Parkes Special Activation Precinct

Economic and industry analysis
Final report

August 2019

SGS Economics & Planning

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Table of contents

Executive summary

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Executive summary

Introduction

Parkes LGA is a shire with a population of 15,250 in the Central West Region of NSW. It sits at the crossroads of Australia's major freight rail lines, connecting Brisbane to Melbourne and Adelaide and Sydney to Perth. As part of major freight infrastructure investment, The Australian Government-owned Australian Rail Track Corporation (ARTC) are investing in upgrades to this inland rail line to improve freight rail efficiency across Australia. As part of this upgrade, the north-south and east-west lines are being connected at Parkes township.

The NSW Government, in partnership with Parkes Shire Council, have committed to investing the development of a clear vision for the land that encompasses this nationally-significant freight line intersection. The precinct has been designated a Special Activation Precinct (SAP) by the NSW Department of Planning and Environment and Department Premier and Cabinet. This designation has set aside 5,600 hectares of land to develop a significant economic and employment driver to make best use of the investment in the Inland Rail line.

As part of this investment, a multi-disciplinary team has collaborated to develop a structure plan for the SAP. This report forms part of this analysis.

Report purpose

The economic and industry analysis report, prepared by SGS Economics and Planning, supports the development of the structure plan in several ways. The report:

- Provides context on the economic and demographic profile of the region surrounding the Parkes LGA, including industries of specialisations
- Analyses supply chain linkages that are likely to play a role in the development of and attraction to the Parkes SAP
- Develops several distinct but complementary economic narratives that drive the industry attraction potential of the SAP
- Develops three growth scenarios to test the take up and employment generation potential of the Parkes SAP
- Develops employment and land area projections for the Parkes SAP over the long term
- Provides a narrative for the sequencing and likely drivers for industry establishment in the precinct
- Considers the implication on the Parkes LGA population as a result of potential future employment growth.

This report summarises the analysis undertaken in this study. It is accompanied by an interactive model that provides more detail on the growth of the SAP and allows users to test different growth scenarios.

Economic narratives

This study, in collaboration with others in the structure plan team, identified three key economic narratives that will underpin the SAP's development and attraction to industry. These are:

- A major freight and logistics hub serving road and rail, building on the investment in the Inland Rail and investment in the Newell Highway's bypass of Parkes township
- An advanced agribusiness precinct with intensive agricultural activity focused on increasing the value proposition of agriculture in the area and increasing Parkes' position in the value chain through co-location with food process and distribution functions
- A leading waste transition precinct, led by an energy from waste and resource recovery facility that supports new manufacturing industries as part of a circular economy.

Each of these narratives are intertwined through the SAP's various sub precincts. The development of the SAP will require certain industries catalysing others to grow. In doing so, the SAP's industry and employment narrative is one that recognises the long-term nature of such a precinct and particularly one growing in an area where employment growth has been historically low.

Catalyst investment

The growth of the Parkes SAP will occur incrementally and be instigated by first movers who take advantage of the Inland Rail and establishment of the SAP streamlined planning process. Those that do move first will effect those who follow. This report identifies likely first movers, drawn to the precinct by the road and rail interface, linkages with surrounding industries (such as mining and agriculture) and the established role of the major active land owners – Pacific-National and SCT.

Longer term industry investment is predicated on discussions with multiple stakeholders and policy and market drivers. Opportunities such as an energy from waste and resource recovery industry will be driven by state regulation and supply chain linkages. Value-adding food processing will be driven by an established distribution network and potential future intensive agricultural opportunities in the SAP.

Executive summary

Employment growth

Over the past ten years, employment in the Parkes LGA has grown by 0.9% pa between 2006 and 2016. The SAP is likely to attract a number of different yet inter-dependent industries and businesses over twenty years and beyond. It is anticipated that by 2041, the SAP could generate between 2,147 and 3,016 jobs in the precinct.

Employment multipliers

Jobs growth in the SAP is likely to create additional employment opportunities in the wider Parkes LGA. Applying the region's employment multiplier to the direct jobs anticipated in the SAP, there could be between 1,767 and 2,482 additional jobs created within the Parkes LGA. These are considered to be on the high end of the estimation, as the precinct's growth rates already account for general industry growth as part of the projections. However, with a significant increase in employment in the region, the flow-on impacts will likely create additional employment opportunities over the long term.

Land area take up

The growth of the Parkes SAP is likely to radiate out from several points of establishment. The most significant of these will be the Regional and Mixed Enterprise sub-precincts, where much of the initial investment is likely to occur.

Over time, the SAP is likely to grow significantly and by 2041, the total lot coverage is expected to range between 808 hectares (low scenario) and 1,112 hectares (high scenario). These land estimates do not take into consideration roads, open space or any other non-lot land requirements.

Alignment with regional labour market

The creation of new jobs in the SAP is likely to have at least some impact on the population of the Parkes LGA and surrounds. With approximately 5,400 jobs in the Parkes LGA in 2016, even a low growth scenario will have a significant impact on the regional economy, which under a business as usual growth scenario (without the SAP) is expected to add only around 250 new jobs by 2041.

A number of factors will determine how much of the projected jobs growth can be absorbed by the current and future labour market. This will be driven by skill alignment, willingness for people to travel and the ability for the region to retain young people who often leave regional areas due to a shortage of employment opportunities.

However, the projections for the SAP suggest employment growth in excess of what would organically occur. This may require people to move into Parkes LGA to service these jobs and this will have an impact on the size of the population. The scale of this impact will depend on the skill alignment with the current population and the ability for the existing labour market to absorb these new jobs, through means such as a reduction in unemployment and underemployment, retention of younger population and even the servicing of jobs by residents from other LGAs.

EMPLOYMENT GROWTH IN SAP

	2021	2026	2031	2036	2041
Low Growth	1,204	1,321	1,982	2,061	2,147
Medium Growth	1,204	1,352	2,117	2,347	2,628
High Growth	1,204	1,420	2,301	2,751	3,016

EMPLOYMENT MULTIPLIERS IN PARKES SHIRE LGA

	2021	2026	2031	2036	2041
Low Growth	991	1,087	1,631	1,696	1,767
Medium Growth	991	1,113	1,742	1,931	2,162
High Growth	991	1,168	1,893	2,264	2,482

LAND AREA GROWTH IN SAP (Hectares)

	2021	2026	2031	2036	2041
Low Growth	519	553	759	782	808
Medium Growth	519	568	808	879	965
High Growth	519	601	881	1,027	1,112

Introduction

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Introduction

Project context

In 2018, the NSW State Government launched the Special Activation Precinct program, aimed at supporting business investment in regional NSW through coordinated planning and infrastructure delivery processes.

Parkes Shire Council were identified as the location for the first of these Special Activation Precincts (SAP). This was driven by Commonwealth investment in the Inland Rail network through the Australian Rail Track Corporation (ARTC). Specifically for Parkes, this involved the linking of the north-south and east-west freight rail lines through a connection immediately to the west of the Parkes township. Additionally, the NSW Government is investing in a major upgrade to the Newell Highway that will bypass Parkes and come close to the rail lines. The SAP is a designated 5,600 hectare site that is centred on this major investment.

The NSW Government, through the Department of Planning and Environment have commissioned a series of complementary studies to inform the master plan of the SAP and, ultimately, guide the development of a business case to support its realisation.

This report

This report provides guidance on the industry mix, growth potential, land use take up and employment potential of the SAP.

The report is structured in the following way:

- **Chapter 1 – Socio-economic analysis.** Provides a brief overview of key demographic and economic indicators of the Parkes Shire and surrounding area.
- **Chapter 2 – Supply chain and industry linkages.** Examines the likely industries attracted to the Parkes SAP and the supply chain linkages that may attract future investment.
- **Chapter 3 – Economic narratives.** Establishes three distinct yet complementary economic narratives that will underpin the growth of the Parkes SAP.
- **Chapter 4 – Land use implications.** Examines that potential land use functions, business types and operational scale of future industries.
- **Chapter 5 – Considering growth.** Introduces the concept of the Three Horizons that will govern the long term growth strategy of the Parkes SAP.
- **Chapter 6 – Master plan growth projections.** Provides detailed projections for both land area and employment under three growth scenarios for the Parkes SAP and wider Parkes LGA.

Certain sections are supported by additional information contained in several appendices.

Socio-economic analysis

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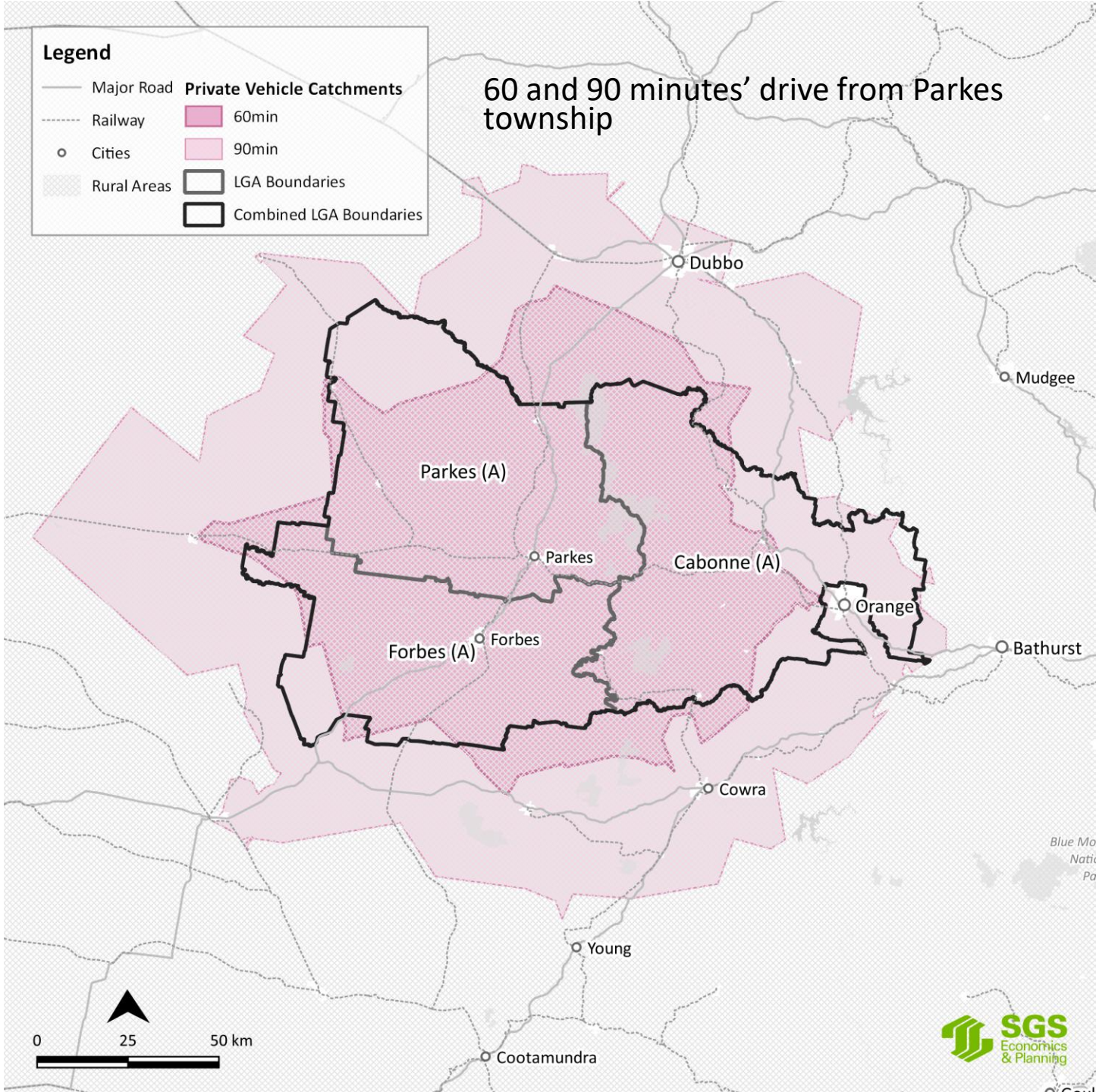
Labour catchment

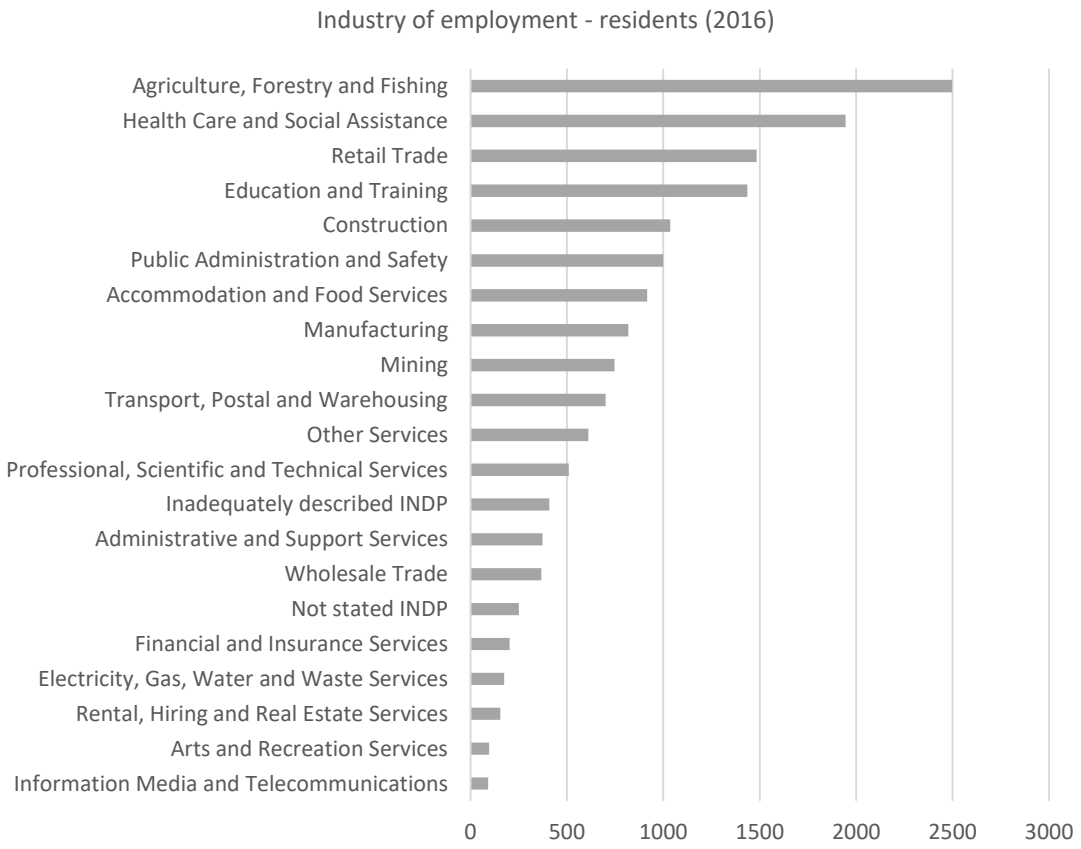
The Parkes township is located approximately 300km from the outskirts of Sydney. It is about 90 minutes' by car from the next largest towns in the Central West Region – Dubbo and Orange.

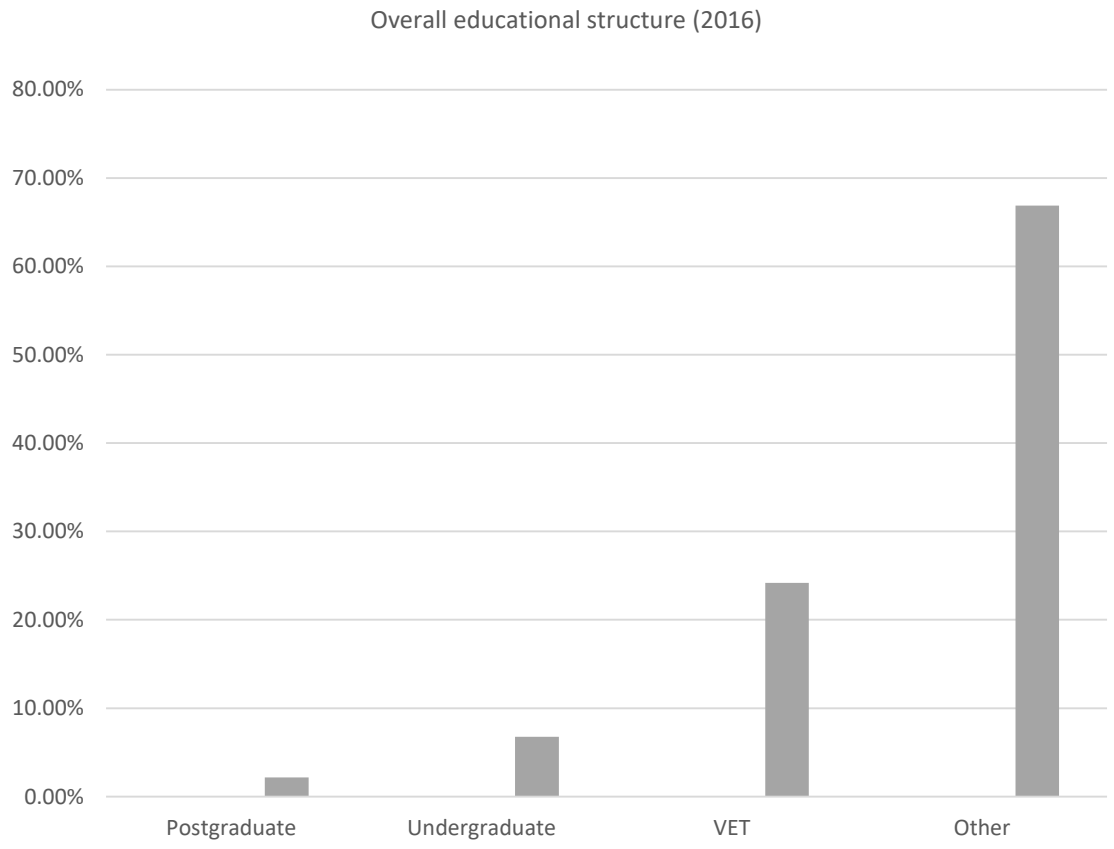
The profile of the surrounding labour catchment provides an insight into what types of industries operate in the Parkes township's immediate vicinity but importantly, what the type of skills and labour market depth is accessible in the short term as the Parkes SAP develops.

The socio-economic analysis considers the profile of the three LGAs that surround Parkes township within that travel time catchment – Parkes, Forbes and Cabonne. These are collectively referred to as the Parkes catchment in this chapter.



Socio-economic profile insights

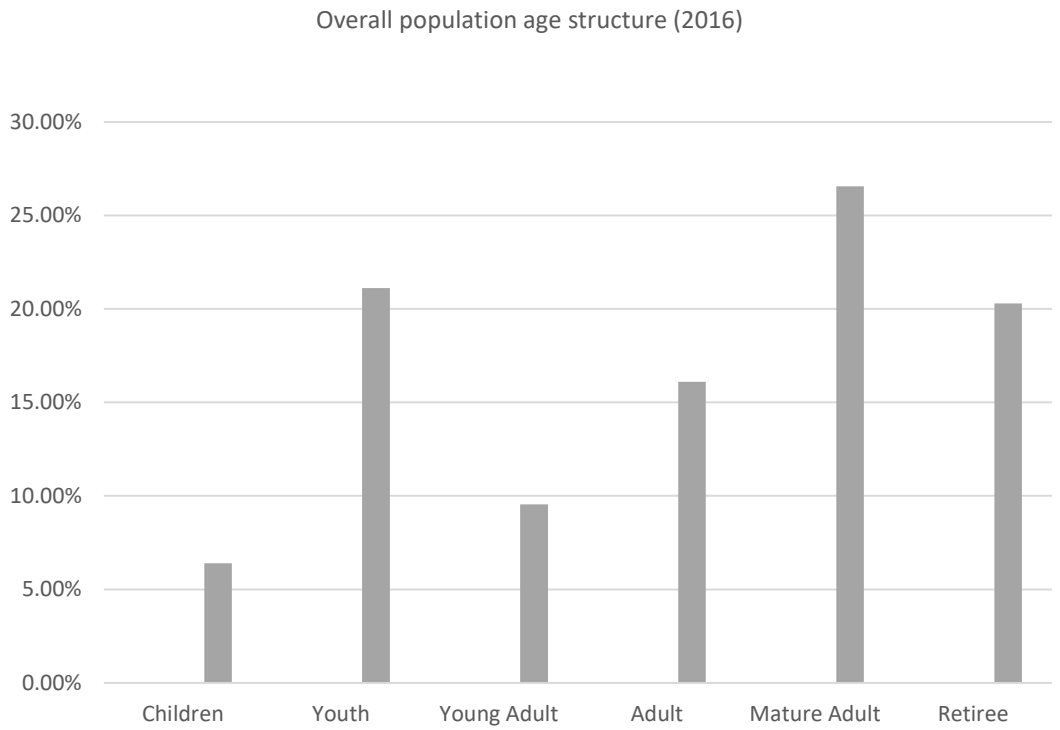


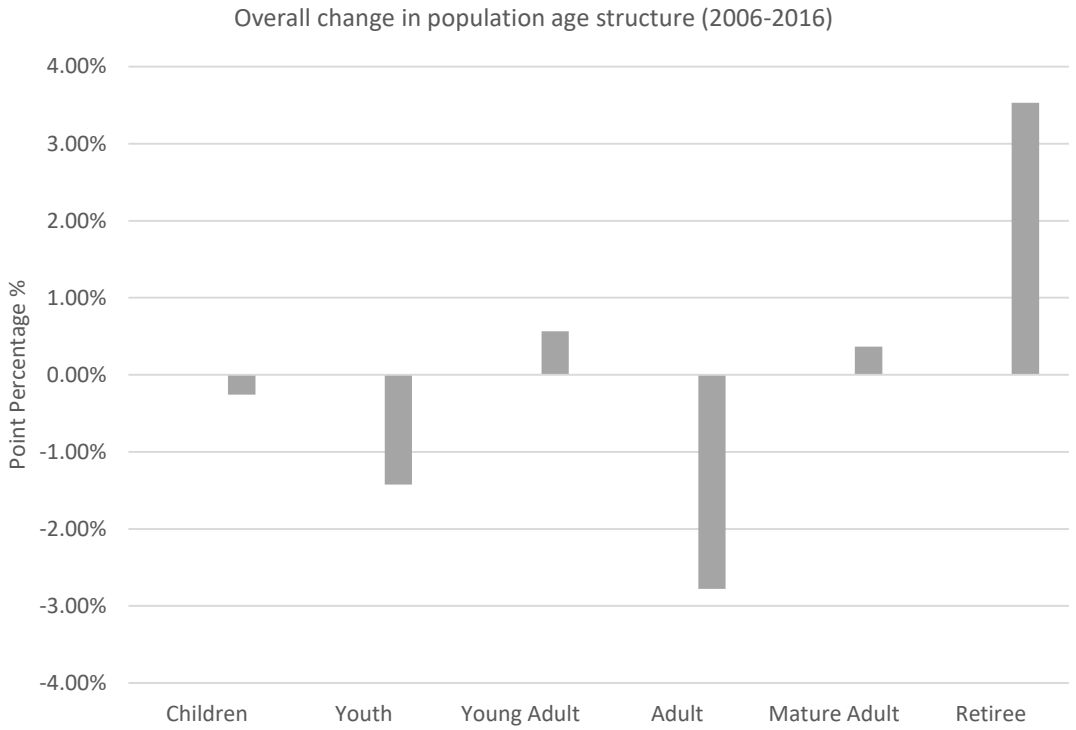


Typical of a regional area, there are two main types of industry employing the residents in the Parkes catchment. The first are resource, production and agriculture-related (agriculture, mining, manufacturing) and the other are population-serving industries (retail, health care, education).

Reflecting the type of industries that employ high numbers of the catchment's residents, the educational attainment of the catchment population has a higher proportion of those with training from Vocational Educational Providers (for instance TAFEs) and other sources, with a lower proportion of the population having undergraduate degrees or above.

Socio-economic profile insights





As with many regional areas, the Parkes catchment has a bias towards an older population, with Mature adults and those 65 and over making up nearly half the population. This has potential implications for the future industries locating in Parkes given that there are relatively low levels of people of working age (accounting for only a quarter of the catchment's population).

The higher level of youths does hold promise as these are the employees of the future. The challenge is ensuring that there are appropriate and diverse employment opportunities for these residents AND that there are appropriate educational facilities and/or workplace training schemes to keep them in the region rather than leaving for opportunities in larger centres.

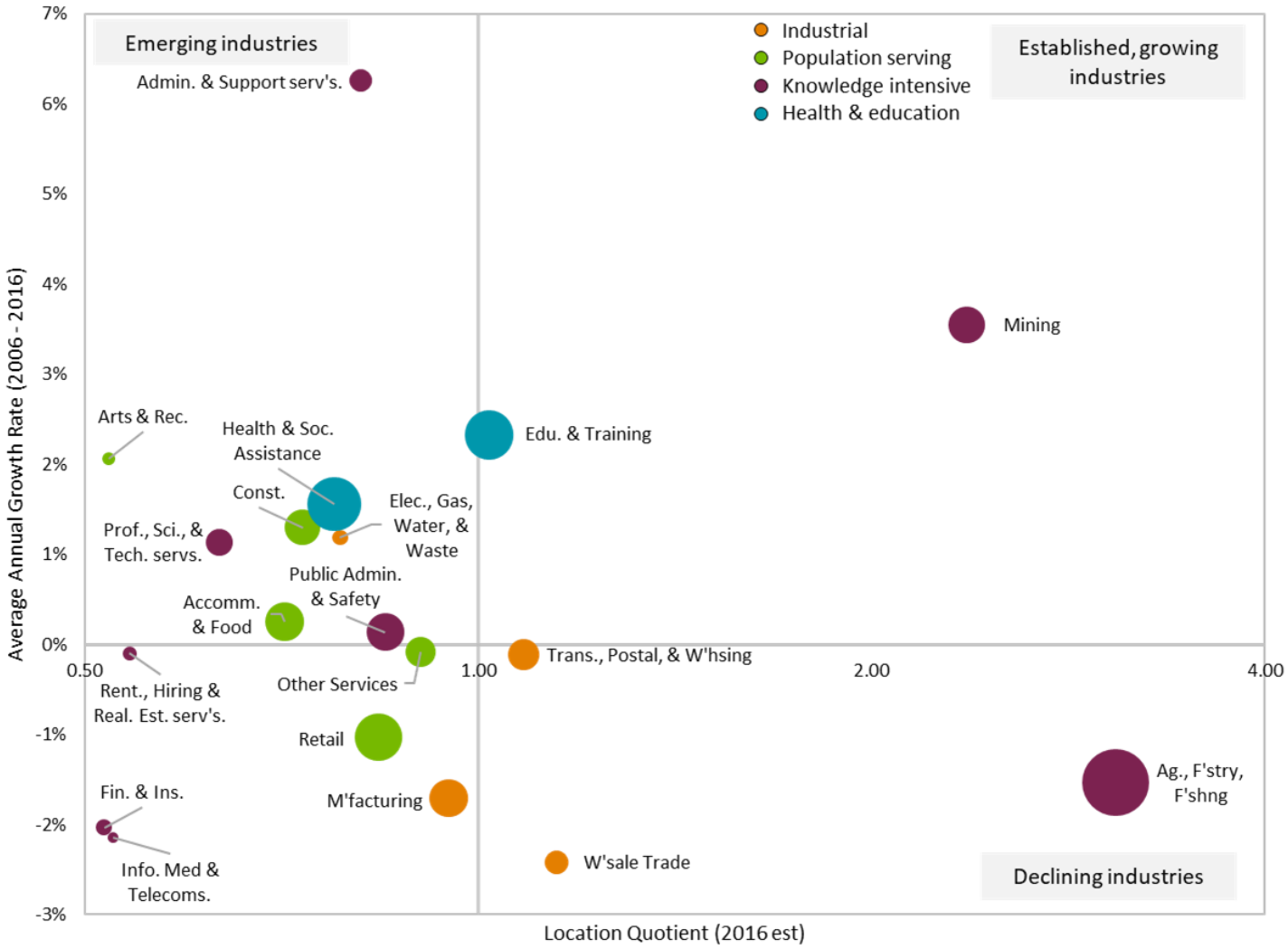
Socio-economic profile insights

Location Quotient analysis compares one geographic region with a larger one that it is part of, to understand how a place's industries are performing relative to a wider region (in this case, the three LGAs compared with NSW).

There are clear specialisations in the region for Agriculture and mining-related sectors, however in terms of employment, Agriculture has declined between 2006 and 2016. The region's only other relative specialisation is Transport, Postal and Warehousing –related industries which are relatively stable in terms of growth between 2006 and 2016.

Ideally, the Parkes SAP would leverage the relative specialisations observed in the region as they form the basis of its competitive advantage.

The other industries of scale are heavily centred on population-serving industries and do not offer any inherent opportunity that other regional centres would not also have.



Supply chain and industry linkages

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Supply chain analysis - Approach

There are a number of industries that *could* locate in the Parkes SAP. To refine this, analysis of the Australian Bureau of Statistics National Accounts database was used to map the strength and relevance of industry relationships upstream and downstream of identified primary industries.

As a predominantly agricultural region, much of the Central West economy is focused on industries upstream in the supply chain. The Parkes SAP has an opportunity to do two things:

1. Shift towards higher value agriculture (and away from lower value such as cropping for feed and water intensive low value uses)

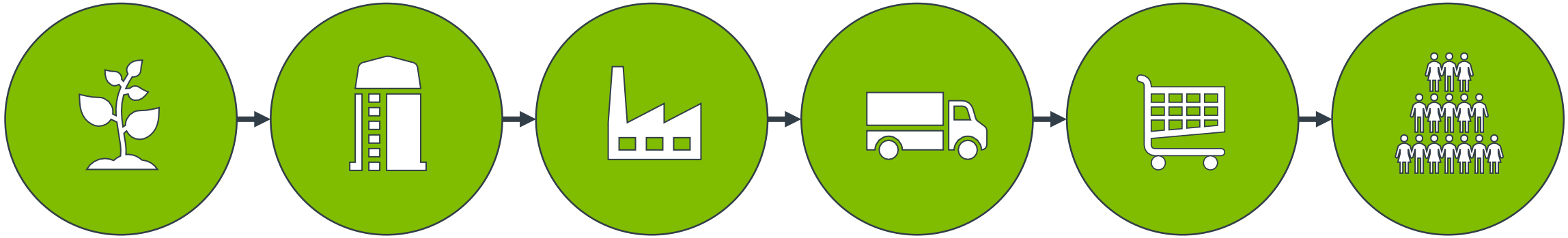
2. Capture more of the downstream supply chain uses that add increasing value

Building on three distinct (but potentially overlapping) overarching economic narratives (outlined later in this report), SGS has undertaken a staged process of analysis to understand the potential industry mix that the Parkes SAP could support.

Firstly, a suite of primary industries was identified. These are considered critical to the realisation of each of the identified economic narratives and would be the drivers of investment and business attraction.

Secondly, mapping the Australian supply chain data identified secondary upstream and downstream industries that relate to these primary industries. This mapping has facilitated the identification of potential complementary and co-locating industries that would support the development and realisation of such an economic vision. The industries of interest are the ones where there is a reasonable share of trade towards or from the primary industry, compared to other industries.

Finally, businesses that were considered representative of these industries was captured (along with their form and employment profile) to understand the spatial and built form characteristics that may characterise the SAP under different economic directions.

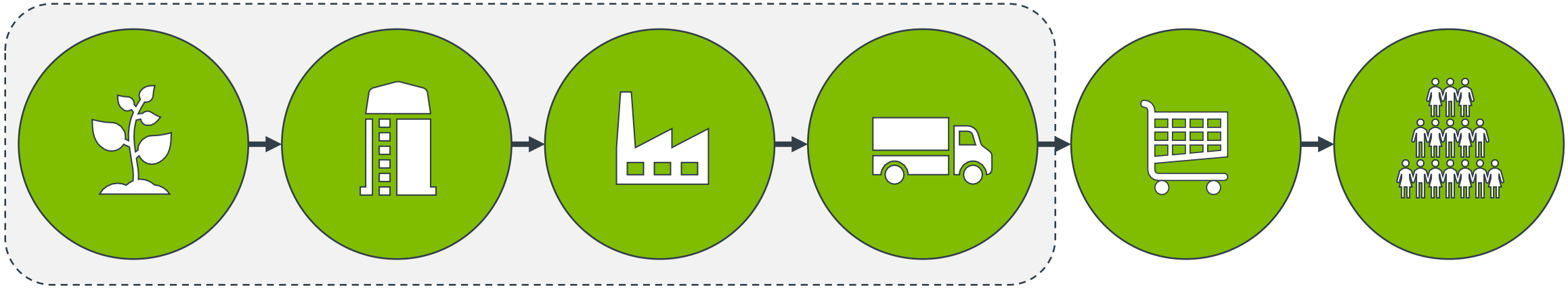


Supply chain analysis – the benefits of co-location

There are numerous benefits to co-locating related industries or functions within a precinct of this scale:

- **Infrastructure optimisation.** Precinct-wide infrastructure (such as roads, water, energy systems etc) can be provided once for a suite of industries and tailored towards their specific needs).
- **Shared facilities and services.** Certain operations may serve multiple businesses. For instance a freight handling business or warehousing can support many business operations if appropriately located. This extends down to complementary retail operations that may exist on site. It also includes the ability to share service provision (such as repairs) and gives these businesses a wider customer base.
- **Business collaboration.** Businesses with direct connections benefit from engaging with suppliers or customers. This can facilitate specialisation or innovation of product.
- **Travel time savings.** Businesses can save time and money by reducing distances travelled to deliver or receive goods. This provides suppliers with longer lead times and can reduce cost of products by reducing freight handling.
- **Precinct identity.** A coherent cluster of complementary industries can become self-fulfilling by identifying the precinct as having a particular specialisation and attracting further businesses to locate in the region.
- **Employment opportunity.** A wider ranger of industries provides more employment opportunity and potential for career mobility within the region rather than requiring residents to move with employment.

It is highly unlikely that the Parkes SAP will be able to capture ALL of the upstream and downstream sectors in the relevant supply chains. This is particularly the case with downstream linkages as the final products often end up in areas of high population where markets are larger. Instead, Parkes should consider capturing its share of the supply chain co-location opportunities from production through to distribution (or export).



Parkes SAP's competitive offer

The Parkes LGA has a number of characteristics that present a competitive offer to attract industries to the region. These include:

- **An established agricultural and mining sector**. These industries characterise the economy of the Parkes LGA (and the Central West Region), although it is noted that while Mining continues to grow in demand, in terms of employment, Agriculture is declining and is also subject to increasing climate volatility. Notwithstanding this, the skills of the region's workforce lend themselves to supporting a transition towards a different type of agricultural role.
- **Location on Inland Rail.** At the intersection of the Brisbane to Melbourne and the Sydney to Perth Lines, Parkes township is extremely well connected to the Australian freight network and this is an advantage afforded to no other town in Australia.
- **Committed infrastructure investment.** Committed investment by ARTC to develop a connection between the two freight lines at Parkes increases the competitive advantage of the region by providing unparalleled national freight connectivity. The commitment by the NSW Government to upgrade the Newell Highway bypass further strengthens this advantage by connecting road and rail-based freight.
- **Existing freight and logistics operations.** Existing businesses (Pacific National, SCT, Linfox) are already taking advantage of this infrastructure connectivity and have an established (and growing) presence in the Parkes SAP area. These already have intermodal terminal infrastructure and support the emergence of a freight and logistics identity for the region.
- **Availability of land.** There is significant land available surrounding the SAP with relatively unfragmented land ownership patterns. Unlike more urban precincts, there are few land constraints driving the scale of the precinct.
- **Co-ordinated government approach.** The Parkes SAP has co-ordinated support at all levels of government, from local Council, multiple state agencies and Commonwealth awareness.

It is important to recognise that the Parkes SAP does not exist in isolation. Along the inland rail lines, other regional centre such as Dubbo, Wagga Wagga and Wodonga all have aspirations for economic development based on similar characteristics. While the Parkes township's location at the intersection of the two inland rail lines is a unique advantage, other regions have larger centres to draw from a deeper a labour market, established hubs, exiting industry or instructional partners (such as universities) and so on.

It is important therefore that these are acknowledged and that Parkes SAP works to its specific strengths to build a clear economic identity that is distinct from these others.

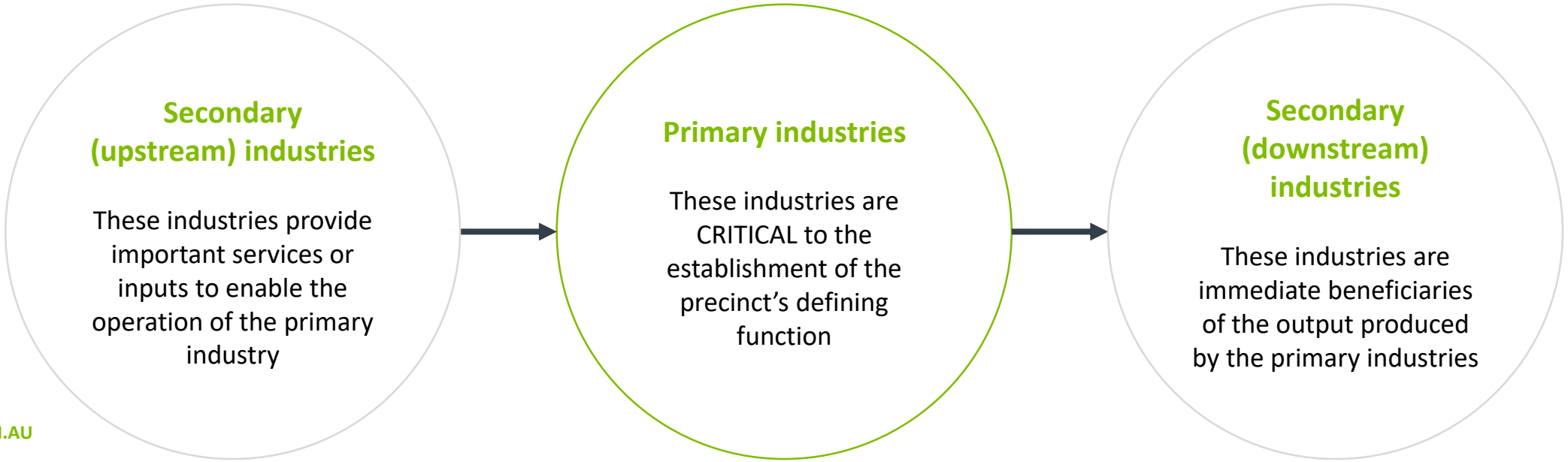
Industry linkages

For each economic narrative, a selection of primary industries has been identified that are considered *critical* to the operation of the precinct under such a scenario. That is, without these industries (or functions) there would not be the ability to develop a precinct with that particular role and identity.

While the specific industries are identified later in this report, by way of example, a precinct with a freight and logistics specialisation could not operate without freight handling activities or distribution centres. An agribusiness precinct could not operate without some sort of intensive agriculture and a waste transition precinct could not operate without some sort of processing facility.

While a precinct with these primary uses could operate, there are a number of supporting industries that will consolidate the role of the precinct under that economic scenario and help to develop a specialised identity. These supporting industries are referred to as 'secondary' industries and can be either upstream or downstream of the primary industry. The are identified as a result of observations of Australia-wide industry linkages. The benefits of co-locating the supporting industries creates a specialised industrial ecosystem that creates economies of scope that the precinct can trade under and develop its specialisation.

For the reasons discussed previously, there are multiple operational benefits to co-locating these businesses in the same precinct. This analysis identifies potential secondary industries that will aid the establishment and specialisation of the precinct under one or more of the over-arching economic narratives.



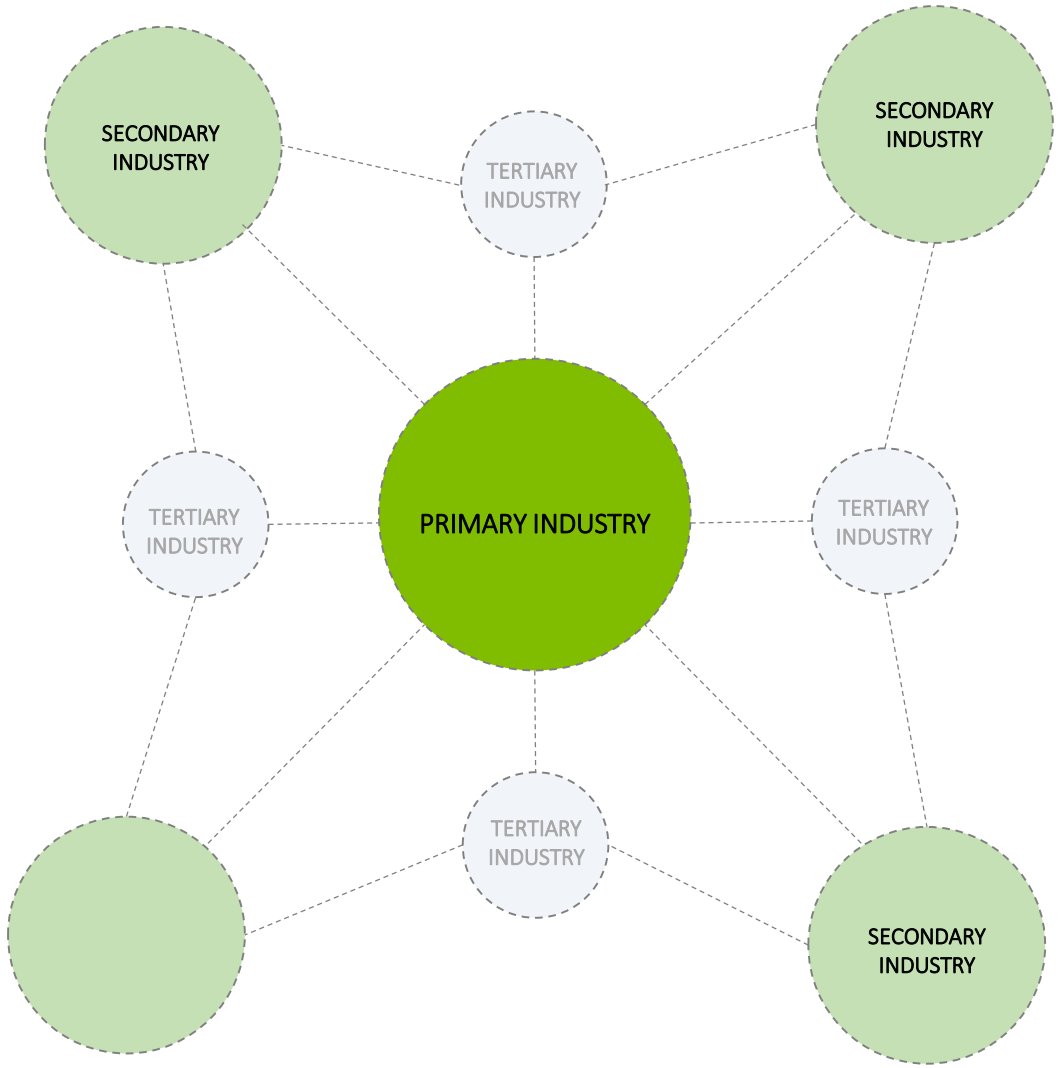
Industry linkages

A number of industries that reflect what are considered to be critical to the development of the precinct's economic narrative have been identified for each economic narrative. Secondary industries identified as having strong linkages to one or more of those primary industries are then identified both upstream and downstream.

Tertiary industries are also to be considered in any land use planning. These are smaller 'infill' industries that support bot the primary and secondary operations.

Of note is the repetition of certain industries across more than one of these primary and secondary (upstream and downstream) industries. These reflect the complexity of industry linkages and the fact that multiple primary industries have been identified. Those that do appear several times pose high potential for attraction as they are likely to support multiple industries in the precinct.

In practice, there is likely to be some sort of industry linkage across all the industries that make up the Australian economy. Not all are necessarily relevant to the Parkes SAP. Those that are have been identified. A detailed breakdown for both upstream and downstream industry relationships, including the share of trade, is included in Appendix 1.



Economic narratives

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Economic narratives

There are a number of distinct but potentially inter-connected economic narratives that could underpin the development of the Parkes SAP.

These have been used as guiding visions to understand what industries may seek to locate in a precinct with these identifying characteristics.

Each of these economic narratives are supported by a potentially different mix of industries that would reflect the SAP's role.

They are not, however, mutually exclusive and each comes back to a fundamental economic, locational or infrastructure-related platform from which to build a competitive advantage.

Central to all is the precinct's location at the intersection of major road and rail freight networks.

These over-arching narratives are explored further through this report.

Parkes is…

The largest inland freight and logistics hub in Australia, connecting regional NSW to the major interstate centres, with a focus on agricultural and minerals freight efficiency and removal of trucks from national highways

Parkes is…

An advanced agribusiness and tech precinct, producing high-value agricultural produce, co-located with up-and-downstream value-adding processes. The precinct is focused on the domestic and/or international export market

Parkes is…

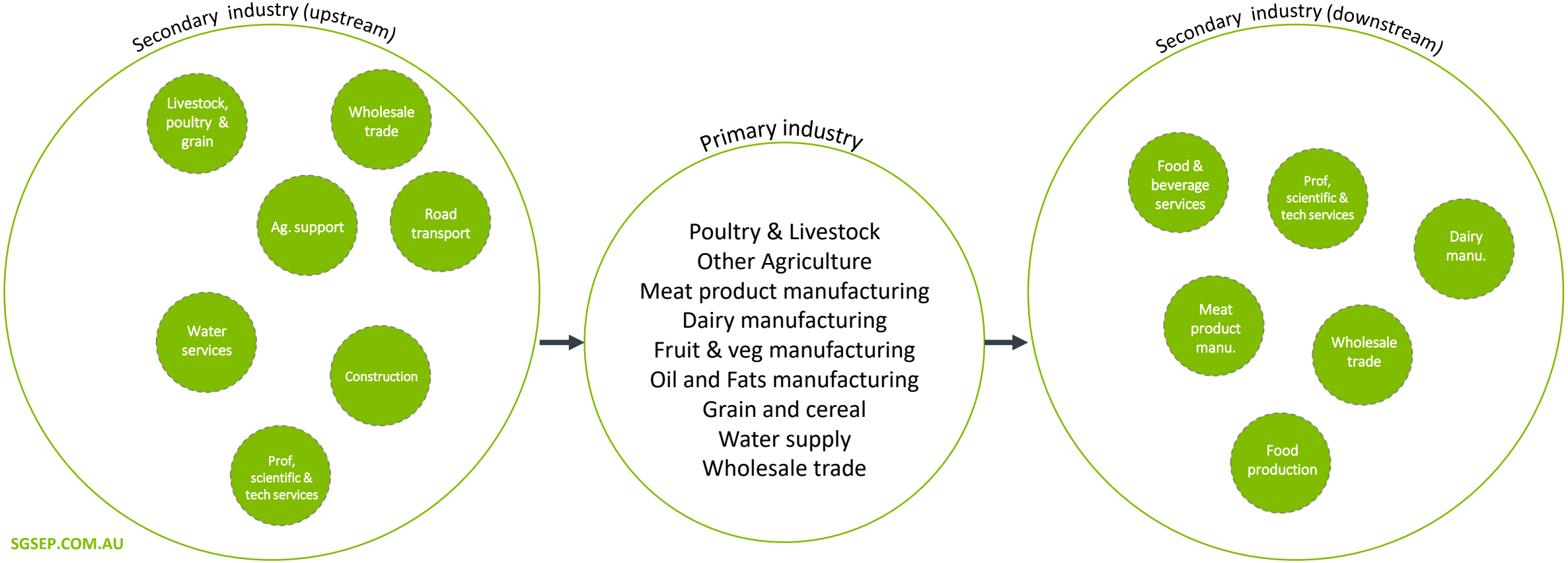
Australia's leading circular economy precinct, focused on waste recovery, waste to energy and waste to resource economies, with potential attraction to other advanced manufacturing sectors

Economic narratives - Agribusiness

Industry supply chains

The agribusiness economic narrative is characterised by a collection of industries that focus on either intensive agriculture (such as Berries, tomatoes, and other vegetables, cut flowers etc) or food processing-related industries. These comprise the identified Primary industries that would drive this economic cluster. The rationale for including both is to distinguish the precinct from simply an agricultural area that is typical of the Central West regional broadly.

A number of secondary industries have been identified both upstream and downstream that may benefit from co-locating in such an agribusiness-focused precinct. These include logistics-related industries such as road transport, agricultural production, agricultural support services and food processing and production.

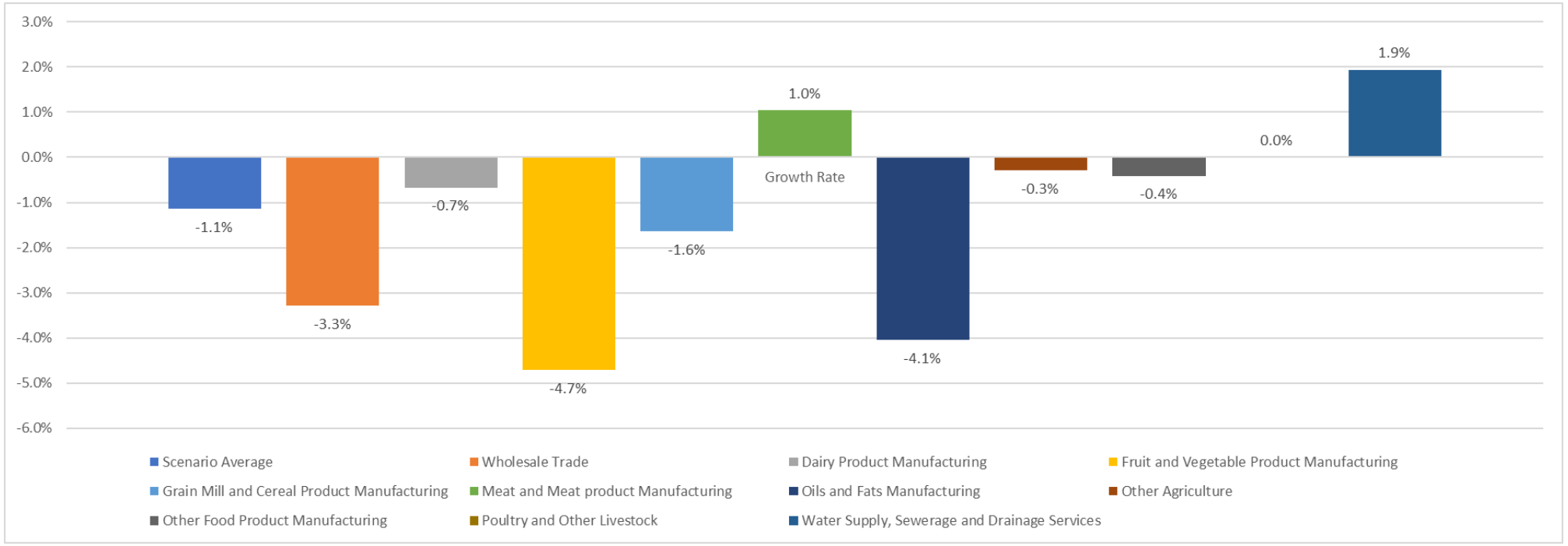


Economic narratives - Agribusiness

Industry growth (national)

Across Australia may of the relevant agricultural industries have seen declines in employment. This is symptomatic of an industry facing increased climate volatility, lower profit margins and increasing automation.

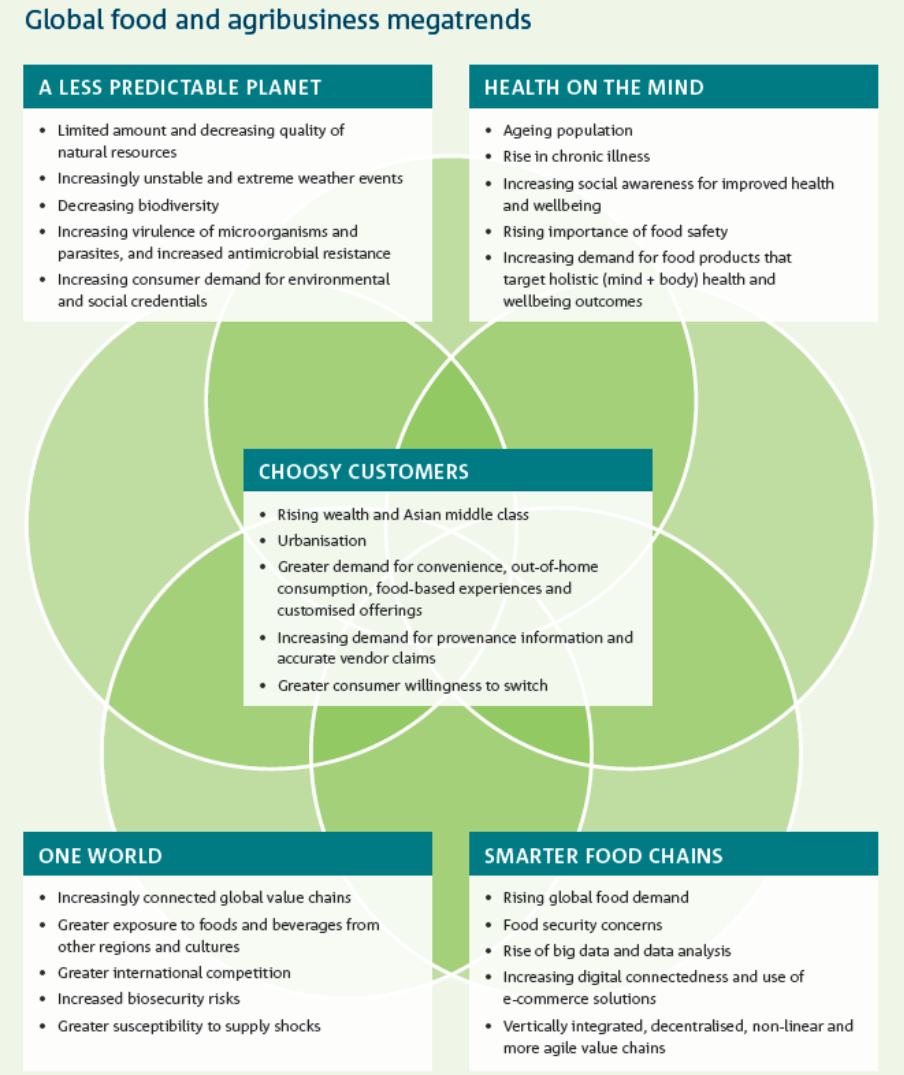
	Jobs			
Industries	**2006**	**2011**	**2016**	**CAGR**
Wholesale Trade	108,992	108,724	78,011	-3.3%
Dairy Product Manufacturing	15,251	15,595	14,253	-0.7%
Fruit and Vegetable Product Manufacturing	13,043	10,563	8,043	-4.7%
Grain Mill and Cereal Product Manufacturing	7,759	7,243	6,574	-1.6%
Meat and Meat product Manufacturing	42,793	43,381	47,447	1.0%
Oils and Fats Manufacturing	1,319	1,284	872	-4.1%
Other Agriculture	51,964	43,451	50,455	-0.3%
Other Food Product Manufacturing	16,670	17,019	15,998	-0.4%
Poultry and Other Livestock	13,722	12,615	13,726	0.0%
Water Supply, Sewerage and Drainage Services	20,407	25,459	24,732	1.9%



Economic narratives - Agribusiness

Drivers

- Increasing population and prosperity driving increased expenditure on food
- Australia is counter-seasonally positioned compared with other international food producing competitors
- Climate volatility driving the need for investment in agtech and new, more appropriate crops and livestock
- Market access with close proximity to Asian markets
- Big data & data analytics driving new approaches to agriculture
- Quality control requirements increasing
- Australian government policy focus on agtech development
- Changing consumer preferences- demand for healthier, more convenient and traceable foods



CSIRO Futures Food and Agribusiness Roadmap, 2017

Economic narratives - Agribusiness

Case study: New England Agtech cluster- Armidale, NSW

- University of New England has a 2,900 hectare Smart Farm and Innovation Centre located in Armidale, NSW.
- Built a reputation for pairing high-quality research and development with innovative local business efforts
- Greater efficiency, productivity and improved working life compared to entrepreneurs going it alone
- Received support to connect Agtech start-ups with global markets

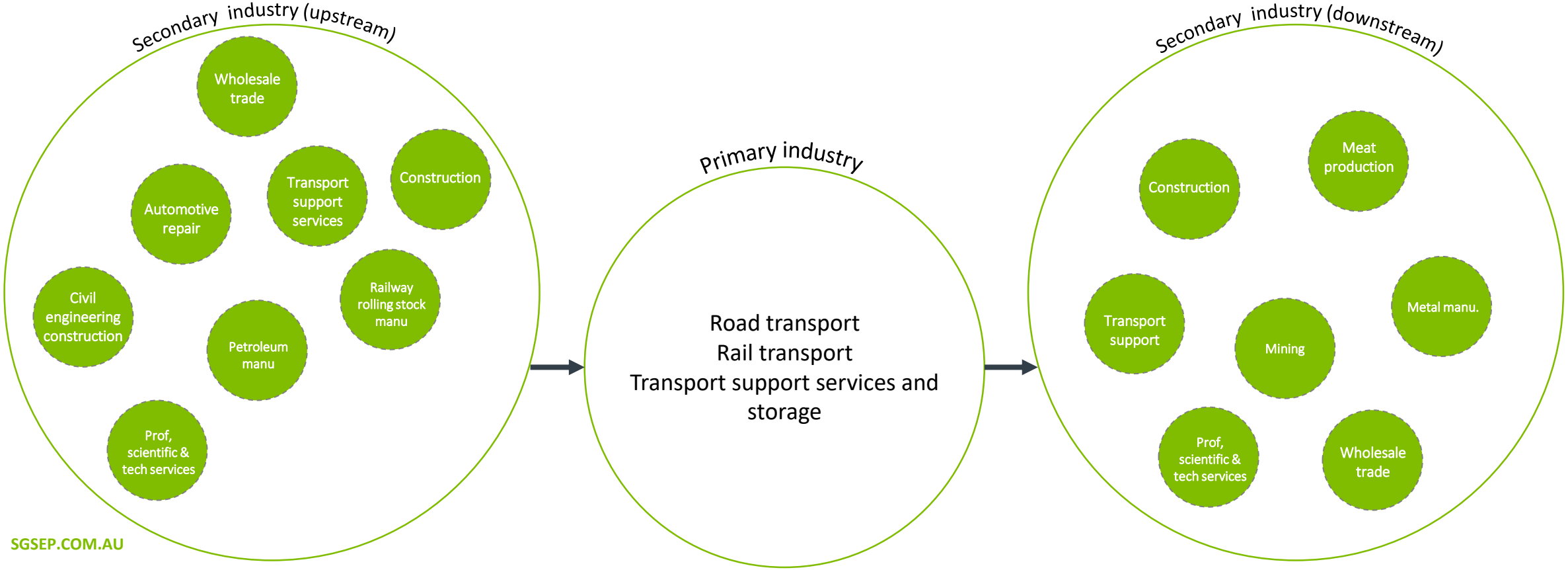
UNE Business School blog, 2016

Economic narratives – Freight & Logistics

Industry supply chains

The freight and logistics economic narrative is characterised by a focus on transportation. This is to do with such a clusters' reliance on the moving and handling of freight. Without such facilities, a freight and logistics facility would not be able to operate.

A number of other industries rely on freight movement and storage, hence the upstream and downstream industries being relatively diverse.

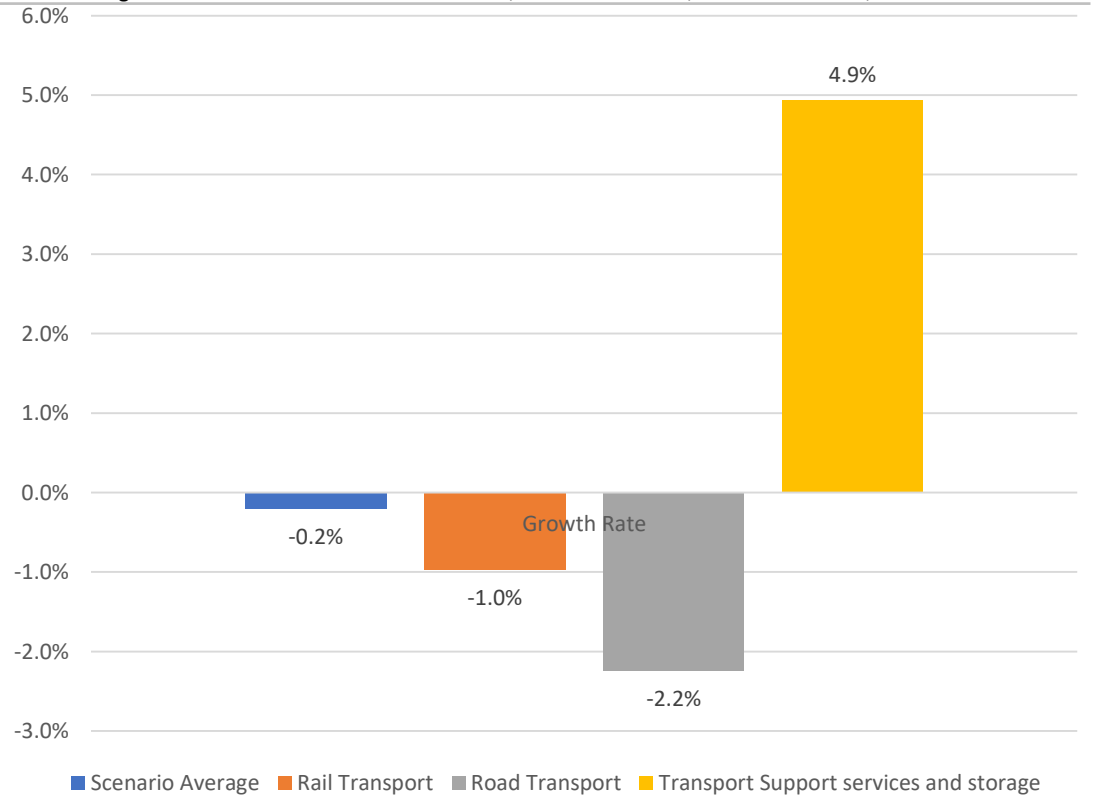


Economic narratives – Freight & Logistics

Industry growth (national)

Both rail and road transport have seen declines in employment while jobs aligned with transport-related storage have grown considerably.

	Jobs			
Industries	**2006**	**2011**	**2016**	**CAGR**
Rail Transport	29,384	36,838	26,644	-1.0%
Road Transport	162,451	165,985	129,525	-2.2%
Transport Support services and storage	49,662	57,425	80,413	4.9%

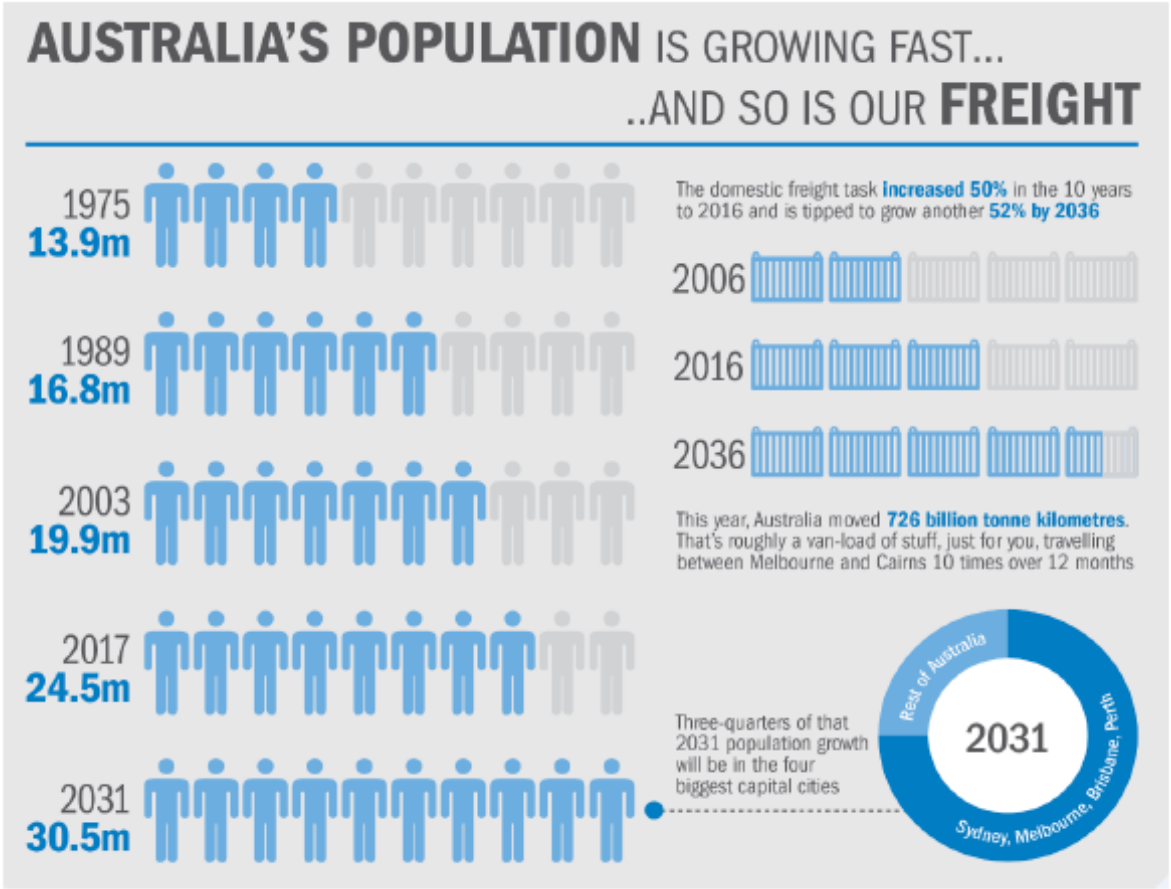


Economic narratives – Freight & Logistics

Drivers

A number of factors influence the demand for freight and logistics operations across Australia.

- Continued growth in freight volumes and increased demand for goods, particular in line with growth in online retail and allied distribution demands
- High domestic population growth will naturally grow the demand for products
- New technology is increasing automation of freight and logistics, both in terms of the storage and packaging in warehouses as well as the emergence of autonomous trucks
- Changing consumer preferences and demands, with a rise in bespoke and customised production and increased demand for just-in-time deliveries
- Gradual decline of domestic manufacturing requiring products produced overseas being shipped and distributed
- Australian Government interest in maintaining international competitiveness, particularly with the growth of advanced manufacturing



Department of Infrastructure, Regional Development and Cities, 2018

Economic narratives – Freight & Logistics

Case study: Daventry Intermodal Rail Freight Terminal- Midlands, UK

- Large, multi-user, multi-product regional intermodal terminal
- UK's largest rail-linked logistics development, handling around 200,000 containers per year
- Open-user rail terminal, a private rail terminal for Tesco, 39 hectares of warehousing and 18 hectares for rail-linked warehousing
- Offers distribution and manufacturing floorspace- has attracted major distribution and retailing occupiers

PWC, 2017

Economic narratives – Freight & Logistics

Case Study: Toowoomba Freight and Logistics Hub, Queensland

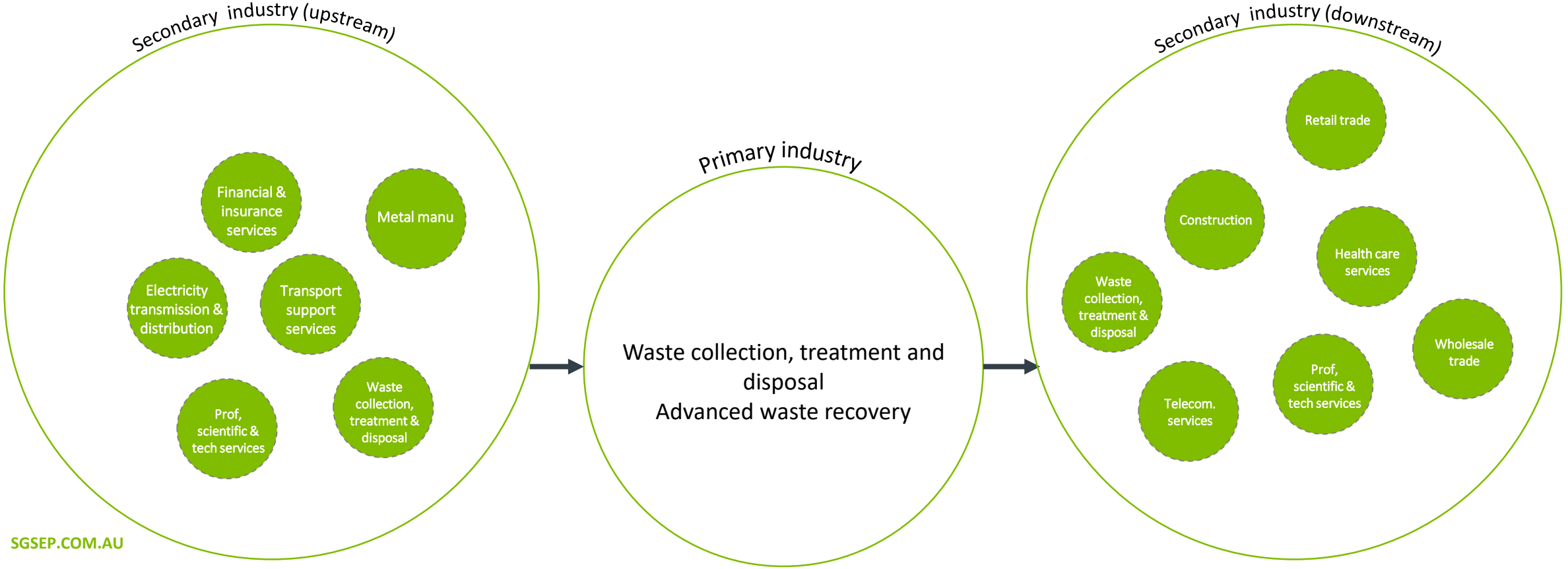
- 2,000 hectares of industrial land at the western outskirts of Toowoomba culminating in one of the largest transport, logistics, and business hubs in Australia
- 50% of freight that moves through the Port of Brisbane comes through Toowoomba
- Adjacent Wellcamp Airport has a focus on flying freight to Asia- just 8km away from Toowoomba
- Runs 250,000 IMEX Twenty Foot Equivalent Units' on its rail service per year

Colliers International, 2018

Economic narratives – Waste transition

Industry supply chains

The process of collecting, treating and disposing of waste is considered a critical component to any waste transition precinct. The term waste transition is used as it covers a range of waste-related process including waste to energy, waste recovery and waste to resource functions. The repetition of Waste Collection in the secondary industries suggests that there is relatively high levels of interaction within the waste industry between businesses. Australia does not appear to have a strong waste recovery or waste to energy sector and, as such, waste-related industries are often towards the end of the supply chain (past the consumer use phase of a product's life-cycle). There is opportunity therefore to increase the relevant secondary industries downstream to support the emergence of this new industry.

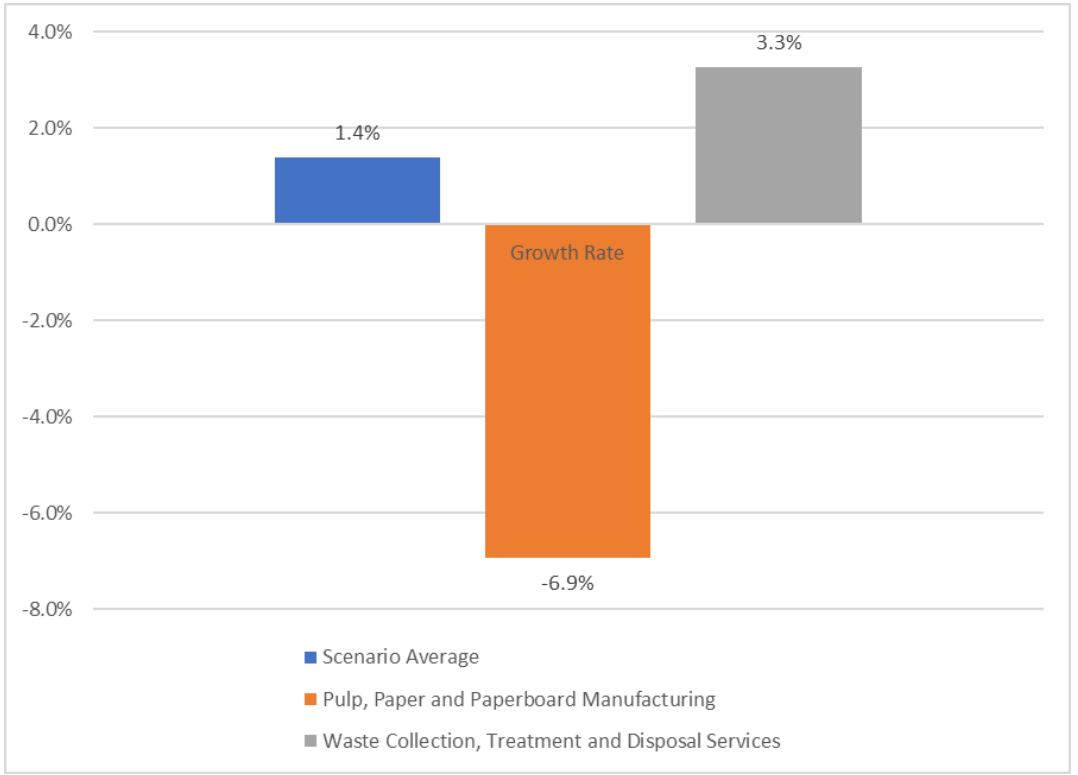


Economic narratives – Waste transition

Industry growth (national)

Waste collection and treatment has grown over the past 15 years, although this is likely driven by an increasing population, rather than a concerted effort to grow the waste recovery sector, which is still in its infancy in Australia.

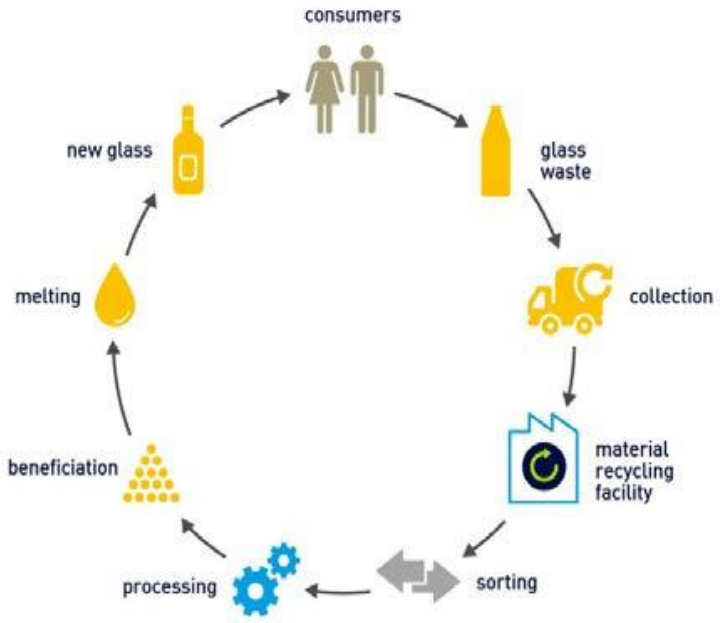
	Jobs			
Industries	**2006**	**2011**	**2016**	**CAGR**
Pulp, Paper and Paperboard Manufacturing	4,949	3,403	2,413	-6.9%
Waste Collection, Treatment and Disposal Services	14,157	19,332	19,538	3.3%



Economic narratives – Waste transition

Drivers

- Population and economic growth will continue to create waste and therefore resources for the recovery or waste to energy sectors
- Resultant growing volumes of waste with landfills near metropolitan areas nearing or at capacity
- Halting of recycling export to China in 2017 and more recent discussions in Malaysia is increasing the volume of recycling in Australia that is unable to be processed efficiently due to no national-scale industry capacity
- Increasing community expectations on the treatment and recycling of waste
- Increasing focus on circular economy to remove ‘cradle to grave’ approach to waste
- Increasing financial efficiency in diverting waste away from landfill and recovering value



Suez Australia, 2019

Economic narratives – Waste transition

Case Study: Wingfield Waste & Recycling Centre- South Australia

- 94 hectare ‘One stop shop’ for waste receipt, processing and recycling by accommodating complementary resource recovery activities
- Waste management facility includes:
  - Paper and cardboard waste
  - Construction and demolition
  - Green waste
  - Residual waste
- Collectively, each business makes a powerful contribution towards SA’s enviro and recycling objectives with increased productivity and efficiency from collaboration

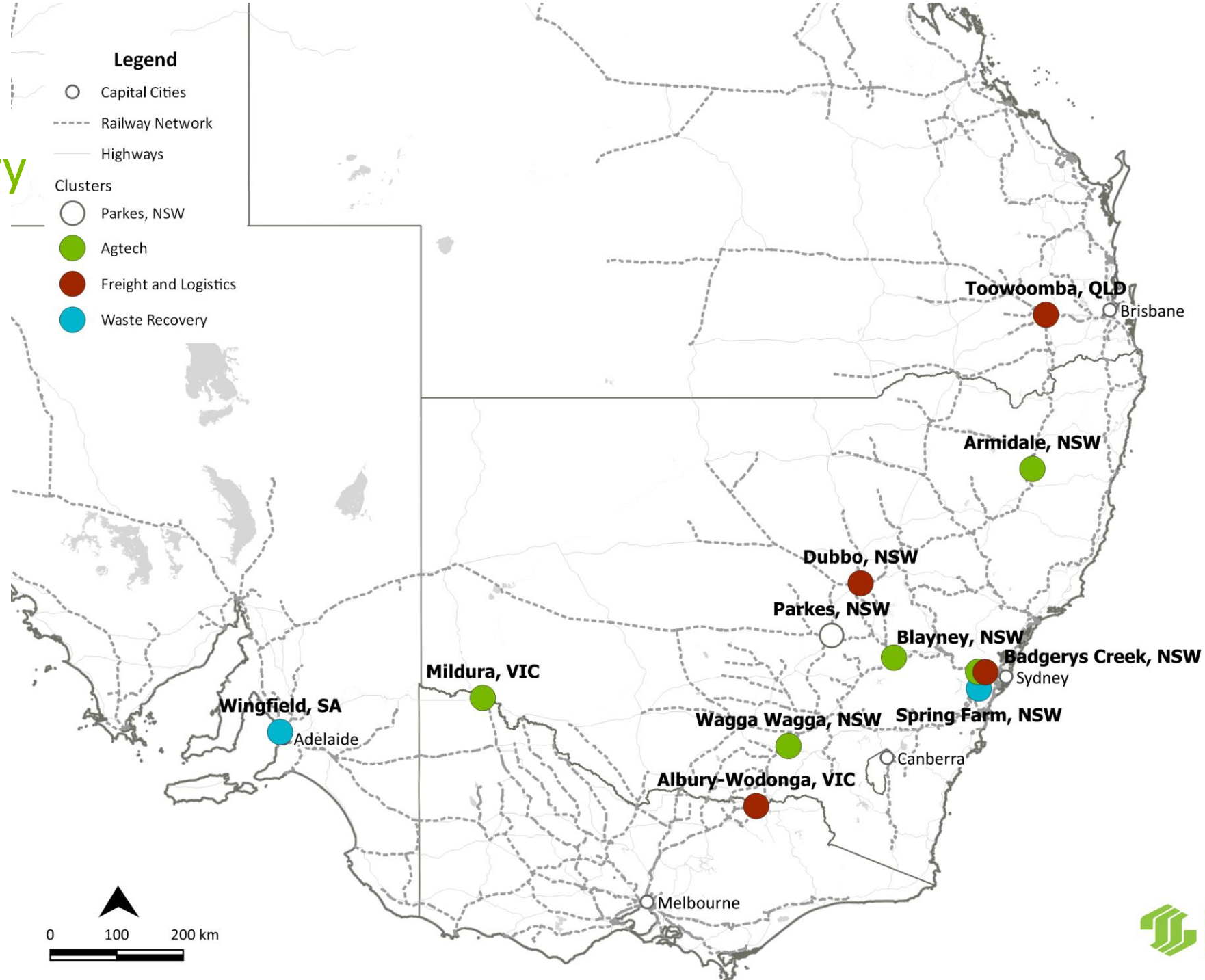
Competitive regional industry clusters

Regional industry clusters exist across the Australian seaboard. These clusters represent places where the primary industries for the economic narratives exist in some degree of concentration.

They have also been identified through case studies and policy review.

They reflect a strong alignment with inland rail networks.

Agribusiness and Freight and Logistics in particular are established throughout Eastern Australia, while Waste Recovery is less established. This could present an opportunity for Parkes SAP to fill a gap.



Land use implications

SGS Economics & Planning

Land use translation

Rural Broad Land-use categories

Analysis of the Australia National Accounts highlights the interconnectivity of industries across all three of the broad economic narratives (and the Australian economy in general). While this process has identified a number of different industries, they do not all have distinct built form and land use configurations.

Rather, many of the identified primary and secondary industries may share building typology similarities as well as locational, scale and operational characteristics.

These are Rural Broad Land-use Categories that have been developed through this analysis and build on SGS's standardised Broad Land-use Categories (BLCs) that are applied in many urban studies undertaken by SGS.

The classification of defined industry classifications into BLCs is important because industry descriptions do not necessarily have a spatial dimension to them. The assignment of BLCs makes the industry able to be better represented from a design and planning perspective.

It is expected that a mix of these land uses categories will be reflective of the overall built form and operational character of the Parkes SAP.

Rural BLC	Description
Broad hectare grazing/ cropping	Agricultural pasture land, typical of standard farming
Horticulture (covered)	Greenhouse or enclosed growing conditions with varying degrees of climate and water control
Horticulture (open air)	Plantation crops with fixed plant producing harvested fruit or flowers
Intensive animal production	Enclosed facility housing livestock, usually in large sheds (for example broiler farms or piggeries)
Warehousing/ logistics	Large buildings for storage, sorting and distribution; usually with truck loading dock facilities and large, flexible floorplates. Include internal truck access around building
Grain storage	Silos
Bulky goods	Display facilities for large plant, equipment or supplies. Include functional hardstand for storage as well as internal warehousing and ancillary offices and/or showrooms
Local service industrial	Provide services to other businesses or individuals, such as vehicle service and repair, construction and building supplies
Industry (product manufacturing)	Facilities that produce products or materials that include processing plants, raw material storage, heavy-duty fabrication and ancillary office functions.
Industry (food manufacturing)	Facilities that process raw materials into consumable food products. Can include food packaging, abattoirs etc.
Utilities (urban services)	Specialised infrastructure to support precinct function. For instance electricity generation, electricity sub-station, water treatment plant, concrete batching etc.
Office	Commercial office building
Education/ research	Office-style buildings with range of internal floorspace functions including laboratories, seminar rooms and offices.
Functional hardstand	Land with no significant built structure but used for storage or movement.

Land use translation

Industry summary

Each of the identified likely primary industries for the three economic narratives have been identified by the ANZSIC category (at a 4-digit level). Based on the type of businesses that represent these industries, they have been assigned a Rural BLC to reflect their likely built form and operational characteristics.

This alignment of ANZSIC to Rural BLC through business sampling is the pre-cursor step to being able to understand the possible lot size requirements for the SAP's lot structure.

It is noted that this process does remove potentially unique characteristics of particular businesses, however, when planning for a range of industries in a market-led investment attraction process, there is a need to retain a degree of flexibility rather than assume each lot will have a pre-determined type of industry.

A full list of the businesses sampled and the accompanying data is provided in an accompanying excel spreadsheet.

AGRIBUSINESS

Primary Industry	Rural BLC	Representative business example
Floriculture Production (Outdoors)	Horticulture (open air)	Geelong Flower Farm
Vegetable Growing (Under Cover)	Horticulture (covered)	Costa Group (Tomatoes, Mushrooms)
Berry Fruit Growing	Horticulture (covered)	Mountain Blue Blueberry Farm
Meat Processing	Industry (food manufacturing)	Cootamundra Meat
Fruit and Vegetable Processing	Industry (food manufacturing)	Simplot
Milk and Cream Processing	Industry (food manufacturing)	KyValley Dairy Group
Grain Mill Product Manufacturing	Industry (food manufacturing)	Freedom Foods

FREIGHT AND LOGISTICS

Primary Industry	Rural BLC	Representative business example
Road transport	Warehousing/logistics	McCulloch bulk haulage
Rail transport	Warehousing/logistics	SCT Logistics
Transport support services and storage	Warehousing/logistics	

WASTE TRANSITION

Primary Industry	Rural BLC	Representative business example
Waste collection, treatment & disposal	Industry (product manufacturing)	Suez Resource Recovery Facility
Advanced waste recovery	Utilities	Casino BioHub

Land use translation

Rural BLC land profiles – primary industries

To understand the size, site structure and employment generation capacity of the various industries that may comprise the different economic narratives, sampling of approximately 70 different representative businesses was undertaken. These reflect the primary industries sampled and have been summarised under each economic narrative by the relevant Rural BLC. These summary tables reflect the average lot size, site coverage and employment per hectare.

Note, these do not include buffer zone requirements, they simply reflect the scale of the sampled businesses.

They do not also consider any specific design objective of the Parkes SAP regarding intensity of business clustering or need for separation (for green links etc).

AGRIBUSINESS

Rural BLC	Ave. lot size (Ha)	Ave. site coverage (%'age)	Ave. jobs	Ave. jobs/Ha (total lot size)
Horticulture (open air)	177	19%	17	2
Horticulture (covered)	45	21%	253	5
Industry (food manufacturing)	13	19%	210	15

FREIGHT & LOGISTICS

Rural BLC	Ave. lot size (Ha)	Ave. site coverage (%'age)	Ave. jobs	Ave. jobs/Ha (total lot size)
Warehousing / Logistics	2	33%	27	5
Grain Storage	4	16%	4	3
Local Service industrial	2	n/a	69	n/a

WASTE TRANSITION

Rural BLC	Ave. lot size (Ha)	Ave. site coverage (%'age)	Ave. jobs	Ave. jobs/Ha (total lot size)
Industry (product manufacturing)	5	25%	30	2
Utilities (inc. energy production)	5	n/a	20	n/a

Land use translation

Rural BLC land profiles – secondary industries

There are many crossovers between the secondary industries that support the three overarching economic narratives. These have therefore been grouped together. As with the primary industries, these reflect an average of the sampled business types that are representative of these Rural BLCs.

Note, these do not include buffer zone requirements, they simply reflect the scale of the sampled businesses.

They do not also consider any specific design objective of the Parkes SAP regarding intensity of business clustering or need for separation (for green links etc).

SECONDARY INDUSTRIES

Rural BLC	Ave. lot size (Ha)	Ave. site coverage (%'age)	Ave. jobs	Ave. jobs/Ha (total lot size)
Warehousing/ logistics	2	53%	n/a	n/a
Bulky goods	1	25%	14	13
Intensive animal production	9	18%	70	183
Industry (product manufacturing)	1	43%	40	65
Functional hardstand	n/a	51%	n/a	n/a
Education & research	6	21%	130	25

Considering growth

SGS Economics & Planning

Three Horizons approach

Concept

The Three Horizons framework is a concept developed by McKinsey to explain the evolution of businesses that seek to retain market presence and relevance. Briefly, Horizon One is what an organisation is currently doing as core business; Horizon Two are emerging opportunities aligned with these core skills that a business may seek to take advantage of and Horizon Three is entirely new business.

This framework has relevance to the Parkes SAP and can be used as an organising principle to guide the development of the Precinct over the short, medium and long-term.

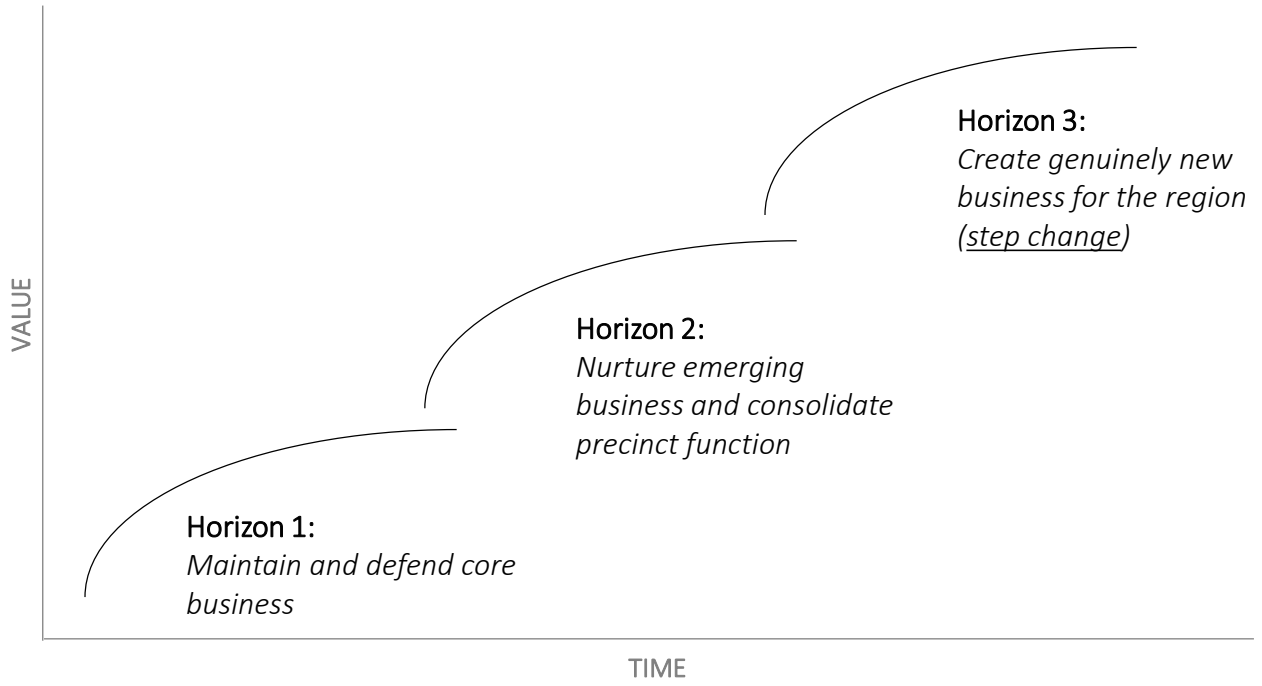
The application of this framework indicates that in the first instance (Horizon One), the SAP should focus on its current competitive offer (or that of the Parkes LGA and wider Central West region) i.e agriculture and/or freight and logistics.

Horizon Two would see the precinct consolidate this function/s, attracting complementary businesses to build a precinct that leverages economies of scope in the services it offers. This will enhance the precinct (and Region's) competitive advantage and industry identity.

Finally, a Third Horizon will attract entirely new business to the region. This can be considered a 'step change' for the Precinct and could not occur without the preceding building blocks that Horizons One and Two play out.

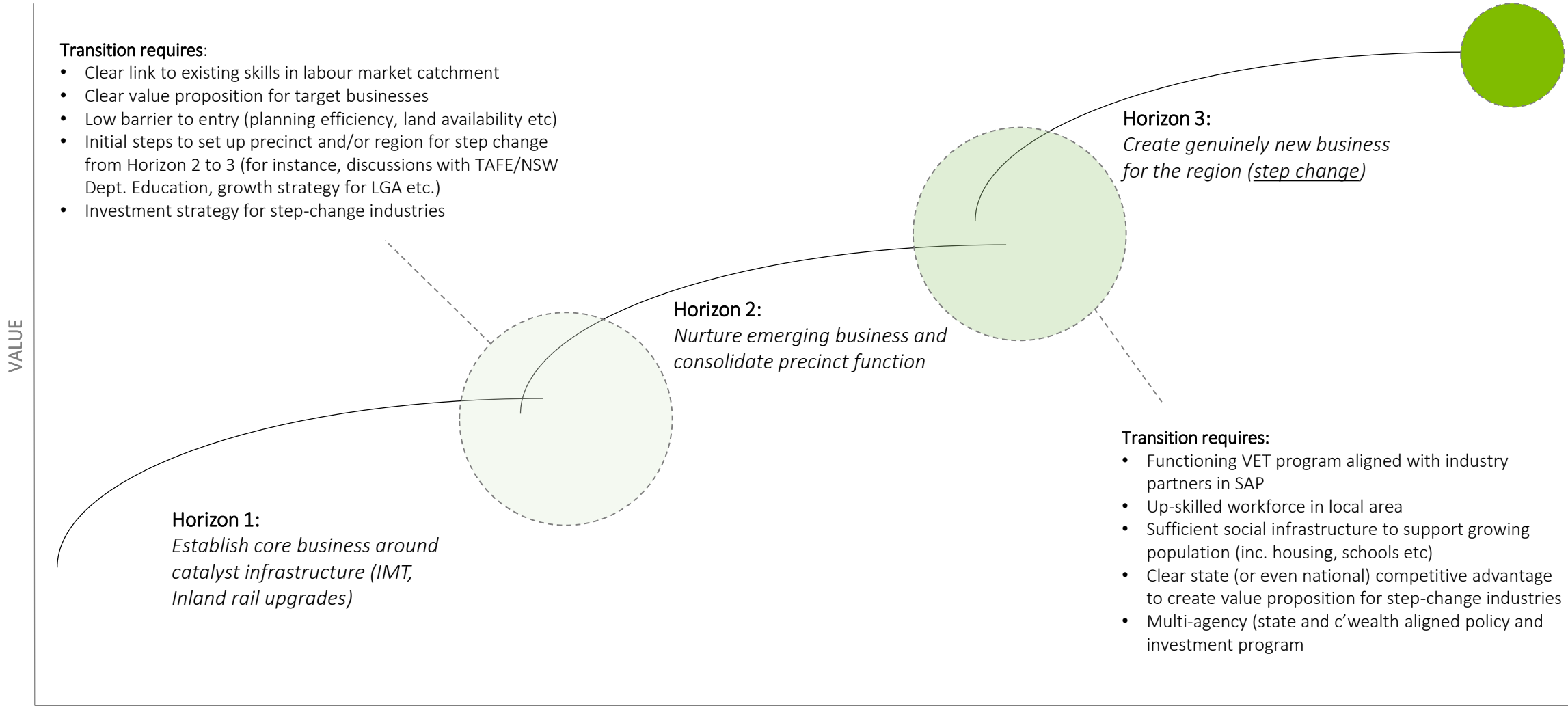
It is important to note that while Horizon Three may be further into the future, the planning for it should be in the Precinct's vision and growth strategy from the outset. In that way, the various Horizons are planned for concurrently.

It is also important to recognise that not all visions may wish to seek, or realise, a Third Horizon. A precinct that consolidates its role and function through industry clustering and specialisation may comfortably mature at the end of horizon Two.



Three Horizons

Considering externalities



Considering growth

The Parkes SAP is significant in size. The challenge is to understand how big will the precinct be in the long term. In practice, given the long timeframes of the project and the competitive environment for finite growth not just in NSW but across Australia, the final size is likely to be defined by the impact of the following:

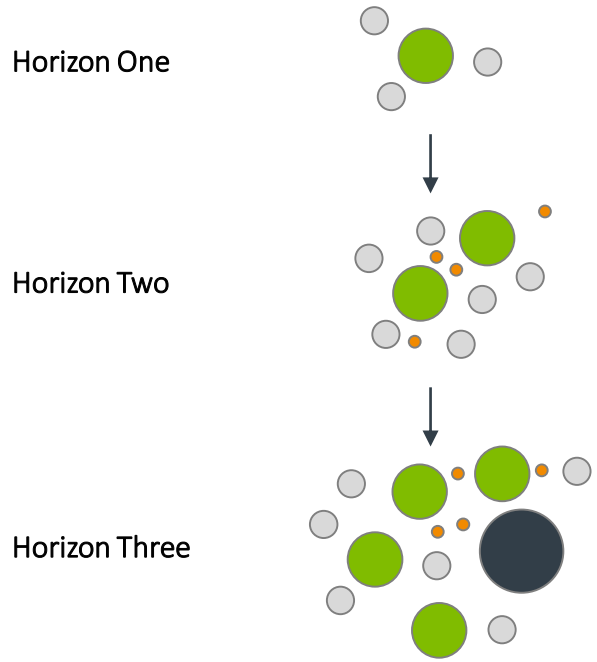
- The success of the initial investment in establishing core businesses to the precinct
- The demonstration of the competitive advantage that both the location and the benefits that industry clustering provides to businesses that are suited to the area
- Long term policy commitments to specific industries
- Macro-economic factors (such as those that led to Australia's recycling no longer being taken by China)
- The ability to upskill the existing labour market and/or attract new people to the region.

Notwithstanding these influences, a coherent vision for the Precinct, grounded in an understanding of market demand and regional competition, is critical in curating the desired industry mix. Acknowledging the macro-influences though, this vision must retain flexibility and agility.

The approach to growth in the Parkes SAP should therefore consider what is likely in the short term that can build on existing demand (committed business interest), current operations and infrastructure and current labour market skills. This is critical to establish a First Horizon outcome. As such, the existing vision of Pacific National and SRC are important early stage investment.

With the Agribusiness and Waste narratives, a conservative initial phase should be considered that assumes the locating of a single yet significant primary industry that can both commence operations immediately (without the need for industries not yet in the precinct) and act as a catalyst to attract complementary primary and secondary industries.

From this position, the Parkes SAP is able to take advantage of a consolidated industry mix and coherent industry identity and gradually grow, specialise and transform.



Master plan growth projections

SGS Economics & Planning

Introduction
Workshop 3

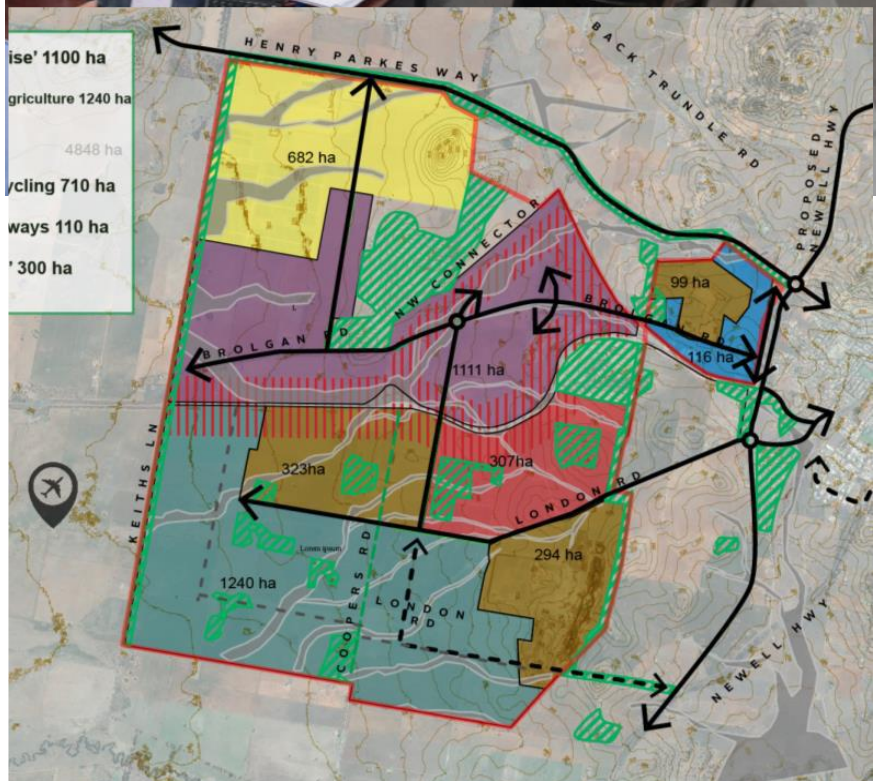
In May, SGS participated in the intensive Enquiry by Design Workshop in Parkes, with the whole project team. SGS's role and contribution was divided into three broad components:

1. **Stakeholder engagement**
   SGS engaged with a number of internal and external stakeholders in order to gain a deeper understanding into the likely businesses attracted to the precinct, their visions and operational and locational requirements. This enabled the development of a clear picture of likely initial industry investment.

2. **Articulation of initial investment phase**
   Based on stakeholder engagement and additional research undertaken, SGS built a picture of what the initial phase of investment may look like for each of the three broad economic functions identified for the SAP. This included a likely business mix, estimated initial land requirements and employment numbers.

3. **Projection of growth**
   Building on the initial investment picture, SGS applied observed growth rates for similar precinct types in Australia to this initial investment to estimate the likely land take up and job numbers over the SAP's long term. This did not concentrate on the specifics of future industry mix, as this will be guided by market interest. Instead, it applied an overarching growth rate to test the capacity of the precinct.

This chapter outlines the work undertaken during and after the Enquiry by Design workshop and forms the findings and recommendations of the employment and economic analysis of the Parkes SAP.



Introduction

Method

This report, and the method used, has been undertaken in the acknowledgment that to have clarity of the precise number and type of jobs in a precinct of this size over the long term is difficult. This difficulty is compounded by the lack of any state government-developed employment projections and a low employment growth rate historically in the region. This report (and the accompanying model) therefore identify where assumptions have been made and provide qualification as required, as well as an accompanying economic narrative, that is to be read in conjunction with the growth scenario estimates of both employment and land take up.

As the SAP has little pre-existing business operations that align with the vision for its future, a lot of power to influence future directions resides with those businesses or industries that move first. Depending what these are, they will induce second-movers to follow if there are co-location benefits such as supply chain efficiencies. The method used in this analysis has attempted to identify what logical first mover industries, and their resultant business types and operations requirements, may be, and build growth on that basis. It does so in recognition that a business or industry not considered may choose to invest early in the SAP and therefore alter the second and third phase investment waves. As such, this analysis is to be used as a guide and a check on whether, under a logical development pattern, there is sufficient land to support the precinct's growth over a long term horizon.

In order to estimate the future land requirements and employment generation potential of the SAP, the following method has been used.

- **Growth rate analysis.** Three growth rates have been identified to inform possible development patterns over a twenty year timeframe.
- **Analysis of primary and secondary industries**. Desktop research has been undertaken to ascertain the likely first-mover industries and those that may subsequently be attracted to the SAP.
- **Engagement with stakeholders**. Discussion with land owners, state and local government representatives has been undertaken to supplement the desktop-based analysis and understand what industries are likely to want to locate in the Parkes SAP. A list of stakeholders is outlined in Appendix 2.
- **Identification of initial phase development**. A profile of what is considered a logical initial phase of development has been defined as a foundation for the SAP's future growth.
- **Development of growth scenarios.** Three separate employment and land use projections have been undertaken to estimate the future employment and functional land area requirements of the SAP.
- **Direction of growth principles**. Qualitative discussion of the likely direction of growth has been developed to support the land area growth projections.
- **Application of multipliers**. Regionally-specific employment multipliers have been applied to understand the potential wider employment impact that the SAP may have on the Parkes LGA.
- **Comparison with population**. A comparison of current population projections and potential population requirements driven by the SAP has been undertaken to identify the departure that the SAP would likely result in from the Parkes LGA's historic population growth.
- **Articulation of assumptions**. The assumptions used to inform this analysis are documented to clearly explain the information behind the analysis.

Growth scenarios

Introducing the growth rates

The Parkes SAP will fundamentally transform the proposed site and have a significant economic impact on the Parkes township and Central West region more broadly. The site currently however has almost no employment and across the region, employment growth has been low. It is important therefore to test a number of growth scenarios to understand the potential scale of the SAP, both in terms of employment and land area coverage.

Any forecasting relies on assumptions being made in order to gauge potential growth trajectories. Three different growth rates have therefore been used to explore the range of employment growth scenarios that could play out as the Parkes SAP matures.

High Growth scenario

The high growth scenario is based on analysis of comparable regional and urban precincts that have developed over a period of time as relatively specialised employment centres. While no precinct in Australia is directly comparable to what is proposed in Parkes, due to the specific locational and infrastructure characteristics of the SAP as well as its scale, the use of multiple precincts to infer an average is appropriate mechanism to identify a growth rate.

The high growth scenario is derived from an analysis of nine separate precincts and the change in job numbers over five year increments (at an annualised rate). What this demonstrates is that depending on the maturity of the precinct, the growth rate is rarely linear. Rather, precincts go through a phase of establishment, growth and then maturity. The average of these precinct growth rates has been used to identify the high growth rate by five year increments to 15 years of operation. After that, a lower growth rate is applied to reflect reduced capacity.

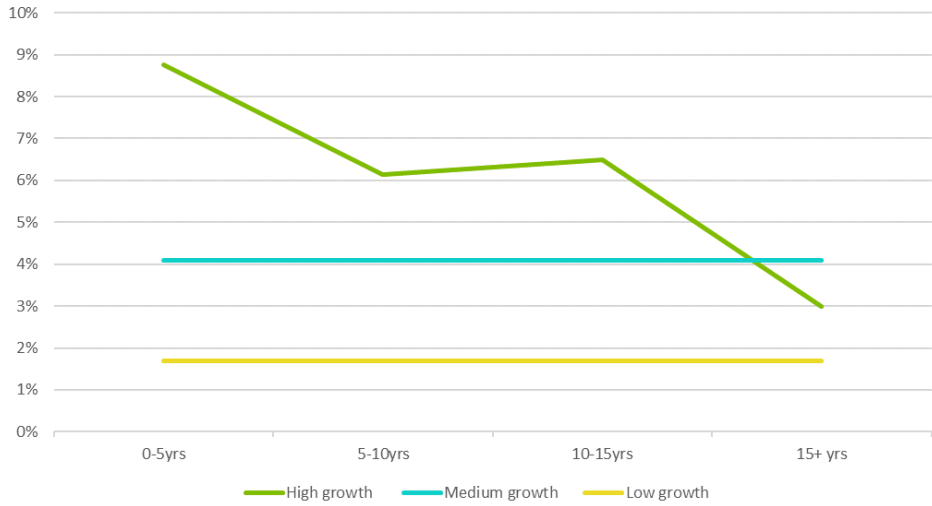
Low growth scenario

The low growth rate is taken from NSW's ten year average annual employment growth rate (2006-16). This is applied across the entire period of operation and represents a much more conservative growth projection that aligns with the state's recent trends.

Medium growth scenario

This has been taken as the median between the average of the high growth rates and the low growth rate.

GROWTH SCENARIOS GROWTH RATES (%age)



	0-5yrs	5-10yrs	10-15yrs	15+ yrs
High growth	9%	6%	7%	3%
Medium growth	4%	4%	4%	4%
Low growth	1.7%	1.7%	1.7%	1.7%

Assumptions

A series of assumptions have been made to inform the employment and land area projections. These assumptions are necessary as there are no employment projections at an LGA level. There has also been low historic employment growth that is not necessarily reflective of the investment in the SAP and the impact that this will have on industry attraction. As such, assumptions have been used to build a picture of what the precinct will look like when initially operational and how it is likely to grow over time.

Initial industry profile

The industry and business make-up of the first stage of the SAP's operation (within two years of commencement) has been developed through consultation with land owners Pacific-National and SCT, as well as engagement with Parkes Shire Council and NSW Department of Premier and Cabinet's Regional Investment teams to understand who is likely to be an early mover into the precinct. This has also informed initial job numbers, based on discussions with operators and sampled businesses representative of the type of industries likely to locate. It is important to note that no firm masterplan has been developed for either the SCT or Pacific-National site, nor are there established committed businesses to the precinct that were used.

Business land sizes

Businesses have a variety of land area requirements, even within the same industry. This is often driven by available land, market competition and operational requirements. There is therefore no single lot size that is suitable to define an industry or business. To overcome this, the representative businesses sampled, coupled with direct discussions with businesses and landowners, has helped to define representative lot sizes that are inputs into the model.

Estimated land size

The estimated land size for the SAP under different growth rates shows the cumulative lot size only. It does not consider roads, public space or any other land use requirement.

Business employment

As with land areas, sampling and industry discussion has provided average employment numbers for business and industry types. These have been used to inform initial employment numbers and numbers for specific operations (such as an abattoir).

Growth rates

Precincts grow at different rates. Historic growth rates of different precincts and geographies across Australia have been used to inform growth rates. This is discussed earlier in the report in more detail.

Commencement of operations

The modelling in this report aligns with the NSW government's common planning assumptions and is therefore anchored by current and future census periods. The nominal year for commencement is 2021 for the SAP as a whole, with other industries considered to be part of second wave of investment commencing in 2027. these latter commencement dates are anecdotal and simply reflect the likely time horizon for certain industries, either due to market depth, regulation or the need for primary industries to establish in the precinct.

Baseline Population and employment growth

NSW Dept. Planning, Industry and Environment provide population projects by LGA out to 2036. To align with the 20 year model, a linear growth rate has been derived from these projections to expand the population projection out to 2041. As mentioned there are no employment projections currently available for Parkes LGA. As such, the current jobs to population ratio of Parkes from the 2016 census has been held and applied to the projected population to get a baseline employment forecast by 2021. This is used to compare the employment growth driven by the SAP to a baseline number.

Automation

The employment forecasts do not factor in any reduction in employment density as a result of future automation of processes in the SAP over the long term. In practice, some of the jobs forecast may reduce as the desire for operational efficiency continue to drive the automation of certain sectors.

Major employment drivers

All growth scenarios assume the delivery of a major abattoir that is projected to provide 1,000 jobs (based on the Teys abattoir in Wagga Wagga).

Modelling of future land uses

When modelling possible land use, it should be understood there is no one single future. Therefore, these projections seek to represent the most likely future for the Parkes SAP based on current data, trends and an understanding of policy/structural changes. It does not reflect a pre-existing policy aspiration.

Economic narratives

The Enquiry by Design process confirmed the opportunity to explore the three identified economic narratives in the SAP, these being:

- Freight and Logistics
- Waste transition
- Agribusiness.

The Master Plan, refined through Workshop 3, identifies a series of sub-precincts within the SAP that are designed to accommodate different business types and these three economic narratives. These sub-precincts have been considered based on the different location and operational characteristics of the intended businesses.

These sub-precincts, identified in the Master Plan developed by Jensen Plus, and the industries they are intended to accommodate, are:

Regional enterprise
Attracting businesses and industries that require access to Intermodal terminals (IMTs) and good highway access, such as freight forwarding and logistics.

Mixed enterprise
More generalised industries that may support operations in other parts of the precinct (or wider region) such as warehousing and cold storage and food processing.

Resource and recycling
Centred on an energy from waste or resource recovery function, attracting industries that benefit from access to recovered waste streams (such as plastics manufacturing) or access to energy production by-product (concrete production from fly ash). Likely to include heavier industries with noise and/or smell implications that are separated from other uses and further from the Parkes township.

Intensive livestock agriculture
A range of intensive agricultural uses that concentrate on high value agriculture or value-adding process. May include protected cropping (such as greenhouses) or an abattoir.

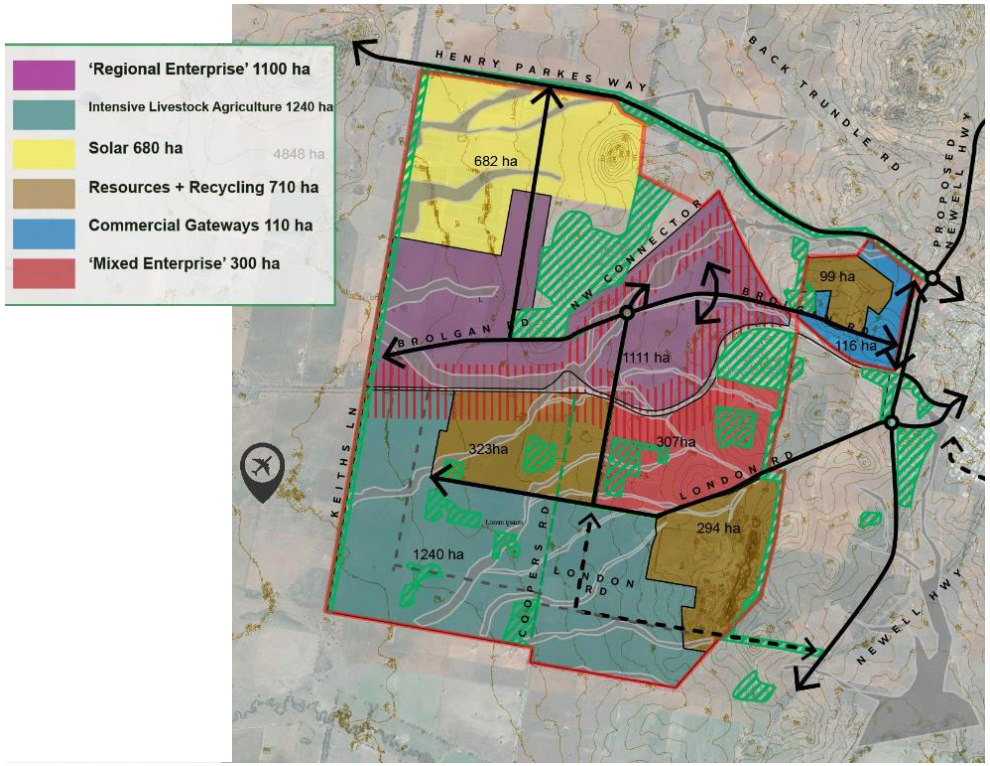
Commercial gateways
Cluster of supporting commercial activities directly related to the SAP, such as operational centres, future research facilities or business-serving functions such as plant and equipment showrooms.

Additionally, there is likely to be demand for food and business-serving retail distributed at key points throughout the SAP to support the future working population. It is important to acknowledge that this does not include higher-order retail uses such as supermarkets that may draw trade away from the established retail centre of the Parkes township.

It is acknowledged that certain businesses may be relatively footloose in their ability to locate throughout the precinct.

This section of the report expands on these roles and functions and the logical sequence that growth is likely to take.

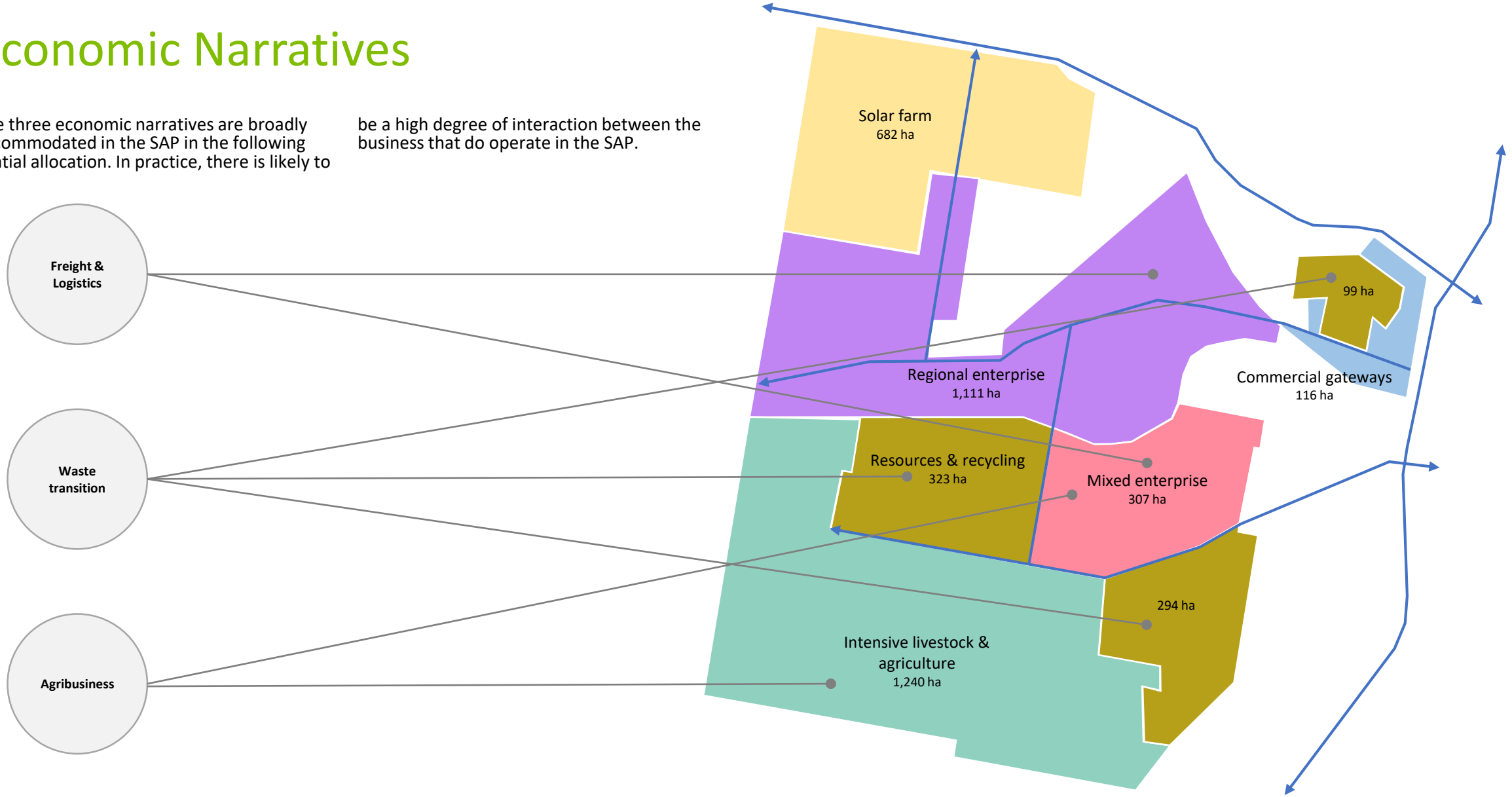
PARKES SAP STRUCTURE PLAN (MAY 2019)



NTS
Structure Plan developed by Jensen Plus

Economic Narratives

The three economic narratives are broadly accommodated in the SAP in the following spatial allocation. In practice, there is likely to be a high degree of interaction between the business that do operate in the SAP.



NTS
Structure Plan developed by Jensen Plus

Regional and Mixed enterprise

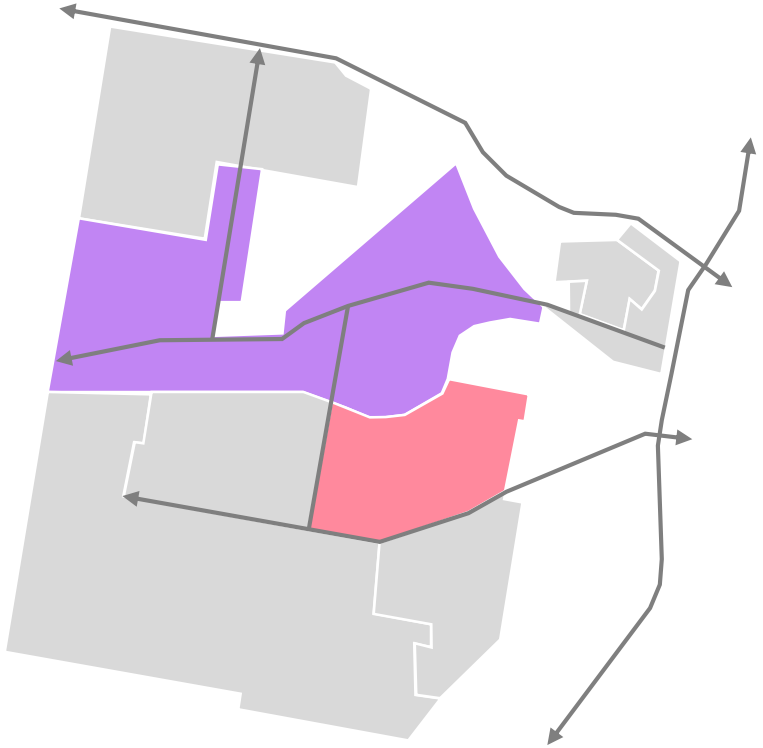
Investment attraction principles and opportunities

Initial growth of the Freight and Logistics-related industries will be concentrated in the identified 'Regional Enterprise' sub-precinct.

FIRST HORIZON

The SAP will need to establish a core operational identity that will drive the first wave of investment and development (First Horizon). This will be driven by:

- **Completion of Pacific-National's first phase of development**. The development of Pacific-National's rail sidings and intermodal facility is a crucial catalyst for future industry attraction as it will provide direct access to the Inland Rail line and kick start freight forwarding and logistics operations.
- **Operation of Inland rail**. The operation of the Inland rail line along the new link will place the Parkes SAP at the centre of Australia's freight network and be a major driver for businesses looking to leverage high access locations.
- **Newell Highway upgrade**. The completion of the Newell Highway bypass will connect the Inland Rail with the inland road network and drive attraction for businesses both seeking intermodal functionality as well as predominantly road-based functions such as truck repairs and other services.
- **Connections to the mining and resources sector**. The Parkes SAP is proximate to the Central West Region's gold, copper and coal mines. It is also connected by rail to the major mines of Western Australia and the ports of Sydney, Port Kembla and Newcastle. This creates an opportunity for the SAP to provide a wide range of mining-related services such as machinery construction and maintenance as well as being a hub for consolidating materials used for high-value manufacturing. An example of this is the potential for Lithium battery production, with lithium from Western Australia being brought together with cobalt mined from the Central West region and port access for other non-locally sourced materials.
- **Establishment of SCT's operations.** SCT's operations provide an incumbent specialisation in the Precinct. This will catalyse industries that will benefit from being close to freight-related operations.



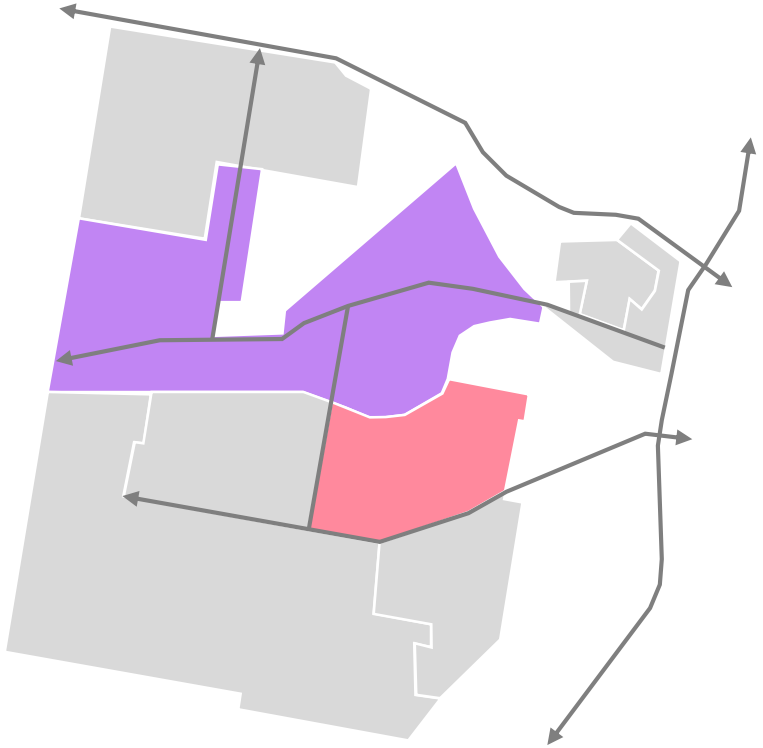
Regional and Mixed enterprise

Investment attraction principles and opportunities

SECOND HORIZON

Once the primary industries have established themselves in the Regional and gradually into the Mixed Enterprise sub-precincts, there is an opportunity to leverage this operational identity and attract secondary industries that will benefit from co-location with operating industries.

- **Consolidation opportunities for rolling stock maintenance.** With multiple inland freight lines intersecting at the Parkes SAP, there is an opportunity to consider consolidated rolling stock maintenance in the sub-precinct.
- **Food processing.** Aligning with the region's agricultural specialisation, the development of food processing operations is likely to be driven by the full operation of specialised distribution networks (especially cold storage and refrigerated distribution) as well as the establishment of precinct-specific agribusiness functions. This may include an abattoir, protected cropping or grain aggregation and storage facility, without which, the growth of a food processing sector in the SAP is likely to be minimal. This is discussed further in relation to the Agribusiness-related industry attraction principles. This type of operation may be better suited to the Mixed Enterprise sub-precinct, given its proximity to the intensive agriculture sub-precinct and lesser reliance on access to freight forwarding (compared with more direct freight and logistics operations).
- **Waste transfer**. As a solution to Australia's national waste and recycling challenge, the Parkes SAP's direct access to the majority of Australia's capital cities presents an opportunity to provide waste transfer capabilities within the Regional enterprise sub-precinct due to the Intermodal Terminal accessibility that such an operation would require. Waste transfer opportunities would be driven directly by the establishment of a Energy from Waste or resource recovery operation within the SAP. This is discussed in the Resource and recycling section.
- **Truck maintenance**. As the SAP develops as a central hub for inland freight, either as a place of handling or passing through, there is opportunity to further grow the maintenance function of the precinct by attracting heavy vehicle maintenance facilities, potentially co-located with rolling stock facilities.
- **General businesses**. Supporting the larger industries that are likely to be attracted to the precinct, there will be a number of smaller, specialised businesses that provide support to the primary and secondary operations. These may include uses such as specialised fabrication or material wholesaling. It is important however that these uses are direct suppliers of the SAP's major industries, rather than the SAP becoming Parkes' locally-focused industrial precinct. This is important both so that the precinct does not become unnecessarily crowded at the expense of more strategic businesses as well as the impact that it may have on incumbent local businesses and the Parkes industrial precinct's viability.



Regional and Mixed enterprise

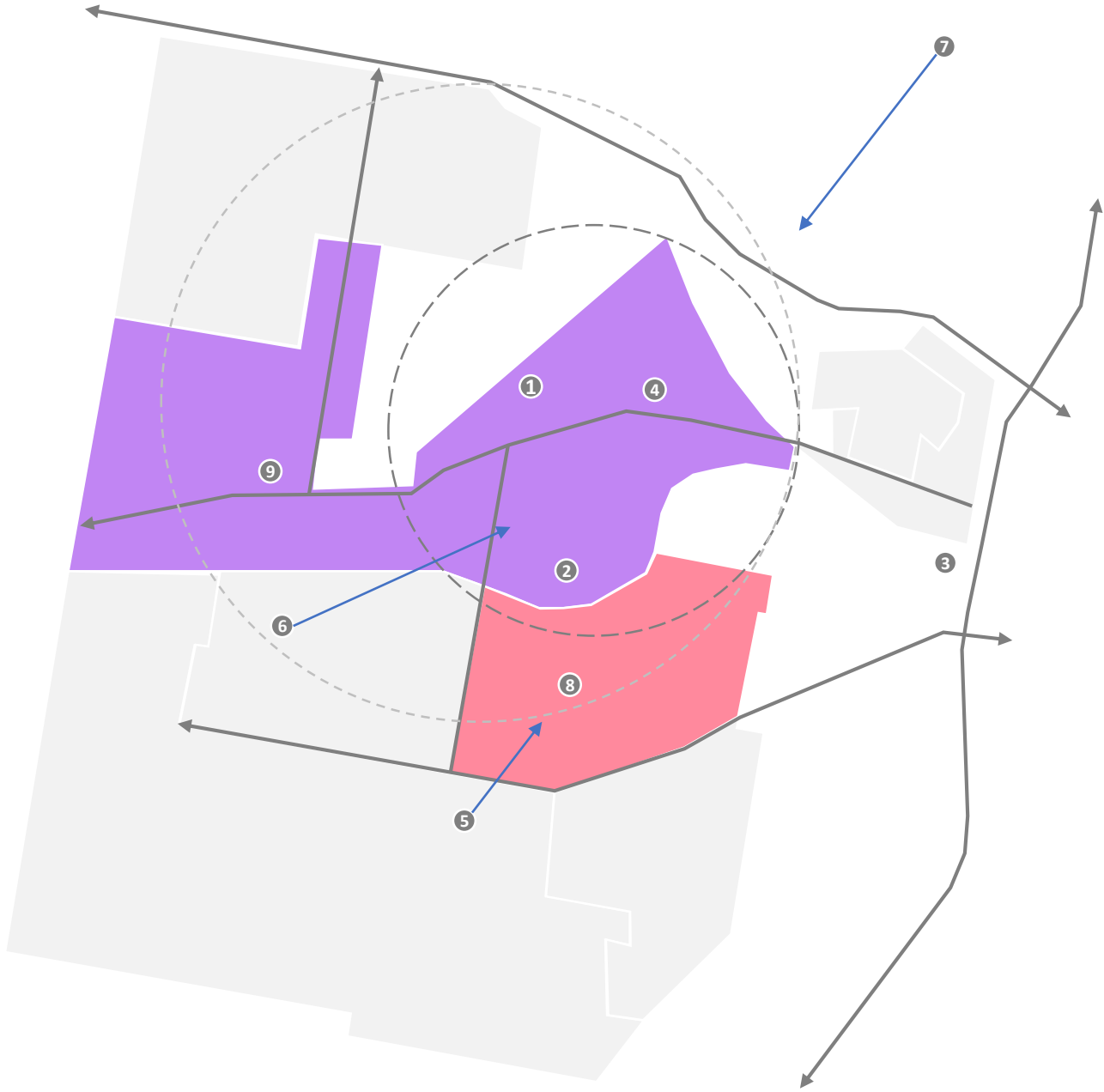
Drivers and direction of growth

The following map spatially represents the industry opportunities identified in the previous commentary.

It also highlights the direction of growth that is likely to occur as the two SAP sub-precincts gradually attract businesses. This is predicated on the advantage that both Pacific-National and SCT have on attracting first-movers, given they are active landlords with a view to growth. From an operational agglomeration perspective as well as an infrastructure efficiency one, it is anticipated that both the Pacific-National and SCT sites would be exhausted before development moves to the west (into the remaining Regional Enterprise sub-precinct) as well as to the south in to the Mixed Enterprise sub-precinct.

Growth of these sub-precincts will be driven by:

1. Pacific-National's completion of Inland Rail sidings, with first-mover businesses having the advantage of choosing the best lots.
2. SCT's freight operations
3. Proximity to Newell Highway
4. Opportunity for rolling stock maintenance
5. Linkages with intensive agriculture and distribution
6. Energy from Waste facility providing rationale for waste transfer industry
7. Mining sector connectivity, locally, regionally and nationally
8. Long term growth radiates out from existing logistics hub along Brolgan Road spine and into the Mixed Enterprise sub-precinct



Regional and Mixed enterprise

Growth scenarios

The potential growth of industries in the Regional and Mixed enterprise sub-precincts is predicated on building a likely profile of initial investment. This has been informed by discussions with land owners, and supplemented by industry research and discussions with both Parkes Shire Council and Regional Investment teams in the NSW Department of Premier and Cabinet. The assumed 'initial phase' profile is outlined in the adjacent box.

More detailed analysis of the projected growth is contained in the accompanying SAP land use model.

Initial phase assumptions

- Estimate of 119 hectares of land dedicated to IMT, 204 jobs at commencement
- Three additional logistics-related businesses in year 2

General growth assumptions

Precinct will then grow as per scenario growth rates, which are applied to land and jobs

Growth will not spill out of these two sites until they are at capacity

HIGH GROWTH SCENARIO

	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041
TOTAL SUB-PRECINCT AREA (Hectares)	119	143	156	170	184	201	213	226	240	255	270	288	307	326	348	370	381	393	405	417	429
TOTAL SUB-PRECINCT JOBS	204	300	326	355	386	420	446	473	502	533	566	603	642	683	728	775	798	822	847	872	899

MEDIUM GROWTH SCENARIO

	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041
TOTAL SUB-PRECINCT AREA (Hectares)	119	143	149	155	162	168	175	182	190	198	206	214	223	232	242	252	262	273	284	295	308
TOTAL SUB-PRECINCT JOBS	204	300	312	325	338	352	367	382	397	414	431	448	467	486	506	527	548	571	594	618	644

LOW GROWTH SCENARIO

	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041
TOTAL SUB-PRECINCT AREA (Hectares)	119	143	146	148	151	153	156	159	161	164	167	170	173	175	178	181	185	188	191	194	197
TOTAL SUB-PRECINCT JOBS	204	300	305	310	316	321	326	332	338	343	349	355	361	367	374	380	386	393	400	406	413

NB. Area represents lots only, it does not consider roads, public space or other amenity

Resource and recycling

Investment attraction principles and opportunities

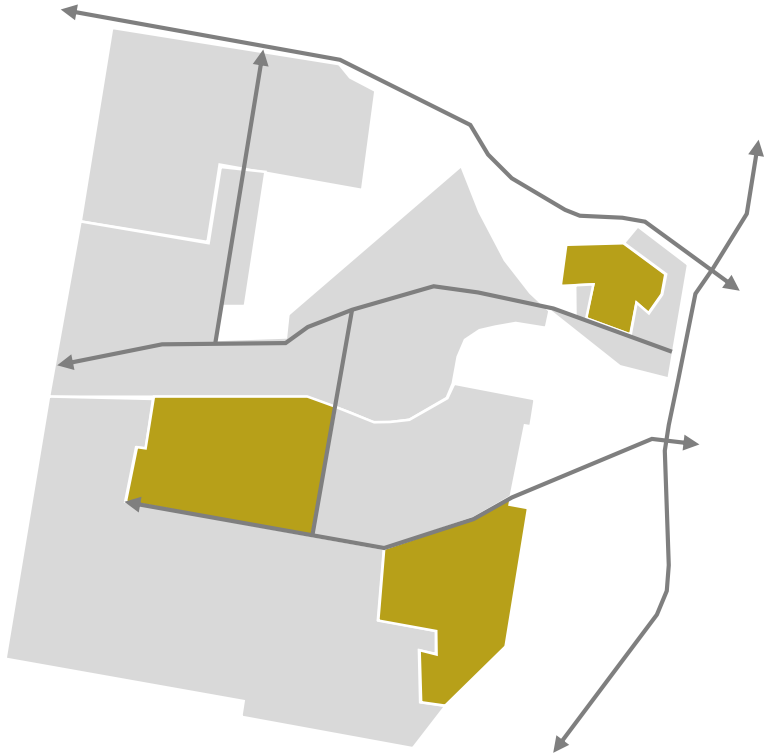
Initial growth of the resource recovery, energy and construction industries will be concentrated in the identified 'resource and recycling' sub-precinct. The horizon of the resource and recycling sub-precinct is unlikely to align with the timeframes of the Regional Enterprise sub-precinct activation due to the longer-term nature of this opportunity.

The consideration of horizons here pertain only to the growth of these industries, not in the context of the wider SAP.

FIRST HORIZON

Unlike the Freight and logistics-related industries, some of the first horizon investment attraction principles are focused on governance and regulation rather than enabling infrastructure.

- **Operation of Inland rail**. The operation of the Inland rail line along the new link will place the Parkes SAP at the centre of Australia's freight network and be a major enabler of waste transfer from capital and regional cities across Australia.
- **Newell Highway upgrade**. The completion of the Newell Highway bypass will connect the Inland Rail with the inland road network and connect the precinct to regional waste facilities.
- **Energy to Waste operator committed**. Establishment of clear agreement with delivery partner to develop energy from waste facility in SAP.
- **Contracts with waste management companies**. Securing a high-volume and regular waste stream for an energy facility is vital. Contractual arrangements must be in place to ensure committed waste stream is in place to generate energy.
- **Regulatory clarity**. Approvals to operate an energy from waste facility must be sought and provided prior to any further establishment of the sub-precinct.



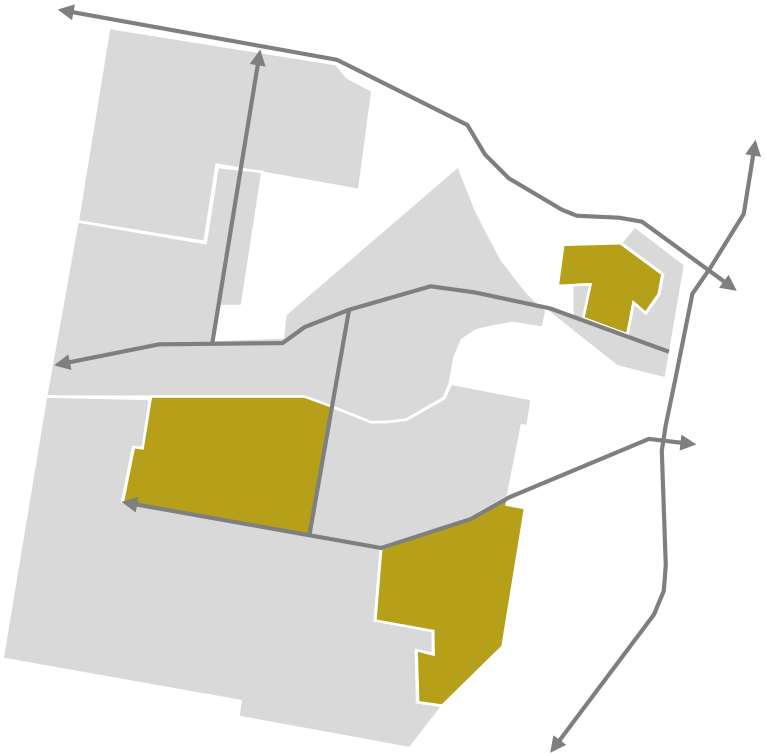
Resource and recycling

Investment attraction principles and opportunities

SECOND HORIZON

The second horizon is likely to be where much of the action happens within the Resource and recycling sub-precinct. Applied to the context of the SAP, this is likely to commence once the Regional Enterprise precinct and its enabling infrastructure are operational.

- **Establishment of energy from waste facility**. The delivery and operation of an energy from waste facility will be the biggest catalyst for development in the Resource and recycling sub-precinct. It will require established linkages with existing Intermodal Terminals.
- **Establishment of resource recovery facility**. A separate resource recovery facility would leverage the same waste distribution infrastructure as an energy from waste facility and likely co-locate to maximise supply chain efficiencies. Such a facility would be a catalyst for allied manufacturing operations to source 'raw' materials as an input to production.
- **Possible additional intermodal terminal**. Depending on the scale of the resource industry, there may be scope to deliver a specialised IMT that provides an energy or recovery facility direct access to waste streams that would otherwise come through the existing Pacific-National and SCT Intermodal Terminals. Such a facility would potentially incentivise development in the western half of the Regional Enterprise sub-precinct out of the sequence outlined in this report.
- **Transfer of waste facility from current Parkes landfill**. The establishment of a waste-related operation in the precinct would likely see the cessation of operations in the current Parkes landfill, in the north-east corner of the SAP. This would free up that part of the precinct for other functions.
- **Links with agriculture sector.** By-products of the energy production process include heat. Internal SAP distribution networks could distribute this and help to support a protected cropping cluster in the adjacent intensive agriculture sub-precinct. In turn, waste from that sub-precinct could be used as fuel for the energy production process.



Resource and recycling

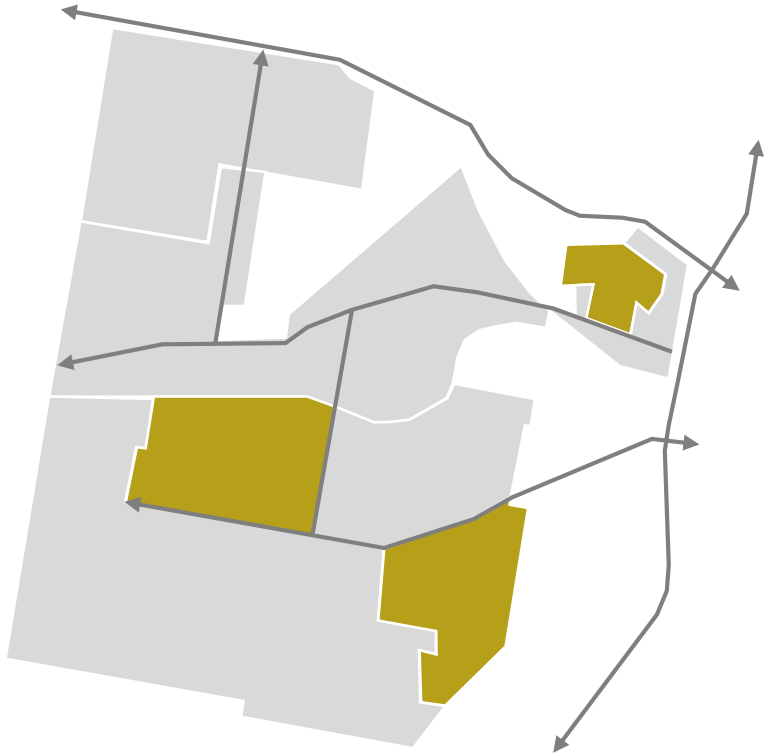
Investment attraction principles and opportunities

THIRD HORIZON

The third horizon is where genuinely new business is attracted to the precinct. It could be argued that several of these potential industries could be considered as second horizon operations, as they have a presence in the regional economy already.

- **Development of manufacturing industry**. Catalysed by a resource recovery function, a manufacturing sector could establish in this precinct, utilising the 'raw' materials recovered by the resource recovery operations. To maximise supply chain linkages and align with the different amenity profiles of the SAP's sub-precincts, these businesses would likely be attracted to the Resource and recycling sub-precinct, where they would have fewer land-use conflicts pertaining to noise and odour.
- **Development of advanced manufacturing processes**. In addition to 'traditional' manufacturing, the SAP can also support advanced manufacturing processes. Manufacturing could also be driven by the SAP's point of convergence for mineral deposits and drive the growth of advanced manufacturing such as Lithium battery production.
- **Development of construction sector**. The establishment of an energy from waste facility would create a supply of fly ash as a by-product of the incineration process. Combined with the current lime distribution operations at the Westlime quarry in the SAP's south east corner, as well as potential mining aggregate supplies from surrounding mining operations, the sub-precinct could develop an industry sector centred on cement and concrete production.

  This could be an important value-adding process, aggregating raw materials, producing cement for regional export as well as supporting a possible pre-cast concrete cluster of businesses with a national distribution network. For instance, major pre-cast concrete culverts, or bridge spans, could be produced in the precinct and distributed nationally via the freight rail network.
- **Materials innovation research facility**. Building on the operation of resource recovery facilities and possible innovative construction industries, the SAP could develop a research-related function of national significance, centred potentially on innovation in construction materials or manufacturing. An example could be the recycling and reuse of bitumen, which is currently predominantly imported into Australia. Such an opportunity would require partnership with universities and industry partners and so is considered a 'Third Horizon' opportunity due to the precursor investment required and the fact that the Parkes township does not currently have a university.
- **Circular economy network**. Over the long term, the resource and recycling sub-precinct would be the 'engine' of a circular economy function of the SAP.



Resource and recycling

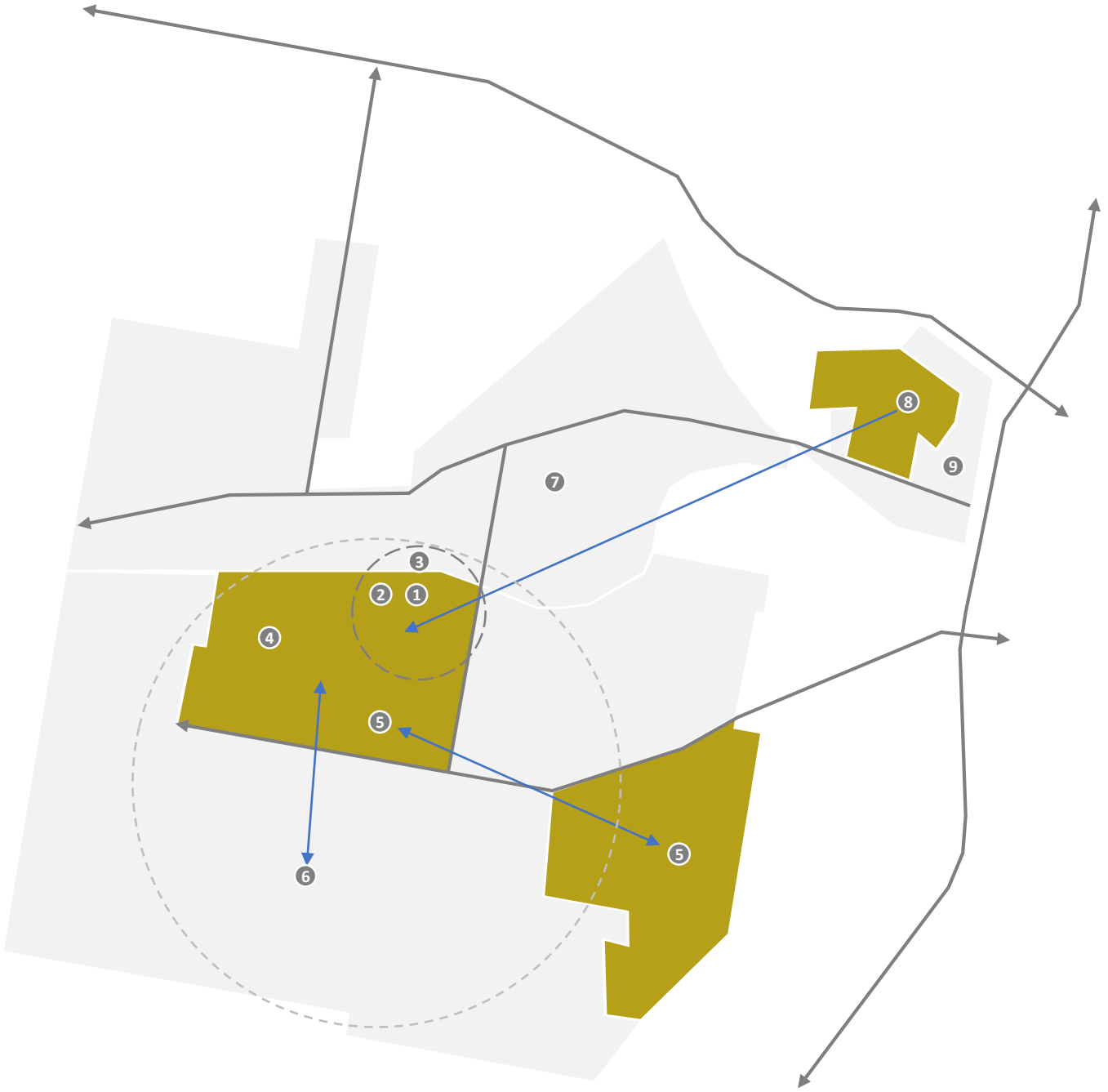
Drivers and direction of growth

The following map spatially represents the industry opportunities identified in the previous commentary.

While the sub-precinct comprises three separate areas, the focus of investment will be in the largest of the three in the centre of the SAP.

Growth of this sub-precinct will likely radiate out from the north-eastern corner of the main area. Growth will be driven by:

1. Establishment of an energy from waste facility in the major resource and resourcing sub-precinct, in the heart of a fully established SAP
2. Establishment of a resource recovery facility co-located with the energy from waste facility to maximise any shared infrastructure such as rail siding and waste sorting facilities
3. Potential future Intermodal terminal (possibly) dedicated to waste operations
4. Manufacturing cluster with businesses utilising materials sourced from resource recovery facility as well as certain advanced manufacturing opportunities such as Lithium batteries.
5. Construction cluster that takes advantage of proximity to material inputs (Lime & fly ash) and has sufficient separation from higher amenity uses towards the north of the SAP
6. Linkages with agricultural sub-precinct, with residual heat used for possible future greenhouses and agricultural by-product used as fuel for energy production.
7. Access to IMT for future pre-cast construction distribution to major cities. This could also be part of possible third IMT's operational capabilities as per (3)
8. Transfer of current Parkes landfill operations to future waste facility, freeing up this sub-precinct for other uses
9. Potential location of future research facility, possibly in a cluster of non-industrial buildings at the SAP's gateway.



Resource and recycling

Growth scenarios

The potential growth of industries in the Resource and recycling sub-precinct is predicated on building a likely profile of initial investment. This has been informed by discussions with waste to energy experts and supplemented by industry research and discussions with both Parkes Shire Council and Regional Investment teams in the NSW Dept. Premier and Cabinet. The assumed 'initial phase' profile is outlined in the adjacent box. Given the various regulatory hurdles the assumption that growth of supporting industries is predicated on an energy from waste facility being operational, this assumes a start date five years after the initial precinct starting date.

More detailed analysis of the projected growth is contained in the accompanying SAP land use model.

Initial phase assumptions

- Establishment of one Energy from Waste facility and one resource recovery facility, both of which remain fixed in their capacity, size and number of employees
- Support of two additional allied manufacturing industry (non-specified)
- Support of one construction-related business

General growth assumptions

Precinct will then grow as per scenario growth rates, which are applied to land and jobs

HIGH GROWTH SCENARIO

	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041
TOTAL SUB-PRECINCT AREA (Hectares)	-	-	-	-	-	-	100	101	102	103	105	106	107	109	110	112	113	114	115	116	117
TOTAL SUB-PRECINCT JOBS	-	-	-	-	-	-	192	199	206	214	222	231	241	252	263	275	281	287	293	299	306

MEDIUM GROWTH SCENARIO

	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041
TOTAL SUB-PRECINCT AREA (Hectares)	-	-	-	-	-	-	100	101	102	102	103	104	105	105	106	107	108	109	110	111	112
TOTAL SUB-PRECINCT JOBS	-	-	-	-	-	-	192	197	201	206	212	217	223	228	234	241	247	254	261	269	277

LOW GROWTH SCENARIO

	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041
TOTAL SUB-PRECINCT AREA (Hectares)	-	-	-	-	-	-	100	100	101	101	101	102	102	102	103	103	103	104	104	104	105
TOTAL SUB-PRECINCT JOBS	-	-	-	-	-	-	192	194	196	198	200	202	204	206	208	210	213	215	217	219	222

NB. Area represents lots only, it does not consider roads, public space or other amenity

Intensive agriculture

Investment attraction principles and opportunities

Initial growth of agribusiness industries will be concentrated in the identified 'Intensive agriculture' sub-precinct. Similar to the resource and recycling sub-precinct, the horizon of the of this sub-precinct is unlikely to align with the timeframes of the Regional Enterprise sub-precinct activation due to the longer-term nature of this opportunity.

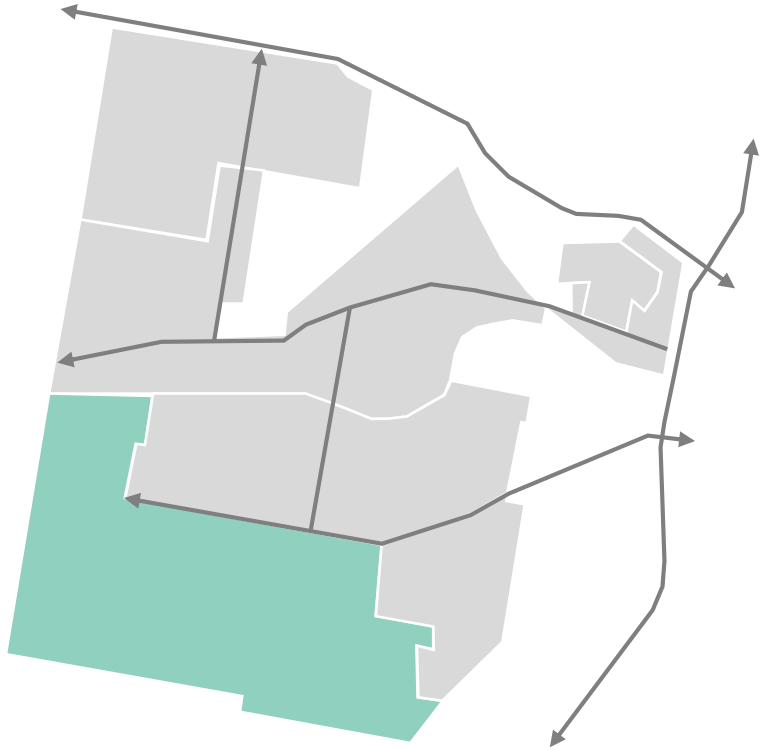
It is important that this sub-precinct doesn't simply accommodate low value agriculture that could locate anywhere in the region. It must support value-adding processes and aid co-location benefits.

The consideration of horizons here only pertain to the growth of these industries, not in the context of the wider SAP.

FIRST HORIZON

While the Central West region is dominated by agricultural production, the ability to move the industry towards higher value agriculture and/or move up the value chain must be considered in light of regional competition, market growth and requisite infrastructure. As such, the only one agriculture-related industry is considered operational in horizon one.

- **Identified demand for abattoir**. Engagement with Parkes Shire Council indicates that there is existing demand for a new abattoir in the region. Noting that there are a number of abattoirs throughout NSW, this revealed demand through industry engagement suggests that the SAP could be well placed to accommodate one.
- **Development of cold storage and refrigerated distribution**. This infrastructure would be central to the viability of an abattoir locating in the Parkes SAP, with the ability for meat to have road and rail access to a national market.



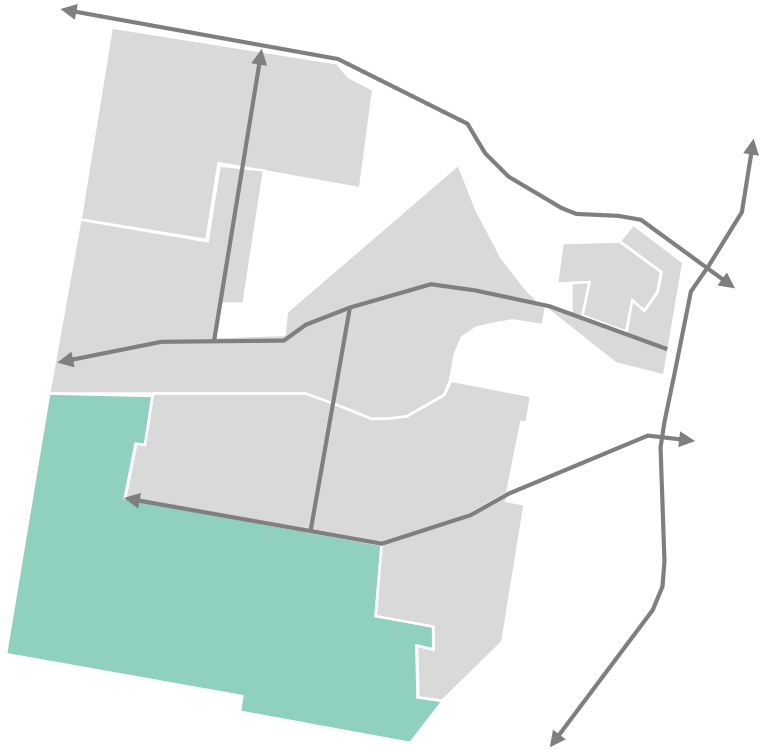
Intensive agriculture

Investment attraction principles and opportunities

SECOND HORIZON

The second horizon is likely to be where much of the action happens within the Intensive agriculture sub-precinct. Applied to the context of the SAP, this is likely to commence once the Regional Enterprise precinct and its enabling infrastructure are operational.

- **Grain storage relocation.** There is a potential for grain aggregation and storage silos to locate in the intensive agriculture sub-precinct to leverage inland rail access. While it is unlikely that this would be an *additional* facility, the SAP may be an opportunity for an existing facility in the region to relocate to benefit from the co-location benefits and infrastructure.
- **Co-location of food processing**. The maturation of the Industry sub-precinct adjacent SCT's freight facilities will open up the potential for value-chain processes to take place within the SAP. Products from the abattoir, grain facility and surrounding region are processed in facilities (for instance food canning or cereal production) and distributed by road or rail.
- **Establishment of energy from waste facility.** The energy from waste facility in the resources and recycling sub-precinct will provide an opportunity to subsidise the energy and heating costs of a range of intensive agricultural uses. It is likely to be a catalyst for any future protected cropping opportunities in the SAP.
- **Growth of protected cropping**. Protected cropping, in the form of greenhouses and glasshouses is increasing in number across Australia. The region's climate, compared with where these facilities currently locate in Australia, are likely to require artificial heating in winter, to ensure sustainable crop production. The delivery of such facilities is therefore considered to be predicated on an energy from waste facility. While technology exists already, the protected cropping market will likely be driven by expansion in established areas in the near term, as well as through concerted effort to grow the industry around Western Sydney Airport. As such, these are considered as a second horizon opportunity.



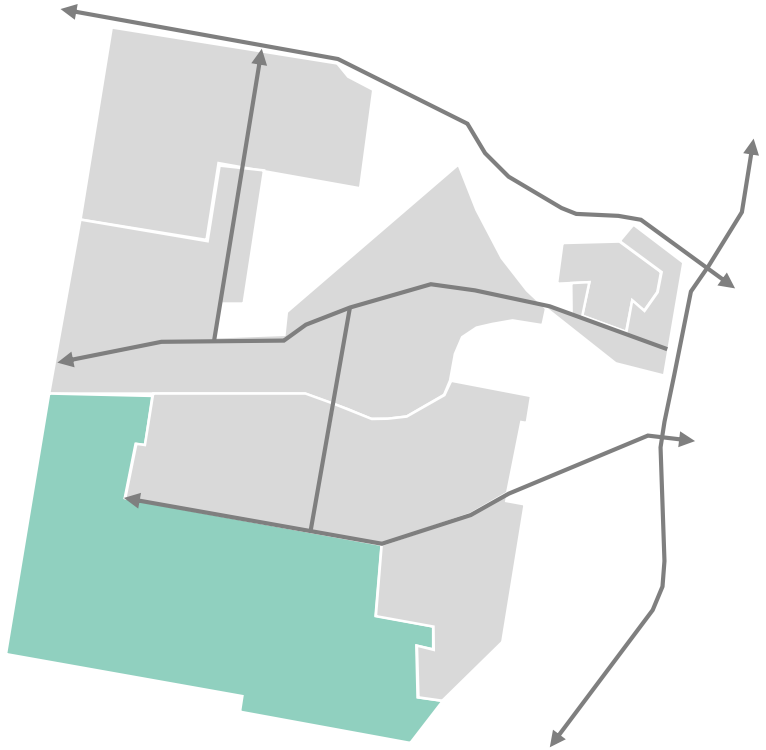
Intensive agriculture

Investment attraction principles

THIRD HORIZON

The third horizon is where genuinely new business is attracted to the precinct.

- **Delivery of a new airport**. The development of an airport adjacent the SAP is considered a game-changer for the precinct (and the region). Such connectivity, assuming that it has an international trade function similar to Wellcamp Airport in Toowoomba, will increase the value of just-in-time delivery of perishable goods. This would likely increase the prospect and scale of any protected cropping operation in the SAP.
- **Research alignment**. With climate volatility and water scarcity increasingly affecting Australia's agriculture sector, there is potential to utilise some of the intensive agriculture land to support agricultural research institutes that focus, for example, on drought tolerant crops. This would require an established relationship with a university or other agency such has the CSIRO.



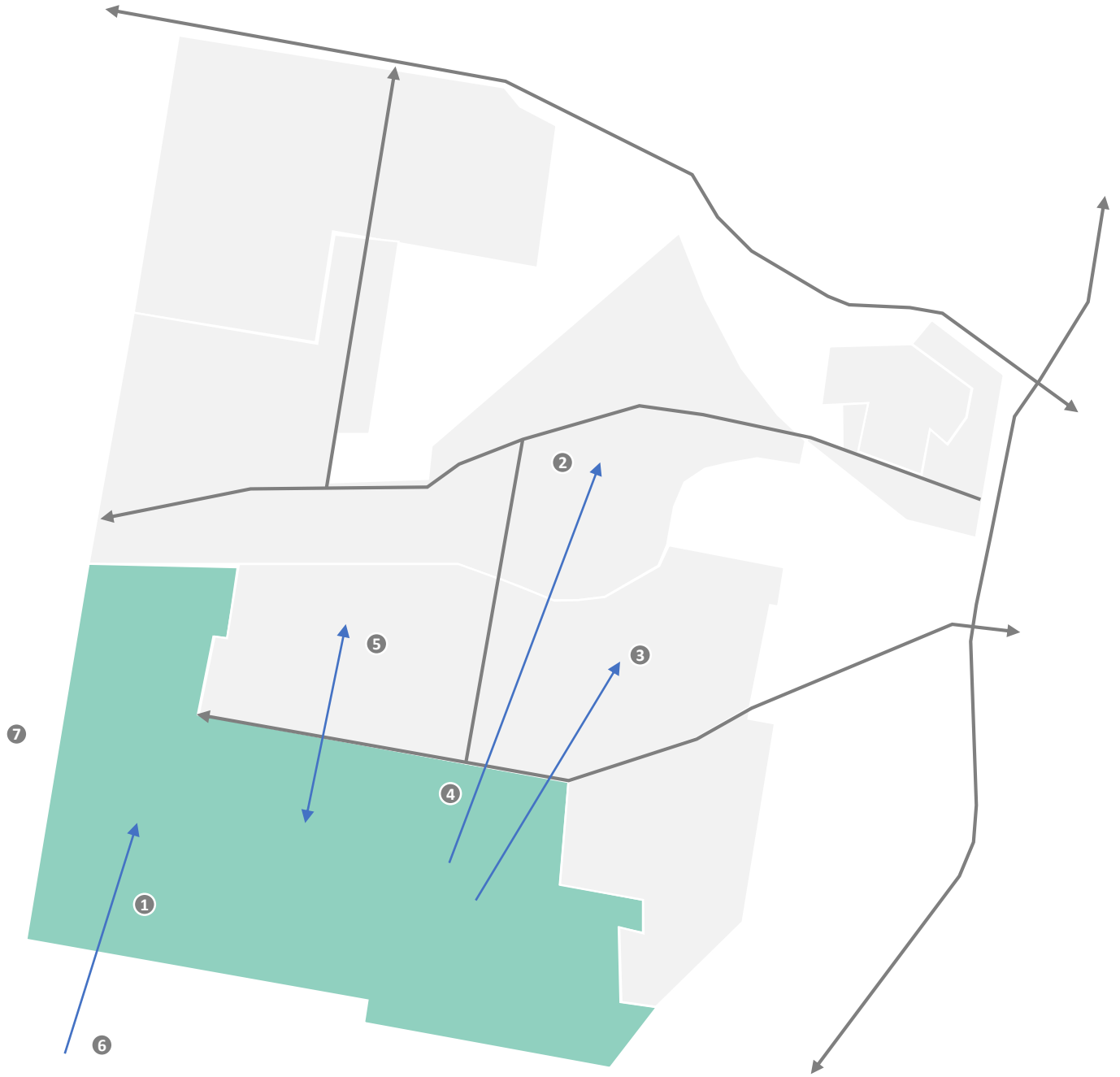
Intensive agriculture

Drivers and direction of growth

The following map spatially represents the industry opportunities identified in the previous commentary.

Growth of this sub-precinct will likely radiate out from two places: the abattoir (assuming it is accommodated) likely from the south-west corner of the sub-precinct; and any future protected cropping facility that would benefit from proximity to the resource and recycling facility and in particular the energy from waste facility. Growth will be driven by:

1. Establishment of an abattoir and (most likely) adjacent feed lots, in the south-west corner of the SAP.
2. Access to the intermodal terminals for bulk grain haulage for feed or production, as well as grain storage.
3. Proximity to the Mixed Enterprise precinct which is suited to food production and processing facilities.
4. Potential for greenhouses that will benefit from proximity to the Energy from Waste facility and access to cold storage facilities and road network for just-in-time distribution to Metropolitan Sydney markets.
5. Physical connection with the Energy from Waste facility to provide both energy and heat to future greenhouses
6. Connection to adjacent agricultural areas, potentially to locate abattoir feed lots adjacent to, rather than in the SAP.
7. Long term possibility of freight-aligned airport to connect the Parkes SAP to international food markets.



Intensive agriculture

Growth scenarios

The potential growth of industries in the Intensive agriculture sub-precinct is predicated on building a likely profile of initial investment. This has been informed by discussions with Parkes Shire Council and Regional Investment teams in the NSW Department of Premier and Cabinet and NSW Department of Industry and supplemented by industry research. The assumed 'initial phase' profile is outlined in the adjacent box. It is assumed that an abattoir will go ahead at the same scale regardless of growth scenario.

More detailed analysis of the projected growth is contained in the accompanying SAP land use model.

Initial phase assumptions

- Delivery of abattoir in initial phase at full capacity; with employment at 1,000 people on day one and remaining constant throughout its life cycle

Subsequent phases

- Introduction of 2x protected cropping businesses after five years at minimum viable size of 40 hectares per operation, growing as per growth rates thereafter
- Introduction of grain storage facility at same time, with fixed size and no growth over the duration.

No specific food processing facilities have been included. Instead, they are considered as part of the general industry growth in the Regional and Mixed Enterprise sub-precinct.

HIGH GROWTH SCENARIO

	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041
TOTAL SUB-PRECINCT AREA (Hectares)	400	400	400	400	400	400	485	490	495	501	507	513	520	528	536	544	548	553	557	562	566
TOTAL SUB-PRECINCT JOBS	1,000	1,000	1,000	1,000	1,000	1,000	1,405	1,430	1,456	1,483	1,513	1,546	1,581	1,618	1,658	1,701	1,722	1,743	1,765	1,788	1,812

MEDIUM GROWTH SCENARIO

	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041
TOTAL SUB-PRECINCT AREA (Hectares)	400	400	400	400	400	400	485	488	492	495	499	503	507	511	515	520	525	529	535	540	545
TOTAL SUB-PRECINCT JOBS	1,000	1,000	1,000	1,000	1,000	1,000	1,405	1,421	1,438	1,456	1,475	1,494	1,514	1,535	1,557	1,579	1,603	1,627	1,653	1,679	1,707

LOW GROWTH SCENARIO

	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041
TOTAL SUB-PRECINCT AREA (Hectares)	400	400	400	400	400	400	485	486	488	489	491	492	494	495	497	498	500	501	503	505	506
TOTAL SUB-PRECINCT JOBS	1,000	1,000	1,000	1,000	1,000	1,000	1,405	1,412	1,419	1,426	1,433	1,440	1,448	1,455	1,463	1,471	1,478	1,486	1,495	1,503	1,511

NB. Area represents lots only, it does not consider roads, public space or other amenity

Growth summary

The following charts summarise the three growth scenarios for the SAP. These show total area and total employment, within the SAP only. They do not show possible multipliers. All scenarios are based on the same initial investment. The changes identified are driven by the different growth rates used to forecast land and jobs. A more detailed overview is provided in Appendix 3.

LAND AREA – SAP ONLY

	2021	2026	2031	2036	2041
Low Growth	519	553	759	782	808
Medium Growth	519	568	808	879	965
High Growth	519	601	881	1,027	1,112

EMPLOYMENT – SAP ONLY

	2021	2026	2031	2036	2041
Low Growth	1,204	1,321	1,982	2,061	2,147
Medium Growth	1,204	1,352	2,117	2,347	2,628
High Growth	1,204	1,420	2,301	2,751	3,016

Applying growth rates

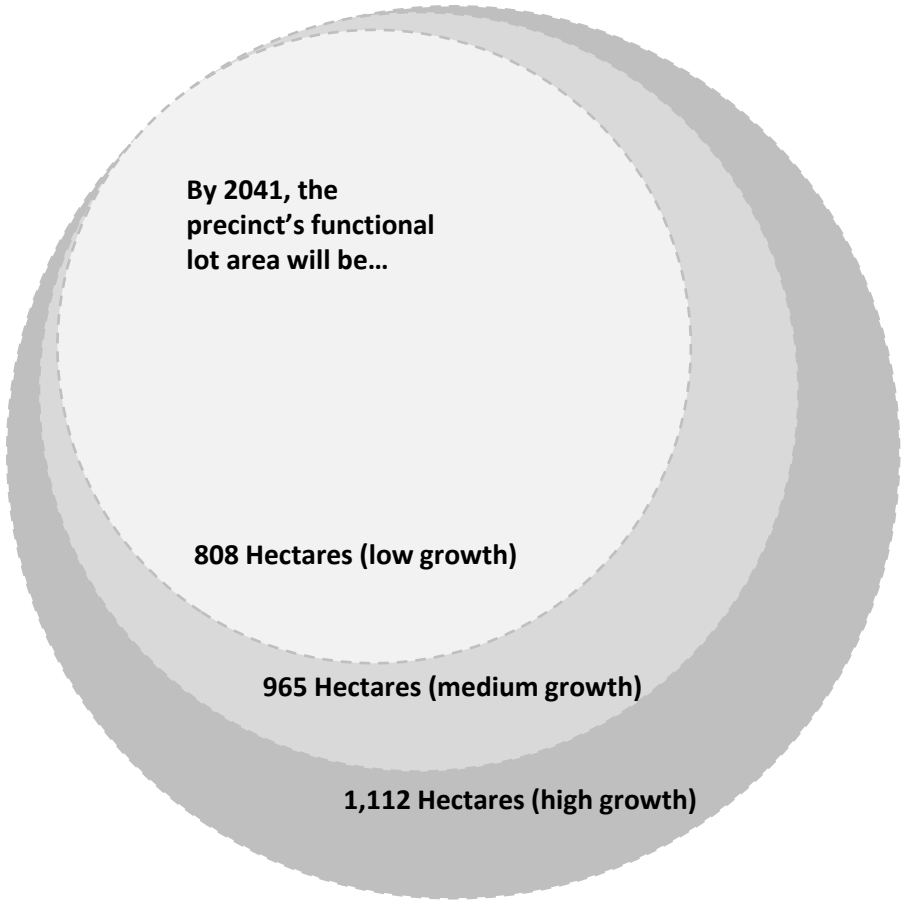
The growth rate scenarios serve two important roles. The provide a range of land area and employment projections for the Parkes SAP. They also test whether the available land is likely to be sufficient to meet the needs of future businesses and precinct functions.

In particular, the high growth scenario provides a check on how the precinct may fill up over a long-term horizon. In doing so, it sets an upper bound of likely land area take up.

The medium and low growth scenarios may well hit that capacity, but would do so over a much longer term. This allows the SAP to retain flexibility and capacity to grow beyond 2041.

The growth rates are not applied to all land uses. Certain specific businesses are assumed to come online and stay at a certain operation. These are identified in the land use and employment model.

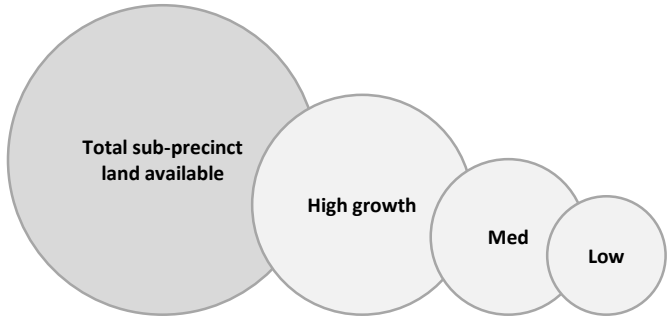
Under all these scenarios, it is assumed that a large abattoir is delivered in the SAP's early stages. This would be a significant contributor to the total land area of the SAP. The abattoir modelled includes feed lots and totals 400 hectares.



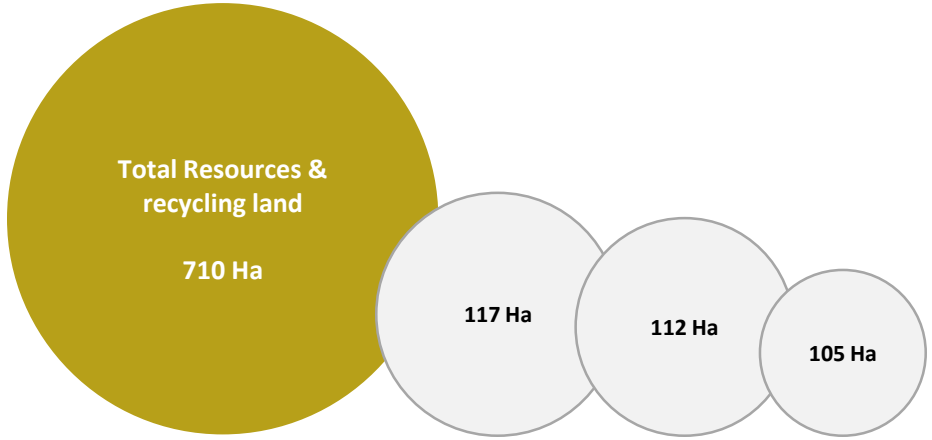
Applying growth rates

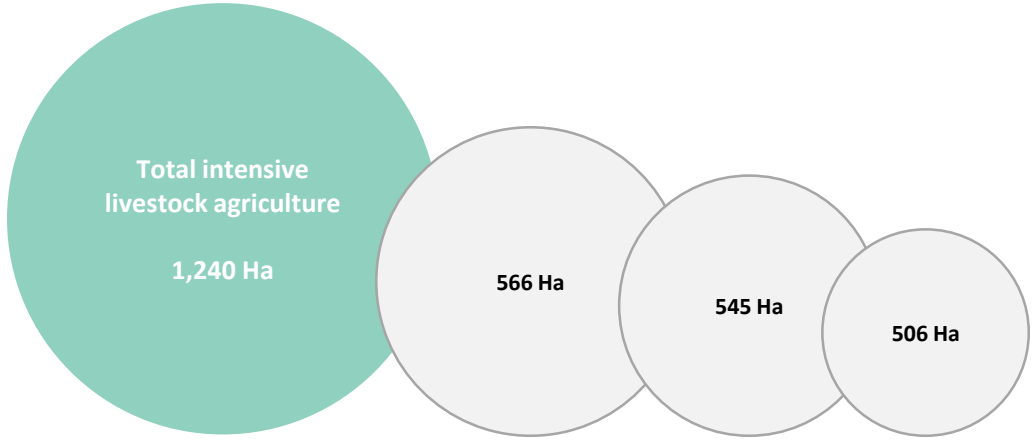
The identified land area for each of the growth rates only considers total lot sizes. It does not account for roads, public spaces, verges and any other design or infrastructure requirements for the precinct. These diagrams compare the total land available for the major sub-precincts of the SAP (as identified in the Draft Master Plan) with the projected total lot sizes of each growth scenario.

It indicates that even under the highest growth scenario, after 20 years of operation there is sufficient capacity to meet this demand with additional capacity should certain businesses need more land, or if certain sub-precincts have a more generous allocation of public land.



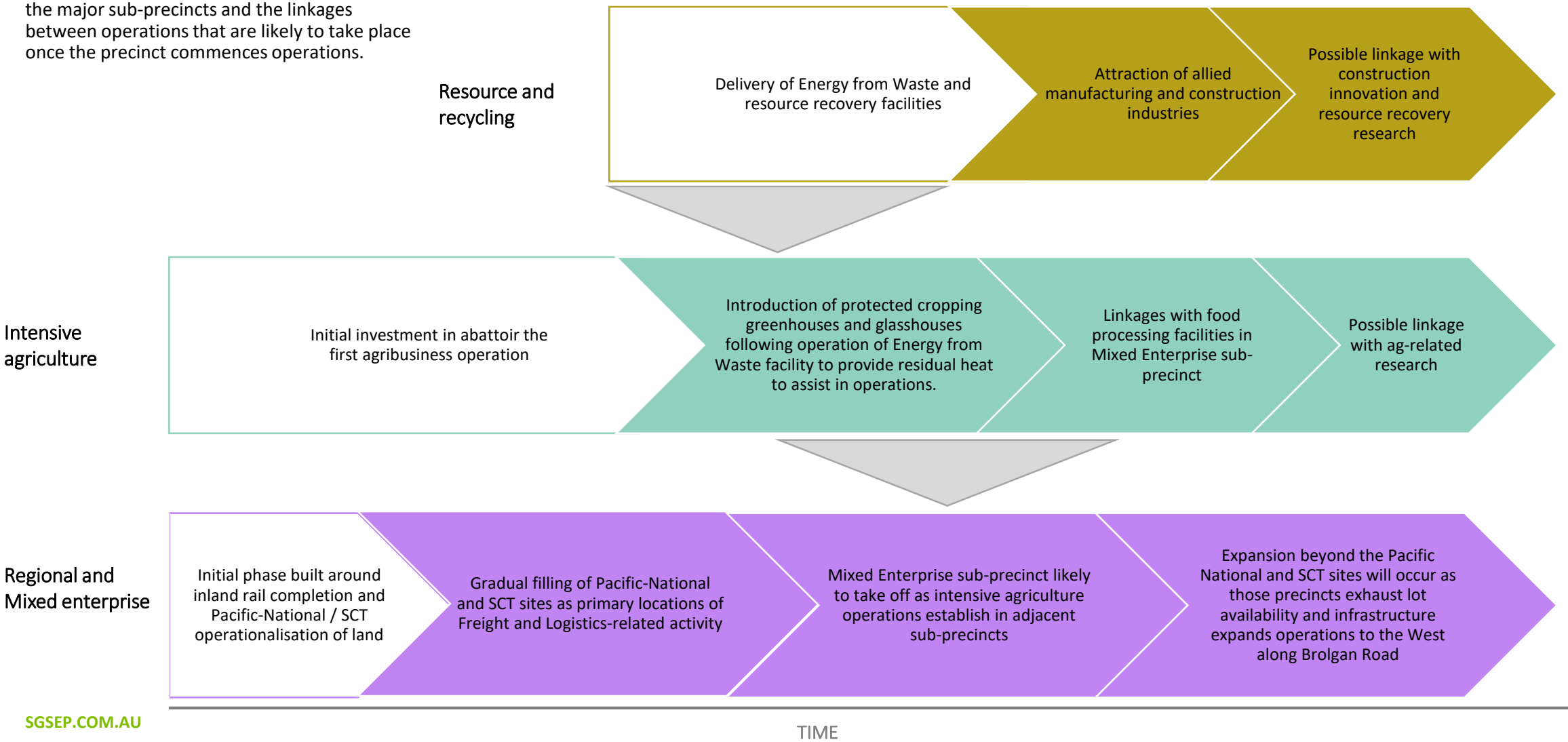
Growth scenario land take up





Summary of phasing

This diagram illustrates the key moves in each of the major sub-precincts and the linkages between operations that are likely to take place once the precinct commences operations.



Employment multipliers

The three growth scenarios identify employment scenarios for jobs that may be directly created in the SAP. In practice, there are multiple economic linkages that create a regional economy. This means that as jobs may grow in a certain sector, there are other supporting industries that may also grow to support them. This impact is referred to a 'multiplier'. In the context of this project, additional people moving to the Parkes LGA for jobs created in the SAP are likely to drive demand for additional jobs in other sectors such as retail or health care.

To get a sense of this impact, the Australian Bureau of Statistics' Input-Output (I-O) model has been used to understand what the average multiplier is for additional jobs in the Parkes LGA. A detailed description of the I-O model and its limitations is provided in Appendix 4.

Acknowledging that I-O models often over-state the economic impacts, the use of the employment multiplier (through Full-time equivalent jobs) for the region provides some idea of what employment flow-on effects the SAP may generate in the wider Parkes LGA economy.

Applying this multiplier to the forecast jobs in the different growth scenarios provides a range of total jobs that may be created in the wider Parkes LGA economy. **For every one job in the SAP, the multiplier assumes *an additional* 0.823 jobs in the wider Parkes LGA economy**.

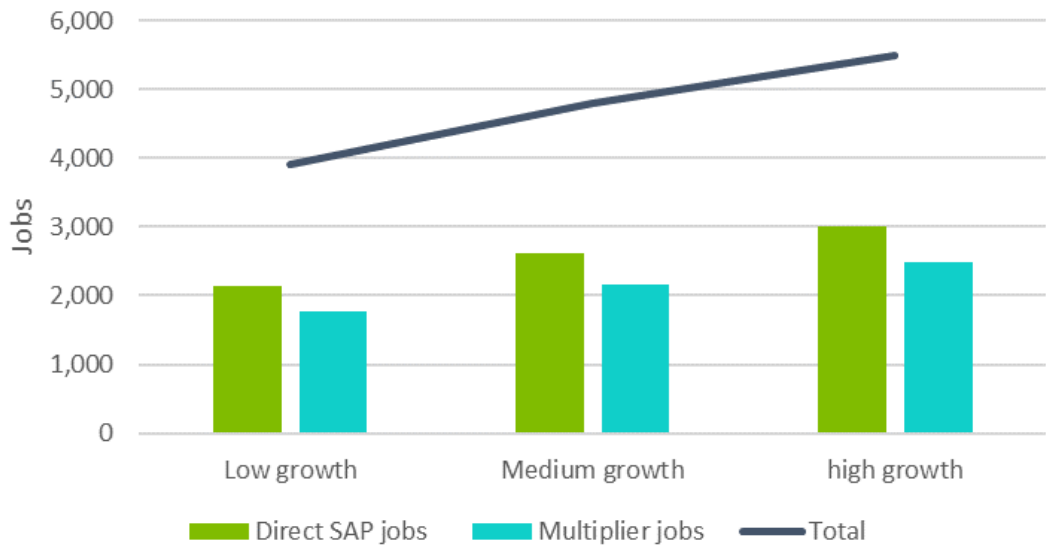
The application of the multiplier also helps to understand the potential implication of the SAP on the Parkes LGA population.

It must be noted that as part of the forecast employment growth of jobs in the SAP, particularly in the Regional and Mixed Enterprise and Resource and Recycling sub-precincts, the growth of jobs is generalised. In doing so, it assumes that some of those jobs may be indirectly related to the primary freight and logistics function of the SAP and are therefore, in effect, multiplier jobs. Given the long term nature of the project, it is not possible to identify the exact industries that will locate in the SAP in the future.

The multiplier applied, although conservative, should therefore be considered a guide to inform possible population and employment growth.

The total jobs projected, with the inclusion of the multiplier, is considered to be at the high end of the potential additional jobs attracted to the Parkes LGA over time.

DIRECT SAP AND INDIRECT MULTIPLIER JOBS (2041)



Regional employment multiplier applied: **0.823**

Alternative scenario – no abattoir

Rationale

The long term employment profile of the Parkes SAP has many potential outcomes. While it is not practical to test every one of them, one alternative scenario has been modelled due to the potentially high employment and land use change it would effect, compared with what has been reported.

This scenario removes the abattoir from all growth scenarios. This is not a comment on the likelihood of an abattoir being feasible in the SAP. Rather, it is a scenario designed to demonstrate the sensitivity of the SAP's growth to one major industry not locating in the precinct as may be expected.

Unsurprisingly, the removal of an industry with such high employment generation has a significant impact on the number of jobs that the SAP may create. The scale of such an abattoir, resulting from the need to include feed lots and a buffer zone, also has a significant impact on the amount of land required.

LAND AREA (Ha) (SAP ONLY) - 2041

	With abattoir	Without abattoir
Low Growth	808	408
Medium Growth	965	565
High Growth	1,112	712

EMPLOYMENT (SAP ONLY) – 2041

	With abattoir	Without abattoir
Low Growth	2,147	1,147
Medium Growth	2,628	1,628
High Growth	3,016	2,016

EMPLOYMENT IN PARKES LGA (INC. MULTIPLIERS) – 2041

	With abattoir	Without abattoir
Low Growth	3,913	2,090
Medium Growth	4,790	2,967
High Growth	5,498	3,675

Regional labour market

Employment scale

The creation of new jobs in the SAP is likely to have at least some impact on the population of the Parkes LGA and surrounds. With the SAP potentially directly accommodating between 950 jobs (low growth scenario with no abattoir) and 3,000 jobs (high growth scenario with abattoir) by 2041, this will clearly be a significant change in the employment scale of the Parkes LGA, which had approximately 5,400 jobs in total in 2016.

Adding to this the potential for multiplier jobs (discussed earlier in this report with accompanying assumptions), the growth of the SAP is likely to exceed the labour market capacity in the region. As such, it is assumed that for jobs to grow to the scale identified in the SAP, so too must the Parkes LGA population.

Labour market

Before considering the potential implication that the SAP will have on the region's population, the following factors would need to be considered:

- **Currently unemployed.** In 2016, the ABS Census indicated that there were 963 people unemployed across the three LGAs of Parkes, Forbes and Cabonne. While not all of these people will necessarily be able to be employed, it does indicate some latent capacity in the labour force to fill new jobs before additional people are required. This would be predicated on the skills of these residents and the type of jobs available in the SAP.
- **People travelling to work from outside of Parkes LGA**. Residents from nearby towns or LGA such as Forbes and Carbonne may choose to work in Parkes LGA without moving to the LGA. Currently, approximately 10% of people work in Parkes LGA come from outside of the LGA.
- **Underemployment**. Census data does not clearly report on underemployment. There may be capacity in the existing workforce to support some of these future jobs.
- **Future labour force**. In 2016, approximately one in five people in Parkes LGA and the surrounding LGAs was aged between five and twenty. Many of these residents are not yet in the labour force but would service future jobs in the region.
- **Automation.** Certain jobs identified in the SAP may become automated. There is also the potential that in some of the industries, and particularly Freight and Logistics-related ones, the increasing automated functions of businesses may reduce this employment projection.
- **Current age of workforce**. In 2016, over 45% of the Parkes. Forbes and Cabonne workforce were over 45 years old. With an older workforce and ageing population generally, there is will be a number of residents exiting the labour market over the next twenty years.

In 2016, for every person in the Parkes LGA, there were 0.36 jobs. Applying that ratio to the NSW Department of Planning and Environment's projected 2041 population would see approximately 5,650 jobs in the Parkes LGA under the current growth projections. This does not include the injection of SAP-related jobs and is only a small increase on the current job number.

The realisation of the SAP is anticipated to attract more jobs than this simplified baseline employment forecast identifies will occur in Parkes LGA under a business as usual growth scenario.

Notwithstanding the identified sources of labour, in practice, some of the jobs created as a result of the SAP are likely to be serviced by people not currently in the region and who may need to move to Parkes LGA. This may be due to factors such as to the lack of people to meet the future employment needs, or the needs for specialised skills in future industries that are not currently available in the region.

This may be exacerbated by the age of the current labour force and the likelihood of retirement over the medium term. The SAP's employment demands are therefore likely to have some impact on the LGA's future population.

Regional labour market

Impact on Parkes LGA

The following comparison is not a population projection.

This comparison is included to convey the potential scale of the SAP's employment impact in the context of the wider Parkes LGA. It does so by applying the current jobs to population ratio (0.36) to the SAP employment scenarios at 2041.

In 2016 the population of Parkes LGA was 15,250. The NSW Department of Planning and Environment population projections currently project the Parkes LGA to grow by 3% in total to 2036. Extrapolating the growth rate assumed in these projections an additional five years to 2041, the projected population for Parkes LGA is 15,900.

Under the most conservative SAP scenario (low growth with no abattoir), by 2041 there would be approximately 6,570 jobs in Parkes LGA (including the SAP) or 7,500 if multiplier jobs are included in full.

Applying the 0.36 ratio to these employment ranges gives a total population of between 18,480 and 21,130.

Under the highest growth SAP scenario (and including the abattoir), by 2041 there would be approximately 8,440 jobs in Parkes LGA (including the SAP) or 10,920 if multiplier jobs are included in full.

Applying the 0.36 ratio to these employment ranges gives a total population of between 23,730 and 30,720.

Using this ratio as a means of comparison. the variance in these different scenarios ranges enormously, from 16% to 93% above the current 2041 population projection (derived from the NSW Dept. Planning and Environment's 2036 projection).

These population to job comparisons do not consider the degree of labour market absorption that could occur before an increase in population is required and are not to be considered as population projections. Rather, they illustrate the scale of growth that the SAP may drive in the region over the long term and flag some potential challenges for Parkes Shire Council, particularly in the provision of future housing, utilities and social infrastructure.

Assumptions

This testing method has several limitations which support why this should not be considered a method for population project, but rather an illustration of impact.

- Because it applies a static ratio, it brings with it an assumption that the future Parkes LGA economic profile will be the same as the today's, and with it the same demographic and skills profile.
- It assumes that all future jobs will require additional people into the LGA to service them. This does not factor in any elasticity in the current labour market to absorb more jobs without the need for the population to grow. As outlined on the previous page, in practice the current labour market is likely to absorb at least some of these jobs.
- It does not include any demographic analysis of the ageing population structure and the impact that it will have on labour availability.
- As outlined in the Multiplier section, the generalised nature of the employment growth projections means that the some of the multiplier jobs may in fact be absorbed as Direct SAP jobs, depending on the industries that establish. The multiplier is therefore likely to overstate the indirect job totals (and therefore any ratio applied to compare with population). This has been factored in by assuming that the projected net growth under a Business as usual scenario (approximately 250 jobs) will be part of the SAP growth to reduce overstating the employment size.

Summary and conclusion

The Parkes SAP will be a significant investment in the economy of the Central West Region and create a major competitive advantage for the Parkes LGA on the cross roads of the Inland Rail freight network.

It is anticipated that the Parkes SAP will attract a number of industries that seek to take advantage of the streamlined planning process and the benefits that the SAP's location has to businesses, particularly related to Freight and Logistics, Intensive Agriculture and Waste-related industries.

While the SAP is likely to accommodate a range of industries and sectors over the long term, its growth will originate around the interface between the Inland Rail and Newell Highway bypass, initially attracting businesses that can take advantage of the access to road and rail freight networks. This will be lead, initially, but the development of both the Pacific-National and SCT site, two major stakeholders with an active role in the region already, and a direct link to the freight and logistics industry.

It is anticipated that over time, the first-mover businesses will build the SAP's operational identity and gradually attract secondary industries to the area. This sequenced growth pattern will catalyse development throughout the SAP's various sub-precincts. Ultimately, it is envisaged that the SAP will support an integrated economy, with businesses co-locating to take advantage of supply chain and value chain efficiencies.

It is difficult to ascertain how quickly such a precinct will grow. The Parkes LGA has seen low employment growth over the past ten years and development at this scale will be a step change in the employment growth of the Parkes LGA and the Central West. The Parkes SAP will also be competing for jobs with other parts of Regional NSW and Regional Australia.

Acknowledging this, the scenarios developed to understand the potential future growth of the SAP are grounded in an understanding of what opportunities present themselves to the region now and into the future.

While the growth rate of the high growth scenarios are above those observed in the region, they serve to pressure test the SAP Masterplan's allocation of land to ensure that sufficient space has been allocated to the various anticipated SAP functions.

The long-term growth of the SAP will be influenced by those operations that initially establish in the area and the competitive advantage that they draw from the access to nationally-significant freight networks. In turn, this will attract second and third phase businesses seeking to support these catalyst precinct functions.

The SAP has a significant potential to create a cluster of industries that will drive long term employment and economic opportunities for the Central West and Regional NSW more broadly.

Appendix 1: Industry linkage strength

SGS Economics & Planning

Agribusiness industry linkages

Upstream

AUSTRALIAN BUREAU OF STATISTICS - NATIONAL ACCOUNTS IO
TABLE 5
2015-16 (Cat. 5209.0.55.001)

	PRIMARY INDUSTRIES									
SECONDARY INDUSTRIES	Poultry and Other Livestock	Other Agriculture	Meat and Meat product Manufacturing	Dairy Product Manufacturing	Fruit and Vegetable Product Manufacturing	Oils and Fats Manufacturing	Grain Mill and Cereal Product Manufacturing	Other Food Product Manufacturing	Water Supply, Sewerage and Drainage Services	Wholesale Trade
Sheep, Grains, Beef and Dairy Cattle	8.9%	3.3%	59.4%	57.4%	0.4%	36.2%	53.1%	7.0%	0.0%	0.8%
Poultry and Other Livestock	4.8%	1.4%	18.1%	1.2%	0.0%	0.1%	0.1%	3.0%	0.0%	0.4%
Other Agriculture	11.7%	6.7%	0.2%	0.1%	32.8%	1.2%	0.1%	13.5%	0.1%	0.2%
Agriculture, Forestry and Fishing Support Services	4.1%	17.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Meat and Meat product Manufacturing	2.0%	0.0%	3.2%	0.1%	2.3%	1.9%	0.4%	8.3%	0.0%	1.4%
Dairy Product Manufacturing	0.6%	0.0%	0.1%	16.6%	0.5%	7.3%	0.3%	6.0%	0.1%	0.1%
Oils and Fats Manufacturing	0.0%	0.0%	0.0%	0.2%	1.5%	21.3%	0.3%	1.4%	0.0%	0.0%
Sugar and Confectionery Manufacturing	0.1%	0.0%	0.0%	0.8%	0.7%	0.2%	2.6%	7.3%	0.0%	0.0%
Other Food Product Manufacturing	12.9%	0.1%	0.2%	0.9%	3.2%	0.4%	1.4%	6.0%	0.0%	0.1%
Water Supply, Sewerage and Drainage Services	5.4%	4.9%	0.3%	0.1%	0.3%	0.1%	0.3%	0.3%	8.4%	0.2%
Construction Services	7.4%	4.5%	0.2%	0.3%	0.9%	0.5%	0.4%	0.6%	12.7%	4.1%
Wholesale Trade	4.2%	7.5%	2.2%	3.6%	15.1%	6.8%	4.8%	8.9%	3.2%	6.1%
Road Transport	5.5%	2.2%	4.5%	5.6%	7.0%	5.1%	7.5%	5.9%	0.8%	4.4%
Finance	4.3%	7.2%	0.7%	0.4%	0.8%	0.1%	1.5%	1.1%	21.4%	3.5%
Auxiliary Finance and Insurance Services	2.4%	5.8%	0.5%	0.4%	0.4%	0.4%	0.5%	0.5%	12.3%	2.8%
Professional, Scientific and Technical Services	3.9%	7.4%	0.7%	1.6%	1.9%	0.6%	4.7%	2.9%	8.7%	10.8%
Employment, Travel Agency and Other Administrative Services	1.0%	0.8%	2.2%	0.2%	5.2%	0.2%	0.5%	1.9%	2.8%	3.4%

There are over 100 industry classifications in the National Accounts input-output tables. A nominal minimum threshold of 5% has been applied to identify industries that may have a reasonably strong share of trade to or from the identified primary industries along the top of the spreadsheet.

Agribusiness industry linkages

Downstream

AUSTRALIAN BUREAU OF STATISTICS - NATIONAL ACCOUNTS IO
TABLE 5
2015-16 (Cat. 5209.0.55.001)

	PRIMARY INDUSTRIES									
SECONDARY INDUSTRIES	Poultry and Other Livestock	Other Agriculture	Meat and Meat product Manufacturing	Dairy Product Manufacturing	Fruit and Vegetable Product Manufacturing	Oils and Fats Manufacturing	Grain Mill and Cereal Product Manufacturing	Other Food Product Manufacturing	Water Supply, Sewerage and Drainage Services	Wholesale Trade
Sheep, Grains, Beef and Dairy Cattle	1.4%	15.7%	1.5%	1.2%	0.4%	0.4%	1.0%	20.6%	6.7%	3.0%
Poultry and Other Livestock	2.1%	2.3%	0.5%	0.3%	0.1%	0.1%	0.5%	8.2%	1.4%	0.2%
Agriculture, Forestry and Fishing Support Services	0.0%	14.1%	0.1%	0.0%	0.5%	0.0%	0.1%	1.5%	0.2%	0.7%
Meat and Meat product Manufacturing	65.8%	0.3%	7.0%	0.3%	9.1%	0.3%	1.9%	0.9%	0.6%	0.8%
Dairy Product Manufacturing	1.8%	0.1%	0.1%	32.9%	2.3%	2.3%	0.7%	1.9%	0.1%	0.5%
Fruit and Vegetable Product Manufacturing	0.0%	6.0%	0.5%	0.3%	5.6%	5.7%	3.5%	1.9%	0.1%	0.6%
Oils and Fats Manufacturing	0.0%	0.1%	0.2%	1.7%	0.1%	33.9%	0.1%	0.1%	0.0%	0.1%
Bakery Product Manufacturing	0.6%	0.4%	2.9%	3.7%	9.8%	20.1%	23.7%	5.3%	0.0%	0.5%
Sugar and Confectionery Manufacturing	0.4%	16.9%	0.2%	3.4%	1.1%	4.1%	6.8%	1.8%	0.2%	0.5%
Other Food Product Manufacturing	2.3%	4.8%	3.8%	6.2%	10.1%	10.2%	4.7%	6.9%	0.2%	0.7%
Wine, Spirits and Tobacco	0.0%	12.1%	0.0%	0.2%	0.1%	0.0%	0.0%	0.0%	0.0%	0.2%
Water Supply, Sewerage and Drainage Services	0.0%	0.1%	0.0%	0.1%	0.1%	0.0%	0.0%	0.1%	6.5%	0.4%
Residential Building Construction	0.0%	0.6%	0.1%	0.3%	0.8%	0.2%	0.4%	0.6%	7.6%	4.4%
Construction Services	0.0%	2.1%	0.6%	0.6%	1.5%	0.5%	0.8%	1.5%	5.6%	9.2%
Wholesale Trade	4.1%	0.7%	8.1%	1.2%	1.1%	0.5%	0.6%	1.3%	1.0%	5.8%
Retail Trade	9.5%	3.3%	4.1%	5.0%	3.4%	1.2%	8.2%	4.4%	0.5%	4.1%
Food and Beverage Services	3.4%	5.1%	52.2%	9.7%	17.5%	4.4%	11.7%	8.3%	3.1%	3.5%
Non-Residential Property Operators and Real Estate Services	1.7%	1.5%	0.1%	0.2%	0.1%	0.0%	0.0%	0.1%	8.1%	0.7%
Professional, Scientific and Technical Services	0.1%	0.1%	0.7%	1.4%	0.4%	0.1%	0.2%	0.3%	11.0%	2.8%
Health Care Services	0.7%	1.0%	3.1%	9.6%	6.4%	1.2%	5.8%	2.1%	3.5%	5.0%
Residential Care and Social Assistance Services	0.2%	0.3%	2.1%	8.9%	7.9%	1.6%	7.9%	4.0%	1.3%	1.7%
Sports and Recreation	1.1%	0.8%	0.3%	0.0%	0.3%	0.0%	0.3%	11.2%	2.5%	0.9%

There are over 100 industry classifications in the National Accounts input-output tables. A nominal minimum threshold of 5% has been applied to identify industries that may have a reasonably strong share of trade to or from the identified primary industries along the top of the spreadsheet.

Freight & Logistics industry linkages

Upstream

AUSTRALIAN BUREAU OF STATISTICS - NATIONAL ACCOUNTS IO
TABLE 5
2015-16 (Cat. 5209.0.55.001)

	PRIMARY INDUSTRIES		
SECONDARY INDUSTRIES	Road Transport	Rail Transport	Transport Support services and storage
Petroleum and Coal Product Manufacturing	6.0%	2.6%	0.3%
Railway Rolling Stock Manufacturing	0.0%	9.7%	0.1%
Heavy and Civil Engineering Construction	0.1%	6.4%	7.0%
Construction Services	1.2%	15.6%	4.5%
Wholesale Trade	7.6%	3.8%	1.3%
Retail Trade	7.6%	1.4%	0.5%
Road Transport	9.0%	4.2%	3.1%
Rail Transport	1.3%	5.2%	1.2%
Transport Support services and storage	5.4%	10.6%	19.9%
Finance	1.8%	2.6%	6.2%
Non-Residential Property Operators and Real Estate Services	4.3%	8.1%	5.0%
Professional, Scientific and Technical Services	13.3%	1.0%	7.9%
Employment, Travel Agency and Other Administrative Services	2.9%	3.6%	9.9%
Public Administration and Regulatory Services	6.4%	0.4%	2.9%
Automotive Repair and Maintenance	11.1%	0.2%	0.3%
Petroleum and Coal Product Manufacturing	6.0%	2.6%	0.3%
Railway Rolling Stock Manufacturing	0.0%	9.7%	0.1%

There are over 100 industry classifications in the National Accounts input-output tables. A nominal minimum threshold of 5% has been applied to identify industries that may have a reasonably strong share of trade to or from the identified primary industries along the top of the spreadsheet.

Freight & Logistics industry linkages

Downstream

AUSTRALIAN BUREAU OF STATISTICS - NATIONAL ACCOUNTS IO
TABLE 5
2015-16 (Cat. 5209.0.55.001)

	PRIMARY INDUSTRIES		
SECONDARY INDUSTRIES	Road Transport	Rail Transport	Transport Support services and storage
Coal mining	1.2%	13.5%	2.8%
Iron Ore Mining	0.4%	3.1%	0.5%
Meat and Meat product Manufacturing	3.5%	0.7%	0.6%
Basic Non-Ferrous Metal Manufacturing	1.7%	5.6%	0.2%
Residential Building Construction	3.5%	0.9%	1.5%
Construction Services	8.1%	2.4%	3.2%
Wholesale Trade	8.9%	15.9%	16.8%
Retail Trade	4.6%	1.7%	2.7%
Road Transport	7.6%	7.5%	3.7%
Rail Transport	1.0%	8.3%	2.0%
Air and Space Transport	1.7%	0.7%	5.7%
Transport Support services and storage	2.9%	7.3%	14.9%
Professional, Scientific and Technical Services	1.6%	1.1%	4.2%

There are over 100 industry classifications in the National Accounts input-output tables. A nominal minimum threshold of 5% has been applied to identify industries that may have a reasonably strong share of trade to or from the identified primary industries along the top of the spreadsheet.

Waste transition industry linkages

Upstream

AUSTRALIAN BUREAU OF STATISTICS - NATIONAL ACCOUNTS IO TABLE 5 2015-16 (Cat. 5209.0.55.001)	PRIMARY INDUSTRIES	
	Pulp, Paper and Paperboard Manufacturing	Waste Collection, Treatment and Disposal Services
SECONDARY INDUSTRIES		
Sawmill Product Manufacturing	16.6%	0.0%
Structural Metal Product Manufacturing	6.9%	0.1%
Electricity Transmission, Distribution, On Selling and Electricity Market Operation	5.2%	0.0%
Waste Collection, Treatment and Disposal Services	0.5%	11.0%
Wholesale Trade	6.0%	2.8%
Internet Service Providers, Internet Publishing and Broadcasting, Websearch Portals and Data Processing	5.3%	0.4%
Auxiliary Finance and Insurance Services	1.4%	25.8%
Non-Residential Property Operators and Real Estate Services	5.3%	3.2%
Professional, Scientific and Technical Services	5.4%	30.4%

There are over 100 industry classifications in the National Accounts input-output tables. A nominal minimum threshold of 5% has been applied to identify industries that may have a reasonably strong share of trade to or from the identified primary industries along the top of the spreadsheet.

Waste transition industry linkages

Downstream

AUSTRALIAN BUREAU OF STATISTICS - NATIONAL ACCOUNTS IO TABLE 5 2015-16 (Cat. 5209.0.55.001)	PRIMARY INDUSTRIES	
	Pulp, Paper and Paperboard Manufacturing	Waste Collection, Treatment and Disposal Services
SECONDARY INDUSTRIES		
Paper Stationery and Other Converted Paper Product Manufacturing	12.0%	0.0%
Printing (including the reproduction of recorded media)	10.4%	0.1%
Waste Collection, Treatment and Disposal Services	0.2%	7.9%
Construction Services	1.4%	6.6%
Wholesale Trade	11.3%	4.9%
Retail Trade	6.6%	1.1%
Publishing (except Internet and Music Publishing)	15.4%	0.0%
Telecommunication Services	0.1%	8.9%
Professional, Scientific and Technical Services	0.2%	7.9%
Computer Systems Design and Related Services	0.0%	6.0%
Employment, Travel Agency and Other Administrative Services	0.3%	5.1%
Health Care Services	0.4%	8.6%

There are over 100 industry classifications in the National Accounts input-output tables. A nominal minimum threshold of 5% has been applied to identify industries that may have a reasonably strong share of trade to or from the identified primary industries along the top of the spreadsheet.

Appendix 2: Stakeholder engagement

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Stakeholders engaged during the study

A number of stakeholders have been engaged with as part of this study to provide insights that have informed the industry profile and future growth opportunities, These stakeholders are:

- Pacific National (landowner)
- SCT (landowner)
- NSW Dept. Planning and Environment
- NSW Dept. Premier and Cabinet
- Transport for NSW
- Parkes Shire Council
- NSW Dept. Industry
- Dr Ali Abbas, UNSW

Appendix 3: Employment and land area forecast detailed spreadsheets

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Parkes SAP summary

High growth scenario

	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041
Enterprise hectares	119	143	156	170	184	201	213	226	240	255	270	288	307	326	348	370	381	393	405	417	429
Enterprise jobs	204	300	326	355	386	420	446	473	502	533	566	603	642	683	728	775	798	822	847	872	899
Agriculture hectares	400	400	400	400	400	400	485	490	495	501	507	513	520	528	536	544	548	553	557	562	566
Agriculture Jobs	1,000	1,000	1,000	1,000	1,000	1,000	1,405	1,430	1,456	1,483	1,513	1,546	1,581	1,618	1,658	1,701	1,722	1,743	1,765	1,788	1,812
Resource hectares	-	-	-	-	-	-	100	101	102	103	105	106	107	109	110	112	113	114	115	116	117
Resource jobs	-	-	-	-	-	-	192	199	206	214	222	231	241	252	263	275	281	287	293	299	306
Total SAP hectares	**519**	**543**	**556**	**570**	**584**	**601**	**798**	**817**	**837**	**859**	**881**	**907**	**934**	**963**	**994**	**1,027**	**1,043**	**1,059**	**1,077**	**1,094**	**1,112**
Total SAP jobs	**1,204**	**1,300**	**1,326**	**1,355**	**1,386**	**1,420**	**2,043**	**2,101**	**2,164**	**2,230**	**2,301**	**2,380**	**2,464**	**2,554**	**2,649**	**2,751**	**2,801**	**2,852**	**2,905**	**2,960**	**3,016**
Multiplier jobs (in Parkes LGA)	991	1,070	1,092	1,115	1,141	1,168	1,681	1,730	1,781	1,836	1,893	1,959	2,028	2,102	2,180	2,264	2,305	2,347	2,391	2,436	2,482
Total SAP hectares	**519**	**543**	**556**	**570**	**584**	**601**	**798**	**817**	**837**	**859**	**881**	**907**	**934**	**963**	**994**	**1,027**	**1,043**	**1,059**	**1,077**	**1,094**	**1,112**
Total jobs	**2,195**	**2,370**	**2,418**	**2,470**	**2,527**	**2,588**	**3,724**	**3,831**	**3,945**	**4,066**	**4,194**	**4,338**	**4,492**	**4,655**	**4,829**	**5,015**	**5,106**	**5,200**	**5,296**	**5,396**	**5,498**

This data can be accessed through the accompanying land use and employment model.

Parkes SAP summary

Medium growth scenario

	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041
Enterprise hectares	119	143	149	155	162	168	175	182	190	198	206	214	223	232	242	252	262	273	284	295	308
Enterprise jobs	204	300	312	325	338	352	367	382	397	414	431	448	467	486	506	527	548	571	594	618	644
Agriculture hectares	400	400	400	400	400	400	485	488	492	495	499	503	507	511	515	520	525	529	535	540	545
Agriculture Jobs	1,000	1,000	1,000	1,000	1,000	1,000	1,405	1,421	1,438	1,456	1,475	1,494	1,514	1,535	1,557	1,579	1,603	1,627	1,653	1,679	1,707
Resource hectares	-	-	-	-	-	-	100	101	102	102	103	104	105	105	106	107	108	109	110	111	112
Resource jobs	-	-	-	-	-	-	192	197	201	206	212	217	223	228	234	241	247	254	261	269	277
Total SAP hectares	519	543	549	555	562	568	760	772	783	795	808	821	834	849	863	879	895	911	929	947	965
Total SAP jobs	1,204	1,300	1,312	1,325	1,338	1,352	1,964	2,000	2,037	2,076	2,117	2,159	2,203	2,249	2,297	2,347	2,398	2,452	2,508	2,567	2,628
Multiplier jobs (in Parkes LGA)	991	1,070	1,080	1,091	1,102	1,113	1,616	1,646	1,677	1,709	1,742	1,777	1,813	1,851	1,890	1,931	1,974	2,018	2,064	2,112	2,162
Total SAP hectares	**519**	**543**	**549**	**555**	**562**	**568**	**760**	**772**	**783**	**795**	**808**	**821**	**834**	**849**	**863**	**879**	**895**	**911**	**929**	**947**	**965**
Total jobs	**2,195**	**2,370**	**2,392**	**2,416**	**2,440**	**2,465**	**3,580**	**3,646**	**3,714**	**3,785**	**3,859**	**3,937**	**4,017**	**4,100**	**4,187**	**4,278**	**4,372**	**4,471**	**4,573**	**4,679**	**4,790**

This data can be accessed through the accompanying land use and employment model.

Parkes SAP summary

Low growth scenario

	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041
Enterprise hectares	119	143	146	148	151	153	156	159	161	164	167	170	173	175	178	181	185	188	191	194	197
Enterprise jobs	204	300	305	310	316	321	326	332	338	343	349	355	361	367	374	380	386	393	400	406	413
Agriculture hectares	400	400	400	400	400	400	485	486	488	489	491	492	494	495	497	498	500	501	503	505	506
Agriculture Jobs	1,000	1,000	1,000	1,000	1,000	1,000	1,405	1,412	1,419	1,426	1,433	1,440	1,448	1,455	1,463	1,471	1,478	1,486	1,495	1,503	1,511
Resource hectares	-	-	-	-	-	-	100	100	101	101	101	102	102	102	103	103	103	104	104	104	105
Resource jobs	-	-	-	-	-	-	192	194	196	198	200	202	204	206	208	210	213	215	217	219	222
Total SAP hectares	519	543	546	548	551	553	741	745	750	754	759	763	768	773	778	782	787	792	798	803	808
Total SAP jobs	1,204	1,300	1,305	1,310	1,316	1,321	1,923	1,938	1,952	1,967	1,982	1,997	2,013	2,028	2,044	2,061	2,077	2,094	2,111	2,129	2,147
Multiplier jobs (in Parkes LGA)	991	1,070	1,074	1,078	1,083	1,087	1,583	1,595	1,607	1,619	1,631	1,644	1,656	1,669	1,683	1,696	1,710	1,724	1,738	1,752	1,767
Total SAP hectares	**519**	**543**	**546**	**548**	**551**	**553**	**741**	**745**	**750**	**754**	**759**	**763**	**768**	**773**	**778**	**782**	**787**	**792**	**798**	**803**	**808**
Total jobs	**2,195**	**2,370**	**2,379**	**2,389**	**2,398**	**2,408**	**3,506**	**3,532**	**3,559**	**3,586**	**3,613**	**3,641**	**3,669**	**3,698**	**3,727**	**3,757**	**3,787**	**3,818**	**3,849**	**3,881**	**3,913**

This data can be accessed through the accompanying land use and employment model.

Appendix 4: Input-Output method

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Input-Output modelling limitations

I-O models measure the relationships and inter-dependence between industries in the economy. The model identifies the buyer and supplier linkages in the local economy, highlighting those industries that have the greatest economic 'multipliers'. Multipliers are measures of the total impact on all industries in an economy arising from changes in the output of a particular industry. For example, an increase in output of the construction industry (i.e. more houses) would have a flow-on effect to industries related to construction. The I-O model framework enables identification of those industries that have the biggest 'bang for the buck' – in terms of value add and employment per additional unit of output.

The Input-Output Model measures the effects of additional development in a particular industry. For every dollar or unit of output from one industry there are flow-on effects to other industries in the form of goods and services required. These supply-chain effects (generally referred to as 'production induced effects') are both direct (first round effects) and indirect (second round effects). For example, a housing construction firm might require the services of a bricklayer (direct round), who would in turn require the services of a brick maker (indirect effect), and so on. There are also consumer driven effects (otherwise known as 'consumption induced effects'), which are created by the additional demand in the economy generated by the wages of those employed in the production process. The focus of this analysis is on the local 'multiplier' effects associated with an increase in production in a particular industry.

Multipliers derived from the model estimate three key measures:

- Output (or income);
- Value added Gross Regional Product (GRP); and
- Full time equivalent (FTE) jobs.

While a cost-effective and widely used technique for economic impact analysis, I-O modelling has some limitations, as follows.

The model assumes relationships between industries are static over the forecast period. That is, productivity improvements are not factored in and historic relationships are assumed to hold.

The I-O model derives relationships between industries using total production estimates. Consequently, the relationships are 'average', whereas the stimulus used as an input is 'marginal'. Such an approach does not account for any 'underutilised capacity' at the industry level or additional economies of scale that might ensue, as production expands from its existing base.

The model assumes that there are no supply constraints. An additional drawback is that the model does not take into account the 'crowding out' of other sectors. This is recognition of the fact that there are scarce resources in an economy.

The combination of these limitations may lead to inflated economic impact results. Hence, the I-O model is generally considered a useful starting point only.

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