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CHANGE AND CONTINUITY IN PERI-URBAN AUSTRALIA

Peri-Urban Case Study: South-East Queensland

Darryl Low Choy, Cassara Sutherland, Sally Scott, Kylie Rolley, Brendan Gleeson, Jago Dodson and Neil Sipe

Urban Research Program
Monograph 3
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Change and Continuity in Peri-Urban Australia: Peri-urban Case Study South East Queensland.

Monograph 3 of 4

Change and Continuity in Peri-urban Australia is a collaborative research project by researchers from Griffith University's Urban Research Program, Griffith School of Environment and RMIT University's School of Global Studies, Social Science and Planning.

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Cover Photograph: Peri-urban areas surrounding Laidley Township: Darryl Low Choy

Preface

This is the third monograph produced as part of research into peri-urban areas in Australia funded by Land and Water Australia (LWA) and the (former) Commonwealth Department of Environment and Heritage (DEH). The research project, Change and Continuity in Peri-urban Australia, aims to help redress the relative lack of attention given to peri-urban regions in Australia and to contribute to a growing international literature on these areas.

The project will produce four monographs. The first, Change and Continuity in Peri-urban Australia, State of the Peri-urban Regions: A Review of the Literature was published in October 2006. This monograph was intended to inform the later project work, and provided:

- a critical review of Australian and international research and evidence encompassing conceptual and policy literatures;
- an identification of key empirical and knowledge gaps nationally and regionally;
- an identification of key conceptual, governance and institutional arrangements and issues for peri-urban regions in Australia, as well as methodological issues, typologies, and policy responses, and the implications of these factors for peri-urban change; and
- a preliminary outline of sectoral and cross-sectoral concerns which apply to Australian peri-urban regions.

The second and third monographs are case studies of two Australian peri-urban regions, the Extended Western Corridor to the west of Brisbane and the Bendigo corridor north-west of Melbourne. They analyse spatial, land use, environmental, social and economic trends; describe and analyse governance, institutional, policy and management arrangements and evaluate their adequacy; and examine the implications of change for future land use and land management.

The fourth monograph will model possible future land use, development and management scenarios and consider business-as-usual, interventionist and deregulated options. Together, they seek to produce a review of relevant literature, concepts and methods, and assess change and continuity in two Australian peri-urban regions.

The project involves a team of researchers working in collaboration from RMIT University's School of Global Studies, Social Science and Planning, and Griffith University's Urban Research Program (Griffith School of Environment). The RMIT team was responsible for the drafting and finalisation of Monograph 1. The RMIT University team prepared Monograph 2, and the Griffith University team was responsible for preparing Monographs 3 and 4. Joint project chief investigators are Associate Professor Michael Buxton, RMIT University, and Professor Brendan Gleeson and Associate Professor Darryl Low Choy, Griffith University.

The Griffith University research team consisted of Darryl Low Choy, Cassara Sutherland, Sally Scott, and Kylie Rolley with support from Brendan Gleeson, Neil Sipe and Jago Dodson. Administrative and technical support was provided by Stephen Horton, Joanne Pascoe, Rick Evans and Aubrey Chandica. We also thank the members of the Project Reference Group for their contributions. The reference

group consisted of Simon Warner, Mick Capelin and Janet Frost from Queensland, and Mick Lumb, Carolyn Cameron, Jim Crosthwaite and Ian Morris from Victoria. The RMIT University research team members are Michael Buxton, George Tieman, Dave Mercer, Sarah Bekessy, Matthew Coote, Danny O'Neill, and Trevor Budge and Andrew Butt of Latrobe University, Bendigo.

Michael Lester, Noel Beynon and Laura Harris, from Land and Water Australia, provided valuable liaison on the project.

We wish to acknowledge the support of a number of agencies who supplied data essential to this Phase of the project. Form the Commonwealth Government they included: Australian Bureau of Statistics, Australian Electoral Commission, and Bureau of Rural Sciences, Department of Agriculture, Fisheries and Forestry. Queensland State Government organisations included: Department of Natural Resources and Water, Department of Mines and Energy; Environmental Protection Agency; Education Queensland; Emergency Services Queensland and the Queensland Fire and Rescue; Queensland Transport; Office of Urban Management. Other SEQ organisations included: Moreton Bay Waterways and Catchment Partnerships (Healthy Waterways) and SEQ Catchments. Local Authorities for the CSA included: Esk Shire Council; Gatton Shire Council; Laidley Shire Council; and Ipswich City Council. Other sources of information included: GISCA - National Centre for Social Applications of GIS, The University of Adelaide; and Peter Houston (South Australian Department of Primary Industries and Resources).

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List of Abbreviations

AARG	Average Annual Rate of Growth
ABS	Australian Bureau of Statistics
ANZIC	Australian and New Zealand Standard Industrial Classification
ASEAN	Association of Southeast Asian Nations
BOM	Bureau of Meterology
BSD	Brisbane Statistical Division
CBD	Central Business District
CD	Collection District
CoM	Council of Mayors
CSA	Case Study Area
DCDB	Digitial Cadastre Database
DEH	Department of Environment and Heritage
DEO	Desired Environmental Outcomes
DES	Department of Emergency Services
DLGP	Department of Local Government and Planning
DM&E	Department of Mines and Energy
DNR&M	Department of Natural Resources and Mines (former)
DNR&W	Department of Natural Resources and Water
DNRM&W	Department of Natural Resources, Mines and Water (former)
DPI	Department of Primary Industries (former)
DPI&F	Department of Primary Industries and Fisheries
EPA	Environmental Protection Agency
EU	European Union
FDI	Foreign Direct Investment
FPC	Foliage Projective Cover
GIS	Geographical Information System
GISCA	National Centre for Social Applications of GIS, University of Adelaide
GQAL	Good Quality Agricultural Land
GU	Griffith University
GWDB	Groundwater Information Database
IPA	Integrated Planning Act 1997
IRSD	Index of Relative Socio-Economic Disadvantage
JTW	Journey to Work
LGA	Local Government Authority
LGMS	Local Growth Management Strategy
LWA	Land and Water Australia
MBWCP	Moreton Bay Waterways and Catchment Partnership
MSD	Moreton Statistical Division
NAFTA	North American Free Trade Agreement
NRM	Natural Resource Management
NRMSEQ	Natural Resource Management South-East Queensland
OUM	Office of Urban Management
QLD	Queensland
QLUMP	Queensland Land Use Mapping Program
RCC	Regional Coordination Committee
REIQ	Real Estate Institute of Queensland

RFGM	Regional Framework for Growth Management
RMIT	Royal Melbourne Institute of Technology
RPAG	Regional Planning Advisory Group
SEIFA	Socio-Economic Indexes for Areas
SEQ	South-East Queensland
SEQROC	South-East Queensland Regional Organisation of Councils
SEQRP	South-East Queensland Regional Plan 2005-2026
SEQWCG	South-East Queensland Western Catchments Group (former)
SLA	Statistical Local Areas
SLATS	State-wide Land and Tenure Study
SPP	State Planning Policy
UQ	University of Queensland

Executive Summary

Introduction

This is the third in a series of four monographs investigating peri-urban issues throughout Australia. This monograph examines the peri-urbanisation that has occurred in the South East Queensland (SEQ) region, the fastest growing metropolitan region in Australia. It has investigated the structural and functional aspects of peri-urbanisation that has characterised a growth corridor to the west of the Brisbane - Ipswich metropolitan area towards the regional centre of Toowoomba. The monograph is part of the *Peri-urban Continuity and Change* project which has been funded by Land and Water Australia (LWA) and the (former) Department of Environment and Heritage (DEH). The principal aims of the project have been to identify the nature and extent of contemporary peri-urban Australia and the likely future patterns of socio-economic, cultural and particularly, natural resource developments in peri-urban landscapes.

South-East Queensland Case Study Area & Peri-urban Settings

A review of the literature (Monograph 1) provided this study with a starting definition of peri-urban areas. It defined peri-urban regions as those areas on the urban periphery into which cities expanded or which cities influenced ('peri': around, about or beyond). Peri-urban areas usually are not homogenous, have different characteristics and dynamics, and contain a disorderly jumble of residential, commercial, and rural-residential land uses, often interspersed without apparent order. Their spatial expression often contradicts the model of orderly, clearly defined concentric zones to cities. It may also be difficult to identify where a peri-urban area ends and a truly rural landscape begins.

The SEQ region is one of the largest planning regions in the world. It extends 250 kilometres north-south and 160 kilometres east-west, and comprises an area of 2.2 million hectares (23,700 km^2). The region has been dominated by sustained urban growth over the past two to three decades with a large proportion of that growth associated with the metropolitan core centred on the City of Brisbane and its immediately hinterland.

Much of the emphasis of peri-urban work to date has been associated with metropolitan centres, hence the focus on the perimetropolitan region. The extent of the broader SEQ peri-urban zone, centred on Brisbane City, was identified through first approximation mapping. This was designed to provide a generic identification and interpretation of the region's approximate peri-urban area during the study's initial stages.

The study confirmed and extended current understanding of peri-urbanisation as a dynamic urbanising process that involved the closer subdivision, fragmentation and land use conversation of former rural lands. It also confirmed that it involved high levels of non metropolitan growth which often resulted in a blurred transitional zone comprised of jumbled, temporary mixes of urban and rural activities and functions. The resulting peri-urban land use activities exhibited a high degree of heterogeneity, continual change and conflicting values. This extended working definition of peri-

urbanisation also provided an opportunity to see the phenomenon a process that related to a number of spatial contexts, many of which were not always associated with the fringes of metropolitan centres. The enhanced typology of spatial peri-urban settings can include a range of metropolitan and non metropolitan landscape settings such as: adjacent to a metropolitan centre; adjacent to a (non metropolitan) regional centre; adjacent to an urban centre within the commuter hinterland of a metropolitan centre; adjacent to an urban centre within the rural landscape; or linear contexts along growth corridors, transit routes or amenity landscape settings such as ridgelines and coastlines.

This preliminary phase allowed the study to focus on a peri-urbanising case study area (CSA) within the SEQ region centred on a corridor to the west of the Brisbane - Ipswich metropolitan urban growth corridor. The findings of this research confirmed the broader understanding of peri-urbanisation with particular relevance to the SEQ region.

Major Findings

Socio-Economic Aspects

The CSA experienced strong population growth during the 1980s and early 1990s which led to dynamic social and environmental changes. Between1981 to 1991 the CSA had an average annual growth rate of 3.7%. During the 1991 to 2001 period, growth slowed to 1.2%, indicating that the primary wave of peri-urbanisation occurred nearly two decades ago. Preliminary 2006 census data indicates that peri-urban growth trends have continued and it is highly probable that it has been an exponential increase from the previous periods

Out-migration of the young adult population (aged 24-35 years) from the CSA, especially the Rural Balance area, occurred over the period 1981 to 2001. In contrast, the number of people aged over 60 years grew. The Rural Balance had a relatively high proportion of people aged less than 19 years for this 20 year period.

Employment within the CSA has traditionally been associated with physical labour including occupations such as labourers and tradespeople. The principal industries of employment included manufacturing and agriculture, fishing and forestry. However, recent trends indicate increasing employment in manufacturing and the retail trade.

Levels of disadvantage within the CSA, compared to the remainder of SEQ, have improved, with the population becoming less disadvantaged in terms of low income and unemployment over the years 1996 to 2001.

Land Use Aspects

Rural residential development and primary production are the dominant land uses in the CSA, accounting for 19.3% and 33.8% of land respectively. The smallest percentage of lot sizes within the CSA is in the less than 1 hectare size (5.7%). The greatest percentage of land is comprised of lots greater than 40 hectares (36.0%), demonstrating the remaining availability of larger areas for agricultural production.

Eighty-four percent of the land within the CSA is freehold title being managed by private land holders on an individual property basis. This situation can potentially contribute to ongoing fragmentation of management effort for these landscapes.

Agriculture

A diverse range of agricultural activities exist across the CSA which contributes significantly to agriculture production at both the regional and state scales. SEQ generally is also significant to production within Queensland. Commodities such as poultry, mushrooms, strawberries and nurseries produced in the CSA comprise a large proportion of the value of State production.

Agricultural establishments in general have been decreasing in size and number, whilst production of crops including lettuce has increased and a shift towards crops suitable to intensive farming is taking place.

Declining establishments and increasing intensification are growing trends in the production of crops such as mushrooms, with the majority of growth occurring between 1991 and 1996. Production of mushrooms, for example, increased by 98% whilst the area under production remained relatively stable.

The emergence of lifestyle horticulture including turf farms, cut flowers and nurseries has also been noted in the CSA, with the industry becoming one of Queensland's fastest growing. The growth in this industry is consistent with the continued and sustained population growth occurring in SEQ. However, future growth is potentially threatened by urban encroachment into the peri-urban area and by the severe water shortages associated with the recent drought in SEQ.

Biophysical Threats

Land previously not viable for agriculture and left undeveloped, coincides largely with elevated ridgelines which now function as biodiversity corridors. These regionally significant pockets of remnant vegetation also represent some of the CSAs highest biodiversity values. However, these areas are now under serious threat as they are now highly sought after for rural residential purposes.

Fragmentation of remnant vegetation and loss of habitat and wildlife corridors has occurred throughout the CSA as a consequence of vegetation clearing for settlement purposes. Many rare, vulnerable or endangered species inhabit the peri-urban area and further land fragmentation in addition to increasing densities of residential development may result in further biodiversity losses. Clearing of woody vegetation for pastoral and settlement purposes has been extensive with minimal revegetation efforts to date.

The high demand for lifestyle properties has resulted in subdivisions being approved in locations which are sought after for their natural and scenic amenity value but also having moderate to high bushfire hazard ratings. These 'at risk' developments can also have significant impacts on scenic amenity through interrupting sightlines and losses of remnant vegetation. Increasing peri-urban activities can exacerbate the spread of alien flora and fauna and the impacts from popular peri-urban activities such as those related to the keeping of horses, have to date been underestimated.

The strong population growth and continued urbanisation has resulted in the region's limited water resources being assigned for urban consumption at the expense of agricultural uses. Identified impacts of peri-urbanisation in the CSA include an altered hydrological regime, over-extraction of groundwater and poor water quality. Persistent drought conditions will place increased pressure on groundwater sources as surface water availability becomes more limited.

The scale and distribution of natural resource issues makes it difficult for local government to successfully address with few resources and specialist skills at their disposal. Consistently, the smaller peri-urban local authorities identified a lack of funds and dedicated staff available for NRM activities. Specifically, funding is generally only available where a subsidy exists and often it lacks the permanency required for long term projects and landscape maintenance.

Management Challenges

The diverse nature of peri-urban areas generally, and the CSA specifically, presents numerous challenges of both a socio-economic and landscape management nature. This study has identified a range of peri-urban challenges and presents a focus for future priorities in terms of land management. The following challenges can be expected to confront the management of other peri-urban areas in the SEQ region and beyond.

Landscape Management Challenges

Loss of Biodiversity

There has been a significant loss of habitat within the CSA especially for endangered, vulnerable and rare taxa. Clearing of woody vegetation has occurred in an inconsistent and fragmented manner between 1988 and 2003. This was mainly for the creation of pastures (to the north-east of Gatton Shire and the north-west of Laidley Shire) and to facilitate settlement and infrastructure.

The subdivision and resulting fragmentation of land has resulted in loss of wildlife corridors throughout the CSA. Remnant areas of biodiversity correlate with the remaining wildlife corridors further enhancing the importance of maintaining and protecting such areas. Regionally significant wildlife corridors exist to the east of Laidley township, to the southern side of the Warrego Highway, in addition to an area to the north of Helidon. A larger corridor rated as being of state significance is located on the escarpment to the east of Toowoomba. All of these areas require protection from rural residential development.

Pests Animals/Weed Infestation

A large number of pests within the CSA are becoming more widespread compared to their past distributional localisation. Pest animals becoming more widespread include the feral cat, fox and wild dog. Continued peri-urbanisation and the accompanying increase in rural residents will increase the likelihood of growing numbers of domestic animals escaping to the wild.

There is a high incidence of alien flora in the CSA. The distribution of prevalent species remains relatively constant, however, the extent of weed infestation is becoming more prevalent within each locality. Weeds becoming extremely common and problematic include mother of millions, groundsel bush and *Parthenium* (a weed of national significance).

Loss of Scenic Amenity

Scenic amenity in the CSA is highest in the more vegetated areas, particularly along ridge lines in the lower Laidley and Gatton Shires. Conversely, scenic amenity was the lowest in sections adjacent to the Warrego Highway. The areas of highest scenic amenity correlate with areas of highest biodiversity suggesting even greater protection and management should be sought for these areas. This is particularly pertinent given the ever-increasing loss of biodiversity in the CSA. Scenic amenity has the potential to be reduced by increasing fragmentation of the landscape through increasing subdivision and urban related development.

Water Quality Decline

The water quality in the CSA and its related catchments has remained poor over the period 2001 to 2006. Despite some improvement being recorded in stream quality, overall the principal drainage systems in the CSA, the Lockyer and Bremer catchments performed poorly across all indicators such as wellbeing and health of aquatic macro invertebrates, fish species, ecosystem health, nutrients and physical/chemical processes. The Mid-Brisbane catchment downstream of the Lockyer Creek catchment performed fairly across all indicators. The implications for water quality resulting from increasing rural residential developments that rely on on-site sewage disposal have yet to be ascertained.

Changes to Hydrological Regime

The Lockyer Valley has been recognised as a stressed groundwater system where extraction of water has exceeded a sustainable rate. Low to medium flows within waterways has occurred in upstream areas and the stream flow in the middle and lower sections of the valley have been altered causing ponding in some areas. Permanent loss of stream flow and lowering of the alluvial watertable has been accompanied by losses in aquatic and riparian vegetation.

Significant quantities of surface water have been captured in numerous farm dams that litter the rural residential landscape in increasing numbers, thus depriving the natural hydrological system of its usual flows.

Impacts to Groundwater Resources

Over extraction of groundwater has resulted in salinity and long term impacts such as falling water tables. Increasing housing densities will reduce infiltration of precipitation into the water table particularly where these developments have been inappropriately sited over groundwater recharge areas. Currently groundwater extraction is largely unregulated.

Bushfire Prevalence

The bushfire hazard in the CSA is predominantly low to medium, with a small area classed as high risk on the northern side of the escarpment. The vegetated escarpment is predominantly classed as medium bushfire risk, whilst the lowland valley is largely a low bushfire risk area. The nature of the CSA, particularly where settlement has extended into densely vegetated areas, makes bushfire risk an increasing management issue.

Landscape Management Capacity

The ability of landscape managers (existing and new) in the peri-urban areas to manage the landscape is governed by indicators such as awareness, previous experience, skills and experience, resources available, time and willingness to contribute to NRM. A preliminary assessment using these indicators showed that urban newcomers may have capacity in terms of available time to devote to their property given their employment status, however, it also suggests that they may not have the knowledge, skills, educational background or surplus resources available to devote to landscape management.

Social and Economic Challenges

Social Conflicts

Examining the extent of social conflicts between new and long-term residents in the CSA was beyond the scope of this study. However, anecdotal evidence suggests that conflicts do exist particularly between the incoming urban life-stylers and the traditional farming community. There appears to be far from satisfactory dispute resolution processes in place to deal with these conflict or strategies to minimise their occurrence. The continued and changing nature of land use in the peri-urban CSA from predominantly rural to increasingly urban has the potential to further exacerbate these conflicts.

Social Disadvantage

Levels of social disadvantage in the CSA have declined since 1996. Marked improvements were observed in terms of income, employment levels, improved housing stocks and the number of people with vehicles. The following trends were noted:

- improvement in the percentage of early school leavers, meaning people are staying on at school for longer periods;
- the percentage of people with low income has declined especially around Gatton township; and
- minimal public housing is available in the CSA and is generally confined to the town of Laidley and to the south of Gatton.

Some disadvantage remains however, with increases in poorly serviced areas, particularly the more remote areas of the CSA.

Increasing Economic and Social Divide

An increasing divide in terms of economic wellbeing within peri-urban areas may be influenced by the changing nature of land use and traditional enterprises within the area. The movement of investors and wealthy urbanites into the peri-urban CSA has the potential to displace current residents, especially the low income or disadvantaged. This process could increase the social divide between people who are economically secure and those that are not, potentially causing further conflict. This could impact on the availability of services and social infrastructure as well as affordable housing and rental properties. Alteration of existing conditions in workforce, employment and community services may also increase the divide between new and long-time residents.

Loss of a 'Sense of Community'

The sense of community demonstrated through long-time residents can be disturbed when new residents move into an area through changing land uses from rural to urban or peri-urban. This is particularly the case if that process occurs in a rapid and fragmented manner. The peri-urban transformation of the former rural CSA into an increasingly urban-oriented area has the potential to disrupt its existing social networks and community values through the introduction of residents with differing values and beliefs. These changes can disrupt and even alter the existing sense of community inherent in these established communities which ironically may be the very attraction that is drawing many of the former urbanites to these locations.

The high degree of population mobility characterised in many peri-urban communities, (both in and out migration), further complicates the ability to re-establish a sense of community in these emergent peri-urban settlements.

Skewed Population

The age structure of the CSAs population illustrates characteristics associated with structural ageing and a noticeable loss of young adults. As previously noted, this has involved a decline in young adults aged between 24 and 35 years and an increase in those aged over 55, with greater numbers aged less than 14 years. This skewed population, characterised by a greater proportion of very young and older people with an declining young adult population, necessitates special attention in social services which differs from traditional urban and rural areas.

Emergence of New Local and Regional Economies

The changing nature of the peri-urban CSA has seen the emergence of new land uses, industrial networks and new enterprises significant for both the local and regional economy. The location of the CSA within a relatively rural area, yet still close to a major metropolitan centre, enables the utilisation of the landscape for boutique farming catering for affluent urbanites. For instance, the transformation of traditional agriculture has seen the rapid appearance of vineyards and wineries in many peri-urban areas. The CSA is becoming utilised for intensive animal husbandry (including kennels and catteries), horse agistment and turf farms and nurseries servicing both local and regional communities.

Intensification of Agriculture

Agriculture in the CSA has intensified over the ten years to 2001, with production increasing despite declining numbers of establishments. Over this time, the area of holding has declined as a proportion of SEQ from 39.8% to 26.4%. The majority of agricultural growth in the CSA occurred from 1991 to 1996 and trends indicate the remaining significance of the CSA to the overall agricultural production of SEQ.

While growth in total area of land holding was experienced during the mid 1990's, the steady decline is consistent with the intensification of agricultural production in the CSA. Commodities such as lettuce and mushrooms are suited to intensive growing conditions. In the case of lettuce, the number of establishments has declined, yet production showed marked increases. The same trend is seen for commodities such as nurseries products and poultry.

Improved Management Arrangements

Governance and institutional arrangements for land use and environmental planning and NRM across the SEQ region are highly fragmented. There are many institutions that exercise some form of management for selected aspects of peri-urbanisation across the CSA – a situation compounded by three scales of governance and management. The resulting duplication in management functions causes unnecessary redundancies and leads to uncertainty in respect of management responsibilities between levels of government and across institutional boundaries.

Improved coordination is required to ensure that planning is consistent, avoids duplication and involves greater degrees of integration of planning and management functions. This will require greater alignment of plans, policies and strategies, particularly between NRM plans and statutory plans at regional and local levels.

Recent regional planning initiatives associated with the *SEQ Regional Plan 2005-2026* and its realignment efforts with other State agency and Local Government planning provides a range of potential opportunities to address these planning and management shortcomings.

The discrete landscape management and socio economic peri-urban management challenges identified in this study must be addressed through improved planning processes and procedures as traditional urban planning approaches are incapable of adequately addressing them. . Whilst these peri-urban landscapes display certain urban like characteristics, they are not urban landscapes and they may never become incorporated into the urban framework of a region as exemplified by the SEQ Regional Plan's statutory delineation of its designated urban footprint.

A New Peri-urban Landscape

The study has presented evidence to suggest that the CSAs population is maturing through a stabilising resident population, a broadening employment base, less commuting to nearby larger urban and metropolitan areas, improved housing stock, and declining evidence of social disadvantage. These trends are consistent with overseas experience which suggests that in these circumstances there is a strong

possibility that these peri-urban areas may be evolving into a new form of settlement – one distinct from traditional forms of urban and rural settlements. This also acknowledges that many of these areas will never become fully urbanised in the sense of the traditional urban growth model. Statutory regional planning initiatives such as the SEQ Regional Plan's designated "Urban Footprint" provides additional weight to these possible outcomes. Recent indications suggest that peri-urban growth in the CSA will continue and has recently experienced an exponential increase from previous periods.

The study has also highlighted the significant demographic changes that areas such as the CSA have experienced. These changes have led to a wave of new settlers now being largely responsible for the management of these freehold landscapes. Future management initiatives, especially in the NRM area, will have to engage this raft of new "actors" on the peri-urban stage who have been categorised as:

> *The Seekers*: including "tree/sea change" life stylers, "blockies/homesteaders", religious communities and alternative life stylers.
>
> *The Survivors*: including DIY home builders, the horse community, "truckies" and "adaptive" farmers.
>
> *The Speculators*: including farm stays & retreats, the pet industry, boutique farmers, recreational providers, landscape suppliers, the equine industry and developers & real estate agents.
>
> *The Strugglers*: characterised by the "holding-on" farmers.

Future NRM initiatives will have to engage this full range of new private landowners who have settled into the full spectrum of peri-urban landscape settings and who now have stewardship responsibilities for increasing proportions of these areas. .

Principal Recommendations

The study has concluded with a series of recommendations covering generic data issues, specific NRM research questions, and planning & management research questions. The first two groups deal largely with specific to SEQ matters although many of the NRM questions can relate to almost any peri-urban area. The question of the role, impact and future of the equine industry in emergent peri-urban areas is a major issue that has largely been ignored in planning, NRM and landscape management circles to date and is a ubiquitous challenge for NRM across all peri-urban landscapes. The continued fragmentation and peri-urbanisation that is potentially possible through future sales of multi-titled farms to non farmers is perhaps the most pressing issue that requires urgent attention by the State and Local governments.

The priority planning & management research questions of a specific nature address the "new settlement" hypothesis, the ability of the new managers ('actors') of the peri-urban landscape to exercise their stewardship responsibilities for their properties, and the requirements to engage them in future NRM initiatives, especially in order to improve their landscape management capabilities. The cost, especially to the community, associated with the provision of physical, social and environmental

infrastructure to peri-urban areas, specifically to rural residential areas, also needs urgent attention.

Summary

The range of major landscape management challenges associated with peri-urban landscapes characterised by the CSA requires a coordinated approach delivered through appropriate institutional arrangements. The current SEQ regional planning initiative has the potential capability to provide for these integrated outcomes. Future management initiatives should focus on the process of peri-urbanisation and not solely on its spatial dimensions. These initiatives can be focussed through the employment of the recommended peri-urbanisation cycles which highlight the critical linkages between the drivers of change, the peri-urban process and its resulting management challenges, and the new 'actors' on the peri-urban scene who now have stewardship responsibility for these peri-urban landscapes.

This study concludes with a research agenda that acknowledges a number of data deficiencies and matters that require attention through further or newly initiated investigation. The recommendations for further research cover generic data deficiencies, specific NRM issues and planning and management issues.

This study has used a case study approach to provide a broad scoping study of peri-urbanisation in Australia. The examination of this SEQ case study has highlighted a wide range of emergent peri-urban issues including a number of specific landscape and socio economic management challenges. Effectively addressing these challenges demands a new approach different from past practices that were based on traditional urban and growth management approaches. These peri-urban landscapes display certain urban like characteristics, however, they may never become fully urbanised and become incorporated into the region's urban fabric. New approaches are required to address the management challenges in these evolving peri-urban landscapes.

1 Introduction

1.1 The Peri-Urban Question

Peri-urban regions are those areas on the urban periphery into which cities expand or which cities influence (‘peri’: around, about or beyond).

Peri-urban regions have been defined both structurally and functionally. A structural analysis is concerned with locational and spatial elements such as proximity to primary metropolitan areas, physical structure and form, population distribution, employment patterns, lot and dwelling density, the location and types of land uses. Alternatively, they have been defined functionally, by reference to factors such as population dynamics, or by a combination of spatial and functional factors. A functionalist analysis is concerned with processes, particularly the uses of and inter-relationships between structural elements, how elements work, what they do – particularly what impacts they exert – and how they interact. Some common functional processes are consumption and production processes and flows, and means of communication. The extent of peri-urban areas, for example, is commonly defined as the extent of the outer commuter belt of a city.

A peri-urban area can be defined in relation to a nearby metropolitan area on its inner boundary, a rural area on its outer boundary, or as the land in between. There are difficulties with all three approaches.

Peri-urban land can be seen simply as land adjacent to the edge of an urban area into which an urban area expands. This definition is common to many researchers, see for example, Burnley and Murphy (1995a and b). Alternatively, the focus may be on the land between urban and rural uses, on that area of land existing in a perpetually unstable state between inner and outer boundaries. Nelson (1999:137, 138), for example, defines ‘exurbia’ as “a landscape situated between the built up urban areas and their suburbs, and the truly rural hinterland”, and “not quite urban but not quite rural” in contrast to truly rural areas which are situated well beyond reasonable commuting range of urban areas and isolated from urban markets. This dynamism often results in reference to the transitional nature of peri-urban areas and implies that they are a “zone of impermanence” or an urban land bank awaiting use (Pryor 1968:205). A continuum can be a useful way of seeing the peri-urban area, implying a progressive almost measured change across the landscape.

However, change may not be a uniform pattern and many peri-urban areas may not exhibit a simple gradation from urban to rural. It may be difficult to identify both the inner and outer boundaries of peri-urban areas. Some cities end with a clear boundary and maintain a separation of uses in their immediate hinterland. However, in the areas around many cities, it may be difficult to identify the characteristics and boundaries of the peri-urban zone as the space between urban and rural land, or as orderly bands or sectors within this peri-urban zone. Peri-urban areas usually are not homogenous and may have differing characteristics and dynamics, containing a disorderly jumble of residential, commercial, and rural-residential, often interspersed. Their dynamism often contradicts the model of orderly, clearly defined bands. It may also be difficult to identify where a peri-urban area ends and a truly rural one begins.

The debate between a rural and an urban perspective underpins much debate on peri-urban issues. A rural perspective regards urban expansion primarily as a threat, although at times, by introducing new income and skills into areas outside cities, it can also be seen as an opportunity. An urban perspective will concentrate on the needs of the city, and will regard nearby non-urban areas as the means to satisfy urban needs by providing land and resources. Walker (1987) for example, speaks of the peri-urban zone as invaded countryside. In contrast, Houston (2003, 2005:209) regards peri-urban areas as those within the sphere of influence of adjacent urban centres. Some attention has been paid by Australian planning and policy makers to types of influence such as the effect of cities on the productivity of land, land prices, habitat and the maintenance of biological diversity, landscapes, and commuting patterns.

This monograph examines the peri-urbanisation that has occurred in the South East Queensland (SEQ) region, the fastest growing metropolitan region in Australia. Specifically, it has investigated the structural and functional aspects of peri-urbanisation that has characterised a growth corridor to the west of the Brisbane/ Ipswich metropolitan area towards the regional centre of Toowoomba. The monograph is part of the Peri-urban Continuity and Change project which has been funded by Land and Water Australia (LWA) and the (former) Department of Environment and Heritage (DEH). The principal aims of the overall project have been to identify:

1. the nature and extent of contemporary peri-urban regions in Australia; and
2. the likely future patterns of socio-economic, cultural and particularly, natural resource development in peri-urban landscapes.

1.2 The Research Question

The Phase 2 investigations, being reported by this monograph, have addressed a number of key research questions, namely:

1. What social, natural resource, agricultural, economic, land use and environmental trends are evident in the study areas and how do key factors interact? What are the key drivers of the trends?
2. What institutional, legislative, policy and other instruments are in place to manage trends and how adequate are these instruments to anticipate and respond to changes?
3. What are the factors that could influence how rural and peri-urban lands are used in the future?

A set of specific research questions that have guided this component of the project are set out in Table A-1 (Appendix A).

1.3 The Broader SEQ Peri-urban Zone

The SEQ region is one of the largest planning regions in the world. It extends 250 kilometres north-south and 160 kilometres east-west, and comprises an area of 2.2 million hectares (23,700 km^2). The region has been dominated by sustained urban growth over the past 2 to 3 decades with much of that growth associated with the

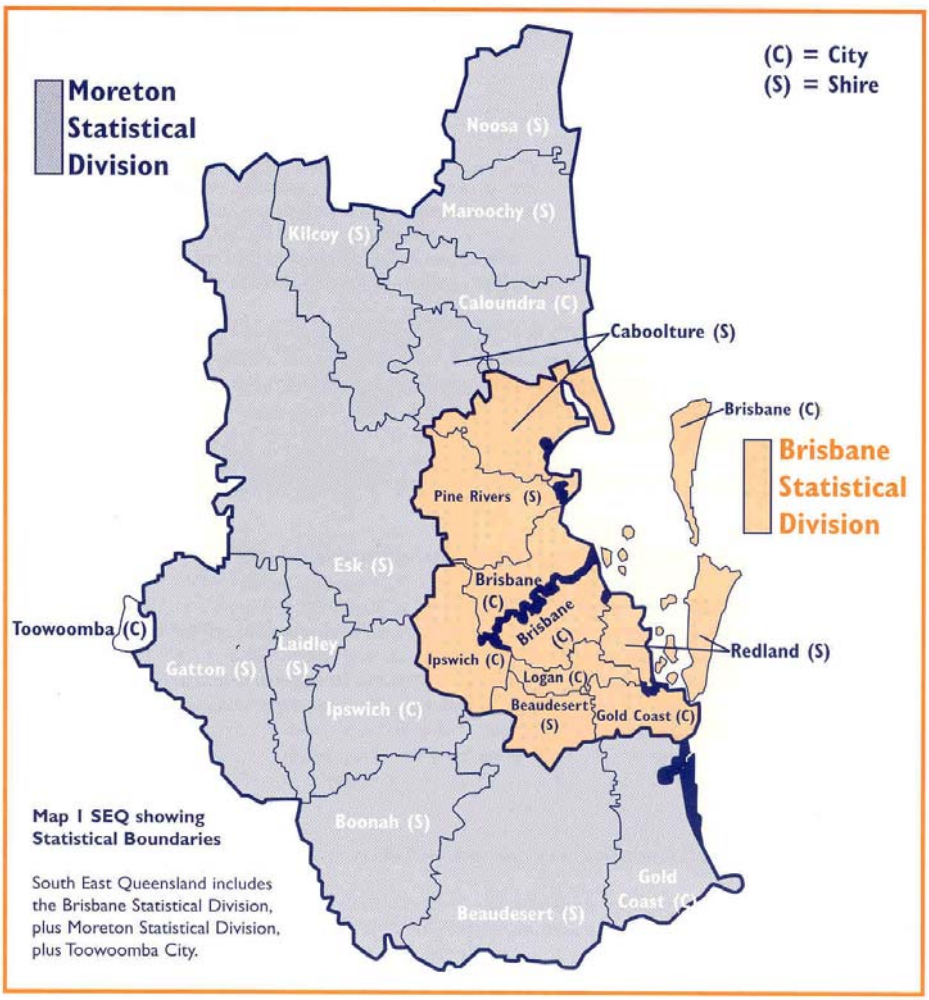
metropolitan core centred on the LGA of the City of Brisbane (discussed in detail in subsequent chapters).

Much of the emphasis of peri-urban work to date has been associated with metropolitan centres, hence the focus on the perimetropolitan region. The extent of the broader SEQ peri-urban zone can be identified through first approximation mapping. This was designed to provide a generic identification and interpretation of the approximate peri-urban area for the region under investigation during the study's initial stages. It involved the identification and mapping of the peri-urban zones contiguous to the Brisbane metropolitan area using McKenzie's (1996) methodology and then a confirmation using the Burnley and Murphy (1995) methodology. McKenzie's (1996) Exurban model identifies an Inner Exurban Zone (areas containing less than 50% urbanised and contiguous to the metropolitan area), and an Outer Exurban Zone (areas within 100km radius from CBD but not contiguous to metropolitan area). The Perimetropolitan model of Burnley and Murphy (1995b) identifies a number of components:

- Edge Urban – contiguous to the metropolitan centre with parts defined as urban;
- Edge Rural – parts defined as urban but also containing parts where commercial agriculture takes place;
- Peripheral Urban – defined as rural and in the commuter zone for the metropolitan centre; and
- Peripheral Rural – contiguous with outer limits of the commuting zone for the metropolitan centre.

Whilst there were some methodological difficulties applying the available statistical data to these definitional models (discussed in detail in Chapter 2), for the purposes of this study, the Brisbane Statistical Division (BSD) was taken as the metropolitan centre. The BSD is defined as containing the urban LGAs of the Cities of Brisbane, Logan and Redcliffe and the Shires of Redland and Pine Rivers together with the contiguous "built up" (urban) areas of the Shires of Caboolture, and Beaudesert and the Cities of Ipswich and the Gold Coast. On the other hand the Moreton Statistical Division (MSD) constituted the region's non metropolitan portions in which the past peri-urbanisation has occurred.

In the SEQ regional context, the identification of the metropolitan core and its (first approximation) peri-urban zone demonstrates that eight of the SEQ region's eighteen local authorities are wholly within this peri-urban zone whilst a further four are partly within the zone (totally two thirds of the region's LGAs). It was into this first approximation peri-urban zone, represented by these MSD local government areas, that the Phase 2 work was then focussed. See Map B-1 (Appendix B).



(Source: ABS n.d.)

Map 1: SEQ Relationship between the Brisbane and Moreton Statistical Division and the SEQ Region

Past urban and peri-urban growth has been strongly influenced by the region's topography. Essentially this constraining topography has influenced urban growth outwards from the Brisbane metropolitan core into three possible directions. This has given rise to three growth corridors which have dominated past growth patterns and will continue to do so under the current regional plan for SEQ. The principal growth has occurred along the narrow coastal plain in two direction, giving emphasis to a Brisbane – Gold Coast corridor to the south, and secondly, to a Brisbane – Sunshine Coast corridor to the north. To date the third corridor has received less population growth in comparison to its northern and southern counterparts but as subsequent chapters will demonstrate, this area has been the subject of significant peri-urbanisation for the past 2 to 3 decades. Hence, this history of peri-urban growth has provided opportunities for the exploration of the project's Phase 2 research question.

2 Methodology and Data Sources

2.1 Approach

The study uses a case study method to investigate trends in key sectoral areas in the Extended Western Corridor to the immediate west of the Brisbane metropolitan area. This case study was selected as the Phase 2 Queensland study area and is the subject of this monograph (Monograph 3). A comparative Victorian case study - the Bendigo corridor to the north-west of Melbourne - was investigated and is reported in Monograph 2. The overall sequence of study steps for Phase 2 is illustrated in the Figure C- 1(see Appendix C).

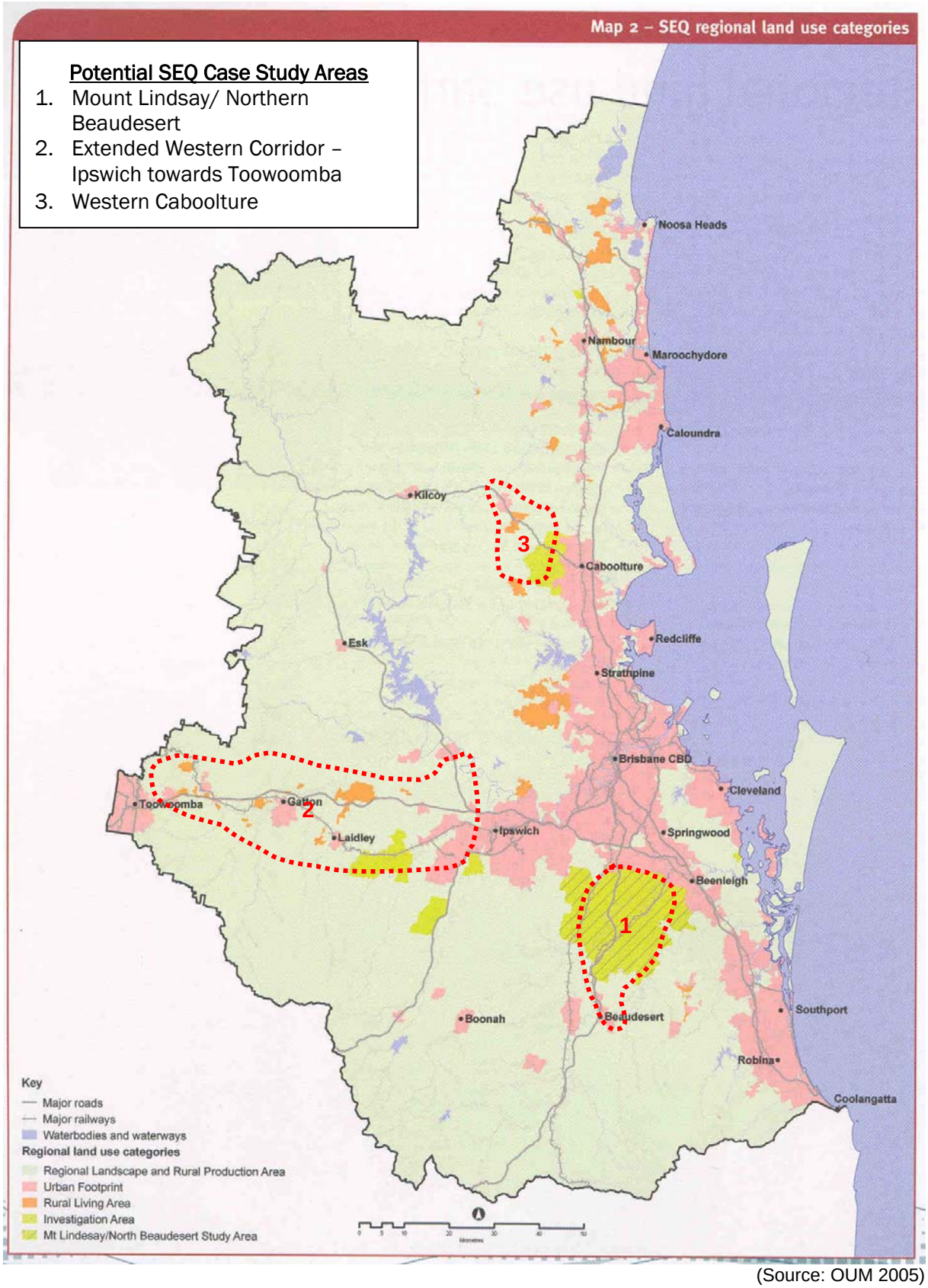
2.2 Study Objectives

In response to the key research questions (see Table A-1) the Phase 2 study objectives for the investigation of the case study area (CSA) were:

1. to identify the cultural, political and institutional drivers of change in peri-urban landscapes that derive from endogenous and exogenous sources, including globalisation and regionalisation, the shifting political economy, new work and lifestyles aspirations, migration and reform of governance and institutional frameworks;
2. to identify trends in factors affecting peri-urban landscapes, particularly, demographic changes, employment reconstitution and redistribution, transport and infrastructure development, cultural shifts, changing agricultural practices and viability, political institutional reform and the reflection of these changes in the evolution of land use patterns;
3. to identify types, locations and trends in land use, the use or condition of natural resources (including water) and of environmental and community values (including remnant flora and fauna, riparian areas, and landscapes (scenic) amenity), and key NRM issues and threats;
4. to identify the conditions and trends associated with the social environment and community landscape of peri-urban areas;
5. to identify the existing governance and institutional arrangement and policy responses for the management of the peri-urban areas and assess their adequacy to address future pressures and changes to these areas;
6. to examine regional, state, national and global trends in factors such as natural resource availability, for example, in oil supply, energy use and type, and water availability and use; and
7. to discriminate, on the basis of findings for objectives 1-6, between embedded, new and emergent drivers of change in peri-urban areas.

2.3 Case Study Selection

In the South East Queensland (SEQ) context a number of possible case study areas displaying varying degrees of peri-urbanisation presented themselves (see Table D-1).



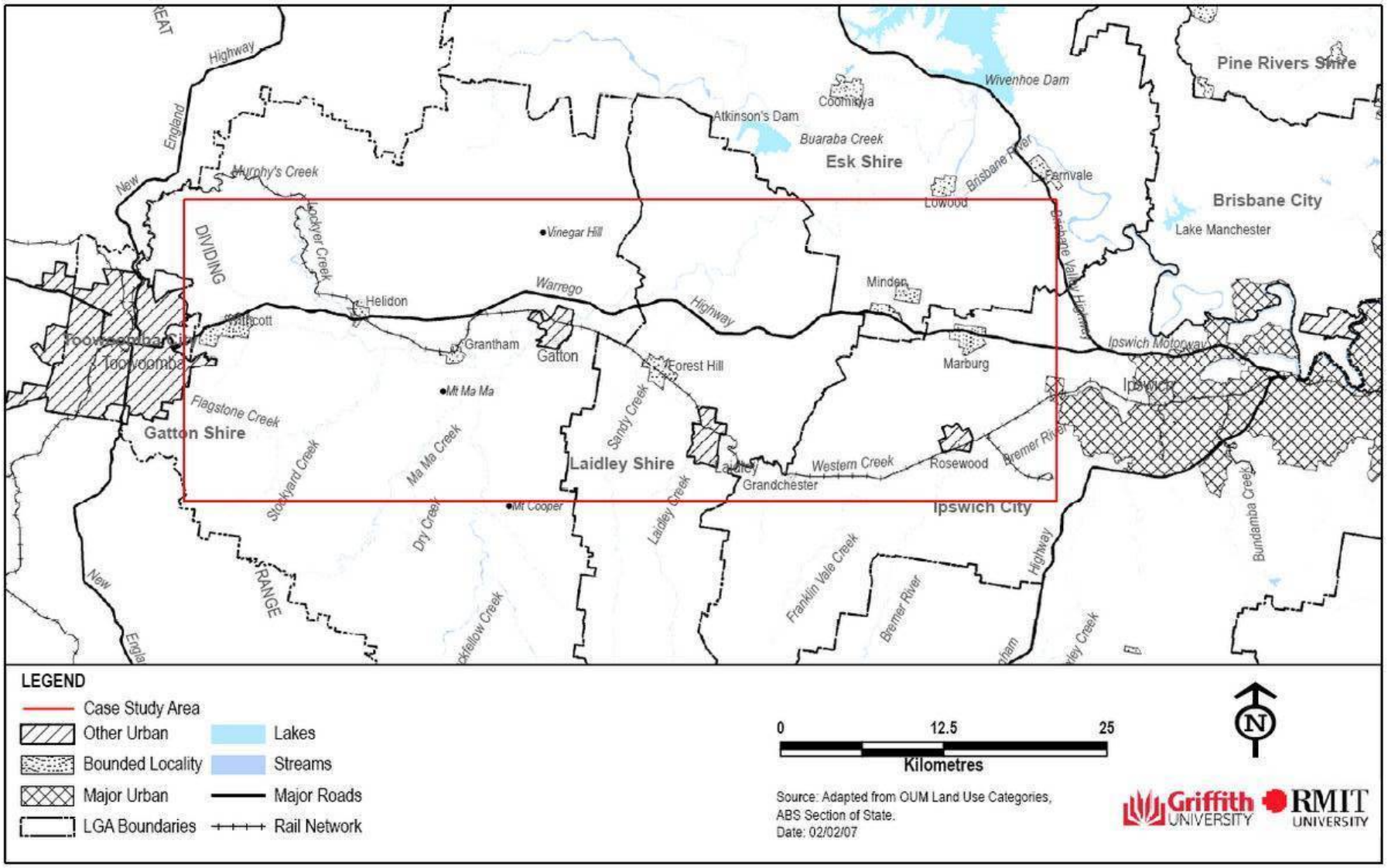
(Source: OUM 2005)

Map 2: Potential SEQ Case Study Areas

The analysis of the three potential SEQ case study areas is summarised in Table D-1 (Appendix D). The principal justification for the selection of the Extended Western Corridor Case Study Area (CSA) included:

1. it lies between the Brisbane metropolitan area and the major regional centre of Toowoomba, with many smaller towns of varying size between these two centres;
2. it can accommodate the study of the initial peri-urban typologies;
3. it has and is expected to continue to experience high and rapid population growth rates and other demographic changes. Much of this change is being driven by its proximity to the Brisbane metropolitan area and to the regional centre of Toowoomba;
4. the area has strong physical, social and economic links with the adjacent urban/metropolitan areas and it performs many important support functions for these areas;
5. it retains important areas of continuing agricultural enterprises despite increasing pressures on the viability of agricultural production;
6. it has experienced closer subdivision and fragmentation of lot sizes in the recent past. This has resulted in a wide range of rural residential lot sizes;
7. it contains large areas of freehold land whose remnant environmental values illustrate both the importance of biodiversity values in peri-urban regions and the threats to these values;
8. the area contains a range of natural resources and there are some significant NRM issues that require resolution;
9. it is experiencing substantially decreased water supply at times of increasing demand for water, population increases, and pressures for increased development;
10. it contains a diversity of social issues, including declining country towns, residential pockets of social disadvantage and urban-rural conflicts;
11. there are a plethora of land use/landscape management agencies involved in the management of its various landscape assets and this provides opportunities for a rich examination of the issues and challenges associated with institutional arrangements and governance for the peri-urban areas;
12. it has many similar issues to the Melbourne case study area; and
13. it is highly relevant to current and future policy initiatives and offers the best potential to influence long-term strategic planning – for example the Western corridor is a preferred regional growth option for the long-term under the SEQ Regional Plan 2005-2026.

The selected Extended Western Corridor CSA is mapped in Map 2. It is located astride the Brisbane to Toowoomba highway and is comprised of portions of four local government areas (LGAs), the City of Ipswich and the Shires of Esk, Gatton and Laidley. There are numerous other institutional administrative and management boundaries crossing through the CSA – all randomly located without any coordinated attention. These areas are described in the appropriate sections throughout the monograph.



Map 3: Selected CSA

2.4 Analysis of the Case Study Area

The Extended Western Corridor CSA is an example of organic peri-urban growth which does not conform to, nor is influenced by, the artificial boundaries for governance and institutional management. Most agencies usually do not collect and present data for areas and phenomenon that do not coincide with their boundaries of responsibility. Consequently, as an artificial construct, the case study has had to utilise data from a range of sources based on different spatial units.

This variety of data from various sources related to a range of basic spatial units for collection and representation and varied from census collection districts (CDs) and statistical local areas (SLA) to entire local government areas (LGAs). The basic spatial units that were used for examining individual aspects of the CSA are identified in each subsequent section.

The case study describes and analyses sectoral trends in the biodiversity, natural resources, spatial, land use, agriculture and socio-economic, areas. Comparisons are developed across sectors. Governance and management arrangements, and planning and policy measures, are investigated for each sector, and the adequacy of cross-sectoral policy measures evaluated. In particular, the case study sought to relate spatial lot patterns, remnant biodiversity, natural resource values and demographic changes to land use planning, and to natural resource management and policy measures in order to evaluate the adequacy of institutional responses to trends and identified needs.

This case study approach recognises that there are many differences between the two case study areas, between parts of the SEQ peri-urban region, and across Australian peri-urban areas generally. Trends and institutional arrangements differ between these areas. Different findings on the agricultural production types and their importance, for example, would have been made had the other potential CSAs been selected as the Queensland case study instead of the Extended Western Corridor. However, there are many similarities between peri-urban areas. The case studies serve to illustrate the trends, types of change and development, the pressures on Australian peri-urban regions, drivers of change, and the institutional and community responses and their adequacy. These case studies therefore can help set the parameters of future research into these important areas in Australia.

2.5 Data Sources

The study uses empirical data from a wide range of data sets and other sources such as the Australian Bureau of Statistics (ABS) including the 2001 census (latest available at the time of this investigation), digital cadastral data base (DCDB), Landsat 5 for SEQ (30m), the Queensland Land Use Mapping Program (QLUMP), local authority planning schemes, reports by state and local governments and by government agencies, and reports of regional bodies such as the Regional NRM body. The monograph presents this data sectorally, and then compares data in a cross-sectoral analysis in order to analyse functional interactions between key factors operating in sectors and their implications.

To analyse the trends and patterns of recent development and develop an indication of potential future development, a spatial analysis of lots, land tenure and cadastral

information was undertaken. It was focussed specifically on the patterns of property fragmentation and the potential within the existing planning system for ongoing landscape-scale change and the intensification of urban-generated rural housing in this peri-metropolitan region.

The ABS agricultural data used in this study is drawn from annual data 1985-2004. During this period some changes in data collection have occurred that require consideration when looking at trends in production, farm businesses and farm size. Up until 1998 the ABS undertook an annual agricultural census (with some minor gaps in data collection). From 1997-98 a survey has been undertaken and extrapolated data has been released at the SLA level. A full agricultural census was undertaken in 2001 and again in June 2006 (with the latter unreleased to date). Reliable data is collected at SLA level.

Data was sought from the four local authorities in the CSA, specifically to gain an understanding of the rate and nature of changes occurring in the peri-urban areas of the CSA. Local authority data and records was requested in the areas of land use, housing and physical infrastructure. Specific information was also sought on landscape management arrangements including NRM. The original data sought from the local authorities in the CSA (including available GIS data sets) is outlined in Table E- 1 (Appendix E). However, the receipt of suitable and useably data proved problematic due to data limitations (discussed below) and understaffing in the local authorities.

A range of formal data share agreements were entered into with key planning and policy agencies in the SEQ region. They included: SEQ Catchments; Moreton Bay Waterways and Catchments Partnership; Environmental Protection Agency (EPA); Department of Natural Resources and Water (DNR&W); and the Office of Urban Management (OUM).

Detailed data sources are contained in the sectoral chapters.

2.6 Data Limitations

The study has highlighted a range of data limitations which constrained the completion of the original study intentions (study objectives) to varying degrees. These deficiencies require attention in order to more fully understand the nature of the peri-urbanisation phenomenon. Hence the data limitations that came to light during the course of this study are discussed in some detail below.

2.6.1 Types of Limitations

The process of collecting data for this project was made difficult by limitations placed on the data for several reasons including:

i. Unavailability of data;

ii. Unsuitability of data;

iii. Inconsistencies of data (including changes to geographical and spatial boundaries and changes to questions being asked);

iv. Scale of the available data being unsuitable; and

v. Format of available data not being suitable for analysis.

In some cases these limitations were compounded by the occurrence of one or more problems in gaining access or analysis.

2.6.2 Unavailability of Data

In some instances, data simply was not available whether it is a result of not being collected in the first place or whether issues such as confidentiality and accessibility were a problem. For example, data on water usage, electricity, gas and telecommunication reticulation (including electricity and gas usage) was not available for purchase from the service providers.

Data on social isolation and conflicts between new and existing residents was not available to the research team. This type of data was not readily collected by agencies and would most probably involve primary data collection which is outside the scope of this study.

Data on travel times was also unavailable. At present there is no question in the ABS Population and Housing Census relating to time spent travelling to and from places of work. The journey to work (JTW) data available from the ABS does not include any travel time data either.

Restrictions on the scope of data collected were also encountered. The majority of agricultural production data utilised in this monograph is based on ABS Agricultural Census data which is restricted to collecting data from enterprises that earn more than $5,000 per annum. Consequently smaller establishments such as hobby farms may not be fully captured by the ABS statistics.

The availability of longitudinal data or data comparable over time was an issue that confronted the research team. For instance, land use data and the QLUMP (Queensland Land Use Mapping Program) were only available for 1999 thus making analysis of trends over time impossible. The same issue existed with Good Quality Agricultural Land (GQAL) data where a snapshot for one time period was all that was available.

The problem of accessing longitudinal data was one of the most common data limitations encountered. The majority of problems existed in obtaining census data over long periods of time. Due to changes in census questions, census boundaries and census classifications (such as Australian and New Zealand Standard Industrial Classification (ANZSIC) it was difficult to assess longitudinal change.

2.6.3 Unsuitability of Data

Poor data quality was another issue encountered. Missing or inadequately collected data proved to be a problem for much of the data that was requested from local governments. Much data was collected on an *ad hoc* basis which caused it to be incomplete and ultimately of poor quality to be relied upon for this study.

In some cases the data available was not suitable for the purpose of this study, for example cost of services including social infrastructure. While some general information was available from council websites (for example, sourced from annual

reports), the information did not detail the cost of services such as garbage clearance and road maintenance.

In the analysis of migration data, it was only possible to examine (based on ABS Population and Housing Census data) whether people had lived at the same address one and five years earlier. Determining the origin of incoming residents was not possible.

2.6.4 Inconsistencies in Data

Inconsistencies were experienced in the comparative analysis of Agricultural Census data obtained from the ABS. Firstly, no clear classification of 'hobby farms' based on farm size or agricultural production was available. As a result it is difficult to determine the number of hobby farms in the peri-urban region and how this has changed over time. In addition, the descriptions for some commodities vary considerably from census to census, making it difficult to compare trends over time for commodities such as chicken production. Further, data was sometimes collected intermittently over time creating gaps in available knowledge.

In some cases recent data sets were not available to add to existing data banks. For instance, data on social welfare recipients were only available for the years 2002 and 2003. However for unknown reasons this data is no longer provided to ABS from Centrelink, nor can the data be purchased or accessed from Centrelink directly.

Inconsistencies in the data across agencies (including state and local governments) was also experienced. Data held on complaints is spread across various tiers of government depending on the type of complaint. For example, state government (Environmental Protection Agency), Queensland Police and local governments deal with differing types of complaints. EPA complaints data was difficult to access given the low maintenance of the complaints register, Police data has been time consuming to access given confidentially issues and a drawn out process required to gain use of the data, and local governments (where the data was available) utilise a manual record keeping system not easily accessible given the constraints of the study.

2.6.5 Scale of Data Unsuitable

Inconsistencies and deficiencies in the scale of data was also a common problem. For instance, data on tourism demand was available to the research team however at too coarse a scale and Tourism Queensland's regions are too crude (larger than LGAs) for a peri-urban study of this nature. In addition, the CSA crosses two of these regions making it even more difficult to identify local tourism trends. Alternative data sources (such as those collected by visitor centres within the case study area) could not be accessed due to confidentiality issues. Moreover inconsistencies in data collected across visitor centres compounded the difficulty in using this data.

In addition to tourism data, data on farm dams, pests and weeds and migration data (GISCA) were only available at the LGA level - again making it difficult to draw specific conclusions about the CSA.

2.6.6 Format of Available Data was Not Suitable for Analysis

Accessing data in a format suitable for analysis was another limitation encountered. Data collected by local governments in some cases could only be provided in textual format and this data did not lend itself to GIS analysis. State department regional boundaries were only available in PDF format and farm dam data was only provided in a table format without geographic location detail. In addition, ABS data prior to 1981 is not available in electronic format and cannot be easily mapped using a GIS format limiting the amount of comparative analysis that could be undertaken.

2.6.7 Methodological Limitations

In addition to data limitations, methodological limitations were also presented. For instance the application of existing peri-urban models (developed for other than planning purposes – e.g. demographic analysis such as Burnley and Murphy) could not be supported by the available statistics in SEQ. Further the methodology associated with determining the study area for the second approximation relied on accepting census collection district boundaries that were not necessarily indicative of the peri-urban areas of the focus of this study.

3 Peri-urban Influences

Peri-urban processes are affected by a wide range of influences. In particular, global, national, regional and local scale drivers are influencing change in the peri-urban area, with many drivers occurring at multiple scales. The influence of these drivers is variable and they impact on and result in different outcomes for the peri-urban landscape.

3.1 Global Peri-urban Influences

Globalisation is the integration of national economies into global systems of production, consumption, distribution and exchange, the widespread adoption of free-market ideology and corporate dominance, and the use of new methods of communication to conquer distance through the compression of time. Globalisation (and regionalisation through EU, NAFTA, ASEAN, for example) is a driver of urban change in many regions, particularly in Asia and South America, but also in some developed countries. The liberalisation or opening up of national markets, coupled with capital mobility and technological change, has reduced the costs and time factors associated with distance. The world is becoming a smaller and more economically integrated place. However, at the same time, new and more intense forces of global competition, including the cost of labour, have been released. Globalisation has re-emphasised the importance of space and location, and cities as much as nations now compete to attract scarce capital investments. The notion of competing cities includes their hinterlands and regional centres.

Globalisation has increased linkages between national economies and intensified economic competition for more efficient production, whatever the level of output. This transformation is often characterised in terms of increased international trade, advanced communications, floating international monetary exchange systems and volatile currency flows. The terms of trade have continued to move against agriculture, driving increased farm sizes to ensure farm viability. Micro-economic and labour market reforms have sought to achieve greater levels of specialisation, output per unit cost, and to more closely integrate the Australian economy into the world economy (Tieman, 2003). All of these reforms have had profound impacts on rural and regional Australia.

Foreign direct investment (FDI) in manufacturing in the developing world has contributed to the rapid growth of many urban areas, often in large industrial estates on the edges or in rural areas outside major cities. Access to modern ports is also critical. As Webster observes:

> Modern manufacturing, utilizing just-in-time production processes, requires large perimeter single storey structures that occupy large land areas, but at the same time relatively easy access to a major city offering higher order services (Webster 2001:5).

Regionalisation and protectionist policies, such as NAFTA and the EU, have also attracted FDI into the main developed countries.

Economic restructuring is not confined to manufacturing but now includes the relocation of business services. This more recent trend has an impact on the shape

of urban development in both developed and developing countries, as described below.

- Back office functions for companies based in North America, Europe, Japan, Hong Kong etc, are increasingly being located in lower cost East Asian (or South Asian) extended urban regions (Webster, 2001: 44).
- Business services including 'help line' facilities for computer software or credit card accounts, data processing for airlines, and retail distribution for web-based shopping are increasingly being sited in peri-urban areas. Peri-urban areas in developed countries such as Australia have been attractive locations for the location of many of these services because of the availability of reliable, relatively low cost labour sources, inexpensive land, government incentives, and high quality communications services including telecommunications and road networks.

3.2 Other Drivers of Change

Changes in the nature of work and the growth of knowledge and information based economies are exerting important impacts on many of Australia's peri-urban areas. Manufacturing and the numbers of employees in agriculture have declined. But the growth of part-time, short-term and female employment, small and medium sized firms and consulting businesses, and financial and professional services such as business, tourist, cultural and education services, have proved compatible with the development of peri-urban areas. Cultural and lifestyle choices are important independent attractors of people and activity into peri-urban areas. Many people are choosing to relocate, matching their professional, cultural and other work choices to peri-urban life and the high standard of amenity, communication facilities, and other desirable lifestyle choices it provides.

Urban population growth is a major driver of peri-urban development. In particular non-urban growth has become concentrated in the peri-urban regions surrounding major urban centres.

Conventional spatial planning and development policies can act as a powerful independent factor leading to change in peri-urban areas. When coupled with urban population growth, spatial policies can lead to rapid and irreversible change. Spatial pressures are of two kinds. Firstly, as all outer urban development occurs in peri-urban land, the type of new outer urban residential development can increase pressure on peri-urban areas through the excessive consumption of land. Conventional practices such as the separation of uses, large residential lot sizes, large retail malls, and car-based subdivision practices, along with infrastructure developments such as new freeway construction, consumes land in outer urban areas at a very high rate in comparison to population size. Secondly, where peri-urban land remains non-urban, the type of spatial policies can either control or facilitate change to traditional uses such as agriculture, and protect or degrade environmental values. Many Australian researchers, such as Burnley and Murphy (1995a and b), have explained the lower exurban growth in Australia than the US by differences in land use planning systems. However, exurban land continues to be subdivided and developed. The little ex-urban regional planning which has occurred in Australia has now generally been discarded. Metropolitan plans are usually not

regional plans, with the notable recent exception of the new South East Queensland Regional Plan. The strength of land use planning controls on the fringes of Australia's capital and regional cities varies considerably.

Environmental and natural resource factors are also increasingly important factors affecting peri-urban areas and the townships in them. Chief among these are climate change with serious impacts on rainfall, water supply, temperature and growing conditions. Soil conditions and land degradation issues such as salinity, soil erosion and declines in soil moisture and fertility, are increasingly important factors. The impending change from an oil economy will have many impacts on peri-urban areas. Finally, the quality of the environment is an important independent factor which potentially affects the attractiveness of peri-urban areas and their contributions to Australia's environmental values and economic output through activities such as tourism and outdoor recreation. The most attractive environments attract the most development pressure which can lead in turn to substantial environmental, social and economic costs.

3.3 The Lifestyle Property

Rural Australia is experiencing a shift, with the processes of globalisation, technological and demographic changes occurring at an increasing rate (Curry, et. al. 2001, Swaffield and Fair-weather 1998). Some rural areas are experiencing population growth at an unprecedented rate, in particular those areas located close to large metropolitan areas, which enjoy appealing and scenic environments (Curry et. al. 2001). An emergence of strong environmental values and enriched images associated with the rural urban fringe has occurred since 1975 (Bunker and Holloway 2001). The importance of such characteristics have been recognised as a key feature by individuals migrating to these areas, emphasising the driving factors behind migration to these areas during the 1970s/1980s by persons seeking an alternative lifestyle.

The varying functions of peri-urban areas are diverse and are highlighted by Bunker and Holloway (2001: 66) as a "recreational area, place for living or visiting and source of services, water, food and minerals". In addition, peri-urban areas also have a role in the provision of affordable housing, high amenity living, high value agriculture and horticulture, waste disposal, water resource management and the maintenance of air quality and minimisation of pollution.

The nature of peri-urban areas inherently makes them places where conflicting uses and purposes are in play. Curry et. al. (2001) have noted that the diversity in use within some peri-urban areas has seen the transformation of traditional agriculture occur with the rapid emergence of vineyards and wineries. It was noted that the emergence of enterprises such as wineries was given emphasis by recent in-migrants being wealthier than the original lifestyle seeking residents of the 1970s/1980s. The initial migration of alternative lifestylers for the environmental and high amenity values has helped create locations that possess considerable cultural capital, and in some cases, this has led to the increase of economic potential of those areas (Curry et. al. 2001).

There appear to be several factors driving the desire for lifestyle properties. Some motivations behind the migration into these areas are perhaps related to the closeness of peri-urban areas to metropolitan and urban centres, in addition to the lure of cheap land (affordable housing) and the "promise of an idyllic rural lifestyle and the possibility of generating a modest income" (Curry et. al. 2001: 115). In a study conducted by Walmsley et al (1998: 114 cited Curry et al. 2001: 110), the top three ranked factors influencing migration to peri-urban areas included 'more pleasant climate', 'more relaxed lifestyle' and 'attractive physical environment. Moreover, studies in Canada have identified a consistent "rural sentiment" sustaining the aspiration for lifestyle properties (Swaffield and Fairweather 1998). Stimulus for people moving to peri-urban areas are also seen to be a response by people to avoid the pressures of today's life in the city and to escape to a happier and more fulfilled life away from the economic, social and political climate that has ultimately reduced their quality of life (Juniu 2000). These motivations have traditionally been associated with retirees. However, this trend is no longer the major factor that it once was. Instead, new residents of high growth areas, particularly in coastal regions are noted as belonging to a younger age profile and are generally younger than the existing 'sea change' populations (Gurran et. Al, 2006).

Increasingly busy lifestyles and associated loss of leisure and connection with the landscape of people living in cities has essentially created a culture where leisure and in particular rurality has become a commodity to be bought and sold (Swaffield and Fairweather 1998, Juniu 2000). This idea is further developed by Schor (1998) who notes the emergence of upscale versions products that were generally commonplace (e.g. food, shelter) are now being sold with powerful status symbols associated with them. Schor (1998: 18) also argues that this competitive consumption "was created by the escalating lifestyles of the most affluent and the need that many others felt to meet that standard, irrespective of their financial ability to maintain such a lifestyle". Featherstone (1990 cited in Walmsley 2003: 64) notes that commodities are increasingly used to "signify status and to mediate social relationships". Further, the excesses associated with the wealthy and the lifestyles they lead are commonplace. Featherstone (1990 cited in Walmsley 2003: 65) suggests that "we live in an age of affluence where excess resources (over and above the basic needs of life) foster a carnilvalesque atmosphere where people are able to experiment with different lifestyles and experiences". This viewpoint would suggest that wealthier people have the luxury of picking and choosing the lifestyle they want - a lifestyle that is increasingly becoming one that attempts to return to the idyllic rural way of life.

Curry et. al. (2001) identified investors (in both financial and lifestyle) as an additional group moving into peri-urban areas. They noted that many of this group were investing in a lifestyle whilst also capitalising on growth occurring in their region. In addition, the environmental amenity, easy-going lifestyle and cultural ambience "resulting from the presence of a large number of alternative lifestylers as positive features influencing their decision to move there" (Curry et. al. (2001: 120). As new residents move into these areas, increased commodification of the rural landscape and traditional images of the countryside occurs. Increasingly these areas are being marketed with images of elite consumption and lifestyles (Curry et. al. 2001). Commodification in this sense causes continued differentiation and revaluing of the

rural space, so much so that the traditional farming enterprises and the like make way for niche markets tailoring their products to wealthier consumers. As such, the combination of diverse land uses and an attitude of consumptive consumerism have led to a transition occurring in peri-urban areas. In areas where there existed a large reliance on traditional agriculture industries (e.g. dairy), a shift has occurred where farms are reducing in size and farmers are increasing their reliance on off-farm incomes, in part as a factor of growth in non-agricultural and new rural land uses (Curry et. al. 2001). Settlement in rural areas by urban dwellers has the potential to cause displacement of existing communities (Swaffield and Fairweather 1998).

Studies such as those conducted by Walmsley et. al. (1998 cited in Curry et al. 2001) further emphasise the importance of such lifestyle factors and their influence on the changing rural landscape (Curry et. al. 2001). Subsequent augmentation of the identity of peri-urban areas appears to create a cycle of growth and decline. The lifestyle values that attracted migrants in the first instance become the product that is sold to those seeking an alternative lifestyle. Rising land values characterise the next phase of this commodification with wineries catering to the elite and wealthy. Ultimately, the lifestyle that attracted people is increasingly available only to those who can afford to pay for it (Curry et. al. 2001). The increasing demand for lifestyle properties has prompted the creation of websites and expos, both developed to inform potential buyers and migrants of information relating to purchase and migration to peri-urban areas.

4 Towards an Enhanced Peri-urban Typology

Monograph 1 reviewed a number of typologies of peri-urban areas that have been advanced in recent Australian studies. These studies distinguished the different structure, form and processes operating within the perimetropolitan region. The different typologies included:

Typology 1: A perimetropolitan region (Burnley and Murphy 1995a) that provides three types of residential settings comprising:

- Outer suburbs - contiguous to the metropolitan centre and its CBD;
- Peri-urban centres - located beyond the outer suburbs up to the limits of commuting and are less accessible to the metropolitan centre; and
- Exurban - rural land between the outer suburbs and the peri-urban centres.

Typology 2: A perimetropolitan region (Burnley and Murphy 1995b) comprising a refined set of components influenced by the boundaries of available spatial data namely:

- Edge Urban - contiguous to the metropolitan centre and its CBD and with parts defined as urban;
- Edge Rural – includes parts defined as urban and other parts where commercial agriculture is occurring;
- Peripheral Urban - defined as rural and located within commuter shed; and
- Peripheral Rural - contiguous with the outer limits of commuting.
- *Typolocy 3:* Exurban (McKenzie 1996) comprising:
- Inner Exurban Zone – recognised where less than 50% of physical land area is urbanised and is contiguous to the metropolitan area; and
- Outer Exurban Zone – within 100km radius from CBD but not contiguous to metropolitan area.

Burnley and Murphy's (1995a) first typology is useful for the close examination of a large growing city's perimetropolitan region. Its principal components are illustrated in Figure 1.

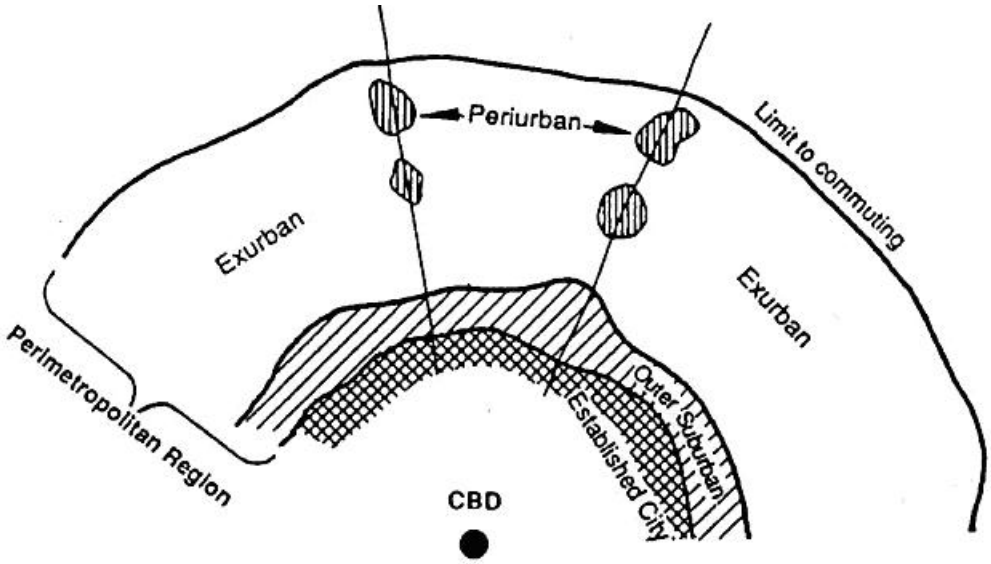


Figure 1: Components of the Perimetropolitan Region

By comparison, the relationship between McKenzie's (1996) exurban zones to the overall form of the metropolitan centre can be seen in Figure 2.

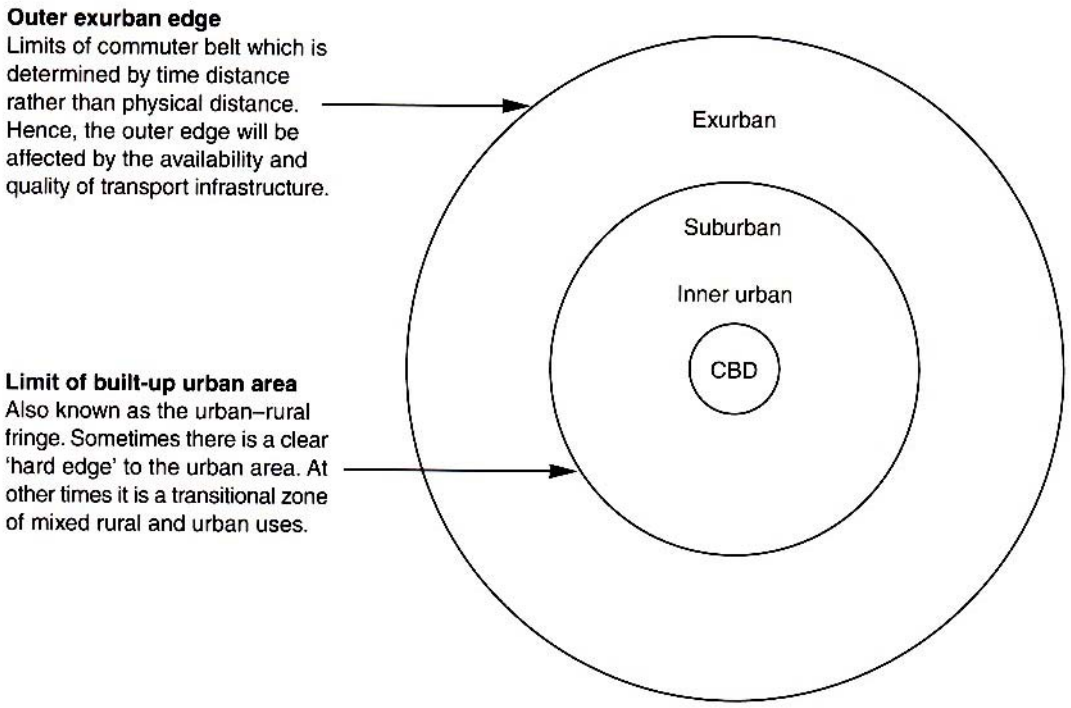


Figure 2: Relationship between Exurban Zones and the Metropolitan Centre

The majority of these studies have focused on the highly dynamic growth that has occurred around the peripheries of metropolitan centres in the recent past. This is what has been referred to as peri-urban areas (McKenzie, 1996; Houston, 2005). This peri-urban concept has its origins in the need to acknowledge the increasingly diminishing distinction between rural and urban (Champion and Hugo, 2004). However there is no universally agreed definition of this concept.

This study has adopted the position that peri-urbanisation is a dynamic urbanising process that can involve the closer subdivision, fragmentation and land use conversation of former rural lands. It involves high levels of non metropolitan growth and results in a blurred transitional zone comprised of temporary mixes of urban and rural activities and functions. The resulting peri-urban land use activities exhibit a high degree of heterogeneity, continual change and conflicting values.

Most peri-urban areas lie within the sphere of influence of a nearby metropolitan/urban centre and display a variety of dependencies on these centres for economic, employment, social and cultural purposes. Consequently, peri-urban studies have mainly had spatial connotations and been related to the metropolitan region. However, peri-urban attributes can be recognised in areas outside of perimetropolitan regions. If this phenomenon is seen as a process as previously discussed, then it can relate to a number of spatial contexts, many of which will not always be associated with the fringes of metropolitan centres.

This research has recognised that peri-urbanisation does occur across a range of metropolitan and non metropolitan landscape settings including:

- adjacent to a metropolitan centre;
- adjacent to a (non metropolitan) regional centre;
- adjacent to an urban centre within the commuter hinterland of a metropolitan centre;
- adjacent to an urban centre within the rural landscape; or
- linear contexts along growth corridors, transit routes or amenity landscape settings.

Hence it is possible to refine the nature of traditional peri-urbanisation and identify a more definitive typology. This multi-setting typology is illustrated in Figure 3.

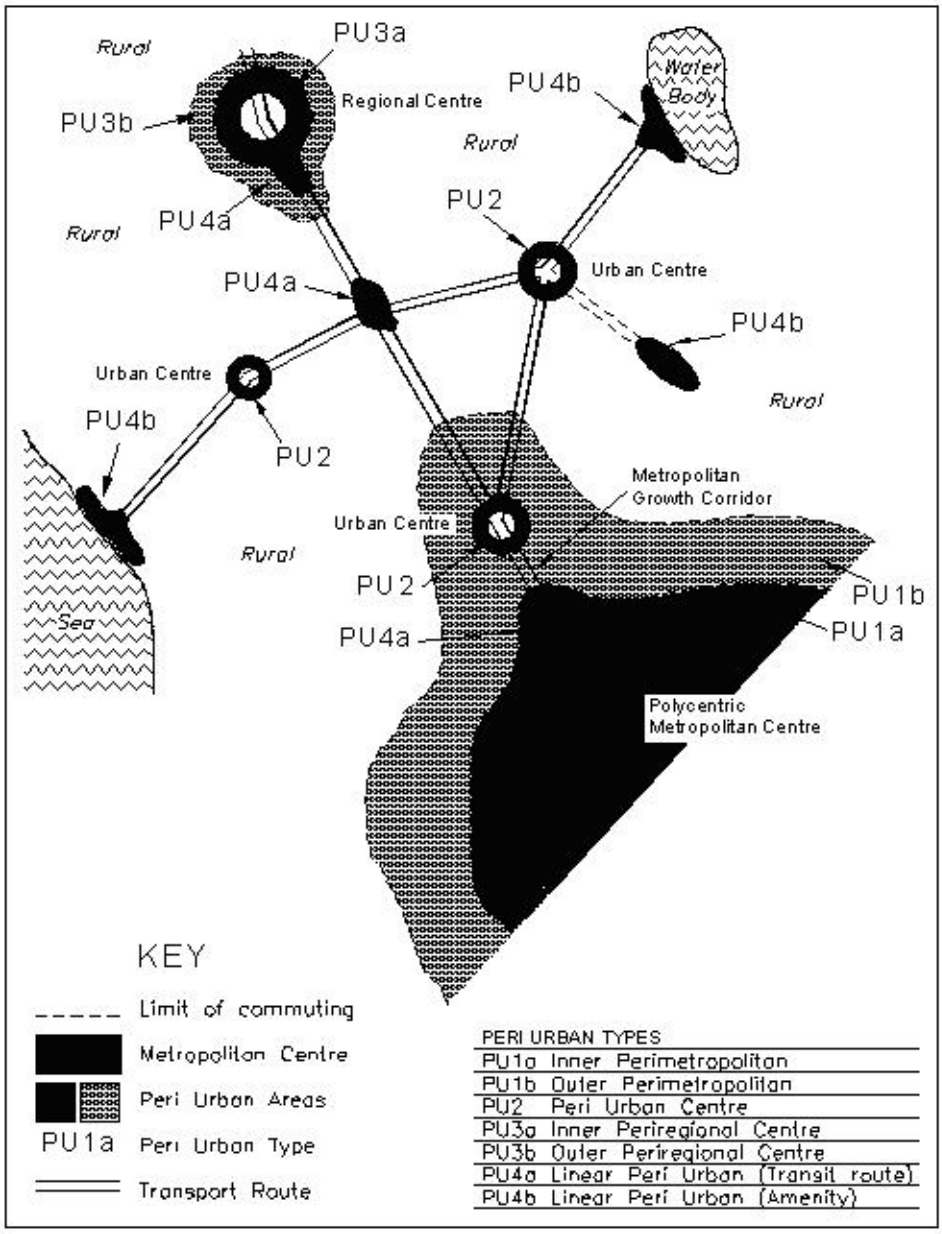


Figure 3: Peri-urban Typologies

This enhanced typology includes an inner and an outer perimetropolitan zone that acknowledges previous perimetropolitan models that identified Outer Suburbs or Inner Exurban zones and Exurban or Outer Exurban zones. The enhanced typology extends the recognition of the association of these perimetropolitan zones to what would normally be a polycentric metropolitan centre where the peri-urban connection can be to either the CBD or a sub-metropolitan centre. This model also acknowledges that the inner perimetropolitan zone will display a higher degree of urbanisation than its outer perimetropolitan counterpart. However, it is recognised that in reality, there is not a normally distinct boundary between these inner and outer perimetropolitan zones. Instead, the whole perimetropolitan zone can comprise a random and confusing mix of land uses with urban and rural activities coexisting without apparent order.

The enhanced typology also acknowledges the existence of a number of urban centres within the commuting zone of the metropolitan centre. However, it is recognised that these smaller urban centres can have their own discrete peri-urban zone. Again, any relationship to the nearby metropolitan centre can be to its CBD or one of its sub-metropolitan centres.

Similar perimetropolitan circumstances of a lesser scale can also be recognised in relation to non metropolitan regional centres where urbanising processes have overspilled the regional centre's boundary into its surrounding rural hinterland. Similarly, peri-urbanisation can also be distinguished in relation to small discrete urban centres within rural areas well separated from the influences of larger urban and metropolitan centres and their commuting zones.

The fourth peri-urban type is usually of a linear nature commonly associated with transit routes, growth corridors or landscape settings favoured for amenity/residential purposes (eg ridge lines, watercourses, coastlines).

This populating process of peri-urbanisation has given rise to a range of quite diverse residential types which have been described in the literature as rural residential, hobby farms and lifestyle properties. One distinguishing and common characteristic is that none of the new owners/occupants of these properties will use them as a commercial agricultural enterprise that becomes their primary source of income. However, in this mix of temporary land uses, commercial agriculture will still be occurring. This mix of urban oriented and traditional rural activities is often characterised by conflicting values and social disharmony.

Peri-urbanisation can occur across a range of landscape settings including the coastal zone as well as inland regions. The full range of the peri-urban typologies can be recognised in all of the landscape settings, including the coastal zone.

Many of the peri-urban typologies have been developed through the recognition of one distinguishing attribute. However, this single indicator approach does not sufficiently describe the full context of the complicated structures and functions that are associated with this peri-urban phenomenon.

The principal attributes of the peri-urban zone that contribute to its distinctive character as well to its complex set of management challenges include:

- its is a dynamic zone undergoing constant and rapid change;
- its growth is related to the growth of nearby metropolitan/urban centres;

- a growing population dependent on the nearby metropolitan/urban centre for employment, cultural, social and recreational needs;
- an area in transition dominated by the temporary nature of land uses;
- low to ultra low housing densities;
- a heterogeneous population;
- an increasing diverse range of heterogeneous and conflicting rural and urban land uses;
- an increasingly fragmented landscape;
- a location within the sphere of influence of adjacent urban centres;
- a poorly planned and managed landscape;
- highly contested activities and values; and
- an increasingly illegible landscape character.

The challenge for planners and policy makers working at the heart of these rapidly evolving peri-urban dynamics is the management of change in a confusing milieu of land uses, values and aspirations which bear little resemblance to past circumstances in which planning has been applied.

5 Growth and Planning in SEQ

This chapter commences the examination of the South East Queensland (SEQ) case study. It provides a review of the spatial and temporal context in which the case study area (CSA) has developed within SEQ during the last six decades.

5.1 Growth in the SEQ Region

The past and projected population growth for the South East Queensland (SEQ) region from 1947 through to 2026 is shown in Figure 5.1. Prior to 2004, the SEQ region was represented by the combination of the Brisbane Statistical Division (BSD) and the Moreton Statistical Division (MSD). After the introduction of the most recent regional planning initiative in 2004, Toowoomba City has been added to the region as the eighteenth local government area (LGA).

As discussed in Chapter 1, the BSD is equivalent to the Brisbane metropolitan region whilst the MSD roughly equates to the first approximation of the SEQ region's peri-urban zone. The steady and strong growth in the BSD and the MSD can be observed in Figure 5.1. Both of these SEQ areas have experienced steady growth since the end of World War 2 up until the early 1970s, and this growth was consistent between the BSD and the MSD. From the early 1970s, in the mid 1980s, and then again in the early 2000s, there were noticeable population growth spurts throughout the region as evidenced by the correspondingly steeper growth curves in Figure 5.1. Interestingly, Brisbane City did not grow consistently with the balance of the region for the early part of this period. In fact from the early 1970s through to the late 1980s, its growth stagnated. For a variety of reasons, population growth in the region was primarily accommodated in the contiguous areas of the local governments adjacent to Brisbane City. In fact it went beyond the Brisbane Metropolitan area (BSD) into the peri-urban areas of the MSD. This is clearly illustrated in Figure 4 where the growth curve for the MSD starts to increasingly diverge from the BSD's curve from the early 1970s onwards.

Figure 4 also positions the principal regional and metropolitan planning initiatives (discussed below) in relation to the population growth in the region over this time frame. In all cases, these planning undertakings have occurred after a growth spurt, demonstrating the highly reactive nature of past regional and metropolitan scale planning in SEQ.

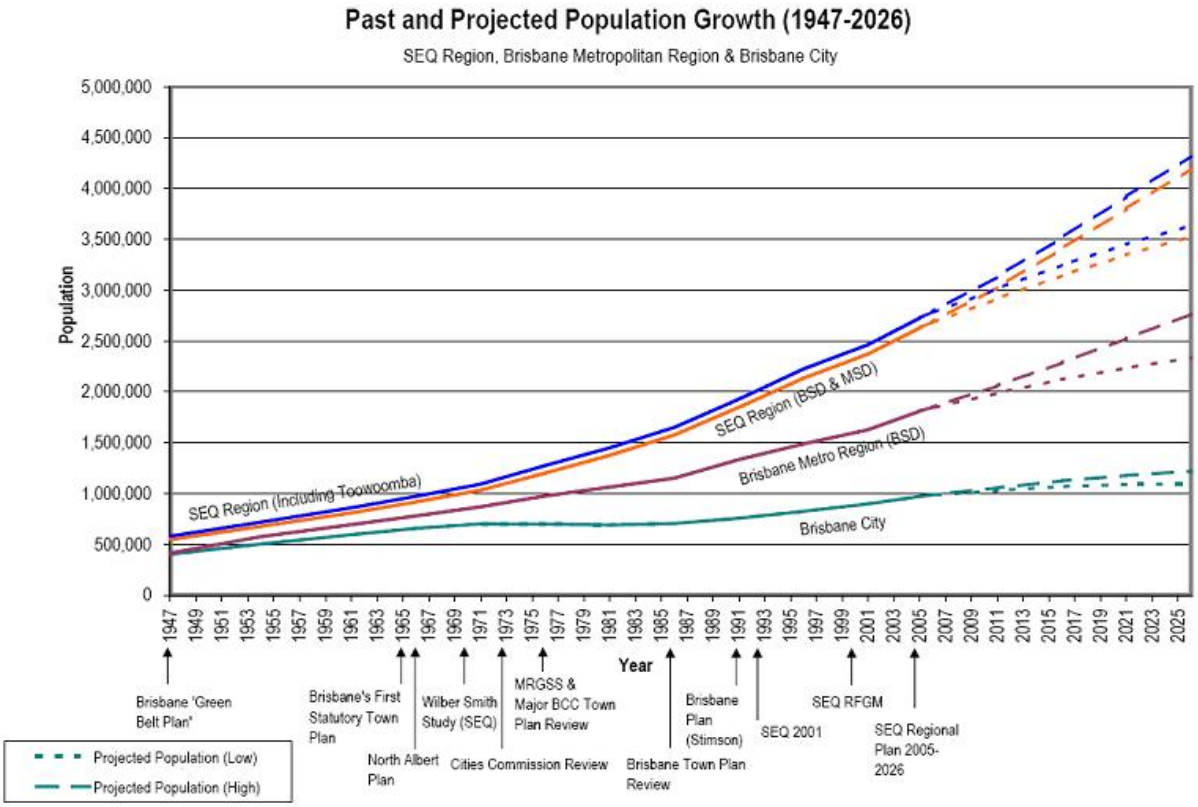


Figure 4: SEQ Past and Projected Population Growth (1947-2026) with Associated Planning Initiatives

5.2 Regional Planning in South-East Queensland

Regional planning in SEQ has assumed a number of forms since the first efforts were undertaken towards planning the region at this scale in the late 1940's. Over this period a number of different arrangements have existed in attempts to coordinate regional planning which has progressed from being a voluntary planning arrangement to a statutory process enforceable at both State and Local levels of government. This period has been characterised by unpredicted in-migration and population growth compounded by the absence of a discrete agency focused on monitoring these changes and effecting appropriate planning responses to manage these changes. Abbott in Minnery & Low Choy (2005: 2) suggested that regional planning 'deals with uncertainty'. This has particularly been the case in SEQ, where regional planning attempts such as the Moreton Regional Growth Strategy (1976) outgrew their original growth projections and became redundant in a short period of time.

The first attempt at planning on a regional scale which had implications for the SEQ region was Brisbane City Council's 1944 draft town planning scheme for the City of Greater Brisbane. This plan recommended a green belt around Brisbane's growing urban areas to include natural assets which in the past constrained urban growth and furthermore it 'identified satellite towns' (Minnery & Low Choy 2005: 2). Unfortunately this plan was never implemented. This plan and more recent regional planning

endeavours have focused on intra-regional planning, where the objective has been to manage and plan for future urban expansion within the greater regional area.

The early 1970's brought awareness that urban growth in the Brisbane metropolitan region could not be successfully addressed at either a State wide or Local planning scale, and regional planning was required. This contributed to the passing of the *State and Regional Planning and Development, Public Works Organisation and Environmental Control Act 1971*. It was under this legislation that the Moreton Regional Co-ordination Council was initiated to coordinate State and Local authority interests and commence the formation of a growth strategy for future regional development. The result was the Moreton Regional Growth Strategy (1976) which had the overarching objective to 'establish a broad regional strategy for urban growth and non-urban land use for the period up to the year 2000'.

This document was the first serious effort to investigate and plan for urban growth in the SEQ region. It presented a preferred urban growth strategy for the region which focused the development of the region around Brisbane as the regional centre, the Gold Coast as a sub-regional centre, and two major centres at Ipswich and North Beaudesert. Several smaller retail/service centres were also nominated around the region. Specific policy responses included the consolidation of urban development within and short of the urban fringe and the creation of a buffer zone to preserve open space corridors between major population centres. Despite these provisions, the 1976 Urban Growth Strategy did identify a significantly large area adjacent to existing urban development within the region for future urban growth on the rural urban fringe. This effectively would allow for the growth of the peri-urban area. However, Minnery & Low Choy (2005: 3) noted that the Moreton Region Growth Strategy was not adopted by the State Government of that time and consequently it was never implemented in practice.

A further regional planning study undertaken around the same time was the Wilbur Smith and Associates study of 1970. It looked at the future transport needs of the Brisbane metropolitan region. In order to envisage future transport needs, the study provided an anticipated land use pattern for the wider metropolitan area surrounding Brisbane. This could be seen as an important first step towards planning and land use and transport integration, at a regional scale. However, its future land use plan had no legal standing and it was never adopted nor reflected in subsequent regional and local plans, despite the partial implementation of some of the recommended transport initiatives.

In 1976, Brisbane City Council produced the City of Brisbane Town Plan. Whilst not a regional planning document, this Plan provided a broad regional context to the development of Brisbane and addressed physical, social and economic connections to the wider regional area. In particular, the plan identified a number of regional business centres within the Brisbane metropolitan area. These regional business centres were intended to reduce the need for travel journeys to and from the central business district, and distribute opportunities including employment, shopping, recreation, business and government services to the wider metropolitan area. The Plan shows the connection of these regional business centres to the centres identified in the Moreton Region Growth Strategy. However, as previously noted, the latter was never officially adopted or implemented.

In response to unprecedented population growth in SEQ during the 1980s, a need was established by the newly elected Goss Labour Government in the early 1990's for a new regional plan to ensure a more coordinated approach to growth and development. Minnery and Low Choy (2005: 6) recognise that the planning process was 'highly collaborative and participatory' and included many stakeholders. To allow local governments a voice, the South East Queensland Regional Organisation of Council's (SEQROC) was established and provided membership to a new Regional Planning Advisory Group (RPAG). Following the production of a series of policy and technical papers by the RPAG, the Regional Framework for Growth Management (RFGM) for SEQ was launched in 1994 with the intent of guiding regional planning and development in SEQ until 2001. The Integrated Regional Transport Plan commenced in 1997 to support the RFGM. This process did not directly involve any 'State government regional planning agency' and was based entirely on collaborative partnerships (Minnery & Low Choy 2005: 6). Outputs were all advisory and were to be used to inform, local and state government in determining infrastructure requirements.

A ten-year review of the RFGM undertaken in the year 2000, resulted in the continuation of the voluntary collaborative regional planning process in the form of the 'SEQ 2021' initiative. This new regional planning process was directed by the Regional Coordination Committee (RCC), which had replaced the earlier Regional Planning Advisory Group. The RCC presented a series of discussion papers and undertook community consultation in preparation for a new RFGM. However, no final plan was released as a new direction to embrace a statutory process for regional planning was initiated by the incoming State Government in 2004.

The '*South East Queensland Regional Plan 2005-2026*' (SEQRP), was completed and launched in June 2005, following the release of a draft version in October 2004. This plan was rolled out under the newly formed Office of Urban Management (OUM) which is administered under the Infrastructure portfolio with close associations with Treasury.

This radical step was in response to limitations presented by the previous regional plans, which included:

- previous regional plans were merely advisory and local governments often had different aspirations to the plan so desired regional outcomes were not always reflected in local planning scheme and development decisions;
- there was a lack of coordination of the interests of varying state government departments and agencies; and
- infrastructure was poorly coordinated and there was no prioritisation for implementation.

Concordantly, Queensland's planning legislation, the Integrated Planning Act 1997, was amended in 2004. It established the SEQRP as the superior planning instrument for the region thereby relegating State Planning Policies and other regional plans for SEQ (eg regional coastal management strategy, regional nature conservation strategy etc) to supporting roles. It also required the SEQRP to be reflected in State and local government planning. As a result, local authorities within the SEQ region are required to prepare Local Growth Management Strategies (LGMSs) which demonstrate the measures to be taken to accommodate the

population threshold allocated for each local government area by the SEQRP. Further, all Local Government statutory planning schemes had to be realigned to be consistent with the provisions of the SEQRP and their new LGMSs. Similar requirements for consistency of policy proposals, implementation actions and priorities were placed on state agencies.

5.3 State Planning Policies

A number of State Planning Policies (SPPs) have been derived to reflect strategic matters of state interest. The specific SPPs of relevance to this study include:

- SPP 1/92 Development and the Conservation of Agricultural Land;
- SPP 1/02 Development in the Vicinity of Certain Airport and Aviation Facilities;
- SPP 2/02 Planning and Managing Development involving Acid Sulphate Soils;
- SPP1/03 Mitigating the Adverse Impacts of Flood, Bushfire and Landslide; and
- SPP1/05 Conservation of Koalas in South East Queensland (superseded by the SEQ Regional Plan 2005-2026).

As statutory enforceable instruments, SPPs must be integrated into planning schemes to allow developments to be assessed against required outcomes. If planning schemes do not appropriately reflect the state planning policy, assessment managers must address the policies separately. If developments trigger referral to a state agency, such as for development on good quality agricultural land, the appropriate agency will assess the development against the State Planning Policy. Table 5.1 below describes the extent to which the existing planning schemes of local governments in the CSA address the state planning policies relevant to this study.

Table 1: State Planning Policy Acknowledgement in Local Government Planning Schemes

Local Authority	Reference to State Planning Policies in Planning Schemes
Esk Shire	Esk Planning Scheme identifies SPP 1/92 Development and the Conservation of Agricultural Land. Does not refer to policy on mitigating the adverse impacts of flood, bushfire and landslide, however it does have a Natural Hazards Overlay.
Gatton Shire	Reflects SPP 1/92 Development and the Conservation of Agricultural Land. Code addressing 'Development in Bushfire Risk Areas'. Does not refer to the applicable policy.
Ipswich City	Ipswich identifies up front that 4 State Planning Policies are reflected in the Planning Scheme. These are SPP1/92 Development and the Conservation of Agricultural Land; SPP 1/02 Development in the Vicinity of Certain Airport and Aviation Facilities; SPP 2/02 Planning and Managing Development involving Acid Sulphate Soils; and SPP1/03 Mitigating the Adverse Impacts of Flood, Bushfire and Landslide.
Laidley Shire	Planning Scheme does not identify that it reflects State Planning Policies. The Scheme does have a code addressing rural areas and uses as well as a Natural and Environmental Significance Overlay Code which specifies criteria for bushfire prone areas.

(Source: Planning Schemes, Esk, Gatton, Ipswich and Laidley)

This post war period under review has witnessed unprecedented strong population growth within the SEQ region. However, State and Local governments did not have adequate processes or institutional arrangements in place to affect appropriate planning and management responses to manage this growth. Whilst there were attempts to derive a coordinated response through collaborative planning

arrangements, implementation of the agreed regional policies and growth management measures was voluntary and non-binding on State and local governments. Consequently, a significant proportion of the region's population growth was accommodated outside of the metropolitan areas of the region resulting in the peri-urbanisation of the contiguous rural local government areas from the late 1970s/early 1980s onwards. This has included areas such as the CSA.

6 Biophysical Aspects

The peri-urbanisation of the case study area (CSA) has resulted in considerable change to the region's natural landscape. This chapter examines the biophysical attributes of the CSA and, in particular, the impacts that peri-urbanisation has had on those attributes. This chapter and the next, which deals with the CSAs natural resources, provide an overview of the close connection between peri-urbanisation and natural resource management.

6.1 Existing Biophysical Conditions

6.1.1 Native Species at Risk

Within the four subject Local Government Areas (LGAs) containing the CSA, there are a number of species (taxa) listed as extinct, endangered or vulnerable (EPA 2006a: 2). Whilst Gatton Shire Council has a large area of remnant vegetation in the CSA, it also has the highest number of extinct, endangered and vulnerable species, followed closely by Esk Shire (refer to Table 2).

Table 2: Native Species at Risk

Local Government Area	Extinct in the Wild	Endangered	Vulnerable	Total
Esk	1	8	19	28
Gatton	1	6	22	29
Ipswich	2	3	14	19
Laidley	0	3	9	12

(Source: EPA 2006a)

Table 3 presents the status of species in the four LGAs (EPA 2006b). A total of 1545 plants and animal species have been recorded at present within the case study area. Under the *Nature Conservation Act 1992 (QLD)*, 21 of these are classed as vulnerable, 20 are identified as rare, and a further 3 are recognised as being endangered. The Federal Government's *Environmental Protection and Biodiversity Conservation Act 1999*, also identifies some of these species as vulnerable or endangered. The majority of species identified as vulnerable, rare or endangered are plants and birds with a small number of mammals, reptiles and amphibians also identified (EPA 2006b).

Table 3: Status of Species in CSA

Status	Total Number of Species Identified by NCA 1992	Classification under the EPBC Act 1999	Plants	Mammals	Bird	Reptile	Amphibian
Vulnerable	21	16 vulnerable	11	3	5	1	1
Rare	20	-	7	1	11		1
Endangered	3	1 vulnerable 1 endangered			2	1	

(Source: EPA 2006b)

6.1.2 Biodiversity Significance

The Environmental Protection Agency (EPA) has identified biodiversity significant areas of the peri-urban landscape. These areas are largely fragmented with very few remaining linkages of substance. There is a large section towards the north of Gatton Shire which is identified to be of State significance for its biodiversity, as is the Toowoomba Escarpment area located towards the western boundary of Gatton Shire (Map F-**1**, Appendix F). A major biodiversity area of regional significance straddles the border between Laidley Shire and Ipswich City. Like most of the remaining lands of State and regional biodiversity significance, this zone coincides with elevated hilly lands that were not required for past agricultural purposes. Consequently these lands have remained uncleared until the commencement of the peri-urbanisation process.

Within the CSA, the majority of land identified is of State biodiversity significance and to a lesser extent regional significance and State habitat for endangered, vulnerable and rare taxa. Very little land is identified as being of local significance. This indicates that the vegetation in the subject area is of high importance and requires appropriate measures to ensure its preservation. Specifically, it is essential that a coordinated and collaborative management approach is implemented where these remaining biodiversity important areas exist along common institutional boundaries such as local authority borders.

6.1.3 Regional Ecosystems

EPAs remnant vegetation map (refer to Map F-2) indicates that the large majority of the existing remnant vegetation is classified: no concern at present. However, the CSA does include areas which are of concern, as well as vegetation which is endangered. Table 4 shows the extent of regional ecosystems across the case study area.

Table 4: Extent of Regional Ecosystems

Local Government Area	Endangered (ha)	Of Concern (ha)	Not of Concern (ha)	Non-Remnant (ha)	Total (ha)
Esk	5,224	30,448	89,192	267,535	392,399
Gatton	5,307	8,419	60,633	82,276	156,635
Laidley	808	6,995	11,789	50,347	69,939
Ipswich	1,892	7,128	16,213	94,911	120,144
Total	13,231	52,990	177,827	495,069	739,117

(Source: OUM unpublished)

It is significant to note that the ecosystems listed as endangered are generally isolated within the subject area. It can be assumed that the biodiversity values of these areas of remnant vegetation (endangered) are under severe threat or have already been compromised, owing to their fragmentation and the encroachment of incompatible land uses and activities such as farming and rural residential.

The Foliage Protective Cover (FPC) Map (refer to Map F-3 shows the density of tree cover. The map indicates an area comparable to the remnant vegetation map, as being covered with an upper tree layer. In the South East Queensland Bioregion, (slightly larger than the SEQ regional planning area), approximately 86% of the associated regional ecosystems are represented in protected areas greater than 1000ha in size.

Within the CSA, the vegetation identified as remnant correlates with the areas classified as being of biodiversity significant. Hence, further fragmentation of these lands, with increases in the density of human activities, would place these areas at further risk.

6.1.4 Conservation Reserves

Only minimum areas in each of the LGAs containing the CSA are protected through conservation reserves of some form (refer to Table 5. The principal measure of conservation protection within the CSA occurs in the form of nature refuges.

Table 5: Proportion of Conservation Reserves within Case Study Area

Local Government Area	Area of EPA Estate (ha)	Total Area of LGA (ha)	Proportion of LGA (%)
Esk	59615	392990	15
Gatton	17679	156819	11
Ipswich	469	120112	0.4
Laidley	1318	69927	1
Total	79081	739848	10.7

(Source: EPA 2006a)

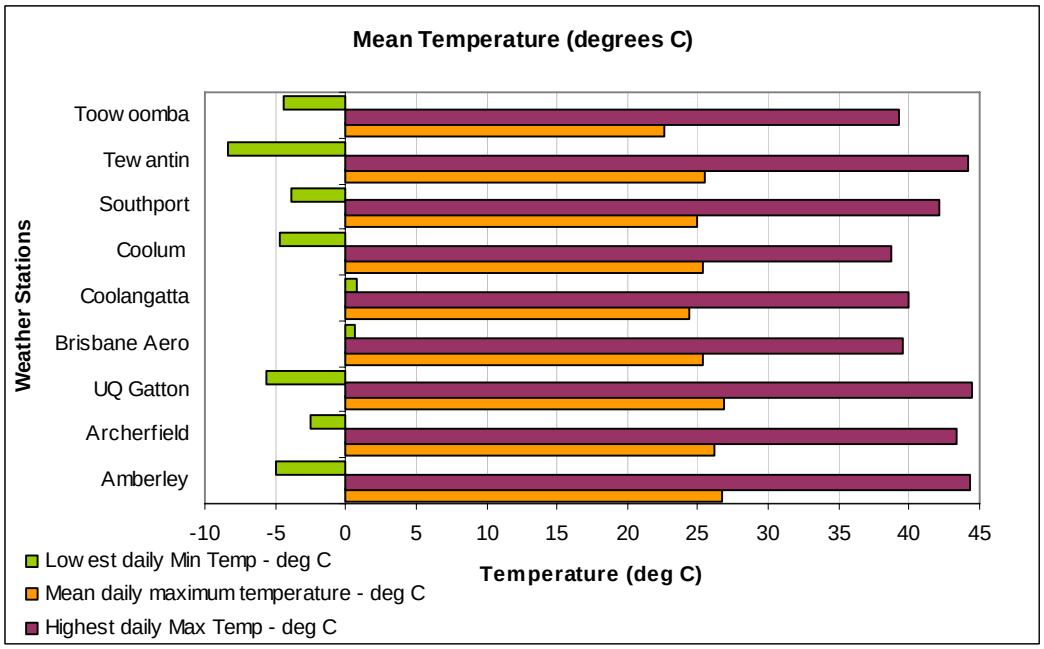
Within the CSA, Gatton has the largest proportion of its land area protected in conservation reserves. Ipswich and Laidley have negligible protected areas, whilst the majority of conservation estate in Esk Shire is located outside the peri-urban case study area.

All Shires contain protected areas such as nature refuges. A total of 31 of 182 nature refuges in Queensland (17%) are located in the SEQ region. Esk has the highest number of nature refuges (6), indicating the willingness of private landholders to contribute to the protection of biodiversity in their area. A further 11 nature refuges are located within Gatton, Laidley and Ipswich LGAs. Whilst these refuges provide a limited degree of protection, they are not necessarily located in the areas at most risk.

6.1.5 Climate

The accompanying figures show the temperature, relative humidity, and rainfall at various weather recording stations around the SEQ region. Weather stations in the CSA include UQ Gatton and Amberley.

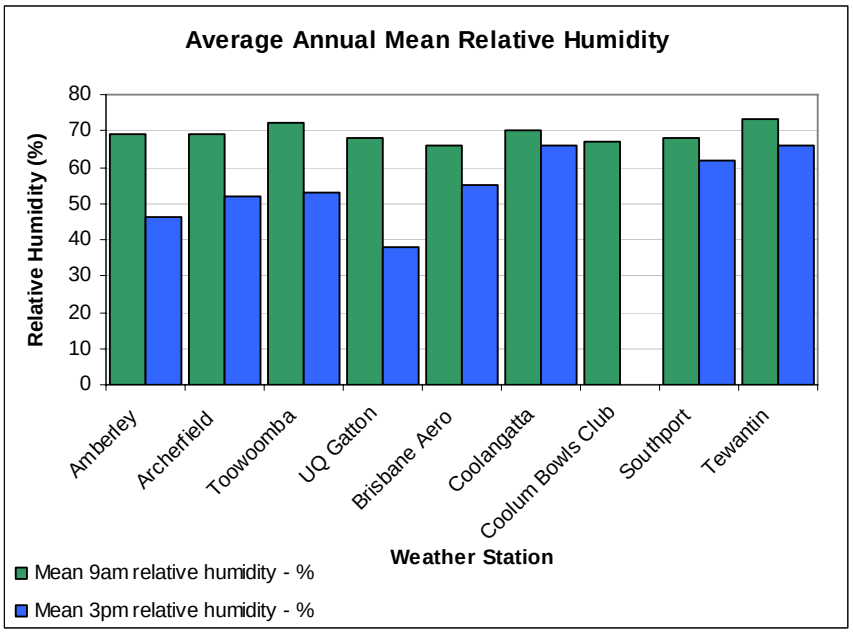
In comparison to other weather stations in the region, UG Gatton and Amberley have higher mean temperatures and higher daily maximums than other areas (see Figure 5). In addition, the observation stations in the CSA have two of the three lowest daily temperatures. Brisbane and other coastal areas such as Coolangatta, generally have lower temperature variances, whilst Tewantin and Archerfield have a similar temperature profile to the CSA.



Adapted from BOM (2007)

Figure 5: Mean Temperature at Selected Stations within SEQ

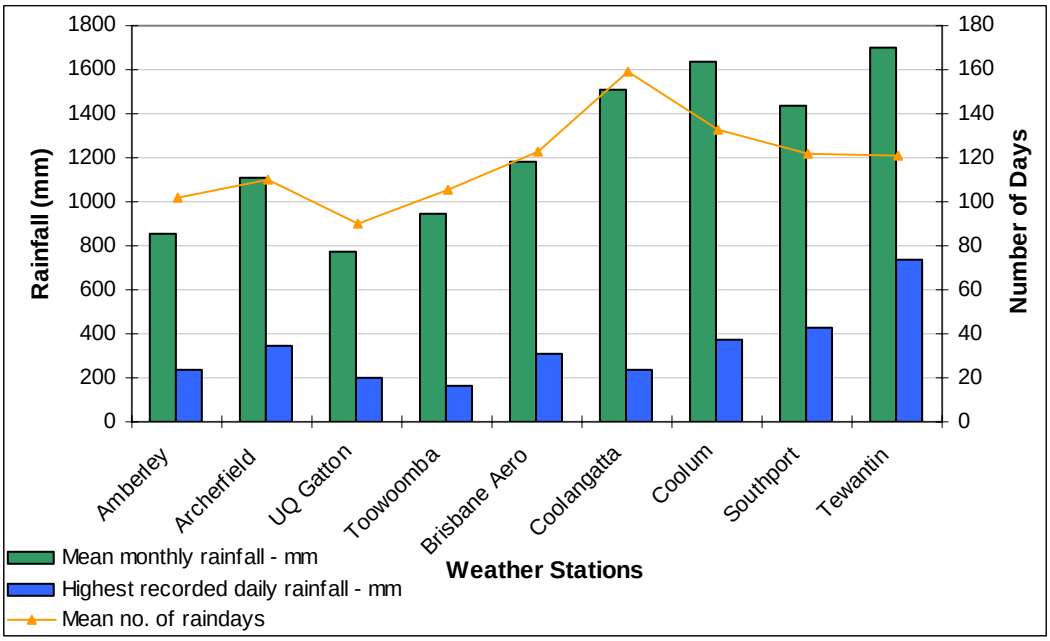
The CSA is significantly less humid than other parts of SEQ, including Toowoomba, at 3pm. Specifically, the moisture content of air in coastal areas is more pronounced. Little variance in relative humidity is evident at 9am (refer to Figure 6).



Adapted from BOM (2007)

Figure 6: Average Annual Mean Relative Humidity at Selected Stations within SEQ

Rainfall levels and the mean number of rainfall days are lower in the CSA, than other observation points in SEQ (refer to Figure 7). On average rainfall levels are much higher in the coastal areas north and south of Brisbane, and respectively, levels are significantly less along the western corridor from Brisbane. This pattern is consistent for the total number of rain days and highest recorded daily rainfall.



Adapted from BOM (2007)

Figure 7: Rainfall at Selected Stations within SEQ

In summary, the CSA in comparison to the balance of the SEQ region is warmer and has the greatest range of diurnal temperatures along with Tewantin. It is less humid, especially in the afternoons, and receives noticeable less precipitation than other areas in the region.

- Potential issues associated with these variations in climate include:
- limited surface water supplies for a growing population;
- increasing reliance on groundwater sources;
- competing interests between residential and agricultural land uses for limited water supplies; and
- greater evaporation rates associated with higher temperatures

Surface and groundwater resources are discussed in detail in Chapter 8.

6.2 Trends and Threats to Biodiversity

Peri-urban changes to the CSAs natural landscape have placed pressures on its biodiversity and its resultant activities now threaten those biodiversity values. This section identifies and discusses these threats.

6.2.1 Loss of Vegetation Cover

An analysis of vegetation loss was carried out using the Department of Natural Resources and Water's woody vegetation maps produced as a product from the Statewide Land and Tenure Study (SLATS) conducted in 2001. This study examined the changes to woody vegetation from a range of land use activities for the period 1988 to 2003 (Refer to Map F-4 through Map F-9). Prior to the SLATS investigation,

large areas of the CSA had been previously cleared for agriculture, particularly the floodplains of the major drainage systems. At the scale of the mapping, the following trends for the SLATs period investigated were noted:

- Recent clearing of woody vegetation has been predominately undertaken for the creation of pastures, with small amounts of clearing undertaken for settlement and infrastructure.
- There is no consistent pattern regarding the amount of clearing over the study period.
    - Between 1988 and 1991 there was a high level of clearing occurring.
    - Between 1991 and 1999 there was a low to moderate rate of clearing.
    - In 1999 to 2001, there was very little clearing undertaken. It was during this time that the Vegetation Management Act was gazetted. It is unclear whether this affected the amount of clearing as there was a high level of clearing in the years that followed from 2001- 2003. Perhaps it could be attributed to a lack of certainty regarding rights for clearing.
- There was minimal or negligible work undertaken towards revegetation and no evidence of natural regrowth occurring in the CSA.
- Clearing for pasture was consistently undertaken within the area towards the north-east of Gatton Shire and north-west of Laidley.
- Clearing for settlements was generally concentrated in specific areas and coincided with the major periods of population growth that the CSA experienced (see section 9). This suggests that the majority of the incoming population have been accommodated in new greenfield developments.
- For the whole of the SEQ region, clearing for pasture and settlement has made up 39% and 28% of the total clearing in the region respectively since 1988.

6.2.2 Loss of Habitat

Loss of habitat within the CSA, especially for Endangered, Vulnerable and Rare taxa is a significant problem. If further vegetation clearing is approved for settlement and pasture, this will result in greater fragmentation of existing remnant vegetation, and the potential loss of the few remaining wildlife corridors. This almost certainly will lead to an increase in the number of species endemic to the area becoming extinct, endangered, vulnerable and/or rare. An increase in urban activities will also result in the spread of alien flora and fauna. Additionally, increased peri-urbanisation will result in the need to extend existing waste systems to cope with additional loads, thus potentially resulting in further loss of habitat.

Areas most at risk include those properties sought for amenity residential purposes. They tend to coincide with the elevated uncleared portions of former agricultural and pasture properties which have previously been noted for their high remnant biodiversity values. This increases the priority for the protection of these areas which display high natural, biodiversity and/or landscape values.

Whilst the SEQRP acknowledges the state, regionally and locally significant areas of biodiversity, the significant biodiversity corridors have not yet been definitely identified in a manner that they can be incorporated into this statutory plan. The

SEQRP also identifies three koala conservation areas of regional significance adjacent to the urban footprint in the extreme east of the CSA.

At present there are no satisfactory State or Local government level policies that guide sustainable subdivision design. The Department of Natural Resources and Water has limited power, in their capacity as a referral agency, to restrict subdivision of lots which are partially covered by remnant vegetation or adjacent to remnant vegetation.

6.2.3 Vegetation Protection Through Local Government Planning Schemes

The protection of vegetation through the different local government planning schemes in the CSA varies between local authorities. This section summarises the degree of vegetation protection afforded in each local authority in the CSA.

Laidley Shire

Protection of vegetation, especially remnant vegetation in the Shire, is minimal. The Shire has established assessment categories for developments associated with different areas in its Natural and Environmental Significance Overlay. In addition, it details the overall outcomes for development in Rural Areas being to: “avoid significant native vegetation areas”. No reference to the Vegetation Management Act 1999 was found in the scheme.

Esk Shire

Generally, the Esk Shire Planning Scheme provides protection of vegetation. It states that clearing of vegetation should be kept to a minimum, with on-site landscaping being established to retain the existing native vegetation. In addition, the biodiversity values of Esk Shire are acknowledged in its Biodiversity and Scenic Amenity Overlay.

Esk Shire’s Planning Scheme also makes provisions for the clearing of vegetation in areas of medium to high significance. When these areas are part of an assessable development, an ecological report may be required detailing the ecological attributes and values of the site along with potential impacts, mitigation and rehabilitation measures to be included in the development. Further, if clearance or degradation of remnant vegetation is unavoidable, ‘no-go’ areas within the site boundaries are to be established where the development must not occur. These measures effectively restrict the footprint of any development to a minimum within areas of remnant vegetation.

Esk Shire Planning Scheme also provides for a Catchment Management Overlay which notes the vegetation along the sides of a watercourse must be retained and rehabilitated. No reference to the Vegetation Management Act 1999 was found in the scheme.

Gatton Shire

The Gatton Shire Planning Scheme includes a Biodiversity Overlay code which illustrates the areas within the Shire of biodiversity significance. Clearing of vegetation in zones such as the Rural Uplands Zone must be undertaken pursuant to the Vegetation Management Act 1999.

Regional Ecosystem classed areas within the Shire require special development requirements such as the siting of buildings in cleared areas or where the environmental impacts of vegetation clearing are acceptable.

Environmental Management Plans where appropriate will also indicate the extent of proposed clearing.

Ipswich City

The vegetation protection provisions in the Ipswich City Planning Scheme are the most comprehensive of all local authorities in the CSA. Vegetation management established in the planning scheme seeks appropriate conservation and management for the following:

1. significant areas of native vegetation and their associated wildlife habitats and linkages;
2. vegetation within defined water catchment areas, riparian areas or wetlands;
3. vegetation within environmentally sensitive areas including steeply sloping land and areas prone to erosion or salinity; and
4. vegetation which is of cultural heritage, ecological, horticultural, scientific, educational, recreation or aesthetic (including streetscape, townscape or landscape) significance or value.

The Ipswich City planning scheme notes the provisions of the Vegetation Management Act 1999 applies regardless of the vegetation measures included in the Ipswich Planning Scheme.

Specific outcomes for the management of vegetation include: environmentally sensitive areas; environmental weeds, commercial/sustainable resources; bona fide agricultural or animal husbandry; risks to health and safety; clearing of fire breaks, building envelopes and fences lines; wildlife habitats; soil fertility; and scenic amenity.

6.2.4 Pests and Weeds

There is a high incidence of alien flora and fauna in the case study area. Social, environmental and economic impacts result from a prevalence of weeds and pests. These could include:

- Social: the degradation of public recreation areas in terms of visual amenity, quality and accessibility and health impacts from injury;
- Economic: reduced capacity for earnings from primary production and tourism; and
- Environmental: loss of biodiversity; and the ‘out-competing’ of indigenous flora and fauna.

An analysis of the dispersal of pests and weeds across the CSA between the relatively short period, 2003 to 2005, has revealed that many species have become more prevalent in their distribution, with a large percentage of pests becoming more widespread than localised (refer to Table 6). Despite this, a number of other species were identified as having minimal change in the extent of their locality.

Particular pests and weeds identified as becoming extremely common and widespread in the CSA include the feral cat, fox, wild dog, mother of millions and

groundsel bush. The changing status of the occurrence of these pests and weeds in the CSA is tabulated below.

Table 6: Incidence of Major Pests and Weeds in the CSA

	2003 Status	2004 Status	2005 Status
Feral Cats	West: Occasional & widespread East: Common & Widespread	West: Occasional & Widespread East: Common & Widespread	Common & Widespread
Wild Dogs	Occasional & Localised	Occasional & Localised to Widespread	Common & Widespread
Mother of Millions	West: Absent East: Common & Widespread	West: Occasional & Localised East: Common & Widespread	West: Occasional to Common & Localised East: Common & Widespread
Groundsel Bush	West: Absent Centre: Occasional & Localised to Widespread East: Common & Widespread	West: Absent Centre: Occasional & Localised to Widespread East: Common & Widespread	West & Centre: Occasional & Localised to Widespread East: Common & Widespread
Honey Locust	West: Absent Centre: Absent to Occasional & Localised East: Occasional & Localised	West: Absent to Occasional & Localised Centre: Absent to Occasional & Localised East: Occasional & Localised	West: Common to Occasional & Localised Centre: Absent East: Occasional & Localised
Parthenium (weed of national significance)	West: Absent Centre: Absent to Occasional & Localised East: Occasional & Localised	West: Absent Centre: Absent to Occasional & Localised East: Absent	West: Common & Localised Centre: Occasional to Abundant & Localised East: Absent

(Source: DNR&M 2003,2004,2005)

Parthenium is a weed of national significance that contributes to an estimated $16 million loss annually for pasture and cropping industries in increased management costs and reduced production (Commonwealth of Australia & National Weeds Strategy Executive Committee 2001: 2). It aggressively colonises disturbed sites, making it a significant issue for farming in Australia. Parthenium has also been known to degrade natural ecosystems. The spread of this weed occurs largely through the movement of vehicles and the transportation of produce, livestock, feed and water (Commonwealth of Australia & National Weeds Strategy Executive Committee 2001: 2). In the CSA, Parthenium, whilst absent in the east, is becoming increasingly more common in the west. This may be an indication of the different capacities between Local Governments to control this weed.

One particular species recognised as having become more contained in its distribution in the CSA is the African Boxthorn. Guidelines produced by the (former) Department of Natural Resources and Mines exist for the African Boxthorn, however it is not known whether these have been acted upon by Local Authorities to ensure its eradication. A lack of available data in relation to a small number of pests and weeds identified in the CSA, means that trends in species dispersion are unable to be established, emphasising the need for additional monitoring programs.

The *Land Protection (Pest and Stock Route Management) Act* 2002 categorises pests and weeds from Class 1 to Class 3. The authorities and persons responsible for management vary between these categories. Class 1 animal and plant pests are to be prevented and eradicated by the State Government, whilst Class 2 species are to be largely controlled by Local Government with the assistance of community groups and landowners. In regards to Class 3 species, these species are only required to be controlled by landowners in the situation where the land affected is located adjacent to an environmentally significant area. The majority of animal and plant pests identified within the CSA, are declared Class 2 Species. Only one Class 1 plant pests is identified in the CSA, the Honey Locust.

The capacity of the various Local Governments to undertake monitoring and management of alien pest and weed species, including the ability to engage private landowners, is discussed in greater detail in 7. This section also details Council initiatives to improve the management of natural resources, including rebates for pest and weed control.

There is the potential for the spread of weeds from recreational activities such as horse riding and trail bike riding in the CSA. Specifically, in Australia membership of horse riding associations including the Equestrian Federation of Australia, and Australian Trail Horse Riders Association has increased in recent times, indicating that there is a greater public interest in these activities (Equestrian Federation of Australia 2006: 4-5; and Australian Trail Horse Riders Association 2007). The movement of animals, equipment, and fodder relating to this activity, has the potential to spread weeds, such as Parthenium, within and external to the CSA. These potential natural resource impacts must be taken into account when considering appropriate land use management for the peri-urban area, including if existing management regimes addressing the spread of pests and weeds are effective.

6.2.5 Fragmentation of the Landscape

The subdivision and resulting fragmentation of the landscape (discussed in greater detail in Chapter 8) has resulted in loss of habitats and wildlife corridors throughout the CSA. The CSA retains few large intact natural habitat areas with the few remaining ones at threat of encroachment. The wildlife corridors map (refer to Map F-10) shows the correlation between biodiversity and wildlife corridors, further emphasising the importance of maintaining and protecting such areas. The map indicates a regionally significant wildlife corridor to the east of Laidley Township on the southern side of the Warrego Highway, in addition to a larger intact area north of Helidon. A larger corridor, rated as State significant, is located along the escarpment to the east of Toowoomba.

If further vegetation clearing is approved for settlement and pasture, this will result in greater fragmentation of existing remnant vegetation, and the loss of the functionality of these existing wildlife corridors. This in turn may lead to an increase in the number of species endemic to the area becoming extinct, endangered, vulnerable and/ or rare. An increase in urban activities may also result in the spread of alien flora and fauna. Given the importance of these corridors, and being the only examples within the case study area, it is imperative that they are maintained and afforded a high degree of protection.

6.3 Natural Hazards and Threats to Human Occupation

Natural hazards play an important role in shaping the landscape. The principal hazards prevalent to the case study area include bushfires and floods. This section examines these hazards.

6.3.1 Occurrence and Incidence of Natural Hazards

The bushfire hazard in the CSA is predominately low to medium, with a small area classed as high risk on the northern side of the escarpment. This vegetated escarpment is predominately classed as medium bushfire risk, whilst the lowland valley is largely a low bushfire risk. Map G-1 (Appendix G) illustrates the bushfire hazard as mapped by the Rural Fire Service of the Department of Emergency Services. Potential issues associated with the bushfire hazard in the CSA include:

- Further subdivision for rural residential development will place more residents at risk from bushfires;
- Increased urban densities will result in the increased likelihood of damage to buildings from bushfire;
- Current climate variables in the CSA favour increased bushfire risk. The particular variables include lower rainfall, longer periods of drought owing to El Nino and high summer temperatures.
- Environmental variables include the close proximity of vegetation, the likelihood of floating embers, ground slope, and the type of vegetation that has evolved to promote the spread of fire and quick regeneration following fire events.

Up to present times, bushfire risk has been given little consideration and many houses have been sited on ridgelines susceptible to bushfire encroachment in order to ‘take advantage of views’ and to be “amongst the trees’. These sites are the most vulnerable locations as they present as ‘wildland urban interfaces’ and can be subject to fire storms resulting from uncontrolled bushfires racing upslope. In a ridgeline case, this can be on two fronts. Consequently, these elevated upslope sites are the least recommended for the siting of dwellings.

Little land use planning has been done to foster a bushfire minimisation outcome particularly using available scientific data.

6.3.2 Overall Management Issues

In the case of residential subdivisions in bushfire or flood prone areas, Local Government planning staff address hazard management as part of planning applications. If applications relate to land which is located in an area with increased risk of bushfire, flooding, or erosion, then the State Planning Policy 1/03 – Mitigating the Adverse Impacts of Flood, Bushfire and Landslide, must be addressed. This Policy and supporting guideline is required to be reflected by Local Government Planning Schemes. It identifies outcomes that must be achieved by development and specific solutions to meet these outcomes. As a planning instrument, it is stated that it is 'not intended to be a complete technical guide to the assessment and management of natural hazards', and an extensive list of documents are referenced for greater technical information (Queensland Government, 2003: 1).

Whilst development in areas of increased hazard risk must address the SPP, there are no State Government Departments to whom a lot reconfiguration or material change of use application must be referred to under the *Integrated Planning Act 1997*, such as the Queensland Fire and Rescue Service. This is a potential planning issue, as Local Government planning staff do not always have the skills to successfully apply the SPP to development applications and draft reasonable and relevant conditions. Ensuring developments comply with the conditions set, such as the maintenance of a cleared buffer around a building, is also problematic with limited staff available to conduct regular compliance reviews. It is important to note that old subdivision approvals may not have had conditions regarding bushfire management and do not comply with the subsequent SPP, yet they can remain valid and developable.

A number of the Planning Schemes of Council's in the CSA, refer to diagrammatic guidance for assessing bushfire risk. Both Esk and Gatton Shire Planning Schemes refer to a diagram from a 1998 document published by the Rural Fire Service and Department of Local Government and Planning, titled 'Bushfire Hazard Planning in Queensland'. It identifies 'good' as opposed to 'bad' subdivision design for development on a ridge top. However, the SPP states that development should be avoided in locations at the top of a steep slope as fire accelerates in speed uphill. This contradicts the former diagram which essentially promotes ridge top development. The Ipswich City Planning Scheme contains a diagram that identifies the increased level of risk associated with locating buildings on a ridge top or slope. Despite this, rural residential development has been permitted to occur in ridge top locations with medium to high bushfire hazard probability including Ipswich and particularly the neighbouring Shires of Laidley and Gatton. Given the SPP and its Guideline are not a 'complete technical guide', more technical guidance is required to assist planners in the development assessing process.

The Building Code of Australia and Australian Standard AS3959-1999 "Construction of Buildings in Bushfire Prone Areas" have building design and construction requirements to improve a buildings performance when subjected to burning debris, radiant heat or flame contact from a bushfire. However, it is important that buildings are not permitted to be developed in "at risk" locations from the outset and this can only be addressed at the subdivision approval stage.

6.3.3 Local Authority Hazard Management

All planning schemes reflect outcomes which seek to protect development from hazards including bushfire, flood, and landslide. Local Government planning schemes that commenced after the introduction of SPP 1/03 on the 1 September 2003, would have been assessed for compliance with the SPP by the Planning Minister. Development Constraints Overlays, Overlay Assessment Tables and Codes are utilised by Local Government for the assessment of hazards and to ensure developments comply with overall Desired Environmental Outcomes (DEO's). DEO's function as the overarching foundation to planning schemes and all other elements of the planning scheme work to support their achievement. The following table identifies current DEO's relating to hazard management of the Local Authorities in the CSA in their respective statutory town planning schemes.

Table 7: DEO's for Hazard Management of Local Governments in the CSA

Local Government Area	Planning Tool	Outcome Sought
Esk	DEO - F	…consistent with desired local character and sited so as to minimise the potential adverse impacts of flood, bushfire and landslide.
Gatton	1.2.4 Settlement Pattern, Amenity and Safety Outcomes sought: - outcome 5	Urban and rural residential communities are free from an unacceptable risk from natural hazards such as bushfires, landslip or flooding
Ipswich	DEO - I	… the adverse effects from natural and other hazards, including flooding, land subsidence, bush fires, ordnance explosions and aircraft operations, are minimised;
Laidley	DEO - K	The adverse effects from natural and other hazards including flooding and bushfires are minimised.

(Source: Planning Schemes, Esk, Gatton, Ipswich and Laidley, 2007)

The landscape of the CSA was extensively modified through the original expansion of agricultural settlement which commenced from the second half of the 1800s. The CSAs landscape today contains remnant vegetation patches and corridors of both state and regional significance. In most instances, these areas of remanent vegetation are the 'left-over' areas that were not required for the traditional agricultural pursuits that have until recently solely dominated this region. However the CSAs remaining biodiversity values contained in its remnant vegetation are now placed at threat through more recent and continuing peri-urbanisation. Rural residential and life style living developments are at the forefront of these potential threats. However, these forms of land use activities are themselves at threat from the occurrence of natural hazards, in particular, bushfires.

Vegetation protection is not uniform across the CSA and varies between local authorities. Ipswich City has the most comprehensive protection of vegetation, whilst shires with greater proportions of remnant vegetation have limited provisions for

protection of vegetation. The Vegetation Management Act 1999 was referenced in the planning schemes of Ipswich and Gatton only.

These landscape challenges affecting the biophysical attributes of the CSA require a concerted management effort and in particular rely to a large degree on the responsibilities, efforts and capacities of local government. The continued fragmentation of the landscape through ongoing peri-urbanisation is contributing to a range of major challenges for natural resource management. These issues, the connection between peri-urbanisation and natural resource management, are further developed and examined in the next chapter.

7 Natural Resources

This chapter continues the examination of the biophysical attributes of the Case Study Area (CSA) by focussing on a number of key natural resources. These include water, minerals and construction material, and timber resources. The chapter concludes with a review of natural resource management (NRM) in the CSA at regional and local levels.

7.1 Water Resources for Human and Agricultural Purposes

A number of different users depend on the provision of a reliable water supply in the CSA and the downstream catchments. Domestic, agricultural, commercial and industrial users receive their water supply from a variety of sources including dams, bores, aquifers, water tanks, streams, and town water infrastructure. Given the range of users and supply sources, the management of water resources in the CSA is a complex and strategically important issue. In particular, current consumption rates of this resource raise questions concerning the viability of future urban and economic growth.

In recent years a number of government studies have been undertaken that specifically address the management of this natural resource, in particular focusing on the agricultural area of the Lockyer Valley. These studies address the current state and administration of ground and overland water sources in the area.

This section provides an overview of the current state of affairs in regards to the supply, use and management of water resources in the CSA. The provision of urban water infrastructure is addressed in Chapter 7.

7.1.1 Water Management Areas

Water resources are managed as part of several different catchments and systems within the CSA. The three principal catchments include Lockyer Creek, Bremer River and the Central Brisbane River. Alluvial resources in the Lockyer Creek catchment are further managed as part of the following three catchment areas – Central Lockyer, Upper Lockyer and Lower Lockyer.

A significant proportion of ground water resources within the CSA are part of the Great Artesian Basin. The Great Artesian Basin is a large underwater reservoir underling approximately one-fifth of Australia, and extending across Queensland, New South Wales, South Australian and the Northern Territory. Within the CSA, this system is managed as part of the Clarence-Moreton Management Area.

7.1.2 Water Sources

Overland Water Sources (Streams and Creeks)

The CSA contains a wide range of stream order channels ranging from first to seventh order streams (refer to Map H-1) Lockyer Creek is the main drainage system which flows east approximately 100 kilometres from the Great Dividing Range

(Escarpment) in the west, into the mid section of the Brisbane River. Significant tributaries entering the Lockyer Creek catchment include Stockyard/ Flagstone Creek, Ma Ma Creek, Laidley Creek and Sandy Creek.

The Bremer River, another major drainage system in the CSA, flows north-east through Ipswich and towards the Brisbane River system from the South. Its main tributaries include Franklin Vale Creek and Warrill/Reynolds Creek.

7.1.2.1 Groundwater Artesian Sources

Intensive agriculture in the CSA has been largely founded on the extensive availability of groundwater. Primary sources include alluvium and artesian sediments from the Great Artesian Basin. An additional minor source includes fractured rocks which are not part of the Great Artesian Basin.

In the CSA, facilities for harvesting the groundwater reserves, such as bores, are generally concentrated along the higher order streams. Here aquifers are associated with the major surface drainage systems, including Lockyer and Laidley creeks, which are bordered by alluvial plains. Map H-2 identifies the status of bores in the CSA.

Water harvesting infrastructure in the CSA is largely sub-artesian with a small number of surface water facilities and artesian bores. The majority of bores are mapped as 'existing' meaning they are currently operational (80%), and to a smaller extent a number of bores are classified as 'abandoned and destroyed' (15%) indicating that they have ceased to be operational. Of the remaining 5% of bores in the CSA, 156 bores are currently abandoned but are able to be reinstated making them operational, and 27 new bores have been proposed.

7.1.2.2 Dams (Including Farm Dams)

The CSA includes a number of dams in its catchments that capture water from streams in medium to high flow periods for primarily agricultural uses. Water infrastructure, including channels and pipelines, deliver this water to users, or alternatively the captured water is released back into the streams when water levels become low (DNRM&W 2006: 70).

The Lockyer Creek and Bremer River catchments include a significant proportion of the total water storage areas (dams) within the Moreton Statistical Division. Three major water harvesting schemes located within the Lockyer Creek catchment include Atkinson's Dam (Buraba Creek), Lake Clarendon (Lockyer Creek) and Bill Gunn Dam/ Lake Dyer (Laidley Creek) (DNRM&W 2006: 70).

Table 8 provides an overview of the relationship between the dams in the Lockyer Creek and Bremer River catchments and the Moreton Region Water Resource Plan area of the Department of Natural Resources and Water. It indicates that these two principal catchments of the CSA combined represent 42% of the total number of dams in the region, 25% of the region's total water storage surface areas, and 25% of its total volume of dam water storages. Given the proportion of storage areas and the size and volume these represent for region, it can be concluded that in relation to

water resource management the CSA is strategically important on a local and regional basis.

Table 8: The Extent of Dam Storage Areas in the Lockyer Creek and Bremer River Catchments

Catchment Area	Gradient of Storage Area	Lockyer Creek Catchment	Bremer River Catchment	Moreton Region Water Resource Plan Area
Number of Storages	<10% Slope	1,410	1,110	5,959
	>10% Slope	871	117	2,535
	Total	2,281	1,287	8,494
	%	26.85	15.15	100
Surface Area of Storages *(m²)*	<10% Slope	3,323,747	1,348,415	19,155,034
	>10% Slope	809,278	189,572	3,215,362
	Total	4,133,025	1,537,987	22,370,396
	%	18.48	6.88	100
Volume of Storages *(ML)*	<10% Slope	4,986	2,023	28,929
	>10% Slope	1,214	284	4,627
	Total	6,200	2,307	33,556
	%	18.47	6.88	100
Total Catchment Area		2,974 km²	2,031km²	
Percentage of SEQ Total Area[1]		12.1%	8.3%	

(Source: DNRM&W 2003)

7.1.3 Water Quality

Numerous studies have been undertaken which provide evidence regarding the deterioration of water quality and aquatic environments in the CSA. One significant issue is the rate of groundwater extraction. It has been recognised that the extraction of this resource has exceeded sustainable yields in the Lockyer Valley (DNR&M 2005: 16). Given the value of water for the continuation of the agricultural activities within the CSA, it is important that this resource is sustainably managed.

A study undertaken by the (former) Department of Natural Resources and Mines (2002: 4-5), which mapped the change in groundwater quality at a number of locations across the Lockyer Valley between the years of 1990 and 1996-2000, had the following key findings:

- there is an increase in salinity at groundwater supply sources;

[1] Based on aggregation of individual catchment areas – Healthy Waterway Annual Technical Report 2005-06.

- groundwater levels have consistently dropped across the CSA; and
- over extraction at one source has consequences for groundwater supplies in separate areas of the system.

Various implications arise from the increase in salinity and the lowering of groundwater levels. In particular, some crops do not tolerate high levels of salt, which may have major implications for the cultivation of crops in the Lockyer Valley in the future. Whilst salt tolerant crop varieties could be selected, this will not address the cause of the problem. There is evidence which demonstrates that there have been long term reductions in groundwater levels in recent years, as the underground aquifers fail to refill following limited rain events (DNR&M 2002:5).

An analysis of the Mid Brisbane, Lockyer and Bremer freshwater catchments by Healthy Waterways as part of their annual Ecosystem Health Monitoring Program, found that stream quality has slightly improved in condition from 2001 to 2006 (see Table H-1 for Report Card Scores). The report card provides an overall score from A (Excellent) to F (Fail) for catchment areas in SEQ. Despite some improvement being recorded in stream quality, overall the principal drainage systems in the CSA, the Lockyer and Bremer freshwater catchments, perform poorly. Specifically, measures of the wellbeing of fish communities have consistently indicated that the ecosystem is stressed. Ecological assessments of fish communities address both abundance and species composition, comparing percentages of native fish species with alien fish species to determine the health of the waterway. The Mid Brisbane River catchment, downstream from the Lockyer Creek Catchment, performed fairly across the full range of indicators.

Water quality may be affected where septic systems are constructed in situations where there are poor soils, a high water table, erected on small allotments or close to riparian areas. Beal et. al. (2004:12) conducted an audit of non sewered local government areas in SEQ. This research found that with the exception of Ipswich, the majority of residences in the CSA are not sewered (see Table 9). Specifically, whilst Ipswich has 74% of its population sewered, Esk Shire has only 24%, Laidley 37% and Gatton 43%.

Table 9: Effluent Disposal in the CSA by Local Government Authority

LGA	Esk Shire	Gatton Shire	Ipswich City	Laidley Shire
Population	14,773	15,579	126,663	13,089
Percent of Population Sewered	24%	43%	74%	37%
Average Non Sewered Allotment Area	4000m²	3000m²	4000m²	6000m²
Number of Reported Septic/ Greywater Failures	*10*	10	30	50
Number of Septic Systems	2,000	2,700	5,104	3,500
Number of Septics pre-AS1547:1994	1,800	2,000	4,594	2,100
Number of Aerated Waste Treatment Systems	500	60	750	200
Number of Sand Filters	0	10	50	5
Number of Other	0	20	12	10
Current Number of On-Site Effluent Disposal Systems (2003)	2,500	2,790	5,916	3,715
Projected Number of On-Site Effluent Disposal Systems (2013)	2,860	10,000	12,000	5,124

(Source: Beal et. al. 2004:12)

The average area for lots with on-site effluent disposal varies between the LGAs from 3000m² to 6000m². This area is predominately a rural residential lot size. Environmental problems could result from having a high number of septic systems concentrated within one area.

A large percentage of the current septic systems were installed prior to new regulations becoming effective in 1994. The reliability of the older septic systems is uncertain and often they have inappropriate greywater discharge, and septic failures are frequent (particularly in Ipswich City and Laidley Shire) – see Table 7.2. This has potential impacts on water quality throughout the CSA. Council staff often lack control over this situation as they do not have the power to impose new requirements or conditions on old subdivision approvals such as systems upgrade to current standards. The local authorities in the CSA currently do not have inspection programs to inspect the reliability of septic systems. At the time of the study, Ipswich City Council indicated that they were looking at developing an inspection program.

7.1.4 Changes to Hydrological Regimes

The 2006 Environmental Condition Report for Moreton and the Gold Coast gave an overview of the changes occurring within the different stream levels of the Lockyer Creek system. The Lockyer Valley has been recognised as a stressed groundwater area, where sustainable yields for water extraction have been exceeded. The following changes have been identified in the Lockyer Valley catchment (DNR&M 2006: 67-70):

- In upstream areas reductions in low to medium flows within waterways have occurred. This lack of stream flow has resulted in pondages downstream which can result in weed growth and algal blooms;
- In middle and lower sections of the valley, stream flow has been altered from perennial to ephemeral, and has resulted in ponding within some areas. The permanent loss of stream flow and lowering of the alluvial watertable has been accompanied by losses in aquatic and riparian zone vegetation, and the consequential loss of permanent communities of aquatic flora and fauna. An effect of this is that some habitats are less suitable for native vegetation and more tolerant of weeds; and
- Creeks downstream from Lakes Atkinson and Dyer have experienced substantial reductions in medium and high flows.

The development of weirs in the Lockyer Creek catchment often creates an impenetrable barrier to the movement of aquatic fauna and transportation of sediment and organic matter downstream. A further observation made is that a reduction in medium to high flows downstream from water harvesting sites may result in little change occurring to geomorphology and riparian vegetation in comparison to normal flows (less impact) (DNRM&W 2006: 71).

7.1.5 Management of Water Resources

As the peri-urbanisation of the CSA continues, the limited water resources presently available will be required to be utilised for urban (human) consumption rather than agricultural purposes. This is not a sustainable outcome given the drop in the water table and the current drought status of the CSA and the SEQ region. The continued displacement of commercial agriculture through continuing peri-urbanisation will only exacerbate this unsatisfactory situation.

Water quality will also be affected. For example if land use change occurs and land is not managed in an ecologically beneficial way, water quality in catchments may be impacted on from stormwater runoff, and increased sedimentation. As a number of councils lack instruments or strategic plans for the management of riparian areas and creek systems, assessing the impact of proposed development on water resources may be problematic.

Confusion over the level of government responsible for the management of the different water resources in the CSA is a major impediment to the successful execution of NRM. This is not assisted by the large number of studies and management plans that overlap and do not address the management of the catchment in its entirety. The integration of land use planning and catchment management is also inadequately addressed for the CSA, and it can be concluded that:

- there is a poor fit between existing NRM boundaries and governance and biophysical systems; and
- catchment management appears to have little impact on resource use.

Control over the extraction of water from groundwater sources is also a major concern. Specifically, extraction of groundwater from the Warrill Bremer Management Area and Lockyer Valley Management Area (with the exception of

Central Lockyer) is currently unregulated with no bore licensing or metering required. Central Lockyer, as the only declared subartesian area in the Lockyer Valley, is required to have licences and meters for groundwater use – however, this does not apply to the extraction of water for stock and domestic purposes (DNR&M 2005: 9). The Water Resource (Moreton) Plan 2006 and Overview Report seek to address some of these key issues.

7.2 Mineral Resources

The CSA's geology comprises large deposits of alluvium, arenite, arenite murdock, granitoid, and some smaller deposits of colluvium (DM&E 2007).

A large number of coal deposits exist in the vicinity of the Bremer River and Franklin Vale Creek, west and south of Ipswich towards Rosewood. Coal has been the foundation of a strong industry in the area since mining operations commenced in the late 1800's. The loss of power supply agreements in the 1980's and a decline in the profitability of underground coal mining in the 1990's, led to the closure of the majority of coal mines in the Ipswich District (New Hope Corporation, 2006). One of the few open cut coal mining operations that still exist is the New Oakleigh open cut coal mine west of Rosewood and operated by New Hope Corporation Limited. This operation dominates the eastern end of the CSA. Coal is mined from New Oakleigh for power generation and general industry and is sold into both the export and domestic market (New Hope Corporation, 2006).

Sand and gravel extraction operations in the CSA are generally located close to creek systems. Concentrations are located around Lockyer Creek, the Brisbane River north of Ipswich and creeks upstream from Atkinsons Dam. Other extraction operations are located around smaller creeks within the catchment.

The majority of quarries and sand and gravel extraction operations are currently identified as operational, however a significant number are closed, suspended or undeveloped. Refer to Map I-1 (Appendix I) for location and status of the quarry operations within the CSA.

Quarries and sand and gravel extraction operations are an intensive land use and the nature of the operations often results in a number of negative externalities for individuals residing in close proximity. Impacts can include noise from blasting, machinery, traffic, dust and odour – requiring clear separation for incompatible land uses such as rural and urban residential. A number of environmental externalities also arise from quarries, including impacts on water and air quality, and erosion and subsidence. Subsidence from abandoned quarries and former underground coal mines can and has also been a problem in this part of the region in the past.

7.3 Timber Resources

The CSA has large tracts of land utilised for production forestry. The area to the north of the Warrego Highway in Gatton Shire is categorised as production forestry by the Queensland Land Use Mapping Project (QLUMP). In 1999, 14,986 hectares or 17.5% of the land in the CSA was utilised as production forestry (DNR&W 1999). The QLUMP maps, (discussed in Chapter 8), include an analysis of primary,

secondary and tertiary land uses and illustrate the location of production forestry within the CSA.

Federal, state and local government have different interests and powers in regards to forestry and timber resources. The federal government exercises predominately an advisory role, influencing structural change within the industry and encouraging greater sustainability through numerous strategies and action plans (DPI&F 2007b). Alternatively, the state government has 'constitutional powers over land allocation and most natural resources', and therefore plays a significant role in the management of forestry and timber resources in the CSA (DPI&F 2007b). At the other end of the spectrum, local government, under the *Integrated Planning Act 1997*, has a degree of influence over forestry interests through land use planning and development control responsibilities. However, given the forestry industry is administered by the state, and that local government planning schemes are reviewed by the state, the capacity of local authorities to influence land use planning decisions is weakened.

Population growth in SEQ has resulted in an increased demand for forestry products to supply the subsequent growth in residential building (DPI&F, 2007b). In addition, demographic changes, consumer preferences for products, economic conditions and government policy all influence demand. The viability of the timber industry in the CSA and the SEQ region will depend on this issues as well as its ability to withstand increasing peri-urbanisation demands for land.

7.4 Natural Resources Management Governance

The management of the biophysical attributes (see Chapter 6) and key natural resources (discussed in this chapter), in the CSA have been developed in recent times along both regional and local levels. This has embraced key functions such as planning, management and governance. These matters are discussed below.

7.4.1 Regional NRM Governance

The first major step towards a regional planning approach for natural resource management (NRM) in the CSA was the production of the 'Healthy Land - Our Future' plan for the western catchment area of SEQ. This document produced by the (former) SEQ Western Catchments Group (now a part of SEQ Catchments), drew together information on current natural resources and threats to their sustainability, in order to develop strategies and actions for their management. A later plan 'The Future in Balance' (December 2004), focused on the whole of SEQ, and addressed the establishment of priorities for protecting assets, actions to be undertaken and funding opportunities.

The 'Healthy Land – Our Future' document focused on seven key interrelated resource assets: surface water; groundwater; aquatic ecosystems; terrestrial biodiversity; land resources; landscape amenity and appreciation; and atmosphere. These resources all have social (including cultural), economic and environmental functions and therefore their management is of upmost importance. Whilst a large number of threats to the key resources was identified, there were a few recurring

threats. Specifically, the increased demand from population growth, and industry and agricultural expansion, is placing significant strain on a number of resources, particularly water and land resources. In relation to this, as land use change occurs to reflect the contemporary social and economic environment, impacts such as land clearing and erosion are occurring, further compromising the natural resource assets. An additional recurring issue is climate change. Climate change was considered in terms of human causes, such as greenhouse emissions, and also the impacts resulting from climate change such as prolonged drought and a lack of water supply. The impact of pests and weeds on land resources and terrestrial and aquatic ecosystems was also identified as a major threat to a number of the key resource assets.

At this stage, the non-statutory regional NRM plan is an advisory document and it has not been aligned with the statutory regional plan (SEQ Regional Plan 2005-2026). It is intended to do so for the next version in 2010. In the meantime, the regional NRM plan remains a voluntary document with one of its main uses being to identify and prioritise regional scale investments in NRM.

7.4.2 Local Government NRM Practice and Challenges

The methods in which local governments are currently facilitating the management of natural resources, is central to current environmental and resource concerns in the CSA. Low Choy, Steiner, and Maccheroni (2006), examined the uptake of NRM in the Local Authorities that made up the SEQ Western Catchments Group. This study has been used to inform the following section on NRM challenges for the CSA local governments of Esk, Gatton, Ipswich and Laidley.

7.4.2.1 Generic Issues for Local Government NRMs

Whilst there was visibility of NRM in many of the overarching planning and management documents of the local authorities, it was patchy and inconsistent. There was no specific and direct reference to NRM in the vision statements of their mandatory Corporate Plans but they did contain oblique references to NRM through statements concerning sustainability and the desire to protect natural attributes and selected environmental elements. Hence it could possibly be inferred that NRM was intended in these cases.

Whilst there was mention of elements of natural resources, none contained a specific commitment to manage them. Some vision statements sought a high quality (and sustainable) environment, but none directly made a commitment to manage existing natural resources to achieve these outcomes. In one case there was a commitment “to protect”, or “to promote” (Gatton Shire), or “to care” (Ipswich City), from which it could be inferred that NRM was the means that the council intended to use (Low Choy, Steiner and Maccheroni, 2006).

The specific NRM Issues that were addressed in the individual Corporate Plans of the Local Authorities in the CSA are identified in Table 10.

Table 10: NRM Issues Addressed in Corporate Plans of Local Authorities in the CSA

Local Authority	NRM Issues Addressed in Corporate Plans															
	Environ Management	Catchment & Waterways M'ment	Rural Land Management	Protecting Character	Promoting Sustainable dev'ment	Environmental (Public) Health	Protecting Open Space	Natural Environment	Biodiversity Protection	Wildlife management	Water Management	Waste Water M'ment	Atmosphere	Plant & Animal Pest Control	Sports & Recreation	Heritage Protection
Esk Shire	✓	✓	✓		✓	✓	✓	✓			✓	✓		✓	✓	✓
Gatton Shire	✓		✓	✓		✓	✓	✓			✓			✓	✓	
Ipswich City		✓	✓			✓	✓	✓	✓		✓	✓	✓			✓
Laidley Shire		✓						✓	✓	✓	✓	✓	✓	✓		

(Source: Low Choy, Steiner and Maccheroni, 2006)

The specific NRM links between various planning instruments of each local authority (including IPA Planning Schemes, Operational Plans and Local Laws) and the Regional NRM Plan for the CSA are tabulated in Table J-1 (Appendix J). It demonstrates that a common issue for all of the local governments in the CSA is a lack of funding for NRM activities and dedicated staff to support NRM efforts. This is more pronounced in the less populated Shires of Esk, Gatton and Laidley, where a small rate base means that funds available for NRM are limited. Funding is available from state and federal government, however this is generally for instances in which the natural resource issue is considered of strategic importance. For example the management of terrestrial biodiversity is limited to situations where a subsidy is available, such as 'Declared Species' under the Nature Conservation Act 1992. However, many other core NRM activities do not fall under any government subsidised program. Specifically at both the local and regional level, funding is ad hoc and lacks the permanency required for long term projects.

Three of the four local governments impose an environmental levy on top of the property rates (see table below). The creation of an environmental levy on rates does allow for a more consistent budget to be allocated to priority NRM initiatives annually.

Table 11: Environmental Levy - CSA LGAs

Council	Amount $ Per Annum
Esk	$12.92
Gatton	$20
Ipswich	$32
Laidley	No Environmental Levy

(Source: Planning Schemes, Esk, Gatton, Ipswich and Laidley)

The scale and distribution of some natural resource issues makes it difficult for local governments to successfully address with the limited resources and specialist skills at their disposal. Greater input is required from state agencies to assist local governments to achieve the improved NRM outcomes.

7.4.2.2 Esk Shire Council

Current NRM Challenges

The key challenge to providing more proactive NRM in Esk Shire is resource funding. Specifically, greater resource funding is required to increase the councils capacity, particularly for employing staff trained in NRM (policy and operational), and for general maintenance projects.

A strategic concern is that the council does not have control over private land, and therefore has no control over the management of problems such as pests and weeds, on these properties. Whilst Esk Shire Council indicated that they encourage and support private land owners to seek funding for NRM, the process of getting funding is considered complicated, and involves considerable paperwork, making it a time and resource consuming process. The council does however support environmental groups through their Community Assistance Grant Scheme, whereby approximately $25,000 is allocated annually to groups with a NRM focus.

Organisational Structure

Within the Council, NRM issues are addressed by the Planning and Development Department and the Works, Health and Environment Committee. Approximately six (6) staff members are involved in delivering NRM outcomes as part of their overall duties. They include a Parks and Gardens Coordinator (duties include weed and pest control), a Declared Pest Inspector, Engineers, a Surveyor and Town Planners. Whilst these individuals all have qualifications in disciplines related to NRM, their skills are described as limited and a full time NRM Officer is desired. In the past the Council has engaged private consultants to design and implement projects and the Brisbane City Council for monitoring. One opportunity recognised to increase the capacity of the Council to undertake NRM, is to engage more with the SEQ Western Catchments Group. It was further identified that for projects to be successful often a level of community ownership is required.

Responses to NRM Challenges (Including Instruments Available)

Esk Shire Council does not have a specific annual budget for funding NRM initiatives. However, they do allocate approximately 0.7% of their budget to individual projects, which are related to NRM. This small and project specific budget has meant that the Council is largely dependent on outside funding for regular NRM. The Council did introduce this year an Environmental Levy ($12.92 per annum) on rates.

Given a lack of funding for managing and monitoring existing natural resource problems, the Esk Shire Council appears to be concentrating their efforts towards prevention. For instance, in relation to the management of water quality, it was indicated that the Council is looking at waste/sewerage treatment, stormwater and water retention, including the compulsory implementation of water tanks. The Council's IPA Planning Scheme provides overall control over land use planning and land resource management, including the identification of areas with limitations such as bushfire, flooding, and erosion and sediment problems.

7.4.2.3 Gatton Shire Council

Current NRM Challenges

Gatton Shire Council staff have a strong range of skills in NRM, yet are nonetheless limited in their ability to provide a range of services by a lack of resource funding for additional staff and long term projects, particularly those projects requiring ongoing maintenance, such as weed control.

Weak legislation regarding land management practice was identified as a barrier to effective NRM. Specifically, the need was recognised for local laws which allow the Council to exercise power over land use practices being undertaken on private properties, which may have external impacts on environmental resources, such as water quality.

Entrenched public perceptions, poor information, and difficulties in balancing the need to make a living with the maintenance of the natural environmental, were also acknowledged as limitations to effective NRM by this Local Authority.

Organisational Structure

The Council's Department of Planning and Environment administer overall NRM for the Shire. An Environmental Advisory Committee exists, whose key role is to advise and report to Council on NRM matters. Approximately 20 staff in total are engaged in activities related to NRM, including an Environmental Officer, Planners, Parks and Gardens workers, Environmental Health Officers, and Pest and Weed Officers. These Officers' skills extend to land resource assessment, planning and project coordination, pest and weed control, and environmental health assessment.

If funding were available, the Council would like to employ a number of additional staff to increase the capacity of the existing staff to deal with a greater range of NRM issues. Specifically, it is desired to have greater GIS capacity, and skills including rural techniques, technologies and management; flora and fauna biology, ecology

and management; waste disposal and reuse technology; and NRM and the management of urban/peri-urban landscapes, amongst others.

Responses to NRM Challenges (Including Instruments Available)

Whilst the Council has no definitive budget allocation for NRM, an Environmental levy is charged on rates which is allocated for the funding of an Environmental Officer position, and to assist/fund a number of environmental projects. A variable budget is provided for funding environmental groups on an individual project basis.

State and Federal legislative requirements drive NRM in Gatton Shire, and as a result issues are generally addressed on a needs only basis, with little monitoring and evaluation undertaken. Specifically, limited consideration is given to the management of NRM variables including salinity, erosion, land management, atmosphere and scenic amenity.

The Council's IPA Planning Scheme and State Planning Policy's are utilised as tools to manage land resources in the Shire. The Council has a strong emphasis on requiring land and resource management to be addressed through Development Assessment Conditions. Whilst this is a good approach to NRM, it also requires Council to have the resources to monitor compliance with these conditions. Gatton also relies on a number of incentive based programs to encourage the public to engage in NRM, such as herbicide subsidy schemes, a free tree program, dingo bounty, and rain water tank rebates.

It was identified that Gatton Shire has had a number of successful NRM projects. Their success often resulted from a collaborative effort between a number of stakeholders such as Council teams, Landcare, community groups, and former "work for the dole" schemes.

7.4.2.4 Ipswich City Council

Current NRM Challenges

Ipswich Shire Council, with over seven times the number of rate payers than other local authorities in the CSA, has significantly more resources at their disposal. Despite this, it was recognised that more staff and funding is required, particularly in regards to planning for long term management of natural resources. Currently, NRM appears to lack 'permanency' owing to a lack of reliability and consistency in funding from year to year, which has resulted in 'band aid' solutions being applied to complex issues.

Organisational Structure

NRM is devolved to a number of sections of Council who have varying responsibilities and interests, and includes the following Departments: Environment/ Conservation and Catchment Conservation; Parks and Sport; and Health and Environmental Protection. It is estimated that 60 to 90 staff (approximately 3-4.5% from a total of 2000 staff) are involved indirectly and directly with NRM. Roles vary from Town Planners to Bushland care staff, and Pest Managers and Inspectors, and

some of the skills include, project management, mapping (GIS), strategic planning, and report writing.

Training of Ipswich City Council staff in NRM is considered important, and they provide for individuals to attend conferences and support further education such as higher degrees.

Responses to NRM Challenges (Including Instruments Available)

The Councils 'Enviroplan Levy' provides funding for three key NRM actions, namely, to acquire core properties; assist the creation of Natural Resource and Planning partnerships; and lastly the creation of Conservation Agreements.

Ipswich City's IPA Planning Scheme addresses strategic resource management issues including land use planning, the preservation of good quality land (GQAL), and erosion and sedimentation. It was identified that the Council does take into consideration issues such as air quality and landscape amenity/appreciation, however these issues are not addressed in the planning scheme.

Community assistance for NRM is provided in a variety of forms, such as sponsorship of projects, special events, free trees, mulch, and pesticide rebate programs. Budgets for community assistance come under different Councillors, making it difficult to establish the amount given in full in any one year.

Monitoring and evaluation programs are undertaken of natural resources in the Shire by the Council and the Bremer Catchment Association. Results from these activities are fed back into Council discussion papers and reports, and often made available to the Community, in order to influence change, and inform the Corporate Plan and budget.

It was identified that with their current resources, Ipswich City Council has adequate capacity to supervise and undertake projects. At times the Council is required to employ specialist individuals to undertake tasks such as research.

7.4.2.5 Laidley Shire Council

Current NRM Challenges

Of the Local Authorities in the CSA, only Laidley lacks an Environmental (or similar) Levy. This makes funding for NRM activities difficult, as the Council does not commit a dedicated percentage of their annual budget to such activities, but funds projects on an individual needs basis. Overall, increased funding and resources are required for the Council to successfully undertake NRM. Specifically, the current criterion for attaining funding is considered restrictive, and therefore greater flexibility in administration of funding is considered necessary. Increased flexibility is also warranted in the provisions regarding where funding can be spent, as currently funding provides for materials and not staff facilitation and operation costs, or long term maintenance.

The Council previously supported the 'Lockyer Catchment Centre', which recently ceased operating after 15 years. This Centre undertook a number of NRM projects, engaging consultants to embark upon projects such as a review of aquatic

ecosystems. Following the closure of this initiative, community expectation and involvement in NRM has dwindled and Council would like to see this Centre re-established as it was a proactive approach towards NRM in the Lockyer catchment.

It is considered that current NRM-type legislation is ineffective and should be improved to be more stringent, particularly in regards to tree clearing. A lack of community awareness was also identified as a problem compromising effective NRM, especially as individuals do not have sufficient information to become more aware and involved in NRM in their local areas.

Another NRM issue is whether adequate resources exist to effectively utilise monitoring results. For example, whilst ecological monitoring is undertaken by a University under the 'Waterways Partnership', the results are often not available for public viewing and 'filed away' as Council does not have the capacity to address these issues. Furthermore, it was indicated that monitoring results do not necessarily inform their Corporate Plan or annual budget, however, it may trigger some improvements.

A major NRM issue identified was the current lack of control over NRM on private land such as runoff from farms, and that this needs to be addressed as impacts result in the downstream portions of catchments.

Organisational Structure

Laidley Shire Council has approximately seven staff members involved directly and indirectly with NRM. The Planning section of Council generally has responsibility for NRM issues, and an Engineering and Assets Committee exists to examine topical issues. Staff have a range of responsibilities including planning, supervision of projects, on ground work and project administration/control. Some of the skills that exist include land use planning, mapping, report writing, weed management, and horticultural experience.

It is desired to have an Environmental Planner/Engineer with particular skills in salinity, water and air quality management, and community consultation.

Responses to NRM Challenges (Including Instruments Available)

Whilst funding is a major limitation to resource management in Laidley Shire, a number of initiatives exist, some community based. Environmental Groups are assisted by Council, including the recently closed Lockyer Catchment Centre, and the Waterways Partnership, who undertake stream monitoring. A free tree and mulch program is funded by the Council.

A few reports/strategies exist in relation to Natural Resources. A Recovery Plan exists for a number of sites and council is seeking funding to assist partly in execution of this plan. The Council also has a generic Pest Management Plan which is intended to be revised in the future to include greater detail. In relation to scenic amenity, the Council has study findings which are yet to be reflected in planning documents.

Salinity hotspots are identified on an overlay to the Planning Scheme. Council requires that salinity be addressed during its development approval process.

Overall, it appears that Laidley Shire has the ability to provide supervision and assistance regarding NRM projects. However, they do not have the resource capacity for tasks such as monitoring and researching natural assets, and concordantly rely heavily on community based assistance.

7.5 Summary

The conclusions regarding the threats and challenges to the biophysical attributes of the CSA reported in the previous chapter are generally consistent with the findings in regard the natural resources that have been examined in this chapter. Past and ongoing peri-urbanisation is contributing to a range of major challenges for natural resource management in the CSA. These challenges require a concerted management effort and in particular rely to a large degree on the responsibilities, efforts and capacities of local government operating within the relatively recently established regional NRM arrangements.

Complex management arrangements have been established for the management of natural resources throughout the State and these are reflected in the CSA. The management of water resources in a good case-in-point. In most cases, a combination of natural features and artificial boundaries has been used to delineate these areas of planning, policy development and management. At the broader scale, there is no alignment between LGAs, NRM regions and statutory planning regions, compounded by a further non-alignment with natural landscape areas.

Significant challenges for NRM arise from the land tenure arrangements where the majority of land is in freehold ownership resulting in prime responsibility for NRM falling to individual land owners. The next level of NRM responsibility falls to local government. However, it has been demonstrated that local authorities have limited resources, capacity and capability to adequately address NRM challenges in their areas.

Under the current NRM arrangement, ongoing peri-urbanisation of the landscape will continue to place natural resources at risk.

8 Spatial/Land Use Aspects

The biophysical and natural resources of an area play a major influential role in determining the spatial expression of the landscape through the range of land uses established in that landscape. This chapter examines the spatial and land use arrangement of the CSA with a particular emphasis on agricultural, urban and peri-urban activities. Due to the focus on the peri-urbanisation process, the chapter combines details on the land development process, covering: land use, land subdivision and supporting physical infrastructure.

8.1 Land Use

Land use analysis for this project was completed using Queensland Land Use Mapping Program (QLUMP) data. This data was collected for the first and only time in 1999. With no data available for comparison, a snapshot only can be presented[2].

QLUMP provides analysis at three levels: primary; secondary; and tertiary, with each level providing increased detail on land use categories. The following table presents key land uses by level analysis. See **Map K-1**, Map K-2, Map K-3 CSA land use in 1999.

Table 12: QLUMP Analysis of CSA Land Uses

Land Use Level	Analysis
Primary Land Use Categories	The CSA is dominated by primary production especially from dryland agriculture/plantations.
	Primary production also exists along the drainage flood plains where it is generally in the form of irrigation agriculture and plantations
	Intensive uses are scattered throughout the CSA
	Primary production also occurs in the CSA's relatively natural environments located mostly in the north of Gatton Shire where there is production forestry
Secondary Land Use Categories	These areas are generally irrigated seasonal horticulture or irrigated cropping further from the drainage lines.
	The majority of the CSA is utilised for grazing on natural vegetation or modified pasture.
	Residential areas are also interspersed throughout the grazing and horticultural areas of the CSA.
	Small amounts of cropping can be found amongst the production forestry regions to the north of Gatton Shire and in the western part of Ipswich outside the major urban boundary.
	Mining is also carried out to a small extent in middle Laidley Shire.
Tertiary level analysis	19.3% (or 16553 ha) is classed as rural residential
	6% (or 5132 ha) is classed as conservation/national park
	5.1% (or 4380 ha) is classed as dairy

[2] Due to the limitations on the collection of agricultural, real estate and some land use data, the CSA in this Chapter is comprised of the LGAs of Ipswich, Gatton, Laidley and Esk.

A total of 52,476 ha are classed under the generic category of “Other Tertiary”. Given this large amount, a further breakdown by secondary categories provides the following more detailed description:

- 17.5 % (or 14,986 ha) was classed as production forestry;
- 7.9% (or 6,739 ha) was classed as residential; and
- 7.4% (or 6,387 ha) was classed as irrigated cropping.

In summary, the dominant land uses within the CSA are tabulated in Table 13. The most dominant land use identified was ‘rural residential’ (19.3%). This is consistent with more contemporary aerial imagery and ground surveys. Further analysis of rural residential land uses and other dominant categories are provided in subsequent sections of this Chapter.

Table 13: Dominant Land Uses in the CSA

Land Use	% CSA
Rural residential	19.3%
Production forestry	17.5%
Residential	7.9%
Irrigated cropping	7.4%
Conservation & national parks	6.0%
Dairy	5.1%
Grazing	3.8%
Remnant native cover	2.7%
Recreation & culture	2.2%
Mining	2.0%
Other	26.1%
Total	100%

(DNR&M 1999)

8.1.1 Land Use Distributions

Based on the analysis presented in Table 13, Table 14 details the area for each land use category for the tertiary and secondary categories.

Table 14: Area of QLUMP Categories for Tertiary and Secondary

Land Use Level and Categories	ha	% of CSA
TERTIARY		
Intensive Animal Production	180	0.2
Commercial Services	428	0.5

Land Use Level and Categories	ha	% of CSA
Dairy	4380	5.1
Defence	1724	2.0
Electricity Generation/Transmission	34	0.0
Cattle	105	0.1
Conservation/National Park	5132	6.0
Poultry	47	0.1
Public Services	490	0.6
Recreation & Culture	1858	2.2
Remnant Native Cover	2284	2.7
Rural Residential	16553	19.3
Sewage	42	0.0
Water Storage & Treatment	12	0.0
Irrigated Vegetables and Herbs	82	0.1
SECONDARY		
Cropping	116	0.1
Grazing natural vegetation or Grazing modified pastures	3250	3.8
Intensive horticulture	58	0.1
Irrigated cropping	6387	7.4
Irrigated modified pastures	205	0.2
Irrigated perennial horticulture	526	0.6
Lake	209	0.2
Managed resource protection	13	0.0
Manufacturing and industrial	1215	1.4
Mining	1731	2.0
Other minimal uses	477	0.6
Perennial horticulture	8	0.0
Plantation forestry	58	0.1
Production forestry	14986	17.5
Reservoir	1174	1.4
Residential	6739	7.9
River	622	0.7
Services	894	1.0
Utilities	41	0.0
Waste treatment and disposal	52	0.1
Total Tertiary	33351	
Total Secondary	52476	
Total All Categories	85827	

8.1.2 Dominant Land Uses

8.1.2.1 Agricultural and Rural Residential

The 1999 QLUMP analysis has demonstrated that at the tertiary level, the peri-urban area is dominated by rural residential development (19.3%), conservation parks and dairy farming. At the secondary level, production forestry (17.5% of the CSA), residential (7.9%) and irrigated cropping (7.4%) dominate the area. Surrounding urban and metropolitan areas would be reliant on these peri-urban areas for agricultural production, outdoor recreational and open space in the form of recreation, conservation and national parks.

8.1.3 Infrastructure Requirements

Peri-urban land uses initiate infrastructure requirements in terms of effluent and waste disposal, and water supply.

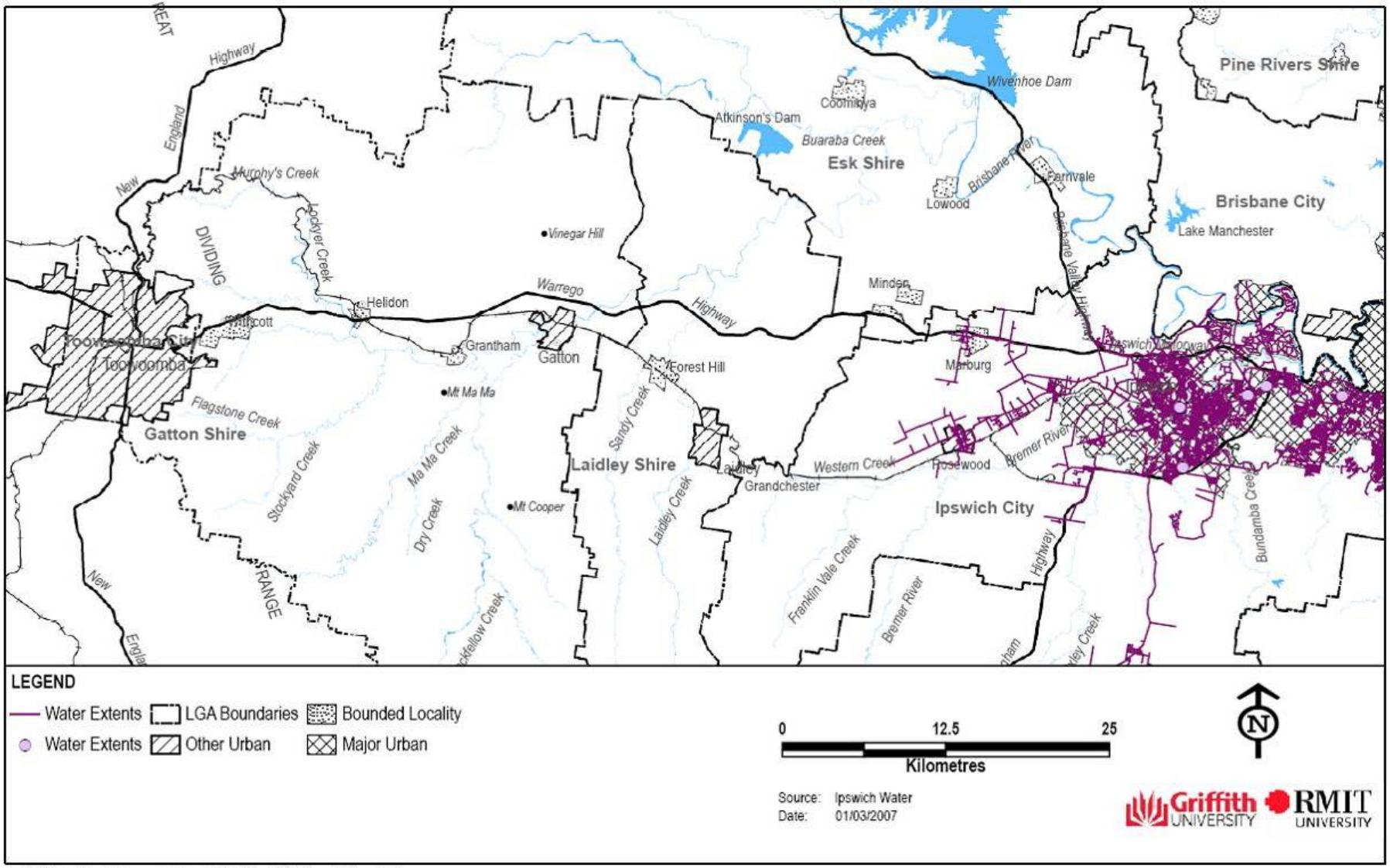
8.1.3.1 Effluent Disposal

As discussed in Chapter 7, use of septic systems within the CSA is significant, with the majority of effluent being disposed of by on-site effluent disposal systems or septic systems. It was shown that in 2003, 74% of Ipswich City, 24% of Esk Shire, 37% of Laidley Shire and 43% of Gatton Shire was sewered, with the remainder being disposed of on-site. It has been projected that Ipswich City, with an average non-sewered lot size of 4000m², will have 12,000 onsite effluent disposal systems by 2013 (an increase of 51%), while Gatton Shire, with an average non-sewered lot size of 3000m², is anticipated to reach 10,000 (an increase of 72%), (Beal et.al. 2004). These figures represent large increases to these LGAs and highlight potential problems with water quality if peri-urbanisation continues and appropriate measures are not put in place. The remaining LGAs are also projected to have increases in onsite effluent disposal systems by 2013, albeit to a lesser extent. Laidley Shire, with an average non-sewered lot size of 6000m², is expected to reach 5,124 onsite effluent disposal systems (an increase of 28%) and Esk Shire with an average non-sewered lot size of 4000m², is projected to reach 2,860 systems (an increase of 13%), (Beal et.al. 2004).

8.1.3.2 Water Supply

The provision of a reticulated water supply varies across the CSAs local authorities. The following presents a synopsis of the situation for each LGA:

Ipswich City: Reticulated water in Ipswich is mostly constrained to the urban areas, with additional supply being provided to the Rosewood and Marburg areas of the City.



Map H-3 illustrates the extent of the reticulated water system in Ipswich City.

Laidley Shire: Laidley Shire has 208km of water pipes located within the Shire. There has been no expansion of water reticulation across the Shire for 15 years.

Esk Shire: The original reticulated water scheme in Esk Shire (the Tarampa/Minden Scheme previously under the direction of the Tarampa Rural Water Board) took water from two bores on Lockyer Creek and supplied untreated water to about 113 connections. In 1994 these bores failed and the scheme of mainly small diameter (30 mm to 60 mm) pipelines was taken over by Esk Shire Council. The scheme was then fed by treated water from the Fairfield Road Reservoir and in 2003 the scheme was connected to a larger diameter steel pipe (600mm) in an attempt to improve pressure and flow. The scheme is now fed from the 3 ML Balance Reservoir at Tarampa above the Fairfield Road Reservoir. The current system (of 0.5 ML/day capacity) consists of:

- Treated water supply from the Esk Gatton Laidley (EGL) Water Board
- A 6.5 km long trunk main (375 mm diameter DICL) supplies water via gravity from the EGL pipeline at Tarampa to Minden Village
- The reticulation pipeline system (26.5 kms of mains) for the Tarampa /Minden scheme
- There are currently about 336 metered connections for the Tarampa /Minden scheme
- Further upgrade of the small diameter pipelines is being undertaken, as funds are made available.

Gatton Shire: Gatton Shire receives its water from Wivenhoe Dam sourced by the Esk/Gatton Water Board and treated at a treatment plant located at Lowood. The Council operates a system that supplies reticulated water to the towns of Gatton, Grantham, Helidon and Withcott. (Gatton Shire Council 2007)

In summary, most rural residential development in the CSA local government areas is not serviced by reticulated water systems or town water and therefore requires alternative sources of water such as rain water tanks and in some cases bores.

8.1.3.3 Groundwater and Bores

The Lockyer Valley is comprised of three alluvial groundwater management areas – the Central, Upper and Lower Lockyer (refer to Map H-4). Central Lockyer or Clarendon Subartesian Area (declared in 1988) is the only declared sub-artesian area in the valley (DNR&W 2005). The Lockyer Valley is recognised as a stressed groundwater system that is continually exceeding its estimated sustainable yield. Sandstone aquifers in the Valley are experiencing major stress as a result of large increases in extraction (DNR&W 2005). Further, the National Land and Water Audit conducted in 2000 by the Natural Heritage Trust estimated that the Upper and Central Lockyer reached their groundwater sustainable yield threshold in 1986, while the Lower Lockyer reached its sustainable yield threshold in 1994. Moreover, in 1996 the ABS listed the Lockyer Valley as the fifth most stressed groundwater system in the country following Burdekin, Namoi Valley, Bundaberg, and the Condamine Valley (ABS 1996 cited DNR&W 2005).

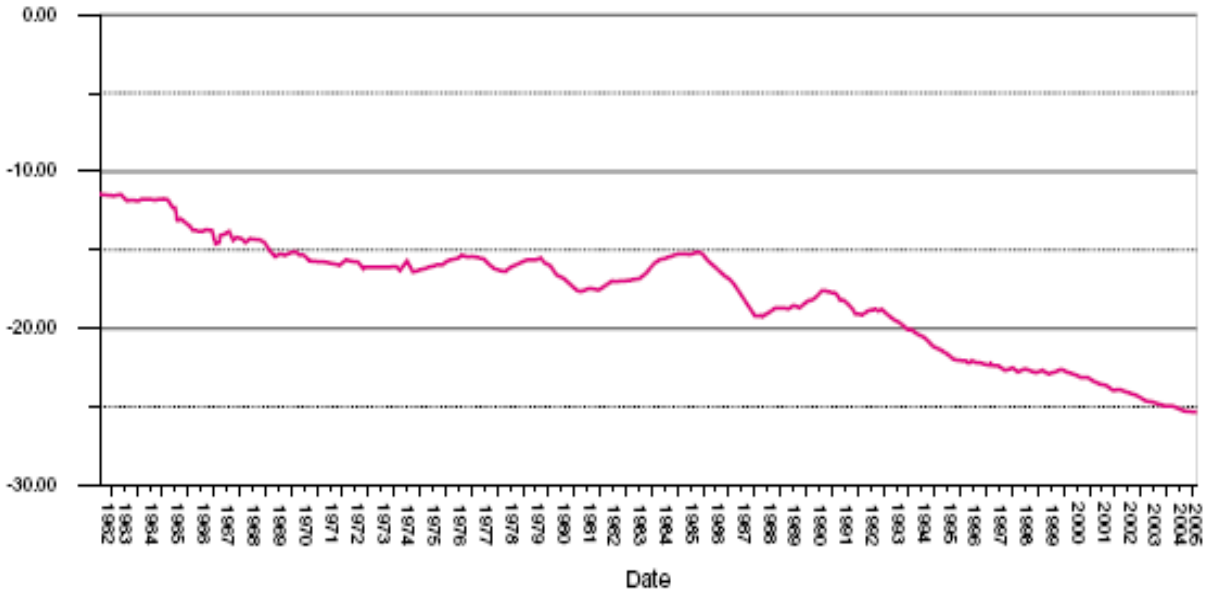
The use of bores to capture groundwater is prominent throughout the CSA (see previous discussion in Chapter 7). Map H-2 illustrates the location and status of bores throughout the CSA (DNR&W, 2006).

The importance of groundwater to agriculture in the Lockyer Valley is significant. Table 15 presents the 2005 situation for the three Lockyer Valley Alluvial Groundwater Areas. This situation is further illustrated by Figure 8 and Figure 9 which highlights the groundwater levels and conductivity profile at specific monitoring sites.

Table 15: 2005 Groundwater Situation in Lockyer Valley Alluvial Groundwater Areas

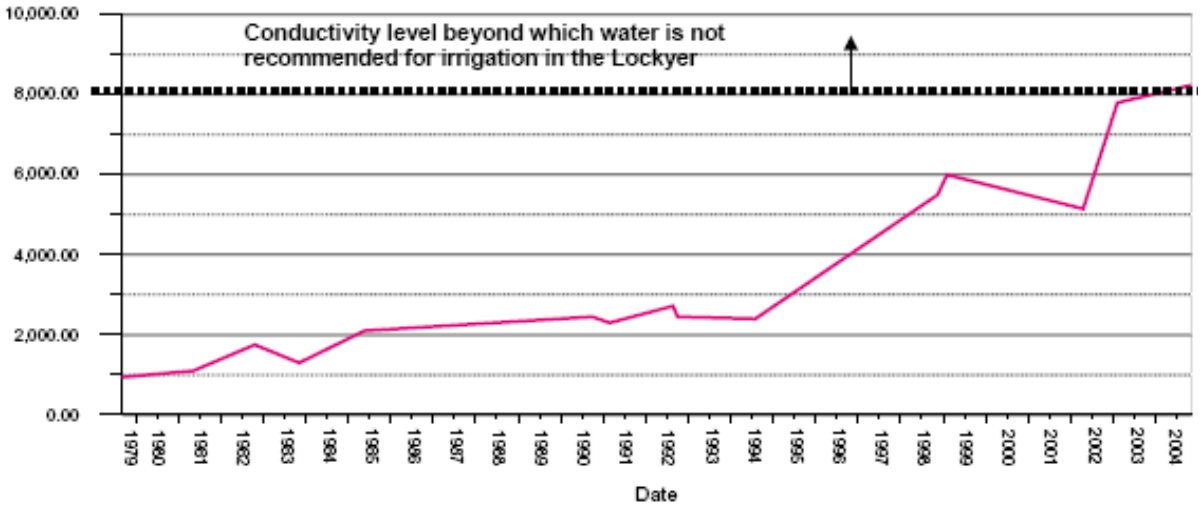
	Upper Lockyer	Central Lockyer	Lower Lockyer
Estimated Number of Irrigation Bores	800	560	150-200
Number of Observation Bores	110	240	69 (needs upgrading)
Current Estimated Groundwater Usage	15,000-20,000 ML/yr	15,000 ML/yr	5,000-10,000 ML/yr
Estimated Groundwater Yield	11,000 ML/yr	14,000 ML/yr	3,000 ML/yr

(Source: DNR&W 2005, p.11)



(Source: DRNW 2005: 18)

Figure 8: Declining Groundwater Levels: Poor Recharge Area (Lawes Siding, Central Lockyer)



(Source: DNRW 2005: 19)

Figure 9: Increasing Conductivity Profile (Bore North of Laidley)

As can be seen from Figure 8 and Figure 9, usage is exceeding yield in all alluvial groundwater areas, a situation that has the potential to cause significant problems for agriculture and for the long term management of the this area. The deteriorating groundwater situation is further illustrated by the above figures. Together, this information not only illustrates a system under stress but also highlights the unsustainable nature of the continued use of this dwindling resource.

See Chapter 7 for a discussion on the incidence of farm dams and related issues.

8.1.3.4 Solid Waste

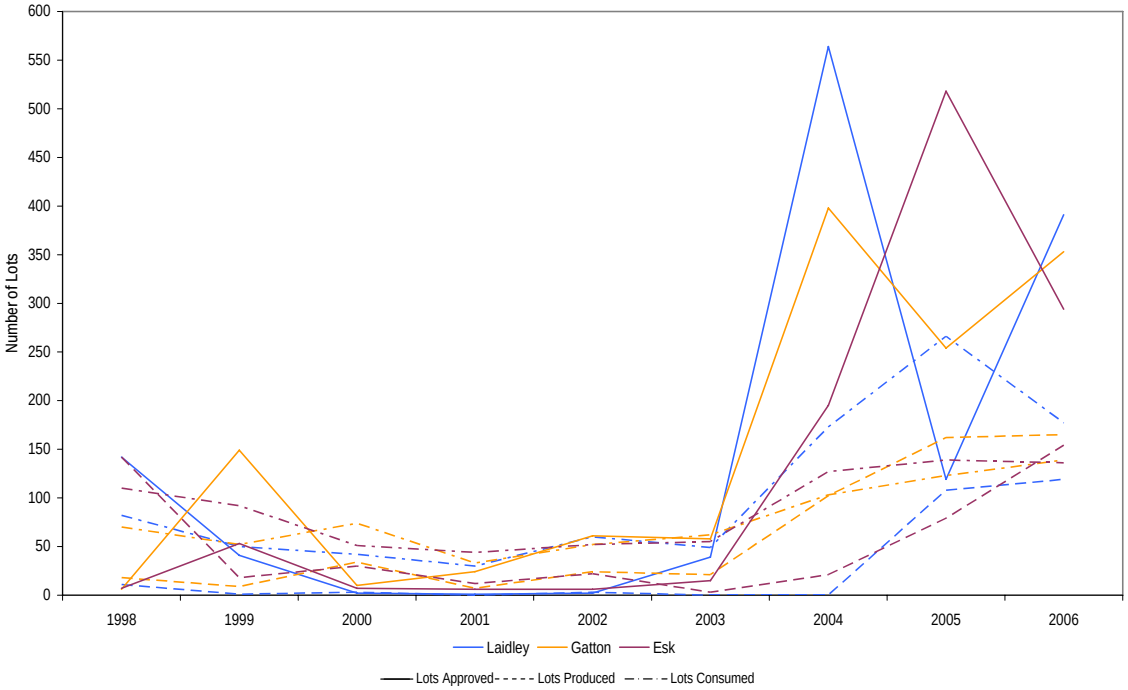
Waste services and facilities are provided by all local governments in the CSA. Gatton Shire has four transfer stations and one refuse tip, Esk has two transfer stations (and is currently preparing a waste management plan), Ipswich has three recycling and refuse centres operated by Ipswich Waste Services, while Laidley has one landfill site only for construction and demolition waste. Laidley Shire Council developed a major transfer station in 2004 and now transfers all putrescible waste to a private landfill facility near Ipswich.

8.2 Landscape Fragmentation

8.2.1 Land Subdivision (Lots Approved, Produced, Registered and Consumed)

Lot approvals varied over the period 1998 to 2006 for all LGAs within the CSA (Figure 10 and Figure 11). In 1998, approvals were low in Gatton and Esk Shires (6 and 7 new lots respectively) while they peaked in Laidley Shire and Ipswich City (142 and 497 lots respectively). An increase in approvals of 46 new lots was seen in Gatton Shire in the following year while Esk Shire also saw growth. This growth however was relatively short-lived until 2000 when the LGAs of Laidley, Gatton and Esk Shires dropped to very few approvals (2, 10 and 7 lots respectively). This low point was subsequently followed by a sharp increase in 2003 for both Laidley and Gatton Shires and was followed again the next year by Esk Shire. Since that time,

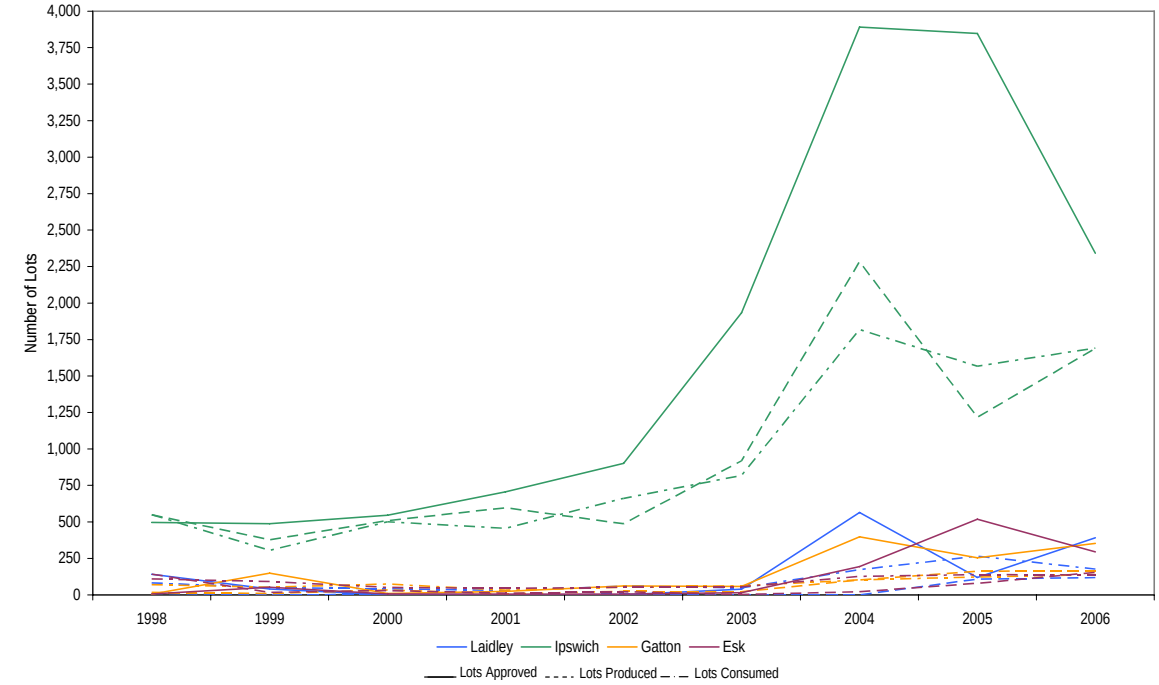
growth in approvals has remained relatively high for all LGAs with only a small dip in 2005. Ipswich City has remained the LGA with the greatest number of approvals with peaks in 2004 (with 3890 approvals in total) and a subsequent decline in 2006.



Source: PIFU (2007) Land Activity Statement for each Shire

Figure 10: Lots Approved, Produced, Registered and Consumed - Laidley, Gatton and Esk Shires

Generally lots produced, registered and consumed have followed a similar trend to the number of lots approved, although the overall rate of these was lower. This tendency indicates that people are gaining approvals for development, yet delaying development of their lot until the future.



Source: PIFU (2007) Land Activity Statement for each Shire

Figure 11: Lots Approved, Produced and Consumed - CSA LGAs:

It is interesting to note that the peaks seen in 2004 coincide with the release of the Draft SEQ Regional Plan. Associated with this plan were changes to development constraints within the region, including a 100 hectare minimum subdivision lot size for areas outside the SEQ Urban Footprints. This planning regulation may have prompted the speed up of lot development plans prior to the full implementation of the Plan in 2005. After this time, the number of lots approved, produced, registered and consumed dropped and this could also reflect the change in planning regulation within the region generally but in the peri-urban areas specifically.

8.2.2 Lot Sizes

The CSA has been highly fragmented through the continuous subdivision of its landscape, originally for agricultural purposes and recently as a consequence of peri-urbanisation. Consequently, lot sizes vary across the CSA. To undertake a detailed analysis of lot sizes in the CSA, specific ranges in area (hectares) were determined, along with a generic descriptor of each category as shown in Table 16.

Table 16: Distribution of Lot Size Range across CSA

Size Range	Description	Area (Hectares)	% of CSA
<1 hectare	Large Residential	12231.7	5.7
1-4 hectares	Hobby Farm (Small)	17258.1	8.0
4-8 hectares	Hobby Farm (Medium)	12767.9	5.9
8-16 hectares	Hobby Farm (Large)	24793.3	11.5
16-40 hectares	Small Farm (Agricultural Production)	70462.7	32.7
>40 hectares	Large Farm (Agricultural Production)	77561.4	36.0

The largest percentage of land within the CSA is comprised of lots greater than 40 hectares (36.0%), while the smallest percentage of lots sizes is comprised of those less than 1 hectare (5.7%).

This distribution of lot sizes demonstrates that there is still a large amount of land in the CSA that would be sufficient to sustain a range of agricultural production at both the smaller and larger scales. Map L-1 (Appendix L) illustrates the individual lots greater than 100 hectares. In view of the number of agricultural properties in the CSA, it is conceivable that some of these properties are made up of a number of separate titles of varying size.3 Presumably, the break up of these multi-titled properties through their future sale would lead to further landscape fragment that could result in further peri-urbanisation. This eventuality highlights a potential challenge in implementing the current SEQ Regional Plan's 100 hectare minimum subdivision lot size for areas outside the region's Urban Footprint.

The CSA contains a total of 135,082 hectares of freehold land. This equated to 84% of its total area which is equivalent to the proportion of freehold land in the SEQ region. Map L-2 locates the freehold land in the CSA at 2004.

8.2.3 Land and Property Values

8.2.3.1 Median Land Sale Values

The median land value from property sales has increased for all LGAs in the CSA over the period 1998 to 2006. Ipswich City has maintained the highest land sales prices over this time compared to the other three local authorities. This trend is understandable given Ipswich City's status, size and level of services compared to the adjacent rural shires. However, all LGAs are showing sustained growth in median land sales values varying in the vicinity of $80,000 for the three rural shires to $156,000 in Ipswich City in 2006. Laidley Shire has shown rapid and consistent

[3] Unfortunately Local Authorities in the CSA were unable to provide data on the number of individual lots in their respective areas.

growth during this period. This growth is expected to continue given the previous trends and sustained population growth in the CSA (see Chapter 9).

8.2.3.2 Median House Prices

Median house prices for the CSA LGAs have increased over the period 2001 to 2006 consistent with the general growth in the property market in SEQ. This growth has the potential to become an issue which may have an impact on the historical ability of this area to provide affordable housing as discussed in Chapter 9. Esk Shire has seen the greatest annual percentage increase over this time (23.1%) followed by Laidley Shire with 22.5%. Esk Shire had the greatest overall median price in the December Quarter with $300,000. Table 17 presents a detailed breakdown of median house prices for the CSA in terms of urban and rural residential properties.

Table 17: Median House Prices for CSA LGAs (2001 to 2006)

LGA	Number of Sales Dec Qtr 2006	% Change over Qtr (Sept-Dec)	Dec Qtr 2006	12 months to end of Dec 2006	12 months to end of Dec 2001	% Change Dec 2001 to Dec 2006
Ipswich	720	3.0%	$242,000	$240,000	$90,000	21.7
Laidley	22	2.2%	$187,000	$179,500	$65,000	22.5
Laidley (Acreage)	63	1.0%	$253,707	$250,000	$95,000	21.4
Esk	31	4.0%	$190,000	$187,000	$66,250	23.1
Esk (Acreage)	45	4.3%	$300,000	$280,000	$120,000	18.5
Gatton	41	6.6%	$210,000	$202,500	$87,000	18.4
Gatton (Acreage)	32	-3.0%	$290,000	$292,000	$137,750	16.2

Source: (REIQ 2007)

8.3 Agriculture

8.3.1 Importance of Agriculture in Peri-urban Case Study Area

A wide range of agricultural enterprises exist within the CSA and within the SEQ region. In fact, the CSA plays a significant role in the production of agriculture both on a local and regional scale. The total gross value of agricultural production in the CSA in 2001 was $277.4 million, accounting for 37.4% of production within the combined Brisbane (BSD) and Moreton Statistical Divisions (MSD); that is, the SEQ planning region less Toowoomba City. The 2001 figure comprised $188.9 million of crops (representing 47.2% of BSD and MSD), and a gross value of livestock disposals ($73.2 million) and livestock products ($15.4 million) which equated to 73.2% and 15.4% respectively of total BSD and MSD production value.

The following table presents the changes in the value of agricultural production in CSA by separate rural industry classes between 1996/97 and 2000/01.

Table 18: Change in the Value of Agricultural Production in CSA (1996/97 and 2000/01)

Industry	1996/1997	2000/2001	Percentage Change
Beef	44.4%	38.7%	-5.7%
Dairy	21.8%	41.0%	19.1%
Fruit	4.1%	3.0%	-1.1%
Grain	60.8%	73.4%	12.6%
Lifestyle Horticulture	14.0%	17.9%	3.9%
Other Crops	47.0%	61.2%	14.1%
Other Livestock	13.1%	12.0%	-1.0%
Pigs	62.6%	55.8%	-6.8%
Poultry	3.3%	4.6%	1.3%
Sheep	12.3%	1.9%	-10.4%
Vegetables	65.6%	64.3%	-1.3%
Total	25.1%	32.1%	7.0%

The importance of the CSA to the SEQ region should also be seen in the broader context of the important role that the SEQ region itself plays within the State. Indeed, SEQ is regional important for the production of fruit and vegetables at the state level. Agricultural enterprises within SEQ include poultry and eggs, fruit and vegetables, pigs, and lifestyle horticultural crops such as cut flowers, turf and nurseries.

The importance of SEQ in terms of agricultural production is significant in Queensland, with the value of production of poultry, mushrooms, strawberries and nurseries in particular accounting for a large proportion of the total state value of production (Robinson and Mangan 2006). The total value of SEQ agricultural production in 1996/97 was $758 million (Robinson and Mangan 2006). In 2001, the value increased to $883 million, representing 12.2% of the Queensland total (OESR 2006). The value of fruit and vegetable production in SEQ increased substantially between 1996/97 and 2001, however the production of fruit in the CSA experienced a decline over this period. Interestingly, the average annual rate of growth in fruit production over this period was 2.1% indicating a growing industry in terms of area under production amongst declining values.

Limitations associated with the collection and analysis of agricultural data are discussed in Chapter 8.

8.3.2 Existing Conditions and Trends in Peri-urban Australia

8.3.2.1 Increase in Intensification

The total area of agricultural land holding (hectares) has declined throughout the CSA as a proportion of SEQ for the period between 1991 and 2001. Over this time, the percentage (as a proportion of SEQ) decreased from 39.8% to 26.4%. Interestingly, the total area of holdings across the CSA saw an increase of 7.0% per

annum from 1991 to 1996, with a subsequent decline of 1.06% from 1996 to 2001. It is evident that agriculture in the CSA saw the majority of growth occur between 1991 and 1996, with a slowing of growth experienced since 1996, both in term of area of holdings and number of establishments. Trends indicates that the significance of the CSA in producing agricultural commodities as part of SEQ is weakening, however, the land under holding used for agriculture has not significantly decreased. During the ten year period (1991 to 2001), the CSA experienced an average annual growth rate of 3.0% in contrast to the 7.2% annual growth experienced by SEQ over the same period.

While growth in total area of land holding was experienced during the early to mid 1990s, the steady decline from 1996 forward is comparable to trends that indicate increased intensification of agriculture in peri-urban areas. In line with these observations, the number of agricultural establishments has been generally declining, again suggesting a move towards means of concentrating production. For instance, commodities such as lettuce and mushrooms are suited to intensive growing conditions, where a high volume of plants can be produced on minimal size allotments. In SEQ, mushroom production increased by 98%, yet the hectares under production remained relatively stable between 1996/97 and 2000/01.

8.3.2.2 Fruit and Vegetables

In the CSA, the number of establishments producing lettuce declined over the period 1991 to 2001. At the same time however, the area and production output increased especially between 1996 and 2001 (Figure 12).

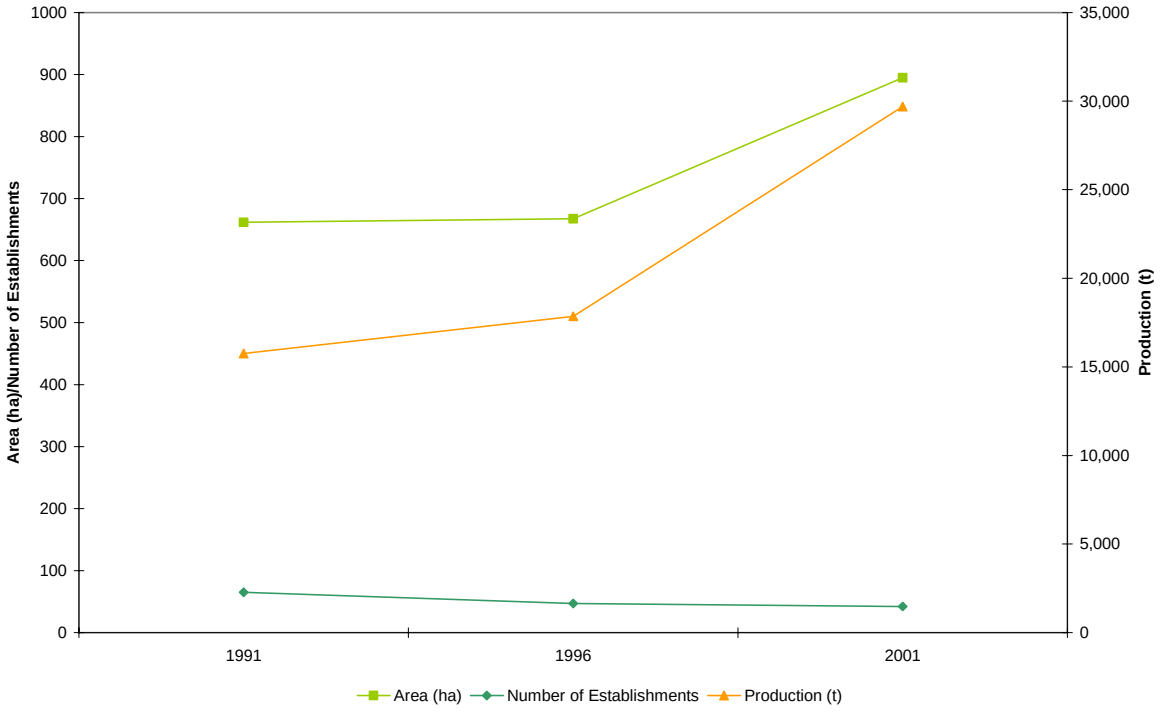


Figure 12: CSA Lettuce Production (1991 to 2001) by Area of Holdings, Production and Number of Establishments

The production of mushrooms in the CSA emerged in 1996 (only in Gatton Shire). This highly intensive activity increased 17.3% per annum between 1996 and 2001 in the CSA (2001 saw production in Ipswich in addition to Gatton). While the harvest more than doubled during this period from 41,000kg to 88,400kg, it still maintained approximately 2 establishments.

Fruit and vegetables overall have seen growth in both the CSA and the SEQ region. As mentioned previously, fruit production in SEQ has grown amid a decline in prices. This trend is mirrored in the CSA, where a decline of 1.1% (as a proportion of SEQ) in the value of fruit production occurred over the period 1996/7 to 2000/01. The area under production and the number of establishments have increased alongside the small decline of 1.1% in production values (see Figure 13).

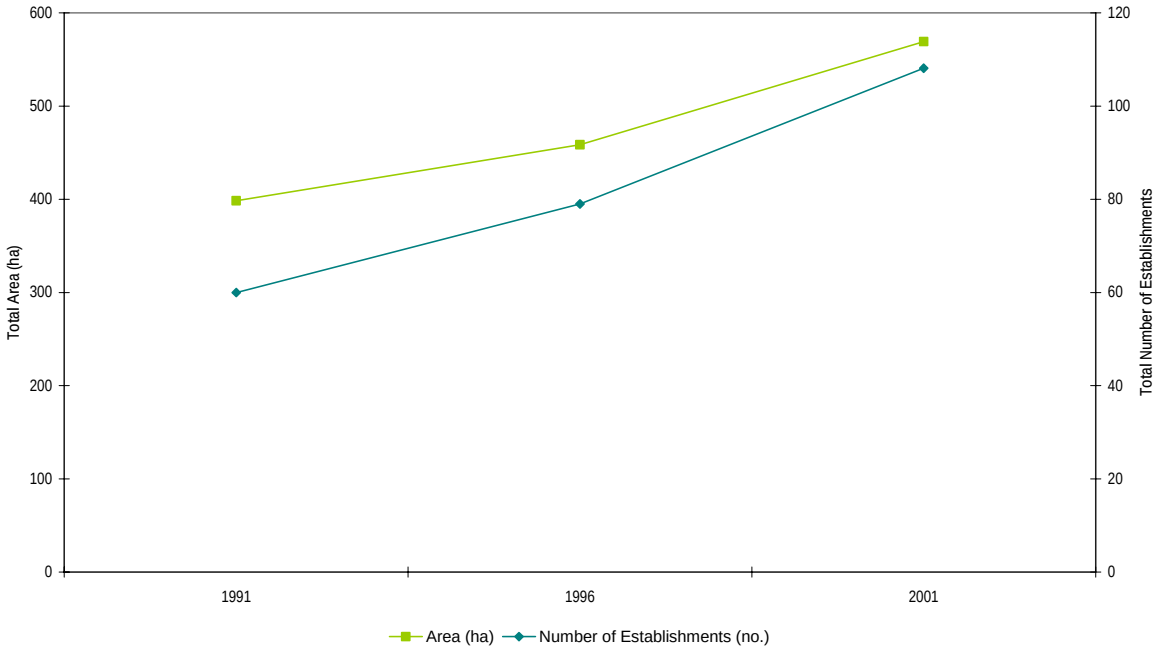


Figure 13: CSA Fruit Production (1991 to 2001) by Area of Holdings and Number of Establishments

8.3.2.3 Onions and Potatoes

Changing agricultural practices and intensification of production in the CSA is further evidenced by the decline of traditional crops such as onions and potatoes (Figure 14). This trend also coincides with the emergence of lifestyle horticulture. In 1991, the CSA accounted for 99.20% of onion (including white and brown varieties) crops in SEQ. By 1996 this figure had declined to 96.91%, reducing further still to 90.91% in 2001. Declines in onions were occurring in both the production and hectares under production. In addition, a trend that is also associated with declining harvests is a reduction in the number of establishments.

The percentage of SEQ as a proportion of Queensland declined also, with the total area decreasing in 1996 from 76.7% to 68.2% and further still from 74.6% to 13.2% in 2001 (ABS 1997). Other traditional crops such as potatoes have also suffered,

with declines in production (as a proportion of SEQ) from 75.60% in 1991 to 71.16% in 1996, then an increase to 75.89% in 2001. SEQ as a proportion of Queensland has also showed declines from 1996 to 2001 decreasing from 46.2% to 34.9% respectively (ABS 1997).

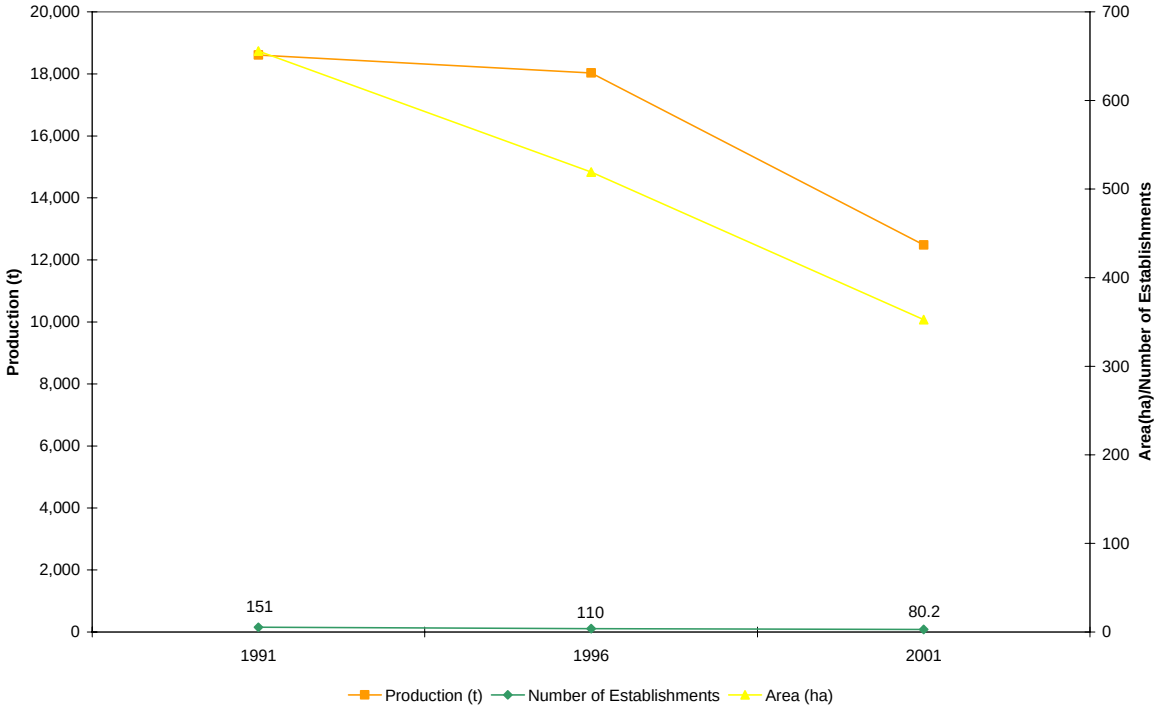


Figure 14: CSA Onion Production (1991 to 2001) by Area of Holdings, Production and Number of Establishments

8.3.2.4 Poultry

Further supporting the trend in intensification of agriculture in the CSA are the changes observed in poultry and poultry products. Broad animal husbandry appears to have been replaced in the CSA by more intensive forms of animal based production such as poultry and pigs. In addition, adaptation by peri-urban farmers occurring alongside changing consumer demands in terms of food products has seen a change to the commodities produced in the CSA. In 1996/97 egg laying chickens from SEQ accounted for 40.0% of the Queensland production. This figure had reduced to 13.6% in 2001 further indicating a decline in this type of poultry production in SEQ (ABS 1997).

Conversely, growth in production of meat chickens expanded, with the CSA gaining greater proportions of the SEQ market. In 1991, the CSA accounted for 1.7% of SEQ production, rising to 3.1% in 1996 and higher still to 4.8% in 2001. Associated with this growth was high average annual growth between 1991 and 1996 reaching 17.1% and in 1996 to 2001 equalling 13.0%. Chickens for meat production in SEQ accounted for 52.0% of the Queensland total in 1996/97 (ABS 1997) (no data was available for comparison at the state level in 2001).

Accompanying this rapid growth was the increase in establishments rising from 4 to 7.1 in the years 1991 to 2001. The price of poultry increased from 1996/97 to

2000/01 across SEQ, however the price of eggs did not (Robinson and Mangan 2006).

8.3.3 Changing Agricultural Practices as a Result of Urbanisation

8.3.3.1 Lifestyle Horticulture

The emergence of lifestyle horticulture, one of Queensland's fastest growing industries (DPI&F, 2007a), has seen the growth and increasing demand for commodities such as nurseries, cut flowers and turf in the CSA (refer to Figure 15 Figure 16 and Figure 17). As a percentage of SEQ, the CSA is increasing its production rates as indicated in Table 19.

Table 19: Lifestyle Horticulture in the CSA as a Proportion of SEQ

Commodity	**1991**		**1996**		**2001**	
	Proportion of SEQ	No. of Est.	Proportion of SEQ	No. of Est.	Proportion of SEQ	No. of Est.
Nurseries	-	-	6.6%	21	10%	19
Cut Flowers	-	-	13.3%	17	16%	17
Turf (cultivated)	33.3%	14	30.5%	27	31.3%	25
N.B. Data was unavailable for nurseries or cut flowers for 1991						

In the years 1996/1997 to 2000-2001, the value of lifestyle horticulture in the CSA as a proportion of SEQ increased by 3.9% to be valued at over $18.7 million. Interestingly, lifestyle horticulture ranked higher than both poultry and fruit production in 2001 and is expected to overtake dairy in the near future (Stockwell, Bullen and Loch, n.d).

In 2001, the economic value of lifestyle horticulture placed it as the fourth largest agricultural segment in SEQ, where it accounted for $105 million (Stockwell et. al n.d.). The value of turf farming across Queensland was estimated to be $100 million. The growth of turf farms in SEQ is particularly associated with the strong and steady population growth in the SEQ region. Growth of turf farms and nurseries in peri-urban areas within SEQ are associated with these growing areas due to their locational advantages close to the areas of demand (Stockwell et. al n.d.).

In the CSA, the number of establishments producing cultivated turf has increased from 1991 to 2001 by 5.88% per annum (Figure 17). Concurrently, the area used for production has declined by 1.76% per annum. In contrast the cut flower industry has seen an increase in hectares under production for 1996 to 2001, with an average annual rate of growth of 11.04%, yet a decline of 0.89% in the number of establishments. The same trend can be seen for nurseries, with the total area increasing by 8.72% per annum and the number of establishments declining by 2.29% per year between 1996 and 2001.

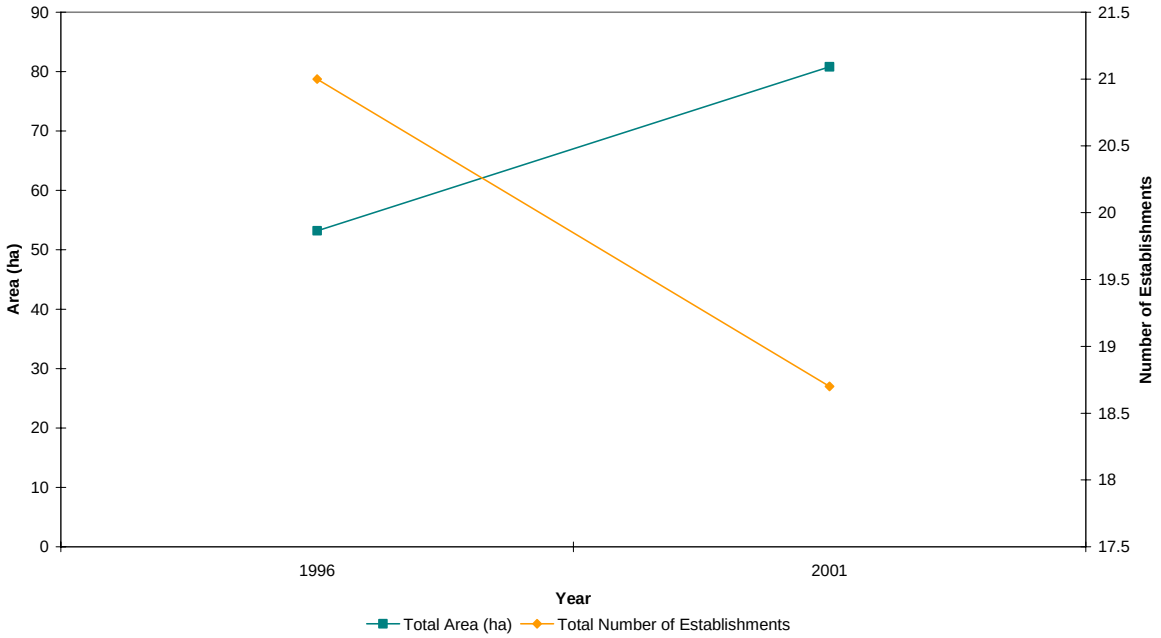


Figure 15: CSA Nurseries Production (1996 to 2001) by Area of Holdings, Production and Number of Establishments

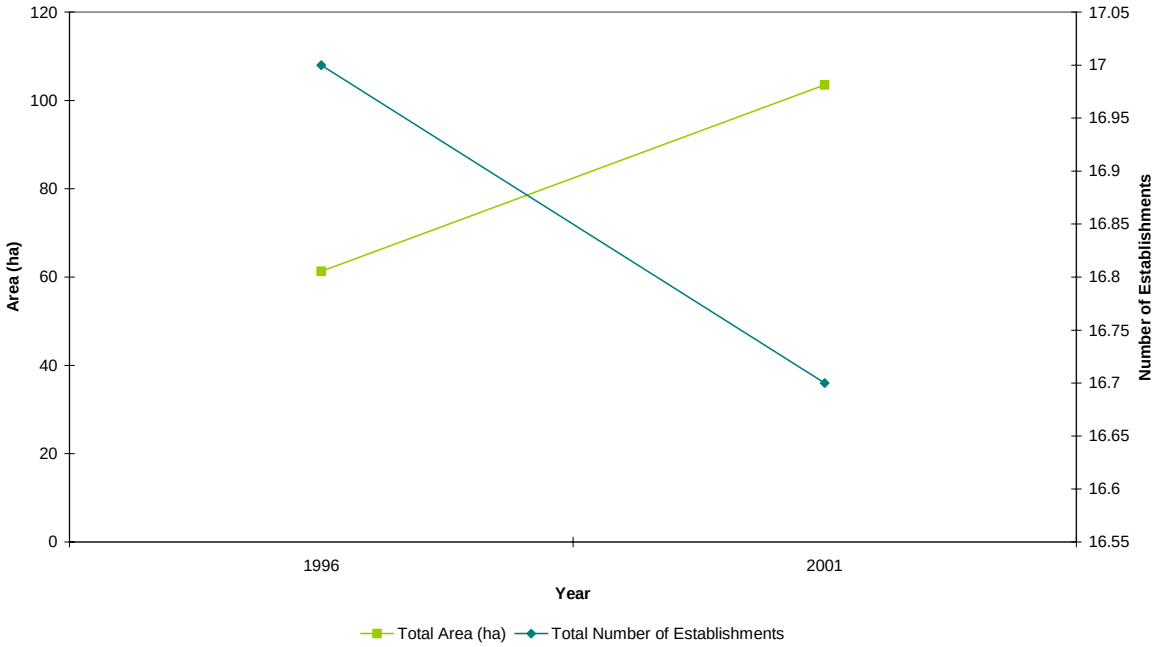


Figure 16: CSA Cut Flowers Production (1996 to 2001) by Area of Holdings, Production and Number of Establishments

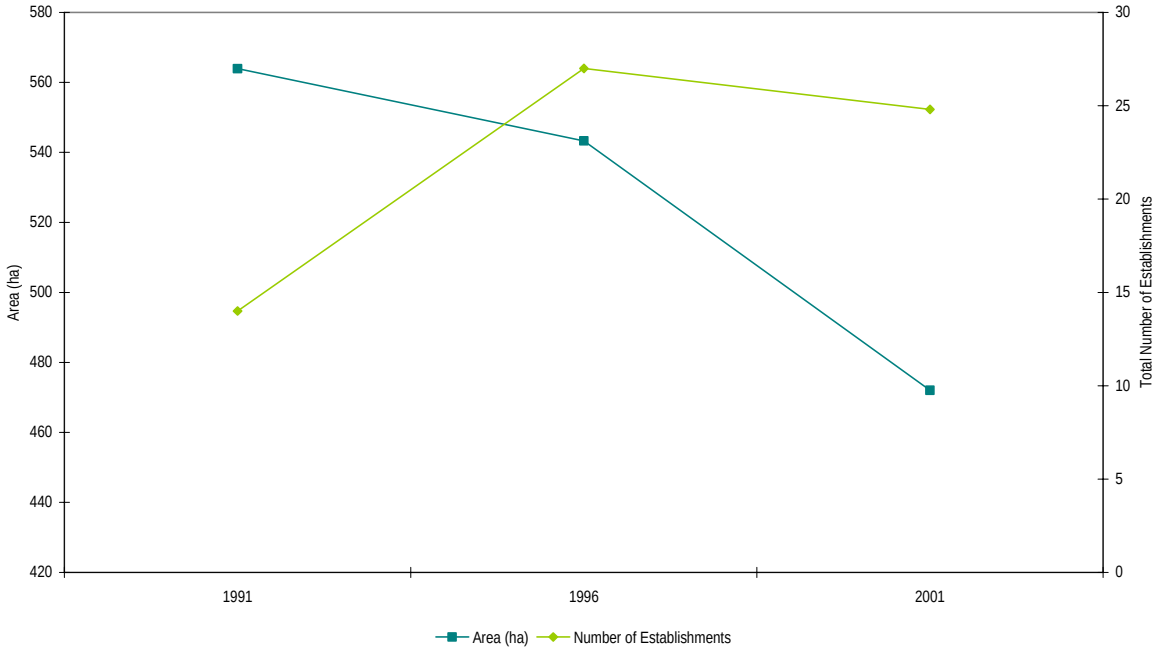


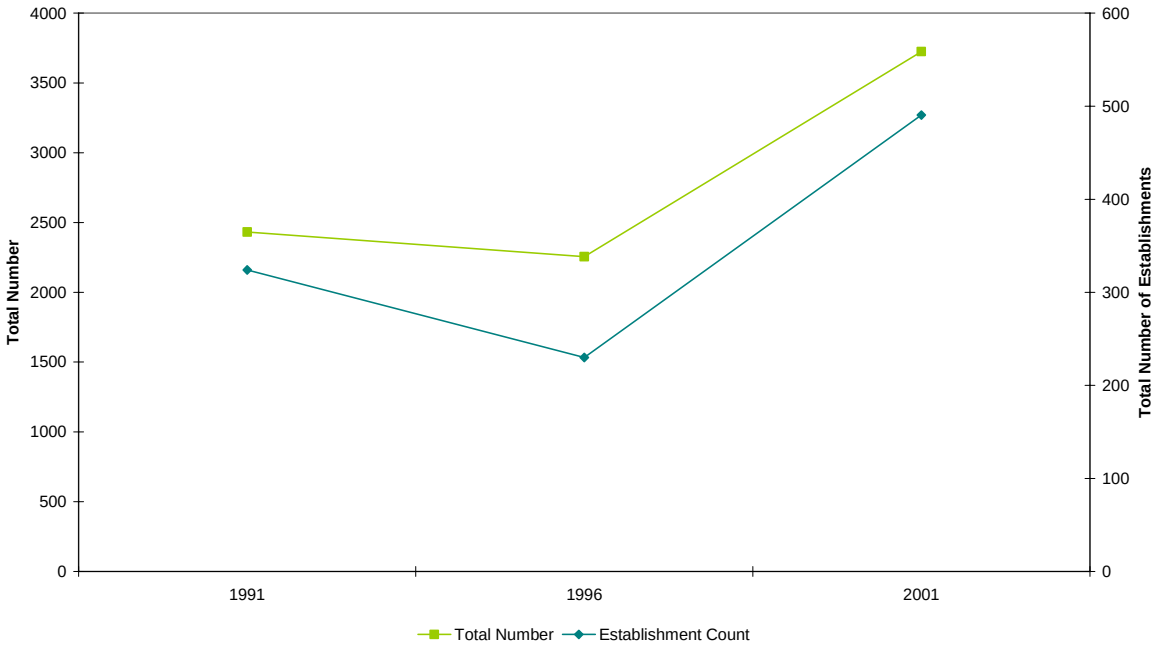
Figure 17: CSA Cultivated Turf Production (1991 to 2001) by Area of Holdings, Production and Number of Establishments

The SEQ region produced 67.4% of Queensland's production of cut flowers and 65.7% of cultivated turf in 1996/97. In addition, the proportion of cut flowers in SEQ compared to Queensland declined in 2001 to 63.3%, while an increase of 6.7% to 74.1% occurred in 2001.

When compared to Queensland, SEQ accounts for 60% of the value of production from nurseries (over $200 million) (Robinson and Mangan 2006) backed by strong demands from urban households. In 1996/97, the SEQ region accounted for 80.7% of the total area of Queensland producing nurseries. This figure declined to 62.7% in 2001. However, recently the lifestyle horticultural industry in SEQ has experienced a downturn in response to current water shortages.

8.3.3.2 Equine Industry

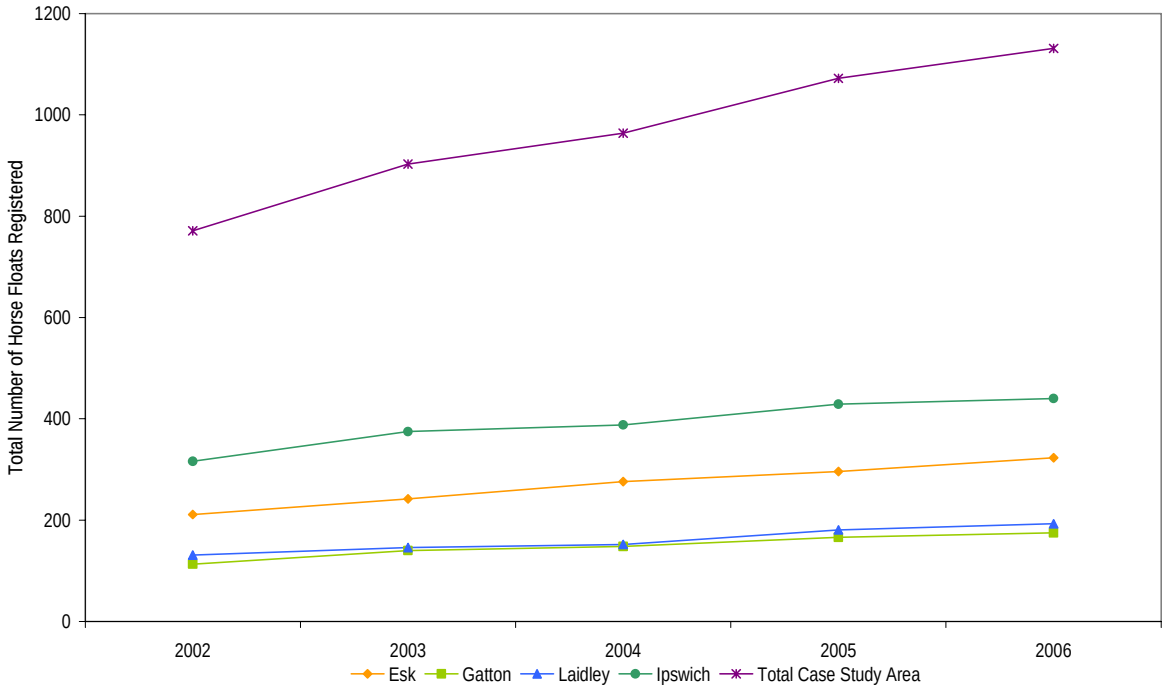
Another industry with similar patterns and rates of growth in the peri-urban CSA is the equine industry (Figure 18). While growth in the number of horses remained generally unchanged across the SEQ region between the years 1996/97 and 2000/01, the CSA experienced an average of 4.35% growth over the ten year 1991 to 2001. In terms of proportion of SEQ, the horse industry saw a 9.32% increase from 1991 to 2001, where the CSA accounted for 38.2% of SEQ horse numbers. While an increase in proportion was seen in 1996 followed by a decrease to 2001, growth rates are still on the increase in terms of SEQ, number of horses and number of establishments. No data was available for Queensland comparisons in 2001.



(N.B. 1996 Numbers account for Studs)

Figure 18: Horses in the Case Study Area (1991 to 2001)

Growth in the equine industry and in other activities involving horses is also supported by the increases observed in the registration of horse floats (Figure 19). Since 2002, registrations of horse floats (including horse float trailer pigs and semis) have been on the increase, with Ipswich City and Esk Shire having the greatest number of registrations. When combined, the four LGAs comprising the CSA reveal a steady growth in registrations from 2002 to 2006, with an average annual growth rate of 8%. Increasing horse float registrations within the CSA support the continuing trends displayed in Figure 18 and the likelihood of sustained growth in horse numbers.



Source: Queensland Transport Registration Database 2006/07

Figure 19: CSA Horse Float Registrations (2002 to 2006)

8.3.4 Summary

Agriculture has played a significant role in shaping the rural landscape especially in the SEQ region. Accompanying population growth in SEQ and particularly in the CSA have resulted in sustained and increasing pressures on existing agriculture to deal with and adapt to changes in land use within these areas.

The contribution of the CSA to the SEQ agricultural industries and the SEQ industries to Queensland has been and remains significant. However, the evidence suggests that this area is potentially under threat from population expansion and the movement of greater populations into peri-urban areas typified by the CSA. Resulting from this peri-urbanisation has come a degree of specialisation and changes in production techniques such as intensification and modification to the way and types of commodities are produced in the CSA.

On the other hand, a number of non traditional rural based industries have experienced strong growth that has been closely associated with the growth in urbanisation and peri-urbanisation. Of note are the lifestyle horticultural industry and the equine industry. These industries have dominated the peri-urban landscape taking advantage of the locational advantages that these areas provide to their growing urban markets.

9 Demographic & Socio-Economic Patterns

9.1 Population Growth

Dynamic changes in population growth have characterised the peri-urban CSA in the immediate past. The overall population growth for the CSA from 1981 to 2001 is outlined in Figure 20. It demonstrates that strong growth was experienced during the 1980s and early 1990s (Average Annual Rate of Growth (AARG) of 3.7% between 1981 to 1991) compared to the latter half of this period when AARG declined to 1.2%. Although the CSA has continued to grow, it is evident that the main wave of peri-urban immigration occurred nearly two decades ago (refer to Figure M-1 and Figure M-2 for an illustration of these trends).

Preliminary data from the 2006 census indicates that these growth trends have continued in the CSA and its four LGAs (ABS 2007). Consistent with the increased growth experienced by the SEQ region as a whole, and with previous trends noted in land subdivision and lot production in the CSA, it is highly probable that peri-urban growth in the CSA has not only continued but has actually experienced an exponential increase from the previous periods shown in Figure 20.

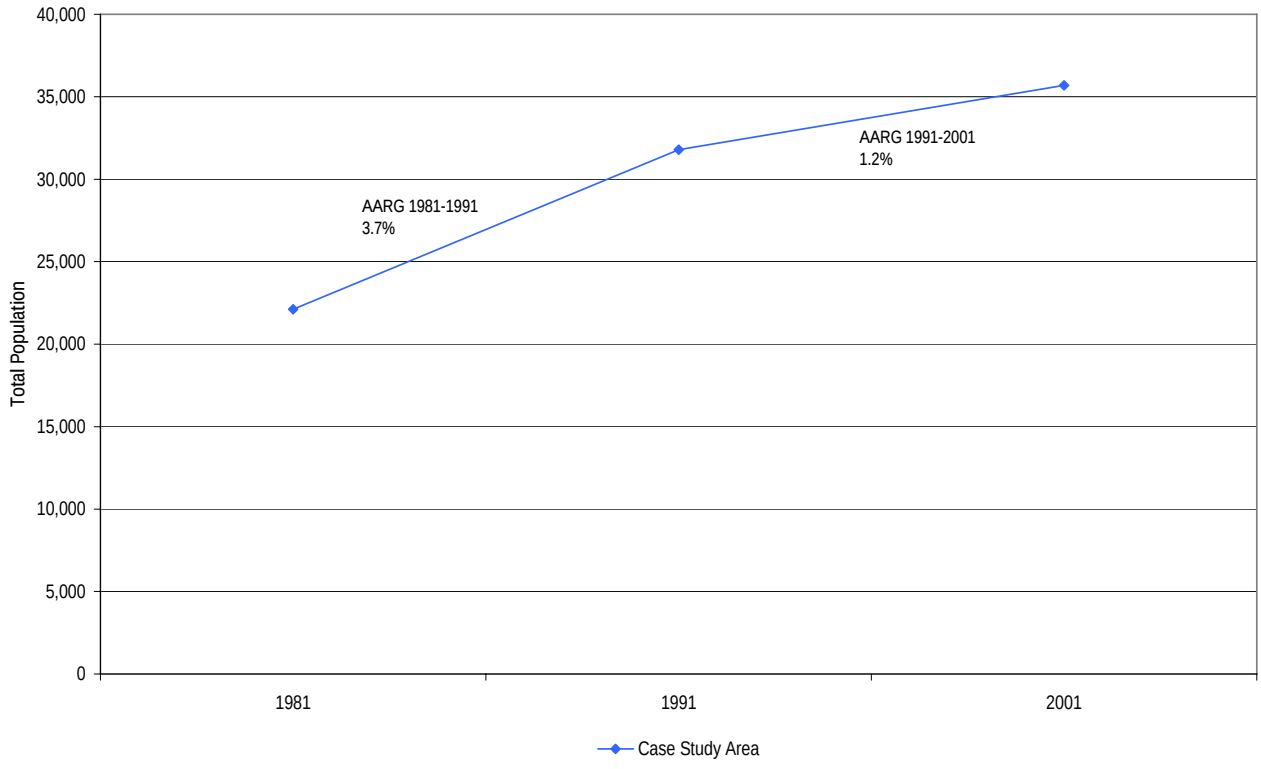


Figure 20: Total Population Growth CSA (1981-2001)

The following section is a more detailed examination of the nature of this growth in terms of the Towns and the Rural Balance that constitute the CSA. A comparison with the broader spatial areas associated with the CSA within the SEQ regional

context is also provided with references to the Brisbane Statistical Division (BSD) and Moreton Statistical Division (MSD). The CSA is contained within the MSD. This comparative examination of the AARG for the Towns and Rural Balance of the CSA along with the BSD and MSD has identified the following trends for the periods identified:

1981-1991

Towns: steady growth across all age cohorts to 13% in people aged 80-84 and negative growth in 55-59 age cohort

Rural Balance: considerable growth in age cohorts 35-50 along with 16% growth at 45-49 age cohort. This suggests high growth amongst middle-aged people throughout the CSA.

MSD: high growth among 35-39, 40-44 and 44-49 as well as 70+ age cohorts

BSD: AARG lower than Rural Balance and MSD with negative growth in 55-59 age cohort.

1996-2001

Towns/Rural Balance: declining AARG for younger cohorts 10-14 through to 25-29 contrasting with growth in middle age cohorts 40-44 and 55-59. There was a sharp decline at 60-64, followed by negative growth for the 65-69 age cohort. A growth spike (17%) at 85+ was experienced.

MSD: growth in all age cohorts, with peaks at 10-14, 50-54 and 85+

BSD: less growth (total) than all other areas examined. There was growth in 15-19 through to 30-34 age cohorts when Towns and Rural Balance experienced decline. This may indicate rural decline amongst a youth population which is also supported by the population pyramids and age/sex structure discussed in the next section. There were peaks in growth at 50-54 age cohort.

There was a noticeable general trend in population ageing especially evident in the Rural Balance and MSD.

9.1.1 Population and Mobility

Increased population mobility into an area has the potential to influence the connections that people develop with the landscape and subsequently their skill levels to manage and deal with the requirements of living in a peri-urban area.

In 1991, CSA Towns had the greatest percentage of people (45.9%) with the same address as 5 years ago. At the same time, the BSD and MSD had considerably low same address retention rates. Interestingly, a considerably high number of people in the BSD and MSD, who lived at a different address 5 years ago, originated from Victoria. In comparison, the most dominant origin for immigrant CSA residents at that time was Queensland. Refer to Table M-1 for details.

The 1996 census data revealed that Towns within the CSA had a greater retention of population (45.9%) compared to other areas. The highest percentage of different address 5 years ago was MSD (51.6%) and BSD (46.3%). Together with population mobility data shown in Table M-1, this demonstrates that approximately half of the

CSAs incoming population for that period was derived from within the SEQ region including through the outwards movement of the region's urban population.

Compared to 1996, data for 2001 highlights that a greater percentage of people within all areas including the CSA had maintained the same address as 5 years ago. Since 1991 an increasing percentage of people have maintained the same address, with the Rural Balance of the CSA experiencing the highest in 2001 (51.2%). Conversely, MSD had the highest rate of a difference address 5 years ago (48.9%).

In 2001, data on previous address 1 year ago was included. Analysis of this indicates that the majority of people across all areas had the same address as at 1 year prior, with the greatest percentage in the Rural Balance. MSD had the highest percentage of different address 1 year ago.

These figures indicate that people are becoming more transient over the long term, especially in the broader regions of the BSD and MSD. It appears that people in the CSA have stayed at the same address for longer over longer periods of time. This evidence supports the previous observation that the main wave of peri-urban immigration occurred nearly two decades ago and that there is now an apparent stabilising and maturing of that population. These longer periods of residence in the CSA provide opportunities for residents to become more involved in community building activities such as natural resource management.

Further evidence of population mobility relevant to the CSA comes from an inter- and intra-state study undertaken by The National Centre for Social Applications of GIS at The University of Adelaide. It used Australia Post's mail redirection database and was based on the data for the period March to May 2005 (Hugo et al, 2005).

During this period, a total of 1,120 people moved out of the CSA, while 1,457 people moved in, giving the CSA a net gain of 337 people. An additional 881 people moved within the CSA. This trend is consistent with the SEQ and State experience as both have experienced the largest net gains across the country.

Interestingly, at the state level, the largest inter-zone movement was from inner regional areas to metropolitan centres such as Brisbane, which is consistent with the longer term decline and movement from rural communities to urban centres. In addition, the second highest migration pattern occurred from urban areas like Brisbane to fringe areas such as the CSA. Generally, the trend sees a net outflow of population to areas outside but nearby to metropolitan areas – the peri-urban areas.

9.2 A Social Profile of the CSA

This section provides an overview of the characteristics of the CSA population and includes a breakdown in analysis by Towns and Rural Balance in addition to comparisons with the BSD and MSD4. Understanding the peri-urban population is imperative to understanding the ability of these people to manage their peri-urban landscape. This profile also aids in identifying differences and relationships between peri-urban areas.

[4] Throughout the text, this cross area comparative analysis between the CSA, its Towns, its Rural Balance, the MSD and the BSD, refers to these geographic units of analysis collectively as the 'areas'.

9.2.1 Age/Sex Structure of the Population

The population pyramids for the five Census years 1981, 1986, 1991, 1996 and 2001 illustrate the change in age/sex structure of the CSA's population for these periods (refer to Figure M-3 through Figure M-12 for details). The following section discusses the observations for the Towns and Rural Balance within the CSA and the BSD and MSD.

The population of the Rural Balance of the CSA in 1981 had a higher proportion of people (both males and females) aged less than 14 years compared to the Towns within the CSA. Conversely, the Towns has greater proportion of both males and females aged 50 years and above, while the CSA as a whole had a relatively small population of people (less than 1%) aged over 80 years. In comparison, the BSD and MSD had a large proportion of people aged over 60 years. In addition, there was a larger proportion of the population cohorts aged 5 to 9 and 30 to 34 within both the BSD and MSD.

The progression of age cohorts through the population pyramid is evidenced in 1986, where the Rural Balance had a greater proportion of the total population aged 0 to 19 years (i.e. the progression of children). This trend also occurred in the Towns, however, the proportion of total population is less. In addition, Towns have a greater proportion of the population aged over 55 years.

Movement of young people from the Rural Balance also occurred in 1986, with a decline in the population aged 20 to 29. This decline in young adults is not replicated in the BSD and MSD regions. The young age cohorts (especially 10 to 29 years of age) in these statistical divisions experienced a small increase, which perhaps indicates the destination of rural youth.

The trend of greater numbers of youth (aged between 0 and 19 years) in the Rural Balance continued in 1991. Conversely, the larger percentages of people ages over 60 years also continued in the Towns. Declines in population of younger aged cohorts (especially among 25 to 29 years) persist. This may indicate young people are continuing to move away from the CSA to other regions. It also appears that the CSA is experiencing a smaller rate of ageing of the population when compared to MSD and BSD.

The Rural Balance maintained greater proportions of youth compared to Towns within the CSA in 1996. Similarly to 1991, the trend of declining population (both male and female) of 25-29 year age cohort occurs again in 1996 population, indicating further young adult decline in the CSA. In contrast, there is a greater elderly population (aged 65-69 and over) in Towns. The trend of declining young adults in the CSA was not evidenced in the MSD and BSD regions in 1996. Interestingly, the trend appears to almost reverse, with BSD experiencing another spike in the population at age cohort 20-24 years.

Towns in 2001 showed a high proportion of people aged in the cohorts 0 to 19 and 35-59. The ongoing young adult decline in the CSA appears to be compounding with a dramatic decline in people aged between 20 to 34 years. The larger older (aged over 60 years) population in the Towns compared to the Rural Balance in also

continuing. BSD has a greater proportion of the population across all age cohorts to 49 years. MSD has a greater proportion of the population aged 55 and over.

Overall Trends

Overall trends in the CSA illustrate a declining population (aged 24-35 years) from Towns and Rural Balance and conversely a growing population of people aged over 60 years. The growth in the BSD and MSD population under 50 years may reflect the destination of the young adult population from the CSA, that is, CSA young adults are moving to the city. In addition, the Rural Balance appears to have a greater youth population when compared to the CSA Towns. There has been high and sustained population growth across the MSD and BSD.

9.2.2 Ethnicity

The proportion of the total population born in Australia has decreased from 89.20% in 1991 to 86.73% in 2001. This trend (illustrated in Figure M-13) reflects the increasing multi-cultural nature of Australia in general. The CSA has also reflected this trend.

The CSA has maintained similar immigration of ethnic groups over the period 1991 to 2001. Of those people that were born overseas, people from the UK and Ireland has remained the highest proportion although there has been a decline over the period from 41.55% to 30.91%. A similar situation exists with people from Western Europe which is the second highest ethnic group. However it has also seen a decline from 11.50% in 1991 to 7.33% in 2001. Whilst immigrants of European origin dominated in 1991, in 1996 there were declines over this period which accompanied increases from Southeast Asia, Northeast and Southern Asia sources (5.63%, 1.50% and 1.67% respectively). This trend continued to 2001, with increases also seen in the Middle East sources which grew from 1.41% in 1991 to 2.85% in 2001.

There has also been increasing percentages of 'Not Stated' amongst immigrants which may suggest growing levels of people who do not speak English proficiently or exhibit an unwillingness to divulge their place of origin.

9.2.3 Social Cohesion

In the absence of definitive research on this issue in the SEQ region and the CSA, the number and membership of community groups can be used as a surrogate indicator of social cohesion. The following number of community groups are active and registered in the local government areas containing the CSA:

- Laidley Shire has a total of 51 community groups;
- Gatton Shire has approximately 60 community groups servicing the Shire;
- Esk Shire has a total of 62 community groups; and
- Ipswich City has a total of 278 registered community groups.

A more definitive study should examine the membership numbers and retention of these community groups, especially for landcare and natural resource management related groups.

9.2.4 Changing Households and Family Structures

9.2.4.1 Average Household Size

The average household size across all 'areas' has been declining over the period 1991 to 2001 inline with national trends towards smaller families and increasing lone person households (see Table M-2). Over this time, the Rural Balance of the CSA has seen the highest decreases with the average household size falling to 2.6 persons. At the time of the 2001 census, MSD had the lowest average household size at 2.5 persons followed by BSD, CSA Towns and CSA Rural Balance. This trend has continued from 1991 to 2001.

9.2.4.2 Changing Family Structures

Households in all 'areas' show similar characteristics, suggesting broader trends in family structure across SEQ and Queensland (Table M- 3). In terms of household composition, there have been significant increases in single parents with children across all 'areas'. In 1991 for instance, 0.1% of the households in the CSA Towns and 9.1% of the Rural Balance were comprised of single parents with children. In 2001 these figures increased to 20.2% and 11.2% respectively.

Over the period 1991, 1996 and 2001, the Rural Balance has maintained the highest percentage of households made up of couples with children (54.7%, 65.1% and 61.0% respectively). During this same period the Towns within the CSA have shown a 20.1 % increase in single parent households. The percentage of couples without children has fluctuated between the years 1991 to 2001 and the 'areas', with CSA Towns having the highest percentage of 30.1% in 2001, which was 8 % higher than the Rural Balance and 8.8% greater than BSD. In 2001, CSA Towns also had the greatest percentage of Lone person households (14.3%) down 5.8% from 1991. Overall Lone person households have risen from lows experienced in 1996, which in turn dropped from highs in 1991.

Over the ten year period (1991 to 2001) the household formation of the CSA has altered, with increasing proportions of single parents with children in both the Towns and Rural Balance and declining proportions of couples with children in the Towns. Proportions of Lone person households declined from 1991 to 1996 yet showed small increases in 2001 while still only remaining a very small proportion of the household types in the CSA. This trend along with the high proportion of households with children suggests the area is more oriented towards traditional families.

9.2.4.3 Household Income

The CSA Towns are most comparable to the MSD in terms of household income, whilst the Rural Balance shows similarities with the BSD (refer to Table M- 4). These trends are interesting and may suggest linkages in income between each of these groups of 'areas'. The Towns within the CSA and MSD show similar trends for 1991. The three highest annual household income groups for these two 'areas' were $20,001-$30,000, $30,001- $40,000 and $12,001- $16,000. The majority of both 'areas' had a total annual income of $20-001-$30,000 with CSA Towns having 18.34% and the MSD 16.33% of households within this grouping. Similarly, the BSD

and the CSA Rural Balance had the greatest percentage of households earning an annual household income of between $20,001 and $30,000 also, with 15.06% and 16.96% respectively. The CSA Rural Balance and the BSD had greater rates of higher incomes compared to Towns and the MSD (with 9.87% and 11.20% of households in these 'areas' having an income of $40,001-$50,000 compared to 9.43% for CSA Towns and 8.97% of the MSD).

For the years 1996 and 2001, household income was measured on a weekly basis. All four 'areas' showed similar trends in weekly household income as they all ranged from $1-299 to $700-$999 per week. The Towns in the CSA illustrate the highest percentage of households earning of $300-$699 per week, followed by MSD with 35.69% in this category. The CSA Towns also showed the highest rate of household income of $1-299 with 24.79%, 4.79% greater than the next highest rate of the MSD. The BSD has the greatest percentage of households earning over $1,000 per week, while the CSA Towns have the least.

The 2001 census saw a significant shift in the weekly household income across all 'areas'. CSA Towns remained the least well-off with the majority of households (67.76%) earning less than $999 per week. The Towns also have the greatest percentage of households earning below $299 per week. The MSD has the highest percentage of households earning $2,000 or over with 31.14% compared to 7.72% for the BSD, 4.17% for the Rural Balance and 2.04% for Towns.

The household income of the CSA population generally suggests a maturing of the population, especially within the Rural Balance, while suggesting that people living in the CSA Towns are earning more. However, in comparison to the Rural Balance, the BSD and MSD they are still earning comparably less. The large percentage of households earning high incomes in the MSD may reflect the increasing wealth in the peri-urban areas surrounding the BSD.

9.2.4.4 Internet Usage

This assessment of internet usage is based on the 2001 Census data. Prior to this, no questions were asked on this topic and consequently, it is not possible to observe trends. Table M-5 presents the available data.

Total internet usage is highest in the BSD and the MSD (40.7% and 33.7%), with Towns and the Rural Balance of the CSA significantly lower (22.8% and 29.2%). Internet usage at home is comparable across all 'areas'. As a percentage of the total population, both the BSD and MSD have higher rates 20.6% and 19.9% respectively. Within the CSA, its Towns and Rural Balance have much lower rates (11.0% and 15.4% respectively).

Usage at work is considerably lower than at home with the BSD having the highest proportion (5.5%). Rural Balance is comparable to the MSD and the Towns have lowest at work usage (2.7%) with slightly more females than males using this facility.

Non-usage of the internet is greatest in Towns, with 72.3% of the CSA Towns not using the internet in 2001. Non-usage rates were also high for the other 'areas' with the Rural Balance having 64.3%, MSD 58.7% and BSD 54.8%.

Usage in Towns and the Rural Balance (both for total usage and non-usage) as a proportion of the BSD population is less than 1% in both cases. Similarly usage and non-usage in Towns and Rural Balance as a proportion of the MSD is also low although higher than the BSD in both cases. These statistics may suggest poor uptake of technology by the CSA population or a lack of provision of infrastructure to facilitate involvement by the population at that time.

9.2.5 Occupation and Industry of Employment

9.2.5.1 Occupation

In 1991, the largest occupational category in the CSA was Labourers and Related Workers (19.8%). Other major occupational categories included Tradespersons (14.49%) and Managers and Administrators (14.36%). These statistics suggest a working population that was highly involved in physical labour (see Table M-6). This was also supported by the types of industry of employment that predominant in the CSA.

In comparison, the BSD contained more urban oriented occupations as expected, comprising: Clerks (17.25%); Sales and Personal Service Workers (15.14%) and Tradespersons (13.15%). A similar situation was replicated in the MSD with Sales and Personal Service Workers the highest occupation (17.57%), followed by Tradespersons (13.15%) and Managers and Administrators (13.49%).

The number of Labourers in the CSA had declined by 1996 although still the largest occupational category (15.5%). Other dominant occupational categories in 1996 included: Tradespersons (15.13%) and Intermediate clerical and sales staff (14.11%).

The BSD and MSD showed similar occupational trends in 1996. Intermediate Clerical Sales and Service Workers predominated (18.02% and 15.91% respectively). The BSD also had high proportions of Professionals (17.67%) and Tradespersons (14.39%) that situation was reversed for the MSD with Tradespersons (14.39%) and Professionals (13.03%). By 2001, Labourers in the CSA had increased by 2.1% to comprise 17.61% of the CSAs labour force

9.2.5.2 Industries of Employment

Employment in Agriculture, Fishing and Forestry remained highest throughout the CSA, with labour intensive trades such manufacturing dominating employment (refer to Table M-7). In 1991 Wholesale and retail trade was the dominant industry type within the CSA (18.2% of the total CSAs workforce), followed by Community services (17.5%) and Manufacturing (13.9%). It is interesting to note that the CSA has a very high percentage of people employed in the Agriculture, Fishing and Forestry and Hunting industries with 13.3% of people employed in the CSA compared to 5.02% in the MSD.

In 1996, Manufacturing was the largest employment industry in the CSA with 13.56% of people employed. Retail trade saw 13.0% of people employed, while 12.1% of CSA employees were involved in Agriculture, Forestry, Fishing and Hunting.

Agriculture in the CSA remained the industry with the greatest percentage difference in employment rate with the CSA maintaining a higher rate in this industry by 11.1% difference with the BSD and 7.9% difference with the MSD. This may reflect the nature of the land use patterns throughout the CSA when compared to BSD and MSD regions.

The CSA had the highest percentage of employment in manufacturing (14.2%) in 2001, followed by Retail Trade (13.9%) and Agriculture, Fishing and Forestry (12.0%). These figures suggest continued reliance on manual and labour intensive employment in the CSA although a maturing of the population can be explained by the increase in retail trade throughout the CSA alongside similar growth in the MSD (17.3% in 2001).

9.2.5.3 Employment Type

Employment type in the CSA has varied over the 10 year period 1991 to 2001 (see Table M- 8). In 1991 the CSA had the highest proportion of full-time males employed (83.0%), the highest percentage of males employed (60%) and the highest percentage of total persons employed (71.0%) when compared to both the MSD and BSD.

In 1996, 67.8% of the CSA population were employed on a full-time basis, while 30.0% were working part-time. Full-time employment rates for the CSA were 4.8% higher than the MSD, while the MSD maintained part-time rates 4.7% higher than the CSA indicating that more people in the CSA were employed full-time than part-time when compared to the MSD.

Full-time employment types and proportions declined by 2001. The CSA however still maintained the highest proportion of full-time males employed at 76.6% of the total working population compared to the other 'areas'. Part-time employment in the CSA remained lower for both males (18.9%) and females (50%) when compared to the MSD (24.9% and 51.6% respectively). Overall the total percentage of persons working part-time has increased over 7% across all 'areas' since 1991. Conversely full-time employment rates have declined by approximately 6% over the same time.

9.2.5.4 Working from Home

Less than 5% of the CSAs workforce5 worked from home in 2001. This situation generally accords with the relatively low internet usage previously identified in section 9.2.4.4. There was a slight decrease over the 10 year period 1991 to 2001 (1.4%). Over this period, more males have worked from home than females. Table M-9 presents additional details on people working from home over the period 1991 to 2001.

[5] Workforce refers to the total working age population (people aged 15 to 65 years inclusive).

9.2.5.5 Unemployment

Overall, the Towns and Rural Balance of the CSA have lower unemployment rates than the MSD, while the BSD has the lowest overall rate (see Table M-10). In 2001 the Towns and Rural Balance within the CSA had unemployment rates of 8.6% and 8.4% respectively. Over the 10 year period 1991 to 2001, there was a steady overall decline in unemployment, greatest in the CSAs Rural Balance (4.5%) compared to the Towns (3.0%). However, these trends have fluctuated and both 'areas' have experienced an approximate 2% increase between 1996 and 2001. By comparison, in 2001, the MSD had a higher overall unemployment rate (9.9%), but this had declined some 4.7% since 1991. The BSD had a general decline of 2.8% to a 2001 unemployment rate of 7.8%.

Generally, with the exception of the Rural Balance, unemployment has been greater in the male proportion than the female proportion.

9.2.6 Journey to Work

The CSA and its surrounding areas (MSD, BSD and Toowoomba) are also linked through the exchange of labour capacity. This section examines these relationships in terms of the ABSs Journey to Work (JTW) analysis as illustrated by Appendix N.

The proportion of JTW trips originating and ending in the CSA (SLAs) are relatively high with Ipswich City having a containment6 rate of 53.3%, Gatton Shire with 58.3% and Laidley Shire with 38.5% (refer Map N-2). Table 20 shows the containment rate of the CSA through the percentage of JTW trips originating and ending in the CSA.

Table 20: JTW Trips within CSA (2001)

Origin of Trips Ending in CSA	Percentage
Esk	12.4%
Ipswich	30.2%
Laidley	8.7%
Gatton	20.6%
Toowoomba	7.5%
Brisbane – Inner City	1.5%

(Source: ABS 2001)

Self-containment of employment within the CSA SLAs is further evidenced by the relatively low percentage of trips from the western parts of the CSA travelling to the BSD – Ipswich excluded (refer to Map N-4, Map N-5 and Table 21).

[6] Trips originating and ending in the same geographic unit (ie SLA/LGA).

Table 21: JTW Trips to the BSD from CSA (2001)

Trips to BSD from CSA SLAs	Percentages
Esk	34.5%
Ipswich (South West)	64.8%
Ipswich (West)	62.8%
Laidley	26.4%
Gatton	35.0%

(Source: ABS 2001)

Similarly, the percentages of JTW trips originating and ending in the CSA also provide additional evidence of its self-containment. These figures suggest that a noticeable proportion of the CSAs working population are employed within the CSA. This propensity further emphasises the maturing of the CSA population by its ability to maintain employment separate from the surrounding urban areas of the BSD and MSD.

9.2.7 Social Disadvantage

Social disadvantage in the CSA has not increased in conjunction with the dynamic population changes occurring as discussed in section 9.1. Over the period 1996 to 2001, levels of disadvantage across SEQ and particularly the CSA have decreased, with marked improvements to income and the number of people with cars. Increases in disadvantage have been concentration in the poorly serviced areas, particularly the more rural areas within SEQ and the CSA. This situation has the potential to escalate as greater numbers of disadvantaged people are forced to move further from necessary facilities in order to afford housing.

The Socio-Economic Indexes for Areas (SEIFA) 1996 and 2001 analysis highlight this decrease in the levels of disadvantage at the SLA level. For the purposes of analysis, the SEIFA scores have been divided using quantiles. In this way the 10% quantile represents the most disadvantaged areas and 90% quantile represents the areas that are most advantaged. Refer to Map N- 6, Map N- 7, Map N-8 and Map N-9.

In 2001, the LGAs of Esk, Kilcoy, Boonah, Ipswich Central and parts of the Gold Coast ranked in the 50% quantile showing lower levels of disadvantage, when compared to 1996. Over the same time, Laidley Shire's population maintained a similar level of disadvantage remaining in the 25% quantile. This means that Laidley Shire continued to be more disadvantaged relative to the remainder of SEQ.

Examining the variables that make up the SEIFA tool helps to unpack the specific areas of disadvantage across the CSA. A series of maps on the categories used to compose SEIFA have been created for this study. An analysis of these maps shows the following trends:

- *Early School Leavers* (Map N-10 and Map N-11): The percentage of people leaving school early within the CSA has improved from 1996 to 2001.

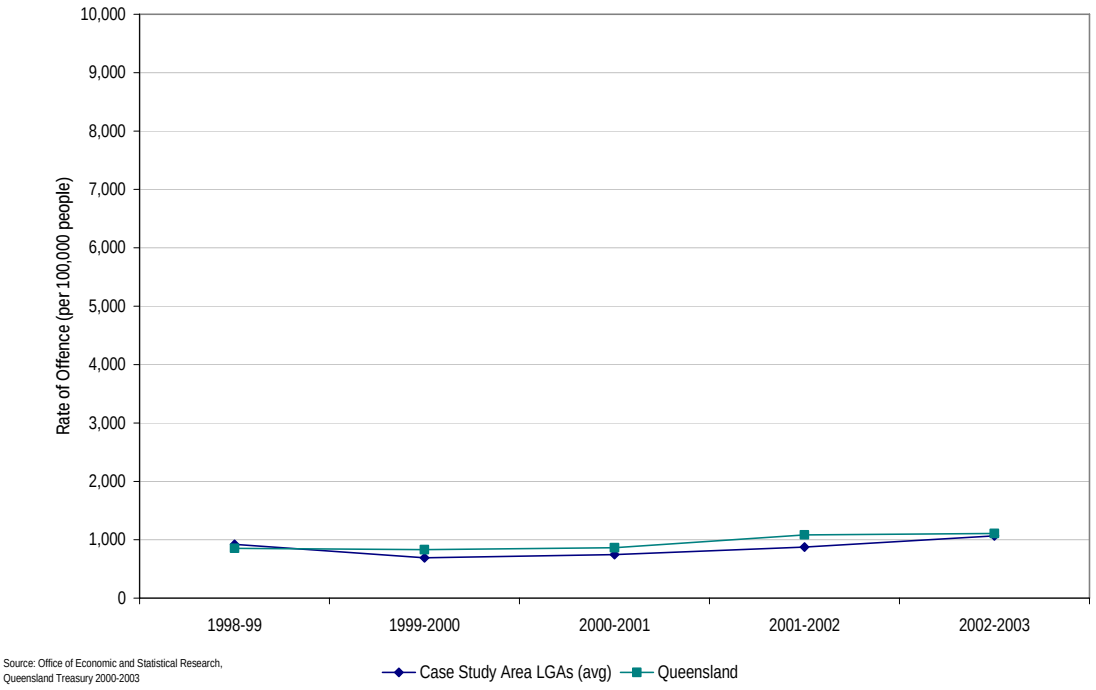
- *Indigenous Population* (Map N-12 and Map N-13): The CSA has varying percentages of Indigenous population especially in lower Laidley and upper Gatton Shires. Between 1996 and 2001 there was an increase in Indigenous population in the western areas of SEQ (South-West Ipswich) into Laidley and upper Gatton from 1 to 3.4% of the total population.
- *Low Income* (Map N-14 and Map N-15): The CSA had a significant proportion of the population classed as low income in 1996. From 1996 to 2001 however, there was a marked improvement in low income, particularly in the areas surrounding Gatton. There has also been a general improvement across all areas of SEQ, most notably the outer suburbs of Brisbane City and in Beaudesert Shire.
- *Public Housing* (Map N-16 and Map N-17): Consistent with the general SEQ situation, there is minimal public housing available across the CSA. Between 1996 and 2201, the amount of public housing has decreased in Gatton and Laidley Shires and generally there has been a decline in availability. A small proportion is available surrounding the Town of Laidley and to the south of Gatton township.
- *Households with No Car:* Most of the population within the CSA have access to a car, particularly in areas surrounding the Towns within the CSA. Households with no vehicle are most evident around Laidley Shire and Toowoomba City for both 1996 and 2001.

9.2.8 Crime Rates

Decreasing crime rates for the LGAs encompassing the CSA also are consistent with the decreasing levels of social disadvantage previously discussed.

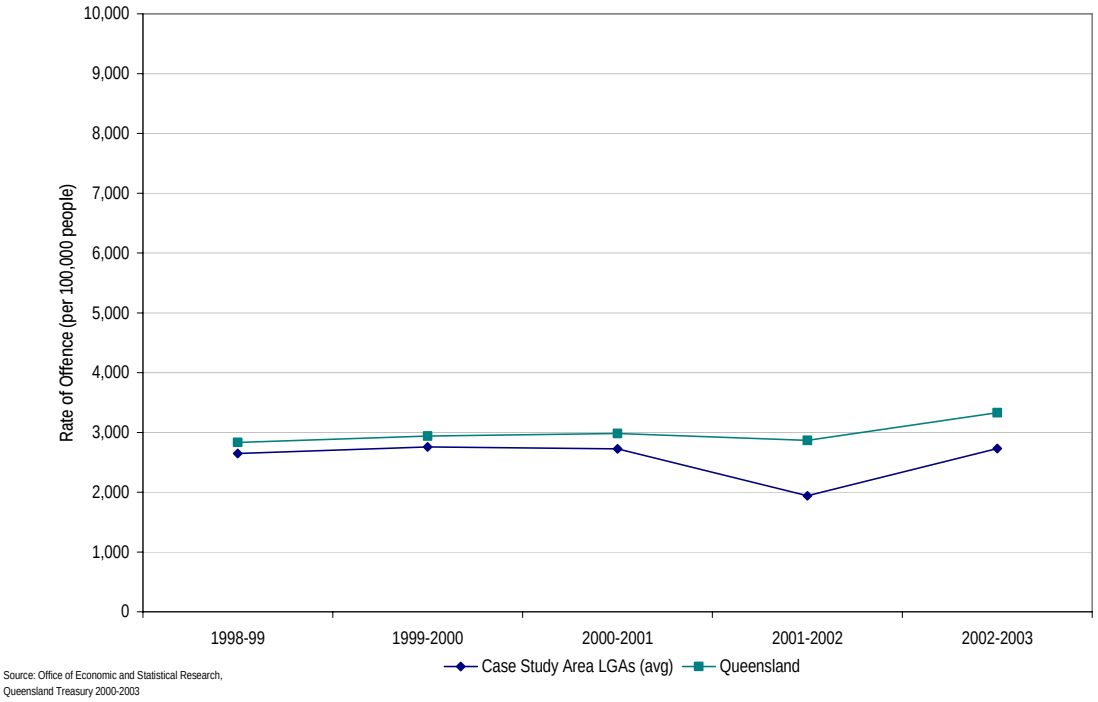
The total number of offences across the CSA has remained relatively steady for the period of records (1998/99 to 2002/03). 'Offences against property' are the highest across the CSA with rates stationary and ranging from 12,958 and 12,243 for the years in question. 'Offences against the person' have increased over the period from 1,922 to 2,154. Similarly 'Other offences' have increased from 4,836 to 5,228 in the CSA. Ipswich City has the highest number of offences from all categories for all years.

Rates of 'offence against the person' in the CSA (see Figure 21) have been comparable to those of the State over this period. Whilst rates of 'Other offences' (see Figure 22) over this time are also comparable with the state, the CSA saw a decline in rates in 2000/01 and again in 2001/02. There was a small increase in the rates of 'Other offences' and 'Offences against the person' but the average rate remains lower than that of the state. Conversely, property offences (see Figure 23) are the highest rates of all offences for both the CSA and Queensland. There were small declines in overall rates (Figure 24) over the time with the CSA rates hovering around 5,000 offences per 100,000 people and Queensland around 8,000 offences per 100,000 people.



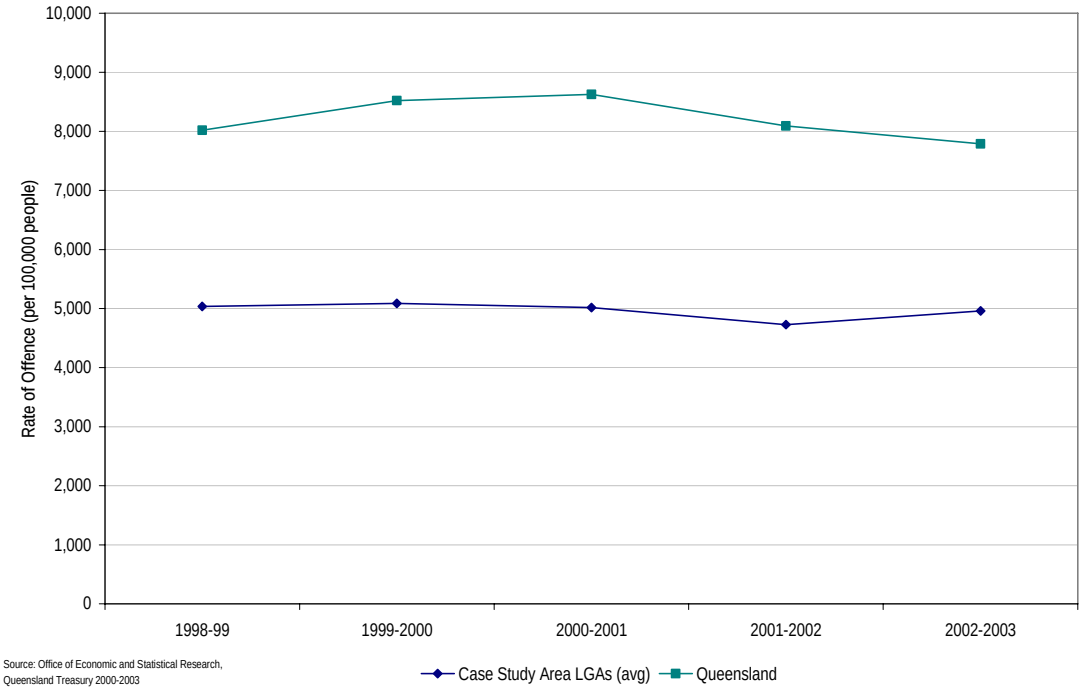
Source: Office of Economic and Statistical Research, Queensland Treasury 2000-2003

Figure 21: Rates of Offences Against the Person CSA LGAs 1998-2003



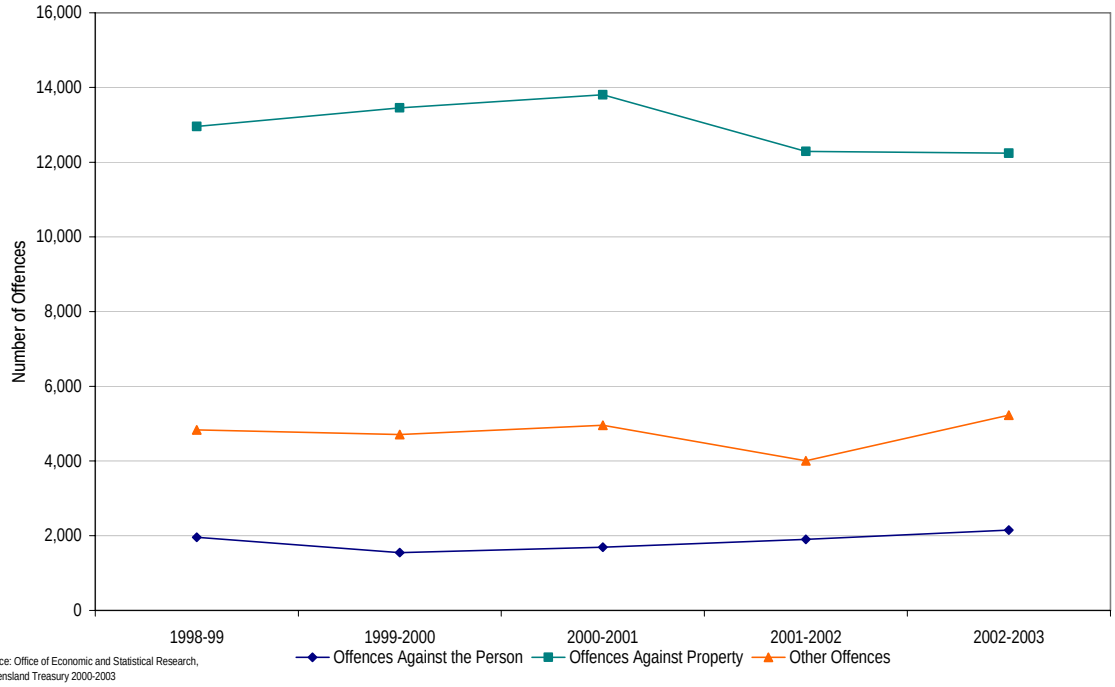
Source: Office of Economic and Statistical Research, Queensland Treasury 2000-2003

Figure 22: Rates of Other Offences CSA LGAs 1998-2003



Source: Office of Economic and Statistical Research, Queensland Treasury 2000-2003

Figure 23: Offences Against Property CSA LGAs 1998-2003



Source: Office of Economic and Statistical Research, Queensland Treasury 2000-2003

Figure 24: Total Offences by Offence Type 1998-2003 CSA LGAs

9.3 Housing

There is limited diversity in dwelling types throughout the CSA, with the majority being separate detached houses. A greater diversity exists within the surrounding urban areas of the MSD and BSD. In addition, some correlation may exist between larger lot sizes in the peri-urban area and associated percentages of separate detached houses. Refer to Chapter 8.2.2 for a discussion of lot sizes.

Over the period 1981 to 2001 there has been a relatively steady increase in overall numbers of separate houses in the CSA Towns, but little variation overall in the Rural Balance (refer to

Table N-1). Total dwellings in the CSA Towns have increased by 39.9%, while in the Rural Balance showed increases of 55.8% over this twenty year period. In Towns across the CSA, there has been a general trend in the decline of separate houses and increases in flats, units, apartments and townhouses.

Compared to the BSD, both the Towns and Rural Balance have a higher proportion of separate houses. However, between 1991 and 2001 there was a decrease in the separate housing stock of the CSAs Towns and Rural Balance (79.6% and 80.1% respectively) compared to the BSD (83.7%). In contrast, the BSD has seen greater proportions of Townhouses and Units, with both on the increase.

'Other dwellings'7 in the BSD in 2001 only accounted for 1.7% of total dwellings, compared to 3.6% and 3.2% for Towns and Rural Balance respectively. The 'other dwellings' category can provide an indication of people living in alternative dwellings such as caravans and improvised dwellings (including sheds). In many peri-urban areas it has become common practice for owner builders to use these types of dwellings as temporary residences whilst they construct their home.

However, over the twenty year period, the percentage of caravans has declined from 4.6% in 1991, to 1.4% in 1996 and to 1.2% in 2001. Similarly sheds have decreased from 0.6% in 1991, to 0.4% in 1996 and 0.2% in 2001. These declines are consistent with the notion that the peri-urban area is maturing.

Affordable housing is one potential reason why people seek residence within peri-urban areas. Over the 20 year period (1981 to 2001), there has been a large increase in the median mortgage housing repayment for separate houses (see Table N-2). Over this time, the median rose steadily from $200 in 1981 to $693 in 2001. Variations can be observed in repayments for townhouses and given the small study area size; there was not enough data to accurately comment on trends for other dwelling types.

Similarly, the median weekly rental price (see Table N-3) has increased from 1981 to 2001 for all dwelling types. Rental payments for separate houses in the CSA have increased by $97.50, while the weekly rental payment for a townhouse dwelling has increased by $110 to $120 in 2001. Flats, units and apartments have also seen rises in median weekly rental payments, with an increase of $75 over the 20 years.

[7] Defined by ABS to include an improvised home, tent and sleepers out, caravan, cabin or houseboat.

9.4 Social Infrastructure

The CSA is well serviced in terms of social infrastructure, particularly emergency services and educational facilities. The CSA has 3 public hospitals, however many residents rely on the larger regional urban areas for more specialised services.

9.4.1 Emergency Services

All of the emergency services stations are located within either town centres or villages within the CSA (refer to Map O-1). This may correspond to the density of the population being greater around these town centres; however it requires people living out of town to either travel further for services or wait longer period for the service to come to them in an emergency. This situation is reversed with the rural fire stations as they are located within the non urban areas of the CSA and serviced by part-time volunteers. The CSA is serviced by fire, police, ambulance and rural fire stations (refer to Table O-1).

9.4.2 Education

The CSA is well serviced by 24 primary schools (refer to Table O-2 for a complete list of state schools). There are a smaller number of secondary and senior secondary schools (3 in total) within the CSA (see Map O-2). However there are no special schools. This may force children with special needs to either attend distant special schools (Ipswich, Toowoomba or Brisbane) or to attend the regular primary school where services may not be suited to their needs. Details on independent and religious schools have not been included as this data was difficult to obtain.

9.4.3 Cultural

The migration of persons into the peri-urban area can be attributed to a number of factors, including cultural. As already identified, this population migration is changing the socio-economic, environmental, and land use profile of the CSA. The capacity to clearly determine the specific impacts that these changes are having on aspects of community life in the former rural communities is beyond the scope of this study. However, a number of trends can be inferred in relation to the identified population growth and its likely impacts on community unity.

It has been established that migration to the peri-urban area can be driven by reasons such as an increased disposable income or the search for affordable housing. In addition, the ambience a place presents and the perceived values and lifestyle the community offers can also be major contributing factors. For instance, the following attractors have been recognised which have influenced the ‘tree change’ movement (see Salamon 2003, Costello 2007):

- the perceived ‘scenic or Arcadian ambience’ the rural area;
- a belief that rural towns are superior places for child rearing for reasons such as safety and community influences; and
- perceived lifestyle gains such as reduced crime rates, peace and quiet, and a greater interaction with nature.

An indicator of the 'Arcadian' and scenic ambience of the peri-urban area could be the listings on the National and State Heritage/ Estate Registers (see Table 22). Within the CSA there are a total of 27 listings on the State Heritage Register, and 111 for the whole of the four LGAs containing the CSA. The National Heritage Database identifies a total of 96 listings for the four LGAs. The latter register not only lists properties which have historical and cultural significance but recognises environmental assets such as forest reserves, and furthermore, qualities such as the scenic rim of mountains, as features worth preserving. It could be assumed that these features foster the 'Arcadian' and scenic ambience which attracts new residents and visitors alike to the peri-urban region.

Table 22: National and State Registers

Listings on the National and State Estate Registers (Includes Environmental and Culturally significant Landmarks)			
Local Government Area	Listings in the State Heritage Register for whole of LGA	Listings in the State Heritage Register in the CSA	Listings in the National Heritage Database for Local Government Areas
Esk	17	0	18
Gatton	8	8	15
Laidley	8	8	11
Ipswich	78	11	52

(Source: EPA 2006)

In recent years there has been much debate regarding the suitability of urban areas for raising children. In the peri-urban CSA the percentage of population between the ages of 0 and 19, has been consistently high from 1981-2001. The data also confirms that generally there is a higher percentage of individuals between the ages of 0 and 19 in the rural section of the CSA, as opposed to towns. In addition, when comparing with the MSD and BSD, it is evident that the CSA represents a much higher percentage of individuals in this age cohort. It can be inferred from this data that there may be a common public belief that the peri-urban area, particularly the rural section, is a good place for child rearing. These findings bring support to the debate on whether cities are suitable places for societies most vulnerable cohort, children.

9.4.4 Emerging Conflicts between Existing and Incoming Residents

It can be assumed that the arrival of new persons into existing communities in the CSA has met with some degree of resistance from different stakeholders. Costello (2007: 86) recognises that community conflict often arises from 'divergent cultural values' in addition to issues associated with the change in population structure, economic circumstances and housing markets. These issues can often result in community divisions between incoming former urban dwellers and established community members. Sources of conflicts may include:

- the displacement of existing agricultural activities through land fragmentation and the settlement of former urban dwellers in rural areas;
- complaints from incoming residents against the normal activities of the rural industries (for example ploughing of fields, spraying of crops);
- complaints for farmers against incoming residents (for example uncontrolled domestic pets, trespassing);
- decreasing housing affordability displacing existing residents; and
- changing community identity and the suburbanisation of the rural landscape.

All CSA local authorities maintained a Complaints Register but their records were not in an easily retrievable state. Hence there is only anecdotal evidence available to suggest that these complaints, especially from the urban immigrant group, did exist and have increased as the CSA became increasingly urbanised.

Costello (2007: 88) recognised that the former urban residents often are opposed to further development in peri-urban towns, as they want to maintain the Arcadian ambience of their new home area. This often results in conflict with the established residents who seek to capitalise on the opportunities presented by the growth in population and visitors to the area.

Short term visitors to the peri-urban area may also emerge as a source of conflict. Whilst established residents and business owners may appreciate the capital they bring to the community, the more recent urban immigrants may resent their intrusion into the idyllic rural lifestyle from activities such as trail bike riding which are banned from the urban environment (Costello 2007: 88).

As previously reflected, the nature of this research has meant that it is difficult to determine the impact the urbanisation of rural landscapes is having on aspects of community life and its long term sustainability. The ways in which rural communities can be positively sustained whilst experiencing additional urban growth, is identified by Salamon (2003) as an area requiring further research. If the rural landscape becomes homogenous and the cultural values that attracted persons to the area are lost, the overall sense of place will be compromised.

9.4.5 Indigenous Cultural Significance

Indigenous attachment to land and the environment operates at a physical, emotional and spiritual level. As previously reported, the Indigenous population varies across the CSA with concentrations in Lower Laidley and upper Gatton Shires. Between 1996 and 2001 there was an increase in Indigenous population in the western areas of SEQ - ie (south-west) Ipswich City into Laidley Shire and upper Gatton Shire from 1 to 3.4 percent of the total population.

A number of Native Title applications exist over the four local government areas (see Table 23). Some of these applications cross the local government boundaries so the total number of applications affecting the area is seven. Thus far, Native Title has not yet been registered in the CSA however a number of the applications are still active. The Register of the National Estate identifies two indigenous places of significance in the LGAs

Overall there appears to be a lack of any review on indigenous areas requiring protection across the CSA. The current growth patterns and increasing fragmentation of the landscape may be placing such areas at risk.

Table 23: Native Title Applications

Number of Native Title Applications over Local Government Areas	
LGA	*Number*
Esk	3
Gatton	4
Laidley	2
Ipswich	4

(Source: EPA 2006)

9.4.6 Scenic Amenity

Natural scenery such as beaches, forests, waterways and farmland can make an important contribution to a region's quality of life (OUM 2007). These natural assets constitute the regional landscape whose values include outdoor recreation, rural production, nature conservation, high scenic amenity, extractive resources, landscape heritage, landscape corridors, water sources and catchments, coastal waters and foreshores and regional infrastructure (Queensland Government & SEQROC, 2005). The SEQ scenic amenity studies undertaken in 2003 demonstrated that 68% of people surveyed (including residents and visitors) considered that scenic values were important and that highly preferred areas of scenic quality should be protected.

Generally, scenic amenity in the CSA was highest in the more vegetated areas (particularly along the ridge lines in the lower Laidley and Gatton Shires and to some extent around Vinegar Hill. Conversely, scenic amenity was lowest in sections adjacent to the Warrego Highway. The areas of highest scenic amenity correlate with areas of highest biodiversity suggesting even greater protection and management should be sought for these areas. Least preferred areas correlated with higher density urban areas, while streams in the Lockyer Valley were rated as least and moderately preferred.

Specific interim scenic amenity values for each LGA of the CSA determined from the Scenic Amenity Maps are presented in Table 24.

Table 24: Scenic Amenity Values of the CSA

Local Government Area	Scenic Amenity Values (Derived from Analysis of Scenic Amenity Maps)
Esk	• Majority of land is locally important in areas outside urban centres. Areas seen less frequently were rated as medium to low value. • Small pockets of regionally high value occurred in the southern sectors of the Shire.
Gatton	• Locally important values surrounding the unurbanised sections of the Warrego Highway • Regionally high values dotted across the Shire with the majority of the Shire being valued as medium to low
Ipswich	• Medium to low value around urban centre • Central Ipswich valued as locally important • Regionally high valued areas are located to the north and west of Rosewood and in the lower south east area of Ipswich City
Laidley	• Regionally high valued areas to the north of the Laidley township towards southern sections of the Shire • Medium to low value in the centre of the Shire • Locally valued areas in the north and around the centre of the Shire.

(Source: OUM 2007)

9.5 Summary

For the period under investigation, the CSA experienced its first wave of peri-urbanisation in the early 1980s and the continued strong population growth has maintained the peri-urbanisation process. Evidence is emerging that recently, this continued peri-urban growth in the CSA has actually experienced an exponential increase from previous periods.

Nearly thirty years of continuous peri-urbanisation has led to some major changes to the demography of the CSA. Principal amongst these changes is the noticeable outflow of young adults that have moved from CSA Towns and Rural Balance to the larger urban and metropolitan centres. There has also been a corresponding increase in elderly in the CSA (ie people aged over 60 years). Whilst past in-migration was dominated by immigrants from Western European sources, recent trends have shown a gradual decline in these sources being replaced by increasing numbers from Asian and Middle Eastern sources.

However, there is strong evidence to suggest that the CSA population is stabilising and that this peri-urban area is maturing as evidenced by:

- a decline in the number of people moving residence and a corresponding increase in residents residing at the same address, especially in the CSAs Rural Balance area. (Although there is anecdotal evidence that suggests that there is still a relatively high turnover amongst a smaller group of peri-urban residents);
- whilst the CSA continues to include a high proportion of manual and labour intensive employment, it also has experienced increases in employment areas such as manufacturing and the retail trade;
- JTW trips originating and ending in the CSA demonstrate that a noticeable proportion of the CSAs working population are employed within its local area. This lessening of the reliance on commuting to nearby metropolitan and regional

centres provides evidence of its growing self-containment and additional evidence of a maturing community with a growing employment base;

- the CSA has demonstrated declining levels of social disadvantage over a twenty year period. This has been characterised by indicators such as marked improvements to income, greater car ownership, and declining crime rates; and
- Improvements in housing and dwelling stock. Over the last twenty year period the CSA has witnessed a decline in the occupation of improvised and temporary dwellings.

The CSAs demographic patterns and the socio-economic aspects provide a strong case to suggest that the peri-urban landscape of the CSA is maturing from its original peri-urban form that characterised the early 1980s. However, as noted, this peri-urban process continues, and the management of this dynamic landscape will depend heavily on the institutional arrangements delivering timely, appropriate, and integrated planning and management responses.

10 Institutional Arrangements

10.1 Introduction

Governance and associated institutional arrangements across the SEQ region, including the peri-urban case study area (CSA), are highly fragmented. As a microcosm of the SEQ region, the CSA reflects a wide range of institutions that exercise various forms of managerial control over the environmental and natural resource assets and human activities within its area. These institutions exist at three levels of governance, namely local and state, and to a lesser degree, national. In relatively recent times, regional scale approaches have come to the fore for a number of planning and management related initiatives. Due to the absence of any formal governance and institutional arrangement at the regional scale, these initiatives were completed as collaborative arrangements (horizontal and vertical) between and within the different levels of government and the non government sector.

10.2 Structure and Nature of Management Agencies in the Case Study Area

In the CSA there is overlap in the three scales of governance and management, (state, regional and local). The state level includes the 24 government agencies and departments that operate throughout Queensland. At the regional level, overriding management includes agencies such as the Office of Urban Management, SEQ Catchments (previously NRMSEQ and SEQ Western Catchments), and Healthy Waterways (an initiative of the Moreton Bay Waterways and Catchments Partnership). Local government provides management at the local scale. Informal management involving initiatives such as property management plans and voluntary industry codes of practice are also utilised at a local/site specific scale.

10.2.1 State Government

A total of 23 departments and agencies form the bureaucratic structure of Queensland's state government. The principal agencies of note for this study are highlighted below. They include:

- **Department of Child Safety**
- **Department of Communities**
- **Department of Education, Training and the Arts**
- **Department of Emergency Services**
- **Department of Employment and Industrial Relations**
- **Department of Housing**
- **Disability Services Queensland**
- **Environmental Protection Agency**
- **Department of Infrastructure and Planning**
- **Department of Justice and Attorney-General**
- **Department of Mines and Energy**
- **Department of Natural Resources and Water**
- **Department of Primary Industries and Fisheries**
- **Department of Public Works**
- **Department of Tourism, Regional Development and Industry**
- **Queensland Health**
- **Queensland Police Service**
- **Queensland Transport**
- **Queensland Treasury**
- **Queensland Corrective Services**
- **Department of Local Government, Planning, Sport and Recreation**
- **Department of Main Roads**
- **Department of the Premier and Cabinet**

Table Q-1 presents details on the individual state government departments, their functions in terms of management and the acts they administer.

Throughout the state, departmental organisation and functions are regionalised. Unfortunately this regionalisation is not coordinated and each Agency has any number of variable regional groupings and functions in any one geographical area - the CSA is a case in point. This decentralisation of governance through regionalisation is discussed below.

10.2.2 Decentralisation of State Government Management

The decentralisation of state government departments has resulted in an increasing delegation of management responsibilities to their regional for local and regional issues. This has resulted in the delegation of day-to-day management to a number of regional offices located throughout the state. The changing focus towards regionalisation has seen each department create its own number of discrete districts or regions throughout the state. The CSA is an example where duplication of state planning and administration regions occurs. Table 25 illustrates the scale of duplication of regions in the CSA.[8]

Table 25: Management Duplication Across the CSA

State Department	Case Study Area (CSA) Details
Emergency Services (including Ambulance Service)	CSA divided by 2 regions including South Eastern and South Western Regions
Police	CSA within the Southern Region
State Development	CSA within Western SEQ Region (Ipswich Region)
Queensland Transport	CSA divided by 2 regions including SEQ Region and Southern Queensland (west from Toowoomba)
Queensland Health	SEQ Health Service Area - Southern Region West Moreton and South Burnett District and Toowoomba/Darling Downs District
Natural Resources and Water	South East
Local Government, Planning, Sport and Recreation	Southern Region
Communities	Moreton Region
Environmental Protection Agency	EPA - Moreton District and Southern Region QPWS – South East District, Southern Region
Main Roads	CSA divided by 2 regional offices located in Toowoomba and Spring Hill
Education and Training	South West

[8] A table was considered the most appropriate form for representing this information given difficulties in portraying the overlap in management boundaries spatially

The overlap in management responsibilities occurring at the state level between individual state agencies has created a complex situation which is confusing and difficult to coordinate. It has also resulted in a case where many different management tools are being applied to the one area. This creates a situation of double-handling, and in some cases, areas are being 'over-managed'.

10.2.3 Regional Management

Impetus for regional scale management has occurred as a consequence of the introduction of regional scale institutions such as the Office of Urban Management (OUM), SEQ Catchments (the region's NRM body) and the Moreton Bay Waterways and Catchments Partnership. These institutional arrangements have led to the development of the SEQ Regional Plan, a number of regional NRM plans for SEQ and a Healthy Waterways Strategy. These initiatives have provided an increased focus on regional scale issues and their management.

10.2.3.1 OUM and the SEQ Regional Plan

The SEQ Regional Plan evolved out of a desire to coordinate at the regional level the rapid urban growth and development that was occurring in the region. The State Government also sought to provide a strategy for the management of regional physical, natural and environmental assets. This statutory regional planning process is designed to provide guidance and direction to other State planning activities, to lower levels of planning involving Local Government and to the private sector. The process is overseen by the recently established Office of Urban Management (OUM).

10.2.3.2 SEQ Catchments

SEQ Catchments is the regional NRM body for South East Queensland. It is a relatively recent creation resulting from the amalgamation of the former Natural Resource Management SEQ Inc. (NRMSEQ) and SEQ Western Catchments Group Inc. (SEQWCG).

SEQ Catchments, one of 15 Regional Bodies established in Queensland to deliver integrated natural resource management (NRM), provides a focused, coordinated and integrated approach to managing and preserving the region's natural resources in close collaboration with local governments, environmental groups, landowners and Traditional Owners (SEQ Catchments 2007).

10.2.3.3 Moreton Bay Waterways and Catchments Partnership & its Healthy Waterways Program

Healthy Waterways is a program that forms part of the whole-of-government, whole of community approach to the management of water quality in SEQ that is overseen by the Moreton Bay Waterways and Catchments Partnership (MBWCP). The Partnership evolved from the South East Queensland Regional Water Quality Management Strategy project (1995 to 2001) and the Brisbane River Management Group (1991 to 2001).

The Partnership aids in the planning and management of the catchments and waterways of SEQ from the border of New South Wales, west to the Great Dividing Range and north to Noosa. Volunteers play a large role in the Healthy Waterways program which relies on commitments from various stakeholders in the regions catchments.

10.2.4 Regional Initiatives

A range of regional planning and management initiatives have been completed for the SEQ region. All of them have been largely developed in isolation of each other and within the narrow confines of their responsible/sponsor agency. Selections of regional initiatives for the SEQ region that impinge on the CSA and consequently have implications for its future management include:

- Integrated Regional Transport Plan
- Economic Development Strategy
- Rural Futures SEQ2021
- Regional Water Quality Management Strategy
- Integrated Natural Resource Management Strategy
- Regional Water Supply Strategy
- Nature Conservation Strategy
- Regional Coastal Management Plan
- Outdoor Recreation Demand Study
- Rural Water Strategy
- Nature Conservation (Koala) Conservation Plan
- Healthy Land-Our Future
- Water for SEQ

With the advent of the SEQ Regional Plan 2005-2026 as a statutory document and as the designated superior plan for the region, the imperative has arisen regarding the integration of all of these separate regional initiatives with the next version of the regional plan to be produced by 2010.

Interestingly, whilst all of these separate regional planning and management initiatives embrace the CSA in a generic spatial context, none specifically address the peri-urban issues directly. Most in fact have an undue emphasis on the urban areas, on growth management and on urban management challenges.

10.2.5 Local Management

Management at the local level is undertaken by Local Governments. The four Local Governments operating in the CSA include Ipswich City and Laidley, Esk and Gatton Shires. These Local Authorities, along with some fourteen others, constitute the Council of Mayors (CoM) and are included in the regional scale collective for local government in the SEQ region. Currently the State Government is undertaking a

review of local government throughout the state with the intention of amalgamating non viable and smaller local authorities.[9]

The statutory planning responsibilities of each Local Authority extend to include:

- a mandatory Corporate Plan – required under the Local Government Act 1993 as amended;
- a Local Growth Management Strategy (LGMS) – required under the SEQ Regional Plan 2005-2026; and
- a town planning scheme – required under the Integrated Planning Act 1997 as amended.

10.2.6 Informal Management Arrangements

Informal land management arrangements also exist within the CSA. Such arrangements are guided by voluntary Industry Codes of Practice and Operators Environmental Guides prepared for industry by government and industry representatives. Whilst not a mandatory requirement, codes of practice provide an overarching selection of principles to guide farming practices towards sustainable outcomes. Three examples include the Queensland Dairy Farming Environmental Code of Practice, the Operators Environmental Guide for Environmentally Relevant Activity 4 and the Environmental Code of Practice for Agriculture.

10.2.6.1 Queensland Dairy Farming Environmental Code of Practice (DPI 2004)

The Queensland Dairy Farming Environmental Code of Practice was developed by officers from the DPI&F in consultation with the dairy industry. The Code of Practice provides a reference point for local authorities and dairy farmers regarding the operation and development of a dairy farm. Specifically the Code provides for a technically sound and consistent set of operational standards to enable the dairy industry to develop and operate in an economically viable and environmentally sustainable manner. This is a valuable tool for assisting dairy farmers, producers, developers and consultants to plan and operate dairies.

10.2.6.2 Operator's Environmental Guide for Environmentally Relevant Activity 4 – Poultry Farms (Brisbane City Council 2000)

The Operators Guide for Poultry Farms was developed to assist members of the poultry industry to achieve best practice and meet their environmental obligations under the Environmental Protection Act 1994. It was formulated by Brisbane City Council in cooperation with representatives of the poultry farming industry. As a planning/management tool it was produced as a guide only, and does not form part of any approval conditions. Specifically it identifies significant environmental

[9] Recently State Government announcements will see Laidley and Gatton Shires amalgamate into the Lockyer Regional Council, Ipswich City remain relatively unaffected and Esk Shire join with Kilcoy Shire to form Somerset Regional Coulcil.

outcomes worthy of attaining and control measures for achieving best practice and compliance with EPA regulations.

10.2.6.3 Environmental Code of Practice for Agriculture (QFF 1998)

The Environmental Code of Practice for Agriculture is an approved code of practice which allows primary producers to demonstrate compliance with their environmental duty under the *Environmental Protection Act 1994*. It is not compulsory to comply with this code of practice, however compliance provides a means of defence in situations where practice is viewed as causing unlawful environmental harm.

10.3 Drivers and Consequences of Management

As identified, there are many institutions that exercise some form of management for selected aspects of peri-urban areas such as the CSA. Duplication and overlap in institutional boundaries and hence management functions is a common outcome. This has the potential to cause unnecessary redundancies in the management of such areas. This has led to a degree of uncertainty in respect of management responsibilities between levels of government and across institutional boundaries.

Improved coordination is required to ensure that planning is consistent, whilst also maintaining appropriate management strategies thus avoiding duplication of effort. This should involve greater integration of planning and management functions through a linked system of management and an alignment of plans, policies and strategies.

The advent of recent regional planning arrangements through the *SEQ Regional Plan 2005-2026* in association with the flow-on realignment efforts with other State agency and Local Government planning provides a range of potential opportunities to address the abovementioned deficiencies in current arrangements and practices. However, it must be through these improved processes and procedures that peri-urban management issues receive discrete attention and not be the subject to past traditional urban planning approaches.

It has been identified that the emergent peri-urban landscape, exemplified by the CSA, is characterised by a range of discrete landscape management and socio economic challenges, many unique to peri-urban areas. These challenges will require a fresh approach which should not be tied unnecessarily to past practices which have relied on traditional urban management approaches. Whilst these peri-urban landscapes display certain urban like characteristics, they are not urban landscapes and they may never become incorporated into the urban framework of a region as exemplified by the SEQ Regional Plan's statutory delineation of its designated urban footprint.

11 A New Peri-urban Landscape

This chapter draws together material from the preceding investigative chapters that have provided analyses of the case study area (CSA). It firstly summarises the principal drivers of change that are acting to initiate and influence the peri-urbanisation process. It then provides an overview of the major findings in respect of the biophysical and socio economic aspects of the CSA that result from the peri-urbanisation process. This overview is reported in terms of the key management challenges that must now be addressed to safeguard the values of these landscapes. The significant demographic changes that have characterised these peri-urban areas are used to highlight and discuss a set of new landscape managers of these emergent peri-urban areas. This leads to a discussion of the stewardship ability and management skills of the new landscape managers. The chapter concludes with proposals to address current and future peri-urban landscape management challenges through a coordinated cyclic approach.

The relationships between global, national and regional drivers of peri-urban change and the landscape managers who now have responsibility for the management of these evolving peri-urban landscapes are illustrated in

Figure 25 and

Figure 26. They also highlight the significant socio-economic and landscape management challenges for responsible and sustainable care of these peri-urban landscapes. These figures provide a diagrammatic framework for the following discussion whilst highlighting the critical linkages between drivers of change, resulting peri-urban management challenges, and the new 'actors' on the peri-urban scene who now have stewardship responsibility for these landscapes.

11.1 Drivers of Change

The principal global drivers of change that could influence change in peri-urban regions have been discussed in Chapter 3. Examples of influential drivers of change that have and continue to initiate, accentuate and perpetuate the peri-urbanisation process across a range of landscapes include:

Lifestyles & Affluence: including changing societal environmental and social values, changing community priorities, and greater access to finance.

Demographics: including the "baby boomer" retirees of an ageing population and inter/intra state migration.

Work Arrangements: involving greater diversity of work arrangements and flexible arrangements for leisure activities.

Urban Housing: increasing housing costs and decreasing availability of affordable housing in urban areas.

Government Policies: including national and state programs such as the 'Roads to Recovery' program. The implementation of regional plans can also impact on peri-urban areas.

Outdoor Recreation: peri-urban areas can be affected by the changing lifestyles of urban residents. This can include increasing demands for outdoor recreation opportunities, and changing patterns and styles of leisure activities.

Figure 25: Landscape Management Challenges in the Peri-urban Zone

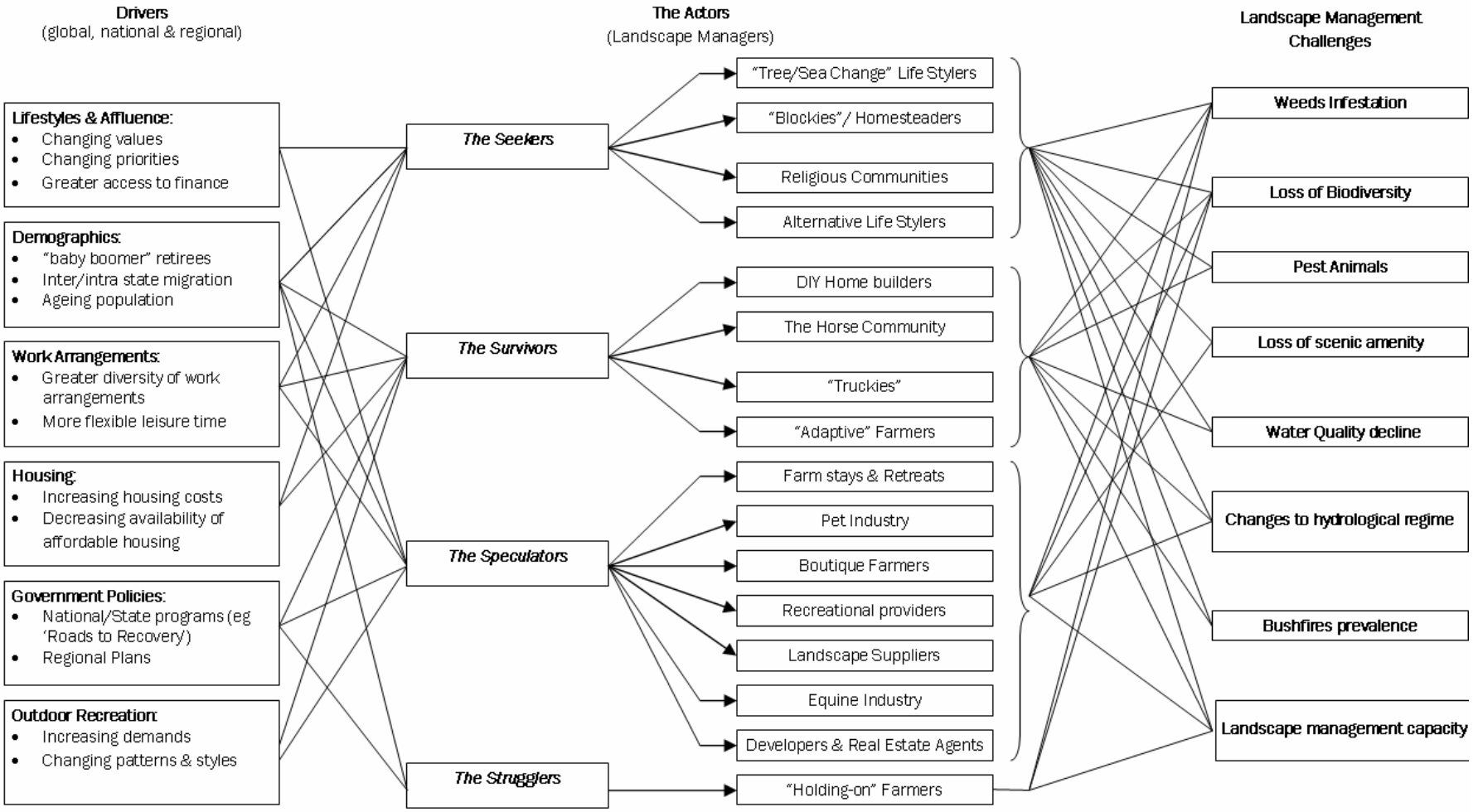
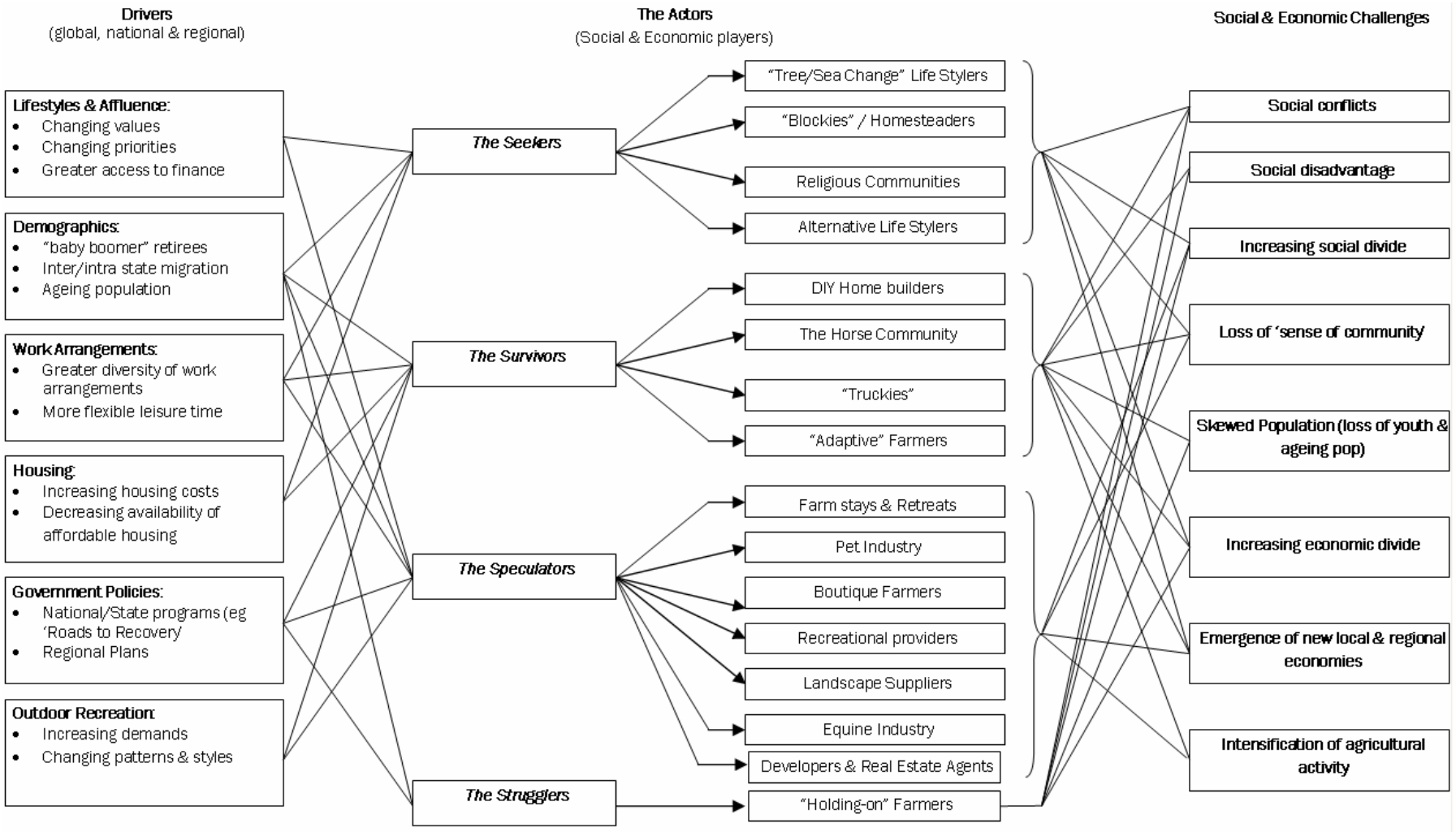


Figure 26: Social and Economic Challenges in the Peri-urban Zone



11.2 Key Management Challenges

The potential management challenges resulting from the peri-urbanisation of these landscapes have been identified in two categories:

Social & Economic Management Challenges: these can involve skewed population structures (loss of young adults & ageing population), new social conflicts, areas of social disadvantage and social polarisation, loss of a 'sense of community', an increasing economic divide, the emergence of new local & regional economies, and the intensification of agricultural activity.

Landscape Management Challenges: previously described as including loss of biodiversity, weeds infestation, pest animals, loss of scenic amenity, water quality decline, changes to hydrological regime, bushfires prevalence, and the landscape management capacity of the incoming peri-urban residents.

11.2.1 Socio-Economic Management Challenges

Dynamic socio-economic changes have characterised the CSA, with strong population growth experienced during the early 1980s and 1990s (AARG of 3.7%). This rate declined to 1.2% between 1991 and 2001, indicating that the primary wave of peri-urbanism occurred nearly two decades ago. However, indications suggest that the CSAs continued peri-urban growth has recently experienced an exponential increase from previous periods.

Strong outward movement of young adults (aged 24-35 years) from the CSA, especially from the Rural Balance area, occurred over the period 1981 to 2001. Conversely, there was noticeable growth in the population aged over 60 years. In addition, the Rural Balance had a relatively high proportion of people aged less than 19 years during this 20-year period compared to regional and state levels. Another demographic change of note includes the recent shift in the sources of overseas migration to the CSA from previous Western European countries to largely Asian and Middle Eastern countries.

Employment within the CSA was generally associated with physical labour and included significant proportions of occupations such as labourers and tradespeople, within the manufacturing and agriculture, fishing and forestry industries. Recent indications highlight gains in manufacturing and retail trade employment.

Traditional areas of disadvantage within the CSA compared to the remainder of SEQ showed improvements from 1996 to 2001, with the population becoming less disadvantaged in terms of low income, unemployment and car ownership.

Overall, recent CSA demographic patterns and socio-economic attributes provide strong evidence that the area's population is stabilising and that it is maturing from the original peri-urban socio-economic structure that characterised the early 1980s.

11.2.2 Landscape Management Challenges

11.2.2.1 Land Use Aspects

The dominant land uses in the CSA are rural residential and primary production which account for 19.3% and 33.8% of land area respectively. Closer subdivision,

originally for farming, and more recently for rural residential purposes has largely been responsible for the significant fragmentation of the CSAs landscape. Rural residential development on ridgelines has had significant impacts on scenic amenity through interrupts to sightlines and the loss of visually prominent remnant vegetation, not to mention the impacts on the biodiversity values of this remnant vegetation.

The largest proportion of land within the CSA is comprised of lots greater than 40 hectares (36.0%), while the smallest proportion is comprised of lots that are less than 1 hectare (5.7%). This demonstrates the ongoing availability of land of sufficient lot sizes for commercial agriculture (assuming the availability of other determents such as water).

It can be assumed that a large number of individual farm properties are comprised of more than one title and that many of these single titles are less than 100 hectares (the regulated minimum subdivision size of the SEQ Regional Plan). In the event of the sale of these multi-titled farm properties to non-farmers on an individual title basis, it would be highly likely that each new owner could utilise their separate title for a residence. Continued fragmentation of the landscape in this manner highlights the challenge to the implementation of the current SEQ Regional Plan's 100 hectare minimum subdivision lot size for areas outside the region's Urban Footprint.

This situation is further exacerbated by the predominance of freehold title land in the CSA (84%) which is equivalent to the SEQ level. This high proportion of freehold land means that the majority of the CSA is privately owned and therefore largely managed by individual land holders.

11.2.2.2 Agriculture

A wide range of agricultural activities are present across the CSA, with the area playing a significant agricultural role at both the local and regional scale. SEQ generally is also a significant contributor to Queensland's agricultural output. Commodities within the CSA such as poultry, mushrooms, strawberries and nurseries comprise a large proportion of the value of state production.

The size of agricultural establishments has been decreasing, whilst production of crops such as lettuce has increased, accompanied by a shift towards intensive crop farming. Intensification is a trend occurring in the production of crops such as mushrooms with the majority of growth in this production occurring between 1991 and 1996. Production of mushrooms for example, increased by 98% during the 1991-1996 period, whilst the area under production remained relatively stable.

The emergence of lifestyle horticulture including turf farms, cut flowers and nurseries has also been noted in the CSA, with the industry becoming one of Queensland's fastest growing. The growth in this industry is consistent with the continued and sustained population growth occurring in SEQ. This growth and subsequent demand for lifestyle horticultural products is however potentially threatened from urban expansion into the peri-urban areas as typified by the CSA. Recent water shortages in SEQ have also had impacts on the region's lifestyle horticultural industry. However, the extent of this impact has not yet been reflected in official statistics.

11.2.2.3 Biophysical Threats

Vegetation clearing for settlement has resulted in the fragmentation of remnant vegetation and loss of habitat and wildlife corridors. The peri-urban area contains ecologically significant flora and fauna species, some identified as endangered or vulnerable. Further land fragmentation and increased settlement densities may result in further biodiversity losses. Clearing of woody vegetation for pasture or settlement has been high with minimal efforts undertaken towards revegetation.

Recent peri-urban development has occurred on land which was not viable for agriculture and remained largely undeveloped (e.g. ridgelines). These areas of remnant vegetation now represent significant pockets and corridors of high biodiversity value that are now under threat due to rural residential development pressures.

Competition and demand for land, especially for lifestyle properties, can result in subdivisions being approved in locations which are valued for their scenic amenity value but also have a high bushfire hazard rating.

Increasing peri-urban activities can also result in the spread of alien flora and fauna. The uncontrolled spread of pests and weeds can result in unnecessary economic, social and environmental losses. The impacts from growing peri-urban activities such as those related to the keeping of horses, have to date been underestimated.

11.2.2.4 Threats to Natural Resources

Peri-urbanisation has led to the limited water resources available to the CSA being increasingly utilised for urban consumption and less available for traditional uses such as agriculture. This has placed agricultural activities under significant pressure and has heightened the following key water resource issues:

- Altered Hydrological Regime from Water Harvesting: Natural in stream flow rates have been altered resulting in downstream pondage. This has led to permanent losses of aquatic and riparian flora and fauna and created conditions for algal blooms and the growth of non-native pest and weed species.
- Over-extraction of Groundwater: This has resulted in salinity and long term impacts as the water table fails to replenish after rain events. Greater housing densities and the spread of impervious surfaces may result in reduced infiltration of rainfall into the water table. Groundwater extraction is at present largely unregulated.
- Deteriorating Water Quality: An increase in residential activities can impact on catchment water quality. Effects are likely to be significant for underground aquifers and downstream areas.

Drought will extraction demand on groundwater sources as surface water availability declines.

This study has highlighted a number of major water related issues that need urgent resolution. They are:

- ascertaining the quantity of water retained in farm dams and not immediately available as natural runoff to the system (particularly those on rural residential/lifestyle properties);

- the potential threat to water quality from rural residential developments that do not have adequate effluent disposal; and
- threats to groundwater resources from the inappropriate siting of rural residential developments in relation to groundwater recharge areas.

The scale and distribution of natural resource issues within the CSA makes it difficult for local government to successfully address these problems given their limited resources and lack of specialist skills at their disposal. The smaller peri-urban local authorities consistently identified a lack of funds and dedicated staff available for NRM activities. Funding is generally only available where a subsidy exists and often lacks the permanency required for long term project initiatives and maintenance.

11.3 The Landscape Managers

The previous discussion has noted the key drivers of peri-urbanisation that have and continue to influence change in areas such as the CSA. The demographic nature of these changes has been identified (see Sections 9.1 and 9.2). It was noted that dynamic population growth has characterised the CSA in the past with an AARG of 3.7% for the period 1981 to 1991 and 1.2% for the period 1991 to 2001. Preliminary 2006 census data suggest that the CSA has continued to experience strong population growth and that it has been of an exponential nature from previous periods.

These periods of continuous in-migration have resulted in major changes to the composition of the CSAs population which now presents a significant divergence from the traditional rural population which dominated these areas prior to the onset of the peri-urban processes. One of the most distinguishing characteristics of these peri-urban areas is their heterogeneity. The incoming population to peri-urban areas defies uniform description and comprises a diverse range of attributes particularly as their motives for relocation are many and varied. Their motives for choosing a peri-urban location and lifestyle have been used as the basis for developing a social typology of the settlers that now dominate peri-urban landscapes such as the CSA.

Essentially these evolving peri-urban areas now have a greater range and number of “actors” now managing (or non-managing) its landscape stage. The broad groups of contemporary landscape managers can be categorised as:

The Seekers: those seeking a changed or alternative lifestyle;

The Survivors: those who have adapted or who have shown initiative to survive the negative aspects of urbanisation;

The Speculators: those who have take advantage of the opportunities presented by peri-urbanisation and growth in the region; and

The Strugglers: those who struggle with the peri-urban changes.

Each group is discussed in detail below. The following sections provide a discussion on the characteristics of what is understood about these new ‘actors’ who now have stewardship responsibilities for these landscapes. An overview of the range of influence that these new ‘actors’ have over different types of peri-urban landscapes can be gauged from Figure 26.

Table 26: Influence of New Landscape Managers over different Peri-Urban Types

New Landscape Managers / Peri Urban Types	The Seekers				The Survivors				The Speculators						The Sufferers
	"Tree/Sea Change" Life Stylers	"Blockies" /Homesteaders	Religious Communities	Alternative Life Stylers	DIY Home builders	The Horse Community	"Truckies"	"Adaptive" Farmers	Farm stays & Retreats	Pet Industry	Boutique Farmers	Recreational providers	Landscape Suppliers	Equine Industry	"Holding-on" Farmers
PU1a Inner Perimetropolitan	•	•	•		o	•	•	o		•	o	•	•		o
PU1b Outer Perimetropolitan	•	•	•	o	•	•	•	•	•	•	•	•	•	•	•
PU2 Peri Urban Centre (Commuting zone)	•	•	•		•	•	•	o	o	o	o	o		o	
PU2 Peri Urban Centre (Rural Zone)	•	•	•	o	•	•	•	o	o			o		•	o
PU3a Inner Peri-regional Centre	•	•	•		o	•	•	o		•	o	•	•		o
PU3b Outer Peri-regional Centre	•	•	•	o	•	•	•	•	•	•	•	•	•	•	•
PU4a Linear Peri urban (transit)		o			o		o	o		o	•		•		o
PU4b Linear Peri urban (amenity - coastal)	•	•	o	o					o			o			
PU4b Linear Peri urban (amenity - aquatic)	•	•		o					•			o			
PU4b Linear Peri urban (amenity - terrestrial)	•	•		o	o	o			•			o			

• **strong possibility of occurrence** o **possible occurrence**

11.3.1 The Seekers

Peri-urban areas are the location for a diversity of landholders. These areas encompass people who are seeking change or an alternative lifestyle; wanting acreage to run a hobby farm; and religious communities - all diverse groups utilising the peri-urban area in their own way. The Seekers are associated with a process that has been occurring since the 1970's.

The 'Blockies'/Homesteaders and Alternative Lifestyle Seekers

The peri-urban area is a magnet for individuals seeking rural idyllic lifestyles. The incentive behind the migration of individuals and families to lifestyle blocks in the peri-urban area varies, but essentially is a product of aspirations such as:

- seeking an appealing and scenic environment;
- proximity to the natural environment;
- increased leisure opportunities;
- seeking a healthier non-urban environment;
- close proximity to services and infrastructure in metropolitan/urban centres;
- opportunity for domestic food production and consumption;
- the availability of more affordable land; or
- larger block sizes with space for outdoor recreation pursuits (e.g. horse/trail bike riding etc).

All of these reflect a desire to invest in a lifestyle that will provide improved quality of life. Such aspirations also reflect broader societal attitudes where quality of life and lifestyle choice are valued as commodities that can be bought and sold. This has created a development market where housing is marketed for its symbolic status such as images of the 'green' environment or access to recreational pursuits.

Tree/Sea Change Lifestyle Properties

Traditionally, the 'tree change' was instigated and driven by the alternative lifestyle seekers (hippies) in the 1970s. The more recent migration has seen the baby boomers and the younger generations moving to the peri-urban area in search of a more balanced lifestyle and for the reasons previously noted. Landcare Australia (2007:1) note that a number of these new migrants 'are highly motivated in terms of wanting to care for the natural resources' yet often they have 'little understanding or practical capacity to manage challenging property and catchment issues'.

Religious Communities

The peri-urban area has become a common location for religious groups and cult movements to establish their institutional base in recent years. This phenomenon is most pronounced in some areas of the U.S., such as Orange County, California, where there are a large number of 'alternative' religions such as the Saddleback Church, the Vineyard Christian Fellowship and Children of God movements. Peri-urban areas have also become common locations for traditional religious organisations to establish their campuses. There is some evidence that similar

trends are occurring in the peri-urban areas around Australian cities. In the SEQ CSA, the Magnificat Meal Movement, an organisation claiming an association with the Roman Catholic Church, had significant land holdings, including a church, in and around the town of Helidon.

Alternative religious groups may choose to form and site their communities in the peri-urban zone as larger, relatively inexpensive lots are available and the geographical isolation may advance their activities and objectives which may not be possible in denser urban landscapes.

As a united group of individuals often with significant land holdings, religious organisations have considerable potential to become involved in natural resource management projects. The level of land and resource management skills that these groups possess will vary.

Trends

The Seekers represent a diverse group of people that includes retirees and people wanting to escape suburbia, with many wanting to live in a sustainable manner. If these recent trends continue, The Seekers 'utopian' search will result in an increasing demand for land in an environment of constrained supply which will lead to inflated property prices in these peri-urban areas. This movement is likely to continue given the increasing trend towards downshifting and retirement amongst the baby boomer generation.

11.3.2 The Survivors

Groups showing initiative and skills to improve their situation given the circumstances of a changing peri-urban landscape have been characterised as The Survivors. This group includes those building their own homes, those utilising their larger lots for pursuing leisure pursuits (many involving horses); those needing to park and service trucks and heavy equipment (illegal in an urban setting); and those farmers who have adapted to changing economic and market circumstances.

DIY Home Builders

Constraints on the supply of urban housing can have a detrimental impact on housing affordability. Evidence on the cost of housing relative to household incomes suggests that Australian urban housing is the least affordable in the world. Relatively stable interest rates have resulted in greater housing demand and housing prices have increased markedly over the past decade.

This effect is partly driving demand for cheap land in peri-urban areas. Many households are buying rural residential allotments and living in improvised accommodation on-site until they can either afford to have a house built either by a professional or build it themselves. This may include live-in sheds, cabins, caravans and tents. With the current economic climate making first home purchase difficult for many households, together with the decline of urban public housing, peri-urban areas are viewed by some lower income households as offering the opportunity for home ownership.

The Horse Community

The proximity of peri-urban area to urban communities is advantageous to those with horse related recreational interests particularly for the range of support requirements they can provide. These may include horse paddocks and stables, pony club facilities, and horse riding trails. In addition, individuals with an interest in horses may move to rural residential properties in the peri-urban area where they can keep and maintain their own horse on their property. This is made possible due to individuals having greater disposable incomes to spend on recreational pursuits such as horse riding and the availability of more affordable land in the peri-urban area. Alternatively, many rural residential properties are used for the agistment of horses owned by urban residents.

Membership in horse riding associations including the Equestrian Federation of Australia and Australian Trail Horse Riders Association has increased in recent times. This is an indication that there is a strong interest in these activities and there is nothing to suggest that this trend will abate. Thus the prevalence of lifestyle properties and activities and industries focused around horses in peri-urban areas is unlikely to diminish.

Horse-based activities have a number of potential environmental and natural resource impacts. Such impacts may include contamination of water bodies from waste, destruction of natural environments from animal hoofs, and the spread of weed and other pest species.

'Truckies'

Owners of trucks and other heavy machinery are often drawn to rural residential allotments in the peri-urban area, as this permits easier storage and maintenance of their vehicles and machinery. Truck and heavy machinery parking is prohibited in urban residential areas for reasons including traffic, small block sizes and amenity impacts. Most statutory town plans explicitly prohibit the parking and maintaining of trucks in residential areas of urban centres. Consequently, lower density residential or rural residential properties on the outskirts of cities are attractive locations for the storage, parking and maintenance of heavy vehicles and machinery. Regulation of these activities is at the discretion of individual local governments.

The road freight industry in Australia has experienced significant growth in the past due to higher volumes of freight movement and its progressive transfer from rail and sea to road. This has been particularly the case for interstate freight movement. Greater inter-regional sourcing of perishable commodities such as fruit and vegetables has further expanded this practice. Coupled with national logistic chains providing an integrated freight environment, road freight is expected to continue to grow.

The number of freight trucks in Australia grew by 16.4% between 1991 and 2001. Queensland recorded the highest growth (17.8%) for the period 1995 and 2001 (Bureau of Transport and Regional Economics, 2003). The most significant aspect of this growth was the reduction in freight vehicles belonging to the ancillary sector (60% in 2000 compared to 74% in 1983). The Bureau of Transport and Regional Economics (2003) noted the growing importance of the hire and reward (sole operator/sub contractor) sector of the industry as a consequence of continued out-

sourcing by the ancillary sector. The Bureau concluded that this out-sourcing will continue.

Adaptive Farmers

Increased pressures from closer settlement, the downsizing of existing rural properties and changing consumer demands, are forcing farmers to adapt their practices and diversify their business interests. Many farmers now have off-farm income sources to supplement farm revenue.

Specifically, the increased cost of farming inputs and transportation of goods to markets means that in order to compete economically, farmers often have to intensify crop production, change production methods, specialise in niche crops and/or diversify their interests. Some farmers are switching their main production to crops such as lettuce and mushrooms that are more suited to intensive growing.

In order to further supplement their income from agricultural activities, some farmers are establishing activities such as farm stays / retreats or recreational facilities on their properties.

Trends

Current patterns of peri-urban change will likely continue over the medium term resulting in increasing numbers in the Survivors group. More people seeking home ownership are likely to be drawn to these areas due to housing cost pressures in urban settings. With an increasing population and current trends in outdoor recreation, it is likely that people in the horse community will increasingly be seeking peri-urban lands to satisfy their needs including agistment.

With continued pressures on existing peri-urban farmscapes, farmers will need to become more adaptive in their practices to ensure their farming enterprises remain viable. Increased urbanisation and peri-urbanisation is also likely to force 'truckies' further towards the periphery of these peri-urban areas.

11.3.3 The Speculators

Peri-urban areas have long been the source of developable land, much of which had become economically nonviable in their former rural use. Some in fact had become degraded through non-use or neglect. These circumstances provide opportunities for developers and individuals to pursue speculative gains through land development and land sale. Others have seized opportunities presented by these circumstances and the locational advantages presented by peri-urban areas in proximity to nearby urban markets. This group of stakeholders have been classified as The Speculators, characterised by their speculation on value created by planning and public investment.

Developers and Real Estate Agents

The most significant and probably successful Speculators in the peri-urban areas have been land and property developers. The evolution of the urban-rural frontier, and as major infrastructure commitments such as highways are provided, the real estate market offers multiple development opportunities. As noted previously, a major driver of peri-urbanisation has been the increasing acceptance by society that

quality of life and lifestyle choice are tradable commodities and can be bought and sold. This has created a development market in the peri-urban landscape which is dominated by significant investment in lifestyle property.

The formulation of statutory regional plans and planning schemes addressing the peri urban areas in recent years weakens land speculation while providing developers with greater certainty over future development opportunities and constraints. However, these planning instruments can also have the effect of driving up land prices where land has been designated for more intensive uses such as industrial, residential and rural residential.

Tourism - Recreational Providers and Farm Stays and Retreats

Tourism in peri-urban Australia is increasingly driven by a 'lifestyle led and leisure oriented society' (Walmsley, 2003: 66). In particular, he identifies a number of leisure oriented lifestyle groups in Australia as driving tourism in rural areas, particularly those within a 160km radius from major urban centres. These lifestyle groups include 'yuppies', 'dinks', 'empty nesters' and the 'baby boomers'. Walmsley (2003: 69) recognises the 160km radius as the approximate limit that individuals are prepared to drive for a day trip, although he concedes that this distance can be affected by variables such as road quality and traffic. The viability and success of peri-urban tourism and recreational opportunities is significantly affected by distance from major centres and therefore capacity to attract day trippers. Concordantly the potential for recreation and tourism enterprises within the peri urban area is extensive.

In many instances, the establishment of tourism services in the peri-urban area is undertaken by existing residents who seek to diversify existing business interests, but also, increasingly by newer residents who have recognised the opportunities provided by these peri-urban environments. Specific tourism and recreation opportunities common to the peri-urban area include farm stays and nature or health retreats, bed and breakfasts, wineries, trail / horse riding, and motorcycle and airborne sports.

Boutique Farmers

Boutique farming encompasses the production of specialist commodities for niche markets and can include goods such as coffee, herbs, olives, wine, lavender, figs and essential oils.

The Australian and New Zealand Wine Industry Directory reveals that from 1991-2002 there has been a large increase in the number of wineries (Tottenham et al. in Buxton et al., 2006: 149). The emergence of enterprises such as wineries in the peri-urban areas has accompanied the recent population growth in these areas and nearby urban and metropolitan centres. These Speculators seek to capitalise on their proximity to the large number of urban consumers of 'lifestyle goods'. In the case of wineries, often the wine is not grown or even produced on site, however it is retailed in the peri-urban area which is accessible to day trippers and tourist groups. Enterprises sometimes also include cafes, restaurants and conference centres to supplement the income gained from the sale of the primary product. Other prominent 'lifestyle goods' production associated with the peri-urban areas include flower / lavender farms and dairies.

In relation to the development of these peri-urban industries, Buxton et al (2006: 149) note that there has been a growth in water supply infrastructure such as dams within peri urban areas to allow for 'diversification into grape or orchard production'.

Landscape Suppliers

Lifestyle horticulture including turf farms and nurseries is a significant and growing industry in peri-urban areas. Similar to the case of Boutique farming, this growth is largely driven by their proximity to growing urban centres whose population is driving the demand for these products. There is evidence to suggest that whilst these industries are growing in value, they are becoming increasingly characterised by expanding areas under cultivation but with an overall decline in the number of establishments. Recent extended periods of water shortage have had major implications for lifestyle horticultural activities in peri-urban areas.

Equine Industry

The equine industry has both a strong influence and presence within peri-urban areas, largely owing to its proximity to urban centres and the availability of land. The scale of this industry is highly underestimated in SEQ (Robinson and Mangan, 2006). This underestimation of the equine sector in peri-urban areas such as SEQ extends to its contribution to the local, regional and State economy and its impacts on natural resource management.

The principal equine activities include: breeding; stabling; training; spelling and agistment. All of these activities involve a significant investment in public and private infrastructure.

Major Lifestyles & Affluence drivers such as the growth in the gambling industry arising from greater affluence, higher levels of disposable income and greater access to finance continue to fuel this element of the peri-urbanisation process. Many entrepreneurs are seeking to capitalise on the increasing interest in the equine industry by establishing equine businesses in the peri-urban area.

Pet Industry

Establishments for the care of domestic animals such as catteries, kennels and veterinary clinics are common in the peri-urban areas. These establishments typically locate in the peri-urban zone because of their need for locations close to the areas of major demand (urban/metropolitan centres). These establishments are not appropriate urban land uses due to the many negative externalities associated with their activities including noise, odour, waste and traffic. The peri-urban area is therefore a popular choice for entrepreneurs seeking to cater to the booming domestic pet market.

Trends

With continuing population growth and when housing costs increase relative to average incomes, peri-urban areas will continue to experience continued housing demand. Accompanying the population growth is the increasing demand for contemporary urban-oriented commodities and services such as landscaping and gardening supplies, cheaper land and boutique farm products which can satisfy the growing demands of affluent communities from the nearby urban/metropolitan centres. Such constraints will continue to place pressure on peri-urban areas.

11.3.4 The Strugglers

Most peri-urban areas formerly and exclusively supported traditional rural activities. However, these areas are now characterised by dwindling pockets of commercial and sub-commercial farms (remnants of the former rural landscape), interspersed amongst a range of recently arrived land use activities typified by those previously discussed. These remanent rural areas and nearby towns are home to residents many of whom have had long associations with the former rural activities, sometimes over generations. This group often has to deal with changing land uses, new residents and the challenges of maintaining their livelihood within the context of continual change and increasing urban encroachment. These are The Strugglers.

Holding On Farmers

The wave of new activities into the peri-urban area is putting increasing pressure on existing rural activities, particularly those associated with commercial agriculture and farm support industries. Farmers of broad scale agriculture are coming under increasing pressure as: (1) the cost of inputs rises; (2) the value of the product falls; and (3) pressure from developers for their land increases. These factors are constraining the economic viability of farms because they inhibit expansion opportunities.

The continuation of agriculture / farming is often not compatible with new uses such as rural residential housing, due to the externalities such as noise from equipment, odour and spray drift. Farmers are also confronted with management challenges such as troublesome domestic animals (pets) and straying livestock escaping through damaged fences and open farm gates attributed to the new rural residents. Past development approvals that have allowed rural residential developments to locate close or adjacent to existing commercial agricultural activities without sufficient separation and buffers, have resulted in conflict between the traditional farming community and the exurban ‘new chums’. This problem is particularly pronounced for animal intensive industries such as feedlots, piggeries and poultry farms.

These ‘Holding On’ farmers are typically individuals or families who have resided on the land for generations and have well established land management skills. Many are aging and have little prospects of passing on their properties to a younger generation. The loss of these farms to development can often result in poor natural resource management and negative environmental externalities, because the new owners often have poor or limited land management skills.

Trends

The Strugglers are likely to continue to experience a changing landscape characterised by population growth and new sets of challenges, such as competing and conflicting land uses. This group may begin to dwindle as individual farm owners succumb to the attraction of lucrative offers for their properties from land developers or even affluent lifestyle seekers. Those that remain will be faced with the challenge of remaining viable as a business while dealing with increasing property prices, demands for land and conflicting land uses.

11.3.5 Summary

The previous discussion has shown that the new peri-urban landscape 'actors' are diverse, with varying backgrounds, attributes and attitudes influencing their use of the land. The complex nature of these relationships emphasises the dynamic and continuously evolving nature of peri-urban areas.

11.4 Management Skills of the Newcomers

The previous section provided an overview of the range of newcomers occupying peri-urban areas. Given the diversity of 'actors' who now have stewardship responsibilities for the peri-urban landscape and the rate of migration of newcomers to these areas, it is imperative to consider their potential land management skills and ability. Specifically, what is their capacity to exercise their duty of care and fulfil their landscape management responsibilities?

The incidence of second home ownership and absentee ownership will also have a significant effect on the outcomes of any future NRM initiative undertaken in the peri-urban areas.

While awareness of the issues and management requirements must be a starting point – this scoping study could not assess this condition. However, it is possible to derive a theoretical model of land manager's ability to exercise their landscape management responsibilities by identifying a set of indicators such as: their previous experience; educational qualifications and skills; available resources; time available to devote to management duties and willingness to do so.

The combination of indicators that can be used to determine a land manager's ability to exercise their duty of care in regard to their landscape management responsibilities is illustrated in Figure 27.

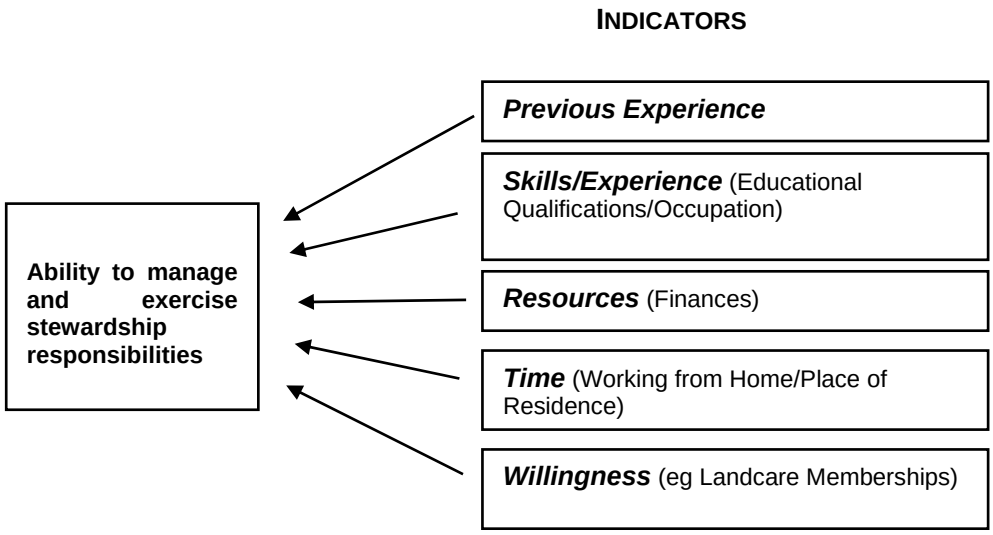


Figure 27: Indicators of Landscape Manager's Ability to Exercise their Duty of Care in relation to their Peri-Urban Property

Whilst it has not been possible during this scoping study to survey and identify these indicators for residents in the CSA, an examination of Census and similar information can provide a first approximation of what these indicators might entail. In some cases there are appropriate variables to support this analysis. However, in other cases, surrogate data has had to be relied upon.

First approximation of Indicators of Landscape Managers Ability to Exercise their Duty of Care in relation to their Peri-Urban Property

1. Skills/Experience: the principal occupations of CSA residents (2001) were in the non-professional fields such as Clerical, Sales and Service Workers; Labourers; and Tradespersons (see **Error! Reference source not found.**). These groups accounted for nearly 60% of all residents. The predominant industries of employment were Manufacturing (14.2%); Retail Trade (13.9%); and Agriculture, Forestry and Fishing (12.0%). Professionals, associated professionals and managers accounted for nearly one third of residents' occupations.

Table 27: Principal Occupations (2001)

Occupation	% of Case Study Area
Clerical, Sales and Service Workers	26.5%
Labourers and Related Workers	17.6%
Tradespersons and Related Workers	14.3%
Production and Transport Workers	10.8%
Professionals	9.9%
Managers and Administrators	9.9%
Associate Professionals	9.3%
Not Stated	1.7%
Total	100%

The CSAs levels of education were generally lower than those for the SEQ region. The proportion of the CSAs population over the age of 15 years who had a post school qualification averaged 35% which was roughly consistent in all of the 4 LGAs comprising the CSA. These levels are significantly lower than averages for SEQ (44.7%) and the State (43%).

2. Resources Available: An indicator of a resident's ability to access personal resources to undertake their landscape management responsibilities might be seen from an examination of household incomes. **Error! Reference source not found.** summarises weekly household income for the Rural Balance (non urban) portion of the CSA for 2001. This information is contrasted with the wider region – the MSD and the BSD.

Table 28: Weekly Household Income - CSA (2001)

	Rural CSA	Moreton SD	Brisbane SD
$1-$299	9.0%	8.9%	10.7%
$300-$599	24.3%	19.7%	20.8%

$1,000-$1,499	17.8%	10.7%	18.0%
$1,500-$1,999	7.3%	5.1%	10.7%
$2,000 or Over	4.2%	31.1%	7.7%
Incomplete response	12.3%	8.2%	10.6%
Total	100%	100%	100%

This table highlights the higher proportion of resident households with low incomes in the non-urban areas of the CSA compared to the balance of the SEQ region.

3. Time available: the ability of residents to devote time to property management responsibilities, beyond the time that they must dedicate to their employment, can be gauged from the following information:

- a declining proportion of CSA residents work from home (only 4.7% in 2001).
- declining proportions of persons engaged in full-time employment (64.4% in 2001) with many possibly being retired - may be an indication of an increased capacity for people to work on their property;
- a declining unemployment rate in the Rural Balance area (8.6% in 2001);
- higher rates of males working from home; and
- an increasing proportion of people working part-time (nearly one third in 2001). This may provide the opportunity for these residents to have extra time available for land management.

4. Willingness: Membership of Landcare Groups was used as an indicator of people's willingness to become involved and to maintain involvement in land management. There are five Landcare groups in the CSA (excluding Ipswich City) comprising the following:

1. Lockyer Catchment Association whose membership includes 74 peak industry and community groups, government agencies and corporations
2. Helidon Hills/Murphy's Creek Landcare has 60 members, with approximately 90 people involved in activities. Since their first formal meeting in mid-2000, the group reports gradual membership growth as more people move into the area, become aware of landcare, and want to know more. This group is currently working with Queensland Parks and Wildlife Service on a Fire Management Strategy in conjunction with the Rural Fire Brigade.
3. Atkinson Buaraba Creek Landcare's membership includes 20 individuals which has remained stable since the group was established in 1992. The same people who have been involved have lived in the area for their entire lives.
4. West Moreton Landcare, established in 1992, has approximately 100 members with the group growing gradually in the last few years.
5. Lockyer Valley Landcare distributes a quarterly Landcare newsletter to over 850 individuals, families, government officers and businesses in the Lockyer and beyond.

In summary, this example provides a cursory examination of available data which suggests that peri-urban newcomers may have capacity in terms of time to devote to

property management given their employment status and circumstances. However, this information also suggests that they may not have the necessary knowledge, skills, educational background or resources to devote to land management of their peri-urban properties. This information provides no indications of the awareness of these new peri-urban 'actors' for the typical landscape management challenges that they now have responsibility for.

Landcare organisations in the CSA have traditionally been based around existing farmers and residents. These Landcare groups were established during the decade of Landcare which began at the beginning of the 1990's. The emphasis on natural resource management inherent in Landcare during this time has been continued through these groups, with few newcomers becoming involved in these activities. Moreover, it appears that all of the Landcare groups in the CSA were formed by existing resident rather than new residents moving into the area.

In some cases however, small numbers of new residents wanting to learn more about natural resource management have become involved in local Landcare groups, but growth in membership has remained steady and is still mostly comprised of existing members.

Clearly, future natural resource management of these peri-urban landscapes cannot rely solely on past practices of engaging the traditional farming community and long-time members of established Landcare groups. Future NRM initiatives must now reach out to the significant numbers of newcomers as typified by the 'actors' identified above. It is this group of new peri-urban residents who now largely have stewardship responsibilities for landscape management of peri-urban areas. The challenge will be to identify the unique attributes of these new peri-urban landscape managers in order to engage them in future NRM initiatives. This will entail an improved understanding of their characteristics that can determine their willingness to lead and commit to become engaged in natural resource management. It will also be imperative to identify future requirements to improve the NRM capacity and capability of the new peri-urban landscape managers.

11.5 Cycles of Peri-urbanisation

This study has adopted the position that peri-urbanisation is a dynamic urbanising process that can involve the closer subdivision, fragmentation and land use conversion of former rural lands. It involves high levels of non-metropolitan growth and results in a blurred transitional zone comprised of temporary mixes of urban and rural activities and functions. The resulting peri-urban land use activities exhibit a high degree of heterogeneity, continual change and conflicting values.

This phenomenon should be seen as a process that can relate to a number of spatial contexts (see Typology – Figure 3), many of which will not always be associated with the fringes of metropolitan centres. Management efforts and planning or policy attention should be directed towards the process of peri-urbanisation and not solely its spatial dimensions or the final outcomes of poor or improper management. Hence, the nature of peri-urbanisation can be conceptualised as cycles which offer opportunities for planning and/or policy intervention directed towards achieving

improved and sustainable landscape management outcomes within an adaptive management framework.

This peri-urbanisation process is a cycle commencing with the drivers of change (global, national, regional or local), leading to a demand for certain land uses that facilitate or support these drivers. By the nature of these land uses and their associated activities, this process leads to the peri-urbanisation of the (former) rural landscape and to a modified landscape management regime. With these peri-urban landscape now under new management by the incoming (largely former urban) residents, this process raises the issue of the availability of appropriate landscape management advice, guidance and regulation for these new 'actors' of peri-urban landscape stewardship. Without this land management support, the result could lead to a complication of the range and type of landscape and socio-economic management challenges highlighted above and illustrated in Figures 11-1 and 11-2.

To illustrate this cyclic approach of the peri-urbanisation process, four examples have been developed for:

1. "An Equine Landscape" (leading to landscape management challenges) – see Figure 28
2. "Castles in the Country" (leading to landscape management challenges) – see Figure 29;
3. "Castles in the Country" (leading to social change and economic management challenges) – see Figure 30; and
4. "New Age Farming" (leading to landscape management challenges) – see Figure 31.

Clearly, planning and policy intervention can be initiated at any number of points along these cycles to address any of the elements of the process, from drivers right through to the various landscape and socio-economic management challenges. The responsibility for this intervention varies according to existing legislative responsibilities, conventions and existing institutional arrangements and management responsibilities (see Chapter 10). However, as indicated on the respective peri-urban cycles (Figures 28 to 31), the responsibilities for planning and policy intervention varies considerable between all three levels of government, the non government sector, industry and the community-at-large. These arcs of responsibility along the peri-urbanisation cycles are often overlapping and duplicated. These cycles can only be closed if appropriate learning from current and future policy implementation is incorporated through an adaptive management framework to affect the drivers of peri-urban change and/or manage the change itself. If this is not done then these cycles illustrate a downwards spiral of the peri-urbanisation process for key NRM issues which eventually lead to irreversible and unsustainable outcomes for the landscape.

Most of the management challenges associated with the peri-urbanisation process cannot be addressed by one level of government or through the individual efforts of the non government sector or industry. There is also a high degree of duplication and overlap amongst those agencies traditionally responsible for the management of these peri-urban issues. Future efforts will require a multilateral approach involving a comprehensive, collaborative and coordinated approach across all levels of

government, the non government sector and industry. Most importantly, future collaborative management initiatives will have to engage with the wider range of peri-urban landscape managers that now have the frontline stewardship responsibilities for the new peri-urban landscape.

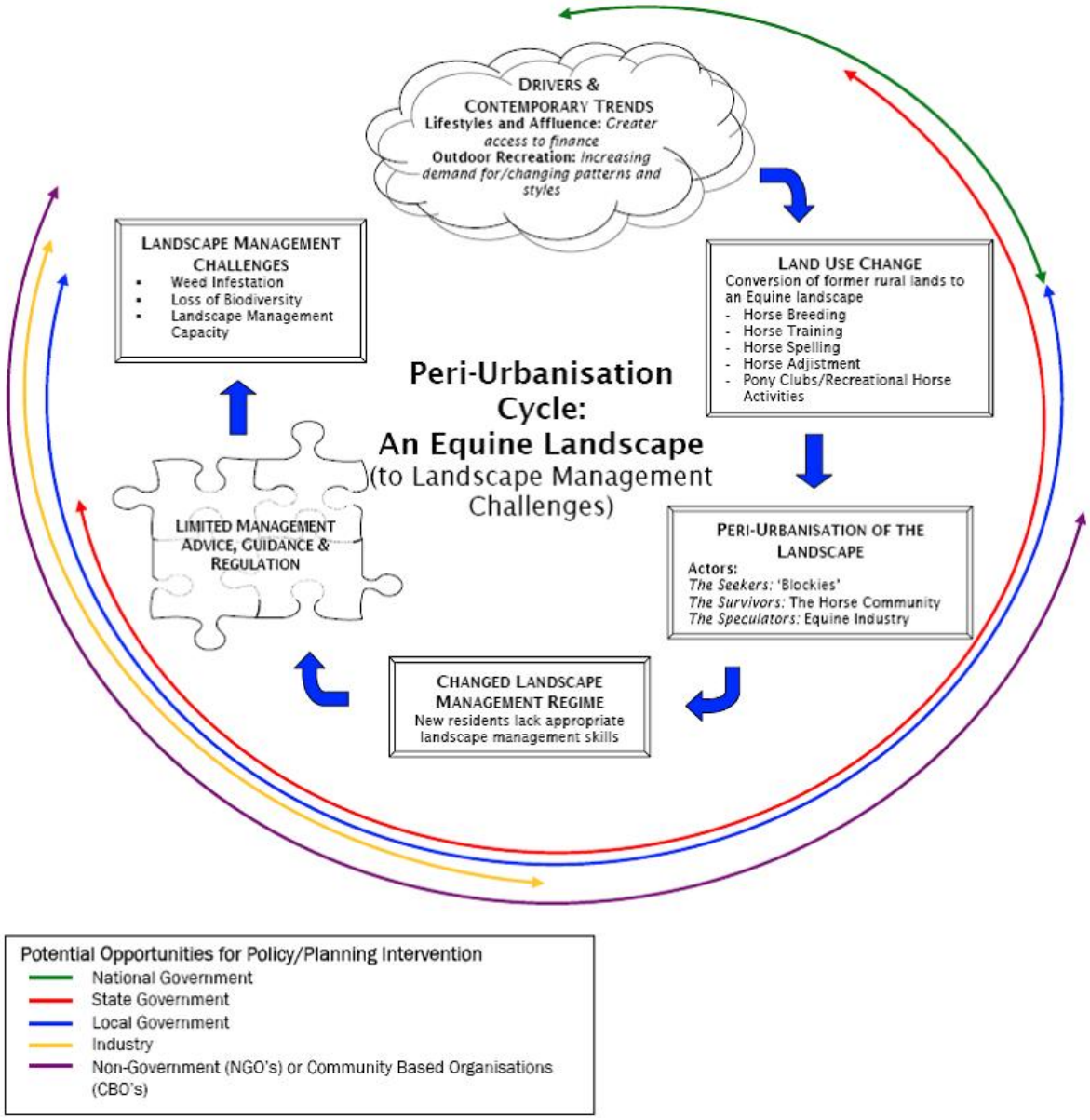


Figure 28: Peri-urbanisation Cycle: An Equine Landscape (leading to landscape management challenges)

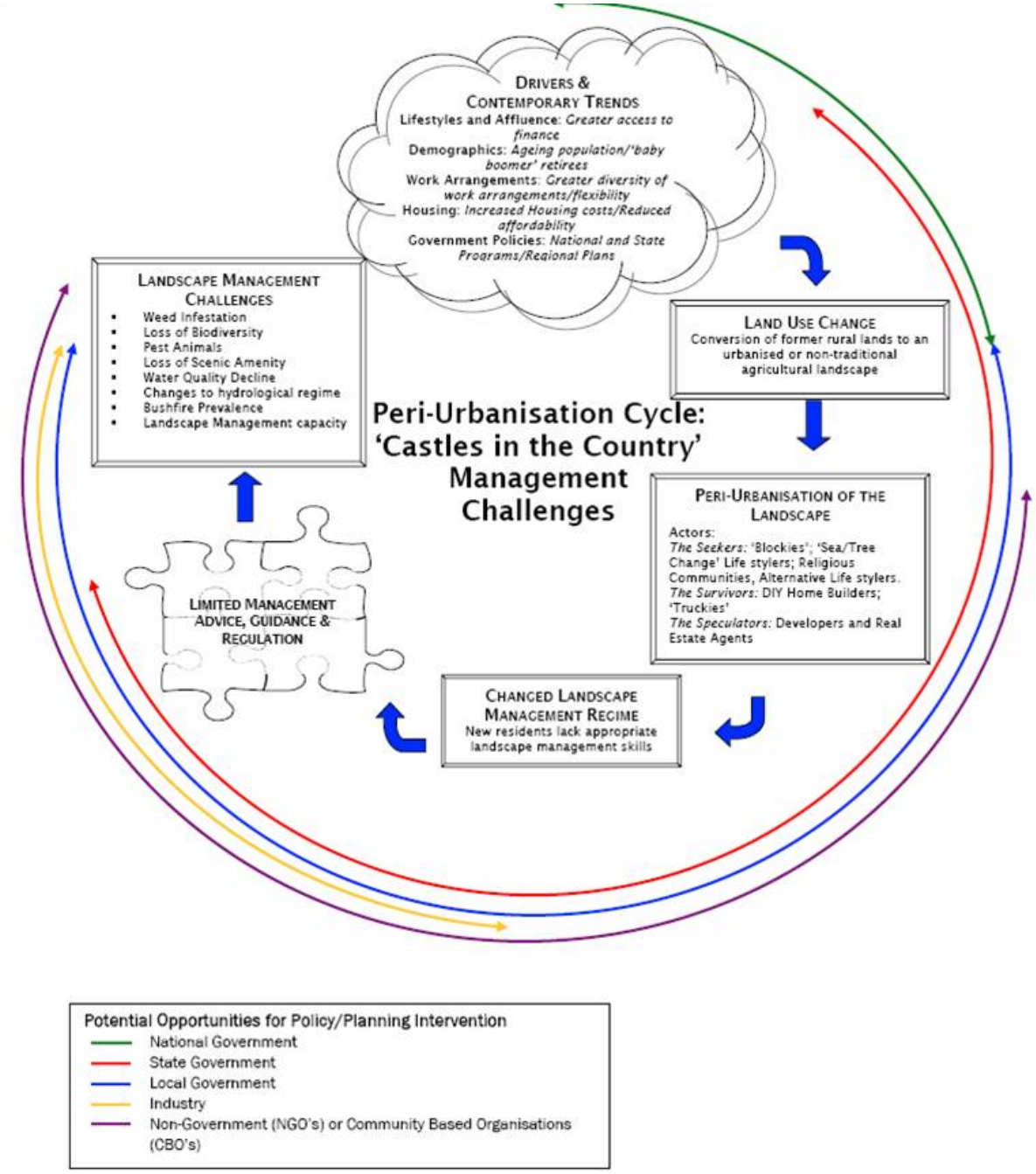


Figure 29: Peri-urbanisation Cycle: 'Castles in the Country' (leading to landscape management challenges)

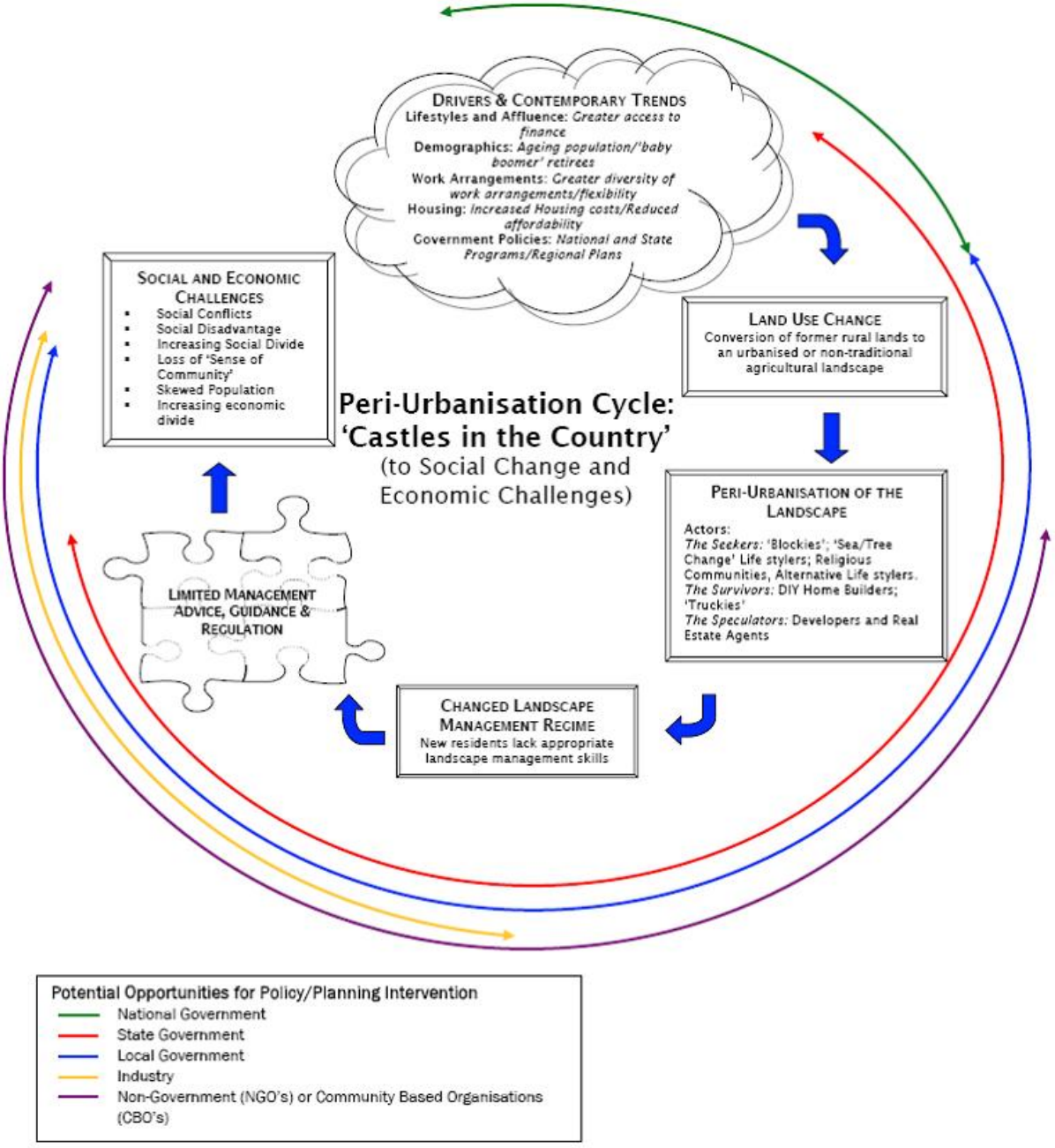


Figure 30: Peri-urbanisation Cycle: 'Castles in the Country' (leading to social change and economic challenges)

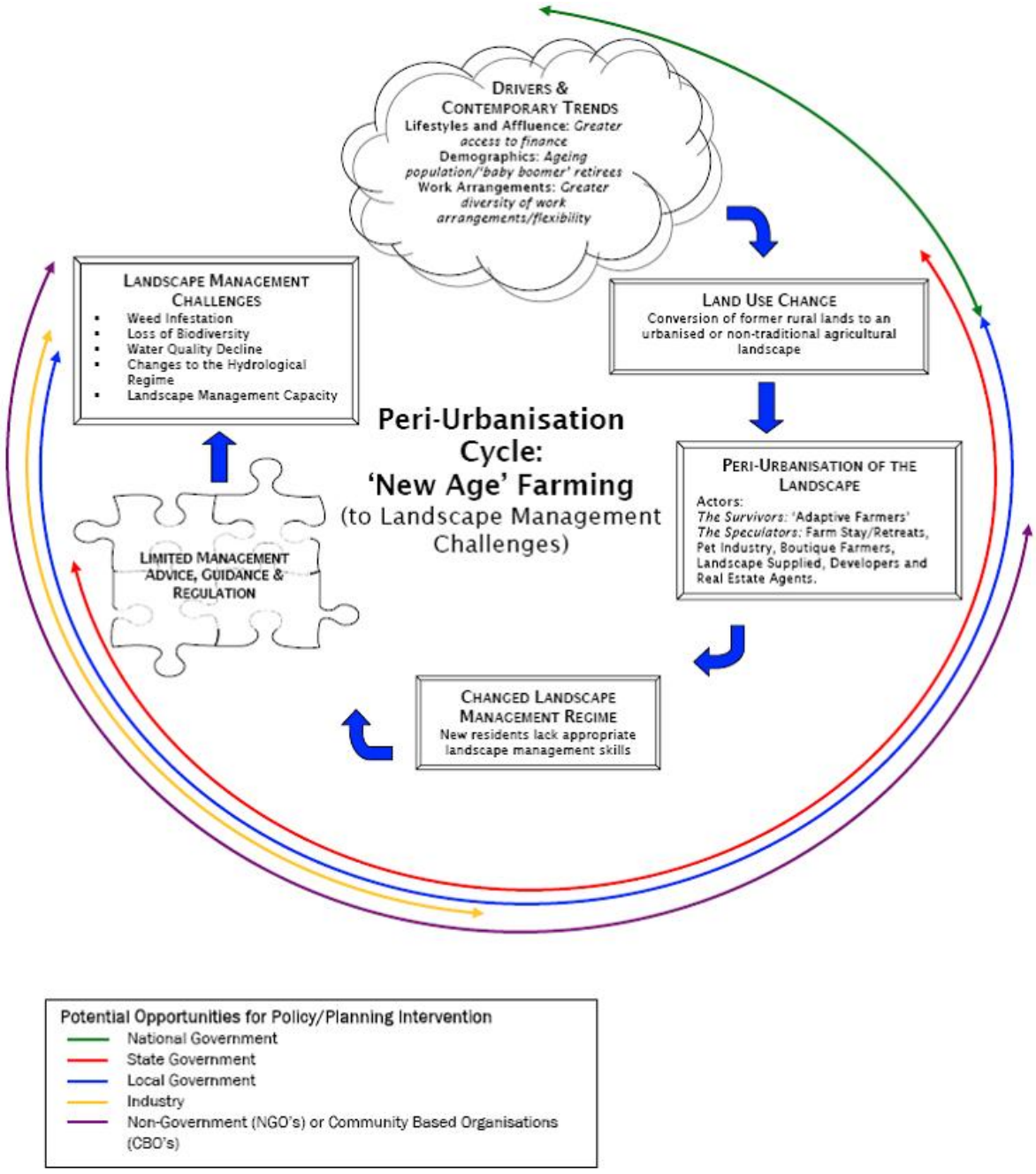


Figure 31: Peri-urbanisation Cycle: 'New Age' Farming (leading to landscape management challenges)

Summary

The study has noted that a number of principal global, national, regional and local drivers of change can act in isolation or multilaterally, and at multiple scales, to initiate and influence the peri-urbanisation process. These can include drivers such as changing lifestyles and affluence; demographic trends; changing work arrangements; urban housing availability; and the policies of higher levels of government. The resulting peri-urban changes in the CSA have been associated with some significant biophysical and socio economic impacts. These environmental, NRM and socio economic impacts present a range of key management challenges that must now be addressed to safeguard the values of these peri-urban landscapes. However, the study has noted that the significant demographic changes in the CSA have seen the emergence of a different set of landscape managers to the traditional land managers from past agricultural eras. This acknowledgement has then raised the question as to the stewardship ability and management skills of these new landscape managers. The concluding considerations focus on proposals to address the peri-urban landscape management challenges through a coordinated cyclic approach. Various cycles highlight the critical linkages between the drivers of change, the resulting peri-urban management challenges, and the new 'actors' on the peri-urban scene who now have stewardship responsibility for these peri-urban landscapes.

Conclusions

The second phase of the project (the subject of this Monograph) has sought to understand the drivers and nature of the social, natural resource, agricultural, economic, land use and environmental trends that are evident in the case study area (CSA) within the South East Queensland (SEQ) region. Whilst observing how these key factors of peri-urbanisation interacted, the study examined the institutional, legislative, policy and other instruments that are available and in place to manage these trends, particularly in terms of their adequacy to anticipate and respond to changes associated with the peri-urbanisation process. This work was designed to address key questions related to the future use of these peri-urban areas and to the management requirements for these evolving landscapes.

To this end, the study focused on a CSA described as the Extended Western Corridor located astride the Brisbane-to-Toowoomba highway. It is a corridor to the west of the designated Western Growth Corridor of the SEQ Regional Plan. The CSA is comprised of portions of four local government areas (LGAs), the City of Ipswich and the Shires of Esk, Gatton and Laidley.

The study has found that peri-urban processes are influenced by a wide range of drivers from global, national, regional and local scales with many occurring at multiple scales. These drivers operate with variable influences and result in different outcomes for evolving peri-urban landscapes.

This confirmed and extended earlier understanding that peri-urbanisation is a dynamic urbanising process that involves the closer subdivision, fragmentation and land use conversation of former rural lands. It also involves high levels of non metropolitan growth and results in a blurred transitional zone comprised of temporary mixes of urban and rural activities and functions. The resulting peri-urban land use activities exhibit a high degree of heterogeneity, continual change and conflicting values and these pose major future management challenges for these landscapes.

This approach to peri-urbanisation has argued that this phenomenon should be seen as a process that relates to a number of spatial contexts, many of which will not always be associated with the fringes of metropolitan centres. The study has recognised that the full range of these peri-urban settings can include areas:

- adjacent to a metropolitan centre;
- adjacent to a (non metropolitan) regional centre;
- adjacent to an urban centre within the commuter hinterland of a metropolitan centre;
- adjacent to an urban centre within the rural landscape; or
- in linear contexts along growth corridors, transit routes or amenity landscape settings such as ridge lines and coastlines.

These peri-urban settings have been described in Chapter 4 (see Figure 3)

The SEQ Case Study Area

The CSA review has demonstrated that along with the SEQ region, this area experienced strong post World War II population growth. For the period under review, growth in the CSA reached its zenith in the late 1980s and early 1990s. This rapid undirected growth can be attributed to inadequate State and Local government institutional arrangements and planning processes that should have been capable of responding to and containing these early population growth pressures. This had the effect of forcing growth, in the form of peri-urban developments, to the outskirts of the existing urban areas, including the CSA.

The thirty plus years of continuous peri-urbanisation has resulted in major changes to the CSAs demography. Some of the principal changes have included the outflow of young adults to larger urban and metropolitan centres and a growing population of people aged over 60 years. Past in-migration which had been dominated by immigrants from Western European countries has now given way to increasing numbers from Asian and Middle Eastern countries.

This study suggests that the CSAs population is stabilising and that this area is maturing from its original peri-urban form of the late 1980s and early 1990s. Evidence for this trend includes: increasing numbers of people residing at the same address for longer periods of time; a broadening of the employment base away from manual and labour-intensive employment to manufacturing and the retail trade; fewer residents commuting outside of the CSA particularly for work; declining evidence of social disadvantage amongst the CSAs residents; and improvements in housing stock. Current indications suggest that peri-urban growth patterns in the CSA are increasing exponentially to previous periods.

These trends reflect the implications of similar overseas experience that such patterns may be the evolution of a new form of settlement – one that is neither urban nor rural in the tradition sense. Many of these peri-urbanising areas will never be fully urbanised as the simplistic perimetropolitan models have suggested. This outcome is given additional weight by the statutory delineation of peri-urban areas such as the CSA outside of the Urban Footprint of the SEQ Regional Plan. However, it was previously noted that the SEQ Regional Plan's statutory regulation defining a 100 hectare minimum subdivision lot size for areas outside of the region's Urban Footprints is unlikely to have its desired effect for those circumstances involving the future sale of multi-titled farms comprised of titles less than 100 hectares to non-farming lifestyle seeking residents.

The impacts of this peri-urban population growth in the CSA include threats to the area's biodiversity values, especially those associated with the areas of remnant vegetation in the form of patches and corridors of both state and regional significance. Vegetation protection is discontinuous across the CSA and varies between local authorities. Whilst rural residential and life style living developments are at the forefront of these potential threats, it has been shown that these forms of land use activities are themselves at threat from the occurrence of natural hazards, in particular, bushfires.

Commercial agriculture remains economically viable throughout many areas of the CSA. This area continues to make a significant contribution to the agricultural output

of the SEQ region which in turn constitutes a significant proportion of the State production. Peri-urbanisation has resulted in specialisation and changes in production and the intensification of production in traditional agricultural concerns. It has also seen the establishment of a number of non-traditional rural based industries such as lifestyle horticulture and the equine industry which are all closely associated with urban growth in the region. These peri-urban industries have dominated these locations taking advantage of their proximity to their growing urban markets.

The continued fragmentation of the landscape through ongoing peri-urbanisation is also contributing to a range of major challenges for natural resource management in the CSA. The complex NRM arrangement for individual resources and geographical features is further compounded by the non-alignment of NRM planning and statutory planning at the regional and local levels. Because a majority of the CSA (and the SEQ region) is held as freehold tenure, landowners have a crucial role in the management of these peri-urban landscapes. The role of Local Government is also critically important. However, Local Government has limited resources, capacity and capability to adequately address NRM challenges. Hence, future management efforts will need to centre on the full engagement of private landholders as well as the enhancement of local government capacity.

Future Management Challenges

Successful management of the continued peri-urbanisation of these dynamic landscapes emphasises the imperative for timely, appropriate, and integrated planning and management responses delivered through appropriate institutional arrangements. To this end, it will be essential to improve coordination and ensure that all facets of planning and policy related to the CSA (and the region) are consistently integrated and aligned. In theory, the SEQ regional planning initiative potentially provides opportunities to achieve these outcomes. However, it has been noted that this must be achieved through discrete attention being focussed on peri-urban management issues specifically and not be the subject of traditional urban planning approaches that have dominated past practices, especially those which view the peri-urban zone as merely a holding area for future urban land. There is a need to begin planning the peri-urban as a distinct regional zone.

The focus for future management endeavours should acknowledge emergent findings that highlight that:

- peri-urbanisation is not restricted to metropolitan areas but occurs across a range of landscapes;
- planning and policy intervention should address the peri-urbanisation process and not just its spatial dimensions;
- there are a number of opportunities to address these challenges along peri-urbanisation cycles which can be derived for specific management challenges. However, this will require coordinated responses across a number of levels of government as well as the private and non-government sectors;
- future regional and local NRM initiatives in peri-urban regions should focus on the new landscape managers (“actors”). However, this will require a much improved understanding of these new stewards of the peri-urban landscapes;

- regional NRM initiatives will require an enhanced alignment with Local Government planning activities and involve their integration with statutory regional and local plans;
- additional and revised planning advice and guidance is required for peri-urban settings, including appropriate advice for rural residential developments in bushfire prone areas; and
- the full range of peri-urban stakeholders must now be engaged including the land development and real estate industries.

As previously noted, continued peri-urbanisation has resulted in increasing numbers of private landowners now having stewardship responsibilities for increasing proportions of these areas. It will be imperative for future landscape management initiatives to fully engage these new "actors" of the peri-urban stage who the study has categorised as:

> *The Seekers*: including "tree/sea change" life stylers, "blockies/homesteaders", religious communities and alternative life stylers.
>
> *The Survivors*: including DIY home builders, the horse community, "truckies" and "adaptive" farmers.
>
> *The Speculators*: including farm stays & retreats, the pet industry, boutique farmers, recreational providers, landscape suppliers, the equine industry and developers & real estate agents.
>
> *The Strugglers*: characterised by the "holding-on" farmers.

Engagement through future NRM initiatives will have to address all of these new settler groups who now reside across the full spectrum of peri-urban landscape settings (see Table 26).

A Research Agenda

This study has identified a number of data deficiencies (see Chapter 2) and matters that require further investigation. Recommendations for further research relate to generic data deficiencies, specific NRM issues and planning and management issues. The priority issues are described in the following textbox.

A Future Peri-urban Research Agenda

Generic Data Issues

The data limitations and associated challenges encountered during this study highlight the need to address a range of specific data deficiencies, and their consistency and comparability (see Section 2.6). The large number of agencies operating within the peri-urban space demonstrates the need for a coordinated approach.

Specific NRM Research Questions

What is the appropriate nature and design of rural residential effluent disposal systems that will not adversely impact on water quality?

Does the increasing incidence of dams on rural residential properties in peri-urban areas impact detrimentally on water quality and does the cumulative impact of this form of water storage have serious implications for natural systems?

Is there a relationship between new settlers migrating to peri-urban areas and the increasing incidence of weeds and pests into these areas?

What is the full extent of the role, impact and future of the equine industry in emergent peri-urban areas?

Specific Planning & Management Research Questions

Is the “new settlement” hypothesis supported by detailed longitudinal data? (priority investigation)

What are appropriate planning and management arrangements for peri-urban areas displaying “new settlement” characteristics? (priority investigation)

What policy options are available to government to manage future potential fragmentation and peri-urbanisation as a consequence of the CSAs existing land tenure arrangement particularly in regard to multi-titled farms?

What are the costs associated with the provision of physical, social and environmental infrastructure to peri-urban areas, specifically to rural residential areas?

Are the awareness levels, available resources, knowledge, capacity, capability, and willingness of the new managers (‘actors’) of the peri-urban landscape sufficient to successfully address NRM issues? (priority investigation)

How should these new peri-urban landscape stewards be engaged in future NRM initiatives? (priority investigation)

Does the mobility and rate of turnover of peri-urban residents require special attention in the engagement process?

What is the incidence of second home ownership in peri-urban areas and does it differ from other areas? How should absentee owners be engaged?

Does the continued in-migration through further peri-urbanisation lead to the displacement of low socio economic residents from these areas?

What is the nature and form of conflicts between newcomers to peri-urban areas and traditional farmers?

What strategies need to be developed to minimise and manage the conflicts between newcomers and traditional farmers in peri-urban areas?

What strategies will support the continuation of commercial agriculture in peri-urban areas?

Can a fuller engagement of the real estate and land development industries assist in achieving the desired sustainable NRM outcomes in peri-urban areas?

Is current planning advice and guidance for rural residents across all peri-urban settings satisfactory to achieve the desired NRM outcomes?

Is the nature and form of advice for rural residential developments in bushfire prone areas appropriate?

What additional and extended peri-urbanisation cycles need to be developed to address the full range of peri-urban management challenges?

Summary

This project represents a major scoping study of peri-urbanisation in Australia through the lens of several case studies. The SEQ case study has identified a range of emergent peri-urban issues including a number of discrete landscape management and social and economic challenges, many unique to peri-urban areas. These challenges will require a fresh approach which should not necessarily follow past practices which have relied on traditional urban and growth management approaches. Whilst these peri-urban landscapes display many urban-like characteristics, they may never become fully urbanised and be incorporated into the urban framework of the region. New approaches are required to address the management challenges in these evolving peri-urban landscapes.

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Appendices

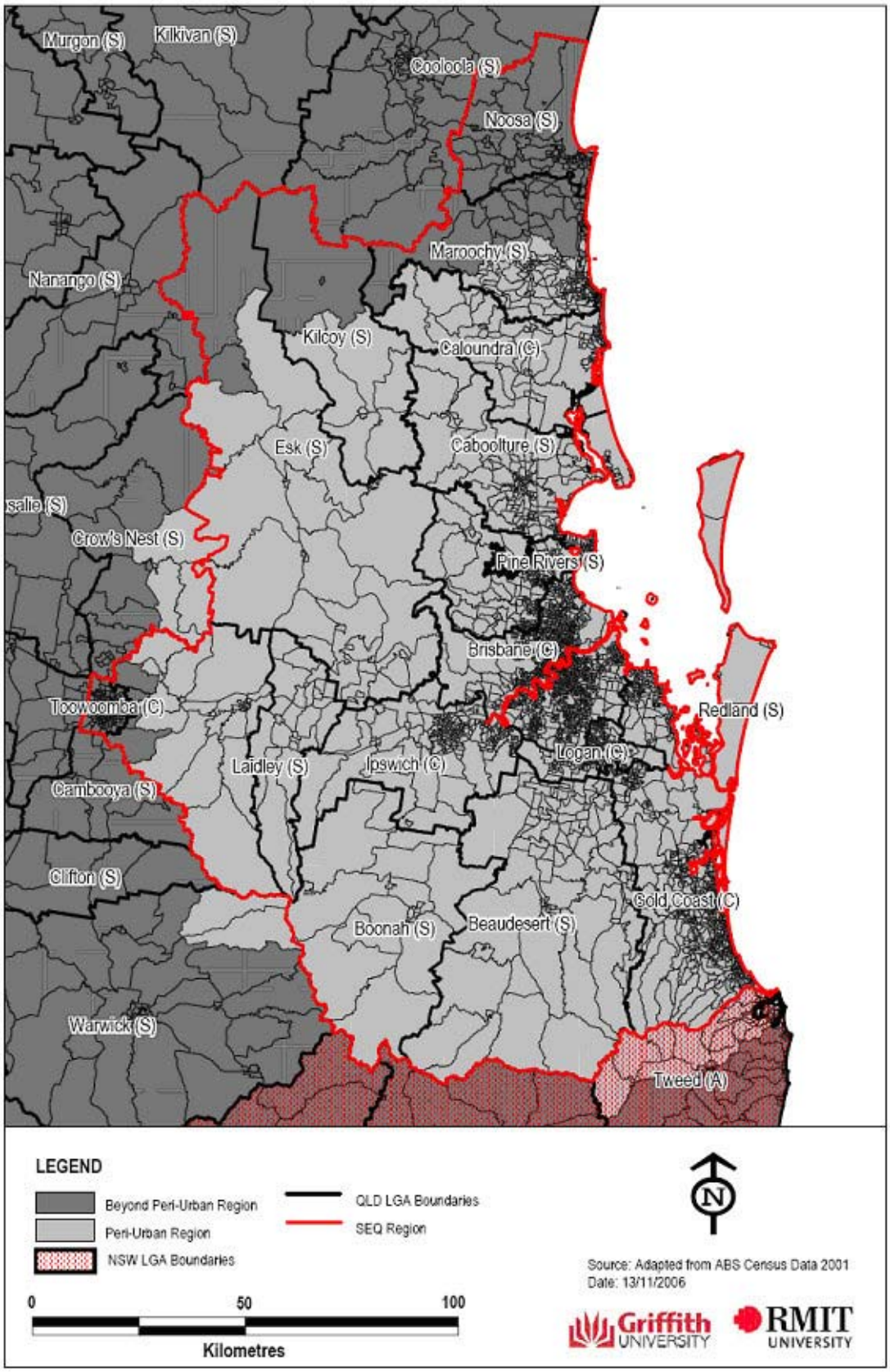
Appendix A: Research Questions

Table A-1: Phase 2 Research Questions

1.0	**Community Values and Change**
1.1 What are the conditions and trends of the range of community values that exist in the peri-urban areas?	
1.2 What dynamic changes have characterised the peri-urban areas in the immediate past?	
1.3 Do current peri-urban models provide accurate means to predict future changes to these areas?	
2.0	**Environmental and Natural Resources**
2.1 What trends can be identified in the use of environmental and natural resources in peri-urban areas?	
2.2 What are the impacts to Environmental and Natural Resource Management as a result of fragmentation through closer subdivision?	
3.0	**Land Use**
3.1 What land use attributes and characteristics distinguish the peri-urban areas?	
3.2 What land use activities dominate the peri-urban areas?	
3.3 How dependant are urban/metropolitan centres on the support functions provided by adjacent peri-urban area?	
3.4 Do certain natural hazards characterise the peri-urban areas?	
4.0	**Agriculture**
4.1 Do agricultural enterprises exist in the peri-urban areas?	
4.2 What are the existing conditions and trends in relation to agriculture in the peri-urban areas?	
4.3 Is there a relationship between the range of agricultural activities and property size?	
4.4 What are the relationships between the types and distribution of agricultural practices and productivity, trends and physical attributes such as soil types?	
5.0	**Residential**
5.1 What is the range and diversity of residential types in the peri-urban areas?	
5.2 Does this range of residential types have any correlation to lot sizes?	
5.3 Have residential developments in peri-urban areas led to areas of social disadvantage?	
5.4 Do the social and economic profiles of peri-urban residents display distinct differences from conventional urban areas?	
5.5 What relationships do the peri-urban residents have with the adjacent urban/metropolitan areas?	
6.0	**Infrastructure**
6.1 Do the unique peri-urban land uses and activities give rise to special physical, social and environmental infrastructural requirements?	

6.2 How do the infrastructure requirements of peri-urban areas differ from conventional urban areas?
7.0 Governance and Institutional Arrangements
7.1 How is the range of peri-urban community and environmental resources managed?
a. How are the biodiversity values of these areas protected?
b. How are natural resources in these areas protected?
c. How are cultural resources in these areas protected?
d. How is the scenic amenity of these areas protected?
7.2 How are conflicting peri-urban environmental and community resources resolved?
7.3 Are the institutional arrangements and planning processes satisfactory for the sustainable management of the peri-urban areas and its dominant land use activities?
Phase 2 Study Objectives
▪ to identify the cultural, political and institutional drivers of change in peri-urban landscapes that derive from endogenous and exogenous sources, including globalisation and regionalisation, the shifting political economy, new work and lifestyles aspirations, migration and reform of governance and institutional frameworks;
▪ to identify trends in factors affecting peri-urban landscapes, particularly, demographic changes, employment reconstitution and redistribution, transport and infrastructure development, cultural shifts, changing agricultural practices and viability, political institutional reform and the reflection of these changes in the evolution of land use patterns;
▪ to identify types, locations and trends in land use, the use or condition of natural resources (including water) and of environmental and community values (including remnant flora and fauna, riparian areas, and landscapes (scenic) amenity), and key NRM issues and threats;
▪ to identify the conditions and trends associated with the social environment and community landscape of peri-urban areas;
▪ to identify the existing governance and institutional arrangement and policy responses for the management of the peri-urban areas and access their adequacy to address future pressures and changes to these areas;
▪ to examine regional, state, national and global trends in factors such as natural resource availability, for example, in oil supply, energy use and type, and water availability and use; and
▪ to discriminate, on the basis of findings for objectives 1-6, between embedded, new and emergent drivers of change in peri-urban areas

Appendix B: First Approximation - SEQ Peri-urban Region



Map B-1: First Approximation Peri-urban SEQ

Appendix C: Phase 2 Methodology

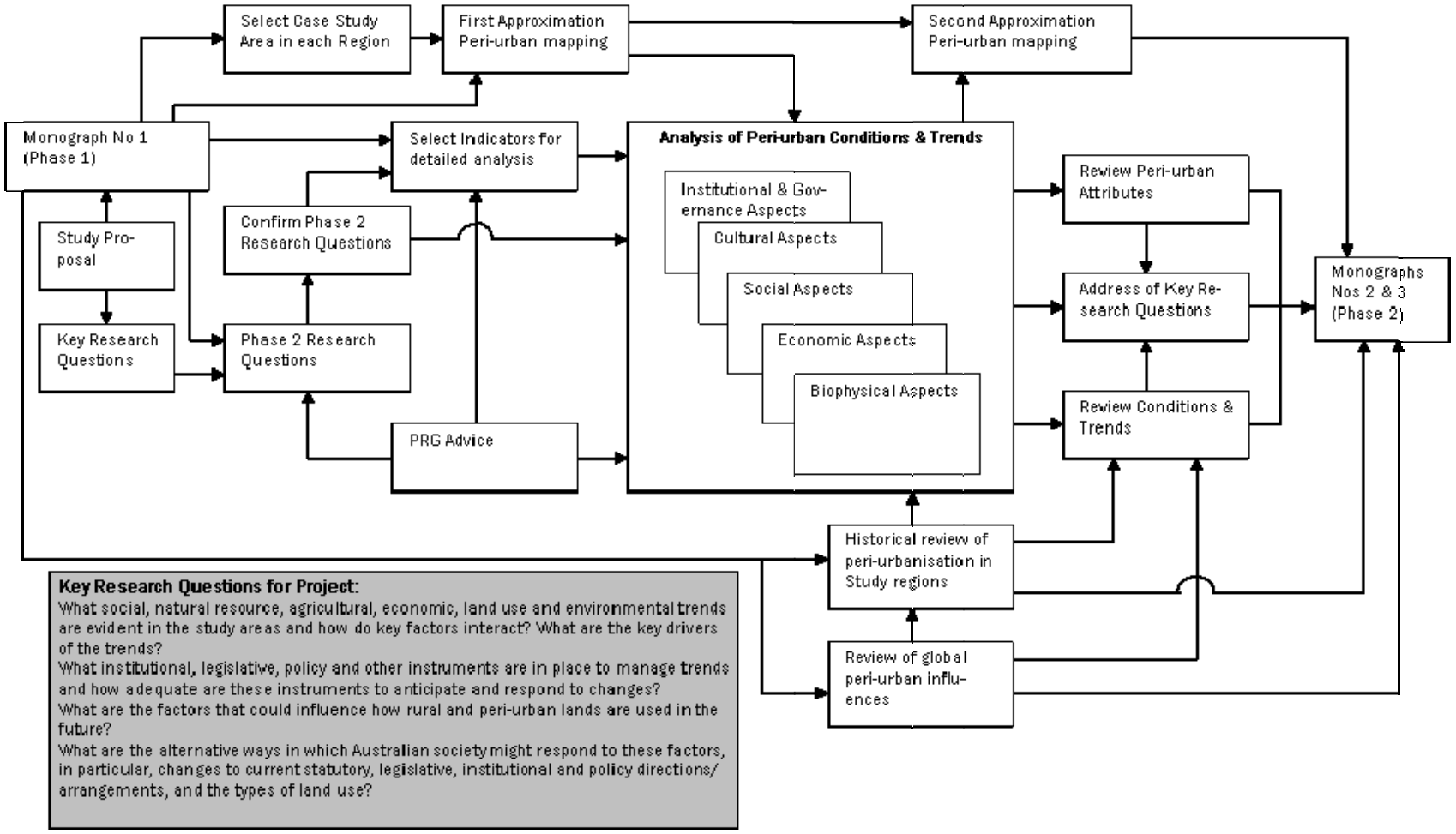


Figure C- 1: Phase 2 Methodology

Appendix D: Case Study Area

Table D-1: Comparison of Potential Case Study Areas

Key Attributes pertinent to Peri-Urban research	Characteristic of the potential Case Study Areas	Opportunities presented by Case Study Area		
		1. Mount Lindsay/ Northern Beaudesert	2. Extended Western Corridor (Ipswich towards Toowoomba)	3. Western Caboolture
Peri-Urban Typology 1* – 'Adjacent to Metropolitan Centre'	Presence in potential study area	Yes – but into high priority Special Investigation Area (now subject to draft Amendment No. 1 to Regional Plan)	Yes – includes Regional Plan's preferred long-term Western growth corridor	Yes – includes an investigation area of the Regional Plan
Peri-Urban Typology 2* – 'Growth Corridor'		Yes – if extended to Beaudesert (beyond the Special Investigation Area)	Yes – includes extensions to Western growth corridor	No
Peri-Urban Typology 3* – 'Adjacent to Regional Centre'		Yes – if extended to Beaudesert (beyond the Special Investigation Area)	Yes – includes Gatton and Laidley	No
Scale of occurrence (spatial scale)	Range of scales – local, regional etc	Local through sub-regional to regional	Local through sub-regional to regional	Local
Collaborative Management (governance scale)	Level and number of management agencies	ROC level plus 3 LGAs (Logan, Gold Coast and Beaudesert); and min 12 State agencies; plus NRM regional body	ROC level plus 3 LGAs (Ipswich, Laidely, Gatton); and min 12 State agencies plus NRM regional body	1 LGA (Caboolture); and min 12 (?) State agencies plus NRM regional body
Rate of Population Growth (temporal scale)	Rate of Change: Past growth (population) Expected growth (SEQ Regional Plan) (dwellings)	a. Past growth: Moderate to High b. Expected growth: Moderate to High	a. Past growth: Moderate b. Expected growth: High	a. Past growth: Moderate to High b. Expected growth: Moderate to High
Community Values	Diversity of Values	No traditional farming remaining in Special Investigation Area (some traditional farming around Beaudesert) Large rural residential community	Traditional rural vs urban Includes largest remaining areas of rural production in region Includes areas of rural residential	Minimal traditional farming in Investigation Area
Natural Resource Conflicts	Conflict over the division or use of natural resources	Moderate	High (potential conflict with greater range of natural resources)	Low to moderate
Fragmentation of Lots	Degree of lot fragmentation	Extremely fragmented	Pockets of highly fragmented	Minimal fragmentation
Diversity of Land Uses	Existence of diverse land uses e.g. productive and consumptive uses	Moderate (largely rural residential and urban)	High (ranging from traditional farming to rural residential and urban)	Limited
Range of Social Issues	Existence of social issues, e.g. social disadvantage, locational disadvantage, lack of social	Large range - would include low-income rural residential through to McMansions and life-style residents	Moderate range – includes rural communities, rural residential (less emphasised than Mt Lindsay) and urban	Moderate range

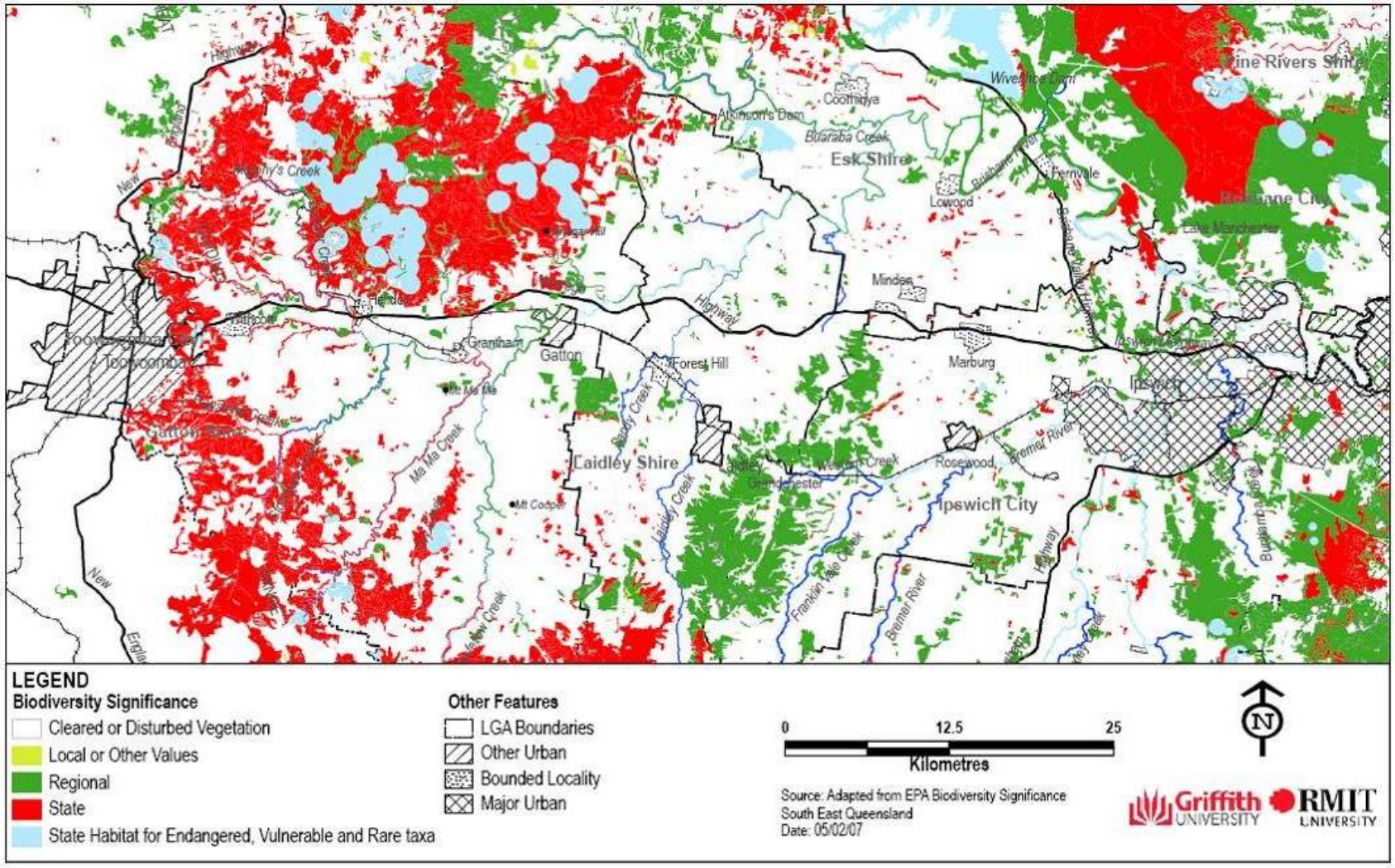
Key Attributes pertinent to Peri-Urban research	Characteristic of the potential Case Study Areas	Opportunities presented by Case Study Area		
		1. Mount Lindsay/ Northern Beaudesert	2. Extended Western Corridor (Ipswich towards Toowoomba)	3. Western Caboolture
	infrastructure and social services, poor accessibility, social cohesion			
Biophysical Complexity	Existence of a variety of natural environments and natural resources	Moderate (includes areas of regional significance and minor areas of state significance)	Moderate to High (includes koala conservation areas and areas of regional significance)	Moderate (includes minor areas of state and regional significance)
Policy Relevance	Relevance to current and future policy initiatives	Draft of special investigation completed – timelines not consistent with those of this research project	Western corridor is a preferred regional growth option for the long-term (i.e. to 2026) Offers best potential to influence long-term strategic planning	Identified as future investigation area OUM study timing unknown Relevance to this research project uncertain
Comparison to RMIT case study area	Growth around metropolitan centre and along transport route	Different in scale and diversity of issues	Similar in most respects	Different in nearly all aspects

Appendix E: Data Sought from CSA Local Authorities

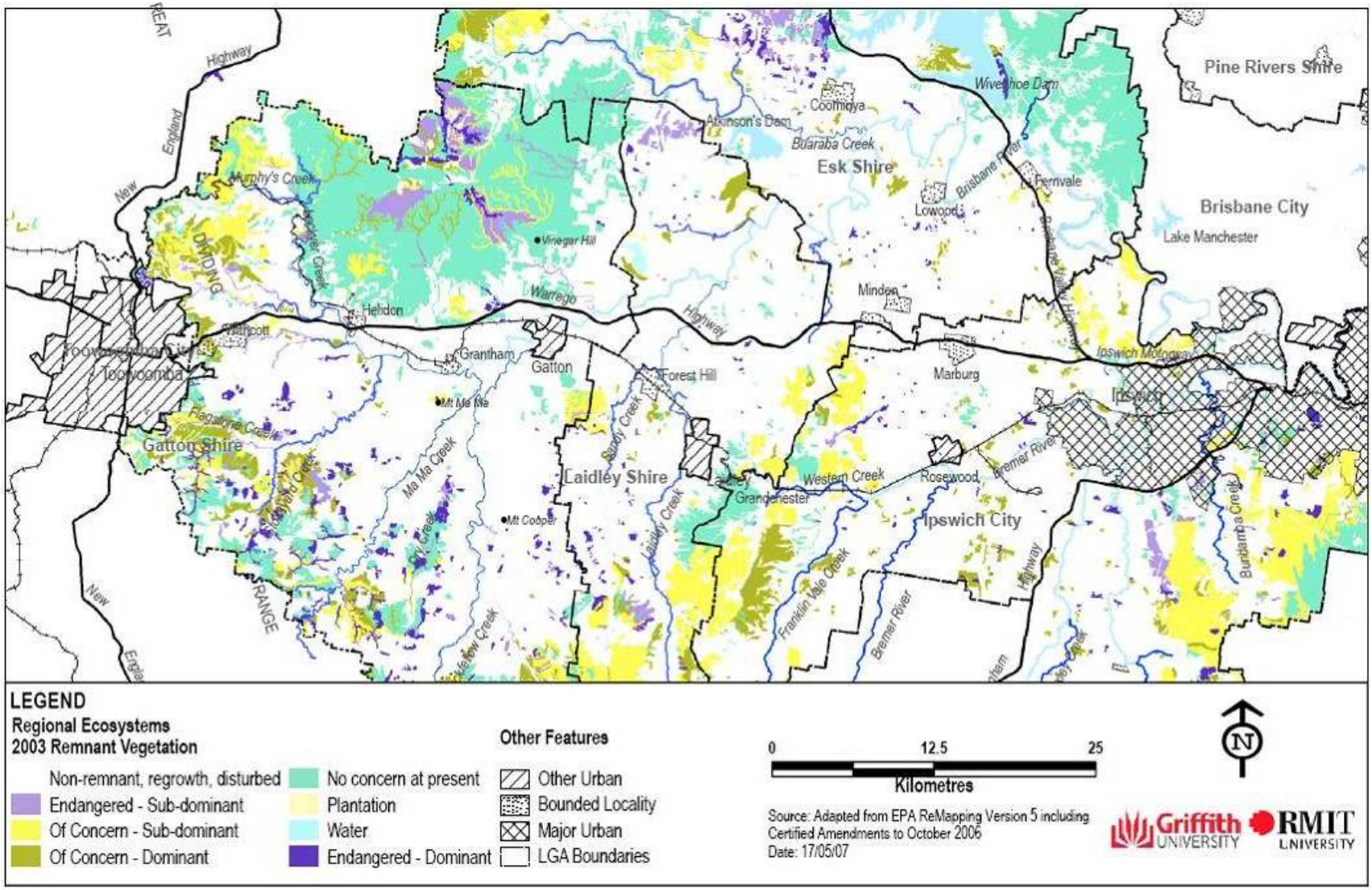
Table E- 1: Data Sought from CSA Local Authorities

Housing
Housing, building applications and approvals (by type)
Rate records – addresses for rates notices (absentee ownership)
Land Use
Land use changes including number of rezoning applications (rural to urban uses)
Rate of modifications and revisions of town planning schemes – qualitative
Subdivision applications and approvals (small, medium and large)/Property parcels
Rate of agricultural land loss - Good Quality Agricultural Land (GQAL) and changes over time
Open space network (including areas of regional significance)
Areas of high biodiversity (including the protected estate)
Rural industries
Physical Infrastructure
Km of sealed road and type (main, secondary, local)
Water supply
Septic systems (number and rate of change)
Extent of growth of head works; sewerage and water reticulation across the LGA (GIS)
Other
Farm dams – numbers over time
Quarries and sand and gravel pits – numbers over time; production/resources available
Pests and weeds – types and proliferation (including trends over time)
Solid and liquid waste – location and life of any land fills/waste sites; any changes over time
Land use/neighbour complaints and disputes – numbers over time (?)
Planning Scheme Overlays
Bushfires (from QRFS)

Appendix F: Biodiversity and Vegetation

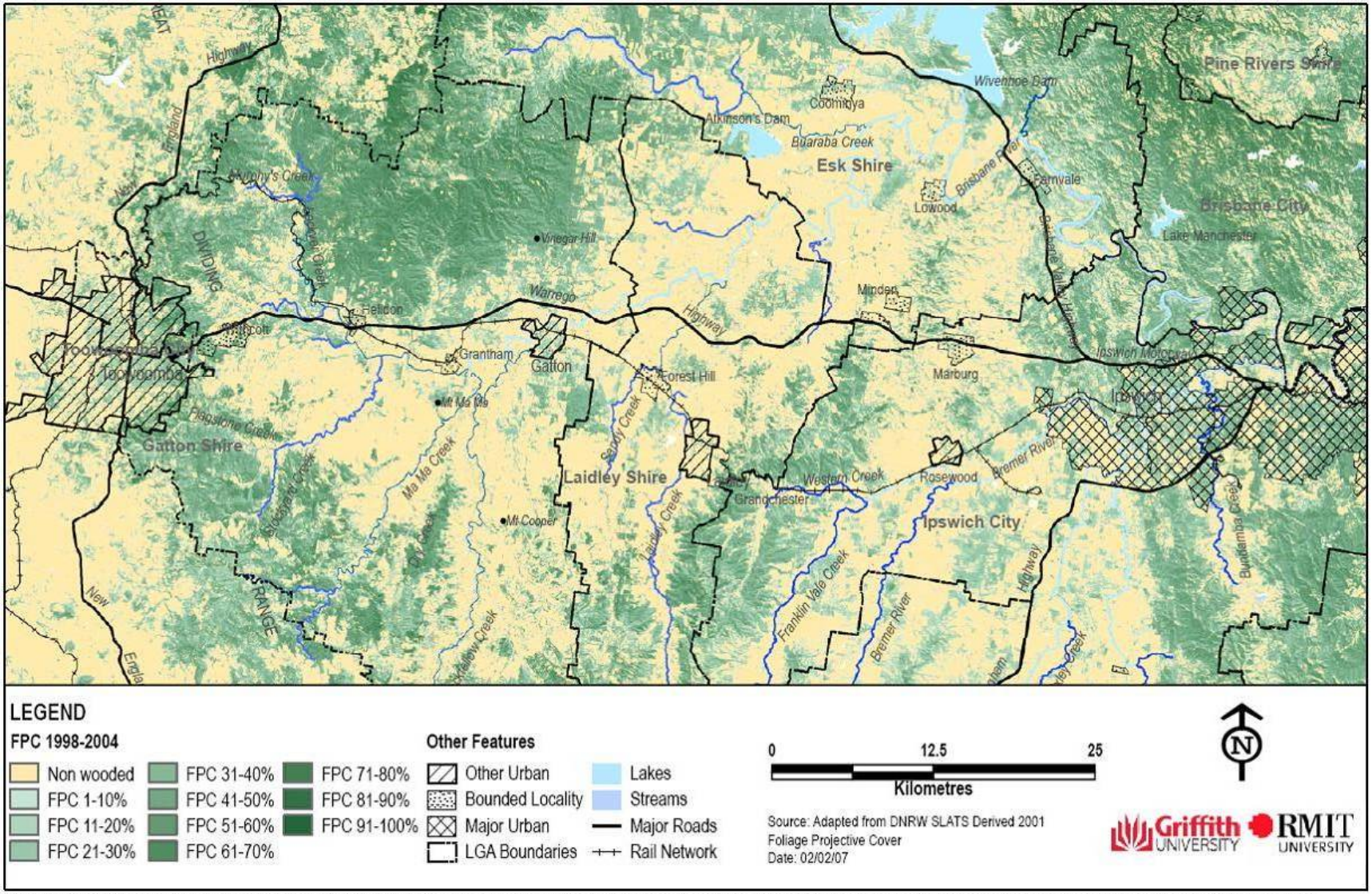


Map F-1: Biodiversity Significance



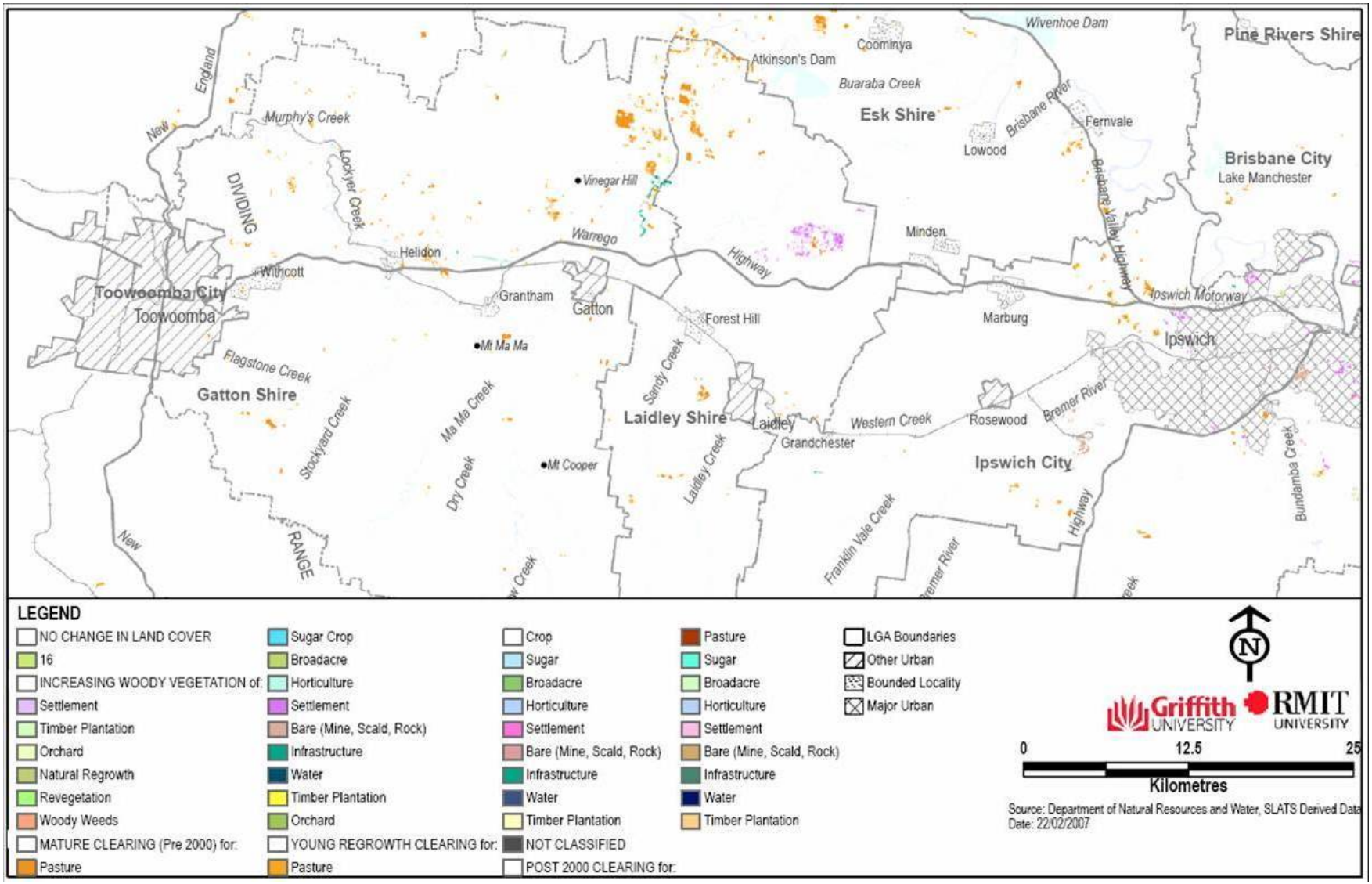
Remnant Vegetation Data provided by the Environmental Protection Agency (EPA).

Map F-2: Remnant Vegetation 2003

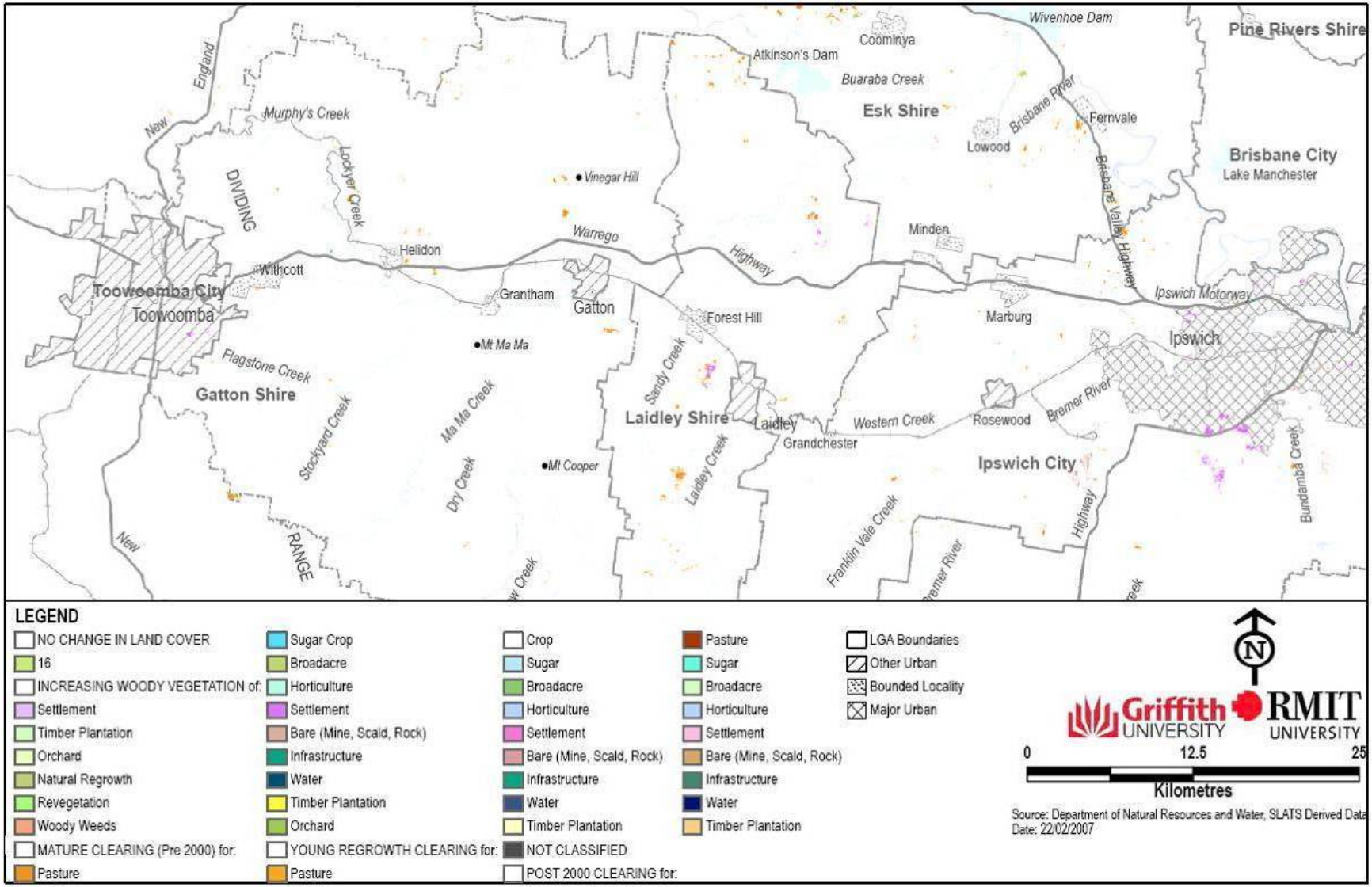


FPC Data was supplied by the Department of Natural Resources and Water. This data is to be used as a guide only for planning purposes. While every care has been taken to ensure the accuracy of this data, DNRW makes no representations or warranties about its accuracy, reliability or completeness or suitability, and disclaims all responsibility and reliability.

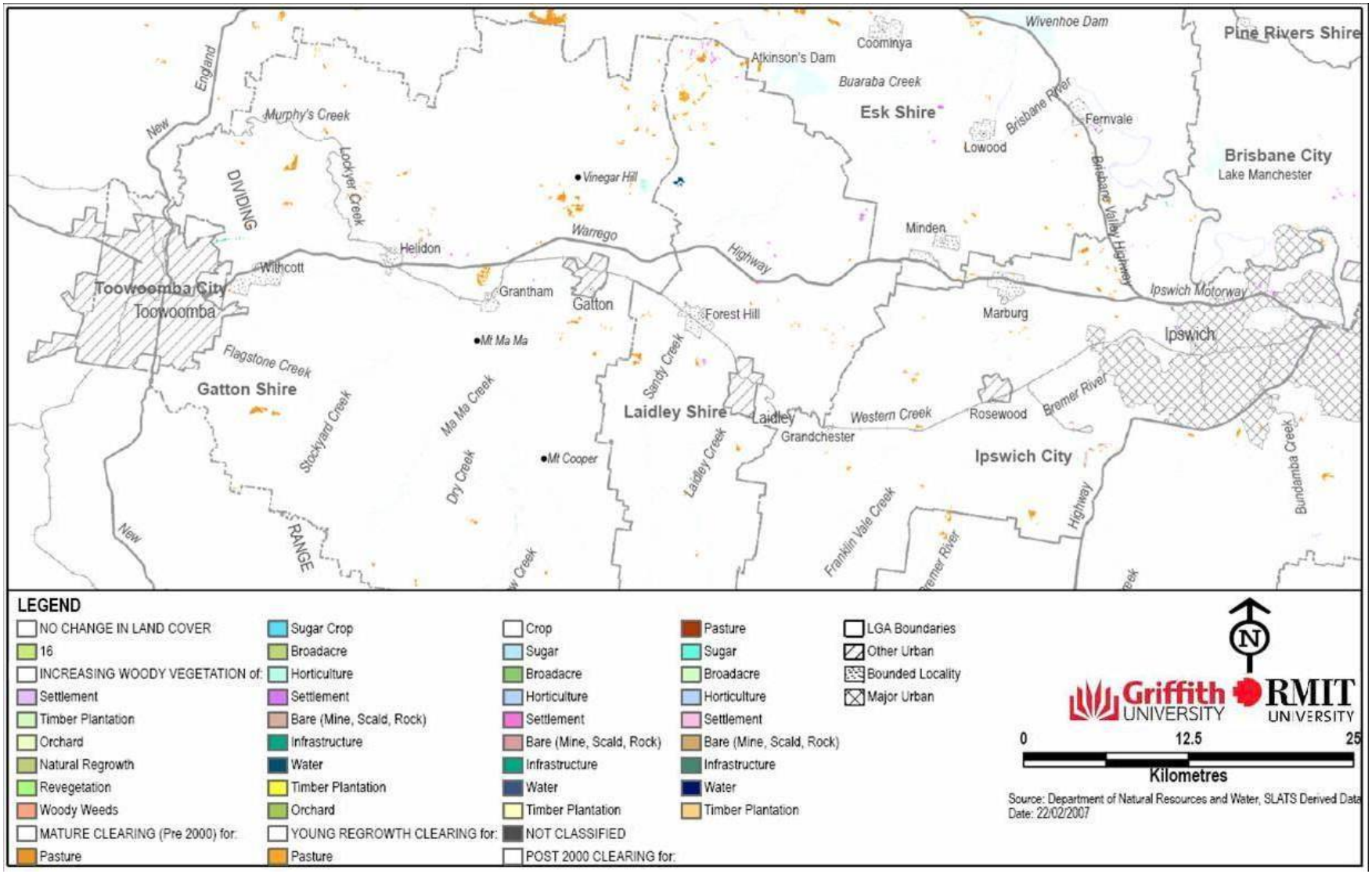
Map F-3: Foliage Projective Cover 1998-2004



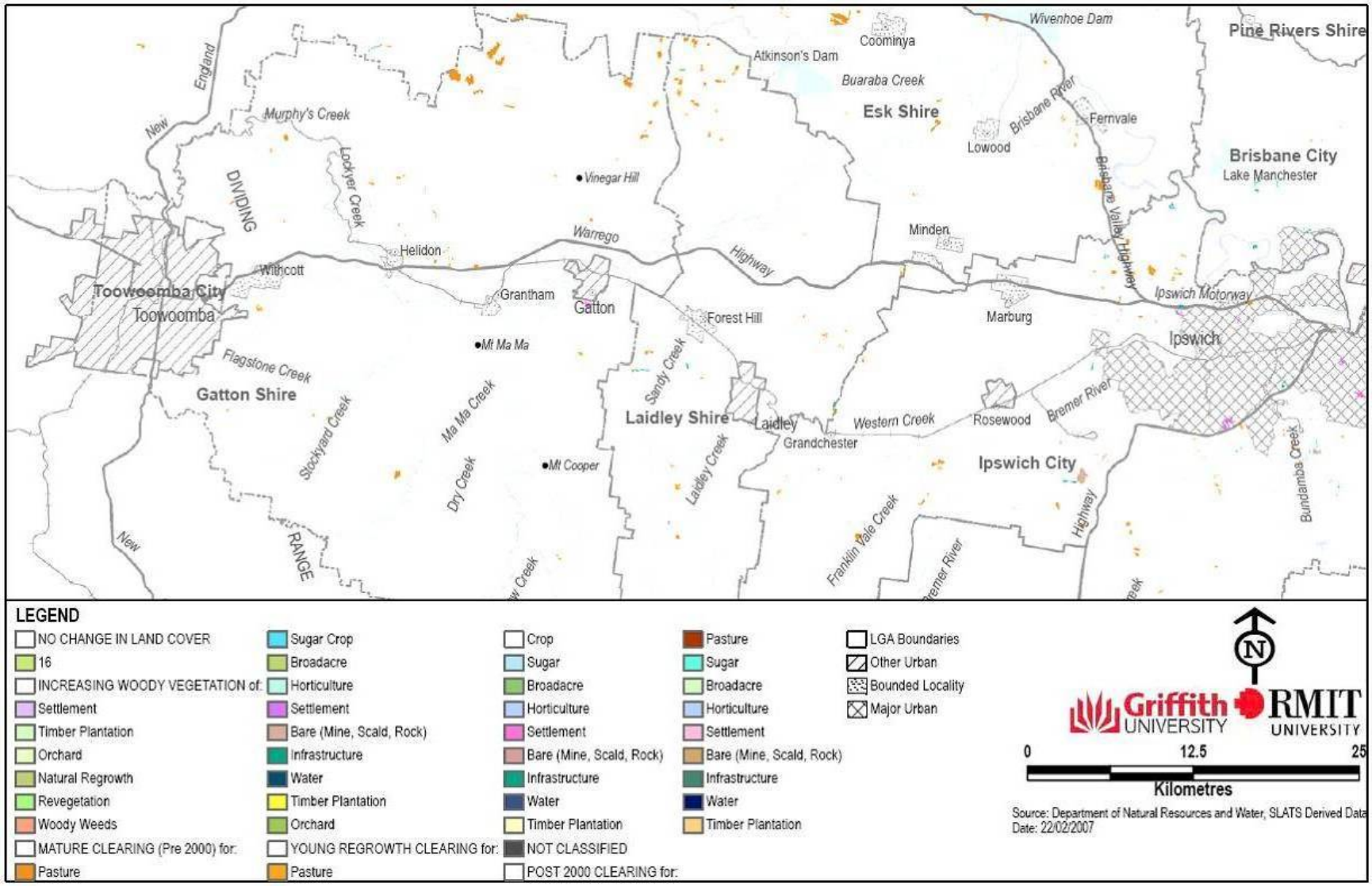
Map F-4: Changes in Woody Vegetation in the CSA 1988-1991



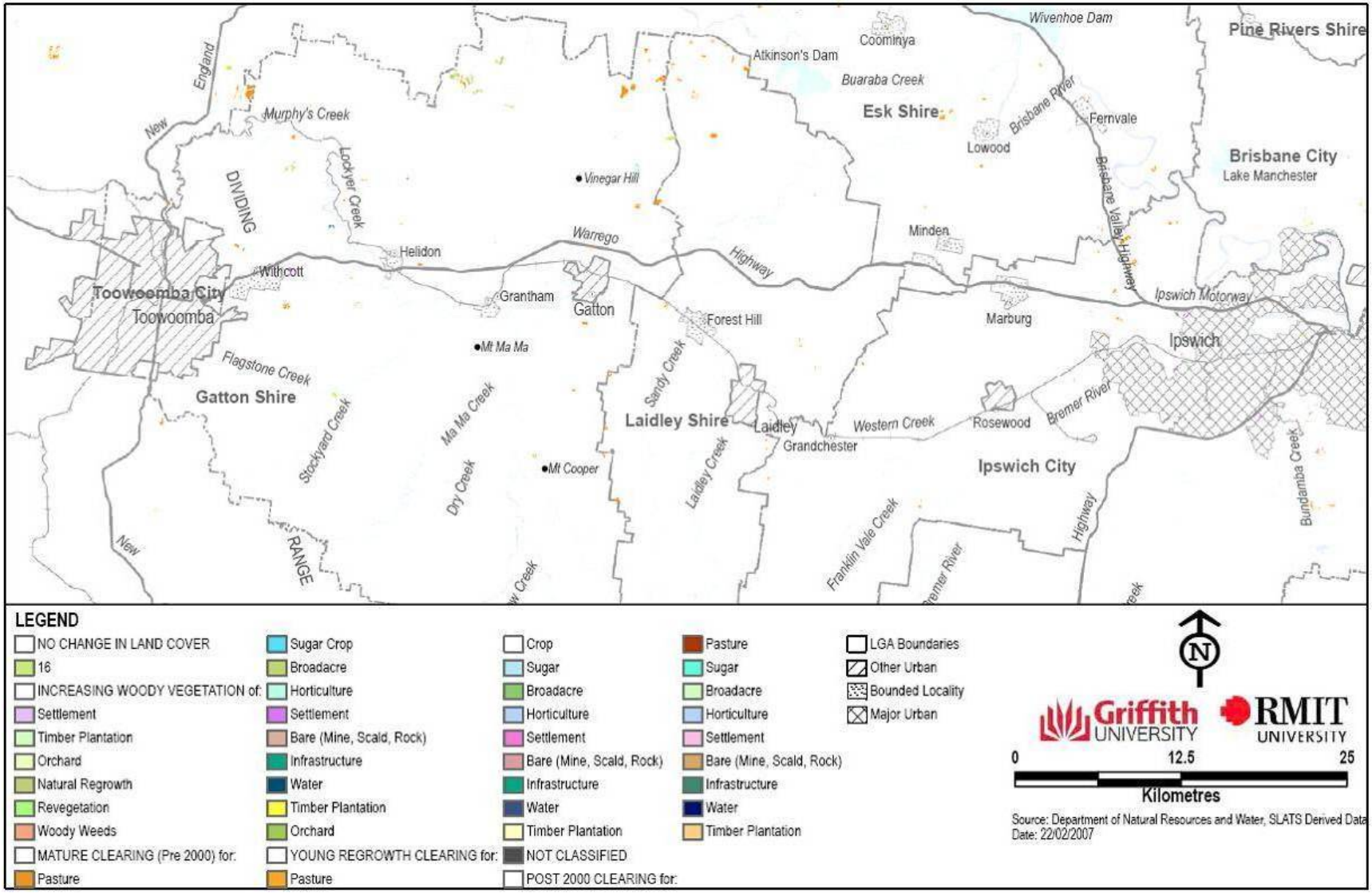
Map F-5: Changes in Woody Vegetation 1991-1995



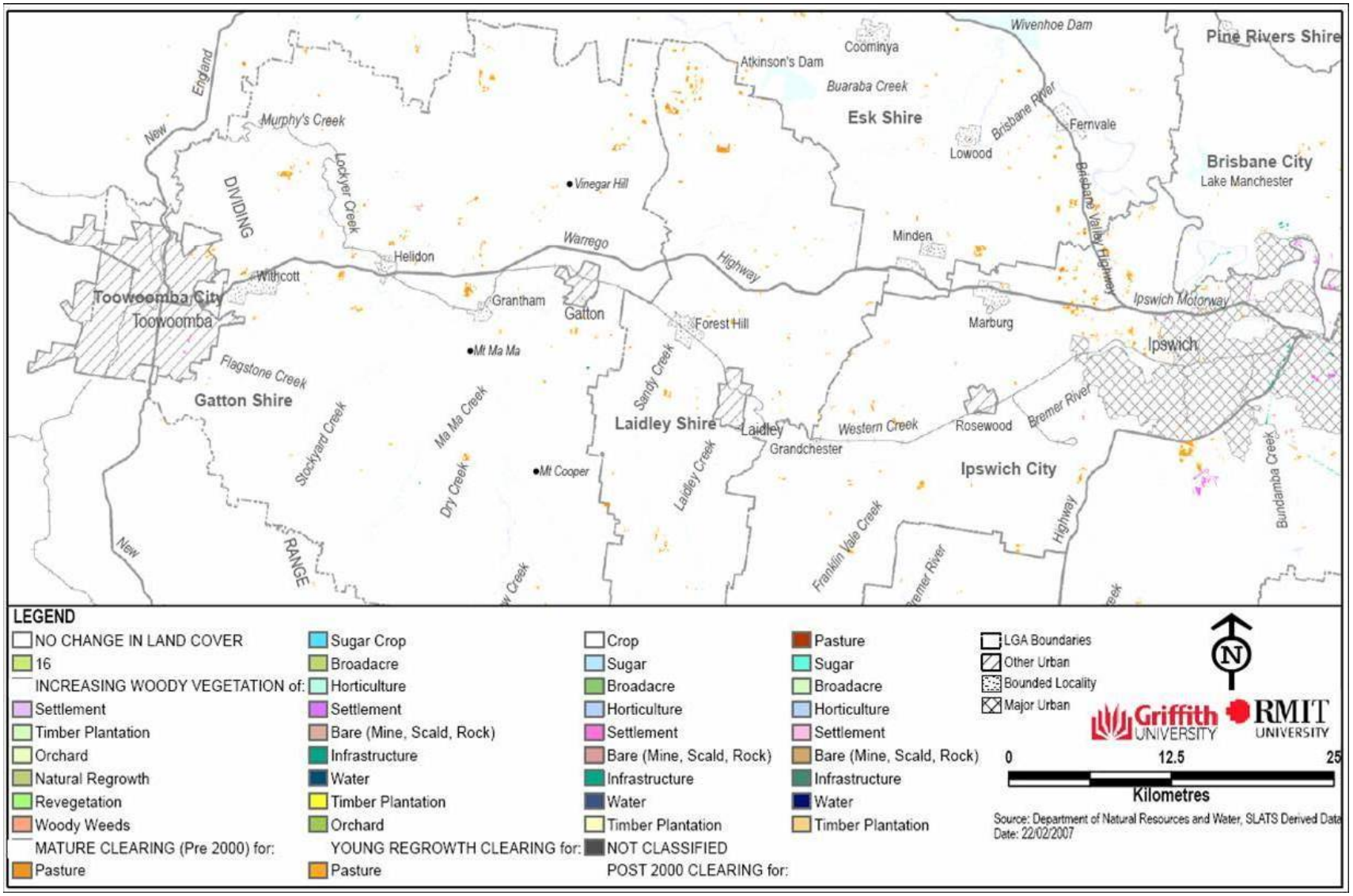
Map F-6: Changes in Woody Vegetation in the CSA 1995-1997



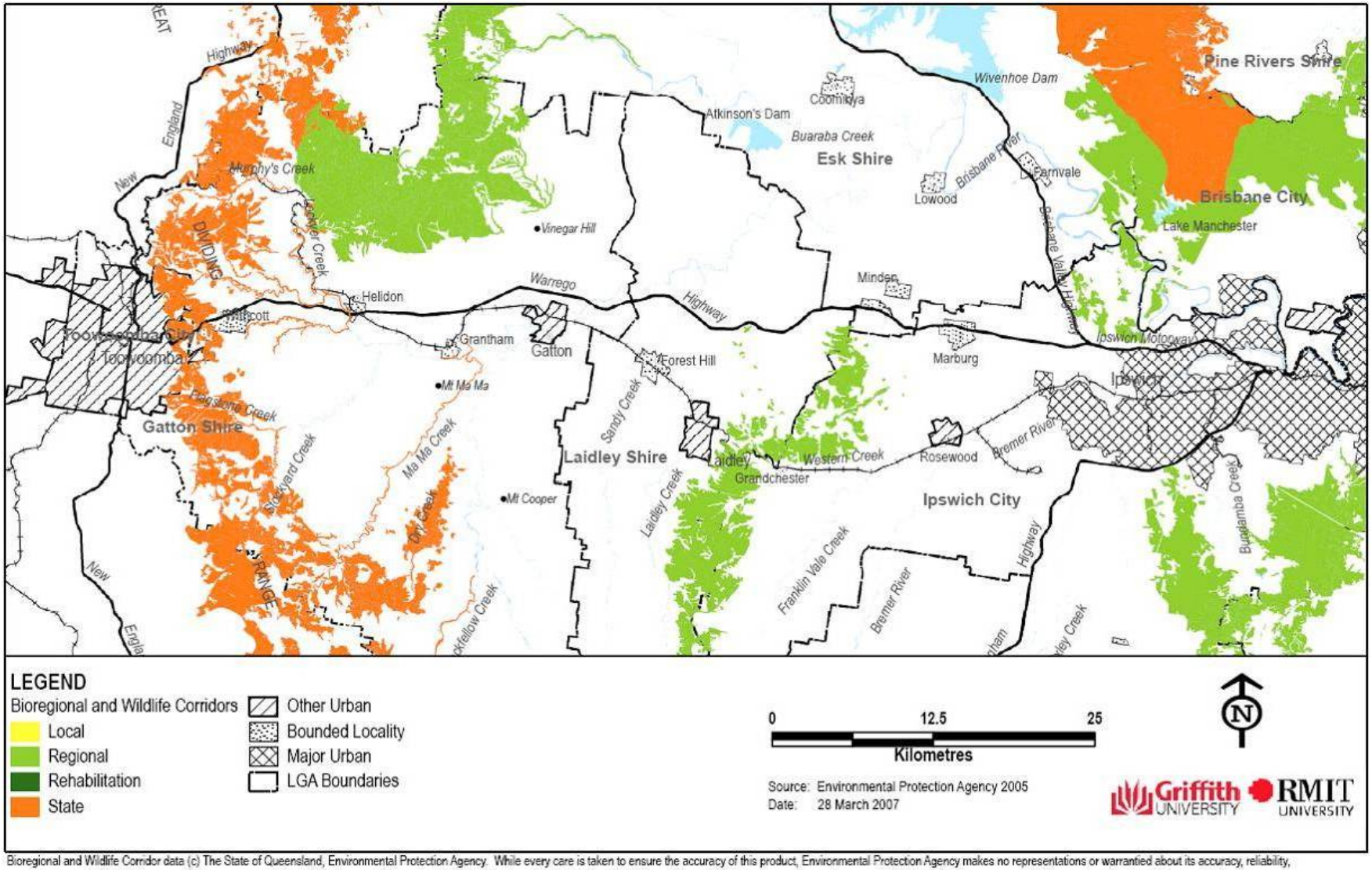
Map F-7: Changes in Woody Vegetation in the CSA 1997-1999



Map F-8: Changes in Woody Vegetation in the CSA 1999-2001

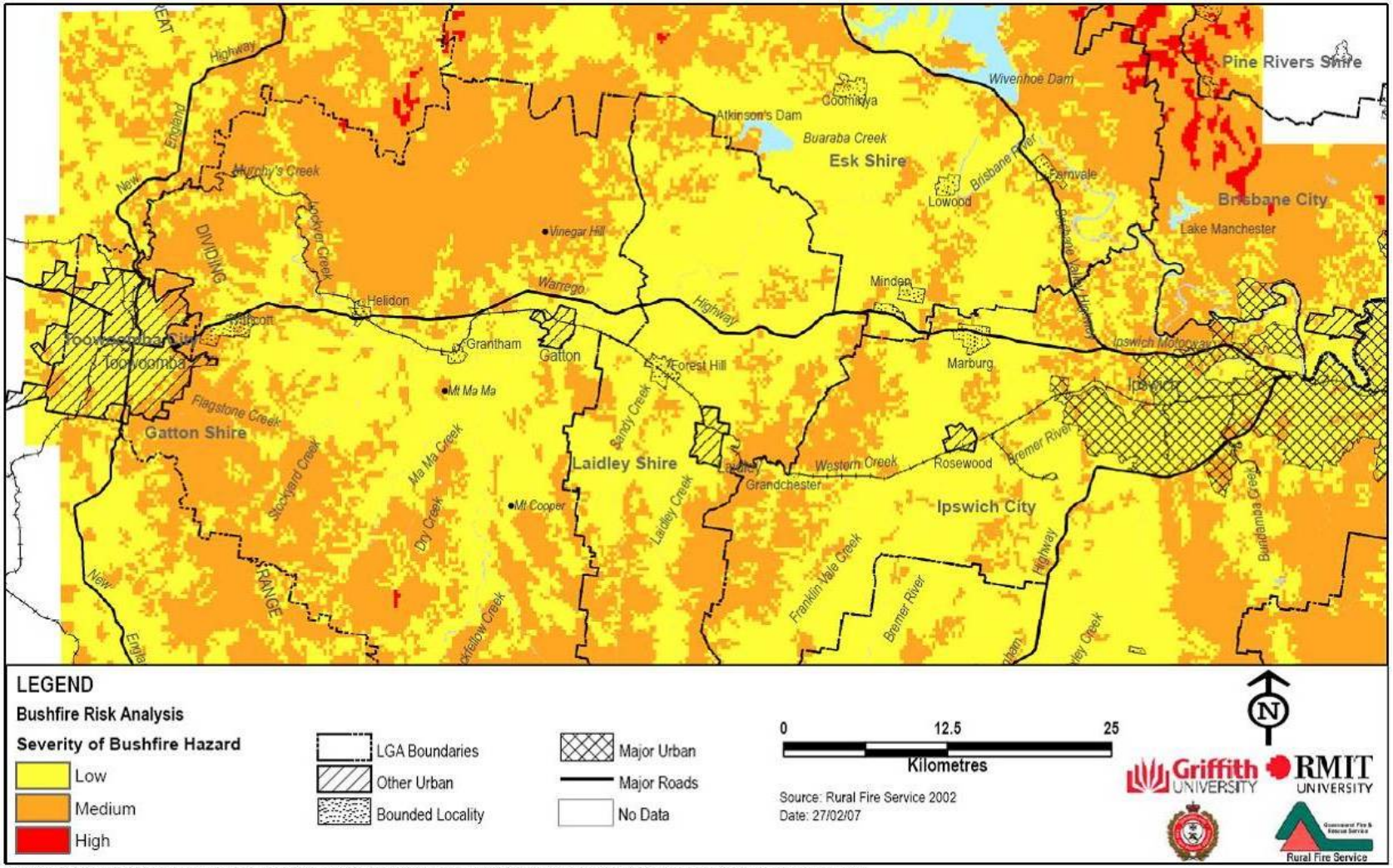


Map F-9: Changes in Woody Vegetation in the CSA 2001-2003



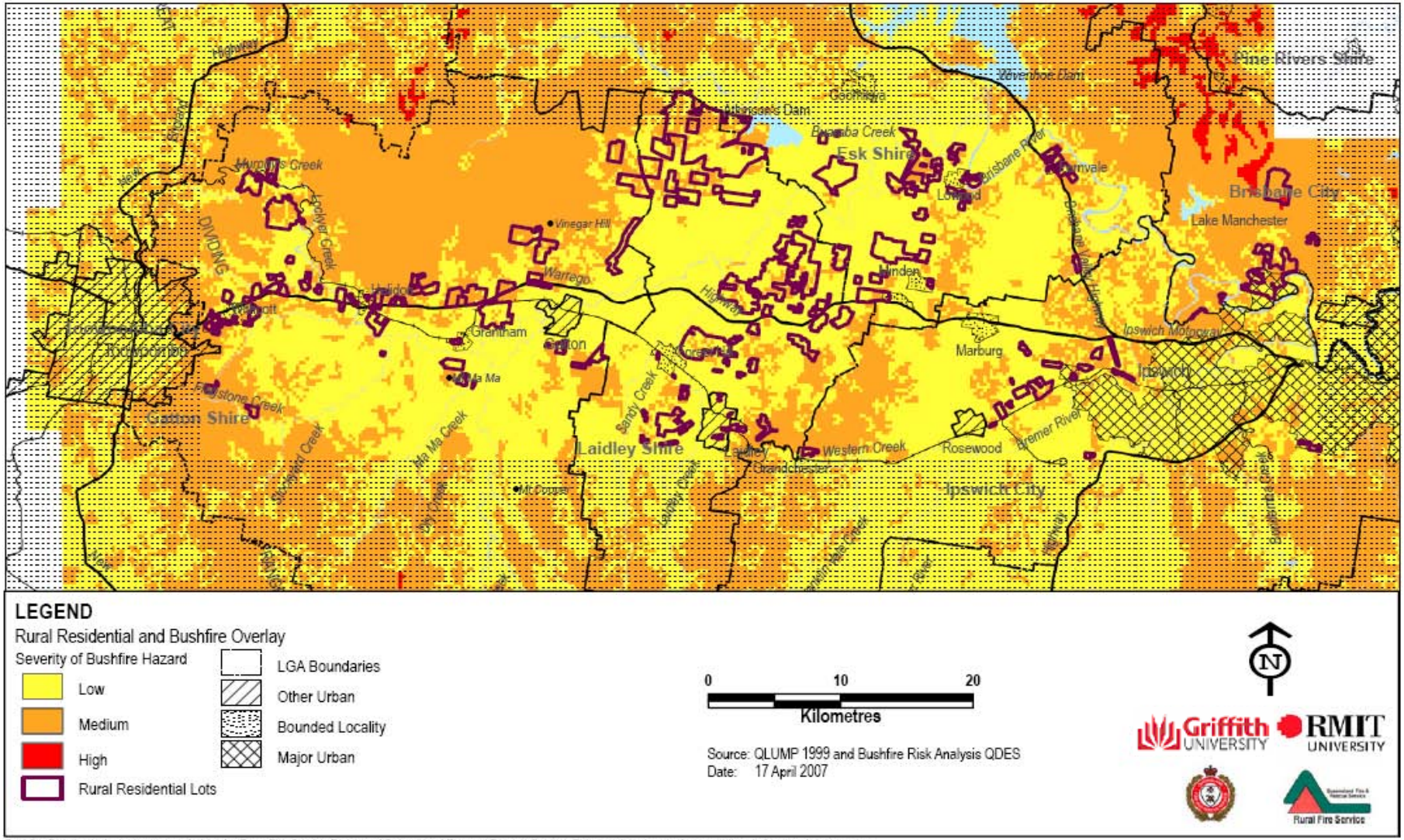
Map F-10: Bioregional and Wildlife Corridors

Appendix G: Bushfire Risk



Bushfire Risk Analysis data was supplied by the Rural Fire Service Division of Queensland Fire and Rescue Service. This data is to be used as a guide only for planning purposes.
While every care is taken to ensure the accuracy of this data, the Department of Emergency Services makes no representations or warranties about its accuracy, reliability, completeness or suitability and disclaims all responsibility and liability.

Map G-1: Bushfire Risk Analysis



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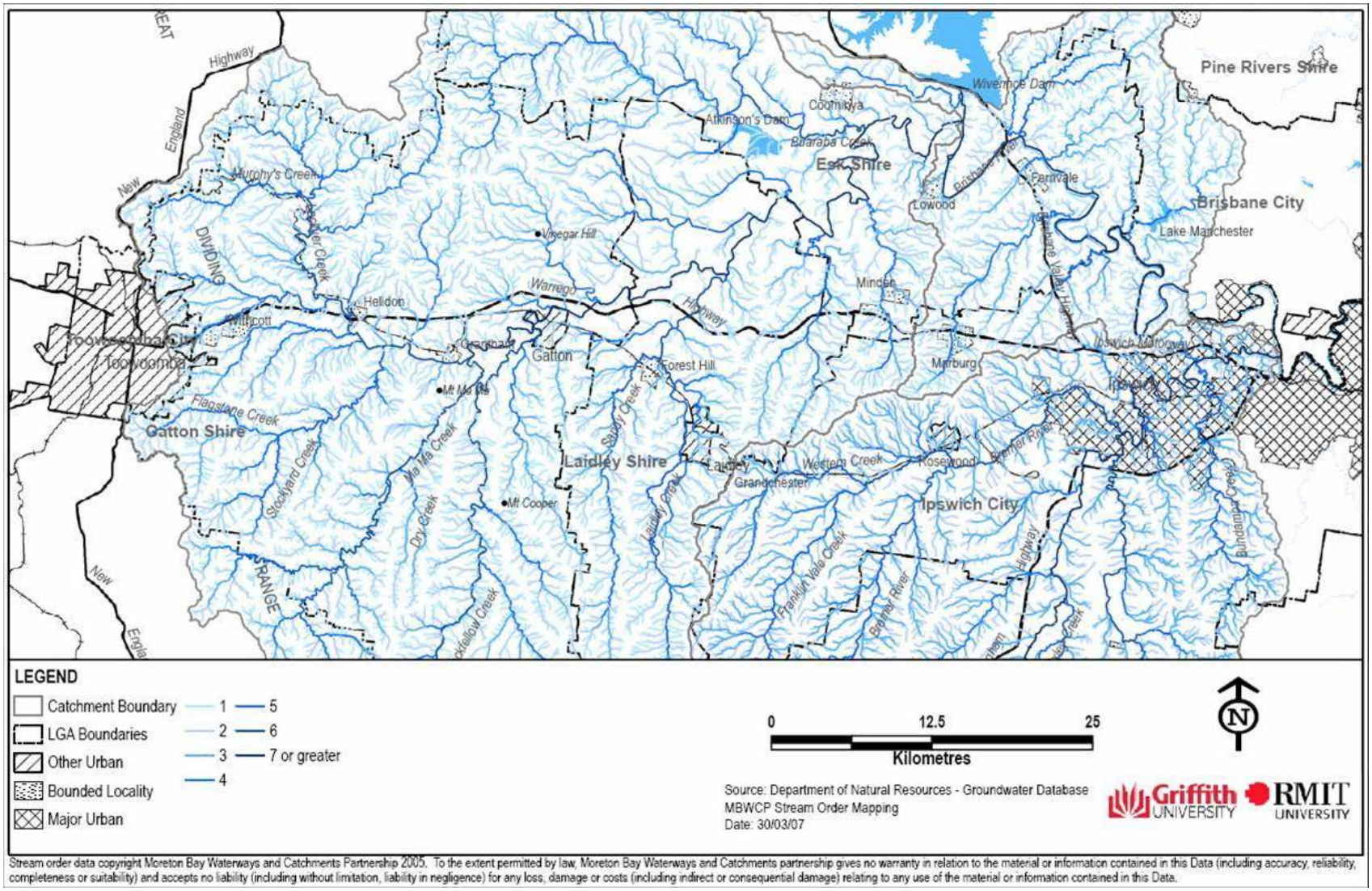
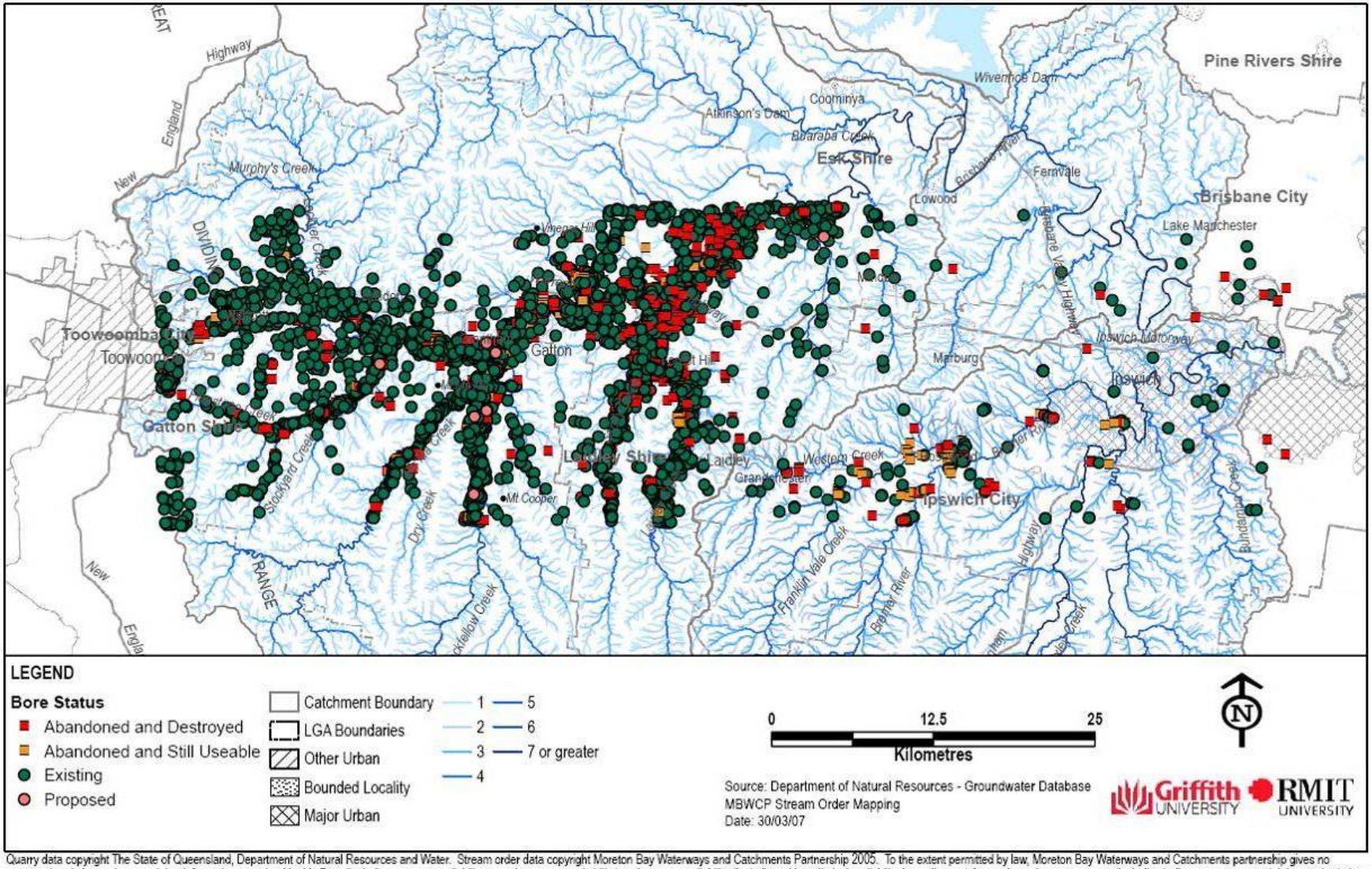
Map G-2: Bushfire Risk Analysis Overlay with Rural Residential Zoning (Derived from QLUMP 1999)

Appendix H: Water Resources



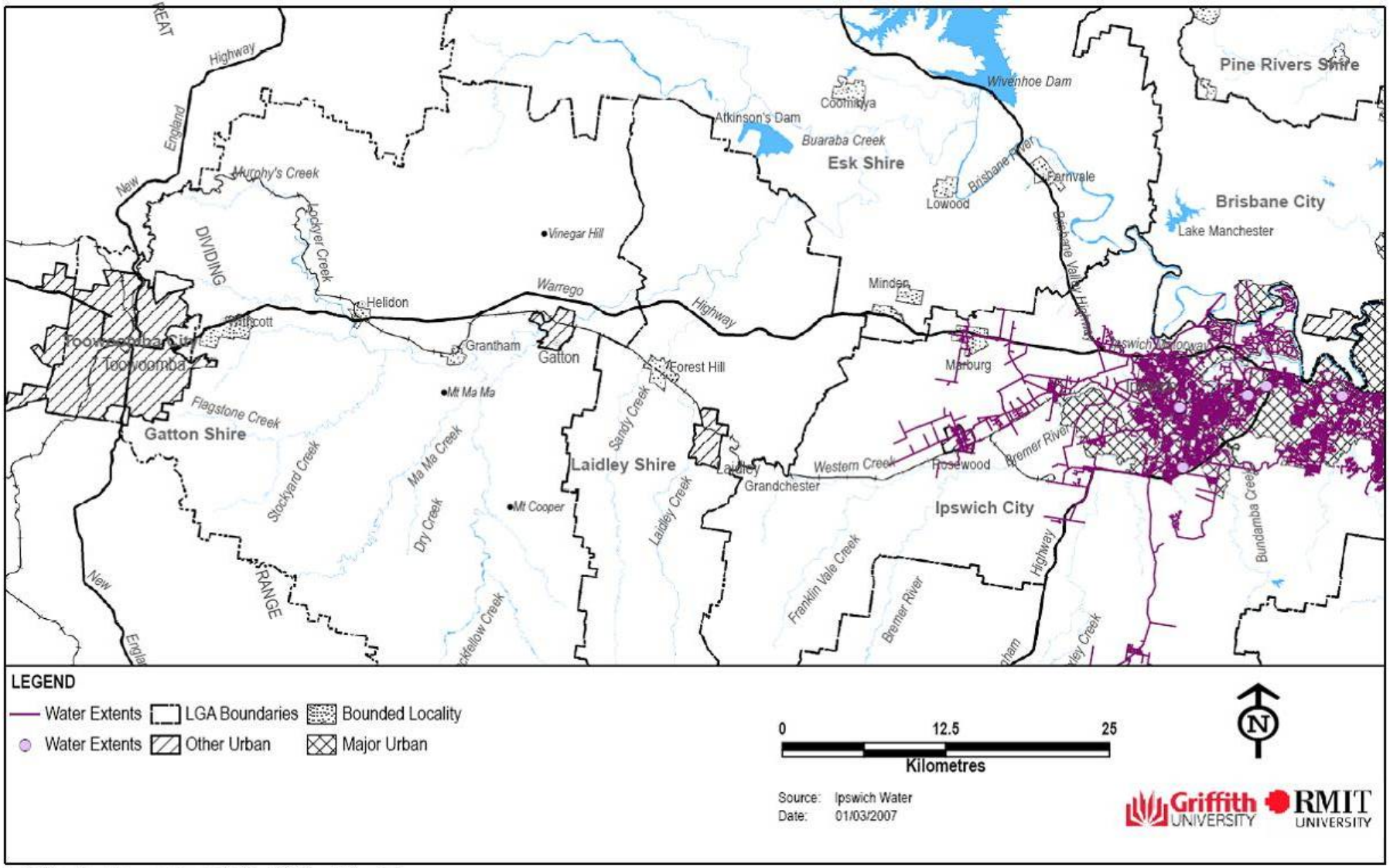
Map H-1: Stream Orders within the CSA



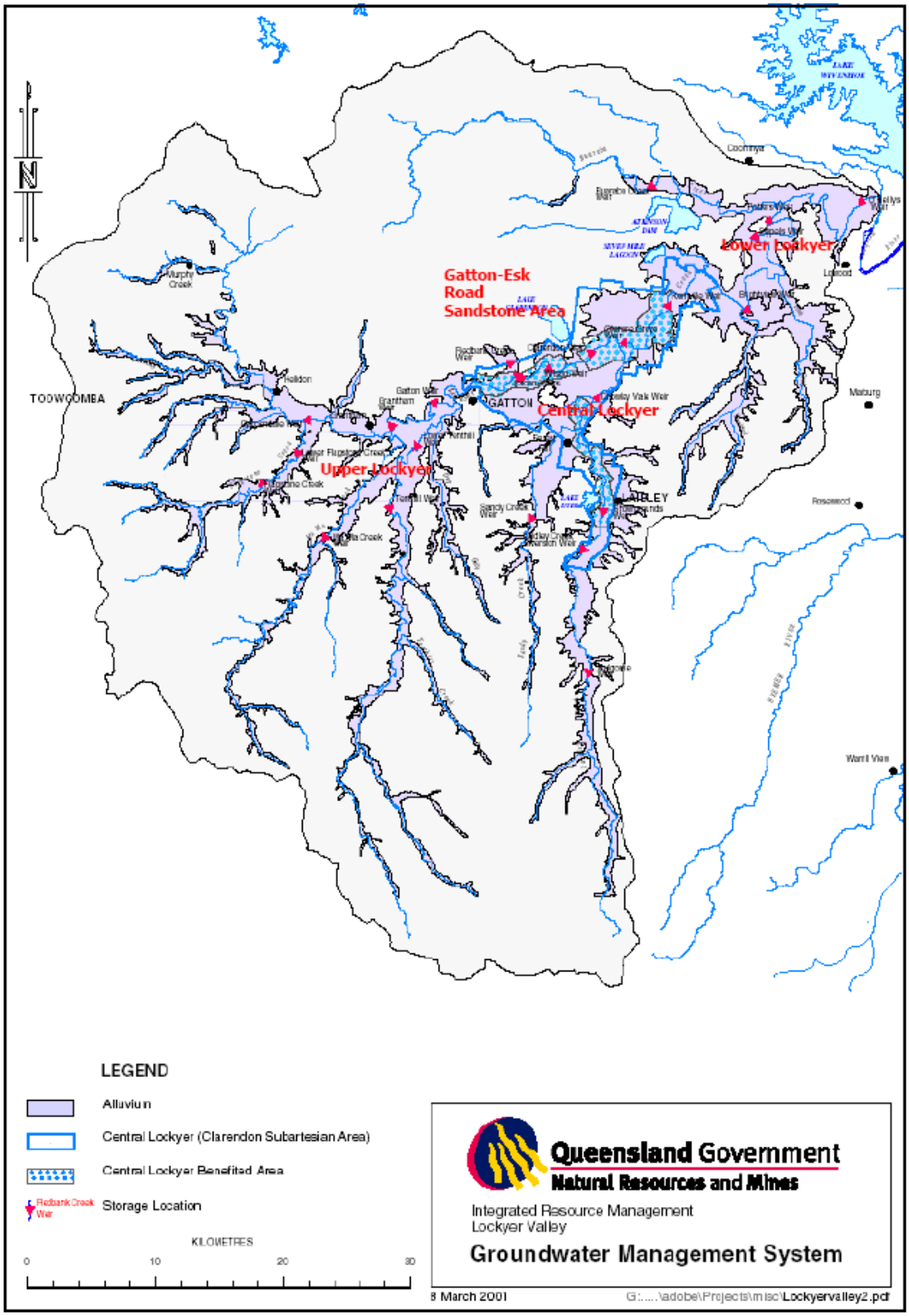
Map H-2: Status of Bores within the CSA

Table H-1: Healthy Waterways Report Card 2001-2006 for the Mid-Brisbane, Lockyer and Bremer Catchments

2001	C	Alternate flow regime; banks eroded to loss of riparian vegetation; reduced habitat diversity due to elevated vase flows; murky water due to sediments from tributaries	F	Little or no riparian vegetation in lowland areas; widespread evidence of channel and gully erosion; very high sediment loads during floods; elevated nutrient and salinity levels in groundwater; fish communities dominated by exotic species.	F	Little or no riparian vegetation in lowland areas; widespread evidence of channel and gully erosion; water turbid due to elevated loads; very high sediment loads during floods; elevated nutrient concentration downstream.
2002	C	River in fair to poor condition; some changes to fish communities; altered flow regime - decreased opportunity for fish recruitment.	F	Major streams in very poor condition, some upland streams good; stream flow reduced by water extraction, particularly during the dry years; channels lack suitable riparian vegetation and often choked with weeds.	F	Major streams in very poor condition; stream flows reduced by water extraction, particularly during dry years; channel erosion in some areas.
2003	C	River in fair condition; fish communities reflect moderate condition; good water quality.	F	Major streams in very poor condition, but some healthy stream in upper catchment; fish communities depleted with non-native species dominating at some sites; very high (unhealthy) algal growth at downstream sites.	F	Streams generally in poor condition; fewer species of fish than expected; reduced dissolved oxygen at some sites.
2004	B-	Site in good condition.	D	Generally poor results consistent across spring and autumn, but slight improvement from 2002-03 possibly due to flow	D-	Generally poor results across all indicators, particularly in spring 2003.
2005	C+	This site is in fair condition; reduced score for the fish indicator during spring.	D-	Streams remain in poor condition; lower scores for most indicators in autumn.	D-	Streams in poor condition; most indicators scored poorly throughout the year.
2006	C+	This site is in fair condition; scored for physical-chemical and aquatic macro invertebrate indicators excellent for both seasons as in previous years; results for nutrient cycling highly variable	D-	Streams generally remain in poor condition; results for the ecosystem processes indicator improved substantially, but those for fish remain poor.	D-	Streams generally in poor condition; improvements in annual scores for ecosystem processes and physical-chemical indicators were offset by a decline in other services.

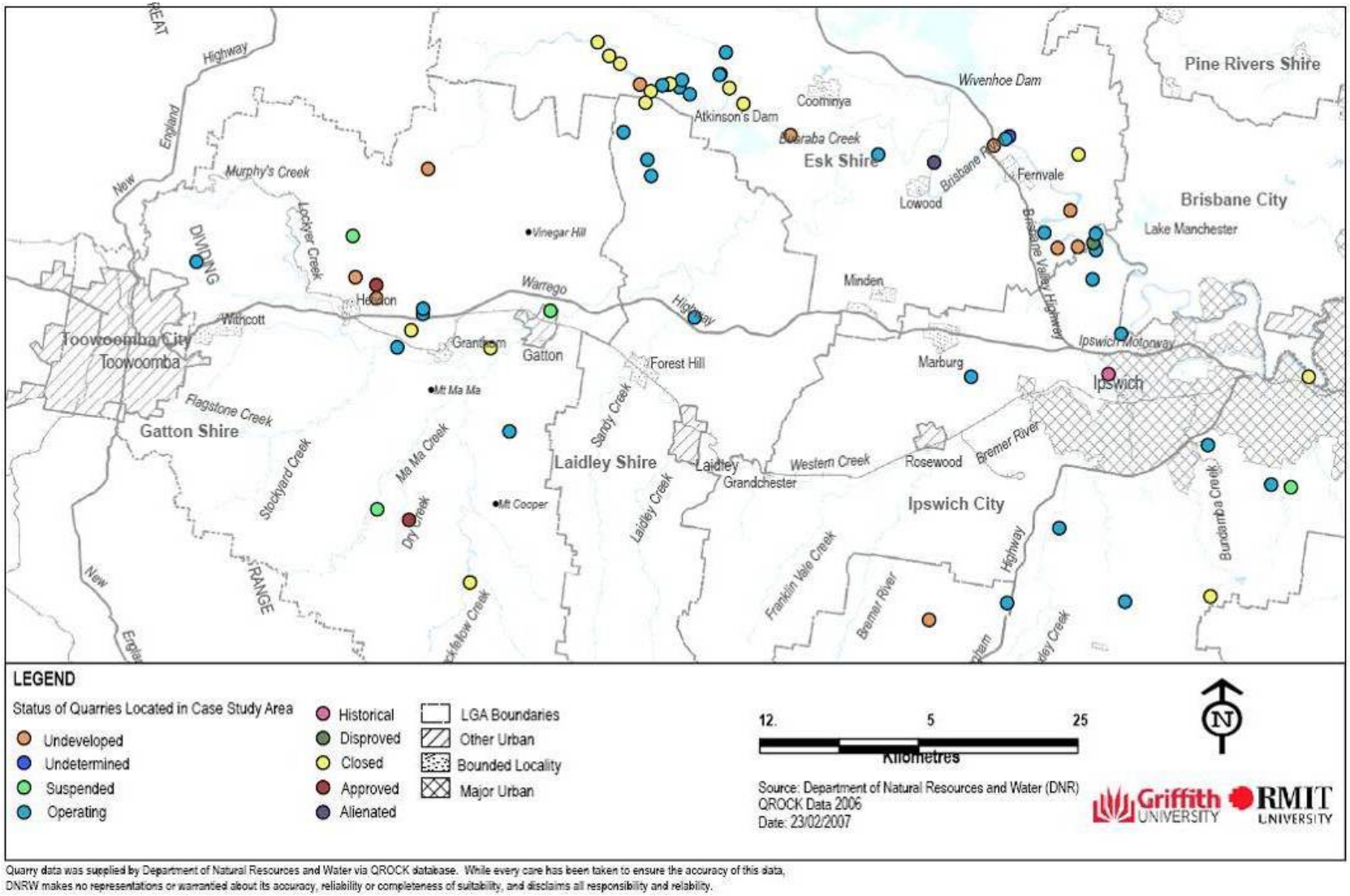


Map H-3: Ipswich Water Extents



Map H-4: Lockyer Valley Groundwater System

Appendix I: Quarries



Quarry data was supplied by Department of Natural Resources and Water via QROCK database. While every care has been taken to ensure the accuracy of this data, DNRW makes no representations or warranties about its accuracy, reliability or completeness of suitability, and disclaims all responsibility and reliability.

Map I-1: Location and Status of Quarries Located in the CSA

Appendix J: NRM Links in the CSA

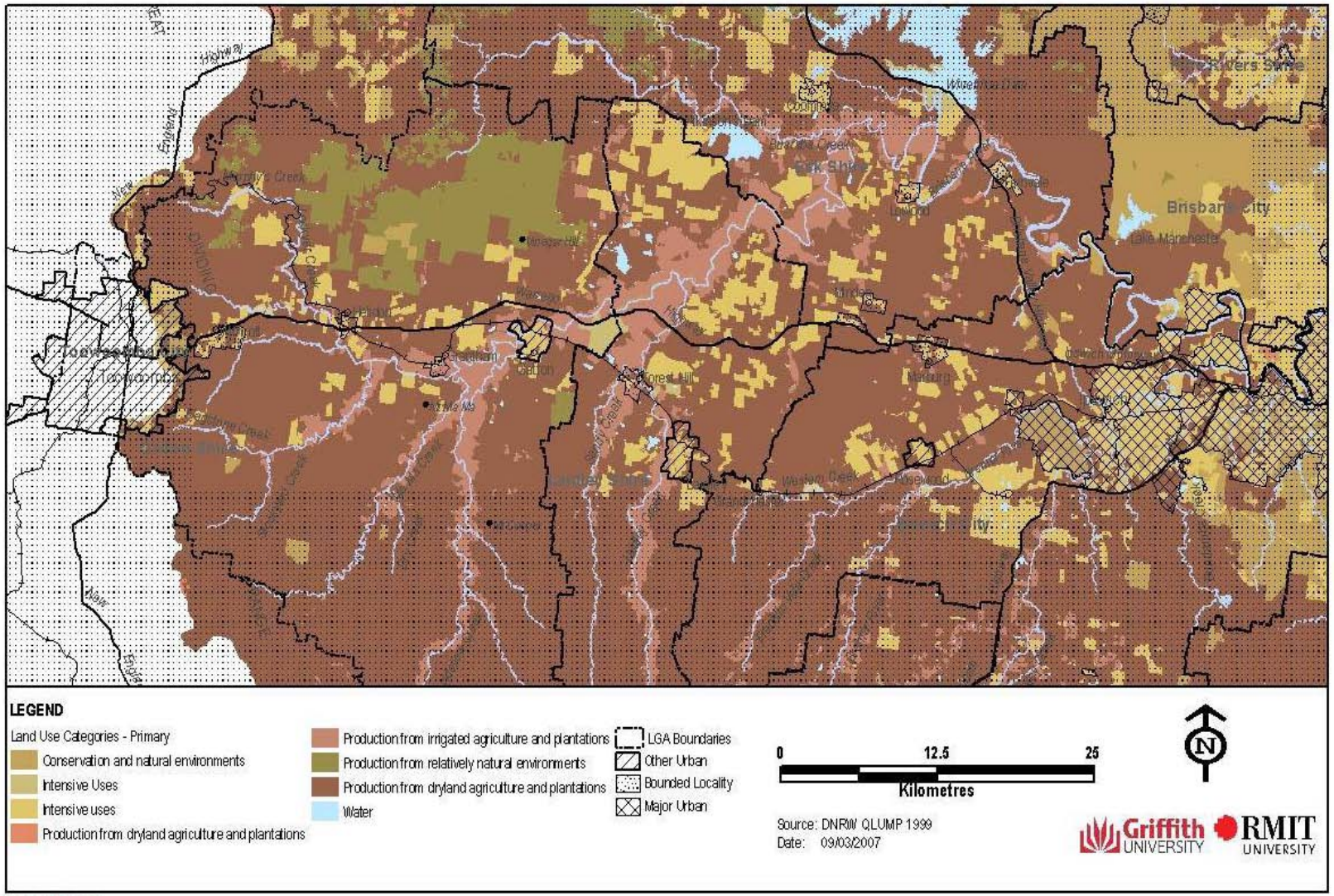
Table J-1: NRM Links between Local Authority Planning Instruments and the Regional NRM Plan for the CSA

Local Authority		NRM Links between LG plans and planning instruments and HLOF MATs and RCTs						
		SW	GW	AE	TB	LR	LA	AT
Esk Shire	IPA Planning Scheme	✓ - catchment protection and water storage buffer ✓ - DEO to protect catchments, waterways and water quality ✓ - C'ment Mgt overlay		✓ - DEO to protect catchments, waterways and water quality	✓ - open space system to protect biodiversity ✓ - Trees (veg protection) ✓ - DEO to protect biodiversity & ecological processes ✓ - Biodiversity overlay code	✓ - rural area protection aim ✓ - DEO to protect land resources (inc GQAL)	✓ - rural amenity and character protection aim ✓ - open space system to meet rec needs ✓ - DEO to protect amenity and character ✓ - Scenic amenity overlay code	
	Operational Plan							
	Local Law				✓ - control of pests ✓ - extractive industry (rehabilitation requirements)			

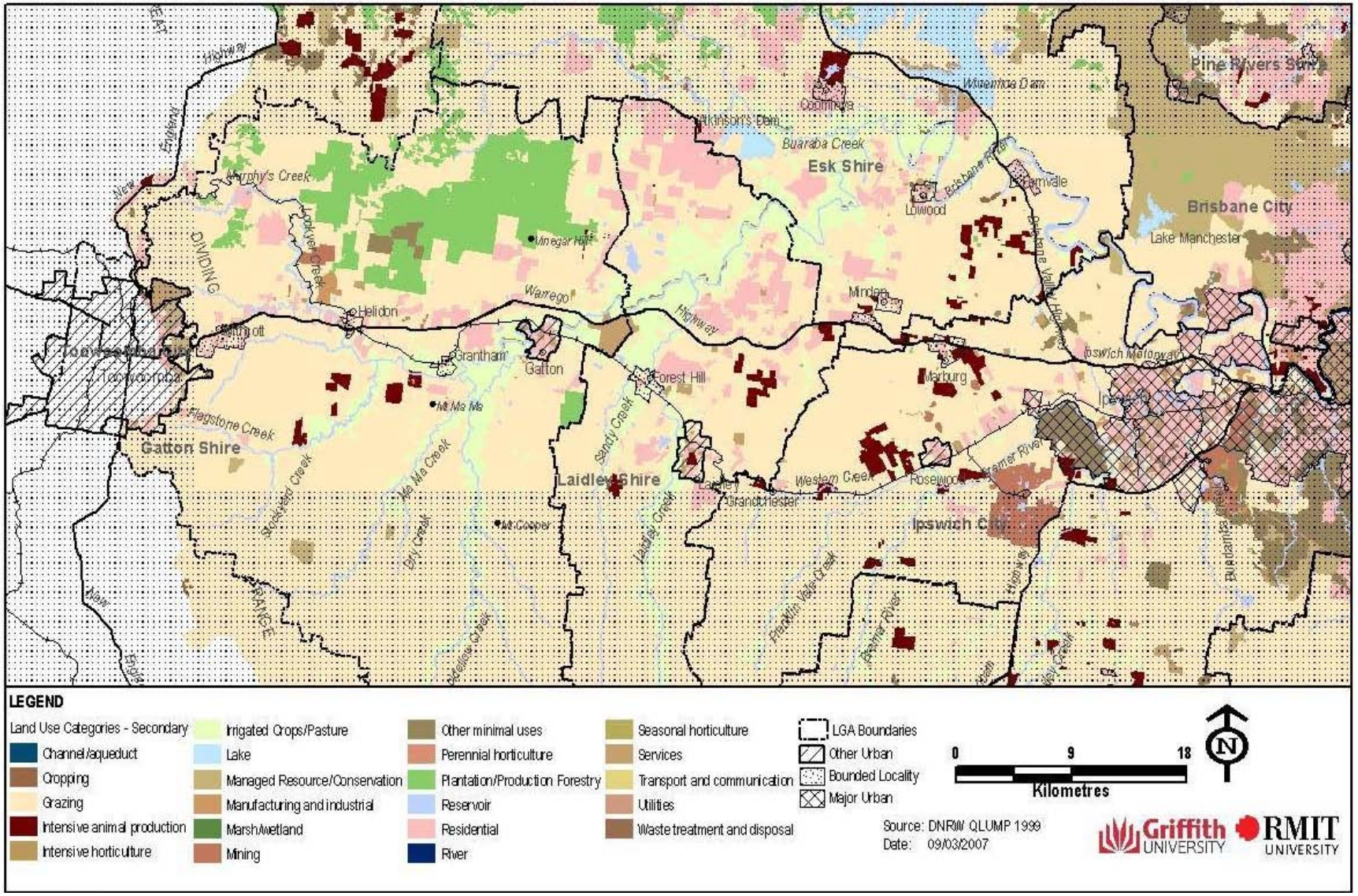
Local Authority		NRM Links between LG plans and planning instruments and HLOF MATs and RCTs						
		SW	GW	AE	TB	LR	LA	AT
Gatton Shire	IPA Planning Scheme	✔ - maintain water quality, buffer water catchments		✔ - buffer water catchments	✔ - prevent weed pests ✔ - protect biological values	✔ - protect natural resources (GQAL) ✔ - DEO (draft) to protect natural resources	✔ - protect amenity and visual character ✔ - DEO (draft) to protect visual amenity, character and image	
	Operational Plan							
	Local Law				✔ - control of pests			✔ - air standards
Ipswich City	IPA Planning Scheme	✔ DEO to protect water resources ✔ - DEO to prevent water pollution ✔ - Bushland Mgt Plan ✔ - planning scheme policies			✔ - DEO to protect natural vegetation & habitats ✔ - Bushland Mgt Plan ✔ - vegetation mgt code	✔ - DEOs to protect rural areas and GQAL	✔ - protect rural landscape	✔ - DEO to prevent air pollution
	Operational Plan	✔ - Ipswich Water (water conservation practices and education) ✔ - Cons,			✔ - Cons, Parks & Sports Dept (greening program, open space)			

Local Authority		NRM Links between LG plans and planning instruments and HLOF MATs and RCTs						
		SW	GW	AE	TB	LR	LA	AT
		Parks & Sports Dept (catchment mgt) ✔ - Health & Env Protection Program (urban stormwater)						
	Local Law				✔ - control of pests ✔ - vegetation mgt			
Laidley Shire	IPA Planning Scheme	✔ - Overlay for water quality		✔ - DEO to protect wetlands ✔ - Overlay for wetlands	✔ - DEO to protect rem veg, habitats, corridors ✔ - Overlay for rem veg, open space, biodiversity protection, corridors, habitats	✔ - DEO to min land degradation ✔ - Overlay for GQAL, erosion, salinity control	✔ - DEO to protect scenic amenity ✔ - Overlay for protection of scenic amenity	
	Operational Plan							

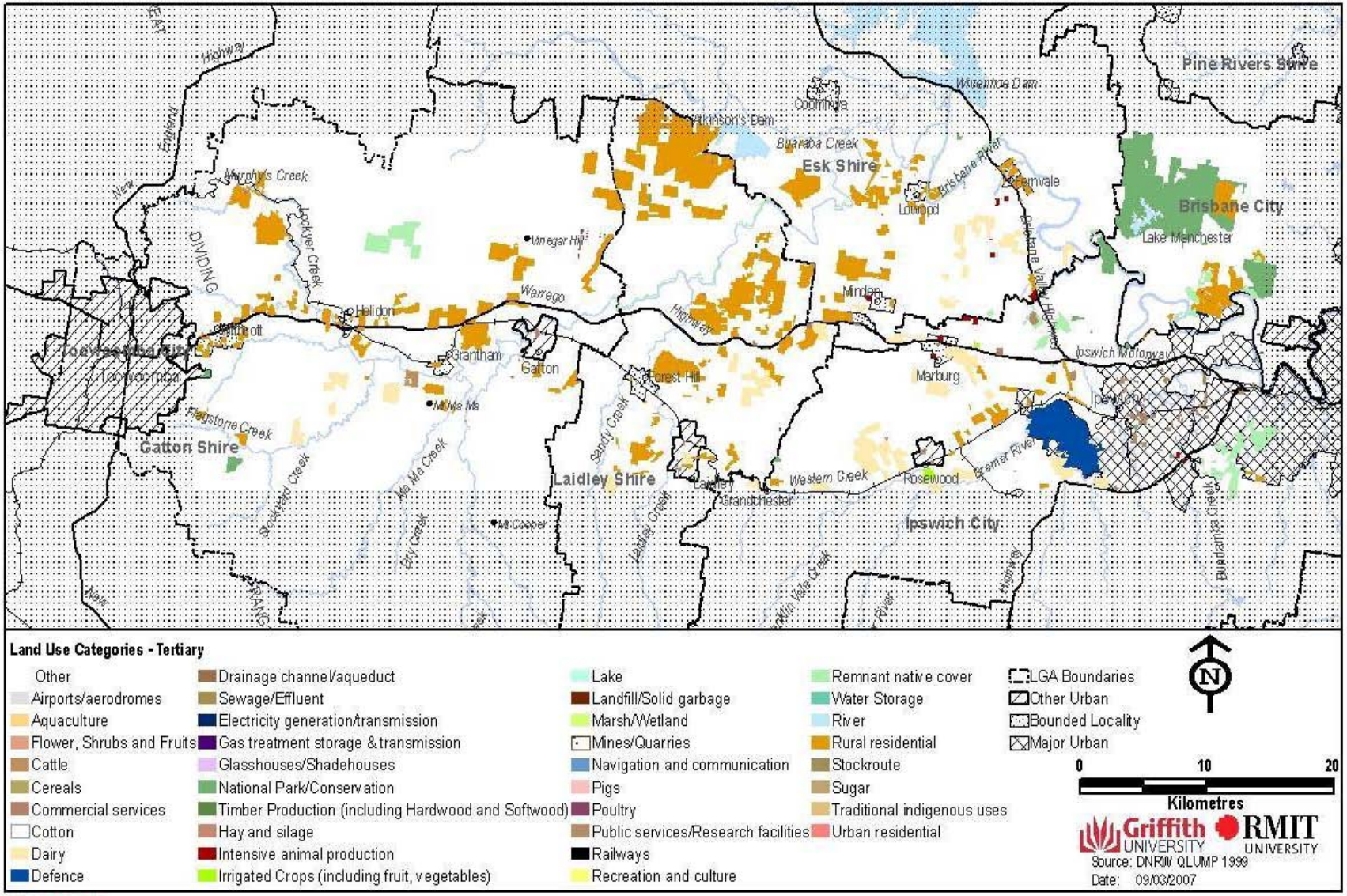
Appendix K: QLUMP Land Use Analysis



Map K-1: QLUMP 1999 Primary Land Use Categories

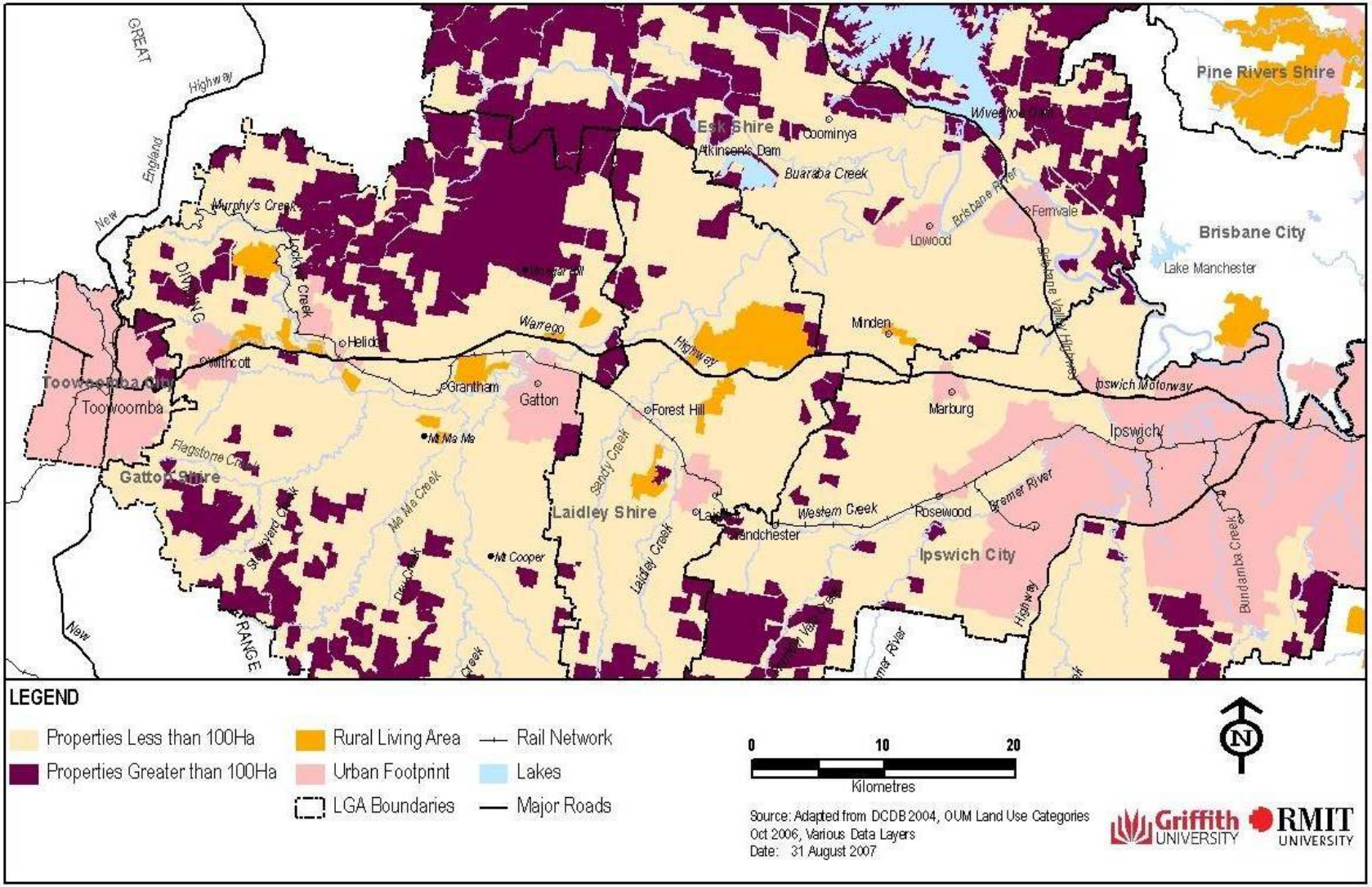


Map K-2: QLUMP 1999 Secondary Land Use Categories

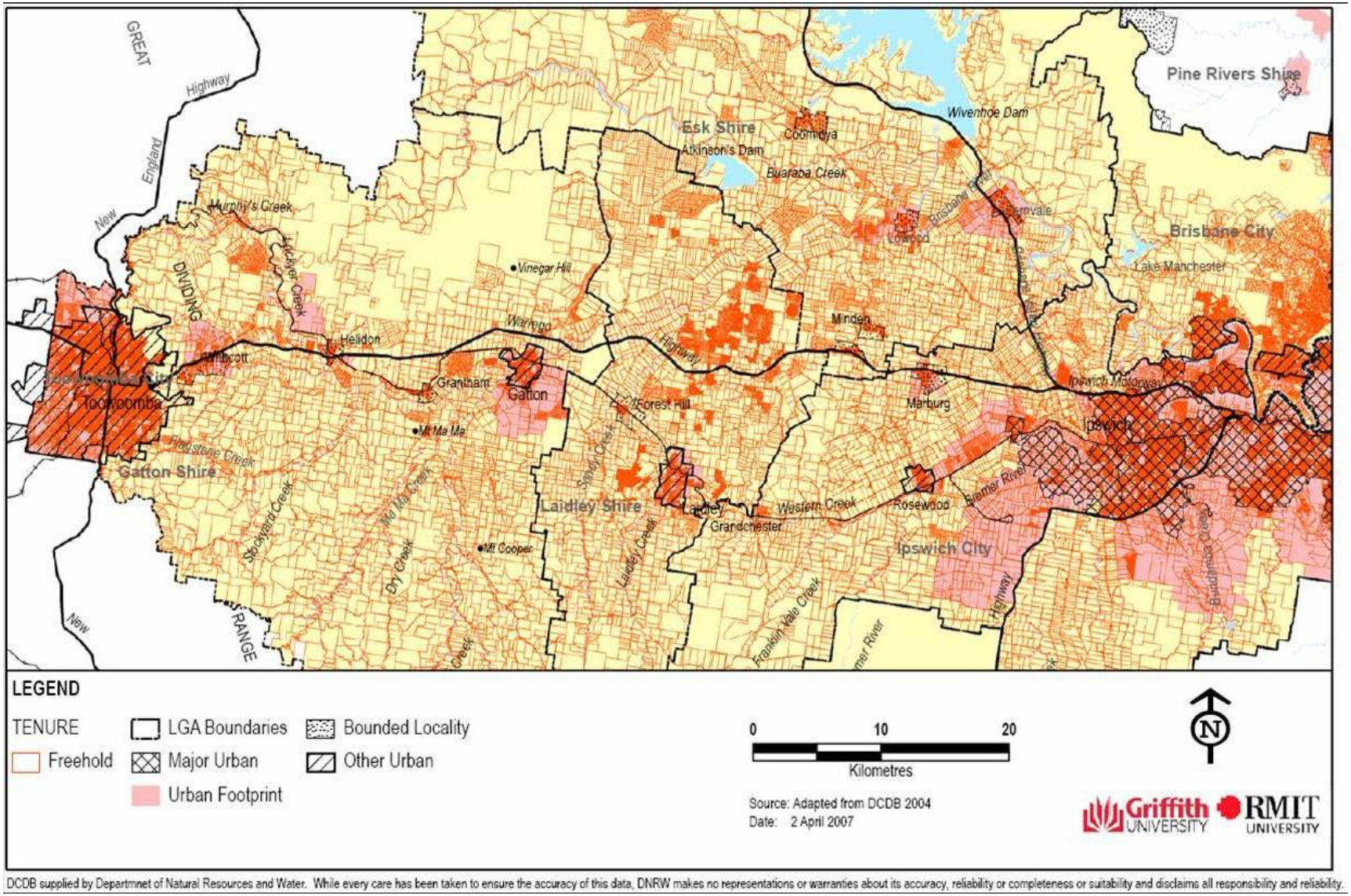


Map K-3: QLUMP 1999 Tertiary Land Use Categories

Appendix L: Lot Size Analysis



Map L-1: Properties Greater than 100ha



DCDB supplied by Departmnet of Natural Resources and Water. While every care has been taken to ensure the accuracy of this data, DNRW makes no representations or warranties about its accuracy, reliability or completeness or suitability and disclaims all responsibility and reliability.

Map L-2: Properties Classified as Freehold within the CSA

Appendix M: Demography

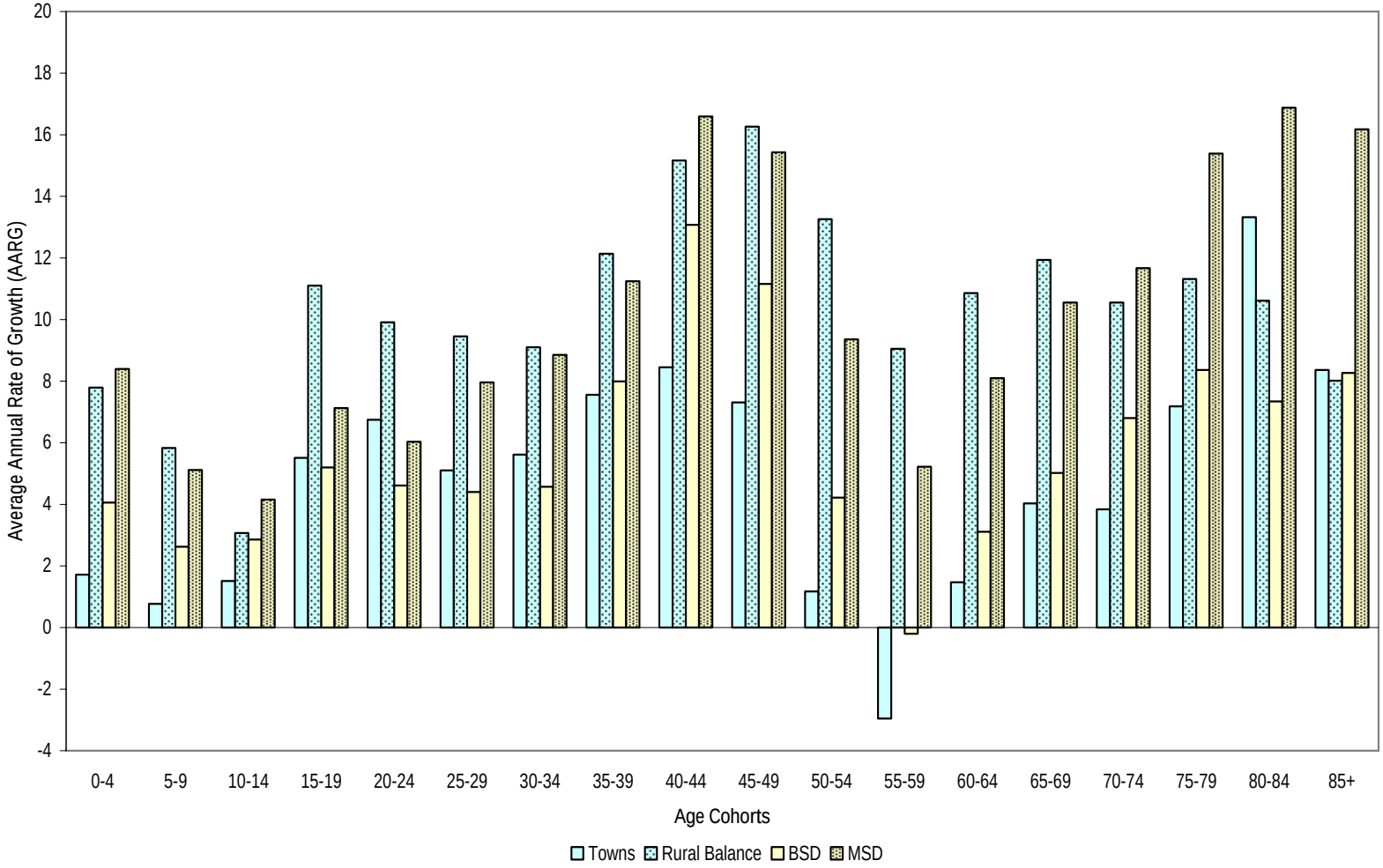


Figure M-1: Average Annual Growth Rate (%) 1981-1991

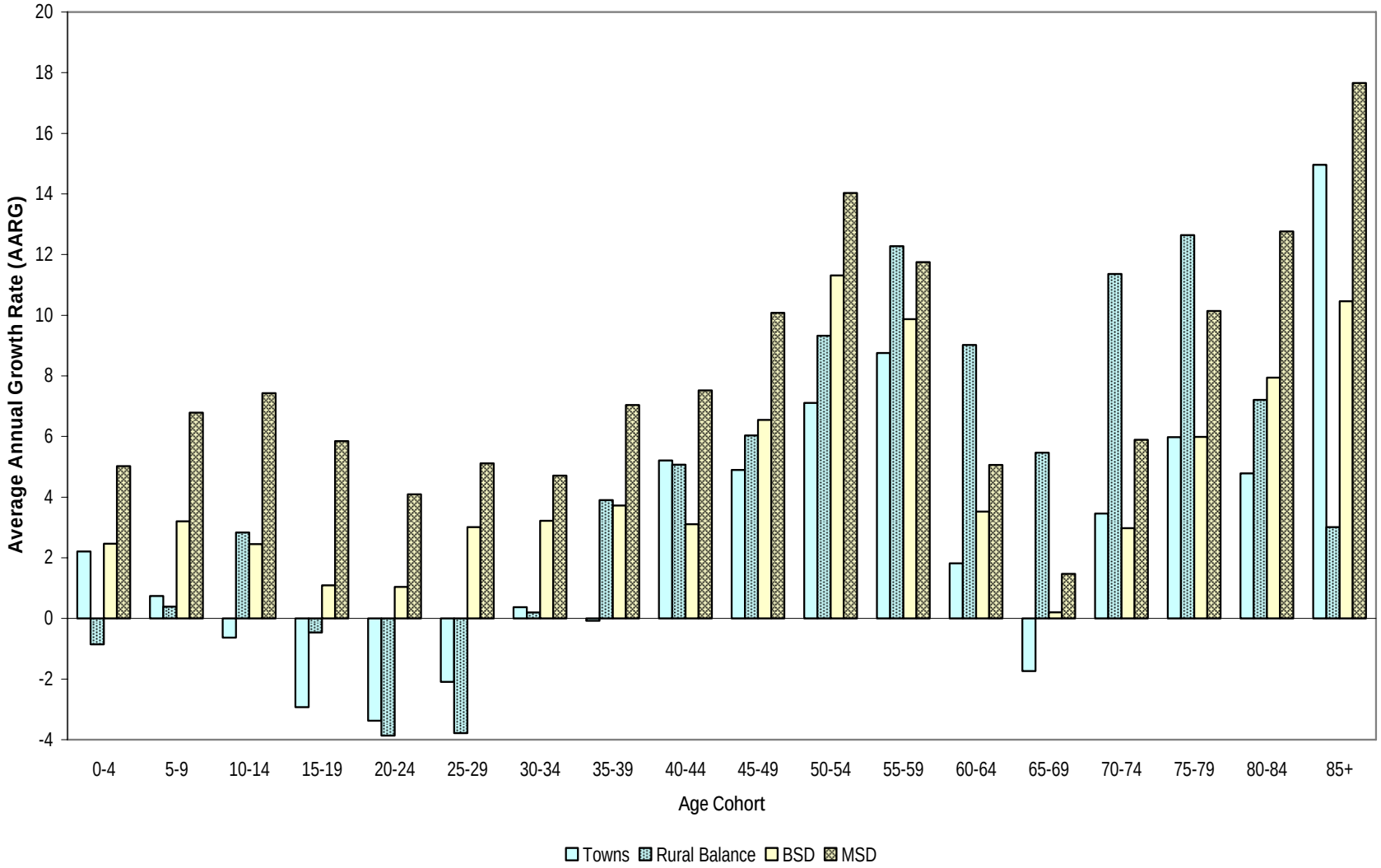


Figure M-2: Average Annual Growth Rate (%) 1991-2001

Table M-1: Population Mobility (1991-2001)

1991	Towns	Rural Balance	BSD	MSD
Same Address 5 years ago_TP	45.9	43.3	4.9	7.0
Diff SLA: Same SLA_TP	11.0	6.9	3.9	7.6
Diff SLA: NSW_TP	3.4	4.4	1.6	3.7
Diff SLA: VIC_TP	0.9	1.1	24.4	21.5
Diff SLA: QLD_TP	20.5	25.9	0.4	0.6
Diff SLA: SA_TP	0.4	0.4	0.3	0.4
Diff SLA: WA_TP	0.2	0.3	0.2	0.4
Diff SLA: TAS_TP	0.2	0.1	0.2	0.3
Diff SLA: NT_TP	0.2	0.3	0.3	0.4
Diff SLA: ACT_TP	0.1	0.1	4.3	4.3
Different Address 5 Years Ago_OS_TP	1.3	1.3	0.5	0.5
Different Address 5 Years Ago: NS_TP	0.4	0.4	3.2	3.5

1996	Town	Rural Balance	BSD	MSD
Same Address 5 years Ago_M	22.7	22.4	20.9	18.5
Same Address 5 years Ago_F	23.2	20.8	22.1	19.3
Same Address 5 years Ago_TP	45.9	43.1	43.0	37.8
Differrent Address 5 years Ago_M	20.8	22.1	22.7	25.2
Differrent Address 5 years Ago_F	21.8	21.7	23.6	26.3
Differrent Address 5 years Ago_TP	42.6	43.8	46.3	51.6

2001	Towns	Rural Balance	BSD	MSD
Same Address 1 Year Ago_M	36.2	39.2	36.3	34.8
Same Address 1 Year Ago_F	37.5	37.2	38.1	36.4
Same Address 1 Year Ago_TP	73.7	76.4	74.4	71.2
Different Address 1 Year Ago_M	10.3	8.2	10.4	11.3
Different Address 1 Year Ago_F	11.0	8.4	10.8	12.0
Different Address 1 Year Ago_TP	21.3	16.5	21.2	23.3
Same Address 5 Years Ago_M	23.8	26.3	21.8	19.7
Same Address 5 Years Ago_F	24.3	24.9	23.0	20.5
Same Address 5 Years Ago_TP	48.13	51.2	44.8	40.3
Differenet Address 5 Years Ago_M	19.23	17.8	21.9	23.6
Different Address 5 Years Ago_F	21.33	17.9	23.1	25.2
Different Address 5 Years Ago_TP	40.6	35.7	44.9	48.9

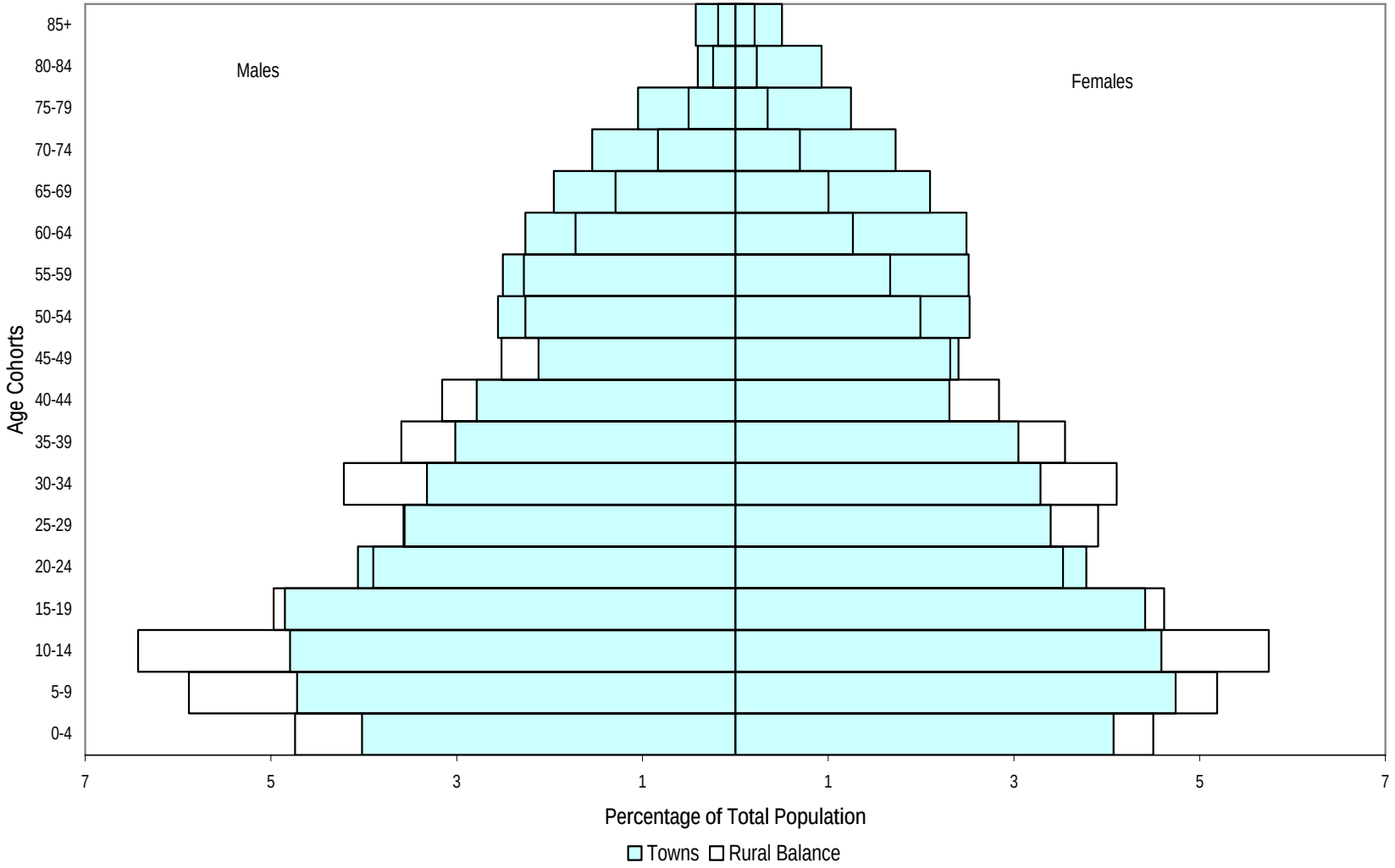


Figure M-3: Population Pyramid 1981- Towns and Rural Balance

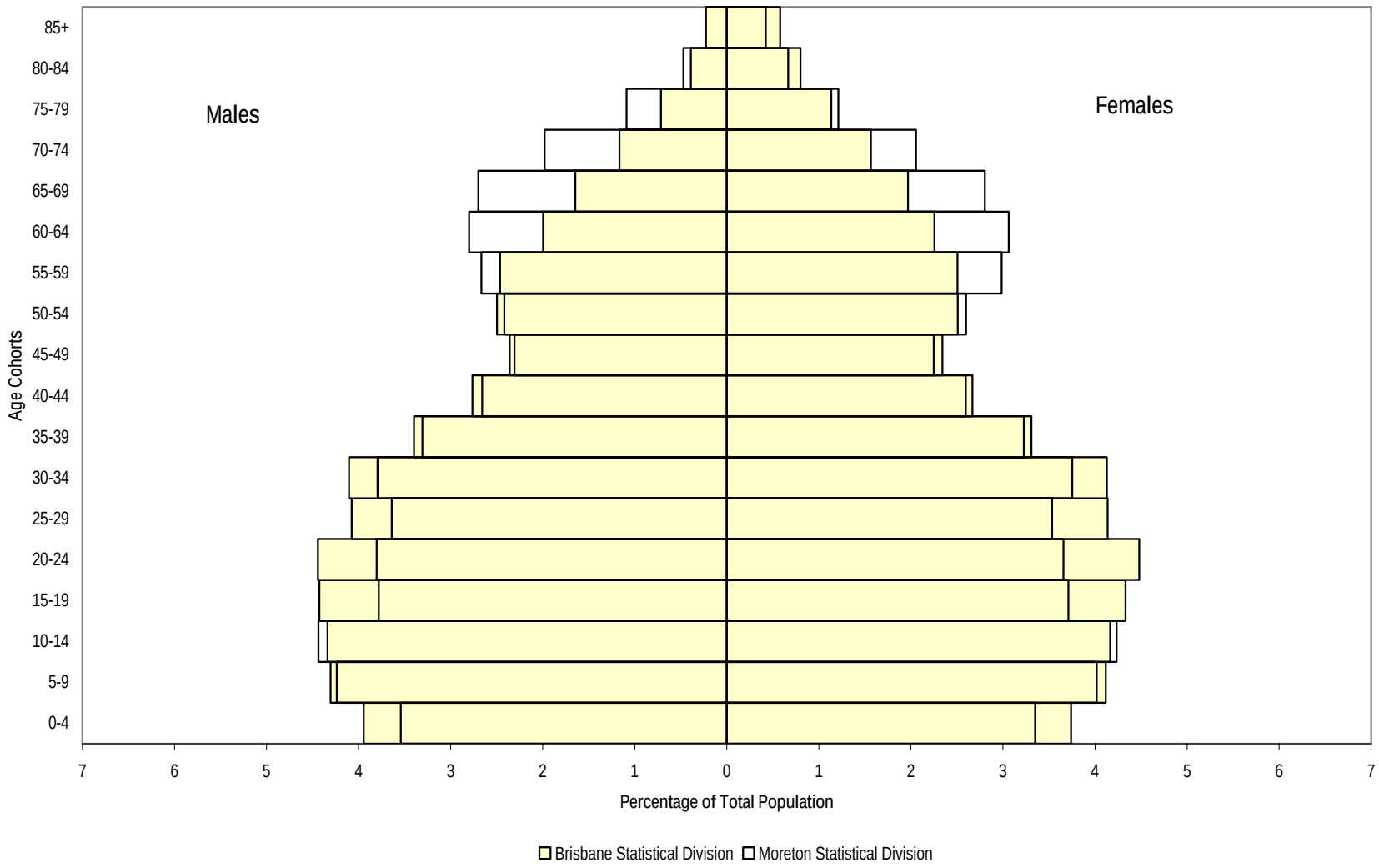


Figure M-4: Population Pyramid 1981- BSD and MSD

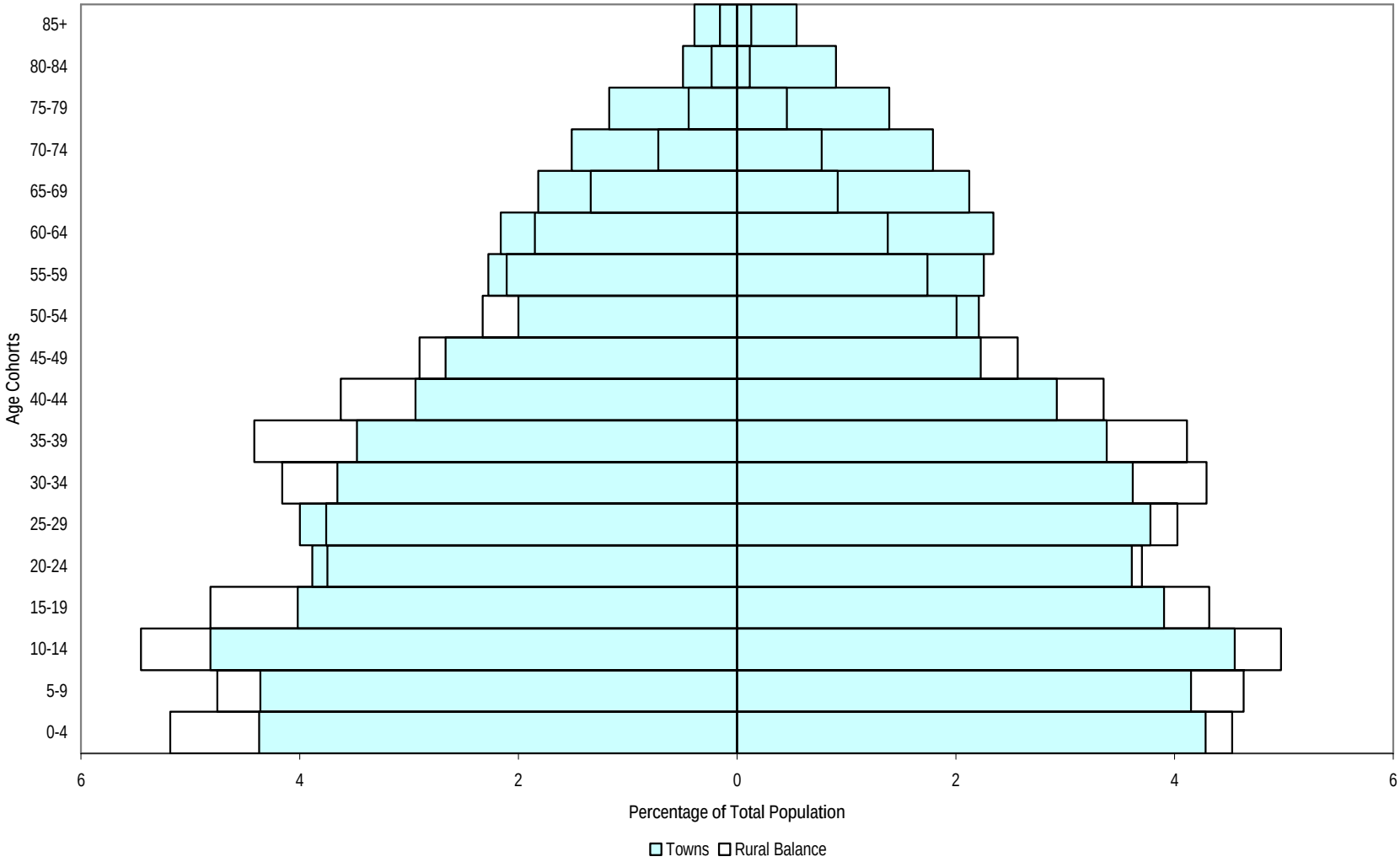


Figure M-5: Population Pyramid 1986- Towns and Rural Balance

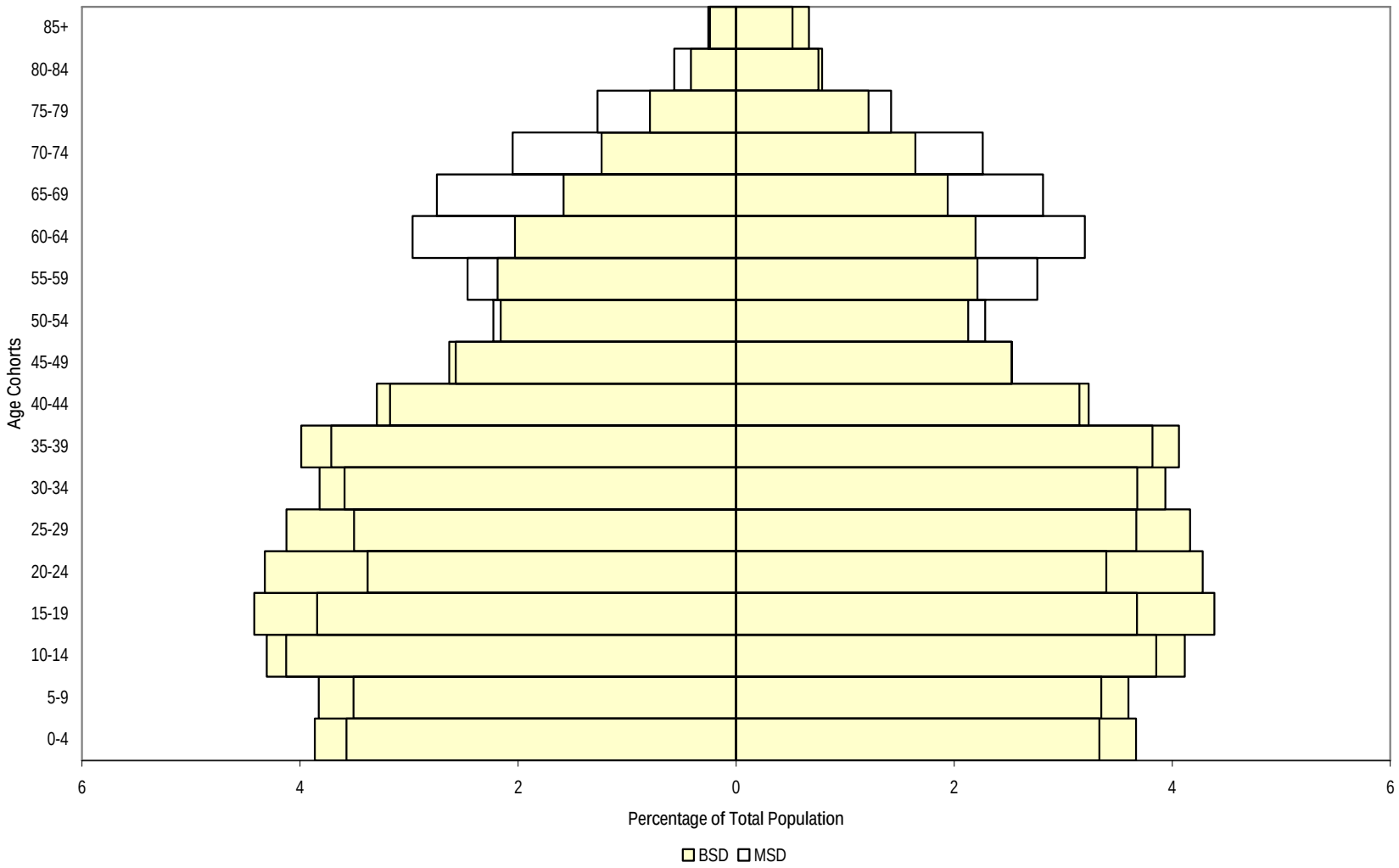


Figure M-6: Population Pyramid 1981- BSD and MSD

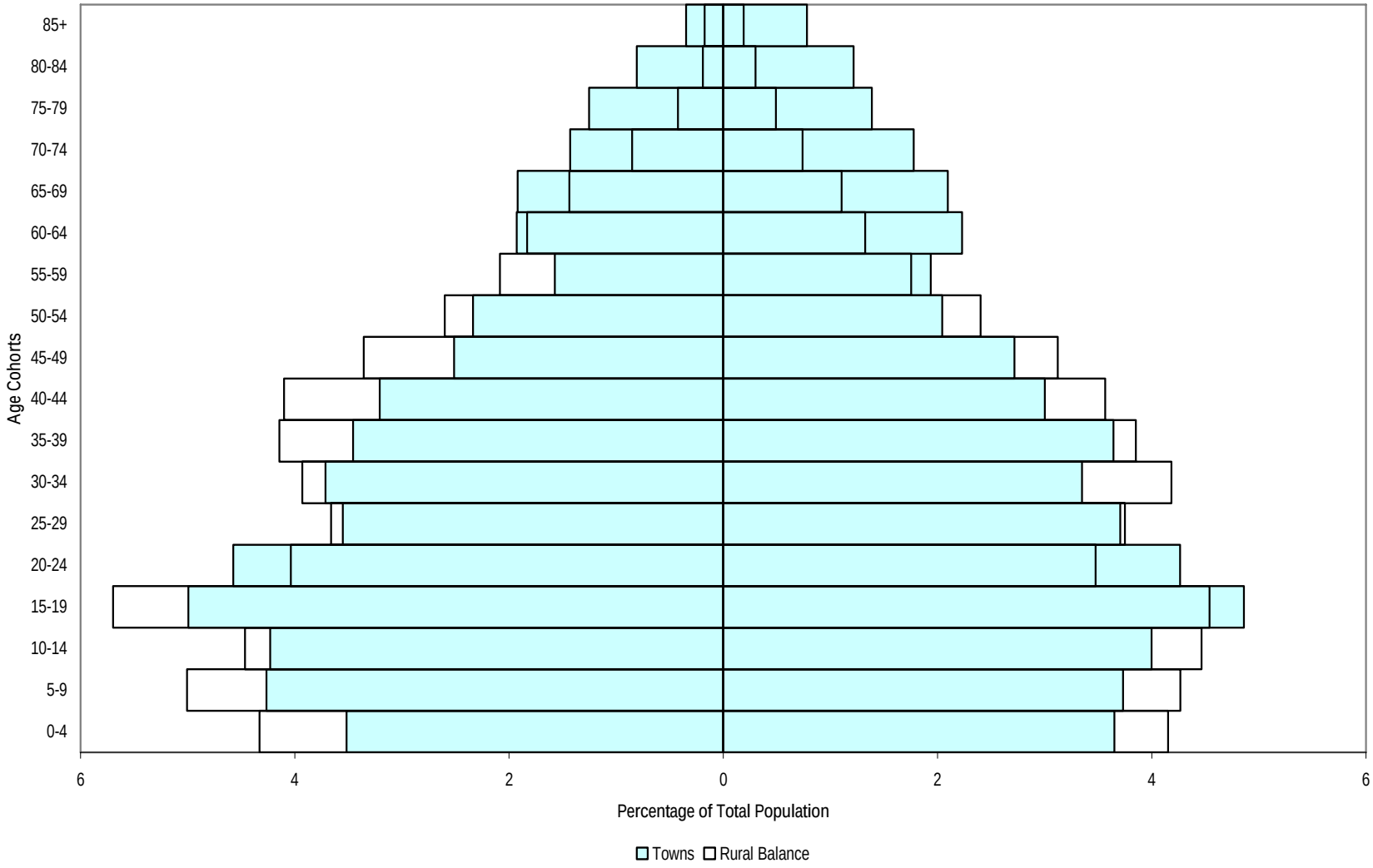


Figure M-7: Population Pyramid 1991- Towns and Rural Balance

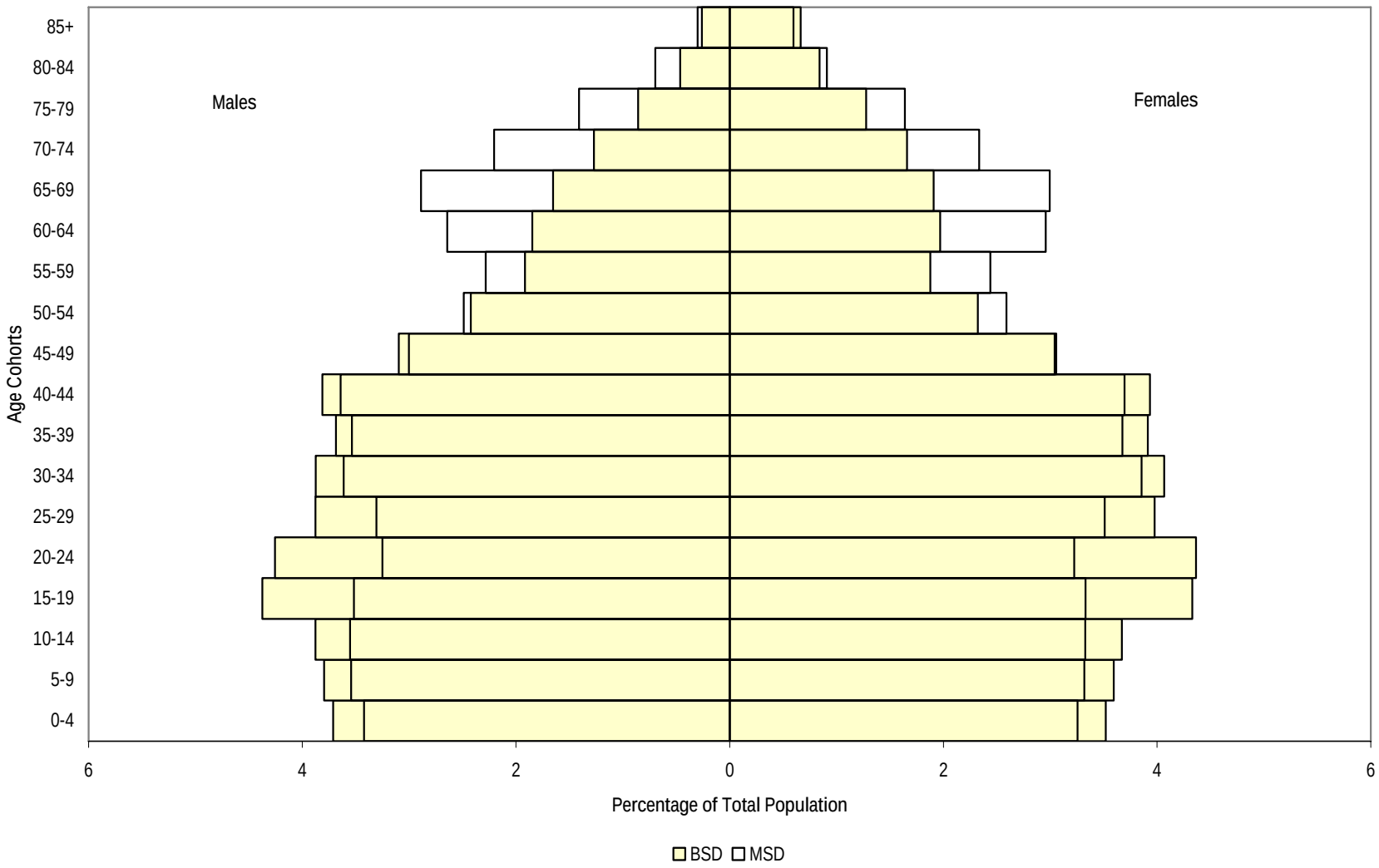


Figure M-8: Population Pyramid 1991 – BSD and MSD

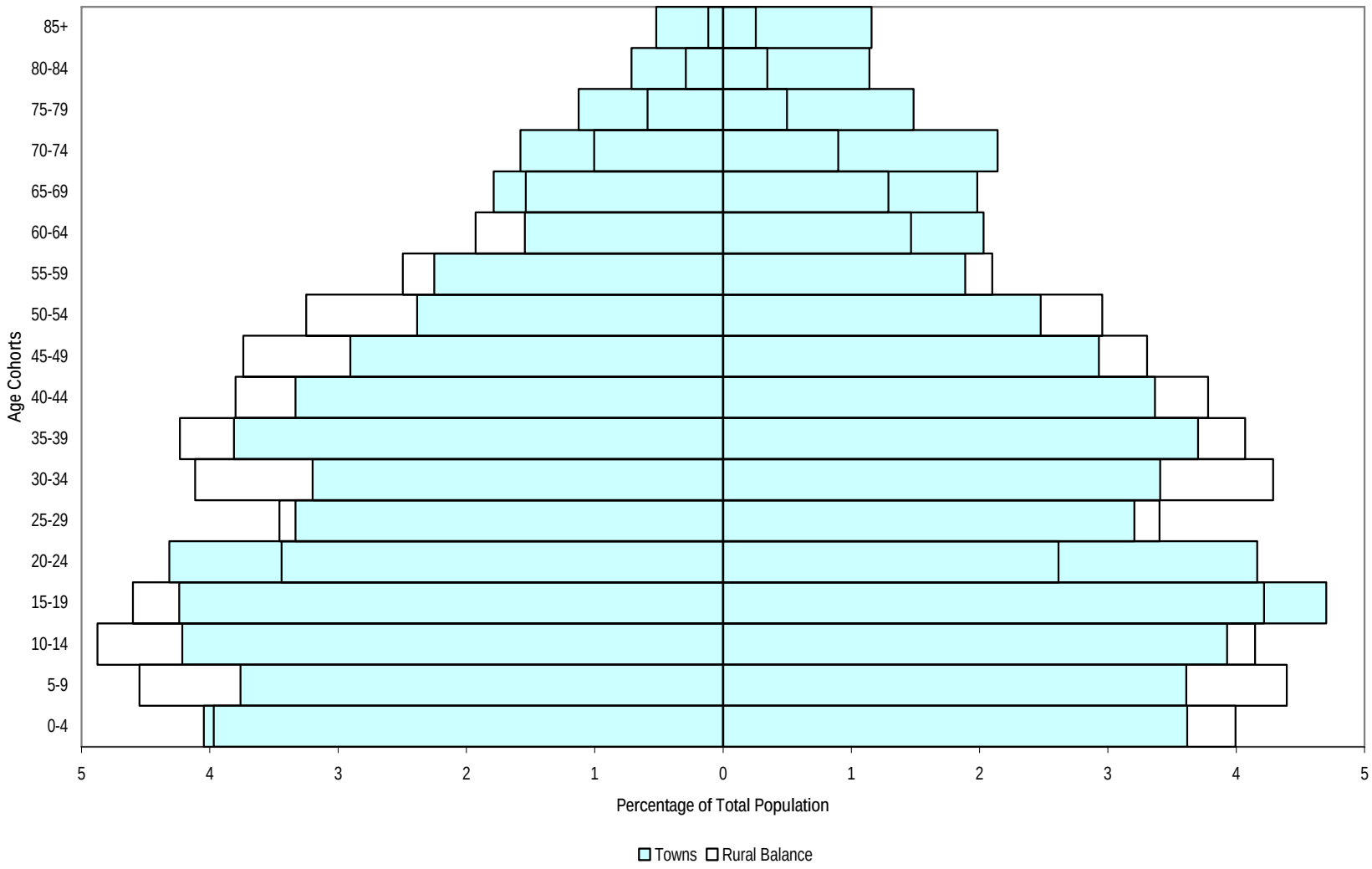


Figure M-9: Population Pyramid 1996- Towns and Rural Balance

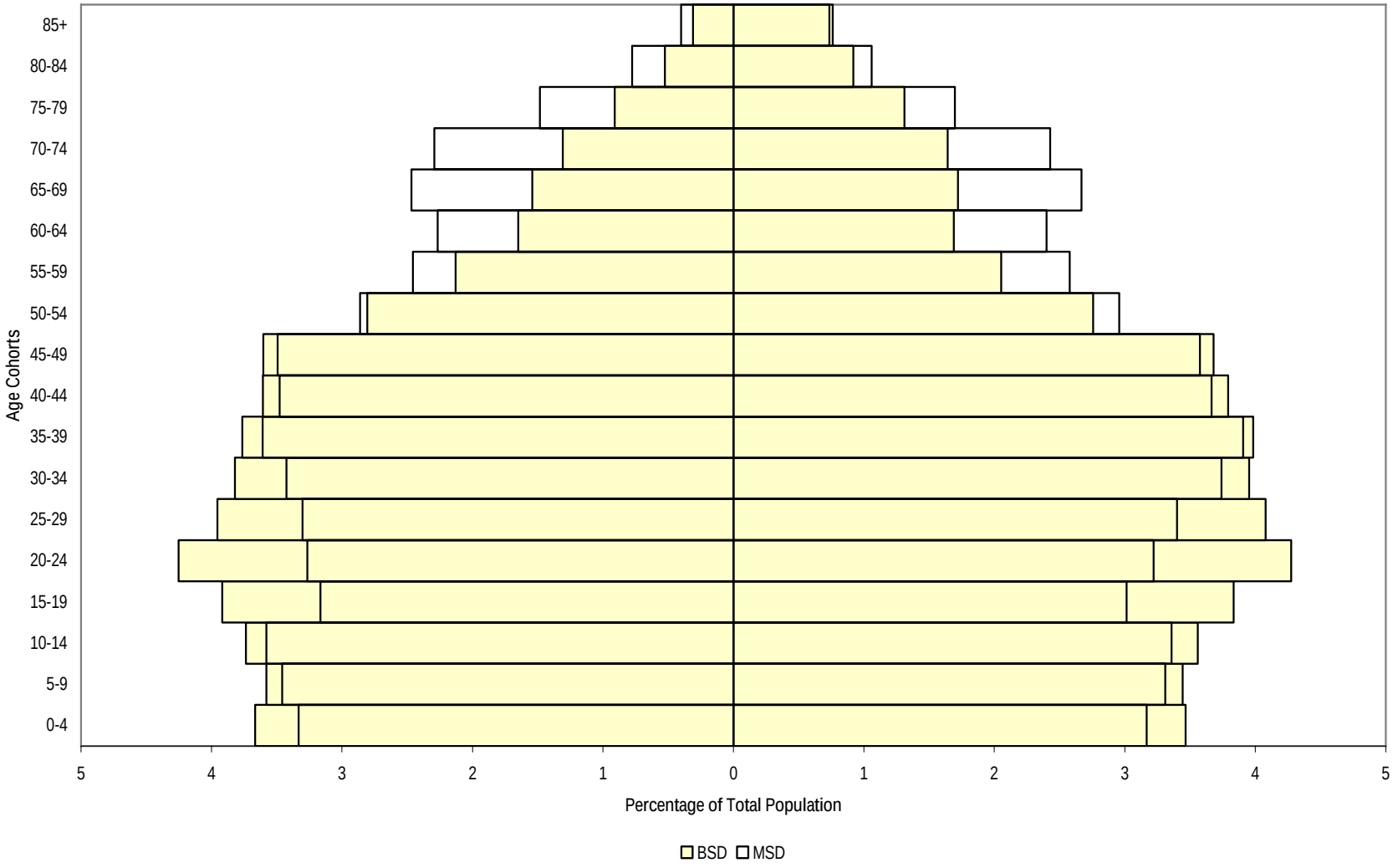


Figure M-10: Population Pyramid 1996- BSD and MSD

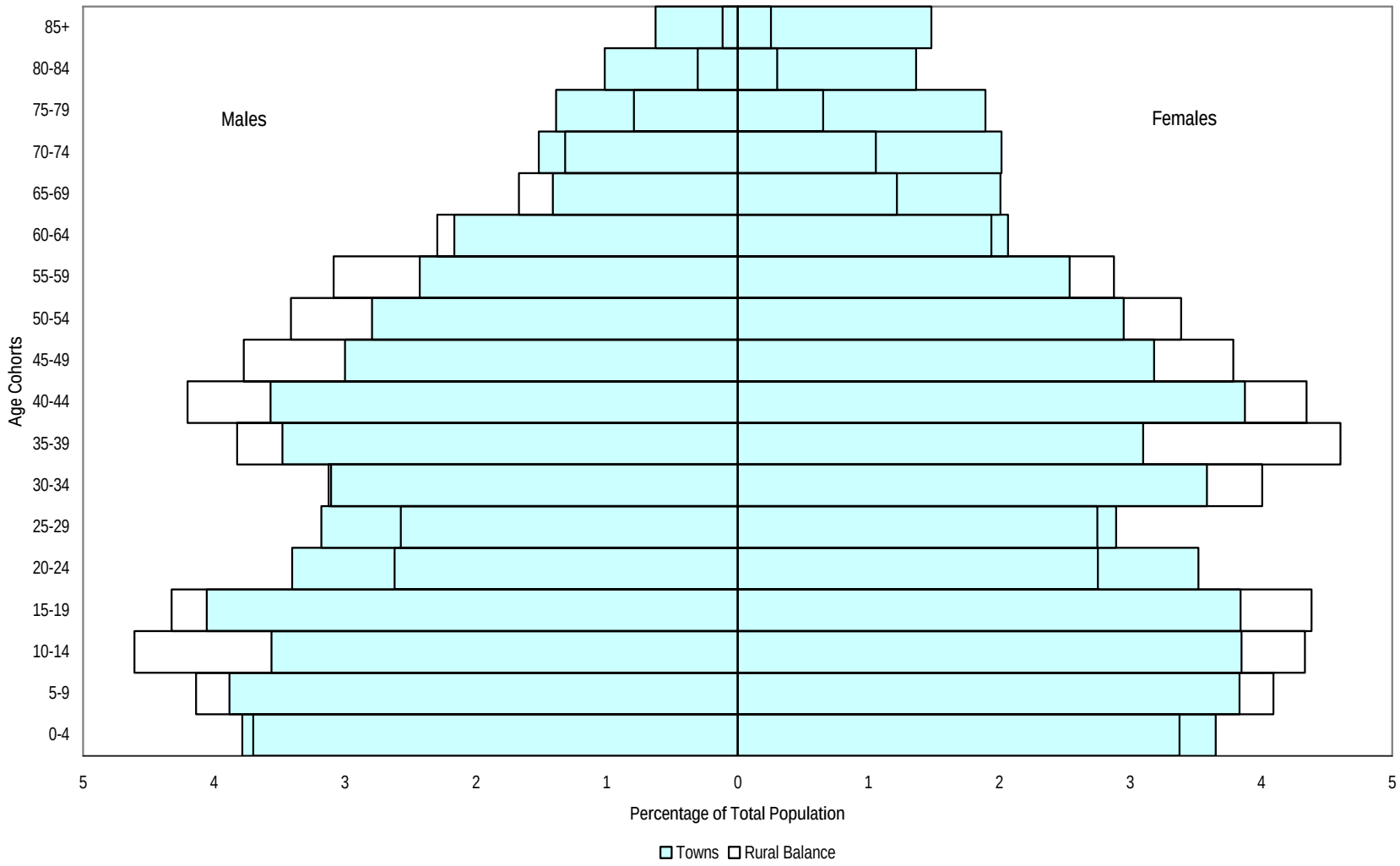


Figure M-11: Population Pyramid 2001 - Towns and Rural Balance

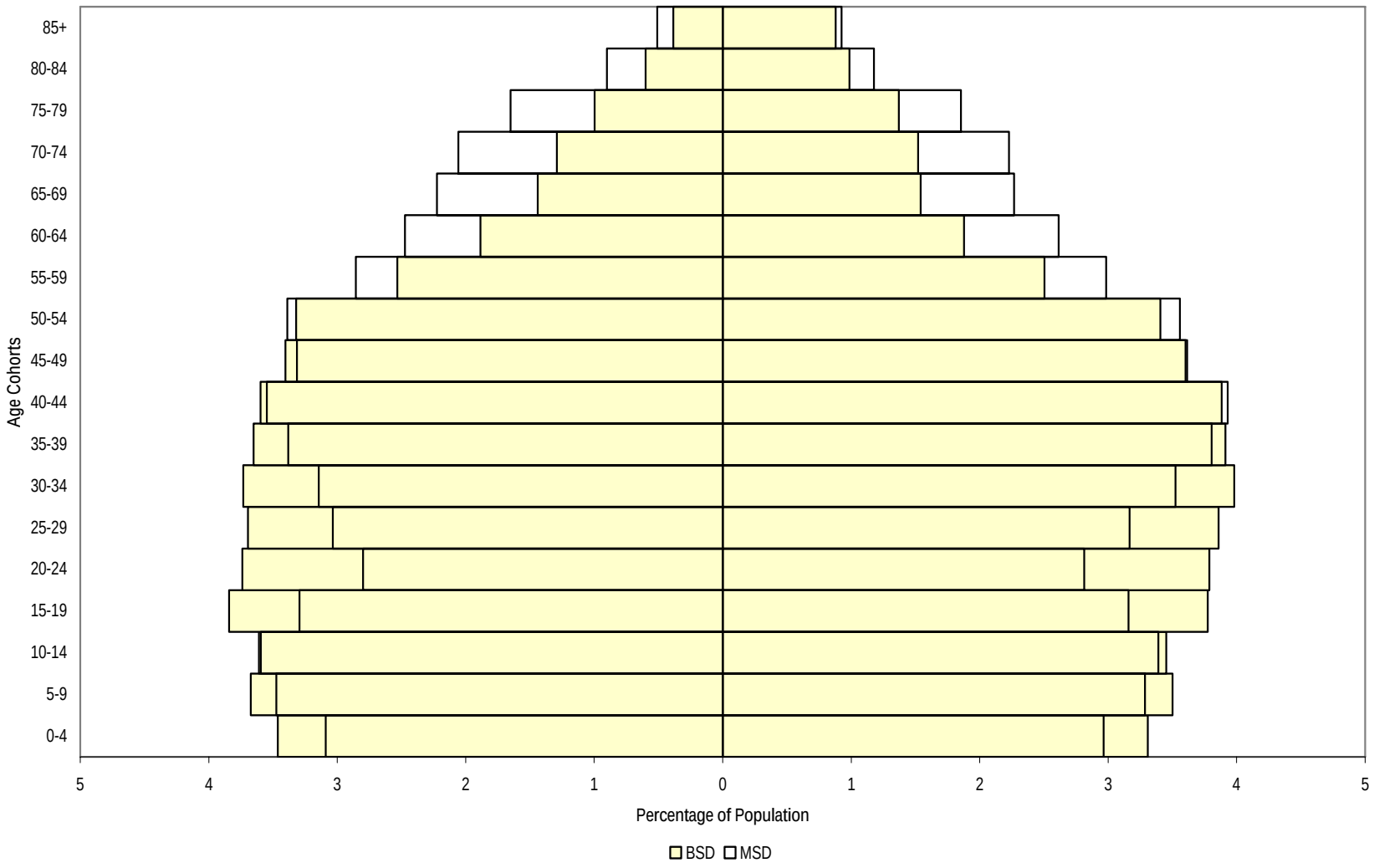


Figure M-12: Population Pyramid 2001 – BSD and MSD

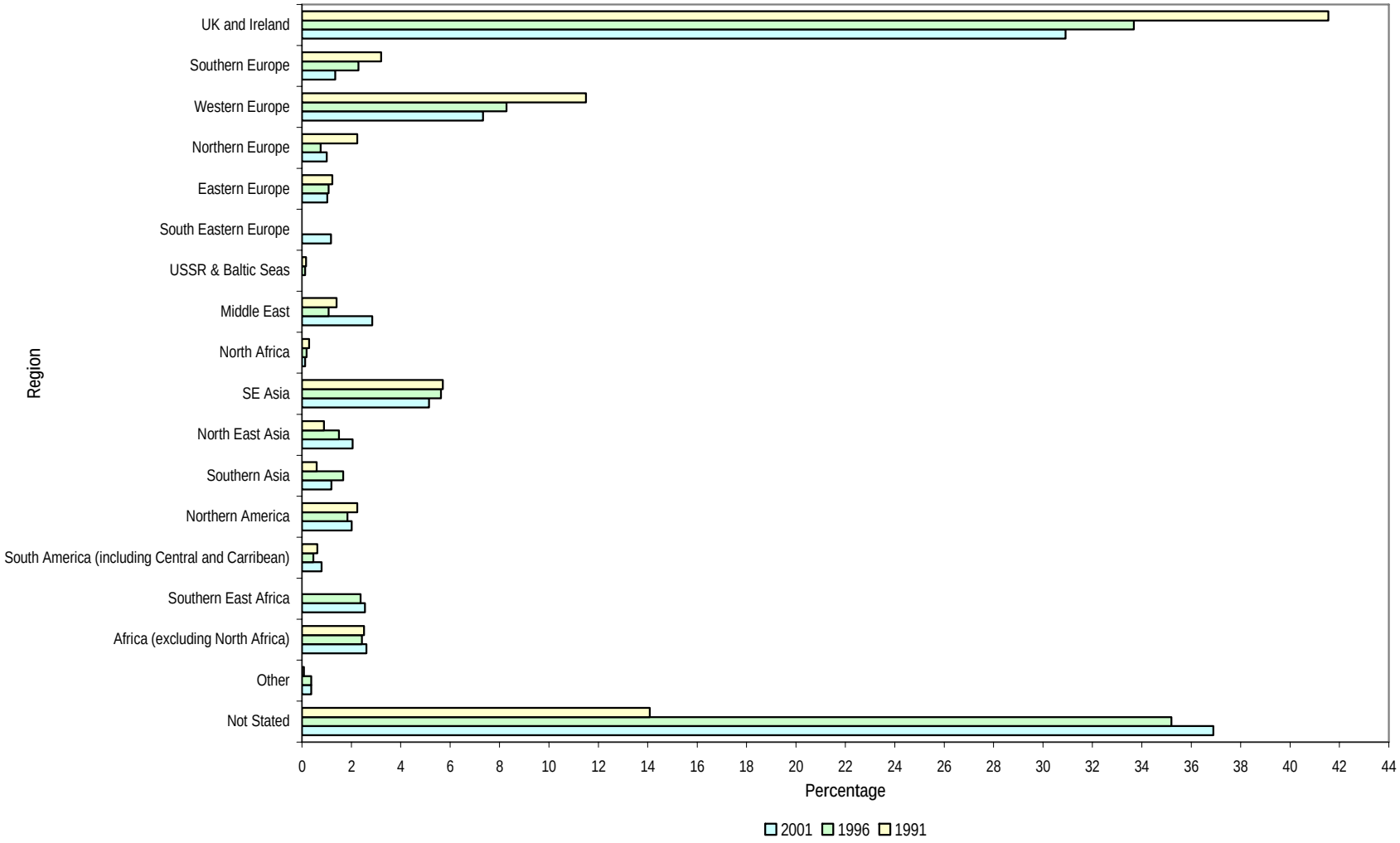


Figure M-13: Ethnic Composition of CSA Population

Table M-2: Household Size of the CSA, BSD and MSD 1991-2001

	1991	1996	2001
Town CSA	3.1	2.8	2.7
Rural Balance CSA	5.6	3.1	3.0
Brisbane	2.8	2.7	2.6
Moreton	2.7	2.5	2.5

(Source: ABS Census Data 1991, 1996, 2001)

Table M- 3: Composition of Houshold 1991,1996,2001

Composition of Household 1991									
	Couple with Children	%	Single Parent with Children	%	Couple without Children	%	Lone Person	%	Total
Towns CSA	1506	43.8	317	9.2	924	26.9	691	20.1	3438
Rural Balance CSA	3130	54.7	519	9.1	1459	25.5	614	10.7	5722
Brisbane SD	180387	43.8	44446	10.8	102354	24.8	84807	20.6	411994
Moreton SD	59004	37.7	14606	9.3	50293	32.1	32577	20.8	156480
Composition of Household 1996									
	Couple with Children	**%**	**Single Parent with Children**	**%**	**Couple without Children**	**%**	**Lone Person**	**%**	**Total**
Towns CSA	5913	57.7	1253	12.2	2169	21.2	919	9.0	10254
Rural Balance CSA	13551	65.1	1979	9.5	4261	20.5	1026	4.9	20817
Brisbane SD	752479	58.8	154687	12.1	259412	20.3	113469	8.9	1280047
Moreton SD	268560	52.4	61428	12.0	133831	26.1	48793	9.5	512612
Composition of Household 2001									
	Couple with Children	**%**	**Single Parent with Children**	**%**	**Couple without Children**	**%**	**Lone Person**	**%**	**Total**
Towns CSA	2667	35.4	1525	20.2	2271	30.1	1079	14.3	7542
Rural Balance CSA	12631	61.0	2322	11.2	4577	22.1	1170	5.7	20700
Brisbane SD	782490	55.9	186876	13.3	297864	21.3	133644	9.5	1400874
Moreton SD	294829	49.5	81618	13.7	157968	26.5	61443	10.3	595858
Moreton SD	294829	49.5	81618	13.7	157968	26.5	61443	10.3	595858

Source: Australian Bureau of Statistics 1991, 1996 and 2001

Table M- 4: Household Income of the CSA 1991,1996,2001

1991	*Town CSA*	*Rural CSA*	*Brisbane SD*	*Moreton SD*
$0-$3,000	1.2	0.9	0.6	1.0
$3,001-$5,000	0.8	0.7	0.4	0.6
$5,001-$8,000	8.2	4.1	5.3	5.6
$8,001-$12000	6.3	4.0	5.4	6.1
$12,001-$16,000	11.1	9.7	8.1	11.5
$16,001-$20,000	8.4	8.1	7.0	9.8
$20,001-$30,000	18.3	17.0	15.1	16.3
$30,001-$40,000	11.2	12.8	12.0	11.0
$40,001-$50,000	9.4	9.9	11.2	9.0
$50,001-$60,000	4.6	5.8	7.5	5.3
$60,001-$70,000	1.8	2.4	3.9	2.6
$70,001-$80,000	0.9	1.7	2.7	1.6
$80,001-$100,000	0.9	1.4	2.3	1.3
$100,001-$120,000	0.6	0.5	1.3	0.9
$120,001-$150,000	0.2	0.4	0.8	0.5
Over $150,001	0.1	0.3	0.4	0.4
Partial Income Stated	12.3	15.7	12.8	12.1
No Income Stated	3.7	4.8	3.3	4.3
Total	100.0	100.0	100.0	100.0
1996	**Town CSA**	**Rural CSA**	**Brisbane SD**	**Moreton SD**
Nil Income	0.4	1.0	0.7	0.9
$1-$299	24.8	15.5	16.6	19.9
$300-$699	36.2	35.3	29.5	35.7
$700-$999	15.4	18.5	17.2	15.1
$1,000-$1,499	9.7	12.7	15.8	11.3
$1,500-$1,999	1.5	3.2	5.6	3.1
$2,000 or Over	1.1	1.8	4.6	2.8
Partial Income Stated	7.9	9.1	7.8	7.4
Income Not Stated	3.2	2.8	2.3	3.9
Total	100.0	100.0	100.0	100.0
2001	**Town CSA**	**Rural CSA**	**Brisbane SD**	**Moreton SD**
$1-$299	16.2	9.0	10.7	8.9
$300-$599	28.7	24.3	20.8	19.7
$600-$999	22.8	25.0	21.5	16.2
$1,000-$1,499	13.7	17.8	18.0	10.7
$1,500-$1,999	5.1	7.3	10.7	5.1
$2,000 or Over	2.0	4.2	7.7	31.1
Partial Income Stated	7.2	9.2	7.5	5.3
Income Not Stated	4.2	3.1	3.1	2.9
Total	100.0	100.0	100.0	100.0

(Source: ABS 1991, 1996 and 2001)

Table M-5: Internet Usage of the CSA, MSD, BSD 2001

	At Home			At Work			Total Usage as a Proportion of the Total Population			No Usage		
	M	F	TP	M	F	TP	M	F	TP	M	F	TP
Towns	10.9	11.0	11.0	2.4	3.0	2.7	11.0	23.1	22.8	72.6	71.9	72.3
Rural Balance	15.1	15.1	15.4	3.1	3.5	3.3	28.7	29.6	29.2	66.7	61.9	64.3
BSD	21.3	20.0	20.6	5.2	5.8	5.5	42.5	39.0	40.7	52.9	56.2	54.6
MSD	20.3	19.3	19.8	3.3	3.8	3.6	34.8	32.8	33.7	57.9	59.4	58.7
	% of Total Usage as a Proportion of the Total Population in BSD			% of Total Non-Usage as a Proportion of the Total Population in BSD			% of Total Usage as a Proportion of the Total Population of MSD			% of Total Non-Usage as a Proportion of the Total Population of MSD		
	M	F	TP	M	F	TP	M	F	TP	M	F	TP
Towns	0.2	0.2	0.2	0.6	0.5	0.5	0.4	0.4	0.4	1.2	1.2	1.2
Rural Balance	0.4	0.4	0.4	1.0	0.9	0.9	0.9	0.9	0.9	2.2	1.9	2.0

(Source: ABS 2001)

Table M-6: Occupation of the CSA, BSD, MSD 1991, 1996, 2001

1991	Case Study Area	Brisbane SD	Moreton SD
Managers and Administrators	14.4	9.5	13.5
Professionals	6.4	12.8	9.1
Para-professionals	5.6	7.1	5.2
Tradespersons	14.5	13.2	15.1
Clerks	11.1	17.3	13.1
Sales and Personal Service Workers	11.6	15.1	17.6
Plant and Machine Operators and Drivers	9.7	6.6	6.3
Labourers and Related Workers	19.8	12.3	13.3
Inadequately Described/ Not Stated	7	6.2	7
Total	100.1	100.1	100.2
1996	**Case Study Area**	**Brisbane SD**	**Moreton SD**
Managers and Administrators	10.8	7.2	8.9
Professional	10	17.7	13
Associate Professionals	9.4	11.6	12.9
Tradespersons and Related Workers	15.1	12.7	14.4
Advanced Clerical, Sales and Service Workers	3.4	4.4	4.5
Intermediate Clerical, Sales and Service Workers	14.1	18	15.9
Intermediate Production and Transport Workers	11.2	8.3	7.6
Elementary Clerical, Sales and Service Workers	8.3	9.6	10.7
Labourers and Related Workers	15.5	8.2	9.5
Inadequately Described/ Not Stated	2.3	2.3	2.7
Total	100.1	100	100.1
2001	**Case Study Area**	**Brisbane SD**	**Moreton SD**
Managers and Administrators	9.9	7.1	8.1
Professionals	9.9	18.8	14
Associate Professionals	9.3	12.1	13.4
Tradespersons and Related Workers	14.3	11.8	13.6
Advanced Clerical, Sales and Service Workers	3.2	3.7	4.1
Intermediate Clerical, Sales and Service Workers	14.7	18.5	16.8
Intermediate Production and Transport Workers	10.8	7.9	6.9
Elementary Clerical, Sales and Service Workers	8.5	10.1	11.7
Labourers and Related Workers	17.6	8.1	9.4
Inadequately Described/ Not Stated	1.6	1.8	2.1
Total	99.8	99.9	100.1

(Source: ABS 1991, 1996 and 2001)

Table M-7: Industries of Employment CSA, BSD and MSD 1991, 1996, 2001

1991	Case Study Area	Brisbane SD	Moreton SD
Agriculture, Forestry, Fishing & Hunting	13.3	1.0	5.0
Mining	1.3	0.4	0.4
Manufacturing	13.9	12.8	9.9
Electricity, Gas & Water	1.1	1.0	0.7
Construction	5.6	6.5	9.7
Wholesale & Retail Trade	18.2	20.9	20.3
Transport and Storage	5.9	5.3	3.7
Communication	1.0	1.8	1.3
Finance, Property & Business Services	5.4	12.2	11.3
Public Administration & Defence	5.0	6.3	3.4
Community Services	17.5	18.6	14.0
Recreation, Personal & Other Services	4.5	6.4	12.0
Non Classifiable & Not Stated	7.4	6.8	8.2
Total	100	100	99.9
1996	**Case Study Area**	**Brisbane SD**	**Moreton SD**
Agriculture, Forestry, Fishing and Hunting	12.1	1.0	4.2
Mining	1.1	0.4	0.4
Manufacturing	13.6	12.0	9.5
Electricity, Gas and Water Supply	0.9	0.6	0.5
Construction	6.1	6.8	9.4
Wholesale Trade	5.9	6.6	4.7
Retail Trade	13.0	13.9	16.4
Accommodation, Cafes and Restaurants	3.2	4.2	8.1
Transport and Storage	5.1	5.0	3.8
Communication	1.2	2.1	1.5
Finance and Insurance	1.6	3.8	2.7
Property and Business Services	5.4	11.4	10.0
Government Administration and Defence	5.8	5.3	3.1
Education	9.0	7.5	6.1
Health and Community Services	8.3	10.0	8.7
Cultural and Recreational Services	0.7	2.3	3.7
Personal and Other Services	3.5	4.0	3.8
Non-Classifiable Economic Units/ Not Stated	3.4	3.1	3.5
Total	99.9	100	100

2001	Case Study Area	Brisbane SD	Moreton SD
Agriculture, Forestry and Fishing	12.0	1.0	3.6
Mining	0.7	0.4	0.3
Manufacturing	14.2	12.2	9.8
Electricity, Gas and Water Supply	0.7	0.8	0.5
Construction	6.4	6.7	8.9
Wholesale Trade	6.8	5.6	4.5
Retail Trade	13.9	15.0	17.3
Accommodation, Cafes and Restaurants	3.3	4.4	8.4
Transport and Storage	6.0	5.1	3.9
Communication Services	1.1	1.8	1.3
Finance and Insurance	1.5	3.7	2.6
Property and Business Services	5.5	12.0	10.2
Government Administration and Defence	3.9	4.8	2.9
Education	7.9	7.9	6.6
Health and Community Services	8.4	10.3	9.2
Cultural and Recreational Services	1.5	2.3	3.7
Personal and Other Services	3.4	4.0	3.9
Non Classifiable Economic Units/ Not Stated	2.6	2.1	2.6
Total	100.0	100.0	100.0

(Source: ABS 1991, 1996 and 2001)

Table M- 8: Employment Type 1991,1996,2001

1991	FT Males	PT Males	Total Males	FT Females	PT Females	Total Females	Total Persons Working FT	Total Persons Working PT
Case Study Area	83	12	60	52	41	40	71	24
Brisbane SD	81	14	57	55	40	43	70	25
Moreton SD	77	17	56	50	45	44	65	29
1996	FT Males	PT Males	Total Males	FT Females	PT Females	Total Females	Total Persons Working FT	Total Persons Working PT
Case Study Area	81	17	58	50	48	42	68	30
Brisbane SD	81	18	55	53	45	45	68	30
Moreton SD	76	22	55	48	50	45	63	35
2001	FT Males	PT Males	Total Males	FT Females	PT Females	Total Females	Total Persons Working FT	Total Persons Working PT
Case Study Area	77	19	58	48	50	42	64	32
Brisbane SD	77	20	54	51	46	46	65	32
Moreton SD	72	25	54	45	52	46	60	37

(Source: ABS 1991, 1996 and 2001)

Table M-9: Percentage Working from Home in CSA 1991,1996,2001

	1991	1996	2006
Male	6.36	6.36	4.93
Female	5.72	4.99	4.52
Total Population	6.05	5.10	4.72

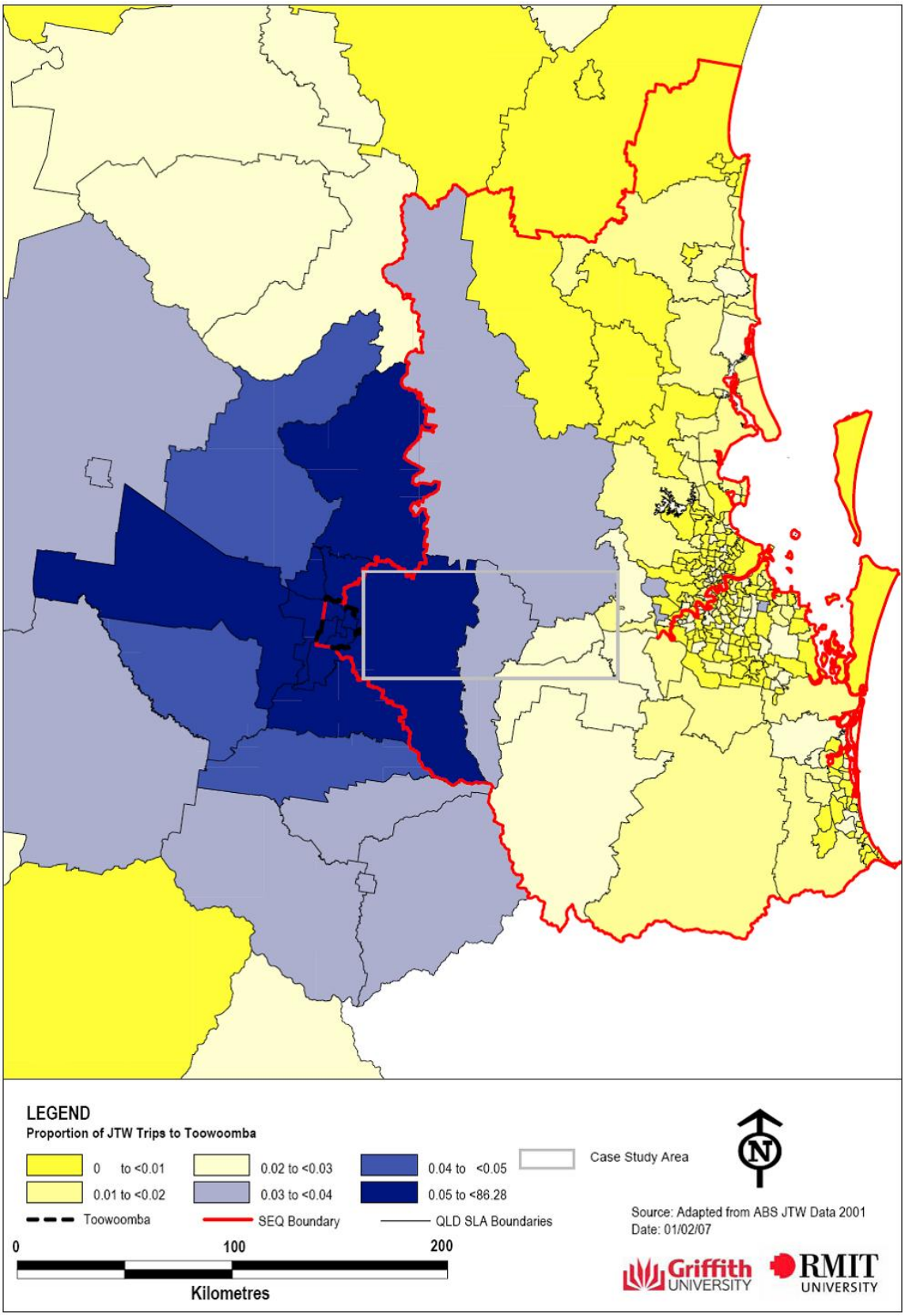
(Source: ABS Census 1991, 1996, 2001)

Table M-10: Unemployment Rate - Towns, Rural Balance, BSD, MSD 1991,1996,2001

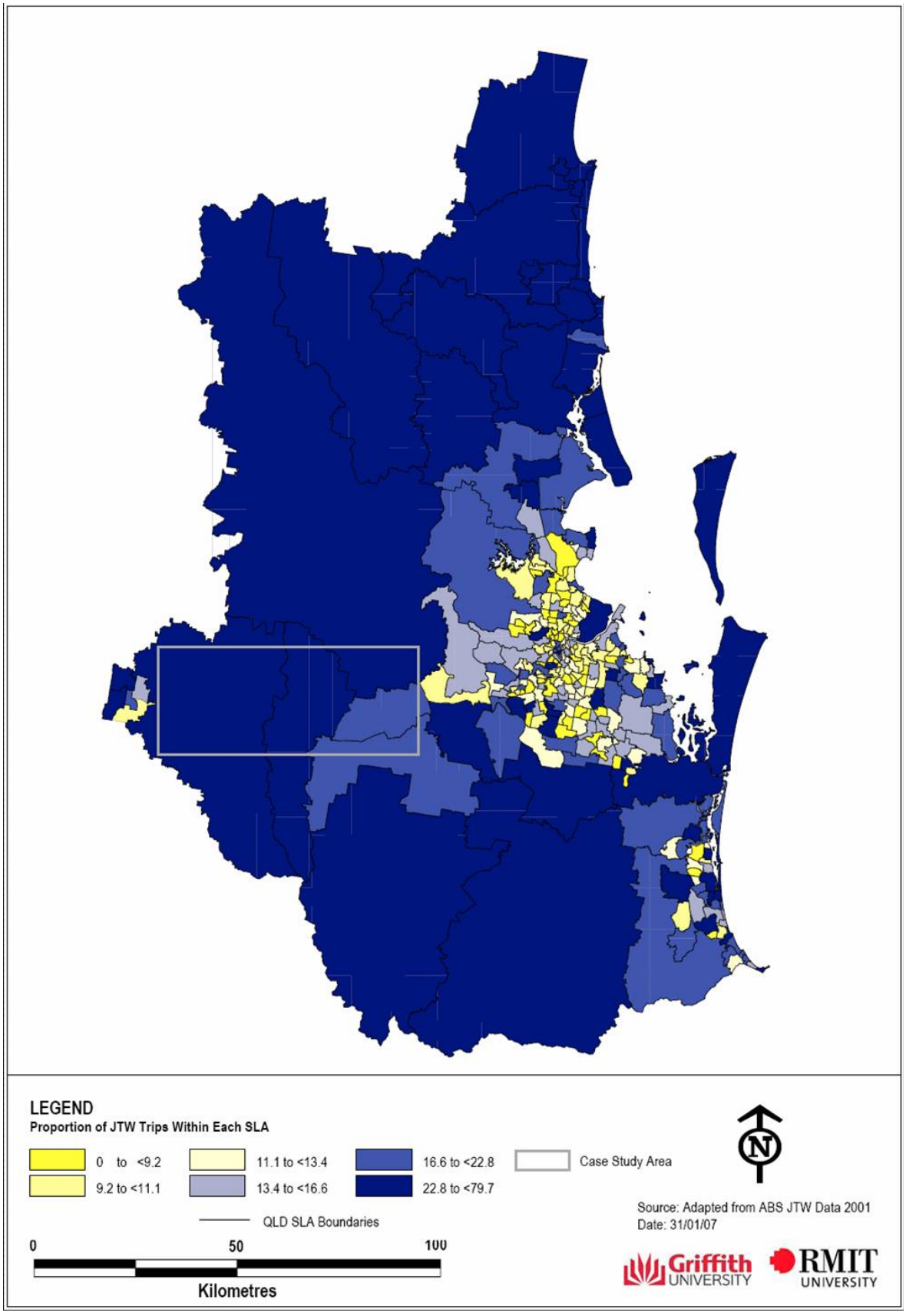
	1991	1996	2001
Towns			
Male	12.4	8.0	8.6
Female	10.5	5.8	8.5
Total Population	11.7	6.9	8.6
Rural Balance			
Male	12.5	7.1	8.3
Female	10.9	5.0	8.5
Total Population	12.8	6.1	8.4
BSD			
M	11.3	9.5	8.3
F	9.6	7.9	7.1
TP	10.5	8.8	7.8
MSD			
M	16.0	14.2	10.7
F	12.7	11.2	8.8
TP	14.6	12.9	9.9

(Source: Australian Bureau of Statistics 1991; 1996 and 2001)

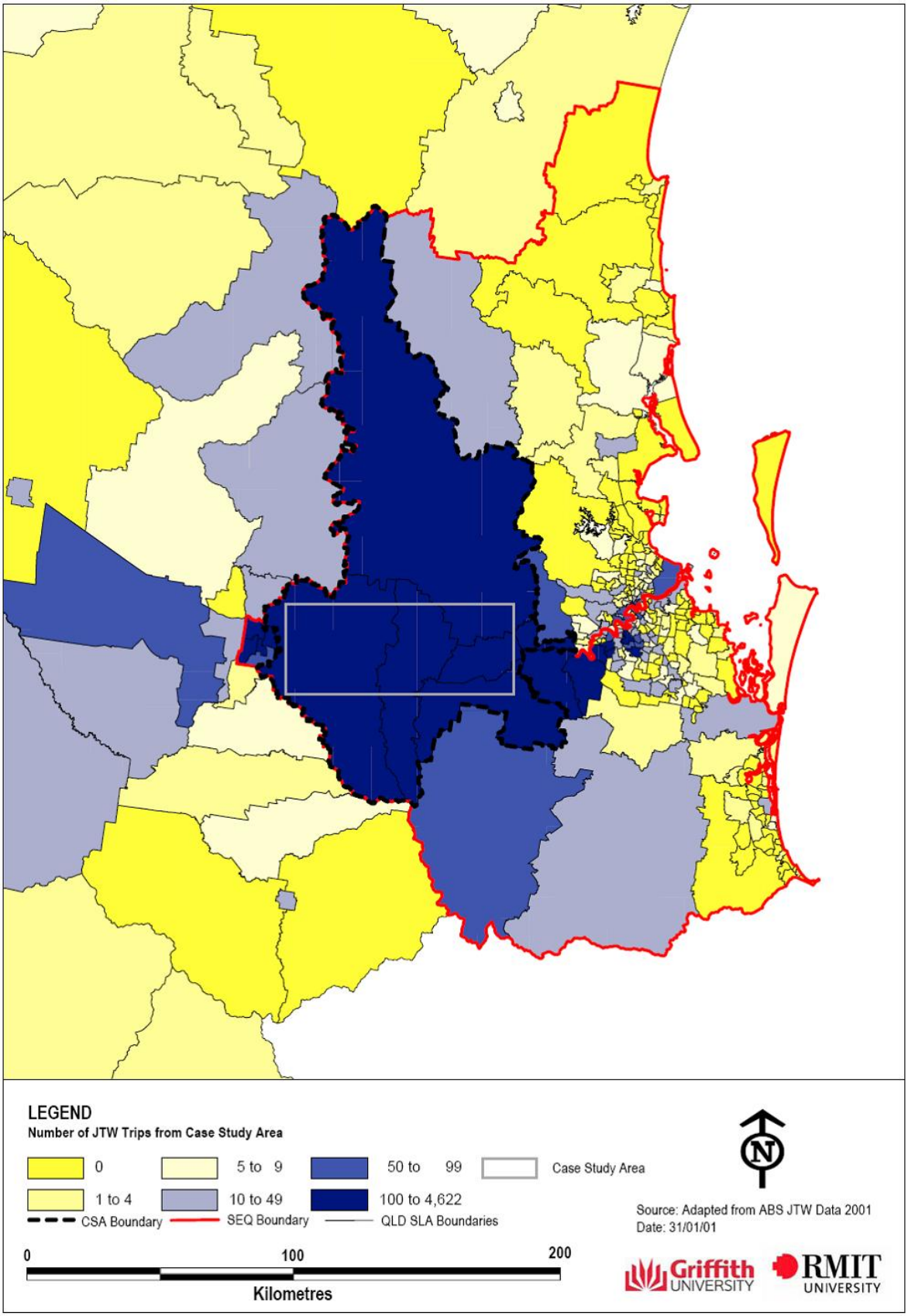
Appendix N: Journey to Work and SEIFA



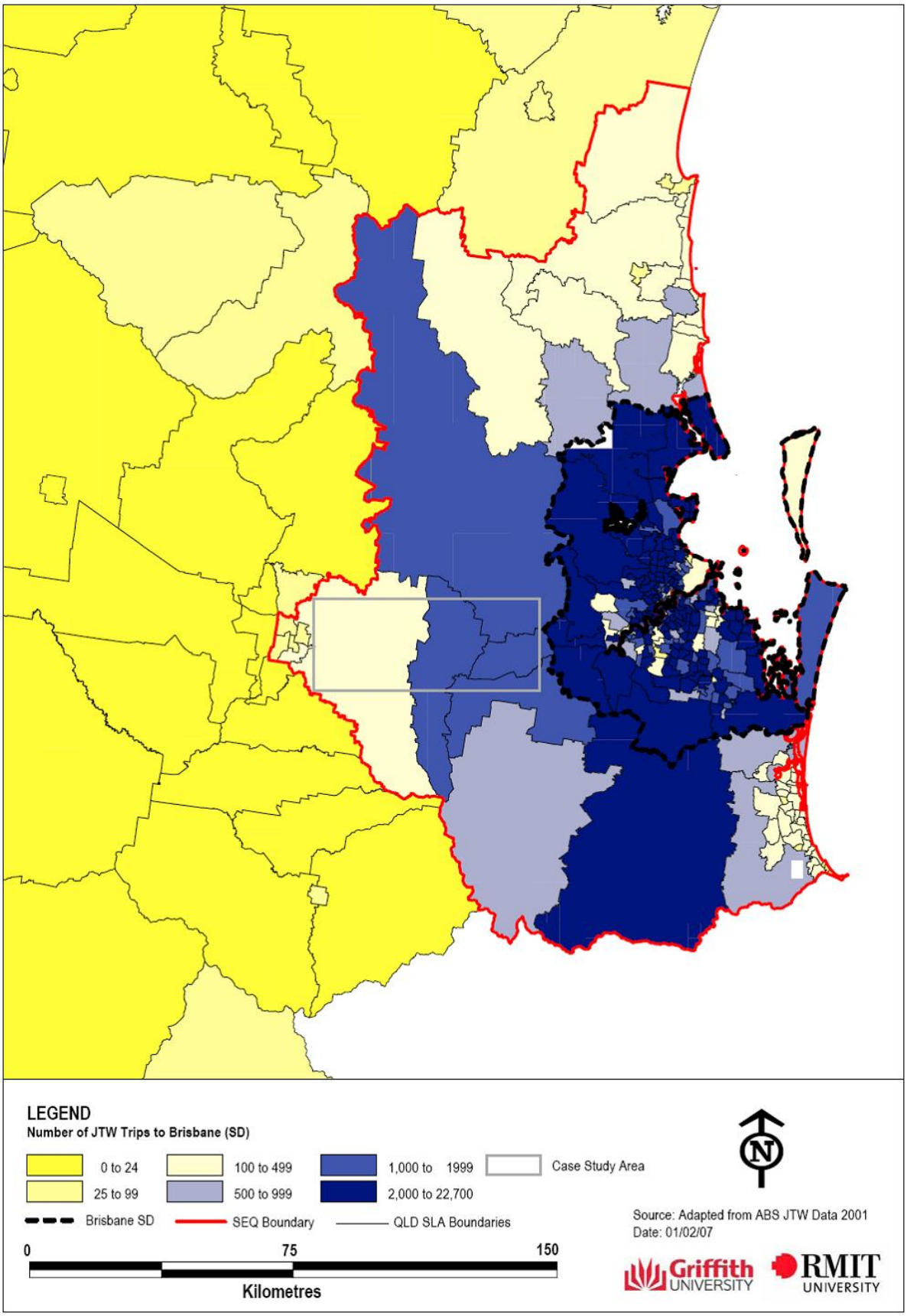
Map N-1: Proportion of JTW to Toowoomba (2001)



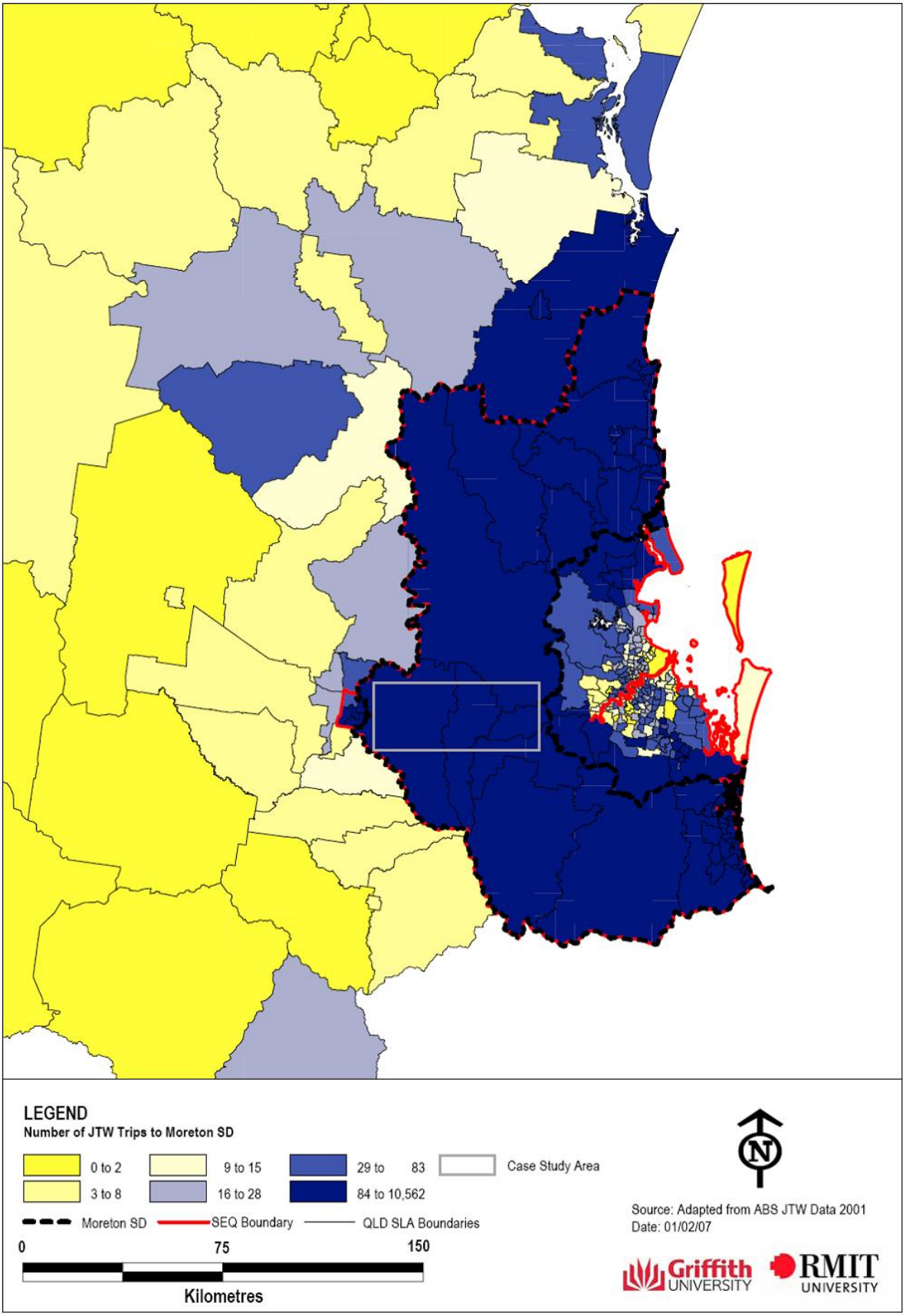
Map N-2: Journey to Work - Trips within each SLA (2001)



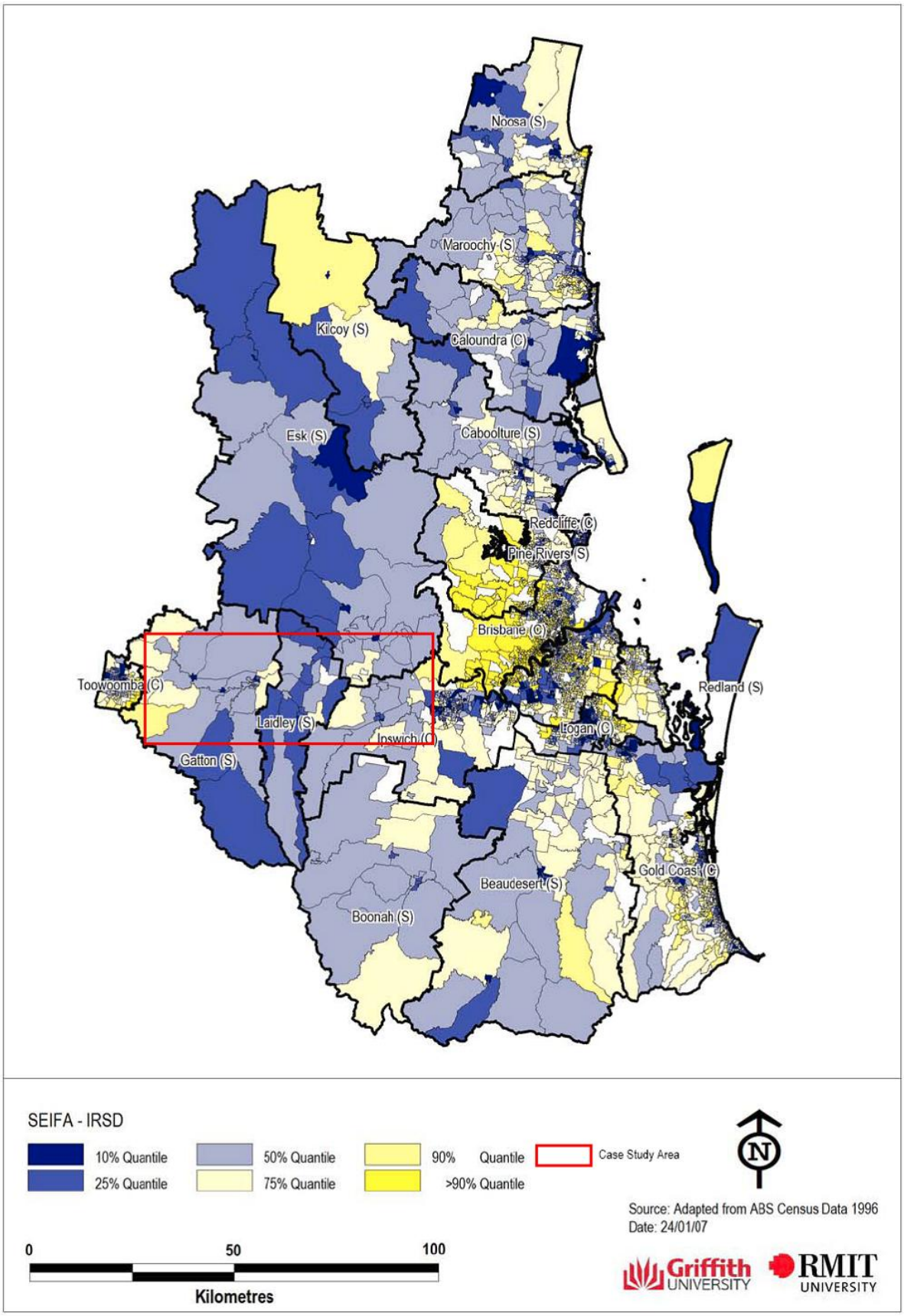
Map N-3: Journey to Work - Trips from the CSA (2001)



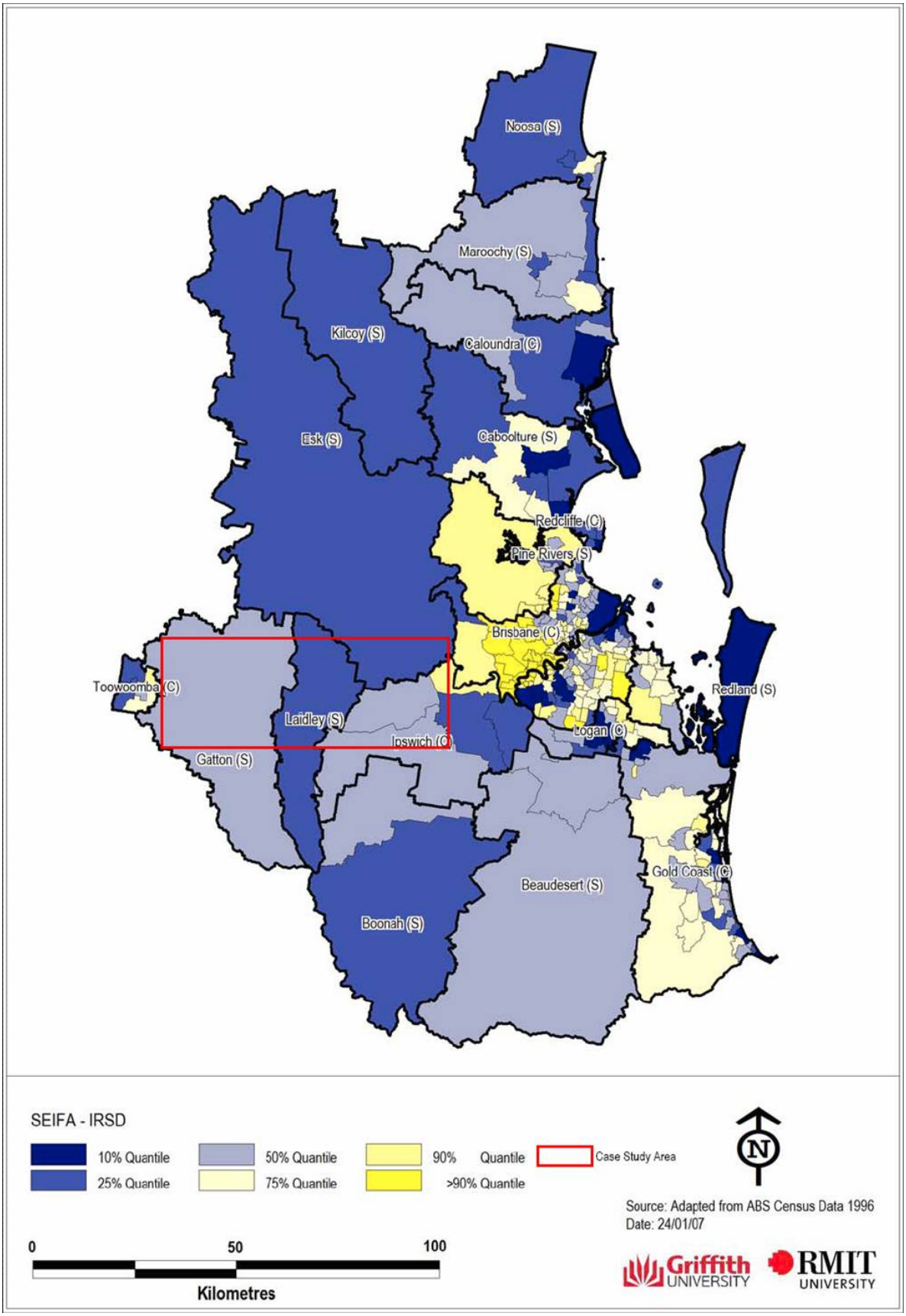
Map N-4: Journey to Work - Trips to Brisbane (SD) (2001)



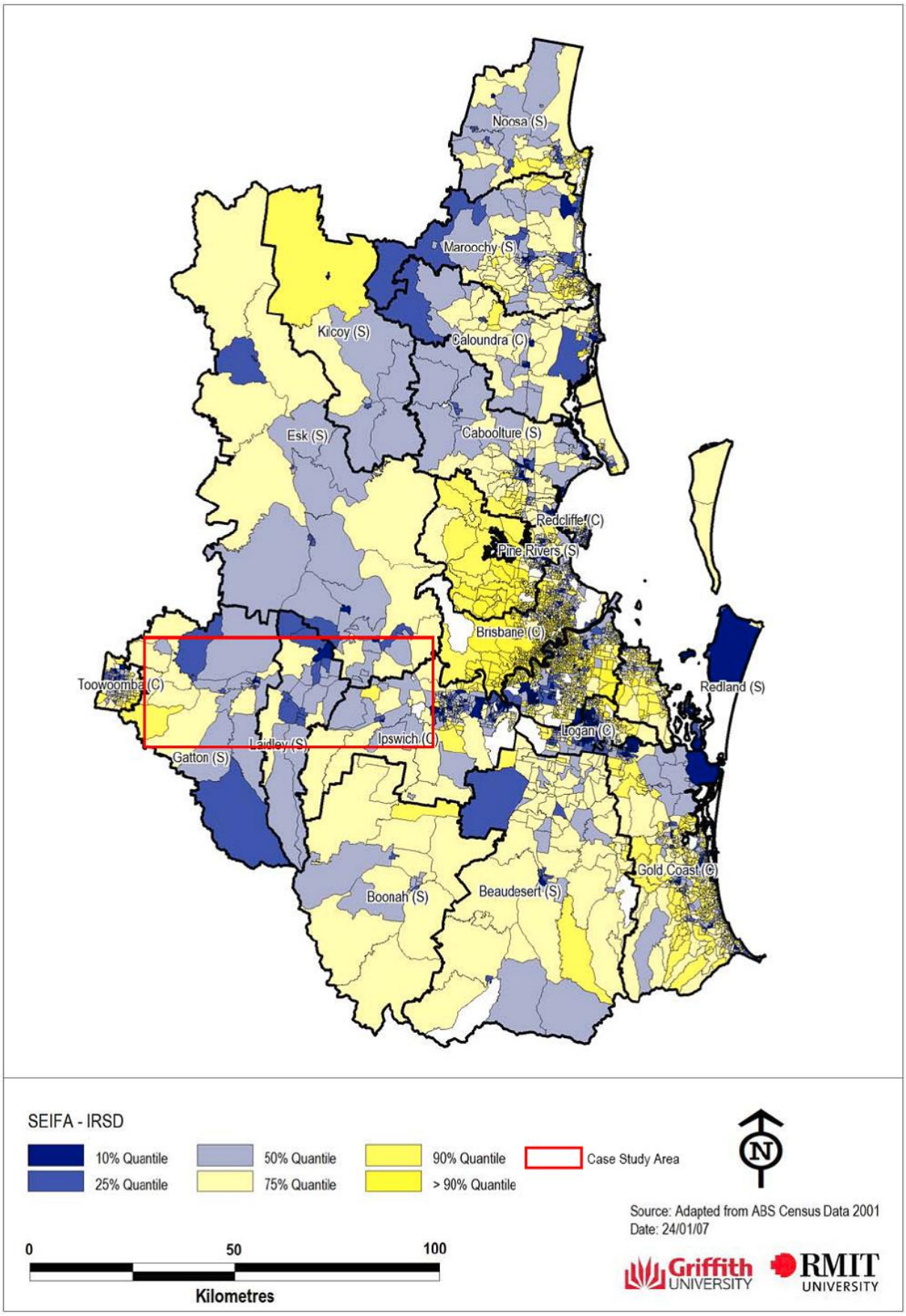
Map N-5: Journey to Work - Trips to MSD (2001)



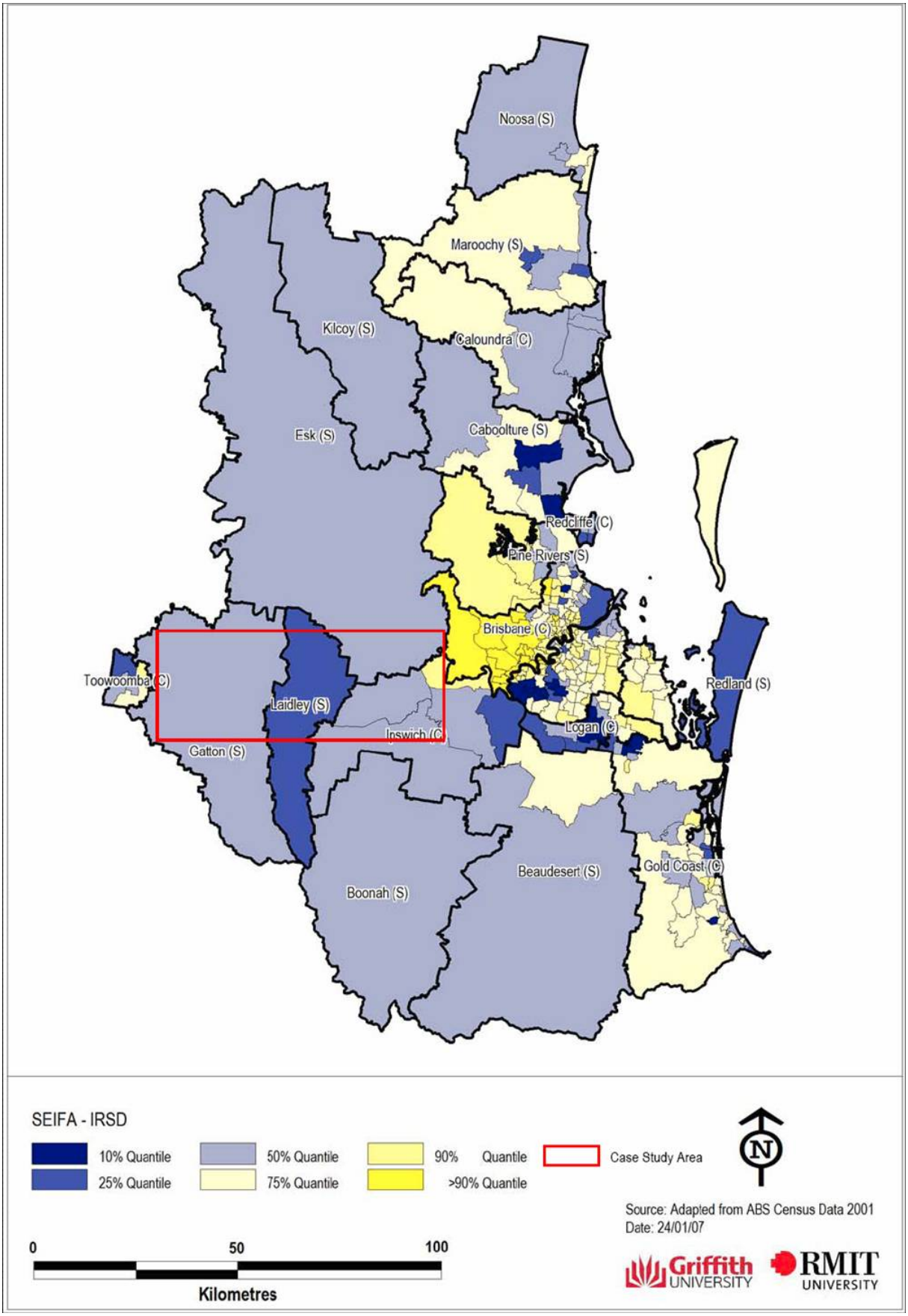
Map N- 6: Relative Socio-Economic Disadvantage by CD (1996)



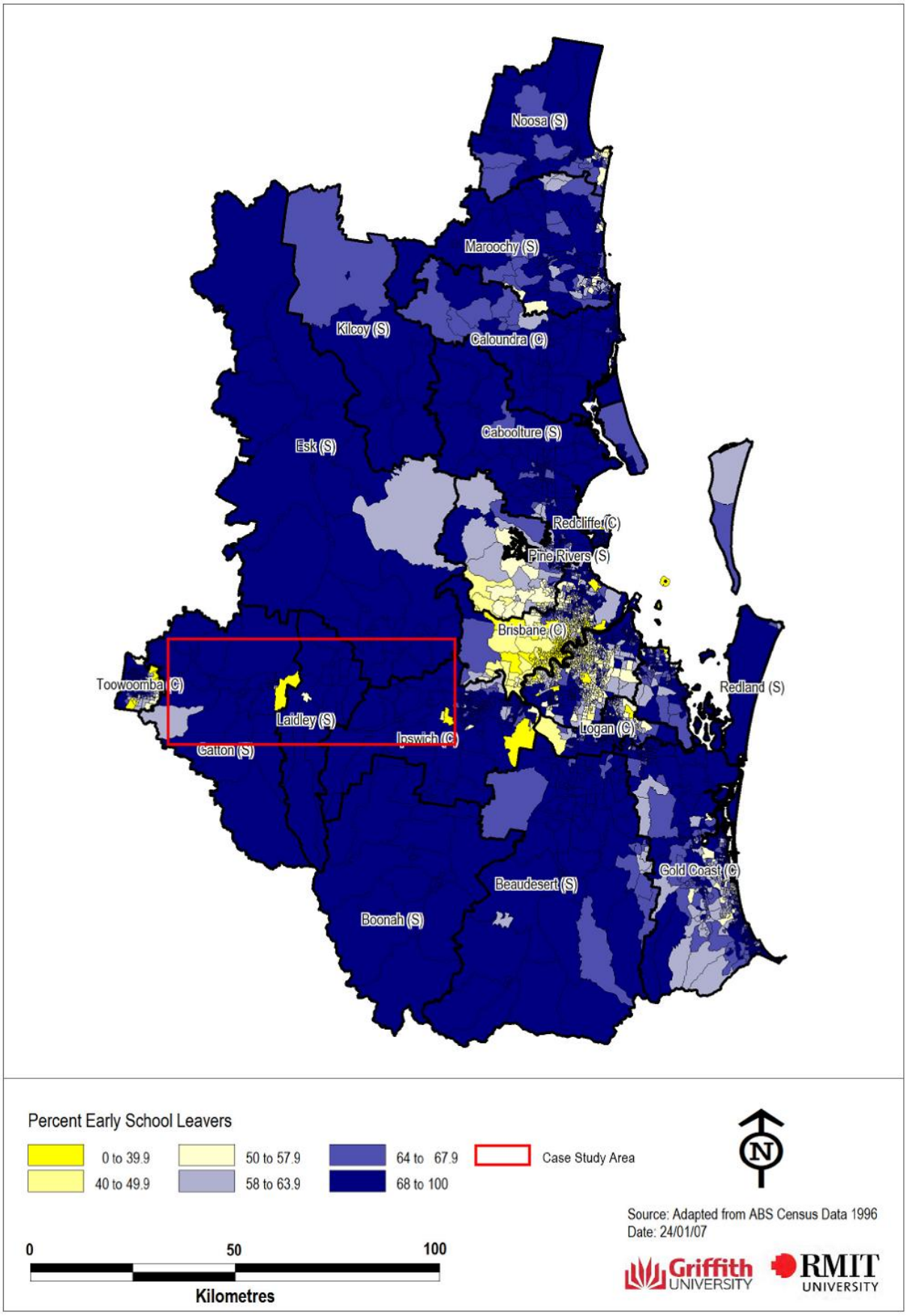
Map N- 7: Relative Socio-Economic Disadvantage by SLA (1996)



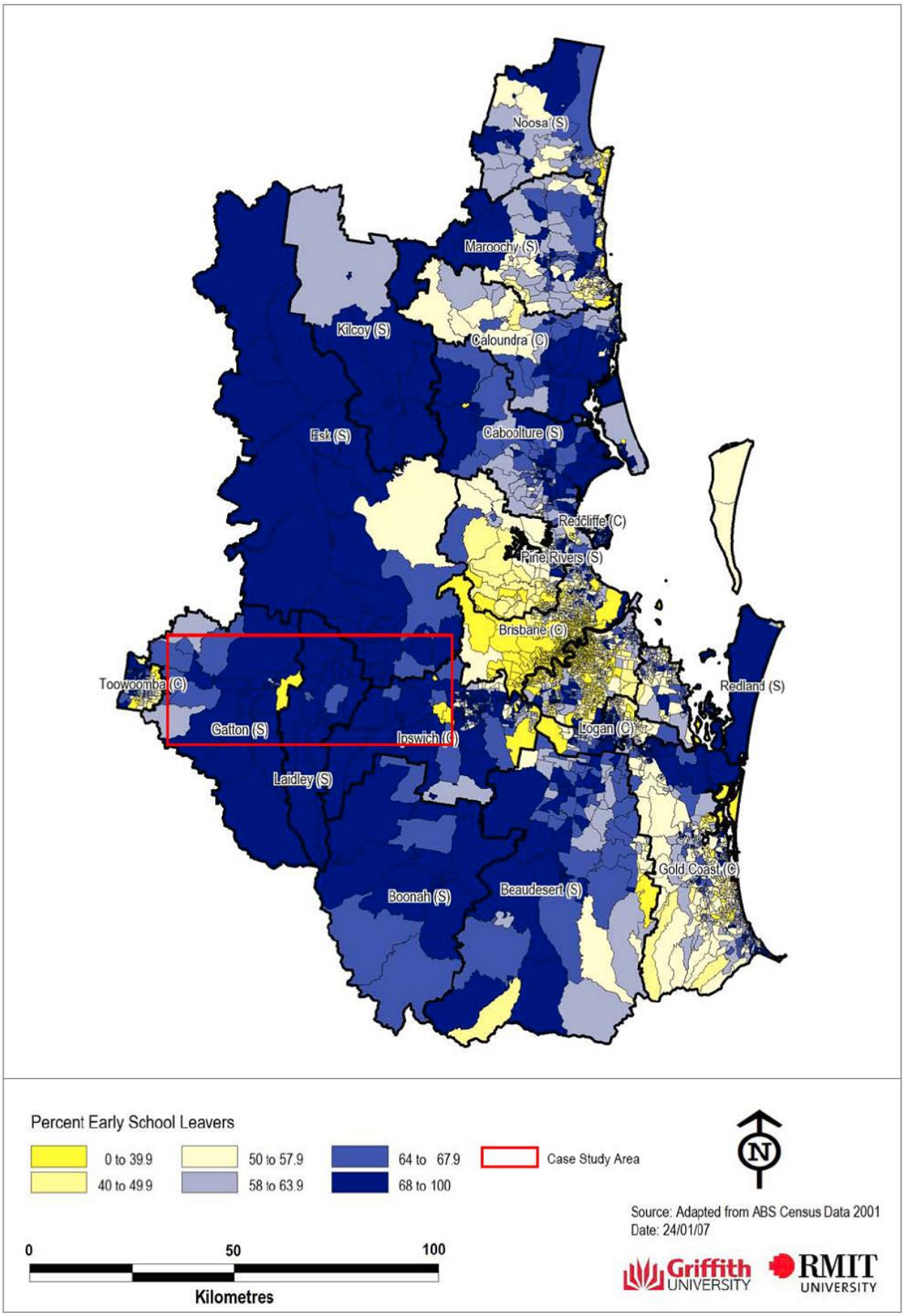
Map N-8: Relative Socio-Economic Disadvantage by CD (2001)



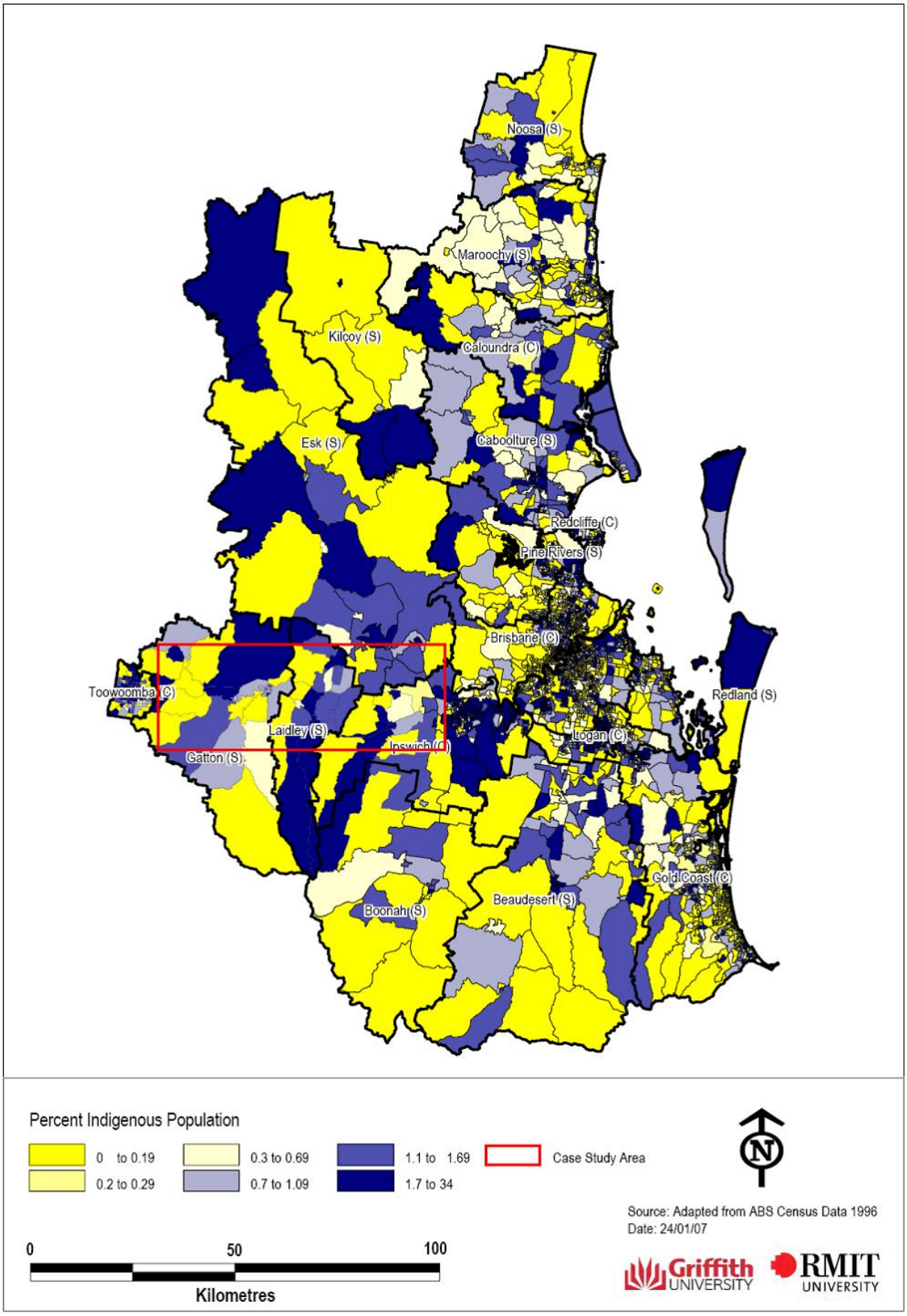
Map N-9: Relative Socio-Economic Disadvantage by SLA (2001)



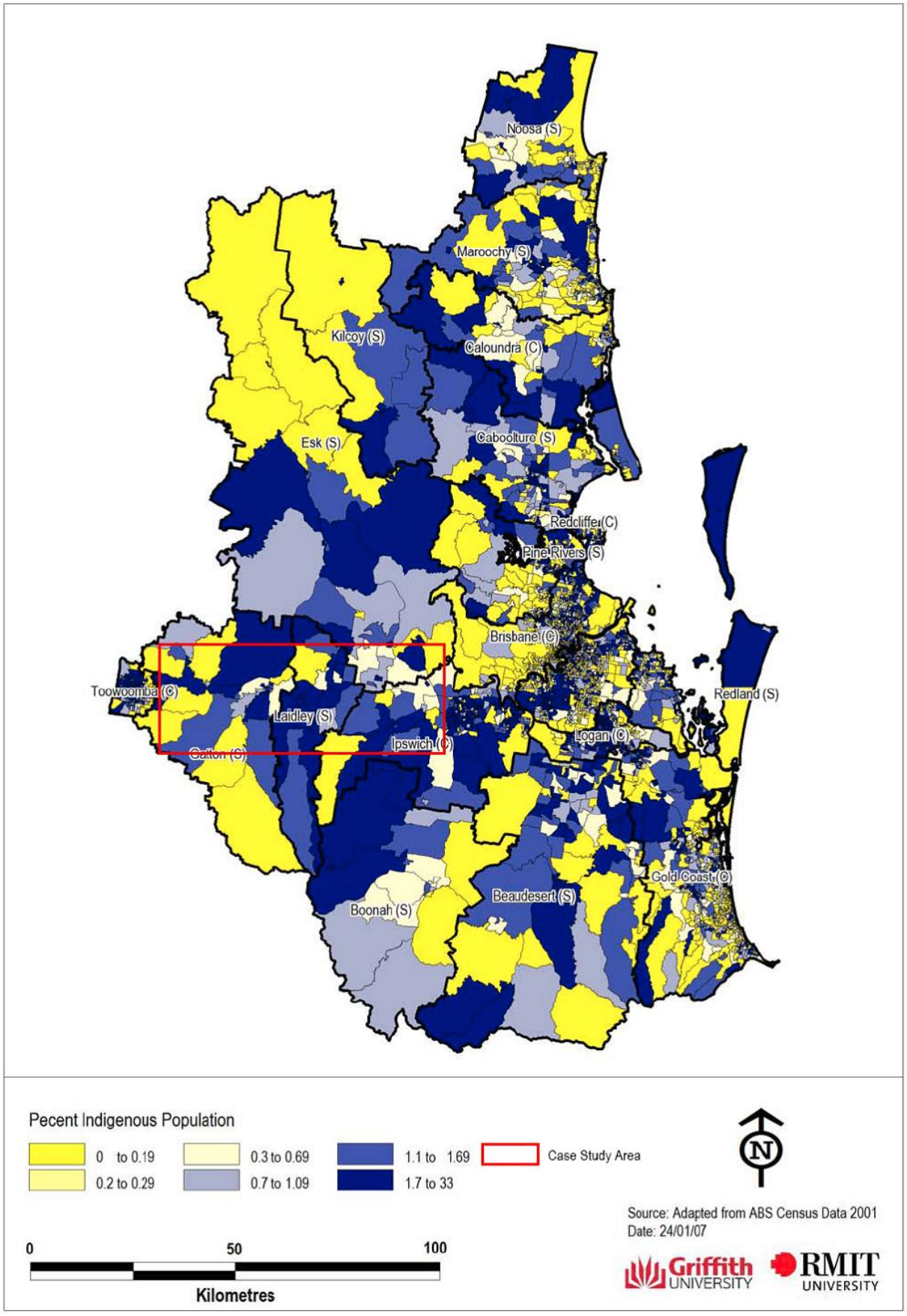
Map N-10: Percentage of Early School Leavers (1996)



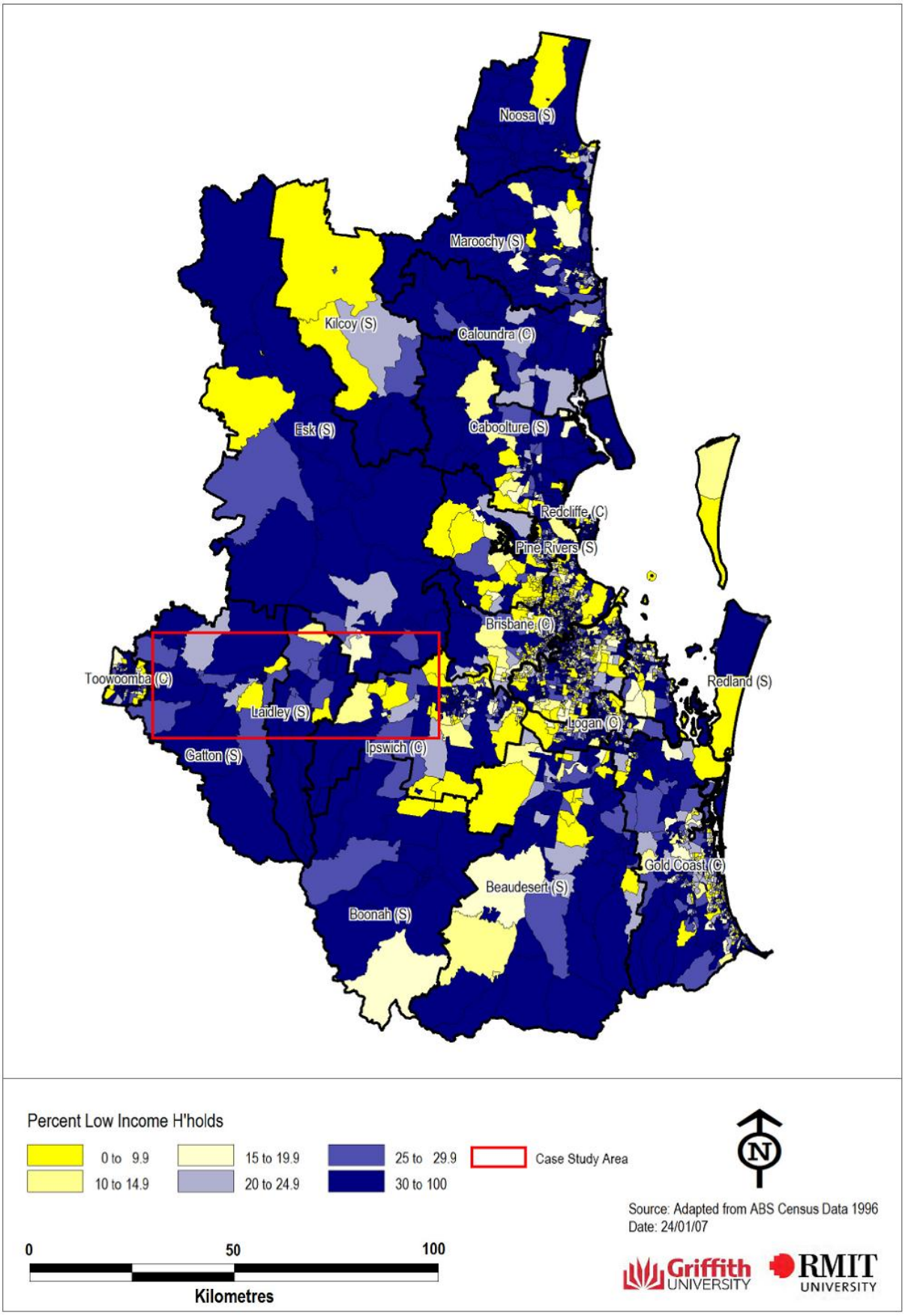
Map N-11: Percentage of Early School Leavers (2001)



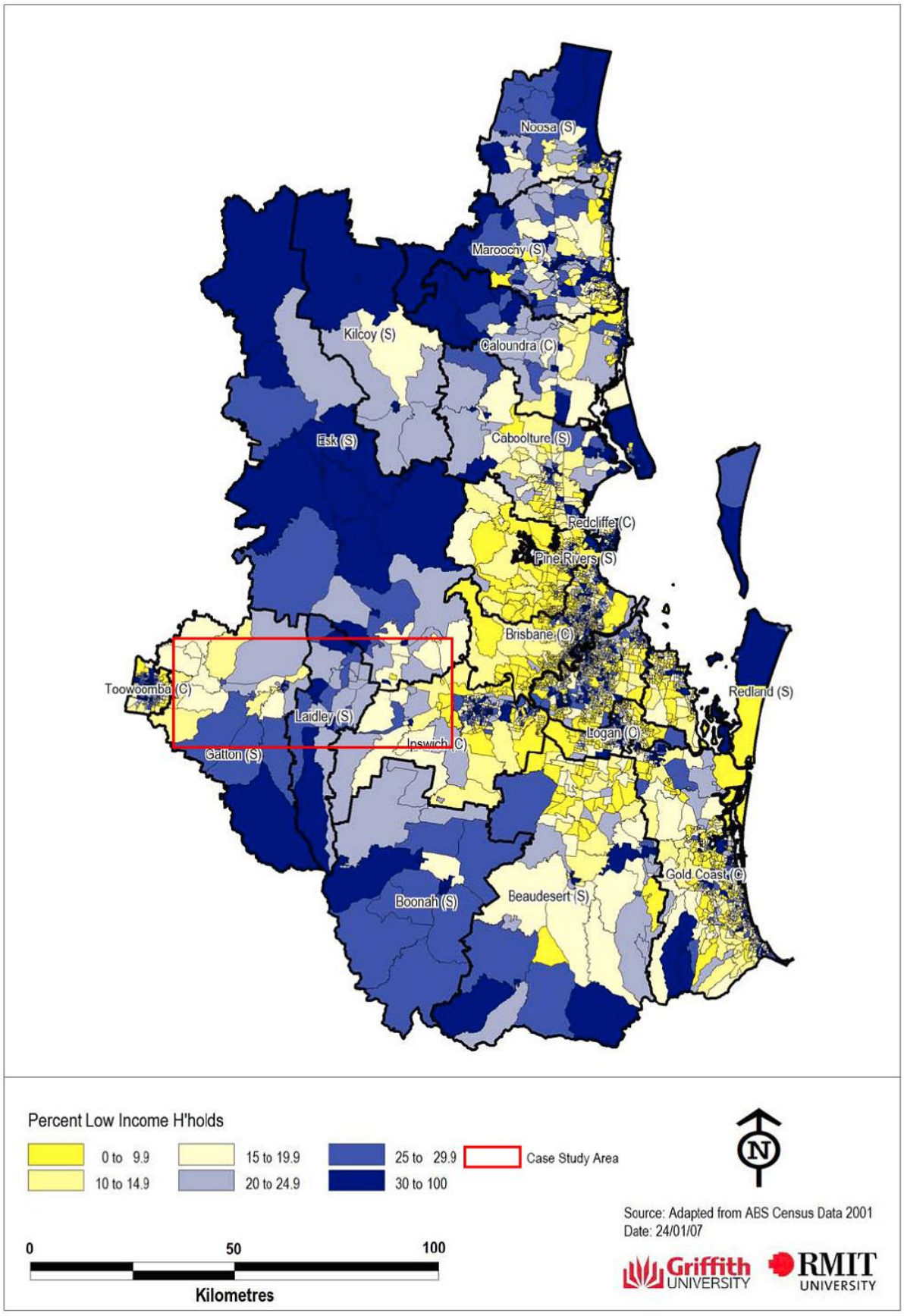
Map N-12: Percentage of Indigenous Population (1996)



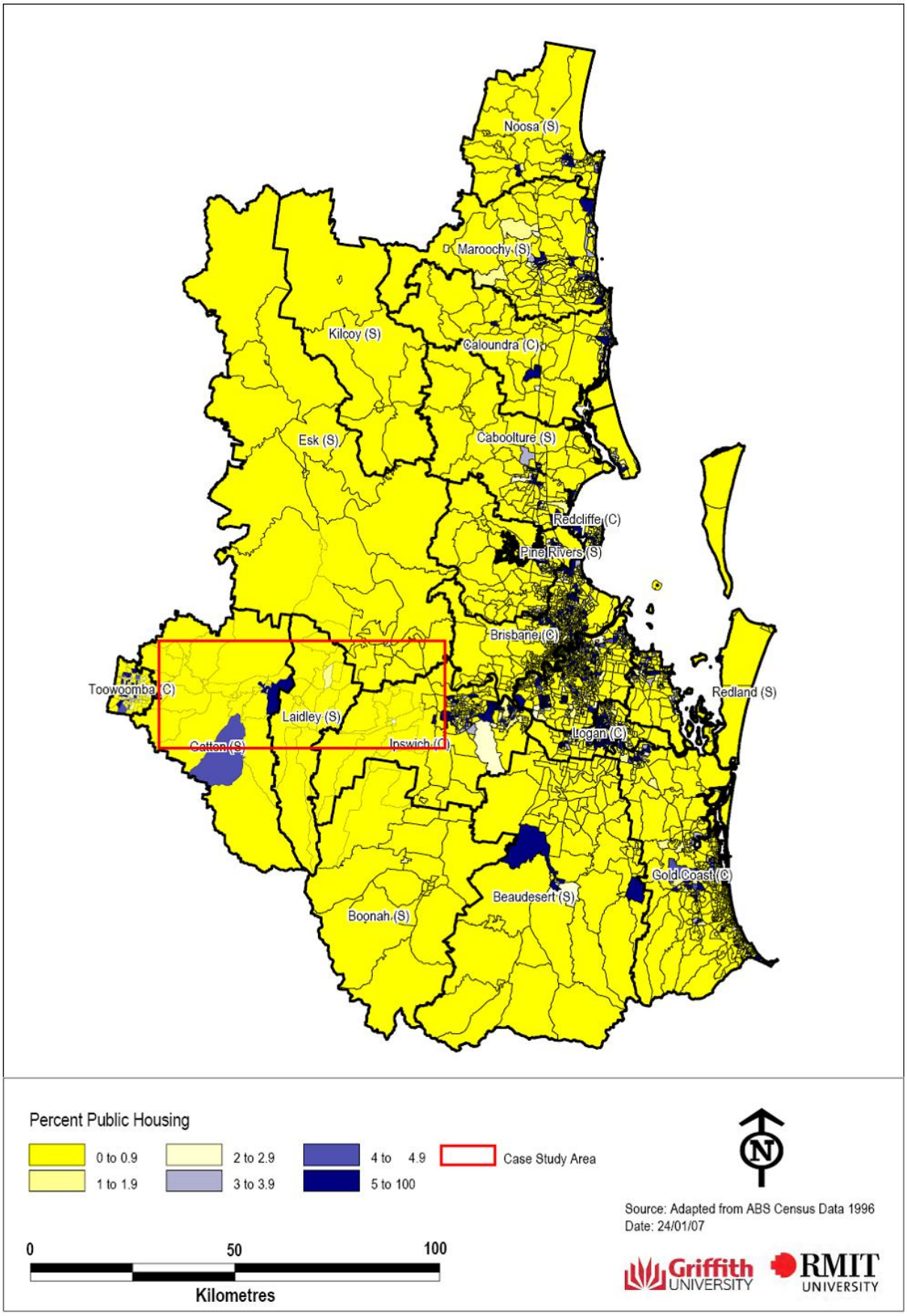
Map N-13: Percentage of Indigenous Population (2001)



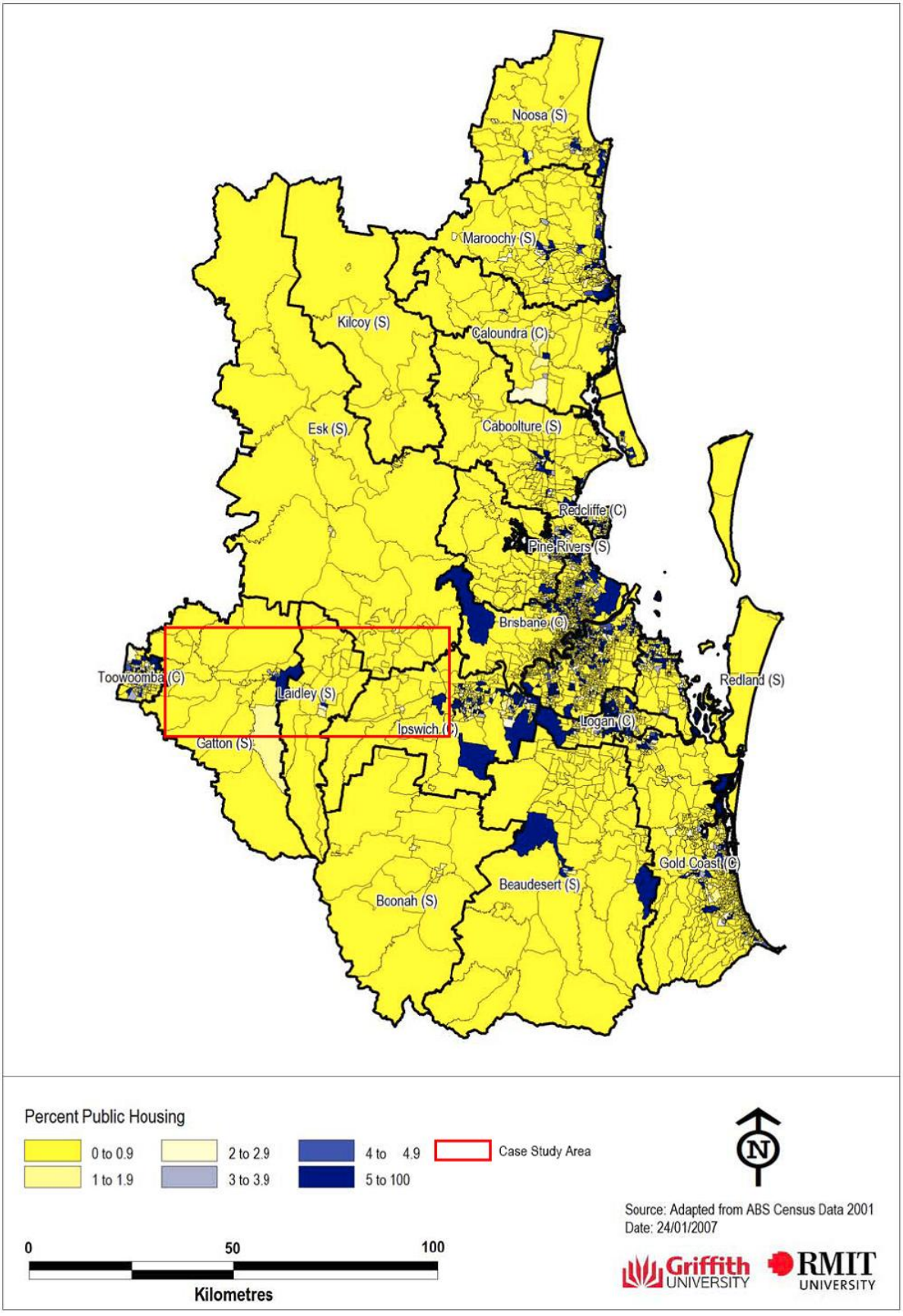
Map N-14: Percentage of Low Income Households (1996)



Map N-15: Percentage of Low Income Households (2001)



Map N-16: Percentage of Public Housing (1996)



Map N-17: Percentage of Public Housing (2001)

Table N-1: Dwellings in the CSA (Breakdown by Towns and Rural Balance) 1981-2001

	Separate House	Townhouse/Semi Detached	Flat, Unit or Apartment	Other Dwelling/ Not Stated	Total Dwellings
1981	2593	9	87	70	2759
1986	3134	0	159	74	3367
1991	3341	136	127	81	3685
1996	3753	197	187	191	4328
2001	4019	178	229	164	4590

	Separate House	Townhouse/Semi Detached	Flat, Unit or Apartment	Other Dwelling/ Not Stated	Total Dwellings
1981	3269	6	10	196	3481
1986	4586	9	13	225	4833
1991	5775	12	30	213	6030
1996	7104	13	54	338	7509
2001	7527	46	43	254	7870

(Source: ABS Census Data 2001)

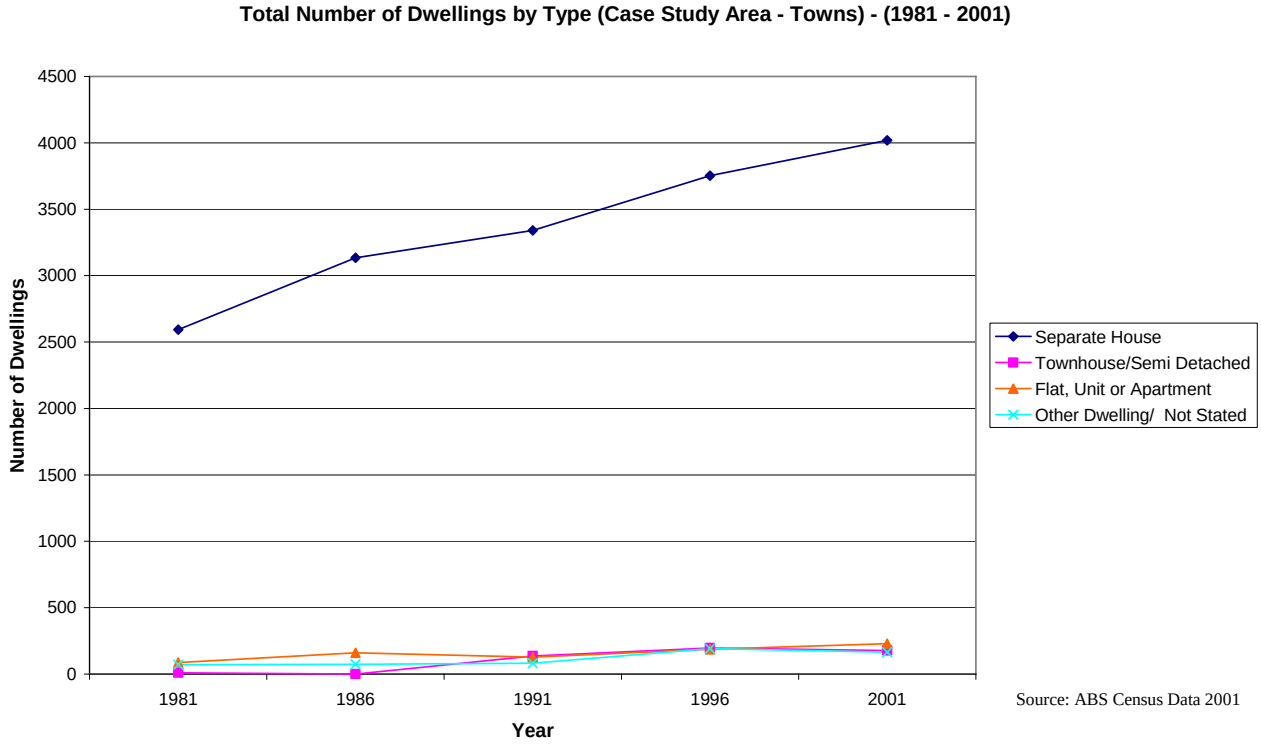


Figure N-1: Total Number of Dwellings - CSA Towns 1981-2001

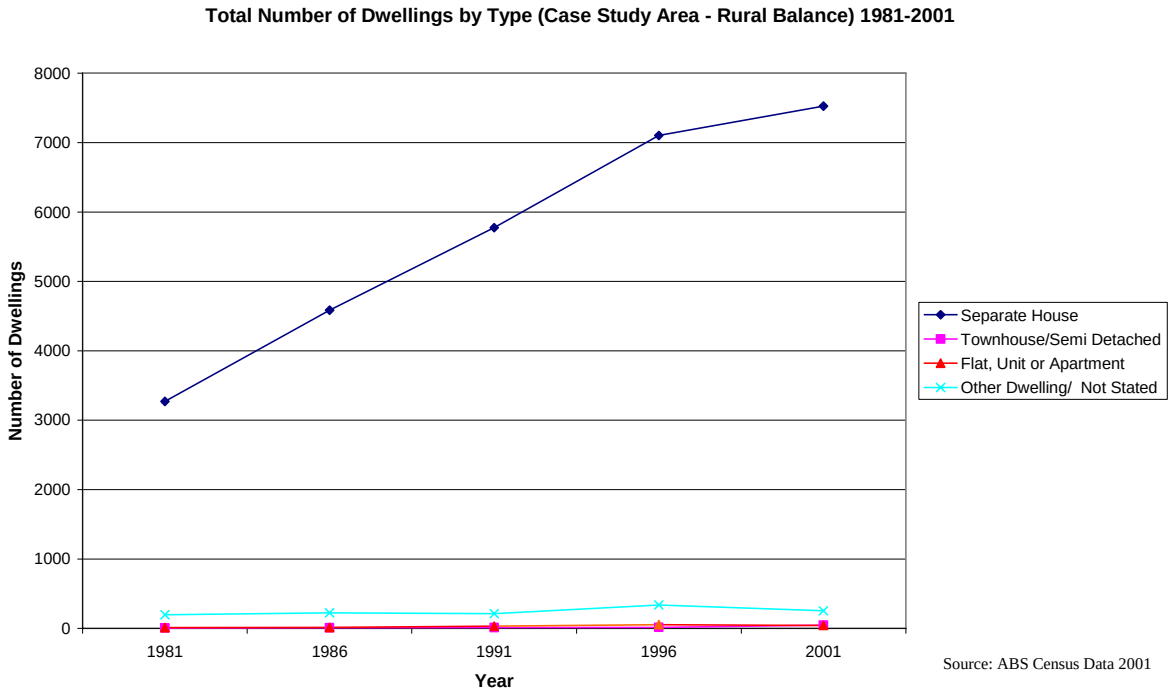


Figure N-2: Total Number of Dwellings by Type CSA Rural Balance 1981-2001

Table N-2: Median Weekly Housing Repayment by Dwelling Type in the CSA 1981-2001

	Separate house	Semi-detached/row/terrace	Flat/unit/apartment	Other & not stated
	Median Mortgage Repayment ($)	Median Mortgage Repayment ($)	Median Mortgage Repayment ($)	Median Mortgage Repayment ($)
1981	200	0	209	221
1986	334	800*	340	393.5
1991	494.5	925.5	0	588
1996	690	160	0	767
2001	693	580.5	100*	645
		* Only one CD to determine weekly repayment on		

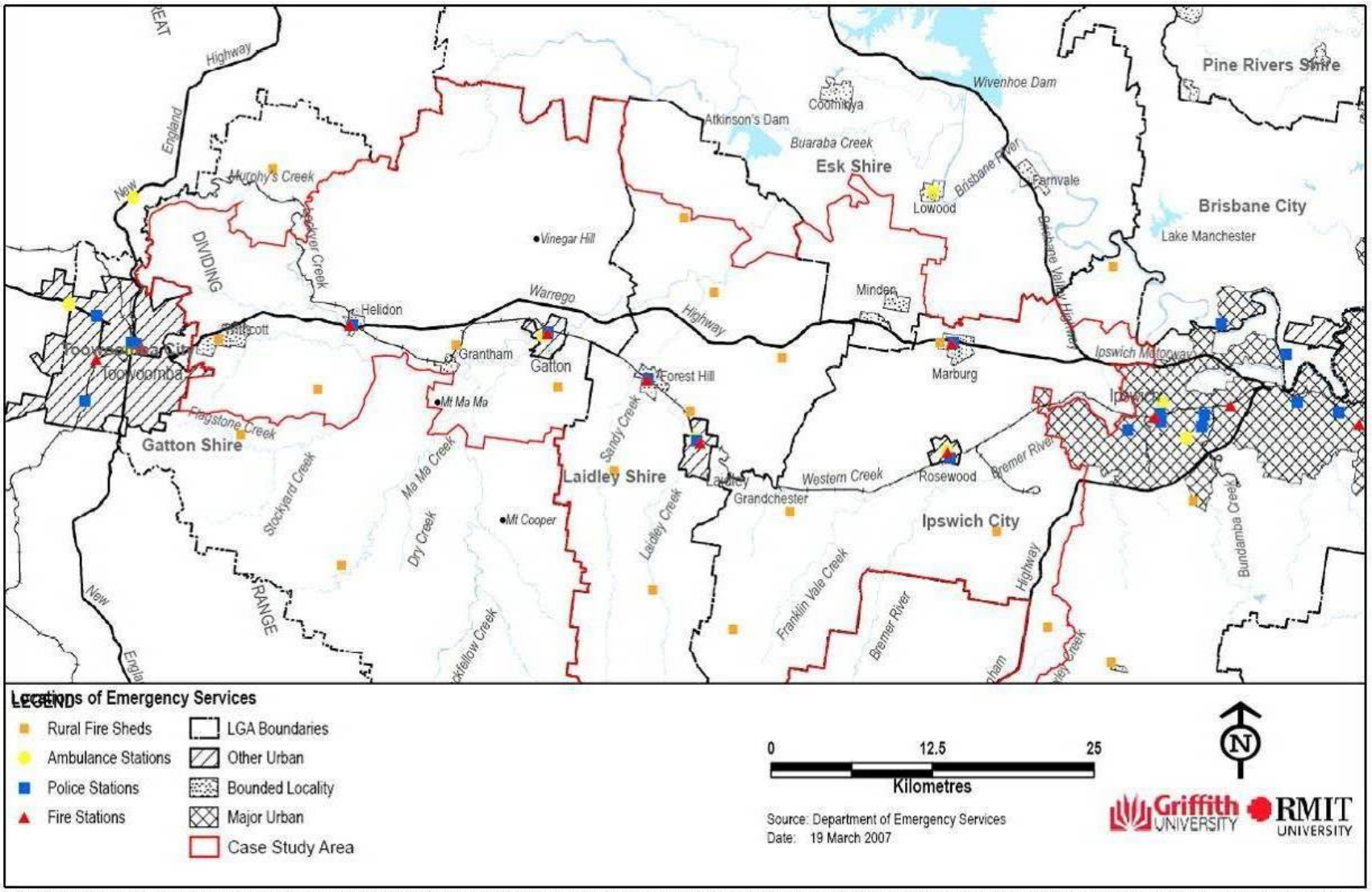
Table N-3: Median Weekly Rent by Dwelling Type in the CSA 1981-2001

	Separate house	Semi-detached/row/terrace	Flat/unit/apartment	Other & not stated
	Median Rent ($)	Median Rent ($)	Median Rent ($)	Median Rent ($)
1981	31.5	10	34	30
1986	69	0	57	80
1991	97	94	67	93
1996	120	110	82	90
2001	129	120	109	106.5

Appendix O: Emergency and Community Service

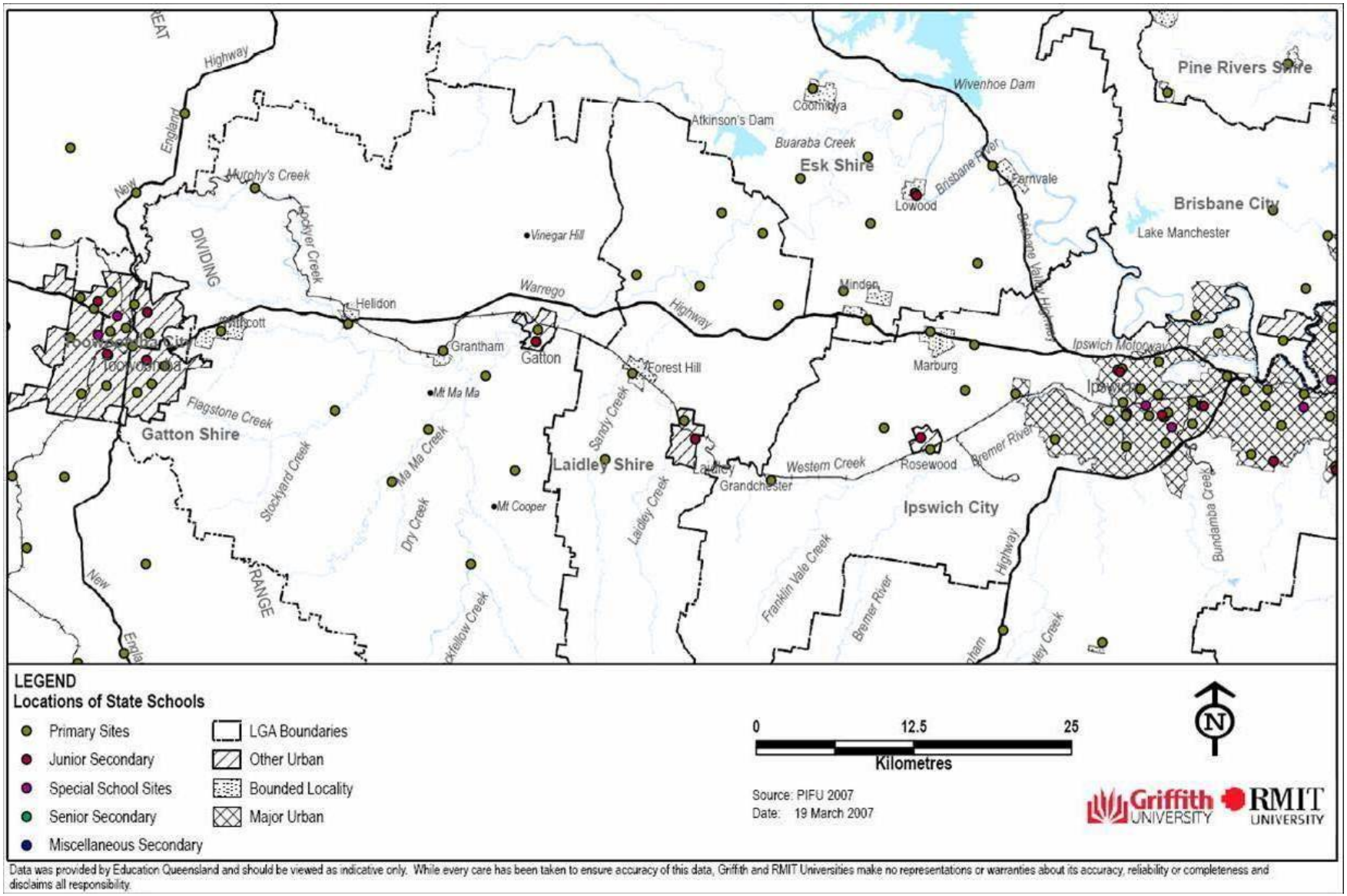
Table O-1: Emergency Services within the CSA

Fire Stations (6)	Rural Fire Stations (15)
Marburg	Blenheim District
Rosewood	Hattonvale Sumerholm Rural
Helidon	Laidley North East
Gatton	Marburg District
Laidley	Mulgowie
Forest Hill	Withcott
Police Stations (6)	Woodlea
Helidon	Grandchester
Gatton	Grantham
Forest Hill	Iredale Flagstone
Rosewood	Lockyer Waters
Laidley	Mount Forbes
Marburg	Mount Mort
Ambulance Stations (3)	Mutdapilly
Gatton	Central Lockyer
Laidley	
Rosewood	



Data provided by the Department of Emergency Services. The accuracy of the location of Rural Fire Sheds is indicative only. While every care has been taken to ensure the accuracy of this data, Griffith and RMIT Universities make no representations or warranties about its accuracy, reliability or completeness and disclaims all responsibility.

Map O-1: Location of Emergency Services in the CSA

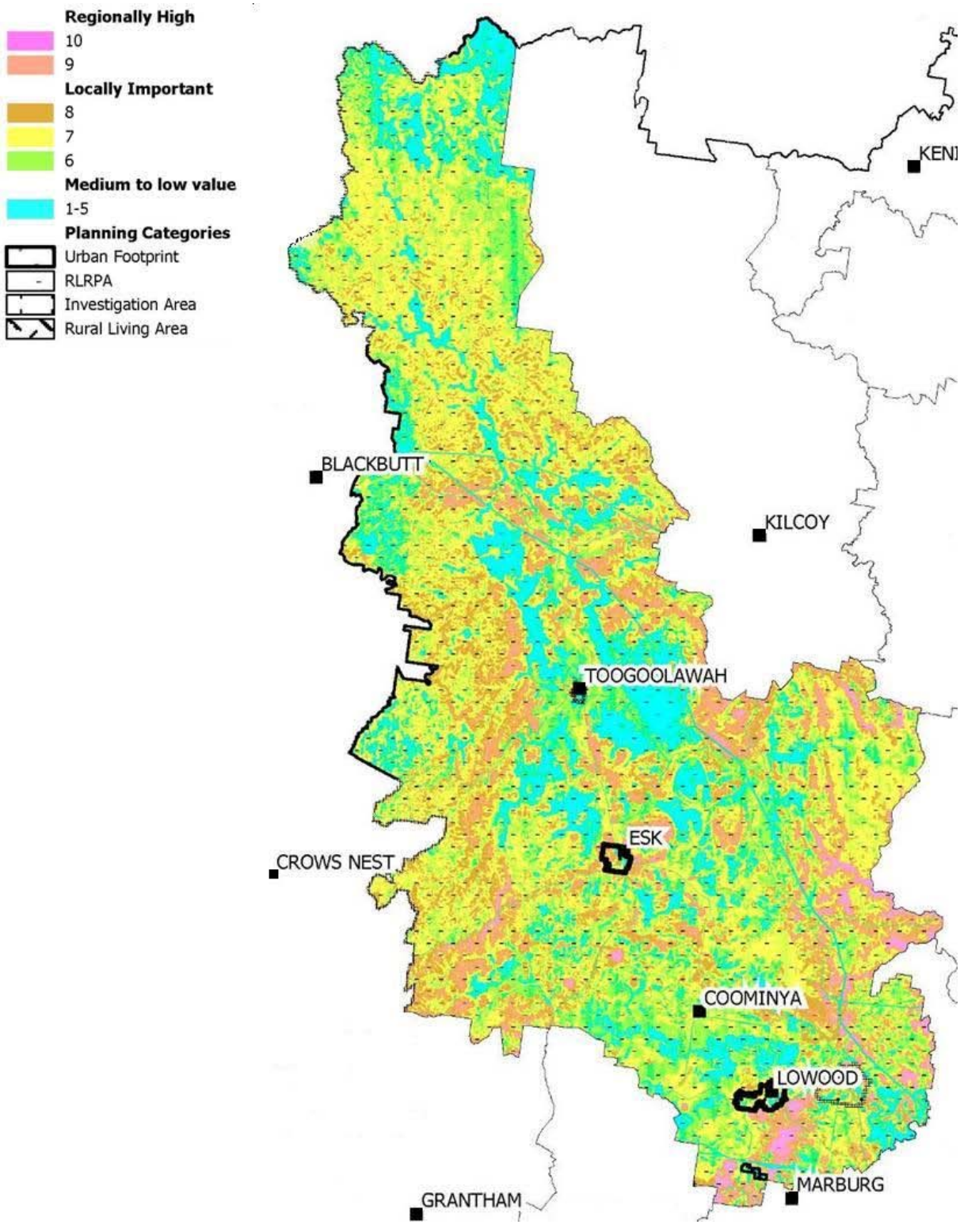


Map O-2: Location of State and Secondary Schools in the CSA

Table O-2: State Primary and Secondary Schools in the CSA

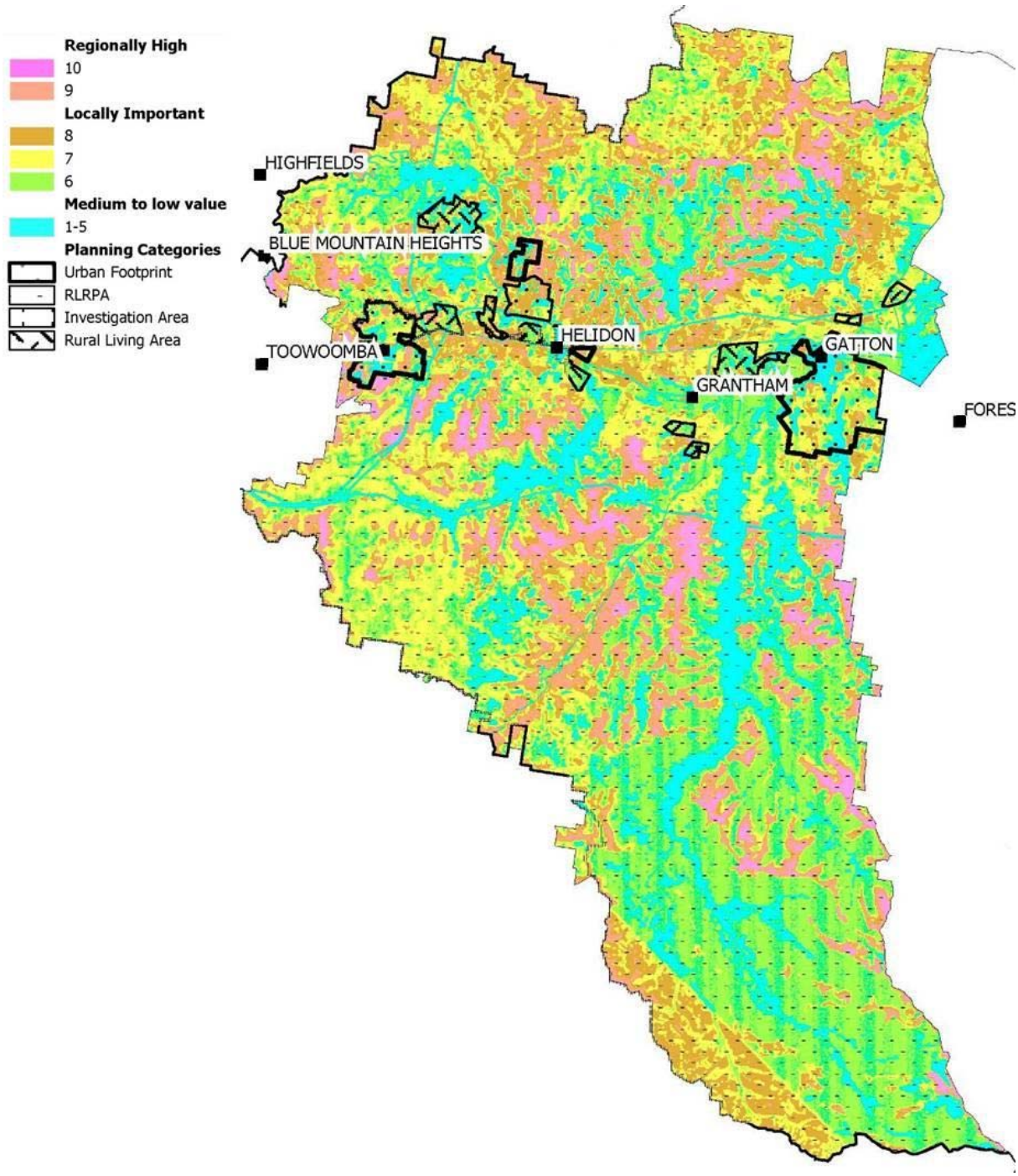
Primary Schools (24)	Secondary Schools/Senior Secondary (3)
Ashwell SS	Laidley SHS
Blenheim SS	Lockyer District SHS
Flagstone Creek SS	Rosewood SHS
Forest Hill SS	
Gatton SS	
Glenore Grove SS	
Granchester SS	
Grantham SS	
Haigslea SS	
Hatton Vale SS	
Helidon SS	
Laidley District SS	
Lake Clarendon SS	
Marburg SS	
Minden SS	
Mount Marrow SS	
Mutdapilly SS	
Prenzlau SS	
Rosewood SS	
Tarampa SS	
Tent Hill Lower SS	
Thorton SS	
Walloon SS	
Withcott SS	

Appendix P: Scenic Amenity



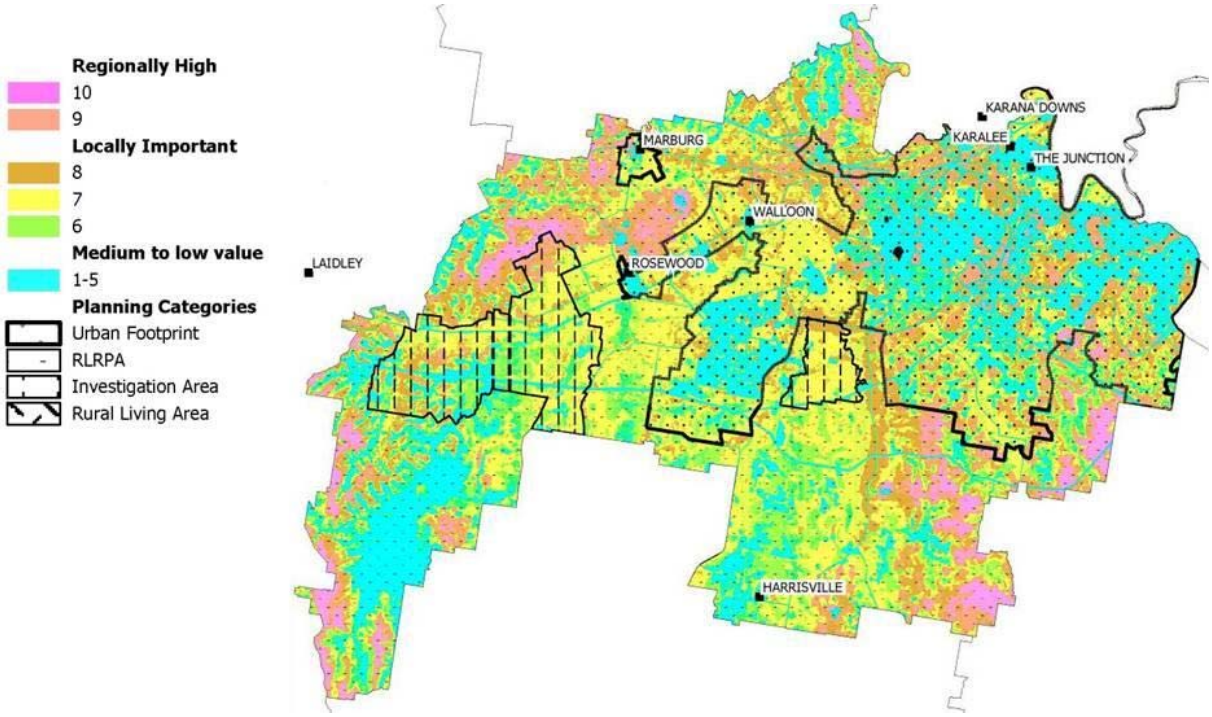
(Source: OUM 2007)

Map P-1: Interim Scenic Amenity Maps Esk Shire



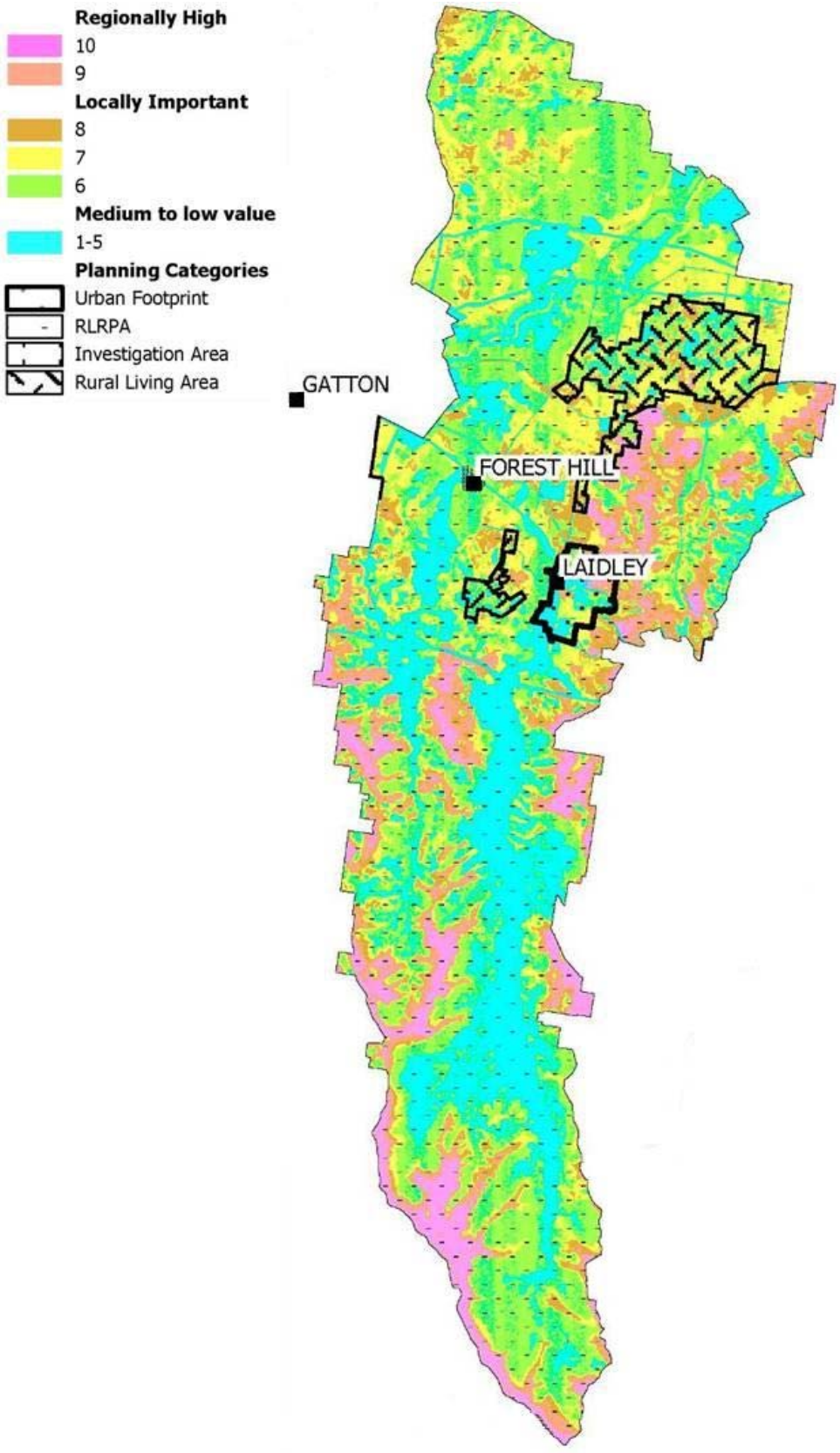
(Source: OUM 2007)

Map P-2: Interim Scenic Amenity Map Gatton Shire



(Source: OUM 2007)

Map P-3: Interim Scenic Amenity Map Ipswich City



(Source: OUM 2007)

Map P-4: Interim Scenic Amenity Map Laidley Shire

Appendix Q: Queensland State Departments, Function and Acts Administered

Table Q-1: Description of Example State Departments, Function and Acts Administered

State Department	Function	Acts Administered
State Development (DSD)	Works to support business growth in Queensland. SD is the lead agency in economic development and focal point in State Government for raising and negotiating matters impacting on the State's development and innovation with other levels of Government.	Biodiscovery Act 2004 Gene Technology Act 2001 Mutual Recognition Act (Qld) 1992 Retail Shop Leases Act 1994 Trans-Tasman Mutual Recognition (Qld) 2003
Emergency Services (DES)	The Agency provides services covering all phases of emergency and disaster management, prevention, preparedness, response and recovery 3 operational arms: Queensland Ambulance Service; Queensland Fire and Rescue Service; and Emergency Management Queensland.	Ambulance Services Act 1991 Fire and Rescue Service Act 1990 Disaster Management Act 2003 Dangerous Good Safety Management Act 2001
Police (QP)	Serving the people of Queensland by protecting life and property, preserving peace and safety, preventing crime and upholding the law in a manner which had regard for the public good and the rights of the individual.	Weapons Act 1990, National Crime Authority (State Provisions) Act 1985, Police Powers and Responsibility Act 2000, Prostitution Act 1999, Public Safety Preservation Act 1996, Queensland Police Welfare Club Act 1970, Suppression of Gambling Act 1895, Vagrants Gaming and Other Offences Act 1931, and Police Service Administration Act 1990.
Queensland Transport (QT)	3 main roles: Transport leadership including policy and planning; System stewardship, managing access to and use of the transport system; and Service delivery, coordinating and integrating transport-related services and infrastructure.	Air Navigation Act 1937 Australian Shipping Commission Authorization Act 1977 Brisbane River Tidal Lands Improvement Act 1927 Central Queensland Coal Associates Agreement Act 1968 (Schedule parts IV-IVC) Century Zinc Project Act 1997 (ss 5(2)-(7),11,12,13,21) Civil Aviation (Carriers' Liability) Act 1964 Maritime Safety Queensland Act 2002 National Rail Corporation (Agreement) Act 1991 Queensland Nickel Agreement Act 1970 (Schedule parts IV-V) State Transport Act 1938 State Transport (People Movers) Act 1989 Thiess Peabody Mitsui Coal Pty. Ltd. Agreements Act 1965 Tow Truck Act 1973 Transport Infrastructure Act 1994[a] Transport Operations (Marine Pollution) Act 1995 Transport Operations (Marine Safety) Act 1994 Transport Operations (Passenger Transport) Act 1994 Transport Operations (Road Use Management) Act 1995 Transport Planning and Coordination Act 1994[b] Transport (South Bank Corporation Area Land) Act 1999.
Queensland Health (QH)	Provides a range of health services aimed at achieving good health and wellbeing for all Queenslanders through the 20 health services districts and 4 health areas of Northern, Capricorn Coast, Central and Southern Queensland.	Chiropractors Registration Act 2001 Dental Practitioners Registration Act 2001 Dental Technicians And Dental Prosthetists Registration Act 2001 Drugs Standard Adopting Act 1976 Fluoridation Of Public Water Supplies Act 1963 Food Act 2006

State Department	Function	Acts Administered
		Health Act 1937 Health Practitioners (Professional Standards) Act 1999 Health Practitioners (Professional Standards) Regulation 2000 Health Practitioners (Special Events Exemption) Act 1998 Health Practitioner Registration Boards (Administration) Act 1999 Health Quality And Complaints Commission Act 2006 Health Services Act 1991 Hospitals Foundations Act 1982 Medical Practitioners Registration Act 2001 Medical Radiation Technologist Registration Act 2001 Mental Health Act 2000 Nursing Act 1992 Occupational Therapists Registration Act 2001 Optometrists Registration Act 2001 Osteopaths Registration Act 2001 Pest Management Act 2001 Pharmacists Registration Act 2001 Physiotherapists Registration Act 2001 Podiatrists Registration Act 2001
Natural Resources and Water (DNR&W)	Plays a role in stewardship of Queensland's natural resources, managing and allocating the state's land and water resources, managing native vegetation and the use/sale of native forest resources and managing control of pest plants and animals.	Aboriginal Cultural Heritage Act 2003 Aboriginal Land Act 1991 (except to the extent administered by the Attorney-General and Minister for Justice and Minister Assisting the Premier in Western Queensland and the Minister for Environment and Multiculturalism) Acquisition of Land Act 1967 Allan and Stark Burnett Lane Subway Authorisation Act 1926 Building Units and Group Titles Act 1980 (except to the extent administered by the Minister for Tourism, Fair Trading, Wine Industry Development and Women; sections 5, 5A, 119, 133 and 134 jointly administered with the Minister for Tourism, Fair Trading, Wine Industry Development and Women) Century Zinc Project Act 1997 (section 9) Foreign Governments (Titles to Land) Act 1948 Foreign Ownership of Land Register Act 1988 Forestry Act 1959 (jointly administered with the Minister for Environment and Multiculturalism; except to the extent administered by the Deputy Premier, Treasurer and Minister for Infrastructure and the Minister for Primary Industries and Fisheries) Ipswich Trades Hall Act 1986 Lake Eyre Basin Agreement Act 2001 Land Act 1994 Land Protection (Pest and Stock Route Management) Act 2002 (to the extent that it is relevant to Stock Route Management) (jointly administered with the Minister for Primary Industries and Fisheries) Land Title Act 1994 Metropolitan Water Supply and Sewerage Act 1909 Murray-Darling Basin Act 1996 Native Title (Queensland) Act 1993 New South Wales – Queensland Border Rivers Act 1946 Place Names Act 1994

State Department	Function	Acts Administered
		Recreation Areas Management Act 1988 (jointly administered with the Minister for Environment and Multiculturalism) Registration of Plans (H.S.P. [Nominees] Pty. Limited) Enabling Act 1980 Registration of Plans (Stage 2) (H.S.P. [Nominees] Pty. Limited) Enabling Act 1984 River Improvement Trust Act 1940 Soil Conservation Act 1986 Soil Survey Act 1929 Starcke Pastoral Holdings Acquisition Act 1994 Survey and Mapping Infrastructure Act 2003 Surveyors Act 2003 Torres Strait Islander Cultural Heritage Act 2003 Torres Strait Islander Land Act 1991 (except to the extent administered by the Attorney-General and Minister for Justice and Minister Assisting the Premier in Western Queensland and the Minister for Environment and Multiculturalism) Valuation of Land Act 1944 Valuers Registration Act 1992 Vegetation Management Act 1999 Water Act 2000 (except to the extent administered by the Deputy Premier, Treasurer and Minister for Infrastructure) Wild Rivers Act 2005 Yeppoon Hospital Site Acquisition Act 2006
Environmental Protection Agency (EPA)	The EPA incorporates the Queensland Parks and Wildlife Service and has the following key functions: Environmental planning, policy and operations; Environmental and technical services; Management of parks, forestry and wildlife; and Sustainable industries and corporate affairs and development. EPA strives to protect Queensland's natural and cultural heritage, promote sustainable use of its natural resources and ensure a clean environment.	Aboriginal Land Act 1991 (s83(2)-(11); s134 (as it applies to the provisions of the Act administered by the Minister for Environment) Brisbane Forest Park Act 1977 Coastal Protection and Management Act 1995 Currumbin Bird Sanctuary Act 1976 Environmental Protection Act 1994 Forestry Act 1959 (jointly administered with the Minister for Natural Resources, Mines and Water except to the extent administered by the Minister for Primary Industries and Fisheries) Gurulmundi Secure Landfill Agreement Act 1992 Marine Parks Act 2004 National Environment Protection Council (Queensland) Act 1994 National Trust of Queensland Act 1963 Nature Conservation Act 1992 Newstead House Trust Act 1939 Queensland Heritage Act 1992 Recreation Areas Management Act 1988 Torres Strait Islander Land Act 1991 (s 80(2)- (11); s131 (as it applies to the provisions of the Act administered by the Minister for Environment) Tweed River Entrance Sand Bypassing Project Agreement Act 1998 Water Efficiency Labelling and Standards Act 2005 Wet Tropics World Heritage Protection and Management Act 1993
Primary Industries (DPI)	Mission is to maximise the economic potential for Queensland's primary	Agricultural Chemicals Distribution Control Act 1966 Agriculture and Veterinary Chemicals (Queensland) Act

State Department	Function	Acts Administered
	industries on a sustainable basis through four major inputs: Industry development; Biosecurity; Forestry; and Fisheries.	1994 Agricultural and Veterinary Chemicals (Administration) Act 1992 (Cwth) Agricultural Standards Act 1994 Animal Care and Protection Act 2001 Apiaries Act 1982 Banana Industry Protection Act 1989 Biological Control Act 1987 Brands Act 1915 Chemical Usage (Agricultural and Veterinary) Control Act 1988 Drugs Misuse Act 1986 (Part 5B only) Exotic Diseases in Animals Act 1981 Fisheries Management Act 1994 Land Protection (Pest and Stock Route Management) Act 2002 Plant Protection Act 1989 Stock Act 1915 Veterinary Surgeons Act 1936
Local Government, Planning, Sport and Recreation (DLGPSR)	The role of DLGPSR is to deliver a better and sustainable built environment and local government system for the people of Queensland.	Aboriginal Communities (Justice and Land matters) Act 1984 (Part 13, Div 2 and Part 15); Australian Estates Company Limited, Hastings Street, New Farm, Viaduct Authorisation Act 1962; Brisbane City Council Business and Procedure Act 1939; Building Act 1975; Central Queensland Coal Associates Agreement Act 1968 (Sch pt VI); Century Zinc Project Act 1997 (ss14-17); City of Brisbane Act 1924; Community Services (Torres Strait) Act 1984 (Parts 3,4 (Div 1,2), Part 7,8,12 (s192(d), (f)-(m) and (r)-(s)), 13, 14 and 15) (Parts 1, 2, 12 (s191, 192 (a), (t) and (zb-zg)) jointly administered with the Minister for Energy and Aboriginal and Torres Strait Islander Policy); Eagle Farm Racecourse Act 1998; Gold Coast Motor Racing Events Act 1990; Integrated Planning Act 1997 (Chapter 2, Part 5A; except to the extent administered by the Premier and Treasurer); Integrated Resort Development Act 1987; Local Government (Aboriginal Lands) Act 1978; Local Government Act 1993; Local Government (Chinatown and the Valley Malls) Act 1984; Local Government (Community Government Areas) Act 2004; Local Government (Queen Street Mall) Act 1981; Local Government (Robina Central Planning Agreement) Act 1992; Major Sports Facilities Act 2001; Mixed Use Development Act 1993; Mount Gravatt Showgrounds Act 1988; Plumbing and Drainage Act 2002;

State Department	Function	Acts Administered
		Racing Act 2002; Racing Venues Development Act 1982; Royal National Agricultural and Industrial Association of Queensland Act 1971; Sanctuary Cove Resort Act 1985; Southern Moreton Bay Islands Development Entitlements Protection Act 2004; Townsville Breakwater Entertainment Centre Act 1991; Townsville City Council (Douglas Land Development) Act 199;. Sporting Bodies' Property Holding Act 1975; Sports Drug Testing Act 2003.
Department of Communities (DC)	Providing service to the community and developing policy on community engagement, volunteering, crime prevention, family and domestic violence prevention, family support, individual support (including gambling support and management of public intoxication), homelessness, disaster recovery and support to non-government organisations; Supporting and monitoring the provision of quality services for children and families; Promoting the interests of seniors so they are valued and active members of Queensland communities; Supporting young people to achieve their full potential and providing quality youth justice services; and Facilitating easier access to responsive government services and information.	Child Care Act 2002 Childrens Court Act 1992, ss20(1)(f), 20(2)(a)(ii) Domestic and Family Violence Protection Act 1999 Family Services Act 1987 Juvenile Justice 1992 Young Offenders (Interstate transfer) Act 1987
Department Main Roads (DMR)	Role is to plan, provide and manage Queensland's major road network.	Transport Infrastructure Act 1994 Transport Planning and Coordination Act 1994

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