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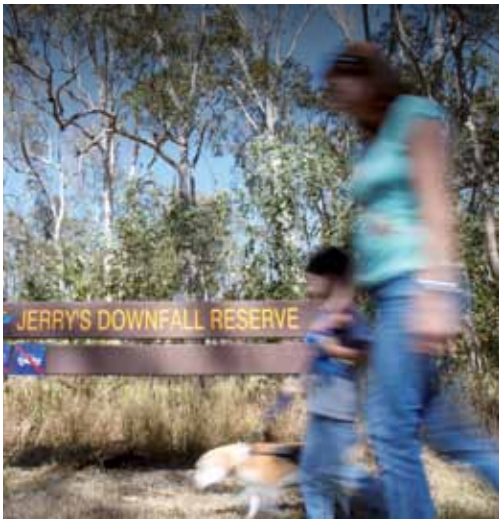


Transport and Main Roads

Park Ridge Connector

Review of Environmental Factors Technical Report

Tomorrow's Queensland:
strong, green, smart, healthy and fair

LOGAN CITY COUNCIL

1. The review of environmental factors

1.1 Relationship to overview document

This *Review of Environmental Factors Technical Report* follows and should be read in conjunction with the *Park Ridge Connector Review of Environmental Factors Overview* document. The overview document provides a high-level summary of the project that highlights the:

- need for the Park Ridge Connector
- planning approach
- possible locations for a Park Ridge Connector
- community consultation process.

1.2 Purpose of this document

This *Review of Environmental Factors Technical Report* details the process adopted to determine whether or not there is a viable road transport corridor for the Park Ridge Connector in an identified area of interest. The primary aim of the review of environmental factors is to document potential constraints to locate a Park Ridge Connector corridor for future investigation and assessment. It summarises the outcomes of the technical investigations and community consultation undertaken to date to narrow the identified area of interest (refer to Figure 1.1) to a refined area of interest.

This document establishes the strategic transport project context, presents the project rationale, sets out the project aims and provides a summary of the process followed for the Park Ridge Connector review of environmental factors.

The methodology for determining whether or not a viable motorway corridor exists requires consideration of the community's view about environmental, economic and social values and then translating that into constraint mapping. The process followed to date in engaging the community towards identifying whether or not a viable motorway corridor exists is documented in this review of environmental factors.

Over the coming months, continued consultation will further investigate the refined area of interest. This review of environmental factors will be placed on public display for further community feedback before a decision is made about whether or not a suitable and viable motorway corridor exists.

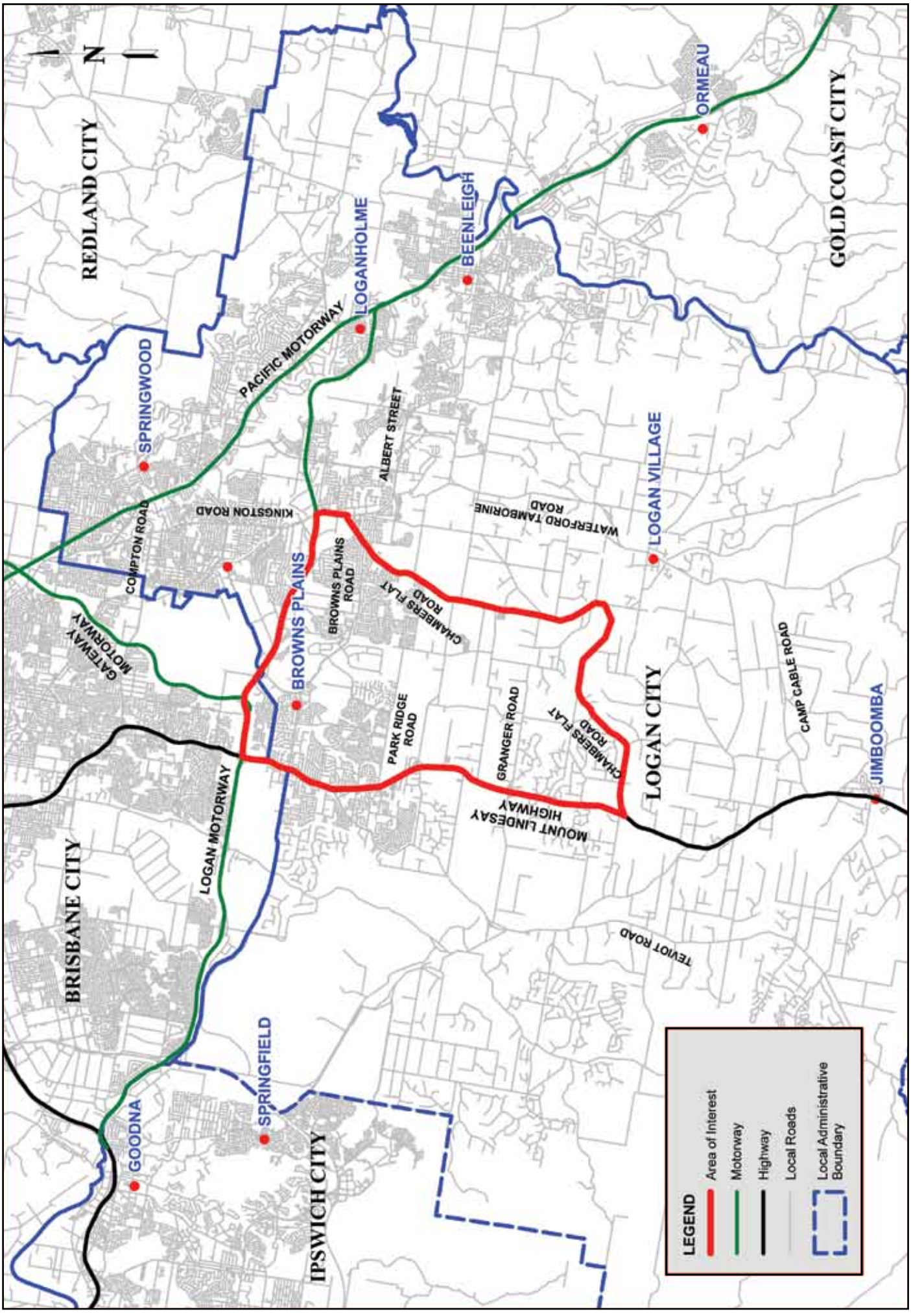
Once the public display is complete in late 2011, community feedback will be used to prepare a road route strategy report. The road route strategy report will then form the basis for a decision as to whether there is a viable route for the Park Ridge Connector. Should there be a viable corridor, the early preservation of land will prevent new development from occurring where it is intended that the Park Ridge Connector will be built in the future. There is no current commitment for construction, but the preservation of the Park Ridge Connector corridor will allow development in the surrounding area to proceed with due regard for the road corridor.

Specifically, this report:

- reviews social, environmental, and economic impacts to the Park Ridge Connector by summarising technical investigations undertaken in the area of interest
- incorporates feedback provided by the Community Stakeholder Reference Group
- summarises the process to determine a refined area of interest
- makes recommendations for further information requirements and on the scope and purpose of further investigations to assist the decision-making on whether a motorway corridor is available for preservation in the area of interest.

Should there be a viable corridor, work will continue to develop future construction timeframes, costs or estimates, an economic evaluation, and detailed engineering road design.

Figure 1.1: Park Ridge Connector area of interest



2. The Park Ridge Connector

2.1 Overview

The Department of Transport and Main Roads and Logan City Council are working together to identify a viable corridor for the Park Ridge Connector.

The Park Ridge Connector is a future motorway identified at a conceptual level in the *South-East Queensland Regional Plan 2009-2031* and the *Connecting South-East Queensland 2031*, an integrated regional transport plan for south-east Queensland. The Park Ridge Connector aims to strengthen the road network in Logan City to ensure the existing community and planned future communities at Park Ridge, Greater Flagstone and Yarrabilba have good access to employment and services.

The Department of Transport and Main Roads and Logan City Council are working together to examine the social, economic and environmental (triple bottom line) issues in the identified area of interest. A number of technical reports have been commissioned by the Department of Transport and Main Roads that have informed this review of environmental factors report. This review of environmental factors has also been informed by the Community Stakeholder Reference Group, which has identified a series of important community values relating to the area of interest. The outputs of both the technical reports and the Community Stakeholder Reference Group have enabled this review of environmental factors to define a refined area of interest that could potentially accommodate the Park Ridge Connector.

2.2 Background

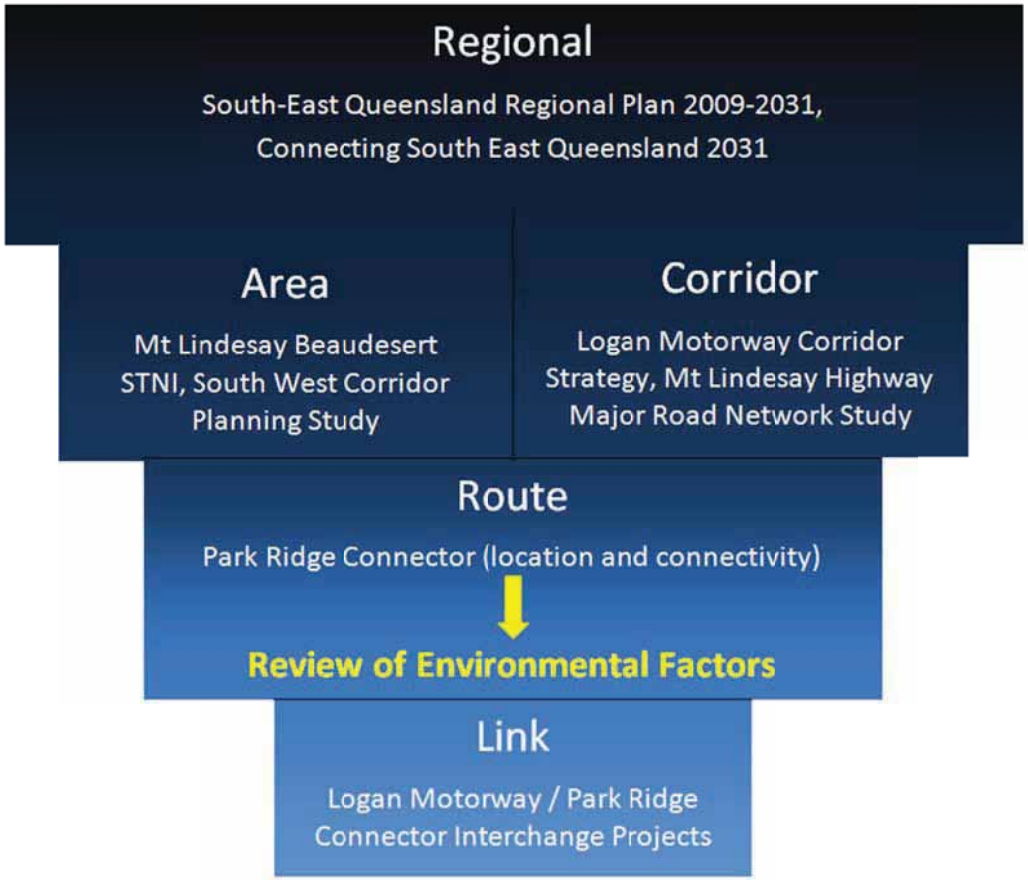
Logan City and Scenic Rim Council areas anticipate significant urban growth. New urban development at Park Ridge, Greater Flagstone, Jimboomba, Beaudesert, Bromelton and Yarrabilba are planned to accommodate an additional 160 000 people and 80 000 jobs by 2031.

Sections of the Logan Motorway, Mt Lindesay Highway and the local road network are already under pressure. In addition, the forecast growth means significant future expenditure is needed on the transport network to cope with the resultant increases in residential, commercial and industrial populations over the next two decades.

As identified in Figure 2.1, strategic documents such as the *South-East Queensland Regional Plan 2009-2031*, Mt Lindesay Beaudesert Strategic Transport Network Investigation, Logan Motorway Corridor Strategy and the Mt Lindesay Highway Major Road Network Study (May 2010) examined the travel issues to support planned growth and identified a future network of motorways, local arterial roads, public transport and active transport. This network is to be designed to deliver a future transport system south of the Logan Motorway.

These documents identify the requirement for further studies to identify the viability of the Park Ridge Connector, at a motorway standard, to provide a direct link to the Gateway Motorway and beyond.

Figure 2.1: Context of Park Ridge Connector study



2.3 Legislative framework

2.3.1 *Transport Infrastructure Act 1994*

The overall objective of the *Transport Infrastructure Act 1994* is to provide a statutory framework that allows for and encourages effective integrated planning and efficient management of a system of transport infrastructure.

A key planning objective of the Act is to establish a system under which roads of national and state significance can be effectively planned.

The Department of Transport and Main Roads is able to protect a preferred corridor, if it is available in the area of interest, using powers under the *Sustainable Planning Act 2009* and the *Transport Infrastructure Act 1994*. The Department of Transport and Main Roads would then act as a referral agency for development applications under the *Sustainable Planning Act 2009* that may impact the preferred corridor.

The process requires a letter of notification to the relevant local council (Logan City Council) from the Department of Transport and Main Roads, and then gazettal in the Queensland Government Gazette.

Although no plans or studies are legislatively required, it is recommended that a plan with a defined route accompanies the notice to council. It is beneficial that the future state-controlled road is identified in the local planning scheme, as this provides advice to applicants looking to develop the affected land. This will also assist local government to plan their future road network.

2.3.2 State planning documents

This section provides a summary of the state strategic planning and legislative documentation as it applies to the Park Ridge Connector project.

South-East Queensland Regional Plan 2009–2031

South-east Queensland is one of the fastest growing regions in Australia and a major strategic direction underpinning the regional plan is the need to facilitate this forecast growth.

The regional plan identifies a number of local and regional development areas that are anticipated to accommodate future urban development to 2031. The plan also nominates identified growth areas which are capable of supporting growth and development beyond 2031, subject to further investigation.

The regional plan sets out a vision for south-east Queensland as *a region of interconnected communities, with excellent accessibility and an extensive and efficient public transport system that contributes to reducing greenhouse gas emissions*.

A significant number of these future growth areas are located in south-east Queensland's south-western corridor, located in the south of the Logan City and Scenic Rim local government areas (refer Figure 3.1) including Browns Plains, Flagstone, Park Ridge, Greenbank and Yarrabilba. The south-western corridor has the potential to accommodate regionally significant levels of residential and employment growth to 2031 and beyond, and will emerge in the medium- to long-term as a key provider for employment and residential growth. The corridor contains existing infrastructure including the Brisbane-Sydney rail line and the Mt Lindesay Highway, but will require significant extensions of urban infrastructure networks, including roads and public transport. It also contains significant environmental values and natural resources that need to be protected.

Regional and local development areas are fundamental to delivering dwelling and employment targets in the regional plan. The successful development of these areas as regionally significant centres for growth is dependent on the timely delivery of transport infrastructure and other services.

Through the Mt Lindesay Beaudesert Strategic Transport Network Investigation, which was released for public comment in mid-2009, state infrastructure planning has identified the need for extensions to existing transport networks to service future growth areas in the south-western corridor.

The regional plan also identifies Park Ridge as a regional development area, adjacent to Logan's existing urban area. Park Ridge is envisaged to comprise residential communities and employment precincts, offer diverse housing, community facilities, knowledge-based employment opportunities and a mixed-use business park.

Development of the Park Ridge Connector would provide essential transport infrastructure to service future development areas in the south-western corridor, as well as servicing the regional development area of Park Ridge. The Park Ridge Connector would also improve services for established and proposed urban development areas to the south of Brisbane. Planning now to preserve a corridor for the Park Ridge Connector would ensure future integration of transport and land uses that can best achieve social, economic and environmental sustainability in the south-east Queensland region.

Connecting South-East Queensland 2031

This document is an integrated regional transport plan for south-east Queensland. It is the state government's blueprint for establishing a long-term plan to develop a sustainable transport system. The plan adopts an integrated approach that considers land use planning and the various modes of the transport system that move people and goods.

The document's purpose is to guide government-decision-making and provide the community with insight and say as to how the south-east Queensland transport system can look and work in the future.

The vision of the *Connecting South-East Queensland 2031* is a transport system that *Supports the lifestyle enjoyed by residents and visitors, enhances the state's economic vitality and protects the natural environment*. Achieving the transport vision would mean:

- Residents in urban communities would have easy access to jobs, shops, recreation and lifestyle opportunities.
- Freight, business and commercial traffic would enjoy reliable travel times to access key destinations within the region and quality links to other places.
- Rural communities would have safe access to local services and other parts of the region. Though private transport would still meet the majority of rural transport needs, options for those who do not own a car or are unable to drive would be available.

Connecting South-East Queensland 2031 recognises that, even though the plan targets a substantial reduction in the share of trips by private car from 83 to 66 percent between 2006 and 2031, the number of overall trips on the road system would still grow by some 19 percent (2.8 million trips) by 2031. This growth is significant and cannot be accommodated by the current road system. Therefore further development of the region's strategic road network is required, in particular to improve links to new communities.

The Park Ridge Connector is identified within *Connecting South-East Queensland 2031* as part of the strategic motorway network, aimed at ensuring heavy traffic remains on this network and does not have to unnecessarily use suburban roads.

South-East Queensland Infrastructure Plan and Program 2010–2031

The *South-East Queensland Infrastructure Plan and Program 2010-2031* is guided by the *Connecting South-East Queensland 2031 Policy* (as above) and outlines the estimated key infrastructure projects and investments required to meet the needs of South East Queensland to 2031. It represents a long-term commitment to infrastructure delivery in south-east Queensland, including transport, community and electricity infrastructure.

Park Ridge is noted in *South-East Queensland Infrastructure Plan and Program 2010-2031* (as part of the south-western corridor) and identified as having longer term potential to accommodate regionally significant levels of growth and alleviate long-term growth pressures on the southern areas of south-east Queensland such as the Gold Coast. Developing such growth areas will require elements such as transport infrastructure to be enhanced and extended and appropriately sequenced, which is integral to achieving dwelling targets set in the *South-East Queensland Infrastructure Plan and Program 2010-2031*. Sub-regional public transport and road networks will link communities with existing urban areas, employment and services. The Park Ridge Connector is a key piece of road infrastructure that will assist in the growth of the south-western corridor. It has been formally recognised and funded for investigation in the current version of *South-East Queensland Infrastructure Plan and Program 2010-2031*, with the Park Ridge Connector referred to as the Gateway Motorway extension.

2.3.3 Logan City Council planning documents

Logan Planning Scheme (2006)

The *Logan Planning Scheme* (2006) sets out the future intentions for much of the Park Ridge Connector area of interest, with the *Beaudesert Planning Scheme* stipulating planning requirements for Park Ridge South.

Desired environmental outcomes contained in Chapter 2 of the scheme reflect the core vision of Logan as a city for families, lifestyle and businesses, and aspirations for ecological sustainable development. The city aspires to achieve this by balancing the social, economic and environmental needs of the community, through:

- maintenance of the cultural, economic, physical and social wellbeing of people and communities
- protection of ecological processes and natural systems
- development and supporting infrastructure in the planning scheme area.

The *Logan Planning Scheme* (2006) currently identifies land within the area of interest as an investigation zone, which has specific requirements regarding future development, based on the *Park Ridge Structure Plan*.

The location of a Park Ridge Connector will also assist the preparation of Logan City Council's *Priority Infrastructure Plan*, which will form part of Logan City Council's new planning scheme. This is currently in preparation by Logan City Council to supersede the 2006 scheme.

Growth Management – Core Matters (2008)

The Logan City Council document, *Growth Management – Core Matters* (2008), sets out a vision for Logan as a city of expanding and increasing opportunities, containing a diverse range of integrated regional activity centres, communities and environments. The policy aims to achieve a dynamic city that sustains people's quality of life and achieves a balance with the environment, which is safe and healthy and a place where current and future generations will be proud to live and thrive.

The document identifies Park Ridge as a new regional development area incorporating enterprise areas and specialist activity centres for economic growth.

Logan City Council also seeks to ensure that, in responding to growth, it will promote the principles of ecological sustainability through development as it relates to the maintenance of wildlife habitats, water quality enhancement, vegetation and habitat protection, climate change and sensitive design.

Park Ridge Structure Plan

Park Ridge is located on the southern edge of Logan's urban area and includes a mix of rural and rural-residential development. There has been heightened interest in the area's urban development potential as a consequence of the increasing demand for greenfield sites to accommodate south-east Queensland's projected population growth. This has led to Park Ridge being identified as a regional development area (residential and employment) in the *South-East Queensland Regional Plan 2009-2031*.

The Park Ridge area has been subject to a structure planning process led by Logan City Council to guide the growth and development of the area. The *Park Ridge Structure Plan* sets out the pattern of urban development proposed, including land use distributions (housing, employment and green space) as well as the infrastructure network that will support urban development. The structure plan has been designed to inform an amendment to the *Logan Planning Scheme* and covers an area of approximately 2 500ha from Green Road south to Rosia Road.

This process has been supported by a transport strategy that aims to ensure Park Ridge will be highly accessible via integrated public transport, cycle, pedestrian and road networks. While the strategy focuses primarily on accessibility and movement within the Park Ridge area, the proposed Park Ridge Connector is recognised as playing a key role in the efficient and effective regional road network supporting the Park Ridge area. Provision has been made for the Park Ridge Connector corridor in the structure plan.

2.3.4 Strategic objectives to achieve one network

The Department of Transport and Main Roads and Logan City Council have been working in partnership to achieve a One Network transport plan for the area. This planning integrates state government strategic objectives which guide the management of the state-controlled road network, with local government transport and land use planning.

This partnership between state and local government aims to optimise the transport network in relation to major roads such as the Logan Motorway, Mt Lindesay Highway, Browns Plains Road and Park Ridge Road. The local road network would then be supported by the Park Ridge Connector.

Table 2.1 denotes how planning for the Park Ridge Connector is part of the state government's commitment to meet the vision of *planning, delivering and managing transport systems that connect Queensland*.

Figure 2.1: Alignment of the Park Ridge Connector with Queensland Government objectives

Queensland Government objectives	Department of Transport and Main Roads corporate objectives	Key performance indicators	How Park Ridge Connector meets objectives
Strong – creating a diverse economy powered by bright ideas	• A sustainable transport system which promotes growth and enhances liveability	• Transport efficiency • Proximity to transport • Transport infrastructure delivery • Transport infrastructure condition	✓ The Park Ridge Connector will create a direct link to the motorway network from the Park Ridge area to the Australia TradeCoast to allow for the future growth of industrial traffic from Crestmead Industrial Estate and future industry.
Green – protecting our lifestyle and environment	• Transport-related impacts on the natural and cultural environment and built environments managed for the community	• Transport greenhouse emissions • Transport-related environmental incidents	✓ The location and design of the Park Ridge Connector aims to minimise impacts to the ecological values of key environmental locations and places. ✓ Negative impacts will be offset by opportunities for environmental extensions to important local natural areas.
Smart – delivering world class education and training	• Enhanced capability of people involved in the transport logistics and supply chain industry	• Capability of the transport, logistics and supply chain industry	✓ The Park Ridge Connector will provide a safer, more efficient route for heavy vehicles travelling into and out of the Crestmead industrial areas, South West 1 and the future Park Ridge industrial developments, as well as reduce congestion on the local road network. ✓ By improving Park Ridge freight accessibility, the Park Ridge Connector will improve logistics and supply chain efficiency, including smart warehousing.
Healthy – making Queenslanders Australia's healthiest people	• A safe transport system leading to improved health and wellbeing for Queenslanders	• Safety of users of the transport system • Active transport	✓ The Park Ridge Connector will take trucks off local road networks, reducing emissions and allowing people to move freely and safely.
Fair	• Inclusive transport services, linking people to employment, education, services and their communities	• Effectiveness of public transport services • Transactional services delivery	✓ The Park Ridge Connector, in parallel with improvements to the Mt Lindesay Highway, will reduce congestion and enable more integrated transport opportunities for improved public transport services, walking and cycling. ✓ The Park Ridge Connector will improve access to jobs and businesses to assist in maximising growth for local employment and job opportunities.
Enabling	• Enhanced leadership and stakeholder relationships improving transport outcomes for Queensland • Contemporary people, and processes and systems, enabling us to achieve our corporate objectives	• Department of Transport and Main Roads influence over national transport - related policy • Department of Transport and Main Roads leadership of state transport-related policy • Stakeholder relations • Workplace health and safety • Capability and capacity of the department	✓ The Department of Transport and Main Roads and Logan City Council are working in partnership to achieve a One Network Plan for the Logan area, and the Park Ridge Connector is a critical link in that network. ✓ The community engagement process for the Park Ridge Connector has been open and transparent through the involvement of the Community Stakeholder Reference Group since the early phases of the planning process. This has enabled social, environmental and economic factors to be fully reviewed.

Given the legislative context, the objective of identifying whether a suitable corridor exists for the Park Ridge Connector is a response to policy direction contained in numerous state and local government planning documents. These documents highlight:

- There is an urgent need for a future high-standard road to service the major development areas in the south (such as Park Ridge, Flagstone, Yarrabilba and Bromelton), and that without an adequate road network, the growth of the planned development areas in the regional plan will not be fully realised.
- Development pressures between the Logan Motorway and Park Ridge are rapidly reducing the opportunity to preserve land for a future motorway corridor.
- Considering the high forecast traffic volumes and the high percentage of commercial vehicles, the new road should be planned to a motorway standard.

The *South-East Queensland Infrastructure Regional Plan 2009-2031* restricts urban development to areas identified within the urban footprint. In Logan City, the urban footprint extends to Granger Road. Development is anticipated to proceed quickly within the urban footprint and in the new urban development areas of Flagstone and Yarrabilba. Logan City Council is actively engaged in preparing land use plans for these new development areas.

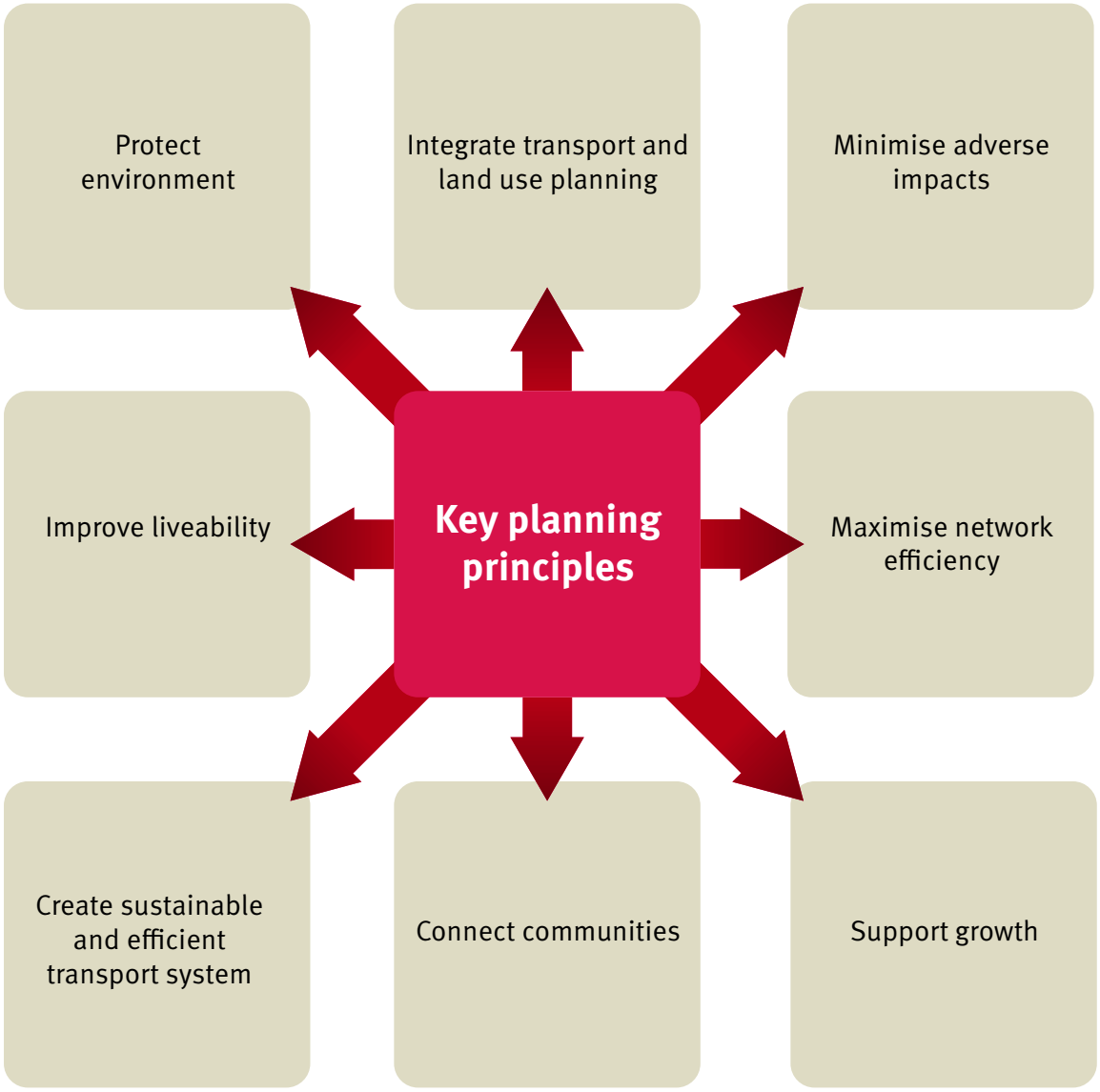
This review of environmental factors for the Park Ridge Connector is focused on determining a viable location within the urban footprint to Granger Road. The Park Ridge Connector may take the form of a motorway standard link extending south from the Gateway Motorway to Granger Road. The section of the Park Ridge Connector directly south of Granger Road (to the future proposed Southern Infrastructure Corridor) is not under development pressure and the need to fix its optimal location is not as urgent as it is in the northern section within the urban footprint. Ultimately post-2031, the Park Ridge Connector may extend further south to the proposed Southern Infrastructure Corridor.

The Southern Infrastructure Corridor is identified as a road corridor investigation route in the *South-East Queensland Infrastructure Regional Plan 2009-2031* and *South-East Queensland Infrastructure Plan and Program 2010-2031*. The Southern Infrastructure Corridor is indicatively identified as providing an east-west linkage south of the Logan Motorway between the Pacific Motorway and Mt Lindesay Highway to support growth and development in the south-western corridor. Part of the Southern Infrastructure Corridor is intended to function as a priority freight route, working with the Park Ridge Connector, providing strong connectivity for freight movements from Bromelton.

2.3.5 Key planning principles

Throughout the levels of relevant legislation noted, key principles emerge as being important to achieving desirable planning and transport outcomes in south-east Queensland. These common principles have been derived and summarised in Figure 2.2 from the above state and local planning documents. How the planning for the Park Ridge Connector meets these principles is provided in Chapter 6.8.

Figure 2.2: Key planning principles from state and local planning documents



2.4 Project rationale

The future demands for personal and commercial travel in and around Park Ridge will place substantial pressure on existing infrastructure and services. Within the framework of the *South-East Queensland Regional Plan 2009-2031*, the *Connecting South-East Queensland 2031* policy outlines the strategy for developing a transport network to support the growth planned in each council area. Within the Logan and Scenic Rim council areas, the Park Ridge Connector is identified as an important link in the future arterial network to serve passenger and freight demands.

The current close intersection spacing between the Mt Lindesay Highway, Gateway Motorway and Wembley Road connections to the Logan Motorway make it difficult to expand existing links to support the forecast traffic demand. Although upgrading of the Mt Lindesay Highway will continue to be required, there is limited potential in the long term for the Mt Lindesay Highway to expand to cater for the projected high traffic demand from Park Ridge and the new communities of Greater Flagstone and Yarrabilba.

An upgrade of Chambers Flat Road to the east has also been considered, but the connections to Kingston Road, Loganlea Road and the Pacific Motorway are already near capacity and would be unable to take the projected traffic volumes.

The Park Ridge Connector would therefore provide a new corridor that would relieve the demand on sections of parallel roads (such as the Mt Lindesay Highway) that are already congested and seek to provide the roadway capacity needed to support the planned development in the south-western corridor. The Park Ridge Connector would help attract more traffic directly to the Gateway Motorway and away from suburban roads.

The Park Ridge Connector would seek to relieve congestion on roads linking the northern and southern parts of Logan City. It will provide direct access for heavy freight traffic into the industrial areas of Crestmead and Park Ridge, reducing truck volumes on local roads.

The Park Ridge Connector would allow traffic currently passing through the area with an external origin and destination to pass through the southern part of Logan without causing further congestion on roads serving the communities within the area. This would free up capacity on the Mt Lindesay Highway to provide improved access for non-through traffic into Park Ridge, Browns Plains and to sections of Beaudesert Road. Freeing up capacity on existing arterial and local roads would also improve the quality of public transport services able to be provided in the area of interest, and increase the opportunities for cycling and walking. Further benefits to the community would also include reduced noise and emissions from freight and through-traffic, and improved amenity and safety for local road users along existing local roads.

As a strategic element in the regional freight network, the Park Ridge Connector would seek to link the future freight terminal and industrial precinct in Bromelton to the distribution industries in the southern part of the Brisbane metropolitan area, the Australia TradeCoast and the Port of Brisbane.

The Park Ridge Connector would support population growth and bring future planning certainty to Logan City, and promote the economic development of the corridor by:

- providing a more efficient delivery network for freight vehicles
- improving economic opportunities for local businesses
- improving traffic flow, allowing all road users improved access to goods and services
- improving travel time and reducing vehicle operating costs
- making safety improvements to the road network by reducing the number of potential conflict points and improving traffic performance
- providing a link for the industrial areas of Crestmead and planned industrial development in Park Ridge directly to the Gateway Motorway and the Logan Motorway
- improving connectivity to the Ipswich Motorway, Pacific Motorway, Australia TradeCoast and the Port of Brisbane
- relieving congestion on the Mt Lindesay Highway, Wembley Road and other local roads by re-distributing freight and commuter traffic, and freeing up local roads for local traffic, public transport and cycling.

2.4.1 Population and employment growth

Population growth data is typically used to determine what new social infrastructure, such as schools, hospitals and local services, and physical infrastructure, such as roads and utilities, will be required to support the new residents in an area.

Current population projections show Logan is forecast to grow from 260 000 in 2006 to 410 060 by 2031. The Park Ridge Master Plan Area alone will accommodate 37 000 to 52 000 residents, and create 20 600 to 43 000 jobs (based on current Logan City Council planning assumptions). Without planning for new road networks, freight from the region's growing industrial areas will be forced onto the existing local road network.

Logan City Council has developed, for the purposes of preparing its new planning scheme, population and employment growth projections to 2031 and through to ultimate development at 2051. The Logan Development Projections Model shows close alignment with state government projections, but is more finely grained, as is required for local government purposes. Projected population and employment growth from the Logan Development Projections Model is shown at Figure 2.3 and Figure 2.4 below.

Figure 2.3: Projected population change 2006–2031

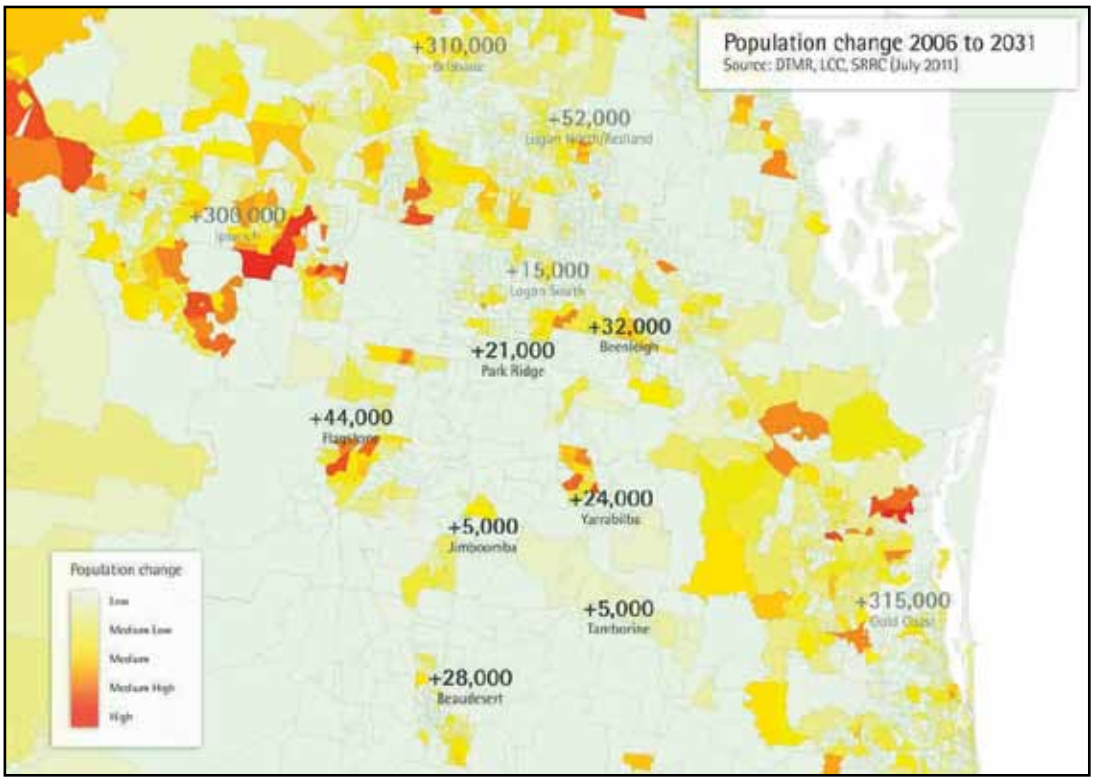
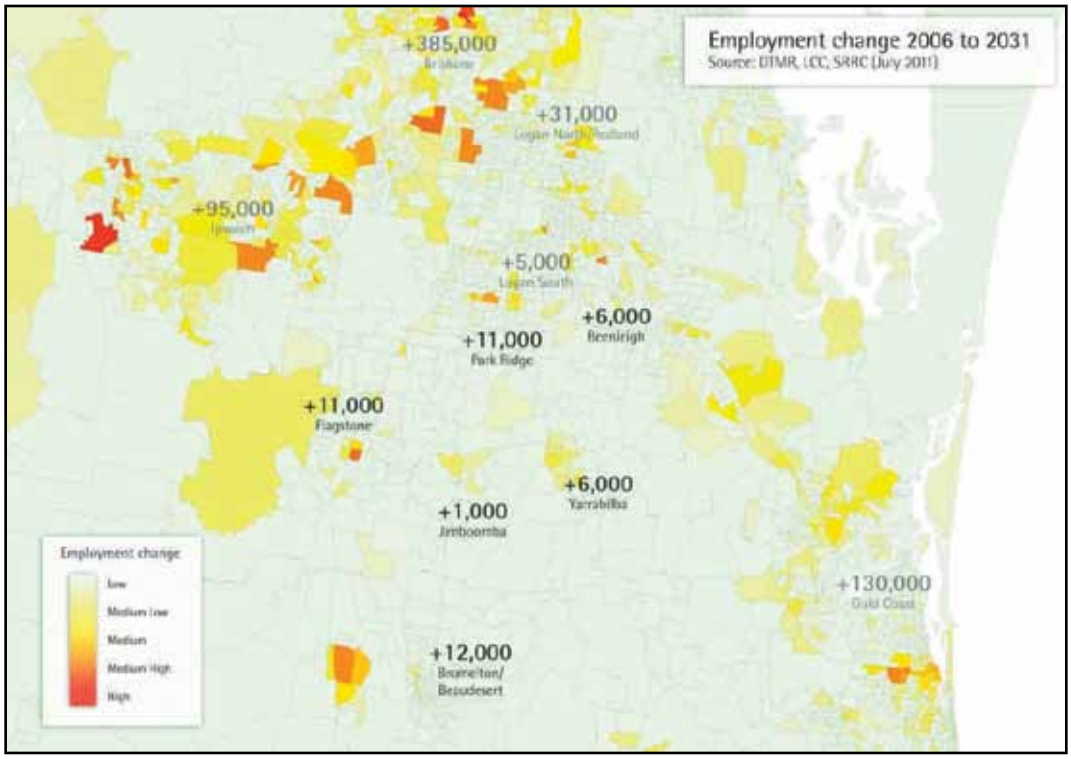


Figure 2.4: Projected employment change 2006–2031



Regional population and employment growth is projected to be significant, as illustrated in Figure 2.3 and Figure 2.4. The significant growth forecasts for the area over the medium- to long-term will require new transport infrastructure to service business and residential growth. In order to provide new communities with access to jobs, services and recreation in the future, planning for delivery of the necessary infrastructure must begin now.

The Park Ridge Connector will allow through-traffic that is bound for other destinations to pass through the southern part of Logan without causing further congestion on existing roads serving the communities in these areas. The Park Ridge Connector will protect the functions of the Mt Lindesay Highway and provide good access into Park Ridge, Browns Plains and to Beaudesert Road north of the Logan Motorway. The improved road network will provide more opportunities for improved public transport services, walking and cycling on the local road network.

2.4.2 Traffic modelling

Traffic modelling plays an important role in determining the type, location and function of new transport infrastructure that is required to support development and population growth. Using population growth data, it is possible to estimate the number of vehicle trips that will be generated by the new residential population. This is done by considering a number of factors, including:

- availability of public transport services
- car ownership data (how many cars are likely to be used by each household)
- location of key attractors (where people will want to travel to and from)
- links with existing road network and volume of traffic already on this network
- what proportion of trips are likely via public transport, walking, cycling, and other modes (known as mode split)
- type of vehicles that new roads need to accommodate such as freight, bus, car and cyclists)
- travel patterns (when people travel during the day and week).

Most of this information can be obtained through data already available on travel behaviour in similar development areas, and through observations and knowledge of how road systems operate within the urban environment. The resulting data on likely travel behaviour, trip frequency, type, location and duration allows the design of a road network to service new residential areas.

Planning for a future road network typically includes recommendations regarding road corridor widths, number of lanes in each direction and a hierarchy of roads to carry different amounts and types of traffic, from local streets to major regional motorway connectors. Proposed road networks can be tested by traffic modelling programs that analyse all the available data to forecast the number and types of vehicles on any part of the network at any time of the day. Traffic models can be run in real time to allow an understanding of how the network would operate and estimate travel times under different conditions, for example in peak travel periods, which indicates where constraints exist in the system and where congestion may occur as a result.

This traffic modelling data is then used to plan road network upgrades and new transport infrastructure, such as the Park Ridge Connector.

2.4.3 Congestion relief

Traffic modelling has predicted severe congestion on sections of the arterial road network in the south-western corridor by 2031, if there is no Park Ridge Connector link. The positive effect of the Park Ridge Connector in reducing congestion is depicted in the two maps below. Figure 2.5 demonstrates traffic volumes on the network without the Park Ridge Connector and where the traffic would go with a Park Ridge Connector link. The maps show the effect of including the Park Ridge Connector on reducing congestion on existing roads.

Figure 2.5: Congestion relief on existing roads by introducing the Park Ridge Connector

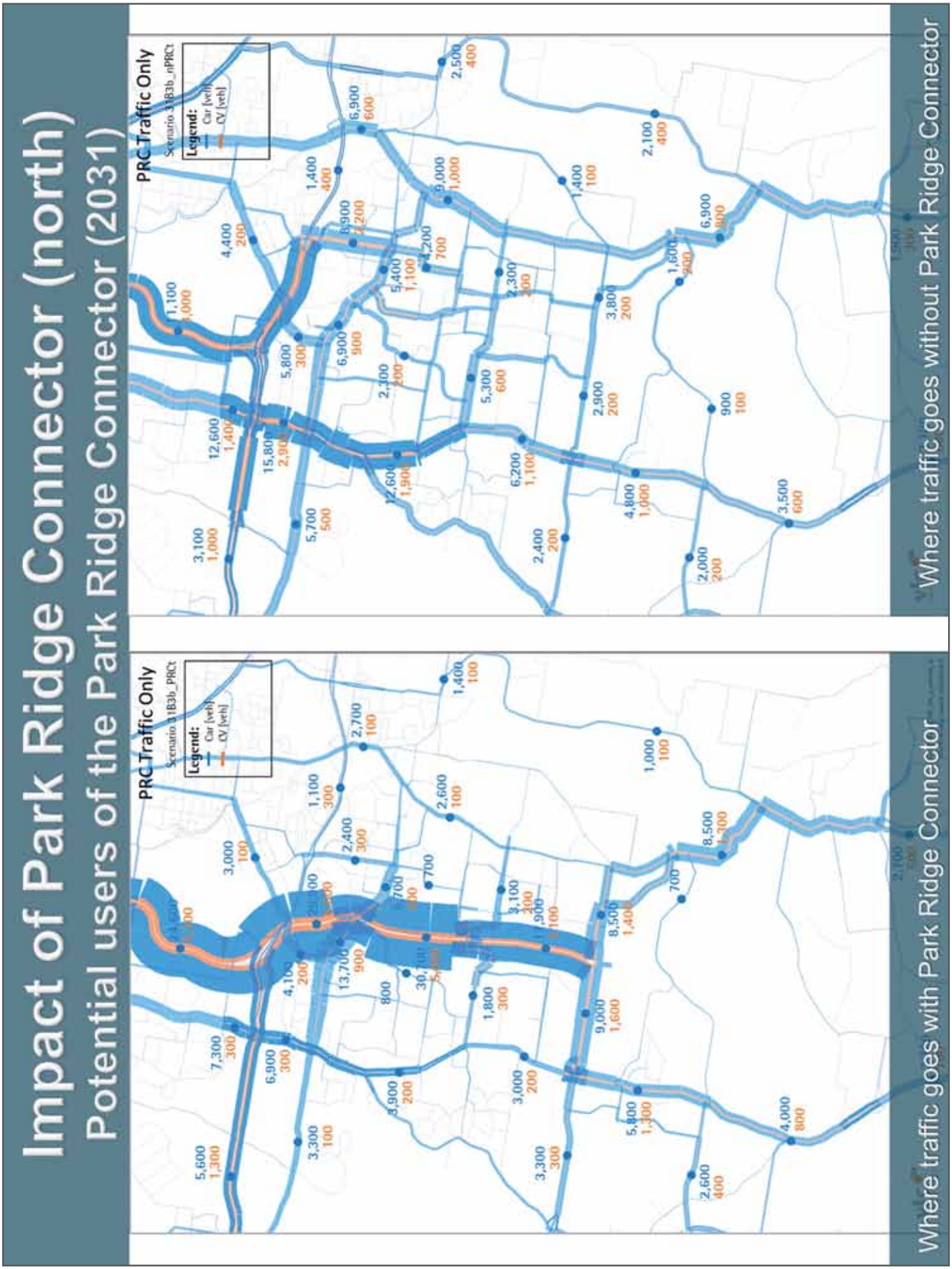


Figure 2.5 demonstrates that, without the Park Ridge Connector, some of the traffic between the Springfield-Ipswich and Park Ridge-Logan areas will find the routes leading to the Logan Motorway to be congested and may use other east-west arterials.

2.5 The proposal

2.5.1 Locating the corridor

The overall aim of the Park Ridge Connector investigation is to identify whether there is a viable location for a new motorway link from the Gateway Motorway south.

An initial broad area of interest that is bounded by the Logan Motorway to the north, Mt Lindesay Highway to the west and Chambers Flat Road to the south and east has been identified for investigation to locate a Park Ridge Connector. The current investigation has been limited at this stage to the area currently defined as the Park Ridge urban footprint in the regional plan.

Ultimately (post-2031), the Park Ridge Connector could have a southern connection to a future proposed east-west Southern Infrastructure Corridor towards Jimboomba.

2.5.2 Corridor design criteria

Geometrics

The proposed Park Ridge Connector requires the preservation of a corridor approximately 9 km in length, from the existing Gateway Motorway and Logan Motorway to Granger Road.

Although this review of environmental factors does not address the design of a road, the geometric layout of the Park Ridge Connector needs to be considered to determine the width of corridor to be preserved. Geometric design of the Park Ridge Connector will ultimately require the selection of features and dimensions, such as the number of lanes and location of interchanges.

At this early stage of planning, the review of environmental factors has allowed for the highest order of road likely to be built in the corridor, that is, a motorway. Based on the typical single lane width for a motorway of 3.5 m, an approximate 100 m wide corridor would enable up to six lanes (i.e. three lanes in each direction), as well as medians, shoulders, road verges and setbacks, to be incorporated. The eventual road design process will be required to balance the ideal motorway form against a reasonable outcome in terms of cost, safety, driver expectation, economic drivers, environmental impacts and social issues.

The Park Ridge Connector corridor location methodology, as documented in this review of environmental factors, has been designed to be sympathetic to the natural environment and user expectations while maintaining a balance between construction, maintenance and operating (including accident) costs.

At later stages of the planning process, road cross-sections will be proposed for selected points to demonstrate the lane widths and allowances necessary to construct of the link, with the aim of showing variations within the design and interaction with the natural topography.

Interchange spacing

The Park Ridge Connector would have controlled access boundaries for the full length of the route.

Interchange spacing on the Park Ridge Connector will ultimately be optimised with respect to access, capacity and safety considerations. The general design criterion recommends minimum interchange spacing for a six lane motorway of approximately 3 km in urban areas. It follows that the ultimate

number of lanes must be considered when interchanges are initially planned. Maximum spacing is less easily determined and will depend on the need for accessibility and service to the local road network.

Managed motorways

In October 2009, the Department of Transport and Main Roads adopted an internal policy that all motorway upgrade projects must include the provision of a managed motorway outcome within the planning and design phases. The Logan Motorway and the Park Ridge Connector are listed in the policy as being motorways that must include the managed motorway standard. The Park Ridge Connector, if constructed, will need to incorporate infrastructure that will enable the motorway operators to better manage congestion and incidents including breakdowns, crashes, hazards and maintenance. Adequate availability of open space at interchange locations adjacent to ramps will need to be made available for ramp-metering infrastructure such as signal heads, additional storage lanes and bypass lanes. Integration with water bodies, culverts, adjacent residential development, adjacent businesses and sound barriers could act as constraints to ramp metering implementation.

The implementation of ramp metering will require sufficient storage for vehicle queuing. Ramps should be of sufficient length to provide adequate storage space and the required acceleration distances for the implementation of ramp-metering based on 2031 volumes. Designing ramps to provide adequate storage for ramp metering will require more land area and should be considered at the early planning stage, as it will be expensive to retro-fit.

Freight movement clearances

To accommodate high volumes of inter-regional freight trips between major enterprise precincts such as the Australia TradeCoast, the design of Park Ridge Connector intersection and ramps will require adequate geometry to cater for 25 m B-doubles and multi-axle fleet turning movements.

As identified in the *Logan Motorway Corridor Strategy*, bridges will need to provide vertical clearance of 6.1 m to the motorway to accommodate the future freight function.

Cycling

The Park Ridge Connector will provide opportunity for separated cycling facilities along the length of the proposed corridor by building on the local and regional cycle network.

Flooding

The area of interest contains a number of waterways, wetlands and low-lying land including the Berrinba Wetlands. Much of the area is subject to inundation during a 100-year flood event.

The Park Ridge Connector will need to be designed to achieve a one in 100-year average recurrence interval flood immunity at all locations along the motorway. The impacts of the motorway embankments and cross-motorway drainage on flooding in adjacent areas must be considered in future stages. Potential scour and erosion around creek crossings as a result of high-velocity flows could be an issue.

Mitigation strategies to ensure acceptable levels of flood immunity for the corridor, without adversely impacting on existing properties, will need to be identified in future, more detailed, planning and design stages.

3. Area of interest

The area of interest is presented on Figure 3.1 in the context of the *South-East Queensland Regional Plan 2009-2031* south-western corridor. It covers the suburbs of Browns Plains, Marsden, Regents Park, Heritage Park, Crestmead, Park Ridge and Park Ridge South. It covers approximately 7 000 hectares of residential, rural-residential, industrial and some commercial uses.

3.1 Area description

The investigation area is bounded by the Logan Motorway to the north, Mt Lindesay Highway to the west and Chambers Flat Road to the south and east (Figure 3.2). As previously noted, while the area of interest extends to Chambers Flat Road, the location of a Park Ridge Connector for this review of environmental factors is limited to the existing urban footprint, which is to Granger Road.

Figure 3.1: Area of interest in the south-western corridor

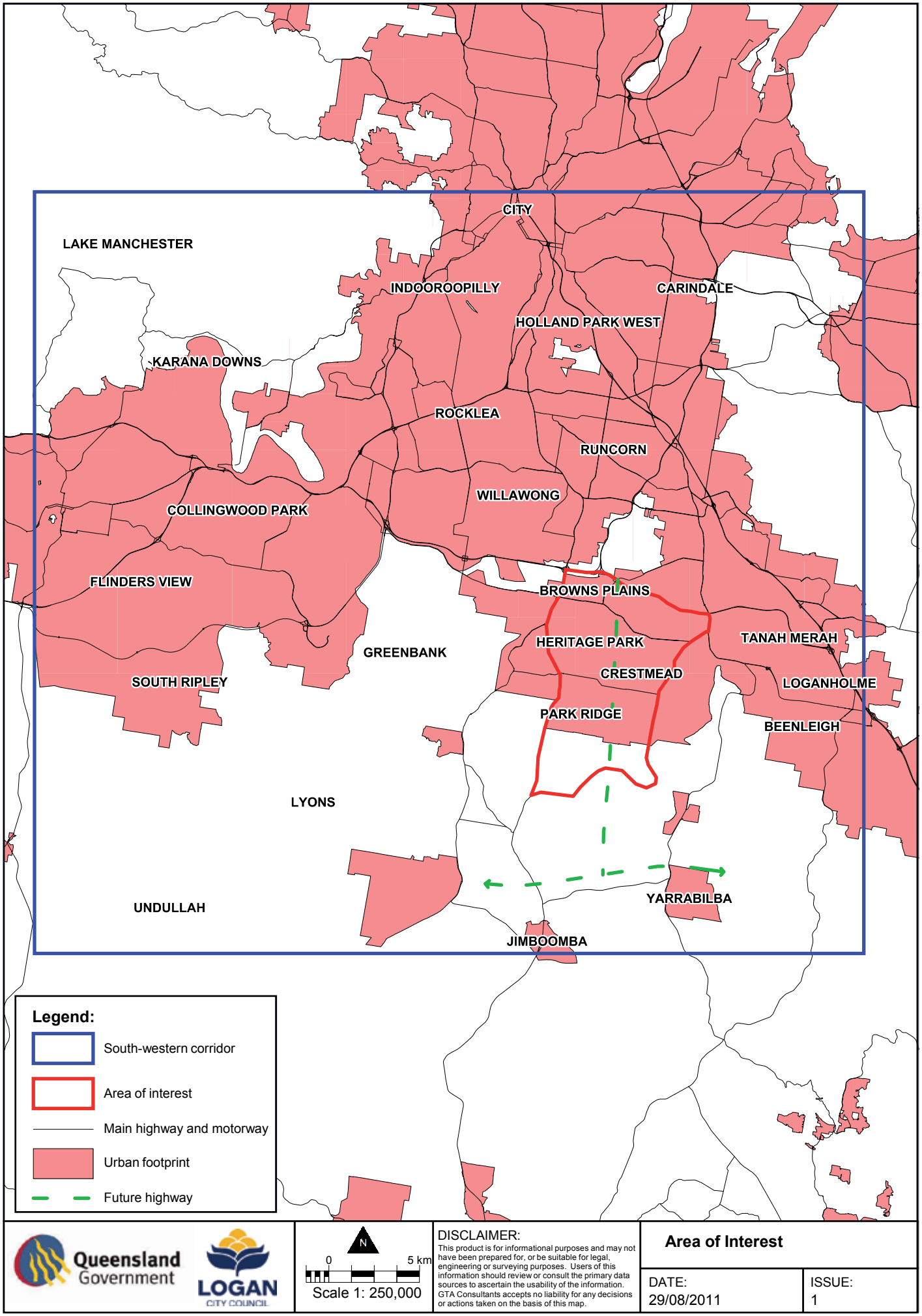
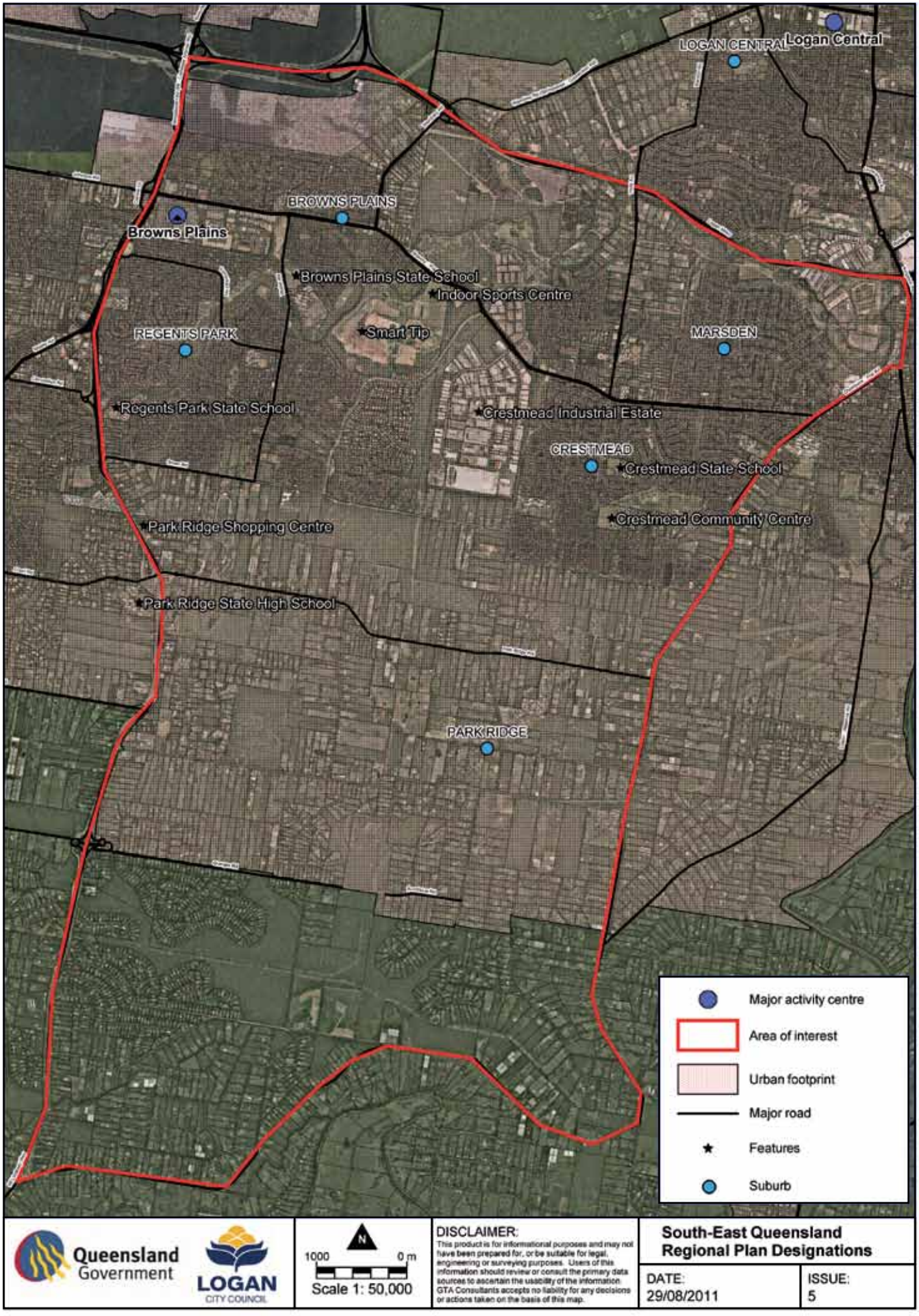


Figure 3.2: Park Ridge Connector area of interest under *South-East Queensland Regional Plan 2009-2031* designations



3.2 Natural environment features

3.2.1 Topography

Figure 3.3 shows the topography and contours within the area of interest. The landform of the area of interest is relatively flat from south of the Logan Motorway to gently undulating through to Beaudesert, with the southern extent forming part of the Logan River floodplain. The landform is bisected by a number of creeks, rivers and wetlands. The northern part of the area of interest drains east to Scrubby Creek and the Berrinba Wetlands, which are within the Logan River catchment.

The area of interest varies from higher elevations, approximately 75 m Australian Height Datum at the Logan Motorway and Gateway Motorway interchange. From here, the land generally falls away towards the east to approximately 20 m Australian Height Datum along the edge of the Scrubby Creek floodplain.

The lowest elevation in the area of interest lies to the north-east of the site in the Berrinba Wetlands, which is located between Browns Plains Road and the Logan Motorway. The topographic map indicates that Scrubby Creek passes through the area of interest in an east-west alignment.

More details on the topography of the area of interest can be found in Chapter 5, together with a description of the underlying geology and soil types.

3.2.2 Flora and fauna

The following environmental considerations have been identified in the area of interest:

- vulnerable and endangered species protected under the *Nature Conservation Act 1992* and *Environment Protection and Biodiversity Conservation Act 1999*
- essential habitat for the vulnerable wallum froglet and koala
- urban koala areas
- endangered and of concern regional ecosystems
- riparian vegetation (Scrubby Creek and Berrinba Wetlands)
- conservation areas (Logan City Council)
- biodiversity corridors (Logan City Council).

The area of interest also contains vegetation and fauna movement corridors, some of which connect to Karawatha Forest. The forest represents the most eastern part of the regionally significant Flinders to Greenbank-Karawatha wildlife corridor (Figure 3.4). The 40 km wildlife corridor stretches from south of Ipswich at Flinders Peak to Karawatha Forest in Brisbane City and Logan City, passing through Scenic Rim and the Greenbank Military Reserve. The major bushland areas of Flinders Peak, Mount Perry, White Rock, Greenbank Military Reserve and Karawatha Forest are linked by bushland remnants which are mostly privately owned.

Figure 3.3: Area of interest topography and contours

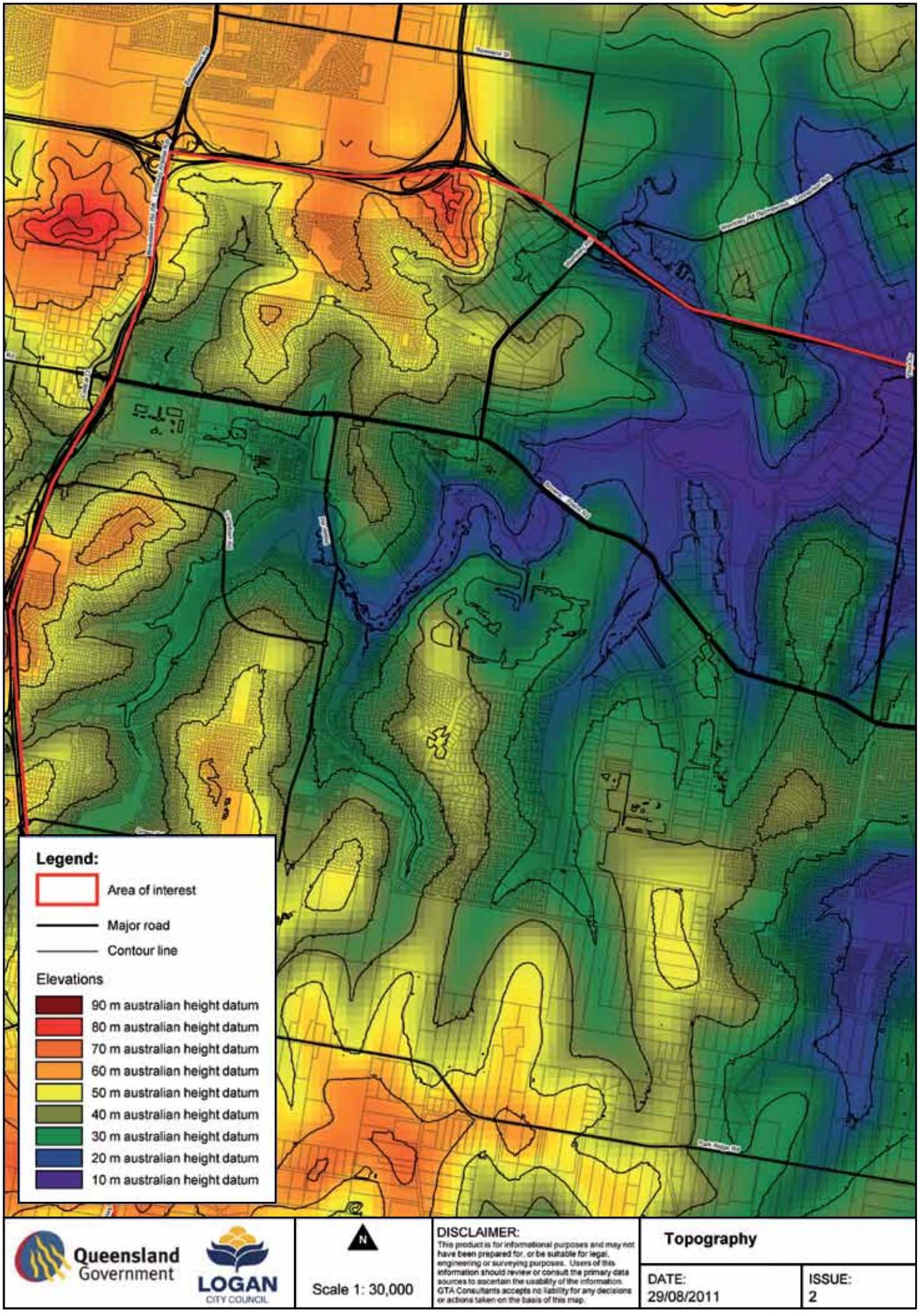
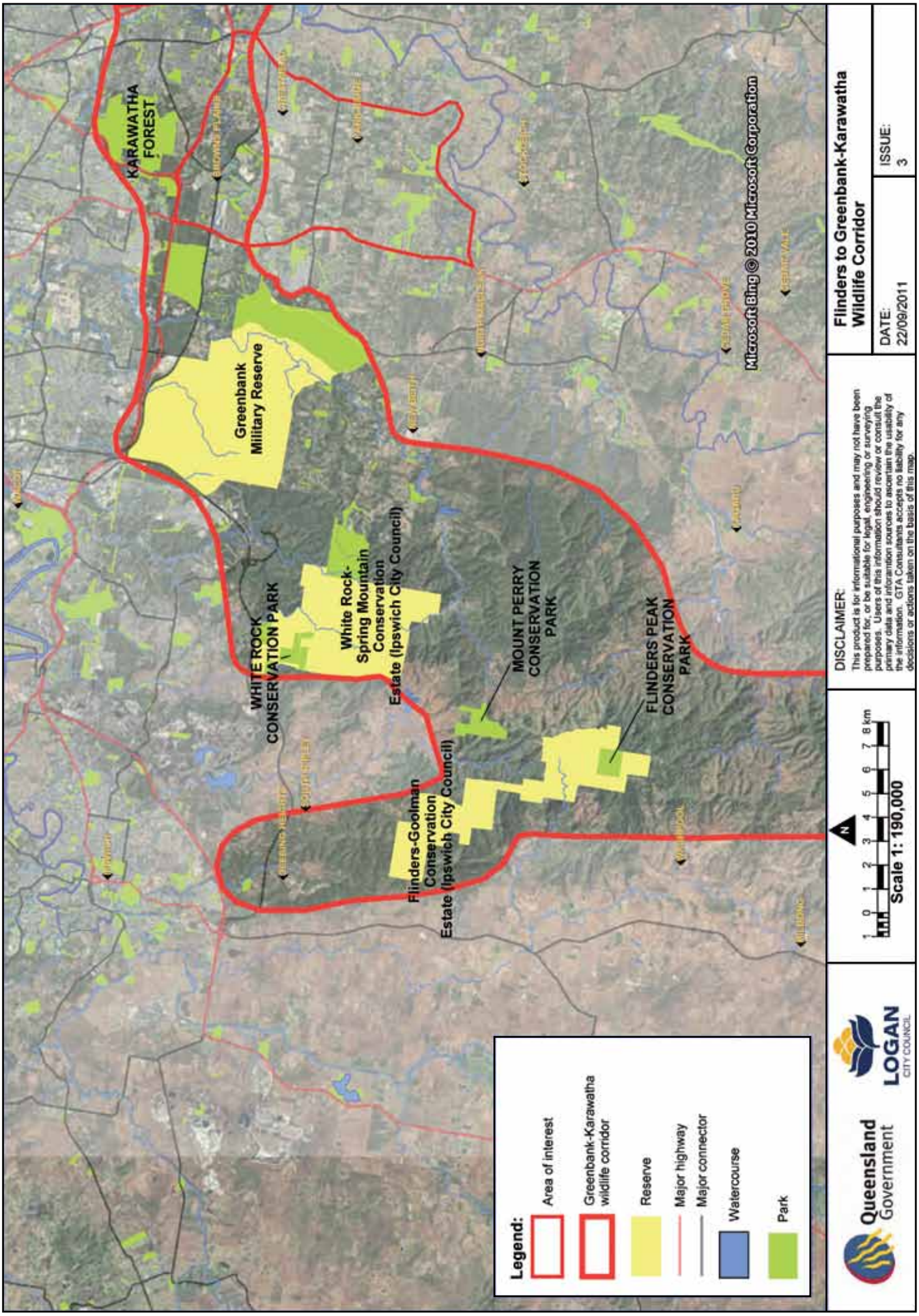


Figure 3.4: Flinders to Greenbank-Karawatha wildlife corridor



3.2.3 Regional ecosystems

The regional ecosystem database includes the status of regional ecosystems as gazetted under the *Vegetation Management Act 1999* and their biodiversity status as recognised by the Environmental Protection Agency.

The Environmental Protection Agency's regional ecosystem mapping has identified vegetation communities of concern and endangered in the area of interest. Their locations have been identified directly south of the Logan Motorway and south of the existing Gateway Motorway interchange with the Logan Motorway. These areas are highlighted in Chapter 5.2.2

A number of endangered regional ecosystem areas can be found adjacent to the Scrubby Creek waterways. Their locations have been identified directly south of the Logan Motorway, directly south of the Gateway Extension and Logan Motorway interchange, and between Green Road and Rosia Road.

Essential habitat is vegetation in which a species that is endangered, vulnerable, rare or near-threatened has been known to occur. Essential habitat for the koala (vulnerable) and the wallum froglet (vulnerable) has been identified throughout the area of interest. This includes a large section of Karawatha forest, and scattered areas of vegetation south of the Logan Motorway.

3.2.4 Wetlands, waterways and open spaces

Key natural environment features in the area of interest include wetlands, waterways and associated buffers, and open spaces such as flood plain management areas, vegetation management areas and parks.

The Berrinba Wetlands lies approximately 900 m south of the Logan Motorway in the area of interest, a place of potential natural and historic heritage significance. The wetlands are man-made, created by sand and mining operations after World War II, and have largely remained untouched since the 1990s. Only 40 ha of the 120 ha site has been developed, with the remaining 80 ha protected and rehabilitated. Berrinba Wetlands is a significant water body within the Scrubby Creek catchment, affecting upstream and downstream flows, water quality and potential flooding.

Scrubby Creek catchment area and its tributaries are the main waterways that could be affected by a Park Ridge Connector corridor. Water from this catchment eventually drains into the Logan River.

In terms of key open spaces and parklands, the area of interest contains Marsden Park and Scrubby Creek Park to the north-east; Browns Plains Park and Homebush Koala Park to the north-west; Hawthorn Park, Crestmead Park and Hubner Park to the centre of the area of interest; and Jerry's Downfall Reserve to the south. Vegetation corridors and fauna movement corridors also run through the area that connects to Karawatha Forest.

3.3 Built environment features

3.3.1 Land use

The northern portion of the area of interest (Logan Motorway to Green Road) is characterised by a highly urbanised environment, containing well-established residential communities and commercial, industrial and open space land uses.

The southern portion (Green Road to Granger Road) of the area of interest is existing rural residential development, with the recently finalised *Park Ridge Structure Plan* covering the area between Green Road and Rosia Road and providing a footprint for development.

The future land uses expected within the area of interest are outlined in Chapter 5.1.4, including the potential short-term land use changes as a result of current development applications, as well as the

longer-term land use changes that are envisaged by a number of documents (*South-East Queensland Regional Plan 2009-2031*, *Logan Planning Scheme* and the *Park Ridge Structure Plan*).

3.3.2 Infrastructure

Key existing infrastructure in the area of interest is outlined below.

Transport networks

Within the area of interest, the transport network consists of active transport routes, buses and roads.

The existing road network has three highways that run along the northern and western boundaries of the site. These are the Logan Motorway, Gateway Motorway and Mt Lindesay Highway. Other major roads that operate throughout the investigation area include:

- Browns Plains Road
- Park Ridge Road
- Wembley Road
- Waller Road
- Green Road.

Logan City Council identifies a cycleway network that extends along Browns Plains Road, Park Ridge Road, Bayliss Road, Wembley Road, Clarkes Road, Mt Lindesay Highway and Waterford-Tamborine Road.

There is no existing rail infrastructure within the study corridor. However, a disused rail line runs from Jimboomba to Logan Village. Logan City Council has undertaken some planning on the disused rail line for possible future use for walking cycling and horse riding – known as the rail trail development.

Bus services in Logan City Council are provided by two private bus companies: Logan City Bus Service and Park Ridge Transit. Both are under contract to the TransLink Transit Authority.

Electricity towers

Existing Powerlink towers run generally north-south through the area of interest. A Kuraby Interconnector Pipeline is also planned within this corridor for some of the distance.

Landfill

SmartTip, an existing landfill station for waste disposal and storage, is located on Browns Plains Road, Heritage Park. This facility is also the location of the Logan Recycling Market.

Public utilities

Logan Water Alliance is constructing new water, wastewater and recycled water infrastructure throughout Logan. A 1.5 km pipeline has been constructed within the area of interest at Wembley Road, Berrinba an attached wastewater pump station has been decommissioned.

Social and community infrastructure

The area of interest contains some significant social and community infrastructure, including a number of schools, churches and sporting facilities. As mentioned above, there are significant open spaces and recreational facilities. Social and community infrastructure is mapped and analysed in more detail in Chapter 5.1.

4. The planning framework

4.1 How information has been gathered and assessed

The process of narrowing the broad area of interest to a refined area of interest in which a Park Ridge Connector could be located has been informed in the following ways:

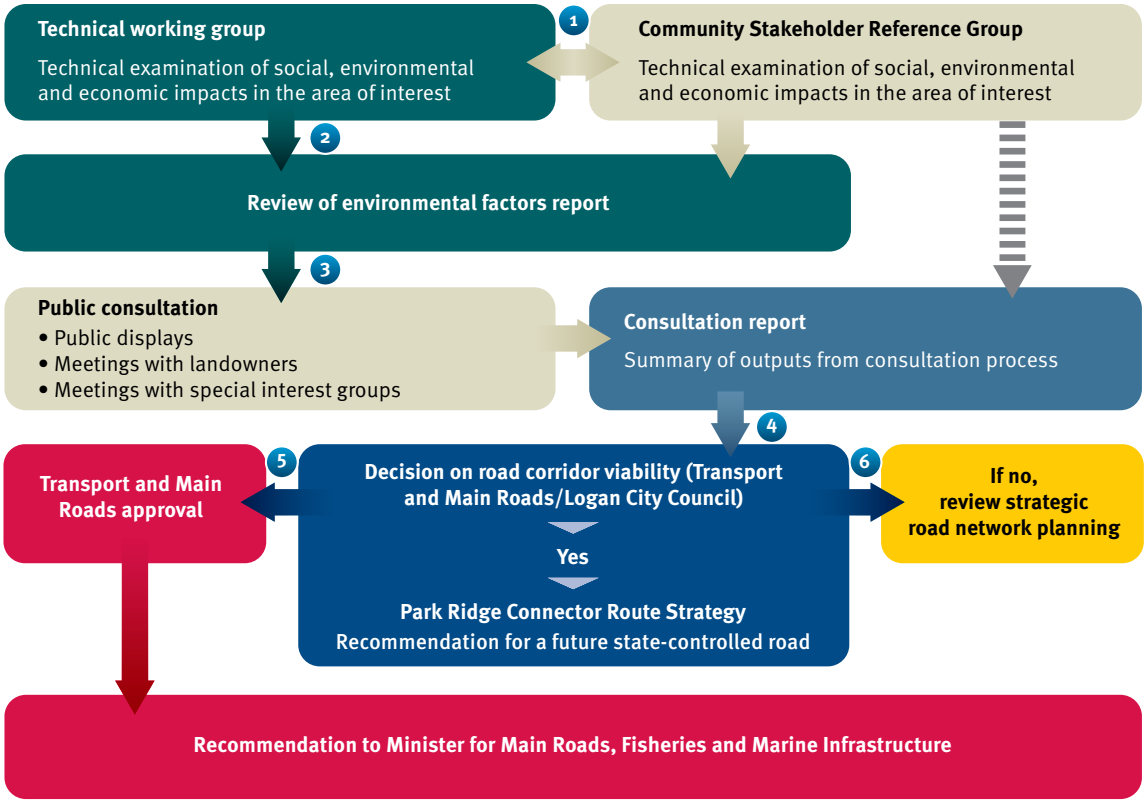
- Through technical investigations undertaken by a range of experts in disciplines across social, environmental and economic fields.
- From the input of the Community Stakeholder Reference Group and targeted consultation (environmental and Indigenous), which has been used to identify geographical areas of high value, meaning any impact to these areas should be avoided or mitigated. This information has also been used to guide further technical data from the technical advisors.
- Regular meetings between the partnership group, the Department of Transport and Main Roads and Logan City Council, to investigate integrating transport and land use planning to develop one network.

The Park Ridge Connector planning process is represented in Figure 4.1. To date, consultation and technical investigations have narrowed the area of interest to a refined area of interest for the Park Ridge Connector for the purpose of public display. Once the public display period is complete, all feedback will be collated and included in a consultation report. This report will be analysed by the Department of Transport and Main Roads and Logan City Council to determine whether a viable road corridor is available through the refined area of interest. This will consider:

- Whether the level of technical data gathered has been sufficient to adequately inform the Park Ridge Connector planning process.
- If the refined area of interest accurately reflects the values and views of the wider community.

Further targeted landowner consultation will occur during public display with significantly affected property owners as part of the consultation process.

Figure 4.1: Park Ridge Connector Planning Process



4.2 Technical assessments

Road corridor planning requires a high level of strategic planning and technical input. To successfully deliver this outcome, the Department of Transport and Main Roads engaged a number of technical advisors. The technical advisors have provided specialist input to the project process, provided advice to the community and stakeholder reference group members, and given feedback on the constraints and opportunities within the area of interest.

The technical advisors to the project include specialists in the following areas:

Acoustics:	Acoustic (noise) assessment of the potential impacts associated with the location of a future state-controlled road
Air quality:	Air quality assessment of the potential impacts associated with constructing and operating a future state-controlled road
Cultural heritage:	Assessment of historic (non-Indigenous) cultural heritage
Economics:	Economic impact assessment and technical reporting on the economic benefits or risks of locating a potential corridor in the Park Ridge region
Environment:	Environmental impact assessment and technical reporting on flora, fauna, habitat and biodiversity corridors in the potential corridor region
Flooding:	Mapping of flooding levels for a 100-year flooding event and assessment of the potential impact of flooding on a future state-controlled road
Planning:	Land use planning and information regarding development applications of interest
Social:	Social impact assessment and technical reporting on the potential impacts to social infrastructure and community facilities, including community connectedness and potential property acquisitions in the corridor area

Technical design: Road transport planning and design, technical reporting on the feasibility of potential corridor options identified with input from a Community Stakeholder Reference Group, including constructability and potential design options

Visual amenity: An assessment of the visual and landscape impacts associated with constructing and operating a future state-controlled road.

The technical advisors developed a series of social, environmental and economic values relevant to the area of interest and translated that to constraints mapping. As discussed previously, the Community Stakeholder Reference Group also provided input to this process. The findings were critical in providing information to define a refined area of interest.

Regular project team meetings of all technical consultants involved in planning for the Park Ridge Connector have ensured that technical reports have not been prepared in isolation. These cross-discipline meetings have also been used to guide and inform the Park Ridge Connector process and information feedback to the Community Stakeholder Reference Group.

The technical data-gathering has been guided by a project manager to ensure timely delivery of the information required. The project team has also been instrumental in identifying additional data requirements, conflicts or ambiguity between reports, and ensuring a comprehensive information gathering process.

4.3 Community-based approach to planning

The Park Ridge Connector community engagement process ensures that any decision about the location of a future Park Ridge Connector fully references community interests.

The process adopted recognises that planning transport infrastructure requires a high degree of community input to ensure an equitable outcome for communities living near, or affected by, transport corridors. Early community involvement is of primary importance and, from the outset, the Park Ridge Connector project has taken a community values-based approach.

4.3.1 Focus groups and Community Stakeholder Reference Group

At the commencement of the project, focus group research was undertaken with the Logan community to determine their level of understanding and awareness of population and growth issues, and what this means for transport planning in their local community. This research identified the need to improve community understanding of transport issues. It also identified the need for state and local governments to coordinate their planning. The outcomes of this research have helped shape the community consultation process for Park Ridge Connector.

The initial input of the Community Stakeholder Reference Group has provided a foundation to build a picture of community values that will be further developed in the next stages of the consultation process via the public display with the broader community, stakeholder groups and affected property owners.

The Community Stakeholder Reference Group with a representative group of local community members was formed to ensure community values, opinions and views were fully understood by the project team. The purpose of the Community Stakeholder Reference Group was to bring together a broad and diverse section of the Park Ridge community, representative of the area of interest.

The role of the Community Stakeholder Reference Group was to:

- provide input into the social, environmental, economic and technical data used to prepare the review of environmental factors.

- act as a reference group and identify constraints and opportunities within the area of interest prior to the public display of potential corridor options.

The community engagement strategy for the Park Ridge Connector investigation was designed to:

- enable community input into the Park Ridge Connector planning process
- inform the broader community in the Park Ridge area about the review of environmental factors process and schedule for public display
- inform the broader community in the Park Ridge area about the Community Stakeholder Reference Group process and outcomes
- provide information about the project to local residents and stakeholders
- manage the local community's issues and concerns.

To enable the Community Stakeholder Reference Group to deliberate on the viability of the road corridor they were provided with:

- technical data on the social, environmental and economic values in the area of interest
- road transport planning information relating to common terms and design requirements
- the structure of the review of environmental factors and the technical data it contains
- the decision-making process leading to the ministerial designation of a road corridor.

The Community Stakeholder Reference Group consisted of 14 community members selected through a publicly advertised nomination process in May 2011. Each nomination was reviewed by the project team and local councillors to ensure participation across a range of interests and sections of the community.

The Community Stakeholder Reference Group was selected to ensure the following were appropriately represented:

Community of interest:	Representatives of special interests within the region, including local businesses, environmental groups, local residents' groups, Neighbourhood Watch and Rural Fire Brigade members
Community of place:	Residents from communities within the area of interest, including Browns Plains, Park Ridge, Park Ridge South, Heritage Park, Berrinba, Crestmead and Regents Park
Community of purpose:	A balance of key interest areas as they relate to the corridor, including impacts on social, economic and environmental representatives
Demographics:	A balance of gender and ages (that is from youth representatives to retirees).

The final composition of the Community Stakeholder Reference Group and the community groups it represents is detailed below:

- Logan and Albert Rivers Catchment Association
- Berrinba Wetlands area resident
- Indigenous representative
- youth representative
- Crestmead Industrial Estate business representative
- Community or cultural representative
- Logan and Albert Conservation Association
- Munruben or Chambers Flat area resident
- Park Ridge neighbourhood watch representative

- Friends of South-East Queensland
- Three local business representatives
- Park Ridge South area resident.

More information on the Community Stakeholder Reference Group process is detailed on the project website at **http://www.tmr.qld.gov.au/Projects/Name/P/Park-Ridge-Connector**.

The Community Stakeholder Reference Group met five times from May 2011 to October 2011, up unti the commencement of the public display of the review of environmental factors. Group members were encouraged to provide feedback to their industry and interest group contacts to ensure these groups were satisfied the best outcomes were available to assist in the decision-making process.

The Community Stakeholder Reference Group has informed this review of environmental factors, drawing on the knowledge, views and resources available to representatives of stakeholder groups whose interests were potentially affected by the location and network connections of the Park Ridge Connector.

While the review of environmental factors has drawn on the Community Stakeholder Reference Group, it is important to highlight that the group was involved in an advisory capacity only. The decision to locate a road transport corridor in Park Ridge, and where this corridor may sit, remained with the Department of Transport and Main Roads and Logan City Council.

There was no payment for Community Stakeholder Reference Group membership and each member volunteered their time and energy to contribute to a shared outcome from the group. Each member completed the Community Stakeholder Reference Group charter and procedure, and agreed to contribute positively towards group discussions and outcomes. The effort and time each member contributed created a positive and energetic group committed to cooperating and setting aside differing agendas.

4.3.2 Public display-targeted landowner and stakeholder consultation

The public display of this review of environmental factors is scheduled for four weeks and allows any member of the public to view the document and comment on the outcomes of the process undertaken During the public display period, the wider community will be invited to participate in the planning process for the Park Ridge Connector.

All public input will be captured in a separate Park Ridge Connector consultation summary report that will inform further planning and decision-making.

As part of the review of environmental factors public display, the engagement activities will also focus on potentially affected property owners and other key stakeholder groups. These stakeholders have been identified throughout the process in close partnership between the Department of Transport and Main Roads and Logan City Council.

5. Technical reports

This section of the *Review of Environmental Factors Technical Report* summarises the key social, environmental and economic issues, impacts and potential mitigation measures as examined in the technical reports.

This summary is intended to provide an overview of the findings, and does not attempt to cover all details contained in the technical reports. The technical reports referenced are listed in Table 5.1.

Table 5.1: Park Ridge Connector technical reports

Discipline	Report name	Author	Date
Acoustic	*Park Ridge Connector Acoustic Assessment*	Ron Rumble Renzo Tonin	September 2011
Air quality	*Park Ridge Connector Review of Environmental Factors Air Quality*	VIPAC Consulting	June 2011
Cultural heritage	*Historic Cultural Heritage Report*	Everick Heritage Consultants Pty Ltd	August 2011
Environmental	*Environmental Assessment and Investigation Report*	PLANIT Consulting	August 2011
Fauna	*Survey for Spotted-Tail Quoll within Logan City Council Bushland Reserves, Park Ridge South*	PLANIT Consulting	August 2011
Indigenous heritage	*Introductory Report: Park Ridge Connector East and West Locations Investigations*	Turnstone Archaeology	August 2011
Landscape and visual amenity	*Landscape and Visual Amenity Introductory Report*	PLANIT Consulting	June 2011
Land use	*Land Use Study: Park Ridge Connector Review of Environmental Factors*	PSA Consulting	April 2011
Social	*Social Assessment Report: Park Ridge Corridor Preservation Study*	SMEC Australia Pty Ltd	August 2011

5.1 Social considerations

5.1.1 Cultural

The *Historic Cultural Heritage Report* (Everick Heritage Consultants, August 2011) presents the results of a preliminary assessment for historic (non-Indigenous) cultural heritage assessment in the area of interest. The primary aim of the assessment was to identify historic heritage constraints that may impact the eventual corridor location for the Park Ridge Connector.

The scope of investigation has been based on a literature review, heritage register search and a review of historic aerial photography. Historic cultural heritage is defined as being items or places of particular aesthetic, historic, scientific, social or spiritual value for past, present or future generations but not related solely to Aboriginal occupation or culture. A brief discussion on the potential impacts of a Park Ridge Connector has also been provided.

Existing environment

Cultural heritage registers

A search was undertaken of the following heritage registers listing historic cultural heritage:

- World Heritage Register
- Register of the National Estate
- National Heritage List
- Commonwealth Heritage List
- State Heritage Register
- Logan City Council Heritage Register
- Beaudesert Shire Council Heritage Register.

The Chambers Flat Cemetery (refer Figure 5.8) is the only registered historic site in the area of interest. It is at the intersection of Sungold Road, Chambers Flat Road and Logan Reserve. The cemetery is relatively small, and it is estimated that approximately 200 persons have been buried there since 1891. The cemetery continues to be used and constitutes an extremely significant heritage place.

One listed heritage place, the Park Ridge School (refer Figure 5.8), is situated immediately adjacent to the area of interest. The school is listed on the Logan City Council Heritage Register, and is situated at 3776-3796, Mt Lindesay Highway, Park Ridge.

Two other schools, the Browns Plain Provisional School and the Chambers Flat School, have been closed since 1913 and 1921 respectively. It is not known whether any remnants of either school remain on site. The approximate location of these schools is shown in Figure 5.7.

Historic aerial photography

Land use within the area of interest was reviewed using aerial photography from 1955 and 1983. The 1955 photographs show that, for the most part, the area of interest was undisturbed at the time, with extensive tree coverage. It is likely this was a mix of old forest and new regrowth. Within this bush setting are a number of small homesteads, identifiable from the fire break cleared around them. Only a handful show evidence of small to medium scale farming or industry, primarily in the north of the area of interest.

The 1955 historic aerial photography is important because it demonstrates that there is a generally low likelihood of significant heritage items being impacted by the Park Ridge Connector. The historic themes listed in the technical report, such as early settlement and the introduction of local industry, are relatively unlikely to be demonstrated by the limited number of places evident in the 1955 photographs.

The 1983 photograph shows Scrubby Creek and the surrounding area have been significantly disturbed as a result of sand mining of the creek. However, the central and southern portions of the area of interest appear to have undergone little major development up to 1983.

Potential impacts

Historic heritage

Chambers Flat Cemetery is considered a place of extremely high local cultural heritage significance and, as such, it is recommended the Park Ridge Connector alignment should avoid the immediate area surrounding the cemetery.

The original Park Ridge Primary schoolhouse is immediately adjacent to the western boundary of the area of interest. Should the Park Ridge Connector come within close proximity to the school building, a heritage impact assessment would be required.

Based on the historical context and desktop resources consulted during this assessment, the potential for the Park Ridge Connector to directly affect additional historic heritage sites is generally considered low to moderate.

Natural heritage

Places of natural heritage significance also commonly retain historical importance, and as such have been considered in the project assessment. It is important that any discussion of the impact of the Park Ridge Connector on natural places is not limited to discussion of their environmental values. The local communities will often have a more complex relationship with a natural place than the quality of the environmental values the place retains. Local communities may have a strong association with a natural place due to its recreational or scenic value.

The Berrinba Wetland is a place of potential natural heritage significance within the area of interest. The wetland, situated in the northern part of the area of interest, contains an important ecosystem. Its value to members of the local community is enhanced through the construction of a number of walking tracks and public places. The wetland is a relatively recent construction, with the site formerly used for sand mining. The age of the place is not critical to it being of heritage value. Rather, it is the strength and nature of the associations that groups within the community may have with the wetlands. Regarding the local community support that drove the creation of the wetlands, it is possible that they retain heritage and environmental values.

Mitigation measure and recommended further studies

The following mitigation measures and recommendations are provided by the technical consultant for the area of interest. The Department of Transport and Main Roads will determine the extent of future studies and mitigations should a viable corridor be determined within the refined area of interest.

Chambers Flat Cemetery

Chambers Flat Cemetery is a likely heritage place, set within a leafy backdrop of eucalyptus woodland. This vegetation provides the cemetery a visually attractive and reclusive setting, and is likely a key component to the significance of the place. Impacts to the surrounding bushland should be avoided. Further, in the event that the Park Ridge Connector refined area of interest is in close proximity of the cemetery, any impacts from noise pollution should be the subject of further investigations.

Chambers Flat School

Should the refined area of interest run close to the former Chambers Flat School, further study should be undertaken to determine:

- the location of the former school building
- whether there are any physical remnants of the school yard and infrastructure.

If any evidence of the Chambers Flat School remains on the site and may be impacted by the Park Ridge Connector, a cultural heritage significance assessment should be undertaken. This assessment should guide management strategies.

Further historical cultural heritage assessment

Further cultural heritage assessment will need to be undertaken at detailed design stages once the corridor is selected. This assessment should include further research, community consultation and a targeted site inspection strategy.

Historic cultural management plan

A cultural heritage management plan needs to be developed for the Park Ridge Connector once a corridor is selected. The plan should include:

- general principles of historic heritage management
- responsibilities and channels of communication
- find strategy for items of potentially significant cultural heritage found
- archaeological monitoring standards
- archaeological investigative standards
- conservation and interpretation standards
- appointment of a cultural heritage advisor
- periodic review requirements
- requirements for the approval of Department of Environment and Resource Management or other government agencies as needed.

5.1.2 Indigenous

This section of the report addresses aspects of Aboriginal cultural heritage relating to the area of interest

The scope of investigation included a literature review of previous cultural heritage studies and intensive searches of cultural heritage registers. The study also provides information regarding relevant native title claimants, cultural heritage bodies and interested stakeholders. The investigation provides a predictive model for potential cultural heritage sites, both sub-surface and non-visible. Furthermore, the investigation outlines constraints and possible strategies for addressing Aboriginal cultural heritage issues and makes a number of recommendations to assist progress.

Existing environment

The *Aboriginal Cultural Heritage Report* (Turnstone Archaeology, August 2011) looks at aspects of Aboriginal cultural heritage in the area of interest and provides information regarding relevant native title claimants, cultural heritage bodies and interested stakeholders.

Native title claims

Within the area of interest there are two competing native title registered claims and two registered cultural heritage bodies. These are:

- Jagera People #2 (native title claimants QC03/15) filed in Queensland on 12 November 2003 (Federal Court file number QUD6014/03). This claim is currently registered and active.
- Turrbal People (native title claimants QC98/26) filed in Queensland on 13 May 1998 (Federal Court file number QUD6196/98). This claim is currently registered and active.

Under the *Aboriginal Cultural Heritage Act 2003*, cultural heritage is the responsibility of the relevant registered Aboriginal cultural heritage body. The role of the body is to provide a focus group that has legal identification with an area of land, and the right to speak for that 'country'. The Department of Environment and Resource Management registers Aboriginal cultural heritage bodies.

The registration of a claim gives claimants the right to be consulted on or involved in future negotiations about proposed developments in the claim area. It also gives claimants with a cultural heritage body the right to be parties to certain types of Indigenous land use agreements.

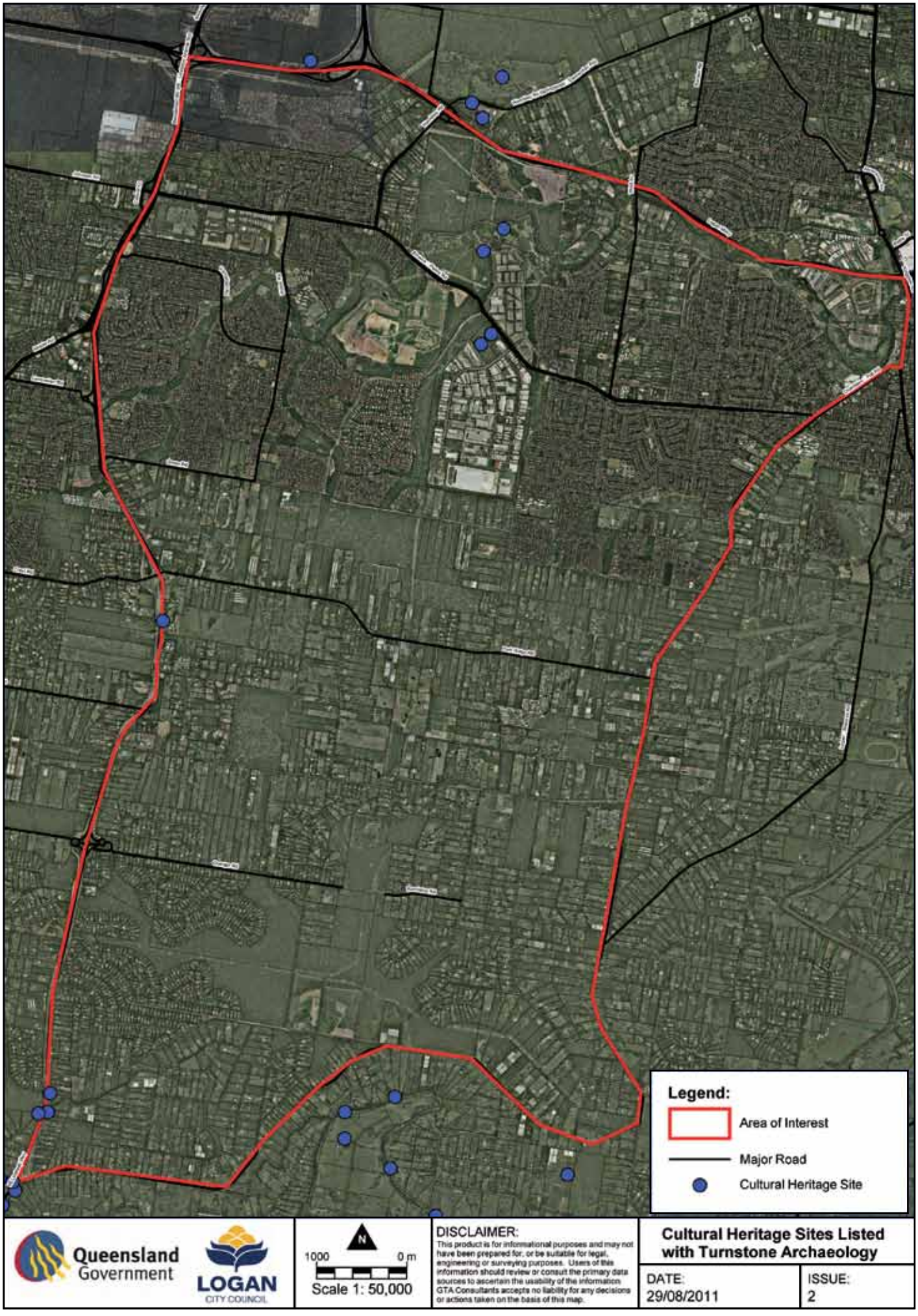
Until the claims are resolved, the study recommends consultation with both bodies on the potential location of a road corridor.

Registered sites with Cultural Heritage Coordination Unit

The Cultural Heritage Coordination Unit within the Department of Environment and Resource Management is responsible for maintaining and monitoring the status of registered cultural heritage sites. The Department has provided a list of cultural heritage sites within the boundaries of the Jagera People's native title claim.

A number of cultural heritage sites and places were sourced from Turnstone Archaeology databases within the area of interest. However, none of these cultural heritage sites are currently registered by the Cultural Heritage Coordination Unit (Figure 5.1).

Figure 5.1: Known Aboriginal cultural heritage sites



Potential impacts

Turnstone Archaeology has developed a tool called Predictive Landscape and Cultural Environment modelling. Cultural landscape mapping and predictive modelling are tools that Indigenous communities, planners and developers can use to develop future planning strategies. The modelling uses more than 100 criteria to determine the location of archaeological sites, particularly sub-surface archaeological sites.

The range of data in the modelling tool is used to rebuild and re-identify lost landscapes. These include oral histories and stories; historical and pioneer accounts; archaeological studies and surveys; and environmental data (especially geomorphology, topography, geology, soils and regional ecosystems) and landscape mapping. This has allowed the reconstruction of the cultural landscape to a relatively high degree of accuracy.

Based on the results of the modelling, and taking into account environmental, cultural and archaeological factors and indicators, the study found there were no major heritage constraints identified from the current knowledge. The Berrinba Wetlands were shown to be significant to Aboriginal people and to have emotive constraints. These would need to be addressed through consultation and management strategies.

The recommendations note very little fieldwork has occurred within the area of interest and that future fieldwork, in consultation with the appropriate Aboriginal party, should be an essential component of the next stage of pre-construction investigation once a corridor is identified. Fieldwork should include some sub-surface investigation. A number of registered Aboriginal cultural heritage sites are located within the general Logan Motorway and Browns Plains region, although not in the area of interest, which indicates that cultural heritage constraints requiring mitigation strategies may be identified.

Conclusions based on modelling include:

- It is unlikely significant cultural heritage sites will be located of a nature that would be a major constraint to the Park Ridge Connector.
- There is a high potential for cultural heritage sites will be located within the area of interest despite fragmentation and modification of the cultural landscape. This is most likely to occur in the western location of the area of interest, partially because of the greater green field spread, but also due to cultural indicators. Notwithstanding, it is considered unlikely that cultural heritage sites will be located of a nature that would be a major constraint to the Park Ridge Connector.
- Stone artefact concentrations and isolates are highly likely to be the most common form of cultural heritage site. It is likely that there exist substantial sub-surface concentrations of stone artefacts, possibly with associated camp sites and ovens, particularly in the ridges adjacent to Scrubby Creek and on terraces above the Logan River.
- It is unlikely that preserved ceremonial sites still exist within the area of interest, although there are indications that a bora ground may have existed somewhere on the Park Ridge Road area. If the location of this site can be identified, it would have significance.
- It is possible that scarred trees may still survive but it is unlikely.
- It is possible that a stone source or quarry exists within the area of interest. Should such a quarry or stone source be located, then it could prove a substantial constraint.
- It is possible that intangible sites still exist and information about this may be forthcoming once the review of environmental factors is exhibited for public consultation. These sites could potentially impact on the Park Ridge Connector, although it is considered the likelihood of this occurring is small.

- The Berrinba Wetlands holds considerable significance for Aboriginal people. However, it should be noted that the wetlands in their current form appear to date to post-1950s sand mining activities and there may not have been lagoons present prior to this activity. It is likely that the adjacent flood plain and ridges to Scrubby Creek may have cultural heritage sites present.

The technical report contains detailed desktop mapping of the area of interest based on the PLACE modelling process. This provides a three-tier level of assessment, showing areas considered to have a high, medium or low potential for cultural heritage (refer Figure 5.2 and Table 5.2). It is noted this predictive modelling does not ensure definitive results, but does provide a valuable management tool to determine areas of potential sensitivity.

Table 5.2: Description of Aboriginal cultural heritage sites within area of interest

Description	Location	Coordinates	Data source	Significance
Scrubby Creek and wetlands	Berrinba Wetlands	507946, 6940000	Archaeo 2004b	High
Isolated flake	Berrinba Wetlands	507345,6939815	Archaeo 2004b	Low
Two Isolates	Crestmead North	507507, 6938871	Jagera Daran 2010	Low

Mitigation measure and recommended further studies

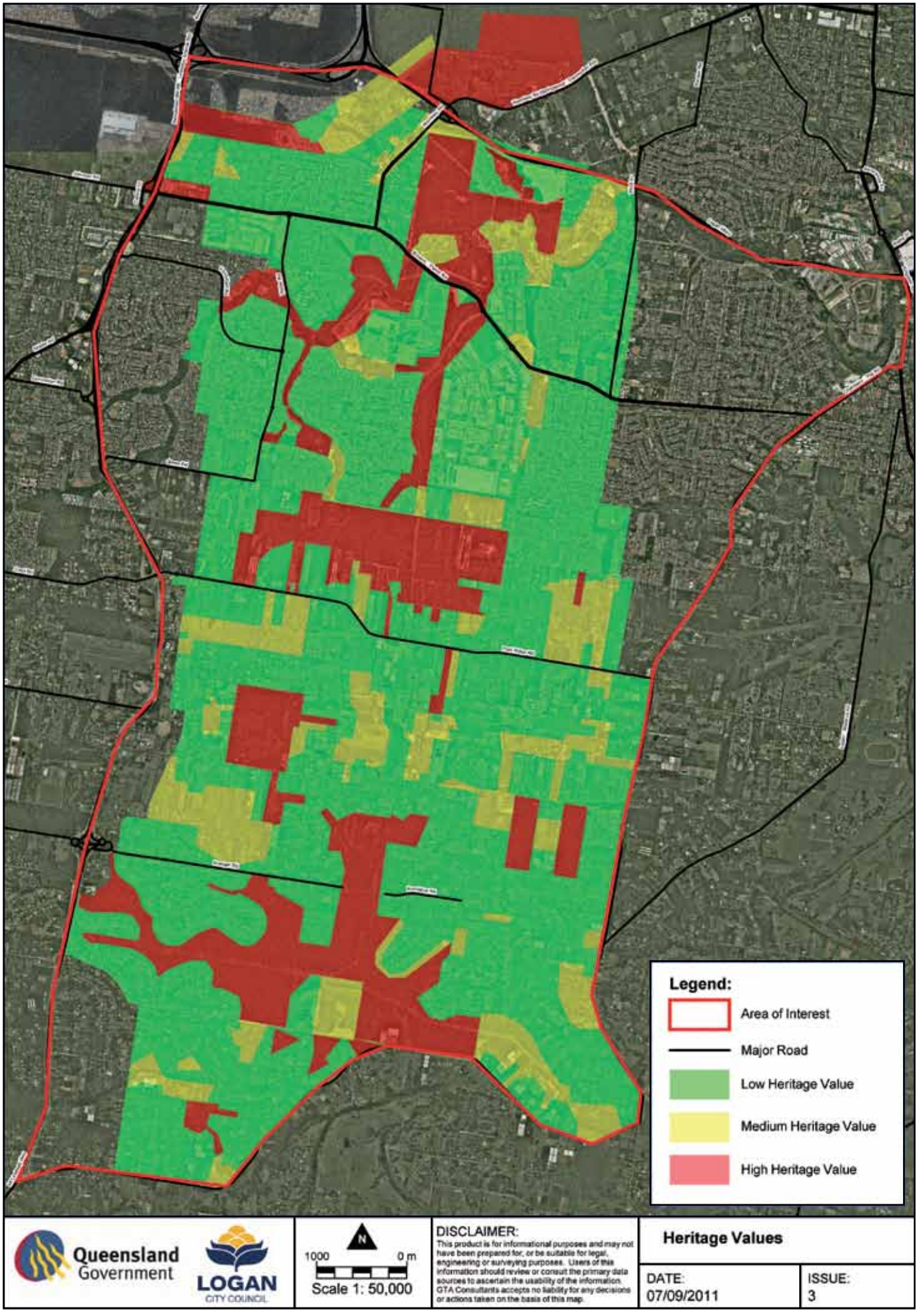
The following mitigation measures and recommendations are provided by the technical consultant for the area of interest. The Department of Transport and Main Roads will determine the extent of future studies and mitigations should a viable corridor be determined within the refined area of interest.

The investigations recommend continued consultation with both the Jagera and Turrbal people about the Park Ridge Connector.

Further investigation should take two directions:

1. Based on the findings of the predictive model, and once a location for the corridor is determined, fieldwork program should be undertaken over the target areas to determine whether any potential constraints exist that have not been identified in the predictive model. In particular, a program of sub-surface investigation should be considered as part of this fieldwork component.
2. Discussion will be facilitated within the wider Jagera, Ugarapul and Yuggera groups and the Turrbal people to determine if there are any known cultural places that might act as a constraint to the Park Ridge Connector corridor. It is likely that Berrinba Wetlands is a significant constraint, but it should be reiterated that the Wetlands are only in their present form since the 1950s. However, there may be some residual information passed on about camps or intangible places that forms part of a body of oral information not always recorded in the literature. This might also apply to the Park Ridge area where a bora ground has been indicated.

Figure 5.2: Heritage values in the area of interest



5.1.3 Landscape, open space and visual amenity

A *Landscape and Visual Amenity Introductory Report* (Planit Consulting, June 2011) includes desktop analysis and preliminary field investigations. The study draws on a number of methodologies from Australia and overseas to complete the analysis, as well as a review of existing planning controls. In particular, the report references the Department of Transport and Main Roads *Road Landscape Manual* and the previously published South-East Queensland Regional Plans, specifically Guideline 8.

Existing environment

Scenic amenity is defined as "a measure of the relative contribution of each place in the landscape to the collective appreciation of open space as viewed from places that are important to the public" (Department of Natural Resources 2001). The report maps the existing environment in terms of scenic amenity, in accordance with previously published South-East Queensland Regional Plans (specifically, implementation Guideline 8). The scenic amenity map for the area of interest is shown at Figure 5.3.

The area of interest is gently undulating, with the southern extent forming part of the Logan River floodplain. The landform is bisected by a number of creeks, rivers and wetlands. The northern part of the area of interest drains east to Scrubby Creek and the Berrinba Wetlands, which are within the Logan River catchment. As outlined previously in this review of environmental factors, the area of interest has been influenced by a range of human activity. This has resulted in a mosaic of remnant and regrowth vegetation throughout the area.

Potential impacts

Figure 5.3 divides the area into visual catchments that generally related to levels of visual impacts. This map provides a base that will help determine the extent of the impact of the road within the corridor.

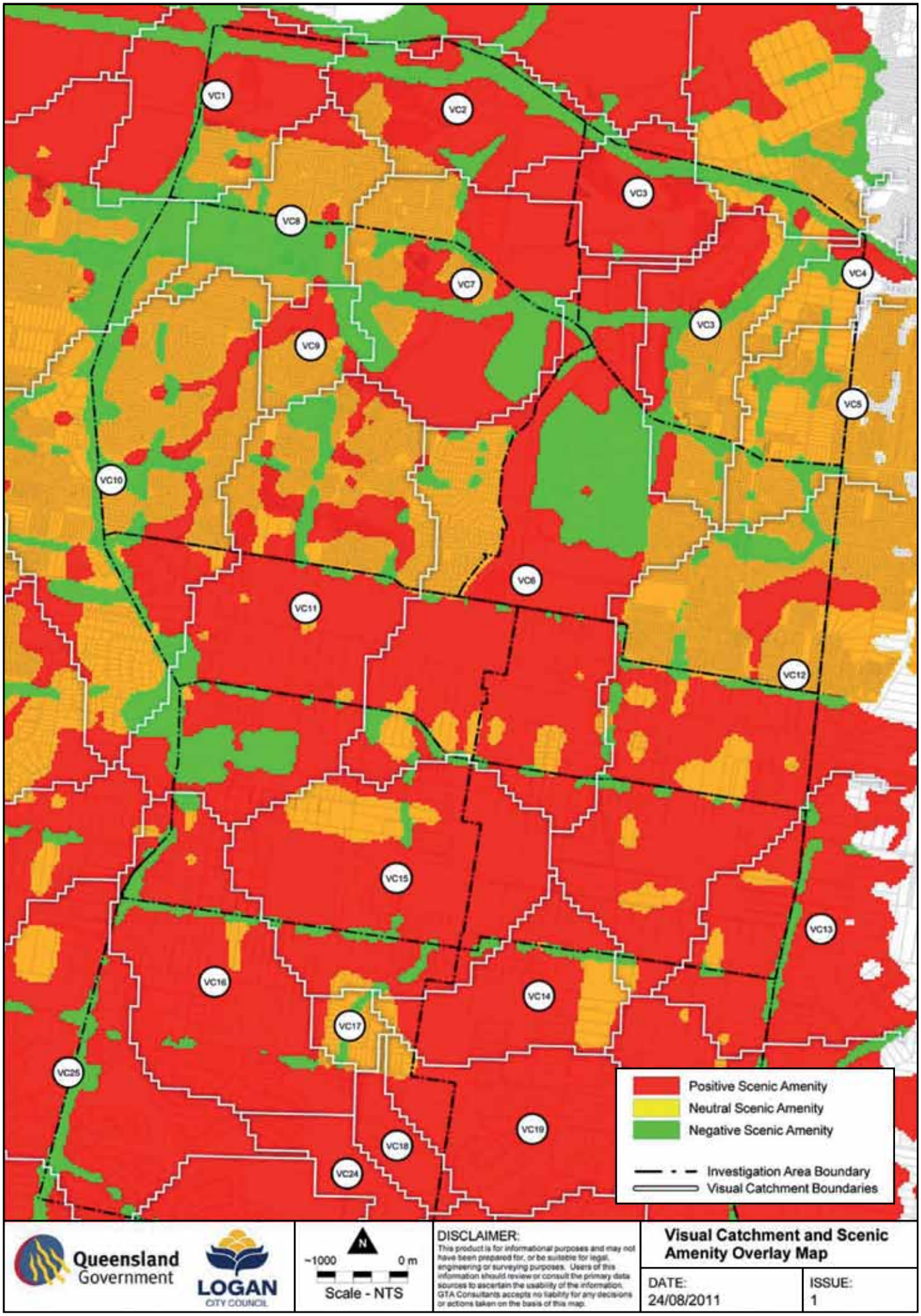
Based on the scenic amenity map, it allows for scenic amenity ratings to be identified within the various catchment zones. This creates an important planning tool that will help to determine the potential visual impact or exposure that the proposed Park Ridge Connector could have to surrounding view catchments in various locations, versus the existing scenic amenity within the catchments.

Mitigation measure and recommended further studies

The scenic amenity map and visual catchment map are planning tools to be used in conjunction with others in the Park Ridge Connector planning process. The maps have been created using the previously published South-East Queensland Regional Plans (specifically, implementation Guideline 8 methodology), with base information being refined and verified through site investigations.

Potential impacts will need to be further reviewed and mitigation considered in the next stage of the investigation, once a potential corridor is defined.

Figure 5.3: Visual catchment and scenic amenity



5.1.4 Land use and built form

The *Land Use Technical Report* (PSA Consulting, April 2011) identified land use and planning issues which are of direct relevance to the location of a Park Ridge Connector in the area of interest. Effective location of the corridor with existing and proposed future land uses is considered critical to minimising the actual and potential impacts of the Park Ridge Connector on the amenity of those land uses. The accessibility of the Park Ridge Connector by various land uses in the area will also be an important factor for consideration.

The report provides a summary of land use issues in the area of interest based on:

- the *South-East Queensland Regional Plan 2009-2031*
- the *South-East Queensland Infrastructure Plan and Program 2010-2031*
- Logan and Beaudesert planning schemes
- *Logan Growth Management - Core Matters (2008)*
- *Park Ridge Structure Plan* and associated planning scheme amendments
- recent development applications lodged and approved.

Existing and future land uses are addressed in order to identify the restricted areas, potential impacts to existing and future land uses, and mitigation measures in the area of interest.

Existing land use

Existing land uses in the area of interest are summarised as mainly residential, industrial, rural residential and open space in the northern part of the area of interest, while the southern area is dominated by rural residential uses. In summary:

- The existing residential area within the northern part of the area of interest represents a significant constraint to possible corridor locations for a Park Ridge Connector.
- Commercial and retail uses in the west of the area of interest also represent a significant constraint to corridor locations for a Park Ridge Connector.
- Significant industrial uses in the northern section of the area of interest include the Crestmead Industrial Estate and the Logan Smart Tip.
- Extensive rural residential areas to the south are envisaged to remain relatively intact in the short-to-medium term at least.
- A relatively new indoor sports complex on Browns Plains Road represents a significant recent investment.
- A large open space and conservation corridor runs through the centre of the area of interest, and there are a number of other significant open space corridors such as Berrinba Wetlands, Waller Park, Heritage Park and Hubner Park.
- Agricultural and rural uses include flower farms, poultry farms and market gardens, particularly along Park Ridge Road.
- Community and special uses include a number of schools, places of worship and community centres.
- A large Powerlink corridor has been previously identified as a potential location for the Park Ridge Connector corridor alignment.

Ownership of land is generally fragmented, with the exception of the Powerlink corridor and some significant land holdings by Logan City Council.

Future land use

A number of significant development applications have the potential to affect a potential Park Ridge Connector corridor. These include residential and industrial subdivisions, retail and shopping centres, and community uses. Development applications lodged under the provisions of the existing planning scheme may further limit the potential options for the Park Ridge Connector corridor.

The area of interest also has potential for longer term change, based on the intent outlined in the strategic planning documents that influence the area (see list above). It is noted that the Park Ridge Connector project will only be required if this long-term change eventuates. Almost all of the area of interest is defined in the future urban footprint, with the Park Ridge area being designated as a regional development area for residential and employment purposes (*South-East Queensland Regional Plan 2009-2031*). The Park Ridge Connector project is also identified in the *South-East Queensland Infrastructure Plan and Program 2010-2031* as a key piece of road infrastructure that will assist in the growth of the south-western corridor.

Local planning strategies

The Logan and Beaudesert planning schemes set out the future land uses for the area of interest. The current *Beaudesert Planning Scheme* does not incorporate an extension to the urban footprint to Park Ride South, mentioned in the *South-East Queensland Regional Plan 2009-2031*, and a new planning scheme is currently being developed to more accurately reflect the status of this area as future urban rather than rural residential.

Logan City Council's *Logan Growth Management - Core Matters (2008)* document identifies several locations within the area of interest that have specific planning intent within this strategy.

The *Park Ridge Structure Plan* also effectively incorporates the intent of this document within the structure plan area (see Figure 5.5). Logan City Council is working closely with the Department of Transport and Main Roads to prepare its priority infrastructure plan for incorporation into the new planning scheme in 2013.

Land use impacts

The refined area of interest selected for a Park Ridge Connector needs to consider a number of land use impacts in relation to acquisitions, adjoining land uses, severance of communities, amenity and access.

Land acquisition

The more developed nature of the northern part of the area of interest will limit the potential corridors for a Park Ridge Connector. In order to minimise the land acquisitions required, co locating the corridor with the existing power line corridor west of the Crestmead Industrial Estate will give the best result.

In the south of the area of interest, the predominantly rural residential land use is likely to result in relatively few acquisitions and a greater flexibility of corridor alignment. In addition to this, the future use of land for a road corridor has been established through the *Park Ridge Structure Plan* public exhibition.

Adjoining land uses

The land uses adjoining the refined area of interest, are important in determining the final corridor. The corridor should exist, as far as possible, within a land use area that is likely to result in the least disruption or impact to adjoining land uses.

As mentioned above, the northern part of the area of interest includes extensive residential communities and, as such, the preferred location for a Park Ridge Connector may be along the power line corridor, adjacent to the Crestmead Industrial Estate.

In the southern part of the area of interest, the nominated future industrial area and planned new road corridor as part of the *Park Ridge Structure Plan* could be an appropriate location for a Park Ridge Connector.

Severance of communities

The location of the road corridor and the ultimate design of the road has the potential to impact on the communities it traverses. The location and design of the road should minimise any separation or severance of local communities. The location of the new road should ensure all east-west local road connections are maintained.

Environmental impacts

The area of interest incorporates a number of significant open space and conservation corridors. These areas have been appropriately zoned within the Logan City Council's planning scheme to reflect their status. Potential impacts on areas of environmental significance should be considered in the refinement of the area of interest. The environmental impacts of the corridor are further considered at Chapter 5.2.

Noise impacts

The selection of a refined area of interest should consider the existing and future land uses adjoining the corridor so that noise impacts can be kept to a minimum and affect a minimum number of people and properties.

The Park Ridge Connector area of interest to the north has the greatest potential for adverse noise impacts, due to the extensive existing residential uses. Locating the road corridor within or adjacent to industrial areas would minimise acoustic impacts on sensitive land uses in this part of the area of interest.

Park Ridge and Park Ridge South are predominantly rural residential in nature, but likely to change in future with the implementation of the *Park Ridge Structure Plan*. The road corridor should be located to minimise impacts on current and future land use.

Appropriate noise attenuation measures should be incorporated into the design of the new road. A further study regarding noise impacts and potential amelioration measures should be conducted at a design stage. Noise impacts are considered at Chapter 5.1.6.

Visual impacts

Similar to noise impacts, the visual impact of a Park Ridge Connector on adjoining land uses needs to be carefully considered and treated at the time of the detailed design and construction. In considering the refined area of interest, the same consideration should be given to potential visual impacts of the road on adjoining uses as is given to potential noise impacts. Visual amenity issues are considered at Chapter 5.1.3.

Existing infrastructure

Where possible, the refined area of interest should consider opportunities to co locate or adjoin existing infrastructure corridors, such as the existing power line easement west of the Crestmead Industrial Estate.

The *Park Ridge Structure Plan* has established expectations for a future road corridor within the centre of the proposed industrial area. Using existing and planned corridors will minimise the impacts of a road corridor on adjoining land uses.

Alignment location and mitigation measures

The following mitigation measures and recommendations are provided by the technical consultant for the area of interest. The Department of Transport and Main Roads will determine the extent of future studies and mitigations, should a viable corridor be determined within the refined area of interest.

The *Land Use Technical Report* provides a rationale to locate a corridor for the Park Ridge Connector generally running north-south in proximity to the existing power line easement. This represents a logical focus in terms of existing and future land uses and the impacts the corridor may have on the area of interest, including land acquisitions, current and future land use, noise, visual and environmental impacts.

A range of mitigation measures will be required when determining the final location of a Park Ridge Connector. These measures will include minimising the:

- number and extent of land acquisitions
- impact of a Park Ridge Connector on current and future land uses by locating in an area most suitable for the purpose (for example through industrial rather than residential areas)
- impact of a Park Ridge Connector on the acoustic and visual amenity of the area, including consideration of appropriate visual and acoustic buffers and other amelioration measures
- impact of a Park Ridge Connector on the environmental and ecological attributes of the area
- impact on land through the use of existing infrastructure corridors where possible.

Figure 5.4: Development applications of interest and tenure

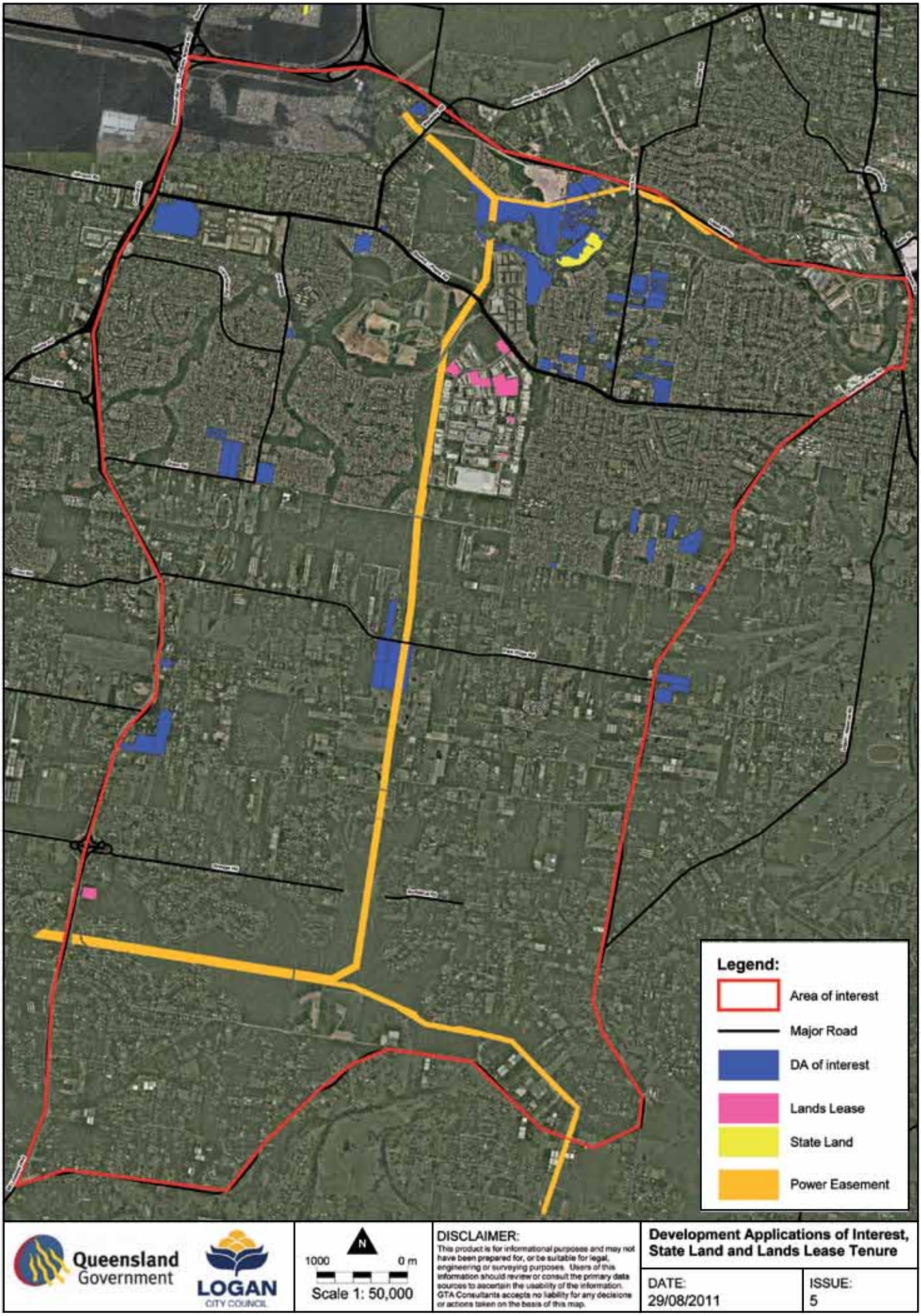
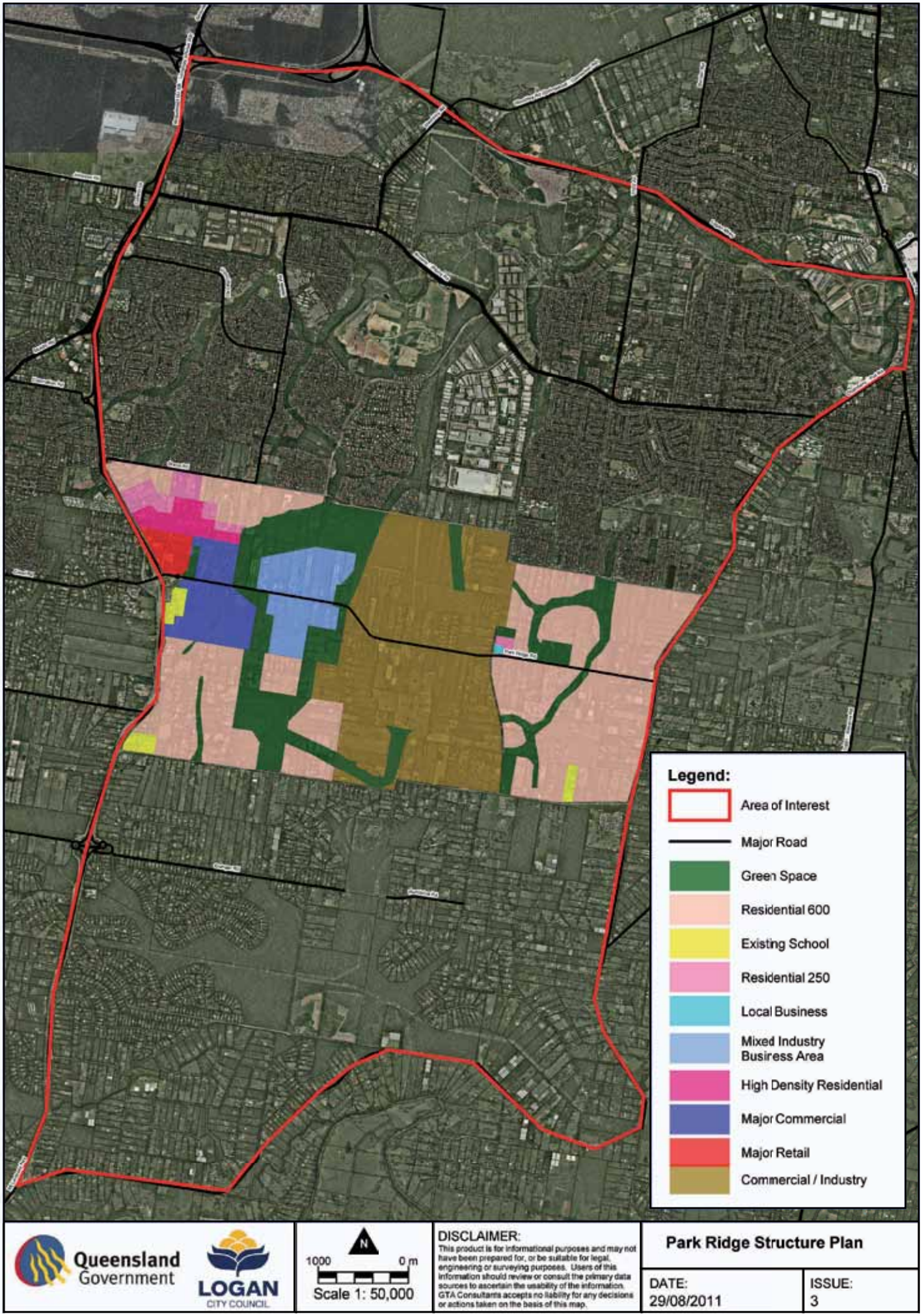


Figure 5.5: ***Park Ridge Structure Plan*** **area**



5.1.5 Social assessment

The social assessment study is intended to provide an outline of the social and community profile, including social indicators, social conditions and social infrastructure in the area of interest.

Social assessment provides an insight into people's way of life, their culture, community, government systems, health and wellbeing, and community aspirations. The main types of social impacts (both positive and negative) can result from project-related changes and include:

- lifestyle impacts – on the way people behave and relate to family, friends and the wider community on a day-to-day basis
- community impacts – on infrastructure, services, voluntary organisation, activity networks and cohesion
- quality of life impacts – on sense of place, aesthetics and amenity, perception of belonging, security and liveability, and aspirations for the future
- Health impacts – on mental, physical and social wellbeing.

The social assessment identifies social impacts and benefits for future stages of planning, construction and operation and it also:

- provides feedback into future Park Ridge Connector planning and design stages
- complements the community engagement and impact assessment activities
- provides quantitative measures of social impact aligned with the qualitative measures of social impact through the engagement undertakings
- highlights a range of social opportunities, benefits and constraints.

Existing environment

The assessment of Logan demographics and social infrastructure shows that:

- the average age in the area of interest population was only 28 years and the proportion of people aged between 0-14 years was 27 percent compared to 34 years and 18 percent respectively in Brisbane
- the area of interest typically has more families with children than Logan and Brisbane
- the area of interest typically has less people earning a high income, less number of people with formal qualifications and a very high proportion of people working in the technical trades, machinery and labouring sectors.

The area of interest is well served by a wide range of community services and facilities, including a number of schools, health and aged care services in reasonable proximity; a community centre; shopping centres; a wide range of sport and recreation facilities including the Logan Metro Indoor Sports centre; and a large number of parks and informal recreation facilities. The location of these facilities is indicated in Figure 5.7 to Figure 5.10.

The *Social Assessment Study* conducted a social value mapping exercise, which attempts to classify and represent areas and facilities of high, medium and low social value. This social mapping was presented and discussed as part of the Community Stakeholder Reference Group process. It is important to note that low social value is a relative term and these areas or facilities may be locally significant.

The areas of social value are shown in Table 5.3 overleaf.

Potential impacts and mitigation measures

The following mitigation measures and recommendations are provided by the technical consultant for the area of interest. The Department of Transport and Main Roads will determine the extent of future studies and mitigations should a viable corridor be determined within the refined area of interest.

The *Social Assessment Study* assesses potential social impacts as a result of a road located in the area of interest, as shown in Figure 5.6. Where possible, the study considers current and future land uses. Potential construction impacts are also considered.

The following table from the report summarises the impact assessment and potential mitigation measures in relation to the areas of high, medium and low social value.

Table 5.3: Summary of social impact assessment

Section	Place	Value	Description
North	Residential communities of: Berrinba, Browns Plains, Crestmead, Heritage Park, Marsden and Regents Park	High	Existing infrastructure and services: schools, commercial centres, health facilities, recreation facilities, clubs, associations, church groups and community centres
North	Berrinba Wetlands	High	Environmental reserve for recreation, events and outdoor dining
North	Logan Metro Indoor Sports Centre	High	Indoor sports, gym, events, functions and vocation care
North	Crestmead Industrial Estate (large businesses)	High	Contains 100 businesses employing 3 500 people. Large businesses are considered important due to increased employment numbers
North	Proposed residential community in Park Ridge	High	Adjacent to Park Ridge Shopping Centre and other proposed infrastructure
North	Rural residential	Medium	Properties along and adjacent to Wembley Road and Scrubby Creek Road
North	South West One Industrial Estate	Medium	Two large commercial businesses employing 100 people
North	Crestmead Industrial Estate (small and medium businesses)	Medium	As per previous description, however small to medium businesses have a greater ability to cope with change
North	SmartTip and proposed Logan Metro sports precinct	Medium	Currently a landfill area, reserved for future recreational area
North	Open space in Berrinba Browns Plains	Low	Land parcel between Scrubby Creek Road and Wembley Road, and Freshwater Estate and Berrinba Wetlands. Provides environmental buffer
North	Proposed commercial and industrial zone in Park Ridge	Low	Area bound by Clark Road-Lindenthal Road to the east and Hubner Road to the west. It is expected by the community this area will be serviced by a motorway
South	Retirement villages and golf course in Park Ridge	High	Five hundred established residents and only golf club in area of interest
South	Hubner Park	High	Twenty-seven sporting teams, only sporting field in the southern section of the area of interest
South	Chambers Flat Cemetery	High	Established in 1891, with significant cultural heritage value
South	Residential communities of Chambers Flat, Park Ridge, Park Ridge South and Munruben	Medium	Long-established communities and associated infrastructure and services
South	Proposed Park Ridge open space network	Medium	Proposed open space
South	Jerry's Downfall Reserve	Medium	High environmental value, adds to local amenity
South	Agricultural land in Chambers Flat	Medium	Used for agricultural purposes, idea soil for agriculture. Supports employment
South	Proposed commercial and industrial zone in Park Ridge	Low	Area expected to be serviced by a motorway

Conclusion and further studies

During and after the public consultation period, a more detailed social assessment should be conducted on the refined area of interest. The additional study would include assessments of social impacts on affected properties in greater detail, consulting with business owners in Crestmead and Park Ridge, and identifying options to ameliorate any impacts on Logan Metro Sports Precinct in conjunction with Logan City Council.

Figure 5.6: Social value results

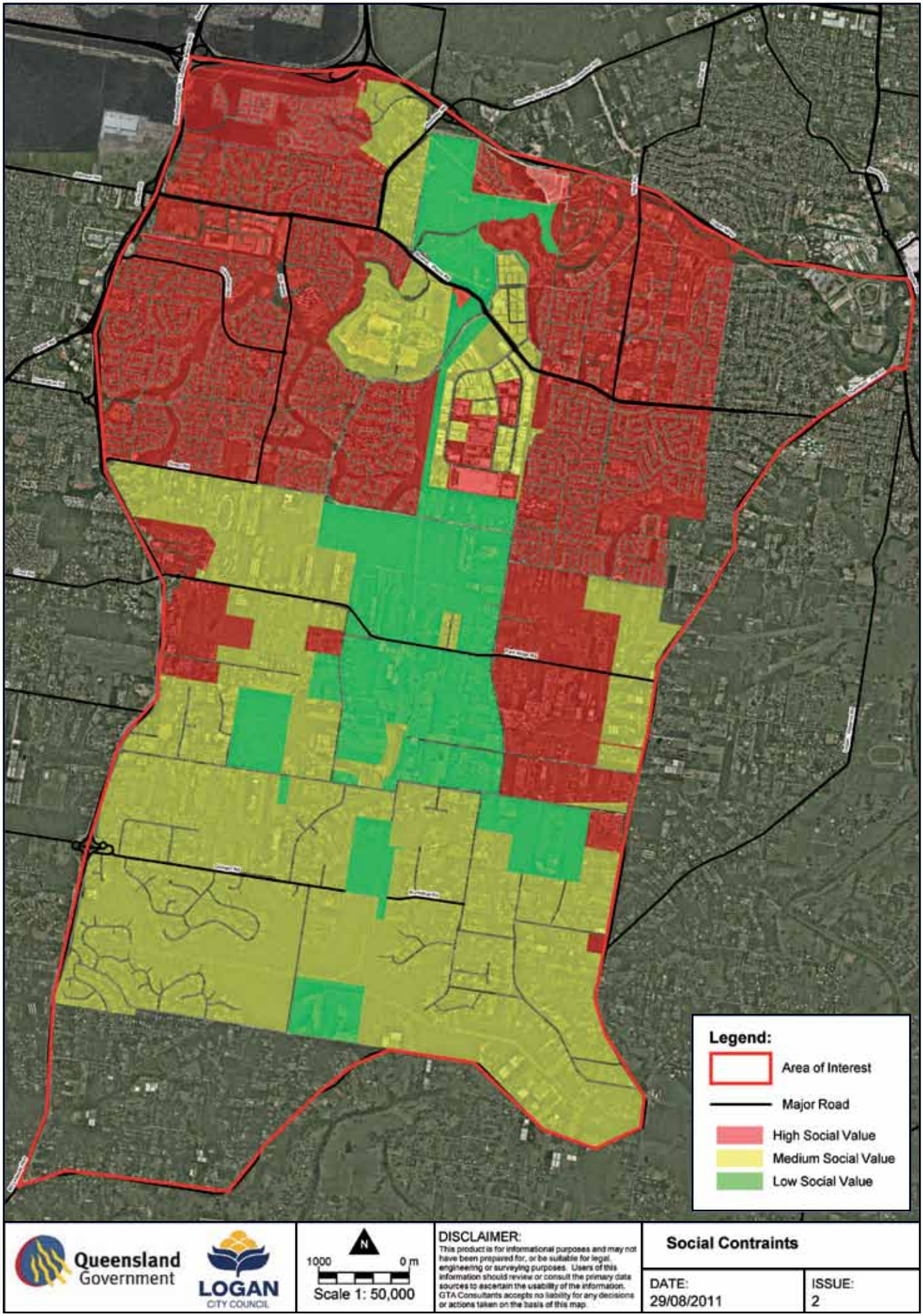


Figure 5.7: Social values in northern area of interest

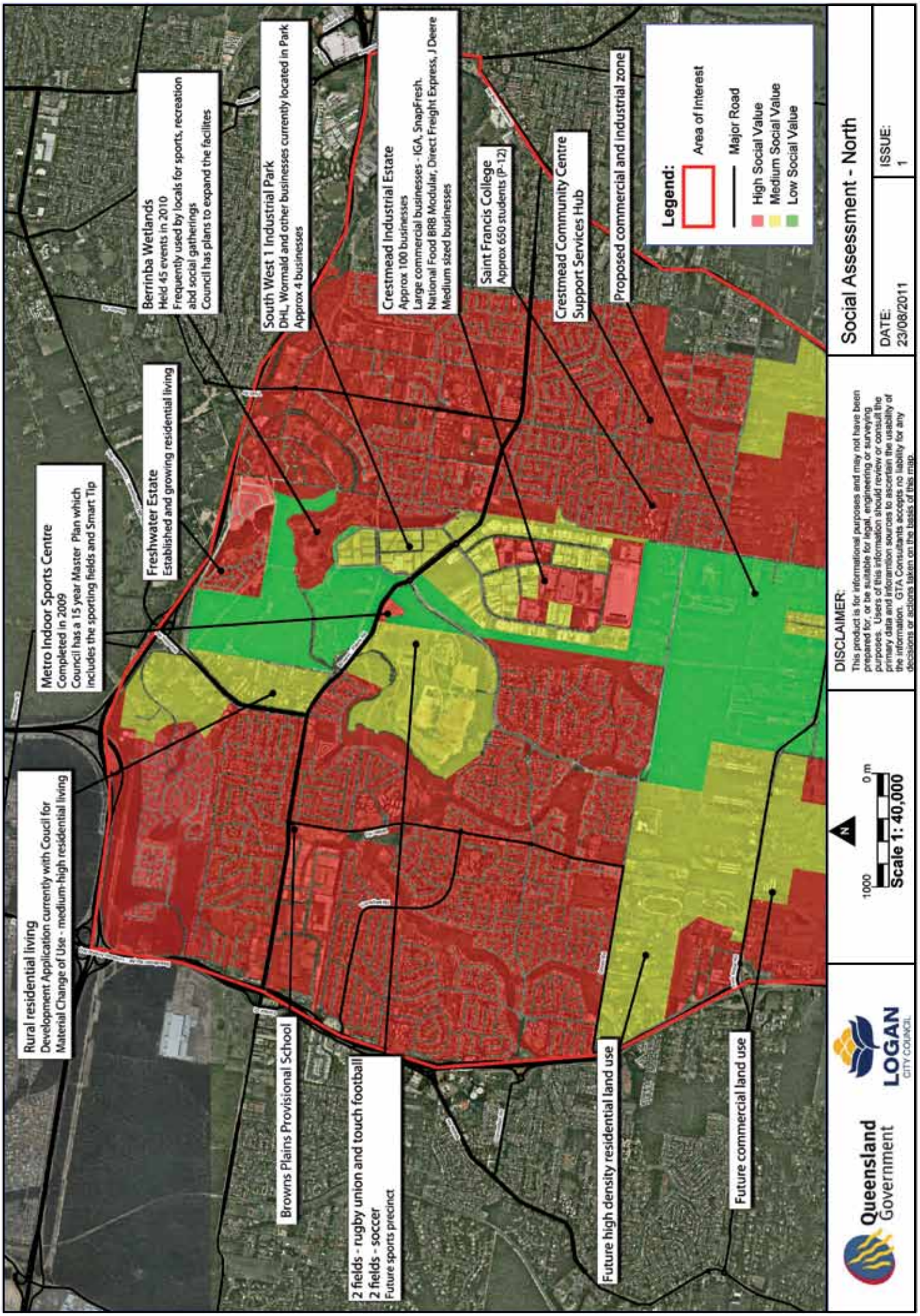


Figure 5.8: Social values in southern area of interest

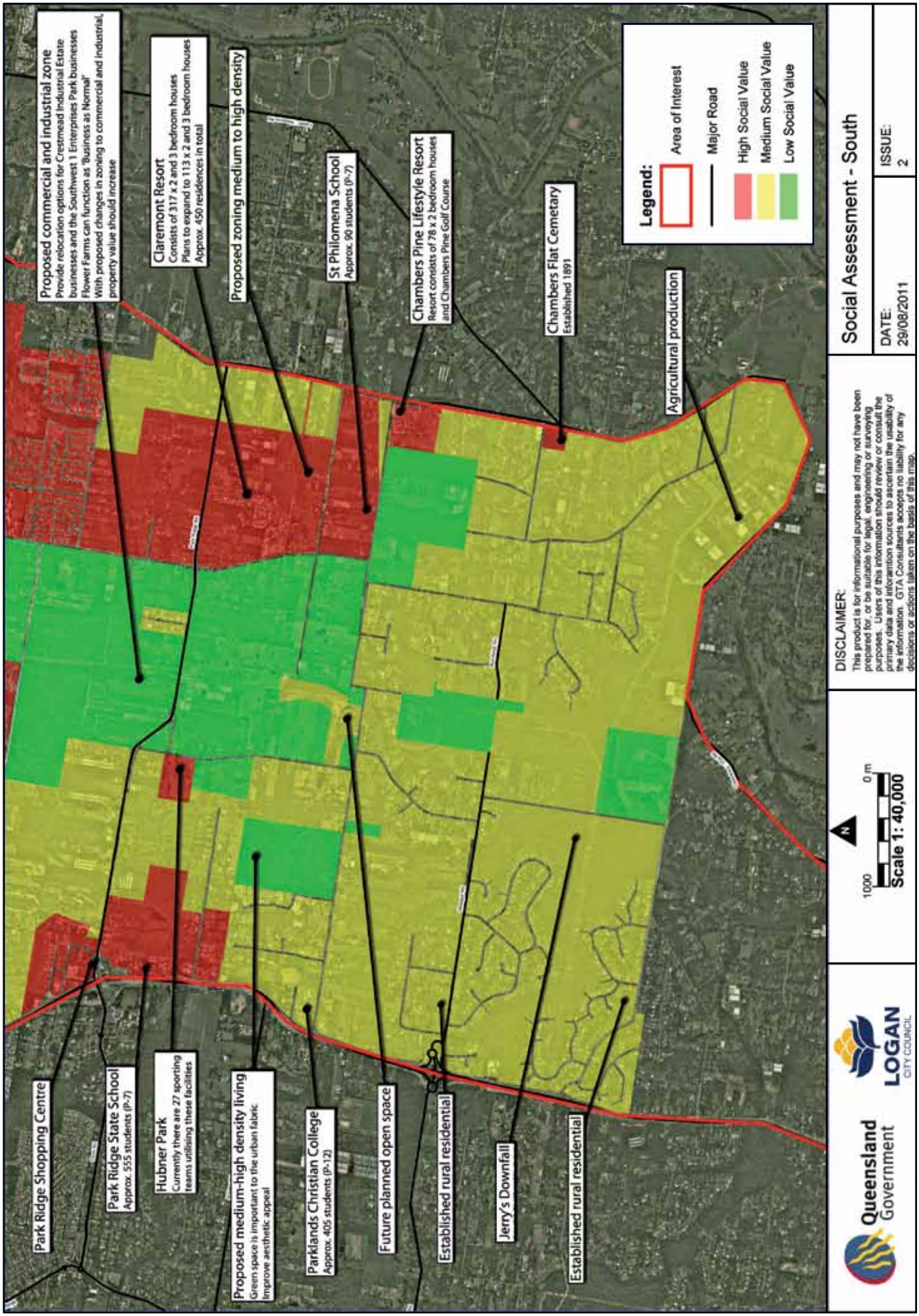


Figure 5.9: Community infrastructure – features

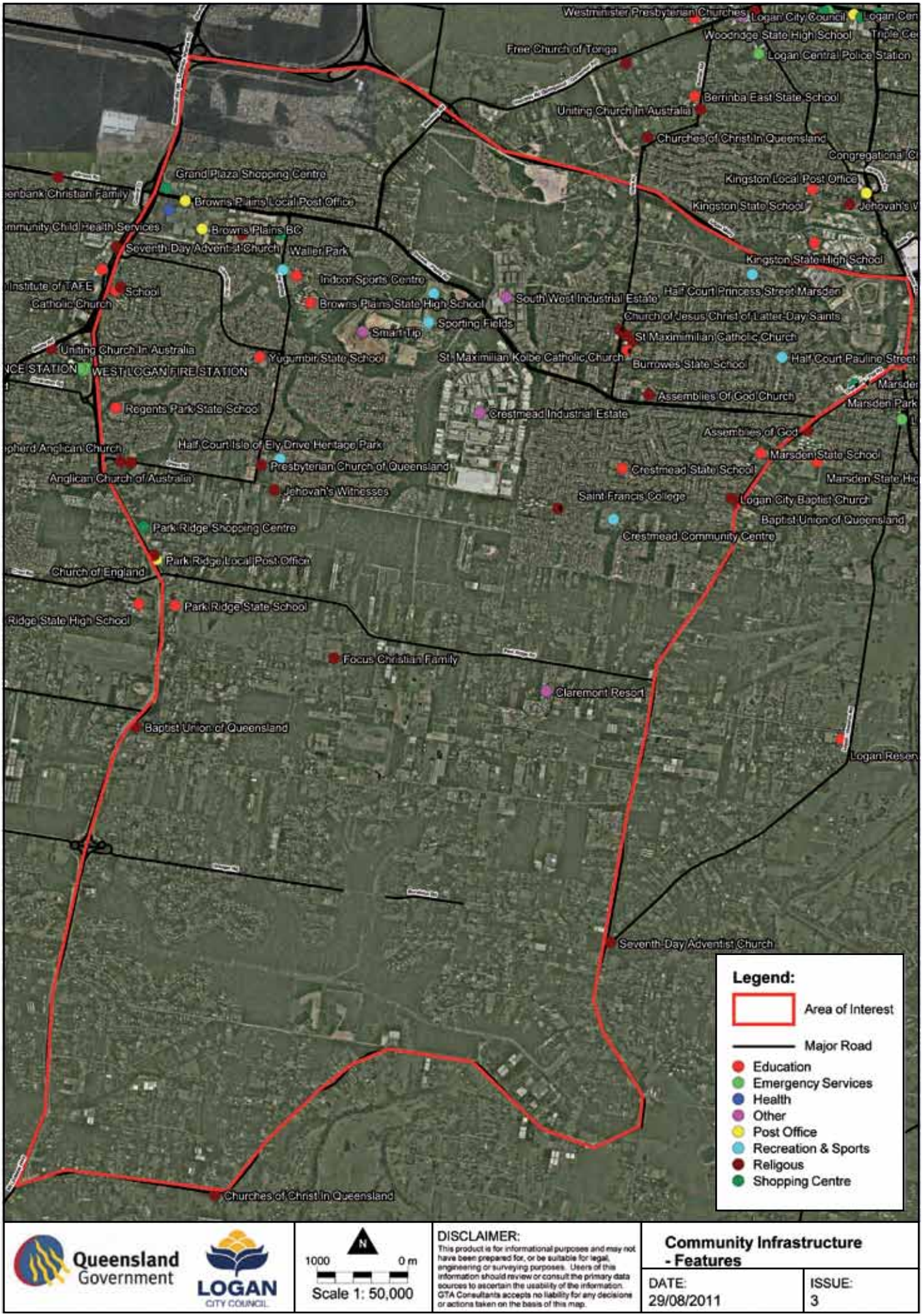
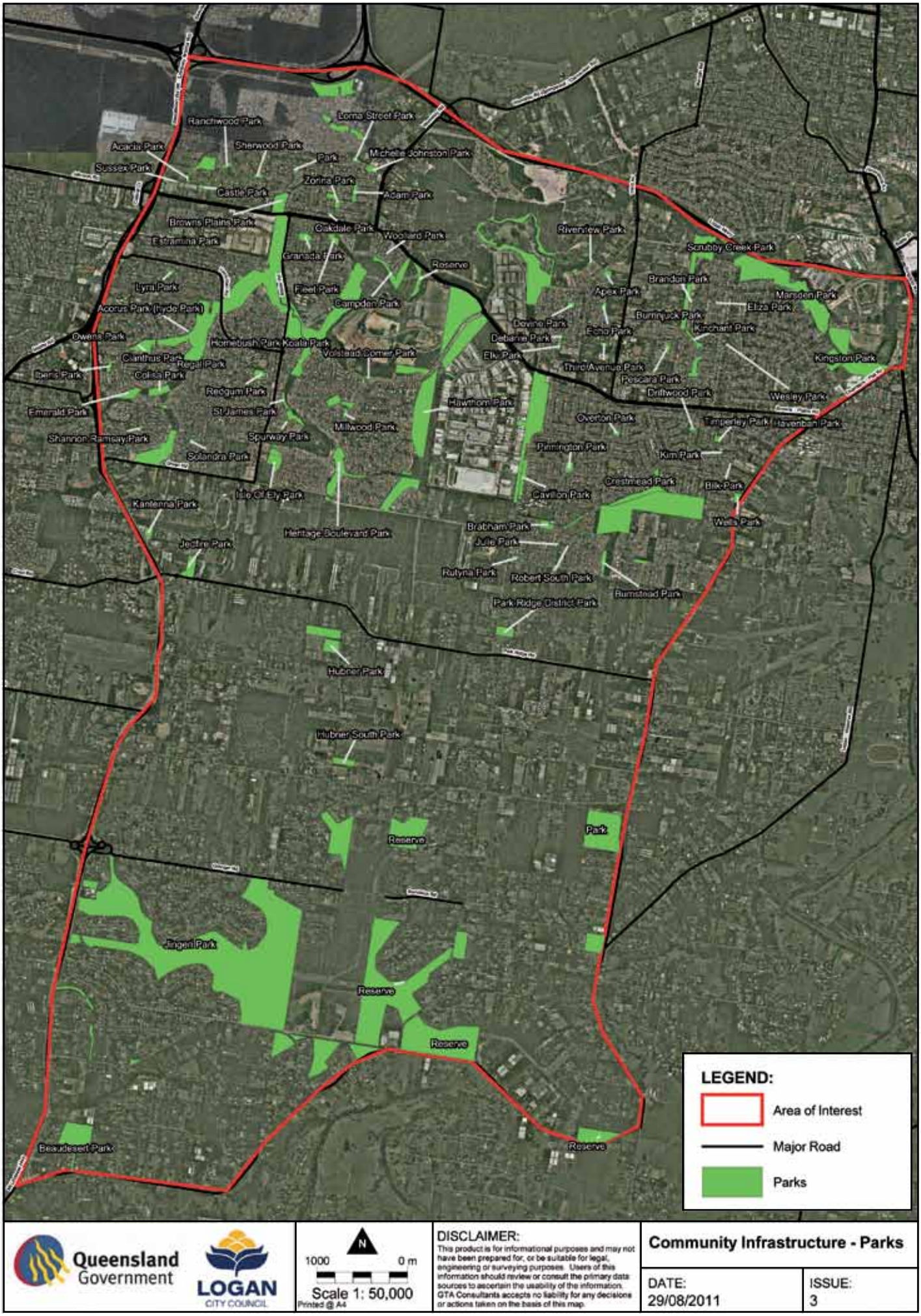


Figure 5.10: Community infrastructure – parks



5.1.6 Noise

A preliminary assessment of the noise and vibration issues associated with the construction and operation of the Park Ridge Connector was undertaken as part of the review of environmental factors. This assessment involved a review of the following sources of information:

- Australian Standard AS 1055.2 – 1997: Acoustics (description and measurement of environmental noise – application to specific situations)
- Australian Standard AS 2436 – 1981: Guide to noise control on construction, maintenance and demolition sites
- *Environment Protection Act* 1994 - Environmental Protection (Noise) Policy 2008.

Road traffic noise is the sum of all noise produced by vehicles in the traffic stream. Road traffic noise levels vary throughout the day and night, depending on the prevailing traffic volume, type and speed of vehicles. Because of these time-related variations in traffic noise, a variety of noise descriptors are used. The main descriptors are a measure of the amount of acoustic energy from the traffic stream over the day and night-time periods.

The Department of Transport and Main Roads specifies road traffic noise performance criteria to guide noise attenuation treatments. In the case of new roads, the scale and increase in road traffic noise level is considered. The criteria represent a compromise between the need to improve acoustic amenity and visual amenity, and the constraints in providing treatments for noise attenuation.

In January 2008, the Department of Transport and Main Roads issued the new *Road Traffic Noise Management: the Code of Practice*.

The road traffic noise assessment has been undertaken in accordance with this code of practice. It enables the department to demonstrate its general environmental duty by establishing and implementing good practice environmental management.

Existing environment

The northern section of the area of interest is generally highly urbanised and the predominant land use adjacent to the corridor is residential, interspersed with some industrial and commercial activities, parkland and open space. As a consequence of these land uses, significant numbers of noise sensitive receptors may be located close to the proposed Park Ridge Connector. Residences comprise the vast majority of sensitive receptors and these closely abut the corridor within the suburbs of Browns Plains, Crestmead, Regents Park and Park Ridge.

The southern portion (Green Road to Granger Road) of the area of interest is predominantly characterised by rural residential development, which has been identified as holding the potential for future residential suburban development. The southern area would generally be considered to be less noise sensitive due to the lower density urban development and lower numbers of sensitive receptors.

Potential impacts

In order to determine the potential noise levels generated by a fully operational Park Ridge Connector, a SoundPLAN computer prediction model was prepared based on:

- road traffic volumes and vehicle mix for year 2031
- posted traffic speed of 110 km/h
- 3D electronic files of the road alignment, topography and the adjoining land uses located within the area of interest
- road surfaces using dense graded asphalt

The SoundPLAN calculations consider variables that influence the level of road traffic noise at adjoining noise sensitive receivers, such as:

- site topography
- distance from the road
- road gradient and road surface
- vertical alignment of the road
- angle of view to road.

The Department of Transport and Main Roads noise limits at residential receivers is either 60 dB(A), usually applied to rural areas with a quiet background such as the southern section of the area of interest, or 63 dB(A) for noisier areas near major roads or an industrial estate, such as the northern section of the area of interest.

It is recommended that areas more sensitive to noise impacts, for example residential, be given particular regard when determining an appropriate road corridor.

A full noise impact assessment of the alignment options for the Park Ridge Connector that considers the numbers of dwellings where the Department of Transport and Main Roads noise limits are exceeded will be undertaken in the next stage of the planning process.

Construction noise assessment

Detailed design of the proposed works would be undertaken prior to the completion of final construction contracts. The successful tenderer would be responsible for determining construction methods. This assessment is, therefore based on the general type of construction activity likely to occur. The construction of the project would involve several phases: an initial earthworks and drainage phase, the construction of overpasses phase, and a pavement laying and landscaping phase.

The earthworks and drainage phase is expected to have the longest duration and also generate the highest construction noise levels. This phase would involve the use of a variety of earthmoving machinery undertaking various operations to create the base for the new carriageway.

The construction of overpasses would likely involve the use of plant such as concrete trucks and pumps, pneumatic and hydraulic hammers, mobile cranes and other machinery. Surface preparation of the road base would involve compaction with vibratory rollers and final laying of paving. This process would be shorter than the earthworks phase and the machinery would generally produce lower noise emissions.

Mitigation measure and recommended further studies

The following mitigation measures and recommendations are provided by the technical consultant for the area of interest. The Department of Transport and Main Roads will determine the extent of future studies and mitigations should a viable corridor be determined within the refined area of interest.

There are a number of methods available to mitigate road traffic noise, including:

- roadside mounds or barriers
- architectural treatment to buildings
- road pavement surfaces which decrease tyre noise
- reducing traffic speed, and
- land use planning, site design and building layout.

The most likely option for noise control to affected residential areas would be the construction of an acoustic barrier along the edge of the road corridor. Choosing a suitable barrier for noise control would be based on factors such as the surrounding land uses, the orientation of the

buildings, intervening structures between the residences and the road, and the views and wishes of the community. It would also depend upon the topography of the ground and the actual distance between the roadside and the residential areas.

An acoustic barrier that breaks the line of sight between a noise source and a receiver will generally reduce received noise by approximately 5 dB(A).

An assessment of the feasibility and reasonability of any proposed barrier or other mitigation measure would be required to be undertaken during detailed design stage. The assessment would define factors including the location of the road in the corridor, its elevation, the appropriate location of barriers or other measures in relation to road services, and the treatment of the roadside in this location.

5.2 Environmental considerations

This section of the report summarises the key findings of the *Environment Assessment and Investigation Report* (Planit Consulting, August 2011) and the *Park Ridge Connector Review of Environmental Factors Air Quality Report* (Vipac Engineers and Scientists Ltd, June 2011).

5.2.1 Ecological assessment

The *Environmental Assessment Introductory Report* (Planit Consulting, April 2011) provides an assessment of ecological matters affecting the area of interest, and assigns significance to those matters. The resulting *Overall Map of Ecological Values* (Figure 5.16) is a summary of all matters considered.

The technical report consists of the following sections:

- ecological assessment, including land form, geology, flora, fauna, wetlands, water, open space and recreation
- defining significance of areas and functions, including vegetation communities, flora, fauna, specific species, habitat and corridors, wetlands and waterways, and open space reserves
- potential impacts and offsets to study area values.

5.2.2 Flora

A desktop assessment and preliminary field survey were conducted to evaluate the vegetation communities within and near the area of interest. The field work confirmed input data and examined more recent site influences.

Vegetation survey

The area of interest has been modified by current and past land use activities, including timber harvesting, agricultural, industrial and residential uses. The resulting landscape presents a range of remnant and regrowth vegetation within a largely cleared or modified landscape. The area of interest includes large tracts of remnant vegetation greater than 100 hectares in size, which are generally based around dedicated recreation areas or large land holdings.

Historic and current aerial photography was used to gain an overview of land use over time, and the location and extent of vegetation. The quality and integrity of vegetation was assessed using regional ecosystem mapping undertaken by the Department of Environment and Resource Management, which in turn was checked with limited field survey work.

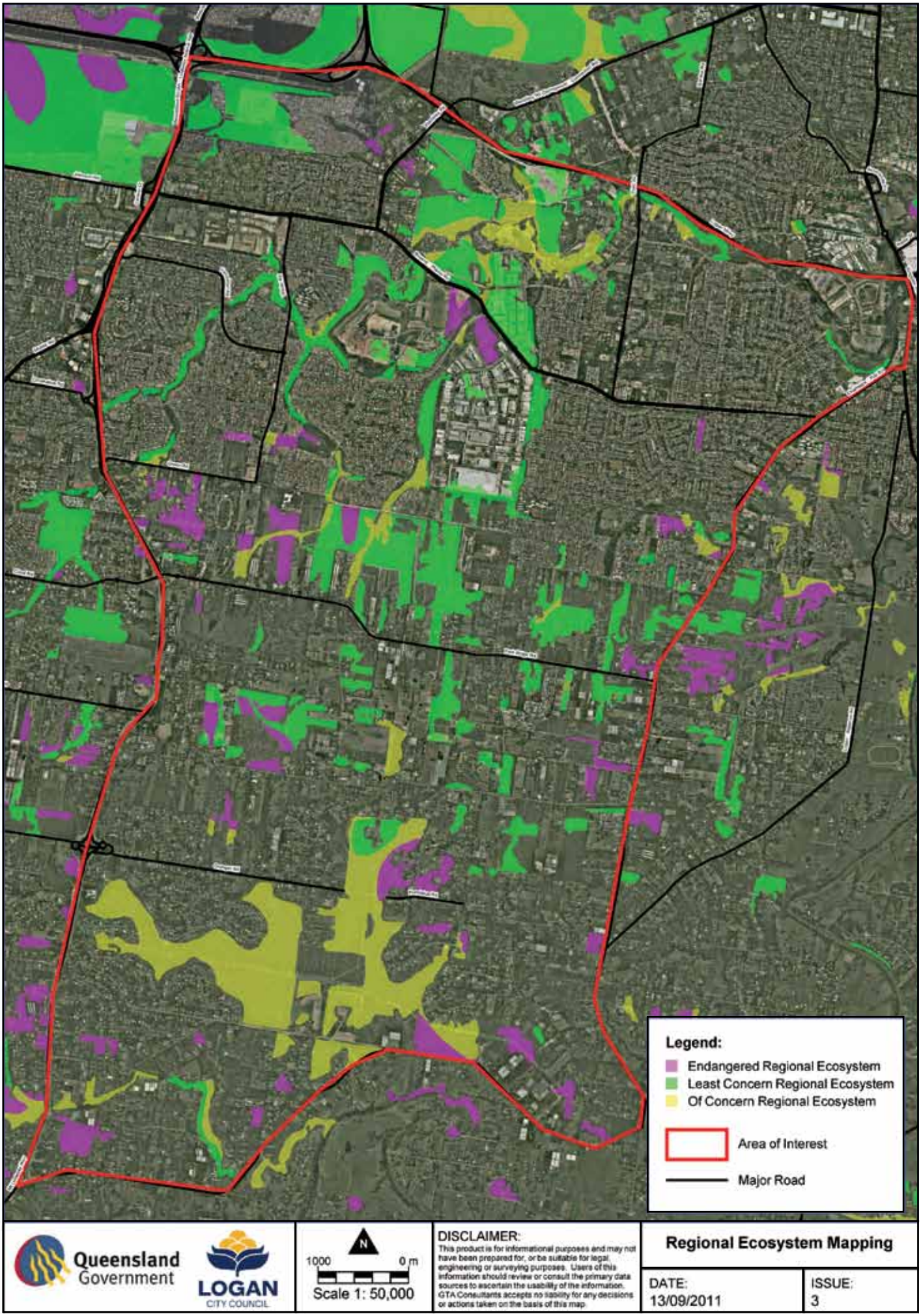
Regional ecosystems

The mapping identifies specific vegetation communities, which are referred to as regional ecosystems. These ecosystems are assigned a conservation status which is based on how much of it remains in a region. The regional ecosystems are declared in the *Vegetation Management Regulation 2000* and are classified as endangered, of concern or of least concern.

Nine different regional ecosystems occur within the area of interest. Of these, two are identified as endangered, two of concern and five of least concern. The regional ecosystems and their classifications are identified in Figure 5.11. The *Environmental Assessment Introductory Report* describes the nine regional ecosystems in more detail.

The field survey work found that the classification appears to be accurate. However, a more detailed review of the regional ecosystems and ground conditions should be undertaken as the area of interest is refined. It is also noted that there is ongoing land use change within the area of interest which may impact the classification of regional ecosystems over time.

Figure 5.11: Regional ecosystems



Regrowth vegetation

Regrowth vegetation is widespread within the area of interest, much of which is comparable to remnant vegetation in terms of environmental value. There are extensive areas containing 'High Value' regrowth containing endangered Regional Ecosystems, and extensive wetland related communities, which will be included as Regional Ecosystems when they mature. These wetland related communities provide a level of connectivity throughout the area of interest.

Flora species of conservation significance

Research was undertaken to identify species of national, state or local conservation significance. This included a protected matters report, a Queensland Wildlife Online report and a review of material from Logan City Council.

The research shows that a number of species of significance may be present in the area of interest:

- fourteen species of national conservation significance, listed under the *Environment Protection and Biodiversity Conservation Act 1999*
- eight species of state significance
- twenty-one plants are recorded in Logan City Council area as being near-threatened, vulnerable or endangered under the *Queensland Nature Conservation Act 1992*.

It should be noted that some of these may not be present due to the absence of preferred habitat, and that further study-including a detailed survey-should be undertaken of the preferred corridor to record the actual occurrence of any significant species in the area.

Floristic summary

The area of interest has been modified by current and past land use activities. The resultant landscape is a mosaic of remnant vegetation communities. Remnant vegetation associated with drainage lines does provide a level of connectivity within the study area to these larger remnants.

Despite this disturbance, the area of interest contains vegetation communities of national significance as well as endangered and of concern remnant vegetation communities at a state level. In addition to this, significant areas of regrowth vegetation occur within the area of interest which potentially contain a number of nationally and state significant species.

5.2.3 Fauna

A desktop assessment and field survey was conducted to describe the fauna within and near the area of interest. This includes birds, mammals, reptiles, fish and amphibians. Further detailed outcomes of these investigations can be found in Chapter 5 of the *Environmental Assessment Introductory Report*. In addition, a survey for spotted-tail quoll was conducted in parks and reserves in Park Ridge South.

As outlined in the Flora section, there are large areas of remnant and regrowth vegetation both within and near the area of interest, with a degree of connectivity between areas enhanced by remnant vegetation along drainage lines (creeks, rivers and wetlands). These vegetation areas provide core habitat for a variety of fauna. In addition, many of the regrowth areas provide opportunities for foraging for a range of fauna, as well as some older trees that provide suitable habitat for a variety of mammals and birds.

Essential habitat mapping

Department of Environment and Resource Management conduct essential habitat mapping as part of their remnant vegetation mapping program (see earlier Flora section). This mapping also covers regrowth vegetation. The mapping identifies three vulnerable species that are associated with the vegetation communities present within the area of interest. These species are the koala, wallum froglet and tusked frog.

The potential extent of koala habitat is illustrated in the Koala state planning regulatory provision (Figure 5.12). Density is likely to vary dependent on habitat quality, size, connectivity and any impediments to movement (for example stock fences or roads).

Both species of frog are potentially found across much of the area of interest.

The essential habitat mapping tool provides an initial identification of potential habitat for threatened species. However, the mapping should not be considered a reliable predictor of actual habitat. It is important that ground surveys are conducted during detailed design to ground-truth the essential habitat maps.

Significant fauna species

In addition to the essential habitat mapping, a protected matters report was obtained for the area of interest, as a guide on species of national significance and other matters protected by the *Environment Protection and Biodiversity Conservation Act 1999*. The report lists species that are scheduled as critically endangered, endangered, vulnerable or conservation dependent under the *Environment Protection and Biodiversity Conservation Act 1999*, or endangered, vulnerable or near threatened under the *Nature Conservation Act 1992*.

The report outlines 16 fauna species, including seven species of bird, one fish, one frog, five mammals and two reptiles as potentially present within the area of interest.

The protected matters report also lists 17 migratory bird species that could potentially occur in the area of interest.

Local species of interest

In addition to the state and federally listed significant species, there are a range of locally significant or migratory fauna in Logan, including platypus, gliding marsupials, wallabies, local significant birds and migratory significant birds. These species are protected through the *Logan Planning Scheme* and local laws, which promote the protection of bushlands, wetlands and waterways, and areas of significant environmental value.

Spotted-tail quoll

No spotted-tail quolls were recorded during the survey undertaken by Planit Consulting, despite the application of a robust survey methodology. This may be attributed to a number of factors:

- search area sufficiency
- elusivity of species
- absence or scarcity of quolls in the surveyed area.

The study identified two factors threatening the viability of potential quoll populations in the area of interests. Firstly, the need to provide adequate means of dispersal across any future road (for example through bridges, culverts and the like), and the abundance of foxes and dogs that can compete with quolls for food or prey directly upon them.

Potential impacts

It is recognised that roads can cause a wide range of impacts on flora and fauna, both short and long term. In general, impacts are considered more significant if:

- areas of high conservation value are affected
- individual animals or plants that are affected play an important role in the long-term viability of the species, population or ecological community
- habitat features that are affected play an important role in the viability of the species, population or ecological community
- the impacts are likely to be long term
- the impacts are likely to be permanent and irreversible.

Impacts of road construction on flora and fauna can be generalised as habitat fragmentation and resultant barrier and edge effects, fauna mortality associated with vehicle strikes, and the establishment of weeds caused by disturbances to ground conditions (such as clearing and earthworks).

Chapter 6 of the *Environmental Assessment Introductory Report* (Planit Consulting, April 2011) provides a preliminary analysis of potential impacts to flora and fauna in the area of interest.

5.2.4 Wetlands

Existing environment

The area of interest includes two tributaries to the Logan River – Scrubby Creek in the north-east and Norris Creek in the south-west.

The protected matters search under the *Environment Protection and Biodiversity Conservation Act 1999* notes that the site occurs upstream from the Moreton Bay Ramsar wetland, a site of international significance. Potential impacts to the wetlands from land use change in the area of interest are therefore relevant to this study, however it is not expected that there would be any impacts to Moreton Bay from the Park Ridge Connector project. A more detailed assessment of potential impacts should be undertaken if a decision is made to progress the road further south.

A review of the *Department of Environment and Resource Management's Map* indicates that there are Referable Wetlands within the area of interest.

A composite map of the wetlands and their classification is presented at Figure 5.15. Recognised significant wetlands in the area of interest include Berrinba Wetlands and the Munruben Wetlands. The mapped wetlands and waterways of the area of interest have been classified as high ecological significance (Department of Environment and Resource Management mapped wetlands) and medium significance (Logan City Council mapped wetlands).

Potential impacts

The area of interest contains several key wetlands. At the current stage of the Park Ridge Connector project in which corridor locations have not been identified, potential impact to wetlands cannot be determined.

Mitigation and further studies required

The following mitigation measures and recommendations are provided by the technical consultant for the area of interest. The Department of Transport and Main Roads will determine the extent of future studies and mitigations should a viable corridor be determined within the refined area of interest.

It is recommended that an adaptive management framework for wetlands potentially impacted by the Park Ridge Connector be prepared. Such a framework would include, but not be limited to, the following five-stage process:

- collate information
- design a wetland buffer
- prepare a detailed management plan
- implement of the management plan
- ongoing monitoring and review.

5.2.5 Water

This section of the report provides a brief discussion covering groundwater, surface water and water quality matters related to the Park Ridge Connector.

The scope of investigation for items presented and detailed below has been limited to a preliminary desktop review of both existing ground water and surface water environments and provides a brief discussion on potential impacts of the Park Ridge Connector.

Existing environment

The environmental investigation area is located wholly within the Moreton-Clearance Basin (*Geological Survey of Queensland 1980*). The area of interest falls within the area managed under the Logan Basin Water Resource Plan (2007). Specifically, the area of interest can be identified within the Logan River subcatchment. No groundwater management areas have been designated within the plan.

Underlying geology of the area of interest has been extrapolated from detailed data sets. Based on available data, it is understood that no geological faults are identified within the environmental investigation area.

It can be noted that the geological units within the environmental investigation area have potential to contain aquifers. In particular, alluvium has the potential to contain shallow aquifers. This is of particular importance for potential future planning of a road corridor on the Logan River floodplain, which is likely to have more widespread areas of alluvium and thus shallow aquifers.

Water flow and catchment description

The environmental investigation area of the Park Ridge Connector is located entirely within the Logan Basin major catchment area. The Logan Basin catchment occupies an area of approximately 3 440 sq km and can be generally described as extending from the McPherson Ranges through to Moreton Bay. In specifically identifying the environmental investigation area, it is noted the location is entirely located within the Logan River subcatchment. While the formal area of interest for the Park Ridge Connector extends to Granger Road, it does not include the Logan River.

The area of interest includes numerous drainage and natural tributaries of the Logan River, with Scrubby Creek and Norris Creek identified as notable tributaries. Scrubby Creek traverses the area of interest and includes the Berrinba Wetlands.

Water quality

The area of interest is in an area of the Logan Basin catchment where little data or baseline studies have been conducted and documented in relation to water quality throughout the catchment. In the absence of detailed baseline water quality information, reference has been made to the South-East Queensland Healthy Waterways Report Card results for 2008, 2009 and 2010.

The Logan Basin catchment was rated by the 2008 and 2009 report cards as very poor (rating D). The rating only slightly improved in the 2010 report card to a D+ rating, although the catchment can still be categorised as very poor. This rating implies that existing conditions in the Logan Basin catchment are unlikely to meet set ecosystem health values in most areas many processes are not functioning and many critical habitats are affected.

The dominant land uses within the Logan Basin catchment include grazing, native bushland, rural residential and intensive agriculture, with the majority of the upper catchment now extensively cleared for agriculture, grazing and dairy. It is noted that the area of interest for the Park Ridge Connector is a transitioning land use area. It has been recognised that rural residential uses are currently transitioning to increased urban residential development. The area is also currently seeing increased and more intensive industrial development. The increase of urban and industrial development within the area of interest is likely to be having significant impacts on water quality within the Logan Basin catchment.

Potential impacts

Groundwater

The extent of investigations related to the Park Ridge Connector does not include any detailed engineering or design documentation which would detail the cut required for the Park Ridge Connector, as the project is at this point in time primarily concerned with securing a viable corridor location. As such, no assessment can be made to determine if the Park Ridge Connector may possibly intersect with groundwater within the area of interest.

Should the corridor location include the Logan River floodplain, it would be likely that earthworks and pile-driving potentially associated with the future construction would have a high potential to intersect with shallow groundwater and aquifers. This issue will require further consideration during detailed design stages.

Surface water

The discussion surrounding surface water flows and quality shall be based around construction and operational phases of the Park Ridge Connector.

Water flow

Based on a preliminary assessment of the area of interest, it is not considered that the potential future construction of the Park Ridge Connector would result in any significant impacts to water flow within the area. Minor and localised impacts may occur as a result of any potential in stream works that may be necessary to install culverts or bridges as required. It would be expected that such impacts would be temporary, limited to the construction phase of the Park Ridge Connector and could be managed to ensure impacts are minimised.

It is considered that potential impacts during the operational phase of the Park Ridge Connector would be those related to the interference to water flow during normal flow and flood times. During flood events, alteration to flow may occur due to the presence of structures, such as culverts, bridges and embankments in the future construction of the Park Ridge Connector.

Water quality

It would be expected that the most significant impacts to water quality as a result of the construction of the Park Ridge Connector would relate to impacts from sediment run-off entering creeks, waterways, wetlands and river systems within the area of interest.

Given the ongoing expansion of residential and industrial development within the area of interest, it is highly probable that impacts to water quality from sediment run-off are already occurring within the area. The potential future construction of the Park Ridge Connector would need to be managed and monitored to ensure water quality within waterways and wetlands throughout the area of interest are not significantly worsened.

The following construction activities also have potential to impact upon water quality in the catchment area:

- chemical storage
- production of solid waste
- production of waste water
- stockpiling of cleared vegetation.

In the operational phase of the Park Ridge Connector, the operation of a road has the potential to contribute to pollutants and the degrading of water quality based on the following:

- wear and tear from vehicle tyres, brakes and other mechanical components (including hydraulic fluids and brake pad dust)
- accidental spills
- wear of the road surface, shoulder and verge
- maintenance practices such as herbicide use, mowing, road surface cleaning or reparation.

In addition, roads collect pollutants from the atmosphere and adjacent land use that are also washed off into the stormwater system, further adding to the potential impacts during the operational phase of the Park Ridge Connector.

Mitigation measure and recommended further studies

The following mitigation measures and recommendations are provided by the technical consultant for the area of interest. The Department of Transport and Main Roads will determine the extent of future studies and mitigations should a viable corridor be determined within the refined area of interest.

Groundwater

A detailed groundwater assessment should be undertaken in the detailed design stage of the Park Ridge Connector which should include a description of existing groundwater environment and potential impacts on groundwater and mitigation measures.

Depending on the outcome of the assessment, a groundwater management plan may need to be prepared, in order to minimise the impacts of the Park Ridge Connector. The plan would seek to achieve the following objectives:

- appropriate stewardship of natural resources
- protection of flora and fauna habitats
- confirmation of the success of impact control measures by the means of monitoring during construction
- compliance with statutory requirements
- preservation of existing groundwater conditions.

Surface water flow

It is considered that potential mitigation measures to ensure any future construction does not interfere with existing water flows in the catchment would include carrying out works outside the bed of the waterway and, where required, providing temporary drainage structures.

The most critical mitigation measures to reduce the operational impacts of the Park Ridge Connector on water flows within the catchment is to ensure the detailed design of the project is properly informed by an in-depth and detailed flood modelling study. A detailed flood modelling study would provide information to facilitate the design of the Park Ridge Connector to ensure flood levels or the duration of floods is not increased by any action related to the project.

Surface water quality

Although not the primary focus of this report, it is recommended that a sediment and erosion control plan is prepared prior to construction to manage the impact of the Park Ridge Connector on water quality in the catchment.

It is expected that the detailed impact and mitigation assessment of water quality issues during any future construction related to the Park Ridge Connector would be addressed by preparing an environmental management plan.

Given the lack of water quality data available within the area of interest, it is recommended that a detailed baseline water quality monitoring study be undertaken prior to any construction related to the project. In this regard, existing water quality data (where available) should be supplemented by water quality monitoring to establish baseline water quality in the area against which potential impacts of the Park Ridge Connector can be considered and accordingly quantified.

Any future baseline study should define and describe the water quality objectives required to protect the environmental values identified, including discussion of why they are suitable indicators for these values. The description of surface water run-off characteristics and the receiving environment should be undertaken in accordance with relevant state and local government requirements, including the *Environmental Protection (Water) Policy 1997* and the relevant Logan City Council policies.

It is considered that water quality management and impact mitigation during future operational phases of the project would be managed in accordance with the Department of Transport and Main Roads standard practices and policies for water quality. It would be expected that water quality management would be incorporated when undertaking the detailed planning and design of the project.

5.2.6 Flooding

Natural hazards are a significant and rising cost to the community. They are estimated to have cost Queensland an average of $239 million per year in direct and indirect tangible costs between 1967 and 1999. In addition, there are several intangible costs associated with loss of life, injury, human suffering, loss of productivity and environmental degradation.

Inappropriate development in areas susceptible to natural hazards significantly increases the risks (and associated costs) to the community. The State aims to minimise these risks by ensure that the potential adverse impacts of natural hazards are adequately considered when development applications are assessed, when planning schemes are amended and when land is designated for community infrastructure.

The Queensland Government considers that any development should minimise the potential adverse impacts of flood, bushfire and landslide on people, property, economic activity and the environment. Flooding is addressed in *Queensland State Planning Policy 1/03 – Mitigating the Adverse Impacts of Flood, Bushfire and Landslide*.

The *State Planning Policy* requires the identification of natural hazard management areas within which minimising risks to the community should be a key consideration in development assessment. In relation to community infrastructure (such as roads), the *State Planning Policy* aims to ensure that they are able to maintain operation during and immediately after major natural hazard events where practicable.

The State Government's position is that the appropriate flood event for determining a natural hazard management area is the 1 percent Annual Exceedance Probability Flood, which is a one in 100-year (Q100) flood event.

Land adjacent to the many waterways throughout the Park Ridge Connector area of interest is affected by Q100 overland flow flooding. To minimise exposure to this flooding hazard, and mitigate adverse effects associated with flooding in these areas, it is recommended that the Park Ridge Connector alignment avoid the Q100 flooding areas where possible. Where it is not possible to avoid these areas, consideration must be given to appropriate mitigation measures such as bridging over flood-prone land areas.

During flood events, afflux (the alteration to flow due to the presence of structures such as culverts, bridges and embankment) may occur as a result of the construction of the Park Ridge Connector.

Specific impacts of afflux include:

- water table effects as a result of damming and seepage
- reduced land use while trapped flood waters recede
- reduced structural integrity as a result of damming pressure
- changes to ecology relying on specific stream velocities
- flooding of properties.

The proposed Park Ridge Connector vertical alignment within the floodplain would need to be raised above the Q100 flood level by a combination of viaducts and embankments. In addition, a number of culverts, bridges and embankments would be constructed within other sections of the corridor in order to maintain an appropriate grade for the road. The design of the proposal would be informed by detailed hydrological and hydraulic modelling to ensure that any structures associated with the proposal did not contribute to unacceptable levels of afflux.

5.2.7 Open space and recreation

Existing environment

There are a number of strategic planning documents that reinforce the importance of retaining and enhancing the park and open space network within the area of interest. These include the *South-East Queensland Regional Plan*, *South-East Queensland Recreation Strategy 2010*, *Logan Planning Scheme*, and the *Logan City Corporate Plan*.

The *Logan Planning Scheme* classifies parks according to their function, including recreation, sport, environmental, constrained and unallocated parks. Of these, recreation and sport parks are further divided into metropolitan, district, local and corridor parks.

Metropolitan level parks are in place to serve the majority of the local government area, and as such are of the highest value and should be retained where possible.

The network of open space and recreation facilities is shown at Figure 5.9 and Figure 5.10. In addition to these parks, there is a new Logan Metro Sports Park, a $17 million multi-purpose venue of metropolitan significance in Crestmead (refer Figure 5.9). The park includes international standard facilities, commercial health and fitness facilities, function rooms and allied health professionals.

Potential impacts

It is likely that the proposed road corridor will have some impact on open space and recreational facilities within the area. Due to the large investment in, and significance of, the Logan Metro Sports Park and surrounding precinct, it should be considered in the corridor selection for the Park Ridge Connector.

5.2.8 Defining significance of areas and functions

Following a review of the flora and fauna assessments, the report has developed a planning tool to assign degrees of significance to various layers or elements being considered as significant. The tool maps areas of ecological significance as high, medium or low significance. The elements forming the assessment criteria and their relative weight are presented in Table 5.4 below.

Table 5.4: Ecological significance values and criteria

High (red)	Medium (yellow)	Low (green)	Unmapped (white)
Endangered regional ecosystems (Department of Environment and Resource Management) State significant habitat (South-east Queensland Biodiversity Protection Act) Mapped wetland (Department of Environment and Resource Management /Logan) or Wetland Regional Ecosystem Existing Parkland (Logan) Mapped as high value bushland habitat (Department of Environment and Resource Management's South East Queensland Koala Conservation State Planning Regulatory Provisions, State Planning Policy 2/10: Koala Conservation in South East Queensland)	Of concern regional ecosystem (Department of Environment and Resource Management) Regional Significant Habitat (South-east Queensland Biodiversity Protection Act) Mapped Waterway (Logan) Mapped as medium value bushland habitat (Department of Environment and Resource Management's South East Queensland Koala Conservation State Planning Regulatory Provisions, State Planning Policy 2/10: Koala Conservation in South East Queensland) Remnant vegetation mapped within a planned environmental corridor	Least concern regional ecosystem (Department of Environment and Resource Management) High value regrowth (Department of Environment and Resource Management) Local significant habitat (South-east Queensland Biodiversity Protection Act) Non remnant vegetation mapped within a planned environmental corridor Mapped as low value bushland habitat (Department of Environment and Resource Management's South East Queensland Koala Conservation State Planning Regulatory Provisions, State Planning Policy 2/10: Koala Conservation in South East Queensland)	Neither high, medium or low

These values have been mapped individually (Figure 5.12–Figure 5.14), then added to a composite map that adds all the layers of significance together to form an overall map of ecological significance in the area of interest (Figure 5.15).

Figure 5.12: Koala state planning and regulatory provision

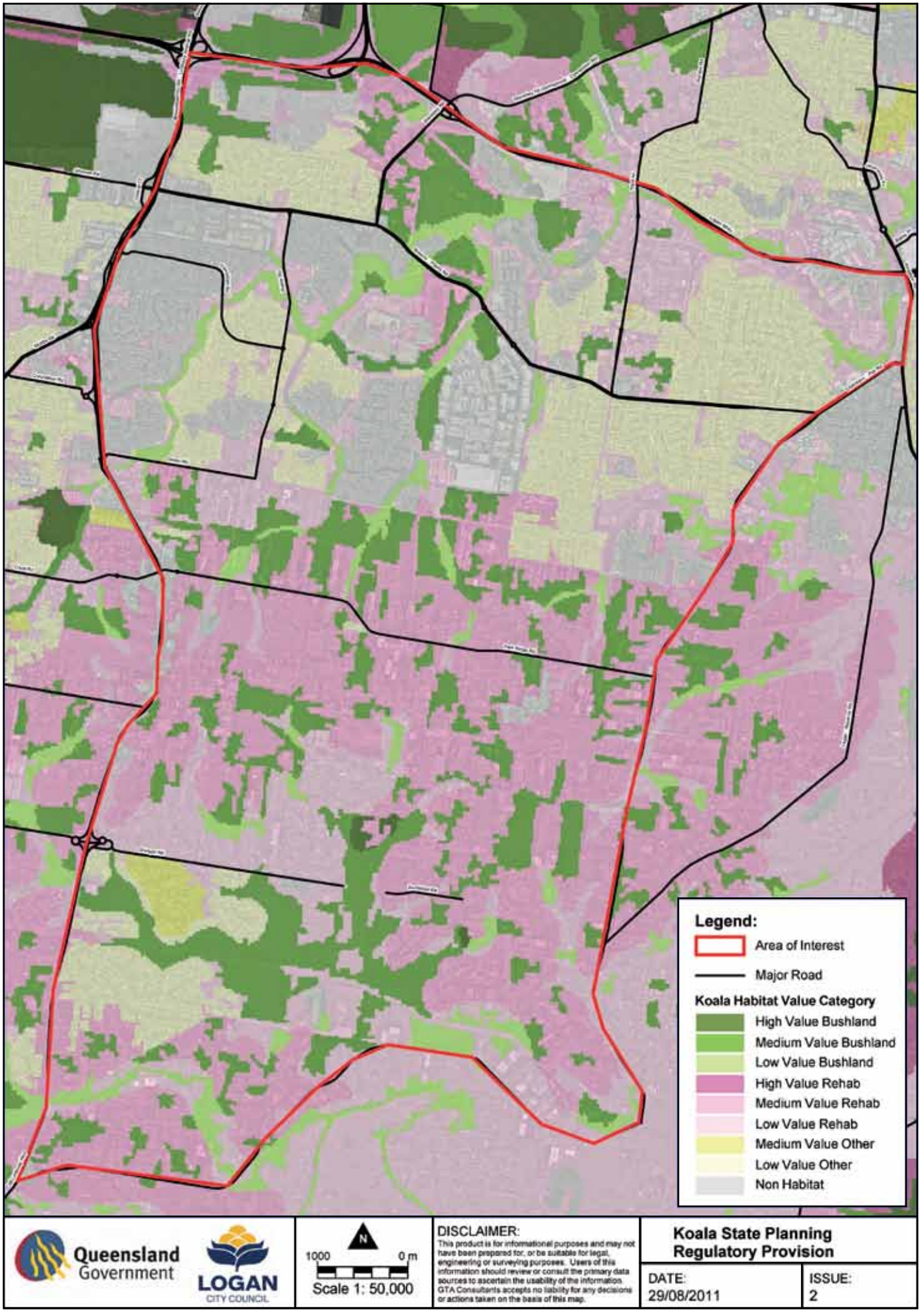


Figure 5.13: Biodiversity planning assessment

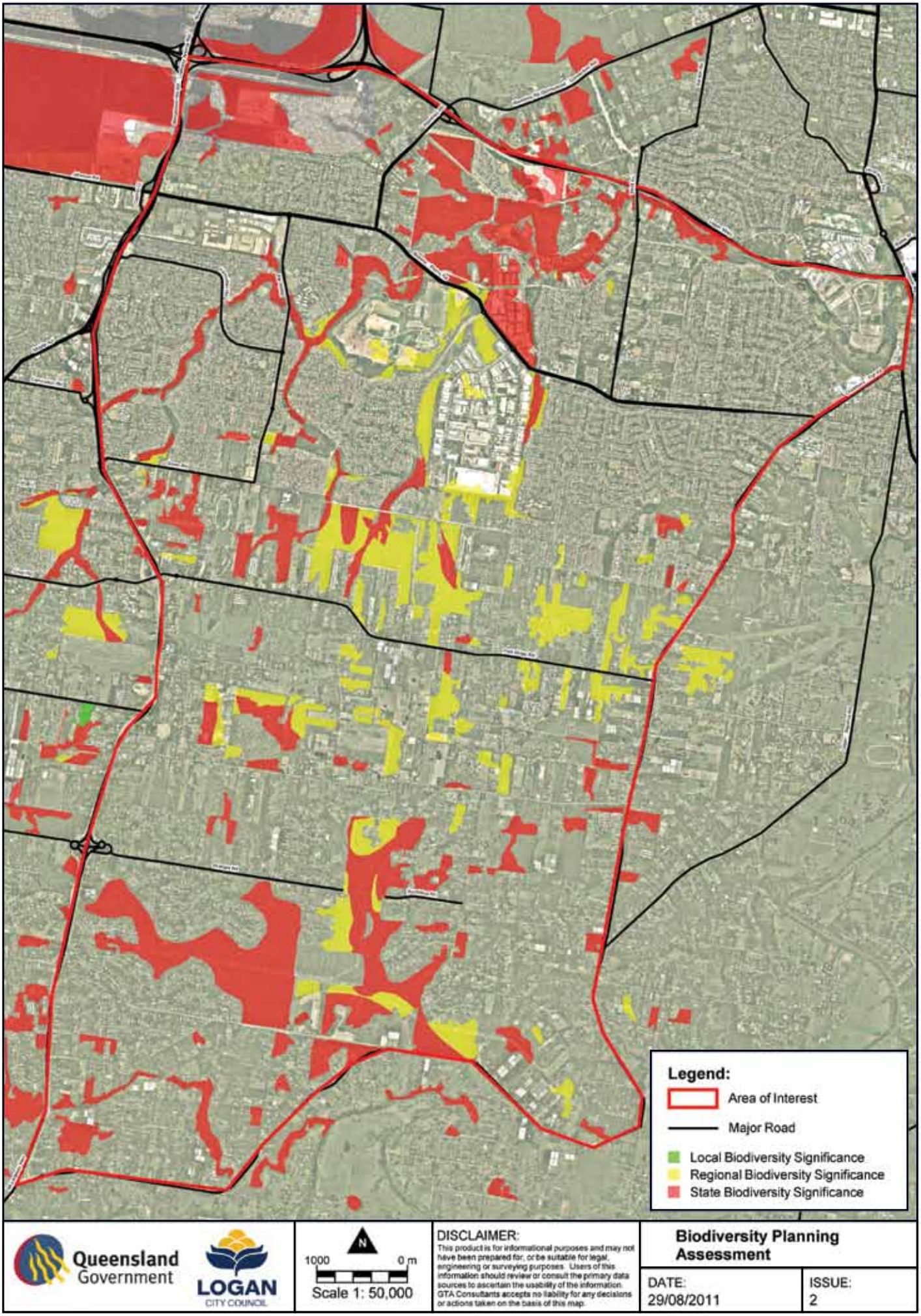


Figure 5.14: Wetlands in the locality

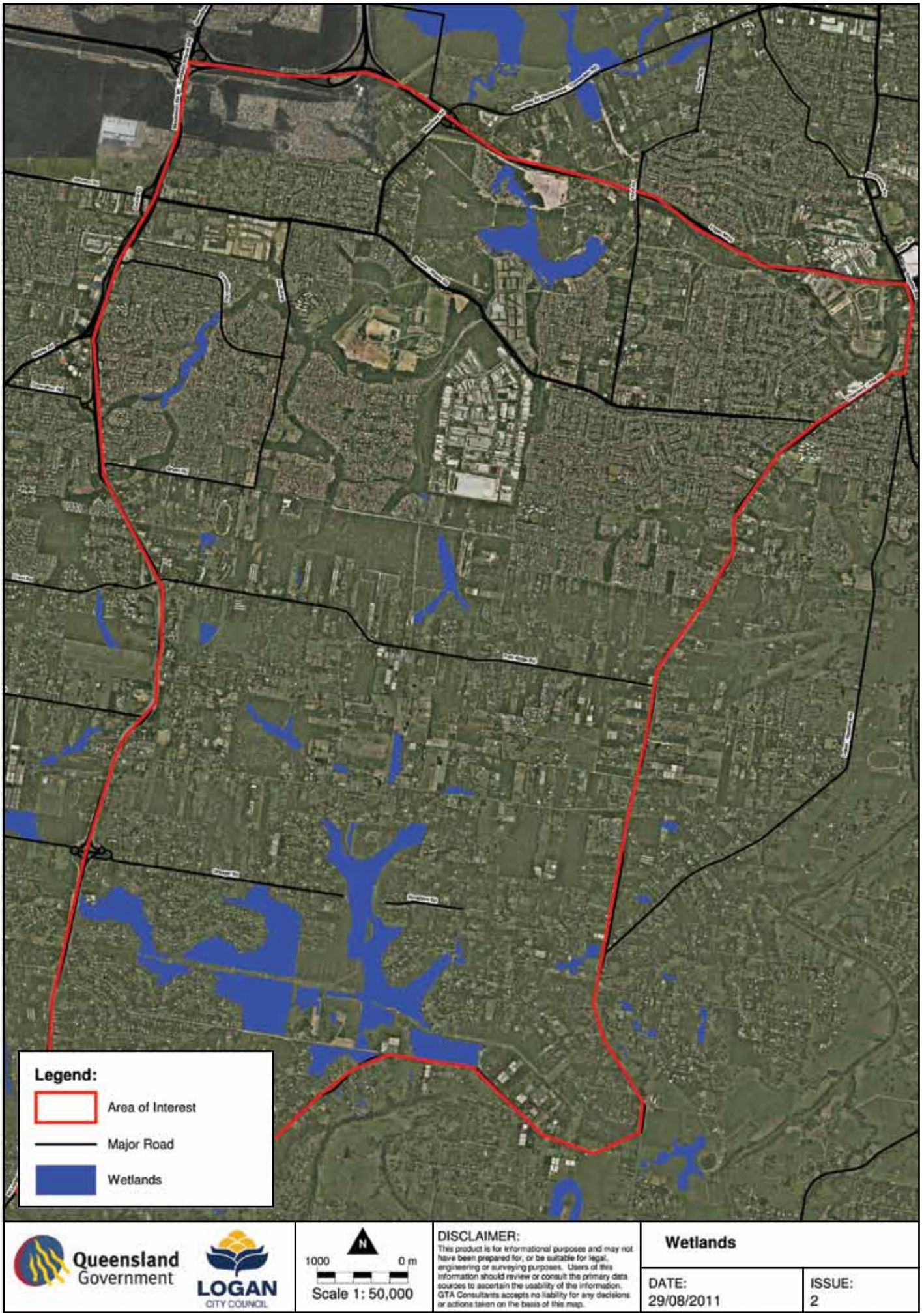
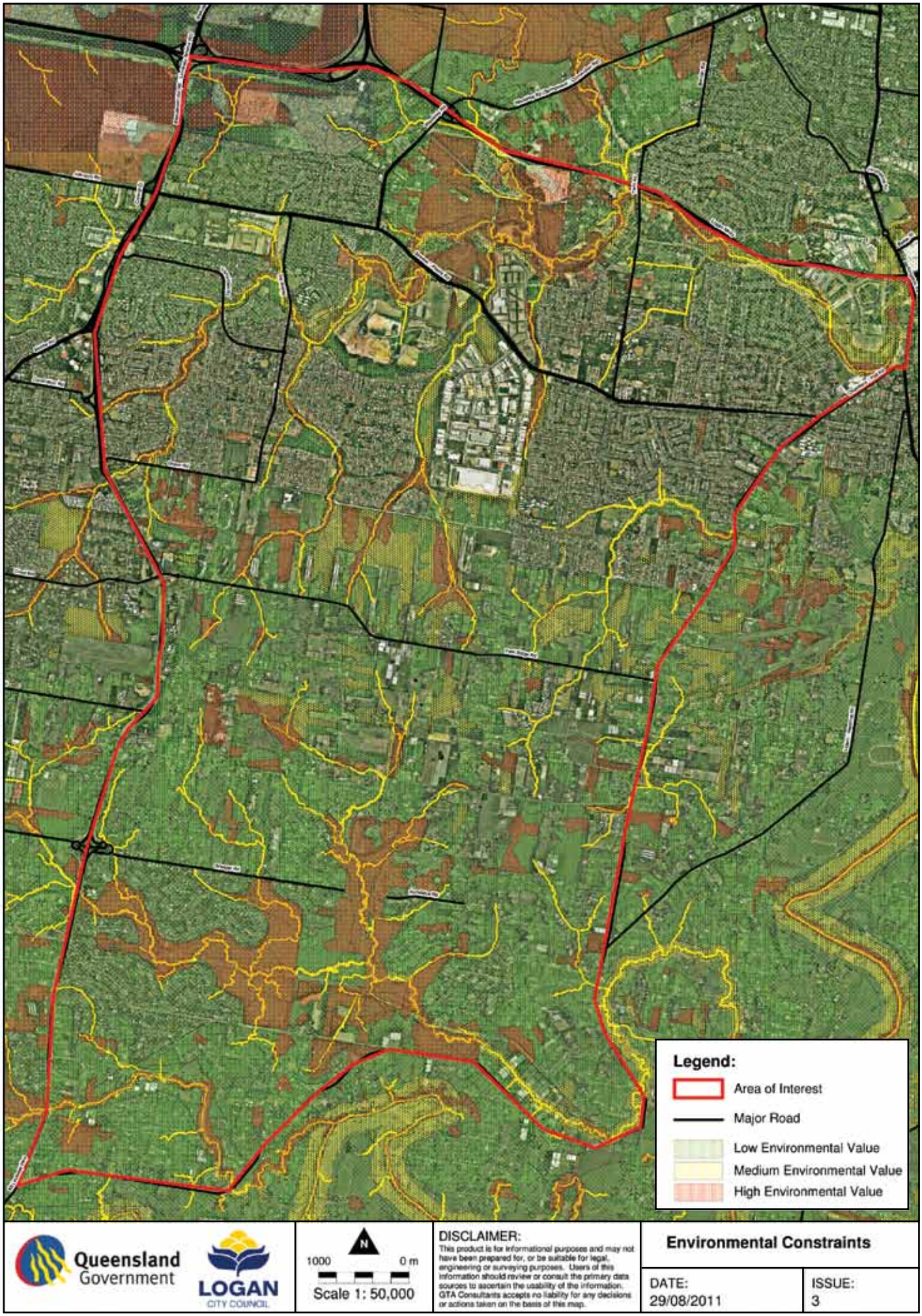


Figure 5.15: Summary of environmental values in area of interest



5.2.8.1 Potential Impacts to study area values

The *Environmental Assessment Introductory Report* has identified a number of significant environmental and ecological issues and constraints. These should be further investigated in the second phase of the project.

Tree-clearing can directly cause death in animals, in addition to indirect impacts such as the removal of habitat or changes to accessibility within movement corridors. Road kill can also occur, particularly at gullies and creeks, or other sites that present easy crossing opportunities for animals.

Roads can also alter animal behaviour due to altered microclimate, noise, headlights, movement and vibration. This can lead to negative changes in animal populations and communities, including reduced genetic diversity and decline in population.

In considering the design of the road and potential mitigation measures, impacts are considered more significant if:

- areas of high conservation value are affected
- individual animals, plants or habitat areas that are likely to be affected are significant in maintaining the long-term viability of the population, ecological community or species
- the impacts are likely to be long-term in duration
- the impacts are likely to be permanent and irreversible.

5.2.9 Air quality

The *Park Ridge Connector Review of Environmental Factors Air Quality Report* (Vipac Engineers and Scientists Pty Ltd, June 2011) was prepared to provide an air quality assessment for a potential future Park Ridge Connector.

5.2.9.1 Existing environment

Pollutants investigated

The pollutants investigated in the technical study are those referred to as common air pollutants. These are nitrogen dioxide (NO_2), particulate matter (PM_{10}), carbon monoxide (CO), sulphur dioxide (SO_2) and Benzene. Ozone is a secondary pollutant which is not directly emitted from vehicles and is therefore a regional air quality issue.

Meteorology

Wind roses were generated for different hours of the day using the meteorological data from Brisbane Airport.

Typically, a light land breeze comes from the south-west up until midday. In the afternoon, a sea breeze typically develops and winds increase in strength, with the dominant directions from the south-east and north-east and to a lesser extent the south-west.

In the evening, moderate to strong winds are more dominant from the north and, to a lesser extent, the south-west to south-east.

Background concentrations

Background concentrations for NO_2, CO and PM_{10} have been obtained from the Queensland 2006 air monitoring report. Locations as monitored by Department of Environment and Resource Management include Woolloongabba and Springwood. Since the modelling was used to evaluate impacts, and shows all major sources of pollutants in the vicinity, including emissions from road sources (a major component of background concentrations), it is not considered appropriate to add background data from the local area.

5.2.9.2 Methodology

Air quality goals

Air quality goals have been sourced from Queensland Department of Environment and Resource Management criteria, or where this data is not available, Brisbane City Council and New South Wales Department of Environment and Conservation criteria.

Emission rate estimation

The road emission rates used for model inputs were prepared based on a spreadsheet developed by Brisbane City Council and the Queensland Environmental Protection Agency, with additional data input as required.

5.2.9.3 Potential impacts

Operational impacts

Dispersion modelling was performed using worst-case meteorological data and peak traffic data in order to produce a conservative result.

The results of the dispersions modelling indicate that NO_2 is the critical pollutant and will therefore be considered for this assessment as the primary indicator of air quality. In order to introduce a safety factor, a new criterion has been adopted, that is defined as 75 percent of the Brisbane City Council criteria of 110 parts per billion which equates to 82.5 parts per billion.

A recommended air quality corridor width has been defined by considering a typical portion of the Park Ridge Connector. Figure 5.16 shows the concentration of NO_2 relative to an assumed Park Ridge Connector centreline. The red line corresponds to the Brisbane City Council criteria of 110 parts per billion, while the green line shows the adopted criteria of 82.5 parts per billion. The graph shows that the concentration of NO_2 falls below the adopted criteria 40 m from the road centreline. This means that the road corridor should be a minimum of 80 m wide to ensure that NO_2 concentrations are not above the adopted criteria outside the road corridor.

Figure 5.16: NO2 concentration decay curve

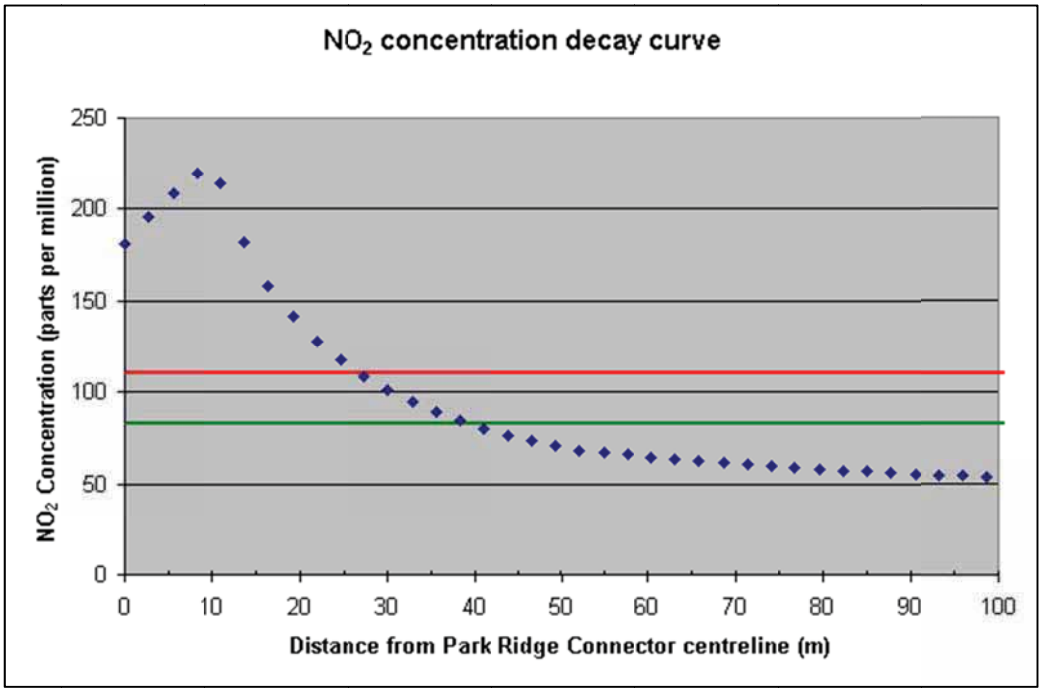


Table 5.5 shows the predicted concentrations, including background concentrations of the other relevant pollutants at 40 m from the Park Ridge Connector centreline.

Table 5.5: Predicted concentrations at 40 m from road centreline

Pollutant	Concentration	Criteria	Comparison with criteria
Particular matter < 10 µm (PM10)	190 µg/m3	200 µg/m3	complies
Carbon monoxide (CO)	6.0 ppm	25 ppm	complies
Sulphur dioxide (SO2)	56 µg/m3	570 µg/m3	complies
Benzene (C6H6)	6.1 µg/m3	10 µg/m3	complies

µg/m3: micrograms (one-millionth of a gram) per cubic meter air
ppm: parts per million

It is noted that all other pollutants are below their relevant criteria.

Construction

During construction, the pollutant that has the greatest risk of exceeding ambient air quality goals is dust, which is generated through earthworks associated with road construction. Exhaust emissions from construction equipment would not be significant and will be only a fraction of those emitted during the normal operation of the motorway.

5.3 Economic considerations

5.3.1 Economic benefits from a traffic planning perspective

This section summarises the outcomes of the preliminary road network modelling undertaken for the Park Ridge Connector corridor. The modelling was used to forecast the impacts of projected development on the road network in the area of interest, and traffic volumes that would result from various options to upgrade the network.

The preliminary investigation has enabled the assessment of future congestion levels and the costs of travel under each future road network option, including selected stages of the proposed Park Ridge Connector. This provides a range of performance measures to assist in corridor planning during this stage of the planning process. These traffic forecasts have been used to inform a number of technical investigations associated with the review of environmental factors and consultation with the Community Stakeholder Reference Group.

A more detailed economic evaluation would then be carried out once a corridor location has been further refined, drawing on the values and scope of impacts identified during this phase of the investigation.

5.3.1.1 Planning context

The *South-East Queensland Regional Plan 2009-2031* provides for substantial growth in the Logan and Scenic Rim Council areas. This plan identified locations within the existing urban area, and in new urban development areas to accommodate the planned increases in population, employment and economic activity. Particular areas of residential growth include Park Ridge, Greater Flagstone and Yarrabilba, and the existing towns of Jimboomba and Beaudesert.

The declared state development area in Bromelton is of strategic importance in supporting economic development of the region, as a hub for industry and freight movement. The Park Ridge structure plan also provides for significant growth in industrial and commercial activity.

5.3.1.2 Projected performance of road network

The future demands for personal and commercial travel would place substantial pressure on existing infrastructure and services.

Examining a medium-term planning horizon for 2031, consistent with the *South-East Queensland Regional Plan 2009-2031* and more recent planning by Logan City Council, the following is noted in relation to the progress of development in the master-planned areas:

- Park Ridge would have 60 percent of long-term population and 25 percent of long-term employment.
- Yarrabilba would have 50 percent of long-term population and 30 percent of long-term employment.
- Flagstone and Jimboomba would have 40 percent of long-term population and 25 percent of long-term employment.
- Beaudesert and Bromelton would have 50 percent of long-term population and 40 percent of long-term employment.

Preliminary road network modelling show congestion across the road network during the peak periods projected in the medium term (2031), with only priority improvements to local roads being completed.

Without further widening, sections of the Mt Lindesay Highway and Chambers Flat Road would experience severe congestion, impeding access to the area of interest and travel

through it. This would result in queues and long delays on the Mt Lindesay Highway through Browns Plains, Park Ridge and Munruben, as well as Chambers Flat Road through Logan Reserve and Marsden.

As a result, a significant volume of traffic would filter through the local road network in Park Ridge and Crestmead, causing a number of localised bottlenecks and reducing the amenity of neighbourhoods along those routes.

5.3.1.3 Performance of alternative network options

Within the framework of the *South-East Queensland Regional Plan 2009-2031*, the *Connecting South-East Queensland 2031* policy outlines the strategy for developing a transport network to support the growth planned in each of the council areas. Within the Logan and Scenic Rim areas, it identifies the Park Ridge Connector as an important link in the future arterial network to serve passenger and freight demands.

The Park Ridge Connector would allow traffic destined further afield to pass through the southern part of Logan without causing further congestion on the roads serving the communities within the area. This would enable the Mt Lindesay Highway to provide good access into Park Ridge, Browns Plains and to Beaudesert Road north of the Logan Motorway, and improve the quality of public transport services able to be provided in the corridor, as well as opportunities for cycling and walking.

The Park Ridge Connector will also relieve congestion on the roads linking the northern and southern parts of Logan City that would otherwise occur. It will provide direct access for heavy freight traffic into the industrial areas of Crestmead and Park Ridge, reducing truck volumes on local roads.

As a strategic element in the regional freight network, a full-length Park Ridge Connector will link the future freight terminal and industrial precinct in Bromelton via the Gateway Motorway to the Port of Brisbane and to the Logan Motorway, and to the distribution industries in the southern part of the metropolitan area.

5.3.1.4 Impacts of the Park Ridge Connector on medium-term (2031) traffic performance

Figure 5.17 and Figure 5.18 illustrate how traffic volumes would change if the Park Ridge Connector was constructed to Granger Road, in conjunction with other network upgrades over the medium-term (2031). Key results for general traffic are:

- Weekday traffic volumes on Mt Lindesay Highway would be reduced by 23 percent through Browns Plains and by 9 percent through Park Ridge.
- Weekday traffic volumes would be reduced by 23 percent on Chambers Flat Road through Marsden, by 40 percent on Logan Reserve Road and by 9 percent on Waterford-Tamborine Road.
- Traffic volumes would be reduced on local roads through Park Ridge:
    - On Bayliss Road by 39 percent
    - On Third Avenue by 28 percent
    - On Park Ridge Road (west of a potential Park Ridge Connector) by 23 percent.

The impacts on freight traffic volumes are even more significant:

- a reduction of 48 percent on Mt. Lindesay Highway through Browns Plains.
- a reduction of 49 percent on Chambers Flat Road through Marsden, 67 percent on Logan Reserve Road, and 34 percent on Waterford-Tamborine Road.
- a reduction of 3 percent in freight volumes on the Logan Motorway between Mt Lindesay Highway and the Gateway Motorway.

Figure 5.17: Impact of Park Ridge Connector to Granger Road on medium-term road network (total traffic)

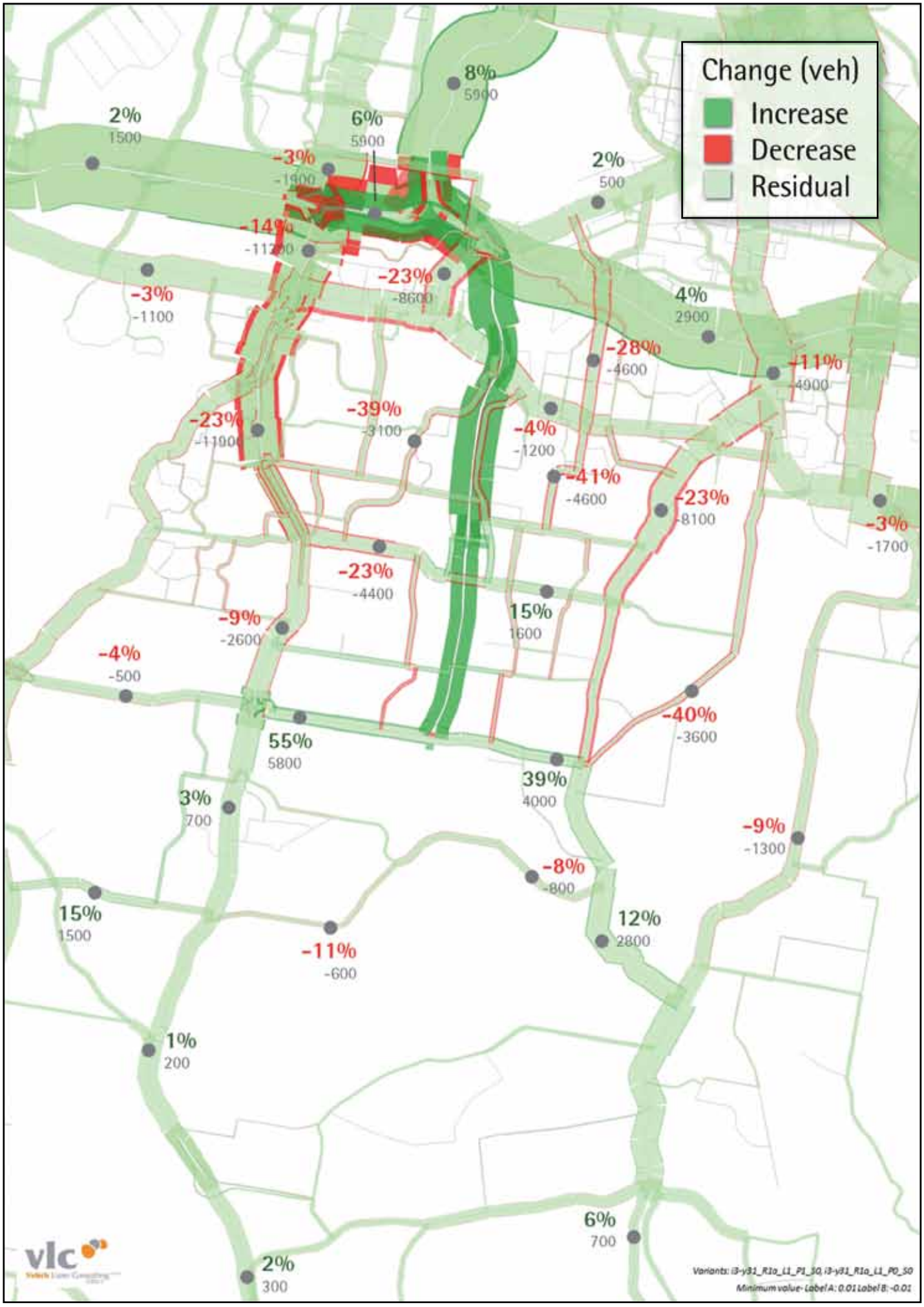


Figure 5.18: Impact of Park Ridge Connector to Granger Road on medium-term road network (goods vehicles)

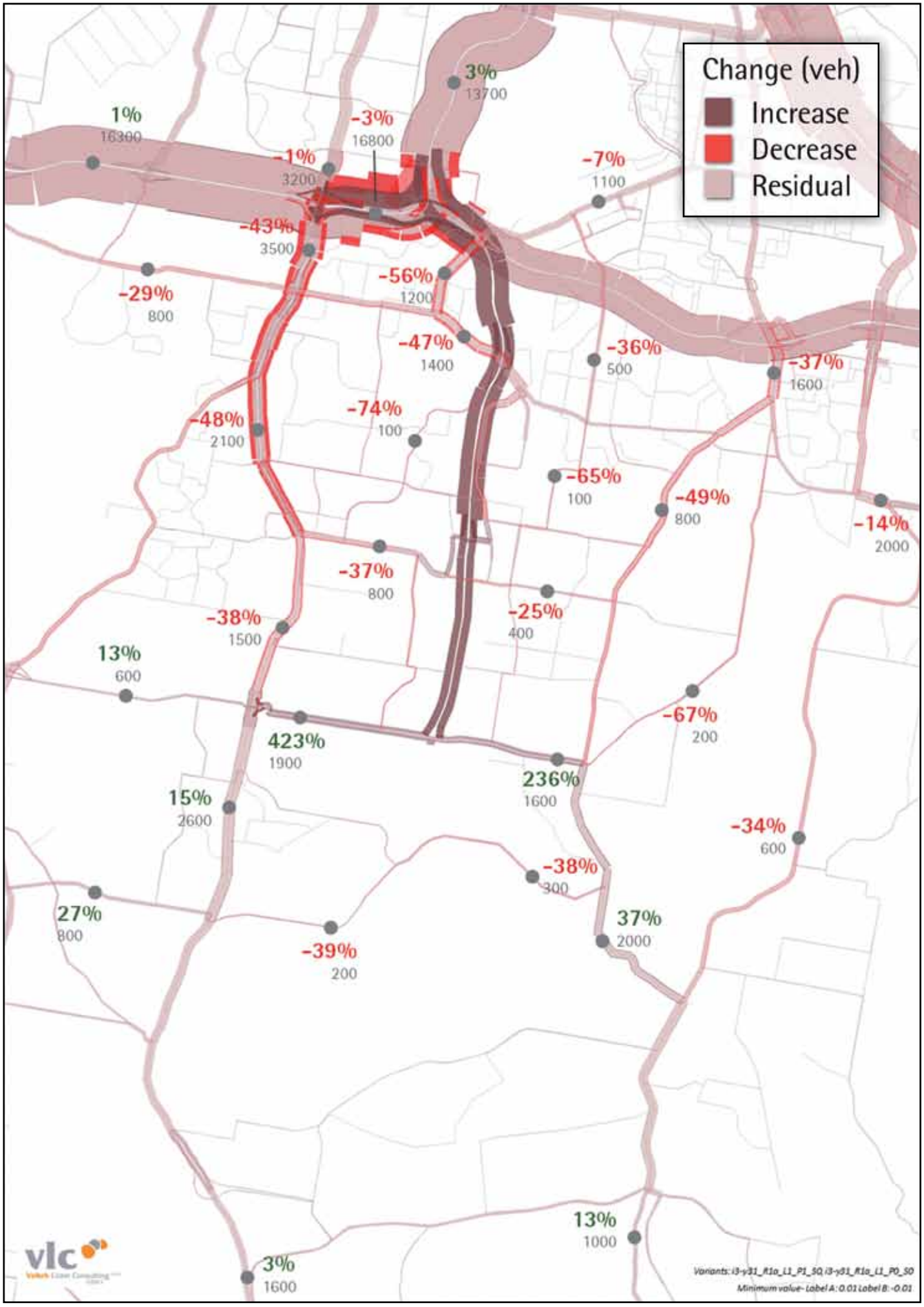


Table 5.6 provides a summary of the key measures of performance for the introduction of the Park Ridge Connector northern section (to Granger Road) in the road network option described above.

Table 5.6: Impact of Park Ridge Connector (to Granger Road) on network performance in 2031

Measure of performance		Cars	Light goods vehicle	Heavy goods vehicle	Total
Fuel consumption	Megalitres per annum	-10.7	-1.2		-11.9
Green house gas emissions	Kilotonne of CO_2 equivalent per annum	-25.4	-3.0		-28.4
Vehicle operating costs (including fuel)	million dollars per annum	-7.7	-7.9	-1.2	-16.8
Vehicle travel time	million vehicle hours per annum	-4.1	-0.2	-0.1	-4.4
Personal travel time	million hours per annum	-5.4			
Value of travel time saved	million dollars per annum	81.6	4.2	6.0	91.8
Fatal accidents	frequency per annum				-0.8
Injury accidents	frequency per annum				-28.2

It is anticipated that by 2031, the congestion relief and improved travel speeds provided by the Park Ridge Connector will result in vehicles being on the road for 4.4 million fewer hours in that year, saving almost 12 million litres of fuel and reducing greenhouse gas emissions by more than 28 kilotonnes ($C0_2$-eq).

The annual cost of operating private and commercial vehicles would reduce by around $17 million, and with a higher proportion of travel taking place on motorway and arterial roads, there would be on average, 28 fewer injury accidents and 0.8 fewer fatal accidents in 2031.

5.3.1.5 Impacts of the Park Ridge Connector on longer term (2051) traffic performance

Figure 5.19 and Figure 5.20 illustrate how traffic volumes would change if the Park Ridge Connector was extended to a future Southern Infrastructure Corridor in the long term (2051). In this example, the reference case assumes that the balance of the strategy for ultimate development of the arterial and local road network is in place, with the exception of the Park Ridge Connector. It therefore shows the incremental impact of the Park Ridge Connector. Key results for general traffic are:

- Weekday traffic volumes on Mt Lindesay Highway would be reduced by 22 percent through Browns Plains, and by 25 percent through Park Ridge and Munruben.
- Weekday traffic volumes would be reduced by 21 percent on Chambers Flat Road through Marsden, by 29 percent on Anzac Avenue, and by 28 percent on Waterford-Tamborine Road.
- Traffic volumes would reduce by 5 percent on the Logan Motorway between Mt Lindesay Highway and Gateway Motorway – providing significant congestion relief to this bottleneck.
- Traffic volumes would be reduced on local roads through Park Ridge:
    - on Bayliss Road by 39 percent
    - on Third Avenue by 28 percent
    - on Park Ridge Road (west of Park Ridge Connector) by 18 percent.

The impacts on freight traffic volumes are even more significant:

- a reduction of 45-55 percent on Mt Lindesay Highway between Maclean and Browns Plains
- a reduction of 44 percent on Chambers Flat Road through Marsden, by 54 percent on Anzac Avenue, and by 44 percent on Waterford-Tamborine Road

- a reduction of 14% in freight volumes on the Logan Motorway between Mt Lindesay Highway and the Gateway Motorway.

Figure 5.19: Impact of Park Ridge Connector to Granger Road on longer-term road network (total traffic)

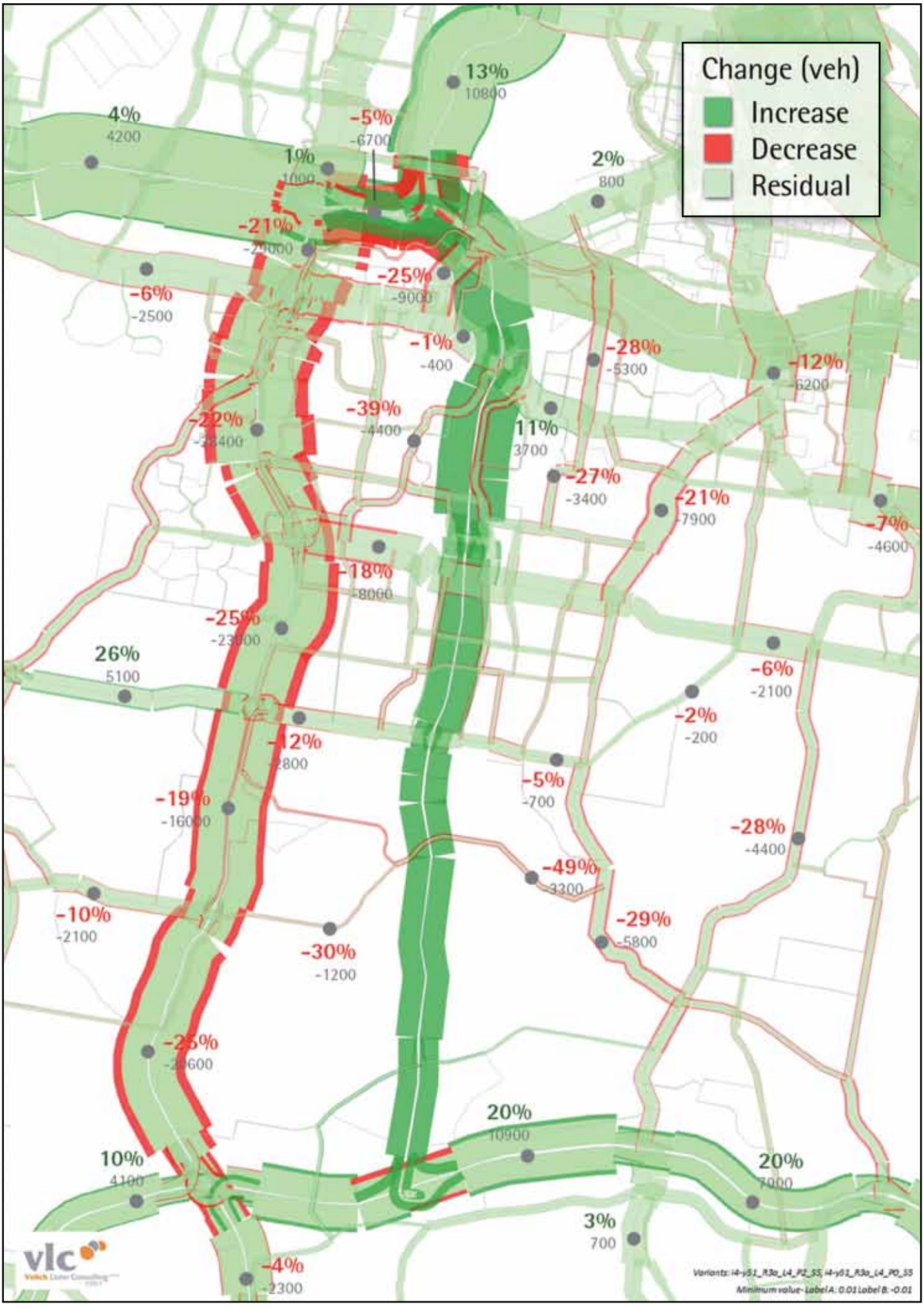


Figure 5.20: Impact of Park Ridge Connector to Granger Road on longer-term road network (good vehicles)

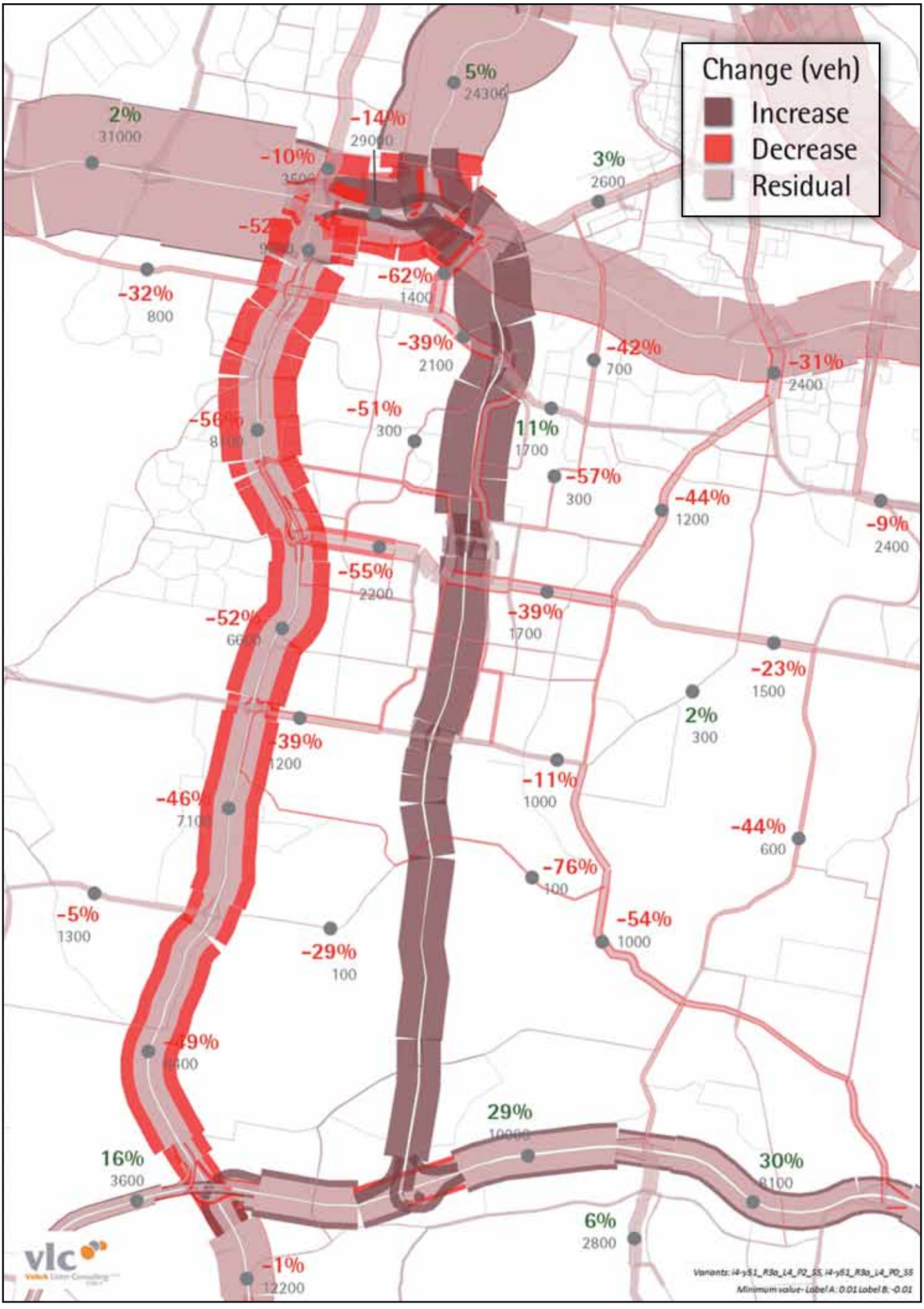


Table 5.7 provides a summary of the key measures of performance for the introduction of the full Park Ridge Connector in the road network option described above.

Table 5.7: Impact of Park Ridge Connector on network performance in 2051

Measure of performance		Cars	Light goods vehicle	Heavy goods vehicle	Total
Fuel consumption	Megalitres per annum	-23.5	-3.5		-27.0
Green house gas emissions	Kilotonne of CO_2 equivalent per annum	-54.3	-8.8		-63.1
Vehicle operating costs (including fuel)	million dollars per annum	-16.7	-17.6	-3.5	-37.8
Vehicle travel time	million vehicle hours per annum	-9.8	-0.3	-0.6	-10.7
Personal travel time	million hours per annum	-11.9			
Value of travel time saved	million dollars per annum	178.3	11.9	23.2	213.4
Fatal accidents	frequency per annum				-1.5
Injury accidents	frequency per annum				-54.5

By 2051, the congestion relief and improved travel speeds provided by the Park Ridge Connector are expected to result in vehicles being on the road for 10.7 million fewer hours in that year, saving 27 million litres of fuel and reducing greenhouse gas emissions by over 63 kilotonnes ($C0_2$-eq).

The annual cost of operating private and commercial vehicles would reduce by around $27 million, and with a higher proportion of travel taking place on motorway and arterial roads, there would be on average, 55 fewer injury accidents and 1.5 fewer fatal accidents in 2051.

5.3.1.6 Interchange location considerations

End connections to the existing road network and interchange locations are important considerations. For the Park Ridge Connector, the following factors have guided the refined area of interest:

- northern connection to Gateway Motorway
- southern connection to Granger Road. Later planning stages of the Park Ridge Connector will consider connections further south to the conceptual Southern Infrastructure Corridor between Mt Lindesay Highway and Waterford Tamborine Road.
- an interchange to support the Crestmead Industrial Estate
- an interchange near Browns Plains Road to support the planned industrial area in Park Ridge between Green Road and Park Ridge Road
- an interchange at either Granger Road or Chambers Flat Road (feedback on the preferred location will be sought from the community throughout the public display period).

These planned interchanges aim to connect the local road network and make access to the Park Ridge Connector easy and safe. The location of the interchanges will be consistent with Logan City Council land use planning.

5.3.2 Economic benefit from a project planning perspective

The Park Ridge area is identified in the *South-East Queensland Regional Plan 2009-2031* as a regional development area. Further, the *Park Ridge Structure Plan* provides opportunity for economic development within the well defined enterprise areas. This includes the allocation of land for general or light industry development, and for clean technology business park

developments. As Park Ridge develops, economic and operational pressures will influence the ongoing operation of existing and future businesses.

The Park Ridge Connector would be expected to improve services for established (such as Crestmead Industrial Estate) and proposed development areas (South West 1 Industrial Area and future business parks in the *Park Ridge Structure Plan*). Planning now to preserve a corridor would ensure future integration of transport and surrounding land to best achieve social and economic sustainability in the region.

The Park Ridge Connector would also be expected to provide an economic stimulus during the construction phase, as a result of the employment opportunities directly related to the construction phase as well as indirect economic benefits to businesses both locally and nationally.

Accommodation of workers and families from regional locations during construction also has the potential to boost local housing and rental markets.

5.3.2.1 Impacts to access and amenity

The Park Ridge Connector would cross a number of local roads which run east-west in the area of interest. Detailed planning will ensure that those links remain connected. At the more detailed design stages of the Park Ridge Connector, amenity impacts - such as those arising from noise associated with the motorway operations, or dust emissions during construction which may affect communities and landholders in the vicinity of the future corridor - will require consideration.

A high value associated with reducing the area of interest to a refined area of interest to date has been to minimise the number of affected lots. However, some level of acquisition of properties that are either partially or completely within the preferred final corridor is expected to occur. Any land required to secure the corridor in the future would be acquired in accordance with the procedures governing land acquisition and compensation under the *Acquisition of Land Act 1967*. The Park Ridge Connector planning process incorporates targeted landowner consultation during the public display period.

5.3.3 Impact mitigation

Any land required to secure the Park Ridge Connector corridor in the future would be acquired in accordance with the procedures governing land acquisition and compensation under the *Acquisition of Land Act 1967*. Other actions or mitigation measures which may be applied to particular sections of the area of interest or to particular communities include:

- continued consultation with affected sectors of the community
- governing land acquisition and compensation
- integrate Park Ridge Connector with existing infrastructure corridors where practical and with other modes of transport such as cycling.

5.3.4 Future economic investigations

As this review of environmental factors is about providing community information in the process to identify a viable corridor, it is not a comparison of motorway route alignments and a detailed economic investigation at this early stage is not required. It is, however, anticipated that a cost benefit analysis will be undertaken should the Park Ridge Connector be determined as viable in the refined area of interest.

6. Outcomes

6.1 Technical investigations

The outputs of the technical data-gathering process as summarised in Chapter 5 include identifying a wide range of areas and sites that are considered less suitable to accommodate the Park Ridge Connector. In addition, recommendations on further studies and mitigations have been provided by a range of technical consultants. However, the requirement for these additional studies will depend on whether a viable corridor can be identified within the refined area of interest, following the public display.

The technical data has been used for two purposes:

- to assist the project team in identifying a refined area of interest through the removal of sites considered less suitable for a road corridor
- to support the Community Stakeholder Reference Group in identifying areas of high value that the community wishes to preserve or protect.

These outputs can be summarised under the areas of social, environment and economic as below.

6.2 Social

Social factors can be described as being people-related and associated with historical and cultural heritage, Indigenous heritage, parklands, community infrastructure, established residential communities, land use planning, road network safety and acoustic impacts. Individual community members may attach different values to these aspects. However, it is important to recognise the range of community views and endeavour to protect areas that are, as far as possible, the shared view of the community's high values.

The areas identified as having a high social value and as being unsuitable for a road link within the area of interest include:

- Chambers Flat Cemetery (historical and cultural heritage)
- Berrinba Wetlands, parklands, residential areas in Crestmead (western side), south of Green Road (west of existing power corridor) and Flesser Reserve (Indigenous heritage)
- Hawthorn Park, Berrinba Wetlands, Flesser Road Reserve, Hubner Park, Jerry's Downfall Reserve (Parklands)
- Logan Sports Centre, sports fields, St Francis College, Park Ridge Shopping Centre, Grand Plaza Shopping Centre (community infrastructure)
- Freshwater Estate, Heritage Park, Park Ridge, Crestmead (established residential communities).

6.3 Environmental

Environmental factors are primarily concerned with natural resources and environmental sustainability and are categorised under a number of broad headings including flora and fauna, open space, biodiversity significance, water quality, natural waterways, wetlands and air quality considerations.

The Park Ridge Connector planning process has recognised the relevant standards and values attached to these environmental factors. The Park Ridge Connector area of interest and the surrounding locality are identified in various state and local government policies and plans relating to environmental values. These various documents have identified specific values and locations through mapping of areas of significance. These documents provide robust and quantitative assessment criteria to enable a specific planning tool to be generated to define ecological significance within the Park Ridge Connector area of interest and, in turn, to describe existing site conditions or values for the various environmental categories.

Key environmental values identified within the area of interest include the area having been mapped as containing nine distinct remnant regional ecosystems of which two are endangered and a further two are of concern. Also, the area of interest contains a number of drainage lines, with the area of interest being located in the Logan River catchment. Two significant wetlands have been noted with the area of interest, these being the Berrinba and Munruben Wetlands.

Additionally, a series of open spaces and reserves also protects, to a degree, other significant vegetation and habitat for scheduled species, including both Jerry's Downfall and Flesser Reserves to south of the Park Ridge Connector area of interest.

The areas identified as having a high environmental value and therefore not preferred for a road link within the area of interest include:

- Berrinba Wetlands
- Munruben Wetlands
- Jerry's Downfall Reserve
- Isle of Ely Park
- Scrubby Creek.

6.4 Economic

Economic factors relate primarily to considerations of cost and economic impact. The economic aspects of road planning are not always easy to accurately measure. In the case of the Park Ridge Connector planning, factors such as impacts on employment, road network operating efficiency, freight movement, travel time, traffic congestion and colocation with other infrastructure have been taken into consideration.

The assessment of economic factors within the area of interest has resulted in high employment attractors in the Crestmead Industrial Estate being considered unsuitable to locate a road.

It is also important to consider where the new road may link in to the existing network in the form of starting and end points and potential interchange locations. In the case of the Park Ridge Connector, the following factors have guided the refined area of interest:

- northern connection to Gateway Motorway
- the extent of the urban footprint to Granger Road

- later planning stages of the Park Ridge Connector will consider connections further south to the conceptual Southern Infrastructure Corridor between the Mt Lindesay Highway and Waterford-Tamborine Road
- an interchange to support the Crestmead Industrial Estate near Browns Plains Road
- an interchange to support the planned industrial area in Park Ridge between Green Road and Park Ridge Road.

6.5 Community value statements

To date, community consultation through the Community Stakeholder Reference Group has informed this *Review of Environmental Factors Technical Report* by drawing on the knowledge, views and resources available to representatives of stakeholder groups whose interests may be affected by the location and network connections of a Park Ridge Connector.

The Community Stakeholder Reference Group members have represented the interests of the community from business, social and environmental perspectives. This has helped to ensure that the group contained a balanced and diverse range of views from across the area of interest.

This value-setting approach to planning has been undertaken as a joint process between the Community Stakeholder Reference Group and with technical studies across a range of triple bottom line areas (social, economic and environment) in the development of this review of environmental factors.

The information gathered through the Community Stakeholder Reference Group process has been represented through a series of value statements relating to different aspects of the area of interest. These values are then matched to a Park Ridge Connector commitment that seeks to recognise and protect the values, and forms the basis of decisions around sites that may be less suitable for a road corridor in the area of interest. It is then possible to determine performance measures that are a means of judging how successfully the values have been protected and addressed, and contain specific actions that can be undertaken by the project team.

The output from the technical and community consultation aspects of the Park Ridge Connector planning process is represented in map form. Social, environmental and economic factors are those which have been assessed, with those identified as high value in the Park Ridge Connector planning process shown in map form. The areas determined as high value and therefore considered not desirable to accommodate a Park Ridge Connector are represented in Figure 6.1 and Figure 6.2.

6.6 Refined area of interest

The output of the Park Ridge Connector planning process to date can be best represented in a map showing the areas determined as high value, that is, the areas not desirable to accommodate a road corridor. By removing these areas from the area of interest, a refined area of interest in which a Park Ridge Connector corridor could be located has been identified, as shown on Figure 6.3.

The refined area of interest has been aligned to maximise network efficiency and minimise the impacts to the population and natural environment. The refined area of interest can be considered as the area of least adverse impact noted to date to locate the Park Ridge Connector.

A refined area of interest has been developed by working closely with representatives of the local community and project stakeholders, with input from technical experts. This refined area

of interest is considered to be the area of least impact for a future Park Ridge Connector corridor, and will now be tested through the public consultation process.

There are areas identified as high value that have been retained in the refined area of interest, in particular the section north of Browns Plains Road. These areas indicate an environment more sensitive to the impact of a potential road corridor, and may require a higher level of mitigation activity to ensure any adverse effects associated with the Park Ridge Connector are adequately addressed.

The purpose of the Park Ridge Connector planning process is to determine whether or not a viable corridor exists within the area of interest. The high value areas have provided valuable guidance in identifying the refined area of interest and will continue to influence future decision-making processes.

6.7 Summary table

Table 6.1 summarises the outputs of the technical investigations and consultation values in relation to specific locations in the area of interest. The table sets out the actions that will be undertaken to recognise and protect these values through the Park Ridge Connector planning process.

Table 6.1: Park Ridge Connector planning value outputs

Social	The Park Ridge Connector should not detrimentally affect and may enhance the social wellbeing of people living in the area.			
Issues	Values	Park Ridge Connector commitment	Relevant locations in the area of interest	Performance measures
Historical heritage **Cultural heritage** **Indigenous heritage**	Traditional owners seek to protect cultural heritage sites. The community values links to the past represented by cultural heritage and historical sites.	Avoid, minimise or mitigate impacts to historic and Indigenous heritage.	Chambers Flat Cemetery, Jerry's Downfall Reserve, Berrinba Wetlands	Feedback and results of infield surveying undertaken with Aboriginal cultural heritage bodies. Traditional owners shown to participate in the project as demonstrated through: • identification of significant cultural heritage • attendance at relevant workshops • involvement in other planning, design and construction activities such as undertaking pre-clearing surveys and site investigations.
Landscape and visual amenity	The community desires that new road infrastructure respect the natural environment.	Ensure visual and scenic impact are minimised through detailed landscape design.	Refined area of interest exists in close proximity to housing, community facilities, parklands, and environmentally sensitive areas.	Alignments avoid impacts to landscape and visual amenity, including impacts on existing land uses that contribute to the character of the local area. Landscaping is integrated with the natural environment, as demonstrated through: • ongoing consultation with community • use species of local provenance in planting scheme.
Parklands	The community places a high value on recreational open spaces.	Park Ridge Connector corridor may avoid existing community parklands where possible.	Berrinba Wetlands, Hawthorn Park, Hubner Park, Flesser Road Reserve, Jerry's Downfall Reserve	Direct and indirect impacts on parkland and recreational open space are, in order of preference: avoided, minimised, mitigated, offset (such as compensated for loss)
Community infrastructure	The community values access to important social meeting places, such as sporting fields, parks, community centres, schools and shops.	Park Ridge Connector corridor may avoid existing infrastructure parklands where possible.	Sportsfields, Logan Metro Indoor Sports Centre, St Francis College, Park Ridge Shopping Centre, Grand Plaza Shopping Centre, Claremont Retirement Village	Recognition of the value of parkland and open space comes from avoiding as much direct impact as possible. Minimisation of impact would include choosing a route that does not fragment the space.

Table 6.1: Park Ridge Connector planning value outputs (continued)

Social	**The Park Ridge Connector should not detrimentally affect and may enhance the social wellbeing of people living in the area.**			
Issues	Values	Park Ridge Connector commitment	Relevant locations in the area of interest	Performance measures
Established communities	The community values cohesive and integrated neighbourhoods.	Park Ridge Connector should minimise impact on residential neighbourhoods.	Freshwater Estate, Heritage Park, Crestmead, Park Ridge South, Marsden	The highest preference for corridor alignment is one that has the minimum effect on existing houses (prevents corridor passing through lots or cuts their access). The location of alignment (and connector roads) seeks to improve connectivity and maintain cohesion between neighbourhoods.
Land use Planning	Good planning is about integrating transport and land use.	Park Ridge Connector should integrate local and state transport planning policies.	*Park Ridge Structure Plan*, Logan City Council Planning Scheme, *South-East Queensland Regional Plan 2009–2031*, *Connecting South-East Queensland 2031*	Assessment of land use undertaken to identify opportunities for transport integration, including: • locations for public transport • location for pedestrian and cycle facilities • location of on/off ramps • location of east–west connector roads.
Acoustics	The community values a high standard of living and minimal noise disturbance.	Park Ridge Connector should seek to minimise noise impacts on existing residential amenity.	Existing residential areas and community infrastructure	Planning process identifies the presence of 'sensitive receptors' and in order of preference: avoids, minimises, mitigates or offsets impacts. It includes provisions for noise attenuation devices where noise impacts cannot be avoided.

Table 6.1: Park Ridge Connector planning value outputs (continued)

Environmental	As far as practical, the Park Ridge Connector should not change or alter the ecological values of key environmental locations and places, by adopting the principles of protection and avoidance, mitigation and management, restoration and rehabilitation and offset of residual and unavoidable impacts.			
Issues	Values	Park Ridge Connector commitment	Relevant locations in the area of interest	Performance measures
Air quality	The community values a clean environment that promotes high living standards.	Design, construction and operation of the Park Ridge Connector should seek to minimise adverse impacts upon air quality.		A minimum corridor width of 80 m be used for the Park Ridge Connector
Flora	To protect areas of ecological significance for the benefit and enjoyment of existing and future communities.	Design, construction and operation of the Park Ridge Connector should incorporate measures to minimise impacts on flora, biodiversity and environmental corridors.	Berrinba Wetlands, Jerry's Downfall Reserve, bushland pockets, Isle of Ely Park	Preference for alignment with minimum impact on endangered flora and environmental and biodiversity corridors Monitoring of flora community numbers on a regular basis Liaison with Logan City Council officers and state government agencies on community numbers and sightings
Fauna	To protect areas of ecological significance for the benefit and enjoyment of existing and future communities.	Design, construction and operation of the Park Ridge Connector should incorporate measures to minimise impacts on native fauna.	Berrinba Wetlands, Jerry's Downfall Reserve, bushland pockets, Isle of Ely Park	Preference for alignment with minimum impact to fauna habitat Monitoring of fauna community numbers on a regular basis Liaison with Logan City Council officers and state government agencies on community numbers
Water quality	To protect significant water courses and waterways for the benefit and enjoyment of existing and future communities.	Park Ridge Connector should not result in a significant or sustained deterioration in the existing water quality of principal water courses and wetlands traversed by the corridor.	Scrubby Creek, Logan River, Jerry's Downfall Reserve, Berrinba Wetlands	Avoid potential direct and indirect impacts of the project on run-off. Quantity and quality of the water Quality of the receiving environment Monitoring of water quality and volume sediment testing Monitoring aquatic communities

Table 6.1: Park Ridge Connector planning value outputs (continued)

Environmental	As far as practical, the Park Ridge Connector should not change or alter the ecological values of key environmental locations and places, by adopting the principles of protection and avoidance, mitigation and management, restoration and rehabilitation and offset of residual and unavoidable impacts.			
Issues	Values	Park Ridge Connector commitment	Relevant locations in the area of interest	Performance measures
Flooding	Park Ridge Connector planning should cater for flooding as a minimum standard to protect communities.	Park Ridge Connector should not have a significant impact on afflux or flow velocities and, where possible, should reduce local flood levels.	Logan River and tributaries	Design of the location of the motorway is above one-in-100-year flood levels.
Partnerships	Environmental groups have a unique knowledge of the area.	Park Ridge Connector should work toward best practice environmental outcomes.		Maintain ongoing contact with key environmental stakeholders throughout all phases of the project from planning to construction.

Table 6.1: Park Ridge Connector planning value outputs (continued)

Economic	The Park Ridge Connector is important for the local and regional economy.			
Issues	Values	Park Ridge Connector commitment	Relevant locations in the area of interest	Performance measures
Employment	Existing and future growth in local communities creates local employment opportunities.	Park Ridge Connector should protect and enhance local employment and opportunities for economic growth.	Crestmead, flower farms, market gardens, commercial agricultural businesses, small businesses	Projected number of trucks to use the Park Ridge Connector Volume growth in the local economy Number of job opportunities created
Traffic congestion	The local community values a local road network that functions effectively and allows traffic to move freely to workplaces, recreation and local services.	Park Ridge Connector should support a local road network that functions effectively and allows traffic to move freely.	Crestmead, local road network south of Logan Motorway, Mt Lindesay in the west to Chambers Flat in the east and south to Granger Road (area of interest)	Travel times for freight deliveries Travel times for local trips on the local road network
Road safety	The local community values a local road network that provides the safest possible environment for users.	Park Ridge Connector should support a safe local road network.	Local road network	Reduction of freight and through-traffic on local streets and road network
Network efficiency	Motorways have the function of taking freight traffic off the community's arterial and local road system.	Park Ridge Connector should promote the most efficient transport outcomes, for example more cycle ways and public transport.	Crestmead, local road network south of Logan Motorway, Mt Lindesay in the west to Chambers Flat in the east and south to Granger Road (area of interest)	Reduced freight on local roads allowing other transport options
Co-location	Service should be aligned with existing infrastructure to minimise the level of disruption.	The Park Ridge Connector should co-locate with existing services to minimise footprint where possible.	Power corridor east of Crestmead and south of Park Ridge Road	Co-location where possible
Freight	The community is concerned about the safety and efficiency of trucks on local roads.			Projected number of trucks to use the Park Ridge Connector Volume growth in the local economy Number of job opportunities created

Figure 6.1: Summary of environmental values in area of interest

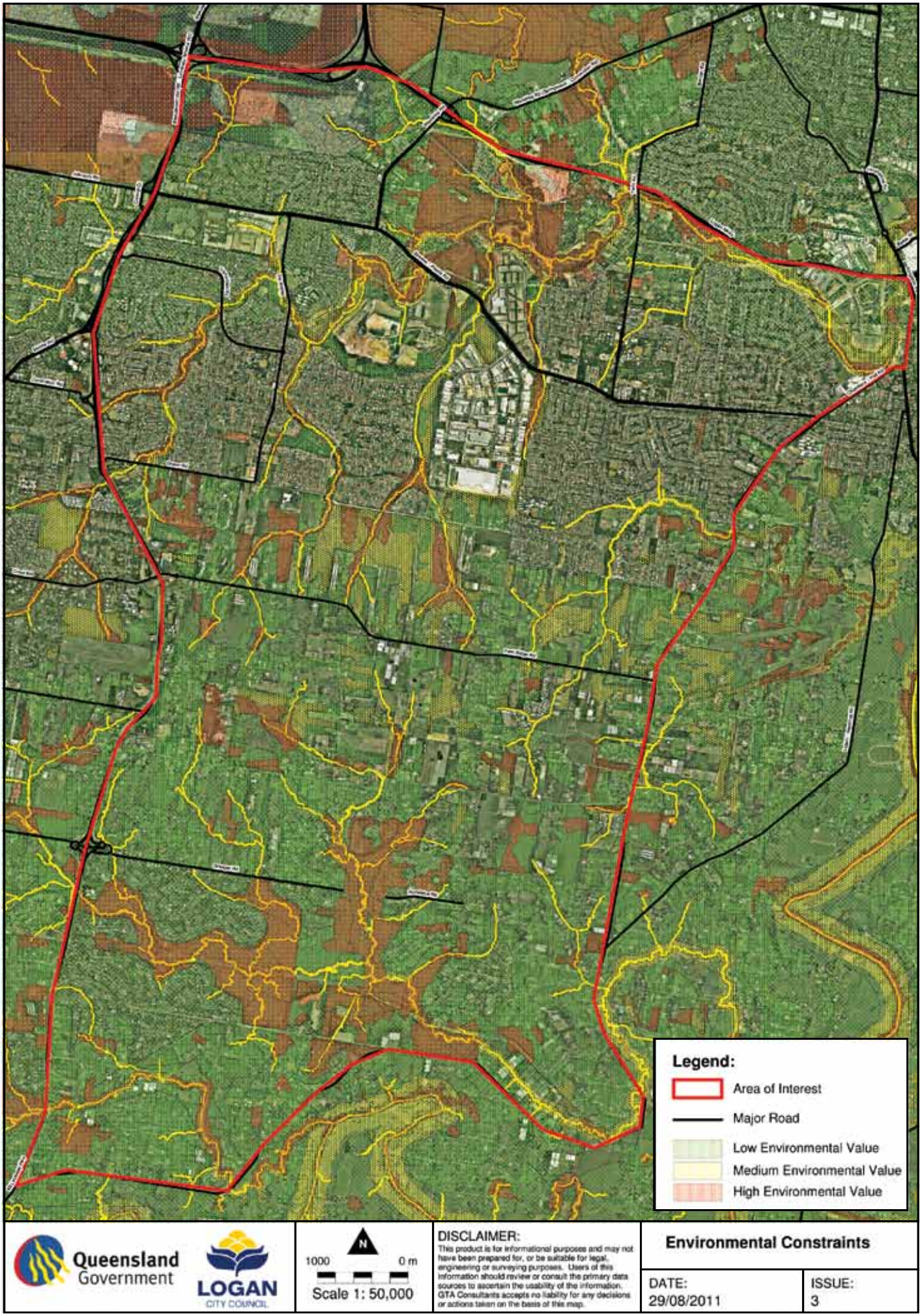


Figure 6.2: Summary of social values in area of interest

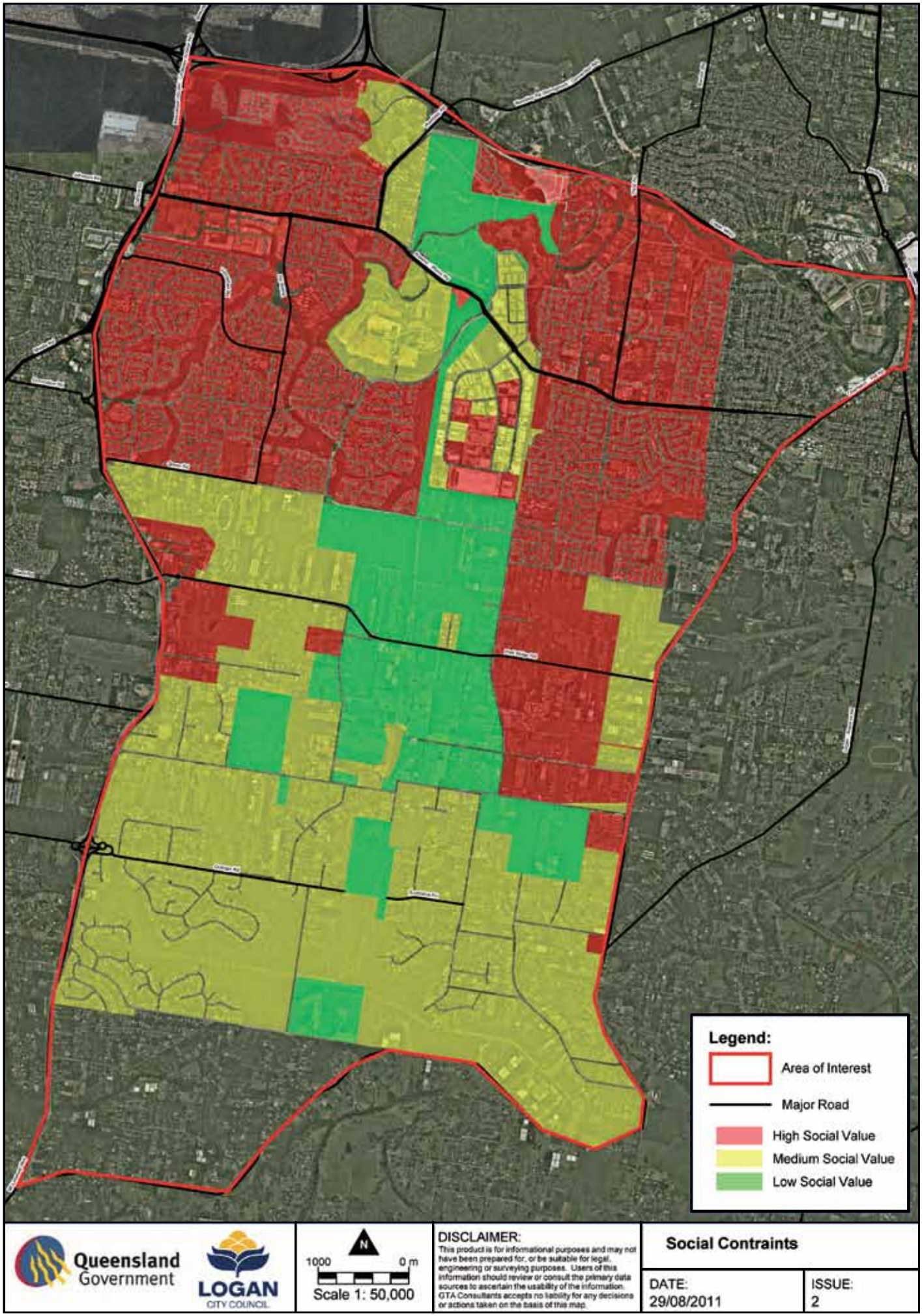
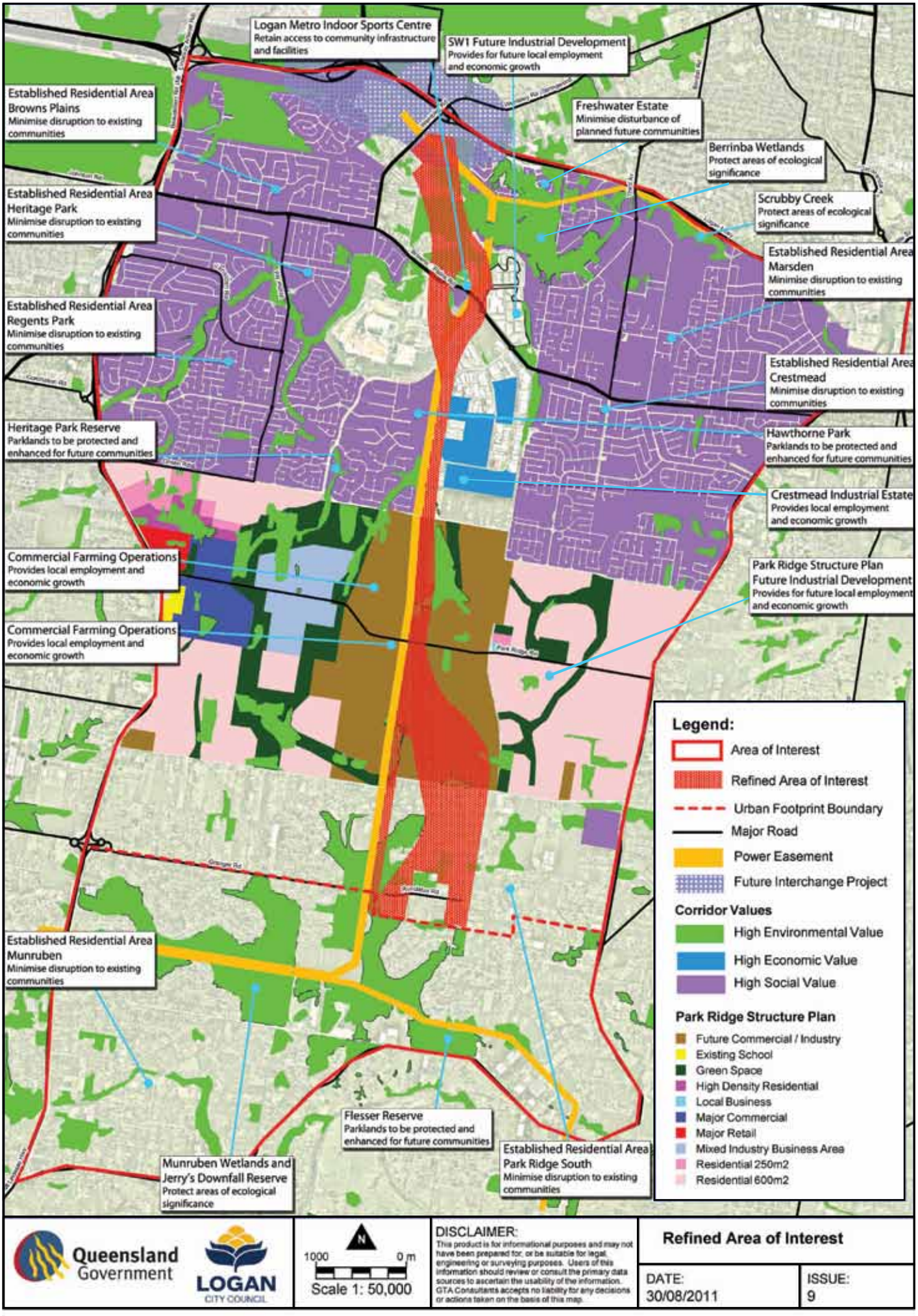


Figure 6.3: Resulting refined area of interest



6.8 Meeting Park Ridge Connector objectives

As assessment of how the refined area of interest aligns with key state and local planning principles (set out in Figure 2.2) is included in Table 6.2.

Table 6.2: How the Park Ridge Connector meets key planning principles

Key principles derived from state and local planning documents	How the refined area of interest meets Park Ridge Connector objectives
Integrate with planning policy	Aligns with relevant state and local planning legislation contained in: • *South-East Queensland Regional Plan 2009-2031* • *Connecting South-East Queensland 2031* • Mt Lindesay Beaudesert Strategic Transport Network Investigation • relevant Logan City Council planning documents
Minimise adverse impacts	Geographical areas of high value determined by technical investigations and community input has: • aligned the refined area of interest to minimise potential adverse impacts on areas of high social value • aligned the refined area of interest to minimise potential adverse impacts on the natural environment and heritage • located the refined area of interest of least adverse impact or where impacts can be reasonably mitigated The upcoming public display will further identify any potential impacts not raised through technical investigations or Community Stakeholder Reference Group input. Further information collected through the public display will enable the project team to address potential mitigation measures.
Maximise network efficiency	• The refined area of interest allows the Park Ridge Connector to be connected with the surrounding road network and provide regional travel benefits. • The Park Ridge Connector should align with identified desire lines and connectivity. It should be located to provide optimal travel times and congestion relief to meet anticipated future demand associated with population and employment growth in south-east Queensland.
Support growth	• provides access to the south west growth corridor • provides capacity for additional vehicle and freight movement in growth area • provides growth areas with access to necessary infrastructure • supports delivery of improved public transport, active transport and freight systems
Connecting communities	• connects residents to existing urban communities • connects residents to employment, education and services • connects businesses with commercial markets
Sustainable and efficient transport system	• mitigates congestion on existing road network • provides dedicated freight and heavy traffic route through sensitive urban development areas • frees up capacity on existing road network for public transport and active transport priority • provides additional travel choice
Improve liveability	• reduces congestion and provides time savings for local residents • promotes equality of access to employment and services with residents in established urban areas • removes heavy freight vehicles from local road networks
Environmental protection	• alleviates congestion, improves fuel efficiency and decreases carbon emissions • protects sensitive ecological environments through identifying and avoiding 'no go' zones • promotes more efficient movement of freight and mitigates environmental effects of heavy traffic on local road networks, for example noise, air quality, vibration and safety

7. Summary

7.1 Process to date and process to follow

The Park Ridge Connector planning process, as described in this review of environmental factors document, seeks to determine whether a viable corridor is available within the broad area of interest to accommodate a future state-controlled road.

The process to date has narrowed the area of interest to a refined area of interest through a values-based approach to planning. This process has included the data gathered from technical reports and consultation with the community and stakeholders to identify social, environmental and economic values relating to the area of interest. This has enabled the Department of Transport and Main Roads to determine geographical areas determined as high value, which are considered to be less suitable to accommodate a road corridor. These geographical areas are represented in Figure 6.3.

The refined area of interest is being publicly displayed to further obtain information on the outcomes of the technical assessment and the community consultation undertaken to date. It is anticipated that public feedback will provide further information on and adjacent to the refined area of interest. This additional information will then enable the Department of Transport and Main Roads to develop the next stage of detailed technical reporting toward the corridor preservation and planning process.

Once the public display period is complete, all feedback will be collated and included in a public consultation report. This report will be analysed by the Department of Transport and Main Roads and Logan City Council to determine whether a viable road corridor is available for preservation. The Department of Transport and Main Roads and Logan City Council will consider:

- whether the level of technical data gathered has been sufficient to adequately inform the Park Ridge Connector planning process
- if the refined area of interest accurately reflects the values and views of the wider community
- how to mitigate any major impacts the Park Ridge Connector may have upon parts of the refined area of interest.

If an approximately 100 m wide corridor within the refined area of interest is available, some level of design must take place as a next step. This design will aim to determine a road centreline for a Park Ridge Connector. To do that, the next level of planning and design will need to consider the following:

- to confirm the location and the form of how the Park Ridge Connector will link into the Gateway Motorway and Logan Motorway as part of a future interchange project
- to identify the locations where the Park Ridge Connector will connect with the east-west alignment of major roads within Park Ridge, in due consideration of Logan City Council's land use planning
- minimum interchange spacing for a six-lane motorway of approximately 3 km and maximum spacing that is dependent on the needs for accessibility and service to the local road network
- incorporate infrastructure of a managed motorway standard that will enable the Department of Transport and Main Roads to better manage congestion and incidents including breakdowns, crashes, hazards and maintenance
- adequate availability of open space at interchange locations for ramp-metering infrastructure such as signal heads, additional storage lanes and bypass lanes. Ramp metering will require sufficient storage for vehicle queuing

- a selection of features and dimensions that would enable six lanes (that is three lanes in each direction) plus medians, shoulders, road verges and setbacks to be incorporated within the approximately 100 m wide corridor
- design of intersection and ramps with adequate geometry to cater for 25 m B-doubles and multi-axle fleet turning movements
- bridges with vertical clearance of 6.1 m to the motorway
- designed to achieve a 1 in 100 year Average Recurrence Interval flood immunity at all locations along the motorway.

The primary aim is to balance the ideal motorway form against a reasonable outcome in terms of cost, safety, driver expectation, economic drivers, environmental impacts and social issues.

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Acts

Environment Protection and Biodiversity Conservation Act 1999 (Commonwealth).

Sustainable Planning Act 2009 (Qld).

Transport Integration Act 1994 (Qld).

Review of environmental factors glossary of terms

TERM	DEFINITION
Area of interest	The area initially selected for investigation for the Park Ridge Connector. This includes an area south of the Gateway Motorway and Logan Motorway interchange and bounded by Mt Lindesay Highway to the west, Granger Road to the south and Chambers Flat Road to the east
Connectivity	The way people and freight may be connected to and from the Park Ridge Connector, such as on-ramps, off-ramps and overpasses
Constraints	Existing physical factors such as terrain, drainage, geotechnical, structures, buildings, residential estates and endangered fauna and flora within the area of interest that may need to be avoided, protected or mitigated in positioning the Park Ridge Connector corridor
Corridor	A 100 m to 150 m wide passage of land recognised as the potential Park Ridge Connector location, connecting the Gateway Motorway south to the vicinity of Granger Road
Corridor preservation	Safeguarding an area identified as having capacity to accommodate the Park Ridge Connector from development or a use that may adversely impact this potential
Environment	Meaning in the review of environmental factors investigation to include specifics such as flora, fauna and water, as well as a broad understanding of environment, including public open space and social and cultural heritage. The environment is investigated at desktop level and is supported by consultation and targeted ground surveys
Environment Protection and Biodiversity Conservation Act 1999 (Commonwealth)	The Act focuses Australian Government interests on the protection of matters of national environmental significance, with the states and territories having responsibility for matters of state and local significance
Environmental Protection (Water) Policy 1997 (Queensland)	Aims to identify environmental values for Queensland waters, and make decisions about water that promote efficient use and best practice environmental management
Gazettal	The process to enable official notification of decisions or actions taken by, or information from, the Governor, government authorities, government departments, local councils, companies and individuals
High value area	An area with a high corridor value; not desirable for consideration for the future Park Ridge Connector corridor
Interchange	The junction of two or more roads connected by ramps and vertical alignment to separate turning and through-movements. *System* interchange is between a major road and a major road, usually motorways. *Service* interchange is between a major road and a minor road, usually a motorway to a local road
Mitigation	A measure or factor intended to lessen or minimise the severity of an impact
Motorway	A divided road primarily for through-traffic with full control of access and with interchanges provided at points where access to the local road system is required
Nature Conservation Act 1992 (Queensland)	Aims to conserve nature through declaration and management of protected areas, and protection of native wildlife and its habitat
Negotiable	A measure or factor that may be discussed or changed in order to reach an agreement on the location of the Park Ridge Connector

TERM	DEFINITION
Park Ridge Connector	The intended connection of the Gateway Motorway to the south to meet a new east-west road corridor in the vicinity of Camp Cable Road (defined as the Southern Infrastructure Corridor, linking Yatala and Ebenezer), as shown in the *South-East Queensland Regional Plan 2009-2031* and *Connecting South-East Queensland 2031* planning documents
Project team	Representatives of the Department of Transport and Main Roads and Logan City Council supported by expert technical consultants responsible for the Park Ridge Connector planning process
Ramp	Carriageway within an interchange providing for travel between two legs of the intersecting roads
Ramsar Wetlands	The Ramsar Convention on Wetlands is an intergovernmental treaty that obliges signatory nations (which includes Australia) to conserve and use wisely all wetlands as a contribution toward sustainable development
Refined area of interest	An area of land identified as potentially being subject to the least adverse impact from the Park Ridge Connector
South-western corridor	Identified in the *South-East Queensland Regional Plan 2009-2031* and *Connecting South-East Queensland 2031* planning documents as having potential to accommodate regionally significant levels of population and employment growth. Located in the south of Logan City and the Scenic Rim local government areas, including Browns Plains, Flagstone, Park Ridge, Greenbank and Yarrabilba
Southern Infrastructure Corridor	An east-west aligned road corridor investigation route in the vicinity of Camp Cable Road. The intent is to connect it to the Park Ridge Connector, as shown in the *South-East Queensland Regional Plan 2009-2031 and Connecting South-East Queensland 2031* planning documents
Sustainable Planning Act 2009 (Queensland)	Seeks to achieve sustainable planning outcomes by managing the process by which development takes place; managing the effects of development on the environment; and continuing the coordination and integration of local, regional and state planning
Transport Infrastructure Act 1994 (Queensland)	Aims to allow for and encourage effective integrated planning and management of the transport system
Technical advisors	A team comprising technical experts in the environmental, transport planning and economic sectors providing input into the review of environmental factors
Value	To consider with respect to significance, worth, excellence, usefulness or importance
Viable location	A location that achieves the acceptable standards of service for the motorway without causing unacceptable adverse economic, social or environmental impacts
Vegetation Management Act 1999 (Queensland)	Aims to regulate the clearing of vegetation to conserve remnant vegetation, ensures clearing does not cause land degradation, prevents loss of biodiversity and maintains ecological processes

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