

APPENDIX T2

Hydrology and Flooding Technical Report—Volume 2

Part 7 of 8

BORDER TO GOWRIE REVISED DRAFT ENVIRONMENTAL IMPACT STATEMENT

APPENDIX T2

Hydrology and Flooding Technical Report—Volume 2

Appendix O Local drainage 20% AEP flood maps

CONTINUED

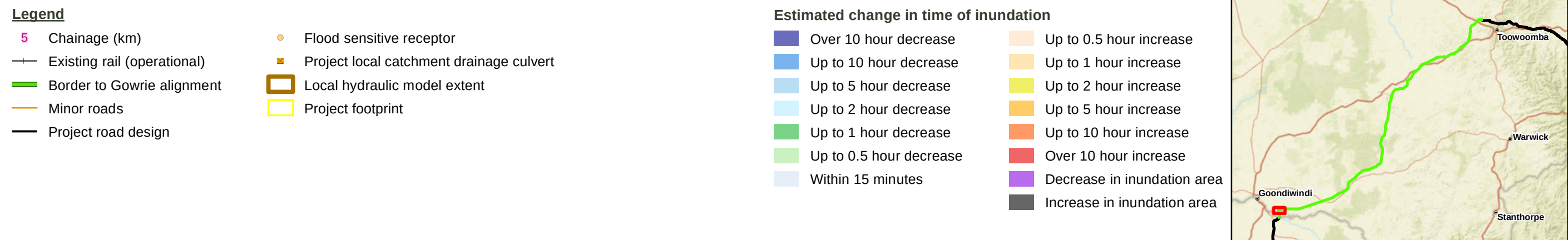
BORDER TO GOWRIE REVISED DRAFT ENVIRONMENTAL IMPACT STATEMENT

Appendix O

Local Drainage 20% AEP Flood Maps

Figure O1-1 to 48	20% AEP Event - Peak Water Levels - Existing Case
Figure O2-1 to 48	20% AEP Event - Peak Velocity - Existing Case
Figure O3-1 to 48	20% AEP Event - Peak Hazard - Existing Case
Figure O4-1 to 48	20% AEP Event - Peak Time of Inundation - Existing Case
Figure O5-1 to 48	20% AEP Event - Peak Water Levels - Developed Case 20%
Figure O6-1 to 48	AEP Event - Peak Velocity - Developed Case
Figure O7-1 to 48	20% AEP Event - Peak Hazard - Developed Case
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Figure O13-1 to 48	20% AEP Event - Change in Velocity (<0.5m/s cutoff)
Figure O14-1 to 48	20% AEP Event - Percentage Change in Velocity (<0.5m/s and >1.0m/s cutoff)
Figure O15-1 to 48	20% AEP Event - Percentage Change in Velocity (<1.0m/s cutoff)
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Figure O18-1 to 48	20% AEP Event - Percentage Change in Time of Inundation (<1 hour cutoff applied)

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\GIS_310_IHY\202005121245_SurfaceWater\5mxd_Appendix_D\310-IHY\202005121245_FF\JV_FigO12-X_Time_Inundation_Change_v5.mxd Date: 20/06/2024 15:29



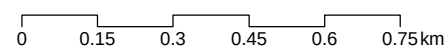
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0 0.2 0.4 0.6 0.8 1km



- ### Estimated change in time of inundation

-

A3 scale: 1:15,000



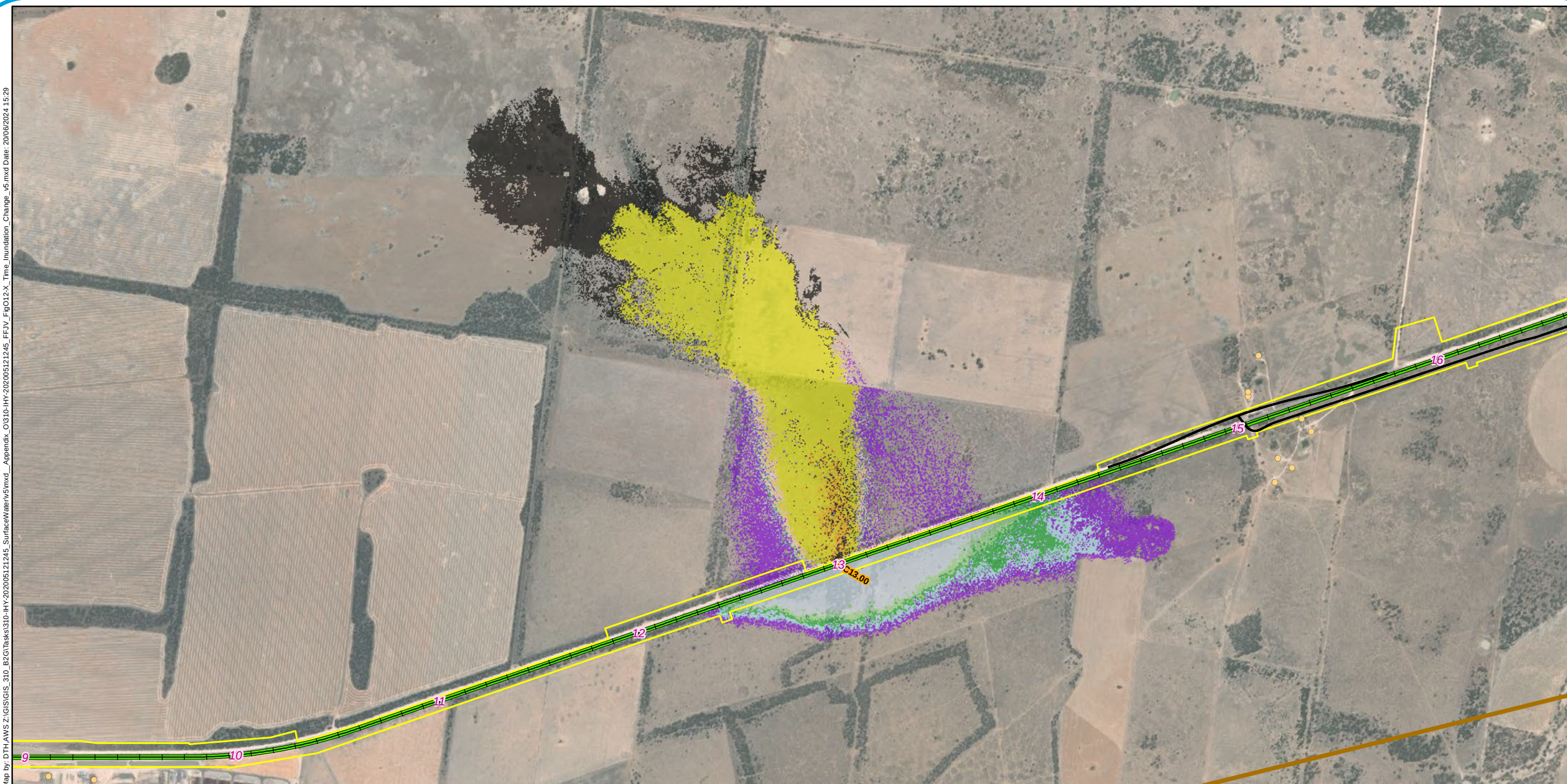
Issue date: 20/06/2024 Version: 5

Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure O12 - page 2 of 48:

20% AEP Event - Local Catchments - Change in Time of Inundation



5 Chainage (km)

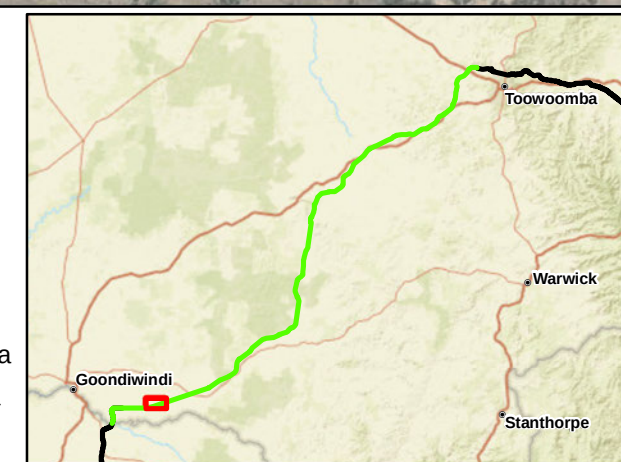
— Existing rail (operational)

— Border to Gowrie alignment

— Project road design

- Flood sensitive receptor
- Project local catchment drainage culvert
- ▭ Local hydraulic model extent
- ▭ Project footprint

Over 10 hour decrease	Up to 0.5 hour increase
Up to 10 hour decrease	Up to 1 hour increase
Up to 5 hour decrease	Up to 2 hour increase
Up to 2 hour decrease	Up to 5 hour increase
Up to 1 hour decrease	Up to 10 hour increase
Up to 0.5 hour decrease	Over 10 hour increase
Within 15 minutes	Decrease in inundation area
	Increase in inundation area



A3 scale: 1:20,000



Issue date: 20/06/2024 Version: 5

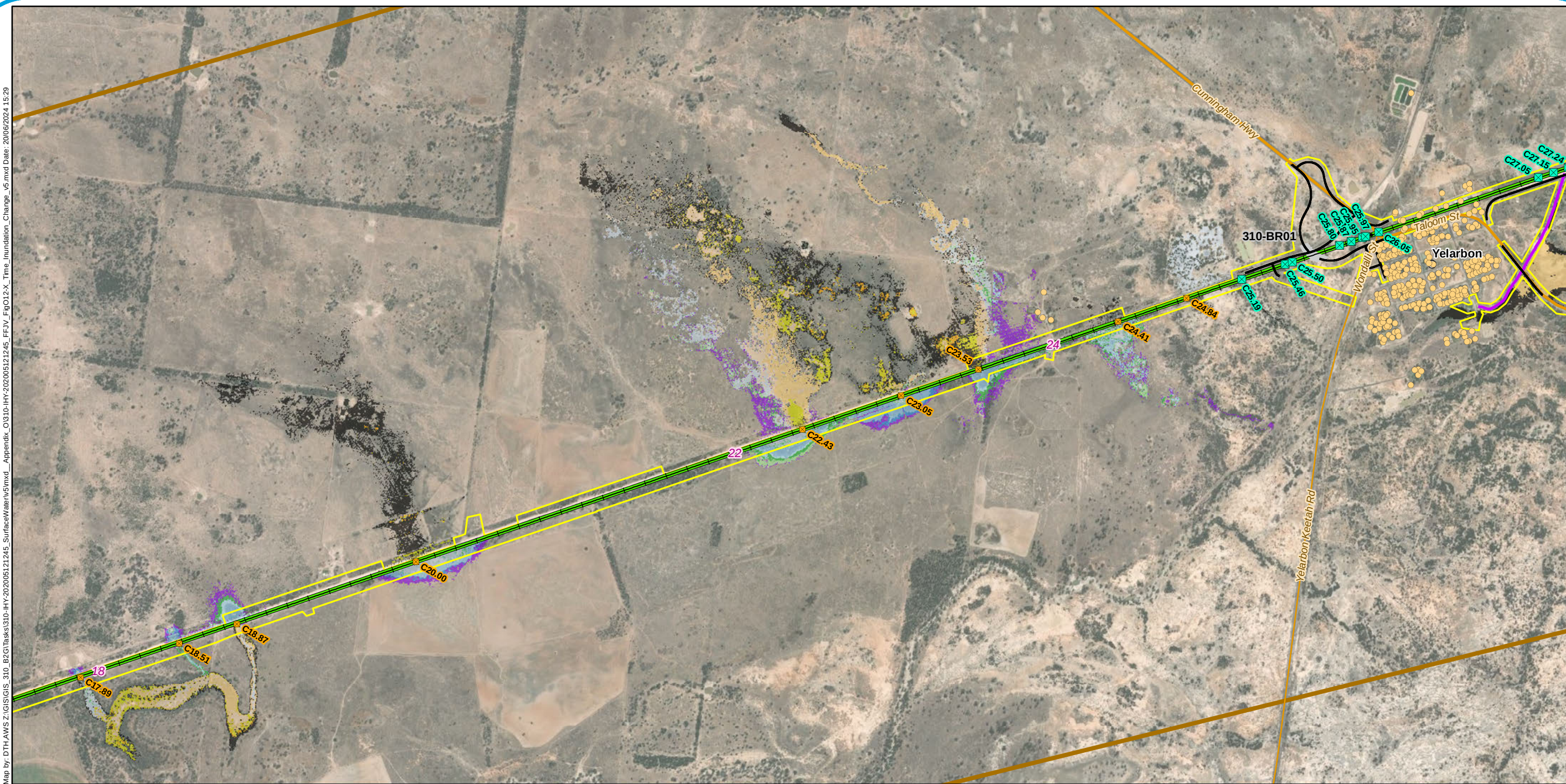
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure O12 - page 3 of 48:

20% AEP Event - Local Catchments - Change in Time of Inundation

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Legend

- 5 Chainage (km)
- Localities
- Existing rail (operational)
- Border to Gowrie alignment
- Major roads
- Minor roads
- Project road design
- Yelarbon levee
- Flood sensitive receptor
- Project floodplain culvert
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated change in time of inundation

- Over 10 hour decrease
- Up to 10 hour decrease
- Up to 5 hour decrease
- Up to 2 hour decrease
- Up to 1 hour decrease
- Up to 0.5 hour decrease
- Within 15 minutes
- Up to 0.5 hour increase
- Up to 1 hour increase
- Up to 2 hour increase
- Up to 5 hour increase
- Up to 10 hour increase
- Over 10 hour increase
- Decrease in inundation area
- Increase in inundation area



A3 scale: 1:25,000
0 0.25 0.5 0.75 1 1.25 km



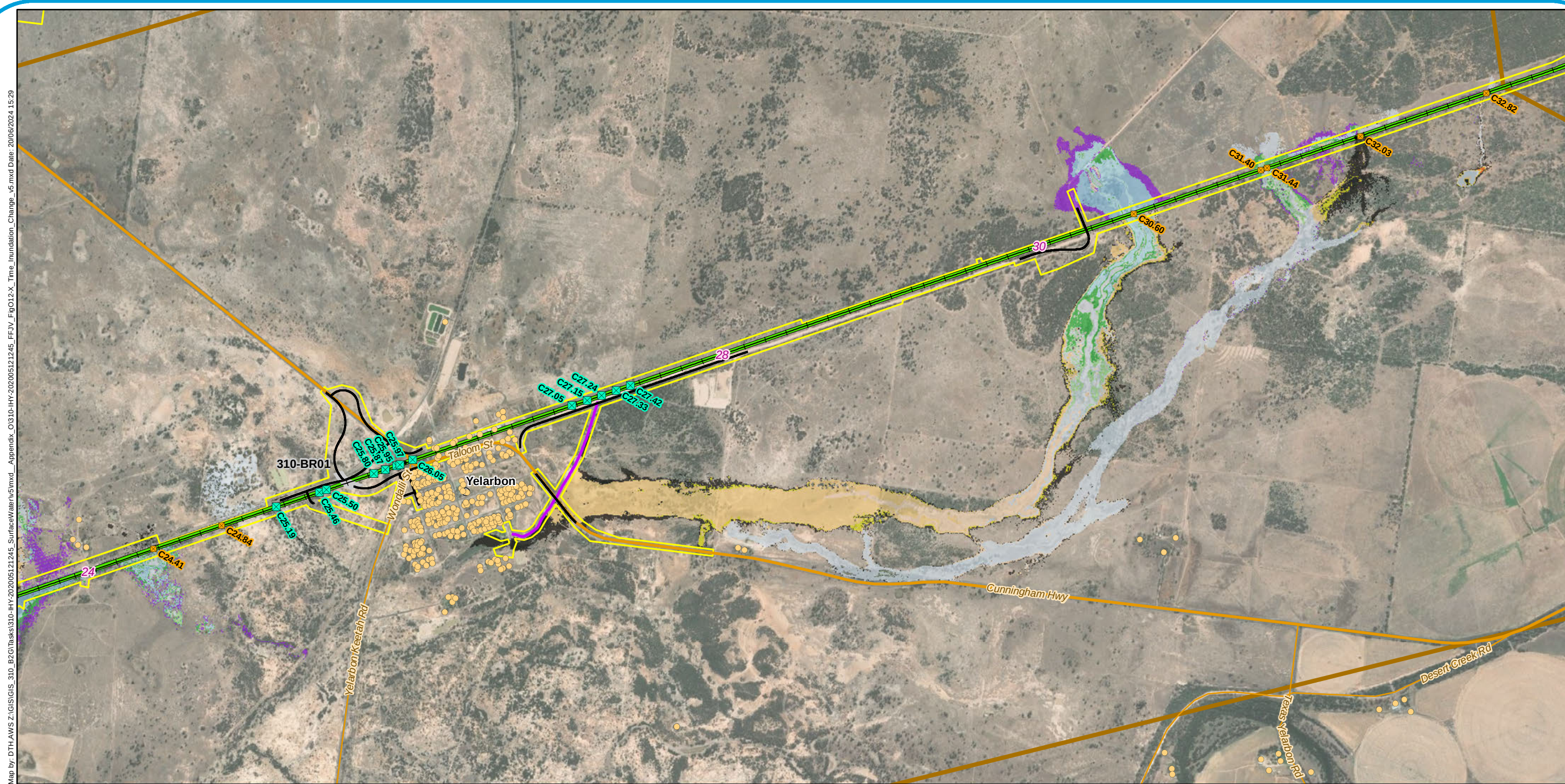
Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure O12 - page 4 of 48:

20% AEP Event - Local Catchments - Change in Time of Inundation

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\GIS_310-IHY-202005121245_SurfaceWater\5mxd_Appendix_D\310-IHY-202005121245_FF\JV_FigO12-X_Time_Inundation_Change_v5.mxd Date: 20/06/2024 15:29

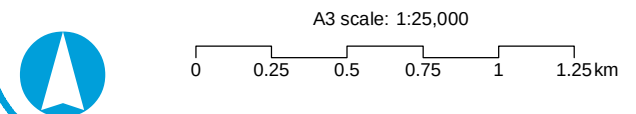
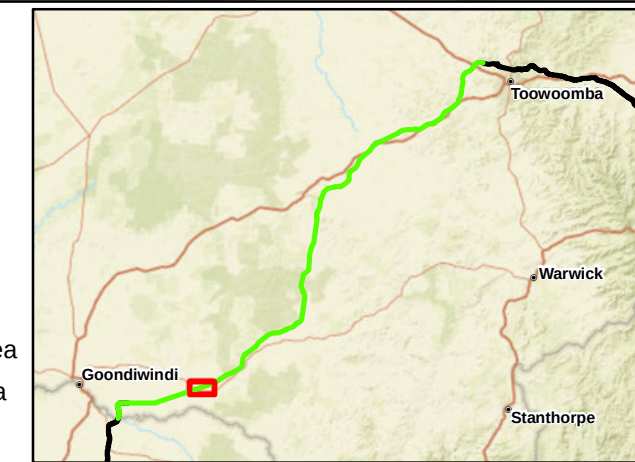


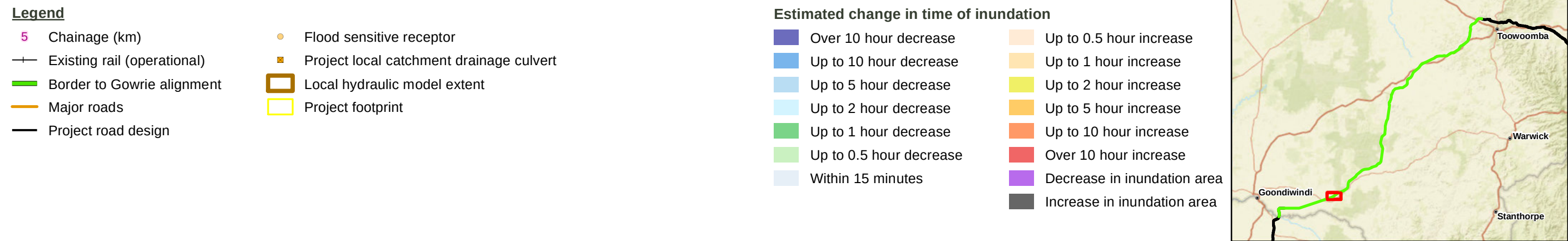
Legend

- 5 Chainage (km)
- Localities
- Existing rail (operational)
- Border to Gowrie alignment
- Major roads
- Minor roads
- Project road design
- Yelarbon levee
- Flood sensitive receptor
- Project floodplain culvert
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated change in time of inundation

- Over 10 hour decrease
- Up to 10 hour decrease
- Up to 5 hour decrease
- Up to 2 hour decrease
- Up to 1 hour decrease
- Up to 0.5 hour decrease
- Within 15 minutes
- Up to 0.5 hour increase
- Up to 1 hour increase
- Up to 2 hour increase
- Up to 5 hour increase
- Up to 10 hour increase
- Over 10 hour increase
- Decrease in inundation area
- Increase in inundation area





A3 scale: 1:25,000
0 0.25 0.5 0.75 1 1.25 km

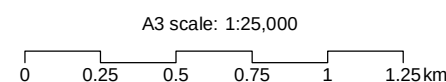


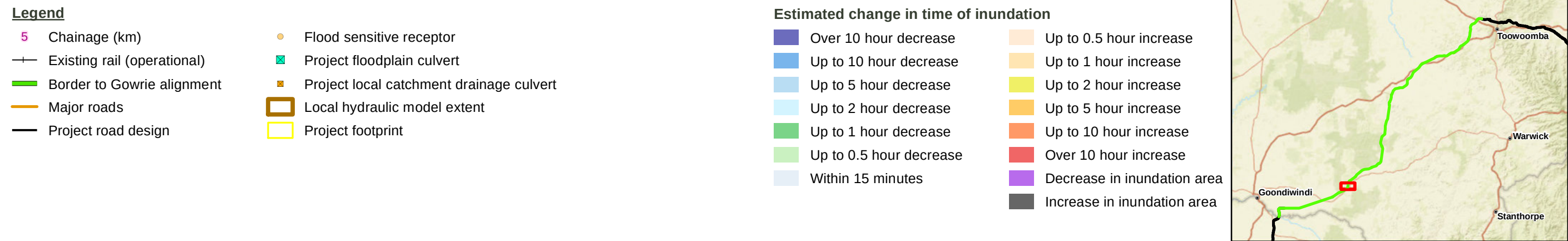
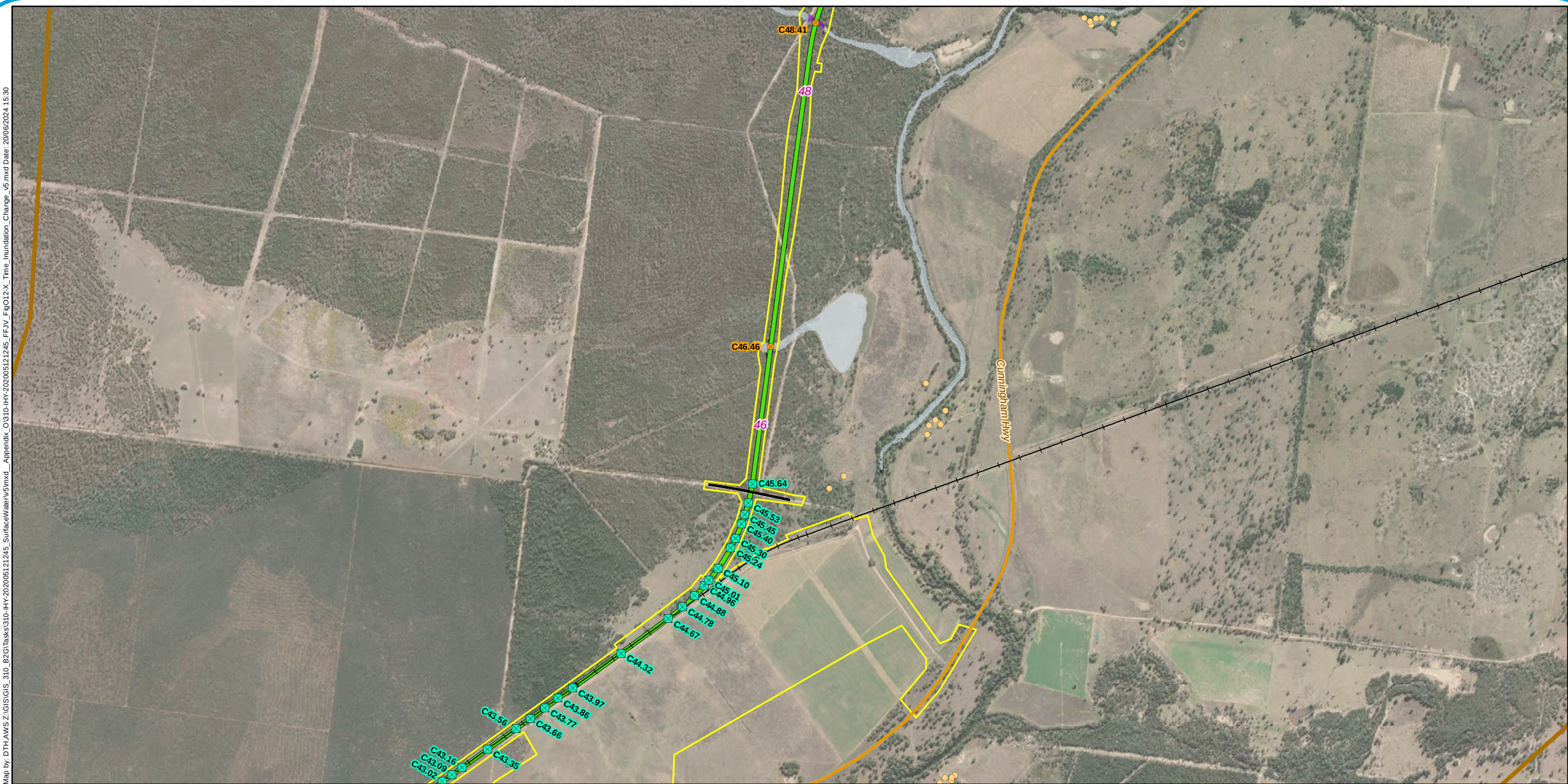
Legend

- | | |
|-------------------------------|--|
| 5 Chainage (km) | ● Flood sensitive receptor |
| — Existing rail (operational) | ■ Project floodplain culvert |
| — Border to Gowrie alignment | ■ Project local catchment drainage culvert |
| — Major roads | ■ Local hydraulic model extent |
| — Project road design | ■ Project footprint |

Estimated change in time of inundation

- | | |
|-------------------------|-----------------------------|
| Over 10 hour decrease | Up to 0.5 hour increase |
| Up to 10 hour decrease | Up to 1 hour increase |
| Up to 5 hour decrease | Up to 2 hour increase |
| Up to 2 hour decrease | Up to 5 hour increase |
| Up to 1 hour decrease | Up to 10 hour increase |
| Up to 0.5 hour decrease | Over 10 hour increase |
| Within 15 minutes | Decrease in inundation area |
| | Increase in inundation area |





A3 scale: 1:25,000

0 0.25 0.5 0.75 1 1.25 km



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Border to Gowrie

Figure O12 - page 8 of 48:

20% AEP Event - Local Catchments - Change in Time of Inundation



- ### Estimated change in time of inundation

-
- A map of south-eastern Queensland, Australia, showing the location of the study site. The study site is marked with a red square on a road between Goondiwindi and Toowoomba. Other towns labeled on the map include Toowoomba, Warwick, and Stanthorpe. The map shows a network of roads and a river (the Condamine River) flowing through the region.

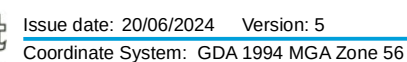


Figure O12 - page 9 of 48:

20% AEP Event - Local Catchments - Change in Time of Inundation

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\310-IHY-202005121245_SurfaceWater\5mxd_Appendix_D\310-IHY-202005121245_FF\JV_FigO12-X_Time_Inundation_Change_v5.mxd Date: 20/06/2024 15:30



Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Major roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated change in time of inundation

- | | |
|-------------------------|-----------------------------|
| Over 10 hour decrease | Up to 0.5 hour increase |
| Up to 10 hour decrease | Up to 1 hour increase |
| Up to 5 hour decrease | Up to 2 hour increase |
| Up to 2 hour decrease | Up to 5 hour increase |
| Up to 1 hour decrease | Up to 10 hour increase |
| Up to 0.5 hour decrease | Over 10 hour increase |
| Within 15 minutes | Decrease in inundation area |
| | Increase in inundation area |



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 O12 - page 10 of 48:

20% AEP Event - Local Catchments - Change in Time of Inundation



- ### Estimated change in time of inundation

-
- A map of south-eastern Australia showing the study area. A red square indicates the study site, located on a road between Goondiwindi and Toowoomba. The map also shows the locations of Toowoomba, Warwick, and Stanthorpe. The study area is highlighted in green.

A3 scale: 1:15,000



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Figure O12 - page 11 of 48:

20% AEP Event - Local Catchments - Change in Time of Inundation

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Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project floodplain culvert
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated change in time of inundation

- | | |
|-------------------------|-----------------------------|
| Over 10 hour decrease | Up to 0.5 hour increase |
| Up to 10 hour decrease | Up to 1 hour increase |
| Up to 5 hour decrease | Up to 2 hour increase |
| Up to 2 hour decrease | Up to 5 hour increase |
| Up to 1 hour decrease | Up to 10 hour increase |
| Up to 0.5 hour decrease | Over 10 hour increase |
| Within 15 minutes | Decrease in inundation area |
| | Increase in inundation area |



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



- ### Estimated change in time of inundation

-
- A map of south-eastern Queensland, Australia, showing the location of the study area. The map includes major roads (red lines) and rivers (blue lines). The study site is marked with a red rectangle. Key locations labeled on the map are Goondiwindi, Toowoomba, Warwick, and Stanthorpe. The study area is located between Goondiwindi and Toowoomba, near the border with New South Wales.

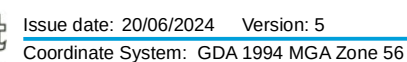
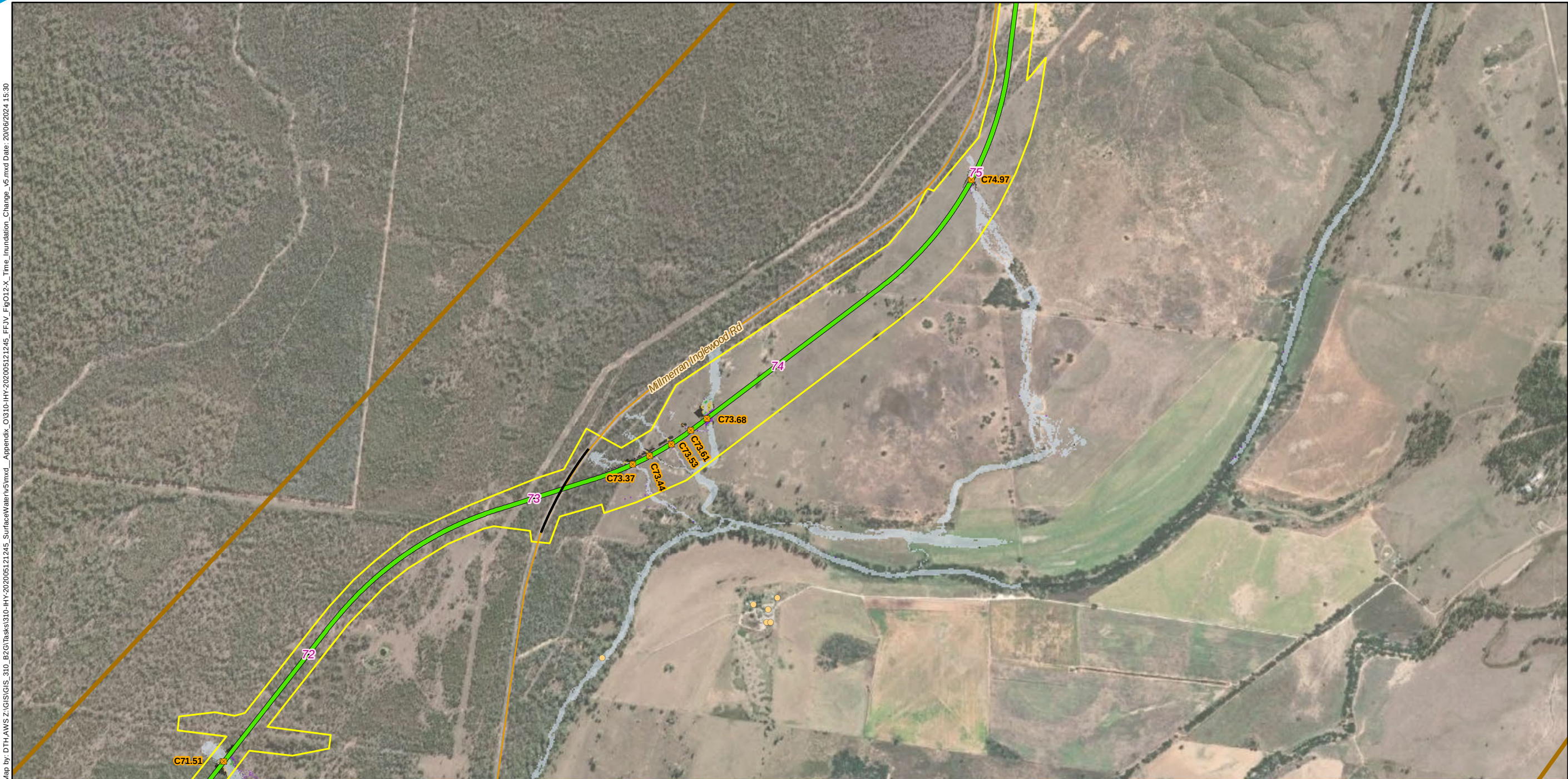


Figure O12 - page 13 of 48:

20% AEP Event - Local Catchments - Change in Time of Inundation

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Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Local hydraulic model extent
- Project footprint

Estimated change in time of inundation

- | | |
|-------------------------|-----------------------------|
| Over 10 hour decrease | Up to 0.5 hour increase |
| Up to 10 hour decrease | Up to 1 hour increase |
| Up to 5 hour decrease | Up to 2 hour increase |
| Up to 2 hour decrease | Up to 5 hour increase |
| Up to 1 hour decrease | Up to 10 hour increase |
| Up to 0.5 hour decrease | Over 10 hour increase |
| Within 15 minutes | Decrease in inundation area |
| | Increase in inundation area |



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



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Border to Gowrie

Figure O12 - page 14 of 48:

20% AEP Event - Local Catchments - Change in Time of Inundation

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\GIS_310_IHY\202005121245_SurfaceWater\5mxd_Appendix_D\310-IHY\202005121245_FF\JV_FigO12-X_Time_Inundation_Change_v5.mxd Date: 20/06/2024 15:30



Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Local hydraulic model extent
- Project footprint

Estimated change in time of inundation

- | | |
|-------------------------|-----------------------------|
| Over 10 hour decrease | Up to 0.5 hour increase |
| Up to 10 hour decrease | Up to 1 hour increase |
| Up to 5 hour decrease | Up to 2 hour increase |
| Up to 2 hour decrease | Up to 5 hour increase |
| Up to 1 hour decrease | Up to 10 hour increase |
| Up to 0.5 hour decrease | Over 10 hour increase |
| Within 15 minutes | Decrease in inundation area |
| | Increase in inundation area |



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 O12 - page 15 of 48:

20% AEP Event - Local Catchments - Change in Time of Inundation

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\310-IHY-202005121245_SurfaceWater\5vnx\Appendix_D\310-IHY-202005121245_FF\JV_FigO12-X_Time_Inundation_Change_v5.mxd Date: 20/06/2024 15:30



Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Local hydraulic model extent
- Project footprint

Estimated change in time of inundation

- | | |
|-------------------------|-----------------------------|
| Over 10 hour decrease | Up to 0.5 hour increase |
| Up to 10 hour decrease | Up to 1 hour increase |
| Up to 5 hour decrease | Up to 2 hour increase |
| Up to 2 hour decrease | Up to 5 hour increase |
| Up to 1 hour decrease | Up to 10 hour increase |
| Up to 0.5 hour decrease | Over 10 hour increase |
| Within 15 minutes | Decrease in inundation area |
| | Increase in inundation area |



A3 scale: 1:15,000

0 0.15 0.3 0.45 0.6 0.75 km



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Border to Gowrie

Figure O12 - page 16 of 48:

20% AEP Event - Local Catchments - Change in Time of Inundation



- ### Estimated change in time of inundation

-
- A map of south-eastern Australia showing the study area. A red square indicates the study site, located between Goondiwindi and Toowoomba. The map also shows the locations of Toowoomba, Warwick, and Stanthorpe. The study area is highlighted in green.

A3 scale: 1:15,000



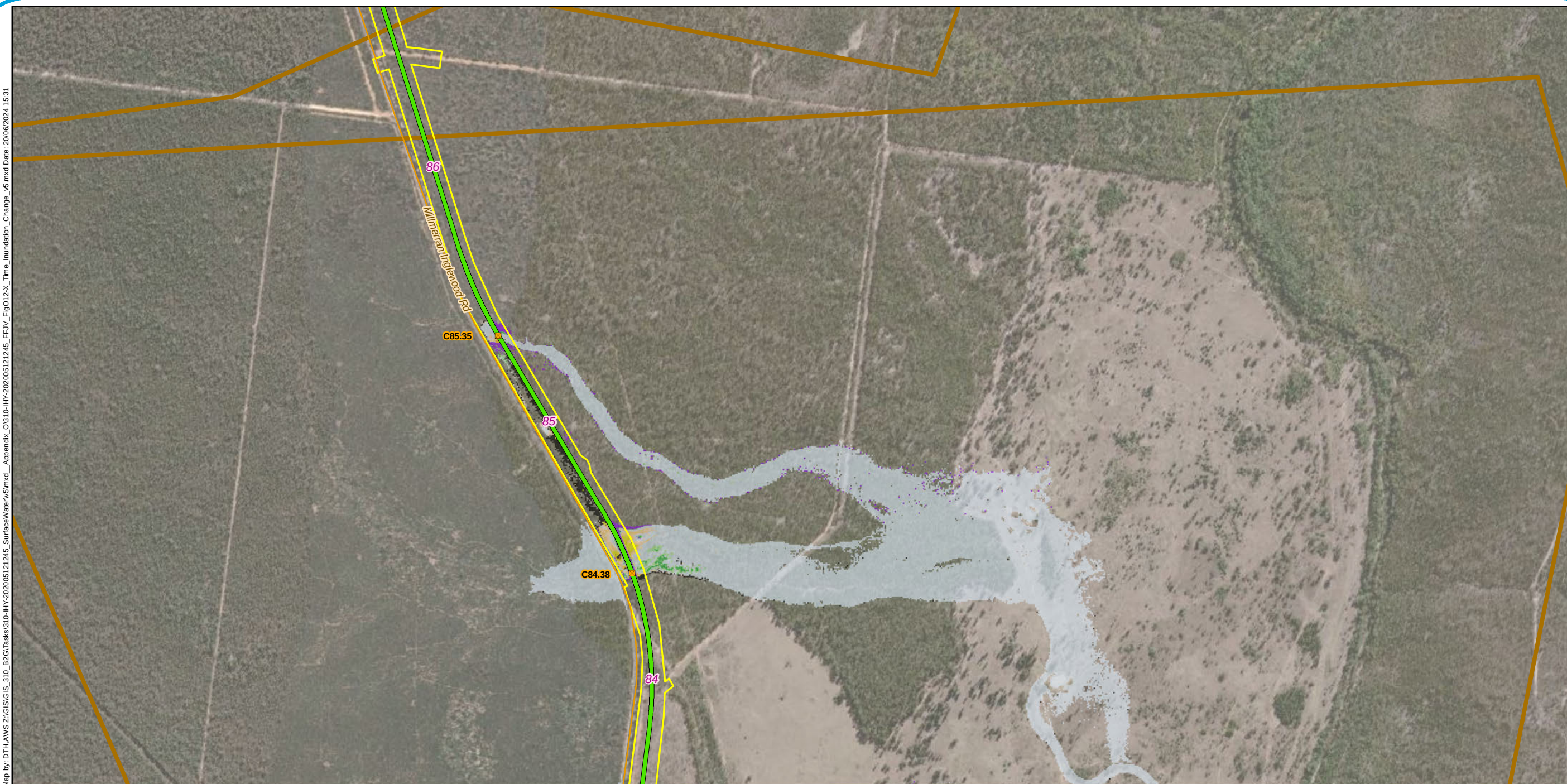
Issue date: 20/06/2024 Version: 5

Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure O12 - page 17 of 48:

20% AEP Event - Local Catchments - Change in Time of Inundation



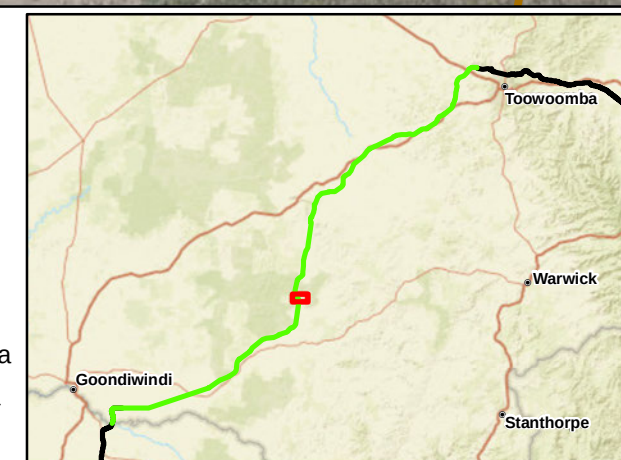
5 Chainage (km)
 ● Flood sensitive receptor

■ Border to Gowrie alignment
 ■ Project local catchment drainage culvert

— Minor roads
 Local hydraulic model extent

— Project road design
 Project footprint

Over 10 hour decrease	Up to 0.5 hour increase
Up to 10 hour decrease	Up to 1 hour increase
Up to 5 hour decrease	Up to 2 hour increase
Up to 2 hour decrease	Up to 5 hour increase
Up to 1 hour decrease	Up to 10 hour increase
Up to 0.5 hour decrease	Over 10 hour increase
Within 15 minutes	Decrease in inundation area
	Increase in inundation area



Border to Gowrie

Figure O12 - page 18 of 48:

20% AEP Event - Local Catchments - Change in Time of Inundation



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

- ### Estimated change in time of inundation

- | | |
|-------------------------|-----------------------------|
| Over 10 hour decrease | Up to 0.5 hour increase |
| Up to 10 hour decrease | Up to 1 hour increase |
| Up to 5 hour decrease | Up to 2 hour increase |
| Up to 2 hour decrease | Up to 5 hour increase |
| Up to 1 hour decrease | Up to 10 hour increase |
| Up to 0.5 hour decrease | Over 10 hour increase |
| Within 15 minutes | Decrease in inundation area |
| | Increase in inundation area |

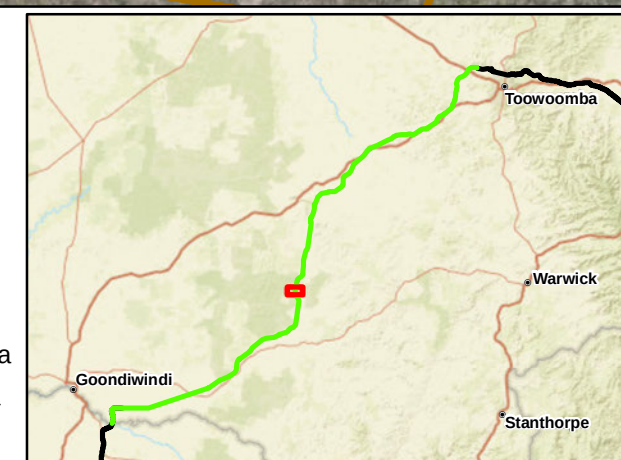


Figure O12 - page 19 of 48:

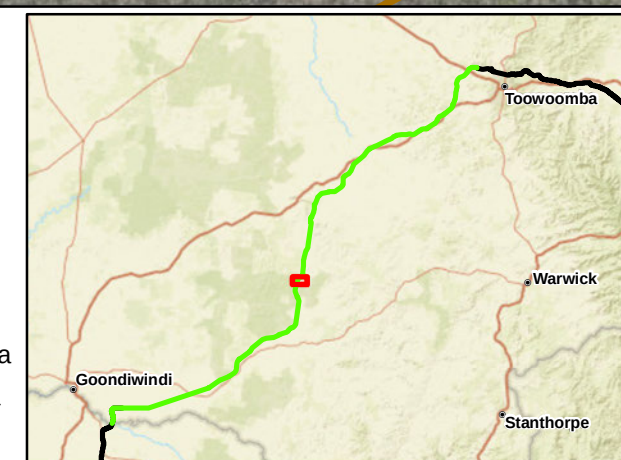
20% AEP Event - Local Catchments - Change in Time of Inundation



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

- ### Estimated change in time of inundation

- | | |
|-------------------------|-----------------------------|
| Over 10 hour decrease | Up to 0.5 hour increase |
| Up to 10 hour decrease | Up to 1 hour increase |
| Up to 5 hour decrease | Up to 2 hour increase |
| Up to 2 hour decrease | Up to 5 hour increase |
| Up to 1 hour decrease | Up to 10 hour increase |
| Up to 0.5 hour decrease | Over 10 hour increase |
| Within 15 minutes | Decrease in inundation area |
| | Increase in inundation area |



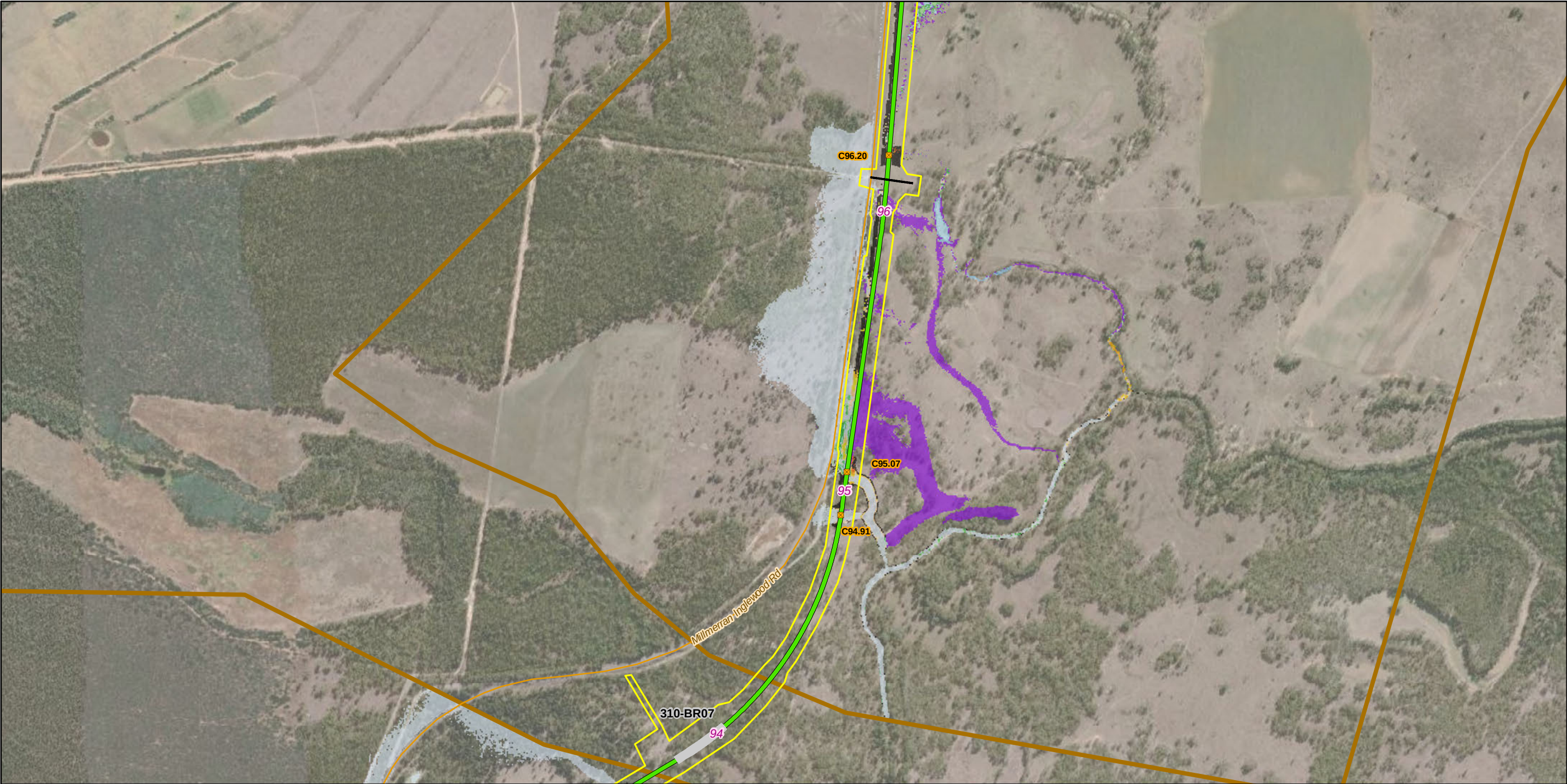
Issue date: 20/06/2024 Version: 5

Coordinate System: GDA 1994 MGA Zone 56

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20% AEP Event - Local Catchments - Change in Time of Inundation

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\310-IHY-202005121245_SurfaceWater\5mxd_Appendix_D\310-IHY-202005121245_FF\JV_FigO12-X_Time_Inundation_Change_v5.mxd Date: 20/06/2024 15:31



Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated change in time of inundation

- | | |
|-------------------------|-----------------------------|
| Over 10 hour decrease | Up to 0.5 hour increase |
| Up to 10 hour decrease | Up to 1 hour increase |
| Up to 5 hour decrease | Up to 2 hour increase |
| Up to 2 hour decrease | Up to 5 hour increase |
| Up to 1 hour decrease | Up to 10 hour increase |
| Up to 0.5 hour decrease | Over 10 hour increase |
| Within 15 minutes | Decrease in inundation area |
| | Increase in inundation area |



A3 scale: 1:15,000

0 0.15 0.3 0.45 0.6 0.75 km



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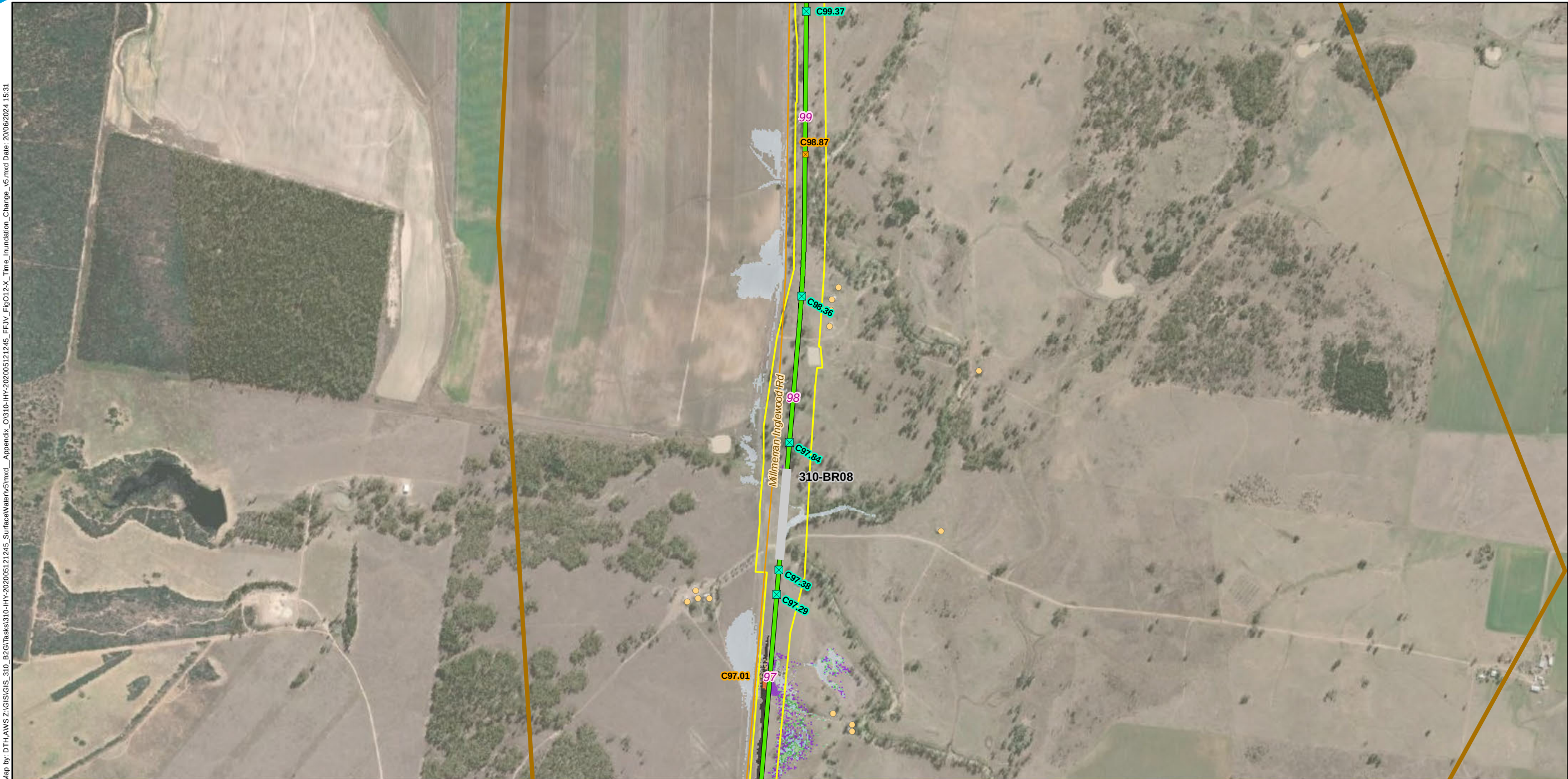
Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure O12 - page 21 of 48:

20% AEP Event - Local Catchments - Change in Time of Inundation

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\310-IHY\202005121245_SurfaceWater\5mxd_Appendix_D\310-IHY\202005121245_FF\JV_FigO12-X_Time_Inundation_Change_v5.mxd Date: 20/06/2024 15:31



Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project floodplain culvert
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated change in time of inundation

- Over 10 hour decrease
- Up to 10 hour decrease
- Up to 5 hour decrease
- Up to 2 hour decrease
- Up to 1 hour decrease
- Up to 0.5 hour decrease
- Within 15 minutes
- Up to 0.5 hour increase
- Up to 1 hour increase
- Up to 2 hour increase
- Up to 5 hour increase
- Up to 10 hour increase
- Over 10 hour increase
- Decrease in inundation area
- Increase in inundation area



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 O12 - page 22 of 48:

20% AEP Event - Local Catchments - Change in Time of Inundation



- ### Estimated change in time of inundation

-
- A map of south-eastern Australia showing the study area. A red square indicates the study site, located on a road between Goondiwindi and Toowoomba. The map also shows the locations of Toowoomba, Warwick, and Stanthorpe. The terrain is depicted with green and brown shading, and a network of roads is shown in red and black lines.

A step function graph on a horizontal axis labeled from 0 to 0.75 km. The function is 1 for intervals $[0, 0.15]$, $[0.3, 0.45]$, and $[0.6, 0.75]$, and 0 for intervals $(0.15, 0.3]$ and $(0.45, 0.6]$.

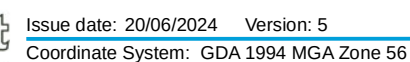


Figure O12 - page 23 of 48:

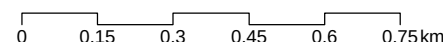
20% AEP Event - Local Catchments - Change in Time of Inundation



- ### Estimated change in time of inundation

-

A3 scale: 1:15,000



Issue date: 20/06/2024 Version: 5

Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure O12 - page 24 of 48:

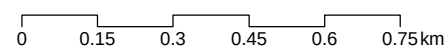
20% AEP Event - Local Catchments - Change in Time of Inundation



- ### Estimated change in time of inundation

-

A3 scale: 1:15,000



Issue date: 20/06/2024 Version: 5

Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure O12 - page 25 of 48:

20% AEP Event - Local Catchments - Change in Time of Inundation



- ### Estimated change in time of inundation

-

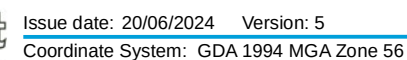


Figure O12 - page 26 of 48:

20% AEP Event - Local Catchments - Change in Time of Inundation



- ### Estimated change in time of inundation

-
- A map of south-eastern Queensland, Australia, showing the location of the study site. The study site is marked with a red square in the center. Major towns labeled include Goondiwindi to the southwest, Toowoomba to the northeast, Warwick to the east, and Stanthorpe to the southeast. A green line indicates a route or boundary passing through the study site. The map shows a network of roads and rivers.

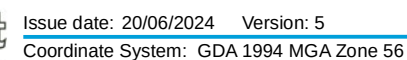


Figure O12 - page 27 of 48:

20% AEP Event - Local Catchments - Change in Time of Inundation



- ### Estimated change in time of inundation

-
- A map of south-eastern Queensland, Australia, showing the location of the study area. The map includes major roads (red lines) and rivers (blue lines). The study site is marked with a red square. Key locations labeled on the map are Goondiwindi, Toowoomba, Warwick, and Stanthorpe. The study area is located between Goondiwindi and Toowoomba, near the border with New South Wales.

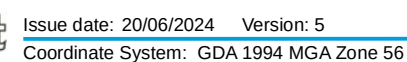


Figure O12 - page 28 of 48:

20% AEP Event - Local Catchments - Change in Time of Inundation



- ### Estimated change in time of inundation

-
- A map of south-eastern Australia showing the study area. A red square indicates the study site, located on a road between Goondiwindi and Toowoomba. The map also shows the locations of Toowoomba, Warwick, and Stanthorpe. The study area is highlighted in green.

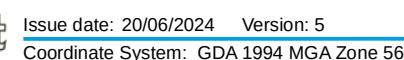


Figure O12 - page 29 of 48:

20% AEP Event - Local Catchments - Change in Time of Inundation

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\310-HY-202005121245_SurfaceWater\5vmsd_Appendix_O\310-HY-202005121245_FF\JV_FigO12-X_Time_Inundation_Change_v5.mxd Date: 20/06/2024 15:32

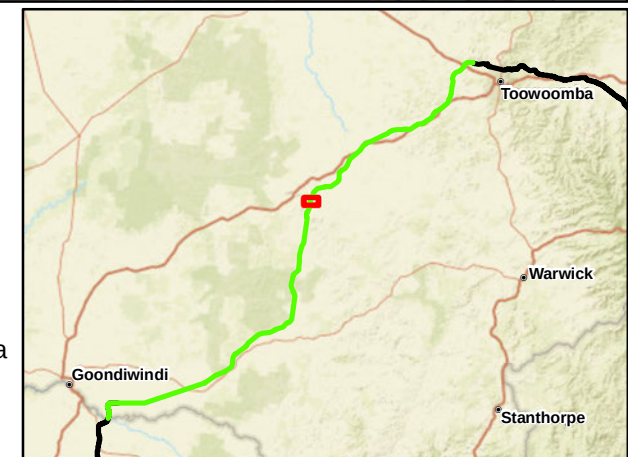


Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Local hydraulic model extent
- Project footprint

Estimated change in time of inundation

- | | |
|-------------------------|-----------------------------|
| Over 10 hour decrease | Up to 0.5 hour increase |
| Up to 10 hour decrease | Up to 1 hour increase |
| Up to 5 hour decrease | Up to 2 hour increase |
| Up to 2 hour decrease | Up to 5 hour increase |
| Up to 1 hour decrease | Up to 10 hour increase |
| Up to 0.5 hour decrease | Over 10 hour increase |
| Within 15 minutes | Decrease in inundation area |
| | Increase in inundation area |



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 O12 - page 30 of 48:

20% AEP Event - Local Catchments - Change in Time of Inundation



- ### Estimated change in time of inundation

-
- A map of south-eastern Australia showing the study area. A red square indicates the study site, located on a road between Goondiwindi and Toowoomba. The map also shows the locations of Toowoomba, Warwick, and Stanthorpe. The study area is highlighted in green.

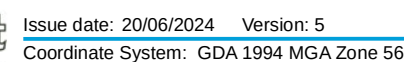
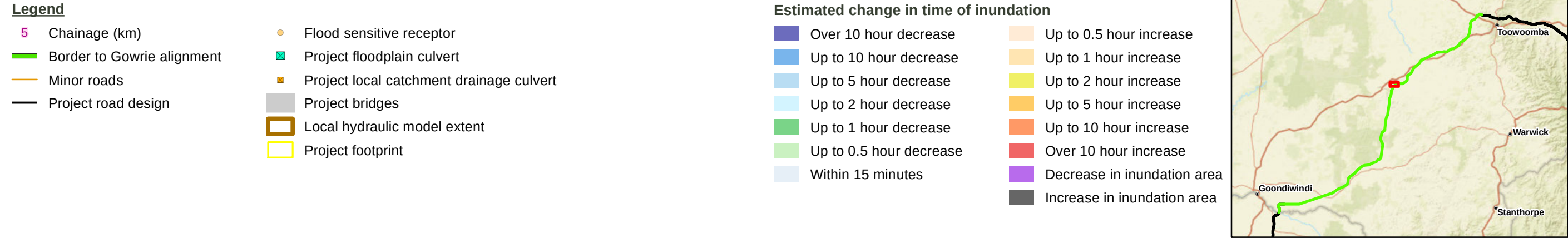
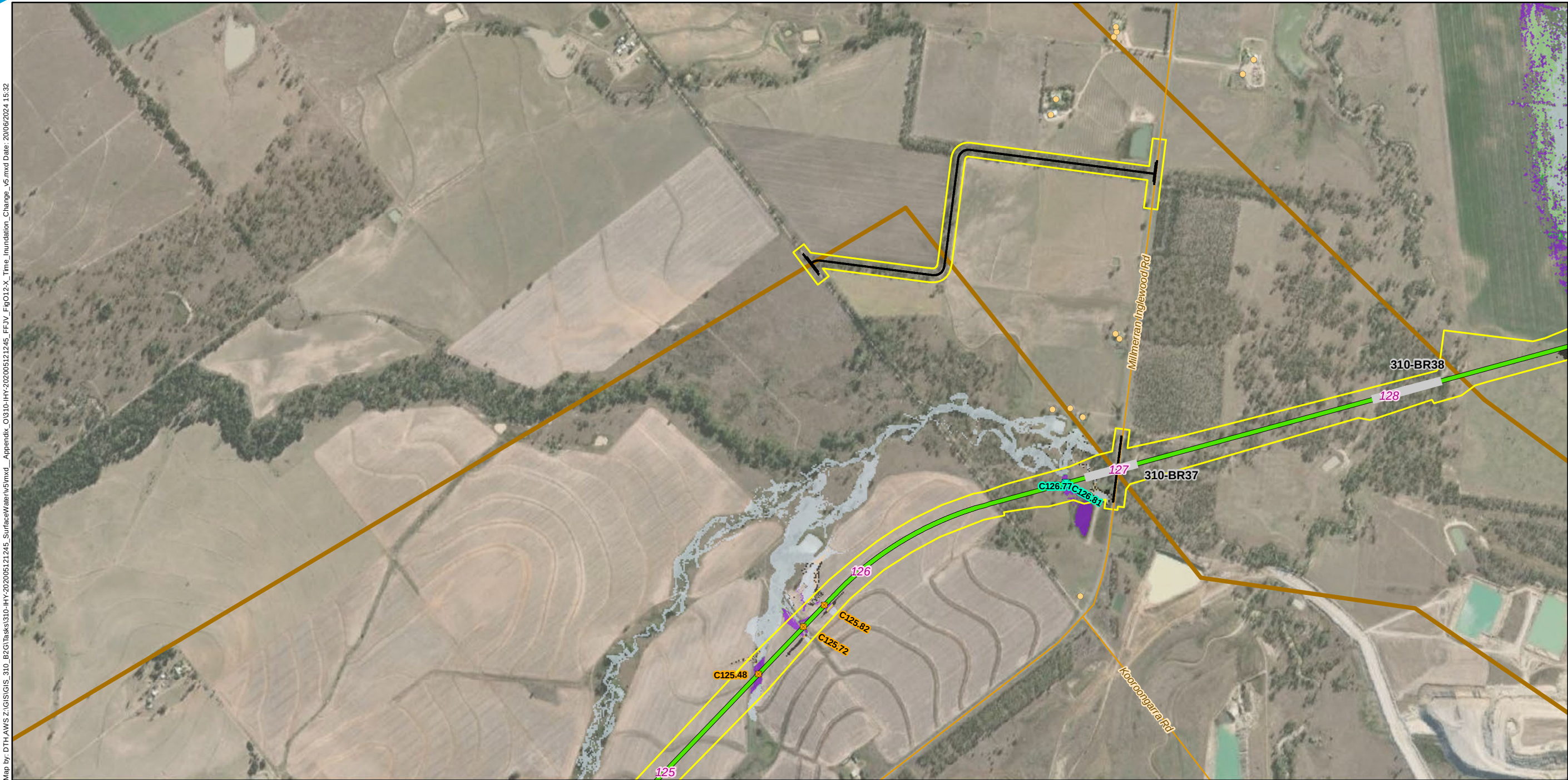


Figure O12 - page 31 of 48:

20% AEP Event - Local Catchments - Change in Time of Inundation

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\310-IHY-202005121245_SurfaceWater\5mxd_Appendix_O\310-IHY-202005121245_FF\JV_FigO12-X_Time_Inundation_Change_v5.mxd Date: 20/06/2024 15:32



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



- ### Estimated change in time of inundation

-



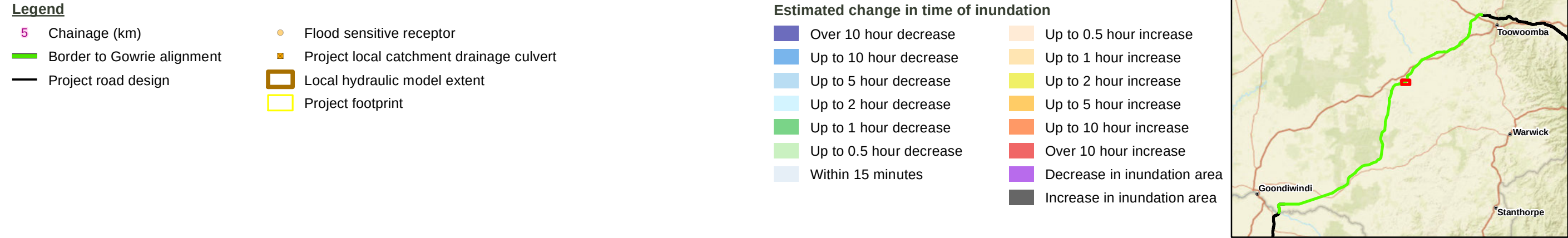
Future Freight
Integrating Community, Environment and Engineering

Border to Gowrie

Figure O12 - page 33 of 48:

20% AEP Event - Local Catchments - Change in Time of Inundation

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\310-IHY-202005121245_SurfaceWater\5mxd_Appendix_D\310-IHY-202005121245_FF\JV_FigO12-X_Time_Inundation_Change_v5.mxd Date: 20/06/2024 15:32



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

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\GIS_310_IHY-202005121245_SurfaceWater\5mxd_Appendix_D\310-IHY-202005121245_FF\JV_FigO12-X_Time_Inundation_Change_v5.mxd Date: 20/06/2024 15:32



Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Local hydraulic model extent
- Project footprint

Estimated change in time of inundation

- | | |
|-------------------------|-----------------------------|
| Over 10 hour decrease | Up to 0.5 hour increase |
| Up to 10 hour decrease | Up to 1 hour increase |
| Up to 5 hour decrease | Up to 2 hour increase |
| Up to 2 hour decrease | Up to 5 hour increase |
| Up to 1 hour decrease | Up to 10 hour increase |
| Up to 0.5 hour decrease | Over 10 hour increase |
| Within 15 minutes | Decrease in inundation area |
| | Increase in inundation area |



A3 scale: 1:15,000

0 0.15 0.3 0.45 0.6 0.75 km



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

Border to Gowrie

Figure O12 - page 35 of 48:

20% AEP Event - Local Catchments - Change in Time of Inundation



- ### Estimated change in time of inundation

-
- A map of south-eastern Queensland, Australia, showing the location of the study area. The map includes major roads (red lines) and rivers (blue lines). The study site is marked with a red square on a road between Goondiwindi and Toowoomba. Other towns labeled are Goondiwindi, Toowoomba, Warwick, and Stanthorpe. The terrain is shown with green and brown shading.

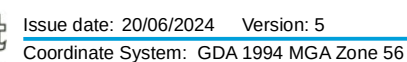
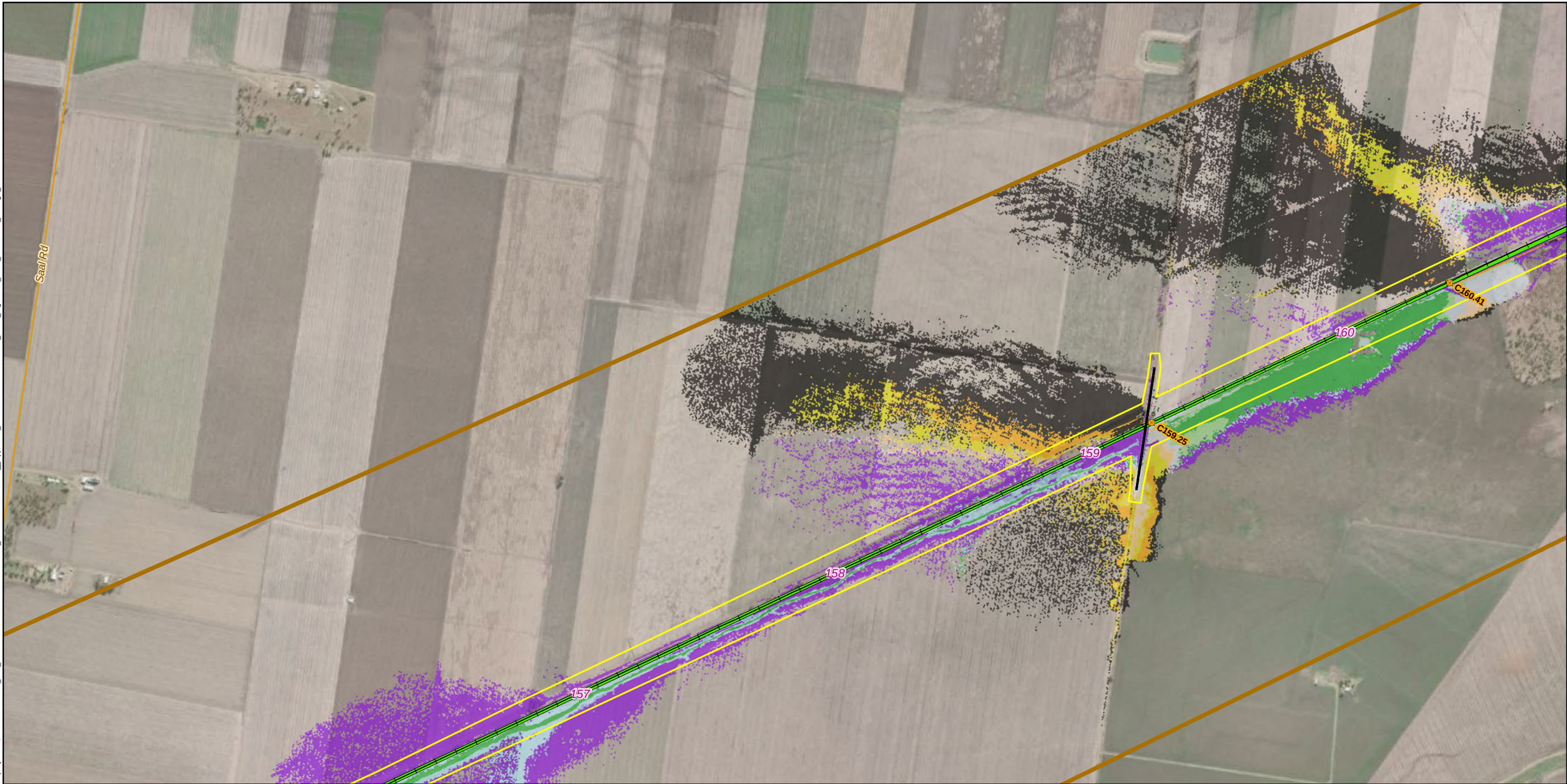


Figure O12 - page 36 of 48:

20% AEP Event - Local Catchments - Change in Time of Inundation

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\GIS_310-IHY-202005121245_SurfaceWater\5mxd_Appendix_D\310-IHY-202005121245_FF\JV_FigO12-X_Time_Inundation_Change_v5.mxd Date: 20/06/2024 15:32



Legend

- 5 Chainage (km)
- Existing rail (operational)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Local hydraulic model extent
- Project footprint

Estimated change in time of inundation

- | | |
|-------------------------|-----------------------------|
| Over 10 hour decrease | Up to 0.5 hour increase |
| Up to 10 hour decrease | Up to 1 hour increase |
| Up to 5 hour decrease | Up to 2 hour increase |
| Up to 2 hour decrease | Up to 5 hour increase |
| Up to 1 hour decrease | Up to 10 hour increase |
| Up to 0.5 hour decrease | Over 10 hour increase |
| Within 15 minutes | Decrease in inundation area |
| | Increase in inundation area |



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



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

Border to Gowrie

Figure O12 - page 37 of 48:

20% AEP Event - Local Catchments - Change in Time of Inundation



- ### Estimated change in time of inundation

-



Border to Gowrie

Figure O12 - page 38 of 48:

20% AEP Event - Local Catchments - Change in Time of Inundation



- ### Estimated change in time of inundation

-
- A map of south-eastern Australia showing the study area. A red rectangle indicates the study site, located on a road between Goondiwindi and Toowoomba. The map also shows the locations of Goondiwindi, Toowoomba, Warwick, and Stanthorpe. The study area is highlighted in green.

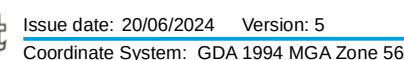


Figure O12 - page 39 of 48:

20% AEP Event - Local Catchments - Change in Time of Inundation



- ### Estimated change in time of inundation

-
- A map of south-eastern Australia showing the study area. A red rectangle indicates the location of the study site, situated on a road between Goondiwindi and Toowoomba. The map also shows the locations of Goondiwindi, Toowoomba, Warwick, and Stanthorpe. The study area is highlighted in green.



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Border to Gowrie

Figure O12 - page 40 of 48:

20% AEP Event - Local Catchments - Change in Time of Inundation



- ### Estimated change in time of inundation

-
- A map of the Toowoomba region in Queensland, Australia. The map shows a proposed green line running from the southwest towards the northeast, passing through a red square. The red square is located near the town of Toowoomba. Other towns labeled on the map include Goondiwindi, Warwick, and Stanthorpe. The map also shows major roads and rivers.

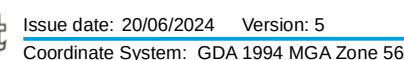


Figure O12 - page 41 of 48:

20% AEP Event - Local Catchments - Change in Time of Inundation



- ### Estimated change in time of inundation

-
- A map of the Toowoomba region in Queensland, Australia. The map shows a proposed green line running from the southwest towards the northeast. A red square is located on this green line, approximately halfway between Goondiwindi and Toowoomba. The map includes labels for Goondiwindi, Toowoomba, Warwick, and Stanthorpe. A black line represents the main road network, and a blue line represents a river. The background is a light beige color with green patches indicating vegetation.

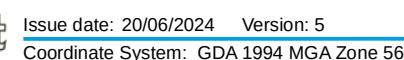


Figure O12 - page 42 of 48:

20% AEP Event - Local Catchments - Change in Time of Inundation

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\GIS_310-B2\Tasks\310-HY-2020\5121245_SurfaceWater\5mxd_Appendix_D\310-HY-2020\5121245_FF\JV_FigO12-X_Time_Inundation_Change_v5.mxd Date: 20/06/2024 15:33

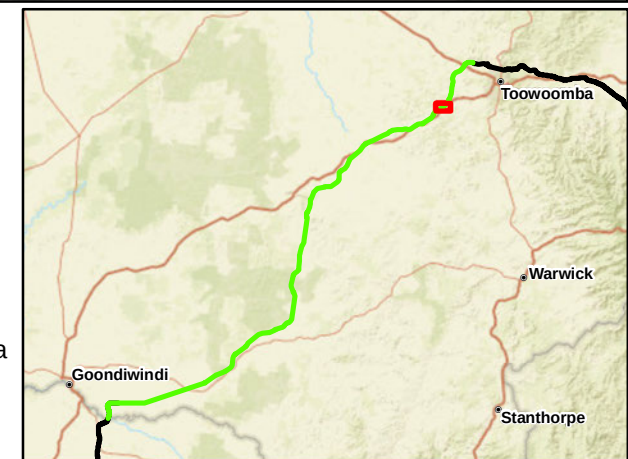


Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Major roads
- Minor roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated change in time of inundation

- | | |
|-------------------------|-----------------------------|
| Over 10 hour decrease | Up to 0.5 hour increase |
| Up to 10 hour decrease | Up to 1 hour increase |
| Up to 5 hour decrease | Up to 2 hour increase |
| Up to 2 hour decrease | Up to 5 hour increase |
| Up to 1 hour decrease | Up to 10 hour increase |
| Up to 0.5 hour decrease | Over 10 hour increase |
| Within 15 minutes | Decrease in inundation area |
| | Increase in inundation area |



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

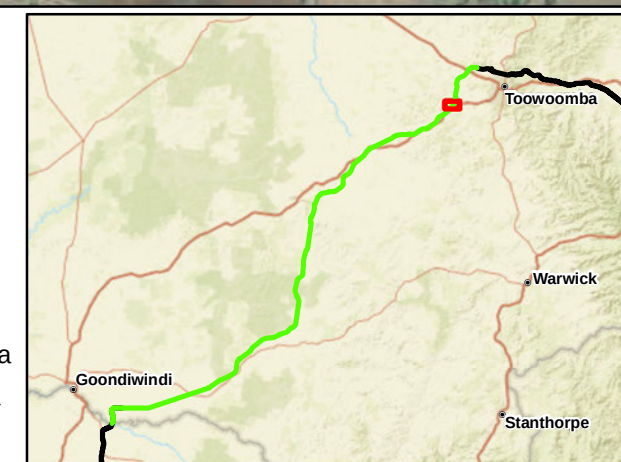
Figure O12 - page 43 of 48:

20% AEP Event - Local Catchments - Change in Time of Inundation



 Chainage (km)
 Border to Gowrie alignment
 Major roads
 Minor roads
 Project road design
 Flood sensitive receptor
 Project floodplain culvert
 Project bridges
 Local hydraulic model extent
 Project footprint

Over 10 hour decrease	Up to 0.5 hour increase
Up to 10 hour decrease	Up to 1 hour increase
Up to 5 hour decrease	Up to 2 hour increase
Up to 2 hour decrease	Up to 5 hour increase
Up to 1 hour decrease	Up to 10 hour increase
Up to 0.5 hour decrease	Over 10 hour increase
Within 15 minutes	Decrease in inundation area
	Increase in inundation area



20% AEP Event - Local Catchments - Change in Time of Inundation

Border to Gowrie

Figure O12 - page 44 of 48:

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\310-IHY-202005121245_SurfaceWater\5mxd_Appendix_D\310-IHY-202005121245_FF\JV_FigO12-X_Time_Inundation_Change_v5.mxd Date: 20/06/2024 15:33



Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Major roads
- Project road design
- Flood sensitive receptor
- Project floodplain culvert
- Project local catchment drainage culvert
- Local hydraulic model extent
- Project footprint

Estimated change in time of inundation

- | | |
|-------------------------|-----------------------------|
| Over 10 hour decrease | Up to 0.5 hour increase |
| Up to 10 hour decrease | Up to 1 hour increase |
| Up to 5 hour decrease | Up to 2 hour increase |
| Up to 2 hour decrease | Up to 5 hour increase |
| Up to 1 hour decrease | Up to 10 hour increase |
| Up to 0.5 hour decrease | Over 10 hour increase |
| Within 15 minutes | Decrease in inundation area |
| | Increase in inundation area |



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 O12 - page 45 of 48:

20% AEP Event - Local Catchments - Change in Time of Inundation

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\310-IHY-202005121245_SurfaceWater\5vmsd_Appendix_O\310-IHY-202005121245_FF\JV_FigO12-X_Time_Inundation_Change_v5.mxd Date: 20/06/2024 15:33



Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project floodplain culvert
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated change in time of inundation

- | | |
|-------------------------|-----------------------------|
| Over 10 hour decrease | Up to 0.5 hour increase |
| Up to 10 hour decrease | Up to 1 hour increase |
| Up to 5 hour decrease | Up to 2 hour increase |
| Up to 2 hour decrease | Up to 5 hour increase |
| Up to 1 hour decrease | Up to 10 hour increase |
| Up to 0.5 hour decrease | Over 10 hour increase |
| Within 15 minutes | Decrease in inundation area |
| | Increase in inundation area |



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



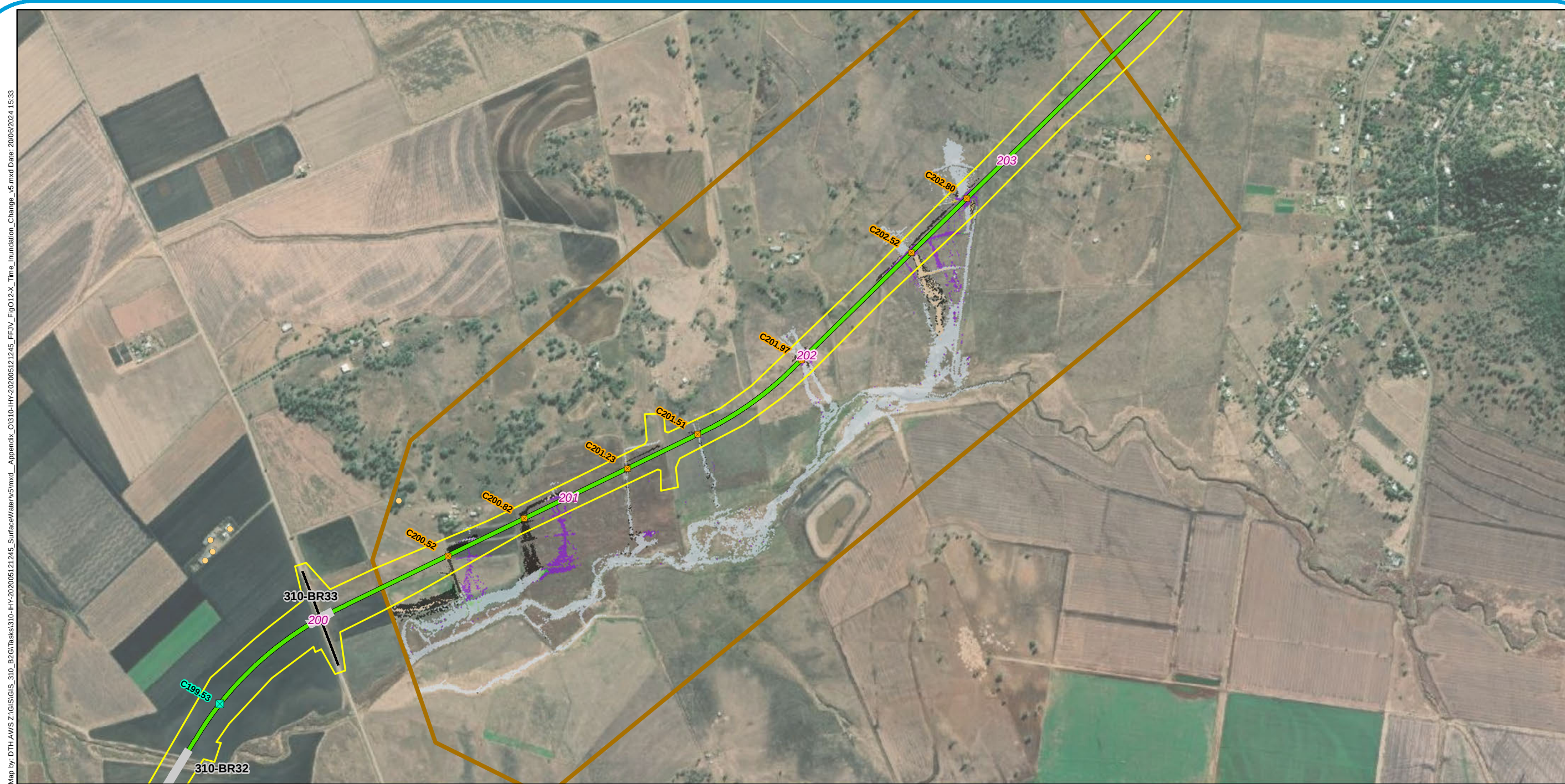
Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure O12 - page 46 of 48:

20% AEP Event - Local Catchments - Change in Time of Inundation

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\310-IHY-202005121245_SurfaceWater\5mxd_Appendix_D\310-IHY-202005121245_FF\JV_FigO12-X_Time_Inundation_Change_v5.mxd Date: 20/06/2024 15:33

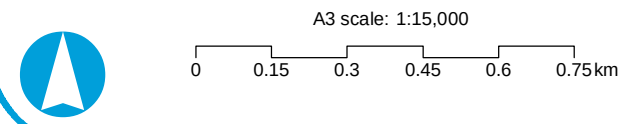
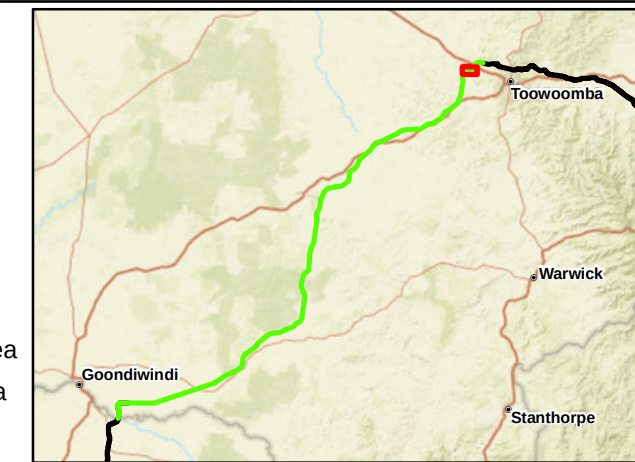


Legend

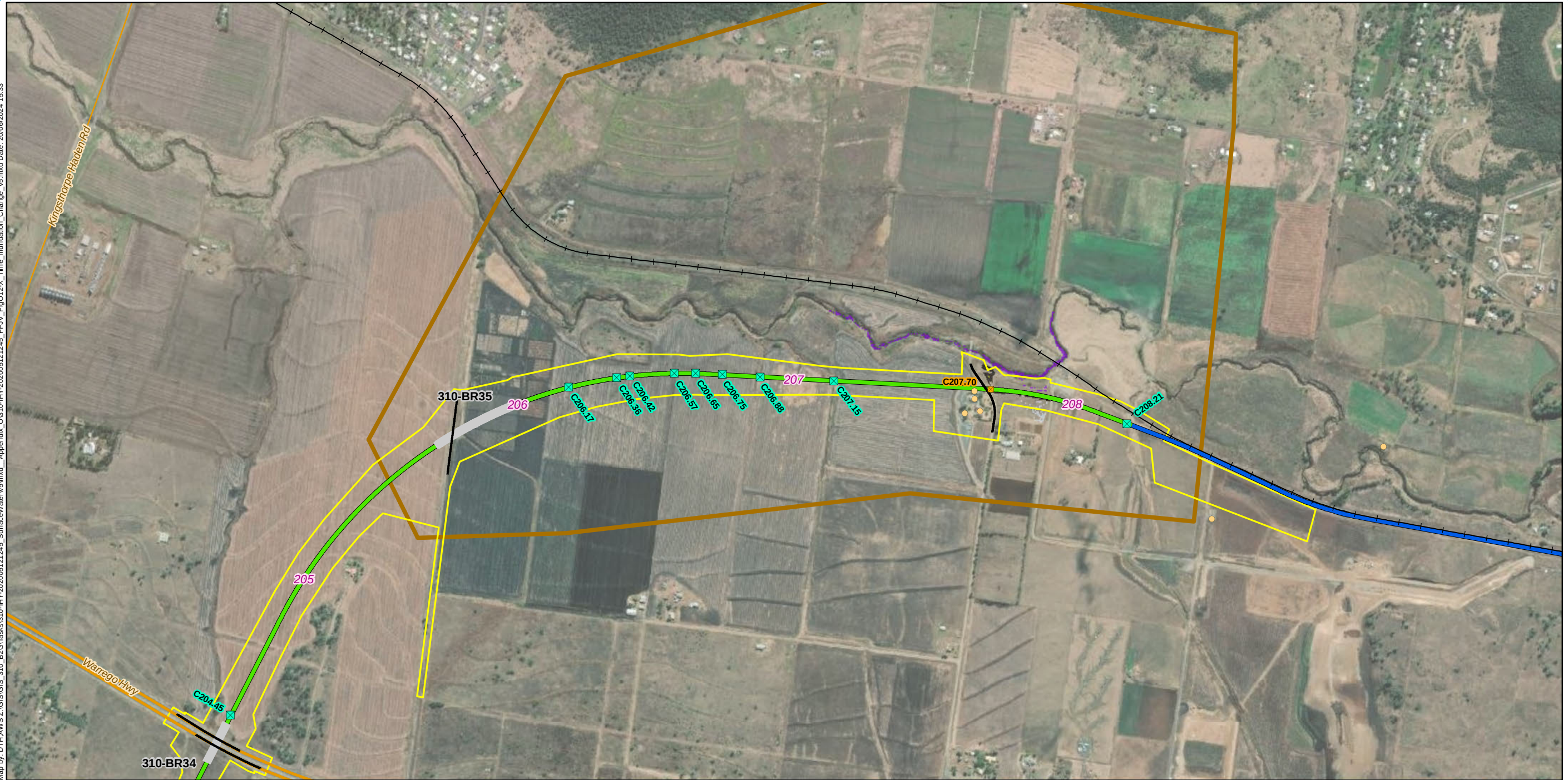
- 5 Chainage (km)
- Border to Gowrie alignment
- Project road design
- Flood sensitive receptor
- Project floodplain culvert
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated change in time of inundation

- | | |
|-------------------------|-----------------------------|
| Over 10 hour decrease | Up to 0.5 hour increase |
| Up to 10 hour decrease | Up to 1 hour increase |
| Up to 5 hour decrease | Up to 2 hour increase |
| Up to 2 hour decrease | Up to 5 hour increase |
| Up to 1 hour decrease | Up to 10 hour increase |
| Up to 0.5 hour decrease | Over 10 hour increase |
| Within 15 minutes | Decrease in inundation area |
| | Increase in inundation area |



Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\310-IHY-202005121245_SurfaceWater\5mxd_Appendix_D\310-IHY-202005121245_FF\JV_FigO12-X_Time_Inundation_Change_v5.mxd Date: 20/06/2024 15:33



Legend

- 5 Chainage (km)
- Existing rail (operational)
- Border to Gowrie alignment
- Gowrie to Helidon alignment
- Major roads
- Minor roads
- Project road design
- Flood sensitive receptor
- Project floodplain culvert
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated change in time of inundation

- Over 10 hour decrease
- Up to 10 hour decrease
- Up to 5 hour decrease
- Up to 2 hour decrease
- Up to 1 hour decrease
- Up to 0.5 hour decrease
- Within 15 minutes
- Up to 0.5 hour increase
- Up to 1 hour increase
- Up to 2 hour increase
- Up to 5 hour increase
- Up to 10 hour increase
- Over 10 hour increase
- Decrease in inundation area
- Increase in inundation area



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



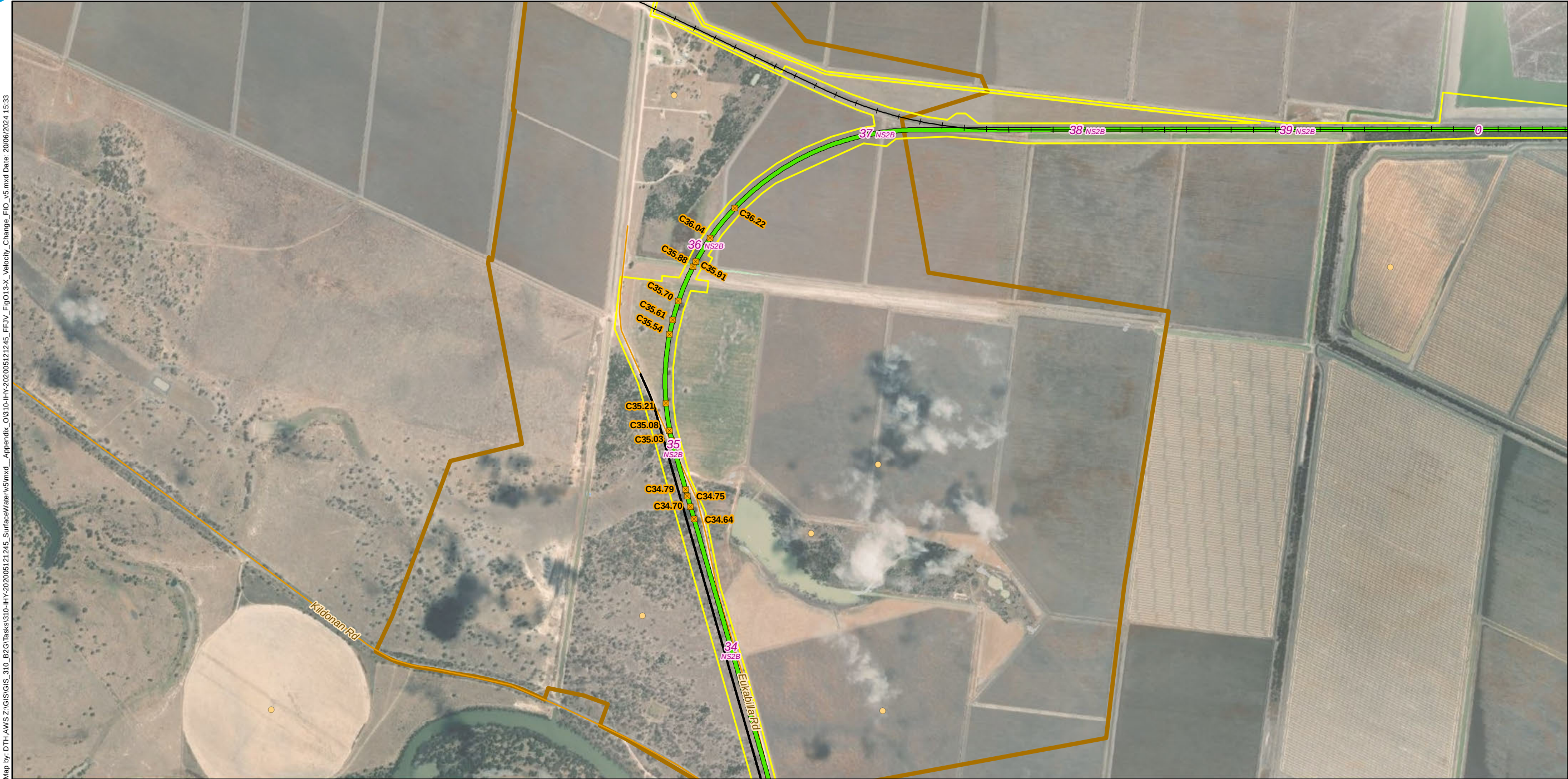
Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure O12 - page 48 of 48:

20% AEP Event - Local Catchments - Change in Time of Inundation

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\GIS_310_IHY\202005121245_SurfaceWater\5mxd_Appendix_D\310-IHY\202005121245_FF\JV_FigO13-X_Velocity_Change_FIO_v5.mxd Date: 20/06/2024 15:33



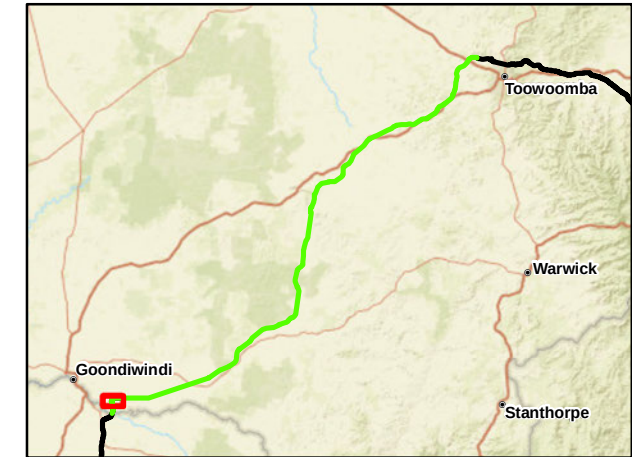
Legend

- 5 Chainage (km)
- Existing rail (operational)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Local hydraulic model extent
- Project footprint

Estimated change in peak velocity (m/s)

< -0.5	0.01 to 0.05
-0.50 to -0.20	0.05 to 0.10
-0.20 to -0.10	0.10 to 0.20
-0.10 to -0.05	0.20 to 0.50
-0.05 to -0.01	> 0.50
-0.01 to 0.01	

A data filter has been applied; results where model input grid's design velocity <0.5m/s have been cut off and are not displayed.



A3 scale: 1:20,000
0 0.2 0.4 0.6 0.8 1km



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

Border to Gowrie

Figure O13 - page 1 of 48:

20% AEP Event - Local Catchments - Change in Velocity (<0.5m/s cutoff)

Map by: D:\HAWKS\GIS\310_B2\GIS\310-HY-202005121245_SurfaceWater\5mxd_Appldix_D\310-HY-202005121245_FF\JV_FigO13-X_Velocity_Change_FIO_v5.mxd Date: 20/06/2024 15:33



Legend

- 5 Chainage (km)
- Existing rail (operational)
- Border to Gowrie alignment
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Local hydraulic model extent
- Project footprint

Estimated change in peak velocity (m/s)

< -0.5	0.01 to 0.05
-0.50 to -0.20	0.05 to 0.10
-0.20 to -0.10	0.10 to 0.20
-0.10 to -0.05	0.20 to 0.50
-0.05 to -0.01	> 0.50
-0.01 to 0.01	

A data filter has been applied; results where model input grid's design velocity <0.5m/s have been cut off and are not displayed.



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

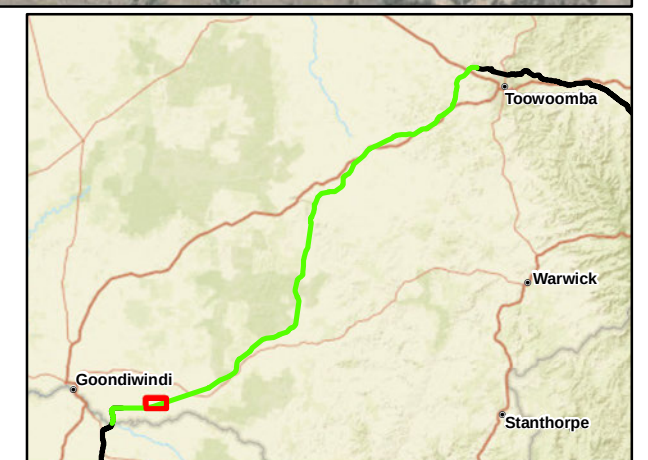


- 5 Chainage (km)
- Existing rail (operational)
- Border to Gowrie alignment
- Project road design

- Flood sensitive receptor
- Project local catchment drainage culvert
- ▭ Local hydraulic model extent
- ▭ Project footprint

	< -0.5		0.01 to 0.05
	-0.50 to -0.20		0.05 to 0.10
	-0.20 to -0.10		0.10 to 0.20
	-0.10 to -0.05		0.20 to 0.50
	-0.05 to -0.01		> 0.50
	-0.01 to 0.01		

A data filter has been applied; results where model input grid's *design velocity* <0.5m/s have been cut off and are not displayed.



A3 scale: 1:20,000

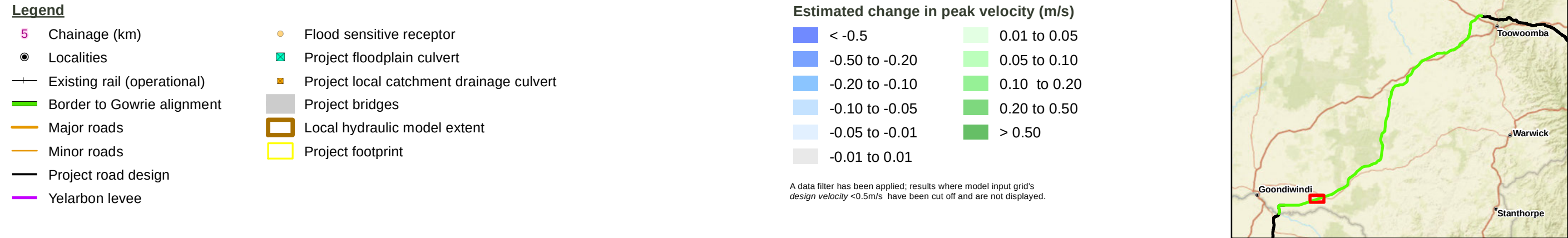


Issue date: 20/06/2024 Version: 5

Coordinate System: GDA 1994 MGA Zone 56

Figure O13 - page 3 of 48:

20% AEP Event - Local Catchments - Change in Velocity (<0.5m/s cutoff)



A3 scale: 1:25,000
0 0.25 0.5 0.75 1 1.25 km



Legend

- ### Legend
- | | | | |
|-----|-----------------------------|---|--|
| 5 | Chainage (km) | | Flood sensitive receptor |
| ● | Localities | ▣ | Project floodplain culvert |
| —+— | Existing rail (operational) | ■ | Project local catchment drainage culvert |
| — | Border to Gowrie alignment | ■ | Project bridges |
| — | Major roads | ▣ | Local hydraulic model extent |
| — | Minor roads | ▣ | Project footprint |
| — | Project road design | | |
| — | Yelarbon levee | | |

Estimated change in peak velocity (m/s)

	< -0.5		0.01 to 0.05
	-0.50 to -0.20		0.05 to 0.10
	-0.20 to -0.10		0.10 to 0.20
	-0.10 to -0.05		0.20 to 0.50
	-0.05 to -0.01		> 0.50
	-0.01 to 0.01		

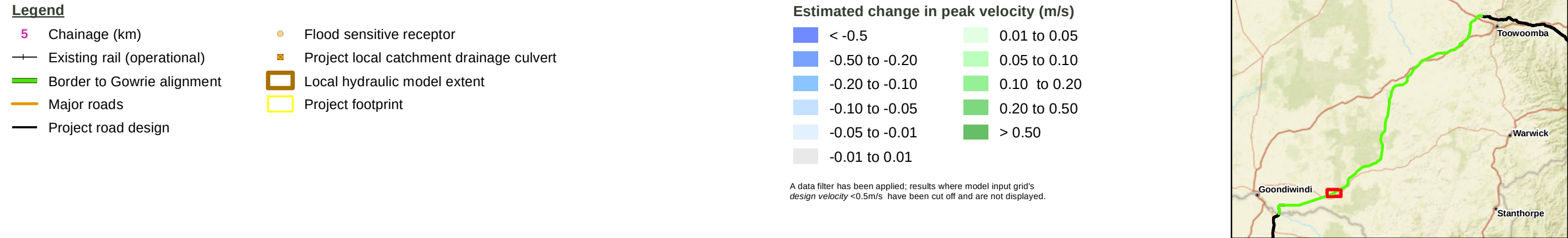
A data filter has been applied; results where model input grid's *design velocity* <0.5m/s have been cut off and are not displayed.



Border to Gowrie

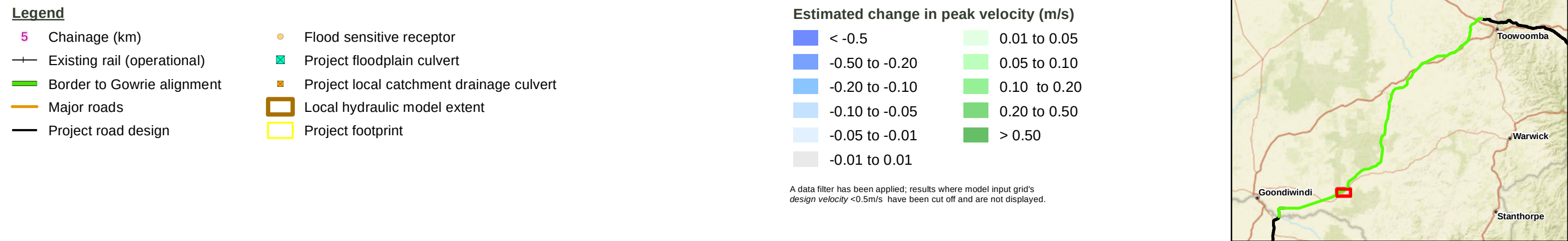
Figure O13 - page 5 of 48:

20% AEP Event - Local Catchments - Change in Velocity (<0.5m/s cutoff)



A3 scale: 1:25,000

0 0.25 0.5 0.75 1 1.25 km



A3 scale: 1:25,000

0 0.25 0.5 0.75 1 1.25 km



- Estimated change in peak velocity (m/s)**

A data filter has been applied; results where model input grid's *design velocity* <0.5m/s have been cut off and are not displayed.



Figure O13 - page 8 of 48:

20% AEP Event - Local Catchments - Change in Velocity (<0.5m/s cutoff)



- 

A step function graph on a horizontal axis labeled from 0 to 0.75 km. The function is 1 for intervals $[0, 0.15]$, $[0.3, 0.45]$, and $[0.6, 0.75]$, and 0 for intervals $(0.15, 0.3]$ and $(0.45, 0.6]$.



Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\310-IHY-202005121245_SurfaceWater\5mxd_Appendix_O\310-IHY-202005121245_FF\JV_FigO13-X_Velocity_Change_FIO_v5.mxd Date: 20/06/2024 15:34



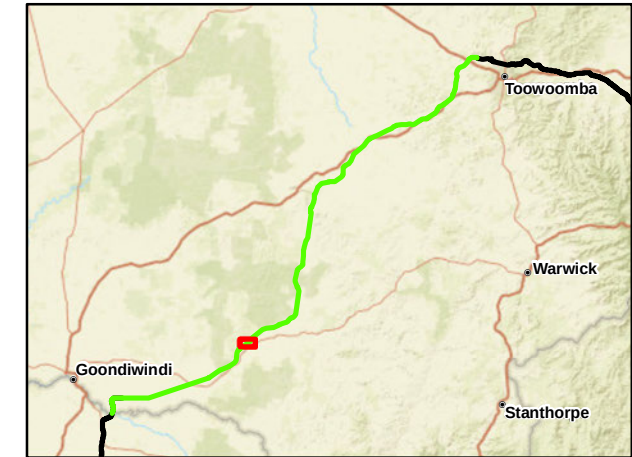
Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Major roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated change in peak velocity (m/s)

< -0.5	0.01 to 0.05
-0.50 to -0.20	0.05 to 0.10
-0.20 to -0.10	0.10 to 0.20
-0.10 to -0.05	0.20 to 0.50
-0.05 to -0.01	> 0.50
-0.01 to 0.01	

A data filter has been applied; results where model input grid's design velocity <0.5m/s have been cut off and are not displayed.



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 O13 - page 10 of 48:

20% AEP Event - Local Catchments - Change in Velocity (<0.5m/s cutoff)



- Estimated change in peak velocity (m/s)**

A data filter has been applied; results where model input grid's *design velocity* <0.5m/s have been cut off and are not displayed.

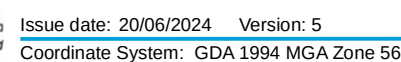
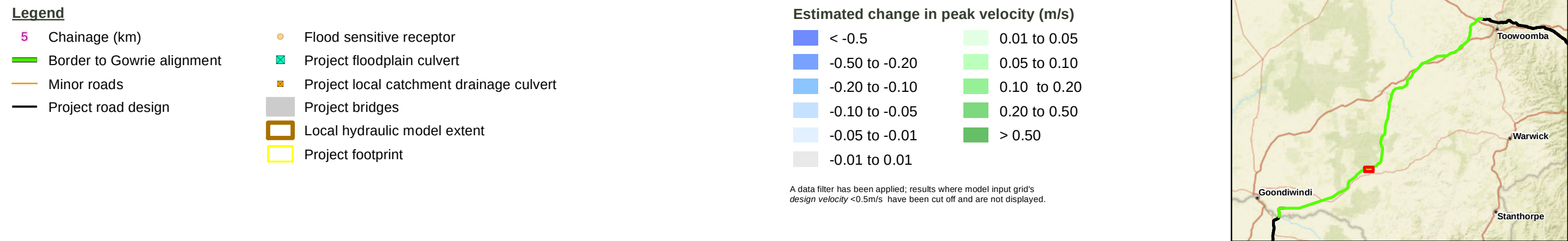


Figure O13 - page 11 of 48:

20% AEP Event - Local Catchments - Change in Velocity (<0.5m/s cutoff)



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

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\Tasks\310-IHY-202005121245_SurfaceWater\5mxd_Appendix_O\310-IHY-202005121245_FF\JV_FigO13-X_Velocity_Change_FIO_v5.mxd Date: 20/06/2024 15:34



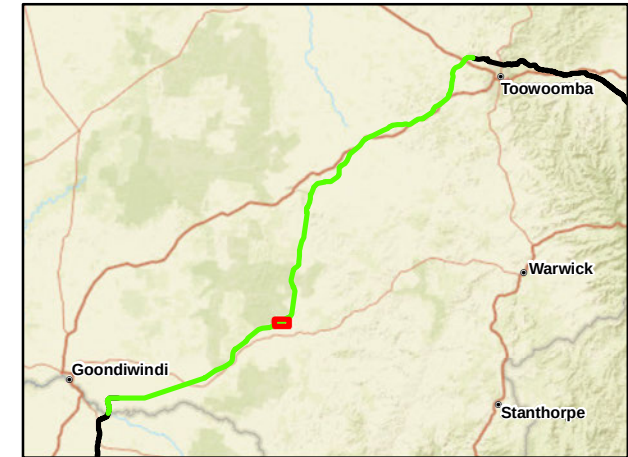
Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project floodplain culvert
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated change in peak velocity (m/s)

< -0.5	0.01 to 0.05
-0.50 to -0.20	0.05 to 0.10
-0.20 to -0.10	0.10 to 0.20
-0.10 to -0.05	0.20 to 0.50
-0.05 to -0.01	> 0.50
-0.01 to 0.01	

A data filter has been applied; results where model input grid's design velocity <0.5m/s have been cut off and are not displayed.



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



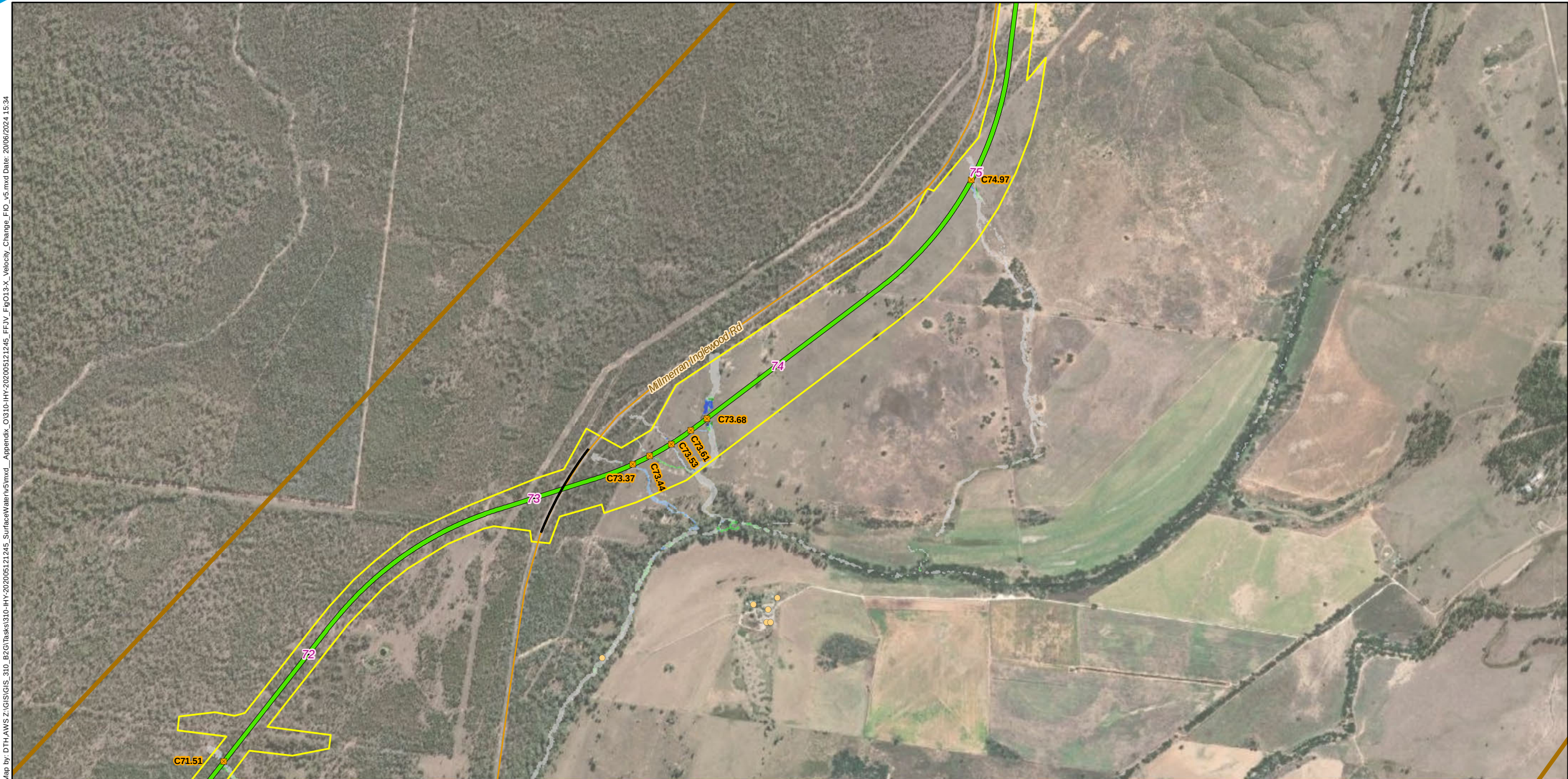
Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure O13 - page 13 of 48:

20% AEP Event - Local Catchments - Change in Velocity (<0.5m/s cutoff)

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\GIS_310-HY-202005121245_SurfaceWater\5mxd_Appendix_O\310-HY-202005121245_FF\JV_FigO13-X_Velocity_Change_FIO_v5.mxd Date: 20/06/2024 15:34



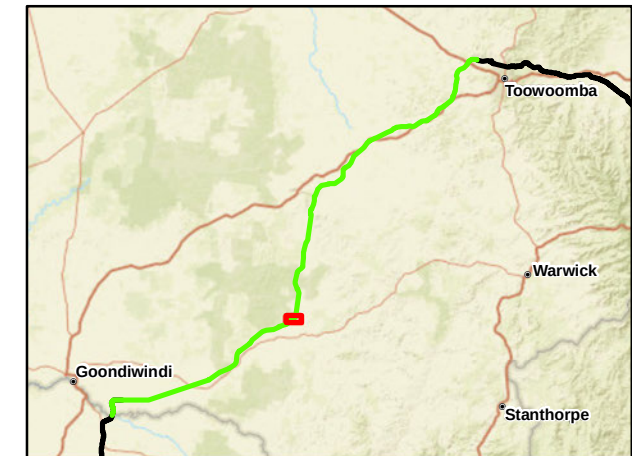
Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Local hydraulic model extent
- Project footprint

Estimated change in peak velocity (m/s)

< -0.5	0.01 to 0.05
-0.50 to -0.20	0.05 to 0.10
-0.20 to -0.10	0.10 to 0.20
-0.10 to -0.05	0.20 to 0.50
-0.05 to -0.01	> 0.50
-0.01 to 0.01	

A data filter has been applied; results where model input grid's design velocity <0.5m/s have been cut off and are not displayed.



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 O13 - page 14 of 48:

20% AEP Event - Local Catchments - Change in Velocity (<0.5m/s cutoff)



- Estimated change in peak velocity (m/s)**

A data filter has been applied; results where model input grid's *design velocity* <0.5m/s have been cut off and are not displayed.

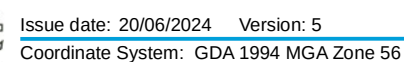


Figure O13 - page 15 of 48:

20% AEP Event - Local Catchments - Change in Velocity (<0.5m/s cutoff)



- Estimated change in peak velocity (m/s)**

A data filter has been applied; results where model input grid's *design velocity* <0.5m/s have been cut off and are not displayed.

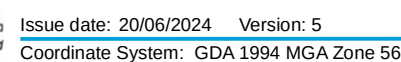


Figure O13 - page 16 of 48:

20% AEP Event - Local Catchments - Change in Velocity (<0.5m/s cutoff)



- Estimated change in peak velocity (m/s)**

A data filter has been applied; results where model input grid's *design velocity* <0.5m/s have been cut off and are not displayed.

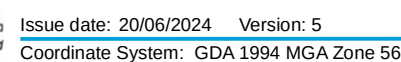
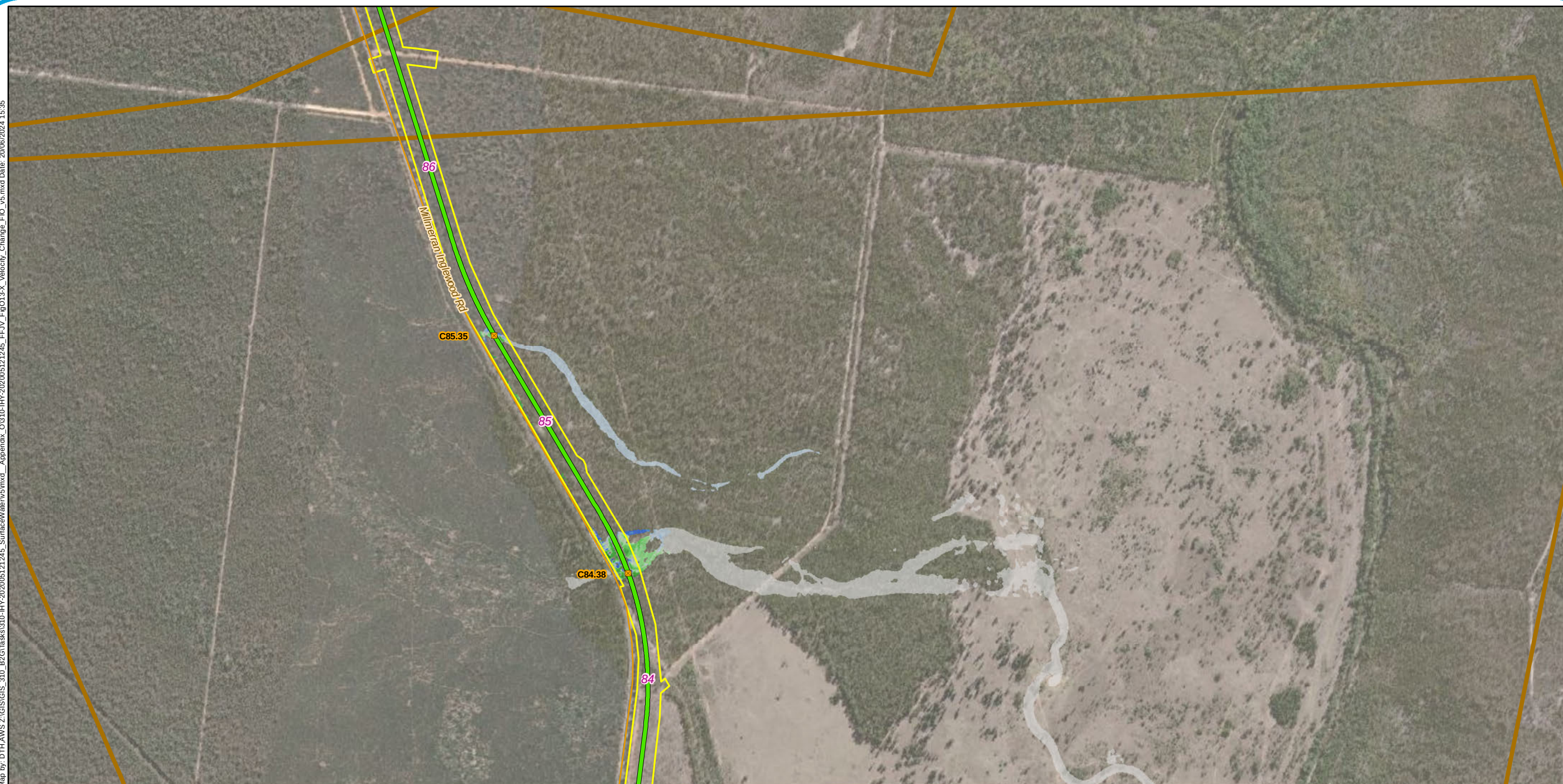


Figure O13 - page 17 of 48:

20% AEP Event - Local Catchments - Change in Velocity (<0.5m/s cutoff)



5 Chainage (km)

Border to Gowrie alignment

Minor roads

Project road design

- Flood sensitive receptor
- Project local catchment drainage culvert
- ▭ Local hydraulic model extent
- ▭ Project footprint

	< -0.5		0.01 to 0.05
	-0.50 to -0.20		0.05 to 0.10
	-0.20 to -0.10		0.10 to 0.20
	-0.10 to -0.05		0.20 to 0.50
	-0.05 to -0.01		> 0.50
	-0.01 to 0.01		

A data filter has been applied; results where model input grid's *design velocity* <0.5m/s have been cut off and are not displayed.



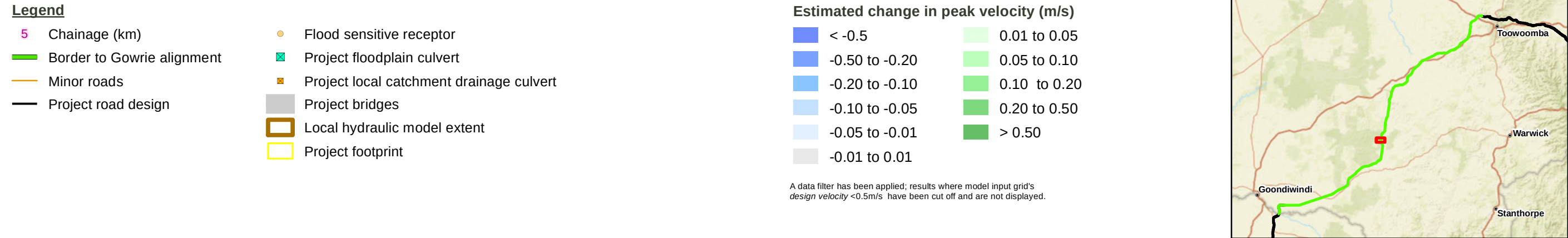
Issue date: 20/06/2024 Version: 5

Coordinate System: GDA 1994 MGA Zone 56

Figure O13 - page 18 of 48:

20% AEP Event - Local Catchments - Change in Velocity (<0.5m/s cutoff)

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\310-IHY-202005121245_SurfaceWater\5mxd_Appldix_D\310-IHY-202005121245_FF\J_V_FigO13-X_Velocity_Change_FIO_v5.mxd Date: 20/06/2024 15:35



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

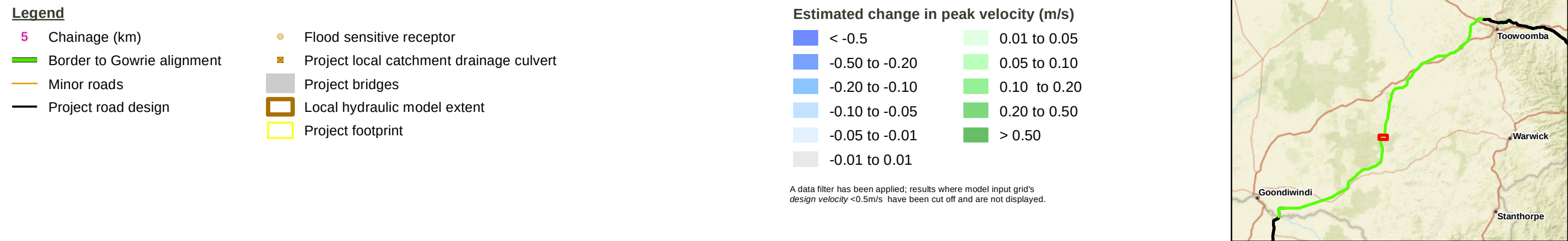


Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure O13 - page 19 of 48:

20% AEP Event - Local Catchments - Change in Velocity (<0.5m/s cutoff)



A3 scale: 1:15,000

0 0.15 0.3 0.45 0.6 0.75 km



- Estimated change in peak velocity (m/s)**

A data filter has been applied; results where model input grid's *design velocity* <0.5m/s have been cut off and are not displayed.

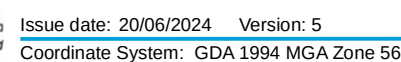
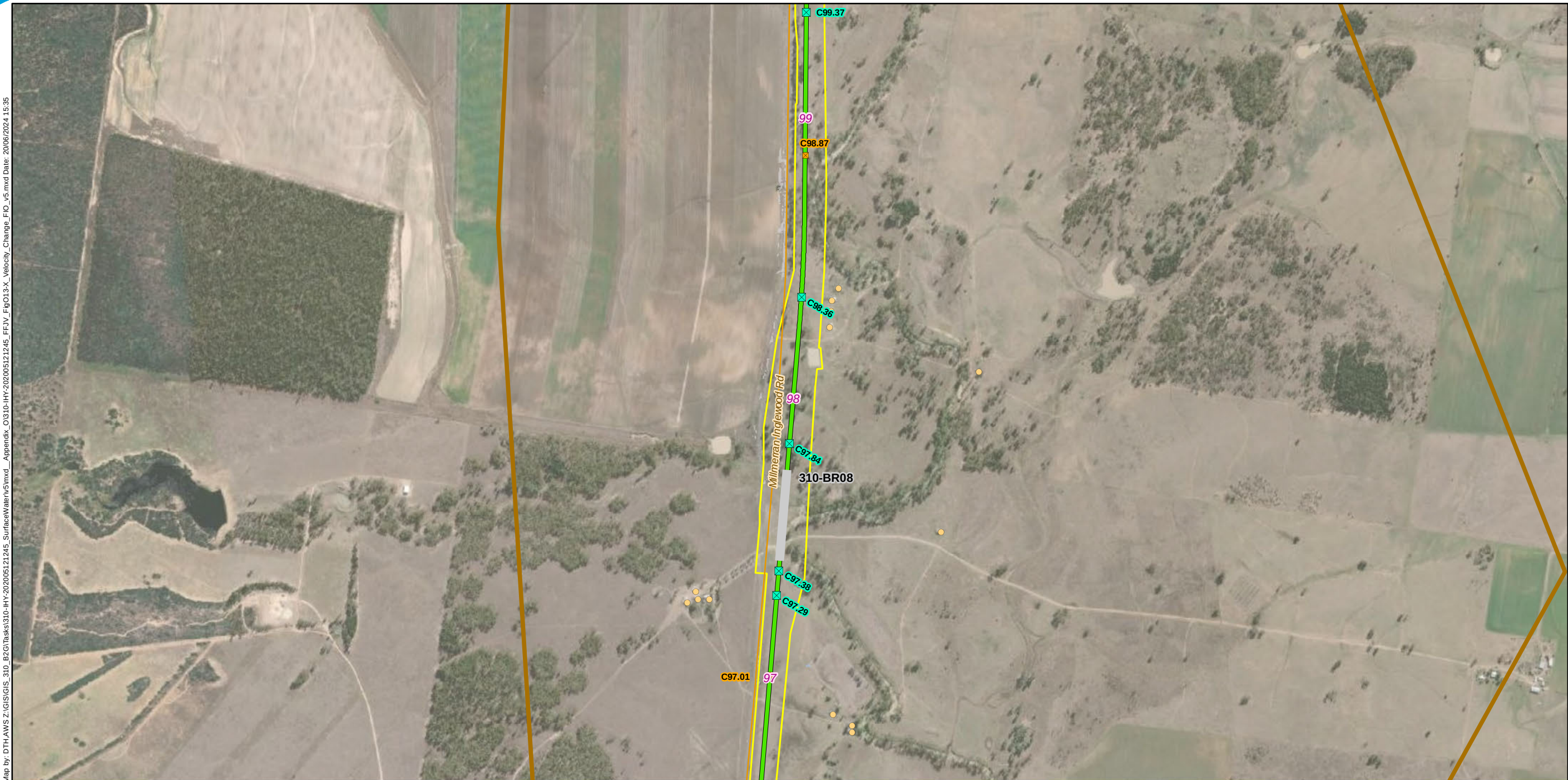


Figure O13 - page 21 of 48:

20% AEP Event - Local Catchments - Change in Velocity (<0.5m/s cutoff)

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\310-IHY-202005121245_SurfaceWater\5mxd_Appendix_O\310-IHY-202005121245_FF\JV_FigO13-X_Velocity_Change_FIO_v5.mxd Date: 20/06/2024 15:35



Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project floodplain culvert
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated change in peak velocity (m/s)

< -0.5	0.01 to 0.05
-0.50 to -0.20	0.05 to 0.10
-0.20 to -0.10	0.10 to 0.20
-0.10 to -0.05	0.20 to 0.50
-0.05 to -0.01	> 0.50
-0.01 to 0.01	

A data filter has been applied; results where model input grid's design velocity <0.5m/s have been cut off and are not displayed.



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 O13 - page 22 of 48:

20% AEP Event - Local Catchments - Change in Velocity (<0.5m/s cutoff)



- Estimated change in peak velocity (m/s)**

A data filter has been applied; results where model input grid's *design velocity* <0.5m/s have been cut off and are not displayed.

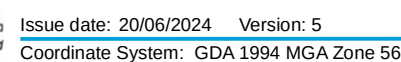


Figure O13 - page 23 of 48:

20% AEP Event - Local Catchments - Change in Velocity (<0.5m/s cutoff)



- Estimated change in peak velocity (m/s)**

A data filter has been applied; results where model input grid's *design velocity* <0.5m/s have been cut off and are not displayed.

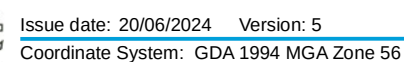
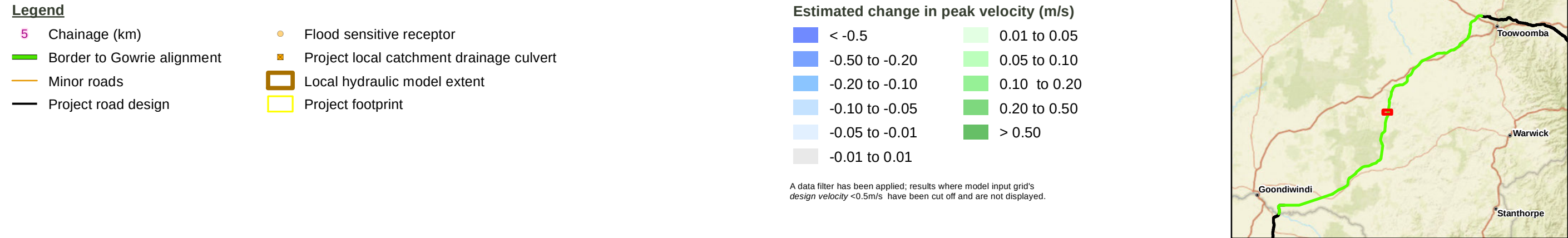


Figure O13 - page 24 of 48:

20% AEP Event - Local Catchments - Change in Velocity (<0.5m/s cutoff)



A3 scale: 1:15,000

0 0.15 0.3 0.45 0.6 0.75 km



- Estimated change in peak velocity (m/s)**

A data filter has been applied; results where model input grid's *design velocity* <0.5m/s have been cut off and are not displayed.

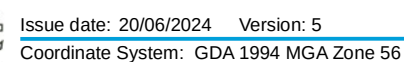


Figure O13 - page 26 of 48:

20% AEP Event - Local Catchments - Change in Velocity (<0.5m/s cutoff)

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\310-IHY-202005121245_SurfaceWater\5mxd_Appldix_D\310-IHY-202005121245_FF\JV_FigO13-X_Velocity_Change_FIO_v5.mxd Date: 20/06/2024 15:35



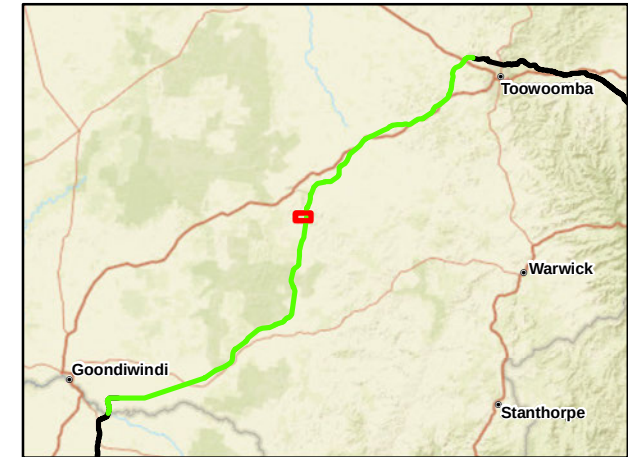
Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Local hydraulic model extent
- Project footprint

Estimated change in peak velocity (m/s)

< -0.5	0.01 to 0.05
-0.50 to -0.20	0.05 to 0.10
-0.20 to -0.10	0.10 to 0.20
-0.10 to -0.05	0.20 to 0.50
-0.05 to -0.01	> 0.50
-0.01 to 0.01	

A data filter has been applied; results where model input grid's design velocity <0.5m/s have been cut off and are not displayed.



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 O13 - page 27 of 48:

20% AEP Event - Local Catchments - Change in Velocity (<0.5m/s cutoff)



- Estimated change in peak velocity (m/s)**

A data filter has been applied; results where model input grid's *design velocity* <0.5m/s have been cut off and are not displayed.

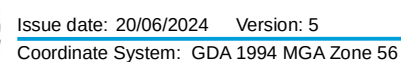


Figure O13 - page 28 of 48:

20% AEP Event - Local Catchments - Change in Velocity (<0.5m/s cutoff)



- Estimated change in peak velocity (m/s)**

A data filter has been applied; results where model input grid's *design velocity* <0.5m/s have been cut off and are not displayed.

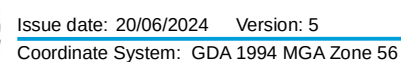
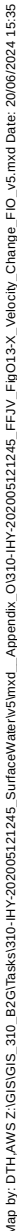


Figure O13 - page 29 of 48:

20% AEP Event - Local Catchments - Change in Velocity (<0.5m/s cutoff)



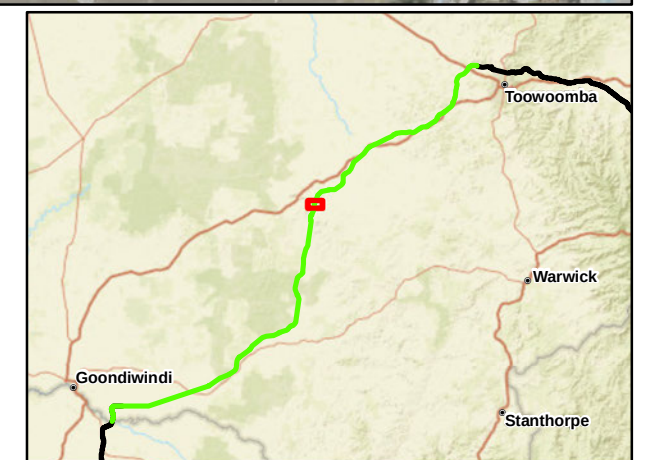
Legend

- Legend**
- | | | | |
|---|----------------------------|---|--|
| 5 | Chainage (km) |  | Flood sensitive receptor |
|  | Border to Gowrie alignment |  | Project local catchment drainage culvert |
|  | Minor roads |  | Local hydraulic model extent |
|  | Project road design |  | Project footprint |

Estimated change in peak velocity (m/s)

	< -0.5		0.01 to 0.05
	-0.50 to -0.20		0.05 to 0.10
	-0.20 to -0.10		0.10 to 0.20
	-0.10 to -0.05		0.20 to 0.50
	-0.05 to -0.01		> 0.50
	-0.01 to 0.01		

A data filter has been applied; results where model input grid's *design velocity* <0.5m/s have been cut off and are not displayed.



A3 scale: 1:15,000



0 0.15 0.3 0.45 0.6 0.75 km





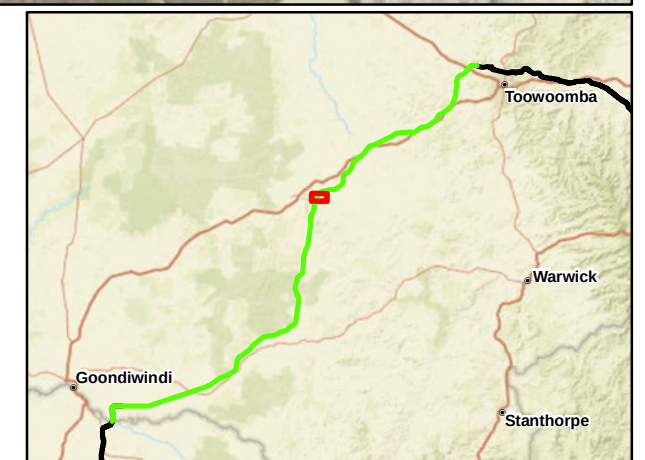
Legend

- Legend**
- | | | | |
|---|----------------------------|--|--|
| 5 | Chainage (km) | | Flood sensitive receptor |
| | Border to Gowrie alignment | | Project local catchment drainage culvert |
| | Minor roads | | Project bridges |
| | Project road design | | Local hydraulic model extent |
| | | | Project footprint |

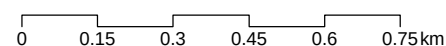
Estimated change in peak velocity (m/s)

	< -0.5		0.01 to 0.05
	-0.50 to -0.20		0.05 to 0.10
	-0.20 to -0.10		0.10 to 0.20
	-0.10 to -0.05		0.20 to 0.50
	-0.05 to -0.01		> 0.50
	-0.01 to 0.01		

A data filter has been applied; results where model input grid's *design velocity* <0.5m/s have been cut off and are not displayed.



A3 scale: 1:15,000



Issue date: 20/06/2024 Version: 5

Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure O13 - page 31 of 48:

20% AEP Event - Local Catchments - Change in Velocity (<0.5m/s cutoff)



- Estimated change in peak velocity (m/s)**

A data filter has been applied; results where model input grid's *design velocity* <0.5m/s have been cut off and are not displayed.

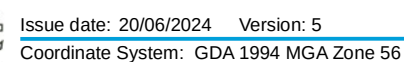


Figure O13 - page 32 of 48:

20% AEP Event - Local Catchments - Change in Velocity (<0.5m/s cutoff)



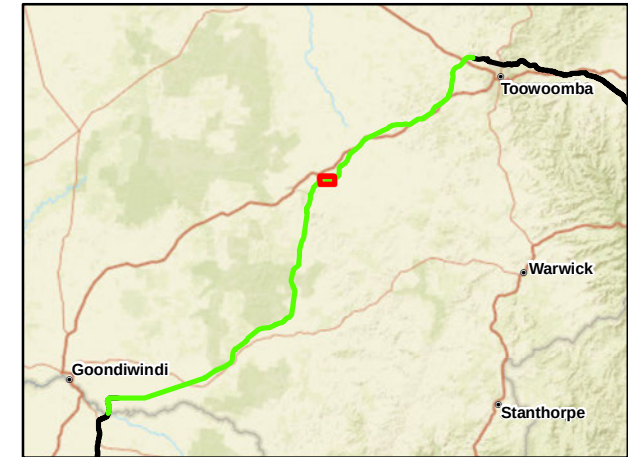
Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated change in peak velocity (m/s)

< -0.5	0.01 to 0.05
-0.50 to -0.20	0.05 to 0.10
-0.20 to -0.10	0.10 to 0.20
-0.10 to -0.05	0.20 to 0.50
-0.05 to -0.01	> 0.50
-0.01 to 0.01	

A data filter has been applied; results where model input grid's design velocity <0.5m/s have been cut off and are not displayed.



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 O13 - page 33 of 48:

20% AEP Event - Local Catchments - Change in Velocity (<0.5m/s cutoff)

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\310-IHY-202005121245_SurfaceWater\5mxd_Appldix_D\310-IHY-202005121245_FF\JV_FigO13-X_Velocity_Change_FIO_v5.mxd Date: 20/06/2024 15:36



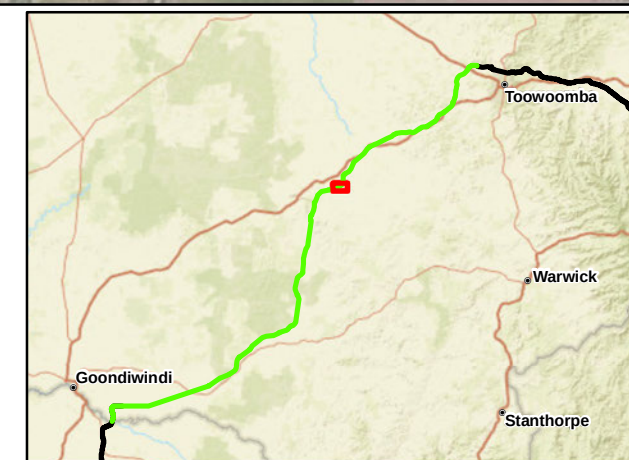
Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Local hydraulic model extent
- Project footprint

Estimated change in peak velocity (m/s)

< -0.5	0.01 to 0.05
-0.50 to -0.20	0.05 to 0.10
-0.20 to -0.10	0.10 to 0.20
-0.10 to -0.05	0.20 to 0.50
-0.05 to -0.01	> 0.50
-0.01 to 0.01	

A data filter has been applied; results where model input grid's design velocity <0.5m/s have been cut off and are not displayed.



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 O13 - page 34 of 48:

20% AEP Event - Local Catchments - Change in Velocity (<0.5m/s cutoff)

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\310-IHY-202005121245_SurfaceWater\5mxd_Appendix_D\310-IHY-202005121245_FF\JV_FigO13-X_Velocity_Change_FIO_v5.mxd Date: 20/06/2024 15:36



Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Local hydraulic model extent
- Project footprint

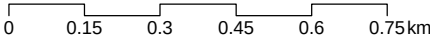
Estimated change in peak velocity (m/s)

< -0.5	0.01 to 0.05
-0.50 to -0.20	0.05 to 0.10
-0.20 to -0.10	0.10 to 0.20
-0.10 to -0.05	0.20 to 0.50
-0.05 to -0.01	> 0.50
-0.01 to 0.01	

A data filter has been applied; results where model input grid's design velocity <0.5m/s have been cut off and are not displayed.



A3 scale: 1:15,000



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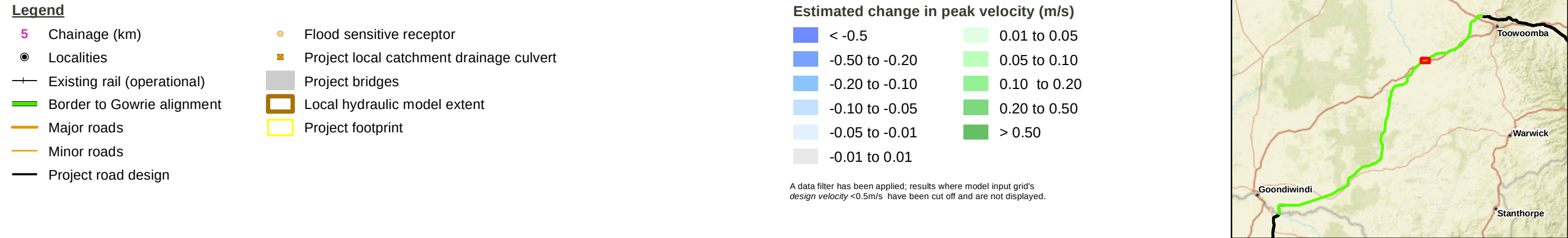
Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure O13 - page 35 of 48:

20% AEP Event - Local Catchments - Change in Velocity (<0.5m/s cutoff)

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\GIS_310-IHY-202005121245_SurfaceWater\5mxd_Appldix_O\310-IHY-202005121245_FF\Y_FigO13-X_Velocity_Change_FIO_v5.mxd Date: 20/06/2024 15:36



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



- Estimated change in peak velocity (m/s)**

A data filter has been applied; results where model input grid's *design velocity* <0.5m/s have been cut off and are not displayed.

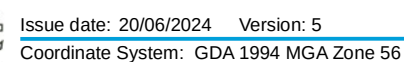
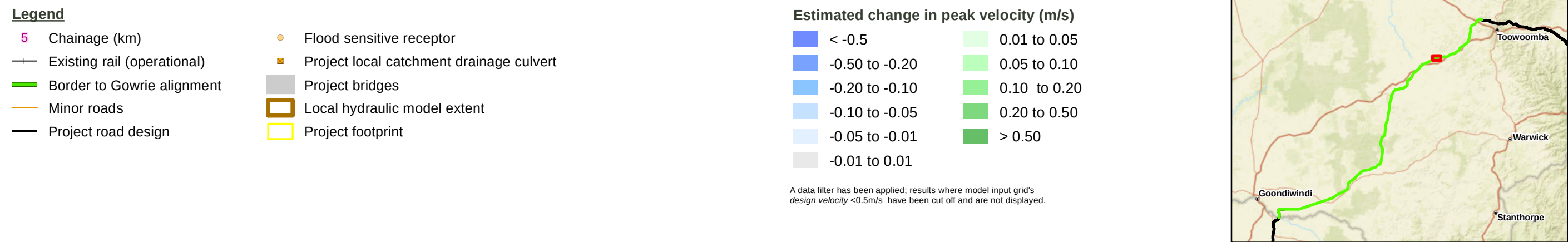
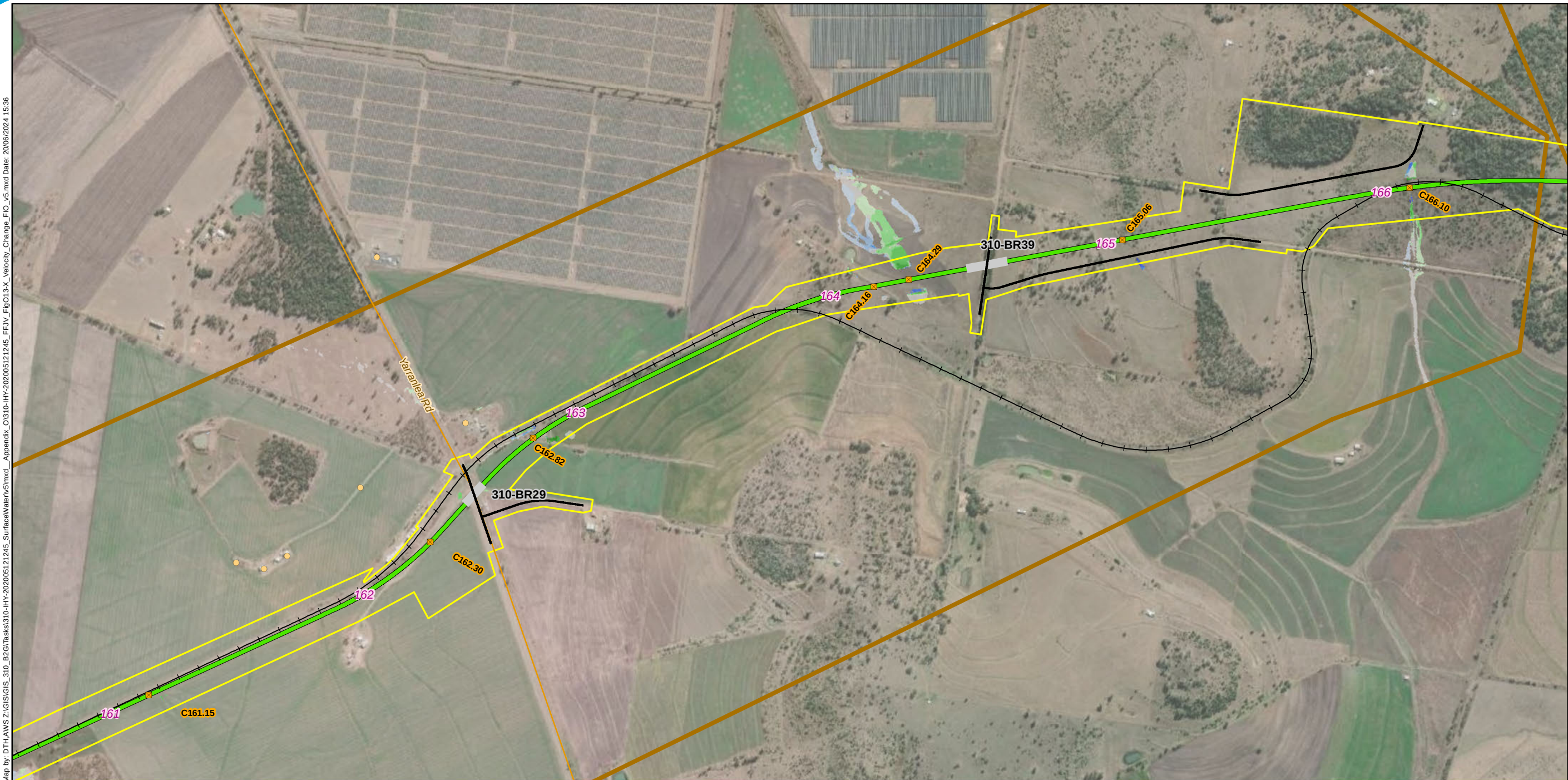


Figure O13 - page 37 of 48:

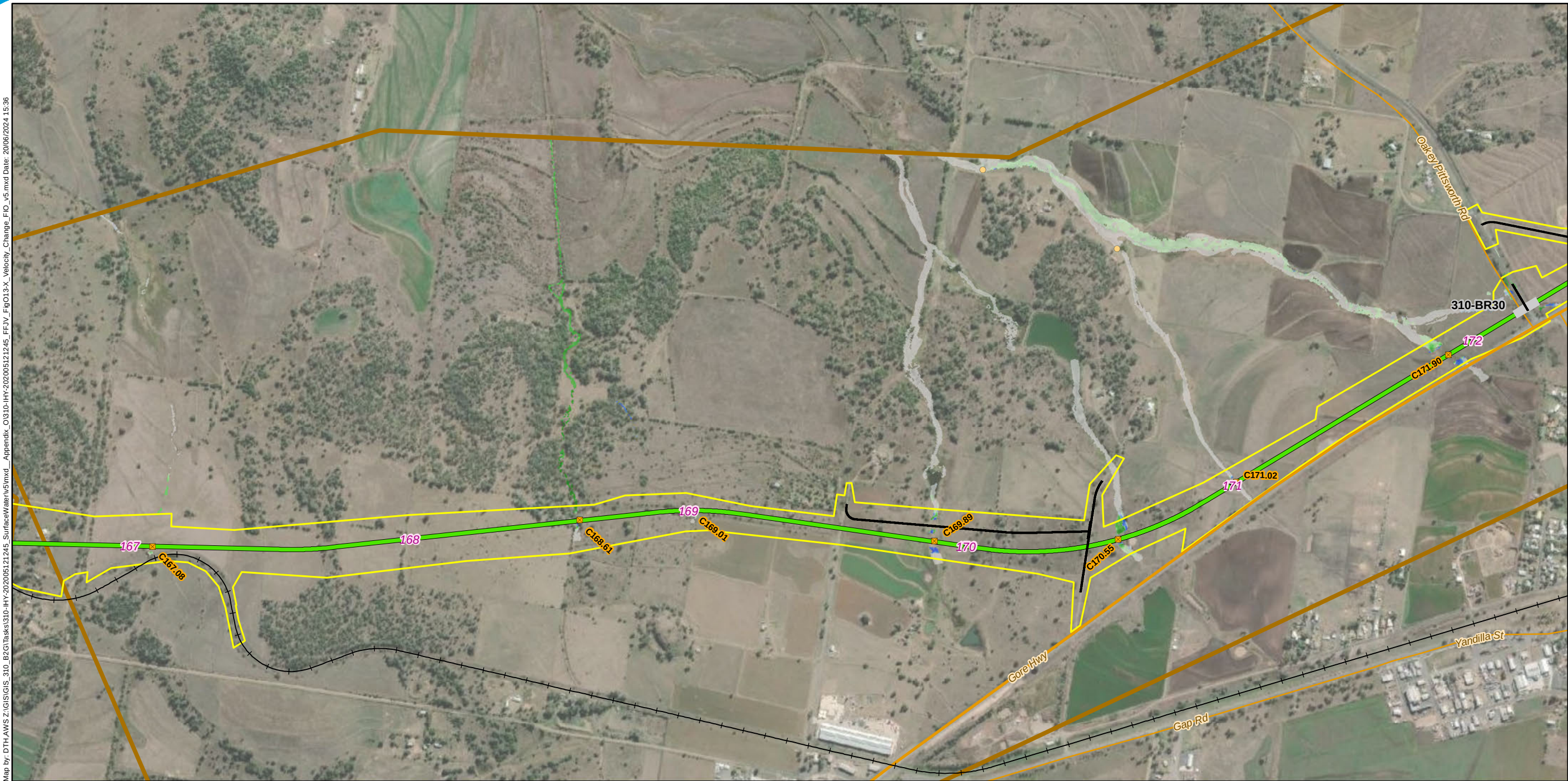
20% AEP Event - Local Catchments - Change in Velocity (<0.5m/s cutoff)

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\GIS_310-B2\Tasks\310-HY-2020\5121245_SurfaceWater\5mxd_Appendix_O\310-HY-2020\5121245_FF\JV_FigO13-X_Velocity_Change_FIO_v5.mxd Date: 20/06/2024 15:36



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

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\310-IHY-202005121245_SurfaceWater\5mxd_Appendix_D\310-IHY-202005121245_FF\JV_Fig013-X_Velocity_Change_FIO_v5.mxd Date: 20/06/2024 15:36



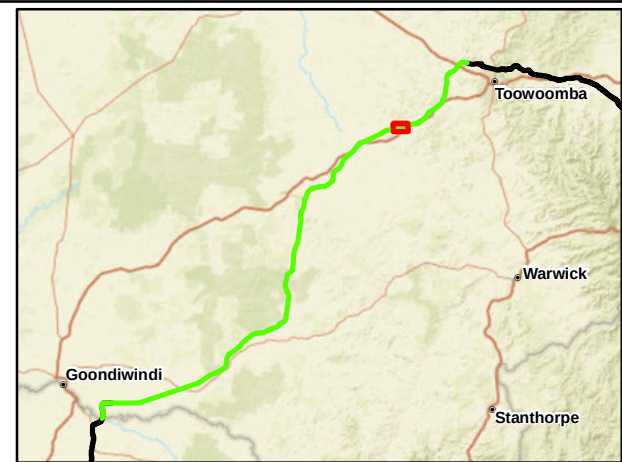
Legend

- 5 Chainage (km)
- Existing rail (operational)
- Border to Gowrie alignment
- Major roads
- Minor roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated change in peak velocity (m/s)

< -0.5	0.01 to 0.05
-0.50 to -0.20	0.05 to 0.10
-0.20 to -0.10	0.10 to 0.20
-0.10 to -0.05	0.20 to 0.50
-0.05 to -0.01	> 0.50
-0.01 to 0.01	

A data filter has been applied; results where model input grid's design velocity < 0.5m/s have been cut off and are not displayed.



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

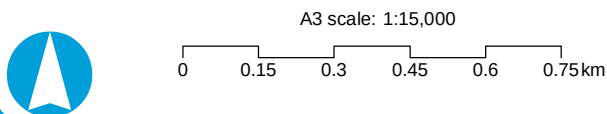
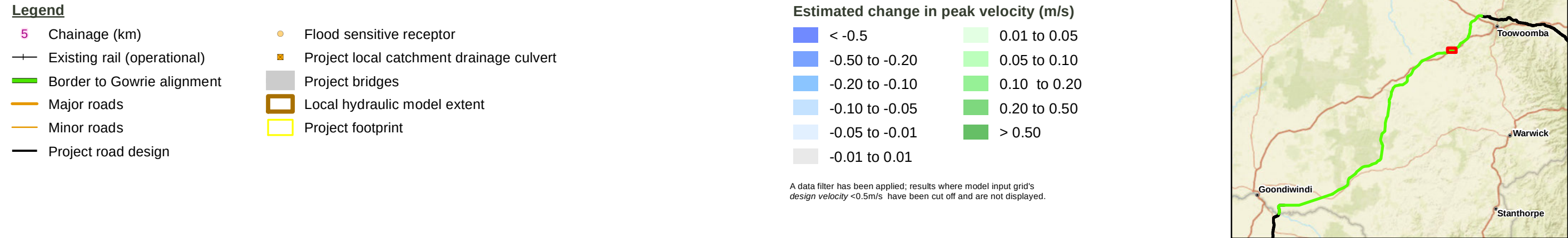


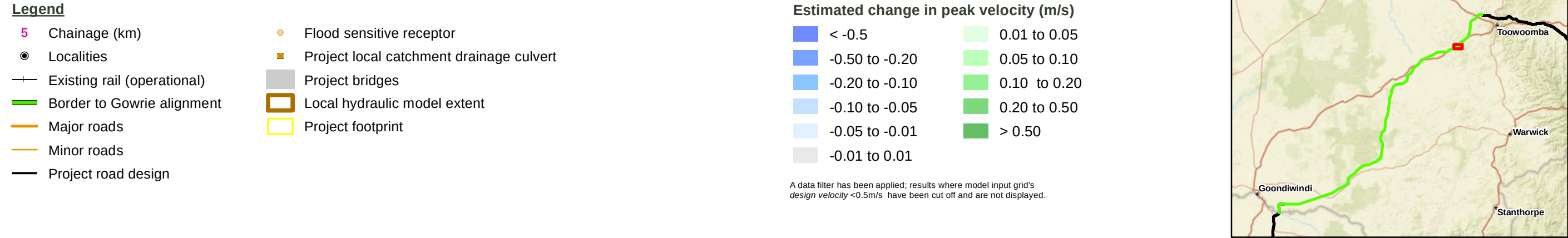
Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure O13 - page 39 of 48:

20% AEP Event - Local Catchments - Change in Velocity (<0.5m/s cutoff)





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 O13 - page 41 of 48:

20% AEP Event - Local Catchments - Change in Velocity (<0.5m/s cutoff)



- Estimated change in peak velocity (m/s)**

A data filter has been applied; results where model input grid's *design velocity* <0.5m/s have been cut off and are not displayed.

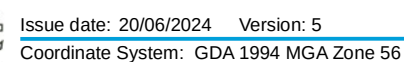


Figure O13 - page 42 of 48:

20% AEP Event - Local Catchments - Change in Velocity (<0.5m/s cutoff)

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\GIS_310-B2\Tasks\310-HY-2020\5121245_SurfaceWater\5mxd_Appendix_D\310-HY-2020\5121245_FF\JV_FigO13-X_Velocity_Change_FIO_v5.mxd Date: 20/06/2024 15:37



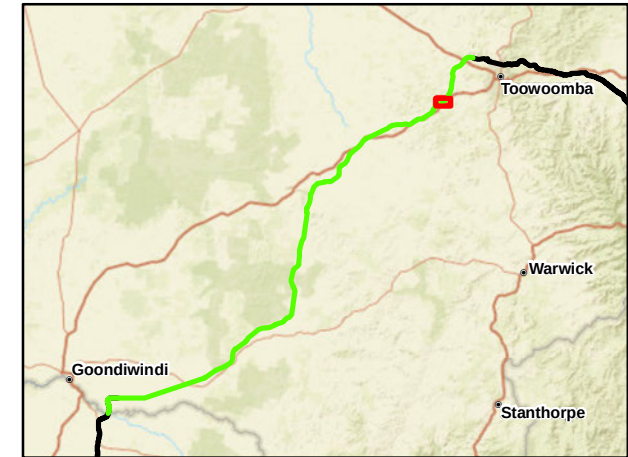
Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Major roads
- Minor roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated change in peak velocity (m/s)

< -0.5	0.01 to 0.05
-0.50 to -0.20	0.05 to 0.10
-0.20 to -0.10	0.10 to 0.20
-0.10 to -0.05	0.20 to 0.50
-0.05 to -0.01	> 0.50
-0.01 to 0.01	

A data filter has been applied; results where model input grid's design velocity <0.5m/s have been cut off and are not displayed.



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 O13 - page 43 of 48:

20% AEP Event - Local Catchments - Change in Velocity (<0.5m/s cutoff)

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\Tasks\310-IHY-202005121245_SurfaceWater\5vmsd_Appendix_O\310-IHY-202005121245_FF\JV_FigO13-X_Velocity_Change_FIO_v5.mxd Date: 20/06/2024 15:37



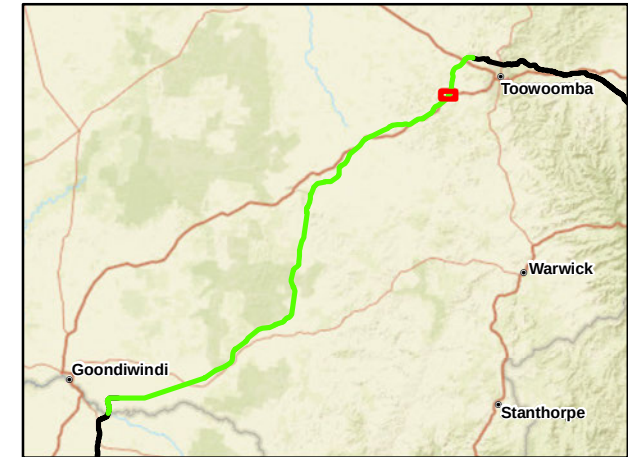
Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Major roads
- Minor roads
- Project road design
- Flood sensitive receptor
- Project floodplain culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated change in peak velocity (m/s)

< -0.5	0.01 to 0.05
-0.50 to -0.20	0.05 to 0.10
-0.20 to -0.10	0.10 to 0.20
-0.10 to -0.05	0.20 to 0.50
-0.05 to -0.01	> 0.50
-0.01 to 0.01	

A data filter has been applied; results where model input grid's design velocity <0.5m/s have been cut off and are not displayed.



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 O13 - page 44 of 48:

20% AEP Event - Local Catchments - Change in Velocity (<0.5m/s cutoff)

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\310-IHY-202005121245_SurfaceWater\5mxd_Appendix_O\310-IHY-202005121245_FF\JV_FigO13-X_Velocity_Change_FIO_v5.mxd Date: 20/06/2024 15:37



Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Major roads
- Project road design
- Flood sensitive receptor
- Project floodplain culvert
- Project local catchment drainage culvert
- Local hydraulic model extent
- Project footprint

Estimated change in peak velocity (m/s)

< -0.5	0.01 to 0.05
-0.50 to -0.20	0.05 to 0.10
-0.20 to -0.10	0.10 to 0.20
-0.10 to -0.05	0.20 to 0.50
-0.05 to -0.01	> 0.50
-0.01 to 0.01	

A data filter has been applied; results where model input grid's design velocity <0.5m/s have been cut off and are not displayed.



A3 scale: 1:15,000

0 0.15 0.3 0.45 0.6 0.75 km



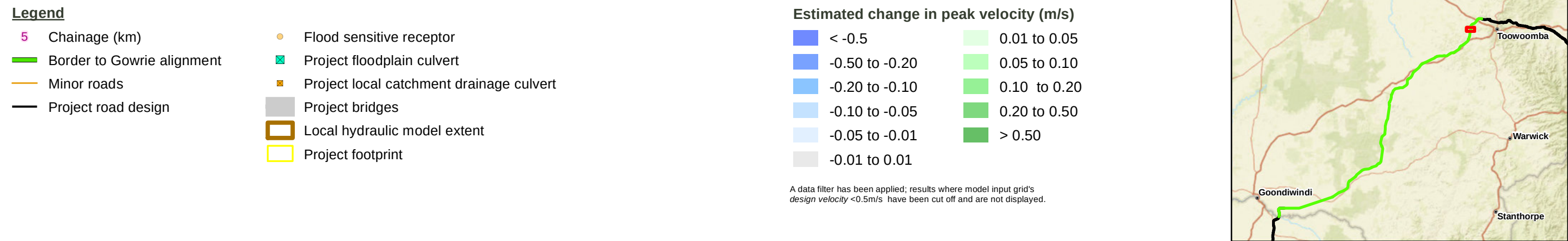
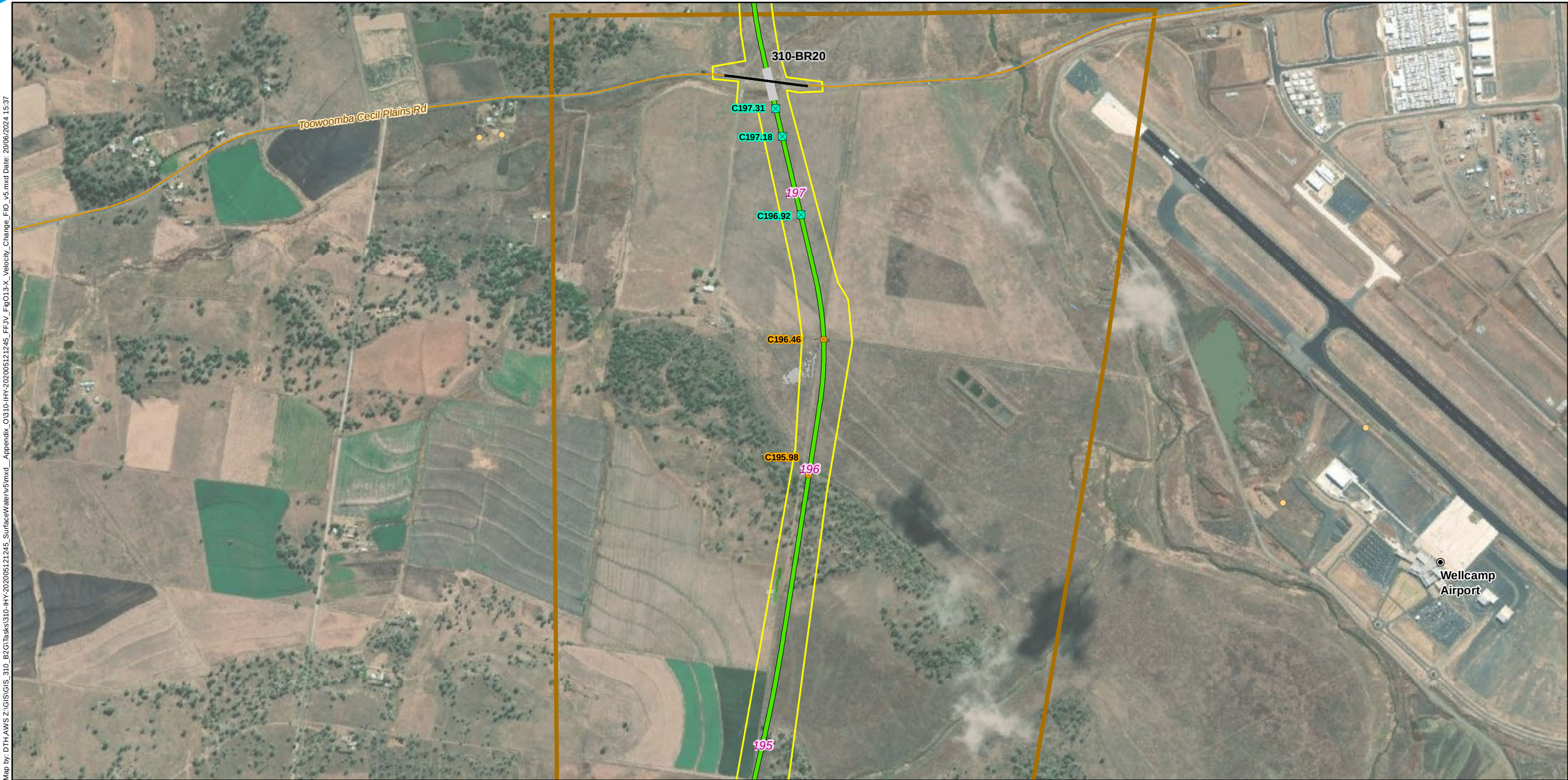
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Border to Gowrie

Figure O13 - page 45 of 48:

20% AEP Event - Local Catchments - Change in Velocity (<0.5m/s cutoff)



A3 scale: 1:15,000

0 0.15 0.3 0.45 0.6 0.75 km

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\310-IHY-202005121245_SurfaceWater\5mxd_Appendix_O\310-IHY-202005121245_FF\JV_FigO13-X_Velocity_Change_FIO_v5.mxd Date: 20/06/2024 15:37



Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Project road design
- Flood sensitive receptor
- Project floodplain culvert
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated change in peak velocity (m/s)

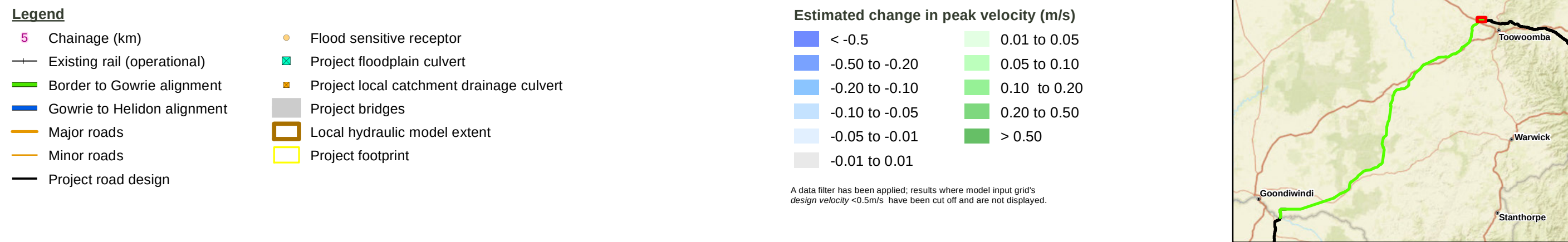
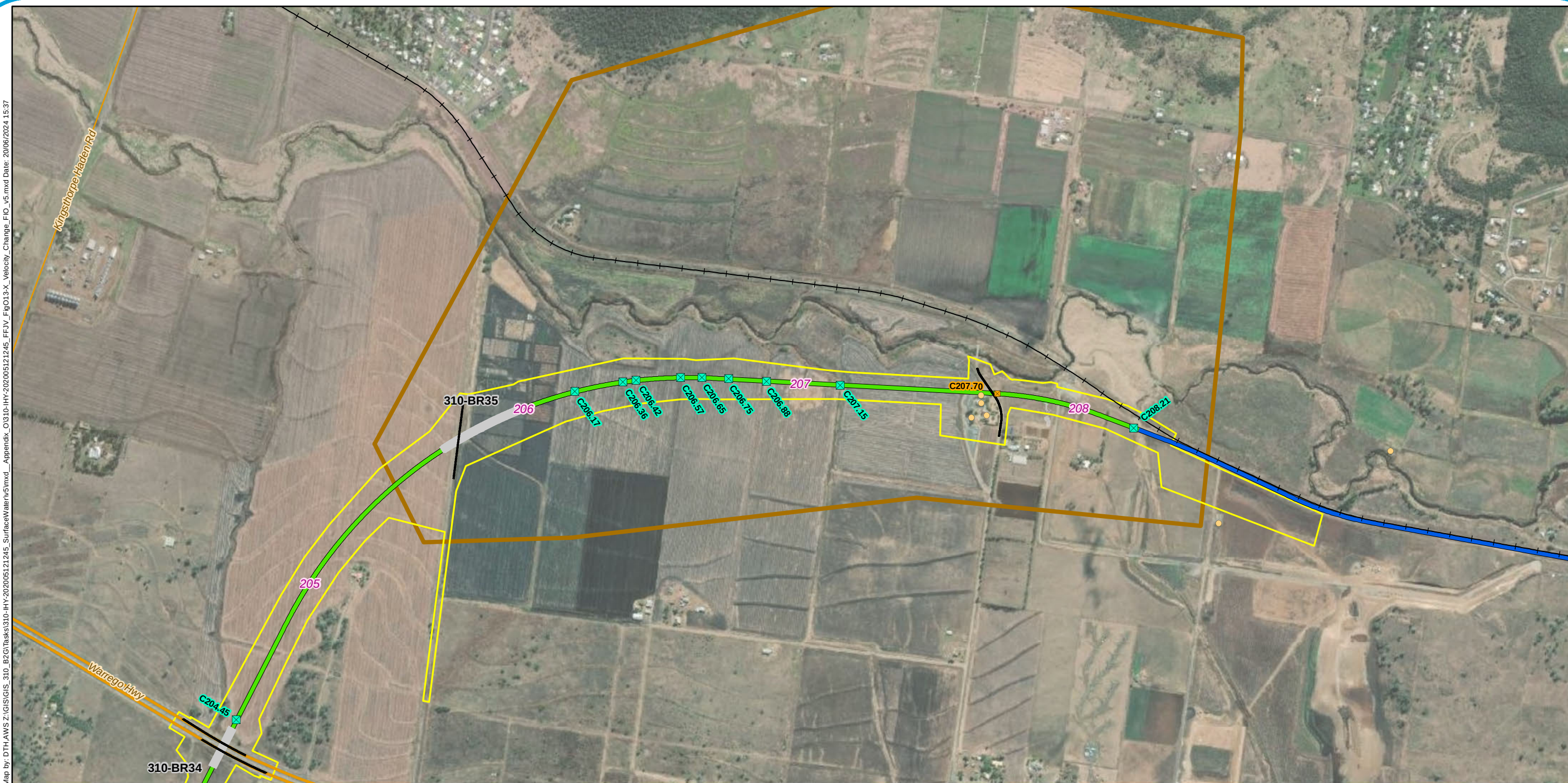
- | | |
|----------------|--------------|
| < -0.5 | 0.01 to 0.05 |
| -0.50 to -0.20 | 0.05 to 0.10 |
| -0.20 to -0.10 | 0.10 to 0.20 |
| -0.10 to -0.05 | 0.20 to 0.50 |
| -0.05 to -0.01 | > 0.50 |
| -0.01 to 0.01 | |

A data filter has been applied; results where model input grid's design velocity < 0.5m/s have been cut off and are not displayed.

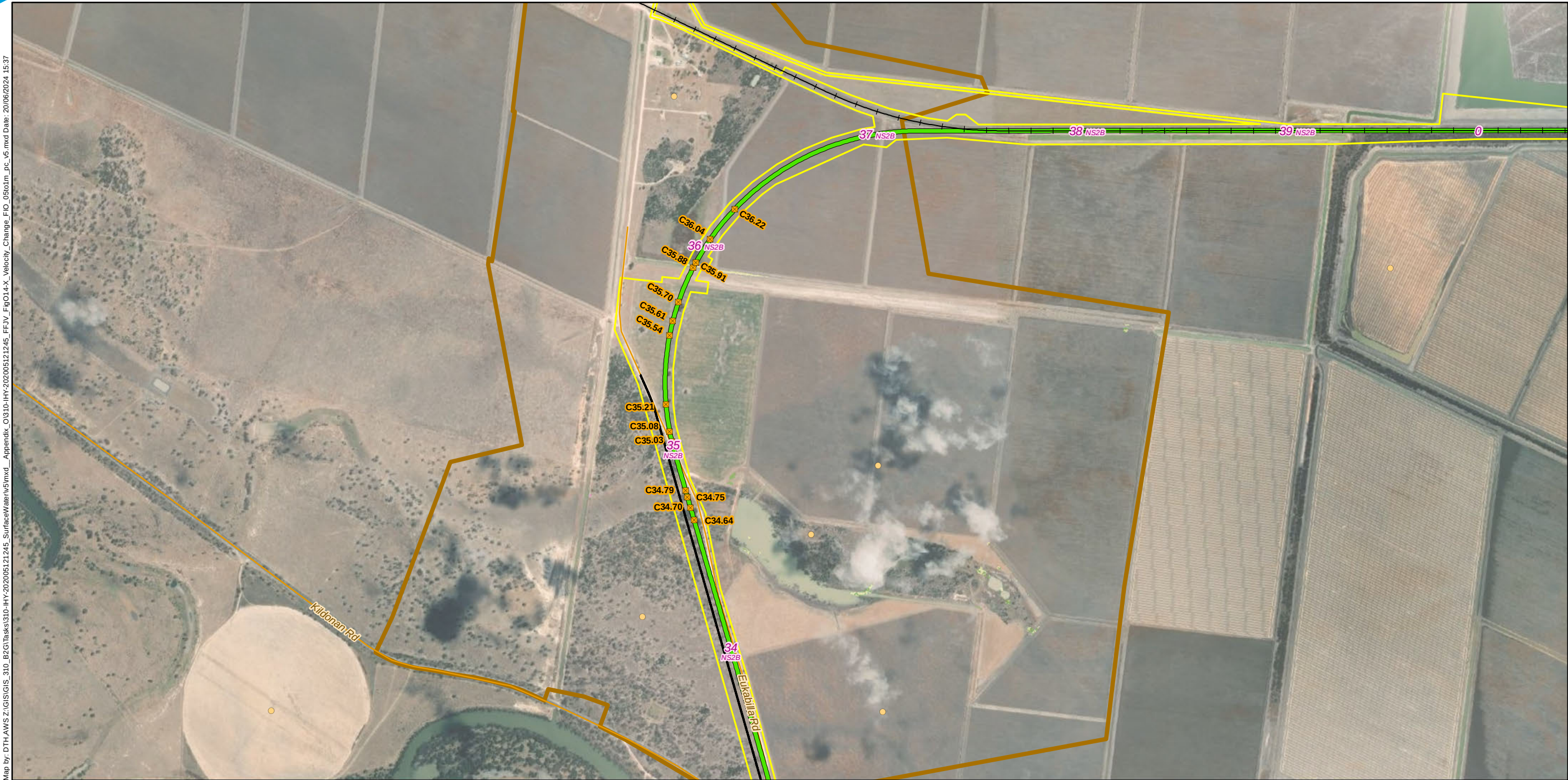


A3 scale: 1:15,000
0 0.15 0.3 0.45 0.6 0.75 km

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\310-IHY-202005121245_SurfaceWater\5mxd_Appldix_D\310-IHY-202005121245_FF\J_V_FigO13-X_Velocity_Change_FIO_v5.mxd Date: 20/06/2024 15:37



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



Legend

- 5 Chainage (km)
- Existing rail (operational)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Local hydraulic model extent
- Project footprint

Estimated change in velocities (%)

- < 0
- 0 to 10
- 10 to 20
- > 20

A data filter has been applied; results where model input grid's design velocity



A3 scale: 1:20,000
0 0.2 0.4 0.6 0.8 1km



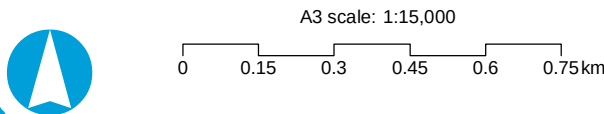
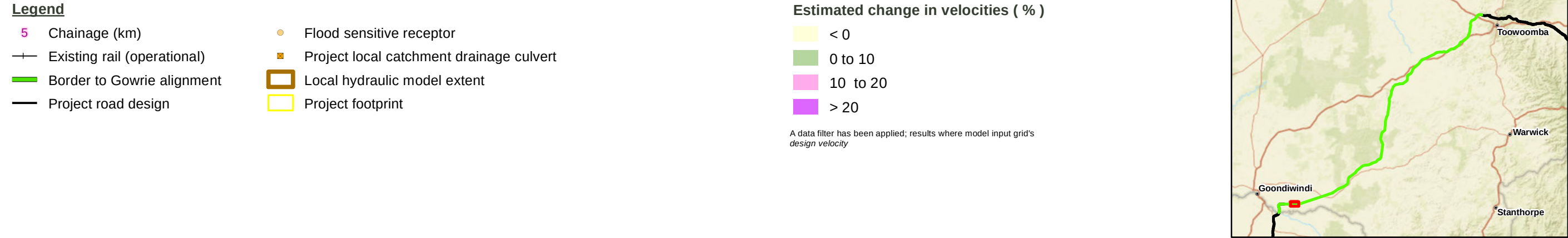
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Border to Gowrie

Figure O14 - page 1 of 48:

20% AEP Event - Local Catchments - Percentage Change in Velocity (<0.5m/s and >1.0m/s cutoff)





- Estimated change in velocities (%)**

A data filter has been applied; results where model input grid's *design velocity*

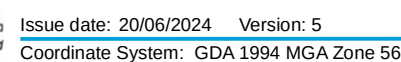
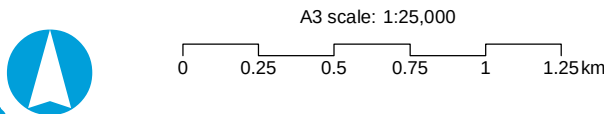
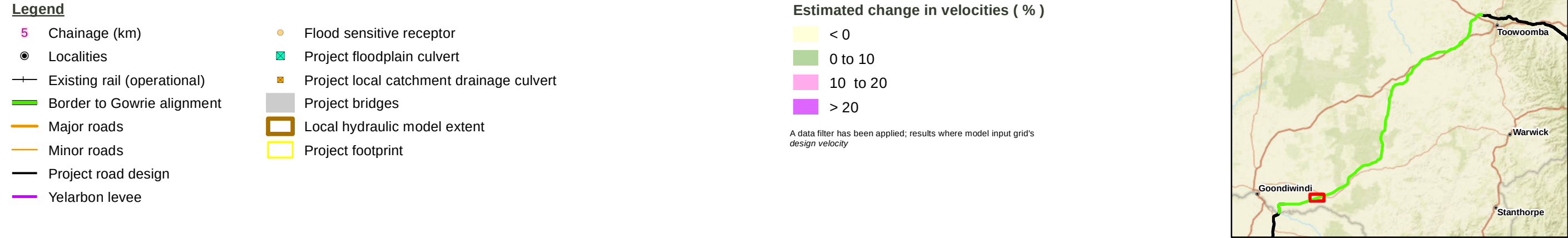
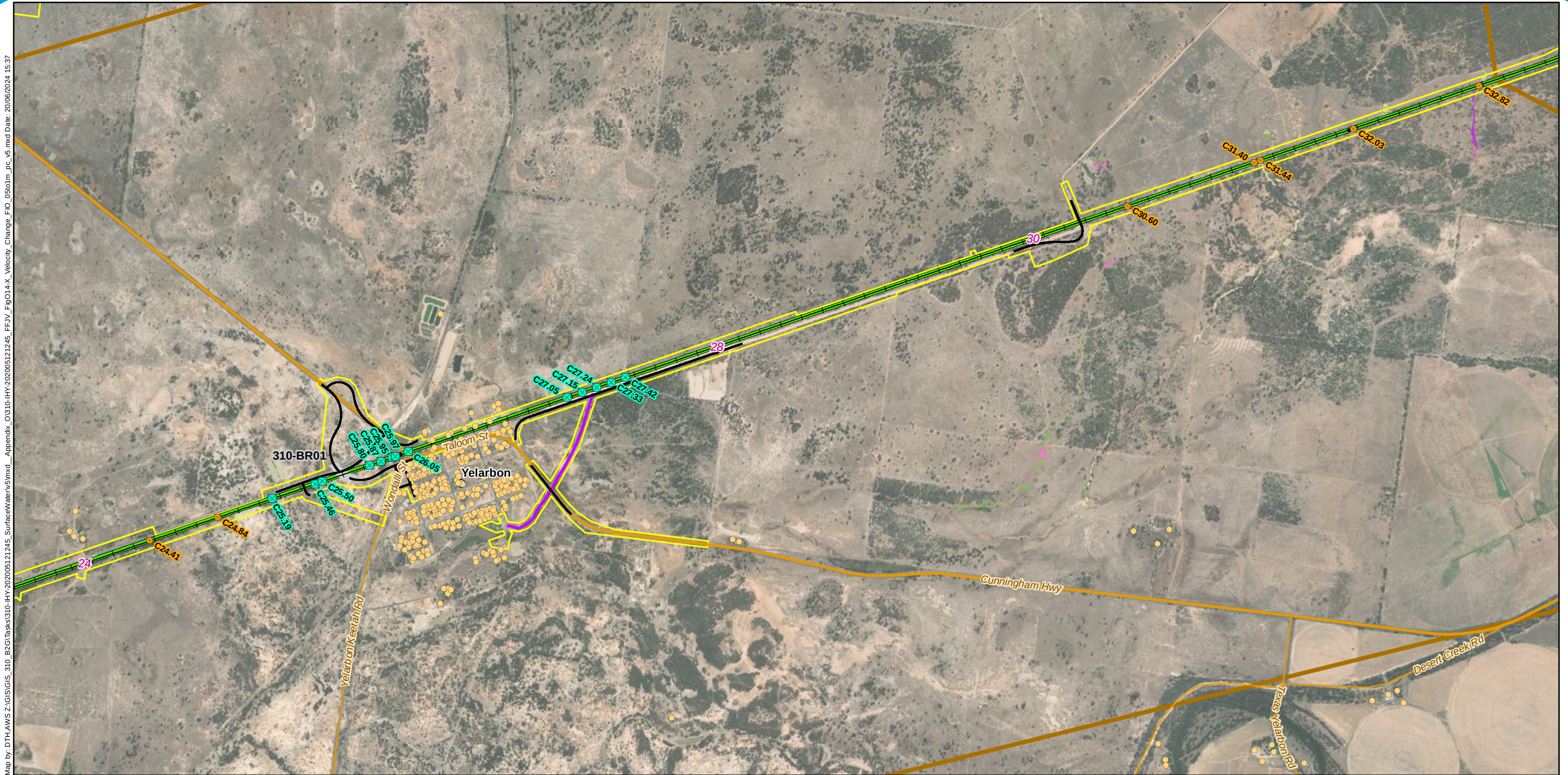


Figure O14 - page 3 of 48:

20% AEP Event - Local Catchments - Percentage Change in Velocity (<0.5m/s and >1.0m/s cutoff)





Legend

- 5 Chainage (km)
- Localities
- Existing rail (operational)
- Border to Gowrie alignment
- Major roads
- Minor roads
- Project road design
- Yelarbon levee
- Flood sensitive receptor
- Project floodplain culvert
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated change in velocities (%)

- < 0
- 0 to 10
- 10 to 20
- > 20

A data filter has been applied; results where model input grid's design velocity



A3 scale: 1:25,000
0 0.25 0.5 0.75 1 1.25 km



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Border to Gowrie

Figure O14 - page 5 of 48:

20% AEP Event - Local Catchments - Percentage Change in Velocity (<0.5m/s and >1.0m/s cutoff)



Legend

- 5 Chainage (km)
- Existing rail (operational)
- Border to Gowrie alignment
- Major roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Local hydraulic model extent
- Project footprint

Estimated change in velocities (%)

- < 0
- 0 to 10
- 10 to 20
- > 20

A data filter has been applied; results where model input grid's design velocity



A3 scale: 1:25,000
0 0.25 0.5 0.75 1 1.25 km

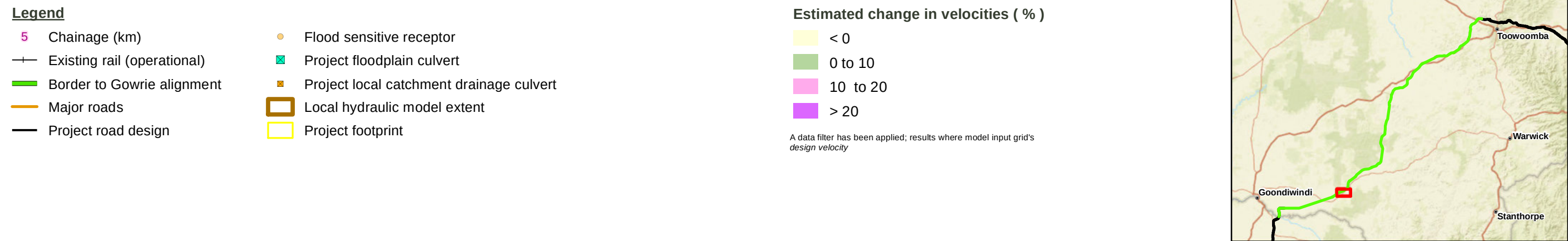


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Border to Gowrie

Figure O14 - page 6 of 48:
20% AEP Event - Local Catchments - Percentage Change in Velocity (<0.5m/s and >1.0m/s cutoff)



A3 scale: 1:25,000

0 0.25 0.5 0.75 1 1.25 km



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Border to Gowrie

Figure O14 - page 7 of 48:

20% AEP Event - Local Catchments - Percentage Change in Velocity (<0.5m/s and >1.0m/s cutoff)



- Estimated change in velocities (%)**

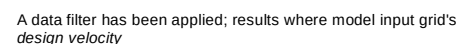


Figure O14 - page 8 of 48:

20% AEP Event - Local Catchments - Percentage Change in Velocity (<0.5m/s and >1.0m/s cutoff)



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

- Flood sensitive receptor
- Project local catchment drainage culvert
- ▭ Local hydraulic model extent
- ▭ Project footprint

	< 0
	0 to 10
	10 to 20
	> 20

A data filter has been applied; results where model input grid's *design velocity*



A3 scale: 1:15,000

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

20% AEP Event - Local Catchments - Percentage Change in Velocity (<0.5m/s and >1.0m/s cutoff)

Border to Gowrie

Figure O14 - page 9 of 48:



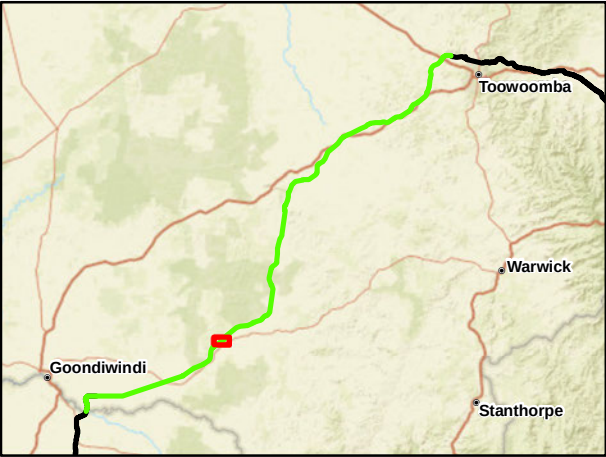
Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Major roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

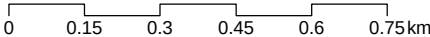
Estimated change in velocities (%)

- < 0
- 0 to 10
- 10 to 20
- > 20

A data filter has been applied; results where model input grid's design velocity



A3 scale: 1:15,000

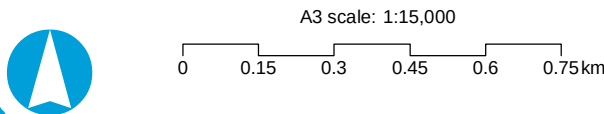
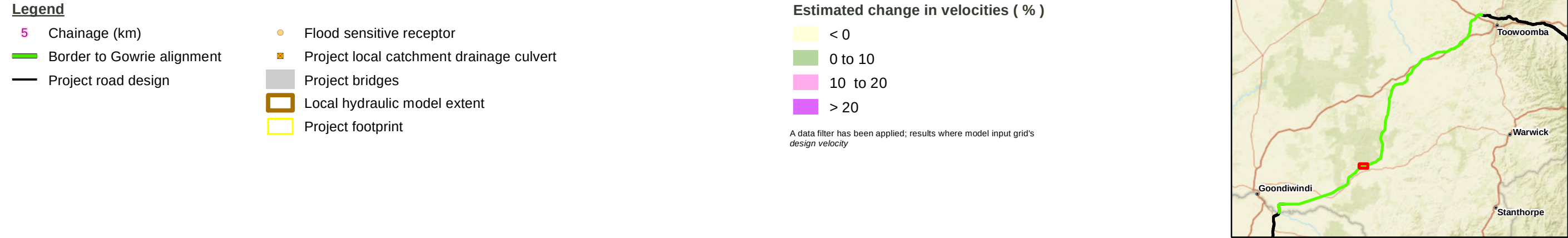
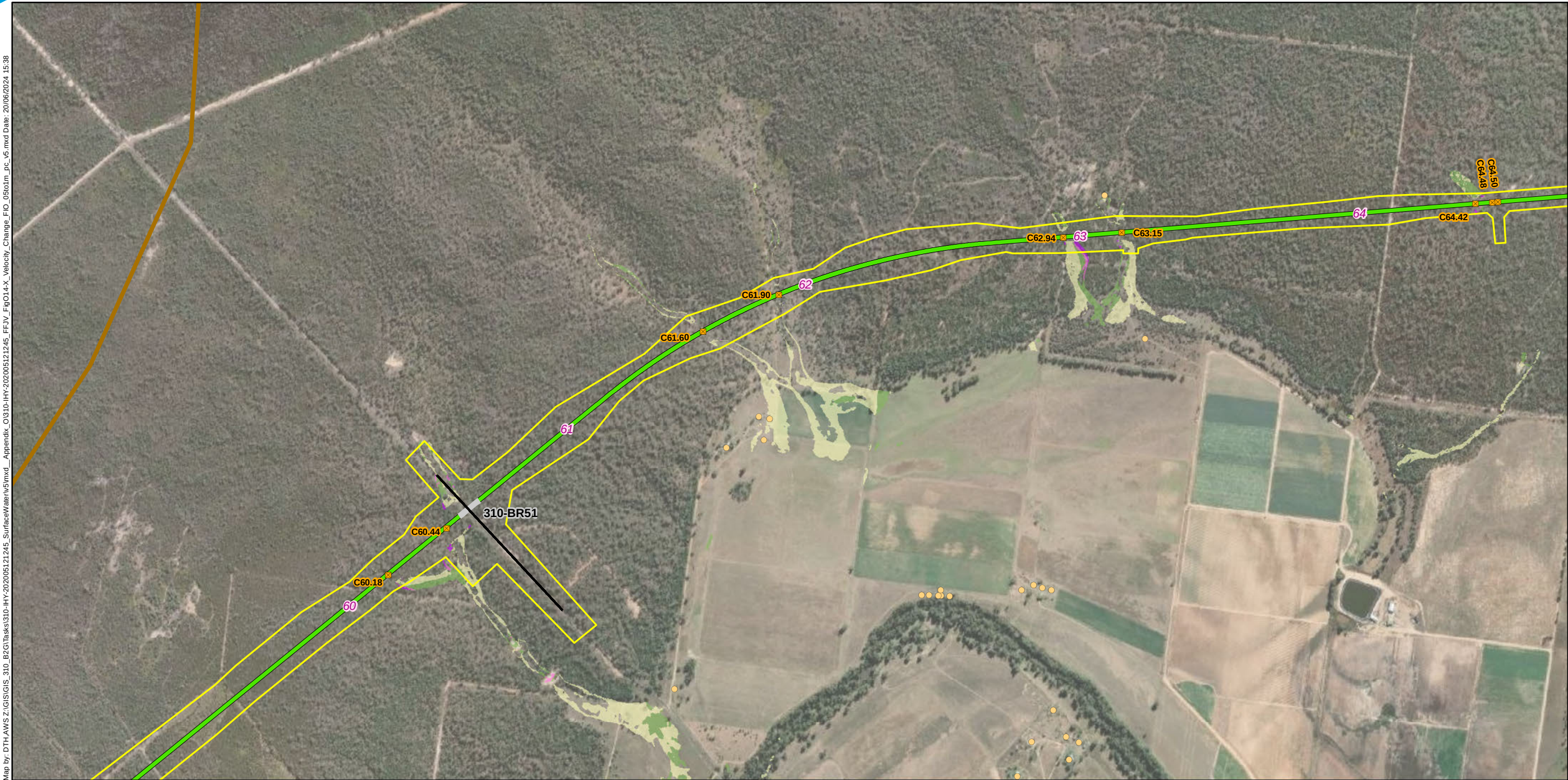


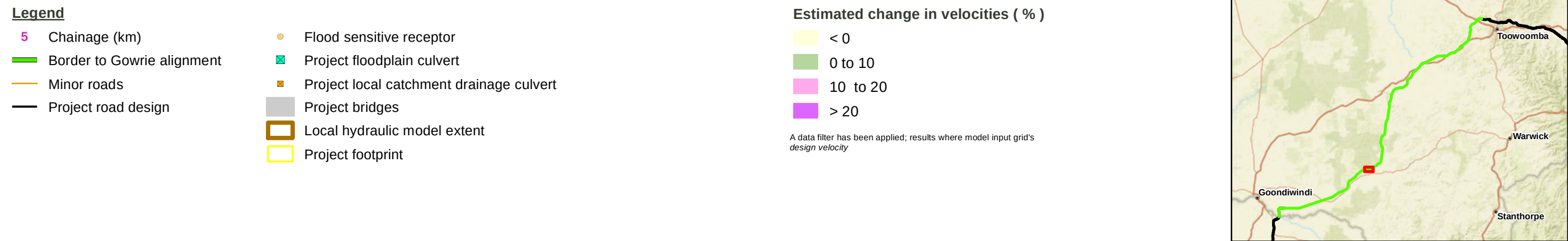
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Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure O14 - page 10 of 48:
20% AEP Event - Local Catchments - Percentage Change in Velocity (<0.5m/s and >1.0m/s cutoff)





A3 scale: 1:15,000

0 0.15 0.3 0.45 0.6 0.75 km

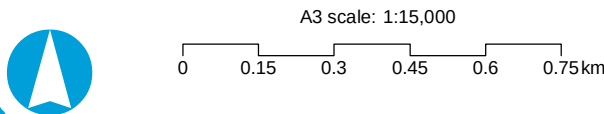
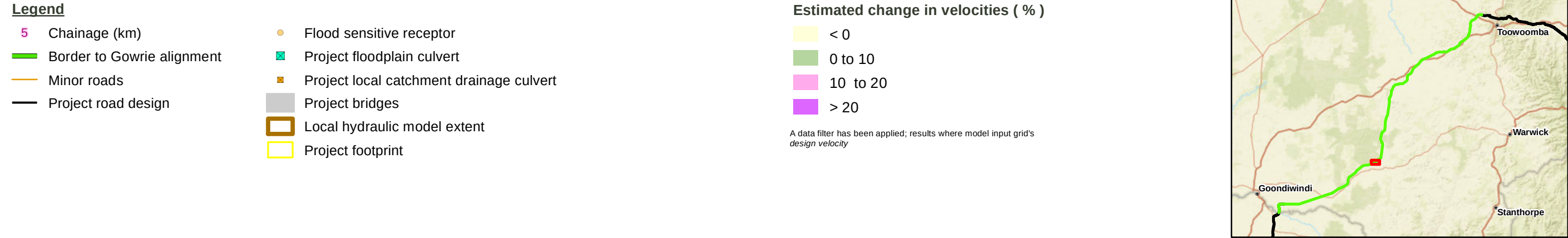


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Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure O14 - page 12 of 48:
20% AEP Event - Local Catchments - Percentage Change in Velocity (<0.5m/s and >1.0m/s cutoff)





Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Local hydraulic model extent
- Project footprint

Estimated change in velocities (%)

- < 0
- 0 to 10
- 10 to 20
- > 20

A data filter has been applied; results where model input grid's design velocity



A3 scale: 1:15,000

0 0.15 0.3 0.45 0.6 0.75 km

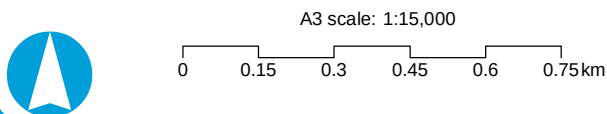
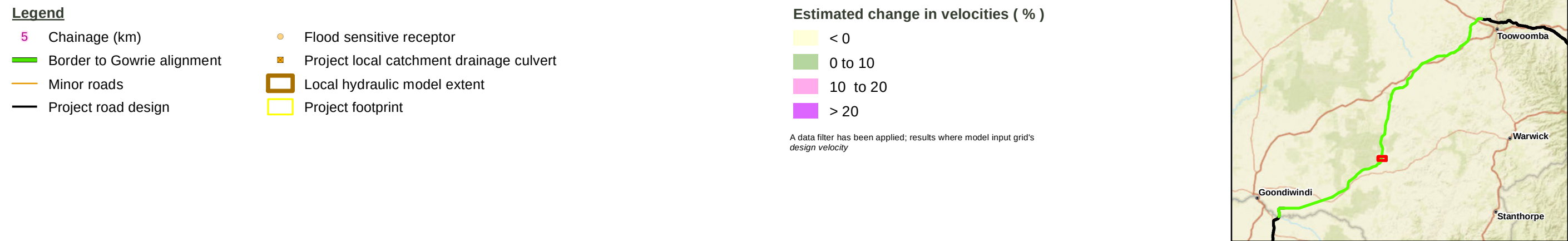


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Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure O14 - page 14 of 48:
20% AEP Event - Local Catchments - Percentage Change in Velocity (<0.5m/s and >1.0m/s cutoff)





- Estimated change in velocities (%)**

A data filter has been applied; results where model input grid's *design velocity*

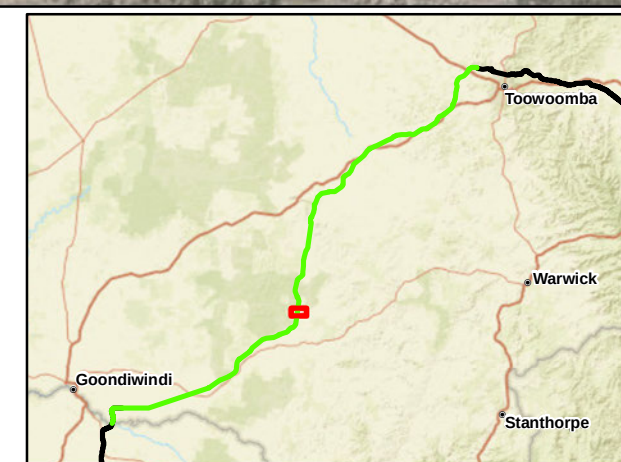
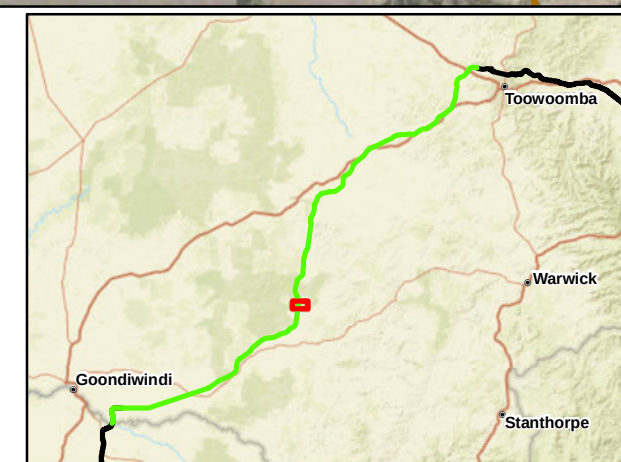


Figure O14 - page 16 of 48:



- Estimated change in velocities (%)**

- A data filter has been applied; results where model input grid's *design velocity*

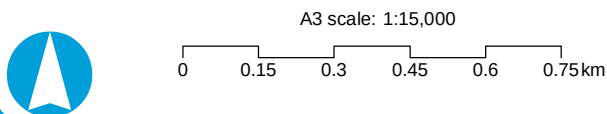
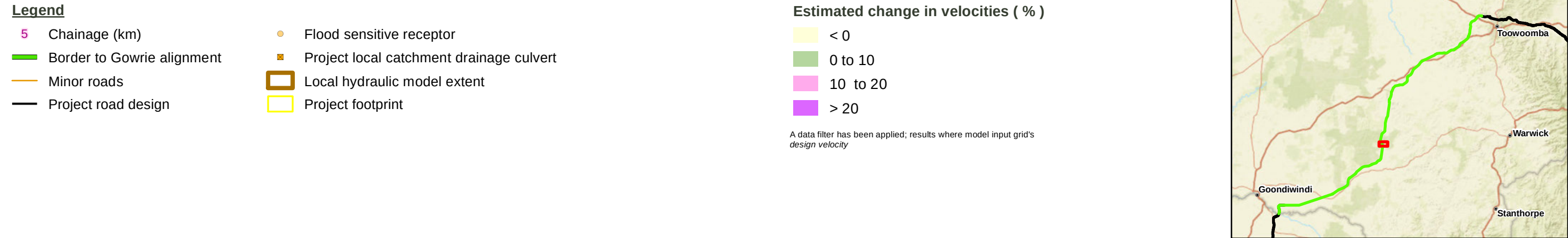


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Figure O14 - page 17 of 48:

20% AEP Event - Local Catchments - Percentage Change in Velocity (<0.5m/s and >1.0m/s cutoff)





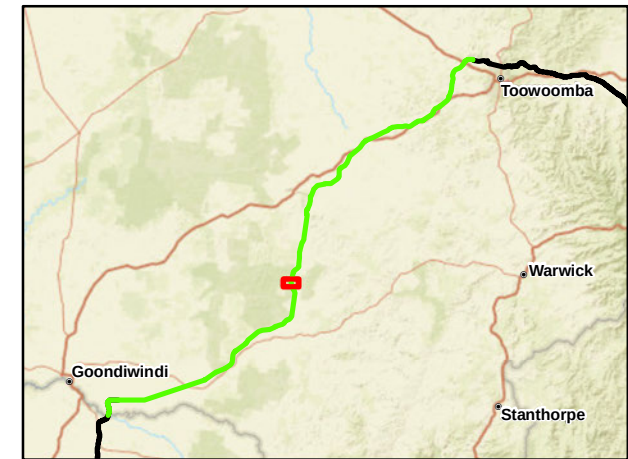
Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project floodplain culvert
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated change in velocities (%)

- < 0
- 0 to 10
- 10 to 20
- > 20

A data filter has been applied; results where model input grid's design velocity



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

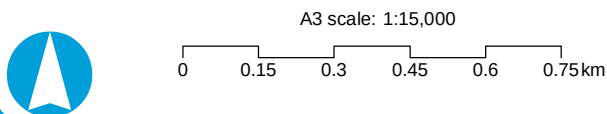
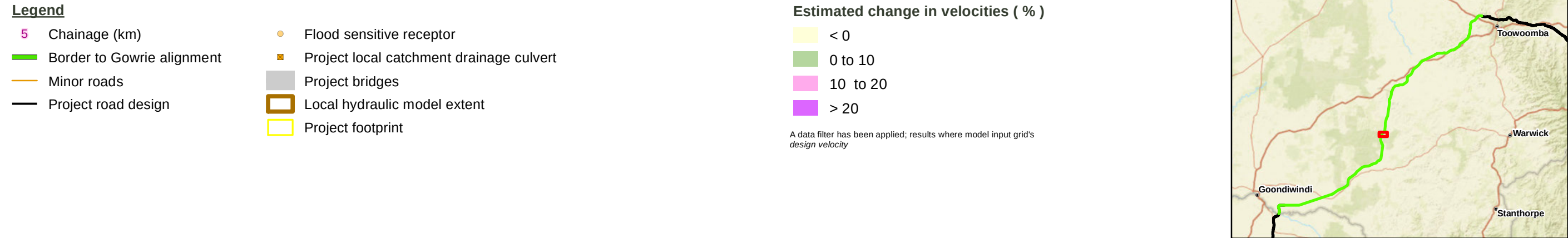


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Border to Gowrie

Figure O14 - page 19 of 48:
20% AEP Event - Local Catchments - Percentage Change in Velocity (<0.5m/s and >1.0m/s cutoff)





Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated change in velocities (%)

- < 0
- 0 to 10
- 10 to 20
- > 20

A data filter has been applied; results where model input grid's design velocity



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



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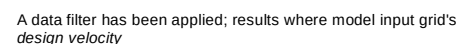
Border to Gowrie

Figure O14 - page 21 of 48:

20% AEP Event - Local Catchments - Percentage Change in Velocity (<0.5m/s and >1.0m/s cutoff)



- Estimated change in velocities (%)**



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Figure O14 - page 22 of 48:

20% AEP Event - Local Catchments - Percentage Change in Velocity (<0.5m/s and >1.0m/s cutoff)



Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project floodplain culvert
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated change in velocities (%)

- < 0
- 0 to 10
- 10 to 20
- > 20

A data filter has been applied; results where model input grid's design velocity



A3 scale: 1:15,000

0 0.15 0.3 0.45 0.6 0.75 km

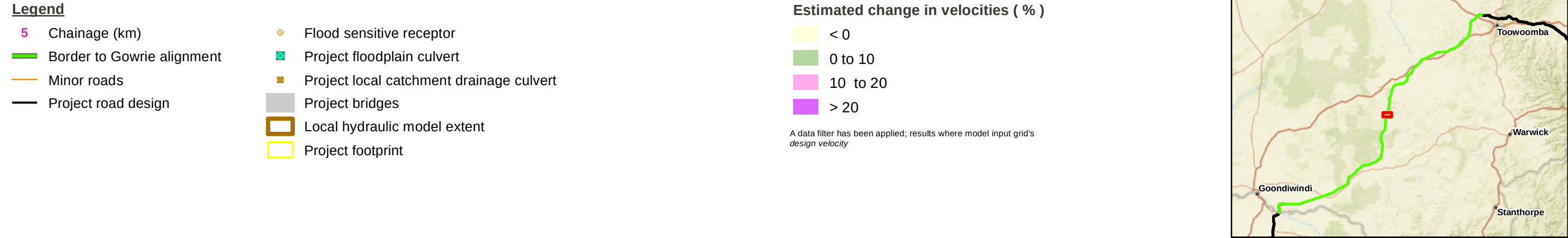


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Border to Gowrie

Figure O14 - page 23 of 48:
20% AEP Event - Local Catchments - Percentage Change in Velocity (<0.5m/s and >1.0m/s cutoff)



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



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Border to Gowrie

Figure O14 - page 24 of 48:
20% AEP Event - Local Catchments - Percentage Change in Velocity (<0.5m/s and >1.0m/s cutoff)



- Estimated change in velocities (%)**

- A data filter has been applied; results where model input grid's *design velocity*

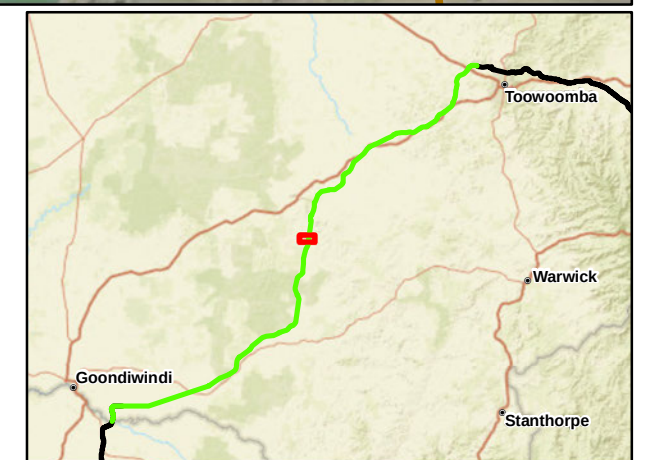


Figure O14 - page 25 of 48:



- Estimated change in velocities (%)**

- A data filter has been applied; results where model input grid's *design velocity*

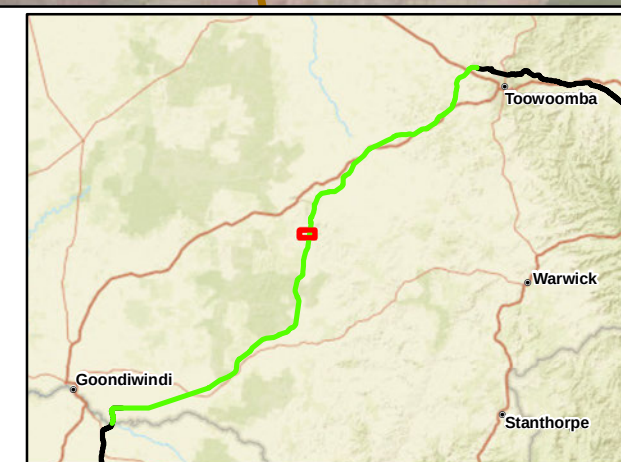


Figure O14 - page 26 of 48:

20% AEP Event - Local Catchments - Percentage Change in Velocity (<0.5m/s and >1.0m/s cutoff)

A3 scale: 1:15,000



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

- Flood sensitive receptor
- Project local catchment drainage culvert
- ▭ Local hydraulic model extent
- ▭ Project footprint

	< 0
	0 to 10
	10 to 20
	> 20

A data filter has been applied; results where model input grid's *design velocity*



A step function graph on a horizontal axis labeled from 0 to 0.75 km. The function is 1 for intervals $[0, 0.15]$, $[0.3, 0.45]$, and $[0.6, 0.75]$, and 0 for intervals $(0.15, 0.3]$ and $(0.45, 0.6]$.

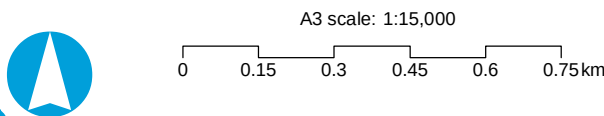
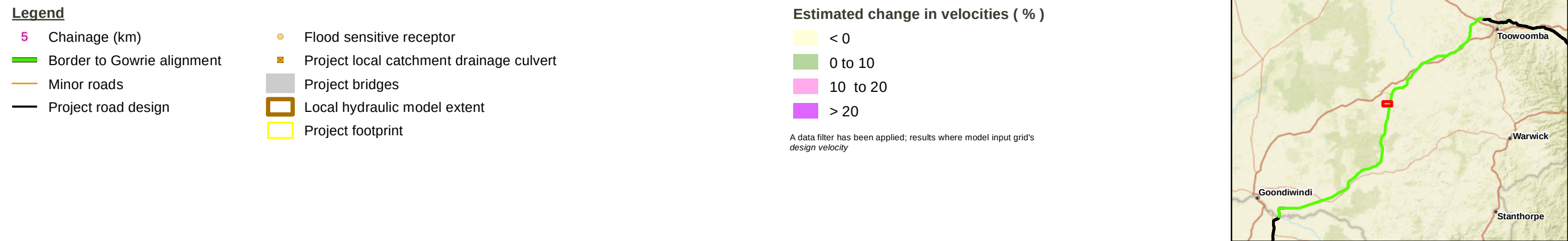


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**Figure O14 - page 27 of 48:
($<0.5\text{m/s}$ and $>1.0\text{m/s}$ cutoff)**





- Estimated change in velocities (%)**

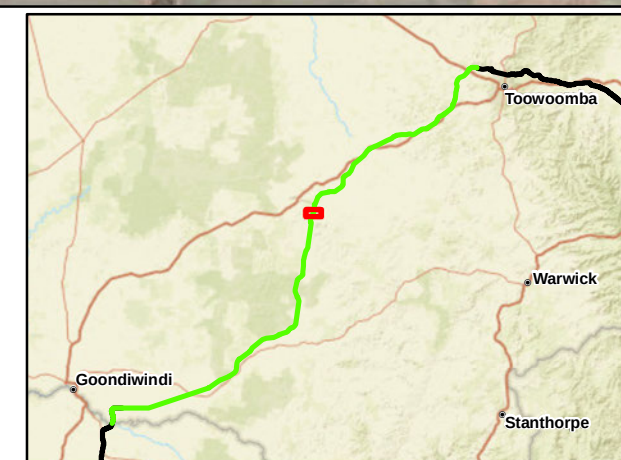
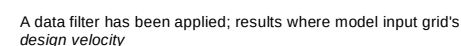


Figure O14 - page 29 of 48:



Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Local hydraulic model extent
- Project footprint

Estimated change in velocities (%)

- < 0
- 0 to 10
- 10 to 20
- > 20

A data filter has been applied; results where model input grid's design velocity



A3 scale: 1:15,000

0 0.15 0.3 0.45 0.6 0.75 km

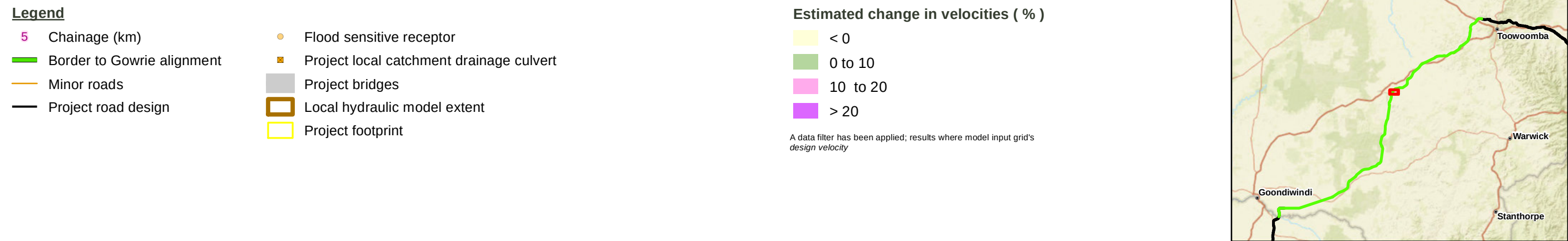


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Border to Gowrie

Figure O14 - page 30 of 48:
20% AEP Event - Local Catchments - Percentage Change in Velocity (<0.5m/s and >1.0m/s cutoff)



A3 scale: 1:15,000

0 0.15 0.3 0.45 0.6 0.75 km

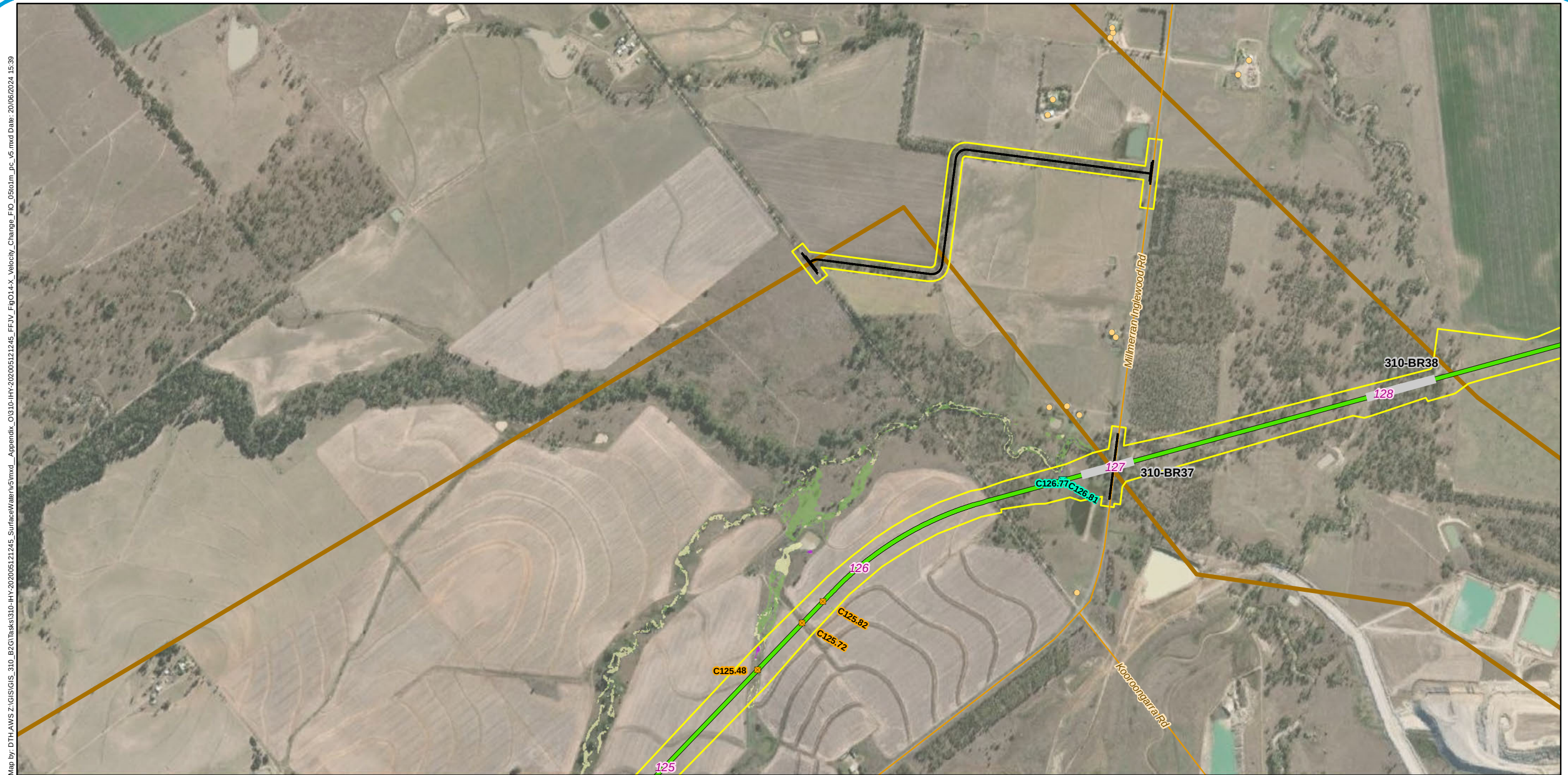


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Border to Gowrie

Figure O14 - page 31 of 48:
20% AEP Event - Local Catchments - Percentage Change in Velocity (<0.5m/s and >1.0m/s cutoff)



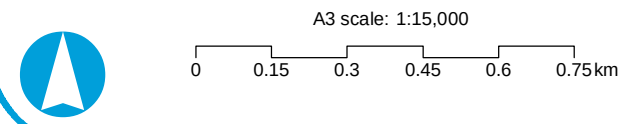
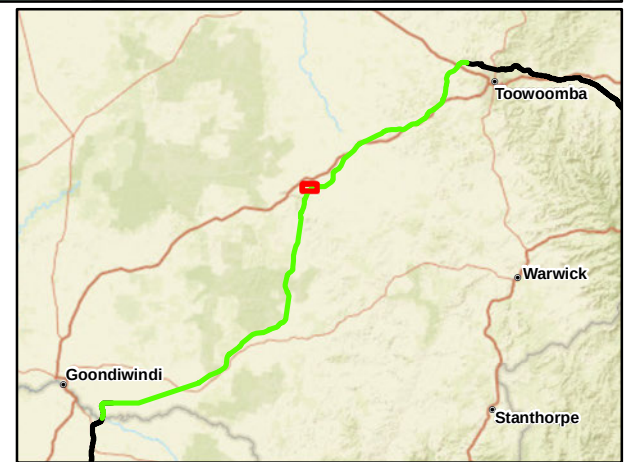
Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project floodplain culvert
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated change in velocities (%)

- < 0
- 0 to 10
- 10 to 20
- > 20

A data filter has been applied; results where model input grid's design velocity





- Estimated change in velocities (%)**

- A data filter has been applied; results where model input grid's *design velocity*

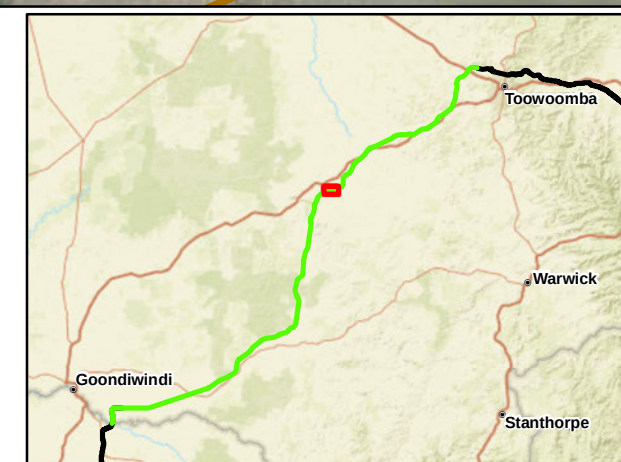


Figure O14 - page 33 of 48:



5 Chainage (km)

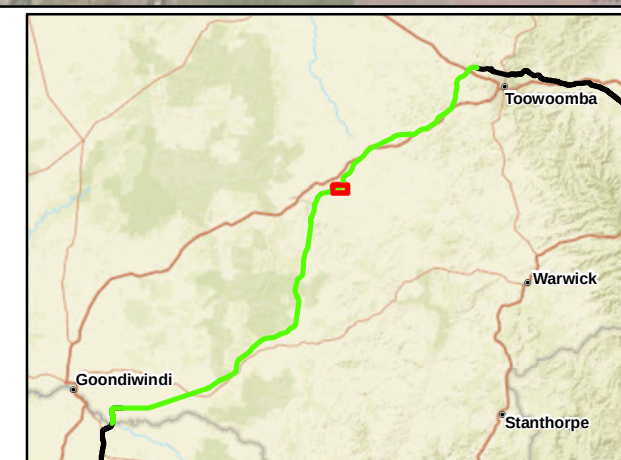
Border to Gowrie alignment

Project road design

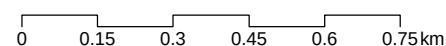
- Estimated change in velocities (%)**

- | | |
|---|----------|
|  | < 0 |
|  | 0 to 10 |
|  | 10 to 20 |
|  | > 20 |

A data filter has been applied; results where model input grid's *design velocity*



A3 scale: 1:15,000



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Border to Gowrie

**Figure O14 - page 34 of 48:
($<0.5\text{m/s}$ and $>1.0\text{m/s}$ cutoff)**



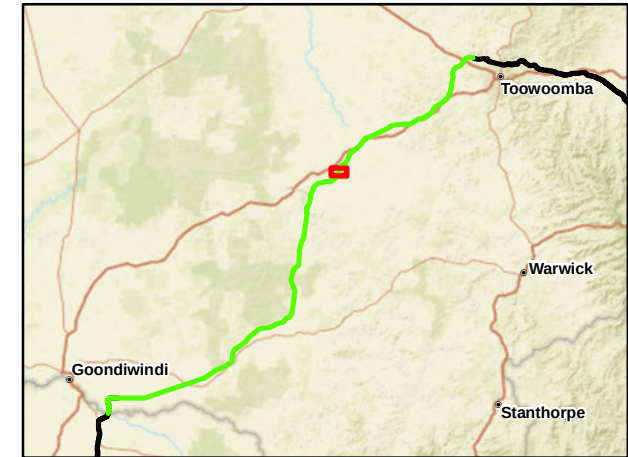
Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Local hydraulic model extent
- Project footprint

Estimated change in velocities (%)

- < 0
- 0 to 10
- 10 to 20
- > 20

A data filter has been applied; results where model input grid's design velocity



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

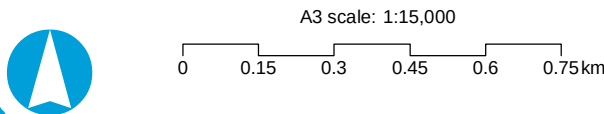
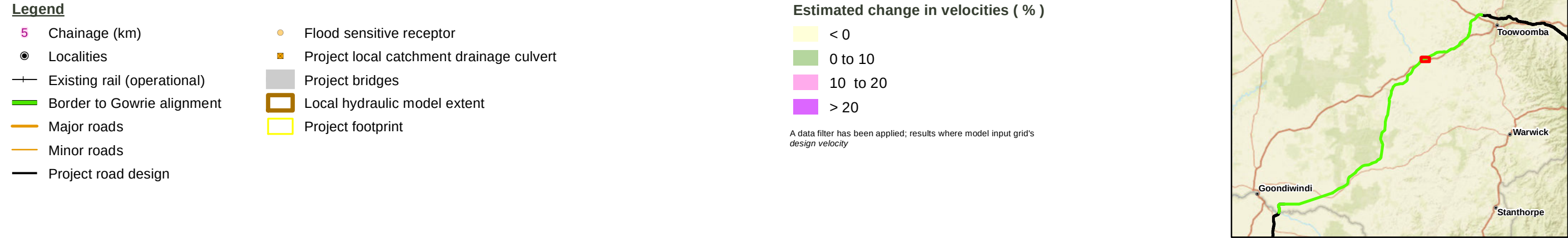


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Border to Gowrie

Figure O14 - page 35 of 48:
20% AEP Event - Local Catchments - Percentage Change in Velocity (<0.5m/s and >1.0m/s cutoff)





Legend

- 5 Chainage (km)
- Existing rail (operational)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Local hydraulic model extent
- Project footprint

Estimated change in velocities (%)

- < 0
- 0 to 10
- 10 to 20
- > 20

A data filter has been applied; results where model input grid's design velocity



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

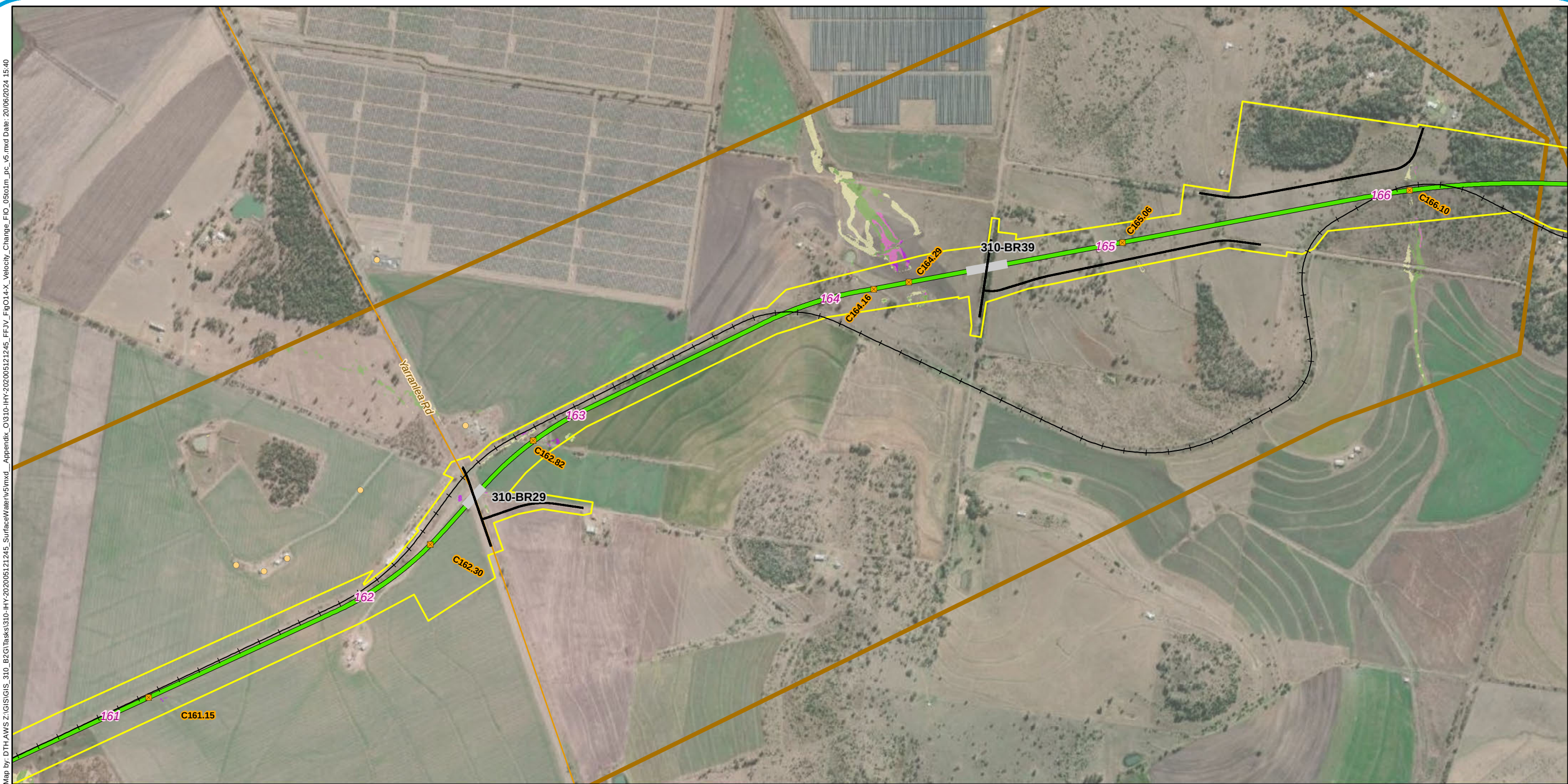


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Border to Gowrie

Figure O14 - page 37 of 48:
20% AEP Event - Local Catchments - Percentage Change in Velocity (<0.5m/s and >1.0m/s cutoff)



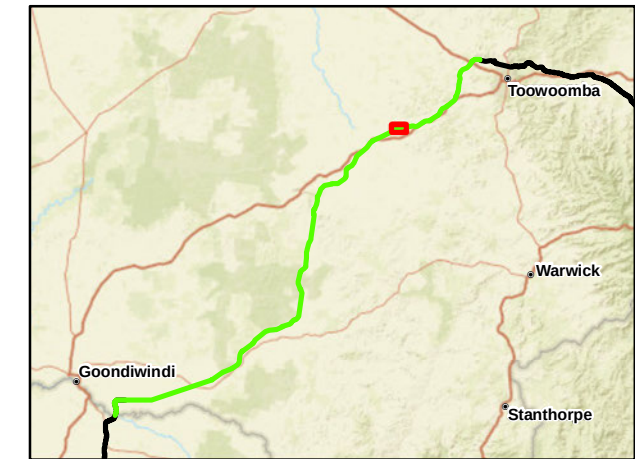
Legend

- | | |
|-------------------------------|--|
| 5 Chainage (km) | ● Flood sensitive receptor |
| — Existing rail (operational) | ✕ Project local catchment drainage culvert |
| — Border to Gowrie alignment | ▭ Project bridges |
| — Minor roads | ▭ Local hydraulic model extent |
| — Project road design | ▭ Project footprint |

Estimated change in velocities (%)

- | |
|----------|
| < 0 |
| 0 to 10 |
| 10 to 20 |
| > 20 |

A data filter has been applied; results where model input grid's design velocity



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

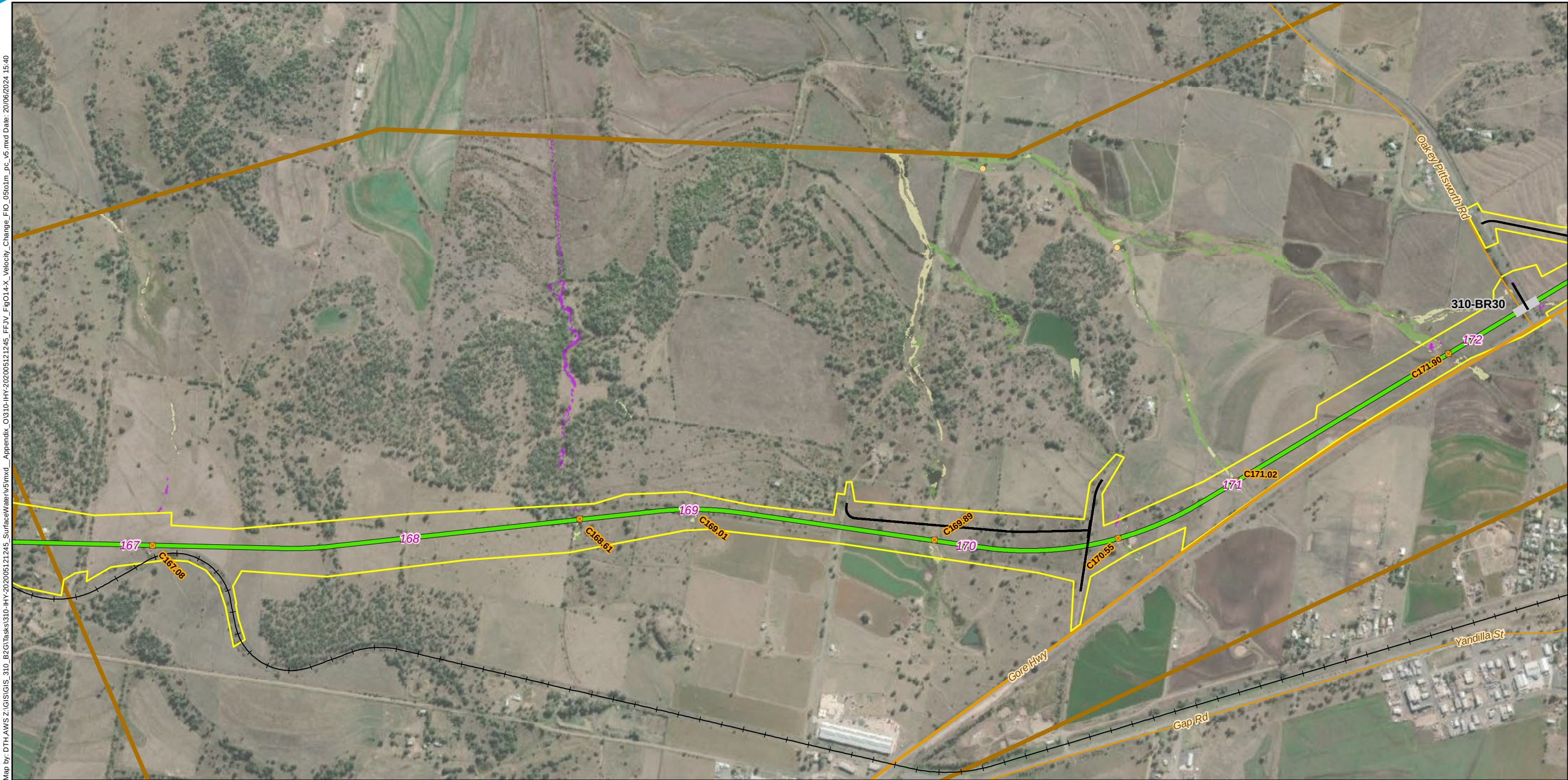


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Border to Gowrie

Figure O14 - page 38 of 48:
20% AEP Event - Local Catchments - Percentage Change in Velocity (<0.5m/s and >1.0m/s cutoff)



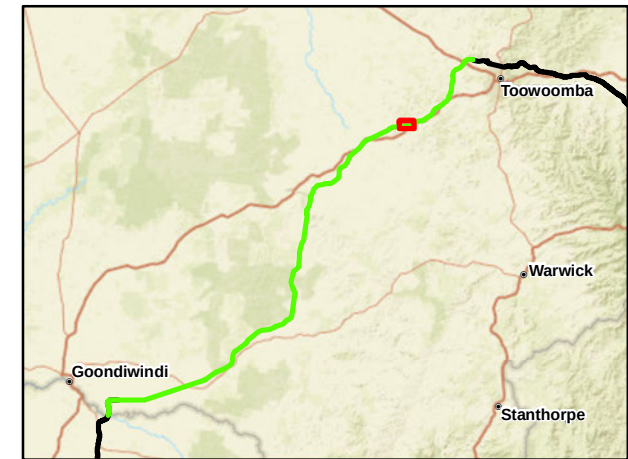
Legend

- 5 Chainage (km)
- Existing rail (operational)
- Border to Gowrie alignment
- Major roads
- Minor roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated change in velocities (%)

- < 0
- 0 to 10
- 10 to 20
- > 20

A data filter has been applied; results where model input grid's design velocity



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

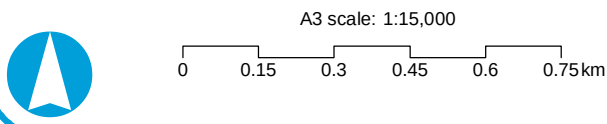
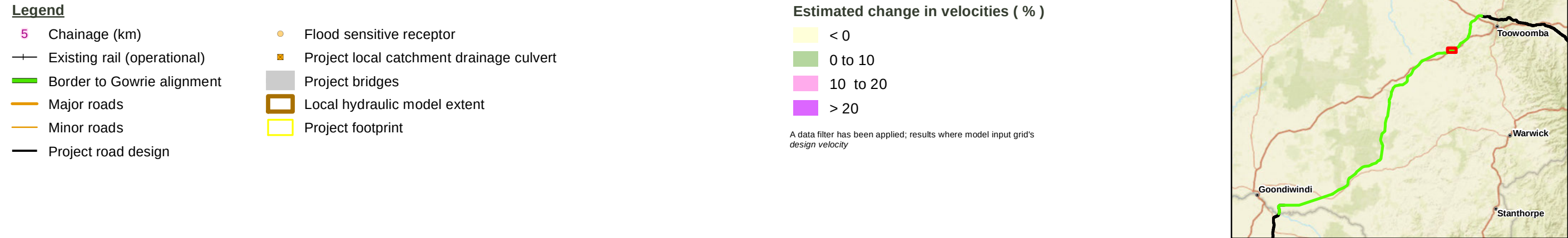


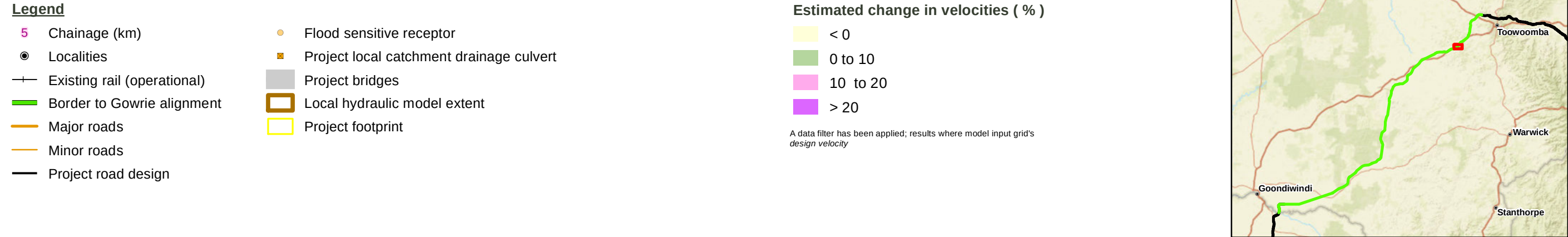
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Border to Gowrie

Figure O14 - page 39 of 48:
20% AEP Event - Local Catchments - Percentage Change in Velocity (<0.5m/s and >1.0m/s cutoff)





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

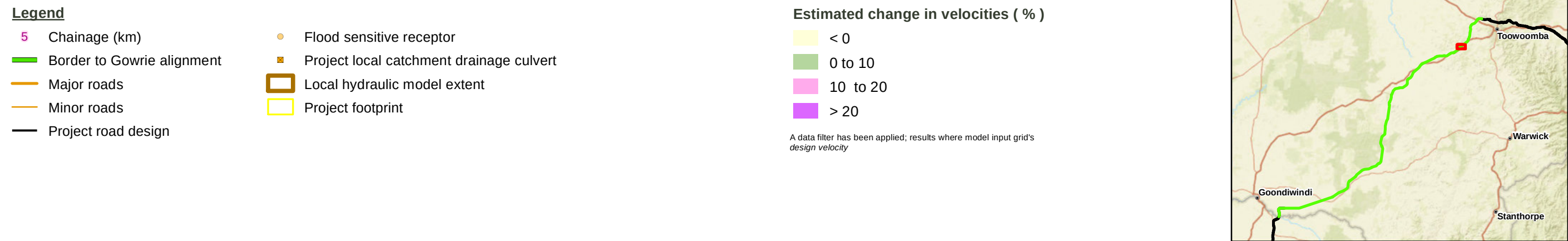


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Border to Gowrie

Figure O14 - page 41 of 48:
20% AEP Event - Local Catchments - Percentage Change in Velocity (<0.5m/s and >1.0m/s cutoff)



A3 scale: 1:15,000

0 0.15 0.3 0.45 0.6 0.75 km



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Border to Gowrie

Figure O14 - page 42 of 48:
20% AEP Event - Local Catchments - Percentage Change in Velocity (<0.5m/s and >1.0m/s cutoff)



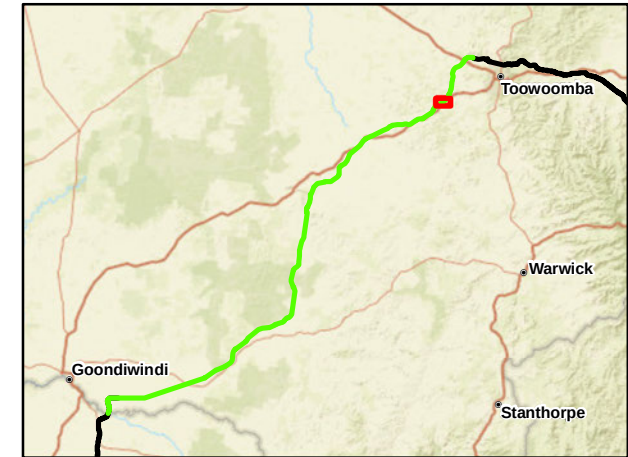
Legend

- | | |
|----------------------------|--|
| 5 Chainage (km) | ○ Flood sensitive receptor |
| Border to Gowrie alignment | ■ Project local catchment drainage culvert |
| Major roads | ■ Project bridges |
| Minor roads | ■ Local hydraulic model extent |
| Project road design | ■ Project footprint |

Estimated change in velocities (%)

- | |
|----------|
| < 0 |
| 0 to 10 |
| 10 to 20 |
| > 20 |

A data filter has been applied; results where model input grid's design velocity



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



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Border to Gowrie

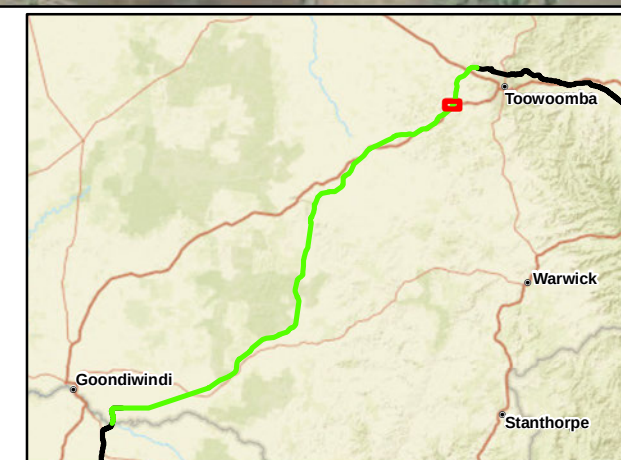
Figure O14 - page 43 of 48:
20% AEP Event - Local Catchments - Percentage Change in Velocity (<0.5m/s and >1.0m/s cutoff)



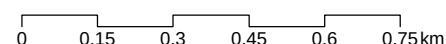
Chainage (km)	Flood sensitive receptor
Border to Gowrie alignment	Project floodplain culvert
Major roads	Project bridges
Minor roads	Local hydraulic model extent
Project road design	Project footprint

	< 0
	0 to 10
	10 to 20
	> 20

A data filter has been applied; results where model input grid's *design velocity*



A3 scale: 1:15,000



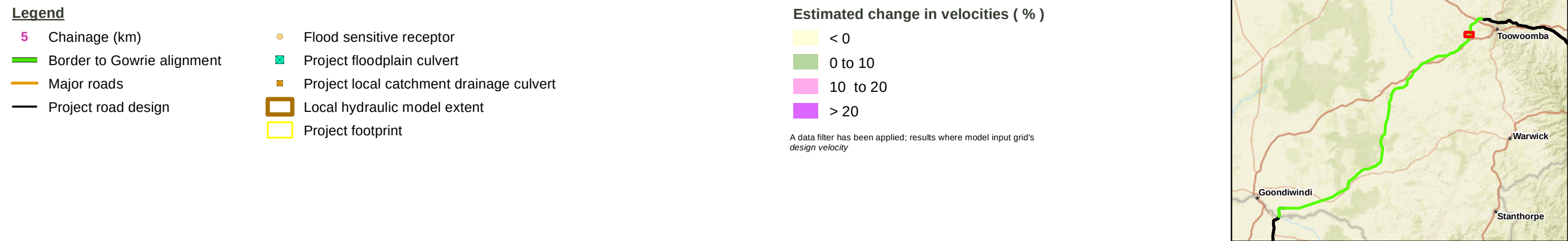
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Figure O14 - page 44 of 48:

20% AEP Event - Local Catchments - Percentage Change in Velocity (<0.5m/s and >1.0m/s cutoff)



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

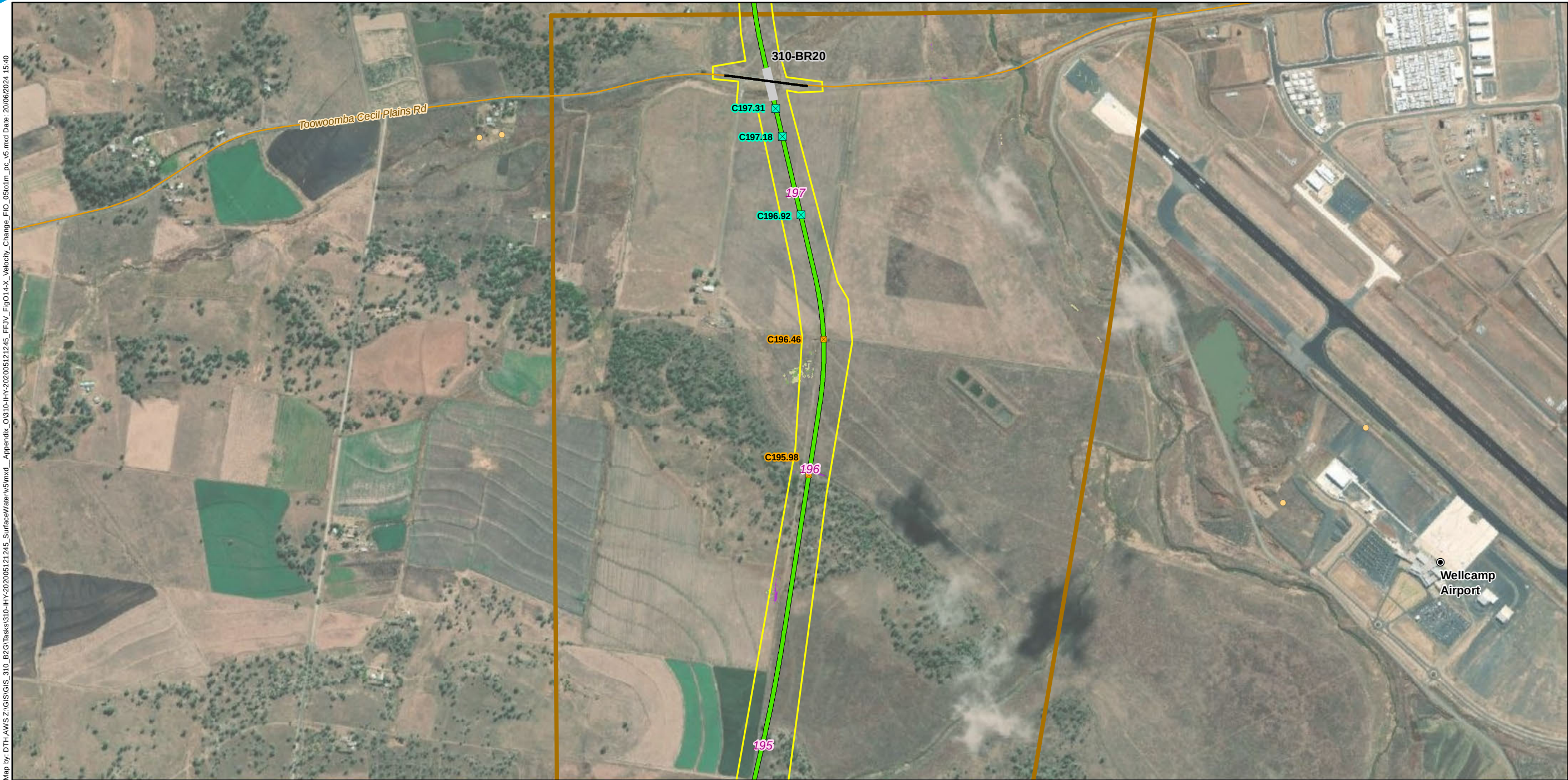


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Border to Gowrie

Figure O14 - page 45 of 48:
20% AEP Event - Local Catchments - Percentage Change in Velocity (<0.5m/s and >1.0m/s cutoff)



Legend

5 Chainage (km)

Border to Gowrie alignment

Minor roads

Project road design

Flood sensitive receptor

Project floodplain culvert

Project local catchment drainage culvert

Project bridges

Local hydraulic model extent

Project footprint

Estimated change in velocities (%)

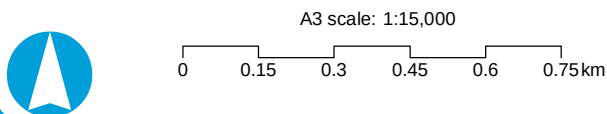
< 0

0 to 10

10 to 20

> 20

A data filter has been applied; results where model input grid's design velocity





Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Project road design
- Flood sensitive receptor
- Project floodplain culvert
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated change in velocities (%)

- < 0
- 0 to 10
- 10 to 20
- > 20

A data filter has been applied; results where model input grid's design velocity



A3 scale: 1:15,000

0 0.15 0.3 0.45 0.6 0.75 km

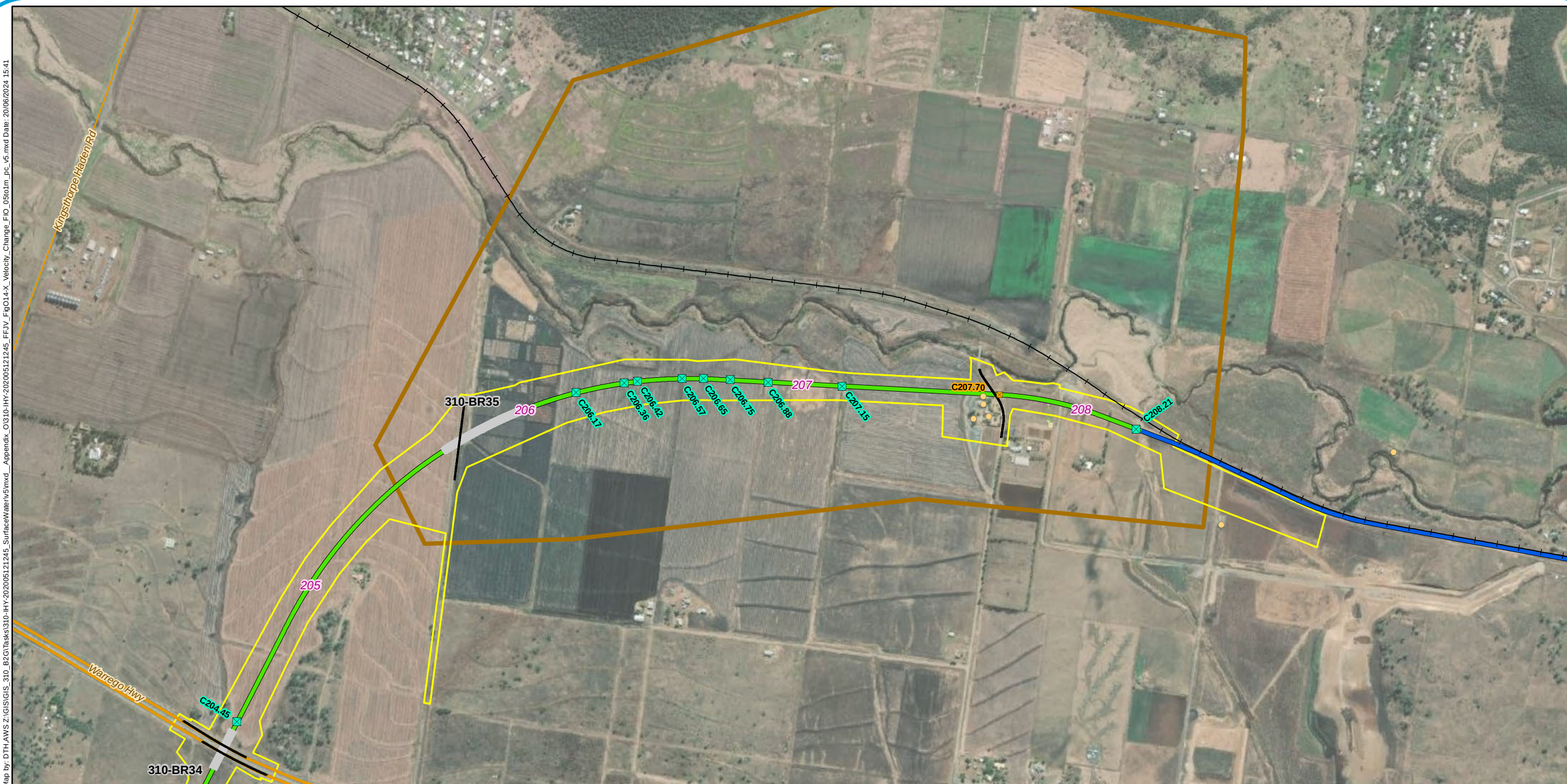


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Border to Gowrie

Figure O14 - page 47 of 48:
20% AEP Event - Local Catchments - Percentage Change in Velocity (<0.5m/s and >1.0m/s cutoff)



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

-  Flood sensitive receptor
-  Project floodplain culvert
-  Project local catchment drainage culvert
-  Project bridges
-  Local hydraulic model extent
-  Project footprint

	< 0
	0 to 10
	10 to 20
	> 20

A data filter has been applied; results where model input grid's *design velocity*

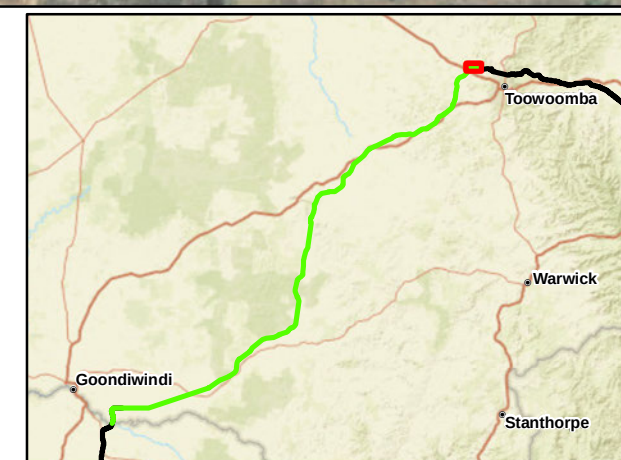
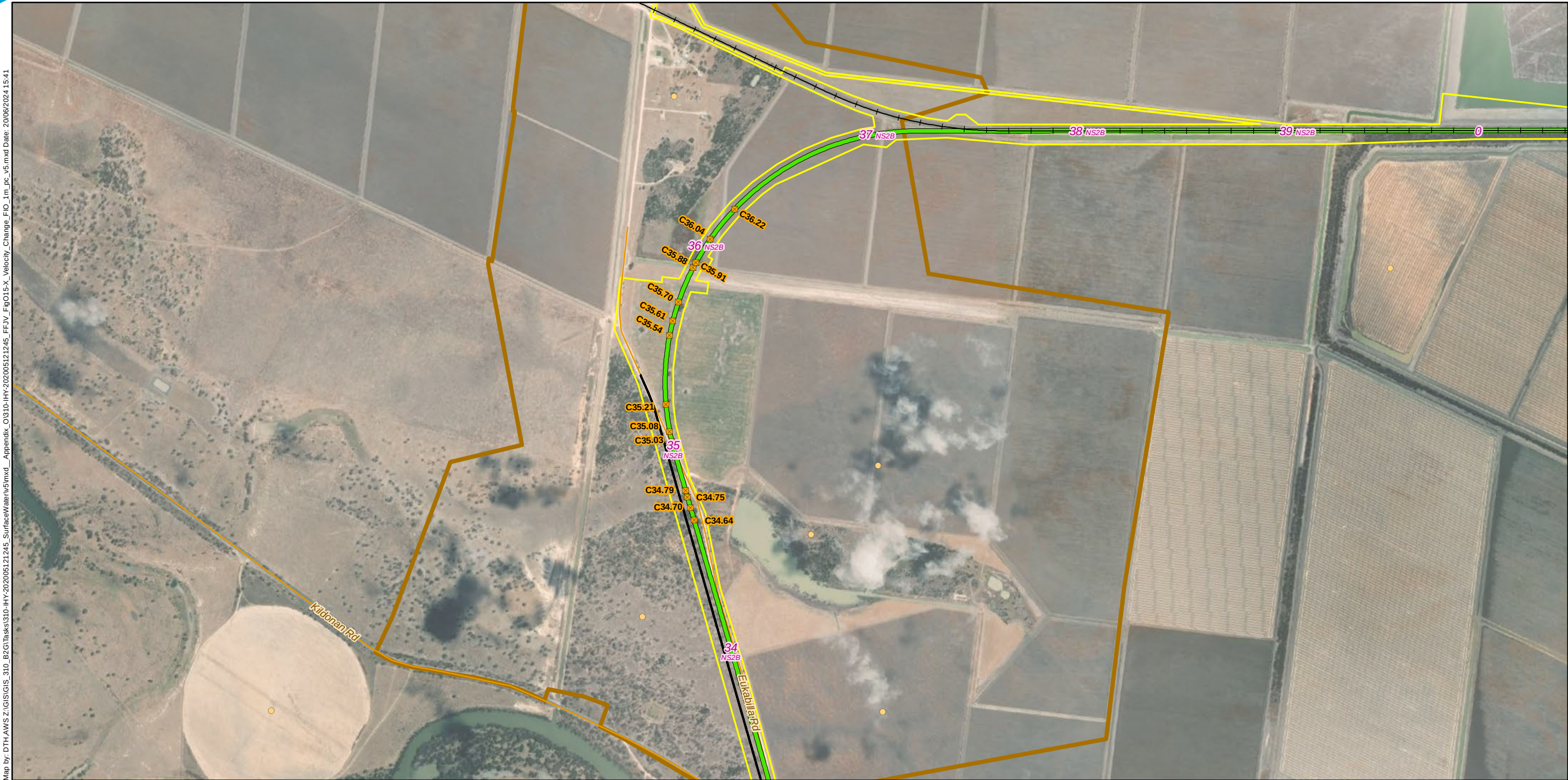


Figure O14 - page 48 of 48:

20% AEP Event - Local Catchments - Percentage Change in Velocity (<0.5m/s and >1.0m/s cutoff)

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\GIS_310_IHY-202005121245_SurfaceWater\5mxd_Appendix_D\310-IHY-202005121245_FF\JV_FigO15-X_Velocity_Change_FIO_1m_pc_v6.mxd Date: 20/06/2024 15:41



Legend

- 5 Chainage (km)
- Existing rail (operational)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Local hydraulic model extent
- Project footprint

Estimated change in velocities (%)

- < 0
- 0 to 10
- 10 to 20
- > 20

A data filter has been applied; results where model input grid's design velocity <1.0m/s have been cut off and are not displayed.



A3 scale: 1:20,000
0 0.2 0.4 0.6 0.8 1km



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Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

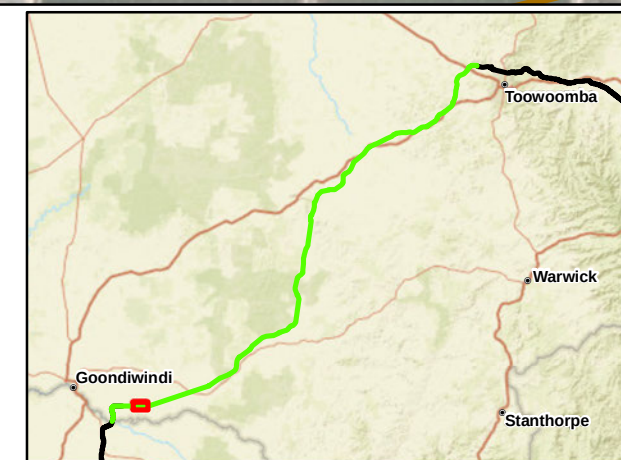
Figure O15 - page 1 of 48:

20% AEP Event - Local Catchments - Percentage Change in Velocity (<1.0m/s cutoff)



- Estimated change in velocities (%)**

A data filter has been applied; results where model input grid's *design velocity* <1.0m/s have been cut off and are not displayed.



20% AEP Event - Local Catchments - Percentage Change in Velocity (<1.0m/s cutoff)

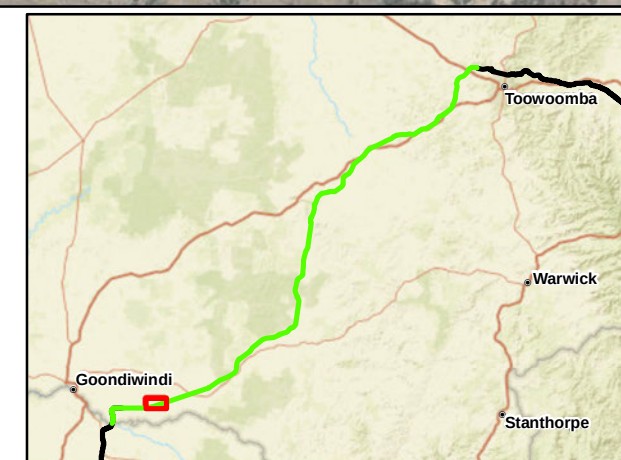
Border to Gowrie

Figure O15 - page 2 of 48:



- Estimated change in velocities (%)**

- A data filter has been applied; results where model input grid's *design velocity* <1.0m/s have been cut off and are not displayed.



A3 scale: 1:20,000



Issue date: 20/06/2024 Version: 5

Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure O15 - page 3 of 48:

20% AEP Event - Local Catchments - Percentage Change in Velocity (<1.0m/s cutoff)

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\310-HY-202005121245_SurfaceWater\5mxd_Appendix_D\310-HY-202005121245_FF\JV_FigO15-X_Velocity_Change_FIO_1m_pc_v6.mxd Date: 20/06/2024 15:41



Legend

- 5 Chainage (km)
- Localities
- Existing rail (operational)
- Border to Gowrie alignment
- Major roads
- Minor roads
- Project road design
- Yelarbon levee
- Flood sensitive receptor
- Project floodplain culvert
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated change in velocities (%)

- < 0
- 0 to 10
- 10 to 20
- > 20

A data filter has been applied; results where model input grid's design velocity <1.0m/s have been cut off and are not displayed.



A3 scale: 1:25,000
0 0.25 0.5 0.75 1 1.25 km

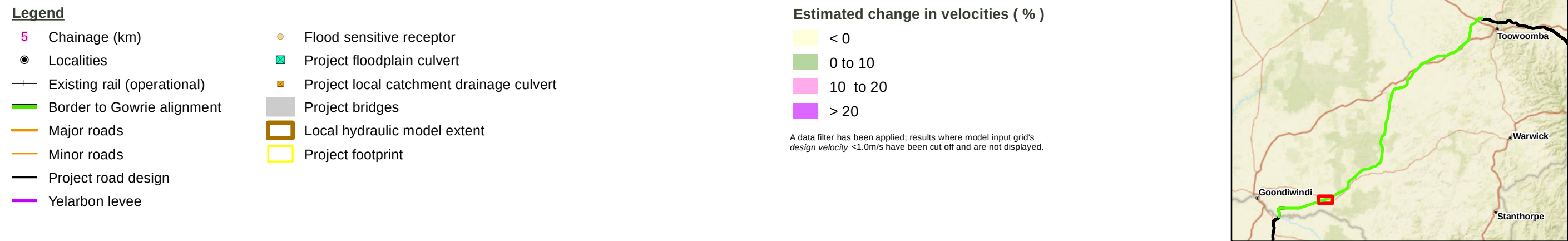
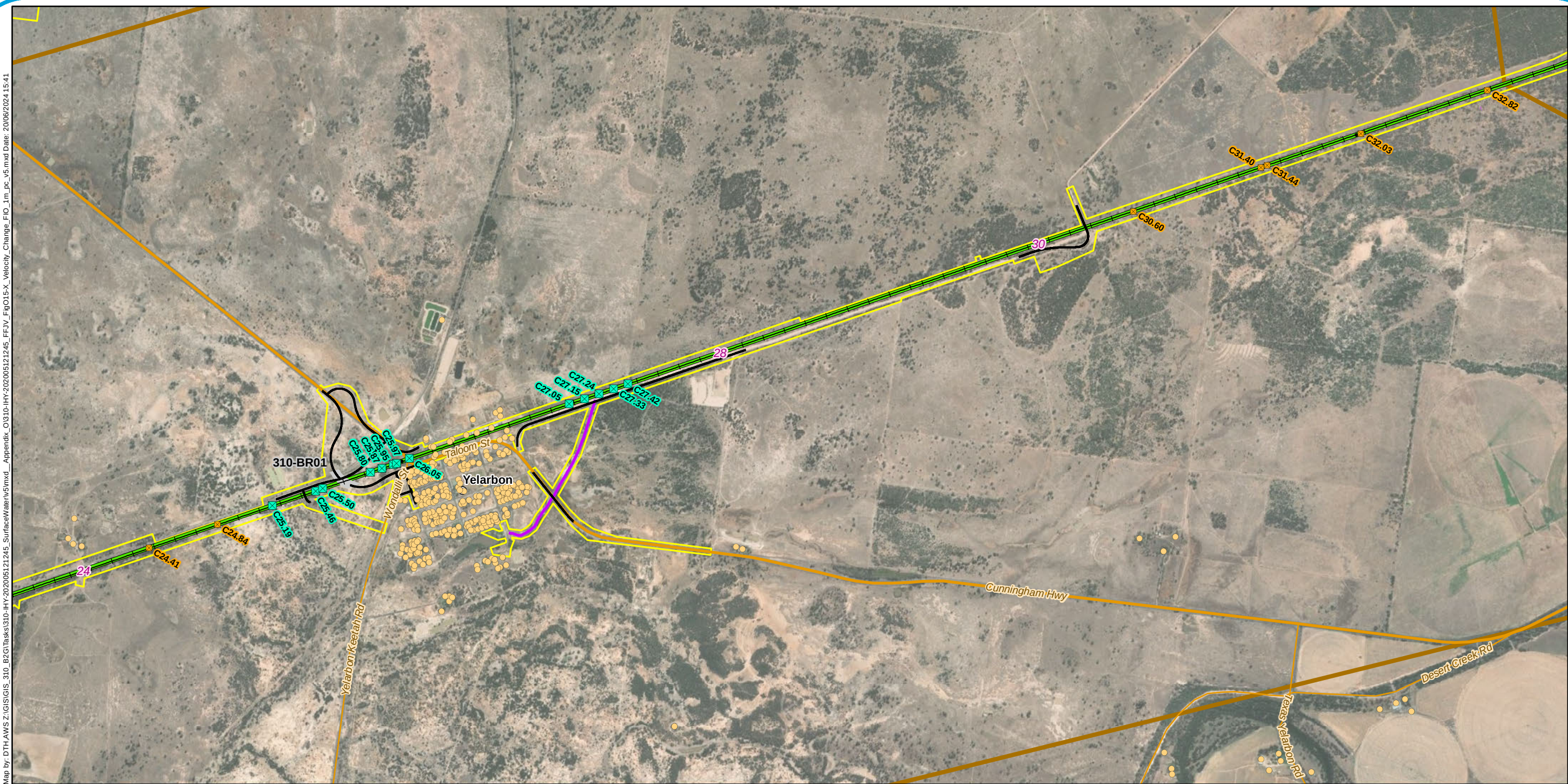


Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

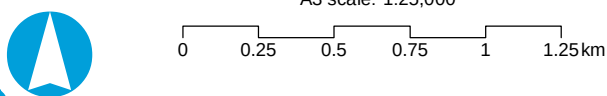
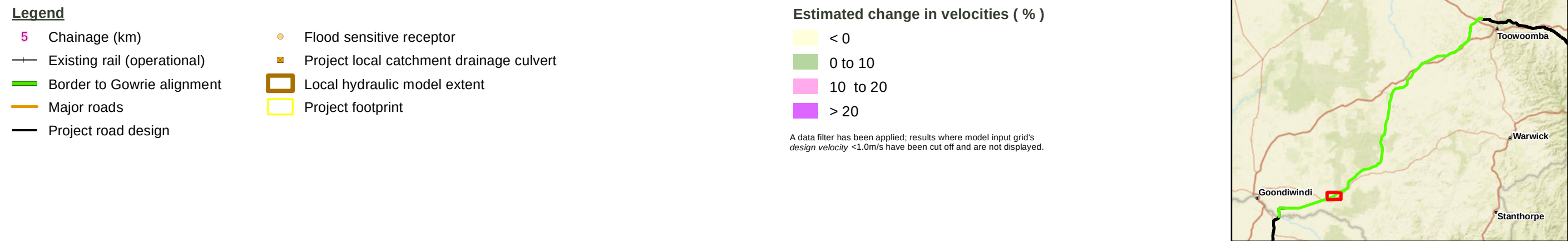
Border to Gowrie

Figure O15 - page 4 of 48:

20% AEP Event - Local Catchments - Percentage Change in Velocity (<1.0m/s cutoff)



A3 scale: 1:25,000
0 0.25 0.5 0.75 1 1.25 km





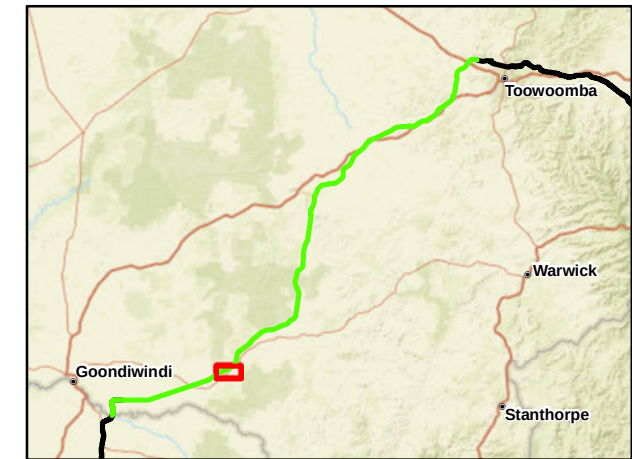
Legend

- | | |
|-------------------------------|--|
| 5 Chainage (km) | ● Flood sensitive receptor |
| — Existing rail (operational) | ■ Project floodplain culvert |
| — Border to Gowrie alignment | ■ Project local catchment drainage culvert |
| — Major roads | ■ Local hydraulic model extent |
| — Project road design | ■ Project footprint |

Estimated change in velocities (%)

- | |
|----------|
| < 0 |
| 0 to 10 |
| 10 to 20 |
| > 20 |

A data filter has been applied; results where model input grid's design velocity <1.0m/s have been cut off and are not displayed.



A3 scale: 1:25,000
0 0.25 0.5 0.75 1 1.25 km



- Estimated change in velocities (%)**

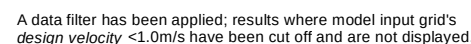
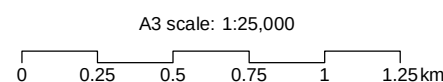


Figure O15 - page 8 of 48:

20% AEP Event - Local Catchments - Percentage Change in Velocity (<1.0m/s cutoff)





- Estimated change in velocities (%)**

- A data filter has been applied; results where model input grid's *design velocity* <1.0m/s have been cut off and are not displayed.



Figure O15 - page 9 of 48:

20% AEP Event - Local Catchments - Percentage Change in Velocity (<1.0m/s cutoff)

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\310-10-HY-202005121245_SurfaceWater\5mxd_Appendix_D\310-10-HY-202005121245_FF\JV_Fig015-X_Velocity_Change_FIO_1m_pc_v6.mxd Date: 20/06/2024 15:41



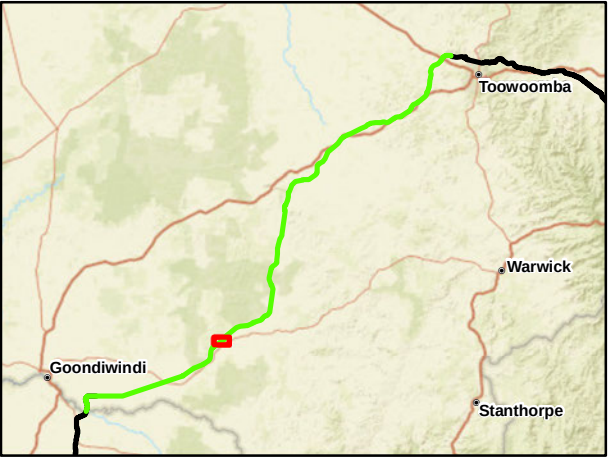
Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Major roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

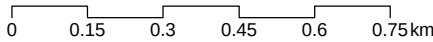
Estimated change in velocities (%)

- < 0
- 0 to 10
- 10 to 20
- > 20

A data filter has been applied; results where model input grid's design velocity <1.0m/s have been cut off and are not displayed.



A3 scale: 1:15,000



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Issue date: 20/06/2024 Version: 5
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Border to Gowrie

Figure O15 - page 10 of 48:

20% AEP Event - Local Catchments - Percentage Change in Velocity (<1.0m/s cutoff)



- Estimated change in velocities (%)**

- A data filter has been applied; results where model input grid's *design velocity* <1.0m/s have been cut off and are not displayed.

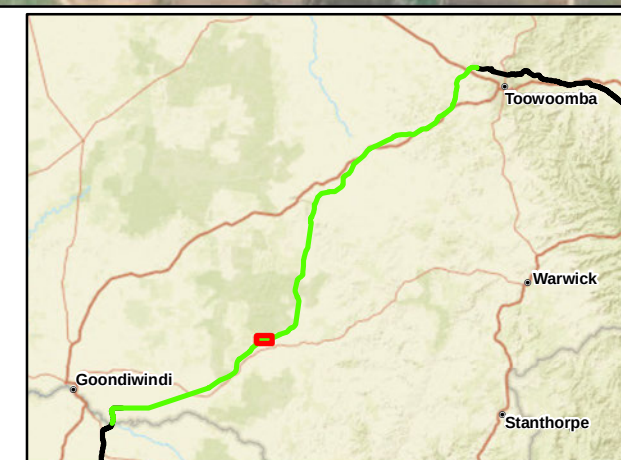


Figure O15 - page 11 of 48:

20% AEP Event - Local Catchments - Percentage Change in Velocity (<1.0m/s cutoff)

A3 scale: 1:15.000

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\310-IHY-202005121245_SurfaceWater\5mxd_Appendix_D\310-IHY-202005121245_FF\JV_FigO15-X_Velocity_Change_FIO_1m_pc_v6.mxd Date: 20/06/2024 15:42



Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project floodplain culvert
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated change in velocities (%)

- < 0
- 0 to 10
- 10 to 20
- > 20

A data filter has been applied; results where model input grid's design velocity <1.0m/s have been cut off and are not displayed.



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

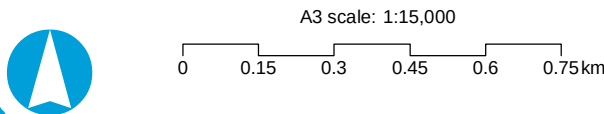
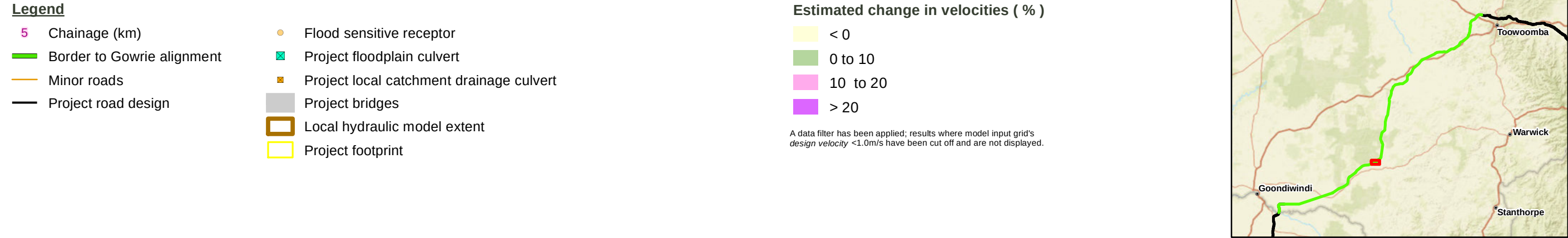


Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure O15 - page 12 of 48:

20% AEP Event - Local Catchments - Percentage Change in Velocity (<1.0m/s cutoff)





- Estimated change in velocities (%)**

- A data filter has been applied; results where model input grid's *design velocity* <1.0m/s have been cut off and are not displayed.

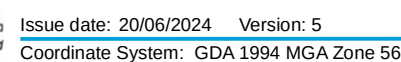


Figure O15 - page 14 of 48:

20% AEP Event - Local Catchments - Percentage Change in Velocity (<1.0m/s cutoff)



- Estimated change in velocities (%)**

- A data filter has been applied; results where model input grid's *design velocity* <1.0m/s have been cut off and are not displayed.

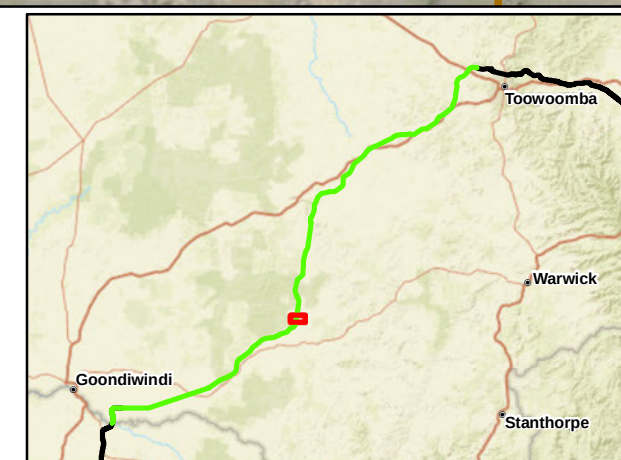


Figure O15 - page 15 of 48:

20% AEP Event - Local Catchments - Percentage Change in Velocity (<1.0m/s cutoff)



- Estimated change in velocities (%)**

A data filter has been applied; results where model input grid's *design velocity* <1.0m/s have been cut off and are not displayed.

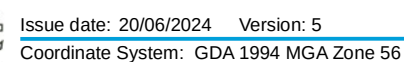


Figure O15 - page 16 of 48:

20% AEP Event - Local Catchments - Percentage Change in Velocity (<1.0m/s cutoff)

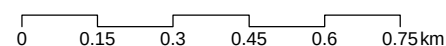


- Estimated change in velocities (%)**

- A data filter has been applied; results where model input grid's *design velocity* <1.0m/s have been cut off and are not displayed.



A3 scale: 1:15,000



Issue date: 20/06/2024 Version: 5

Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure O15 - page 17 of 48:

20% AEP Event - Local Catchments - Percentage Change in Velocity (<1.0m/s cutoff)



5 Chainage (km)

Border to Gowrie alignment

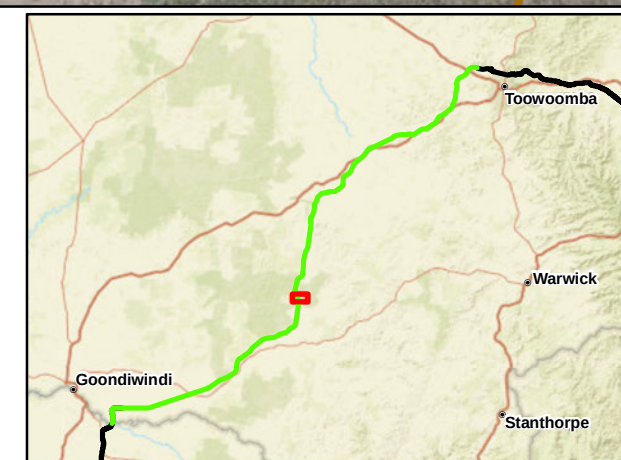
Minor roads

Project road design

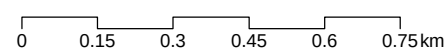
- Flood sensitive receptor
- Project local catchment drainage culvert
- ▭ Local hydraulic model extent
- ▭ Project footprint

	< 0
	0 to 10
	10 to 20
	> 20

A data filter has been applied; results where model input grid's *design velocity* <1.0m/s have been cut off and are not displayed.



A3 scale: 1:15,000



Issue date: 20/06/2024 Version: 5

Coordinate System: GDA 1994 MGA Zone 56

Figure O15 - page 18 of 48:

20% AEP Event - Local Catchments - Percentage Change in Velocity (<1.0m/s cutoff)



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

- Local hydraulic model extent
- Project footprint

	< 0
	0 to 10
	10 to 20
	> 20

A data filter has been applied; results where model input grid's *design velocity* <1.0m/s have been cut off and are not displayed.

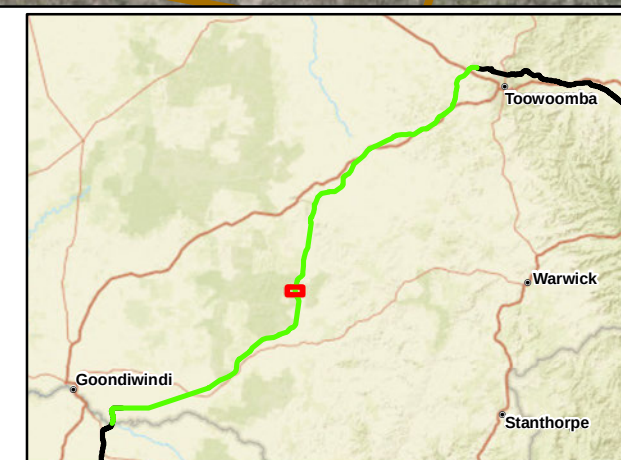


Figure O15 - page 19 of 48:

20% AEP Event - Local Catchments - Percentage Change in Velocity (<1.0m/s cutoff)

A3 scale: 1:15.000

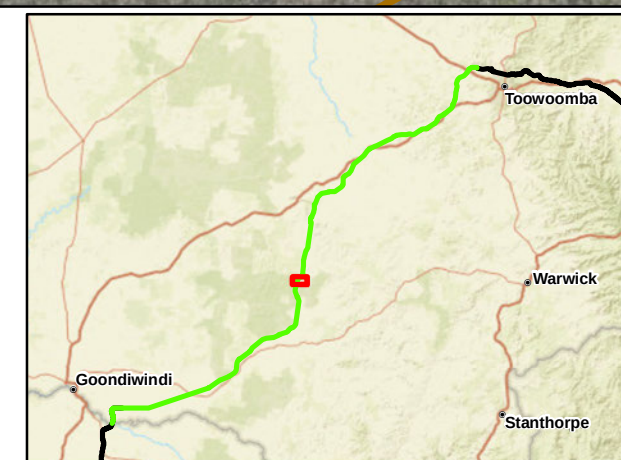


- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project road design

- Flood sensitive receptor
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

	< 0
	0 to 10
	10 to 20
	> 20

A data filter has been applied; results where model input grid's *design velocity* <1.0m/s have been cut off and are not displayed.



Issue date: 20/06/2024 Version: 5

Coordinate System: GDA 1994 MGA Zone 56

Figure O15 - page 20 of 48:

20% AEP Event - Local Catchments - Percentage Change in Velocity (<1.0m/s cutoff)

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\GIS_310_IHY-202005121245_SurfaceWater\5mxd_Appendix_O\310-IHY-202005121245_FF\JV_FigO15-X_Velocity_Change_FIO_1m_pc_v6.mxd Date: 20/06/2024 15:42



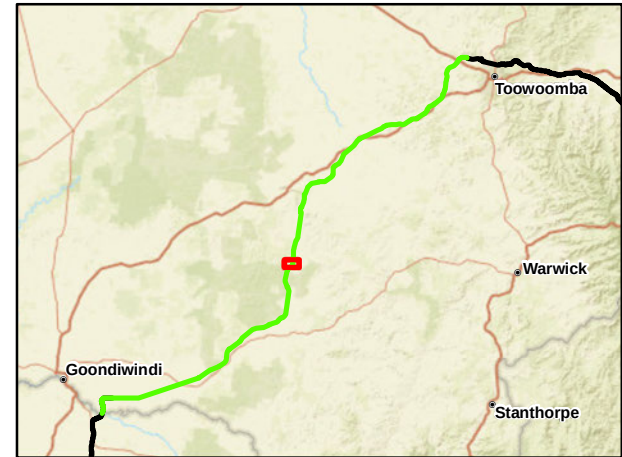
Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated change in velocities (%)

- < 0
- 0 to 10
- 10 to 20
- > 20

A data filter has been applied; results where model input grid's design velocity <1.0m/s have been cut off and are not displayed.



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 O15 - page 21 of 48:

20% AEP Event - Local Catchments - Percentage Change in Velocity (<1.0m/s cutoff)



- Estimated change in velocities (%)**

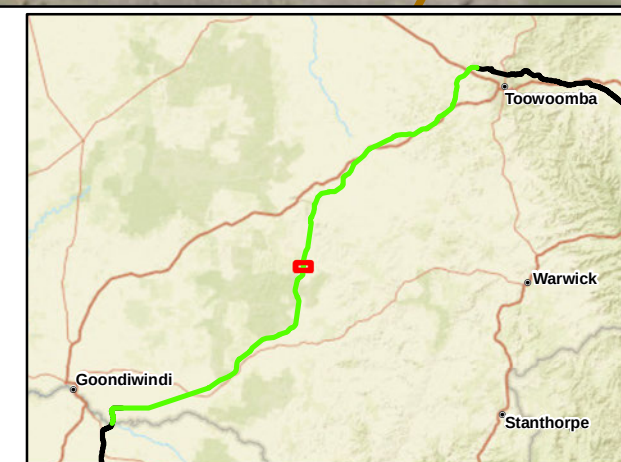
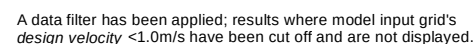
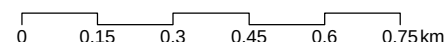


Figure O15 - page 22 of 48:

20% AEP Event - Local Catchments - Percentage Change in Velocity (<1.0m/s cutoff)

A3 scale: 1:15,000





- Estimated change in velocities (%)**

- A data filter has been applied; results where model input grid's *design velocity* <1.0m/s have been cut off and are not displayed.

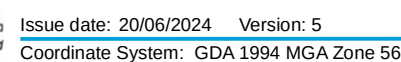


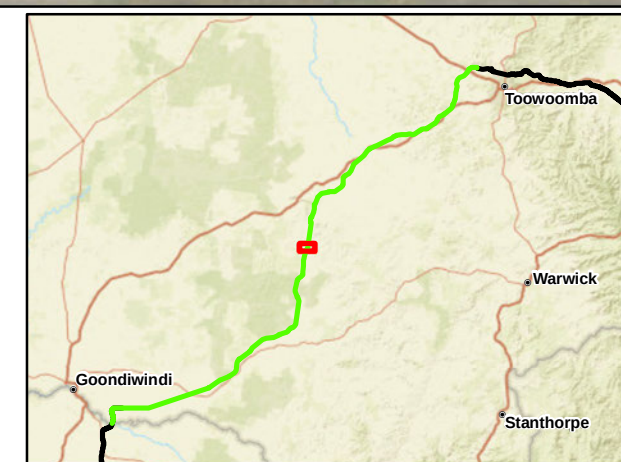
Figure O15 - page 23 of 48:

20% AEP Event - Local Catchments - Percentage Change in Velocity (<1.0m/s cutoff)



- Estimated change in velocities (%)**

- A data filter has been applied; results where model input grid's *design velocity* <1.0m/s have been cut off and are not displayed.



Issue date: 20/06/2024 Version: 5

Coordinate System: GDA 1994 MGA Zone 56

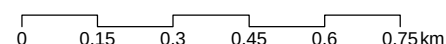
Border to Gowrie

Figure O15 - page 24 of 48:

20% AEP Event - Local Catchments - Percentage Change in Velocity (<1.0m/s cutoff)



A3 scale: 1:15,000





- Estimated change in velocities (%)**

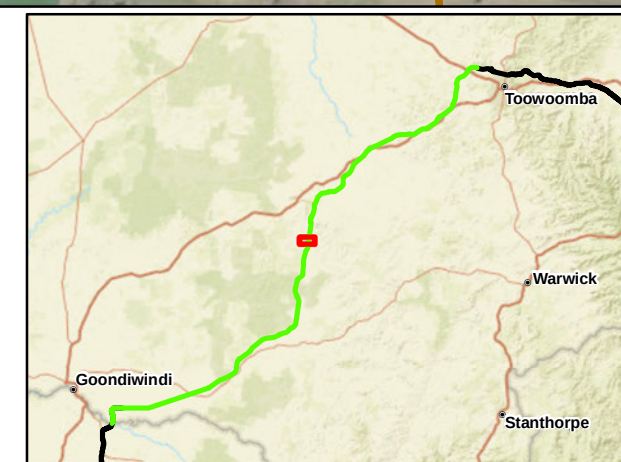
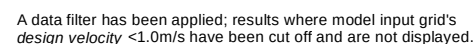


Figure O15 - page 25 of 48:

20% AEP Event - Local Catchments - Percentage Change in Velocity (<1.0m/s cutoff)



- Estimated change in velocities (%)**

- A data filter has been applied; results where model input grid's *design velocity* <1.0m/s have been cut off and are not displayed.

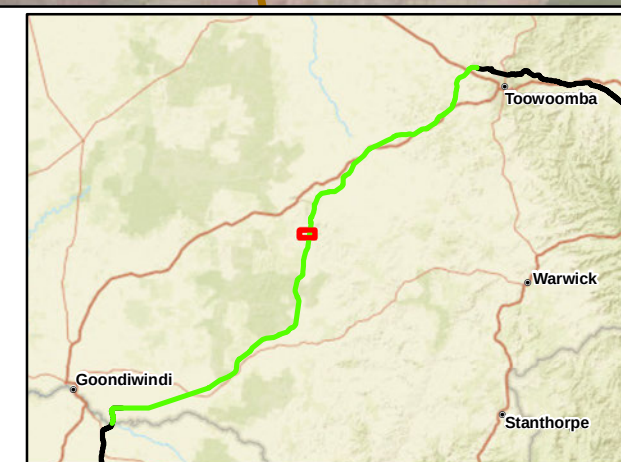


Figure O15 - page 26 of 48:

20% AEP Event - Local Catchments - Percentage Change in Velocity (<1.0m/s cutoff)

A3 scale: 1:15,000

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\GIS_310-IHY-202005121245_SurfaceWater\5vmsd_Appendix_D\310-IHY-202005121245_FF\JV_FigO15-X_Velocity_Change_FIO_1m_pc_v6.mxd Date: 20/06/2024 15:43



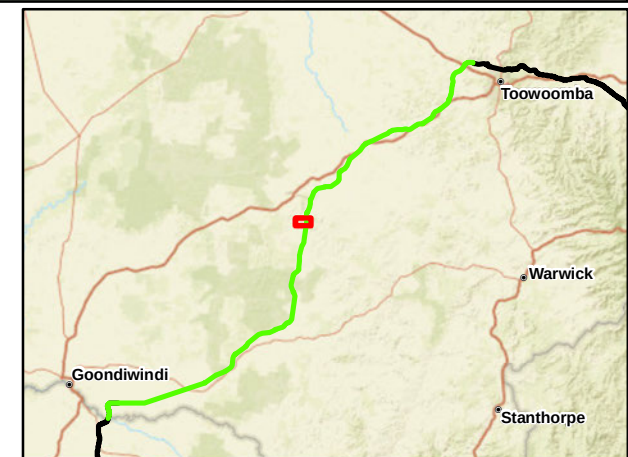
Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Local hydraulic model extent
- Project footprint

Estimated change in velocities (%)

- < 0
- 0 to 10
- 10 to 20
- > 20

A data filter has been applied; results where model input grid's design velocity <1.0m/s have been cut off and are not displayed.



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 O15 - page 27 of 48:

20% AEP Event - Local Catchments - Percentage Change in Velocity (<1.0m/s cutoff)



- Estimated change in velocities (%)**

- A data filter has been applied; results where model input grid's *design velocity* <1.0m/s have been cut off and are not displayed.



Figure O15 - page 28 of 48:

20% AEP Event - Local Catchments - Percentage Change in Velocity (<1.0m/s cutoff)

A3 scale: 1:15,000



- Estimated change in velocities (%)**

- A data filter has been applied; results where model input grid's *design velocity* <1.0m/s have been cut off and are not displayed.

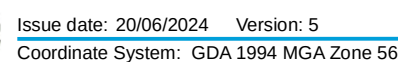


Figure O15 - page 29 of 48:

20% AEP Event - Local Catchments - Percentage Change in Velocity (<1.0m/s cutoff)



- Estimated change in velocities (%)**

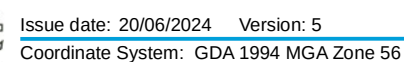
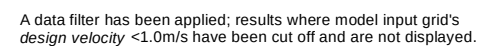


Figure O15 - page 30 of 48:

20% AEP Event - Local Catchments - Percentage Change in Velocity (<1.0m/s cutoff)



- Estimated change in velocities (%)**

- A data filter has been applied; results where model input grid's *design velocity* <1.0m/s have been cut off and are not displayed.

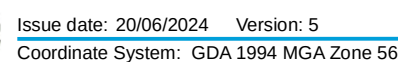
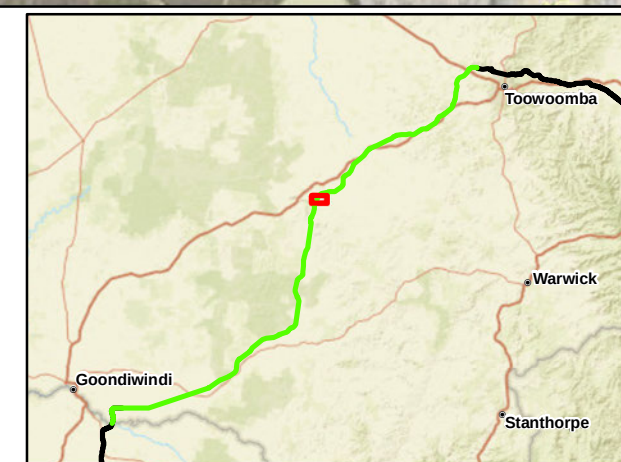


Figure O15 - page 31 of 48:

20% AEP Event - Local Catchments - Percentage Change in Velocity (<1.0m/s cutoff)



- Estimated change in velocities (%)**

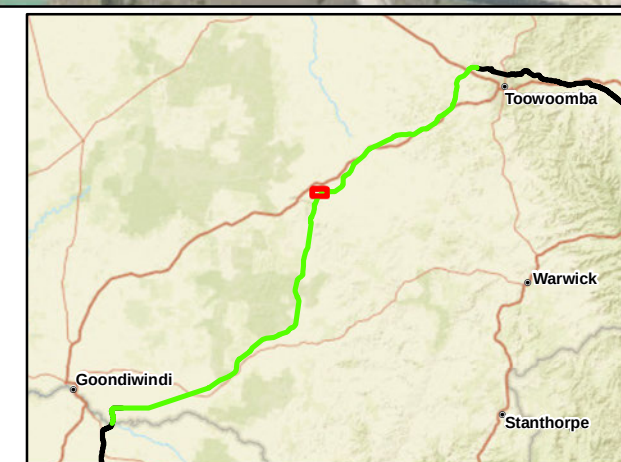
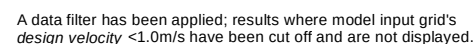


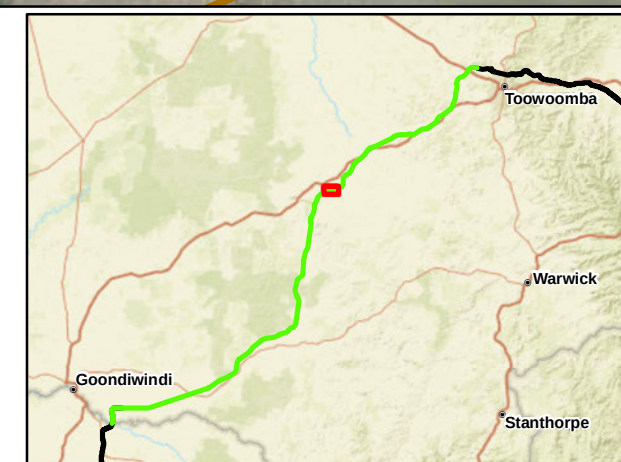
Figure O15 - page 32 of 48:

20% AEP Event - Local Catchments - Percentage Change in Velocity (<1.0m/s cutoff)



- Estimated change in velocities (%)**

- A data filter has been applied; results where model input grid's *design velocity* <1.0m/s have been cut off and are not displayed.



Issue date: 20/06/2024 Version: 5

Coordinate System: GDA 1994 MGA Zone 56

Figure O15 - page 33 of 48:

20% AEP Event - Local Catchments - Percentage Change in Velocity (<1.0m/s cutoff)

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\310-HY-202005121245_SurfaceWater\5mxd_Appendix_O\310-HY-202005121245_FF\JV_FigO15-X_Velocity_Change_FIO_1m_pc_v6.mxd Date: 20/06/2024 15:43



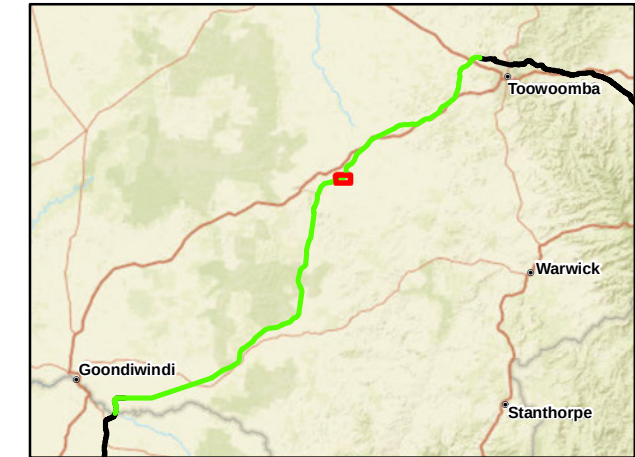
Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Local hydraulic model extent
- Project footprint

Estimated change in velocities (%)

- < 0
- 0 to 10
- 10 to 20
- > 20

A data filter has been applied; results where model input grid's design velocity <1.0m/s have been cut off and are not displayed.



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 O15 - page 34 of 48:

20% AEP Event - Local Catchments - Percentage Change in Velocity (<1.0m/s cutoff)

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\310-IHY-202005121245_SurfaceWater\5mxd_Appendix_D\310-IHY-202005121245_FF\JV_FigO15-X_Velocity_Change_FIO_1m_pc_v6.mxd Date: 20/06/2024 15:43



Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Local hydraulic model extent
- Project footprint

Estimated change in velocities (%)

- < 0
- 0 to 10
- 10 to 20
- > 20

A data filter has been applied; results where model input grid's design velocity <1.0m/s have been cut off and are not displayed.



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



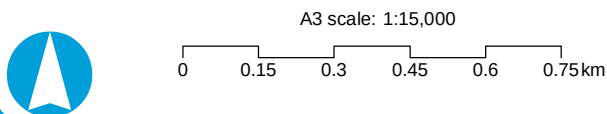
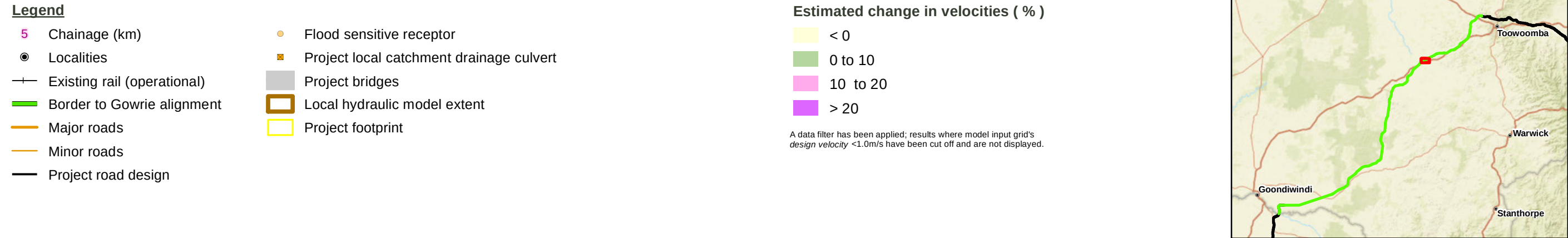
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Border to Gowrie

Figure O15 - page 35 of 48:

20% AEP Event - Local Catchments - Percentage Change in Velocity (<1.0m/s cutoff)





- Estimated change in velocities (%)**

- A data filter has been applied; results where model input grid's *design velocity* <1.0m/s have been cut off and are not displayed.



Figure O15 - page 37 of 48:

20% AEP Event - Local Catchments - Percentage Change in Velocity (<1.0m/s cutoff)

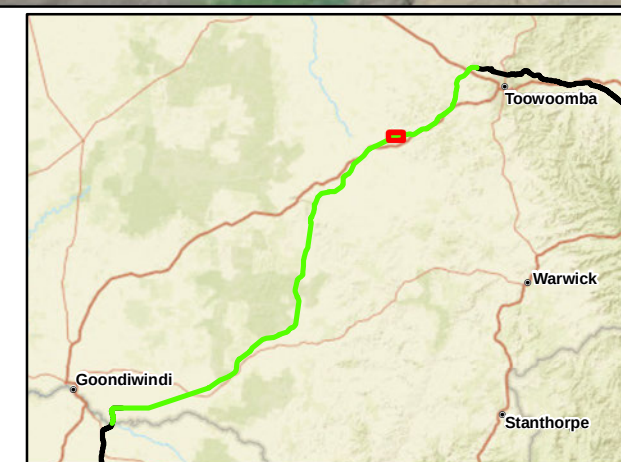
A3 scale: 1:15,000



Chainage (km)	Flood sensitive receptor
Existing rail (operational)	Project local catchment drainage culvert
Border to Gowrie alignment	Project bridges
Minor roads	Local hydraulic model extent
Project road design	Project footprint

	< 0
	0 to 10
	10 to 20
	> 20

A data filter has been applied; results where model input grid's *design velocity* <1.0m/s have been cut off and are not displayed.



A step function graph on a horizontal axis labeled from 0 to 0.75 km. The function is 1 for intervals $[0, 0.15]$, $[0.3, 0.45]$, and $[0.6, 0.75]$, and 0 for intervals $(0.15, 0.3]$ and $(0.45, 0.6]$.



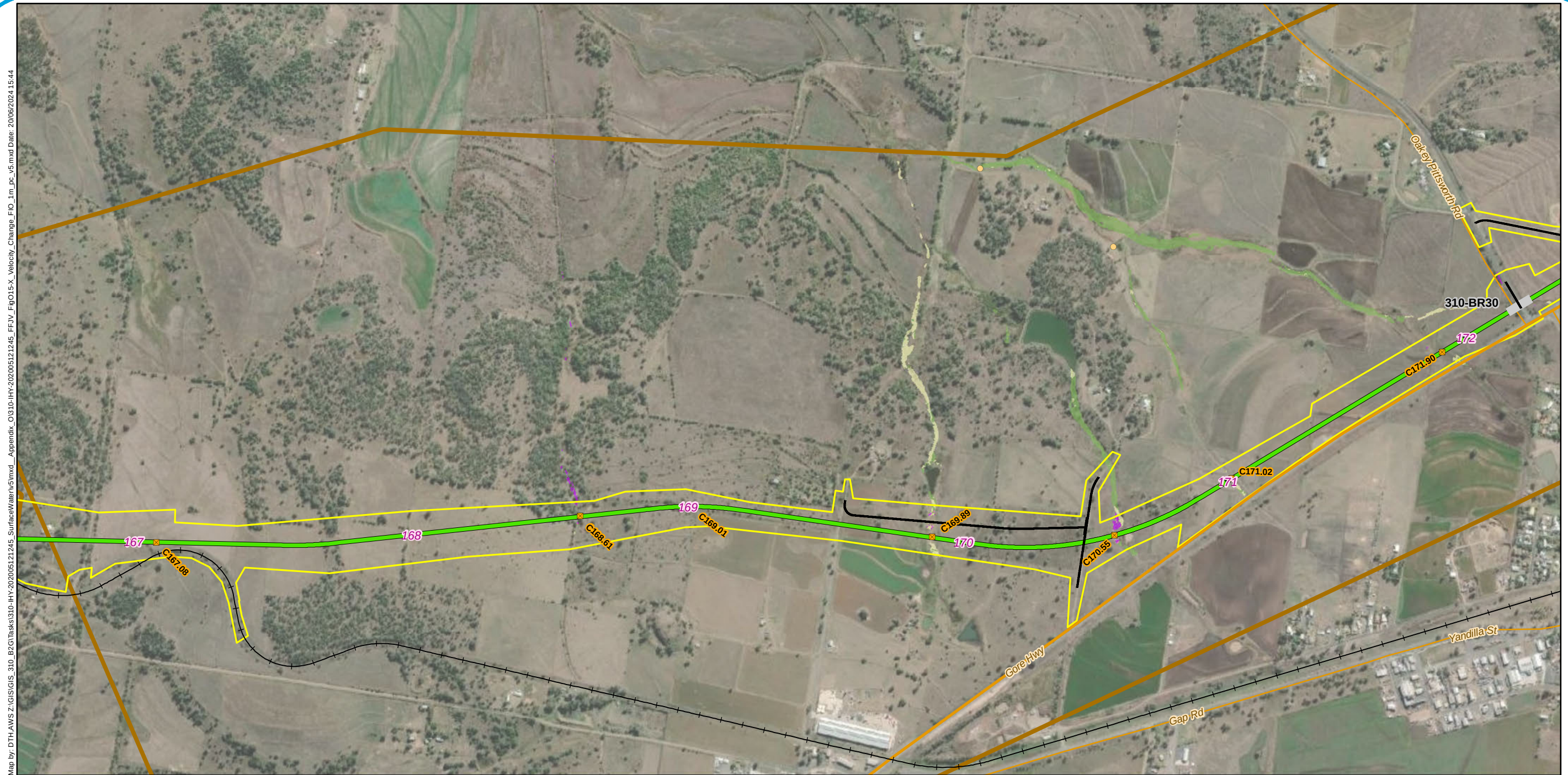
Issue date: 20/06/2024 Version: 5

Coordinate System: GDA 1994 MGA Zone 56

Figure O15 - page 38 of 48:

20% AEP Event - Local Catchments - Percentage Change in Velocity (<1.0m/s cutoff)

Map by: D:\HAWKS\GIS\310_B2\GIS\310-HY-2020\5121245_SurfaceWater\5mxd_Appendix_O\310-HY-2020\5121245_FF\JV_FigO15-X_Velocity_Change_FIO_1m_pc_v6.mxd Date: 20/06/2024 15:44



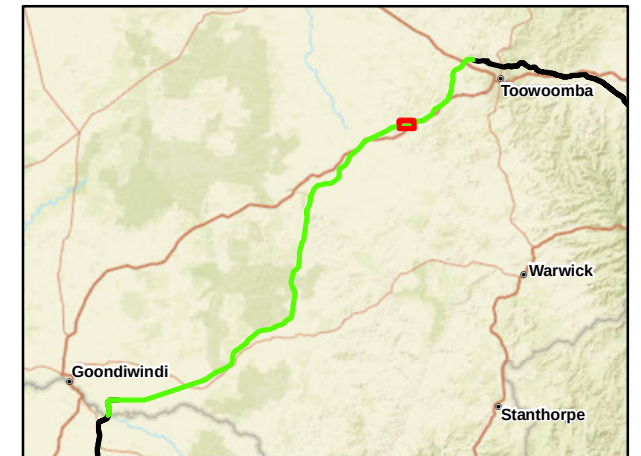
Legend

- 5 Chainage (km)
- Existing rail (operational)
- Border to Gowrie alignment
- Major roads
- Minor roads
- Project road design
- Flood sensitive receptor
- ✕ Project local catchment drainage culvert
- Project bridges
- ▭ Local hydraulic model extent
- ▭ Project footprint

Estimated change in velocities (%)

- < 0
- 0 to 10
- 10 to 20
- > 20

A data filter has been applied; results where model input grid's design velocity <1.0m/s have been cut off and are not displayed.



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



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Border to Gowrie

Figure O15 - page 39 of 48:

20% AEP Event - Local Catchments - Percentage Change in Velocity (<1.0m/s cutoff)

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\310-IHY-202005121245_SurfaceWater\5mxd_Appendix_D\310-IHY-202005121245_FF\JV_FigO15-X_Velocity_Change_FIO_1m_pc_v6.mxd Date: 20/06/2024 15:44



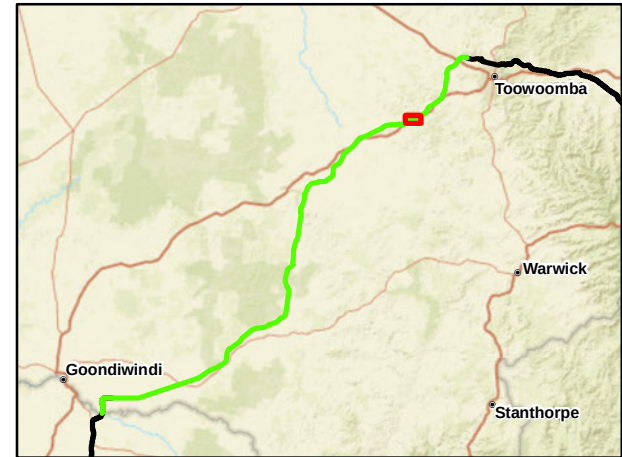
Legend

- 5 Chainage (km)
- Existing rail (operational)
- Border to Gowrie alignment
- Major roads
- Minor roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated change in velocities (%)

- < 0
- 0 to 10
- 10 to 20
- > 20

A data filter has been applied; results where model input grid's design velocity <1.0m/s have been cut off and are not displayed.



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

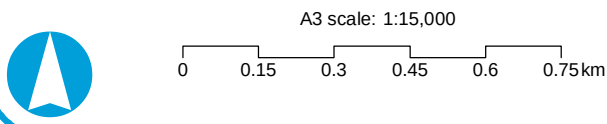
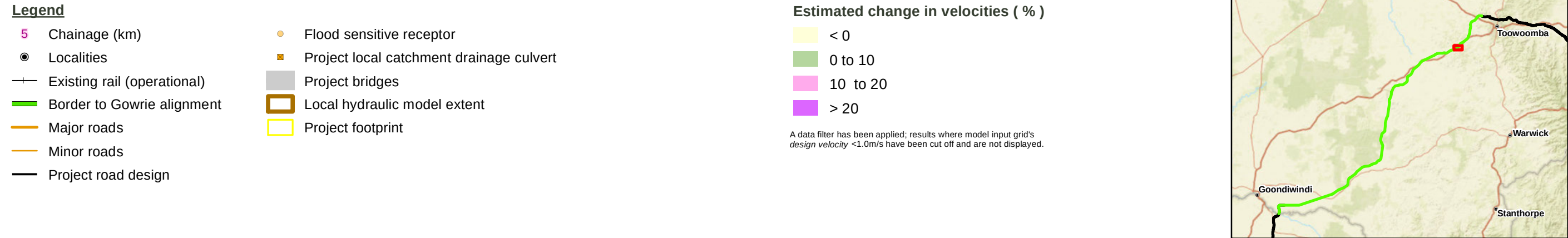


Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure O15 - page 40 of 48:

20% AEP Event - Local Catchments - Percentage Change in Velocity (<1.0m/s cutoff)





- Estimated change in velocities (%)**

- A data filter has been applied; results where model input grid's *design velocity* <1.0m/s have been cut off and are not displayed.

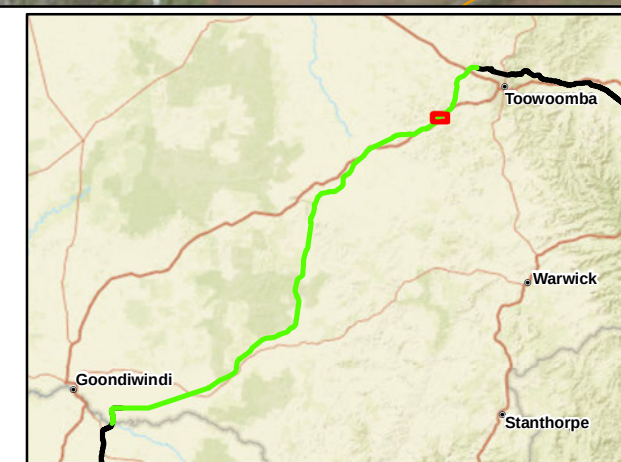


Figure O15 - page 42 of 48:

20% AEP Event - Local Catchments - Percentage Change in Velocity (<1.0m/s cutoff)

A3 scale: 1:15,000

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\GIS_310-B2\Tasks\310-HY-2020\5121245_SurfaceWater\5mxd_Appendix_D\310-HY-2020\5121245_FF\JV_FigO15-X_Velocity_Change_FIO_1m_pc_v6.mxd Date: 20/06/2024 15:44



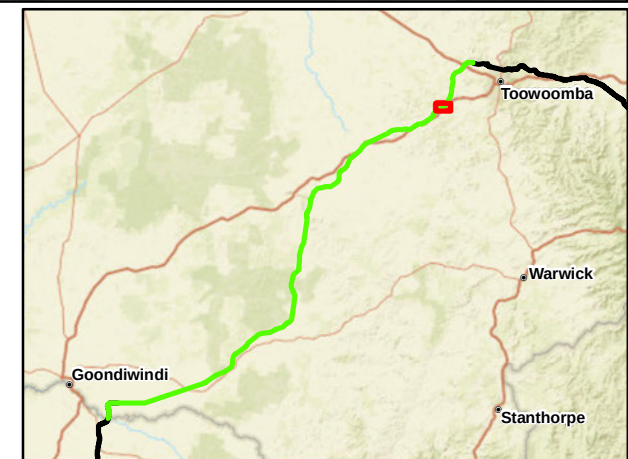
Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Major roads
- Minor roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated change in velocities (%)

- < 0
- 0 to 10
- 10 to 20
- > 20

A data filter has been applied; results where model input grid's design velocity <1.0m/s have been cut off and are not displayed.



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

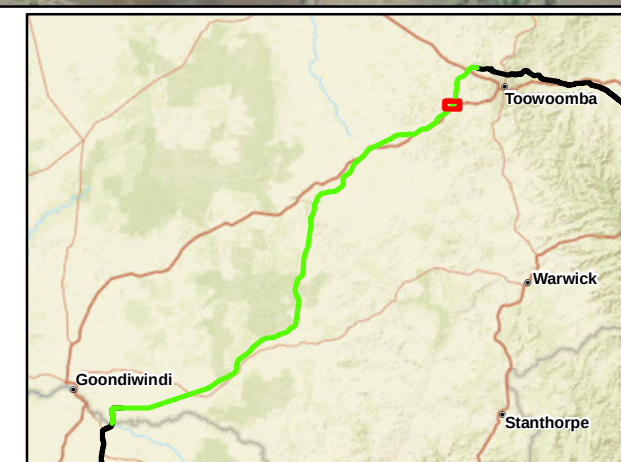
Figure O15 - page 43 of 48:

20% AEP Event - Local Catchments - Percentage Change in Velocity (<1.0m/s cutoff)

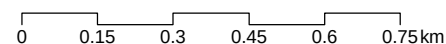


- Estimated change in velocities (%)**

- A data filter has been applied; results where model input grid's *design velocity* <1.0m/s have been cut off and are not displayed.



A3 scale: 1:15,000

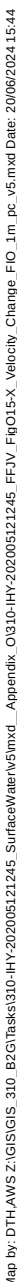


Issue date: 20/06/2024 Version: 5

Coordinate System: GDA 1994 MGA Zone 56

Figure O15 - page 44 of 48:

20% AEP Event - Local Catchments - Percentage Change in Velocity (<1.0m/s cutoff)



	Chainage (km)		Flood sensitive receptor
	Border to Gowrie alignment		Project floodplain culvert
	Major roads		Project local catchment drainage culvert
	Project road design		Local hydraulic model extent
			Project footprint

	< 0
	0 to 10
	10 to 20
	> 20

A data filter has been applied; results where model input grid's *design velocity* <1.0m/s have been cut off and are not displayed.

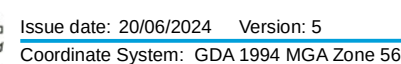
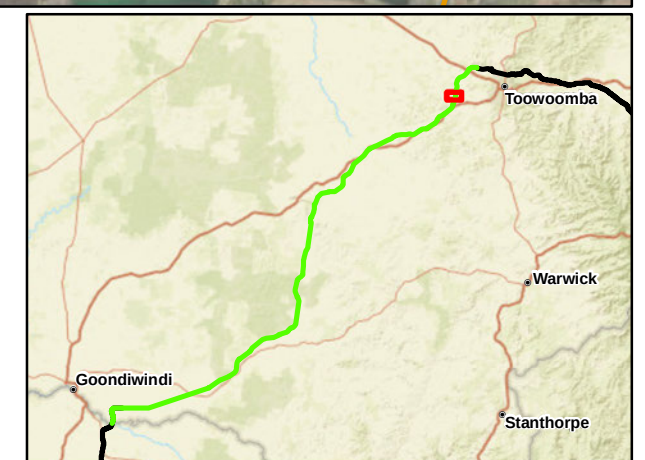


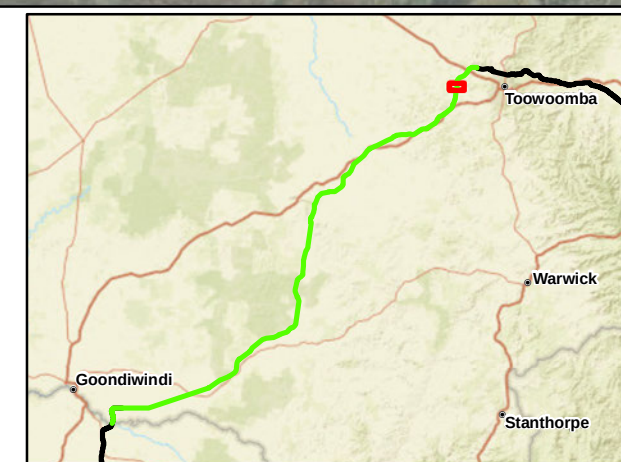
Figure O15 - page 45 of 48:

20% AEP Event - Local Catchments - Percentage Change in Velocity (<1.0m/s cutoff)



- Estimated change in velocities (%)**

- A data filter has been applied; results where model input grid's *design velocity* <1.0m/s have been cut off and are not displayed.



Issue date: 20/06/2024 Version: 5

Coordinate System: GDA 1994 MGA Zone 56

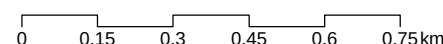
Border to Gowrie

Figure O15 - page 46 of 48:

20% AEP Event - Local Catchments - Percentage Change in Velocity (<1.0m/s cutoff)



A3 scale: 1:15,000



Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\310-IHY-202005121245_SurfaceWater\5mxd_Appendix_O\310-IHY-202005121245_FF\JV_FigO15-X_Velocity_Change_FIO_1m_pc_v6.mxd Date: 20/06/2024 15:44



Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Project road design
- Flood sensitive receptor
- Project floodplain culvert
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated change in velocities (%)

- < 0
- 0 to 10
- 10 to 20
- > 20

A data filter has been applied; results where model input grid's design velocity <1.0m/s have been cut off and are not displayed.



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 O15 - page 47 of 48:

20% AEP Event - Local Catchments - Percentage Change in Velocity (<1.0m/s cutoff)



- Estimated change in velocities (%)**

- A data filter has been applied; results where model input grid's *design velocity* <1.0m/s have been cut off and are not displayed.

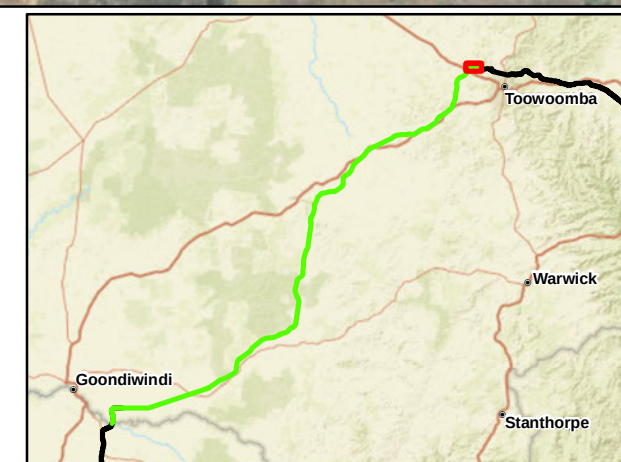
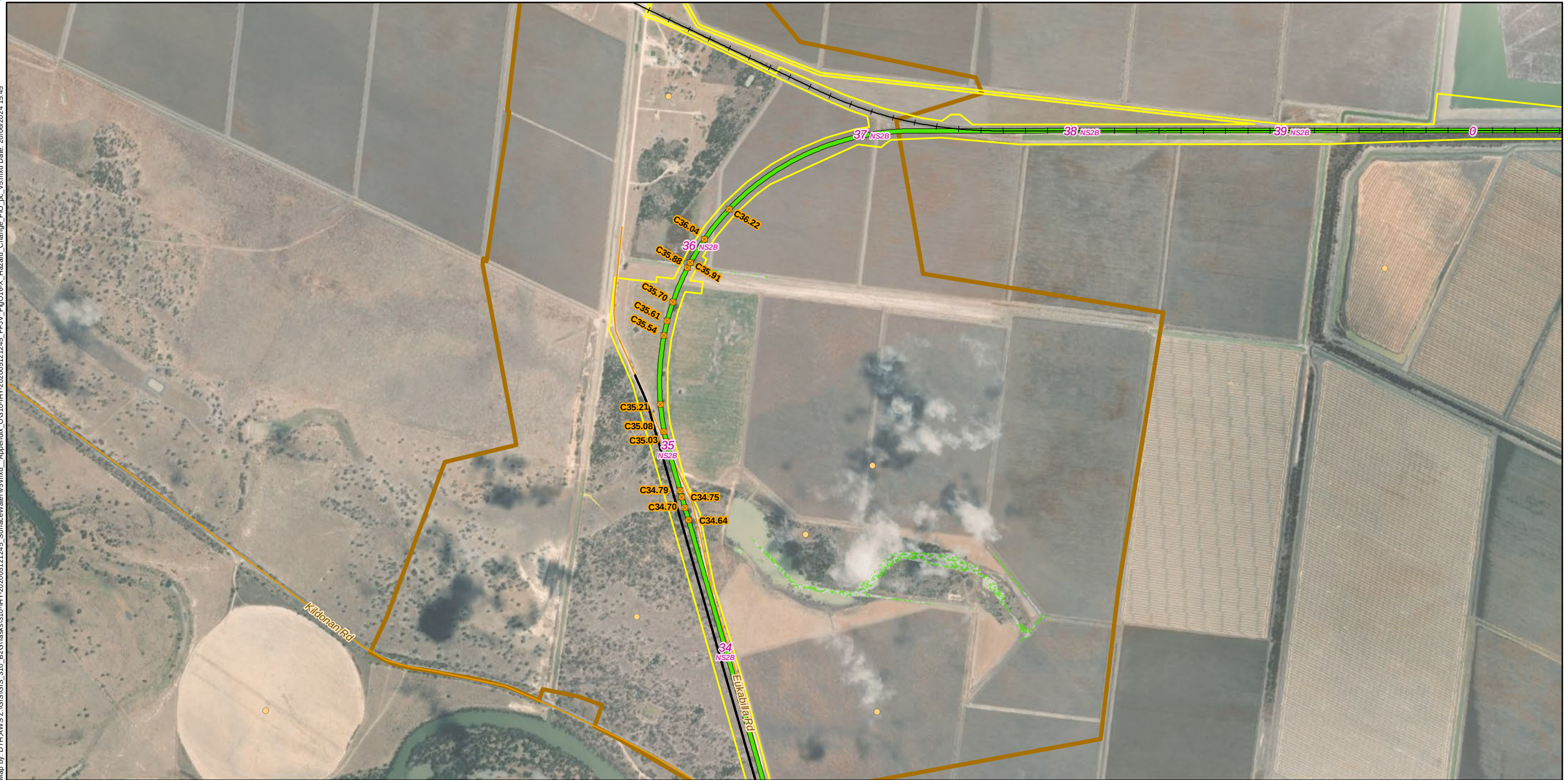


Figure O15 - page 48 of 48:

20% AEP Event - Local Catchments - Percentage Change in Velocity (<1.0m/s cutoff)

A3 scale: 1:15,000

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\GIS_310_IHY\202005121245_SurfaceWater\5mxd_Appendix_O\310-IHY\202005121245_FF\JV_FigO16-X_Hazard_Change_FIO_pc_v5.mxd Date: 20/06/2024 15:45



Legend

- 5 Chainage (km)
- Existing rail (operational)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Local hydraulic model extent
- Project footprint

Estimated change in velocity x depth product (%)

- < 0%
- 0% to 10%
- 10% to 20%
- 20% to 50%
- 50% to 100%
- > 100%

A data filter has been applied; results where model input design velocity x depth < 0.15 m²/s have been cut off and are not displayed.



A3 scale: 1:20,000
0 0.2 0.4 0.6 0.8 1km



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Border to Gowrie

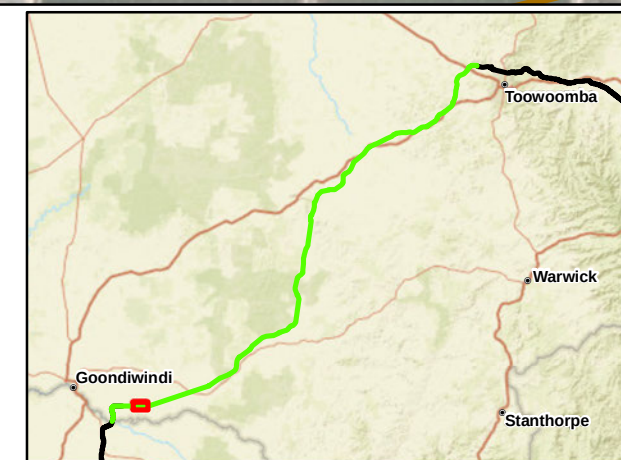
Figure O16 - page 1 of 48:

20% AEP Event - Local Catchments - Percentage Change in Hazard ($v \times d$) (<0.15m²/s cutoff applied)



- Estimated change in velocity x depth product (%)**

- A data filter has been applied; results where model input design velocity $\times$ depth $< 0.15 \text{ m}^2/\text{s}$ have been cut off and are not displayed.



Border to Gowrie

Figure O16 - page 2 of 48:
d) ($<0.15\text{m}^2/\text{s}$ cutoff applied)



 Chainage (km)
 Flood sensitive receptor

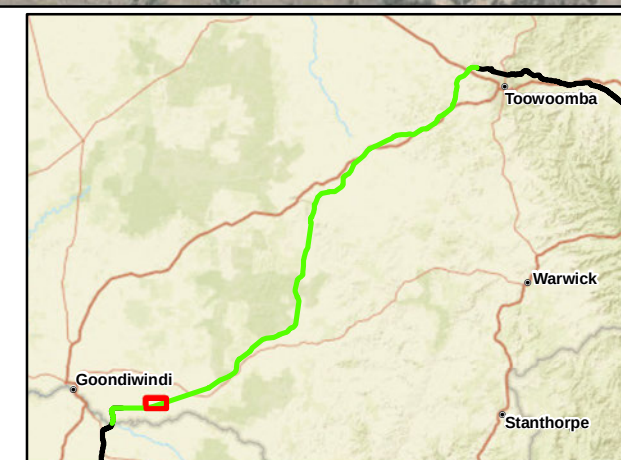
 Existing rail (operational)
 Project local catchment drainage culvert

 Border to Gowrie alignment
 Local hydraulic model extent

 Project road design
 Project footprint

< 0%
 0% to 10%
 10% to 20%
 20% to 50%
 50% to 100%
 > 100%

A data filter has been applied; results where model input design velocity x depth < 0.15 m²/s have been cut off and are not displayed.



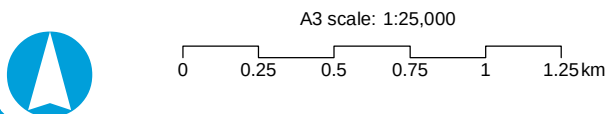
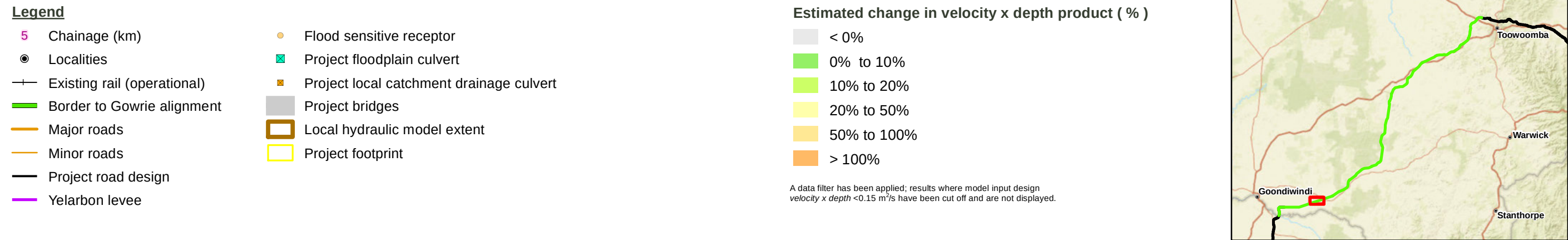
A3 scale: 1:20,000

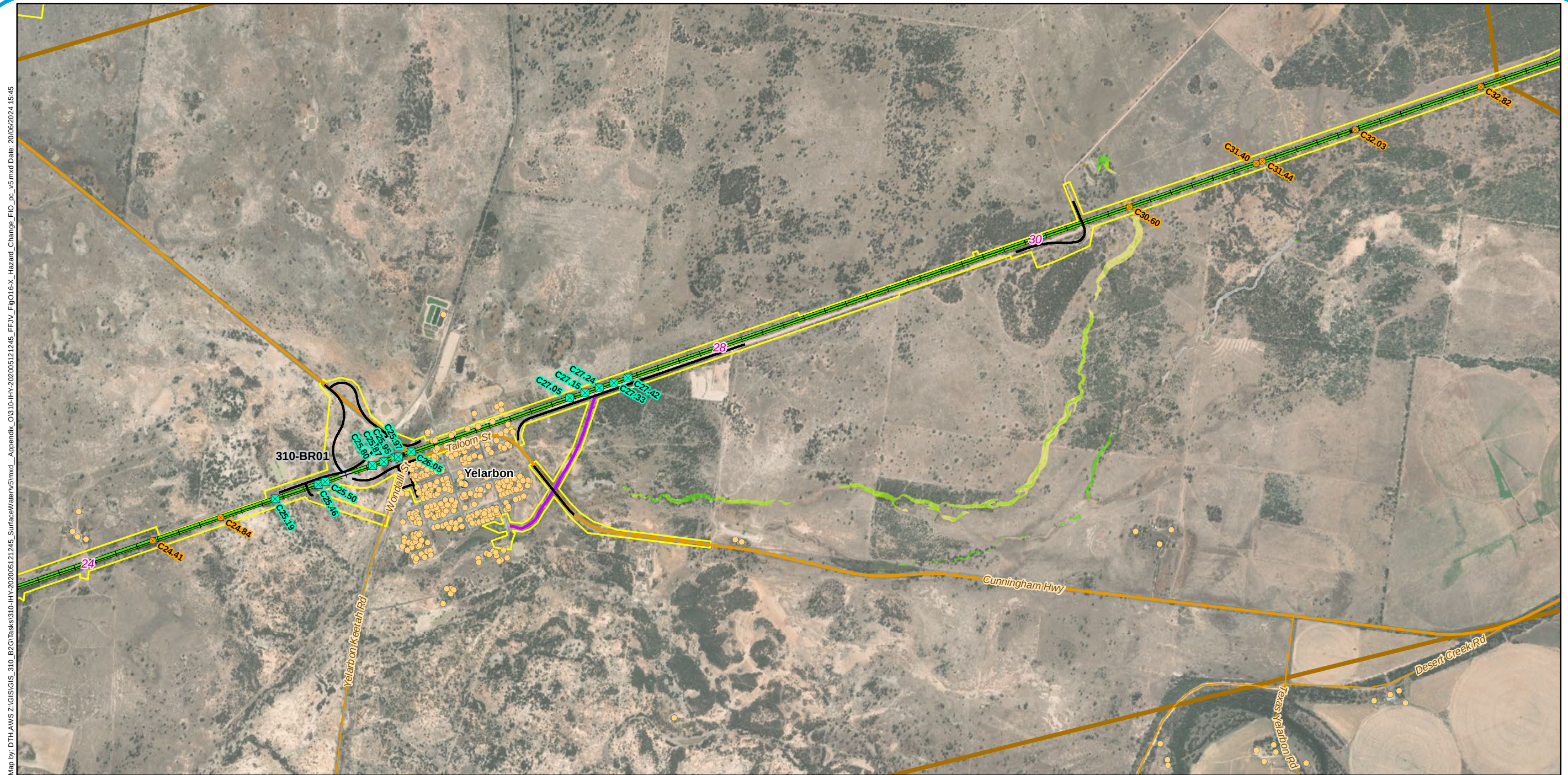


Issue date: 20/06/2024 Version: 5

Coordinate System: GDA 1994 MGA Zone 56

Figure O16 - page 3 of 48:
d) ($<0.15\text{m}^2/\text{s}$ cutoff applied)





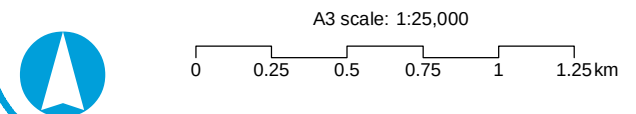
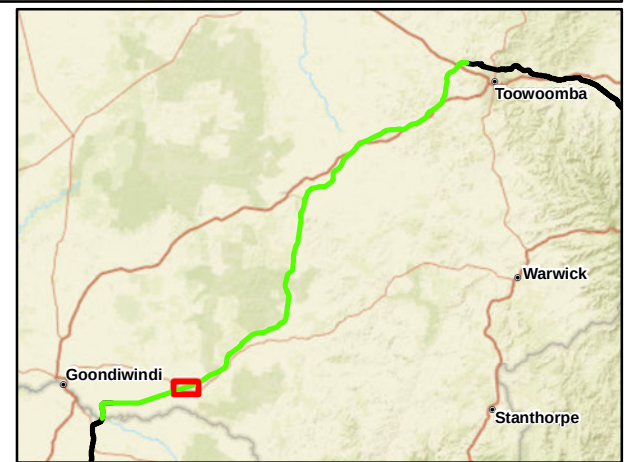
Legend

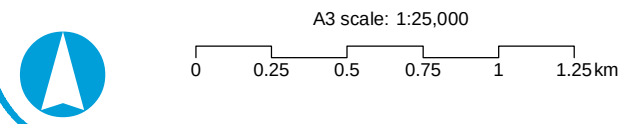
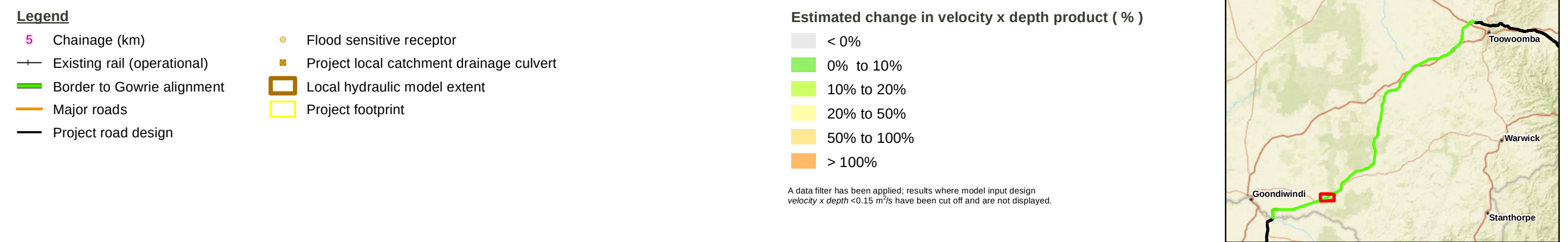
- 5 Chainage (km)
- Localities
- Existing rail (operational)
- Border to Gowrie alignment
- Major roads
- Minor roads
- Project road design
- Yelarbon levee
- Flood sensitive receptor
- Project floodplain culvert
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

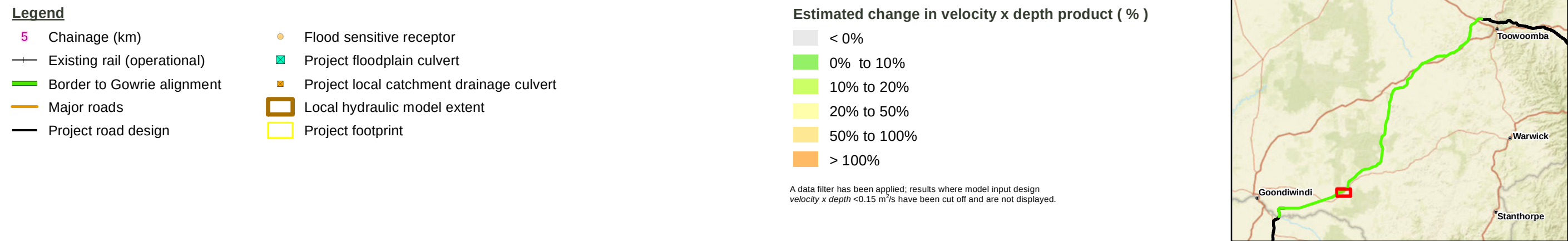
Estimated change in velocity x depth product (%)

- < 0%
- 0% to 10%
- 10% to 20%
- 20% to 50%
- 50% to 100%
- > 100%

A data filter has been applied; results where model input design velocity x depth < 0.15 m²/s have been cut off and are not displayed.







A3 scale: 1:25,000

0 0.25 0.5 0.75 1 1.25 km



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Border to Gowrie

Figure O16 - page 7 of 48:
20% AEP Event - Local Catchments - Percentage Change in Hazard (v x d) (<0.15m²/s cutoff applied)



Legend

- 5 Chainage (km)
- Existing rail (operational)
- Border to Gowrie alignment
- Major roads
- Project road design
- Flood sensitive receptor
- Project floodplain culvert
- Project local catchment drainage culvert
- Local hydraulic model extent
- Project footprint

Estimated change in velocity x depth product (%)

- < 0%
- 0% to 10%
- 10% to 20%
- 20% to 50%
- 50% to 100%
- > 100%

A data filter has been applied; results where model input design velocity x depth < 0.15 m²/s have been cut off and are not displayed.





- Estimated change in velocity x depth product (%)**

- A data filter has been applied; results where model input design velocity $\times$ depth $< 0.15 \text{ m}^2/\text{s}$ have been cut off and are not displayed.

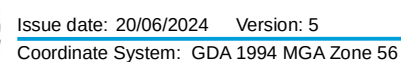


Figure O16 - page 9 of 48:
d) ($<0.15\text{m}^2/\text{s}$ cutoff applied)

20% AEP Event - Local Catchments - Percentage Change in Hazard (v x d) (<0.15m²/s cutoff applied)

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\310-IHY-202005121245_SurfaceWater\5mxd_Appendix_O\310-IHY-202005121245_FF\JV_FigO16-X_Hazard_Change_FIO_pc_v5.mxd Date: 20/06/2024 15:45



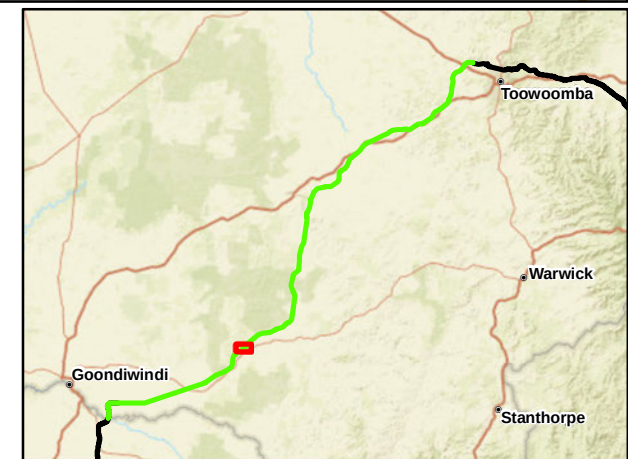
Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Major roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated change in velocity x depth product (%)

- < 0%
- 0% to 10%
- 10% to 20%
- 20% to 50%
- 50% to 100%
- > 100%

A data filter has been applied; results where model input design velocity x depth < 0.15 m²/s have been cut off and are not displayed.



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 O16 - page 10 of 48:
20% AEP Event - Local Catchments - Percentage Change in Hazard ($v \times d$) (<0.15m²/s cutoff applied)



- Estimated change in velocity x depth product (%)**

- A data filter has been applied; results where model input design velocity x depth < 0.15 m²/s have been cut off and are not displayed.



Figure O16 - page 11 of 48:
d) ($<0.15\text{m}^2/\text{s}$ cutoff applied)

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\310-HY-202005121245_SurfaceWater\5mxd_Appendix_D\310-HY-202005121245_FF\JV_FigO16-X_Hazard_Change_FIO_pc_v5.mxd Date: 20/06/2024 15:45



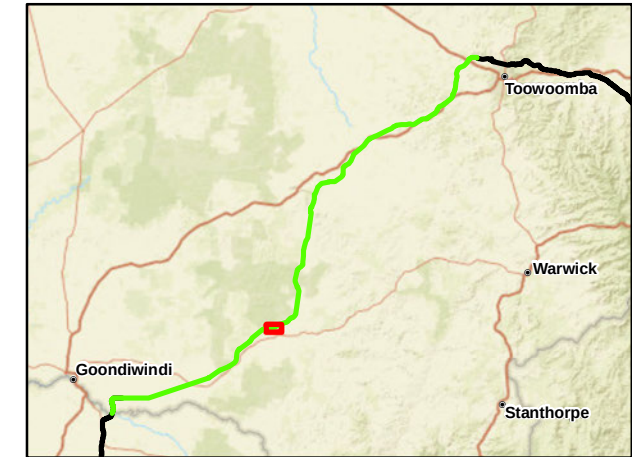
Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project floodplain culvert
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated change in velocity x depth product (%)

- < 0%
- 0% to 10%
- 10% to 20%
- 20% to 50%
- 50% to 100%
- > 100%

A data filter has been applied; results where model input design velocity x depth < 0.15 m²/s have been cut off and are not displayed.



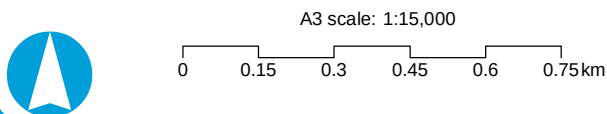
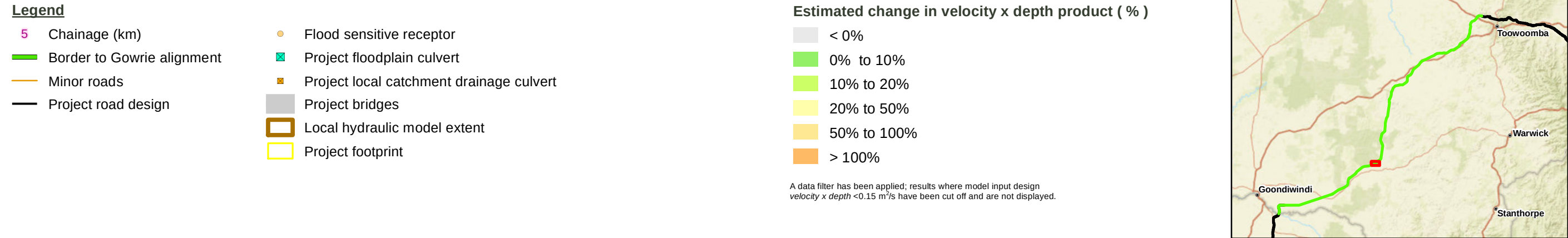
A3 scale: 1:15,000
0 0.15 0.3 0.45 0.6 0.75 km



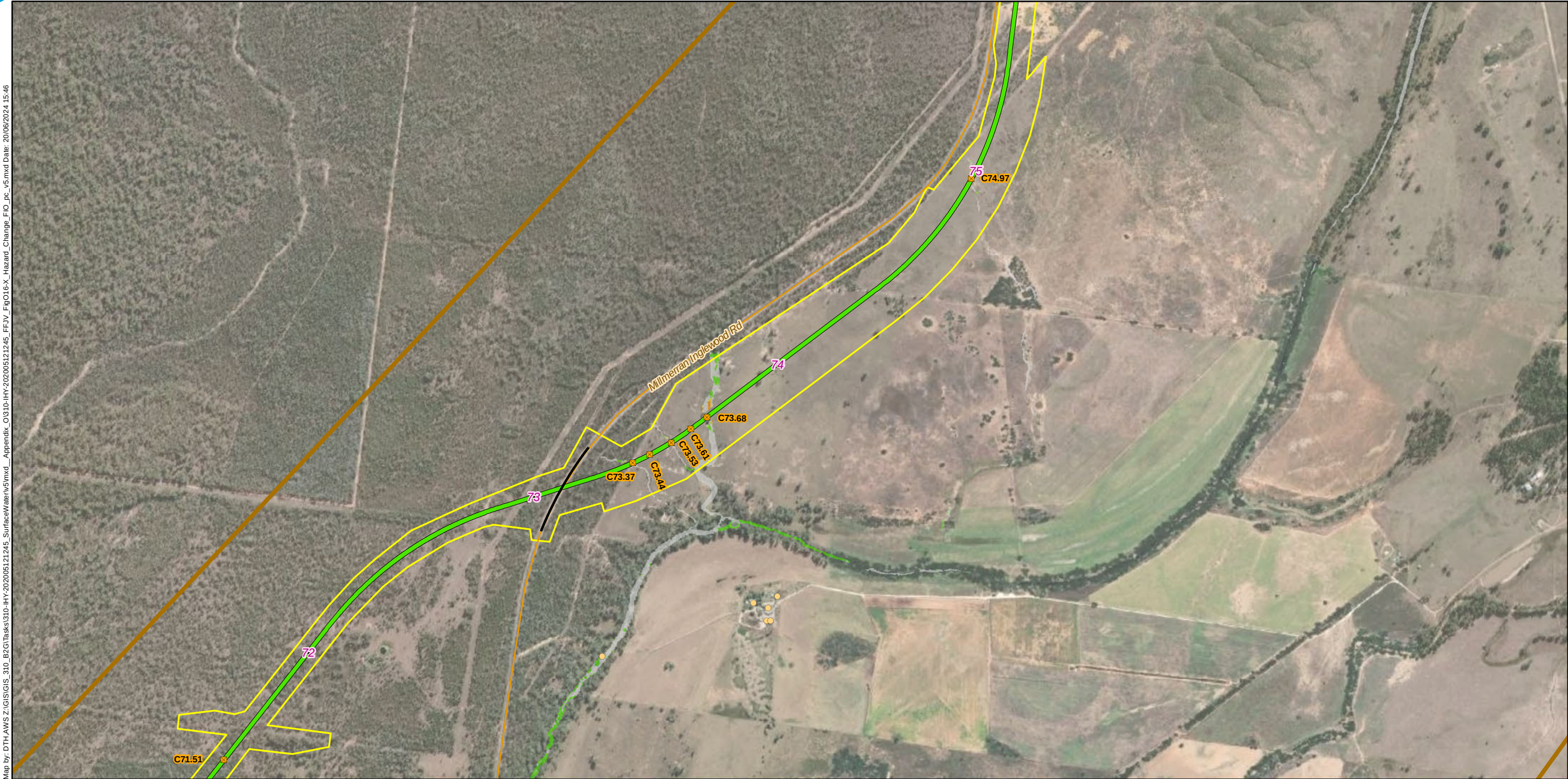
Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure O16 - page 12 of 48:
20% AEP Event - Local Catchments - Percentage Change in Hazard ($v \times d$) (<0.15m²/s cutoff applied)



Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\GIS_310_IHY\202005121245_SurfaceWater\5vmsd_Appendix_O16-X_Hazard_Change_FIO_pc_v5.mxd Date: 20/06/2024 15:46



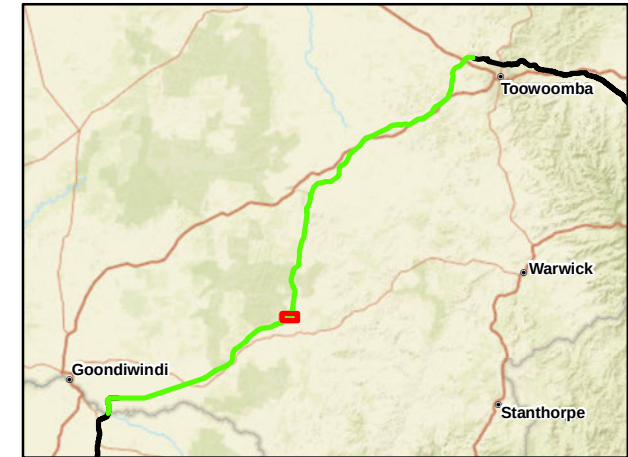
Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Local hydraulic model extent
- Project footprint

Estimated change in velocity x depth product (%)

- < 0%
- 0% to 10%
- 10% to 20%
- 20% to 50%
- 50% to 100%
- > 100%

A data filter has been applied; results where model input design velocity x depth < 0.15 m²/s have been cut off and are not displayed.



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 O16 - page 14 of 48:
20% AEP Event - Local Catchments - Percentage Change in Hazard ($v \times d$) (<0.15m²/s cutoff applied)



	Chainage (km)		Flood sensitive receptor
	Border to Gowrie alignment		Project local catchment drainage culvert
	Minor roads		Local hydraulic model extent
	Project road design		Project footprint

< 0%
 0% to 10%
 10% to 20%
 20% to 50%
 50% to 100%
 > 100%

A data filter has been applied; results where model input design velocity $\times$ depth $< 0.15 \text{ m}^2/\text{s}$ have been cut off and are not displayed.



Border to Gowrie

Figure O16 - page 15 of 48:
d) ($<0.15\text{m}^2/\text{s}$ cutoff applied)



- Estimated change in velocity x depth product (%)**

- A data filter has been applied; results where model input design velocity $\times$ depth $< 0.15 \text{ m}^2/\text{s}$ have been cut off and are not displayed.

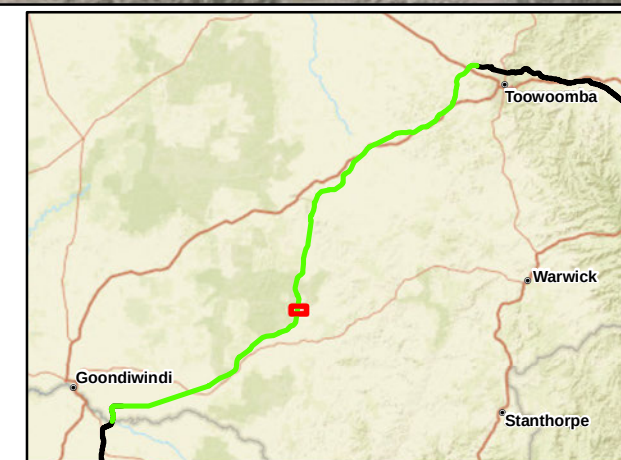


Figure O16 - page 16 of 48:
d) ($<0.15\text{m}^2/\text{s}$ cutoff applied)



- Estimated change in velocity x depth product (%)**

- A data filter has been applied; results where model input design velocity $\times$ depth $< 0.15 \text{ m}^2/\text{s}$ have been cut off and are not displayed.

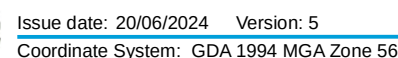
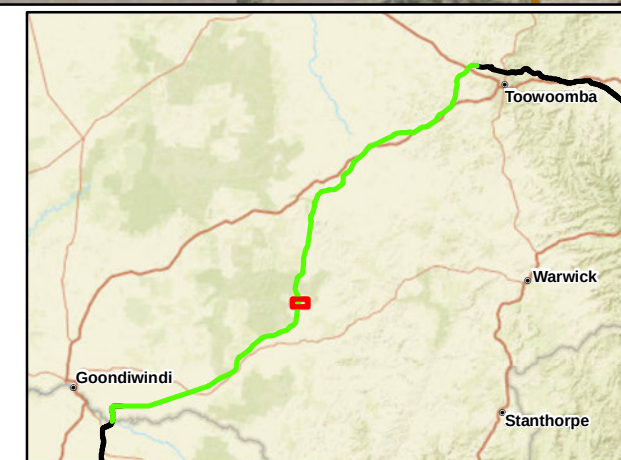


Figure O16 - page 17 of 48:
d) ($<0.15\text{m}^2/\text{s}$ cutoff applied)



- Estimated change in velocity x depth product (%)**

- A data filter has been applied; results where model input design velocity x depth < 0.15 m²/s have been cut off and are not displayed.

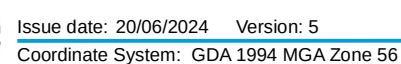
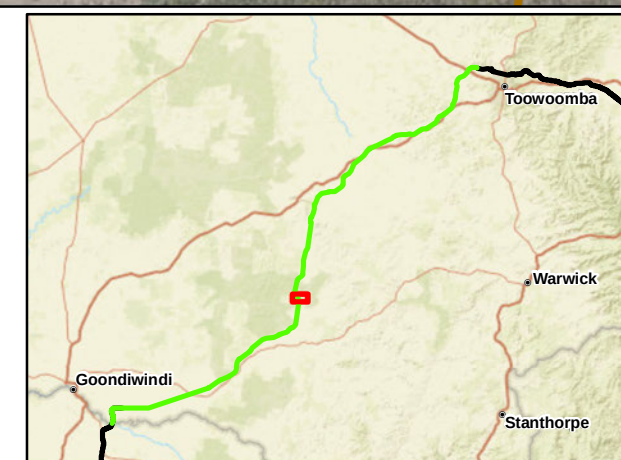


Figure O16 - page 18 of 48:
d) ($<0.15\text{m}^2/\text{s}$ cutoff applied)



- Estimated change in velocity x depth product (%)**

- A data filter has been applied; results where model input design velocity $\times$ depth $< 0.15 \text{ m}^2/\text{s}$ have been cut off and are not displayed.

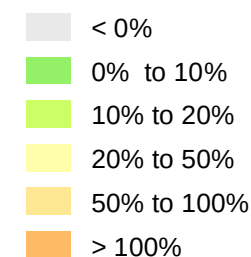


Figure O16 - page 19 of 48:
d) ($<0.15\text{m}^2/\text{s}$ cutoff applied)



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

- Estimated change in velocity x depth product (%)**



A data filter has been applied; results where model input design velocity $\times$ depth $< 0.15 \text{ m}^2/\text{s}$ have been cut off and are not displayed.

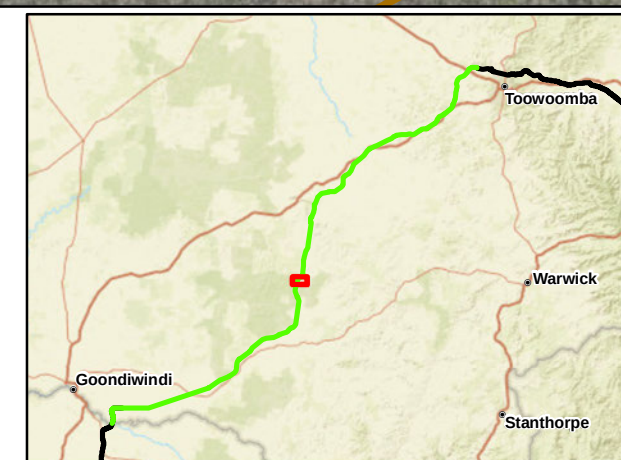
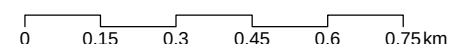


Figure O16 - page 20 of 48:
d) ($<0.15\text{m}^2/\text{s}$ cutoff applied)

A3 scale: 1:15,000



Issue date: 20/06/2024 Version: 5

Coordinate System: GDA 1994 MGA Zone 56

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\GIS_310_IHY\202005121245_SurfaceWater\5vmsd_Appendix_O\310-IHY\202005121245_FF\JV_FigO16-X_Hazard_Change_FIO_pc_v5.mxd Date: 20/06/2024 15:46



Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated change in velocity x depth product (%)

- < 0%
- 0% to 10%
- 10% to 20%
- 20% to 50%
- 50% to 100%
- > 100%

A data filter has been applied; results where model input design velocity x depth < 0.15 m²/s have been cut off and are not displayed.



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 O16 - page 21 of 48:
20% AEP Event - Local Catchments - Percentage Change in Hazard (v x d) (<0.15m²/s cutoff applied)

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\310-IHY\202005121245_SurfaceWater\5mxd_Appendix_O\310-IHY\202005121245_FF\JV_FigO16-X_Hazard_Change_FIO_pc_v5.mxd Date: 20/06/2024 15:46



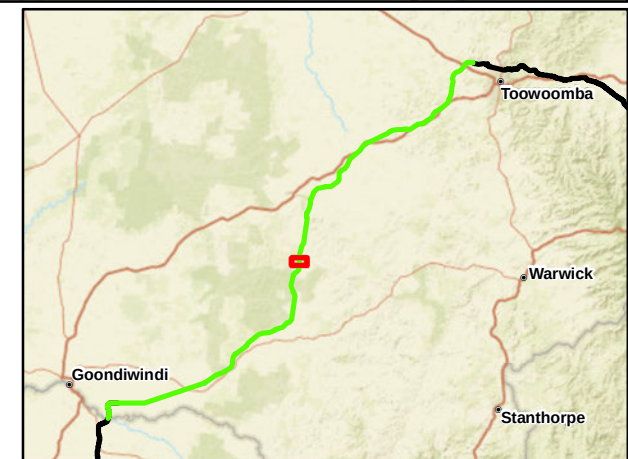
Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project floodplain culvert
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated change in velocity x depth product (%)

- < 0%
- 0% to 10%
- 10% to 20%
- 20% to 50%
- 50% to 100%
- > 100%

A data filter has been applied; results where model input design velocity x depth < 0.15 m²/s have been cut off and are not displayed.



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 O16 - page 22 of 48:
20% AEP Event - Local Catchments - Percentage Change in Hazard ($v \times d$) (<0.15m²/s cutoff applied)

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\310-IHY-202005121245_SurfaceWater\5mxd_Appendix_O\310-IHY-202005121245_FF\JV_FigO16-X_Hazard_Change_FIO_pc_v5.mxd Date: 20/06/2024 15:46



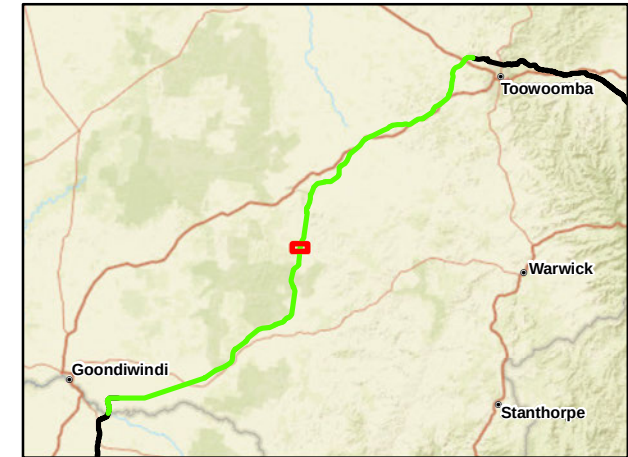
Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project floodplain culvert
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated change in velocity x depth product (%)

- < 0%
- 0% to 10%
- 10% to 20%
- 20% to 50%
- 50% to 100%
- > 100%

A data filter has been applied; results where model input design velocity x depth < 0.15 m²/s have been cut off and are not displayed.



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 O16 - page 23 of 48:
20% AEP Event - Local Catchments - Percentage Change in Hazard ($v \times d$) (<0.15m²/s cutoff applied)



- Estimated change in velocity x depth product (%)**

- A data filter has been applied; results where model input design velocity $\times$ depth $< 0.15 \text{ m}^2/\text{s}$ have been cut off and are not displayed.

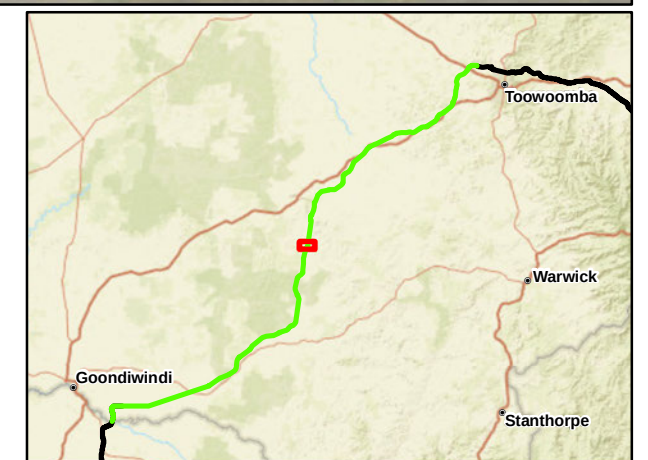


Figure O16 - page 24 of 48:
d) ($<0.15\text{m}^2/\text{s}$ cutoff applied)



- Estimated change in velocity x depth product (%)**

- A data filter has been applied; results where model input design velocity $\times$ depth $< 0.15 \text{ m}^2/\text{s}$ have been cut off and are not displayed.

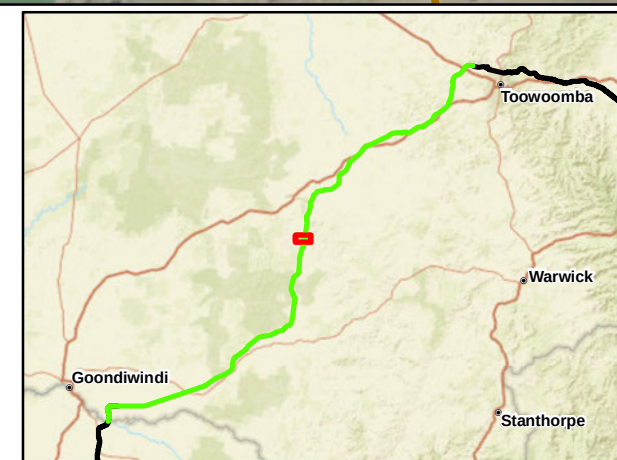


Figure O16 - page 25 of 48:
d) ($<0.15\text{m}^2/\text{s}$ cutoff applied)



- Estimated change in velocity x depth product (%)**

- A data filter has been applied; results where model input design velocity $\times$ depth $< 0.15 \text{ m}^2/\text{s}$ have been cut off and are not displayed.

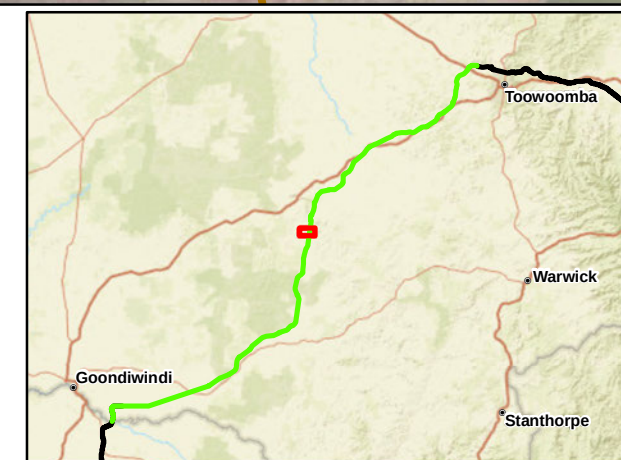


Figure O16 - page 26 of 48:
d) ($<0.15\text{m}^2/\text{s}$ cutoff applied)

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\GIS_310-IHY-202005121245_SurfaceWater\5mxd_Appendix_D\310-IHY-202005121245_FF\JV_FigO16-X_Hazard_Change_FIO_pc_v5.mxd Date: 20/06/2024 15:47



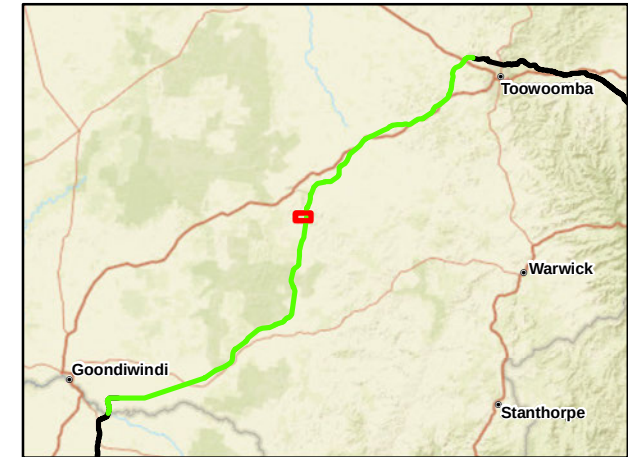
Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Local hydraulic model extent
- Project footprint

Estimated change in velocity x depth product (%)

- < 0%
- 0% to 10%
- 10% to 20%
- 20% to 50%
- 50% to 100%
- > 100%

A data filter has been applied; results where model input design velocity x depth < 0.15 m²/s have been cut off and are not displayed.



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 O16 - page 27 of 48:
20% AEP Event - Local Catchments - Percentage Change in Hazard ($v \times d$) (<0.15m²/s cutoff applied)



- Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

■ < 0%
 ■ 0% to 10%
 ■ 10% to 20%
 ■ 20% to 50%
 ■ 50% to 100%
 ■ > 100%

A data filter has been applied; results where model input design velocity $\times$ depth $< 0.15 \text{ m}^2/\text{s}$ have been cut off and are not displayed.





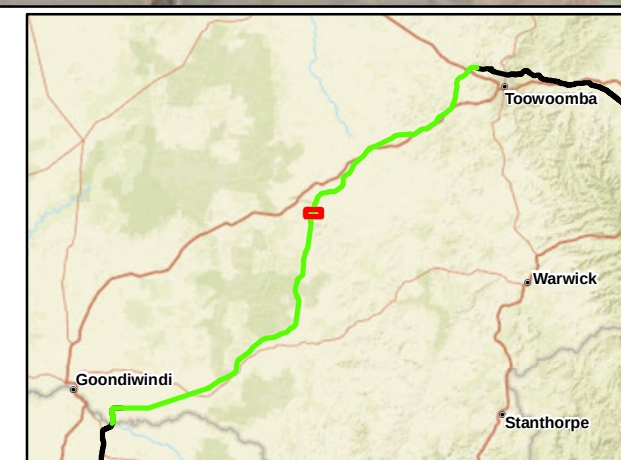
Legend

- ### Legend

Estimated change in velocity x depth product (%)

- Estimated change in velocity x depth product (%)**

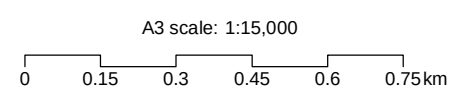
Estimated change in velocity x depth product (%)



A3 scale: 1:15,000



0 0.15 0.3 0.45 0.6 0.75 km



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Border to Gowrie

Figure O16 - page 29 of 48:
d) ($<0.15\text{m}^2/\text{s}$ cutoff applied)

20% AEP Event - Local Catchments - Percentage Change in Hazard ($v \times d$) ($<0.15\text{m}^2/\text{s}$ cutoff applied)

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\310-HY-202005121245_SurfaceWater\5vmsd_Appendix_O\310-HY-202005121245_FF\JV_FigO16-X_Hazard_Change_FIO_pc_v5.mxd Date: 20/06/2024 15:47



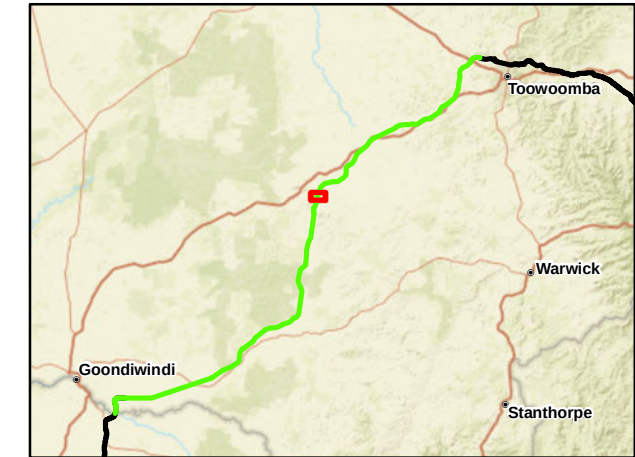
Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Local hydraulic model extent
- Project footprint

Estimated change in velocity x depth product (%)

- < 0%
- 0% to 10%
- 10% to 20%
- 20% to 50%
- 50% to 100%
- > 100%

A data filter has been applied; results where model input design velocity x depth < 0.15 m²/s have been cut off and are not displayed.



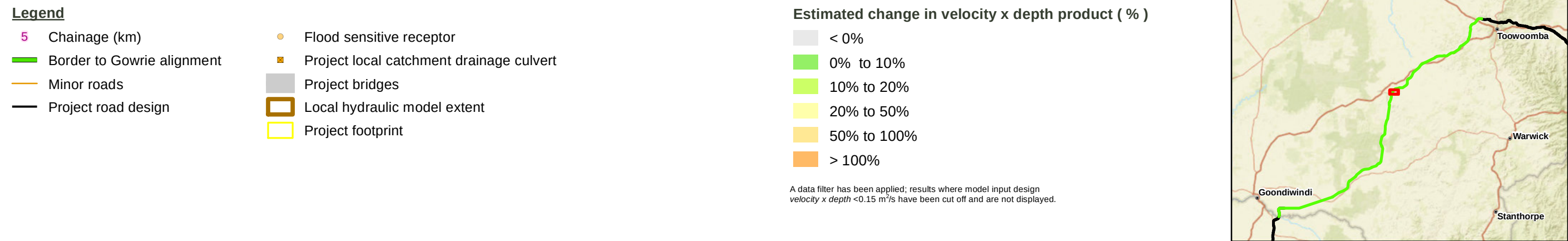
A3 scale: 1:15,000
0 0.15 0.3 0.45 0.6 0.75 km



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

Border to Gowrie

Figure O16 - page 30 of 48:
20% AEP Event - Local Catchments - Percentage Change in Hazard (v x d) (<0.15m²/s cutoff applied)



A3 scale: 1:15,000

0 0.15 0.3 0.45 0.6 0.75 km



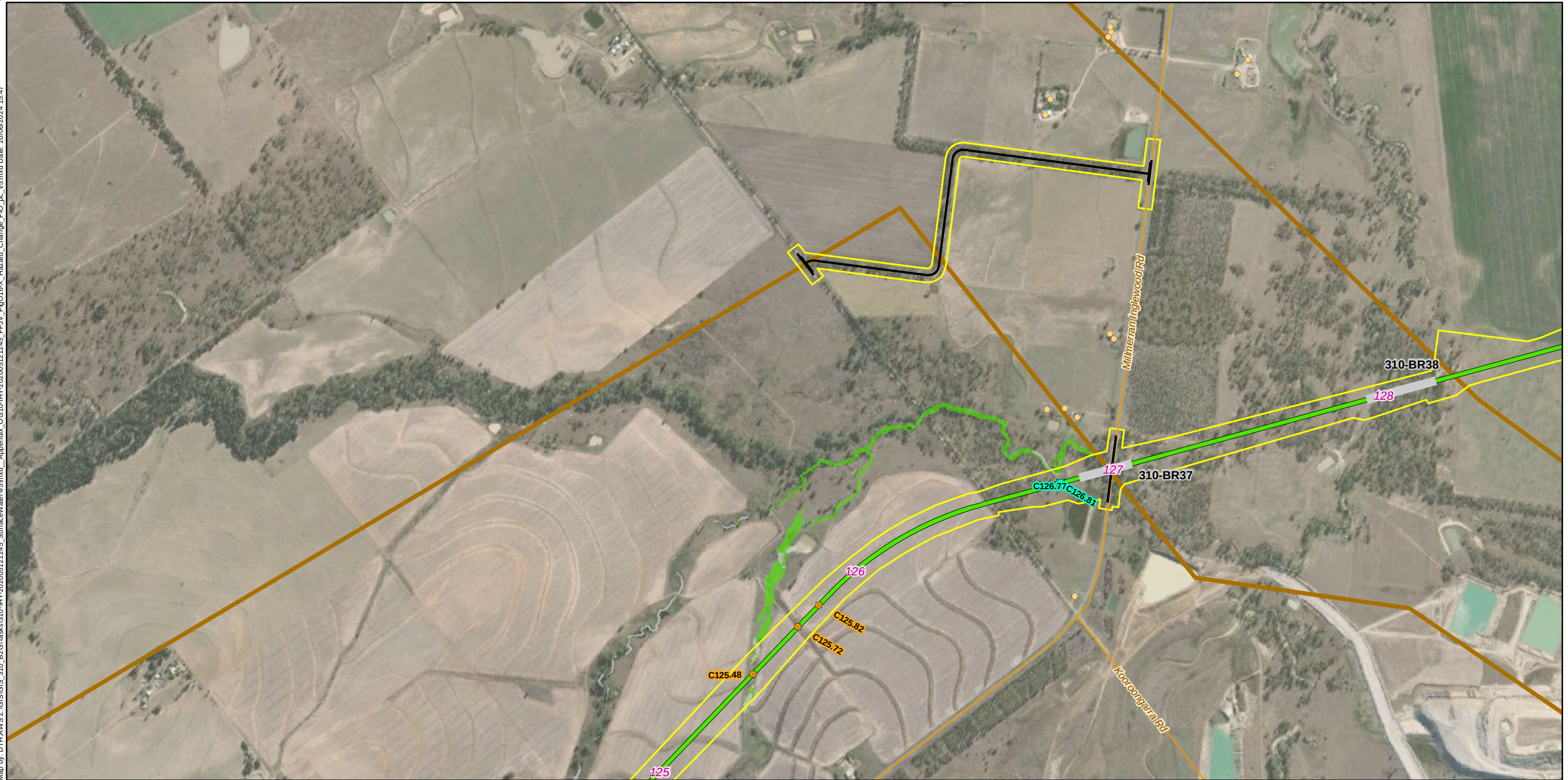
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Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure O16 - page 31 of 48:
20% AEP Event - Local Catchments - Percentage Change in Hazard ($v \times d$) (<0.15m²/s cutoff applied)

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\310-IHY-202005121245_SurfaceWater\5mxd_Appendix_O\310-IHY-202005121245_FF\JV_FigO16-X_Hazard_Change_FIO_pc_v5.mxd Date: 20/06/2024 15:47



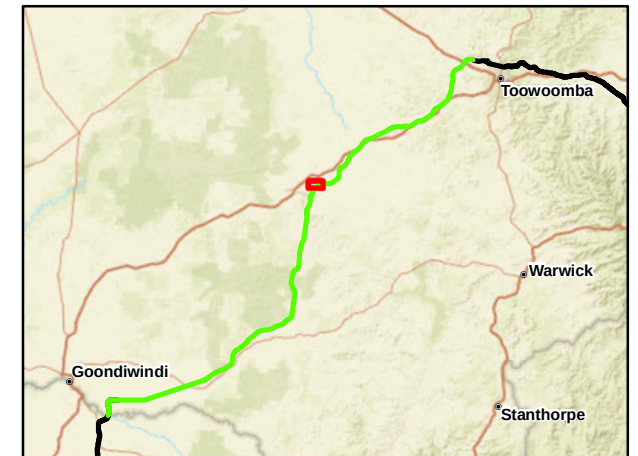
Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project floodplain culvert
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated change in velocity x depth product (%)

- < 0%
- 0% to 10%
- 10% to 20%
- 20% to 50%
- 50% to 100%
- > 100%

A data filter has been applied; results where model input design velocity x depth < 0.15 m²/s have been cut off and are not displayed.



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 O16 - page 32 of 48:
20% AEP Event - Local Catchments - Percentage Change in Hazard ($v \times d$) (<0.15m²/s cutoff applied)



- Estimated change in velocity x depth product (%)**

- A data filter has been applied; results where model input design velocity $\times$ depth $< 0.15 \text{ m}^2/\text{s}$ have been cut off and are not displayed.

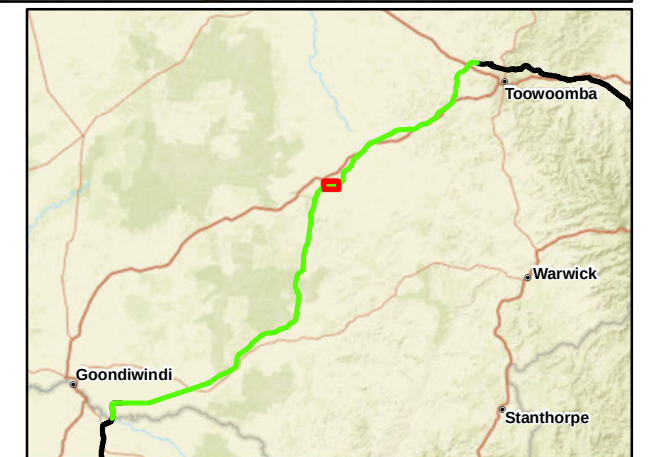


Figure O16 - page 33 of 48:
d) ($<0.15\text{m}^2/\text{s}$ cutoff applied)

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\310-IHY-202005121245_SurfaceWater\5mxd_Appendix_D\310-IHY-202005121245_FF\JV_FigO16-X_Hazard_Change_FIO_pc_v5.mxd Date: 20/06/2024 15:47



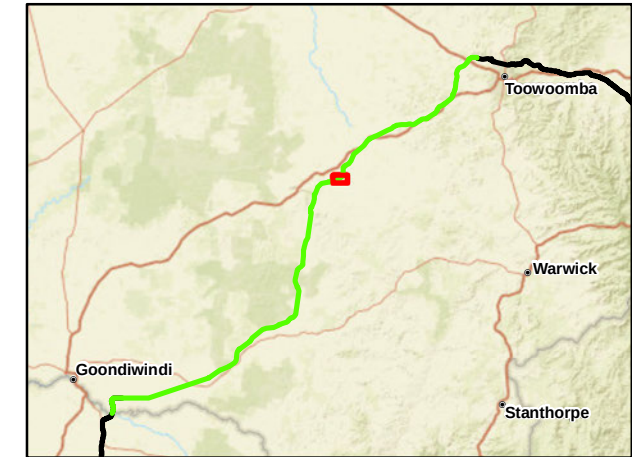
Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Local hydraulic model extent
- Project footprint

Estimated change in velocity x depth product (%)

- < 0%
- 0% to 10%
- 10% to 20%
- 20% to 50%
- 50% to 100%
- > 100%

A data filter has been applied; results where model input design velocity x depth < 0.15 m²/s have been cut off and are not displayed.



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 O16 - page 34 of 48:
20% AEP Event - Local Catchments - Percentage Change in Hazard (v x d) (<0.15m²/s cutoff applied)

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\310-IHY-202005121245_SurfaceWater\5mxd_Appendix_D\310-IHY-202005121245_FF\JV_FigO16-X_Hazard_Change_FIO_pc_v5.mxd Date: 20/06/2024 15:47



Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Local hydraulic model extent
- Project footprint

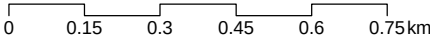
Estimated change in velocity x depth product (%)

- < 0%
- 0% to 10%
- 10% to 20%
- 20% to 50%
- 50% to 100%
- > 100%

A data filter has been applied; results where model input design velocity x depth < 0.15 m²/s have been cut off and are not displayed.



A3 scale: 1:15,000

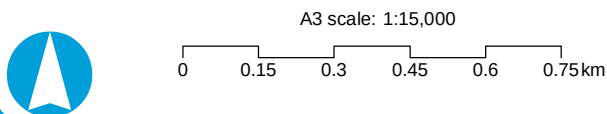
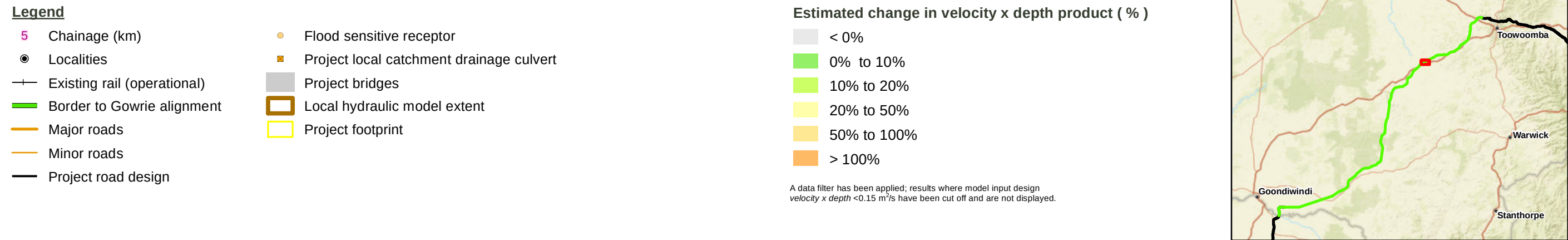


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Border to Gowrie

Figure O16 - page 35 of 48:
20% AEP Event - Local Catchments - Percentage Change in Hazard (v x d) (<0.15m²/s cutoff applied)





- Estimated change in velocity x depth product (%)**

- A data filter has been applied; results where model input design velocity $\times$ depth $< 0.15 \text{ m}^2/\text{s}$ have been cut off and are not displayed.



Figure O16 - page 37 of 48:
d) ($<0.15\text{m}^2/\text{s}$ cutoff applied)

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\GIS_310_IHY\202005121245_SurfaceWater\5mxd_Appendix_O\310-IHY\202005121245_FF\JV_FigO16-X_Hazard_Change_FIO_pc_v5.mxd Date: 20/06/2024 15:47



Legend

- 5 Chainage (km)
- Existing rail (operational)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated change in velocity x depth product (%)

- < 0%
- 0% to 10%
- 10% to 20%
- 20% to 50%
- 50% to 100%
- > 100%

A data filter has been applied; results where model input design velocity x depth < 0.15 m²/s have been cut off and are not displayed.



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

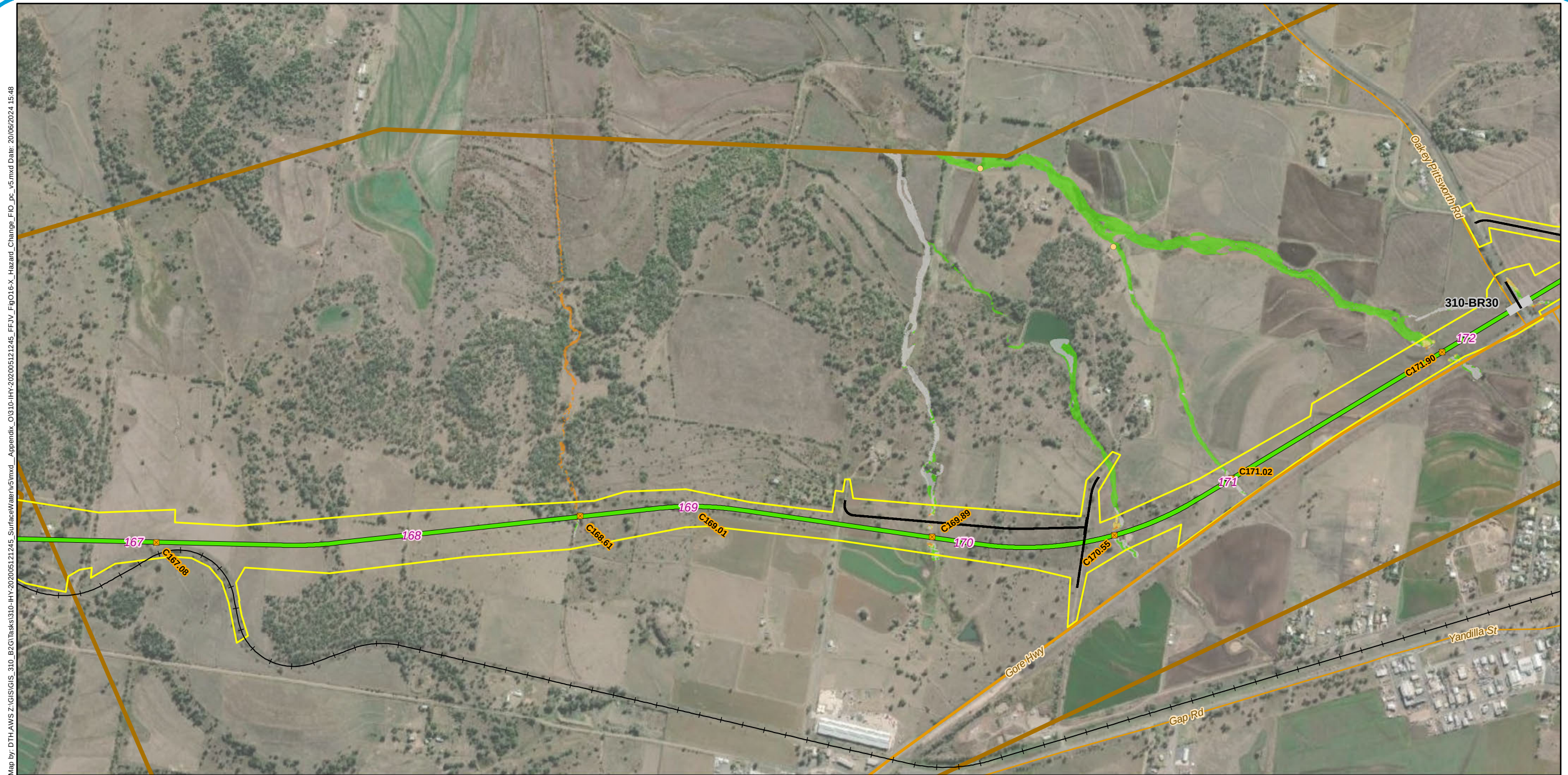


Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure O16 - page 38 of 48:
20% AEP Event - Local Catchments - Percentage Change in Hazard ($v \times d$) (<0.15m²/s cutoff applied)

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\310-IHY-202005121245_SurfaceWater\5mxd_Appendix_D\310-IHY-202005121245_FF\JV_FigO16-X_Hazard_Change_FIO_pc_v5.mxd Date: 20/06/2024 15:48



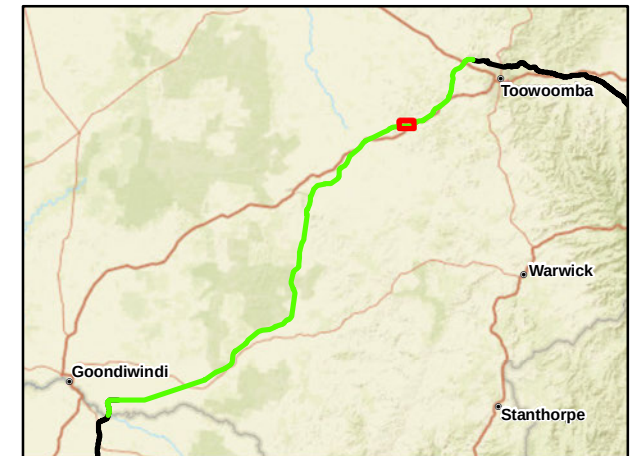
Legend

- 5 Chainage (km)
- Existing rail (operational)
- Border to Gowrie alignment
- Major roads
- Minor roads
- Project road design
- Flood sensitive receptor
- ✕ Project local catchment drainage culvert
- Project bridges
- ▭ Local hydraulic model extent
- ▭ Project footprint

Estimated change in velocity x depth product (%)

- < 0%
- 0% to 10%
- 10% to 20%
- 20% to 50%
- 50% to 100%
- > 100%

A data filter has been applied; results where model input design velocity x depth < 0.15 m²/s have been cut off and are not displayed.



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



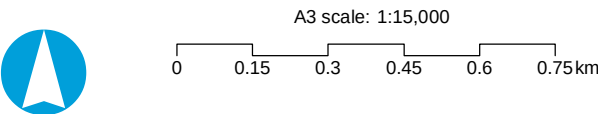
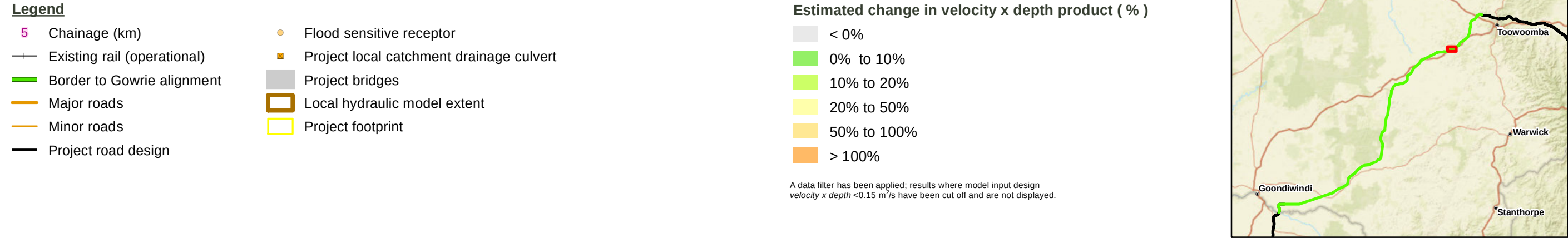
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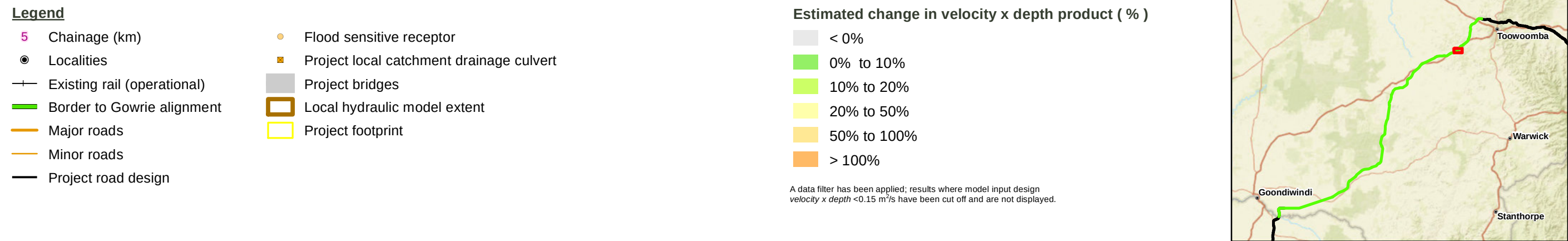
Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure O16 - page 39 of 48:

20% AEP Event - Local Catchments - Percentage Change in Hazard ($v \times d$) (<0.15m²/s cutoff applied)





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



- Estimated change in velocity x depth product (%)**

- A data filter has been applied; results where model input design velocity $\times$ depth $< 0.15 \text{ m}^2/\text{s}$ have been cut off and are not displayed.



Figure O16 - page 42 of 48:
d) ($<0.15\text{m}^2/\text{s}$ cutoff applied)

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\GIS_310-IHY-202005121245_SurfaceWater\5mxd_Appendix_D\310-IHY-202005121245_FF\JV_FigO16-X_Hazard_Change_FIO_pc_v5.mxd Date: 20/06/2024 15:48



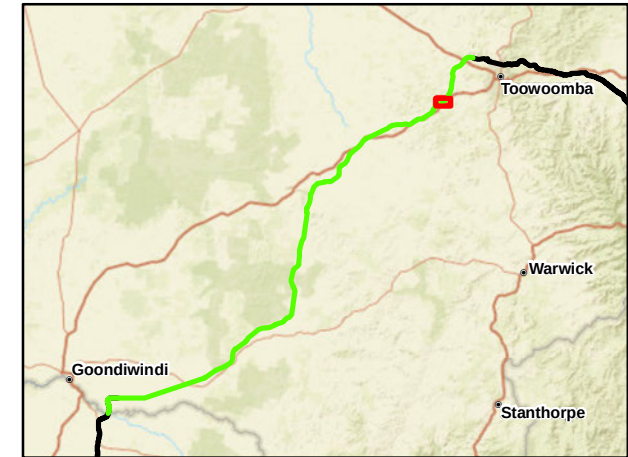
Legend

- | | |
|----------------------------|--|
| 5 Chainage (km) | ● Flood sensitive receptor |
| Border to Gowrie alignment | ✕ Project local catchment drainage culvert |
| Major roads | ■ Project bridges |
| Minor roads | ▭ Local hydraulic model extent |
| Project road design | ▭ Project footprint |

Estimated change in velocity x depth product (%)

- | |
|---------------|
| ■ < 0% |
| ■ 0% to 10% |
| ■ 10% to 20% |
| ■ 20% to 50% |
| ■ 50% to 100% |
| ■ > 100% |

A data filter has been applied; results where model input design velocity x depth < 0.15 m²/s have been cut off and are not displayed.



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 O16 - page 43 of 48:
20% AEP Event - Local Catchments - Percentage Change in Hazard ($v \times d$) (<0.15m²/s cutoff applied)

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\Tasks\310-IHY-202005121245_SurfaceWater\5vmsd_Appendix_O\310-IHY-202005121245_FF\JV_FigO16-X_Hazard_Change_FIO_pc_v5.mxd Date: 20/06/2024 15:48



Legend

- | | |
|------------------------------|--------------------------------|
| 5 Chainage (km) | ○ Flood sensitive receptor |
| — Border to Gowrie alignment | ▣ Project floodplain culvert |
| — Major roads | ▣ Project bridges |
| — Minor roads | ▣ Local hydraulic model extent |
| — Project road design | ▣ Project footprint |

Estimated change in velocity x depth product (%)

- | |
|---------------|
| ▣ < 0% |
| ▣ 0% to 10% |
| ▣ 10% to 20% |
| ▣ 20% to 50% |
| ▣ 50% to 100% |
| ▣ > 100% |

A data filter has been applied; results where model input design velocity x depth < 0.15 m²/s have been cut off and are not displayed.



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 O16 - page 44 of 48:
20% AEP Event - Local Catchments - Percentage Change in Hazard (v x d) (<0.15m²/s cutoff applied)

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\310-IHY-202005121245_SurfaceWater\5mxd_Appendix_O\310-IHY-202005121245_FF\JV_FigO16-X_Hazard_Change_FIO_pc_v5.mxd Date: 20/06/2024 15:48



Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Major roads
- Project road design
- Flood sensitive receptor
- Project floodplain culvert
- Project local catchment drainage culvert
- Local hydraulic model extent
- Project footprint

Estimated change in velocity x depth product (%)

- < 0%
- 0% to 10%
- 10% to 20%
- 20% to 50%
- 50% to 100%
- > 100%

A data filter has been applied; results where model input design velocity x depth < 0.15 m²/s have been cut off and are not displayed.



A3 scale: 1:15,000

0 0.15 0.3 0.45 0.6 0.75 km

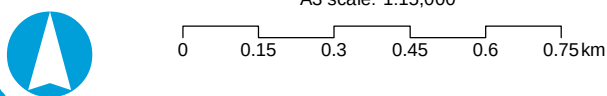
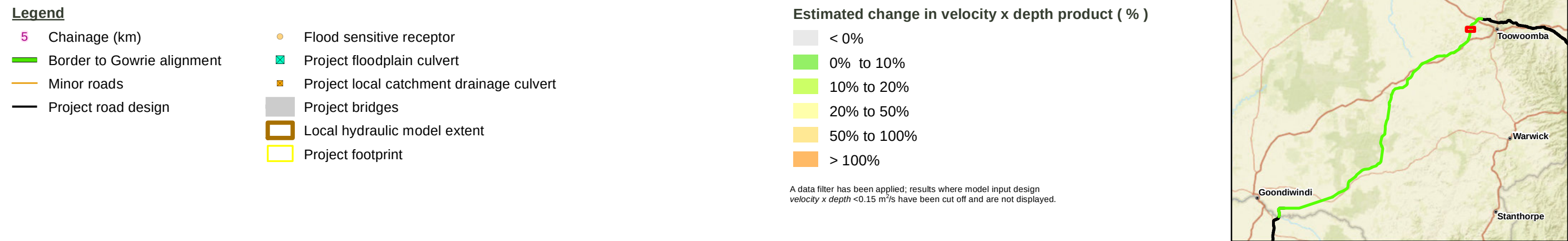
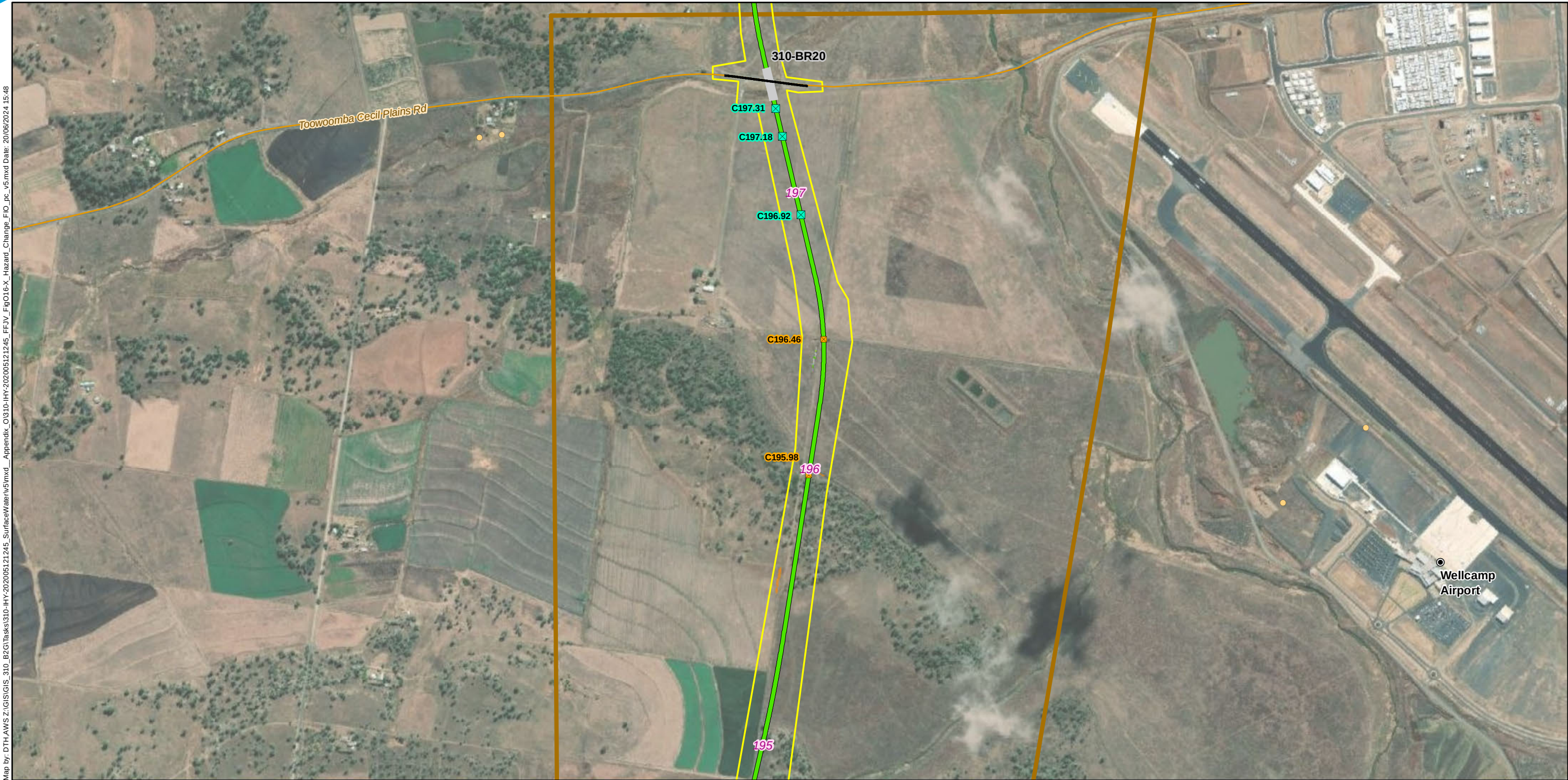


Future Freight
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Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure O16 - page 45 of 48:
20% AEP Event - Local Catchments - Percentage Change in Hazard (v x d) (<0.15m²/s cutoff applied)



Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\310-IHY-202005121245_SurfaceWater\5mxd_Appendix_O16-IHY-202005121245_FF1V_FigO16-X_Hazard_Change_FIO_pc_v5.mxd Date: 20/06/2024 15:48



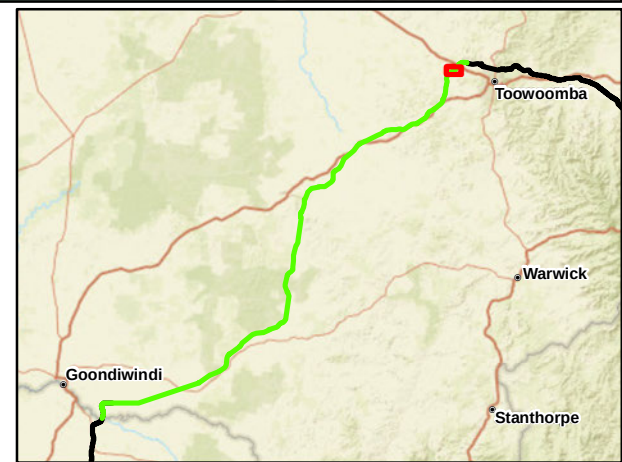
Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Project road design
- Flood sensitive receptor
- Project floodplain culvert
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated change in velocity x depth product (%)

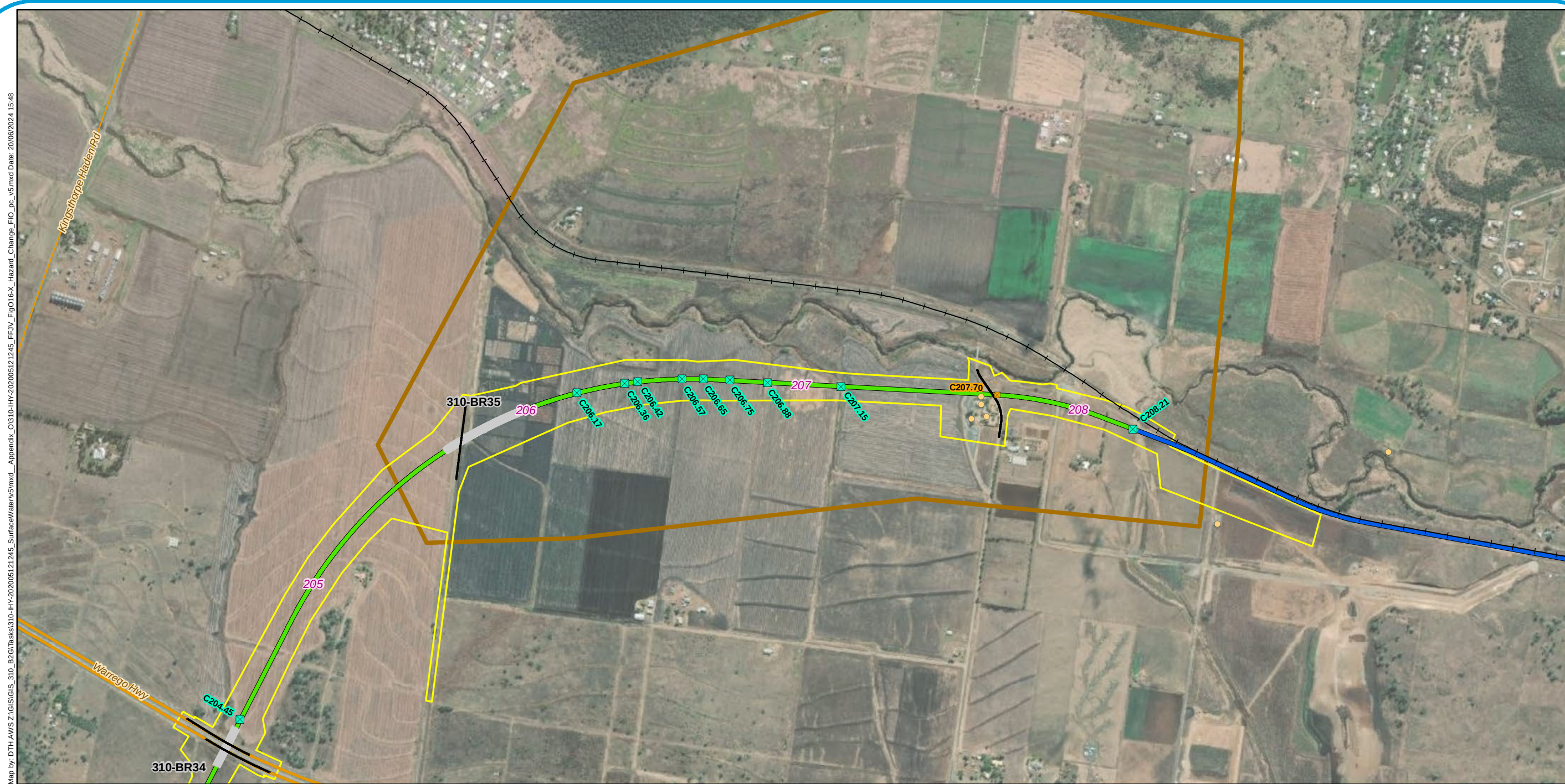
- < 0%
- 0% to 10%
- 10% to 20%
- 20% to 50%
- 50% to 100%
- > 100%

A data filter has been applied; results where model input design velocity x depth < 0.15 m²/s have been cut off and are not displayed.



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

Map by: DTH\AWS\Z\GIS\GIS_310_BR2\GIS_310-HY-202005121245_SurfaceWater\5mxd_Appendix_D\310-HY-202005121245_FF\JV_FigO16-X_Hazard_Change_FIO_pc_v5.mxd Date: 20/06/2024 15:48



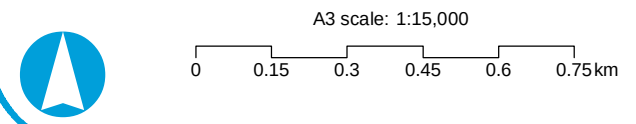
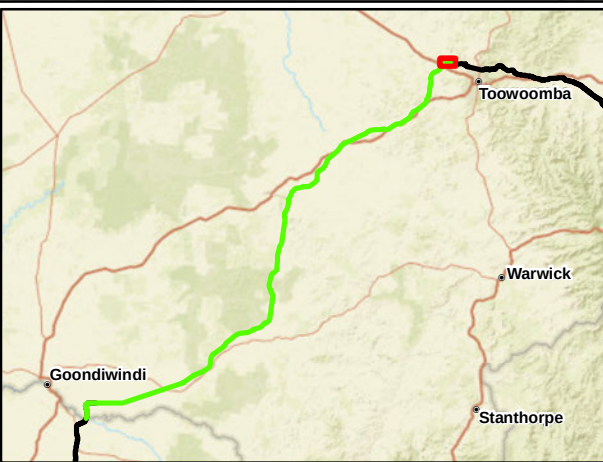
Legend

- 5 Chainage (km)
- Existing rail (operational)
- Border to Gowrie alignment
- Gowrie to Helidon alignment
- Major roads
- Minor roads
- Project road design
- Flood sensitive receptor
- Project floodplain culvert
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

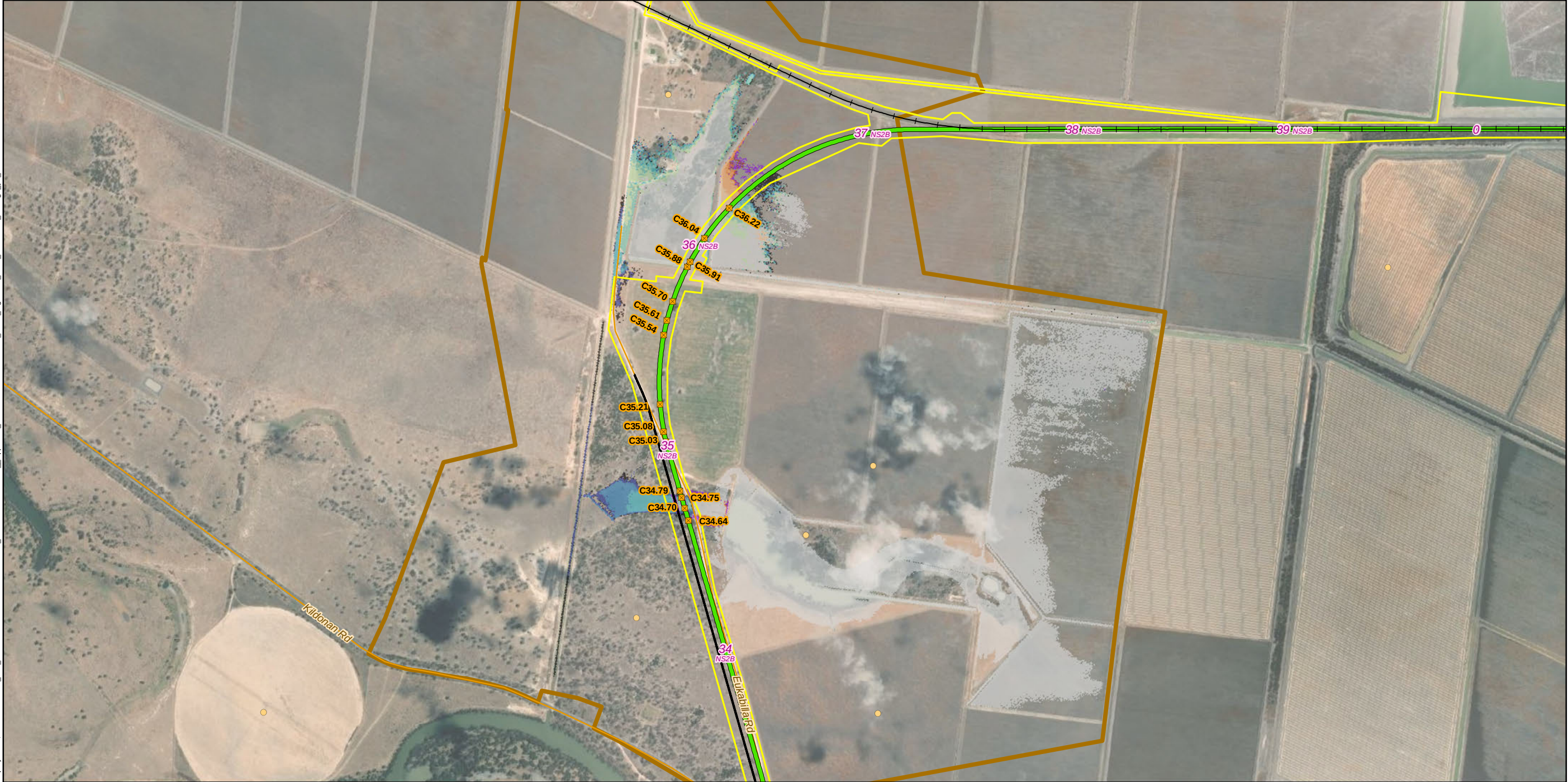
Estimated change in velocity x depth product (%)

- < 0%
- 0% to 10%
- 10% to 20%
- 20% to 50%
- 50% to 100%
- > 100%

A data filter has been applied; results where model input design velocity x depth < 0.15 m²/s have been cut off and are not displayed.



Map by: DTH\AWS Z:\GIS\GIS_310_B2\GIS\310-IHY-202005121245_SurfaceWater\5mxd_Appldix_D\310-IHY-202005121245_FF\JV_FigO17-X_Time_Inundation_Change_pc_v5.mxd Date: 20/06/2024 15:48

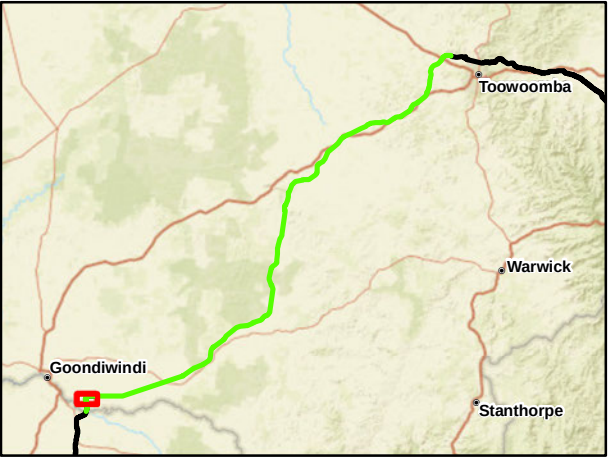


Legend

- 5 Chainage (km)
- Existing rail (operational)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Local hydraulic model extent
- Project footprint

Estimated change in time of inundation (%)

- | | |
|--------------|-----------------------------|
| < -50% | -5% to 5% |
| -50% to -40% | 5% to 10% |
| -40% to -30% | 10% to 20% |
| -30% to -20% | 20% to 50% |
| -20% to -10% | 50% to 100% |
| -10% to -5% | >100% |
| | Decrease in inundation area |
| | Increase in inundation area |



A3 scale: 1:20,000



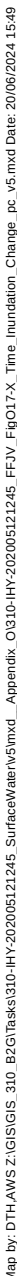
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Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure O17 - page 1 of 48:

20% AEP Event - Local Catchments - Percentage Change in Time of Inundation



	Chainage (km)		Flood sensitive receptor
	Existing rail (operational)		Project local catchment drainage culvert
	Border to Gowrie alignment		Local hydraulic model extent
	Project road design		Project footprint

	< -50%		-5% to 5%
	-50% to -40%		5% to 10%
	-40% to -30%		10% to 20%
	-30% to -20%		20% to 50%
	-20% to -10%		50% to 100%
	-10% to -5%		>100%
			Decrease in inundation area
			Increase in inundation area

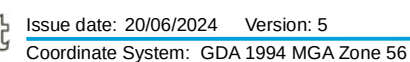
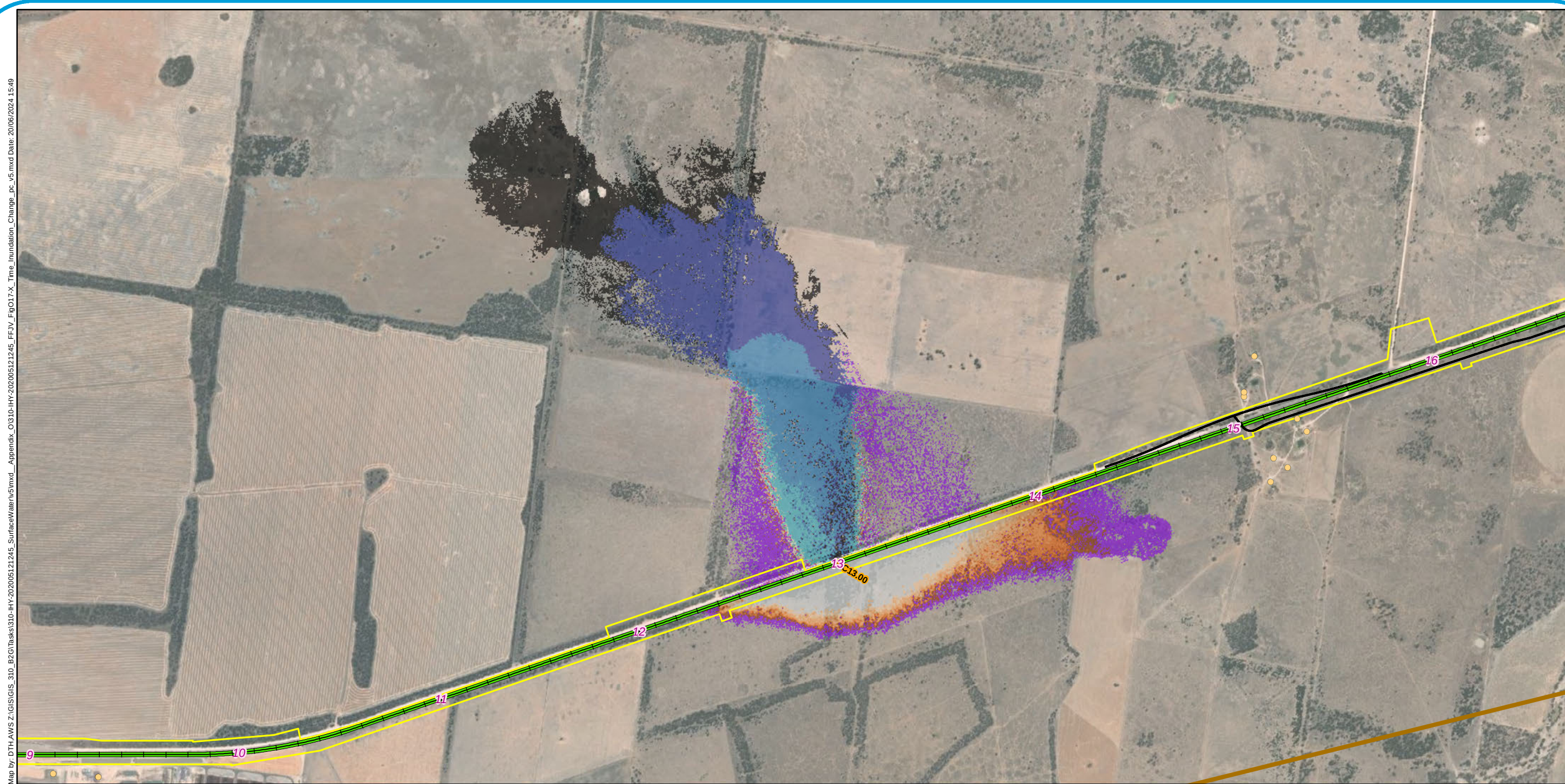


Figure O17 - page 2 of 48:

20% AEP Event - Local Catchments - Percentage Change in Time of Inundation

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\310-IHY-202005121245_SurfaceWater\5mxd_Appendix_D\310-IHY-202005121245_FF\JV_FigO17-X_Time_Inundation_Change_pc_v5.mxd Date: 20/06/2024 15:49

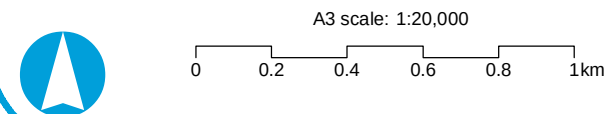
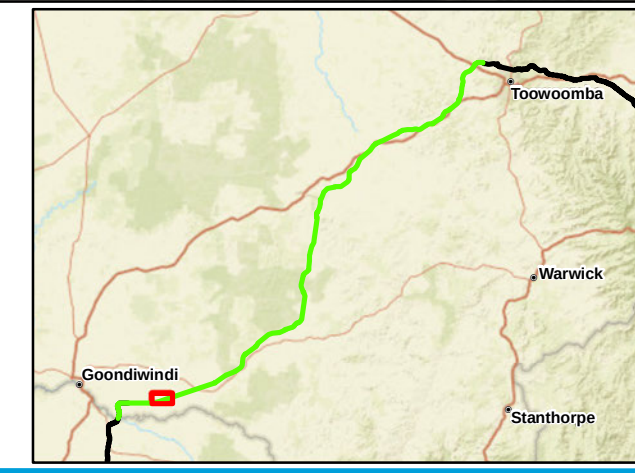


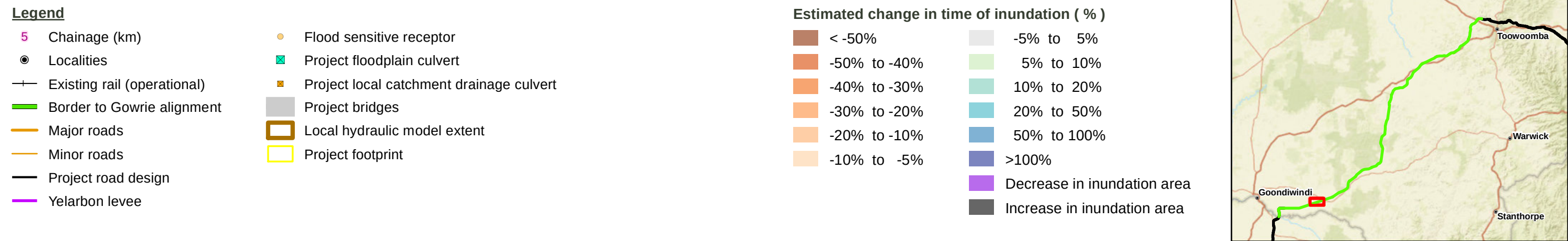
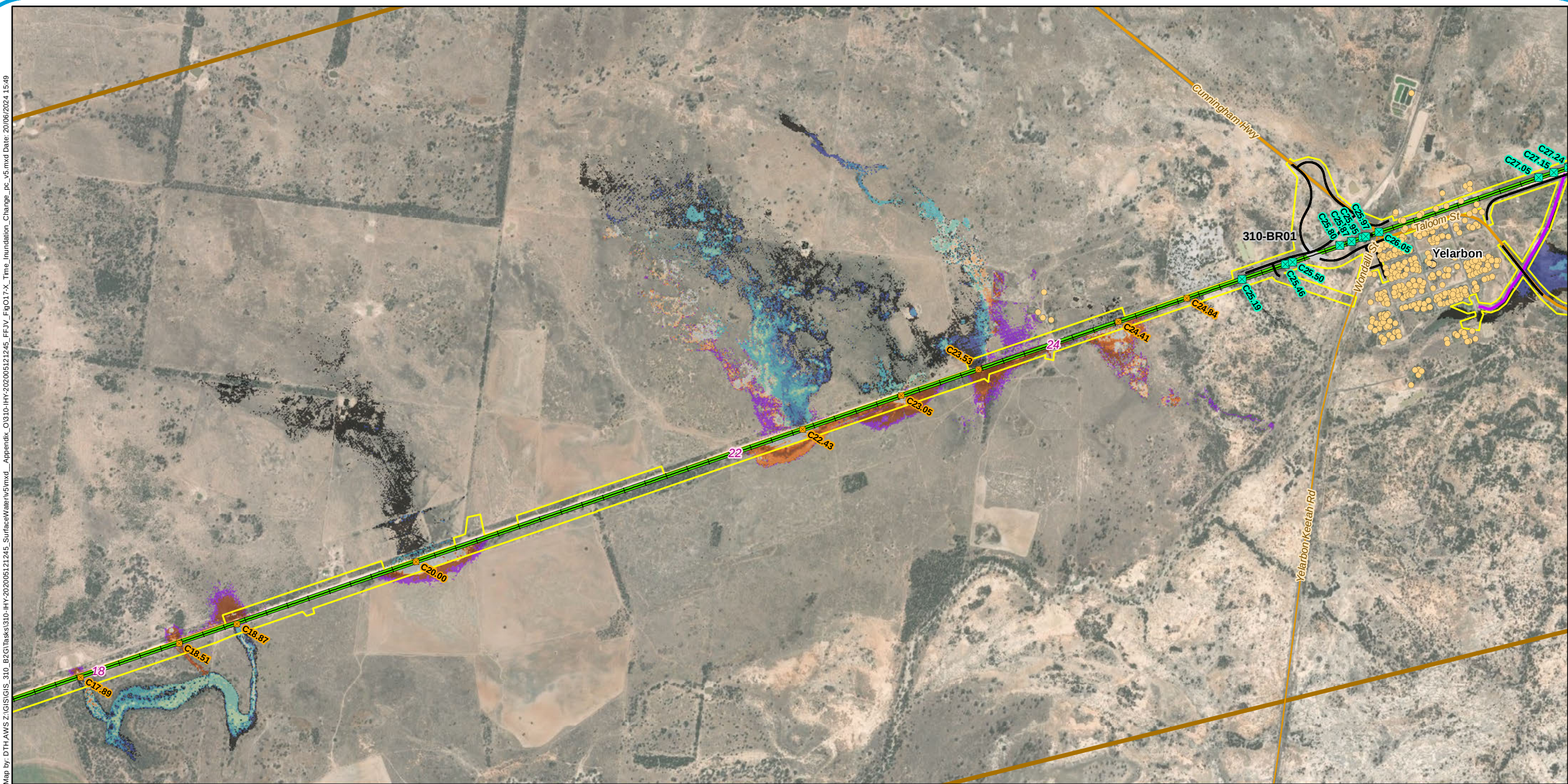
Legend

- 5 Chainage (km)
- Existing rail (operational)
- Border to Gowrie alignment
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Local hydraulic model extent
- Project footprint

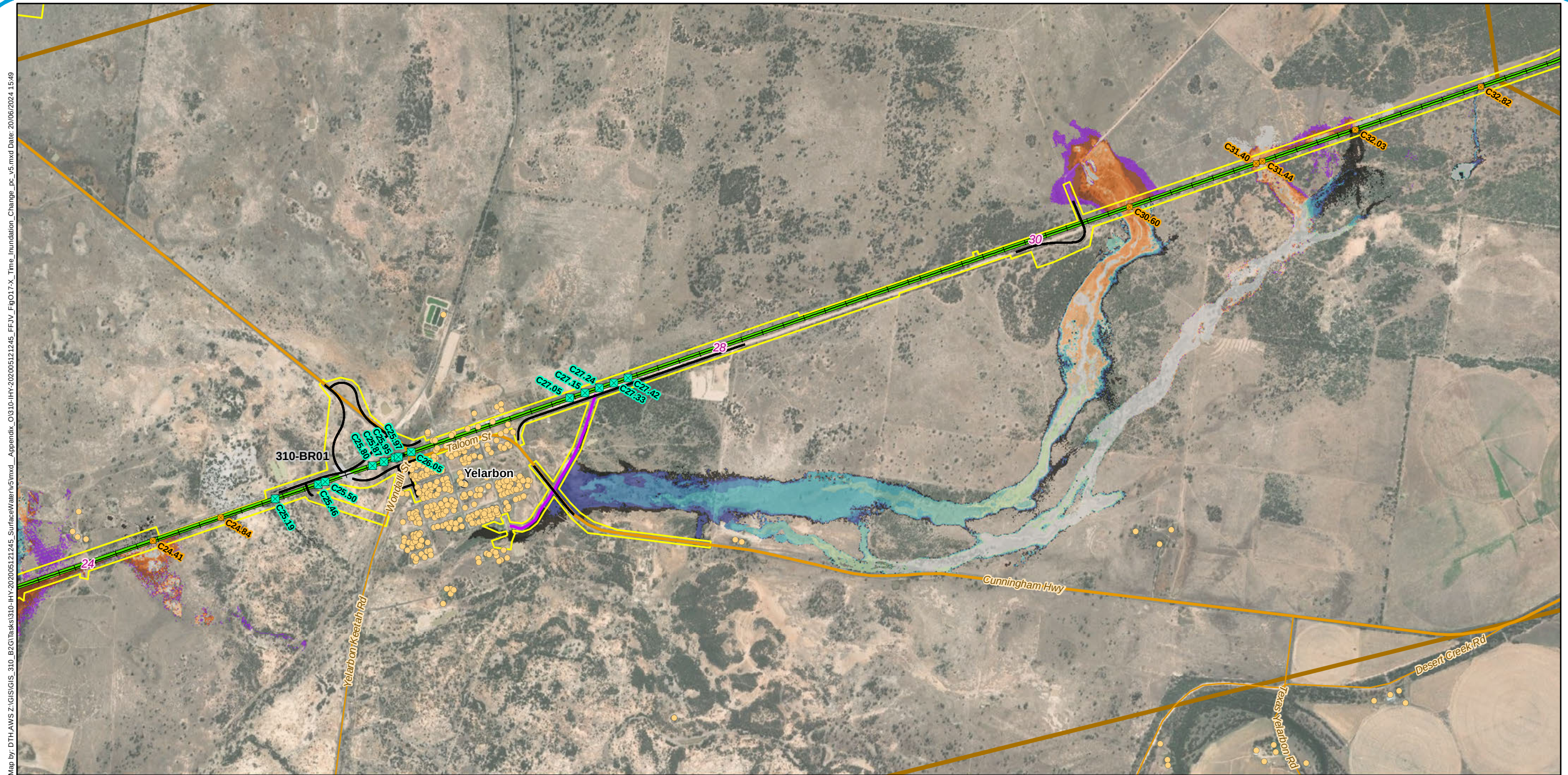
Estimated change in time of inundation (%)

- | | |
|--------------|-----------------------------|
| < -50% | -5% to 5% |
| -50% to -40% | 5% to 10% |
| -40% to -30% | 10% to 20% |
| -30% to -20% | 20% to 50% |
| -20% to -10% | 50% to 100% |
| -10% to -5% | >100% |
| | Decrease in inundation area |
| | Increase in inundation area |





A3 scale: 1:25,000
0 0.25 0.5 0.75 1 1.25 km



Legend

- 5 Chainage (km)
- Localities
- Existing rail (operational)
- Border to Gowrie alignment
- Major roads
- Minor roads
- Project road design
- Yelarbon levee
- Flood sensitive receptor
- Project floodplain culvert
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

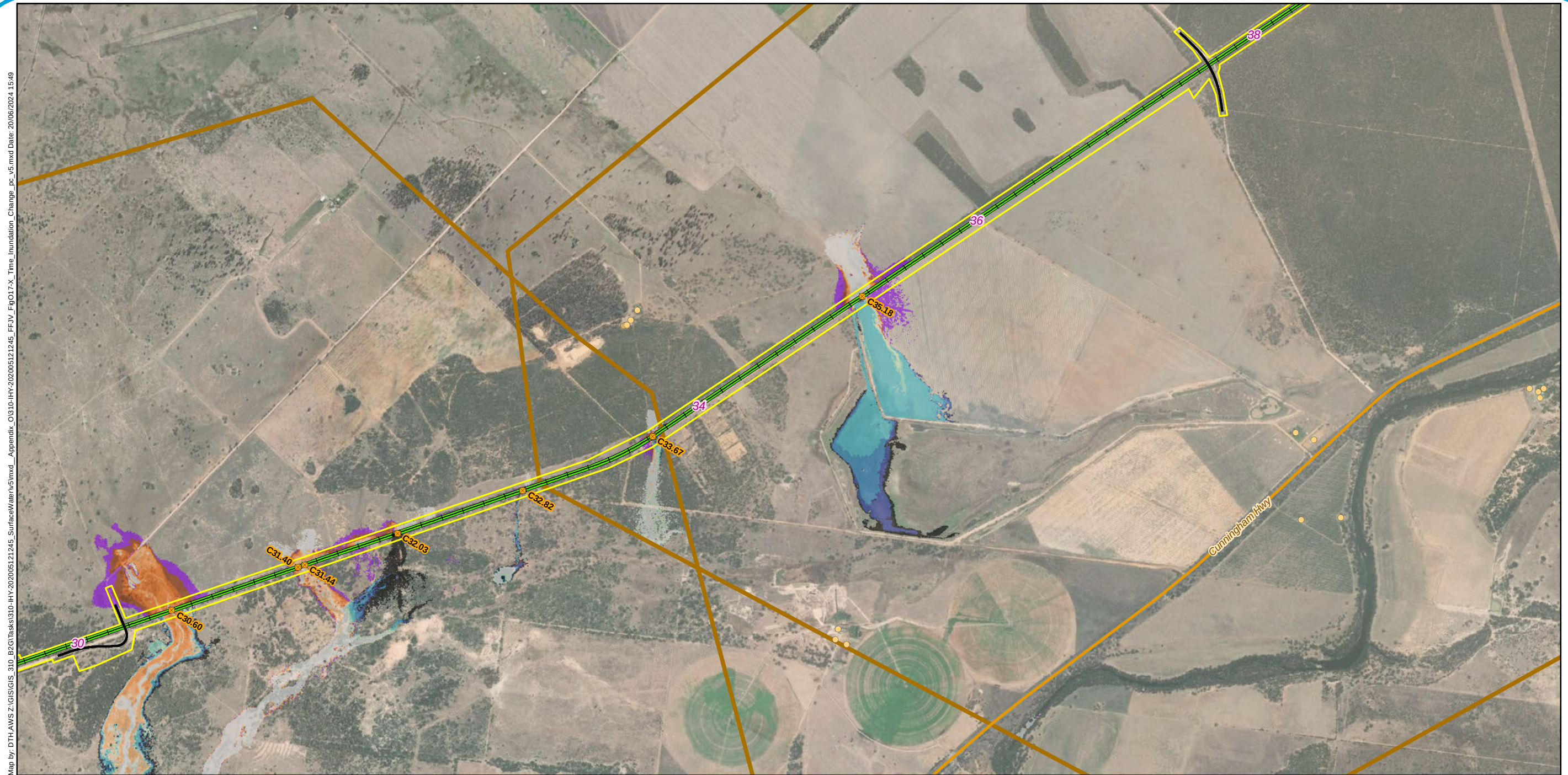
Estimated change in time of inundation (%)

- | | |
|--------------|-----------------------------|
| < -50% | -5% to 5% |
| -50% to -40% | 5% to 10% |
| -40% to -30% | 10% to 20% |
| -30% to -20% | 20% to 50% |
| -20% to -10% | 50% to 100% |
| -10% to -5% | >100% |
| | Decrease in inundation area |
| | Increase in inundation area |



A3 scale: 1:25,000

0 0.25 0.5 0.75 1 1.25 km



Legend

- 5 Chainage (km)
- Existing rail (operational)
- Border to Gowrie alignment
- Major roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Local hydraulic model extent
- Project footprint

Estimated change in time of inundation (%)

- | | |
|--------------|-----------------------------|
| < -50% | -5% to 5% |
| -50% to -40% | 5% to 10% |
| -40% to -30% | 10% to 20% |
| -30% to -20% | 20% to 50% |
| -20% to -10% | 50% to 100% |
| -10% to -5% | >100% |
| | Decrease in inundation area |
| | Increase in inundation area |



A3 scale: 1:25,000
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 O17 - page 6 of 48:

20% AEP Event - Local Catchments - Percentage Change in Time of Inundation



Legend

- 5 Chainage (km)
- Existing rail (operational)
- Border to Gowrie alignment
- Major roads
- Project road design
- Flood sensitive receptor
- Project floodplain culvert
- Project local catchment drainage culvert
- Local hydraulic model extent
- Project footprint

Estimated change in time of inundation (%)

- | | |
|--------------|-----------------------------|
| < -50% | -5% to 5% |
| -50% to -40% | 5% to 10% |
| -40% to -30% | 10% to 20% |
| -30% to -20% | 20% to 50% |
| -20% to -10% | 50% to 100% |
| -10% to -5% | >100% |
| | Decrease in inundation area |
| | Increase in inundation area |



A3 scale: 1:25,000
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 O17 - page 7 of 48:

20% AEP Event - Local Catchments - Percentage Change in Time of Inundation



- Estimated change in time of inundation (%)**

A map of south-eastern Australia showing the study area. A red rectangle indicates the study site, located between Goondiwindi and Toowoomba. The map also shows the locations of Toowoomba, Warwick, and Stanthorpe. The study area is highlighted in green.

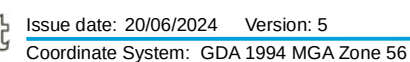


Figure O17 - page 8 of 48:

20% AEP Event - Local Catchments - Percentage Change in Time of Inundation



- 5 Chainage (km)
- Border to Gowrie alignment
- Major roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Local hydraulic model extent
- Project footprint

	< -50%		-5% to 5%
	-50% to -40%		5% to 10%
	-40% to -30%		10% to 20%
	-30% to -20%		20% to 50%
	-20% to -10%		50% to 100%
	-10% to -5%		>100%
			Decrease in inundation area
			Increase in inundation area

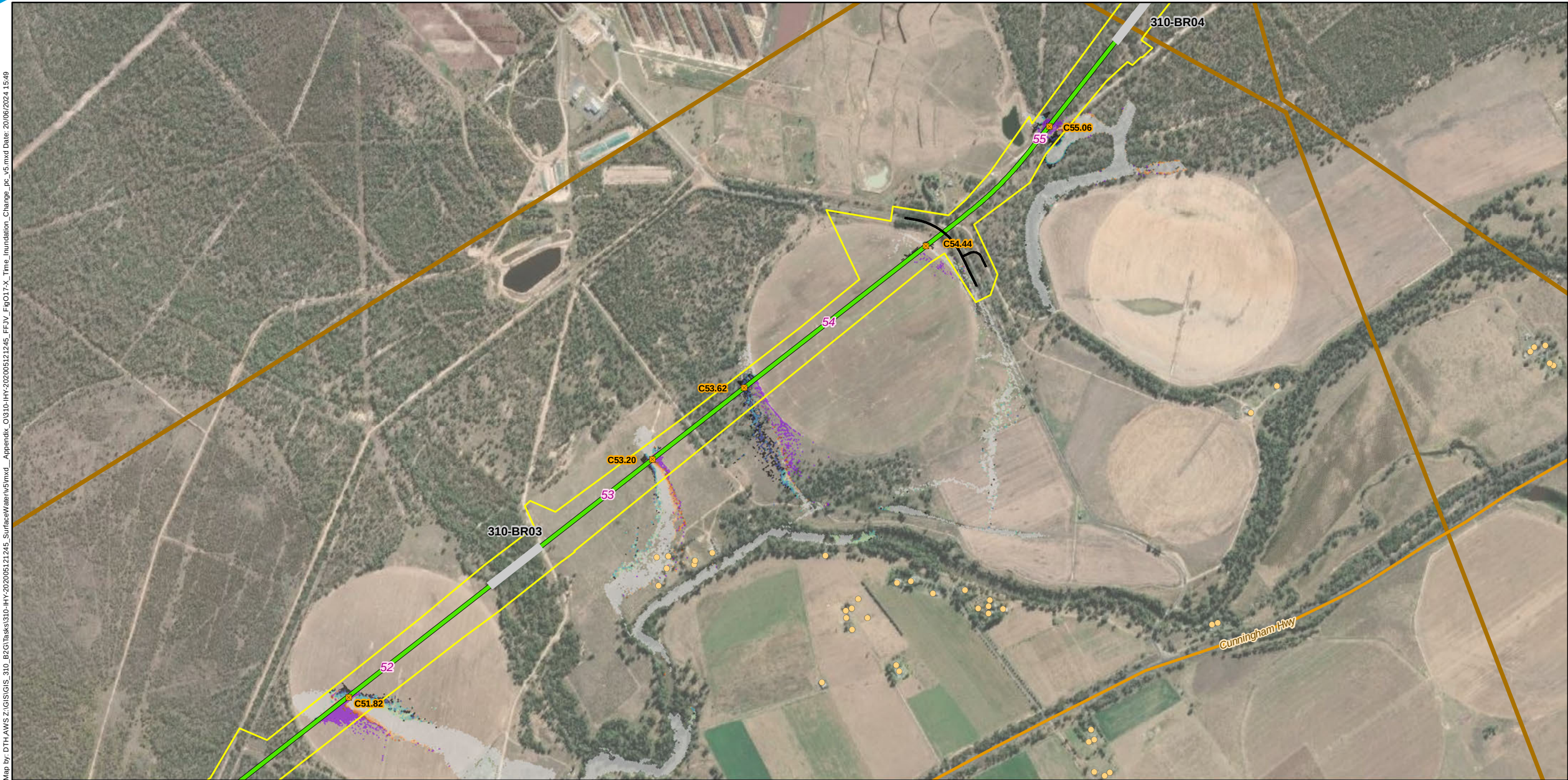


20% AEP Event - Local Catchments - Percentage Change in Time of Inundation

Border to Gowrie

Figure O17 - page 9 of 48:

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\310-IHY-202005121245_SurfaceWater\5mxd_Appldix_D\310-IHY-202005121245_FF\JV_FigO17-X_Time_Inundation_Change_pc_v5.mxd Date: 20/06/2024 15:49



Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Major roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated change in time of inundation (%)

- | | |
|--------------|-----------------------------|
| < -50% | -5% to 5% |
| -50% to -40% | 5% to 10% |
| -40% to -30% | 10% to 20% |
| -30% to -20% | 20% to 50% |
| -20% to -10% | 50% to 100% |
| -10% to -5% | >100% |
| | Decrease in inundation area |
| | Increase in inundation area |



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 O17 - page 10 of 48:

20% AEP Event - Local Catchments - Percentage Change in Time of Inundation



- Estimated change in time of inundation (%)**

A map of south-eastern Australia showing the study area. A red square indicates the study site, located on a road between Goondiwindi and Toowoomba. The map also shows the locations of Toowoomba, Warwick, and Stanthorpe. The study area is highlighted in green.

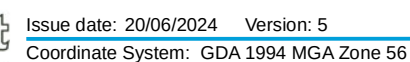


Figure O17 - page 11 of 48:

20% AEP Event - Local Catchments - Percentage Change in Time of Inundation

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\310-IHY-202005121245_SurfaceWater\5mxd_Appldix_D\310-IHY-202005121245_FF\JV_FigO17-X_Time_Inundation_Change_pc_v5.mxd Date: 20/06/2024 15:49



Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project floodplain culvert
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated change in time of inundation (%)

- | | |
|--------------|-----------------------------|
| < -50% | -5% to 5% |
| -50% to -40% | 5% to 10% |
| -40% to -30% | 10% to 20% |
| -30% to -20% | 20% to 50% |
| -20% to -10% | 50% to 100% |
| -10% to -5% | >100% |
| | Decrease in inundation area |
| | Increase in inundation area |



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



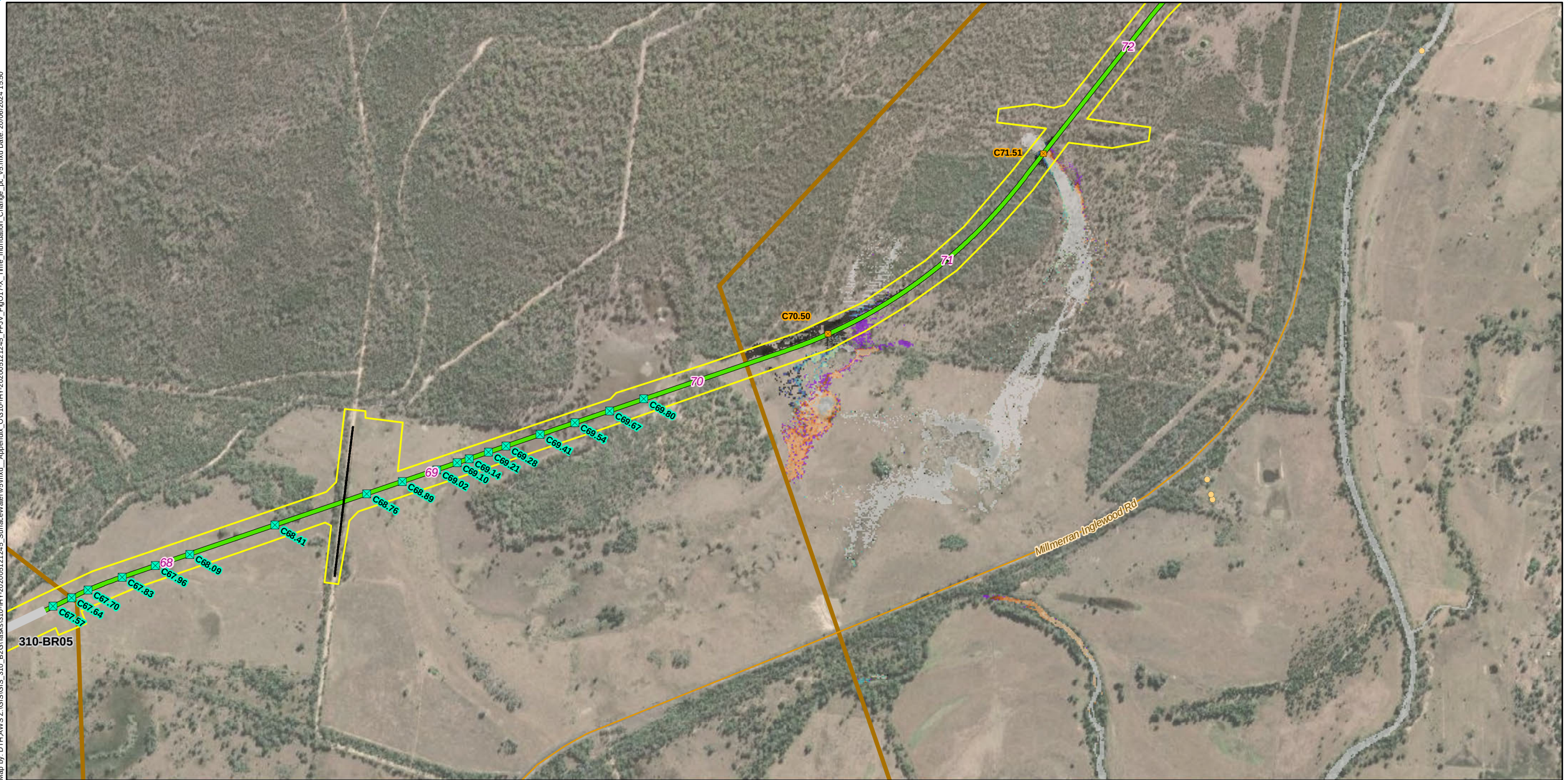
Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure O17 - page 12 of 48:

20% AEP Event - Local Catchments - Percentage Change in Time of Inundation

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\Tasks\310-HY-2020\5121245_SurfaceWater\5vmsd_Appendix_D\310-HY-2020\5121245_FF\JV_FigO17-x_Time_Inundation_Change_pc_v5.mxd Date: 20/06/2024 15:50



Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project floodplain culvert
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated change in time of inundation (%)

- | | |
|--------------|-----------------------------|
| < -50% | -5% to 5% |
| -50% to -40% | 5% to 10% |
| -40% to -30% | 10% to 20% |
| -30% to -20% | 20% to 50% |
| -20% to -10% | 50% to 100% |
| -10% to -5% | >100% |
| | Decrease in inundation area |
| | Increase in inundation area |



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



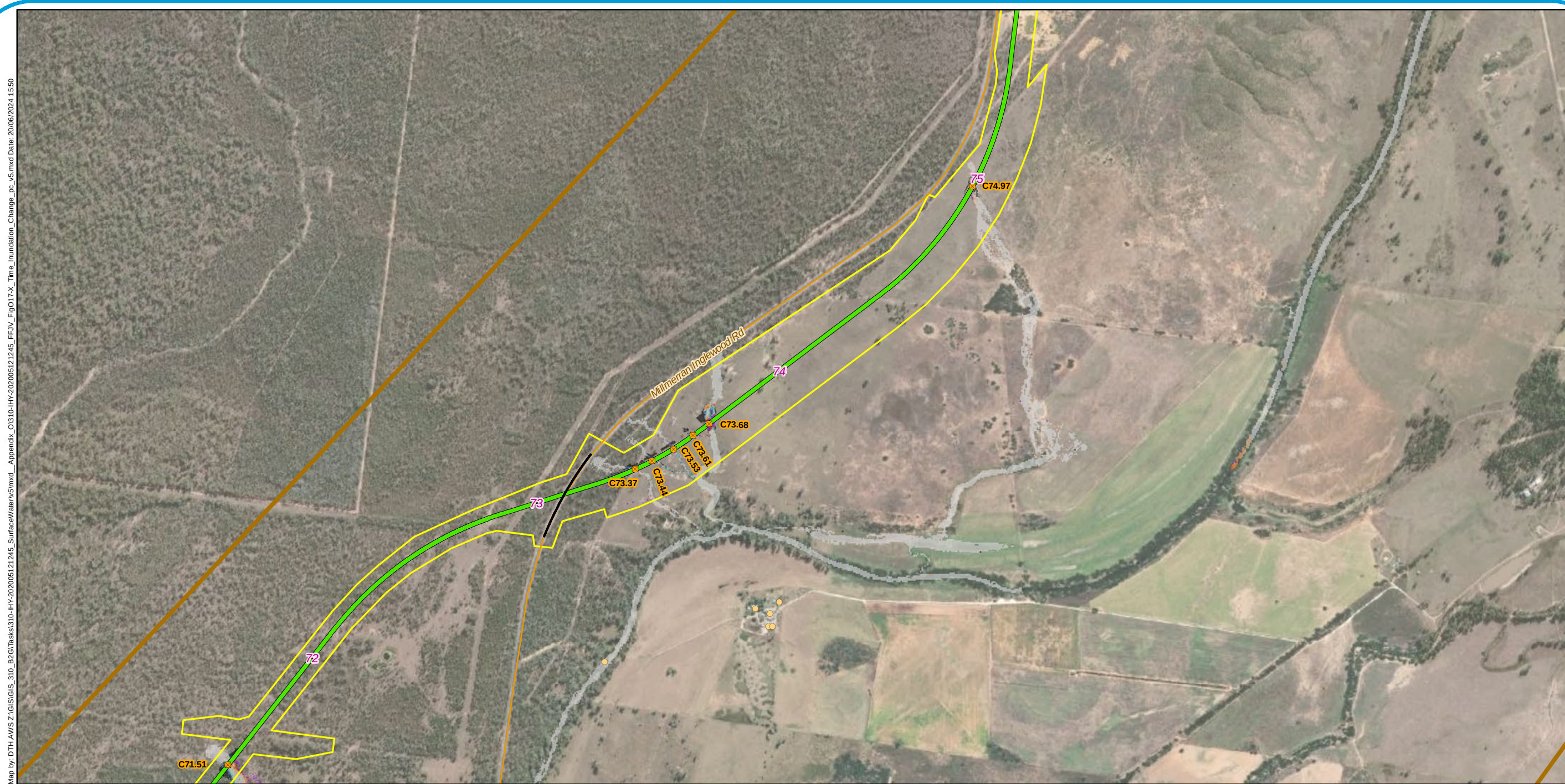
Issue date: 20/06/2024 Version: 5
 Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure O17 - page 13 of 48:

20% AEP Event - Local Catchments - Percentage Change in Time of Inundation

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\GIS_310_IHY\202005121245_SurfaceWater\5mxd_Appendix_D\310-IHY\202005121245_FF\JV_FigO17-X_Time_Inundation_Change_pc_v5.mxd Date: 20/06/2024 15:50

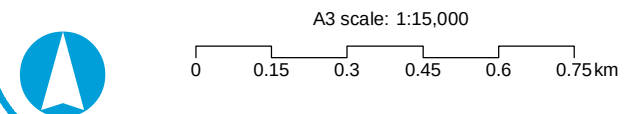
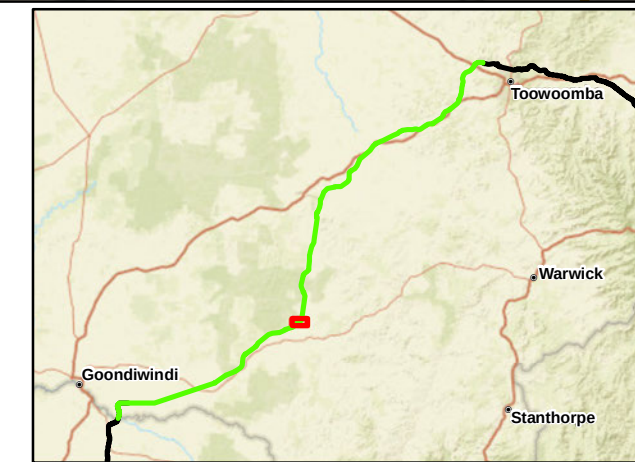


Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Local hydraulic model extent
- Project footprint

Estimated change in time of inundation (%)

- | | |
|--------------|-----------------------------|
| < -50% | -5% to 5% |
| -50% to -40% | 5% to 10% |
| -40% to -30% | 10% to 20% |
| -30% to -20% | 20% to 50% |
| -20% to -10% | 50% to 100% |
| -10% to -5% | >100% |
| | Decrease in inundation area |
| | Increase in inundation area |





- Estimated change in time of inundation (%)**

A map of south-eastern Australia showing the study area. A red square indicates the study site, located on a road between Goondiwindi and Toowoomba. The map also shows the locations of Toowoomba, Warwick, and Stanthorpe. The study area is highlighted in green.

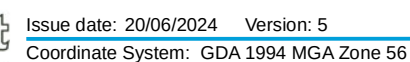


Figure O17 - page 15 of 48:

20% AEP Event - Local Catchments - Percentage Change in Time of Inundation



- Estimated change in time of inundation (%)**

A map of south-eastern Australia showing the study area. A red square indicates the study site, located on a road between Goondiwindi and Toowoomba. The map also shows the locations of Toowoomba, Warwick, and Stanthorpe. The study area is highlighted in green.

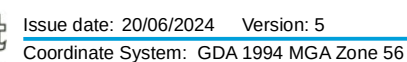


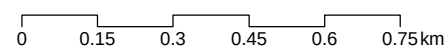
Figure O17 - page 16 of 48:

20% AEP Event - Local Catchments - Percentage Change in Time of Inundation



- Estimated change in time of inundation (%)**

A3 scale: 1:15,000



Border to Gowrie

Figure O17 - page 17 of 48:

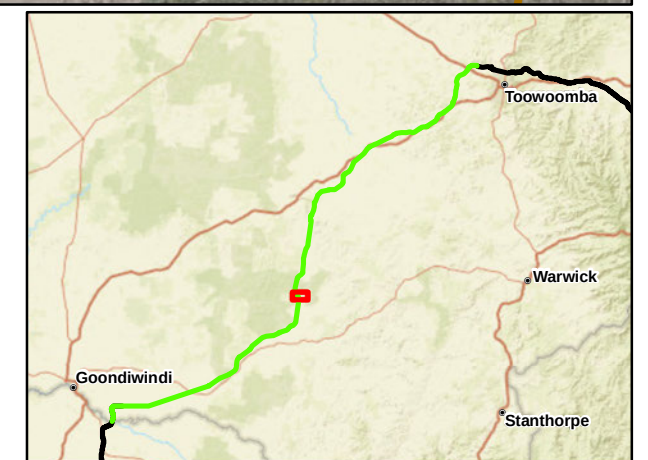
20% AEP Event - Local Catchments - Percentage Change in Time of Inundation



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

- Flood sensitive receptor
- Project local catchment drainage culvert
- ▭ Local hydraulic model extent
- ▭ Project footprint

	< -50%		-5% to 5%
	-50% to -40%		5% to 10%
	-40% to -30%		10% to 20%
	-30% to -20%		20% to 50%
	-20% to -10%		50% to 100%
	-10% to -5%		>100%
			Decrease in inundation area
			Increase in inundation area



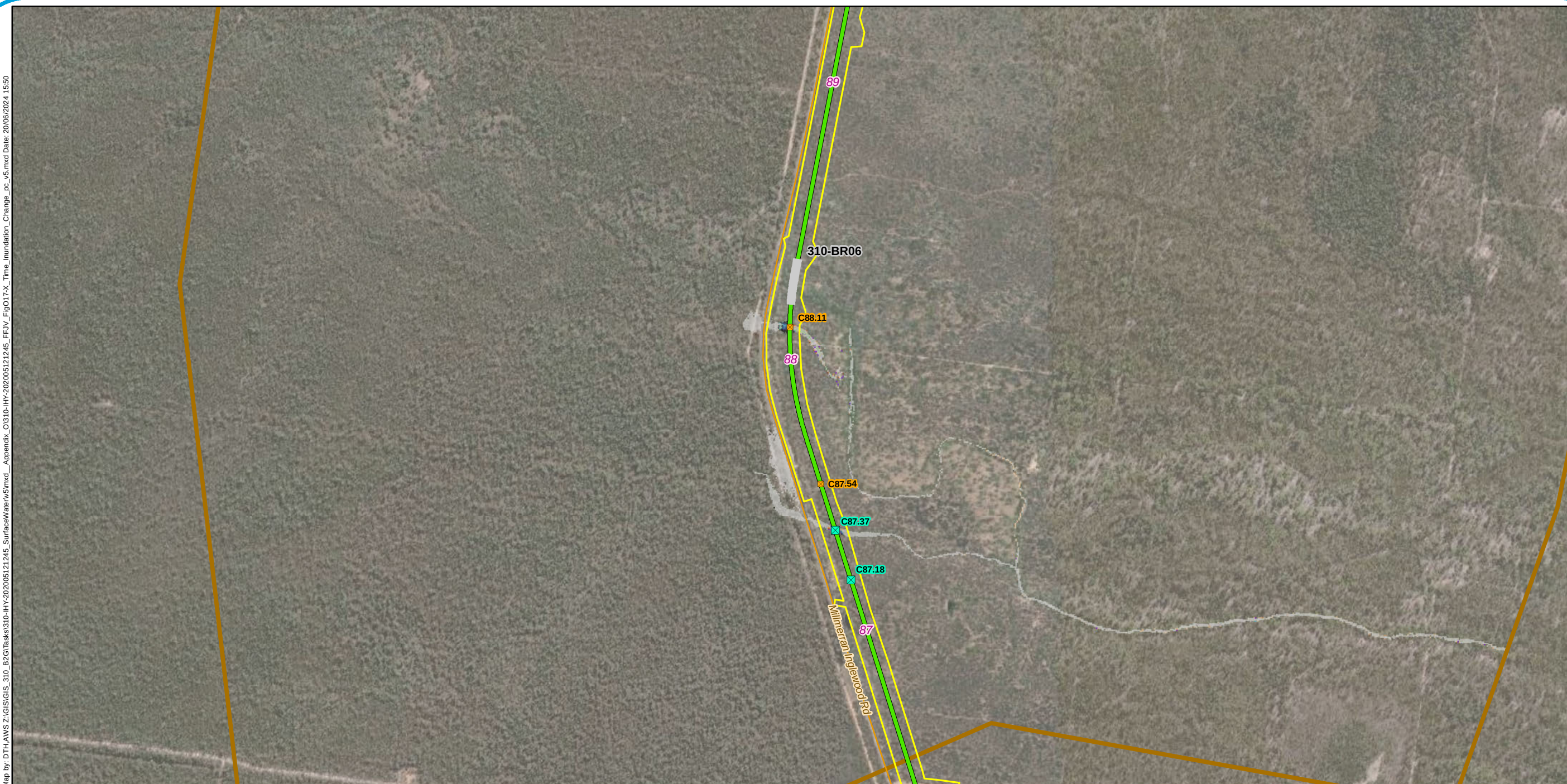
A step function graph on a horizontal axis labeled from 0 to 0.75 km. The function is 1 for intervals $[0, 0.15]$, $[0.3, 0.45]$, and $[0.6, 0.75]$, and 0 for intervals $(0.15, 0.3]$ and $(0.45, 0.6]$.



20% AEP Event - Local Catchments - Percentage Change in Time of Inundation

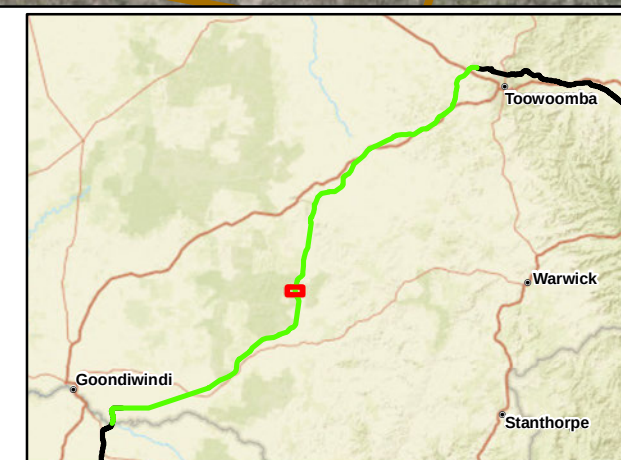
Border to Gowrie

Figure O17 - page 18 of 48:



5	Chainage (km)		Flood sensitive receptor
	Border to Gowrie alignment		Project floodplain culvert
	Minor roads		Project local catchment drainage culvert
	Project road design		Project bridges
			Local hydraulic model extent
			Project footprint

	< -50%		-5% to 5%
	-50% to -40%		5% to 10%
	-40% to -30%		10% to 20%
	-30% to -20%		20% to 50%
	-20% to -10%		50% to 100%
	-10% to -5%		>100%
			Decrease in inundation area
			Increase in inundation area



20% AEP Event - Local Catchments - Percentage Change in Time of Inundation

Border to Gowrie

Figure O17 - page 19 of 48:



- Estimated change in time of inundation (%)**

-

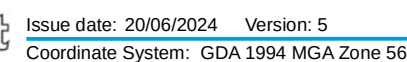


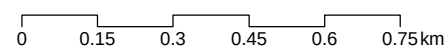
Figure O17 - page 20 of 48:

20% AEP Event - Local Catchments - Percentage Change in Time of Inundation



- Estimated change in time of inundation (%)**

A3 scale: 1:15,000



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

Figure O17 - page 21 of 48:

20% AEP Event - Local Catchments - Percentage Change in Time of Inundation

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\310-IHY\202005121245_SurfaceWater\5mxd_Appendix_D\310-IHY\202005121245_FF\JV_FigO17-X_Time_Inundation_Change_pc_v5.mxd Date: 20/06/2024 15:50



Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project floodplain culvert
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated change in time of inundation (%)

- | | |
|--------------|-----------------------------|
| < -50% | -5% to 5% |
| -50% to -40% | 5% to 10% |
| -40% to -30% | 10% to 20% |
| -30% to -20% | 20% to 50% |
| -20% to -10% | 50% to 100% |
| -10% to -5% | >100% |
| | Decrease in inundation area |
| | Increase in inundation area |



A3 scale: 1:15,000

0 0.15 0.3 0.45 0.6 0.75 km



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

Border to Gowrie

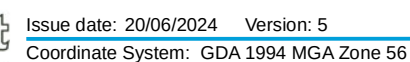
Figure O17 - page 22 of 48:

20% AEP Event - Local Catchments - Percentage Change in Time of Inundation



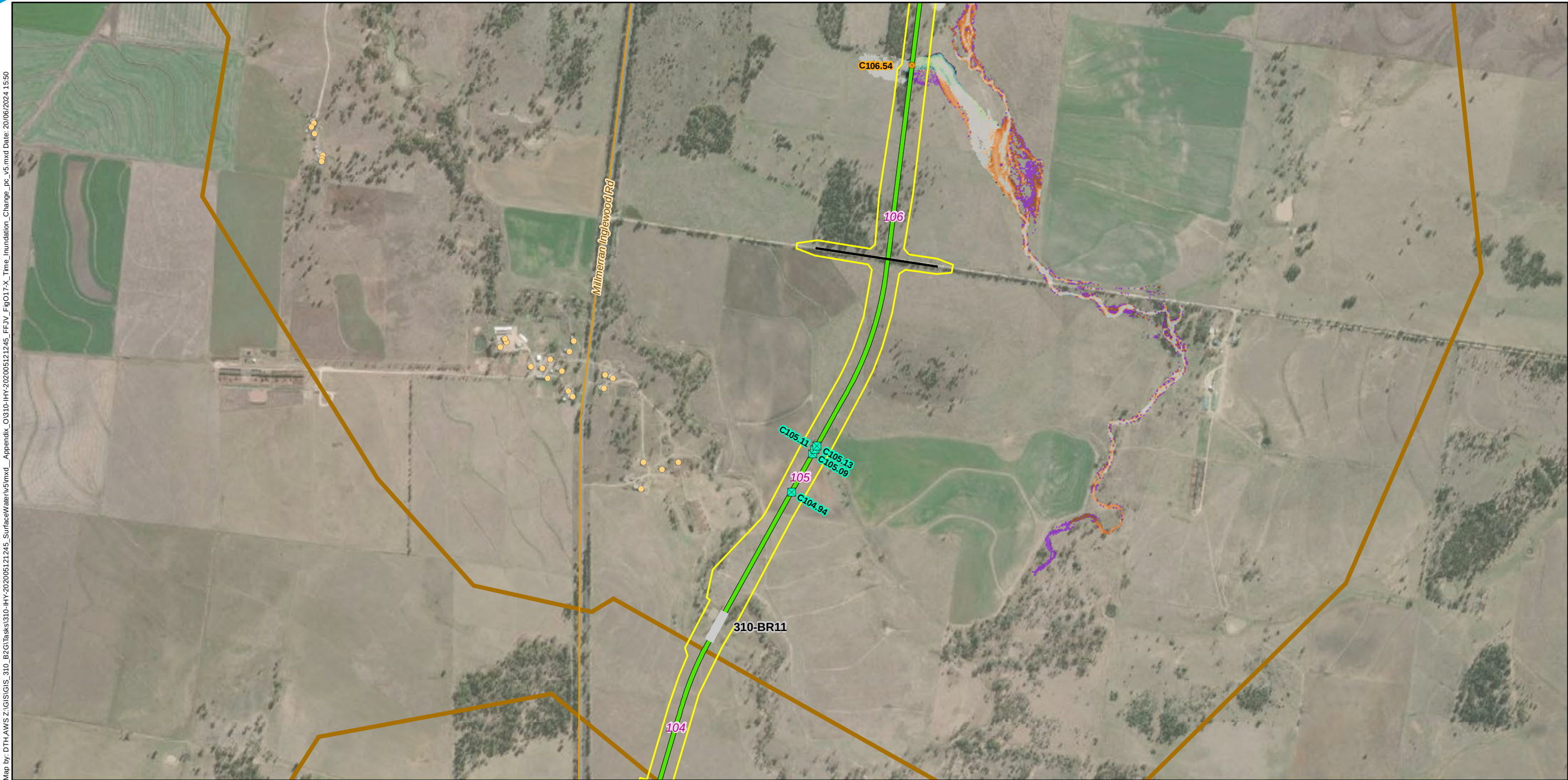
- Estimated change in time of inundation (%)**

-
- A map of south-eastern Australia showing the study area. A red square indicates the study site, located on a road between Goondiwindi and Toowoomba. The map also shows the locations of Toowoomba, Warwick, and Stanthorpe. The study area is highlighted in green.



20% AEP Event - Local Catchments - Percentage Change in Time of Inundation

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\310-HY-202005121245_SurfaceWater\5mxd_Appendix_O\310-HY-202005121245_FF\JV_FigO17-X_Time_Inundation_Change_pc_v5.mxd Date: 20/06/2024 15:50

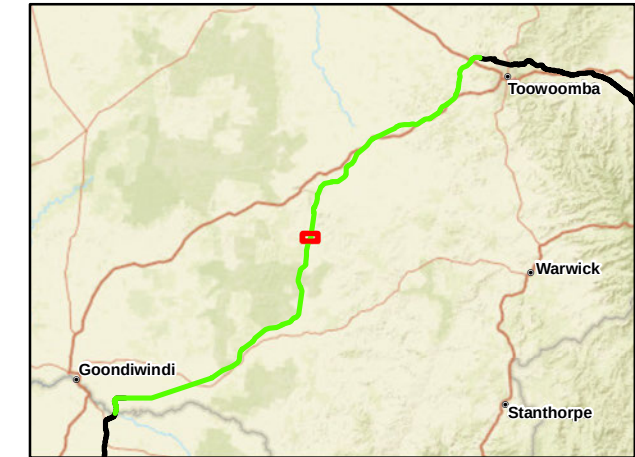


Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project floodplain culvert
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated change in time of inundation (%)

- | | |
|--------------|-----------------------------|
| < -50% | -5% to 5% |
| -50% to -40% | 5% to 10% |
| -40% to -30% | 10% to 20% |
| -30% to -20% | 20% to 50% |
| -20% to -10% | 50% to 100% |
| -10% to -5% | >100% |
| | Decrease in inundation area |
| | Increase in inundation area |



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 O17 - page 24 of 48:

20% AEP Event - Local Catchments - Percentage Change in Time of Inundation



- Estimated change in time of inundation (%)**

A map showing the proposed rail line between Toowoomba and Goondiwindi. The line is highlighted in green, following a path that is mostly straight but has some curves. The map includes labels for Toowoomba, Warwick, Stanthorpe, and Goondiwindi. A red rectangular marker is placed on the green line between Warwick and Goondiwindi.

A step function graph on a horizontal axis labeled from 0 to 0.75 km. The function is 1 for intervals $[0, 0.15]$, $[0.3, 0.45]$, and $[0.6, 0.75]$, and 0 for intervals $(0.15, 0.3]$ and $(0.45, 0.6]$.

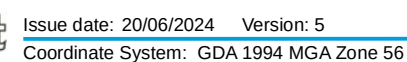


Figure O17 - page 25 of 48:

20% AEP Event - Local Catchments - Percentage Change in Time of Inundation



- Estimated change in time of inundation (%)**

-
- A map of south-eastern Australia showing the study area. A red square indicates the study site, located on a road between Goondiwindi and Toowoomba. The map also shows the locations of Toowoomba, Warwick, and Stanthorpe. The terrain is depicted with green and brown shading, and a network of roads is shown in red and black lines.

A step function graph on a horizontal axis labeled from 0 to 0.75 km. The function is 1 for intervals $[0, 0.15]$, $[0.3, 0.45]$, and $[0.6, 0.75]$, and 0 for intervals $(0.15, 0.3]$ and $(0.45, 0.6]$.

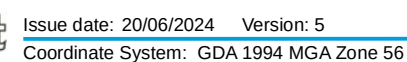


Figure O17 - page 26 of 48:

20% AEP Event - Local Catchments - Percentage Change in Time of Inundation



- Estimated change in time of inundation (%)**

A step function graph on a horizontal axis labeled from 0 to 0.75 km. The function is 1 for intervals $[0, 0.15]$, $[0.3, 0.45]$, and $[0.6, 0.75]$, and 0 for intervals $(0.15, 0.3]$ and $(0.45, 0.6]$.

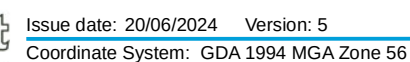


Figure O17 - page 27 of 48:

20% AEP Event - Local Catchments - Percentage Change in Time of Inundation



- Estimated change in time of inundation (%)**

A map of south-eastern Australia showing the study area. A red square indicates the study site, located on a road between Goondiwindi and Toowoomba. The map also shows the locations of Toowoomba, Warwick, and Stanthorpe. The study area is highlighted in green.

A step function graph on a horizontal axis labeled from 0 to 0.75 km. The function is 1 for intervals $[0, 0.15]$, $[0.3, 0.45]$, and $[0.6, 0.75]$, and 0 for intervals $(0.15, 0.3]$ and $(0.45, 0.6]$.

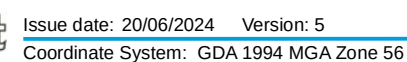


Figure O17 - page 28 of 48:

20% AEP Event - Local Catchments - Percentage Change in Time of Inundation



- Estimated change in time of inundation (%)**

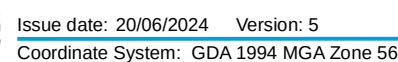


Figure O17 - page 29 of 48:

20% AEP Event - Local Catchments - Percentage Change in Time of Inundation

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\310-HY-202005121245_SurfaceWater\5vmsd_Appendix_O\310-HY-202005121245_FF\JV_FigO17-X_Time_Inundation_Change_pc_v5.mxd Date: 20/06/2024 15:51



Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Local hydraulic model extent
- Project footprint

Estimated change in time of inundation (%)

- | | |
|--------------|-----------------------------|
| < -50% | -5% to 5% |
| -50% to -40% | 5% to 10% |
| -40% to -30% | 10% to 20% |
| -30% to -20% | 20% to 50% |
| -20% to -10% | 50% to 100% |
| -10% to -5% | >100% |
| | Decrease in inundation area |
| | Increase in inundation area |



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 O17 - page 30 of 48:

20% AEP Event - Local Catchments - Percentage Change in Time of Inundation

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\310-IHY-202005121245_SurfaceWater\5vmsd_Appendix_O\310-IHY-202005121245_FF\JV_FigO17-X_Time_Inundation_Change_pc_v5.mxd Date: 20/06/2024 15:51

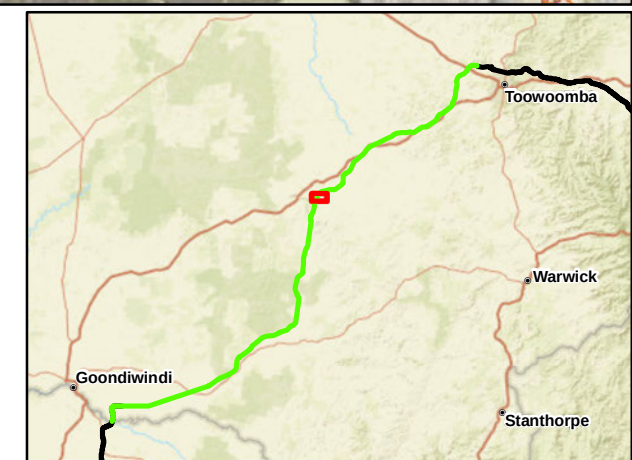


Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated change in time of inundation (%)

- | | |
|--------------|-----------------------------|
| < -50% | -5% to 5% |
| -50% to -40% | 5% to 10% |
| -40% to -30% | 10% to 20% |
| -30% to -20% | 20% to 50% |
| -20% to -10% | 50% to 100% |
| -10% to -5% | >100% |
| | Decrease in inundation area |
| | Increase in inundation area |



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 O17 - page 31 of 48:

20% AEP Event - Local Catchments - Percentage Change in Time of Inundation

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\310-IHY-202005121245_SurfaceWater\5mxd_Appendix_O\310-IHY-202005121245_FF\JV_FigO17-X_Time_Inundation_Change_pc_v5.mxd Date: 20/06/2024 15:51



Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project floodplain culvert
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated change in time of inundation (%)

- | | |
|--------------|-----------------------------|
| < -50% | -5% to 5% |
| -50% to -40% | 5% to 10% |
| -40% to -30% | 10% to 20% |
| -30% to -20% | 20% to 50% |
| -20% to -10% | 50% to 100% |
| -10% to -5% | >100% |
| | Decrease in inundation area |
| | Increase in inundation area |



A3 scale: 1:15,000

0 0.15 0.3 0.45 0.6 0.75 km



Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated change in time of inundation (%)

- < -50%
- 50% to -40%
- 40% to -30%
- 30% to -20%
- 20% to -10%
- 10% to -5%
- 5% to 5%
- 5% to 10%
- 10% to 20%
- 20% to 50%
- 50% to 100%
- >100%
- Decrease in inundation area
- Increase in inundation area



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 O17 - page 33 of 48:

20% AEP Event - Local Catchments - Percentage Change in Time of Inundation

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\310-IHY-202005121245_SurfaceWater\5mxd_Appendix_D\310-IHY-202005121245_FF\JV_FigO17-X_Time_Inundation_Change_pc_v5.mxd Date: 20/06/2024 15:51



Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Local hydraulic model extent
- Project footprint

Estimated change in time of inundation (%)

- | | |
|--------------|-----------------------------|
| < -50% | -5% to 5% |
| -50% to -40% | 5% to 10% |
| -40% to -30% | 10% to 20% |
| -30% to -20% | 20% to 50% |
| -20% to -10% | 50% to 100% |
| -10% to -5% | >100% |
| | Decrease in inundation area |
| | Increase in inundation area |



A3 scale: 1:15,000

0 0.15 0.3 0.45 0.6 0.75 km



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Integrating Community, Environment and Engineering

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Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure O17 - page 34 of 48:

20% AEP Event - Local Catchments - Percentage Change in Time of Inundation

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\GIS_310_IHY-202005121245_SurfaceWater\5mxd_Appldix_D\310-IHY-202005121245_FF\JV_FigO17-X_Time_Inundation_Change_pc_v5.mxd Date: 20/06/2024 15:51

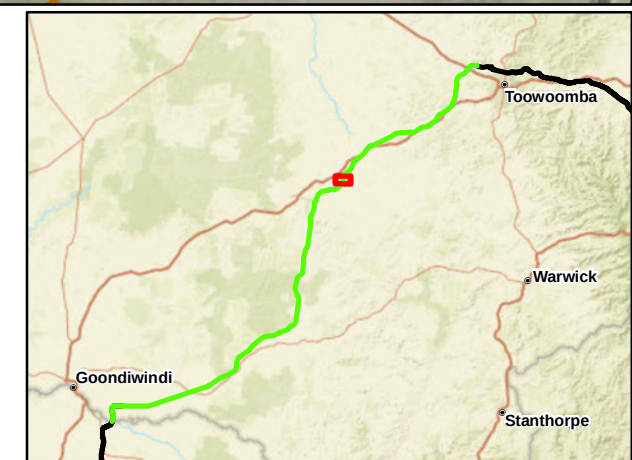


Legend

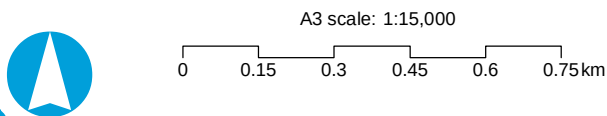
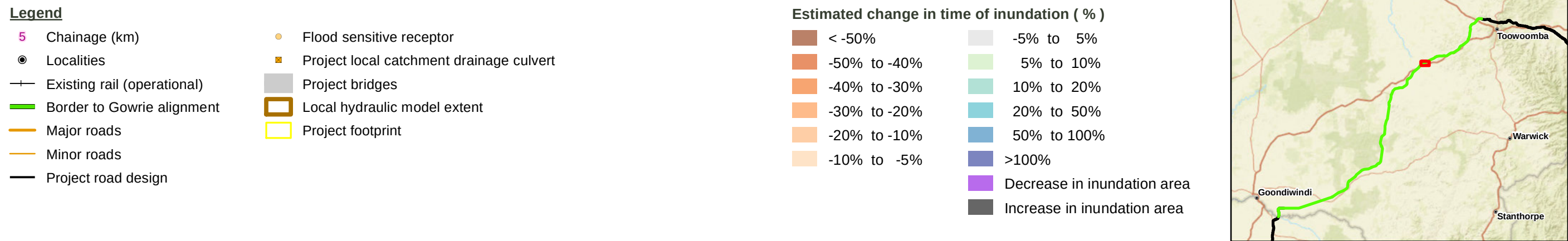
- 5 Chainage (km)
- Border to Gowrie alignment
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Local hydraulic model extent
- Project footprint

Estimated change in time of inundation (%)

- | | |
|--------------|-----------------------------|
| < -50% | -5% to 5% |
| -50% to -40% | 5% to 10% |
| -40% to -30% | 10% to 20% |
| -30% to -20% | 20% to 50% |
| -20% to -10% | 50% to 100% |
| -10% to -5% | >100% |
| | Decrease in inundation area |
| | Increase in inundation area |



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





- Estimated change in time of inundation (%)**

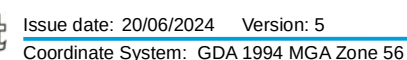
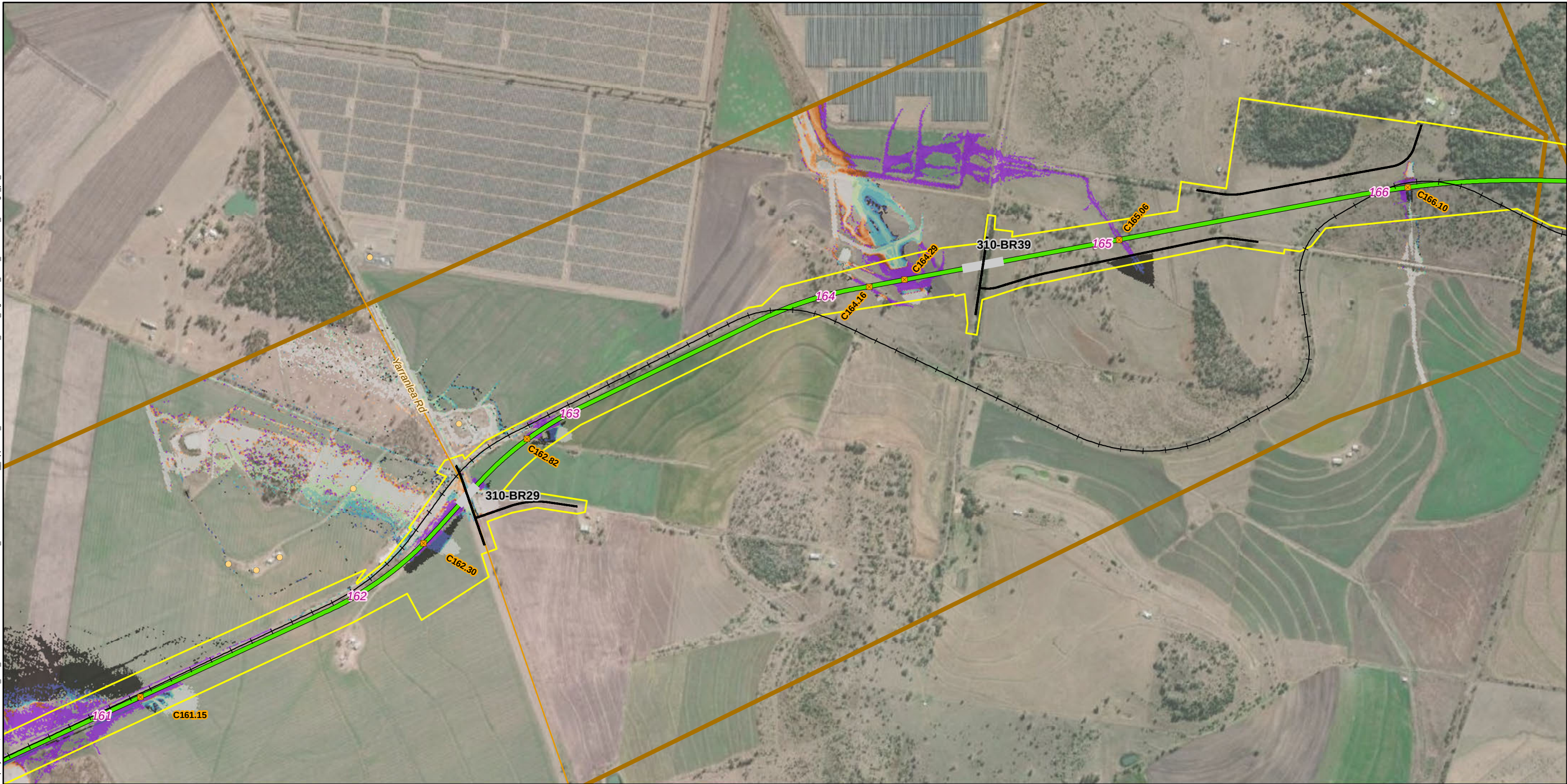


Figure O17 - page 37 of 48:

20% AEP Event - Local Catchments - Percentage Change in Time of Inundation

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\310-IHY-202005121245_SurfaceWater\5mxd_Appendix_O17-X_Time_Inundation_Change_pc_v5.mxd Date: 20/06/2024 15:52



Legend

- | | |
|-------------------------------|--|
| 5 Chainage (km) | ● Flood sensitive receptor |
| — Existing rail (operational) | ✕ Project local catchment drainage culvert |
| — Border to Gowrie alignment | ■ Project bridges |
| — Minor roads | ■ Local hydraulic model extent |
| — Project road design | ■ Project footprint |

Estimated change in time of inundation (%)

- | | |
|----------------|-------------------------------|
| ■ < -50% | ■ -5% to 5% |
| ■ -50% to -40% | ■ 5% to 10% |
| ■ -40% to -30% | ■ 10% to 20% |
| ■ -30% to -20% | ■ 20% to 50% |
| ■ -20% to -10% | ■ 50% to 100% |
| ■ -10% to -5% | ■ >100% |
| | ■ Decrease in inundation area |
| | ■ Increase in inundation area |



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



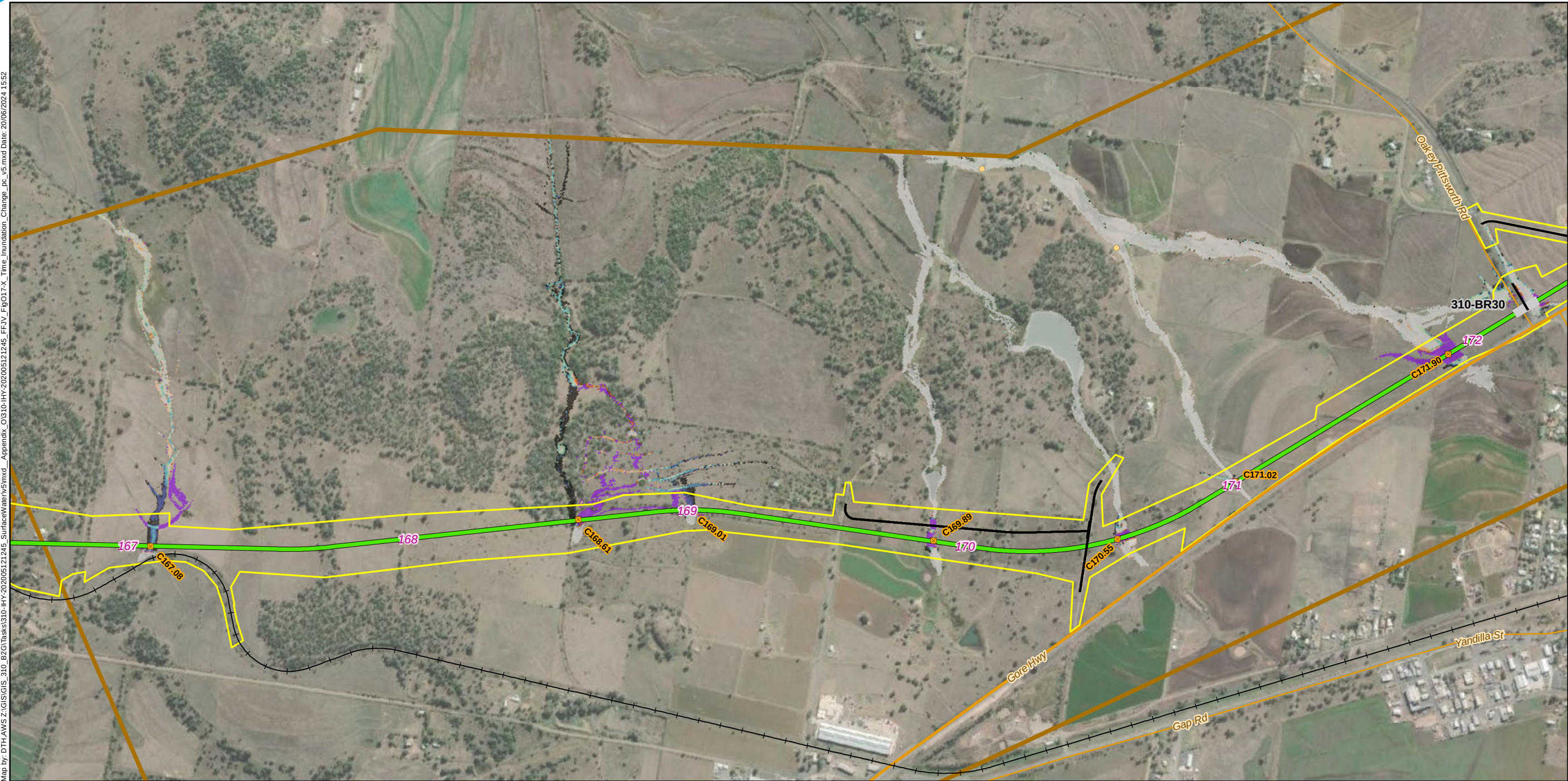
Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure O17 - page 38 of 48:

20% AEP Event - Local Catchments - Percentage Change in Time of Inundation

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\310-IHY-202005121245_SurfaceWater\5mxd_Appendix_D\310-IHY-202005121245_FF\JV_FigO17-X_Time_Inundation_Change_pc_v5.mxd Date: 20/06/2024 15:52

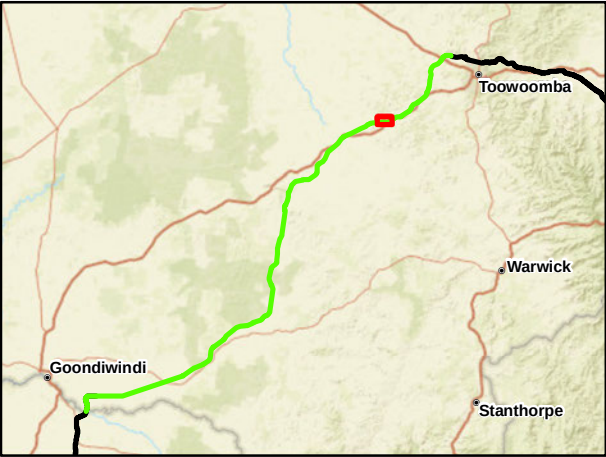


Legend

- 5 Chainage (km)
- Existing rail (operational)
- Border to Gowrie alignment
- Major roads
- Minor roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated change in time of inundation (%)

- < -50%
- 50% to -40%
- 40% to -30%
- 30% to -20%
- 20% to -10%
- 10% to -5%
- 5% to 5%
- 5% to 10%
- 10% to 20%
- 20% to 50%
- 50% to 100%
- >100%
- Decrease in inundation area
- Increase in inundation area



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 O17 - page 39 of 48:

20% AEP Event - Local Catchments - Percentage Change in Time of Inundation

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\310-IHY-202005121245_SurfaceWater\5mxd_Appendix_D\310-IHY-202005121245_FF\JV_FigO17-X_Time_Inundation_Change_pc_v5.mxd Date: 20/06/2024 15:52

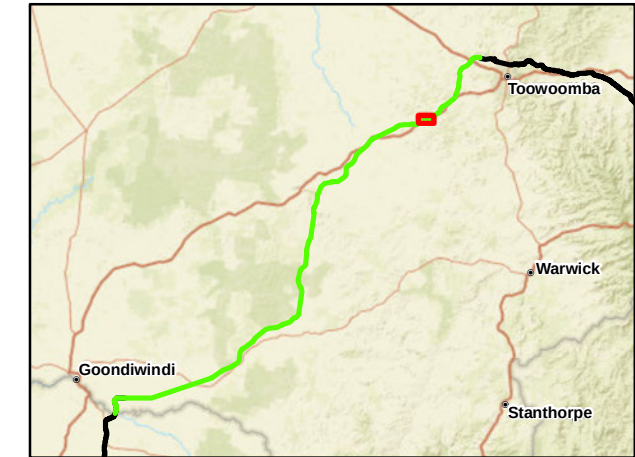


Legend

- 5 Chainage (km)
- Existing rail (operational)
- Border to Gowrie alignment
- Major roads
- Minor roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated change in time of inundation (%)

- | | |
|--------------|-----------------------------|
| < -50% | -5% to 5% |
| -50% to -40% | 5% to 10% |
| -40% to -30% | 10% to 20% |
| -30% to -20% | 20% to 50% |
| -20% to -10% | 50% to 100% |
| -10% to -5% | >100% |
| | Decrease in inundation area |
| | Increase in inundation area |



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 O17 - page 40 of 48:

20% AEP Event - Local Catchments - Percentage Change in Time of Inundation



- Estimated change in time of inundation (%)**



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Border to Gowrie

Figure O17 - page 41 of 48:

20% AEP Event - Local Catchments - Percentage Change in Time of Inundation



- Estimated change in time of inundation (%)**

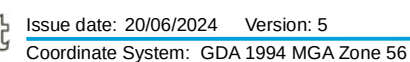


Figure O17 - page 42 of 48:

20% AEP Event - Local Catchments - Percentage Change in Time of Inundation

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\GIS_310-B2\Tasks\310-HY-2020\5121245_SurfaceWater\5mxd_Appendix_D\310-HY-2020\5121245_FF\JV_FigO17-X_Time_Inundation_Change_pc_v5.mxd Date: 20/06/2024 15:52



Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Major roads
- Minor roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated change in time of inundation (%)

- | | |
|--------------|-----------------------------|
| < -50% | -5% to 5% |
| -50% to -40% | 5% to 10% |
| -40% to -30% | 10% to 20% |
| -30% to -20% | 20% to 50% |
| -20% to -10% | 50% to 100% |
| -10% to -5% | >100% |
| | Decrease in inundation area |
| | Increase in inundation area |



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 O17 - page 43 of 48:

20% AEP Event - Local Catchments - Percentage Change in Time of Inundation



- Estimated change in time of inundation (%)**

-
- A map of the Toowoomba region in Queensland, Australia. The map shows a proposed green line route starting from the bottom left near Goondiwindi, passing through the center, and ending near Toowoomba. A red square marks a specific location on the green line, just west of Toowoomba. Other towns labeled on the map include Goondiwindi, Toowoomba, Warwick, and Stanthorpe. The map also shows major roads and geographical features like rivers and hills.

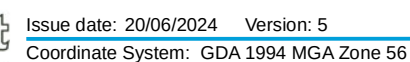


Figure O17 - page 44 of 48:

20% AEP Event - Local Catchments - Percentage Change in Time of Inundation



- Estimated change in time of inundation (%)**



Border to Gowrie

Figure O17 - page 45 of 48:

20% AEP Event - Local Catchments - Percentage Change in Time of Inundation



- Estimated change in time of inundation (%)**

-
- A map of the study area in south-eastern Queensland, Australia. The map shows a network of roads and rivers. A red square indicates the study site, located near Toowoomba. Other towns labeled on the map include Toowoomba, Warwick, Stanthorpe, and Goondiwindi. The terrain is depicted with green and brown shading, indicating different land cover types.

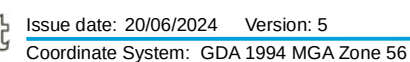


Figure O17 - page 46 of 48:

20% AEP Event - Local Catchments - Percentage Change in Time of Inundation

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\310-IHY-202005121245_SurfaceWater\5mxd_Appendix_O17\X-Time_Inundation_Change_pc_v5.mxd Date: 20/06/2024 15:52



Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Project road design
- Flood sensitive receptor
- Project floodplain culvert
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated change in time of inundation (%)

< -50%	-5% to 5%
-50% to -40%	5% to 10%
-40% to -30%	10% to 20%
-30% to -20%	20% to 50%
-20% to -10%	50% to 100%
-10% to -5%	>100%
	Decrease in inundation area
	Increase in inundation area



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

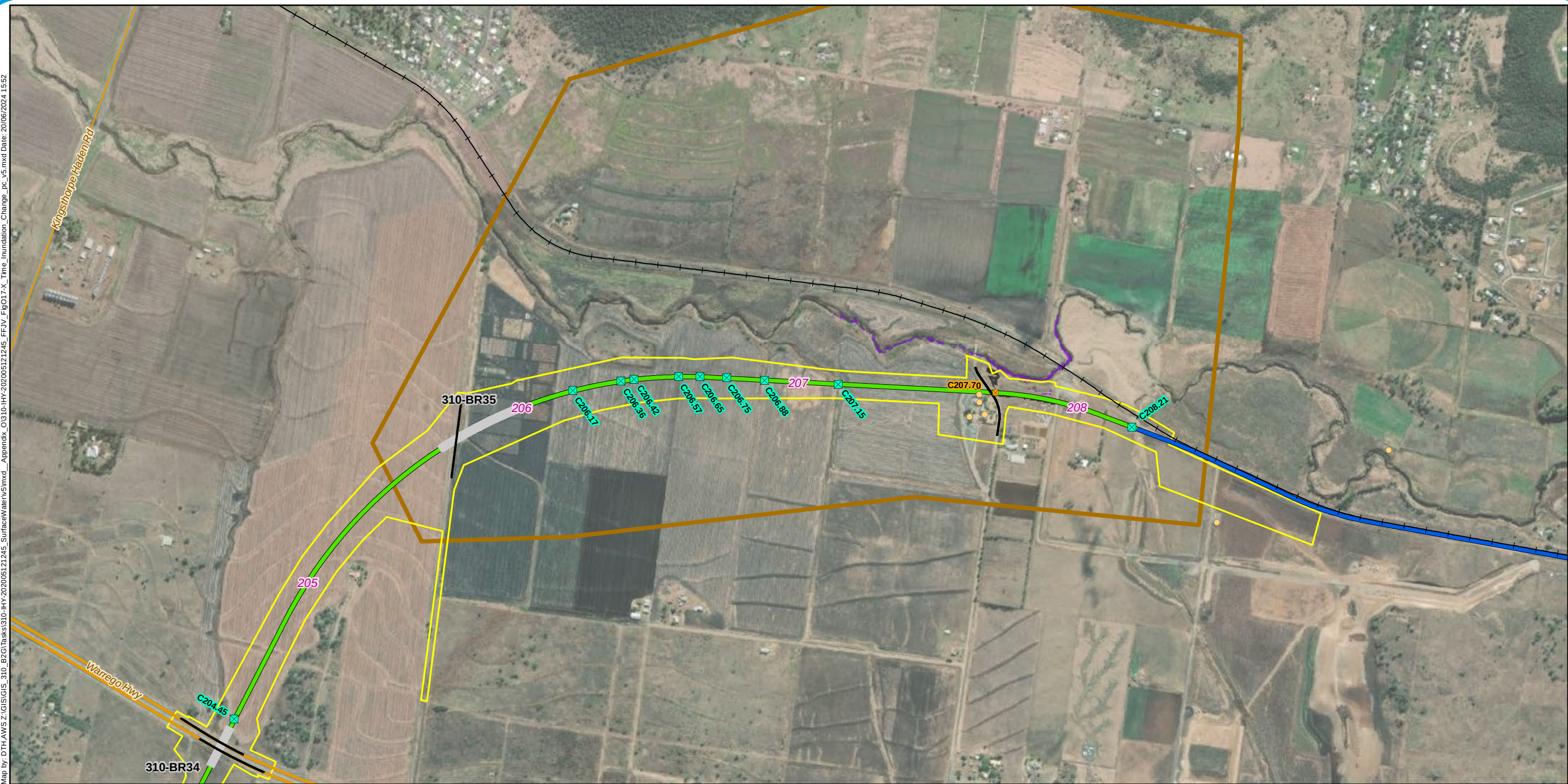


Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure O17 - page 47 of 48:

20% AEP Event - Local Catchments - Percentage Change in Time of Inundation



Legend

- 5 Chainage (km)
- Existing rail (operational)
- Border to Gowrie alignment
- Gowrie to Helidon alignment
- Major roads
- Minor roads
- Project road design
- Flood sensitive receptor
- Project floodplain culvert
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated change in time of inundation (%)

- < -50%
- 50% to -40%
- 40% to -30%
- 30% to -20%
- 20% to -10%
- 10% to -5%
- 5% to 5%
- 5% to 10%
- 10% to 20%
- 20% to 50%
- 50% to 100%
- >100%
- Decrease in inundation area
- Increase in inundation area



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

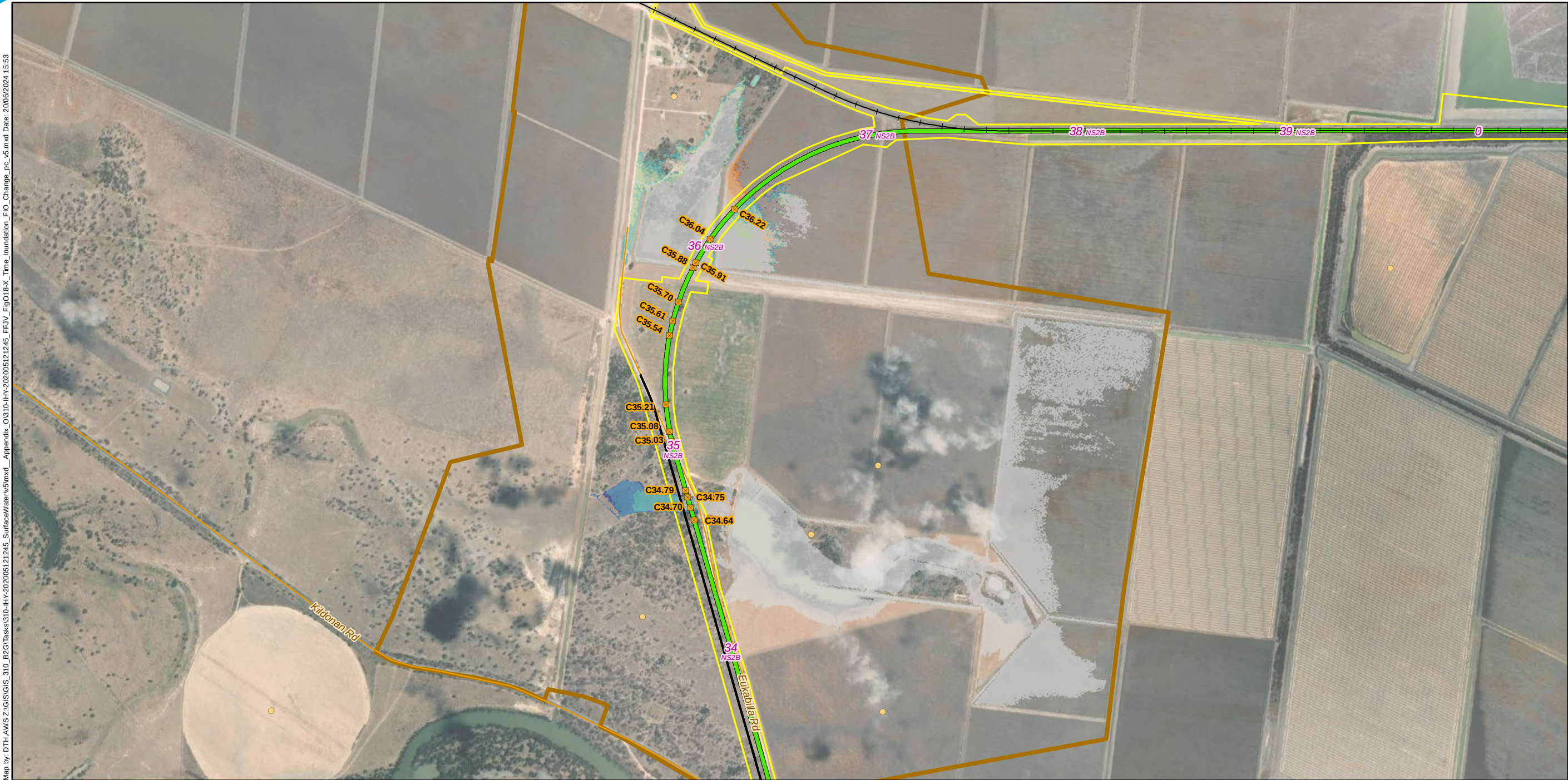


Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure O17 - page 48 of 48:

20% AEP Event - Local Catchments - Percentage Change in Time of Inundation



Legend

- 5 Chainage (km)
- Existing rail (operational)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Local hydraulic model extent
- Project footprint

Estimated change in time of inundation (%)

< -50%	-5% to 5%
-50% to -40%	5% to 10%
-40% to -30%	10% to 20%
-30% to -20%	20% to 50%
-20% to -10%	50% to 100%
-10% to -5%	>100%

A data filter has been applied; results where model input grid's design time of inundation



A3 scale: 1:20,000
0 0.2 0.4 0.6 0.8 1km



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

Border to Gowrie

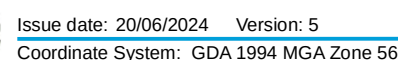
Figure O18 - page 1 of 48:

20% AEP Event - Local Catchments - Percentage Change in Time of Inundation (<1 hour cutoff applied)



- Estimated change in time of inundation (%)**

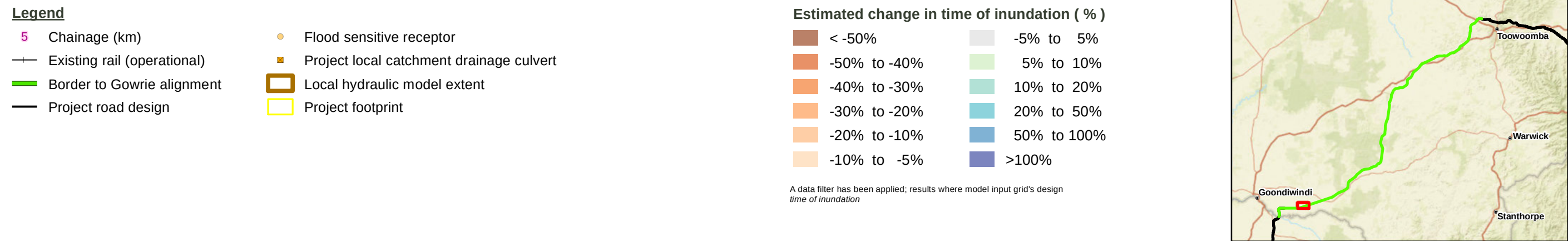
A data filter has been applied; results where model input grid's design
time of inundation



20% AEP Event - Local Catchments - Percentage Change in Time of Inundation (<1 hour cutoff applied)

Border to Gowrie

Figure O18 - page 2 of 48:



A3 scale: 1:20,000
0 0.2 0.4 0.6 0.8 1km

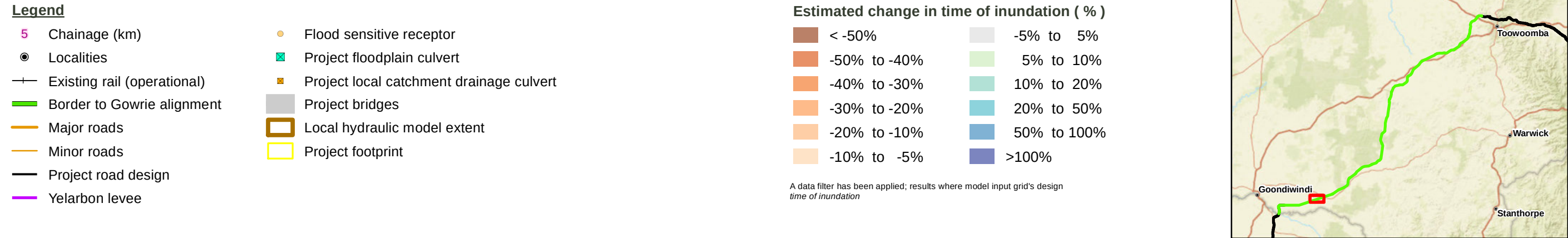
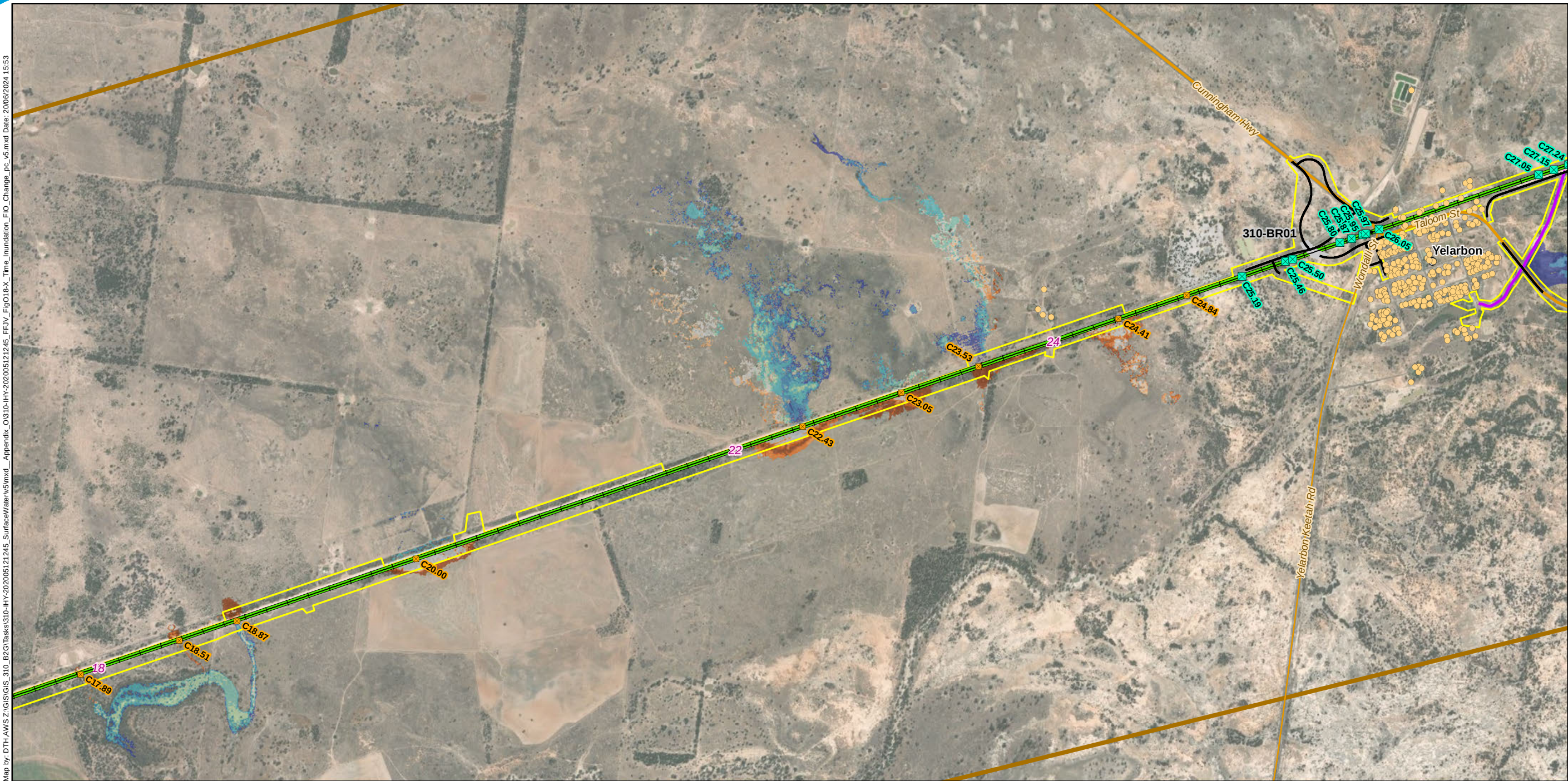


Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure O18 - page 3 of 48:

20% AEP Event - Local Catchments - Percentage Change in Time of Inundation (<1 hour cutoff applied)



A3 scale: 1:25,000
0 0.25 0.5 0.75 1 1.25 km

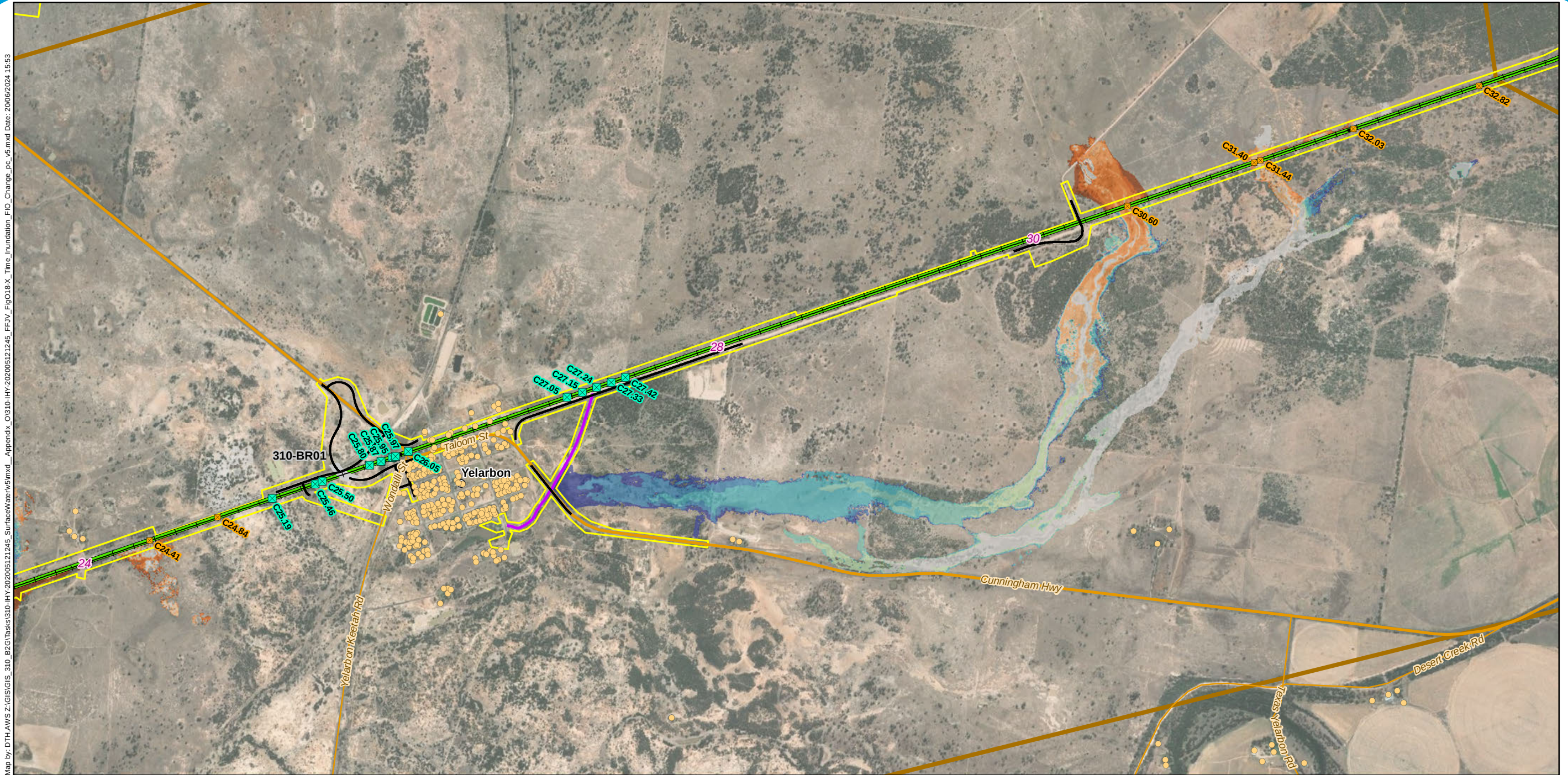


Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure O18 - page 4 of 48:

20% AEP Event - Local Catchments - Percentage Change in Time of Inundation (<1 hour cutoff applied)



Legend

- 5 Chainage (km)
- Localities
- Existing rail (operational)
- Border to Gowrie alignment
- Major roads
- Minor roads
- Project road design
- Yelarbon levee
- Flood sensitive receptor
- Project floodplain culvert
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

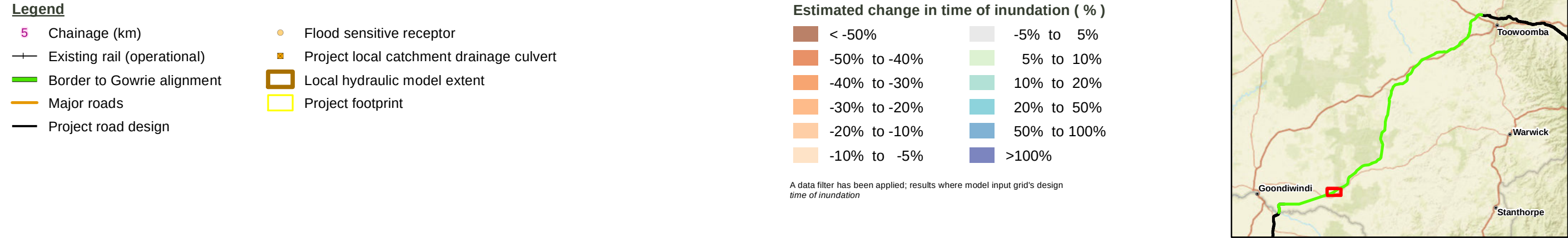
Estimated change in time of inundation (%)

- | | |
|--------------|-------------|
| < -50% | -5% to 5% |
| -50% to -40% | 5% to 10% |
| -40% to -30% | 10% to 20% |
| -30% to -20% | 20% to 50% |
| -20% to -10% | 50% to 100% |
| -10% to -5% | >100% |

A data filter has been applied; results where model input grid's design time of inundation



A3 scale: 1:25,000
0 0.25 0.5 0.75 1 1.25 km



A3 scale: 1:25,000

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 O18 - page 6 of 48:

20% AEP Event - Local Catchments - Percentage Change in Time of Inundation (<1 hour cutoff applied)



Legend

- 5 Chainage (km)
- Existing rail (operational)
- Border to Gowrie alignment
- Major roads
- Project road design
- Flood sensitive receptor
- Project floodplain culvert
- Project local catchment drainage culvert
- Local hydraulic model extent
- Project footprint

Estimated change in time of inundation (%)

< -50%	-5% to 5%
-50% to -40%	5% to 10%
-40% to -30%	10% to 20%
-30% to -20%	20% to 50%
-20% to -10%	50% to 100%
-10% to -5%	>100%

A data filter has been applied; results where model input grid's design time of inundation



A3 scale: 1:25,000
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 O18 - page 7 of 48:

20% AEP Event - Local Catchments - Percentage Change in Time of Inundation (<1 hour cutoff applied)



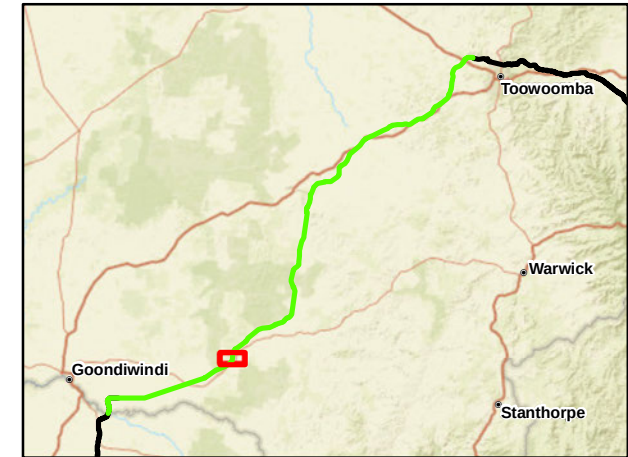
Legend

- 5 Chainage (km)
- Existing rail (operational)
- Border to Gowrie alignment
- Major roads
- Project road design
- Flood sensitive receptor
- Project floodplain culvert
- Project local catchment drainage culvert
- Local hydraulic model extent
- Project footprint

Estimated change in time of inundation (%)

< -50%	-5% to 5%
-50% to -40%	5% to 10%
-40% to -30%	10% to 20%
-30% to -20%	20% to 50%
-20% to -10%	50% to 100%
-10% to -5%	>100%

A data filter has been applied; results where model input grid's design time of inundation



A3 scale: 1:25,000
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 O18 - page 8 of 48:

20% AEP Event - Local Catchments - Percentage Change in Time of Inundation (<1 hour cutoff applied)



5 Chainage (km)
 ● Flood sensitive receptor

■ Border to Gowrie alignment
 ■ Project local catchment drainage culvert

■ Major roads
 Local hydraulic model extent

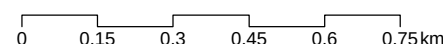
— Project road design
 Project footprint

	< -50%		-5% to 5%
	-50% to -40%		5% to 10%
	-40% to -30%		10% to 20%
	-30% to -20%		20% to 50%
	-20% to -10%		50% to 100%
	-10% to -5%		>100%

A data filter has been applied; results where model input grid's design *time of inundation*



A3 scale: 1:15.000



Issue date: 20/06/2024 Version: 5

Coordinate System: GDA 1994 MGA Zone 56

Figure O18 - page 9 of 48:

20% AEP Event - Local Catchments - Percentage Change in Time of Inundation (<1 hour cutoff applied)



- Estimated change in time of inundation (%)**

A data filter has been applied; results where model input grid's design
time of inundation

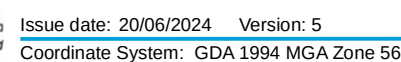
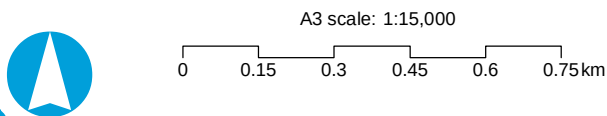
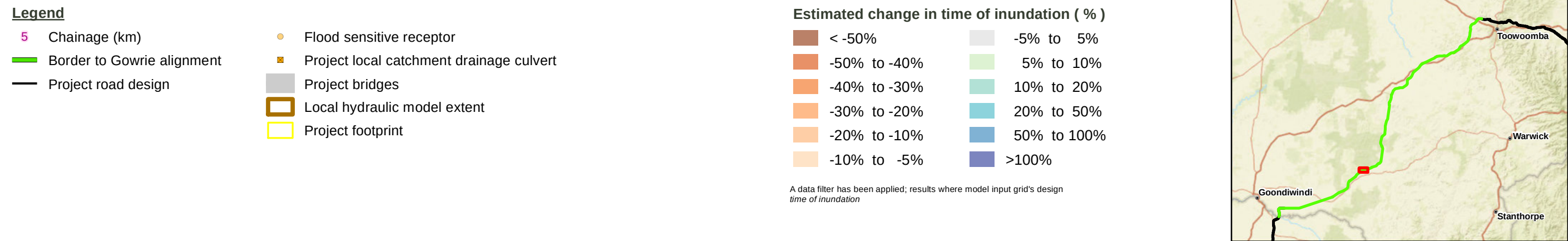
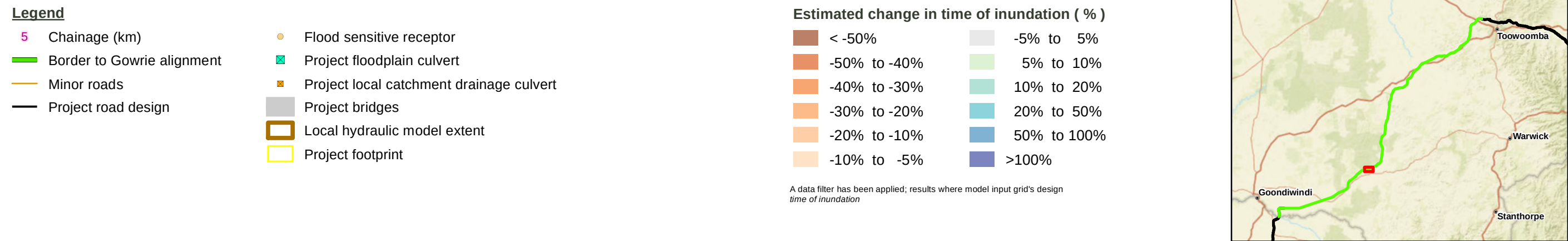


Figure O18 - page 10 of 48:

20% AEP Event - Local Catchments - Percentage Change in Time of Inundation (<1 hour cutoff applied)





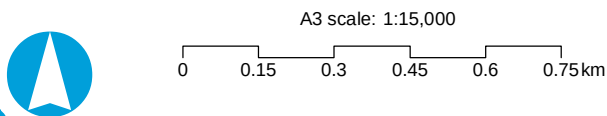
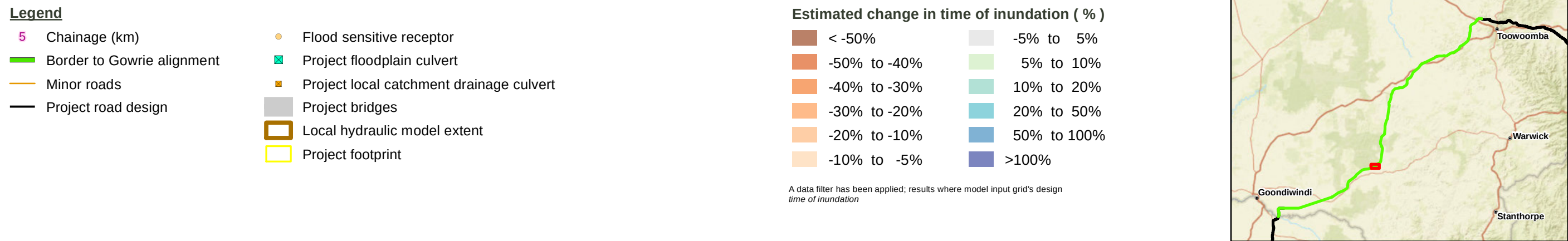
A3 scale: 1:15,000
0 0.15 0.3 0.45 0.6 0.75 km



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

Border to Gowrie

Figure O18 - page 12 of 48:
20% AEP Event - Local Catchments - Percentage Change in Time of Inundation (<1 hour cutoff applied)





- Estimated change in time of inundation (%)**

A data filter has been applied; results where model input grid's design
time of inundation

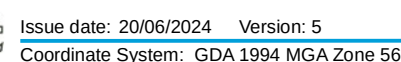
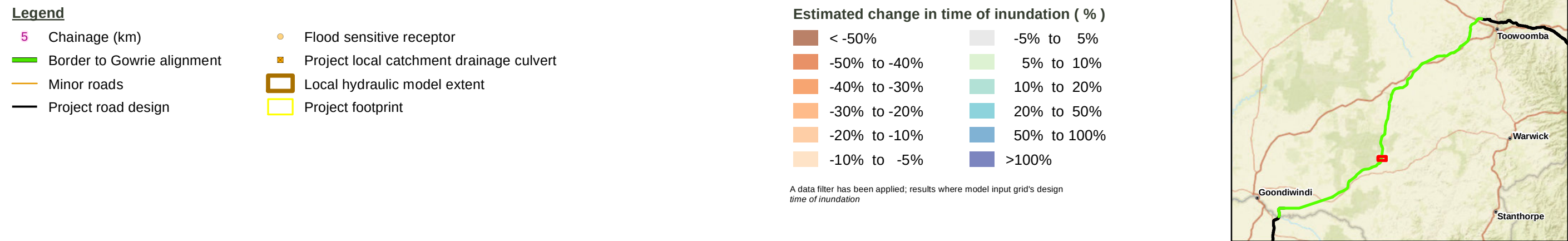


Figure O18 - page 14 of 48:

20% AEP Event - Local Catchments - Percentage Change in Time of Inundation (<1 hour cutoff applied)



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 O18 - page 15 of 48:

20% AEP Event - Local Catchments - Percentage Change in Time of Inundation (<1 hour cutoff applied)



- Estimated change in time of inundation (%)**

A data filter has been applied; results where model input grid's design
time of inundation

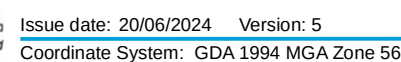


Figure O18 - page 16 of 48:

20% AEP Event - Local Catchments - Percentage Change in Time of Inundation (<1 hour cutoff applied)



- Estimated change in time of inundation (%)**

A data filter has been applied; results where model input grid's design
time of inundation

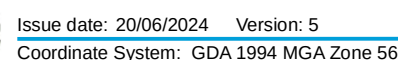
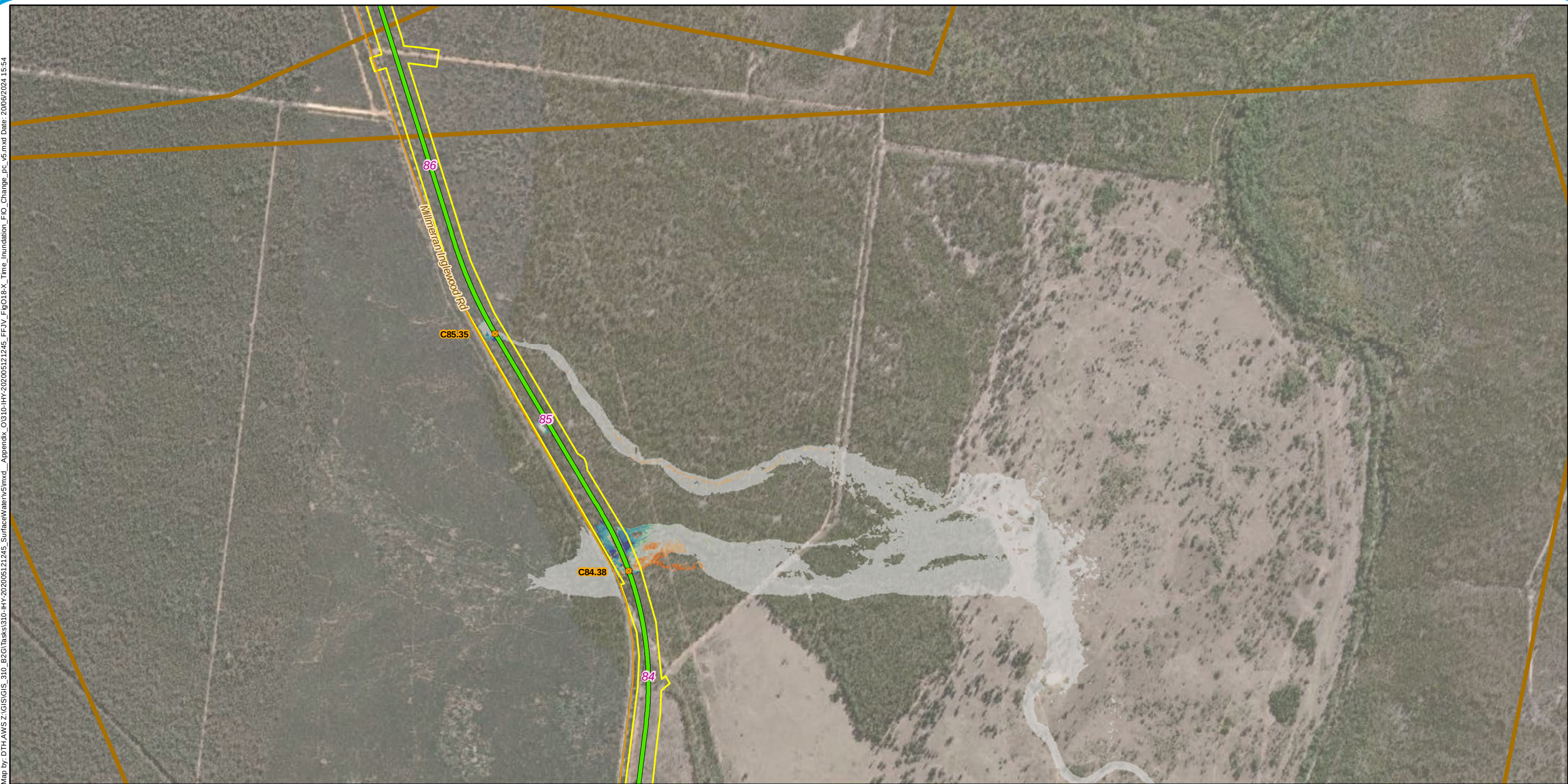


Figure O18 - page 17 of 48:

20% AEP Event - Local Catchments - Percentage Change in Time of Inundation (<1 hour cutoff applied)



Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Local hydraulic model extent
- Project footprint

Estimated change in time of inundation (%)

< -50%	-5% to 5%
-50% to -40%	5% to 10%
-40% to -30%	10% to 20%
-30% to -20%	20% to 50%
-20% to -10%	50% to 100%
-10% to -5%	>100%

A data filter has been applied; results where model input grid's design time of inundation



A3 scale: 1:15,000

0 0.15 0.3 0.45 0.6 0.75 km



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Border to Gowrie

Figure O18 - page 18 of 48:

20% AEP Event - Local Catchments - Percentage Change in Time of Inundation (<1 hour cutoff applied)



5	Chainage (km)		Flood sensitive receptor
	Border to Gowrie alignment		Project floodplain culvert
	Minor roads		Project local catchment drainage culvert
	Project road design		Project bridges
			Local hydraulic model extent
			Project footprint

	< -50%		-5% to 5%
	-50% to -40%		5% to 10%
	-40% to -30%		10% to 20%
	-30% to -20%		20% to 50%
	-20% to -10%		50% to 100%
	-10% to -5%		>100%



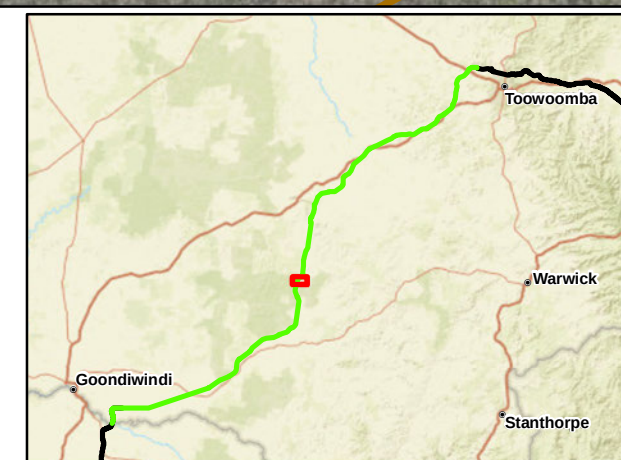


- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project road design

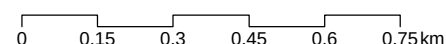
- Estimated change in time of inundation (%)**

	< -50%		-5% to 5%
	-50% to -40%		5% to 10%
	-40% to -30%		10% to 20%
	-30% to -20%		20% to 50%
	-20% to -10%		50% to 100%
	-10% to -5%		>100%

A data filter has been applied; results where model input grid's design
time of inundation



A3 scale: 1:15.000

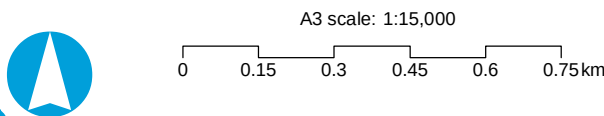
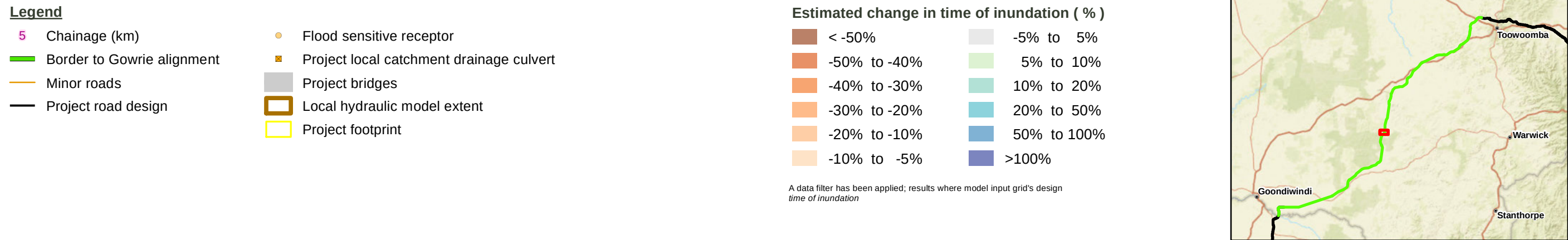


Issue date: 20/06/2024 Version: 5

Coordinate System: GDA 1994 MGA Zone 56

Figure O18 - page 20 of 48:

20% AEP Event - Local Catchments - Percentage Change in Time of Inundation (<1 hour cutoff applied)



Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\310-IHY\202005121245_SurfaceWater\5mxd_Appendix_D\310-IHY\202005121245_FF\JV_FigO18-X_Time_Inundation_FIO_Change_pc_v5.mxd Date: 2006/2024 15:54



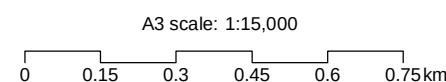
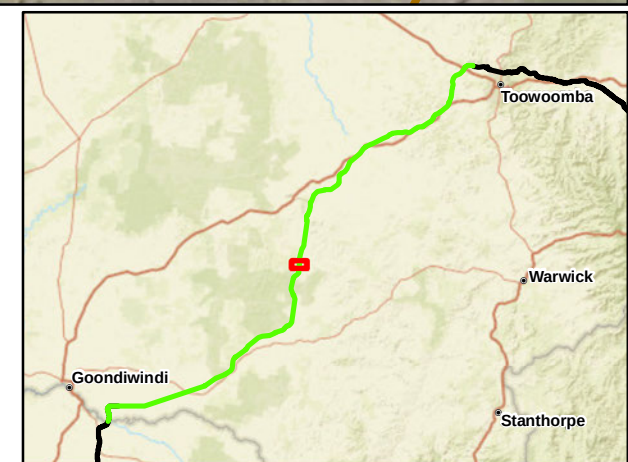
Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project floodplain culvert
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated change in time of inundation (%)

< -50%	-5% to 5%
-50% to -40%	5% to 10%
-40% to -30%	10% to 20%
-30% to -20%	20% to 50%
-20% to -10%	50% to 100%
-10% to -5%	>100%

A data filter has been applied; results where model input grid's design time of inundation





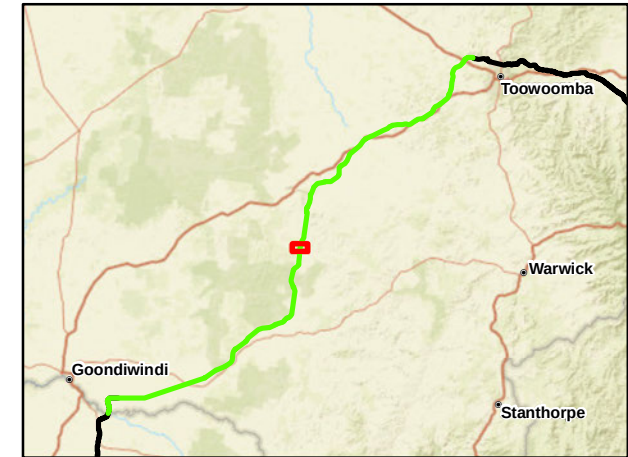
Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project floodplain culvert
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated change in time of inundation (%)

- | | |
|--------------|-------------|
| < -50% | -5% to 5% |
| -50% to -40% | 5% to 10% |
| -40% to -30% | 10% to 20% |
| -30% to -20% | 20% to 50% |
| -20% to -10% | 50% to 100% |
| -10% to -5% | >100% |

A data filter has been applied; results where model input grid's design time of inundation



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

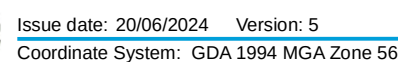
Figure O18 - page 23 of 48:

20% AEP Event - Local Catchments - Percentage Change in Time of Inundation (<1 hour cutoff applied)



- Estimated change in time of inundation (%)**

A data filter has been applied; results where model input grid's design time of inundation



20% AEP Event - Local Catchments - Percentage Change in Time of Inundation (<1 hour cutoff applied)

Border to Gowrie

Figure O18 - page 24 of 48:



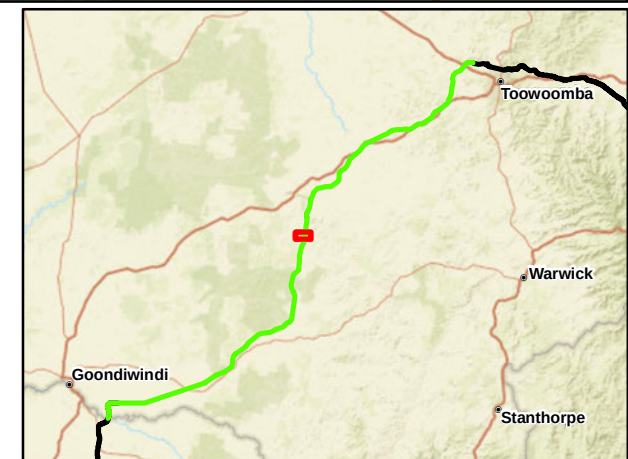
Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Local hydraulic model extent
- Project footprint

Estimated change in time of inundation (%)

< -50%	-5% to 5%
-50% to -40%	5% to 10%
-40% to -30%	10% to 20%
-30% to -20%	20% to 50%
-20% to -10%	50% to 100%
-10% to -5%	>100%

A data filter has been applied; results where model input grid's design time of inundation



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 O18 - page 25 of 48:

20% AEP Event - Local Catchments - Percentage Change in Time of Inundation (<1 hour cutoff applied)



- Estimated change in time of inundation (%)**

A data filter has been applied; results where model input grid's design time of inundation

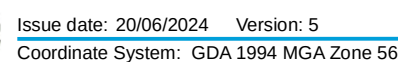


Figure O18 - page 26 of 48:

20% AEP Event - Local Catchments - Percentage Change in Time of Inundation (<1 hour cutoff applied)



Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Local hydraulic model extent
- Project footprint

Estimated change in time of inundation (%)

< -50%	-5% to 5%
-50% to -40%	5% to 10%
-40% to -30%	10% to 20%
-30% to -20%	20% to 50%
-20% to -10%	50% to 100%
-10% to -5%	>100%

A data filter has been applied; results where model input grid's design time of inundation



A3 scale: 1:15,000

0 0.15 0.3 0.45 0.6 0.75 km



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Border to Gowrie

Figure O18 - page 27 of 48:

20% AEP Event - Local Catchments - Percentage Change in Time of Inundation (<1 hour cutoff applied)



- Estimated change in time of inundation (%)**

A data filter has been applied; results where model input grid's design
time of inundation





- Estimated change in time of inundation (%)**

A data filter has been applied; results where model input grid's design time of inundation

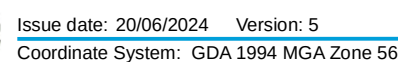
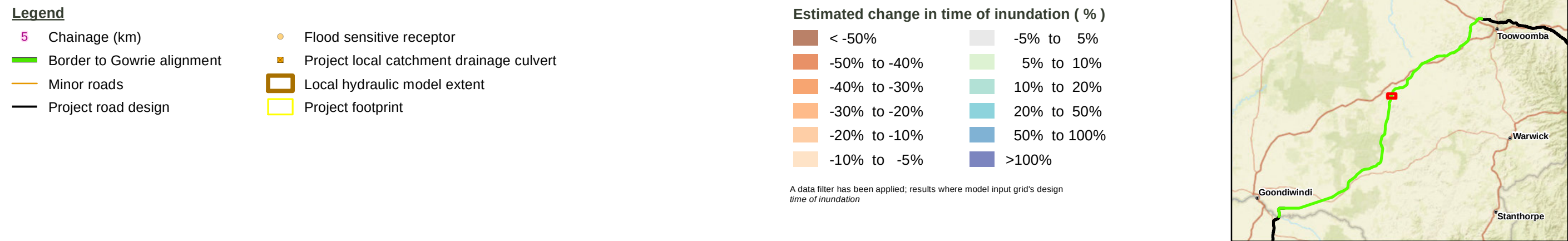


Figure O18 - page 29 of 48:

20% AEP Event - Local Catchments - Percentage Change in Time of Inundation (<1 hour cutoff applied)



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 O18 - page 30 of 48:
20% AEP Event - Local Catchments - Percentage Change in Time of Inundation (<1 hour cutoff applied)



- Estimated change in time of inundation (%)**

A data filter has been applied; results where model input grid's design
time of inundation

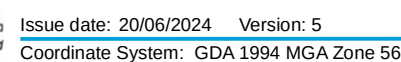
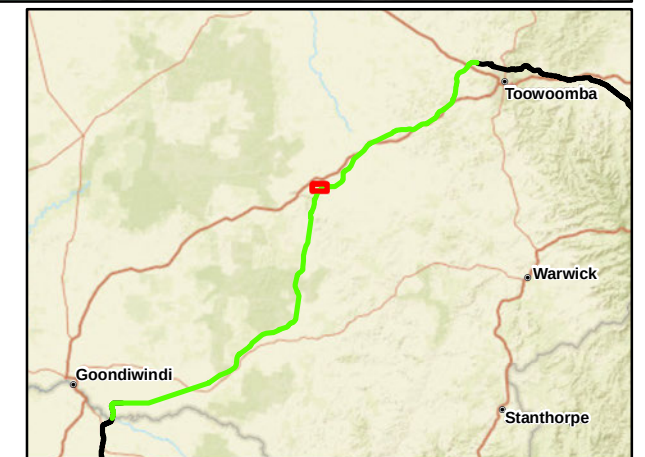


Figure O18 - page 32 of 48:

20% AEP Event - Local Catchments - Percentage Change in Time of Inundation (<1 hour cutoff applied)



Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated change in time of inundation (%)

< -50%	-5% to 5%
-50% to -40%	5% to 10%
-40% to -30%	10% to 20%
-30% to -20%	20% to 50%
-20% to -10%	50% to 100%
-10% to -5%	>100%

A data filter has been applied; results where model input grid's design time of inundation



A3 scale: 1:15,000

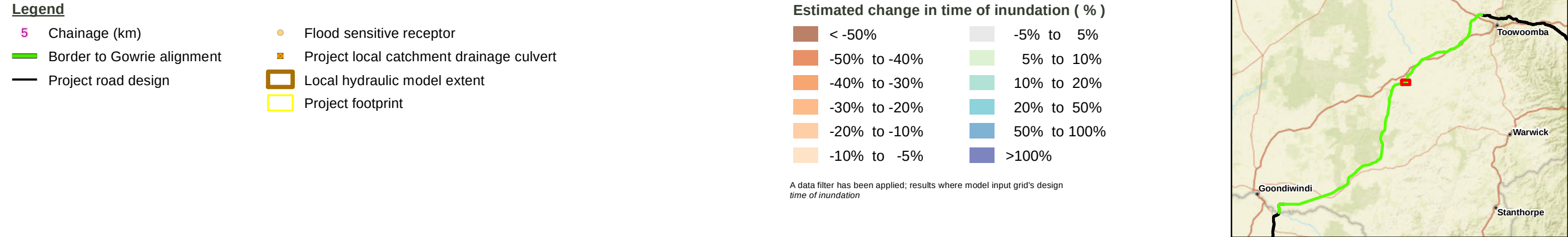
0 0.15 0.3 0.45 0.6 0.75 km



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

Border to Gowrie

Figure O18 - page 33 of 48:
20% AEP Event - Local Catchments - Percentage Change in Time of Inundation (<1 hour cutoff applied)



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 O18 - page 34 of 48:

20% AEP Event - Local Catchments - Percentage Change in Time of Inundation (<1 hour cutoff applied)



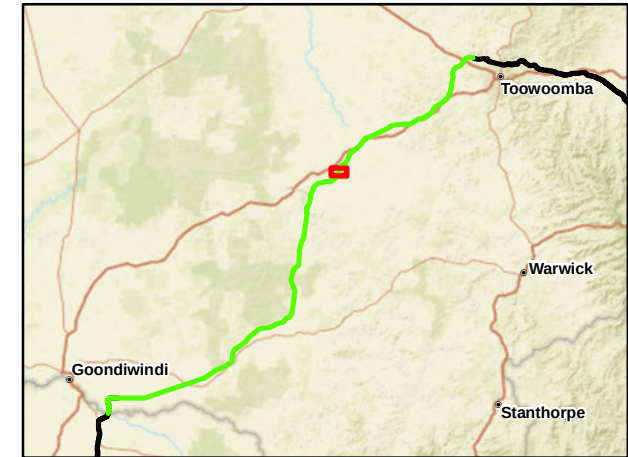
Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Local hydraulic model extent
- Project footprint

Estimated change in time of inundation (%)

< -50%	-5% to 5%
-50% to -40%	5% to 10%
-40% to -30%	10% to 20%
-30% to -20%	20% to 50%
-20% to -10%	50% to 100%
-10% to -5%	>100%

A data filter has been applied; results where model input grid's design time of inundation



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

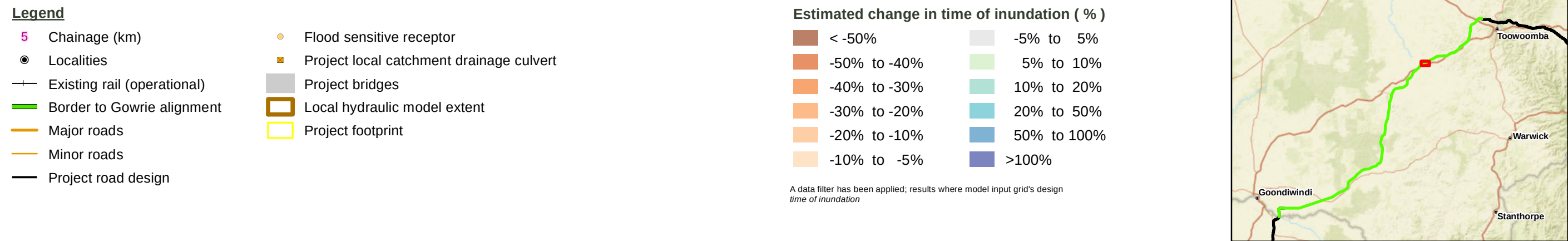


Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure O18 - page 35 of 48:

20% AEP Event - Local Catchments - Percentage Change in Time of Inundation (<1 hour cutoff applied)



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 O18 - page 36 of 48:
20% AEP Event - Local Catchments - Percentage Change in Time of Inundation (<1 hour cutoff applied)



- Estimated change in time of inundation (%)**

A data filter has been applied; results where model input grid's design
time of inundation

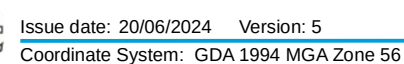


Figure O18 - page 37 of 48:

20% AEP Event - Local Catchments - Percentage Change in Time of Inundation (<1 hour cutoff applied)



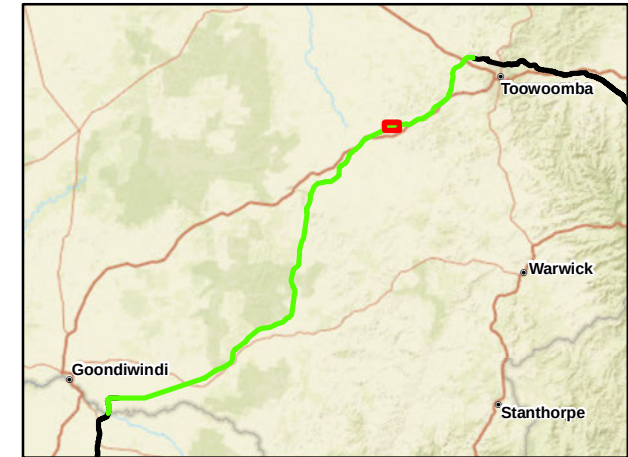
Legend

- 5 Chainage (km)
- Existing rail (operational)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- ✦ Project local catchment drainage culvert
- Project bridges
- ▭ Local hydraulic model extent
- ▭ Project footprint

Estimated change in time of inundation (%)

- | | |
|--------------|-------------|
| < -50% | -5% to 5% |
| -50% to -40% | 5% to 10% |
| -40% to -30% | 10% to 20% |
| -30% to -20% | 20% to 50% |
| -20% to -10% | 50% to 100% |
| -10% to -5% | >100% |

A data filter has been applied; results where model input grid's design time of inundation



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

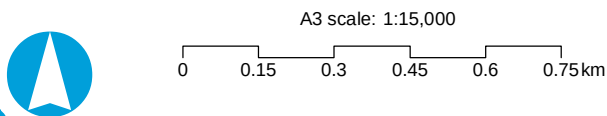
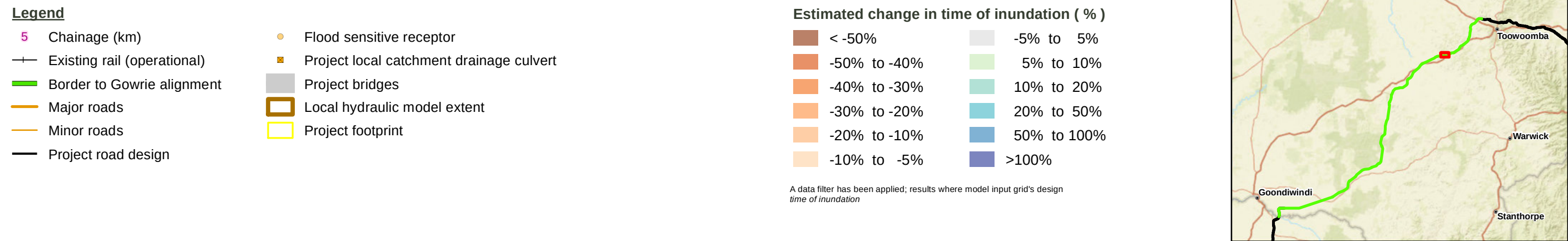
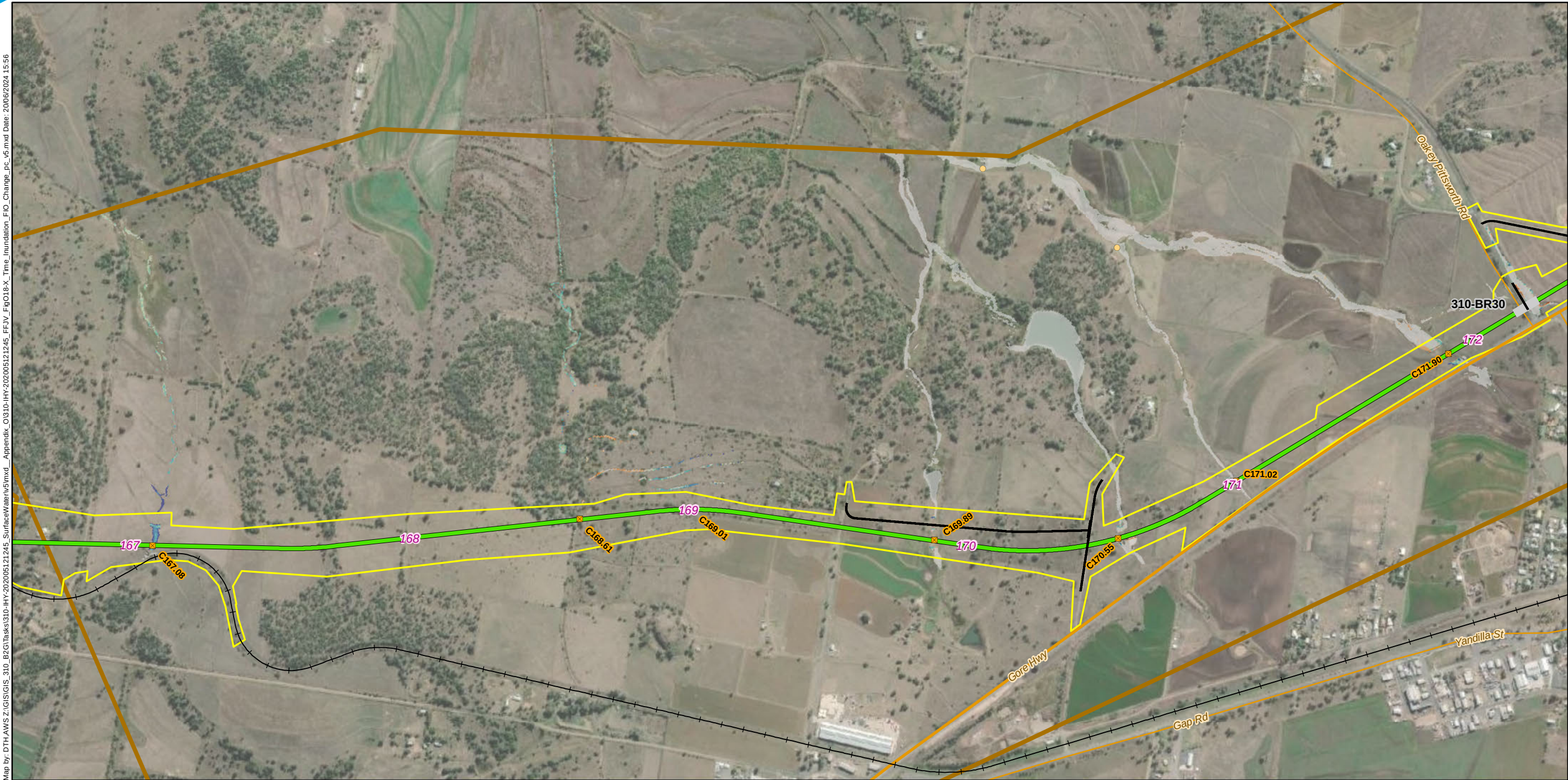


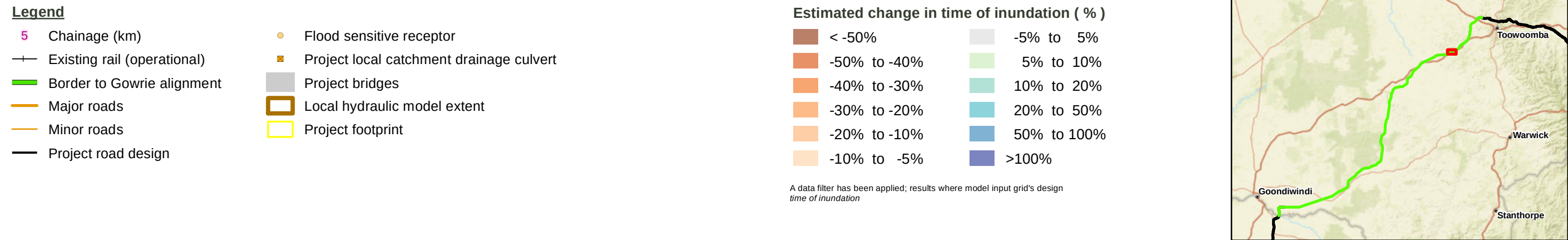
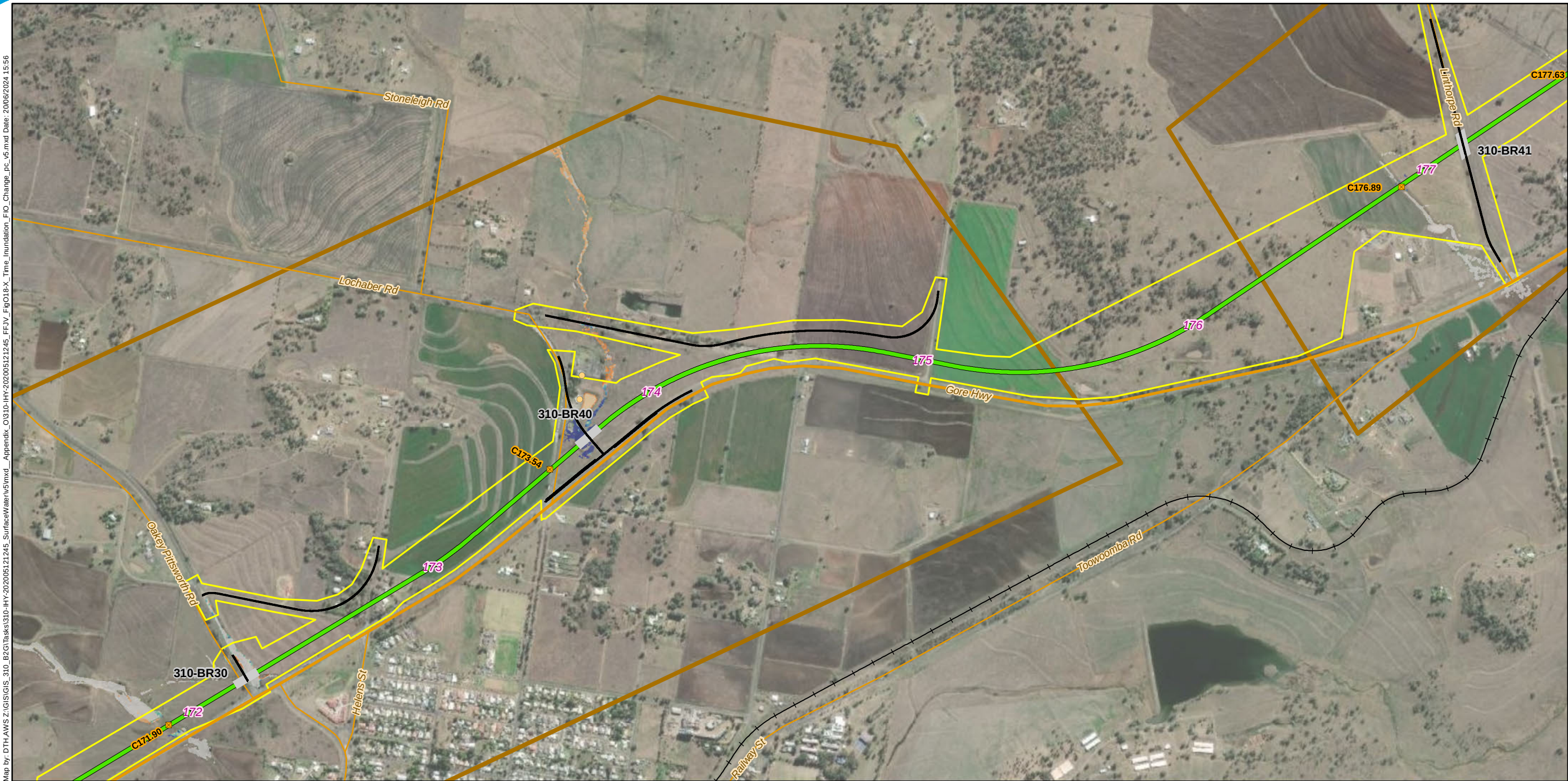
Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure O18 - page 38 of 48:

20% AEP Event - Local Catchments - Percentage Change in Time of Inundation (<1 hour cutoff applied)





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 O18 - page 40 of 48:
20% AEP Event - Local Catchments - Percentage Change in Time of Inundation (<1 hour cutoff applied)



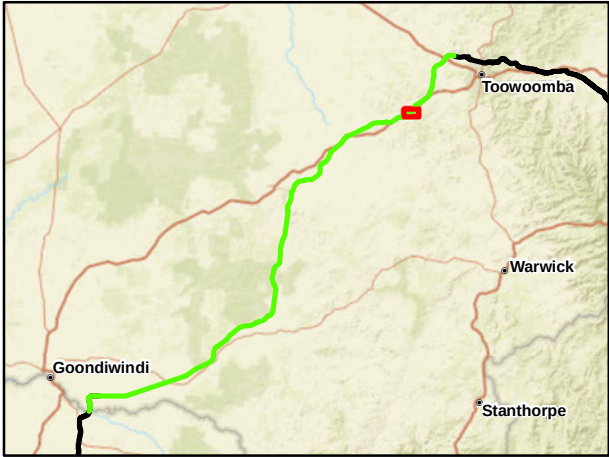
Legend

- 5 Chainage (km)
- Localities
- Existing rail (operational)
- Border to Gowrie alignment
- Major roads
- Minor roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated change in time of inundation (%)

< -50%	-5% to 5%
-50% to -40%	5% to 10%
-40% to -30%	10% to 20%
-30% to -20%	20% to 50%
-20% to -10%	50% to 100%
-10% to -5%	>100%

A data filter has been applied; results where model input grid's design time of inundation



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 O18 - page 41 of 48:

20% AEP Event - Local Catchments - Percentage Change in Time of Inundation (<1 hour cutoff applied)



- Estimated change in time of inundation (%)**

A data filter has been applied; results where model input grid's design
time of inundation

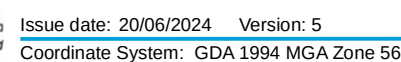


Figure O18 - page 42 of 48:

20% AEP Event - Local Catchments - Percentage Change in Time of Inundation (<1 hour cutoff applied)

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\GIS_310-B2\Tasks\310-HY-2020\5121245_SurfaceWater\5vnxmxd_Appendix_D\310-HY-2020\5121245_FF\JV_FigO18-X_Time_Inundation_FIO_Change_pc_v5.mxd Date: 2006/2024 15:56



Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Major roads
- Minor roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated change in time of inundation (%)

< -50%	-5% to 5%
-50% to -40%	5% to 10%
-40% to -30%	10% to 20%
-30% to -20%	20% to 50%
-20% to -10%	50% to 100%
-10% to -5%	>100%

A data filter has been applied; results where model input grid's design time of inundation



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 O18 - page 43 of 48:

20% AEP Event - Local Catchments - Percentage Change in Time of Inundation (<1 hour cutoff applied)



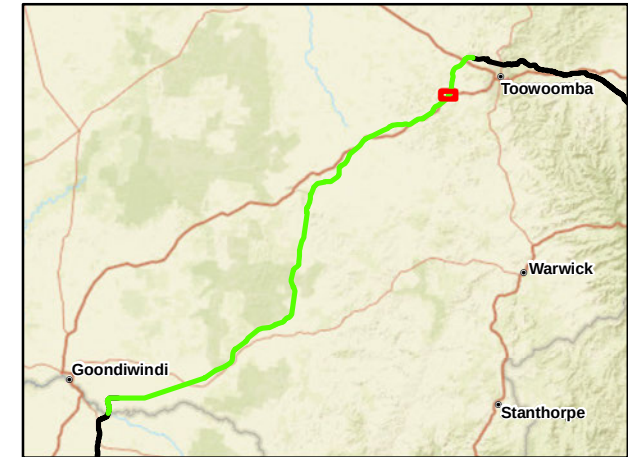
Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Major roads
- Minor roads
- Project road design
- Flood sensitive receptor
- Project floodplain culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated change in time of inundation (%)

< -50%	-5% to 5%
-50% to -40%	5% to 10%
-40% to -30%	10% to 20%
-30% to -20%	20% to 50%
-20% to -10%	50% to 100%
-10% to -5%	>100%

A data filter has been applied; results where model input grid's design time of inundation



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

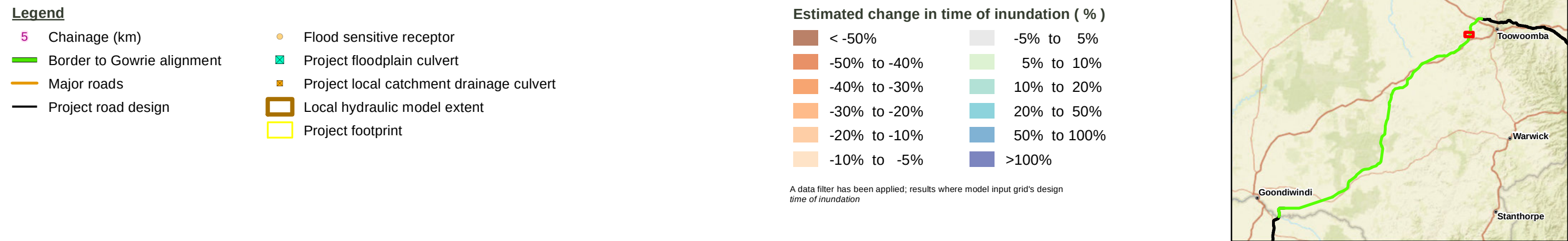


Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure O18 - page 44 of 48:

20% AEP Event - Local Catchments - Percentage Change in Time of Inundation (<1 hour cutoff applied)



A3 scale: 1:15,000

0 0.15 0.3 0.45 0.6 0.75 km

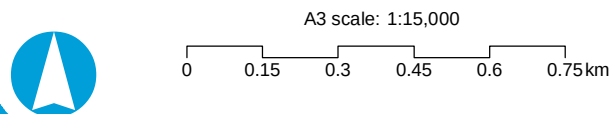
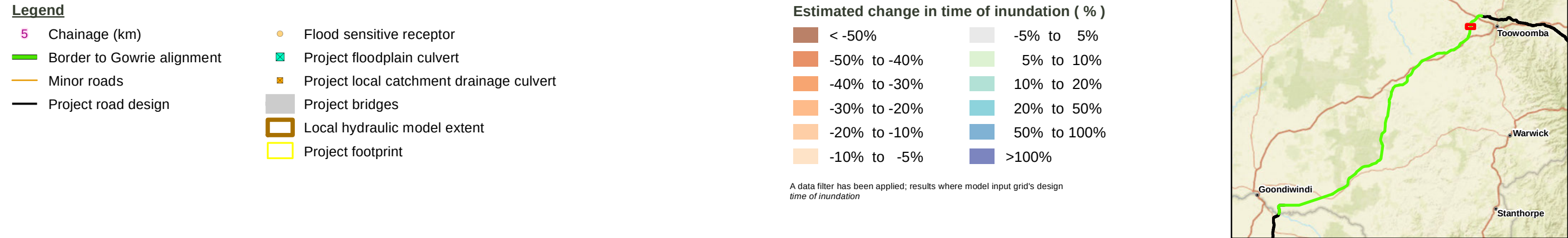
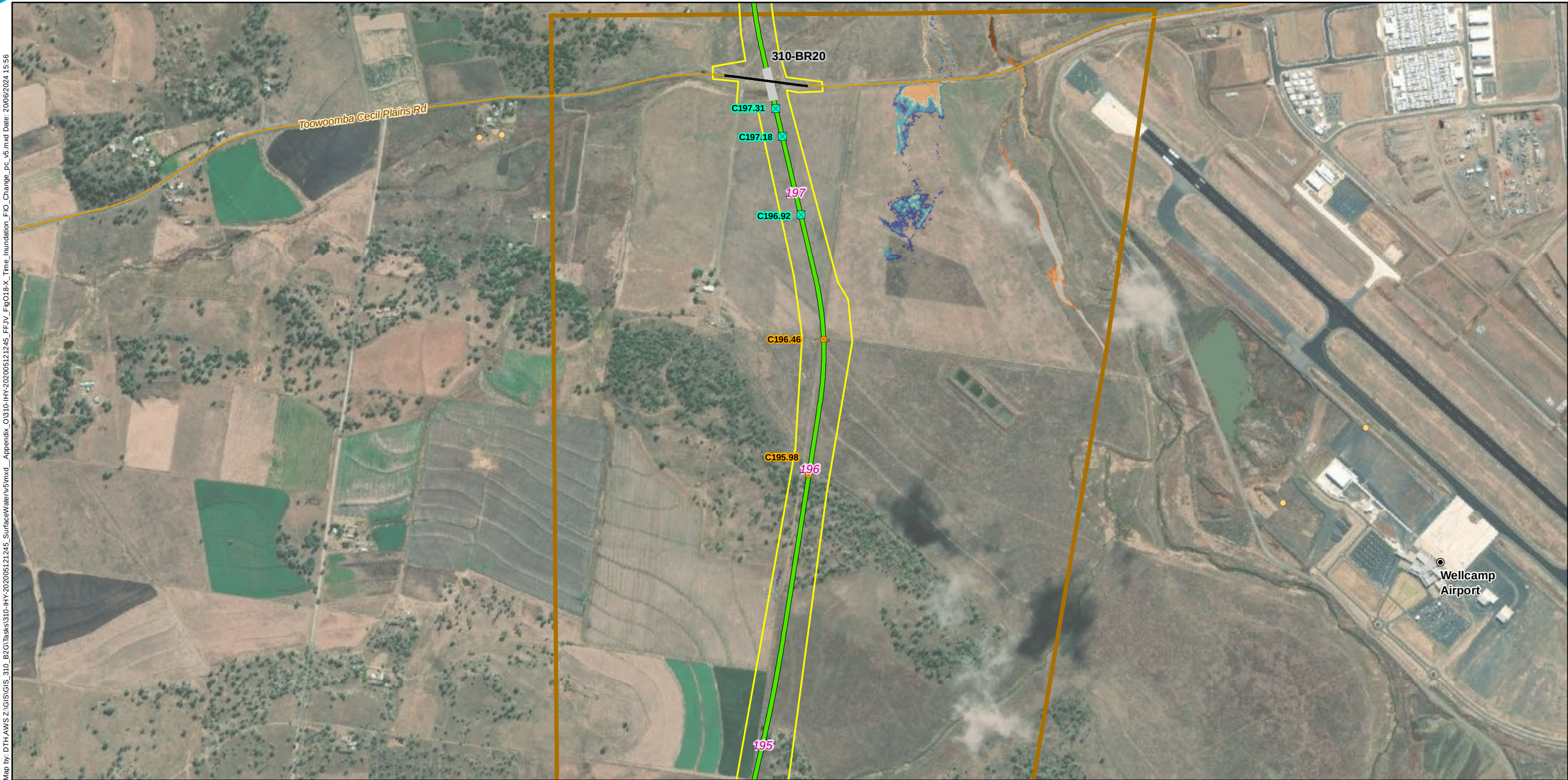


Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure O18 - page 45 of 48:

20% AEP Event - Local Catchments - Percentage Change in Time of Inundation (<1 hour cutoff applied)



Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\310-IHY-202005121245_SurfaceWater\5mxd_Appendix_O\310-IHY-202005121245_FF\JV_FigO18-X_Time_Inundation_FIO_Change_pc_v5.mxd Date: 2006/2024 15:56



Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Project road design
- Flood sensitive receptor
- Project floodplain culvert
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated change in time of inundation (%)

< -50%	-5% to 5%
-50% to -40%	5% to 10%
-40% to -30%	10% to 20%
-30% to -20%	20% to 50%
-20% to -10%	50% to 100%
-10% to -5%	>100%

A data filter has been applied; results where model input grid's design time of inundation



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

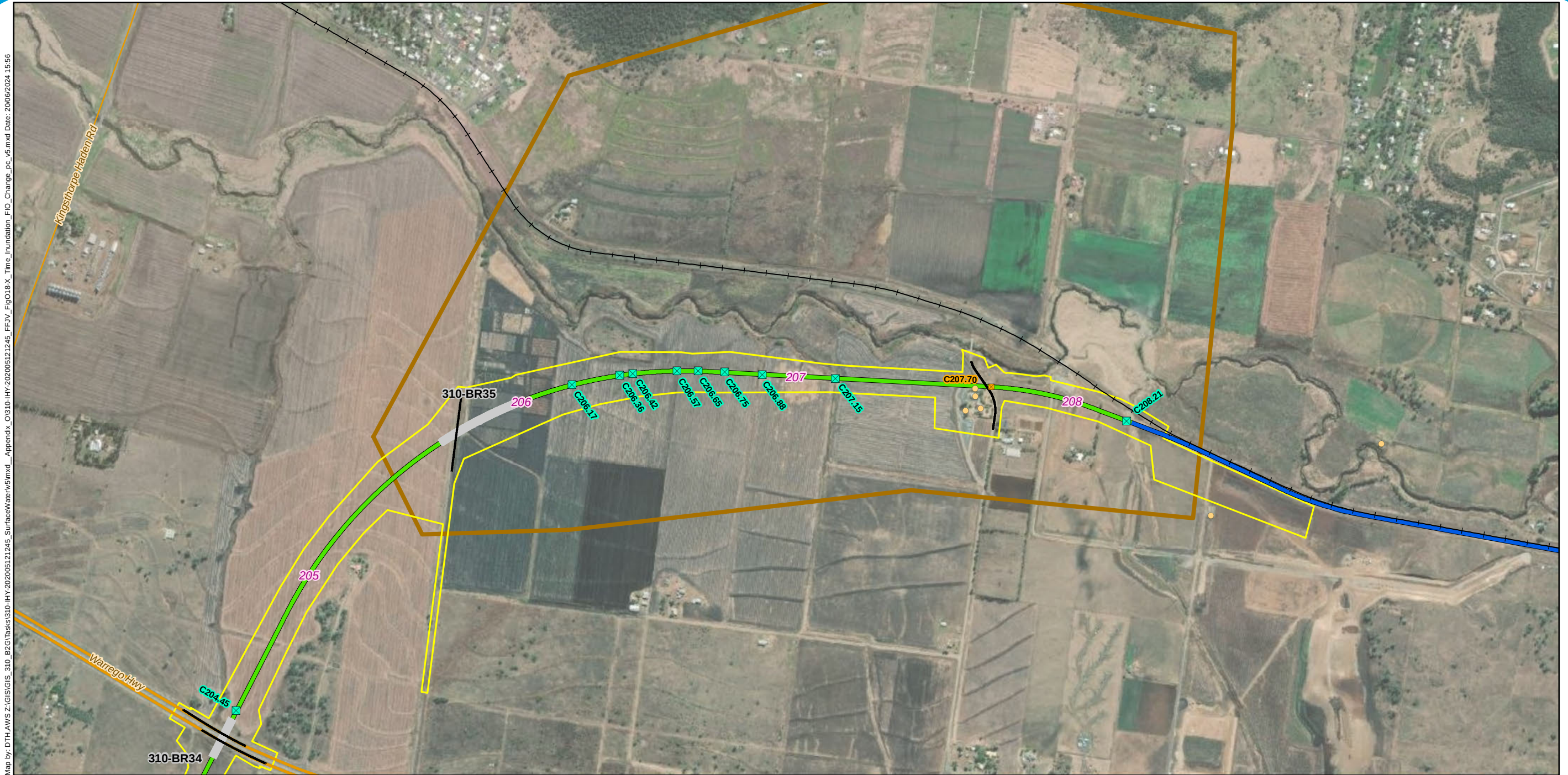


Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure O18 - page 47 of 48:

20% AEP Event - Local Catchments - Percentage Change in Time of Inundation (<1 hour cutoff applied)



Legend

- 5 Chainage (km)
- Existing rail (operational)
- Border to Gowrie alignment
- Gowrie to Helidon alignment
- Major roads
- Minor roads
- Project road design
- Flood sensitive receptor
- Project floodplain culvert
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated change in time of inundation (%)

< -50%	-5% to 5%
-50% to -40%	5% to 10%
-40% to -30%	10% to 20%
-30% to -20%	20% to 50%
-20% to -10%	50% to 100%
-10% to -5%	>100%

A data filter has been applied; results where model input grid's design time of inundation

