

APPENDIX

M

INLAND
RAIL 

Hydrology and Flooding

Part 2 of 2

GOWRIE TO HELIDON ENVIRONMENTAL IMPACT STATEMENT

ARTC

The Australian Government is delivering
Inland Rail through the Australian
Rail Track Corporation (ARTC), in
partnership with the private sector.

APPENDIX

M

Hydrology and Flooding

Appendix B Intermediate tunnel shaft figures

GOWRIE TO HELIDON ENVIRONMENTAL IMPACT STATEMENT



Appendix B

Intermediate Tunnel Shaft Figures

Figure B1-A: Locality

Figure B1-B: TUFLOW model setup

Figure B1-C: Design structures

Figure B1-D: Flood Sensitive Receptors

Figure B2-A: Existing Case - Inundation Extent - 10% AEP event

Figure B2-B: Developed Case - Afflux - 10% AEP event

Figure B3-A: Existing Case - Inundation Extent - 1% AEP event

Figure B3-B: Existing Case - Velocity - 1% AEP event

Figure B3-C: Developed Case - Afflux - 1% AEP event

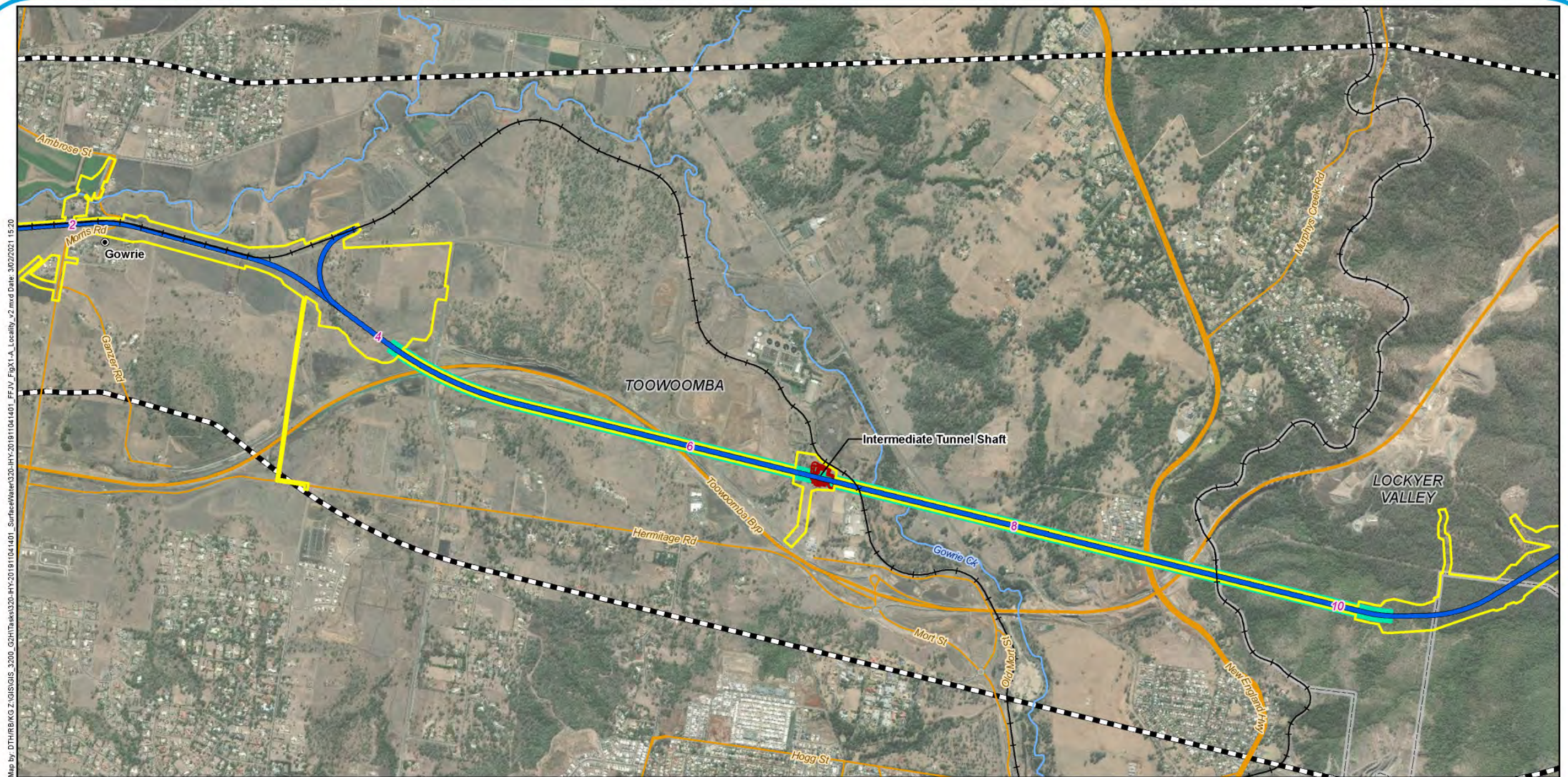
Figure B3-D: Climate Change Scenario - Afflux - 1% AEP event

Figure B3-E: Developed Case - Difference in Velocity -1% AEP event

Figure B3-F: Developed Case - Difference in Time of Submergence - 1% AEP event

Figure B4-A: Existing Case - Inundation Extent - 1 in 10,000 AEP event

Figure B4-B: Developed Case - Afflux - 1 in 10,000 AEP event



Legend

- 5 Chainage (km)
- Localities
- Existing rail
- G2H project alignment
- Tunnel
- Major roads
- Minor roads
- Watercourses
- Proposed works
- EIS disturbance footprint
- ▤ EIS investigation corridor
- ▭ Local Government Areas



A3 scale: 1:25,000
 0 0.2 0.4 0.6 0.8 1km



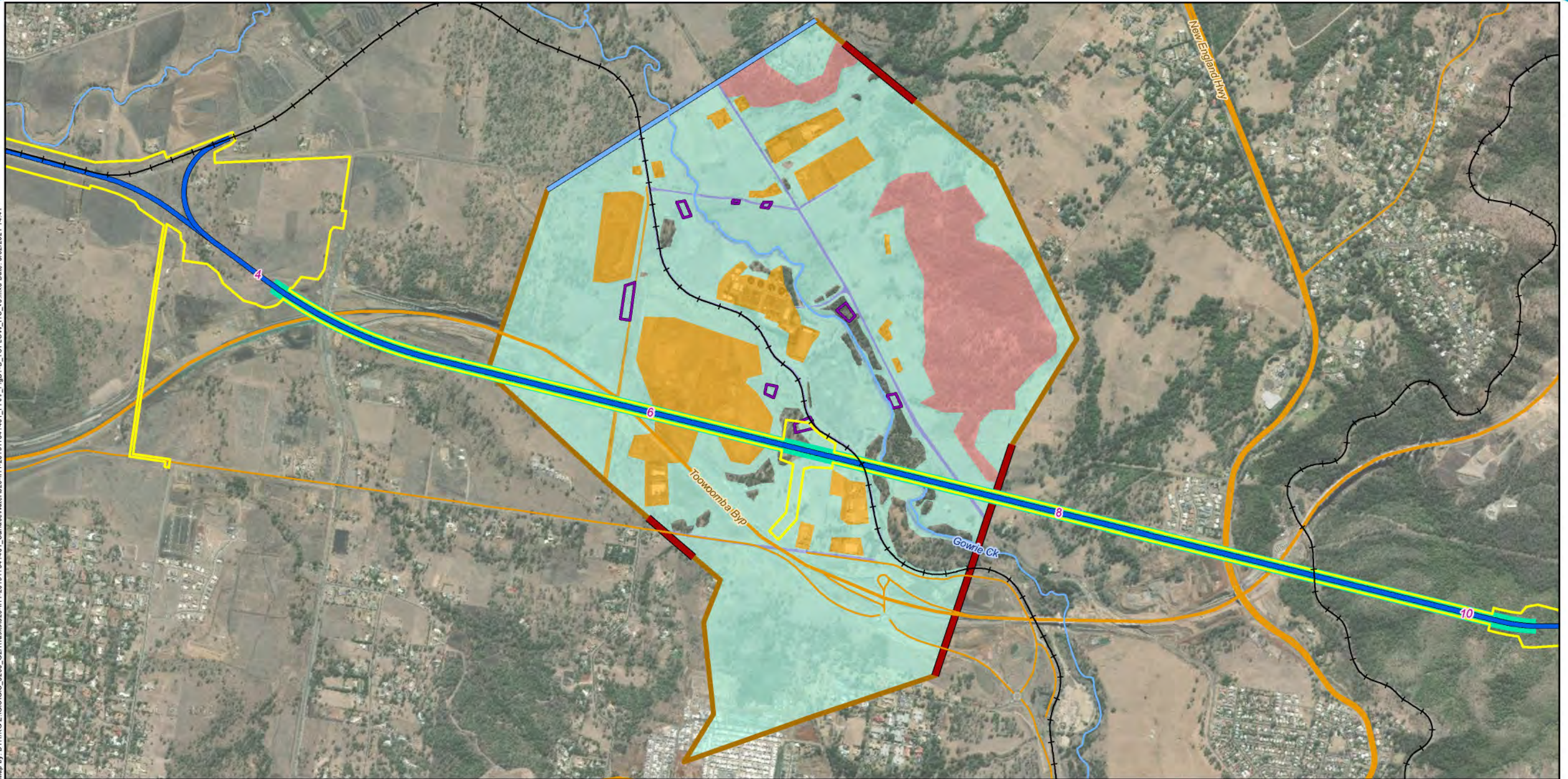
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Gowrie to Helidon

Figure B1-A: Locality - Intermediate Tunnel Shaft

Map by: DTH/KG Z:\GIS\GIS_3200_G2H\Tasks\320-HY-201911041401_SurfaceWater\320-HY-201911041401_FFIV_FigB1-B_TUFLOW_ITS_v3.mxd Date: 3/02/2021 14:41



Legend

- 5 Chainage (km)
- Existing rail
- G2H project alignment
- Tunnel
- Major roads
- Minor roads

- EIS disturbance footprint
- Code boundary
- Downstream boundary
- Upstream boundary
- Internal boundary
- Watercourses

Materials

- Dense vegetation
- Creek overbank
- Developed area
- Floodplain
- Waterway
- Road



A3 scale: 1:20,000
 0 0.15 0.3 0.45 0.6 0.75 km

Map by: DTH/RB/KG Z:\GIS\GIS_3200_G2H\Tasks\3200-HY-201811041401_SurfaceWater\3200-HY-201811041401_FF_V_FigX1-D_Structures_v2.mxd Date: 3/02/2021 15:31



Legend

- | | | |
|-----------------------|---------------------------|----------------------------|
| 5 Chainage (km) | EIS disturbance footprint | Drainage Structures |
| Existing rail | Defined watercourses | Floodplain culvert |
| G2H project alignment | Watercourses | Local drainage culvert |
| Tunnel | Bridges | |



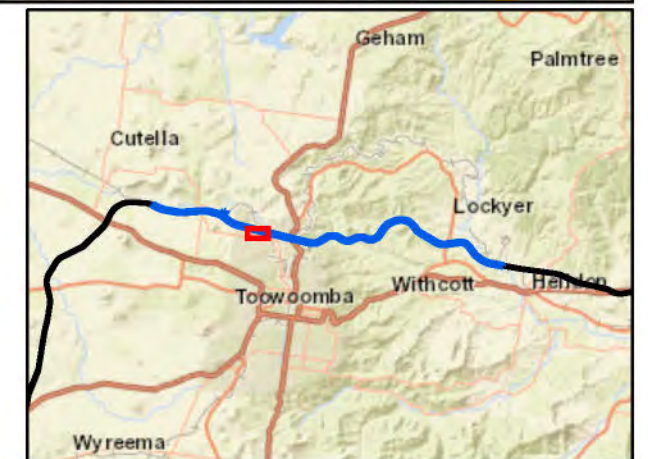
A3 scale: 1:20,000
 0 0.15 0.3 0.45 0.6 0.75 km

Map by: DTH/RB/KG Z:\GIS\GIS_3200_G2H\Task\320-HY-201811041401_SurfaceWater\320-HY-201811041401_FF\IV_FigX1-E_FloodSensitiveReceptors_v2.mxd Date: 3/02/2021 16:18



Legend

- 5 Chainage (km)
- Flood sensitive receptors
- Existing rail
- G2H project alignment
- Tunnel
- Major roads
- Minor roads
- EIS disturbance footprint
- Proposed works
- Local Government Areas



A3 scale: 1:4,000
 0 0.03 0.06 0.09 0.12 0.15 km

Map by: DTH/RB/KG Z:\GIS\GIS_3200_G2H\Tasks\320-HY-201811041401_SurfaceWater\320-HY-201811041401_FF_VV_FigXX-X_Depth_v2.mxd Date: 10/02/2021 09:54



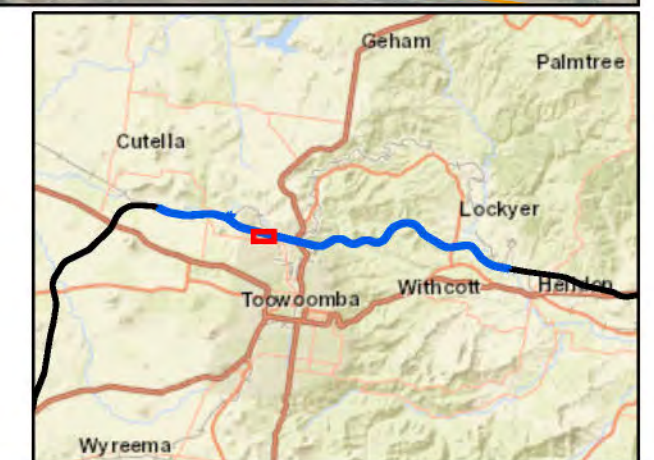
Legend

- 5 Chainage (km)
- Existing rail
- G2H project alignment
- Tunnel
- Major roads
- Minor roads
- Road design

- EIS disturbance footprint
- 1.0m contour mAHd

Depth (m)

- | | |
|-----------|-----------|
| 0 - 0.5 | 3.0 - 3.5 |
| 0.5 - 1.0 | 3.5 - 4.0 |
| 1.0 - 1.5 | 4.0 - 4.5 |
| 1.5 - 2.0 | 4.5 - 5.0 |
| 2.0 - 2.5 | > 5.0 |
| 2.5 - 3.0 | |



A3 scale: 1:4,000
 0 0.03 0.06 0.09 0.12 0.15 km



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Gowrie to Helidon

Figure B2-A: Existing Case - Inundation Extent - 10% AEP event - Intermediate Tunnel Shaft

Map by: D:\TRB\KG\GIS\GIS_3200_G2H\Tasks\3200-HY-201811041401_SurfaceWater\3200-HY-201811041401_FF_IV_FigXX-X_Afflux_v3.mxd Date: 3/02/2021 16:27



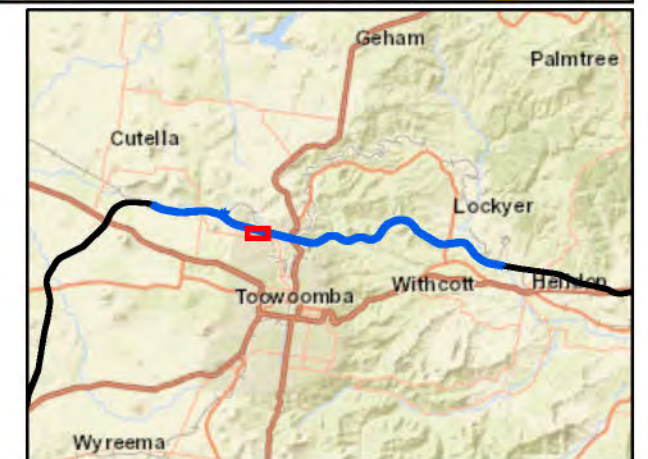
Legend

- 5 Chainage (km)
- Flood sensitive receptors
- Existing rail
- G2H project alignment
- Tunnel
- Major roads
- Minor roads
- Road design
- Proposed works

- EIS disturbance footprint
- Was Wet Now Dry
- Was Dry Now Wet

Change in peak water levels (m)

- | | |
|----------------|--------------|
| < -0.5 | 0.01 to 0.05 |
| -0.5 to -0.2 | 0.05 to 0.1 |
| -0.2 to -0.1 | 0.1 to 0.2 |
| -0.1 to -0.05 | 0.2 to 0.5 |
| -0.05 to -0.01 | > 0.5 |
| -0.01 to 0.01 | |



A3 scale: 1:4,000
 0 0.03 0.06 0.09 0.12 0.15 km



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Gowrie to Helidon

Figure B2-B: Developed Case - Afflux - 10% AEP event - Intermediate Tunnel Shaft

Map by: DTH/RB/KG Z:\GIS\GIS_3200_G2H\Tasks\320-HY-201811041401_SurfaceWater\320-HY-201811041401_FF_V_FigXX-X_Depth_v2.mxd Date: 10/02/2021 09:54



Legend

- 5 Chainage (km)
- Existing rail
- G2H project alignment
- Tunnel
- Major roads
- Minor roads
- Road design

- EIS disturbance footprint
- 1.0m contour mAHd

Depth (m)

- | | |
|-----------|-----------|
| 0 - 0.5 | 3.0 - 3.5 |
| 0.5 - 1.0 | 3.5 - 4.0 |
| 1.0 - 1.5 | 4.0 - 4.5 |
| 1.5 - 2.0 | 4.5 - 5.0 |
| 2.0 - 2.5 | > 5.0 |
| 2.5 - 3.0 | |



A3 scale: 1:4,000
 0 0.03 0.06 0.09 0.12 0.15 km



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Gowrie to Helidon

Figure B3-A: Existing Case - Inundation Extent - 1% AEP event - Intermediate Tunnel Shaft

Map by: DTH/RB/KG Z:\GIS\GIS_3200_G2H\Tasks\3200-HY-201811041401_SurfaceWater\3200-HY-201811041401_FF_V_V_FigXX-X_Velocity_v2.mxd Date: 5/02/2021 10:02



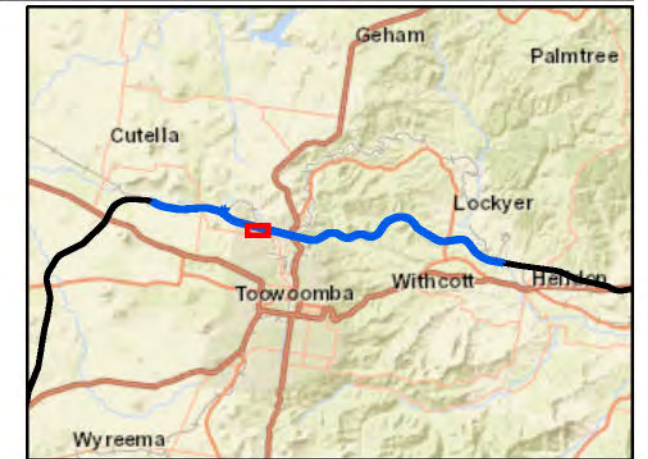
Legend

- 5 Chainage (km)
- Existing rail
- G2H project alignment
- Tunnel
- Major roads
- Minor roads
- Road design

EIS disturbance footprint

Peak velocity (m/s)

0.0	3.0
0.5	3.5
1.0	4.0
1.5	4.5
2.0	5.0
2.5	



A3 scale: 1:4,000
 0 0.03 0.06 0.09 0.12 0.15 km



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Figure B3-B: Existing Case - Velocity - 1% AEP event - Intermediate Tunnel Shaft

Map by: DTH/RRB/KG 2:GIS/GIS_3200_G2HTasks320-HY-201811041401_SurfaceWater320-HY-201811041401_FF-IV_FigXX-X_Afflux_v3.mxd Date: 3/02/2021 16:27

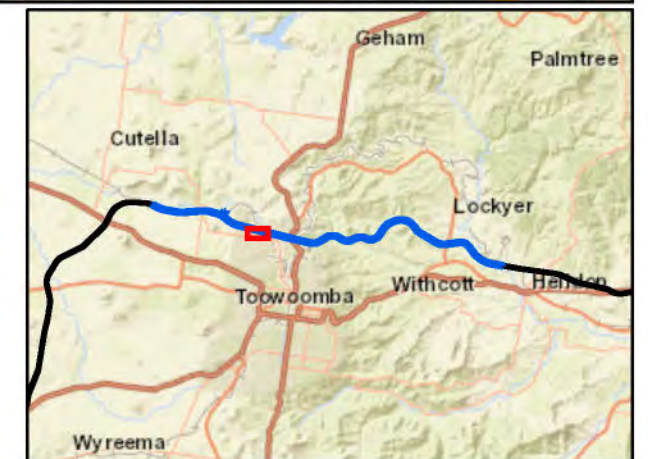


Legend

- 5 Chainage (km)
- Flood sensitive receptors
- Existing rail
- G2H project alignment
- Tunnel
- Major roads
- Minor roads
- Road design
- Proposed works
- EIS disturbance footprint
- Was Wet Now Dry
- Was Dry Now Wet

Change in peak water levels (m)

- | | |
|------------------|----------------|
| ■ < -0.5 | ■ 0.01 to 0.05 |
| ■ -0.5 to -0.2 | ■ 0.05 to 0.1 |
| ■ -0.2 to -0.1 | ■ 0.1 to 0.2 |
| ■ -0.1 to -0.05 | ■ 0.2 to 0.5 |
| ■ -0.05 to -0.01 | ■ > 0.5 |
| ■ -0.01 to 0.01 | |



A3 scale: 1:4,000
 0 0.03 0.06 0.09 0.12 0.15 km



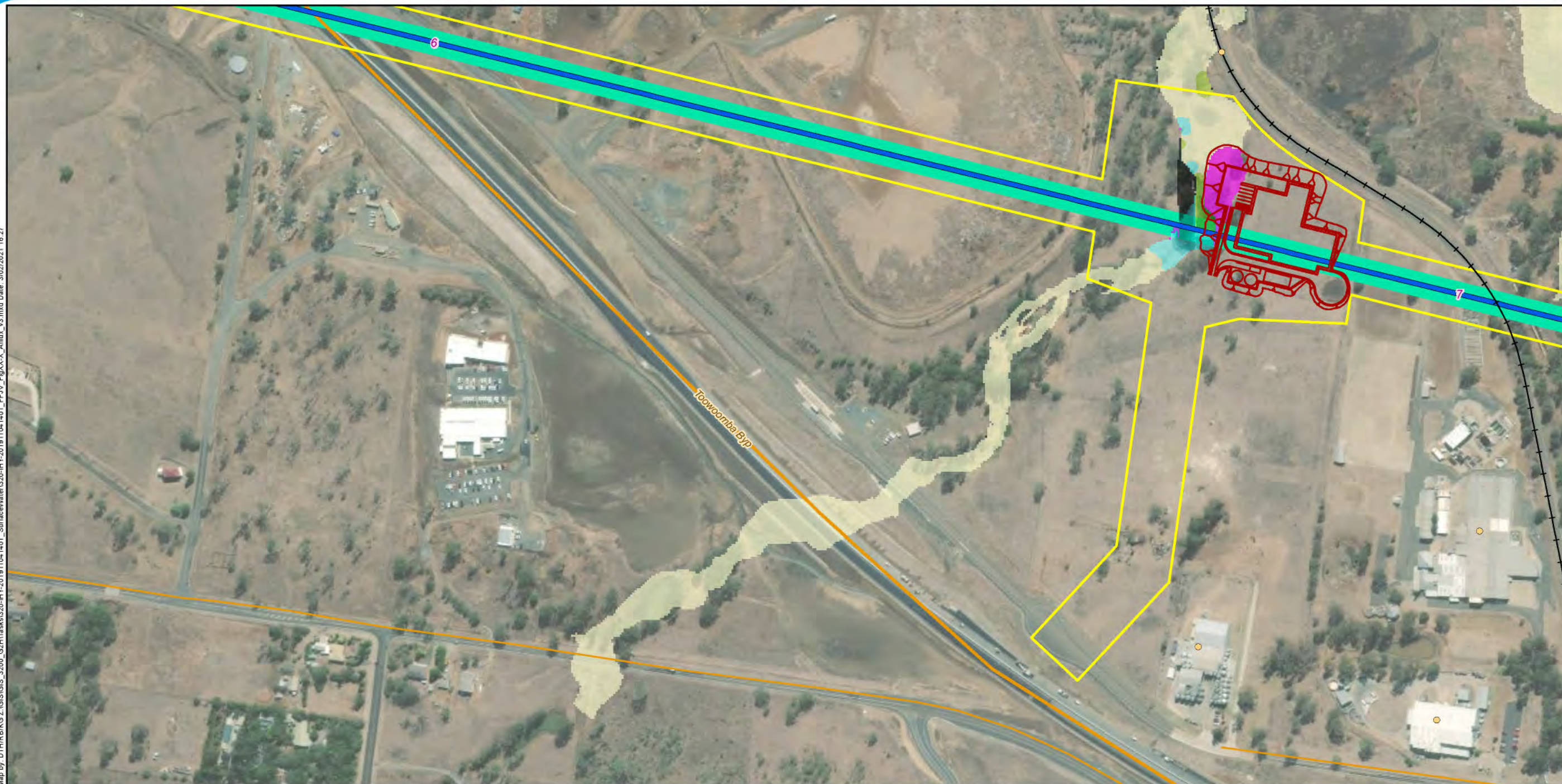
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Gowrie to Helidon

Figure B3-C: Developed Case - Afflux - 1% AEP event - Intermediate Tunnel Shaft

Map by: D:\TRB\KG\GIS\GIS_3200_G2H\Tasks\3200-HY-201811041401_SurfaceWater\3200-HY-201811041401_FF\IV_FigXX-X_Afflux_v3.mxd Date: 3/02/2021 16:27



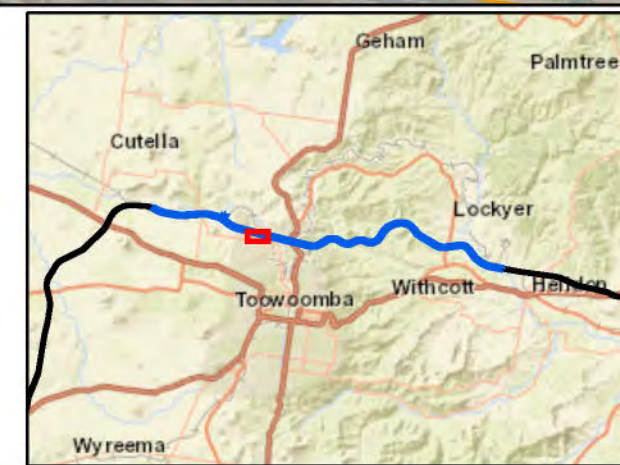
Legend

- 5 Chainage (km)
- Flood sensitive receptors
- Existing rail
- G2H project alignment
- Tunnel
- Major roads
- Minor roads
- Road design
- Proposed works

- EIS disturbance footprint
- Was Wet Now Dry
- Was Dry Now Wet

Change in peak water levels (m)

- | | |
|----------------|--------------|
| < -0.5 | 0.01 to 0.05 |
| -0.5 to -0.2 | 0.05 to 0.1 |
| -0.2 to -0.1 | 0.1 to 0.2 |
| -0.1 to -0.05 | 0.2 to 0.5 |
| -0.05 to -0.01 | > 0.5 |
| -0.01 to 0.01 | |



A3 scale: 1:4,000
 0 0.03 0.06 0.09 0.12 0.15km



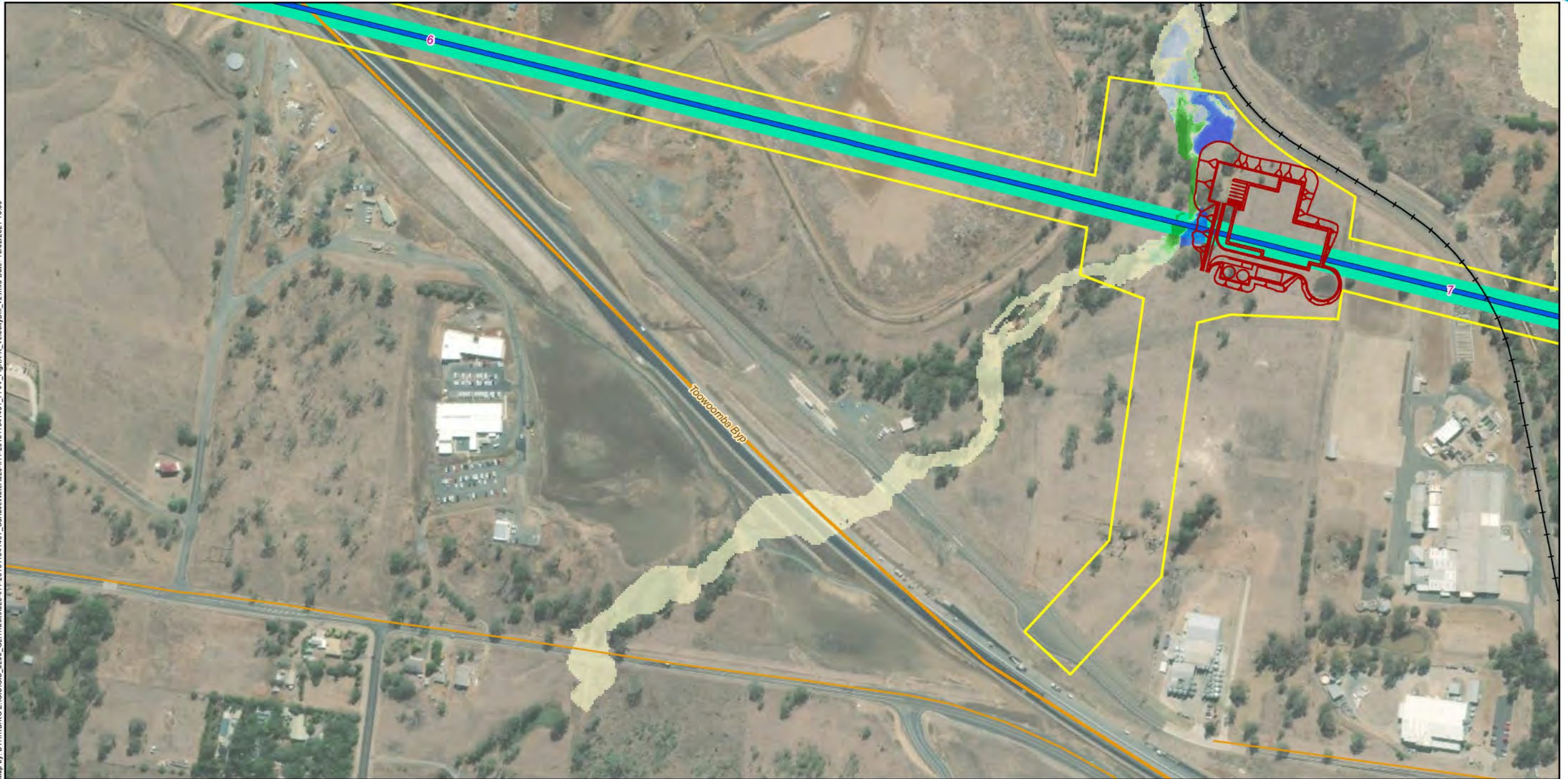
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Gowrie to Helidon

Figure B3-D: Climate Change Scenario - Afflux - 1% AEP event - Intermediate Tunnel Shaft

Map by: D:\TRB\KG 2\GIS\GIS_3200_G2H\Tasks\320-HY-201811041401_SurfaceWater\320-HY-201811041401_FF_VV_FigXX-X_VelocityDiff_v2.mxd Date: 10/02/2021 13:09



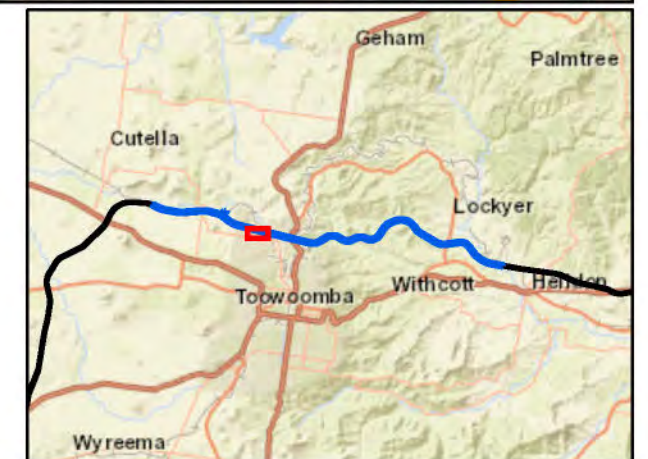
Legend

- 5 Chainage (km)
- Flood sensitive receptors
- Existing rail
- G2H project alignment
- Tunnel
- Major roads
- Minor roads
- Road design
- Proposed works

□ EIS disturbance footprint

Change in peak velocity (m/s)

□ < -0.50	□ 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	



A3 scale: 1:4,000
 0 0.025 0.05 0.075 0.1 0.125 km



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Gowrie to Helidon

Figure B3-E: Developed Case - Difference in Velocity - 1% AEP event - Intermediate Tunnel Shaft

Map by: DTH/RB/KG 2:GIS/GIS_3200_G2HTasks320-HY-201811041401_SurfaceWater320-HY-201811041401_FF-V_FigXX-X_TimeDiff_v2.mxd Date: 10/02/2021 13:15

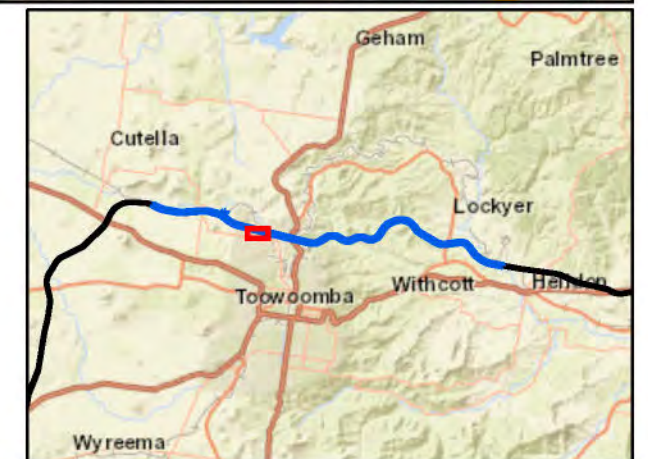


Legend

- 5 Chainage (km)
- EIS disturbance footprint
- Existing rail
- G2H project alignment
- Tunnel
- Major roads
- Minor roads
- Road design

Difference in Time of Submergence

- | | |
|---|--|
| ■ 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 | |



A3 scale: 1:4,000
 0 0.03 0.06 0.09 0.12 0.15 km



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Gowrie to Helidon

Figure B3-F:

Developed Case - Difference in Time of Submergence - 1% AEP event - Intermediate Tunnel Shaft

Map by: DTH/RB/KG Z:\GIS\GIS_3200_G2H\Tasks\3200-HY-201811041401_SurfaceWater\3200-HY-201811041401_FF JV_FigXX-X_Depth_v2.mxd Date: 10/02/2021 09:54



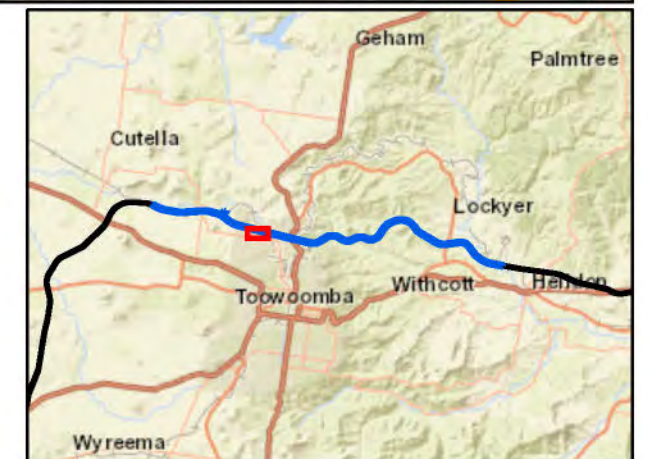
Legend

- 5 Chainage (km)
- Existing rail
- G2H project alignment
- Tunnel
- Major roads
- Minor roads
- Road design

- EIS disturbance footprint
- 1.0m contour mAHd

Depth (m)

- | | |
|-----------|-----------|
| 0 - 0.5 | 3.0 - 3.5 |
| 0.5 - 1.0 | 3.5 - 4.0 |
| 1.0 - 1.5 | 4.0 - 4.5 |
| 1.5 - 2.0 | 4.5 - 5.0 |
| 2.0 - 2.5 | > 5.0 |
| 2.5 - 3.0 | |



A3 scale: 1:4,000
 0 0.03 0.06 0.09 0.12 0.15 km



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Gowrie to Helidon

Figure B4-A: Existing Case - Inundation Extent - 1 in 10,000 AEP event - Intermediate Tunnel Shaft

Map by: DTH/RB/KG 2:GIS/GIS_3200_G2HTasks320-HY-201811041401_SurfaceWater320-HY-201811041401_FF-IV_FigXX-X_Afflux_v3.mxd Date: 3/02/2021 16:27

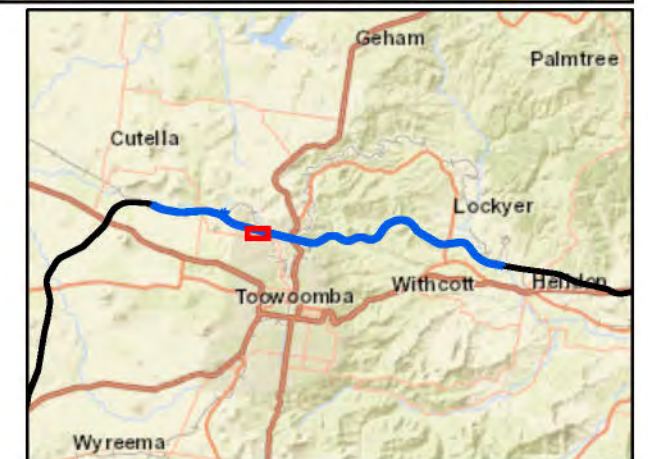


Legend

- 5 Chainage (km)
- Flood sensitive receptors
- Existing rail
- G2H project alignment
- Tunnel
- Major roads
- Minor roads
- Road design
- Proposed works
- EIS disturbance footprint
- Was Wet Now Dry
- Was Dry Now Wet

Change in peak water levels (m)

- | | |
|----------------|--------------|
| < -0.5 | 0.01 to 0.05 |
| -0.5 to -0.2 | 0.05 to 0.1 |
| -0.2 to -0.1 | 0.1 to 0.2 |
| -0.1 to -0.05 | 0.2 to 0.5 |
| -0.05 to -0.01 | > 0.5 |
| -0.01 to 0.01 | |



A3 scale: 1:4,000
 0 0.03 0.06 0.09 0.12 0.15 km



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Gowrie to Helidon

Figure B4-B: Developed Case - Afflux - 1 in 10,000 AEP event - Intermediate Tunnel Shaft

APPENDIX

M

Hydrology and Flooding

Appendix C Oaky Creek figures

GOWRIE TO HELIDON ENVIRONMENTAL IMPACT STATEMENT



Appendix C

Oaky Creek Figures

Figure C1- A: Locality

Figure C1- B: Hydrology setup

Figure C1- C: TUFLOW model setup

Figure C1- D: Design structures

Figure C1-E: Flood Sensitive Receptors

Figure C2- A: Existing Case - Inundation Extent - 20% AEP event

Figure C2- B: Developed Case - Afflux - 20% AEP event

Figure C3- A: Existing Case - Inundation Extent - 10% AEP event

Figure C3- B: Developed Case - Afflux - 10% AEP event

Figure C4- A: Existing Case - Inundation Extent - 5% AEP event

Figure C4- B: Developed Case - Afflux - 5% AEP event

Figure C5- A: Existing Case - Inundation Extent - 2% AEP event

Figure C5- B: Developed Case - Afflux - 2% AEP event

Figure C6- A: Existing Case - Inundation Extent - 1% AEP event

Figure C6- B: Developed Case - Afflux - 1% AEP event

Figure C6- C: Developed Case - Velocity - 1% AEP event

Figure C6- D: Developed Case - Difference in Velocity -1% AEP event

Figure C6- E: C6- E: Developed Case - Difference in Time of Submergence - 1% AEP event

Figure C7- A: Existing Case - Inundation Extent -1 in 2,000 AEP event

Figure C7- A: C7- B: Developed Case - Afflux -1 in 2,000 AEP

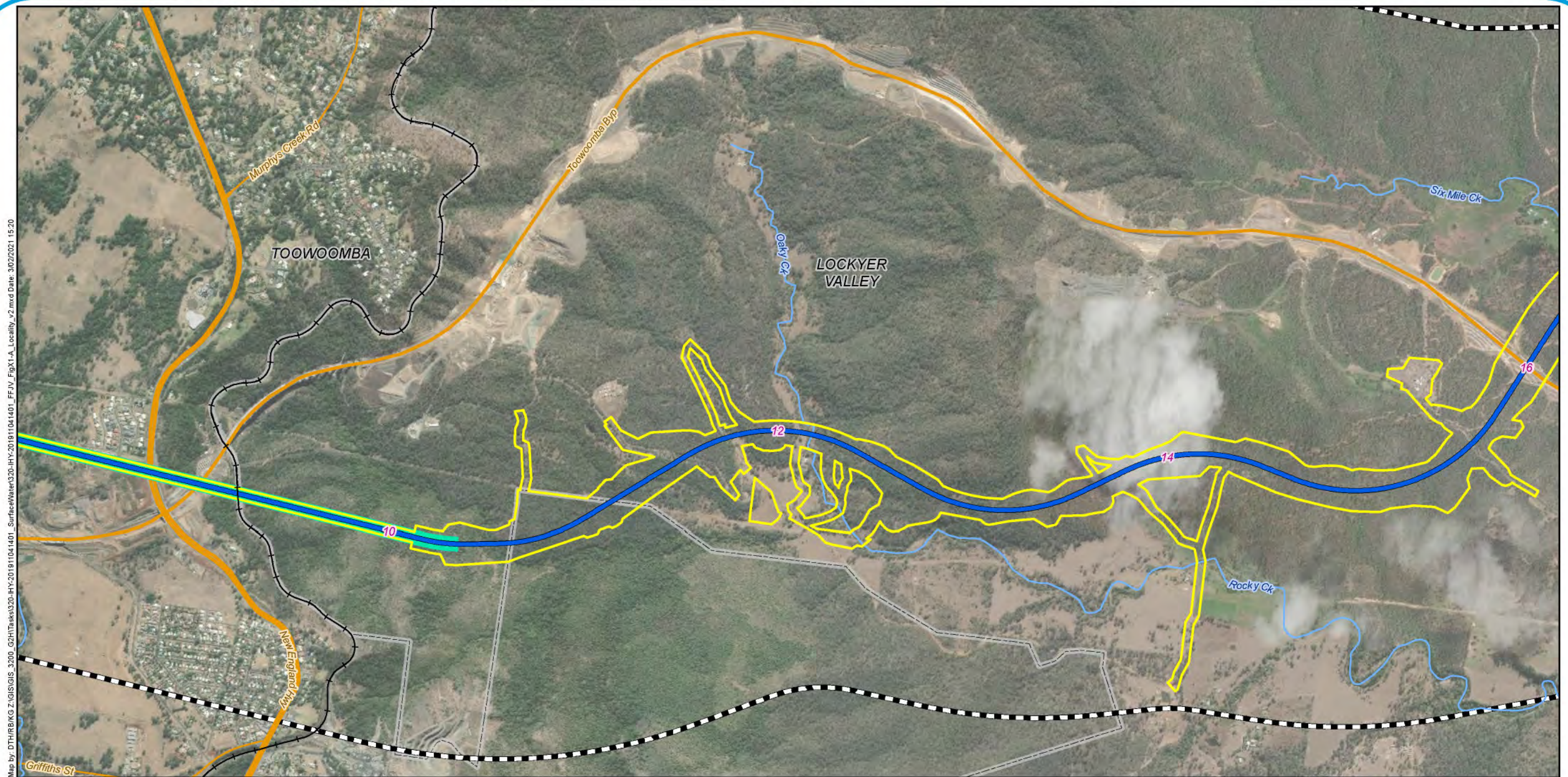
Figure C7- B: Developed Case - Velocity - 1 in 2,000 AEP event

Figure C8- A: Existing Case - Inundation Extent - 1 in 10,000 AEP event

Figure C8- B: Developed Case - Afflux - 1 in 10,000 AEP event

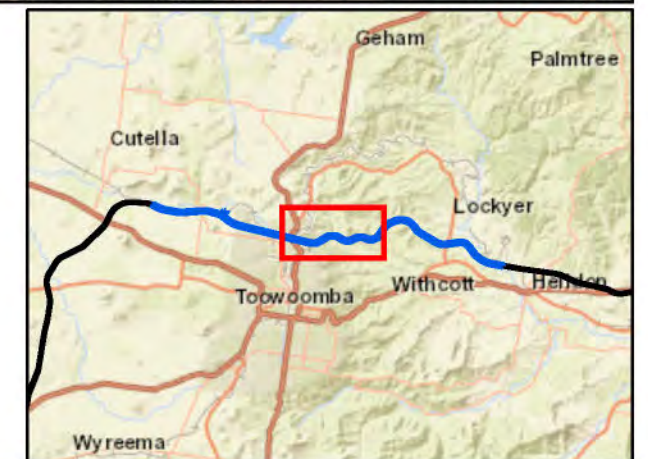
Figure C9- A: Existing Case - Inundation Extent - PMF event

Figure C9- B: Developed Case - Afflux - PMF event

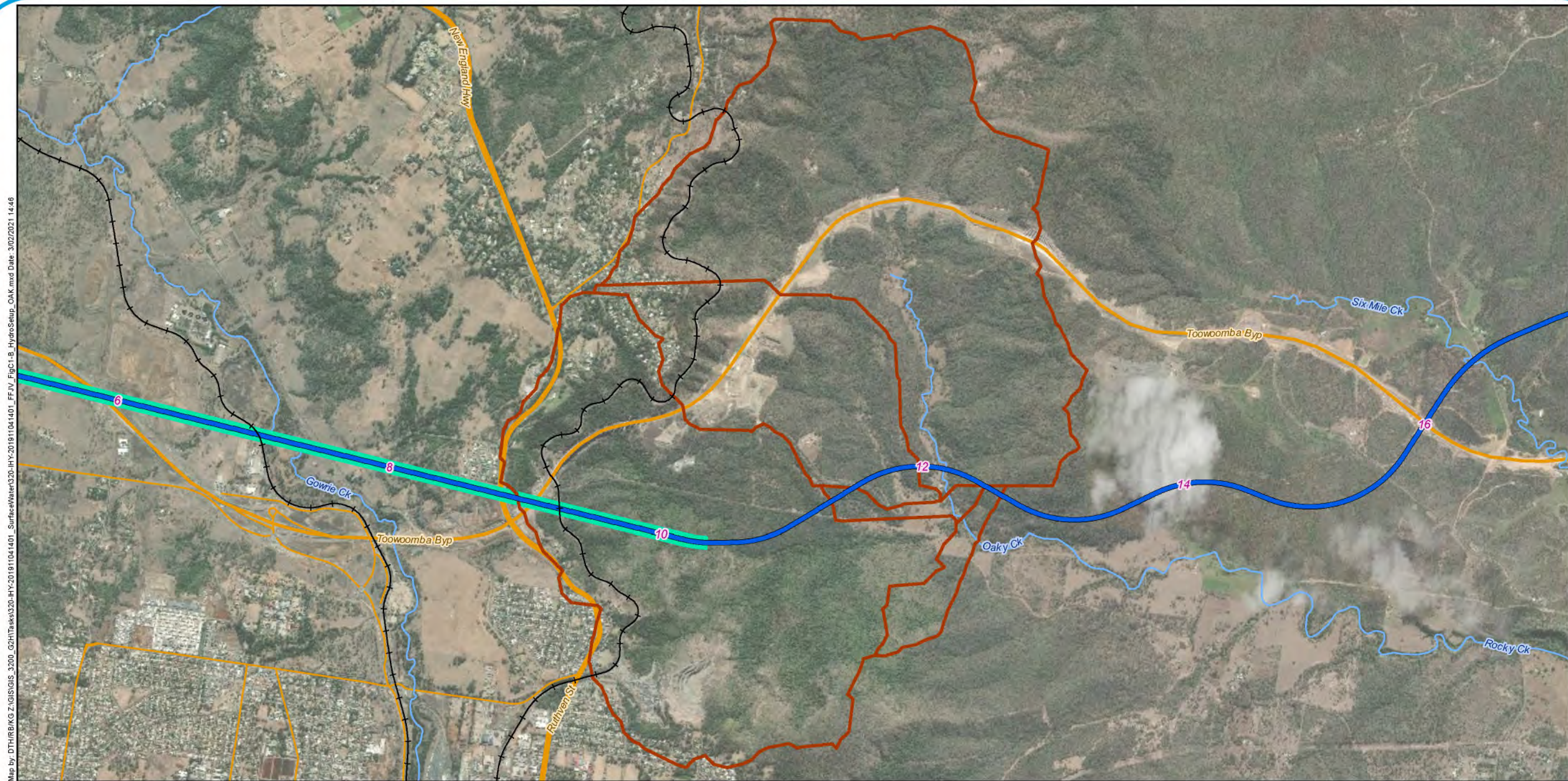


Legend

- | | |
|-----------------------|----------------------------|
| 5 Chainage (km) | EIS disturbance footprint |
| Existing rail | EIS investigation corridor |
| G2H project alignment | Local Government Areas |
| Tunnel | |
| Major roads | |
| Minor roads | |
| Watercourses | |



A3 scale: 1:20,000
 0 0.15 0.3 0.45 0.6 0.75 km



Map by: D:\HRR\KG\GIS\GIS_3200_G2H\Task320-HY-201811041401_SurfaceWater320-HY-201811041401_FF_V_FigC1-B_HydroSetup_OAK.mxd Date: 3/02/2021 14:46

Legend

- | | |
|-----------------------|---------------------|
| 5 Chainage (km) | Watercourses |
| Localities | Major roads |
| G2H project alignment | Minor roads |
| Existing rail | Model subcatchments |
| Tunnel | |



A3 scale: 1:30,000
0 0.2 0.4 0.6 0.8 1 km



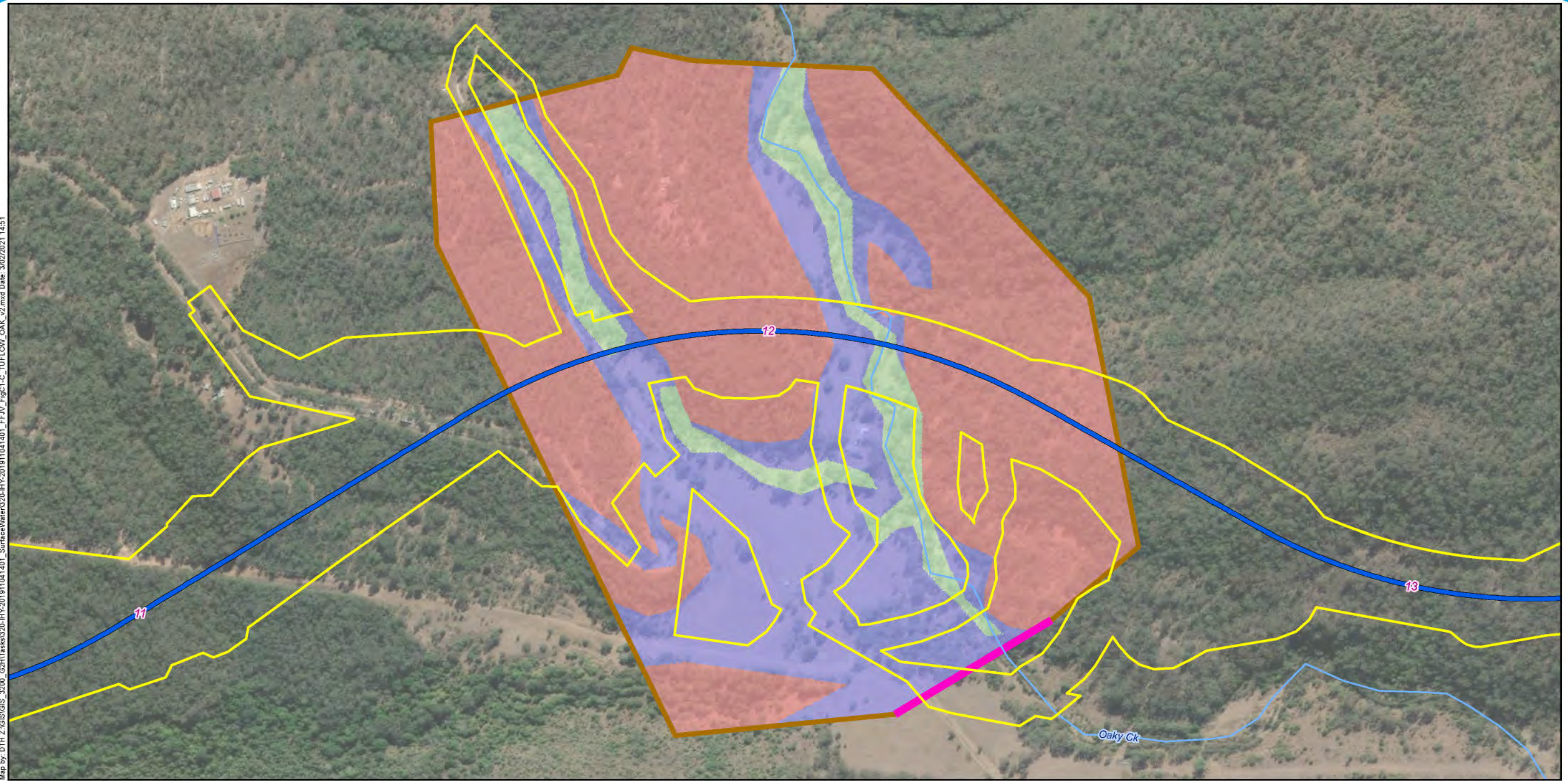
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Gowrie to Helidon

Figure C1- B: Hydrology setup - Oaky Creek

Map by: DTH Z:\GIS\GIS_3200_G2H\Task\3200_IHY-201911041401_SurfaceWater\3200-IHY-201911041401_FF\IV_FigC1-C_TUFLOW_OAK_v2.mxd Date: 3/02/2021 14:51



Legend

- 5 Chainage (km)
- G2H project alignment

- EIS disturbance footprint
- Code boundary
- Downstream boundary
- Watercourses

Materials

- Dense vegetation
- Vegetated waterways
- Floodplain



A3 scale: 1:6,000
 0 0.05 0.1 0.15 0.2 0.25km



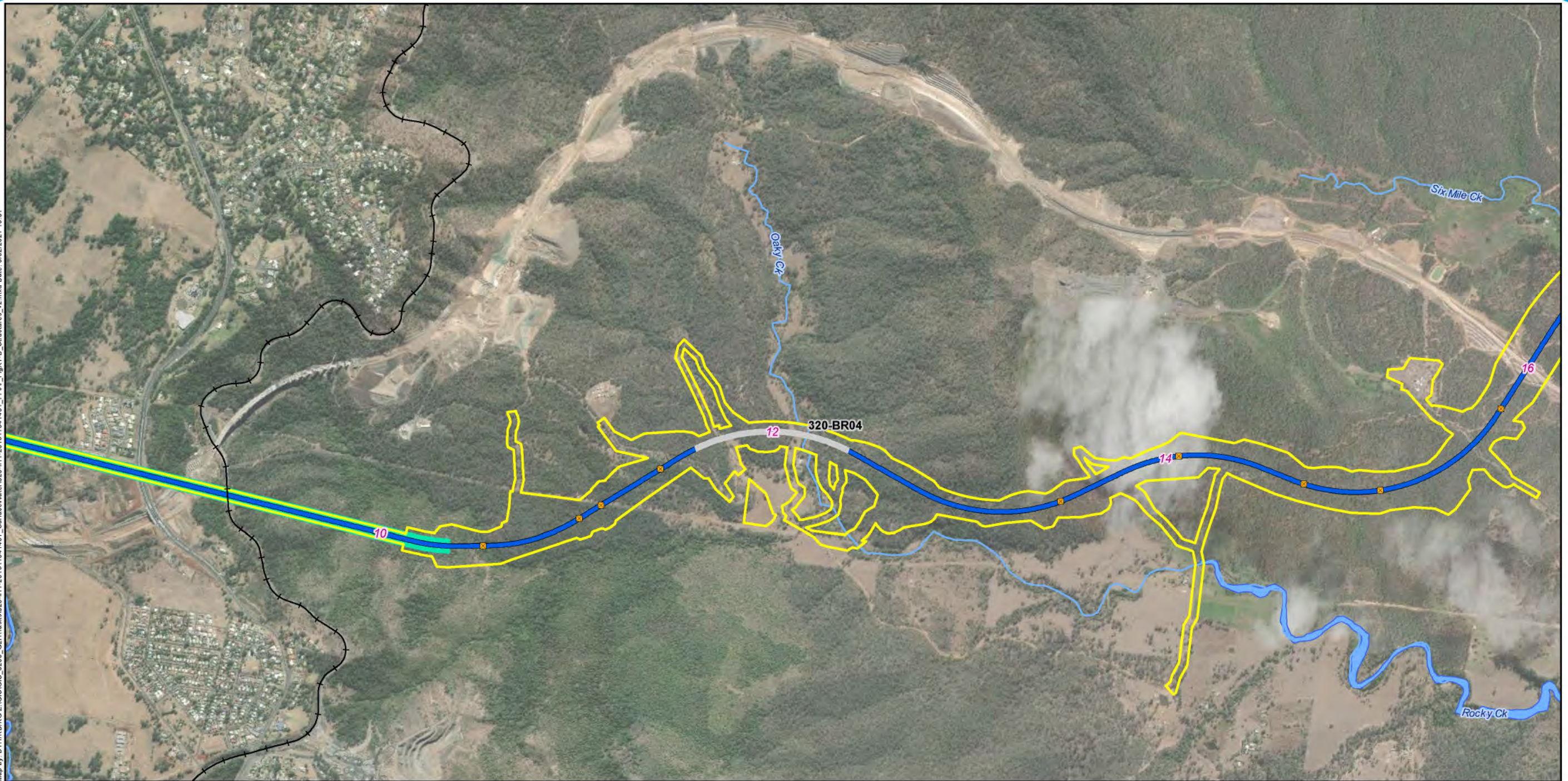
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Figure C1-C: TUFLOW model setup - Oaky Creek

Map by: DTH/RB/KG Z:\GIS\GIS_3200_G2H\Tasks\320-HY-201911041401_SurfaceWater\320-HY-201911041401_FF_V1-D_Structures_v2.mxd Date: 3/02/2021 15:31



Legend

- | | | |
|-----------------------|---------------------------|----------------------------|
| 5 Chainage (km) | EIS disturbance footprint | Drainage Structures |
| Existing rail | Defined watercourses | Floodplain culvert |
| G2H project alignment | Watercourses | Local drainage culvert |
| Tunnel | Bridges | |



A3 scale: 1:20,000
 0 0.15 0.3 0.45 0.6 0.75 km



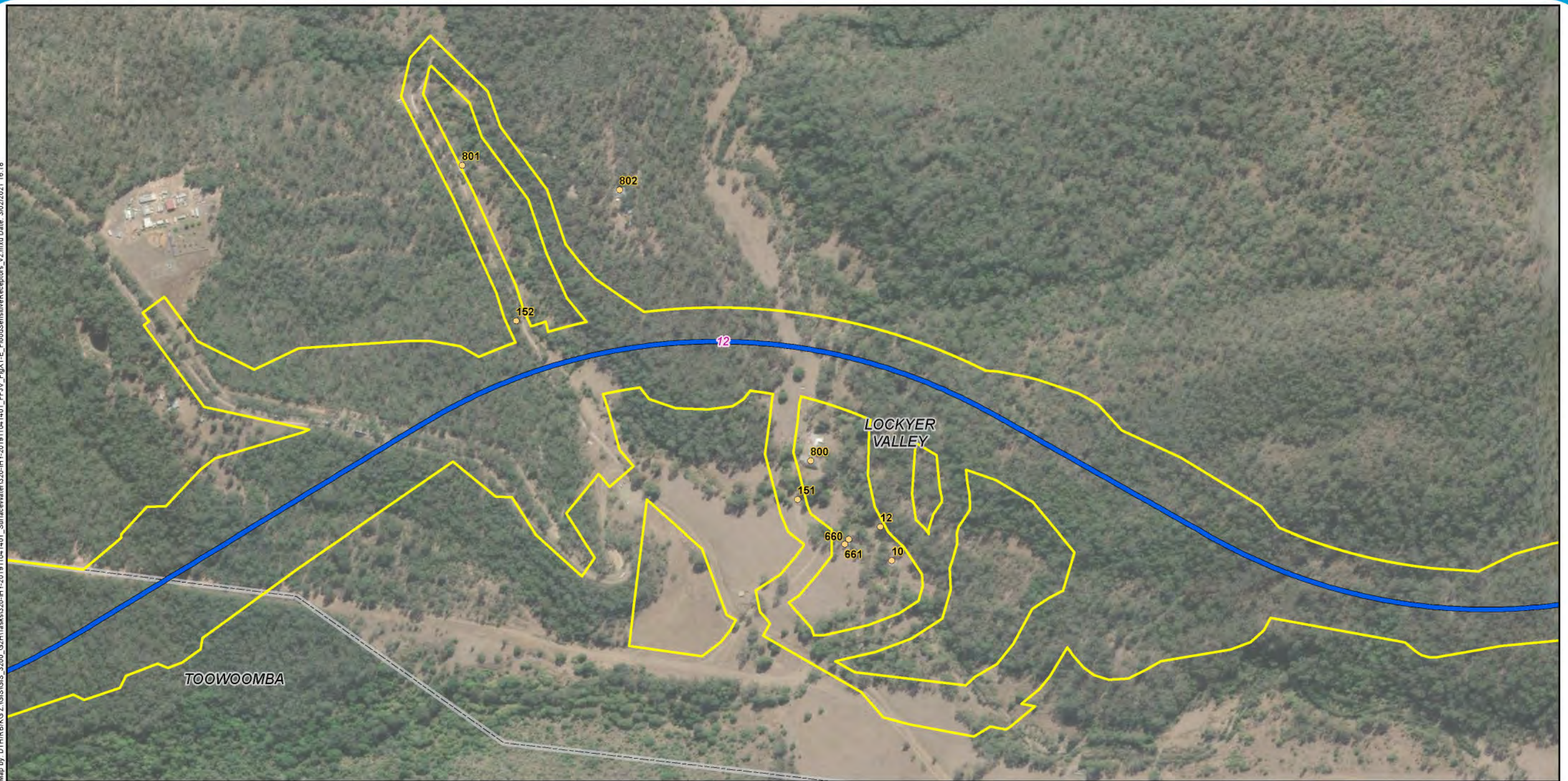
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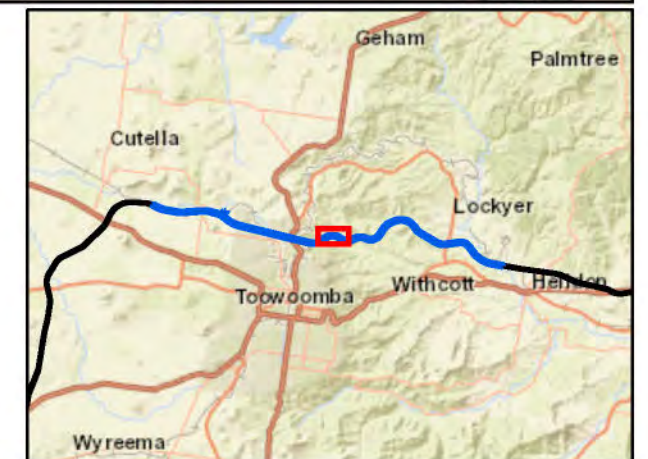
Figure C1-D: Design structures - Oaky Creek

Map by: D:\HRR\KG\GIS\GIS_3200_G2H\Task320-HY-201811041401_SurfaceWater320-HY-201811041401_FF_V_FigX1-E_FloodSensitiveReceptors_v2.mxd Date: 3/02/2021 16:18



Legend

- 5 Chainage (km)
- Flood sensitive receptors
- G2H project alignment
- EIS disturbance footprint
- Local Government Areas



A3 scale: 1:6,000
 0 0.05 0.1 0.15 0.2 0.25km



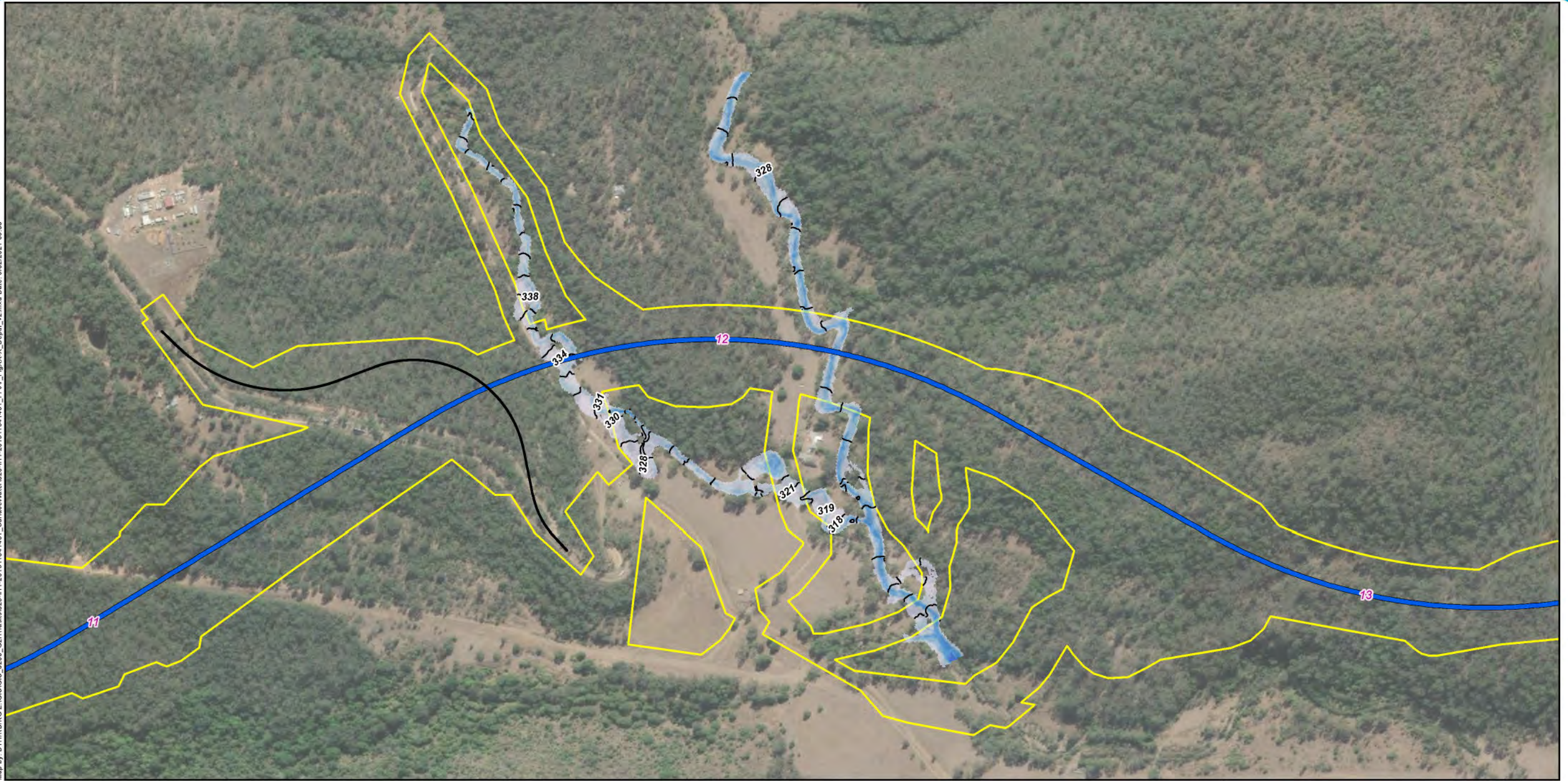
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Gowrie to Helidon

Figure C1-E: Flood Sensitive Receptors - Oaky Creek

Map by: D:\H\RB\KG\GIS\GIS_3200_G2H\Tasks\3200-HY-201811041401_SurfaceWater\3200-HY-201811041401_FF_V_FigXX-X_Depth_v2.mxd Date: 5/02/2021 08:33



Legend

- 5 Chainage (km)
- G2H project alignment
- Road design
- EIS disturbance footprint
- 1.0m contour mAHD

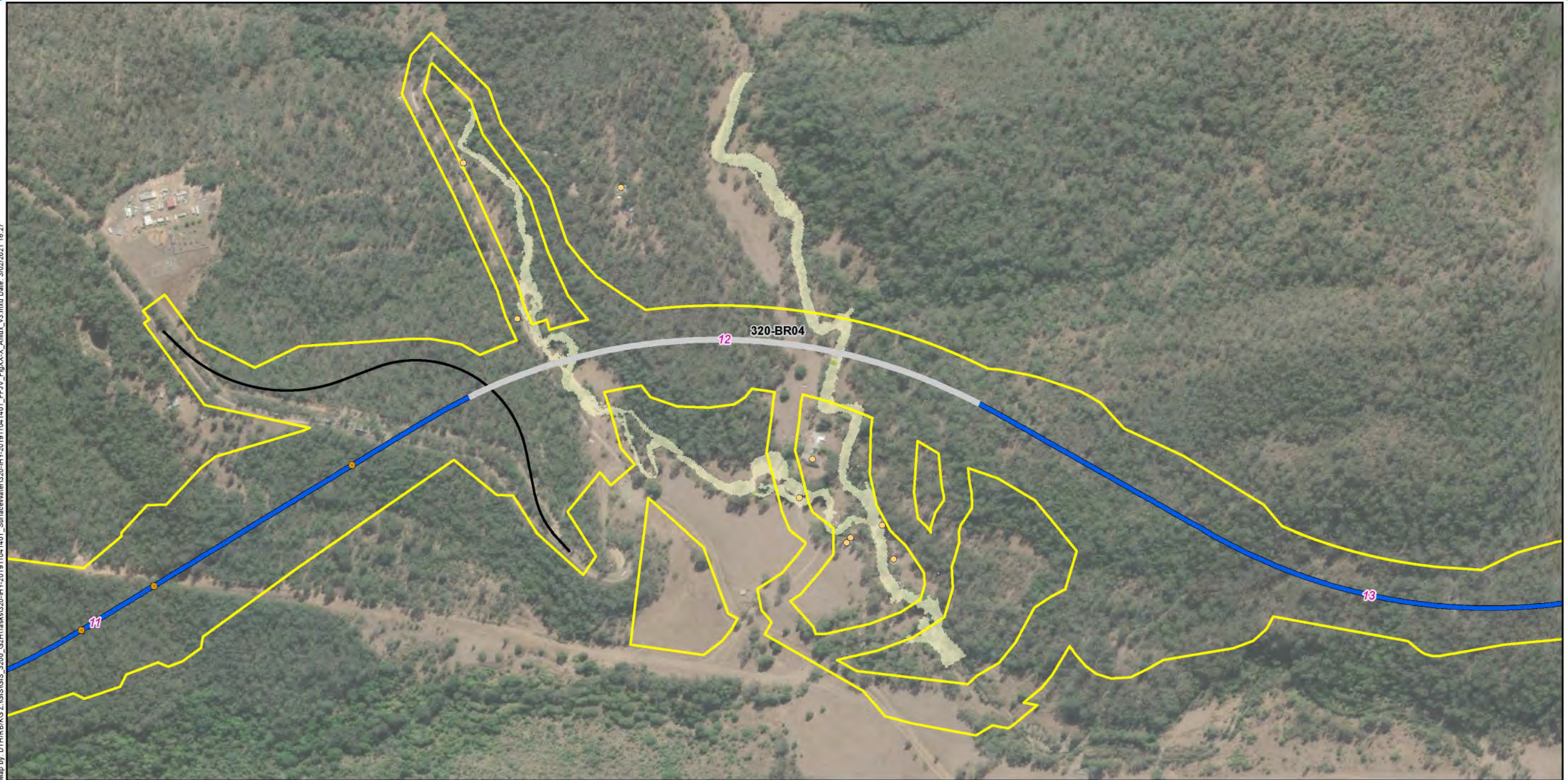
Depth (m)

0 - 0.5	3.0 - 3.5
0.5 - 1.0	3.5 - 4.0
1.0 - 1.5	4.0 - 4.5
1.5 - 2.0	4.5 - 5.0
2.0 - 2.5	> 5.0
2.5 - 3.0	



A3 scale: 1:6,000
 0 0.04 0.08 0.12 0.16 0.2km

Map by: DTH/RB/KG Z:\GIS\GIS_3200_G2H\Tasks\3200-HY-201811041401_SurfaceWater\3200-HY-201811041401_FF_V_FigXX-X_Afflux_v3.mxd Date: 3/02/2021 16:27



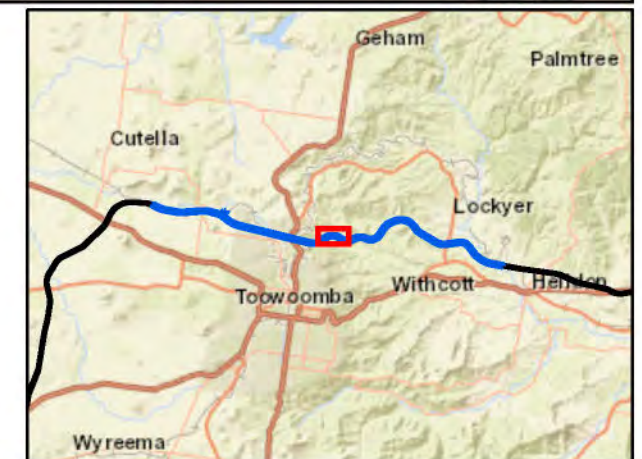
Legend

- 5 Chainage (km)
- Flood sensitive receptors
- G2H project alignment
- Road design

- EIS disturbance footprint
- Was Wet Now Dry
- Was Dry Now Wet
- Drainage Structures**
 - Local drainage culvert
 - Bridges

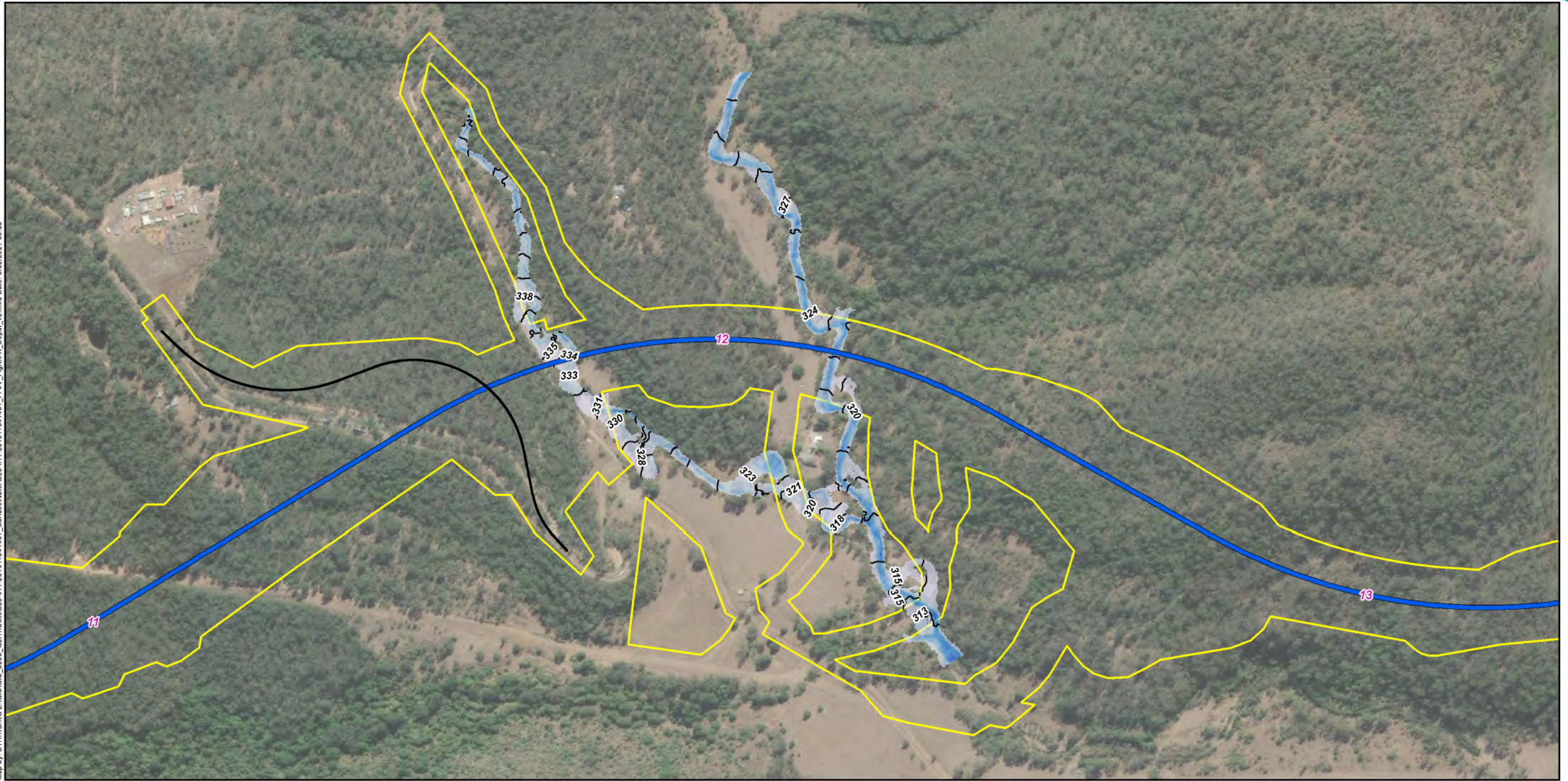
Change in peak water levels (m)

- | | |
|----------------|--------------|
| < -0.5 | 0.01 to 0.05 |
| -0.5 to -0.2 | 0.05 to 0.1 |
| -0.2 to -0.1 | 0.1 to 0.2 |
| -0.1 to -0.05 | 0.2 to 0.5 |
| -0.05 to -0.01 | > 0.5 |
| -0.01 to 0.01 | |



A3 scale: 1:6,000
 0 0.04 0.08 0.12 0.16 0.2km

Map by: DTH/RB/KG Z:\GIS\GIS_3200_G2H\Tasks\320-HY-201811041401_SurfaceWater\320-HY-201811041401_FF_V_FigXX-X_Depth_v2.mxd Date: 5/02/2021 08:33

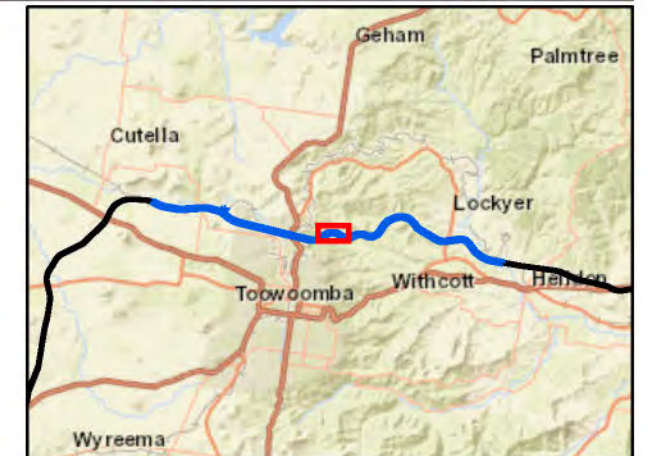


Legend

- 5 Chainage (km)
- G2H project alignment
- Road design
- EIS disturbance footprint
- 1.0m contour mAHD

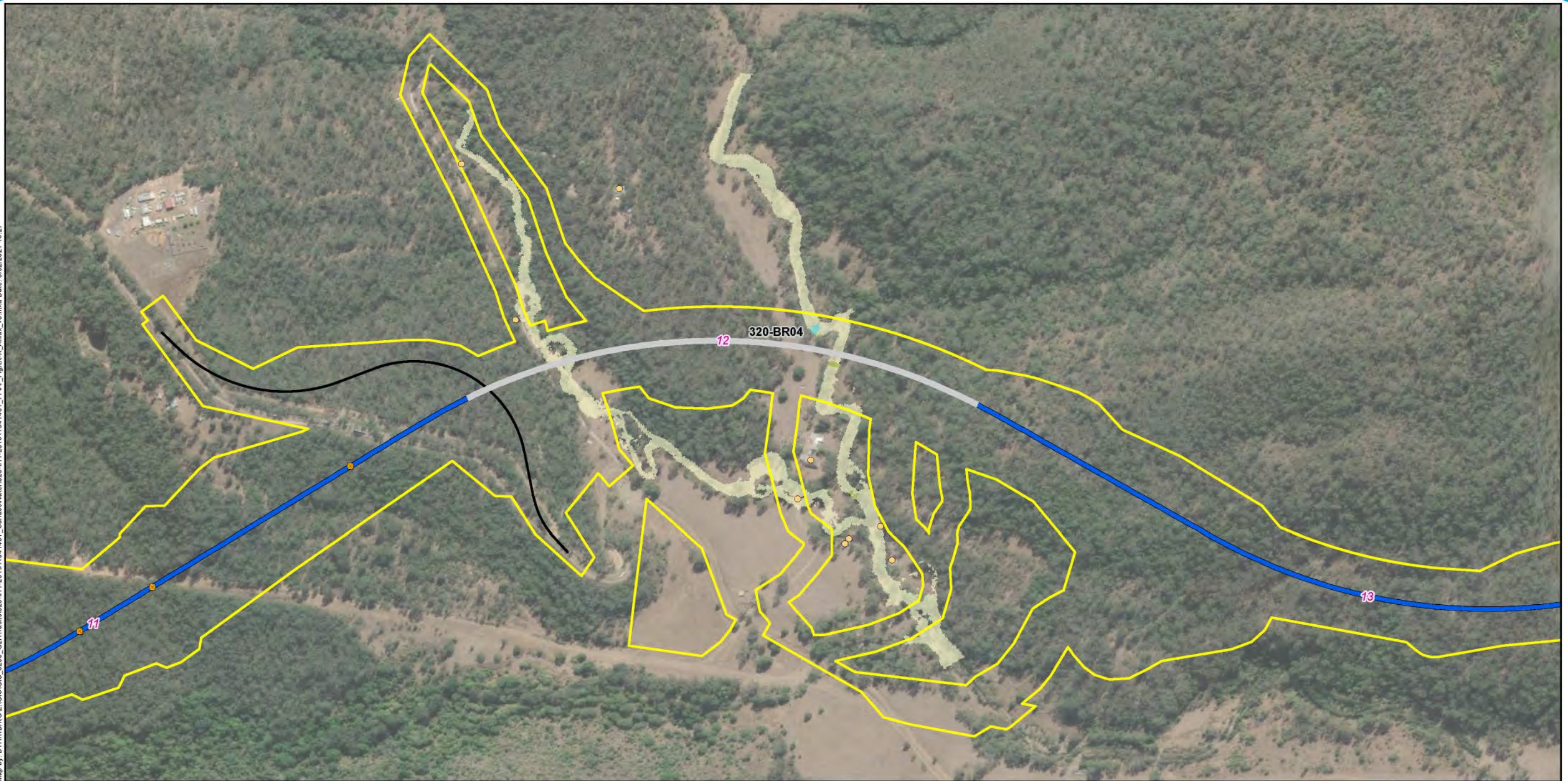
Depth (m)

0 - 0.5	3.0 - 3.5
0.5 - 1.0	3.5 - 4.0
1.0 - 1.5	4.0 - 4.5
1.5 - 2.0	4.5 - 5.0
2.0 - 2.5	> 5.0
2.5 - 3.0	



A3 scale: 1:6,000
 0 0.04 0.08 0.12 0.16 0.2km

Map by: DTH/RB/KG Z:\GIS\GIS_3200_G2H\Tasks\3200-HY-201811041401_SurfaceWater\3200-HY-201811041401_FF\IV_FigXX-X_Afflux_v3.mxd Date: 3/02/2021 16:27



Legend

- 5 Chainage (km)
- Flood sensitive receptors
- G2H project alignment
- Road design

- EIS disturbance footprint
- Was Wet Now Dry
- Was Dry Now Wet
- Drainage Structures**
 - Local drainage culvert
 - Bridges

Change in peak water levels (m)

- | | |
|----------------|--------------|
| < -0.5 | 0.01 to 0.05 |
| -0.5 to -0.2 | 0.05 to 0.1 |
| -0.2 to -0.1 | 0.1 to 0.2 |
| -0.1 to -0.05 | 0.2 to 0.5 |
| -0.05 to -0.01 | > 0.5 |
| -0.01 to 0.01 | |



A3 scale: 1:6,000
 0 0.04 0.08 0.12 0.16 0.2km



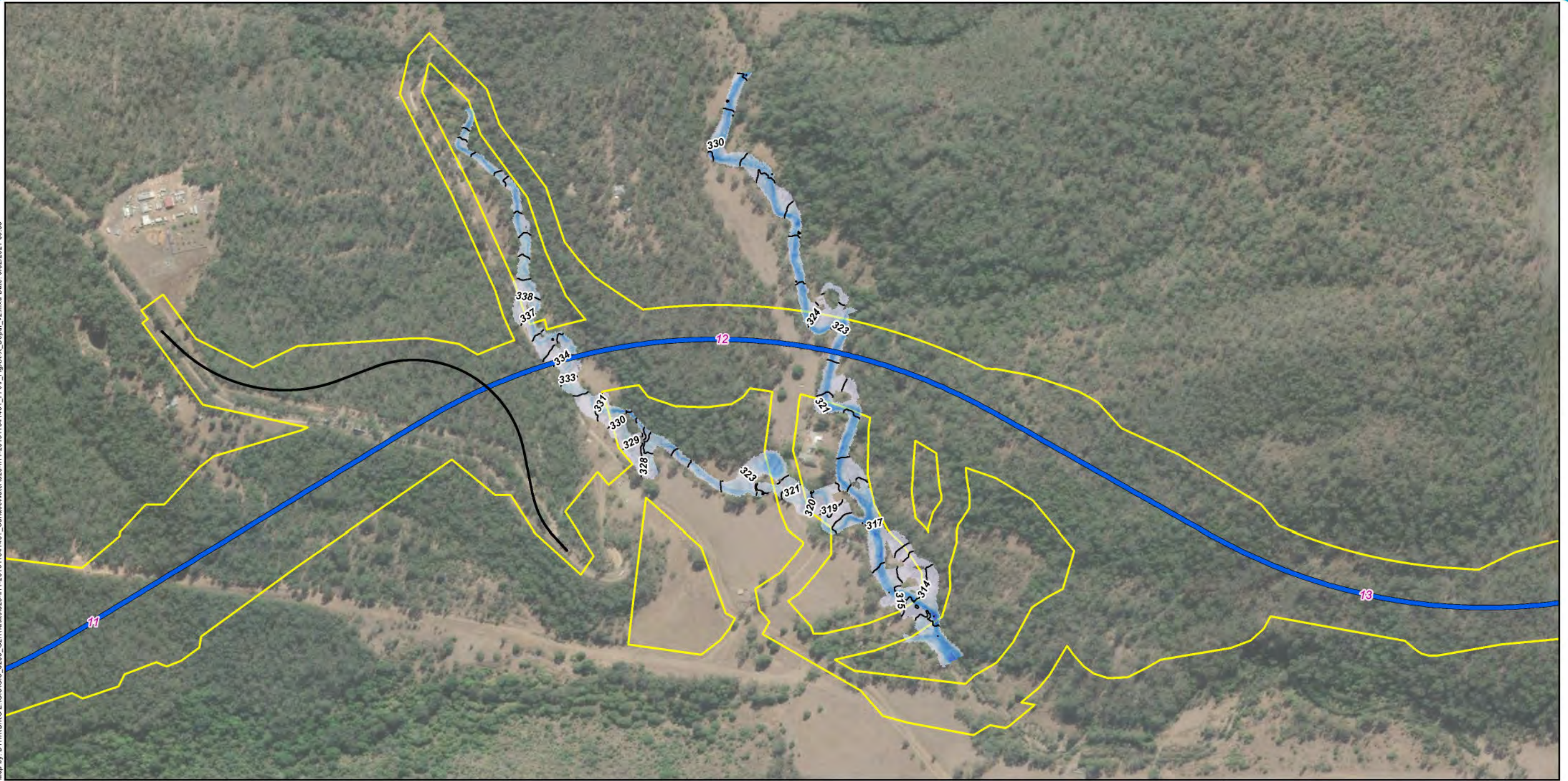
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Gowrie to Helidon

Figure C3-B: Developed Case - Afflux - 10% AEP event - Oaky Creek

Map by: D:\H\RB\KG\GIS\GIS_3200_G2H\Tasks\3200-HY-201811041401_SurfaceWater\3200-HY-201811041401_FF_V_FigXX-X_Depth_v2.mxd Date: 5/02/2021 08:33



Legend

- 5 Chainage (km)
- G2H project alignment
- Road design
- EIS disturbance footprint
- 1.0m contour mAHD

Depth (m)

- | | |
|-----------|-----------|
| 0 - 0.5 | 3.0 - 3.5 |
| 0.5 - 1.0 | 3.5 - 4.0 |
| 1.0 - 1.5 | 4.0 - 4.5 |
| 1.5 - 2.0 | 4.5 - 5.0 |
| 2.0 - 2.5 | > 5.0 |
| 2.5 - 3.0 | |



A3 scale: 1:6,000
 0 0.04 0.08 0.12 0.16 0.2km

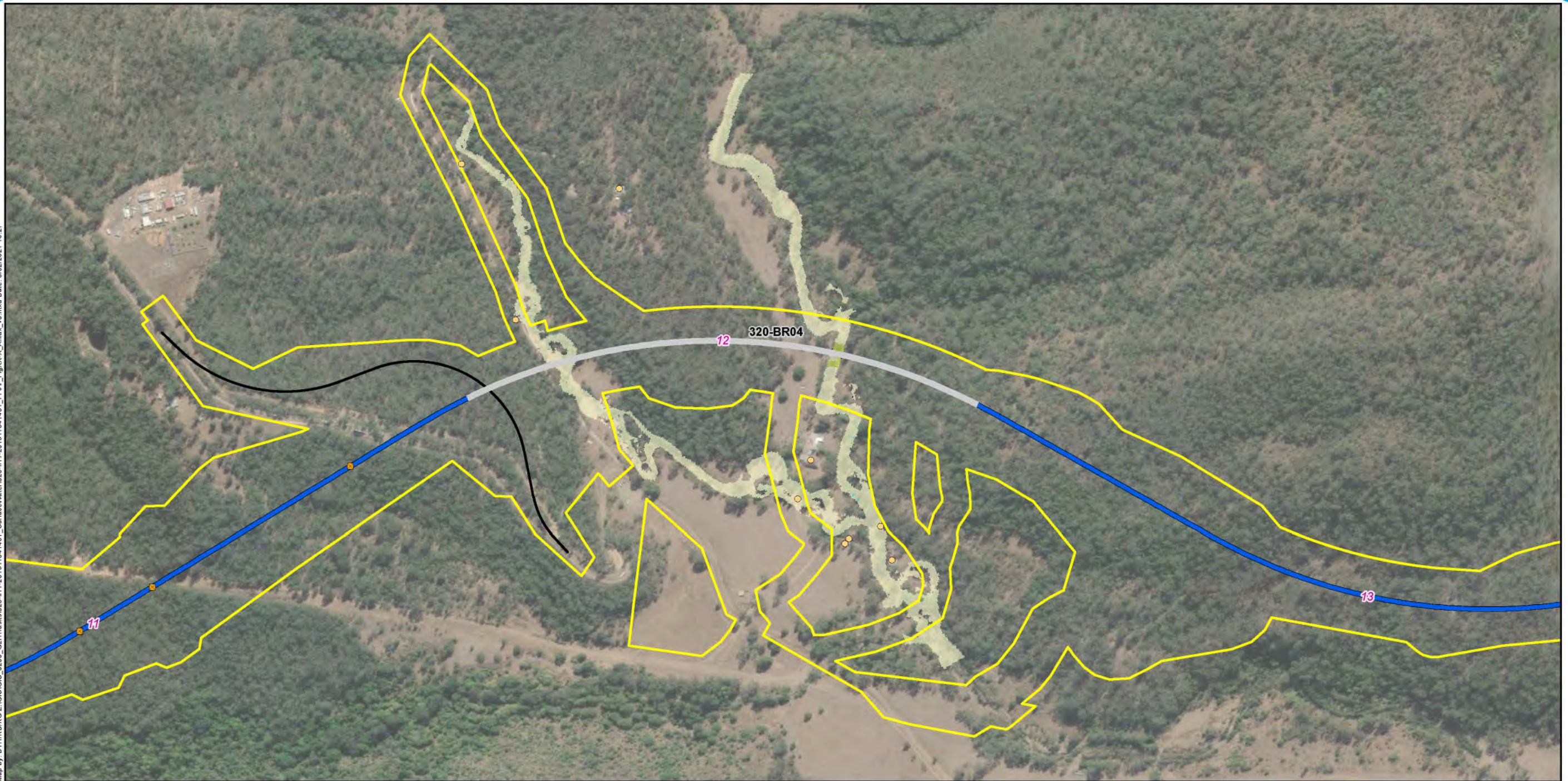


Issue date: 05/02/2021 Version: 2
 Coordinate System: GDA 1994 MGA Zone 56

Gowrie to Helidon

Figure C4-A: Existing Case - Inundation Extent - 5% AEP event - Oaky Creek

Map by: DTH/RB/KG Z:\GIS\GIS_3200_G2H\Tasks\3200-HY-201811041401_SurfaceWater\3200-HY-201811041401_FF_V_FigXX-X_Afflux_v3.mxd Date: 3/02/2021 16:27



Legend

- 5 Chainage (km)
- Flood sensitive receptors
- G2H project alignment
- Road design

- EIS disturbance footprint
- Was Wet Now Dry
- Was Dry Now Wet
- Drainage Structures**
 - Local drainage culvert
 - Bridges

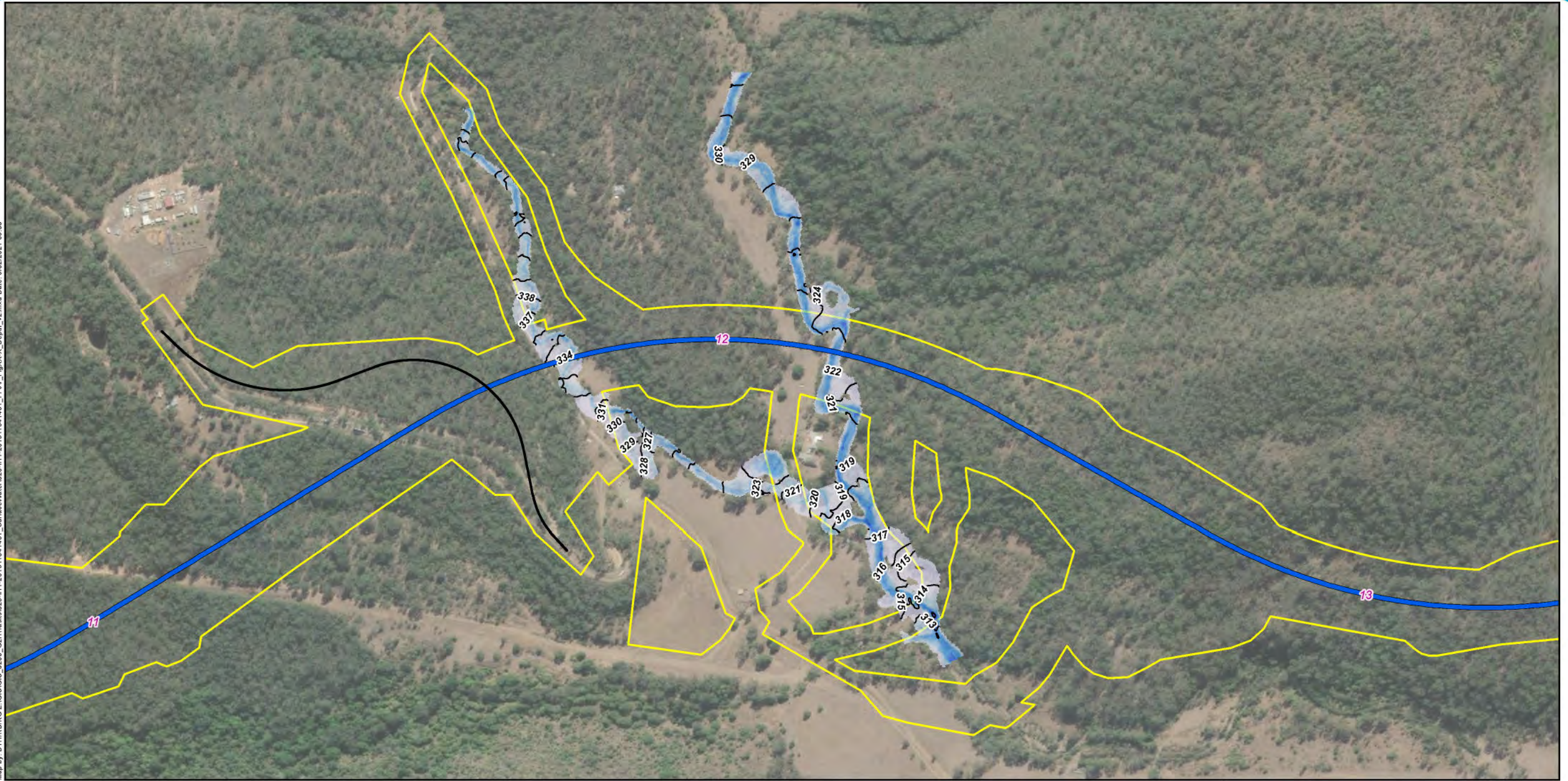
Change in peak water levels (m)

- | | |
|----------------|--------------|
| < -0.5 | 0.01 to 0.05 |
| -0.5 to -0.2 | 0.05 to 0.1 |
| -0.2 to -0.1 | 0.1 to 0.2 |
| -0.1 to -0.05 | 0.2 to 0.5 |
| -0.05 to -0.01 | > 0.5 |
| -0.01 to 0.01 | |



A3 scale: 1:6,000
 0 0.04 0.08 0.12 0.16 0.2km

Map by: D:\H\RB\KG\Z\GIS\GIS_3200_G2H\Tasks\320-HY-201811041401_SurfaceWater\320-HY-201811041401_FF_V_FigXX-X_Depth_v2.mxd Date: 5/02/2021 08:33

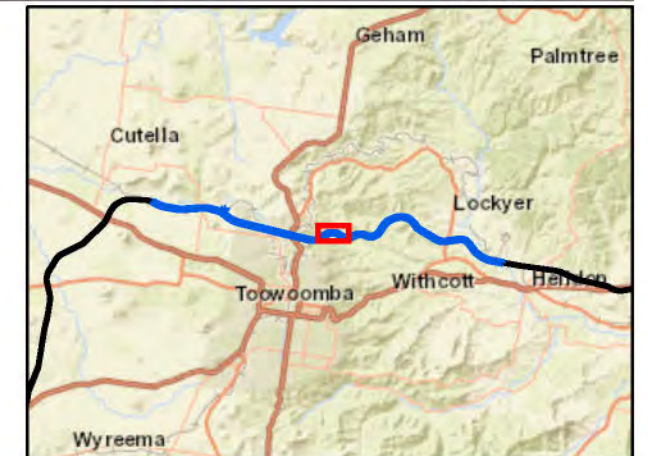


Legend

- 5 Chainage (km)
- G2H project alignment
- Road design
- EIS disturbance footprint
- 1.0m contour mAHD

Depth (m)

0 - 0.5	3.0 - 3.5
0.5 - 1.0	3.5 - 4.0
1.0 - 1.5	4.0 - 4.5
1.5 - 2.0	4.5 - 5.0
2.0 - 2.5	> 5.0
2.5 - 3.0	



A3 scale: 1:6,000
 0 0.04 0.08 0.12 0.16 0.2km



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Gowrie to Helidon

Figure C5-A: Existing Case - Inundation Extent - 2% AEP event - Oaky Creek

Map by: DTH/RB/KG Z:\GIS\GIS_3200_G2H\Tasks\3200-HY-201811041401_SurfaceWater\3200-HY-201811041401_FF_V_FigXX-X_Afflux_v3.mxd Date: 3/02/2021 16:27



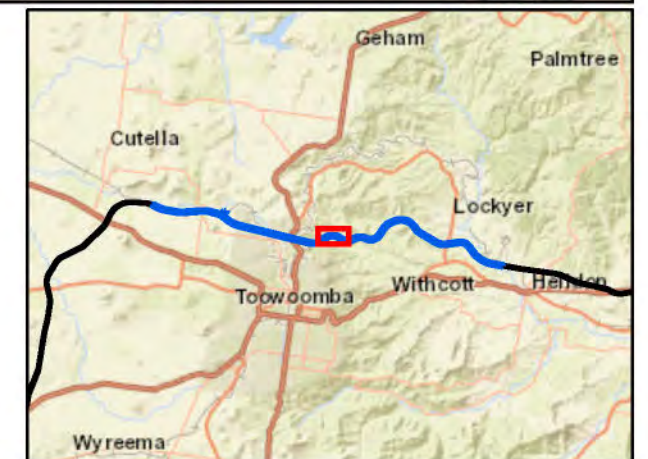
Legend

- 5 Chainage (km)
- Flood sensitive receptors
- G2H project alignment
- Road design

- EIS disturbance footprint
- Was Wet Now Dry
- Was Dry Now Wet
- Drainage Structures**
 - Local drainage culvert
 - Bridges

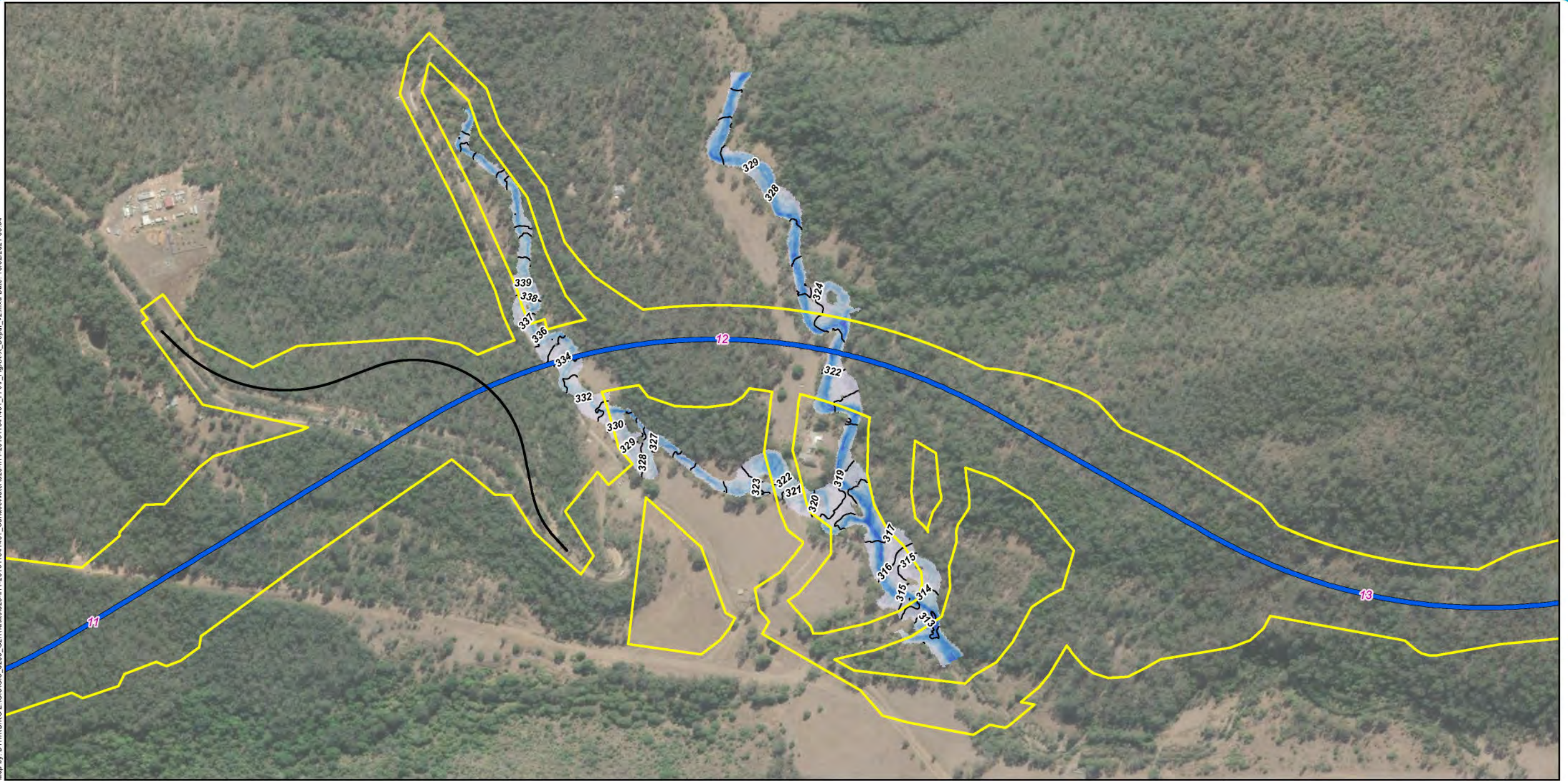
Change in peak water levels (m)

- | | |
|----------------|--------------|
| < -0.5 | 0.01 to 0.05 |
| -0.5 to -0.2 | 0.05 to 0.1 |
| -0.2 to -0.1 | 0.1 to 0.2 |
| -0.1 to -0.05 | 0.2 to 0.5 |
| -0.05 to -0.01 | > 0.5 |
| -0.01 to 0.01 | |



A3 scale: 1:6,000
 0 0.04 0.08 0.12 0.16 0.2km

Map by: D:\H\RB\KG\GIS\GIS_3200_G2H\Tasks\3200-HY-201811041401_SurfaceWater\3200-HY-201811041401_FF_V_FigXX-X_Depth_v2.mxd Date: 10/02/2021 09:54



Legend

- 5 Chainage (km)
- G2H project alignment
- Road design
- EIS disturbance footprint
- 1.0m contour mAHD

Depth (m)

 0 - 0.5	 3.0 - 3.5
 0.5 - 1.0	 3.5 - 4.0
 1.0 - 1.5	 4.0 - 4.5
 1.5 - 2.0	 4.5 - 5.0
 2.0 - 2.5	 > 5.0
 2.5 - 3.0	



A3 scale: 1:6,000
 0 0.04 0.08 0.12 0.16 0.2km



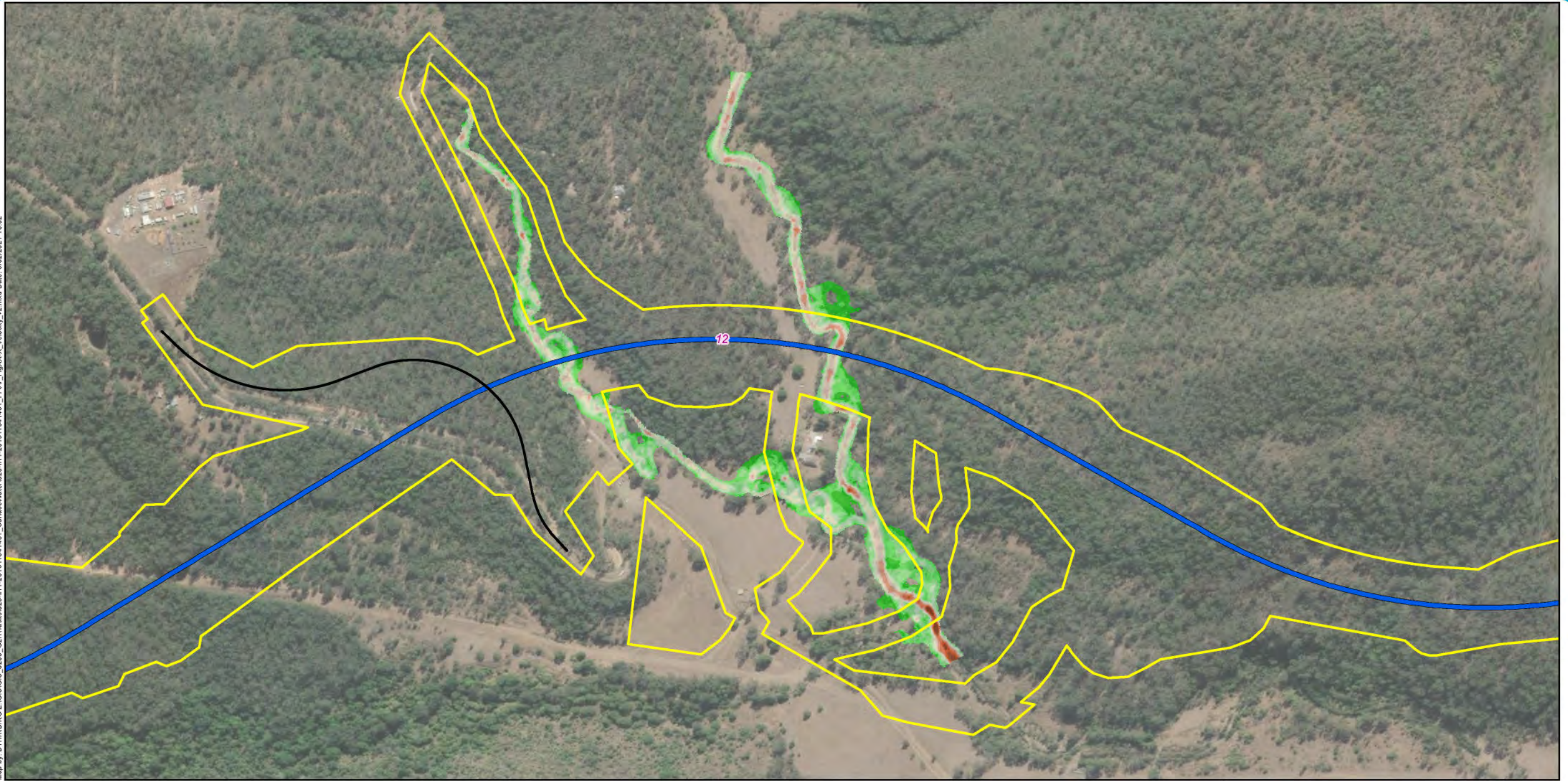
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Issue date: 10/02/2021 Version: 2
 Coordinate System: GDA 1994 MGA Zone 56

Gowrie to Helidon

Figure C6-A: Existing Case - Inundation Extent - 1% AEP event - Oaky Creek

Map by: DTH/RB/KG Z:\GIS\GIS_3200_G2H\Tasks\3200-HY-201811041401_SurfaceWater\3200-HY-201811041401_FF_V_FigXX-X_Velocity_v2.mxd Date: 5/02/2021 10:02



Legend

- 5 Chainage (km)
- G2H project alignment
- Road design

EIS disturbance footprint

Peak velocity (m/s)

0.0	3.0
0.5	3.5
1.0	4.0
1.5	4.5
2.0	5.0
2.5	



A3 scale: 1:6,000
 0 0.04 0.08 0.12 0.16 0.2km

Map by: DTH/RB/KG Z:\GIS\GIS_3200_G2H\Tasks\3200-HY-201811041401_SurfaceWater\3200-HY-201811041401_FF_V_FigXX-X_Afflux_v3.mxd Date: 3/02/2021 16:27



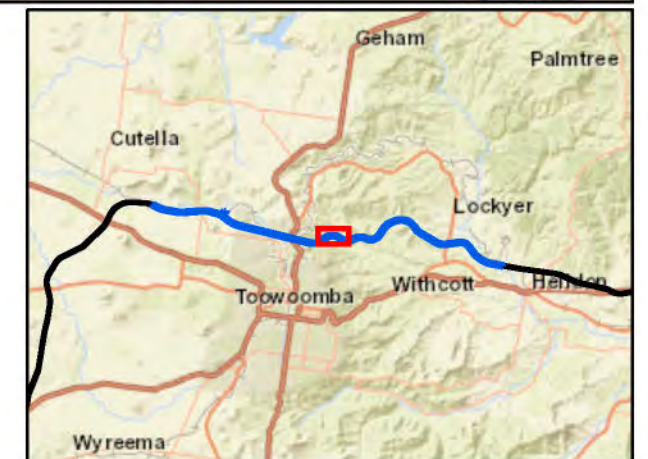
Legend

- 5 Chainage (km)
- Flood sensitive receptors
- G2H project alignment
- Road design

- EIS disturbance footprint
- Was Wet Now Dry
- Was Dry Now Wet
- Drainage Structures**
 - Local drainage culvert
 - Bridges

Change in peak water levels (m)

- | | |
|----------------|--------------|
| < -0.5 | 0.01 to 0.05 |
| -0.5 to -0.2 | 0.05 to 0.1 |
| -0.2 to -0.1 | 0.1 to 0.2 |
| -0.1 to -0.05 | 0.2 to 0.5 |
| -0.05 to -0.01 | > 0.5 |
| -0.01 to 0.01 | |



A3 scale: 1:6,000
 0 0.04 0.08 0.12 0.16 0.2km



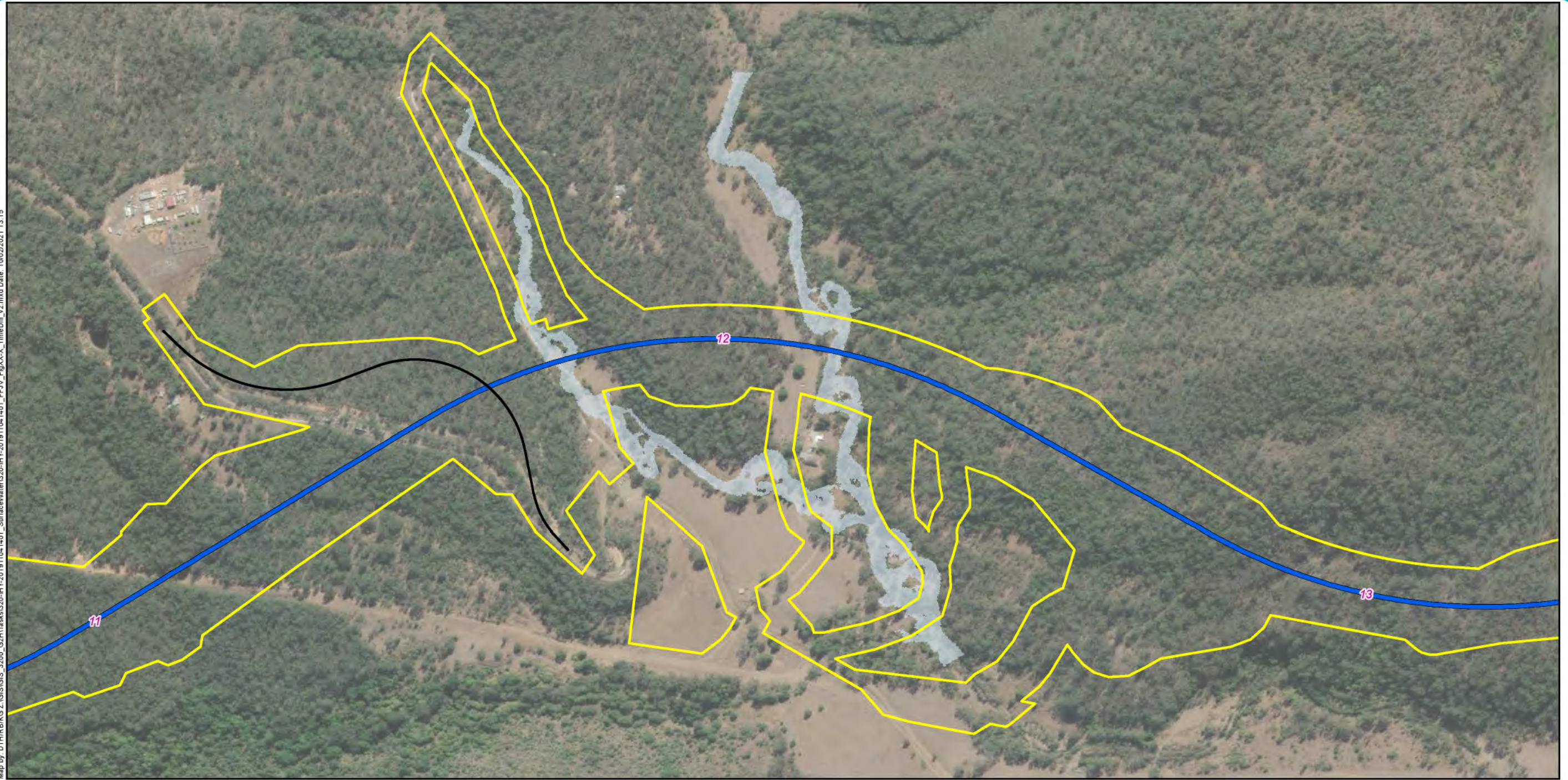
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 Coordinate System: GDA 1994 MGA Zone 56

Gowrie to Helidon

Figure C6-C: Developed Case - Afflux - 1% AEP event - Oaky Creek

Map by: D:\TRB\KG\GIS\GIS_3200_G2H\Tasks\3200-HY-201811041401_SurfaceWater\3200-HY-201811041401_FF_V_FigXX-X_TimeDiff_v2.mxd Date: 10/02/2021 13:15



Legend

- 5 Chainage (km)
- G2H project alignment
- Road design
- EIS disturbance footprint

Difference in Time of Submergence

- | | |
|-------------------------|-------------------------|
| 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 | |



A3 scale: 1:6,000
 0 0.04 0.08 0.12 0.16 0.2km



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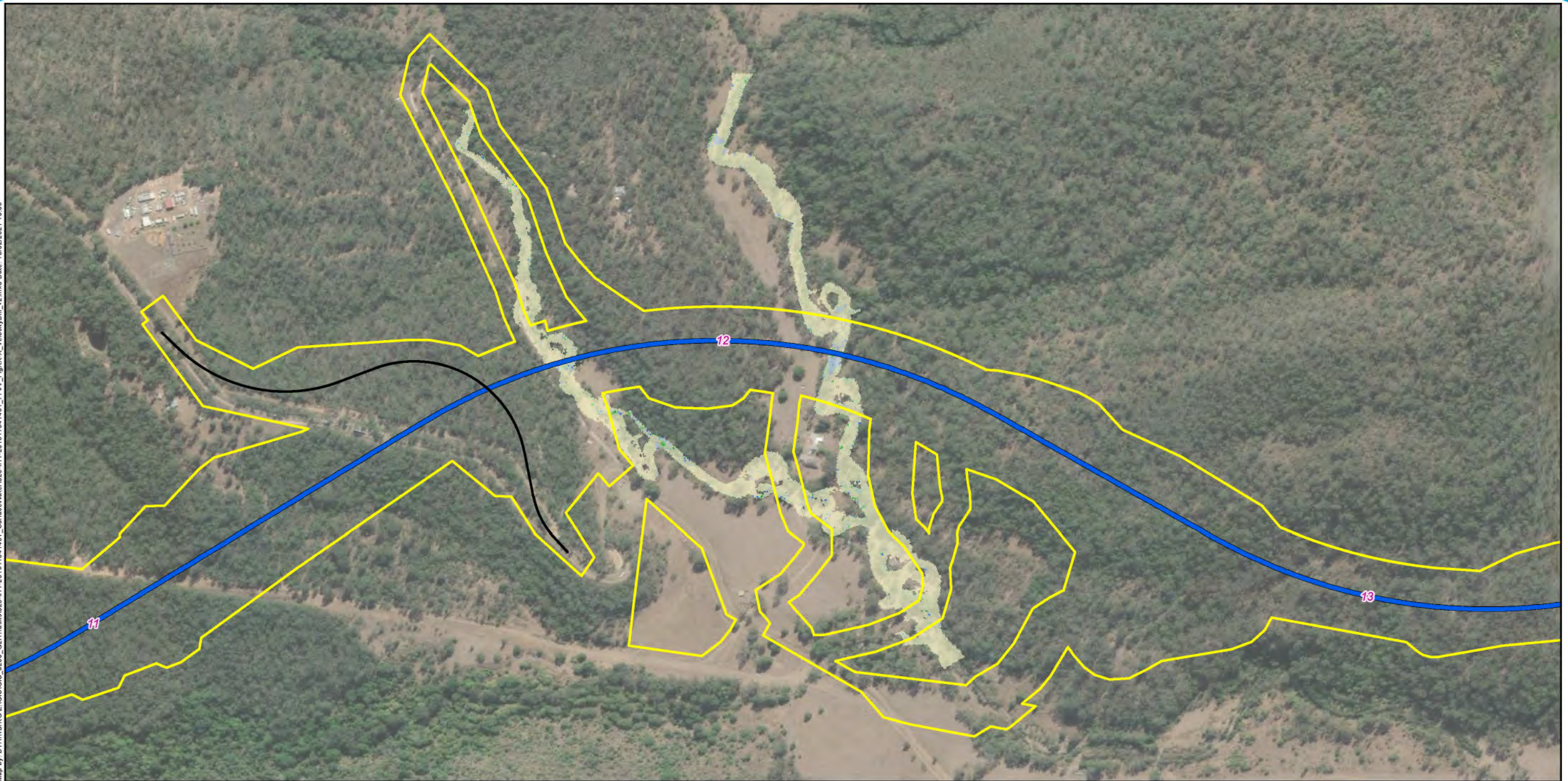
Issue date: 10/02/2021 Version: 2
 Coordinate System: GDA 1994 MGA Zone 56

Gowrie to Helidon

Figure C6-D:

Developed Case - Difference in Time of Submergence - 1% AEP event - Oaky Creek

Map by: DTH/RB/KG Z:\GIS\GIS_3200_G2H\Tasks\3200-HY-201811041401_SurfaceWater\3200-HY-201811041401_FF_V_V_FigXX-X_VelocityDiff_v2.mxd Date: 10/02/2021 13:09



Legend

- 5 Chainage (km)
- Flood sensitive receptors
- G2H project alignment
- Road design
- EIS disturbance footprint

Change in peak velocity (m/s)

< -0.50	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	



A3 scale: 1:6,000
 0 0.04 0.08 0.12 0.16 0.2km



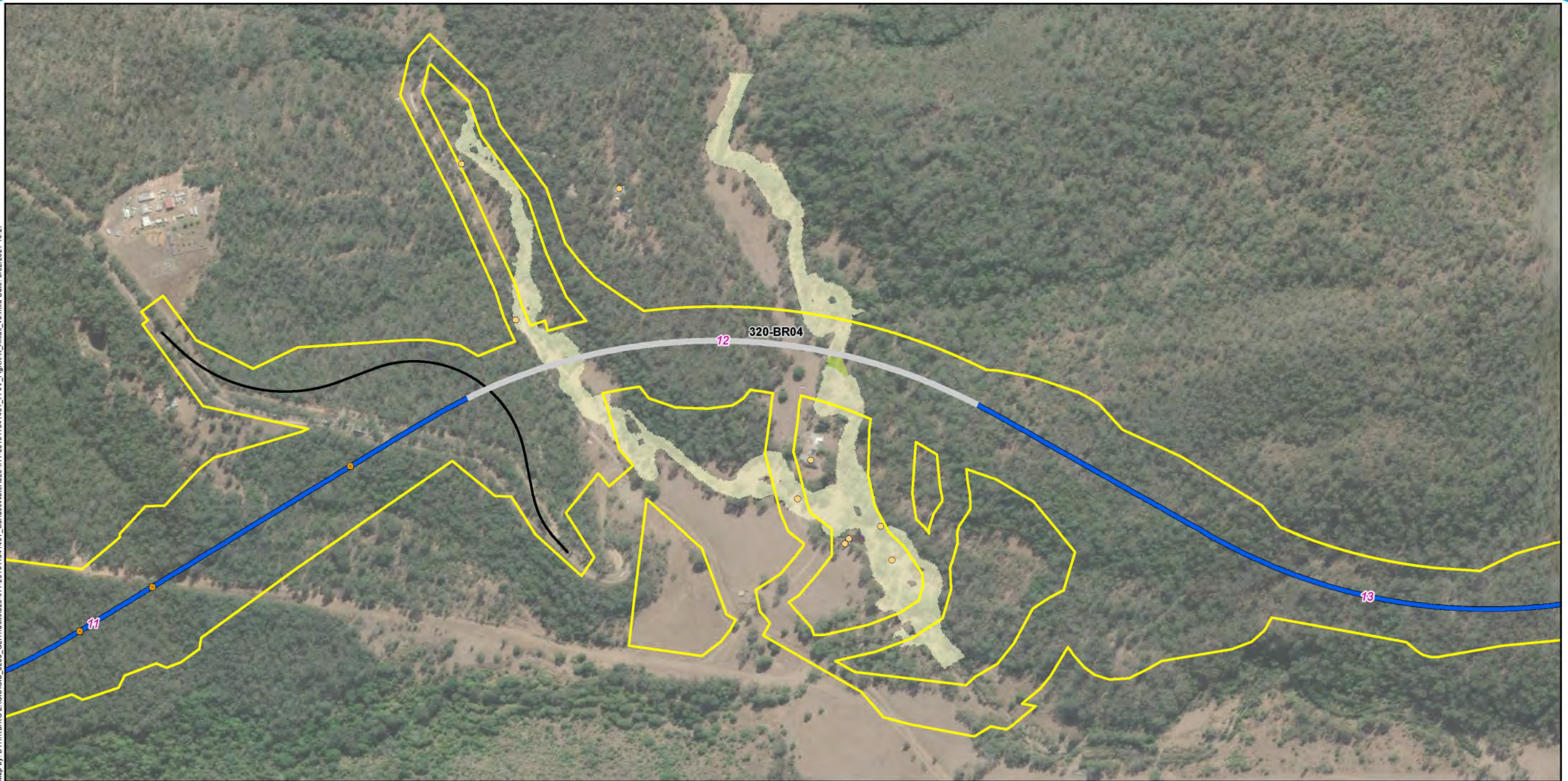
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 Coordinate System: GDA 1994 MGA Zone 56

Gowrie to Helidon

Figure C6-E: Developed Case - Difference in Velocity - 1% AEP event - Oaky Creek

Map by: DTH/RB/KG Z:\GIS\GIS_3200_G2H\Tasks\3200-HY-201811041401_SurfaceWater\3200-HY-201811041401_FF_V_FigXX-X_Afflux_v3.mxd Date: 3/02/2021 16:27



Legend

- 5 Chainage (km)
- Flood sensitive receptors
- G2H project alignment
- Road design

- EIS disturbance footprint
- Was Wet Now Dry
- Was Dry Now Wet
- Drainage Structures**
 - Local drainage culvert
 - Bridges

Change in peak water levels (m)

- | | |
|----------------|--------------|
| < -0.5 | 0.01 to 0.05 |
| -0.5 to -0.2 | 0.05 to 0.1 |
| -0.2 to -0.1 | 0.1 to 0.2 |
| -0.1 to -0.05 | 0.2 to 0.5 |
| -0.05 to -0.01 | > 0.5 |
| -0.01 to 0.01 | |



A3 scale: 1:6,000
 0 0.04 0.08 0.12 0.16 0.2km



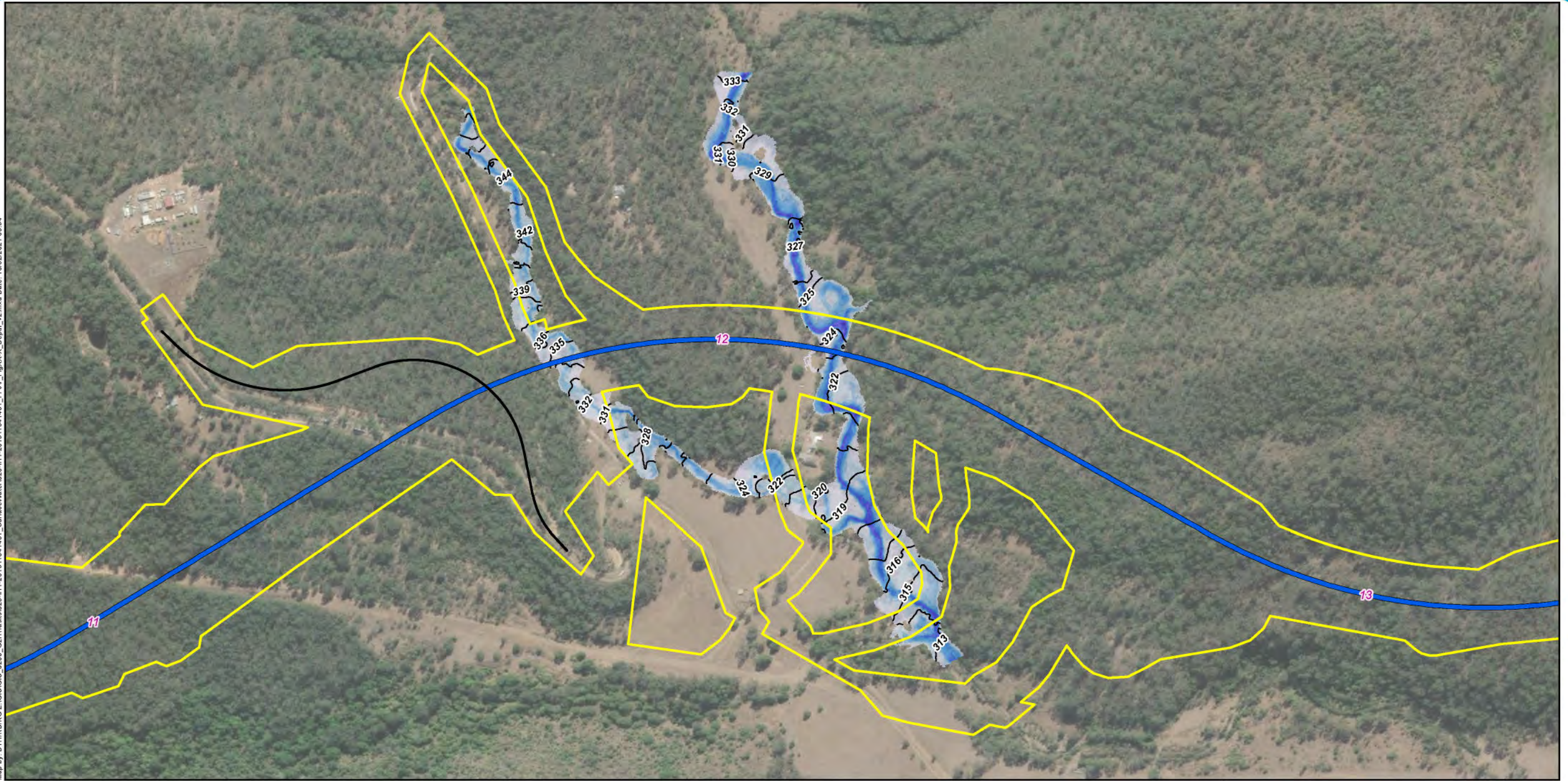
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Gowrie to Helidon

Figure C6-F: Developed Case - Climate Change - Afflux - 1% AEP event - Oaky Creek

Map by: DTH/RB/KG Z:\GIS\GIS_3200_G2H\Tasks\3200-HY-201811041401_SurfaceWater\3200-HY-201811041401_FF_V_FigXX-X_Depth_v2.mxd Date: 10/02/2021 09:54



Legend

- 5 Chainage (km)
- G2H project alignment
- Road design
- EIS disturbance footprint
- 1.0m contour mAHD

Depth (m)

 0 - 0.5	 3.0 - 3.5
 0.5 - 1.0	 3.5 - 4.0
 1.0 - 1.5	 4.0 - 4.5
 1.5 - 2.0	 4.5 - 5.0
 2.0 - 2.5	 > 5.0
 2.5 - 3.0	



A3 scale: 1:6,000
 0 0.04 0.08 0.12 0.16 0.2km



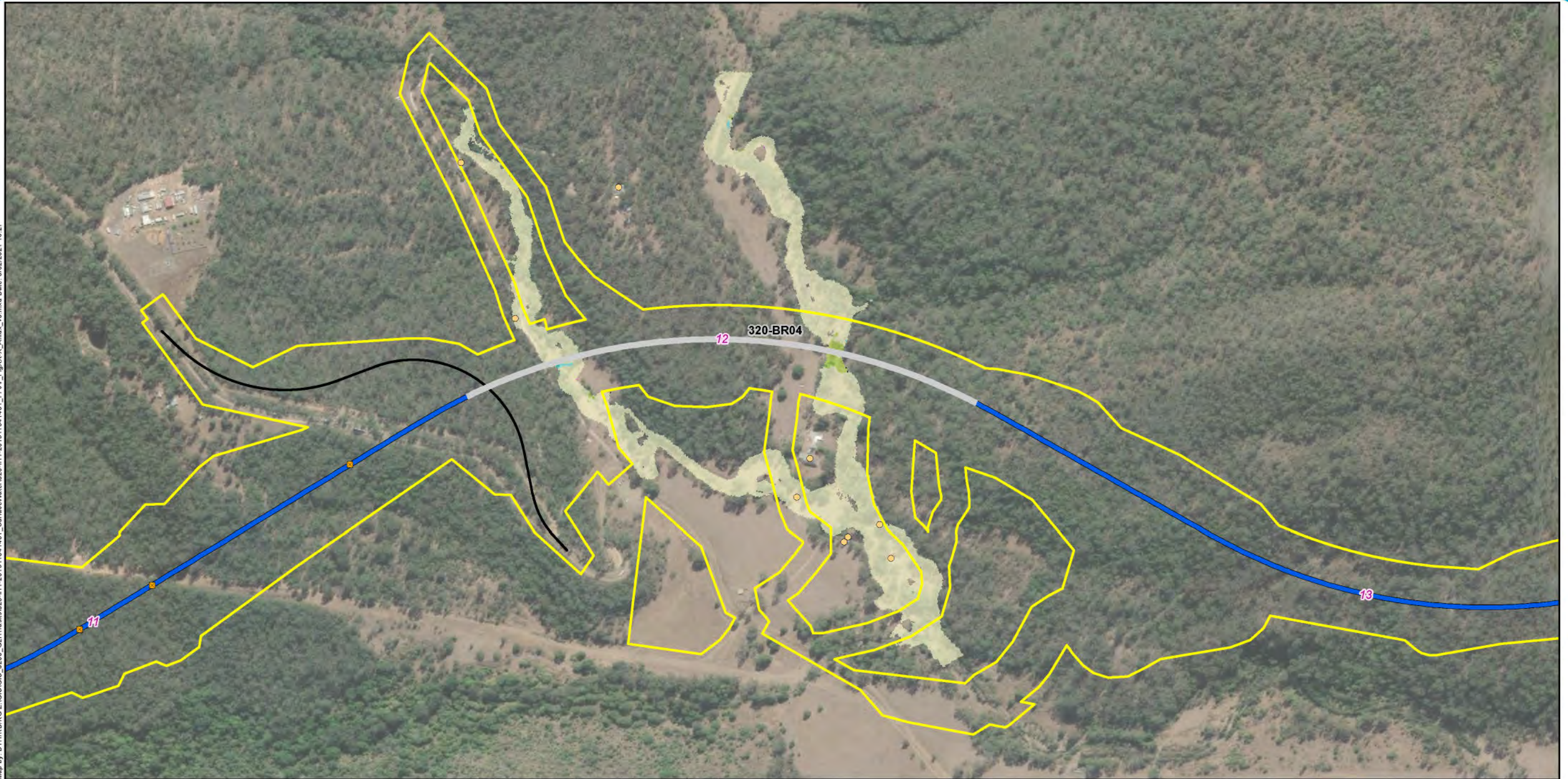
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Issue date: 10/02/2021 Version: 2
 Coordinate System: GDA 1994 MGA Zone 56

Gowrie to Helidon

Figure C7-A: Existing Case - Inundation Extent -1 in 2,000 AEP event - Oaky Creek

Map by: DTH/RB/KG Z:\GIS\GIS_3200_G2H\Tasks\3200-HY-201811041401_SurfaceWater\3200-HY-201811041401_FF_V_FigXX-X_Afflux_v3.mxd Date: 3/02/2021 16:27



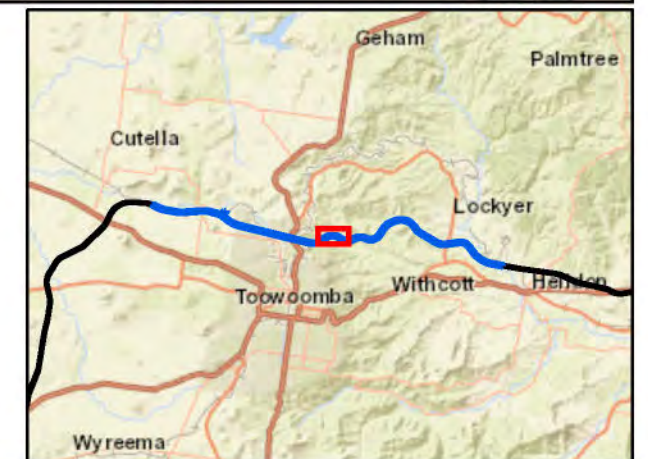
Legend

- 5 Chainage (km)
- Flood sensitive receptors
- G2H project alignment
- Road design

- EIS disturbance footprint
- Was Wet Now Dry
- Was Dry Now Wet
- Drainage Structures**
 - Local drainage culvert
 - Bridges

Change in peak water levels (m)

- | | |
|----------------|--------------|
| < -0.5 | 0.01 to 0.05 |
| -0.5 to -0.2 | 0.05 to 0.1 |
| -0.2 to -0.1 | 0.1 to 0.2 |
| -0.1 to -0.05 | 0.2 to 0.5 |
| -0.05 to -0.01 | > 0.5 |
| -0.01 to 0.01 | |



A3 scale: 1:6,000
 0 0.04 0.08 0.12 0.16 0.2km



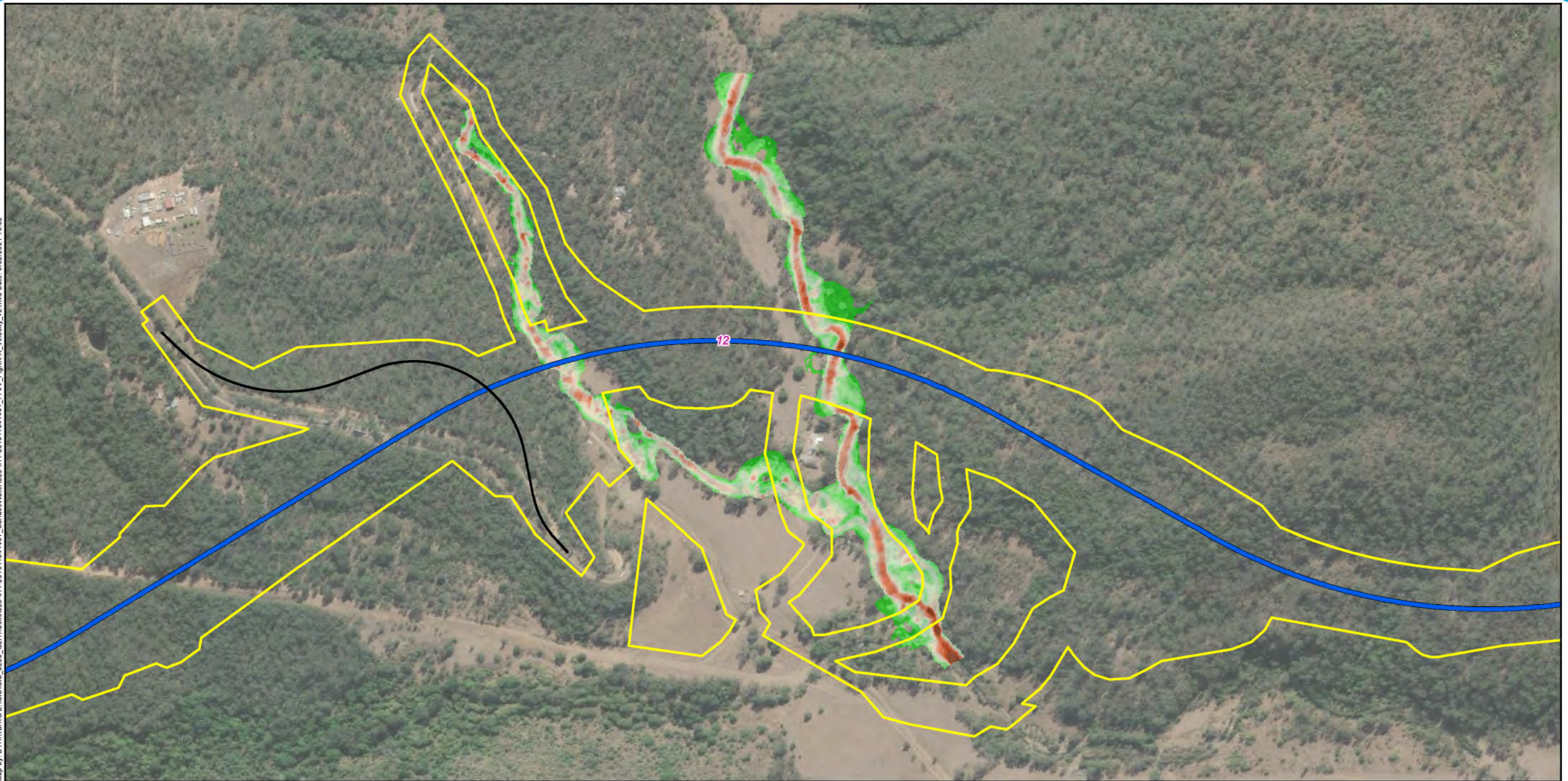
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Issue date: 03/02/2021 Version: 3
 Coordinate System: GDA 1994 MGA Zone 56

Gowrie to Helidon

Figure C7-B: Developed Case - Afflux - 1 in 2,000 AEP - Oaky Creek

Map by: D:\H\RB\KG\GIS\GIS_3200_G2H\Tasks\3200-HY-201811041401_SurfaceWater\3200-HY-201811041401_FF_V_Velocity_v2.mxd Date: 5/02/2021 10:02



Legend

- 5 Chainage (km)
- G2H project alignment
- Road design
- EIS disturbance footprint

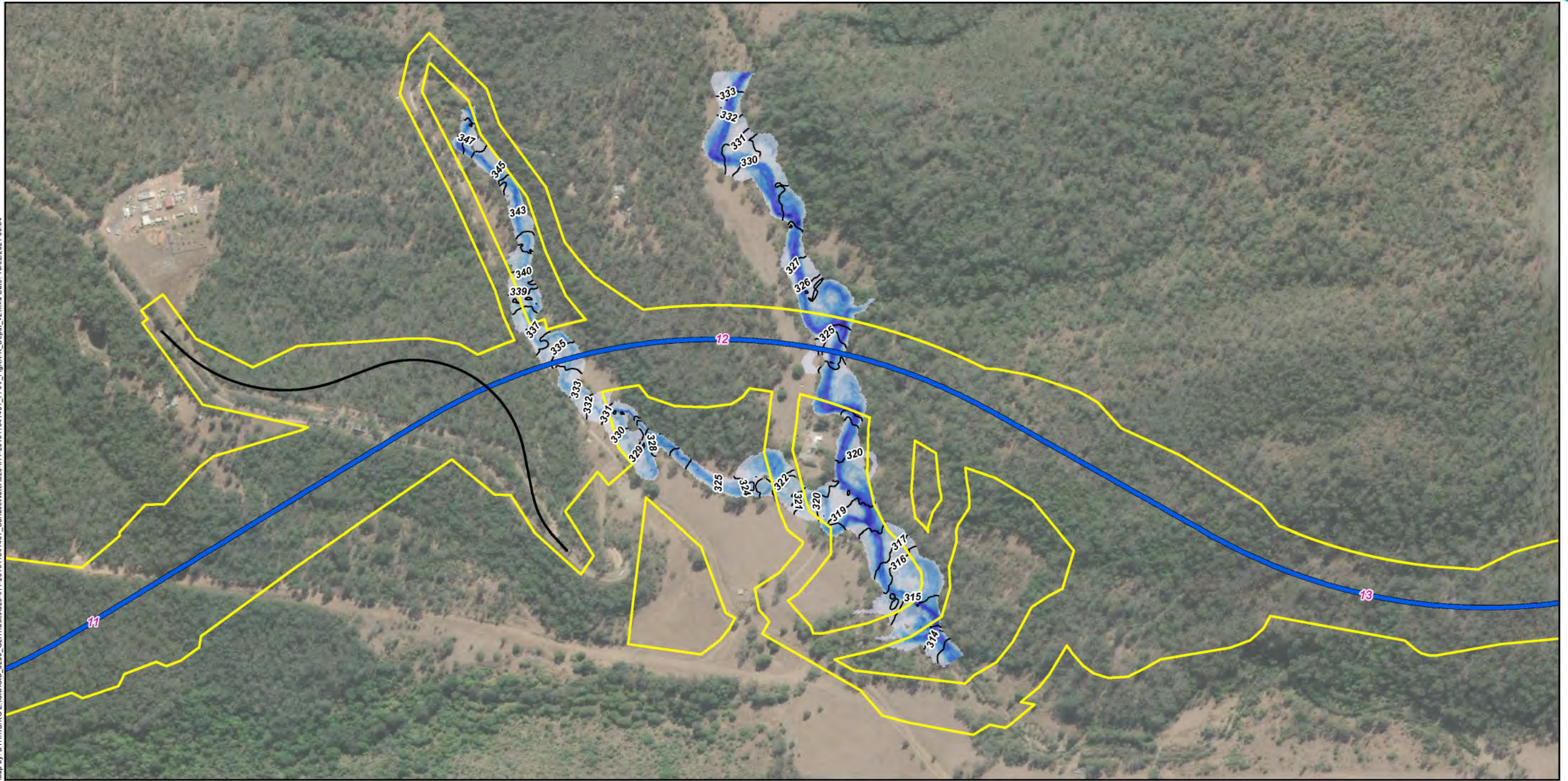
Peak velocity (m/s)

0.0	3.0
0.5	3.5
1.0	4.0
1.5	4.5
2.0	5.0
2.5	



A3 scale: 1:6,000
 0 0.04 0.08 0.12 0.16 0.2km

Map by: D:\HRRB\KG\GIS\GIS\3200_G2H\Tasks\3200-HY-201811041401_SurfaceWater\3200-HY-201811041401_FF_V_FigXX-X_Depth_v2.mxd Date: 10/02/2021 09:54



Legend

- 5 Chainage (km)
- G2H project alignment
- Road design
- EIS disturbance footprint
- 1.0m contour mAHD

Depth (m)

- | | |
|-----------|-----------|
| 0 - 0.5 | 3.0 - 3.5 |
| 0.5 - 1.0 | 3.5 - 4.0 |
| 1.0 - 1.5 | 4.0 - 4.5 |
| 1.5 - 2.0 | 4.5 - 5.0 |
| 2.0 - 2.5 | > 5.0 |
| 2.5 - 3.0 | |



A3 scale: 1:6,000
 0 0.04 0.08 0.12 0.16 0.2km



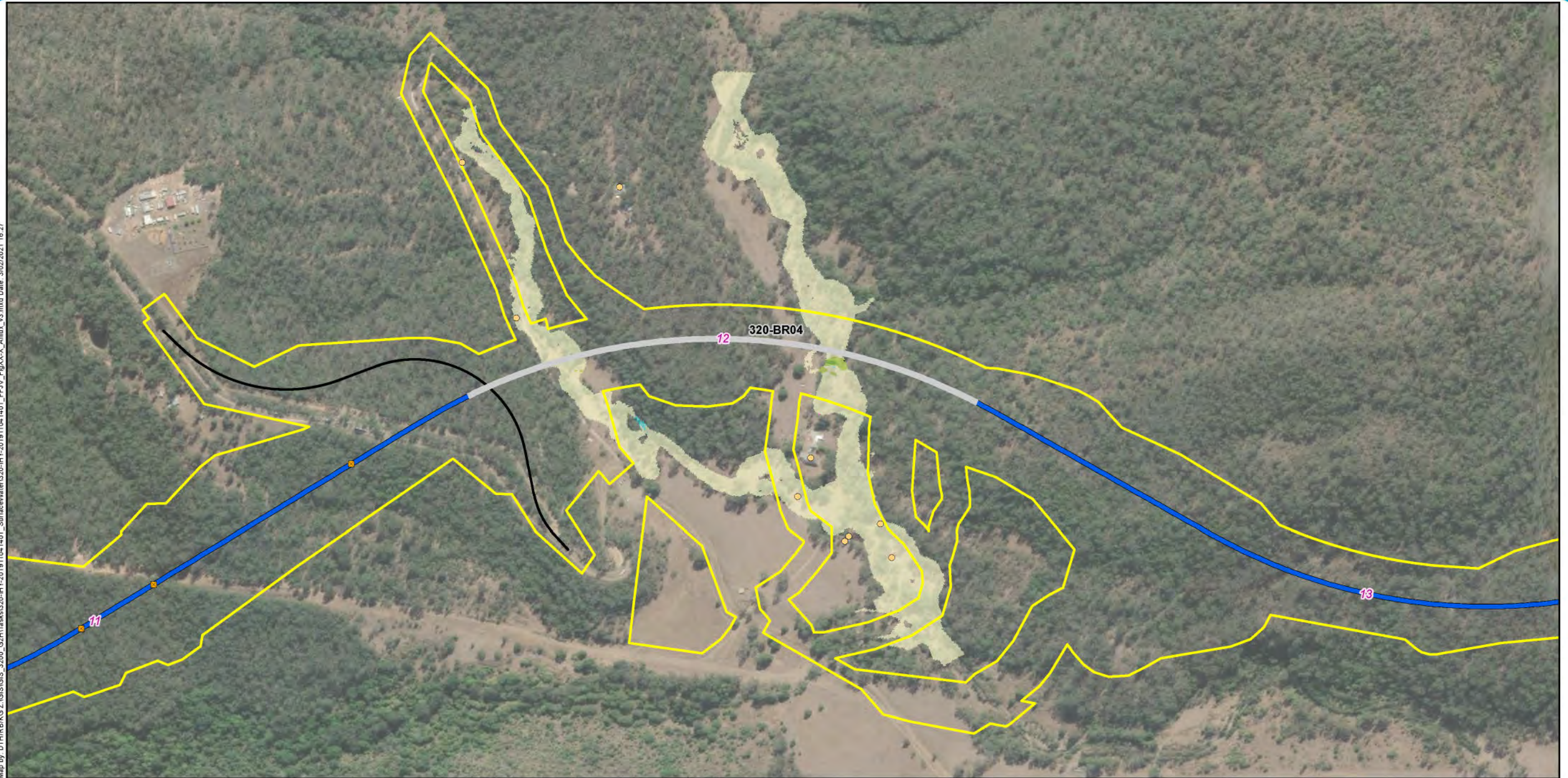
Future Freight
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Issue date: 10/02/2021 Version: 2
 Coordinate System: GDA 1994 MGA Zone 56

Gowrie to Helidon

Figure C8-A: Existing Case - Inundation Extent - 1 in 10,000 AEP event - Oaky Creek

Map by: DTH/RB/KG Z:\GIS\GIS_3200_G2H\Tasks\3200-HY-201811041401_SurfaceWater\3200-HY-201811041401_FF_V_FigXX-X_Afflux_v3.mxd Date: 3/02/2021 16:27



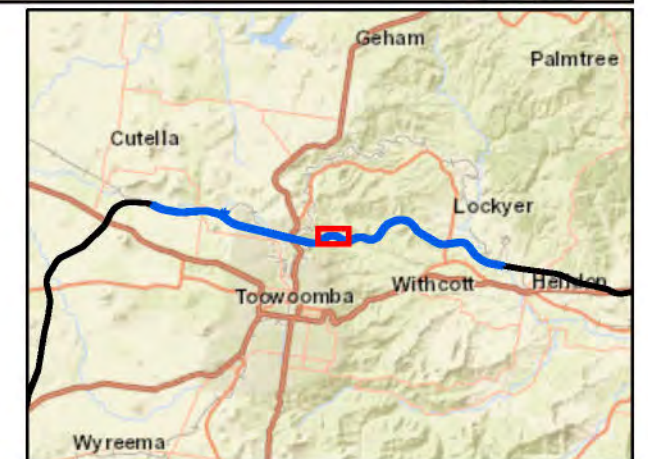
Legend

- 5 Chainage (km)
- Flood sensitive receptors
- G2H project alignment
- Road design

- EIS disturbance footprint
- Was Wet Now Dry
- Was Dry Now Wet
- Drainage Structures**
 - Local drainage culvert
 - Bridges

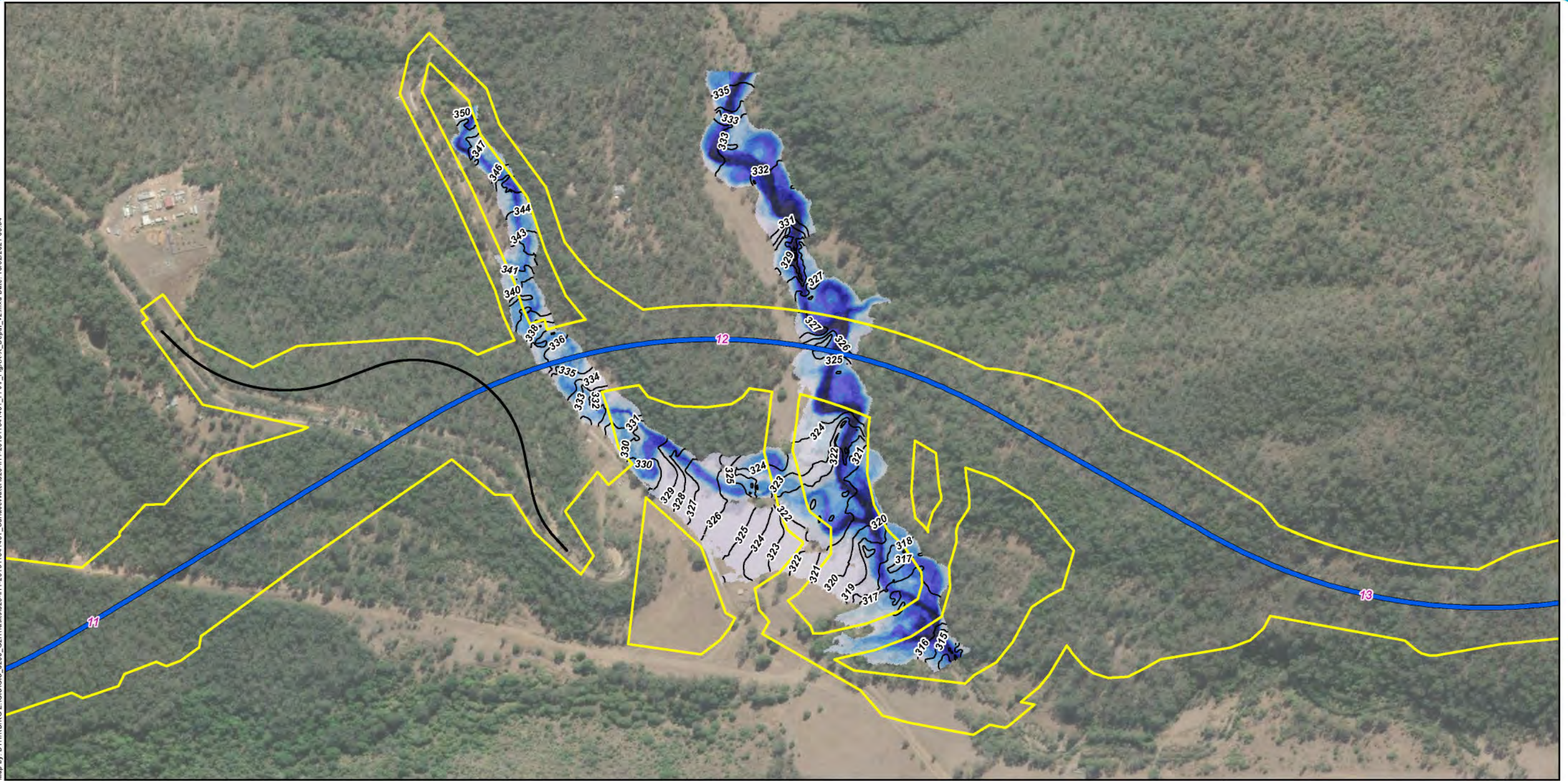
Change in peak water levels (m)

- | | |
|------------------|----------------|
| □ < -0.5 | □ 0.01 to 0.05 |
| □ -0.5 to -0.2 | □ 0.05 to 0.1 |
| □ -0.2 to -0.1 | □ 0.1 to 0.2 |
| □ -0.1 to -0.05 | □ 0.2 to 0.5 |
| □ -0.05 to -0.01 | □ > 0.5 |
| □ -0.01 to 0.01 | |



A3 scale: 1:6,000
 0 0.04 0.08 0.12 0.16 0.2km

Map by: D:\HRRB\KG\GIS\GIS\3200_G2H\Tasks\3200-HY-201811041401_SurfaceWater\3200-HY-201811041401_FF_V1_FigXX-X_Depth_v2.mxd Date: 10/02/2021 09:54



Legend

- 5 Chainage (km)
- G2H project alignment
- Road design
- EIS disturbance footprint
- 1.0m contour mAHD

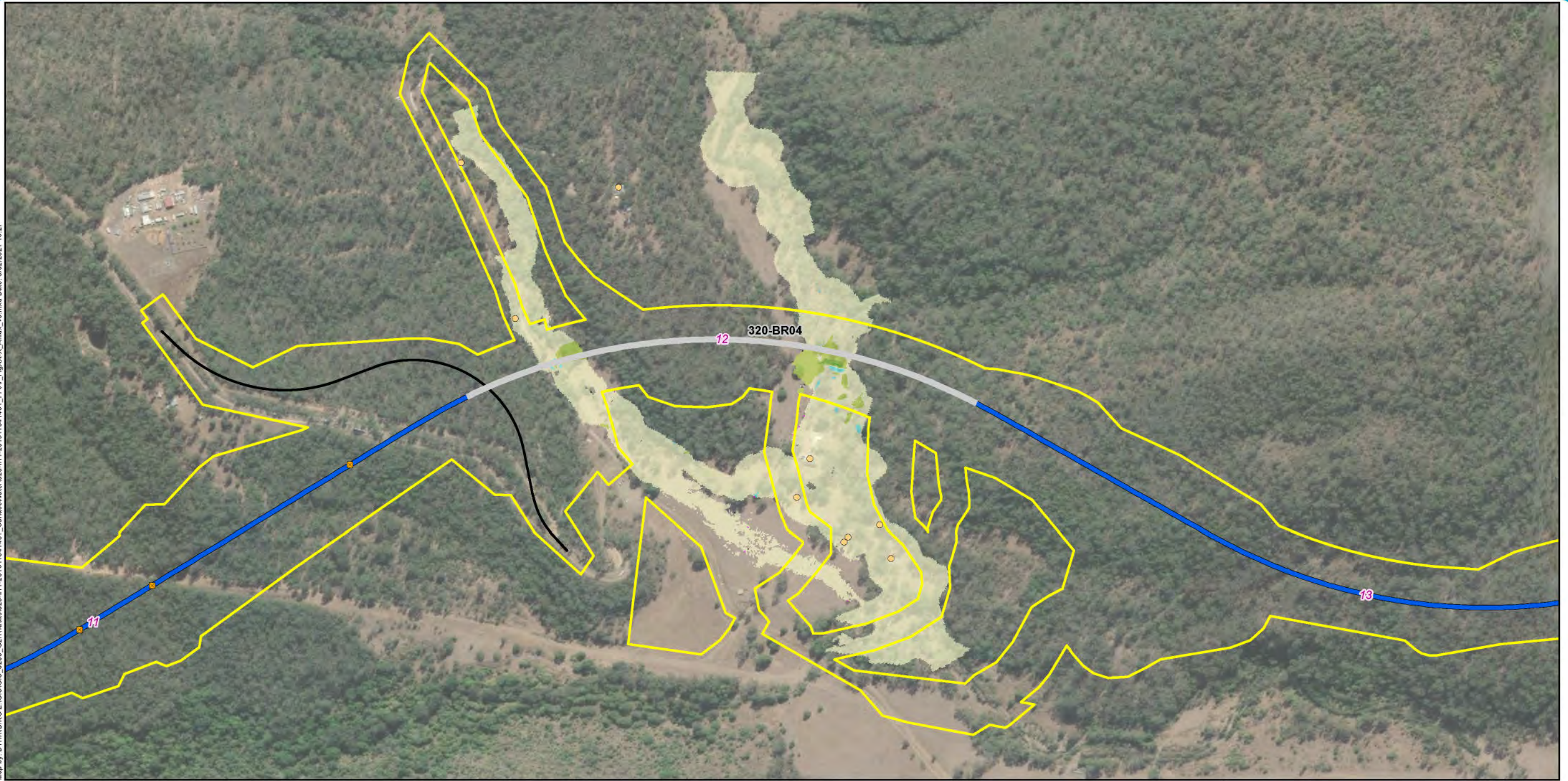
Depth (m)

- | | |
|-----------|-----------|
| 0 - 0.5 | 3.0 - 3.5 |
| 0.5 - 1.0 | 3.5 - 4.0 |
| 1.0 - 1.5 | 4.0 - 4.5 |
| 1.5 - 2.0 | 4.5 - 5.0 |
| 2.0 - 2.5 | > 5.0 |
| 2.5 - 3.0 | |



A3 scale: 1:6,000
 0 0.04 0.08 0.12 0.16 0.2km

Map by: DTH/RB/KG Z:\GIS\GIS_3200_G2H\Tasks\3200-HY-201811041401_SurfaceWater\3200-HY-201811041401_FF_V_FigXX-X_Afflux_v3.mxd Date: 3/02/2021 16:27



Legend

- 5 Chainage (km)
- Flood sensitive receptors
- G2H project alignment
- Road design

- EIS disturbance footprint
- Was Wet Now Dry
- Was Dry Now Wet
- Drainage Structures**
 - Local drainage culvert
 - Bridges

Change in peak water levels (m)

- | | |
|------------------|----------------|
| □ < -0.5 | □ 0.01 to 0.05 |
| □ -0.5 to -0.2 | □ 0.05 to 0.1 |
| □ -0.2 to -0.1 | □ 0.1 to 0.2 |
| □ -0.1 to -0.05 | □ 0.2 to 0.5 |
| □ -0.05 to -0.01 | □ > 0.5 |
| □ -0.01 to 0.01 | |



A3 scale: 1:6,000
 0 0.04 0.08 0.12 0.16 0.2km



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Gowrie to Helidon

Figure C9-B: Developed Case - Afflux - PMF event - Oaky Creek

APPENDIX

M

Hydrology and Flooding

Appendix D Six Mile Creek figures

GOWRIE TO HELIDON ENVIRONMENTAL IMPACT STATEMENT



Appendix D

Six Mile Creek Figures

Figure D1- A: Locality

Figure D1- B: Hydrology setup

Figure D1- C: TUFLOW model setup

Figure D1- D: Design structures

Figure D1- E: Flood Sensitive Receptors

Figure D2- A: Existing Case - Inundation Extent - 20% AEP event

Figure D2- B: Developed Case - Afflux - 20% AEP event

Figure D3- A: Existing Case - Inundation Extent - 10% AEP event

Figure D3- B: Developed Case - Afflux - 10% AEP event

Figure D4- A: Existing Case - Inundation Extent - 5% AEP event

Figure D4- B: Developed Case - Afflux - 5% AEP event

Figure D5- A: Existing Case - Inundation Extent - 2% AEP event

Figure D5- B: Developed Case - Afflux - 2% AEP event

Figure D6- A: Existing Case - Inundation Extent - 1% AEP event

Figure D6- B: Developed Case - Afflux - 1% AEP event

Figure D6- C: 1% AEP event Developed Case velocity

Figure D6- D: Developed Case - Difference in Velocity -1% AEP event

Figure D6- E: Developed Case - Difference in Time of Submergence - 1% AEP event

Figure D7- A: Existing Case - Inundation Extent -1 in 2,000 AEP event

Figure D7- B: Developed Case - Afflux -1 in 2,000 AEP

Figure D7- C: Developed Case - Velocity - 1 in 2,000 AEP event

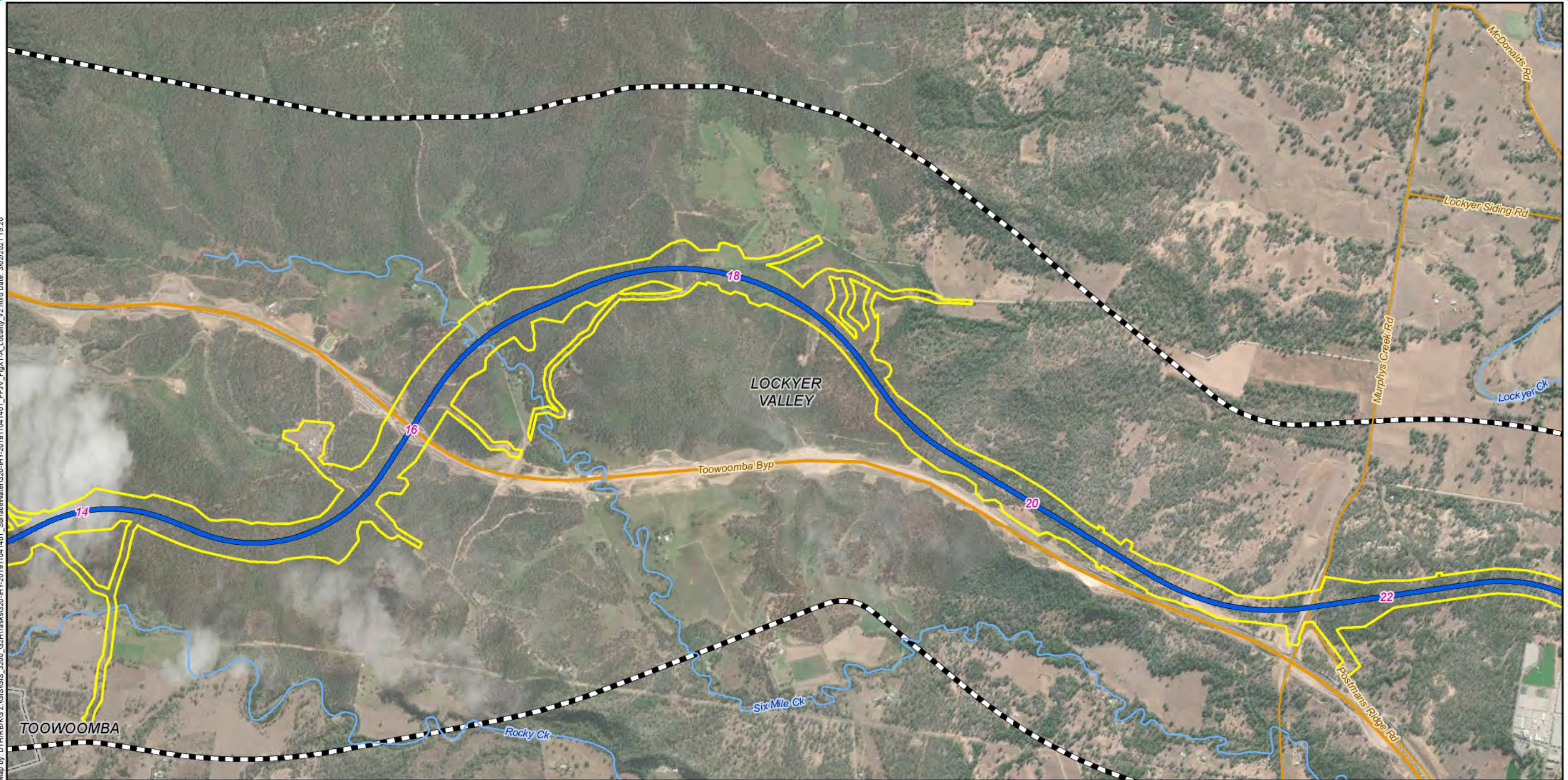
Figure D8- A: Existing Case - Inundation Extent - 1 in 10,000 AEP event

Figure D8- B: Developed Case - Afflux - 1 in 10,000 AEP event

Figure D9- A: Existing Case - Inundation Extent - PMF event

Figure D9- B: Developed Case - Afflux - PMF even

Map by: DTH/RB/KG Z:\GIS\GIS_3200_G2H\Tasks\3200-HY-201811041401_SurfaceWater\3200-HY-201811041401_FF_V1_A_Locality_V2.mxd Date: 30/02/2021 15:20



Legend

- | | |
|-----------------------|----------------------------|
| 5 Chainage (km) | EIS disturbance footprint |
| G2H project alignment | EIS investigation corridor |
| Major roads | Local Government Areas |
| Minor roads | |
| Watercourses | |



A3 scale: 1:22,000
 0 0.15 0.3 0.45 0.6 0.75 km



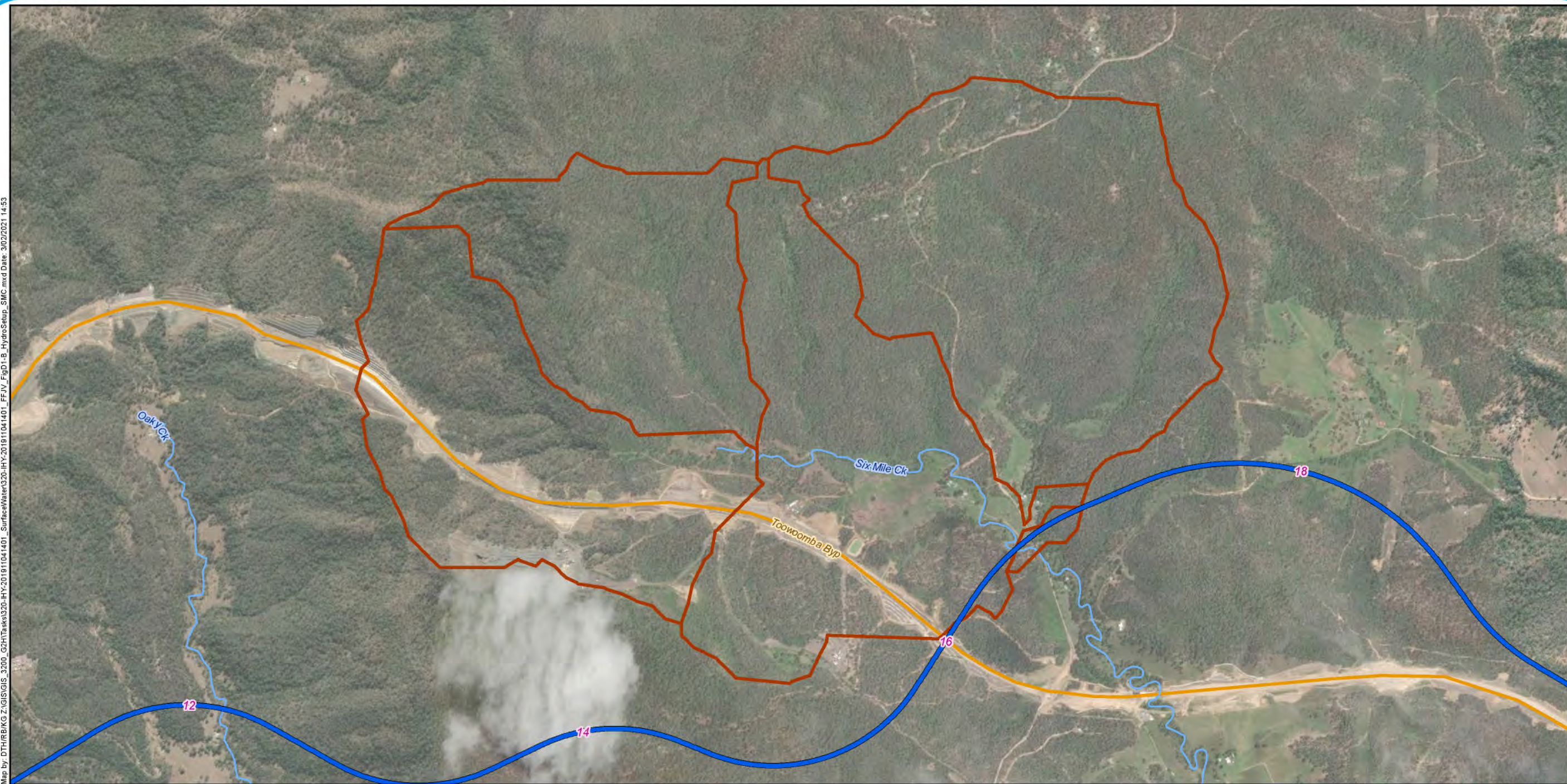
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Gowrie to Helidon

Figure D1-A: Locality - Six Mile Creek

Map by: DTH/RB/KG Z:\GIS\GIS_3200_G2H\Tasks\3200-HY-201811041401_SurfaceWater\3200-HY-201811041401_FF JV_FigD1-B_HydroSetup_SMC.mxd Date: 30/2/2021 14:53



Legend

- 5 Chainage (km)
- Localities
- G2H project alignment
- Watercourses
- Major roads
- Minor roads
- Model subcatchments



A3 scale: 1:20,000
0 0.15 0.3 0.45 0.6 0.75 km



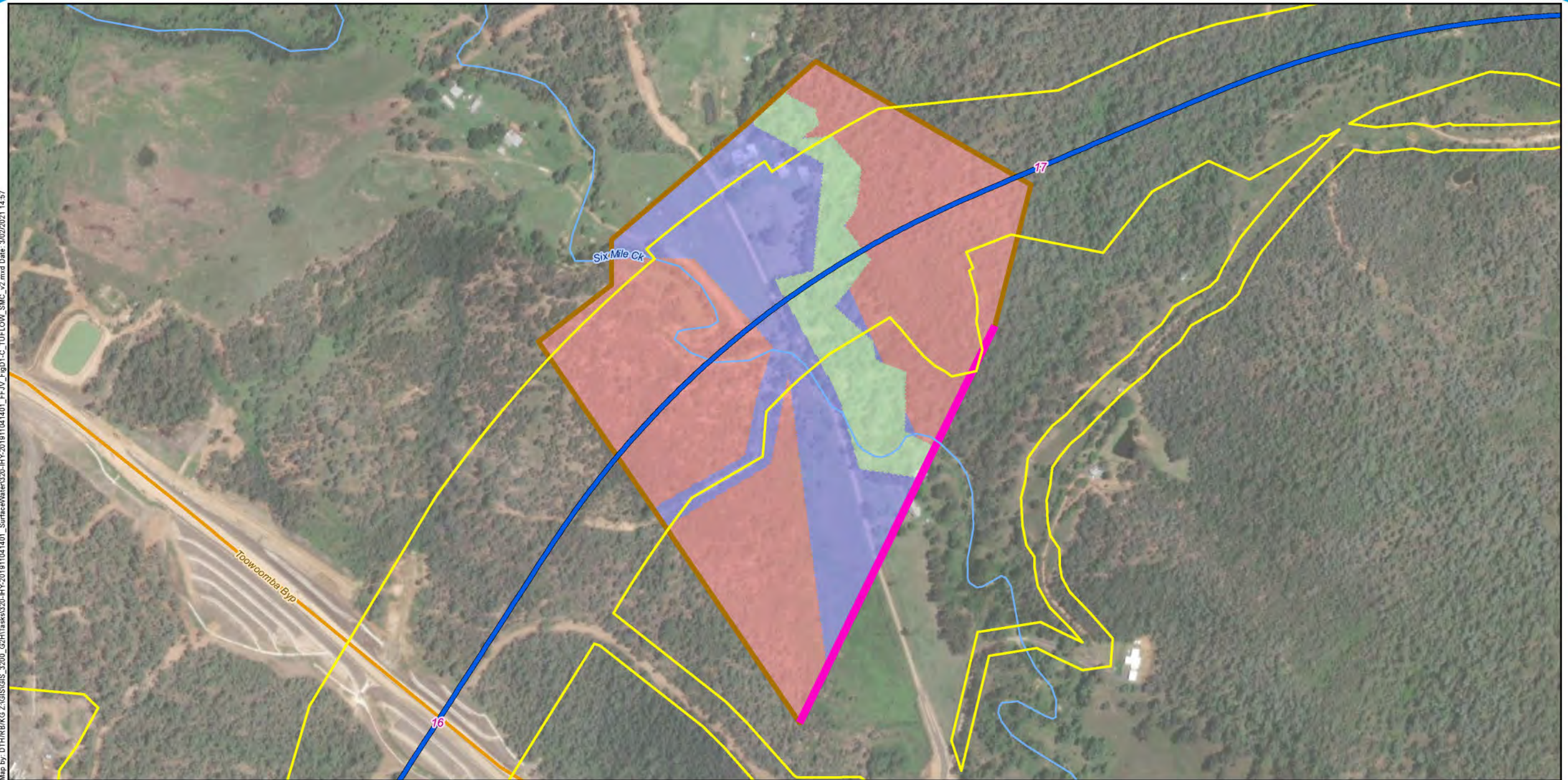
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Gowrie to Helidon

Figure D1- B: Hydrology setup - Six Mile Creek

Map by: DTH/RB/KG Z:\GIS\GIS_3200_G2H\Task\320-HY-201811041401_SurfaceWater\320-HY-201811041401_FF_V_FigD1-C_TUFLOW_SMC_v2.mxd Date: 30/02/2021 14:57



Legend

- 5 Chainage (km)
- G2H project alignment
- Major roads

- EIS disturbance footprint
- Code boundary
- Downstream boundary
- Watercourses

Materials

- Dense vegetation
- Vegetated waterways
- Floodplain



A3 scale: 1:5,000
 0 0.05 0.1 0.15 0.2 0.25 km



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Gowrie to Helidon

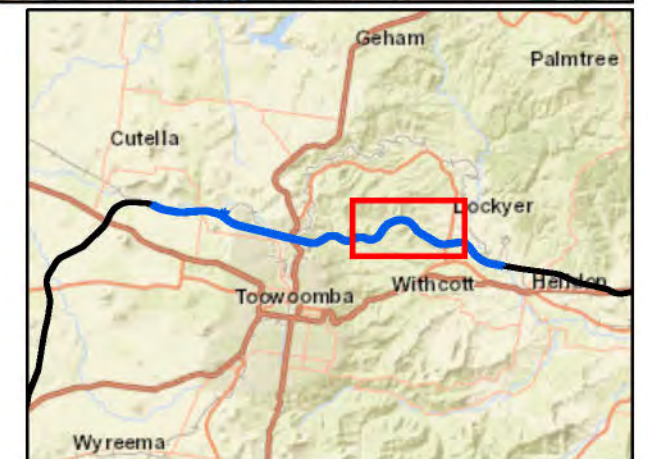
Figure D1-C: TUFLOW model setup - Six Mile Creek

Map by: DTH/RB/KG Z:\GIS\GIS_3200_G2H\Tasks\3200-HY-201811041401_SurfaceWater\3200-HY-201811041401_FF_V1-D_Structures_v2.mxd Date: 30/02/2021 15:47



Legend

- | | | |
|-----------------------|---------------------------|----------------------------|
| 5 Chainage (km) | EIS disturbance footprint | Drainage Structures |
| G2H project alignment | Defined watercourses | Floodplain culvert |
| | Watercourses | Local drainage culvert |
| | Bridges | |



A3 scale: 1:22,000
 0 0.15 0.3 0.45 0.6 0.75 km



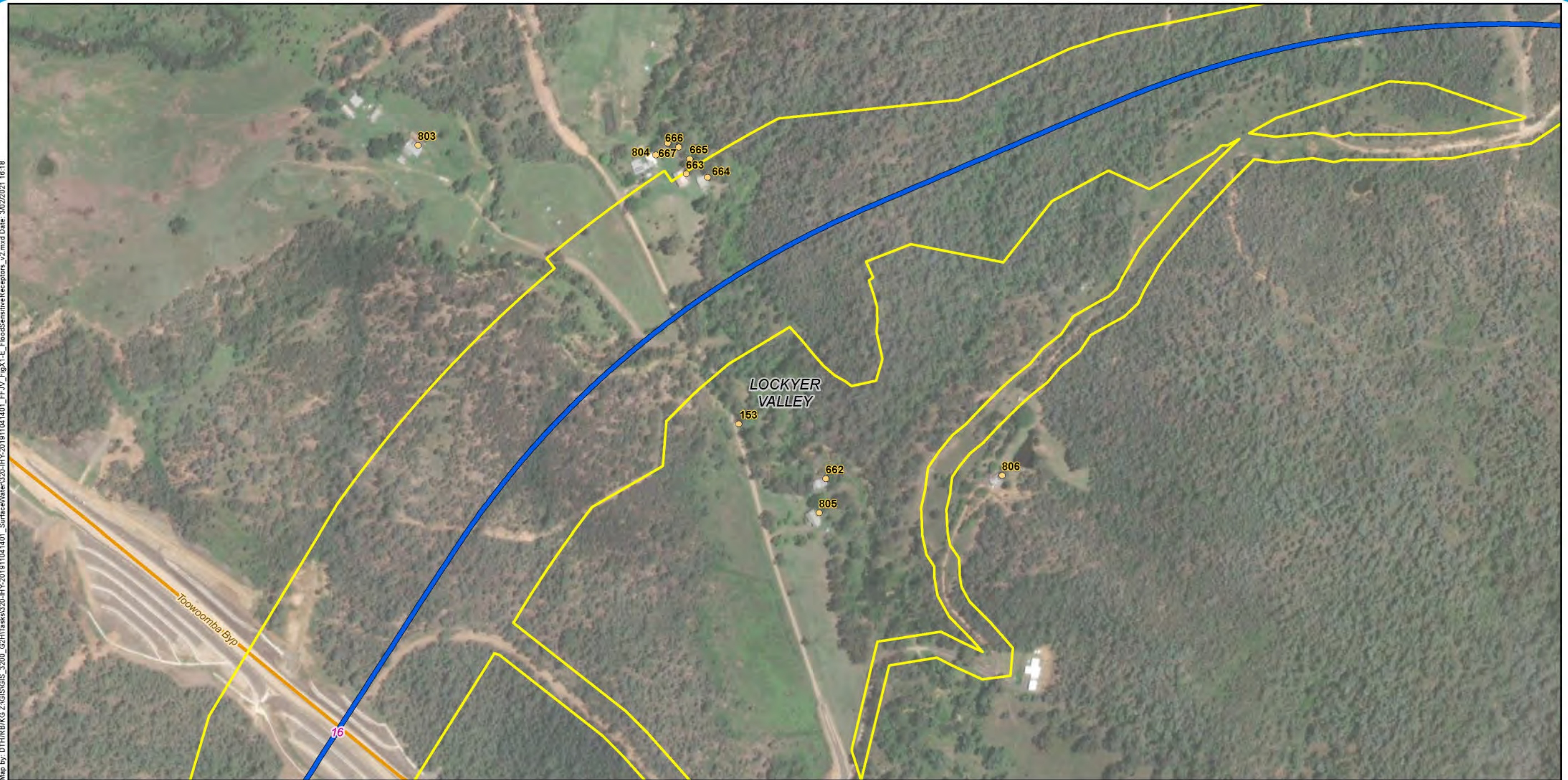
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 Coordinate System: GDA 1994 MGA Zone 56

Gowrie to Helidon

Figure D1-D: Design structures - Six Mile Creek

Map by: DTH/RB/KG Z:\GIS\GIS_3200_G2H\Task320-HY-201811041401_SurfaceWater320-HY-201811041401_FF_V_FigX1-E_FloodSensitiveReceptors_v2.mxd Date: 3/02/2021 16:18



Legend

- | | |
|---|---|
| 5 Chainage (km) | EIS disturbance footprint |
| ● Flood sensitive receptors | Local Government Areas |
| — G2H project alignment | |
| — Major roads | |



A3 scale: 1:5,000
 0 0.04 0.08 0.12 0.16 0.2km



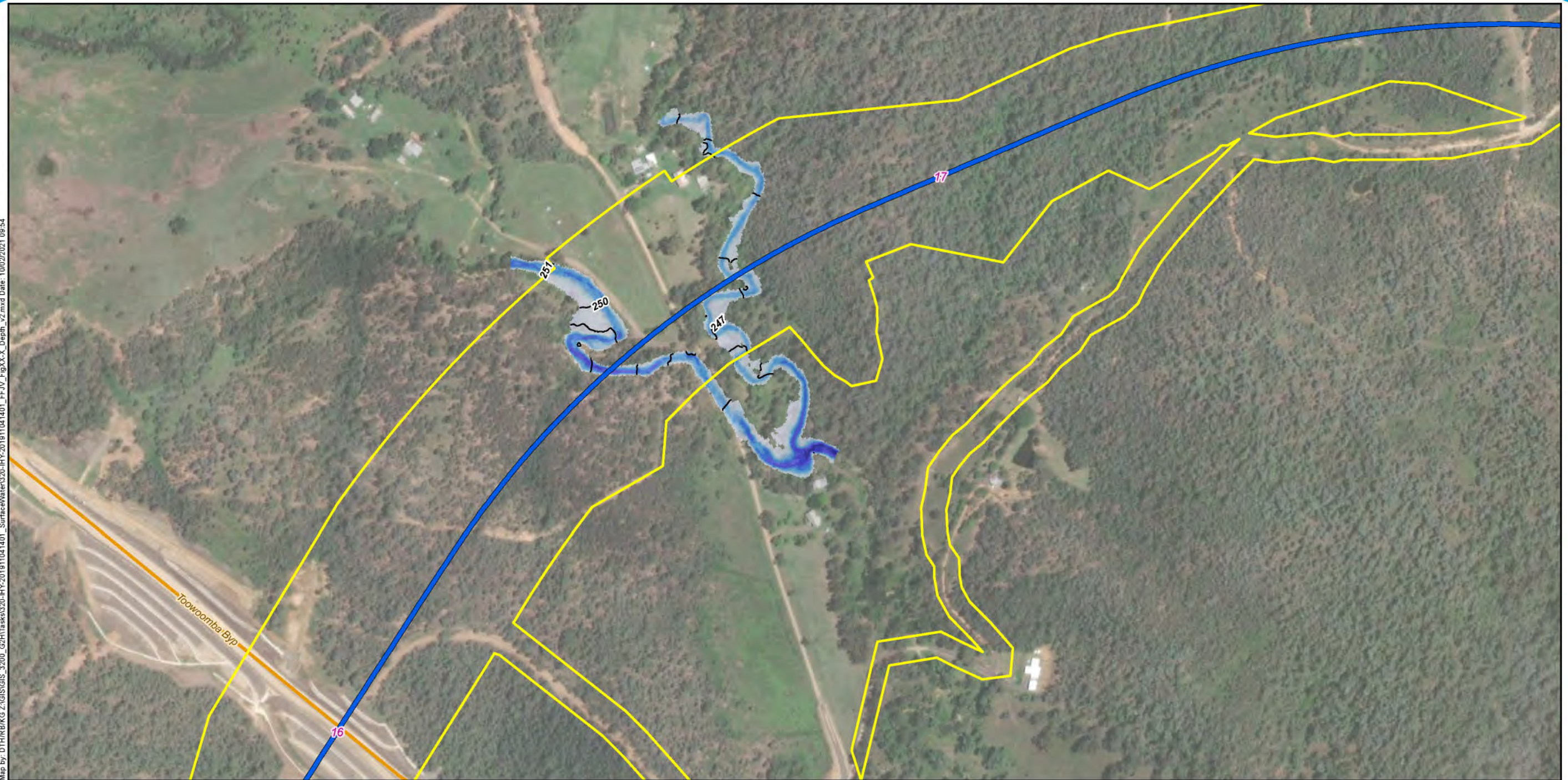
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Gowrie to Helidon

Figure D1-E: Flood Sensitive Receptors - Six Mile Creek

Map by: D:\H\RB\KG\GIS\GIS_3200_G2H\Tasks\320-HY-201811041401_SurfaceWater\320-HY-201811041401_FF_V_FigXX-X_Depth_v2.mxd Date: 10/02/2021 09:54



Legend

- 5 Chainage (km)
- G2H project alignment
- Major roads
- Road design
- EIS disturbance footprint
- 1.0m contour mAHD

Depth (m)

0 - 0.5	3.0 - 3.5
0.5 - 1.0	3.5 - 4.0
1.0 - 1.5	4.0 - 4.5
1.5 - 2.0	4.5 - 5.0
2.0 - 2.5	> 5.0
2.5 - 3.0	



A3 scale: 1:5,000
 0 0.035 0.07 0.105 0.14 0.175km



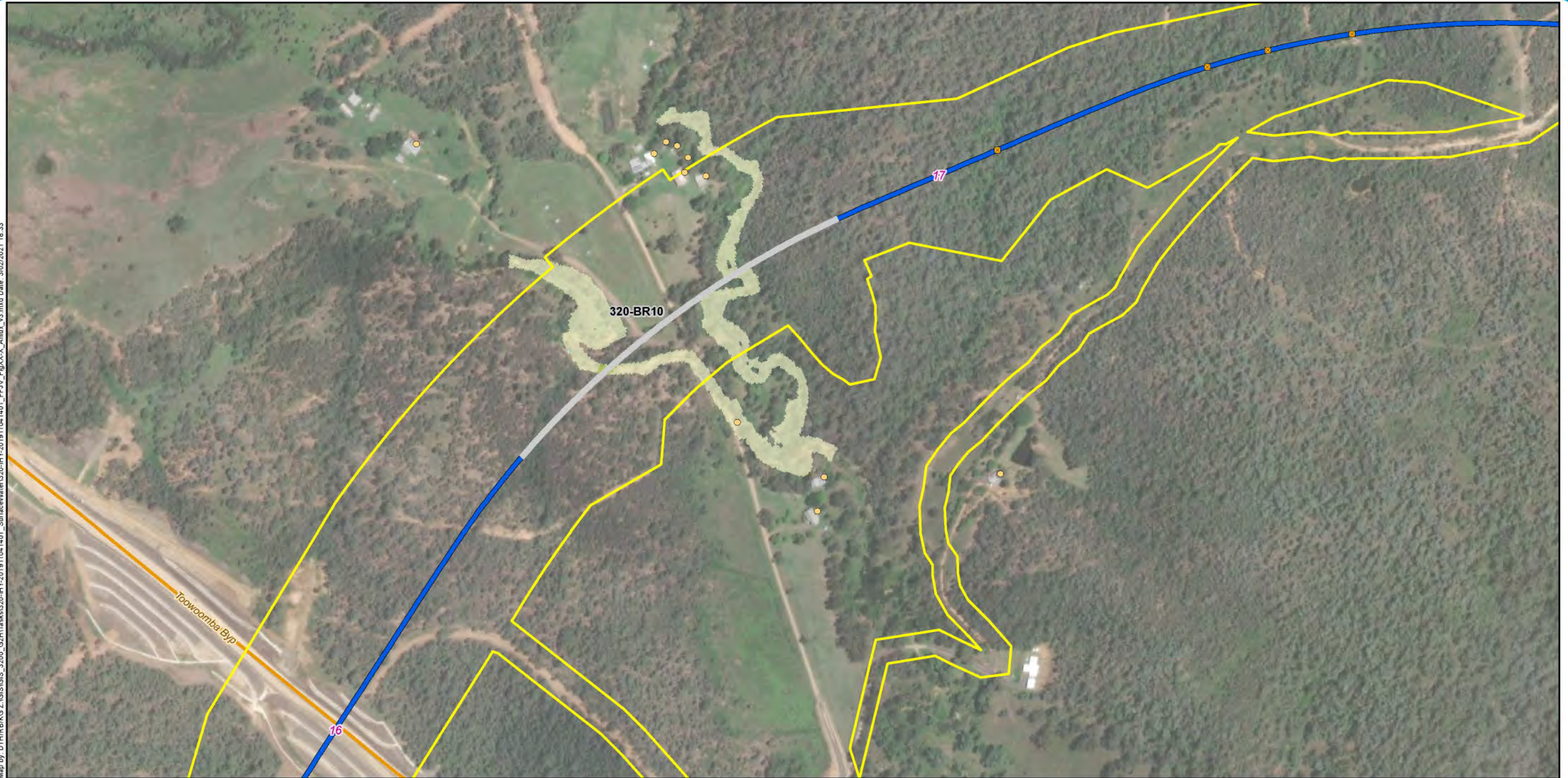
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 Coordinate System: GDA 1994 MGA Zone 56

Gowrie to Helidon

Figure D2-A: Existing Case - Inundation Extent - 20% AEP event - Six Mile Creek

Map by: DTH/RB/KG Z:\GIS\GIS_3200_G2H\Tasks\320-HY-201811041401_SurfaceWater\320-HY-201811041401_FF_V_FigXX-X_Afflux_v3.mxd Date: 3/02/2021 18:33

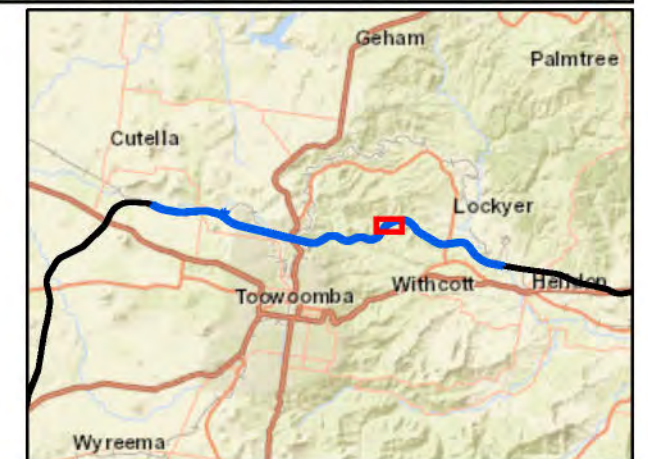


Legend

- 5 Chainage (km)
- Flood sensitive receptors
- G2H project alignment
- Major roads
- Road design
- EIS disturbance footprint
- Was Wet Now Dry
- Was Dry Now Wet
- Drainage Structures
 - Local drainage culvert
 - Bridges

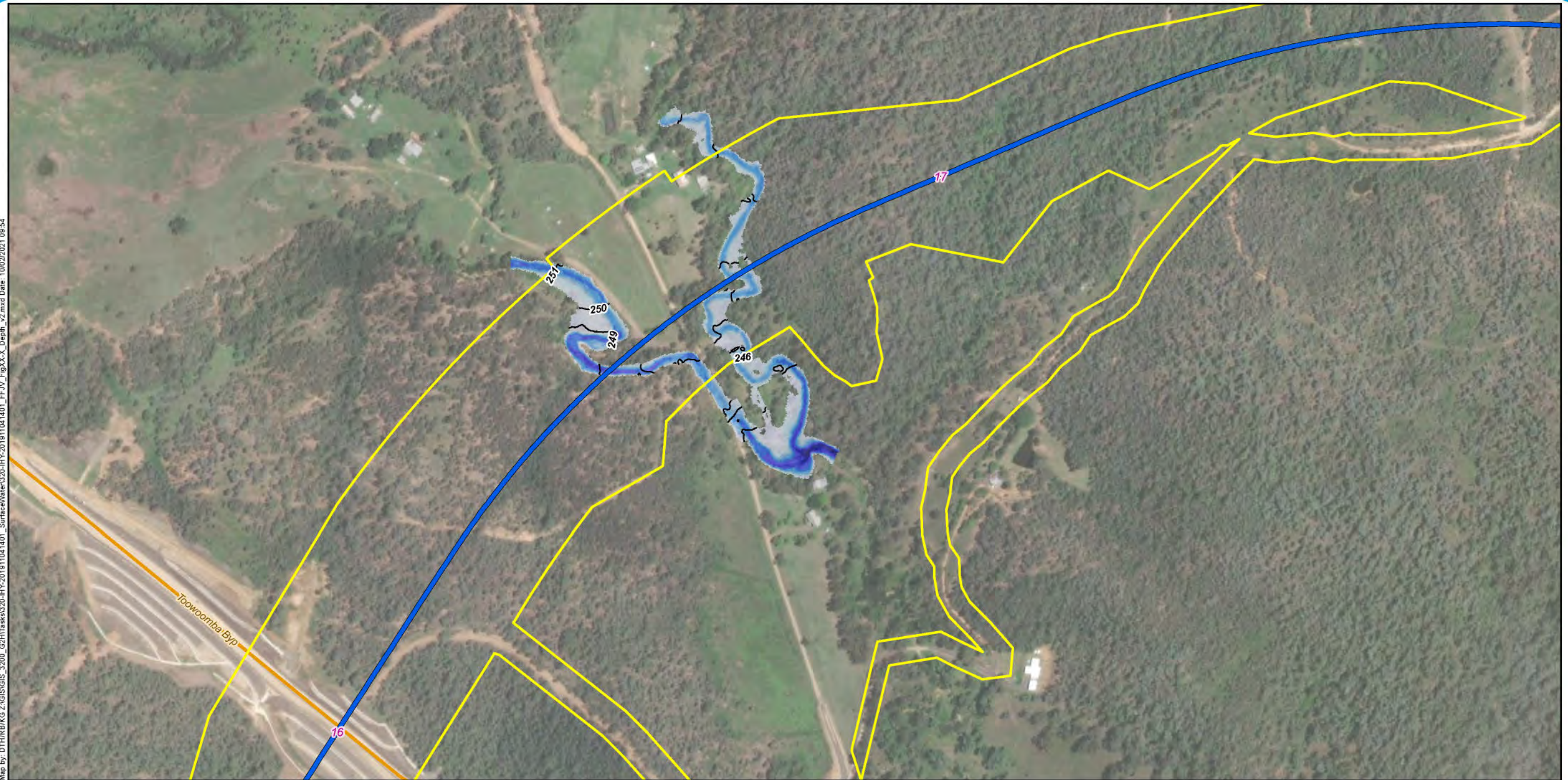
Change in peak water levels (m)

- | | |
|------------------|----------------|
| ■ < -0.5 | ■ 0.01 to 0.05 |
| ■ -0.5 to -0.2 | ■ 0.05 to 0.1 |
| ■ -0.2 to -0.1 | ■ 0.1 to 0.2 |
| ■ -0.1 to -0.05 | ■ 0.2 to 0.5 |
| ■ -0.05 to -0.01 | ■ > 0.5 |
| ■ -0.01 to 0.01 | |



A3 scale: 1:5,000
 0 0.035 0.07 0.105 0.14 0.175km

Map by: DTH/RB/KG Z:\GIS\GIS_3200_G2H\Tasks\3200-HY-201811041401_SurfaceWater\3200-HY-201811041401_FF_V_FigXX-X_Depth_v2.mxd Date: 10/02/2021 09:54



Legend

- 5 Chainage (km)
- G2H project alignment
- Major roads
- Road design
- EIS disturbance footprint
- 1.0m contour mAHD

Depth (m)

0 - 0.5	3.0 - 3.5
0.5 - 1.0	3.5 - 4.0
1.0 - 1.5	4.0 - 4.5
1.5 - 2.0	4.5 - 5.0
2.0 - 2.5	> 5.0
2.5 - 3.0	



A3 scale: 1:5,000
 0 0.035 0.07 0.105 0.14 0.175km



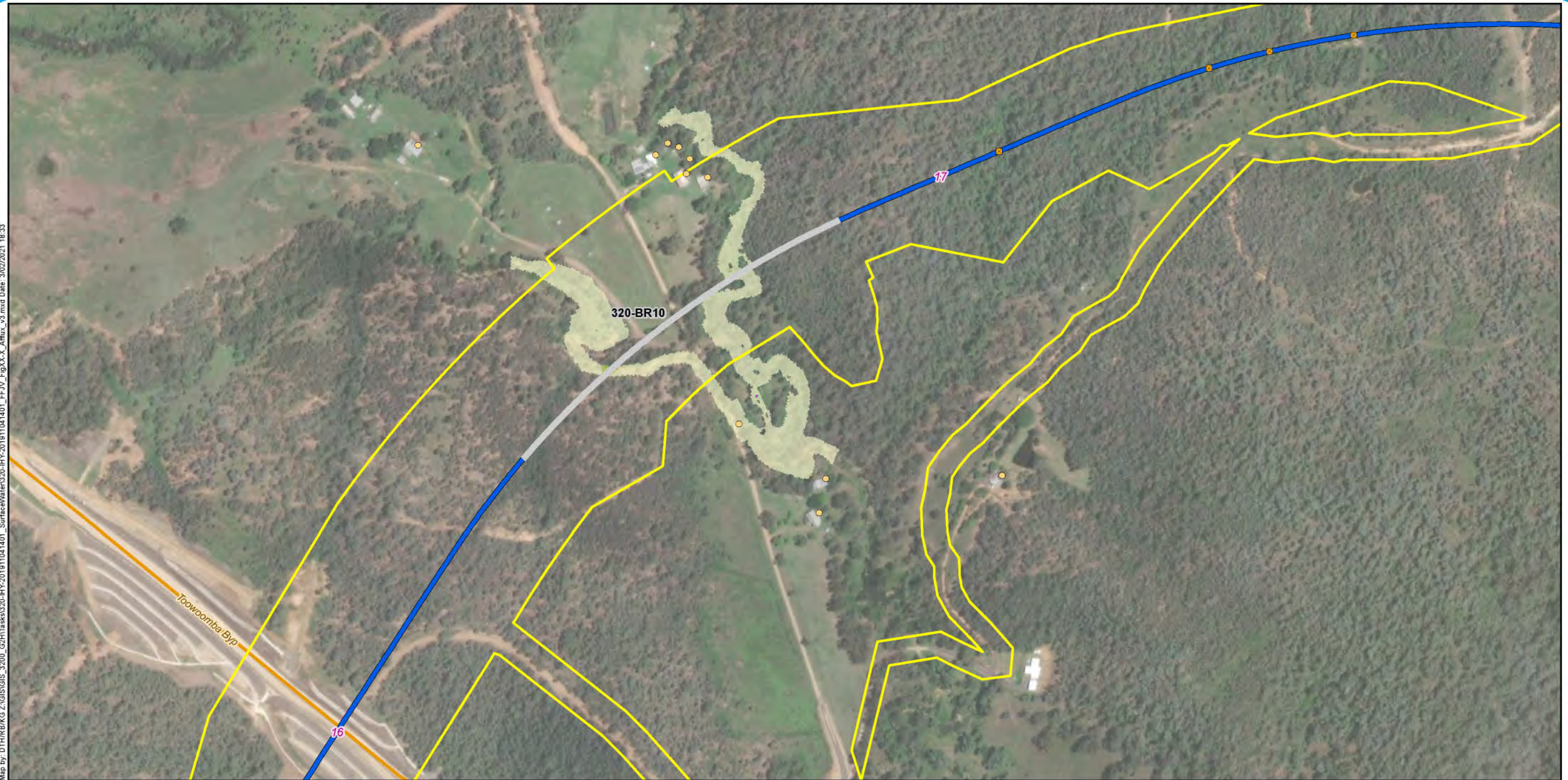
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 Coordinate System: GDA 1994 MGA Zone 56

Gowrie to Helidon

Figure D3-A: Existing Case - Inundation Extent - 10% AEP event - Six Mile Creek

Map by: DTH/RB/KG Z:\GIS\GIS_3200_G2H\Tasks\320-HY-201811041401_SurfaceWater\320-HY-201811041401_FF_V_FigXX-X_Afflux_v3.mxd Date: 3/02/2021 18:33



Legend

- 5 Chainage (km)
- Flood sensitive receptors
- G2H project alignment
- Major roads
- Road design
- EIS disturbance footprint
- Was Wet Now Dry
- Was Dry Now Wet
- Drainage Structures
 - Local drainage culvert
 - Bridges

Change in peak water levels (m)

- | | |
|------------------|----------------|
| ■ < -0.5 | ■ 0.01 to 0.05 |
| ■ -0.5 to -0.2 | ■ 0.05 to 0.1 |
| ■ -0.2 to -0.1 | ■ 0.1 to 0.2 |
| ■ -0.1 to -0.05 | ■ 0.2 to 0.5 |
| ■ -0.05 to -0.01 | ■ > 0.5 |
| ■ -0.01 to 0.01 | |



A3 scale: 1:5,000
 0 0.035 0.07 0.105 0.14 0.175km



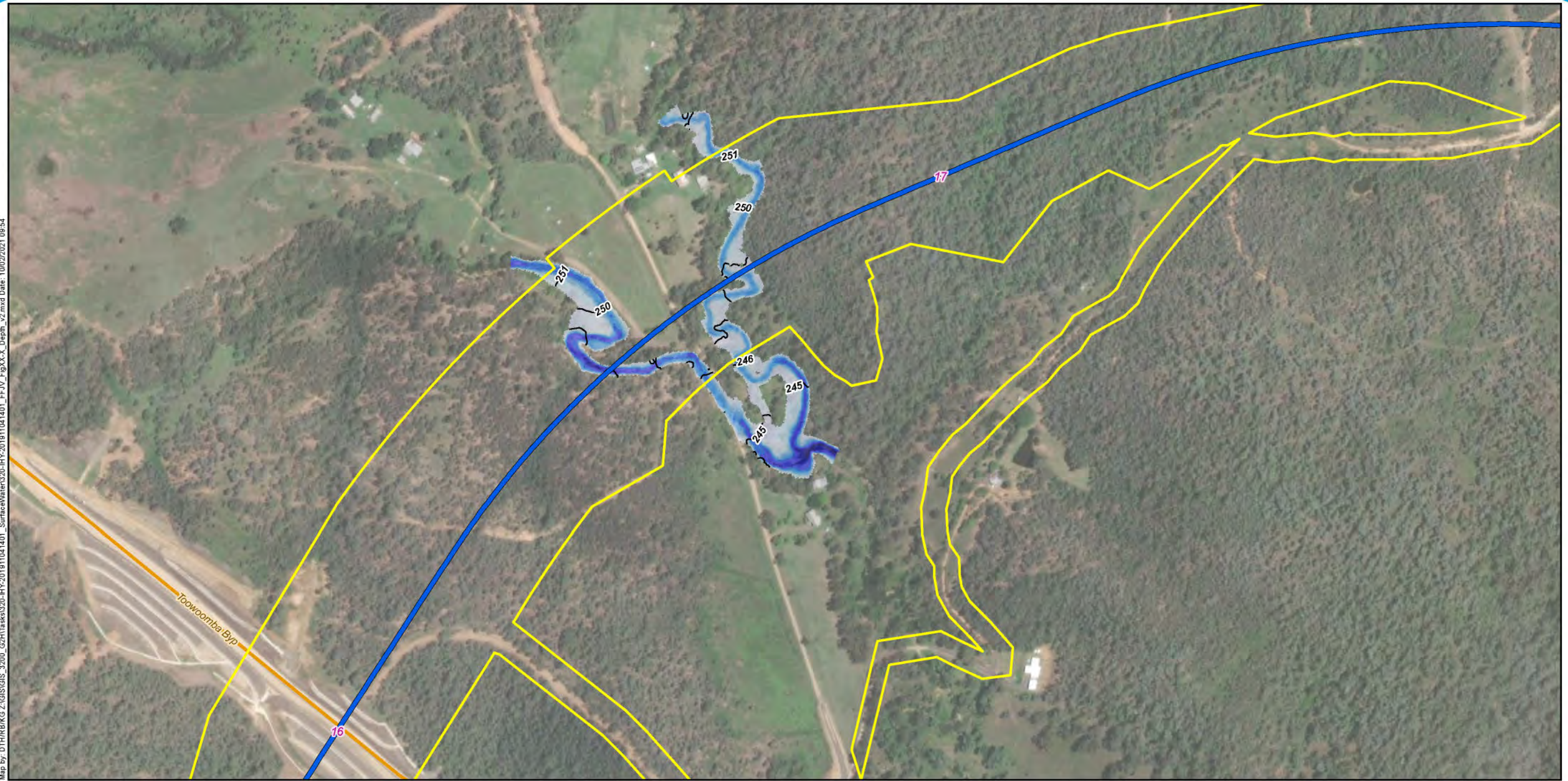
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 Coordinate System: GDA 1994 MGA Zone 56

Gowrie to Helidon

Figure D3-B: Developed Case - Afflux - 10% AEP event - Six Mile Creek

Map by: D:\H\RB\KG\GIS\GIS_3200_G2H\Tasks\3200-HY-201811041401_SurfaceWater\3200-HY-201811041401_FF_V_FigXX-X_Depth_v2.mxd Date: 10/02/2021 09:54



Legend

- 5 Chainage (km)
- G2H project alignment
- Major roads
- Road design
- EIS disturbance footprint
- 1.0m contour mAHD

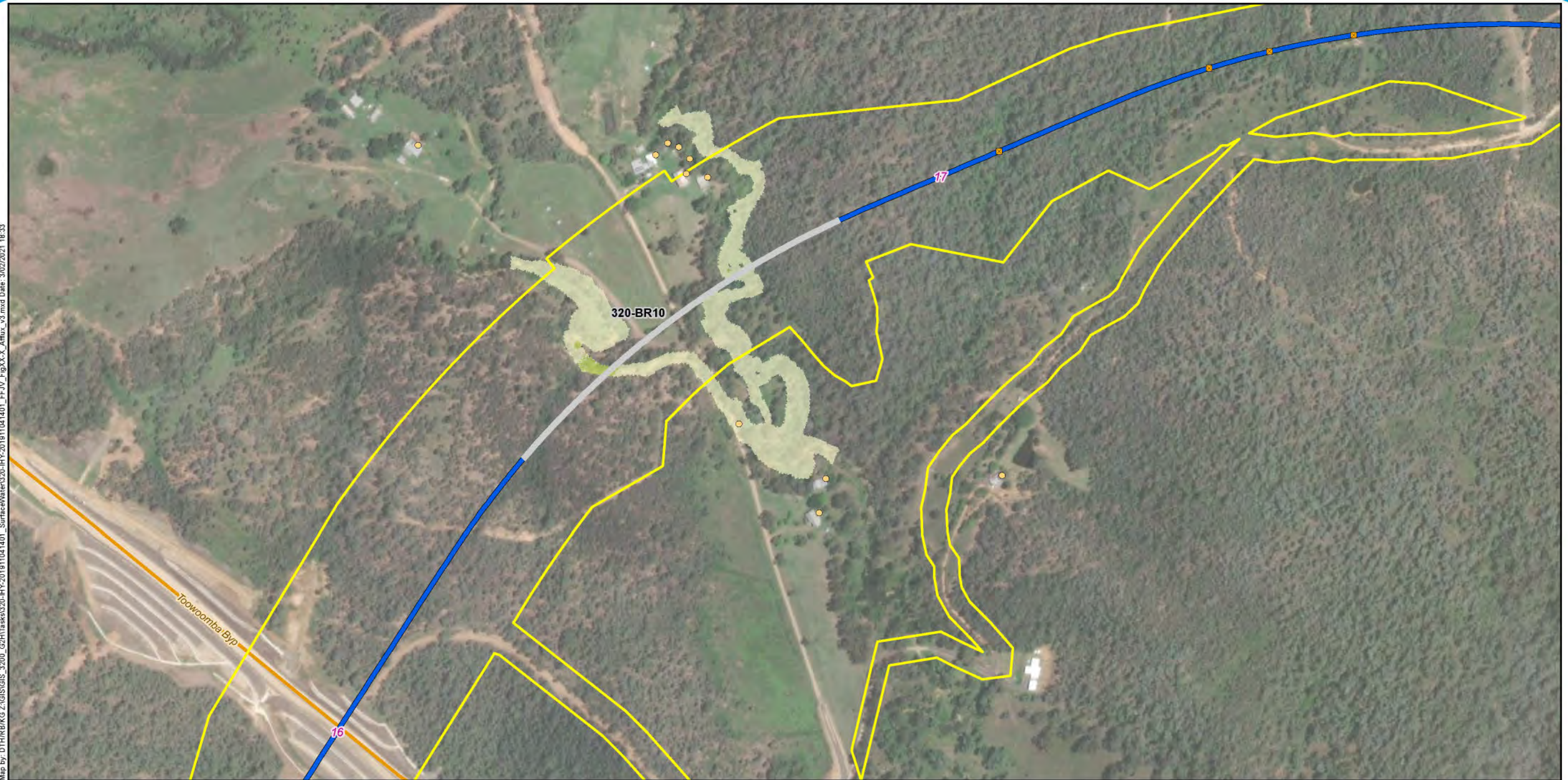
Depth (m)

0 - 0.5	3.0 - 3.5
0.5 - 1.0	3.5 - 4.0
1.0 - 1.5	4.0 - 4.5
1.5 - 2.0	4.5 - 5.0
2.0 - 2.5	> 5.0
2.5 - 3.0	



A3 scale: 1:5,000
 0 0.035 0.07 0.105 0.14 0.175km

Map by: DTH/RB/KG Z:\GIS\GIS_3200_G2H\Tasks\320-HY-201811041401_SurfaceWater\320-HY-201811041401_FF_V_FigXX-X_Afflux_v3.mxd Date: 3/02/2021 18:33



Legend

- 5 Chainage (km)
- Flood sensitive receptors
- G2H project alignment
- Major roads
- Road design
- EIS disturbance footprint
- Was Wet Now Dry
- Was Dry Now Wet
- Drainage Structures**
 - Local drainage culvert
 - Bridges

Change in peak water levels (m)

- | | |
|----------------|--------------|
| < -0.5 | 0.01 to 0.05 |
| -0.5 to -0.2 | 0.05 to 0.1 |
| -0.2 to -0.1 | 0.1 to 0.2 |
| -0.1 to -0.05 | 0.2 to 0.5 |
| -0.05 to -0.01 | > 0.5 |
| -0.01 to 0.01 | |



A3 scale: 1:5,000
 0 0.035 0.07 0.105 0.14 0.175km



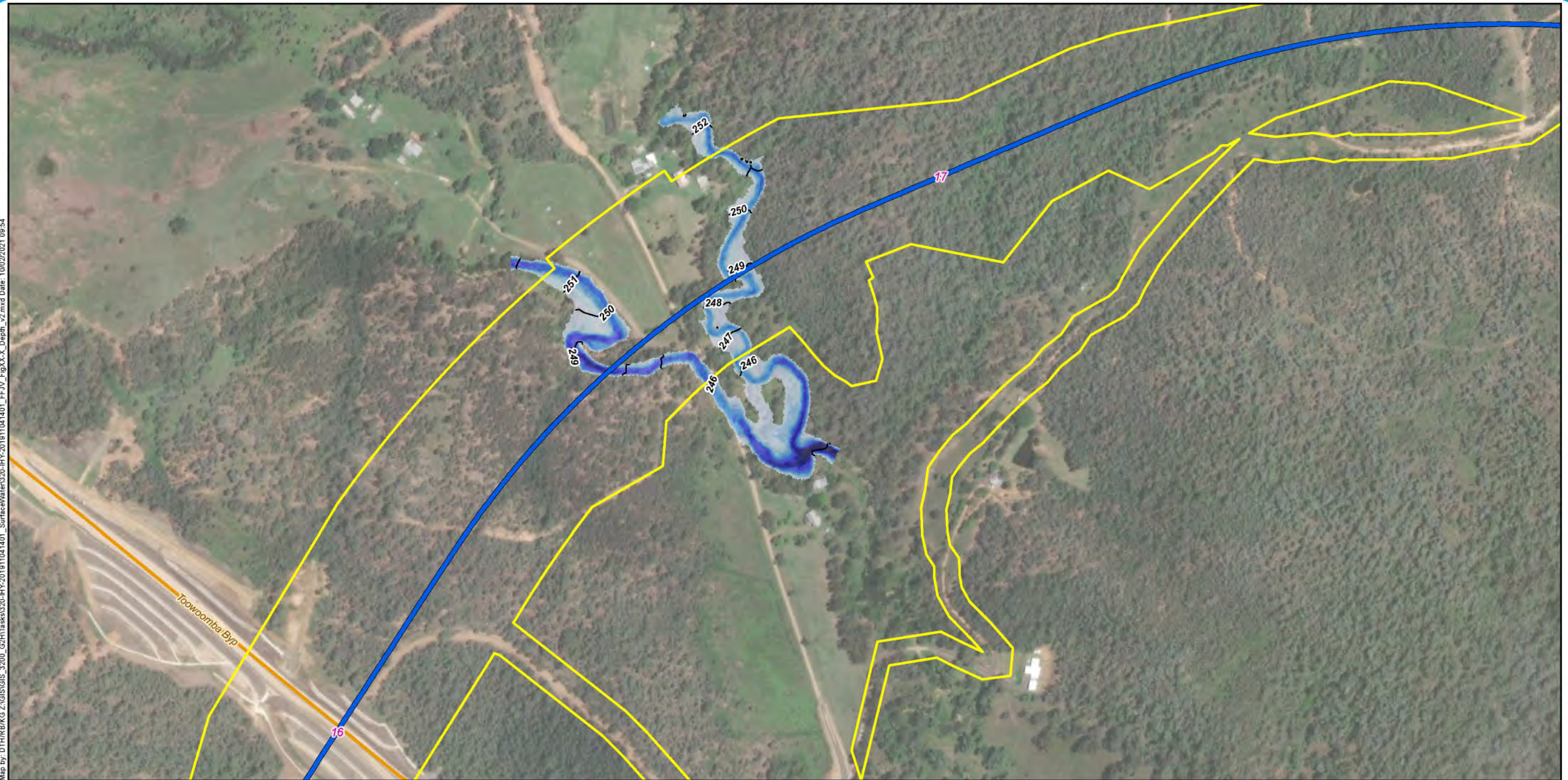
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 Coordinate System: GDA 1994 MGA Zone 56

Gowrie to Helidon

Figure D4-B: Developed Case - Afflux - 5% AEP event - Six Mile Creek

Map by: DTH/RB/KG Z:\GIS\GIS_3200_G2H\Tasks\3200-HY-201811041401_SurfaceWater\3200-HY-201811041401_FF_V_FigXX-X_Depth_v2.mxd Date: 10/02/2021 09:54



Legend

- 5 Chainage (km)
- G2H project alignment
- Major roads
- Road design
- EIS disturbance footprint
- 1.0m contour mAHD

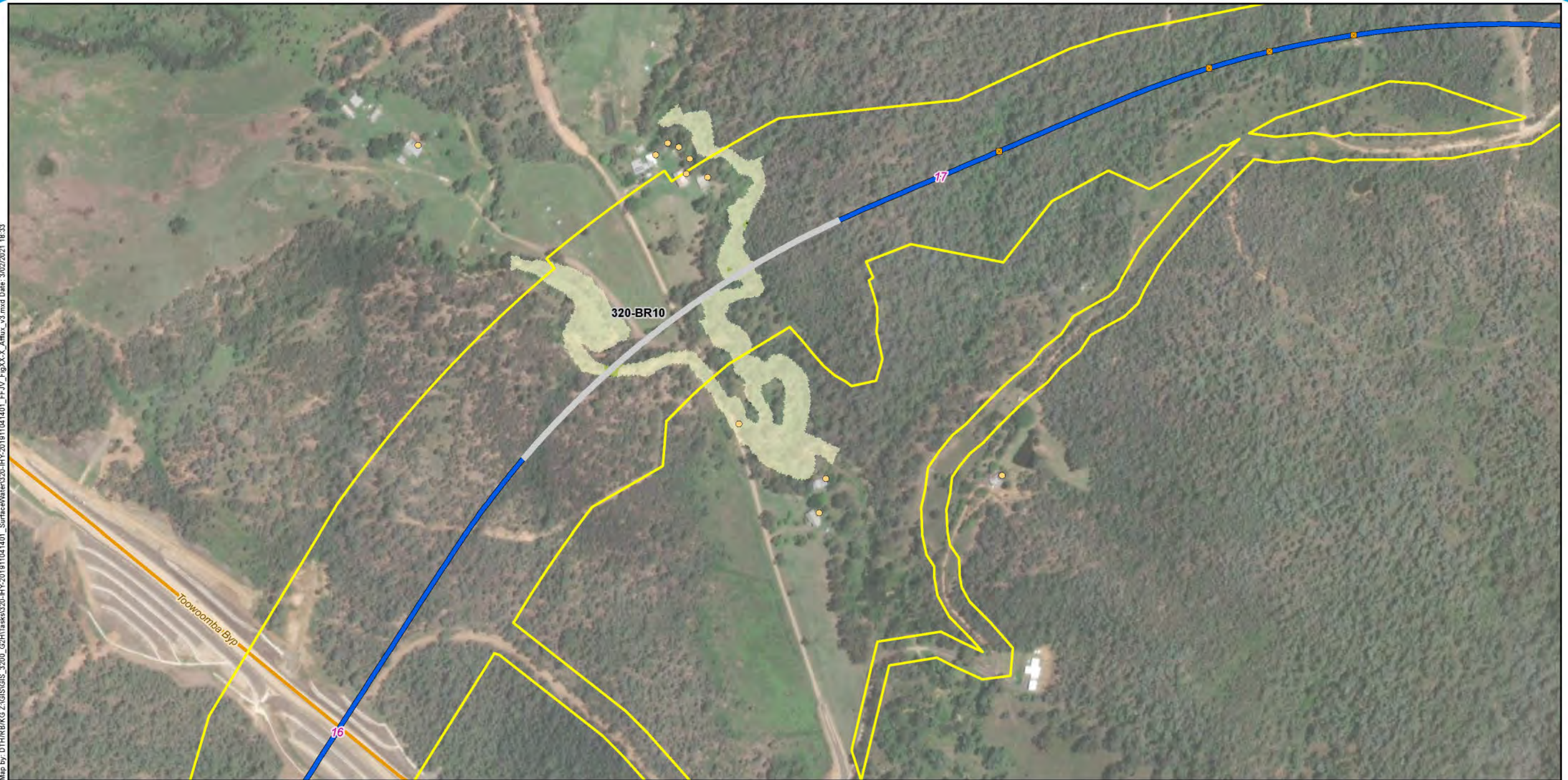
Depth (m)

0 - 0.5	3.0 - 3.5
0.5 - 1.0	3.5 - 4.0
1.0 - 1.5	4.0 - 4.5
1.5 - 2.0	4.5 - 5.0
2.0 - 2.5	> 5.0
2.5 - 3.0	



A3 scale: 1:5,000
 0 0.035 0.07 0.105 0.14 0.175km

Map by: DTH/RB/KG Z:\GIS\GIS_3200_G2H\Tasks\3200-HY-201811041401_SurfaceWater\3200-HY-201811041401_FF_V3_FigXX-X_Afflux_v3.mxd Date: 3/02/2021 18:33



Legend

- 5 Chainage (km)
- Flood sensitive receptors
- G2H project alignment
- Major roads
- Road design
- EIS disturbance footprint
- Was Wet Now Dry
- Was Dry Now Wet
- Drainage Structures**
 - Local drainage culvert
 - Bridges

Change in peak water levels (m)

- | | |
|----------------|--------------|
| < -0.5 | 0.01 to 0.05 |
| -0.5 to -0.2 | 0.05 to 0.1 |
| -0.2 to -0.1 | 0.1 to 0.2 |
| -0.1 to -0.05 | 0.2 to 0.5 |
| -0.05 to -0.01 | > 0.5 |
| -0.01 to 0.01 | |



A3 scale: 1:5,000
 0 0.035 0.07 0.105 0.14 0.175km

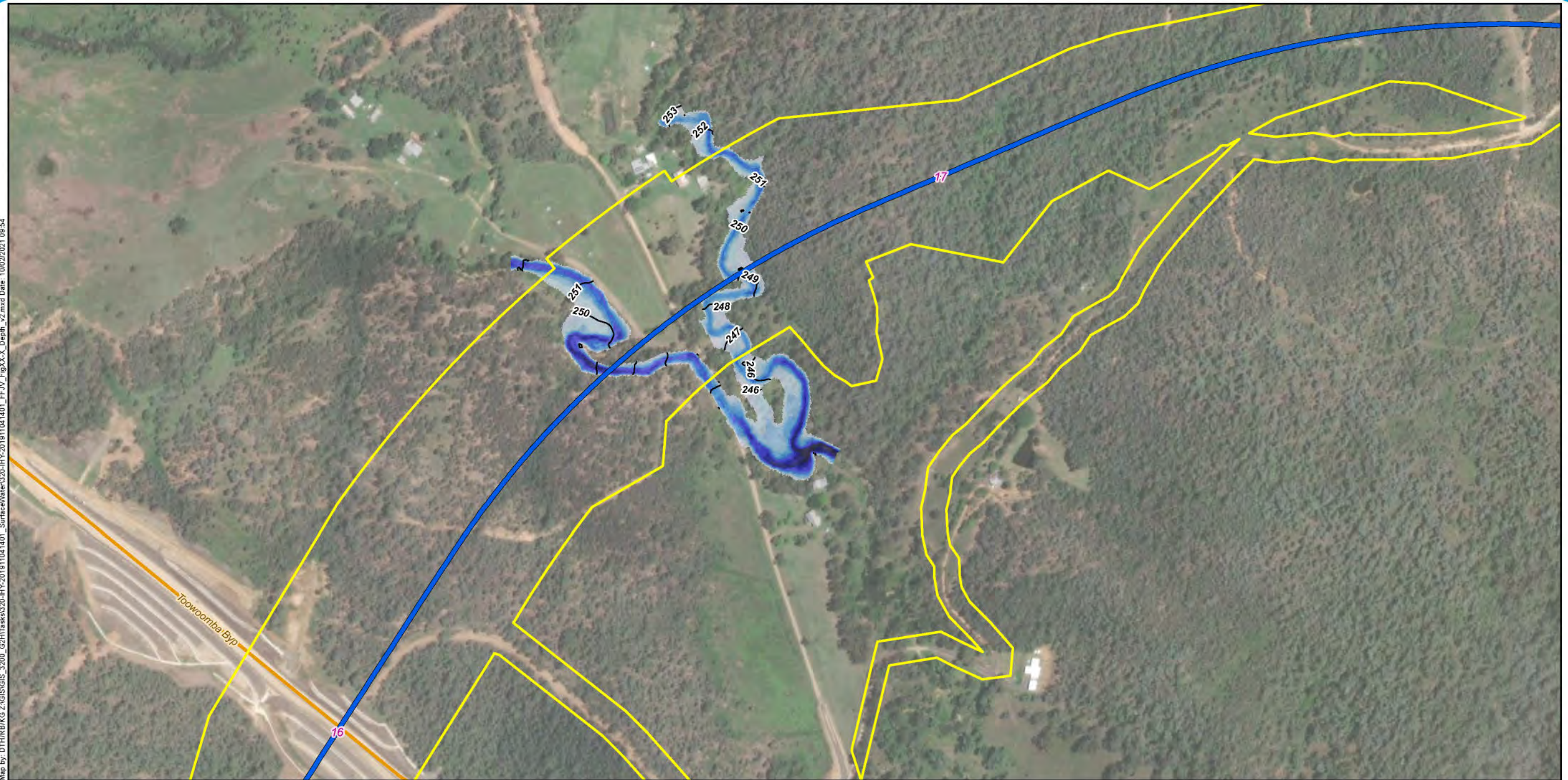


Issue date: 10/02/2021 Version: 3
 Coordinate System: GDA 1994 MGA Zone 56

Gowrie to Helidon

Figure D5-B: Developed Case - Afflux - 2% AEP event - Six Mile Creek

Map by: D:\H\RB\KG\GIS\GIS_3200_G2H\Tasks\320-HY-201811041401_SurfaceWater\320-HY-201811041401_FF_V_FigXX-X_Depth_v2.mxd Date: 10/02/2021 09:54



Legend

- 5 Chainage (km)
- G2H project alignment
- Major roads
- Road design
- EIS disturbance footprint
- 1.0m contour mAHD

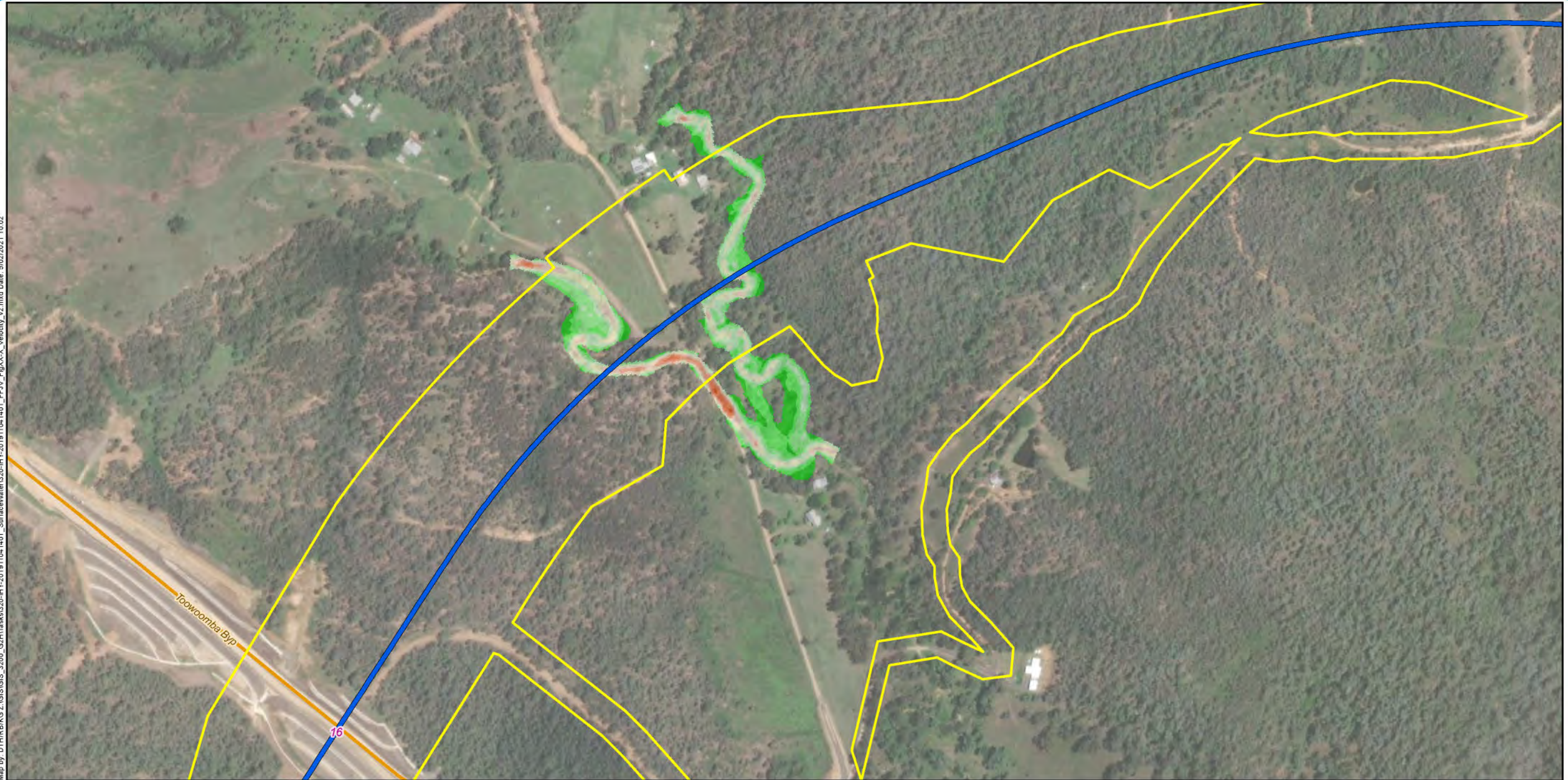
Depth (m)

0 - 0.5	3.0 - 3.5
0.5 - 1.0	3.5 - 4.0
1.0 - 1.5	4.0 - 4.5
1.5 - 2.0	4.5 - 5.0
2.0 - 2.5	> 5.0
2.5 - 3.0	



A3 scale: 1:5,000
 0 0.035 0.07 0.105 0.14 0.175km

Map by: D:\H\RB\KG\GIS\GIS_3200_G2H\Tasks\320-HY-201811041401_SurfaceWater\320-HY-201811041401_FF_V_Velocity_v2.mxd Date: 5/02/2021 10:02

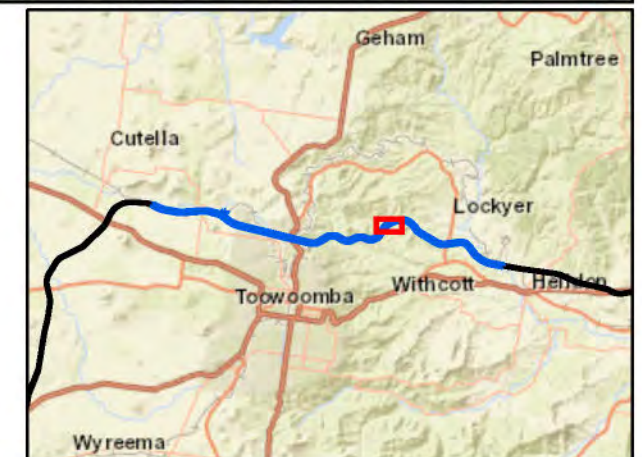


Legend

- 5 Chainage (km)
- G2H project alignment
- Major roads
- Road design
- EIS disturbance footprint

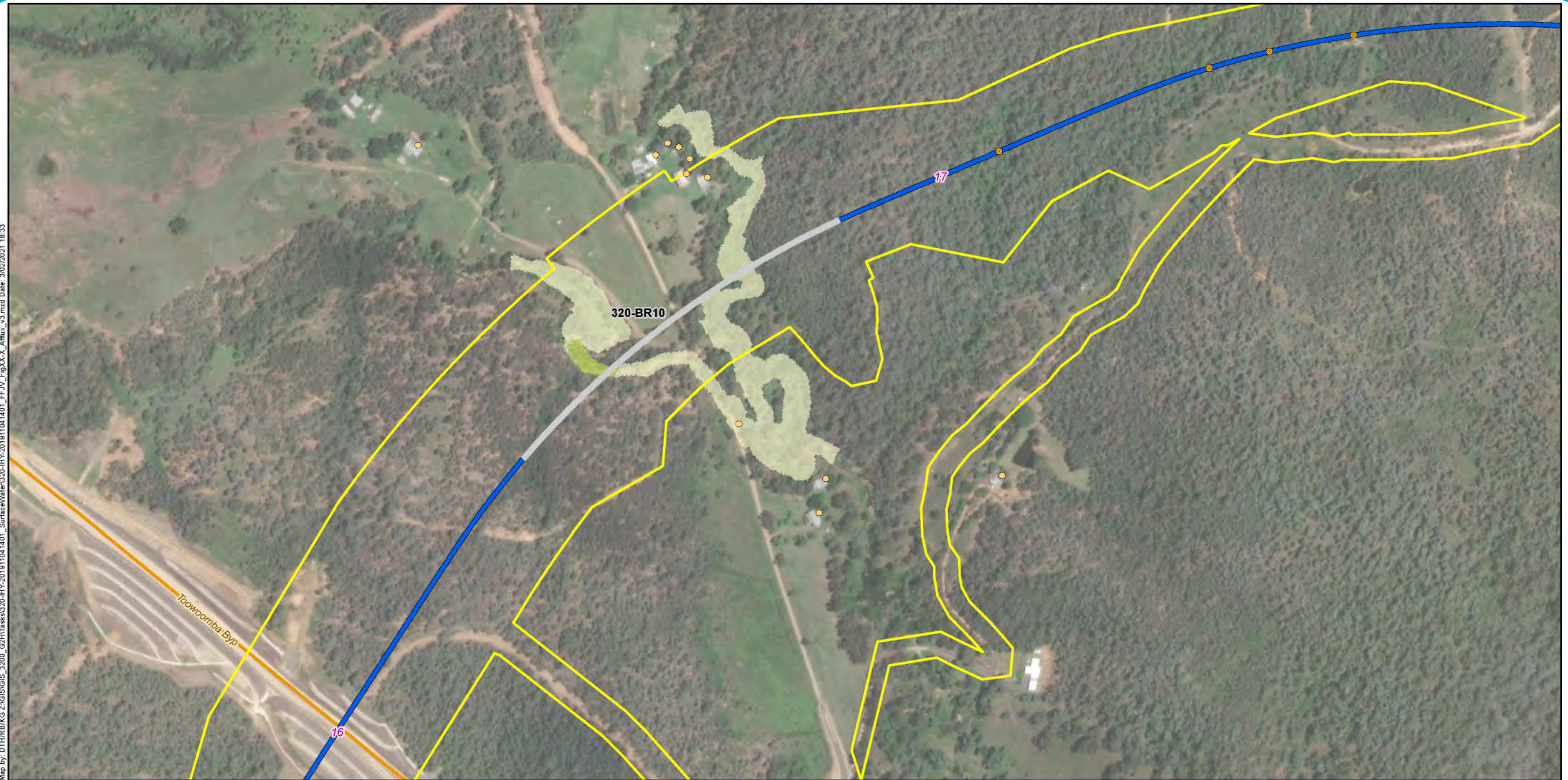
Peak velocity (m/s)

0.0	3.0
0.5	3.5
1.0	4.0
1.5	4.5
2.0	5.0
2.5	



A3 scale: 1:5,000
 0 0.035 0.07 0.105 0.14 0.175km

Map by: DTH/RB/KG Z:\GIS\GIS_3200_G2H\Tasks\3200-HY-201811041401_SurfaceWater\3200-HY-201811041401_FF_V_FigXX-X_Afflux_v3.mxd Date: 3/02/2021 18:33



Legend

- 5 Chainage (km)
- Flood sensitive receptors
- G2H project alignment
- Major roads
- Road design
- EIS disturbance footprint
- Was Wet Now Dry
- Was Dry Now Wet
- Drainage Structures**
 - Local drainage culvert
 - Bridges

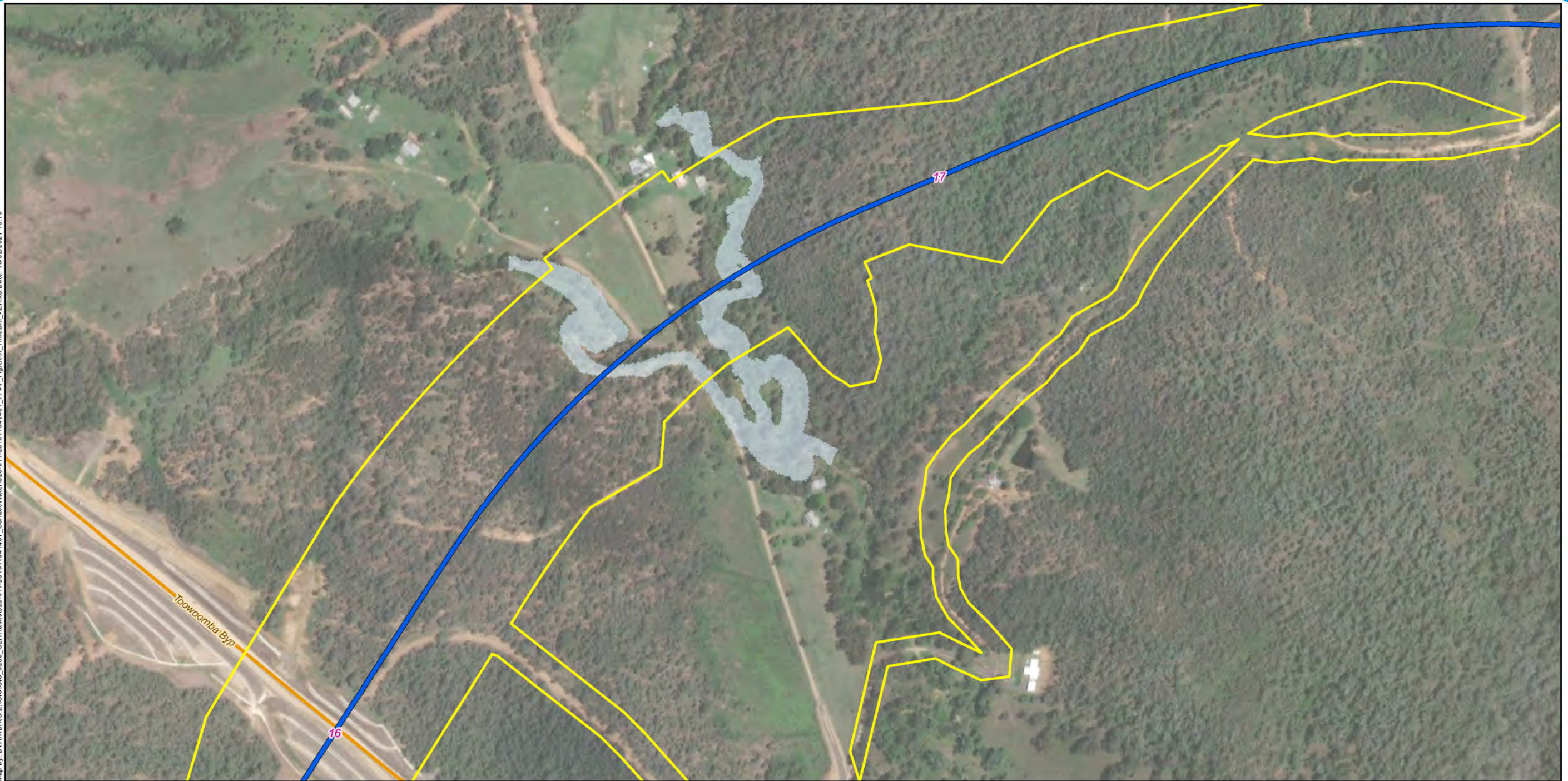
Change in peak water levels (m)

- | | |
|----------------|--------------|
| < -0.5 | 0.01 to 0.05 |
| -0.5 to -0.2 | 0.05 to 0.1 |
| -0.2 to -0.1 | 0.1 to 0.2 |
| -0.1 to -0.05 | 0.2 to 0.5 |
| -0.05 to -0.01 | > 0.5 |
| -0.01 to 0.01 | |



A3 scale: 1:5,000
 0 0.035 0.07 0.105 0.14 0.175km

Map by: DTH/RB/KG Z:\GIS\GIS_3200_G2H\Tasks\320-HY-201811041401_SurfaceWater\320-HY-201811041401_FF_V_FigXX-X_TimeDiff_v2.mxd Date: 10/02/2021 13:15



Legend

- 5 Chainage (km)
- G2H project alignment
- Major roads
- Road design
- EIS disturbance footprint

Difference in Time of Submergence

- | | |
|-------------------------|-------------------------|
| 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 | |



A3 scale: 1:5,000
 0 0.035 0.07 0.105 0.14 0.175km



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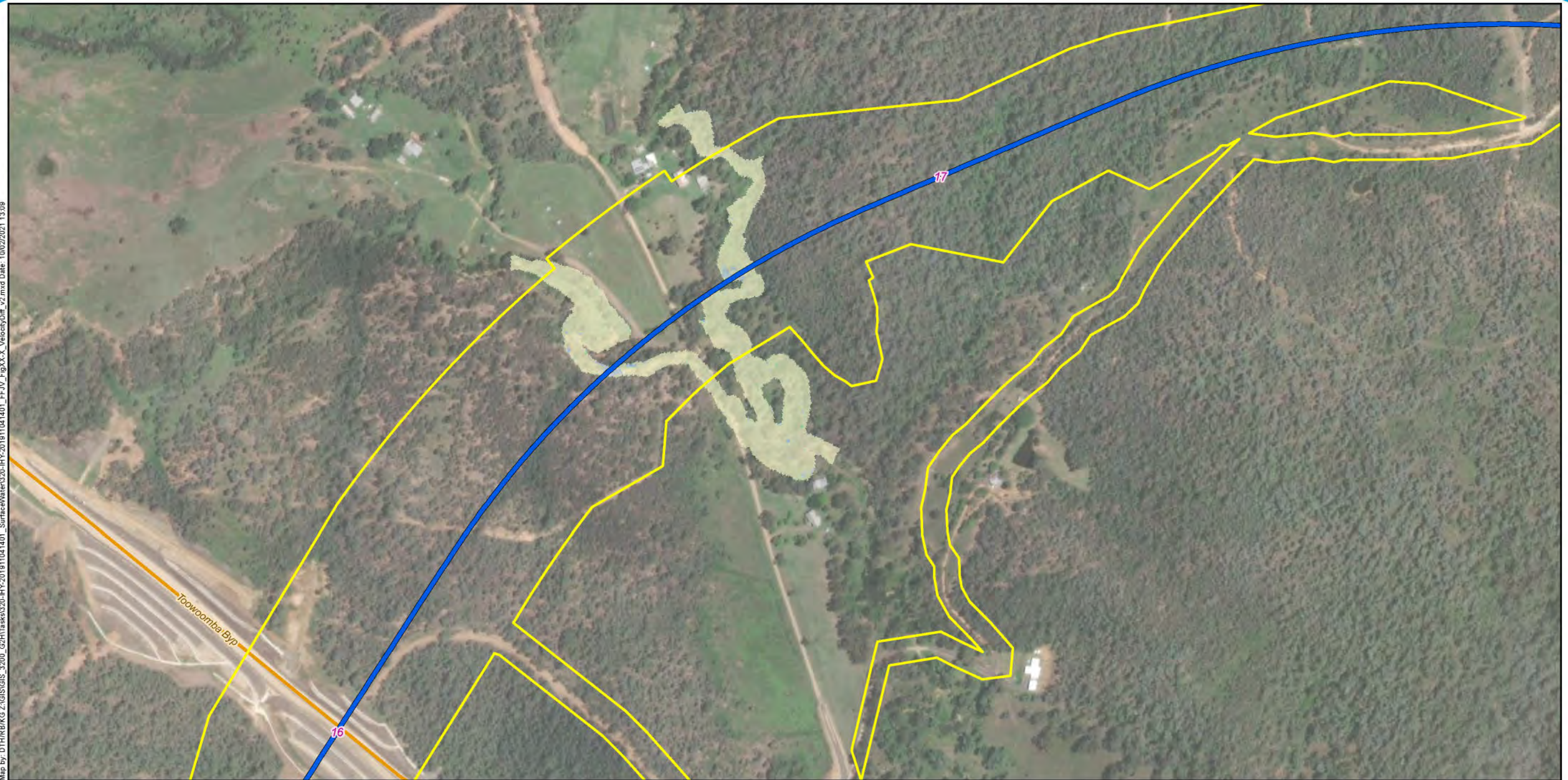
Issue date: 10/02/2021 Version: 2
 Coordinate System: GDA 1994 MGA Zone 56

Gowrie to Helidon

Figure D6-D:

Developed Case - Difference in Time of Submergence - 1% AEP event - Six Mile Creek

Map by: DTH/RB/KG Z:\GIS\GIS_3200_G2H\Tasks\3200-HY-201811041401_SurfaceWater\3200-HY-201811041401_FF_V_V_FigXX-X_VelocityDiff_v2.mxd Date: 10/02/2021 13:09



Legend

- 5 Chainage (km)
- Flood sensitive receptors
- G2H project alignment
- Major roads
- Road design
- EIS disturbance footprint

Change in peak velocity (m/s)

- | | |
|----------------|--------------|
| < -0.50 | 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 | |



A3 scale: 1:5,000
 0 0.035 0.07 0.105 0.14 0.175km



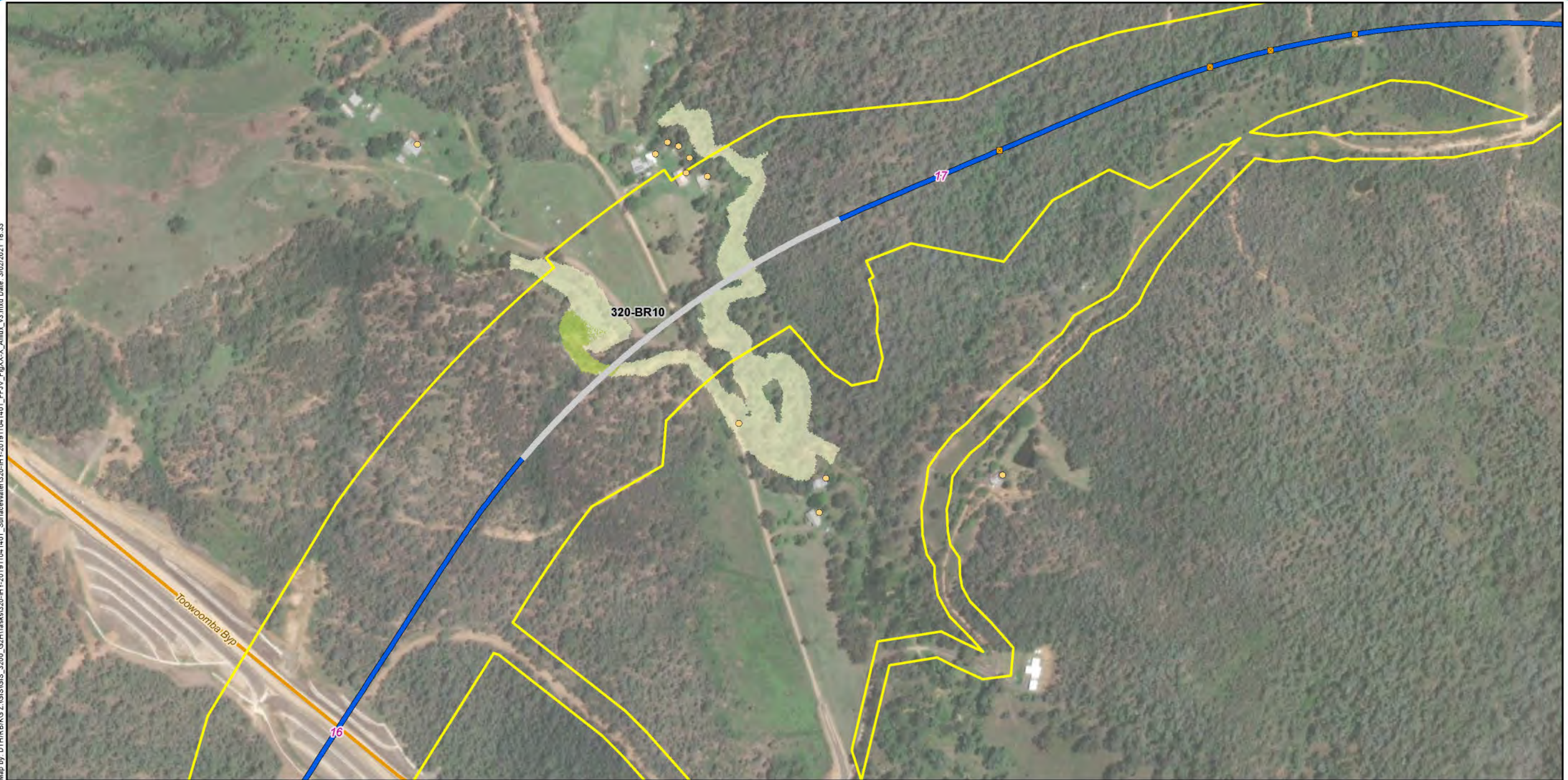
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 Coordinate System: GDA 1994 MGA Zone 56

Gowrie to Helidon

Figure D6-E: Developed Case - Difference in Velocity - 1% AEP event - Six Mile Creek

Map by: DTH/RB/KG Z:\GIS\GIS_3200_G2H\Tasks\320-HY-201811041401_SurfaceWater\320-HY-201811041401_FF_V_FigXX-X_Afflux_v3.mxd Date: 3/02/2021 18:33



Legend

- 5 Chainage (km)
- Flood sensitive receptors
- G2H project alignment
- Major roads
- Road design
- EIS disturbance footprint
- Was Wet Now Dry
- Was Dry Now Wet
- Drainage Structures**
 - Local drainage culvert
 - Bridges

Change in peak water levels (m)

- | | |
|----------------|--------------|
| < -0.5 | 0.01 to 0.05 |
| -0.5 to -0.2 | 0.05 to 0.1 |
| -0.2 to -0.1 | 0.1 to 0.2 |
| -0.1 to -0.05 | 0.2 to 0.5 |
| -0.05 to -0.01 | > 0.5 |
| -0.01 to 0.01 | |



A3 scale: 1:5,000
 0 0.035 0.07 0.105 0.14 0.175km

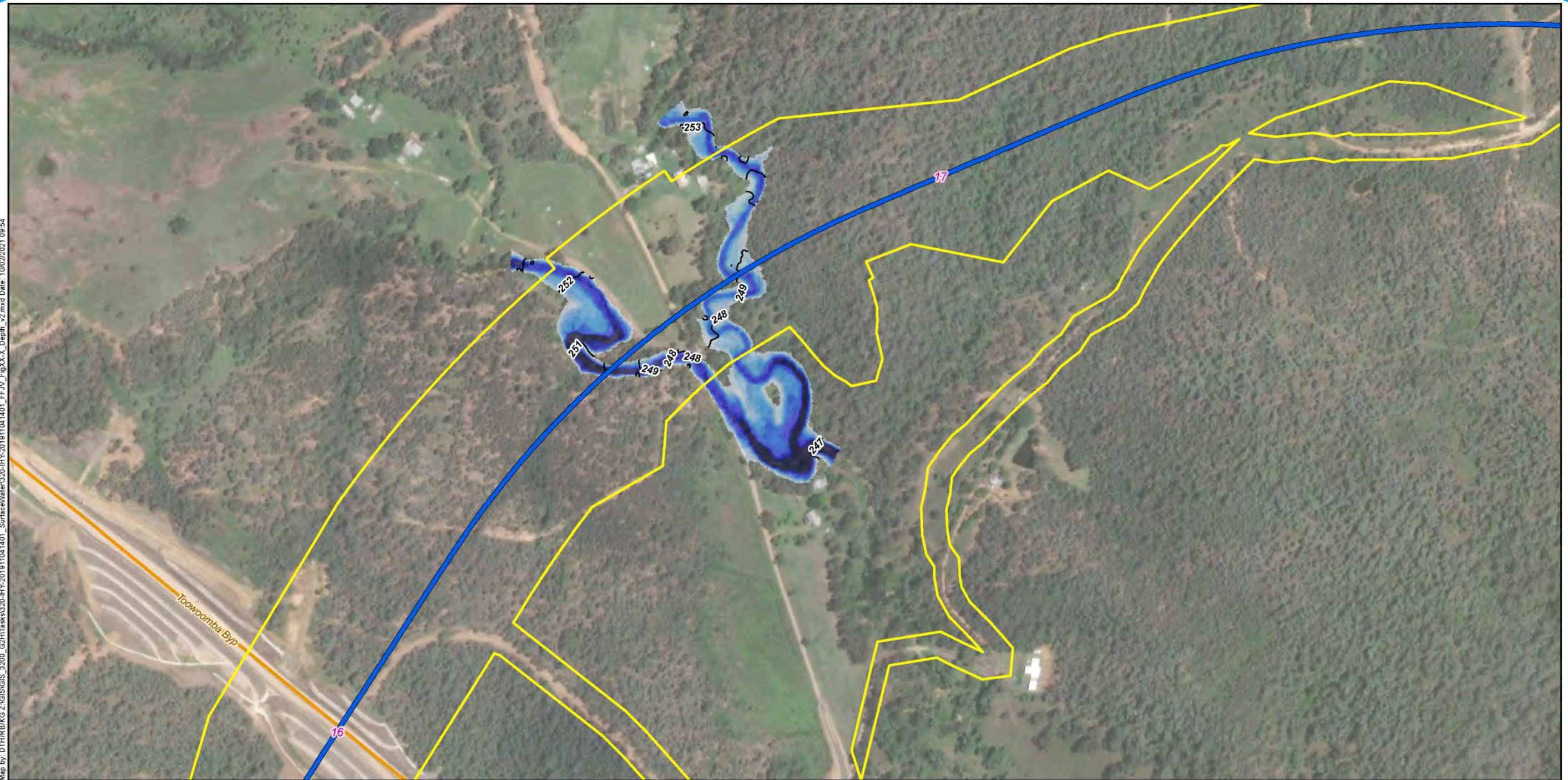


Issue date: 10/02/2021 Version: 3
 Coordinate System: GDA 1994 MGA Zone 56

Gowrie to Helidon

Figure D6-F: Climate Change Scenario - Afflux - 1% AEP event - Six Mile Creek

Map by: DTH/RB/KG Z:\GIS\GIS_3200_G2H\Tasks\3200-HY-201811041401_SurfaceWater\3200-HY-201811041401_FF_V_FigXX-X_Depth_v2.mxd Date: 10/02/2021 09:54



Legend

- 5 Chainage (km)
- G2H project alignment
- Major roads
- Road design
- EIS disturbance footprint
- 1.0m contour mAHD

Depth (m)

■ 0 - 0.5	■ 3.0 - 3.5
■ 0.5 - 1.0	■ 3.5 - 4.0
■ 1.0 - 1.5	■ 4.0 - 4.5
■ 1.5 - 2.0	■ 4.5 - 5.0
■ 2.0 - 2.5	■ > 5.0
■ 2.5 - 3.0	



A3 scale: 1:5,000
 0 0.035 0.07 0.105 0.14 0.175km



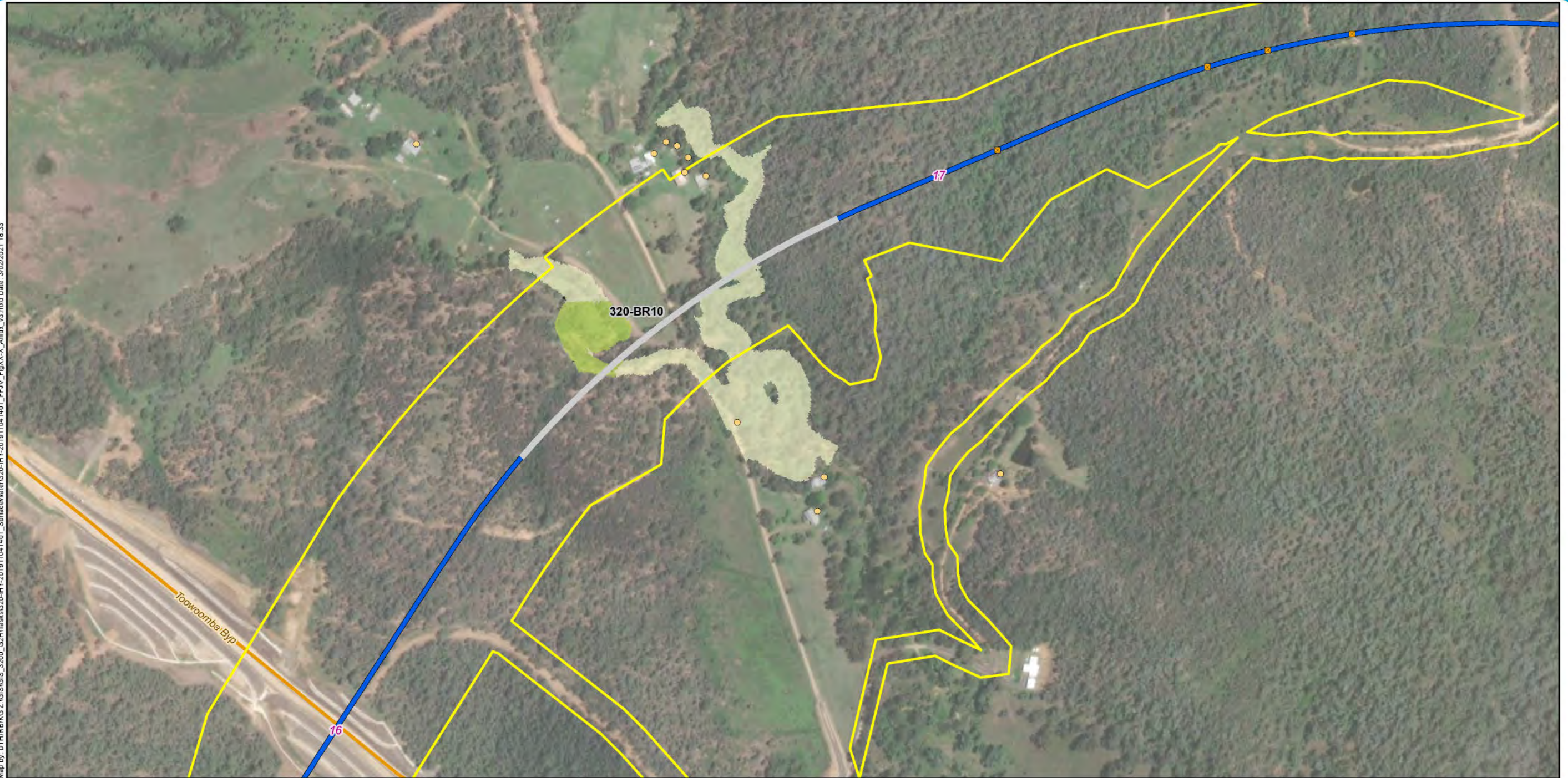
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Gowrie to Helidon

Figure D7-A: Existing Case - Inundation Extent - 1 in 2,000 AEP event - Six Mile Creek

Map by: D:\H\RB\KG\GIS\GIS_3200_G2H\Tasks\320-HY-201811041401_SurfaceWater\320-HY-201811041401_FF_V_FigXX-X_Afflux_v3.mxd Date: 3/02/2021 18:33

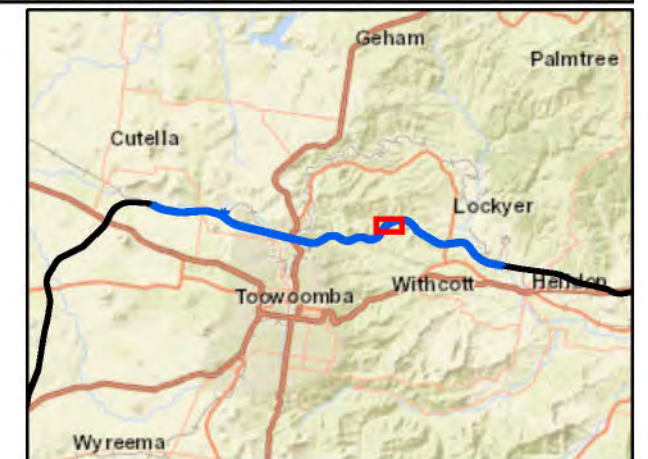


Legend

- 5 Chainage (km)
- Flood sensitive receptors
- G2H project alignment
- Major roads
- Road design
- EIS disturbance footprint
- Was Wet Now Dry
- Was Dry Now Wet
- Drainage Structures**
 - Local drainage culvert
 - Bridges

Change in peak water levels (m)

- | | |
|----------------|--------------|
| < -0.5 | 0.01 to 0.05 |
| -0.5 to -0.2 | 0.05 to 0.1 |
| -0.2 to -0.1 | 0.1 to 0.2 |
| -0.1 to -0.05 | 0.2 to 0.5 |
| -0.05 to -0.01 | > 0.5 |
| -0.01 to 0.01 | |



A3 scale: 1:5,000
 0 0.035 0.07 0.105 0.14 0.175km

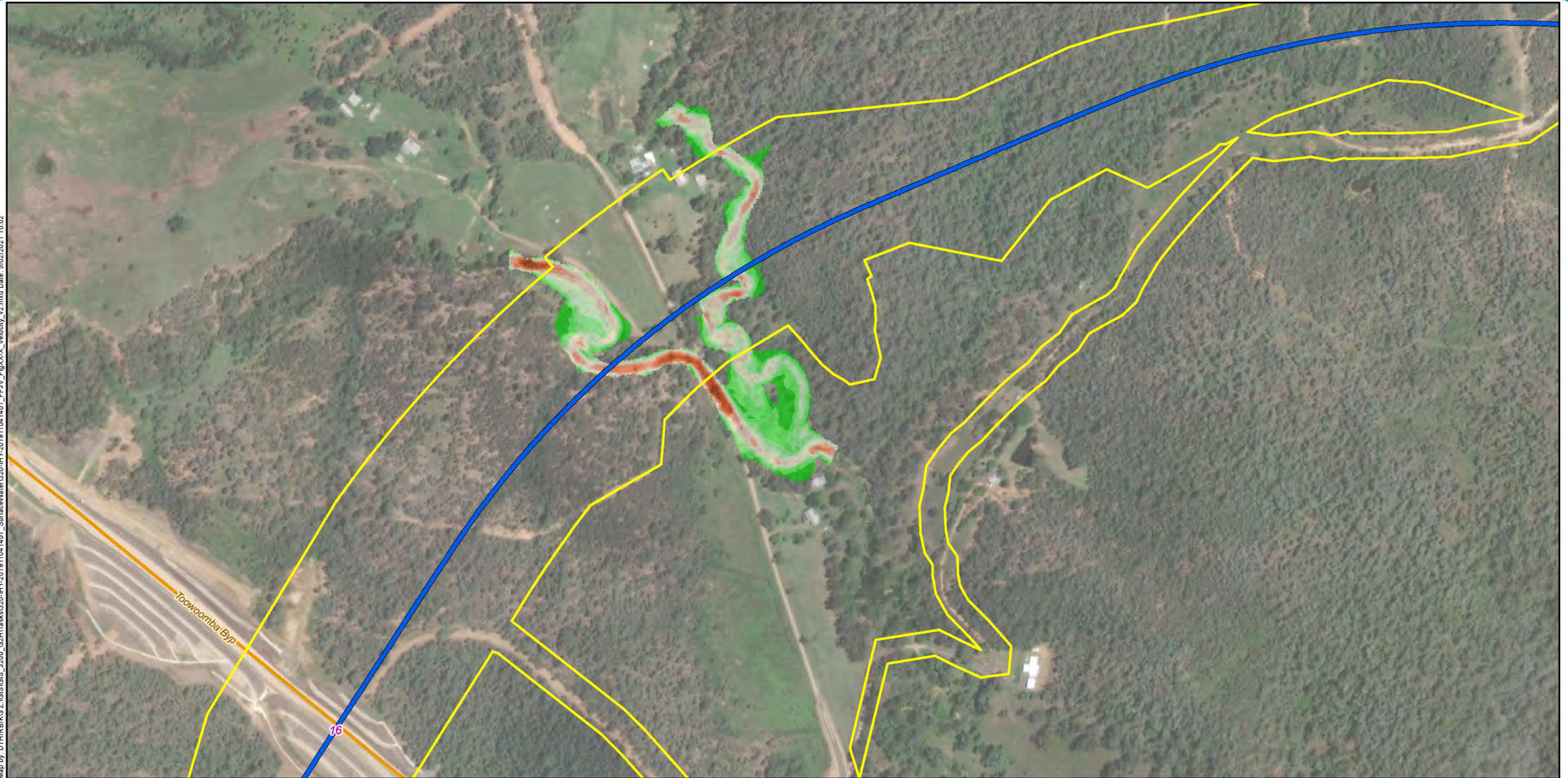


Issue date: 10/02/2021 Version: 3
 Coordinate System: GDA 1994 MGA Zone 56

Gowrie to Helidon

Figure D7-B: Developed Case - Afflux - 1 in 2,000 AEP event - Six Mile Creek

Map by: DTH/RB/KG Z:\GIS\GIS_3200_G2H\Tasks\3200-HY-201811041401_SurfaceWater\3200-HY-201811041401_FF_V_V_FigXX-X_Velocity_v2.mxd Date: 5/02/2021 10:02

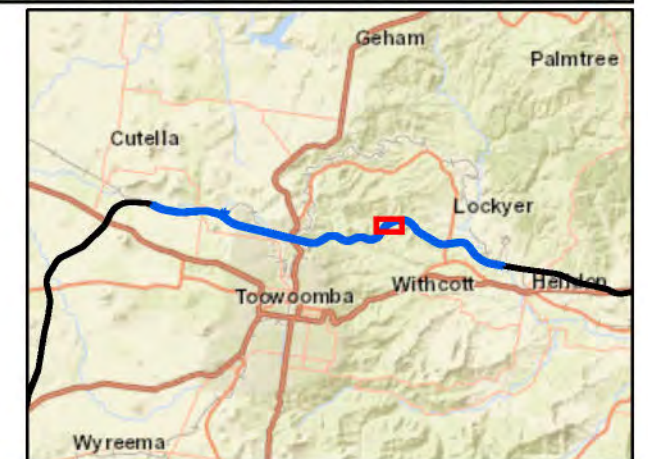


Legend

- 5 Chainage (km)
- G2H project alignment
- Major roads
- Road design
- EIS disturbance footprint

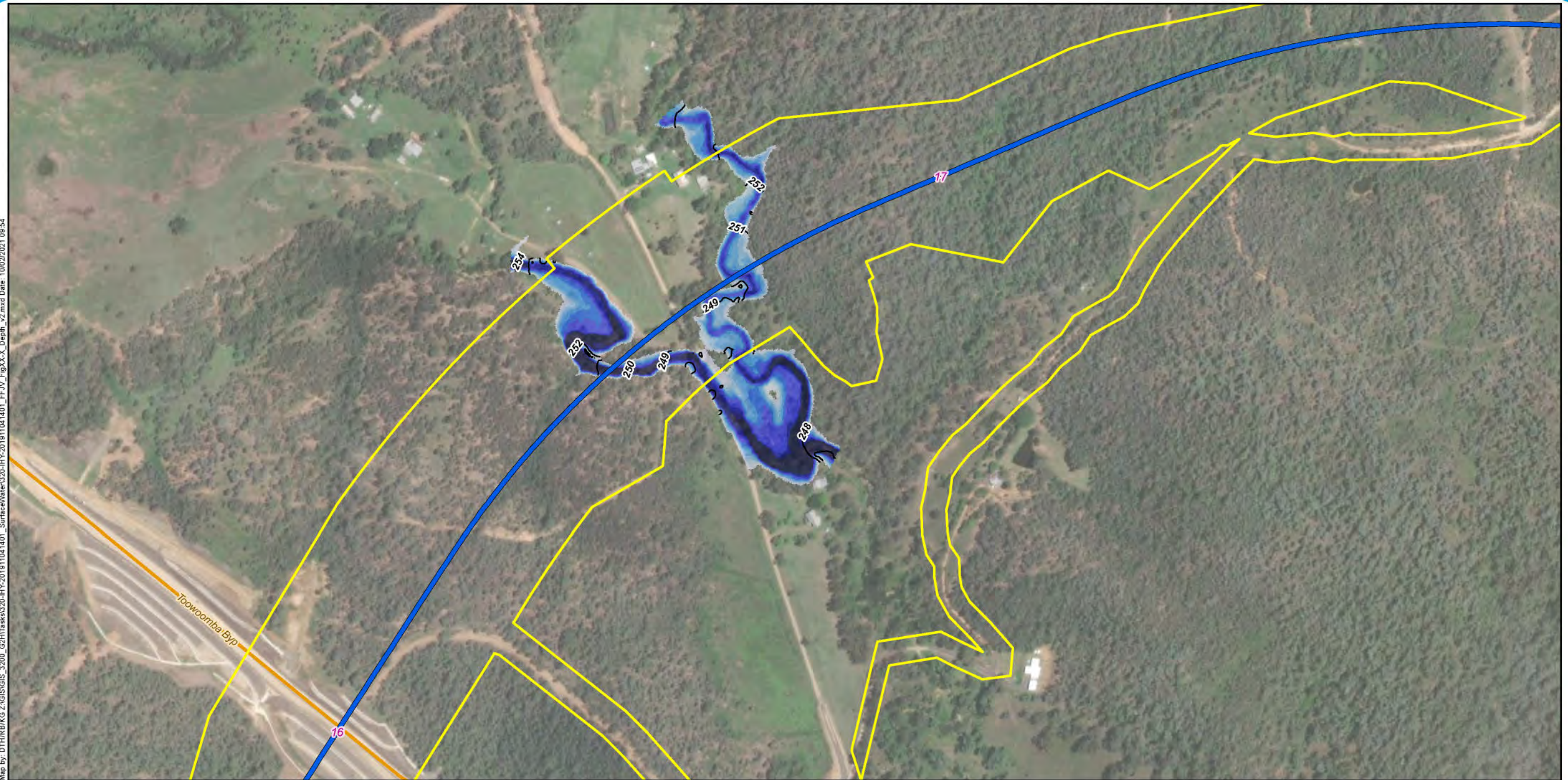
Peak velocity (m/s)

0.0	3.0
0.5	3.5
1.0	4.0
1.5	4.5
2.0	5.0
2.5	



A3 scale: 1:5,000
 0 0.035 0.07 0.105 0.14 0.175km

Map by: DTH/RB/KG Z:\GIS\GIS_3200_G2H\Tasks\3200-HY-201811041401_SurfaceWater\3200-HY-201811041401_FF_V_FigXX-X_Depth_v2.mxd Date: 10/02/2021 09:54



Legend

- 5 Chainage (km)
- G2H project alignment
- Major roads
- Road design
- EIS disturbance footprint
- 1.0m contour mAHD

Depth (m)

- | | |
|-----------|-----------|
| 0 - 0.5 | 3.0 - 3.5 |
| 0.5 - 1.0 | 3.5 - 4.0 |
| 1.0 - 1.5 | 4.0 - 4.5 |
| 1.5 - 2.0 | 4.5 - 5.0 |
| 2.0 - 2.5 | > 5.0 |
| 2.5 - 3.0 | |



A3 scale: 1:5,000
 0 0.035 0.07 0.105 0.14 0.175km



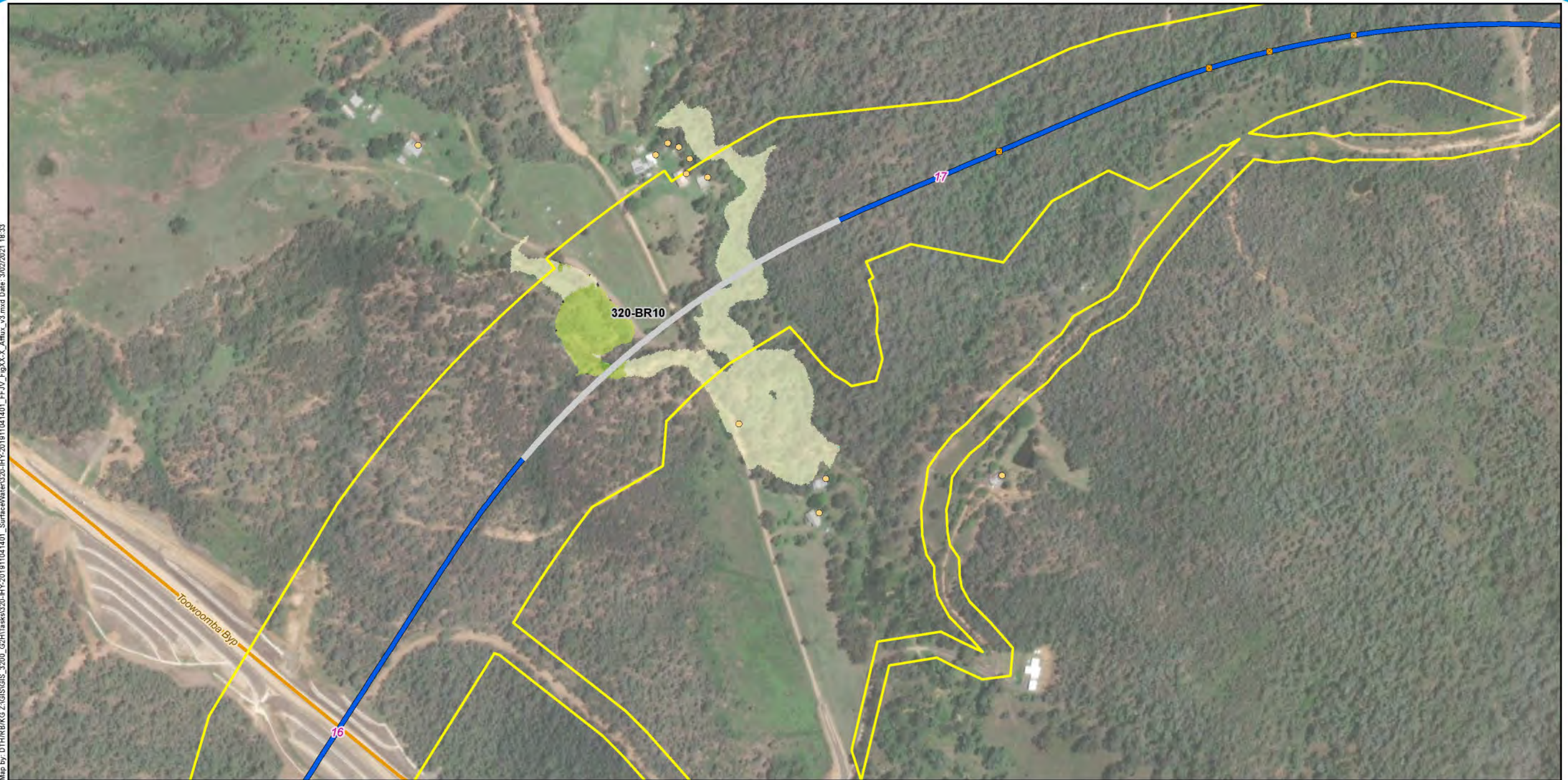
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 Coordinate System: GDA 1994 MGA Zone 56

Gowrie to Helidon

Figure D8-A: Existing Case - Inundation Extent - 1 in 10,000 AEP event - Six Mile Creek

Map by: DTH/RB/KG Z:\GIS\GIS_3200_G2H\Tasks\3200-HY-201811041401_SurfaceWater\3200-HY-201811041401_FF_V_FigXX-X_Afflux_v3.mxd Date: 3/02/2021 18:33



Legend

- 5 Chainage (km)
- Flood sensitive receptors
- G2H project alignment
- Major roads
- Road design
- EIS disturbance footprint
- Was Wet Now Dry
- Was Dry Now Wet
- Drainage Structures**
 - Local drainage culvert
 - Bridges

Change in peak water levels (m)

- | | |
|----------------|--------------|
| < -0.5 | 0.01 to 0.05 |
| -0.5 to -0.2 | 0.05 to 0.1 |
| -0.2 to -0.1 | 0.1 to 0.2 |
| -0.1 to -0.05 | 0.2 to 0.5 |
| -0.05 to -0.01 | > 0.5 |
| -0.01 to 0.01 | |



A3 scale: 1:5,000
 0 0.035 0.07 0.105 0.14 0.175km



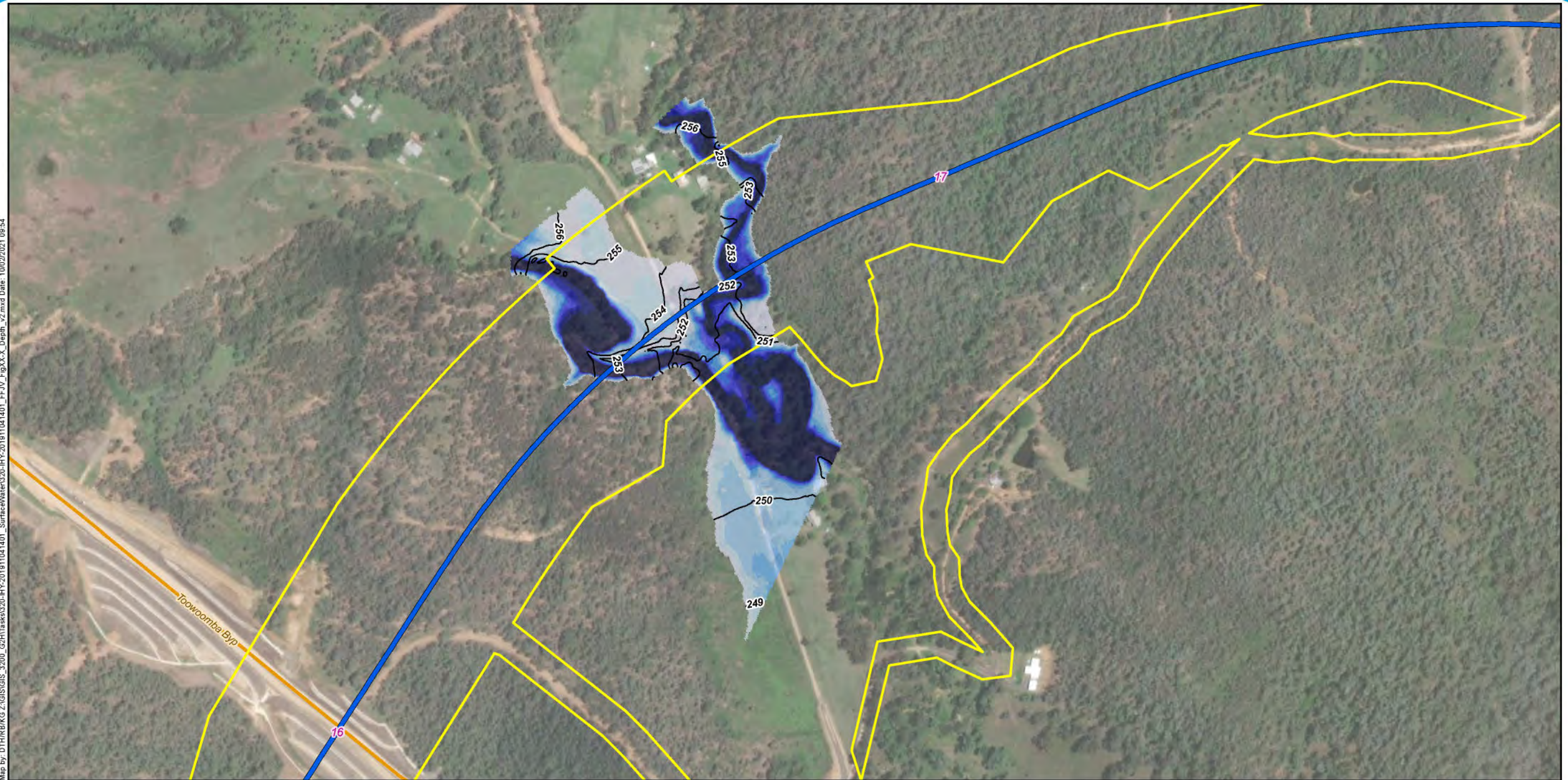
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 Coordinate System: GDA 1994 MGA Zone 56

Gowrie to Helidon

Figure D8-B: Developed Case - Afflux - 1 in 10,000 AEP event - Six Mile Creek

Map by: DTH/RB/KG Z:\GIS\GIS_3200_G2H\Tasks\3200-HY-201811041401_SurfaceWater\3200-HY-201811041401_FF_V_FigXX-X_Depth_v2.mxd Date: 10/02/2021 09:54



Legend

- 5 Chainage (km)
- G2H project alignment
- Major roads
- Road design
- EIS disturbance footprint
- 1.0m contour mAHd

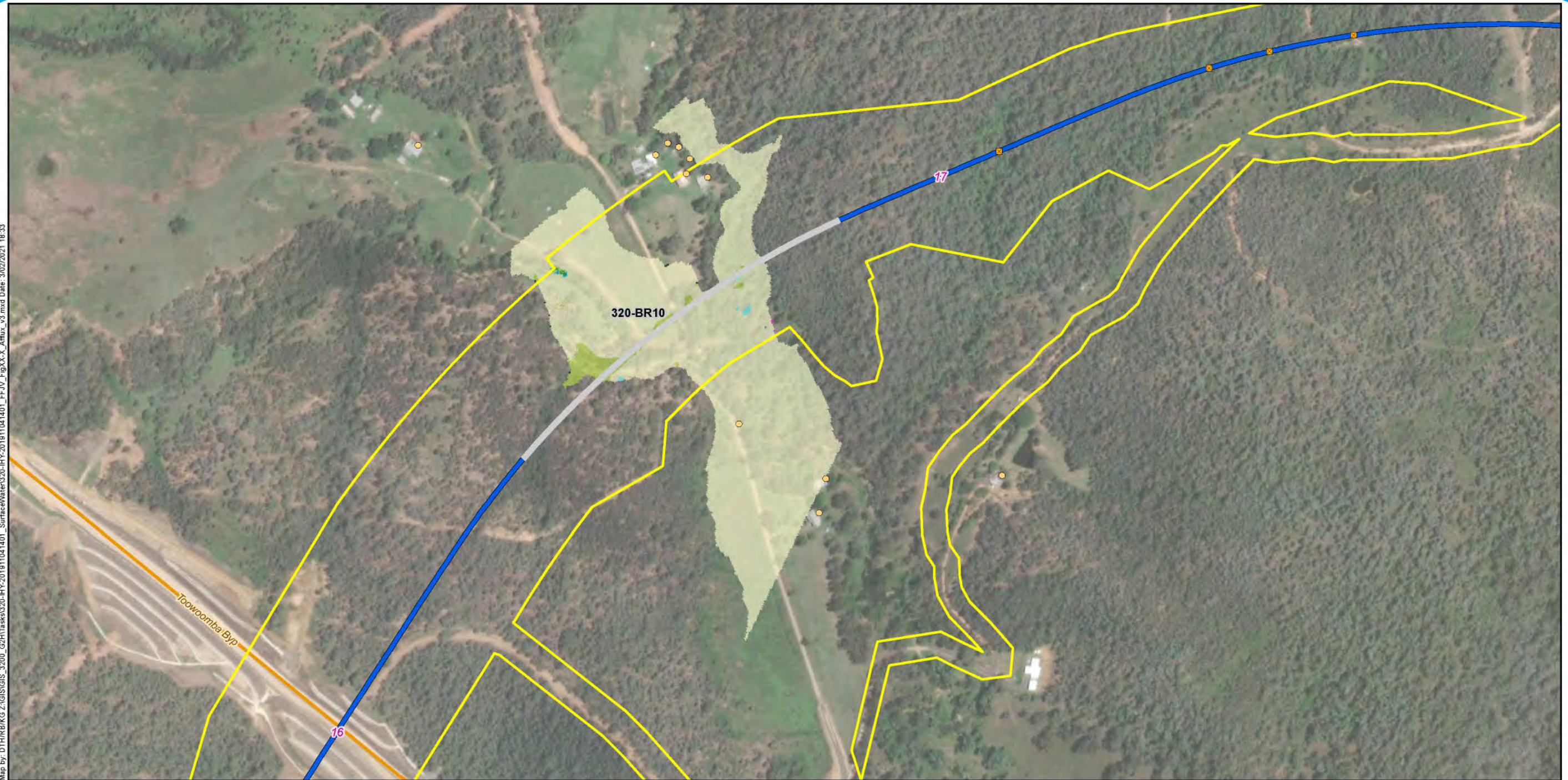
Depth (m)

0 - 0.5	3.0 - 3.5
0.5 - 1.0	3.5 - 4.0
1.0 - 1.5	4.0 - 4.5
1.5 - 2.0	4.5 - 5.0
2.0 - 2.5	> 5.0
2.5 - 3.0	



A3 scale: 1:5,000
 0 0.035 0.07 0.105 0.14 0.175km

Map by: D:\H\RB\KG\GIS\GIS_3200_G2H\Tasks\320-HY-201811041401_SurfaceWater\320-HY-201811041401_FF_V_FigXX-X_Afflux_v3.mxd Date: 3/02/2021 18:33



Legend

- 5 Chainage (km)
- Flood sensitive receptors
- G2H project alignment
- Major roads
- Road design
- EIS disturbance footprint
- Was Wet Now Dry
- Was Dry Now Wet
- Drainage Structures**
 - Local drainage culvert
 - Bridges

Change in peak water levels (m)

- | | |
|----------------|--------------|
| < -0.5 | 0.01 to 0.05 |
| -0.5 to -0.2 | 0.05 to 0.1 |
| -0.2 to -0.1 | 0.1 to 0.2 |
| -0.1 to -0.05 | 0.2 to 0.5 |
| -0.05 to -0.01 | > 0.5 |
| -0.01 to 0.01 | |



A3 scale: 1:5,000
 0 0.035 0.07 0.105 0.14 0.175km



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Gowrie to Helidon

Figure D9-B: Developed Case - Afflux - PMF event - Six Mile Creek

APPENDIX

M

Hydrology and Flooding

Appendix E Upper Lockyer Creek figures

GOWRIE TO HELIDON ENVIRONMENTAL IMPACT STATEMENT



Appendix E

Upper Lockyer Creek Figures

Figure E1- A: Locality

Figure E1- B: Hydrology setup

Figure E1- C: TUFLOW model setup

Figure E1- D: Design structures

Figure E1- E: Flood Sensitive Receptors

Figure E2- A: 1974 Calibration event

Figure E2- B: 2011 Calibration event

Figure E2- C: 2013 Calibration event

Figure E3- A: Existing Case - Inundation Extent - 20% AEP event

Figure E3- B: Developed Case - Afflux - 20% AEP event

Figure E4- A: Existing Case - Inundation Extent - 10% AEP event

Figure E4- B: Developed Case - Afflux - 10% AEP event

Figure E5- A: Existing Case - Inundation Extent - 5% AEP event

Figure E5- B: Developed Case - Afflux - 5% AEP event

Figure E6- A: Existing Case - Inundation Extent - 2% AEP event

Figure E6- B: Developed Case - Afflux - 2% AEP event

Figure E7- A: Existing Case - Inundation Extent - 1% AEP event

Figure E7- B: Developed Case - Afflux - 1% AEP event

Figure E7- C: Climate Change Scenario - Afflux - 1% AEP event

Figure E7- D: Developed Case - Velocity - 1% AEP event

Figure E7- E: Developed Case - Difference in Velocity -1% AEP event

Figure E7- F: Developed Case - Difference in Time of Submergence - 1% AEP event

Figure E8- A: Existing Case - Inundation Extent -1 in 2,000 AEP event

Figure E8- B: Developed Case - Afflux -1 in 2,000 AEP

Figure E8- C: Developed Case - Velocity - 1 in 2,000 AEP event

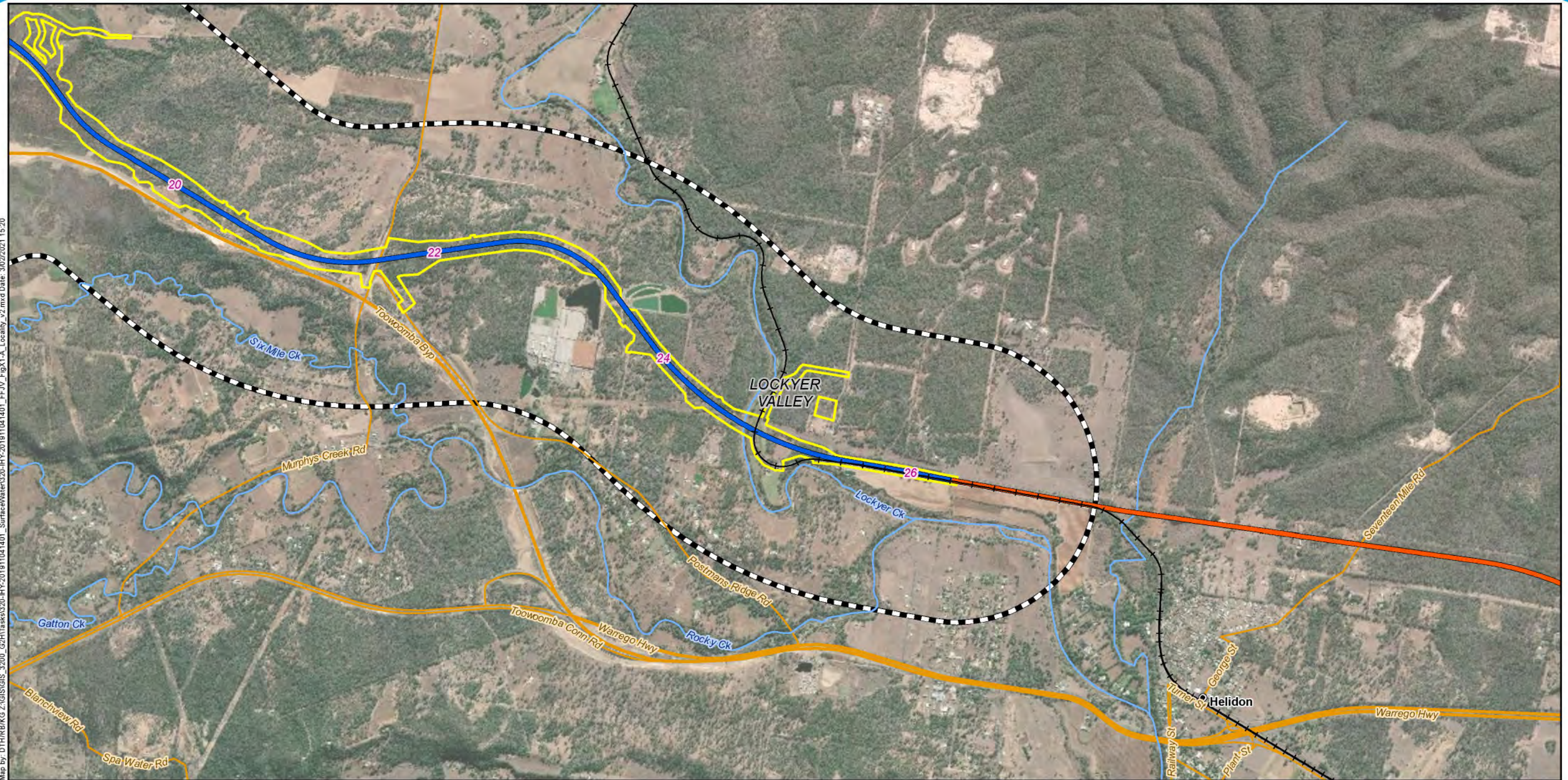
Figure E9- A: Existing Case - Inundation Extent - 1 in 10,000 AEP event

Figure E9- B: Developed Case - Afflux - 1 in 10,000 AEP event

Figure E10- A: Existing Case - Inundation Extent - PMF event

Figure E10- B: Developed Case - Afflux - PMF event

Map by: DTH/RB/KG Z:\GIS\GIS_3200_G2H\Tasks\3200-HY-201811041401_SurfaceWater\3200-HY-201811041401_FF_V1-A_Locality_V2.mxd Date: 30/02/2021 15:20



Legend

- 5 Chainage (km)
- Localities
- Existing rail
- G2H project alignment
- H2C project alignment
- Major roads
- Minor roads
- Watercourses
- EIS disturbance footprint
- EIS investigation corridor
- Local Government Areas



A3 scale: 1:30,000
 0 0.25 0.5 0.75 1 1.25km

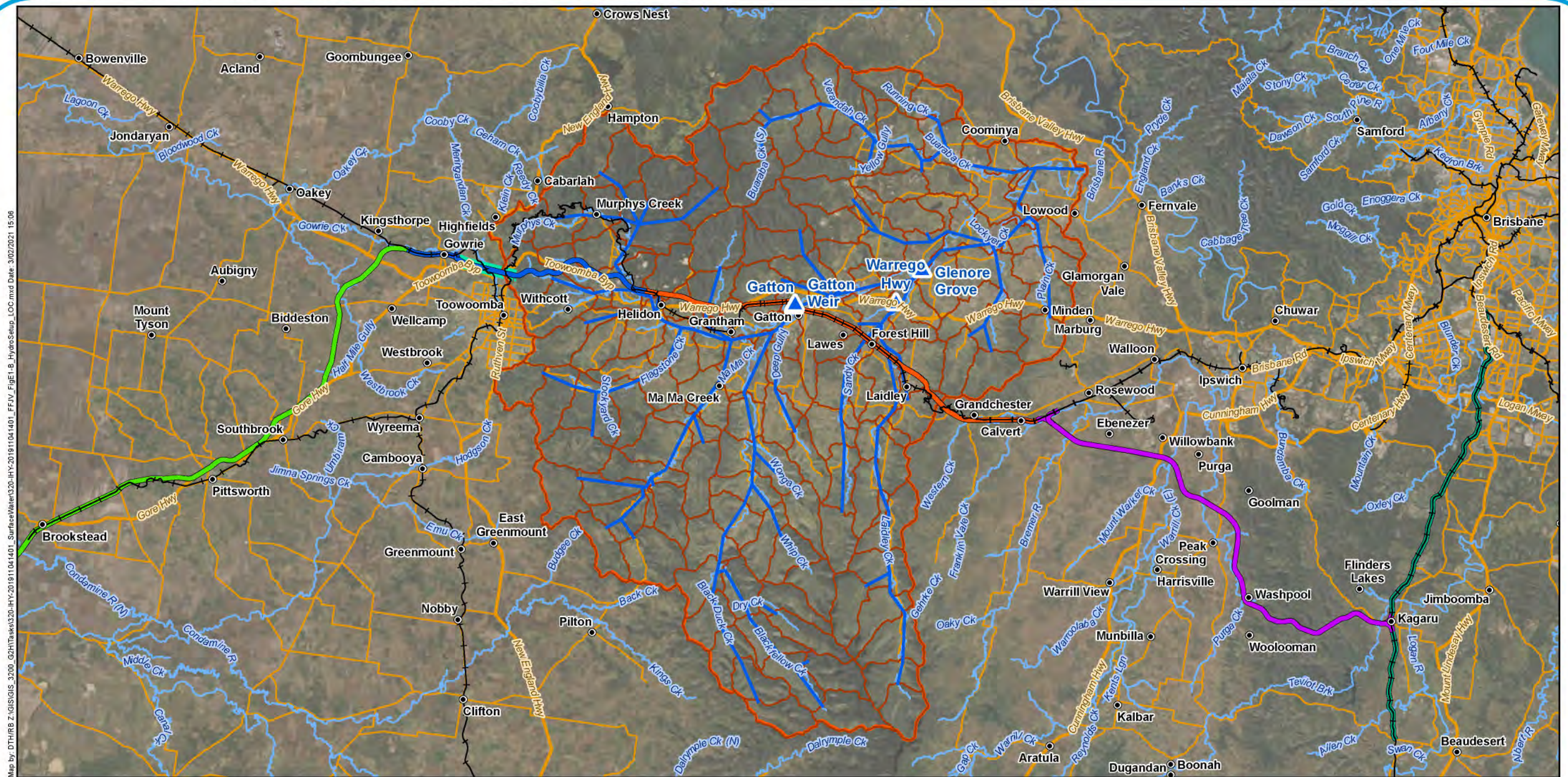


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Gowrie to Helidon

Figure E1-A: Locality - Lockyer Creek



Map by: DTH/RB Z:GIS/915_3200_Q2H1Task320-IHY-201911041401_SurfaceWater320-IHY-201911041401_FFIV_FigE1-B_HydroSetup_LOC.mxd Date: 30/02/2021 15:06

Legend

- Localities
- B2G project alignment
- G2H project alignment
- H2C project alignment
- C2K project alignment
- K2ARB project alignment
- Existing rail
- Tunnel
- Watercourses
- Major roads
- Minor roads
- ▲ Stream gauge
- Hydrologic model links
- Model subcatchments
- Lockyer Creek catchment boundary



A3 scale: 1:450,000
0 3 6 9 12 15km

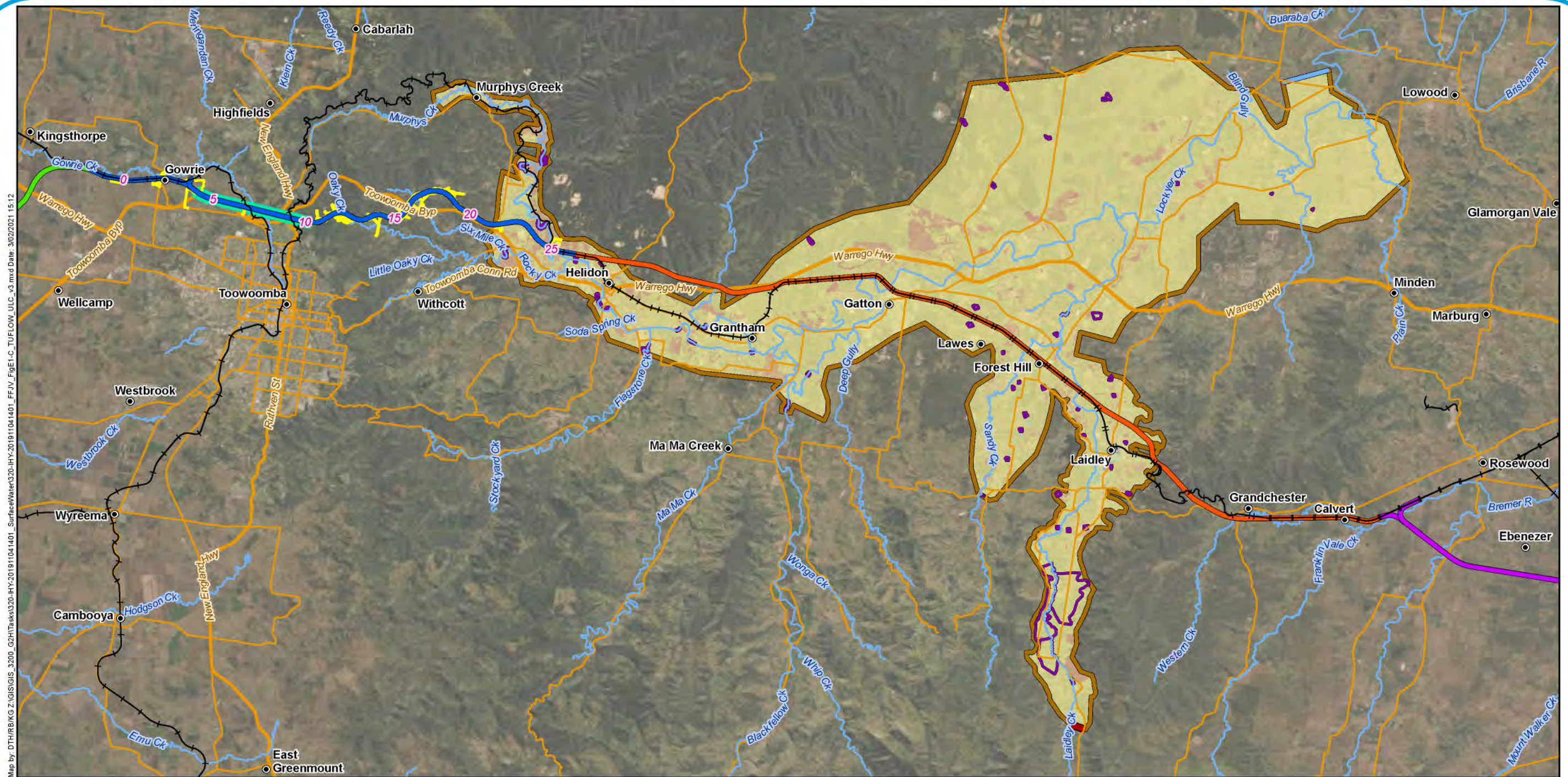


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Coordinate System: GDA 1994 MGA Zone 56

Gowrie to Helidon

Figure E1- B: Hydrology setup - Lockyer Creek

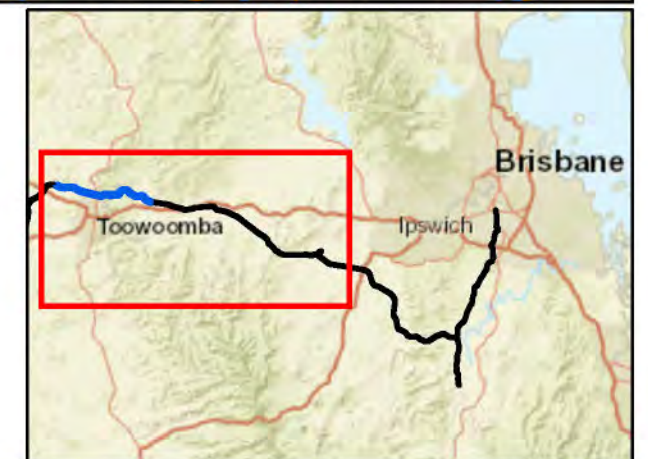


Legend

- 5 Chainage (km)
- Localities
- Existing rail
- B2G project alignment
- G2H project alignment
- H2C project alignment
- C2K project alignment
- Tunnel
- Major roads
- Minor roads
- EIS disturbance footprint
- Code boundary
- Downstream boundary
- Upstream boundary
- Internal boundary
- Watercourses

Materials

- Non tidal waterway
- Farmland / general area
- Demolished building
- Farm dam / open water
- Dense vegetation
- Low-medium vegetation
- Building
- Road
- Clear paved area
- Riparian vegetation
- Urban
- Waterbodies
- Fallow
- Houses
- Creek banks
- Urban general yards



A3 scale: 1:220,000
 0 2 4 6 8 10 km



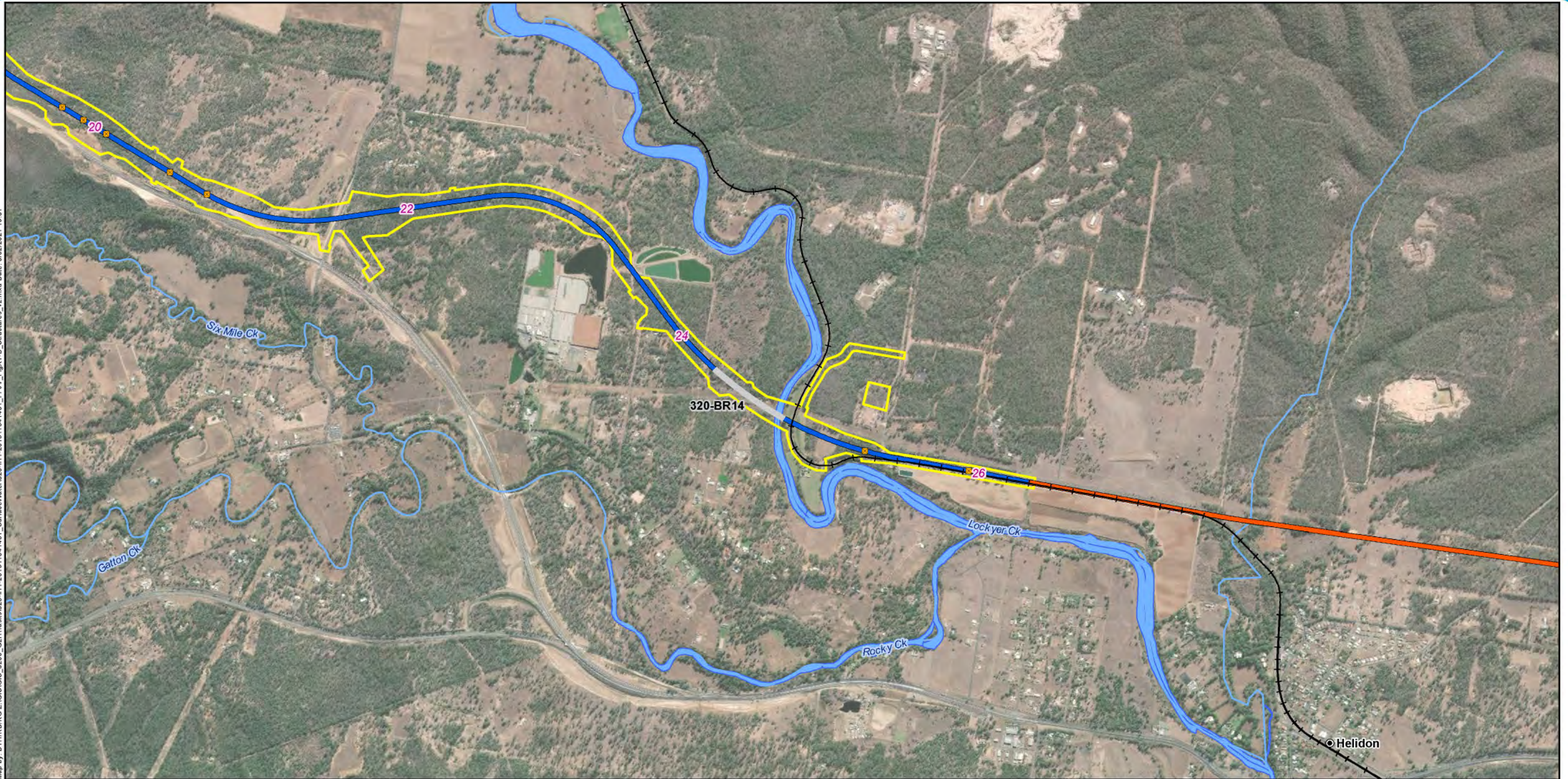
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Gowrie to Helidon

Figure E1-C: TUFLOW model setup - Lockyer Creek

Map by: DTH/RB/KG Z:\GIS\GIS_3200_G2H\Tasks\320-HY-201811041401_SurfaceWater\320-HY-201811041401_FF_V_FigX1-D_Structures_v2.mxd Date: 3/02/2021 15:31



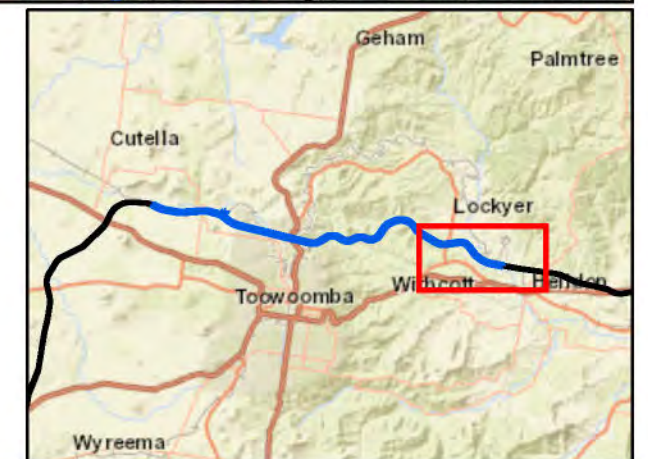
Legend

- 5 Chainage (km)
- Localities
- Existing rail
- G2H project alignment
- H2C project alignment

- EIS disturbance footprint
- Defined watercourses
- Watercourses
- Bridges

Drainage Structures

- Floodplain culvert
- Local drainage culvert



A3 scale: 1:25,000
 0 0.2 0.4 0.6 0.8 1km

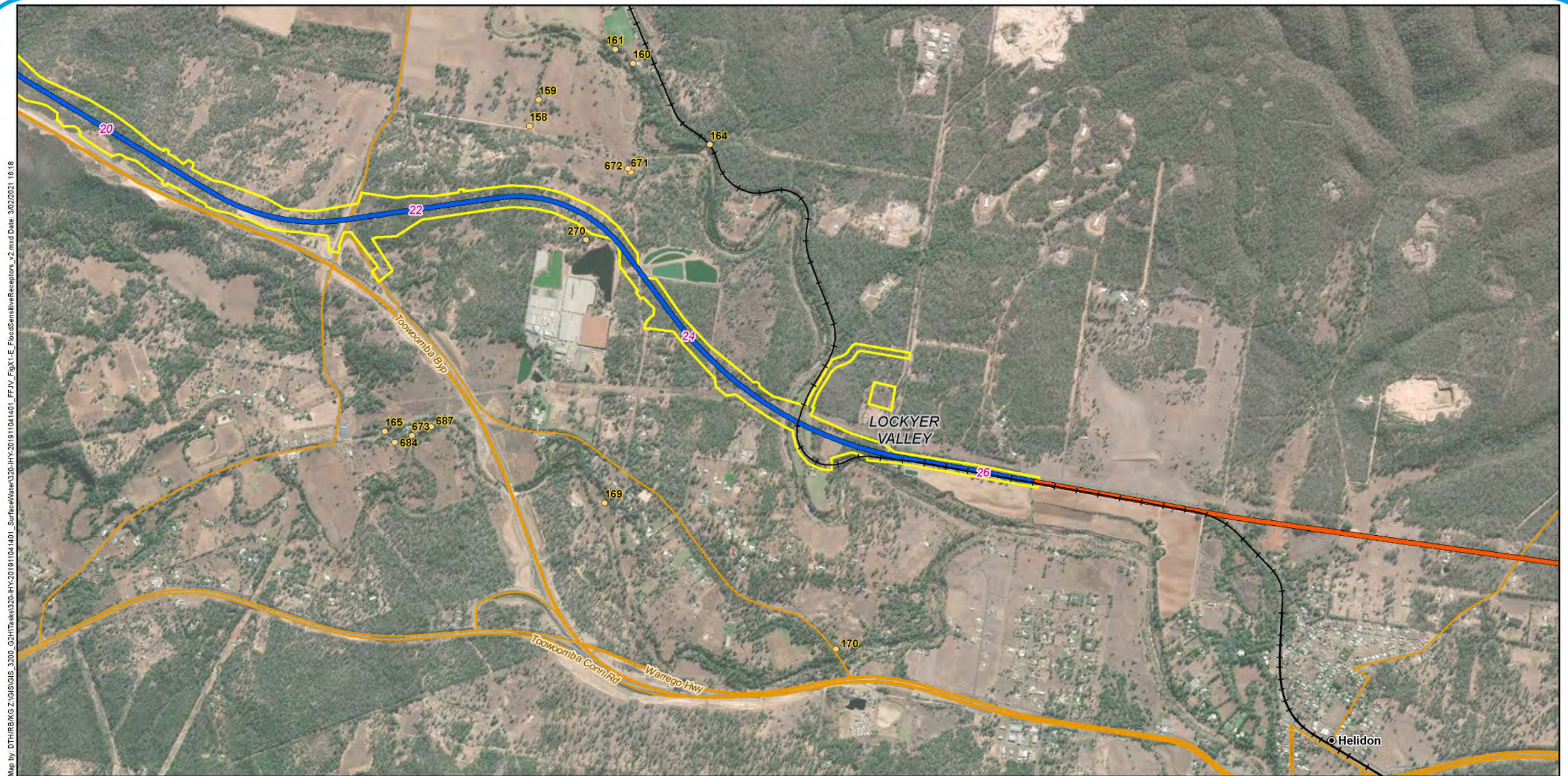


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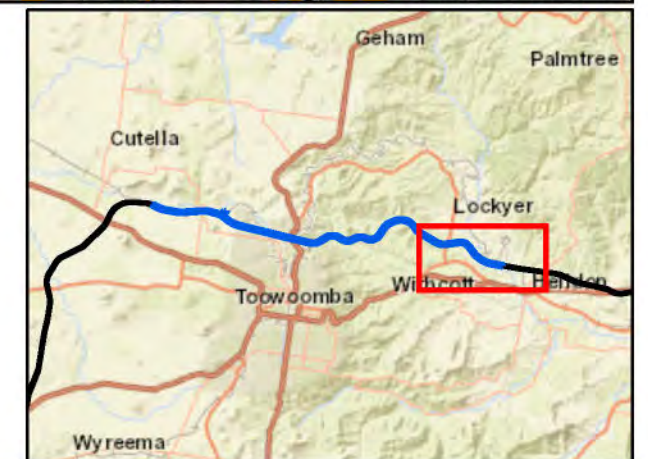
Gowrie to Helidon

Figure E1-D: Design structures - Lockyer Creek



Legend

- 5 Chainage (km)
- Localities
- Flood sensitive receptors
- Existing rail
- G2H project alignment
- H2C project alignment
- Major roads
- Minor roads
- EIS disturbance footprint
- Local Government Areas



A3 scale: 1:25,000
 0 0.2 0.4 0.6 0.8 1km

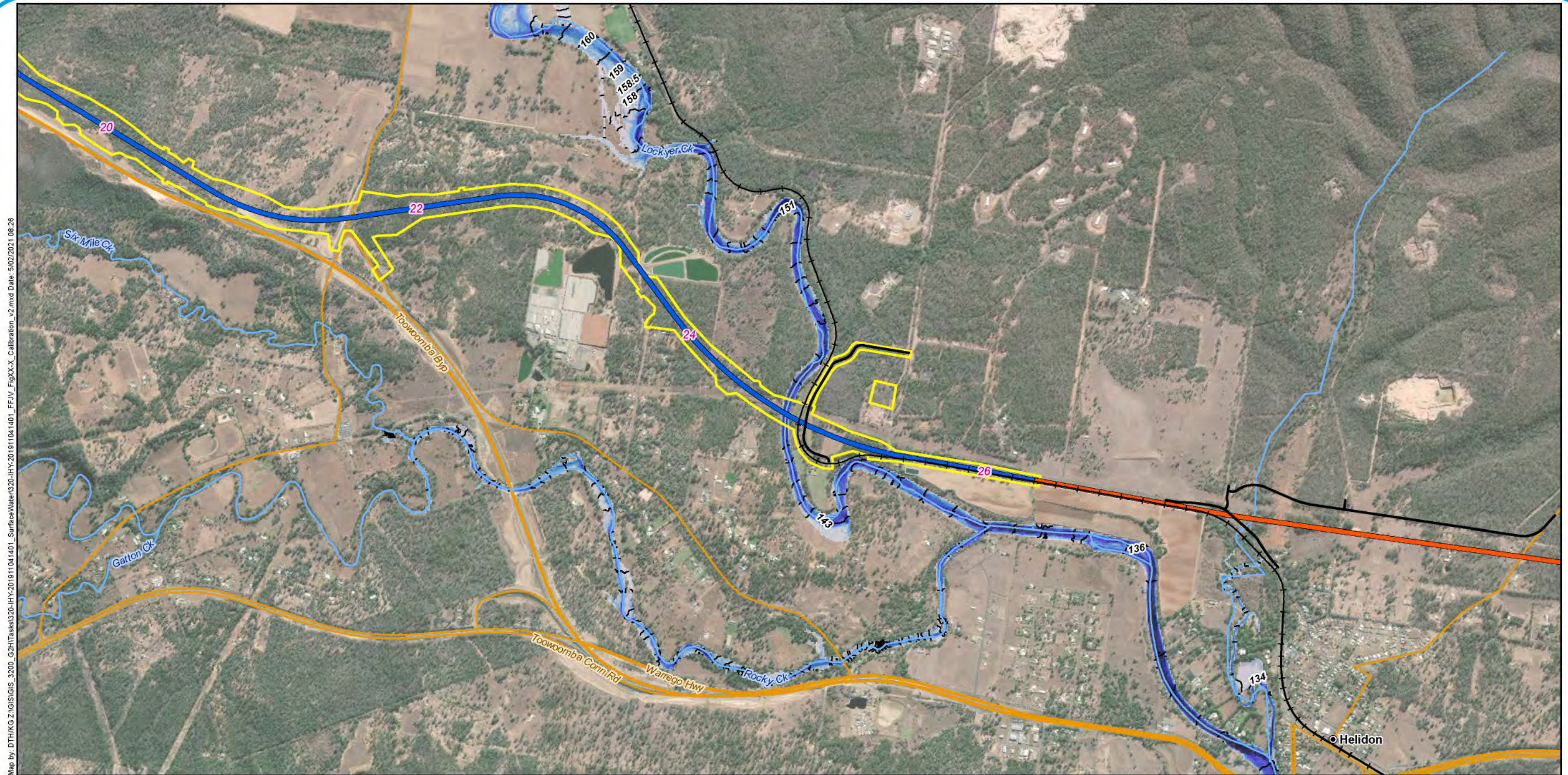


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Gowrie to Helidon

Figure E1-E: Flood Sensitive Receptors - Lockyer Creek

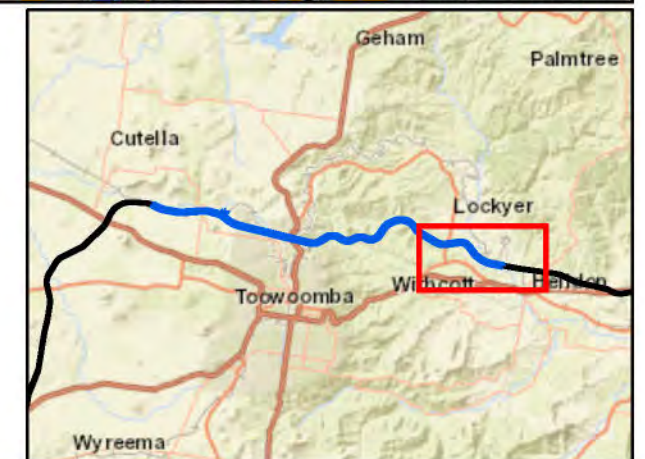


Legend

- 5 Chainage (km)
- Localities
- Existing rail
- G2H project alignment
- H2C project alignment
- Major roads
- Minor roads
- Road design
- EIS disturbance footprint
- Watercourses
- 0.5m contour mAHD

Depth (m)

- | | |
|-----------|-----------|
| 0 - 0.5 | 3.0 - 3.5 |
| 0.5 - 1.0 | 3.5 - 4.0 |
| 1.0 - 1.5 | 4.0 - 4.5 |
| 1.5 - 2.0 | 4.5 - 5.0 |
| 2.0 - 2.5 | > 5.0 |
| 2.5 - 3.0 | |



A3 scale: 1:25,000
 0 0.15 0.3 0.45 0.6 0.75km

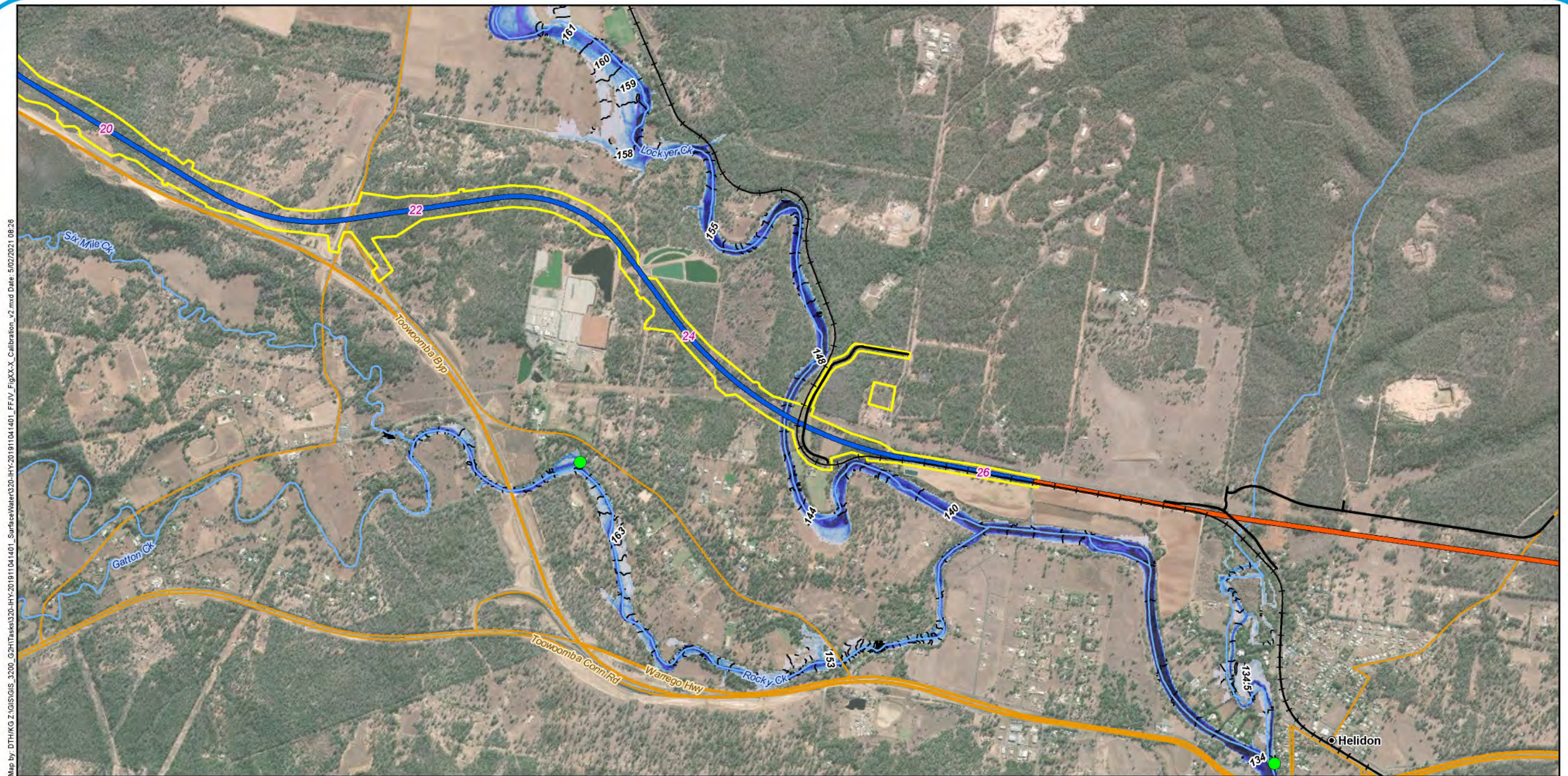


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Gowrie to Helidon

Figure E2-A: 1974 Calibration event - Lockyer Creek

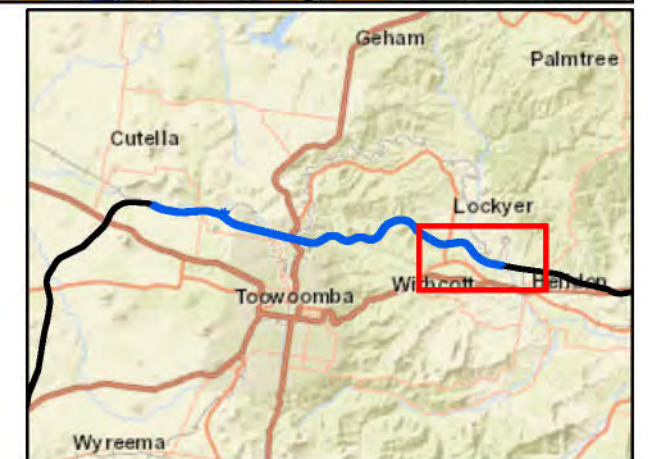


Legend

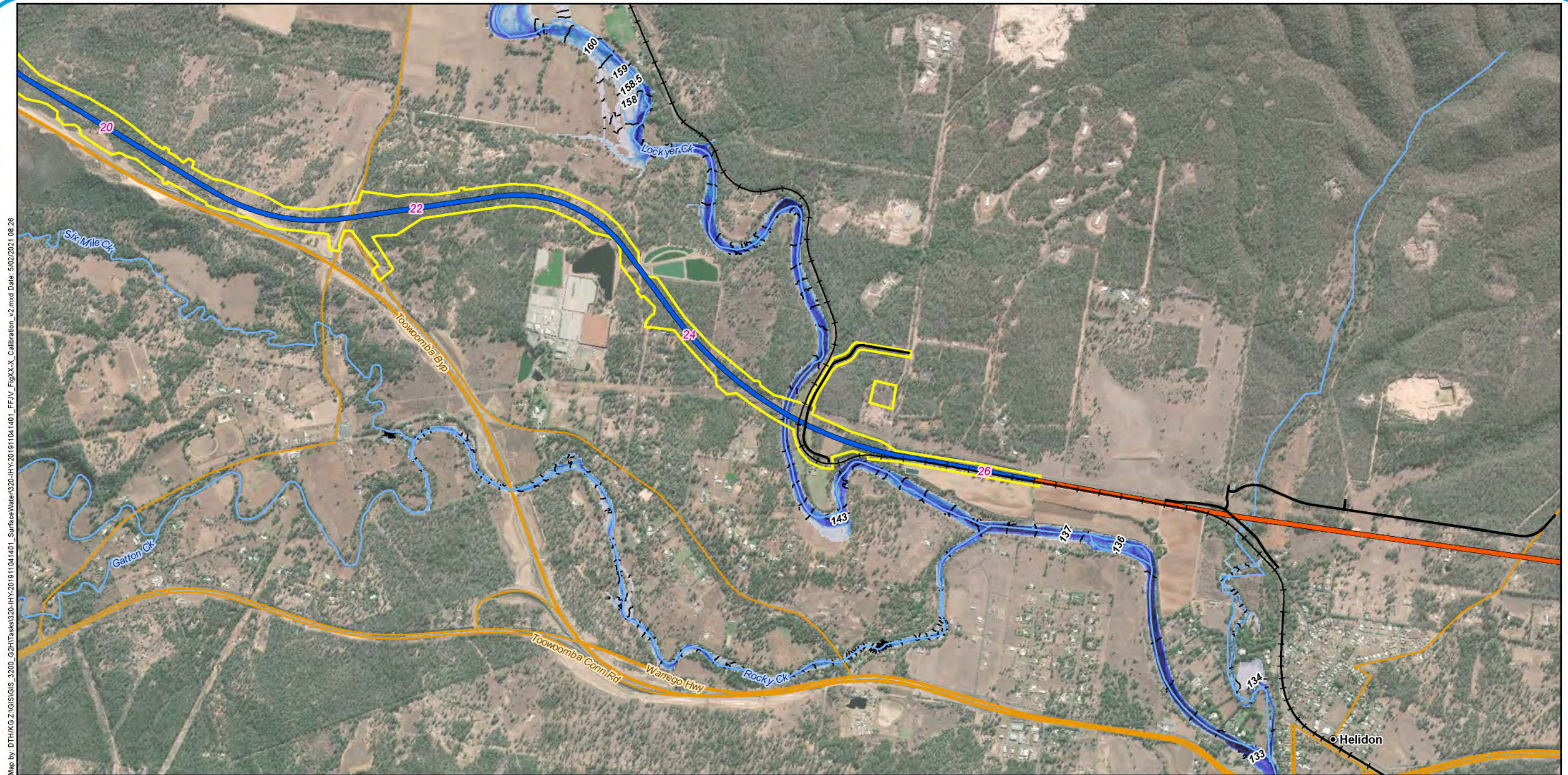
- 5 Chainage (km)
- Localities
- Existing rail
- G2H project alignment
- H2C project alignment
- Major roads
- Minor roads
- Road design
- EIS disturbance footprint
- Watercourses
- 0.5m contour mAHd

Depth (m)

- | | |
|-----------|-----------|
| 0 - 0.5 | 3.0 - 3.5 |
| 0.5 - 1.0 | 3.5 - 4.0 |
| 1.0 - 1.5 | 4.0 - 4.5 |
| 1.5 - 2.0 | 4.5 - 5.0 |
| 2.0 - 2.5 | > 5.0 |
| 2.5 - 3.0 | |



A3 scale: 1:25,000
 0 0.15 0.3 0.45 0.6 0.75km

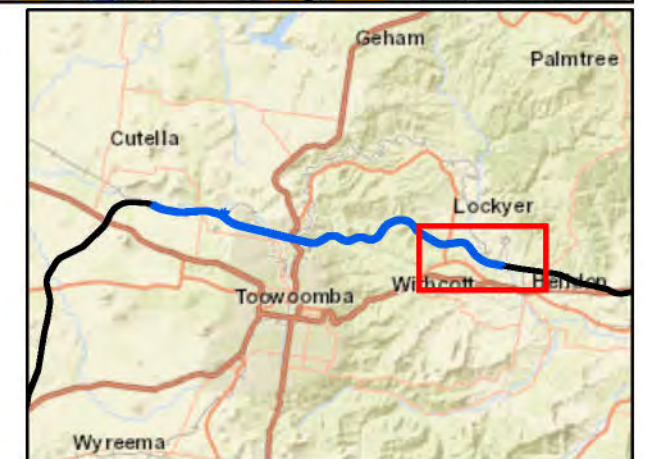


Legend

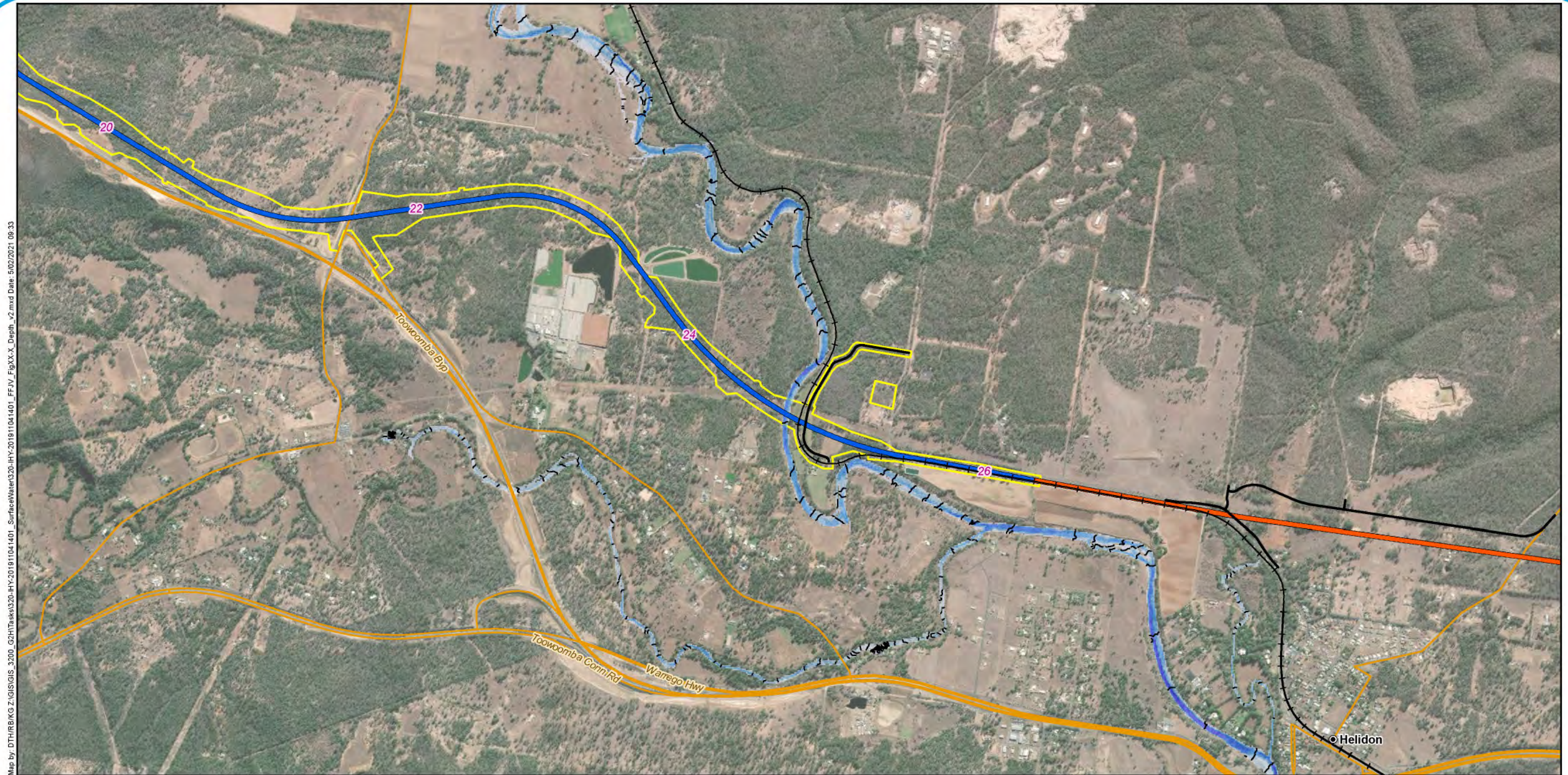
- 5 Chainage (km)
- Localities
- Existing rail
- G2H project alignment
- H2C project alignment
- Major roads
- Minor roads
- Road design
- EIS disturbance footprint
- Watercourses
- 0.5m contour mAHd

Depth (m)

- | | |
|-----------|-----------|
| 0 - 0.5 | 3.0 - 3.5 |
| 0.5 - 1.0 | 3.5 - 4.0 |
| 1.0 - 1.5 | 4.0 - 4.5 |
| 1.5 - 2.0 | 4.5 - 5.0 |
| 2.0 - 2.5 | > 5.0 |
| 2.5 - 3.0 | |



A3 scale: 1:25,000
 0 0.15 0.3 0.45 0.6 0.75km



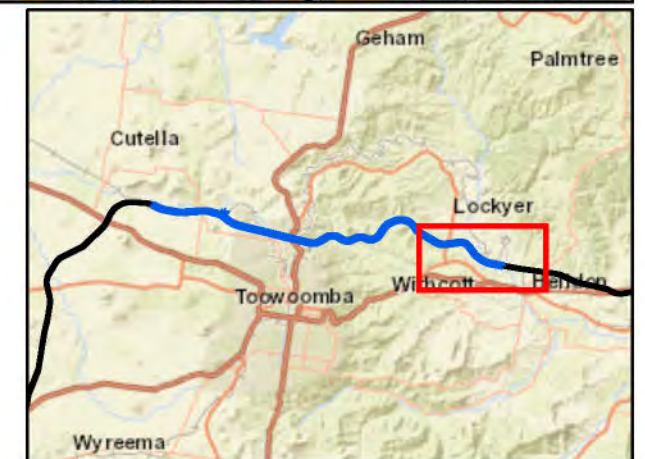
Legend

- 5 Chainage (km)
- Localities
- Existing rail
- G2H project alignment
- H2C project alignment
- Major roads
- Minor roads
- Road design

- EIS disturbance footprint
- 1.0m contour mAHd

Depth (m)

- | | |
|-------------|-------------|
| □ 0 - 0.5 | □ 3.0 - 3.5 |
| □ 0.5 - 1.0 | □ 3.5 - 4.0 |
| □ 1.0 - 1.5 | □ 4.0 - 4.5 |
| □ 1.5 - 2.0 | □ 4.5 - 5.0 |
| □ 2.0 - 2.5 | □ > 5.0 |
| □ 2.5 - 3.0 | |



A3 scale: 1:25,000
 0 0.15 0.3 0.45 0.6 0.75km

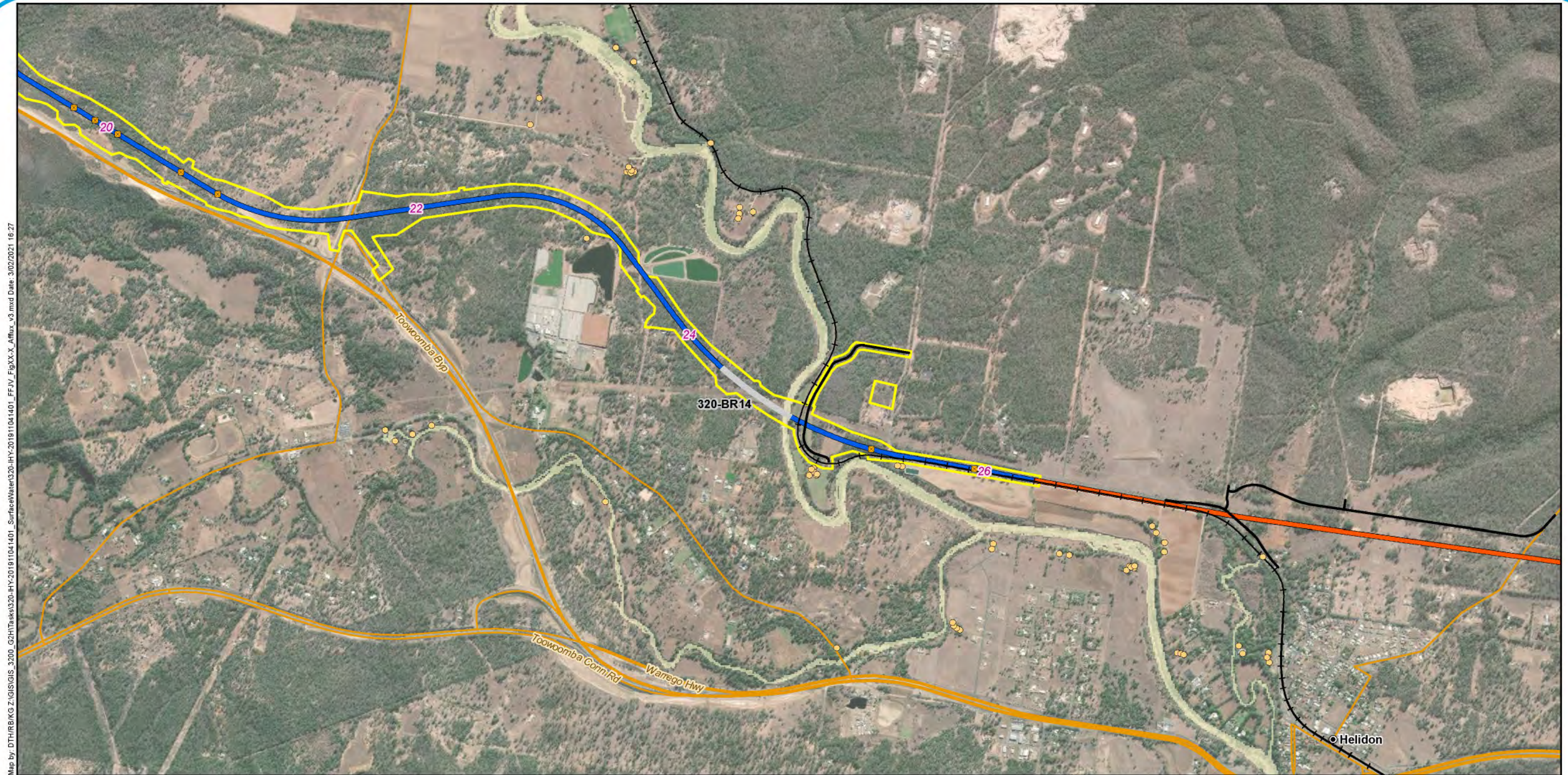


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Gowrie to Helidon

Figure E3-A: Existing Case - Inundation Extent - 20% AEP event - Lockyer Creek



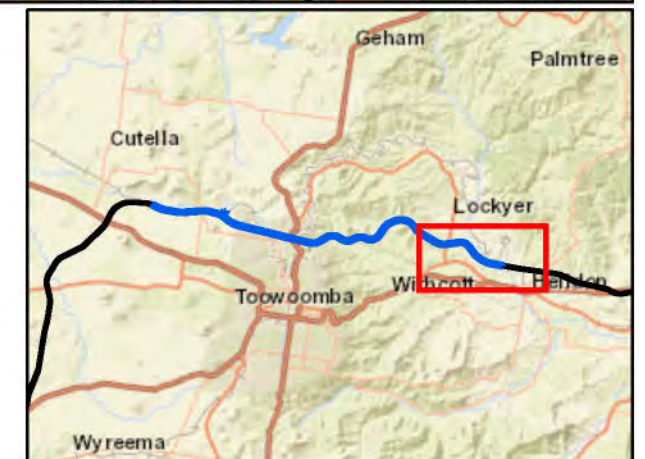
Legend

- 5 Chainage (km)
- Localities
- Flood sensitive receptors
- Existing rail
- G2H project alignment
- H2C project alignment
- Major roads
- Minor roads
- Road design

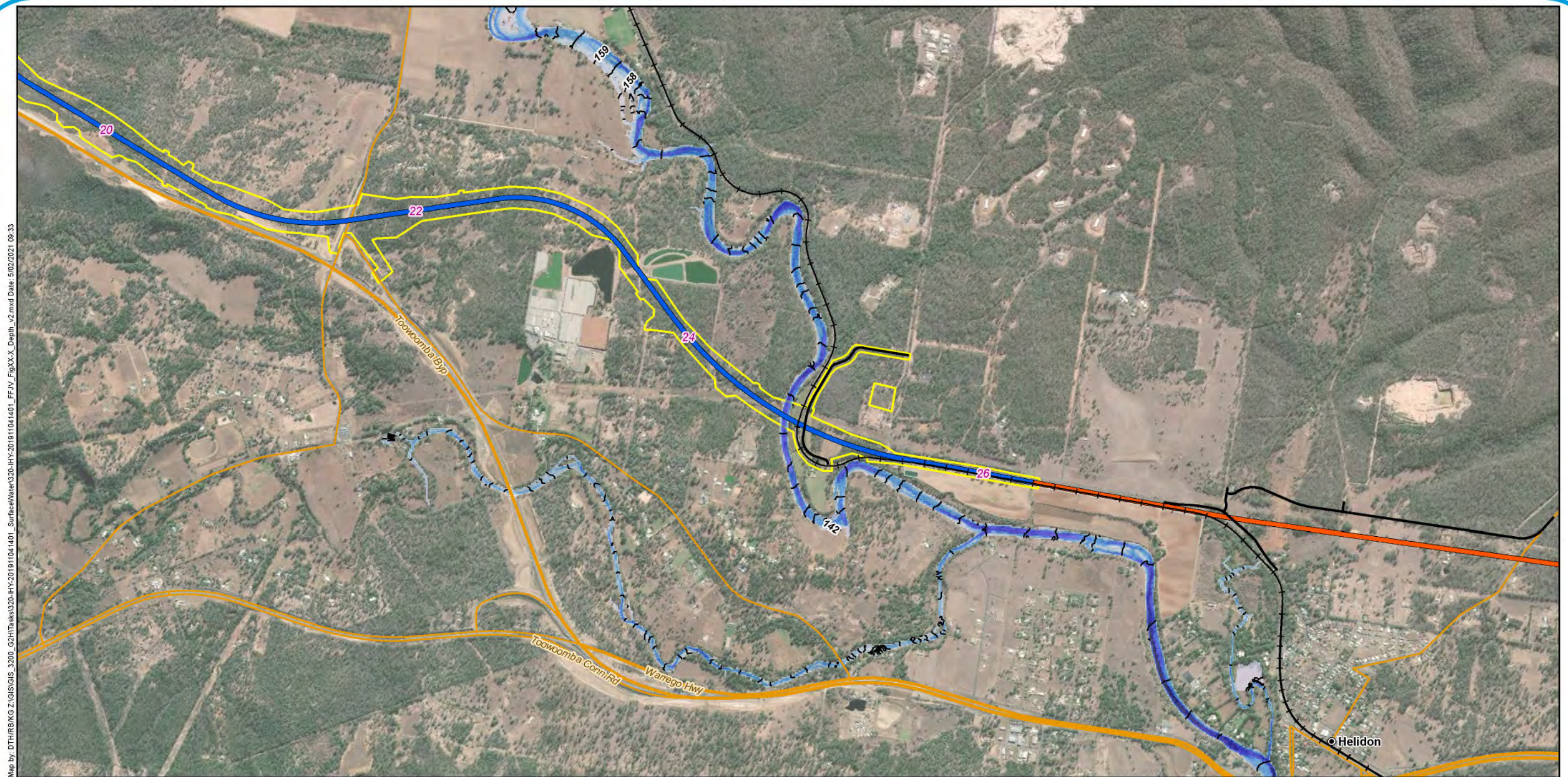
- EIS disturbance footprint
- Was Wet Now Dry
- Was Dry Now Wet
- Local drainage culvert
- Bridges

Change in peak water levels (m)

- | | |
|----------------|--------------|
| < -0.5 | 0.01 to 0.05 |
| -0.5 to -0.2 | 0.05 to 0.1 |
| -0.2 to -0.1 | 0.1 to 0.2 |
| -0.1 to -0.05 | 0.2 to 0.5 |
| -0.05 to -0.01 | > 0.5 |
| -0.01 to 0.01 | |



A3 scale: 1:25,000
 0 0.15 0.3 0.45 0.6 0.75km

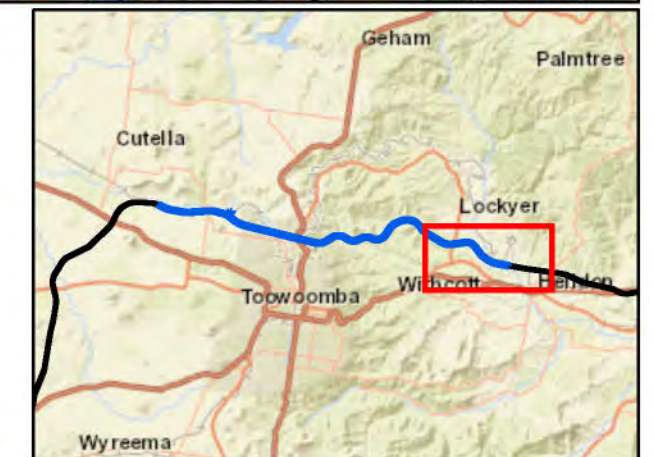


Legend

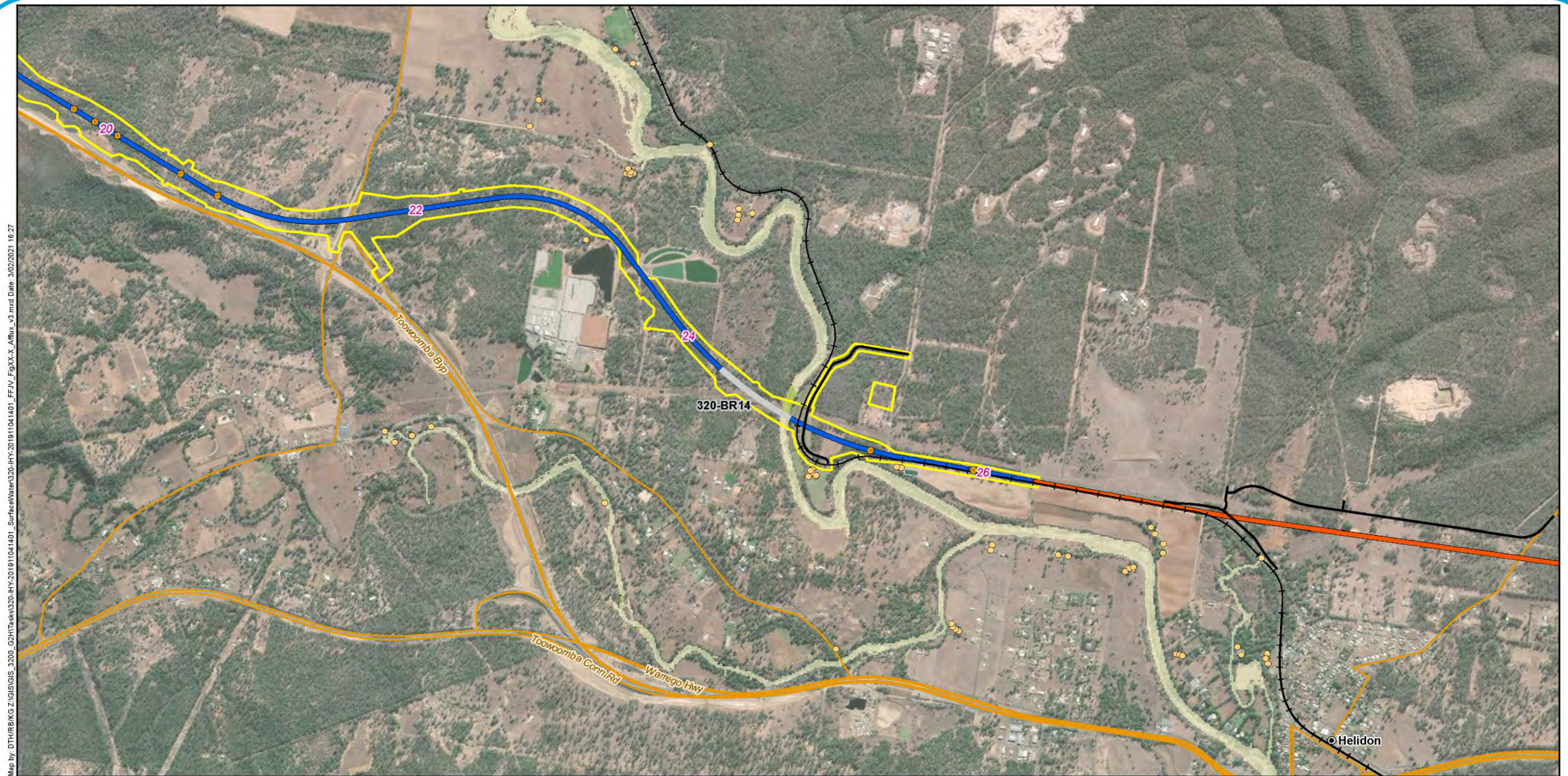
- 5 Chainage (km)
- Localities
- Existing rail
- G2H project alignment
- H2C project alignment
- Major roads
- Minor roads
- Road design
- EIS disturbance footprint
- 1.0m contour mAHd

Depth (m)

- | | |
|-----------|-----------|
| 0 - 0.5 | 3.0 - 3.5 |
| 0.5 - 1.0 | 3.5 - 4.0 |
| 1.0 - 1.5 | 4.0 - 4.5 |
| 1.5 - 2.0 | 4.5 - 5.0 |
| 2.0 - 2.5 | > 5.0 |
| 2.5 - 3.0 | |



A3 scale: 1:25,000
 0 0.15 0.3 0.45 0.6 0.75km



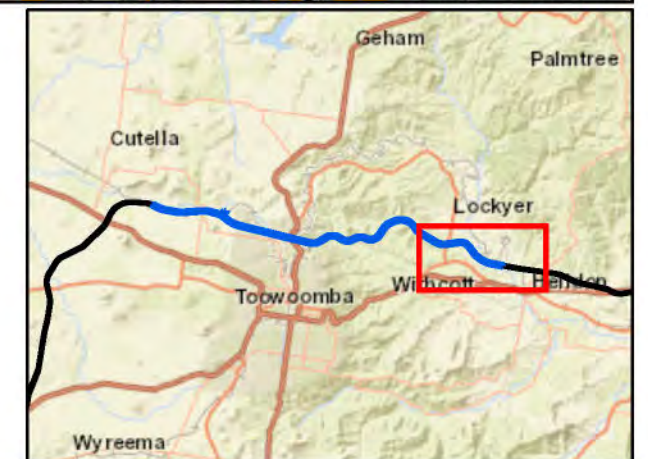
Legend

- 5 Chainage (km)
- Localities
- Flood sensitive receptors
- Existing rail
- G2H project alignment
- H2C project alignment
- Major roads
- Minor roads
- Road design

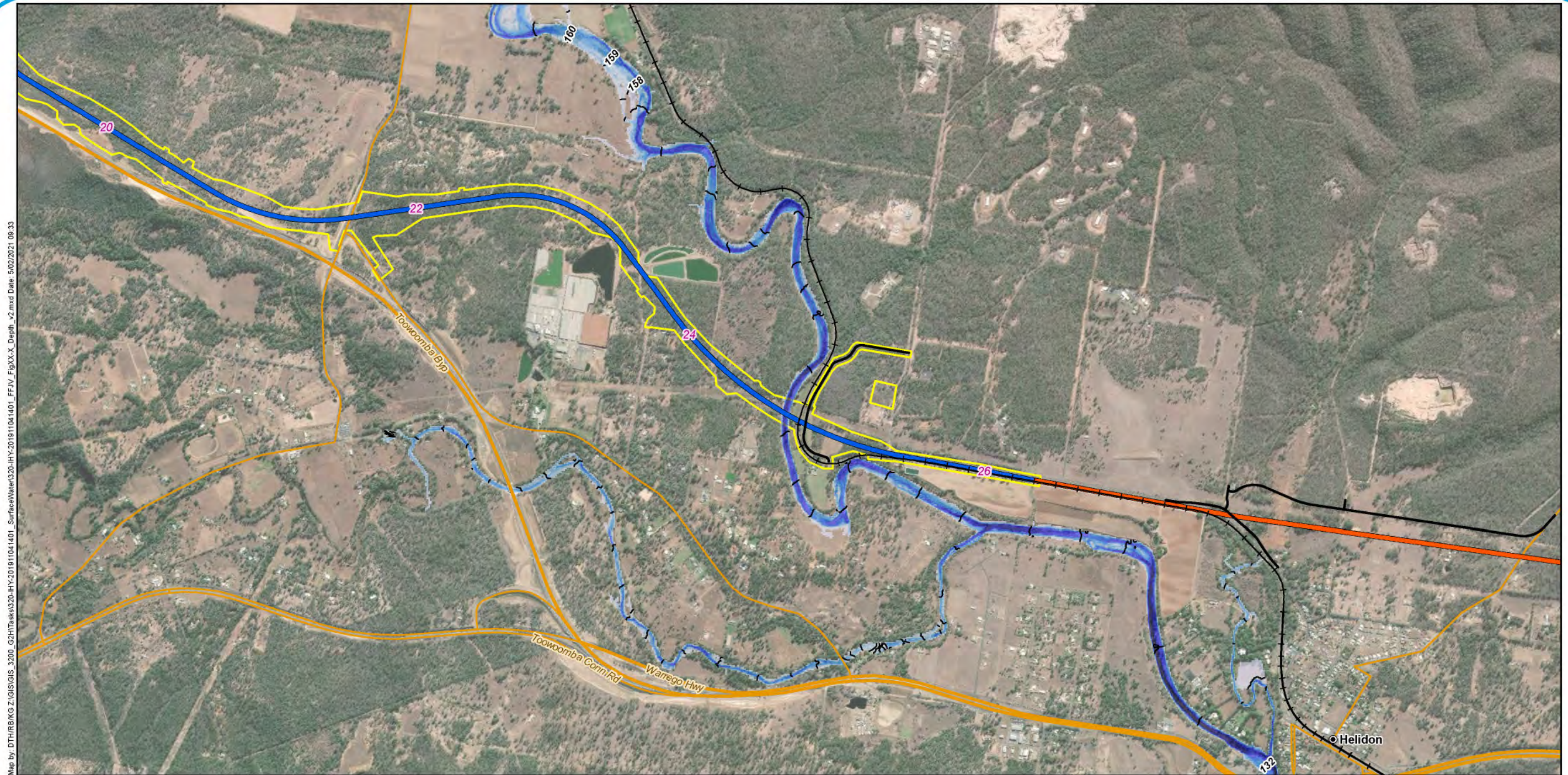
- EIS disturbance footprint
- Was Wet Now Dry
- Was Dry Now Wet
- Local drainage culvert
- Bridges

Change in peak water levels (m)

- | | |
|----------------|--------------|
| < -0.5 | 0.01 to 0.05 |
| -0.5 to -0.2 | 0.05 to 0.1 |
| -0.2 to -0.1 | 0.1 to 0.2 |
| -0.1 to -0.05 | 0.2 to 0.5 |
| -0.05 to -0.01 | > 0.5 |
| -0.01 to 0.01 | |



A3 scale: 1:25,000
 0 0.15 0.3 0.45 0.6 0.75km

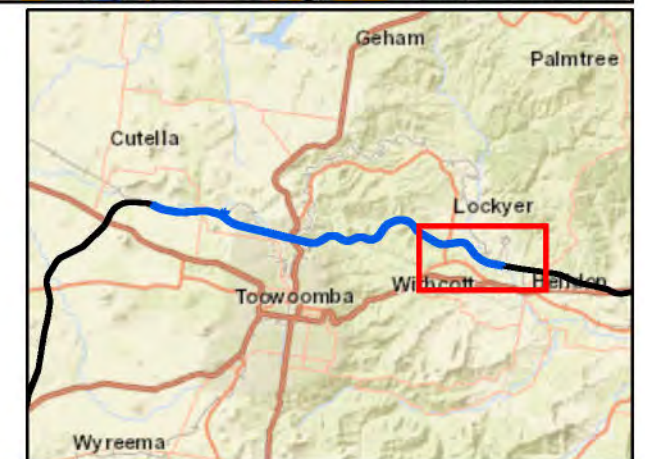


Legend

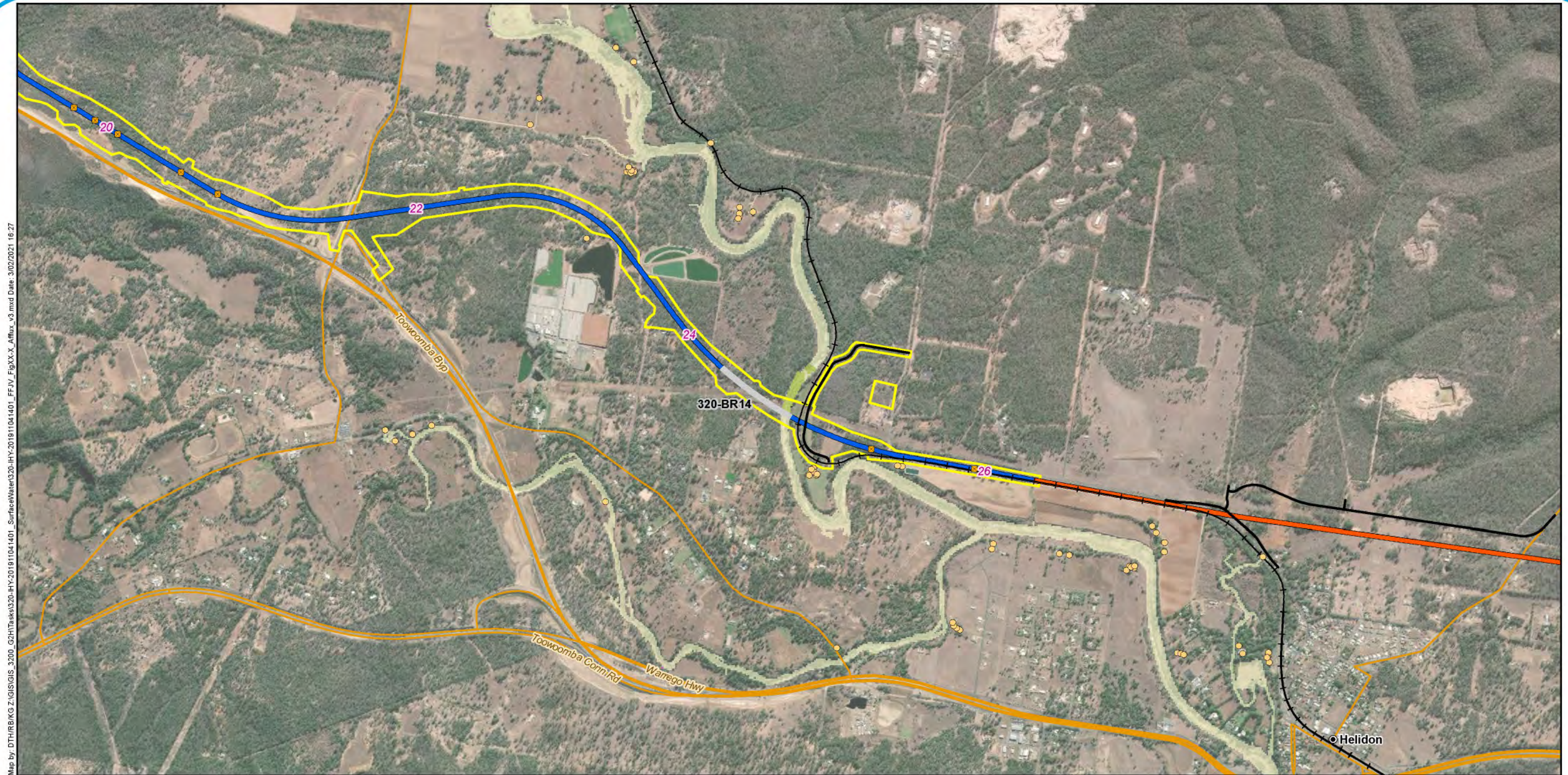
- 5 Chainage (km)
- Localities
- Existing rail
- G2H project alignment
- H2C project alignment
- Major roads
- Minor roads
- Road design
- EIS disturbance footprint
- 1.0m contour mAHd

Depth (m)

- | | |
|-------------|-------------|
| □ 0 - 0.5 | □ 3.0 - 3.5 |
| □ 0.5 - 1.0 | □ 3.5 - 4.0 |
| □ 1.0 - 1.5 | □ 4.0 - 4.5 |
| □ 1.5 - 2.0 | □ 4.5 - 5.0 |
| □ 2.0 - 2.5 | □ > 5.0 |
| □ 2.5 - 3.0 | |



A3 scale: 1:25,000
 0 0.15 0.3 0.45 0.6 0.75km



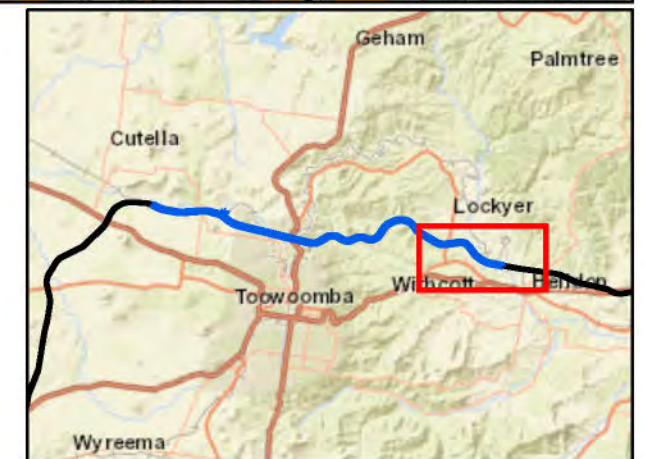
Legend

- 5 Chainage (km)
- Localities
- Flood sensitive receptors
- Existing rail
- G2H project alignment
- H2C project alignment
- Major roads
- Minor roads
- Road design

- EIS disturbance footprint
- Was Wet Now Dry
- Was Dry Now Wet
- Local drainage culvert
- Bridges

Change in peak water levels (m)

- | | |
|----------------|--------------|
| < -0.5 | 0.01 to 0.05 |
| -0.5 to -0.2 | 0.05 to 0.1 |
| -0.2 to -0.1 | 0.1 to 0.2 |
| -0.1 to -0.05 | 0.2 to 0.5 |
| -0.05 to -0.01 | > 0.5 |
| -0.01 to 0.01 | |



A3 scale: 1:25,000
 0 0.15 0.3 0.45 0.6 0.75km

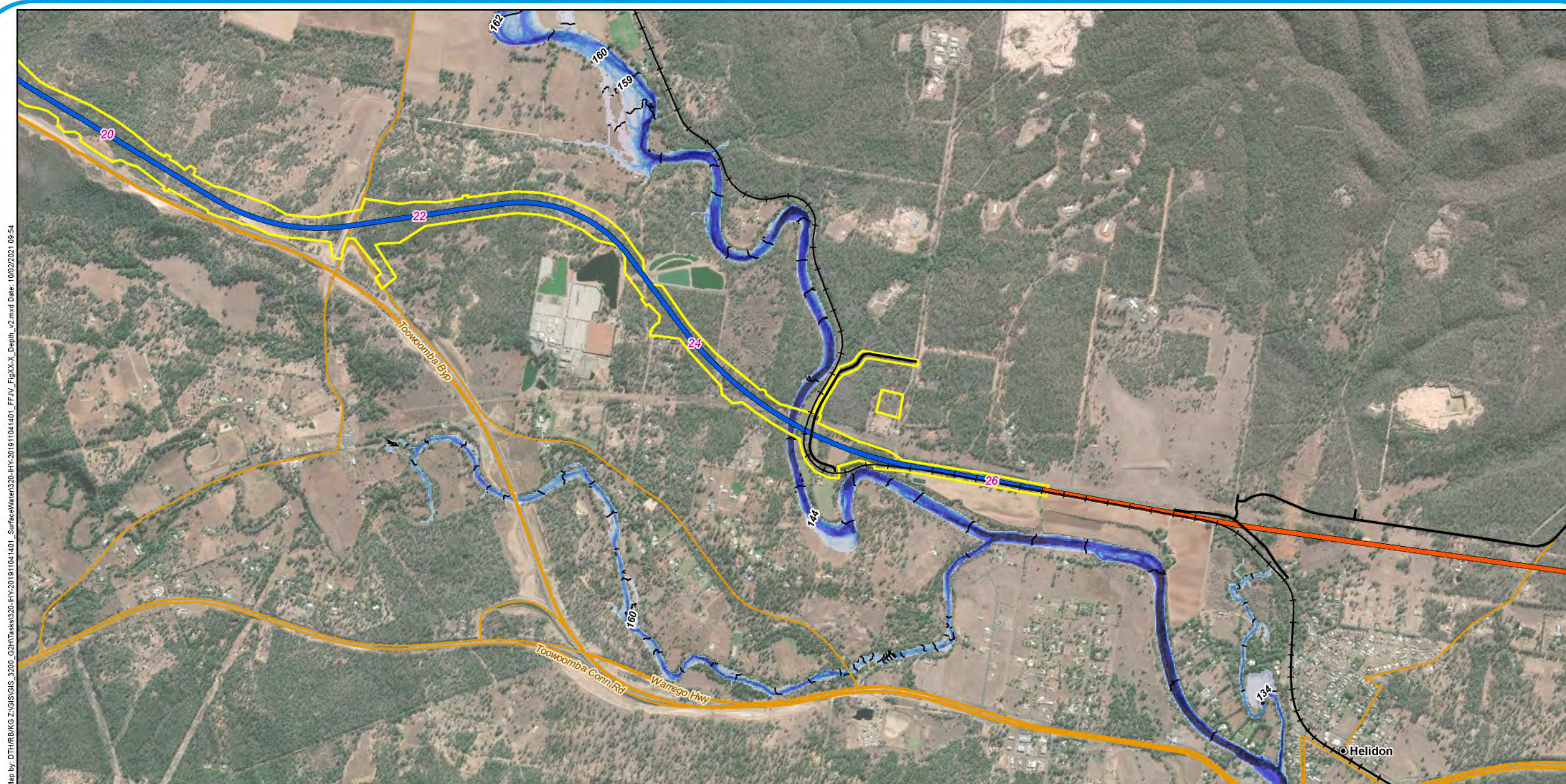


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Gowrie to Helidon

Figure E5-B: Developed Case - Afflux - 5% AEP event - Lockyer Creek



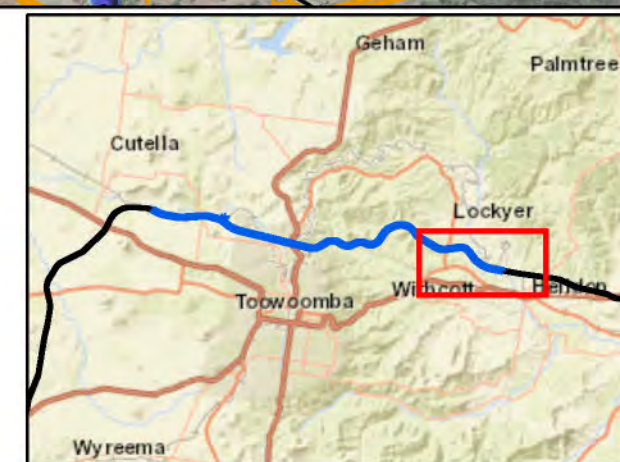
Legend

- 5 Chainage (km)
- Localities
- Existing rail
- G2H project alignment
- H2C project alignment
- Major roads
- Minor roads
- Road design

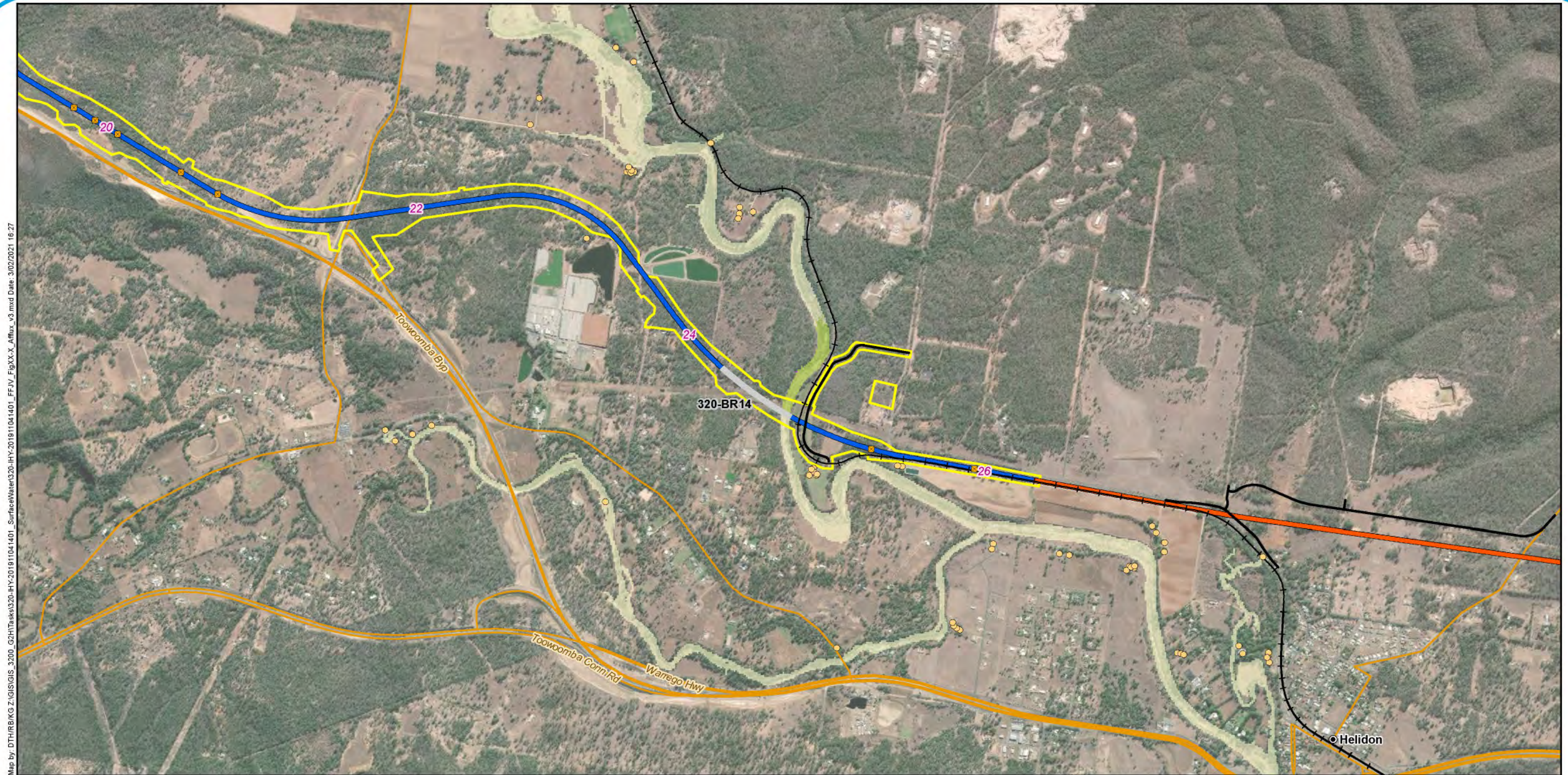
- EIS disturbance footprint
- 1.0m contour mAH

Depth (m)

- | | |
|-----------|-----------|
| 0 - 0.5 | 3.0 - 3.5 |
| 0.5 - 1.0 | 3.5 - 4.0 |
| 1.0 - 1.5 | 4.0 - 4.5 |
| 1.5 - 2.0 | 4.5 - 5.0 |
| 2.0 - 2.5 | > 5.0 |
| 2.5 - 3.0 | |



A3 scale: 1:25,000
 0 0.15 0.3 0.45 0.6 0.75km



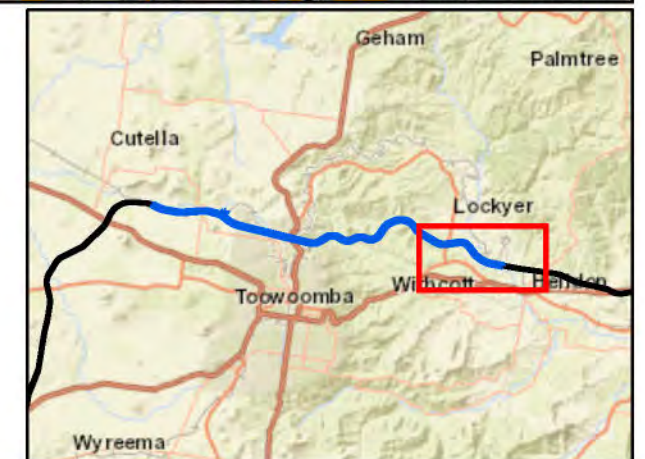
Legend

- 5 Chainage (km)
- Localities
- Flood sensitive receptors
- Existing rail
- G2H project alignment
- H2C project alignment
- Major roads
- Minor roads
- Road design

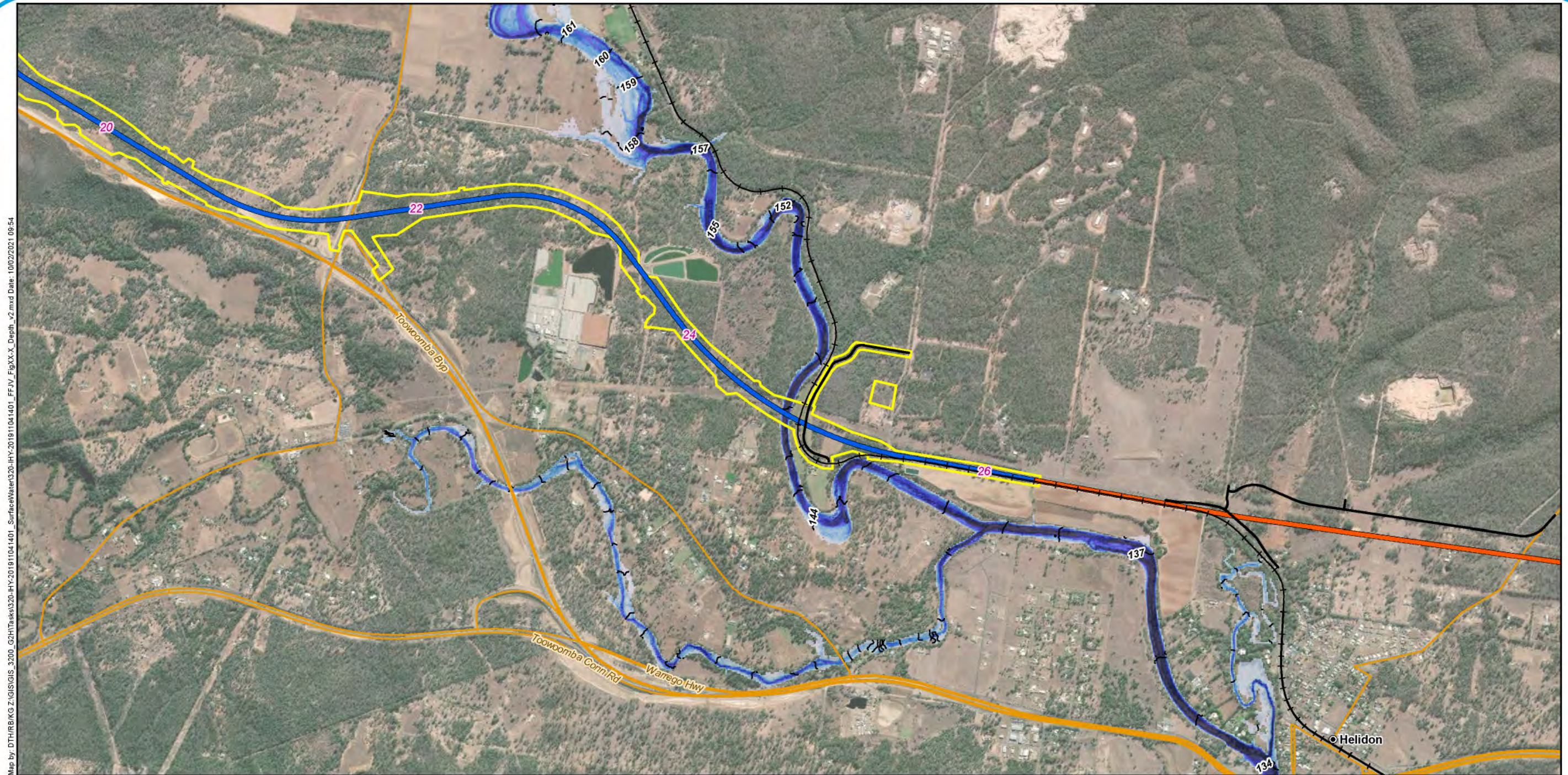
- EIS disturbance footprint
- Was Wet Now Dry
- Was Dry Now Wet
- Local drainage culvert
- Bridges

Change in peak water levels (m)

- | | |
|----------------|--------------|
| < -0.5 | 0.01 to 0.05 |
| -0.5 to -0.2 | 0.05 to 0.1 |
| -0.2 to -0.1 | 0.1 to 0.2 |
| -0.1 to -0.05 | 0.2 to 0.5 |
| -0.05 to -0.01 | > 0.5 |
| -0.01 to 0.01 | |



A3 scale: 1:25,000
 0 0.15 0.3 0.45 0.6 0.75km

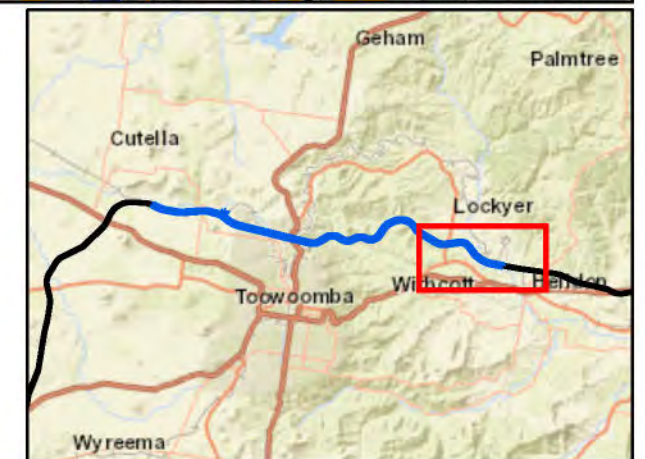


Legend

- 5 Chainage (km)
- Localities
- Existing rail
- G2H project alignment
- H2C project alignment
- Major roads
- Minor roads
- Road design
- EIS disturbance footprint
- 1.0m contour mAHd

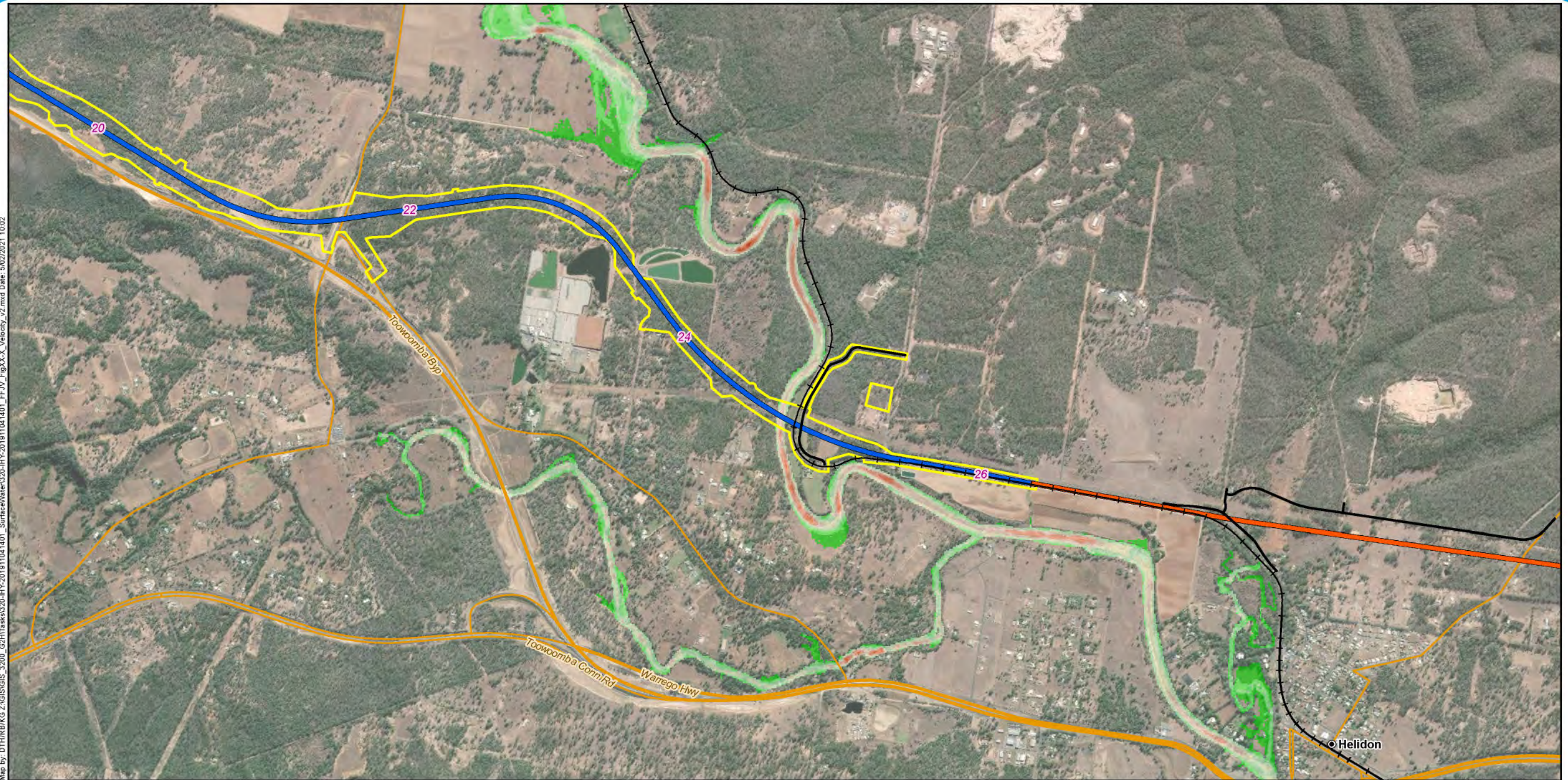
Depth (m)

- | | |
|-----------|-----------|
| 0 - 0.5 | 3.0 - 3.5 |
| 0.5 - 1.0 | 3.5 - 4.0 |
| 1.0 - 1.5 | 4.0 - 4.5 |
| 1.5 - 2.0 | 4.5 - 5.0 |
| 2.0 - 2.5 | > 5.0 |
| 2.5 - 3.0 | |



A3 scale: 1:25,000
 0 0.15 0.3 0.45 0.6 0.75km

Map by: DTH/RB/KG Z:\GIS\GIS_3200_G2H\Tasks\3200-HY-201811041401_SurfaceWater\3200-HY-201811041401_FF_V_FigXX-X_Velocity_v2.mxd Date: 5/02/2021 10:02

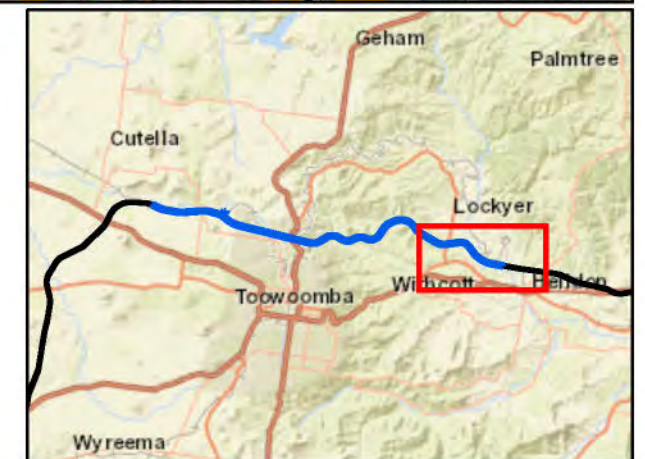


Legend

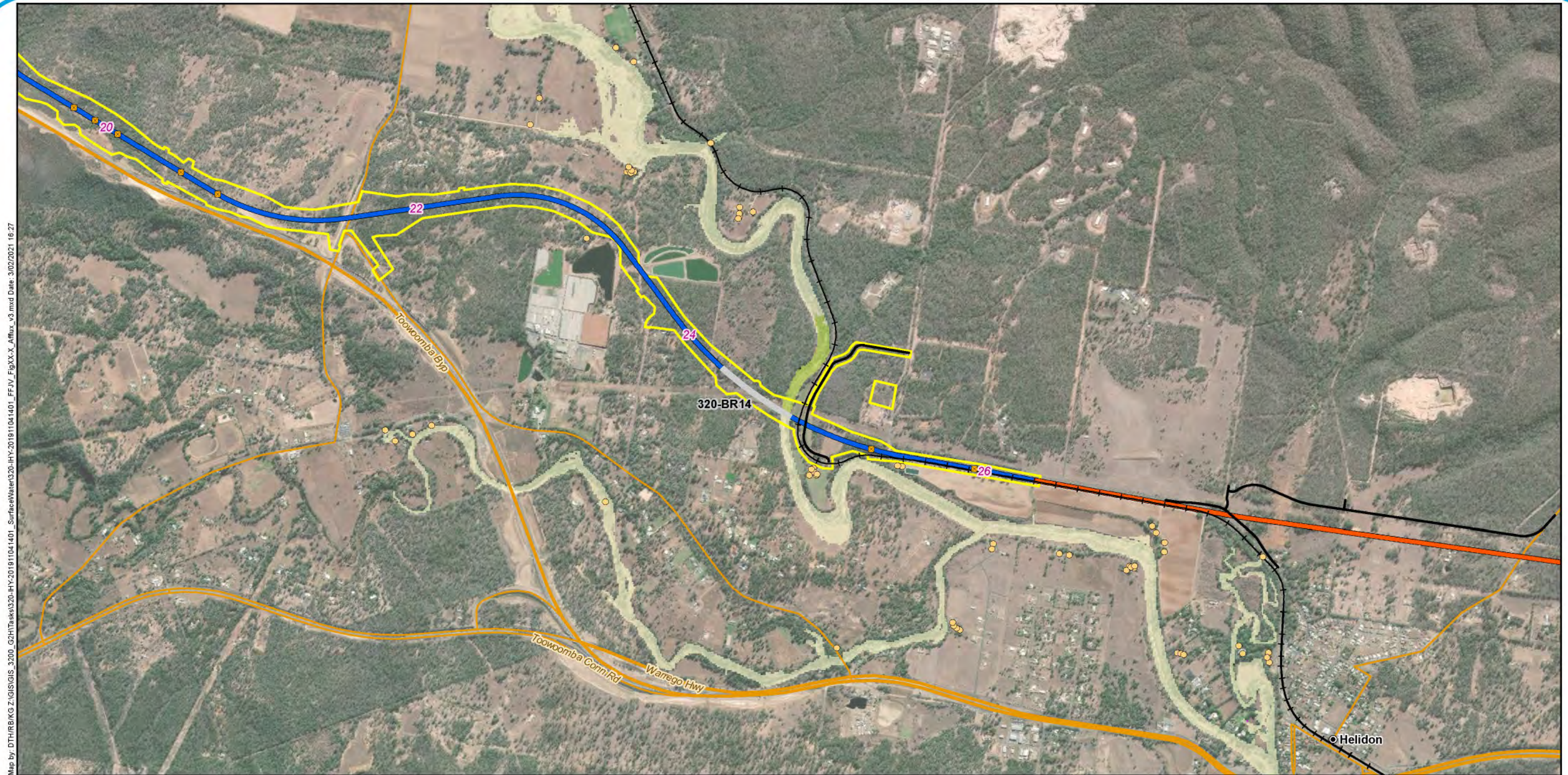
- 5 Chainage (km)
- Localities
- Existing rail
- G2H project alignment
- H2C project alignment
- Major roads
- Minor roads
- Road design
- EIS disturbance footprint

Peak velocity (m/s)

0.0	3.0
0.5	3.5
1.0	4.0
1.5	4.5
2.0	5.0
2.5	



A3 scale: 1:25,000
 0 0.15 0.3 0.45 0.6 0.75km



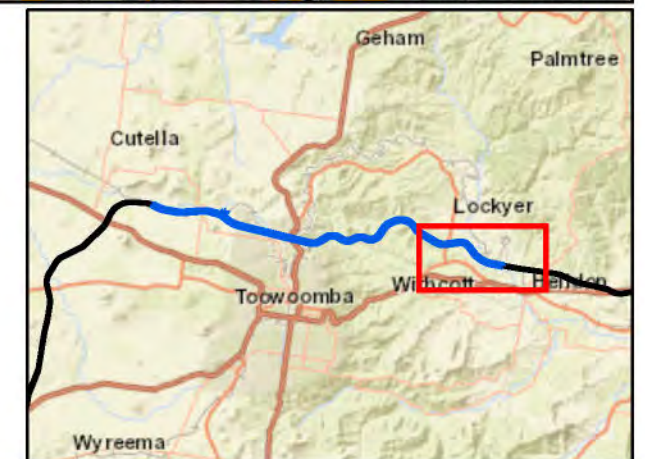
Legend

- 5 Chainage (km)
- Localities
- Flood sensitive receptors
- Existing rail
- G2H project alignment
- H2C project alignment
- Major roads
- Minor roads
- Road design

- EIS disturbance footprint
- Was Wet Now Dry
- Was Dry Now Wet
- Local drainage culvert
- Bridges

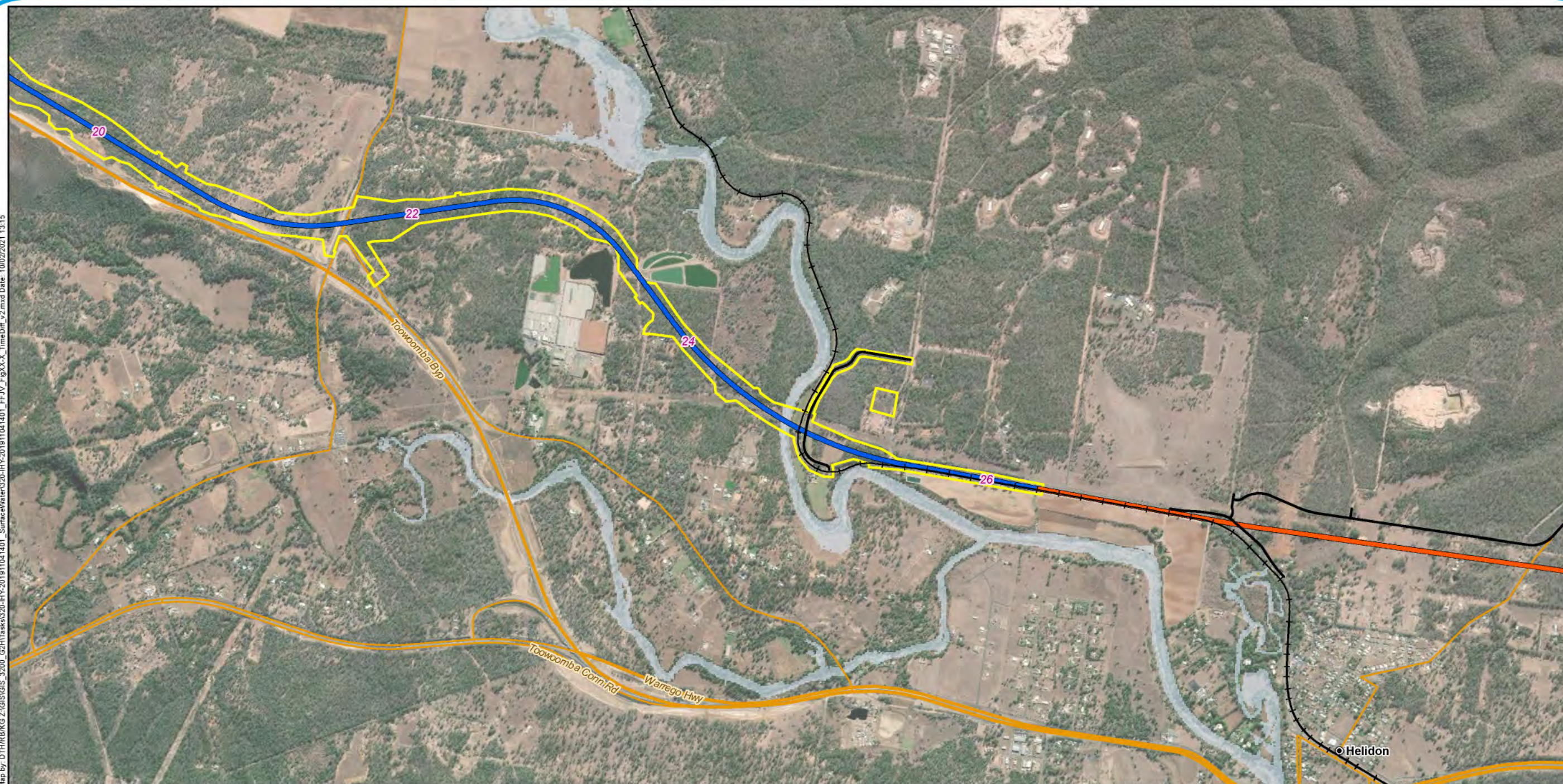
Change in peak water levels (m)

- | | |
|----------------|--------------|
| < -0.5 | 0.01 to 0.05 |
| -0.5 to -0.2 | 0.05 to 0.1 |
| -0.2 to -0.1 | 0.1 to 0.2 |
| -0.1 to -0.05 | 0.2 to 0.5 |
| -0.05 to -0.01 | > 0.5 |
| -0.01 to 0.01 | |



A3 scale: 1:25,000
 0 0.15 0.3 0.45 0.6 0.75km

Map by: DTH/RB/KG Z:\GIS\GIS_3200_G2H\Tasks\3200-HY-201811041401_SurfaceWater\3200-HY-201811041401_FF_V1_FigXX-X_TimeDiff_v2.mxd Date: 10/02/2021 13:15

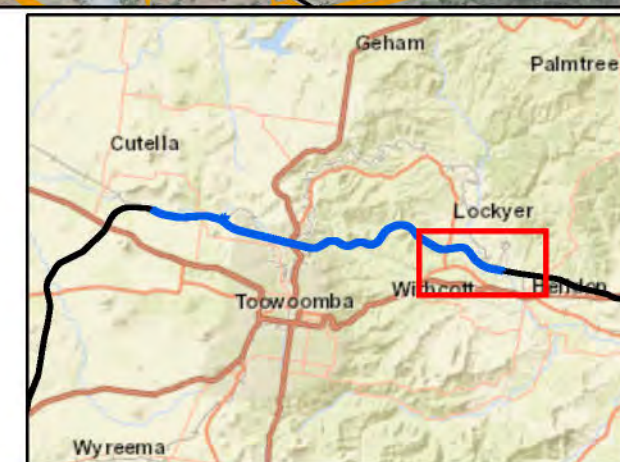


Legend

- 5 Chainage (km)
- Localities
- Existing rail
- G2H project alignment
- H2C project alignment
- Major roads
- Minor roads
- Road design
- EIS disturbance footprint

Difference in Time of Submergence

- 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



A3 scale: 1:25,000
 0 0.15 0.3 0.45 0.6 0.75km



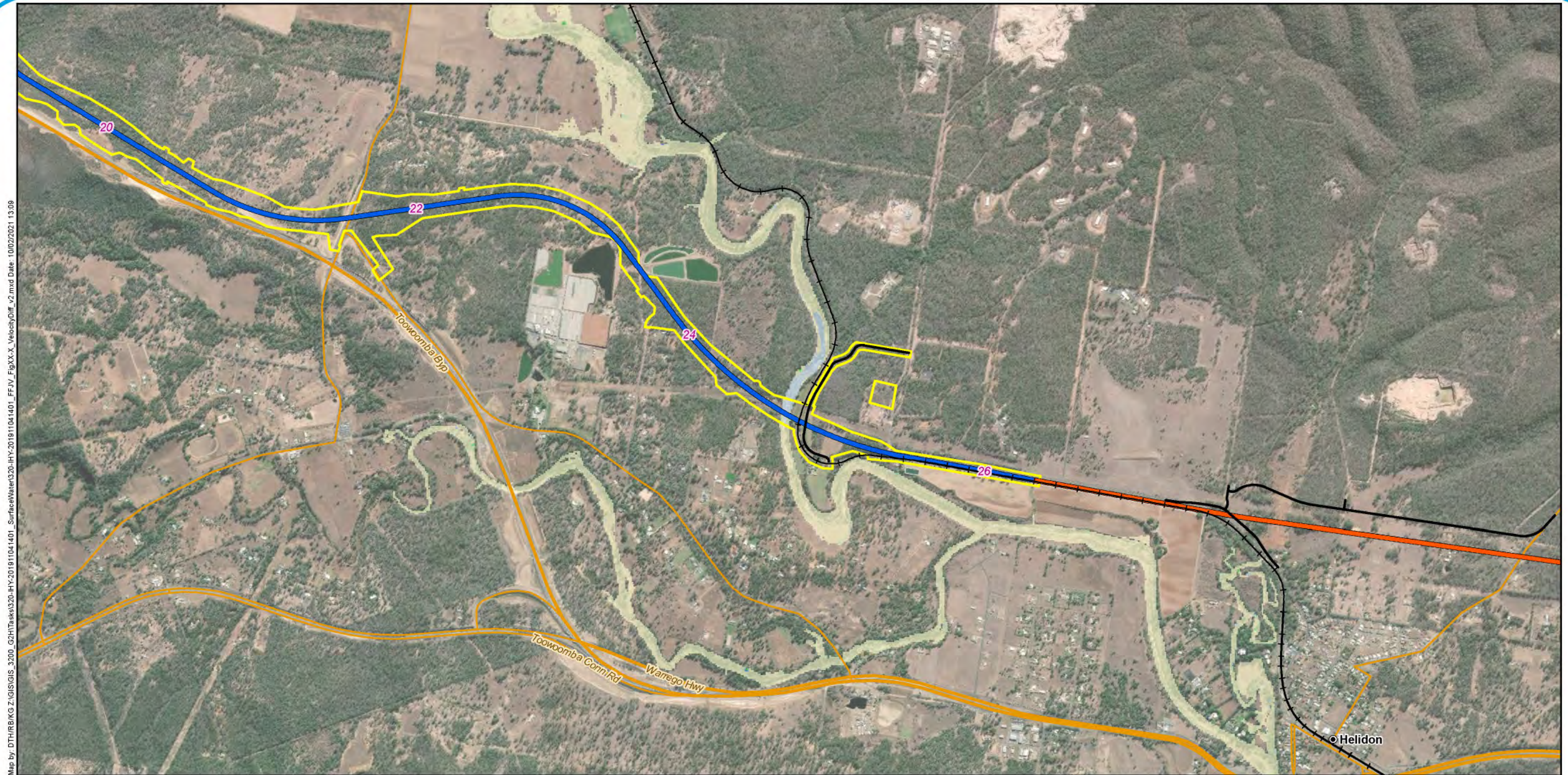
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Gowrie to Helidon

Figure E7-D:

Developed Case - Difference in Time of Submergence - 1% AEP event - Lockyer Creek



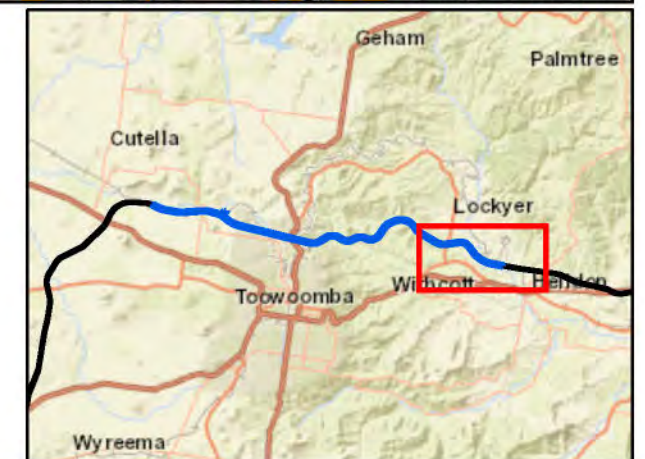
Legend

- 5 Chainage (km)
- Localities
- Flood sensitive receptors
- Existing rail
- G2H project alignment
- H2C project alignment
- Major roads
- Minor roads
- Road design

EIS disturbance footprint

Change in peak velocity (m/s)

< -0.50	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	



A3 scale: 1:25,000
 0 0.15 0.3 0.45 0.6 0.75km

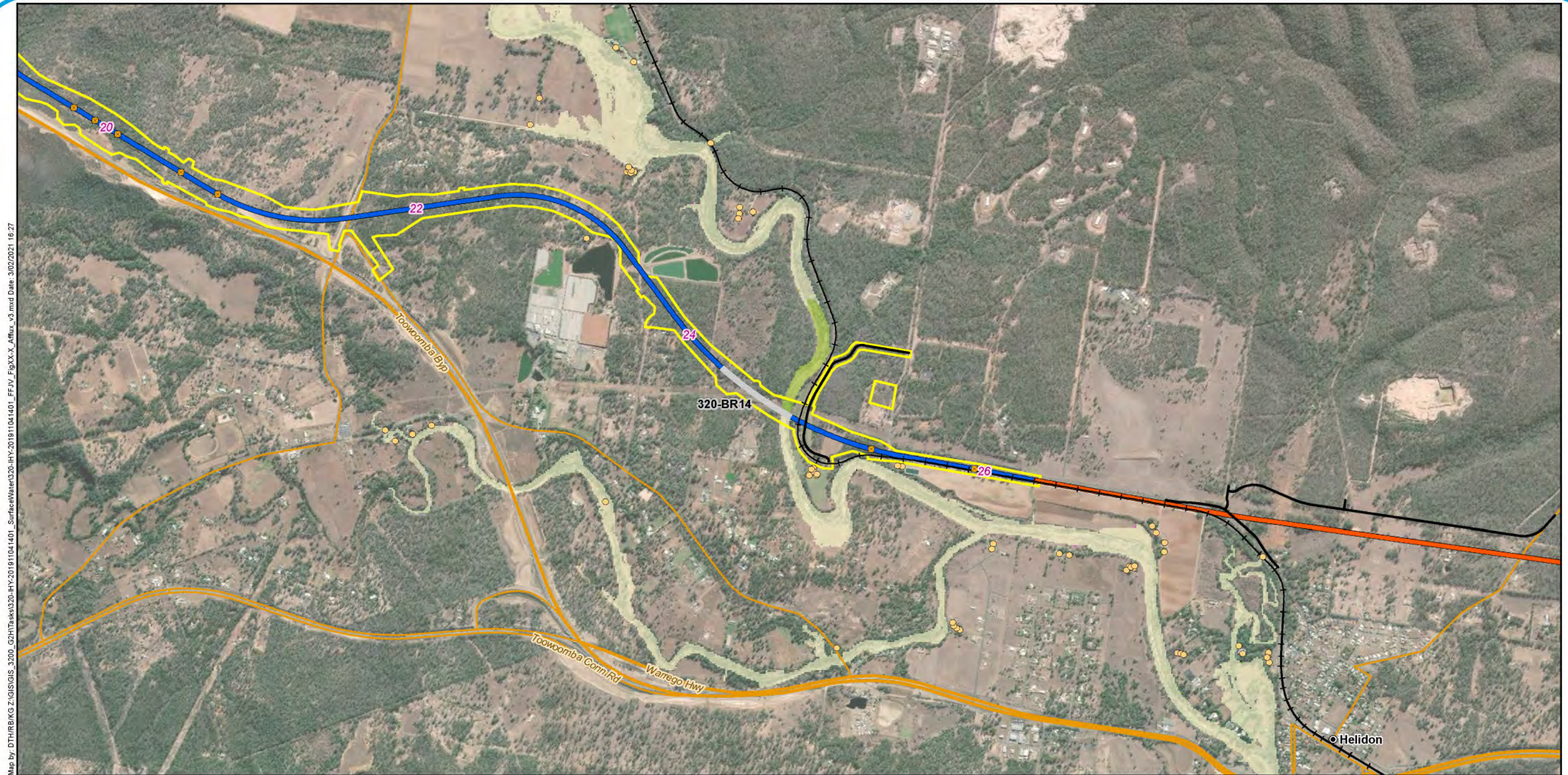


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Gowrie to Helidon

Figure E7-E: Developed Case - Difference in Velocity - 1% AEP event - Lockyer Creek



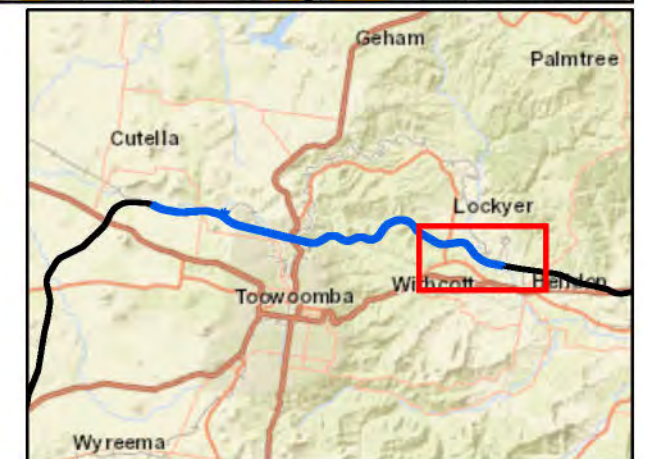
Legend

- 5 Chainage (km)
- Localities
- Flood sensitive receptors
- Existing rail
- G2H project alignment
- H2C project alignment
- Major roads
- Minor roads
- Road design

- EIS disturbance footprint
- Was Wet Now Dry
- Was Dry Now Wet
- Local drainage culvert
- Bridges

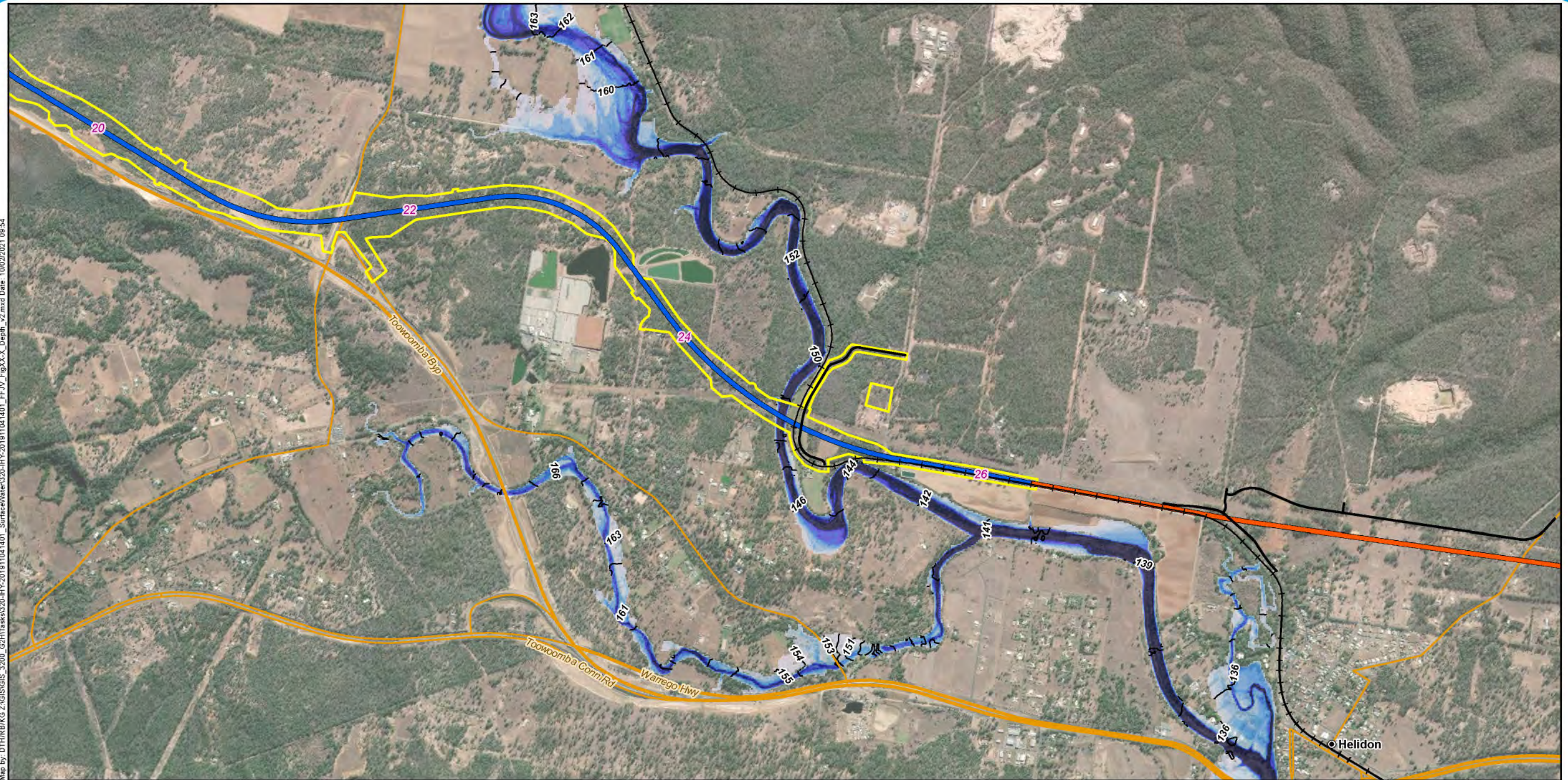
Change in peak water levels (m)

- | | |
|----------------|--------------|
| < -0.5 | 0.01 to 0.05 |
| -0.5 to -0.2 | 0.05 to 0.1 |
| -0.2 to -0.1 | 0.1 to 0.2 |
| -0.1 to -0.05 | 0.2 to 0.5 |
| -0.05 to -0.01 | > 0.5 |
| -0.01 to 0.01 | |



A3 scale: 1:25,000
 0 0.15 0.3 0.45 0.6 0.75km

Map by: DTH/RB/KG Z:\GIS\GIS_3200_G2H\Tasks\3200-HY-201811041401_SurfaceWater\3200-HY-201811041401_FF_V1_FigXX-X_Depth_v2.mxd Date: 10/02/2021 09:54

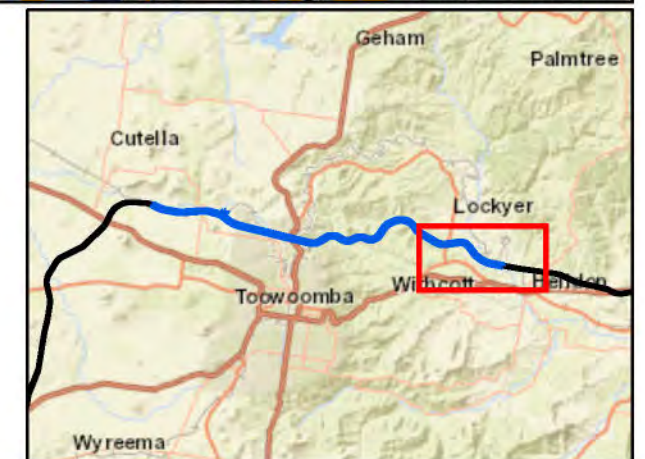


Legend

- 5 Chainage (km)
- Localities
- Existing rail
- G2H project alignment
- H2C project alignment
- Major roads
- Minor roads
- Road design
- EIS disturbance footprint
- 1.0m contour mAHd

Depth (m)

- | | |
|-------------|-------------|
| □ 0 - 0.5 | □ 3.0 - 3.5 |
| □ 0.5 - 1.0 | □ 3.5 - 4.0 |
| □ 1.0 - 1.5 | □ 4.0 - 4.5 |
| □ 1.5 - 2.0 | □ 4.5 - 5.0 |
| □ 2.0 - 2.5 | □ > 5.0 |
| □ 2.5 - 3.0 | |



A3 scale: 1:25,000
 0 0.15 0.3 0.45 0.6 0.75km

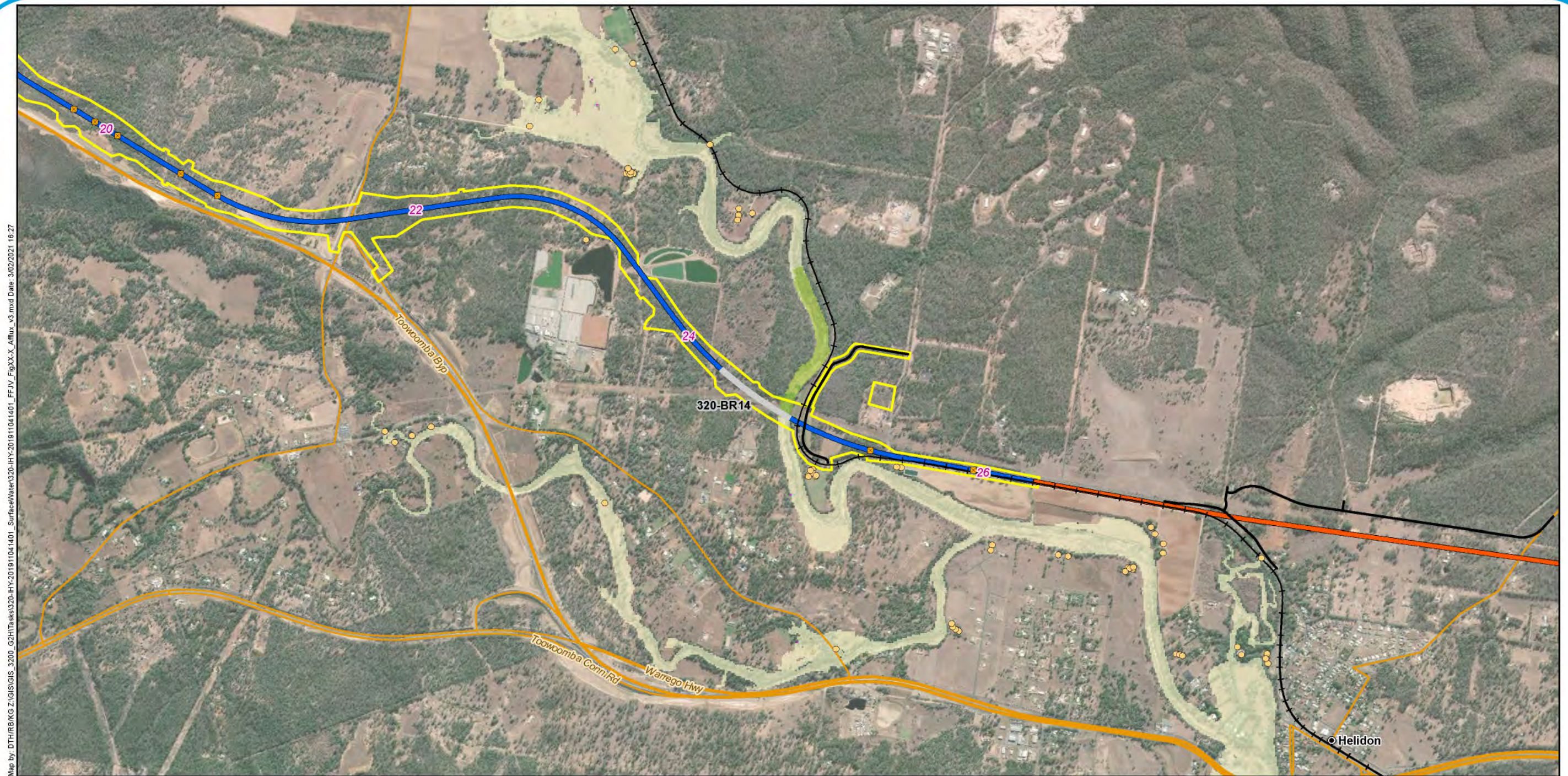


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Gowrie to Helidon

Figure E8-A: Existing Case - Inundation Extent -1 in 2,000 AEP event - Lockyer Creek



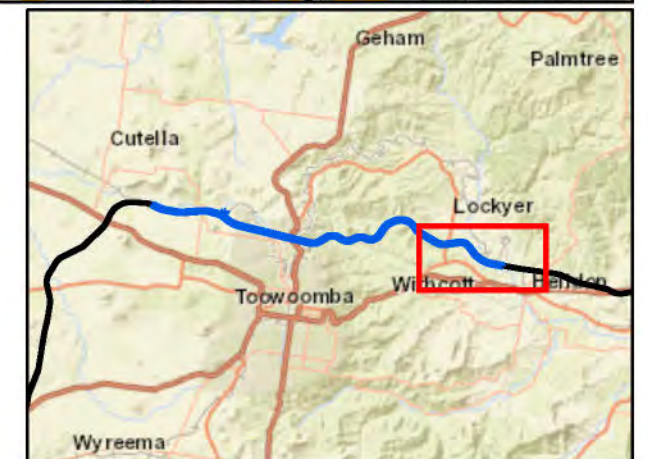
Legend

- 5 Chainage (km)
- Localities
- Flood sensitive receptors
- Existing rail
- G2H project alignment
- H2C project alignment
- Major roads
- Minor roads
- Road design

- EIS disturbance footprint
- Was Wet Now Dry
- Was Dry Now Wet
- Local drainage culvert
- Bridges

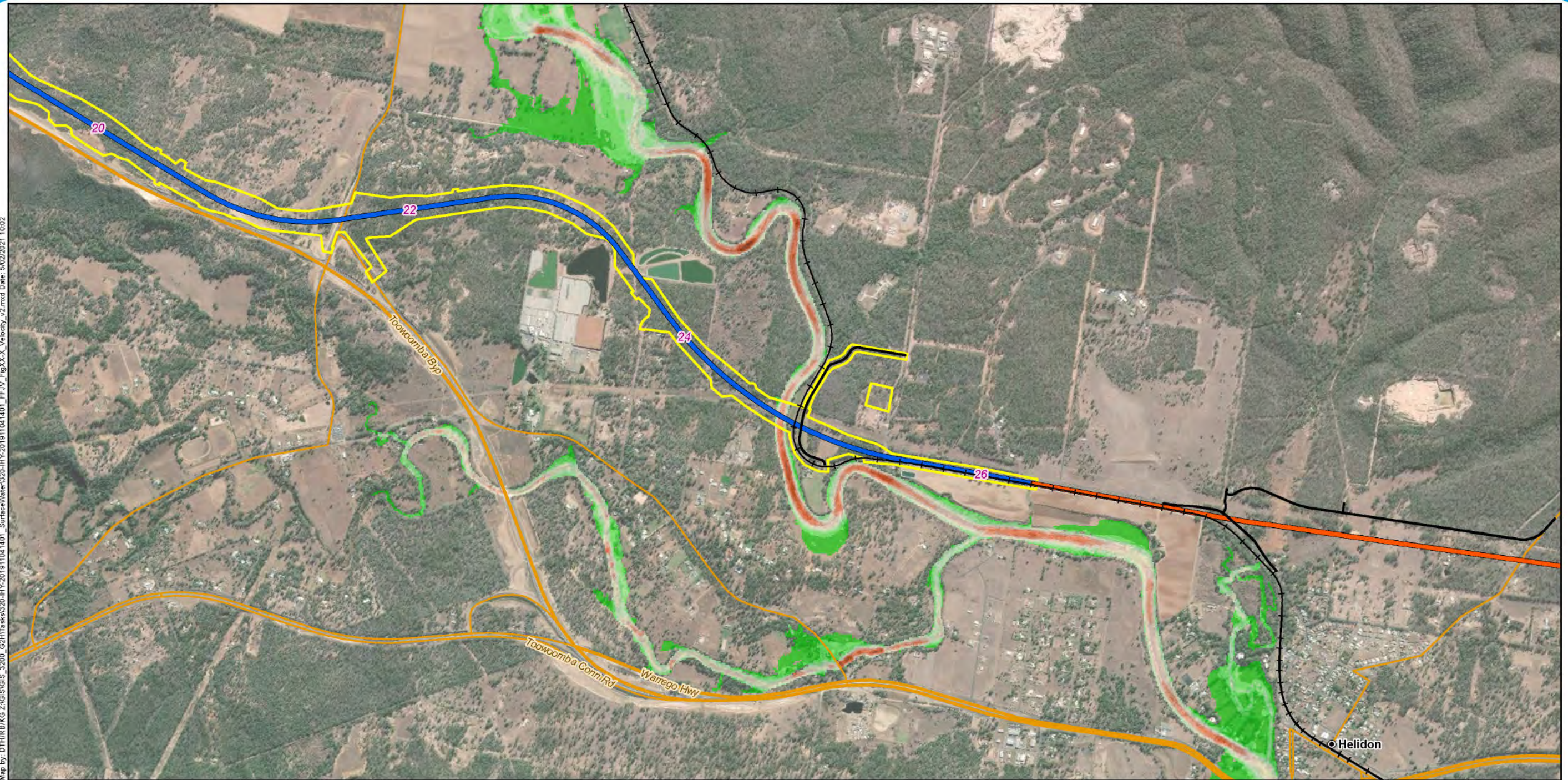
Change in peak water levels (m)

- | | |
|----------------|--------------|
| < -0.5 | 0.01 to 0.05 |
| -0.5 to -0.2 | 0.05 to 0.1 |
| -0.2 to -0.1 | 0.1 to 0.2 |
| -0.1 to -0.05 | 0.2 to 0.5 |
| -0.05 to -0.01 | > 0.5 |
| -0.01 to 0.01 | |



A3 scale: 1:25,000
 0 0.15 0.3 0.45 0.6 0.75km

Map by: DTH/RB/KG Z:\GIS\GIS_3200_G2H\Tasks\3200-HY-201811041401_SurfaceWater\3200-HY-201811041401_FF_V_FigXX-X_Velocity_v2.mxd Date: 5/02/2021 10:02

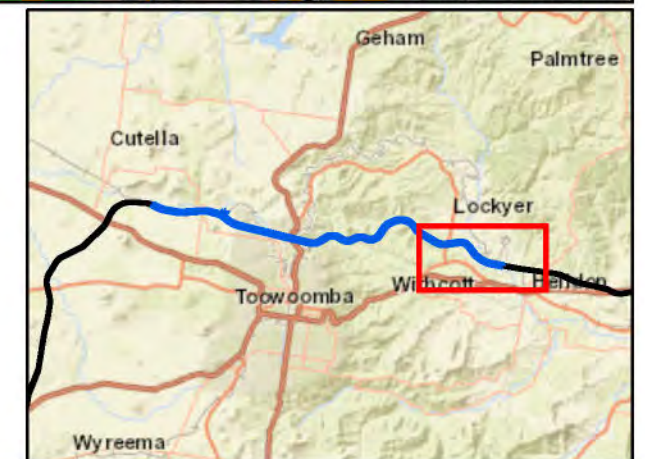


Legend

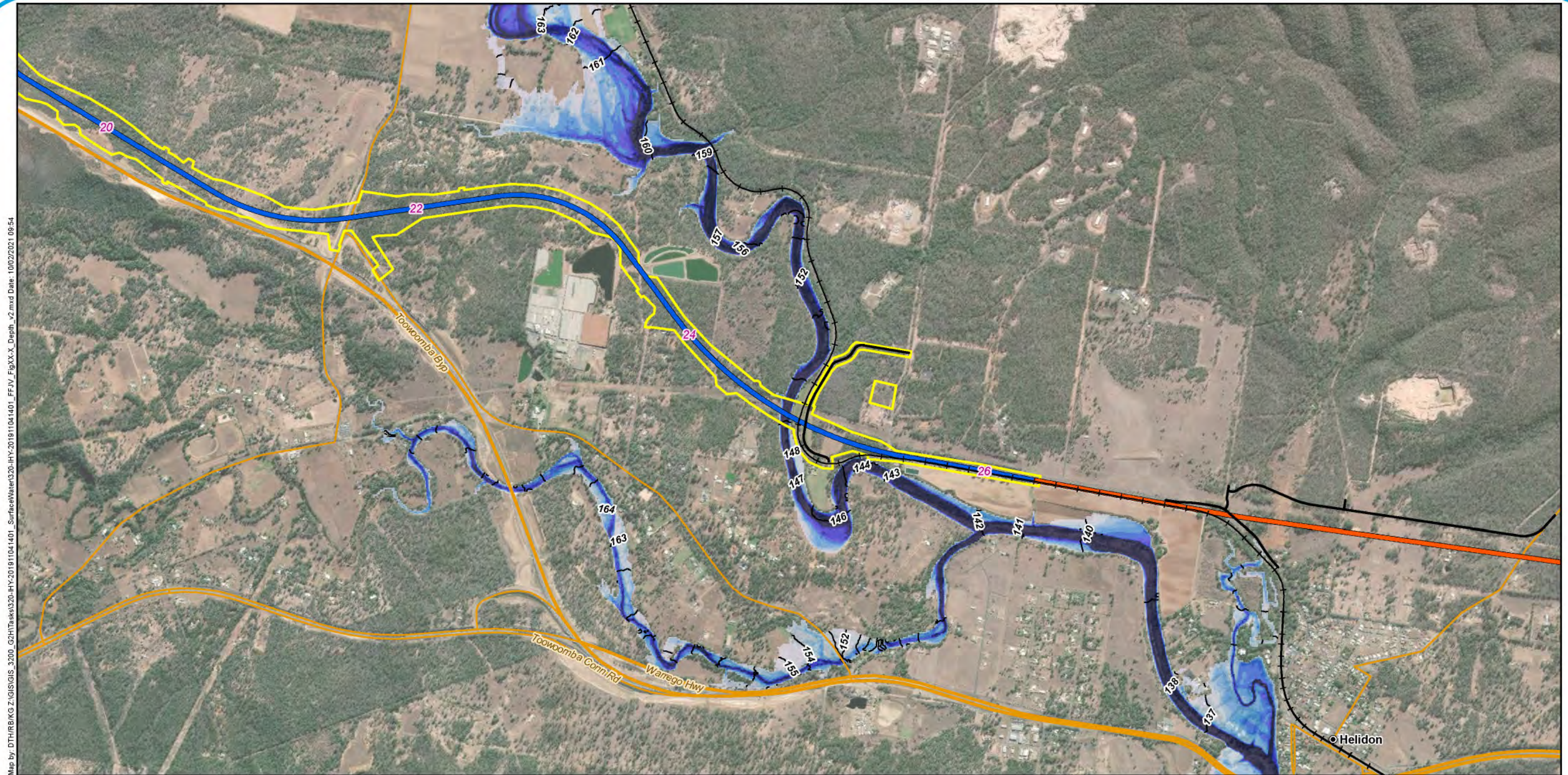
- 5 Chainage (km)
- Localities
- Existing rail
- G2H project alignment
- H2C project alignment
- Major roads
- Minor roads
- Road design
- EIS disturbance footprint

Peak velocity (m/s)

0.0	3.0
0.5	3.5
1.0	4.0
1.5	4.5
2.0	5.0
2.5	



A3 scale: 1:25,000
 0 0.15 0.3 0.45 0.6 0.75km

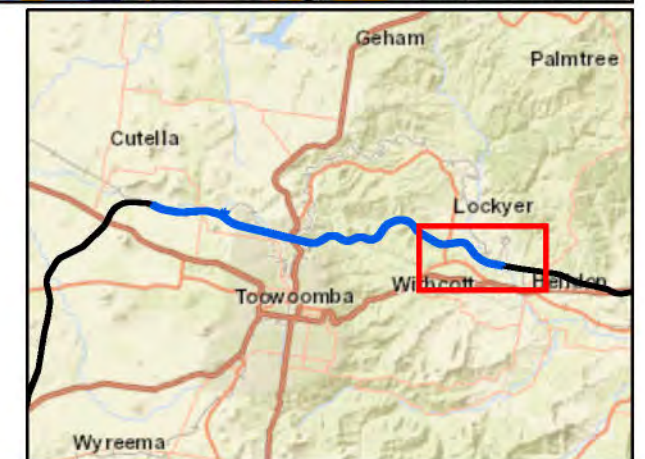


Legend

- 5 Chainage (km)
- Localities
- Existing rail
- G2H project alignment
- H2C project alignment
- Major roads
- Minor roads
- Road design
- EIS disturbance footprint
- 1.0m contour mAHd

Depth (m)

- | | |
|-----------|-----------|
| 0 - 0.5 | 3.0 - 3.5 |
| 0.5 - 1.0 | 3.5 - 4.0 |
| 1.0 - 1.5 | 4.0 - 4.5 |
| 1.5 - 2.0 | 4.5 - 5.0 |
| 2.0 - 2.5 | > 5.0 |
| 2.5 - 3.0 | |



A3 scale: 1:25,000
 0 0.15 0.3 0.45 0.6 0.75km

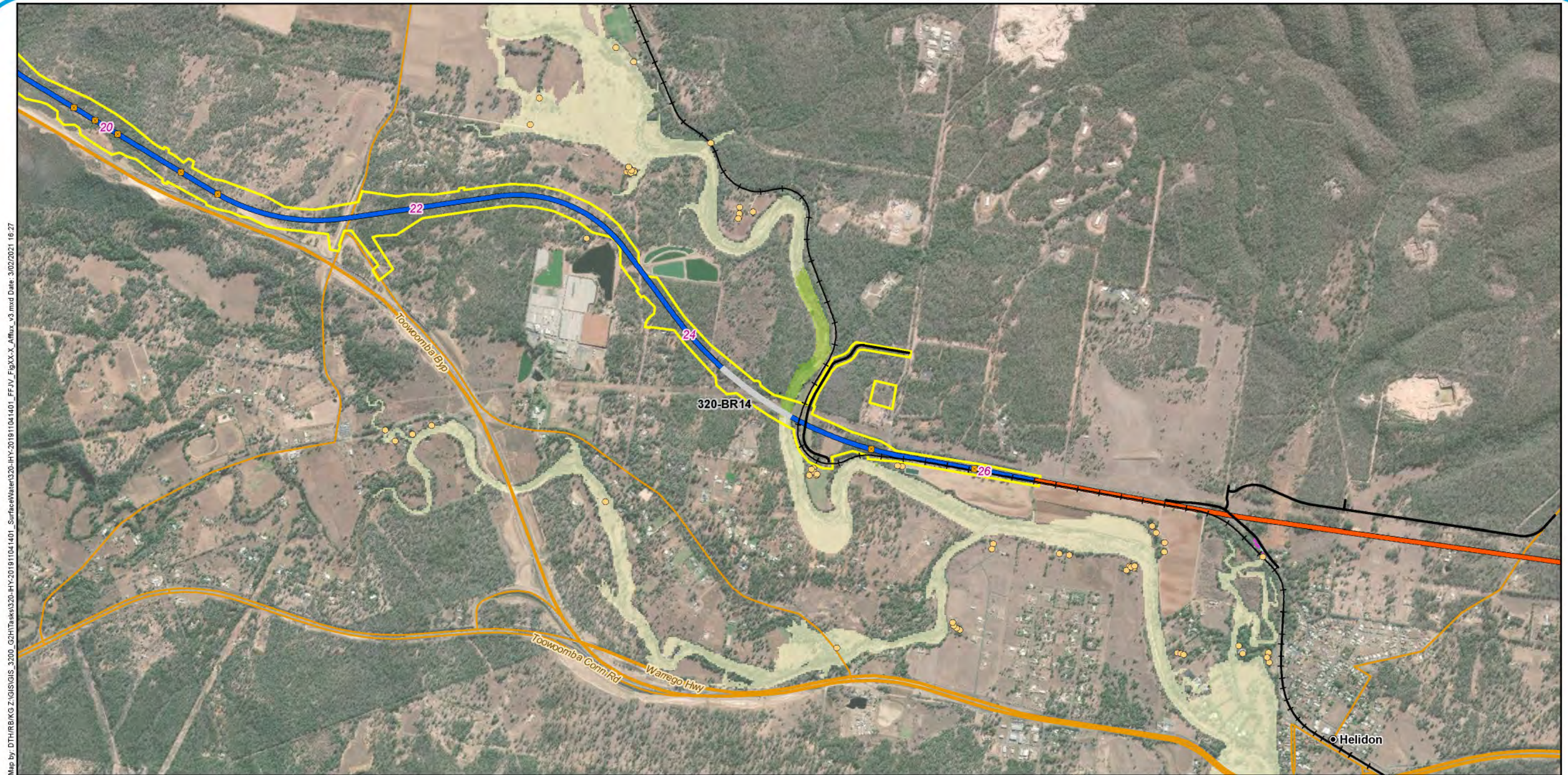


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Gowrie to Helidon

Figure E9-A: Existing Case - Inundation Extent - 1 in 10,000 AEP event - Lockyer Creek



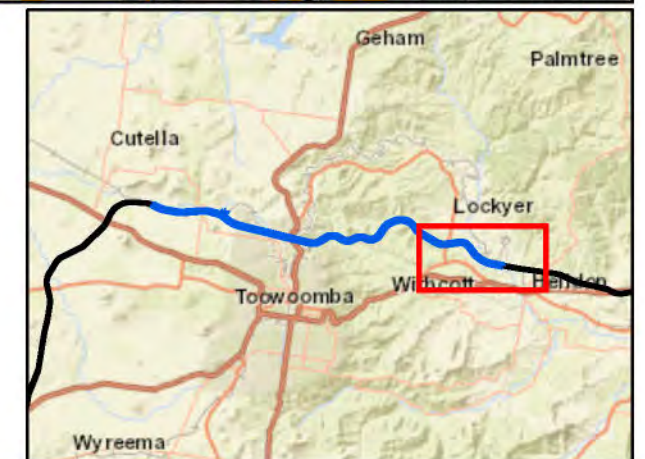
Legend

- 5 Chainage (km)
- Localities
- Flood sensitive receptors
- Existing rail
- G2H project alignment
- H2C project alignment
- Major roads
- Minor roads
- Road design

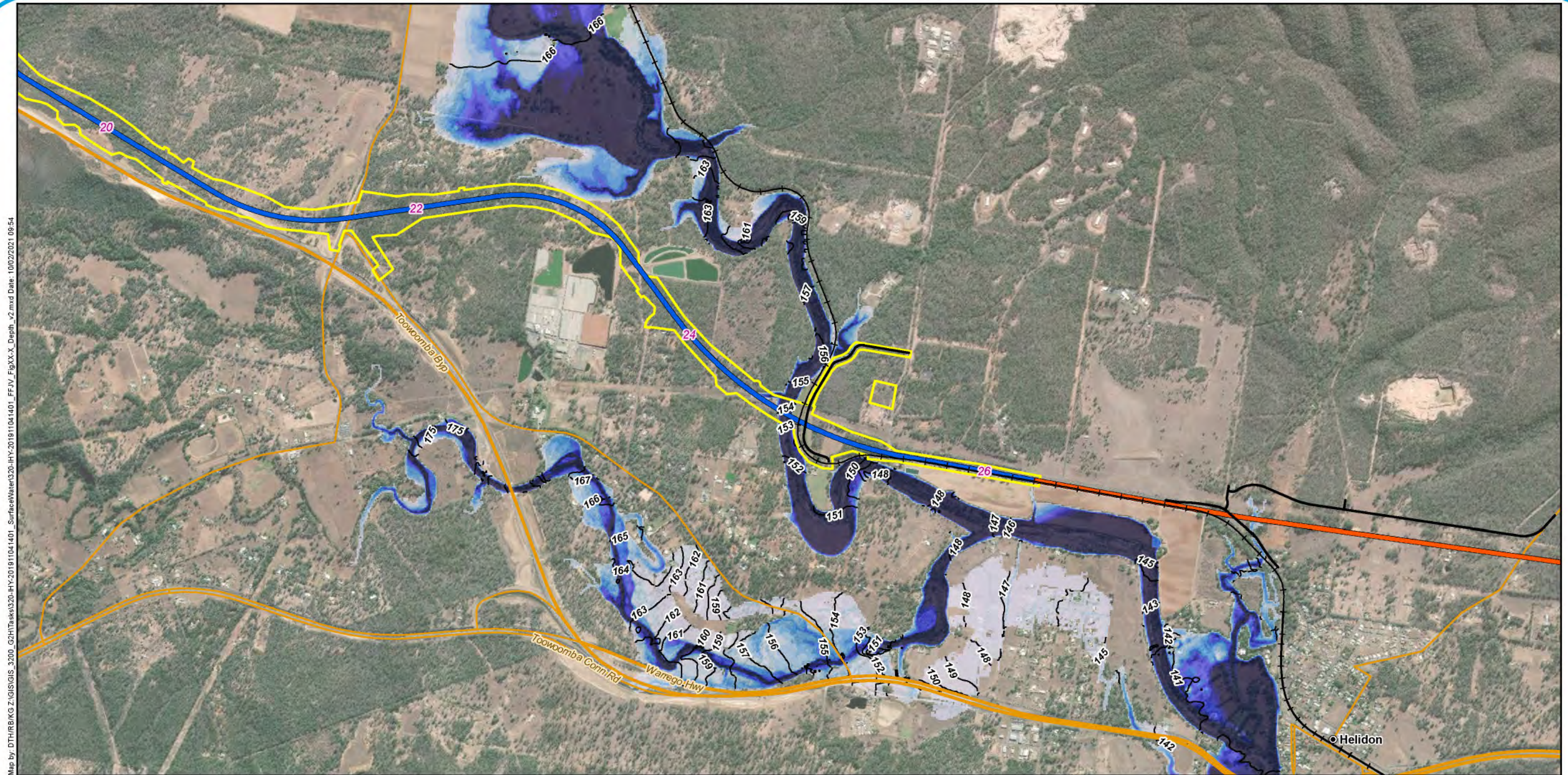
- EIS disturbance footprint
- Was Wet Now Dry
- Was Dry Now Wet
- Local drainage culvert
- Bridges

Change in peak water levels (m)

- | | |
|----------------|--------------|
| < -0.5 | 0.01 to 0.05 |
| -0.5 to -0.2 | 0.05 to 0.1 |
| -0.2 to -0.1 | 0.1 to 0.2 |
| -0.1 to -0.05 | 0.2 to 0.5 |
| -0.05 to -0.01 | > 0.5 |
| -0.01 to 0.01 | |



A3 scale: 1:25,000
 0 0.15 0.3 0.45 0.6 0.75km

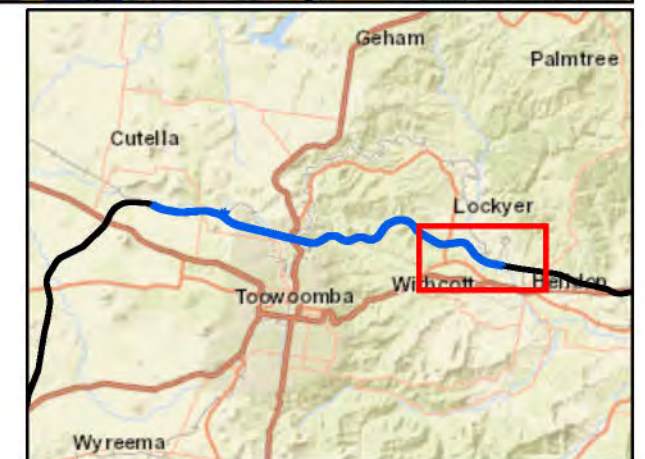


Legend

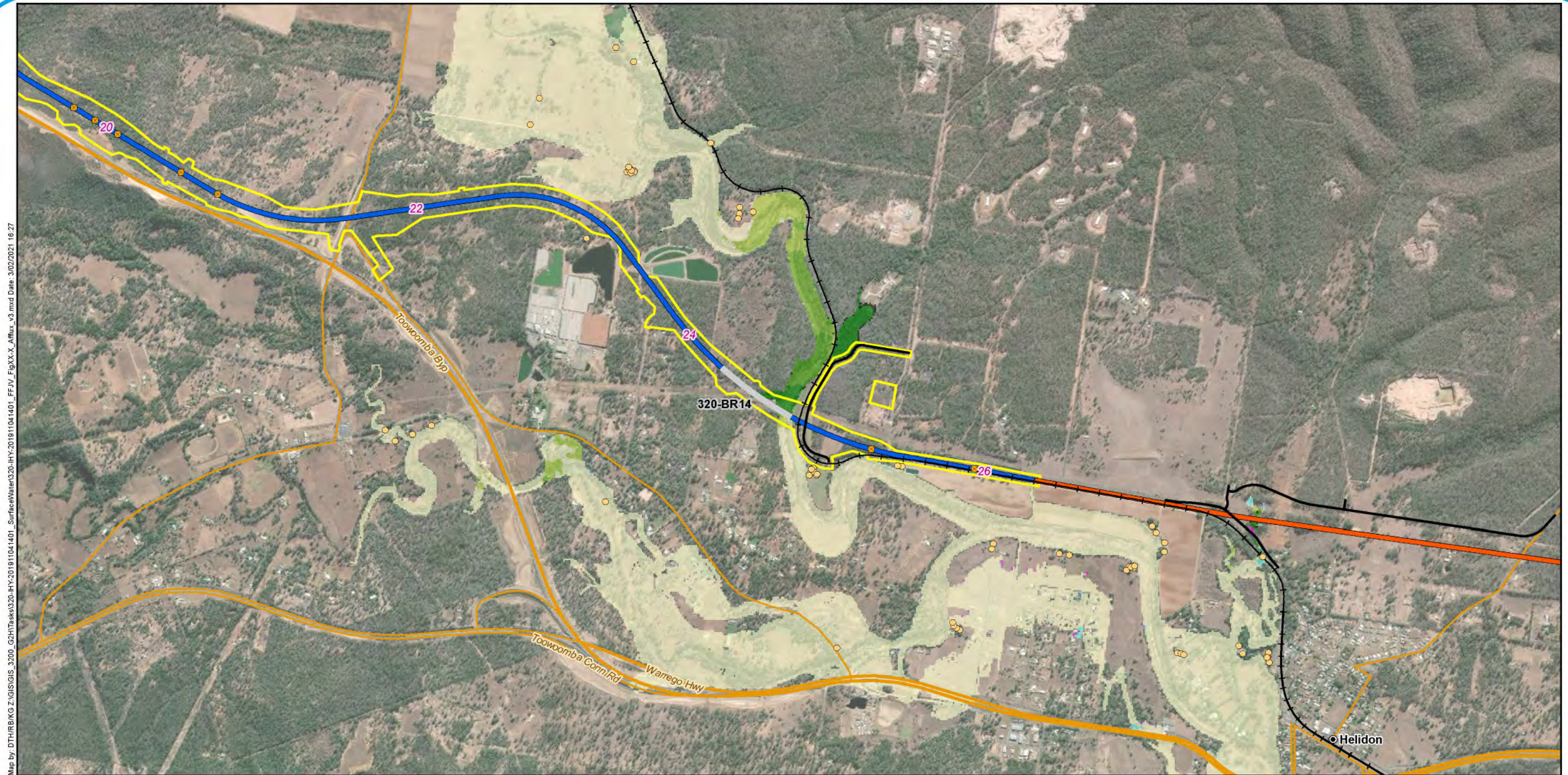
- 5 Chainage (km)
- Localities
- Existing rail
- G2H project alignment
- H2C project alignment
- Major roads
- Minor roads
- Road design
- EIS disturbance footprint
- 1.0m contour mAHd

Depth (m)

- | | |
|-------------|-------------|
| □ 0 - 0.5 | □ 3.0 - 3.5 |
| □ 0.5 - 1.0 | □ 3.5 - 4.0 |
| □ 1.0 - 1.5 | □ 4.0 - 4.5 |
| □ 1.5 - 2.0 | □ 4.5 - 5.0 |
| □ 2.0 - 2.5 | □ > 5.0 |
| □ 2.5 - 3.0 | |



A3 scale: 1:25,000
 0 0.15 0.3 0.45 0.6 0.75km



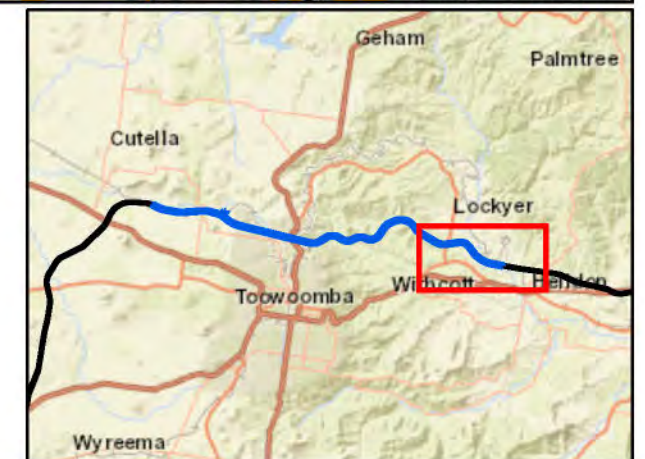
Legend

- 5 Chainage (km)
- Localities
- Flood sensitive receptors
- Existing rail
- G2H project alignment
- H2C project alignment
- Major roads
- Minor roads
- Road design

- EIS disturbance footprint
- Was Wet Now Dry
- Was Dry Now Wet
- Local drainage culvert
- Bridges

Change in peak water levels (m)

- | | |
|----------------|--------------|
| < -0.5 | 0.01 to 0.05 |
| -0.5 to -0.2 | 0.05 to 0.1 |
| -0.2 to -0.1 | 0.1 to 0.2 |
| -0.1 to -0.05 | 0.2 to 0.5 |
| -0.05 to -0.01 | > 0.5 |
| -0.01 to 0.01 | |



A3 scale: 1:25,000
 0 0.15 0.3 0.45 0.6 0.75km

APPENDIX

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Hydrology and Flooding

Appendix F Gowrie Creek Hydraulic results at structures

GOWRIE TO HELIDON ENVIRONMENTAL IMPACT STATEMENT



Appendix F

Gowrie Creek Hydraulic results at structures

20% AEP Event							
Chainage (km)	Waterway	Structure name	Structure type	Upstream Peak Water Level (m AHD)	Freeboard to rail formation level (m)	Outlet velocity (m/s)	Peak discharge (m³/s)
-1.76	Gowrie Creek	C-1.76	RCBC	457.42	2.16	1.2	14.4
-1.42		C-1.42	RCP	460.56	0.47	0.8	0.8
-0.25		C-0.25	RCP	465.74	2.69	1.0	0.8
0.11		C0.11	RCBC	-	-	-	-
0.21		C0.21	RCBC	468.69	2.30	2.1	13.2
1.03		C1.0	RCBC	474.19	1.64	1.7	18.6
1.46		C1.46	RCBC	477.54	1.59	<0.1	<0.1
2.41		C2.4	RCBC	-	-	-	-
3.45		320-BR02	Bridge	493.40	1.77	2.4	27.6
3.54		C3.54	RCBC	495.17	2.28	1.0	0.9

10% AEP Event							
Chainage (km)	Waterway	Structure name	Structure type	Upstream Peak Water Level (m AHD)	Freeboard to rail formation level (m)	Outlet velocity (m/s)	Peak discharge (m³/s)
-1.76	Gowrie Creek	C-1.76	RCBC	457.45	2.13	1.3	20.6
-1.42		C-1.42	RCP	460.61	0.42	0.9	2.2
-0.25		C-0.25	RCP	465.75	2.68	1.0	0.8
0.11		C0.11	RCBC	-	-	-	-
0.21		C0.21	RCBC	468.81	2.18	2.3	16.9
1.03		C1.0	RCBC	474.33	1.50	1.6	22.4
1.46		C1.46	RCBC	477.54	1.59	<0.1	<0.1
2.41		C2.4	RCBC	-	-	-	-
3.45		320-BR02	Bridge	493.50	1.67	2.4	34.4
3.54		C3.54	RCBC	495.18	2.27	1.1	1.1

5% AEP Event							
Chainage (km)	Waterway	Structure name	Structure type	Upstream Peak Water Level (m AHD)	Freeboard to rail formation level (m)	Outlet velocity (m/s)	Peak discharge (m³/s)
-1.76	Gowrie Creek	C-1.76	RCBC	457.71	1.87	0.8	27.6
-1.42		C-1.42	RCP	460.69	0.34	1.0	2.1
-0.25		C-0.25	RCP	465.81	2.62	1.1	1.2
0.11		C0.11	RCBC	-	-	-	-
0.21		C0.21	RCBC	468.91	2.08	2.4	19.9
1.03		C1.0	RCBC	474.69	1.14	1.9	33.9
1.46		C1.46	RCBC	477.68	1.45	0.2	0.1
2.41		C2.4	RCBC	481.52	2.72	0.4	0.1
3.45		320-BR02	Bridge	493.90	1.27	2.7	52.1

5% AEP Event							
Chainage (km)	Waterway	Structure name	Structure type	Upstream Peak Water Level (m AHD)	Freeboard to rail formation level (m)	Outlet velocity (m/s)	Peak discharge (m³/s)
3.54		C3.54	RCBC	495.26	2.19	1.3	1.8

2% AEP Event							
Chainage (km)	Waterway	Structure name	Structure type	Upstream Peak Water Level (m AHD)	Freeboard to rail formation level (m)	Outlet velocity (m/s)	Peak discharge (m³/s)
-1.76	Gowrie Creek	C-1.76	RCBC	458.11	1.47	1.4	47.2
-1.42		C-1.42	RCP	460.76	0.27	1.0	2.7
-0.25		C-0.25	RCP	465.96	2.47	1.3	2.2
0.11		C0.11	RCBC	-	-	-	-
0.21		C0.21	RCBC	469.04	1.95	2.6	24.4
1.03		C1.0	RCBC	475.36	0.47	2.8	52.4
1.46		C1.46	RCBC	478.00	1.13	0.7	0.5
2.41		C2.4	RCBC	481.53	2.71	0.4	0.1
3.45		320-BR02	Bridge	494.58	0.59	3.4	96.4
3.54		C3.54	RCBC	495.39	2.06	2.1	3.4

1% AEP Event							
Chainage (km)	Waterway	Structure name	Structure type	Upstream Peak Water Level (m AHD)	Freeboard to rail formation level (m)	Outlet velocity (m/s)	Peak discharge (m³/s)
-1.76	Gowrie Creek	C-1.76	RCBC	458.3	2.1	1.6	55
-1.42		C-1.42	RCP	460.8	0.9	1.0	2
-0.25		C-0.25	RCP	466.0	3.2	1.3	2.4
0.11		C0.11	RCBC	-	-	0	0
0.21		C0.21	RCBC	469.2	2.7	2.8	29
1.03		C1.0	RCBC	475.7	1.1	3.1	58
1.46		C1.46	RCBC	478.1	1.9	0.7	0.5
2.41		C2.4	RCBC	481.5	3.7	0	0
3.45		320-BR02	Bridge	494.6	1.0	3.6	125
3.54		C3.54	RCBC	495.4	2.7	2.1	4.1

1 in 2,000 AEP Event							
Chainage (km)	Waterway	Structure name	Structure type	Upstream Peak Water Level (m AHD)	Freeboard to rail formation level (m)	Outlet velocity (m/s)	Peak discharge (m³/s)
-1.76	Gowrie Creek	C-1.76	RCBC	459.00	0.58	2.6	89.4
-1.42		C-1.42	RCP	460.95	0.08	1.0	3.4
-0.25		C-0.25	RCP	466.43	2.00	2.1	7.2
0.11		C0.11	RCBC	-	-	-	-
0.21		C0.21	RCBC	469.85	1.14	3.5	57.8

1 in 2,000 AEP Event							
Chainage (km)	Waterway	Structure name	Structure type	Upstream Peak Water Level (m AHD)	Freeboard to rail formation level (m)	Outlet velocity (m/s)	Peak discharge (m³/s)
1.03		C1.0	RCBC	476.21	-0.38	3.7	70.1
1.46		C1.46	RCBC	478.46	0.67	0.8	0.7
2.41		C2.4	RCBC	482.94	1.30	2.2	28.5
3.45		320-BR02	Bridge	495.63	-0.46	4.2	161.7
3.54		C3.54	RCBC	495.67	1.78	2.1	7.6

1 in 10,000 AEP Event							
Chainage (km)	Waterway	Structure name	Structure type	Upstream Peak Water Level (m AHD)	Freeboard to rail formation level (m)	Outlet velocity (m/s)	Peak discharge (m³/s)
-1.76	Gowrie Creek	C-1.76	RCBC	459.47	0.11	3.1	108.4
-1.42		C-1.42	RCP	461.02	0.01	1.2	4.5
-0.25		C-0.25	RCP	467.29	1.14	2.6	16.3
0.11		C0.11	RCBC	469.44	0.57	0.6	0.0
0.21		C0.21	RCBC	470.20	0.79	3.8	75.3
1.03		C1.0	RCBC	476.37	-0.54	3.8	72.2
1.46		C1.46	RCBC	479.17	-0.04	5.0	4.3
2.41		C2.4	RCBC	484.02	0.22	3.1	60.2
3.45		320-BR02	Bridge	495.97	-0.80	4.3	219.3
3.54		C3.54	RCBC	495.81	1.64	2.3	10.1

PMF Event							
Chainage (km)	Waterway	Structure name	Structure type	Upstream Peak Water Level (m AHD)	Freeboard to rail formation level (m)	Outlet velocity (m/s)	Peak discharge (m³/s)
-1.76	Gowrie Creek	C-1.76	RCBC	460.32	-0.74	3.6	122.7
-1.42		C-1.42	RCP	461.37	-0.34	1.3	5.0
-0.25		C-0.25	RCP	468.96	-0.53	4.9	31.5
0.11		C0.11	RCBC	470.64	-0.63	2.6	4.2
0.21		C0.21	RCBC	471.25	-0.26	4.5	122.4
1.03		C1.0	RCBC	477.44	-1.61	4.0	76.5
1.46		C1.46	RCBC	480.11	-0.98	5.5	4.7
2.41		C2.4	RCBC	485.62	-1.38	6.4	74.5
3.45		320-BR02	Bridge	497.05	-1.88	5.0	316.6
3.54		C3.54	RCBC	497.26	0.19	5.8	25.4

APPENDIX

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Hydrology and Flooding

Appendix G Flood sensitive receptors

GOWRIE TO HELIDON ENVIRONMENTAL IMPACT STATEMENT



Appendix G

Flood sensitive receptors

FSR ID	Waterway	Flood sensitive receptor
1	Gowrie Creek	House
13	Gowrie Creek	House
38	Gowrie Creek	House
20	Gowrie Creek	House
26	Gowrie Creek	House
41	Gowrie Creek	House
27	Gowrie Creek	House
40	Gowrie Creek	House
28	Gowrie Creek	House
29	Gowrie Creek	House
30	Gowrie Creek	House
33	Gowrie Creek	House
37	Gowrie Creek	House
44	Gowrie Creek	House
45	Gowrie Creek	House
46	Gowrie Creek	House
47	Gowrie Creek	House
48	Gowrie Creek	House
49	Gowrie Creek	House
53	Gowrie Creek	House
51	Gowrie Creek	House
59	Gowrie Creek	House
57	Gowrie Creek	House
58	Gowrie Creek	House
55	Gowrie Creek	House
52	Gowrie Creek	House
62	Gowrie Creek	House
63	Gowrie Creek	House and sheds
66	Gowrie Creek	House
77	Gowrie Creek	House
82	Gowrie Creek	Industrial
88	Gowrie Creek	Sheds
89	Gowrie Creek	House and sheds
98	Gowrie Creek	House
101	Gowrie Creek	House
104	Gowrie Creek	House
109	Gowrie Creek	House
112	Gowrie Creek	House
117	Gowrie Creek	House

FSR ID	Waterway	Flood sensitive receptor
121	Gowrie Creek	House
133	Gowrie Creek	Sheds
278	Gowrie Creek	House
280	Gowrie Creek	Sheds
282	Gowrie Creek	House and sheds
296	Gowrie Creek	House
297	Gowrie Creek	House and sheds
305	Gowrie Creek	House
306	Gowrie Creek	House
311	Gowrie Creek	Industrial and sheds
312	Gowrie Creek	Industrial
314	Gowrie Creek	House
321	Gowrie Creek	House
324	Gowrie Creek	House
326	Gowrie Creek	House
337	Gowrie Creek	House
340	Gowrie Creek	House
348	Gowrie Creek	House
349	Gowrie Creek	House
373	Gowrie Creek	House
383	Gowrie Creek	Sheds
388	Gowrie Creek	Sheds
393	Gowrie Creek	Industrial
394	Gowrie Creek	House
405	Gowrie Creek	House
408	Gowrie Creek	House
411	Gowrie Creek	House
418	Gowrie Creek	House
425	Gowrie Creek	House
426	Gowrie Creek	House
430	Gowrie Creek	House
434	Gowrie Creek	House
439	Gowrie Creek	Industrial
440	Gowrie Creek	House
453	Gowrie Creek	House and sheds
460	Gowrie Creek	Industrial
468	Gowrie Creek	House and sheds
478	Gowrie Creek	House
488	Gowrie Creek	Tanks
489	Gowrie Creek	Tank
490	Gowrie Creek	Tank
491	Gowrie Creek	Tank

FSR ID	Waterway	Flood sensitive receptor
506	Gowrie Creek	Sheds
520	Gowrie Creek	House and sheds
525	Gowrie Creek	Shed
526	Gowrie Creek	House and sheds
544	Gowrie Creek	House
553	Gowrie Creek	House and shed
555	Gowrie Creek	House and shed
557	Gowrie Creek	House
565	Gowrie Creek	House and shed
579	Gowrie Creek	House
581	Gowrie Creek	House
588	Gowrie Creek	House
477	Gowrie Creek	House
591	Gowrie Creek	Tank
592	Gowrie Creek	Houses and sheds
599	Gowrie Creek	Sheds
600	Gowrie Creek	House and sheds
606	Gowrie Creek	Shed
619	Gowrie Creek	House
624	Gowrie Creek	House
626	Gowrie Creek	Industrial
638	Gowrie Creek	House
639	Gowrie Creek	House
641	Gowrie Creek	House
642	Gowrie Creek	House
643	Gowrie Creek	House
644	Gowrie Creek	House
645	Gowrie Creek	House
646	Gowrie Creek	House
647	Gowrie Creek	House
648	Gowrie Creek	House
649	Gowrie Creek	House
650	Gowrie Creek	House
653	Gowrie Creek	House
654	Gowrie Creek	House
655	Gowrie Creek	House
658	Gowrie Creek	House
419	Gowrie Creek	Industrial
429	Gowrie Creek	Shed
352	Gowrie Creek	Shed
401	Gowrie Creek	Shed
131	Gowrie Creek	Sealed Road

FSR ID	Waterway	Flood sensitive receptor
136	Gowrie Creek	Sealed Road
363	Gowrie Creek	East Paulsens Road
361	Gowrie Creek	Morris Road
362	Gowrie Creek	East Paulsens Road
300	Gowrie Creek	Paulsens Road
301	Gowrie Creek	Shed
275	Gowrie Creek	Gowrie Junction Road
689	Gowrie Creek	House
365	Gowrie Creek	Sealed Road
695	Gowrie Creek	Bridge
360	Gowrie Creek	Burkes Road
313	Gowrie Creek	Mansel Drive
432	Gowrie Creek	Shed
334	Gowrie Creek	Shed
694	Gowrie Creek	Old Homebush Road
298	Gowrie Creek	Paulsens Road
286	Gowrie Creek	Krienkes Road
299	Gowrie Creek	Paulsens Road
485	Gowrie Creek	Paulsens Road
11	Gowrie Creek	Shed
290	Gowrie Creek	Draper Road
371	Gowrie Creek	Nass Road
291	Gowrie Creek	Nass Road
693	Gowrie Creek	Tilgonda Kingsthorpe Road
294	Gowrie Creek	Robsons Road
692	Gowrie Creek	Kingsthorpe Haden Road
691	Gowrie Creek	Gowrie Junction Road
690	Gowrie Creek	McMahon Road
10	Oaky Creek	Shed
12	Oaky Creek	Shed
151	Oaky Creek	Unsealed Road
152	Oaky Creek	Jones Road
660	Oaky Creek	Shed
661	Oaky Creek	Sheds
800	Oaky Creek	House
801	Oaky Creek	House
802	Oaky Creek	House
662	Six Mile Creek	Shed
663	Six Mile Creek	Shed
664	Six Mile Creek	Shed
665	Six Mile Creek	Shed
666	Six Mile Creek	Shed

FSR ID	Waterway	Flood sensitive receptor
667	Six Mile Creek	Shed
153	Six Mile Creek	Gittins Road
803	Six Mile Creek	House
804	Six Mile Creek	House
805	Six Mile Creek	House
806	Six Mile Creek	House
160	Lockyer Creek	Shed
161	Lockyer Creek	Sheds
164	Lockyer Creek	Bridge
174	Lockyer Creek	House
179	Lockyer Creek	House
185	Lockyer Creek	House
192	Lockyer Creek	House
199	Lockyer Creek	Shed
202	Lockyer Creek	Shed
208	Lockyer Creek	House
209	Lockyer Creek	House
217	Lockyer Creek	House
231	Lockyer Creek	House
270	Lockyer Creek	Industrial
671	Lockyer Creek	Industrial and sheds
672	Lockyer Creek	Shed
158	Lockyer Creek	Rossiters Road
159	Lockyer Creek	Rossiters Road
156	Lockyer Creek	Lockyer Siding Road
195	Lockyer Creek	Helidon Dip Road
188	Lockyer Creek	Bridge
197	Lockyer Creek	Bridge
170	Lockyer Creek	Postmans Ridge Road
169	Lockyer Creek	Paynter Road
165	Lockyer Creek	Murphys Creek Road
673	Lockyer Creek	Shed
684	Lockyer Creek	Shed
687	Lockyer Creek	Shed

APPENDIX

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Hydrology and Flooding

Appendix H Afflux at flood sensitive receptors

GOWRIE TO HELIDON ENVIRONMENTAL IMPACT STATEMENT



Appendix H

Afflux at Flood sensitive receptors

Flood sensitive receptor number	Flood sensitive receptor type	Catchment	20% AEP (mm)	10% AEP (mm)	5% AEP (mm)	2% AEP (mm)	1% AEP (mm)	1 in 2,000 AEP (mm)	1 in 10,000 AEP (mm)	PMF (mm)
1	House	Gowrie Creek	-	-	-	-	-	-	-	0
11	Shed	Gowrie Creek	-	-	-	-	-	-3	-3	-3
13	House	Gowrie Creek	-	-	-	0	0	0	0	0
20	House	Gowrie Creek	-	-	-	-	-	-	-	0
26	House	Gowrie Creek	-	-	-	-	-	-	0	0
27	House	Gowrie Creek	-	-	-	0	0	0	0	0
28	House	Gowrie Creek	-	-	0	0	0	0	0	0
29	House	Gowrie Creek	-	0	0	0	0	0	0	0
30	House	Gowrie Creek	0	0	0	0	0	0	0	0
33	House	Gowrie Creek	-	-	-	-	-	-	-	-
37	House	Gowrie Creek	-	-	-	-	-	-	-	-
38	House	Gowrie Creek	0	0	0	0	0	0	0	0
40	House	Gowrie Creek	-	-	-	-	-	0	0	0
41	House	Gowrie Creek	-	-	-	-	-	-	-	0
44	House	Gowrie Creek	-	-	-	-	-	-	0	0
45	House	Gowrie Creek	-	-	-	-	-	-	-	0
46	House	Gowrie Creek	-	-	-	-	-	-	-	0
47	House	Gowrie Creek	-	-	-	-	-	-	-	0
48	House	Gowrie Creek	-	-	-	0	0	0	0	0
49	House	Gowrie Creek	-	-	-	-	-	-	-	0
51	House	Gowrie Creek	-	-	-	-	-	0	0	0
52	House	Gowrie Creek	-	-	-	-	-	0	0	0
53	House	Gowrie Creek	-	-	-	0	0	0	0	0
55	House	Gowrie Creek	-	-	-	-	-	-	-	0
57	House	Gowrie Creek	-	-	-	-	-	-	-	-
58	House	Gowrie Creek	-	-	-	-	-	-	-	-
59	House	Gowrie Creek	-	-	-	0	0	0	0	0
62	House	Gowrie Creek	-	-	-	-	-	-	-	-
63	House and sheds	Gowrie Creek	-	-	-	-	0	0	0	0
66	House	Gowrie Creek	-	-	-	-	-	0	-1	-6
77	House	Gowrie Creek	-	-	-	-	-	WWND	-4	-38
82	Industrial	Gowrie Creek	-	-	0	0	0	0	0	0
88	Sheds	Gowrie Creek	-	-	-	-	-	-	-	0
89	House and sheds	Gowrie Creek	-	-	-	-	-	0	0	0
98	House	Gowrie Creek	-	-	-	-	-	-	0	0
101	House	Gowrie Creek	-	-	-	-	-	0	0	1
104	House	Gowrie Creek	-	-	-	-	-	-	0	1
109	House	Gowrie Creek	-	-	-	-	-	-	0	1

Flood sensitive receptor number	Flood sensitive receptor type	Catchment	20% AEP (mm)	10% AEP (mm)	5% AEP (mm)	2% AEP (mm)	1% AEP (mm)	1 in 2,000 AEP (mm)	1 in 10,000 AEP (mm)	PMF (mm)
112	House	Gowrie Creek	-	-	-	-	-	0	0	0
117	House	Gowrie Creek	-	-	-	-	0	0	0	0
121	House	Gowrie Creek	-	-	-	-	0	0	0	0
131	Sealed Road	Gowrie Creek	0	0	0	0	0	0	0	1
133	Sheds	Gowrie Creek	-	-	-	-	-	-	0	0
136	Sealed Road	Gowrie Creek	0	0	0	0	0	0	0	0
275	Gowrie Junction Rd	Gowrie Creek	-	-	-	-	-	-13	-12	-35
278	House	Gowrie Creek	-	-	-	-	-	-	-	-1
280	Sheds	Gowrie Creek	-	-	-	-	-	-6	-6	-12
282	House and sheds	Gowrie Creek	-	-	-	-	-	WWND	-69	-40
286	Krienkes Rd	Gowrie Creek	-	WWND	7	28	33	11	3	-1
290	Draper Rd	Gowrie Creek	0	0	0	0	0	0	0	-20
291	Nass Rd	Gowrie Creek	0	0	0	0	0	0	0	0
294	Robsons Rd	Gowrie Creek	-	-	-	0	0	0	0	0
296	House	Gowrie Creek	-	-	-	-	-	38	65	48
297	House and sheds	Gowrie Creek	-	-	-	-	-	WDNW	86	63
298	Paulsens Rd	Gowrie Creek	-	-	-	-	-	-	WDNW	-44
299	Paulsens Rd	Gowrie Creek	3	14	14	-62	-89	-13	13	-1
300	Paulsens Rd	Gowrie Creek	-	-	-	-	-	64	1	41
301	Shed	Gowrie Creek	-	-	-	-	-	34	0	28
305	House	Gowrie Creek	-	-	-	-	-	57	63	86
306	House	Gowrie Creek	-	-	-	-	-	47	59	77
311	Industrial and sheds	Gowrie Creek	-	-	-	-	-	25	100	117
312	Industrial	Gowrie Creek	-	-	-	-	-	24	63	57
313	Mansel Dr	Gowrie Creek	0	0	0	0	0	0	0	45
314	House	Gowrie Creek	-	-	-	-	-	-	0	46
321	House	Gowrie Creek	-	-	-	-	-	-	0	0
324	House	Gowrie Creek	-	-	-	0	0	0	0	0
326	House	Gowrie Creek	-	-	-	-	-	0	0	0
334	Shed	Gowrie Creek	-	-	-	-	0	0	0	0
337	House	Gowrie Creek	-	-	-	-	-	0	0	0
340	House	Gowrie Creek	-	-	-	-	-	0	0	0
348	House	Gowrie Creek	-	-	-	-	-	-	-	0
349	House	Gowrie Creek	-	-	-	-	-	0	0	1
352	Shed	Gowrie Creek	-	-	-	0	0	0	0	0
360	Burkes Rd	Gowrie Creek	-	-	-	-	-	0	0	0
361	Morris Rd	Gowrie Creek	-	-	-	-	-	WDNW	17	71
362	East Paulsens Rd	Gowrie Creek	-	-	WDNW	WDNW	414	449	388	-20
363	East Paulsens Rd	Gowrie Creek	-	-	-	WDNW	WDNW	56	31	130
365	Sealed Road	Gowrie Creek	0	0	0	0	0	0	0	0

Flood sensitive receptor number	Flood sensitive receptor type	Catchment	20% AEP (mm)	10% AEP (mm)	5% AEP (mm)	2% AEP (mm)	1% AEP (mm)	1 in 2,000 AEP (mm)	1 in 10,000 AEP (mm)	PMF (mm)
371	Nass Rd	Gowrie Creek	0	0	0	0	0	0	0	0
373	House	Gowrie Creek	-	-	-	-	-	-	-	-13
383	Sheds	Gowrie Creek	-	-	-	-	-	-	16	28
388	Sheds	Gowrie Creek	-	-	-	-	-	-	15	25
393	Industrial	Gowrie Creek	-	-	-	-	-	-	11	33
394	House	Gowrie Creek	-	-	-	-	-	-	56	86
401	Shed	Gowrie Creek	-	-	-	-	-	-	-	0
405	House	Gowrie Creek	-	-	-	-	-	-	-	-
408	House	Gowrie Creek	-	-	-	-	-	-	-	-
411	House	Gowrie Creek	-	-	-	-	-	-	-	0
418	House	Gowrie Creek	-	-	-	-	-	-	-	1
419	Industrial	Gowrie Creek	-	-	-	-	-	-	-	0
425	House	Gowrie Creek	-	-	-	-	-	-	-	-
426	House	Gowrie Creek	-	-	-	-	-	-	-	-
429	Shed	Gowrie Creek	-	-	-	-	-	-	-	1
430	House	Gowrie Creek	-	-	-	-	-	-	-	0
432	Shed	Gowrie Creek	-	-	-	-	-	-	-	-
434	House	Gowrie Creek	-	-	-	-	-	-	-	0
439	Industrial	Gowrie Creek	-	-	-	-	-	-	-	29
440	House	Gowrie Creek	-	-	-	-	-	-	85	60
453	House and sheds	Gowrie Creek	-	-	-	-	-	-	56	51
460	Industrial	Gowrie Creek	-	-	-	-	-	-	-	-22
468	House and sheds	Gowrie Creek	-	-	-	-	-	-	-	-29
477	House	Gowrie Creek	-	-	-	-	-	-	-	-
478	House	Gowrie Creek	-	-	-	-	WWND	-64	-53	-49
485	Paulsens Rd	Gowrie Creek	-	-1	-1	-191	-202	-27	0	-35
488	Tanks	Gowrie Creek	-	-	-	-	-	-	-	0
489	Tank	Gowrie Creek	-	-	-	0	0	0	0	0
490	Tank	Gowrie Creek	0	0	0	0	0	0	0	0
491	Tank	Gowrie Creek	0	0	0	0	0	0	0	0
506	Sheds	Gowrie Creek	-	-	-	-	-	-	21	28
520	House and sheds	Gowrie Creek	-	-	-	-	-	-	-	-
525	Shed	Gowrie Creek	-	-	-	-	-	-	-	-19
526	House and sheds	Gowrie Creek	-	-	-	-	-	-	-	-
544	House	Gowrie Creek	-	-	-	-	-	-	-	-
553	House and shed	Gowrie Creek	-	-	-	-	-	-	-	-15
555	House and shed	Gowrie Creek	-	-	-	-	-	WWND	-12	-21
557	House	Gowrie Creek	-	-	-	-	-	-	-	-25
565	House and shed	Gowrie Creek	-	-	-	-	-	-	-	9

Flood sensitive receptor number	Flood sensitive receptor type	Catchment	20% AEP (mm)	10% AEP (mm)	5% AEP (mm)	2% AEP (mm)	1% AEP (mm)	1 in 2,000 AEP (mm)	1 in 10,000 AEP (mm)	PMF (mm)
579	House	Gowrie Creek	-	-	-	-	-	-	-	-
581	House	Gowrie Creek	-	-	-	-	-	-	-	-
588	House	Gowrie Creek	-	-	-	-	-	-	-	-
591	Tank	Gowrie Creek	-	-	-	-	-	-	-29	-39
592	Houses and sheds	Gowrie Creek	-	-	-	-	-	-	-	-45
599	Sheds	Gowrie Creek	-	-	-	-	-	-	-	-5
600	House and sheds	Gowrie Creek	-	-	-	-	-	-	-	-
606	Shed	Gowrie Creek	-	-	-	-	-	-	-	0
619	House	Gowrie Creek	-	-	-	-	-	-	-	-
624	House	Gowrie Creek	-	-	-	-	-	-	-	-
626	Industrial	Gowrie Creek	-	-	-	-	-	-	-	0
638	House	Gowrie Creek	-	-	-	-	-	-	-	0
639	House	Gowrie Creek	-	-	-	-	-	-	-	-
641	House	Gowrie Creek	-	-	-	-	-	-	-	-
642	House	Gowrie Creek	-	-	-	-	-	-	-	-
643	House	Gowrie Creek	-	-	-	-	-	-	-	-
644	House	Gowrie Creek	-	-	-	-	-	-	-	-
645	House	Gowrie Creek	-	-	-	-	-	-	-	-
646	House	Gowrie Creek	-	-	-	-	-	-	-	-
647	House	Gowrie Creek	-	-	-	-	-	-	-	-
648	House	Gowrie Creek	-	-	-	-	-	-	-	-
649	House	Gowrie Creek	-	-	-	-	-	-	-	-
650	House	Gowrie Creek	-	-	-	-	-	-	-	-
653	House	Gowrie Creek	-	-	-	-	-	-	-	-
654	House	Gowrie Creek	-	-	-	-	-	-	-	-
655	House	Gowrie Creek	-	-	-	-	-	-	-	-
658	House	Gowrie Creek	-	-	-	-	-	-	-	-
689	House	Gowrie Creek	-	-	-	-	-	-	-	-
690	McMahon Rd	Gowrie Creek	-	-	-	-	-	WWND	WWND	688
691	Gowrie Junction Rd	Gowrie Creek	-	-	-	-	-	-	-	-
692	Kingsthorpe Haden Rd	Gowrie Creek	0	0	0	0	5	15	0	-11
693	Tilgonda Kingsthorpe Rd	Gowrie Creek	-	-	-	2	3	-6	-5	84
694	Old Homebush Rd	Gowrie Creek	-	-	-	-	-	32	73	106
695	Bridge	Gowrie Creek	-	-	-	-	-	-	-	-
10	Shed	Oaky Creek	-	-	-	0	0	0	0	1
12	Shed	Oaky Creek	0	0	0	0	-1	0	0	4
151	Unsealed Road	Oaky Creek	0	0	0	0	0	0	0	-1
152	Jones Rd	Oaky Creek	-	0	0	0	0	0	0	0
660	Shed	Oaky Creek	-	-	-	-	-	-	-	8
661	Sheds	Oaky Creek	-	-	-	-	-	-	-	5

Flood sensitive receptor number	Flood sensitive receptor type	Catchment	20% AEP (mm)	10% AEP (mm)	5% AEP (mm)	2% AEP (mm)	1% AEP (mm)	1 in 2,000 AEP (mm)	1 in 10,000 AEP (mm)	PMF (mm)
800	House	Oaky Creek	-	-	-	-	-	-	-	-5
801	House	Oaky Creek	-	-	-	-	-	-	-	-
802	House	Oaky Creek	-	-	-	-	-	-	-	-
153	Gittins Rd	Six Mile Creek	0	0	0	0	0	-1	0	0
662	Shed	Six Mile Creek	-	-	-	-	-	-	-	-
663	Shed	Six Mile Creek	-	-	-	-	-	-	-	-
664	Shed	Six Mile Creek	-	-	-	-	-	-	-	-
665	Shed	Six Mile Creek	-	-	-	-	-	-	-	-
666	Shed	Six Mile Creek	-	-	-	-	-	-	-	-
667	Shed	Six Mile Creek	-	-	-	-	-	-	-	-
803	House	Six Mile Creek	-	-	-	-	-	-	-	-
804	House	Six Mile Creek	-	-	-	-	-	-	-	-
805	House	Six Mile Creek	-	-	-	-	-	-	-	-
806	House	Six Mile Creek	-	-	-	-	-	-	-	-
156	Lockyer Siding Rd	Lockyer Creek	0	0	0	0	0	0	0	1
158	Rossiters Rd	Lockyer Creek	-	-	-	-	-	0	0	1
159	Rossiters Rd	Lockyer Creek	-	-	-	-	-	0	0	2
160	Shed	Lockyer Creek	-	-	-	-	-	0	0	2
161	Sheds	Lockyer Creek	-	-	-	-	-	0	0	2
164	Bridge	Lockyer Creek	0	0	0	0	0	0	0	2
165	Murphys Creek Rd	Lockyer Creek	-	-	0	0	0	0	0	0
169	Paynter Rd	Lockyer Creek	-	0	1	0	0	0	0	2
170	Postmans Ridge Rd	Lockyer Creek	-	-	-	-	-	0	0	0
174	House	Lockyer Creek	-	-	-	-	-	-1	0	-3
179	House	Lockyer Creek	-	-	-	-	-	-1	0	-3
185	House	Lockyer Creek	-	-	-	-	-	-1	0	-3
188	Bridge	Lockyer Creek	0	0	0	0	0	0	0	-3
192	House	Lockyer Creek	-	-	-	-	-	0	0	-3
195	Helidon Dip Rd	Lockyer Creek	-	-	-	-	WWND	0	0	-3
197	Bridge	Lockyer Creek	0	0	0	0	-1	0	0	-2
199	Shed	Lockyer Creek	0	0	0	-1	-1	0	0	-3
202	Shed	Lockyer Creek	-	-	-	-	-	0	0	-2
208	House	Lockyer Creek	-	-	-	-	-	0	0	-1
209	House	Lockyer Creek	-	-	-	-	-	0	0	-1
217	House	Lockyer Creek	-	-	-	-	-	0	-1	-1
231	House	Lockyer Creek	-	-	-	-	-	0	0	-1
270	Industrial	Lockyer Creek	-	-	-	-	-	-	-	-
671	Industrial and sheds	Lockyer Creek	-	-	-	-	-	-	-	2
672	Shed	Lockyer Creek	-	-	-	-	-	-	-	2
673	Shed	Lockyer Creek	-	-	-	-	-	-	-	-
684	Shed	Lockyer Creek	-	-	-	-	-	-	-	-

Flood sensitive receptor number	Flood sensitive receptor type	Catchment	20% AEP (mm)	10% AEP (mm)	5% AEP (mm)	2% AEP (mm)	1% AEP (mm)	1 in 2,000 AEP (mm)	1 in 10,000 AEP (mm)	PMF (mm)
687	Shed	Lockyer Creek	-	-	-	-	-	-	-	-

Table notes:

- 1 WDNW is Was Dry Now Wet
- 2 WWND in Was Wet Now Dry

APPENDIX

M

Hydrology and Flooding

Appendix I Local drainage structures and impact outcomes

GOWRIE TO HELIDON ENVIRONMENTAL IMPACT STATEMENT



Appendix I

Local drainage structures and impact outcomes

Culvert ID	Chainage (km)	Type	Number of cells	Diameter/ width(m) for Culverts or Span (m) for Bridges	Height (m) – Culverts Soffit Level (m AHD) – Bridges	1% AEP Flow Through Structure (m³/s)	1% AEP Upstream Water Level Design (m AHD)	1% AEP Upstream Headwater Depth-Design (m)	1% AEP Freeboard to Formation (m)	Impacts at Rail Corridor		
										1% AEP Afflux (mm)	Existing Time of Inundation (hrs)	Change Time of Inundation (hrs)
C3.14	3.14	RCBC	1	0.9	0.9	0.36	490.85	0.45	0.18	0	0.28	0.00
C10.50	10.50	RCP	7	2.7	-	54.4	378.64	1.63	12.08	+20	1.10	0.06
C10.98	10.98	RCP	2	1.2	-	4.85	372.03	1.53	11.39	+30	0.27	0.02
C11.10	11.10	RCP	2	1.5	-	8.14	362.62	1.87	18.68	0	0.57	0.02
C11.43	11.43	RCBC	2	1.2	0.9	1.45	376.06	0.58	0.40	0	0.28	0.09
320-BR05	12.96	BRIDGE	-	261	348.40	13.1	348.18	N/A	2.68	0		0.17
C13.46	13.46	RCP	1	1.2	-	2.02	344.41	1.43	0.74	+10	0.27	0.00
320-BR06	13.78	BRIDGE	-	322	334.30	25.1	313.71	N/A	23.78	0		0.00
C14.07	14.07	RCP	1	0.9	-	0.36	329.88	0.52	6.01	0	0.18	0.00
320-BR07	14.22	BRIDGE	-	174	329.70	9.73	304.67	N/A	27.50	0		0.00
C14.68	14.68	RCBC	4	1.2	0.9	3.92	325.94	0.70	0.38	0	0.27	0.00
C15.05	15.05	RCBC	1	1.2	0.9	1.11	320.27	0.77	0.35	0	0.27	0.00
320-BR08	15.25	BRIDGE		145	313.90	7.58	299.37	N/A	17.07	0		0.00
C15.77	15.77	RCP	1	1.2	-	1.66	299.39	1.32	10.21	0	0.19	0.00
C17.08	17.08	RCP	1	1.2	-	2.02	273.83	1.33	15.08	+60	0.19	0.02
C17.35	17.35	RCP	1	1.2	-	2.24	274.96	1.59	9.83	+60	0.33	0.08
C17.42	17.42	RCP	1	0.9	-	0.89	277.33	0.97	6.48	+60	0.33	0.00
C17.52	17.52	RCP	1	1.65	-	4.31	278.93	1.88	3.28	+60	0.33	0.00
C17.99	17.99	RCP	1	1.65	-	3.76	259.38	1.66	15.77	0	0.38	0.03
C18.16	18.16	RCP	1	1.65	-	3.98	252.42	1.75	20.28	+40	0.38	0.02
C18.28	18.28	RCP	1	1.35	-	2.95	255.25	1.75	15.51	+220	0.38	0.00
320-BR11	18.82	BRIDGE	-	644	255.00	14.6	247.65	N/A	10.56	0		0.00
C19.33	19.33	RCP	2	1.2	-	4.02	242.90	1.44	11.38	0	0.17	0.00

Culvert ID	Chainage (km)	Type	Number of cells	Diameter/ width(m) for Culverts or Span (m) for Bridges	Height (m) – Culverts Soffit Level (m AHD) – Bridges	1% AEP Flow Through Structure (m³/s)	1% AEP Upstream Water Level Design (m AHD)	1% AEP Upstream Headwater Depth-Design (m)	1% AEP Freeboard to Formation (m)	Impacts at Rail Corridor		
										1% AEP Afflux (mm)	Existing Time of Inundation (hrs)	Change Time of Inundation (hrs)
C19.78	19.78	RCP	1	1.65	-	2.94	232.74	1.74	14.66	0	0.20	0.02
C19.93	19.93	RCP	1	1.35	-	2.04	227.76	1.24	16.76	+50	0.29	0.07
C20.08	20.08	RCP	2	1.35	-	5.59	226.08	1.65	16.04	+70	0.30	0.18
C20.53	20.53	RCP	1	0.9	-	1.00	233.33	1.61	2.39	0	0.12	0.00
C20.78	20.78	RCP	1	1.35	-	1.81	217.76	1.61	13.99	+30	0.19	0.00
320-BR12	21.32	BRIDGE	-	690	216.80	7.34	196.80	N/A	23.19	0		0.00
320-BR13	23.01	BRIDGE	-	1794	184.50	26.0	170.82	N/A	16.91	0		0.00
C25.31	25.31	RCP	1	1.2	-	2.14	155.04	1.51	6.94	0	0.27	0.35
C25.94	25.94	RCP	1	1.35	-	15.0	150.24	1.79	1.99	+390	1.24	3.18
C25.94	25.94	RCP	4	1.35	-							
QR Connection Line												
C3.12	3.12	RCBC	4	1.2	0.9	3.47	495.71	0.64	0.44	+100	0.72	3.17
C3.51	3.51	RCBC	5	1.2	0.9	9.77	496.37	1.37	1.08	+10	1.10	0.00

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