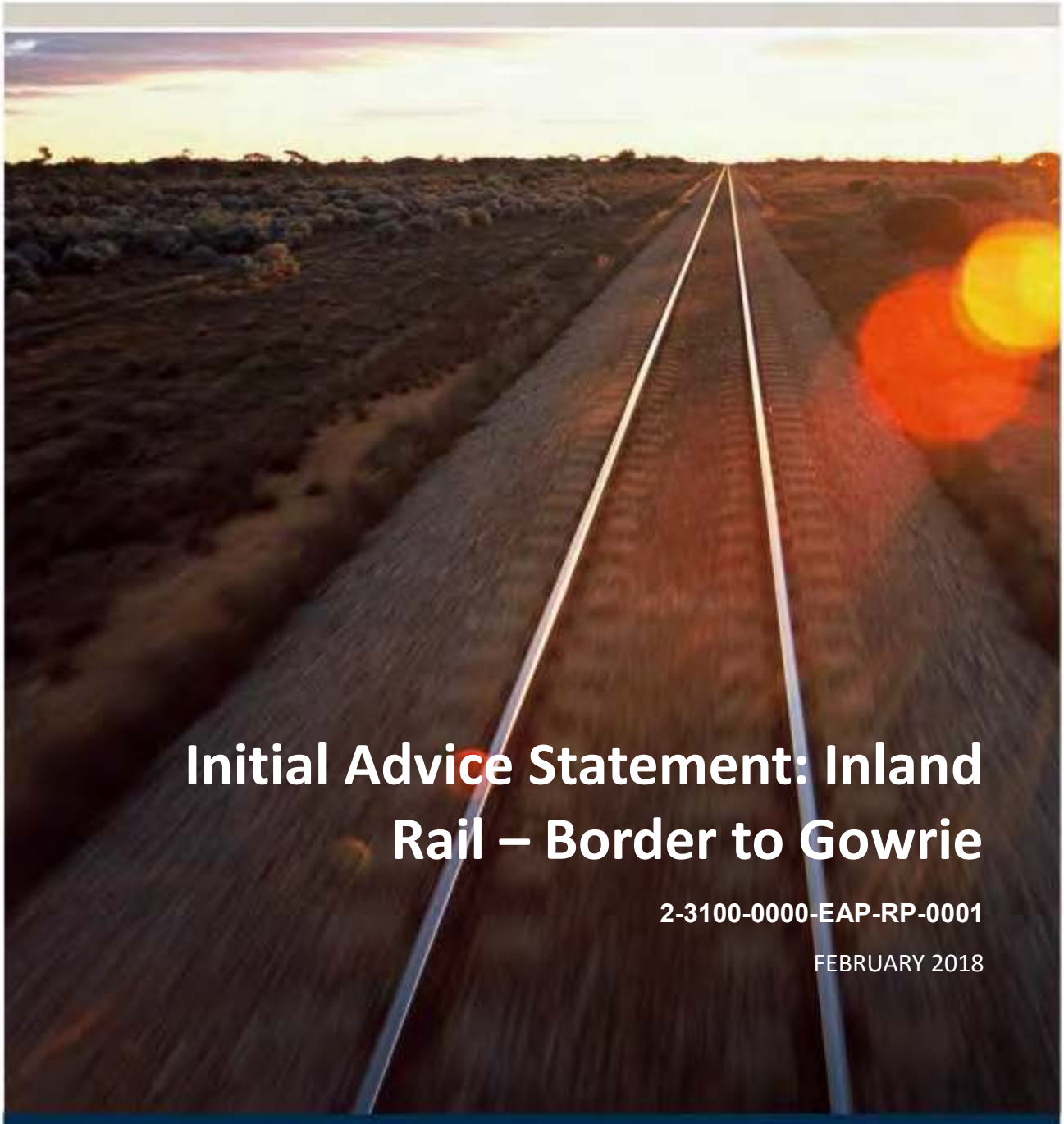
ARTC InlandRail

The Australian Government's priority freight rail project



Initial Advice Statement: Inland Rail – Border to Gowrie

2-3100-0000-EAP-RP-0001

FEBRUARY 2018

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EXECUTIVE SUMMARY

This Initial Advice Statement (IAS) has been prepared for the Inland Rail Border to Gowrie Project, one of 13 separate projects that are part of the Inland Rail programme. Australian Rail Track Corporation (ARTC) is an Australian Government owned corporation and currently manages and maintains approximately 8,500 kilometres (km) of rail network across Victoria, NSW, South Australia, Western Australia and QLD.

The project would comprise a new dual gauge freight railway extending from the border of New South Wales (NSW) and Queensland (QLD), near Kildonan, to Gowrie, 13 km north west of Toowoomba. The following Table 1 sets out the 13 projects that collectively comprise the Inland Rail programme.

Table 1 Inland Rail Programme projects

PROJECT NAME	STATE	DESCRIPTION	LENGTH (KM)
Tottenham to Albury	VIC	Enhancement works	305
Albury to Illabo	NSW	Enhancement works	185
Illabo to Stockinbingal	NSW	New Railway	37
Stockinbingal to Parkes	NSW	Enhancement works	169
Parks to Narromine	NSW	Upgrade works	111
Narromine to Narrabri	NSW	New Railway	307
Narrabri to North Star	NSW	Upgrade works	186
North Star to NSW/QLD Border	NSW	New Railway	37
NSW/QLD Border to Gowrie	**QLD**	**New Railway and upgrade works**	**224**
Gowrie to Helidon	**QLD**	New Railway	26
Helidon to Calvert	**QLD**	New Railway	47
Calvert to Kagaru	**QLD**	New Railway	53
Kagaru to Acacia Ridge/Bromelton	**QLD**	Enhancement works	49
	Total	**Total**	**1,736**

Each project can be delivered independently with tie-in points on the existing railway. The ARTC 2015 Inland Rail Business Case shows that Inland Rail maximises value for money while meeting market needs and provides benefits to the Australian economy through efficient freight transport.

The Border to Gowrie Project will be constructed as an approximately 224 km long single-track dual gauge railway with crossing loops to accommodate double stack freight trains up to 1,800 m long. Impact assessment will be undertaken for the proposed development described in the Inland Rail Business Case (2015) for rail traffic and associated activities projected at the year 2040. The Border to Gowrie Project will also include land provision to accommodate the

potential future duplication of the rail line and possible future extension of the crossing loops to accommodate trains up to 3,600 m in length.

The Border to Gowrie Project is one of the 'missing links' within the Inland Rail programme. A Conceptual Alignment has been identified for the Border to Gowrie Project within a broader Study Area. This will allow for route optimisation and other value engineering opportunities to be investigated during subsequent design development, community engagement, environmental assessment and approvals processes. The final alignment and Project Corridor will be defined during the Environmental Impact Statement (EIS) and design development phases.

ARTC is seeking a declaration for coordinated project status under the *State Development and Public Works Organisation Act 1971 (Qld)* (SDPWO Act). The Border to Gowrie Project will also be referred under the *Environment Protection and Biodiversity Conservation Act 1999 (Cth)* (EPBC Act) and if determined to be a controlled action, it is anticipated that assessment of the Border to Gowrie Project will be progressed under the Assessment Bilateral Agreement between the Australian and Queensland Governments.

The key reasons ARTC is seeking the coordinated project declaration under the SDPWO Act are:

- To provide the public with the opportunity to comment and provide input into the terms of reference for the Environmental Impact Statement (EIS), and following its development, on the draft EIS prepared by ARTC,
- To have an independent and transparent social, economic and environmental assessment of the project undertaken by the Queensland Coordinator-General; and
- For the opportunity of efficient assessment of EPBC Act matters in accordance with the Queensland and Commonwealth Government EPBC Act Assessment Bilateral Agreement (if required).

The EIS will undertake a range of investigations into the potential impacts and mitigation measures required for the delivery of the Border to Gowrie Project. Those investigations will as a minimum assess:

- Land use
- Flora and fauna
- Water quality
- Hazards, health and safety
- Social and economic factors
- Air quality
- Noise and vibration
- Water resources
- Waste management
- Cultural heritage
- Transport.

1. INTRODUCTION

1.1. Background

The Australian Government has committed to building a nationally significant piece of transport infrastructure by constructing an inland railway between Melbourne and Brisbane, via regional Victoria, central-west New South Wales (NSW) and Toowoomba in Queensland (QLD).

The Melbourne to Brisbane Inland Rail programme will enhance Australia's existing rail network and serve the interstate freight market by delivering a road competitive service that will see freight delivered by rail between Melbourne and Brisbane in less than 24 hours with reliability, pricing and availability that is equal to or better than road. Inland Rail provides a step-change in freight productivity, while also catalysing a range of potential benefits from complementary investments in land use and supply chains that leverage the enhanced logistics capabilities of Inland Rail.

The Inland Rail programme has evolved over several decades with many alternatives and options assessed to meet Australia's growing freight transport needs. The current Inland Rail alignment, shown in **Figure 1-1**, builds upon the alignment in the Inland Rail Business Case 2015 and the Inland Rail Implementation Group's report to the Australian Government (August 2015).

The Australian Government has prioritised the Inland Rail programme, and in 2014 engaged Australian Rail Track Corporation (ARTC) under the guidance of the Inland Rail Implementation Group to develop a 10-year delivery programme for Inland Rail.

The Inland Rail route, which is approximately 1,700 km long, will involve:

- Using the existing interstate rail line through Victoria and southern NSW
- Enhancing and upgrading approximately 1200 km of existing track, Victoria, NSW and QLD; and
- Providing approximately 500 km of new track in northern NSW and south-east QLD.

Inland Rail has been divided into 13 projects, five (5) of which are located in QLD, as shown in

Figure 1-2. Each of these projects is able to be delivered, constructed and operated independently with tie-in points on the existing railway.

The Border to Gowrie Project is the subject of this Initial Advice Statement (IAS). The Border to Gowrie Project will provide an efficient route through the undulating topography between the NSW/QLD border and Gowrie.

The Study Area's southern extent has been curtailed at the state border to enable a single state approval process to be followed.

On 21 September 2017, the then Minister for Infrastructure and Transport, the Hon Darren Chester MP, announced that the alignment via Wellcamp and Charlton will proceed to the planning and approvals phase.

The proposed Study Area has been determined based on environmental, engineering and property/community impact considerations. This determination followed a lengthy and extensive alignment review under the direction of the Federal Minister for Transport & Infrastructure and with the establishment of the Yelarbon to Gowrie Project Reference Group.

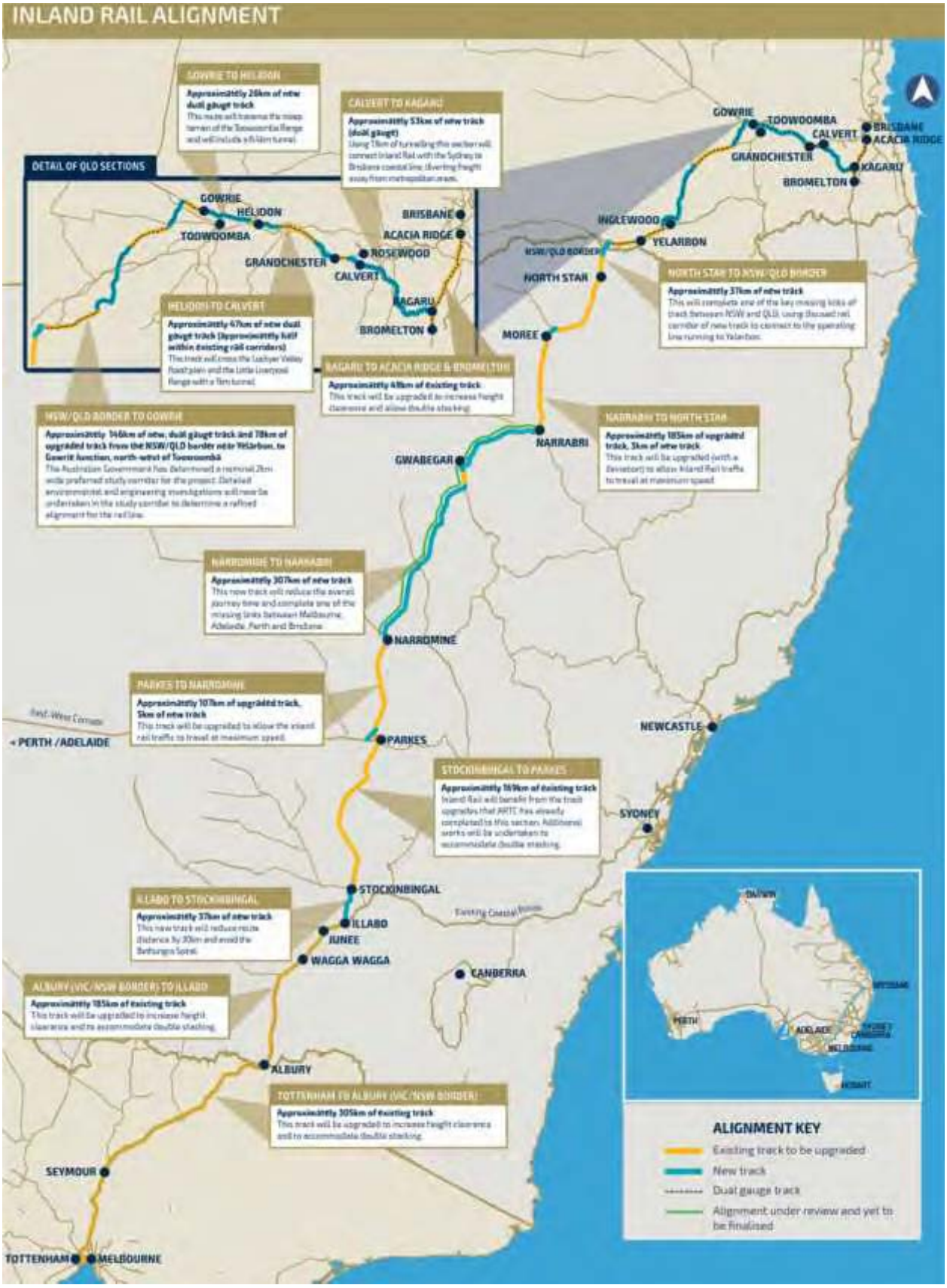


Figure 1-1 The Melbourne to Brisbane Inland Rail programme

Figure 1-2 QLD Projects in the Inland Rail programme

1.2. Purpose and Scope of the Initial Advice Statement

This IAS has been prepared for the Border to Gowrie Project to support an application to the Queensland Coordinator-General for a 'coordinated project' declaration under Part 4 of the *State Development and Public Works Organisation Act 1971* (SDPWO Act). Given the scale and extent of the proposed Border to Gowrie Project, ARTC believe that an Environmental Impact Statement (EIS) is appropriate for assessing the social, economic and environmental impacts.

ARTC is seeking a declaration that the Border to Gowrie Project is a coordinated project due to the significant infrastructure investment and strategic direct and indirect economic benefits of creating an efficient freight route. ARTC is also seeking to have Commonwealth matters under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) assessed in accordance with the Assessment Bilateral Agreement between the Queensland State Government and the Commonwealth Government, if the Commonwealth Minister determines that the Border to Gowrie Project is a controlled action. The Border to Gowrie Project will have complex approval and permitting requirements under Commonwealth, State and local legislation and the potential for significant environmental impact unless appropriately managed.

The IAS provides information to assist the Coordinator-General to decide whether the Border to Gowrie Project should be declared a coordinated project, to determine the appropriate level of assessment, and inform the preparation of a terms of reference for an EIS should the Border to Gowrie Project be declared under section 26(1)(a) of the SDPWO Act, and require an EIS.

The Border to Gowrie Project will be referred to the Commonwealth Department of the Environment and Energy (DotEE) for a decision as to whether the Border to Gowrie Project is a controlled action requiring assessment and approval under the EPBC Act. If the Border to Gowrie Project is determined to be a controlled action, it can be assessed by the SDPWO Act EIS process accredited under the Assessment Bilateral Agreement between the Australian Government and the State of Queensland.

A Conceptual Alignment and a broader Study Area for the Border to Gowrie Project has been identified for consideration in the IAS and EPBC Referral. These aspects are discussed further in **Section 3.1**.

2. THE PROPONENT

ARTC is an Australian Government owned corporation and current operator of the Australian freight network. ARTC has been tasked by the Australian Government with delivery of the Inland Rail programme. ARTC was established in 1998 after the privatisation of the national rail network and Commonwealth and State Government agreement to form a 'one-stop' shop for all operators wanting access to the standardised interstate rail network.

ARTC currently manages and maintains approximately 8,500 km of rail network across Victoria, NSW, South Australia, Western Australia and QLD. Since 2011, ARTC has delivered a capital works programme of almost $3 billion to modernise the east coast freight rail lines and other projects to enhance the national rail network offering to customers. The Inland Rail is an integral component of the future enhancement of the national rail network.

ARTC is fully capable of completing an EIS, having established an Inland Rail programme team with in-house support from specialist consultant technical advisors. Packages of technical (engineering and environmental) work are also being procured from industry consultants. ARTC plans to engage suitably qualified consultants with demonstrated experience in delivering the required social, economic and environmental impact assessment, and the associated engineering solutions for a project of this nature and scale.

ARTC has not incurred any environmental prosecutions within the last five years. During the execution of almost $3 billion of capital works, ARTC have incurred two penalties relating to minor environmental incidents including:

- New South Wales Environment Protection Authority (EPA) Penalty Notice to ARTC dated 29 May 2012 for discharge of sediment-laden water at Allandale (Maitland to Minimbah Third Track Project). Penalty: $1500.
- New South Wales EPA Penalty Notice to Transport Express JV (operating under ARTC Environment Protection Licence) dated 5 March 2012 for sediment and erosion control issues at Sawtell. Penalty: $1500.

ARTC entered into a Voluntary Enforceable Undertaking, i.e. formal written undertakings in relation to a contravention or alleged contravention of the law, with the Commonwealth DotEE under the EPBC Act in 2011.

Contact details for the Inland Rail programme are as follows:

Inland Rail
Australian Rail Track Corporation
Level 12, 40 Creek Street
PO Box 2462 Queen Street
Brisbane Qld 4000
Telephone: 1800 732 761

3. NATURE OF THE PROPOSAL

3.1. Scope of the Border to Gowrie Project

The proposed Border to Gowrie Project is an approximately 224 km long single-track dual-gauge railway with crossing loops to accommodate double stacked freight trains up to 1,800 m long. The land requirement for the Border to Gowrie Project will comprise a corridor with an average width of 40 m, with some variation to accommodate particular infrastructure and to cater for local topography. The corridor will be of sufficient width to accommodate the infrastructure currently proposed for construction, as well as future expansion, including possible future requirement for 3,600 m trains.

Initial project construction will be a single-track dual-gauge railway, with crossing loops to accommodate double stacked freight trains up to 1,800 m long. Components of the construction will include infrastructure to accommodate possible future augmentation and upgrades of the track, including a possible future requirement for 3,600 m trains.

The operational phase at year 2040 will be of a single track with crossing loops to accommodate double stacked freight trains up to 1,800 m long. Impact assessment will be undertaken for the proposed development described in the Inland Rail Business Case (ARTC, 2015) for rail traffic and associated activities projected at the year 2040.

The Border to Gowrie Project will use a combination of new corridor and track (greenfield) and upgrade of existing rail track (brownfield) of which some is currently operational and some disused (non-operational) rail corridor. The Conceptual Alignment connects to the existing Queensland Rail West Moreton Line to the west of Toowoomba in Gowrie (**Figure 3-1**) and traverses in a south-west direction towards the QLD and NSW border with a bridge crossing across the McIntyre River near Kildonan. The Border to Gowrie Project is located between the adjacent Inland Rail proposed projects of North Star to Border to the south west and Gowrie to Helidon to the north east.

A Conceptual Alignment and a Study Area have been identified as shown in **Figure 3-1**. The Study Area will allow for route optimisation and other value engineering opportunities to be investigated during subsequent design development, community engagement, environmental assessment and approvals processes. Further details are included in **Section 3.4**.

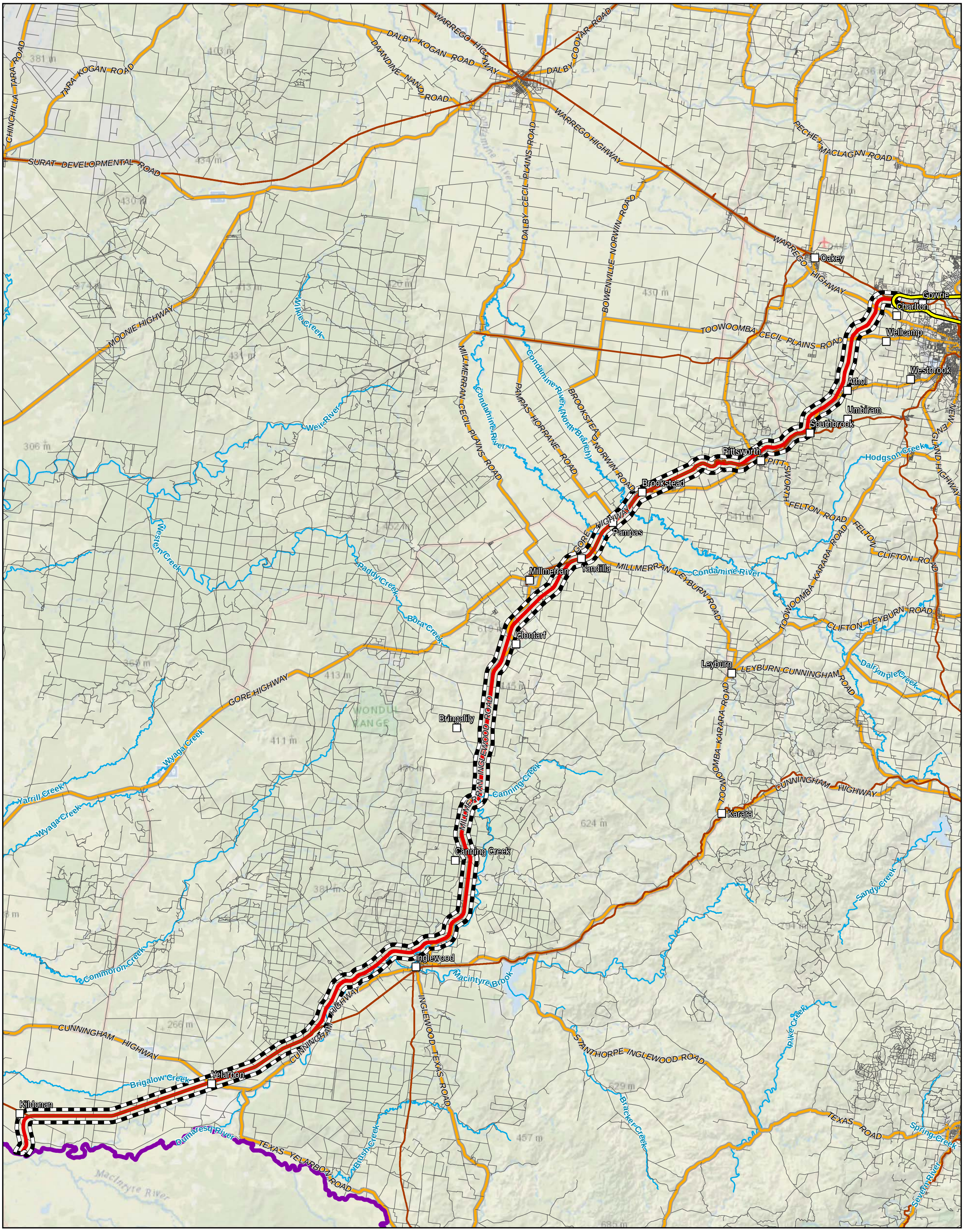
3.2. Land Use

The Study Area is primarily characterised by rural and rural-residential land uses on a variety of property sizes. The diversity in rural land use is reflected through the various rural allotment sizes.

The Conceptual Alignment passes through, or within proximity to, a number of townships such as Yelarbon, Inglewood, Millmerran, Brookstead, Pittsworth, Southbrook, Athol and Gowrie.

- The Conceptual Alignment extends across approximately 46 km of floodplain[1] (Macintyre River, Macintyre Brook, Condamine River (south, main and north branches), Westbrook Creek and Gowrie Creek).

[1] Based on the Queensland Reconstruction Authority (QRA) Indicative Flood Assessment Overlays.



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Coordinate System: GDA 1994 MGA Zone 56
Projection: Transverse Mercator

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Kms

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Legend

- Towns
- Existing Rail Network
- Conceptual Alignment
- Major Roads
- Minor Roads
- Study Area
- Adjacent Inland Rail Project
- State Boundary

OVERVIEW

Data sources:
Road and Rail Network - DNRM 2017
Imagery - QLDGov 2017
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Initial Advice Statement
Border to Gowrie Project

Project Context

PROJECT ID: 60492124
CREATED BY: JR
LAST MODIFIED: JR - 2/02/2018
VERSION: 3

Figure **3.1** (1 of 3)

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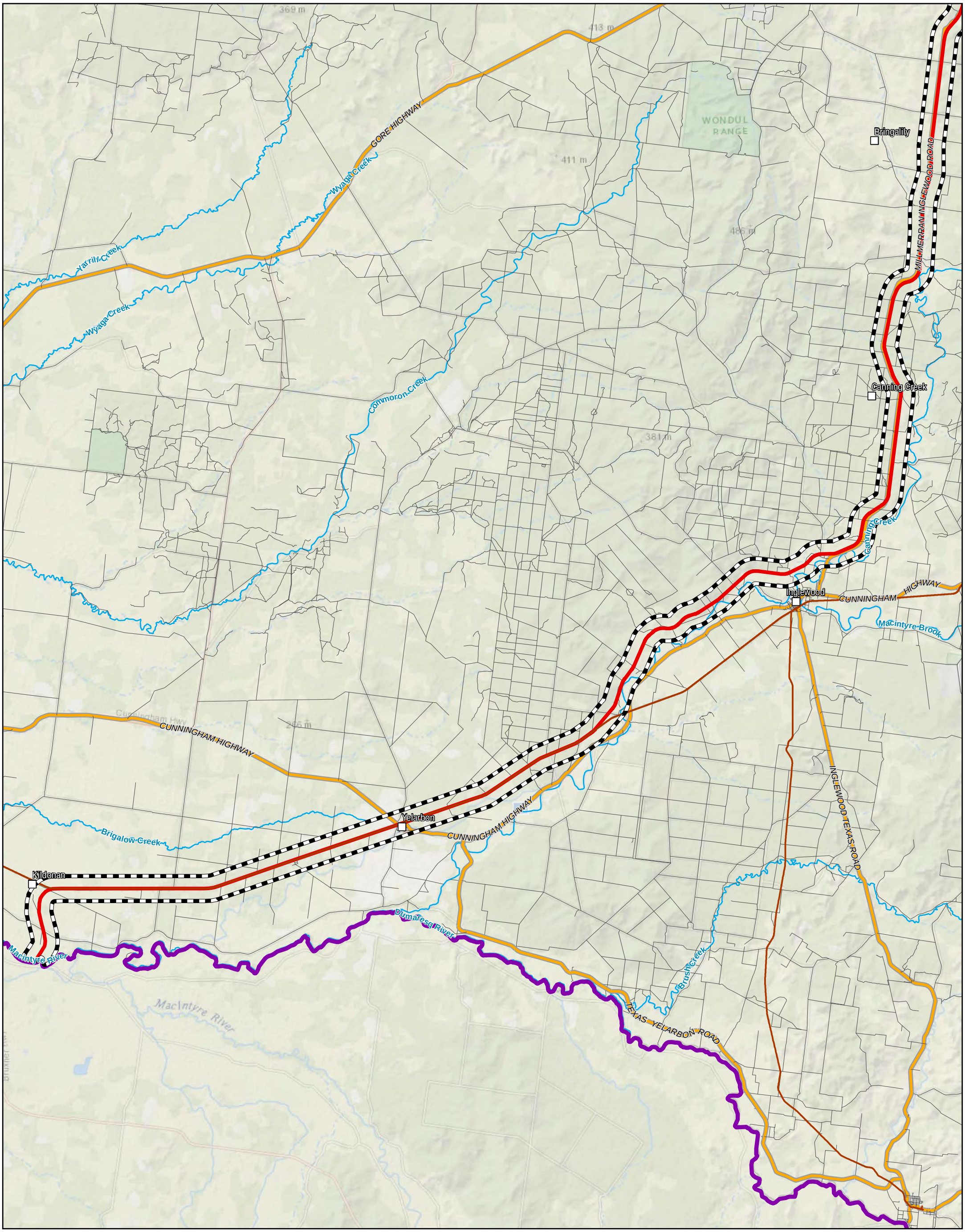

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- Towns
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Project Context

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Figure **3.1**
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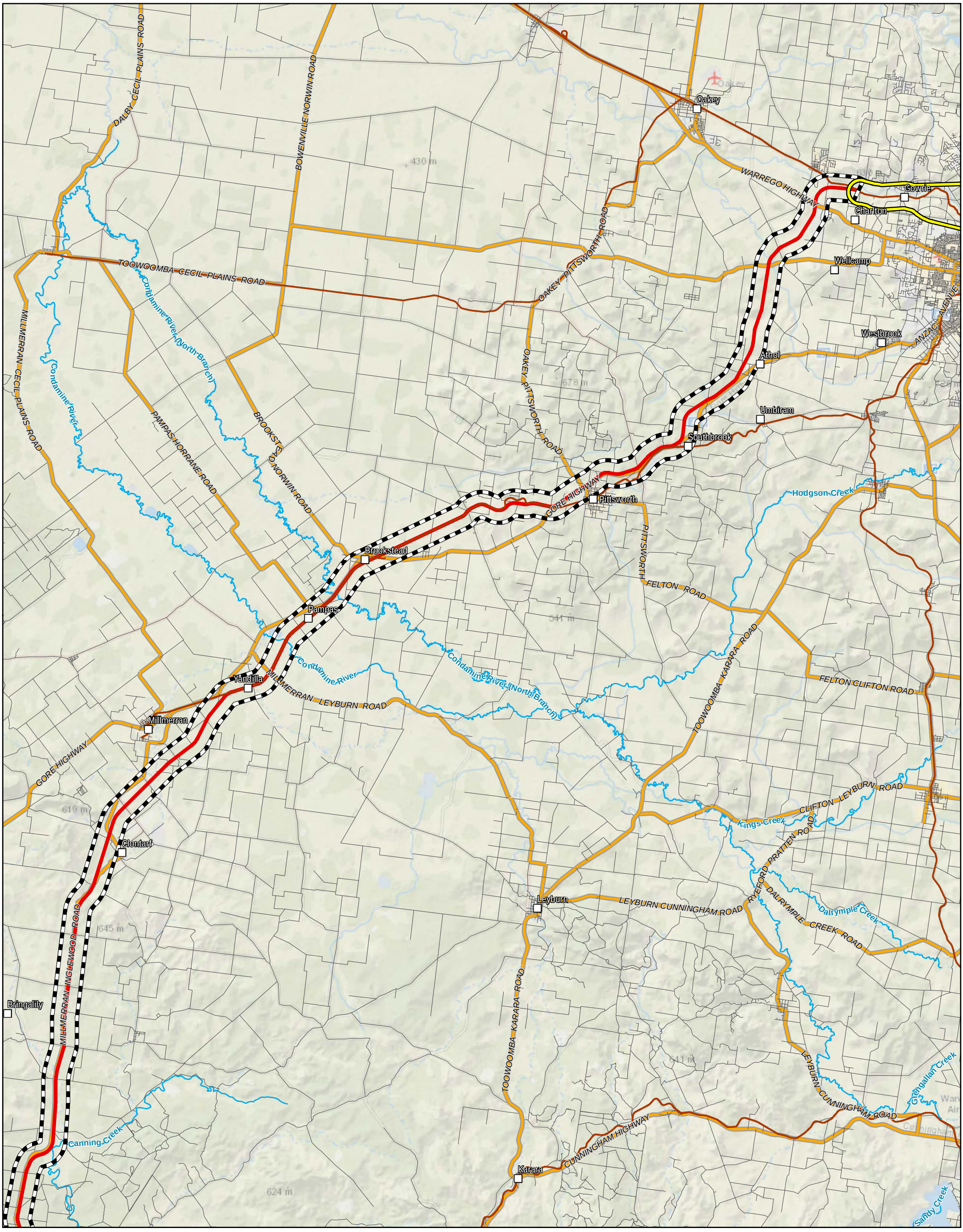

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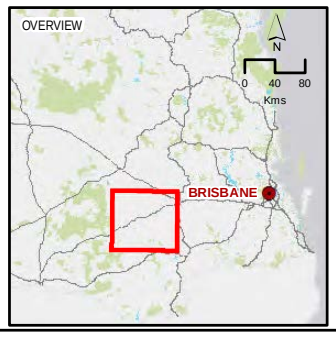

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Initial Advice Statement
Border to Gowrie Project

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Figure **3.1** (3 of 3)

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3.3. Project Need, Justification and Alternatives Considered

3.3.1. The Melbourne to Brisbane Inland Rail Programme Business Case

The Inland Rail programme has been under development for over ten years. This has included economic analysis, route studies and preliminary engineering analysis. The original North-South Rail corridor study was undertaken in 2006, followed by the Inland Rail Alignment Study (IRAS) released in 2010 (ARTC, 2010). A concept business case was prepared in 2014, followed by the preparation of the Programme Business Case in 2015 (ARTC, 2015). The Inland Rail programme is recognised in the National Land Freight Strategy (Standing Council on Transport and Infrastructure 2012) and endorsed by Infrastructure Australia.

The Business Case examines the complex issue of freight movement and forecast freight demand along the east coast of mainland Australia.

Australia is heavily reliant on efficient supply chains to provide competitive domestic freight links and gateways for international trade. Freight transport services between major population centres, particularly our capital cities, deliver millions of tonnes of freight each year and provide for the distribution of goods throughout the country. Efficient and effective domestic supply chains that are internationally competitive against import chains, support economic growth and help keep down the cost of the products we buy.

It is estimated that the transport and logistics sectors of the Australian economy contribute 14.5 per cent of gross domestic product (GDP), with Australia's supply chain worth an estimated $150 billion per annum (ARTC, 2015). Efficient transport of Australian exports to world markets maximises the economic returns to the Australian economy. Productive ports, freight networks and other critical infrastructure is the key to efficient supply chains and to Australia's competitiveness. Better infrastructure has a critical role in lifting our nation's wealth and prosperity and the effective operation of national freight is integral to the wellbeing of all Australians. Inefficient infrastructure networks are one of the key reasons why Australia's productivity has declined and a key driver of the cost of living pressures affecting Australians. Australia's east coast comprises 70 per cent of the country's population, 78 per cent of Australia's national employment and generates 75 per cent of the nation's GDP (ARTC, 2015). With the population estimated to grow by 60 per cent over the next 40 years increasing pressure would be placed on freight infrastructure and services.

The Business Case identifies that:

- Relying on road for freight transport would result in increasing safety, environmental and community impacts;
- The existing rail line between Melbourne and Brisbane is constrained by passing through Sydney and cannot accommodate double stacking; and
- Our regional suppliers have limited transport options.

The Business Case shows that Inland Rail:

- Is compatible and interoperable with high productivity train operations in the east-west corridor, to Adelaide and Perth;
- Uses and enhances existing rail infrastructure where possible, making the most of recent investments;
- Bypasses the congested Sydney rail network;
- Improves connections with regional and local rail and road networks;

- Maximises value for money, while meeting market needs;
- Delivers the service that freight customers want, at a price they are willing to pay;
- Provides significant social and environmental benefits compared with road transport;
- Would cover its ongoing operating and maintenance costs, once operational; and
- Is good for the country's economy – increasing Australia's GDP by an estimated net $16 billion by 2050 meets Australia's strategic, long-term needs'.

The Australian Government through ARTC, is delivering Inland Rail in partnership with the private sector and has to date committed a total of $9.3bn to progress the design, approvals, construction and property acquisition for all 13 Inland Rail projects. The Border to Gowrie Project forms an essential component of the Inland Rail programme.

3.3.2. Queensland Planning Context

ARTC is seeking that the Border to Gowrie Project be declared a 'coordinated project for which an EIS is required' under section 26(1)(a) of the SDPWO Act.

In deciding whether to declare a project to be a coordinated project, the Coordinator General must have regard to:

- Detailed information about the project given by the proponent in an IAS
- Relevant planning schemes or policy frameworks of a local government, the State or the Commonwealth
- Relevant State policies and Government priorities
- A pre-feasibility assessment of the project, including how it satisfies an identified need or demand
- The capacity of the proponent to undertake and complete the EIS for the project; and/or
- Any other matter the Coordinator-General considers relevant.

3.3.2.1. Relevant Planning Schemes and Policy Frameworks

The *Planning Act 2016* is the overarching framework for Queensland's planning and development system. It is supported by the Planning Regulation 2017, the State Planning Policy, regional plans and local planning schemes and other statutory instruments.

The Border to Gowrie Project traverses two local government areas (LGAs) being:

1. Goondiwindi Regional Council (GRC)
2. Toowoomba Regional Council (TRC)

The Border to Gowrie traverses areas that are within the following local government planning schemes:

- For Goondiwindi Regional Council:
    - Former Waggamba Shire Council Planning Scheme 2006
    - Former Inglewood Shire Council Planning Scheme 2006
- Toowoomba Planning Scheme 2012

Inland Rail is identified as a priority project in the State Infrastructure Plan Part B: Program – 2017 update (The State of Queensland, 2017). It is also specified as major enabling infrastructure in the South East Queensland Regional Plan 2017 (The State of Queensland, 2017), and is consistent with the intent of the Darling Downs Regional Plan (The State of Queensland, 2013) to create opportunities for a modal shift towards rail and provide new economic development in

the region. Additionally, the Queensland Government's Moving Freight strategy (DTMR 2013) recognises the need for Inland Rail and the potential benefits to the state of Queensland.

The Border to Gowrie Project will support efficient freight movement throughout the region and provide opportunities for increased transportation of agricultural commodities and other goods to service the mining and gas sectors within the region. Importantly, the Inland Rail Progamme will provide opportunities for the development of intermodal facilities in the Toowoomba Enterprise Hub which may enable integrated multi-modal logistics (rail, road and aviation) opportunities to be realised.

3.3.3. Alternatives Considered – Programme wide

Various alternate scenarios to the overall Inland Rail have been considered and are discussed in the Business Case including:

- Do nothing: freight remains on the existing road network, regional development opportunities are not realised, and potential opportunities to reduce significant greenhouse gas emissions unlikely to be realised
- Reforms to delay or remove the need for infrastructure investment (demand management, productivity enhancement or deregulation)
- Progressive upgrades of the National Highway
- Upgrades of the existing coastal railway
- Alternate freight transport solutions including air freight (cost prohibitive) and coastal shipping (constrained by port access).

The Business Case concludes that the preferred way to achieve the programme objectives is to proceed with implementation of the Inland Rail.

3.3.4. Alternatives Considered – Border to Gowrie Project

Several alternate route options have been investigated between the QLD and NSW border and Gowrie. The Conceptual Alignment is the result of several iterations of option assessment, and consultation with the Queensland Government, key stakeholders and community groups. This includes the following:

- The 2006 North South Rail Corridor Study, commissioned by the Commonwealth Department of Transport and Regional Services. This study assessed the high level viability of four north south freight corridors between Melbourne and Brisbane. The study was not designed to identify a preferred option but identified the most affordable and economic corridor within which to focus future investigation.
- 2010 IRAS undertaken by ARTC. This study set the blueprint for the development of an inland railway to meet the future freight demands of eastern Australia. The results of the analysis indicated that the route via Toowoomba had stronger transit time and economic merit than routes via Werris Creek and was recommended in the 2010 IRAS study.
- 2015 Melbourne to Brisbane Inland Rail Business Case confirms the 2014 alignment decision and the 2016 ARTC Concept Assessment process proceeds in consultation with the Queensland Government on this basis.
- 2015 Queensland Department of Transport and Main Roads review of route options between NSW/QLD Border and Toowoomba. The Queensland Department of Transport and Main Roads (DTMR) commissioned SMEC to

undertake a high level examination of feasible alternative route options not previously considered in the ARTC Melbourne to Brisbane Inland Rail freight route in 2010.

- 2016-2017 Yelarbon to Gowrie alignment review and Yelarbon to Gowrie Project Reference Group. This was undertaken between December 2016 and April 2017 and considered four available routes on a like-for-like basis to determine which route option to adopt for future project phases. This alignment review process was extensive and included the following:
  - Multi-Criteria Analysis of the four routes;
  - Comparative construction cost estimates; and
  - Community consultation and validation of the transparency of the assessment process

On 21 September 2017, the then Federal Minister for Infrastructure and Transport (the Hon Darren Chester MP) announced the preferred route of the Australian Government, which is the subject of this IAS.

3.4. Components, developments, activities and infrastructure that constitute the coordinated project

Key components of the Border to Gowrie Project include:

- Establishment of approximately 146 km of new rail corridor and track (greenfield) and upgrade of approximately 78 km of existing rail (brownfield).
- The rail line is to be single track dual gauge with crossing loops for 1,800m long train sets, with the ability to extend in the future to accommodate trains up to 3,600 m long based on business and market needs
- Connections to existing sidings has not been confirmed, but are not precluded
- Crossing of the Condamine River floodplain and associated engineering solutions (culverts, bridges and other elevated structures to maintain hydraulic conditions)
- Crossing of other watercourses and floodplains utilising a combination of bridges and/or culverts
- Tie-ins to the existing South West Railway Line and the West Moreton Railway Line at the project boundary and other potential intermediate locations to be confirmed by operational modelling
- The construction of associated rail infrastructure including on track and trackside monitoring, maintenance sidings and signalling infrastructure to support the Advanced Train Management Systems (ATMS)
- Ancillary works including road and public utility crossings and realignments (including stock crossings where required).
- Construction of temporary site offices and temporary workforce accommodation if required
- Third party infrastructure requirements to be determined during future project stages (refer **Section 3.5**)
- Identification, establishment and use of borrow pits and quarries for construction materials if required
- Construction workspace, laydown areas and access roads.

Construction activities for the project will likely include temporary roads, upgrades and/or alterations to existing roads. The construction of the Border to Gowrie Project may also require relocation of some services, depending on their proximity to the construction zone. These aspects will be further examined in future design stages.

The Border to Gowrie Project description will be further refined in future design development and environmental assessment during the EIS process.

3.5. Third Party Infrastructure Requirements

Third party infrastructure requirements will be determined during future design development. Power and water supply will be required during the construction of the Border to Gowrie Project.

Electricity supply will also be needed for points, signalling and other infrastructure. It is anticipated that the supply of these services would be delivered by relevant providers under the terms of their respective approvals and/or assessment exemptions.

Key elements not included as part of the Border to Gowrie Project include the following:

- Third party rail operator infrastructure requirements
- Complementary infrastructure, such as metropolitan and regional freight terminals
- Upgraded fleet/rolling stock
- Administration, train provisioning, fuelling and maintenance depots
- Train crew change and other intermediate depots/facilities
- Complementary land use and freight precinct developments.

3.6. Timeframes for the Border to Gowrie Project

The indicative program is provided as follows:

- 2017-2019: design, planning and approvals
- 2019-end of 2020: pre-construction and land acquisition
- 2021-2024: Construction
- 2025 Project Opening.

3.7. Construction and Operational Processes

At present, only preliminary information is available about the way in which the Border to Gowrie Project will be designed and delivered, with future stages of design and assessment to provide further clarification of these aspects.

Pre-construction activities are anticipated to include geotechnical investigations, survey, ecological investigations and cultural heritage surveys. This may include establishment of access tracks where required.

Construction will involve the following:

- Site preparation, earthworks and vegetation clearing for construction accesses, depots and laydown areas
- Early works, including ground disturbance and relocation of impacted utilities, roads and fencing at key locations for safety and construction access
- Sourcing all construction and construction related materials, including won material, manufactured materials and construction water
- Earthworks, including construction of embankments and fill
- Construction of bridges and viaducts at watercourses, which may require temporary or permanent stream diversion
- Relocation or protection of services and public utilities

- Construction of drainage and stormwater treatment infrastructure
- Construction of track and signalling
- Construction and implementation of environmental management measures (e.g. fauna crossings, noise treatments, sedimentation control)
- Landscaping and rehabilitation treatments to areas disturbed during construction.

As described in **Section 3.5**, power supplies will be required during the operational phase. It is anticipated that the supply of these services will be delivered by relevant providers under the terms of their respective approvals and/or assessment exemptions.

During the operational phase, maintenance activities will be carried out as required by ARTC or contractors on behalf of ARTC. The dual gauge track will maintain the narrow gauge connectivity to the Brisbane and regional QLD lines along the Inland Rail corridor once the Border to Gowrie Project is operational.

3.8. Workforce requirements during Construction and Operation

The Border to Gowrie Project is part of the larger Inland Rail programme. The Business Case identifies an anticipated additional 16,000 direct and indirect jobs will be created programme-wide at the peak of construction (estimated in 2019 to 2020). An average of 700 additional jobs per annum is anticipated over 50 years of operation (2024 to 2074). It is estimated that approximately 60 per cent of the capital expenditure (CAPEX) for Inland Rail will be expended on projects in Queensland, including the Border to Gowrie Project. Therefore an equivalent proportion of jobs are anticipated to be based in QLD. Based on the capital cost associated with the Border to Gowrie Project (refer to **Section 3.9.1**), a peak workforce for the Border to Gowrie Project may be around 1600.

The expansion in the construction sector would support additional flow on demand through the construction industry supply chain and additional spending on consumer orientated products by the construction workforce in the local area. It is proposed that considerable indirect employment opportunities will also arise as a result of the construction and operation of the Border to Gowrie Project. The associated supply of construction materials, the development of associated external infrastructure and complementary services as described in **Section 3.5** will require additional workforce beyond those directly associated with the construction of Inland Rail, stimulating jobs and growth in the region.

3.9. Economic Indicators

3.9.1. Capital Cost

Inland Rail will be a strategic catalyst for economic development. A conventional economic appraisal was undertaken for the Business Case in line with relevant government guidelines focusing on the direct economic benefits from increased transport efficiency and the standard indirect benefits which flow from moving freight from roads onto rail (such as reduced accident and environmental costs).

Major infrastructure projects like the Inland Rail programme inevitably involve significant construction costs. Delivering Inland Rail is expected to cost approximately $10.9 billion. The Border to Gowrie Project is expected to cost approximately $1.4 billion due to its significant overall length and the significant drainage elements and earthworks associated with the Border Rivers and Condamine River floodplains.

3.9.2. Economic Analysis

An important aspect to assist governments in deciding whether or not to invest in such projects are the benefits to the community as a whole from the investment, and whether the net benefits of the project over the life of the

infrastructure are likely to exceed its net cost. The economic analysis contained within the Inland Rail Business Case compares a scenario where there is an inland railway, to one where road and rail freight would use the existing roads and coastal railway, over a 50-year period (2025 to 2075).

Comparing these two scenarios, the economic analysis indicates that the Inland Rail programme could deliver almost $22.5 billion worth of direct and indirect benefits to the nation, based on 2015 dollars, of which approximately $6.4 billion direct operating cost savings would be accrued by freight users and assumed to flow on directly to consumers. The resulting net economic benefit of the Inland Rail programme is expected to be approximately $16 billion—a benefit-cost ratio (BCR) of 2.62 based on a discount rate of 4 per cent. That is, the benefits of the Inland Rail programme are approximately 2.6 times the cost (when measured at the 4 per cent discount rate).

3.9.3. Local and Regional Benefits

Regional communities along and adjacent to the Inland Rail programme would benefit through more efficient and effective rail access to metropolitan and international markets. While the purpose of Inland Rail is primarily for interstate intermodal freight such as moving shipping containers, whitegoods, steel and other bulk commodities, Inland Rail would also support minerals, regional freight and agriculture. The Inland Rail programme will enable farmers to move agricultural commodities more efficiently to capital cities and ports for export.

3.9.4. Wider Economic Benefits

An assessment of the wider economic benefits (WEBs) of Inland Rail is provided in the Addendum to the ARTC Business Case (PwC, 2016). Since the release of the 2015 Programme Business Case (ARTC, 2015), stakeholder feedback has supported the role of Inland Rail in transforming the economic geography of inter-capital freight and creating additional benefits across the broader economy. This addendum therefore seeks to provide an assessment of these broader benefits in two parts:

- A more expansive calculation of induced freight benefits that considers the benefits that may arise across the supply chain (e.g. to rail operators and retailers in the relevant markets) from the additional freight demand induced by lower supply chain costs of Inland Rail; and
- WEBs that arise because businesses benefit from agglomeration economies (improved accessibility to customers, suppliers and labour markets).

It is considered that improved accessibility to customers, suppliers and labour markets (i.e. effective density or agglomeration) from the operating cost savings delivered by Inland Rail, would result in agglomeration economies. The Inland Rail operating cost savings have been estimated to effectively increase the catchment of customers, suppliers and products that may be accessed in the absence of Inland Rail resulting in an increase in productivity.

The economic appraisal results for each business case scenario including the three alternative calculations of producer surplus are presented in **Table 3-1**. These results are not cumulative.

Table 3-1 Economic appraisal results with expanded benefits*

INLAND RAIL PROGRAMME BUSINESS CASE RESULTS ($ M)	7% DISCOUNT RATE	4% DISCOUNT RATE
Programme Business Case results (August 2015)	1.02	2.62
Programme Business Case results with Wider Economic Benefits	1.06	2.74

INLAND RAIL PROGRAMME BUSINESS CASE RESULTS ($ M)	7% DISCOUNT RATE	4% DISCOUNT RATE
Producer surplus of rail operators	1.08	2.81
Producer surplus of rail operators and from sale of final good	1.17	3.07
Producer surplus of businesses along all supply chain	1.52	4.15

Source: **Addendum to the ARTC 2015 Inland Rail Programme Business Case** (ARTC, 2015)**.**

Notes: Analysed over 50 year appraisal period to 2073-2074 and discounted applying real discount rates; based on P50 cost certainty; excludes Port of Brisbane Extension; assumes complementary investment on the Queensland Rail network (West Moreton Railway Line and Brisbane metropolitan network). Source: (PwC, 2016).

3.9.5. Synergies with Business and Industry

The construction and operation of Inland Rail would present opportunities for local and regional freight hub development. In particular, the Border to Gowrie section is expected to provide benefits to existing and future users of the South-West Railway Line and West Moreton Railway Line by providing improved efficiencies and new opportunities along the Border to Gowrie Project. The Border to Gowrie Project will create new efficiencies with business and industry in the Darling Downs region, linking with the Toowoomba Enterprise Hub and other potential intermodal facilities (e.g. Inglewood).

3.10. Financing Requirements and Implications

The Australian Government has committed $9.3 billion for ARTC to develop and build Inland Rail. Additional funds will come from a partnership with the private sector.

4. LOCATION OF KEY PROJECT ELEMENTS

4.1. Location

The Conceptual Alignment for the Border to Gowrie Project commences at the median line of the Macintyre River south of Kildonan, this point being the state border between QLD and NSW. The Conceptual Alignment continues north to tie into the existing South Western Line between Kildonan and Kurumbul stations, running along this line in a north east direction past Yelarbon. The Conceptual Alignment deviates in a northern direction from the South West Line before Whetstone Station, bypassing Inglewood on the northern side of Macintyre Brook before aligning with Millmerran-Inglewood Road. The Conceptual Alignment then generally follows Millmerran-Inglewood Road in a northern direction, bypassing Millmerran on the eastern side of the township and tying into the existing (but disused) Millmerran Branch line.

The Conceptual Alignment generally follows the Millmerran Branch line through the townships of Pampas and Brookstead, deviating from the existing line to bypass Pittsworth in parallel to the Gore Highway. The Conceptual Alignment departs from the Gore Highway at Linthorp Valley Road, to the west of Southbrook, and heads in a north-north-east direction towards Wellcamp, passing to the east of Athol.

The Conceptual Alignment passes to the west of Brisbane West Wellcamp Airport, crossing over Toowoomba-Cecil Plains Road and the Warrego Highway, turning east to parallel the existing West Moreton Line, before tying into this same line at Draper Road, Charlton. This is the termination point of the Border to Gowrie Project, east of which is the Gowrie to Helidon Project.

The location of the Study Area and Conceptual Alignment are shown in (**Figure 3-1**). The Conceptual Alignment comprises of brownfield and greenfield segments of track, as described in Table 4-1. The brownfield corridor, in parts, does not comply with the project design criteria and as such the Conceptual Alignment will follow the brownfield track where practical, however the construction can be considered as greenfield in nature.

Table 4-1 Overview of Conceptual Alignment segments

START (KM)	END (KM)	FROM - TO	GREENFIELD (KM)	BROWNFIELD (KM)
0	44	QLD/NSW Border to Yelarbon	7	37
44	90	Yelarbon to Inglewood North	32	14
90	150	Inglewood North to Millmerran	60	
150	166	Millmerran to Brookstead		16
166	185	Brookstead to Pittsworth	11	8
185	224	Pittsworth to Gowrie	36	3

4.2. Tenure

The Conceptual Alignment intersects approximately 286 lots, the majority of which are held in freehold title (Appendix A). Other tenure arrangements traversed by the Conceptual Alignment include Lands Lease (e.g. railway land), Reserve and State Forest. While the Australian and Queensland Governments have yet to determine the land acquiring authority for the Border to Gowrie Project, ARTC assumes for the purposes of this IAS that land required for the Border

to Gowrie Project would be acquired in accordance with the provisions of the *Transport Infrastructure Act* 1994 and the *Acquisition of Land Act 1967*.

5. DESCRIPTION OF THE EXISTING ENVIRONMENT

5.1. Natural environment

5.1.1. Land

Topography

From the QLD and NSW border, the Conceptual Alignment generally follows a gradual incline from an approximate elevation of 230 m (Australian Height Datum, AHD) at the border, extending across the flood plains of the Macintyre River and Macintyre Brook, to approximately 470 m AHD at Millwood, south of Millmerran. Topography along the Conceptual Alignment between Millmerran and Yarranlea is generally flat, representative of the Condamine River floodplain.

North of Yarranlea, the Conceptual Alignment passes around the foothills of multiple topographical features encountering frequent variance in elevation. In doing so, the Conceptual Alignment rises from approximately 430 m AHD at Yarranlea to a maximum elevation of approximately 500 m AHD on the western outskirts of Southbrook, returning to 430 m AHD at the crossing of Westbrook Creek. North of Westbrook Creek, the Conceptual Alignment threads between Gowrie Mountain and the adjacent outcrop before tying into the West Moreton Railway Line at an approximate elevation of 460 m AHD.

Topographical contours within the Study Area are shown on **Figure 5-1.**

Geology

Previous geotechnical assessments have highlighted geotechnical conditions for the Study Area (Coffey, 2015) (WSP Parsons Brinckerhoff, 2016). **Table 5-1** describes the geology that is anticipated to be encountered and their potential reuse application. Geological units that occur within the Study Area are shown on **Figure 5-1**.

Table 5-1 GSQ dataset rock type summary (DNRM 2008)

ROCK UNIT NAME	ID	DESCRIPTION	POTENTIAL USE
Quaternary alluvium and lacustrine deposits	Qa	Clay, silt, sand, gravel; flood plain alluvium	Aggregate
Late Cainozoic floodout and residual sand, soil and gravel	Czs	Sand, soil and gravel	Aggregate
Evergreen Formation, Hutton Sandstone, Marburg Formation (in part), Precipice Sandstone	Jlb	Siltstone, mudstone, sandstone, oolitic ironstone, coal	Bulk and select fill material
Texas beds	Ctx	Greywacke, mudstone, slate, local phyllite; subordinate jasper, chert, conglomerate, limestone	Bulk and select fill material
New England Batholith, Unnamed Intrusions	R5	Biotite granite and granodiorite	Capping

ROCK UNIT NAME	ID	DESCRIPTION	POTENTIAL USE
Injune Creek Group, Mulgildie Coal Measures, Walloon Subgroup (Moreton Basin)	Ji	Sandstone, siltstone, mudstone, coal, conglomerate	Fill material
Tertiary volcanics, mainly basalt*	Tv	Basalt flows overlying older sedimentary formations. Relatively permeable, and weather to produce vertosols, creating trafficability and foundation issues.	Select fill and capping
Bungil Formation, Gubberamunda Sandstone, Hooray Sandstone, Kumbarilla beds, Longsight Sandstone, Mooga Sandstone, Orallo Formation, Southlands Formation	JKb	Glauconitic, labile to quartzose, siltstone, mudstone; sandstone, minor conglomerate, siltstone; coal	Bulk fill and some select fill material

*The Toowoowba region and district to the immediate west and south west is dominated by mid-Tertiary (27–18 Ma Lafferty and Golding (1985) and Webb et al. (1967)) basalts, associated volcanics and palaeosols (Toowoomba Volcanics—a member of the Main Range Volcanics). The MRV is the most extensive surface unit. Late Tertiary and Quaternary denudation has resulted in more recent soils and colluvial and alluvial deposits.

The geology is reported as being dominated by extensive alluvial and slope wash sediments on the western slopes of the Great Dividing Range (AECOM, 2016). Within the Study Area, bedrock outcrops and steep topography are almost exclusively restricted to occurring within two bedrock units, i.e. the Tertiary Main Range Volcanics and the Texas Beds.

Areas of hard rock are expected to be encountered from Pittsworth to Gowrie.

Soils

A profile of the soils that are located within the Study Area has been established with reference to the Australian Soil Resource Information System (ASRIS 2014), supported by in-field observations from publicly accessible locations. A descriptive summary of all soil types encountered is provided in **Table 5-2**.

Table 5-2 ASRIS dataset soil type summary (ASRIS 2014)

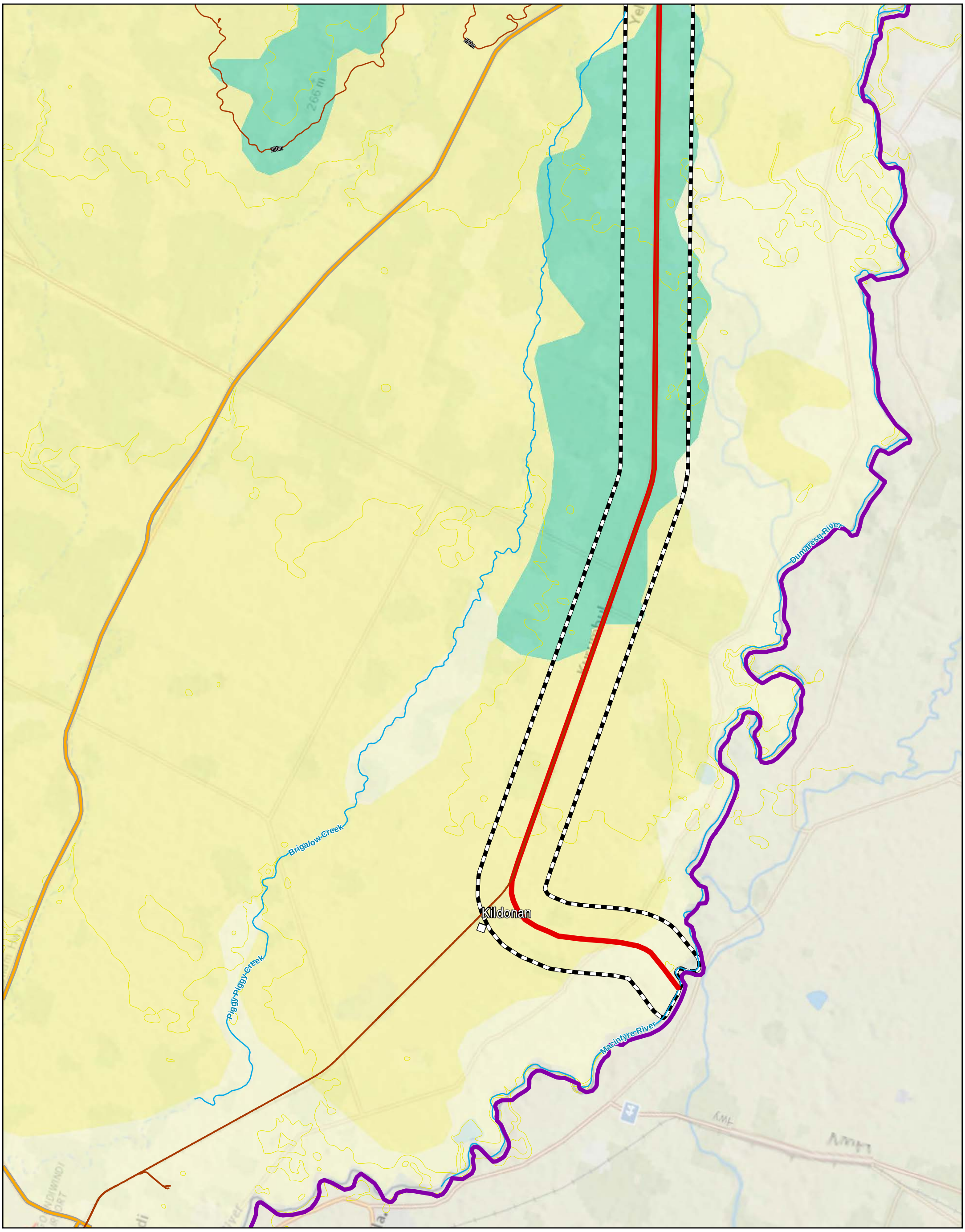
SOIL TYPE	ID	GENERAL DESCRIPTION
Chromosol	CH	Soils with an abrupt increase in clay
Dermosol	DE	Structured soils
Kandosol	KA	Structureless soils
Kurosol	KU	Acidic soils with an abrupt increase in clay
Sodosol	SO	Soils high in sodium and an abrupt increase in clay
Vertosol	VE	Shrink and swell clay soils

Soil development is characterised as dominantly vertosol soils (black cracking and reactive clay soils) however the actual depth of soils may be variable and a function of the underlying parent geology. Where topographic relief is maintained through the presence of more resistant, less eroded and less weathered lava flows, it is reasonable to assume reduced soil thickness and a more rapid transition to weathered rock.

The Condamine River alluvial system is dominantly mapped as vertosol soils as a combined result of alluvial processes and insitu and transported parent geology. Soil thickness is greatly increased through the deposition of alluvial materials and subsequent soil development.

Both mechanisms are supported by geomorphological and agricultural practices. Generally speaking, thicker soils can be correlated with flatter, lower topographic relief and the development of broad acre agricultural cropping practices. Where remnant basalt flows remain, thinner soils can be correlated with a relative increase in topography, reduced cropping and increased livestock grazing. The agricultural values of the Study Area are discussed in Section 5.5.1.3.

Soil development and distribution will be subject to further investigation as part of the EIS.



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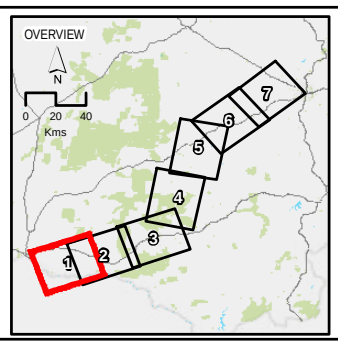
Legend

- Towns
- Existing Rail Network
- Conceptual Alignment
- Major Roads
- Contours (50m interval)
- Contours (10m interval)
- Study Area
- State Boundary

Rock Unit (DNRM regional geology)

Surat Region - Regional surface geology 1974

- Kumbarilla beds (JKk)
- Q-NSB (Q)
- Qa-QLD (Qa)



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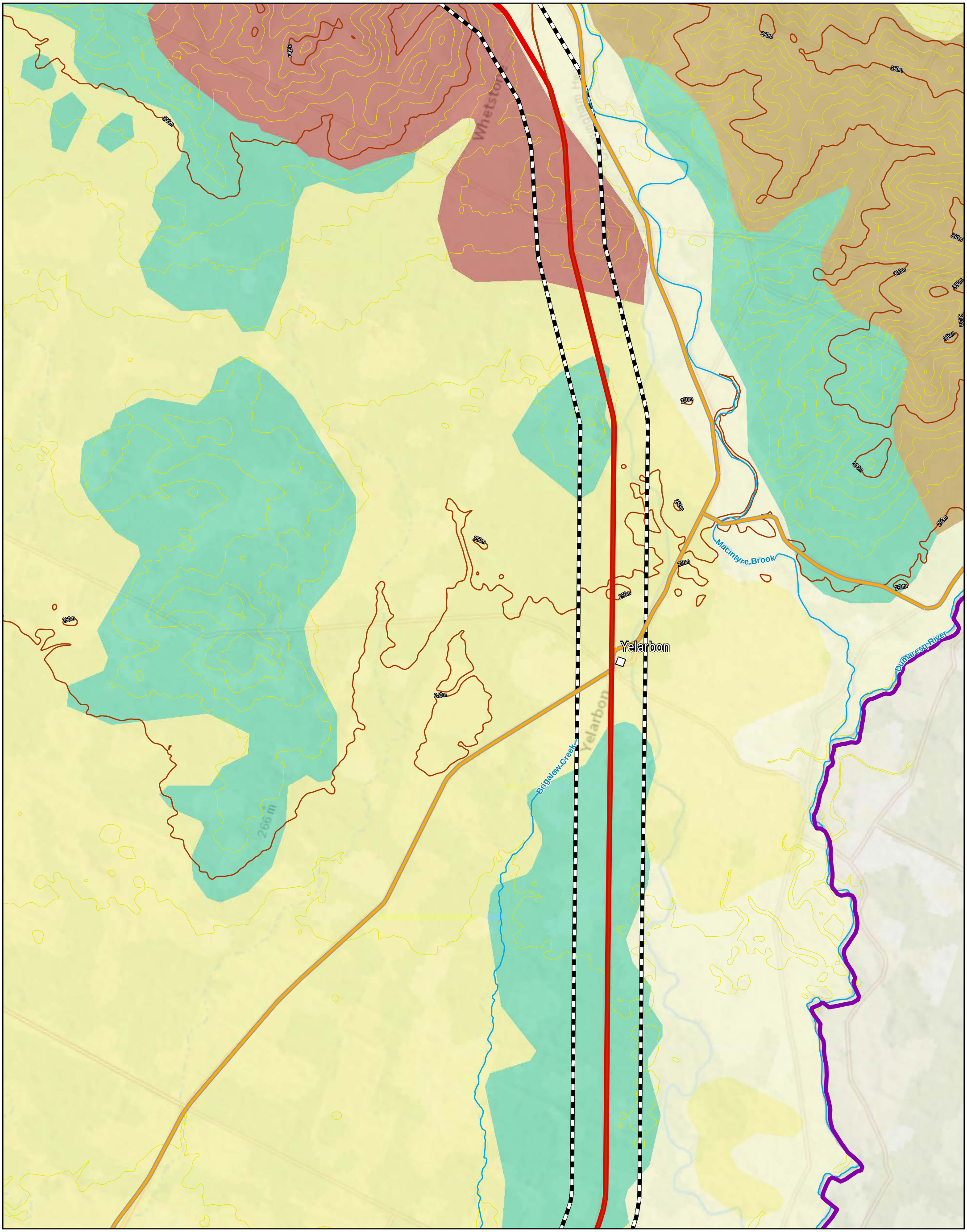

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- Towns
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- Contours (10m interval)
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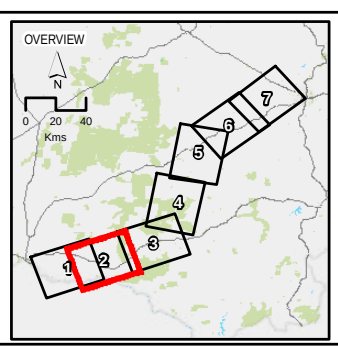
Rock Unit (DNRM regional geology)

Surat Region - Regional surface geology 1974

- Kumbarilla beds (JKk)
- Pilliga Sandstone (Jp)
- Q-NSB (Q)
- Qa-QLD (Qa)
- Walloon Subgroup (Jw)



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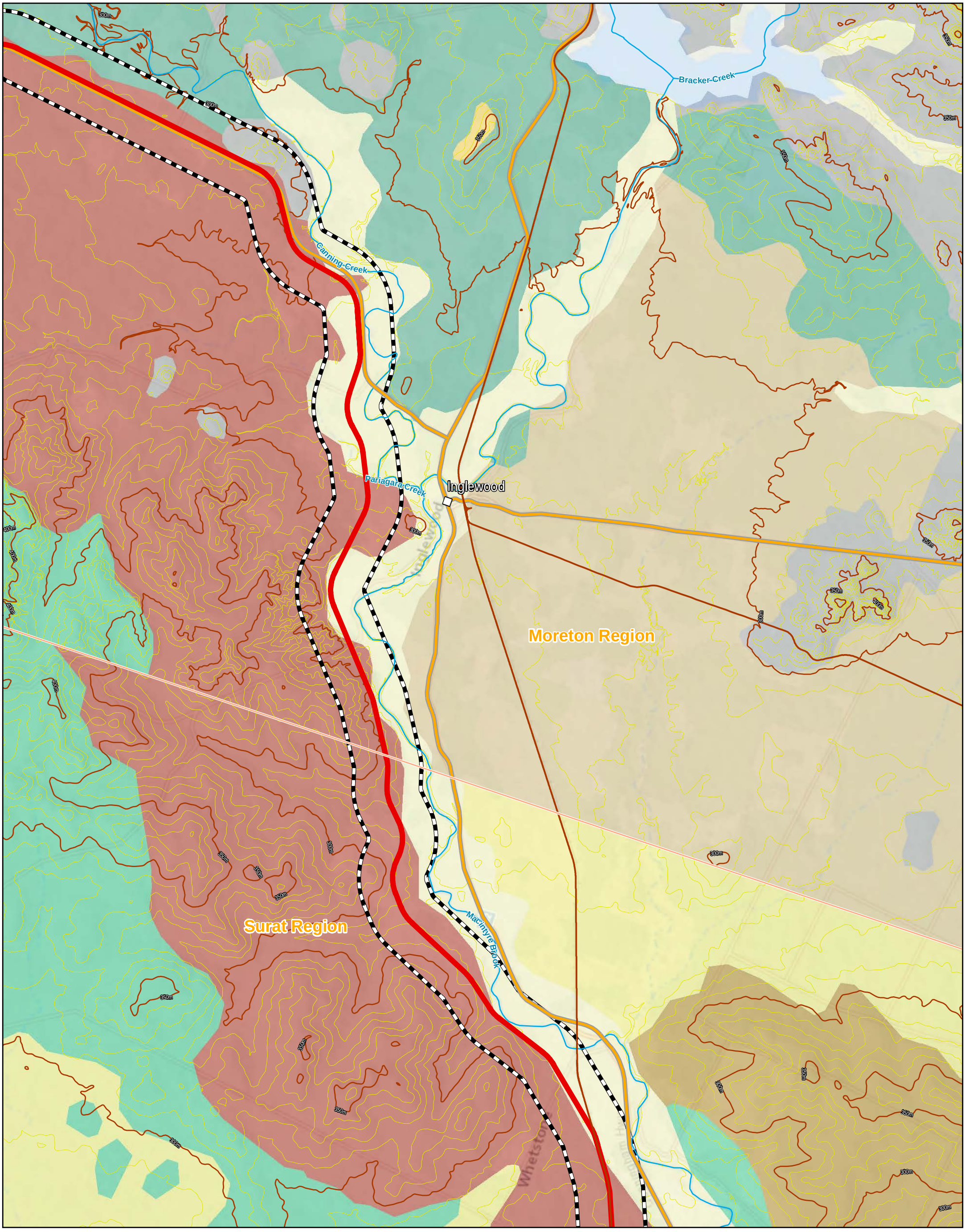

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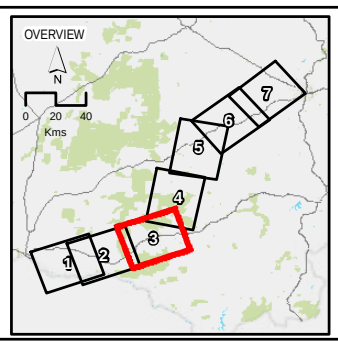
Rock Unit (DNRM regional geology)

Moreton Region - Regional surface geology 1978

- Kumbarilla beds (JKk)
- MG-TQs (TQs)
- Main Range Volcanics (Tm)
- Marburg Subgroup (Jbm)
- Qa-QLD (Qa)
- Texas beds (Ctx)
- Walloon Subgroup (Jw)
- Water body (unspecified) (W)

Surat Region - Regional surface geology 1974

- Kumbarilla beds (JKk)
- Pilliga Sandstone (Jp)
- Q-NSB (Q)
- Qa-QLD (Qa)
- Walloon Subgroup (Jw)



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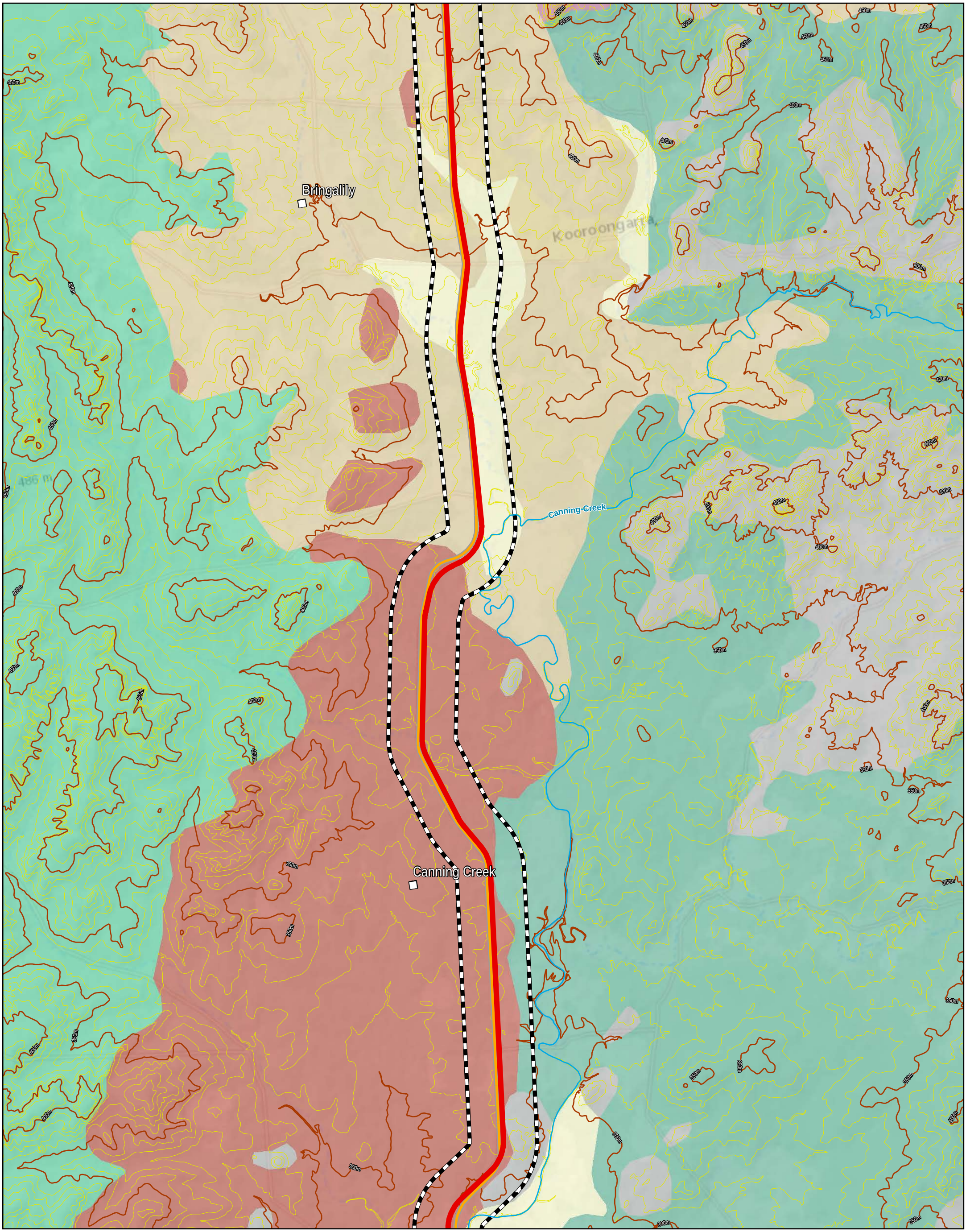

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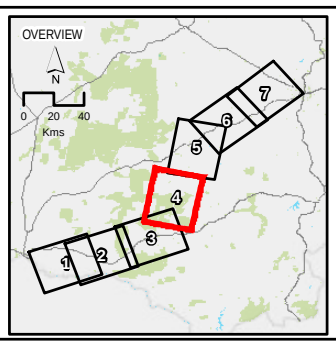
- MG-Ts (Ts)
- Marburg Subgroup (Jbm)
- PRg-MG (PRg)
- Qa-QLD (Qa)
- Texas beds (Ctx)
- Walloon Subgroup (Jw)



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Pampas
Condamine River (North Branch)
Condamine River
Yandilla
Millmerran
Clontarf
460m
600m
550m
500m
550m
600m
500m
550m
500m
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- Qa-QLD (Qa)
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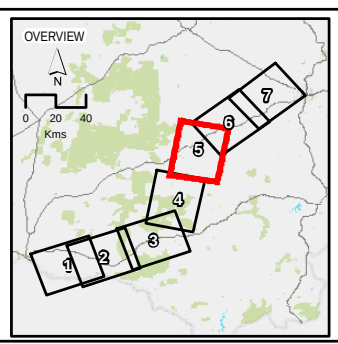

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Pittsworth

Brookstead

Pampas

Mount Tyson

Condamine River (North Branch)

Condamine River

Condamine River (North Branch)

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- Towns
- Existing Rail Network
- Conceptual Alignment
- Major Roads
- Contours (50m interval)
- Contours (10m interval)
- Study Area
- State Boundary

Rock Unit (DNRM regional geology)

Moreton Region - Regional surface geology 1978

- MG-TQs (TQs)
- Main Range Volcanics (Tm)
- Marburg Subgroup (Jbm)
- Qa-QLD (Qa)
- Walloon Subgroup (Jw)

OVERVIEW

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Border to Gowrie Project

Geology and Terrain

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Figure **5.1**

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Gowrie
Charlton
Wellcamp
Westbrook
Oakey
Athol
Umbiram
Southbrook
Pittsworth

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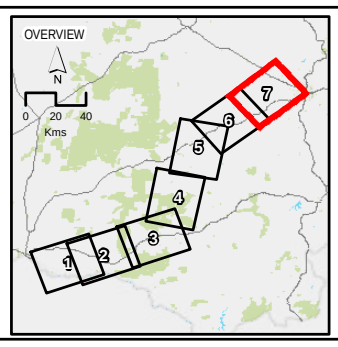

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Contaminated Land and Unexploded Ordnance

A desktop review of land uses and known contaminated areas has been conducted for the Study Area to identify potential sources of contamination. The Border to Gowrie Conceptual Alignment consists of brownfield and greenfield components. Existing rail corridors that would be utilised by brownfield components of the Conceptual Alignment has the potential to be contaminated due to historical operation and maintenance activities.

In addition, railway yards (operating a railway yard including goods-handling yards, workshops and maintenance areas) are listed in Schedule 3 of the *Environmental Protection Act 1994* as a notifiable activity and therefore are potentially contaminated sites. A review of aerial photography and land use mapping (Queensland Land Use Mapping Program, February 2016) within the Study Area has identified the following land uses that warrant further review of potential contamination in future project stages:

- Mining, e.g. the Commodore Mine at Millmerran
- Intensive animal husbandry, e.g. feedlots, poultry farms, piggeries etc.
- Agricultural land
- Waste treatment and disposal facilities
- Manufacturing and industrial uses.

An assessment of the Department of Defence unexploded ordnance (UXO) mapping concludes that the Study Area does not extend through any areas of UXO potential.

Visual Amenity

The Study Area encompasses various visual environments, from flat open rural country, with essentially uninterrupted vistas extending across agricultural plains, to undulating terrain, dense vegetation and regional settlements.

The current landscape of the study area is mostly cleared rural land subject to a range of agricultural activities with production from irrigated agriculture and cropping. Open agricultural fields and scattered farmsteads are a dominant feature in views across the landscape. Other notable features in the landscape include major roads, disused rail corridor and the operational Millmerran Power Station and mine operations.

5.1.2. Water

5.1.2.1. Surface Water Quality

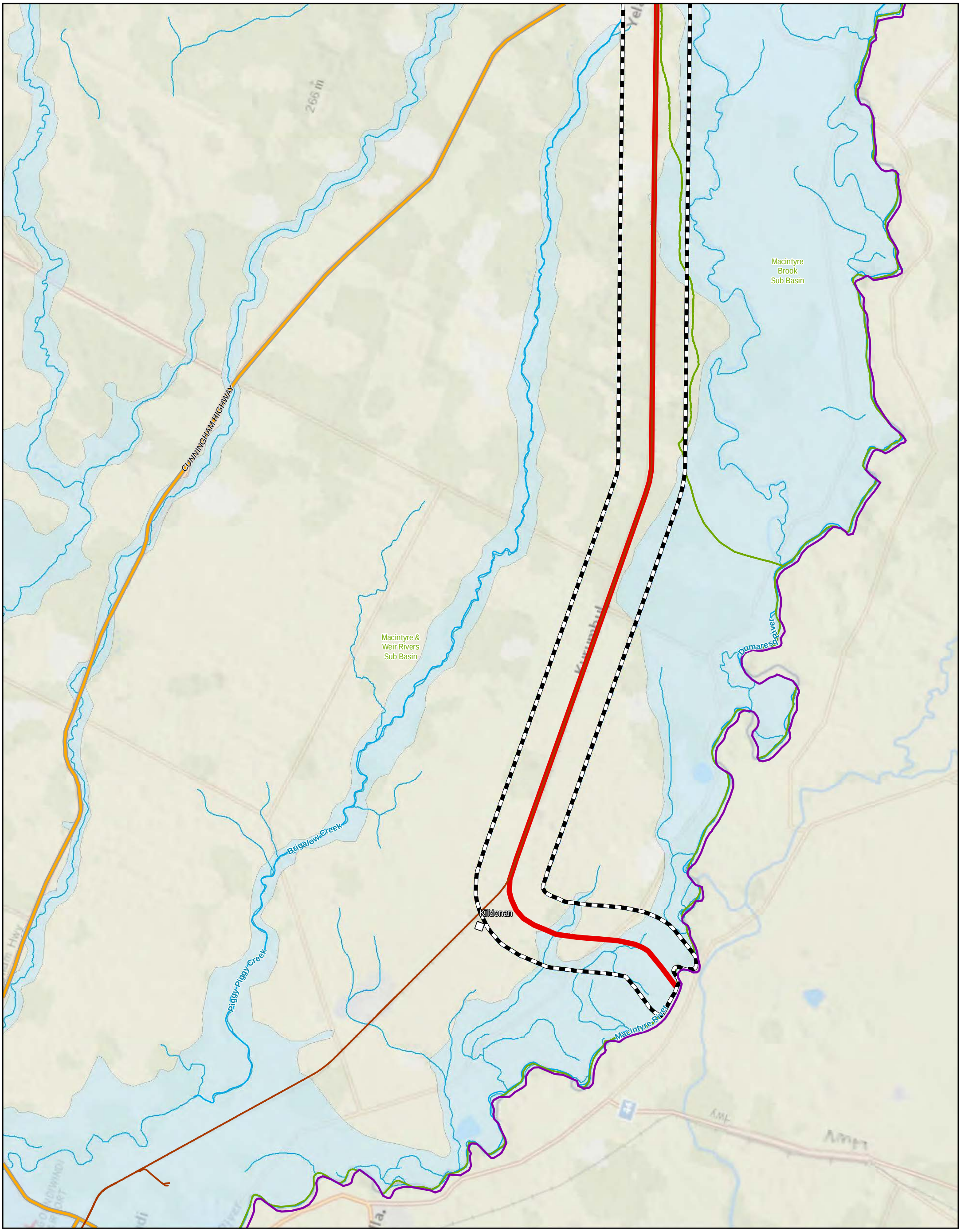
The Conceptual Alignment and the wider Study Area span three catchments. Between the QLD/NSW border and Yelarbon, the Study Area is located within the Macintyre River catchment and from Yelarbon to Millwood the Study Area is located in the Macintyre Brook catchment of the Border Rivers drainage basin. North of Millwood the Study Area is located within the Condamine River catchment of the Balonne-Condamine drainage basin.

The Conceptual Alignment crosses 16 major waterways, 69 minor waterways and their associated floodplains. The major waterway crossings include the Macintyre River, Condamine River, Cattle Creek, Westbrook Creek and Dry Creek.

Water quality data is gathered in the Balonne-Condamine river basin for a range of water quality markers including total nitrogen, total phosphorus, total suspended solids and many other chemicals, such as cadmium, copper, the herbicides atrazine and diuron, and the insecticide Dieldrin (DERM, 2011). In the upper Condamine river basin nutrient levels have generally been within the adopted guidelines at the nutrient monitoring sites. Electrical conductivity (EC) measured on the Condamine River at Chinchilla Weir has provided results ranging from 800 µS/cm during low flows to 100 to 180 µS/cm during high flows. These results indicate that the Condamine River is relatively saline compared to other rivers in QLD (Welsh W, 2014).

Sites in Border Rivers river basin in QLD (not all within the subregion) are monitored on a monthly basis by the NSW Office of Water on behalf of Dumaresq Barwon Border Rivers Commission for electrical conductivity, nutrients, turbidity, total suspended solids and water temperature (Welsh W, 2014). Data collected in 2012 showed Macintyre Brook had salinity levels above the guidelines for protection of aquatic ecosystems in upland streams (DBBRC, 2012).

Figure 5-2 shows the catchments and key watercourses within the Study Area.



Legend

- Towns
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- Drainage sub basins
- Floodplain Assessment Overlay

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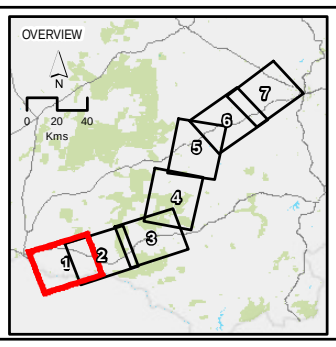

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Catchments, waterways and flooding

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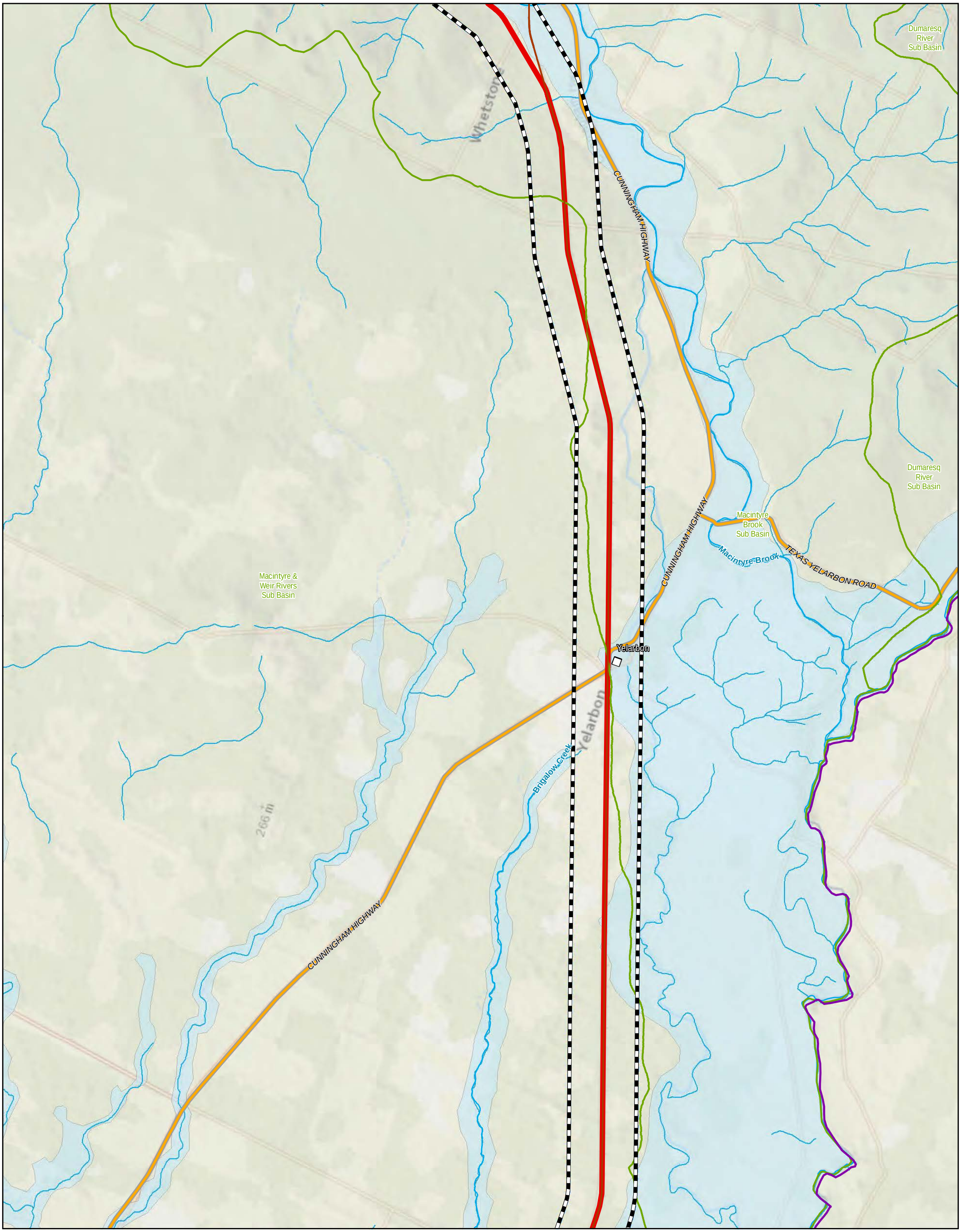

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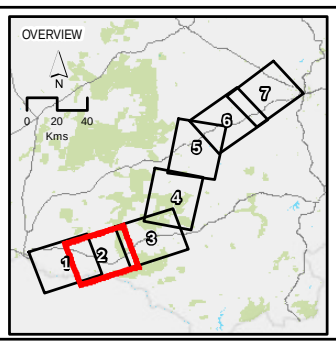

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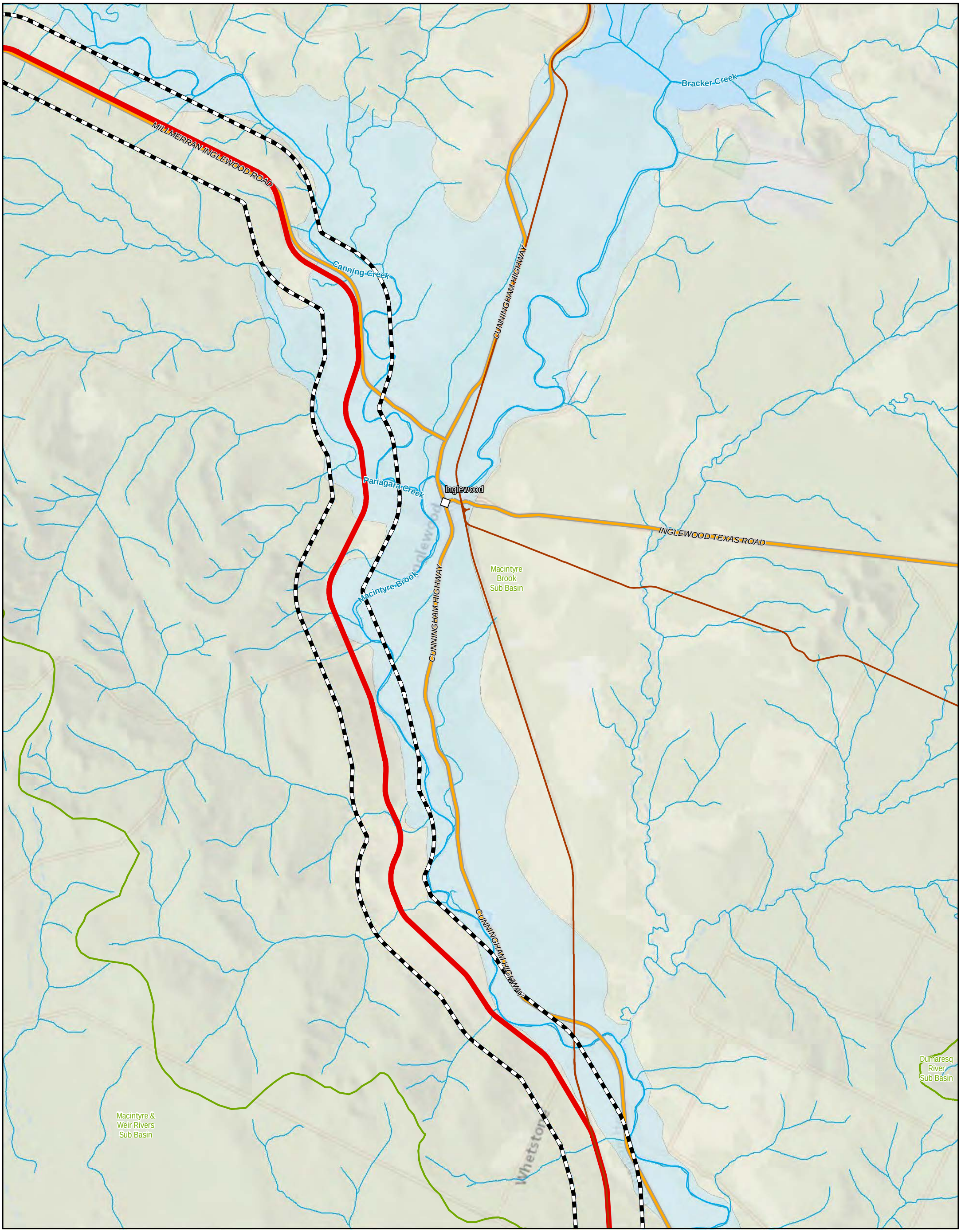

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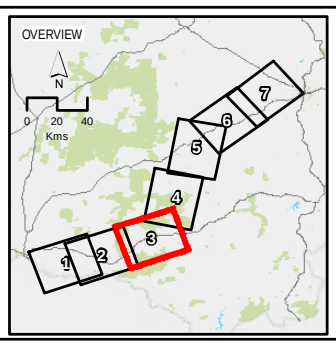

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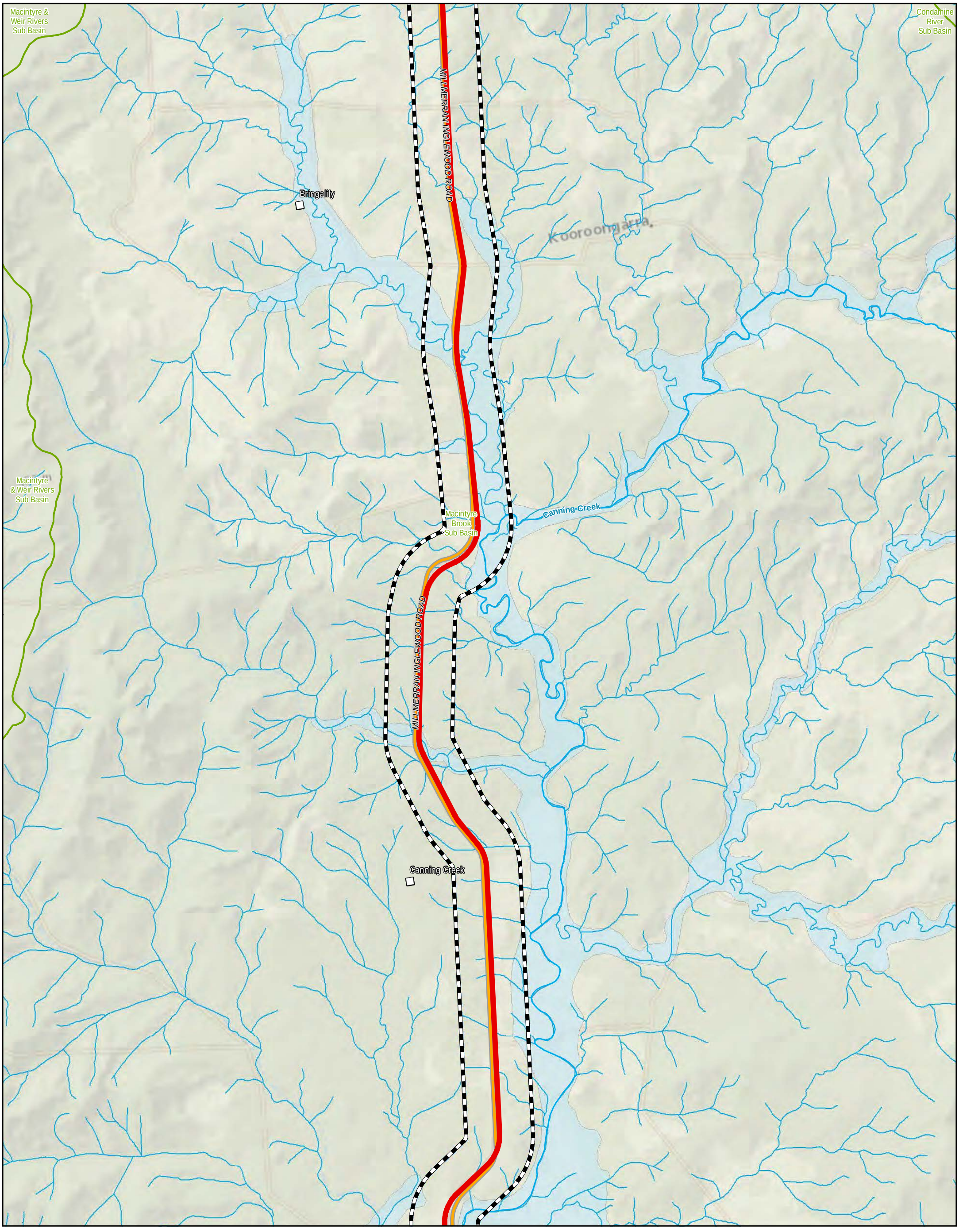

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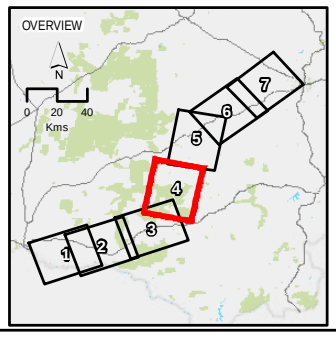

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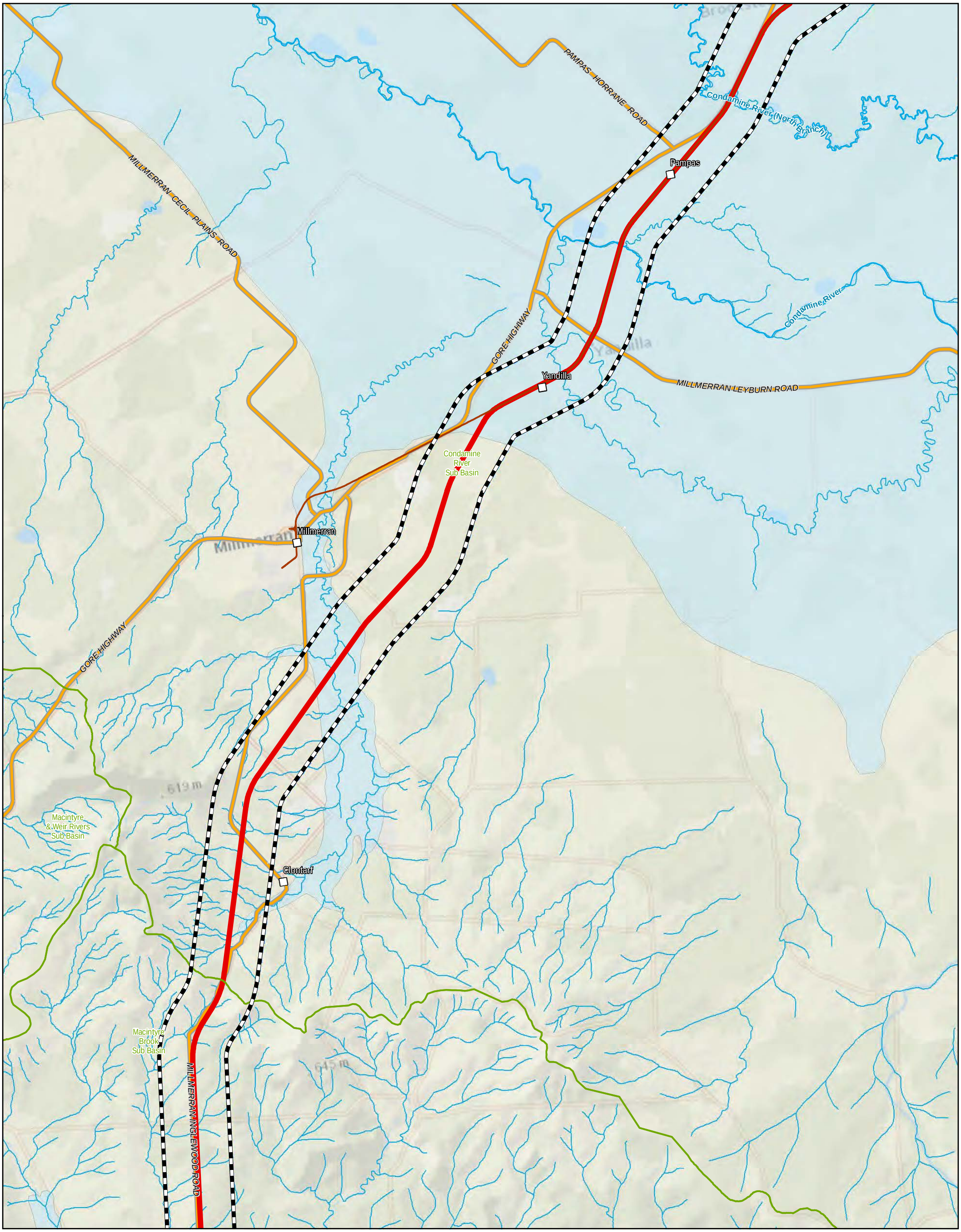

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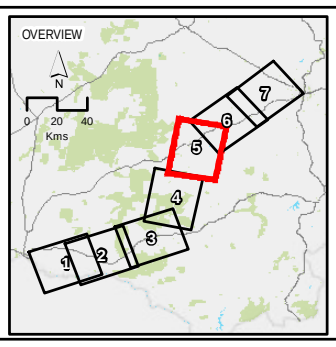

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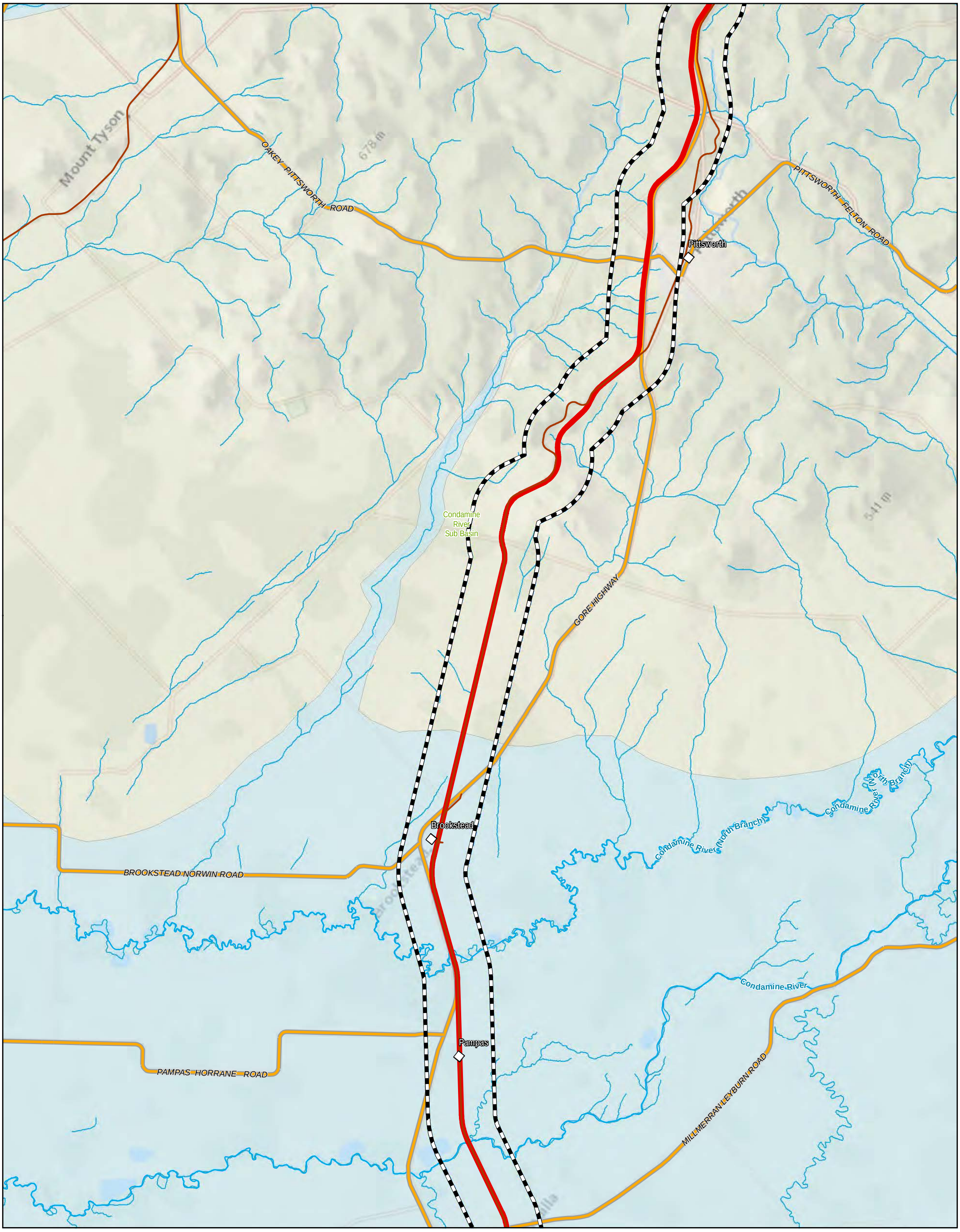

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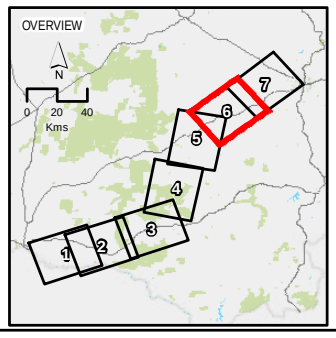

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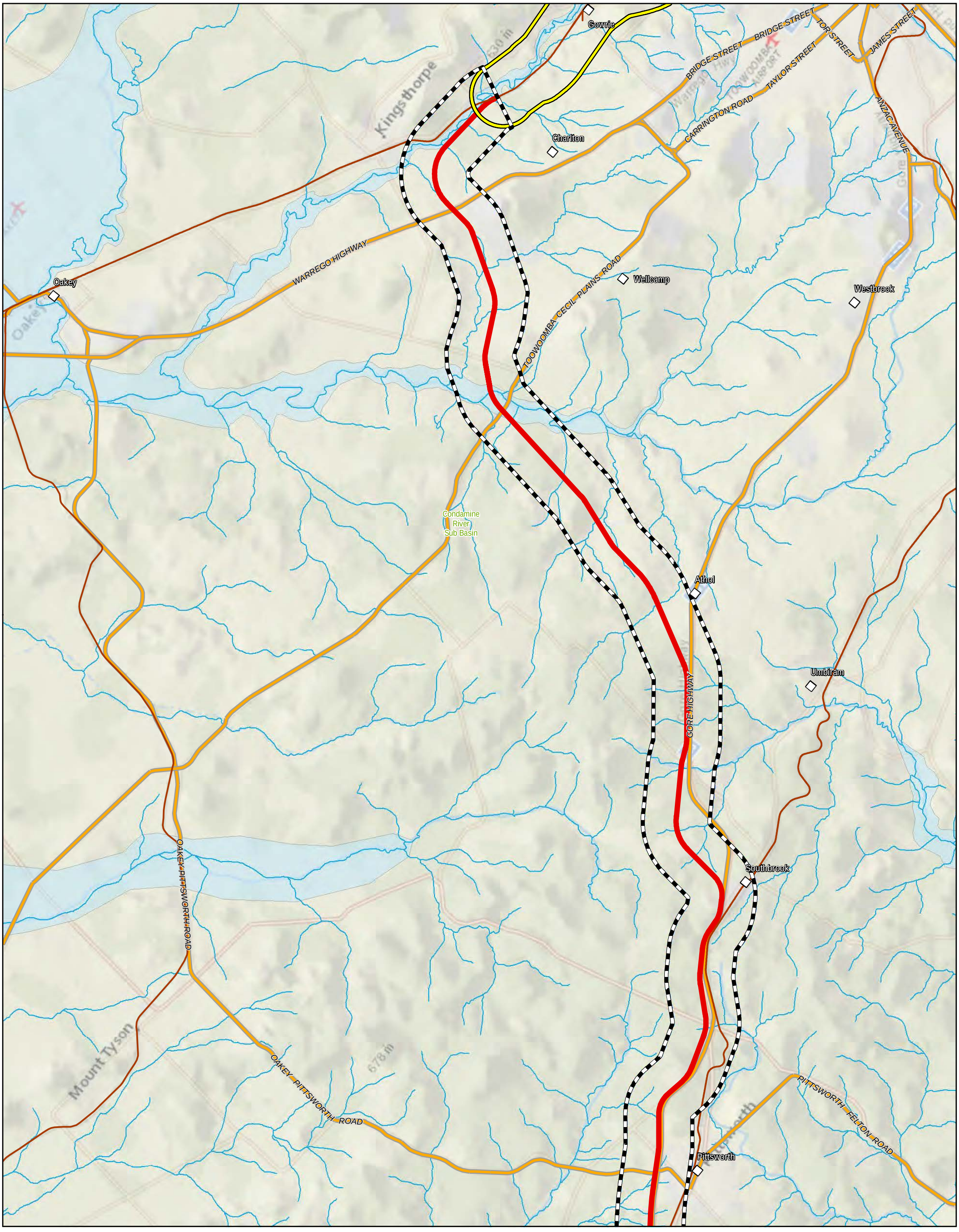

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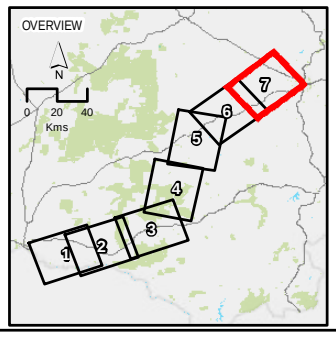

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5.1.2.2. Flooding

The total length of floodplain crossed by the Conceptual Alignment is estimated at 46 km. This total length includes the floodplains of:

- Macintyre River (5.3 km)
- Macintyre Brook (14.8 km)
- Condamine River (south, main and north branches) (22.4 km)
- Westbrook Creek (1.3 km)
- Gowrie Creek (2.1)

The estimate of these floodplain lengths is derived from the Queensland Floodplain Assessment Overlay (DNRM, 2013).

The Study Area crosses extensive sections of floodplain at the Condamine River. During high flow events, the Condamine River breaks out into a complex floodplain formed by three main branches, the Northern Branch, Main Branch and Southern Branch (also known as Grasstree Creek). The main Condamine 1% Annual Exceedance Probability (AEP) floodplain crossing length, as estimated using a 2D TUFLOW model is approximately 12.5 km, although the total floodplain length at this location extends further when tributaries such as Back Creek and Learmonth Gully are included.

As part of the previous route option comparison process managed by the Department of Infrastructure and Regional Development, a guided tour of the area was undertaken on 18 January 2017 with 23 landholders. Historical water depths from 2010/11 flood and debris markers were photographed, measured and recorded. These water depths were compared against the results of the TUFLOW flood model established to simulate the 2010/11 flood.

The comparison found that the 2010/11 flood model results are within a reasonable level of accuracy to observed flood markers, generally within ±0.1 m. The greatest difference in model results was ±0.66 m near the Condamine River South Branch (Grasstree Creek). It is believed that this difference could be attributed to timing of coincident flood peaks between Back Greek and Grasstree Creeks, and associated backwater effects.

Model calibration in this location will be considered in more detail during the EIS.

5.1.2.3. Groundwater

Groundwater within the Study Area is regulated under the Water Plan (Great Artesian Basin and Other Regional Aquifers) 2017, Water Plan (Condamine and Balonne) 2004 and the Water Plan (Border Rivers) 2003.

There is a strong agricultural reliance on groundwater situated in alluvial deposits associated with the network of watercourses in the Study Area.

Salinity is predominantly an ephemeral occurrence that is dependent on a combination of bio-physical conditions (e.g. rainfall, groundwater levels, geology, soils) and land management practices (e.g. removal of vegetation cover, cropping regimes, soil compaction processes). Salinity occurrences are located throughout the eastern Darling Downs, particularly along the boundary of the Tertiary Main Range Volcanics and the alluvial plains.

5.1.3. Air Quality and Noise

Ambient Air Quality

Ambient air quality data, published by the Queensland Department of Science, Information Technology and Innovation (DSITI) in the vicinity of the Border to Gowrie Project has been utilised to characterise existing air quality in the Study Area. The monitoring stations at Toowoomba (North) and Jondaryan are likely to provide good indications of existing air quality in the northern section of the Study Area. However, these monitoring locations would not be representative for the middle and southern sections of the Study Area where land uses and sources of emissions differ. As such, the air quality data from Toowoomba (North) and Jondaryan presented in Table 5-3 are indicative only of ambient conditions in the northern section of the Study Area.

Table 5-3 Air Quality Background Concentrations (µg/m^3)

Pollutant	Averaging Period	Adopted Background Concentration (µg/m^3)	Monitoring Station
CO	8 Hour	224.7	Toowoomba
NO_2	1 Hour	42.7	
	Annual	11.8	
PM_{10}	24 Hour	24.3	Jondaryan
$PM_{2.5}$	24 Hour	6.6	Toowoomba
	Annual	4.3	

Source: DSITI, 2017

The land use in the Study Area is characterised by an urbanised area centred on Toowoomba, with smaller population centres in Southbrook, Pittsworth, Brookstead, Millmerran, Inglewood and Yelarbon. Between the major centres, the land use is largely rural and dominated by rural activities. Existing air quality emissions in the region principally relate to dust from agricultural activities and wind erosion. Specific industrial emissions occur on the outskirts of Toowoomba, and in some of the regional towns.

The Queensland Government Air Quality Index rates air quality based on the relationship between observed pollutant and pollutant goal concentrations. Using this air quality rating system, the adopted pollutant background concentrations (Table 5-3) in the northern portion of the Study Area for carbon monoxide (CO) and nitrogen dioxide (NO_2) are rated as 'Very Good' and PM_{10} and $PM_{2.5}$ as 'Good'.

Noise and Vibration

Major sources of noise and vibration situated within the Study Area are as follows:

- Main linear sources:
  - Operational rail lines: South Western Line, Millmerran Branch Railway, West Moreton Line
  - State controlled roads: Cunningham Highway, Millmerran-Inglewood Road, Gore Highway, Millmerran-Leyburn Road, Pampas-Horane Road, Brookstead-Norwin Road, Oakey-Pittsworth Road, Pittsworth-Felton Road, Toowoomba-Cecil Plains Road and Warrego Highway.

  - Local roads
- Main point sources:
  - Commodore Mine
  - Brisbane West Wellcamp Airport
  - Communities within the Study Area: Yelarbon, Inglewood, Millmerran, Brookstead, Pittsworth, Southbrook, Gowrie Mountain and Gowrie.

Noise monitoring undertaken at locations in Pampas and Brookstead in 2016 found noise levels to be typical of a rural township environment, with generally low background noise levels.

5.1.4. Ecosystems

This section describes the protected areas, mapped remnant vegetation (QLD regional ecosystems) and mapped essential habitat likely to be present in the Study Area. Aquatic habitats (creeks in the Study Area) are also described. Matters of National Environmental Significance (MNES) are described in Section 6.6. Preliminary ecological surveys were conducted in 2016 to inform the development of the conceptual alignment and identify ecological values within the study area.

5.1.4.1. Protected Areas

Two State Forests declared under the *Forestry Act 1959* are partially situated within the Study Area, being Whetstone State Forest between Yelarbon and Inglewood and Bringalily State Forest between Inglewood and Millmerran. Where the Conceptual Alignment passes through the Whetstone State Forest, it is likely to comprise an upgrade to the existing South Western railway line. The Conceptual Alignment through Bringalily State Forest will require new rail corridor and is proposed to align with Millmerran-Inglewood Road.

There are no national parks, regional parks or areas protected by international treaties (e.g. Ramsar wetlands) within the Study Area.

5.1.4.2. Matters of State Environmental Significance

Matters of State Environmental Significance (MSES) identified within the Study Area include remnant vegetation consistent with Endangered and Of Concern Regional Ecosystems (REs), riparian vegetation fringing water courses and Essential Habitat.

Habitat for Endangered, Vulnerable or Near Threatened (EVNT) flora and fauna are also classified as MSES. Some cleared areas are also potential habitat for EVNT species, in particular the suite of flora species found in disturbed roadside reserves and rail corridors on the Darling Downs.

MSES that are known to or have potential to occur within the Study Area are discussed in Section 5.1.5.

The impacts of the project on these matters, including opportunities for avoidance and mitigation during construction will be assessed through the EIS process.

5.1.4.3. Ecological Corridors

Overall ecological connectivity within the Study Area is generally low, with most areas of remnant vegetation being small and/or narrow, surrounded by non-remnant grazing pastures and cultivation. Although these areas may provide some stepping-stone connectivity value, due to the highly disturbed state of the surrounds, their overall connectivity value is considered low.

Areas providing significant connectivity values include remnant vegetation associated with watercourses and drainage lines and areas of State Forest (Figure 5-3). These areas provide movement corridors between larger patches of remnant vegetation. The potential value of the riparian areas as movement corridors was evident by the observation of Koala scats and scratches during initial field surveys.

5.1.4.4. Regional Ecosystems

The following section provides a summary of the broad remnant vegetation that occurs within the Study Area. Where appropriate, reference has been made to the relevant Regional Ecosystem (RE) code under the *Vegetation Management Act 1999* (Qld) (VMA). State significant environmental values are mapped on Figure 5-3.

Drainage lines and alluvial plains

River red gum (*Eucalyptus camaldulensis*) and/or forest red gum (*E. tereticornis*) woodlands (RE 11.3.25, least concern) occur on fringing drainage lines that cross the Study Area.

Areas with broader alluvial/flood plains support poplar box (*E. populnea*) (11.3.2, of concern) and/or forest red gum (11.3.4, of concern) woodlands although many of these areas have been extensively cleared, particularly in the more fertile valleys surrounding the Macintyre Brook and the Condamine River.

Areas of natural grassland (11.3.21, endangered and 11.3.24, endangered) previously occurred on the alluvial plains of the Darling Downs in the northern parts of the Study Area although there is little of this vegetation type remaining intact and no remnant areas (as defined under the VMA) were observed during initial field surveys.

Areas of non-riverine wetlands (11.3.27, least concern) are mapped as part of a mosaic on the Condamine River floodplain within the Study Area. However, these areas are not situated along the Conceptual Alignment.

Yelarbon Desert

This vegetation type (RE 11.5.14, of concern) occurs in the south western parts of the Study Area around Yelarbon. Fensham *et al*. (Fensham, 2007) noted that ephemeral wetlands were a common component of this ecosystem, although these were not observed by initial field surveys.

Eucalypt woodlands with cypress pine/bull oak on plains

Areas of flat to undulating plains on texture contrast soils occur where the Conceptual Alignment traverses Bringalilly State Forest between Inglewood and Millmerran. The vegetation group includes a series of eucalypt woodlands dominated by poplar box (11.3.18, least concern), poplar box or narrow leaved-ironbark (*E. crebra*) (11.5.1, least concern), gum topped box (*E. woollsiana*) (11.9.13, of concern and 11.5.20, least concern) and dirty gum (*E. chloroclada*) (11.5.4, least concern), with a low tree layer usually dominated by cypress pine (*Cypress glaucophylla*) and bull oak.

Mountain coolibah on undulating rises and low hills

Mountain coolibah *(E. orgadophila)* woodlands occur on the crests and lower slopes hills of mainly basalt (11.8.5, least concern) or less often sediments (11.9.2, least concern). This vegetation occurs within the Study Area on steeper hills with rock outcrops, although these areas will typically be avoided by the alignment due to topographical constraints. Small areas on lower slopes of basalt hills are mapped as natural grasslands (11.8.11, of concern) although no areas of this RE was observed in initial field surveys.

Brigalow woodland and Semi Evergreen Vine Thicket on undulating plains

Brigalow (*Acacia harpophylla*) and/or belah (*Casuarina cristata*) woodlands (11.3.1, endangered; 11.4.3, endangered and 11.9.5, endangered) occur scattered across flat and gently undulating clay plains, mainly in the southern half of

the Study Area, although scattered patches were also recorded to the east of the Condamine River floodplain. Most of these areas have been cleared and only isolated remnants/regrowth patches remain. There were small areas of Semi-evergreen vine thicket (SEVT) (11.8.3, of concern) mapped and observed north of Millmerran and also near Gowrie within the Study Area.

5.1.4.5. Aquatic Ecosystems

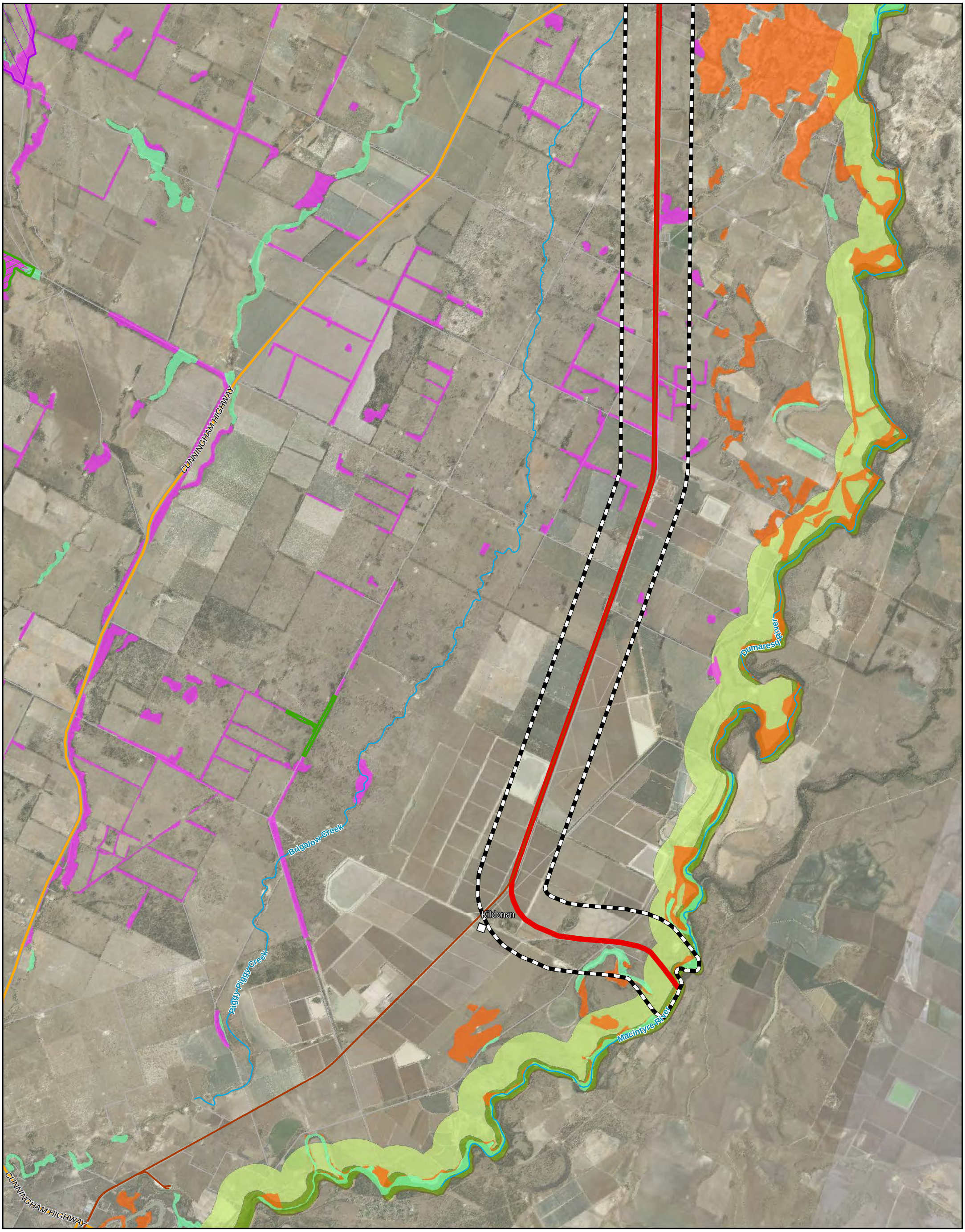
Under the provisions of the *Fisheries Act 1994*, a waterway barrier is defined as any structure that limits fish movement along a waterway. Waterway barriers can have a significant impact on native fish numbers such as by preventing the movement of fish species and changing the natural flow patterns of a river or creek. Examples of waterway barriers include dams, bridges and culverts.

A search of the Department of Agriculture and Fisheries (DAF) Waterways for Waterway Barrier Works Mapping has identified numerous mapped waterways within the Study Area. These are summarised in Table 5-4.

Table 5-4 Watercourse classifications crossed by the Conceptual Alignment

WATERCOURSE CLASSIFICATION UNDER *THE FISHERIES ACT 1994*	NUMBER CROSSED BY THE CONCEPTUAL ALIGNMENT
Purple (Major)	11
Red (High)	8
Amber (Moderate)	27
Green (Low)	46

The aquatic values of watercourses within the Study Area were not assessed by initial field surveys. However, most of the larger streams were lined by River Red Gum (*E. camaldulensis*) or Forest Red Gum (*E. tereticornis*) riparian woodlands. These areas would typically provide fauna breeding habitat such as hollows, and connectivity to other habits for a range of fauna species including the Greater Glider and Koala.



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Legend

- Towns
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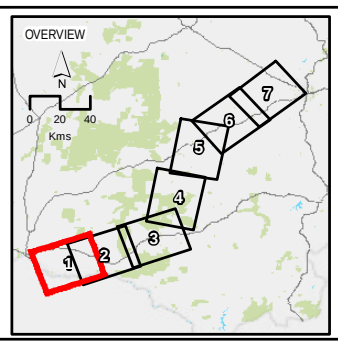
- Major Roads
- Major Rivers
- Study Area
- Protected areas
- Essential habitat
- State Boundary
- Adjacent Inland Rail Project

Remnant Vegetation

- Category A or B area containing endangered regional ecosystems
- Category A or B area that is a least concern regional ecosystem
- Category A or B area containing of concern regional ecosystems

Statewide environmental corridors (DEHP)

- State
- Regional



Data sources:
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Environmental Corridors - DEHP
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Figure **5.3**
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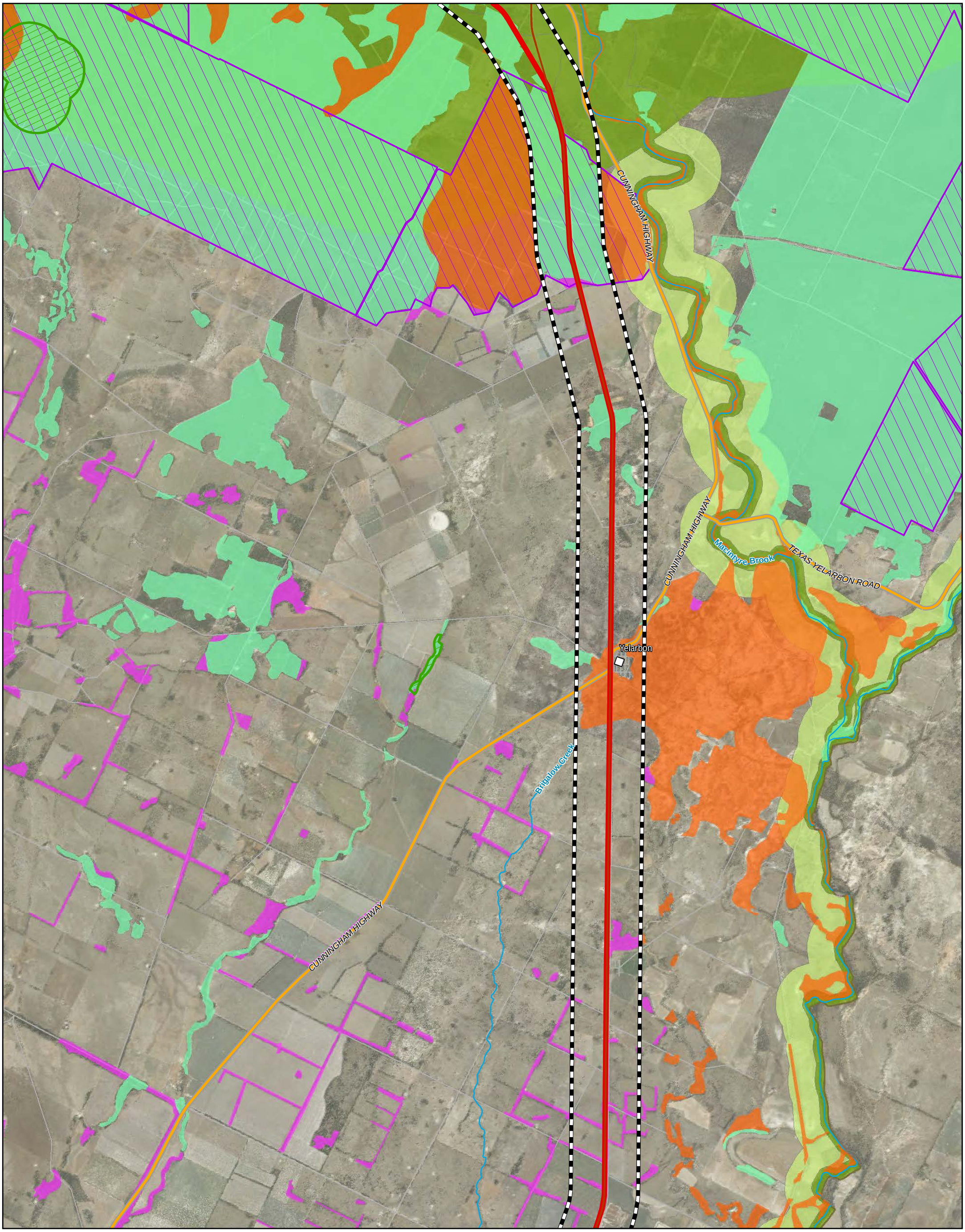

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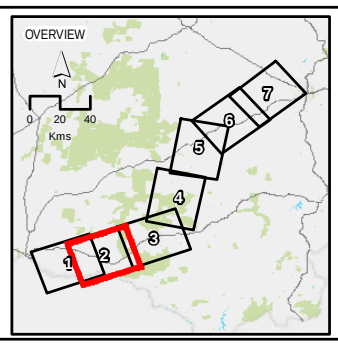
OVERVIEW



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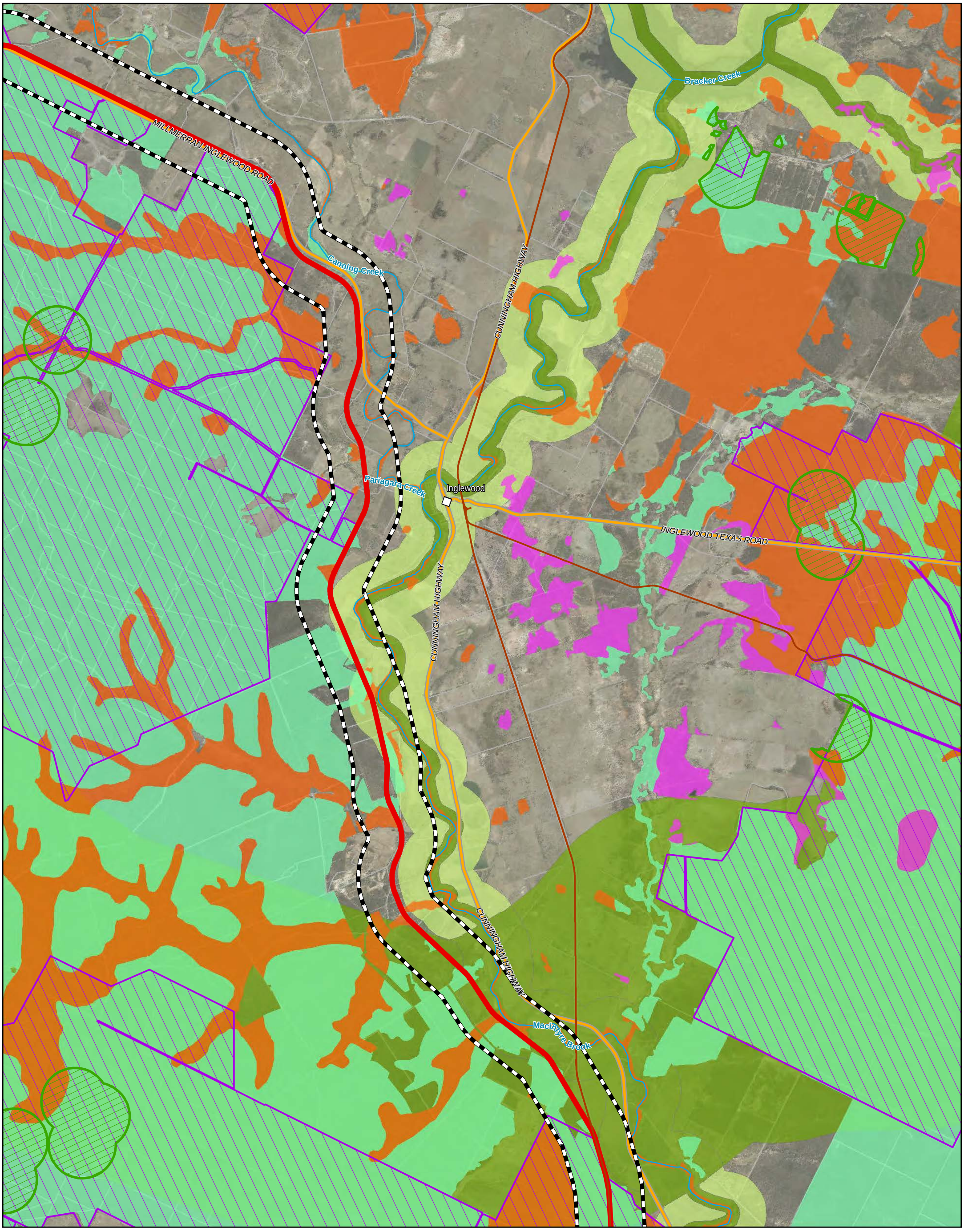

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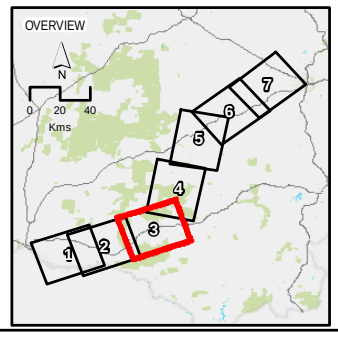

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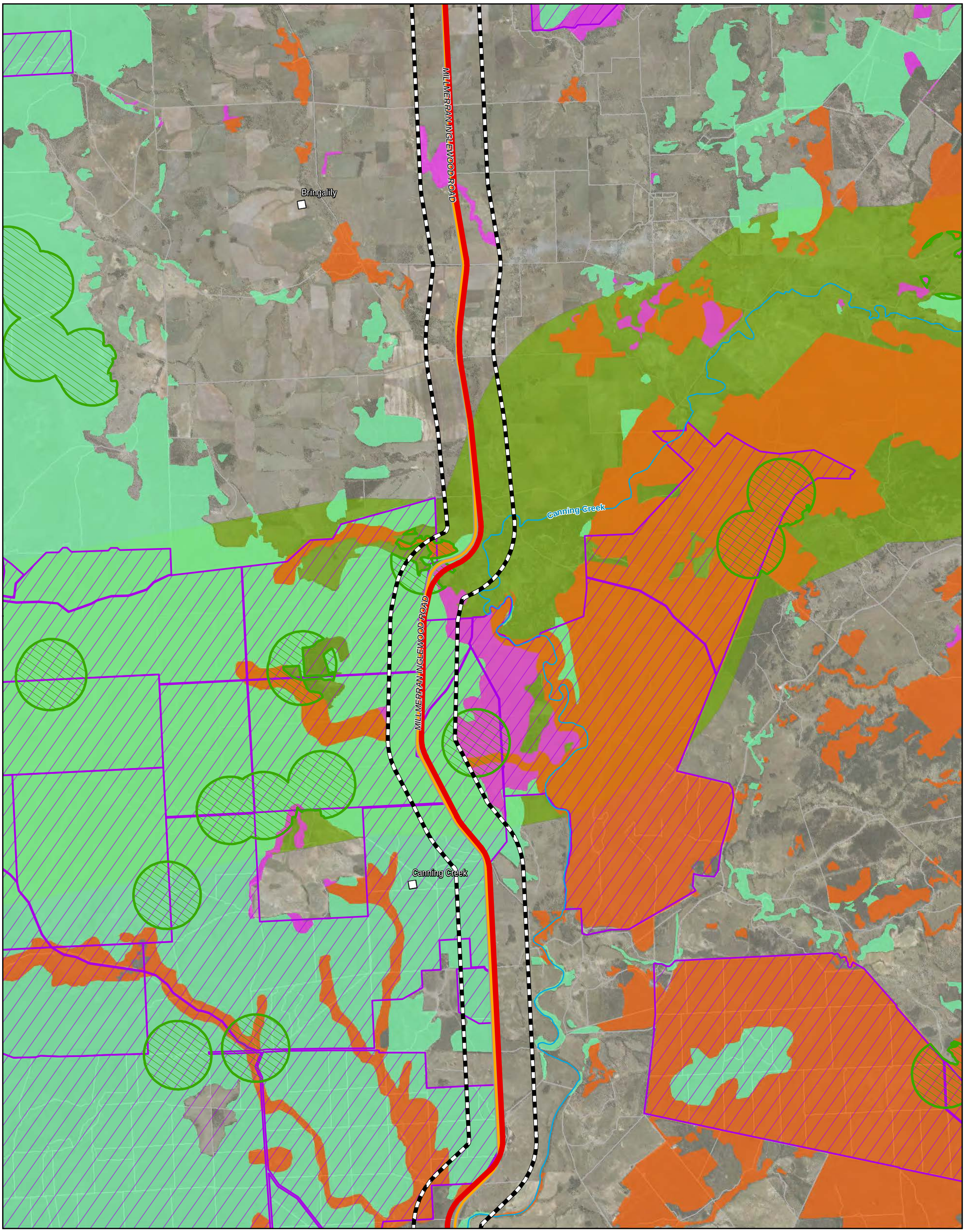

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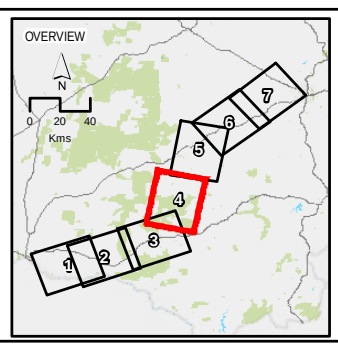

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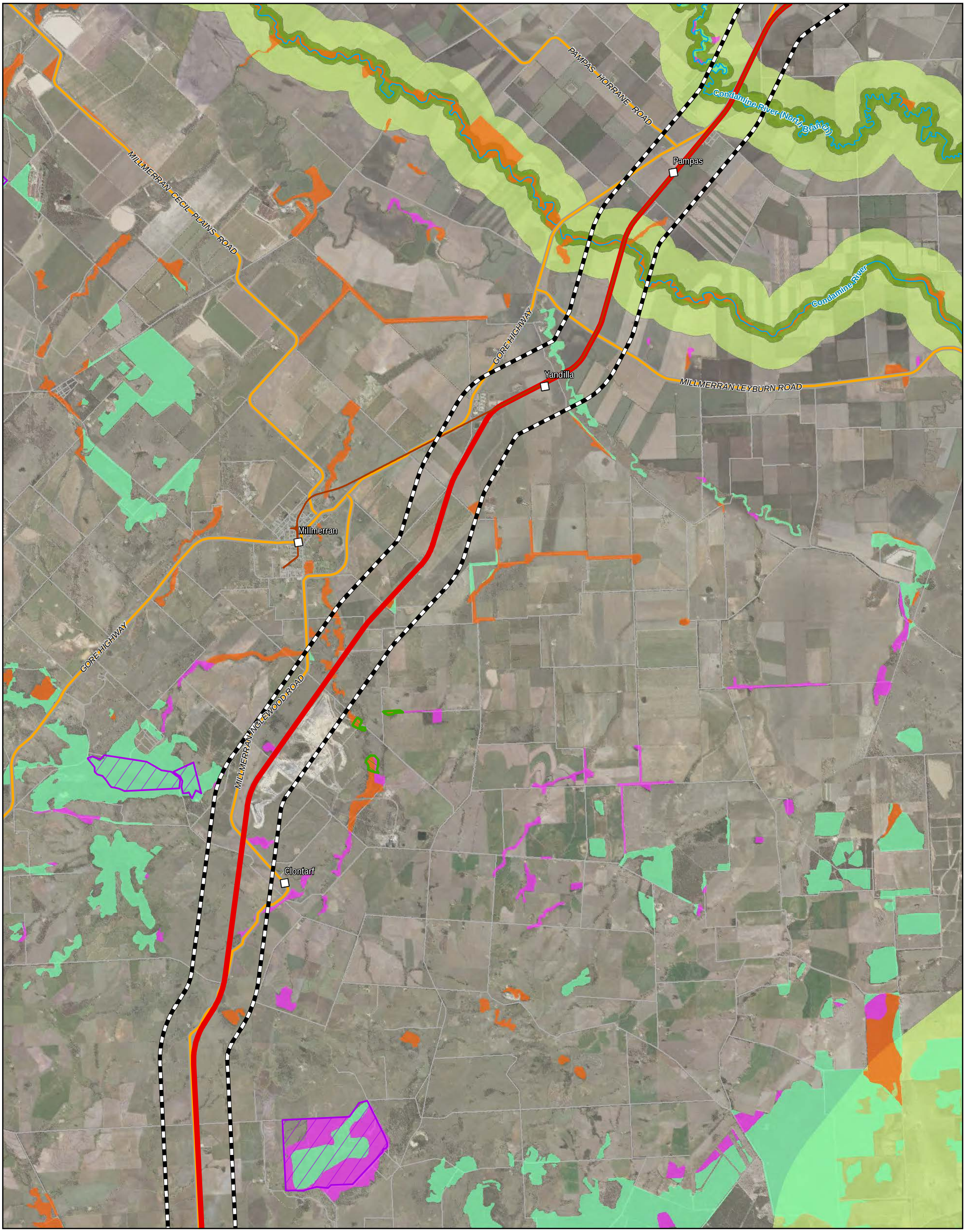

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OAKEY PITTSWORTH ROAD
PITTSWORTH FELTON ROAD
Pittsworth
GORE HIGHWAY
Brookstead
BROOKSTEAD NORWIN ROAD
Condamine River (North Branch)
Condamine River
Pampas
PAMPAS HORRANE ROAD
MILLMERRAN LEYBURN ROAD

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Gowrie
Charlton
Oakey
Wellcamp
Westbrook
Athol
Umbiram
Southbrook
Pittsworth
BRIDGE STREET
TAYLOR STREET
JOR STREET
JAMES STREET
CARRINGTON ROAD
ANZAC AVENUE
WARREGO HIGHWAY
TOOWOOMBA CECIL PLAINS ROAD
GORE HIGHWAY
OAKEY PITTSWORTH ROAD
PITTSWORTH FELTON ROAD

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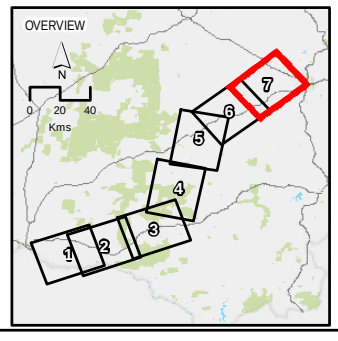

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5.1.4.6. Threatened Ecological Communities

The Protected Matters Report identified seven EPBC Act listed Threatened Ecological Communities (TECs) as potentially occurring within the Study Area, as listed in Table 5-5. Two of these communities – Brigalow and SEVT were mapped and observed during initial field surveys in the immediate vicinity of the Conceptual Alignment.

Table 5-5 List of TECs identified from desktop assessment and field survey

TEC	EPBC ACT STATUS	LIKELIHOOD OF PRESENCE (POST-SURVEY)
Brigalow (*Acacia harpophylla* dominant and codominant)	Endangered	**Known** Mapped and observed from several areas in and adjacent to the Study Area. These include small areas not shown on state RE mapping.
Semi-evergreen vine thickets of the Brigalow Belt (North and South) and Nandewar Bioregions	Endangered	**Known** Mapped and observed adjacent to the Conceptual Alignment within the Study Area north of Millmerran and west of Gowrie. Usually occurs on steeper slopes that are likely to be avoided by the rail alignment.
Coolibah - Black Box Woodlands of the Darling Riverine Plains and the Brigalow Belt South Bioregions	Endangered	**Unlikely** A small (<1 ha) stand, that was not shown on the state RE mapping and did not meet the size threshold in the listing criteria was observed adjacent to the Study Area.
Natural grasslands on basalt and fine-textured alluvial plains of northern NSW and southern QLD	Critically Endangered	**Potential** Not observed in the Study Area although areas that are small (< 0.1 ha) or dominated by exotic species were observed. Areas of this community are mapped immediately adjacent to the Study Area but two patches that were viewed through binoculars in this survey were incorrectly mapped woodlands.
Weeping Myall Woodlands	Endangered	**Potential** Not mapped or observed during field survey in or adjacent to the Study Area. Does occur to west of region.
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	Critically Endangered	**Potential** Not mapped or observed in or adjacent to the Study Area. Scattered Yellow Box were observed in the Gowrie area near the current railway. It appears unlikely that areas that meet the definition of the TEC occur although this needs to be verified along the entire length of the alignment.
Lowland Rainforest of Subtropical Australia	Critically Endangered	**Unlikely** Not mapped or observed in or adjacent to the Study Area. Does occur to the east of the Study Area.

Brigalow TEC within the Study Area is present in the form of two remnant Brigalow REs (11.4.3 and 11.9.5), in addition to stands of vegetation shown as non-remnant 'high value regrowth' (HVR) on state mapping or not shown on state mapping at all. It is likely that these latter areas of vegetation are not shown on state mapping due to being a)

vegetation was often found to meet the definition for the Brigalow TEC in the Commonwealth listing advice (Threatened Species Scientific Committee, 2001), which includes regrowth older than 15 years and patches greater than 0.5 ha in size.

The SEVT TEC identified within the Study Area equated to RE 11.8.3. These areas were verified by initial field surveys, although generally occurred on steeper slopes within the Study Area.

No areas of the Natural Grassland TEC were observed during initial field surveys in proximity to the Conceptual Alignment. Areas of this TEC do occur on the Darling Downs and small areas of grassland dominated by bluegrass (*Dichanthium sericeum*) were identified during the field survey within the Study Area. However, in the case of grasslands on alluvium (equivalent to REs 11.3.21 and 11.3.24), all areas observed in the field were too small (<0.1 ha) or too dominated by exotic weed species to meet the listing criteria for this TEC (Threatened Species Scientific Committee, 2008).

Areas of grassland on basalt (RE 11.8.11) are also representative of the Natural Grassland TEC. There are areas of this RE mapped within the Study Area that were not able to be ground-truthed directly by initial field surveys due to land access constraints. However, in two cases that were observed through binoculars from adjacent public roads the mapped vegetation was found not to be the Natural Grassland TEC as they appeared to be dominated by *Eucalyptus orgadophila* open woodland and therefore equated to RE 11.8.5. Therefore it is concluded that it is unlikely that there are substantial, if any, areas of the Natural Grassland TEC along the Conceptual Alignment.

The coolibah, white box, weeping myall and lowland rainforest TECs that are also listed in Table 5-5, are considered unlikely to occur within the Study Area based on the results of desktop assessment and initial field survey.

One small patch of coolibah (*E. coolabah*) woodland was observed in the Study Area south of Yelarbon. However, this patch was less than 0.25 ha in area and therefore was too small to meet the listing criteria (5 ha) for the coolibah TEC (Threatened Species Scientific Committee, 2011).

Scattered individual yellow box (*E. melliodora*) trees were observed in the vicinity of Gowrie although no area that met the listing criteria for the white box TEC was observed (Threatened Species Scientific Committee, 2006).

Individual weeping myall (*Acacia pendula*) trees are known from the surrounding area although none were observed during the initial field survey. Small stands of the weeping myall TEC do occur near Goondiwindi, west of Dalby (B Wilson pers ob.) and north of Oakey (G. Ford pers. comm) but none are known within the Study Area.

5.1.5. Flora and Fauna

5.1.5.1. Threatened Flora

Desktop assessment

Desktop assessment identified 46 threatened flora species listed under the *Nature Conservation Act 1992* (NC Act) and/or EPBC Act, as potentially occurring within the Study Area. This list includes 42 species listed under the NC Act (12 Endangered, 23 Vulnerable, 6 Near Threatened and 1 Presumed Extinct) and 33 species listed under the EPBC Act (1 Critically Endangered, 8 Endangered and 24 Vulnerable) (Eco Logical Australia, 2016).

Field survey

No EVNT flora species were identified in the initial field surveys, although six species, *Picris evae*, *Picris barbarorum*, *Homopholis belsonii, Rhaponticum austral, Macrozamia machinii* and *Sophora fraseri* have previously been recorded in the Study Area. A total of 17 species were considered likely to occur because their preferred habitat is found within the Study Area and adjacent regions (Eco Logical Australia, 2016).

A preliminary assessment of the likelihood of occurrences of the listed species within the Study Area, based on their known distribution, Conceptual habitat and the habitats that were identified from the desktop assessment and field survey is summarised in Table 5-6.

Table 5-6 EVNT flora likelihood assessment

SCIENTIFIC NAME	COMMON NAME	NC ACT[1]	EPBC ACT[1]	LIKELIHOOD
Homopholis belsonii		E	V	Known
Picris barbarorum		V		Known
Picris evae	Hawkweed	V	V	Known
Macrozamia machinii		V	V	Known
Rhaponticum australe	Austral Cornflower	V	V	Known
Sophora fraseri	Brush Sophora	V	V	Known
Acacia lauta	Tara Wattle	V	V	Likely
Bertya opponens			V	Likely
Bothriochloa bunyensis	Satin-top Grass	V	V	Likely
Calotis glabrescens		PE		Likely
Cymbonotus maidenii		E		Likely
Dichanthium queenslandicum	King Bluegrass	V	E	Likely
Dichanthium setosum			V	Likely
Digitaria porrecta	Finger Panic Grass	NT	E	Likely
Lepidium monoplocoides			E	Likely
Lepidium peregrinum			E	Likely
Philotheca sporadica		NT	V	Likely
Prostanthera sp. (Dunmore D.M.Gordon 8A)		V	V	Likely
Solanum papaverifolium		E		Likely
Solanum stenopterum		V		Likely
Thesium australe	Toadflax	V	V	Likely
Tylophora linearis		E	E	Likely
Xerothamnella herbacea		E	E	Likely

SCIENTIFIC NAME	COMMON NAME	NC ACT[1]	EPBC ACT[1]	LIKELIHOOD
Aristida forsteri		E		Potential
Arthraxon hispidus	Hairy-joint grass	V	V	Potential
Cadellia pentastylis	Ooline	V	V	Potential
Clematis fawcettii	Stream Clematis	V	V	Potential
Commersonia inglewoodensis		E		Potential
Eucalyptus curtisii	Plunkett Mallee	NT		Potential
Eucalyptus virens	Shiny-leaved Ironbark	V	V	Potential
Leucopogon sp. (Coolmunda D.Halford Q1635)		E	E	Potential
Macrozamia conferta		V	V	Potential
Pomaderris coomingalensis		E		Potential
Westringia parvifolia		V	V	Potential
Daviesia quoquoversus		V		Unlikely
Haloragis exalata subsp. velutina	Tall Velvet Sea-berry	V	V	Unlikely
Macadamia integrifolia	Macadamia Nut	V	V	Unlikely
Microcarpaea agonis		E	E	Unlikely
Phebalium distans	Mt. Berryman Phebalium	E	CE	Unlikely
Rutidosis glandulosa		NT		Unlikely
Rutidosis lanata		NT		Unlikely
Sarcochilus hartmannii		V	V	Unlikely
Sarcochilus weinthalii	Blotched Sarcochilus	E	V	Unlikely
Bulbophyllum globuliforme	Miniature Moss-orchid	NT	V	Does not occur
Eucalyptus dunnii	Dunn's white gum	V		Does not occur
Eucalyptus infera	Durikai Mallee	V	V	Does not occur

[1] CE – Critically Endangered; E-Endangered; PE – Presumed Extinct; V – Vulnerable; NT – Near Threatened.

A more detailed flora survey of the rail alignment is required to fully assess the occurrence of EVNT flora species. Numerous sections of the Study Area are within a 'High Risk' area shown on the Flora Survey Trigger Map. Under the NC Act, these areas, plus a 100 m buffer, are required to be surveyed using the NC Act Flora Survey Guidelines (DEHP, 2014).

5.1.5.2. Threatened Fauna

Desktop assessment

Desktop assessment identified 55 threatened fauna species as potentially occurring within the Study Area. This includes 33 listed under the NC Act (10 Endangered, 22 Vulnerable and 1 Near Threatened) and 46 species listed under the EPBC Act (4 Critically Endangered, 8 Endangered, 19 Vulnerable and 15 Migratory) (Eco Logical Australia, 2016). A preliminary assessment of the likelihood of occurrences of the listed species based on their known distribution and habitats mapped or observed on the alignment is presented in Table 5-7.

Field survey

No EVNT fauna species were observed in the survey, although existing records show that several species have previously been recorded in close proximity to the Study Area. A total of 28 EVNT fauna species are considered likely/known to occur within the Study Area based on appropriate habitat being observed or mapped and their known distribution.

Essential habitat within the Study Area is shown in Figure 5-3.

Table 5-7 EVNT fauna likelihood assessment

CLASS	SCIENTIFIC NAME	COMMON NAME	NCA [1]	EPBC [1]	LIKELIHOOD
Mammals	*Phascolarctos cinereus*	Koala (Qld, NSW and the ACT)	V	V	Known
Reptiles	*Tympanocryptis condaminensis*	Condamine (Darling Downs) earless dragon	E	E	Known
Birds	*Anthochaera phrygia*	Regent Honeyeater	E	CE	Likely
Birds	*Apus pacificus*	Fork-tailed Swift		Mig.	Likely
Birds	*Calidris acuminata*	Sharp-tailed Sandpiper		Mig.	Likely
Birds	*Calyptorhynchus lathami*	Glossy Black Cockatoo	V		Likely
Birds	*Erythrotriorchis radiatus*	Red Goshawk	E	V	Likely
Birds	*Geophaps scripta scripta*	Squatter Pigeon (Southern Subspecies)	V	V	Likely
Birds	*Grantiella picta*	Painted Honeyeater	V	V	Likely
Birds	*Hirundapus caudacutus*	White-throated Needletail		Mig.	Likely

CLASS	SCIENTIFIC NAME	COMMON NAME	NCA [1]	EPBC [1]	LIKELIHOOD
Birds	*Lathamus discolor*	Swift Parrot	E	CE	Likely
Birds	*Myiagra cyanoleuca*	Satin Flycatcher		Mig.	Likely
Birds	*Ninox strenua*	Powerful Owl	V		Likely
Butterfly	*Hypochrysops piceata*	Bulloak Jewel	E		Likely
Butterfly	*Jalmenus eubulus*	Pale Imperial Hairstreak	V		Likely
Mammals	*Dasyurus maculatus maculatus*	Spot-tailed Quoll, Tiger Quoll (SE mainland population)	V	E	Likely
Mammals	*Nyctophilus corbeni*	South-eastern Long-eared Bat	V	V	Likely
Mammals	*Petauroides volans*	Greater Glider	V	V	Likely
Mammals	*Pteropus poliocephalus*	Grey-headed Flying-fox		V	Likely
Molluscs	*Adclarkia cameroni*	Brigalow Woodland Snail	V	E	Likely
Ray-finned fishes	*Bidyanus bidyanus*	Silver Perch		CE	Likely
Ray-finned fishes	*Maccullochella peelii*	Murray Cod		V	Likely
Reptiles	*Acanthophis antarcticus*	Common Death Adder	V		Likely
Reptiles	*Anomalopus mackayi*	Five-clawed Worm-skink, Long-legged worm skink	E	V	Likely
Reptiles	*Delma torquata*	Collared Delma	V	V	Likely
Reptiles	*Egernia rugosa*	Yakka Skink	V	V	Likely
Reptiles	*Furina dunmalli*	Dunmall's Snake	V	V	Likely
Reptiles	*Hemiaspis damelii*	Grey Snake	E		Likely
Birds	*Actitis hypoleucos*	Common Sandpiper		Mig.	Potential
Birds	*Calidris ferruginea*	Curlew Sandpiper	E	CE	Potential
Birds	*Calidris melanotos*	Pectoral Sandpiper		Mig.	Potential
Birds	*Cuculus optatus*	Oriental Cuckoo		Mig.	Potential

CLASS	SCIENTIFIC NAME	COMMON NAME	NCA [1]	EPBC [1]	LIKELIHOOD
Birds	*Falco hypoleucos*	Grey Falcon	V		Potential
Birds	*Gallinago hardwickii*	Latham's Snipe, Japanese Snipe		Mig.	Potential
Birds	*Monarcha melanopsis*	Black-faced Monarch		Mig.	Potential
Birds	*Pandion cristatus*	Eastern Osprey		Mig.	Potential
Birds	*Pandion haliaetus*	Osprey		Mig.	Potential
Birds	*Rhipidura rufifrons*	Rufous Fantail		Mig.	Potential
Birds	*Rostratula australis*	Australian Painted Snipe	V	E	Potential
Birds	*Tringa nebularia*	Common Greenshank		Mig.	Potential
Birds	*Turnix melanogaster*	Black-breasted Button-quail	V	V	Potential
Mammals	*Chalinolobus dwyeri*	Large-eared Pied Bat	V	V	Potential
Mammals	*Petrogale penicillata*	Brush-tailed Rock-wallaby	V	V	Potential
Mammals	*Potorous tridactylus tridactylus*	Long-nosed Potoroo (SE Mainland)	V	V	Potential
Molluscs	*Adclarkia dulacca*	Dulacca Woodland Snail	E	E	Potential
Birds	*Botaurus poiciloptilus*	Australasian Bittern		E	Unlikely
Birds	*Lophochroa leadbeateri*	Major Mitchell's Cockatoo	V		Unlikely
Birds	*Monarcha trivirgatus*	Spectacled Monarch		Mig.	Unlikely
Birds	*Motacilla flava*	Yellow Wagtail		Mig.	Unlikely
Birds	*Poephila cincta cincta*	Black-throated Finch (southern)	E	E	Unlikely
Mammals	*Dasyurus hallucatus*	Northern Quoll/Digul		E	Unlikely
Mammals	*Pseudomys novaehollandiae*	New Holland Mouse		V	Unlikely
Reptiles	*Uvidicolus sphyrurus*	Border Thick-tailed Gecko		V	Unlikely
Reptiles	*Wollumbinia belli*	Bell's Turtle	V	V	Unlikely
Birds	*Menura alberti*	Albert's Lyrebird	NT		Does not

CLASS	SCIENTIFIC NAME	COMMON NAME	NCA [1]	EPBC [1]	LIKELIHOOD
					occur

[1] CE – Critically Endangered; E-Endangered; PE – Presumed Extinct; V – Vulnerable; Mig. – Migratory; NT – Near Threatened.

5.1.5.3. Essential Habitat

The desktop assessment showed that one area of Essential Habitat for the Pale Imperial Hairstreak Butterfly (*Jalmenus eubulus*) is mapped along the Conceptual Alignment near Native Dog Creek in the Bringalily State Forest. The Essential Habitat factor listed for this species is old growth Brigalow (DNRM, 2016). This community was observed during surveys, often as a sub-dominant in a Belah open forest.

5.1.5.4. Migratory and marine species

Migratory species with potential to occur within the Study Area are identified in Table 5-7.

Observation of a number migratory and wader species during the initial field surveys was considered unlikely due to the seasonal timing of the survey. It was, however, possible to note potential habitat for such species, based upon previous records and habitat preferences. Habitat for wader species was limited at the time of the survey due to the ephemeral nature of waterbodies surveyed. One farm dam adjacent to the Conceptual Alignment offered potential habitat, in addition to the riverine systems surveyed such as Canning Creek.

5.1.5.5. Pest Species

Seven weeds listed as Weeds of National Significance (WoNS) and/or declared weeds under the *Biosecurity Act 2014* were identified during the initial field survey within the Study Area (Table 5-8). The abundance of these species varied from a few scattered individuals to dense infestations (e.g. *Bryophyllum* spp. in the Yelarbon Desert and tiger pear along the Condamine River).

In addition to these declared weeds listed in Table 5-8, a large number of non-declared exotic species including *Sorghum* spp., red natal grass (*Melinis repens*) and Maynes pest (*Verbena aristigera*) also occur within the Study Area.

Table 5-8 Declared weeds occurring within the Study Area identified during the field survey

SPECIES NAME	COMMON NAME	WONS	LP ACT
Asparagus africanus	Climbing asparagus	✓	Class 3
Asparagus plumosus	Feathered asparagus-fern	✓	Class 3
Bryophyllum spp.	Mother of millions		Class 2
Dolichandra unguis-cati	Cat's claw vine	✓	Class 3
Harrisia martinii	Harissa catus		Class 2
Lantana camara	Lantana	✓	Class3
Lycium ferocissimum	African boxthorn	✓	Class 2

SPECIES NAME	COMMON NAME	WONS	LP ACT
Opuntia aurantiaca	Tiger pears	✓	Class 1
Opuntia stricta/tomentosa	Prickly pears	✓	Class 2
Senecio madagascariensis	Fireweed	✓	Class 2
Sporobolus spp.	Giants rats tail grass		Class 2

Based on desktop assessment results, ten declared pest species under the *Biosecurity Act 2014* were identified as potentially occurring within the Study Area (Table 5-9).

Table 5-9 Declared pests identified as potentially occurring within the Study Area based on desktop results

SPECIES NAME	COMMON NAME
Bos taurus/indicus	Domestic cattle
Felis catus	Cat
Oryctolagus cuniculus	Rabbit
Lepus capensis	Brown hare
Ovis airies	Domestic sheep
Sus scrofa	Pig
Vulpes vulpes	Red fox
Canis lupus familiaris	Wild dog
Columba livia domestica	Feral pigeon
Acridotheres tristis	Common mynah

It is expected, based on the habitat assessment, that other feral species such as the house mouse (*Mus musculus*), would also occur throughout the Study Area.

5.2. Social and Economic Environment

The project will be located in a predominantly rural area and be encompassed within Goondiwindi Regional Council (GRC) and Toowoomba Regional Council (TRC) Local Government Areas (LGAs). These LGAs have a combined total resident population of 171,409 people (Queensland Government Statistician's Office, 2016) and cover a total area of 32,203 km² (Australian Bureau of Statistics, 2016).

Goondiwindi Local Government Area

The Goondiwindi LGA has an estimated population of 10,630 with an average age of 40 years (Queensland Government Statistician's Office, 2016) and covers an area of approximately 19,255 km² (Australian Bureau of

Statistics, 2016). Key industries in the area traditionally include cotton, grains, wool and beef, with recent developments in olive and peanut production, as well as stone fruits, citrus, pecan nuts, vegetable crops, grapes and aqua culture.

The median weekly personal income for people aged 15 years and over in Goondiwindi LGA was $653 in 2016 (Australian Bureau of Statistics, 2016). The majority of the population within the Goondiwindi LGA are employed full time, with an unemployment rate of 3.6% (Queensland Government Statistician's Office, 2016).

The town of Inglewood is within both the Study Area and the Goondiwindi LGA. Inglewood is the second largest town within the GRC area with 1,069 people (Australian Bureau of Statistics, 2016).

Toowoomba Local Government Area

The Toowoomba LGA has an estimated resident population of 160,779 people with an average age of 38 years and covers an area of approximately 12,978.5 km2 (Queensland Government Statistician's Office, 2016). Toowoomba is experiencing considerable growth, driven by its regional location and proximity to natural resource production as well as significant investment in infrastructure.

With highly fertile farming land, the Toowoomba region has a strong agricultural history with agriculture, forestry and fishing contributing $666 million to the region's economy with key outputs in grain, poultry, cotton, beef, pork and dairy. Toowoomba has diversified its economy with strong education, health, business services, Defence and construction industries. Mining operations in the Surat Basin also support Toowoomba's economy.

The median weekly personal income for people aged 15 years and over in Toowoomba LGA was $642 in 2016 (Australian Bureau of Statistics, 2016).

The key towns within the local government area and within the Study Area include Millmerran, with a population of around 1,566 and Oakey, with a population of around 1,994 people (Australian Bureau of Statistics, 2016).

5.2.1. Accommodation and Housing

The capacity of the local housing market to absorb a large influx of construction workers is low. Private dwelling occupancy within Goondiwindi and Toowoomba LGAs is considered high with 83% and 88% respectively (Queensland Government Statistician's Office, 2016). Therefore, further detailed analysis will be required to determine the availability of accommodation and housing in both regions and any strategies such as temporary workers accommodation facilities, to mitigate potential adverse impacts on the local housing market.

5.2.2. Cultural Heritage (Indigenous and non-Indigenous)

5.2.2.1. Indigenous Heritage

Aboriginal party and cultural heritage body

There is currently no registered Cultural Heritage Body for the Study Area. A search of the Queensland Department of Aboriginal and Torres Strait Islander Partnerships (DATSIP) database identified that there are currently two Aboriginal Parties for the Study Area (Western Wakka Wakka People and Bigambul People) under ss. 34 and 35 of the *Aboriginal Cultural Heritage Act 2003 (*Table 5-10). A large proportion of the Study Area (Inglewood to Brookstead) is not currently covered by a registered Aboriginal Party or Cultural Heritage Body.

Table 5-10 Registered Aboriginal Parties

QC REF NUMBER	TEAM	STUDY AREA LOCATION
QCD2016/012QC2009 – Bigambul People		That part of the determination area for the Bigambul People determination that covers the southern portion of the Study Area (approximately 4km south of Inglewood) and continues through to Yelarbon
QC1999/004 - Western Wakka Wakka People	Team McLeod Sandra Bauwens Margaret McLeod	That part of the former claim area for the Western Wakka Wakka People claim that covers the northern portion of the Study Area (just south from Brookstead) and continues through to Gowrie
QC1999/004 PRC - Western Wakka Wakka People	Team Beattie Adrian Beattie	That part of the former claim area for the Western Wakka Wakka People claim that covers the northern portion of the Study Area (just south from Brookstead) and continues through to Gowrie

Registered Aboriginal Heritage Sites

Twelve registered Aboriginal heritage sites are located within the Study Area. The DATSIP Aboriginal Cultural Heritage Sites Database & Register only records the central location of these sites, and as such, the full sites may extend further beyond their recorded position. These registered locations are shown on Figure 5-4.

DATSIP does not provide detailed information on these heritage sites without express permission of the relevant Aboriginal Party. It is also important to note that DATSIP states that it is not possible to conclusively guarantee the accuracy of these recordings (in particular, the longitude and latitude location description for each site) and extra diligence is required when operating in these locations. Therefore, DATSIP records are not likely to reflect a true picture of the Aboriginal cultural heritage values of the area.

Based on the broad regional appreciation of recorded Aboriginal heritage, permanent water appears to be one of the major driving forces in the placement of major archaeological sites (open artefact scatters) along the Conceptual alignment. While archaeological artefacts can be found elsewhere, this tends to be 'background scatter', less than one artefact/m^2 and probably represent transient usage of the landscape, rather than dedicated occupation.

5.2.2.2. Non-Indigenous

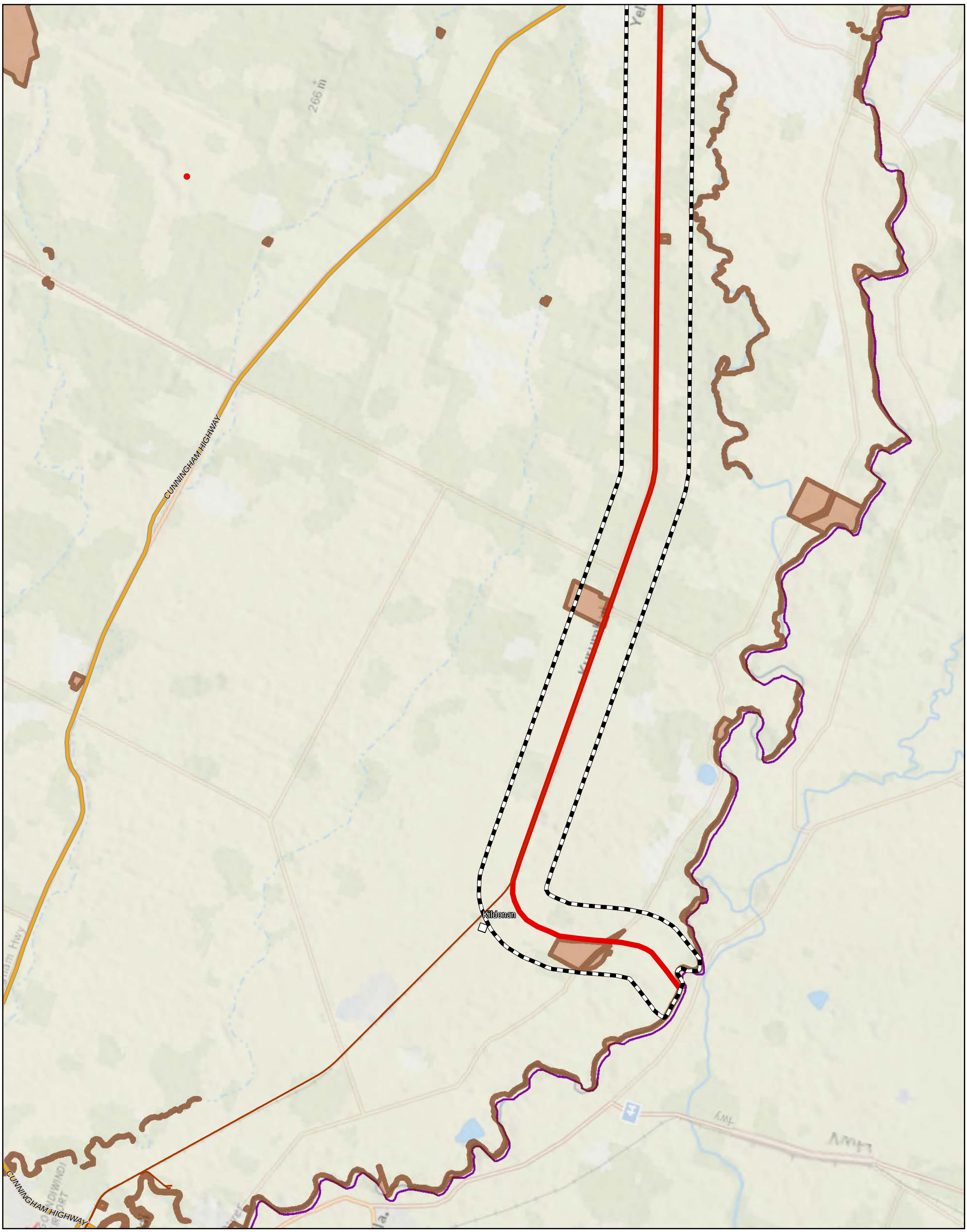
A search of the Australia Heritage Database identified no statutory listed heritage places within or adjacent to the Conceptual Alignment. The closest item (Gowrie Creek Valley View - RNE # 15798) was identified on the now non-statutory Register of the National Estate and is approximately 1 km north of the Conceptual Alignment. This item is not currently recognised by the Commonwealth for its heritage values.

A search of the Queensland State Heritage Register (SHR) identified no statutory listed heritage places within the Study Area.

The Queensland Cultural Heritage Information Management System (CHIMS) is managed by the Department of Environment and Science (DES) and lists historic heritage sites of importance to QLD history, which are not of State Significance. The CHIMS register is non-statutory and instead is a database of sites which are of heritage significance or require additional investigation to determine their significance. A search of CHIMS has identified three items of heritage significance within the Study Area (Table 5-11).

Table 5-11 CHIMS Heritage Items

CHIMS ID	Place Name	Latitude	Longitude	Location to Conceptual Alignment
2425	Macintyre Brook Bridge - Whetstone	-28.4953	150.9353	Located within the Study Area, approximately 800 m south east of the Conceptual Alignment.
2440	Site of former Brookstead Station building	-27.7594	151.4475	Conceptual Alignment located immediately adjacent to this item
22934	Brookstead Station building	-27.761	151.4464	Conceptual Alignment is located 80 m to the north



AECOM

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Coordinate System: GDA 1994 MGA Zone 56
Projection: Transverse Mercator

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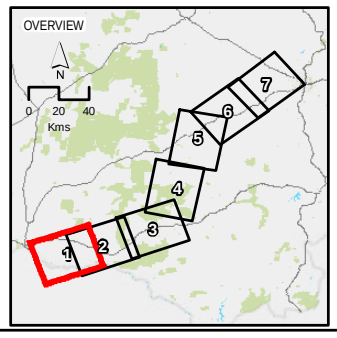
Kms

1:100,000 (when printed at A3)

Legend

- Towns
- Aboriginal Cultural Heritage (DATSIP)
- CHIMS Reported Places
- Existing Rail Network
- Conceptual Alignment
- Major Roads
- Study Area
- Adjacent Inland Rail Project
- QLD heritage register boundaries
- Register of Native Title Claims
- State Boundary



Data sources:
Aboriginal Cultural Heritage - DATSIP 2017
Heritage Register Boundaries - DEHP 2017
Roads and Rail Network - DNRM 2017
Imagery - QLDGov 2017
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Initial Advice Statement
Border to Gowrie Project

Cultural heritage
Indigenous and Historical

PROJECT ID: 60492124
CREATED BY: JR
LAST MODIFIED: JR - 2/02/2018
VERSION: 3

Figure **5.4**
(1 of 7)
A3 size

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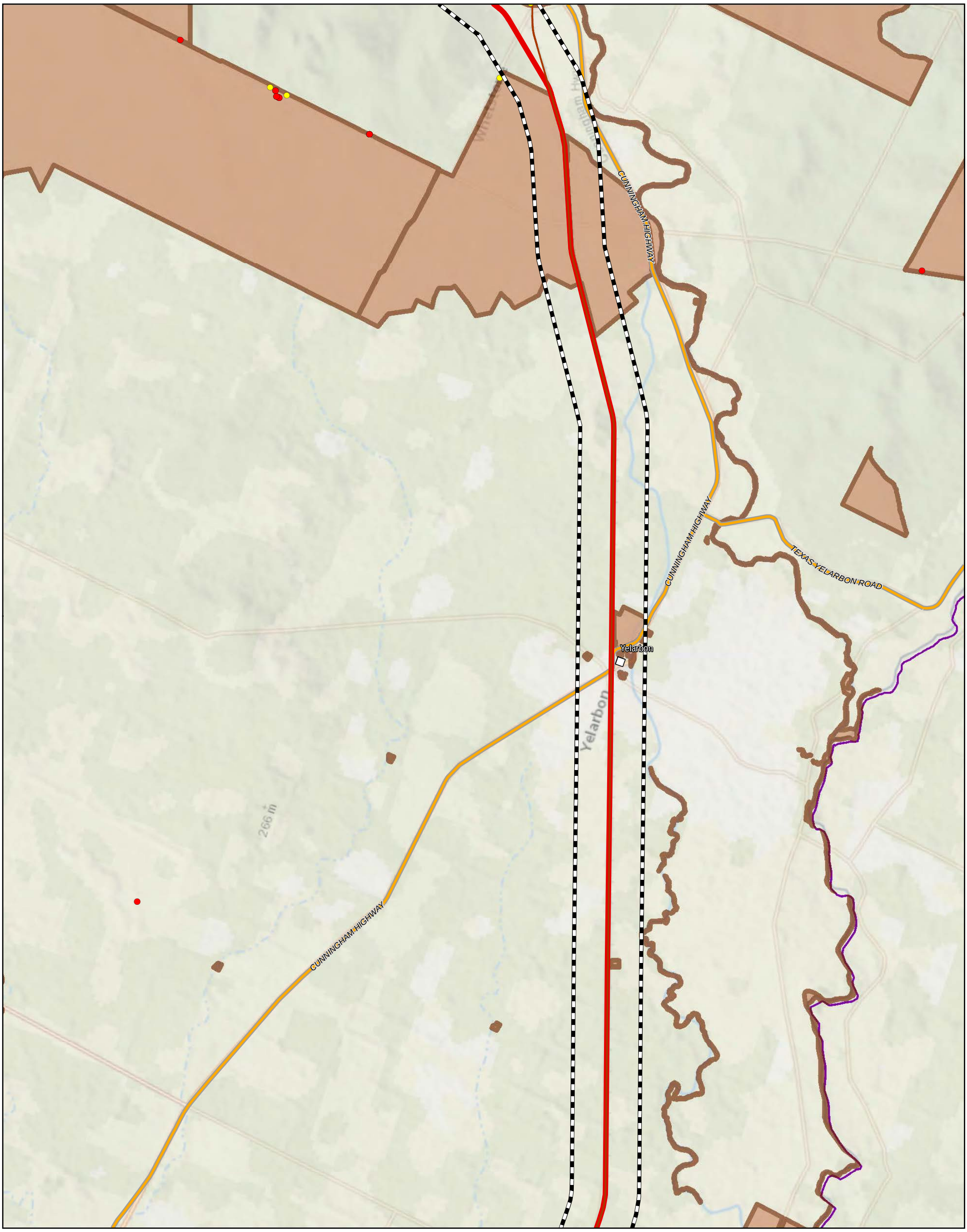

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Coordinate System: GDA 1994 MGA Zone 56
Projection: Transverse Mercator

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Legend

- Towns
- Aboriginal Cultural Heritage (DATSIP)
- CHIMS Reported Places
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- Adjacent Inland Rail Project
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- State Boundary

OVERVIEW

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0 20 40
Kms

1 2 3 4 5 6 7

Data sources:
Aboriginal Cultural Heritage - DATSIP 2017
Heritage Register Boundaries - DEHP 2017
Roads and Rail Network - DNRM 2017
Imagery - QLDGov 2017
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Figure **5.4**
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A3 size

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MILLMERRAN INGLEWOOD ROAD

CUNNINGHAM HIGHWAY

Inglewood

INGLEWOOD TEXAS ROAD

CUNNINGHAM HIGHWAY

CUNNINGHAM HIGHWAY

AECOM
www.aecom.com

Coordinate System: GDA 1994 MGA Zone 56
Projection: Transverse Mercator

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Kms

1:100,000 (when printed at A3)

Legend

- Towns
- Aboriginal Cultural Heritage (DATSIP)
- CHIMS Reported Places
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OVERVIEW

N

0 20 40
Kms

1 2 3 4 5 6 7

Data sources:
Aboriginal Cultural Heritage - DATSIP 2017
Heritage Register Boundaries - DEHP 2017
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Border to Gowrie Project

Cultural heritage
Indigenous and Historical

PROJECT ID: 60492124
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Figure **5.4**
(3 of 7)

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MILLMERRAN INGLEWOOD ROAD

Bringalily

Kooroongarra

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MILLMERRAN INGLEWOOD ROAD

Canning Creek

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- CHIMS Reported Places
- Existing Rail Network
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- Major Roads
- Study Area
- Adjacent Inland Rail Project
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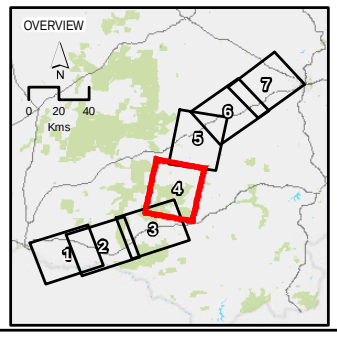

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Figure **5.4** (4 of 7)

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PAMPAS HORRANE ROAD
MILLMERRAN CECIL PLAINS ROAD
Pampas
GORE HIGHWAY
Yandilla
MILLMERRAN LEYBURN ROAD
Millmerran
GORE HIGHWAY
MILLMERRAN INGLEWOOD ROAD
619 m
Clontarf
645 m

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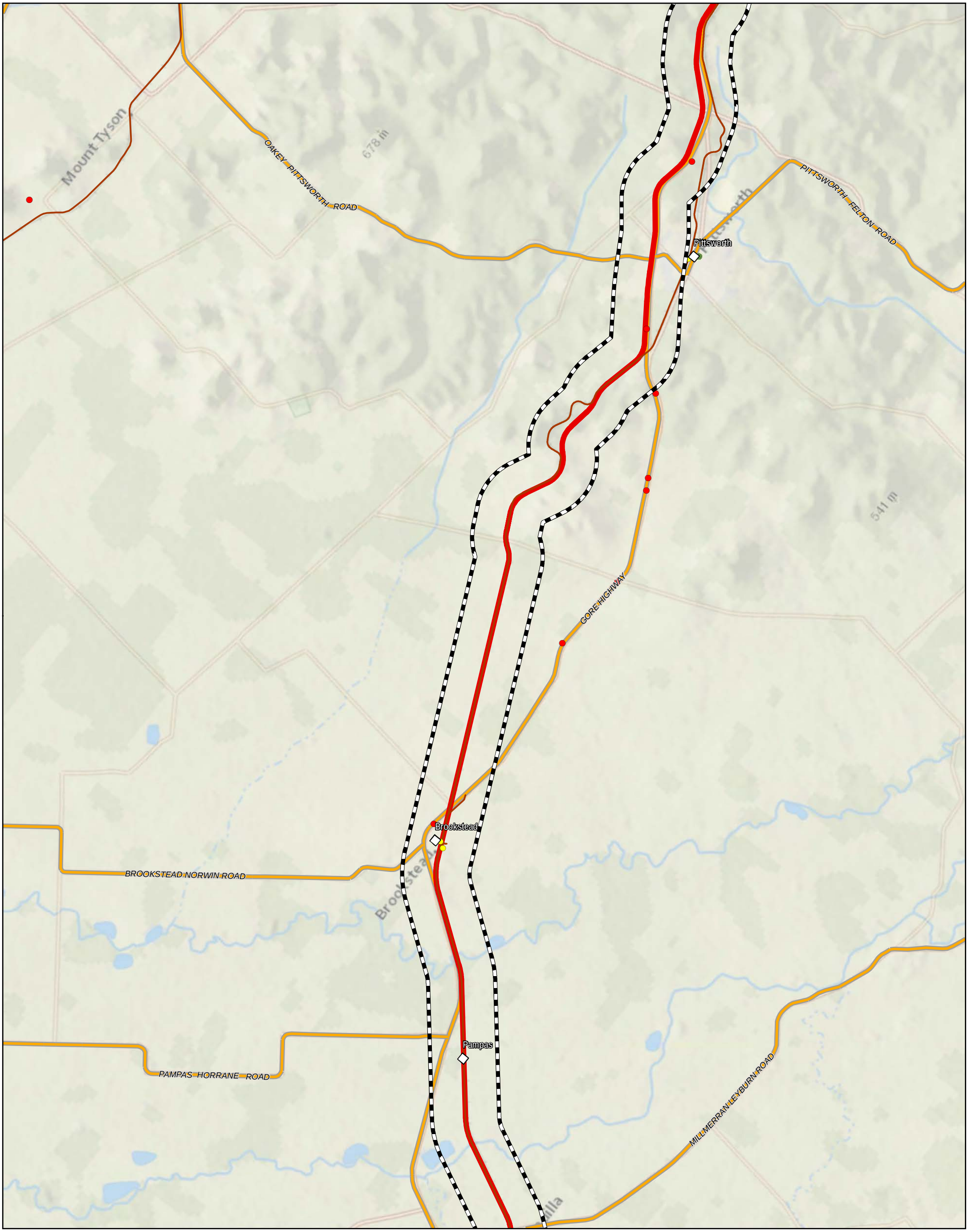

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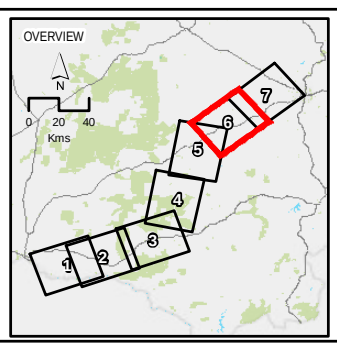

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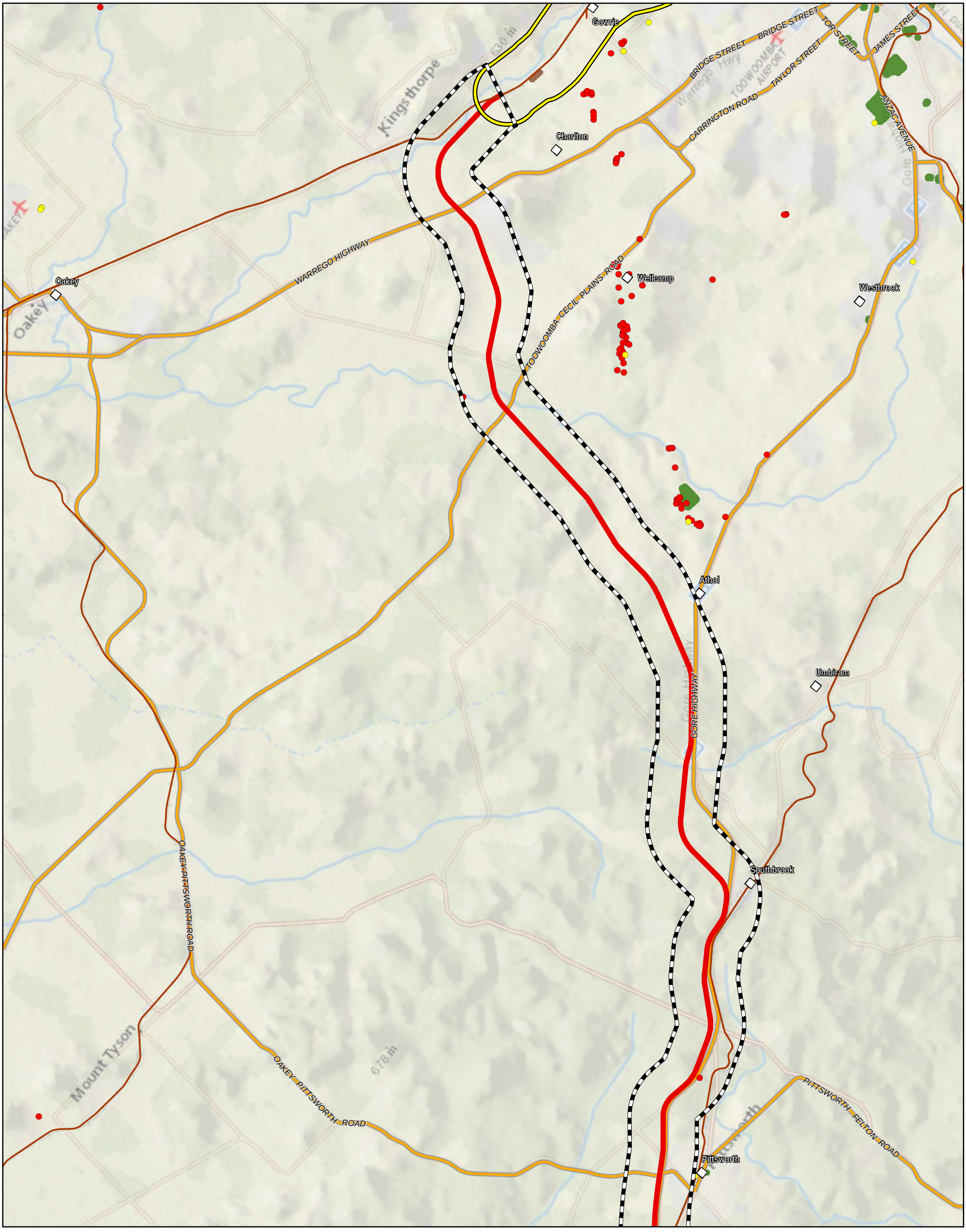

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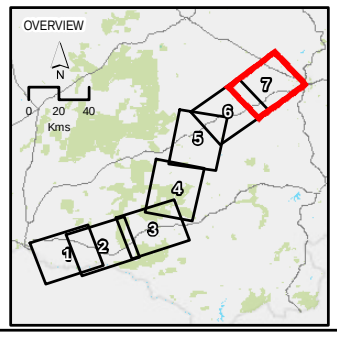

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5.3. Built Environment

Key existing regional infrastructure in the Study Area includes existing railway lines, state-controlled roads, local roads and Brisbane West Wellcamp Airport. These are described further in Section 5.4.

The Conceptual alignment will unavoidably transect several mining exploration tenements, two Mineral Development Licences – MDL 299 held by Newmont Pacific Energy Pty Ltd and MDL 300, held by Queensland Power Company Limited – and one Mining Lease, ML 50151 held by Queensland Power Company Limited (Figure 5-5). The Mining Lease is associated with the Commodore Mine adjacent to the Millmerran Power Station. The Conceptual alignment traverses this lease area.

The Toowoomba Second Range Crossing (TSRC) motorway is a new 41 km motorway currently under construction connecting the Warrego Highway at Helidon Spa in the east with the Gore Highway at Athol in the west, via Charlton, also shown in Figure 3-1. The TSRC provides a second range crossing to the north of Toowoomba rather than through it. The TSRC terminates just outside of the Study Area at Athol.

There are likely to be opportunities to use or connect to existing third party supporting infrastructure such as borrow pits and quarries, power and communications infrastructure and accommodation facilities. ARTC will work with the relevant regional councils, government departments, land owners, government-owned corporations and community groups to identify potential impacts on existing infrastructure external to the project and to develop measures to minimise potential impacts.

5.4. Traffic and Transport

A well-established transport network extends across the Study Area, consisting of a combination of railway lines, state-controlled roads, local roads and unformed private access tracks.

State controlled roads within the Study Area provide vehicle movements, including regional and interstate freight movements are as follows:

- Cunningham Highway
- Millmerran-Inglewood Road
- Gore Highway, Millmerran-Leyburn Road
- Pampas-Horane Road
- Brookstead-Norwin Road
- Oakey-Pittsworth Road
- Pittsworth-Felton Road
- Toowoomba-Cecil Plains Road
- Warrego Highway.

The existing rail corridors for the South Western Railway, Millmerran Branch Railway and West Moreton Line are all proposed to be utilised by the project.

The Study Area encompasses land that forms part of the Brisbane West Wellcamp Airport precinct. The airport, which became operational in 2014, provides for domestic passenger and international freight transportation. The Border to Gowrie Project will provide the opportunity to supplement air freight movements with access to the national rail freight network.

5.5. Land Use and Tenures

5.5.1. Key Local and Regional Land Uses

5.5.1.1. Land Use

The land uses within the Study Area predominantly consist of agricultural activities, characterised by open grazing land combined with areas of more intensive practices such as animal breeding and crop cultivation. Rural land within the Study Area is largely identified as regionally significant for agricultural production within the Darling Downs Regional Plan and is zoned for rural uses under the Waggamba Shire Planning Scheme, Inglewood Shire Planning Scheme and Toowoomba Regional Planning Scheme.

The Conceptual Alignment passes through, or within close proximity to, a number of townships such as Yelarbon, Inglewood, Millmerran, Brookstead, Pittsworth, Southbrook, Athol and Gowrie. Yelarbon, Inglewood, Millmerran, Pittsworth and Southbrook are identified as Priority Living Areas under the Darling Downs Regional Plan. PLAs are designed to provide opportunities for identified towns to expand through the establishment of a town buffer.

Land use zoning of the Study Area is shown in Figure 5-5. Other existing and historical land uses within the Study Area include:

- Mining and extractive industry
- Forestry (Whetstone and Bringalily State Forests)
- Residential and urban development.

5.5.1.2. Key Resource Areas

One key resource area (KRA), the Kildonan sand and gravel quarry, is situated within the Study Area. The resource is located approximately 18 km east south-east of Goondiwindi, on the Kildonan-Old Warwick Road. The deposit is large and is significant as deposits of sand are scarce in the region. The Kildonan KRA is shown in Figure 5-5.

5.5.1.3. Agricultural Uses

The Study Area extends through the Important Agricultural Areas (IAA) of the Border Region and the Eastern Darling Downs. IAA are defined by the Department of Agriculture and Forestry (DAF) Qld Agricultural Land Audit (2013) as "land that has all of the requirements for agriculture to be successful and sustainable, is part of a critical mass of land with similar characteristics and, is strategically significant to the region or the state".

The DAF was consulted in order to determine the best means of identifying and assessing impacts to current land uses and to assess potential impacts to each. DAF advised that the Queensland Land Use Mapping Program (QLUMP) is currently the best available means of mapping and assessing land use patterns and changes across QLD, in accordance with the Australian Land Use and Management Classification system.

Future land use impacts were assessed with reference to DAF's Qld Agricultural Land Audit (2013) data set, to identify current and future agricultural land use designations traversed by the Conceptual Alignment. Agricultural land uses traversed by the Conceptual Alignment are as follows:

- Current agricultural land use:
  - Cropping (irrigated and non-irrigated)
  - Animal production:
    - Intensive animal production (feedlots, poultry, piggeries etc.)
    - Grazing native vegetation
    - Grazing modified pastures

- Potential agricultural land use:
  - Broadacre cropping
  - Annual horticulture
  - Perennial horticulture
  - Intensive livestock

Strategic cropping land is located within the Study Area and will potentially impacted by the Conceptual Alignment. However, the provisions of the *Regional Planning Interests Act 2014* apply only to defined resource and regulated activities.

Travelling Stock Routes (TSRs) are corridors on roads, reserves, pastoral leases and unallocated state land along which stock are driven on foot and are designated for travelling stock purposes under the relevant State legislation. The proposed base case alignment traverses six TSRs.

Consultation with TRC and GRC will be necessary to ensure that the final alignment does not inhibit traditional stock movements without the provision of suitable alternative routes.

5.5.2. Key Local and Regional Land Tenures

Existing Land Tenure

The majority of property tenure in the Study Area is freehold, with areas of state reserve located adjacent to the Conceptual Alignment between Inglewood and Millmerran.

The Conceptual Alignment will unavoidably transect several mining exploration tenements, two Mineral Development Licences – MDL 299 held by Newmont Pacific Energy Pty Ltd and MDL 300, held by Queensland Power Company Limited – and one Mining Lease, ML 50151 held by Queensland Power Company Limited (Figure 5-5). The Mining Lease is associated with the Commodore Mine adjacent to the Millmerran Power Station.

No granted petroleum leases are traversed by the Conceptual Alignment.

Proposed Land Tenure

Parts of the Conceptual Alignment (brownfield) that follow the alignment of existing rail corridors are already gazetted railway land. It is proposed that land for the new (greenfield) or widened (brownfield) corridors be acquired by the State at the request of ARTC, with the railway corridor proposed to be incorporated into a proposed Sub-Lease of the rail corridor from TMR.

This model will be subject to agreement between the Australian Government and the Queensland State Government.

5.5.3. Native Title

A search of the relevant Native Title Registers identified one native title determination, QCD2016/012, over southern portions of the Study Area. Native title claims and determinations relevant to the Study Area are summarised in Table 5-12.

Table 5-12 Native Title Determinations and Claims for the Study Area

Native Title Status	Name	Summary
Native Title determined	QCD2016/012 – Bigambul People Part	Native title exists in the entire determination area. The extent of this area, in relation to the Study Area, is shown by those areas identified in

Native Title Status	Name	Summary
	A	Figure 5.4 south of Inglewood.
Application struck out	QC99/4 – Western Wakka Wakka People	The Western Wakka Wakka People lodged a native title claim which included the northern part of the Study Area to just south of Brookstead on 27 January 1999 (Tribunal File No.: QC1999/004; Federal Court File No.: QUD6004/99). Their application was struck out in Beattie on behalf of Western Wakka Wakka Peoples v State of Queensland [2007] FCA 596 (27 April 2007) and is not currently listed as active by the National Native Title Tribunal.

5.6. Planning Instruments, Government Policies

5.6.1. Regional Plans

Regional plans are part of a suite of policies and legislative instruments that guide land use planning and development in order to influence economic, social and environmental factors. Both the South East Queensland Regional Plan 2017 and the Darling Downs Regional Plan (2013), which overlap, are relevant to the Study Area.

The entirety of the Study Area is covered by the Darling Downs Regional Plan. Parts of the Study Area, north east of Southbrook, extend into the area covered by the South East Queensland Regional Plan.

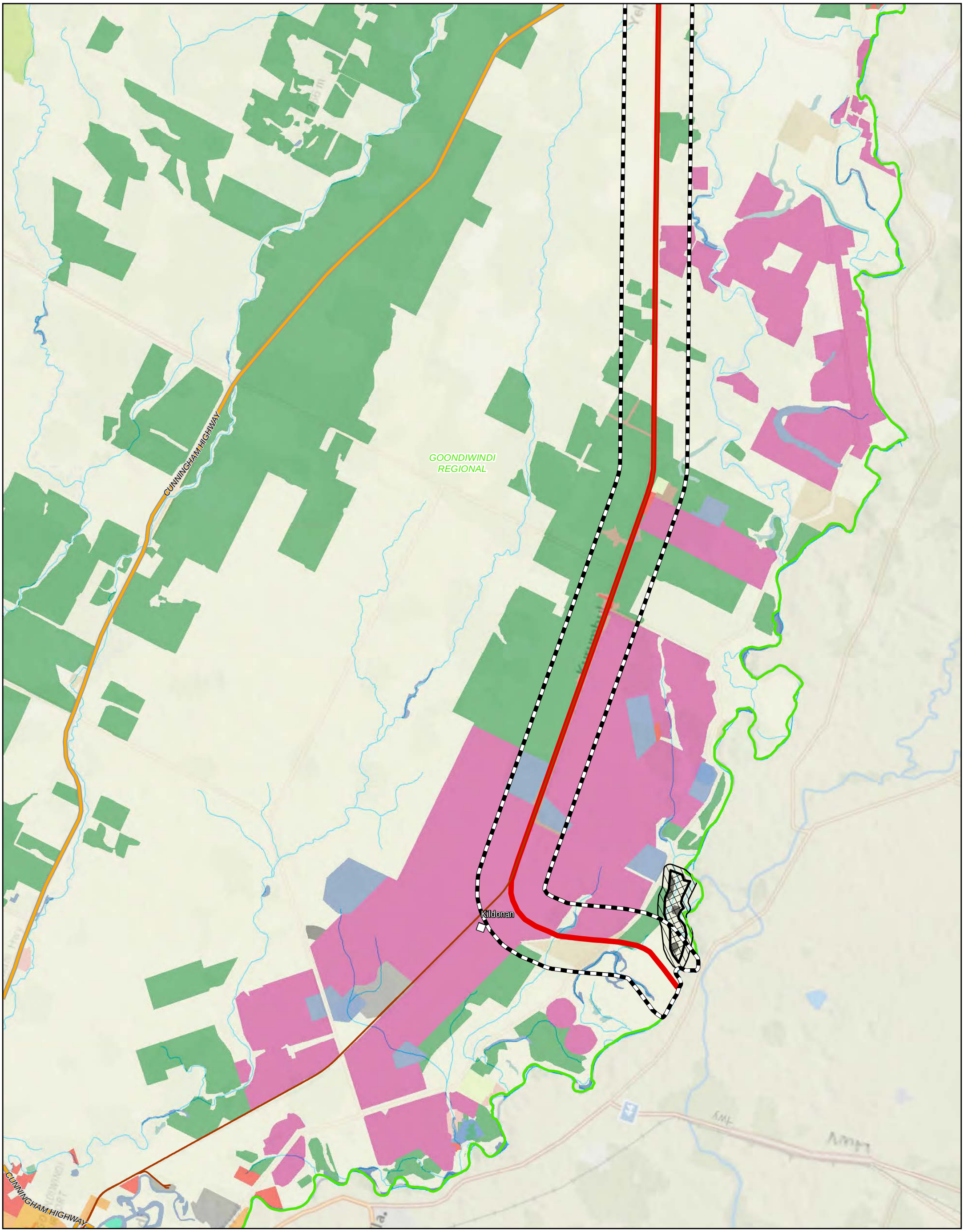
5.6.2. Local Planning Schemes – Land Use Designations

The applicable planning schemes for the Border to Gowrie Project are as follows:

- For Goondiwindi Regional Council:
  - Former Waggamba Shire Council Planning Scheme
  - Former Inglewood Shire Council Planning Scheme
- Toowoomba Planning Scheme

Land use zoning along the Conceptual Alignment is primarily zoned as Rural within GRC, with the localised exception of the rail corridor in the town of Yelarbon, which is zoned as 'Small Town'.

Similarly, the land traversed by the Conceptual Alignment in TRC is primarily zoned Rural. Exceptions to this are where the Conceptual Alignment utilises existing rail corridor, which is zoned as Community Facility, where the alignment traverses the Commodore Mine (Extractive Industry) or localised occurrences of High and Medium Impact Industry.



Legend

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- Key Resource Area (resource processing area)
- Key Resource Area (separation area)
- LGA Boundary

QLUMP Land Use

- Nature conservation
- Other minimal use
- Grazing native vegetation
- Production native forests
- Grazing modified pastures
- Cropping
- Perennial horticulture
- Land in transition
- Irrigated cropping
- Intensive animal production
- Manufacturing and industrial
- Residential and farm infrastructure
- Services
- Transport and communication
- Mining
- Waste treatment and disposal
- Reservoir/dam
- River
- Marsh/wetland

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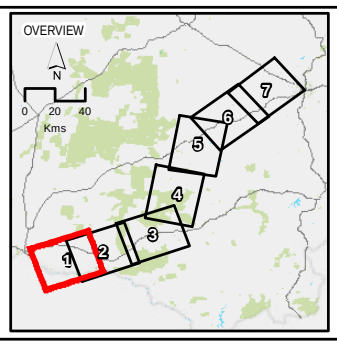

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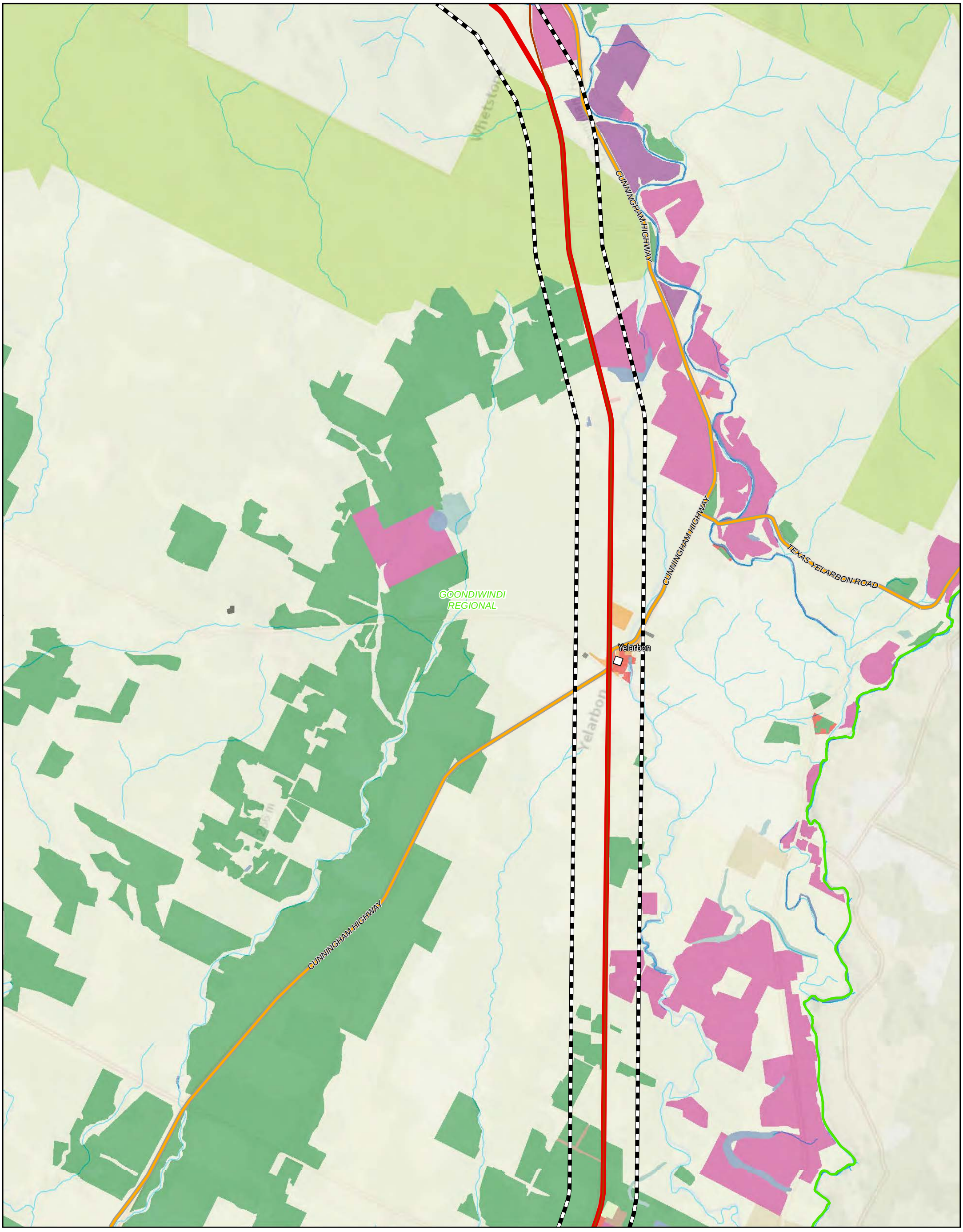

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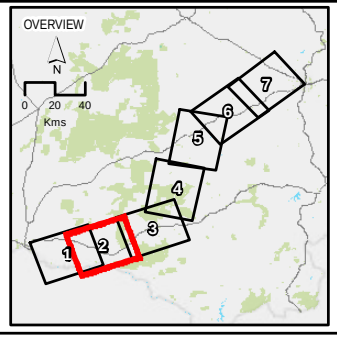

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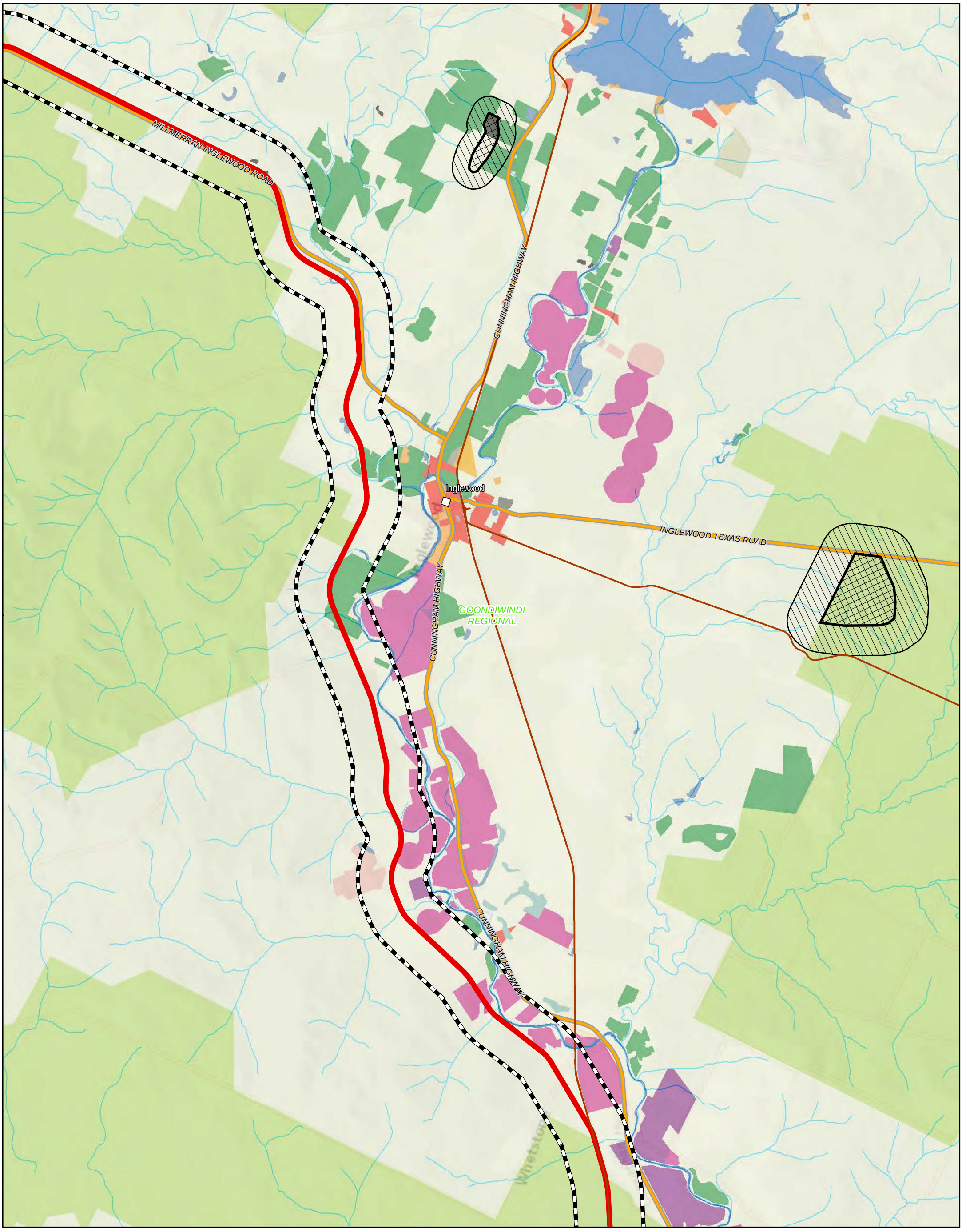

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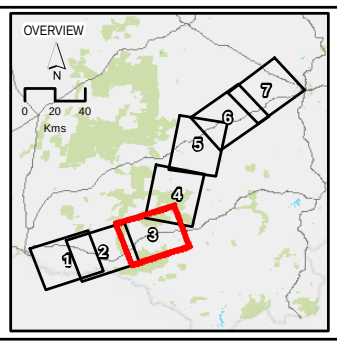

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MILLMERRAN INGLEWOOD ROAD

Bringalily

TOOWOOMBA REGIONAL

GOONDIWINDI REGIONAL

GOONDIWINDI REGIONAL

MILLMERRAN INGLEWOOD ROAD

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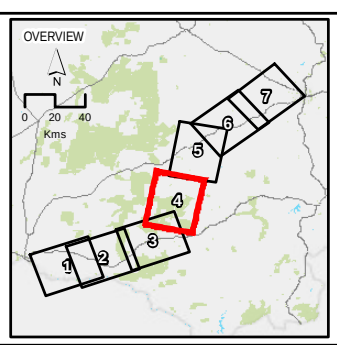
- Marsh/wetland

OVERVIEW



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Border to Gowrie Project

Land Use

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Figure **5.5**
(4 of 7)

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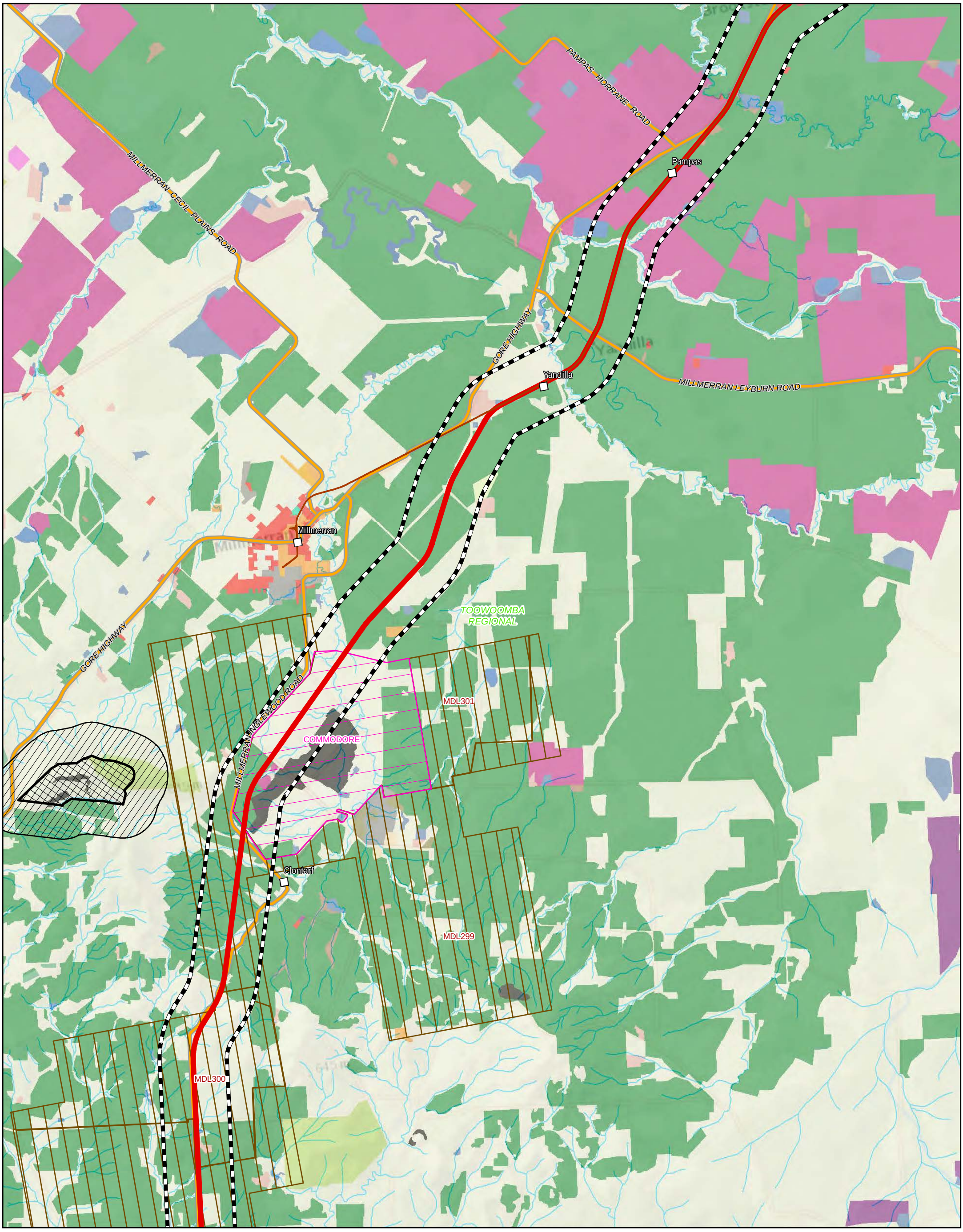

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Projection: Transverse Mercator

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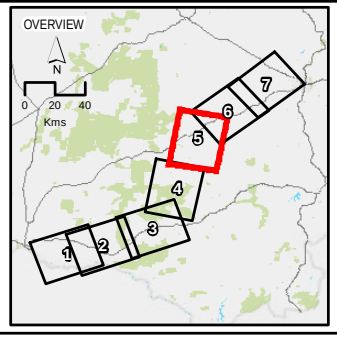
Legend

- Towns
- Existing Rail Network
- Conceptual Alignment
- Major Roads
- Waterways
- Study Area
- Key Resource Area (resource processing area)
- Key Resource Area (separation area)
- Mining Leases
- Mineral Development Licence
- LGA Boundary

QLUMP Land Use

- Nature conservation
- Other minimal use
- Grazing native vegetation
- Production native forests
- Plantation forests
- Grazing modified pastures
- Cropping
- Perennial horticulture
- Land in transition
- Grazing irrigated modified pastures
- Irrigated cropping
- Irrigated perennial horticulture
- Intensive animal production
- Manufacturing and industrial
- Residential and farm infrastructure
- Services
- Utilities
- Transport and communication
- Mining
- Lake
- Reservoir/dam
- River
- Channel/aquedeuct



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OAKEY PITTSWORTH ROAD

PITTSWORTH FELTON ROAD

Pittsworth

TOOWOOMBA REGIONAL

GORE HIGHWAY

MDL304

Brookstead

BROOKSTEAD NORWIN ROAD

Pampas

PAMPAS HORRANE ROAD

MILLMERRAN LEYBURN ROAD

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QLUMP Land Use

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- Other minimal use
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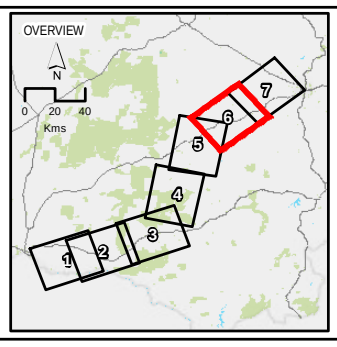
- Marsh/wetland



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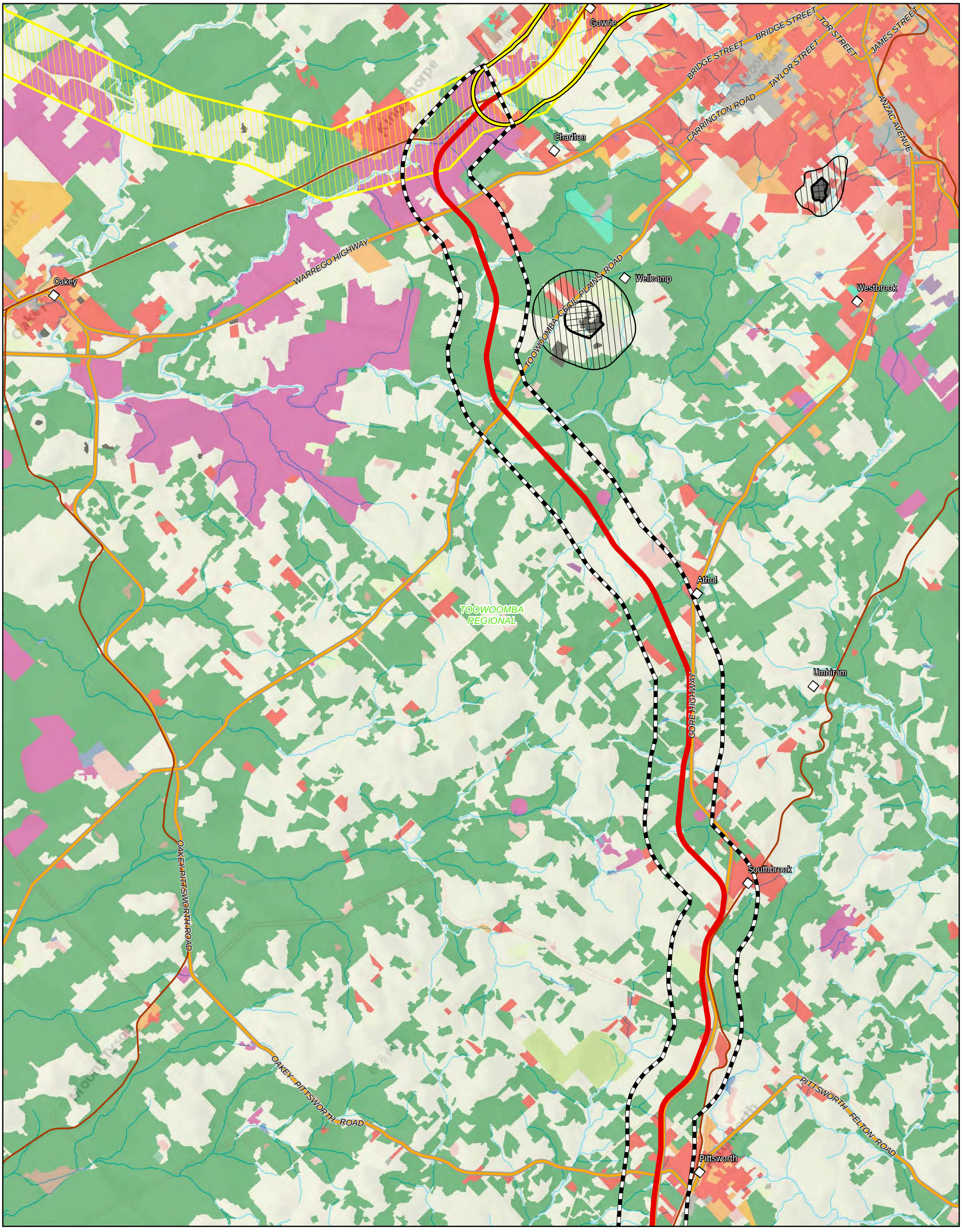

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- Adjacent Inland Rail Project
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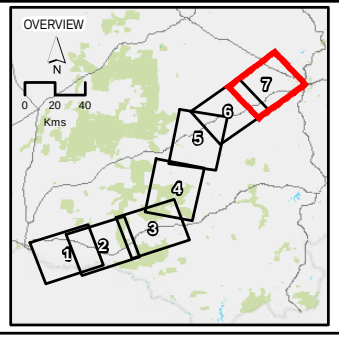
- Key Resource Area (separation area)
- Mining Leases
- Mineral Development Licence
- Coordinated Projects
- LGA Boundary

QLUMP Land Use

- Nature conservation
- Managed resource protection
- Other minimal use
- Grazing native vegetation
- Production native forests
- Grazing modified pastures
- Cropping
- Perennial horticulture
- Land in transition
- Grazing irrigated modified pastures
- Irrigated cropping
- Irrigated perennial horticulture
- Irrigated seasonal horticulture
- Intensive horticulture
- Intensive animal production
- Manufacturing and industrial
- Residential and farm infrastructure
- Services
- Utilities
- Transport and communication
- Mining
- Waste treatment and disposal
- Reservoir/dam
- Channel/aqueduct
- Marsh/wetland



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6. POTENTIAL IMPACTS

6.1. Natural Environment

6.1.1. Land Use

The construction and operation of the Border to Gowrie Project has the potential to directly impact upon land use within the Study Area. The impacts would occur during both construction and operation stages, with the majority of the change occurring during construction of the project. The potential impacts to land use associated with the project in both the construction and operation phases are anticipated to relate to one or more of the following:

- Potential air quality, noise and visual impacts to rural residential and residential land uses
- Direct impacts to existing land uses such as loss of rural agricultural land, impacts to existing businesses
- Severance and access impacts

Most of the work associated with the project would be undertaken within either existing gazetted rail corridor (brownfield) or new rail corridor (greenfield).

During construction, there will be temporary changes in land use to accommodate construction activities, such as material haulage, movement of plant etc. During operation, direct land use impacts would result from any change in use associated with the operation of the project and its associated facilities. The Conceptual Alignment has been designed to minimise detrimental land use impacts as much as possible. The Conceptual Alignment will be refined through the detailed design process, in combination with landholder consultation, to mitigate disturbance to current and future land uses.

6.1.2. Geology and Soils

The variable geology along the Conceptual Alignment has the potential to impact the design, construction and operational stages of the Border to Gowrie Project. Potential impacts relating to soils and geology include, but are not limited to, the following:

- Cracking and/or settlement of structures due to the high potential for shrinkage and swelling of the black soils and cracking clays. Cracking may also result from the removal of vegetation with roots in these soils
- Limitations to construction programme due to black soils and cracking clays being non-trafficable during wet conditions
- Slope instability requiring stabilisation of cut faces
- Erosion due to the loamy soils on alluvial plains and terraces
- Reduced potential for re-use of materials and increased requirement for imported materials due to poor engineering qualities of black earth and cracking clays
- Large quantities of material import and export due to the poor founding characteristics of alluvial soils
- Significant cuts as the Conceptual Alignment weaves through basaltic outcrops of the Main Range western slopes.

There are land uses within and adjacent to the Conceptual Alignment that pose a known or possible risk of contamination. This includes sections of the existing rail corridor which have potential to be contaminated from historical operational and maintenance practices.

6.1.3. Water

6.1.3.1. Surface water

The Conceptual Alignment crosses 16 major and 69 minor watercourses as defined under the *Water Act 2000,* these being:

- Macintyre River
- Grasstree Creek (Condamine River South Branch)
- Condamine River Main Branch
- Condamine River North Branch
- Westbrook Creek, crossed twice.

Numerous other natural water features, not defined under the *Water Act 2000*, will also be crossed by the Conceptual Alignment.

Impacts to water quality are expected to be primarily confined to the construction phase of the project. In the absence of appropriate mitigation measures and controls, construction activities such as clearing vegetation, earthworks and vehicle/plant movement on un-sealed roads may result in sediments entering watercourses. There is also potential for release of contaminants from construction plant, equipment and vehicles on site into adjacent receiving waters.

6.1.3.2. Flooding

If unmitigated, the construction of a new rail embankment within floodplains and the establishment of new river crossings have the potential to change existing flooding patterns and impact properties and infrastructure in the vicinity of the rail alignment.

ARTC have established design criteria for the entire Melbourne to Brisbane Inland Rail project, including this Border to Gowrie section. These include the following criteria relevant to flooding:

- 1% AEP flood immunity for the rail
- no change in flood inundation footprint
- no redistribution of flood flows
- minimise changes in flood peak timing
- minimise changes in flood levels with an aim of no net worsening
- minimise downstream erosion and minimise changes in flow velocities.

Preliminary cross drainage solutions have been identified for the Conceptual Alignment in order to achieve the Melbourne to Brisbane Inland Rail project design criteria. These cross drainage solutions were determined through iterative model runs to achieve 1% AEP flood immunity for the rail and comparable areas of potential impact.

Potential impacts to flooding were subsequently assessed for the Condamine River by comparing the TUFLOW model results for the developed case against the results of the existing case model. The results found that there was negligible change to both flooding extent and total duration in flooding by incorporating appropriate cross drainage solutions into the concept design. Further, more refined flood modelling will be required as part of future design development stages to update flood models with actual survey data, and to consider project specific design criteria. Through this process preliminary cross drainage solutions will be challenged and refined in consultation with relevant landholders and stakeholders.

6.1.3.3. Groundwater

The impacts to groundwater elevations from earthworks and bridge piling works would primarily be associated with potential dewatering requirements. However, groundwater infiltration rates into bridge foundation bore holes or cuttings would be minor and temporary given the depth to groundwater in most locations and the relatively short-term nature of these types of works.

There is also the potential for groundwater impacts associated with construction water supply. The water supply requirements for the Border to Gowrie Project are not known at this stage. Investigations undertaken during the EIS will identify the potential for groundwater in the Study Area to be used as a possible source of water during construction activities.

The EIS will identify any nearby sensitive receptors including groundwater dependent ecosystems that would be adversely impacted by temporary drawdown from potential dewatering sites or potential surface chemical spills that may contaminate groundwater quality.

High risk salinity areas within the Study Area will need to be identified and assessed along the Conceptual Alignment during the EIS. Selecting an appropriate overall salinity management strategy will depend on:

- the extent and nature of the salting problem
- the characteristics of the area - soils, geomorphology, water quality etc.
- access to unaffected areas that are contributing to the salinity problem (recharge and transmission areas)
- economic issues, such as the comparative value of the land and cost of implementing various management practices
- landholder's own specific desires and needs.

6.1.4. Air Quality

6.1.4.1. Operational Air Quality Impacts

The primary operational pollutants of concern are products of combustion (particulate matter, carbon monoxide, nitrogen dioxide, sulfur dioxide, volatile organic compounds) from train locomotives. Some fugitive particulate emissions from loaded grain or cotton wagons or from wheel-generated dust from rail line ballast may also occur; however these are expected to be relatively minor.

Coal dust emissions may occur from existing coal carrying trains, particularly along the existing Western System, between Oakey and Gowrie. Coal dust emissions from existing coal trains along this section are currently managed by way of the South West System Coal Dust Management Plan.

Potential air quality impacts associated with the project will be assessed as part of the EIS and management measures developed where required to mitigate potential impacts.

6.1.4.2. Construction Air Quality Impacts

The primary construction phase pollutant of concern will be particulate matter due to disturbance of earth and rock associated with construction activities such as excavation and land clearing. Emissions of combustion products from construction plant exhaust will also occur. Emission factors (available from the National Pollutant Inventory or USEPA AP-42) for major particulate matter sources are generally based on the volume of material that is being moved (earthworks), and kilometres travelled on unsealed haul roads (wheel-generated dust).

Construction phase emissions will be dependent largely on earthworks volumes and unsealed haul road length.

6.1.5. Ecosystems

Clearing as a result of the project has the potential to impact ecosystems within the Study Area. The Conceptual Alignment has been selected to reduce the impacts on the environment, including the need for clearing. Some aspects of the project will be refined in engineering design and will be preferably located in existing disturbed areas where possible to minimise impacts along the Conceptual Alignment.

The approximate length of Conceptual Alignment that extends through areas of RE is provided in Table 6-1. For likely impacts on the TEC present in the corridor, refer to Section 6.6.2.

Table 6-1 RE along the Conceptual Alignment

VM ACT STATUS	APPROXIMATE LENGTH OF CONCEPTUAL ALIGNMENT (KM)
Endangered	6.4
Of Concern	10.8
Least Concern	16.1
Total	33.3

6.1.6. Flora and Fauna

The Study Area provides potential habitat and movement opportunities for a large number of fauna species listed under the NC Act as well as species listed under the EPBC Act. Loss of habitat, habitat fragmentation and mortality during construction and operation are the key potential impacts to fauna as a result of the project. A rail corridor may form a linear barrier to fauna movement, particularly if exclusion fencing is installed. Habitat fragmentation may isolate populations, which if confined to sufficiently small patches of habitat, may result in localised population decline. Movement barriers may also restrict gene flow across the landscape.

Impacts to flora and fauna that may occur as a result of the project include the following:

- Vegetation clearing and fragmentation
- Fauna injury and mortality during earthworks
- Disturbance to fauna from noise, vibration, lighting etc.
- Loss of breeding habitat
- Importation and/or spread of weeds
- Introduction and/or proliferation of pest fauna
- Degradation of habitat through dust, sedimentation and erosion
- Degradation of aquatic environments.

6.2. Amenity, including noise, vibration, lighting, urban design and visual aesthetics

6.2.1. Noise and Vibration

6.2.1.1. Construction

Construction plant and equipment may potentially impact the local ambient noise environment where construction activities are in proximity to sensitive receivers. If unmitigated, construction noise has the potential to be a source of nuisance to the nearest sensitive receivers.

Earth moving machinery, vibrating rollers and impact plant such as piling rigs and hydraulic hammers are likely to result in perceptible vibration impacts for sensitive receivers in proximity to construction activities.

Construction activities are expected to be generally transitory and potential noise and vibration impacts associated with the works intermittent in nature and short term in duration.

6.2.1.2. Operation

Operational noise emissions will be associated with the movement of rollingstock along the rail line. Detailed modelling will be undertaken as part of the EIS to determine the potential impacts on sensitive receptors.

6.2.2. Landscape and Visual

For the purposes of assessing potential impacts to visual amenity, the Basis of Design for Inland Rail (Parsons Brinckerhoff, 2015) specifies a reference train that is double stacked (7.1 m above rail formation) with an initial maximum length of 1,800 m (with a maximum future length of 3,600 m).

Sections of the Conceptual Alignment have utilised existing Queensland Rail rail corridors. In these areas, where the Conceptual Alignment will re-purpose an existing rail corridor, visual amenity impacts would predominantly be limited to views of the double stacked freight train operating along the corridor.

Where the Conceptual Alignment is a new track (primarily from Whetstone to Yandilla and Yarranlea to Gowrie) or those works involve upgrade of the decommissioned Queensland Rail Cecil Plains narrow gauge rail network, impacts to visual amenity may be greater.

Additional to those visual impacts associated with the movement of trains through the environment, the principal visual amenity issues associated with the project are expected to include, but not be limited to, the following:

- Changes in landform with embankments of varying height up to ~15 m. The railway corridor will typically comprise an elevated ballast and track ~730 mm above natural ground level
- Creation of crossing loops, and associated signals
- Passive crossings, and associated signs
- Active crossings, and associated signs, flashing lights and boom gates etc.
- Multiple new bridges and upgrades to existing bridges, which require a clearance of 9 m
- Culverts where located within the Condamine river floodplain
- Additional road network infrastructure, as a result of road realignments or closures
- Loss of vegetation.

The greatest visual impact will be experienced by residents within close proximity to the rail alignment.

Temporary visual impacts associated with construction works to upgrade the existing track and construction of the project is also anticipated. These may include:

- Localised concentration of machinery and laydown areas
- Equipment and personnel at active construction sites
- Temporary reduction in visual amenity
- Temporary construction camps.

An assessment of the potential visual amenity impacts from the project will be undertaken as part of the EIS and mitigation measures, if required, will be identified.

6.3. Social Environment

The Border to Gowrie Project is likely to create a number of national, state-wide and regional benefits, whilst also creating a number of localised impacts. Potential social impacts will be further investigated as part of the EIS. The following sections identify the potential social impacts associated with the project.

6.3.1. Amenity and Social Cohesion

The Border to Gowrie route was announced by the Minister for Infrastructure and Transport, the Hon Darren Chester MP, following a lengthy options assessment process and period of deliberation.

During construction there may be reduced connectivity between key locations along the Conceptual Alignment as a result of road network disruptions.

Land requirements for the Border to Gowrie Project may result in severance of properties and a reduction in available land for agricultural holdings. The presence of the project may result in long term changes to land use patterns within the Study Area.

During construction and operation there are likely to be amenity impacts to residential, rural residential and rural land uses near the Conceptual Alignment.

6.3.2. Community Health and Safety

Community health and safety risks related to the operation of the Border to Gowrie Project include safety risks associated with access, both pedestrian and for stock, and the type of materials (e.g. hazardous goods) that are transported on the rail line.

Increased road traffic particularly heavy vehicles during construction may also increase the risk of traffic incidents and generate increased noise and dust.

6.3.3. Access

Changes in road access, including increased road/rail interface, has the potential to decrease the accessibility and increase travel times associated with accessing key destinations, facilities and community services for local residents.

Additionally, the crossing of private accesses (i.e. driveways and operational tracks), has the potential to result in significant modification to the operation and useability of single or multiple land holdings.

6.3.4. Housing and Workforce

During construction there is the potential for temporary and localised inflation in property prices and reductions in the availability of rental properties to the influx of additional workers to the area. There is an opportunity to utilise local workforce and enhance economic development opportunities through local supply chains.

A social impact assessment process will analyse potential social impacts in further detail, with input from the community through consultation. This will identify how positive social impacts can be enhanced and negative impacts mitigated and/ or managed.

6.3.5. Cultural Heritage

6.3.5.1. Indigenous Cultural Heritage

In accordance with the *Aboriginal Cultural Heritage Act 2003*, all persons in QLD have a duty to take all reasonable and practicable measures to ensure they do not harm Aboriginal cultural heritage whenever they undertake an activity (cultural heritage duty of care).

Despite large sections of the Study Area having been historically cleared and disturbed there remains a risk that areas although cleared, may contain evidence of prior Aboriginal use.

Based on the results of the desktop assessment, the proposed project is expected to incorporate activities that meet the definition of Category 5 of the duty of care categories listed in the Duty of Care Guidelines. This means the project would traverse, or be in proximity to landscapes which have a higher risk of Aboriginal cultural heritage being present. High risk landscapes include those where natural landscape features are present, such as rock outcrops, caves, wetlands, permanent water holes, creeks, springs, hills and mound formations.

The existence of known tangible and intangible Aboriginal cultural heritage sites and intangible sites within and in proximity to the Study Area, as well as high risk landscape features such as creeks, indicate that there may be a high cultural heritage risk to the Border to Gowrie Project. It is possible that further unidentified Aboriginal cultural heritage values and places exist within the Study Area.

6.3.5.2. Non-Indigenous Cultural Heritage

Historic heritage places, particularly the existing and former Brookstead station buildings, may be subject to direct or indirect impacts. These potential impacts include the introduction of new environmental elements such as noise, altered visual aspects, and alterations to land use patterns in the area as a result of the project. The extent of impact will be assessed through the EIS process. Works that may impact on known heritage-listed places may require approvals from State or local authorities, although investigations show that there are no heritage-listed places intersected by the Conceptual alignment..

6.4. Economic Effects

Economic modelling detailed in the Inland Rail Business case (ARTC, 2015) indicates that the project will increase gross domestic product, provide direct and indirect employment opportunities, and provide other economic benefits across improved productivity and efficiency; safety benefits resulting from the removal of heavy vehicles from the road network; sustainability benefits; and reduced lifecycle costs for asset owners.

It is anticipated that the Border to Gowrie project will deliver significant benefits specific to the Darling Downs region as a whole. With a large agricultural base, the project will reduce transport costs, which may subsequently improve industry competitiveness. Additionally, further export opportunities may arise for the sector by creating additional capacity and a more efficient and reliable supply network that facilitates easier paths to market.

In a local context, the project may also impact the socio-economic environment and values. For the most part, the direct socio-economic impacts associated with the project will be experienced by people owning or operating agricultural land within or immediately adjacent to the project area whose land management practices may be disturbed.

Detailed socio-economic assessment will be conducted to identify and quantify the benefits and impacts of the Border to Gowrie Project. Section 9 provides discussion on the anticipated costs and benefits of Inland Rail and the Border to Gowrie Project.

6.5. Built Environment

6.5.1. Transport Infrastructure Impacts

There is the potential for a number of transport infrastructure crossings of the proposed Border to Gowrie project, including highways, major arterial roads, local and private roads. In future project stages consultation with TMR, local councils and impacted land holders will be conducted to agree the specific treatment of crossings.

During construction, the project will result in localised impacts to existing traffic and transport networks as construction progresses. Likely impacts include:

- Increased light and heavy vehicle traffic on the Cunningham, Gore and Warrego highways, Inglewood-Millmerran Road and other roads in the local area for the transportation of construction personnel, materials and resources for construction
- Local access changes where local roads are required for construction access, this may include temporary road closures or detours.

Construction traffic management will be detailed in future project stages and will include a traffic management plan as part of the Construction Environmental Management Plan (CEMP) and consultation with stakeholders including local and state authorities.

6.5.2. Other Infrastructure Impacts

Public utility plant (PUPs) analysis has focused on backbone/transmission infrastructure as these services have a longer approval time and are more complex to either protect or relocate than local supplies.

These services include; oil, trunk gas, water, backbone fibre and major power transmission lines. The approach taken during development of the design was:

- Identify possible conflicts using Dial Before You Dig and GIS data sets
- Assess high level opportunities to avoid or reduce service impact (design out or protect).

An initial assessment of the number of PUP interfaces is summarised in Table 6-2.

Table 6-2 PUPs details

PUP TYPE	NO. CROSSED BY CONCEPTUAL ALIGNMENT
Gas or oil pipeline	7
Overhead electrical crossings - 11kV and greater	62
Overhead electrical crossings - less than 11kV	14
Telecommunications & optic fibre underground	19

6.6. Matters of National Environmental Significance

The EPBC Act identifies and protects MNES. MNES reflect nationally and internationally significant flora, fauna, ecological communities and heritage.

Following a preliminary evaluation of the Border to Gowrie Project and its potential impact on MNES, it was determined that the project has the potential to have a significant impact on listed threatened species and ecological communities. Based on this initial assessment ARTC will be making a referral to the Commonwealth Minister for the Environment under the EPBC Act.

ARTC intend to coordinate the timing of the EPBC Act referral to correspond with the State SDPWO Act process so that the project may be assessed under the bilateral agreement between the Commonwealth and QLD, if the Commonwealth Minister determines that it is a controlled action.

6.6.1. World Heritage Properties and National Heritage Places

No World Heritage Properties or National Heritage places have been identified as occurring within or near to the Study Area.

The Gondwana Rainforests of the Main Range National Park, recognised as both a world heritage property and a national heritage place, is approximately 90 km immediately east of Study Area (at its closest point). No direct or indirect impacts to this place are anticipated as a consequence of this project.

6.6.2. Threatened Ecological Communities

As discussed in Section 5.1.4.6, six EPBC Act listed TECs are recorded as potentially occurring within the Study Area. Two of these communities, Brigalow and SEVT, have been observed during initial field surveys in the immediate vicinity of the Conceptual Alignment. The extent of potential impact on these communities will be assessed through the EIS phase of the project.

TEC has the potential to be directly or indirectly impacted by the project through:

- Clearing resulting in loss or bifurcation of a TEC
- Importation and/or spread of weeds
- Habitat disturbance through introduction and/or proliferation of pest fauna
- Degradation through dust, sedimentation, erosion and / or altered hydrology.

ARTC's preferred hierarchy of managing potential impacts to TEC will be to:

1) Avoid or minimise impacts through design modification
2) Implement mitigation measures to minimise the extent and severity of impact
3) Establish offsets for residual impacts.

6.6.3. EPBC Act Listed Threatened Fauna

As discussed in Section 5.1.5.2, 22 EPBC Act listed fauna species are likely to occur or are known to occur within the Study Area. The extent of potential impact on these species will be assessed through the EIS phase of the project.

Impacts to EPBC Act listed threatened fauna species may occur by the same processes discussed in Section 6.1.6. Impacts to threatened fauna will be managed by adopting the same hierarchy of principles specified in Section 6.6.2.

6.6.4. EPBC Act Listed Threatened Flora

As discussed in Section 5.1.5.1, 18 EPBC Act listed flora species are likely to occur or are known to occur within the Study Area. The extent of potential impact on these species will be assessed through the EIS phase of the project.

Impacts to EPBC Act listed threatened flora species may occur by the same processes discussed in Section 6.1.6. Impacts to threatened fauna will be managed by adopting the same hierarchy of principles specified in Section 6.6.2.

6.6.5. Migratory Species

Migratory and marine species have potential to be impacted by the same processes identified in Section 6.1.6. No significant impacts to migratory species are expected as a result of the project, as all species known or considered likely to occur in the Study Area are widely distributed and regionally common in south-east QLD.

The migratory and marine species known or considered likely to occur within the Study Area are not dependent on a localised breeding or foraging resource. The project may result in localised losses of woodland vegetation and grassland that provides nesting and foraging resources for these species. However, given the wide availability of suitable habitat within the surrounding landscape, the project is unlikely to have a significant adverse impact on important habitat for the species.

6.6.6. Wetlands of International Importance

No wetlands of international importance occur in or near the Study Area.

The closest wetland of international importance to the project is the Moreton Bay Ramsar Wetland, which is situated approximately 130 km to the east of the Study Area (at its closest point).

7. ENVIRONMENTAL MANAGEMENT AND MITIGATION MEASURES

The following section specifies the management and mitigation measures that will be required in order to minimise foreseeable impacts of the Border to Gowrie Project. It should be noted that the route adopted by the Conceptual Alignment has been determined in consideration of environmental, social, engineering and economic factors.

7.1. Natural Environment

7.1.1. Land

Land use impacts (direct and indirect) are likely to result from the Border to Gowrie Project. Further consideration of potential land impacts (severance, access, direct impact, and amenity) will be undertaken during subsequent project phases. Further design refinements will aim to minimise impacts on property owners where reasonable and

practicable. Construction planning will be required to determine the laydown requirements and optimally locate construction workspaces to minimise property impact.

Geological and soils impacts will influence the design and also require mitigation during construction. Future design stages as part of the EIS process will include detailed geotechnical testing to confirm ground conditions and progress the design accordingly. Design mitigation will include measures to minimise the effect of shrink/swell in soils, minimise slope instability, drainage design to reduce the inflow of water into dispersive soils.

During construction, environmental impacts will be managed through a CEMP which will detail environmental outcomes, performance criteria and mitigation measures.

Further contaminated land investigation will be required in future project stages, including field investigations and testing where risk of contamination is likely.

7.1.2. Water

The following principles and mitigation measures will be investigated during the design phase to minimise impacts to water quality, water courses and on floodplains:

- Adhere to ARTC's design criteria for achieving the necessary flood immunity (refer to Section 6.1.3.2)
- Minimise the number of crossings on each waterway where possible, however multiple perpendicular crossings are Conceptual to crossing of long sections
- Minimise the need for in-stream works, i.e. bridges are preferable to culverts at major waterway crossings
- Where possible, avoid realignment of waterways
- Design bridges such that works are avoided within riparian, littoral and in-stream environments as much as possible
- Design drainage systems to provide stormwater quality treatment prior to discharge to sensitive receptors
- Provide spill containment devices using a risk based approach taking into account sensitive receptor locations
- Identify areas that may require additional scour protection during construction
- Undertake geological investigations to inform the management of erosion prone and alluvium aquifer areas, and determine the risk of soils being impacted by the lowering of groundwater causing the soils to change properties and release contaminants (e.g. salinity)
- Undertake hydrological investigations to determine the size and location of stormwater management devices to collect any excess water and treat stormwater run-off and determine the location of high-risk areas in terms of impacts to groundwater quality and draw down.

Management of impacts during the construction phase will be documented in a CEMP prior to the commencement of construction and will likely include:

- Design and implementation of erosion and sediment control measures to minimise erosion occurring and sedimentation impacting surface waters
- Avoidance of high risk construction activity/earthworks during wet weather
- Minimise disturbance to stream banks and beds
- Rehabilitate and revegetate the worksite after the completion of works (or as areas are no longer required for construction activities)
- If it is determined that groundwater will be extracted and used during construction, minimise the groundwater use.

7.1.3. Air Quality and Noise

7.1.3.1. Construction

Management of potential air quality and noise impacts during the construction phase will be documented in a CEMP prior to the commencement of construction, including measures intended to reduce dust generation, vibration and noise impacts to sensitive receptors. The framework for the CEMP and identification of the range of possible mitigation measures will be included as part of the EIS process.

7.1.3.2. Operation

Air quality and noise modelling will be completed for the Border to Gowrie Project through the EIS process to predict potential impacts and determine appropriate mitigation measures for project design.

7.1.4. Ecosystems and Flora and Fauna

In the first instance, and where possible, the Conceptual Alignment will avoid impacts to substantial ecological constraints. Where this is not feasible, an approach of minimising or offsetting impacts will be adopted.

Where required, species-specific management plans will be prepared in addition to the EMP to detail appropriate impact mitigation actions. Measures of key importance are likely to include the following:

- Where possible, design waterway crossings (temporary and permanent) to comply with the DAF accepted development requirements for waterway barrier works
- Alternative fauna access solutions to maintain opportunities for species movement
- Fauna exclusion fencing is to be installed, particularly in areas of high koala habitat value, to reduce the potential for fauna mortality
- Vegetation clearing is to be undertaken in a sequential manner, and areas for removal are to be clearly demarcated or identified
- Suitably qualified and experienced fauna spotter-catchers are to be present during vegetation clearing and construction to identify and clear breeding sites for threatened (and other) species listed
- Cleared vegetation is to be stockpiled for a short period of time after clearing to allow any remaining fauna time to escape
- Avoid, where possible, clearing of large hollow-bearing trees
- Weed and pest species control and prevention measures are to be implemented. In particular, control of dogs and other feral predators during the construction and immediate post-construction period is critical
- Provision of appropriate environmental offsets
- Where possible, schedule construction to minimise potential impacts to protected fauna species during breeding season.

7.1.5. Landscape and Visual

To reduce the potential landscape and visual amenity impacts, the following mitigation measures are proposed:

- Use of existing rail corridors where practicable
- Investigate opportunities for advanced planting to reduce visual impacts.
- Minimise vegetation removal by protecting existing vegetation adjacent to the Conceptual Alignment where practicable.
- Rehabilitate the temporarily disturbed areas as construction proceeds to encourage rapid screening views and integration of the railway into the wider landscape to minimise visual disturbance.

Landscape and visual treatments can be delivered as part of a coordinated response, integrated with provision of noise, fauna sensitive design and water quality provisions.

7.2. Built Environment

The Border to Gowrie Project will interact with existing infrastructure including road, rail, pipelines and utilities in the Study Area. Mitigation measures for these impacts will be detailed in the EIS but will include:

- Consultation with stakeholders including State and local authorities and utility providers to discuss potential project impacts and design options to avoid or mitigate impacts
- Consider options for minimising impacts through the engineering design process
- Additional survey to identify all utilities and services (including minor utilities etc.) so that they can be considered in design development.

Appropriate approaches to construction traffic management will be investigated through the EIS process, which will include a traffic management plan as part of the CEMP and consultation with stakeholders including local and state authorities.

7.3. Native Title and Cultural Heritage (Indigenous)

The existence of known Aboriginal cultural heritage sites within, and in close proximity to, the Study Area, as well as high risk landscape features such as creeks, indicate that there is a high potential for Aboriginal cultural heritage to exist within the Study Area.

Further assessment and consultation is proposed in future project stages to determine the management measures required for Aboriginal cultural heritage. This includes:

- A cultural heritage field assessment of the entire with the relevant Aboriginal parties to identify Aboriginal and/or historical cultural heritage objects and places
- Development of one or more Cultural Heritage Management Plans under Part 7 of the *Aboriginal Cultural Heritage Act 2003*to establish agreed procedures for the investigation, conservation and management Aboriginal cultural heritage.

The Border to Gowrie Project will require an assessment of Native Title within the Study Area. Where Native Title may continue to exist, the Project may also require consultation with (and the authorisation of) affected Native Title parties under the *Native Title Act 1993* (Cth).

From an Aboriginal cultural heritage perspective, preliminary consultation has been undertaken with the statutory Aboriginal parties for the area covered by the Border to Gowrie Project. The purpose of this initial consultation was to provide an overview of the project, outline the assessment process and ascertain particular areas of cultural and archaeological sensitivity that might be present in the proposed disturbance area which was not identified in the database searches and background literature review.

7.4. Non-Indigenous Cultural Heritage Management

The EIS process will detail mitigation and management measures including a non-Indigenous cultural heritage management plan if required. Measures of key importance are likely to include the following:

- Avoid areas or items of significance through appropriate design modifications
- Establish procedures to be followed should previously unidentified historic sites and/or objects be discovered.

Further heritage assessment and consultation with local heritage groups and regulatory authorities will be undertaken to determine heritage values and required management measures. Appropriate measures may include:

- design refinement to minimise impacts to listed heritage places (i.e. the existing and former station buildings in Brookstead) and unlisted heritage places (such as pre-war housing stock and rail infrastructure which have potential heritage value)
- obtaining relevant heritage permits and approvals for impacts to listed heritage places, if required.

The CEMP would include management measures for the construction phase to describe the measures to minimise impacts to heritage values.

7.5. Greenhouse Gas Management

Construction of the Border to Gowrie Project will generate greenhouse gases (GHG) through the transportation of materials, embodied energy of materials used for construction and the consumption of electricity and other fuels during construction (earthworks). Construction of large-scale infrastructure projects is GHG intensive especially where significant earthworks and bridging is required (Hill et al, 2011).

During operation the key contribution to greenhouse gas emissions will be from diesel consumption from train operations. The Border to Gowrie Project will also have a significant beneficial impact in greenhouse gas generation due to the transfer of freight transport from road to rail. On average, road transport has significantly greater greenhouse gas emissions than rail transport – approximately 62 g CO_2/tonne-km compared to 22 g CO_2/tonne-km (Cefic, 2011).

There are a number of opportunities to minimise greenhouse gas generation during construction and operation of the Border to Gowrie Project, including:

- Selection of construction materials with low embodied energy
- Optimising the cut/fill balance for earthworks to minimise material transport requirements
- Driver assistance systems and speed management.

7.6. Waste Management

The ARTC Environmental Policy (2014) commits to 'preventing or minimising pollution and the generation of waste in all of their activities'. This policy is broadly consistent with the waste and resource management hierarchies of the National Waste Policy (DEE, 2009) and the Queensland Waste Management Strategy (DEHP, 2014) which set an order of preference for options for managing waste—from avoiding/reducing, to reusing, recovering, treating and disposing of waste.

The further development of the Border to Gowrie Project design and construction will be required to manage waste and materials in accordance with ARTC's Environmental Policy and industry standards through procurement requirements. Furthermore, economic incentives to balance earthworks materials to minimise material moved within and into/out of the project area during the construction phase are expected to drive design development and construction approaches.

7.7. Hazard and risk, and Health and Safety

A detailed risk assessment will be undertaken for the Border to Gowrie Project and effective mitigation measures will be developed to manage identified hazards and risks.

Hazards and risks to health and safety as part of the Border to Gowrie Project and their management would include:

- Bushfire and emergency response e.g. fires, explosions, flooding. An emergency response plan will be developed in consultation with state and regional emergency service providers. This plan will be consistent with ARTC's existing Safety Management System and associated procedures.
- Storage, handling and transport of dangerous goods and hazardous materials. Hazardous materials and dangerous goods would be stored, handled and transported in accordance with relevant regulatory requirements and relevant Australian Standards and Codes. ARTC will also prepare and implement an Emergency Management Plan during the operational phase of the project.
- Changing traffic conditions during construction and operation. Community health and safety will be managed through regular consultation and consideration of aspects in the traffic, transport and access management plan.
- Pedestrian and stock access to an operational rail corridor. Mitigation measures in relation to access include fencing the Conceptual Alignment with suitable fencing in densely populated locations and allowance for essential stock management.

7.8. Environmental Management

All ARTC's operations and activities, including those undertaken by their contractors, are required to be undertaken in accordance with ARTC's Environmental Policy (2014) which is available on the ARTC website (www.artc.com.au) and Environmental Management System (EMS). The ARTC Environmental Policy provides a framework for continual improvement of an Environmental Management System and sets our commitments for managing potential environmental risks.

This EMS outlines processes that are designed to guide compliance with environmental laws, statutes, regulations and corporate policies while managing ARTC's environmental impacts.

The principal benefits of operating in accordance with the ARTC EMS include:

- A clear definition of the corporate environmental goals;
- Documented policies and procedures that aim to prevent and / or minimise environmental damage and achieve legal compliance;
- Management of environmental risks;
- Documented roles and responsibilities in the decision making process; and
- Improved community relationships.
- The EMS also provides a structure for staff training, measuring environmental performance, environmental auditing and managing non-conformances.

The Border to Gowrie Project would be procured, designed, constructed and operated with regard to ARTC's policies and systems and relevant legislation, guidelines and standards.

Avoidance and minimisation of environmental impacts has been a key factor in the route selection processes for the Border to Gowrie Project. As the Border to Gowrie Project progresses, impact avoidance and reduction will remain key drivers in design development.

Key aspects to be addressed include:

- Further definition of habitat and vegetation impacts, through iterative design and environmental assessment

- Confirmation of the location of MNES and MSES habitat and species presence, and significance of populations, through targeted ecological investigations, in accordance with relevant State and Commonwealth survey guidance
- Confirmation of other environmental values in the Study Area
- Design development to avoid, reduce or manage impacts to identified environmental values
- Determination of environmental offset requirements for MNES and MSES impacts.

The Border to Gowrie Project's environmental outcomes should also be considered in the context of the overall intent and outcomes of the Melbourne to Brisbane Inland Rail programme. The establishment of a freight rail route that provides a comparable level of service to road freight is expected to negate or delay the need for progressive upgrades of the National Highway and associated environmental impacts.

An environmental management approach including the development of an environmental management plan for the construction and commissioning phases of the Border to Gowrie Project would be developed based on the potential environmental impacts of the Border to Gowrie Project. These impacts have initially been identified in this IAS and will be further assessed, developed and understood during the environmental assessment (e.g. EIS) phase.

7.9. Temporary Infrastructure Decommissioning and Rehabilitation

7.9.1. Laydown Areas, Offices, Stockpiles, Topsoil and Cleared Vegetation

The Border to Gowrie Project will incorporate numerous laydown areas along the Conceptual Alignment. The location and extent of these will be determined during future design phases during the EIS.

During construction the laydown areas will be progressively decommissioned and rehabilitated. This is likely to include the following actions:

- Demountable buildings will be removed progressively and concrete slabs broken up. The surface of all rehabilitated areas will be relieved of compaction prior to rehabilitation. De-compaction (ripping) or aeration will be done in accordance with management plans developed during the EIS. Previously excavated material stockpiled on site will be used to reinstate and the ground form to ensure that it is returned to its pre-existing profile and contour where practicable.
- Some sediment and erosion control measures will be left in place until completion of the rehabilitation of the area. Upon removal of offices, laydowns, stockpiles, topsoil and cleared vegetation will be spread over the area and seeding undertaken according to a Rehabilitation Plan that shall be developed in later phases of the project.
- Permanent erosion and sediment control measures (drainage and berms) may be installed as appropriate prior to re-spreading of topsoils and maintained until rehabilitation goals are achieved.
- Some office facilities may be left for the commissioning phase within the railway corridor.

7.9.2. Access Tracks and Roads

Access roads and tracks that will no longer be used will be decommissioned. Decommissioning of the temporary road/accesses shall achieve complete stabilisation and restoration to a condition generally consistent with the pre-existing area characteristics.

Treatments will be designed and implemented to completely eliminate the road/access track by restoring natural contours, hydrology, and vegetation through mechanical and/or natural means.

8. APPROVALS REQUIRED FOR THE PROJECT

If the Border to Gowrie Project is declared a coordinated project and is also determined to be a controlled action under the EPBC Act it is anticipated that assessment will be progressed under the Bilateral Assessment Agreement between the Commonwealth and Queensland Governments.

Further approvals are likely to be required under separate approvals processes. Furthermore other post-approval management plans may be required to progress implementation of the Border to Gowrie Project.

Table 8-1 summarises the approval and permit requirements likely to be applicable to the Border to Gowrie Project. Approval and permit requirements may vary depending on the final design and construction methodology, and future changes in statutory requirements prior to project implementation. Further detailed review of legislative requirements should be conducted in future project phases.

Table 8-1 Anticipated Approvals

ACT/ PROVISIONS	RESPONSIBLE/ADMINISTERING AUTHORITY	APPROVAL/PERMIT	TRIGGER	APPLICABILITY	COORDINATED/ INDEPENDENT
Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act)	Commonwealth Department of the Environment and Energy	EPBC Act referral to the Commonwealth Minister for the Environment and Energy for determination on whether the proposal is a 'controlled action'	Undertaking an action which has or is likely to have a significant impact on matters of national environmental significance	Potential project impacts to matters of national environmental significance including threatened species and threatened ecological communities	Coordinated and assessed under the provision of the assessment bilateral between the Queensland and Australian governments.
State Development and Public Works Organisation Act 1971 (Qld) (SDPWO Act)	Coordinator General (Queensland Department of State Development, Manufacturing, Infrastructure and Planning (DSDMIP))	Coordinated Project decision and subsequent EIS or Impact Assessment Report.	Declaration by the Coordinator-General	This IAS is part of the application for a coordinated project declaration.	Coordinated
Native Title Act 1993 (Cth) (NT Act)	National Native Title Tribunal	Where an interest is required on land where native title has not been extinguished, the requirements of the NT Act must be met before tenure can be granted.	Works within areas where Native Title may continue to exist.	Native Title may still exist in areas of the Conceptual Alignment. The Border to Gowrie Project will require an assessment of Native Title within the Study Area. Consultation with, and authorisation of, affected	Independent

ACT/ PROVISIONS	RESPONSIBLE/ADMINISTERING AUTHORITY	APPROVAL/PERMIT	TRIGGER	APPLICABILITY	COORDINATED/ INDEPENDENT
				Native Title parties under the NT Act may also be required.	
Aboriginal Cultural Heritage Act 2003 (Qld)	Queensland Department of Aboriginal Torres Strait Islander Partnerships (DATSIP)	Duty to take all reasonable and practical measures not to harm Aboriginal cultural heritage cultural heritage assessment/ development (and DATSIP approval) of Cultural Heritage Management Plan	Construction works with the potential for impact to Aboriginal Cultural Heritage. Requirement for Cultural Heritage Management Plan where such works are covered by the Project EIS.	The Border to Gowrie Project will require further detailed cultural heritage assessment and the Cultural Heritage Management Plan/Agreement for the works.	Coordinated
Planning Act 2016 (Qld) (PA)	Queensland Department of State Development, Manufacturing, Infrastructure and Planning (DSDMIP)	Development Permit for Material Change of Use, Operational Work, Reconfiguring a Lot and/or Building Work. Development assessed against applicable instruments.	Development that is assessable development requires a development permit.	Will be determined by the overall approvals pathway.	Coordinated
Environmental Protection Act	Queensland Department of Environment and Science (DES)	Section 739 Disposal Permit	Disposal of contaminated	Subject to EMR/CLR search and further contaminated	Coordinated

ACT/ PROVISIONS	RESPONSIBLE/ADMINISTERING AUTHORITY	APPROVAL/PERMIT	TRIGGER	APPLICABILITY	COORDINATED/ INDEPENDENT
1994 (Qld) *Planning Act 2016* (Qld)	and DSDMIP		material from a site listed on the EMR or Contaminated Land Register (CLR)	land investigations.	
		Environmental Authority Development approval for a concurrence ERA under the Planning Act 2016	Undertaking an Environmentally Relevant Activity (ERA) listed under Schedule 2 of the Environmental Protection Regulation 2008 (EP Regulation)	Potential ERAs associated with construction to be confirmed in future project phases and may include: • Chemical storage • Extractive and screening activities • Crushing, milling, grinding or screening material • Regulated waste storage/transport	Coordinated
Fisheries Act 1994 (Qld) *Planning Act 2016* (Qld)	Queensland Department of Agriculture and Fisheries (DAF), DSDMIP and DES	Operational works permit for works within a declared fish habitat area	Development in a declared fish habitat area	Not applicable as no declared fish habitat areas in the vicinity of the Conceptual Alignment	Coordinated

ACT/ PROVISIONS	RESPONSIBLE/ADMINISTERING AUTHORITY	APPROVAL/PERMIT	TRIGGER	APPLICABILITY	COORDINATED/ INDEPENDENT
		Development permit for Operational Works that is raising or constructing a waterway barrier	Constructing or raising waterway barrier works in a waterway mapped as a waterway for waterway barrier works under the Fisheries Act.	There are a number of waterways in the Conceptual Alignment that are mapped as low, medium or high risk under the Fisheries Act. Requirement for permit to be confirmed in future project phases, depends on the design and nature of creek crossings and whether crossings can comply with accepted development requirements for permanent or temporary works.	Coordinated
Vegetation Management Act 1999 (Qld) (VM Act) *Planning Act 2016* (Qld)	Queensland Department of Natural Resources, Mines and Energy (DNRM) and DSDMIP	Operational works permit for clearing remnant native vegetation (and possibly regrowth vegetation pending changes to the VM Act)	Clearing of native vegetation	The Border to Gowrie Project will require the clearing of mapped remnant native vegetation. Potential exemptions may be applicable to the Border to Gowrie Project. Extent of native vegetation clearing and applicability of exemptions to be confirmed in future project phases.	Coordinated
Nature Conservation Act 1992 (Qld)	DES	Protected Plant Clearing Permit Protected Plant	Taking protected plants under the NC Act, or within	Parts of the Conceptual Alignment are within the high risk flora survey trigger	Coordinated

ACT/ PROVISIONS	RESPONSIBLE/ADMINISTERING AUTHORITY	APPROVAL/PERMIT	TRIGGER	APPLICABILITY	COORDINATED/ INDEPENDENT
(NC Act)		Exemption Notification.	100 m of protected plants Clearing of vegetation within the high risk flora trigger area.	area, requiring flora survey and identification of protected plants, and if applicable a clearing permit or exemption will be required.	
		Approval to tamper with an animal breeding place.	If an animal breeding place used by an endangered, vulnerable or least concern fauna species requires removal a species-specific Species Management Program (SMP) will require approval by DEHP.	There is the potential for animal breeding places to be present within the Conceptual Alignment. This is to be confirmed in future project phases through detailed fauna survey, and if necessary a SMP will be required.	Coordinated
Queensland Heritage Act 1992 (Qld)	DES and Queensland Heritage Council	Exemption certificate (for a low impact activity which will not significantly detract from the heritage values of the place) or Development Application for impacts to a QLD	Impacts to a QLD heritage place/Local government heritage place	The extent of impact to heritage places should be determined in future project phases to determine if an exemption certificate or approval is required.	Coordinated

ACT/ PROVISIONS	RESPONSIBLE/ADMINISTERING AUTHORITY	APPROVAL/PERMIT	TRIGGER	APPLICABILITY	COORDINATED/ INDEPENDENT
		heritage place/Local government heritage place			
Water Act 2000 (Qld)	DNRME and DSDMIP	Riverine Protection Permit unless the Riverine protection permit exemption requirements (DNRM 2016) can be complied with.	Destroying of vegetation, excavating or placing fill in watercourse, lake or spring	Exemptions from the requirement for a Riverine Protection Permit may apply if the excavation or placing of fill is a necessary part of another permitted activity, or if the project is "prescribed assessable development" under the definition in Section 814 of the *Water Act 2000*. If this is not the case, a Riverine Protection Permit should be obtained for the Border to Gowrie Project.	Coordinated
		Water licence/allocation associated with the taking or interfering with water for construction	Taking or interfering with water	Taking or interfering with water for construction purposes is likely to be required for the Border to Gowrie Project. Construction entities may take water without an allocation, subject to conditions prescribed under a regulation. Creek	Coordinated

ACT/ PROVISIONS	RESPONSIBLE/ADMINISTERING AUTHORITY	APPROVAL/PERMIT	TRIGGER	APPLICABILITY	COORDINATED/ INDEPENDENT
				diversions may also require licences under the Water Act and development permits under PA.	
Transport Infrastructure Act 1994 (Qld) (TI Act)	Queensland Rail	Approval to interfere with a railway (s255)	Crossing of existing rail line or works within existing rail corridor	Subject to detailed design and consultation with Queensland Rail	Coordinated
	Queensland Department of Transport and Main Roads (DTMR)	Road corridor permit for works within a State Controlled Road (s50) Access to State Controlled Road (s62/66)	Works within State controlled roads Access to State controlled road (e.g. during construction)	Subject to detailed design and consultation with DTMR	Coordinated
Environmental Offsets Act 2014 (Qld) and Policy	DES	Offsets Management Plan	An environmental offset under the *Environmental Offsets Act 2014* may be required as a condition of approval where—following consideration of avoidance and mitigation measures—the	The Border to Gowrie Project is likely to have an impact on MSES. The significance of the residual impact would need to be confirmed in future project phases to determine offset requirements.	Coordinated

ACT/ PROVISIONS	RESPONSIBLE/ADMINISTERING AUTHORITY	APPROVAL/PERMIT	TRIGGER	APPLICABILITY	COORDINATED/ INDEPENDENT
			activity is likely to result in a significant residual impact on prescribed environmental matters.		
Local Government Act 2009 (Qld)	Local Government	Work on a local government controlled road permit	Construction works within a local government controlled road.	The Conceptual Alignment intersects a number of local roads. Construction works are likely to occur within local roads.	Independent

9. COSTS AND BENEFITS SUMMARY

9.1. Local, State and National Economies

As described in **Section 3.3.1** and **Section 3.9**, the ARTC Business Case outlines the significant economic benefits of the Inland Rail, which contributes to the efficient movement of freight in Australia and supports economic growth. The Inland Rail is expected to increase Australia's GDP by an estimated $16 billion by 2050.

The Border to Gowrie Project is a key project of the Inland Rail Programme and would bring economic benefits to the region and State by providing a critical element of the State and national freight network. In future project stages the economic costs and benefits would be subject to further detailed study.

In summary the benefits expected to arise from the Border to Gowrie Project include:

- During the construction phase it is anticipated that the workforce would primarily be derived from local and regional sources depending on the nature of the skills required, creating local and regional job opportunities. Workforce numbers and their source would be determined once a construction methodology has been finalised and would be quantified as far as possible in the EIS.
- Job creation has the potential to create flow-on economic benefits in regional centres in the Study Area.
- Regional communities along and adjacent to the rail corridor would benefit through more efficient and effective freight rail access to metropolitan and international markets. The Border to Gowrie Projects proximity to the Toowoomba Enterprise Hub would enable agricultural producers to move grain and cotton more efficiently for export to port.
- Provision of rail transport for freight potentially delays the need for road infrastructure investment and reduces the congestion and safety issues on existing transport routes such as the Warrego Highway.

The Border to Gowrie Project is expected to have a capital cost of $1.4 billion and would require substantial public funding, however the business case demonstrates that operating revenues would cover operating costs (including maintenance), meaning that once delivered, Inland Rail would not require on-going taxpayer support.

Effects on the local and state economy that will be further investigated as part of the EIS may include:

- Local and temporary access disruption during construction and associated impacts on businesses in the region
- Land acquisition and property impacts
- Influx of workers during construction and associated accommodation issues
- Economic benefits to the Darling Downs and South East Queensland regions.

9.2. Natural and Social Environments

Without Inland Rail, consideration of other freight solutions would be required. This could include upgrades to the National Highway network, or the existing coast railway corridor. The establishment of a freight rail route that provides a comparable level of service to road freight is expected to negate or delay the need for progressive upgrades of the National Highway and associated environmental impacts. Furthermore, it provides opportunities for regional development and supports regional agricultural business by providing improved access to freight services.

The Border to Gowrie Project has the potential for both temporary and longer term environmental and social effects that may require further management and mitigation. Environmental and social matters that will be investigated further as part of the EIS may include:

- Clearing of regulated vegetation and fauna habitat for species listed under State and National legislation

- Potential impacts to fauna movement as a result of rail infrastructure
- Air quality and noise impacts
- Potential changes to flooding and watercourses due to crossing of floodplains and watercourses
- Landscape and visual impacts particularly at significant embankments, cuttings and viaducts
- Potential impacts to known and unknown Indigenous and historical heritage places.

Social benefits are expected to arise from the economic benefits and opportunities of the Border to Gowrie Project that is described above.

Environmental and social impacts and benefits will be subject to further assessment in the SIA and the EIS with the development of mitigation and management measures where required. There is also an opportunity for design refinement in future phases to minimise or remove some of the impacts identified. A programme-wide biodiversity offset strategy is currently being investigated in the event that significant residual impacts are identified.

10. COMMUNITY AND STAKEHOLDER CONSULTATION

There has been a wide range of consultation undertaken for the Inland Rail programme, and specifically the Border to Gowrie project between 2015 and February 2018. Accordingly, the Border to Gowrie project is generally known to stakeholders. Consultation undertaken for the Border to Gowrie project to date has included consultation with local councils, businesses, farming and mining exporters, motoring organisations, the general community and adjoining landholders.

Consultation with the following stakeholder groups is ongoing:

- State and Commonwealth representatives, departments and agencies
- GRC and TRC representatives and executive management.
- Business and tourism stakeholders (e.g. local Chamber of Commerce).
- Agricultural stakeholders.
- Freight stakeholders.
- Environmental and natural resource management stakeholders.
- Service providers (e.g. community, medical, emergency).
- Indigenous groups.
- Community groups.
- Landholders.

ARTC values active engagement with stakeholders and the community and all consultation will be undertaken in line with ARTC's Communication Strategy. A community engagement plan has been prepared for the Border to Gowrie Project that would guide proposed consultation activities.

10.1. ARTC Consultation 2015 –October 2016

The purpose of engagement completed between March and May 2016 was primarily to facilitate the 'ground – truthing' of desk-top studies through field studies, establish positive relationships with key stakeholders and raise awareness of the programme status with the broader community.

Stakeholder groups engaged included Councils (Goondiwindi and Toowoomba), landowners (where field access was desired), peak bodies (relevant to the focus of the field studies) and regional communities.

10.1.1. Council technical sessions and workshops

Technical sessions were held with each Council in the local government areas to discuss issues and opportunities and how these could be addressed. Technical sessions were held on 23 March 2016 with Goondiwindi and Toowoomba Regional Councils. A workshop was held with Toowoomba Regional Councillors and management on 8 June 2016 and a discussion with Goondiwindi Council on 7 June 2016.

Key issues raised were:

Toowoomba Regional Council

- Road/rail interface and optimisation

- Flooding and hydrology
- Commodore Mine
- Alignment suggestions for Inglewood-Millmerran Road, Millmerran to Brookstead and Condamine Flood Plain, Brookstead to Mt Tyson (to avoid cropping land), Gowrie Junction and Kingsthorpe
- Tunnel portal area of the adjacent Inland Rail project (Gowrie to Helidon)
- Terminal locations
- Supply of quarry materials

Goondiwindi Regional Council

- Rail/rail interface and optimisation
- Level crossings and grade separation
- Flooding and hydrology mitigation
- Moving alignment to go through State Forest Areas and north of McIntyre Brook
- Connecting south-west of existing Millmerran line
- Avoidance of farm severance
- Ability for farmers to move stock and equipment
- Ability to add spurs to line and potential for terminal sites.

10.1.2. Landowner engagement

Engagement with landowners was undertaken to enable initial investigative works to assist preliminary engineering and environmental assessments. Fifteen landowners were engaged during the field access process.

Key issues raised were:

- Flooding and hydrology impacts of the rail corridor
- Impact of the rail corridor on farming operations where land is segmented
- Appropriateness of black soil for this type of infrastructure.

10.1.3. Peak body workshops

Initial briefings were undertaken in peak bodies to determine their interest in the Inland Rail project and to invite their participation into a stakeholder workshop held on 12 May 2016. Peak bodies including the Border Rivers Chamber of Commerce, Condamine Alliance, Inglewood Chamber of Commerce, Millmerran Commerce and Progress Inc., Millmerran Power, Queensland Farmers Federation, Regional Development Australia, McIntyre Brook Irrigators and Toowoomba Surat Basin Enterprise were involved in identifying opportunities and constraints in the two kilometre wide study corridor.

Key issues raised were:

- Flooding and hydrology management, particularly through the Condamine River Flood Plain
- Alternative alignment suggestion taking the corridor away from farming properties and through forestry area
- Impact of the corridor on farming operations, particularly for the movement of stock and machinery
- Soil types – black soil and sodic soils – and their implications for construction

Opportunities identified included:

- Location of existing quarries and relevant grade material
- Option to construct a workers camp and hub at Millmerran to service the project.

10.1.4. Community Information Sessions

Community Information Sessions were held in four locations for the Border to Gowrie project between 13 and 16 June 2016. Project representatives also attended adjacent sessions for Gowrie to Helidon and North Star to Border in the weeks of 20 June and 27 June respectively, in the event community members attended with an interest in the Border to Gowrie project. A community-led information session was also attended on 5 July 2016 at the request of the local community between Millmerran and Inglewood.

Key issues identified included:

- Impact to farming land between Brookstead and Oakey and between Inglewood and Millmerran. Alternatives suggested avoiding this land.
- Flood management and mitigation of hydrological impacts.
- Noise implications for both greenfield and brownfield areas.
- Operational impacts for farms intersected by the corridor – stock and machinery crossings etc.

In addition to aforementioned stakeholder engagement, ARTC engaged directly with Intergen (Millmerran Power Station) and the Hon. Lawrence Springborg MP (State MP and Landowner).

Millmerran Power Station/Commodore Mine

Key issues and opportunities included:

- Opportunity for rail alignment to be located between current mine operations and Millmerran Inglewood Road where there is a 200 metre buffer
- Potential impacts of rail alignment on future mine operations.

Hon Lawrence Springborg MP (State MP and Landowner)

Key issues and opportunities included:

- Concerns about survey work and ‘pink tape’ markers in local area.
- Concerns many people think the concept alignment later in the year is the final alignment.

- Concerns about impact of corridor on farming land and opportunity for route optimisation to minimise impacts on productive agricultural land.

10.2. November 2016 – September 2017

10.2.1. Corridor Options Review and Project Reference Group

In October 2016 the Australian Government determined that four possible Inland Rail corridor options between Yelarbon and Gowrie would be assessed independently and the assessment process would be overseen by the Yelarbon to Gowrie Project Reference Group. The then Minister for Infrastructure and Transport, the Hon Minister Chester announced the appointment of Mr Bruce Wilson AM as the Inland Rail Queensland Community Advisor and Chair of the Reference Group on 30 November 2016. The Project Reference Group (PRG) process was established in November 2016 by the Department of Infrastructure and Regional Development (DIRD) to provide local community input into a like-for-like review of four alignment options for the section of Inland Rail between Yelarbon and Gowrie in Queensland.

PRG members appointed represented a range of peak organisations representing:

- farming peak bodies;
- chambers of commerce and business groups;
- environmental and conservation organisations; and
- community and progress associations.

Relevant elected officials and State agencies also attended meetings of the Reference Group as observers.

The role of the PRG was to:

- Review and comment on the planned approach to the investigation of the alternative routes
- Provide feedback on investigation findings as they are shared
- Provide local input into investigations, particularly where anecdotal data and local knowledge will assist in enhancing investigations or shaping the process
- Seek feedback and input from local networks on specific issues as requested
- Provide final endorsement of the approach taken and the rigor behind the comparative analysis of the various options.

The PRG met seven times between 14 December 2016 and 10 April 2017. The topics covered at each of these meetings is summarised in Table 10-1

Table 10-1 Project Reference Group consultation

Date	Location	Topic
14 December, 2016	Toowoomba	Introduction to project and assessment methodology. like-for-like evaluation. Information request.

Date	Location	Topic
1 February, 2017	Warwick	Technical Update. MCA Assessment Framework & Case Study.
20 February, 2017	Millmerran	Technical Update Assessment of integration of PRG. Hydrological inputs. Data results and inputs for MCA. Cost estimate approach.
27 February, 2017	Toowoomba	Question and Answer session. Blockage Assessment. Route Changes. Typical Culvert detail.
15 March, 2017	Toowoomba	Question and Answer session. Blockage hydrological modelling. Rail crossings, approach, typical details, frequency. Typical undertrack crossing. Assessment of alternate Warwick Route.
22 March, 2017	Toowoomba	Assessment of alternate Leyburn Route. MCA outcomes presentation. Comparative cost estimate.
10 April 2017	Toowoomba	Details of construction capital cost estimates for options Options for ongoing consultation Finalising work of the PRG

To further engage with the broader community outside of the PRG, the PRG Chair, Mr Bruce Wilson AM conducted four public meetings over three days where the technical engineering consultant team were in attendance together with officers of the Department of Infrastructure & Regional Development. The meetings were advertised via local press and radio and located as follows:

- Millwood, 8 March 2017
- Brookstead, 9 March 2017
- Felton, 9 March 2017

- Southbrook, 10 March 2017

The purpose of these meetings was to give the community the opportunity to ask questions and provide further input for the project. The locations were as agreed to by PRG members. The sessions were then facilitated with the assistance of PRG members at the nominated locations.

The community were given the opportunity to register with DIRD for future correspondence and were provided with details to enable them to provide information and make submissions.

Following the meetings of the PRG and the public meetings, a Corridor Options Report (AECOM 2017) was developed and submitted in April 2017. This report was one of several inputs considered by the Australian Government and informed the decision on the study area for the Border to Gowrie project.

10.3. September 2017 - 2018

Following the announcement of the study area on 21 September 2017, the overall focus of ARTC's engagement has been to inform the community about the nominal corridor and study area, the proposed project assessment and approvals process, and securing future access to private properties in order to carry out environmental and technical investigations.

Stakeholder groups engaged included Goondiwindi Regional Council and Toowoomba Regional Council, landowners (where field access was desired) and those within the proposed study area, relevant peak bodies and organisations (e.g. Queensland Farmers Federation, Toowoomba Chamber of Commerce and Toowoomba Surat Basin Enterprise TSBE), interested community groups and local communities.

10.3.1. Council technical sessions and workshops

Five technical planning sessions were held with Toowoomba Regional Council (TRC) on 4 August, 7 September, 5 October, 9 November, 6 December 2017. The primary focus of these sessions was the interface of the project with council assets and future development. A briefing to TRC Councillors and Mayor was also delivered on 6 December 2017.

Key issues raised and subject to ongoing engagement include:

- Road/rail interface and interaction with current local roads and future planned upgrades for local roads
- Current and future land use planning considerations for route optimisation (Pittsworth Industrial Precinct Enabling Project, Toowoomba Enterprise Hub)
- Flooding and hydrology (Condamine River, Westbrook Creek and Gowrie Creek)
- Opportunities to learn from the development of other significant infrastructure projects currently being delivered within the TRC local government area.

A meeting was held with Goondiwindi Regional Council (GRC) engineering manager in Inglewood on 16 November 2017 to provide an update on the project and timing. The main issue discussed was the consideration of an alternative alignment through Whetstone and Bringalily State Forests. This issue has been the subject of ongoing correspondence between GRC and ARTC, and was most recently addressed at a meeting between Inland Rail senior executives and GRC Councillors on 24 January 2018.

Other key issues raised and subject to ongoing engagement include:

- Road/rail interface and interaction with current local roads and future planned upgrades for local roads. Additionally, the interaction of the proposed rail line and arterial roads that provide access during for emergency services during significant flood events
- Road/rail interface and opportunities for grade separation to improve safety, specifically in the town of Yelarbon
- Flooding and hydrology (Macintyre River, Macintyre Brook)
- Minimising impacts on farm land and the avoidance of farm severance
- Ensuring the consideration and future ability for farmers to move stock and equipment across rail infrastructure.

10.3.2. Landowner engagement

In addition to community meetings, ARTC has engaged directly with 92 landowners in the project area since June 2016, 32 being contacted since September 2017 for the purposes of obtaining access agreements for environmental and technical investigations required for the project EIS. As at 31 January 2018 ARTC has secured 75% of the land access agreements required for initial field investigations, with four landowners declining to agree to provide access at present.

Key issues raised during meetings have included:

- The regional location of the area, the absence of train operations in certain parts of the study area and the corridor options assessment process delivered by DIRD
- Potential for impact on property value and saleability of property
- Compensation for any property impacts
- Potential for flooding impacts of the rail corridor and possible design solutions
- Impacts of the rail corridor on farming operations (potential changes to property access, potential severance and overall operability of agricultural properties

10.3.3. Community information meetings

Between 20 October 2017 and 21 November 2017, ARTC hosted 14 community information meetings held across seven locations in two 'rounds'. The information meetings were widely advertised in print and on radio and attended by a total of approximately 750 people (although this number includes people who attended more than one meeting). The locations and dates of the community information sessions are detailed in Table Table 10-2.

Table 10-2 Community Information Sessions

Date	Venue	Address
Friday, 20 October 6-8pm	Gowrie Progress Association Community Hall	24 Old Homebush Road, Gowrie Junction
Saturday, 21 October 8.30-10.30am	Southbrook Hall	Queen Street, Southbrook
Saturday, 21 October 1-3pm	Millmerran Cultural Centre	45 Walpole Street, Millmerran
Wednesday, 25 October	Inglewood Civic Centre	18 Elizabeth Street, Inglewood

Date	Venue	Address
6-8pm		
Thursday, 26 October 6-8pm	Yelarbon and District Soldiers Memorial Hall	Taloom Street, Yelarbon
Saturday, 28 October 9-11am	Pittsworth Function Centre	42 Hume Street, Pittsworth
Saturday, 28 October 2-4pm	Brookstead Hall	Madelaine Street, Brookstead
Monday, 13 November 6-8pm	Pittsworth Function Centre	42 Hume Street, Pittsworth
Tuesday, 14 November 6-8pm	Inglewood Civic Centre	18 Elizabeth Street, Inglewood
Wednesday, 15 November 6-8pm	Millmerran Cultural Centre	45 Walpole Street, Millmerran
Thursday, 16 November 6-8pm	Yelarbon and District Soldiers Memorial Hall	Taloom Street, Yelarbon
Saturday, 18 November 9-11am	Gowrie Progress Association Community Hall	24 Old Homebush Road, Gowrie Junction
Saturday, 18 November 2-4pm	Southbrook Hall	Queen Street, Southbrook
Tuesday, 21 November 6-8pm	Brookstead Hall	Madelaine Street, Brookstead

The key themes and details of the issues emerging from the Community Information Sessions are detailed in the following Table 10-3.

Table 10-3 Key themes and issue descriptions emerging from Community Information Sessions

Issue Themes	Issue description
Further investigation of an alternative routes	There was broad recognition from attendees that the study area had been determined by the Australian Government and any change to the study area would have to be brought about by the Australian Government, rather than ARTC. A significant number of attendees voiced their view that the study area should be changed but with no consistent views as to where.

Issue Themes	Issue description
Property impacts and compensation	Property impacts and compensation was another theme regularly raised by members of the community. There are concerns at the time it will take to proceed through the EIS process and to determine the land requirements of the project. Landowners were also concerned about perceived loss of value to the property through the EIS process due to the potential construction and operation of the Border to Gowrie project. Potential impacts on properties (physical infrastructure, fencing, access and operability of farming operations) were also raised by the community.
Flooding impacts	Flooding impacts of building Inland Rail continued to be a significant issue, particularly in relation to crossing of the Condamine floodplain.
Train operations	Clarity was provided to the community for the planned operations of trains up to 1800m, noting that train length and composition of freight being carried would vary across trains. The community and business operators are interested in opportunities to transport grain and other goods, as well as the potential for local employment for maintenance and operations and potential sidings and planned future intermodal developments.
Engineering design	The technical engineering feasibility of the proposed rail line across the Condamine flood plain was regularly raised as a concern of the communities. Landowners are concerned about the potential impacts of earthworks and cuttings on surface and groundwater resources.
EIS process	The formal Environmental Impact Statement and approvals process was raised throughout the community information sessions. The communities are keen to have their say throughout the EIS process.
Study area	The community raised concerns about the study area following the announcement of the preferred corridor.
Noise	Potential noise impacts, the estimated number of train movements and potential mitigation measures have been raised.
Liveability and wellbeing impacts	Amenity impacts, liveability and well-being of the small rural communities have been raised by the community.

Issue Themes	Issue description
The nature and extent of future consultation	The ability for the community to be informed and able to engage with ARTC through future project stages was raised during information sessions.

10.3.4. Broader Stakeholder engagement

Briefings have been held from October 2017 and continue to be held with stakeholders about the proposed study area. These briefings and meetings have been primarily to inform the stakeholders of the study area and the process for the development of the engineering design and EIS in addition to providing a forum for the stakeholders to provide feedback and ask questions about the project. Broader stakeholder engagement details are included in Table 10-4.

Table 10-4 Broader stakeholder engagement from October 2017 to January 2018

	Stakeholder
Elected Representatives	• Federal Member for Groom, Dr John McVeigh MP • Federal Member for Maranoa, Mr David Littleproud • Member for Condamine, Mr Pat Weir MP • Member for Toowoomba South, Mr David Janetski MP • Member for Toowoomba North, Mr Trevor Watts MP • Then Member for Southern Downs, Mr Lawrence Springborg • Then candidate (now State Member) for Southern Downs, Mr. James Lister MP
Queensland Government Departments and Agencies	• Queensland Department of Transport and Main Roads • Department of Agriculture and Fisheries • Department of State Development, Manufacturing, Infrastructure and Planning
Other Stakeholders	• InterLink SQ • Smithfield Cattle Company (Sapphire Feedlot) • John Dee (Yarranbrook Feedlot) • InterGen (Millmerran Power Station) • Regional Development Australia • University of Southern Queensland • Toowoomba Surat Basin Enterprise • Toowoomba Chamber of Commerce
Community Groups	• Inner Downs Inland Rail Action Group

	Stakeholder
	• University of the Third Age • Down Steam Tourist Railway and Museum

10.3.5. Community Consultative Committees

ARTC has established two Community Consultative Committees within the project area: Southern Darling Downs Community Consultative Committee (SDCCC) and the Inner Darling Downs Community Consultative Committee (IDCCC). The Committees are respectively chaired by Mr Graham Clapham (nominated by the Queensland Farmers Federation) and Professor. Steven Raine (nominated by the Federal member for Darling Downs).

Members were appointed following a publicly advertised nomination period and nominations were assessed against a set of criteria by an independent party (Brisbane based consultancy Three Plus). Candidates for appointment were then recommended to ARTC and ARTC formally appointed the Chairs and Members of the two committees.

For the SDCCC, 29 nominations were received from which 15 Members were appointed while for the IDCCC there were 38 nominations received from which 16 Members were appointed.

The first meetings of the SDCCC and IDCCC were held on 13 and 14 December 2017 respectively. The committees will meet on no less than a quarterly basis, and more often if required. Meeting summaries and minutes are publicly available on the Inland rail website as are the Membership and governing Charters for each Committee.

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12. GLOSSARY, ACRONYMS AND ABBREVIATIONS

A list of terms, acronyms and abbreviations are provided below.

TERM	DEFINITION	ACRONYM/ABBREVIATION
Aboriginal Cultural Heritage Act 2003		ACH Act
Annual Exceedance Probability		AEP
Australian Height Datum		AHD
Australian Rail Track Corporation		ARTC
Advance Train Management Systems		ATMS
Benefit-cost ratio		BCR
Border to Gowrie Project	The section of the Inland Rail programme between the NSW/QLD Border to Gowrie	Border to Gowrie
Capital Expenditure		CAPEX
Construction Environmental Management Plan		CEMP
Cultural Heritage Integrated Management System		CHIMS
Carbon monoxide		CO
Department of Agriculture and Fisheries		DAF
Department of Aboriginal and Torres Strait Islander Partnerships		DATSIP
Department of Environment and Science		DES
Department of Natural Resources, Mines and Energy		DNRM
Department of the Environment and Energy		DotEE
Department of Science, Information Technology and Innovation		DSITI
Department of Transport and Main Roads		DTMR

TERM	DEFINITION	ACRONYM/ABBREVIATION
Electrical conductivity		EC
environmental impact statement		EIS
Environmental Management Register		EMR
Environmental Management System		EMS
Environment Protection and Biodiversity Conservation Act 1999		EPBC Act
Endangered, Vulnerable and Near Threatened		EVNT
Gross Domestic Product		GDP
Greenhouse Gas		GHG
Goondiwindi Regional Council		GRC
High Value Regrowth		HVR
Important Agricultural Areas		IAA
Initial Advice Statement		IAS
Inland Rail Alignment Study		IRAS
Key Resource Area		KRA
Local Government Area		LGA
Matters of National Environmental Significance		MNES
Matters of State Environmental Significance		MSES
Planning Act 2016		PA
Priority Living Areas		PLA
Public Utility Plant		PUPs
Queensland Environmental Offsets Policy		QEOP

TERM	DEFINITION	ACRONYM/ABBREVIATION
Queensland		QLD
Queensland Land Use Mapping Program		QLUMP
Queensland Reconstruction Authority		QRA
State Development and Public Works Organisation Act 1971		SDPWO Act
Threatened Ecological Community		TEC
Transport Infrastructure Act 1994		TI Act
Toowoomba Regional Council		TRC
Travelling Stock Routes		TSRs
UXO		Unexploded ordnance
Vegetation Management Act 1999		VMA
Wider economic benefits		WEB
Weeds of National Significance		WoNS
coastal route	The existing rail route from Melbourne to Brisbane via Sydney	
dual gauge track	A line of track that provides for two trains of two separate track gauges	
chainage	A distance measured along such a line.	
embankment	A bank of earth or stone built to carry a railway over an area of low ground	
Inland Rail programme	Programme to deliver Inland Rail	
laydown area	Area to store materials located adjacent to the rail corridor or remote from site	
narrow gauge	Railway track gauge of 1067 mm; used in Queensland except on the interstate line from Sydney to Brisbane	
Crossing loop	A place on a single line railway, often located at a station, where trains travelling	

TERM	DEFINITION	ACRONYM/ABBREVIATION
	in opposite directions can pass each other.	
project footprint	Area of disturbance	
Queensland Rail 'South Western System'	Consists of Toowoomba to Thallon via Warwick as the primary corridor, with branch lines from Warwick to Wallangarra and Wyreemah to Millmerran. The South Western system adjoins the West Moreton System at Toowoomba.	
Queensland Rail 'Western System'	Adjoins the far western section of the West Moreton system at Miles with the Western system branch lines running directly off the West Moreton system	
rail alignment	The route considering design parameters and site constraints	
rail corridor	A strip of land with a width measured in kilometres that is suitable for a railway	
rolling stock	Any vehicle that moves on a railway	
standard gauge	Railway track gauge of 1,435 mm; used on the ARTC network and for the New South Wales railway system	
structure gauge	Specification for the position of structures such as overhead bridges, and platforms relative to a railway track to allow adequate clearance for the passage of trains	

APPENDIX A CONCEPTUAL ALIGNMENT TENURE

LOTPLAN	TENURE
39MH796	Freehold
37MH878	Reserve
10K5781	Freehold
104MH143	Freehold
413SP119197	Lands Lease
1K5781	Freehold
2K5781	Freehold
3K5781	Freehold
4K5781	Freehold
5K5781	Freehold
6K5781	Freehold
7K5781	Freehold
8K5781	Freehold
9K5781	Freehold
411SP119197	Lands Lease
038MH728	Lands Lease
32SP139977	Freehold
484SP119198	Lands Lease
2SP142352	Freehold
38MH728	Reserve
102MH143	Freehold
8SP146067	Freehold
28MH210	Freehold
25MH143	Freehold
27K5781	Freehold
28K5781	Freehold
29K5781	Freehold
30K5781	Freehold
DSP129307	Easement
ESP129307	Easement
ARP216755	Easement
36MH345	Freehold
1RP49163	Freehold
24MH143	Freehold
14SP127017	Freehold
22K5781	Freehold
23K5781	Freehold
24K5781	Freehold
25K5781	Freehold
26K5781	Freehold
21K5781	Freehold
34CP884737	Freehold
1MH461	Freehold
2MH461	Freehold
71SP131782	Freehold
90SP169187	Freehold
58SP169187	Freehold

LOTPLAN	TENURE
AMH842	Lands Lease
54SP129536	Lands Lease
341FTY1881	State Forest
3RP16081	Freehold
1RP124356	Freehold
2SP256680	Freehold
9RP841180	Freehold
5RP841180	Freehold
20RP913044	Freehold
2RP215348	Freehold
21RP913044	Freehold
2RP182048	Freehold
6RP212368	Freehold
52SP104973	Lands Lease
51SP104973	Lands Lease
54SP112651	Lands Lease
62SP104974	Lands Lease
61SP104974	Lands Lease
3RP212365	Freehold
3RP205145	Freehold
7SP209435	Freehold
8SP209435	Freehold
2RP30861	Freehold
2437A341136	Freehold
15RP212368	Freehold
12RP212366	Freehold
22SP104970	Lands Lease
1A341936	Freehold
2RP835800	Freehold
2RP142680	Freehold
1RP182048	Freehold
2RP7465	Freehold
3RP7482	Freehold
1495A34822	Freehold
2RP50027	Freehold
62SP146089	Freehold
61SP146089	Freehold
3RP7485	Freehold
2RP7469	Lands Lease
2RP7463	Lands Lease
2RP205146	Freehold
2RP7479	Lands Lease
2RP14244	Lands Lease
4RP14244	Lands Lease
6RP14244	Lands Lease
8RP14244	Lands Lease
2RP7478	Lands Lease
1AP3377	Lands Lease
JRP103164	Easement

LOTPLAN	TENURE
2RP7477	Lands Lease
2RP7467	Freehold
3RP7468	Freehold
FRP152994	Easement
ERP153406	Easement
8RP208616	Freehold
30RP212415	Freehold
1RP114861	Freehold
2RP7482	Lands Lease
1RP30861	Freehold
22SP125605	Freehold
19SP125605	Freehold
1AG4028	Freehold
4RP208562	Freehold
46MH426	Freehold
2718A341307	Freehold
1789A34919	Freehold
7RP212353	Freehold
2RP212352	Freehold
6RP203202	Freehold
2RP14241	Lands Lease
4RP14241	Lands Lease
2RP14242	Lands Lease
71SP104975	Lands Lease
72SP104975	Lands Lease
92SP104978	Lands Lease
2RP37132	Lands Lease
2RP37103	Lands Lease
5RP37103	Lands Lease
22SP124720	Lands Lease
114SP113906	Lands Lease
113SP113906	Lands Lease
112SP113906	Lands Lease
99DY182	Freehold
111DY182	Freehold
73DY153	Freehold
97DY181	Freehold
44AG109	Freehold
2RP55460	Freehold
1SP260880	Freehold
2SP260880	Freehold
1SP136970	Freehold
3SP136970	Freehold
3RP47093	Freehold
3761DER34129	Freehold
3150DER3484	Freehold
43AG109	Freehold
88MH16	Freehold
151MA3433	Freehold

LOTPLAN	TENURE
76MA3478	Freehold
121MH94	Freehold
245CP902340	Freehold
78MA3480	Freehold
77MA3426	Freehold
371SP116435	Lands Lease
372SP116435	Lands Lease
2RP14272	Lands Lease
5RP14253	Lands Lease
2RP14253	Lands Lease
2RP14248	Lands Lease
6RP14245	Lands Lease
4RP14245	Lands Lease
2RP14245	Lands Lease
5RP14231	Lands Lease
2RP14250	Lands Lease
91SP104978	Lands Lease
1RP14231	Lands Lease
81SP104976	Lands Lease
82SP104976	Lands Lease
121SP104977	Lands Lease
102SP113905	Lands Lease
2RP37133	Lands Lease
103SP113905	Lands Lease
1RP53346	Freehold
4RP220762	Freehold
1AG4150	Freehold
3RP215320	Freehold
4RP215320	Freehold
1RP215319	Freehold
2RP215357	Freehold
2RP215383	Freehold
42RP24623	Freehold
2RP24614	Freehold
1RP24606	Freehold
2RP24615	Freehold
GAP9310	Easement
2AG3200	Freehold
3AG3669	Freehold
863A34637	Freehold
AAP19429	Lands Lease
10D3691	Lands Lease
33SP294200	Freehold
2RP839421	Freehold
1RP36568	Freehold
2RP172596	Freehold
4RP16058	Lands Lease
2RP16058	Lands Lease
2RP16081	Lands Lease

LOTPLAN	TENURE
EMTAG2891	Easement
HCP902066	Easement
9RP37102	Lands Lease
4RP37102	Lands Lease
121SP113907	Lands Lease
122SP113907	Lands Lease
202SP124721	Freehold
201SP124721	Lands Lease
131SP113908	Lands Lease
132SP113908	Lands Lease
6RP37102	Lands Lease
1PER6382	Lands Lease
2RP197967	Freehold
6MH364	Freehold
155MA3432	Freehold
10MH737	Freehold
2RP145435	Freehold
107MH808	Freehold
47MH435	Freehold
9MH365	Freehold
5SP194159	Freehold
1SP204014	Freehold
1RP100482	Freehold
1RP87074	Freehold
27MH367	Freehold
29MH367	Freehold
30MH562	Freehold
51MH562	Freehold
2RP100482	Freehold
169MH786	Freehold
1RP27437	Freehold
31SP118699	Freehold
ASP216725	Easement
2RP110474	Freehold
3RP24614	Freehold
1RL2728	Lands Lease
26RP24609	Freehold
1RP194766	Freehold
2RP155499	Freehold
2RP86319	Freehold
10RP47857	Freehold
5SP158473	Freehold
6SP158473	Freehold
17D3590	Freehold
2RP49965	Freehold
12SP285307	Freehold
11SP285307	Freehold
LSP131547	Easement
1SP166689	Freehold

LOTPLAN	TENURE
3SP166689	Freehold
5SP166689	Freehold
7SP126840	Freehold
8SP126840	Freehold
93MH819	Lands Lease
273MA3478	Freehold
60MA3456	Freehold
413SP119196	Lands Lease
143CP902340	Freehold
71MA3479	Freehold
20SP120712	Lands Lease
2MH784	Freehold
65MA3454	Freehold
66MA3454	Freehold
67MA3454	Freehold
1RP147969	Freehold
64MA3456	Freehold
69MA3454	Freehold
1MH171	Freehold
70MA3454	Freehold
74MA3455	Freehold
73MA3455	Freehold
1RL1245	Lands Lease
72SP173128	Freehold
75MA3455	Freehold
8MH286	Freehold
2RP147969	Freehold
2SP214649	Freehold
2SP109525	Freehold
171MH75	Freehold
124MH79	Freehold
102MH643	Freehold
128MA3430	Freehold
1RP156957	Freehold
2RP156957	Freehold
91MH79	Freehold
33MA34110	Freehold
61MH84	Freehold
62MA3456	Freehold
352SP116434	Lands Lease
79MH94	Freehold
7MH286	Freehold