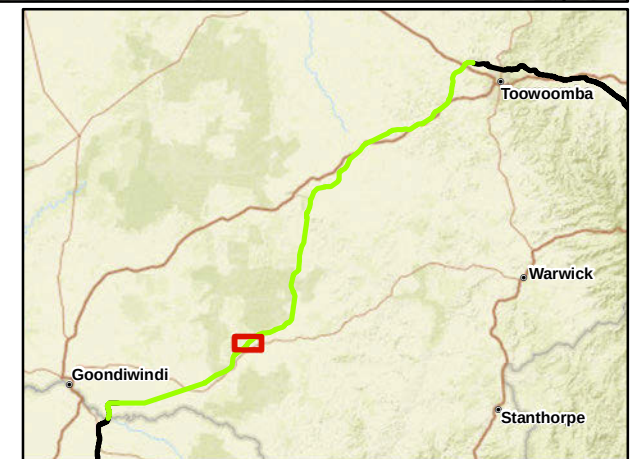
Legend

- 5 Chainage (km)
- Existing rail (operational)
- Border to Gowrie alignment
- Major roads
- Project road design

- Regional hydraulic model extent
- Project footprint
- Decrease in inundation area
- Increase in inundation area

% Change in unit flow

- | | |
|--------------|----------------------------|
| < -20% | 2% to 5% |
| -20% to -15% | 5% to 10% |
| -15% to -10% | 10% to 15% |
| -10% to -5% | 15% to 20% |
| -5% to -2% | > 20% |
| -2% to 2% | < 0.15 m ³ /s/m |



A3 scale: 1:27,500
0 0.25 0.5 0.75 1 1.25 km



Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure Q11-5:

1% AEP Event - Percentage Change in Flow Distribution - Bybera Road

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\Tasks\310-HY-2020\5121245_SurfaceWater\5vmsd_Appendix_Q\Q11-HY-2020\5121245_FF\JV_FigQ-X_PC_Change_Flow_Distrib_v5.mxd Date: 20/06/2024 16:56



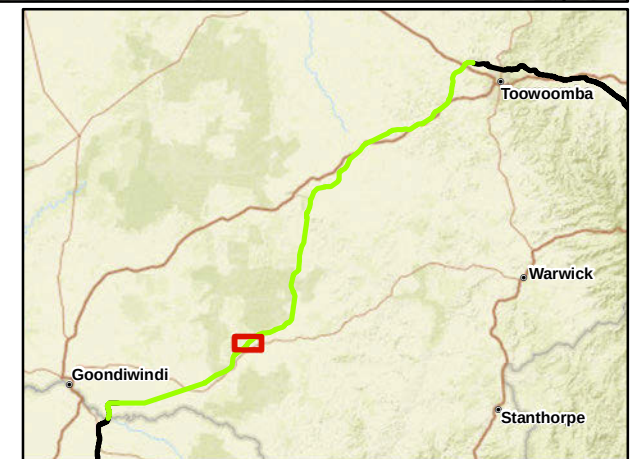
Legend

- 5 Chainage (km)
- Existing rail (operational)
- Border to Gowrie alignment
- Major roads
- Project road design

- Regional hydraulic model extent
- Project footprint
- Decrease in inundation area
- Increase in inundation area

% Change in unit flow

- | | |
|--------------|----------------------------|
| < -20% | 2% to 5% |
| -20% to -15% | 5% to 10% |
| -15% to -10% | 10% to 15% |
| -10% to -5% | 15% to 20% |
| -5% to -2% | > 20% |
| -2% to 2% | < 0.15 m ³ /s/m |



A3 scale: 1:27,500
0 0.25 0.5 0.75 1 1.25 km



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Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure Q11-6:

1 in 2,000 AEP Event - Percentage Change in Flow Distribution - Bybera Road

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\Tasks\310-IHY-2020\5121245_SurfaceWater\5vmsd_Appendix_Q\Q11-IHY-2020\5121245_FF\JV_FigQ-X_PC_Change_Flow_Distrib_v5.mxd Date: 20/06/2024 16:56



Legend

- 5 Chainage (km)
- Existing rail (operational)
- Border to Gowrie alignment
- Major roads
- Project road design
- Regional hydraulic model extent
- Project footprint
- Decrease in inundation area
- Increase in inundation area

% Change in unit flow	
< -20%	2% to 5%
-20% to -15%	5% to 10%
-15% to -10%	10% to 15%
-10% to -5%	15% to 20%
-5% to -2%	> 20%
-2% to 2%	< 0.15 m ³ /s/m



A3 scale: 1:27,500
0 0.25 0.5 0.75 1 1.25 km



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Border to Gowrie

Figure Q11-7:

1 in 10,000 AEP Event - Percentage Change in Flow Distribution - Bybera Road



-  Regional hydraulic model extent
-  Project footprint
-  Decrease in inundation area
-  Increase in inundation area

	< -20%		2% to 5%
	-20% to -15%		5% to 10%
	-15% to -10%		10% to 15%
	-10% to -5%		15% to 20%
	-5% to -2%		> 20%
	-2% to 2%		< 0.15 m ³ /s/m

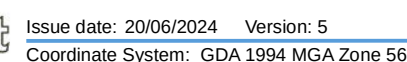
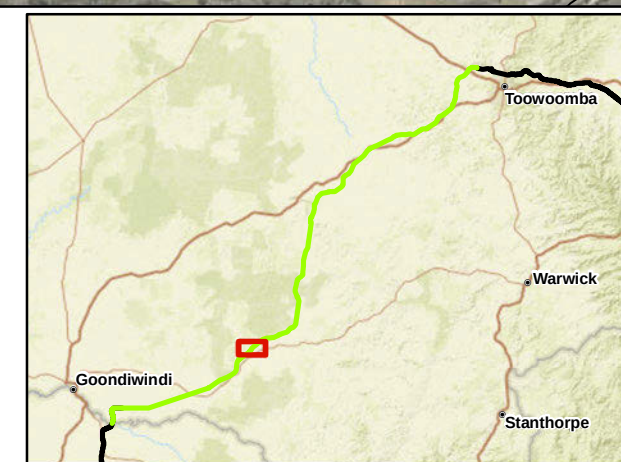


Figure Q11-8:

PMF Event - Percentage Change in Flow Distribution - Bybera Road



- % Change in unit flow**

-
- A map of south-eastern Australia showing the study area. A red rectangle indicates the study site, located near Goondiwindi. Major roads are shown in black, and rivers in blue. Other towns labeled include Toowoomba, Warwick, and Stanthorpe.



Border to Gowrie

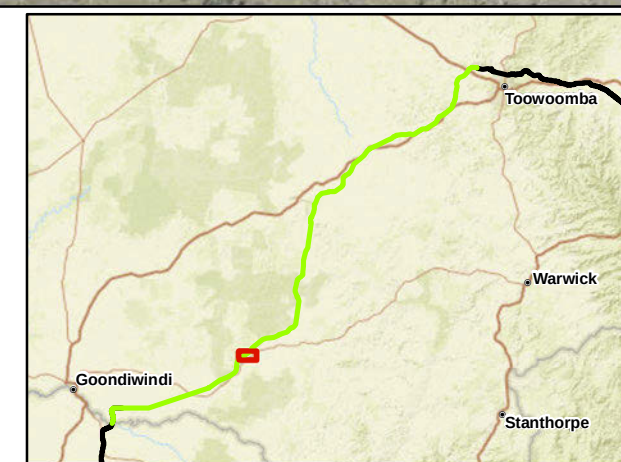
Figure Q12-1:

20% AEP Event - Percentage Change in Flow Distribution - Cremascos Road



-  Regional hydraulic model extent
-  Project footprint
-  Decrease in inundation area
-  Increase in inundation area

	< -20%		2% to 5%
	-20% to -15%		5% to 10%
	-15% to -10%		10% to 15%
	-10% to -5%		15% to 20%
	-5% to -2%		> 20%
	-2% to 2%		< 0.15 m ³ /s/m



10% AEP Event - Percentage Change in Flow Distribution - Cremascos Road



-  Regional hydraulic model extent
-  Project footprint
-  Decrease in inundation area
-  Increase in inundation area

	< -20%		2% to 5%
	-20% to -15%		5% to 10%
	-15% to -10%		10% to 15%
	-10% to -5%		15% to 20%
	-5% to -2%		> 20%
	-2% to 2%		< 0.15 m ³ /s/m

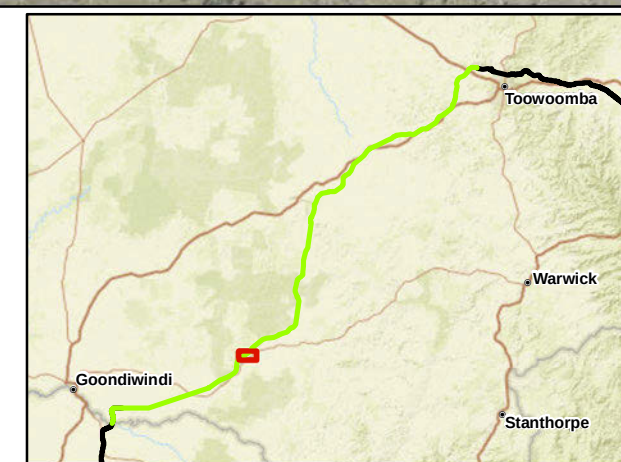


Figure Q12-3:

5% AEP Event - Percentage Change in Flow Distribution - Cremascos Road



- % Change in unit flow**

-

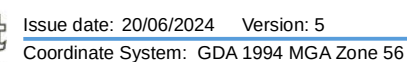


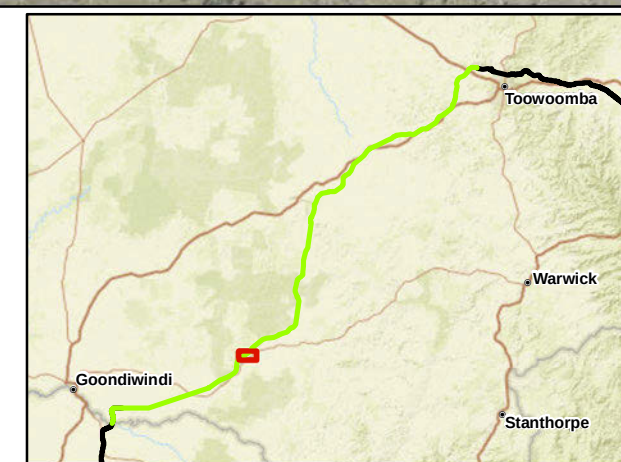
Figure Q12-4:

2% AEP Event - Percentage Change in Flow Distribution - Cremascos Road



-  Regional hydraulic model extent
-  Project footprint
-  Decrease in inundation area
-  Increase in inundation area

	< -20%		2% to 5%
	-20% to -15%		5% to 10%
	-15% to -10%		10% to 15%
	-10% to -5%		15% to 20%
	-5% to -2%		> 20%
	-2% to 2%		< 0.15 m ³ /s/m



Border to Gowrie

Figure Q12-5:

1% AEP Event - Percentage Change in Flow Distribution - Cremascos Road



- % Change in unit flow**

-
- A map of south-eastern Australia showing the study area. A red rectangle indicates the study site, located near Goondiwindi. Major roads are shown in red, and rivers in blue. Other towns labeled include Toowoomba, Warwick, and Stanthorpe.



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Figure Q12-6:

1 in 2,000 AEP Event - Percentage Change in Flow Distribution - Cremascos Road



- % Change in unit flow**

-
- A map of south-eastern Australia showing the study area. A red rectangle indicates the study site, located near Goondiwindi. Major roads are shown in red, and rivers in blue. Other towns labeled include Toowoomba, Warwick, and Stanthorpe.

A3 scale: 1:20,000



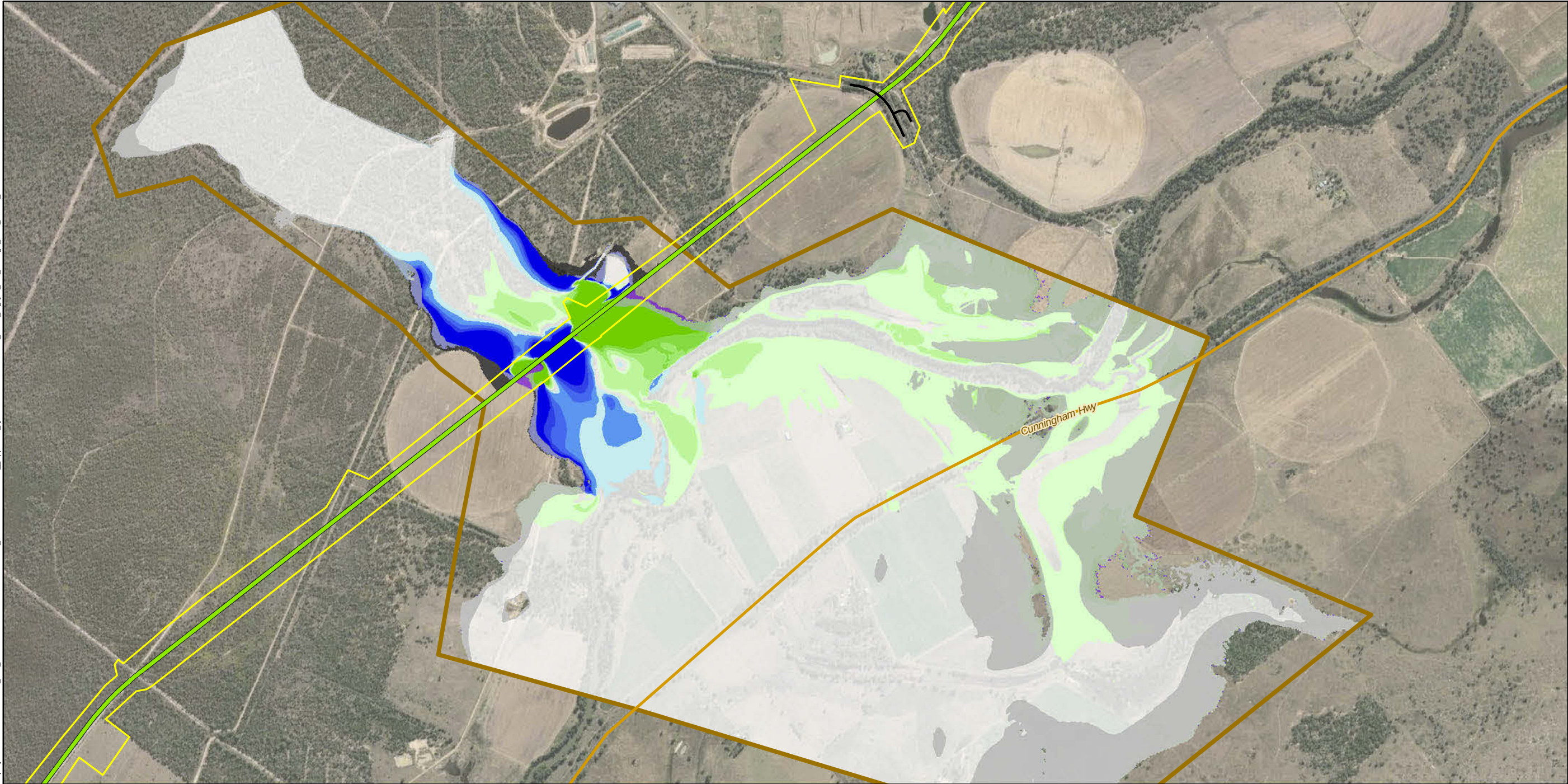
Issue date: 20/06/2024 Version: 5

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Figure Q12-7:

1 in 10,000 AEP Event - Percentage Change in Flow Distribution - Cremascos Road

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\GIS_310_IHY\202005121245_SurfaceWater\5mxd_Appendix_Q\310-IHY\202005121245_FF\JV_FigQ-X_PC_Change_Flow_Distrib_v5.mxd Date: 20/06/2024 16:57



Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Major roads
- Project road design
- Regional hydraulic model extent
- Project footprint
- Decrease in inundation area
- Increase in inundation area

% Change in unit flow

- < -20%
- 20% to -15%
- 15% to -10%
- 10% to -5%
- 5% to -2%
- 2% to 2%
- 2% to 5%
- 5% to 10%
- 10% to 15%
- 15% to 20%
- > 20%
- < 0.15 m³/s/m



A3 scale: 1:20,000



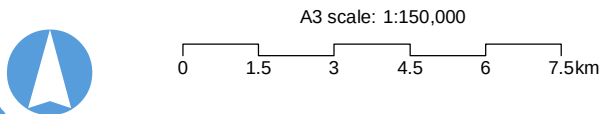
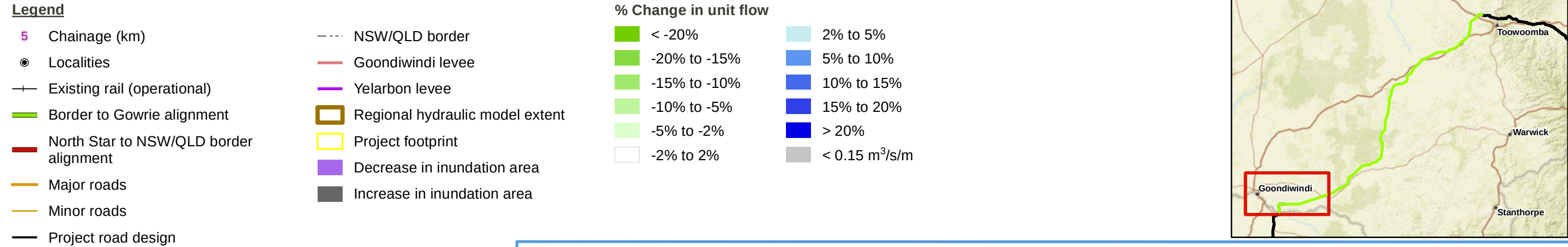
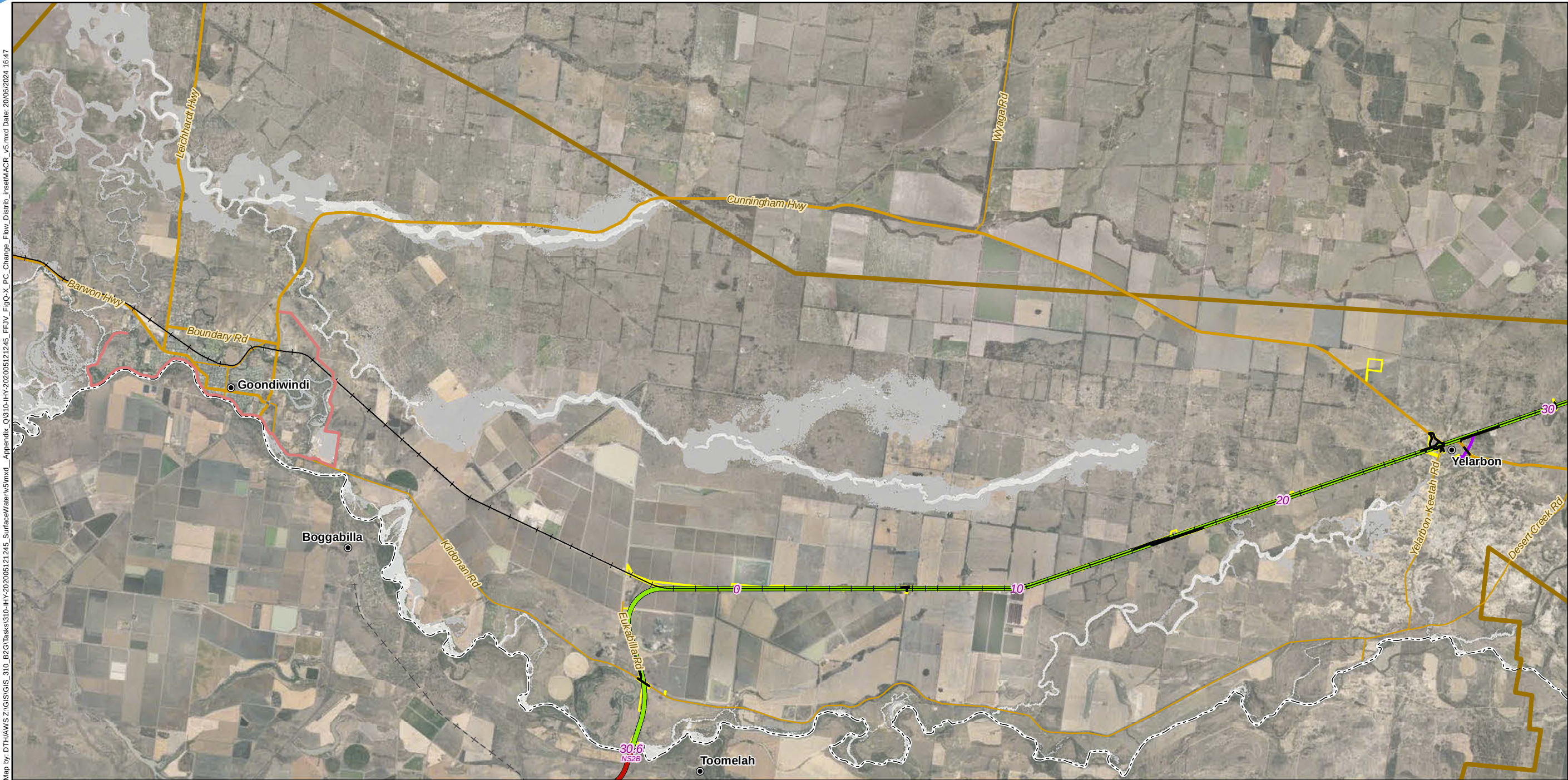
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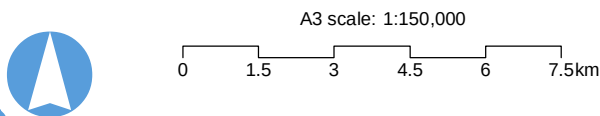
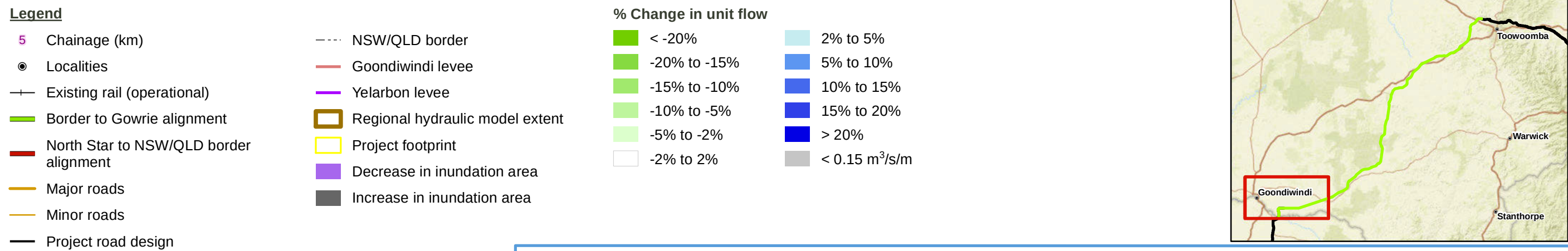
Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

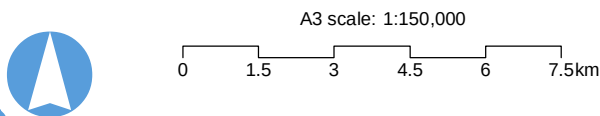
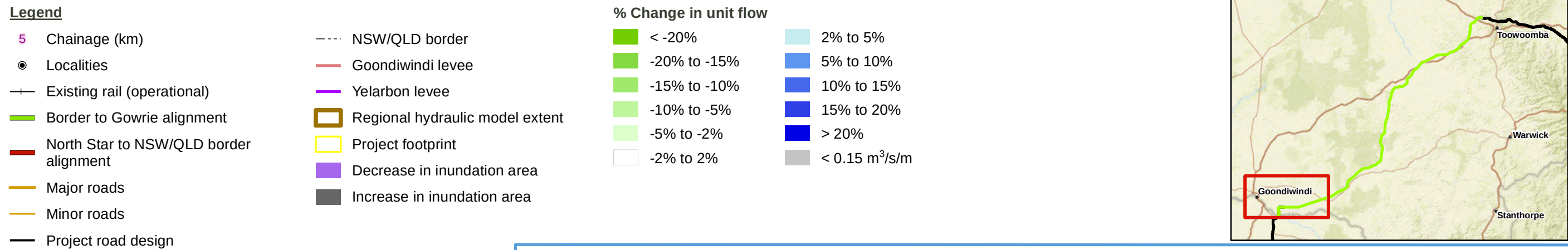
Border to Gowrie

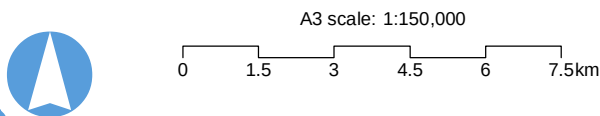
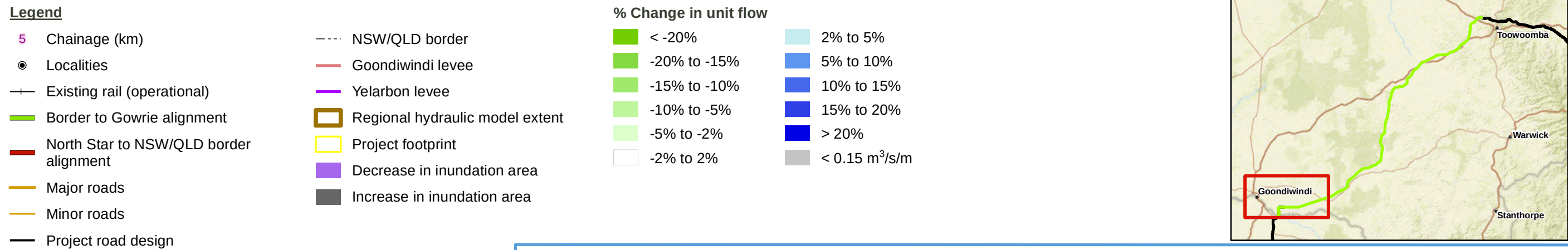
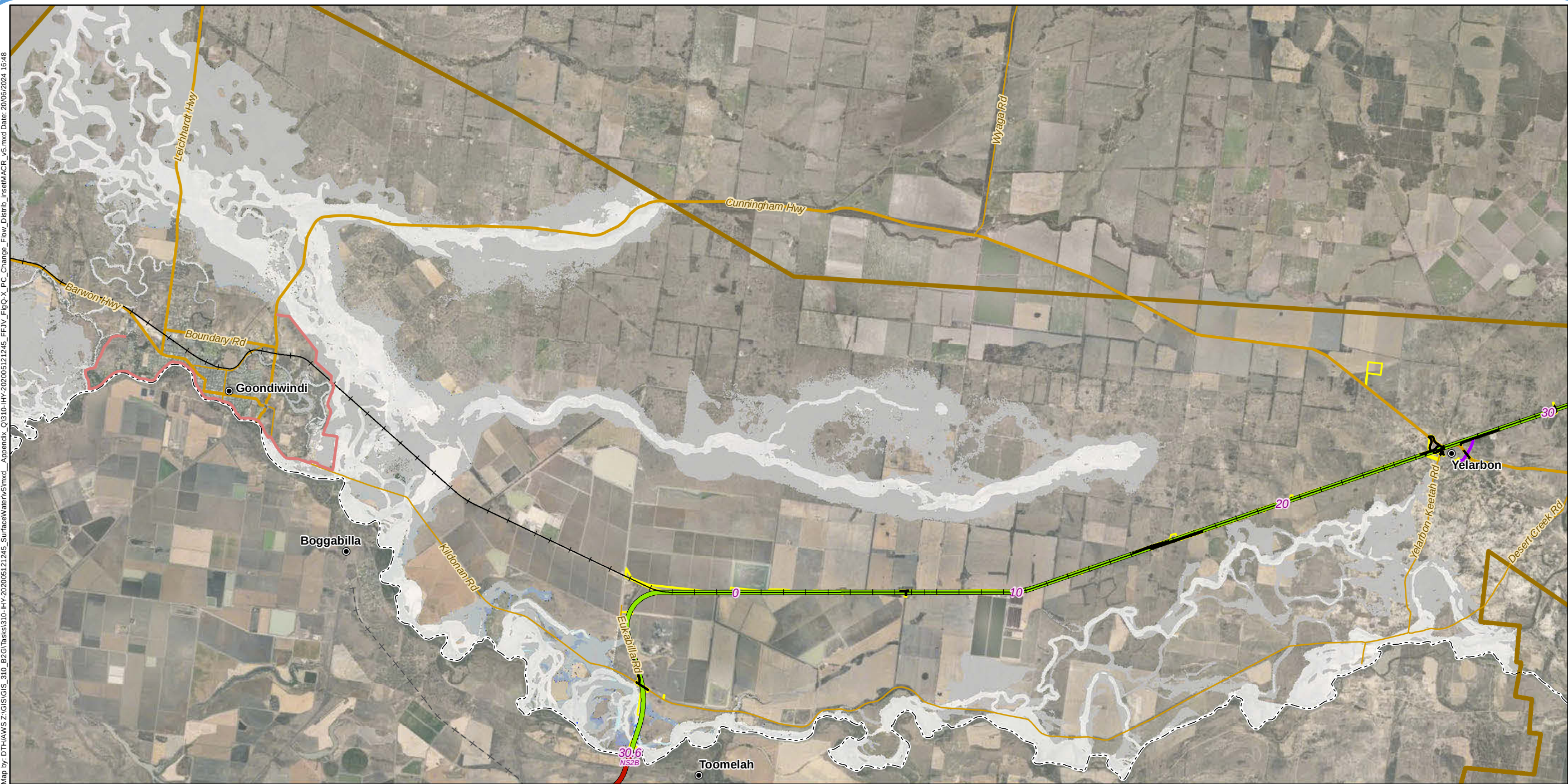
Figure Q12-8:

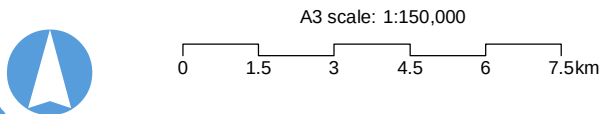
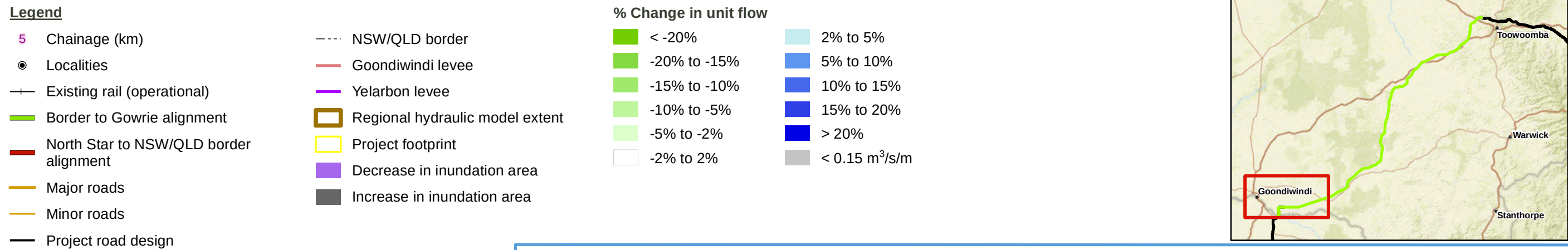
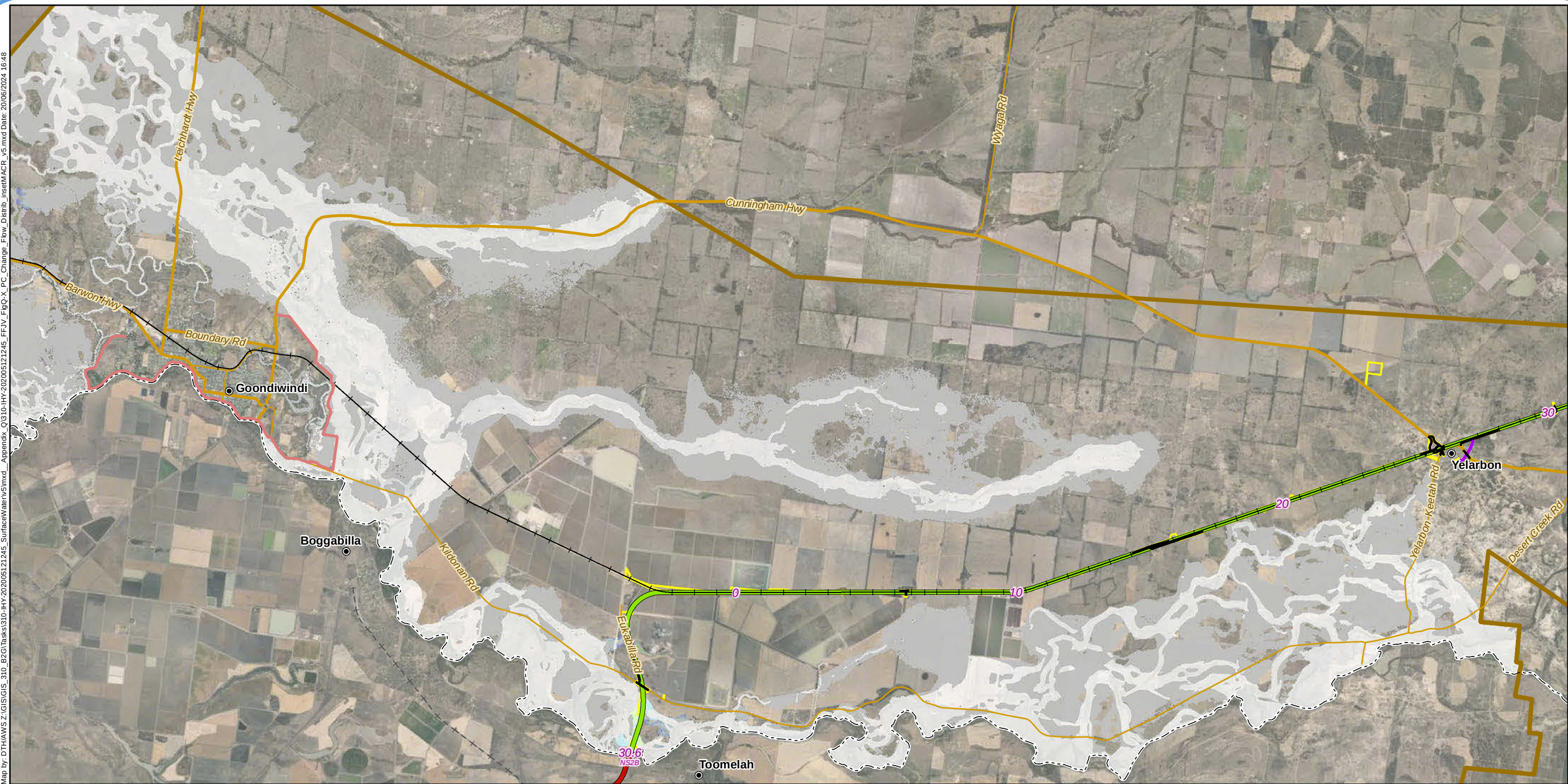
PMF Event - Percentage Change in Flow Distribution - Cremascos Road

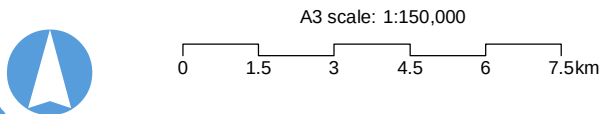
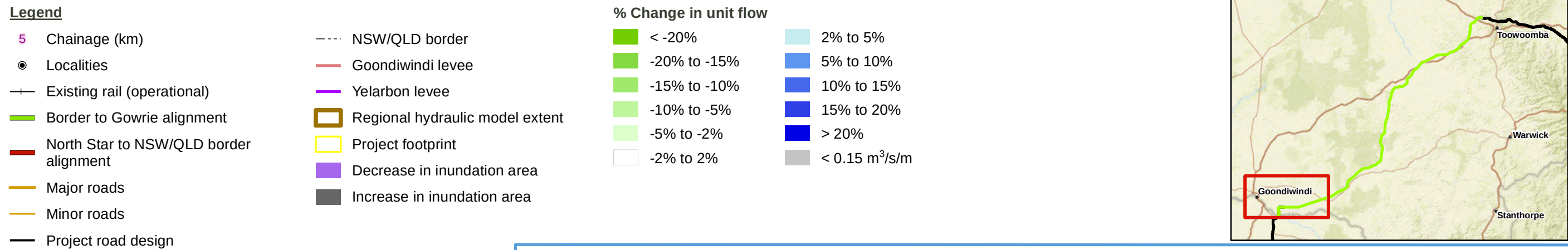
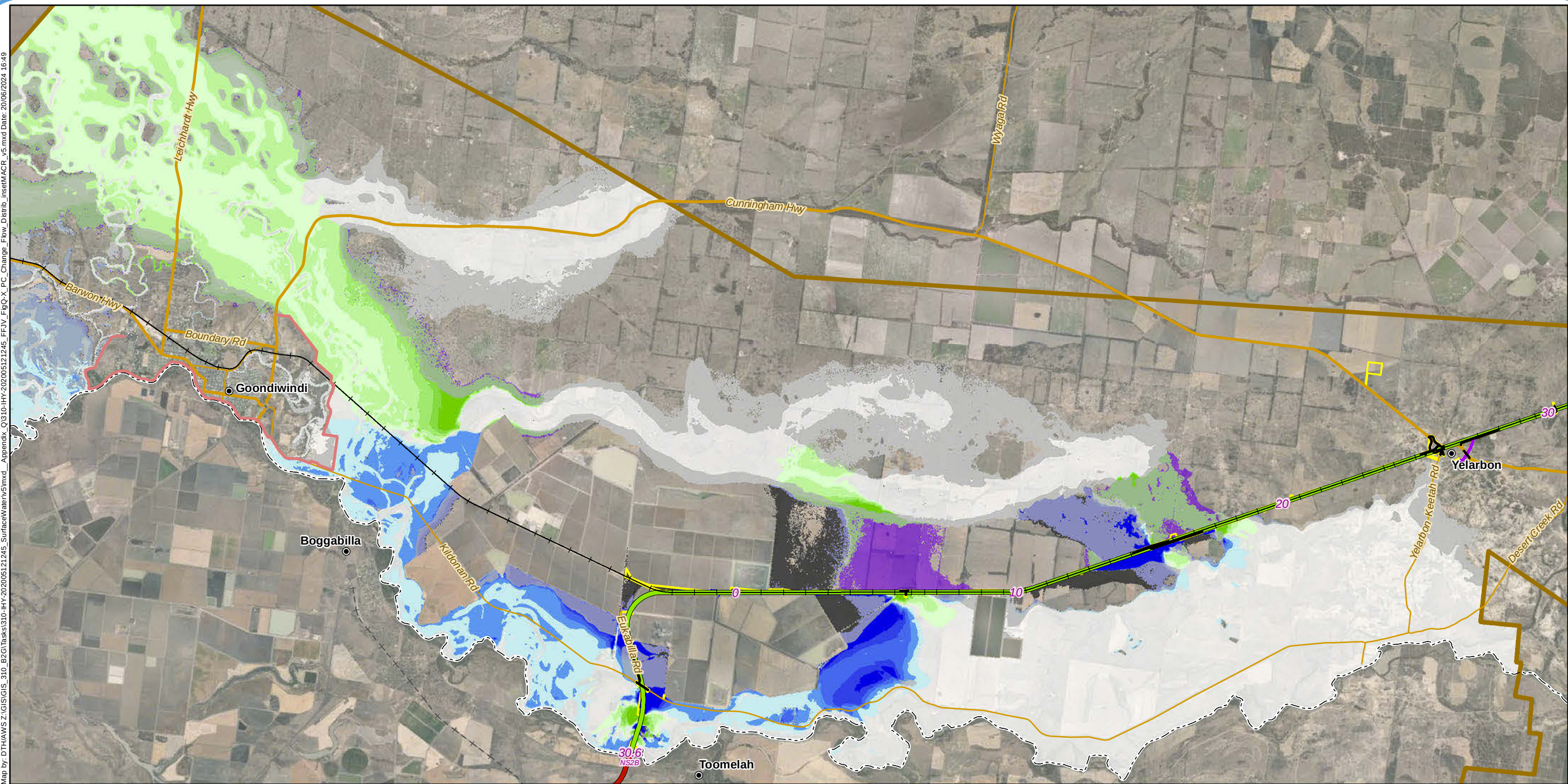


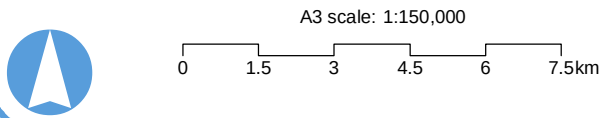
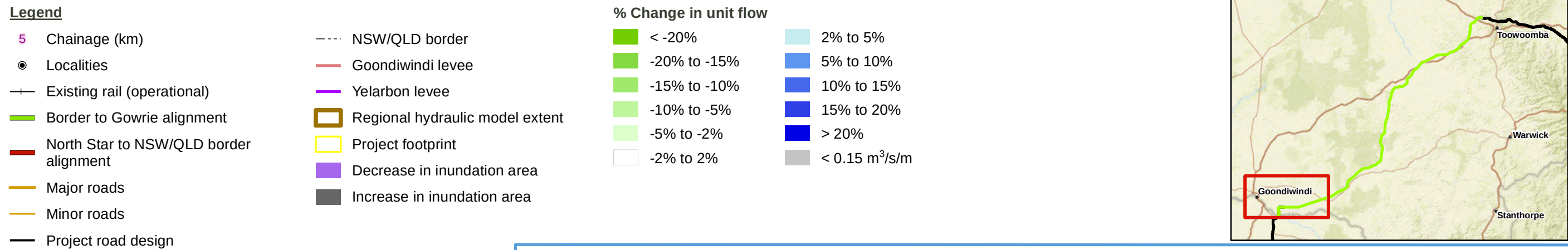
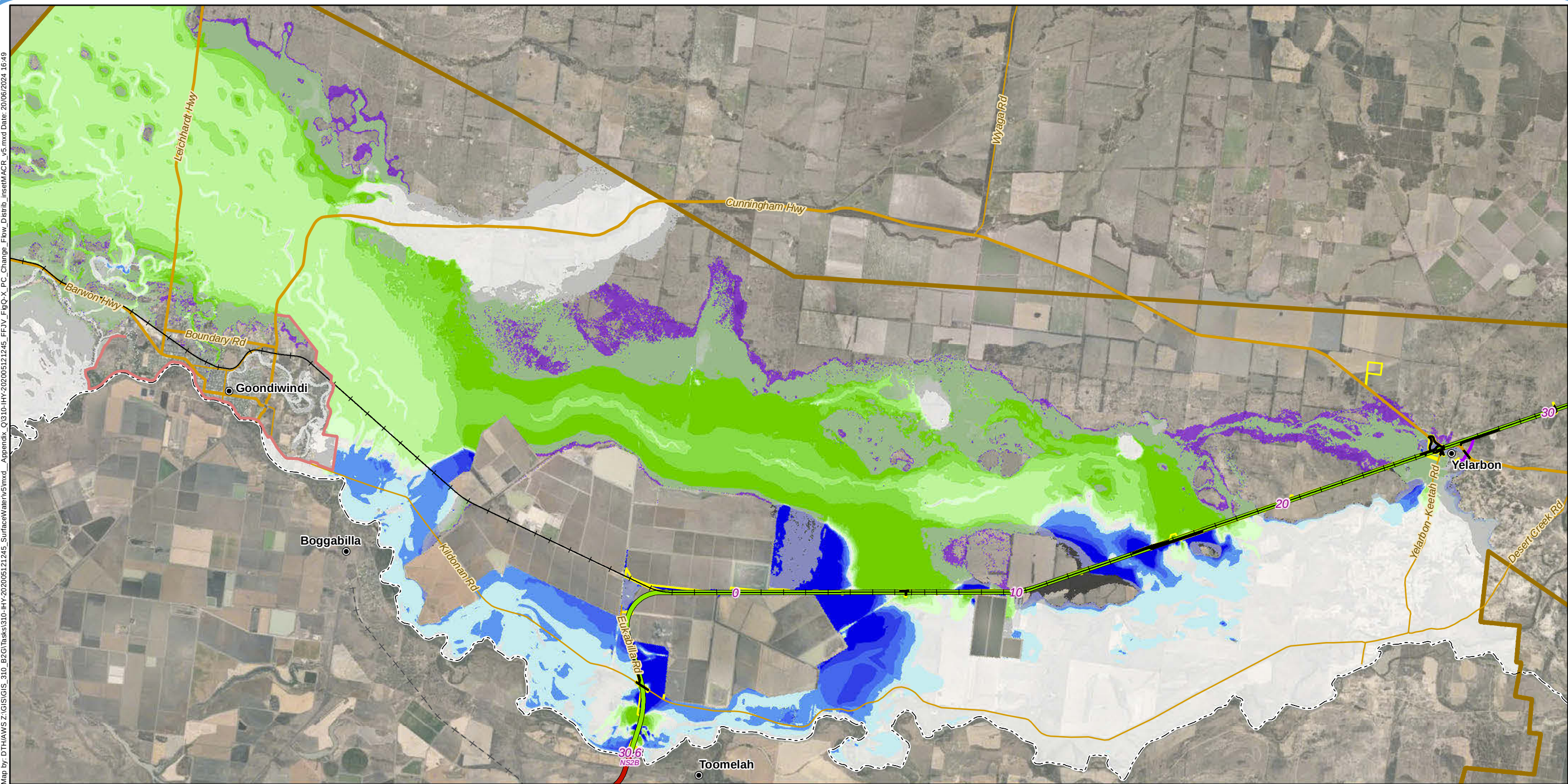




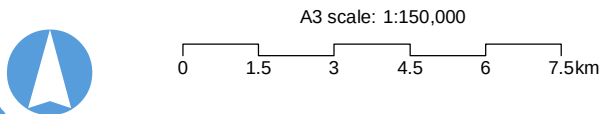
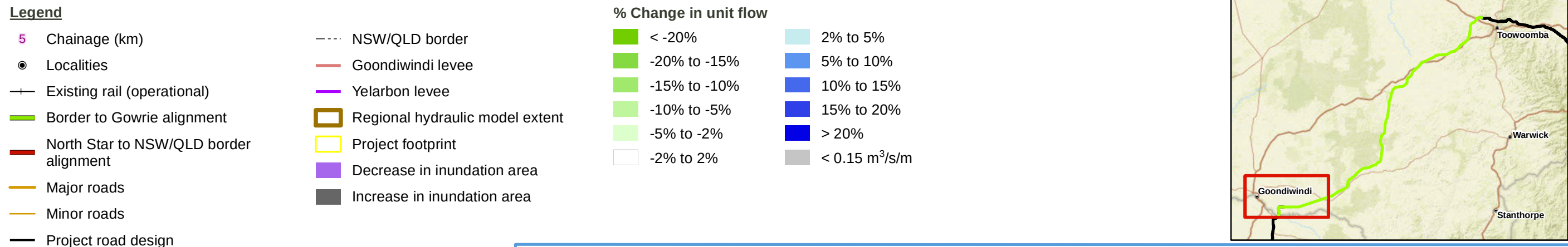
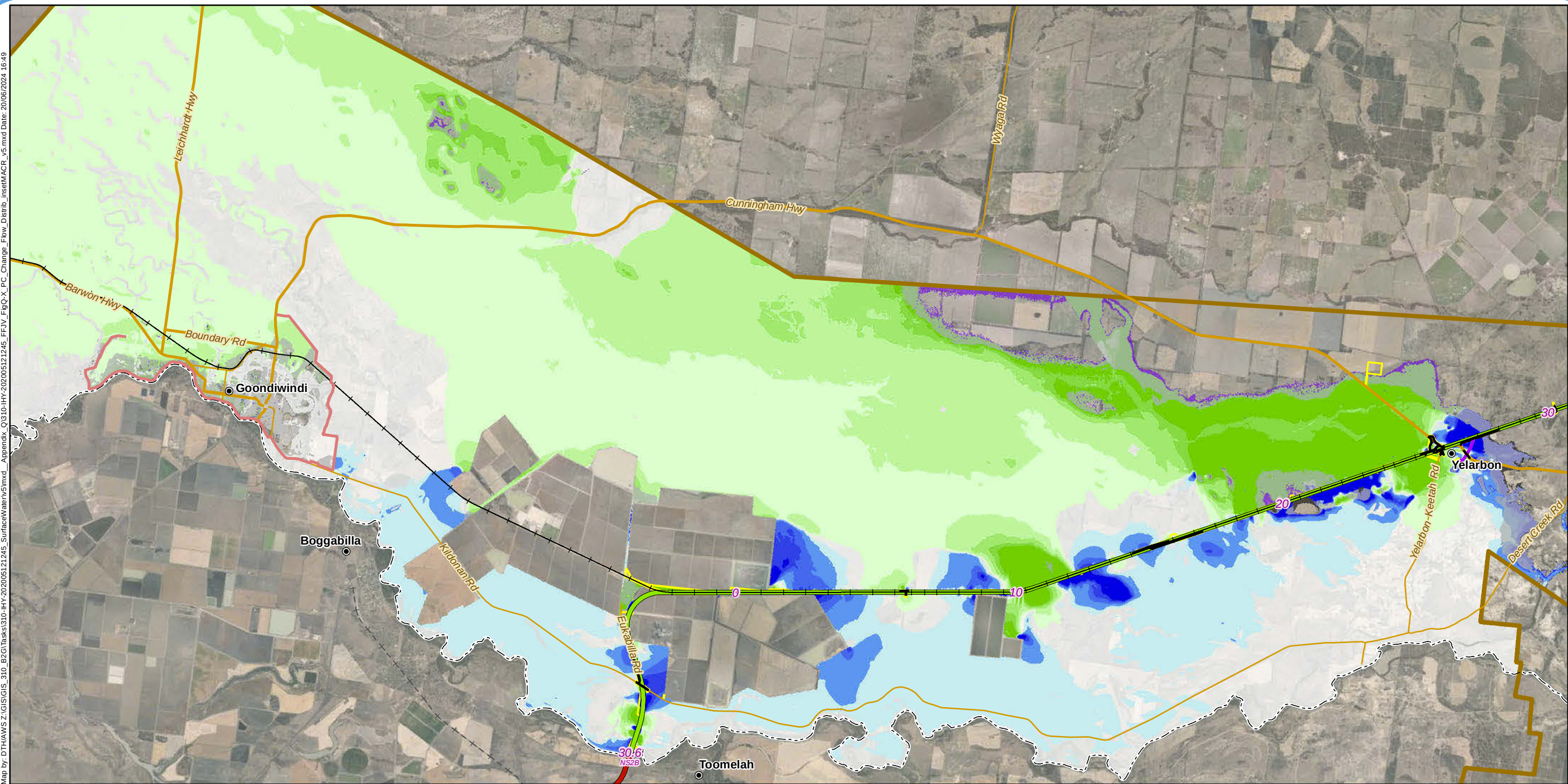








Border to Gowrie
Figure Q13-7:
1 in 10,000 AEP Event - Percentage Change in Flow Distribution - Macintyre River



APPENDIX T2

Hydrology and Flooding Technical Report—Volume 2

Appendix R Embankment overtopping failure risk assessment flood maps

BORDER TO GOWRIE REVISED DRAFT ENVIRONMENTAL IMPACT STATEMENT

Appendix R

Embankment Overtopping Failure Risk Assessment Flood Maps

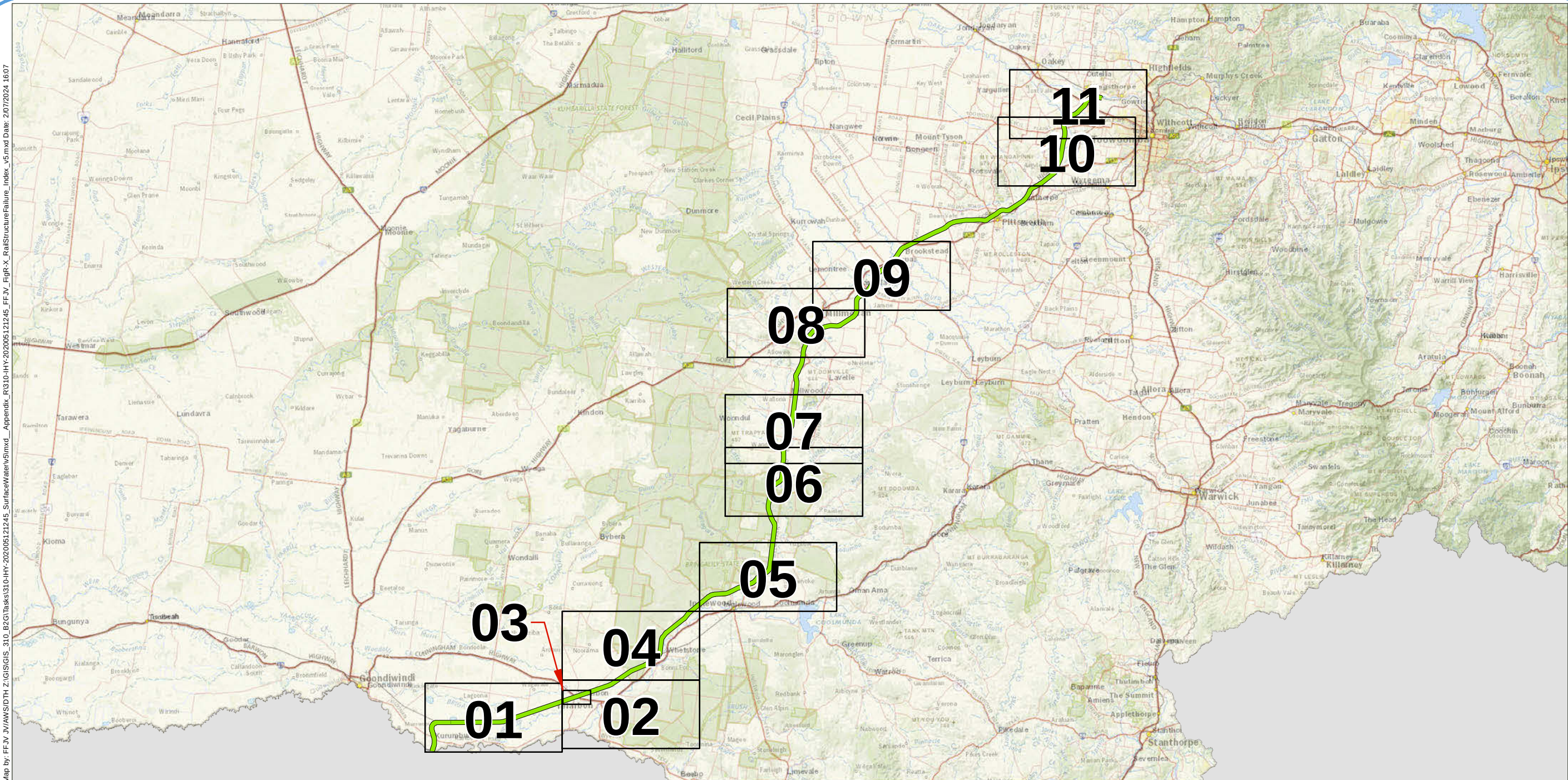
Figure R1-1 Embankment Overtopping Failure Risk Assessment - Map Index

Figure R2-1 Embankment Overtopping Failure Risk Assessment - 1 in 2,000 AEP Design Flood
Figure R2-2 Embankment Overtopping Failure Risk Assessment - 1 in 2,000 AEP Design Flood
Figure R2-3 Embankment Overtopping Failure Risk Assessment - 1 in 2,000 AEP Design Flood
Figure R2-4 Embankment Overtopping Failure Risk Assessment - 1 in 2,000 AEP Design Flood
Figure R2-5 Embankment Overtopping Failure Risk Assessment - 1 in 2,000 AEP Design Flood
Figure R2-6 Embankment Overtopping Failure Risk Assessment - 1 in 2,000 AEP Design Flood
Figure R2-7 Embankment Overtopping Failure Risk Assessment - 1 in 2,000 AEP Design Flood
Figure R2-8 Embankment Overtopping Failure Risk Assessment - 1 in 2,000 AEP Design Flood
Figure R2-9 Embankment Overtopping Failure Risk Assessment - 1 in 2,000 AEP Design Flood
Figure R2-10 Embankment Overtopping Failure Risk Assessment - 1 in 2,000 AEP Design Flood
Figure R2-11 Embankment Overtopping Failure Risk Assessment - 1 in 2,000 AEP Design Flood

Figure R3-1 Embankment Overtopping Failure Risk Assessment - 1 in 10,000 AEP Design Flood
Figure R3-2 Embankment Overtopping Failure Risk Assessment - 1 in 10,000 AEP Design Flood
Figure R3-3 Embankment Overtopping Failure Risk Assessment - 1 in 10,000 AEP Design Flood
Figure R3-4 Embankment Overtopping Failure Risk Assessment - 1 in 10,000 AEP Design Flood
Figure R3-5 Embankment Overtopping Failure Risk Assessment - 1 in 10,000 AEP Design Flood
Figure R3-6 Embankment Overtopping Failure Risk Assessment - 1 in 10,000 AEP Design Flood
Figure R3-7 Embankment Overtopping Failure Risk Assessment - 1 in 10,000 AEP Design Flood
Figure R3-8 Embankment Overtopping Failure Risk Assessment - 1 in 10,000 AEP Design Flood
Figure R3-9 Embankment Overtopping Failure Risk Assessment - 1 in 10,000 AEP Design Flood
Figure R3-10 Embankment Overtopping Failure Risk Assessment - 1 in 10,000 AEP Design Flood
Figure R3-11 Embankment Overtopping Failure Risk Assessment - 1 in 10,000 AEP Design Flood

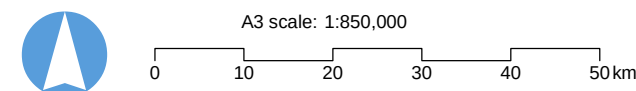
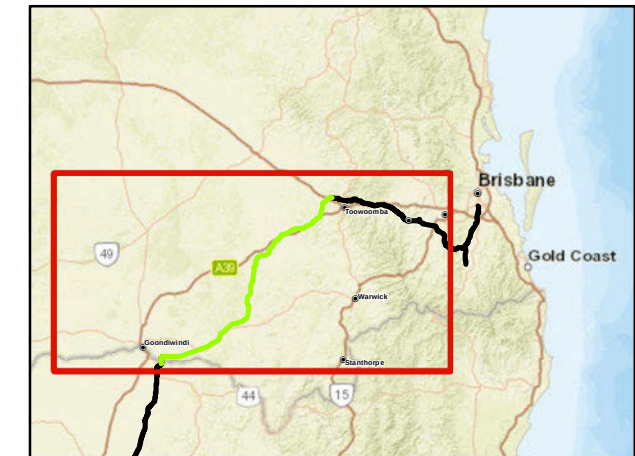
Figure R4-1 Embankment Overtopping Failure Risk Assessment - PMF Design Flood
Figure R4-2 Embankment Overtopping Failure Risk Assessment - PMF Design Flood
Figure R4-3 Embankment Overtopping Failure Risk Assessment - PMF Design Flood
Figure R4-4 Embankment Overtopping Failure Risk Assessment - PMF Design Flood
Figure R4-5 Embankment Overtopping Failure Risk Assessment - PMF Design Flood
Figure R4-6 Embankment Overtopping Failure Risk Assessment - PMF Design Flood
Figure R4-7 Embankment Overtopping Failure Risk Assessment - PMF Design Flood
Figure R4-8 Embankment Overtopping Failure Risk Assessment - PMF Design Flood
Figure R4-9 Embankment Overtopping Failure Risk Assessment - PMF Design Flood
Figure R4-10 Embankment Overtopping Failure Risk Assessment - PMF Design Flood
Figure R4-11 Embankment Overtopping Failure Risk Assessment - PMF Design Flood

Map by FF JV JVAWS/DTH Z:GIS/GIS_310_B2G/Task310-HY-202005121245_SurfaceWaterV5mxd_Appendix_R010-HY-202005121245_FF JV_FIGR-X_RailStructureFailure_Index_v5mxd Date: 20/07/2024 16:07



Legend

 Border to Gowrie alignment





Map by: FF JV JVAWS/DTH
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Legend

- 5 Chainage (km)
- Localities
- - - Design rail alignment
- + + Existing rail (operational)
- + - Existing rail (non-operational)
- Major roads
- Minor roads
- - - NSW/QLD border
- Project footprint

Receptors Sensitive to Embankment Overtopping Flood Failure

- House
- Shed
- ▲ Other assets

Receptors Affected by Non Failure Flood

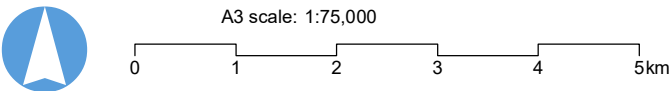
- House
- Shed
- ▲ Other assets

Design Event (No Failure) Flood Depth (m)

- ≤ 0.3
- 0.3 - 1.0
- 1.0 - 1.5
- 1.5 - 2.0
- > 2.0
- Waterway

Risk of Embankment Overtopping Failure

- High (overtopping depth > top of rail)
- Medium to high (overtopping depth > top of formation + 0.3m and ≤ top of rail)
- Low to medium (overtopping depth ≥ top of formation and ≤ top of formation + 0.3m)
- No overtopping (adjacent flood level below top of formation)

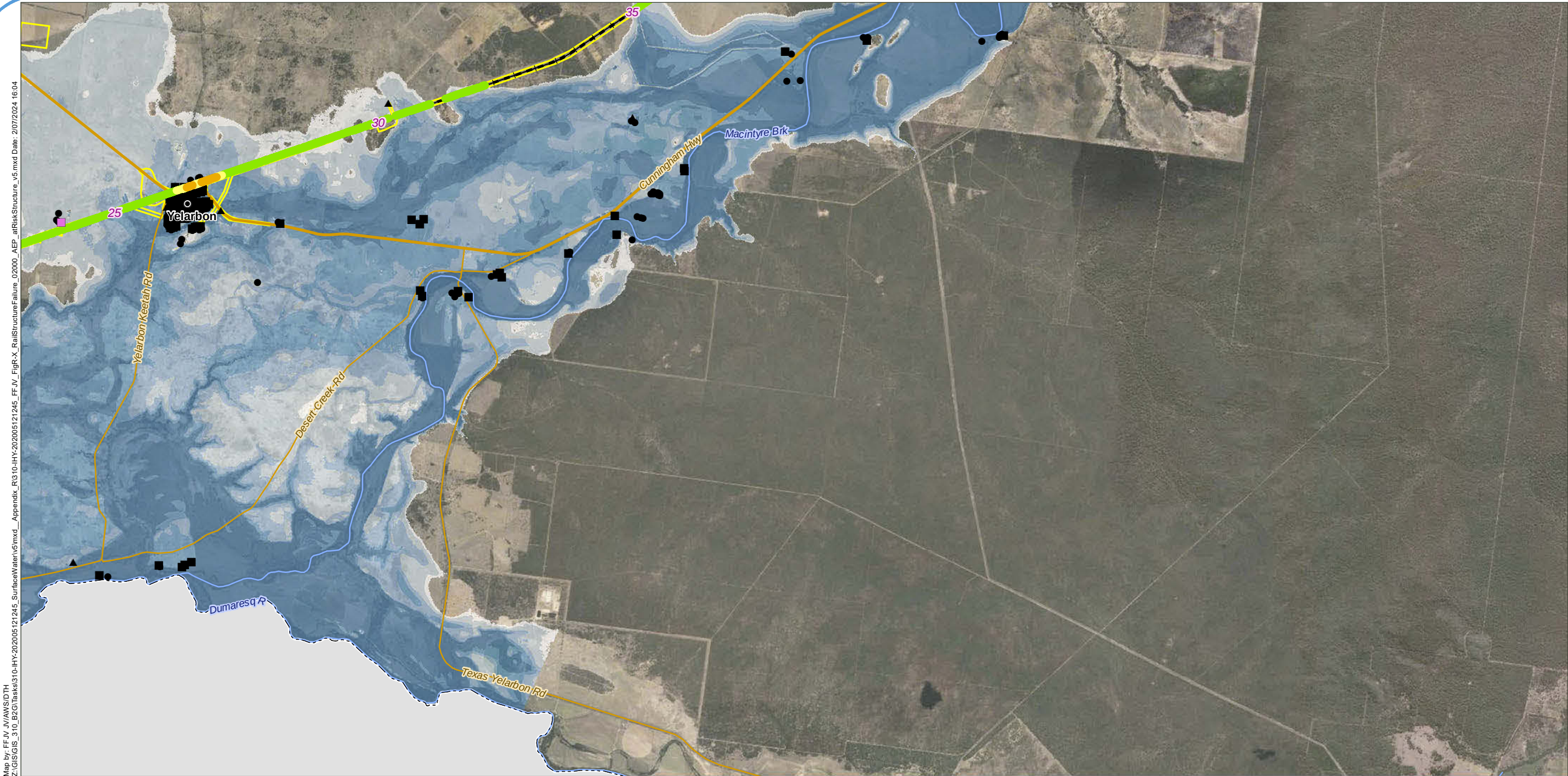


Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure R2-1:

1 in 200 AEP Event - Embankment Overtopping Failure Risk Assessment - Developed Case



Map by: FF JV/JAWS/DTH
Z:\GIS\GIS_310_B2G\Task\310-HY-2020\05121245_SurfaceWater\5mxd_Appendix_R\310-HY-2020\5121245_FF_JV_FigR-X_RailStructureFailure_02000_AEP_atRiskStructure_v5.mxd Date: 20/07/2024 16:04

Legend

- 5 Chainage (km)
- Localities
- - - Design rail alignment
- + + Existing rail (operational)
- + - Existing rail (non-operational)
- Major roads
- Minor roads
- NSW/QLD border
- Project footprint

Receptors Sensitive to Embankment Overtopping Flood Failure

- House
- Shed
- Other assets

Receptors Affected by Non Failure Flood

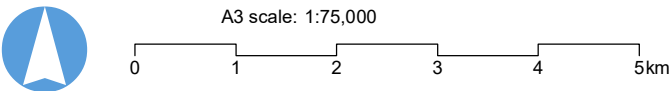
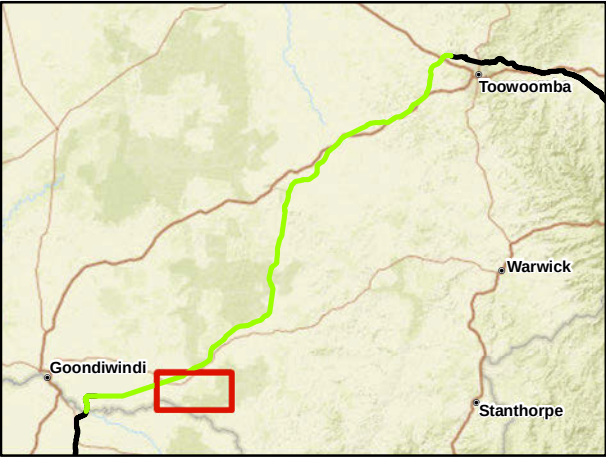
- House
- Shed
- Other assets

Design Event (No Failure) Flood Depth (m)

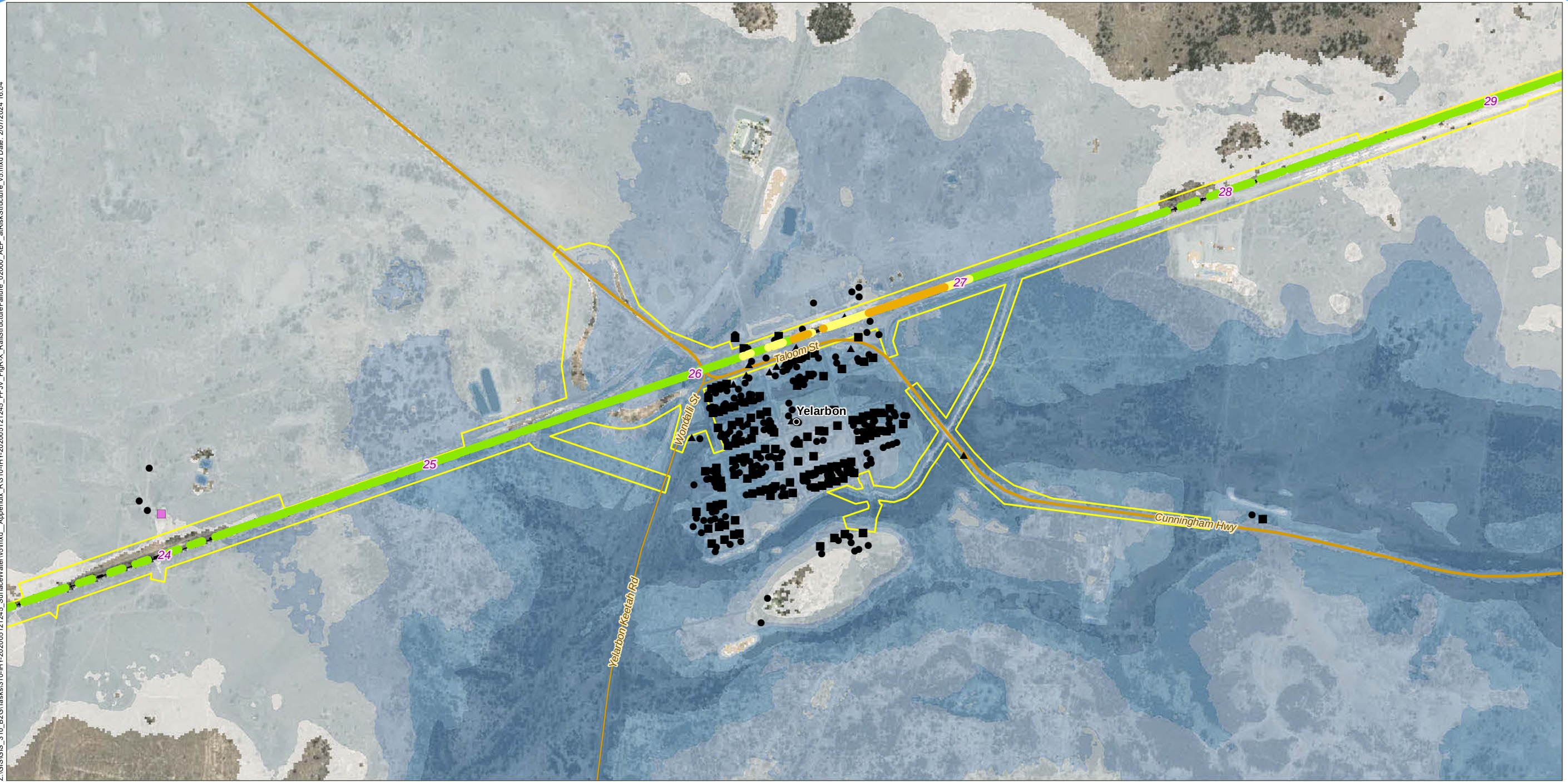
- ≤ 0.3
- 0.3 - 1.0
- 1.0 - 1.5
- 1.5 - 2.0
- > 2.0
- Waterway

Risk of Embankment Overtopping Failure

- High (overtopping depth > top of rail)
- Medium to high (overtopping depth > top of formation + 0.3m and ≤ top of rail)
- Low to medium (overtopping depth ≥ top of formation and ≤ top of formation + 0.3m)
- No overtopping (adjacent flood level below top of formation)



Map by: FF-JV JVAWS/DTH
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Legend

- 5 Chainage (km)
- Localities
- - - Design rail alignment
- + + Existing rail (operational)
- + - Existing rail (non-operational)
- Major roads
- Minor roads
- - - NSW/QLD border
- Project footprint

Receptors Sensitive to Embankment Overtopping Flood Failure

- House
- Shed
- ▲ Other assets

Receptors Affected by Non Failure Flood

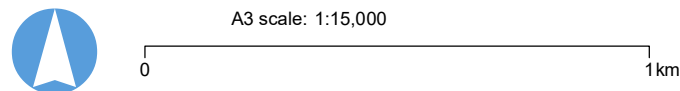
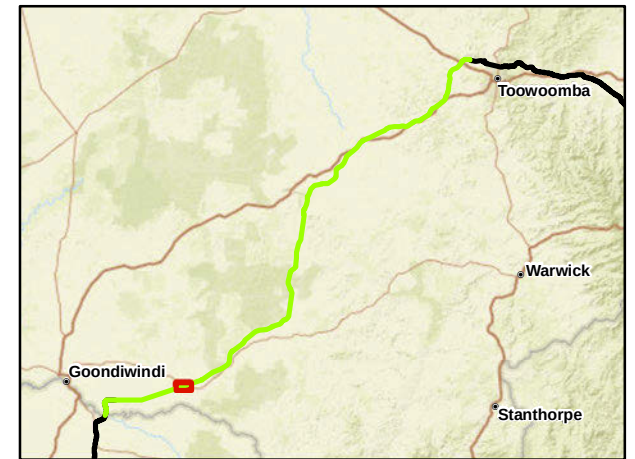
- House
- Shed
- ▲ Other assets

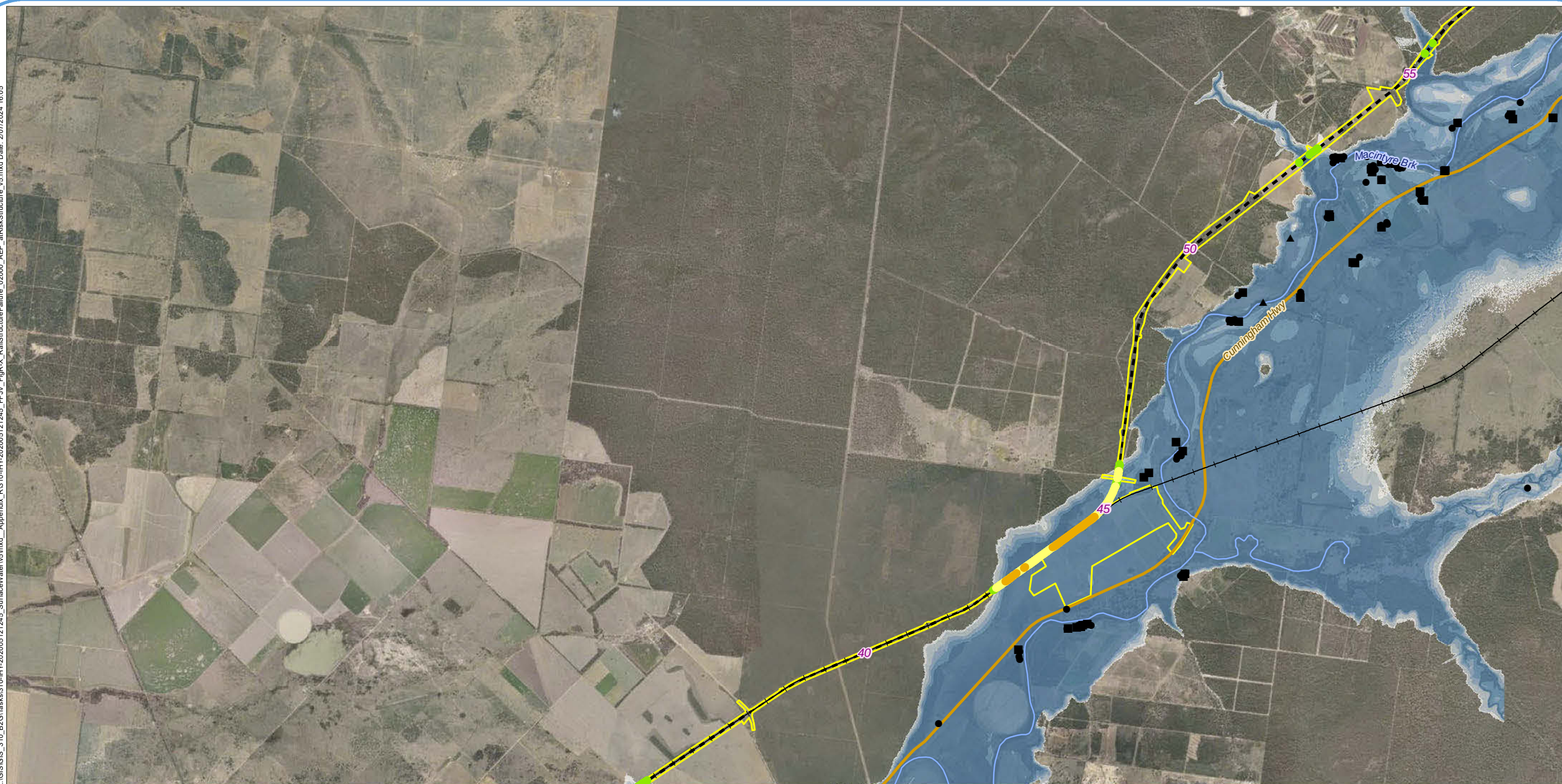
Design Event (No Failure) Flood Depth (m)

- ≤ 0.3
- 0.3 - 1.0
- 1.0 - 1.5
- 1.5 - 2.0
- > 2.0
- Waterway

Risk of Embankment Overtopping Failure

- High (overtopping depth > top of rail)
- Medium to high (overtopping depth > top of formation + 0.3m and ≤ top of rail)
- Low to medium (overtopping depth ≥ top of formation and ≤ top of formation + 0.3m)
- No overtopping (adjacent flood level below top of formation)





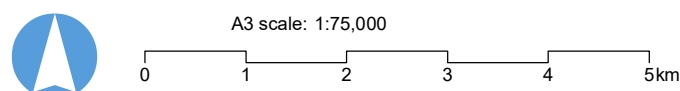
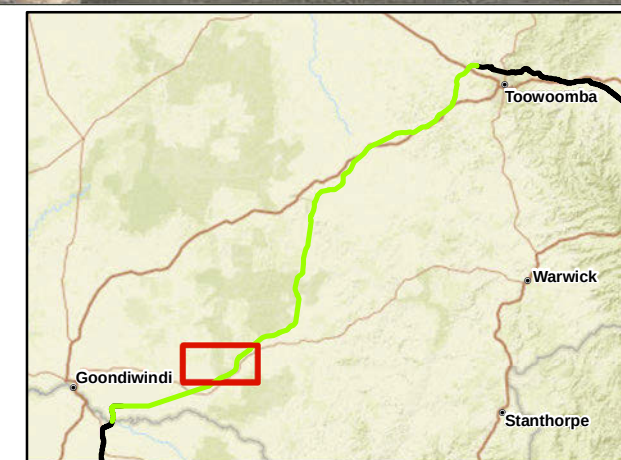
- 5 Chainage (km)
- Localities
- - - Design rail alignment
- + + Existing rail (operational)
- + + Existing rail (non-operational)
- Major roads
- Minor roads
- - - NSW/QLD border
- Project footprint

- House
- Shed
- ▲ Other assets

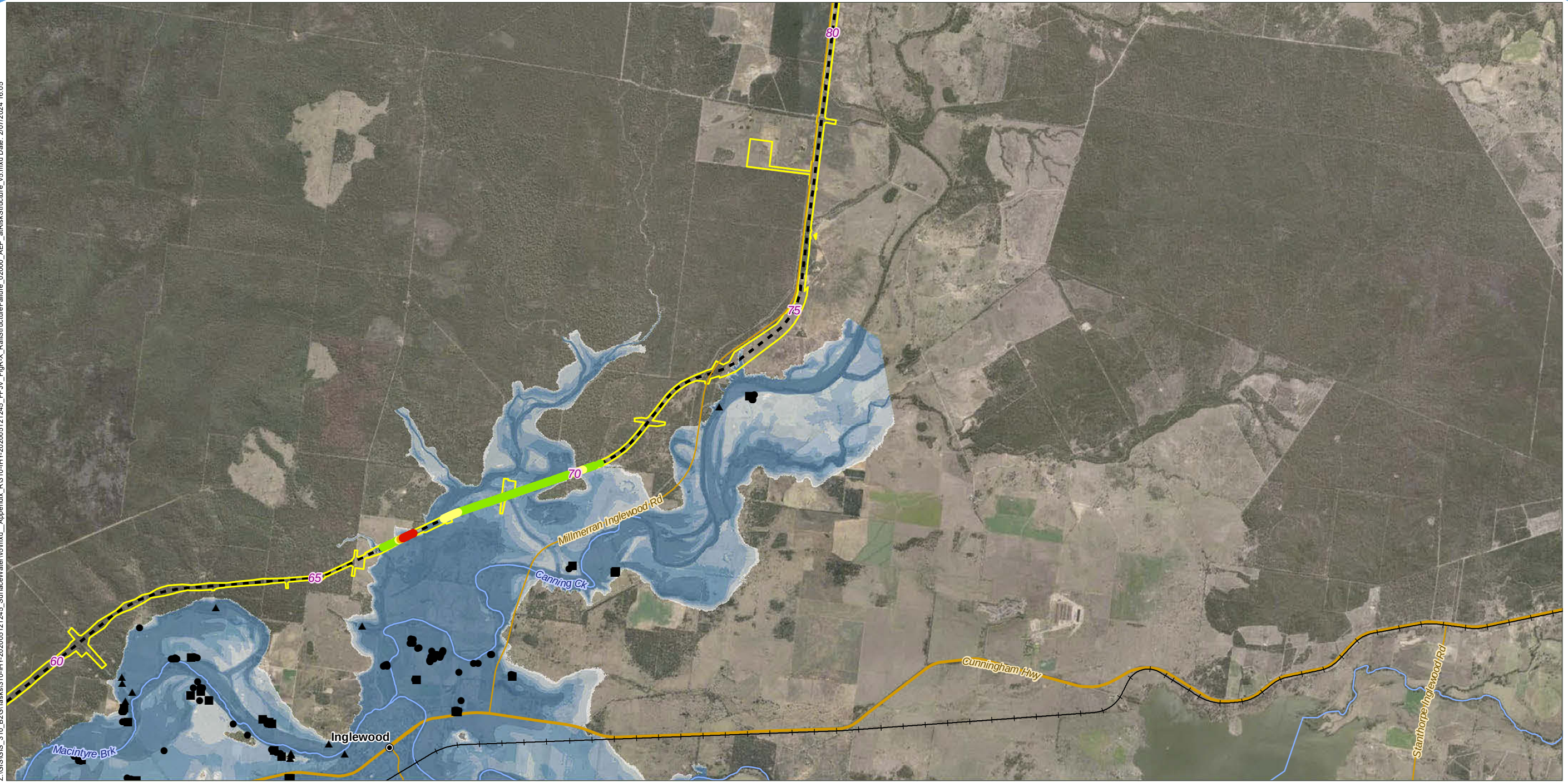
- House
- Shed
- ▲ Other assets

 ≤ 0.3
 0.3 - 1.0
 1.0 - 1.5
 1.5 - 2.0
 > 2.0
 Waterway

- High
(overtopping depth > top of rail)
- Medium to high
(overtopping depth > top of formation + 0.3m
and ≤ top of rail)
- Low to medium
(overtopping depth ≥ top of formation
and ≤ top of formation + 0.3m)
- No overtopping
(adjacent flood level below top of formation)



Map by: FF JV JVAWS/DTH
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Legend

- 5 Chainage (km)
- Localities
- - - Design rail alignment
- + + Existing rail (operational)
- + - Existing rail (non-operational)
- Major roads
- Minor roads
- - - NSW/QLD border
- Project footprint

Receptors Sensitive to Embankment Overtopping Flood Failure

- House
- Shed
- ▲ Other assets

Receptors Affected by Non Failure Flood

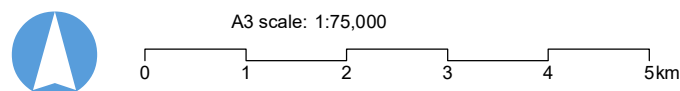
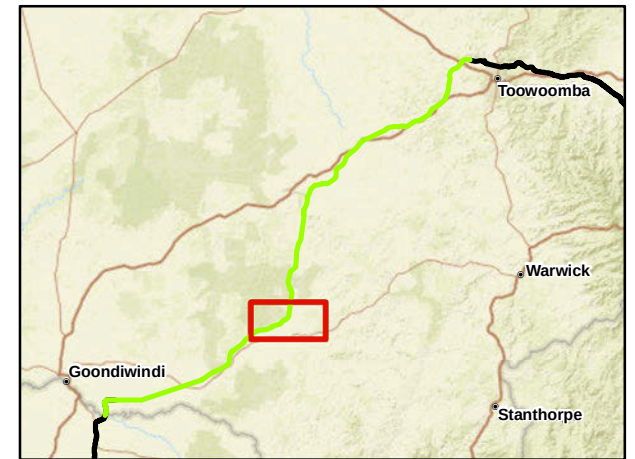
- House
- Shed
- ▲ Other assets

Design Event (No Failure) Flood Depth (m)

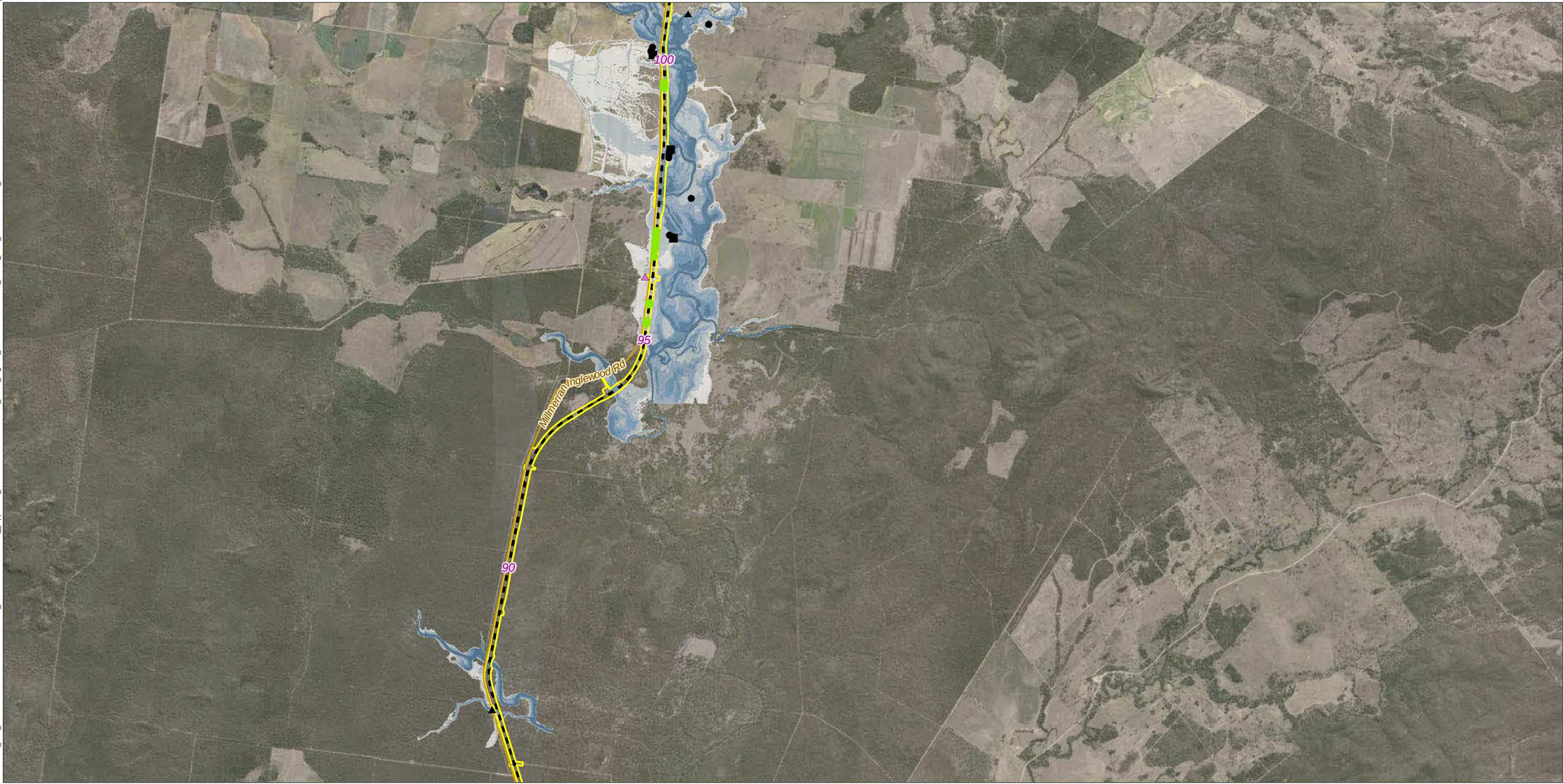
- ≤ 0.3
- 0.3 - 1.0
- 1.0 - 1.5
- 1.5 - 2.0
- > 2.0
- Waterway

Risk of Embankment Overtopping Failure

- High (overtopping depth > top of rail)
- Medium to high (overtopping depth > top of formation + 0.3m and ≤ top of rail)
- Low to medium (overtopping depth ≥ top of formation and ≤ top of formation + 0.3m)
- No overtopping (adjacent flood level below top of formation)



Map by: FF-JV_JV/AWS/DTH
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Legend

- 5 Chainage (km)
- Localities
- - - Design rail alignment
- + + Existing rail (operational)
- + - Existing rail (non-operational)
- Major roads
- Minor roads
- NSW/QLD border
- Project footprint

Receptors Sensitive to Embankment Overtopping Flood Failure

- House
- Shed
- Other assets

Receptors Affected by Non Failure Flood

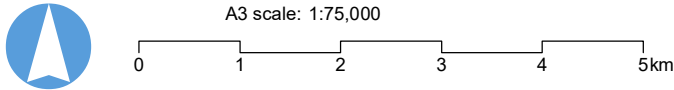
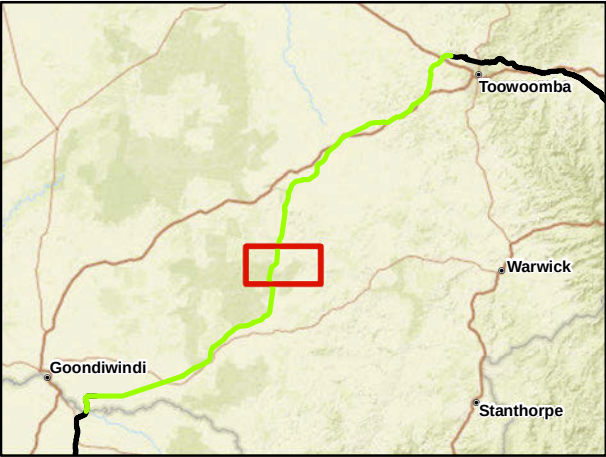
- House
- Shed
- Other assets

Design Event (No Failure) Flood Depth (m)

- ≤ 0.3
- 0.3 - 1.0
- 1.0 - 1.5
- 1.5 - 2.0
- > 2.0
- Waterway

Risk of Embankment Overtopping Failure

- High (overtopping depth > top of rail)
- Medium to high (overtopping depth > top of formation + 0.3m and ≤ top of rail)
- Low to medium (overtopping depth ≥ top of formation and ≤ top of formation + 0.3m)
- No overtopping (adjacent flood level below top of formation)



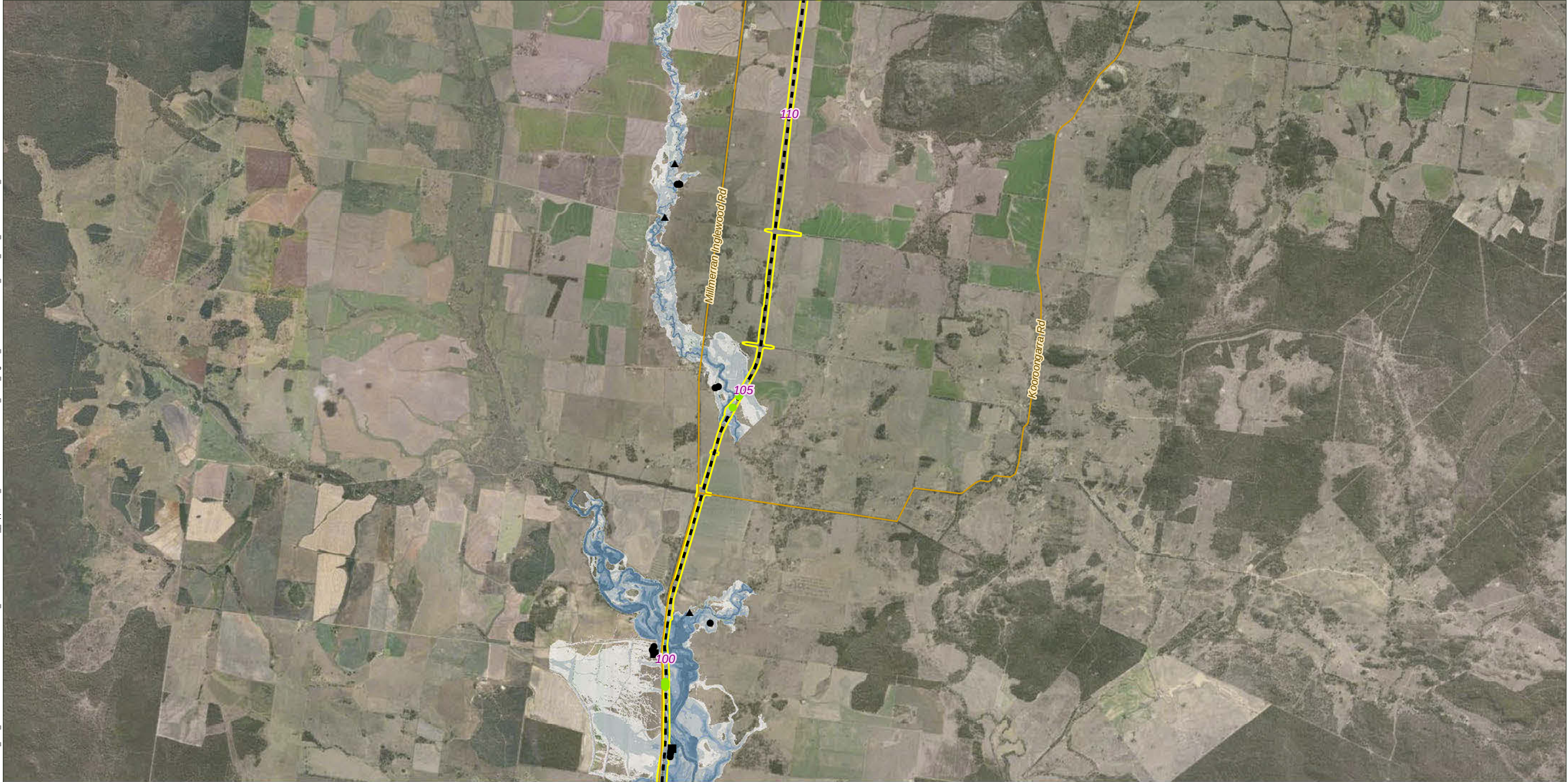
Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure R2-6:

1 in 200 AEP Event - Embankment Overtopping Failure Risk Assessment - Developed Case

Map by: FF-JV_JV/AWS/DTH
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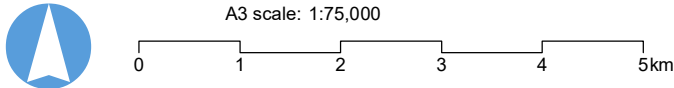
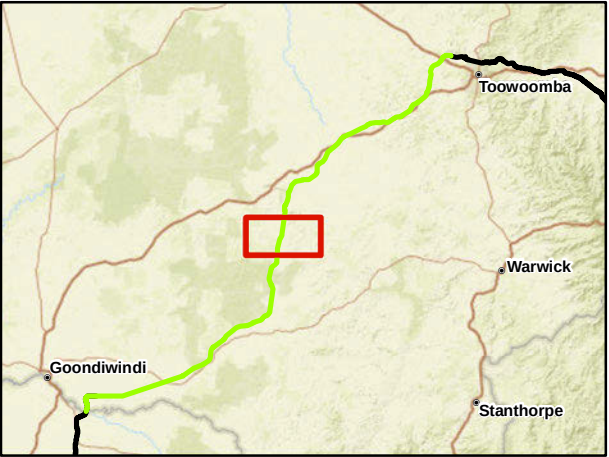
Legend

- 5 Chainage (km)
- Localities
- - - Design rail alignment
- + + Existing rail (operational)
- + - Existing rail (non-operational)
- Major roads
- Minor roads
- NSW/QLD border
- Project footprint

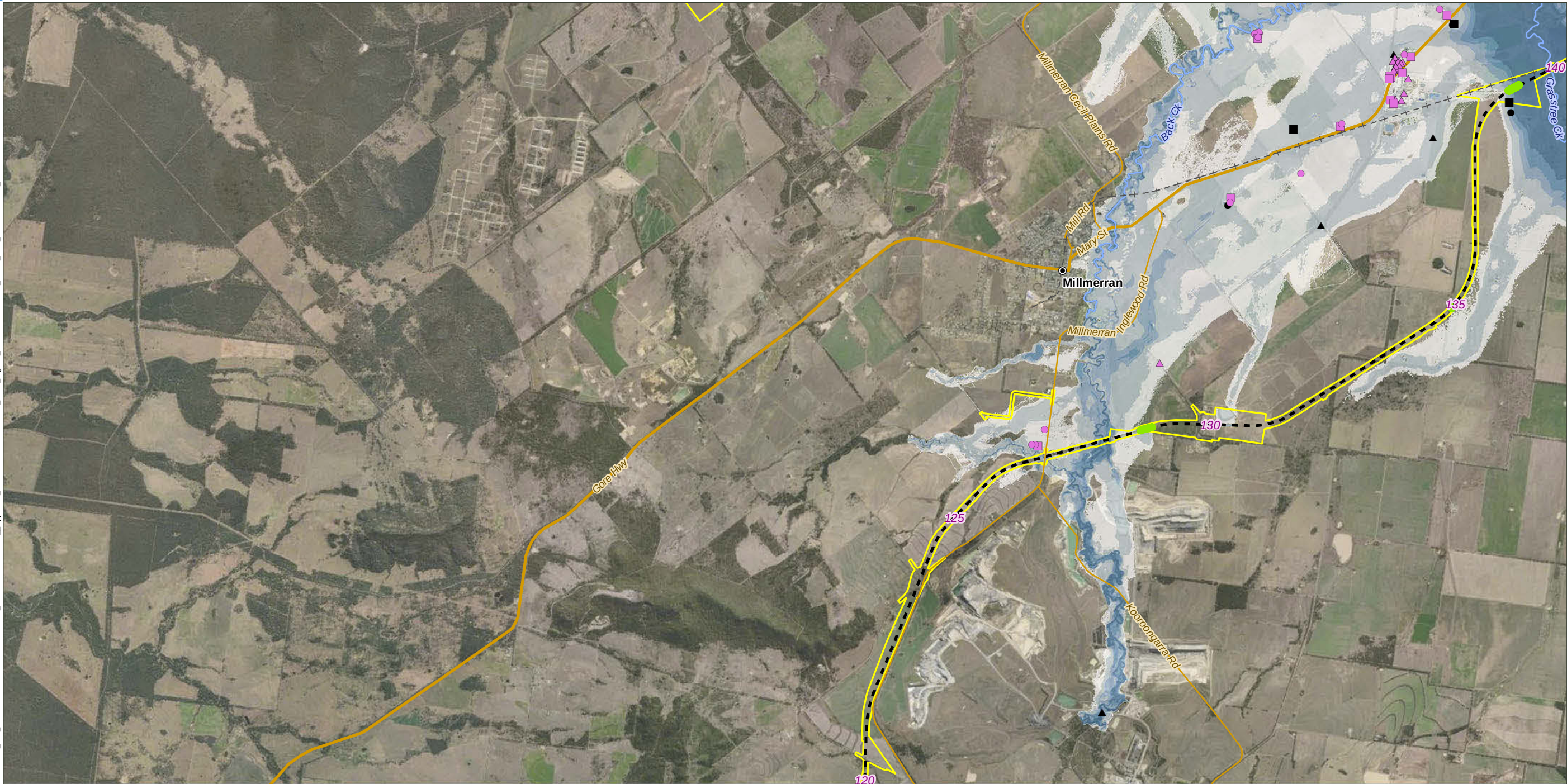
- Receptors Sensitive to Embankment Overtopping Flood Failure**
- House
 - Shed
 - Other assets
- Receptors Affected by Non Failure Flood**
- House
 - Shed
 - Other assets

- Design Event (No Failure) Flood Depth (m)**
- ≤ 0.3
 - 0.3 - 1.0
 - 1.0 - 1.5
 - 1.5 - 2.0
 - > 2.0
 - Waterway

- Risk of Embankment Overtopping Failure**
- High (overtopping depth > top of rail)
 - Medium to high (overtopping depth > top of formation + 0.3m and ≤ top of rail)
 - Low to medium (overtopping depth ≥ top of formation and ≤ top of formation + 0.3m)
 - No overtopping (adjacent flood level below top of formation)



Map by: FF JV/AVS/DTH
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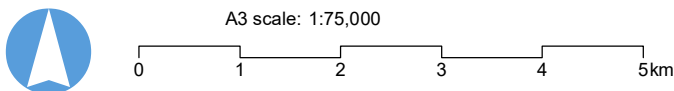
Legend

- 5 Chainage (km)
- Localities
- - - Design rail alignment
- + Existing rail (operational)
- + - Existing rail (non-operational)
- Major roads
- Minor roads
- NSW/QLD border
- Project footprint

- Receptors Sensitive to Embankment Overtopping Flood Failure**
- House
 - Shed
 - Other assets
- Receptors Affected by Non Failure Flood**
- House
 - Shed
 - Other assets

- Design Event (No Failure) Flood Depth (m)**
- ≤ 0.3
 - 0.3 - 1.0
 - 1.0 - 1.5
 - 1.5 - 2.0
 - > 2.0
 - Waterway

- Risk of Embankment Overtopping Failure**
- High (overtopping depth > top of rail)
 - Medium to high (overtopping depth > top of formation + 0.3m and ≤ top of rail)
 - Low to medium (overtopping depth ≥ top of formation and ≤ top of formation + 0.3m)
 - No overtopping (adjacent flood level below top of formation)



Border to Gowrie
Figure R2-8:
1 in 200 AEP Event - Embankment Overtopping Failure Risk Assessment - Developed Case



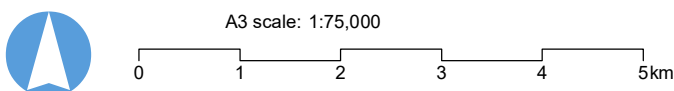
- 5 Chainage (km)
- Localities
- - - Design rail alignment
- + + Existing rail (operational)
- + - Existing rail (non-operational)
- Major roads
- Minor roads
- - - NSW/QLD border
- Project footprint

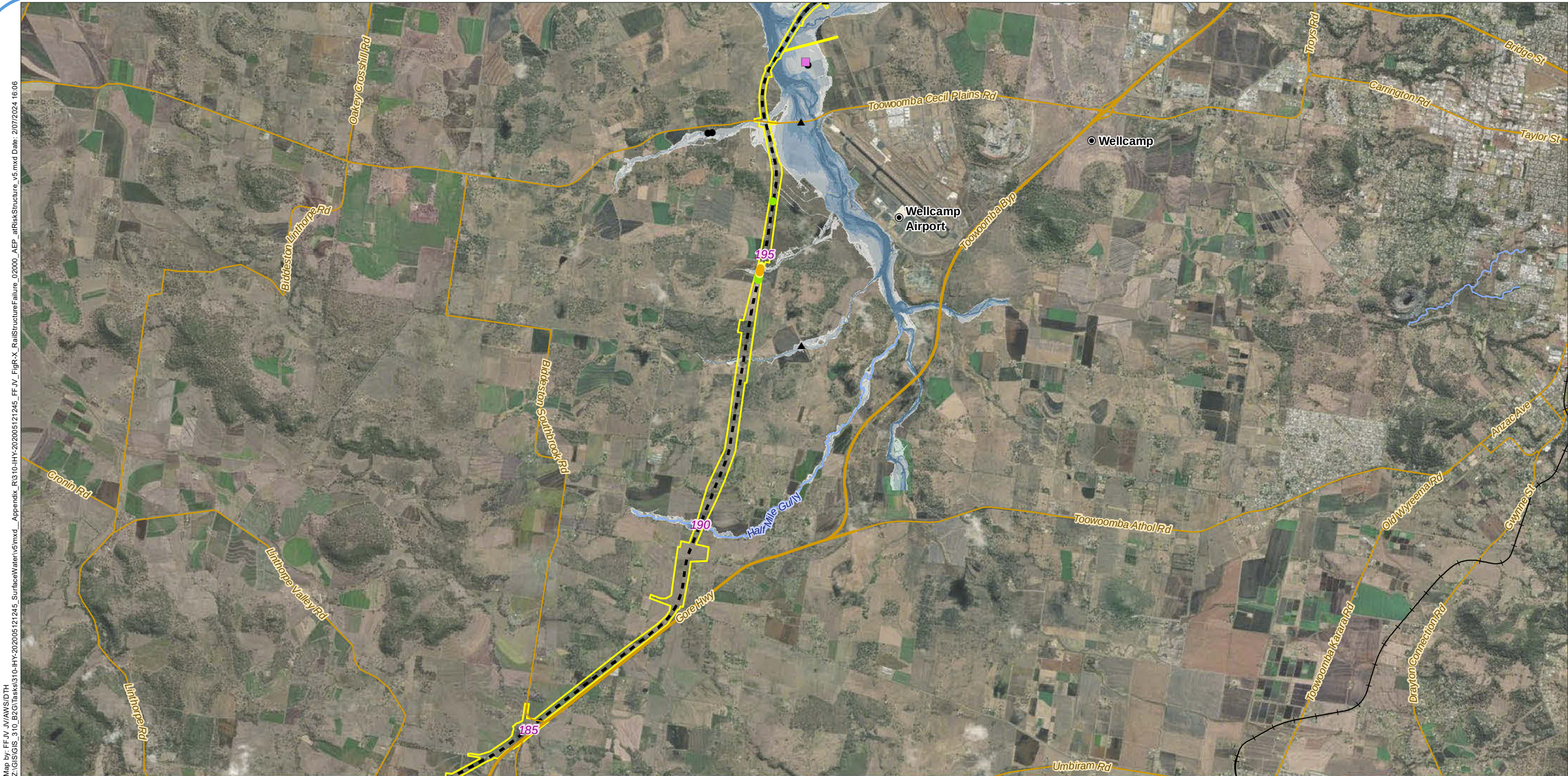
- House
- Shed
- ▲ Other assets

- House
- Shed
- ▲ Other assets

 ≤ 0.3
 0.3 - 1.0
 1.0 - 1.5
 1.5 - 2.0
 > 2.0
 Waterway

- High
(overtopping depth > top of rail)
- Medium to high
(overtopping depth > top of formation + 0.3m
and ≤ top of rail)
- Low to medium
(overtopping depth ≥ top of formation
and ≤ top of formation + 0.3m)
- No overtopping
(adjacent flood level below top of formation)





Map by: FF JV JVAWS/DTH
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Legend

- 5 Chainage (km)
- Localities
- - - Design rail alignment
- + + Existing rail (operational)
- + - Existing rail (non-operational)
- Major roads
- Minor roads
- - - NSW/QLD border
- Project footprint

Receptors Sensitive to Embankment Overtopping Flood Failure

- House
- Shed
- ▲ Other assets

Receptors Affected by Non Failure Flood

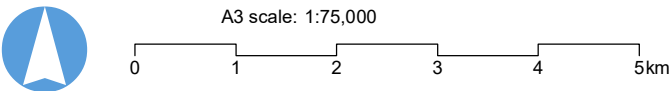
- House
- Shed
- ▲ Other assets

Design Event (No Failure) Flood Depth (m)

- ≤ 0.3
- 0.3 - 1.0
- 1.0 - 1.5
- 1.5 - 2.0
- > 2.0
- Waterway

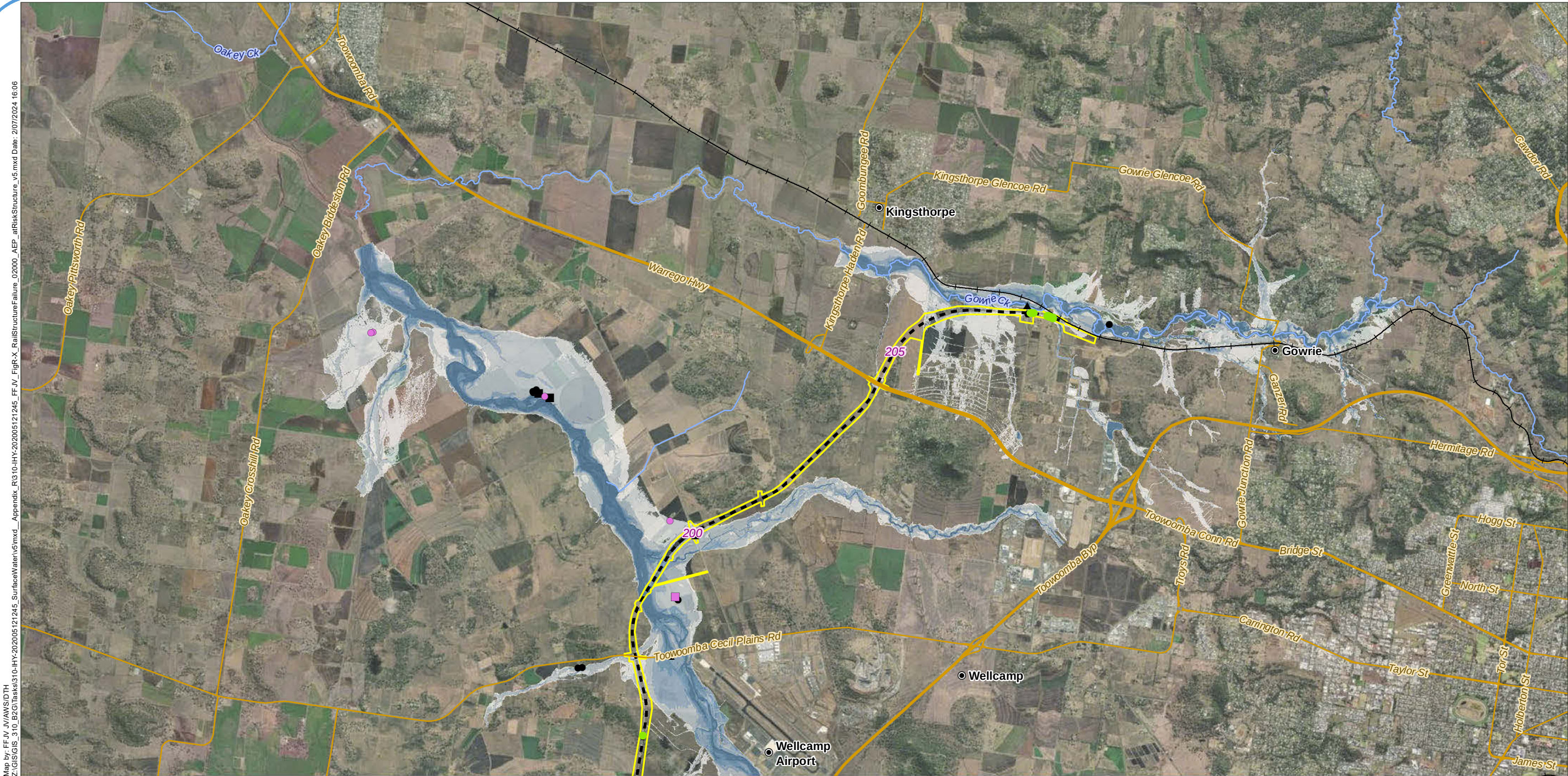
Risk of Embankment Overtopping Failure

- High (overtopping depth > top of rail)
- Medium to high (overtopping depth > top of formation + 0.3m and ≤ top of rail)
- Low to medium (overtopping depth ≥ top of formation and ≤ top of formation + 0.3m)
- No overtopping (adjacent flood level below top of formation)



Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie
Figure R2-10:
1 in 200 AEP Event - Embankment Overtopping Failure Risk Assessment - Developed Case



Legend

- 5 Chainage (km)
- Localities
- - - Design rail alignment
- + + Existing rail (operational)
- + - Existing rail (non-operational)
- Major roads
- Minor roads
- NSW/QLD border
- Project footprint

Receptors Sensitive to Embankment Overtopping Flood Failure

- House
- Shed
- Other assets

Receptors Affected by Non Failure Flood

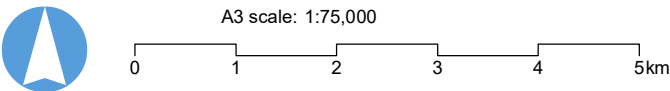
- House
- Shed
- Other assets

Design Event (No Failure) Flood Depth (m)

- ≤ 0.3
- 0.3 - 1.0
- 1.0 - 1.5
- 1.5 - 2.0
- > 2.0
- Waterway

Risk of Embankment Overtopping Failure

- High (overtopping depth > top of rail)
- Medium to high (overtopping depth > top of formation + 0.3m and ≤ top of rail)
- Low to medium (overtopping depth ≥ top of formation and ≤ top of formation + 0.3m)
- No overtopping (adjacent flood level below top of formation)



Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure R2-11:

1 in 200 AEP Event - Embankment Overtopping Failure Risk Assessment - Developed Case



Map by: FF-JV JVAWS/DTH
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Appendix_R\310-HY-2020\05121245_FF-JV_FigR-X_RailStructureFailure_10000_AEP_AirRiskStructure_v5.mxd
Date: 20/07/2024 16:06

Legend

- 5 Chainage (km)
- - - Design rail alignment
- + Existing rail (operational)
- Major roads
- Minor roads
- NSW/QLD border
- Project footprint

Receptors Sensitive to Embankment Overtopping Flood Failure

- House
- Shed
- Other assets

Receptors Affected by Non Failure Flood

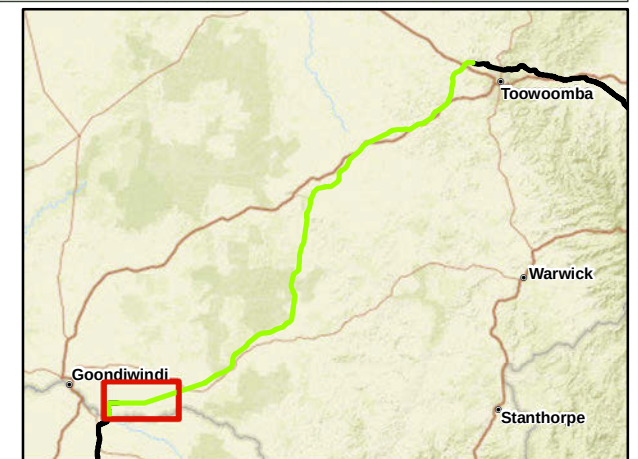
- House
- Shed
- Other assets

Design Event (No Failure) Flood Depth (m)

- ≤ 0.3
- 0.3 - 1.0
- 1.0 - 1.5
- 1.5 - 2.0
- > 2.0
- Waterway

Risk of Embankment Overtopping Failure

- High (overtopping depth > top of rail)
- Medium to high (overtopping depth > top of formation + 0.3m and ≤ top of rail)
- Low to medium (overtopping depth ≥ top of formation and ≤ top of formation + 0.3m)
- No overtopping (adjacent flood level below top of formation)



A3 scale: 1:75,000

0 1 2 3 4 5km

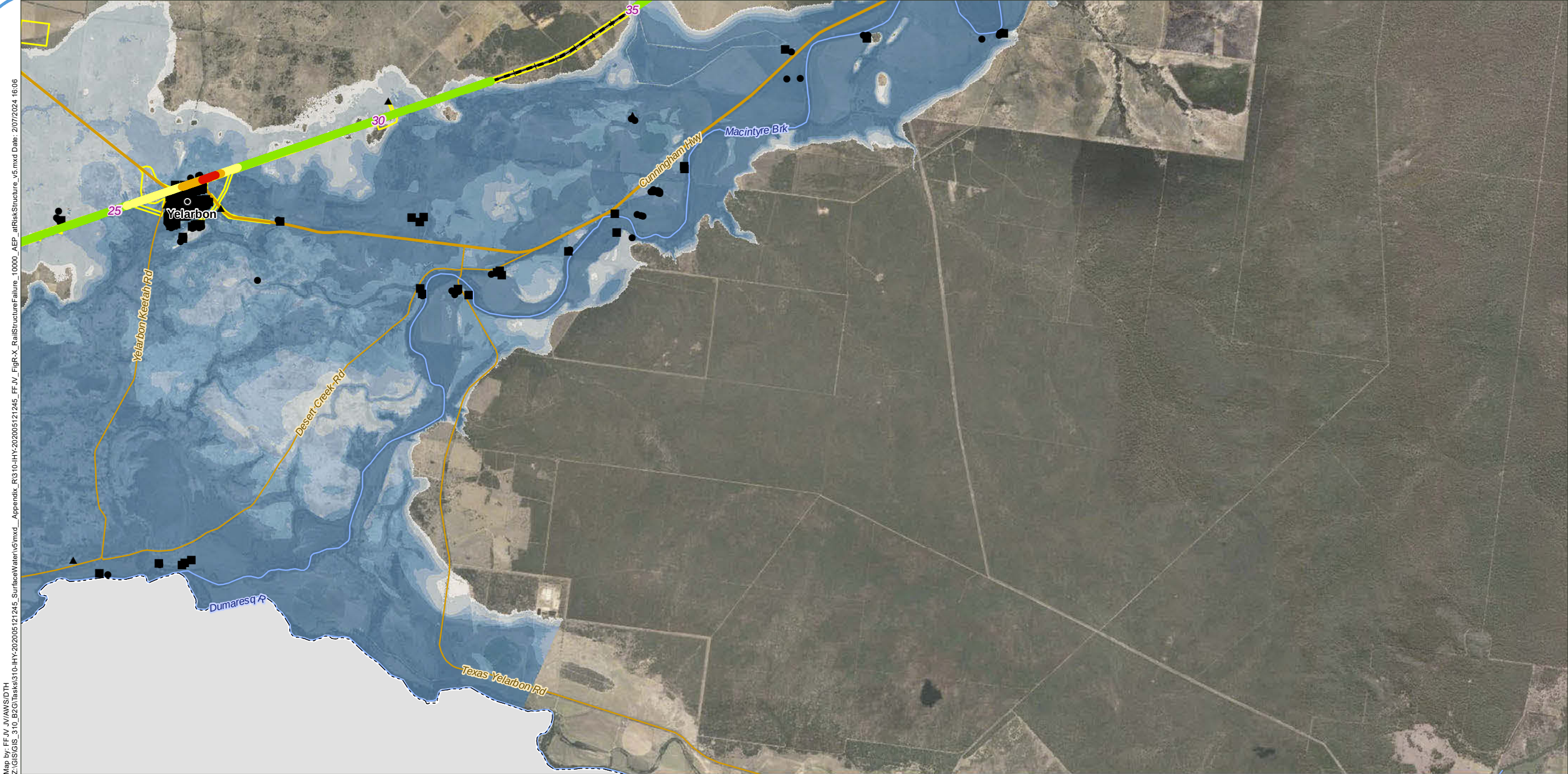


Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure R3-1:

1 in 1000 AEP Event - Embankment Overtopping Failure Risk Assessment - Developed Case



Map by: FF JV/JV/AS/DTH
Z:\GIS\GIS_310_B2G\Task\310-IHY-2020\05121245_SurfaceWater\5mxd_Appendix_R\310-IHY-2020\5121245_FF_JV_FigR-X_RailStructureFailure_10000_AEP_atRiskStructure_v5.mxd Date: 20/07/2024 16:06

Legend

- 5 Chainage (km)
- Localities
- Design rail alignment
- Existing rail (operational)
- Major roads
- Minor roads
- NSW/QLD border
- Project footprint

Receptors Sensitive to Embankment Overtopping Flood Failure

- House
- Shed
- Other assets

Receptors Affected by Non Failure Flood

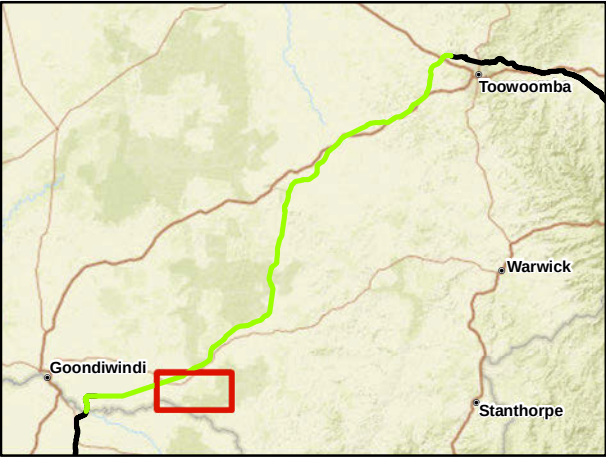
- House
- Shed
- Other assets

Design Event (No Failure) Flood Depth (m)

- ≤ 0.3
- 0.3 - 1.0
- 1.0 - 1.5
- 1.5 - 2.0
- > 2.0
- Waterway

Risk of Embankment Overtopping Failure

- High (overtopping depth > top of rail)
- Medium to high (overtopping depth > top of formation + 0.3m and ≤ top of rail)
- Low to medium (overtopping depth ≥ top of formation and ≤ top of formation + 0.3m)
- No overtopping (adjacent flood level below top of formation)



A3 scale: 1:75,000

0 1 2 3 4 5km



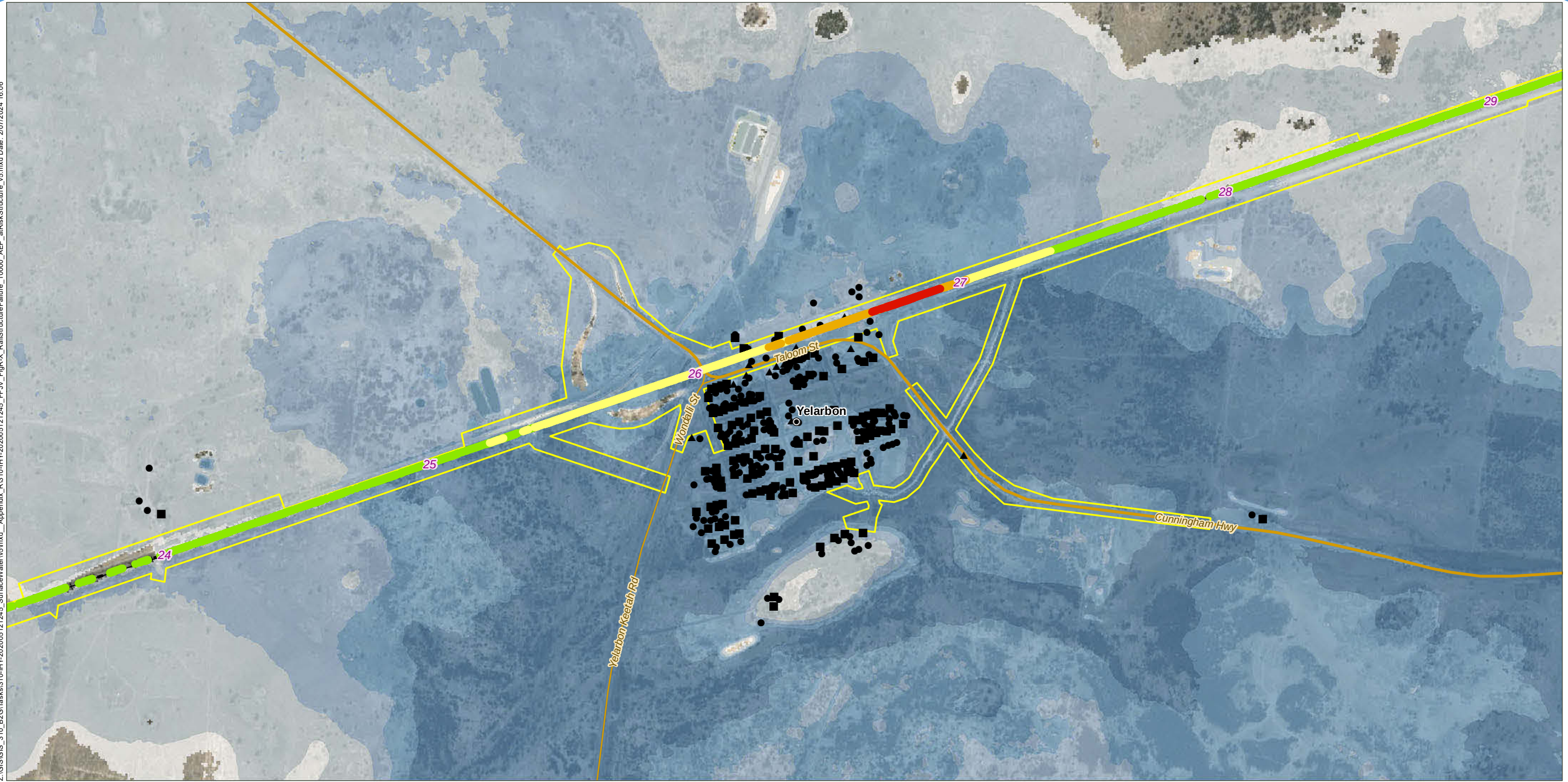
Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure R3-2:

1 in 1000 AEP Event - Embankment Overtopping Failure Risk Assessment - Developed Case

Map by: FF JV/AVS/DTH
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Legend

- 5 Chainage (km)
- Localities
- - - Design rail alignment
- + Existing rail (operational)
- Major roads
- Minor roads
- Project footprint

Receptors Sensitive to Embankment Overtopping Flood Failure

- House
- Shed
- Other assets

Receptors Affected by Non Failure Flood

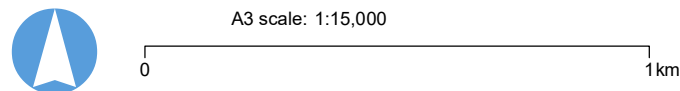
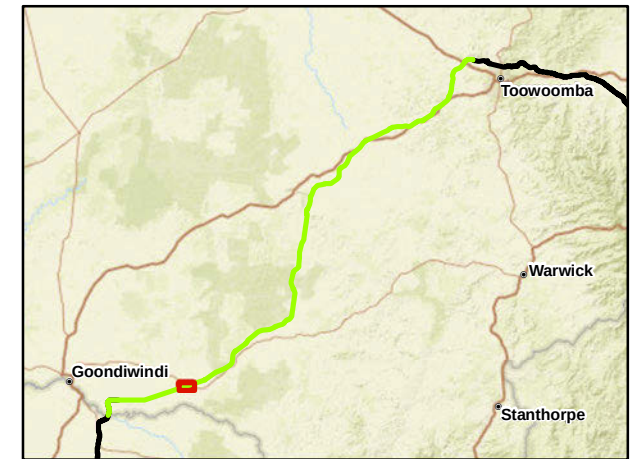
- House
- Shed
- Other assets

Design Event (No Failure) Flood Depth (m)

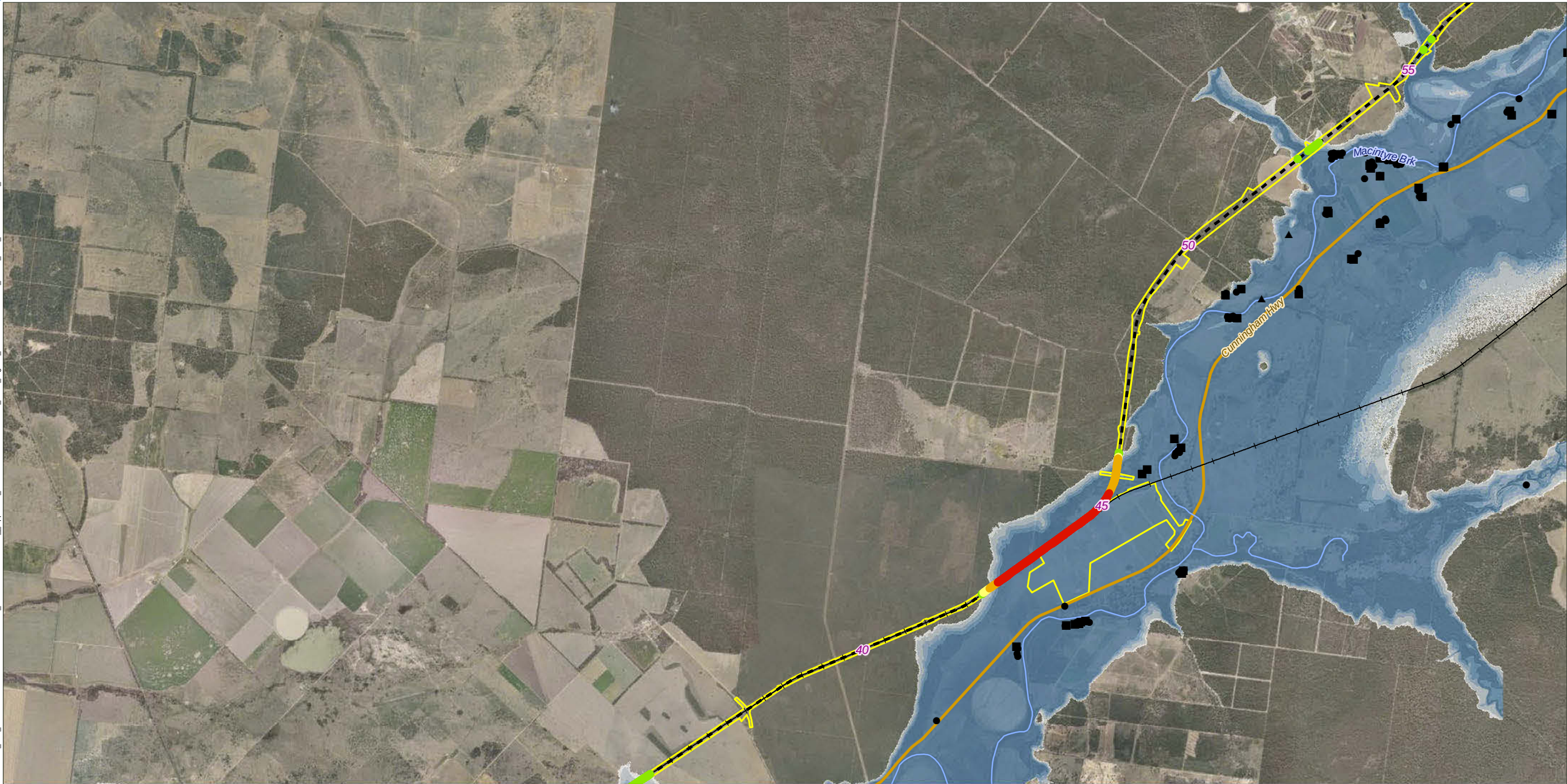
- ≤ 0.3
- 0.3 - 1.0
- 1.0 - 1.5
- 1.5 - 2.0
- > 2.0
- Waterway

Risk of Embankment Overtopping Failure

- High (overtopping depth > top of rail)
- Medium to high (overtopping depth > top of formation + 0.3m and ≤ top of rail)
- Low to medium (overtopping depth ≥ top of formation and ≤ top of formation + 0.3m)
- No overtopping (adjacent flood level below top of formation)



Map by: FF JV/AVS/DTH
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Legend

- 5 Chainage (km)
- - - Design rail alignment
- + Existing rail (operational)
- Major roads
- Project footprint

Receptors Sensitive to Embankment Overtopping Flood Failure

- House
- Shed
- Other assets

Receptors Affected by Non Failure Flood

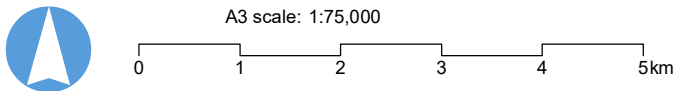
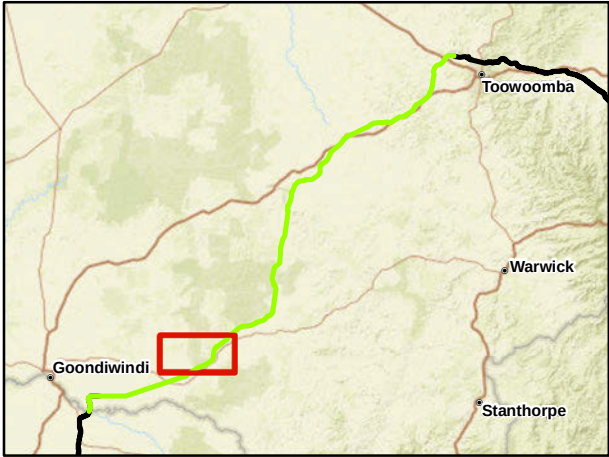
- House
- Shed
- Other assets

Design Event (No Failure) Flood Depth (m)

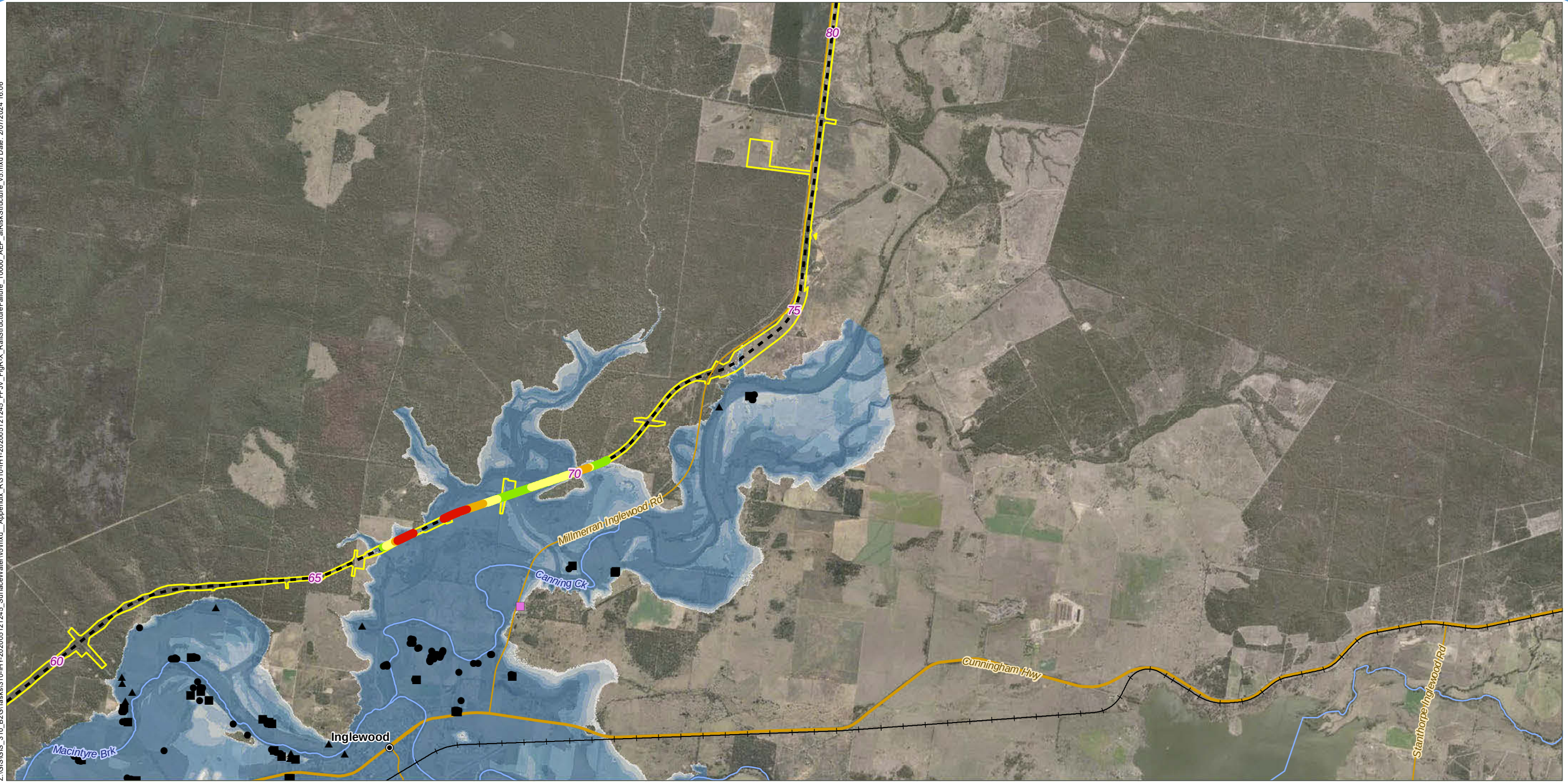
- ≤ 0.3
- 0.3 - 1.0
- 1.0 - 1.5
- 1.5 - 2.0
- > 2.0
- Waterway

Risk of Embankment Overtopping Failure

- High (overtopping depth > top of rail)
- Medium to high (overtopping depth > top of formation + 0.3m and ≤ top of rail)
- Low to medium (overtopping depth ≥ top of formation and ≤ top of formation + 0.3m)
- No overtopping (adjacent flood level below top of formation)



Map by: FF JV/AVS/DTH
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Legend

- 5 Chainage (km)
- Localities
- Design rail alignment
- Existing rail (operational)
- Major roads
- Minor roads
- Project footprint

Receptors Sensitive to Embankment Overtopping Flood Failure

- House
- Shed
- Other assets

Receptors Affected by Non Failure Flood

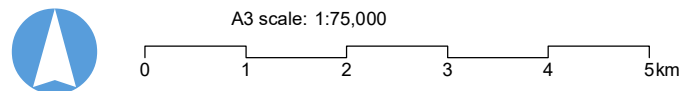
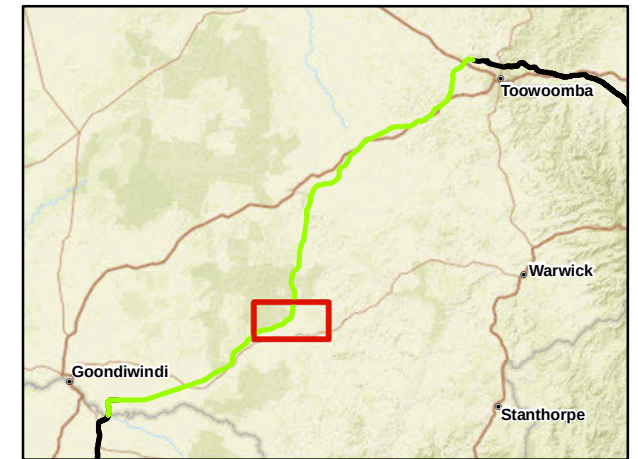
- House
- Shed
- Other assets

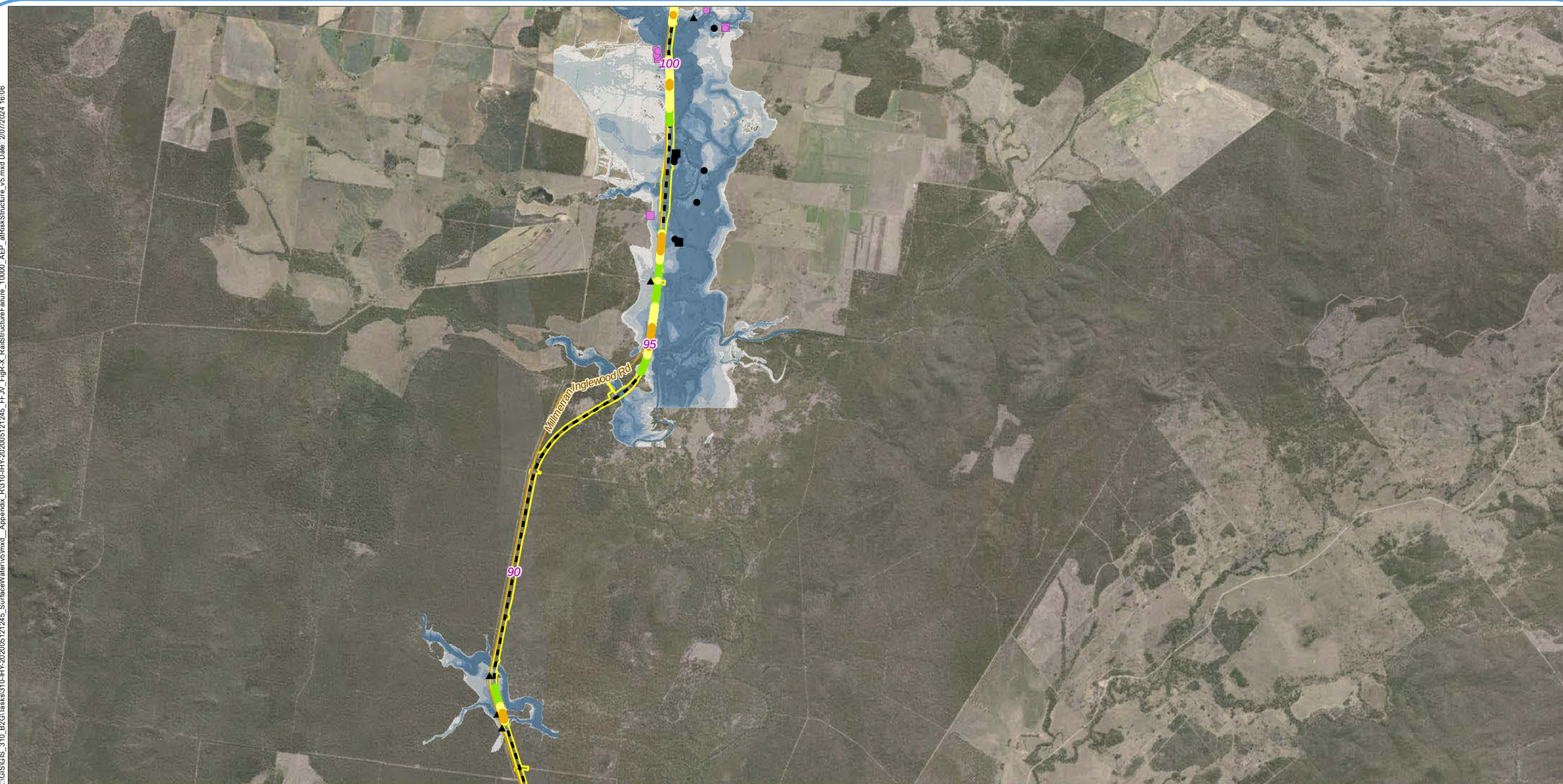
Design Event (No Failure) Flood Depth (m)

- ≤ 0.3
- 0.3 - 1.0
- 1.0 - 1.5
- 1.5 - 2.0
- > 2.0
- Waterway

Risk of Embankment Overtopping Failure

- High (overtopping depth $>$ top of rail)
- Medium to high (overtopping depth $>$ top of formation + 0.3m and $\leq$ top of rail)
- Low to medium (overtopping depth $\geq$ top of formation and $\leq$ top of formation + 0.3m)
- No overtopping (adjacent flood level below top of formation)





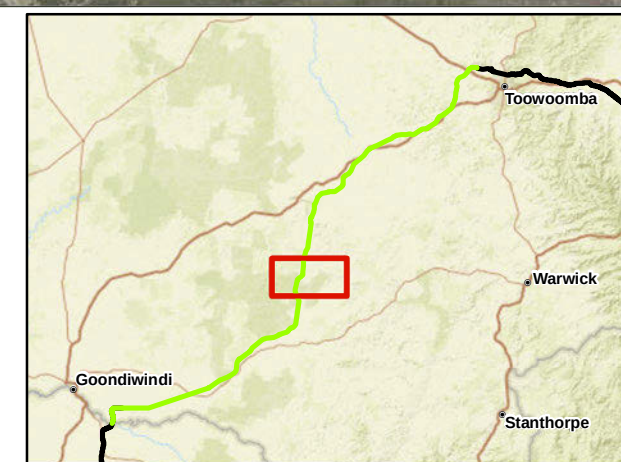
- 5 Chainage (km)
- - - Design rail alignment
- Minor roads
- Project footprint

- House
- Shed
- ▲ Other assets

- House
- Shed
- ▲ Other assets

 ≤ 0.3
 0.3 - 1.0
 1.0 - 1.5
 1.5 - 2.0
 > 2.0
 Waterway

- High
(overtopping depth $>$ top of rail)
- Medium to high
(overtopping depth $>$ top of formation + 0.3m
and $\leq$ top of rail)
- Low to medium
(overtopping depth $\geq$ top of formation
and $\leq$ top of formation + 0.3m)
- No overtopping
(adjacent flood level below top of formation)



A3 scale: 1:75,000



Issue date: 20/06/2024 Version: 5

Coordinate System: GDA 1994 MGA Zone 56

Figure R3-6:

1 in 10000 AEP Event - Embankment Overtopping Failure Risk Assessment - Developed Case

Map by: FF-JV JVAWS/DTH
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Legend

- 5 Chainage (km)
- - - Design rail alignment
- Minor roads
- Project footprint

Receptors Sensitive to Embankment Overtopping Flood Failure

- House
- Shed
- Other assets

Receptors Affected by Non Failure Flood

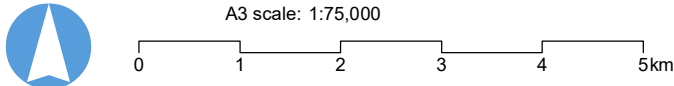
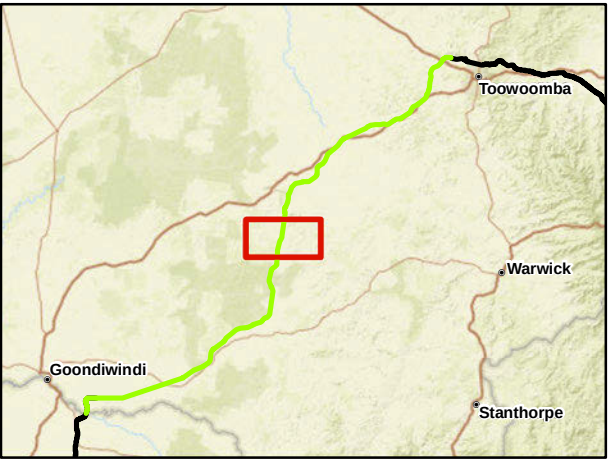
- House
- Shed
- Other assets

Design Event (No Failure) Flood Depth (m)

- ≤ 0.3
- 0.3 - 1.0
- 1.0 - 1.5
- 1.5 - 2.0
- > 2.0
- Waterway

Risk of Embankment Overtopping Failure

- High (overtopping depth > top of rail)
- Medium to high (overtopping depth > top of formation + 0.3m and ≤ top of rail)
- Low to medium (overtopping depth ≥ top of formation and ≤ top of formation + 0.3m)
- No overtopping (adjacent flood level below top of formation)



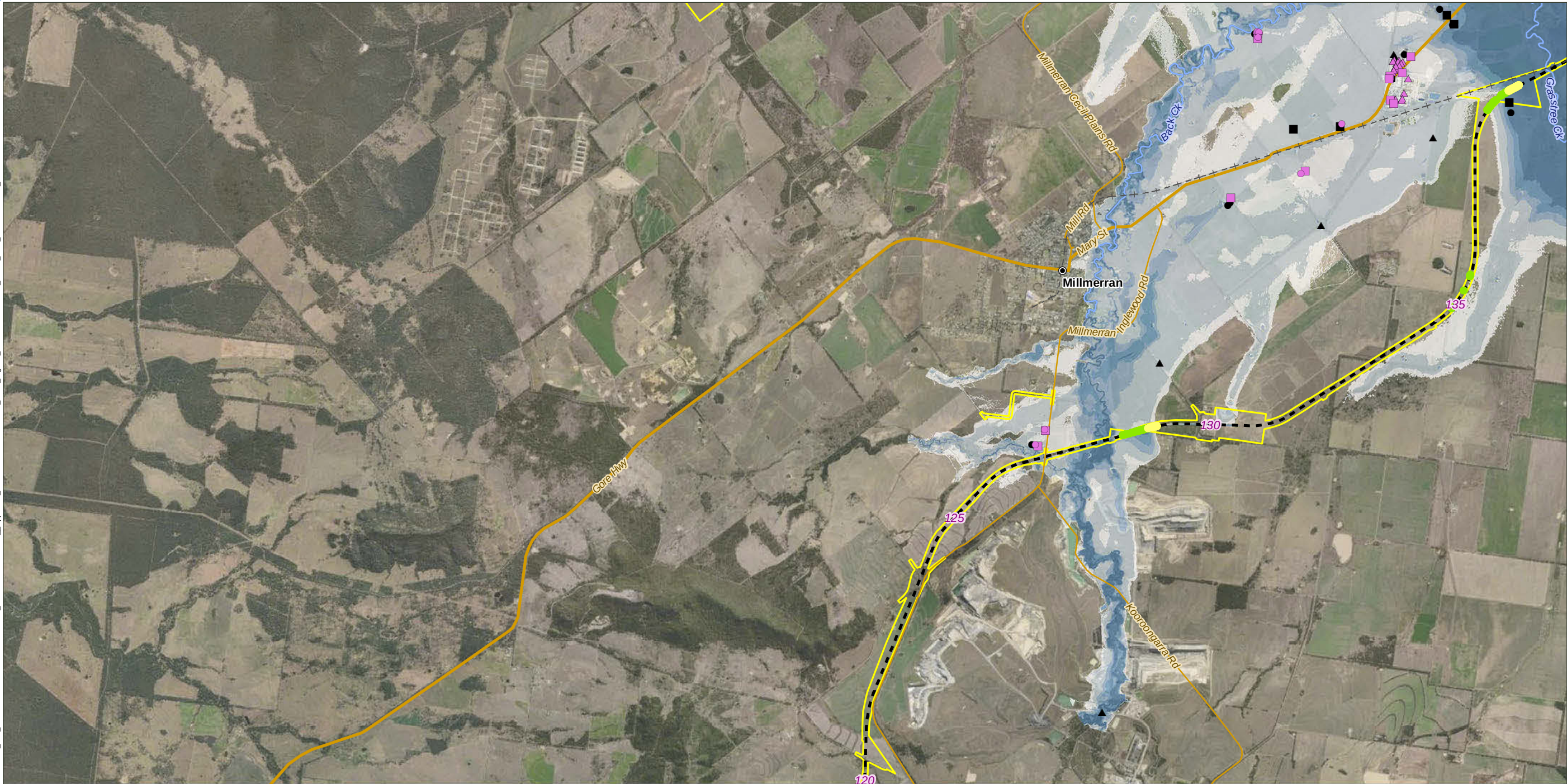
Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure R3-7:

1 in 10000 AEP Event - Embankment Overtopping Failure Risk Assessment - Developed Case

Map by: FF JV JVAWS/DTH
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Legend

- 5 Chainage (km)
- Localities
- - - Design rail alignment
- . - Existing rail (non-operational)
- Major roads
- Minor roads
- Project footprint

Receptors Sensitive to Embankment Overtopping Flood Failure

- House
- Shed
- Other assets

Receptors Affected by Non Failure Flood

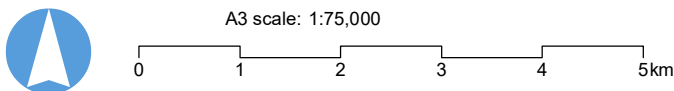
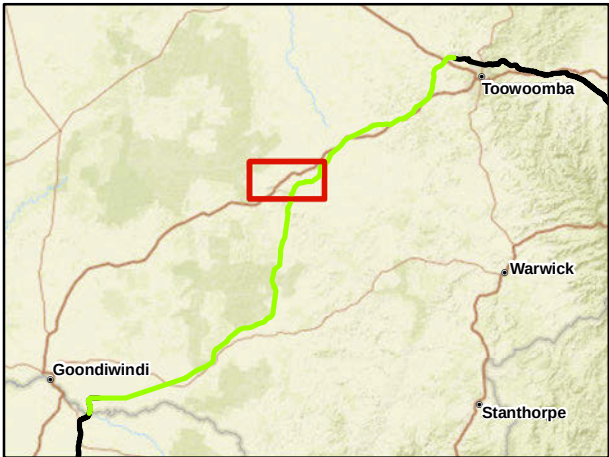
- House
- Shed
- Other assets

Design Event (No Failure) Flood Depth (m)

- ≤ 0.3
- 0.3 - 1.0
- 1.0 - 1.5
- 1.5 - 2.0
- > 2.0
- Waterway

Risk of Embankment Overtopping Failure

- High (overtopping depth > top of rail)
- Medium to high (overtopping depth > top of formation + 0.3m and ≤ top of rail)
- Low to medium (overtopping depth ≥ top of formation and ≤ top of formation + 0.3m)
- No overtopping (adjacent flood level below top of formation)





Map by: FF JV JVAWS/DTH
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Legend

- 5 Chainage (km)
- Localities
- Design rail alignment
- Existing rail (operational)
- Existing rail (non-operational)
- Major roads
- Minor roads
- Project footprint

Receptors Sensitive to Embankment Overtopping Flood Failure

- House
- Shed
- Other assets

Receptors Affected by Non Failure Flood

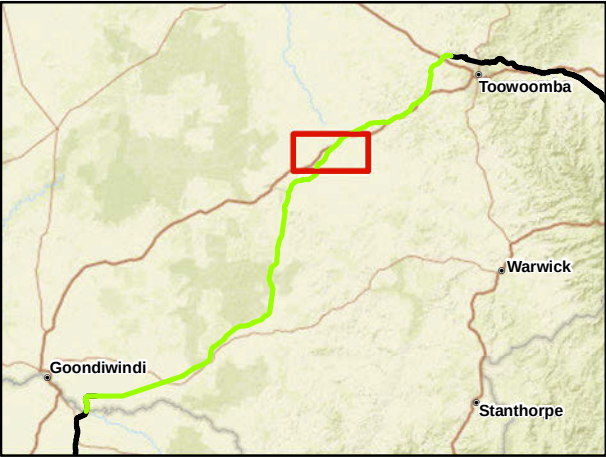
- House
- Shed
- Other assets

Design Event (No Failure) Flood Depth (m)

- ≤ 0.3
- 0.3 - 1.0
- 1.0 - 1.5
- 1.5 - 2.0
- > 2.0
- Waterway

Risk of Embankment Overtopping Failure

- High (overtopping depth > top of rail)
- Medium to high (overtopping depth > top of formation + 0.3m and ≤ top of rail)
- Low to medium (overtopping depth ≥ top of formation and ≤ top of formation + 0.3m)
- No overtopping (adjacent flood level below top of formation)



A3 scale: 1:75,000

0 1 2 3 4 5km

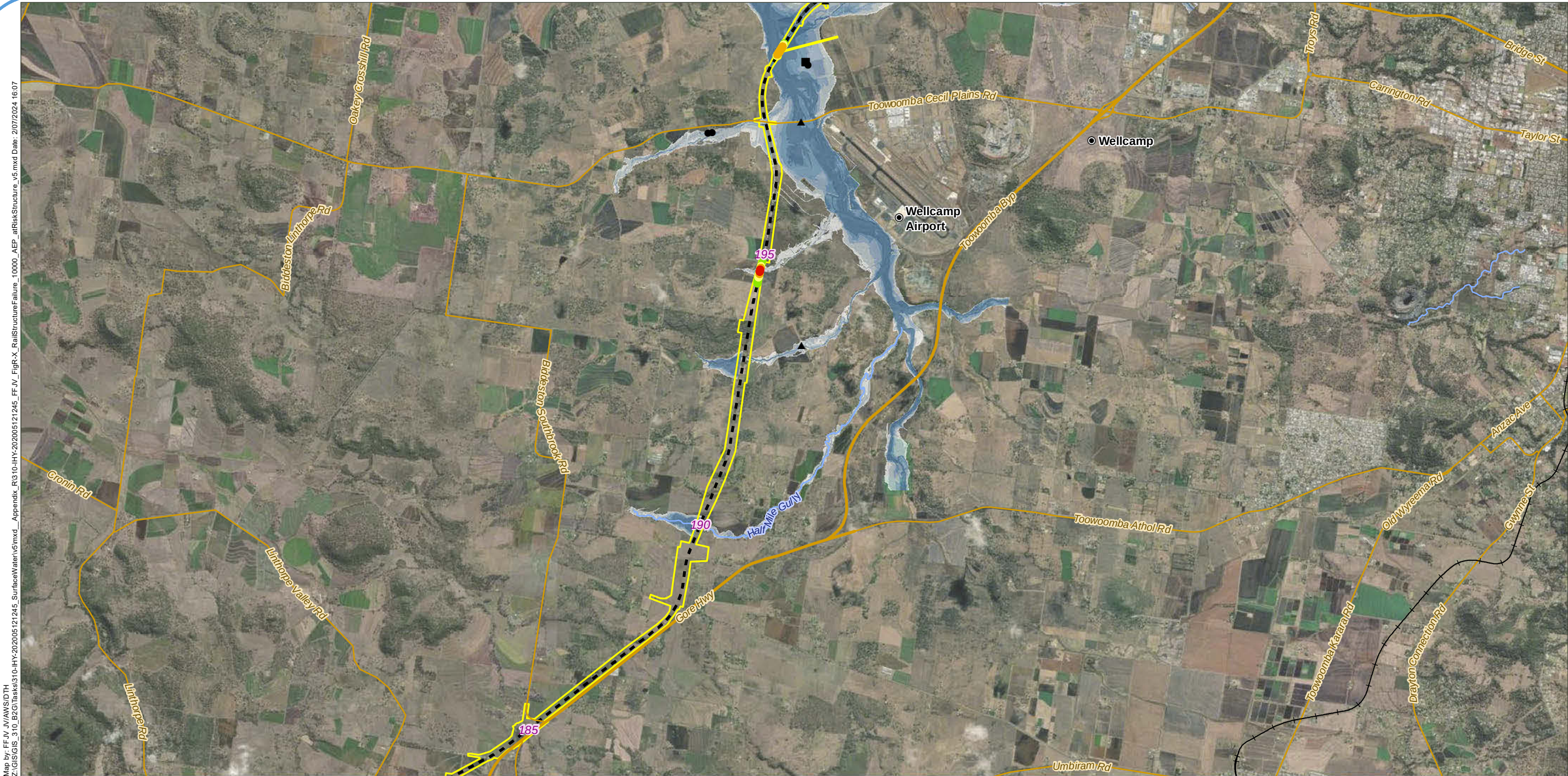


Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure R3-9:

1 in 1000 AEP Event - Embankment Overtopping Failure Risk Assessment - Developed Case



Legend

- 5 Chainage (km)
- Localities
- - - Design rail alignment
- + Existing rail (operational)
- Major roads
- Minor roads
- Project footprint

Receptors Sensitive to Embankment Overtopping Flood Failure

- House
- Shed
- Other assets

Receptors Affected by Non Failure Flood

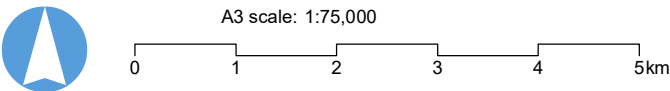
- House
- Shed
- Other assets

Design Event (No Failure) Flood Depth (m)

- ≤ 0.3
- 0.3 - 1.0
- 1.0 - 1.5
- 1.5 - 2.0
- > 2.0
- Waterway

Risk of Embankment Overtopping Failure

- High (overtopping depth > top of rail)
- Medium to high (overtopping depth > top of formation + 0.3m and ≤ top of rail)
- Low to medium (overtopping depth ≥ top of formation and ≤ top of formation + 0.3m)
- No overtopping (adjacent flood level below top of formation)





Map by: FF JV JVAWS/DTH
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Legend

- 5 Chainage (km)
- Localities
- - - Design rail alignment
- + Existing rail (operational)
- Major roads
- Minor roads
- Project footprint

Receptors Sensitive to Embankment Overtopping Flood Failure

- House
- Shed
- Other assets

Receptors Affected by Non Failure Flood

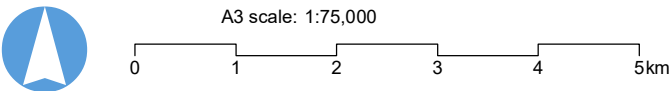
- House
- Shed
- Other assets

Design Event (No Failure) Flood Depth (m)

- ≤ 0.3
- 0.3 - 1.0
- 1.0 - 1.5
- 1.5 - 2.0
- > 2.0
- Waterway

Risk of Embankment Overtopping Failure

- High (overtopping depth > top of rail)
- Medium to high (overtopping depth > top of formation + 0.3m and ≤ top of rail)
- Low to medium (overtopping depth ≥ top of formation and ≤ top of formation + 0.3m)
- No overtopping (adjacent flood level below top of formation)



Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure R3-11:

1 in 1000 AEP Event - Embankment Overtopping Failure Risk Assessment - Developed Case



Map by: FF JV/AVS/DTH
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Legend

- 5 Chainage (km)
- - - Design rail alignment
- + Existing rail (operational)
- Major roads
- Minor roads
- NSW/QLD border
- Project footprint

Receptors Sensitive to Embankment Overtopping Flood Failure

- House
- Shed
- Other assets

Receptors Affected by Non Failure Flood

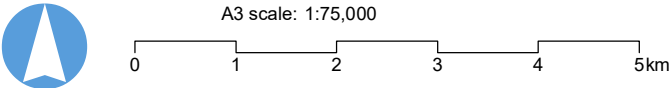
- House
- Shed
- Other assets

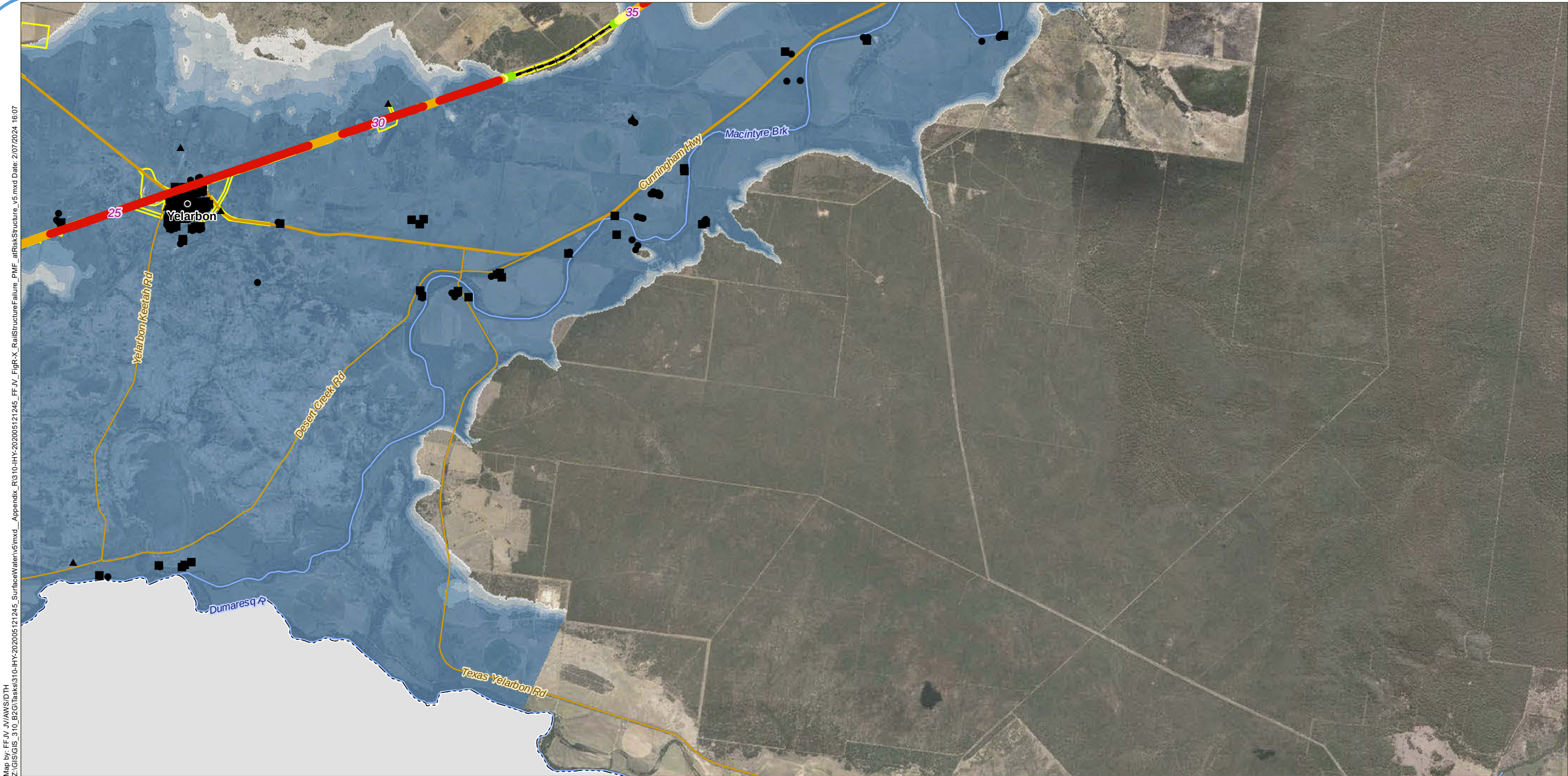
Design Event (No Failure) Flood Depth (m)

- ≤ 0.3
- 0.3 - 1.0
- 1.0 - 1.5
- 1.5 - 2.0
- > 2.0
- Waterway

Risk of Embankment Overtopping Failure

- High (overtopping depth > top of rail)
- Medium to high (overtopping depth > top of formation + 0.3m and ≤ top of rail)
- Low to medium (overtopping depth ≥ top of formation and ≤ top of formation + 0.3m)
- No overtopping (adjacent flood level below top of formation)





Legend

- 5 Chainage (km)
- Localities
- Design rail alignment
- Existing rail (operational)
- Major roads
- Minor roads
- NSW/QLD border
- Project footprint

Receptors Sensitive to Embankment Overtopping Flood Failure

- House
- Shed
- Other assets

Receptors Affected by Non Failure Flood

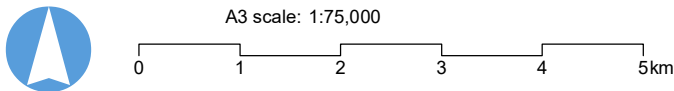
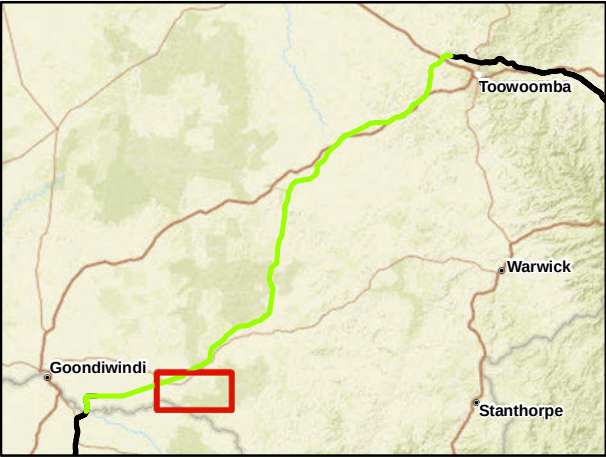
- House
- Shed
- Other assets

Design Event (No Failure) Flood Depth (m)

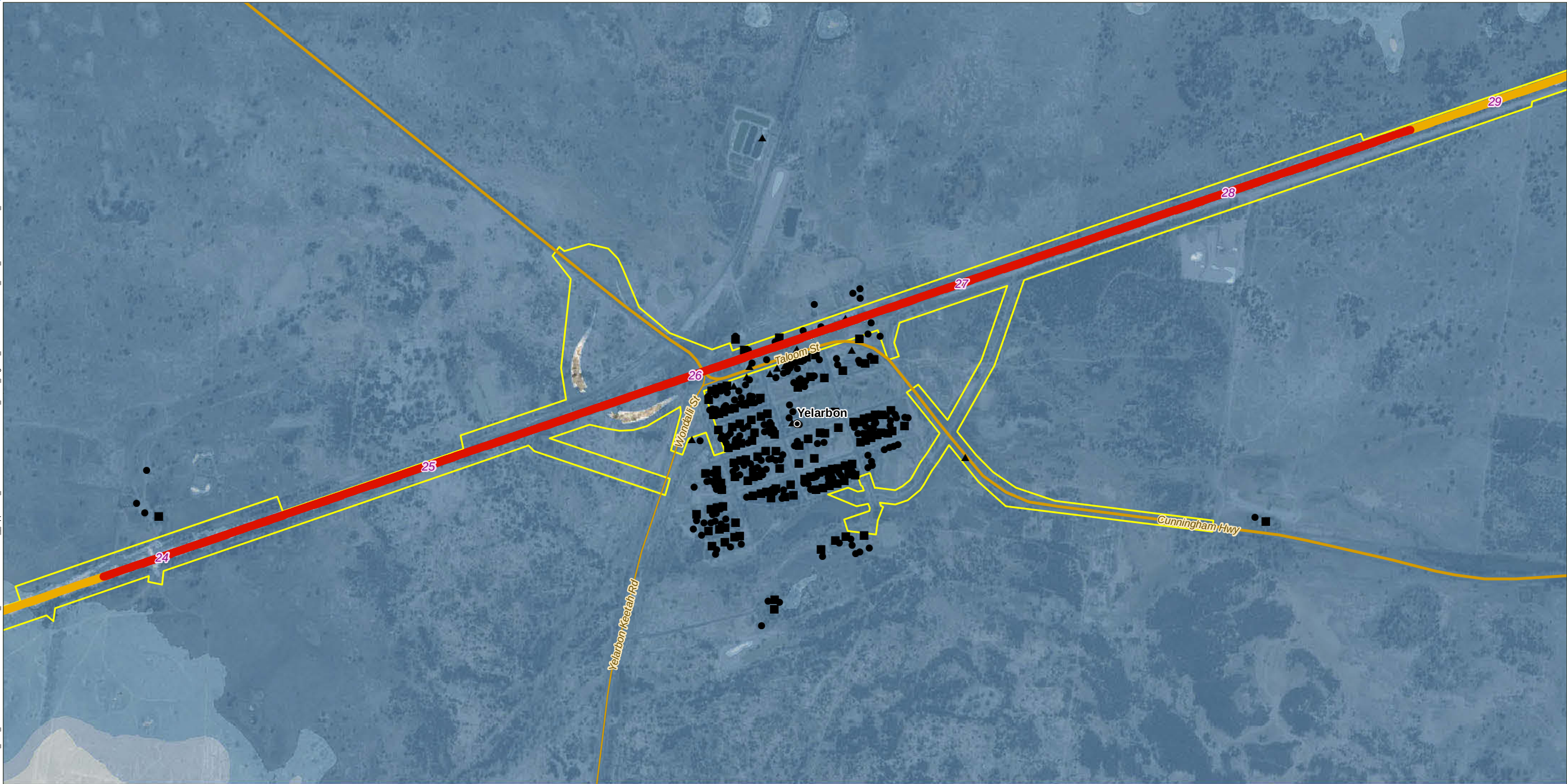
- ≤ 0.3
- 0.3 - 1.0
- 1.0 - 1.5
- 1.5 - 2.0
- > 2.0
- Waterway

Risk of Embankment Overtopping Failure

- High (overtopping depth > top of rail)
- Medium to high (overtopping depth > top of formation + 0.3m and ≤ top of rail)
- Low to medium (overtopping depth ≥ top of formation and ≤ top of formation + 0.3m)
- No overtopping (adjacent flood level below top of formation)



Map by: FF-JV JVAWS/DTH
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Legend

- 5 Chainage (km)
- Localities
- - - Design rail alignment
- + Existing rail (operational)
- Major roads
- Minor roads
- Project footprint

Receptors Sensitive to Embankment Overtopping Flood Failure

- House
- Shed
- Other assets

Receptors Affected by Non Failure Flood

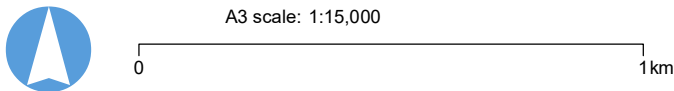
- House
- Shed
- Other assets

Design Event (No Failure) Flood Depth (m)

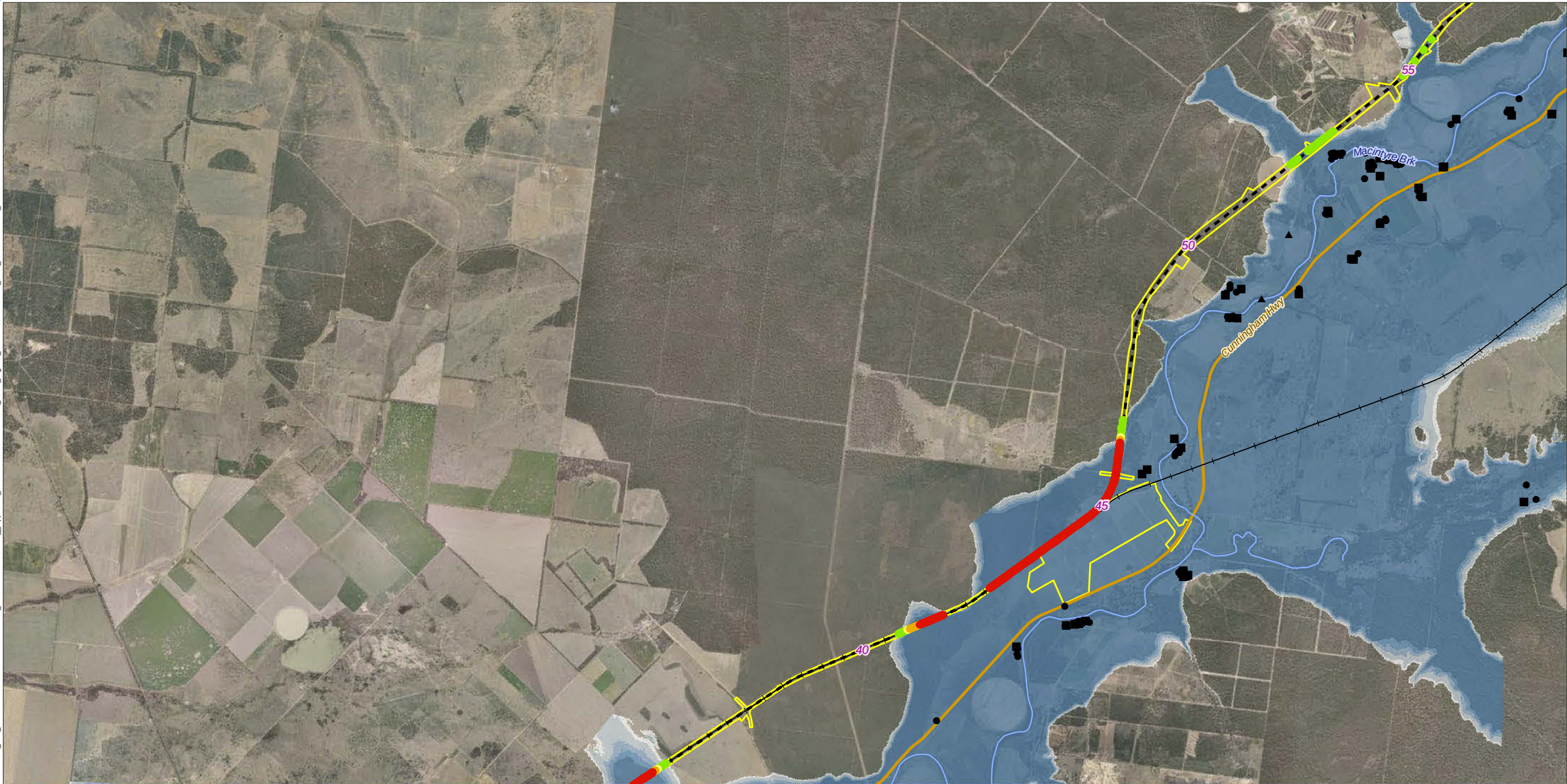
- ≤ 0.3
- 0.3 - 1.0
- 1.0 - 1.5
- 1.5 - 2.0
- > 2.0

Risk of Embankment Overtopping Failure

- High (overtopping depth > top of rail)
- Medium to high (overtopping depth > top of formation + 0.3m and ≤ top of rail)
- Low to medium (overtopping depth ≥ top of formation and ≤ top of formation + 0.3m)
- No overtopping (adjacent flood level below top of formation)



Map by: FF JV/AVS/DTH
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Legend

- 5 Chainage (km)
- - - Design rail alignment
- + Existing rail (operational)
- Major roads
- Project footprint

Receptors Sensitive to Embankment Overtopping Flood Failure

- House
- Shed
- Other assets

Receptors Affected by Non Failure Flood

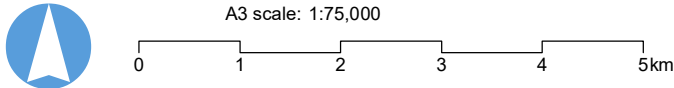
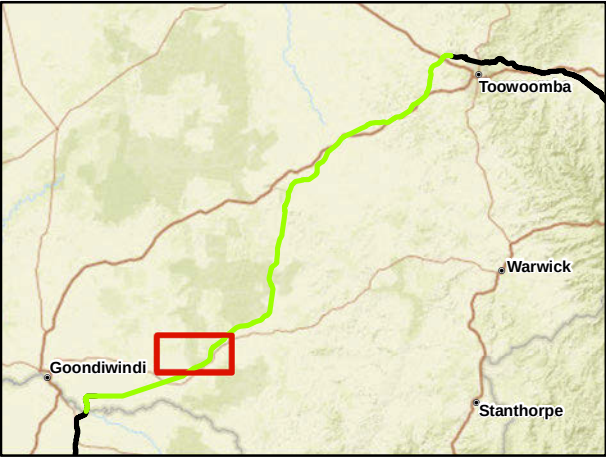
- House
- Shed
- Other assets

Design Event (No Failure) Flood Depth (m)

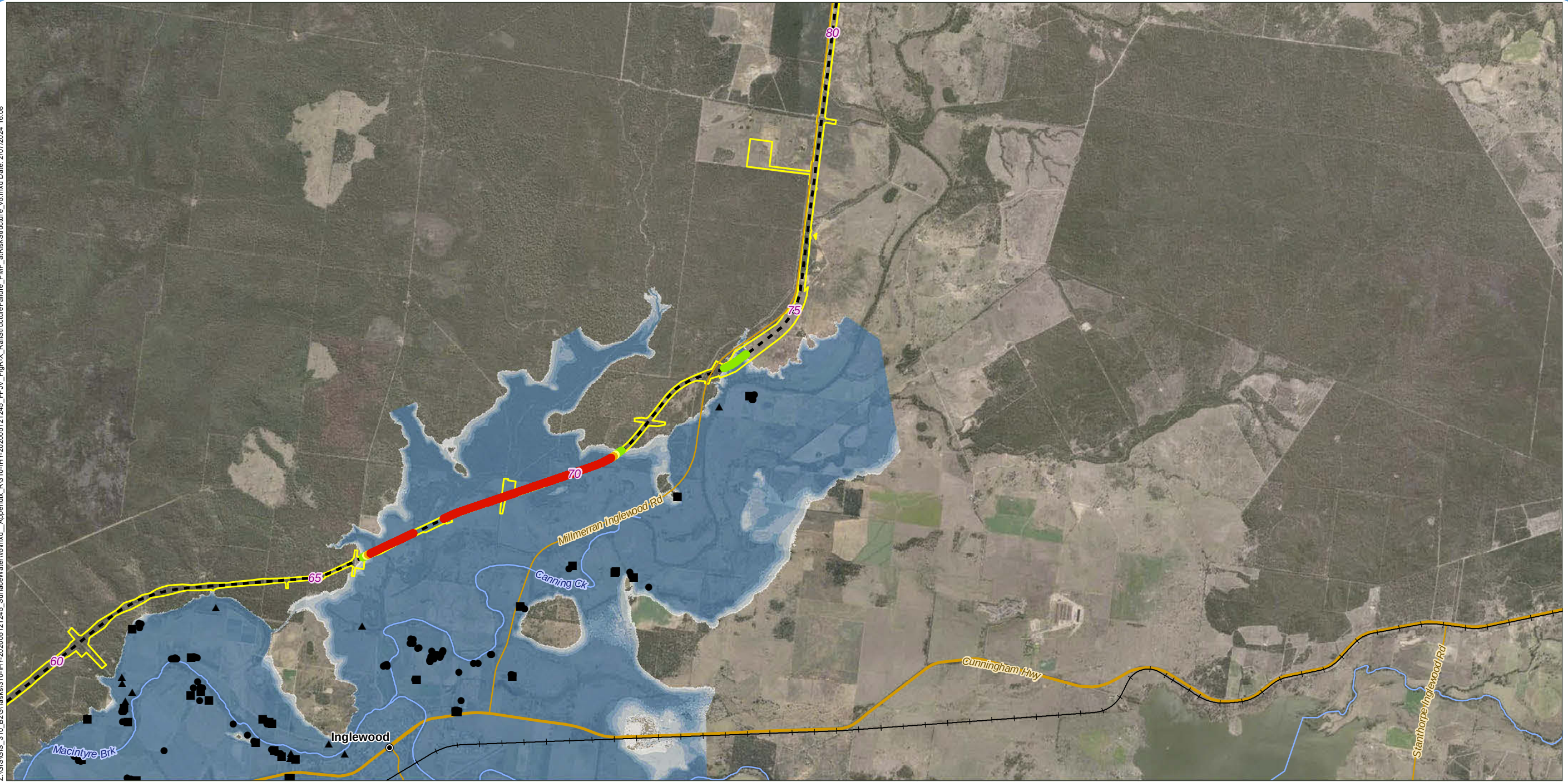
- ≤ 0.3
- 0.3 - 1.0
- 1.0 - 1.5
- 1.5 - 2.0
- > 2.0
- Waterway

Risk of Embankment Overtopping Failure

- High (overtopping depth > top of rail)
- Medium to high (overtopping depth > top of formation + 0.3m and ≤ top of rail)
- Low to medium (overtopping depth ≥ top of formation and ≤ top of formation + 0.3m)
- No overtopping (adjacent flood level below top of formation)



Map by: FF JV JVAWS/DTH
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Legend

- 5 Chainage (km)
- Localities
- Design rail alignment
- Existing rail (operational)
- Major roads
- Minor roads
- Project footprint

Receptors Sensitive to Embankment Overtopping Flood Failure

- House
- Shed
- Other assets

Receptors Affected by Non Failure Flood

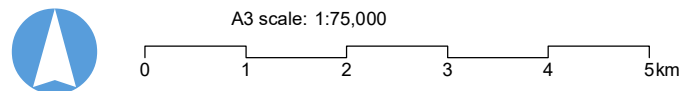
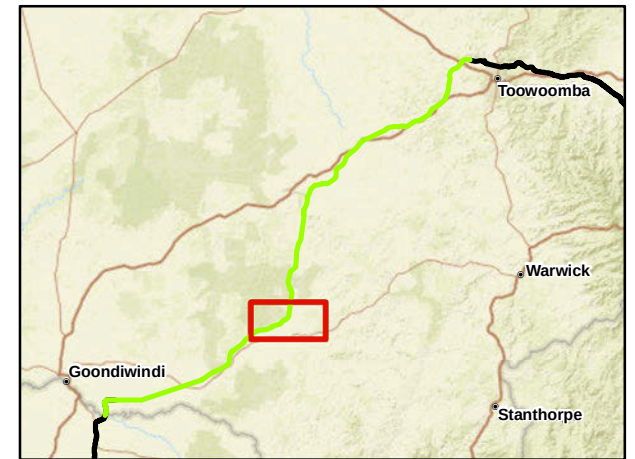
- House
- Shed
- Other assets

Design Event (No Failure) Flood Depth (m)

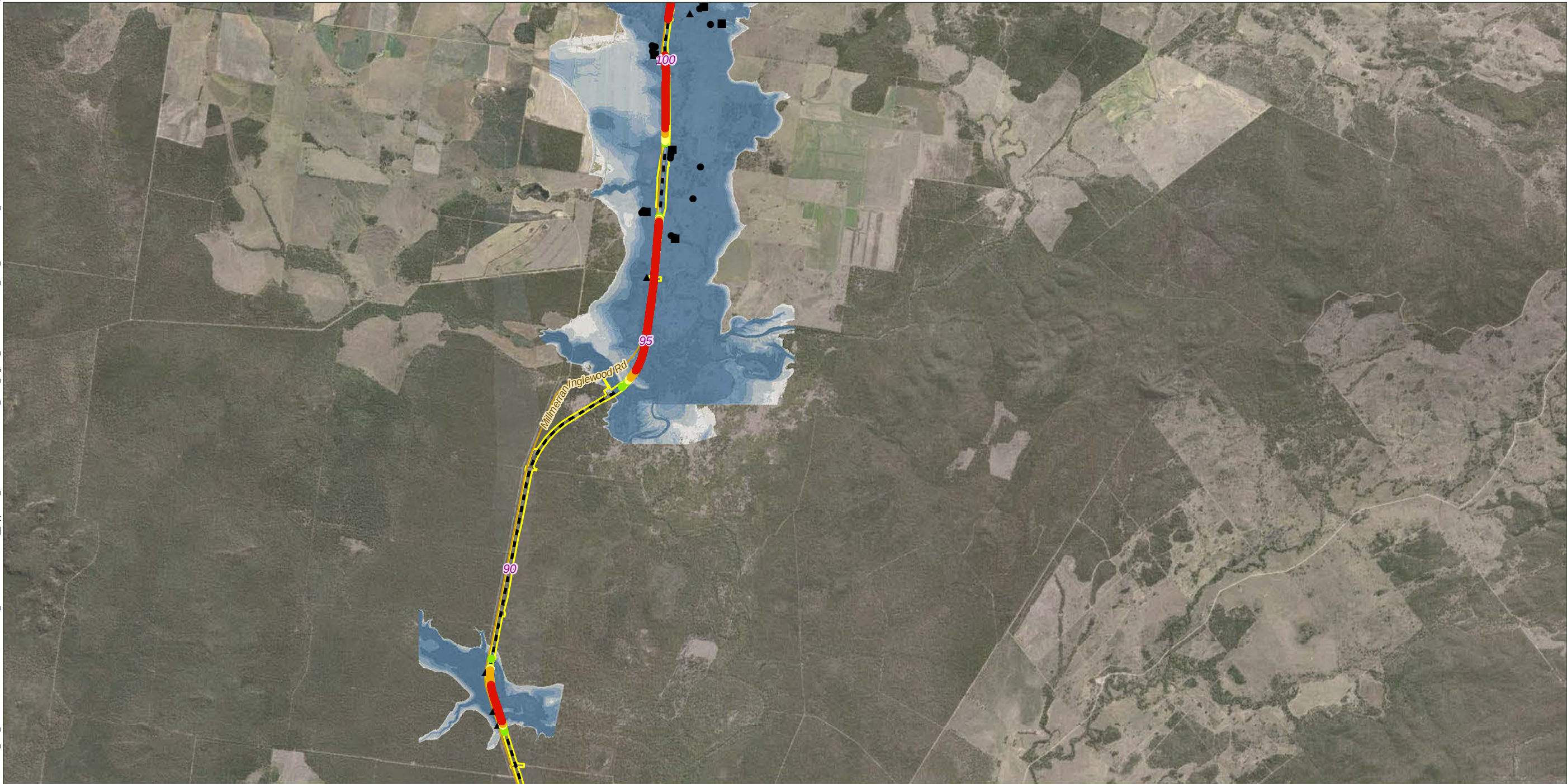
- ≤ 0.3
- 0.3 - 1.0
- 1.0 - 1.5
- 1.5 - 2.0
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- Waterway

Risk of Embankment Overtopping Failure

- High (overtopping depth > top of rail)
- Medium to high (overtopping depth > top of formation + 0.3m and ≤ top of rail)
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Map by: FF-JV JV/ANS/DTH
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Legend

- 5 Chainage (km)
- - - Design rail alignment
- Minor roads
- Project footprint

Receptors Sensitive to Embankment Overtopping Flood Failure

- House
- Shed
- Other assets

Receptors Affected by Non Failure Flood

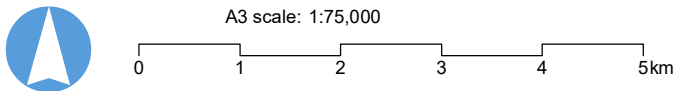
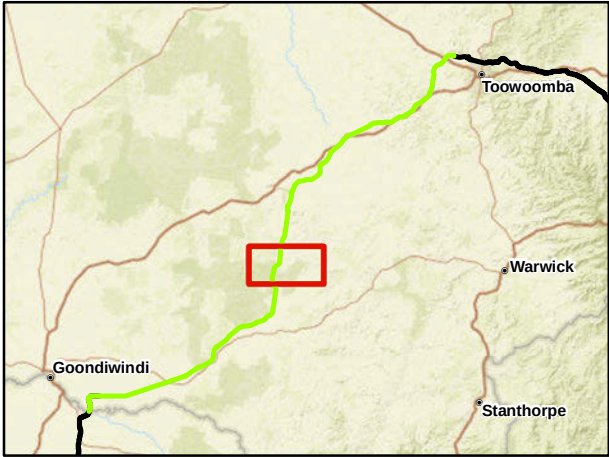
- House
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Design Event (No Failure) Flood Depth (m)

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- 1.5 - 2.0
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Risk of Embankment Overtopping Failure

- High (overtopping depth $>$ top of rail)
- Medium to high (overtopping depth $>$ top of formation + 0.3m and $\leq$ top of rail)
- Low to medium (overtopping depth $\geq$ top of formation and $\leq$ top of formation + 0.3m)
- No overtopping (adjacent flood level below top of formation)



Map by: FF-JV JV/AWS/DTH
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Legend

- 5 Chainage (km)
- - - Design rail alignment
- Minor roads
- Project footprint

Receptors Sensitive to Embankment Overtopping Flood Failure

- House
- Shed
- Other assets

Receptors Affected by Non Failure Flood

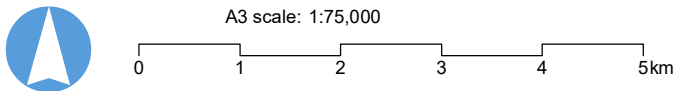
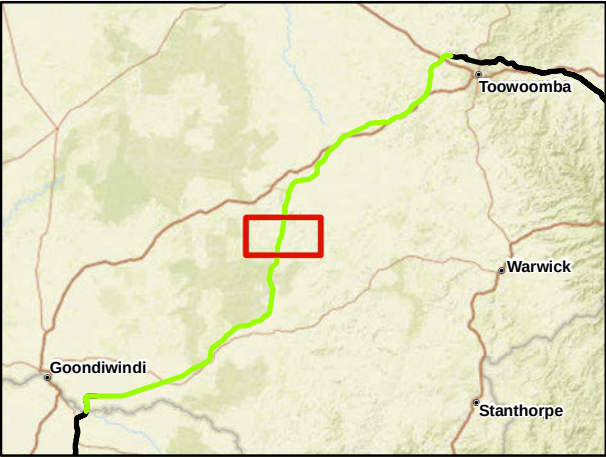
- House
- Shed
- Other assets

Design Event (No Failure) Flood Depth (m)

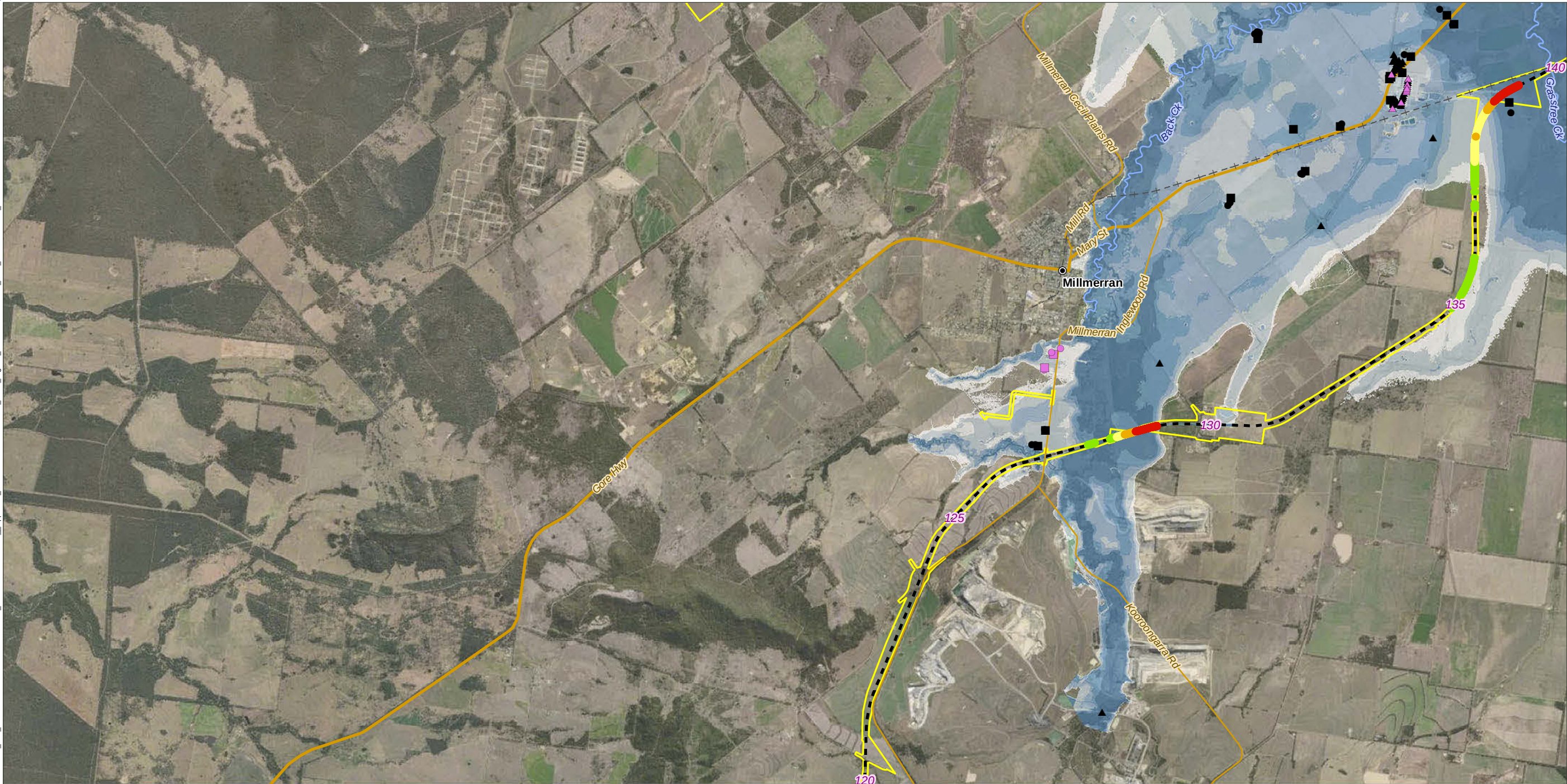
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Legend

- 5 Chainage (km)
- Localities
- - - Design rail alignment
- . - Existing rail (non-operational)
- Major roads
- Minor roads
- Project footprint

Receptors Sensitive to Embankment Overtopping Flood Failure

- House
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Receptors Affected by Non Failure Flood

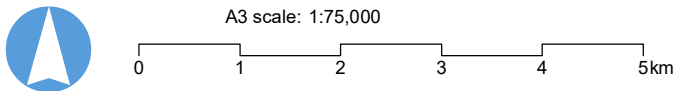
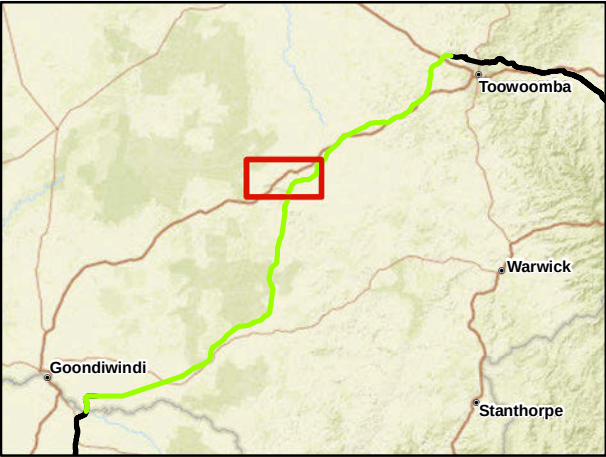
- House
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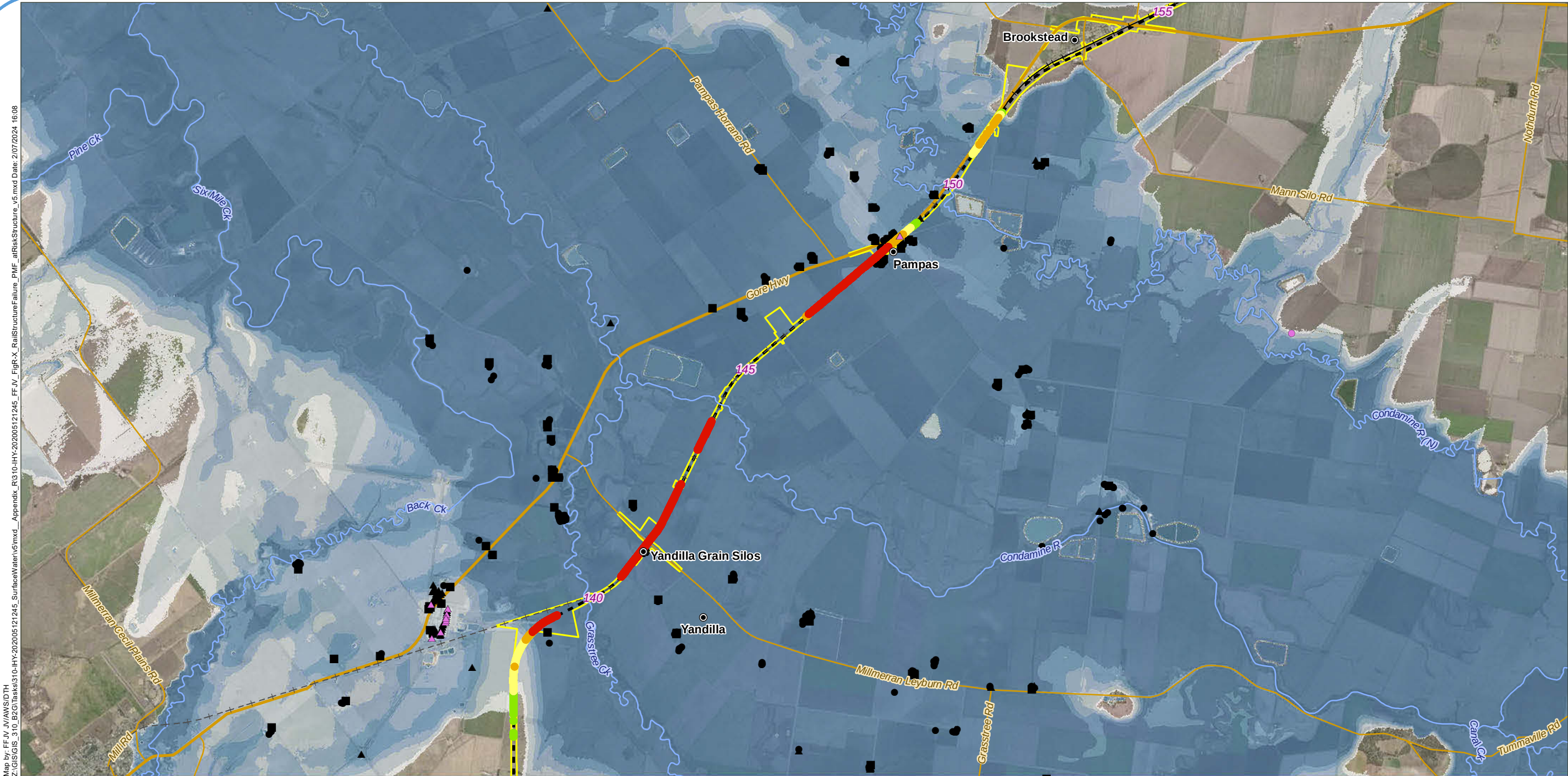
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Legend

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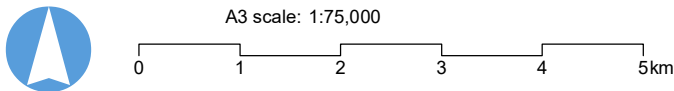
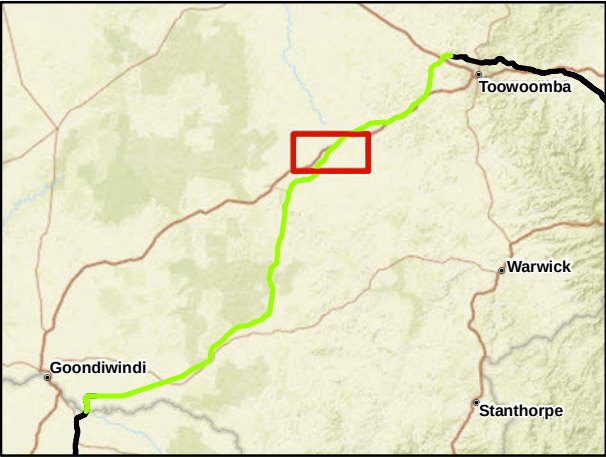
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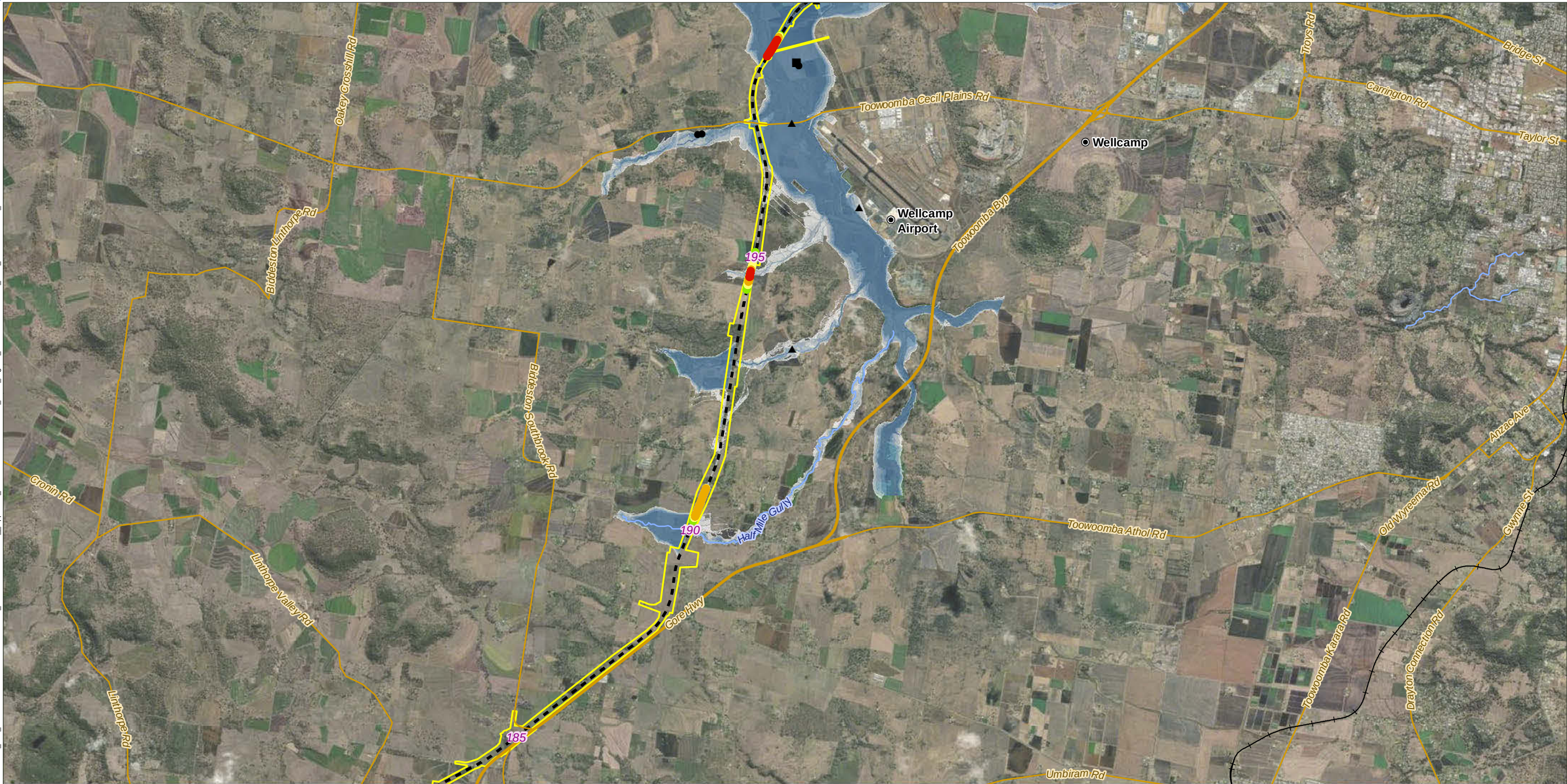
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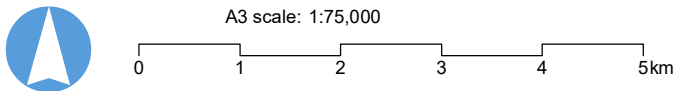
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