



Toowoomba Regional Council

Industrial Land Use Study

2012 Study Update

19 October 2012

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1. Introduction

1.1 Study Purpose

GHD has been commissioned by Toowoomba Regional Council to update the Vacant Industrial Land Study (GHD, 2009) and the Industrial Land Use Study (GHD and Economic Associates 2010) undertaken as part of the Toowoomba Regional Planning Project.

The purpose of this update is to reflect recent economic activity experienced in the industrial sector of the Toowoomba Region, mainly attributed to the growing resources sector within the Surat Basin and South West Queensland. This report provides updated estimates regarding the quantum of industrial land supply and demand to 2031 and implications for the industrial land use strategy for the Toowoomba Region.

1.2 Study Area

The study area comprises land contained within the bounds of Toowoomba Regional Council and covers approximately 12,973 km². Formed as a result of the restructuring of local government boundaries in March 2008, the Region includes the following former local government areas:

- Toowoomba City (Toowoomba);
- Jondaryan Shire (Jondaryan);
- Millmerran Shire (Millmerran);
- Pittsworth Shire (Pittsworth);
- Cambooya Shire (Cambooya);
- Clifton Shire (Clifton);
- Crows Nest Shire (Crows Nest); and
- Rosalie Shire (Rosalie).

2. Industrial Land Supply

A vacant industrial land audit was undertaken by GHD to update the previous audit undertaken in 2009. The following outlines the methodology used for the audit and discusses the quantum, distribution and configuration of vacant industrial land across the Toowoomba Region. The suitability of this land to meet industrial land demand is discussed in section 4.

2.1 Vacant Industrial Land Audit

The vacant industrial land audit was conducted using a combination of desktop assessment and fieldwork to record the vacancy of individual land parcels. The methodology and assumptions adopted for this assessment are as follows:

- A desktop assessment of aerial imagery (provided by Toowoomba Regional Council) was undertaken to identify the presence and/or absence of buildings for individual industrial land parcels within the Toowoomba Regional Council area. Land parcels were identified as either utilised or not utilised based on whether a structure of an industrial nature was present on the land parcel.

This desktop assessment was carried out for all land included within the 'Low Impact Industry', 'Medium Impact Industry' and 'High Impact Industry' zones under the recently adopted Toowoomba Regional Council Planning Scheme. Industrial land included in the 'Extractive Industry' under the planning scheme has not been considered in this Study.

- Upon completion of this process, a review was undertaken to verify the categorisation of the parcels as utilised or not utilised.
- A ground-truthing exercise was then undertaken in the field, during which most land parcels were visited. Lots that were visited were assessed as per the above desktop assessment methodology. Some lots were inaccessible by vehicle and were therefore not able to be visited. Given these sites were identified as vacant during the desktop assessment and not accessible by road, these sites were deemed to be vacant.
- Results of the audit were then cross checked with the results of the 2009 audit and some refinement of the data was undertaken to remove any anomalies.
- Following completion of the desktop and field assessments, the datasets were merged into a single cadastral data layer for use in ongoing planning processes. The presence / absence of buildings by parcel for the specified industrial land are represented via a yes/no attribute.

2.2 Vacant Industrial Land Analysis

Analysis of the vacant industrial land audit indicates there is an estimated 1,858 hectares of vacant industrial land within the Toowoomba Region. Of this, approximately 79 hectares is located in the former Toowoomba City area (including all land at Wilsonton/Torrington), while a significant proportion is within the former Jondaryan Shire (1,554 hectares) and Millmerran Shire (141 hectares).

Table 2-1 presents the industrial land supply, both vacant and occupied, for the Toowoomba Region. Mapping showing the location of vacant industrial land is provided in Appendix A.

Table 2-1 Industrial Land Supply - Number of Hectares per Locality

Locality	Vacant (ha)	Occupied (ha)	Total (ha)
Toowoomba*	79	461	540
Jondaryan	1,554	756	2,310
Millmerran	141	80	221
Pittsworth	30	41	71
Cambooya	-	-	-
Clifton	12	53	65
Crows Nest	28	20	48
Rosalie Shire	14	30	44
Total	1,858	1,441	3,298

Note: Toowoomba includes all industrial land at Wilsonton/Torrington industrial estate.

Table 2-2 and Table 2-3 present the breakdown of vacant industrial land per zone. As shown, 1,382 hectares (74%) of vacant industrial land is allocated for Medium Impact Industry. The remainder of vacant industrial land is zoned as High Impact Industry (294 hectares, 16%) or Low Impact Industry (182 hectares, 10%). Comparison of the number of hectares of industrial land with the number of industrial lots, suggests the majority of the vacant industrial land is currently held in large landholdings and yet to be subdivided. This is demonstrated by the following tables, where 1,857 occupied lots cover 1,441 hectares in comparison to 288 vacant lots covering a larger area of 1,858 hectares. This finding is consistent for each zone category.

It should be noted that this supply also includes the site for a possible alternative airport at Wellcamp, which will require approximately 350 hectares. The airport site includes land in each industrial zone, however mostly land in the Medium Impact Industry zone.

Table 2-2 Industrial Land Supply - Number of Hectares per Zone

Industrial Zone	Vacant (ha)	Occupied (ha)	Total (ha)
Low Impact Industry	182	270	452
Medium Impact Industry	1,382	886	2,268
High Impact Industry	294	284	578
Total	1,858	1,441	3,298

Table 2-3 Industrial Land Supply - Number of Lots per Zone

Industrial Zone	Vacant (lots)	Occupied (lots)	Total (lots)
Low Impact Industry	72	731	803
Medium Impact Industry	206	1,104	1,310
High Impact Industry	10	22	32
Total	288	1,857	2,145

Table 2-4 presents the breakdown of vacant industrial land per zone for the Toowoomba City and Jondaryan localities. Analysis of this data emphasises a few key points in regards to industrial land supply:

- 1,632 hectares (88%) of the total industrial land supply for the region is located in Toowoomba City & Jondaryan, of which 1,470 hectares (79% of total supply) is located in Charlton Wellcamp Enterprise Area (CWEA);
- 263 hectares (89%) of the total High Impact Industry land supply for the region is located in the CWEA. The remaining 31 hectares of High Impact Industry land is located in Millmerran (3 hectares) and Pittsworth (28 hectares). Consequently, any industrial activities of a high impact nature wishing to establish close to the Toowoomba urban fringe will be limited to CWEA;
- 1,197 hectares (87%) of the total Medium Impact Industry land supply for the region is located in Toowoomba City & Jondaryan, of which 1,075 hectares (78% of total supply) is located in CWEA and 83 hectares (6%) is located in Oakey. This only leaves 39 hectares of Medium Impact Industry land in the wider Toowoomba City area;
- 171 hectares (94%) of the total Low Impact Industry land supply for the region is located in Toowoomba City & Jondaryan, of which the majority (132 hectares or 73% of total supply) is located in CWEA. This only leaves a remaining 39 hectares of Low Impact Industry land in Toowoomba City area. While some supporting industries of a low impact nature will wish to establish in CWEA, this location may not be desirable for population serving low impact industry.

Table 2-4 Industrial Land Supply for Toowoomba City & Jondaryan – Number of Hectares per Zone

Industrial Zone	Vacant (ha)	Occupied (ha)	Total (ha)
CWEA			
Low Impact Industry	132	1	133
Medium Impact Industry	1,075	107	1,182
High Impact Industry	263	213	476
Oakey			
Low Impact Industry	-	-	-
Medium Impact Industry	83	230	314
High Impact Industry	-	-	-
Wilsonton & Torrington			
Low Impact Industry	28	41	69
Medium Impact Industry	25	276	302
High Impact Industry	-	-	-
Harlaxton			
Low Impact Industry	5	37	41
Medium Impact Industry	3	46	49
High Impact Industry	-	-	-
Harristown & Drayton			
Low Impact Industry	7	91	98
Medium Impact Industry	11	116	127
High Impact Industry	-	14	14
Inner City North & South			
Low Impact Industry	0.1	17	17
Medium Impact Industry	-	3	3

Industrial Zone	Vacant (ha)	Occupied (ha)	Total (ha)
High Impact Industry	-	-	-
Total			
Low Impact Industry	171	189	360
Medium Impact Industry	1,197	778	1,976
High Impact Industry	263	250	514
Total	1,632	1,218	2,850

Table 2-5 and Table 2-6 present the stock of vacant industrial land within the Toowoomba Region. Analysis of this data indicates that:

- Of the vacant industrial land supply, 35% of land parcels are greater than 2 hectares, 30% are between 2,000 m² to 5,000 m² and 22% are less than 2,000 m².
- The majority (81%) of vacant industrial land parcels greater than 2 hectares are located in CWEA. Of note, there are also a few single large lots located in Oakey, Crows Nest and Millmerran.
- The Wilsonton/Torrington, Harristown/Drayton and Harlaxton industrial areas remain the key supply areas within the former Toowoomba City area. While a mix of lot sizes are provided in these areas, the majority of vacant lots comprise land parcels between 2,000 m² to 5,000 m², with few lots greater than 1 hectare. As identified in the previous Industrial Land Use Study, some lots within the Harlaxton industrial area may be constrained by slopes greater than 10%, which are typically not suitable for industrial development.

Table 2-5 Vacant Industrial Land for Toowoomba Region (Number of Lots)

Lot Size (m ² /ha)	Clifton	Crows Nest	Jondaryan	Millmerran	Pittsworth	Rosalie	Toowoomba	Total
< 1000	-	-	1	2	-	-	13	16
1000 - 2000	3	2	19	4	1	2	17	48
2000 - 5000	13	1	3	16	7	3	43	86
5000 – 1 ha	9	1	1	3	-	-	8	22
1 ha – 2 ha	1	-	6	4	-	-	5	16
> 2 ha	-	3	86	2	1	1	7	100
Total	26	7	116	31	9	6	93	288

Note: Toowoomba includes all industrial land at Wilsonton/Torrington industrial estate.

Table 2-6 Vacant Industrial Land for Toowoomba City & Jondaryan (Number of Lots)

Lot Size (m ² /ha)	CWEA	Oakey	Wilsonton & Torrington	Harlaxton	Harristown & Drayton	Inner City North	Total
< 1000	1	-	1	10	-	2	14
1000 - 2000	-	19	6	2	9	-	36
2000 - 5000	1	2	15	8	20	-	46
5000 – 1 ha	1	-	2	1	5	-	9
1 ha – 2 ha	5	1	1	2	2	-	11
> 2 ha	81	5	5	-	2	-	93
Total	89	27	30	23	38	2	209

In comparison to findings of the previous Industrial Land Use Study (GHD, 2010) there are a few variances which are of note:

- There were considerably more industrial land parcels in the 2009 audit, with an estimated 493 vacant industrial lots covering an area of 2,086 hectares. Overall, this represents a decrease of 228 hectares of vacant industrial land.
- Approximately half (56%) of vacant lots in the 2009 audit were less than 2,000 m², in comparison to 22% in the 2012 audit. Further interrogation of the data indicates that this due to the addition of a number of large lots to the industrial land stock.
- The industrial land supply in the former Toowoomba City area has increased slightly from approximately 78 hectares in the 2009 audit to 78.5 hectares in the 2012 audit (this includes land at Wilsonton/Torrington which straddles the former Jondaryan Shire boundary). While there is additional vacant industrial land in Wilsonton/Torrington industrial area, there is now little to no vacant industrial land in the Cranley and Inner City industrial areas in the 2012 audit.
- The vacant industrial land supply in Pittsworth has increased by approximately 11 hectares.

A 'sanity check' of results of both the 2009 and 2012 audit has identified that while some of these variances are a result of new industrial development, other variances are a result of changes in industrial zoning allocations through the planning scheme process. Table 2-7 shows that 220 vacant lots comprising 112 hectares have been developed in the Toowoomba region since 2009. On the other hand, Table 2-8 shows that while an additional 145 hectares of land was zoned for industrial purposes, 181 hectares of industrial zoned land has been reallocated to other land use zones, resulting in a total decrease of 36 hectares.

Mapping provided in Appendix A shows which vacant industrial lots have been developed since 2009 (ie lots that were vacant in the 2009 audit, but are now utilised in the 2012 audit). Note this mapping only shows land included within the 'Low Impact Industry', 'Medium Impact Industry' and 'High Impact Industry' zones under the recently adopted Toowoomba Regional Council Planning Scheme. Zoning changes as a result of the new planning scheme are shown on mapping in Appendix B.

Table 2-7 Vacant Industrial Land Developed Post 2009

Locality/Industrial Area	Number of Lots Developed	Number of Hectares Developed
Clifton	24	16
Cranley	1	2
Crows Nest	3	1
Goombungee	4	1
Harlaxton	33	14
Harristown & Drayton	35	10
Inner City	26	1
Meringandan	5	5
Millmerran	10	11
Oakey	15	15
Pittsworth	11	2
Wilsonton & Torrington	48	32
Yarraman	5	1
Total	220	112

Table 2-8 Industrial Land Zoning Changes Post 2009 (Number of Hectares)

Locality/Industrial Area	Additional Industrial Land	Reallocated Industrial Land	Unaffected Industrial Land	Total Industrial Land
Brookstead	-	22.7	-	-
Cecil Plains	-	38.5	-	-
CWEA	-	-	1,791.6	1,791.6
Clifton	0.2	-	64.6	64.7
Cranley	-	57.3	26.1	26.1
Crows Nest	6.7	-	11.7	18.4
Goombungee	-	2.2	11.2	11.2
Harlaxton	1.0	0.8	89.4	90.3
Harristown & Drayton	22.7	18.9	215.7	238.4
Inner City	-	12.8	19.5	19.5
Kingsthorpe	-	1.2	13.2	13.2
Meringandan	25.5	0.6	2.3	27.8
Millmerran	-	0.1	221.1	221.1
Oakey	-	-	313.5	313.5
Pittsworth	44.0	10.3	27.2	71.2
Quinalow	-	3.5	-	-
Southbrook	-	0.4	-	-
Wilsonton & Torrington	42.3	4.0	328.2	370.4
Yarraman	2.5	7.9	17.0	19.6
Uncategorised	-	-	1.5	1.5
Total	144.8	181.2	3,153.6	3,298.4

In relation to CWEA, as recent subdivisions in the estate have not yet been reflected in the cadastral data used for this Study, development approval information provided by TRC has been assessed to gain an understanding of the development activity occurring in CWEA. This review indicates substantial lot reconfiguration has occurred since 2009 resulting in an additional 47 lots being created (16 lots have been reconfigured to create 63 lots). Major industrial factories have established on two of these lots, with other industrial development in various stages of the development approval process.

3. Industrial Land Demand

Economic Associates has revised the economic assessment undertaken in 2009 to reflect recent economic activity experienced in the industrial sector of the Toowoomba Region. The following provides a summary of the findings of this assessment. A copy of the full report has been provided in Appendix C.

3.1 Industrial Land Demand Analysis

The purpose of the 2012 study update is to provide revised estimates regarding the quantum of industrial land demanded within Toowoomba Region to 2031. The assessment undertaken seeks to introduce additional analysis to capture the potential impacts of resource sector development within the Darling Downs and South West Queensland.

Given the ever changing nature of the resources sector (i.e. coal seam gas, coal mining, etc) within the region, particularly within the Surat Basin, Economic Associates have generated a number of demand projections based on alternative methodologies. These methodologies can be categorised as follows (refer to section 6 of the report in Appendix C for detailed discussion):

- Population based approach (raw land demand estimates);
- Historical land take-up based approach (net land demand estimates);
- Employment demand approach (gross land demand estimates); and
- Regional / industry development approach (gross land demand estimates).

When assessing industrial land demand, there are a number of industrial land definitions to consider, namely:

- Net industrial land – represents allotment demand and as such makes no allowance for roads, services and open space;
- Gross industrial land – the total amount of land required for an industrial estate (including allowance for roads, services and open space), but does not make allowances for environmental constraints that may constrain land within an allotment such as waterways, areas of high environmental value and slope; and
- Raw industrial land – the total amount of land required for an industrial estate taking into account environmental constraints on-site.

To directly compare the outcomes of each of the four approaches, all results have been converted into incremental raw land demand estimates.

3.2 Property Market Overview

Between 2002 and 2011, there were 587 vacant industrial property sales in the Toowoomba Region. On average, there were 59 vacant industrial property sales per year between 2002 and 2011, with the number of vacant industrial property sales peaking in 2004 at 89 sales.

The total land area occupied by vacant industrial land property sales within Toowoomba Region between 2002 and 2011 was 300.4 hectares, representing a purchase rate of 30.0 hectares per annum. The five year average purchase rate however, was lower at 25.7 hectares per annum.

To determine the take-up rate of vacant industrial land in Toowoomba Region, properties which had previously been sold (resales) were subtracted from total sales to determine net industrial land sales. Accordingly, there were 186 net vacant industrial property sales (i.e. sales exclusive of resales) in Toowoomba Regional Council between 2002 and 2011. The take-up rate of

vacant industrial property within Toowoomba Regional Council between 2002 and 2011 was therefore calculated at 12.9 hectares per annum.

In the five years to 2011, the take-up rate of vacant industrial property sales was lower at 8.7 hectares per annum in the Toowoomba Region. The five year average take-up rate of vacant industrial property per locality was as follows:

- 5.1 hectares per annum in Toowoomba;
- 1.3 hectares per annum in Jondaryan;
- 0.7 hectares per annum in Millmerran;
- 0.0 hectares per annum in Crow's Nest;
- 0.7 hectares in Pittsworth;
- 0.3 hectares in Clifton;
- 0.2 hectares in Rosalie; and
- 0.3 hectares in Cambooya.

An analysis of sales data by lot size was also undertaken by Economic Associates, however no clear trend could be identified to indicate that there was a demand shifting towards either larger or smaller lots. Additionally, analysis by GHD of development approval data for 2011 and 2012 (provided by TRC for this Study) indicates the majority of industrial development approved in the region has been for Medium Impact Industry uses, followed by Low Impact Industry uses. Only one High Impact Industry use was approved in 2012 in Crows Nest.

3.3 Development Industry Consultation

As part of their assessment, Economic Associates held discussions with local property agents, national property agents and representatives from the development industry. Key findings of this consultation included the following (refer to Appendix A of Economic Associates Report for discussion):

- The Toowoomba region industrial market has two distinct segments, firstly the Toowoomba to Oakey corridor and secondly regional towns/villages. The main focus of activity was in the Toowoomba to Oakey corridor, which included Torrington, Wilsonton and the Charlton Wellcamp Enterprise Area.
- The main tenant demand was considered to be for transport and logistics uses and mining / gas services. Traditional agriculture related industry remained a significant driver, but was generally viewed as a secondary driver.
- There is demand for lots across a broad spectrum of sizes, but the turnover of large lots had slowed in the last few months. Smaller allotments of industrial units turned over quickly, although there was some product in Harlaxton and Drayton that had been difficult to move (attributed to the quality of the built form). The developers expressed slightly differing views with regards to lot sizes with two arguing that larger lot sizes (~0.5 ha to 2 ha) would be the principal source of future demand, while the remaining two felt that the future demand profile would simply be a continuation of the region's existing allotment profile, albeit with some growth in the large lot segment.
- Industrial locations within the Toowoomba region were compared with potential locations in Ipswich and south western Brisbane and ultimately locational decisions were a resolution of the interaction between land and operational costs.
- Respondents expressed concern regarding deterioration in the coal mining sector, citing ongoing industrial disputes and the carbon tax (as opposed to falling prices) as a major

contributing factor to the industries recent softening. Respondents remained optimistic with regards to the outlook of the gas sector, citing the long development horizon for most gasfields (i.e. 10 years plus). F J Gardiners' industrial development within the Charlton Wellcamp Enterprise Area was cited as a sign of investor confidence in the Toowoomba region and respondents felt that such a development would stimulate market interest.

- The regional airport proposal was a considerable source of optimism, with respondents universally contending that when (as opposed to if) the project proceeds it will transform Toowoomba into a major residential and industrial hub for the Surat Basin and potentially the southern Bowen and Galilee Basins.

3.4 Industrial Land Demand Projections

3.4.1 Industrial Land Demand - All Approaches

Table 3-1 shows the raw industrial land demand projections for each approach from 2016 to 2031. Raw incremental land demand estimates under the *population based*, *historical take-up* and *employment demand* approaches represent demand within Toowoomba Regional Council. The estimates presented for the *industry development* scenario represent raw incremental land demand within the Darling Downs regional plan area, but it is anticipated that Toowoomba Regional Council will accommodate a significant proportion of demand overall for the broader region.

Table 3-1 Incremental Raw Land Demand by Approach 2016-2031 (Hectares)

Approach	2016	2021	2026	2031
Population Based (upper end)	47	117	201	291
Historical Land Take-Up (upper end)	155	349	543	736
Employment Demand	181	497	819	1,219
Industry Development (DD region)	659	1,004	1,286	1,611

It is anticipated that the *employment demand* and *industry development* approaches are most representative of future land demand within Toowoomba Regional Council as the following factors are considered:

- Likely size of the working age population (15-64 years);
- Consideration of the future industry structure within Toowoomba Regional Council / Darling Downs regional plan area;
- Consideration of varying employment densities at the two digit ANZSIC level based on previous consultation within the region; and
- Consideration of varying requirements for buffers / open space by broad industry sector.

3.4.2 Gross Industrial Land Demand - Employment Demand Approach

On the basis that gross industrial land requirements are 50% of the raw industrial land requirements, under the *employment demand* scenario in Table 3-1 above, an additional 609 hectares of gross industrial land is projected to be demanded by 2031 within the Toowoomba Region. Table 3-2 below provides a summary of the incremental gross industrial land by industry type predicted within the Toowoomba Region between 2016 and 2031.

Table 3-2 Incremental Gross Industrial Land Demand 2016-2031 (Hectares)

Industry Type	2016	2021	2026	2031
Large Footprint & General Industry	23	76	117	175
Service Industry	25	62	97	146
Warehousing & Storage	19	47	82	120
Transport Uses	19	51	93	138
Non-industrial Land Uses	5	12	20	30
Total	91	248	409	609

3.5 Industrial Land Needs Analysis

Planning need is determined after a consideration of the remaining supply of industrial land in the context of projected demand. A negative supply-demand balance indicates a projected shortage of industrial land within a planning area. However, since planning schemes are instruments that have typically evolved over time in response to historical planning objectives or the prospect of various major projects coming online, frequently while there may be a significant quantum of land zoned, such land is located that it is unlikely to satisfy the locational requirements of prospective users.

In the case of the Toowoomba Region, the focal point of future industrial land demand will be within the former Toowoomba City and Jondaryan localities. It is anticipated that resources development within the Surat Basin will be the likely short to medium term driver for development within the Charlton Wellcamp area.

The disaggregation of the supply-demand balance analysis is to identify broadly where within the Toowoomba Region industrial land shortages are projected. The analysis indicates that the Toowoomba City and Jondaryan localities are driving the Toowoomba Region's industrial land projections. Over the last ten to fifteen years, the eastern part of the former Jondaryan Shire area has developed as an extension of metropolitan Toowoomba. As such, it is reasonable to assume that much of the demand projected for the Toowoomba / Jondaryan area would have a locational preference for land within close proximity to Toowoomba City.

3.5.1 Supply-Demand Balance

For the supply-demand balance analysis, the results from the *employment demand* approach have again been chosen to be the most representative of future activity within the Toowoomba Region (refer to section 3.3.1). The *employment demand* approach is considered more appropriate than the *industry development* approach as it considers future industrial land demand within Toowoomba and its localities, rather than the broader Darling Downs Regional Plan area.

The vacant industrial land audit estimated there is 1,858 hectares of remaining industrial land supply within Toowoomba Regional Council area, with a significant proportion located within the Charlton Wellcamp Enterprise Area (1,470 hectares). The supply-demand balance for Toowoomba Regional Council area suggests there is sufficient zoned industrial land within the region until 2031. However, when this result is disaggregated by locality, it is noted that Crows Nest (industrial land shortage by 2031), Rosalie (industrial land shortage by 2031) and Cambooya (industrial land shortage throughout projection period) are anticipated to face industrial land shortages within the projection period.

Table 3-3 below summarises the supply-demand balance across the localities of the Toowoomba Regional Council area.

**Table 3-3 Supply Demand Balance, Toowoomba Regional Council, 2016-2031
(Hectares)**

Locality (Former LGAs)	2016	2021	2026	2031
Supply				
Toowoomba / Jondaryan	1,632	1,632	1,632	1,632
Crows Nest	28	28	28	28
Rosalie	14	14	14	14
Millmerran	141	141	141	141
Pittsworth	30	30	30	30
Clifton	12	12	12	12
Cambooya	0	0	0	0
Toowoomba Regional Council	1,858	1,858	1,858	1,858
Demand				
Toowoomba / Jondaryan	71	195	336	502
Crows Nest	7	15	26	41
Rosalie	2	11	11	15
Millmerran	0	2	6	6
Pittsworth	4	11	11	19
Clifton	2	3	4	4
Cambooya	4	13	16	22
Toowoomba Regional Council	91	248	409	609
Supply-Demand Balance				
Toowoomba / Jondaryan	1,562	1,438	1,296	1,130
Crows Nest	21	13	2	-13
Rosalie	12	4	4	-1
Millmerran	141	139	135	135
Pittsworth	26	19	19	11
Clifton	10	9	8	8
Cambooya	-4	-13	-16	-22
Toowoomba Regional Council	1,767	1,609	1,448	1,248

3.5.2 Need for Additional Zoned Industrial Land

The supply-demand balance highlighted the quantitative need for additional zoned industrial land within the following planning areas by 2031:

- Crows Nest – additional 13 hectares by 2031;
- Rosalie – additional one hectare by 2031; and
- Cambooya – additional 22 hectares by 2031.

While the former Toowoomba City and Jondaryan Shire are not projected to record an industrial land shortage within the projection horizon, it should be noted that the majority of vacant land is located within the Charlton Wellcamp Enterprise Area and is zoned Medium Impact Industry. This quantum of industrial land within the Charlton Wellcamp Enterprise Area is likely to be significantly reduced if the proposed alternative Toowoomba airport ultimately proceeds which

will require approximately 350 hectares. Accounting for the airport, the supply-demand surplus for Toowoomba/Jondaryan would decrease to 780 hectares by 2031.

The following sub-sections provide recommendations regarding the extent of land that could be provided to meet the projected supply shortages in the above sub areas after consideration of both quantitative and qualitative issues.

Toowoomba City & Jondaryan

The Toowoomba City and Jondaryan localities are not projected to experience an industrial land shortage by the end of the planning horizon.

The demand projections and consideration of the location of the remaining supply of vacant industrial land indicates that there would be significant need for land within close proximity to Toowoomba City and the Warrego Highway. Additionally, the most significant industrial land use projected for Toowoomba / Jondaryan is for 'Large Footprint and General Industry', which depending on the scale/level of impact, requires Medium Impact Industry or High Impact Industry zoned land.

Historical planning context of Toowoomba Regional Council indicates that the former Jondaryan Shire area represents the next frontier of industrial development within the region once supply of strategically located industrial sites within Toowoomba City are exhausted. The Charlton Wellcamp Enterprise Area will accommodate a significant amount of the projected demand for Toowoomba / Jondaryan. Given the size of the Charlton Wellcamp Enterprise Area, it is unnecessary to zone additional land to meet the projected demand generated from within the Jondaryan locality.

The Charlton Wellcamp Enterprise Area Structure Plan recognises the changing industrial environment within the Toowoomba Regional Council area and the Darling Downs and Surat Basin by encouraging the establishment of regionally significant industry through the provision of General Industry, Transport and Warehousing and Large Footprint and Heavy Industry land use precincts. The CWEA Local Plan however, may also need to provide for those smaller scale industries or commercial uses which generally establish in lower impact industrial zones and support the operation of larger scale industries and their workers.

The largest uncertainty facing the Charlton Wellcamp Enterprise Area is the potential of an alternative airport being established at Wellcamp on land intended for large footprint and difficult to locate industries. If this were to occur, this would significantly impact the quantum of remaining zoned industrial land for such industries.

Cambooya

The former Cambooya Shire is projected to have a shortage of approximately 22 hectares of industrial land by 2031. This shortage emerges because urban land in the former Cambooya Shire (at Cambooya, Greenmount, East Greenmount and Wyreema) does not have a specific industrial land zoning, rather low impact industrial uses are permitted within the Township Zone. As such, providing industrial uses are continued to be supported in the Township Zone (as allowed for in the Township Zone code of the Planning Scheme), this shortage should be accommodated through the existing urban land supply.

Crows Nest

In the former Crows Nest Shire, there is anticipated to be a shortfall of 13 hectares of industrial land by 2031. The majority of remaining supply within the former Crows Nest Shire is within Meringandan, accounting for just over three quarters of remaining supply. It is suggested that the additional 13 hectares of industrial land is provided within the township of Highfields, rather than within Meringandan to ensure a mix of lot sizes is provided within two alternative locations.

Rosalie

In the former Rosalie Shire, there is anticipated to be a shortfall of one hectare of industrial land by 2031. This shortfall is best accommodated through a small expansion to any of the existing industrial areas within the Rosalie area, rather than the creation of a new industrial estate.

4. Industrial Land Analysis

Analysis of the key findings of the vacant industrial land analysis and industrial land needs assessment has been undertaken to establish the land use planning implications for industrial land in the Toowoomba Region. This analysis has involved the following tasks:

- Identify whether there is likely to be an oversupply or undersupply of land for each industry category and if applicable, provide comment on the role of existing industrial areas in meeting the estimated demand.
- Reconcile the demand for industrial land with the available supply having regard to the target industry characteristics / locational requirements and industrial land site suitability criteria (developed as part of the previous Industrial Land Use Study).
- Identify the implications for the industrial land use strategy for the Toowoomba Region as proposed in the Industrial Land Use Study and make recommendations to update the strategy as required.

The following discusses the findings of this analysis.

4.1 Findings

4.1.1 Supply-Demand Balance

The supply-demand balance for the Toowoomba Region suggests there is sufficient zoned industrial land within the Region until 2031, with an estimated oversupply of 1,248 hectares. When disaggregated by sub-region however, it is noted that the Crows Nest area (shortage of 13 hectares) and Rosalie (shortage of 1 hectare) are anticipated to face industrial land shortages within the projection period. An industrial land shortage was also indicated in the supply-demand balance for the Cambooya area, although this shortage emerges because urban land in Cambooya (at Cambooya, Greenmount, East Greenmount and Wyreema) does not have a specific industrial land zoning, rather industrial uses are permitted within the Township Zone.

The key supply area in the Toowoomba Region is the Charlton Wellcamp Enterprise Area (current supply of 1,470 hectares). While an oversupply of 1,130 hectares is anticipated by 2031 in the Toowoomba/Jondaryan area, this quantum of industrial land is likely to be reduced by 350 hectares if the proposed alternative airport site proceeds. Accounting for the airport, the supply-demand balance for Toowoomba/Jondaryan would therefore decrease to 780 hectares by 2031.

4.1.2 Suitability of Industrial Land Supply

The suitability of the industrial land supply depends on the nature and scale of industrial sector demanded. Attributes such as zoning, location and allotment size/configuration will ultimately affect the attractiveness of vacant industrial land to the market. The following discusses the analysis undertaken to assess the suitability of the vacant industrial land in the Toowoomba Region to meet the projected industrial land demand.

Zoning

An additional 609 hectares of gross industrial land is projected to be demanded by 2031 within the Toowoomba Region, comprising:

- 175 hectares in large footprint and general industry (29%);
- 146 hectares in service industry (24%);

- 120 hectares in warehousing and storage (20%);
- 138 hectares in transport uses (23%); and
- 30 hectares in non-industrial land uses (5%).

The Toowoomba / Jondaryan area is expected to account for 502 hectares of this demand by 2031, comprising a comparable demand profile as for the Region.

Upon review of the purpose of each of the industrial zones in the Toowoomba Regional Council Planning Scheme, the above industry sectors have been allocated to the most appropriate industrial zones as shown in Table 4-1 below. It is acknowledged that some industrial uses will be interchangeable between zones depending on their scale and or nature of the activity, (in particular uses in the large footprint and general industry sector), however the zone purposes appear to be flexible to allow this to occur.

Table 4-1 Conversion of Industry Sectors to Industrial Zones

Industry Zone	Zone Purpose Statement	Applicable Industry Sector
Low Impact Industry	The purpose of the zone is to provide for service and low impact industry uses: (a) It may include non-industrial and business uses that support the industrial activities where they do not compromise the long term use of the land for industrial purposes. (b) Activities considered appropriate in this zone are defined as low impact industry or service industry in the schedule of definitions.	Non-industrial land uses Service Industry
Medium Impact Industry	The purpose of the zone is to provide for medium impact industry uses: (a) It may include non-industrial and business uses that support the industrial activities where they do not compromise the long-term use of the land for industrial purposes; and (b) Activities considered appropriate in this zone are defined as Medium Impact Industry in the schedule of definitions. Residential uses are not located within close proximity to the industrial uses and activities in the zone. High impact industry and rural industry uses may be appropriate where off-site impacts from these uses can be mitigated or managed and where they comply with separation distances to minimise impacts on sensitive land uses.	Warehousing and storage Transport uses
High Impact Industry	The purpose of the zone is to provide for high impact industry uses: (a) It may include non-industrial and business uses that support the industrial activities where they do not compromise the long-term use of the land for industrial purposes; and (b) Activities considered appropriate in this zone are defined as High Impact Industry in the schedule of definitions. Residential uses are not located within close proximity to the industrial uses and activities in the zone. Medium Impact Industry and rural industry uses may be appropriate where they are not detrimentally affected by or compromise the operations of High Impact Industry uses.	Large footprint and general industry

Table 4-2 and Table 4-3 present the supply-demand balance for each industrial zone for the Toowoomba Region and the Toowoomba City and Jondaryan localities. As shown, there is sufficient land in each zone to accommodate the projected demand to 2031. This analysis of remaining land supply by industrial zone highlights that the majority of vacant land is within the Medium Impact Industry zone, which is consistent with the proportional demand per industrial zone, where the majority of demand is anticipated to be for Medium Impact Industry land.

It also highlights that while there is sufficient Low Impact Industry zoned land within Toowoomba City and Jondaryan localities to 2031, further interrogation of the location of the remaining supply of Low Impact Industry land has revealed the majority of remaining land (132 hectares) is within the Charlton Wellcamp Enterprise Area. As discussed previously, this only leaves a remaining 39 hectares of Low Impact Industry land in Toowoomba City area. While some supporting industries of a low impact nature will wish to establish in CWEA, this location may not be desirable for population serving low impact industry activity (e.g. mechanic or smash repairs).

It is suggested that Toowoomba Regional Council encourage the relocation of higher impact industrial activity within Toowoomba City to the Charlton Wellcamp Enterprise Area in the medium to long term. In addition, it is suggested that additional land is zoned for Low Impact Industry within the Toowoomba urban area, in localities such as Wilsonton / Torrington or Highfields, in order to meet the needs of low impact population serving industry.

The Charlton Wellcamp Enterprise Area Structure Plan recognises the changing industrial environment within the Toowoomba Regional Council area and the Darling Downs and Surat Basin by encouraging the establishment of regionally significant industry through the provision of General Industry, Transport and Warehousing and Large Footprint and Heavy Industry land use precincts. The CWEA Local Plan however, may also need to provide for those smaller scale industries or commercial uses which generally establish in lower impact industrial zones and support the operation of larger scale industries and their workers.

Additionally, if the proposed Toowoomba airport development at Wellcamp proceeds, an insufficient supply of Low Impact Industry and High Impact Industry land may emerge. Some land within the Medium Impact zone may also be utilised for this shortage, however rezoning of some of this land, along with the allocation of the current airport site for low impact industrial uses, may need to be considered if the airport development at Wellcamp proceeds.

Table 4-2 Supply-Demand Balance per Industrial Zone (Hectares)

	Low Impact Industry	Medium Impact Industry	High Impact Industry	Total
Supply	182	1,382	294	1,858
Demand	176	258	175	609
Supply-Demand Balance	6	1,124	119	1,248

Table 4-3 Supply-Demand Balance for Toowoomba City and Jondaryan per Industrial Zone (Hectares)

	Low Impact Industry	Medium Impact Industry	High Impact Industry	Total
Supply	172	1,198	263	1,633
Demand	137	220	145	502
Supply-Demand Balance	35	978	118	1,131

Location

As discussed above, Crows Nest (shortage of 13 hectares) and Rosalie (shortage of 1 hectare) are anticipated to face industrial land shortages within the projection period. These shortages are recommended to be addressed as follows:

- Crows Nest – as the majority of remaining supply is within Meringandan, it is suggested that the additional 13 hectares of industrial land is provided within the township of Highfields to ensure a mix of lot sizes is provided within two alternative locations.
- Rosalie - this shortfall is best accommodated through a small expansion to any of the existing industrial areas within the former Rosalie Shire, rather than the creation of a new industrial estate.

The demand projections and consideration of the location of the remaining supply of vacant industrial land indicates that there would be significant need for land within close proximity to Toowoomba City and the Warrego Highway. Additionally, it is anticipated that resources development within the Surat Basin will be the likely short to medium term driver for development within the Charlton Wellcamp Enterprise Area.

Given the size of the Charlton Wellcamp Enterprise Area, a significant amount of the projected demand for Toowoomba / Jondaryan can be accommodated in this location. It is therefore considered unnecessary to zone additional land at this stage. The Charlton Wellcamp Enterprise Area Structure Plan recognises the changing industrial environment within the Toowoomba Regional Council area and the Darling Downs and Surat Basin by providing General Industry, Transport and Warehousing and Large Footprint and Heavy Industry land use Precincts (in addition to the zones) and recommending that areas immediately adjacent to the Warrego Highway are brought on first.

Again, the largest uncertainty facing the Charlton Wellcamp Enterprise Area is the potential for alternative Toowoomba airport site. If this were to occur, this would not only impact the quantum of remaining Low Impact Industry and High Impact Industry land, but will also have implications in terms of height and plume restrictions on remaining High Impact Industry land, which will effectively be adjacent to the airport. While most industrial uses expected to establish in the CEWA will be of a medium impact industry nature, the location of the High Impact Industry land, may need to be reconsidered to allow for such uses in the future.

Lot Sizes

As identified in the vacant industrial land analysis, of the current stock of vacant land parcels (288 lots), 35% are greater than 2 hectares, 30% are between 2,000 m² to 5,000 m² and 22% are less than 2,000 m². The majority (81%) of vacant industrial land parcels greater than 2 hectares are located in the Charlton Wellcamp Enterprise Area. There are also a few single large lots located in Oakey, Crows Nest and Millmerran. Comparison of the number of hectares of industrial land with the number of industrial lots, further suggests the majority of the vacant industrial land is currently held in large landholdings and yet to be subdivided. This finding is consistent for each zone category and as such, land banking or an undersupply of available land to the market may become an issue if this land is not released and/or subdivided in a timely manner.

In preparation of industrial land for sale to the market, large land parcels will need to be subdivided appropriately to accommodate the nature and scale of industrial uses expected. As indicated by Economic Associates assessment, there has been no clear trend identified in recent sales data to indicate that there was a demand shifting towards either larger or smaller lots. Further development industry consultation indicates there is a demand for lots across a

broad spectrum of sizes, but the turnover of large lots had slowed in the last few months. Typical lot size requirements however for each industry sector are as follows:

- Large footprint and general industry 2 – 5 hectares;
- Service industry < 2,000 m²;
- Warehousing and storage 5,000 m² – 2 hectares;
- Transport uses 2 hectares; and
- Non-industrial land uses < 2,000 m².

It is therefore suggested a range of lot sizes are continued to be created to provide choice in the market.

The Toowoomba Regional Council Planning Scheme does not specify minimum lot sizes for industrial zones (only for Residential Living zone, Emerging Communities zone, Rural Residential zone, Rural zone or Township Zone). The Charlton Wellcamp Enterprise Area local plan code does however specify minimum lot sizes for each of the precincts as follows:

- Intermodal facility – subdivision not permitted;
- Transport and warehousing – 5 hectares;
- General industry – 2 hectares; and
- Extractive and Heavy Industry – 10 hectares.

The above lot sizes as prescribed in the planning scheme are considered appropriate for the types of industrial uses expected to establish in the Charlton Wellcamp Enterprise Area. Although, there may need to be smaller lots in the long term to accommodate future service industrial activities to support the estate.

4.2 Implications for Industrial Land Strategy

Due to the relatively small amount of additional land required to meet industrial demand to 2031 (14 ha) and that the current industrial land supply is largely considered suitable in terms of zoning, location and lot size, the industrial land strategy for the Toowoomba Region should continue to comprise consolidation of the current pattern of industrial development. The industrial needs assessment indicated that expansion will need to occur in the Rosalie and Highfields areas to meet projected demand to 2031. Additionally, the Charlton Wellcamp Enterprise Area will cater for regional industry opportunities of the Darling Downs together with overflow demand from Toowoomba.

Accordingly, the preferred industrial land strategy as recommended in the 2010 Study, and now incorporated into the Toowoomba Regional Council Planning Scheme, will generally remain relevant. Any future loss of industrial land at Wellcamp due to the possible development of the airport will have a significant impact on the supply of land for high impact and difficult to locate industries. However, there will remain a generous surplus of industrial land for general industrial activities. Redevelopment of the current airport site for low to medium impact industry could have the potential to offset any loss of land for this type of industry.

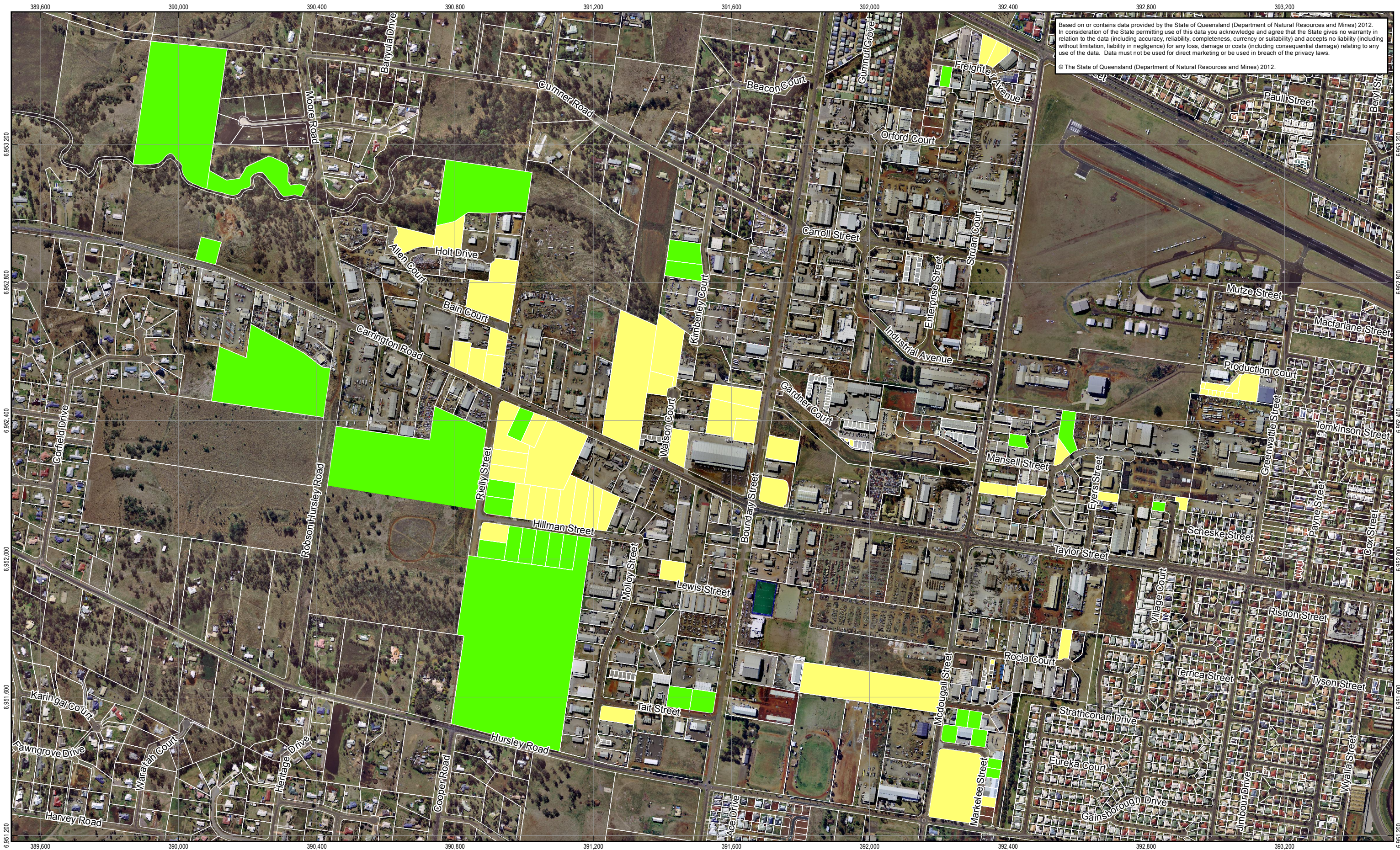
It is suggested that Toowoomba Regional Council encourage the relocation of higher impact industrial activity within Toowoomba City to the Charlton Wellcamp Enterprise Area in the medium to long term. In addition, it is suggested that additional land is zoned for Low Impact Industry within the Toowoomba urban area, in localities such as Wilsonton / Torrington or Highfields, in order to meet the needs of low impact population serving industry. The CWEA Local Plan however, may also need to be more flexible in allowing for those smaller scale

industries or commercial uses which generally establish in lower impact industrial zones and support the operation of larger scale industries and their workers.

Appendices

Appendix A Vacant Land Figures

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Map Projection: Transverse Mercator
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Toowoomba Regional Council
Industrial Land Use Study Update

Wilonton / Torrington Vacant Industrial Land (as of 23/07/2012)

Job Number	41-25208
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Figure 3



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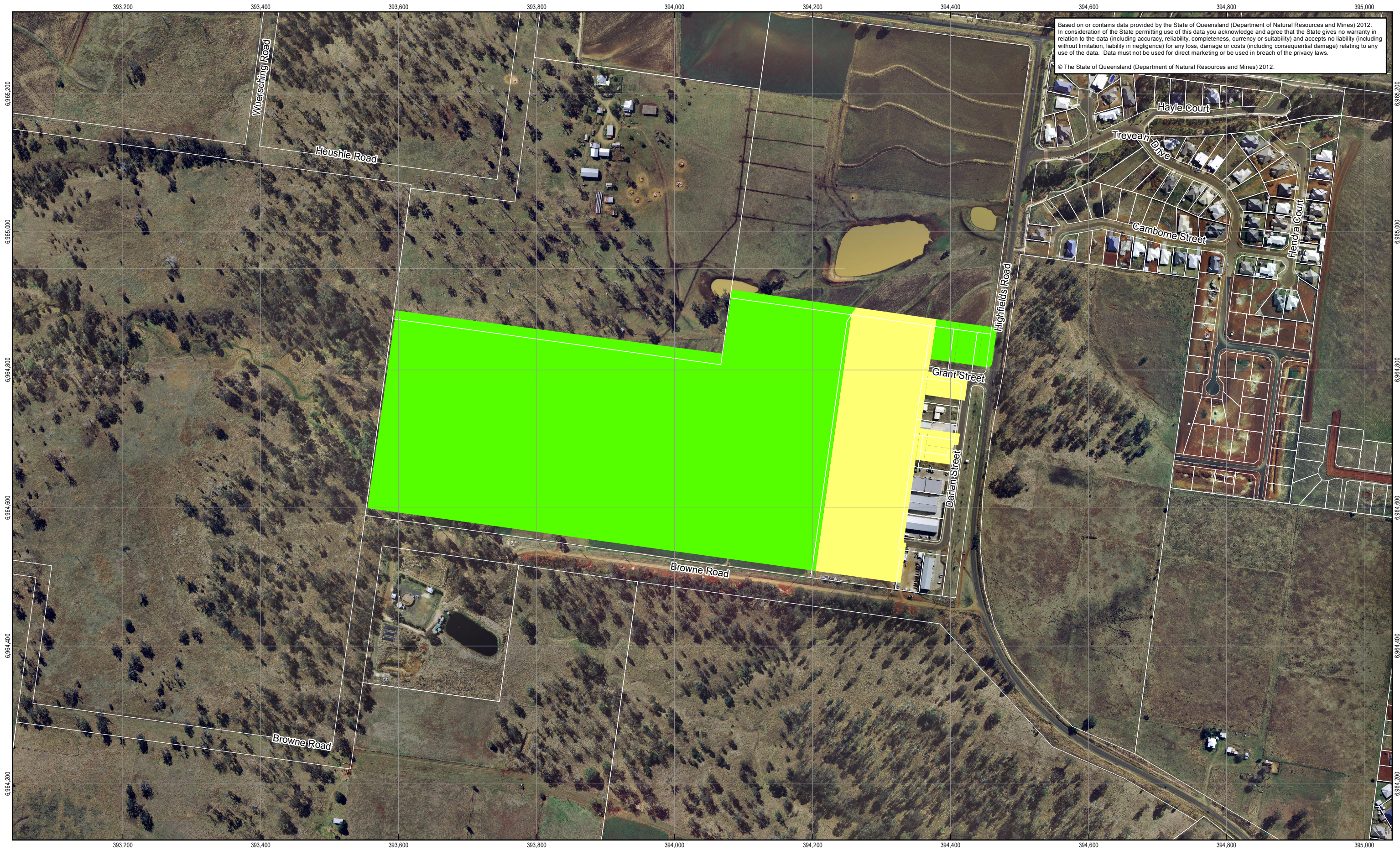


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Inner City Vacant Industrial Land (as of 23/07/2012)

Figure 4



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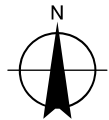
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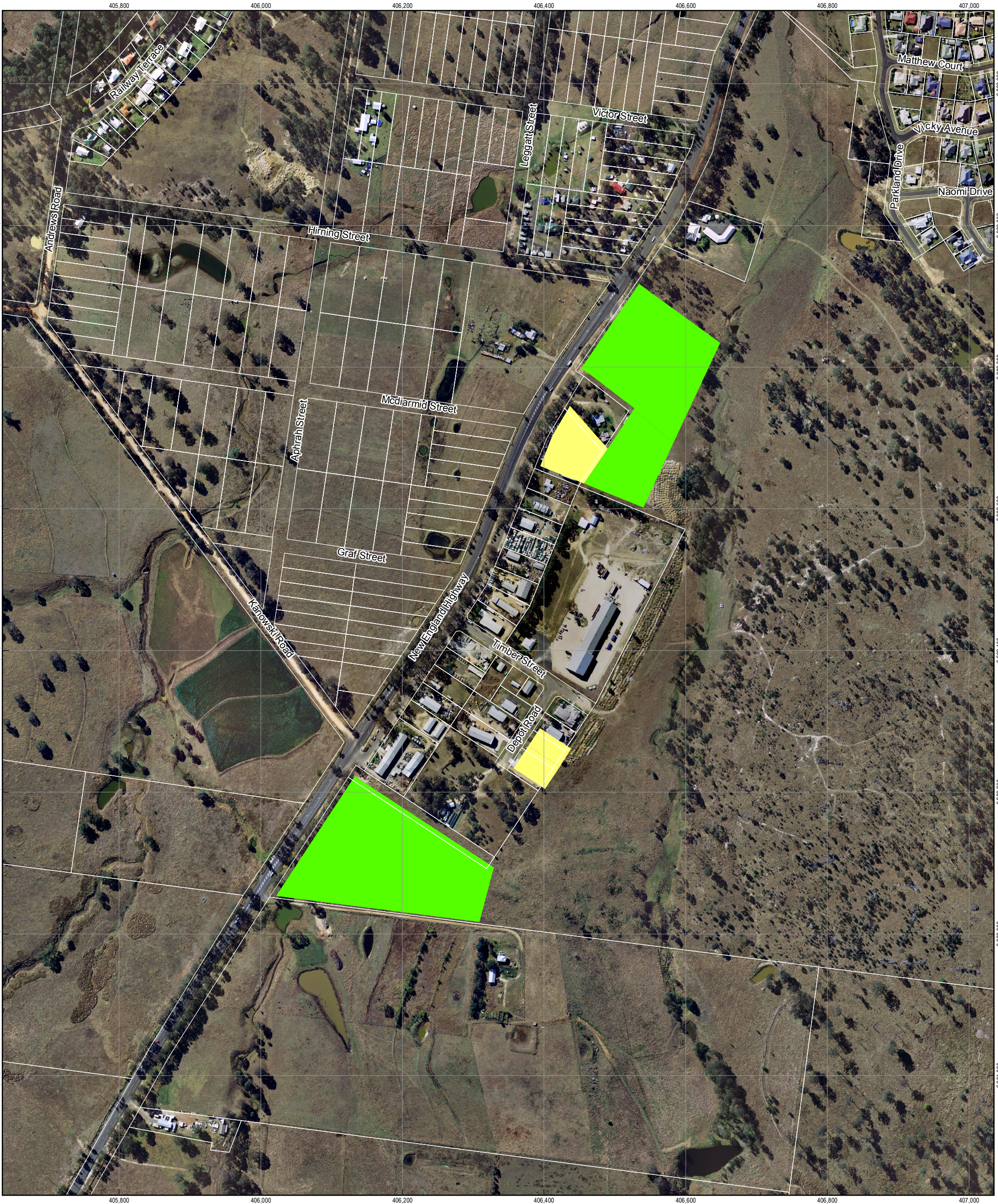
Meringandan Vacant Industrial Land (as of 23/07/2012)

Figure 5

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Crows Nest Vacant Industrial
Land (as of 23/07/2012)

Figure 6



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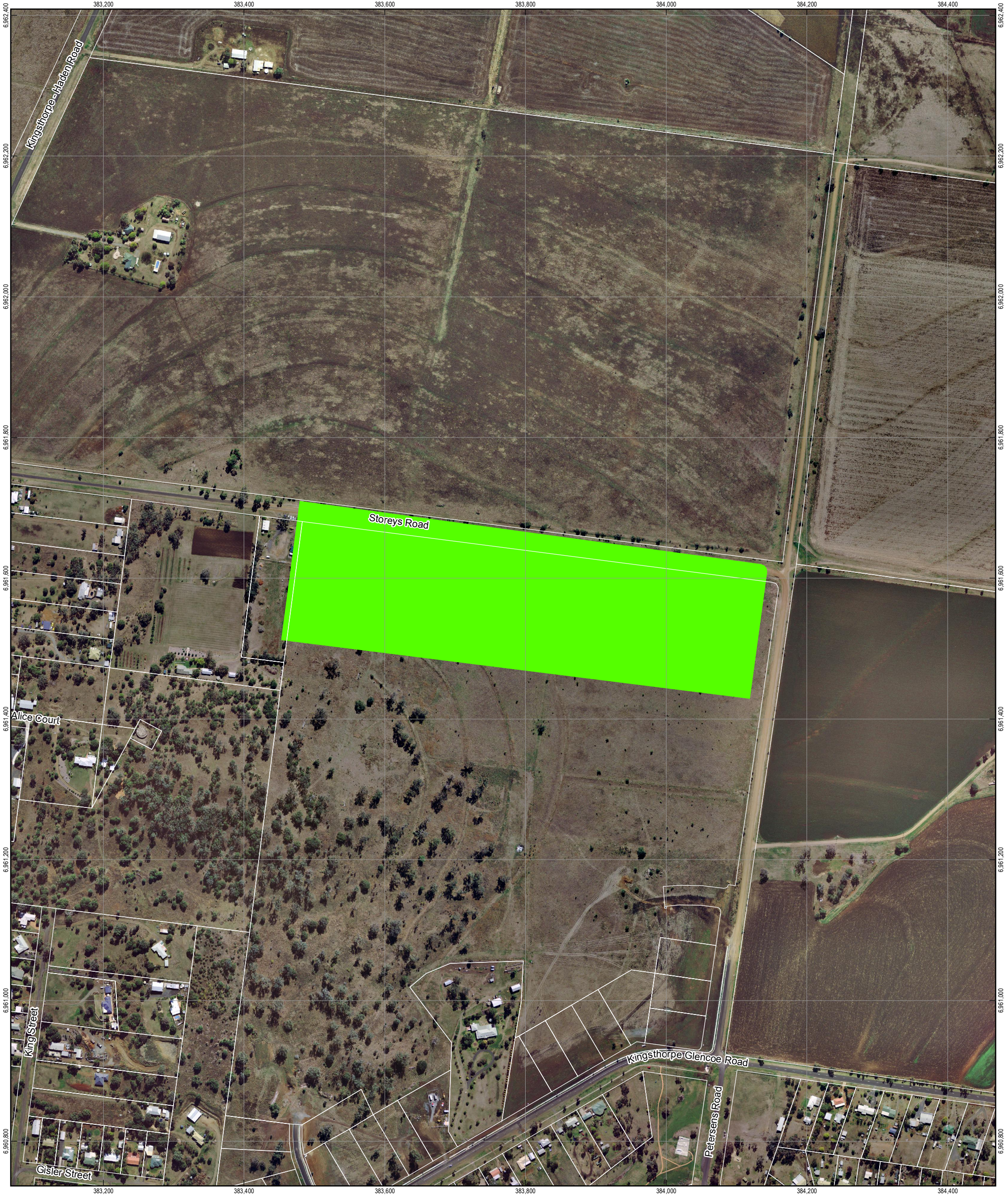
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Yarraman Vacant Industrial
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Figure 7

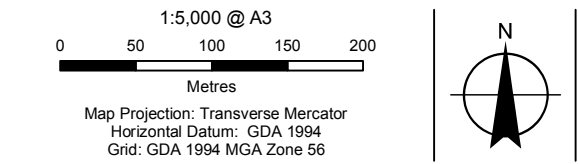


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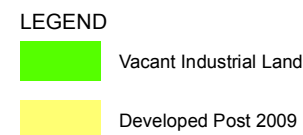
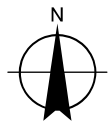
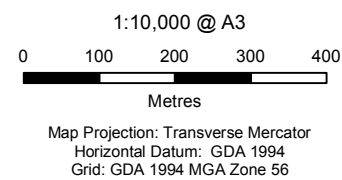
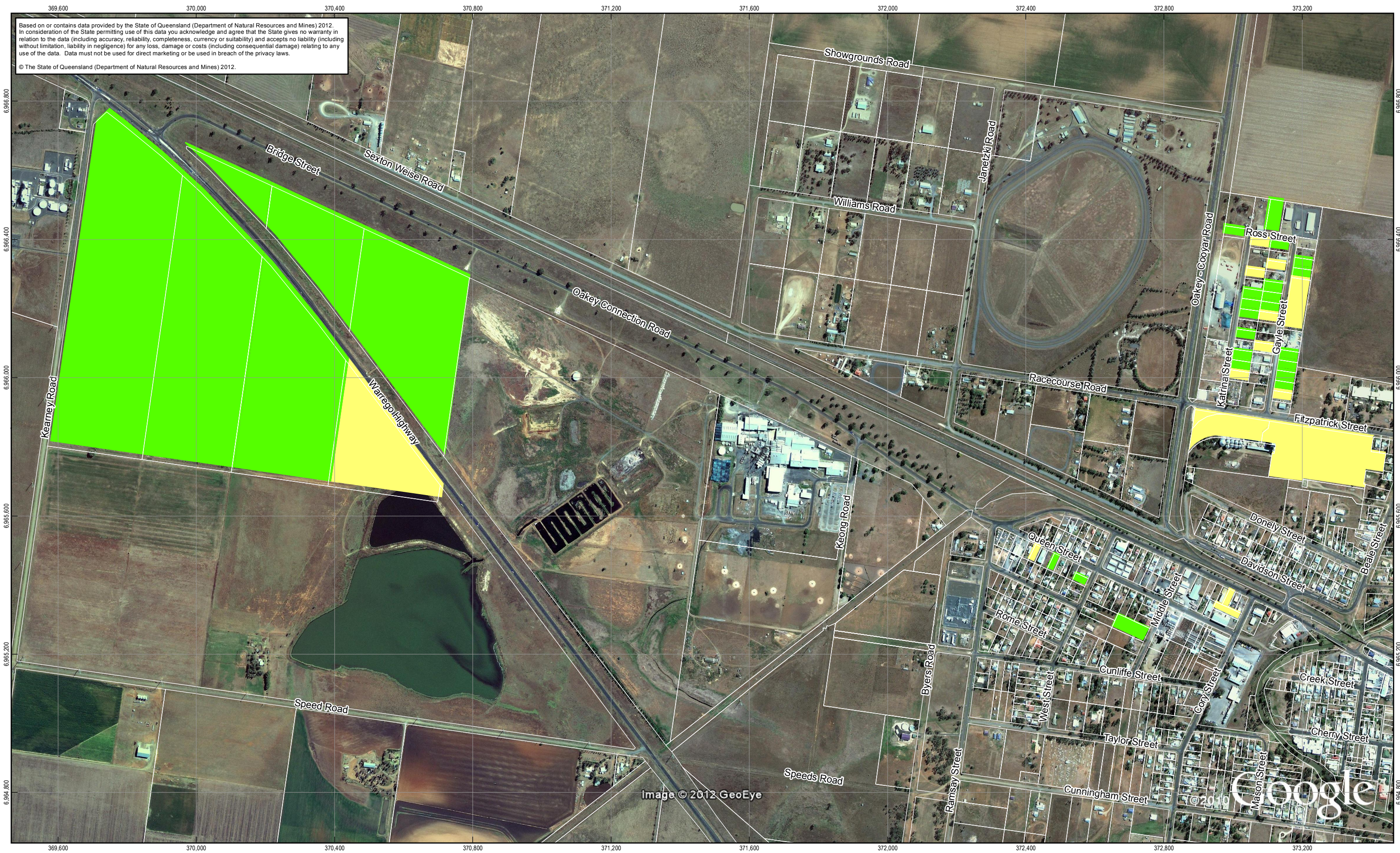


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Kingsthorpe Vacant Industrial Land (as of 23/07/2012)

Figure 8



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Oakey Vacant Industrial Land (as of 23/07/2012)

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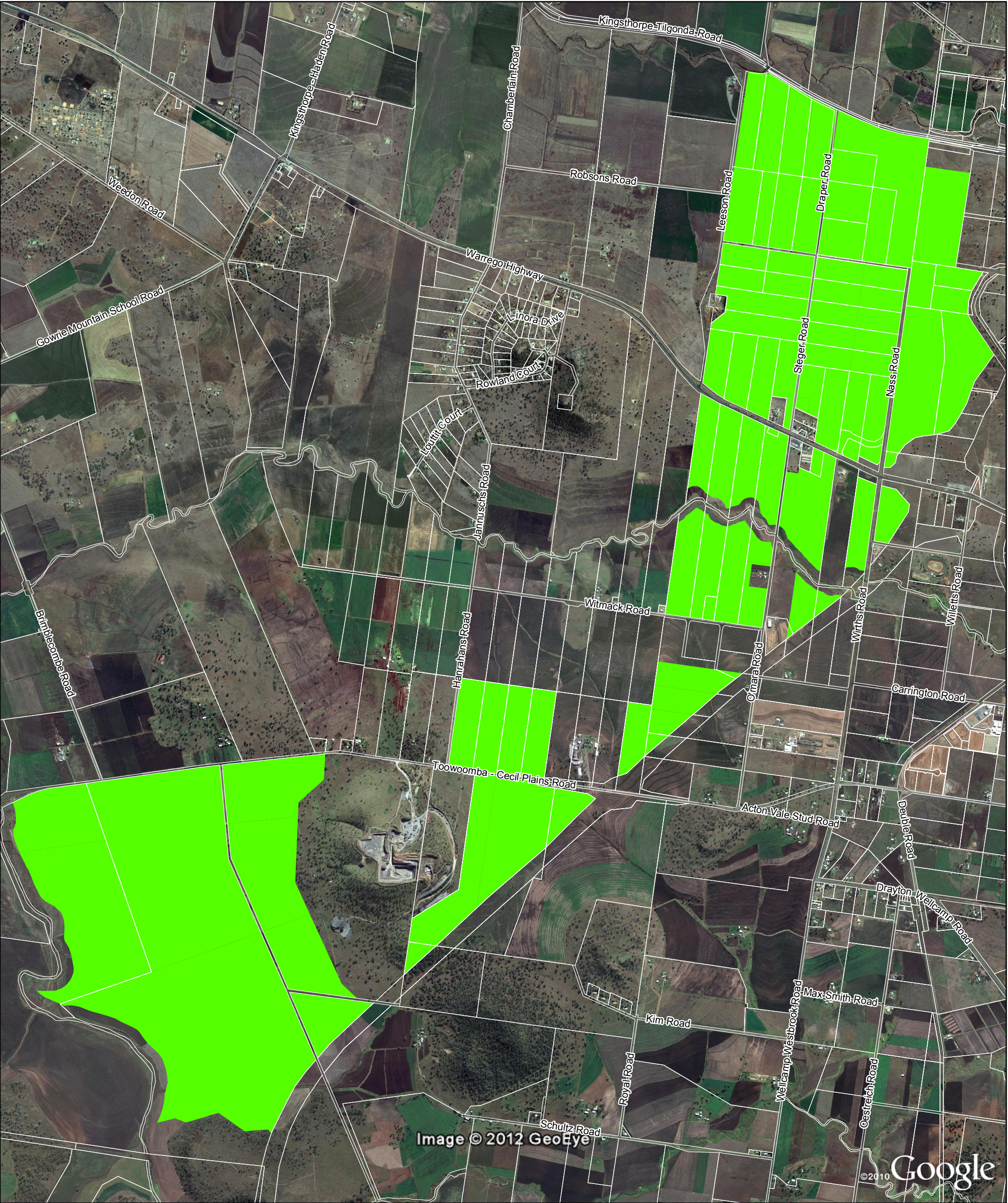
Figure 9

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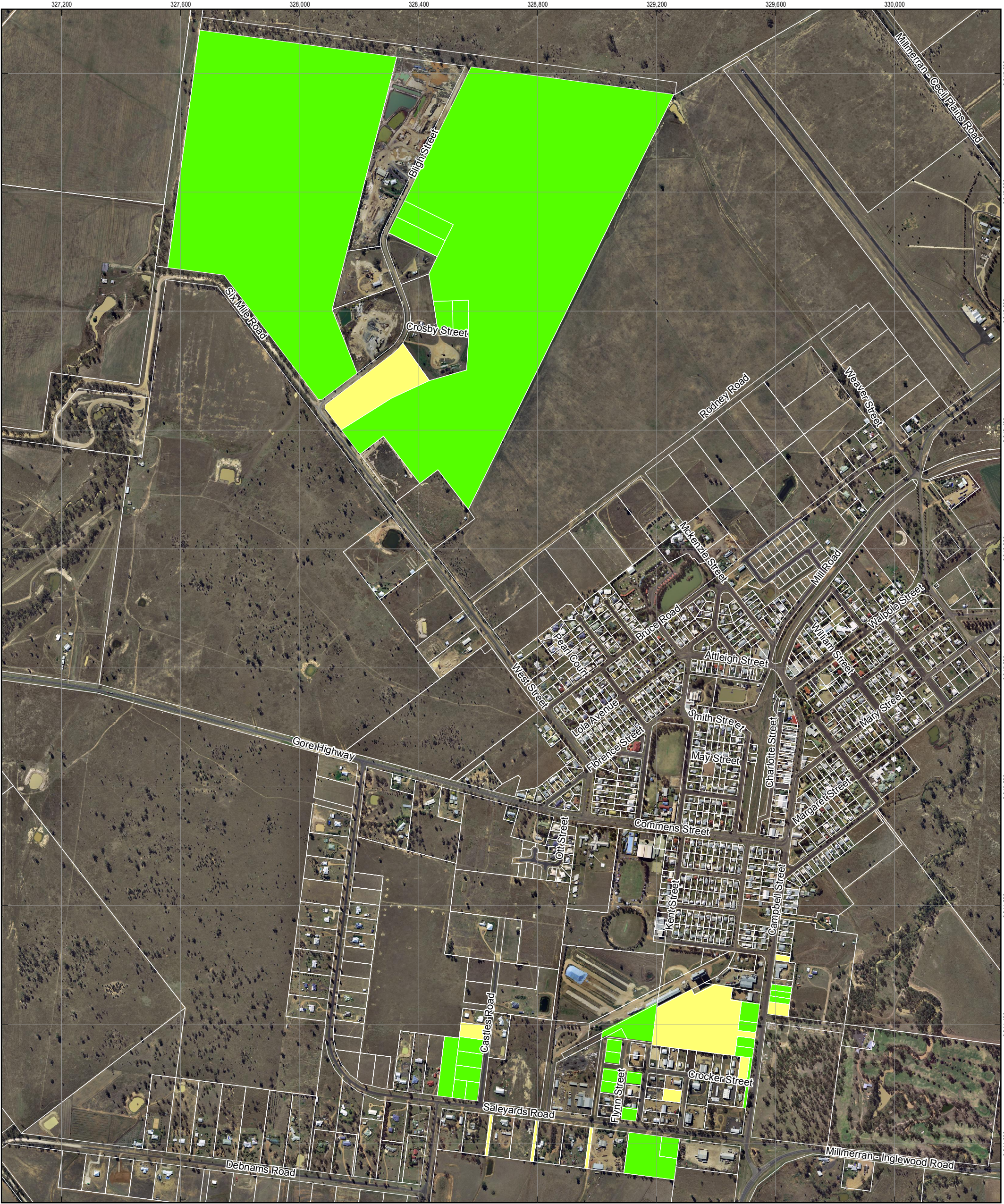


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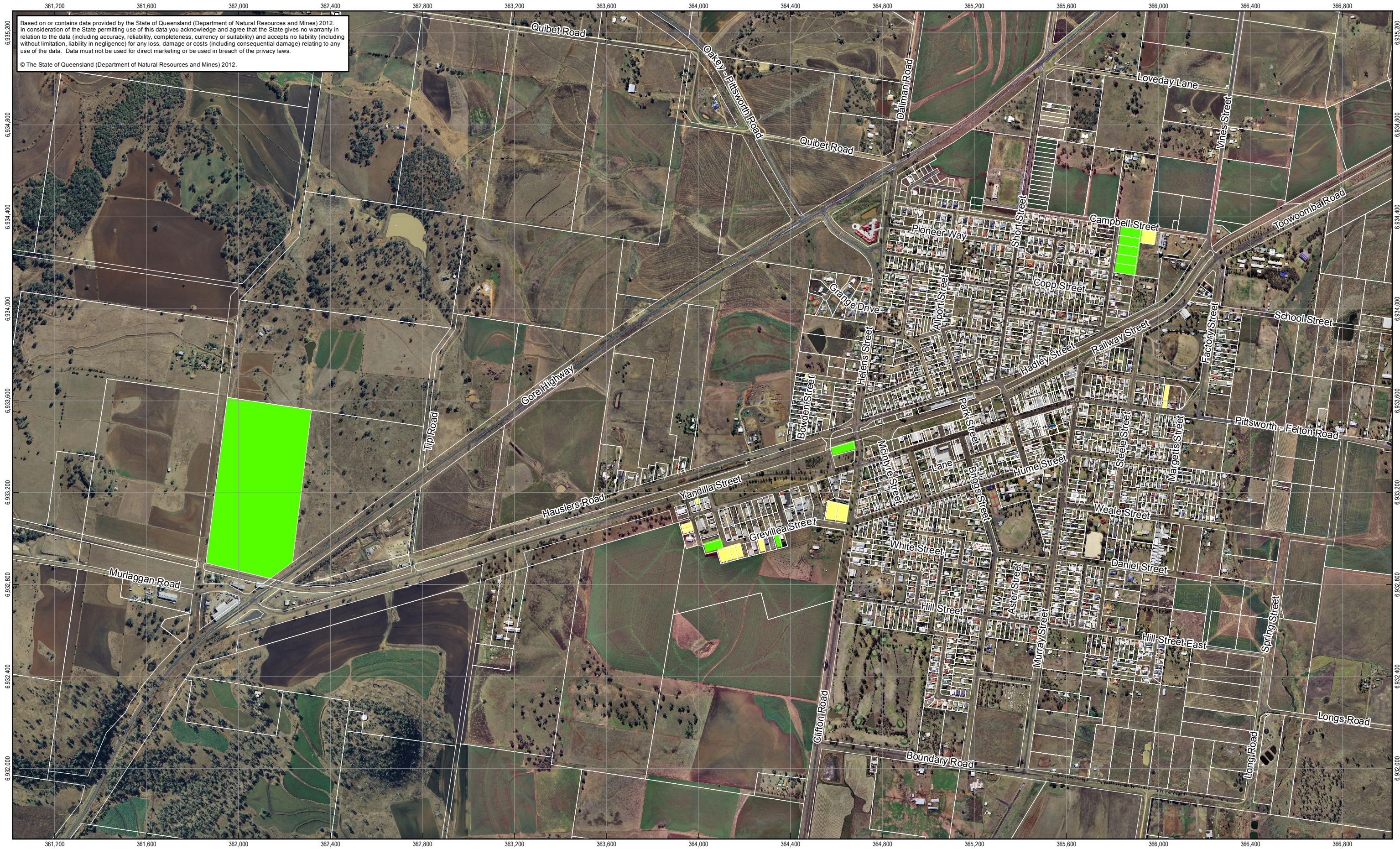
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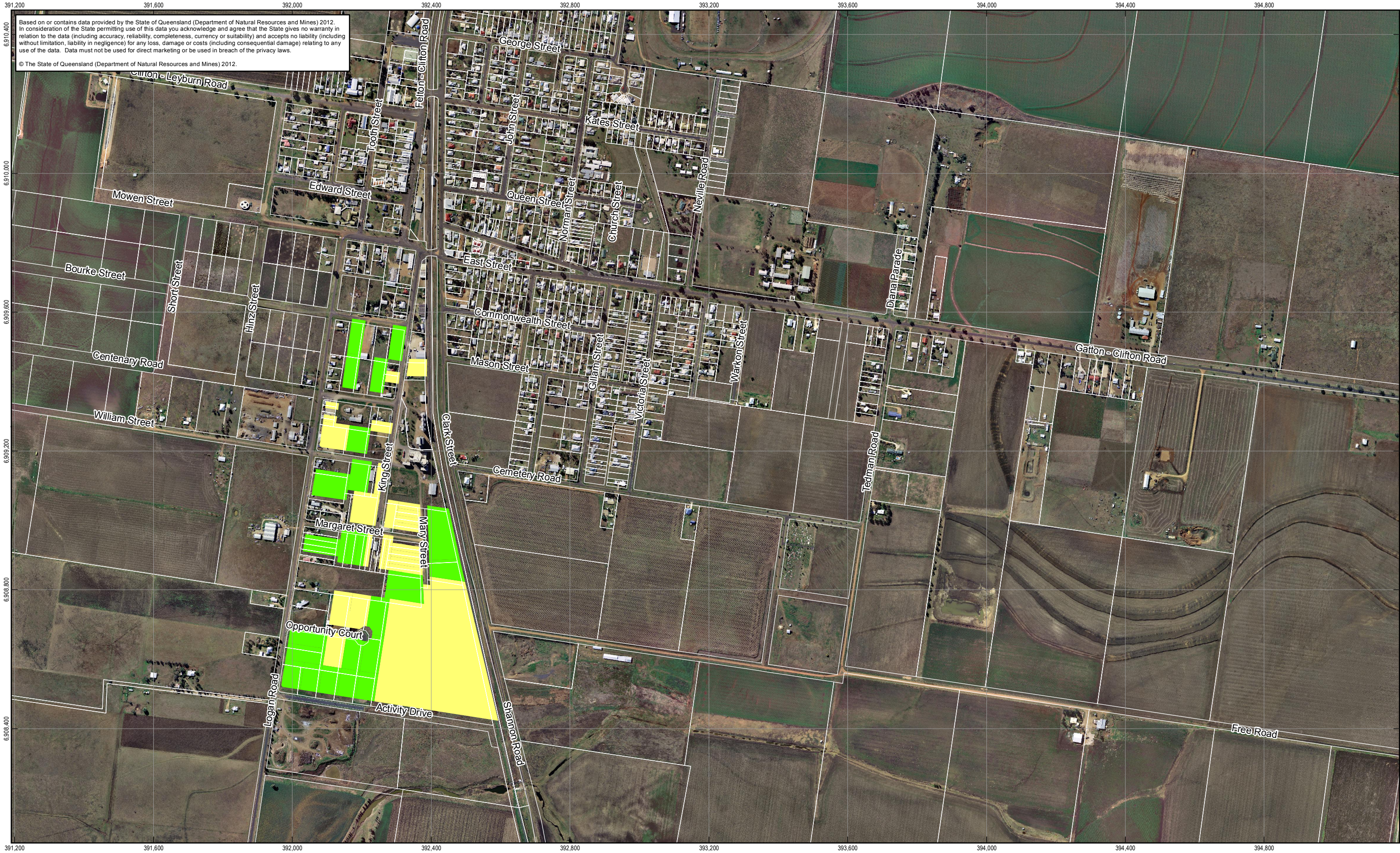
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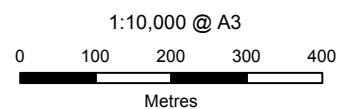
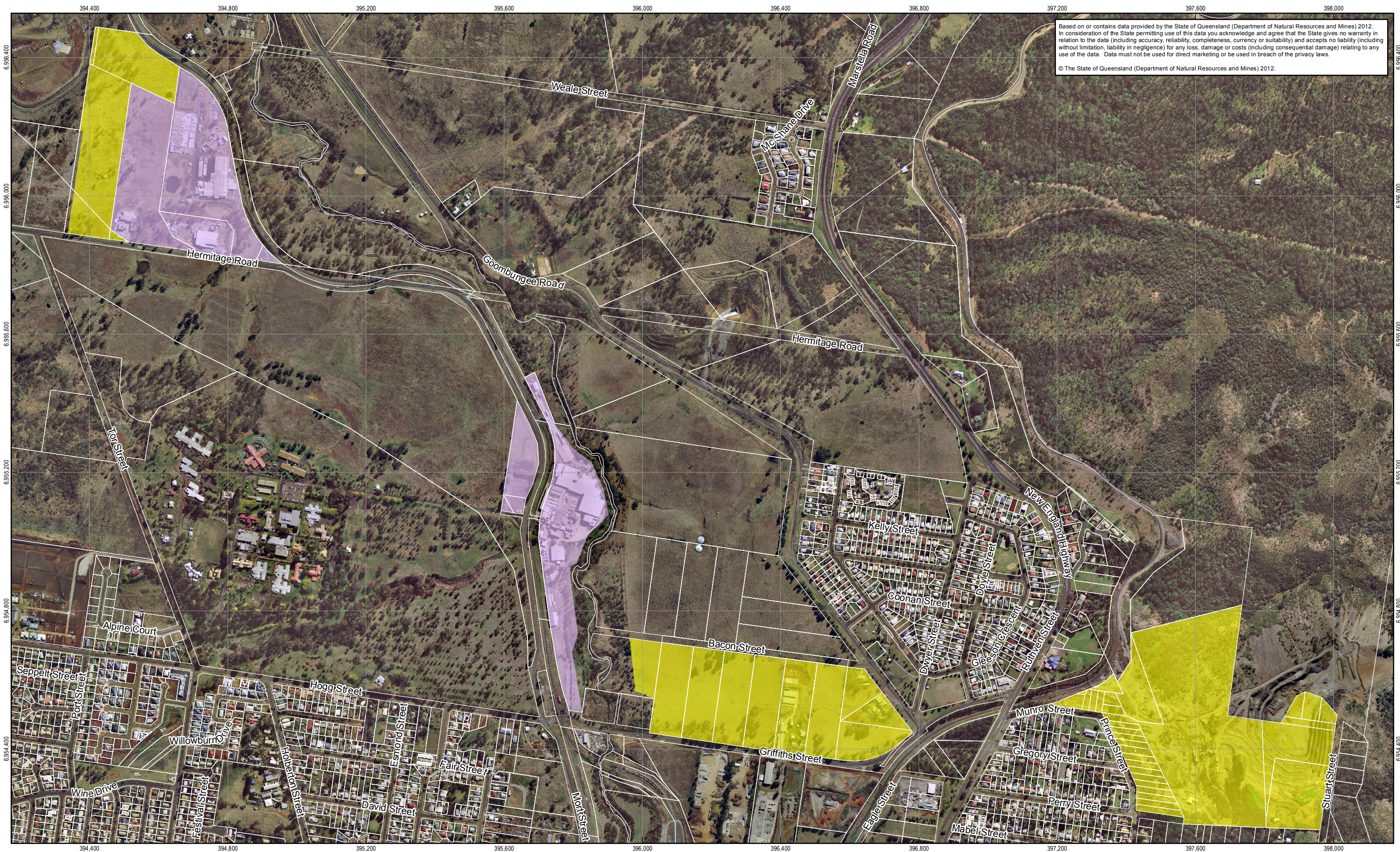
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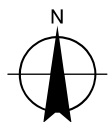
Figure 13

Appendix B Industrial Land Zoning Figures

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Grid: GDA 1994 MGA Zone 56



LEGEND

Industrial Land Footprint 2009 - 2012

- Removed (57.27 ha)
- Unchanged (26.09 ha)



Toowoomba Regional Council
Industrial Land Use Study Update

Cranley Industrial Land Footprint Change 2009 - 2012

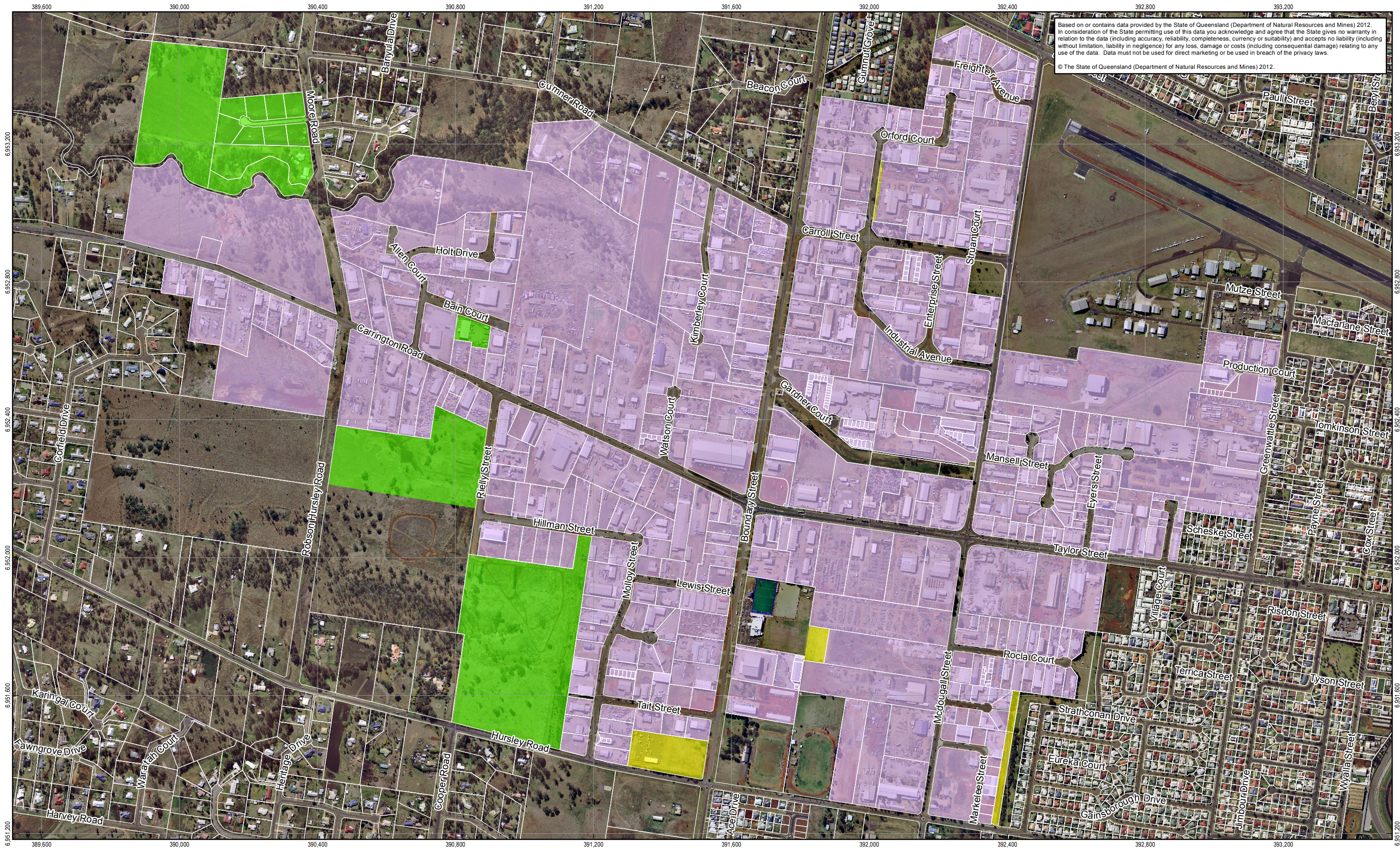
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Figure 3

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Metres

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LEGEND

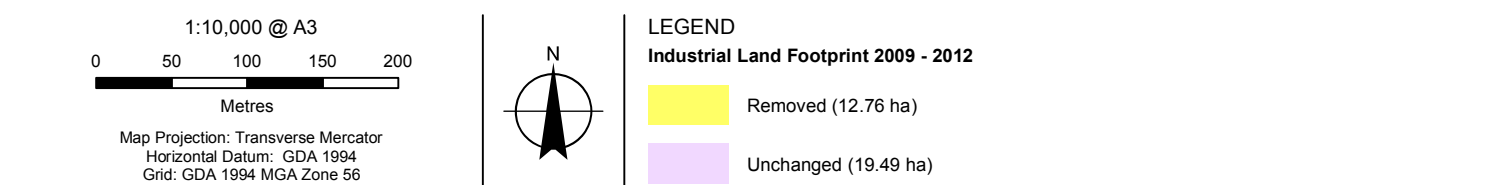
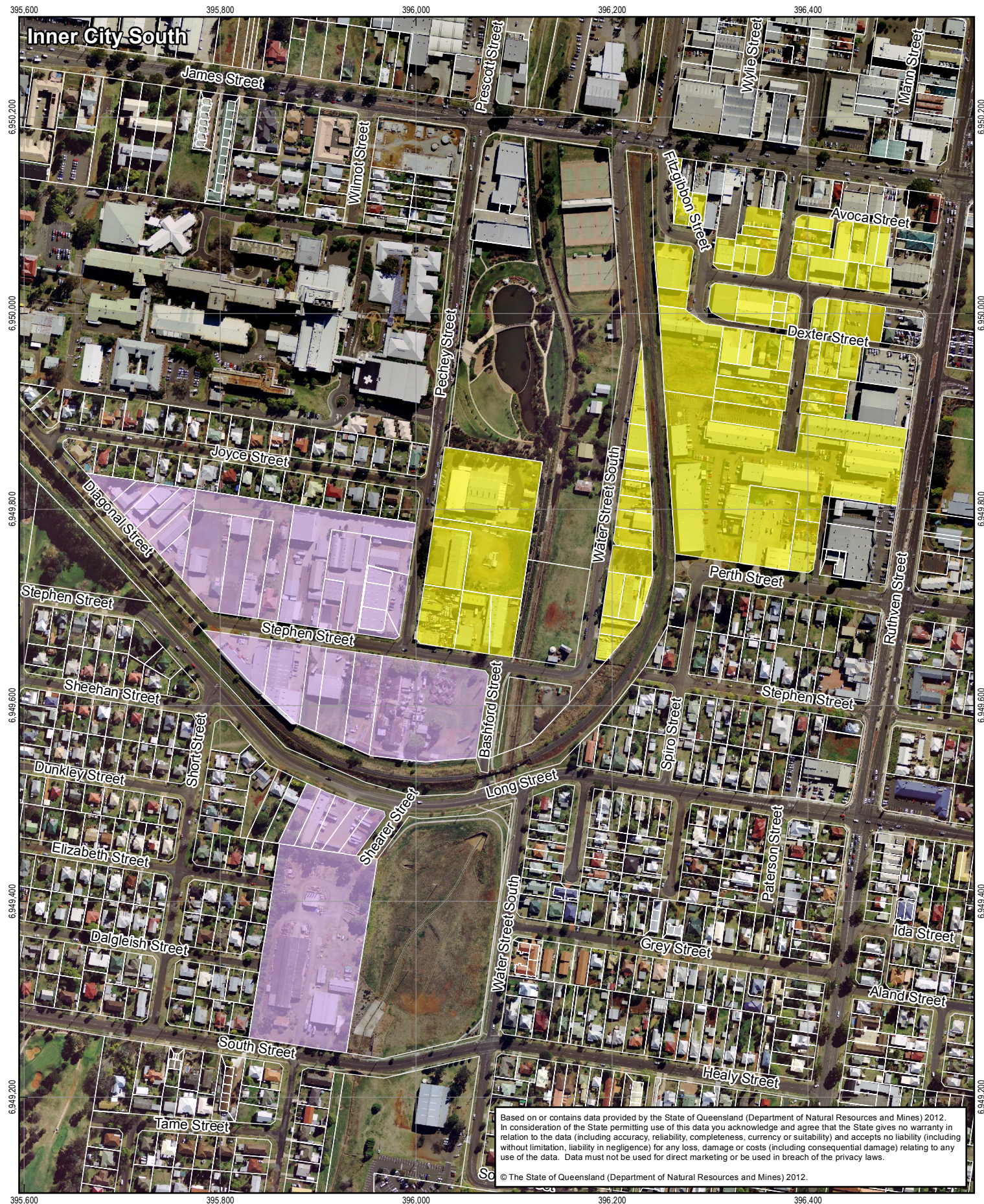
Industrial Land Footprint 2009 - 2012

	Added (42.26 ha)		Removed (4.03 ha)
	Unchanged (328.16 ha)		

Toowoomba Regional Council
Industrial Land Use Study Update

**Wilonton / Torrington Industrial
Land Footprint Change 2009 - 2012**

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Toowoomba Regional Council
Industrial Land Use Study Update

Inner City Industrial Land Footprint Change 2009 - 2012

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Date 09 Oct 2012

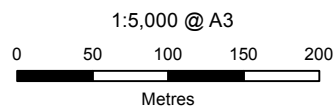
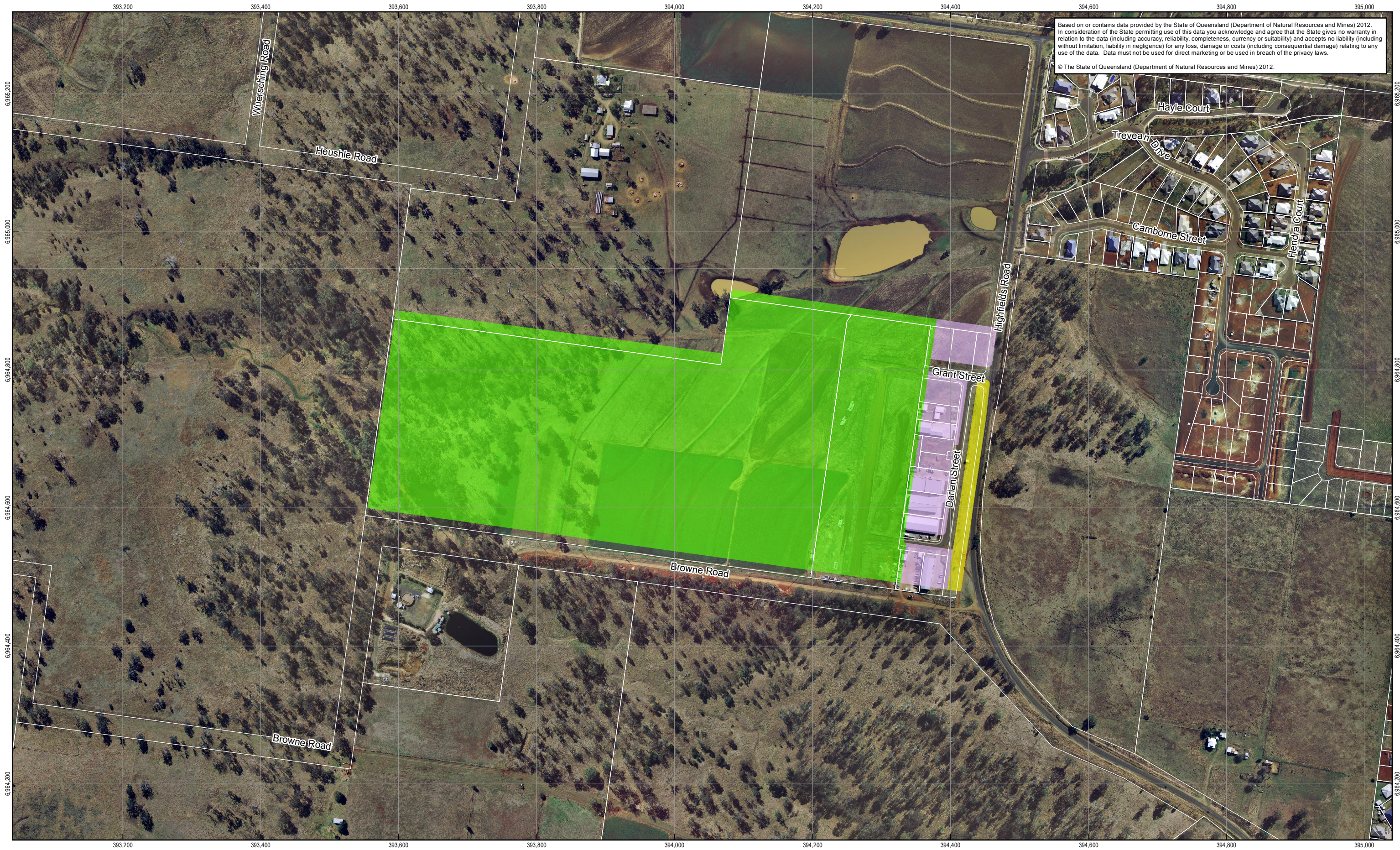
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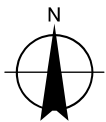
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LEGEND

Industrial Land Footprint 2009 - 2012

Added (25.49 ha)

Removed (0.61 ha)

Unchanged (2.26 ha)



Toowoomba Regional Council
Industrial Land Use Study Update

Meringandan Industrial Land Footprint Change 2009 - 2012

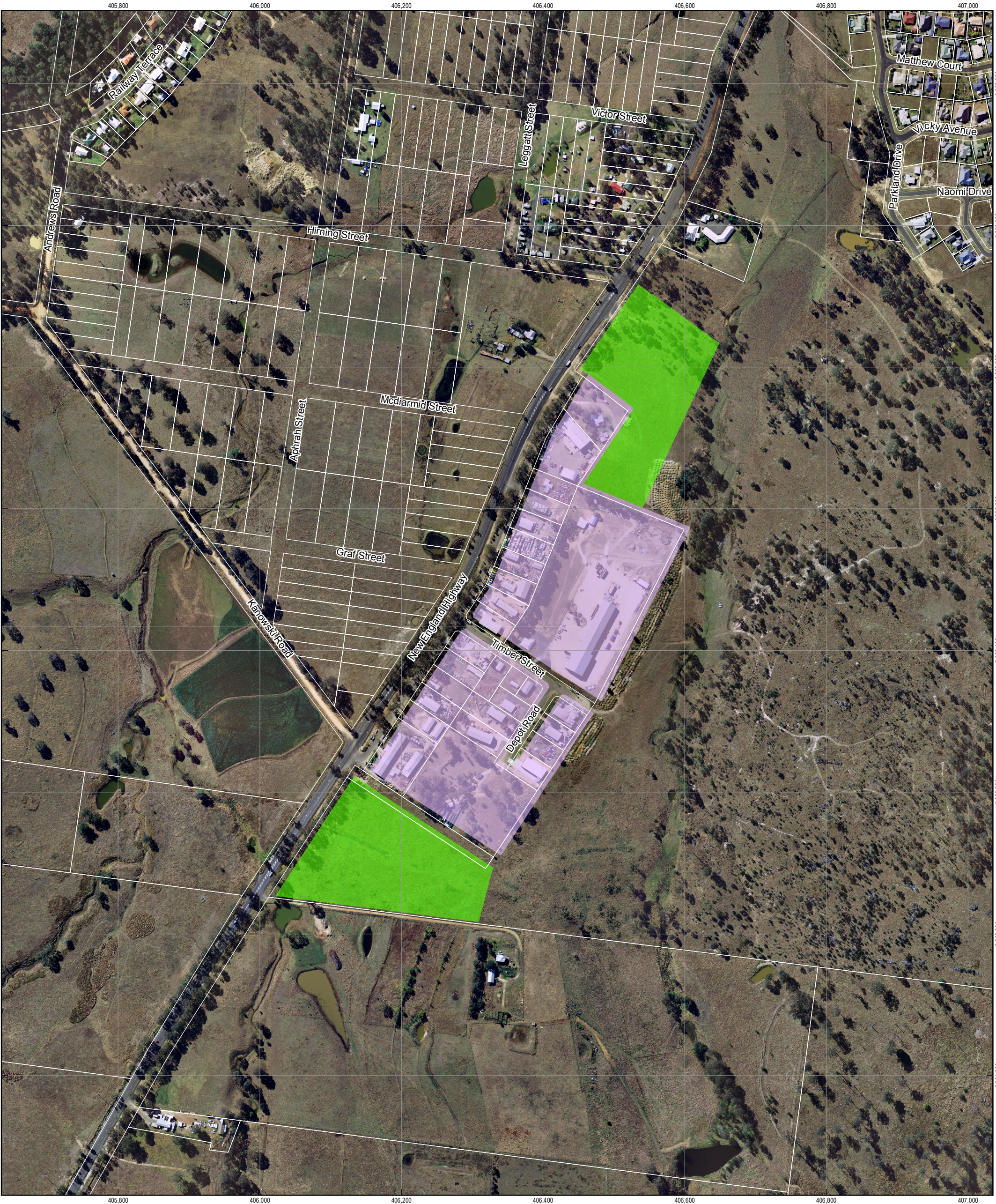
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Figure 6

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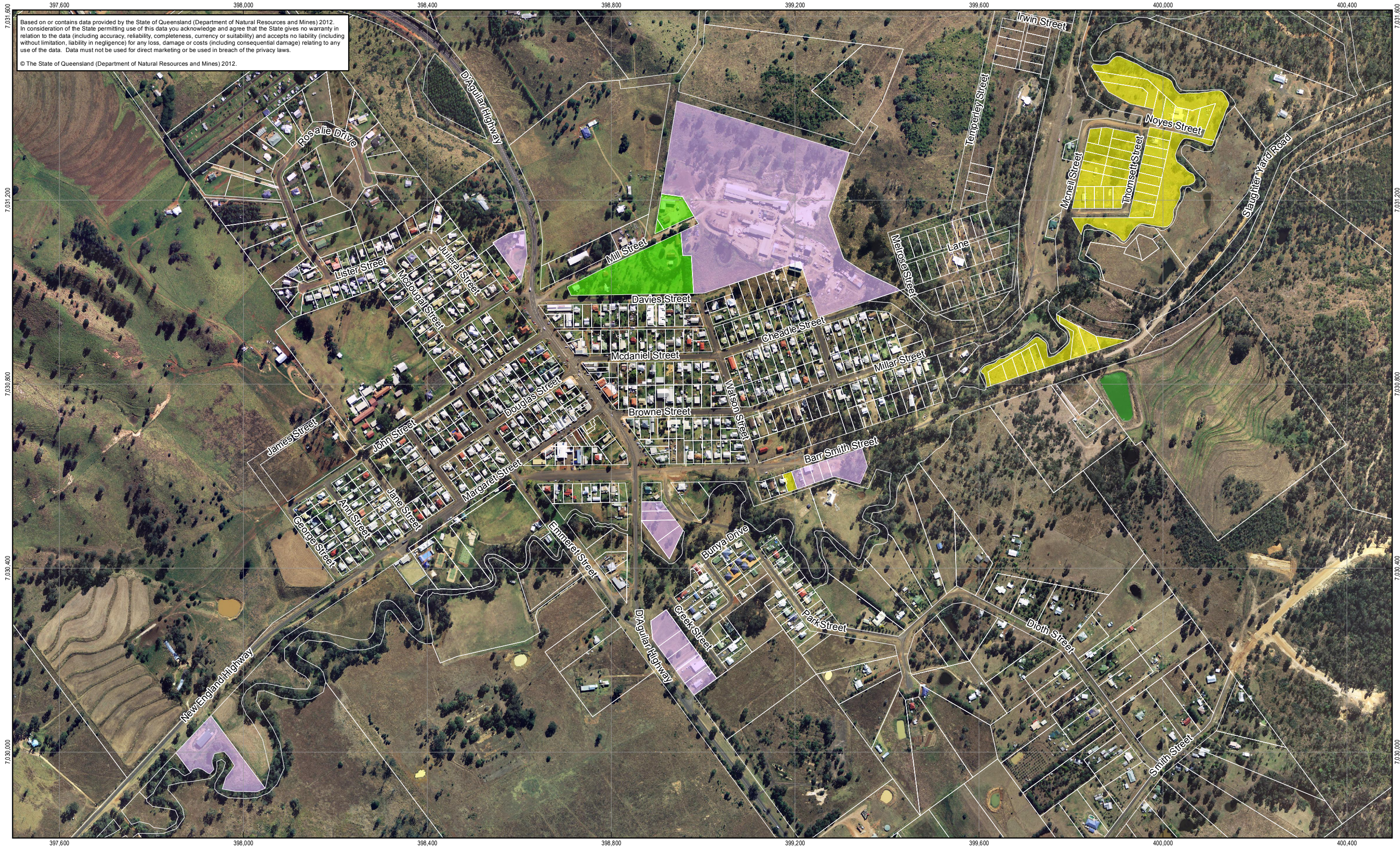
Industrial Land Footprint 2009 - 2012

Added (6.7 ha)

Unchanged (11.69 ha)

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Metres

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N

LEGEND

Industrial Land Footprint 2009 - 2012

	Removed (7.93 ha)
	Added (2.54 ha)
	Unchanged (17.04 ha)

Toowoomba Regional Council
Industrial Land Use Study Update

**Yarraman Industrial Land
Footprint Change 2009 - 2012**

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Figure 8



LEGEND

Industrial Land Footprint 2009 - 2012

Removed (2.24 ha)

Unchanged (11.22 ha)

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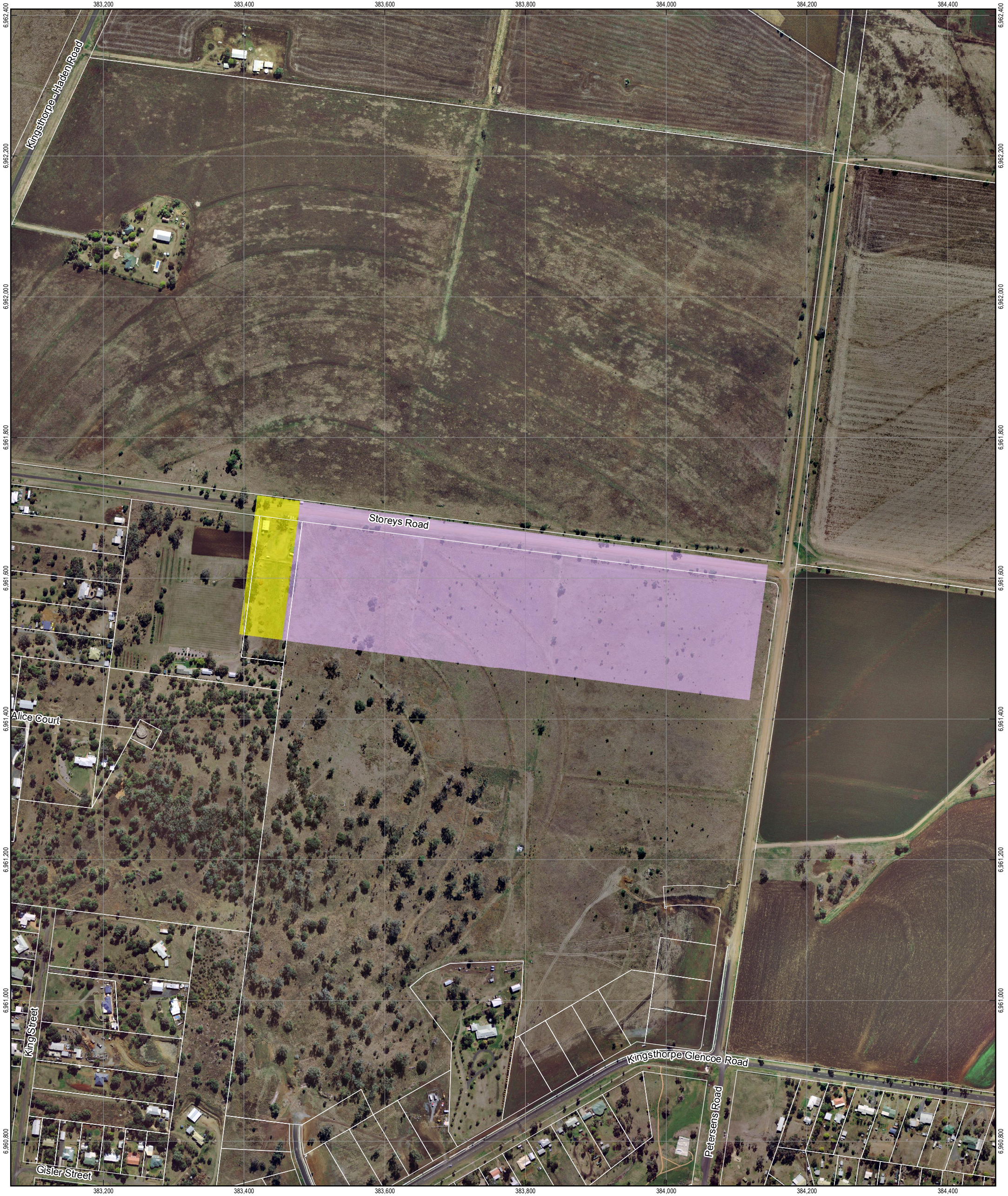
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Industrial Land Footprint 2009 - 2012

Removed (3.55 ha)

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LEGEND

Industrial Land Footprint 2009 - 2012

Removed (1.22 ha)

Unchanged (13.17 ha)

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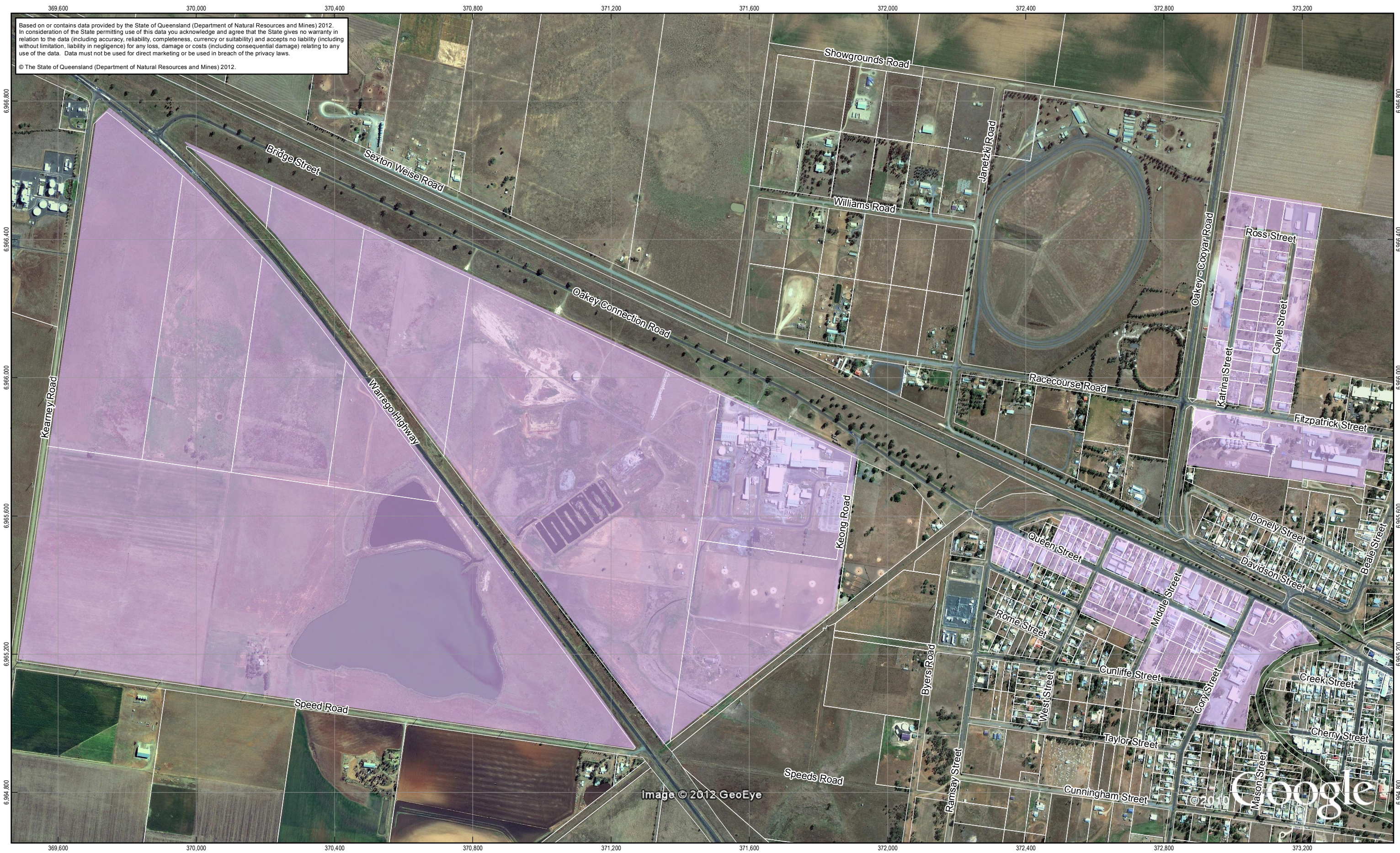
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0
09 Oct 2012

Kingsthorpe Industrial Land
Footprint Change 2009 - 2012

Figure 11

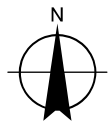


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Metres

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LEGEND

Industrial Land Footprint 2009 - 2012

Unchanged (313.53 ha)



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Industrial Land Use Study Update

Oakey Industrial Land Footprint Change 2009 - 2012

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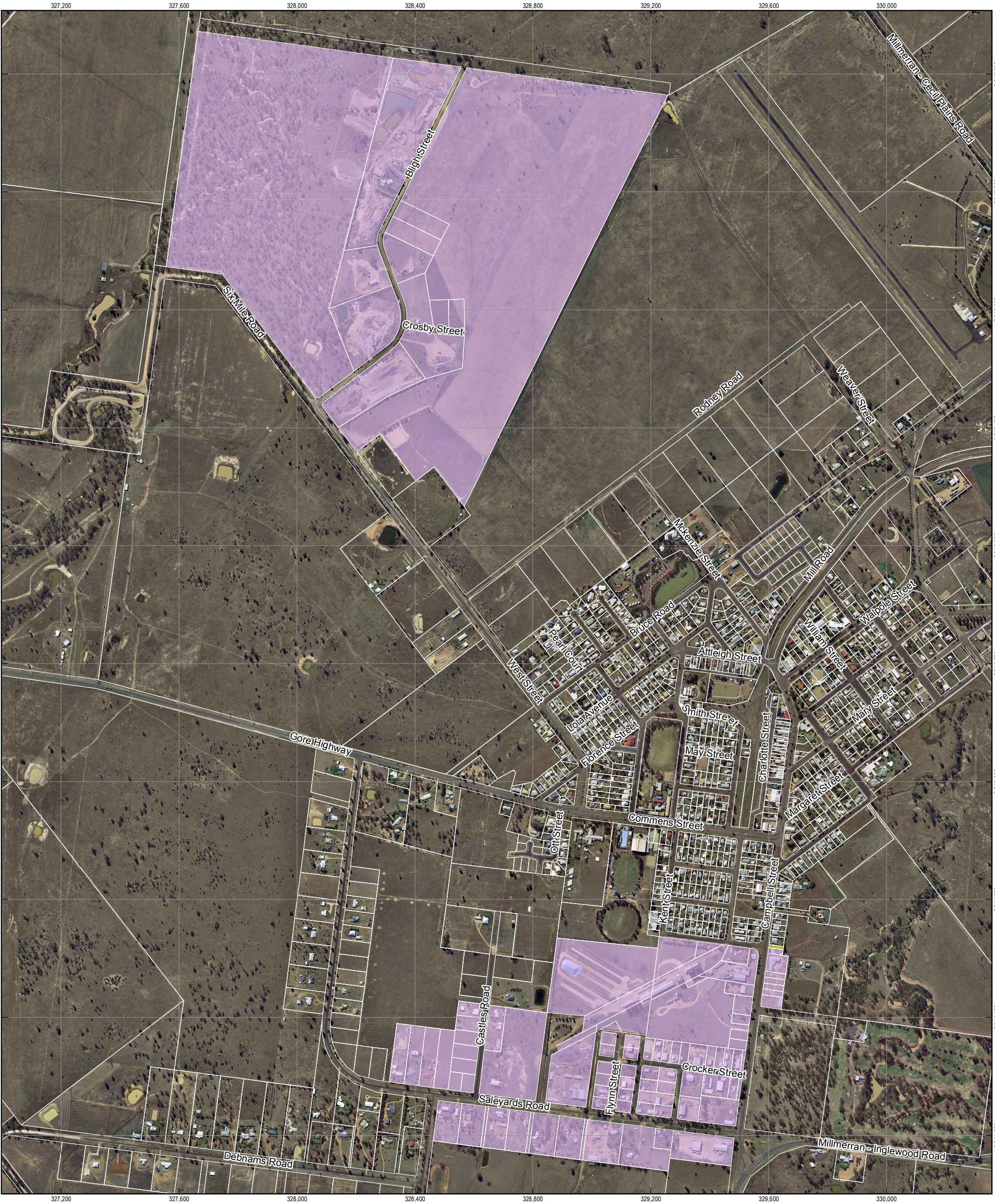
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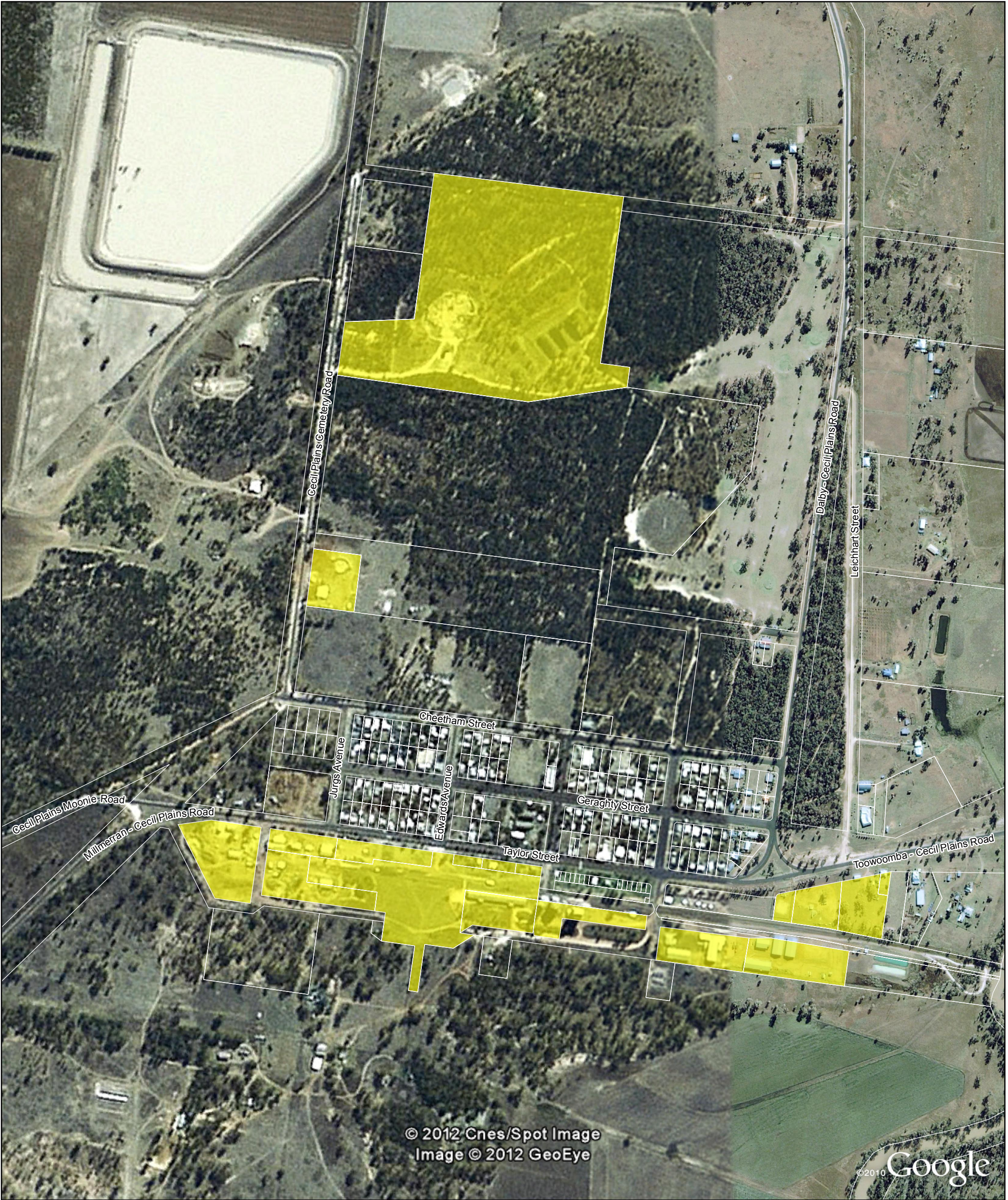
Industrial Land Footprint 2009 - 2012

Removed (0.05 ha)

Unchanged (221.06 ha)

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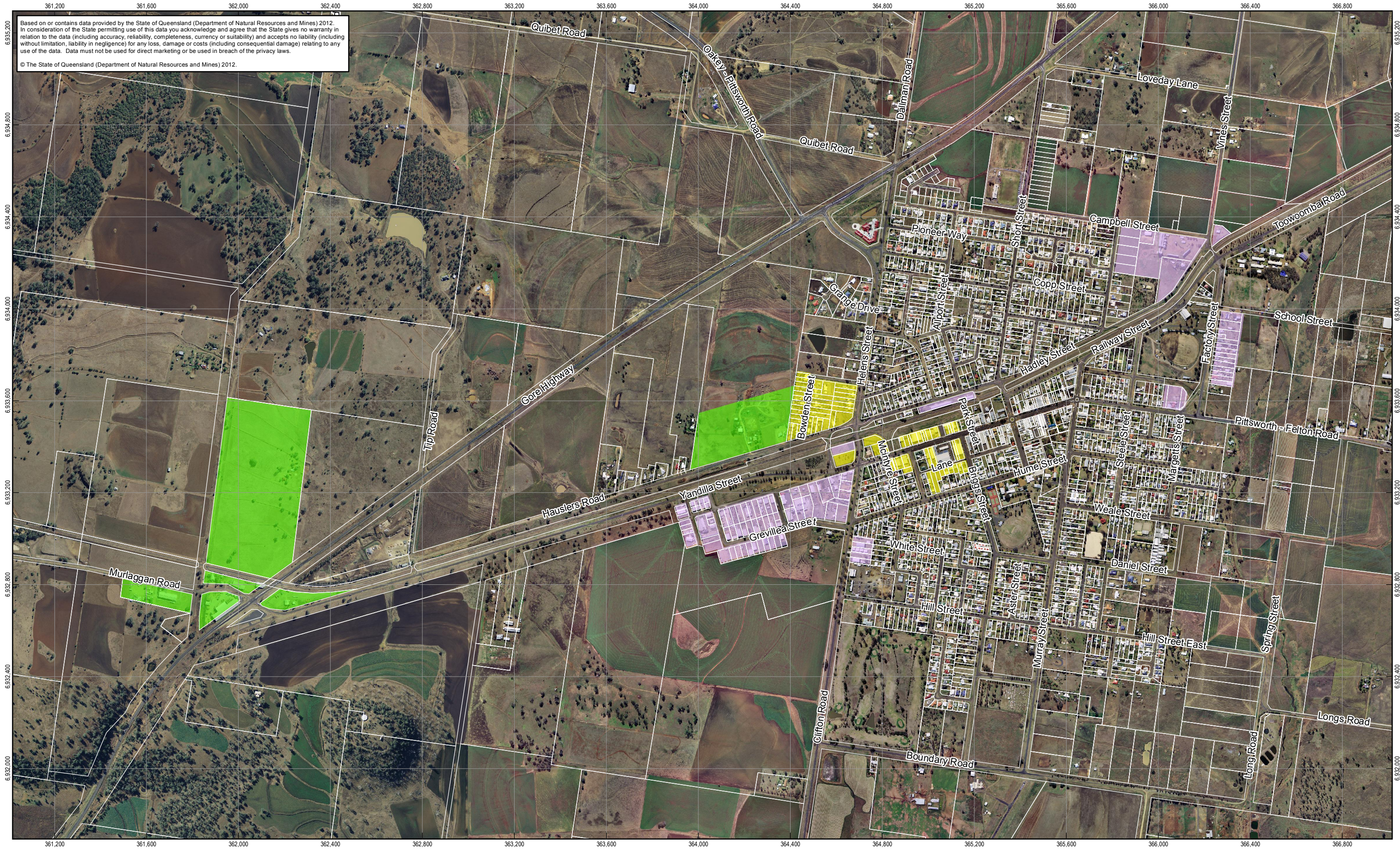
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Industrial Land Footprint 2009 - 2012

Removed (38.48 ha)

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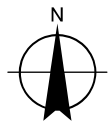
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Metres

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LEGEND

Industrial Land Footprint 2009 - 2012

Added (44.03 ha)

Removed (10.29 ha)

Unchanged (27.19 ha)



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Pittsworth Industrial Land Footprint Change 2009 - 2012

Figure 15

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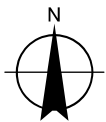
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Metres
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LEGEND
Industrial Land Footprint 2009 - 2012
 Removed (22.68 ha)



Toowoomba Regional Council
Industrial Land Use Study Update

**Brookstead Industrial Land
Footprint Change 2009 - 2012**

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Figure 16

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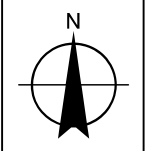
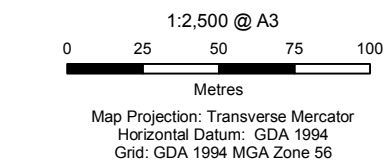
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Industrial Land Footprint 2009 - 2012

Removed (0.37 ha)

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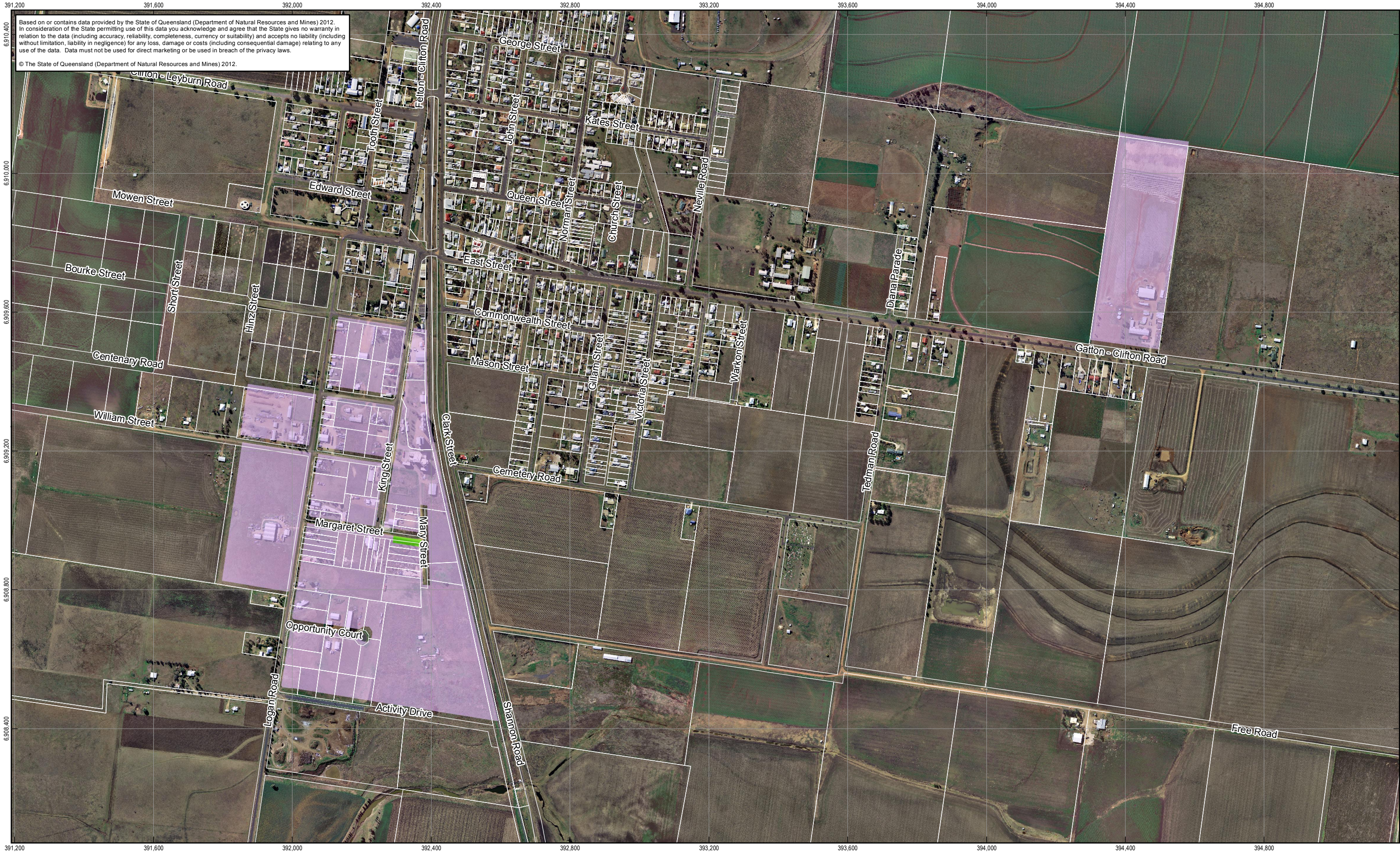


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Southbrook Industrial Land
Footprint Change 2009 - 2012

Figure 17

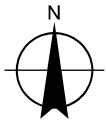


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Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56



LEGEND

Industrial Land Footprint 2009 - 2012

Added (0.17 ha)

Unchanged (64.56 ha)



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Industrial Land Use Study Update

Clifton Industrial Land Footprint Change 2009 - 2012

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Figure 18

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Appendix C Economic Working Paper

Toowoomba Region Industry Study: 2012 Update
prepared by Economic Associates Pty Ltd

DRAFT

Toowoomba Region Industry Study: 2012 Update

Final Report

October 2012



ECONOMIC ASSOCIATES

Toowoomba Region Industry Study: 2012 Update

Final Report

Prepared for:

Toowoomba Regional Council
PO Box 3021
TOOWOOMBA VILLAGE FAIR QLD 4350

Prepared by:

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Telephone: (07) 3839 1011
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October 2012

12036

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ECONOMIC ASSOCIATES

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Disclaimer: This report has been prepared based on the most recent and readily available data at the time of drafting. Economic Associates has applied due professional care and diligence in accordance with generally accepted standards of professional practice in undertaking analysis contained within this report from these information sources. Economic Associates shall not be liable for damages arising from any errors or omissions contained within these data sources. As this report involves future market projections which can be affected by a number of unforeseen variables, they represent our best possible estimates at this point in time and no warranty is given that this particular set of projections will in fact eventuate.

1 INTRODUCTION

1.1 Purpose of Study

The purpose of the Toowoomba Region Industry Study 2012 update is to provide updated estimates regarding the quantum of industrial land demanded within Toowoomba Regional Council to 2031. This report seeks to introduce additional analysis to more fully capture the potential impacts of resource sector development within the Darling Downs and South West Queensland.

1.2 Study Area Definition

The report focuses on the future industrial land needs of Toowoomba Regional Council, which includes the following former local government areas:

- Toowoomba City (Toowoomba);
- Jondaryan Shire (Jondaryan);
- Millmerran Shire (Millmerran);
- Pittsworth Shire (Pittsworth);
- Cambooya Shire (Cambooya);
- Clifton Shire (Clifton);
- Crow's Nest Shire (Crow's Nest); and
- Rosalie Shire (Rosalie).

A number of sections of the report also consider the broader Darling Downs regional plan area, which is geographically defined as follows:

- Toowoomba Regional Council;
- Southern Downs Regional Council;
- Goondiwindi Regional Council;
- Western Downs Regional Council;
- Maranoa Regional Council; and
- Balonne Shire.

1.3 Report Structure

The structure of the report is as follows:

- *Chapter 1: Introduction:* Provides an overview of the purpose of the study and report structure;
- *Chapter 2: Socio-Economic Overview:* Provides an overview of the socio-economic characteristics of Toowoomba Regional Council and the Darling Downs regional plan area, benchmarked against Queensland;
- *Chapter 3: Industrial Land Supply in Toowoomba Regional Council:* Provides an overview of the remaining industrial land supply within each of the former local government areas of Toowoomba Regional Council;

- *Chapter 4: Property Market Overview:* Provides an overview of industrial land activity within each of the former local government areas within Toowoomba Regional Council, including a summary on the volume and value of industrial land sales;
- *Chapter 5: Resource Sector Development Pipeline:* Provides an overview of the existing and proposed coal and gas projects within the Darling Downs regional plan area;
- *Chapter 6: Projected Industrial Land Demand:* Provides an overview of the projected demand for industrial land within the Toowoomba Regional Council area under a number of alternative approaches. This chapter also considers the findings of previous studies regarding the future demand for industrial land within Toowoomba Regional Council; and
- *Chapter 7: Industrial Land Needs Analysis:* Provides an overview of the need for additional industrial land demand within Toowoomba Regional Council by sub-area.

2 SOCIO-ECONOMIC OVERVIEW

2.1 Data Availability

At the time of preparation (August 2012), limited data sets were available from the first release of the 2011 Census of Population and Housing. A second release of data is anticipated later this year. This second release will include data pertaining to employment and labour force characteristics and is due to be released in late October / November 2012. Available data sets at the time of preparation included:

- Population by age and sex;
- Household type;
- Household ownership;
- Household income;
- Rent payments; and
- Housing loan repayments.

The 2006 Census of Population and Housing have been used for the following data sets:

- Labour market;
- Qualifications;
- Occupation; and
- Employment by industry.

The socio-economic overview has been undertaken for Toowoomba Regional Council and the Darling Downs Regional Plan area, benchmarked against Queensland. The Darling Downs Regional Plan Area is geographically defined as follows:

2.2 Socio-Economic Profile

2.2.1 2011 Census Data

A socio-economic profile of Toowoomba Regional Council as at the 2001, 2006 and 2011 Censuses of Population and Housing, benchmarked against Darling Downs Region and Queensland, is provided in Table 2.1 below. A number of key points can be drawn from this profile including:

- The population of Toowoomba Regional Council increased from 132,125 persons in 2001 to 149,212 persons in 2011, accounting for approximately 60.8% of the Darling Downs Region population in 2011. The average annual population growth was lower in Toowoomba Regional Council than in Darling Downs Region and Queensland between 2006 and 2011;
- The average age of residents in Toowoomba Regional Council increased from 35.9 years in 2001 to 38.1 years in 2011. In 2011, the age profile of Toowoomba Regional Council was similar to Darling Downs Region. Toowoomba Regional Council and Darling Downs Region were characterised by a higher proportion of persons aged 65 years and over relative to the state average;

- Consistent with an aging population, the incidence of couple families without children households increased between 2001 and 2011 in Toowoomba Regional Council and Darling Downs while the proportion of couple families with children households declined. Toowoomba Regional Council recorded a marginally higher proportion of single parent family households than Darling Downs Region;
- The incidence of households fully owning their home decline in Toowoomba Regional Council and Darling Downs Region between 2001 and 2011, but was consistently above the state average. Toowoomba Regional Council recorded a marginally higher proportion of households with a mortgage than Darling Downs Region;
- In 2011, the average weekly household income was \$1,319 in Toowoomba Regional Council, higher than in Darling Downs Region (\$1,284) but lower than in Queensland (\$1,501). On average, mortgages and rents were also higher in Toowoomba Regional Council than in Darling Downs Region, but lower than the Queensland average.

Table 2.1: Socio-Economic Profile, Toowoomba Regional Council, Darling Downs Region and Queensland, 2001 to 2011

	Toowoomba Regional Council			Darling Downs Region			Queensland		
	2001	2006	2011	2001	2006	2011	2001	2006	2011
Population	132,125	141,021	149,212	218,654	228,859	245,256	3,585,639	3,973,958	4,392,097
Ave. Annual Population Growth (%)	-	1.3%	1.1%	-	0.9%	1.4%	-	2.1%	2.0%
Age Distribution									
0-14 years	22.6%	22.2%	21.8%	23.1%	22.3%	21.8%	21.3%	20.4%	20.0%
15-24 years	15.4%	14.7%	13.6%	13.9%	13.4%	12.6%	13.8%	13.6%	13.4%
25-34 years	13.2%	11.8%	11.8%	13.2%	11.7%	11.6%	14.2%	13.3%	13.4%
35-44 years	14.2%	13.4%	12.8%	14.3%	13.6%	13.1%	14.9%	14.6%	14.2%
45-54 years	12.9%	13.2%	13.1%	13.0%	13.5%	13.4%	13.7%	13.7%	13.6%
55-64 years	9.0%	10.8%	11.5%	9.7%	11.4%	12.0%	9.7%	11.4%	11.7%
65+ years	12.7%	13.8%	15.4%	12.8%	14.1%	15.4%	12.4%	13.0%	13.7%
Average age (years)	35.9	37.1	38.1	36.2	37.6	38.4	36.6	37.6	38.0
Household Type (% of dwellings)									
Couple families with children	33.0%	30.8%	29.0%	33.0%	30.4%	28.5%	30.7%	29.4%	29.5%
Couple families without children	26.2%	27.8%	28.1%	26.6%	28.3%	28.2%	25.3%	26.0%	26.6%
Single parent family	10.1%	10.3%	10.5%	9.4%	9.8%	9.9%	10.8%	10.5%	10.7%
Lone person households	23.2%	23.1%	24.6%	23.2%	23.1%	24.2%	21.8%	21.0%	21.4%
Household size	2.7	2.7	2.6	2.7	2.6	2.6	2.6	2.6	2.7
Household Finances									
% of households fully owning home	39.8%	34.3%	32.2%	42.2%	35.9%	33.4%	36.6%	30.4%	28.4%
% of households purchasing home	26.2%	31.5%	32.0%	23.5%	29.4%	29.9%	25.8%	31.4%	32.6%
% of households renting ¹	29.4%	28.3%	29.7%	29.3%	28.2%	29.8%	31.6%	30.0%	32.0%
Average weekly household income	\$841	\$1,075	\$1,319	\$821	\$1,038	\$1,284	\$902	\$1,202	\$1,501
Average monthly housing loan repayment	\$759	\$1,033	\$1,302	\$732	\$993	\$1,269	\$854	\$1,175	\$1,538
Average weekly rent payment	\$131	\$172	\$230	\$118	\$156	\$216	\$155	\$219	\$300

Source: 2011 Census of Population and Housing – 1st release data

2.2.2 2006 Census Data

A socio-economic profile of Toowoomba Regional Council as at the 1996, 2001 and 2006 Censuses of Population and Housing, benchmarked against Darling Downs Region and Queensland, is provided in Table 2.2 below. A number of key points can be drawn from this profile including:

- The unemployment rate within Toowoomba Regional Council decreased from 7.5% in 1996 to 4.5% in 2006, and was similar to the Darling Downs Region (4.3%) and Queensland (4.7%) rates in 2006. The labour force participation rate increased in Toowoomba Regional Council and Darling Downs Region between 1996 and 2006;
- Toowoomba Regional Council recorded a higher proportion of persons with a post-school qualification than Darling Downs Region but lower than Queensland. Toowoomba Regional Council recorded a similar proportion of persons with a Diploma or Certificate qualification to Queensland, but a lower proportion of persons with a Bachelor or higher qualification;
- Toowoomba Regional Council was characterised by persons employed in white collar professions, similar to Darling Downs Region and Queensland. Between 1996 and 2006, Toowoomba Regional Council recorded an increase in the proportion of persons employed in lower white collar professions; and
- In 2006, the most significant industries in terms of employment in Toowoomba Regional Council were health care and social assistance, manufacturing and retail trade. Toowoomba Regional Council recorded a significantly higher proportion of persons employed in the agriculture, forestry and fishing industry than Queensland, although it was below the rate in Darling Downs Region.

Table 2.2: Socio-Economic Profile, Toowoomba Regional Council, Darling Downs Region and Queensland, 1996 to 2006

	Toowoomba Regional Council			Darling Downs Region			Queensland		
	1996	2001	2006	1996	2001	2006	1996	2001	2006
Labour Market									
Full-time employment (% labour force)	63.4%	60.0%	62.0%	64.8%	61.4%	62.8%	61.2%	58.6%	61.4%
Part-time employment (% labour force)	24.5%	27.1%	28.0%	23.0%	25.8%	27.1%	24.2%	26.6%	27.7%
Total employment (% labour force)	92.5%	93.3%	95.5%	92.6%	93.5%	95.7%	90.4%	91.8%	95.3%
Unemployment rate (% labour force)	7.5%	6.7%	4.5%	7.4%	6.5%	4.3%	9.6%	8.2%	4.7%
Participation rate (% of population > 15 years)	58.7%	60.6%	61.0%	59.8%	61.3%	61.5%	60.7%	60.6%	61.1%
Qualifications									
% of persons with a post-school qualification	24.6%	29.6%	35.5%	22.7%	27.4%	31.1%	27.6%	32.3%	37.5%
% of persons with Bachelor or higher	7.7%	9.9%	11.9%	6.8%	8.7%	10.2%	8.6%	10.8%	13.1%
% of persons with Diploma	5.5%	5.1%	6.3%	5.1%	4.7%	3.9%	5.4%	5.5%	6.6%
% of persons with Certificate	11.3%	14.6%	17.3%	10.8%	14.0%	17.0%	13.6%	16.0%	17.8%
Occupation									
Upper White Collar									
Managers	15.4%	14.4%	13.3%	20.4%	19.2%	17.0%	13.3%	12.9%	12.4%
Professionals	15.3%	15.8%	16.3%	13.2%	13.6%	14.0%	15.3%	16.4%	17.2%
<i>Subtotal</i>	30.6%	30.2%	29.6%	33.7%	32.8%	31.1%	28.6%	29.3%	29.6%
Lower White Collar									
Community & Personal Service Workers	7.6%	8.6%	8.9%	7.1%	8.0%	8.4%	8.1%	8.9%	9.1%
Clerical and Admin Workers	13.2%	13.2%	13.6%	12.0%	12.1%	12.4%	15.3%	15.0%	14.8%
Sales Workers	9.8%	10.1%	10.0%	8.5%	9.0%	9.1%	10.2%	10.7%	10.3%
<i>Subtotal</i>	30.5%	31.8%	32.5%	27.6%	29.2%	29.9%	33.6%	34.7%	34.2%
Upper Blue Collar									
Technicians & Trades Workers	15.3%	15.1%	15.4%	13.9%	13.8%	14.5%	15.6%	14.7%	15.3%
<i>Subtotal</i>	15.3%	15.1%	15.4%	13.9%	13.8%	14.5%	15.6%	14.7%	15.3%
Lower Blue Collar									
Machinery Operators & Drivers	7.6%	7.1%	6.7%	8.0%	7.9%	7.6%	8.3%	7.8%	7.2%
Labourers	13.5%	14.1%	14.3%	14.1%	14.5%	15.4%	11.4%	11.5%	11.9%
<i>Subtotal</i>	21.2%	21.2%	21.0%	22.2%	22.5%	23.0%	19.7%	19.3%	19.1%
Employment by Industry (% of employees)									
Agriculture, forestry & fishing	9.6%	8.9%	7.2%	17.0%	16.3%	13.1%	5.2%	4.9%	3.4%
Mining	0.4%	0.3%	0.6%	0.5%	0.5%	1.0%	1.6%	1.2%	1.7%
Manufacturing	11.8%	11.7%	11.8%	9.9%	9.8%	10.2%	10.1%	10.5%	9.9%
Electricity, gas, water & waste services	0.6%	0.8%	1.0%	0.7%	0.9%	1.0%	0.9%	1.0%	1.0%

	Toowoomba Regional Council			Darling Downs Region			Queensland		
	1996	2001	2006	1996	2001	2006	1996	2001	2006
Construction	6.0%	6.2%	7.3%	5.5%	6.2%	7.4%	7.0%	6.9%	9.0%
Wholesale trade	4.7%	5.1%	3.8%	4.7%	5.0%	3.6%	5.3%	4.9%	3.9%
Retail trade	10.9%	11.6%	11.7%	10.3%	11.0%	11.5%	10.6%	11.5%	11.6%
Accommodation & food services	5.3%	5.6%	5.3%	5.2%	5.5%	5.4%	7.2%	7.4%	7.0%
Transport, postal & warehousing	4.6%	4.8%	4.4%	4.5%	4.8%	4.5%	5.1%	5.2%	5.1%
Information media & telecommunications	1.6%	2.3%	1.1%	1.5%	1.7%	0.9%	2.1%	1.9%	1.4%
Financial & insurance services	2.4%	2.2%	3.0%	2.1%	1.9%	2.4%	3.0%	2.8%	2.9%
Rental, hiring & real estate services	1.2%	1.2%	1.5%	1.0%	1.0%	1.2%	2.0%	2.0%	2.1%
Professional, scientific & technical services	3.5%	3.5%	3.8%	3.1%	3.3%	3.3%	5.5%	5.4%	5.6%
Administrative & support services	1.8%	2.2%	2.0%	1.5%	1.9%	1.8%	2.7%	3.2%	3.0%
Public administration & safety	6.1%	6.0%	6.9%	5.8%	5.4%	6.5%	6.3%	6.2%	6.7%
Education & training	10.1%	9.8%	9.6%	9.1%	8.9%	8.7%	7.5%	8.0%	7.6%
Health care & social assistance	11.2%	11.1%	12.0%	9.7%	9.5%	10.6%	9.2%	9.5%	10.2%
Arts & recreation services	1.0%	0.9%	0.9%	0.8%	0.8%	0.7%	1.5%	1.5%	1.4%
Other services	4.1%	3.9%	4.0%	3.8%	3.6%	3.8%	4.3%	4.0%	3.7%

Source: 2006 Census of Population and Housing – 1st release data

2.3 Population Projections

Table 2.3 below presents population projections between 2012 and 2031 for the low, medium and high series, according to OESR (2012). Based on these projections, the population of Toowoomba Regional Council is projected to increase at a rate of 1.5% to 2.4% per annum to between 221,184 and 266,496 persons in 2031.

Under all scenarios, the rate of population growth in Toowoomba Regional Council is projected to exceed the Darling Downs Region and Queensland averages.

Table 2.3: Projected Population, Toowoomba Regional Council, Darling Downs and Queensland, 2012-31

	2012	2016	2021	2026	2031	Ave Ann, 2012-31
<i>Low Series</i>						
Toowoomba Regional Council	166,090	175,503	188,901	204,615	221,184	1.5%
Darling Downs Region	264,510	277,174	294,605	314,069	334,324	1.2%
Queensland	4,655,222	4,942,485	5,293,118	5,633,411	5,957,410	1.3%
<i>Medium Series</i>						
Toowoomba Regional Council	167,500	180,052	198,591	220,571	244,340	2.0%
Darling Downs Region	266,832	284,575	309,754	338,001	368,114	1.7%
Queensland	4,703,979	5,092,858	5,588,617	6,090,548	6,592,857	1.8%
<i>High Series</i>						
Toowoomba Regional Council	169,439	185,039	208,599	236,385	266,496	2.4%
Darling Downs Region	265,019	287,661	320,045	356,199	394,685	2.1%
Queensland	4,765,648	5,258,395	5,905,027	6,576,674	7,267,636	2.2%

Note: The base year for the projections is 2011.

Source: OESR (2012)

3 INDUSTRIAL LAND SUPPLY IN TOOWOOMBA REGIONAL COUNCIL

GHD Pty Ltd conducted an inventory of the remaining available zoned industrial land within Toowoomba Regional Council in August 2012, with estimates compared to those compiled by GHD Pty Ltd in 2009.

In 2012, there were 1,857.6 hectares of remaining zoned industrial land within Toowoomba Regional Council, comprising:

- 78.5 hectares in Toowoomba (increase of 0.5 hectares since 2009);
- 28.0 hectares in Crow's Nest (decrease of 0.4 hectares since 2009);
- 14.2 hectares in Rosalie (decrease of 7.3 hectares since 2009);
- 1,553.7 hectares in Jondaryan (decrease of 188.2 hectares);
- 141.3 hectares in Millmerran (decrease of 27.5 hectares);
- 29.9 hectares in Pittsworth (increase of 10.8 hectares since 2009);
- 11.9 hectares in Clifton (decrease of 16.1 hectares since 2009).

Between 2009 and 2012, there has been a 228.2 hectare decline in the availability of zoned industrial land within Toowoomba Regional Council, with the largest declines in the Charlton Wellcamp Regional Industry Zone (decrease of 85.6 hectares) and Oakey (decrease of 71.2 hectares).

Both the Toowoomba and Pittsworth sub-regions recorded an increase in the availability of industrial land, as a result of additional parcels rezoned to industrial within Wilsonton / Torrington and the locality of Pittsworth.

Table 3.1 below summarises the remaining zoned industrial land supply within Toowoomba Regional Council by industrial area in 2009 and 2012.

Table 3.1: Remaining Zoned Industrial Land Supply, Toowoomba Regional Council

Planning Area	2009 Study Estimates	2012 Study Estimates	Difference
Toowoomba			
Harristown / Drayton	25.7	17.8	-8.0
Harlaxton	20.0	7.6	-12.4
Cranley	17.7	-	-17.7
Wilsonton / Torrington	43.9	53.1	9.2
Inner City North and South	1.3	0.1	-1.2
Total	78.1	78.5	0.5
Crow's Nest			
Meringandan	27.4	21.3	-6.1
Crow's Nest	1.0	6.7	5.7
Total	28.4	28.0	-0.4
Rosalie			
Yarraman	6.0	1.1	-4.9
Goombungee	0.8	-	-0.8
Quinalow	0.2	-	-0.2
Kingsthorpe	14.5	13.1	-1.4
Total	21.5	14.2	-7.3
Jondaryan			
Oakey	154.5	83.3	-71.2
Charlton Wellcamp Regional Industry Zone	1,556.0	1,470.4	-85.6
Other	0.8	-	-0.8
Total	1,741.9	1,553.7	-188.2
Millmerran			
Millmerran	148.4	141.3	-7.1
Cecil Plains	20.4	-	-20.4
Total	168.8	141.3	-27.5
Pittsworth			
Pittsworth	7.0	29.9	23.0
Brookstead	5.6	-	-5.6
Southbrook	0.1	-	-0.1
Other	6.4	-	-6.4
Total	19.1	29.9	10.8
Clifton			
Clifton	28.0	11.9	-16.1
Total	28.0	11.9	-16.1
Toowoomba RC Total	2,085.8	1,857.6	-228.2

Source: GHD Inventory

4 PROPERTY MARKET OVERVIEW

This section provides an overview of vacant industrial property sales within Toowoomba Regional Council and each former local government area. Consultation findings in relation to the industrial market in Toowoomba Regional Council are summarised in Appendix A.

4.1 Total Vacant Industrial Property Sales

Between 2002 and 2011, there were 587 vacant industrial property sales in Toowoomba Regional Council, including:

- 352 sales in Toowoomba;
- 119 sales in Jondaryan;
- 31 sales in Millmerran;
- 25 sales in Crow's Nest;
- 23 sales in Pittsworth;
- 17 sales in Clifton;
- 13 sales in Rosalie; and
- Seven sales in Cambooya.

On average, there were 59 vacant industrial property sales per year between 2002 and 2011 in Toowoomba Regional Council with the number of vacant industrial property sales peaking in 2004 at 89 sales.

The total land area occupied by vacant industrial land property sales within Toowoomba Regional Council between 2002 and 2011 was 300.4 hectares, representing a purchase rate of 30.0 hectares per annum. The five year average purchase rate in Toowoomba Regional Council was lower at 25.7 hectares per annum. Within Toowoomba Regional Council the five year average purchase rate was:

- 13.4 hectares in Toowoomba;
- 5.3 hectares in Jondaryan;
- 3.1 hectares in Millmerran;
- 1.1 hectares in Crow's Nest;
- 1.1 hectares in Pittsworth;
- 0.8 hectares in Clifton;
- 0.6 hectares in Rosalie; and
- 0.4 hectares in Cambooya.

Table 4.1: Total Vacant Industrial Property Sales and Areas (Hectares), Toowoomba Regional Council, 2002 to 2011

	Toowoomba Regional Council		Toowoomba		Jondaryan		Millmerran		Crow's Nest		Pittsworth		Clifton		Rosalie		Cambooya	
	No.	Total Area	No.	Total Area	No.	Total Area	No.	Total Area	No.	Total Area	No.	Total Area	No.	Total Area	No.	Total Area	No.	Total Area
2002	50	17.9	36	5.6	4	3.2	6	6.9	1	0.3	0	0.0	2	1.3	1	0.6	0	0.0
2003	72	30.9	54	18.4	12	9.0	2	1.5	2	1.8	1	0.1	0	0.0	0	0.0	1	0.1
2004	89	44.9	50	17.7	24	19.6	4	5.4	5	1.0	3	0.7	2	0.3	0	0.0	1	0.3
2005	78	36.2	34	9.1	19	11.2	3	2.5	8	1.6	3	0.4	4	1.7	6	3.6	1	6.1
2006	67	41.9	38	19.4	15	9.7	5	7.3	1	4.0	6	1.1	1	0.2	1	0.2	0	0.0
2007	73	37.0	47	23.1	16	6.4	2	4.5	2	0.3	2	0.3	2	1.1	1	1.1	1	0.1
2008	46	33.0	29	16.5	6	4.1	2	1.2	3	4.6	2	3.4	3	1.8	0	0.0	1	1.4
2009	49	21.4	29	8.3	9	7.0	4	4.0	2	0.2	2	0.5	2	0.9	1	0.7	0	0.0
2010	31	15.4	20	7.9	7	6.7	0	0.0	0	0.0	1	0.4	1	0.2	1	0.2	1	0.1
2011	32	21.8	15	11.4	7	2.2	3	5.6	1	0.2	3	0.9	0	0.0	2	1.0	1	0.5
Ten Year Average (2002-11)	59	30.0	35	13.7	12	7.9	3	3.9	3	1.4	2	0.8	2	0.8	1	0.7	1	0.9
Five Year Average (2007-11)	46	25.7	28	13.4	9	5.3	2	3.0	2	1.1	2	1.1	2	0.8	1	0.6	1	0.4

Source: Property Data Solutions

4.2 Net Vacant Industrial Property Sales

To determine the take-up rate of vacant industrial land in Toowoomba Regional Council, properties which had previously been sold (resales) were subtracted from total sales to determine net industrial land sales.

There were 186 net vacant industrial property sales (i.e. sales exclusive of resales) in Toowoomba Regional Council between 2002 and 2011, including

- 95 net sales in Toowoomba;
- 47 net sales in Jondaryan;
- 10 net sales in Millmerran;
- 12 net sales in Crow's Nest;
- Seven net sales in Pittsworth;
- Seven net sales in Clifton;
- Five net sales in Rosalie; and
- Three net sales in Cambooya.

The take-up rate of vacant industrial property within Toowoomba Regional Council between 2002 and 2011 was 12.9 hectares per annum.

In the five years to 2011, the take-up rate of vacant industrial property sales was lower at 8.7 hectares per annum in Toowoomba Regional Council. Within Toowoomba Regional Council, the five year average take-up rate of vacant industrial property was:

- 5.1 hectares per annum in Toowoomba;
- 1.3 hectares per annum in Jondaryan;
- 0.7 hectares per annum in Millmerran;
- 0.0 hectares per annum in Crow's Nest;
- 0.7 hectares in Pittsworth;
- 0.3 hectares in Clifton;
- 0.2 hectares in Rosalie; and
- 0.3 hectares in Cambooya.

Table 4.2 below summarises net industrial property sales within Toowoomba Regional Council between 2002 and 2011.

Table 4.2: Net Industrial Property Sales and Areas (Hectares), Toowoomba Regional Council, 2002 to 2011

	Toowoomba Regional Council		Toowoomba		Jondaryan		Millmerran		Crow's Nest		Pittsworth		Clifton		Rosalie		Cambooya	
	No.	Total Area	No.	Total Area	No.	Total Area	No.	Total Area	No.	Total Area	No.	Total Area	No.	Total Area	No.	Total Area	No.	Total Area
2002	18	6.9	10	1.7	3	2.8	3	0.7	0	0.0	0	0.0	1	1.1	1	0.6	0	0.0
2003	24	14.2	16	10.2	5	2.8	1	0.2	1	0.9	1	0.1	0	0.0	0	0.0	0	0.0
2004	35	25.6	14	8.7	11	12.8	2	2.6	4	0.8	1	0.2	2	0.3	0	0.0	1	0.3
2005	27	18.1	4	0.7	11	8.3	0	0.0	5	1.1	1	0.2	2	1.0	3	0.8	1	6.1
2006	23	21.1	14	9.4	5	3.2	1	4.0	1	4.0	2	0.4	0	0.0	0	0.0	0	0.0
2007	15	7.5	11	5.7	3	0.7	0	0.0	0	0.0	0	0.0	0	0.0	1	1.1	0	0.0
2008	15	9.1	8	1.7	2	1.1	1	0.2	0	0.0	1	3.3	2	1.4	0	0.0	1	1.4
2009	12	7.9	6	2.8	3	1.9	2	3.2	1	0.1	0	0.0	0	0.0	0	0.0	0	0.0
2010	10	9.0	7	6.3	2	2.4	0	0.0	0	0.0	1	0.4	0	0.0	0	0.0	0	0.0
2011	7	9.8	5	9.2	2	0.6	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Ten Year Average (2002-11)	19	12.9	10	5.6	5	3.7	1	1.1	1	0.7	1	0.5	1	0.4	1	0.2	0	0.8
Five Year Average (2007-11)	12	8.7	7	5.1	2	1.3	1	0.7	0	0.0	0	0.7	0	0.3	0	0.2	0	0.3

Source: Property Data Solutions

5 RESOURCE SECTOR DEVELOPMENT PIPELINE

5.1 Operating Mines

Tables 5.1 to 5.3 provide a summary of the existing coal, mineral, coal seam gas, conventional petroleum and gas operations within the Darling Downs regional plan area.

5.1.1 Coal and Mineral Operations

There were five coal mines identified within the Darling Downs regional plan area, namely:

- Cameby Downs;
- Commodore;
- Kogan Creek;
- New Acland; and
- Wilkie Creek.

These mines are all open-cut thermal coal mines. In 2010-11, saleable coal production at these five mines was 12.0 million tonnes, accounting for 6.7% of total saleable coal production in Queensland.

There were four mineral operations identified within the Darling Downs regional plan area, producing bentonite, limestone and silver. Three of the four operations were owned by Unimin Australia Limited.

5.1.2 Coal Seam Gas Operations

There were sixteen coal seam gas operations identified within the Darling Downs regional plan area, with the majority located within Western Downs Regional Council. Estimated production of coal seam gas within Western Downs Regional Council is 219.4PJ per annum, with production highest at Fairview and Talinga.

5.1.3 Conventional Petroleum and Gas Operations

There were three conventional petroleum and gas operations identified within the Darling Downs regional plan area, with activity predominately within Maranoa Regional Council. Estimated production in the six months to December 2009 was:

- 7.3ML of condensate;
- 6.7ML of oil;
- 86M m³ of gas; and
- 11.9ML of LPG.

Table 5.1: Coal and Mineral Operations, Darling Downs Regional Plan Area

Mine	Company	Sedimentary Basin	2010-11 Production (Mt)	Local Authority	Est. Employment
<i>Coal Operations</i>					
Cameby Downs open-cut	Syntech Resources Pty Ltd	Surat	0.5	Western Downs Regional Council	131
Commodore open-cut	Millmerran Operating Company Pty Ltd	Clarence - Moreton	3.4	Toowoomba Regional Council	77
Kogan Creek open-cut	CS Energy Ltd	Surat	2.5	Western Downs Regional Council	80
New Acland open-cut	New Hope Corporation Ltd	Surat	4.5	Toowoomba Regional Council	316
Wilkie Creek open-cut	Peabody Energy Australia Pty Ltd	Surat	1.1	Western Downs Regional Council	655
<i>Mineral Operations</i>					
Gurulmundi	Unimin Australia Limited	Bentonite	n.a.	Western Downs Regional Council	22
Riverton	Unimin Australia Limited	Limestone	n.a.	Southern Downs Regional Council	22
Twin Hills	Alcyone Resources Ltd	Silver	n.a.	Goondiwindi Regional Council	n.a.
Elbow Valley, Warwick	Unimin Australia Limited	Limestone	n.a.	Southern Downs Regional Council	23

Source: DEEDI (2011a) - Southern Queensland Mining, Petroleum and Energy Operations, Mining & Safety (2012) - Coal Industry Review Statistical Tables, 2010-11

Table 5.2: Coal Seam Gas Operations, Darling Downs Regional Plan Area

Mine	Company	Sedimentary Basin	2P Reserves	Gas (PJ)	Groundwater Extraction (ML)	Local Authority
Argyle	Queensland Gas Company (BG Group)	Surat	120.2	4.68	532.15	Western Downs Regional Council
Argyle East	Queensland Gas Company (BG Group)	Surat	57.3	1.39	277.14	Western Downs Regional Council
Bellevue	Queensland Gas Company (BG Group)	Surat	216.9	2.88	369.23	Western Downs Regional Council
Berwyndale	Queensland Gas Company (BG Group)	Surat	313.8	0.15	33.96	Western Downs Regional Council
Berwyndale South	Queensland Gas Company (BG Group)	Surat	330	33.5	1290.86	Western Downs Regional Council
Codie / Lauren	Queensland Gas Company (BG Group)	Surat	549.1	7.46	452.42	Western Downs Regional Council
Roma OA	Santos Ltd	Surat	1480	0.13	256.62	Maranoa Regional Council
Daandine	Arrow Energy Limited	Surat	349.6	12.87	1003.2	Western Downs Regional Council
Fairview	Santos Ltd	Bowen	2901	44.08	3690.57	Banana, Maranoa and Western Downs Regional Councils
Kenya	Queensland Gas Company (BG Group)	Surat	448.4	5.46	799.52	Western Downs Regional Council
Kogan North	Arrow Energy Limited	Surat	185.8	4.05	626.54	Western Downs Regional Council
Peat	Origin Energy Limited	Bowen	133.4	3.43	11.25	Western Downs Regional Council
Scotia	Santos Ltd	Bowen	244.6	10.32	n.a.	Western Downs Regional Council
Spring Gully	Origin Energy Limited	Bowen	1616.4	49	1891.04	Banana, Maranoa and Western Downs Regional Councils
Talinga	Origin Energy Limited	Surat	567	30.07	2398.68	Western Downs Regional Council
Tipton West	Arrow Energy Limited	Surat	626.6	9.93	1460.77	Toowoomba and Western Downs Regional Councils

Source: DEEDI (2011a) - Southern Queensland Mining, Petroleum and Energy Operations

Table 5.3: Conventional Petroleum and Gas Operations, Darling Downs Regional Plan Area

Company	Sedimentary Basin	Number of Wells	6 month Production to December 2009 (Condensate, Oil, Gas and LPG)	Local Authority
Mosaic Oil NL	Bowen / Surat	25	4.5ML (C)	Maranoa Regional Council
	Bowen / Surat	15	2.7ML (O)	Maranoa Regional Council
	Bowen / Surat	26	33Mm ³ (G)	Maranoa Regional Council
Origin Energy Ltd	Bowen / Surat	26	5ML (LPG)	Maranoa Regional Council
	Bowen / Surat	39	2.8ML (C)	Maranoa Regional Council
	Bowen / Surat	38	31Mm ³ (G)	Maranoa Regional Council
	Bowen / Surat	38	6.9ML (LPG)	Maranoa Regional Council
Santos Ltd	Bowen / Surat	24	4ML (O)	Banana and Maranoa Regional Councils
	Bowen / Surat	81	22Mm ³ (G)	Banana and Maranoa Regional Councils

Note: C – condensate, O – oil, G – gas, LPG – liquid petroleum gas

Source: DEEDI (2011a) - Southern Queensland Mining, Petroleum and Energy Operations

5.2 Development Projects

Table 5.4 below provides a summary of the coal, mineral and energy development projects within the Darling Downs regional plan area.

5.2.1 Coal and Mineral Projects

There were ten coal development projects identified within the Darling Downs regional plan area, with potential run of mine coal production ranging between three and 30 million tonnes per annum. The majority of coal development projects are within Western Downs Regional Council. Estimated employment at the construction and operational phase is available for eight of the ten mines. Total estimated construction employment is 3,100 persons, with operational employment similar at 3,082 persons.

There was one mineral project identified within the Darling Downs regional plan area, but it is currently on hold.

5.2.2 Energy Projects

There were thirteen energy projects identified within the Darling Downs regional plan area. Employment estimates were available for ten of the thirteen projects, which suggested total employment of 5,814 persons during the construction period and 2,972 persons employed during the operational phase.

Table 5.4: Coal and Energy Development Projects, Darling Downs Regional Plan Area

Project	Company	Status	Expected Start-Up	Cost	Capacity (per annum)	Local Authority	Employment Cons	Ops
<i>Coal Development Projects</i>								
Bundi underground	MetroCoal	New project, EIS underway	2015	n.a.	6.5Mt thermal ROM	Western Downs Regional Council	300	150
Cameby Downs open-cut	Yancoal Australia	Expansion, EIS underway	2014	n.a.	total 16Mt thermal ROM	Western Downs Regional Council	100	550
Elimatta open-cut	New Hope Coal	New project, EIS underway	2014-15	\$615 million	up to 5Mt thermal ROM	Western Downs Regional Council	400	300
Horse Creek open-cut	Peabody Energy	New project, feasibility study underway	2013	n.a.	5Mt thermal ROM	Western Downs Regional Council	n.a.	n.a.
New Acland open-cut, Stage 3	New Hope Coal	Expansion, EIS underway	2014	\$500 million	additional 5.2Mt thermal ROM (new total capacity of 10Mt thermal ROM)	Toowoomba Regional Council	225	450
Norwood underground	MetroCoal	New project, EIS underway	2015	n.a.	6.5Mt thermal ROM	Western Downs Regional Council	300	150
The Range	Stanmore Coal	New project, EIS underway	2014	\$500 million	5Mt thermal ROM	Western Downs Regional Council	300	500
Wandoan open-cut	Xstrata / Itochu / Sumisho Coal	New project, EIS completed	2013	\$1900 million	30Mt thermal ROM	Western Downs Regional Council	1,375	844
Wilkie Creek open-cut	Peabody Energy	Expansion, Mining Lease application	2013	\$30 million	7.7Mt thermal ROM	Western Downs Regional Council	n.a.	58
Woori (Guluguba) open-cut	Cockatoo Coal	New project, EIS underway	2013	n.a.	3-4Mt thermal ROM	Western Downs Regional Council	100	80
<i>Mineral Development Projects</i>								
Anduramba Molybdenum	Archer Resources (subsidiary of D'Aguilar Gold)	New project, on hold	n.a.	\$86 million	950t Mo, 0.14kt Cu	Toowoomba Regional Council	n.a.	55
<i>Energy Development Projects</i>								
Australian Pacific LNG (Field Development)	Origin Energy / ConocoPhillips	New project, government approval received	2013	\$220 million	n.a.	Western Downs Regional Council	750	600
Braemar Power Station Stage 3	ERM Power	New project	2015	\$550 million	520MW	Western Downs Regional Council	550	200
Gladstone LNG Stage 1 & 2 (Field Development)	Santos / Petronas / Total	New project, government approval received	2013	\$230 million	n.a.	Western Downs Regional Council	745	684
Ironbark CSG Project	Origin Energy	New project, EIS underway	2014	\$1500 million	18-22 PJ per annum	Western Downs Regional Council	200	40
Kogan Creek Power Station Stage 2	CS Energy	New project	2015	\$805-\$1035 million	750MW	Maranoa Regional Council	419	139
Micro LNG plant	BOC	New project, awaiting government approval	2011	\$100 million	20kt LNG	Western Downs Regional Council	n.a.	n.a.
Queensland Curtis LNG Project (Field Development)	Queensland Gas Company (BG Group)	New project, government approval received	2013	\$230 million	n.a.	Western Downs Regional Council	1,750	350
Queensland-Hunter Gas Pipeline	Hunter Gas Pipeline	New project, government approval received	2013	\$800 million	85PJ	Balonne Shire Council, Goondiwindi and Maranoa Regional Councils	600	25
Spring Gully Power Station 1&2	Origin Energy	New project, on hold	2015-18	\$1000 million	500MW	Maranoa Regional Council	200	34
Sunstate Gas to Liquids Project Stage 1 and 2	Energy Infrastructure and Resources Pty Ltd & Direct Invest	New project, feasibility study underway	2013-15	\$250 million	6M barrels per annum	Western Downs Regional Council	100	100
Surat Basin to Gladstone pipeline	Arrow Energy	New project, awaiting government approval	2016-17	\$600 million	180-360PJ	Western Downs Regional Council	n.a.	n.a.
Surat Gas Project (Field Development)	Arrow Energy	New project, EIS underway	2016-18	\$900 million	180-360PJ	Western Downs Regional Council	500	800
Wandoan Power Station	GE Energy and Stanwell Corporation	New project	2015	n.a.	510MW	Western Downs Regional Council	n.a.	n.a.

Note: Mo - Molybdenum, Cu - Copper

Source: DEEDI (2011b) Southern Queensland Mining and Energy Development Projects

5.3 Advanced Exploration Projects

Tables 5.5 and 5.6 below provide a summary of the coal, mineral and energy development projects at the advanced exploration stage within the Darling Downs regional plan area.

5.3.1 Coal and Mineral Exploration Projects

There were 21 coal projects identified as being at the advanced exploration stage within the Darling Downs regional plan area. The majority of coal exploration projects were located within the Surat Basin within Western Downs Regional Council. Of these 21 projects, there are currently seven on hold.

There were two mineral projects identified as being at the advanced exploration phase within the Darling Downs regional plan area. The minerals identified are silver, gold, lead, zinc and sodium bicarbonate.

5.3.2 Coal Seam Gas, Natural Gas and Oil Exploration Projects

There are currently 16 coal seam gas, natural gas and oil exploration projects identified within the Darling Downs regional plan area. The majority of these projects are located within the Surat Basin.

Table 5.5: Advanced Coal and Mineral Exploration Projects, Darling Downs Region

Project	Company	Sedimentary Basin	Status	Resource	Local Authority
<i>Advanced Coal Exploration Projects</i>					
Bentley	Liberty Resources	Surat	Mineral Development License Application	100Mt inferred	Western Downs Regional Council
Bottle Tree	Cockatoo Coal Limited	Surat	Mineral Development License Application	29.5Mt indicated, 5.7Mt inferred	Western Downs Regional Council
Bringalily	Newmont Pacific Energy	Clarence - Moreton	On hold	235Mt inferred	Toowoomba Regional Council
Bushranger	Cockatoo Coal Limited	Surat	Mineral Development License Application	n.a.	Western Downs Regional Council
Collingwood	Cockatoo Coal Limited	Surat	Mineral Development License Application	64.5Mt indicated, 172.4Mt inferred	Western Downs Regional Council
Columboola	Metrocoal Limited	Surat	Exploration continuing	540Mt inferred	Western Downs Regional Council
Cowangah	Xstrata Coal	Surat	Mineral Development License Application	~700Mt inferred	Banana and Western Downs Regional Councils
Davies Road	Cockatoo Coal Limited	Surat	Mineral Development License Application	75.6Mt inferred	Western Downs Regional Council
Denison	Liberty Resources	Surat	Mineral Development License Application	1,467Mt inferred	Maranoa Regional Council
Glen Wilga	Tarong Energy Corporation	Surat	On hold	132Mt measured, 30Mt inferred	Western Downs Regional Council
Goonalah	Liberty Resources	Surat	Mineral Development License Application	185Mt inferred	Western Downs Regional Council
Haystack Road	Tarong Energy Corporation	Surat	On hold	172Mt indicated	Western Downs Regional Council
Juandah	Metrocoal Limited	Surat	Mineral Development License Application	23Mt indicated, 149Mt inferred	Western Downs Regional Council
Krugers	Cockatoo Coal Limited	Surat	Drilling continuing	104.8Mt inferred	Western Downs Regional Council
Meeleebee	Xstrata Coal	Surat	Mineral Development License Application	~500Mt inferred	Western Downs Regional Council
Lochbar	Newmont Pacific Energy	Clarence - Moreton	On hold	44Mt inferred	Toowoomba Regional Council
Orazabah	Xstrata Coal	Surat	Mineral Development License Application	~500Mt inferred	Banana and Western Downs Regional Councils
Ownaview	KEPCO Australia Pty Ltd	Surat	On hold	171Mt inferred	Western Downs Regional Council
Rywwung	Yancoal Australia	Surat	On hold	30Mt measured, 35Mt indicated	Western Downs Regional Council
Sefton Park	Yancoal Australia	Surat	On hold	25Mt measured, 5Mt indicated	Western Downs Regional Council
Tin Hut Creek	Cockatoo Coal Limited	Surat	Drilling continuing	206.6Mt indicated, 137Mt inferred	Western Downs Regional Council
<i>Advanced Mineral Exploration Projects</i>					
Mount Gunyan	Alcyone Resources Limited	Silver, gold, lead and zinc	Updated JORC resource pending	2.1 Mt (indicated and inferred) at 73g/t Ag	Goondiwindi Regional Council
Grafton Range	Pacific Environ Limited	Sodium bicarbonate	Feasibility study underway	2.2Mt inferred	Maranoa Regional Council

Source: DEEDI (2011c) Southern Queensland Advanced Exploration Projects

Table 5.6: Advanced CSG, Natural Gas and Oil Exploration Projects, Darling Downs Regional Plan Area

Project	Company	Sedimentary Basin	Resource Target	Local Authority
Azure	Blue Energy	Surat	Natural gas and CSG	Maranoa Regional Council
Ballangarry	Blue Energy	Surat	Natural gas and CSG	Balonne Shire Council and Goondiwindi Regional Council
Bandanna	Bow Energy	Bowen and Surat	Natural gas and CSG	Maranoa Regional Council
Bellbird	Bounty Oil and Gas	Surat	Natural gas and CSG	Balonne Shire Council and Western Downs Regional Council
Cameron	Queensland Gas Company (BG Group)	Surat	Natural gas and CSG	Western Downs Regional Council
Derwent Park	Santos	Eromanga	Oil and natural gas	Maranoa Regional Council
Don Juan	Bow Energy	Surat	Natural gas and CSG	Maranoa Regional Council
Farawell	Bounty Oil and Gas	Surat	Natural gas and CSG	Maranoa, Goondiwindi and Western Downs Regional Council
Farmosa Downs and Redcap	Bounty Oil and Gas	Surat	Natural gas and CSG	Maranoa Regional Council
Hoadleys	Rawson Resources	Surat	Natural gas and CSG	Western Downs Regional Council
Lacerta	Queensland Gas Company (BG Group)	Surat	Natural gas and CSG	Maranoa Regional Council
Lydia	Icon Energy	Surat	Natural gas and CSG	Goondiwindi Regional Council
Matilda John	Queensland Gas Company (BG Group)	Surat	Natural gas and CSG	Western Downs Regional Council
Stratton	Oilex Ltd	Surat	Natural gas and CSG	Maranoa Regional Council
Weribone	AGL Energy / Origin Energy	Surat	Natural gas and CSG	Maranoa Regional Council
Woleebee Ck / Ross / Cam / Kathleen	Queensland Gas Company (BG Group)	Surat	Natural gas and CSG	Western Downs Regional Council

Source: DEEDI (2011c) Southern Queensland Advanced Exploration Projects

6 PROJECTED INDUSTRIAL LAND DEMAND

This section reports the projected industrial land demand within Toowoomba Regional Council based on various demand forecasting approaches, namely:

- Population based approach;
- Historical take-up approach;
- Employment demand approach; and
- Industry development approach.

Due to the differences in methodologies, different sub-areas had to be defined to facilitate more robust projections.

The population based approach and historical take-up approach both assess future industrial land demand by former local government area and Toowoomba Regional Council as a whole.

The employment demand approach is undertaken at the former local government area level, with the exception of Toowoomba and Jondaryan, which have been combined into a sub-area, because the urban form of Toowoomba City has spread into the former Jondaryan Shire. It is recognised that as Toowoomba becomes increasingly constrained, future industrial land demand will be increasingly met in the Jondaryan sub-region.

The industry development approach assesses future industrial land demand within the broader Darling Downs regional plan area, as while the majority of future coal and gas projects are located outside Toowoomba Regional Council, it is envisaged that the majority of future industrial land demand generated by these projects would be met within Toowoomba Regional Council.

When assessing industrial land demand, there are a number of industrial land definitions to consider, namely:

- *Net industrial land* – Net industrial land represents allotment demand, and as such makes no allowance for roads, services and open space;
- *Gross industrial land* – Gross industrial land demand is the total amount of land required for an industrial estate (including allowance for roads, services and open space), but does not make allowances for environmental constraints on site such as waterways, areas of high environmental value and slope; and
- *Raw industrial land* – Raw industrial land is the total amount of land required for an industrial estate, including the environmental constraints on-site.

The approaches produce varying industrial land demand estimates:

- Population based approach – produces raw industrial land demand estimates;
- Historical take-up approach – produces net industrial land demand estimates;
- Employment demand approach – produces net and gross industrial land demand estimates; and
- Industry development approach - produces net and gross industrial land demand estimates.

In the summary section of the report (Chapter 7), all estimates have been converted to raw industrial land demand in order to provide direct comparison between the approaches.

6.1 Population Based Approach

The population based approach assumes a direct relationship between population size and minimum provision of industrial land within a region.

There are a number of benchmarks for the amount of raw industrial land demand to be provided per 1,000 persons. The former Department of Business, Industry and Regional Development (DBIRD, 1995) identified that a minimum of 2.2 hectares to 3.0 hectares of raw land per 1,000 persons should be provided as a minimum.

Applying this range to the high series population projection estimates by former local government area (2012-2031) suggests that there is demand for an additional 213.5 to 291.2 hectares of raw industrial land (1.2ha/annum to 15.3ha/annum) within Toowoomba Regional Council, comprising:

- 89.6 to 122.1 hectares in Toowoomba (4.7ha/annum to 6.4ha/annum);
- 46.2 to 63.0 hectares in Crow's Nest (2.4ha/annum to 3.3ha/annum);
- 15.8 to 21.5 hectares in Rosalie (0.8ha/annum to 1.1ha/annum);
- 33.0 to 45.1 hectares in Jondaryan (1.7ha/annum to 2.4ha/annum);
- 2.8 to 3.8 hectares in Pittsworth (0.1ha/annum to 0.2ha/annum);
- 6.2 to 8.4 hectares in Clifton (0.3ha/annum to 0.4ha/annum);
- 1.4 to 2.0 hectares in Rosalie (0.1ha/annum); and
- 18.6 to 25.3 hectares in Cambooya (1.0ha/annum to 1.3ha/annum).

Table 6.1: Projected Raw Industrial Land Demand (hectares), Toowoomba Regional Council, 2012-2031

	2012	2016	2021	2026	2031	Incremental Demand, 2012-2031
Estimated Raw Land Demand (2.2 ha / 1,000 persons)						
Toowoomba	226.8	239.6	261.9	288.1	316.3	89.6
Crow's Nest	39.0	46.5	56.5	69.8	85.2	46.2
Rosalie	24.6	27.5	31.5	35.8	40.4	15.8
Jondaryan	37.6	43.2	51.7	61.0	70.7	33.0
Millmerran	7.8	8.4	9.1	9.8	10.6	2.8
Pittsworth	12.4	13.6	15.1	16.8	18.6	6.2
Clifton	7.1	7.4	7.8	8.2	8.5	1.4
Cambooya	17.5	21.0	25.3	30.5	36.1	18.6
Total	372.8	407.1	458.9	520.0	586.3	213.5
Estimated Raw Land Demand (3 ha / 1,000 persons)						
Toowoomba	309.2	326.7	357.1	392.8	431.3	122.1
Crow's Nest	53.2	63.4	77.0	95.2	116.2	63.0
Rosalie	33.5	37.5	42.9	48.9	55.0	21.5
Jondaryan	51.3	58.9	70.5	83.2	96.4	45.1
Millmerran	10.6	11.5	12.4	13.4	14.4	3.8
Pittsworth	16.9	18.5	20.7	22.9	25.3	8.4
Clifton	9.6	10.1	10.6	11.1	11.6	2.0
Cambooya	23.9	28.6	34.5	41.7	49.2	25.3
Total	508.3	555.1	625.8	709.2	799.5	291.2

Note: Calculations based on OESR (2012) high series population projections

6.2 Historical Take-Up Approach

The historical take-up approach considers the net take-up (total industrial land sales less resales) of industrial land within a region. While results have been presented for each of the former local government areas within Toowoomba Regional Council, the results are best considered only at the Toowoomba Regional Council level. A number of industrial land markets within Toowoomba Regional Council are quite small, with limited options for industrial land businesses. For example, an industrial land business may be looking to locate within Millmerran, but due to the lack of suitable industrial allotments may ultimately locate elsewhere in Toowoomba Regional Council, such as in Pittsworth or even Toowoomba.

As outlined in Chapter 5, the five year average annual take-up of industrial land within Toowoomba Regional Council was 8.7 hectares per annum, comprising:

- 5.1 hectares per annum in Toowoomba;
- 1.3 hectares per annum in Jondaryan;
- 0.7 hectares per annum in Millmerran;
- 0.0 hectares per annum in Crow's Nest;
- 0.7 hectares in Pittsworth;
- 0.3 hectares in Clifton;
- 0.2 hectares in Rosalie; and
- 0.3 hectares in Cambooya.

The ten year average annual take-up of industrial land within Toowoomba Regional Council was 12.9 hectares per annum, comprising:

- 5.6 hectares per annum in Toowoomba;
- 3.7 hectares per annum in Crow's Nest;
- 1.1 hectares per annum in Rosalie;
- 0.7 hectares per annum in Jondaryan;
- 0.5 hectares per annum in Millmerran;
- 0.4 hectares per annum in Pittsworth;
- 0.2 hectares per annum in Clifton; and
- 0.8 hectares per annum in Cambooya.

Based on the ten year average take-up rate, net incremental industrial land demand would increase to 245.4 hectares by 2031, comprising:

- 106.9 hectares in Toowoomba;
- 13.1 hectares in Crow's Nest;
- 4.6 hectares in Rosalie;
- 69.6 hectares in Jondaryan;
- 20.8 hectares in Millmerran;
- 8.6 hectares in Pittsworth;

- 7.2 hectares in Clifton; and
- 14.7 hectares in Cambooya.

Table 6.2: Historical Take-Up Rates and Estimated Incremental Industrial Land Demand, Toowoomba Regional Council (hectares)

	Take-up Rate (ha/annum)	2016	2021	2026	2031
Ten Year Average take-up rate					
Toowoomba	5.6	22.5	50.6	78.8	106.9
Crow's Nest	0.7	2.8	6.2	9.6	13.1
Rosalie	0.2	1.0	2.2	3.4	4.6
Jondaryan	3.7	14.6	33.0	51.3	69.6
Millmerran	1.1	4.4	9.9	15.3	20.8
Pittsworth	0.5	1.8	4.1	6.3	8.6
Clifton	0.4	1.5	3.4	5.3	7.2
Cambooya	0.8	3.1	6.9	10.8	14.7
Toowoomba Regional Council	12.9	51.7	116.3	180.8	245.4
Five Year Average take-up rate					
Toowoomba	5.1	20.5	46.1	71.7	97.4
Crow's Nest	0.0	0.1	0.1	0.2	0.3
Rosalie	0.2	0.9	1.9	3.0	4.0
Jondaryan	1.3	5.3	12.0	18.7	25.3
Millmerran	0.7	2.7	6.0	9.4	12.7
Pittsworth	0.7	2.9	6.6	10.3	14.0
Clifton	0.3	1.1	2.6	4.0	5.4
Cambooya	0.3	1.1	2.5	3.9	5.3
Toowoomba Regional Council	8.7	34.6	77.9	121.2	164.5

Source: Economic Associates estimates based on PDS Live data

6.3 Employment Demand Approach

In the employment demand approach, Toowoomba and Jondaryan have been considered as a combined area rather than separately. This has been done as Toowoomba currently faces supply constraints, particularly for large footprint industrial businesses, meaning industrial businesses will increasingly choose to locate within Jondaryan, predominately within the Charlton Wellcamp industrial area.

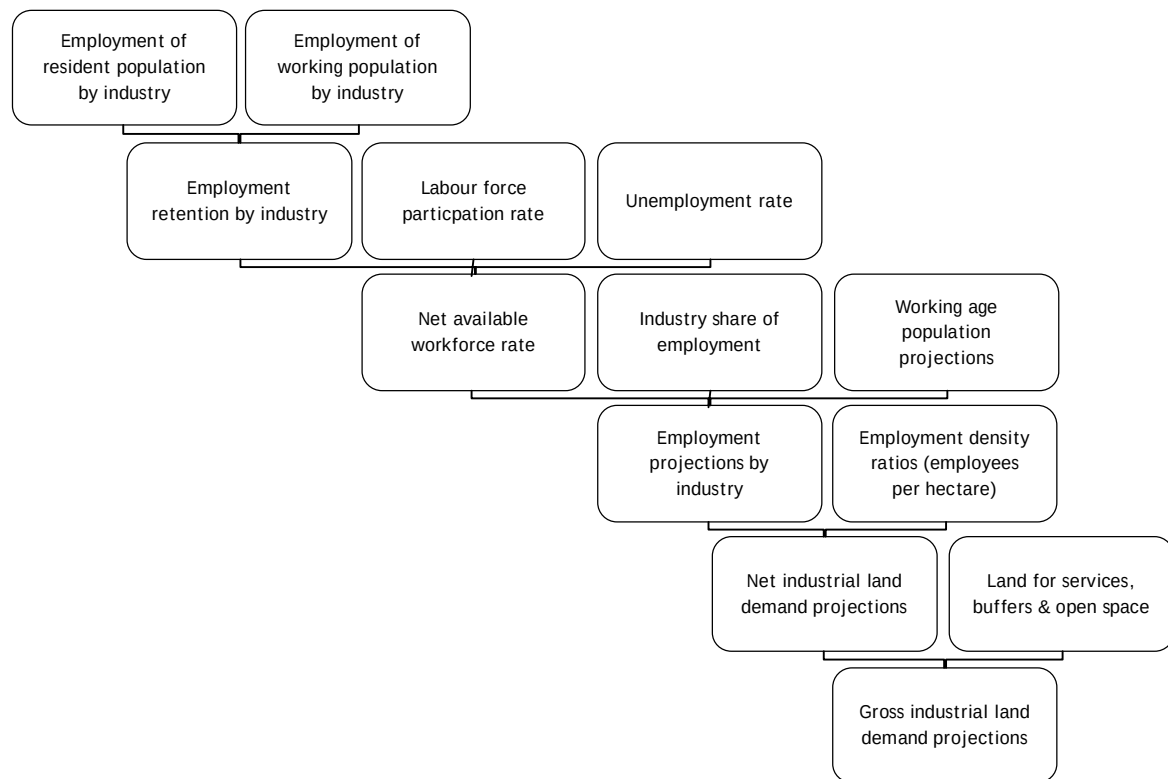
As with the population based approach, the high series population projections have been utilised in preparing the analysis for consistency.

Previous industrial land demand estimates prepared for Toowoomba Regional Council utilised the NIEIR employment projections. These projections appeared to only grow the size of the economy, but did not consider structural change.

This section of the report provides summary results for Toowoomba Regional Council. Detailed estimates for each of the sub-regions within Toowoomba Regional Council are contained within Appendix B.

Figure 6.1 below summarises the methodology applied for the employment demand approach.

Figure 6.1: Methodology for preparing industrial land demand projections



6.4 Assumptions

6.4.1 Working Age Population

Working age population projections are based on the high series projections released by OESR (2012). The working age population within Toowoomba Regional Council is projected to increase from 109,605 persons in 2012 to 160,169 persons in 2031, or by 2.0% per annum. The rate of population growth within the working age cohort is projected to be highest in Cambooya (3.7% per annum) and Crow's Nest (3.6% per annum).

Table 6.3: Projected Size of Working Age Population, 2012-2031

	2012	2016	2021	2026	2031	Ave. Ann. Growth, 2012-31
Total Population						
Toowoomba / Jondaryan	120,183	128,520	142,537	158,656	175,913	2.0%
Crow's Nest	17,731	21,134	25,677	31,722	38,734	4.2%
Rosalie	11,171	12,504	14,311	16,294	18,342	2.6%
Millmerran	3,548	3,818	4,145	4,475	4,806	1.6%
Pittsworth	5,627	6,169	6,884	7,635	8,434	2.2%
Clifton	3,215	3,362	3,539	3,717	3,865	1.0%
Cambooya	7,964	9,533	11,507	13,886	16,402	3.9%
Toowoomba Regional Council	169,439	185,039	208,599	236,385	266,496	2.4%

	2012	2016	2021	2026	2031	Ave. Ann. Growth, 2012-31
15-64 Population						
Toowoomba / Jondaryan	78,483	82,177	89,302	98,135	108,137	1.7%
Crow's Nest	11,007	12,695	14,779	17,857	21,409	3.6%
Rosalie	7,211	7,990	8,942	9,912	10,774	2.1%
Millmerran	2,204	2,339	2,440	2,546	2,644	1.0%
Pittsworth	3,533	3,839	4,208	4,440	4,655	1.5%
Clifton	1,991	2,092	2,150	2,199	2,251	0.6%
Cambooya	5,178	6,165	7,300	8,778	10,299	3.7%
Toowoomba Regional Council	109,605	117,298	129,121	143,868	160,169	2.0%

Source: OESR (2012)

6.4.2 Employment Trends

Precisely predicting employment levels into the future is difficult, because of the cyclical nature of economic activity and employment. As of the 2006 Census of Population and Housing¹, the 15-64 year unemployment rates within Toowoomba Regional Council were:

- Toowoomba / Jondaryan – 5.0%;
- Crow's Nest – 2.8%;
- Rosalie – 3.7%;
- Millmerran – 4.3%;
- Pittsworth – 4.3%;
- Clifton – 4.6%; and
- Cambooya – 3.0%.

Over the last three Censuses, the 15-64 year unemployment rates within Toowoomba Regional Council were:

- Toowoomba / Jondaryan – 7.0%;
- Crow's Nest – 4.5%;
- Rosalie – 5.7%;
- Jondaryan – 4.6%;
- Millmerran – 4.3%;
- Pittsworth – 4.3%;
- Clifton – 4.6%; and
- Cambooya – 4.4%.

For the purposes of this assessment, it has been assumed that the 15-64 year unemployment rates will trend upwards towards the longer term average by 2031. In the case of the Millmerran, Pittsworth and Clifton Planning Areas, where the 2006 Census unemployment level is lower than the long term average, unemployment has been kept constant at 2006 Census levels.

Table 6.4 below summarises the anticipated 15-64 year unemployment rates in Toowoomba Regional Council and its component planning areas between 2006 and 2031.

¹ 2011 Census 2nd release data to be available in October and November 2012.

Table 6.4: Anticipated Unemployment Rates, 2006-2031

	2006	2012	2016	2021	2026	2031
Toowoomba / Jondaryan	5.2%	5.5%	5.8%	6.2%	6.6%	7.0%
Crow's Nest	2.8%	3.2%	3.4%	3.8%	4.1%	4.5%
Rosalie	3.7%	4.2%	4.5%	4.9%	5.3%	5.7%
Millmerran	4.3%	4.3%	4.3%	4.3%	4.3%	4.3%
Pittsworth	4.3%	4.3%	4.3%	4.3%	4.3%	4.3%
Clifton	4.6%	4.6%	4.6%	4.6%	4.6%	4.6%
Cambooya	3.0%	3.3%	3.6%	3.8%	4.1%	4.4%

Source: Economic Associates estimates

The labour force participation rates for the 15-64 population as of the 2006 Census of Population and Housing were:

- Toowoomba / Jondaryan – 71.7%;
- Crow's Nest – 74.6%;
- Rosalie – 70.2%;
- Millmerran – 72.0%;
- Pittsworth – 76.1%;
- Clifton – 69.3%; and
- Cambooya – 76.4%.

It is anticipated that in the longer term, labour force participation rates are likely to increase by 10% in this age category, consistent with the upward trend witnessed in labour force participation rates between the 1996 and 2006 Censuses.

Table 6.5: Anticipated Labour Force Participation Rates, 2006-2031

	2006	2012	2016	2021	2026	2031
Toowoomba / Jondaryan	71.3%	73.4%	74.6%	76.0%	77.4%	78.9%
Crow's Nest	74.6%	76.4%	77.6%	79.1%	80.6%	82.1%
Rosalie	70.2%	71.9%	73.1%	74.5%	75.9%	77.3%
Millmerran	72.0%	73.7%	74.9%	76.3%	77.7%	79.2%
Pittsworth	76.1%	77.9%	79.1%	80.6%	82.2%	83.7%
Clifton	69.3%	71.0%	72.1%	73.5%	74.8%	76.2%
Cambooya	76.4%	78.3%	79.5%	81.0%	82.6%	84.1%

Source: Economic Associates estimates

6.4.3 Industry Sectors in Industrial Estates

Certain key industries tend to locate in industrial estates. The key industry sectors which are broadly considered to locate in industrial areas include:

- Manufacturing;
- Warehousing and storage services; and
- Wholesale trade.

Industrial activity can be classified into four main categories, these being:

- Large Footprint & General Industry: sheet metal fabrication, welding shops, food & beverage manufacturing, concrete product manufacturing, cement batching plants, large equipment or machinery repair, etc;
- Service Industry: construction services, printers, locksmiths, canvas repair, etc;
- Warehousing & Storage: landscape supplies, storage units, equipment hire, etc; and
- Transport uses: truck and agricultural machinery sales and servicing, road transport depots, tyre sales, etc.

The two digit ANZSIC classifications contained within each category are:

- Large Footprint & General Industry²:
 - Beverage & tobacco product manufacturing;
 - Food product manufacturing;
 - Wood product manufacturing;
 - Pulp, paper & converted paper product manufacturing;
 - Petroleum & coal product manufacturing;
 - Basic chemical & chemical product manufacturing;
 - Polymer product & rubber product manufacturing;
 - Non-metallic mineral product manufacturing;
 - Primary metal & metal product manufacturing;
 - Machinery & equipment manufacturing;
 - Fabricated metal product manufacturing;
 - Transport equipment manufacturing; and
 - Furniture and other manufacturing.
- Service Industry:
 - Textile, clothing, leather & footwear manufacturing;
 - Printing (including reproduction of recorded media);
 - Publishing (except internet & music publishing);
 - Construction services; and
 - Repair and Maintenance.
- Warehousing & Storage:
 - Basic material wholesaling;
 - Machinery & equipment wholesaling;
 - Motor vehicle & motor vehicle parts wholesaling;

² Typically the distinction between general industry and high impact or large footprint industry is based on the scale of a particular operation in addition to its industry classification. As such, they are grouped for the purposes of these demand projections.

- Grocery, liquor & tobacco product wholesaling;
- Other goods wholesaling; and
- Warehousing & storage services.
- Transport Uses:
 - Motor vehicle & motor vehicle parts retailing;
 - Road transport;
 - Rail transport;
 - Transport support services; and
 - Postal and courier pick-up and delivery services.

6.4.4 Industrial Employment Assumptions

In addition to anticipated unemployment levels and labour force participation, the employment modelling supporting this assessment makes a number of assumptions regarding:

- Jobs balance by industry sector: the ratio of employed persons by place of residence and employed persons by place of work; and
- Employment by industry sector: the percentage of the working population employed in particular industry sectors.

Employment Retention

It is intended that industrial activity within Toowoomba Regional Council is likely to expand over the next 19 years to 2031, particularly within Toowoomba / Jondaryan. For the purposes of this assessment it has been assumed that the jobs balance for industry sectors increases marginally in all areas.

Employment retention for all other industries has been assumed to remain constant.

Employment by Industry

The economic structure of Toowoomba Regional Council and its component sub-regions is expected to evolve throughout the projection period. These changes are likely to be gradual, however major developments may result in a significant restructuring of the economy. Assumptions made regarding the likely economic structural change within Toowoomba Regional Council and its component sub-regions have been based on regional planning intents, regional input-output tables, a review of recent development applications & approvals, major projects proposed for the region and the findings of field investigations.

Table 6.6 below provides a summary of the employment by industry structure between 2012 and 2031 within Toowoomba Regional Council.

Table 6.6: Projected Employment by Industry, Toowoomba Regional Council, 2012 to 2031

	2012	2016	2021	2026	2031
Agriculture, forestry and fishing	6.3%	6.4%	6.3%	6.2%	6.0%
Mining	0.6%	0.5%	0.5%	0.5%	0.5%
Manufacturing	11.0%	11.0%	11.1%	11.2%	11.3%
Electricity, gas, water and waste services	1.4%	1.6%	1.9%	2.2%	2.4%
Construction	5.8%	5.8%	5.9%	6.0%	6.1%
Wholesale trade	3.7%	3.8%	3.9%	3.9%	4.0%
Retail trade	13.2%	13.2%	13.3%	13.3%	13.4%
Accommodation and food services	5.8%	5.8%	5.9%	6.0%	6.0%
Transport, postal and warehousing	4.0%	4.1%	4.1%	4.2%	4.2%
Information media and telecommunications	1.2%	1.1%	1.1%	1.0%	1.0%
Financial and insurance services	3.2%	3.0%	2.8%	2.5%	2.3%
Rental, hiring and real estate services	1.5%	1.4%	1.3%	1.2%	1.1%
Professional, scientific and technical services	4.2%	4.2%	4.2%	4.2%	4.3%
Administrative and support services	1.6%	1.5%	1.4%	1.3%	1.2%
Public administration and safety	6.4%	6.4%	6.4%	6.4%	6.4%
Education and training	10.6%	10.6%	10.7%	10.7%	10.8%
Health care and social assistance	13.8%	13.8%	13.8%	13.9%	13.9%
Arts and recreation services	0.8%	0.8%	0.7%	0.6%	0.6%
Other services	4.2%	4.1%	4.0%	3.9%	3.8%
Inadequately described / not stated	0.8%	0.8%	0.7%	0.7%	0.7%
Total	71,228	76,583	85,301	96,035	108,210

Source: Economic Associates estimates

6.4.5 Projected Industrial Employment

Based on the above assumptions, employment in industrial sectors in the Toowoomba Regional Council is estimated to be 18,655 workers in 2012, comprising:

- 6,631 persons employed in large footprint & general industry;
- 4,887 persons employed in service industry;
- 2,598 persons employed in warehousing & storage;
- 3,606 persons employed in transport uses; and
- 933 persons employed in non-industrial land uses³.

By 2031, industrial employment within Toowoomba Regional Council is projected to increase to 30,230 workers, comprising:

- 10,640 persons employed in large footprint & general industry;
- 8,041 persons employed in service industry;
- 4,276 persons employed in warehousing & storage;
- 5,761 persons employed in transport uses; and
- 1,512 persons employed in non-industrial land uses.

Table 6.7 provides the detailed two digit employment projections within industrial sectors for Toowoomba Regional Council between 2012 and 2031.

³ This category incorporates workers within industrial estates who are not employed in industrial sectors (e.g. retail service employees).

Table 6.7: Employment Projections, Industrial Land Sectors, Toowoomba Regional Council, 2012-2031

Industry Type	2012	2016	2021	2026	2031
Large Footprint and General Industry					
Beverage and Tobacco Product Manufacturing	48	53	60	69	79
Food Product Manufacturing	2,504	2,721	3,081	3,525	4,036
Wood Product Manufacturing	633	691	783	893	1,018
Pulp, Paper and Converted Paper Product Manufacturing	28	29	30	32	34
Petroleum and Coal Product Manufacturing	0	0	0	0	0
Basic Chemical and Chemical Product Manufacturing	120	132	149	170	193
Polymer Product and Rubber Product Manufacturing	138	150	169	193	221
Non-Metallic Mineral Product Manufacturing	376	406	457	520	593
Primary Metal and Metal Product Manufacturing	390	423	478	544	620
Machinery and Equipment Manufacturing	873	949	1,076	1,231	1,410
Fabricated Metal Product Manufacturing	527	577	655	748	853
Transport Equipment Manufacturing	639	694	785	896	1,023
Furniture and Other Manufacturing	355	384	432	492	561
Subtotal	6,631	7,207	8,155	9,313	10,640
Service Industry					
Textile, Leather, Clothing and Footwear Manufacturing	352	382	432	494	565
Printing (including Reproduction of Recorded Media)	334	361	406	461	524
Publishing (except Internet and Music Publishing)	235	254	286	327	373
Construction Services	2,321	2,567	2,948	3,425	3,974
Repair and Maintenance	1,645	1,782	2,010	2,287	2,605
Subtotal	4,887	5,346	6,082	6,993	8,041
Warehousing & Storage					
Basic Material Wholesaling	935	1,023	1,164	1,339	1,542
Machinery and Equipment Wholesaling	404	440	500	574	659
Motor Vehicle and Motor Vehicle Parts Wholesaling	318	346	394	454	522
Grocery, Liquor and Tobacco Product Wholesaling	624	684	778	896	1,031
Other Goods Wholesaling	196	213	243	280	322
Warehousing and Storage Services	121	132	150	173	200
Subtotal	2,598	2,838	3,230	3,716	4,276
Transport Uses					
Motor Vehicle and Motor Vehicle Parts Retailing	891	964	1,091	1,246	1,426
Road Transport	1,806	1,967	2,223	2,531	2,881
Rail Transport	353	380	428	486	554
Transport Support Services	99	108	123	141	161
Postal and Courier Pick-up and Delivery Services	458	499	565	646	739
Subtotal	3,606	3,919	4,428	5,050	5,761
Miscellaneous industrial area employment (5%)	933	1,016	1,152	1,320	1,512
Total	18,655	20,328	23,048	26,391	30,230

Note: Totals may not add due to rounding.
Source: Economic Associates estimates

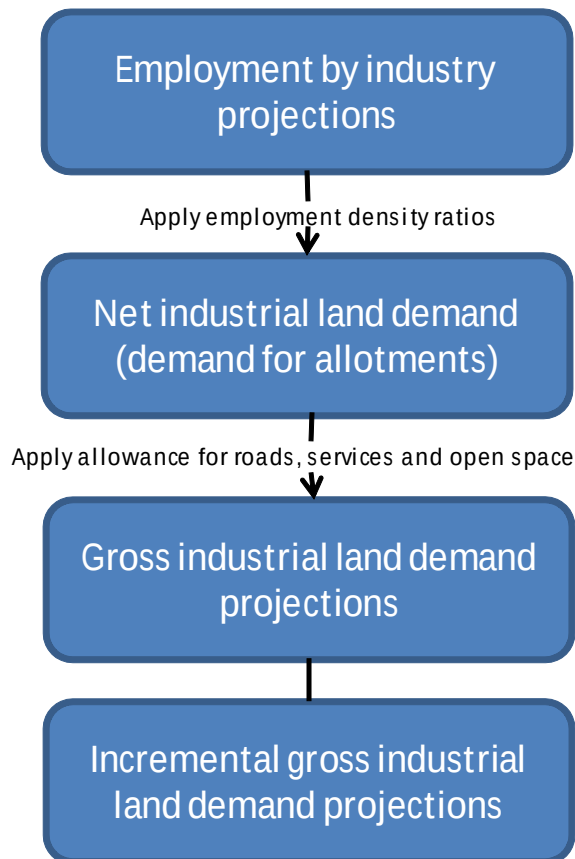
6.5 Industrial Land Demand Projections

Industrial land demand projections are derived by applying employment density ratios (employees per hectare) to employment projections for those industry sectors that utilise industrial land. The application of employment density ratios to employment projections generates net (or allotment) industrial land demand. Net industrial land demand projections are converted to gross land demand projections by making allowances for roads, infrastructure services and open space areas.

The incremental land demand, that demand post 2012, represents future demand or demand over and above land already taken up for industrial uses. Incremental land demand can also be described as the land take-up rate.

Figure 6.2 below illustrates the process of converting employment projections to land demand projections as described above.

Figure 6.2: Process of converting employment projections to land demand projections



6.5.1 Employment Density Ratios

Industrial land demand projections have been derived from employment projections and employment density ratios for industry sectors which utilise industrial land. Employment density ratios were determined through consultation with State government departments and agencies, local governments, industry (or industrial land users) and property developers and agencies.

For the purposes of this analysis, the assumed employment densities have been kept constant throughout the projection period. Table 6.8 below summarises the assumed employment density ratios for Toowoomba Regional Council.

Table 6.8: Assumed Employment Density Ratios, 2012 to 2031

Industry Type	Employment Density (persons / ha)
Large Footprint and General Industry	
Beverage and Tobacco Product Manufacturing	40
Food Product Manufacturing	40
Wood Product Manufacturing	35
Pulp, Paper and Converted Paper Product Manufacturing	40
Petroleum and Coal Product Manufacturing	35
Basic Chemical and Chemical Product Manufacturing	35
Polymer Product and Rubber Product Manufacturing	30
Non-Metallic Mineral Product Manufacturing	20
Primary Metal and Metal Product Manufacturing	25
Machinery and Equipment Manufacturing	45
Fabricated Metal Product Manufacturing	35
Transport Equipment Manufacturing	45
Furniture and Other Manufacturing	35
Service Industry	
Textile, Leather, Clothing and Footwear Manufacturing	45
Printing (including Reproduction of Recorded Media)	40
Publishing (except Internet and Music Publishing)	40
Construction Services	30
Repair and Maintenance	35
Warehousing & Storage	
Basic Material Wholesaling	20
Machinery and Equipment Wholesaling	20
Motor Vehicle and Motor Vehicle Parts Wholesaling	20
Grocery, Liquor and Tobacco Product Wholesaling	25
Other Goods Wholesaling	25
Warehousing and Storage Services	20
Transport Uses	
Motor Vehicle and Motor Vehicle Parts Retailing	30
Road Transport	25
Rail Transport	10
Transport Support Services	30
Postal and Courier Pick-up and Delivery Services	35

Source: Informed by previous industrial land work undertaken within the Toowoomba region

6.5.2 Gross Industrial Land Demand

As stated above, to determine gross industrial land demand, the following calculations are made:

1. Prepare employment projections for industrial sectors.
2. Divide employment projections by employment density ratios to obtain net industrial land demand projections.
3. Multiply net industrial land demand projections by allowances for services and open space buffers to obtain gross industrial land demand projections.

Appendix B outlines employment projections and net industrial land demand estimates for each sub-region between 2012 and 2031.

As stated above gross land demand equals net industrial land demand (i.e. industrial allotment demand) plus allowances made for roads, services and open space.

The requirement for roads and service reserves varies between regions and type of land use. The Department of Business, Industry and Regional Development's (DBIRD)⁴ information paper on *Establishing Future Business and Industry Land Requirements and Identifying Strategically Important Sites* indicates that industrial areas require the equivalent of between 5% and 10% of total allotment area for the provision of road and service corridors, and the equivalent of between 30% and 40% of total allotment area for open space and buffers⁵.

Large footprint and general industry uses, and those reliant on heavy vehicle access, are anticipated to require greater provision for roads, reserves and buffers than lower impact areas, such as service industry precincts.

Table 6.9 below summarises the assumptions used in estimating the industrial land requirement over and above allotment areas.

Table 6.9: Allowances for services and open space buffers by industry type

Industry Type	Services	Open Space
Large Footprint / General Industry	12.5%	40.0%
Service industry	5.0%	25.0%
Warehousing & storage	10.0%	35.0%
Transport uses	10.0%	35.0%

By 2031, an additional 609 hectares of industrial land (or 32.1ha/annum) is projected to be demanded within Toowoomba Regional Council, comprising:

- 175 hectares in large footprint & general industry (9.2ha/annum);
- 146 hectares in service industry (7.7ha/annum);
- 120 hectares in warehousing & storage (6.3ha/annum);
- 138 hectares in transport uses (7.3ha/annum); and
- 30 hectares in non-industrial land uses (1.6ha/annum).

Table 6.10 below provides a summary of the incremental gross industrial land demand within Toowoomba Regional Council between 2016 and 2031.

Table 6.10: Incremental Gross Industrial Land Demand (hectares), Toowoomba Regional Council, 2016-2031

Industry Type	2016	2021	2026	2031
Large Footprint and General Industry				
Beverage and Tobacco Product Manufacturing	0	0	0	0
Food Product Manufacturing	9	22	37	56
Wood Product Manufacturing	2	8	13	17
Pulp, Paper and Converted Paper Product Manufacturing	0	0	0	0
Petroleum and Coal Product Manufacturing	0	0	0	0
Basic Chemical and Chemical Product Manufacturing	0	2	2	5
Polymer Product and Rubber Product Manufacturing	0	4	5	5
Non-Metallic Mineral Product Manufacturing	4	7	11	19

⁴ The Department of Business, Industry and Regional Development was a predecessor to the Department of State Development, Trade and Innovation.

⁵ Consultations with the Coordinator General's Land (Infrastructure) group

Industry Type	2016	2021	2026	2031
Primary Metal and Metal Product Manufacturing	2	5	10	15
Machinery and Equipment Manufacturing	2	13	17	24
Fabricated Metal Product Manufacturing	2	11	14	18
Transport Equipment Manufacturing	1	4	7	13
Furniture and Other Manufacturing	0	3	5	8
Subtotal	23	76	117	175
Service Industry				
Textile, Leather, Clothing and Footwear Manufacturing	1	3	5	7
Printing (including Reproduction of Recorded Media)	3	4	6	7
Publishing (except Internet and Music Publishing)	1	3	4	6
Construction Services	12	33	53	82
Repair and Maintenance	8	19	29	44
Subtotal	25	62	97	146
Warehousing & Storage				
Basic Material Wholesaling	6	17	30	47
Machinery and Equipment Wholesaling	5	8	15	21
Motor Vehicle and Motor Vehicle Parts Wholesaling	4	7	12	16
Grocery, Liquor and Tobacco Product Wholesaling	4	11	16	24
Other Goods Wholesaling	0	2	5	6
Warehousing and Storage Services	0	2	4	6
Subtotal	19	47	82	120
Transport Uses				
Motor Vehicle and Motor Vehicle Parts Retailing	4	11	19	28
Road Transport	10	24	43	66
Rail Transport	5	13	22	31
Transport Support Services	0	0	1	1
Postal and Courier Pick-up and Delivery Services	0	3	8	12
Subtotal	19	51	93	138
Non-industrial land uses (5%)	5	12	20	30
Total	91	248	409	609

Note: Incremental demand is on 2012 demand levels. Totals may not add due to rounding.
Source: Economic Associates estimates

These figures are significantly higher than forecast in the 2009 industrial land study, where the gross incremental land take-up rate was forecast to be 18.4 hectares per annum. Table 6.11 below summarises the differences in the annual gross incremental land take-up rate between the 2009 study and current estimates.

Table 6.11: Annual Gross Incremental Land Take-Up Rate (hectares), Toowoomba Regional Council, 2009 and 2012 Estimates

Industry Type	2009 Report	2012 Report
Large Footprint and General Industry	5.6	9.2
Service Industry	4.7	7.7
Warehousing & Storage	3.8	6.3
Transport Uses	3.5	7.3
Non-Industrial Land Uses	0.9	1.6
Total	18.4	32.1

Source: Economic Associates estimates

6.6 Industry Development Approach

6.6.1 Approach Overview

The industry development approach considers the broader Darling Downs regional plan area, which comprises:

- Toowoomba Regional Council;
- Southern Downs Regional Council;
- Goondiwindi Regional Council;
- Western Downs Regional Council;
- Maranoa Regional Council; and
- Balonne Shire.

This broader region has been chosen to consider that whilst a number of major coal and gas projects are outside Toowoomba Regional Council, a significant proportion of industrial land demand generated as a result of these projects is likely to be within Toowoomba Regional Council, as it represents the main employment centre within the broader Darling Downs regional plan area.

Baseline industrial land demand was modelled for the Darling Downs regional plan area, using the employment demand approach outlined in Section 6.3 above.

The employment impacts of the proposed coal and gas projects within the region estimated through use of the regional input-output model (overview provided in Appendix C of the report). These impacts are what drives the structure change in the Toowoomba Regional Council economy under this approach.

6.6.2 Baseline Industrial Land Demand

The following assumptions were used in the baseline industrial land demand model for the Darling Downs regional plan area:

- OESR high series population projections for 15-64 population were used;
- Employment retention was held constant at 2006 Census levels throughout the projections period;
- Labour force participation and unemployment rate held at 2006 Census⁶ levels throughout the projection period;
- Employment by industry share was held constant at 2006 Census levels throughout the projection period;
- Employment density ratios used were consistent with those applied for Toowoomba Regional Council; and
- Land for services, buffers & open space was consistent with those applied for Toowoomba Regional Council.

⁶ 2006 data used because 2011 employment data will be released as part of the 2nd release of Census data. The methodology has been implemented to allow for future updates at minimal cost.

Incremental gross industrial land demand within the Darling Downs regional plan area is projected to reach 551 hectares by 2031, comprising:

- 158 hectares in large footprint & general industry;
- 125 hectares in service industry;
- 105 hectares in warehousing & storage;
- 135 hectares in transport uses; and
- 28 hectares in non-industrial land uses.

Table 6.12: Baseline Gross Incremental Land Demand (hectares), Darling Downs Regional Plan Area, 2016-2031

Industry Type	2016	2021	2026	2031
Large Footprint and General Industry				
Beverage and Tobacco Product Manufacturing	0	2	2	3
Food Product Manufacturing	12	26	42	62
Wood Product Manufacturing	2	6	9	15
Pulp, Paper and Converted Paper Product Manufacturing	0	0	0	0
Petroleum and Coal Product Manufacturing	0	0	0	0
Basic Chemical and Chemical Product Manufacturing	0	1	1	3
Polymer Product and Rubber Product Manufacturing	0	2	3	3
Non-Metallic Mineral Product Manufacturing	2	5	8	12
Primary Metal and Metal Product Manufacturing	3	6	9	14
Machinery and Equipment Manufacturing	3	8	12	17
Fabricated Metal Product Manufacturing	2	5	8	11
Transport Equipment Manufacturing	3	5	8	12
Furniture and Other Manufacturing	1	3	4	6
Subtotal	28	69	106	158
Service Industry				
Textile, Leather, Clothing and Footwear Manufacturing	0	2	3	5
Printing (including Reproduction of Recorded Media)	2	3	5	6
Publishing (except Internet and Music Publishing)	2	3	3	5
Construction Services	12	29	47	68
Repair and Maintenance	7	17	27	41
Subtotal	23	54	85	125
Warehousing & Storage				
Basic Material Wholesaling	6	17	27	41
Machinery and Equipment Wholesaling	3	8	14	20
Motor Vehicle and Motor Vehicle Parts Wholesaling	1	4	7	10
Grocery, Liquor and Tobacco Product Wholesaling	5	11	17	24
Other Goods Wholesaling	1	1	3	4
Warehousing and Storage Services	1	1	4	6
Subtotal	17	42	72	105
Transport Uses				
Motor Vehicle and Motor Vehicle Parts Retailing	5	12	20	28
Road Transport	14	31	49	72
Rail Transport	3	9	15	22
Transport Support Services	0	2	2	3
Postal and Courier Pick-up and Delivery Services	1	4	7	10
Subtotal	23	58	93	135
Non-industrial land uses (5%)	5	12	19	28
Total	96	235	375	551

Source: Economic Associates estimates

6.6.3 Industrial Land Demand Generated from Coal Projects

Projects in Development Pipeline

There is currently ten thermal coal projects proposed and at an advanced stage within the Darling Downs regional plan area, which would produce an additional 71.5 million tonnes of saleable coal production if all were to proceed.

While it is recognised that there are also a number of coal exploration projects also in the pipeline, it is considered premature to consider these in the analysis.

Table 6.13 below summarises the coal projects considered in the industrial land demand assessment for the Darling Downs region.

Table 6.13: Coal Projects Considered in Industrial Land Demand Estimates, Darling Downs Regional Plan Area

Project	Saleable Coal Production (Mt / annum)	Timing
Bundi underground	5.0	2015
Cameby Downs open-cut	10.0	2014
Elimatta open-cut	5.0	2014-15
Horse Creek open-cut	3.8	2013
New Acland open-cut, Stage 3	4.0	2014
Norwood underground	5.0	2015
The Range	7.0	2014
Wandoan open-cut	22.0	2013
Wilkie Creek open-cut	5.8	2013
Woori (Guluguba) open-cut	4.0	2013

Volume and Value of Production

In assessing the future coal production pipeline within the Darling Downs regional plan area it has been assumed that coal production ramps up over a three year period.

If all projects were to proceed as per the timing outlined in Table 5.11 above with the three year ramp up period, thermal coal production from these projects would increase from 11.8 million tonnes in 2013 to 71.5 million tonnes from 2017 onwards.

The value of coal exports from the Darling Downs regional plan area was estimated by applying coal price parameter values to projected saleable coal production. A thermal coal price of \$95 per tonne was adopted for the analysis. The coal price is likely to vary over time and any major and sustained departures from the assumed coal price (above) would have implications for the region's forward economic outlook.

Based on the above assumptions, the value of additional coal production within the Darling Downs regional plan area is projected to increase from \$1.1 billion in 2013 to \$6.8 billion from 2017 onwards.

Table 5.12 below summarises the projected additional thermal coal production and value of additional production within the Darling Downs regional plan area, assuming a coal price of \$95 per tonne.

Table 6.14: Projected Additional Coal Production and Value of Production, 2013-2031

	Saleable Coal (Mt)	Value of Production (\$ / tonne)	Total Value of Production (\$m)
2013	11.8	95	1,125.0
2014	30.7	95	2,914.9
2015	54.5	95	5,179.9
2016	66.5	95	6,319.9
2017+	71.5	95	6,794.9

Source: Economic Associates estimates

Input-Output Analysis Results

The input-output model provides estimates of the full-time equivalent employment impacts for the Darling Downs regional plan area. These figures have been adjusted to reflect additional employed persons as a result of additional coal production within the Darling Downs regional plan area.

Additional employment within industrial sectors as a result of additional coal production is assumed to increase from 2,842 persons in 2016 to 3,056 persons in 2021 and beyond. Additional employment resulting from additional coal production within the region is concentrated within repair and maintenance, construction services and road transport.

Table 6.15 below summarises the additional industrial employment generated as a result of additional coal mining activity within the Darling Downs regional plan area.

Table 6.15: Industrial Employment Generated from Additional Coal Production – Darling Downs Regional Plan Area, 2016-2031

Industry Type	2016	2021	2026	2031
Large Footprint and General Industry				
Beverage and Tobacco Product Manufacturing	1	1	1	1
Food Product Manufacturing	87	94	94	94
Wood Product Manufacturing	48	52	52	52
Pulp, Paper and Converted Paper Product Manufacturing	0	0	0	0
Petroleum and Coal Product Manufacturing	0	0	0	0
Basic Chemical and Chemical Product Manufacturing	24	25	25	25
Polymer Product and Rubber Product Manufacturing	10	11	11	11
Non-Metallic Mineral Product Manufacturing	22	24	24	24
Primary Metal and Metal Product Manufacturing	47	50	50	50
Machinery and Equipment Manufacturing	134	145	145	145
Fabricated Metal Product Manufacturing	126	135	135	135
Transport Equipment Manufacturing	44	47	47	47
Furniture and Other Manufacturing	13	14	14	14
Subtotal	556	598	598	598
Service Industry				
Textile, Leather, Clothing and Footwear Manufacturing	15	16	16	16
Printing (including Reproduction of Recorded Media)	0	0	0	0
Publishing (except Internet and Music Publishing)	14	15	15	15
Construction Services	465	500	500	500
Repair and Maintenance	615	661	661	661
Subtotal	1,108	1,192	1,192	1,192
Warehousing & Storage				
Basic Material Wholesaling	117	126	126	126
Machinery and Equipment Wholesaling	55	60	60	60
Motor Vehicle and Motor Vehicle Parts Wholesaling	31	34	34	34
Grocery, Liquor and Tobacco Product Wholesaling	84	90	90	90
Other Goods Wholesaling	18	19	19	19

Industry Type	2016	2021	2026	2031
Warehousing and Storage Services	17	18	18	18
Subtotal	322	346	346	346
Transport Uses				
Motor Vehicle and Motor Vehicle Parts Retailing	45	49	49	49
Road Transport	347	373	373	373
Rail Transport	153	165	165	165
Transport Support Services	95	102	102	102
Postal and Courier Pick-up and Delivery Services	73	78	78	78
Subtotal	713	767	767	767
Non-industrial land uses (5%)	142	153	153	153
Total	2,842	3,056	3,056	3,056

Source: Economic Associates estimates

To translate employment estimates into gross incremental land demand estimates, the following assumptions were applied:

- Employment density ratios used were consistent with those applied for Toowoomba Regional Council in the employment demand approach; and
- Land for services, buffers & open space was consistent with those applied for Toowoomba Regional Council in the employment demand approach.

Based on these assumptions, gross incremental industrial land demand generated from additional coal production within the Darling Downs regional plan area is projected to increase from 164 hectares in 2016 to 176 hectares in 2031.

Table 6.16: Gross Incremental Industrial Land Demand Generated from Additional Coal Production (hectares) – Darling Downs Regional Plan Area, 2016-2031

Industry Type	2016	2021	2026	2031
Large Footprint and General Industry				
Beverage and Tobacco Product Manufacturing	0	0	0	0
Food Product Manufacturing	3	3	3	3
Wood Product Manufacturing	2	2	2	2
Pulp, Paper and Converted Paper Product Manufacturing	0	0	0	0
Petroleum and Coal Product Manufacturing	0	0	0	0
Basic Chemical and Chemical Product Manufacturing	2	2	2	2
Polymer Product and Rubber Product Manufacturing	0	0	0	0
Non-Metallic Mineral Product Manufacturing	2	2	2	2
Primary Metal and Metal Product Manufacturing	3	3	3	3
Machinery and Equipment Manufacturing	5	5	5	5
Fabricated Metal Product Manufacturing	6	6	6	6
Transport Equipment Manufacturing	2	2	2	2
Furniture and Other Manufacturing	0	0	0	0
Subtotal	25	25	25	25
Service Industry				
Textile, Leather, Clothing and Footwear Manufacturing	0	0	0	0
Printing (including Reproduction of Recorded Media)	0	0	0	0
Publishing (except Internet and Music Publishing)	0	0	0	0
Construction Services	20	22	22	22
Repair and Maintenance	23	25	25	25
Subtotal	43	47	47	47
Warehousing & Storage				
Basic Material Wholesaling	23	25	25	25

Industry Type	2016	2021	2026	2031
Machinery and Equipment Wholesaling	4	4	4	4
Motor Vehicle and Motor Vehicle Parts Wholesaling	3	3	3	3
Grocery, Liquor and Tobacco Product Wholesaling	4	6	6	6
Other Goods Wholesaling	1	1	1	1
Warehousing and Storage Services	1	1	1	1
Subtotal	36	40	40	40
Transport Uses				
Motor Vehicle and Motor Vehicle Parts Retailing	3	3	3	3
Road Transport	20	22	22	22
Rail Transport	22	23	23	23
Transport Support Services	4	4	4	4
Postal and Courier Pick-up and Delivery Services	3	3	3	3
Subtotal	52	55	55	55
Non-industrial land uses (5%)	8	9	9	9
Total	164	176	176	176

Note: Incremental estimates are on 2012 levels
Source: Economic Associates estimates

6.6.4 Industrial Land Demand Generated from Gas Projects

Projects in Development Pipeline

There were five coal seam gas (CSG) field development projects identified within the Darling Downs regional plan area. If all projects ultimately proceed at full capacity, this will represent an additional 2,039 PJ per annum of coal seam gas production.

Table 6.17 below summarises the existing coal seam gas projects within the development pipeline.

Table 6.17: Coal Seam Gas Projects in Development Pipeline, Darling Downs Regional Plan Area

Project	Ultimate Production (PJ / annum)	Start up year
Australian Pacific LNG (Field Development)	800	2013
Gladstone LNG Stage 1 & 2 (Field Development)	212	2013
Queensland Curtis LNG Project (Field Development)	600	2013
Ironbark CSG Project	44	2014
Surat Gas Project (Field Development)	383	2017

Volume and Value of Production

It has been assumed that there is a five year ramp up period for all CSG projects within the Darling Downs regional plan area, and that the start up year is consistent with Table 6.17 for all projects.

Based on these above assumptions, total CSG production within the Darling Downs regional plan area is projected to increase from 605PJ in 2013 to 2,039PJ from 2021 onwards.

Coal seam gas is not sold directly, rather it is first processed and converted into liquefied natural gas (LNG). However, previous studies have identified the netback price required for CSG projects. Energy Supply Associate of Australia (ESAA, 2011)⁷ estimated a short to medium term

⁷ ESAA (2011) ESAA Domestic Gas Study Stage 2, prepared by Energy Quest, March 2011

netback price for CSG of between \$4 and \$5 per GJ. McLennan Magasanik & Associates (MMA, 2009)⁸ estimated medium to long term netback prices for CSG of between \$3 and \$6.50 per GJ.

For the purposes of this assessment it has been assumed that the netback price of CSG projects within the Darling Downs regional plan area is \$4.50 per GJ (or \$4.5 million per PJ). Based on this assumption, the value of CSG production in the Darling Downs regional plan area is projected to increase from \$322 million in 2013 to \$9,176 million in 2021 and beyond.

Table 6.18: Volume and Value of Additional CSG Production (\$m), Darling Downs Regional Plan Area

	CSG Production (PJ)	Value of CSG Production (\$m)
2013	322	1,451
2014	654	2,941
2015	985	4,432
2016	1,316	5,922
2017	1,724	7,757
2018	1,809	8,141
2019	1,886	8,486
2020	1,962	8,831
2021+	2,039	9,176

Input-Output Analysis

The input-output model provides estimates of the full-time equivalent employment impacts for the Darling Downs regional plan area. These figures have been adjusted to reflect additional employed persons as a result of additional coal production within the Darling Downs regional plan area.

The lower end of estimated values of CSG production was put through the input-output model to generate employment estimates for the Darling Downs regional plan area.

Additional employment within industrial sectors as a result of additional CSG production is assumed to increase from 1,441 persons in 2016 to 2,232 persons in 2021 and beyond. Additional employment resulting from additional CSG production within the region is concentrated within repair and maintenance, construction services and road transport.

Table 6.19 below summarises the additional industrial employment generated as a result of additional CSG production within the Darling Downs regional plan area.

Table 6.19: Industrial Employment Generated from Additional CSG Production – Darling Downs Regional Plan Area, 2016-2031

Industry Type	2016	2021	2026	2031
Large Footprint and General Industry				
Beverage and Tobacco Product Manufacturing	1	1	1	1
Food Product Manufacturing	34	53	53	53
Wood Product Manufacturing	21	33	33	33
Pulp, Paper and Converted Paper Product Manufacturing	0	0	0	0
Petroleum and Coal Product Manufacturing	0	0	0	0
Basic Chemical and Chemical Product Manufacturing	4	6	6	6

⁸ MMA (2009) Queensland LNG Industry Viability and Economic Impact Study, prepared for the Queensland Department of Infrastructure and Planning, 2009

Industry Type	2016	2021	2026	2031
Polymer Product and Rubber Product Manufacturing	5	7	7	7
Non-Metallic Mineral Product Manufacturing	10	16	16	16
Primary Metal and Metal Product Manufacturing	21	32	32	32
Machinery and Equipment Manufacturing	65	101	101	101
Fabricated Metal Product Manufacturing	53	83	83	83
Transport Equipment Manufacturing	13	20	20	20
Furniture and Other Manufacturing	6	9	9	9
Subtotal	232	360	360	360
Service Industry				
Textile, Leather, Clothing and Footwear Manufacturing	7	10	10	10
Printing (including Reproduction of Recorded Media)	0	0	0	0
Publishing (except Internet and Music Publishing)	7	10	10	10
Construction Services	238	368	368	368
Repair and Maintenance	456	706	706	706
Subtotal	707	1,096	1,096	1,096
Warehousing & Storage				
Basic Material Wholesaling	46	71	71	71
Machinery and Equipment Wholesaling	22	34	34	34
Motor Vehicle and Motor Vehicle Parts Wholesaling	12	19	19	19
Grocery, Liquor and Tobacco Product Wholesaling	33	51	51	51
Other Goods Wholesaling	7	11	11	11
Warehousing and Storage Services	7	10	10	10
Subtotal	127	196	196	196
Transport Uses				
Motor Vehicle and Motor Vehicle Parts Retailing	24	38	38	38
Road Transport	117	181	181	181
Rail Transport	67	104	104	104
Transport Support Services	39	60	60	60
Postal and Courier Pick-up and Delivery Services	56	87	87	87
Subtotal	302	469	469	469
Non-industrial land uses (5%)	72	112	112	112
Total	1,441	2,232	2,232	2,232

Source: Economic Associates estimates

To translate employment estimates into gross incremental land demand estimates, the following assumptions were applied:

- Employment density ratios used were consistent with those applied for Toowoomba Regional Council in the employment demand approach; and
- Land for services, buffers & open space was consistent with those applied for Toowoomba Regional Council in the employment demand approach.

Based on these assumptions, gross incremental industrial land demand generated from additional CSG production within the Darling Downs regional plan area is projected to increase from 72 hectares in 2016 to 107 hectares in 2031.

Table 6.20: Gross Incremental Industrial Land Demand Generated from Additional CSG Production (hectares) – Darling Downs Regional Plan Area, 2016-2031

Industry Type	2016	2021	2026	2031
Large Footprint and General Industry				
Beverage and Tobacco Product Manufacturing	0	0	0	0
Food Product Manufacturing	2	2	2	2

Industry Type	2016	2021	2026	2031
Wood Product Manufacturing	2	2	2	2
Pulp, Paper and Converted Paper Product Manufacturing	0	0	0	0
Petroleum and Coal Product Manufacturing	0	0	0	0
Basic Chemical and Chemical Product Manufacturing	0	0	0	0
Polymer Product and Rubber Product Manufacturing	0	0	0	0
Non-Metallic Mineral Product Manufacturing	2	2	2	2
Primary Metal and Metal Product Manufacturing	2	2	2	2
Machinery and Equipment Manufacturing	2	3	3	3
Fabricated Metal Product Manufacturing	3	3	3	3
Transport Equipment Manufacturing	0	0	0	0
Furniture and Other Manufacturing	0	0	0	0
Subtotal	13	14	14	14
Service Industry				
Textile, Leather, Clothing and Footwear Manufacturing	0	0	0	0
Printing (including Reproduction of Recorded Media)	0	0	0	0
Publishing (except Internet and Music Publishing)	0	0	0	0
Construction Services	10	16	16	16
Repair and Maintenance	17	26	26	26
Subtotal	27	42	42	42
Warehousing & Storage				
Basic Material Wholesaling	3	6	6	6
Machinery and Equipment Wholesaling	1	3	3	3
Motor Vehicle and Motor Vehicle Parts Wholesaling	1	1	1	1
Grocery, Liquor and Tobacco Product Wholesaling	1	3	3	3
Other Goods Wholesaling	0	0	0	0
Warehousing and Storage Services	0	1	1	1
Subtotal	6	14	14	14
Transport Uses				
Motor Vehicle and Motor Vehicle Parts Retailing	1	1	1	1
Road Transport	7	10	10	10
Rail Transport	10	15	15	15
Transport Support Services	1	3	3	3
Postal and Courier Pick-up and Delivery Services	3	3	3	3
Subtotal	22	32	32	32
Non-industrial land uses (5%)	4	5	5	5
Total	72	107	107	107

Note: Incremental estimates are on 2012 levels
Source: Economic Associates estimates

6.6.5 Total Industrial Land Demand

For the Darling Downs regional plan area, under the industry development approach, gross incremental industrial land demand is projected to increase from 329 hectares in 2016 to 805 hectares in 2031.

It is anticipated that a significant proportion of demand within the Darling Downs regional plan area, particularly that resulting from additional coal and CSG development, will ultimately be located within Toowoomba Regional Council.

Table 6.21: Gross Incremental Land Demand – Industry Development Approach (hectares), Darling Downs Regional Council, 2016-2031

Industry Type	2016	2021	2026	2031
Large Footprint and General Industry				

Industry Type	2016	2021	2026	2031
Beverage and Tobacco Product Manufacturing	0	2	2	3
Food Product Manufacturing	17	32	49	68
Wood Product Manufacturing	5	9	14	18
Pulp, Paper and Converted Paper Product Manufacturing	0	0	0	0
Petroleum and Coal Product Manufacturing	0	0	0	0
Basic Chemical and Chemical Product Manufacturing	1	3	3	4
Polymer Product and Rubber Product Manufacturing	2	2	3	5
Non-Metallic Mineral Product Manufacturing	5	8	11	15
Primary Metal and Metal Product Manufacturing	6	11	14	18
Machinery and Equipment Manufacturing	11	15	20	25
Fabricated Metal Product Manufacturing	9	14	17	20
Transport Equipment Manufacturing	5	8	11	14
Furniture and Other Manufacturing	1	3	6	7
Subtotal	62	107	150	197
Service Industry				
Textile, Leather, Clothing and Footwear Manufacturing	1	3	4	5
Printing (including Reproduction of Recorded Media)	1	3	4	5
Publishing (except Internet and Music Publishing)	2	3	4	6
Construction Services	42	63	78	97
Repair and Maintenance	45	65	74	85
Subtotal	91	137	164	198
Warehousing & Storage				
Basic Material Wholesaling	34	47	57	70
Machinery and Equipment Wholesaling	8	14	19	24
Motor Vehicle and Motor Vehicle Parts Wholesaling	4	7	10	15
Grocery, Liquor and Tobacco Product Wholesaling	12	17	23	30
Other Goods Wholesaling	3	3	4	6
Warehousing and Storage Services	3	4	6	7
Subtotal	64	92	119	152
Transport Uses				
Motor Vehicle and Motor Vehicle Parts Retailing	8	14	23	30
Road Transport	39	61	78	100
Rail Transport	35	48	54	61
Transport Support Services	7	8	10	10
Postal and Courier Pick-up and Delivery Services	7	10	13	17
Subtotal	96	141	178	218
Non-industrial land uses (5%)	16	25	32	40
Total	329	502	643	805

Source: Economic Associates estimates

6.7 Industrial Land Demand Summary

As outlined above, there were four approaches taken to estimate future industrial land demand within Toowoomba Regional Council, these being:

- Population based approach (raw land demand estimates);
- Historical land take-up based approach (net land demand estimates);
- Employment demand approach (gross land demand estimates); and
- Regional / industry development approach (gross land demand estimates).

To directly compare the outcomes of each of the four approaches, all results have been converted into incremental raw land demand estimates.

6.7.1 Conversion from Net Land Demand to Gross Land Demand

In the case of the historical land take-up based approach, the figures provided represent net industrial land estimates. These estimates represent total net land demand, and do not provide a breakdown of demand by industry sector. A review of the conversion from net industrial land demand to gross industrial land demand under the employment demand approach highlighted that overall, gross industrial land demand was 50% higher than net industrial land demand.

For the purposes of this assessment, the historical land take-up figures were multiplied by 1.5 to achieve gross industrial land demand estimates.

6.7.2 Conversion from Gross Land Demand to Raw Land Demand

The employment demand approach and regional / industry development approach models produced gross industrial land demand estimates, which require conversion to raw land demand estimates. In addition, the historical land take-up based approach figures also required conversion to raw land demand estimates.

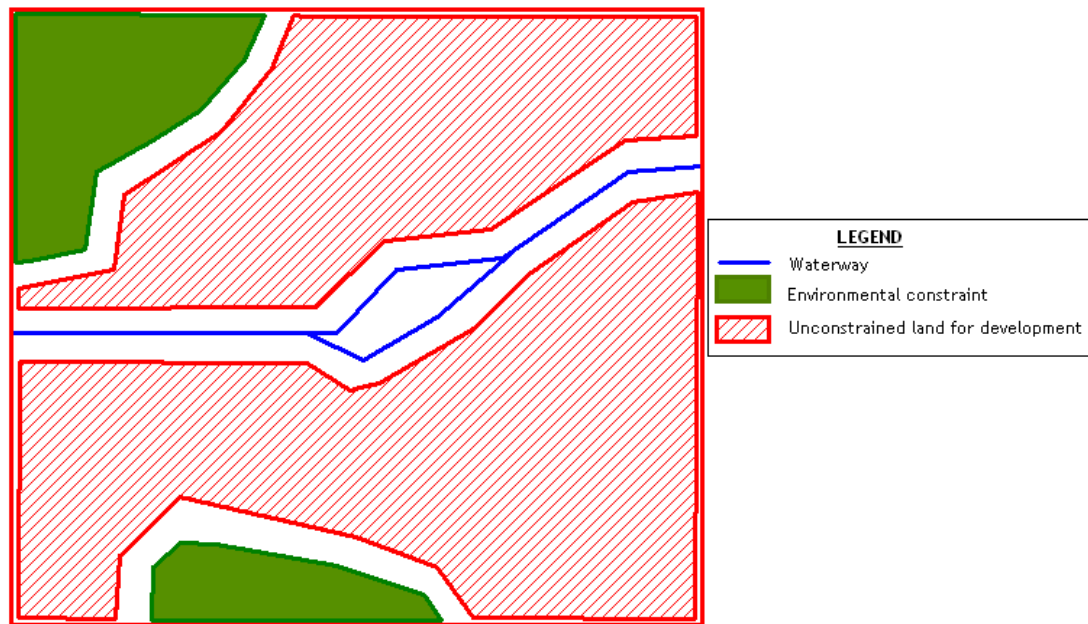
In previous instances where the Queensland Government has developed industrial land estates, it has achieved a yield of approximately 50% in terms of developable land, for example:

- Sunshine Coast Industrial Park: yielded 111 hectares of developable land out of a total site area of 205 hectares;
- Coolum Industrial Estate: yielded 88 hectares of developable land out of a total site area of 424 hectares⁹;
- Lytton Industrial Estate: yielded 47 hectares of developable land out of a total site area of 91 hectares; and
- Crestmead Industrial Estate: yielded 6 hectares of developable land out of a total site area of 9 hectares;

Figure 6.3 below provides an indicative example of the need for raw land over and above gross industrial land demand.

⁹ A significant area was handed over as an environmental reserve.

Figure 6.3: Indicative example of the need for raw land over and above gross industrial land demand



Based on the previous experiences of the Queensland Government, it has been assumed that gross land demand estimates need to be doubled to represent raw land demand estimates.

6.7.3 Raw Incremental Land Demand by Approach

Raw incremental land demand estimates under the population based, historical take-up and employment demand approaches represent demand within Toowoomba Regional Council. The estimates presented for the industry development scenario represented raw incremental land demand within the Darling Downs regional plan area, but it is anticipated that Toowoomba Regional Council will accommodate a significant proportion of demand overall for the broader region.

The population based approach produces the lowest raw incremental land demand estimates, increasing from 47 hectares in 2016 to 291 hectares in 2031. The historical land take-up approach produces a raw land take-up rate of approximately 39 hectares per annum, which translates to raw incremental land demand of 155 hectares in 2016, increasing to 736 hectares in 2031.

It is anticipated that the employment demand and industry development approaches are most representative of future land demand within Toowoomba Regional Council as the following factors are considered:

- Likely size of the working age population (15-64 years);
- Consideration of the future industry structure within Toowoomba Regional Council / Darling Downs regional plan area;
- Consideration of varying employment densities by at the two digit ANZSIC level based on previous consultation within the region; and
- Consideration of varying requirements for buffers / open space by broad industry sector.

Future raw incremental land demand within Toowoomba Regional Council under the employment demand scenario is projected to increase from 181 hectares in 2016 to 1,219 hectares in 2031. Under the industry development scenario, future raw incremental land demand within the Darling Downs regional plan area is projected to increase from 659 hectares in 2016 to 1,611 hectares in 2031.

The results from the employment demand approach and the industry development approach appear to converge over time, primarily as the development pipeline for coal and gas projects is unknown to 2031.

Table 6.22: Raw Incremental Land Demand by Approach (hectares), 2016-2031

Approach	2016	2021	2026	2031
Population Based (upper end)	47	117	201	291
Historical Land Take-Up (upper end)	155	349	543	736
Employment Demand	181	497	819	1,219
Industry Development (for DD region)	659	1,004	1,286	1,611

Note: Incremental demand estimates are on 2012 levels. Figures are rounded to the nearest hectare.
Source: Economic Associates estimates

6.7.4 Summary

Table 6.23 below provides a summary of the net, gross and raw incremental industrial land demand estimates generated by each the four alternative approaches.

Table 6.23: Summary of Net, Gross and Raw Incremental Industrial Land Demand by Approach (hectares)

Approach	Net Incremental Industrial Land Demand		Gross Incremental Industrial Land Demand		Raw Incremental Industrial Land Demand	
	To 2031	Annual	To 2031	Annual	To 2031	Annual
Population Based (upper end)	-	-	-	-	291	15.3
Historical Land Take-Up (upper end)	245	12.9	368	19.4	736	38.8
Employment Demand	404	21.3	609	32.1	1,219	64.2
Industry Development (for DD region)	566	29.8	805	42.4	1,611	84.8

Note: Incremental demand estimates are on 2012 levels. Figures are rounded to the nearest hectare.
Source: Economic Associates estimates

7 INDUSTRIAL LAND NEEDS ANALYSIS

Planning need is determined after a consideration of the remaining supply of industrial land in the context of projected demand. A negative supply-demand balance indicates a projected shortage of industrial land within a planning area. However, since planning schemes are instruments that have typically evolved over time in response to historical planning objectives or the prospect of various major projects coming online, frequently while there may be a significant quantum of land zoned, such land is located that it is unlikely to satisfy the locational requirements of prospective users.

In the case of Toowoomba Regional Council, previous sections of this report indicate that the focal point of future industrial land demand will be within Toowoomba / Jondaryan. It is anticipated that resources development within the Surat Basin will be the likely short to medium term driver for development within the Charlton / Wellcamp area.

The disaggregation of the supply-demand balance analysis is to identify broadly where within the Toowoomba Regional Council industrial land shortages are projected. The demand analysis indicates that the sub-region driving the Toowoomba Regional Council's industrial land projections are the Toowoomba / Jondaryan region. Over the last ten to fifteen years, the eastern part of the Jondaryan Planning Area has developed as an extension of metropolitan Toowoomba. As such, it is reasonable to assume that much of the demand projected for the Toowoomba / Jondaryan area would have a locational preference for land within close proximity to Toowoomba City.

7.1 Need for Additional Zoned Industrial Land

7.1.1 Supply – Demand Balance

For the supply-demand balance analysis, the results from the employment demand approach have been chosen to be the most representative of future activity within Toowoomba Regional Council.

As stated above, the employment demand approach considers a number of factors in projecting future industrial land demand, including:

- Likely size of the working age population (15-64 years);
- Consideration of the future industry structure within Toowoomba Regional Council;
- Consideration of varying employment densities by at the two digit ANZSIC level based on previous consultation within the region; and
- Consideration of varying requirements for buffers / open space by broad industry sector.

The employment demand approach is considered more appropriate than the industry development approach as it considers future industrial land demand within Toowoomba Regional Council and its sub-regions, rather than the broader Darling Downs Regional Plan area.

Estimates provided by GHD indicate there is an estimated 1,858 hectares of remaining industrial land supply within Toowoomba Regional Council, with a significant proportion located within the Charlton Wellcamp Regional Industry Zone (1,470 hectares).

The supply demand balance for Toowoomba Regional Council suggests there is sufficient zoned industrial land within the region until 2031. However, when this result is disaggregated by

planning area, it is noted that the Crow's Nest SLA (industrial land shortage by 2031), Rosalie SLA (industrial land shortage) and Cambooya Planning Area (industrial land shortage throughout projection period) are anticipated to face industrial land shortages within the projection period.

Table 7.1 below summarises the supply demand balance for Toowoomba Regional Council and its component sub-regions.

Table 7.1: Supply Demand Balance, Toowoomba Regional Council, 2016-2031

	2016	2021	2026	2031
<u>Supply</u>				
Toowoomba / Jondaryan	1,632	1,632	1,632	1,632
Crow's Nest	28	28	28	28
Rosalie	14	14	14	14
Millmerran	141	141	141	141
Pittsworth	30	30	30	30
Clifton	12	12	12	12
Cambooya	0	0	0	0
Toowoomba Regional Council	1,858	1,858	1,858	1,858
<u>Demand</u>				
Toowoomba / Jondaryan	71	195	336	502
Crow's Nest	7	15	26	41
Rosalie	2	11	11	15
Millmerran	0	2	6	6
Pittsworth	4	11	11	19
Clifton	2	3	4	4
Cambooya	4	13	16	22
Toowoomba Regional Council	91	248	409	609
<u>Supply-Demand Balance</u>				
Toowoomba / Jondaryan	1,562	1,438	1,296	1,130
Crow's Nest	21	13	2	-13
Rosalie	12	4	4	-1
Millmerran	141	139	135	135
Pittsworth	26	19	19	11
Clifton	10	9	8	8
Cambooya	-4	-13	-16	-22
Toowoomba Regional Council	1,767	1,609	1,448	1,248

Source: Economic Associates estimates

7.1.2 Need for Additional Zoned Industrial Land

The supply-demand balance highlighted the quantitative need for additional zoned industrial land within the following planning areas by 2031:

- Crow's Nest SLA – additional 13 hectares by 2031;
- Rosalie SLA – additional one hectare by 2031; and
- Cambooya SLA – additional 22 hectares by 2031.

While the Toowoomba / Jondaryan sub-region is not projected to record an industrial land shortage within the projection horizon, it should be noted that the majority of vacant land is located within the Charlton Wellcamp Enterprise Area and is zoned Medium Impact Industry. This quantum of industrial land within the Charlton Wellcamp Enterprise Area is likely to be significantly reduced if the proposed Toowoomba Airport relocation ultimately proceeds.

The following sub-sections provide recommendation regarding the extent of land that could be provided to meet the projected supply shortages in the above sub areas after consideration of both quantitative and qualitative issues.

Toowoomba / Jondaryan

The Toowoomba / Jondaryan area is not projected to experience an industrial land shortage by the end of the planning horizon. However, an analysis of remaining land supply by zoning highlights that the majority of vacant land is within the Medium Impact Industry zone (refer to Table 7.2).

Table 7.2: Vacant Zoned Land in Toowoomba / Jondaryan and Toowoomba Regional Council by Zone, 2012

	Toowoomba / Jondaryan	Toowoomba Regional Council
Low Impact Industry	172	182
Medium Impact Industry	1,198	1,382
High Impact Industry	263	294

Source: GHD

By 2031, gross incremental industrial land demand by zoning classification within Toowoomba / Jondaryan is projected to be:

- 137 hectares for Low Impact Industry;
- 220 hectares for Medium Impact Industry;
- 145 hectares for High Impact Industry.

Table 7.3 below summarises the maximum gross incremental land demanded by zoning between 2016 and 2031.

Table 7.3: Gross Incremental Land Demand by Zoning, Toowoomba / Jondaryan and Toowoomba Regional Council, 2031

	2016	2021	2026	2031
Toowoomba / Jondaryan				
Low Impact	21	55	91	137
Medium Impact	31	82	147	220
High Impact	19	58	98	145
Toowoomba Regional Council				
Low Impact	30	74	117	176
Medium Impact	38	98	175	258
High Impact	23	76	117	175

Source: Economic Associates estimates

This analysis highlights there is sufficient Low Impact Industry zoned land within Toowoomba / Jondaryan to 2031. However, further interrogation of the location of the remaining supply of Low Impact Industry land highlights the majority remaining is within the Charlton Wellcamp Regional Industry Zone (132 hectares), and as such would not be considered a desirable location for population serving low impact industry activity (e.g. smash repairs).

It is suggested that Toowoomba Regional Council encourage the relocation of higher impact industrial activity within Toowoomba City to the Charlton Wellcamp Regional Industry Zone in the medium to long term. In addition, it is suggested that additional land is zoned for Low

Impact Industry within the Toowoomba urban area, in localities such as Wilsonton / Torrington or Highfields, in order to meet the needs of low impact population serving industry.

A review of the historical planning context of Toowoomba Regional Council indicates that the Jondaryan Planning Area represents the next frontier of industrial development within the region once supply of strategically located industrial sites within Toowoomba City are exhausted.

The demand projections and consideration of the location of the remaining supply of vacant industrial land indicates that there would be significant need for land within close proximity to Toowoomba City and the Warrego Highway. The most significant industrial land use projected for Toowoomba / Jondaryan is for 'Large Footprint & General Industry'.

It is likely that the Charlton Wellcamp Enterprise Area could accommodate a significant amount of the projected demand for Toowoomba / Jondaryan. Given the size of the Charlton Wellcamp Enterprise Area, it is unnecessary to zone additional land to meet the projected demand generated from within the Jondaryan Planning Area. The Charlton Wellcamp Enterprise Area Structure Plan recognises the changing industrial environment within the Toowoomba Regional Council area and the Darling Downs and Surat Basin by providing General Industry, Transport & Warehousing and Large Footprint / Heavy Industry land use precincts and recommending that areas immediately adjacent to the Warrego Highway are brought on first.

The largest uncertainty facing the Charlton Wellcamp Enterprise Area is the potential relocation of Toowoomba Airport. If this were to occur, this would significantly impact the quantum of remaining zoned industrial land and the potential for high impact industry activity to locate within immediate proximity to the airport.

Cambooya

The former Cambooya Shire is projected to have a shortage of approximately 22 hectares of industrial land by 2031. This shortage emerges because urban land in the former Cambooya Shire (at Cambooya, Greenmount, East Greenmount and Wyreema) does not have a specific industrial land zoning, rather low impact industrial uses are permitted within the Township Zone. As such, providing industrial uses are continued to be supported in the Township Zone (as allowed for in the Township Zone code of the Planning Scheme), this shortage should be accommodated through existing urban land supply.

Crow's Nest

In the Crow's Nest sub-region, there is anticipated to be a shortfall of 13 hectares of industrial land by 2031. The majority of remaining supply within the Crow's Nest sub-region is within Meringandan, accounting for just over three quarters of remaining supply. It is suggested that the additional 13 hectares of industrial land is provided within the township of Highfields, rather than within Meringandan to ensure a mix of lot sizes is provided within two alternative locations.

Rosalie

In the Rosalie sub-region, there is anticipated to be a shortfall of one hectare of industrial land by 2031. This shortfall is best accommodated through a small expansion to any of the existing industrial areas within the Rosalie sub-region, rather than the creation of a new industrial estate.

APPENDIX A

CONSULTATION SUMMARY

Local Property Agents

Discussions with local property agents involved interviews with a number of in-region representatives of major real estate agencies, some of whom were franchisees (i.e. Ray White, LJH Commercial, Hot Property). In-region agents tended to view the Toowoomba region industrial market in two distinct segments, firstly the Toowoomba to Oakey corridor and secondly regional towns/villages.

Agents universally contended that the main focus of activity was in the Toowoomba to Oakey corridor, which included Torrington, Wilsonton and the Charlton Wellcamp Enterprise Area. The main tenant demand was considered to be for transport and logistics uses and mining / gas services. Traditional agriculture related industry remained a significant driver, but was generally viewed as a secondary driver. Although some agents anticipated that interest from agriculture related industry would return in the medium term as resource sector activity subsided.

Some agents confided that the short term tenure being sought by some uses might cause market uncertainty over time.

Local agents contended that there demand for lot across a broad spectrum of sizes, but the turnover of large lots had slowed in the last few months. Smaller allotments of industrial units turned over quickly, although there was some product in Harlaxton and Drayton that had been difficult to move. Some agents felt that this was more likely associated with the quality of the built form than location.

National Property Agents

Discussions were held with head office (Brisbane) representatives of major property firms, including Knight Frank, Jones Land LaSalle, CBRE and Colliers International. At the time of interviews representatives from these national real estate agencies expressed unreserved optimism for the Toowoomba and Surat Basin regions. These representatives cited a range of broad macro-economic indicators and investment announcements as evidence of ongoing demand for industrial land throughout the region. However, no respondents could identify which industrial precincts would move fastest within the region.

F J Gardiners' industrial development within the Charlton Wellcamp Enterprise Area was cited as a sign of investor confidence in the Toowoomba region and respondents felt that such a development would stimulate market interest.

National property agents tended to be more interested in large transactions and offered little insight into the smaller allotment market, except to say that smaller allotments tended to move faster than larger allotments.

An insight offered by agents was that industrial locations within the Toowoomba region were compared with potential locations in Ipswich and south western Brisbane and ultimately locational decisions were a resolution of the interaction between land and operational costs.

Development Industry

The Toowoomba Region Development Industry is highly concentrated. The four respondents requested they remain confidential. All respondents raised concerns regarding past issues with council development assessment timeframes, but acknowledged that there had been significant improvement in assessment timeframes. Respondents also noted that while the new planning scheme addressed a number of issues, it remained too prescriptive.

Aside their concerns regarding council interactions, respondents expressed concern regarding deterioration in the coal mining sector, citing ongoing industrial disputes and the carbon tax (as opposed to falling prices) as a major contributing factor to the industries recent softening. Respondents remained optimistic with regards to the outlook of the gas sector, citing the long development horizon for most gasfields (i.e. 10 years plus).

The regional airport proposal by Wagners was a considerable source of optimism, with respondents universally contending that when (as opposed to if) the project proceeds it will transform Toowoomba into a major residential and industrial hub for the Surat Basin and potential the southern Bowen and Galilee Basins.

The developers expressed slightly differing views with regards to lot sizes with two arguing that larger lot sizes (~0.5 ha to 2 ha) would be the principal source of future demand, while the remaining two felt that the future demand profile would simply be a continuation of the region's existing allotment profile, albeit with some growth in the large lot segment.

APPENDIX B

EMPLOYMENT DEMAND APPROACH – MODELLING RESULTS BY SUB-REGION

Table B.1: Industrial Land Demand – Toowoomba / Jondaryan , Employment Demand Approach, 2012-2031

	Industrial Employment Projections					Emp /ha	Net Industrial Land Demand (ha)					Gross Industrial Land Demand (ha)				
	2012	2016	2021	2026	2031		2012	2016	2021	2026	2031	2012	2016	2021	2026	2031
Large Footprint and General Industry																
Beverage and Tobacco Product Manufacturing	35	38	43	48	55	40	1	1	1	1	1	2	2	2	2	2
Food Product Manufacturing	2,285	2,469	2,790	3,186	3,645	40	57	62	70	80	91	87	95	107	122	139
Wood Product Manufacturing	495	535	604	690	790	35	14	15	17	20	23	21	23	26	31	35
Pulp, Paper and Converted Paper Product Manufacturing	24	24	24	25	26	40	1	1	1	1	1	2	2	2	2	2
Petroleum and Coal Product Manufacturing	0	0	0	0	0	35	0	0	0	0	0	0	0	0	0	0
Basic Chemical and Chemical Product Manufacturing	78	85	97	111	127	35	2	2	3	3	4	3	3	5	5	6
Polymer Product and Rubber Product Manufacturing	121	130	146	166	189	30	4	4	5	6	6	6	6	8	9	9
Non-Metallic Mineral Product Manufacturing	367	395	444	505	575	20	18	20	22	25	29	27	31	34	38	44
Primary Metal and Metal Product Manufacturing	342	368	414	471	536	25	14	15	17	19	21	21	23	26	29	32
Machinery and Equipment Manufacturing	793	857	968	1,105	1,265	45	18	19	22	25	28	27	29	34	38	43
Fabricated Metal Product Manufacturing	405	436	490	557	635	35	12	12	14	16	18	18	18	21	24	27
Transport Equipment Manufacturing	581	628	710	811	928	45	13	14	16	18	21	20	21	24	27	32
Furniture and Other Manufacturing	337	363	408	464	528	35	10	10	12	13	15	15	15	18	20	23
Subtotal	5,863	6,328	7,139	8,139	9,299	36	164	175	200	227	258	249	268	307	347	394
Service Industry																
Textile, Leather, Clothing and Footwear Manufacturing	324	349	393	446	508	45	7	8	9	10	11	11	12	14	15	17
Printing (including Reproduction of Recorded Media)	316	341	383	435	496	40	8	9	10	11	12	12	14	15	17	18
Publishing (except Internet and Music Publishing)	219	236	265	301	343	40	5	6	7	8	9	8	9	11	12	14
Construction Services	1,748	1,896	2,152	2,469	2,837	30	58	63	72	82	95	88	96	110	125	145
Repair and Maintenance	1,467	1,579	1,776	2,018	2,299	35	42	45	51	58	66	64	69	78	88	101
Subtotal	4,074	4,400	4,969	5,669	6,483	34	120	131	149	169	193	183	200	228	257	295
Warehousing & Storage																
Basic Material Wholesaling	799	867	984	1,129	1,297	20	40	43	49	56	65	61	66	75	85	99
Machinery and Equipment Wholesaling	365	396	449	515	592	20	18	20	22	26	30	27	31	34	40	46
Motor Vehicle and Motor Vehicle Parts Wholesaling	310	336	382	438	503	20	15	17	19	22	25	23	26	29	34	38
Grocery, Liquor and Tobacco Product Wholesaling	520	564	641	735	844	25	21	23	26	29	34	32	35	40	44	52
Other Goods Wholesaling	188	203	231	265	304	25	8	8	9	11	12	12	12	14	17	18
Warehousing and Storage Services	115	125	142	163	187	20	6	6	7	8	9	9	9	11	12	14
Subtotal	2,297	2,492	2,829	3,244	3,728	21	108	117	132	152	175	164	179	203	232	267
Transport Uses																
Motor Vehicle and Motor Vehicle Parts Retailing	864	933	1,055	1,204	1,378	30	29	31	35	40	46	44	47	53	61	70
Road Transport	1,429	1,539	1,731	1,967	2,241	25	57	62	69	79	90	87	95	105	120	137
Rail Transport	353	380	428	486	554	10	35	38	43	49	55	53	58	66	75	84
Transport Support Services	84	90	101	115	131	30	3	3	3	4	4	5	5	5	6	6
Postal and Courier Pick-up and Delivery Services	373	402	452	514	585	35	11	11	13	15	17	17	17	20	23	26
Subtotal	3,103	3,345	3,766	4,286	4,889	23	135	145	163	187	212	206	222	249	285	323
Non-industrial land uses (5%)	807	872	984	1,123	1,284	29	28	30	34	39	44	42	46	52	59	67
Total	16,144	17,437	19,687	22,462	25,683	29	555	598	678	774	882	844	915	1,039	1,180	1,346

Table B.2: Industrial Land Demand – Crow's Nest, Employment Demand Approach, 2012-2031

	Industrial Employment Projections					Emp /ha	Net Industrial Land Demand (ha)					Gross Industrial Land Demand (ha)				
	2012	2016	2021	2026	2031		2012	2016	2021	2026	2031	2012	2016	2021	2026	2031
Large Footprint and General Industry																
Beverage and Tobacco Product Manufacturing	4	5	6	7	8	40	0	0	0	0	0	0	0	0	0	0
Food Product Manufacturing	52	60	71	88	106	40	1	2	2	2	3	2	3	3	3	5
Wood Product Manufacturing	19	22	26	32	39	35	1	1	1	1	1	2	2	2	2	2
Pulp, Paper and Converted Paper Product Manufacturing	4	5	6	7	8	40	0	0	0	0	0	0	0	0	0	0
Petroleum and Coal Product Manufacturing	0	0	0	0	0	35	0	0	0	0	0	0	0	0	0	0
Basic Chemical and Chemical Product Manufacturing	8	10	11	14	17	35	0	0	0	0	0	0	0	0	0	0
Polymer Product and Rubber Product Manufacturing	11	13	15	18	22	30	0	0	1	1	1	0	0	2	2	2
Non-Metallic Mineral Product Manufacturing	5	6	8	9	11	20	0	0	0	0	1	0	0	0	0	2
Primary Metal and Metal Product Manufacturing	8	10	11	14	17	25	0	0	0	1	1	0	0	0	2	2
Machinery and Equipment Manufacturing	12	14	17	21	25	45	0	0	0	0	1	0	0	0	0	2
Fabricated Metal Product Manufacturing	14	16	19	23	28	35	0	0	1	1	1	0	0	2	2	2
Transport Equipment Manufacturing	10	11	13	16	20	45	0	0	0	0	0	0	0	0	0	0
Furniture and Other Manufacturing	8	10	11	14	17	35	0	0	0	0	0	0	0	0	0	0
Subtotal	155	181	214	263	319	74	2	3	5	6	9	3	5	8	9	14
Service Industry																
Textile, Leather, Clothing and Footwear Manufacturing	4	5	6	8	10	45	0	0	0	0	0	0	0	0	0	0
Printing (including Reproduction of Recorded Media)	0	0	0	0	0	40	0	0	0	0	0	0	0	0	0	0
Publishing (except Internet and Music Publishing)	9	10	12	16	20	40	0	0	0	0	0	0	0	0	0	0
Construction Services	223	268	327	414	520	30	7	9	11	14	17	9	12	14	18	22
Repair and Maintenance	23	27	33	42	53	35	1	1	1	1	2	1	1	1	1	3
Subtotal	259	310	379	480	603	31	8	10	12	15	19	10	13	15	19	25
Warehousing & Storage																
Basic Material Wholesaling	60	70	83	101	123	20	3	3	4	5	6	4	4	6	7	9
Machinery and Equipment Wholesaling	10	11	13	16	20	20	0	1	1	1	1	0	1	1	1	1
Motor Vehicle and Motor Vehicle Parts Wholesaling	0	0	0	0	0	20	0	0	0	0	0	0	0	0	0	0
Grocery, Liquor and Tobacco Product Wholesaling	38	45	53	65	78	25	2	2	2	3	3	3	3	3	4	4
Other Goods Wholesaling	4	5	6	7	8	25	0	0	0	0	0	0	0	0	0	0
Warehousing and Storage Services	0	0	0	0	0	20	0	0	0	0	0	0	0	0	0	0
Subtotal	112	130	154	189	230	27	5	6	7	9	10	7	8	10	12	14
Transport Uses																
Motor Vehicle and Motor Vehicle Parts Retailing	14	16	19	23	28	30	0	1	1	1	1	0	1	1	1	1
Road Transport	63	73	86	106	129	25	3	3	3	4	5	4	4	4	6	7
Rail Transport	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0
Transport Support Services	4	5	6	7	8	30	0	0	0	0	0	0	0	0	0	0
Postal and Courier Pick-up and Delivery Services	31	37	43	53	64	35	1	1	1	2	2	1	1	1	3	3
Subtotal	112	130	154	189	230	36	4	5	5	7	8	5	6	6	10	11
Non-industrial land uses (5%)	34	40	47	59	73	36	1	1	2	2	2	1	2	2	3	3
Total	671	792	949	1180	1454	36	20	25	31	39	48	26	34	41	53	67

Table B.3: Industrial Land Demand –Rosalie, Employment Demand Approach, 2012-2031

	Industrial Employment Projections					Emp /ha	Net Industrial Land Demand (ha)					Gross Industrial Land Demand (ha)				
	2012	2016	2021	2026	2031		2012	2016	2021	2026	2031	2012	2016	2021	2026	2031
Large Footprint and General Industry																
Beverage and Tobacco Product Manufacturing	9	10	12	14	15	40	0	0	0	0	0	0	0	0	0	0
Food Product Manufacturing	23	26	30	35	39	40	1	1	1	1	1	2	2	2	2	2
Wood Product Manufacturing	67	76	89	102	115	35	2	2	3	3	3	3	3	5	5	5
Pulp, Paper and Converted Paper Product Manufacturing	0	0	0	0	0	40	0	0	0	0	0	0	0	0	0	0
Petroleum and Coal Product Manufacturing	0	0	0	0	0	35	0	0	0	0	0	0	0	0	0	0
Basic Chemical and Chemical Product Manufacturing	0	0	0	0	0	35	0	0	0	0	0	0	0	0	0	0
Polymer Product and Rubber Product Manufacturing	0	0	0	0	0	30	0	0	0	0	0	0	0	0	0	0
Non-Metallic Mineral Product Manufacturing	4	4	5	6	6	20	0	0	0	0	0	0	0	0	0	0
Primary Metal and Metal Product Manufacturing	14	16	18	21	24	25	1	1	1	1	1	2	2	2	2	2
Machinery and Equipment Manufacturing	19	22	25	29	32	45	0	0	1	1	1	0	0	2	2	2
Fabricated Metal Product Manufacturing	77	88	102	118	132	35	2	3	3	3	4	3	5	5	5	6
Transport Equipment Manufacturing	4	4	5	6	6	45	0	0	0	0	0	0	0	0	0	0
Furniture and Other Manufacturing	5	6	7	8	9	35	0	0	0	0	0	0	0	0	0	0
Subtotal	220	252	293	338	379	35	6	7	9	9	10	9	11	14	14	15
Service Industry																
Textile, Leather, Clothing and Footwear Manufacturing	4	4	5	6	6	45	0	0	0	0	0	0	0	0	0	0
Printing (including Reproduction of Recorded Media)	0	0	0	0	0	40	0	0	0	0	0	0	0	0	0	0
Publishing (except Internet and Music Publishing)	0	0	0	0	0	40	0	0	0	0	0	0	0	0	0	0
Construction Services	81	92	107	123	139	30	3	3	4	4	5	4	4	5	5	7
Repair and Maintenance	42	48	55	64	71	35	1	1	2	2	2	1	1	3	3	3
Subtotal	126	144	168	193	217	30	4	4	6	6	7	5	5	8	8	10
Warehousing & Storage																
Basic Material Wholesaling	5	6	7	8	9	20	0	0	0	0	0	0	0	0	0	0
Machinery and Equipment Wholesaling	10	12	13	15	17	20	1	1	1	1	1	1	1	1	1	1
Motor Vehicle and Motor Vehicle Parts Wholesaling	0	0	0	0	0	20	0	0	0	0	0	0	0	0	0	0
Grocery, Liquor and Tobacco Product Wholesaling	16	19	22	25	28	25	1	1	1	1	1	1	1	1	1	1
Other Goods Wholesaling	0	0	0	0	0	25	0	0	0	0	0	0	0	0	0	0
Warehousing and Storage Services	0	0	0	0	0	20	0	0	0	0	0	0	0	0	0	0
Subtotal	31	36	42	48	54	30	2	2	2	2	2	2	2	2	2	2
Transport Uses																
Motor Vehicle and Motor Vehicle Parts Retailing	0	0	0	0	0	30	0	0	0	0	0	0	0	0	0	0
Road Transport	68	78	90	104	117	25	3	3	4	4	5	4	4	6	6	7
Rail Transport	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0
Transport Support Services	4	4	5	6	6	30	0	0	0	0	0	0	0	0	0	0
Postal and Courier Pick-up and Delivery Services	18	20	23	27	30	35	1	1	1	1	1	1	1	1	1	1
Subtotal	89	102	119	137	154	29	4	4	5	5	6	5	5	7	7	8
Non-industrial land uses (5%)	25	28	33	38	42	32	1	1	1	1	1	1	1	2	2	2
Total	491	562	654	754	846	32	17	18	23	23	26	22	24	33	33	37

Table B.4: Industrial Land Demand –Millmerran, Employment Demand Approach, 2012-2031

	Industrial Employment Projections					Emp /ha	Net Industrial Land Demand (ha)					Gross Industrial Land Demand (ha)				
	2012	2016	2021	2026	2031		2012	2016	2021	2026	2031	2012	2016	2021	2026	2031
Large Footprint and General Industry																
Beverage and Tobacco Product Manufacturing	0	0	0	0	0	40	0	0	0	0	0	0	0	0	0	0
Food Product Manufacturing	32	35	38	41	45	40	1	1	1	1	1	2	2	2	2	2
Wood Product Manufacturing	48	52	57	62	67	35	1	1	2	2	2	2	2	3	3	3
Pulp, Paper and Converted Paper Product Manufacturing	0	0	0	0	0	40	0	0	0	0	0	0	0	0	0	0
Petroleum and Coal Product Manufacturing	0	0	0	0	0	35	0	0	0	0	0	0	0	0	0	0
Basic Chemical and Chemical Product Manufacturing	22	24	26	28	30	35	1	1	1	1	1	2	2	2	2	2
Polymer Product and Rubber Product Manufacturing	0	0	0	0	0	30	0	0	0	0	0	0	0	0	0	0
Non-Metallic Mineral Product Manufacturing	0	0	0	0	0	20	0	0	0	0	0	0	0	0	0	0
Primary Metal and Metal Product Manufacturing	0	0	0	0	0	25	0	0	0	0	0	0	0	0	0	0
Machinery and Equipment Manufacturing	5	5	5	6	6	45	0	0	0	0	0	0	0	0	0	0
Fabricated Metal Product Manufacturing	0	0	0	0	0	35	0	0	0	0	0	0	0	0	0	0
Transport Equipment Manufacturing	0	0	0	0	0	45	0	0	0	0	0	0	0	0	0	0
Furniture and Other Manufacturing	0	0	0	0	0	35	0	0	0	0	0	0	0	0	0	0
Subtotal	105	116	126	137	149	34	3	3	4	4	4	5	5	6	6	6
Service Industry																
Textile, Leather, Clothing and Footwear Manufacturing	6	6	7	7	8	45	0	0	0	0	0	0	0	0	0	0
Printing (including Reproduction of Recorded Media)	0	0	0	0	0	40	0	0	0	0	0	0	0	0	0	0
Publishing (except Internet and Music Publishing)	0	0	0	0	0	40	0	0	0	0	0	0	0	0	0	0
Construction Services	66	72	79	86	93	30	2	2	3	3	3	3	3	4	4	4
Repair and Maintenance	26	29	31	34	37	35	1	1	1	1	1	1	1	1	1	1
Subtotal	97	107	117	127	138	32	3	3	4	4	4	4	4	5	5	5
Warehousing & Storage																
Basic Material Wholesaling	25	27	30	32	35	20	1	1	1	2	2	1	1	1	3	3
Machinery and Equipment Wholesaling	7	7	8	9	10	20	0	0	0	0	0	0	0	0	0	0
Motor Vehicle and Motor Vehicle Parts Wholesaling	0	0	0	0	0	20	0	0	0	0	0	0	0	0	0	0
Grocery, Liquor and Tobacco Product Wholesaling	17	19	20	22	24	25	1	1	1	1	1	1	1	1	1	1
Other Goods Wholesaling	0	0	0	0	0	25	0	0	0	0	0	0	0	0	0	0
Warehousing and Storage Services	0	0	0	0	0	20	0	0	0	0	0	0	0	0	0	0
Subtotal	49	54	58	64	69	24	2	2	2	3	3	2	2	2	4	4
Transport Uses																
Motor Vehicle and Motor Vehicle Parts Retailing	0	0	0	0	0	30	0	0	0	0	0	0	0	0	0	0
Road Transport	73	80	87	95	102	25	3	3	3	4	4	4	4	4	6	6
Rail Transport	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0
Transport Support Services	0	0	0	0	0	30	0	0	0	0	0	0	0	0	0	0
Postal and Courier Pick-up and Delivery Services	8	9	9	10	11	35	0	0	0	0	0	0	0	0	0	0
Subtotal	80	88	96	105	114	26	3	3	3	4	4	4	4	4	6	6
Non-industrial land uses (5%)	17	19	21	23	25	29	1	1	1	1	1	1	1	1	1	1
Total	350	384	419	456	493	29	12	12	14	16	16	16	16	18	22	22

Table B.5: Industrial Land Demand – Pittsworth, Employment Demand Approach, 2012-2031

	Industrial Employment Projections					Emp /ha	Net Industrial Land Demand (ha)					Gross Industrial Land Demand (ha)				
	2012	2016	2021	2026	2031		2012	2016	2021	2026	2031	2012	2016	2021	2026	2031
Large Footprint and General Industry																
Beverage and Tobacco Product Manufacturing	0	0	0	0	0	40	0	0	0	0	0	0	0	0	0	0
Food Product Manufacturing	36	41	46	51	56	40	1	1	1	1	1	2	2	2	2	2
Wood Product Manufacturing	5	5	6	7	7	35	0	0	0	0	0	0	0	0	0	0
Pulp, Paper and Converted Paper Product Manufacturing	0	0	0	0	0	40	0	0	0	0	0	0	0	0	0	0
Petroleum and Coal Product Manufacturing	0	0	0	0	0	35	0	0	0	0	0	0	0	0	0	0
Basic Chemical and Chemical Product Manufacturing	12	14	15	17	19	35	0	0	0	0	1	0	0	0	0	2
Polymer Product and Rubber Product Manufacturing	6	7	8	9	9	30	0	0	0	0	0	0	0	0	0	0
Non-Metallic Mineral Product Manufacturing	0	0	0	0	0	20	0	0	0	0	0	0	0	0	0	0
Primary Metal and Metal Product Manufacturing	13	15	17	19	20	25	1	1	1	1	1	2	2	2	2	2
Machinery and Equipment Manufacturing	19	22	25	27	30	45	0	0	1	1	1	0	0	2	2	2
Fabricated Metal Product Manufacturing	14	16	19	20	22	35	0	0	1	1	1	0	0	2	2	2
Transport Equipment Manufacturing	45	50	57	63	69	45	1	1	1	1	2	2	2	2	2	3
Furniture and Other Manufacturing	5	5	6	7	7	35	0	0	0	0	0	0	0	0	0	0
Subtotal	155	175	200	220	240	50	3	3	5	5	7	5	5	8	8	11
Service Industry																
Textile, Leather, Clothing and Footwear Manufacturing	0	0	0	0	0	45	0	0	0	0	0	0	0	0	0	0
Printing (including Reproduction of Recorded Media)	18	20	23	26	28	40	0	1	1	1	1	0	1	1	1	1
Publishing (except Internet and Music Publishing)	4	4	5	5	6	40	0	0	0	0	0	0	0	0	0	0
Construction Services	89	100	115	126	138	30	3	3	4	4	5	4	4	5	5	7
Repair and Maintenance	52	58	67	73	80	35	1	2	2	2	2	1	3	3	3	3
Subtotal	162	183	209	230	252	39	4	6	7	7	8	5	8	9	9	11
Warehousing & Storage																
Basic Material Wholesaling	32	37	42	46	50	20	2	2	2	2	3	3	3	3	3	4
Machinery and Equipment Wholesaling	0	0	0	0	0	20	0	0	0	0	0	0	0	0	0	0
Motor Vehicle and Motor Vehicle Parts Wholesaling	0	0	0	0	0	20	0	0	0	0	0	0	0	0	0	0
Grocery, Liquor and Tobacco Product Wholesaling	12	14	15	17	19	25	0	1	1	1	1	0	1	1	1	1
Other Goods Wholesaling	0	0	0	0	0	25	0	0	0	0	0	0	0	0	0	0
Warehousing and Storage Services	0	0	0	0	0	20	0	0	0	0	0	0	0	0	0	0
Subtotal	45	50	57	63	69	22	2	3	3	3	4	3	4	4	4	5
Transport Uses																
Motor Vehicle and Motor Vehicle Parts Retailing	13	15	17	19	20	30	0	0	1	1	1	0	0	1	1	1
Road Transport	96	108	124	136	149	25	4	4	5	5	6	6	6	7	7	9
Rail Transport	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0
Transport Support Services	4	4	5	5	6	30	0	0	0	0	0	0	0	0	0	0
Postal and Courier Pick-up and Delivery Services	11	12	14	15	17	35	0	0	0	0	0	0	0	0	0	0
Subtotal	124	139	160	176	192	30	4	4	6	6	7	6	6	8	8	10
Non-industrial land uses (5%)	26	29	33	36	40	36	1	1	1	1	1	1	1	2	2	2
Total	512	576	659	725	792	36	14	17	22	22	27	20	24	31	31	39

Table B.6: Industrial Land Demand –Clifton, Employment Demand Approach, 2012-2031

	Industrial Employment Projections					Emp /ha	Net Industrial Land Demand (ha)					Gross Industrial Land Demand (ha)				
	2012	2016	2021	2026	2031		2012	2016	2021	2026	2031	2012	2016	2021	2026	2031
Large Footprint and General Industry																
Beverage and Tobacco Product Manufacturing	0	0	0	0	0	40	0	0	0	0	0	0	0	0	0	0
Food Product Manufacturing	34	37	40	42	45	40	1	1	1	1	1	2	2	2	2	2
Wood Product Manufacturing	0	0	0	0	0	35	0	0	0	0	0	0	0	0	0	0
Pulp, Paper and Converted Paper Product Manufacturing	0	0	0	0	0	40	0	0	0	0	0	0	0	0	0	0
Petroleum and Coal Product Manufacturing	0	0	0	0	0	35	0	0	0	0	0	0	0	0	0	0
Basic Chemical and Chemical Product Manufacturing	0	0	0	0	0	35	0	0	0	0	0	0	0	0	0	0
Polymer Product and Rubber Product Manufacturing	0	0	0	0	0	30	0	0	0	0	0	0	0	0	0	0
Non-Metallic Mineral Product Manufacturing	0	0	0	0	0	20	0	0	0	0	0	0	0	0	0	0
Primary Metal and Metal Product Manufacturing	7	8	9	9	10	25	0	0	0	0	0	0	0	0	0	0
Machinery and Equipment Manufacturing	7	8	9	9	10	45	0	0	0	0	0	0	0	0	0	0
Fabricated Metal Product Manufacturing	5	5	6	6	6	35	0	0	0	0	0	0	0	0	0	0
Transport Equipment Manufacturing	0	0	0	0	0	45	0	0	0	0	0	0	0	0	0	0
Furniture and Other Manufacturing	0	0	0	0	0	35	0	0	0	0	0	0	0	0	0	0
Subtotal	53	58	62	67	71	52	1	1	1	1	1	2	2	2	2	2
Service Industry																
Textile, Leather, Clothing and Footwear Manufacturing	0	0	0	0	0	45	0	0	0	0	0	0	0	0	0	0
Printing (including Reproduction of Recorded Media)	0	0	0	0	0	40	0	0	0	0	0	0	0	0	0	0
Publishing (except Internet and Music Publishing)	4	4	4	5	5	40	0	0	0	0	0	0	0	0	0	0
Construction Services	18	20	21	23	24	30	1	1	1	1	1	1	1	1	1	1
Repair and Maintenance	19	21	23	24	26	35	1	1	1	1	1	1	1	1	1	1
Subtotal	41	45	48	51	55	20	2	2	2	2	2	2	2	2	2	2
Warehousing & Storage																
Basic Material Wholesaling	4	4	4	5	5	20	0	0	0	0	0	0	0	0	0	0
Machinery and Equipment Wholesaling	8	9	10	11	11	20	0	0	0	1	1	0	0	0	1	1
Motor Vehicle and Motor Vehicle Parts Wholesaling	0	0	0	0	0	20	0	0	0	0	0	0	0	0	0	0
Grocery, Liquor and Tobacco Product Wholesaling	11	12	13	14	15	25	0	0	1	1	1	0	0	1	1	1
Other Goods Wholesaling	0	0	0	0	0	25	0	0	0	0	0	0	0	0	0	0
Warehousing and Storage Services	0	0	0	0	0	20	0	0	0	0	0	0	0	0	0	0
Subtotal	23	25	27	29	31	15	0	0	1	2	2	0	0	1	2	2
Transport Uses																
Motor Vehicle and Motor Vehicle Parts Retailing	0	0	0	0	0	30	0	0	0	0	0	0	0	0	0	0
Road Transport	35	38	41	44	47	25	1	2	2	2	2	1	3	3	3	3
Rail Transport	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0
Transport Support Services	0	0	0	0	0	30	0	0	0	0	0	0	0	0	0	0
Postal and Courier Pick-up and Delivery Services	8	9	10	11	11	35	0	0	0	0	0	0	0	0	0	0
Subtotal	44	48	51	54	58	43	1	2	2	2	2	1	3	3	3	3
Non-industrial land uses (5%)	8	9	10	11	11	39	0	0	0	0	0	0	0	0	0	0
Total	170	185	198	212	226	39	4	5	6	7	7	5	7	8	9	9

Table B.7: Industrial Land Demand –Cambooya, Employment Demand Approach, 2012-2031

	Industrial Employment Projections					Emp /ha	Net Industrial Land Demand (ha)					Gross Industrial Land Demand (ha)				
	2012	2016	2021	2026	2031		2012	2016	2021	2026	2031	2012	2016	2021	2026	2031
Large Footprint and General Industry																
Beverage and Tobacco Product Manufacturing	0	0	0	0	0	40	0	0	0	0	0	0	0	0	0	0
Food Product Manufacturing	43	53	65	81	99	40	1	1	2	2	2	2	2	3	3	3
Wood Product Manufacturing	0	0	0	0	0	35	0	0	0	0	0	0	0	0	0	0
Pulp, Paper and Converted Paper Product Manufacturing	0	0	0	0	0	40	0	0	0	0	0	0	0	0	0	0
Petroleum and Coal Product Manufacturing	0	0	0	0	0	35	0	0	0	0	0	0	0	0	0	0
Basic Chemical and Chemical Product Manufacturing	0	0	0	0	0	35	0	0	0	0	0	0	0	0	0	0
Polymer Product and Rubber Product Manufacturing	0	0	0	0	0	30	0	0	0	0	0	0	0	0	0	0
Non-Metallic Mineral Product Manufacturing	0	0	0	0	0	20	0	0	0	0	0	0	0	0	0	0
Primary Metal and Metal Product Manufacturing	6	7	8	11	13	25	0	0	0	0	1	0	0	0	0	2
Machinery and Equipment Manufacturing	18	22	27	34	42	45	0	0	1	1	1	0	0	2	2	2
Fabricated Metal Product Manufacturing	12	15	19	24	29	35	0	0	1	1	1	0	0	2	2	2
Transport Equipment Manufacturing	0	0	0	0	0	45	0	0	0	0	0	0	0	0	0	0
Furniture and Other Manufacturing	0	0	0	0	0	35	0	0	0	0	0	0	0	0	0	0
Subtotal	79	97	120	150	183	37	1	1	4	4	5	2	2	6	6	8
Service Industry																
Textile, Leather, Clothing and Footwear Manufacturing	14	17	21	26	32	45	0	0	0	1	1	0	0	0	1	1
Printing (including Reproduction of Recorded Media)	0	0	0	0	0	40	0	0	0	0	0	0	0	0	0	0
Publishing (except Internet and Music Publishing)	0	0	0	0	0	40	0	0	0	0	0	0	0	0	0	0
Construction Services	97	119	147	184	224	30	3	4	5	6	7	4	5	7	8	9
Repair and Maintenance	17	20	25	32	38	35	0	1	1	1	1	0	1	1	1	1
Subtotal	127	157	193	242	295	40	3	5	6	8	9	4	6	8	10	11
Warehousing & Storage																
Basic Material Wholesaling	10	12	15	18	22	20	0	1	1	1	1	0	1	1	1	1
Machinery and Equipment Wholesaling	4	5	6	8	10	20	0	0	0	0	0	0	0	0	0	0
Motor Vehicle and Motor Vehicle Parts Wholesaling	8	10	13	16	19	20	0	1	1	1	1	0	1	1	1	1
Grocery, Liquor and Tobacco Product Wholesaling	10	12	15	18	22	25	0	0	1	1	1	0	0	1	1	1
Other Goods Wholesaling	4	5	6	8	10	25	0	0	0	0	0	0	0	0	0	0
Warehousing and Storage Services	6	7	8	11	13	20	0	0	0	1	1	0	0	0	1	1
Subtotal	42	51	63	79	96	26	0	2	3	4	4	0	2	3	4	4
Transport Uses																
Motor Vehicle and Motor Vehicle Parts Retailing	0	0	0	0	0	30	0	0	0	0	0	0	0	0	0	0
Road Transport	42	51	63	79	96	25	2	2	3	3	4	3	3	4	4	6
Rail Transport	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0
Transport Support Services	4	5	6	8	10	30	0	0	0	0	0	0	0	0	0	0
Postal and Courier Pick-up and Delivery Services	8	10	13	16	19	35	0	0	0	0	1	0	0	0	0	1
Subtotal	54	66	82	102	125	26	2	2	3	3	5	3	3	4	4	7
Non-industrial land uses (5%)	16	20	24	30	37	30	0	1	1	1	1	0	1	1	1	2
Total	318	391	482	603	735	48	6	11	17	20	24	9	14	22	25	32

APPENDIX C

OVERVIEW OF INPUT-OUTPUT APPROACH

Input-Output Analysis Overview

Economic impact assessment is used to estimate the direct and indirect impacts of a particular economic stimulus or activity, in this case the value of additional coal and gas output within the Darling Downs regional plan area. The economic impact analysis is based on input-output tables which describe inter-industry transactions for a given region. National input-output tables for 2007-08¹⁰ are prepared by the Australian Bureau of Statistics based on the Australian National Accounts. Queensland tables are then imputed using Queensland State Accounts and Census data.

The total economic impact of a particular stimulus or activity comprises the following effects.

- Direct or initial effect: being the stimulus for the economic impact, typically described as the change in sales or contribution to final demand by the stimulus or activity.
- Flow on effects, comprising production-induced effects and consumption-induced effects, these being:
 - First-round production effects: being those purchases of inputs required from other industry sectors in the economy to produce the additional output generated by the stimulus or activity;
 - Industrial support production effects: being those second, third and subsequent-round industrial flow on effects stimulated by the purchases made in the first round; and
 - Consumption induced effects: being those purchases made by households upon receiving additional income from labour payments stemming from the production of additional output generated by the stimulus or activity under assessment.

The extent of these impacts can be represented by multipliers calculated in aggregate for various regional, state or national economies. There are commonly four multipliers used to measure impact - output, income, employment and value added.

Two sets of the above multipliers can be generated, namely:

- Type 1 Multipliers, which estimate the direct and production induced impacts of a stimulus or activity; and
- Type 2 Multipliers, which estimate the direct, production induced and consumption induced impacts of a stimulus or activity.

Type 1 Multipliers are used in our analysis. Queensland Treasury's preference is for use of only Type 1 Multipliers, given that Type 2 Multipliers typically overstate the extent of consumption-induced impacts of any given stimulus or activity.

It is also important to note that value added is the measure of economic impact resulting from a stimulus that is preferred by economists.

The various impact measures used in economic impact assessment are described in Table A.1. Our analysis will consider the employment impacts generated as a result of additional coal and gas production within the Darling Downs regional plan area.

¹⁰ ABS (2009) Australian National Accounts: Input-Output Tables Catalogue No. 5209.0.55.001

Table C.1: Measures of Economic Impact

Impact Measure	Description
Output	The output impact measures the increase in gross sales throughout the entire economy by aggregating all individual transactions (direct and indirect) resulting from the economic stimulus. The output impact provides an indication of the degree of structural dependence between sectors of the economy. However, output impacts are regarded as overstating the impact on the economy as they count all goods and services used in one stage of production as an input to later stages of production, hence counting their contribution more than once.
Household income	The household income impact measures the additional wages, salaries and supplements paid to households associated with the industry under consideration and with other industries benefiting from the stimulus to the economy. It is important to note that the input-output tables on which this analysis is based relate to 2005-06. The input-output tables represent the structural dependence of industry sectors within the regional economy. Since 2005-06 there may have been changes in the composition of real wages. While the input-output tables have been augmented to reflect changes in relative incomes between industries, they have not been augmented such that they reflect relative differences between regions on an inter-industry basis.
Employment	The employment impact measures the number of full time equivalent (FTE) positions for one year created directly and indirectly by the stimulus ¹¹ . However, the short-term response to increased demand may be that existing employees work overtime. Consequently, actual levels of employment generated (in terms of persons employed) will tend to be lower than those estimated by the input-output analysis. This short-term employment response (of working additional overtime) will be more prevalent where the demand stimulus is likely to be temporary and short lived, or where there is limited spare capacity in the economy (that is, when the economy is at or near full employment).
Value added	The value added or Gross Regional Product (GRP) impact measures only the net activity at each stage of production resulting from a stimulus. GRP is defined as the addition of consumption, investment and government expenditure, plus net exports (exports minus imports) from a region. The value added (or GRP) impact is the preferred measure for the assessment of contribution to the economy from a stimulus or impact, and as such should be used to describe the net impact of the event.

Source: Jensen, R. & West, G. (2001) Community Economic Analysis, Department of Primary Industries: Brisbane, Qld

Limitations of the Input-Output Approach

The input-output approach has a number of limitations, which may result in overestimation of impacts.

- The absence of capacity constraints such that the supply of each good is perfectly elastic, implying that each industry can supply whatever quantity is demanded of it and there are no budget constraints.
- The assumed linearity and homogeneity of the input function, which implies constant returns to scale and no substitution between inputs. This occurs because the approach assumes inputs purchased by each industry are a function only of the level of output of that industry.
- Each commodity, or type of commodity, is supplied by a single industry sector, implying there is only one method used to produce each commodity and each sector has only a single primary output.

¹¹ Therefore, if impacts are to be spread over a number of years, the FTE estimate (which relates to the annual equivalent) should be divided by the number of years over which the impact will be spread (in the absence of a clearly defined staging program) to provide an indicative ongoing employment estimate over the life of the impact.

- Multipliers are derived from the 2007-08 Input-Output tables and reflect the structural dependence of the economy at that time. These tables have been augmented to reflect broad level structural change across the national economy by industry sector. The Queensland tables prepared for this analysis reflect regional variation from the national tables as at 2006. As such, the tables do not reflect any intensification or deterioration in regional competitive advantage in specific industry sector that may have occurred since 2007-08.
- The assumption that the economy is in equilibrium at given prices and that the economy is not subject to other external influences.
- The additivity assumption suggests the total effect of carrying on several types of production is the sum of the separate effects, which is not a true reflection of economic systems.

The economic impact analysis contained in this report presents results which are indicative of the scale of the employment impacts resulting from additional coal and gas production within the Darling Downs regional plan area.

APPENDIX D

SUMMARY OF RESULTS: INDUSTRY DEVELOPMENT APPROACH

Table D.1: Industrial Land Demand – Darling Downs Regional Plan Area, Industry Development Approach, 2012-2031

	Industrial Employment Projections					Emp /ha	Net Industrial Land Demand (ha)					Gross Industrial Land Demand (ha)				
	2012	2016	2021	2026	2031		2012	2016	2021	2026	2031	2012	2016	2021	2026	2031
Large Footprint and General Industry																
Beverage and Tobacco Product Manufacturing	166	178	193	210	229	40	4	4	5	5	6	6	6	8	8	9
Food Product Manufacturing	4,414	4,825	5,236	5,679	6,197	40	110	121	131	142	155	168	185	200	217	236
Wood Product Manufacturing	933	1,064	1,161	1,255	1,364	35	27	30	33	36	39	41	46	50	55	59
Pulp, Paper and Converted Paper Product Manufacturing	29	31	34	37	40	40	1	1	1	1	1	2	2	2	2	2
Petroleum and Coal Product Manufacturing	0	0	0	0	0	35	0	0	0	0	0	0	0	0	0	0
Basic Chemical and Chemical Product Manufacturing	237	280	305	329	357	35	7	8	9	9	10	11	12	14	14	15
Polymer Product and Rubber Product Manufacturing	229	259	283	306	333	30	8	9	9	10	11	12	14	14	15	17
Non-Metallic Mineral Product Manufacturing	419	479	523	565	614	20	21	24	26	28	31	32	37	40	43	47
Primary Metal and Metal Product Manufacturing	580	686	751	810	878	25	23	27	30	32	35	35	41	46	49	53
Machinery and Equipment Manufacturing	1,314	1,599	1,760	1,892	2,046	45	29	36	39	42	45	44	55	59	64	69
Fabricated Metal Product Manufacturing	720	947	1,048	1,121	1,205	35	21	27	30	32	34	32	41	46	49	52
Transport Equipment Manufacturing	874	988	1,075	1,163	1,265	45	19	22	24	26	28	29	34	37	40	43
Furniture and Other Manufacturing	390	434	472	511	557	35	11	12	13	15	16	17	18	20	23	24
Subtotal	10,307	11,772	12,842	13,877	15,085		281	321	350	378	411	429	491	536	579	626
Service Industry																
Textile, Leather, Clothing and Footwear Manufacturing	438	489	532	576	628	45	10	11	12	13	14	13	14	16	17	18
Printing (including Reproduction of Recorded Media)	405	432	467	508	556	40	10	11	12	13	14	13	14	16	17	18
Publishing (except Internet and Music Publishing)	335	377	411	445	484	40	8	9	10	11	12	10	12	13	14	16
Construction Services	3,640	4,581	5,065	5,430	5,857	30	121	153	169	181	195	157	199	220	235	254
Repair and Maintenance	2,519	3,755	4,272	4,525	4,820	35	72	107	122	129	138	94	139	159	168	179
Subtotal	7,338	9,635	10,747	11,484	12,345		221	291	325	347	373	287	378	424	451	485
Warehousing & Storage																
Basic Material Wholesaling	1,471	1,936	2,114	2,261	2,434	20	74	97	106	113	122	107	141	154	164	177
Machinery and Equipment Wholesaling	697	820	897	967	1,048	20	35	41	45	48	52	51	59	65	70	75
Motor Vehicle and Motor Vehicle Parts Wholesaling	395	464	508	548	594	20	20	23	25	27	30	29	33	36	39	44
Grocery, Liquor and Tobacco Product Wholesaling	1,053	1,238	1,355	1,460	1,584	25	42	50	54	58	63	61	73	78	84	91
Other Goods Wholesaling	223	263	287	310	336	25	9	11	11	12	13	13	16	16	17	19
Warehousing and Storage Services	216	254	278	300	325	20	11	13	14	15	16	16	19	20	22	23
Subtotal	4,055	4,975	5,438	5,846	6,321		191	235	255	273	296	277	341	369	396	429
Transport Uses																
Motor Vehicle and Motor Vehicle Parts Retailing	1,499	1,667	1,815	1,966	2,141	30	50	56	60	66	71	73	81	87	96	103
Road Transport	3,158	3,829	4,195	4,512	4,883	25	126	153	168	180	195	183	222	244	261	283
Rail Transport	425	674	759	802	852	10	43	67	76	80	85	62	97	110	116	123
Transport Support Services	176	321	365	383	403	30	6	11	12	13	13	9	16	17	19	19
Postal and Courier Pick-up and Delivery Services	691	865	962	1,031	1,112	35	20	25	27	29	32	29	36	39	42	46
Subtotal	5,950	7,356	8,096	8,693	9,391		245	312	343	368	396	356	452	497	534	574
Non-industrial land uses (5%)	1,455	1,765	1,942	2,088	2,259	30	49	60	66	71	77	71	87	96	103	111
Total	29,105	35,298	38,845	41,767	45,180		987	1,219	1,339	1,437	1,553	1,420	1,749	1,922	2,063	2,225

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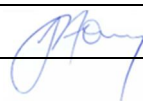
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