Liverpool Ranges Duplication Project

Preliminary Environmental Assessment

Australian Rail Track Corporation

November 2011

Upper Hunter Valley Alliance

Liverpool Ranges Duplication Project

Preliminary Environmental Assessment

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Glossary and Abbreviations

ARTC	Australian Rail Track Corporation.
ASS	Acid Sulphate Soils.
DECCW	NSW Department of Environment, Climate Change and Water (now the NSW Office of Environment and Heritage with some functions transferred to the NSW Department of Primary Industries).
DoPI	NSW Department of Planning and Infrastructure.
Down Main	In a situation with more than one rail track in the rail corridor, the Down Main is the primary (main) rail line that trains usually traverse when they are heading away from Newcastle and is usually positioned on the right when facing towards Newcastle.
Down Side	The side of the track on which trains travel away from Newcastle.
EA	Environmental Assessment.
EP&A Act	The NSW *Environmental Planning and Assessment Act 1979*. Provides the legislative framework for land use planning and development assessment in NSW.
EP&A Regulation	The NSW Environmental Planning and Assessment Regulation 2000.
EPBC Act	The *Commonwealth Environment Protection and Biodiversity Conservation Act 1999*. Provides for the protection of the environment, especially matters of national environmental significance, and provides a national assessment and approvals process.
IGANRIP	Interim Guideline for the Assessment of Noise from Rail Infrastructure Projects
LGA	Local Government Area.
MTPA	Million Tonnes Per Annum
PEA	Preliminary Environmental Assessment.
Project	The area within the rail corridor that the Liverpool Ranges Project is intended to be situated.
OEH	Office of Environment and Heritage.
Rail Corridor	Land dedicated to ARTC for rail purposes.
RAMSAR Convention	An intergovernmental treaty that provides the framework for national action and international cooperation for the conservation and wise use of wetlands

	of international importance and their resources.
SEPP Infrastructure	*State Environmental Planning Policy (Infrastructure) 2007.*
SEPP Major Development	*State Environmental Planning Policy (Major Development) 2005.*
Strategy	*2011-2020 Hunter Valley Corridor Capacity Strategy Consultation Document.*
Train Line	The infrastructure on which a train travels. It includes two rails, sleepers, fastenings to secure the rails to the sleepers, and ballast around and under the sleepers.
Turnout	The mechanisms for the meeting of two tracks.
UHVA	Upper Hunter Valley Alliance.
Up Main	In a situation with more than one rail track in the rail corridor, the Up Main is the primary (main) rail line that trains usually traverse when they are heading toward Newcastle and is usually positioned on the left when facing towards Newcastle.
Up Relief	A rail line that runs parallel with the main line(s) that trains usually traverse when they are heading toward Newcastle. The Up Relief usually provides a passing facility enabling trains to pass those traversing or stationary on the main line thus giving relief to the main line operations. An Up Relief can also allow trains to remain stationary off the Up Main allowing other trains to continue to traverse the main line.
Up Side	The side of the track on which trains travel to Newcastle.

Executive Summary

This Preliminary Environmental Assessment (PEA) has been prepared by the Upper Hunter Valley Alliance (UHVA) on behalf of Australian Rail Track Corporation (ARTC) for the construction of the Liverpool Ranges Duplication Project (the Project). The Project is located adjacent to the New England Highway within the rail corridor between Murrurundi and Willow Tree approximately 260km north of Sydney by rail.

The *2011-2020 Hunter Valley Corridor Capacity Strategy Consultation Document* (the Strategy) is the fifth annual strategy by ARTC. It identifies the constraints on the Hunter Valley Rail Network (the Network), the options to resolve these constraints and a proposed course of action to achieve the necessary increase in coal exports from the region.

The section of track at Liverpool Ranges has been identified as a capacity constraint on the Network. To date, capacity to the Gunnedah Basin has been maintained ahead of demand. However the forecast increase in demand for coal sourced from the Gunnedah Basin will require a solution that provides additional capacity over the Liverpool Range, in particular on the section of track between Willow Tree and Murrurundi.

ARTC propose to duplicate the existing Main North Line across the Liverpool Range from the northern side of Murrurundi to the southern side of Willow Tree.

In total, approximately 13km of new track would be required to complete the duplication. Construction of the Project would be staged to enable completed sections of track to become operational to incrementally increase rail capacity to meet demand.

The Project is described in detail in Section 3 of this document including the options considered and justification for the preferred option. In summary, the key components of the Project comprise:

- Track work – approximately 13 km of track consisting of:
  - Nominally five staged loops of varying length; and
  - 4 turnouts in temporary and permanent locations.
- Signalling – new and changes to existing infrastructure including:
  - Laying new cables;
  - Installation of signals; and
  - Modifications to signalling control systems.
- Civil works including access road works, bulk earthworks, drainage and other associated structures; and
- Environmental works including construction controls and permanent mitigation measures.

At this early stage the estimated cost of the Project is $205 million. The Project would be constructed in stages. Currently it is difficult to estimate how long each stage would take to construct, however the entire Project would be constructed in stages as required.

The approval process for the Project is via an assessment and determination under Part 5.1 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). The Minister for Planning and Infrastructure is the determining authority.

In accordance with the approval process under Part 5.1 of the EP&A Act, the proponent is required to submit a project application to the Department of Planning and Infrastructure (the Department). Accompanying the project application, will be this document which will be used by the Department to

brief Government agencies about the Project. The document will be the basis on which the formal requirements for the preparation of the assessment will be based.

Based on the preliminary project information and an environmental risk assessment conducted, the key environmental issues which will require more detailed investigation are:

- Ecology – the impacts to native vegetation potentially including threatened flora and fauna and Endangered Ecological Communities.
- Non-Indigenous Heritage – a number of heritage items are located in the vicinity of the Project Area.
- Noise - noise impacts associated with the proposed development at nearby receivers, including temporary noise impacts associated with construction of the Project.
- Traffic – the impact to local road users and network throughout the proposed construction phases.
- Topography, Geology and Soils – substantial geotechnical works will be required to construct the Project.

Assessment methodologies for each of the environmental and community issues are included in Sections 4 and 5 of this document.

1. Introduction

This Preliminary Environmental Assessment (PEA) has been prepared by the Upper Hunter Valley Alliance (UHVA) on behalf of Australian Rail Track Corporation (ARTC) for the proposed Liverpool Range Duplication Project (the Project). The Project involves the duplication of the existing Main North Line from north of Murrurundi to the southern portal of the Ardglen Tunnel and from the northern portal of the Ardglen Tunnel to the southern side of Willow Tree. The project is located approximately 260 kilometres north of Sydney by rail (Figure 1.1).

1.1. Development Context

ARTC was created after the Commonwealth and State Governments agreed in 1997 to the formation of a "one stop" shop for all operators seeking access to the National interstate rain network. Within NSW, ARTC is responsible for maintaining the rail network outside of the Sydney Metropolitan area. This network includes the Hunter Valley Rail Network.

In September 2004, ARTC commenced a 60-year lease of the interstate and Hunter Valley Rail Network in NSW. Since commencing the lease, ARTC has released annual Hunter Valley infrastructure enhancement strategies that set out how ARTC plans to ensure rail corridor capacity stays ahead of the expected demand due to the rapid growth in coal exports.

The *2011-2020 Hunter Valley Corridor Capacity Strategy Consultation Document* (the Strategy) is the fifth annual strategy by ARTC. It identifies the constraints on the Hunter Valley Rail Network (Network), the options to resolve these constraints and a proposed course of action to achieve the necessary increase in coal exports from the region. The means by which these capacity increases will be achieved variously includes reducing train headways, reducing junction conflicts and by increasing capacity, either through re-signalling of the current infrastructure or by providing additional infrastructure.

ARTC have delivered a number of capacity enhancement projects on the Main North Line between Muswellbrook and Werris Creek. As a result, capacity to the Gunnedah Basin has to date been maintained ahead of demand. The forecast increase in demand for coal sourced from the Gunnedah Basin will however require a solution that provides additional capacity over the Liverpool Range (in particular on the section of track between Willow Tree and Murrurundi).

The current coal capacity on the section of track between Willow Tree and Murrurundi is as follows:

- Willow Tree to Ardglen – 16 million tonnes per annum (mtpa)
- Ardglen to Murrulla (south of Murrurundi) – 12.4 mtpa

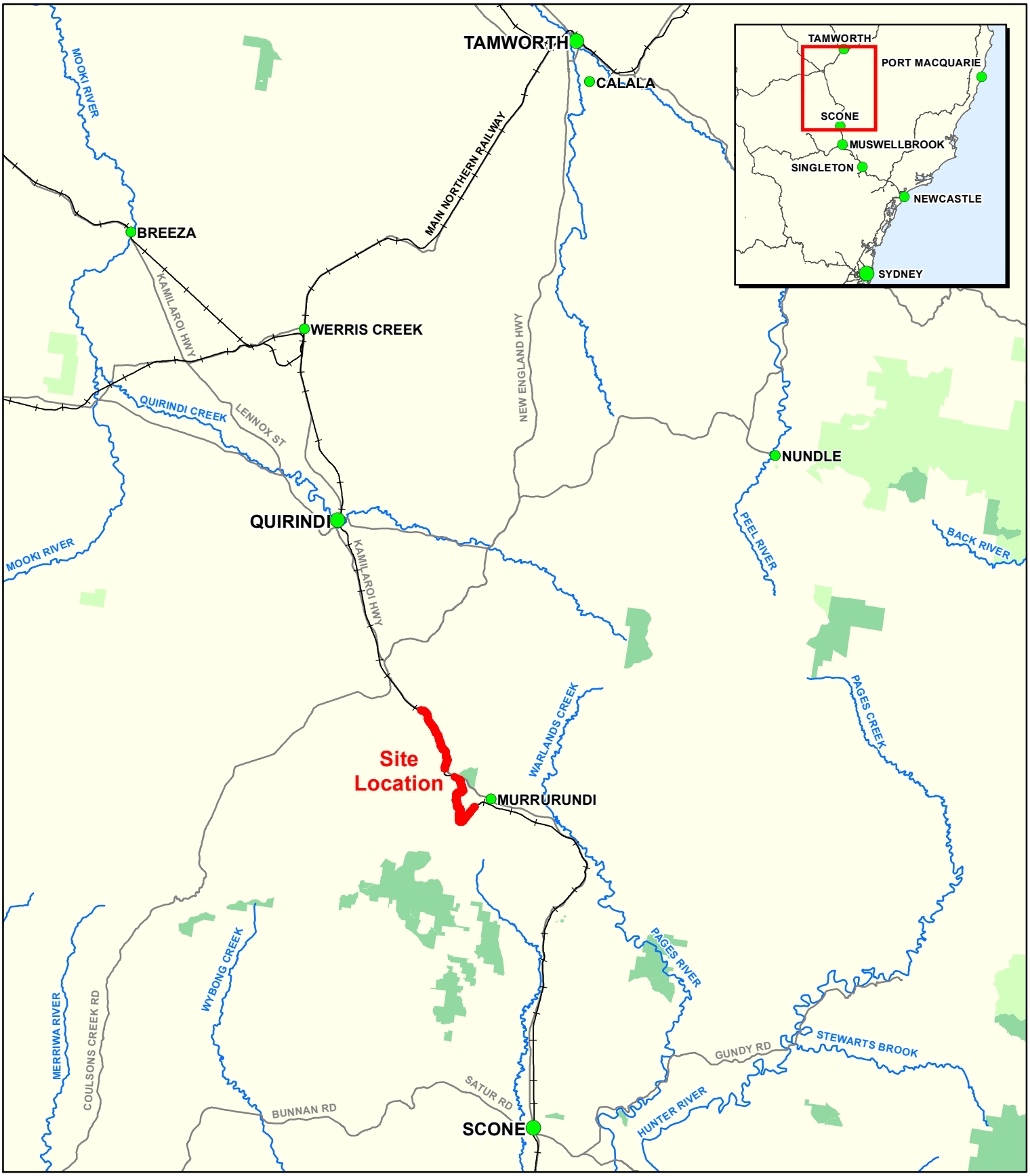
The Project would provide capacity between Willow tree and Murrurundi as follows:

- Willow Tree to Ardglen – 49 mtpa
- Ardglen to Murrurundi – 61 mtpa.

Completion of the Project would thus provide increased rail capacity on the Main North Line and facilitate the expected future increases in coal exports from the region.

1.2. Overview of the Project

ARTC propose to duplicate the existing Main North Line across the Liverpool Range from the northern side of Murrurundi to the southern side of Willow Tree. The duplication would essentially follow the existing alignment at the same grade with the exception of the Ardglen Tunnel which will remain single track and not be duplicated. Similarly, the existing Ardglen passing loop immediately north of Ardglen Tunnel will not require duplication. In the northern section of the Project area there is an existing 600



A4 Original

0 5 10 20

Kilometres

GDA 1994 MGA Zone 56

N

ARTC
Liverpool Range

Location of the Project

Job Number	2110501A
Revision	A2
Date	21.10.2011
Scale	1:500,000

Figure 1.1

\\Auncli\2110501a\LR - Liverpool Ranges\DE_Design\DE06_Design_Doc\Phase_3\Drafting\GIS\Projects\ESRI\2110501B_LRP3_GIS_F003_A2.mxd Author: wilkinsa 24/10/2011

metre long passing loop at Kankool. This loop will require reconditioning (excavation and replacement of fill material) and replacement of timber sleepers with concrete sleepers.

In total, approximately 13 km of new track would be required to complete the duplication (taking into account the existing Ardglen tunnel and passing loops). Construction of the Project would be staged to enable completed sections of track to become operational to incrementally increase rail capacity to meet demand. The Project will include the duplication of track, alteration or creation of permanent vehicular access tracks for maintenance, signalling infrastructure and temporary construction compounds and associated facilities. An overview of the Project components is provided below:

- Track work – approximately 13 km of track consisting of:
  - Nominally five staged loops of varying length (subject to modelling); and
  - 4 turnouts in temporary and permanent locations.
- Signalling – new and changes to existing infrastructure including:
  - Laying new cables;
  - Installation of signals; and
  - Modifications to signalling control systems.
- Civil works including:
  - Road works;
  - Bulk earthworks;
  - Structures (bridges, culverts); and
  - Drainage.
- Environmental works including:
  - Construction controls; and
  - Permanent mitigation measures.

The estimated cost of the Project is $205 million. The Project would be constructed in stages. Currently it is difficult to estimate how long each stage would take to construct, however the entire Project would be constructed in stages as required. More information regarding construction timeframes would be included in the EIS. A more detailed description of the Project is provided in Section 3 of this document.

1.3. Purpose of this Report

This PEA has been prepared to support a State Significant Infrastructure application under Part 5.1 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). The PEA provides the following:

- An overview of the relevant planning legislation and approvals process (Section 2);
- A description of the Project (Section 3);
- A preliminary environmental assessment, strategies to address impacts and a proposed scope for the EIS (Section 4);
- An outline of the proposed stakeholder consultation (Section 5);
- A description of what the Environmental Impact statement (EIS) would address (Section 6); and
- A basis for the receipt of the Environmental Assessment Requirements from the Director-General of the Department of Planning and Infrastructure under Part 5.1 of the EP&A Act, including requirements from other agencies.

2. Statutory and Planning Context

This section provides a discussion of the relevant legislation, including Acts and Environmental Planning Instruments, and provides discussion regarding the approval process for the proposed Project. Discussion in relation to International agreements and NSW State Government Policy of relevance to this Project is also provided.

2.1. Environmental Planning and Assessment Act 1979

The *Environmental Planning and Assessment Act 1979* (EP&A Act) and *Environmental Planning and Assessment Regulation 2000* are the principal pieces of environmental legislation which provide for development planning and control in NSW.

Under *State Environmental Planning Policy (Infrastructure) 2007* (SEPP Infrastructure), development for the purpose of a railway or rail infrastructure facilities (including the proposed Project) may be carried out by or on behalf of a public authority without consent on any land under Part 4 of the EP&A Act.

State Environment Planning Policy (State and Regional Development) 2011 (SEPP State and Regional Development) declares State Significant Infrastructure (SSI) to which development assessment and approval processes under Part 5.1 of the EP&A Act apply. Part 5.1 of the EP&A Act provides a separate, streamlined and integrated development assessment and approval regime for government infrastructure projects of State significance.

Under SEPP State and Regional Development, developments for the purpose of rail infrastructure which are permitted without development consent under Part 4 of the EP&A Act that also satisfy the following requirements, are considered SSI to which Part 5.1 of the EP&A Act applies:

> *"Schedule 3 State significant infrastructure – general*
>
> *3 - Rail infrastructure:*
>
> *Development for the purpose of rail infrastructure by or on behalf of the Australian Rail Track Corporation that has a capital investment value of more than $50 million."*

As the proposed Project is permissible without development consent under Part 4 of the EP&A Act and the estimated capital investment value of the proposed Project is $205 million, the proposed Project will be assessed under Part 5.1 of the EP&A Act.

The Minister for Planning and Infrastructure (the Minister) is the determining authority under Part 5.1 of the EP&A Act and ARTC are required to submit a project application to the Department of Planning and Infrastructure (DoPI). Accompanying the project application, will be this PEA which will be used by DoPI to brief Government agencies about the Project and on which requirements for the preparation of an EIS will be based.

Under Section 115V of the EP&A Act, SSI may be declared to be Critical State Significant Infrastructure (Critical SSI) if it is of a category that, in the opinion of the Minister, is essential for the State for economic, environmental or social reasons. Provisions of the EP&A Act provide a more streamlined assessment process and include restrictions on the availability of appeals for projects declared Critical SSI.

Opinion will be sought as to whether the Project qualifies as Critical SSI and if so a justification will be provided to the Minister.

2.2. Environmental Planning Instruments

State Environmental Planning Policy (State and Regional Development) 2011
SEPP State and Regional Development identifies development that is SSI under Part 5.1 of the EP&A Act. As discussed above, the proposed Project is considered to be a development that falls under SEPP State and Regional Development and the proposed Project is required to be assessed in accordance with the requirements of Part 5.1 of the EP&A Act.

State Environmental Planning Policy (Infrastructure) 2007
SEPP Infrastructure permits rail infrastructure to be carried out on behalf of a public authority without consent on any land (clause 79). Therefore, the proposed Project is permissible. As discussed above, the proposed Project is considered to be SSI under SEPP State and Regional Development and as such approval is required under Part 5.1 of the EP&A Act.

State Environmental Planning Policy No 55 - Remediation of Land

State Environmental Planning Policy No 55 – Remediation of Land (SEPP 55) provides consistent state wide planning and development controls for the remediation of contaminated land. A contamination assessment is being undertaken for the EIS and the applicability of SEPP 55 will be determined in that assessment.

Local Environment Plans
The proposed Project is located within the Upper Hunter Shire Local Government Area (LGA) and the Liverpool Plains LGA. It should be noted that the Upper Hunter Shire Local Environment Plan (LEP) Project will review the three individual LEPs that currently cover the LGA (Scone, Murrurundi and Merriwa) into a consolidated plan. The proposed Project is partly located within the Murrurundi LEP area. Therefore, the current Environmental Planning Instruments relevant to the proposed Project are:

- Murrurundi LEP 1993; and
- Draft Liverpool Plains Shire LEP 2011.

Murrurundi LEP
The majority of the proposed Project is within the existing rail corridor which is within the 5(a) Special Uses Zone (Transport). Other areas adjacent to the railway corridor are zoned:

- 1(c) Rural Small Holdings 'C' Zone
- 2(v) Village "V" Zone

There are numerous heritage listings within the Murrurundi LEP which relate to properties within the Murrurundi town and surrounding area. Most notable in the context of this Project are Ardglen Tunnel (Regional heritage value) and Murrurundi Train Station (Local Heritage Value). The proposed Project area includes the approaches to the Ardglen Tunnel. Further assessment of the impacts associated with the proposed Project on these items will be made in the EIS.

Planning approval from the Upper Hunter Shire Council under the LEP for Murrurundi is not required as the proposed Project is subject to assessment under Part 5.1 of the EP&A Act which prevails over the local planning instrument. However, consideration will be given to the Murrurundi LEP during preparation of the EIS.

Draft Liverpool Plains LEP 2011
Within the Liverpool Plains LGA the proposed Project area and surrounds are zoned RU1 Primary Production. In the draft plan this zone has the main objective of encouraging diversity in primary industry enterprises and systems whilst minimising the fragmentation of the area with other zone classes.

There are numerous heritage listings documented within Liverpool Plains Shire Draft LEP including Local and State significant heritage items. Of relevance to the Project is the Ardglen Tunnel, as discussed above, which is located on the border of the Liverpool Plains and Upper Hunter LGAs.

Planning approval from Liverpool Plains Shire Council under the LEP is not required as the proposed Project is subject to assessment under Part 5.1 of the EP&A Act which prevails over the local planning instrument. However, consideration will be given to the Liverpool Plains Shire LEP in the preparation of the EIS.

2.3. NSW State Legislation

2.3.1. Protection of the Environment Operations Act 1997

The Office of Environment and Heritage (OEH) issues environment protection licences (EPLs) to the owners or operators of railway systems activities under the *Protection of the Environment Operations Act 1997* (POEO Act). The ARTC has an existing EPL (EPL 3142). A project specific EPL will be applied for following project approval.

2.3.2. Other NSW State Legislation

Other NSW State legislation that may be relevant to the proposed Project includes the following:

- Water Management Act 2000;
- Fisheries Management Act 1994;
- Heritage Act 1997;
- Threatened Species Conservation Act 1995;
- Native Vegetation Act 2003;
- National Parks and Wildlife Act 1974;
- Noxious Weeds Act 1993;
- Roads Act 1993;
- Waste Avoidance and Resource Recovery Act 2001;
- Rural Fires Act 1997;
- Occupational Health and Safety Act 2000;
- Land acquisition (Just Terms Compensation) Act 1991;
- Contaminated Land Management Act 1997; and
- Native title (New South Wales) Act 1994.

The extent to which this legislation applies to the proposed Project will be documented in the EIS.

2.3.3. Legislation that does not apply to SSI

Part 5.1 of the EP&A Act overrides the need for certain additional approvals/ permits/ licences/authorisations under certain Acts. Under Section 115ZG of the EP&A Act, the following authorisations are not required for approved SSI:

- The concurrence under Part 3 of the *Coastal Protection Act 1979* of the Minister administering that Part of that Act;
- A permit under section 201, 205 or 219 of the *Fisheries Management Act 1994*;
- An approval under Part 4, or an excavation permit under section 139, of the *Heritage Act 1977*;
- An Aboriginal heritage impact permit under section 90 of the *National Parks and Wildlife Act 1974*;
- An authorisation referred to in section 12 of the *Native Vegetation Act 2003* (or under any Act repealed by that Act) to clear native vegetation or State protected land;
- A bush fire safety authority under section 100B of the *Rural Fires Act 1997*; and
- A water use approval under section 89, a water management work approval under section 90 or an activity approval (other than an aquifer interference approval) under section 91 of the *Water Management Act 2000*.

Division 8 of Part 6 of the *Heritage Act 1977* does not apply to prevent or interfere with the carrying out of approved SSI.

The following directions, orders or notices cannot be made or given so as to prevent or interfere with the carrying out of approved Critical SSI:

- An interim protection order (within the meaning of the *National Parks and Wildlife Act 1974* or the *Threatened Species Conservation Act 1995*);
- An order under Division 1 (Stop work orders) of Part 6A of the *National Parks and Wildlife Act 1974*, Division 1 (Stop work orders) of Part 7 of the *Threatened Species Conservation Act 1995* or Division 7 (Stop work orders) of Part 7A of the *Fisheries Management Act 1994*;
- A remediation direction under Division 3 (Remediation directions) of Part 6A of the *National Parks and Wildlife Act 1974*;
- An environment protection notice under Chapter 4 of the *Protection of the Environment Operations Act 1997*; and
- An order under section 124 of the *Local Government Act 1993*.

2.4. Commonwealth Legislation

Environment Protection and Biodiversity Conservation Act 1999

The Project has been examined in relation to the provisions of the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). At this stage, it is considered likely that the Project will trigger an EPBC Act referral process due to the presence (including potential presence) of threatened species. This will be confirmed when more detailed studies are undertaken as part of the EIS.

Native Title Act 1993

The *Native Title Act 1993* administers processes relating to the recognition, protection and determination of native title and dealings with native title land. Native title is concerned with the rights and interests of Aboriginal and Torres Strait Islander peoples in relation to land and water in Australia and its territories.

An online search of the Native Title Register held by the National Native Title Tribunal undertaken in September 2011 revealed that there are no active native title applications currently pending in Liverpool Plains or Upper Hunter LGAs.

2.5. International Convention and Agreements

JAMBA, CAMBA and ROKAMBA

The first two bilateral agreements relating to the conservation of migratory birds were formed with the Government of Japan in 1974 and the People's Republic of China in 1986.

The Japan-Australia Migratory Bird Agreement (JAMBA) and China-Australia Migratory Bird Agreement (CAMBA) list terrestrial, water and shorebird species which migrate between Australia and the respective countries. In both cases, the majority of listed species are shorebirds.

Both agreements require the parties to protect migratory birds by:

- Limiting the circumstances under which migratory birds are taken or traded;
- Protecting and conserving important habitats;
- Exchanging information; and
- Building cooperative relationships.

The JAMBA also includes provisions for cooperation on the conservation of threatened birds.

In April 2002, Australia and the Republic of Korea agreed to develop a bilateral migratory bird agreement (ROKAMBA) similar to the JAMBA and CAMBA. The ROKAMBA was signed in Canberra on 6 December 2006. The agreement entered into force on 13 July 2007. The ROKAMBA formalises Australia's relationship with the Republic of Korea in respect to migratory bird conservation and provides a basis for collaboration on the protection of migratory shorebirds and their habitat.

All migratory bird species listed in the annexes to the bilateral agreements are protected in Australia as matters of national environmental significance under the EPBC Act. An assessment of the impact of the Project to these bird species will be undertaken as part of the EIS.

2.6. ARTC Code of Practice

As the Project is subject to Part 5.1, Clauses 244D-J of Part 14 of the Environmental Planning and Assessment Regulation 2000 (Special Provisions relating to ARTC) are not relevant. ARTC *Code of Practice for Environmental Impact Assessment of Development Proposals in New South Wales* (ARTC Code of Practice) is made under those clauses and is therefore not applicable to the Project.

2.7. NSW State Government Policy

NSW State Plan

The *NSW State Plan* (NSW Government, 2006) contains a set of goals and identifies priorities for Government action that would help achieve the goals. A review of the goals and the consistency of the Project with the plan will be undertaken in the EIS.

State Infrastructure Strategy

The *State Infrastructure Strategy* (NSW Government, 2008) is a rolling 10 year strategy to plan and fund the infrastructure that supports economic growth and the services that the NSW Government delivers. It is guided by NSW Government agencies', and ARTC's asset management plans, and forms the link between the infrastructure plans detailed in the four forward years of each State budget, the 10 year *NSW State Plan*, and the 25 year metropolitan and regional strategies. The extent to which the infrastructure strategy applies to the Project will be documented in the EIS.

NSW Wetlands Policy

Consistent with the priority on natural resources management in the *NSW State Plan* to deliver better outcomes for native vegetation, biodiversity, land, rivers and coastal waterways, the *NSW Wetlands Policy aims* to provide for the protection, ecologically sustainable use and management of NSW wetlands.

The policy covers all wetlands in the state, including those that are mapped and the many that are yet to be formally identified in recognition of their critical importance in the ecological and hydrological systems of the state's catchments. The extent to which this policy applies to the Project will be included in the EIS.

3. Description of the Project

3.1. Key Design and Operational Features

The purpose of the Liverpool Range Duplication Project is to provide additional rail network capacity to accommodate the future increase in coal traffic from the Gunnedah Basin to the Port of Newcastle.

ARTC propose to duplicate the existing Main North Line across the Liverpool Range from the northern side of Murrurundi to the southern side of Willow Tree (Figure 3.1 a-b). The project area and its extent in relation to the surrounding area and key features are shown in greater detail in Section 4 of this document (Figures 4.1 a-i). It is currently proposed that the duplicated track would be on the eastern side (upside) of the existing track. The duplication would follow the existing alignment at the same grade with the exception of the Ardglen Tunnel which would remain single track and not be duplicated. Similarly, the existing Ardglen passing loop immediately north of Ardglen Tunnel will not require duplication. In the northern section of the Project area there is an existing 600 metre long passing loop at Kankool.

In total, approximately 13 km of new track would be required to complete the duplication (taking into account the existing Ardglen Tunnel and passing loops). At the southern end of the Project the duplication would join the proposed Pages River Loop (construction completion date October 2012) at chainage 355.790. At the northern end of the Project the duplication would join the proposed Chilcotts Creek Loop (construction completion date December 2012) at chainage 371.255. The Project will include the duplication of track, alteration or creation of permanent vehicular access tracks for maintenance, signalling infrastructure and temporary construction compounds and associated facilities.

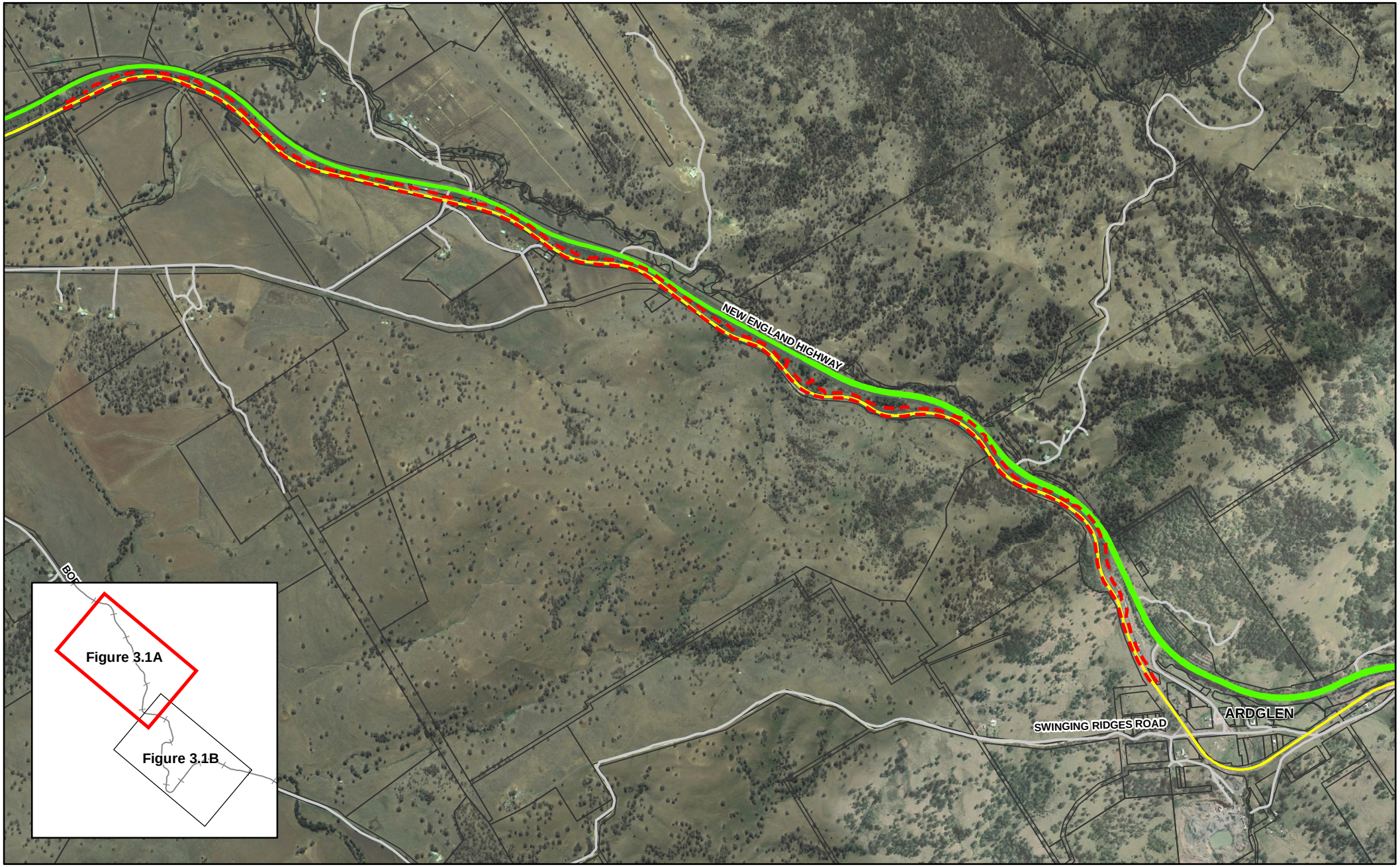
The signalling system will be upgraded to cater for the duplication between the new (proposed) Pages River Loop and the Ardglen Tunnel on the southern side of Liverpool Range and between the existing Ardglen Loop and the new (proposed) Chilcotts Creek Loop on the northern side of the Liverpool Range. The signalling infrastructure will include trenching and cable installation between these limits. It is currently proposed that the signalling cabling would be installed on the eastern side (upside) of the existing and duplicated track.

Signalling infrastructure will also include the signals (a traffic light type structure approximately 3.5 metres high with a concrete base), signalling huts (approximately 12 metres long by five metres wide), location cabinets (approximately 2m high, 1m x 1m wide) track circuits and points machines. The number and location of the required signals and signals huts will be determined during the ongoing design phases of the Project.

The estimated cost of the Project is $205 million.

3.2. Proposed Staging

Construction of the project would be staged to enable completed sections of track to become operational to incrementally increase the rail capacity to meet demand. Five stages split between the southern and northern side of the Liverpool Range (Ardglen Tunnel) have been proposed. The exact stages and timing of delivery of each stage may change in the future depending on the outcome of network capacity modelling and forecast coal output. The proposed staging is illustrated in Figure 3.2.



A4 Original

0 250 500 750

Meters

GDA 1994 MGA Zone 56

Major road
Local Road
Existing Rail
Project Area
Cadastre

ARTC
Liverpool Range

Job Number	2110501B
Revision	A1
Date	13.10.11
Scale	1:25,000

Project Area **Figure 3.1A**

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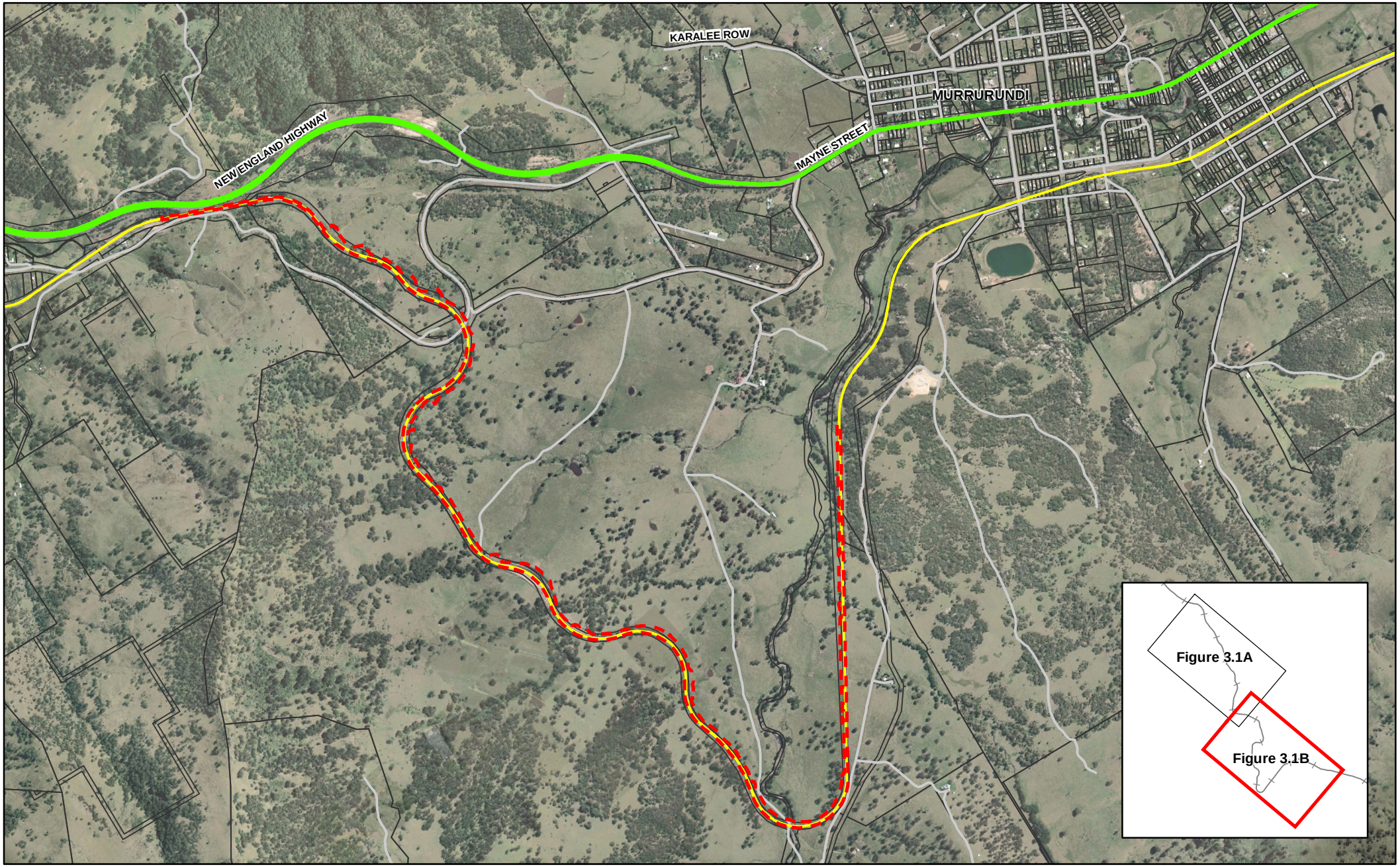

A4 Original

0 250 500 750

Meters

GDA 1994 MGA Zone 56

N

Major road
Local Road
Existing Rail
Project Area
Cadastre

UHVA

ARTC

ARTC
Liverpool Range

Job Number	2110501B
Revision	A1
Date	13.10.11
Scale	1:25,000

Project Area **Figure 3.1B**

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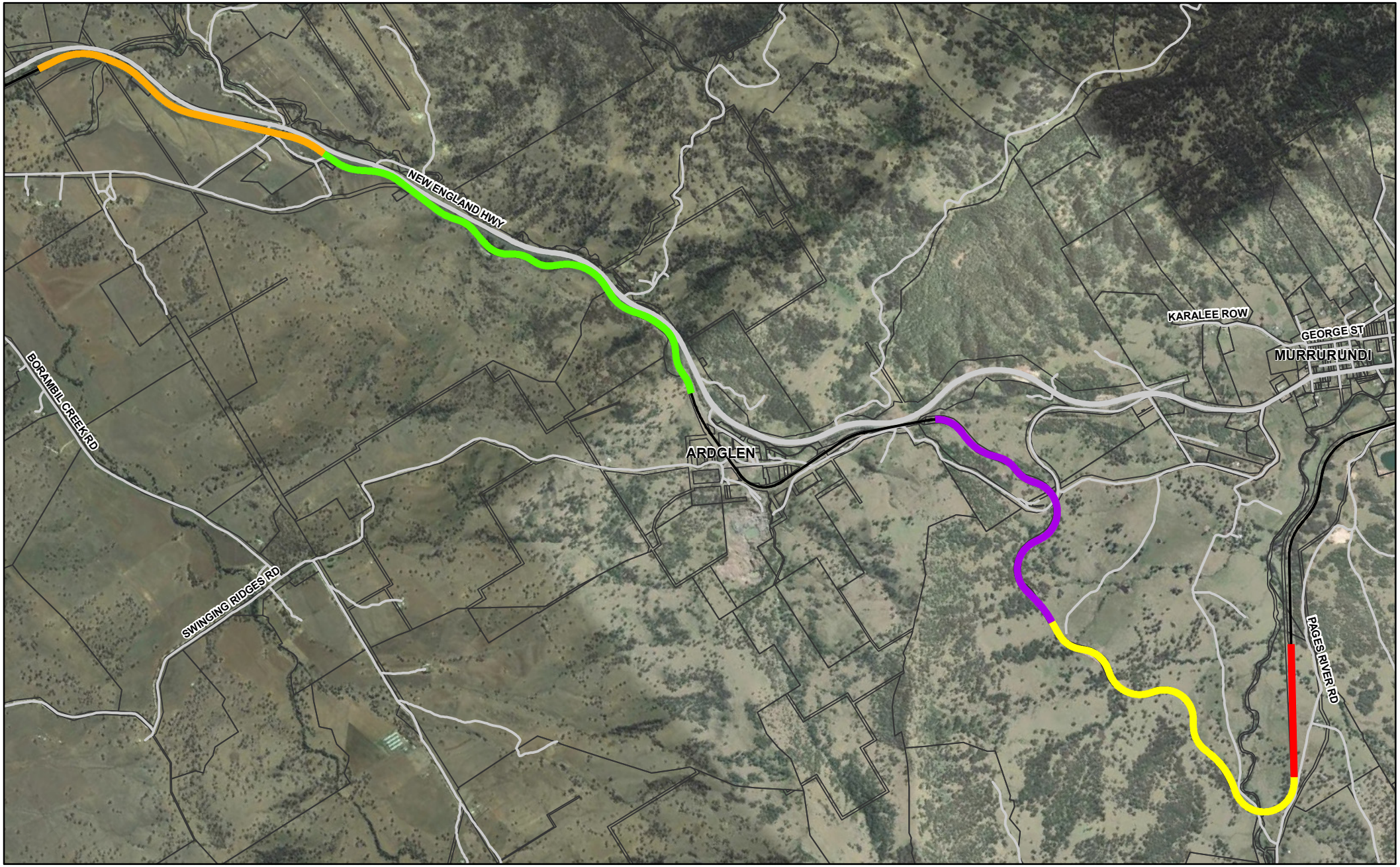

A4 Original

0 0.25 0.5 1 1.5

Kilometres

GDA 1994 MGA Zone 56

N

Local Road
Major road
Existing Rail
Cadastre

Proposed Construction Stages
A
B
C
D
E

UHVA

ARTC

ARTC
Liverpool Range

Job Number	2110501B
Revision	A2
Date	21.10.11
Scale	1:40,000

Proposed Construction Stages **Figure 3.2**

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3.3. Construction Overview

3.3.1. Outline Construction Methodology

The construction period for the Project would depend on the final staging programme developed. The likely sequence and outline of key construction phases and activities would include:

Mobilisation

- Installation of environmental management controls as appropriate;
- Establish permanent and temporary site boundary fencing;
- Weed spraying / removal (if required);
- Establishment of site compounds and site accesses;
- Protection of existing RTA / landholders assets and
- Services relocations (if required).

Earthworks

- Stripping of vegetation and topsoil;
- Bulk earthworks (estimated 37,500 cubic metres of fill required (+/- 20%) ;
- Earth retaining walls;
- Placement of structural and capping layers; and
- Potential slope stability works.

Civil Construction and Track Work

- Modification / replacement of overbridge (Pages River / Chillcotts Creek);
- Modification / repair of existing culvert extensions;
- Construction of retaining walls;
- Placement of ballast, laying of new track;
- Trenching, erection and connection of signalling equipment; and
- Removal / alterations to access crossing.

Demobilisation and Rehabilitation

- Demobilisation of site compounds, including the removal of stockpiles;
- Rehabilitation of excavated and filled areas;
- Removal of protection for RTA / landowners assets;
- Relocation of boundary fences (where required) and
- Removal of erosion and sediment control devices.

3.3.2. Plant and Equipment

Table 3.1 lists the anticipated construction plant and equipment to be used during construction. Other critical plant may be utilised to undertake specific tasks such as piling if required.

Table 3.1 Construction Plant and Equipment

Construction Plant and Equipment		
Concrete truck	Generator	Tamping machine
Concrete vibrator	Pump	Ballast regulator
Concrete pump	Front end loader	Rail cutting equipment
Crane (various types and sizes)	Grader	Rail welding equipment
Hydraulic mobile crane	Vibratory roller	Rail grinder
Excavator (various sizes)	Semi trailer/tipper/ truck and dog	'Hi-rail' vehicle
Backhoe	Dump truck	Bulldozer
Scraper	Water Cart	ADT

3.3.3. Working Hours and Track Possessions

Standard construction hours would be adopted - 7am to 6pm Monday to Friday and 8am to 1pm on Saturdays. Work conducted outside of standard working hours would be undertaken in accordance with any relevant conditions of an Environmental Protection License (EPL) that would be obtained prior to construction commencing. The requirement for out of hours works may arise due to delivery of oversized materials, safety critical works or works during rail possessions. Measures to reduce potential impacts from out of hours works would be identified during the construction noise impact assessment.

A number of scheduled track possessions would be required to facilitate connection of the new staged sections of track to the existing track.

3.3.4. Ancillary Facilities

A primary construction site compound would be established on ARTC land or adjoining land. The compound would be used for the site office, amenities and storage of minor equipment. Secondary site compounds will also be required. Entry and exit to these sites would be further investigated as part of the concept design process and documented in the EIS. Currently it is anticipated that the following access (from south to north) to the rail corridor would be utilised during construction:

- Existing rail compound adjacent to Murrurundi Station;
- Boyd Street at Murrurundi;
- Pages River Road (via Boyd Street);
- Old New England Highway (via New England Highway 1.5 kilometres north of Murrurundi);
- At Ardglen:
    - Old New England Highway to the north; and
    - Main Street to Old New England Highway to the south.
- Glenyalla Road (500 metres north of Kankool) via level crossing; and
- New access point off New England Highway (1.5 kilometres south of Kankool).

3.3.5. Public Utility Adjustment

No significant utilities adjustments have been identified at this stage. Various signalling and drainage infrastructure owned by ARTC would be modified as part of the Project.

3.3.6. Interaction with Existing and Proposed Infrastructure

The design of the Project has taken into consideration other works on the Main North Line. In particular, the Project will join the proposed passing loops of Pages River and Chilcotts Creek at the southern and northern extents of the duplication respectively. The proposed Pages River and Chilcotts Creek projects are being assessed under Part 5 of the EP&A Act.

It is noted that the Queensland Hunter Gas Pipeline (QHGP) project has identified a route in proximity to the Main North Line in the vicinity of Ardglen. Furthermore, the general pipeline route crosses the existing Main North Line at locations in proximity to Ardglen and Murrurundi. The QHGP project has identified that there would be ongoing consultation with ARTC during their detailed design phase to minimise potential impacts to railway infrastructure and this would include submission of detailed design plans for each proposed railway crossing. The QHGP project have indicated that crossings of the rail lines are likely to be via a horizontal bore or horizontal directional drilling. Consultation between QHAP and the project team has commenced.

3.3.7. Property Acquisition

Construction of the Project and associated infrastructure is likely to require some strip acquisition of land on the eastern (upside) adjacent to the existing rail corridor. On the southern side of Ardglen Tunnel there are two main properties where land acquisition is likely to be required. This includes one private landholding and an area of land identified as the Murrurundi Commons (ownership identified as the Murrurundi Common Trust). Depending on the design of the bridge at the Pages River crossing acquisition from an additional landowner may be required.

On the northern side of the Ardglen Tunnel areas of strip acquisition are likely to be required in the section where the rail line is in proximity to the New England Highway (RTA owned land).

The extent of potential land acquisition will be determined during the design process and will be addressed within the EIS. Negotiations would also be held with relevant landowners for the temporary use of their land during construction, for example for secondary site compounds, sediment control devices or other project requirements if required.

3.4. Options Considered

ARTC has developed and implemented a project management system (PP-157) which guides the staged development and approval of proposed infrastructure projects. The six main stages are as follows:

- Concept assessment;
- Project feasibility;
- Project assessment;
- Project approval;
- Project implementation (construction and commissioning); and
- Project close-out.

Environmental, engineering and economic considerations are integrated into every stage of the above process and a hold point at a number of levels of approval are required prior to progression to the next phase. As referred to in Section 2.7, the ARTC Code of Practice also provides specific guidance on the environmental assessment requirements for various classes of projects which align with each of these project phases. Part 5.1 projects are not addressed by the Code as the environmental assessment requirements and processes are specified in legal statute.

ARTC initially considered seven alignment options (two ‘surface options’, four ‘tunnel options’ and a ‘duplication of existing’ option) for operational modelling and environmental and economic analysis. The key characteristics of each of the options are summarised in Table 3.2.

Table 3.2 Key Characteristics of Options

Option Type	Option	Location	Description	Estimated Capacity (mtpa)	Comments/Issues
Surface option	Option 1- *Borambil Creek surface alignment*	Willow Tree	The Borambil Creek surface alignment commences from just south of Willow Tree and approximately follows Borambil Creek to the foothills of the Liverpool Range. It then swings around in a large horseshoe and passes through a short tunnel in the vicinity of Swinging Ridges Road. It crosses over the top of the existing railway to the north of Ardglen and then levels out before joining the existing alignment just to the north of Ardglen Tunnel.	>90	• Extensive land acquisition • Reduced grade
Surface option	Option 2- *Doughboy Hollow surface alignement*	North of Willow Tree	The Doughboy Hollow surface alignment commences approximately 6.9 kilometres North of Willow Tree and proceeds largely parallel to the existing alignment to Ardglen. Note that this option also includes a duplication of the existing alignment from the Southern Portal of Ardglen Tunnel to Murrurundi.	>90	• Extensive land acquisition • Reduced grade
Tunnelling Option	Option 3- *Western Tunnel*	Similar to Borambil Creek	The Western Tunnel option follows a similar alignment to the Borambil Creek surface alignment as it heads south from Willow Tree. When it reaches the foot of the Liverpool Range it enters into a tunnel which re-emerges to the south-west of the existing alignment, which it joins in the vicinity of the crossing of the Pages River.	>200	• Extensive land acquisition • High cost of tunnelling • Reduced grade
Tunnelling Option	Option 4- *Central Tunnel*	Similar to Borambil	The Central Tunnel option is again similar to the Borambil Creek surface alignment for the first section heading south from Willow Tree. It turns south-east somewhat sooner than the Western Tunnel option. The tunnel re-emerges around half-way down the grade between the existing Ardglen Tunnel and Murrurundi. This requires it to pass underneath the existing rail line which it then connects to on the Northern outskirts of Murrurundi.	>200	• Extensive land acquisition • High cost of tunnelling • Highest construction risk option • Least preferred geotechnical conditions for tunnelling • Reduced grade
Tunnelling Option	Option 5 – *Eastern tunnel HIGH*	Follows existing alignment but on the other side of	The Eastern Tunnel - High option follows the existing rail alignment on the Western side of the Range quite closely, though on the other side of the New England highway,	>200	• Extensive land acquisition

Option Type	Option	Location	Description	Estimated Capacity (mtpa)	Comments/Issues
		the New England Highway	closer to the base of the valley. It re-emerges to the east of the existing rail line and reconnects to it at Murrurundi.		• High cost of tunnelling • Geotechnically preferred tunnel alignment • Reduced grade
Tunnelling Option	Option 6 - *Eastern tunnel LOW*	Similar to Eastern Tunnel High	The Eastern Tunnel - Low option was designed to offer the lowest feasible elevation. It generally follows the Eastern Tunnel - High, but enters into tunnel not far south of Chilcotts Creek.	>200	• Extensive land acquisition • Highest capital cost option • High cost of tunnelling for only incremental capacity gain • Reduced grade
Duplication Option	Option 7 - *Duplication*	Existing alignment	The duplication of the existing alignment option involves duplicating the existing Main Northern Line from just South of Willow Tree to the Northern Portal of the Ardglen Tunnel and then from the Southern Portal of Ardglen Tunnel to Murrurundi.	>50	• least (relative) amount of environmental and social impact • Strip acquisition required (two main landowners, including the Roads and Traffic Authority) • No tunnelling required

ARTC used criteria that included cost, property acquisition, geotechnical issues, regulatory approvals, constructability, operations and environmental issues to rank the sites in order to select a preferred option. Following this, Option 7 was selected as the preferred option based on:

- Ability to stage construction and allow for incremental increases in capacity and capital expenditure in line with the required capacity increases;
- Relatively low cost per kilometre of track;
- Ease of property acquisition (RTA being the main landholder); and
- Relative ease of construction when compared to other options.

The PEA was subsequently conducted on the preferred option.

4. Preliminary Environmental Assessment

This section provides a preliminary environmental assessment for the Project as described in Section 3. The assessment includes a description of the existing environment, potential impacts as a result of the Project, the proposed scope of further assessment and identification of mitigation measures to reduce the potential impacts.

The Project area assessed in the EIS may be smaller than that presented in this PEA depending on the progression of the detailed design and construction methodology.

Those issues where detailed investigations are considered necessary are identified and referred to as the key environmental issues relating to the Project. Other issues requiring assessment which are expected to be satisfactorily managed through the adoption of best practice or standard environmental mitigation measures are also documented in this section. The detailed Project area and key environmental features are illustrated in Figure 4a-i.

4.1. Key Issues

4.1.1. Ecology

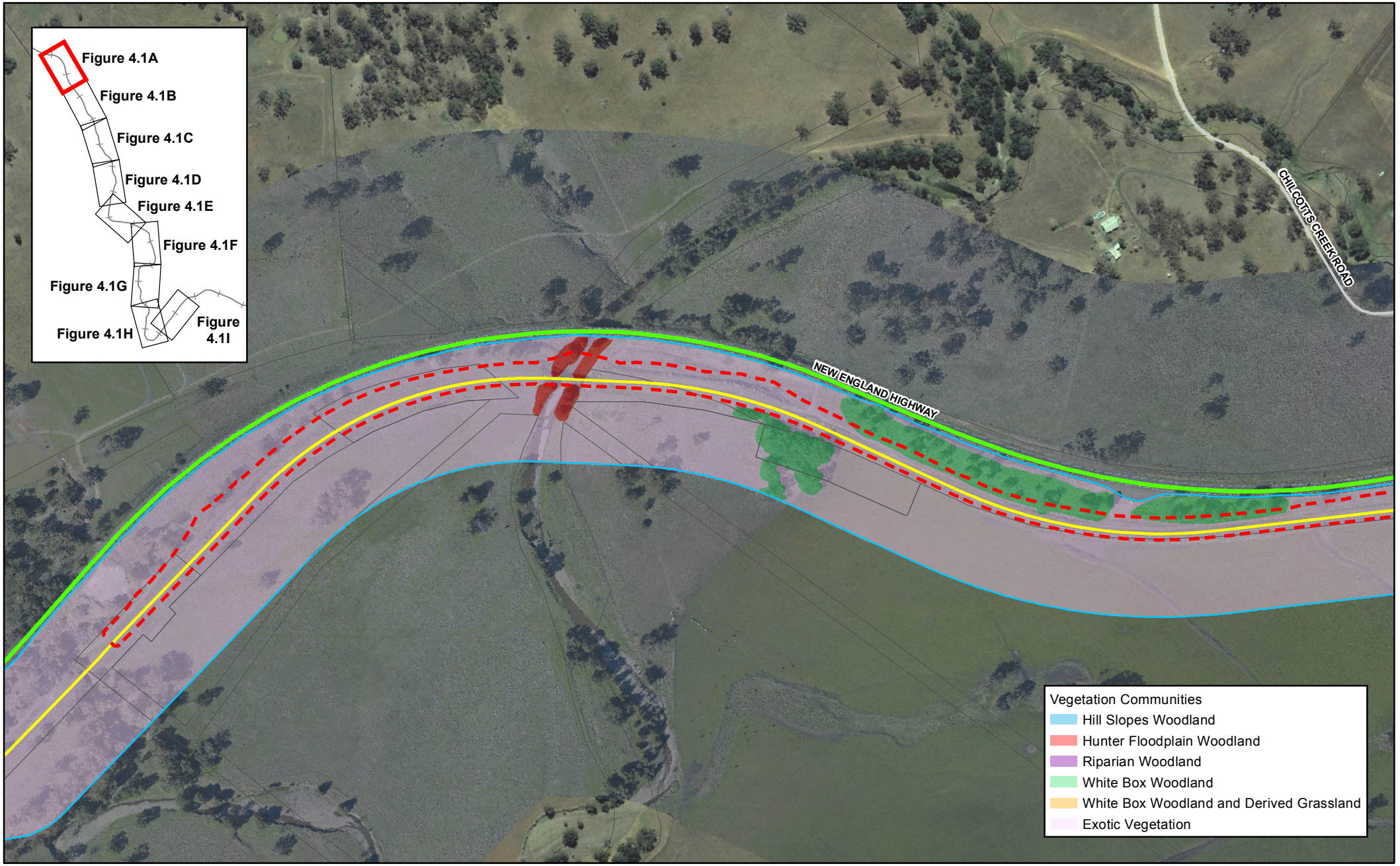
Existing environment

The majority of the Project is located within rural land consisting of pastures and patches of remnant vegetation. A site inspection to gain an understanding of the ecological characteristics of the Project area has been undertaken.

Four vegetation communities were identified within the Project area, with only three likely to occur within the rail corridor itself (see Table 4.1). The majority of the rail corridor consists of vegetation classified as 'Weed-dominated vegetation community' and is dominated by exotic species and has little conservation value. One native vegetation community, White Box Woodland, occurs as scattered small patches within the rail corridor, while some small patches of Hill slopes Woodland occur within the rail corridor but otherwise occurs largely outside of the potential impact area. Hunter Floodplain Red Gum Woodland occurs in areas adjoining the rail corridor. Further survey is required to confirm that Hunter Floodplain Red Gum Woodland does not occur within the rail corridor.

Table 4.1 Summary of vegetation communities within the Project area

Vegetation / habitat type	Location	Dominant species	Conservation value of vegetation community
Weed dominated	The dominant vegetation type within the rail corridor.	Variety of exotic pasture grasses, and exotic herbs including *Sorghum bicolour, Paspalum dilatatum, Foeniculum vulgare, Verbena spp., Gomphocarpus sp., Chloris gayana, Hyparrhenia hirta.*	Low. May provide marginal habitat for a limited number of threatened fauna species.



*Vegetation areas outside the corridor where not accessed and mapping in this area is based on API and survey from within the corridor. Vegetation mapping is subject to further detailed site investigations.

A4 Original

0 25 50 100 150 200

Metres

GDA 1994 MGA Zone 56

Existing Alignment
Major Road
Local Road
Project Area
Heritage Site
Study Area
Cadastre

ARTC
Liverpool Range

Job Number	2110501B
Revision	A3
Date	24.10.11
Scale	1:6,000

Key Environmental Features **Figure 4.1A**

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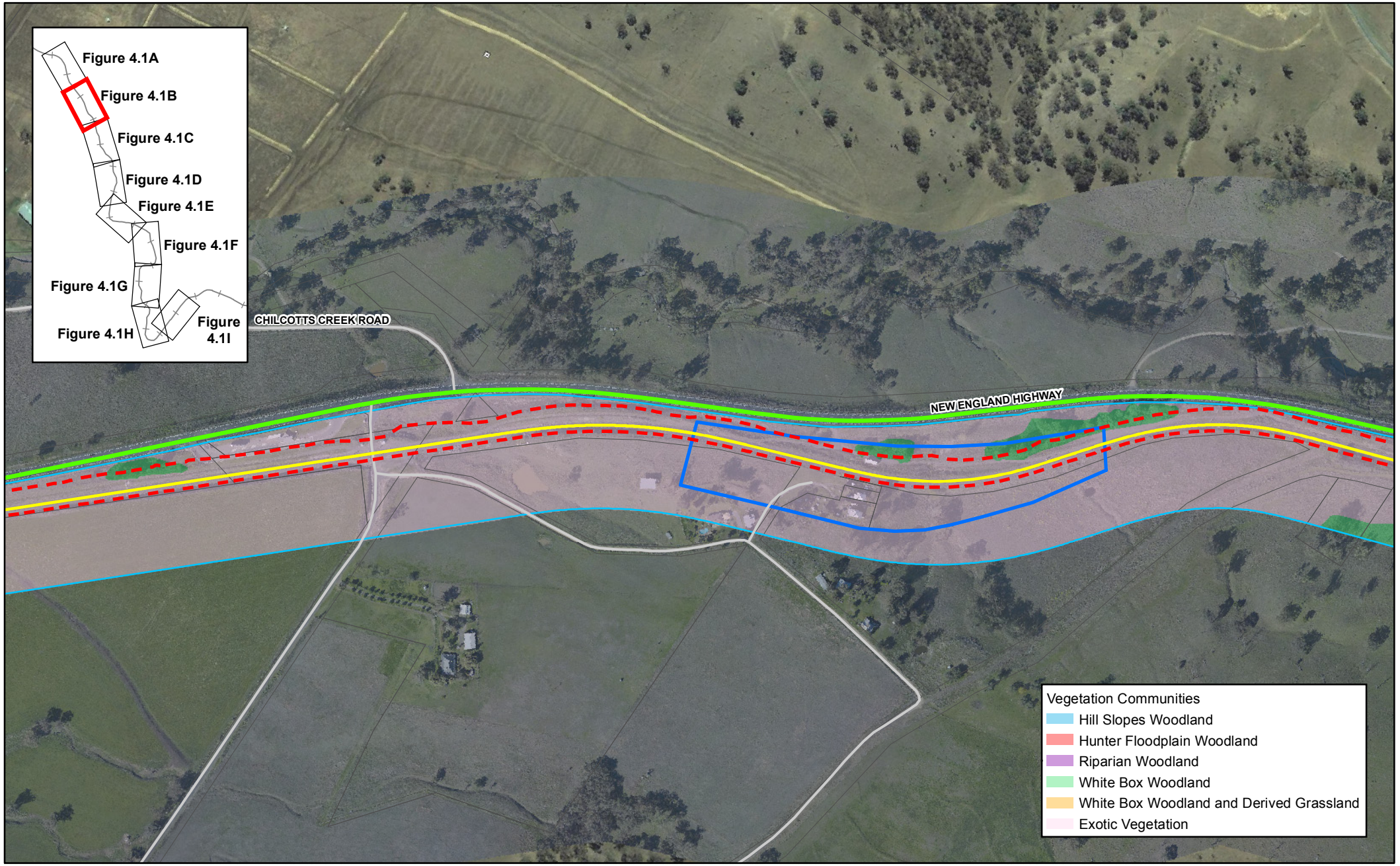

*Vegetation areas outside the corridor where not accessed and mapping in this area is based on API and survey from within the corridor. Vegetation mapping is subject to further detailed site investigations.

A4 Original

0 25 50 100 150 200

Metres

GDA 1994 MGA Zone 56

N

Existing Alignment
Major Road
Local Road
Project Area
Heritage Site
Study Area
Cadastre

UHVA

ARTC

ARTC
Liverpool Range

Job Number	2110501B
Revision	A3
Date	24.10.11
Scale	1:6,000

Key Environmental Features **Figure 4.1B**

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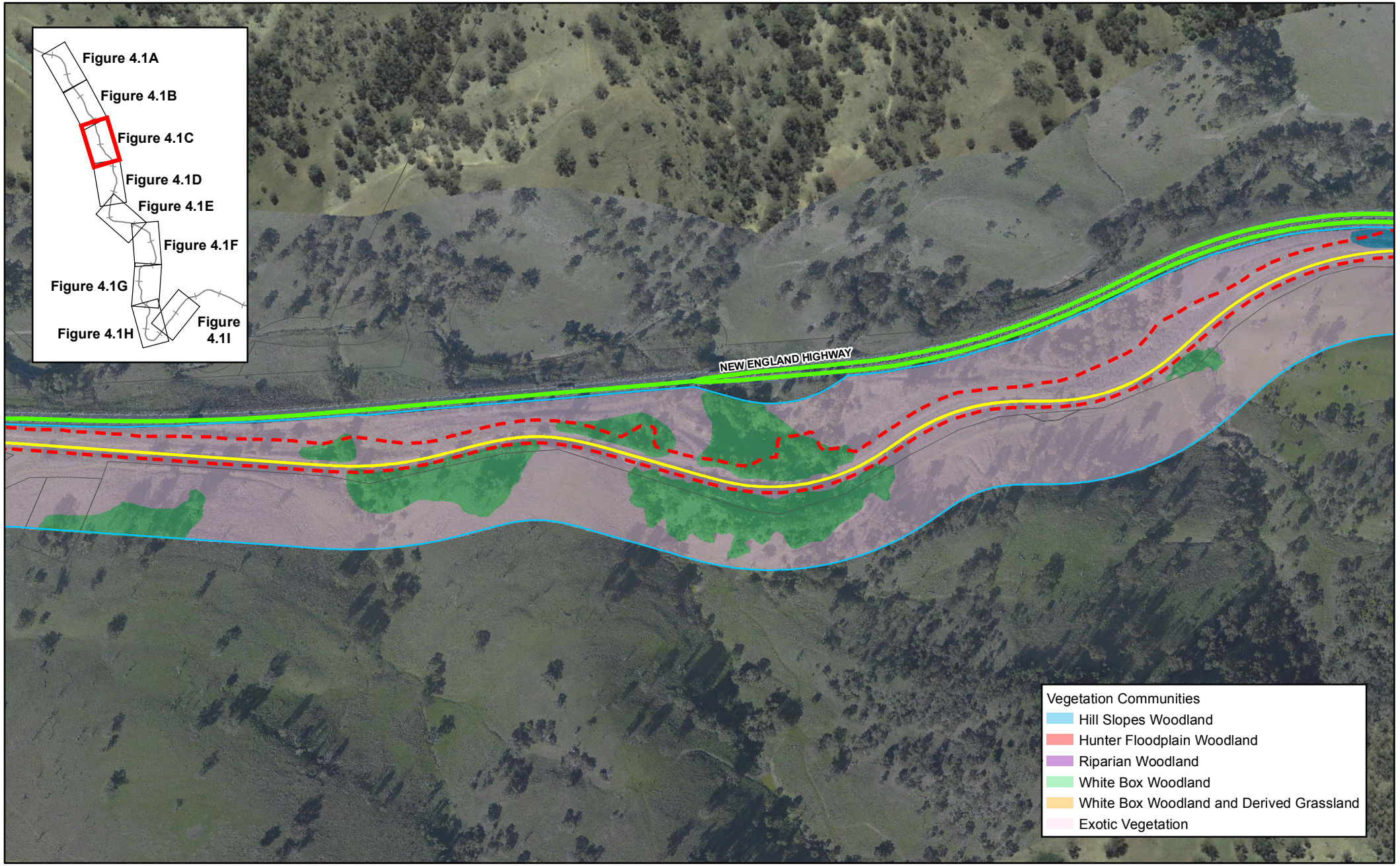

*Vegetation areas outside the corridor where not accessed and mapping in this area is based on API and survey from within the corridor. Vegetation mapping is subject to further detailed site investigations.

A4 Original

0 25 50 100 150 200

Metres

GDA 1994 MGA Zone 56

N

Existing Alignment
Major Road
Local Road
Project Area
Heritage Site
Study Area
Cadastre

UHVA

ARTC

ARTC
Liverpool Range

Job Number	2110501B
Revision	A3
Date	24.10.11
Scale	1:6,000

Key Environmental Features **Figure 4.1C**

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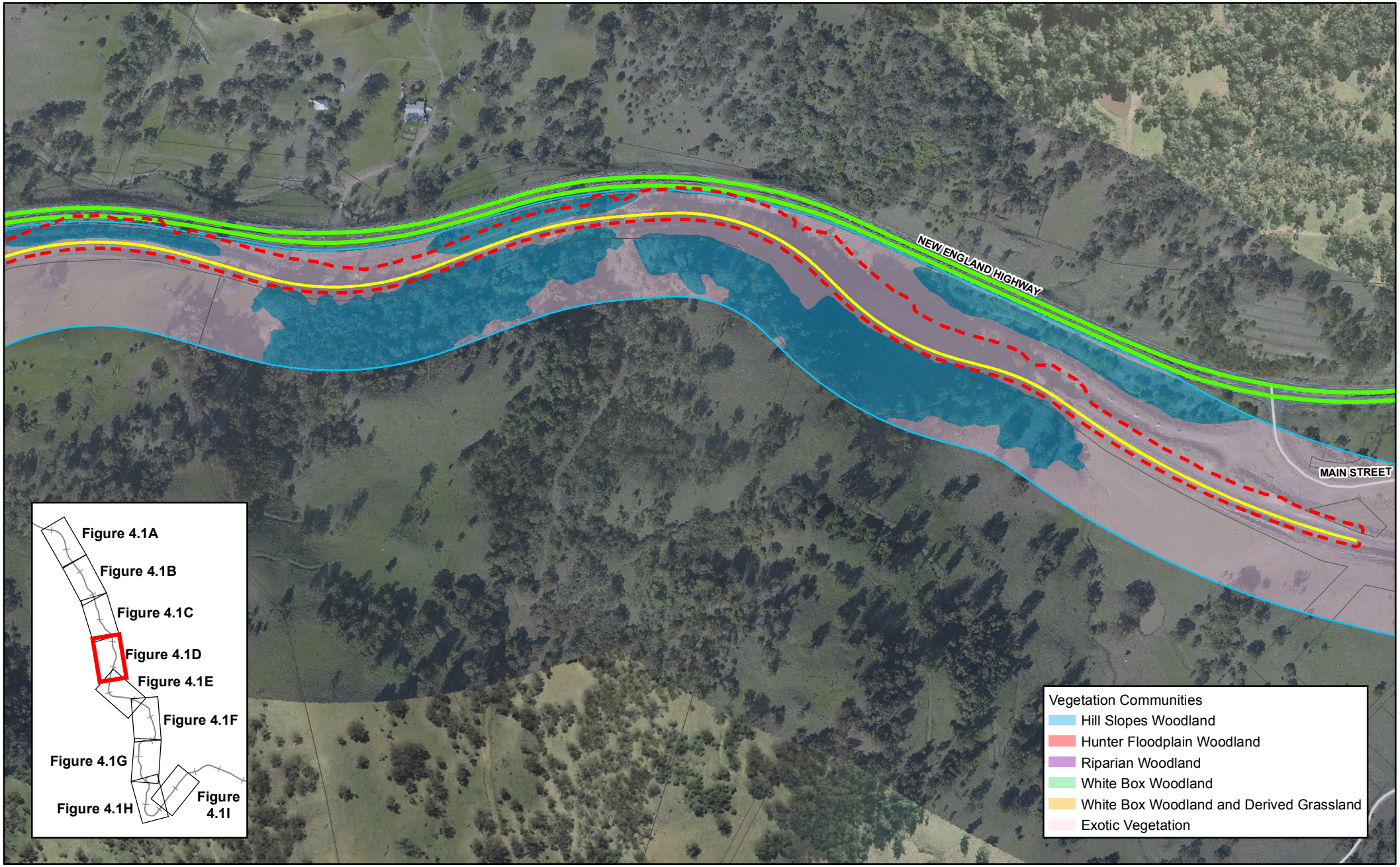

*Vegetation areas outside the corridor where not accessed and mapping in this area is based on API and survey from within the corridor. Vegetation mapping is subject to further detailed site investigations.

A4 Original

0 25 50 100 150 200

Metres

GDA 1994 MGA Zone 56

N

Existing Alignment
Major Road
Local Road
Project Area
Heritage Site
Study Area
Cadastre

UHVA

ARTC

ARTC
Liverpool Range

Job Number	2110501B
Revision	A3
Date	24.10.11
Scale	1:6,000

Key Environmental Features **Figure 4.1D**

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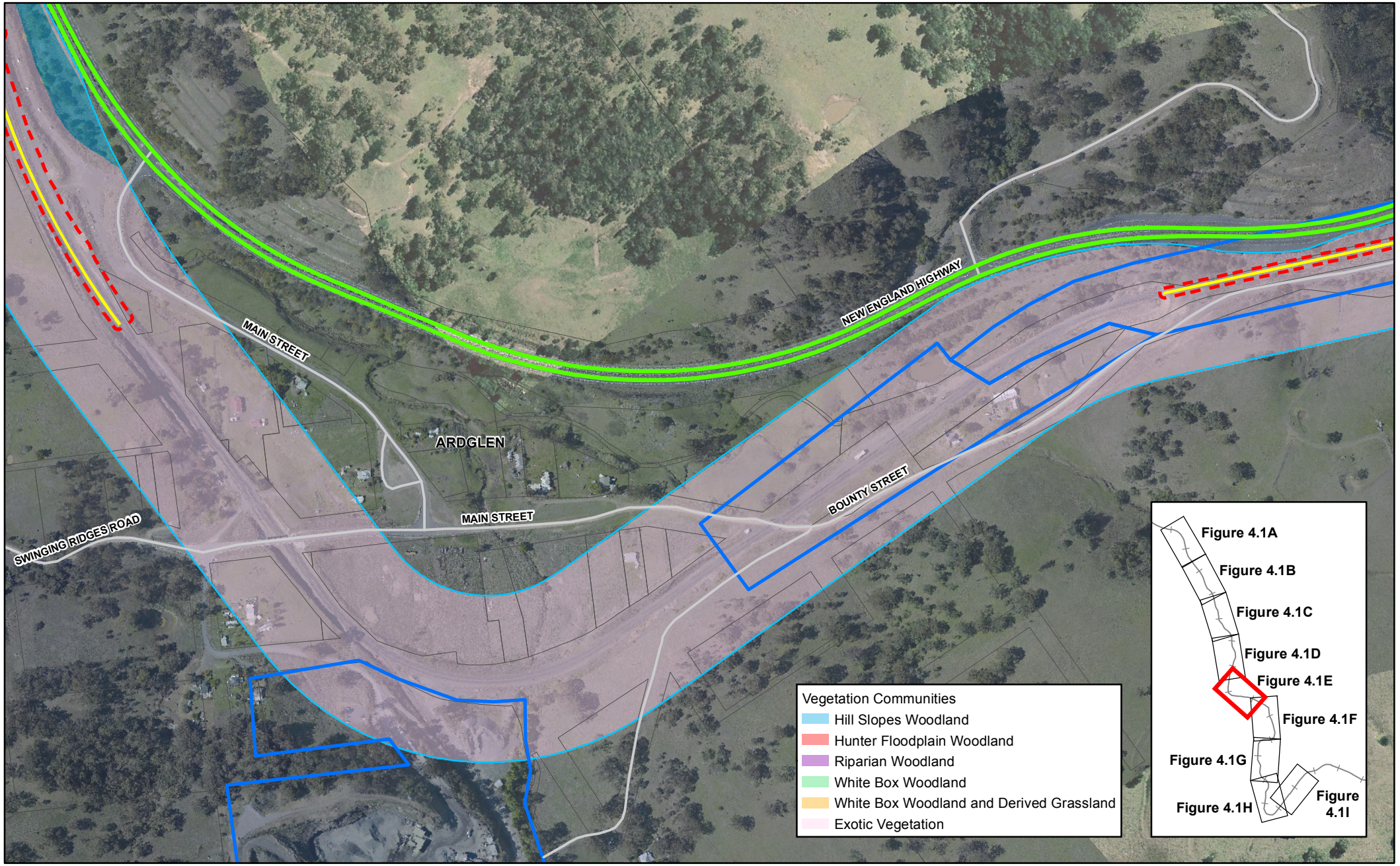

*Vegetation areas outside the corridor where not accessed and mapping in this area is based on API and survey from within the corridor. Vegetation mapping is subject to further detailed site investigations.

A4 Original

0 25 50 100 150 200

Metres

GDA 1994 MGA Zone 56

Existing Alignment
Major Road
Local Road
Project Area
Heritage Site
Study Area
Cadastre

ARTC
Liverpool Range

Job Number	2110501B
Revision	A3
Date	24.10.11
Scale	1:6,000

Key Environmental Features **Figure 4.1E**

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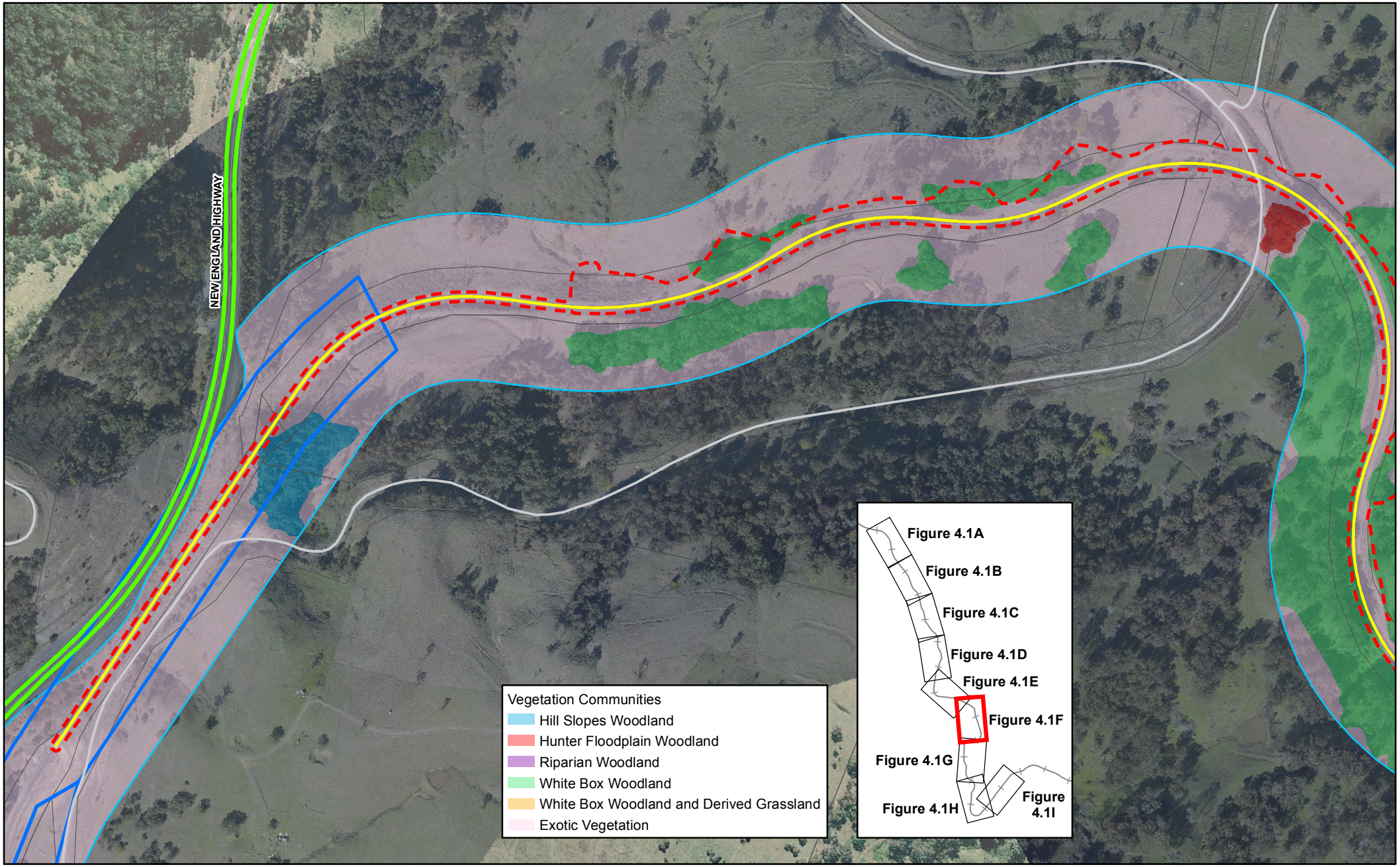

*Vegetation areas outside the corridor where not accessed and mapping in this area is based on API and survey from within the corridor. Vegetation mapping is subject to further detailed site investigations.

A4 Original

0 25 50 100 150 200

Metres

GDA 1994 MGA Zone 56

N

Existing Alignment
Major Road
Local Road
Project Area
Heritage Site
Study Area
Cadastre

UHVA

ARTC

ARTC
Liverpool Range

Job Number	2110501B
Revision	A3
Date	24.10.11
Scale	1:6,000

Key Environmental Features **Figure 4.1F**

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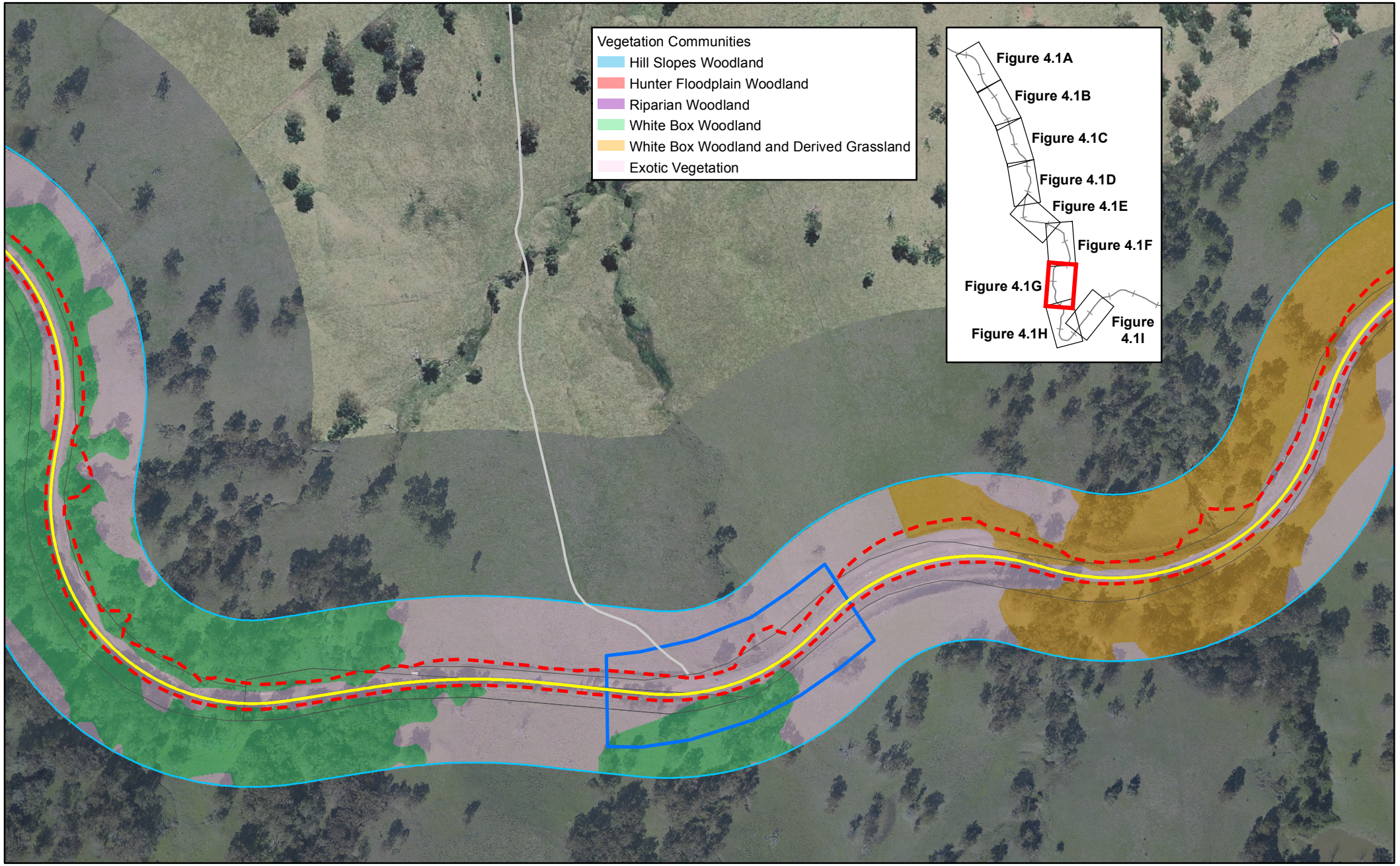

*Vegetation areas outside the corridor where not accessed and mapping in this area is based on API and survey from within the corridor. Vegetation mapping is subject to further detailed site investigations.

A4 Original

0 25 50 100 150 200

Metres

GDA 1994 MGA Zone 56

Existing Alignment
Major Road
Local Road
Project Area
Heritage Site
Study Area
Cadastre

ARTC
Liverpool Range

Job Number	2110501B
Revision	A3
Date	24.10.11
Scale	1:6,000

Key Environmental Features **Figure 4.1G**

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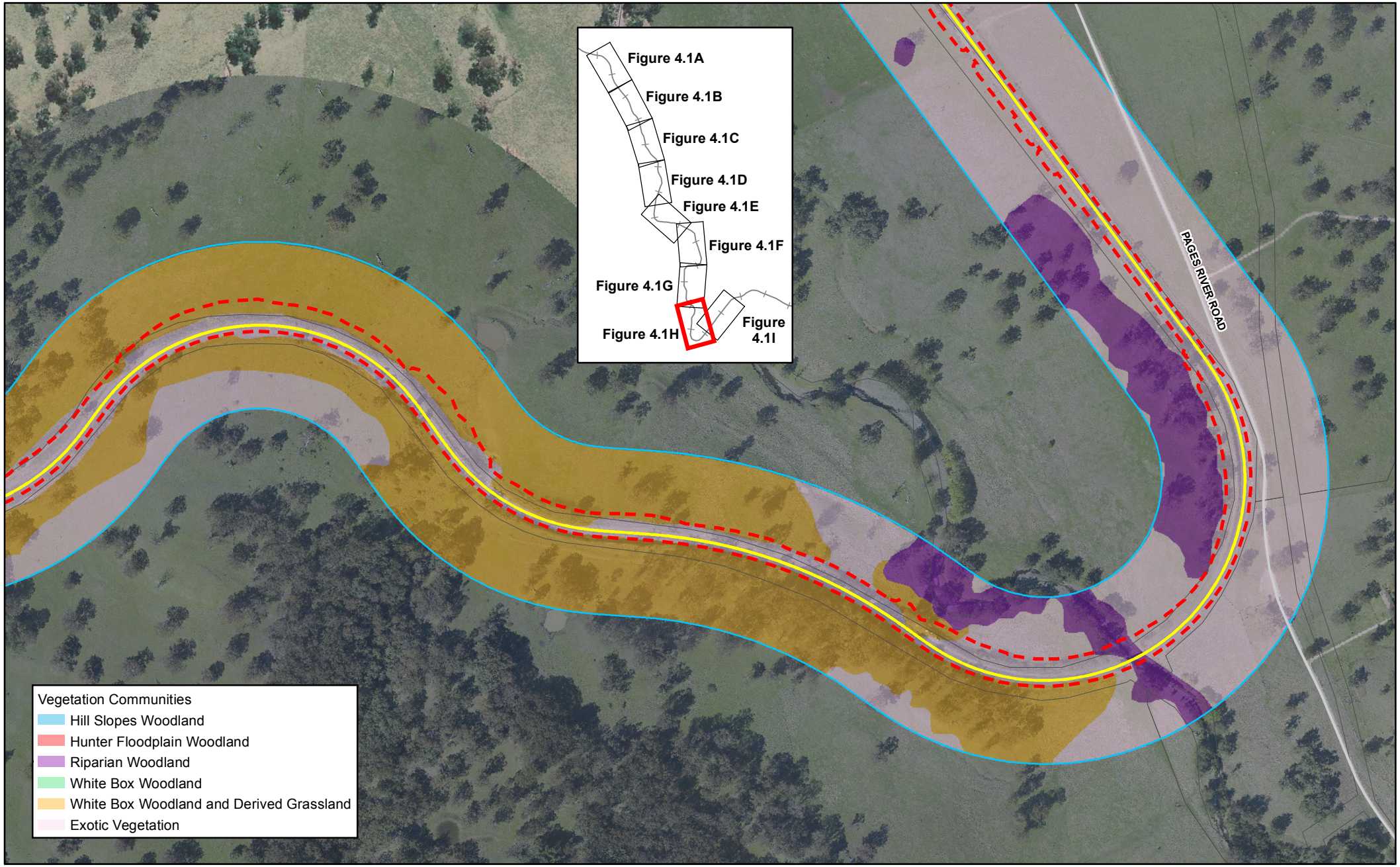

*Vegetation areas outside the corridor where not accessed and mapping in this area is based on API and survey from within the corridor. Vegetation mapping is subject to further detailed site investigations.

A4 Original

0 25 50 100 150 200

Metres

GDA 1994 MGA Zone 56

N

Existing Alignment
Major Road
Local Road
Project Area
Heritage Site
Study Area
Cadastre

UHVA

ARTC

ARTC
Liverpool Range

Job Number	2110501B
Revision	A3
Date	24.10.11
Scale	1:6,000

Key Environmental Features **Figure 4.1H**

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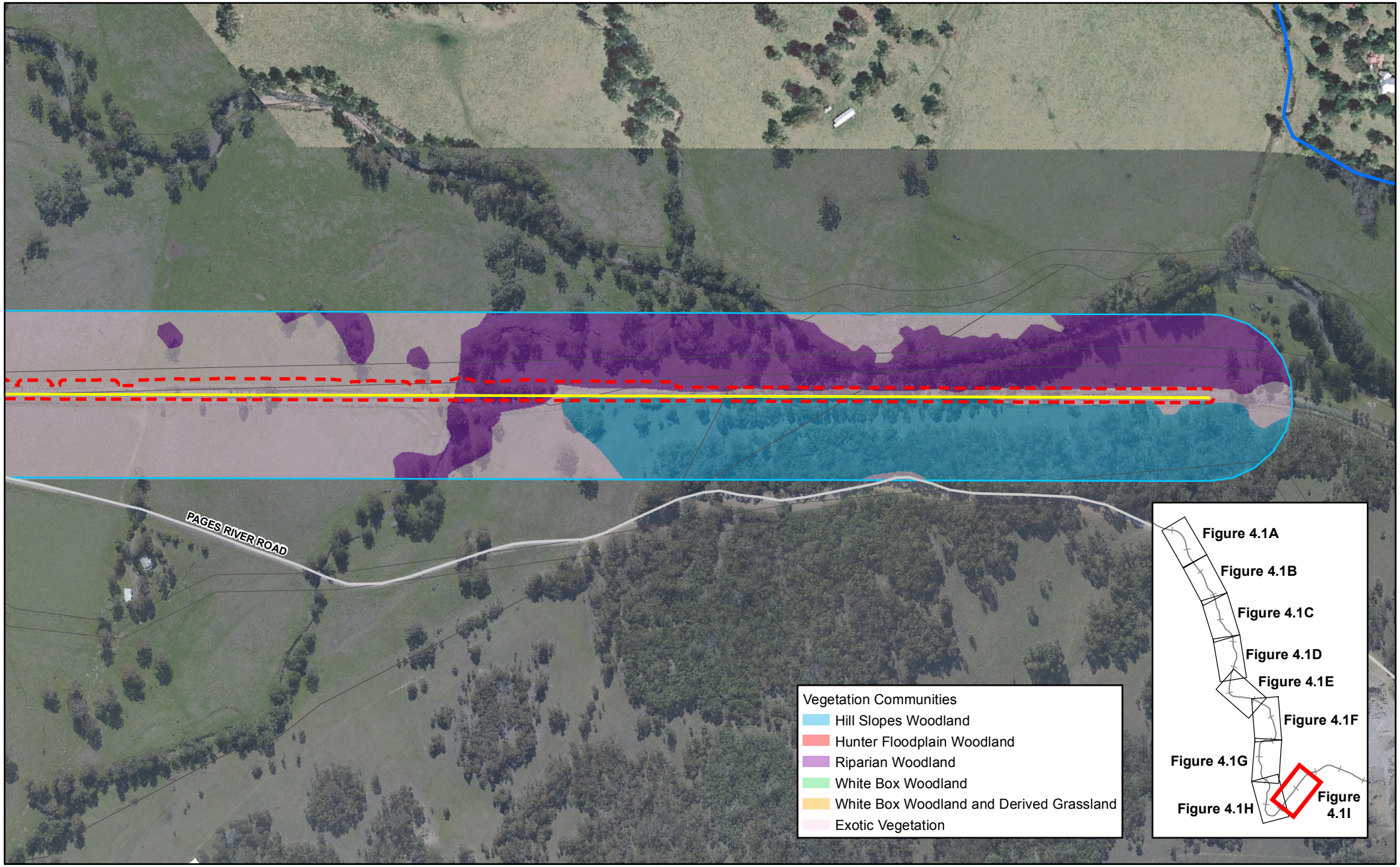

*Vegetation areas outside the corridor where not accessed and mapping in this area is based on API and survey from within the corridor. Vegetation mapping is subject to further detailed site investigations.

A4 Original

0 25 50 100 150 200

Metres

GDA 1994 MGA Zone 56

Existing Alignment
Major Road
Local Road
Project Area
Heritage Site
Study Area
Cadastre

ARTC
Liverpool Range

Job Number	2110501B
Revision	A3
Date	24.10.11
Scale	1:6,000

Key Environmental Features **Figure 4.1I**

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Vegetation / habitat type	Location	Dominant species	Conservation value of vegetation community
Hunter Floodplain Red Gum Woodland	Located on lower slopes and adjacent to the Pages River. This vegetation community is generally outside the rail corridor.	*Casuarina cunninghamiana, Angophora floribunda, Eucalyptus camaldulensis, Eucalyptus tereticornis*	Listed as an Endangered community under the *Threatened Species Conservation Act 1995* (TSC Act) also contains *Eucalyptus camaldulensis* endangered population (on lower slopes outside corridor).
White Box Woodland	This community occurred as small fragmented patches throughout the rail corridor. The understorey varied from exotic dominated to grassy native understorey.	*Eucalyptus albens, Eucalyptus melliodora, Angophora floribunda,* grassy understorey of exotics, and natives such as *Dichanthium sericeum* and *Bothriochloa decipiens*	Listed as an Endangered community under the *Threatened Species Conservation Act 1995* (TSC Act) and as a Critically Endangered ecological community under the *Environment Protection Biodiversity and Conservation Act 1999* (EPBC Act). Further assessment of the remnants will be required to determine if all of the patches meet the EPBC Act criteria for this community.
Hill slopes woodland	Largely outside the rail corridor, on the southern side, between Pages River and Ardglen.	*Eucalyptus macrorhyncha, Angophora floribunda, Eucalyptus laevopinia*	This community is not listed on either the TSC Act nor the EPBC Act .

A range of threatened biodiversity and other species of conservation concern have been identified from database searches as having been recorded, or considered likely to occur, within the local area. Based on the presence of suitable habitat, four flora species and 21 fauna species listed under the TSC Act and / or the EPBC Act are considered to have a moderate likelihood of occurrence. In addition, six migratory species are considered to have a moderate likelihood of occurrence.

Potential impacts

Clearing of vegetation would be required within and adjacent to the existing railway corridor and the loss of this vegetation may impact on the habitat of species, populations and ecological communities listed under the TSC Act and the EPBC Act. Potential temporary and permanent impacts and loss to fauna habitat may also result during both the construction and operation of the Project. The risk of fauna fatalities may also be increased due to increased rail movements and the increased width of infrastructure needing to be crossed. Without adequate mitigation, construction activities may also result in weed invasion that may contribute to the loss of biodiversity in the area.

Proposed assessment methodology

The EIS will include detailed investigations to assess the potential impacts on flora and fauna and to identify appropriate and specific mitigation and management measures.

Flora and fauna investigations will be undertaken in accordance with the *Draft Guidelines for Threatened Species Assessment* (DEC 2005) and the *Threatened Biodiversity Survey and Assessment: Guidelines for Developments and Activities (Working Draft)* (DEC 2004). Assessment will include:

- Literature review and database searches to identify threatened species, populations and ecological communities with potential to occur.
- Compilation of lists of species recorded on-site.
- Detailed flora and fauna surveys to identify and confirm the presence of flora and fauna features of the proposed Project. This will include targeted surveys of potentially occurring threatened species, fauna habitat survey and floristic survey of vegetation communities and descriptions of the vegetation communities and fauna habitats occurring on-site.
- An assessment of potential impacts during construction and operation including loss of native vegetation, loss of fauna habitat and proliferation of weeds.
- Significance assessments for all threatened species, populations and ecological communities following the heads of consideration and the draft Guidelines for Threatened Species Assessment under Part 3A (now Part 5.1) (NPWS 2002) for listing under the TSC Act and the EPBC Act Policy Statement 1.1 Significant Impact Guidelines (DEC 2005).
- Preparation of assessments of significance for threatened species likely to occur on-site in accordance with Section 5A of the EP&A Act.

The Project will be assessed to ensure an EPBC Act referral process is undertaken if required in relation to the federally listed species, ecological communities and migratory species.

A review of the *Fisheries Management Act 1994* will also be undertaken as part of the assessment to ensure that other relevant approvals are sought for the Project.

4.1.2. Indigenous Heritage

Existing Environment

The OEH Aboriginal Heritage Information Management System (AHIMS) database is maintained by the OEH Aboriginal Cultural Heritage Division, and includes a database and recorded site cards for all Aboriginal sites, items, places and other Indigenous heritage objects that have been reported to the OEH.

A search of the AHIMS database was undertaken on 11 October 2011 and one registered Aboriginal site was identified within a 21 km by 11.6 km search area centred on the proposed duplication. This site is described as an open camp site with artefact(s) (AHIMS Site #29-5-0007), located approximately 8.5 km north east of the Project area. It was recorded near Chilcotts Creek by the Quirindi District Historical Society. Rather than an accurate reflection of past Aboriginal occupation and land use, the limited number of previously recorded sites may be from a lack of systematic archaeological survey in the vicinity of the study area.

Potential Impacts

The land on which the Project would be developed is an existing rail corridor that has been substantially modified with infrastructure developments in locations adjacent to residential centres. Railway operations, the road network and agricultural activities have also shaped areas of the landscape significantly. However, there are areas within the proposed Project area that are rural in character and development within these areas is minimal.

Aboriginal sites can be present within any environment in Australia but are more likely around areas of significant resource or cultural value, such as areas that contain rivers (for example Chilcotts creek or Pages River), stone outcrops, and sheltering areas. These types of locations may contain unrecorded settlements and evidence of aboriginal occupation. Therefore the absence of sites in the specific area of the Project is not conclusive as to the potential level of impact which may result due to potential archaeological deposits and other Indigenous objects; sites and places that may be currently unknown.

Further detailed investigation of the Project area is required to ensure that unknown sites, artefacts and objects are recorded and not impacted inadvertently by the construction of the Project. The impacts to Aboriginal heritage items through operation are likely to be minimal.

Proposed Assessment Methodology

An indigenous heritage assessment would be undertaken as part of the environmental assessment following consultation and identification of traditional land owners. The assessment would include:

- Background review of previous cultural heritage and archaeological reports;
- Comprehensive assessment of the environmental context and previous land use history of the Project area;
- Consultation with Aboriginal stakeholders;
- Field survey in collaboration and consultation with local Aboriginal communities;
- Mapping of identified Aboriginal heritage sites and areas of potential Aboriginal heritage sensitivity;
- Assessment of Aboriginal heritage significance, if required;
- Assessment of impacts on Aboriginal heritage; and
- Recommendations regarding appropriate mitigation measures.

The assessment would identify the presence of indigenous artefacts or places to determine the significance of any potential impacts and where necessary, provide appropriate mitigation measures. The Aboriginal Heritage Impact Assessment will be completed in accordance with the principles of the Burra Charter (*The Australia ICOMOS charter for the conservation of places of cultural significance*) and current heritage best practice guidelines as identified in OEH's *Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW* (DECCW 2010) and *Draft Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation* (DEC 2005).

4.1.3. Non-Indigenous Heritage

Existing Environment

A preliminary review of statutory and non-statutory heritage registers has been undertaken and identified eight heritage items and two potential heritage items/sites in the vicinity of the Project area. These are listed in Table 4.2.

Table 4.2 Listed Heritage items/places

Name	Significance
Ardglen Tunnel	State
Ardglen Quarry	Local
Glenalvon Group	Local
Glenalvon Homestead	Local
Glenalvon Cottage	Local
Glenalvon Stables	Local
Old Cemetary	Local
Temple Court Station	Local
Ardglen Railway Items	National Trust

Kankool Railway Items	National Trust

It should be noted that the LEP for the Upper Hunter LGA was not available and further consultation and investigation will be required in the EIS to further categorise heritage items of local importance.

Potential Impacts

Although every effort will be made to identify and avoid heritage items, sites and artefacts the impacts associated with the construction and operation of the Project may include:

- the disturbance of items and sites of historic significance as well as the potential for items that were previously unrecorded to be impacted; and
- a change of character, amenity or physical setting of heritage places.

Further physical and anecdotal investigation will be required to ensure further places of significance that are unregistered are identified.

Proposed Methodology

The full historic assessment of the proposed duplication will include the following tasks:

- Historical research and preparation of a thematic history of the Project area;
- Consultation with relevant stakeholders, including local Councils, and other informed or interested stakeholders;
- Field survey and assessment of physical integrity;
- Mapping of identified and potential heritage items, places, landscapes and archaeological sites;
- Assessment of heritage significance, if required;
- Assessment of impacts on heritage significance;
- Development of appropriate mitigation measures; and
- Preparation of a Statement of Heritage Impact (SHI) for the Ardglen Tunnel, in accordance with Heritage Branch recommendations for State Heritage Register (SHR) items.

Assessments of heritage significance will be prepared in accordance with the SHR assessment criteria defined in the Heritage Branch publication *Assessing Heritage Significance* (2001). Should historical archaeological sites be identified, their research potential and significance will be assessed in accordance with Heritage Branch publications *Archaeological Assessments* (1996) and *Assessing Significance for Historical Archaeological Sites and 'Relics' (*2009).

The Non Indigenous Heritage Impact Assessment will be completed in accordance with the principles of the Burra Charter (*The Australia ICOMOS charter for the conservation of places of cultural significance*) and current heritage best practice guidelines as identified in the Heritage Branch's *Heritage Manual* (1996) and the associated supplementary publications. The protection and conservation of heritage will be a primary objective with mitigation strategies developed where required.

It should be noted that the current feasibility design does not involve any physical impact to Ardglen Tunnel.

4.1.4. Noise and Vibration

Existing Environment

The nearest sensitive receivers within the Project area are dwellings located adjacent to the existing rail loops at Ardglen and Kankool. These dwellings are located approximately 20 metres from the already duplicated rail line. Additional receivers outside of the existing loop areas are located at distances of approximately 175 metres and greater from the proposed duplication. The existing noise

environment for several receivers is influenced by continuous road traffic noise from the New England Highway as well as individual passenger and freight rail pass by events.

Potential Impacts

At the opening of the project in 2016, the duplication of the existing rail line will allow for an increase in freight movements of approximately 2.5 times the current daily movements. No change to daily passenger services is anticipated. The proposed duplication and increased rail movements would increase existing rail noise levels for sensitive receivers. Operational noise will be assessed in accordance with the Interim Guideline for the Assessment of Noise from Rail Infrastructure Projects (IGANRIP) for the year of operation and up to 10 years post Project opening, based on available ARTC capacity modelling.

Noise from temporary construction works would be audible at nearby receivers. To minimise the potential for disturbance, feasible and reasonable noise management and mitigation measures to reduce and control noise impact, consistent with OEH guidelines, will be required. The implementation of noise management and mitigation will include potential control of source noise emissions, limiting off-site noise impacts through the planning and design of operations and consultation with the local community.

Proposed Assessment Methodology

Baseline Noise Survey

To quantify the existing baseline noise levels and characterise the noise environment, a baseline noise survey will be undertaken at nearest residential dwellings and other noise sensitive receivers.

Prior to the commencement of the survey a review of aerial photography will be undertaken to identify key sensitive receivers and noise catchment areas. An initial site visit will be carried out to identify appropriate noise monitoring locations.

Baseline noise levels will be measured for a period of 1 week through unattended noise logging and short term attended measurements including the determination of existing operational rail noise (day, night and maximum noise levels). Measured noise data will be analysed and periods of unsatisfactory noise monitoring conditions such as extraneous noise or adverse meteorological conditions filtered from the datasets.

Noise and Vibration Criteria

Adopting the measured background (LA90) noise levels, Project specific noise objectives for the assessment and management of potential construction impacts will be established with reference to the OEH (formerly Department of Environment, Climate Change and Water, DECCW) Interim Construction Noise Guideline,(ICNG, 2009).

The measured day time, night time (LAeq) and maximum (LAMax) existing rail noise levels will be applied to IGANRIP to assess operational rail noise triggers for residential and other noise sensitive receivers.

For the assessment of potential vibration impacts and management of perceptible (disturbance) and structural (damage) vibration issues, receiver specific vibration objectives will be established for construction works and train operations from the OEH (formerly Department of Environment and Conservation NSW) *Assessing Vibration: a technical guideline*.

Assessment of Potential Impacts

Referencing the Project concept design, potential noise impacts at sensitive receivers during construction and operation will be predicted utilising the SoundPLAN noise propagation software.

Construction impacts will be assessed for worst case noise generating works to assist in the management and mitigation of potential impacts.

Operational noise will be assessed for year of operation and up to 10 years post Project opening, based on available ARTC capacity modelling. The measured existing rail noise levels will be applied to the noise model to calibration noise impact predictions.

Potential vibration impacts will be assessed with reference to measured ground vibration levels from construction plant and freight train pass by events.

A noise and vibration assessment report will be prepared for inclusion in the EIS. The report will include:

- Description of the baseline noise environment and existing rail noise levels (LAeq,15hr and LAeq,9hr and 95th percentile LAMax).
- Measured baseline noise profiles including LAMax, LAeq, LA90, LA10 noise levels.
- Adopted noise objectives for construction and operational phases.
- Methodologies applied for the predictive assessment of noise impacts.
- Detailed predicted noise impacts at nearest receivers and surrounding land use.
- Discussion of potential noise impacts in consideration to the ICNG and IGANRIP guidelines.
- Recommendation of, as required, feasible and reasonable noise management and mitigation measures to reduce and control noise impacts where adopted noise objectives are predicted to be triggered.

4.1.5. Traffic Management

Existing Environment

The road network in the area surrounding the Project consists of the New England Highway and local roads associated with Murrurundi, Ardglen and Kankool. Sections of the Old New England Highway still exist between Murrurundi and Ardglen. The main access to the Project site can be gained from the New England Highway as well as the Old New England Highway and via local roads through Ardglen and Murrurundi.

The section of the New England Highway alongside the proposed rail track duplication works (outside of town centres) is a two-way two-lane, undivided level road with 3.5 metre wide lanes and 1.5 metre wide shoulders. There are a number of horizontal curves with overtaking opportunity with a posted speed limit of 100 km/h. Previous traffic counts undertaken on the New England Highway at a nearby location indicate that the peak hour occurs between 10.30 am and 11.30 am, and between 2.30 pm and 3.30 pm. During the peak hour, approximately 300 vehicles travel along this section of road of which approximately 75 (25%) are heavy vehicles. Average Annual Daily Traffic (AADT) is approximately 5,000 vehicles.

Potential Impacts

The main impact to the local road network would be construction traffic associated with delivery of bulk materials and equipment as well as construction staff movements. It is anticipated that access to the rail corridor for construction purposes would be via the following:

- Existing rail compound adjacent to Murrurundi Station;
- Boyd Street at Murrurundi;
- Pages River Road (via Boyd Street);
- Old New England Highway (via New England Highway 1.5 kilometres north of Murrurundi);
- At Ardglen:
    - Old New England Highway to the north; and

- Main Street to Old New England Highway to the south.

- Glenyalla Road (500 metres north of Kankool) via level crossing; and
- New access point off New England Highway (1.5 kilometres south of Kankool).

At all locations development of these access points will be undertaken in liaison with the RTA and / or local council to ensure compliance to their requirements and processes. It is likely that the new proposed access off the New England Highway would require the design of a temporary T-Junction with deceleration and acceleration lanes on the New England Highway.

It is not anticipated that construction of the Project would require any major disruption to access of private property.

During operation, it is considered that maintenance vehicle traffic would have a negligible impact on the local road network.

Proposed Assessment Methodology

The EIS will document the likely haulage routes to be used and the upgrades of local roads required as well as confirm the likely haulage volumes and period within which haulage will be undertaken. Local road conditions will be assessed as part of the concept and detailed design process to ensure that safety is maintained. Road intersection or infrastructure upgrades required will be determined as part of this process.

Specific tasks to be undertaken as part of the traffic management investigations include:

- Assessment of sight distance requirements at all proposed construction access locations off the New England Highway;
- undertake a road safety assessment including a review of the latest 5-year crash data from the RTA;
- undertake traffic generation and traffic distribution analysis for the construction related traffic along the haulage routes;
- undertake SIDRA intersection modelling to determine intersection performance at key access intersections along the New England Highway;
- review the public transport and school bus services, pedestrian and cyclist facilities and determine any impacts during construction;
- determine appropriate mitigation measures; and
- liaison with the RTA and Councils.

4.1.6. Topography, Geology and Soils

Existing Environment

Topography

The Liverpool Ranges Project area can be characterised by two distinct landform types. On the city (Murrurundi) side and the country (Willow Tree) side of the Liverpool Range the topography and landform is characterised by gently undulating open farmland. Between these two landforms is the Liverpool Range. This area forms part of the Great Dividing Range and is characterised by steep escarpments and high elevation. The Range elevates to a height of approximately 700 m and is distinct from the rest of the Project area as it is enclosed by slopes to the east and west.

There are two main watercourses within the Project area which the duplicated rail line will be required to cross, these are Pages River and Chilcotts Creek. Several other unnamed drainage lines also cross the existing rail line within the Project area.

The Project falls within two catchment management areas: the Hunter / Central Rivers Catchment Management Authority on the south eastern side of the Liverpool Range and Namoi Catchment Management Authority on the north western side of the range.

Geology

The Project is located within a relatively complex geological area and contains varying Quaternary, Tertiary, Triassic and early & late Permian formations. The southern side of the Project area is predominantly located within the Liverpool Ranges Beds, a formation consisting of basalt, dolerite, polymictic conglomerate quartzose, shales and bole. Moving north the Project passes through a variety of alluvium (clays and silt) areas and the Liverpool Range Beds as well as the Ardglen geological site (noted for its Heritage significance).

The Ardglen geological site, a quarry exposure of vesicular olivine basalt of tertiary age, is of significance due to the presence of todorokite which is unusual for its mode of occurrence (in Basalt) and for its simple composition. Ardglen is a noted producer of museum quality zeolites.

As the Project progresses through the Liverpool Range towards Willow Tree the geological formation changes to the Koogah formation which is typified by sandstone, shales, coal shale and lithic sandstone.

Soil Landscape

The land alongside the Project area has varied soil profiles. The soil landscapes are categorised and grouped by geology in Table 4.3 (extracted from *Land & Water Conservations Soil Landscapes of the Murrurundi - 1:100,000 Sheet (McInnes-Clarke, 2002*)). Table 4.3 classifies the soil landscapes found from the south of the Project (Murrurundi) to the North (Willow Tree) in sequence.

Table 4.3: Soil Landscapes

Underlying Geology	Soil Landscape Name	Defining Landform Features	Qualities/limitations
Narrabeen Group lithic and quartz-lithic sandstones and conglomerates	Dunwell	Undulating hills to rolling hills in Parkville Valley, slopes 3-15%, rock outcrop <15%	• Acidity • Low fertility • Low permeability • High erodibility
Singleton Coal Measures super group, Whittingham Coal Measures – sandstone, shale, conglomerate and coal	Donalds Gully	Foot slopes, moderately broad drainage plains and occasional alluvial fans, slopes 1-5%	• Widespread low fertility • Low permeability • High erodibility • Localised salinity & acidity
Alluvium	Yarramoor	High-energy narrow floodplains and low terraces of the Merriwa Plateau and southern Liverpool Range	• High shrink-swell • Low wet bearing strength • Engineering hazard Flood hazard

Underlying Geology	Soil Landscape Name	Defining Landform Features	Qualities/limitations
Basalt	Bow	Rolling to undulating hills and foot slopes 2-10%	• High shrink-swell • Low permeability • High erodibility • High erosion hazard • Engineering hazard
Basalt	Ant Hill	Rolling hills, slopes 15-32%	• Low permeability • Localised acidity • Widespread erosion and engineering hazard • Mass movement hazard
Basalt	Coober Bulga	Very steep mountains and hill slopes of the southern Liverpool Ranges, slopes >33%	• Low permeability • High erodibility • Mass movement hazard • High run-off • Engineering hazard
Basalt	Moan	Rolling hills, low hills and hill slopes of the Liverpool Ranges, slopes 10-33%	• Low permeability • High shrink-swell • Minor to moderate erosion hazard • Mass movement hazard • Engineering hazard
Basalt	Langs Neck	Steep mountain slopes and scarps of the Liverpool Ranges, slopes 30-200%	• Low permeability • Low wet bearing strength • Mass movement hazard • Shallow soils • Engineering hazard

Underlying Geology	Soil Landscape Name	Defining Landform Features	Qualities/limitations
Werrie Basalts	Dunover	Undulating to rolling hills and low hills of the Melville Ranges, slopes 10-25%. Moderately broad crests with generally smooth side slopes.	• High shrink-swell • Low permeability • Mass movement hazard • High run-on • Seasonal waterlogging • Moderate erosion risk • Moderate Engineering hazard
Alluvium	Borambil Creek	Broad floodplains and anastomic plains with relict stream channel features draining the southern Melville Ranges. Sediments are derived from divers sedimentary, metamorphic and igneous rocks	• Low permeability • Localised high Permeability • Localised salinity and alkalinity • Flood hazard • High run-on • Engineering hazard • Minor erosion hazard • Ground water pollution hazard
Werrie Basalts and Warringundi Intrusives – basalt lava, tuff, tuffaceous sandstone quartz dolerite and keratophyre	The Siphon	Very gently to gently inclined long foot slopes and drainage plains on alluvium and colluvium. Local relief to 100m, slopes 2-8%	• Localised shallow flood hazard • High run-on • Localised high water tables • Localised dryland salinity • Localised water erosion hazard

All of the soil landscapes identified pose an erosional and engineering hazard which will influence the design process and potentially impact on the construction methodology.

Acid Sulphate Soils

A search for Acid Sulphate Soils (ASS) concluded there is a low risk of occurrence within the Project area. Further investigation will be required to determine the risk.

Potential Impacts

The Project will impact local topography and geology and will involve the disturbance of soils during construction. The soil types within the Project area have been identified as being highly erodible and of potential engineering hazard and as such could lead to ground instability, run-off and sedimentation.

Stabilisation of soils during geotechnical works will present a key project challenge. Areas of the Project that encounter steep relief in combination with areas of ground disturbance will be higher risk.

Runoff of acid / alkali soils may present a risk during the construction phase due to the presence of stockpiled spoil.

Proposed Assessment Methodology

A detailed investigation of the site soils would be undertaken as part of the geotechnical investigations carried out for the Project. This investigation would include the following:

- Borehole logs including descriptions of physical and chemical characteristics of soils including salinity, erodibility, and ASS;
- Likely impacts on site soils from the Project; and
- Mitigation measures to minimise potential for erosion, soil instability / mass movement and localised ASS impacts.

4.2. Other Issues

4.2.1. Planning, Land Use and Property

Existing environment

The southern section of the Project area, within the Upper Hunter Shire LGA, is located within the 5(a) Special Uses Zone (Transport) with adjacent land zoned 1(c) Rural Small Holdings. The northern section of the Project area, within Liverpool Plains Shire LGA, is all zoned RU1 Primary Production.

The land adjacent to the Project consists of rural land used for agricultural pursuits, predominantly grazing and some cropping. Much of the surrounding farmland has been substantially cleared of native vegetation consisting of pasture grasses with scattered trees and patches of remnant vegetation. The other predominant land use immediately adjacent to the Project is road transport associated with the New England Highway.

The ownership of land adjacent to the Project is both private farmland and public (RTA) road reserve.

Potential impacts

Construction of the Project and associated infrastructure is likely to require some strip acquisition of land on the eastern (upside) adjacent to the existing rail corridor. On the southern side of Ardglen Tunnel there are two main properties where land acquisition is likely to be required. This includes one private landholding and an area of land identified as the Murrurundi Commons (ownership identified as the Murrurundi Common Trust). Depending on the design of the bridge at the Pages River crossing acquisition from an additional landowner may be required.

On the northern side of the Ardglen Tunnel areas of strip acquisition are likely to be required in the section where the rail line is in proximity to the New England Highway (RTA owned land).

Assessment Methodology

The EIS will consider the total amount of land required in more detail and contain an assessment of the impacts associated with land acquisition. In particular, the EIS will address:

- The properties and land uses directly and indirectly affected by the Project;
- Impacts on connectivity and access during construction and operation including users of the New England Highway and local road network;
- Identification of land acquisition and temporary lease areas;
- Development of mitigation measures to address potential impacts on land use and properties.

4.2.2. Visual

Existing Environment

The Project area and surrounds can be characterised by two distinct landform types, the undulating rural land in the north and south and the Liverpool Range escarpment itself.

Within the rural land there are scattered dwellings with other residences centred around the localities of Ardglen and Kankool. The predominant visual element of the landscape is that of farmland.

Immediately adjacent to the rail corridor is the New England Highway. The rail corridor follows the route of the highway for approximately 70% of the length of the Project. The New England Highway is a two-lane two-way road and is an arterial road for the Upper Hunter Valley connecting Tamworth to the North and the Sydney to the South. It is a route used as a 'scenic' route between NSW and QLD.

The Liverpool Range elevates sharply to a height of approximately 700m and is distinct from the rest of the Project area as it is distinctly enclosed in slopes to the east and west.

Along the Project route there are approximately 15–20 dwellings within 350m of the railway.

Potential Impacts

The Project would be mainly located within the existing rail corridor. Potential landscape and visual impacts from the Project are expected to result from construction activity, removal of vegetation and geotechnical works. Temporary visual impacts related to construction would include vehicle and machinery movements, site compounds and material / equipment stockpile areas. Local residents, particularly those adjacent to the rail corridor would experience changes to the existing visual environment during the construction phase.

Construction activities and equipment would also be visible to motorists on the New England Highway at elevations where the rail corridor is visible.

In operation there will be some change to the landscape and visual environment. Additional infrastructure would be present within the rail corridor and would be visible to some receivers. Associated with operation of the Project would be an increase in the number of train movements.

Proposed Assessment Methodology

The visual assessment will include a full description of the landscape character of the Project area and surrounds and the type and number of viewers potentially affected. The impacts identified and assessed will be categorised according to significance and mitigation measures will be proposed identifying the methodology for reducing or eliminating the impacts as well as the residual impacts remaining.

4.2.3. Air Quality

Existing Environment

The Project is located adjoining a quarry (Ardglen), a working railway, agricultural lands and the New England Highway. Key characteristics of local air quality are likely to be elevated levels of dust arising from these sources. The surrounding area is rural and relatively low in population.

No relevant background air quality data is available for the Project location. The closest air monitoring station maintained by the OEH as part of the Upper Hunter Air Quality Monitoring Network is at Muswellbrook. There are several coal mines within close proximity of the town of Muswellbrook, so the background dust levels here are not considered to be comparable to the Liverpool Ranges area.

Potential Impacts

Dust would be generated by construction works particularly bulk earthworks, the removal of structures and the movement of construction vehicles on unsealed roads or roads overlain with silt or dirt. Levels of dust and hydrocarbons due to exhaust emissions from construction equipment will also be elevated during the construction phase. Any impacts to the nearest sensitive receptors during the construction phase are expected to be of a minimal extent. The significance of these impacts will be determined using dispersion modelling and addressed in the EIS.

Rail traffic will increase as the result of the proposed duplication, but the efficiency of movements would increase, meaning less time spent idling and stalling in this area. It is anticipated that the average air quality effects at nearby sensitive receptors due to emissions from diesel locomotives would remain acceptable. This will be confirmed using dispersion modelling for inclusion in the EIS.

Construction dust emissions would be controlled through the application of standard mitigation measures such as covering all loads, ensuring roads are routinely swept (if sealed) or watered or treated with a chemical sealant if unsealed.

Proposed Assessment Methodology

The predicted air quality at sensitive receptors in the vicinity of the proposal will be determined using Ausplume dispersion modelling. Several scenarios will be modelled, depending on the locations of signals and consequently where the trains are likely to be idling in the completed configuration. Each stage of construction will be considered in addition to the completed proposal.

4.2.4. Hydrology, Ground Water and Water Quality

Existing Environment

The Project lies within the Warrah sub-catchment of the Namoi Catchment (northern side of Liverpool range). To the south of Liverpool Range the project lies within the Hunter/Central Rivers Catchment. The Liverpool Range forms a natural divide between the two catchment areas with water flowing south to south east in the Hunter Catchment and north to north west in the Namoi catchment. The water courses in proximity to the Project are Pages River, Doughboy Creek, Chilcotts Creek, Warrah Creek and Borambil Creek as well as associated unnamed drainage lines. The Project includes crossings of Pages River and Chilcotts Creek.

A search of the Natural Resources Atlas has identified 23 ground water bores within approximately one kilometre of the Project area. Bore depths range considerably from between six metres and 66 metres. The predominant registered use of these bores is for domestic livestock uses. Ground water vulnerability also varies from high vulnerability around the Pages River to low/moderate further towards Ardglen. No data is available past Ardglen. Water quality mapping at these areas identified water quality changes from a predominantly moderate quality to brackish at locations to the west of Murrurundi.

Potential Impacts

During construction of the Project, potential impacts on hydrology, groundwater and water quality include:

- Contamination of groundwater supply;
- Erosion from exposed soils, sediments and material stockpiles resulting in sedimentation of watercourses;
- Potential spills of fuels, greases and other chemicals from inadequate storage, handling and disposal procedures entering groundwater and surrounding water courses; and

- Interception of groundwater during excavation.

Proposed Assessment Methodology

Hydrology

The hydrological assessment would consider the construction and operational impacts of the Project on watercourses in the vicinity of the project area including Pages River, Warrah, Borambil, Doughboy Creek and Chilcotts Creek as well as associated drainage lines.

The assessment would include an investigation of existing flood risks and any potential changes as a result of the Project. Existing culverts have been identified and an assessment will be made to ascertain their suitability and the requirements for upgrade.

Ground Water

The groundwater assessment will consider the different hydrogeological systems and potential impacts of the proposed Project.

Water Quality

The water quality assessment will consider the potential impacts associated with construction and operation of the proposed Project. The mitigation measures proposed will address the risk posed by excavation, sedimentation and spillage of fuels and chemicals during construction.

4.2.5. Contaminated Land

Existing Environment

There are no contamination notices for the Project area in the OEH Contaminated Land Record. A search of the Australian Soil Resource Information System (ASRIS) developed by CSIRO identified the site as being of very low to low probability of containing Acid Sulphate Soils (ASS). The contamination risk in the rail corridor is nevertheless high as the previous and current use of the corridor is an activity that can result in localised contamination.

Potential Impacts

It is possible there are residual contaminants in railway ballast materials and soils within and adjacent to the railway from railway operations and maintenance activities. Other sources of contaminants include the use and storage of pesticides, refuelling of machinery and the presence of asbestos in signalling huts and cement pipes.

These sources may present a hazard to construction workers or others through dermal (skin) contact, ingestion and inhalation.

Proposed Assessment methodology

A Stage 1 Preliminary Contaminated Site Investigation will be undertaken at areas within the Project to identify the nature and extent of any contamination within the Project area.

Samples would be taken to establish the level of potential contamination and the suitability of the material for off-site use or disposal. Sampling would be undertaken in accordance with OEH's (previously DECCW's) *Guidelines for Consultants Reporting on Contaminated Material* and classified in accordance with OEH's (previously DECCW's) *Waste Classification Guidelines*.

4.2.6. Social Impact

Existing Environment

The Project is linear in nature. As such it is easy to identify properties, communities and social groups that are likely to be impacted by the development. Along the length of the project there are 3 main

communities; Murrurundi, Ardglen and Willow Tree. In addition to these central communities are several dwellings / properties in close proximity to the Project.

The predominant income/livelihood source of the community is farming, construction and mining/resources.

Potential Impacts

Affected groups and communities within the immediate vicinity of the proposed works are most likely to experience direct impacts as a result of the Project. For example, potential social impacts may be sustained during the construction phase as a result of noise, dust, disruption of access and increased traffic movements. However, these would be temporary in nature.

Regional and wider communities would more likely to experience indirect service demand and economic impacts. Specifically, the Project would result in a long term, economic benefit in relation to the increased capacity and efficiency of passenger and freight movements (particularly coal).

The construction phases are likely to cause the greatest level of impact; however, the construction of the Project would also result in direct employment opportunities for local and regional residents and benefit local and regional service providers over the period of construction.

When operational the Project would allow an increase in the frequency of train movements. The potential for noise and air quality impacts will be investigated as part of the EIS.

Proposed Assessment Methodology

A social impact assessment will be undertaken to determine the potential immediate and cumulative effects (both adverse and beneficial) of the Project. Social Impacts will be assessed using data gathered from other environmental investigations within the EIS.

Impact assessments associated with noise, air quality, water quality, landscape and visual impact, traffic impact will be collated and an assessment made on the overall impact to the local community in each area. This will be combined with social and census data as well as the outcome of community consultation.

The EIS would also assess the potential social benefits and impacts of the Project and develop measures to enhance community opportunities and mitigate potential negative impacts. The disruption to local residents is not likely to occur throughout the whole construction period and the staging of the construction will allow for mitigation to be implemented and further refined as the stages of construction continue. Mitigation in the form of work method statements will address issues such as noise, work hours, disruption to roads and public access points.

4.2.7. Energy Efficiency and Greenhouse

Potential Impacts

Greenhouse gas (GHG) emissions would be generated during the construction phase associated with the combustion of fossil fuels in both stationary and mobile construction plant, equipment and vehicles and clearance of vegetation. Additionally, electricity used in offices is another source of greenhouse gas emissions. Embodied energy in construction materials used would also generate increased greenhouse gas emissions.

Proposed Assessment Methodology

The potential sources and efficiencies for greenhouse gas emissions during the construction and operational phases of the Project will be investigated.

4.2.8. Waste Minimisation

Potential Impacts

The majority of waste would be generated during the construction phase of the Project. The *Waste Avoidance and Resource Recovery Act*, *2001*, the *Protection of the Environment Operations Act*, *1997* and relevant regulations and industry guidelines would be used to classify waste, determine measures for handling and storing waste and appropriate disposal options.

Proposed Assessment Methodology

Mitigation measures included in the EIS would include the preparation of a Waste Management Plan with a focus on waste reduction and avoidance and recycling and reuse of construction materials, packaging and office wastes.

4.2.9. Cumulative Impacts

Potential Impacts

Cumulative impacts may occur where issues of a particular nature arise at multiple sites. ARTC are undertaking a number of upgrades along the Main North Line. There is the potential for cumulative impacts from rail or other sector projects occurring or planned within the local area or region.

The Project would also result in significant cumulative benefits for the future operation of the Main North Line through increased capacity, reduced travel times for freight and improved network flexibility.

Mitigation and Management

The EA will identify and assess potential cumulative impacts in particular to construction scheduling, traffic, interaction with existing infrastructure, noise and air quality.

5. Stakeholder Consultation

In order to ensure that the wider public is informed about the Project, a community consultation and stakeholder engagement plan would be developed and implemented to identify key objectives and outcomes of consultation activities with the community, stakeholders and government agencies.

Consultation undertaken will be focussed on providing a balanced and transparent environmental assessment process which ensures the involvement of the community and local government in the Project's development. Community and stakeholder engagement would commence prior to and during the preparation of the EIS in order that all issues are identified, documented and considered. This would ensure that stakeholder requirements are accurately captured and considered in the detailed design and EIS.

ARTC propose to undertake an appropriate level of consultation with relevant communities and stakeholders including:

- Department of Planning and Infrastructure (including the Hunter Regional Office);
- Office of Environment and Heritage;
- Roads and Traffic Authority;
- Hunter Central Rivers Catchment Management Authority;
- Department of Transport;
- Department of Trade & Investment, Regional Infrastructure and Services;
- Department of Sustainability, Environment, Water, Population and Communities;
- Service and infrastructure providers including Queensland Rail National Coal, Railcorp and Country Rail Infrastructure Authority;
- Special interest groups including the Local Aboriginal Land Council and Aboriginal stakeholder groups;
- Liverpool Plains Shire Council;
- Upper Hunter Shire Council;
- Business Interest Groups;
- Transport and Emergency Services; and
- Affected landowners and businesses.

Consultation requirements for the proposed Project would be outlined in the EIS requirements provided by the Director-General of the DoPI. The above list of stakeholders is preliminary and should any additional stakeholders become apparent during the preparation of the EIS, appropriate consultation would be undertaken and documented within the EIS.

To ensure an appropriate level of consultation, the community consultation and stakeholder engagement plan would include the following:

- Confirmation of the aims of community consultation for the EIS as required by the DoPI as per the Director-General's Requirements;
- Identification of affected stakeholders;
- Outline the activities and techniques proposed to effectively engage the community and stakeholders to raise awareness and identify issues;
- Establish the scope and responsibility for consultation with the stakeholders from within the proposed Project team;
- A planning focus meeting (if required);
- Provision of a website, email address and telephone information line for enquiries;

- Letter to stakeholders introducing the proposed Project and providing details regarding the provision of the website, email address and telephone information line for enquiries;
- Continued liaison with stakeholders; and
- Consultation including one on one meetings with impacted owners and key stakeholders.

Ongoing information-sharing, discussion and consultation are priorities for the Project. All consultation materials prepared would provide accurate and timely information on the proposed Project objectives and construction activities, with a view to maintaining stakeholder and community confidence during all phases of the proposed Project.

6. Environmental Impact Statement

The EIS report would have a structure similar to the following:

- An Executive Summary;
- A review of the relevant NSW and Commonwealth legislation and approvals;
- Strategic and project justification, including an outline of the options assessment process undertaken;
- A detailed description of the proposed Project which includes:
  - Route alignment and corridor investigated;
  - Key design elements;
  - Construction methods and outline program;
  - Description of ancillary facilities; and
  - Outline of land requirements.
- An updated environmental risk assessment;
- An assessment of the key environmental and community issues including description of the existing environment, methodology and approach, standards and guidelines adopted, an assessment of impacts resulting from both construction and operation of the Project (as relevant) and a description of the measures to avoid, reduce, manage and monitor expected impacts and residual impacts;
- An assessment of cumulative impacts;
- A draft statement of commitments;
- Certification by the author that the information contained in the EIS is neither false nor misleading; and
- Appendices which contain detailed information relevant to the EIS including specialist studies reports.

References

ARTC, *Code of Practice for Environmental Impact Assessment of Development Proposals in NSW.*

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DECCW, 2010, *Aboriginal Cultural Heritage Consultation Requirements for Proponents.*

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