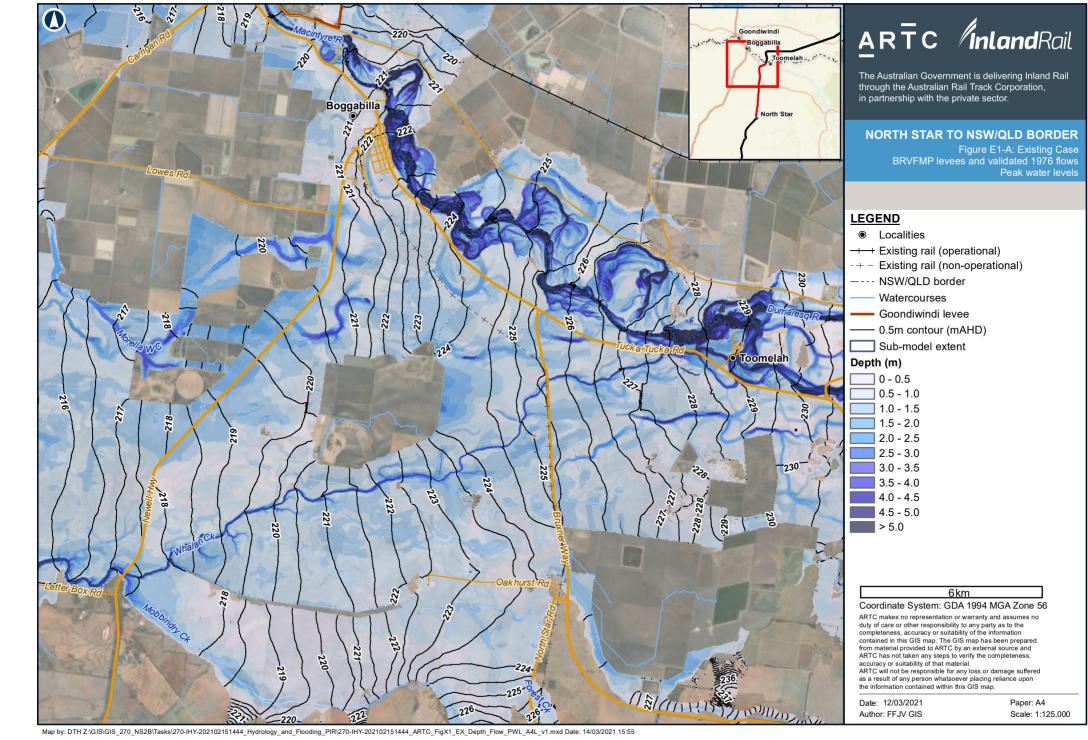
Appendix E Figures – BRVFMP levees and validated 1976 flows



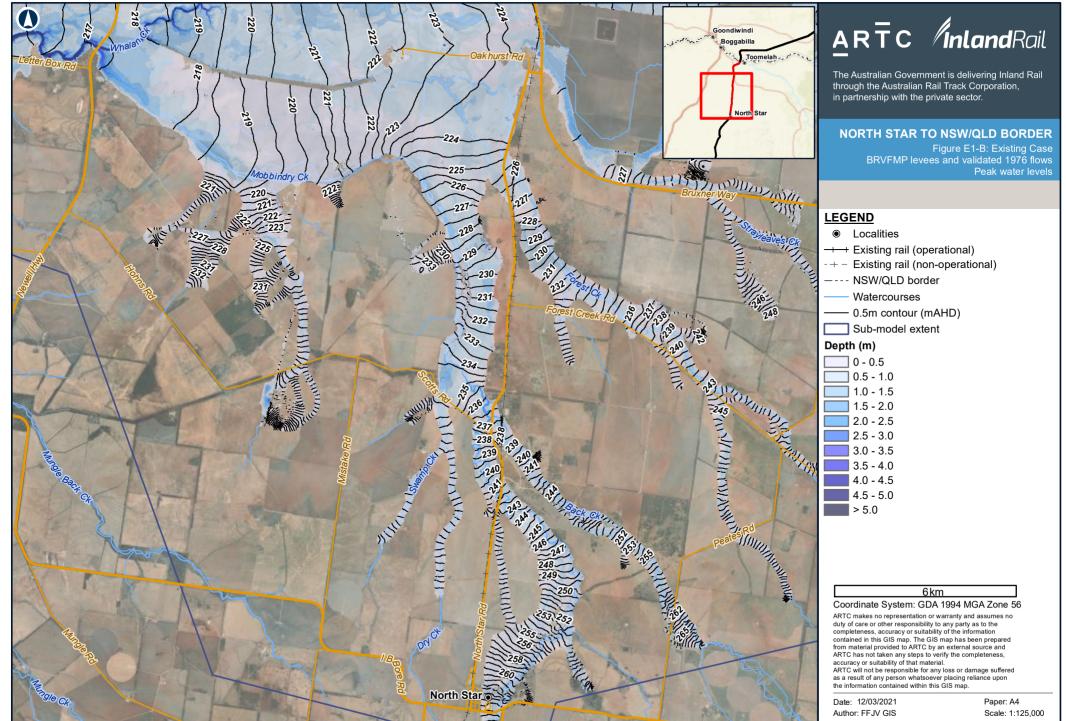
Goondiwind ARTC /InlandRail Goondiwind Boggabilla Toomelah 27 The Australian Government is delivering Inland Rail 30 ð 230 through the Australian Rail Track Corporation, in partnership with the private sector. 2 Boggabilla North Star NORTH STAR TO NSW/QLD BORDER Figure E1: Existing Case BRVFMP levees and validated 1976 flows 23A Peak water levels I FGEND 3 Localities Toomolah +++ Existing rail (operational) -+- Existing rail (non-operational) ---- NSW/QLD border 276 278 225 215 213 214 212 220 Watercourses BL 5 3 Goondiwindi levee 226 28 - 1m contour (mAHD) -220 219 Sub-model extent Wha Depth (m) 22 222 0 - 0.5 -221 ŵ 219 No. 05-10 220 243 10-15 Ck 244 1.5 - 2.02.0 - 2.52 2.5 - 3.0 3.0 - 3.5 3.5 - 4.0 4.0 - 4.5 4.5 - 5.0 > 5.0 COMPANY STRAIN 10 km Coordinate System: GDA 1994 MGA Zone 56 ARTC makes no representation or warranty and assumes no duty of care or other responsibility to any party as to the completeness, accuracy or suitability of the information contained in this GIS map. The GIS map has been prepared from material provided to ARTC by an external source and ARTC has not taken any steps to verify the completeness, accuracy or suitability of that material. ARTC will not be responsible for any loss or damage suffered as a result of any person whatsoever placing reliance upon the information contained within this GIS map. -North Star Date: 12/03/2021 Paper: A4 Author: FFJV GIS Scale: 1:240,000

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Sources: Esri, HERE, Gamin, USSS, Internap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hora Kong), Esri Korea, Esri (Thailand), NGCC. (c) OpenStreetMap contributors, and the GIS User Community

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Goondiwindi ARTC /InlandRail Goondiwind Boggabilla Toomelah. The Australian Government is delivering Inland Rail through the Australian Rail Track Corporation, in partnership with the private sector. Boggabilla North Star NORTH STAR TO NSW/QLD BORDER Figure E2: Existing Case BRVFMP levees and validated 1976 flows LEGEND Toomelah 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 10 km Coordinate System: GDA 1994 MGA Zone 56 ARTC makes no representation or warranty and assumes no duty of care or other responsibility to any party as to the completeness, accuracy or suitability of the information contained in this GIS map. The GIS map has been prepared from material provided to ARTC by an external source and ARTC has not taken any steps to verify the completeness, accuracy or suitability of that material. ARTC will not be responsible for any loss or damage suffered as a result of any person whatsoever placing reliance upon the information contained within this GIS map. North Star Date: 12/03/2021 Paper: A4 Author: FFJV GIS Scale: 1:240,000

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ARTC /InlandRail Goondiwindi Boggabilla Toomelah The Australian Government is delivering Inland Rail through the Australian Rail Track Corporation, in partnership with the private sector. Boggabilla North Sta NORTH STAR TO NSW/QLD BORDER BRVFMP levees and validated 1976 flows LEGEND Localities +++ Existing rail (operational) -+- Existing rail (non-operational) ---- NSW/QLD border Watercourses Goondiwindi levee Sub-model extent Peak velocity (m/s) Toomelah 0 to 0.5 0.5 to 1.0 > 1.0 Coordinate System: GDA 1994 MGA Zone 56 ARTC makes no representation or warranty and assumes no duty of care or other responsibility to any party as to the completeness, accuracy or suitability of the information contained in this GIS map. The GIS map has been prepared from material provided to ARTC by an external source and ARTC has not taken any steps to verify the completeness, accuracy or suitability of that material. ARTC will not be responsible for any loss or damage suffered as a result of any person whatsoever placing reliance upon the information contained within this GIS map. Date: 12/03/2021 Author: FFJV GIS

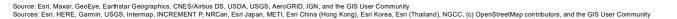
Figure E2-A: Existing Case

6km

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Scale: 1:125,000

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# NORTH STAR TO NSW/QLD BORDER

Figure E2-B: Existing Case BRVFMP levees and validated 1976 flows

- 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

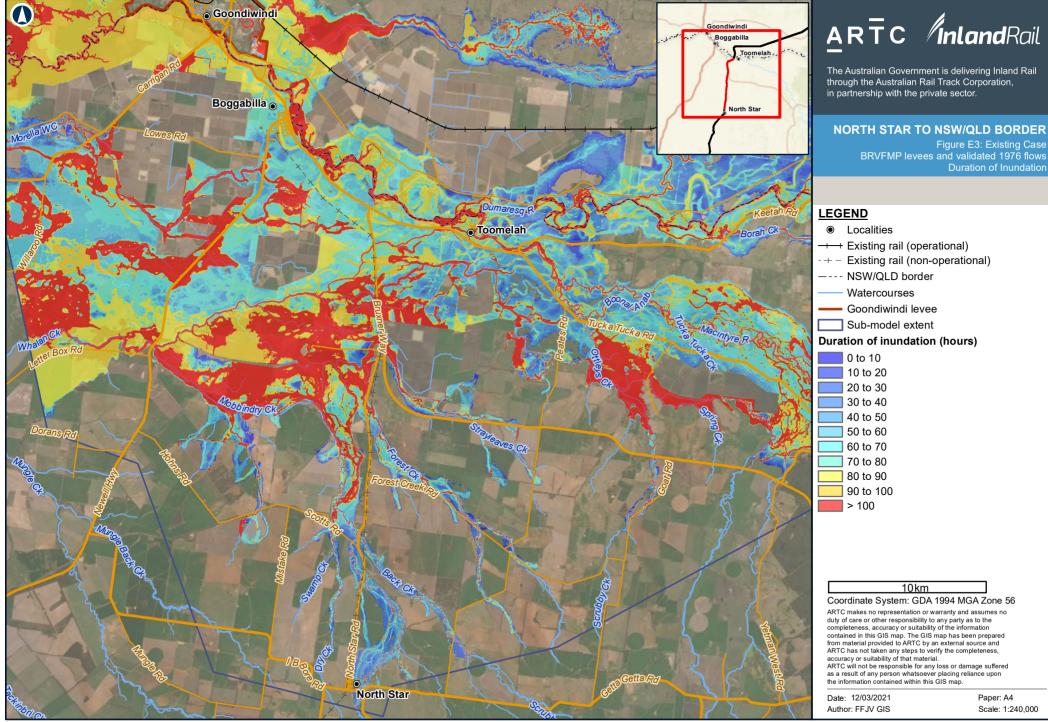
# 6km

Coordinate System: GDA 1994 MGA Zone 56 ARTC makes no representation or warranty and assumes no

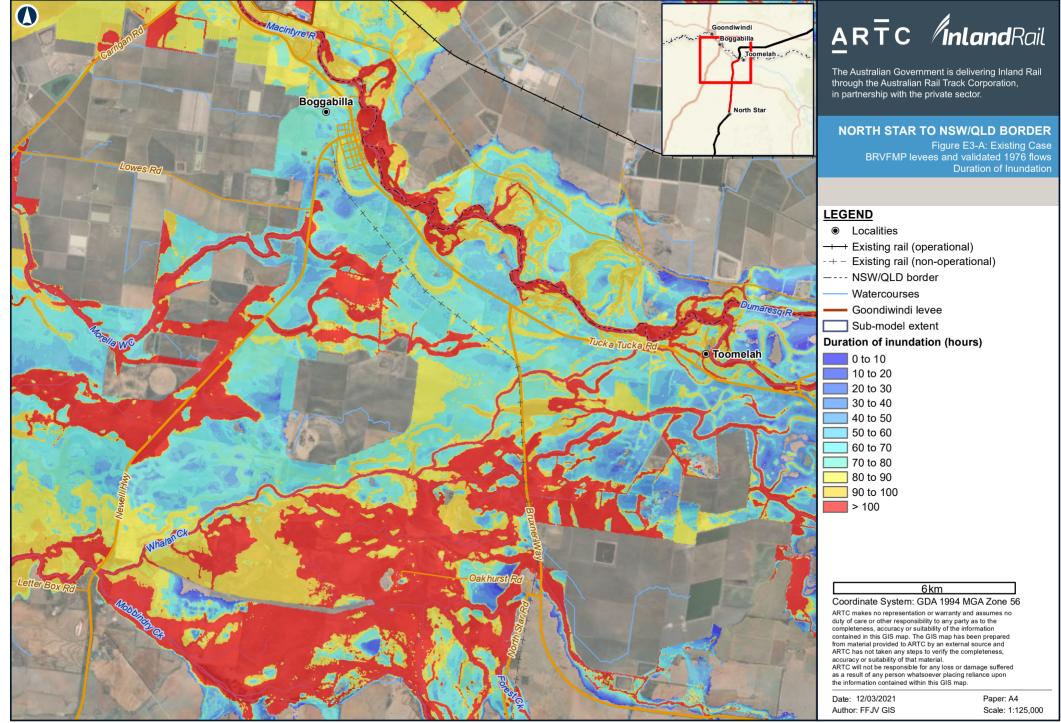
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Goondiwindi Boggabilla Whala Toomelah - .... I FGFND Stayleaves Ck Localities 0 to 10 10 to 20 20 to 30 30 to 40 40 to 50 50 to 60 60 to 70 70 to 80 80 to 90 90 to 100 > 100 DN CK ARTC will not be responsible for any loss or damage suffered as a result of any person whatsoever placing reliance upon the information contained within this GIS map. North Star

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## NORTH STAR TO NSW/QLD BORDER

Figure E3-B: Existing Case BRVFMP levees and validated 1976 flows Duration of Inundation

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

## Duration of inundation (hours)

6km

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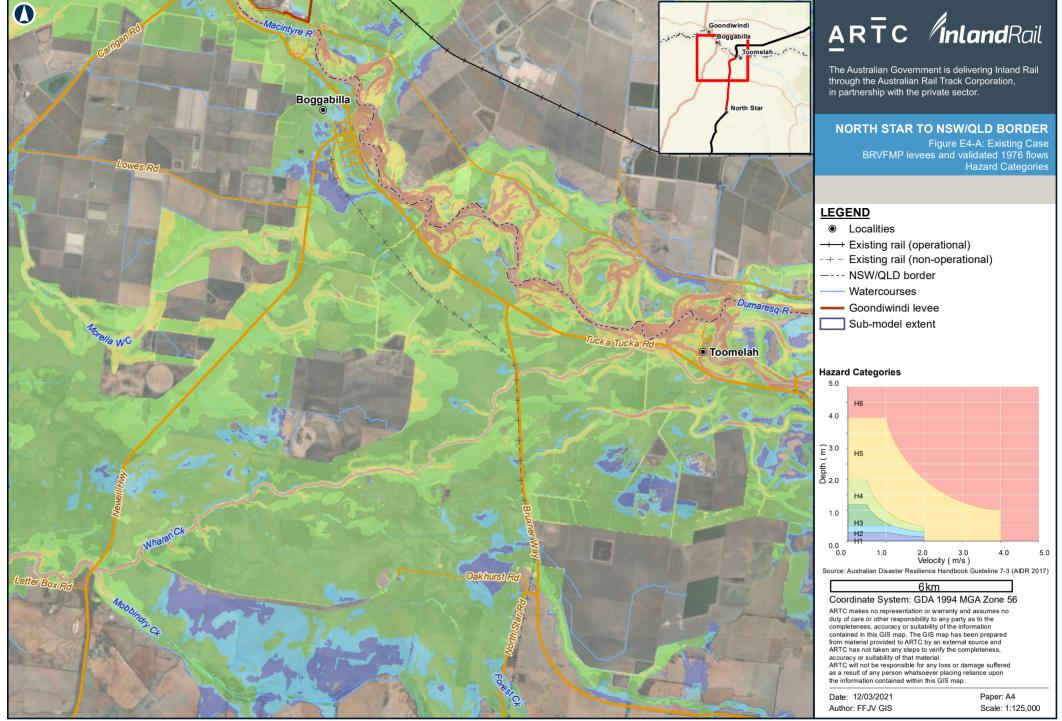
Date: 12/03/2021 Paper: A4 Author: FFJV GIS Scale: 1:125,000

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Goondiwindi ARTC *Inland*Rail Goondiwindi Boggabilla Toomelah The Australian Government is delivering Inland Rail through the Australian Rail Track Corporation, in partnership with the private sector. Boggabilla . North Star NORTH STAR TO NSW/QLD BORDER Mo Figure E4: Existing Case BRVFMP levees and validated 1976 flows Hazard Categories Dumaresa B LEGEND Keeta Borah Ck Toomelah Localities +++ Existing rail (operational) -+- Existing rail (non-operational) ---- NSW/QLD border Watercourses Goondiwindi levee Sub-model extent Macintyre R Wh Hazard Categories 5.0 H6 indry Ck 4.0 ayleaves Ck (m) 3.0 Depth (m) 2.0 H5 1.0 0.0 4.0 3.0 0.0 1.0 2.0 Velocity (m/s) Source: Australian Disaster Resilience Handbook Guideline 7-3 (AIDR 2017) 10km Coordinate System: GDA 1994 MGA Zone 56 ARTC makes no representation or warranty and assumes no duty of care or other responsibility to any party as to the completeness, accuracy or suitability of the information contained in this GIS map. The GIS map has been prepared from material provided to ARTC by an external source and ARTC has not taken any steps to verify the completeness, accuracy or suitability of that material. ARTC will not be responsible for any loss or damage suffered as a result of any person whatsoever placing reliance upon the information contained within this GIS map. North Star Date: 12/03/2021 Paper: A4 Author: FFJV GIS Scale: 1:240,000

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ARTC /InlandRail WhalanCH Goondiwindi Boggabilla Toomelah Letter Box F The Australian Government is delivering Inland Rail through the Australian Rail Track Corporation, in partnership with the private sector. Mar NORTH STAR TO NSW/QLD BORDER Figure E4-B: Existing Case BRVFMP levees and validated 1976 flows Hazard Categories Mobbindry Ck Bruxner Way I FGFND Strayleaves Ck Localities +++ Existing rail (operational) -+- Existing rail (non-operational) ---- NSW/QLD border Watercourses Sub-model extent Hazard Categories 5.0 H6 4.0 (m) 3.0 Depth (m) 2.0 H5 1.0 H3 0.0 4.0 0.0 3.0 1.0 2.0 Velocity (m/s) Source: Australian Disaster Resilience Handbook Guideline 7-3 (AIDR 2017) 6km Coordinate System: GDA 1994 MGA Zone 56 ARTC makes no representation or warranty and assumes no duty of care or other responsibility to any party as to the DN CK completeness, accuracy or suitability of the information contained in this GIS map. The GIS map has been prepared from material provided to ARTC by an external source and ARTC has not taken any steps to verify the completeness, accuracy or suitability of that material. ARTC will not be responsible for any loss or damage suffered as a result of any person whatsoever placing reliance upon the information contained within this GIS map. North Star Date: 12/03/2021 Paper: A4 Author: FFJV GIS Scale: 1:125,000

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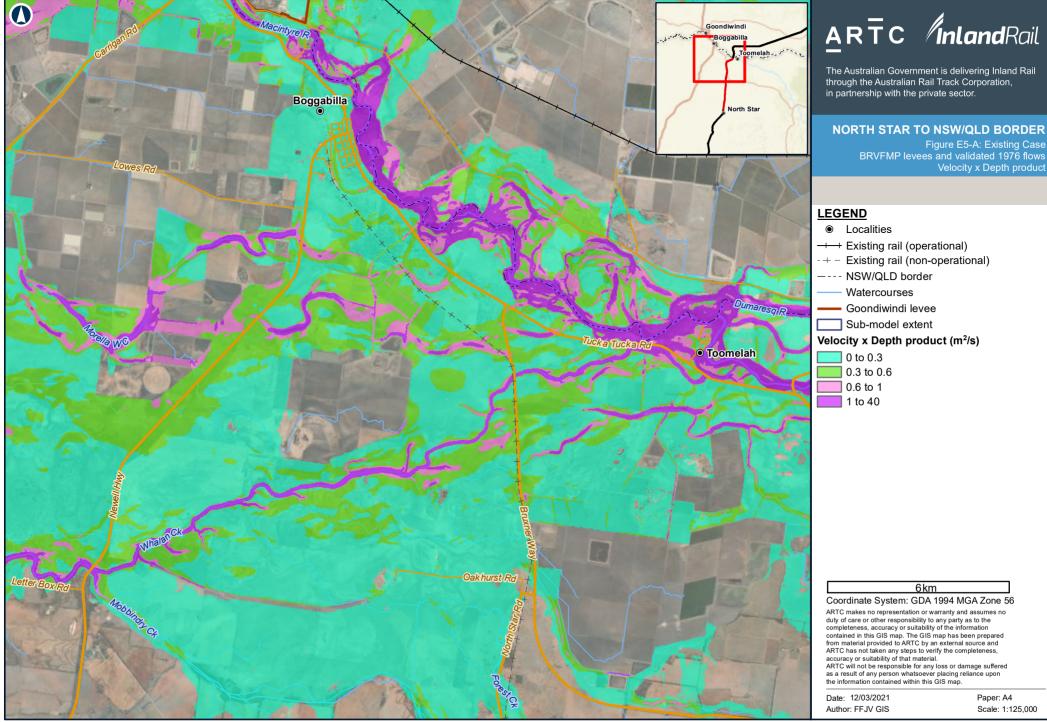
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 $( \ )$ ARTC InlandRail Goondiwind Boggabilla Toomelah The Australian Government is delivering Inland Rail through the Australian Rail Track Corporation, in partnership with the private sector. Boggabilla North Star NORTH STAR TO NSW/QLD BORDER Mor Figure E5: Existing Case Dumaresa I EGEND Keeta o Toomelah I ocalities Borah Ck  $\rightarrow$  Existing rail (operational) -+- Existing rail (non-operational) ---- NSW/QLD border Watercourses Goondiwindi levee Sub-model extent Velocity x Depth product (m<sup>2</sup>/s) Wha 0 to 0.3 0.3 to 0.6 0.6 to 1 1 to 40 666 indry Ck Weaves Ck 10 km Coordinate System: GDA 1994 MGA Zone 56 ARTC makes no representation or warranty and assumes no duty of care or other responsibility to any party as to the completeness, accuracy or suitability of the information contained in this GIS map. The GIS map has been prepared from material provided to ARTC by an external source and ARTC has not taken any steps to verify the completeness, accuracy or suitability of that material. ARTC will not be responsible for any loss or damage suffered as a result of any person whatsoever placing reliance upon the information contained within this GIS map. North Star Date: 12/03/2021 Paper: A4 Author: FFJV GIS Scale: 1:240,000

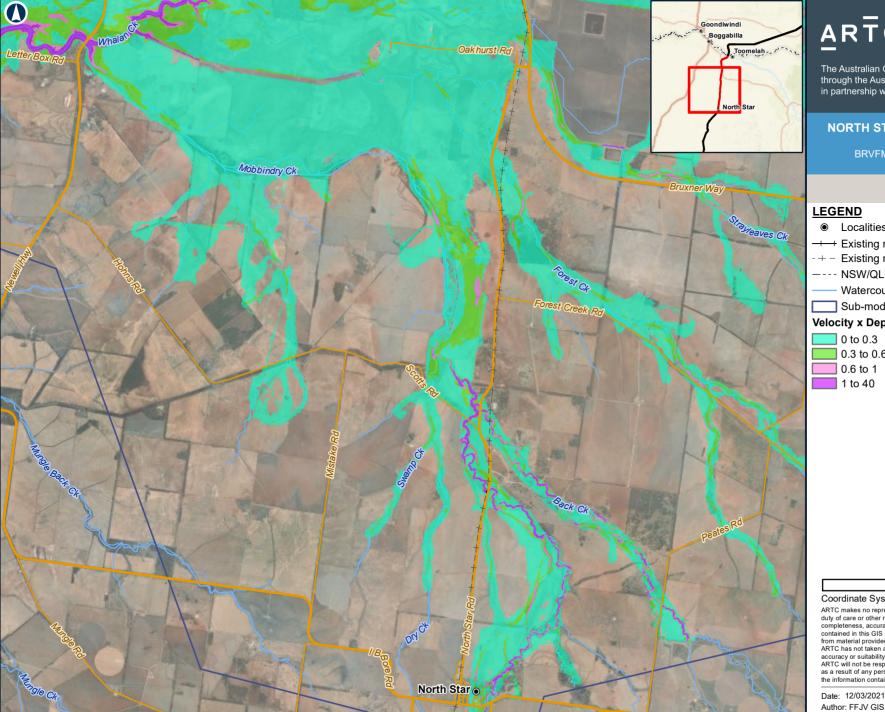
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Goondiwindi



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## NORTH STAR TO NSW/QLD BORDER

Figure E5-B: Existing Case BRVFMP levees and validated 1976 flows

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

# Velocity x Depth product (m<sup>2</sup>/s)

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

## 6km

Coordinate System: GDA 1994 MGA Zone 56

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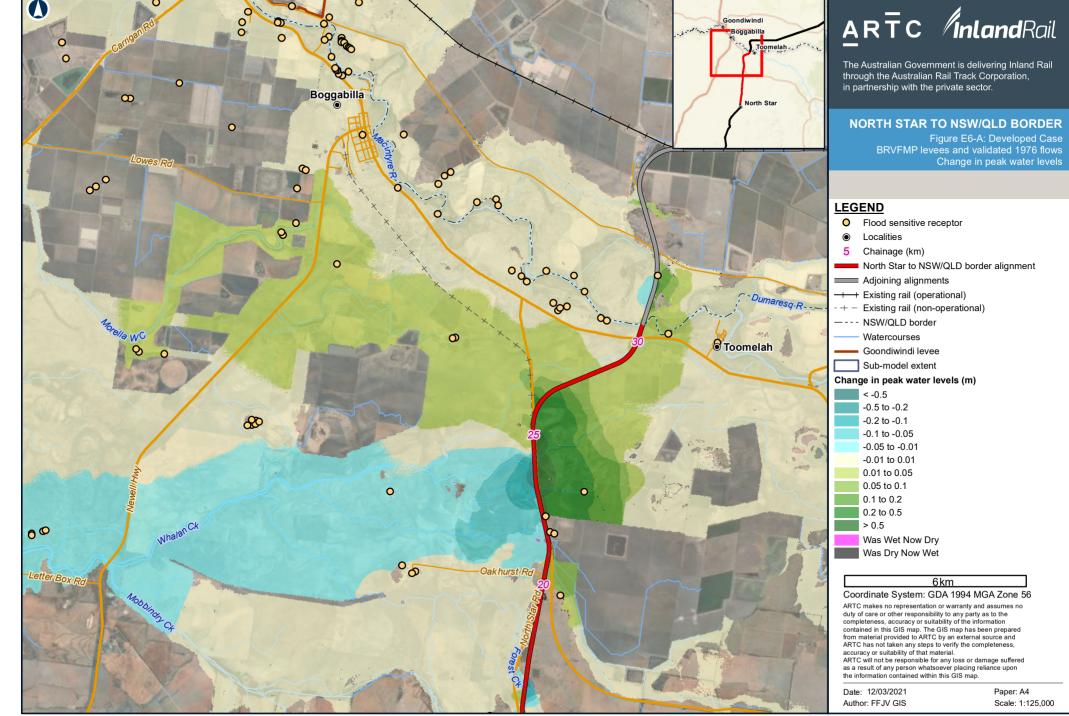
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Goondiwind 62 ARTC InlandRail Goondiwindi 0 Boggabilla Toomelah The Australian Government is delivering Inland Rail through the Australian Rail Track Corporation, in partnership with the private sector. Boggabilla North Star 0 NORTH STAR TO NSW/QLD BORDER 6 Figure E6: Developed Case Õ BRVFMP levees and validated 1976 flows 08 C Change in peak water levels 0 0000 0 Dumaresa R 80 I FGEND Keeta 90 ò <sup>i</sup>O Flood sensitive receptor Borah Ck Toomelah ۲ Localities 5 Chainage (km) C North Star to NSW/QLD border alignment Adjoining alignments +++ Existing rail (operational) 0 0 - + - Existing rail (non-operational) Macintyre R P ---- NSW/QLD border Whalan Ck Watercourses tter Box Rd 90 Goondiwindi levee Sub-model extent Change in peak water levels (m) < -0.5 Mobbindry Ck -0.5 to -0.2 0 -0.2 to -0.1 eaves Ck -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 10 km Coordinate System: GDA 1994 MGA Zone 56 ARTC makes no representation or warranty and assumes no duty of care or other responsibility to any party as to the completeness, accuracy or suitability of the information contained in this GIS map. The GIS map has been prepared from material provided to ARTC by an external source and ARTC has not taken any steps to verify the completeness, accuracy or suitability of that material. ARTC will not be responsible for any loss or damage suffered as a result of any person whatsoever placing reliance upon the information contained within this GIS map. North Star Date: 12/03/2021 Paper: A4 Author: FFJV GIS Scale: 1:240,000

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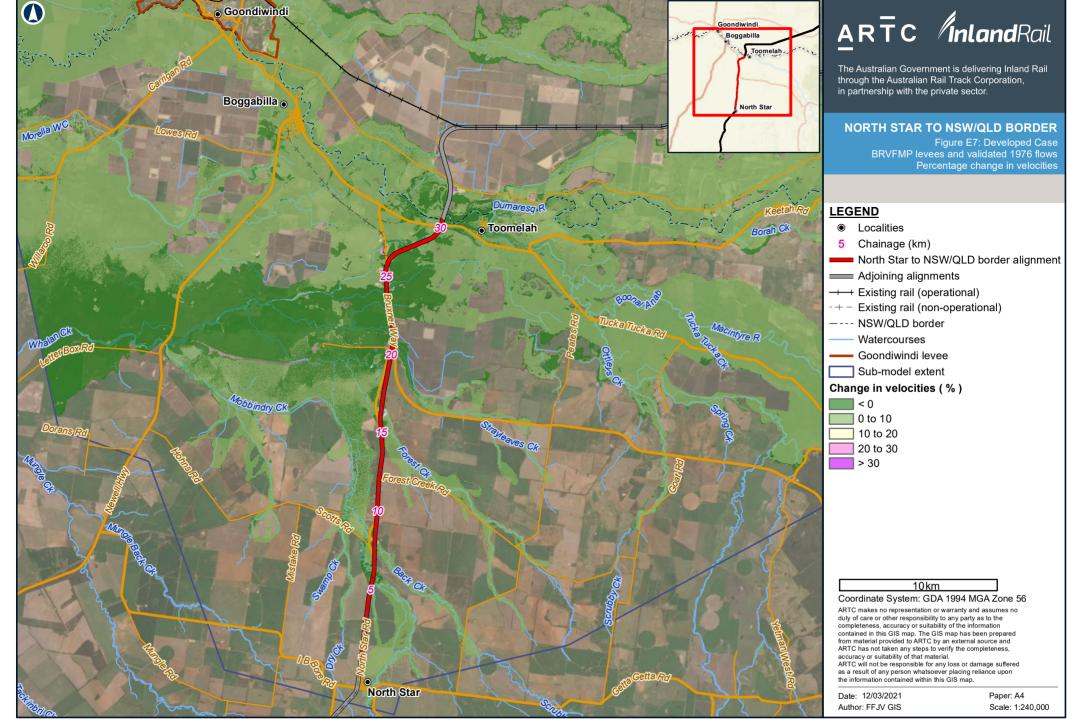
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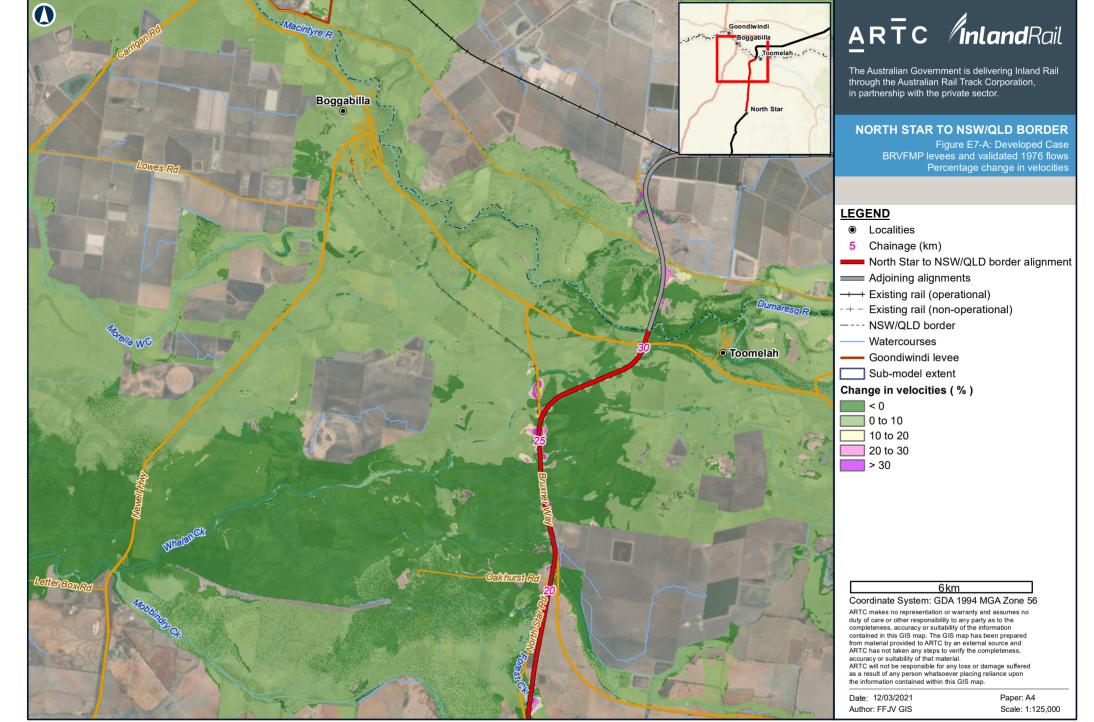
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ARTC /InlandRail WhalanCH Goondiwindi Boggabilla 0 Toomelah 6 Oak hurst Rd Letter Box R The Australian Government is delivering Inland Rail C through the Australian Rail Track Corporation, in partnership with the private sector. Nor NORTH STAR TO NSW/QLD BORDER Figure E6-B: Developed Case BRVFMP levees and validated 1976 flows Change in peak water levels Mobbindry Ck Bruxner-Way I FGFND Sire Jeaves Ck Flood sensitive receptor 0 ۲ Localities 5 Chainage (km) Forest Ck North Star to NSW/QLD border alignment Adjoining alignments +++ Existing rail (operational) brest Creek-Re -+- Existing rail (non-operational) ---- NSW/QLD border Watercourses Sub-model extent 0 Change in peak water levels (m) 0 < -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 6 0.1 to 0.2 0.2 to 0.5 > 0.5 Was Wet Now Drv Was Drv Now Wet 6km Coordinate System: GDA 1994 MGA Zone 56 ARTC makes no representation or warranty and assumes no duty of care or other responsibility to any party as to the DN CF completeness, accuracy or suitability of the information contained in this GIS map. The GIS map has been prepared from material provided to ARTC by an external source and ARTC has not taken any steps to verify the completeness, accuracy or suitability of that material. ARTC will not be responsible for any loss or damage suffered North as a result of any person whatsoever placing reliance upon the information contained within this GIS map. Star 0 Date: 12/03/2021 Paper: A4 Author: FFJV GIS Scale: 1:125,000

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ARTC /InlandRail Goondiwindi Boggabilla Toomelah ..... 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 E7-B: Developed Case BRVFMP levees and validated 1976 flows Percentage change in velocities Mobbindry Ck Bruxner Way I FGFND Strayleaves Ck Localities 5 Chainage (km) North Star to NSW/QLD border alignment Adjoining alignments +++ Existing rail (operational) Existing rail (non-operational) - + ------ NSW/QI D border Watercourses 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 ARTC makes no representation or warranty and assumes no duty of care or other responsibility to any party as to the DN CF completeness, accuracy or suitability of the information contained in this GIS map. The GIS map has been prepared from material provided to ARTC by an external source and ARTC has not taken any steps to verify the completeness, accuracy or suitability of that material. ARTC will not be responsible for any loss or damage suffered North as a result of any person whatsoever placing reliance upon the information contained within this GIS map. Star 0 Date: 12/03/2021 Paper: A4

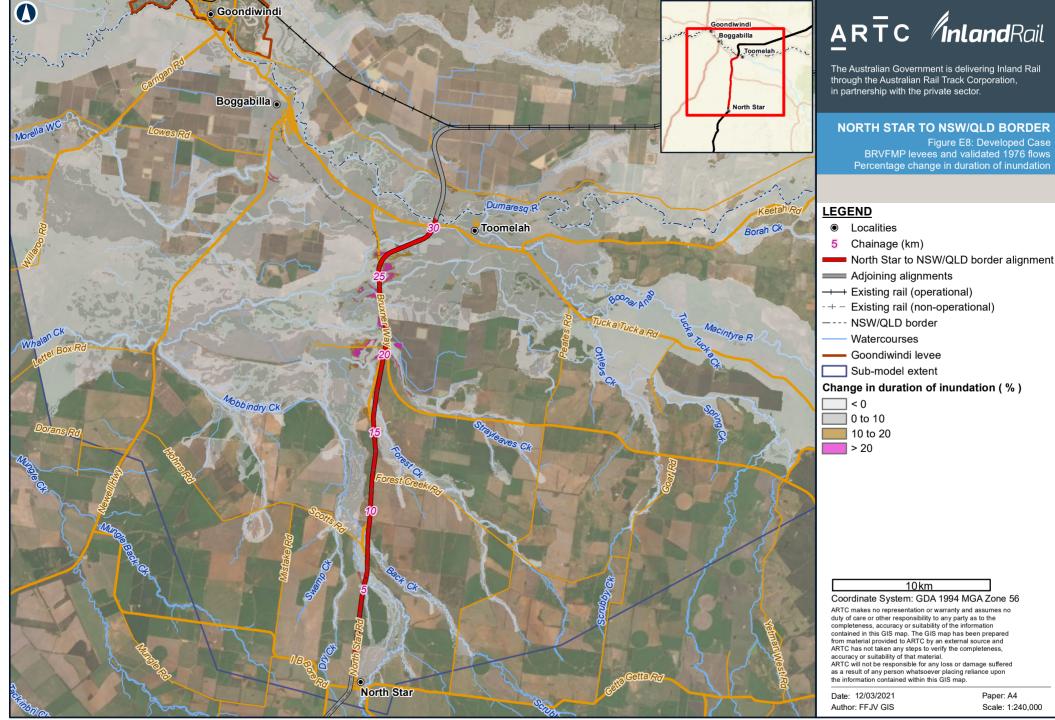
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ARTC /InlandRail Nacintvre R Goondiwindi Boggabilla Toomelah The Australian Government is delivering Inland Rail through the Australian Rail Track Corporation, in partnership with the private sector. Boggabilla North Sta NORTH STAR TO NSW/QLD BORDER Figure E8-A: Developed Case BRVFMP levees and validated 1976 flows Percentage change in duration of inundation I FGFND Localities Chainage (km) 5 North Star to NSW/QLD border alignment Adjoining alignments +++ Existing rail (operational) Dumaresq-R---Existing rail (non-operational) - + ------ NSW/QLD border Morella WC Watercourses Toomelah Goondiwindi levee Sub-model extent Change in duration of inundation (%) < 0 0 to 10 10 to 20 > 20 Whalan Ck 6km Coordinate System: GDA 1994 MGA Zone 56 ARTC makes no representation or warranty and assumes no duty of care or other responsibility to any party as to the completeness, accuracy or suitability of the information C contained in this GIS map. The GIS map has been prepared from material provided to ARTC by an external source and ARTC has not taken any steps to verify the completeness, accuracy or suitability of that material. ARTC will not be responsible for any loss or damage suffered as a result of any person whatsoever placing reliance upon the information contained within this GIS map. C Date: 12/03/2021 Paper: A4 Author: FFJV GIS Scale: 1:125,000

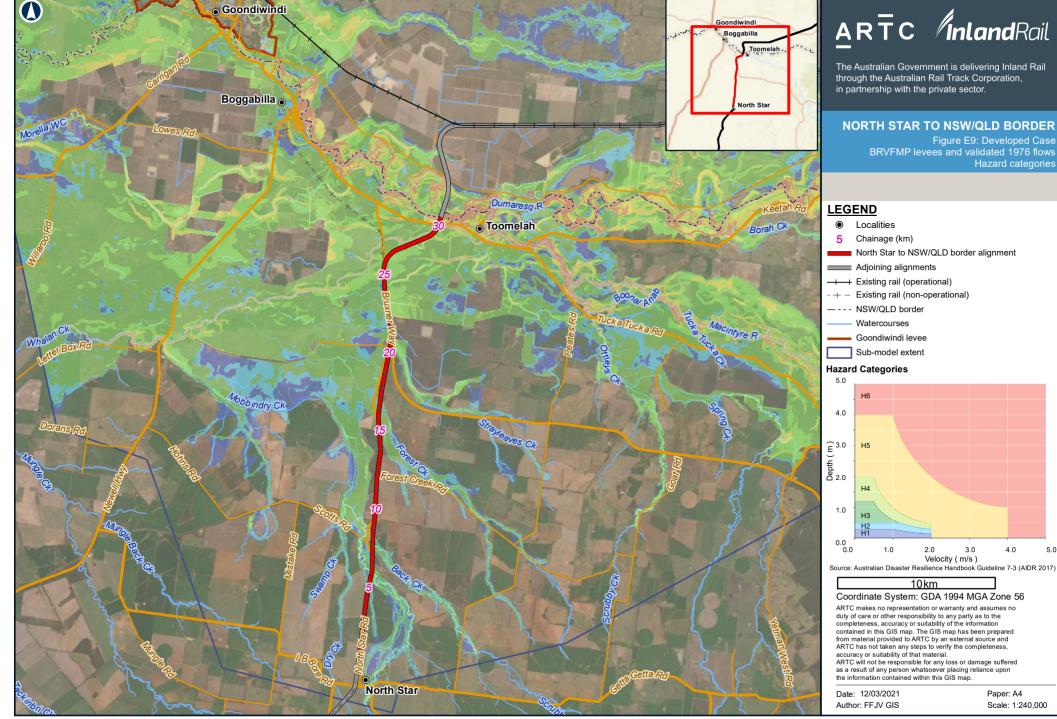
Source: Esri, Maxar, GeoEve, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Map by: DTH Z:\GIS\GIS\_270\_NS2B\Tasks\270-IHY-202102151444\_Hydrology\_and\_Flooding\_PIR\270-IHY-202102151444\_ARTC\_FigX8\_DV\_PercentChangeTimeDur\_A4L\_v1.mxd Date: 14/03/2021 16:08

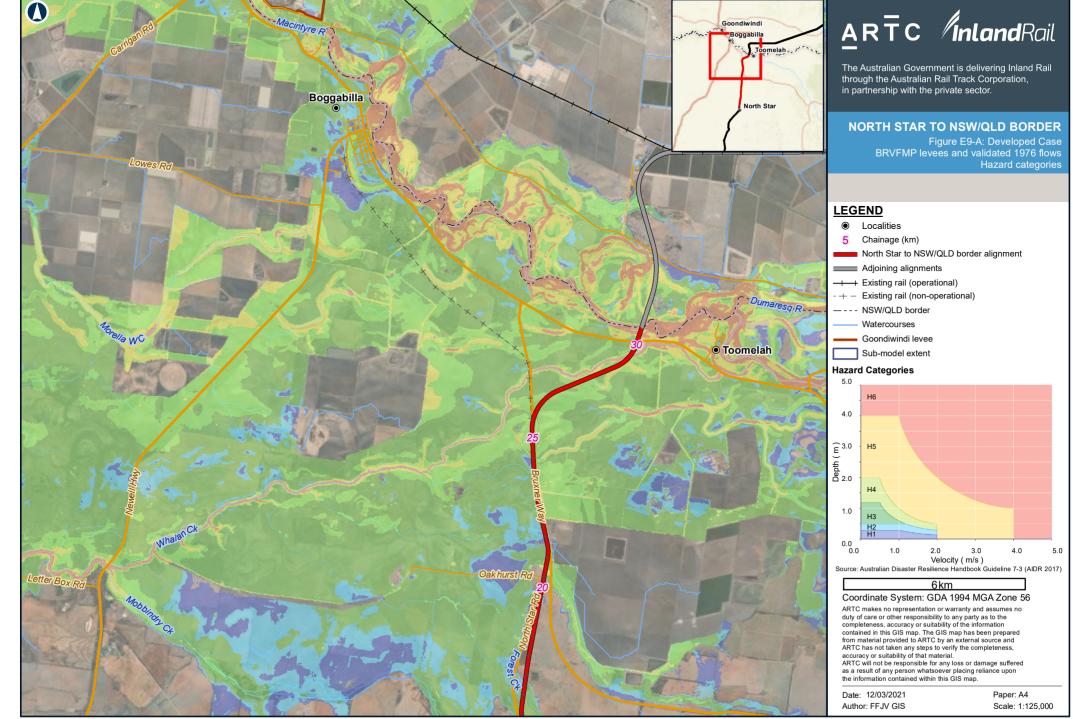
Sources: Esri, HERE, Gamin, USSS, Internap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hora Kong), Esri Korea, Esri (Thailand), NGCC. (c) OpenStreetMap contributors, and the GIS User Community

ARTC /InlandRail Goondiwindi Ct Whalan Boggabilla Toomelah Letter Box P The Australian Government is delivering Inland Rail through the Australian Rail Track Corporation, in partnership with the private sector. Mar NORTH STAR TO NSW/QLD BORDER Figure E8-B: Developed Case BRVFMP levees and validated 1976 flows Percentage change in duration of inundation Mobbindry Ck Bruxner-Way I FGFND Strayleaves Ck Localities 5 Chainage (km) North Star to NSW/QLD border alignment orest CH Adjoining alignments +++ Existing rail (operational) Existing rail (non-operational) rest Creek-R - + ----- NSW/QLD border Watercourses Sub-model extent Change in duration of inundation (%) < 0 0 to 10 10 to 20 > 20 6km Coordinate System: GDA 1994 MGA Zone 56 ARTC makes no representation or warranty and assumes no duty of care or other responsibility to any party as to the DN CH completeness, accuracy or suitability of the information contained in this GIS map. The GIS map has been prepared from material provided to ARTC by an external source and ARTC has not taken any steps to verify the completeness, accuracy or suitability of that material. ARTC will not be responsible for any loss or damage suffered North as a result of any person whatsoever placing reliance upon the information contained within this GIS map. Star 0 Date: 12/03/2021 Paper: A4 Author: FFJV GIS Scale: 1:125,000

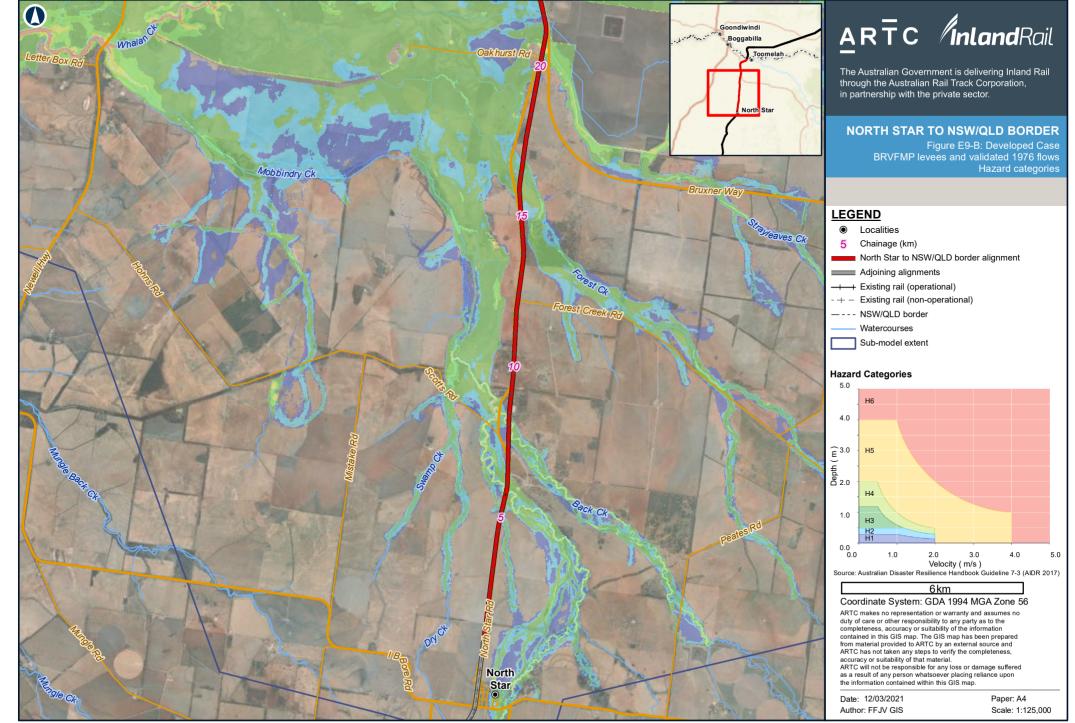
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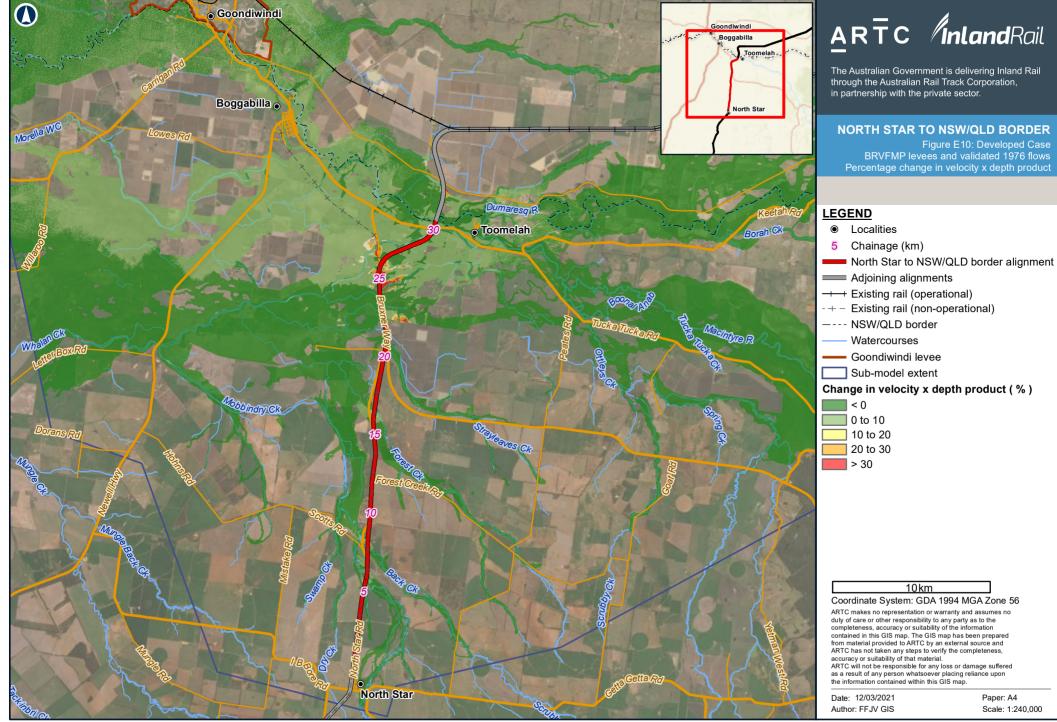
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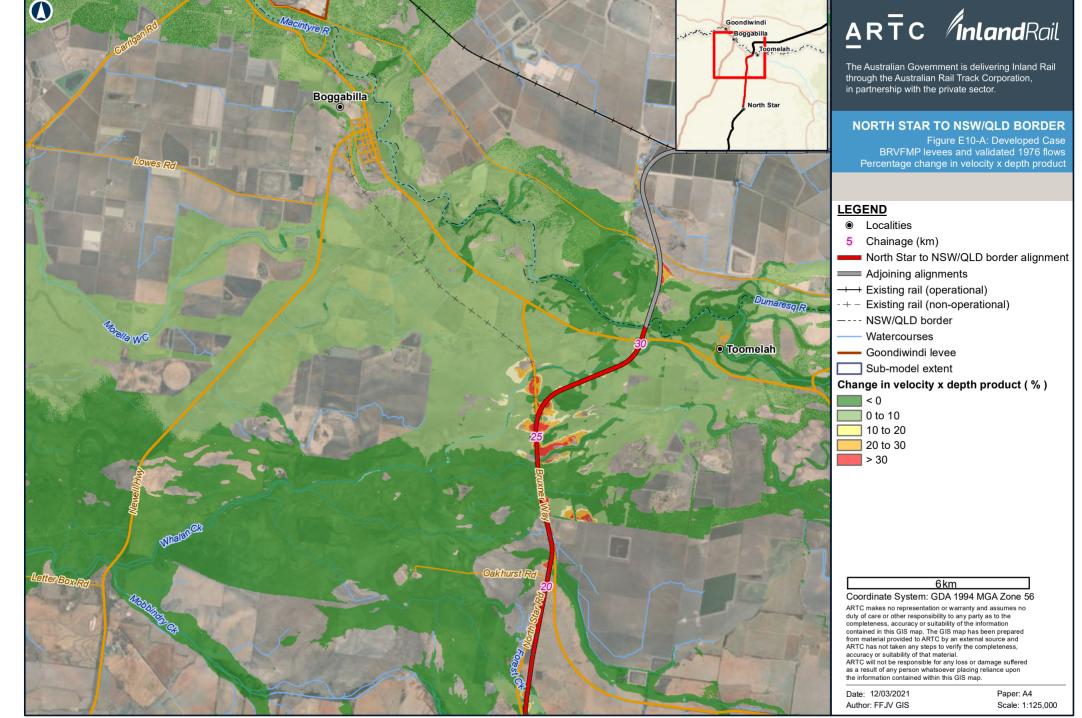
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ARTC InlandRail Goondiwindi Whalas Boggabilla Toomelah The Australian Government is delivering Inland Rail through the Australian Rail Track Corporation, in partnership with the private sector. NORTH STAR TO NSW/QLD BORDER Figure E10-B: Developed Case BRVFMP levees and validated 1976 flows Percentage change in velocity x depth product Mobbindry Ck Bruxner Way I FGFND Stayleaves Ck I ocalities 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 Coordinate System: GDA 1994 MGA Zone 56 ARTC makes no representation or warranty and assumes no duty of care or other responsibility to any party as to the DN CF completeness, accuracy or suitability of the information contained in this GIS map. The GIS map has been prepared from material provided to ARTC by an external source and ARTC has not taken any steps to verify the completeness, accuracy or suitability of that material. ARTC will not be responsible for any loss or damage suffered North as a result of any person whatsoever placing reliance upon the information contained within this GIS map. Star 0 Date: 12/03/2021 Paper: A4 Author: FFJV GIS Scale: 1:125,000

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