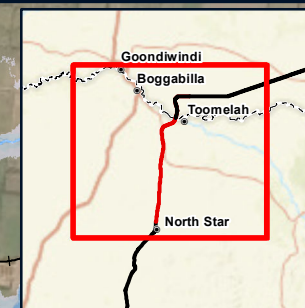
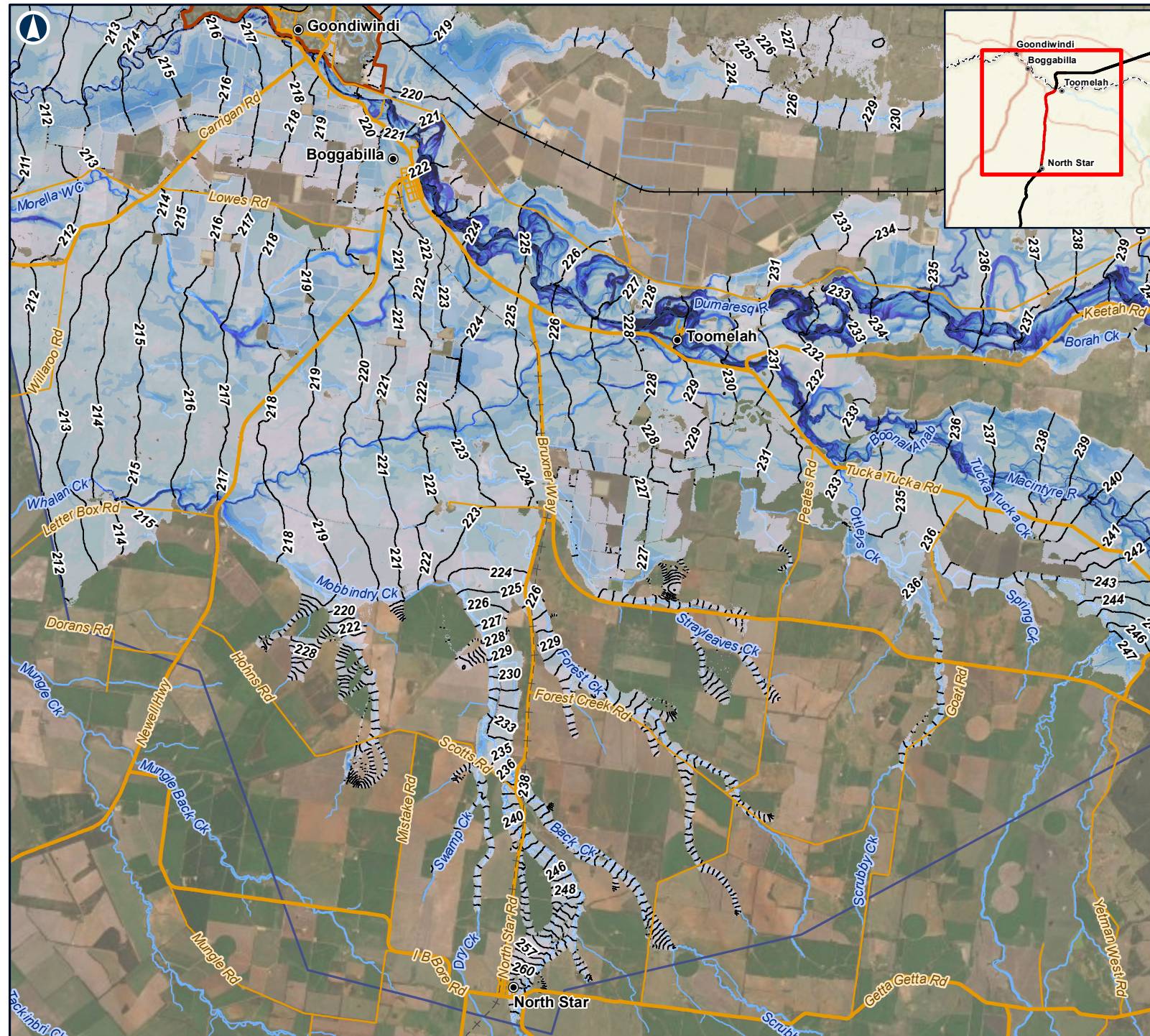


Appendix C

Figures – Verified 2019 levees and validated 1976 flows



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

NORTH STAR TO NSW/QLD BORDER

Figure C1: Existing Case
 Verified 2019 levees and validated 1976 flows
 Peak water levels

LEGEND

- Localities
- Existing rail (operational)
- - - Existing rail (non-operational)
- - - NSW/QLD border
- Watercourses
- Goondiwindi levee
- 1m contour (mAHD)
- Sub-model extent

Depth (m)

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

10km

Coordinate System: GDA 1994 MGA Zone 56

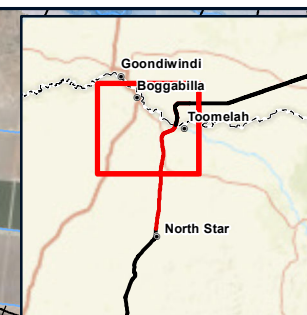
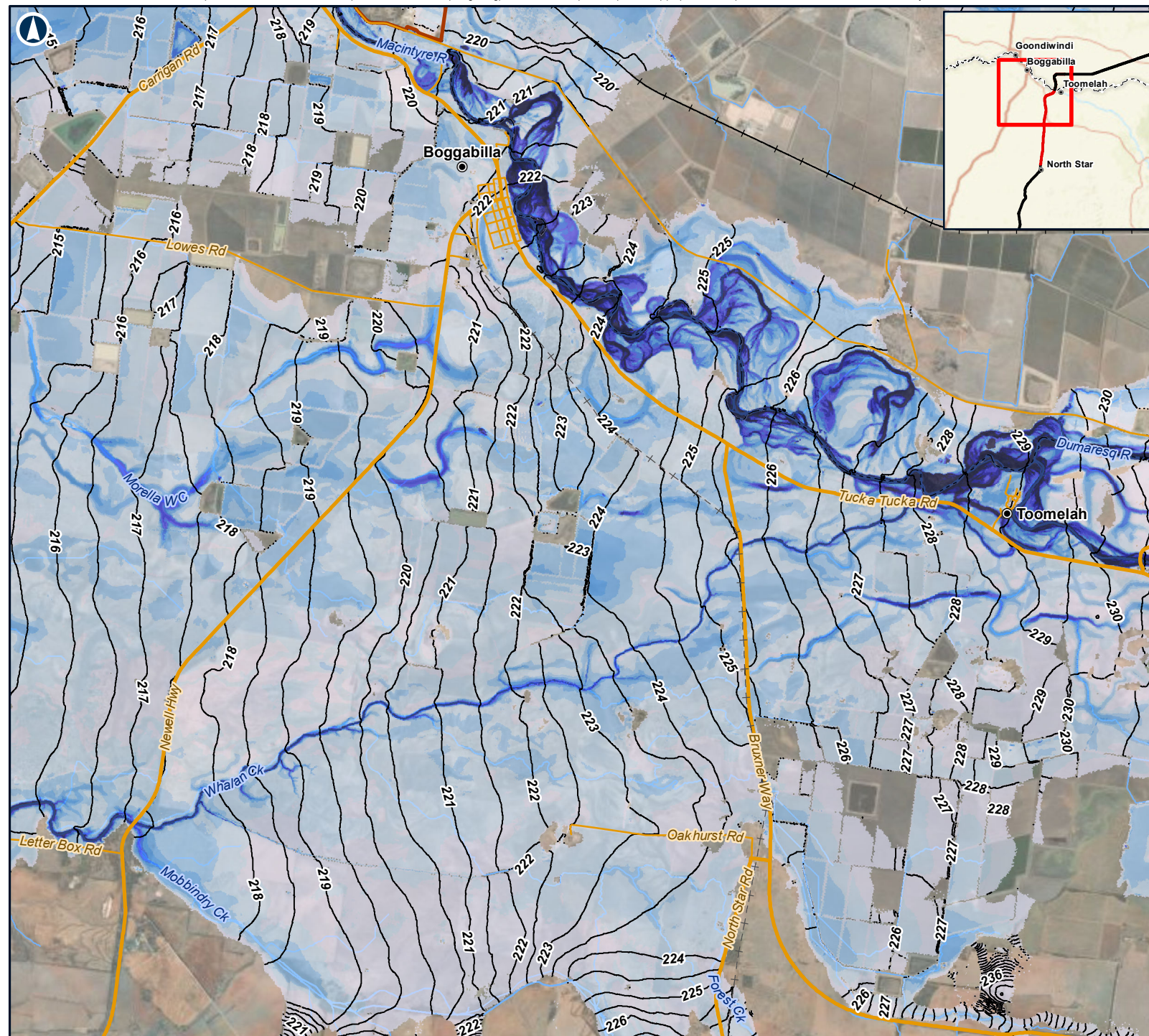
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Paper: A4

Author: FFJV GIS

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NORTH STAR TO NSW/QLD BORDER

Figure C1-A: Existing Case
 Verified 2019 levees and validated 1976 flows
 Peak water levels

LEGEND

- Localities
- +— Existing rail (operational)
- - - Existing rail (non-operational)
- - - NSW/QLD border
- Watercourses
- Goondiwindi levee
- 0.5m contour (mAHD)
- ▭ Sub-model extent

Depth (m)

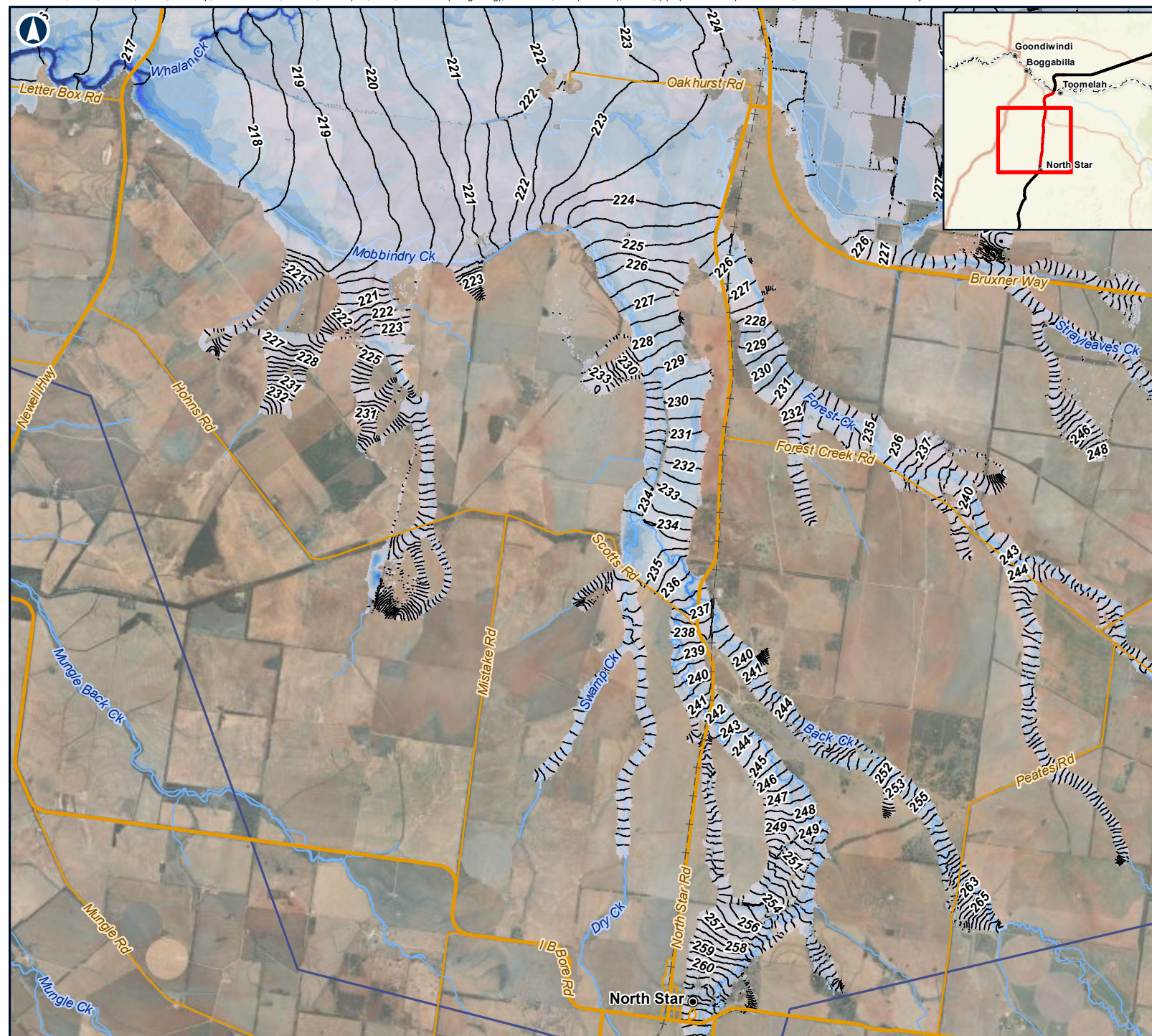
- 0 - 0.5
- 0.5 - 1.0
- 1.0 - 1.5
- 1.5 - 2.0
- 2.0 - 2.5
- 2.5 - 3.0
- 3.0 - 3.5
- 3.5 - 4.0
- 4.0 - 4.5
- 4.5 - 5.0
- > 5.0

6km

Coordinate System: GDA 1994 MGA Zone 56

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NORTH STAR TO NSW/QLD BORDER

Figure C1-B: Existing Case
Verified 2019 levees and validated 1976 flows
Peak water levels

LEGEND

- Localities
- +— Existing rail (operational)
- - - Existing rail (non-operational)
- - - NSW/QLD border
- Watercourses
- 0.5m contour (mAHD)
- ▭ Sub-model extent

Depth (m)

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

6km

Coordinate System: GDA 1994 MGA Zone 56

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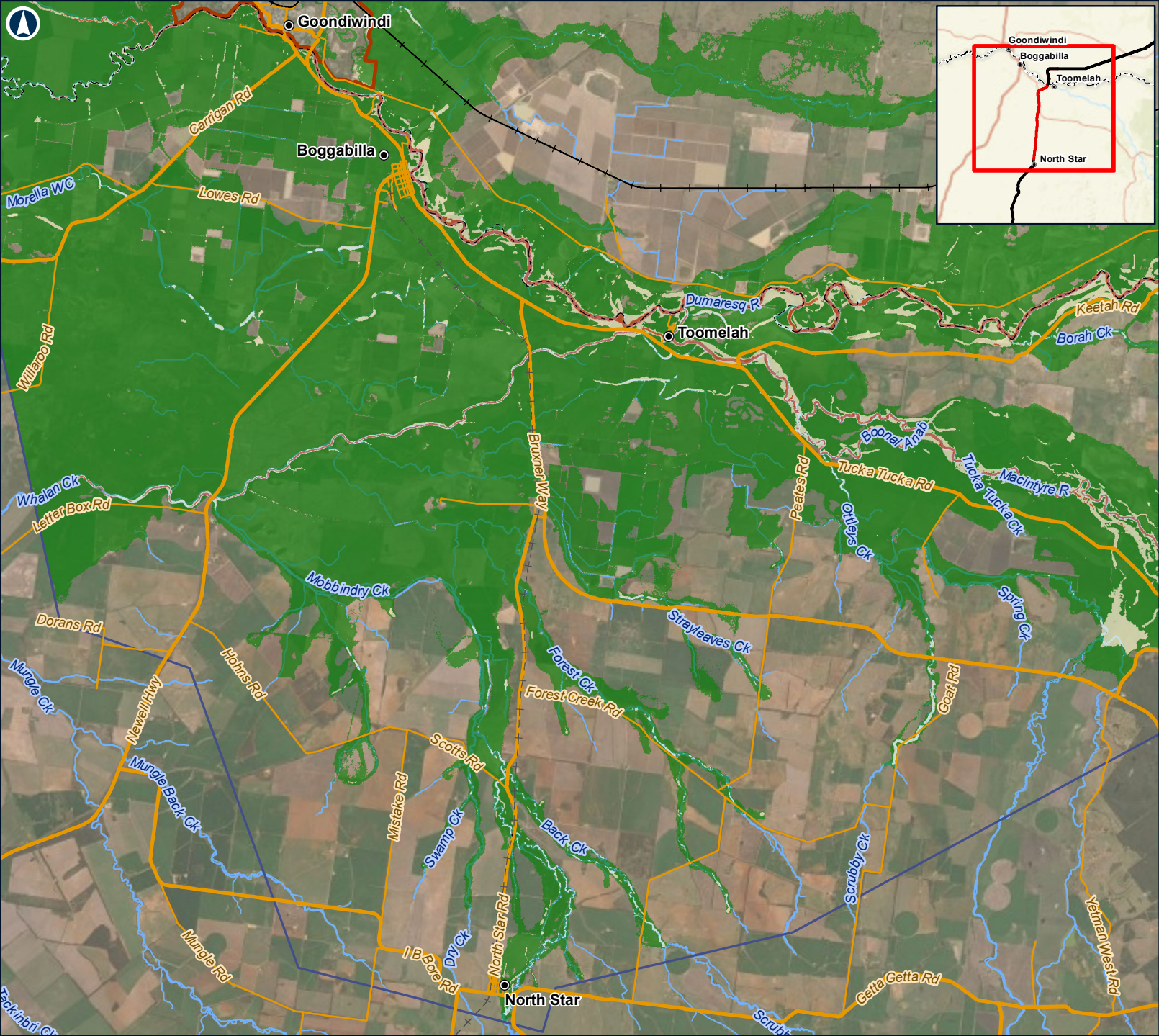
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NORTH STAR TO NSW/QLD BORDER

Figure C2: Existing Case
Verified 2019 levees and validated 1976 flows
Velocities

LEGEND

- Localities
- +— Existing rail (operational)
- - - Existing rail (non-operational)
- - - NSW/QLD border
- Watercourses
- Goondiwindi levee
- Sub-model extent

Peak velocity (m/s)

- 0 to 0.5
- 0.5 to 1.0
- > 1.0

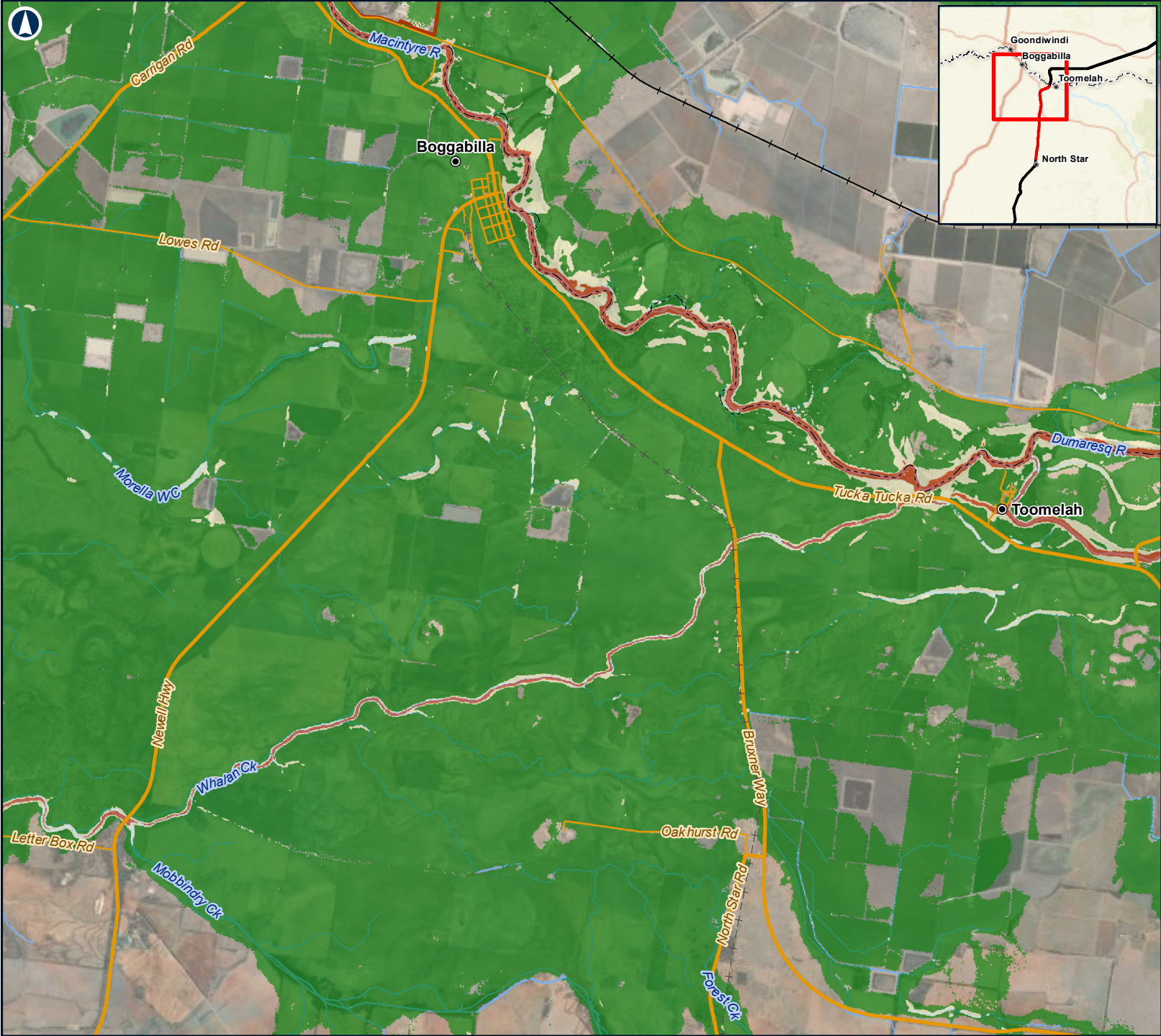
10km

Coordinate System: GDA 1994 MGA Zone 56

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NORTH STAR TO NSW/QLD BORDER

Figure C2-A: Existing Case
Verified 2019 levees and validated 1976 flows
Velocities

LEGEND

- Localities
- +— Existing rail (operational)
- - - Existing rail (non-operational)
- - - NSW/QLD border
- Watercourses
- Goondiwindi levee
- Sub-model extent

Peak velocity (m/s)

- 0 to 0.5
- 0.5 to 1.0
- > 1.0

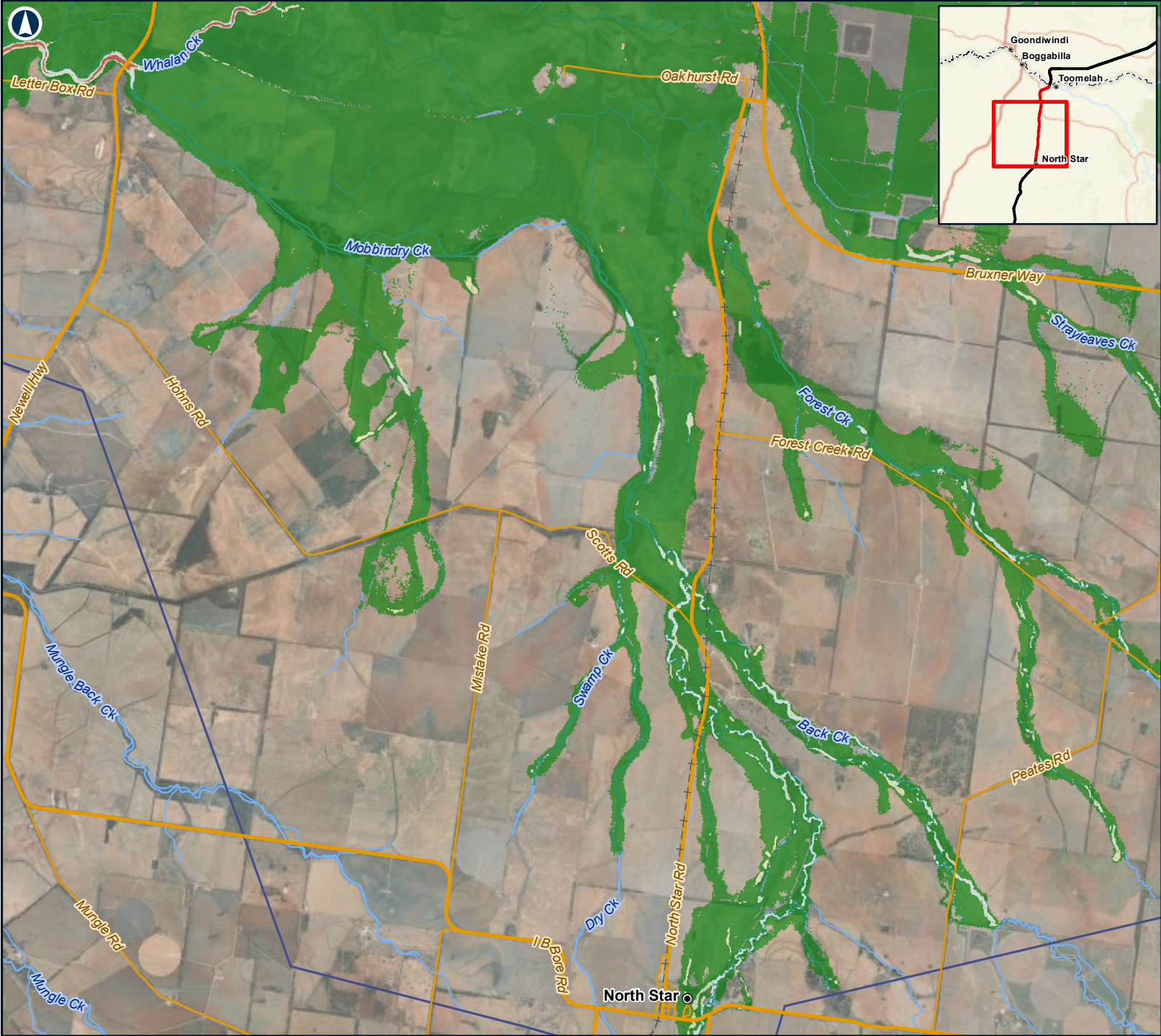
6km

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NORTH STAR TO NSW/QLD BORDER

Figure C2-B: Existing Case
Verified 2019 levees and validated 1976 flows
Velocities

LEGEND

- Localities
- +— Existing rail (operational)
- - - Existing rail (non-operational)
- - - NSW/Qld border
- Watercourses
- ▭ Sub-model extent

Peak velocity (m/s)

- 0 to 0.5
- 0.5 to 1.0
- > 1.0

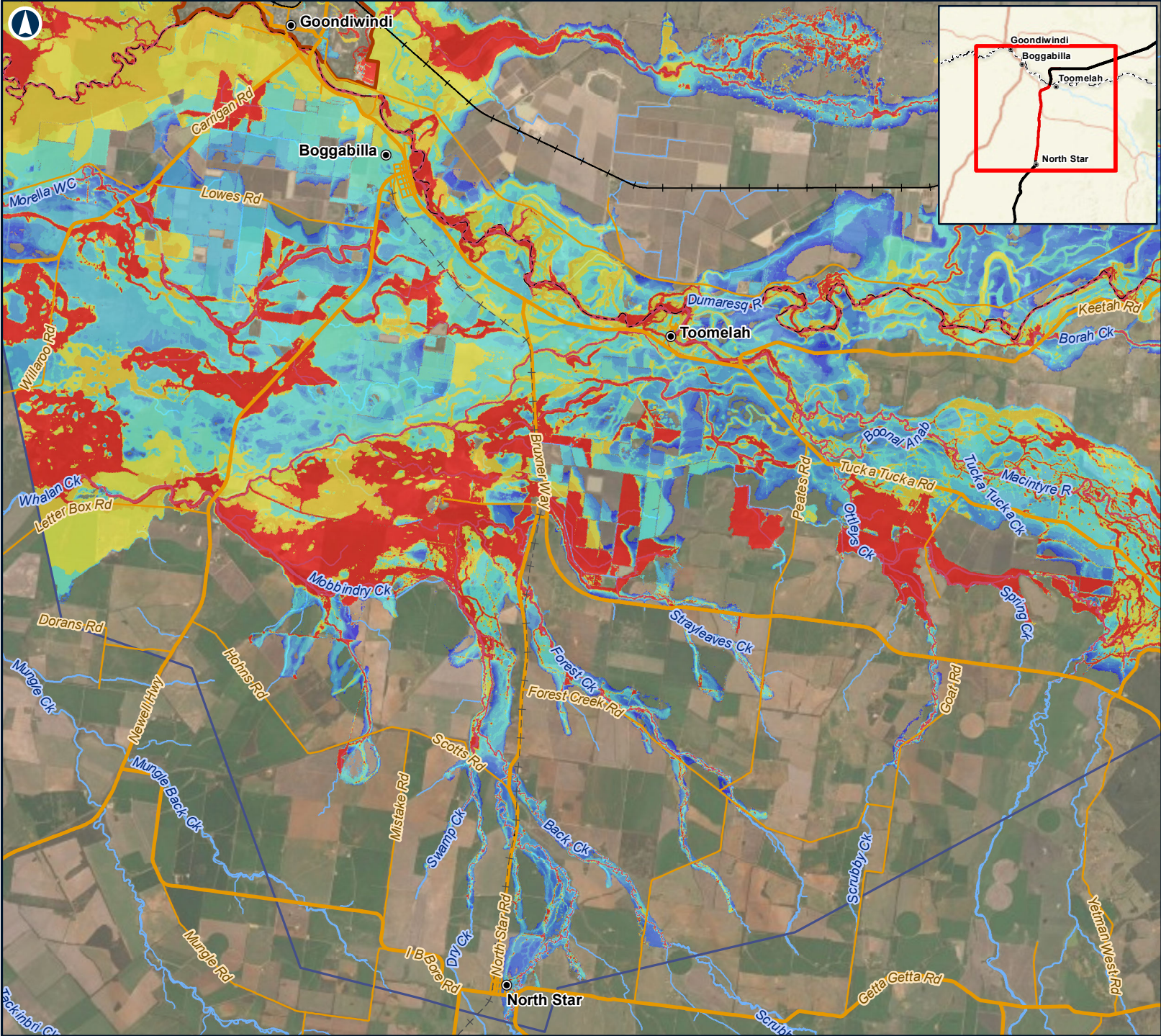
6km

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NORTH STAR TO NSW/QLD BORDER

Figure C3: Existing Case
Verified 2019 levees and validated 1976 flows
Duration of Inundation

LEGEND

● Localities

—+— Existing rail (operational)

- - - Existing rail (non-operational)

- - - NSW/QLD border

Watercourses

Goondiwindi levee

Sub-model extent

Duration of inundation (hours)

0 to 10

10 to 20

20 to 30

30 to 40

40 to 50

50 to 60

60 to 70

70 to 80

80 to 90

90 to 100

> 100

10km

Coordinate System: GDA 1994 MGA Zone 56

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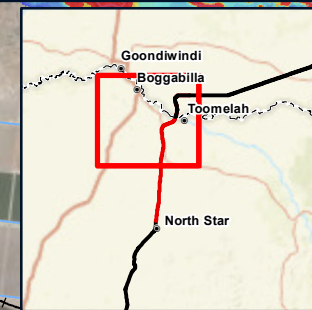
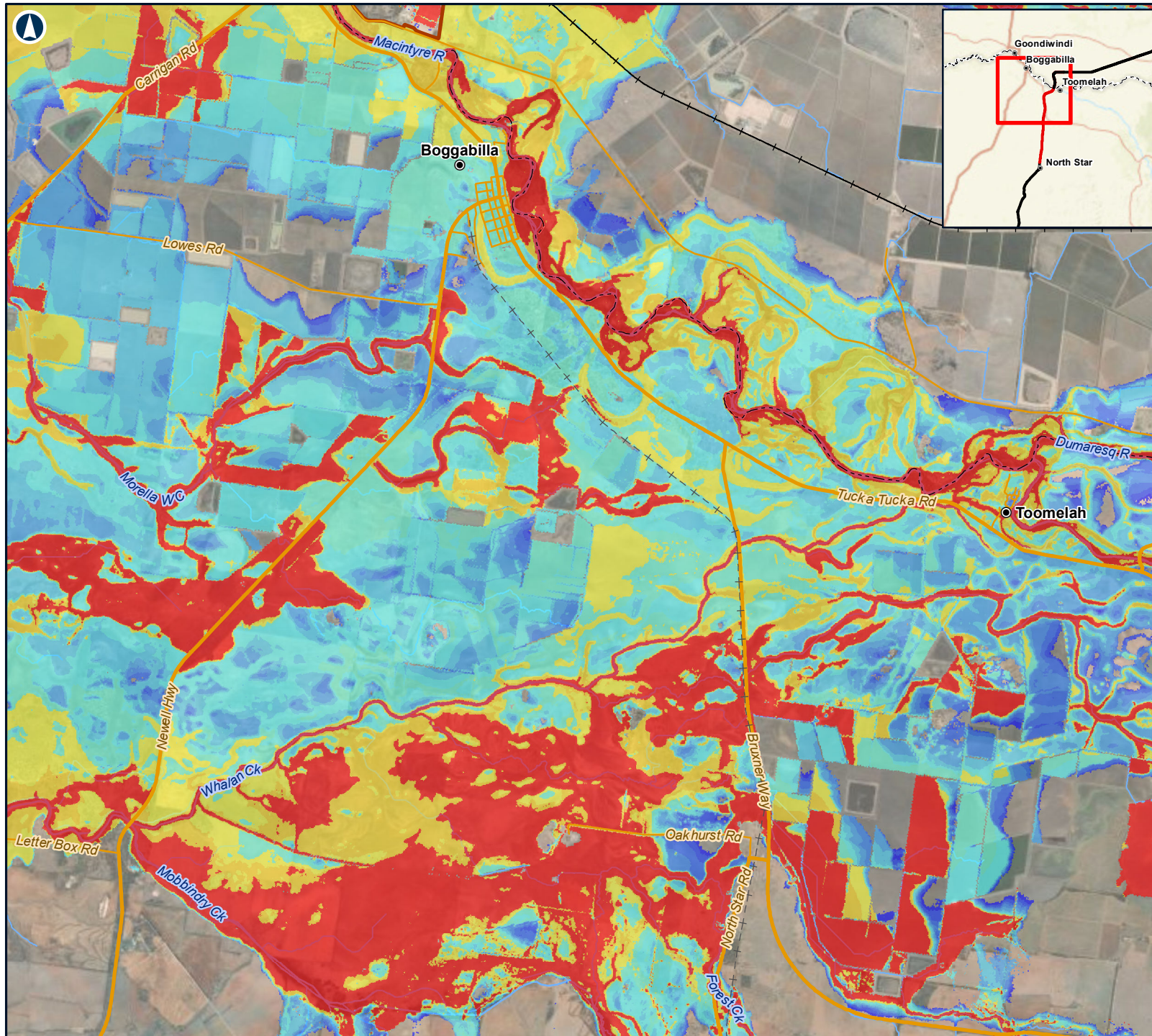
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Scale: 1:240,000

Map by: DTH Z:\GIS\GIS_270_NS2B\Tasks\270-IHY-202102151444_Hydrology_and_Flooding_PIR\270-IHY-202102151444_ARTC_FigX3_EX_Duration_Inundation_A4L_v1.mxd Date: 14/03/2021 15:56



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NORTH STAR TO NSW/QLD BORDER

Figure C3-A: Existing Case
 Verified 2019 levees and validated 1976 flows
 Duration of Inundation

LEGEND

- Localities
- +— Existing rail (operational)
- - - Existing rail (non-operational)
- - - NSW/QLD border
- Watercourses
- Goondiwindi levee
- ▭ Sub-model extent

Duration of inundation (hours)

- 0 to 10
- 10 to 20
- 20 to 30
- 30 to 40
- 40 to 50
- 50 to 60
- 60 to 70
- 70 to 80
- 80 to 90
- 90 to 100
- > 100

6km

Coordinate System: GDA 1994 MGA Zone 56

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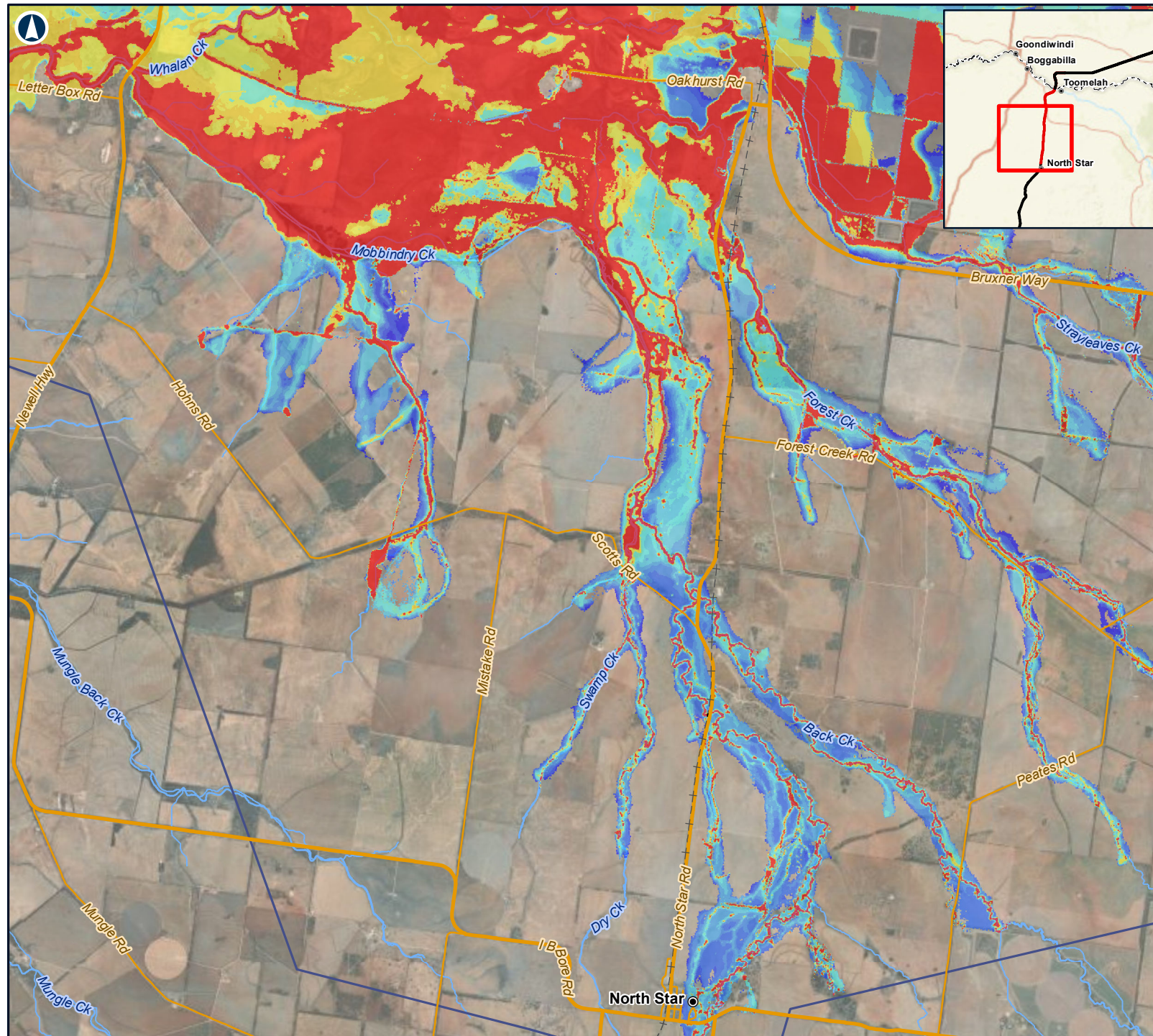
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NORTH STAR TO NSW/QLD BORDER

Figure C3-B: Existing Case
 Verified 2019 levees and validated 1976 flows
 Duration of Inundation

LEGEND

- Localities
- +— Existing rail (operational)
- - - Existing rail (non-operational)
- - - NSW/QLD border
- Watercourses
- ▭ Sub-model extent

Duration of inundation (hours)

- 0 to 10
- 10 to 20
- 20 to 30
- 30 to 40
- 40 to 50
- 50 to 60
- 60 to 70
- 70 to 80
- 80 to 90
- 90 to 100
- > 100

6km

Coordinate System: GDA 1994 MGA Zone 56

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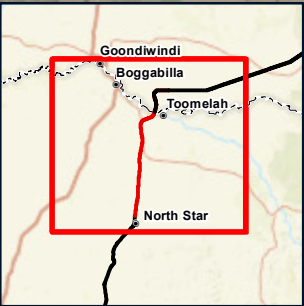
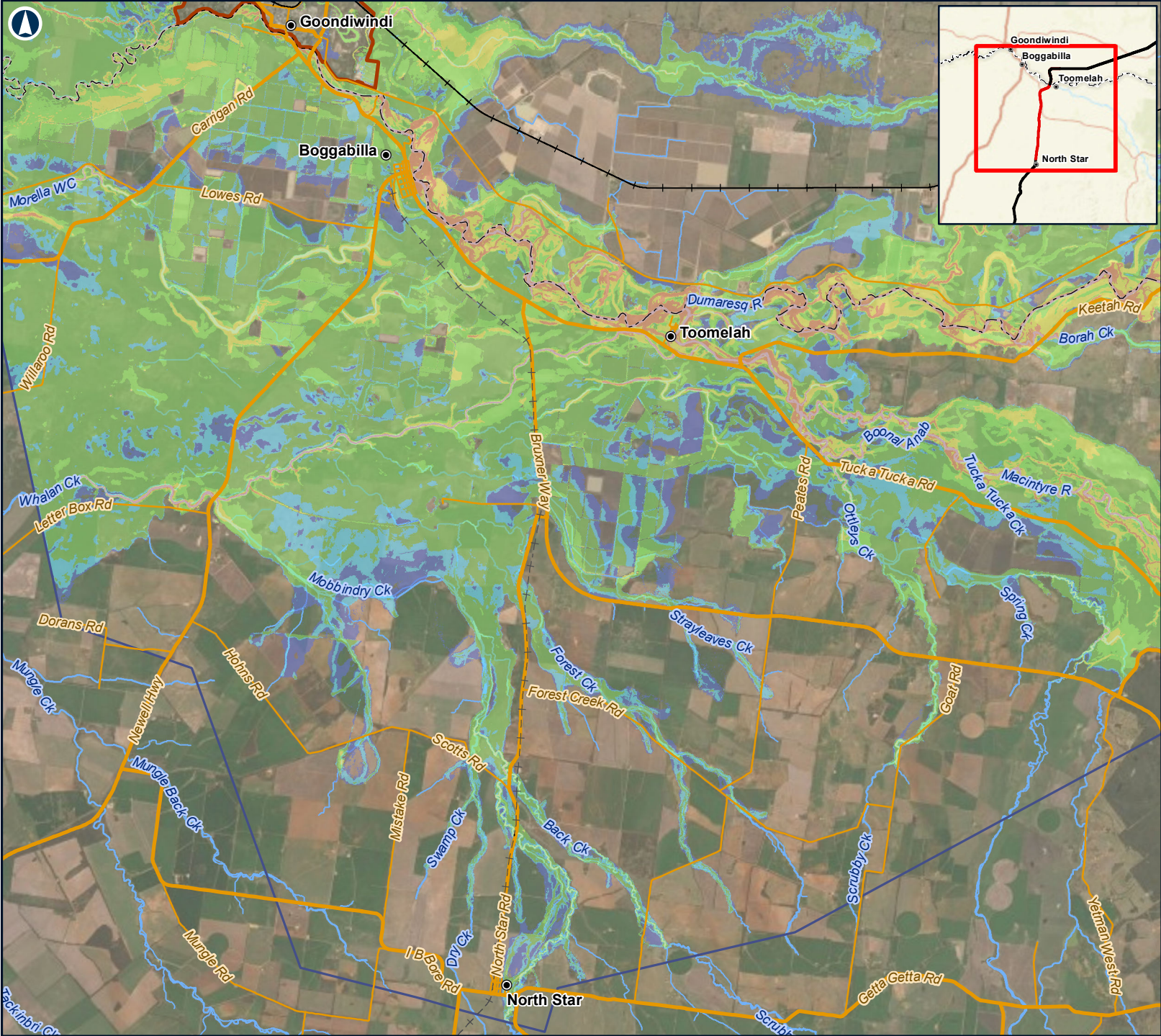
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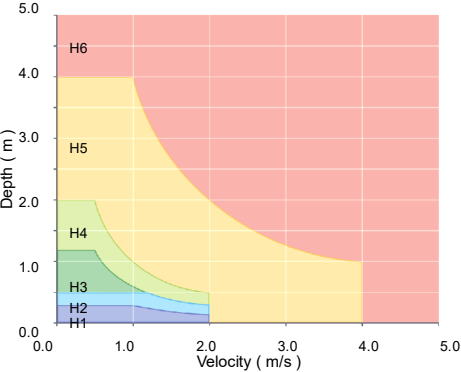
NORTH STAR TO NSW/QLD BORDER

Figure C4: Existing Case
Verified 2019 levees and validated 1976 flows
Hazard categories

LEGEND

- Localities
- +— Existing rail (operational)
- - - Existing rail (non-operational)
- - - NSW/QLD border
- Watercourses
- Goondiwindi levee
- ▭ Sub-model extent

Hazard Categories



Source: Australian Disaster Resilience Handbook Guideline 7-3 (AIDR 2017)

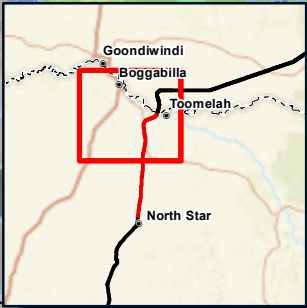
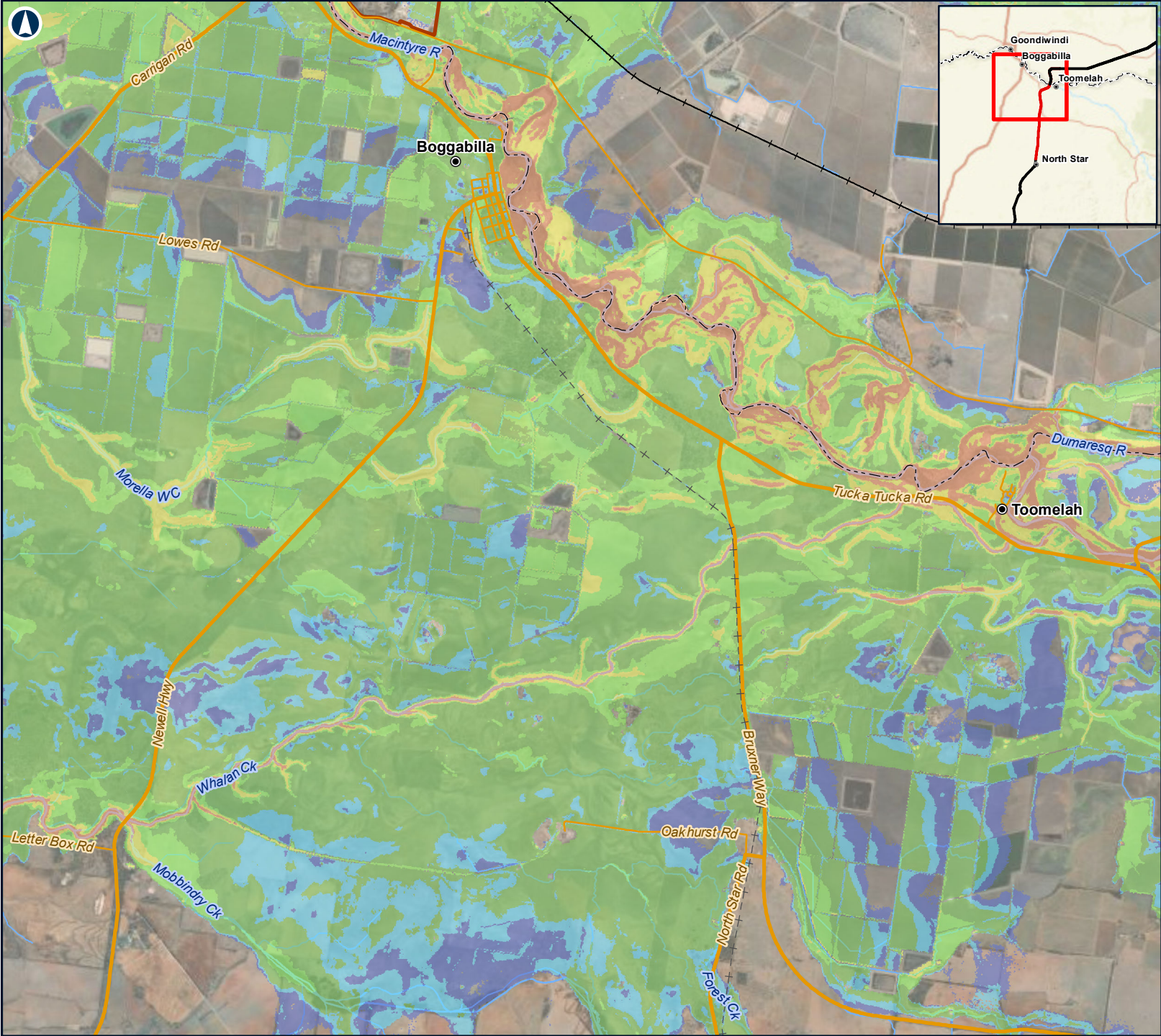
10km

Coordinate System: GDA 1994 MGA Zone 56

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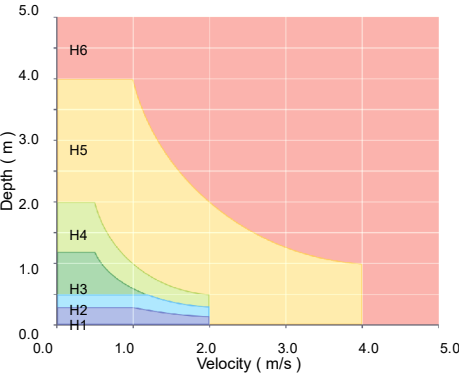
NORTH STAR TO NSW/QLD BORDER

Figure C4-A: Existing Case
Verified 2019 levees and validated 1976 flows
Hazard categories

LEGEND

- Localities
- +— Existing rail (operational)
- - - Existing rail (non-operational)
- - - NSW/QLD border
- Watercourses
- Goondiwindi levee
- Sub-model extent

Hazard Categories



Source: Australian Disaster Resilience Handbook Guideline 7-3 (AIDR 2017)

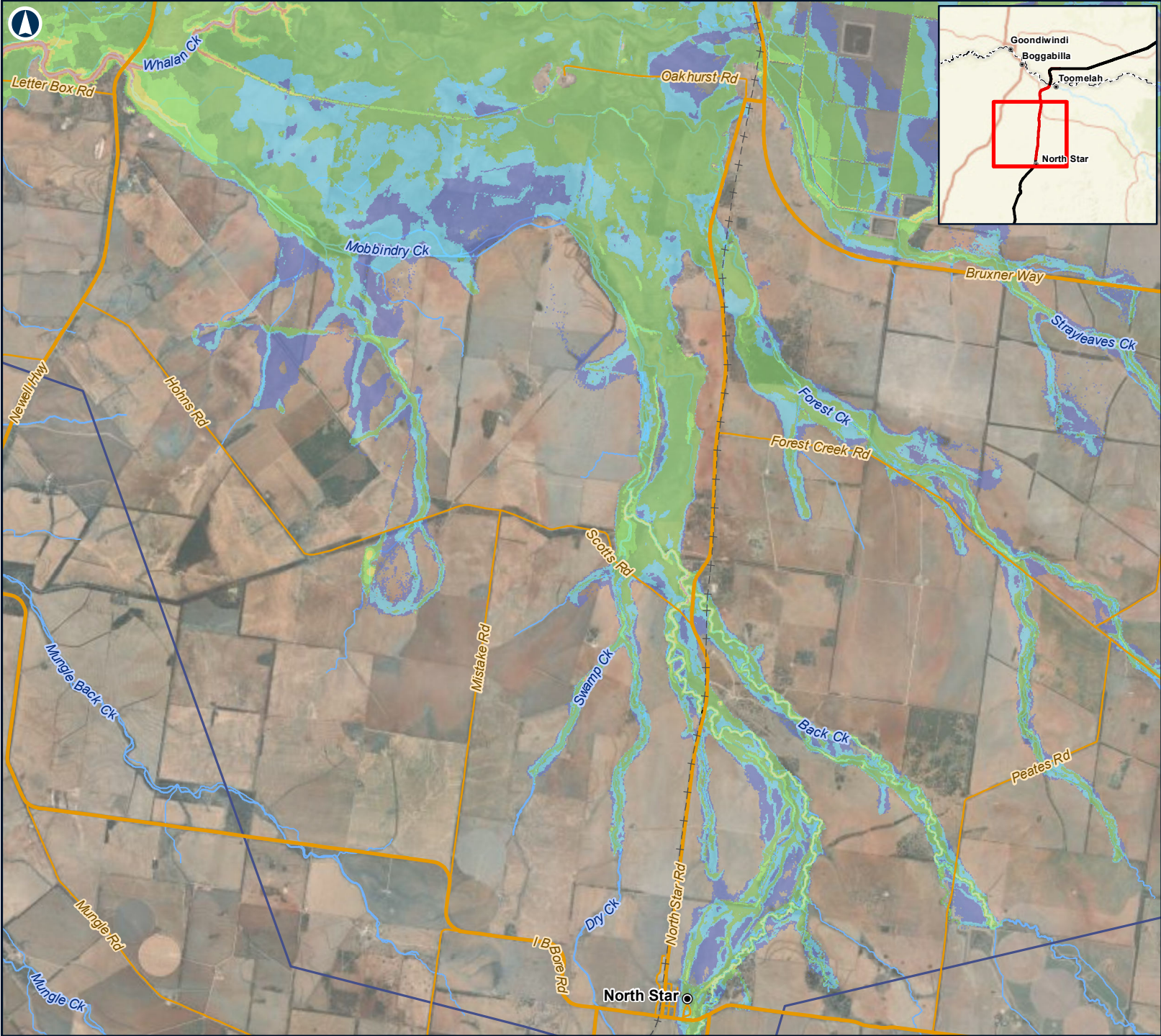
6km

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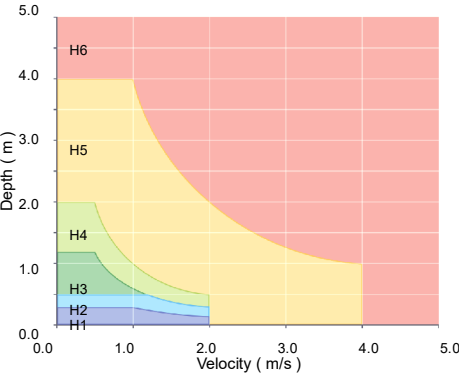
NORTH STAR TO NSW/QLD BORDER

Figure C4-B: Existing Case
Verified 2019 levees and validated 1976 flows
Hazard categories

LEGEND

- Localities
- +— Existing rail (operational)
- - - Existing rail (non-operational)
- - - NSW/QLD border
- Watercourses
- Sub-model extent

Hazard Categories



Source: Australian Disaster Resilience Handbook Guideline 7-3 (AIDR 2017)

6km

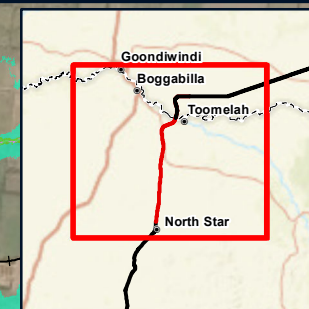
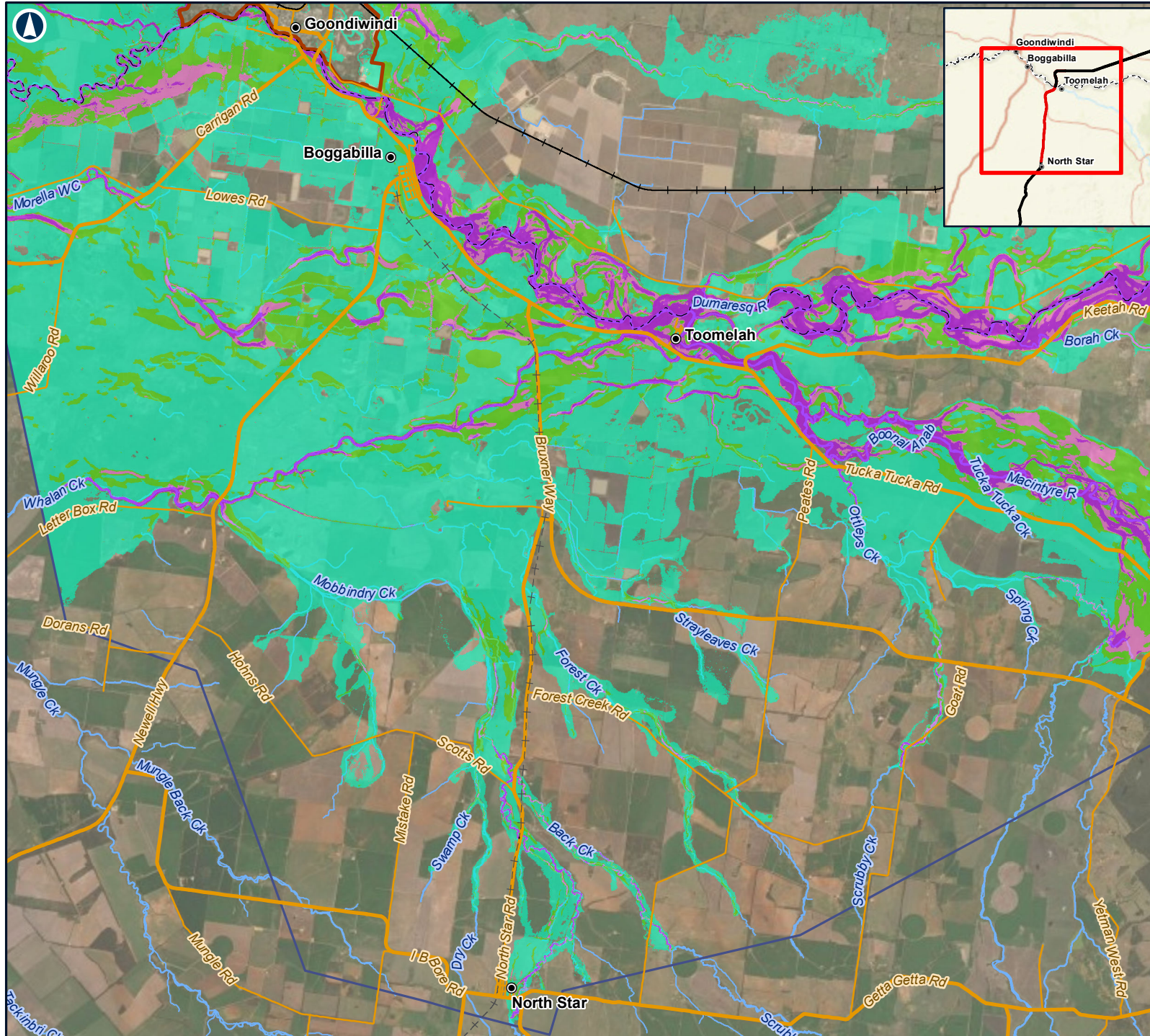
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NORTH STAR TO NSW/QLD BORDER

Figure C5: Existing Case
 Verified 2019 levees and validated 1976 flows
 Velocity x depth product

LEGEND

- Localities
- +— Existing rail (operational)
- - - Existing rail (non-operational)
- - - NSW/QLD border
- Watercourses
- Goondiwindi levee
- ▭ Sub-model extent

Velocity x Depth product (m²/s)

- 0 to 0.3
- 0.3 to 0.6
- 0.6 to 1
- 1 to 40

10km

Coordinate System: GDA 1994 MGA Zone 56

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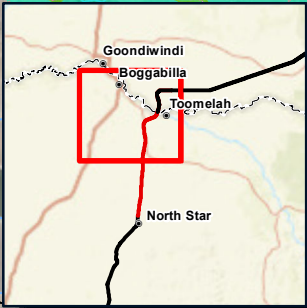
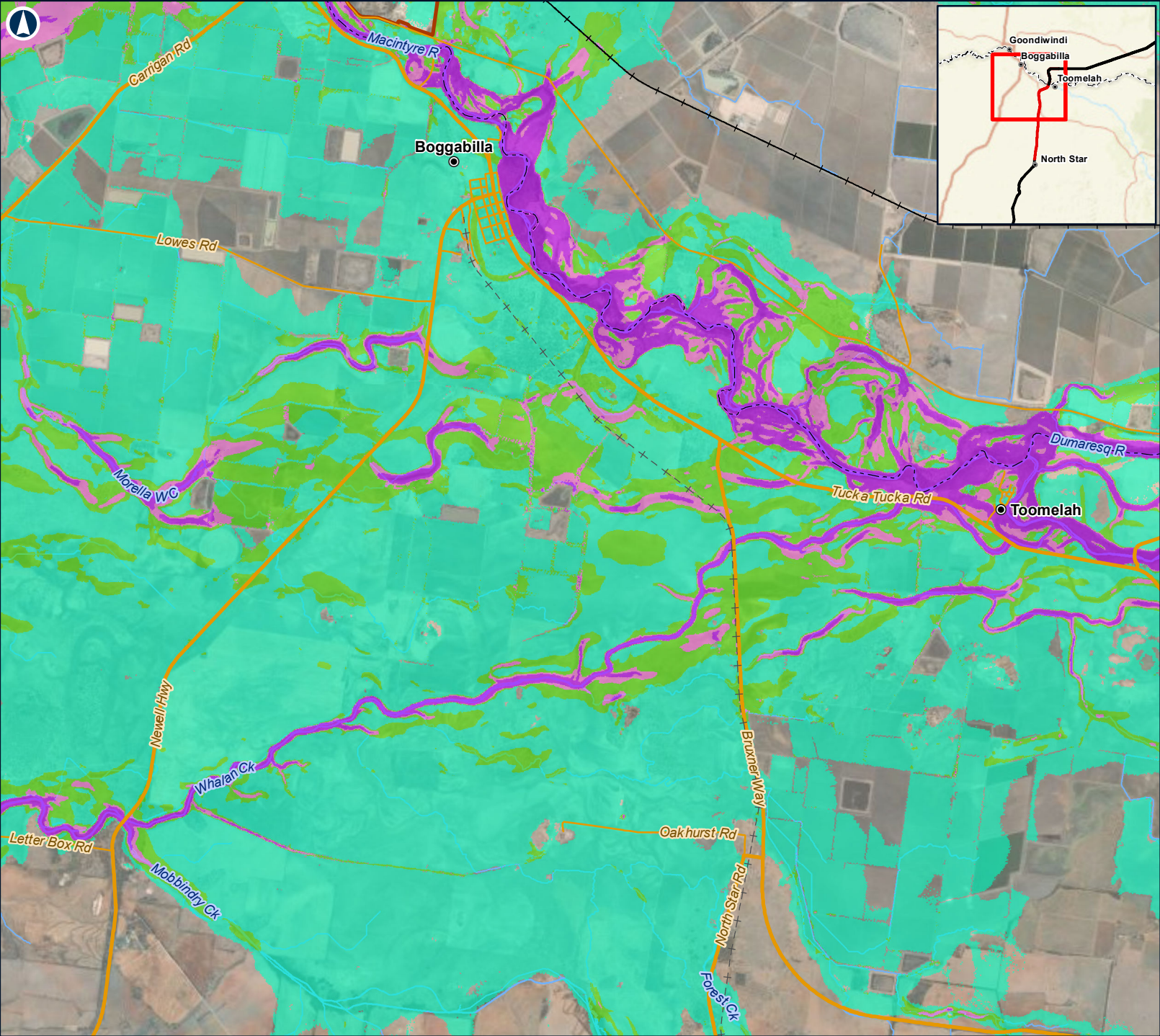
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NORTH STAR TO NSW/QLD BORDER

Figure C5-A: Existing Case
Verified 2019 levees and validated 1976 flows
Velocity x depth product

LEGEND

- Localities
- Existing rail (operational)
- Existing rail (non-operational)
- NSW/QLD border
- Watercourses
- Goondiwindi levee
- Sub-model extent

Velocity x Depth product (m²/s)

- 0 to 0.3
- 0.3 to 0.6
- 0.6 to 1
- 1 to 40

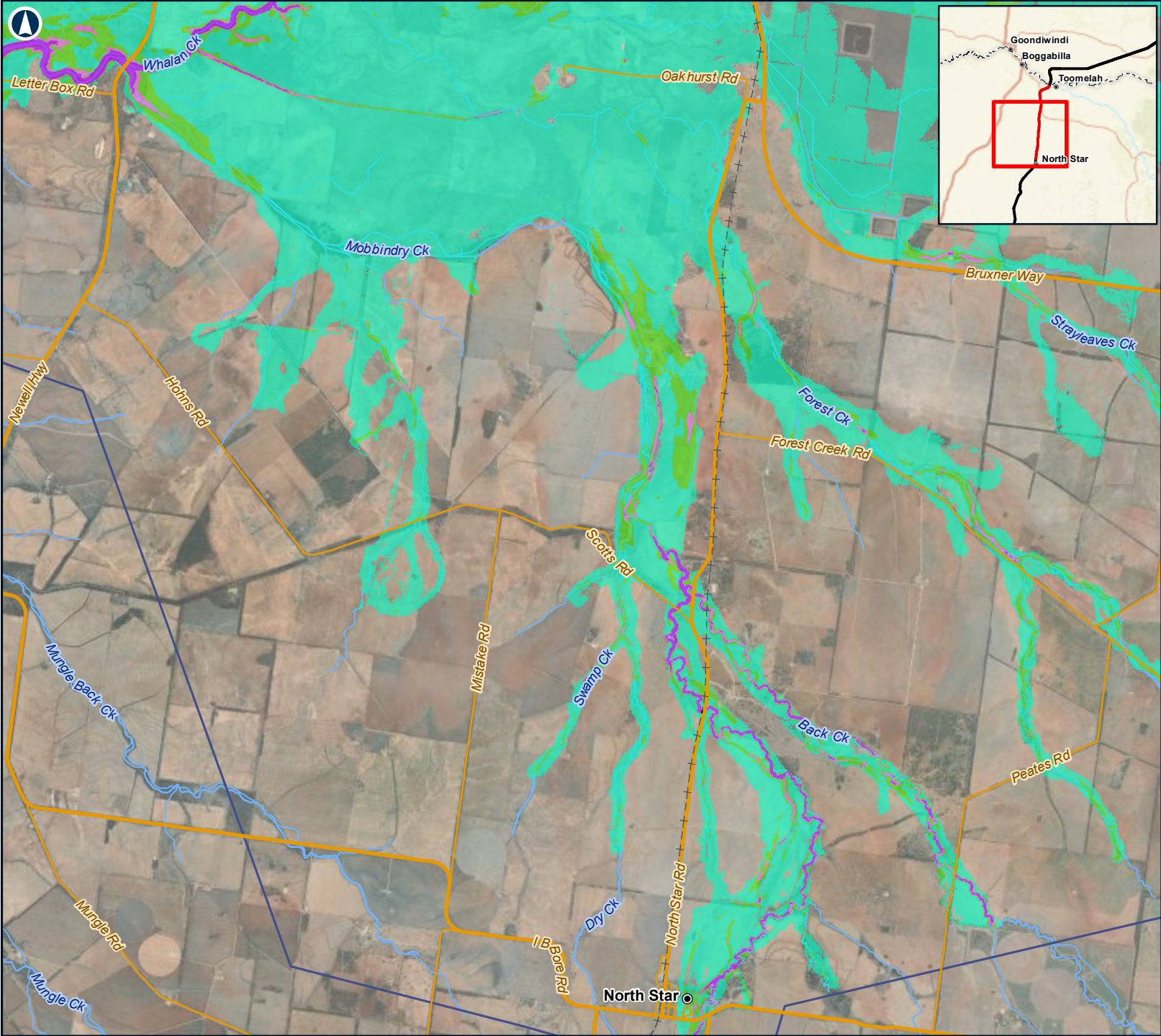
6km

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NORTH STAR TO NSW/QLD BORDER

Figure C5-B: Existing Case
Verified 2019 levees and validated 1976 flows
Velocity x depth product

LEGEND

- Localities
- +— Existing rail (operational)
- - - Existing rail (non-operational)
- - - NSW/QLD border
- Watercourses
- ▭ Sub-model extent

Velocity x Depth product (m²/s)

- 0 to 0.3
- 0.3 to 0.6
- 0.6 to 1
- 1 to 40

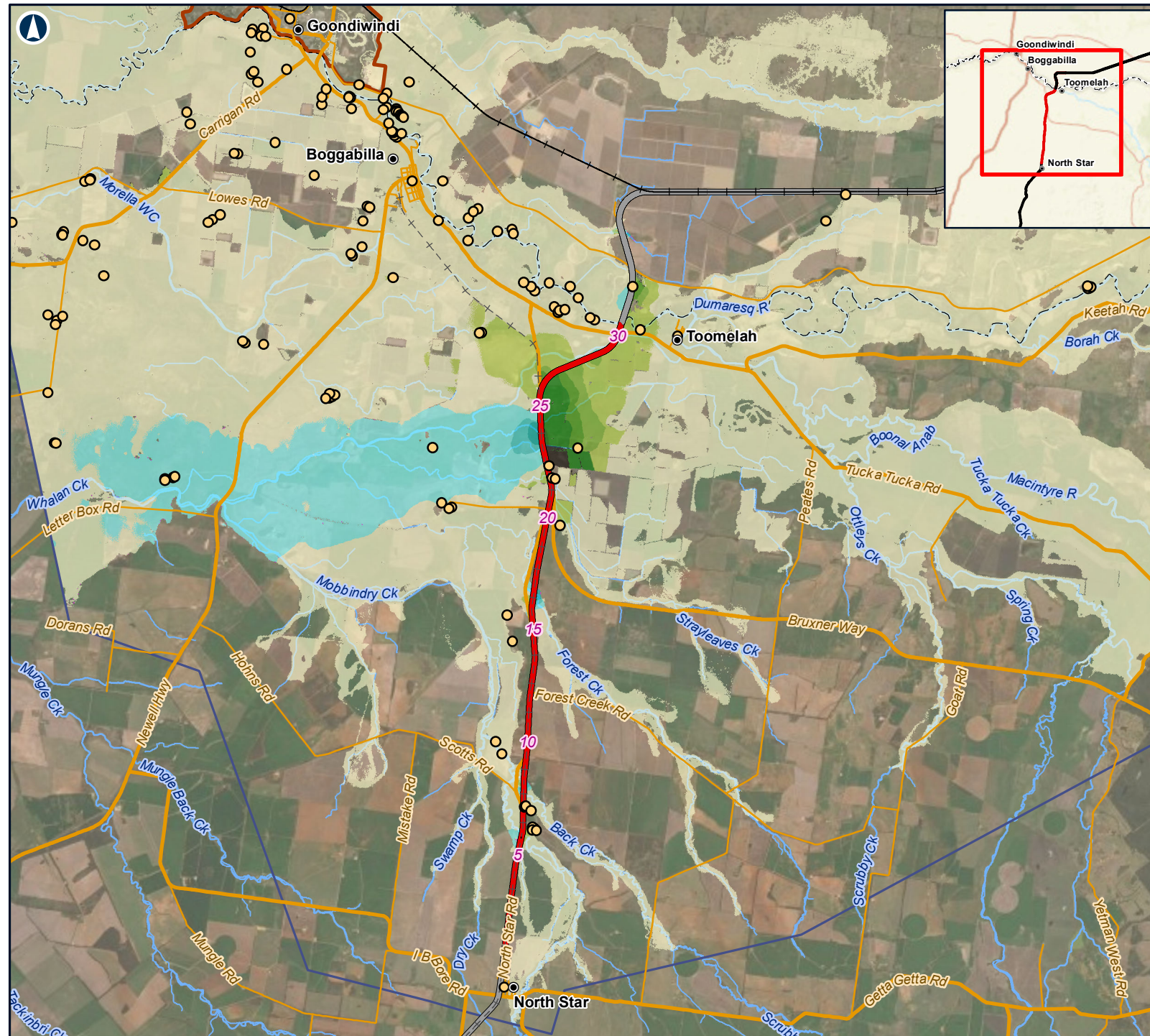
6km

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NORTH STAR TO NSW/QLD BORDER

Figure C6: Developed Case
Verified 2019 levees and validated 1976 flows
Change in peak water levels

LEGEND

- Flood sensitive receptor
 - Localities
 - 5 Chainage (km)
 - North Star to NSW/QLD border alignment
 - Adjoining alignments
 - Existing rail (operational)
 - - - Existing rail (non-operational)
 - - - NSW/QLD border
 - Watercourses
 - Goondiwindi levee
 - Sub-model extent
- Change in peak water levels (m)**
- < -0.5
 - 0.5 to -0.2
 - 0.2 to -0.1
 - 0.1 to -0.05
 - 0.05 to -0.01
 - 0.01 to 0.01
 - 0.01 to 0.05
 - 0.05 to 0.1
 - 0.1 to 0.2
 - 0.2 to 0.5
 - > 0.5
 - Was Wet Now Dry
 - Was Dry Now Wet

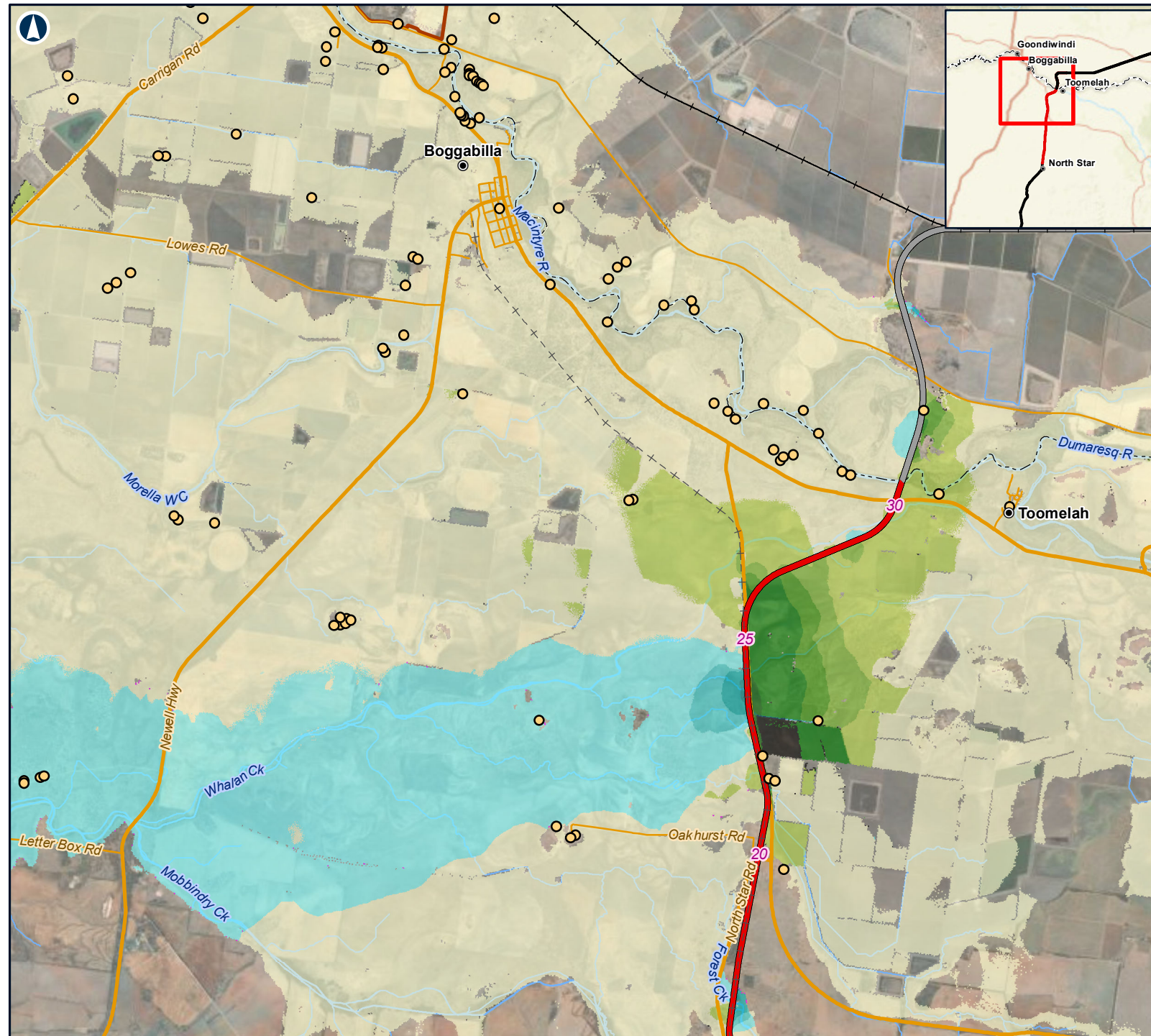
10km

Coordinate System: GDA 1994 MGA Zone 56

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NORTH STAR TO NSW/QLD BORDER

Figure C6-A: Developed Case
 Verified 2019 levees and validated 1976 flows
 Change in peak water levels

LEGEND

- Flood sensitive receptor
- Localities
- 5 Chainage (km)
- North Star to NSW/QLD border alignment
- Adjoining alignments
- + + Existing rail (operational)
- + - Existing rail (non-operational)
- NSW/QLD border
- Watercourses
- Goondiwindi levee
- Sub-model extent

Change in peak water levels (m)

- < -0.5
- -0.5 to -0.2
- -0.2 to -0.1
- -0.1 to -0.05
- -0.05 to -0.01
- -0.01 to 0.01
- 0.01 to 0.05
- 0.05 to 0.1
- 0.1 to 0.2
- 0.2 to 0.5
- > 0.5
- Was Wet Now Dry
- Was Dry Now Wet

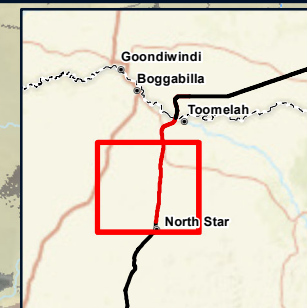
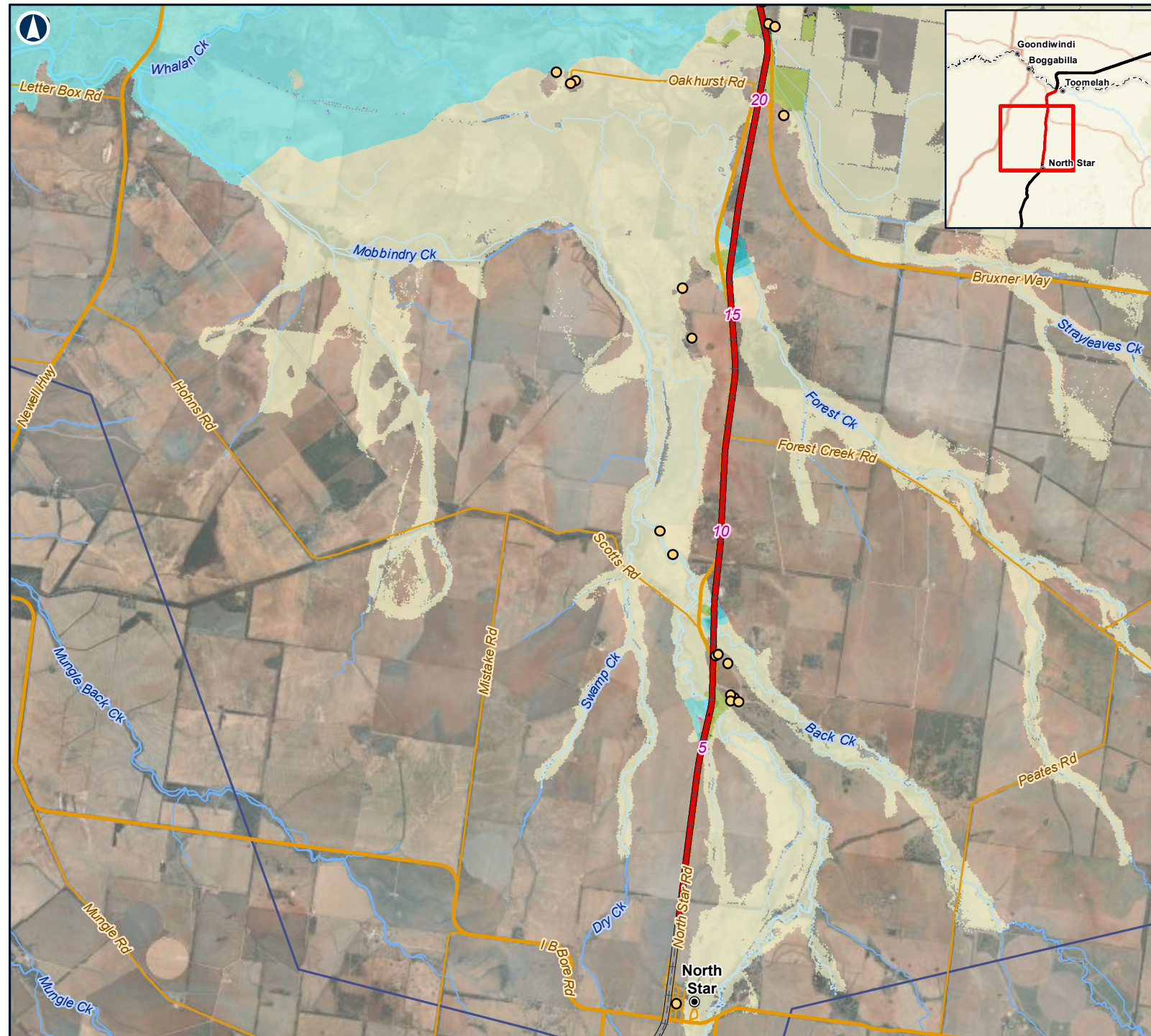
6km

Coordinate System: GDA 1994 MGA Zone 56

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Paper: A4
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NORTH STAR TO NSW/QLD BORDER

Figure C6-B: Developed Case
 Verified 2019 levees and validated 1976 flows
 Change in peak water levels

LEGEND

- Flood sensitive receptor
 - Localities
 - 5 Chainage (km)
 - North Star to NSW/QLD border alignment
 - Adjoining alignments
 - + + Existing rail (operational)
 - + - Existing rail (non-operational)
 - NSW/QLD border
 - Watercourses
 - Sub-model extent
- Change in peak water levels (m)**
- < -0.5
 - -0.5 to -0.2
 - -0.2 to -0.1
 - -0.1 to -0.05
 - -0.05 to -0.01
 - -0.01 to 0.01
 - 0.01 to 0.05
 - 0.05 to 0.1
 - 0.1 to 0.2
 - 0.2 to 0.5
 - > 0.5
 - Was Wet Now Dry
 - Was Dry Now Wet

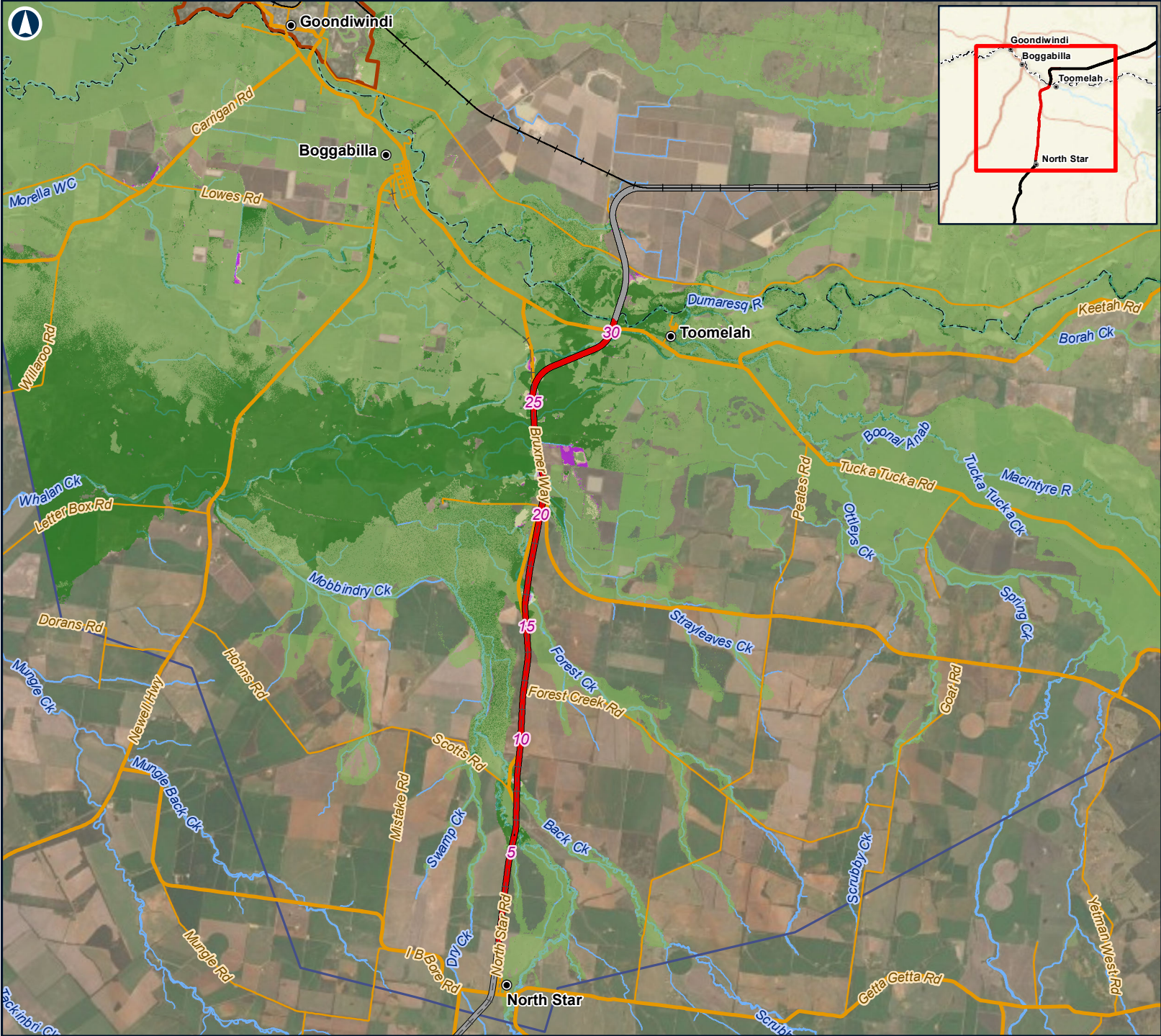
6km

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NORTH STAR TO NSW/QLD BORDER

Figure C7: Developed Case
Verified 2019 levees and validated 1976 flows
Percentage change in velocities

LEGEND

- Localities
 - 5 Chainage (km)
 - North Star to NSW/QLD border alignment
 - Adjoining alignments
 - Existing rail (operational)
 - - - Existing rail (non-operational)
 - - - NSW/QLD border
 - Watercourses
 - Goondiwindi levee
 - Sub-model extent
- Change in velocities (%)**
- < 0
 - 0 to 10
 - 10 to 20
 - 20 to 30
 - > 30

10km

Coordinate System: GDA 1994 MGA Zone 56

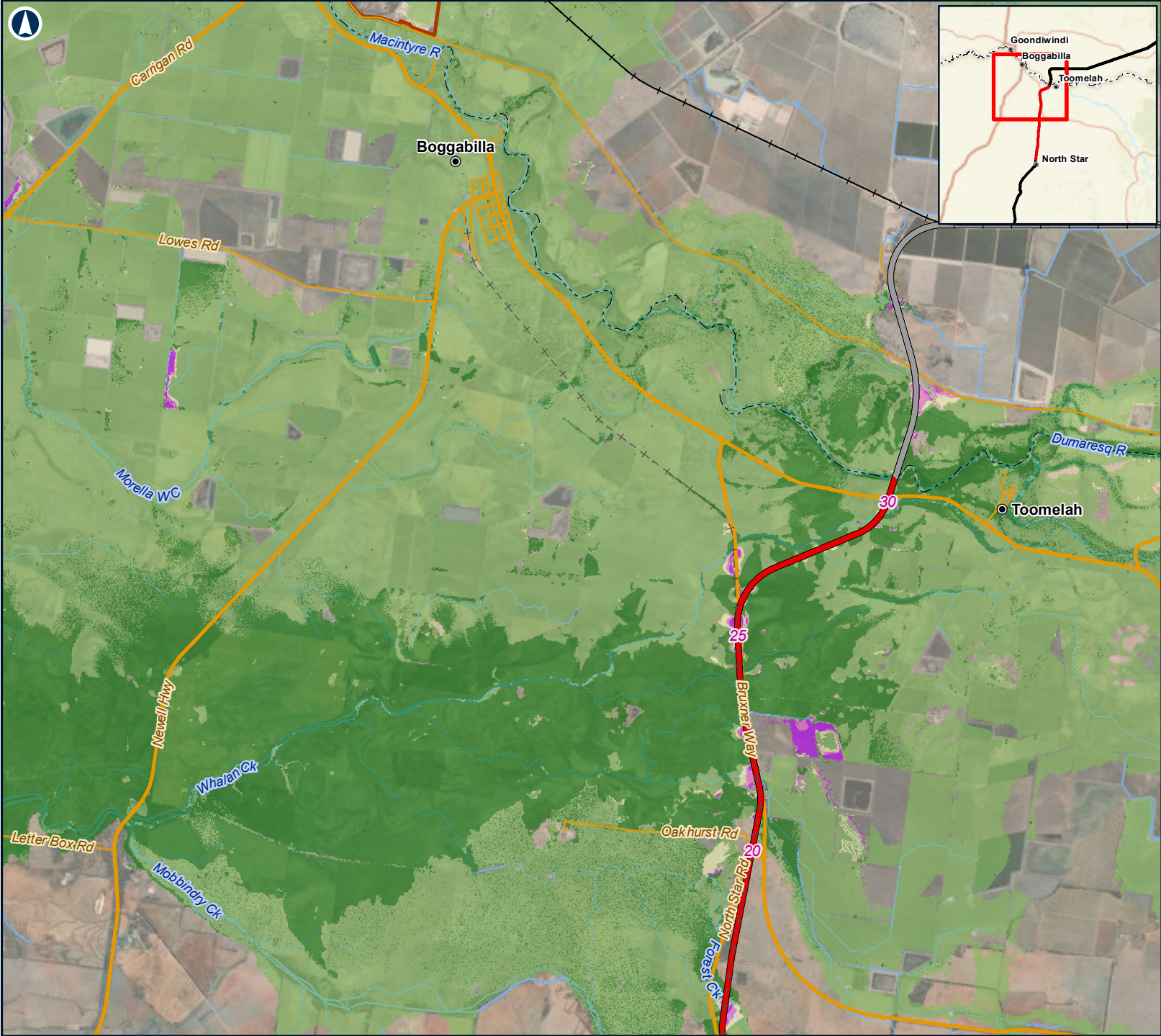
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Paper: A4

Author: FFJV GIS

Scale: 1:240,000



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NORTH STAR TO NSW/QLD BORDER

Figure C7-A: Developed Case
Verified 2019 levees and validated 1976 flows
Percentage change in velocities

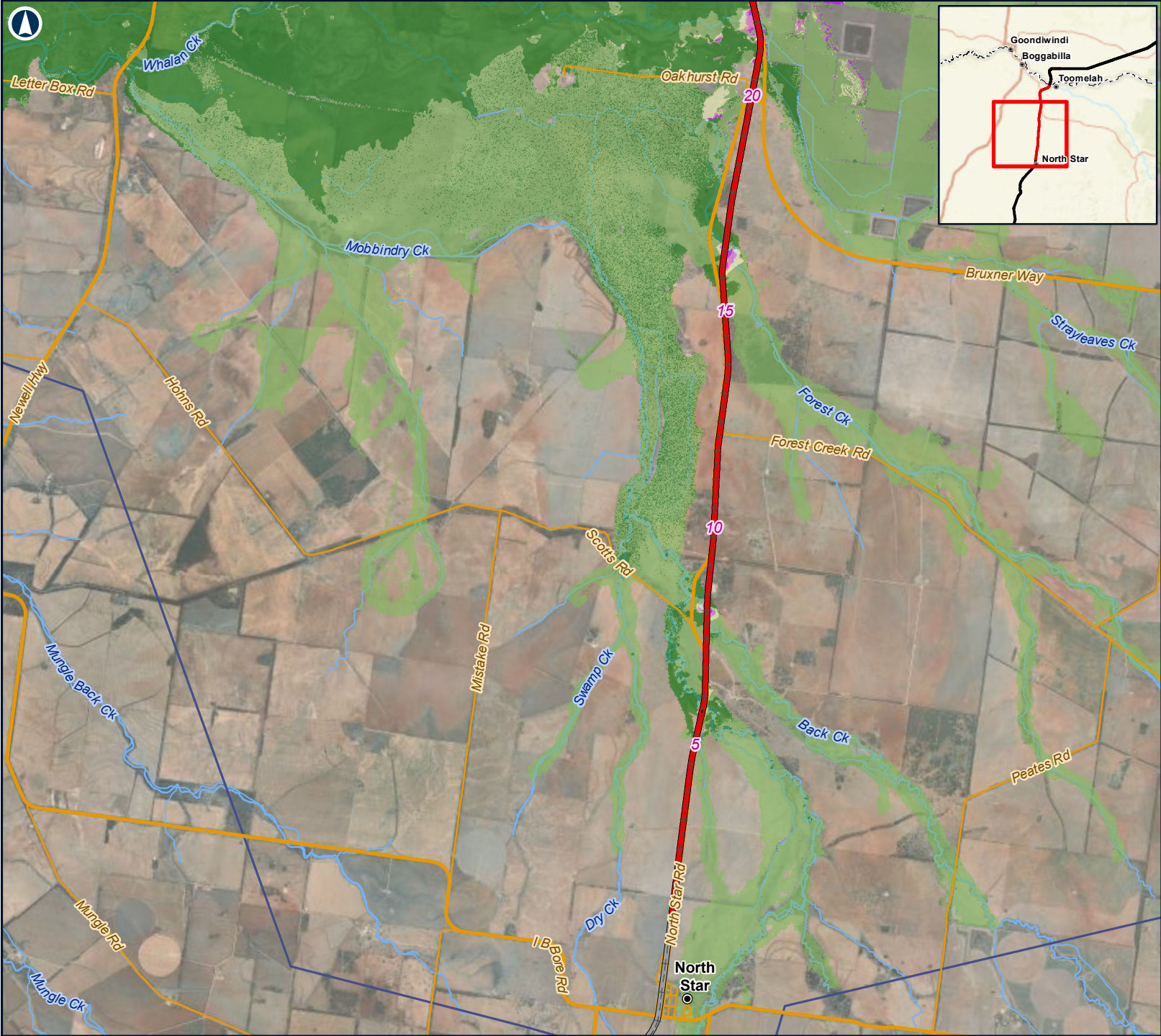
LEGEND

- Localities
- 5 Chainage (km)
- North Star to NSW/QLD border alignment
- Adjoining alignments
- Existing rail (operational)
- Existing rail (non-operational)
- NSW/QLD border
- Watercourses
- Goondiwindi levee
- Sub-model extent
- Change in velocities (%)**
 - < 0
 - 0 to 10
 - 10 to 20
 - 20 to 30
 - > 30

6km

Coordinate System: GDA 1994 MGA Zone 56
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NORTH STAR TO NSW/QLD BORDER

Figure C7-B: Developed Case
Verified 2019 levees and validated 1976 flows
Percentage change in velocities

LEGEND

- Localities
 - 5 Chainage (km)
 - North Star to NSW/QLD border alignment
 - Adjoining alignments
 - Existing rail (operational)
 - - - Existing rail (non-operational)
 - NSW/QLD border
 - Watercourses
 - Sub-model extent
- Change in velocities (%)**
- < 0
 - 0 to 10
 - 10 to 20
 - 20 to 30
 - > 30

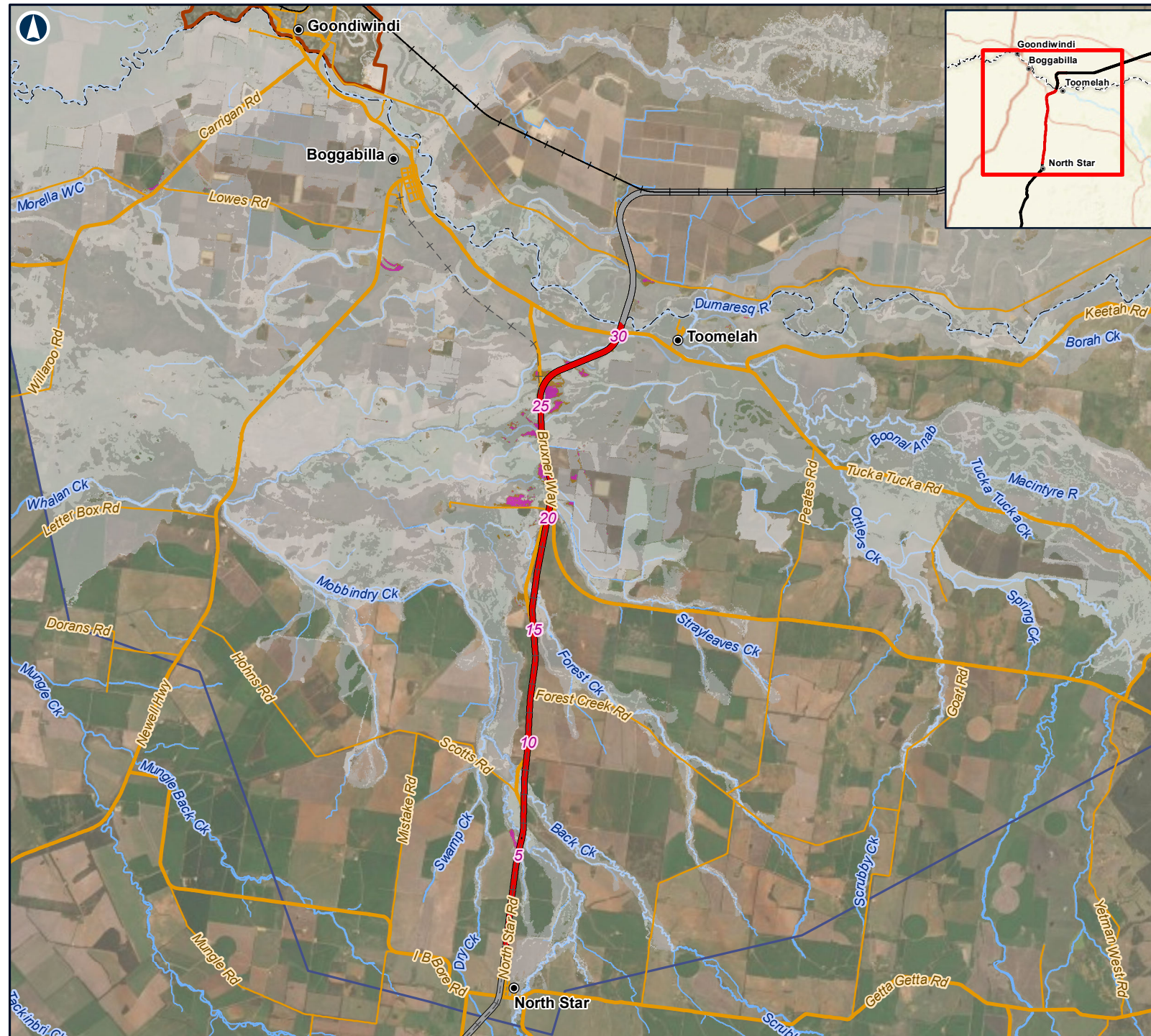
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NORTH STAR TO NSW/QLD BORDER

Figure C8: Developed Case
 Verified 2019 levees and validated 1976 flows
 Percentage change in duration of inundation

LEGEND

- Localities
 - 5 Chainage (km)
 - North Star to NSW/QLD border alignment
 - Adjoining alignments
 - Existing rail (operational)
 - - - Existing rail (non-operational)
 - - - NSW/QLD border
 - Watercourses
 - Goondiwindi levee
 - Sub-model extent
- Change in duration of inundation (%)**
- < 0
 - 0 to 10
 - 10 to 20
 - > 20

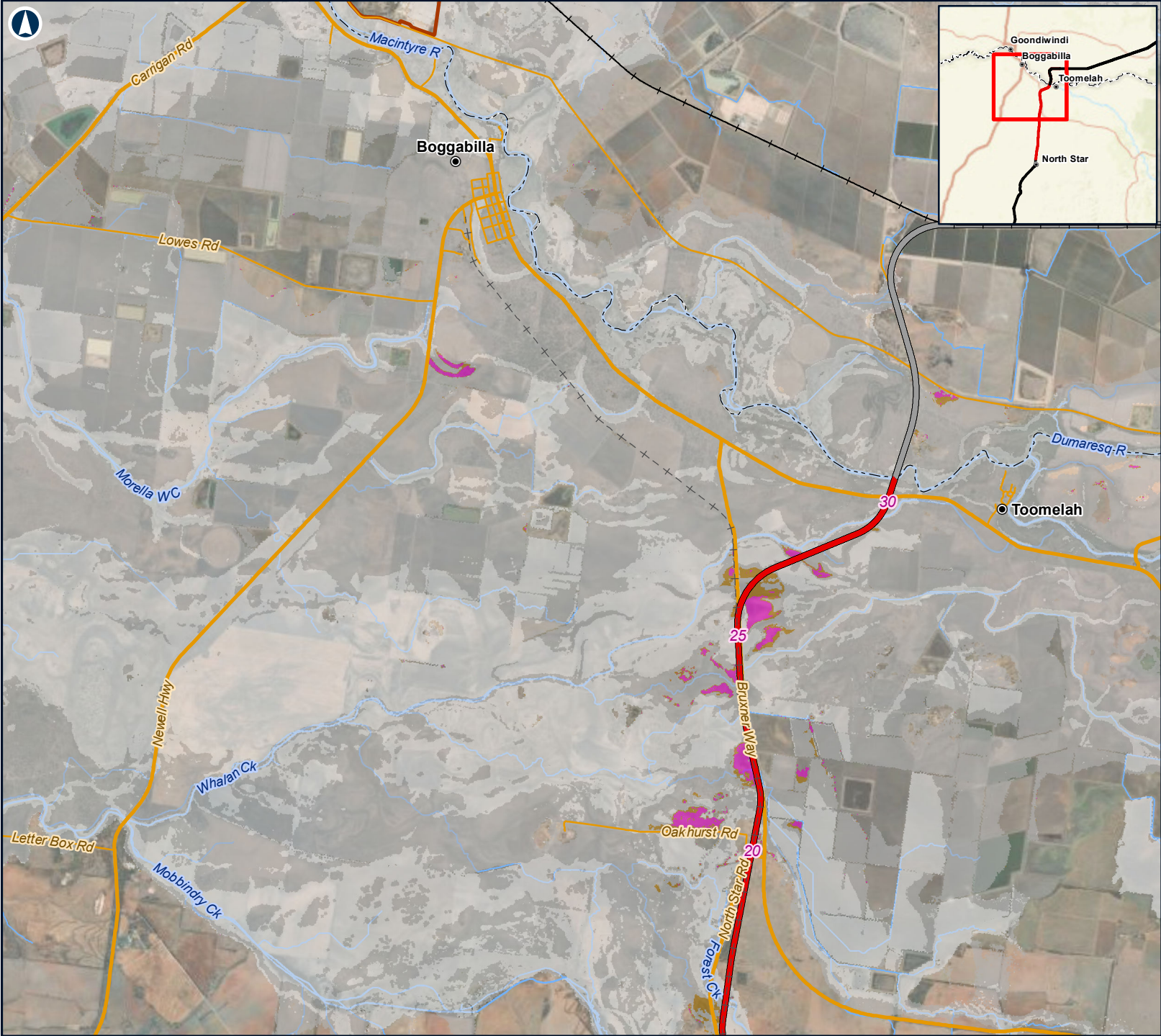
10km

Coordinate System: GDA 1994 MGA Zone 56

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NORTH STAR TO NSW/QLD BORDER

Figure C8-A: Developed Case
Verified 2019 levees and validated 1976 flows
Percentage change in duration of inundation

LEGEND

- Localities
- 5 Chainage (km)
- North Star to NSW/QLD border alignment
- Adjoining alignments
- Existing rail (operational)
- - - Existing rail (non-operational)
- - - NSW/QLD border
- Watercourses
- Goondiwindi levee
- Sub-model extent
- Change in duration of inundation (%)**
- < 0
- 0 to 10
- 10 to 20
- > 20

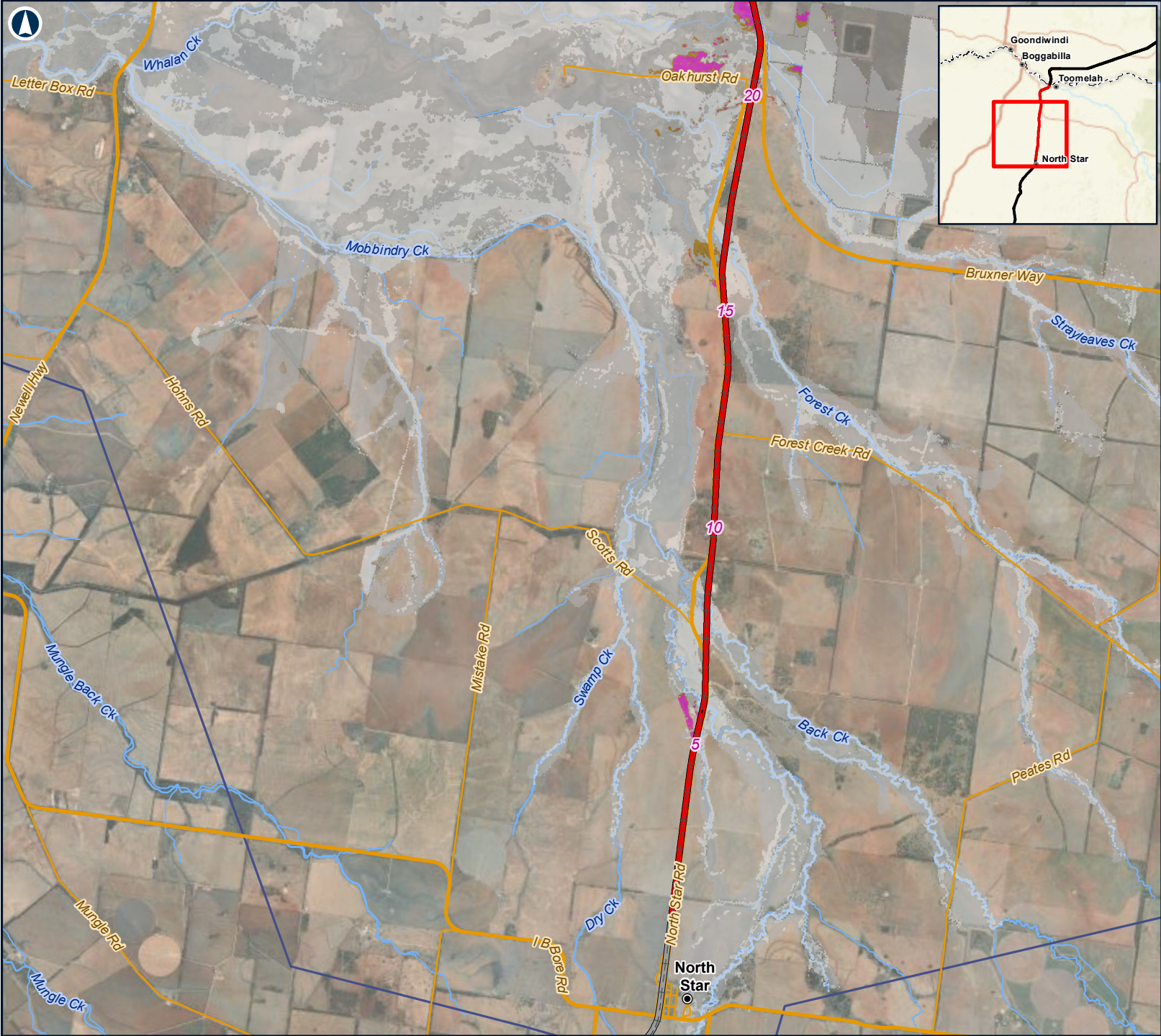
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Coordinate System: GDA 1994 MGA Zone 56

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NORTH STAR TO NSW/QLD BORDER

Figure C8-B: Developed Case
Verified 2019 levees and validated 1976 flows
Percentage change in duration of inundation

LEGEND

- Localities
- 5 Chainage (km)
- North Star to NSW/QLD border alignment
- Adjoining alignments
- Existing rail (operational)
- - - Existing rail (non-operational)
- - - NSW/QLD border
- Watercourses
- Sub-model extent

Change in duration of inundation (%)

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

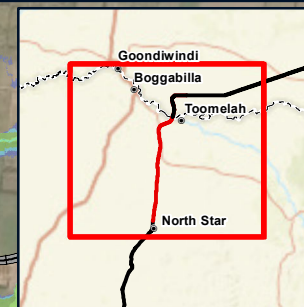
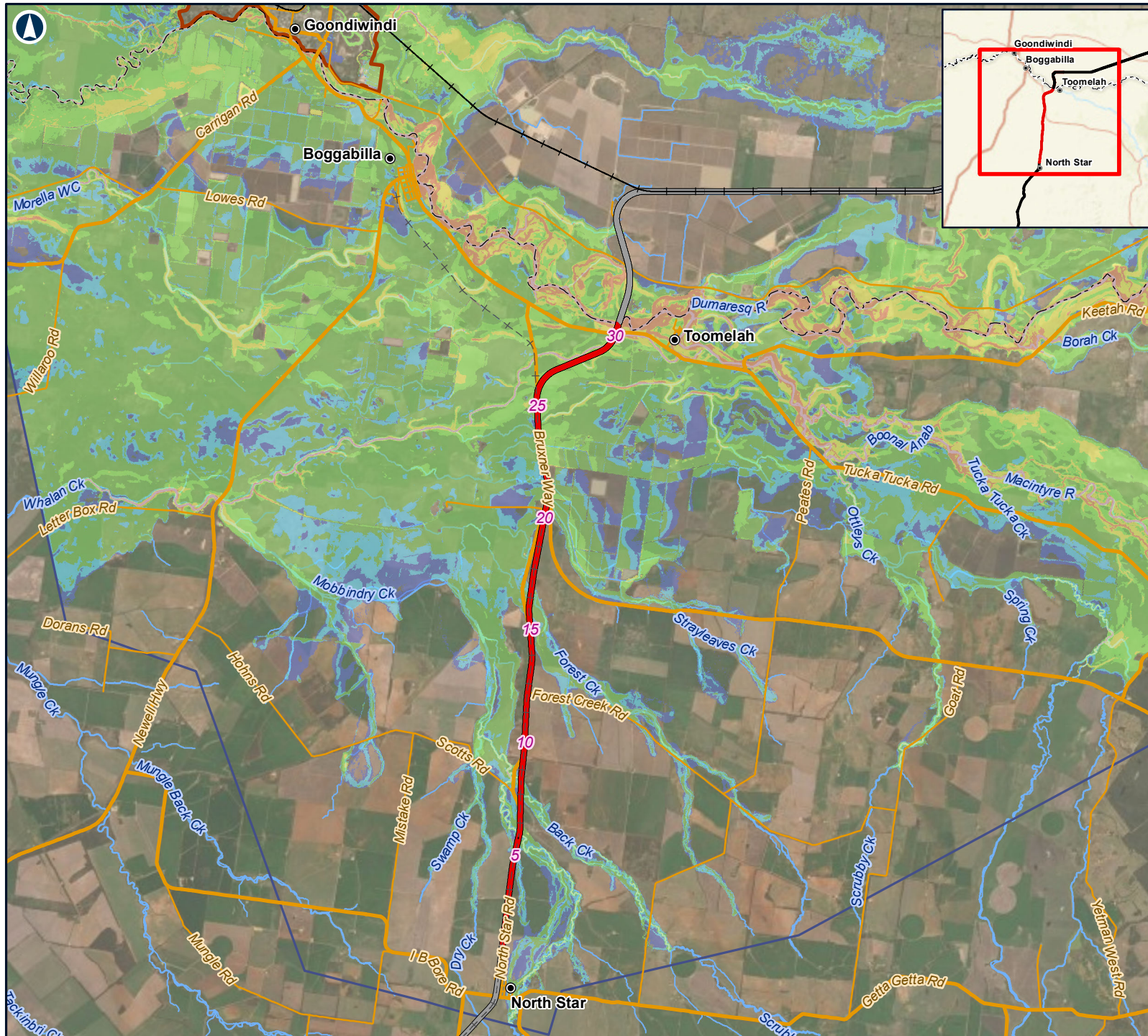
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Coordinate System: GDA 1994 MGA Zone 56

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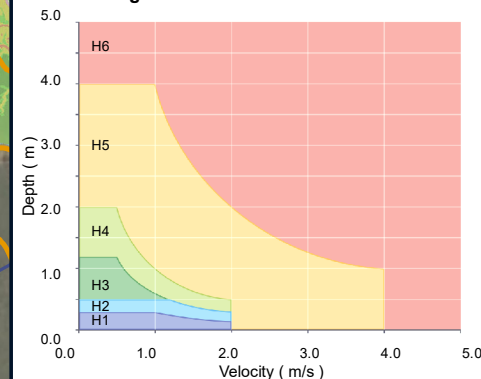
NORTH STAR TO NSW/QLD BORDER

Figure C9: Developed Case
 Verified 2019 levees and validated 1976 flows
 Hazard categories

LEGEND

- Localities
- 5 Chainage (km)
- North Star to NSW/QLD border alignment
- Adjoining alignments
- Existing rail (operational)
- Existing rail (non-operational)
- NSW/QLD border
- Watercourses
- Goondiwindi levee
- Sub-model extent

Hazard Categories



Source: Australian Disaster Resilience Handbook Guideline 7-3 (AIDR 2017)

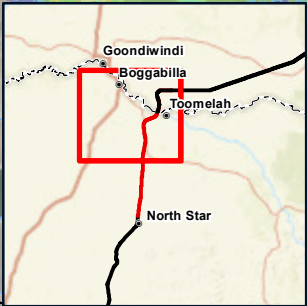
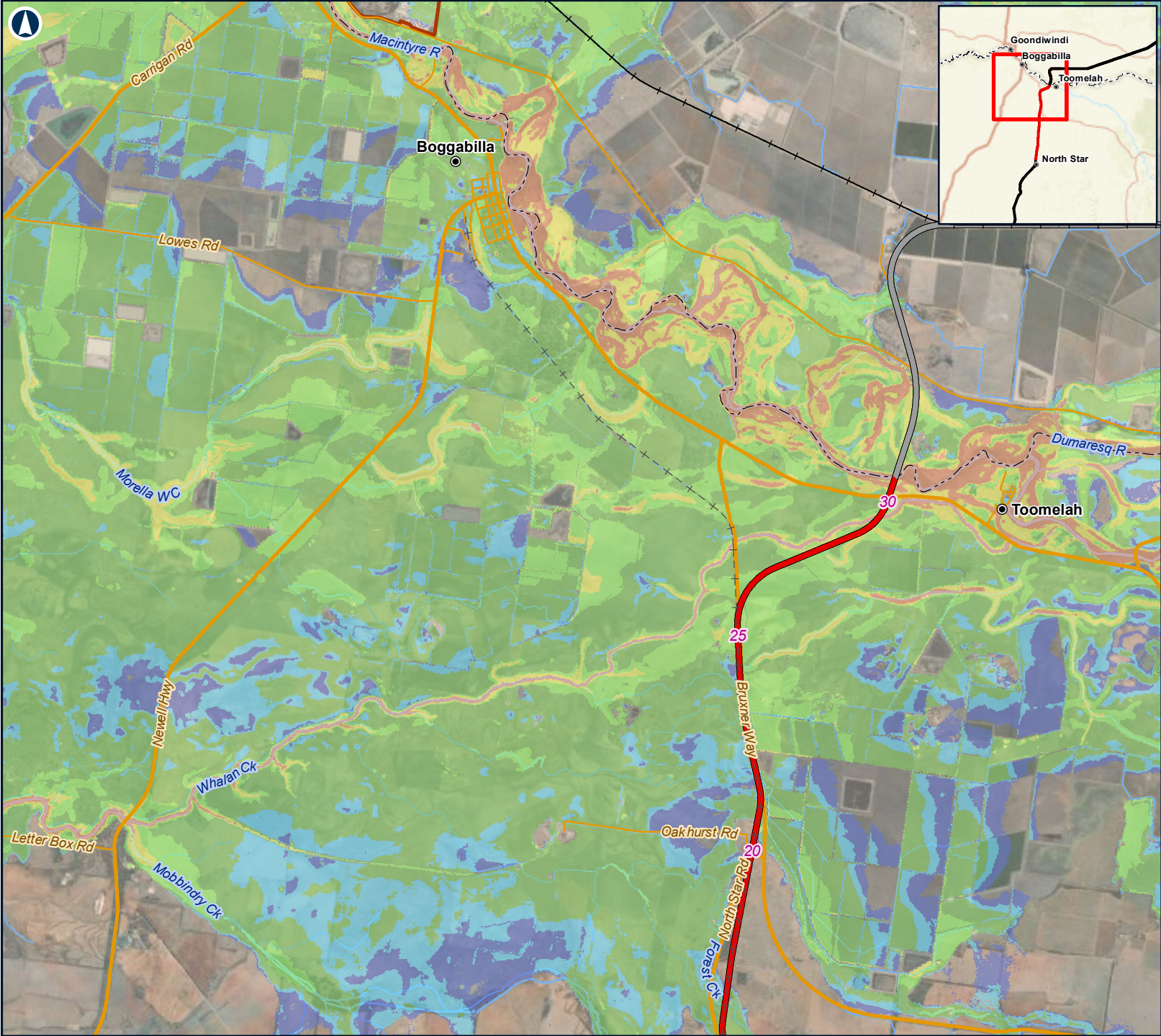
10km

Coordinate System: GDA 1994 MGA Zone 56

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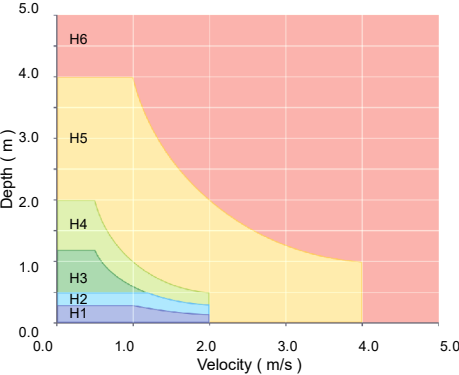
NORTH STAR TO NSW/QLD BORDER

Figure C9-A: Developed Case
Verified 2019 levees and validated 1976 flows
Hazard categories

LEGEND

- Localities
- 5 Chainage (km)
- North Star to NSW/QLD border alignment
- Adjoining alignments
- Existing rail (operational)
- Existing rail (non-operational)
- NSW/QLD border
- Watercourses
- Goondiwindi levee
- Sub-model extent

Hazard Categories



Source: Australian Disaster Resilience Handbook Guideline 7-3 (AIDR 2017)

6km

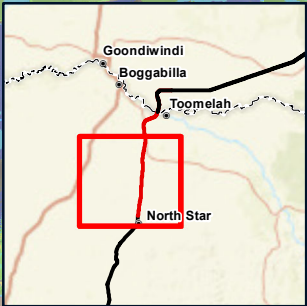
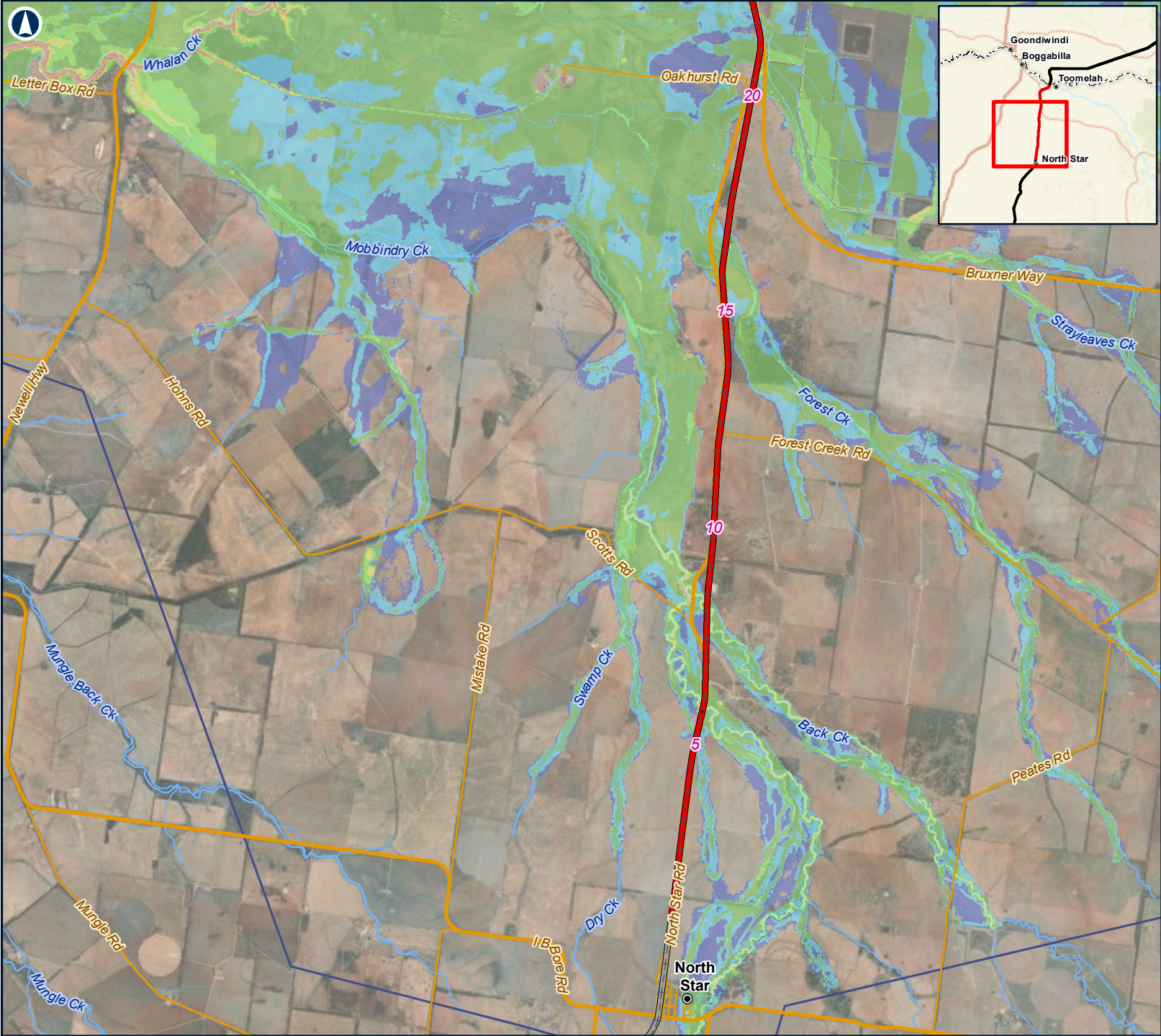
Coordinate System: GDA 1994 MGA Zone 56

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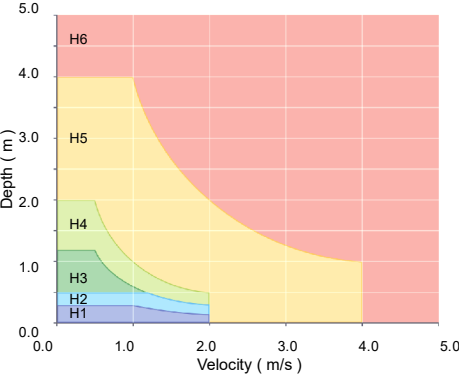
NORTH STAR TO NSW/QLD BORDER

Figure C9-B: Developed Case
Verified 2019 levees and validated 1976 flows
Hazard categories

LEGEND

- Localities
- 5 Chainage (km)
- North Star to NSW/QLD border alignment
- Adjoining alignments
- Existing rail (operational)
- Existing rail (non-operational)
- NSW/QLD border
- Watercourses
- Sub-model extent

Hazard Categories



Source: Australian Disaster Resilience Handbook Guideline 7-3 (AIDR 2017)

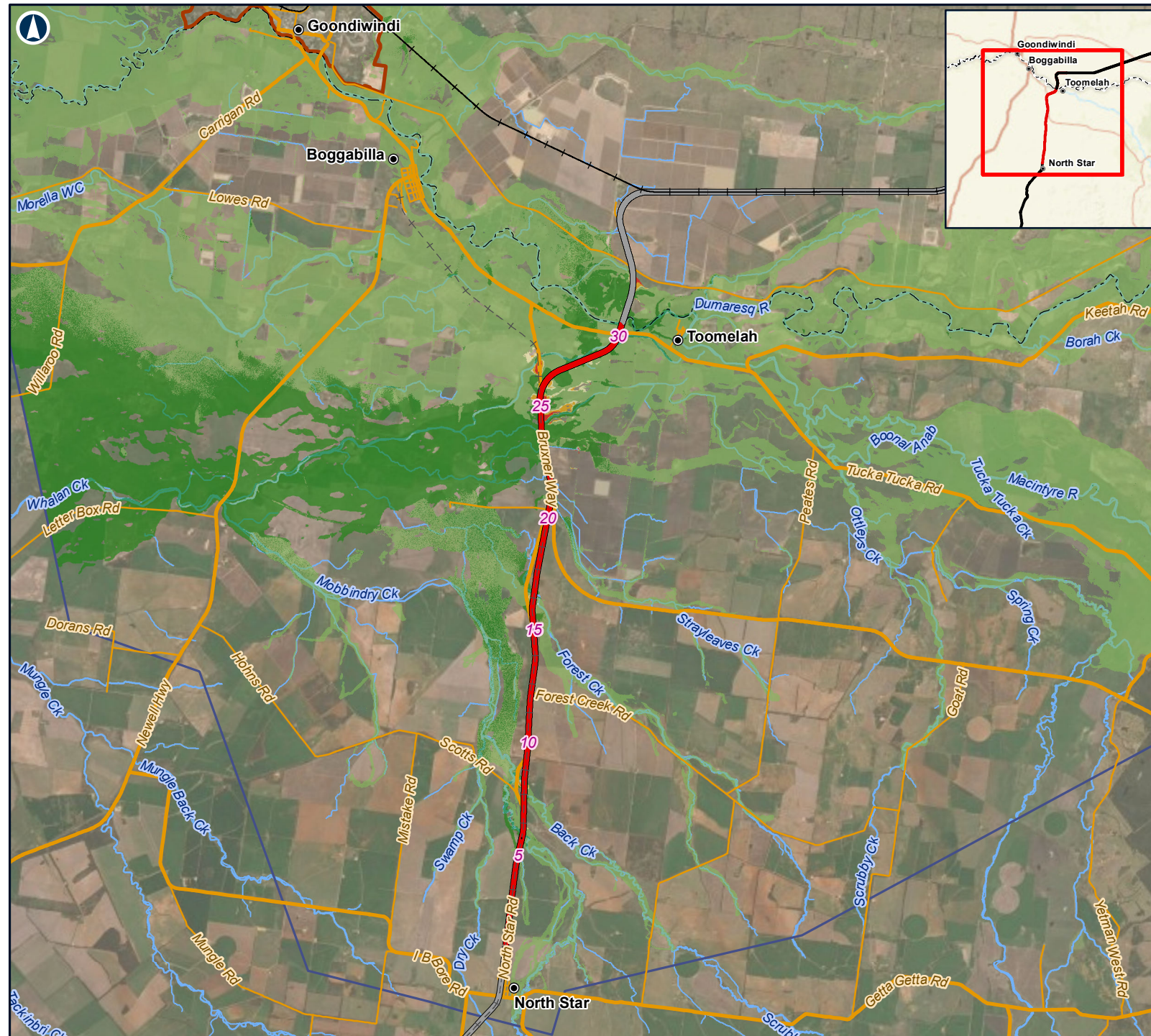
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NORTH STAR TO NSW/QLD BORDER

Figure C10: Developed Case
Verified 2019 levees and validated 1976 flows
Percentage change in velocity x depth product

LEGEND

- Localities
- 5 Chainage (km)
- North Star to NSW/QLD border alignment
- Adjoining alignments
- Existing rail (operational)
- - - Existing rail (non-operational)
- - - NSW/QLD border
- Watercourses
- Goondiwindi levee
- Sub-model extent
- Change in velocity x depth product (%)**

- < 0
- 0 to 10
- 10 to 20
- 20 to 30
- > 30

10km

Coordinate System: GDA 1994 MGA Zone 56

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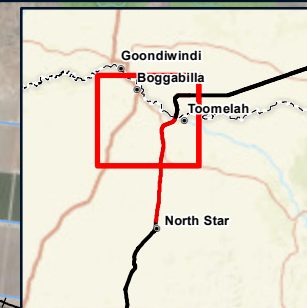
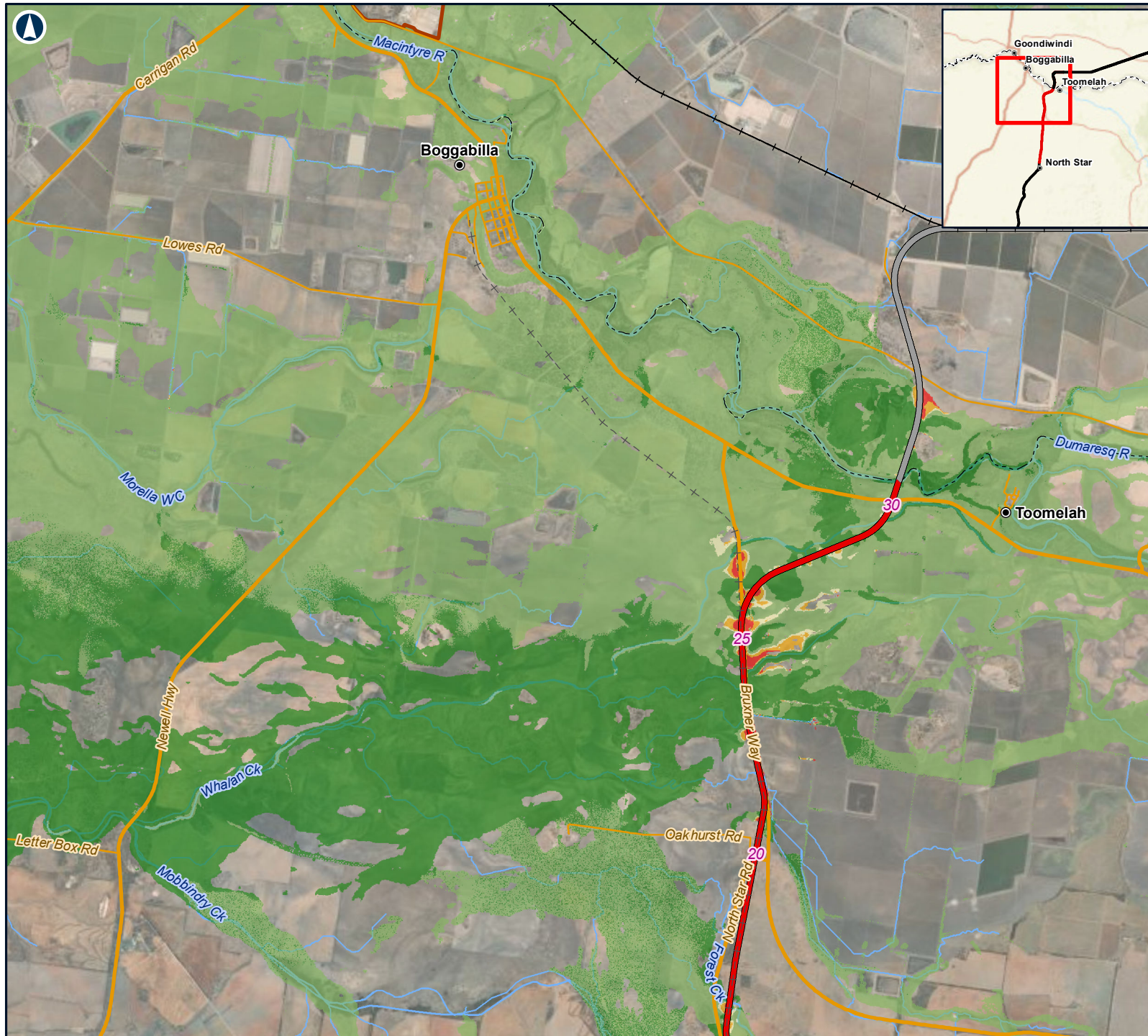
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NORTH STAR TO NSW/QLD BORDER

Figure C10-A: Developed Case
 Verified 2019 levees and validated 1976 flows
 Percentage change in velocity x depth product

LEGEND

- Localities
 - 5 Chainage (km)
 - North Star to NSW/QLD border alignment
 - Adjoining alignments
 - + + Existing rail (operational)
 - - Existing rail (non-operational)
 - NSW/QLD border
 - Watercourses
 - Goondiwindi levee
 - Sub-model extent
- Change in velocity x depth product (%)**
- < 0
 - 0 to 10
 - 10 to 20
 - 20 to 30
 - > 30

6km

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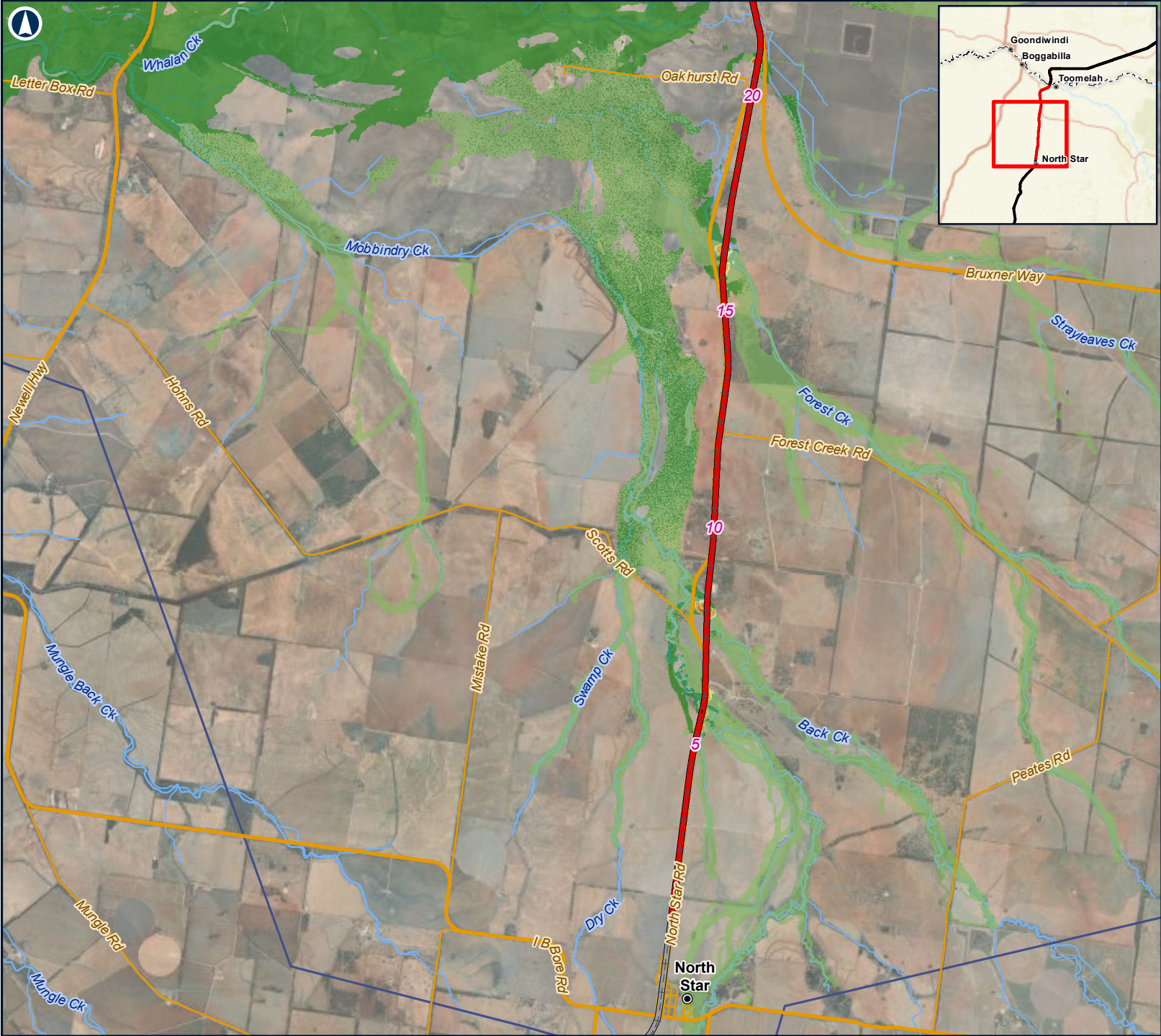
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NORTH STAR TO NSW/QLD BORDER

Figure C10-B: Developed Case
Verified 2019 levees and validated 1976 flows
Percentage change in velocity x depth product

LEGEND

- Localities
 - 5 Chainage (km)
 - North Star to NSW/QLD border alignment
 - Adjoining alignments
 - Existing rail (operational)
 - - - Existing rail (non-operational)
 - - - NSW/QLD border
 - Watercourses
 - Sub-model extent
- Change in velocity x depth product (%)**
- < 0
 - 0 to 10
 - 10 to 20
 - 20 to 30
 - > 30

6km

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