

TECHNICAL PAPER

04

Hydrology and flooding impact assessment

Appendix B Design case flood impact maps

Appendix B4 Hazard (velocity x depth) change maps

NARRABRI TO NORTH STAR—PHASE 2 ENVIRONMENTAL IMPACT STATEMENT



Appendix B – Design case flood impact maps

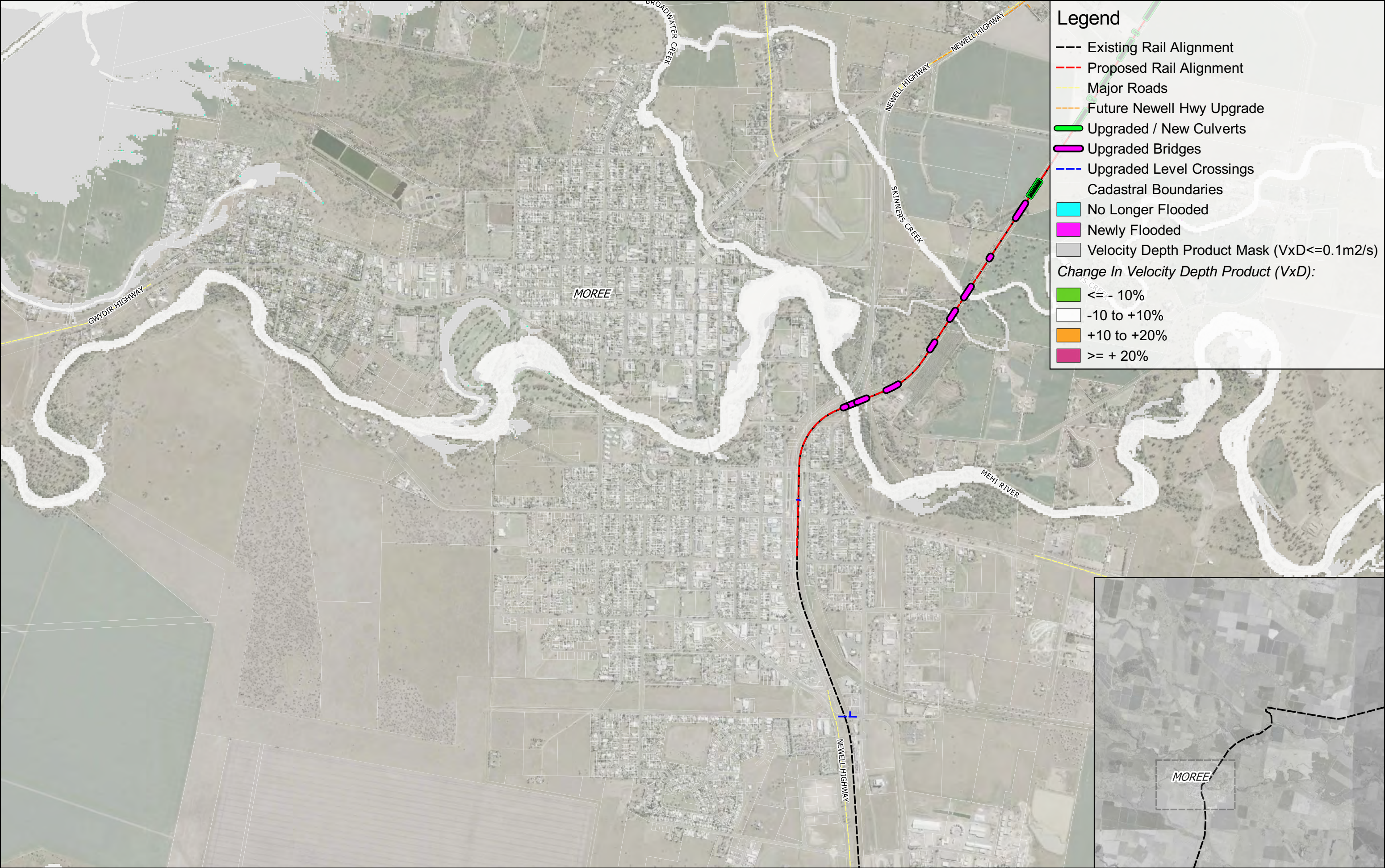
Map list

MAP SET ID	MAP CONTENTS
DES_AFF_020	Flood Level Change (Afflux) – Design Case, 20% AEP Event
DES_AFF_010	Flood Level Change (Afflux) – Design Case, 10% AEP Event
DES_AFF_005	Flood Level Change (Afflux) – Design Case, 5% AEP Event
DES_AFF_002	Flood Level Change (Afflux) – Design Case, 2% AEP Event
DES_AFF_001	Flood Level Change (Afflux) – Design Case, 1% AEP Event
DES_AFF_001CC	Flood Level Change (Afflux) – Design Case, 1% AEP Event with Climate Change
DES_AFF_PMF	Flood Level Change (Afflux) – Design Case, PMF Event
DES_CHV_020	Flood Velocity Change – Design Case, 20% AEP Event
DES_CHV_010	Flood Velocity Change – Design Case, 10% AEP Event
DES_CHV_005	Flood Velocity Change – Design Case, 5% AEP Event
DES_CHV_002	Flood Velocity Change – Design Case, 2% AEP Event
DES_CHV_001	Flood Velocity Change – Design Case, 1% AEP Event
DES_CHV_001CC	Flood Velocity Change – Design Case, 1% AEP Event with Climate Change
DES_CHV_PMF	Flood Velocity Change – Design Case, PMF Event
DES_CHDUR_020	Flood Duration Change – Design Case, 20% AEP Event
DES_CHDUR_010	Flood Duration Change – Design Case, 10% AEP Event
DES_CHDUR_005	Flood Duration Change – Design Case, 5% AEP Event
DES_CHDUR_002	Flood Duration Change – Design Case, 2% AEP Event
DES_CHDUR_001	Flood Duration Change – Design Case, 1% AEP Event
DES_CHDUR_001CC	Flood Duration Change – Design Case, 1% AEP Event with Climate Change
DES_CHDUR_PMF	Flood Duration Change – Design Case, PMF Event
DES_CHHAZ_020	Flood Hazard (Velocity x Depth) Change – Design Case, 20% AEP Event
DES_CHHAZ_010	Flood Hazard (Velocity x Depth) Change – Design Case, 10% AEP Event
DES_CHHAZ_005	Flood Hazard (Velocity x Depth) Change – Design Case, 5% AEP Event
DES_CHHAZ_002	Flood Hazard (Velocity x Depth) Change – Design Case, 2% AEP Event
DES_CHHAZ_001	Flood Hazard (Velocity x Depth) Change – Design Case, 1% AEP Event
DES_CHHAZ_001CC	Flood Hazard (Velocity x Depth) Change – Design Case, 1% AEP Event with Climate Change
DES_CHHAZ_PMF	Flood Hazard (Velocity x Depth) Change – Design Case, PMF Event

B.4 Hazard (velocity x depth) change

Map list

MAP SET ID	MAP CONTENTS
DES_CHHAZ_020	Flood Hazard (Velocity x Depth) Change – Design Case, 20% AEP Event
DES_CHHAZ_010	Flood Hazard (Velocity x Depth) Change – Design Case, 10% AEP Event
DES_CHHAZ_005	Flood Hazard (Velocity x Depth) Change – Design Case, 5% AEP Event
DES_CHHAZ_002	Flood Hazard (Velocity x Depth) Change – Design Case, 2% AEP Event
DES_CHHAZ_001	Flood Hazard (Velocity x Depth) Change – Design Case, 1% AEP Event
DES_CHHAZ_001CC	Flood Hazard (Velocity x Depth) Change – Design Case, 1% AEP Event with Climate Change
DES_CHHAZ_PMF	Flood Hazard (Velocity x Depth) Change – Design Case, PMF Event



Legend

Existing Rail Alignment

Proposed Rail Alignment

Major Roads

Future Newell Hwy Upgrade

Upgraded / New Culverts

Upgraded Bridges

Upgraded Level Crossings

Cadastral Boundaries

No Longer Flooded

Newly Flooded

Velocity Depth Product Mask ($V \times D \leq 0.1 \text{m}^2/\text{s}$)

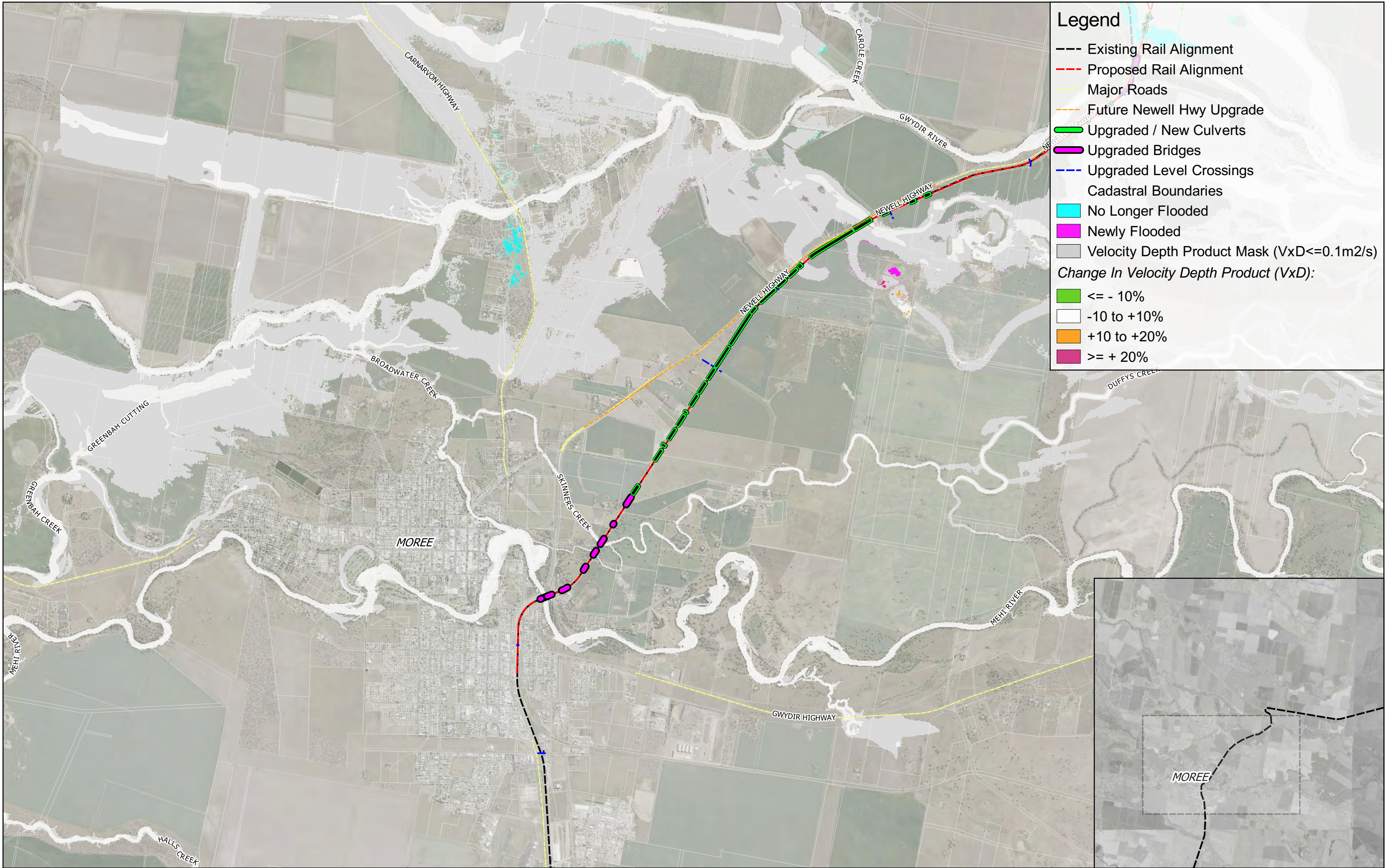
Change In Velocity Depth Product ($V \times D$):

 $\leq -10\%$

-10 to +10%

+10 to +20%

 $\geq +20\%$



Legend

Existing Rail Alignment

Proposed Rail Alignment

Major Roads

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Upgraded Level Crossings

Cadastral Boundaries

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Velocity Depth Product Mask ($V \times D \leq 0.1 \text{ m}^2/\text{s}$)

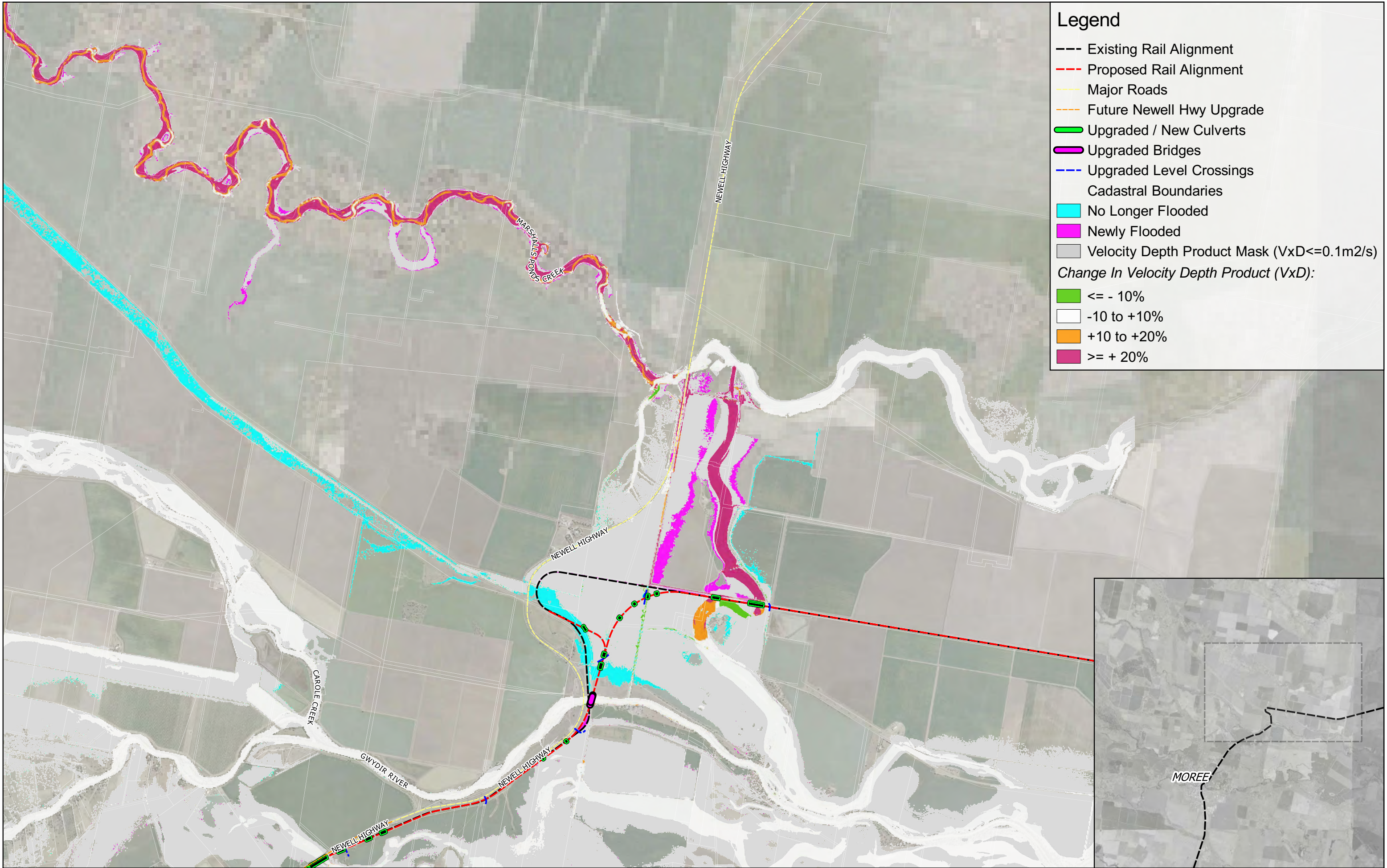
Change In Velocity Depth Product ($V \times D$):

 $\leq -10\%$

-10 to +10%

+10 to +20%

 $\geq +20\%$



Legend

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Cadastral Boundaries

No Longer Flooded

Newly Flooded

Velocity Depth Product Mask ($VxD \leq 0.1m^2/s$)

Change In Velocity Depth Product (VxD):

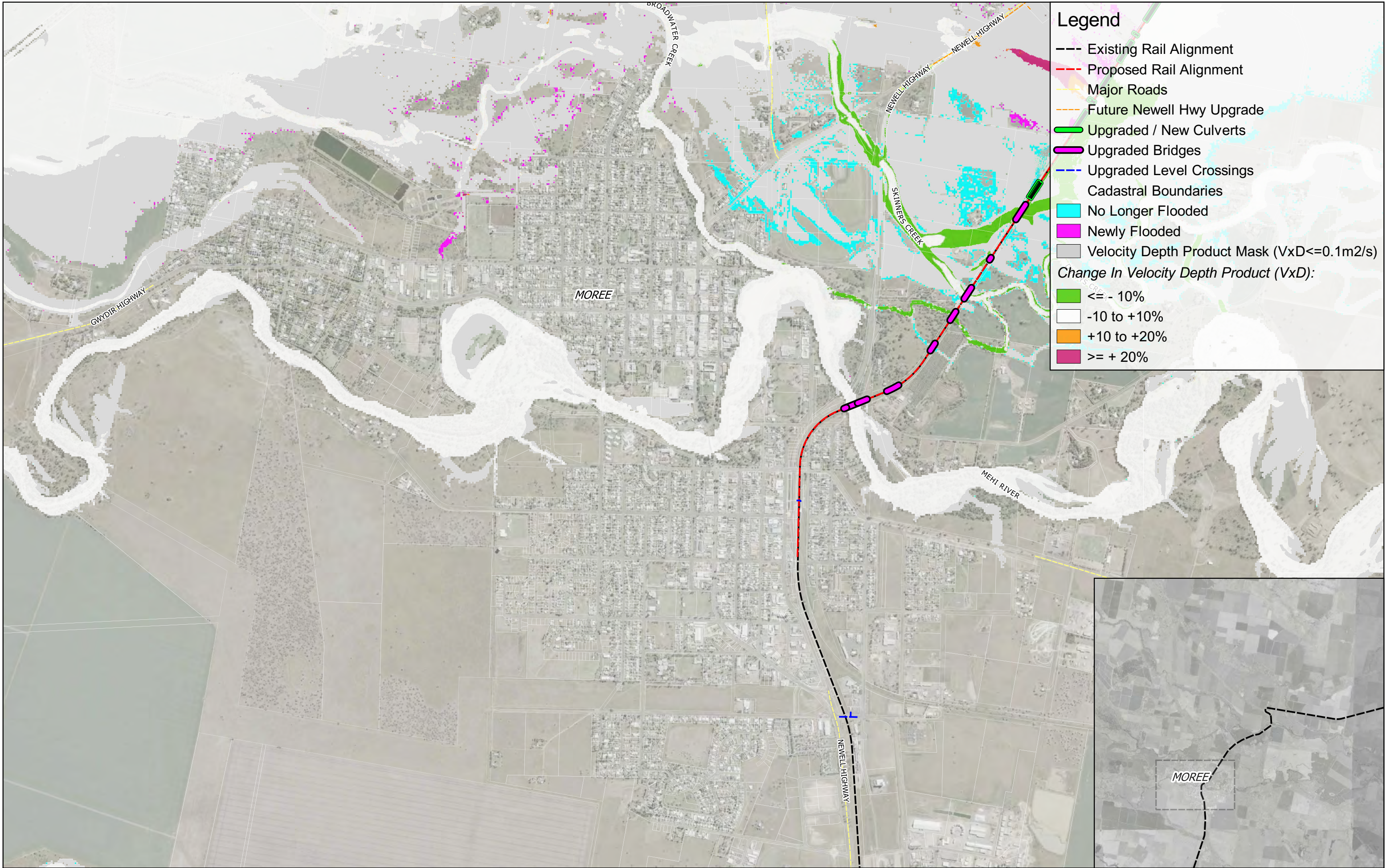
 $\leq -10\%$

-10 to +10%

+10 to +20%

 $\geq +20\%$





Legend

Existing Rail Alignment

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Major Roads

Future Newell Hwy Upgrade

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Cadastral Boundaries

No Longer Flooded

Newly Flooded

Velocity Depth Product Mask ($VxD \leq 0.1 \text{ m}^2/\text{s}$)

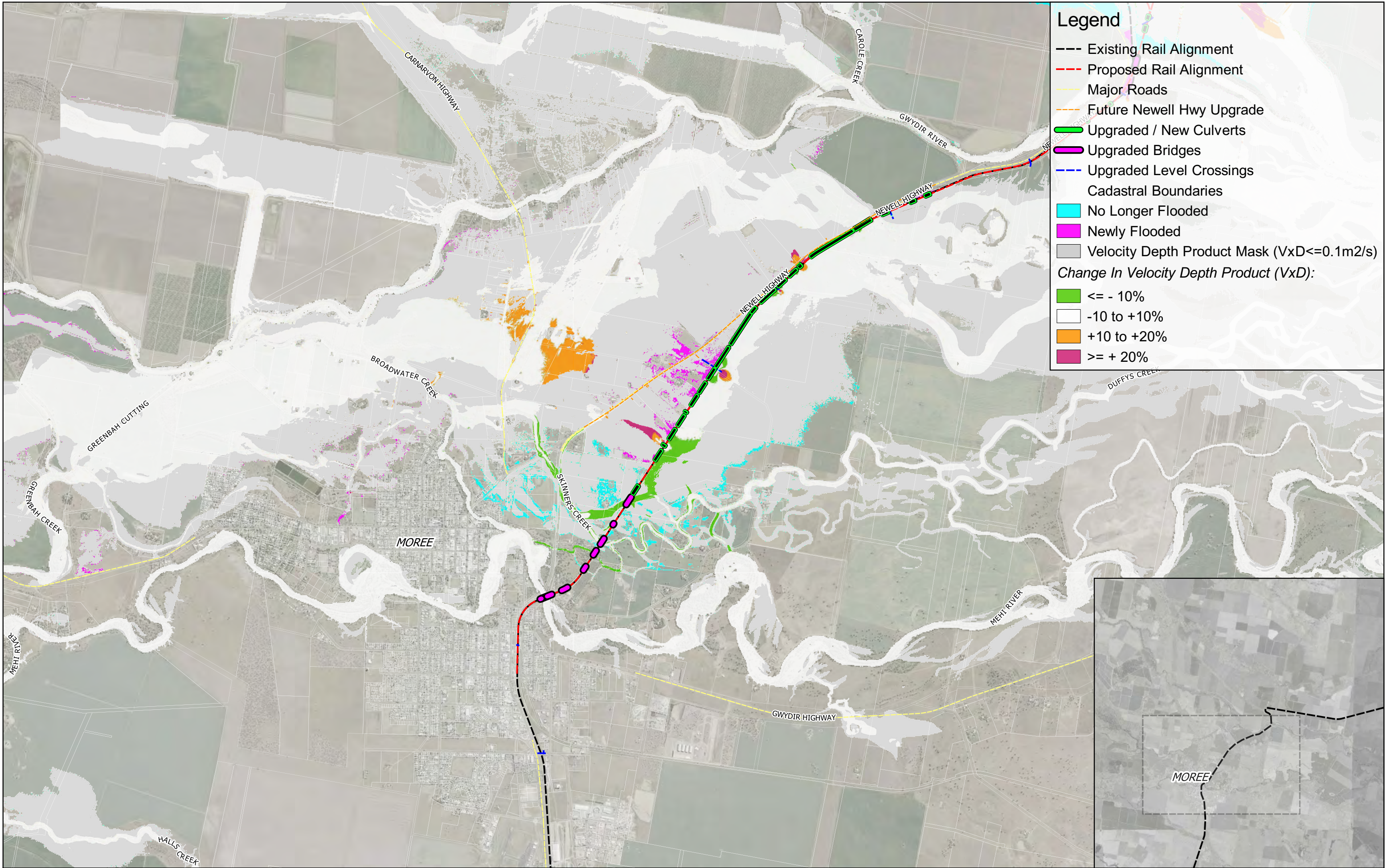
Change In Velocity Depth Product (VxD):

 $\leq -10\%$

 $-10 \text{ to } +10\%$

 $+10 \text{ to } +20\%$

 $\geq +20\%$



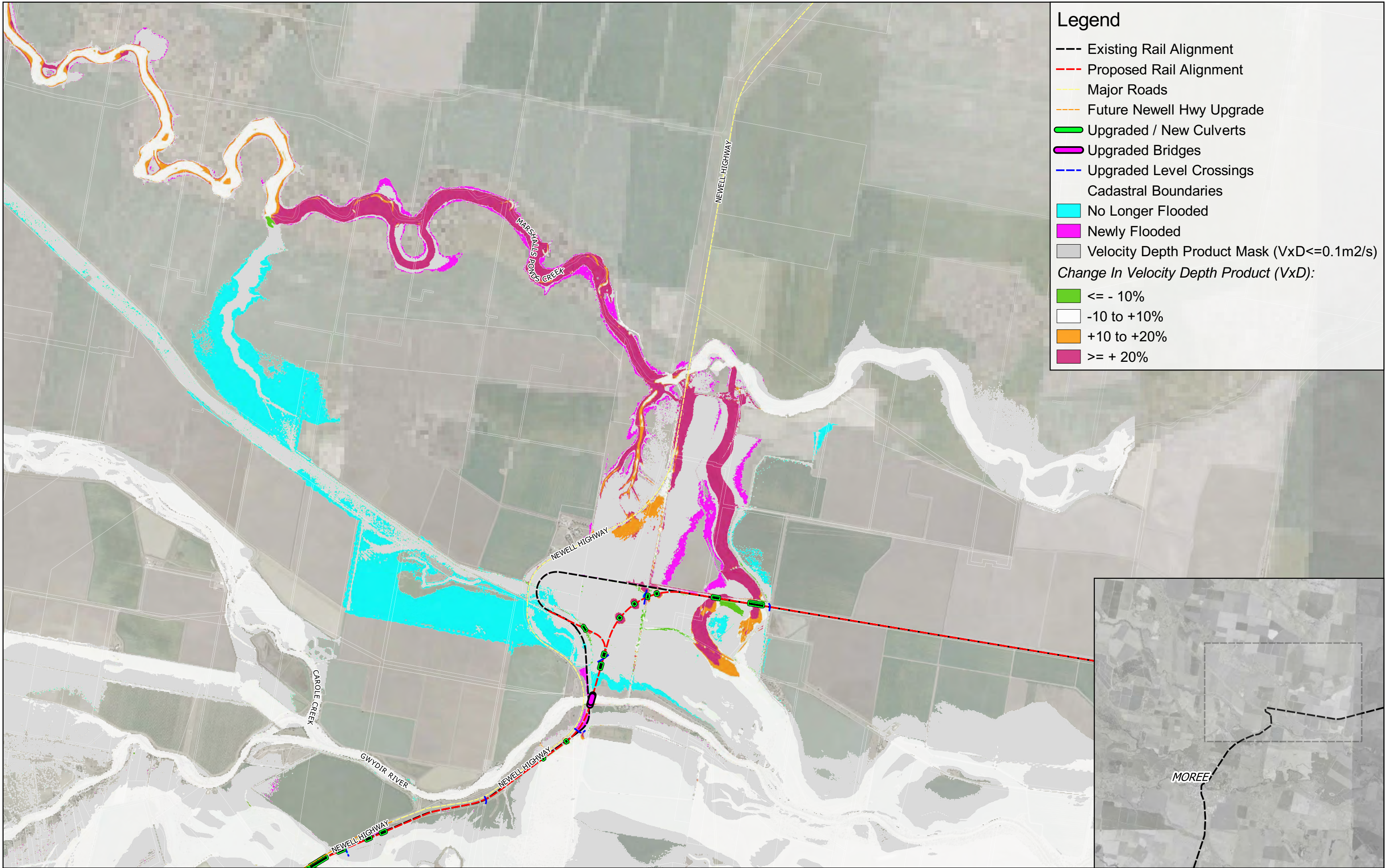
Legend

- Existing Rail Alignment
- - - Proposed Rail Alignment
- Major Roads
- - - Future Newell Hwy Upgrade
- Upgraded / New Culverts
- Upgraded Bridges
- Upgraded Level Crossings
- Cadastral Boundaries
- No Longer Flooded
- Newly Flooded
- Velocity Depth Product Mask ($V \times D \leq 0.1 \text{ m}^2/\text{s}$)

Change In Velocity Depth Product ($V \times D$):

- $\leq -10\%$
- 10 to +10%
- +10 to +20%
- $\geq +20\%$



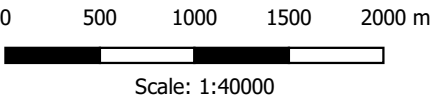


Legend

- Existing Rail Alignment
 - Proposed Rail Alignment
 - Major Roads
 - Future Newell Hwy Upgrade
 - Upgraded / New Culverts
 - Upgraded Bridges
 - Upgraded Level Crossings
 - Cadastral Boundaries
 - No Longer Flooded
 - Newly Flooded
 - Velocity Depth Product Mask ($VxD \leq 0.1 \text{m}^2/\text{s}$)
- Change In Velocity Depth Product (VxD):
- $\leq -10\%$
 - 10 to +10%
 - +10 to +20%
 - $\geq +20\%$

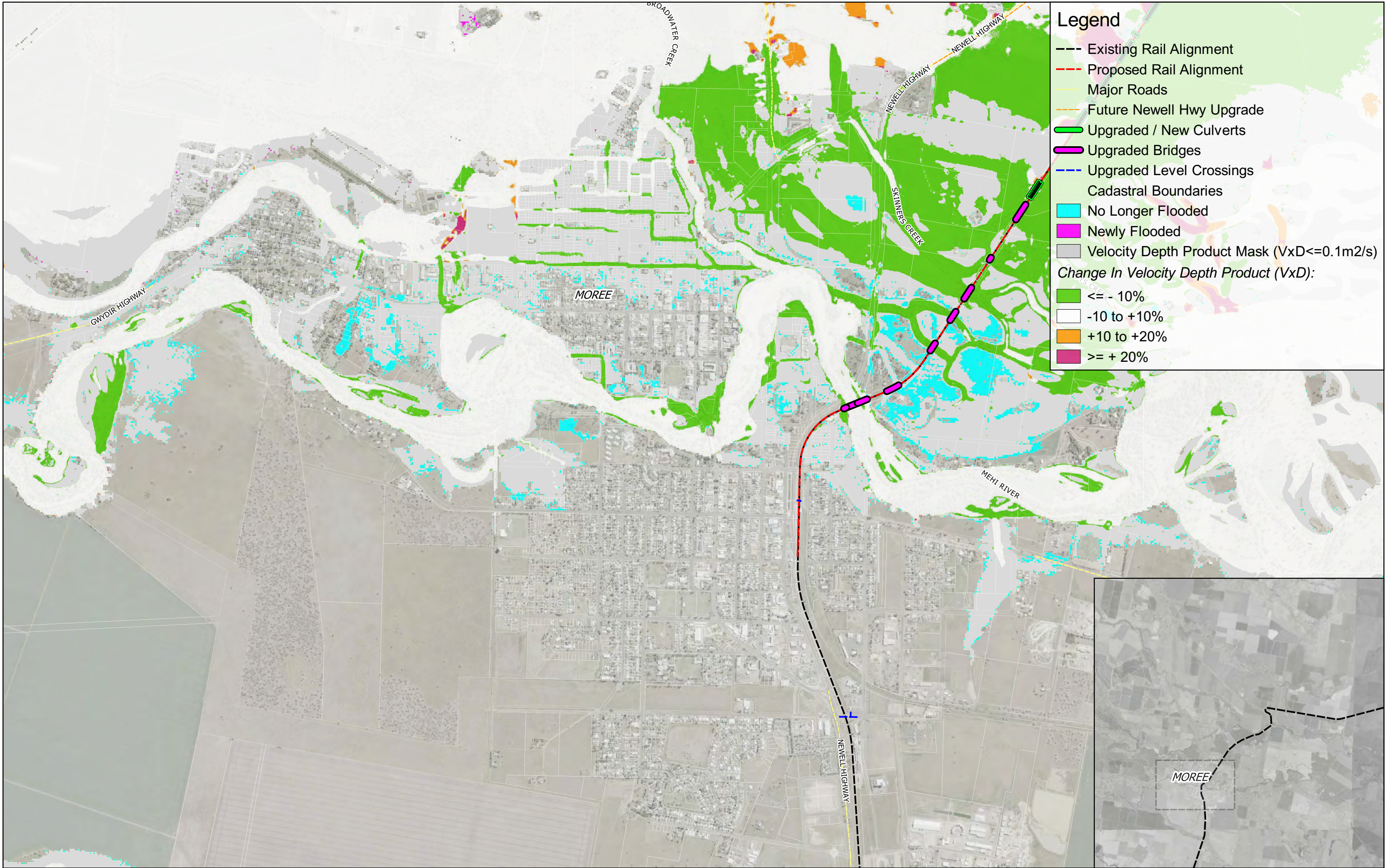


Prepared for: ARTC
Coordinate system: GDA 1994 MGA Zone 55
Aerial Source: NSW Six Maps
Scale ratio correct when printed at A3



Stage: EIS
Version: C
Author: JS
Approved by: RL
Date: 21/03/2022

Inland Rail - Narrabri to North Star Phase 2
Peak Flood Change in Flood Hazard - Proposed Design Scenario
Event: 10% AEP
Sheet 3
Map ID: DES_CHHAZ_010_3



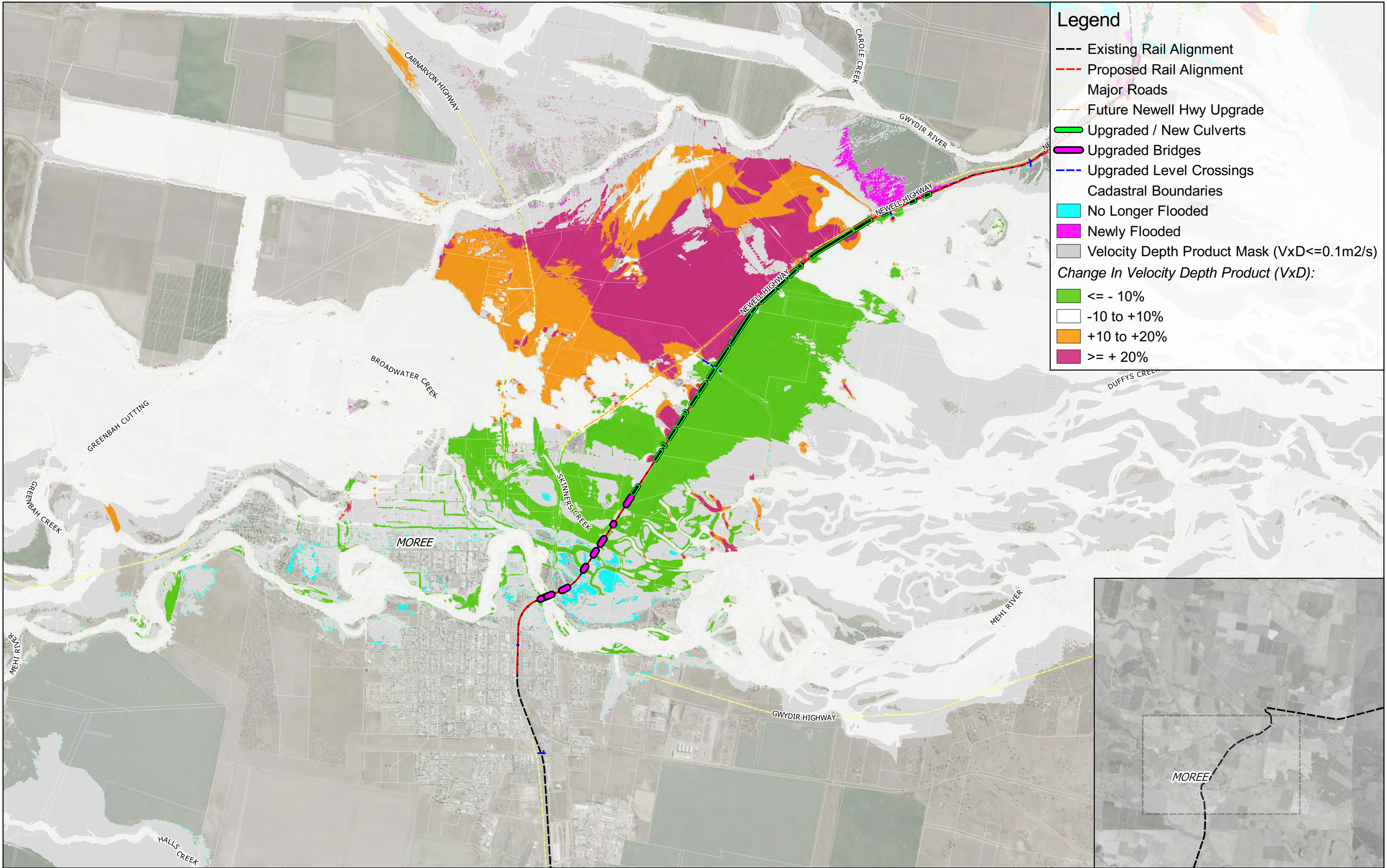
Legend

- Existing Rail Alignment
- - - Proposed Rail Alignment
- Major Roads
- - - Future Newell Hwy Upgrade
- █ Upgraded / New Culverts
- █ Upgraded Bridges
- █ Upgraded Level Crossings
- ▭ Cadastral Boundaries
- █ No Longer Flooded
- █ Newly Flooded
- ▭ Velocity Depth Product Mask ($VxD \leq 0.1 \text{ m}^2/\text{s}$)

Change In Velocity Depth Product (VxD):

- █ $\leq -10\%$
- ▭ $-10 \text{ to } +10\%$
- █ $+10 \text{ to } +20\%$
- █ $\geq +20\%$





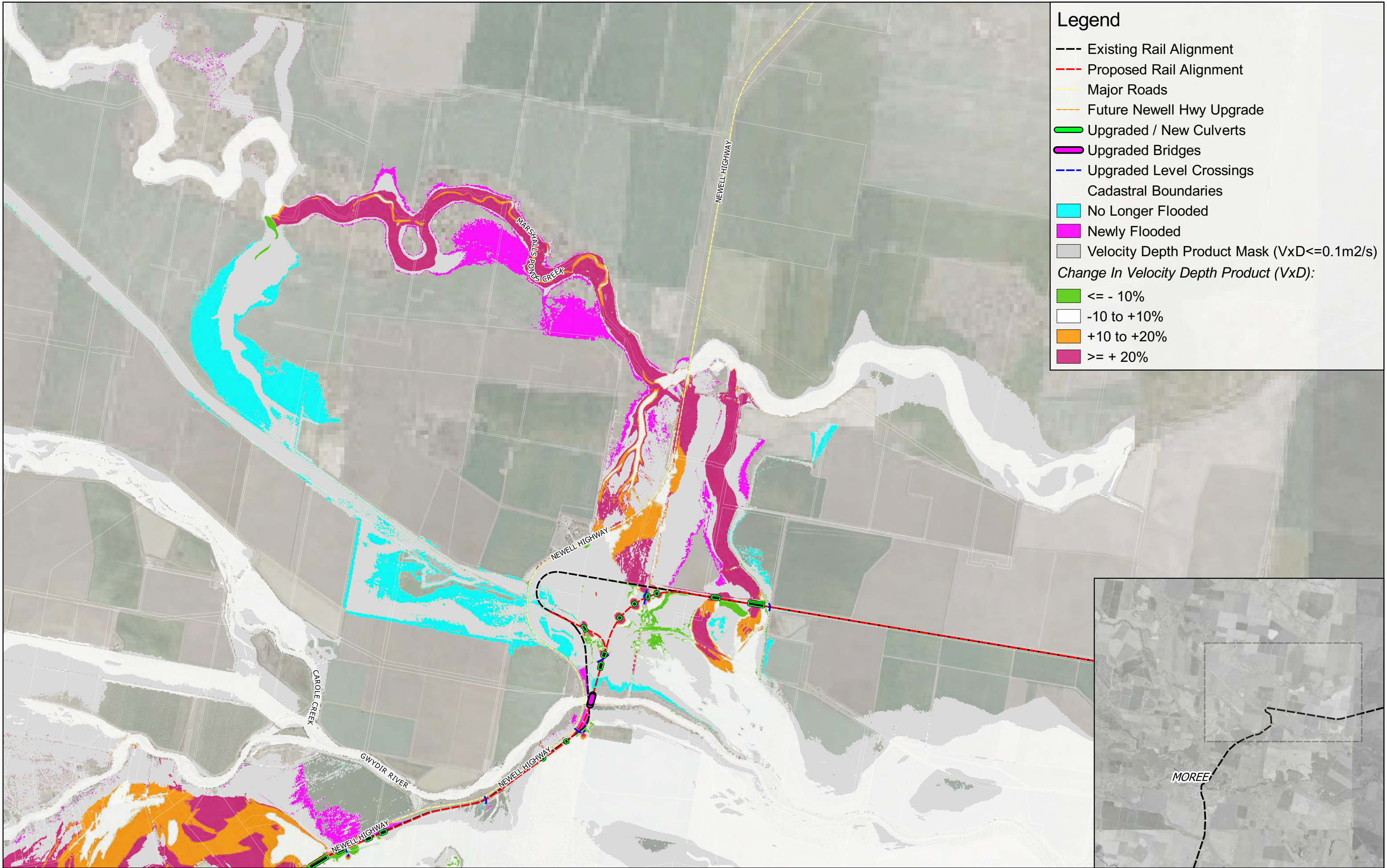
Legend

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- - - Proposed Rail Alignment
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- Upgraded Bridges
- Upgraded Level Crossings
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- Velocity Depth Product Mask ($VxD \leq 0.1 \text{ m}^2/\text{s}$)

Change In Velocity Depth Product (VxD):

- $\leq -10\%$
- -10 to $+10\%$
- $+10$ to $+20\%$
- $\geq +20\%$





Legend

Existing Rail Alignment

Proposed Rail Alignment

Major Roads

Future Newell Hwy Upgrade

Upgraded / New Culverts

Upgraded Bridges

Upgraded Level Crossings

Cadastral Boundaries

No Longer Flooded

Newly Flooded

Velocity Depth Product Mask ($V \times D \leq 0.1 \text{m}^2/\text{s}$)

Change In Velocity Depth Product ($V \times D$):

$\leq -10\%$

-10 to +10%

+10 to +20%

$\geq +20\%$





Legend

Existing Rail Alignment

Proposed Rail Alignment

Major Roads

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Upgraded / New Culverts

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Upgraded Level Crossings

Cadastral Boundaries

No Longer Flooded

Newly Flooded

Velocity Depth Product Mask ($V \times D \leq 0.1 \text{ m}^2/\text{s}$)

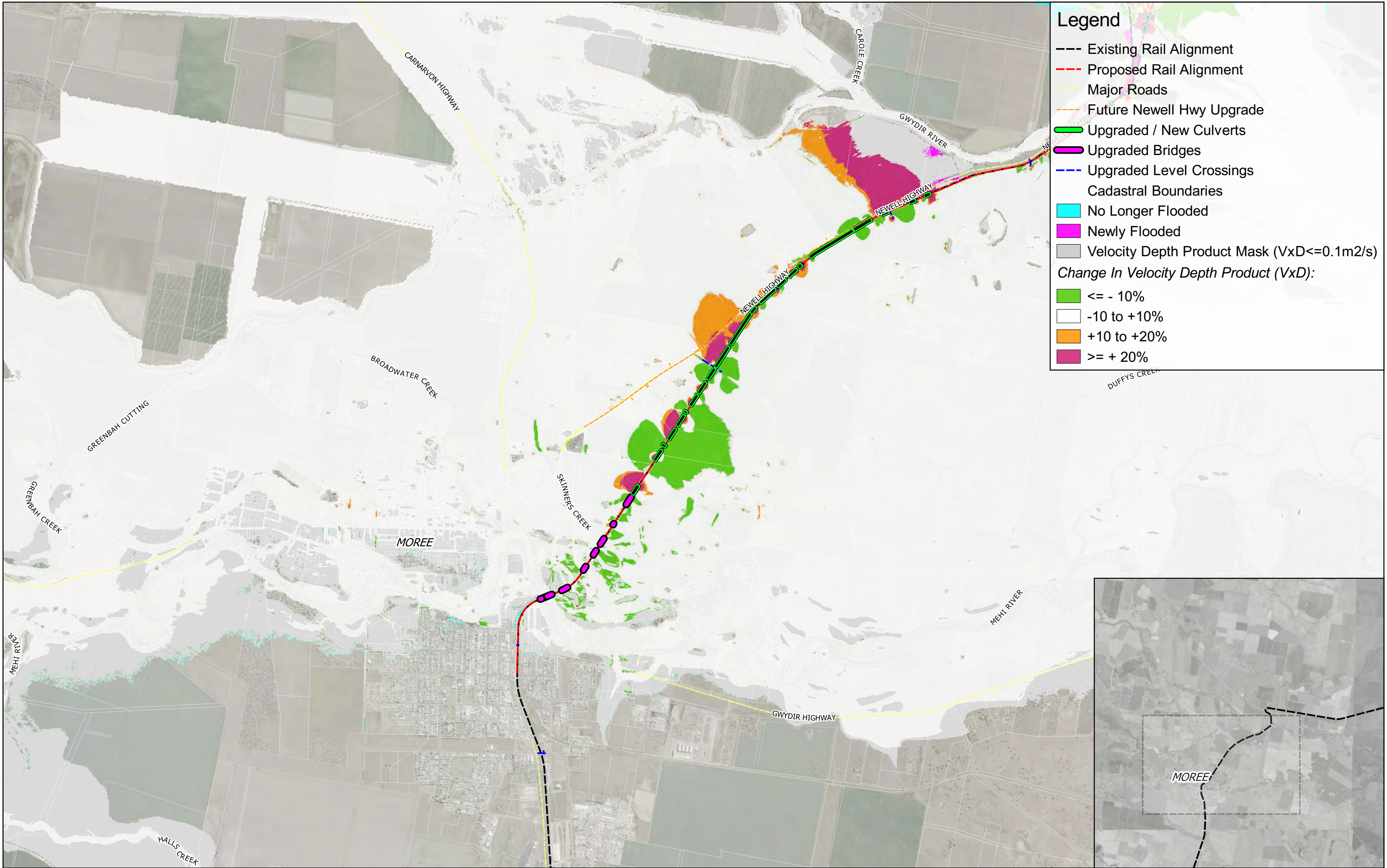
Change In Velocity Depth Product ($V \times D$):

 $\leq -10\%$

 $-10 \text{ to } +10\%$

 $+10 \text{ to } +20\%$

 $\geq +20\%$



Legend

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Velocity Depth Product Mask ($V \times D \leq 0.1 \text{ m}^2/\text{s}$)

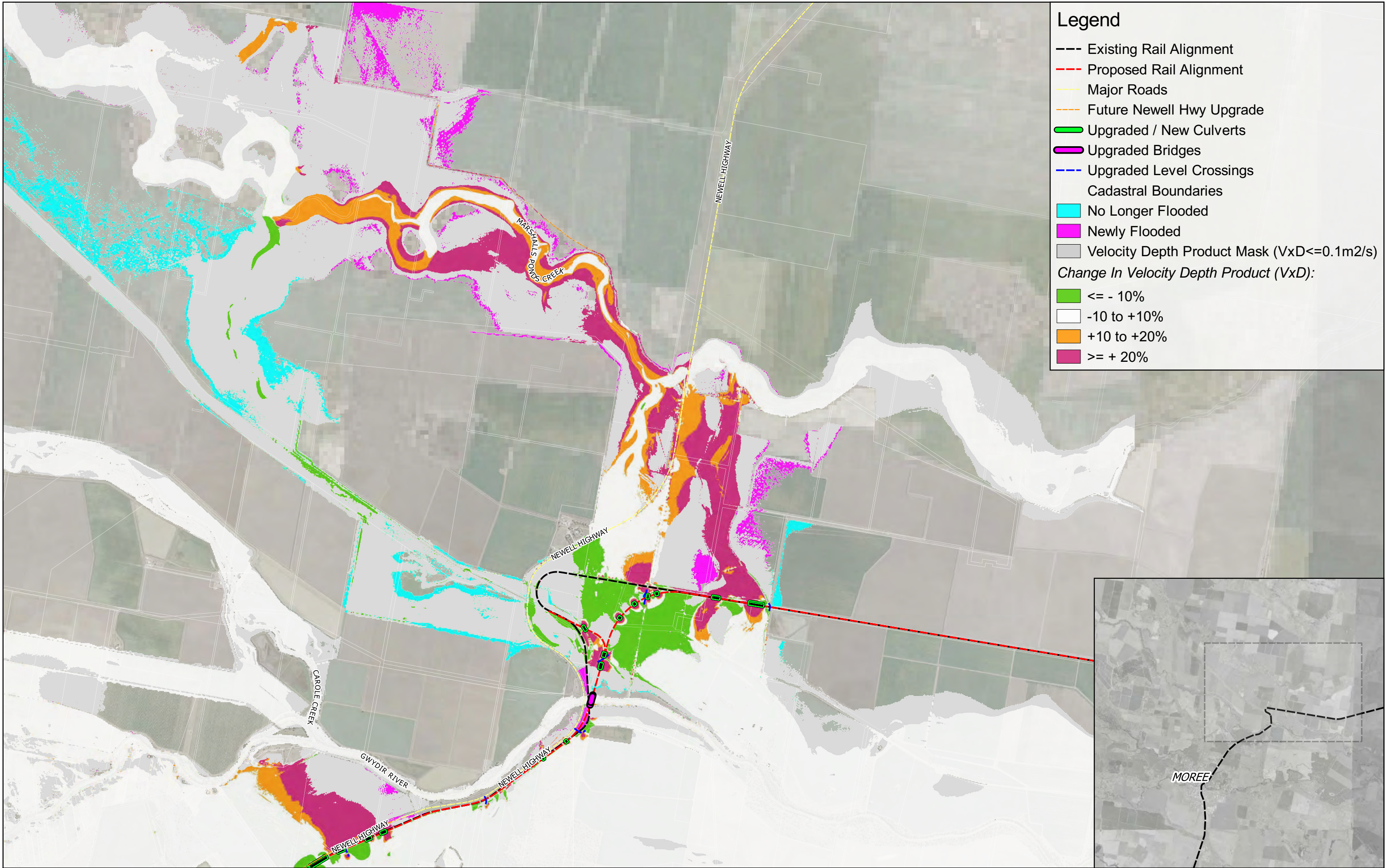
Change In Velocity Depth Product ($V \times D$):

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- Change In Velocity Depth Product (VxD):*
- $\leq -10\%$
 - $-10 \text{ to } +10\%$
 - $+10 \text{ to } +20\%$
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Prepared for: ARTC
Coordinate system: GDA 1994 MGA Zone 55
Aerial Source: NSW Six Maps
Scale ratio correct when printed at A3

0 500 1000 1500 2000 m

Scale: 1:40000



Stage: EIS
Version: C
Author: JS
Approved by: RL
Date: 21/03/2022

Inland Rail - Narrabri to North Star Phase 2
Peak Flood Change in Flood Hazard - Proposed Design Scenario
Event: 2% AEP
Sheet 3
Map ID: DES_CHHAZ_002_3



Legend

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Proposed Rail Alignment

Major Roads

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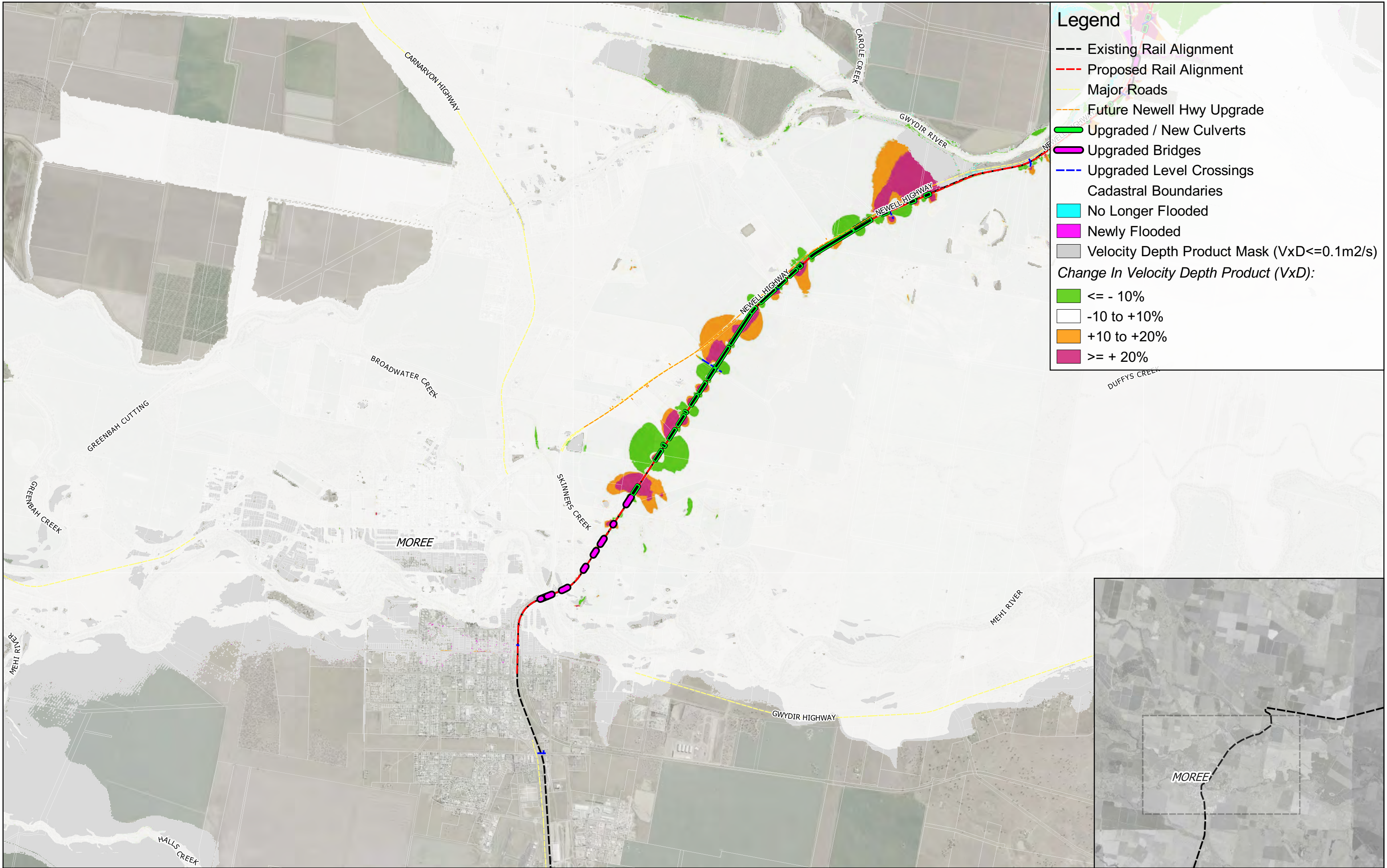
Change In Velocity Depth Product (VxD):

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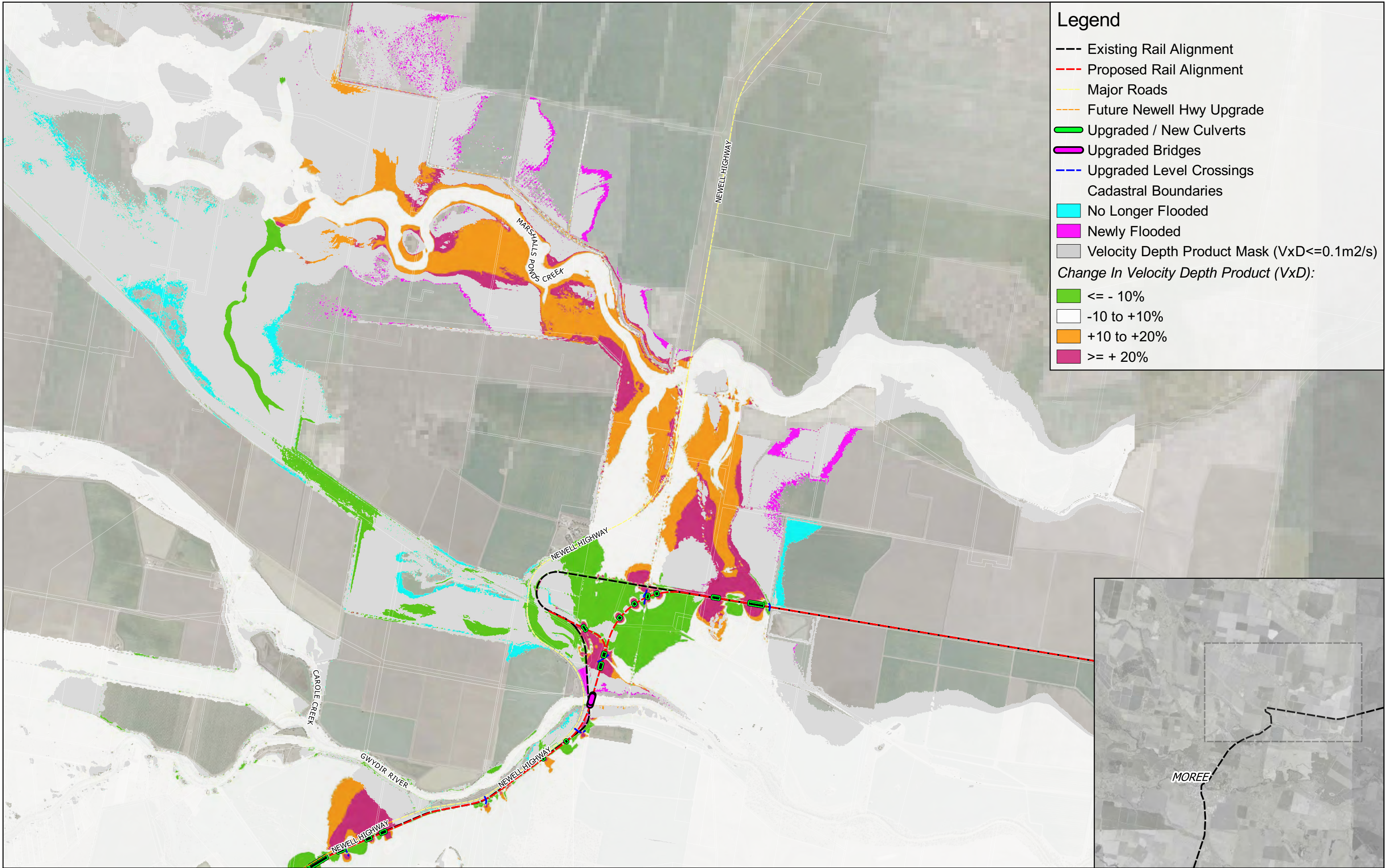
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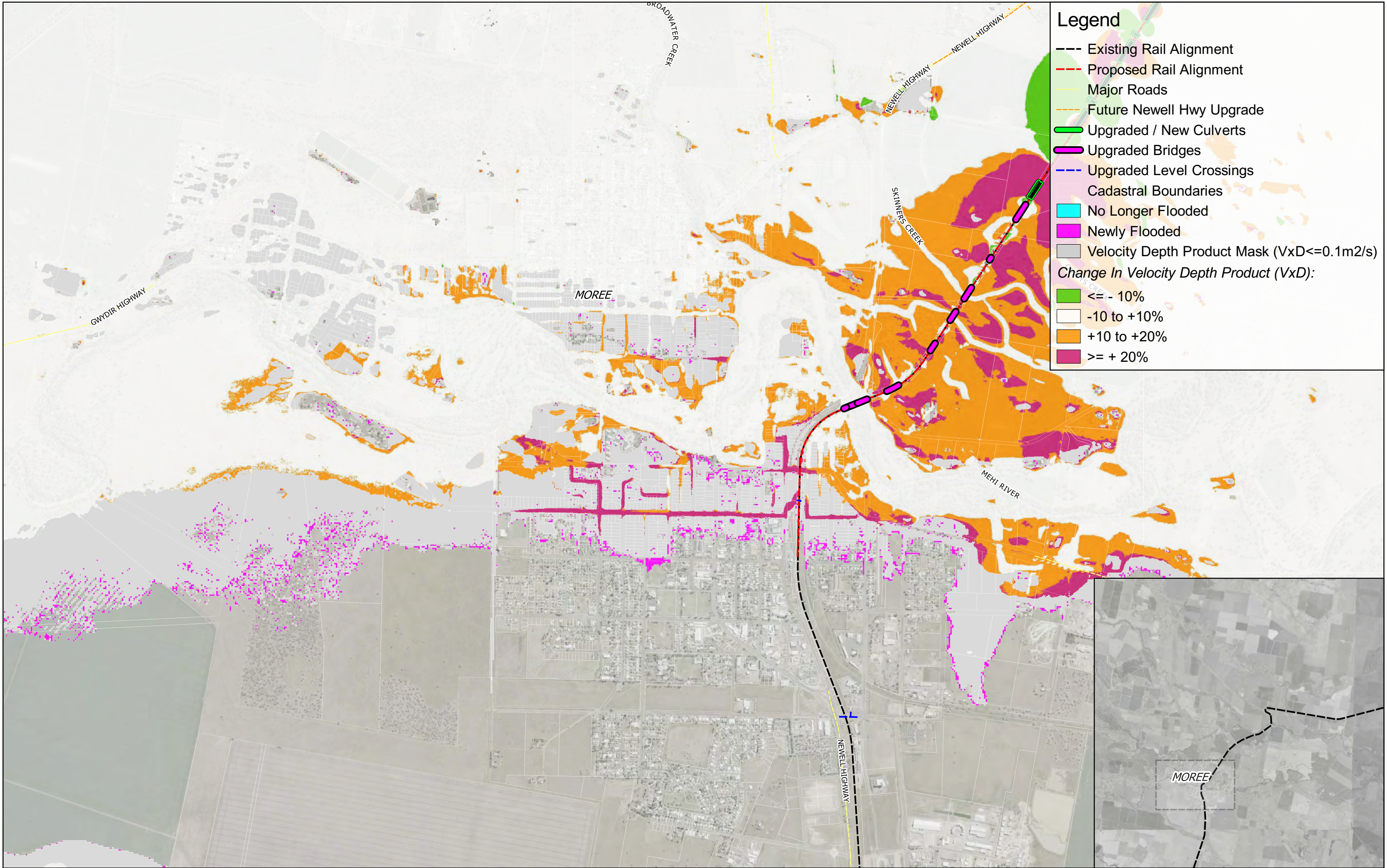
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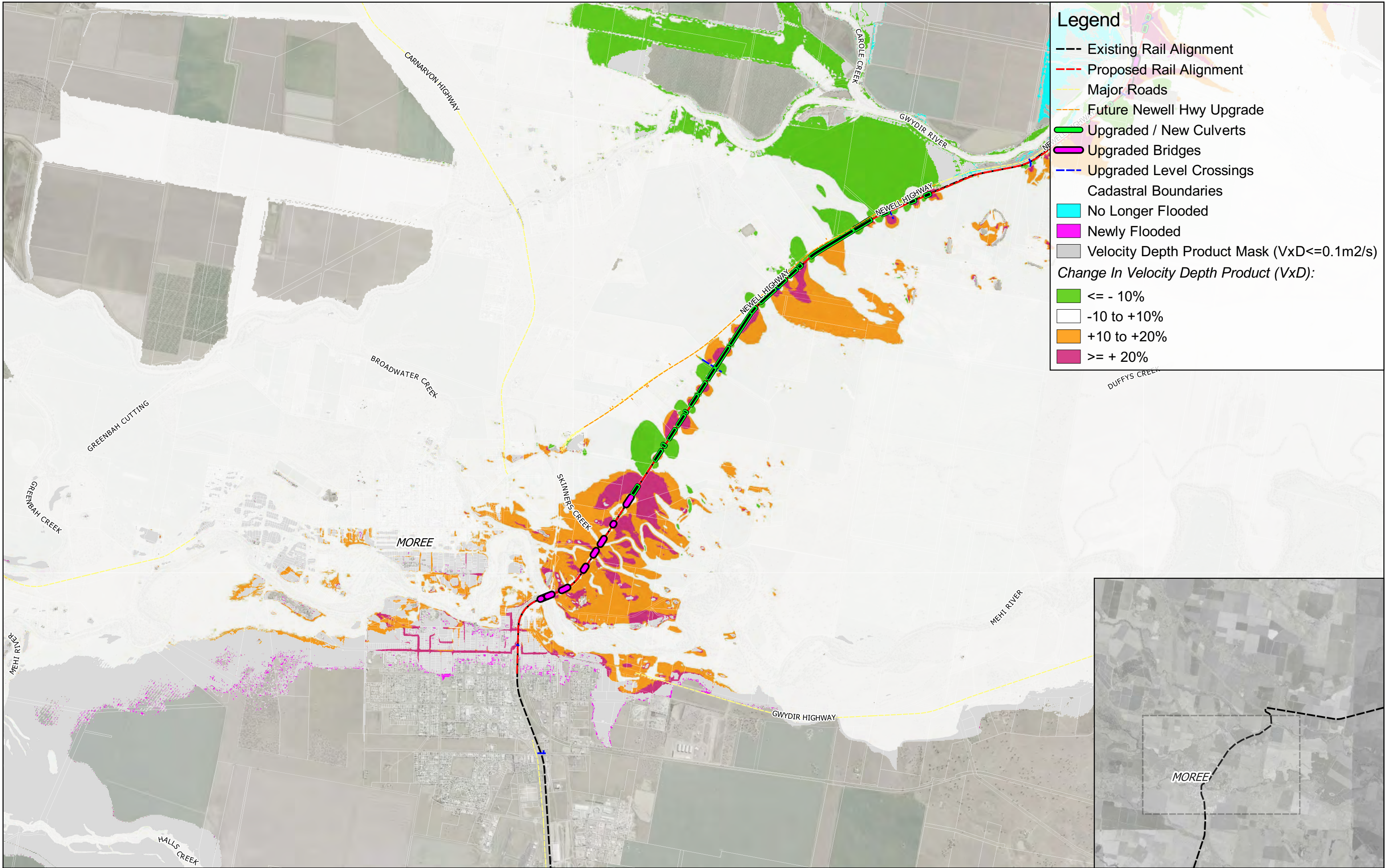
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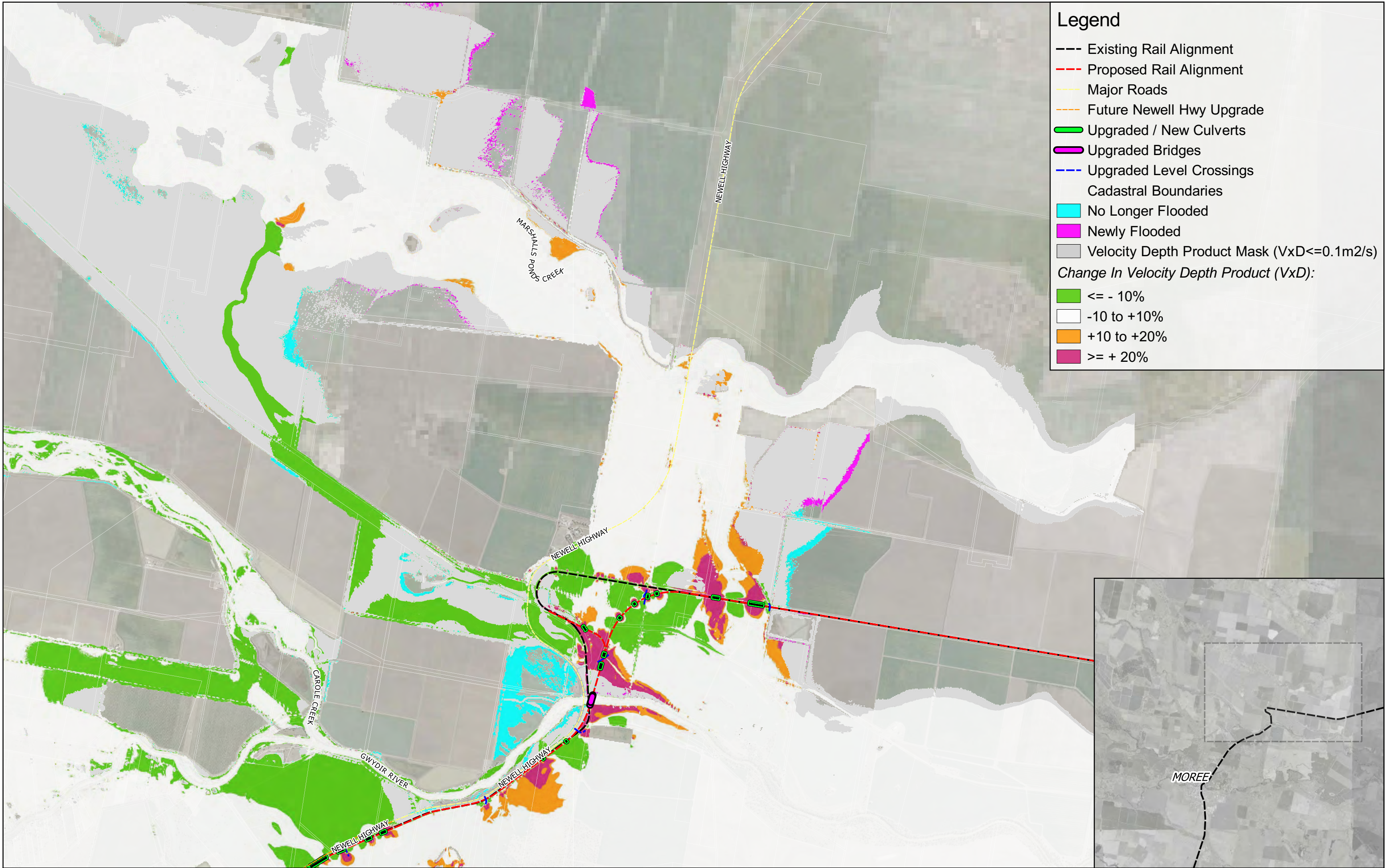
Change In Velocity Depth Product ($V \times D$):

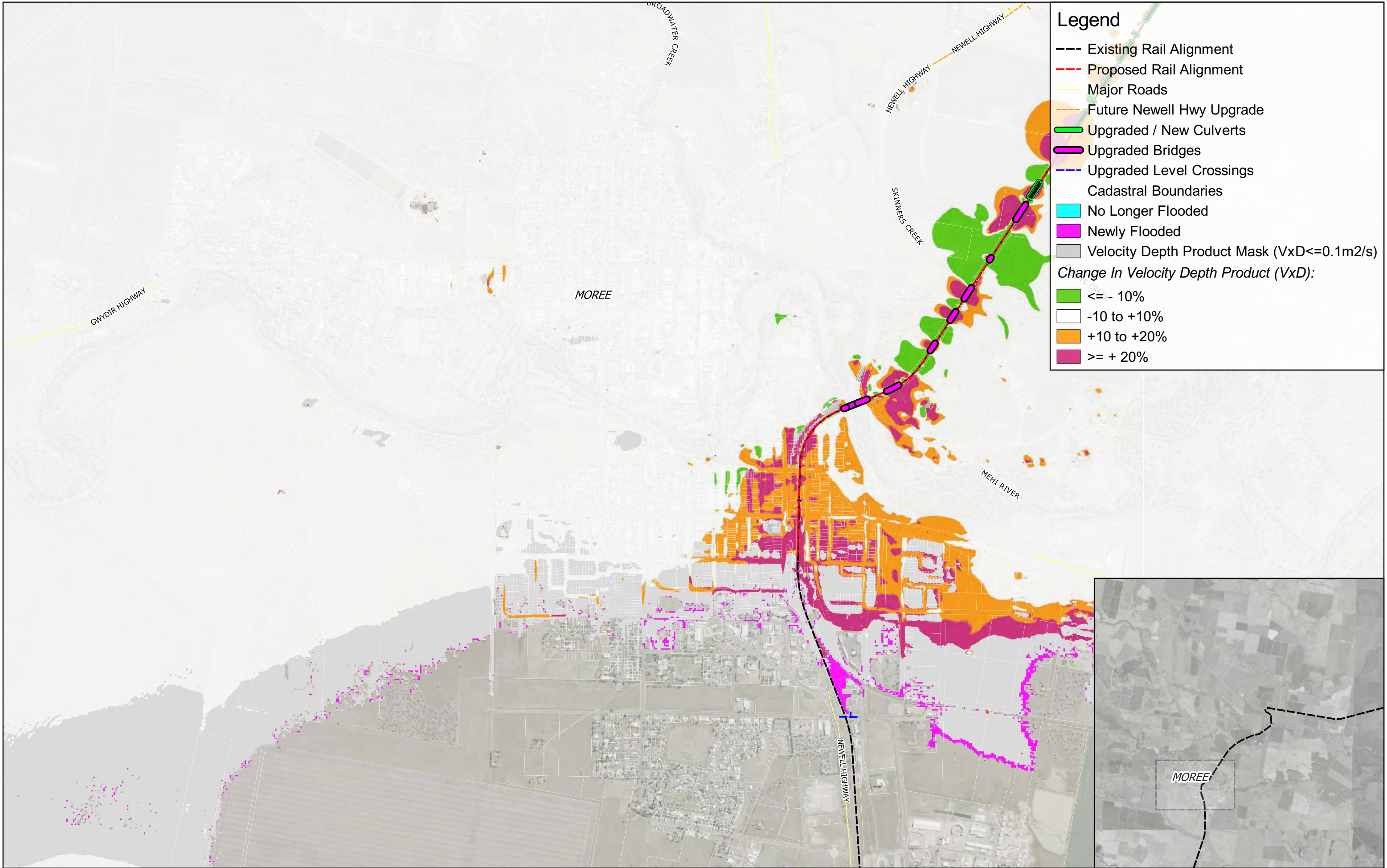
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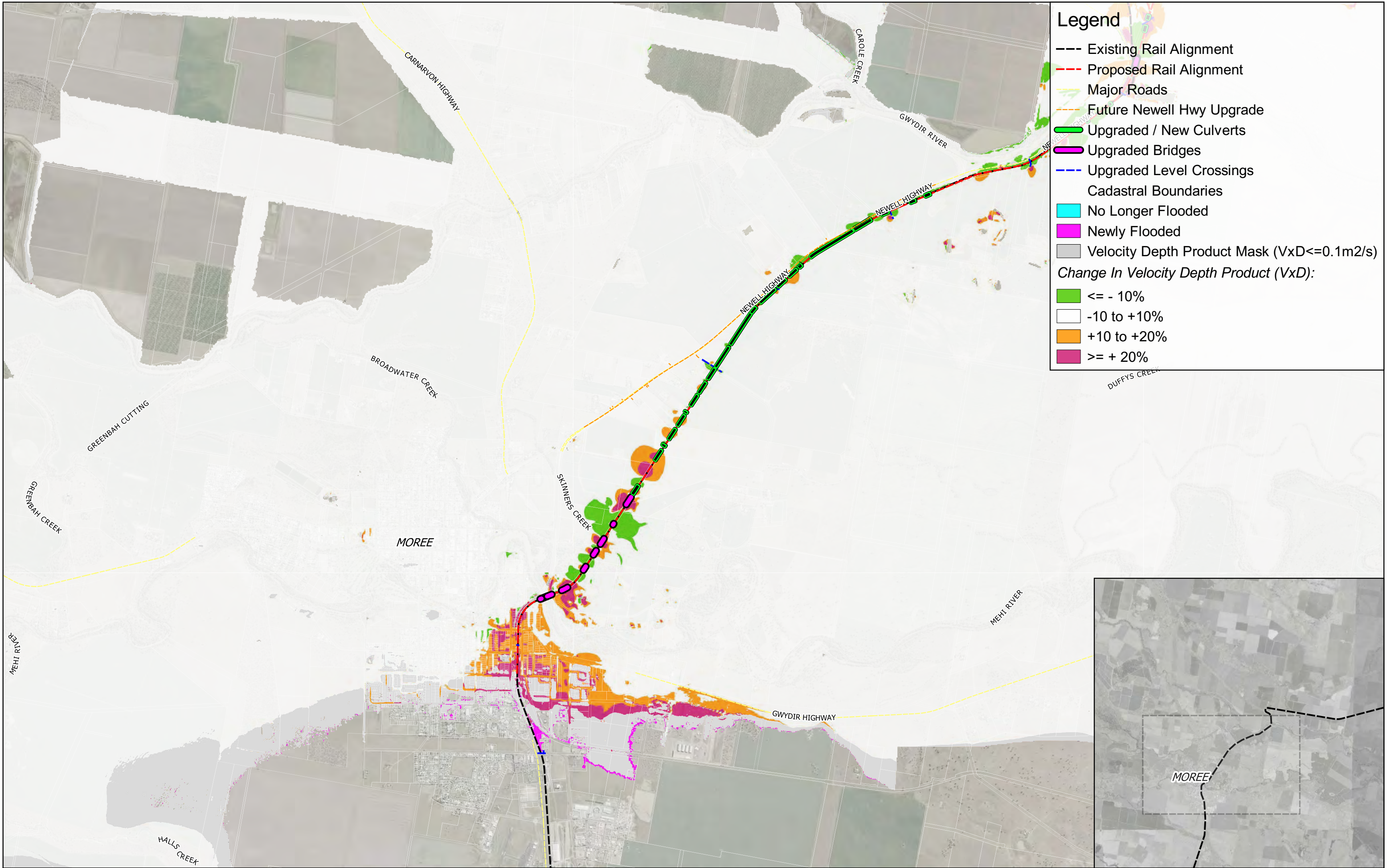
Change In Velocity Depth Product ($V \times D$):

 $\leq -10\%$

-10 to +10%

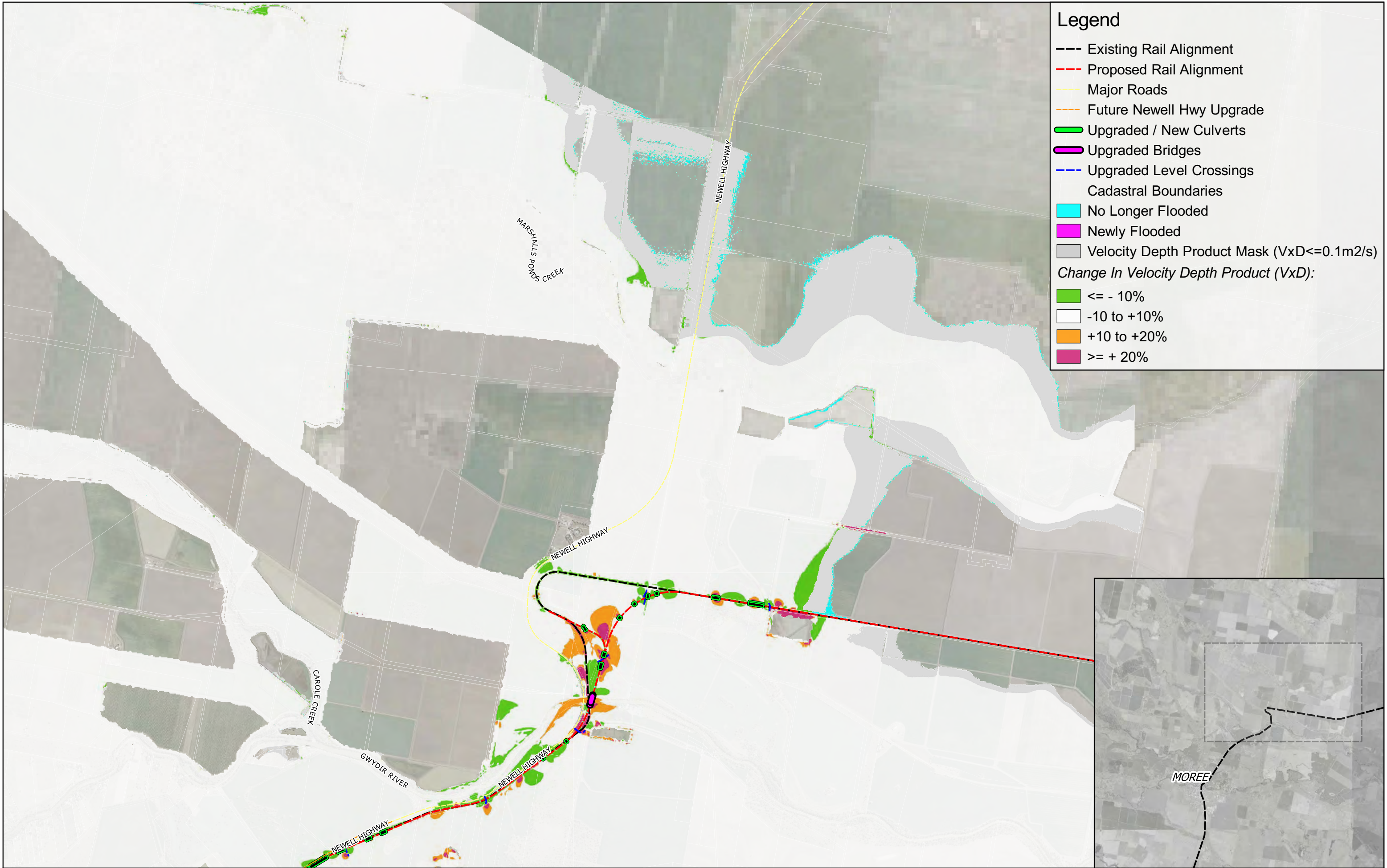
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