11-2017

Peel Business Park transition strategy

GHD

Department of Primary Industries and Regional Development

Peel Business Park Transition Strategy

November 2017

Executive summary

Transform Peel

Transform Peel is a $49m Royalties for Regions funded program aimed at achieving job creation, sustainable growth and economic development in the Peel Region. The Peel Development Commission (PDC) and its partners, intend to implement this program over 35 years where projections estimate that 35,000 jobs will be created generating an approximate $16.2b per annum economic output by 2050. Located in the Shires of Murray and Serpentine Jarrahdale, the program comprises three integrated, strategic elements, the Peel Business Park (PBP), the Peel Food Zone (PFZ) and the Peel Integrated Water Initiative.

The Department of Primary Industries and Regional Development (DPIRD) is the lead agency for PFZ sub-project which involves the development of a food/ agriculture industry transition program to assist with facilitating decisions by existing WA and Australian food industries and related support industries to relocate to the PBP.

The Peel Business Park

Located 10 kilometres north-east of Mandurah, the PBP will cater for agri-food and agri-processing operators, as well as ancillary light, general transport and logistic industries. The overall PBP covers 1,000ha across multiple lot ownerships, however the focus of this study is the planned initial 120ha precinct at Lot 600 Lakes Road Nambeelup, which is under LandCorp ownership.

Purpose of this report

This report provides a strategy to assist with facilitating decisions by existing WA and Australian food industry businesses and support industries to relocate to the PBP or to the Transform Peel area generally. The findings of this report will be used by the Department of Primary Industries and Regional Development (DPIRD), LandCorp and the Peel Development Commission (PDC).

Identification of agri-food businesses under relocation pressure in the Perth and Peel Regions

The analysis identified 401 agri-food businesses in the Perth and Peel Regions. The results show that around 51% of businesses are located within industrial zones, with the remaining businesses located in zones which may be less suitable including commercial (26%)[1], agricultural/rural (9%), development (7%) or residential (6%) zones. The 31 businesses currently located in development zones may be under the most pressure to relocate before their surrounding area transitions to higher density development (e.g. residential). Many of these businesses are located in urban development zonings around North Coogee, where they currently enjoy strategic proximity to major infrastructure such as the Fremantle Port.

The most common businesses identified were classified as gourmet, fresh produce, meat, seafood, food wholesaler, baking, oils, exporter/Importer and packing. Together these businesses represented 77% of all agri-food businesses in the region.

[1] This may include offices and headquarters rather than manufacturing facilities

Agri-Food Businesses in Perth Peel Region by zone category[2]

PRODUCTS	Industrial	Commercial	Agri/Rural	Development	Residential	**Total**
Gourmet	18	25	10	4	9	66
Fresh produce	19	8	10	5	2	44
Meat	30	6	3	2	1	42
Seafood	15	14		7		36
Food Wholesaler	18	5		2	3	28
Baking	21	4		1	1	27
Oils	21	1	1	3	1	27
Exporter/Importer	2	16	2	1	2	23
Packing	15	4				19
Drinks	8	3	2			13
Cereal	4	6		1	1	12
Transport; Distribution	6	1	1		2	10
Brewing	4	1	4			9
Dairy	3	2	3			8
Wool	6	2				8
Flowers	1	3	1	2		7
Food service	4	2				6
Pet food	3		1			4
Skins and hides	1			1		2
Stockfeed	2					2
Association		2				2
Ingredients	1			1		2
Eggs					1	1
Cold Storage				1		1
Poultry processing	1					1
Equipment /Machinery		1				1
Grand Total	203	106	38	31	23	401
Total (%)	**51%**	**26%**	**9%**	**7%**	**6%**	

[2] This data includes food manufacturers, processors, exporters, importers and transport distributors. It does not include producers, wineries and broad scale agriculture businesses.

Across the region, the following 9 areas were identified as having the most agri-food businesses under pressure to relocate:

- Tapping/Wanneroo
- Osborne Park/Innaloo
- Canning Vale
- Cockburn Central/Treeby
- Bibra Lake
- North Coogee
- Aubin Grove
- Casuarina
- Byford

Profiling of existing and new agri-food businesses

In order to better understand the specific requirements of different agri-food businesses, which may seek to relocate to the PBP, profiles were developed for following existing and new or emerging business types:

Profiled agri-food businesses

Existing businesses profiled (see section 4)	New or emerging businesses profiled (see section 5)
• Poultry processing • Fish processing and packaging • Boning and packing - Beef • Processed meats – Sausages • Dairy processing (milk powder, cheese, yoghurt) • Mushroom farming • Cold Storage • Distribution	• Premium/organic food processing incubator • Vertical farming • Medicinal honey processing • Online grocery and meal delivery • Non-meat protein • Nutraceuticals

Profiles of existing businesses are based on modern, best practice operations, outlining typical functions, inputs, outputs and business capability requirements. The results from this profiling exercise outlined in Section 4.1 were used to estimate the overall requirements for land, utilities, transport, waste disposal etc. once the 60.8ha of industrial zones land within the precinct is fully developed.

Suitability of proposed servicing

GHD reviewed the planned servicing for the development to determine if it is likely to be suitable in meeting the estimated requirements. We found that the proposed servicing of the development is generally suitable and adequate, however in order to attract new and existing businesses to the park, additional servicing and facilities will be required. Areas requiring further consideration include:

- **Public transport:** Future planning will need to incorporate public transport to cater for staff movements
- **Lot size:** Many potential businesses will require larger lots than what is proposed, or will need to acquire multiple lots. Some flexibility will be required in local structure planning regarding lot size to allow amalgamation or subdivision in appropriate circumstances.
- **Electricity:** Wherever possible electricity should be underground

- **Liquid waste:** With limited remaining capacity at the Gordon Road WWTP, alternative options will need to be considered in the longer term. Many businesses will require on-site treatment before discharge, which may provide an opportunity for a shared WWTP within the PBP. Consideration should be given to installing a separate sewage line for human waste
- **Solid waste:** Not addressed in current planning. Consideration should be given to waste disposal opportunities via the nearby Eco Industrial Zone
- **Provision of shared services:** to reduce the need for individual businesses developing stand-alone facilities Some of the opportunities for shared services and facilities include: backup water supply tanks, chlorination and boilers, back-up electricity generator(s), telecommunications, truck wash, cold storage, security services, R&D, laboratory, admin and/or training facilities and labour hire. However, while the provision of common use facilities may provide a key incentive for some businesses, due consideration should be given to how these facilities will be financed, governed and managed into the future

Relocation incentives and transition strategy

The Structure Plan for Lot 600 Lakes Rd (URBIS 2017) proposing a staged development assumes a 50% build out of employment generating land uses by the 2031.

Based on the review of potential existing and new food processing businesses it is likely that demand for land within the PBP will come from a range of different business types, with distinct needs in terms of lot size, water reticulation, wastewater, energy, sewage, security etc.

While the proposed staged development can probably cater for any business type developing within any particular portion of the PBP, and businesses will invariably choose a lot within the Park which best suits their needs, there are potential benefits from grouping together certain business with similar needs (and separating certain businesses, which may be less compatible). The table below provides a summary of considerations for locating certain businesses within the PBP.

Considerations for business locations

Enterprise characteristics	Example	Preferable location within PBP
High vehicle movements	Distribution centres Cold stores	Outer perimeter to reduce vehicle loads and noise on internal roads
Security sensitive	Meat processing Poultry processing	Not on the outside perimeter, single road frontage
Generating high amounts of wastewater	Meat processing	Near the western perimeter in closer proximity to the wastewater pump station, pipeline and treatment plant
Generating compostable waste	Mushroom processing Vegetable and fruit processing Diary processing	Grouped to allow for efficient collection or disposal (e.g. composting)
Generating renderable waste	Meat processing Poultry processing	Grouped to allow for efficient collection or disposal (e.g. composting)
Odour and noise generating	Seafood processing Diary processing Meat processing	Separated from more businesses with higher staff numbers
Biosecurity sensitive	Mushroom processing Chicken processing Meat processing	Separated from potential sources of biosecurity risk

A previous survey of agri-food businesses (GHD 2010) identified the following motivations likely to influence decisions to relocate or remain in the current location.

Identified factors affecting relocation decisions

Reasons to move	Reasons to stay
• Wastewater treatment • Land security • Occupants • Occupancy • Access to capital • Urban encroachment • Shared facilities • Noxious industries • Synergies • Freight access	• Relocation costs • Transport costs • Labour • Access to customers • Industry trends • Public transport • Utilities

GHD believe it will be necessary to incentivise new and existing businesses to relocate to the PBP. However rather than providing grants to individual businesses, which only addresses the relocation cost impediment, a preferred approach would involve investing in improved infrastructure and headworks, as well as other incentives including:

- **Negotiated utility rates**: E.g. cheaper electricity through bulk purchase or local generation options, via waste to energy or solar
- **Development assistance:** Assistance with planning applications and certainty around permitting
- **Tenure and payment options:** Certain businesses may be attracted to different types of tenure and payment options. Freehold tenure may be preferred for some businesses due to added security, while others may prefer lease arrangements. The options of making deferred payments against land acquisitions is likely help businesses secure finance for developments

Alternative site opportunities

Outside of the Perth and Peel Regions, there may be opportunities for similar clustering of agri-food businesses particularly in the Waterloo Industrial Park, Mirambeena Strategic Industrial Area, Northern Gateway Industrial Park (Muchea) and the Broome Road Industrial Park. The opportunities for each of these sites is summarised in section 7 of this report.

Need for co-ordinated engagement

Ongoing engagement with existing and new agri-food businesses will be required to ensure the PBP is successful in meeting their individual needs and therefore attracting investment. With multiple agencies and commercial partners involved in the development of the PBP, it will be critical to ensure that stakeholder engagement efforts are coordinated.

Conclusions

The vision to establish a food processing business park in the Peel region, while challenging, promises to bring investment, vibrancy and sustainability to the region. Ongoing and coordinated engagement with existing and new agri-food businesses will be required to ensure the PBP is successful in meeting their individual needs and therefore attracting investment.

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Appendices

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The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

The opinions, conclusions and any recommendations in this report are based on assumptions made by GHD described in this report (refer section 1.5 of this report). GHD disclaims liability arising from any of the assumptions being incorrect.

GHD has prepared this report on the basis of information provided by Department of Primary Industries and Regional Development and others who provided information to GHD (including Government authorities)], which GHD has not independently verified or checked beyond the agreed scope of work. GHD does not accept liability in connection with such unverified information, including errors and omissions in the report which were caused by errors or omissions in that information.

1. Introduction

1.1 Transform Peel

Transform Peel is a $49m Royalties for Regions funded program aimed at achieving job creation, sustainable growth and economic development in the Peel Region. The Peel Development Commission (PDC) and its partners, intend to implement this program over 35 years where projections estimate that 35,000 jobs will be created generating an approximate $16.2b per annum economic output by 2050. Located in the Shires of Murray and Serpentine Jarrahdale, the program comprises three integrated, strategic elements, the Peel Business Park (PBP), the Peel Food Zone (PFZ) and the Peel Integrated Water Initiative.

The Department of Primary Industries and Regional Development (DPIRD) is the lead agency for PFZ sub-project which involves the development of a food/ agriculture industry transition program to assist with facilitating decisions by existing WA and Australian food industries and related support industries to relocate to the PBP.

1.2 The Peel Business Park

Located 10 kilometres north-east of Mandurah, the PBP will cater for agri-food and agri-processing operators, as well as ancillary light, general transport and logistic industries.

Its convenient position, east of the Kwinana Freeway, will provide easy access to the southern corridor and Perth Metropolitan area, as well as the South West and the ports of Kwinana, Bunbury and Fremantle. The development is also within 80km of Perth Airport, allowing for air freight opportunities.

The development will be equipped with water, power, sewer, gas and telecommunications services to maximise efficiency and sustainability. The vision for the PBP also includes plans for a campus style technology park to facilitate research, development and training organisations to the area.

The overall PBP covers 1,000ha across multiple lot ownerships, however the focus of this study is the planned initial precinct which is located on Lot 600 Lakes Road, and is under LandCorp ownership (Figure 2). The development sits at the western side of the proposed 42,000ha PFZ, which aims to foster investment in intensive food production in the Peel region.

1.3 Purpose of this report

This report provides a strategy to assist with facilitating decisions by existing WA and Australian food industry businesses and support industries to relocate to the PBP or to the Transform Peel area generally. The report also aims to inform LandCorp's planning and infrastructure servicing of the Lot 600 site.

1.4 Scope and limitations

The study includes the following components:

- Identification of agri-food business types in the Perth and Peel regions which are currently or likely to become under pressure to relocate
- Profiles of eight (8) agri-food business types identified above, including analysis of infrastructure, planning and servicing needs
- Profiles of potential new agri-food or complementary businesses
- Development and transition strategy

- Critical infrastructure needs
- Potential incentives to encourage relocation
- Municipal planning constraints
- Evaluation of opportunities for food precinct development in other WA locations
- Case studies of existing agri-food businesses which may be suited to the PBP

The study relies largely on desktop analysis, supplemented by consultation with key agencies (DPIRD, Peel Development Commission, LandCorp and Shire of Murray) and interviews conducted with agri-food businesses. Findings from these interviews are presented in a separate Consultation summary report.

1.5 Assumptions

- This report relies largely on desktop analysis of mostly publically available information. GHD has not attempted to validate the accuracy of all sources
- The report utilises available data from the DPIRD database of food businesses. This does not represent a definitive list of food businesses. The data includes manufacturers, processors, exporters, importers, transporters and distributors. It does not include producers, wineries and broad scale agriculture businesses
- Business profiles (Section 4) are hypothetical representations of typical businesses, utilising current best practice
- Profiles of individual businesses seeking to become established in the PBP may vary significantly depending on the scale and scope of the operation
- Estimates of overall requirements presented in Section 4.1 are an extrapolated estimate, which assumes that all available industrial land is developed with representative businesses
- The evaluation of servicing and critical infrastructure (Section 6.2) is largely based on information provided in the *Engineering Servicing Report* (Cossil & Webley 2017), in some cases the planned works for the PBP may have changed

2. The Proposed Peel Business Park

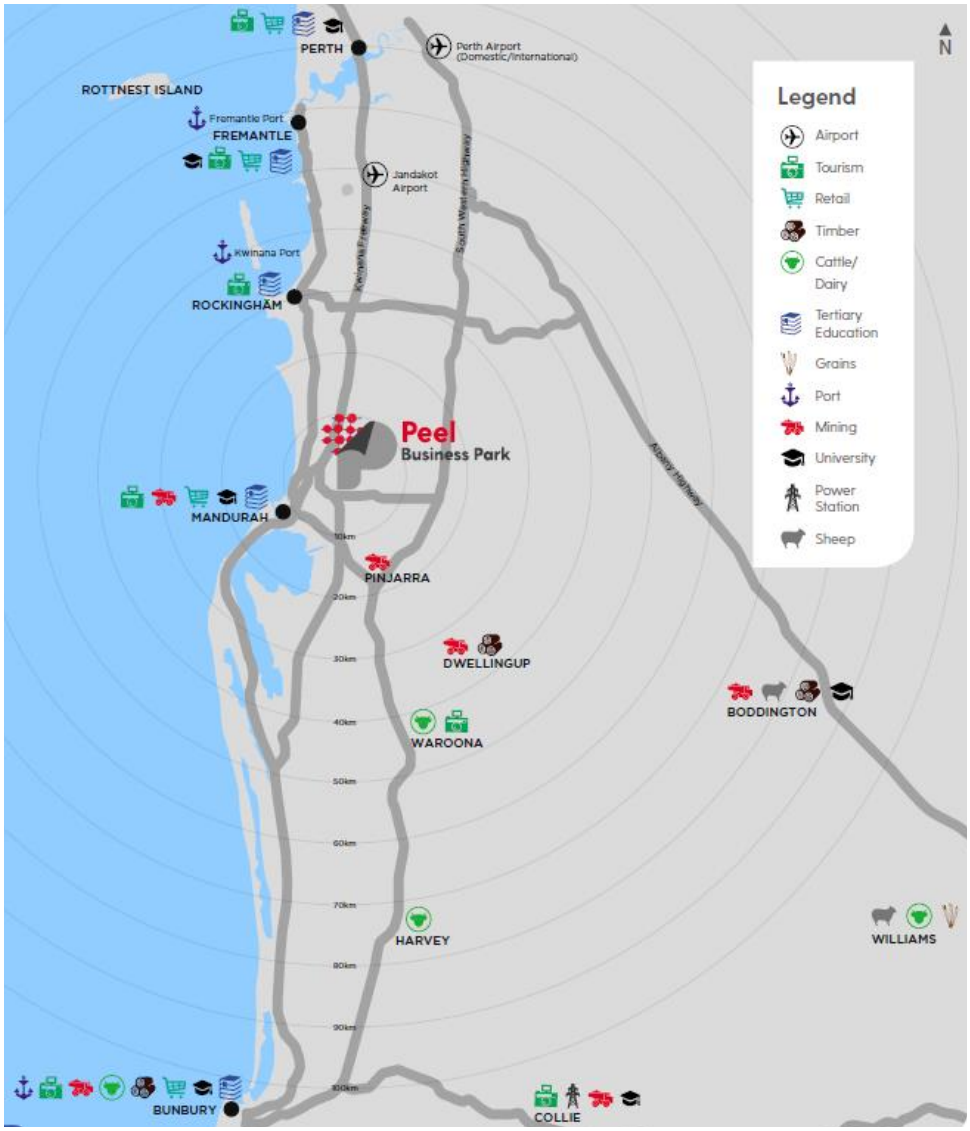
The PBP is being developed by LandCorp to provide a strategically located industrial estate designed to house light and general industry, research and development training facilities, agribusiness, transport and logistics companies. The PBP will be an innovative and sustainable industrial zone backed by best practice services including water, power, gas and telecommunications services to maximise efficiency and sustainability.

The proposed site is situated:

- 70 kilometres south of Perth
- 68 kilometres south of Fremantle Port – WA's largest general cargo port
- 10 kilometres north-east of Mandurah – WA's largest regional city
- 105 kilometres north of Bunbury – WA's third largest city

Figure 1 below shows the location of the PBP in relation to key population centres, infrastructure, services and production industries.

Figure 1 PBP Location



Source: LandCorp 2017

This first precinct of the PBP (Lot 600 Lakes Road) is surrounded by approximately 1,000ha of land, which can facilitate future expansion as required (Figure 2). The PBP sits at the western side of the proposed 42,000ha PFZ, which aims to foster investment in intensive food production in the Peel region.

Figure 2 PBP: Local Context

Source: LandCorp 2017

The current concept layout for the first precinct of the PBP includes a network of internal roads and designated areas for drainage, wetlands and public open spaces (Figure 3).

The development will include:

- 60.8ha of industrial land
- 2.43ha of special industrial land
- 8.59ha of commercial land
- 8.04ha drainage
- 21.64ha public open space

Figure 3 Lot 600 Structure Plan Layout

Source: Urbis 2017

2.1 Transforming the Peel Region

The Peel Region is undergoing significant change, driven by a rapidly increasing population (growing from 130,000 to 440,000 by 2050) and emerging opportunities particularly in the agri-food sector.

The Peel Region's agricultural economy was estimated at $125m in 2011–2012 of which livestock disposals accounted for 65 per cent of the total value (Peel Development Commission, 2014). The other main agricultural commodities produced in the region include crops (27 per cent, largely flowers and hay) and livestock products (8 per cent) (Peel Development Commission, 2014).

Future agricultural activities within the region will be guided by the unique opportunities offered as well as land capability issues. In particular, the challenges presented by water availability, infrastructure, the environmental importance of the Peel Harvey estuary and wetland systems, biosecurity issues and development of appropriate interfaces that minimise operational and land use conflicts, will need to be considered in any future land use planning.

The Transform Peel Program is designed to help the region capitalise on agri-food opportunities, which will help diversify the local economy, create jobs, improve competitiveness, deliver innovation and improved environmental outcomes.

3. Identification of food businesses under relocation pressure

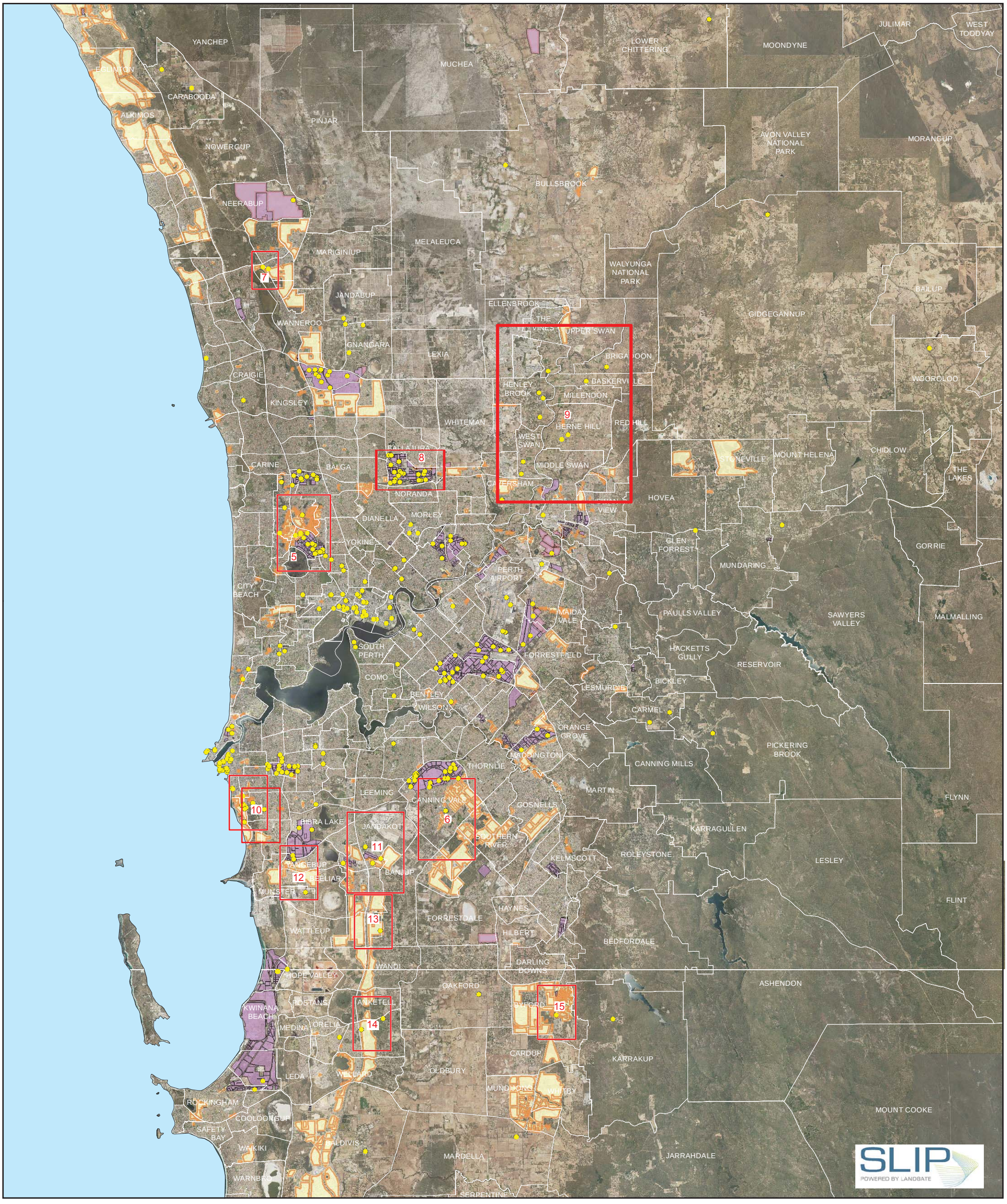
As the Perth and Peel Regions undergo urban expansion and development, pressure is being placed on existing industrial land uses. Pressure can be experienced through:

- Rezoning and planning restrictions
- Residential encroachment
- Insufficient buffers
- Increased complaints
- Insufficient infrastructure access or capacity (e.g. transport, water, power etc.)
- Insufficient lot sizes to cater for expansion

To better understand where food and agribusiness businesses are experiencing relocation pressure in the Perth and Peel Regions, and which types of businesses are under the most pressure, GHD mapped the location of current food and agribusinesses, overlayed with the current Planning Scheme. With further consideration of future growth plans, as set out in *Draft Perth and Peel at 3.5 Million* (WAPC, 2015), several priority areas were identified, where urban growth is likely to place ongoing pressure on existing food and agribusinesses.

3.1 Existing Spatial Trends

A desktop spatial analysis was prepared to understand where existing food processing businesses are located throughout the Perth and Peel region based on local government land use zonings. One challenge for the analysis was the variation in zones types/names throughout the different local government areas. The geospatial analysis therefore has been targeted towards industrial zones and urban development zones. The distribution of the existing food processing businesses (based on DPIRD's database) in relation to the industrial and urban development zoned land, is shown in Figure 4.



LEGEND

- Food processing business
- Suburb boundary
- Industrial zones (Local planning scheme)
- Urban development-zoned areas (Local planning scheme)

Paper Size A3

0 5 10

Kilometres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 50

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Department of Primary Industries and Regional Development
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Department of Primary Industries and Regional Development
Peel Business Park Business Transition Strategy

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Date	24 Jul 2017

Food processing businesses in potential urban development areas (overview) Figure 2

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Data source: GHD and DPIRN: Food processing businesses (geocoded from DPIRN list) - 20170703; DoP: Local planning schemes - 201706; Landgate: Aerial photography (Virtual Mosaic) - 20170724. Created by:mmikkonen

Individual maps showing known food processing businesses within each of the sub-regions are presented in section 3.2 below.

The mapping illustrates a general clustering of food processing businesses in industrially zoned land, particularly in locations such as Gnangara, Malaga, Osborne Park, Welshpool, Canning Vale and O'Connor.

Table 1 presents the overall number of agri-food businesses in the Perth and Peel Regions, by different zone categories (combining similar zone types together). The results show that around 51% of businesses are located within industrial zones, with the remaining businesses located in zones which may be less suitable including commercial (26%)[3], agricultural or rural (9%), development (7%) or residential (6%) zones. The 31 businesses currently located in development zones may be under the most pressure to relocate before their surrounding area transitions to higher density development (e.g. residential). Many of these businesses are located in urban development zonings around North Coogee, where they currently enjoy strategic proximity to major infrastructure such as the Fremantle Port.

Table 1 Agri-Food Businesses in Perth Peel Region by zone category[4]

PRODUCTS	Industrial	Commercial	Agri-Rural	Development	Residential	**Total**
Gourmet	18	25	10	4	9	66
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[4] This data includes food manufacturers, processors, exporters, importers and transport distributors. It does not include producers, wineries and broad scale agriculture businesses.

There is a clustering of businesses in strategic locations such as Fremantle and the Perth central business district however neither of these areas are industrially zoned or zoned for urban development. A number of individual businesses are located outside industrial and urban development zones, however many are located along major transport routes.

Each local government classifies land for different purposes through the local planning scheme and provides land use classifications for different land uses through the zoning table. A challenge for determining a pattern in the appropriateness of food processing businesses within land use zones, is that often local governments have different land use zones and land use definition, therefore a generalised approach cannot necessarily be taken.

Through the planning reform process, updates were made to the *Planning and Development (Local Planning Schemes) Regulations 2015* (the Regulations) with the aim to streamline the number of land use zones and the land use definitions. As local government's review their local planning schemes, compliance with the updated Regulations will be required. Under the Regulations the following objectives apply for the 'urban development', 'light industry', 'general industry' and 'industrial development' zones apply (Table 2).

Table 2 Objectives of land use zones as defined in the Regulations

Zone name	Objectives (as defined in the Regulations)
urban development	• *To provide an intention of future land use and a basis for more detailed structure planning in accordance with the provisions of this Scheme* • *To provide for a range of residential densities to encourage a variety of residential accommodation* • *To provide for the progressive and planned development of future urban areas for residential purposes and for commercial and other uses normally associated with residential development* • *To provide an intermediate transitional zone following the lifting of an urban deferred zoning within the Metropolitan Region Scheme*
light industry	• *To provide for a range of industrial uses and service industries generally compatible with urban areas, that cannot be located in commercial zones.* • *To ensure that where any development adjoins zoned or developed residential properties, the development is suitably set back, screened or otherwise treated so as not to detract from the residential amenity*
general industry	• *To provide for a broad range of industrial, service and storage activities which, by the nature of their operations, should be isolated from residential and other sensitive land uses* • *To accommodate industry that would not otherwise comply with the performance standards of light industry* • *Seek to manage impacts such as noise, dust and odour within the zone*
industrial development	• *To designate land for future industrial development* • *To provide a basis for future detailed planning in accordance with the structure planning provisions of this Scheme*

Based on these zone objectives, food processing businesses are not considered appropriate within the urban development zone. Typically urban land uses in the form of residential and/or commercial would be considered appropriate for this zone. It is recognised that some food

processing businesses may include food retail shops. These uses may be appropriate in the urban development zone, however may depend on whether other activities are also taking place on the site which may have environmental health implications (e.g. relating to noise and odour).

The industrial zones listed in Table 2 are considered appropriate for food processing businesses, however the level of appropriateness may depend on what activities are taking place within the site (e.g. are they noise or odour generating).

As the classification of the existing businesses do not align with conventional planning land use definitions, it is difficult to determine whether the existing businesses are appropriate or not appropriate within the local planning scheme zone. This analysis would need to be undertaken on an individual local government basis and would involve classifying each food business in line with the local government land use definitions and permissibilities within the specific zones.

3.2 Future Growth Trends

Draft Perth and Peel at 3.5 Million provides the strategic framework for guiding the growth of the Perth metropolitan region and Peel region to accommodate a population of 3.5 million people by the year 2050. The document recognises that there will be limitations on land available for residential, commercial and industrial development and that new growth opportunities will need to be managed in a sustainable manner. Perth and Peel at 3.5 Million comprises a suite of documents, including an overarching framework and four sub-regional strategies for more localised considerations and recommendations. The four sub-regions include:

- Central
- North-West
- North-East
- South Metropolitan Peel

The following describes the key characteristics of the four sub-regions, the challenges associated with growth in the areas as identified by Perth and Peel at 3.5 Million, with maps of identified clusters of agri-food businesses which are likely to be under relocation pressure

3.2.1 Central Sub-region

The Central sub-region comprises 19 inner city local government areas. This sub-region is where most of the residential infill and mixed-use development will occur. The area is characterised by some of Perth's oldest settlements. The Central sub-region currently (as at 2011) has the highest population and employment densities. Between 2011 and 2050, the region is likely to see an increase in population of approximately 417,000 people and an additional 240,000 jobs.

The strategy acknowledges that a large proportion of the population work within the Perth Central Business District, but do not live in the area and are therefore having to commute resulting in traffic congestion. Future urban consolidation is encouraged to be concentrated around quality public transport to assist minimising traffic congestion. The framework also encourages the distribution of employment in activity centres and industrial centres to facilitate people living closer to their work.

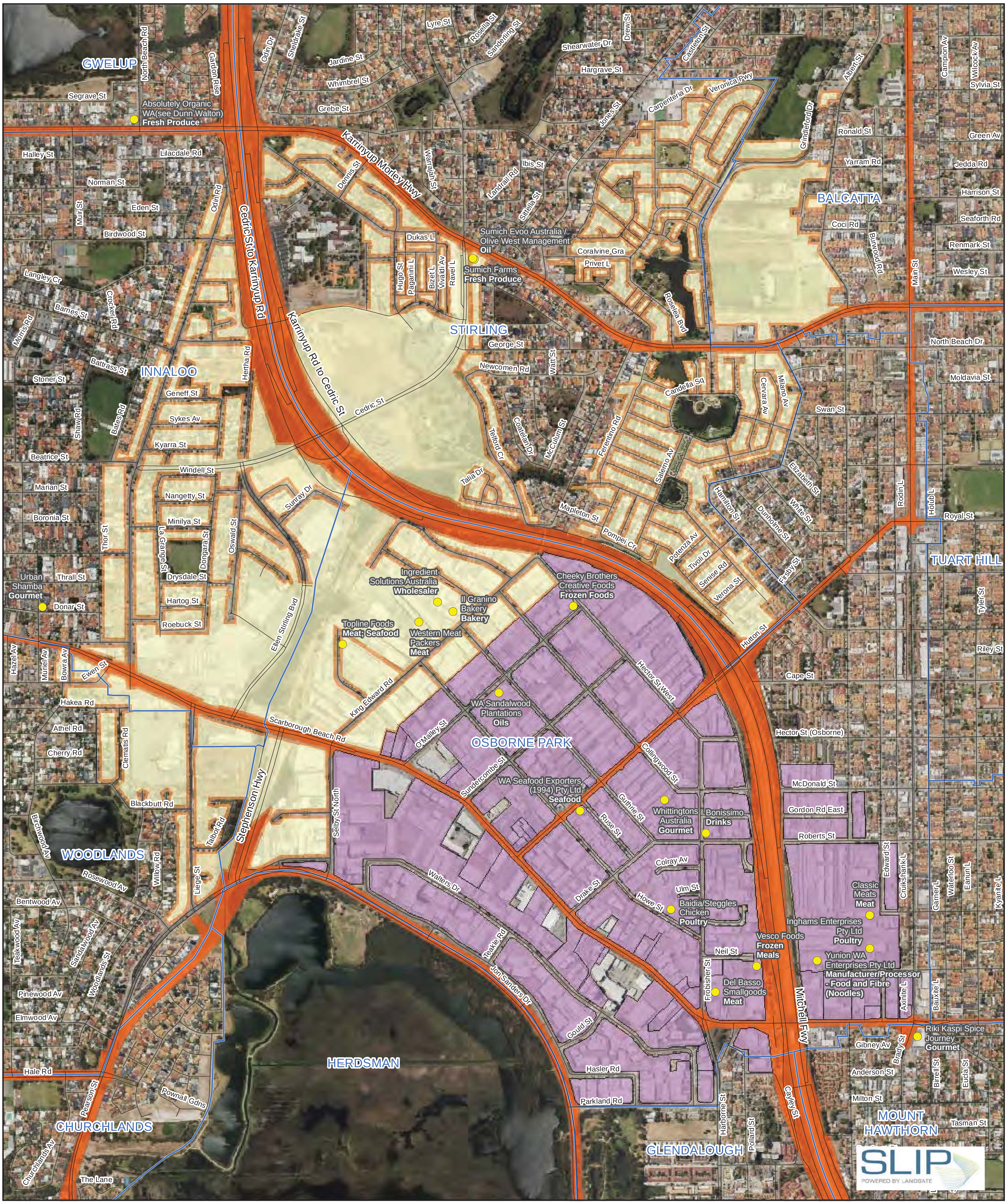
The majority of the food businesses within the Central sub-region are concentrated in the following areas:

- Along major transport routes and train lines
- Within industrial centres such as Osborne Park, Balcatta, Bayswater, Welshpool, Canning Vale and O'Connor

- Within activity centres such as Perth, Stirling, Perth Airport and Fremantle

The Central sub-regional strategy notes that there is limited land available for industrial development and therefore this needs to be protected to avoid the encroachment of incompatible uses such as residential. Future industrial demand is likely to be met by other sub-regions as the Central is nearing capacity. Food businesses within the industrial areas are considered to be appropriate – particularly those of a production or processing nature. However as these industrial areas do not have the ability to expand due to the established built-up nature of the Central sub-region, those industries which may be more land intensive may consider future relocation.

Some food production businesses may be appropriate in activity centre areas, however it may depend on the nature of the industry and the activities taking place on the site.



LEGEND

- Food processing business
- Road
- Suburb boundary
- Industrial zones (Local planning scheme)
- Urban development-zoned areas (Local planning scheme)
- Road and rail reserves (Metropolitan Region Scheme)

Paper Size A3

0 90 180 360 540

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 50

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Department of Primary Industries and Regional Development

Department of Primary Industries and Regional Development
Peel Business Park Business Transition Strategy

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Food processing businesses in the Osborne Park/Innaloo sub-region

Figure 5

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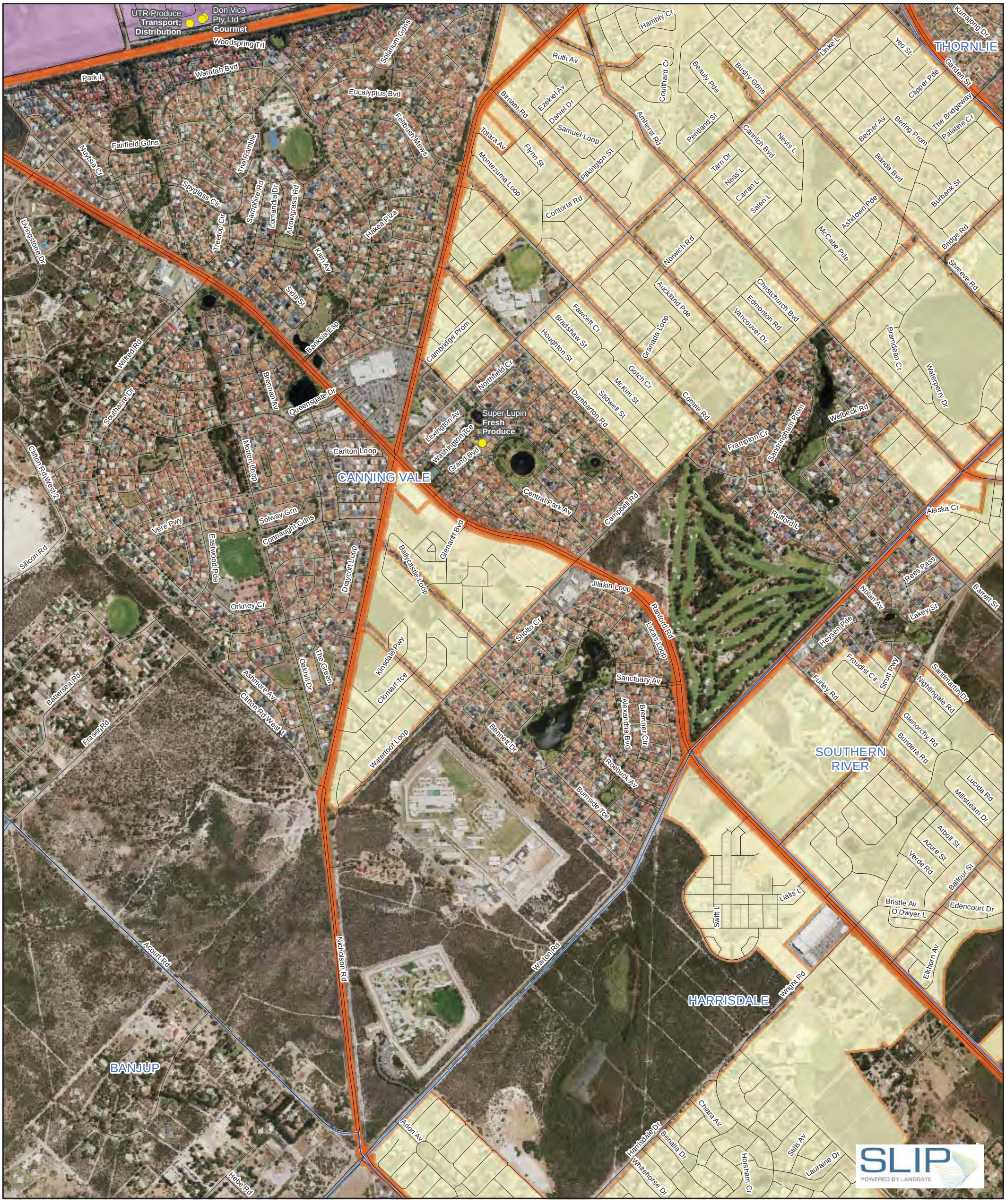

LEGEND

- Food processing business
- Road
- Suburb boundary
- Industrial zones (Local planning scheme)
- Urban development-zoned areas (Local planning scheme)
- Road and rail reserves (Metropolitan Region Scheme)

Paper Size A3

0 100 200 400 600

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 50

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Food processing businesses in the Canning Vale sub-region

Figure 6

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3.2.3 North-West Sub-region

The North-West sub-region comprises two local government areas – Cities of Joondalup and Wanneroo. This sub-region contains a number of environmental assets with 55% of the sub-region being reserved under the Metropolitan Region Scheme for parks and recreation or State Forest.

The sub-region has seen rapid growth particularly due to the coastal lifestyle available and improved infrastructure and services. The sub-region contains a large amount of undeveloped and urban deferred zoned land. The sub-region is likely to experience an increase in population of approximately 417,800 people between 2011 and 2050.

The North-West sub-regional strategy identifies a large area of urban expansion in Gnangara/Wanneroo/Mariginiup, with some urban investigation proposed in Mariginiup. There are small pockets of land identified for urban deferred (future urban) in close proximity to existing centres such as Wanneroo, Clarkson and Alkimos.

Industrial expansion and investigations areas are identified in the north-east part of the sub-region around the existing Neerabup industrial area and industrial investigation in Carabooda. The strategy does acknowledge that the North-West sub-region '*does not have major transport facilities and is not as competitive as other sub-regions in terms of attracting industrial development.*' Therefore strengthening access to the North-East sub-region will be a key focus.

The key challenge for this region is '*protecting employment-generating land from lower-risk competing land uses and maximising opportunities for employment sectors (such as industrial and professional services) within existing and emerging employment nodes*.'

The majority of the food businesses within the North-West sub-region are concentrated in the following areas:

- Urban areas in Pearsall
- Urban expansion areas in Gnangara

Depending on the nature of the food businesses, urban and urban expansion areas may not be appropriate land use zones for these industries. The sub-regional strategy does acknowledge however that further detailed work is required before future urban development occurs in the expansion/investigation areas.

LEGEND

- Food processing business
- Road
- Suburb boundary
- Industrial zones (Local planning scheme)
- Urban development-zoned areas (Local planning scheme)
- Road and rail reserves (Metropolitan Region Scheme)

Paper Size A3

0 45 90 180 270

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 50

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Food processing businesses in the Tapping/Wanneroo sub-region

Figure 7

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3.2.4 North-East Sub-region

The North-East sub-region is made up of the City of Swan and Shires of Mundaring and Kalamunda. A large proportion of the sub-region is identified as rural and rural residential land with large areas of open space and State Forest. Whilst this sub-region is likely to experience the least amount of total population growth, with approximately an additional 241,400 people in the region between 2011 and 2050, this is more than a doubling of the sub-region's 2011 population.

The strategy identifies pockets of urban deferred land throughout the sub-region, generally between Great Eastern Highway and Toodyay Road. Urban expansion areas are identified in Wattle Grove, High Wycombe, South Guildford, Bennet Springs, Henley Brook and Bullsbrook and an urban investigation is identified in Lexia.

Industrial expansion and investigation areas are identified in Bullsbrook and a small area of industrial expansion in Wattle Grove and Hazelmere.

The strategy identifies the key employment sectors for the sub-region will be construction, healthcare and social assistance, manufacturing, transport, distribution and warehousing and retail which is driven by the sub-regions strategic location in proximity to key road and rail freight infrastructure.

The majority of the food businesses within the North-East sub-region are concentrated in the following areas:

- Industrial areas in Malaga
- Rural areas in West Swan and Henley Brook

The industries in the rural areas generally relate to winery and brewery businesses within the Swan Valley region. This area is a tourist attraction and a key employment area and the strategy recognises the importance of maintaining the rural character of the Swan Valley. As a result, these industries are considered appropriate in this location.

Food businesses in the industrial area of Malaga is considered appropriate, particularly as the strategy recognises Malaga industrial centre as a key employment area.

LEGEND

- Food processing business
- Road
- Suburb boundary
- Industrial zones (Local planning scheme)
- Urban development-zoned areas (Local planning scheme)
- Road and rail reserves (Metropolitan Region Scheme)

Paper Size A3

0 100 200 400 600

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 50

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Food processing businesses in the Malaga sub-region

Figure 8

G:\21\26530\GIS\Maps\MXD\2126530_002_ProcessingIndustriesGrowthAreasMapbook_A3P_RevB.mxd

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LEGEND

- Food processing business
- Road
- Suburb boundary
- Industrial zones (Local planning scheme)
- Urban development-zoned areas (Local planning scheme)
- Road and rail reserves (Metropolitan Region Scheme)

Paper Size A3

0 260 520 1,040 1,560

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 50

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Food processing businesses in the the West Swan and Henley Brook sub-region

Figure 9

G:\21\26530\GIS\Maps\MXD\2126530_002_ProcessingIndustriesGrowthAreasMapbook_A3P_RevB.mxd

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3.2.5 South Metropolitan Peel Sub-region

The South Metropolitan Peel comprises nine local government areas. This sub-region is likely to experience the greatest growth in population with approximately an additional 736,600 people in the region between 2011 and 2050.

The sub-regional strategy identifies urban deferred areas in Southern River and Keralup. This sub region contains large areas of urban expansion, particularly in Champion Lakes, Baldivis, Karnup, Lakelands, Cardup, Forrestdale, Ravenswood, Pinjarra, and Waroona. The strategy notes that future urban consolidation is to be generally concentrated close to services and activities.

Industrial expansion areas are identified around Ravenswood/Pinjarra, Nambeelup, Mundijong, Munster/Wattleup/Hope Valley/Kwinana area, Wungong, Forrestdale and Kenwick. Industrial investigation areas are identified around Wagerup, Oakley, West Pinjarra, Mardella and the Beelier/Munster/Wattleup/Mandogalup area. A port installation investigation area is identified for the Cockburn Sound area.

The strategy identifies the area between Fremantle and Kwinana for strategic industrial land uses due to the proximity of major infrastructure (e.g. port and freight). The strategy provides targets for increasing employment self-sufficiency, which could be improved through employment growth matching the region's labour force. *'This would include manufacturing and agricultural sectors as well as knowledge-based employment that should be strategically located at activity and specialised centres.'*

The sub-regional recognises the importance of the Nambeelup Strategic Industrial Area to be developed as the PBP, in order to achieve broad and diversified industry base to increase jobs.

The food businesses in the South metropolitan Peel sub-region are much more disbursed compared with other sub-regions, with no clear trend based on land use areas. Typically the businesses are located north of Rockingham with some concentration between the urban area of North Coogee and the industrial area in Jandakot. Whilst there may not be a pattern for their location based on land use areas, the locations are considered to be strategically located close to port access at Fremantle and Cockburn Sound.

LEGEND

- Food processing business
- Road
- Suburb boundary
- Industrial zones (Local planning scheme)
- Urban development-zoned areas (Local planning scheme)
- Road and rail reserves (Metropolitan Region Scheme)

Paper Size A3

0 65 130 260 390

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 50

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Food processing businesses in the North Coogee sub-region

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Figure 10

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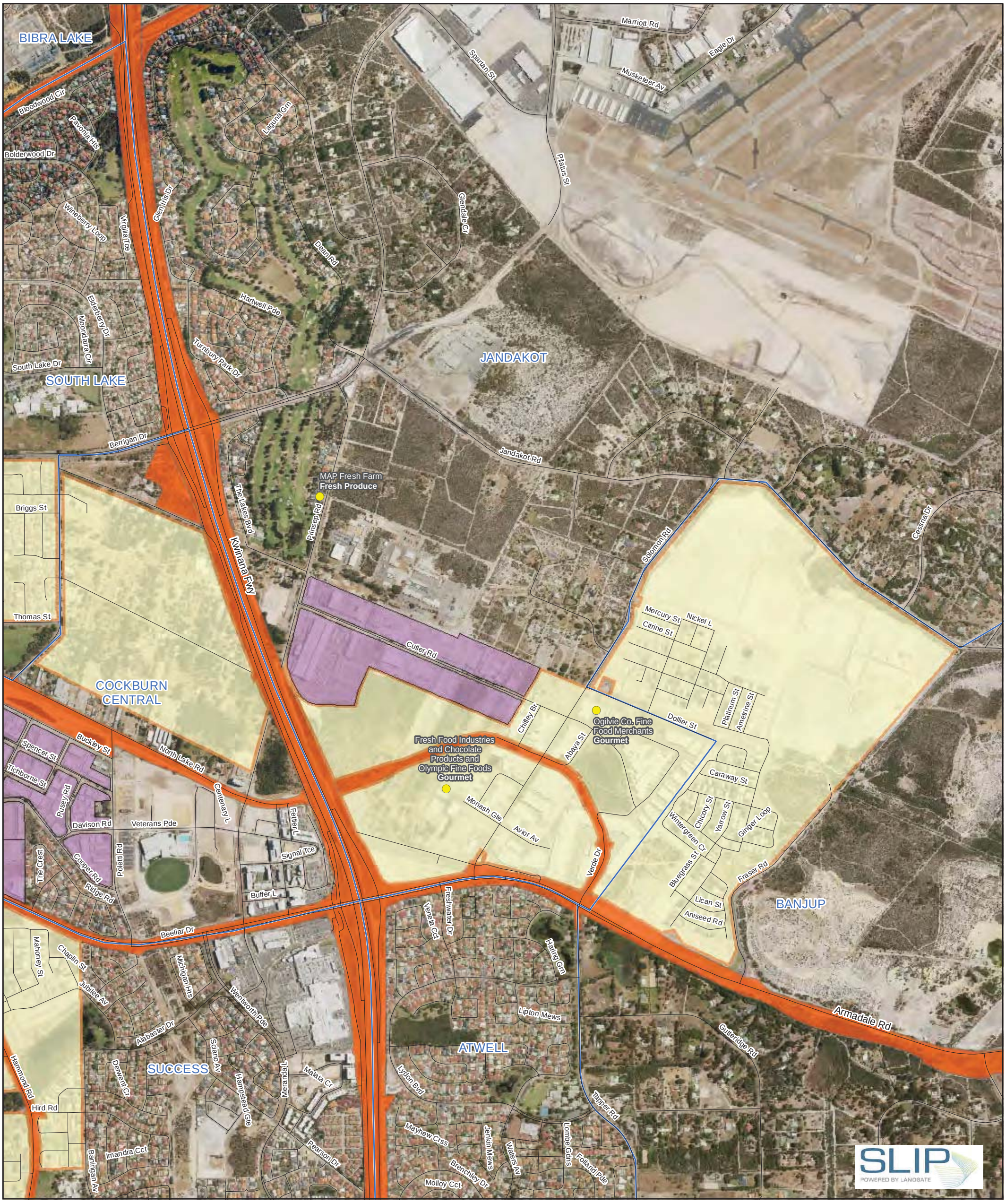

LEGEND

- Food processing business
- Road
- Suburb boundary
- Industrial zones (Local planning scheme)
- Urban development-zoned areas (Local planning scheme)
- Road and rail reserves (Metropolitan Region Scheme)

Paper Size A3

0 100 200 400 600

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
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Food processing businesses in the Cockburn Central/Treeby sub-region

Figure 11

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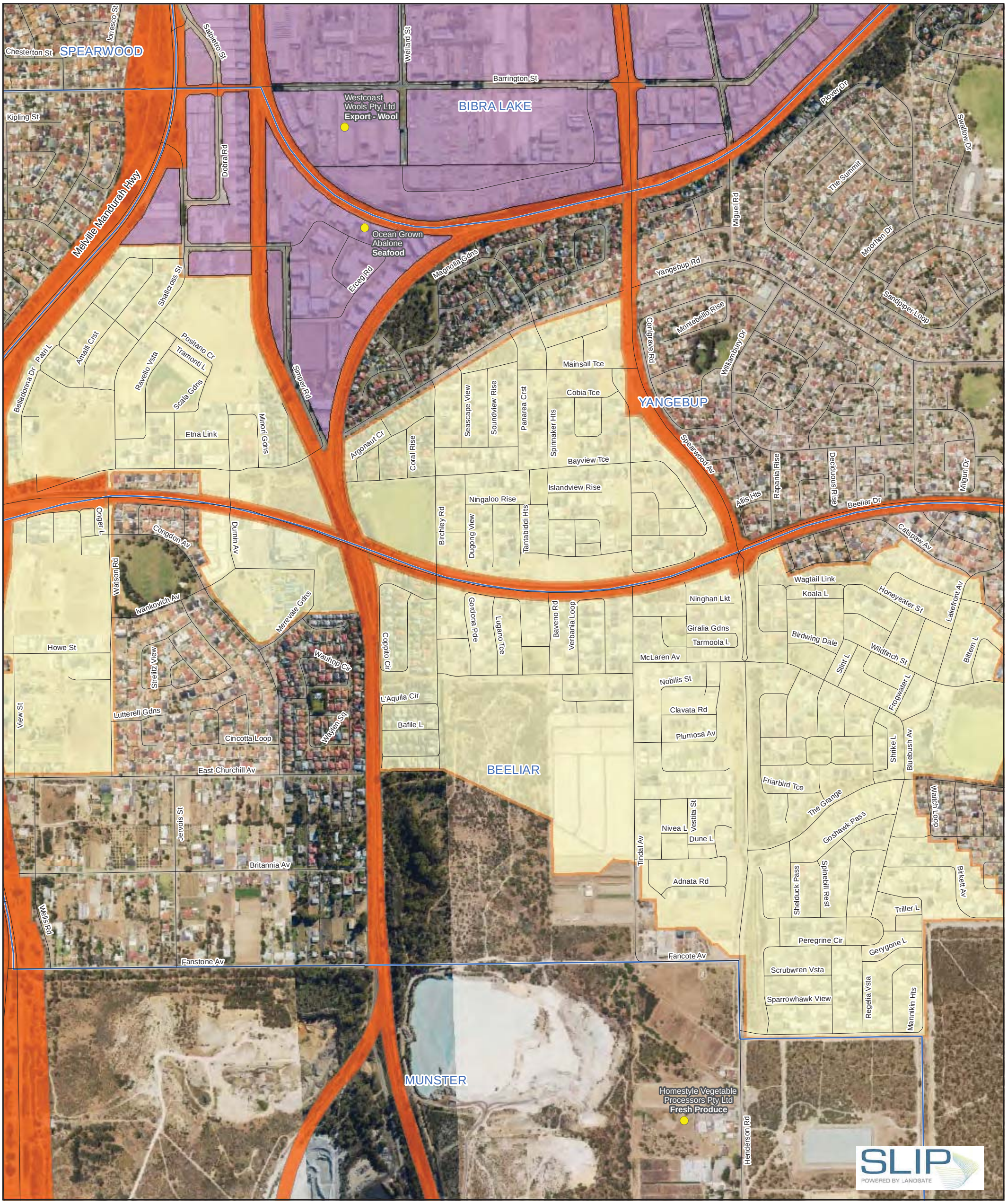

LEGEND

- Food processing business
- Road
- Suburb boundary
- Industrial zones (Local planning scheme)
- Urban development-zoned areas (Local planning scheme)
- Road and rail reserves (Metropolitan Region Scheme)

Paper Size A3

0 65 130 260 390

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 50

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Food processing businesses in the Bibra Lake/Beeliar sub-region

Figure 12

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LEGEND

- Food processing business
- Road
- Suburb boundary
- Industrial zones (Local planning scheme)
- Urban development-zoned areas (Local planning scheme)
- Road and rail reserves (Metropolitan Region Scheme)

Paper Size A3

0 65 130 260 390

Metres

Map Projection: Transverse Mercator
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Food processing businesses in the the Aubin Grove/Hammond Park sub-region

Figure 13

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LEGEND

- Food processing business
- Road
- Suburb boundary
- Industrial zones (Local planning scheme)
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Paper Size A3

0 65 130 260 390

Metres

Map Projection: Transverse Mercator
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Food processing businesses in the Casuarina sub-region

Figure 14

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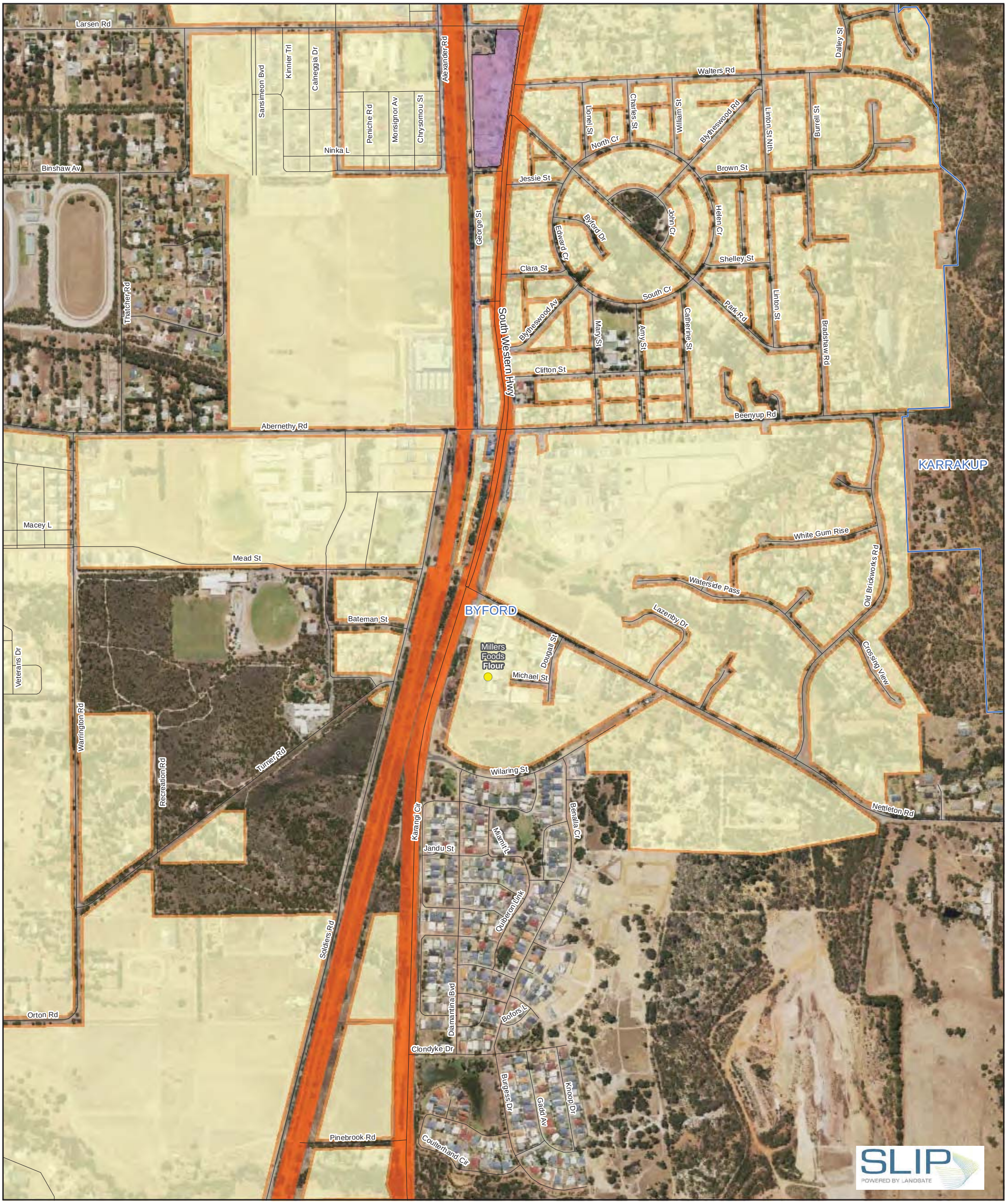

LEGEND

- Food processing business
- Road
- Suburb boundary
- Industrial zones (Local planning scheme)
- Urban development-zoned areas (Local planning scheme)
- Road and rail reserves (Metropolitan Region Scheme)

Paper Size A3

0 65 130 260 390

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 50

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Peel Business Park Business Transition Strategy

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Food processing businesses in potential urban development areas

Figure 15

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3.3 Food businesses under pressure

It is not possible to definitively ascertain whether individual business identified in the data are located in local planning scheme zones which are appropriate for their use. This is because the business classifications do not align with conventional definitions used in land use planning.

Some businesses may be located in inappropriate zones where they have existing land use rights (e.g. non-conforming uses - historically were appropriate and now do not align with current planning framework). These uses can typically continue to operate subject to the requirements within the local planning scheme. There will be other businesses that are located in appropriate zones, however conflict with adjacent land uses as a result of separation buffers (potentially noise, odour etc.).

Industrial zones are typically considered appropriate for food processing businesses due to the nature of the business and the activities taking place on site. Some commercial, rural or urban development zones are appropriate, provided activities taking place on site are suitable, and without excessive impact on local amenity or demand on services.

Factors that can impact the location of food processing businesses include:

- Limitations on land area – some businesses require a much larger footprint in order to operate effectively. These larger land parcels are typically difficult to secure within existing built-up developments
- Proximity to adjacent land uses – some food processing businesses have buffer requirements relating to noise and odour, which impact on their ability to expand or be located within close proximity to sensitive land uses such as residential areas
- Encroaching land uses – some businesses are located in areas which are undergoing redevelopment (e.g. residential) creating relocation pressure
- Access to infrastructure – some businesses are strategically located to provide access to required infrastructure (e.g. freight links, port access and airport access.) or services (e.g. power, water, waste)
- Land values – some businesses choose to establish in, or relocate to, areas where land values are more affordable and/or offer a greater investment potential

The food businesses within the Central Sub-region are likely to experience the greatest pressure to relocate due to the limited availability of land for expansion, and pressures from incompatible encroaching land uses (i.e. residential). The future planning for the Perth and Peel regions identifies future industrial areas within the outer sub-regions, which are likely to attract industrial businesses.

4. Profiling of existing agri-food businesses

GHD developed profiles for the following eight agri-food business:

- Poultry processing
- Fish processing and packaging
- Boning and packing - Beef
- Processed meats – Sausages
- Dairy processing (milk powder, cheese, yoghurt)
- Mushroom farming
- Cold Storage
- Distribution

This sample was selected to represent a range of businesses which:

- appear to be under current or pending planning pressure
- have different infrastructure and servicing requirements
- align with the Peel regions competitive advantage, the PBP vision for value-add processing opportunities
- have not previously been investigated for the region

Profiles include a detailed description of the processes and operating requirements of these businesses. Profiles outline the key inputs, outputs and other factors likely to determine viability and business success. These profiles help to determine the key reasons why these businesses were established in their current location (e.g. access to labour, services, port facilities, suppliers etc.) and whether these conditions can be met at the proposed PBP.

Notes:

- The profiles have drawn information from actual businesses operations, which represent modern best practice
- Estimates of truck movements are assumed to be B-Doubles

Poultry Processing

This operation is modelled on a modern (best practice) chicken operation that receives 20,500 live birds daily, processes them and produces fresh (chilled) and frozen whole chickens as typically seen in a supermarket. The plant also produces a range of further processed bone in and boneless cuts for frozen free flow bags fresh trays. The waste from the plant (feathers, trim, bones etc) is sent to a rendering plant. Contaminated water receives primary treatment using a rotary milli-screen.

Inputs

Raw material(s)
- Live chickens (ave weight 2.3 kg)
- Packaging

Gas – there is a requirement to operate a boiler to provide steam to make hot water for wash downs, HVAC, and general heating.

per day	105 Gj
per bird	0.005 Gj
per kg (cwt)	0.003 Gj

Electricity – is required to run conveyors, refrigeration plant, electrical appliances and lighting. The biggest user of electricity is refrigeration.

Electricity per day	10,660 kwH
Electricity per bird	0.52 kwH
Electricity per kg (cwt)	0.31 kwH
Peak demand	585 kwH
Average per hour	444 kwH

Water – is used extensively within the factory in a potable format as the plant is producing food for human consumption. There is an expectation that potable water would be available at the site. The plant will have its own chlorine dosing system to protect the integrity of the potable water. There is some untreated water used for wash-downs outside the factory. This could be re-cycled water that has received some primary treatment (removal of suspended solids).

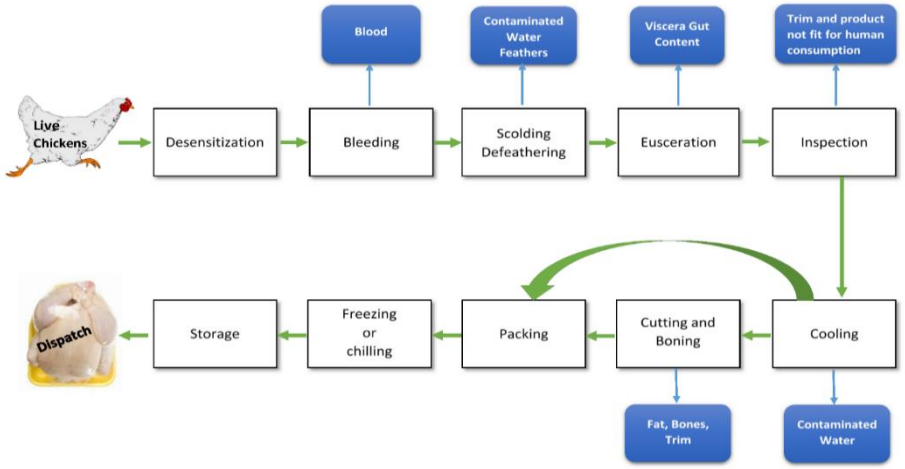
Volumes of potable water will vary depending on how complex the further processing operation (boning and retail/consumer packing) becomes. In this profile we used 15 ltrs/bird but this can be as low as 7 ltrs/bird for simpler operations with less further processing.

The peak potable water usage occurs at the start of the shift (pre-op wash down) and at the end of the day (plant wash down).

Potable water per day	308,000 ltr
Potable water per bird	15 ltr
Potable water per kg (cwt)	8.5 ltr
Peak demand per hour	80,000 ltr
Average per hour	30,800 ltr

Other inputs

Cleaning chemicals (CIP; foam cleaning with a chlorine based sanitiser)
Processing consumables (PPE, processing tools, paper towels etc)



Business capability overview

Volumes - the plant processes 20,500 birds per working day.
Working Day – 10 hour working day, 5 days per week.
Shift work – not uncommon in this industry. Usually 2 x 10 hour allowing time between shits for clean ups.
Staff – 150 management and workers.
Vehicle movements – average 5 trucks per day inwards and 6 trucks per day outwards
Site foot print – building footprint 9,000 sq m and site foot print 17,000 sq m.

Opportunities for future innovation
- Development of inexpensive testing tools to detect potentially dangerous bacteria during processing
- Focus on industry-wide environmental management and move towards net zero emission production

Outputs

Finished product(s)
- Whole chickens, vacuum packed, chilled and frozen (ave weight 1.7kg)
- Free flow bags of frozen pieces
- Boneless/bone in cuts fresh on trays overwrapped
- Giblet packs

Liquid waste – this is water mixed with solid contaminants – feathers, blood, grease, chicken alimentary canal content and suspended small pieces of chicken meat. At the beginning and end of each day it will include CIP cleaning chemicals (alkalis).

Liquid waste per day	277,000 ltr	
Peak flow per hour	75,000 ltr	
Average per hour		27,700 ltr
Composition		
	COD	✓
	TSS	✓
	O&G	✓
	Nitrogen	✓
	Phosphorous	✓
	TDS	
Human waste per day		3,000 ltr

Solid waste – typically, all liquid waste passes through a milli-screen which will remove any suspended solids (fat, meat, feathers). Other solid waste would include processing waste (diseased chickens), plastic containers, packaging waste, consumables waste.

The bio solid waste will be collected from the milli-screen and go to a renderer.

Solid waste bio per day		10,000 kgs
Solid waste landfill	1,100 kgs	

Other:
- **Other services required will include compressed air for process equipment and general service water for washing down surfaces outside the hygiene envelop.**
- There will be a separate waste stream for human sewerage.
- Odours from the holding cages for live birds and solid waste bins can be a potential problem. Odours from open waste water vessels can be an issue. Noise and lights from a night operation may pose an issue.
- The growing vegan and animal rights organisations targeting meat processors mean these operators like to keep a low profile.

Trends:
- More further processing and added value finished goods.

Fish Processing & Packaging

This factory is modelled on a land based processing plant. Fish are caught at sea, packed in ice and then bled and gutted at sea. On landing they are shipped to the plant where they are headed, filleted, weighed and packed. The packs are then frozen. Some fish goes fresh for retail.

Inputs

Raw material(s)
60 MT per day of gutted fish

Gas

Not required

Electricity
80% plus used for refrigeration

Electricity per day	3,753 kwH
Electricity per kg finish product	0.14 kwH

Water

Potable water per day	350 – 700 m³
Potable water per kg	8 to 18 ltrs
Peak demand per hour	60 to 100 m³
Average per hour	35 to 70 m³

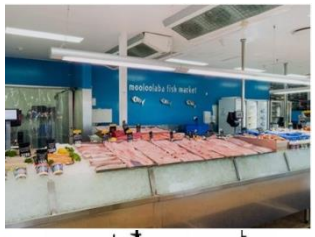
Water – is used extensively within the factory in a potable format as the plant is producing food for human consumption. There is an expectation that potable water would be available at the site. The plant will have its own chlorine dosing system to protect the integrity of the potable water. There is some untreated water used on the refrigeration condensers but this is minimal.

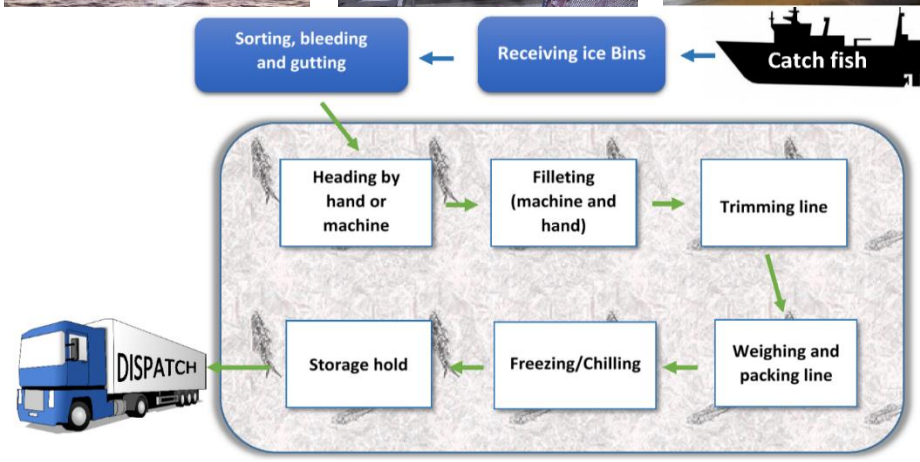
Volumes of potable water will vary depending on how complex the further processing operation (boning and retail/consumer packing) becomes.

The peak potable water usage occurs at the start of the shift (pre-op wash down) and at the end of the day (plant wash down).

Other inputs

Cleaning chemicals (CIP; foam cleaning with a chlorine based sanitiser)
Processing consumables (PPE, processing tools, paper towels etc)





Business capability overview

Volumes (finished product)	Up to 40 MT per day (10,000 MT annually)
Working Day	10 hours
Shift work	Possible
Staff	Up to 200 staff
Vehicle movements	12 per day
Site foot print	10,000 sq m
Plant foot print	3,500 sq m

Opportunities for future innovation
- Infrared and radiofrequency radiation expansion into food processing may be used for thawing fish
- Vacuum cooling for rapid evaporative cooling of fish
- Intelligent and active packaging to allow sensing of the packaging environment and responsive manipulation of the packaging to increase shelf life and food safety
- Pressure shift freezing to reduce shrinkage and tissue deformation with smaller ice crystals

Outputs

Finished product(s)

Liquid waste

Liquid waste per day	320,000 ltr
Peak flow per hour	50,000 ltr
Average per hour	32,000 ltr
Composition	
COD	✓
TSS	✓
O&G	
Nitrogen	✓
Phosphorous	
TDS	✓
Human waste per day	4,000 ltr

Solid waste
Typically, all liquid waste passes through a milli-screen which will remove any suspended solids (skin, bones and flesh).

Other solid waste would include packaging and plastic.

Solid waste landfill	1 MT/day

Renderables - The major by product from this plant is skin, bines and flesh from the processing room. Typically this product would go to a renderer. By weight this represent around 50% of the weight of the carcass.

Solid waste bio per day	20,000 + kgs

Other:
- Other services required will include compressed air for process equipment and general service water for washing down surfaces outside the hygiene envelop.
- There will be a separate waste stream for human sewerage.
- Odours may be an issue.
- Noise and lights from a night operation may pose an issue.
- The growing vegan and animal rights organisations targeting meat and fish processors mean these operators like to keep a low profile.

Trends:
- Being located very close to the port is an advantage and PBP may be seen as too far to travel.

Boning and Packing - Beef

This is export licenced beef boning and packing operation where quarters of beef are trucked in from an abattoir the day after slaughter. The quarters are sorted, boned and packed. The items packed include beef primal cuts, bulk or individually wrapped and some smaller items for retail. Product is then stored either chilled (0°C) or blast frozen and stored at -18°C.

Inputs

Raw material(s)
Quartered carcases
Packaging materials

Gas

	Not required

Electricity

Electricity per day	10,000 kwH
Electricity per head	50 kwH
Electricity per kg (cwt)	0.2 kwH
Peak demand (evening)	650 kwH
Average per hour/day	400 kwH

Water – is used extensively within the factory in a potable format as the plant is producing food for human consumption. There is an expectation that potable water would be available at the site. The plant will have its own chlorine dosing system to protect the integrity of the potable water. There is some untreated water used on the refrigeration condensers but this is minimal.

Volumes of potable water will vary depending on how complex the further processing operation (boning and retail/consumer packing) becomes.

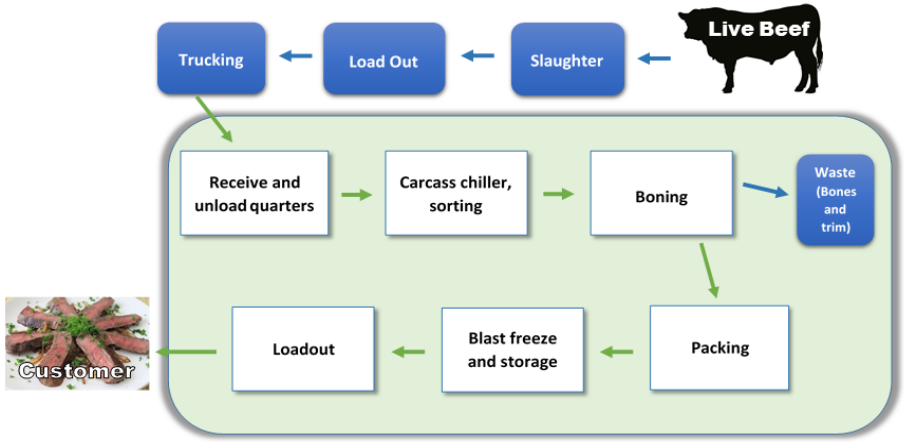
The peak potable water usage occurs at the start of the shift (pre-op wash down) and at the end of the day (plant wash down).

Potable water per day	12,000 ltrs
Potable water per head	60 ltrs
Potable water per kg (cwt)	0.22 ltrs
Peak demand (wash down/hr)	3,000 lts
Average per hour	1,500 lts

Other inputs

Cleaning chemicals (CIP; foam cleaning with a chlorine based sanitiser)
Processing consumables (PPE, processing tools, paper towels etc)



Business capability overview

Volumes	800 quarters (200 head) per working day
Working Day	8 hours
Shift work	Possible
Staff	40
Vehicle movements	5 inwards, 8 outwards
Site foot print	1,500 sq m
Building footprint	5,000 sq m

Opportunities for future innovation
- Objective measurement technology (CT, X-Rays 3D cameras, Near-infrared spectroscopy, Dual-Energy X-Ray Absorptiometry) to measure carcase traits to predict boning cutting lines, lean meat yield, muscle score and eating quality

- Smart packaged meat to increase traceability, shelf life and integrity of the product

- Covered anaerobic lagoons to allow methane and abattoir waste conversion into biogas and irrigation resources

Outputs

Finished product(s)

Liquid waste – this is water mixed with solid contaminants – blood, fat and small meat pieces. At the beginning and end of each day it will include CIP cleaning chemicals (alkalis).

Liquid waste per day	11,750 ltr
Peak flow per hour	2850 ltr
Average per hour	1,500 ltr
Composition	
COD	✓
TSS	✓
O&G	✓
Nitrogen	✓
Phosphorous	
TDS	
Human waste per day	800 ltr

Solid waste – typically, all liquid waste passes through a milli-screen which will remove any suspended solids (fat, meat).

Other solid waste would include packaging and plastic.

Renderables - The major by product from this plant is bones and fat from the boning room. Typically this product would go to a renderer. By weight this represent around 30% of the weight of the carcass.

Solid waste bio per day	13,000 kgs
Solid waste landfill	500 kgs

Other:
- Other services required will include compressed air for process equipment and general service water for washing down surfaces outside the hygiene envelop.
- There will be a separate waste stream for human sewerage.
- Odours are not an issue.
- Noise and lights from a night operation may pose an issue.
- The growing vegan and animal rights organisations targeting meat processors mean these operators like to keep a low profile.

Trends:
- Livestock numbers are dropping which may lead to rationalisation of processing sites.
- If live shipments were stopped there would be a need to have more processing space.

Processed Meats - Sausages

Sausages are made from beef, veal, pork, lamb, poultry and wild game, or from any combination of these meats. Sausage making has become a unique blend of old procedures and new scientific, highly-mechanized processes. Traditionally, sausage was formed into a symmetrical shape, but it now can be found in a variety of shapes and sizes to meet consumers' needs. Sausages can be classified in a variety of ways, but probably the most useful is by how they are processed. Processing methods give sausages easily recognizable characteristics, and there are many types e.g. fresh, smoked, cooked and smoked, dryed and cooked specials.

Inputs

Raw material(s)
A sausage consists of meat, cut into pieces or ground, and filled into a casing, with other ingredients. Ingredients may include a cheap starch filler such as breadcrumbs, seasoning and flavourings such as spices, and sometimes others. The meat may be from any animal, but is often pork, beef, or veal. Typically boning operations would have a sausage making operations attached to add value to trimmings.

Gas

Gas per kg of product (cooking and hot water)	0.01 Gj

Electricity

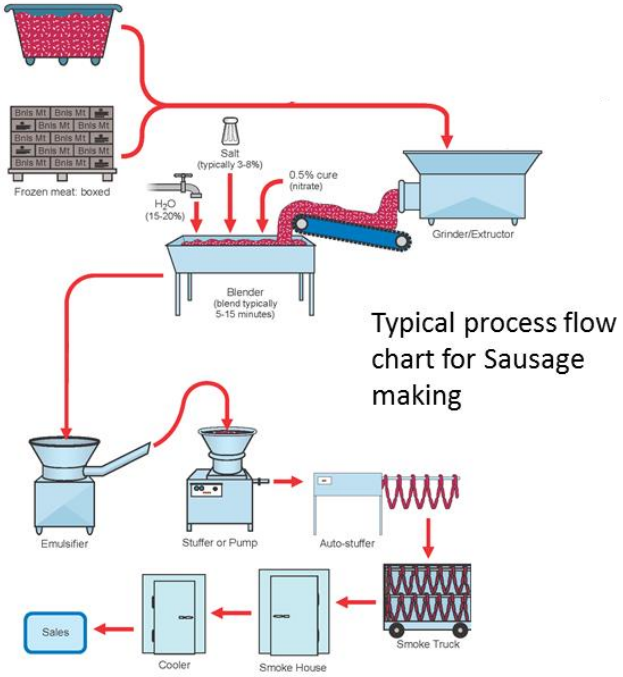
Electricity per kg of product	0.5 kwH

Water

Potable water/kg of product	5.0 ltr
Daily use	125,000 ltr

Other inputs
There are preservatives used in the manufacture of processed meats. Some leaching into the waste water stream could be experienced. They are:

- Sodium acetates (262)
- Natamycin or Pimamycin (235)
- Nisin (234)
- Nitrites – potassium nitrite (249) and sodium nitrite (250)
- Nitrates – sodium nitrate (251) and potassium nitrate (252)
- Sorbates – Sorbic acid (200), sodium sorbate (201), potassium sorbate (202) and calcium sorbate (203)
- Sulphites – Sulphur dioxide (220), sodium sulphite (221), sodium bisulphite (222), sodium metabisulphite (223), potassium metabisulphite (224), potassium sulphite (225) and potassium bisulphite (228)



Typical process flow chart for Sausage making

Business capability overview

Volumes: 25t per day
Working Day: 8 hours
Staff: 120
Vehicle movements: 10 trucks
Site foot print: 1 Ha
Building footprint: 5,000m2

Opportunities for future innovation
- Automation via. Robotics (wash-down robots, EOAT) to eliminate human contact, improve safety and sanitation.
- Nanotechnology and nanomaterials (improves bioavailability of functional compounds) reduces salt, sugar and preservatives while improving colour, flavour and texture
- Reformulation of processed meats (bioactive materials replace food additives) for health benefits, reduce carcinogenic elements
- 3D imaging to determine yield loss of meat products (reduces waste and increases profits)
- X-ray imaging (analyse fat content in sausages) to assure quality consistency

Outputs

Finished product(s)

Liquid

Liquid waste/kg of product	0.5 lts
Composition	
COD	✓
TSS	✓
O&G	✓
Nitrogen	✓
Phosphorous	
TDS	

Human waste per day	2,400 ltr

Solid waste

Solid waste/kg of product	0.5 kgs

Other.

There are direct synergies with raw materials coming from the chicken and beef boning operation and waste products going to a rendering operation.

Trends:
- Further processing in "shelf stable" packages using retorts – ready meals.

Milk Powder

Milk powder manufacture is a simple process now carried out on a large scale. It involves the gentle removal of water at the lowest possible cost under stringent hygiene conditions while retaining all the desirable natural properties of the milk - colour, flavour, solubility, nutritional value. Whole (full cream) milk contains, typically, about 87% water and skim milk contains about 91% water. During milk powder manufacture, this water is removed by boiling the milk under reduced pressure at low temperature in a process known as evaporation. The resulting concentrated milk is then sprayed in a fine mist into hot air to remove further moisture and so give a powder.

Cheese

Cheese can be broadly categorized as acid or rennet cheese, and natural or process cheeses. Acid cheeses are made by adding acid to the milk to cause the proteins to coagulate. Fresh cheeses, such as cream cheese or queso fresco, are made by direct acidification. Most types of cheese, such as cheddar or Swiss, use rennet (an enzyme) in addition to the starter cultures to coagulate the milk. The term "natural cheese" is an industry term referring to cheese that is made directly from milk. Process cheese is made using natural cheese plus other ingredients that are cooked together to change the textural and/or melting properties and increase shelf life.

Yoghurt

Yoghurt is a fermented milk product that contains the characteristic bacterial cultures Lactobacillus bulgaricus and Streptococcus thermophilus. The two styles of yoghurt commonly found in the grocery store are set type yoghurt and swiss style yogurt. Set type yoghurt is when the yoghurt is packaged with the fruit on the bottom of the cup and the yoghurt on top. Swiss style yoghurt is when the fruit is blended into the yoghurt prior to packaging.

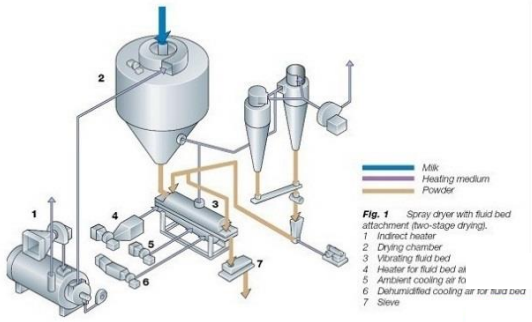
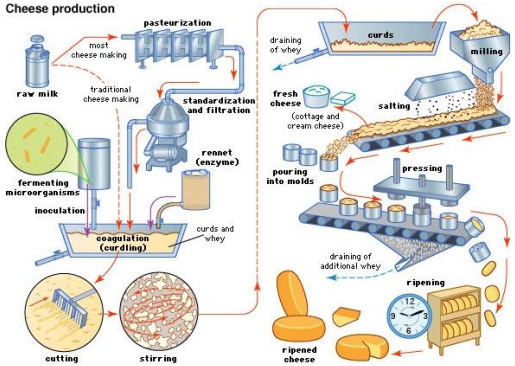
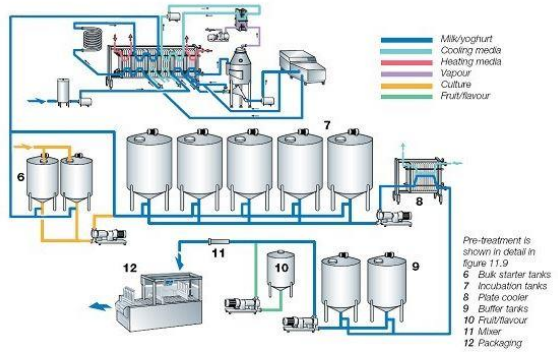


Fig. 1 Spray dryer with fluid bed attachment (two-stage drying).
1 Indirect heater
2 Drying chamber
3 Vibrating fluid bed
4 Heater for fluid bed air
5 Ambient cooling air fan
6 Dehumidified cooling air for fluid bed
7 Sieve





Yields

- Approximately 13 kg of whole milk powder (WMP) or 9 kg of skim milk powder (SMP) can be made from 100 L of whole milk.
- When processing 1 litre of milk to WMP, anywhere from 0.8 to 2.0 litres of potable water will be used and 1.1 to 2.0 litres of waste water will be drained. This is very dependent on what type of process is being used.
- The "typical" milk powder plant drier will produce 12 MT of powder per hour at maximum production. Driers can be as large as 24 MT per hour.
- 1 kg of cheese will come from around 10 litres of milk.
- 1kg of whole milk will make 1kg of yoghurt.

Liquid Waste

Liquid waste per day 300,000 ltr

Composition

COD	✓
TSS	
O&G	✓
Nitrogen	✓
Phosphorous	✓
TDS	✓

Human waste per day 1,000 ltr

Other requirements: Compressed air for process equipment and general service water for washing down surfaces outside the hygiene envelop.

Opportunities for future innovation

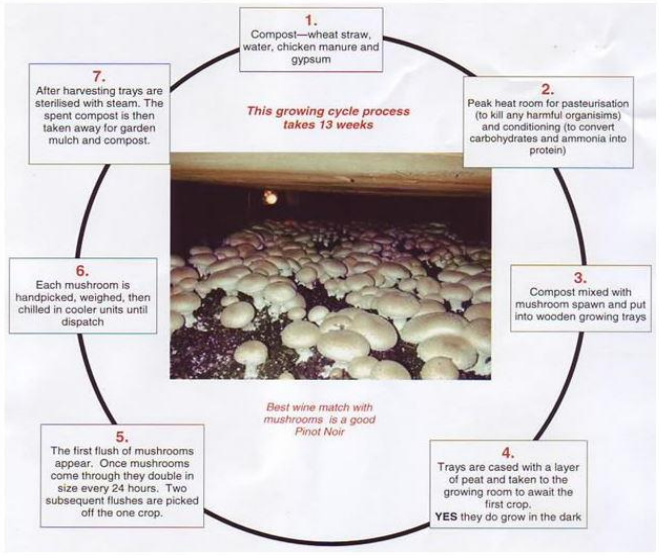
Nanoemulsions research allows separation of fat sizes allowing greater specificity for different dairy products' viscosity and fat content in the future

New strains of bacteria to increase rates of cheese maturation

Type of service	Unit	Requirement including CIP for one ton of milk processed into:								
		Liquid products in bottles		Liquid products in one-way containers		Skim milk powder and butter	Full cream milk powder	Ripened cheeses		Evaporated and condensed milk
		pasteurized	sterilized	pasteurized	UHT			without whey processing	With whey processing	
Net requirement										
Steam	kg/t	250	300	100	150	880	830	190	700	440
Refrigeration total energy equivalent	kWh/t	50	40	50	40	60	45	70	70	45
Refrigeration electric power requirement	kWh/t	20	16	20	16	24	18	28	28	18
Heating	kWh/t	165	200	70	100	585	530	125	460	295
Electric power (total requirement)	kWh/t	55	70	50	90	90	80	75	100	60
TOTAL NET REQUIREMENT	**kWh/t**	**220**	**270**	**120**	**190**	**675**	**610**	**200**	**560**	**355**
Gross energy requirement										
For heating (furnace fuel)	kWh/t	205	250	90	125	730	660	155	575	370
For electric power (generator fuel)	kWh/t	195	250	180	315	315	280	265	350	210
TOTAL GROSS REQUIREMENT	**kWh/t**	**400**	**500**	**270**	**440**	**1,045**	**940**	**420**	**925**	**580**
% of energy in steam in total requirement	%	75	74	58	53	87	84	63	82	83
% of energy in furnace fuel in total gross requirement	%	51	50	33	28	70	70	37	62	64

Mushroom Farming

This example produces white button mushrooms. The growing cycle from preparing the compost growing medium to harvest is around 13 weeks. The major by product from this operation is compost. Seen as environmentally friendly using a waste product (compost)



Inputs

Raw material(s)

Straw, chaff, manure, sawdust and other materials

Packaging

Gas

per day	Not known

Electricity

Electricity per day	1,200 kwH
Electricity per month	35,000 kwH
Electricity per MT mushrooms	1,300 kwH

Heat pumps are used to control the temperature within the growing rooms by having two tanks for water – one cold and one hot. Water is circulated depending on whether they want to raise or lower the room temperature.

Water

Water per day	1,750 ltrs
Water per week	12,500 ltrs
Water per MT mushroom	1,750 ltrs

W en re

Outputs

Finished product(s)

Liquid

Liquid waste per day	Very little
Peak flow per hour	NA
Average per hour	NA
Composition	
COD	
TSS	
O&G	
Nitrogen	✓
Phosphorous	✓
TDS	
Human waste per day	640 ltr

Solid waste

The major by product of mushroom farming is the spent compost. This is typically sold to gardeners and landscapers.

Solid waste (compost) per month 75 kgs

Other.

Odours come from the composting operation so location is key of the plant relative to other food operation and the prevailing wind. There is risk of leaching into the ground from the compost piles.

Trends.

Scale is driving larger operations.

Business capability overview

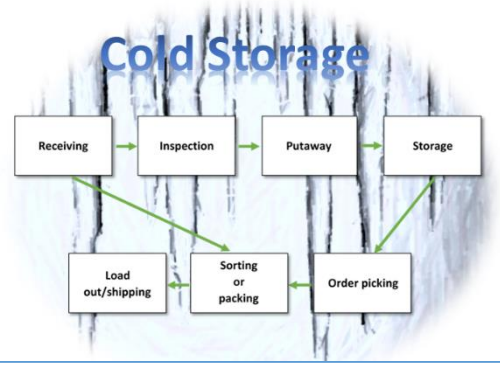
Volumes	7 MT of mushrooms per week, 240 MT of compost per 13 weeks
Working Day	8 hours
Shift work	Possible
Staff	32 casual staff – used as required
Vehicle movements	5 to 6 trucks per day
Site foot print	15,000 sq m

Opportunities for future innovation

- New sampling techniques to allow early detection of diseases on the farm
- Machine vision allows improved opportunities for machine harvesting with greater accuracy, making this option more viable
- Irradiation and UV light treatments to extend shelf life
- Use of solution washes as a chemical processing aid
- Modified atmosphere packaging developments to increase shelf life

Cold Storage

The cold store used in this example has the capacity for 1,000 MT of frozen product, predominantly in cartons. It is constructed to hold export product on pallets to 5 high on racking. Product is loaded in and out from road trucks. The refrigeration system is ammonia and the energy source is electricity.



Inputs

Raw material(s)

Products for storage

Gas

Not required

Electricity

Electricity per day	4,400 kwH
Electricity per kg of product	0.1 kwH
Peak demand	Day end
Average per hour	185 kwH

Water

There is a minimal quantity of water used in condensers for refrigeration.

Other inputs

Operating temperature regime	-18°C

Outputs

Finished product(s)

Liquid

Liquid waste per day (minimal defrost water and condensers)	NA
Human waste per day	160 ltr

Solid waste

Solid waste bio per day (Broken pallets and cardboard)	NA

Other:

- There will be a separate waste stream for human sewerage.
- Odours will not be an issue.
- Noise and lights from a night operation may pose an issue.
- The security of electricity supply is a massive issue. These plant usually come with an auxiliary generator for emergencies.

Trends:

- Size and being located near food process facilities requiring temperature controlled storage.
- The move toward more chilled product (stored at 0°C)
- Option for refrigerant include Ammonia and CO_2

Business capability overview

Volumes	1,000 MT of frozen storage, assume 90% working capacity
Working Day	8 hours
Shift work	As required – usually to coincide with load outs
Staff	8 staff
Vehicle movements	4 to 6 per 24 hours
Site foot print	1 hectare
Building footprint	1,800 sq m.

As a rule of thumb, for every 500MT add 1,000 sq m. (If stacked 4 pallets high)

Opportunities for future innovation

- Single-envelope storage using composite panels to improve energy efficiency, air-tightness and durability.
- Temperature sensors to maintain consistency and detect changes in the cold chain
- Automated guided vehicles (AGV's) reduces personnel fatalities, reduces costs, increase efficiency and profitability.
- LED High Bay lighting offers 24/7 improved light quality, solves equipment safety and employee efficiency issues by eliminating dark areas in the warehouse.
- Using treated wastewater (in irrigation, condensers, refrigeration) for economic viability and water conservation

Inputs

Raw material(s)

Products for distribution

Gas

Not required

Electricity

Electricity per day	3,050 kwh
Electricity per month	60,100 kwh
Electricity per carton	0.14 kwh
Peak demand	5 to 7 pm
Average per hour	210 kwh

Water

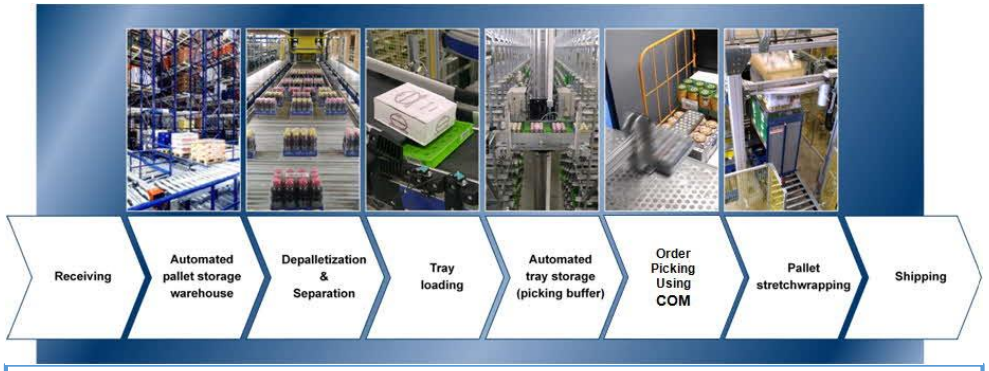
The only water used on site is in the amenities and water storage tank for fire fighting

Other inputs

This is a dry operation.

Distribution

This operation receives a variety of items from a variety of manufacturers for storage. They are generally all of a type that is not temperature sensitive nor do they have a very short (days) shelf life. The items are then collected (order picking) and put together in parcels for shipment to retail, wholesale or smaller distribution centres.



Business capability overview

Volumes	420,000 cartons handled per month (6,300,000 kgs) Pallet storage 10,700 pallets
Working Day	6 am to 9 pm (Monday to Thursday) 6 am to 5 pm (Friday)
Shift work	As above split shifts
Staff	105
Vehicle movements	20 to 28 trucks per day (B trains, up to 26m long)
Site foot print	25,000 sq m
Building footprint	15,000 sq m, apron 5,000 sq m

Opportunities for future innovation

- Active packaging (thermoforming films, antimicrobial vacuum packaging, CO2 emitting and antioxidant O2 scavenging packaging) to prolong shelf life and ease distribution
- Edible/biodegradable packaging advances to reduce landfill and waste (EPI's TDPA oxodegradables, NatureFlex™ packaging)

Outputs

Finished product(s)

Liquid

No liquid waste

Human waste per day	2,100 ltr

Solid waste

10 to 12 cages per day (150 kgs per cage) of shrink wrap and cartons which is recycled

Other:

- Other services required will include compressed air for process equipment.
- There will be a separate waste stream for human sewerage.
- Odours will not be an issue.
- Noise and lights from a night operation may pose an issue.

Trends:

- Being used a hubs (or the centre of a spoke) feeding out to retail centres.
- Getting bigger and highly automated.

4.1 Key findings

It should be noted that the above profiles represent typical business operations utilising current best practices while taking into account the advances in technology and efficiency. However, in reality the exact requirements of individual businesses are likely to vary due to:

- The size of the operation and volumes of raw material processed
- The complexity of the operation, to what level the raw material is processed and value is added
- The type of raw material processed and products produced, e.g. ovine vs bovine meat; wet fish vs shell fish; milk powder vs yoghurt vs cheese etc.
- Seasonal fluctuations in the supply of raw materials
- Whether shift work is used
- Market focus e.g. bulk vs retail ready markets, export vs domestic markets

The tables below summarise the requirements identified in the profiles above, provide an overall estimate of requirements for the industrial area, and provide an assessment of whether these needs can be met via the current planned servicing of the development.

The eight (8) profiled businesses would require an estimated 11ha of industrial land, from the available 60.8ha of industrial land in the first precinct of the development. GHD used a corresponding multiplier (5.53) to escalate the total requirements for utilities, staff, vehicle movements etc. outlined in the eight (8) profiles to reflect the overall industrial precinct once fully sold and developed.

The following should be noted when considering these figures:

- The analysis assumes 100% development of industrial land with profiled businesses reflecting the actual mixture of businesses establishing in the park. In reality there may be fewer heavy utility users (e.g. poultry, dairy, fish and meat processors) and a greater number of businesses with lower utility requirements (e.g. distribution, cold storage)
- The analysis only considers the requirements of developments on the 60.8ha of industrial land within the precinct, and do not account for other land types (e.g. 8.43ha of commercial land, 2.43ha of special industrial land)
- The analysis does not consider the future development requirements of the broader PBP

The findings below highlight some key areas which will need to be addressed:

- Staff movements: Future planning will need to incorporate public transport
- Lot size: Many potential businesses will require larger lots than what is proposed, or will need to acquire multiple lots. Some flexibility will be required in local structure planning regarding lot size to allow amalgamation or subdivision in appropriate circumstances
- Electricity: Wherever possible electricity should be underground
- Liquid waste: Need to understand the expected future capacity of the Gordon Road WWTP, which will determine the need for on-site treatment before discharge. Consideration should be given to installing a separate sewage line for human waste
- Solid waste: Not addressed in current planning. Consideration should be given to waste disposal opportunities via the nearby Eco Industrial Zone

Table 3 Summary of staff, vehicles, site and buildings

	Output	Staff	Vehicle movements	Site foot print	Building foot print
	tonnes/ day	Number	trucks in per day	Ha	m^2
Poultry processing	35	150	5	1.70	9,000
Fish processing and packaging	40	200	12	1.00	3,500
Boning and packing - Beef	35	40	5	0.50	1,500
Processed meats - Sausages					
Dairy processing	1	32	5	1.50	
Mushroom farming	25	120	10	1.00	5,000
Cold storage	15	50	20	1.80	7,500
Distribution	NA	8	5	1.00	1,800
Poultry processing	NA	105	27	2.50	15,000
Total assessed in profiles	**151**	**705**	**89**	**11.0**	**43,300**
Total extrapolated need for PBP industrial land[5]	**835**	**3,897**	**492**	**60.8**	**239,331**
Proposed servicing		B-Double access, shared access opportunity, currently no public transport, opportunity for buses in future		60.8ha of industrial land, which is expected to yield betweem 80 to 110ha lots (0.61-0.76ha per lot).	Not addressed
Assessment against need		Acceptable		Acceptable, noting that most larger facilities will require multiple lots	Acceptable, however needs to be accommodated in building guidelines

[5] Demand extrapolated from profiles to reflect total demand from 60.8ha industrial land, based on land use.

Table 4 Summary of energy and water

	Gas	Electricity			Water		
	per day (Gj)	per day (kWh)	peak demand (kWh)	average per hour (kWh)	per day (L)	peak demand (L//hour)	average per hour (L/hour)
Poultry processing	105	10,660	585	444	308,000	80,000	30,800
Fish processing and packaging	NA	3,753	375	375	525	52	52
Boning and packing - Beef	NA	10,000	650	400	12,000	3,000	1,500
Processed meats - Sausages	50	5,000	500	500	200,000	20,000	20,000
Dairy processing	100	8,000	800	800	300,000	30,000	30,000
Mushroom farming	NA	1,200	50	50	1,750	219	219
Poultry processing	NA	4,400	850	850	0	0	0
Fish processing and packaging	NA	3,050	210	210	0	0	0
Total assessed in profiles	105	46,063	4,020	3,629	822,275	133,271	82,571
Total extrapolated need for PBP industrial land	**580**	**254,603**	**22,220**	**20,058**	**4,544,938**	**736,624**	**456,391**
Proposed servicing	Gas supplied	22kV lines (above and/or below ground)			Short term 250 mm diameter main Long term 375 mm main		
Assessment against need	Acceptable, gas be available as required	Below ground preferable			Acceptable, Most plants will install storage tanks, chlorination dosing and boilers (opportunity for shared services)		

Table 5 Summary of waste

	Liquid Waste				Solid Waste		
	per day (L)	peak (L/hour)	average (L/hour)	Human waste (L/day)	bio per day (kgs)	landfill per day (kgs)	Recyclable per day (kgs)
Poultry processing	27,000	75,000	27,700	3,000	10,000	1,100	
Fish processing and packaging	320,000	50,000	32,000	4000	20,000		
Boning and packing - Beef	11,750	2,850	1,500	800	13,000	500	
Processed meats - Sausages	100,000	10,000	10,000	2,400	1,000	1,000	
Dairy processing	300,000	30,000	30,000	1,000			
Mushroom farming	0	0	0	640			
Cold storage	0	0	0	160			
Distribution	0	0	0	2,100			1,650
Total assessed in profiles	758,750	167,850	101,200	14,100	44,000	2,600	1,650
Total extrapolated need for PBP industrial land	**4,193,818**	**927,753**	**559,360**	**77,935**	**243,200**	**14,371**	**9,120**
Proposed servicing	701.4L/s long term pump rate, disposal into Gordon Road Wastewater Treatment Plant (WWTP), following appropriate treatment.			Reticulated sewage and wastewater	Not addressed		
Assessment against need	Acceptable pumping capacity, the peak flow rate of 706,662 L/h (196 L/s), however there is limited capacity at the Gordon Road WWTP, therefore need to consider alternatives in longer term. Onsite treatment required for some businesses (e.g. meat processing) before discharge. Potential opportunity for communal WWTP within PBP.			Benefits from separate sewage waste line	Opportunity for waste disposal via the nearby Eco Industrial Zone.		

4.1.1 Scope for complementary processes and services

There are many key utilities and services required by any of the possible industries that may be attracted to the PBP. Having these available will make it easier for boards and management teams to make the decision to move. Access to these services will also encourage a community approach to the owners of the business who do move on site. Providing these essential services will make the PBP more attractive for potential businesses, by reducing the cost associated with building stand-alone services. Examples include:

- Auxiliary (back-up) electricity generator(s): many of these operations are dealing with perishable products (refrigeration, continuous processes, 24/7 operations). Any interruption in the supply of electricity is potentially a disaster
- Electricity micro-grid: LandCorp is investigating the development of a micro-grid and solar generation capability. This development may allow for innovative power options to improve security, redundancy and reduce price
- Boiler for steam: several of these operations require steam e.g. meat and dairy processing. A common boiler would be cheaper energy than electricity for heating hot water for example via an industrial electric kettle
- Human sewer plant: Human waste could be processed separately from industrial waste to appropriate levels. The use of modern methods could see biogas and compost produced as by products
- Industrial wastewater plant: If there was a need for significant on-site treatment of wastewater, in order to be accepted for discharge to the Gordon Road WWTP, a communal WWTP would reduce treatment costs, compared to multiple facilities being developed on individual sites
- Potable water supply: food operations are large consumers of potable water. This is an opportunity for the PBP to be the provider of that utility rather than piping in from the nearest local authority. Security of supply and water quality standards will be a major incentive. Often local water authorities fail to understand that industrial users require higher standards of potable water compared to domestic users, e.g. less tolerance for turbidity
- General Service water supply: The provision of common use water storage tanks is an obvious opportunity. Tanks could also be used to meet fire safety regulations
- Telecoms: all these business will require fibre for communications and computers. A deal with a single supplier would bring efficiencies
- Solid waste disposal: many food operations will produce solid waste streams that will need to be taken to be either rendered, composted, recycled or otherwise sent to landfill. There is an opportunity to develop an adjoining or on site eco industrial park to facilitate some of these waste disposal facilities. For example, tt present the only rendering plant in WA is in Hazelmere (Talloman). Transport costs to this facility may provide an opportunity for a more local service
- Employees: opportunity for group contracting services, training, recruiting, catering and accommodation
- Logistics: there will be many large heavy vehicles bringing in raw materials (often dirty) and taking away finished goods (usually clean) and waste/bi-products (usually dirty). Traffic planning should seek to separate clean and dirty vehicles as much as possible. There will also be a need for a common truck wash, preferably via a universal billing system (e.g. Avdata or similar)

- Security and profile: opportunity to provide security sensitive businesses with features including perimeter fencing, access control, CCTV, visual breaks and set backs from public roads.

The above opportunities are discussed further in Section 6.2 which evaluates the servicing of the development, including critical infrastructure.

5. Potential new agri-food businesses

In addition to existing Perth and Peel agri-food businesses seeking to relocate to the PBP, there is potential for new or emerging types of agri-food businesses, which may be attracted to the PBP. Attracting new and innovative food businesses to the region is an important goal for the PBP, and the broader Transform Peel program which aims to diversifying the Peel economy, creating jobs, improving competitiveness, fiscal sustainability and delivering innovation.

The recently released national *Food and Agribusiness Roadmap* (CSIRO 2017) identifies the following value added opportunities for growth:

- Products for health and wellbeing, including free-from and natural foods, supplements, fortified and functional foods, and personalised nutrition
- Sustainability-driven products and processes, including those that convert waste, provide alternative protein sources, sustainable packaging and green and ethical value chains
- Premium foods, including high-quality, convenient, fresh and packaged products; luxury products and gifts; tourism; and novel tastes, smells and textures

Emerging opportunities within WA were further evaluated in *Premium Agri-Food Market Opportunity* (Coriolis 2016), which screened 506 food categories and identified the following list of opportunities.

Figure 24 Identified premium food opportunities for WA

Source: Coriolis 2016

Further information on the above reports is provided in Appendix A.

Based on the above analysis, and guided by input from key agencies on the Peel regions comparative/competitive advantage, and commercial interest, six business types were selected for further profiling below:

- Premium/organic food processing incubator
- Vertical farming
- Medicinal honey processing
- Online grocery and meal delivery
- Non-meat protein
- Nutraceuticals

Profiles are designed to help understand the market drivers for these businesses and the services and infrastructure required should they choose to become established within the PBP.

5.1 Premium/organic food processing incubator

While there is a growing market for premium/organic food products, many start-up food businesses face difficulty accessing processing and packaging facilities that are appropriately certified and able to handle small batches of premium products.

Many start-up food businesses begin manufacturing at home or in in small scale commercial facilities which are unlikely to meet food safety, quality assurance or organic certification requirements. The costs associated with meeting these requirements are often prohibitive.

Analysis in Section 3 shows a high number of food businesses in Perth classified as ‘gourmet’, with many located in areas likely to experience relocation pressure. Continued growth in this premium food sector may necessitate some of these smaller businesses expanding to newer facilities.

Across various industries, incubators are being used to help start-up businesses during the early stages of establish. In addition to shared facilities, incubators can offer funding, education, and mentoring. In the food industry, there are several international examples of incubators providing commercial cooking and contract manufacturing services.

Example: Organic Food Incubator (New York)

For example Organic Food Incubator provides kitchen space, contract manufacturing, education and coaching services, producing products ranging from fermented food and drinks, cold brew coffee, cocktail mixers and sauces. The facility is certified to produce organic and kosher products, most of which are vegetarian and gluten-free.

- Building footprint 1,450 m2
- 30 food and beverage clients
- 16 full time staff
- 11,000 litres per day capacity

The Organic Food Incubator is one of three food incubators to receive up to $2.5 million in start-up funding from New York City.

Figure 25 Profile of premium/organic processing incubator business

Inputs

Raw material(s)
Ingredients
Packaging

Gas

Gas may be required to operate a boiler to provide steam to make hot water for wash downs, HVAC, and general heating.

Electricity

Required to run processing equipment, refrigeration, electrical appliances and lighting.

Water

Potable water will be required to the facility, which will have its own chlorine dosing system to protect the integrity of the potable water. Volumes of potable water will vary depending on the type of processing.
Minimal or no need for non-potable water.

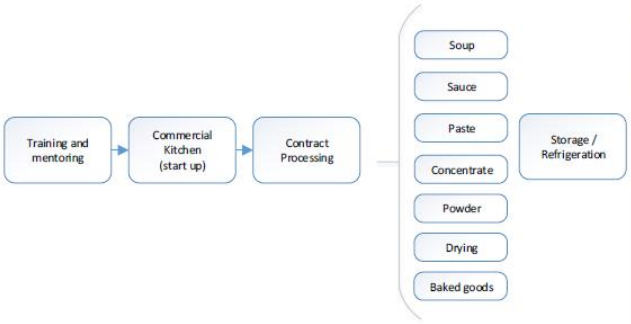
Other inputs

Cleaning chemicals
Processing consumables

Premium/organic food processing incubator

This operation is modelled on a facility offering kitchen space, contract manufacturing, education and coaching services. The facility has capacity to produce a range of products including soup, sauce, paste, concentrate, powder and dried products, upto 11,000 litres per day. The facility is certified to produce organic and kosher products, most of which are vegetarian and gluten-free.





Business capability overview

Volumes - the plant can processes a total of 11,000 litres of product per day
Working Day – 8 hour working day, 5 days per week.
Staff – 15 management and workers.
Vehicle, movements – Minimal 2 truck movements per day
Site foot print – building footprint 1,450 sq m and site foot print 5,000 sq m.

Outputs

Finished product(s)
Soup
Sauce
Pasta
Concentrate
Powder
Dried products
Baked products

Liquid waste
Cleaning runoff
Including cleaning chemicals

Solid waste
Food scraps
Solids screens from liquid waste
Packaging

Other:
Separate waste stream for human sewerage.

5.3 Vertical farming

Vertical farming typically refers to the production of food and medicinal crops in vertically stacked layers, often within factories, warehouses, skyscrapers or shipping containers. The practice can be used in a range of situations and scales ranging from personal or community enterprises integrated into urban buildings, to stand-alone commercial operations (most relevant to the PBP).

Most vertical farming enterprises use controlled environment agriculture, providing optimal light, nutrients, air (CO^2) and temperature. Both hydroponic or soil based production can be used.

Key benefits from vertical farming include:

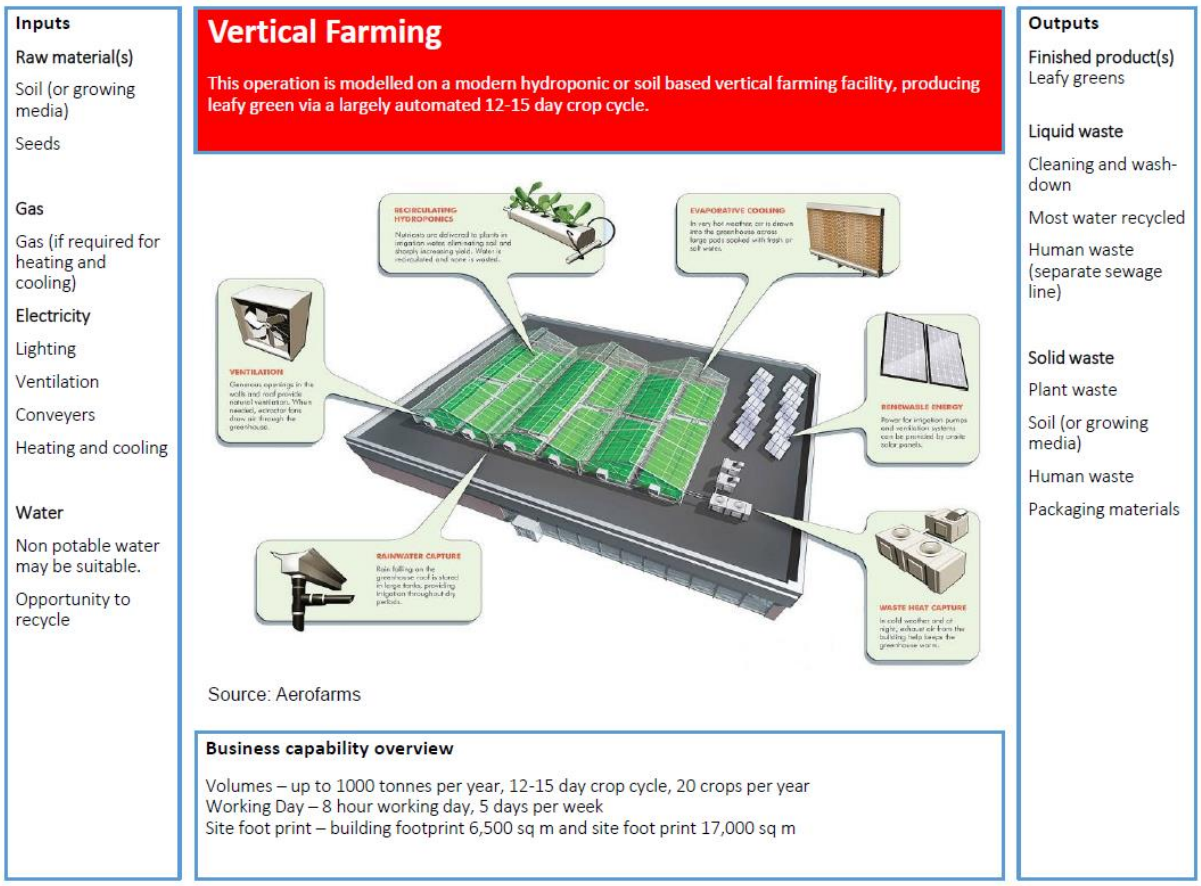
- Lower footprint suitable for urban or industrial production
- Year-round production
- Quality control
- Automatic production
- Reduced chemical use
- Resource use efficiency (water, nutrients, transport etc.)

AeroFarms is a leading US company involved in vertical farming. It operates a number of facilities in New Jersey, the largest of which is 6,500 m^2 and harvests over 900 tonnes of leafy greens (Aerofarm 2017). AeroFarms claims the following environmental benefits over conventional field production:

- 95% less water used
- 99% less land required
- 98% less carbon emissions from transportation (does not consider emissions from production)
- Zero use of pesticides, herbicides, fungicides or insecticides

Electricity costs are a major consideration in vertical farming. It has been estimated that assuming 30% natural light, 70% artificial light, approximately 0.40 kWh of electricity is required to produce each head of lettuce, weighing approximately 150-160 grams each (Hamm (2015) Assuming energy costs of 30c/kWh, this equates to $0.12 per head, or $0.77 per Kg.

Figure 26 Profile of vertical farming business



5.4 Medicinal honey processing

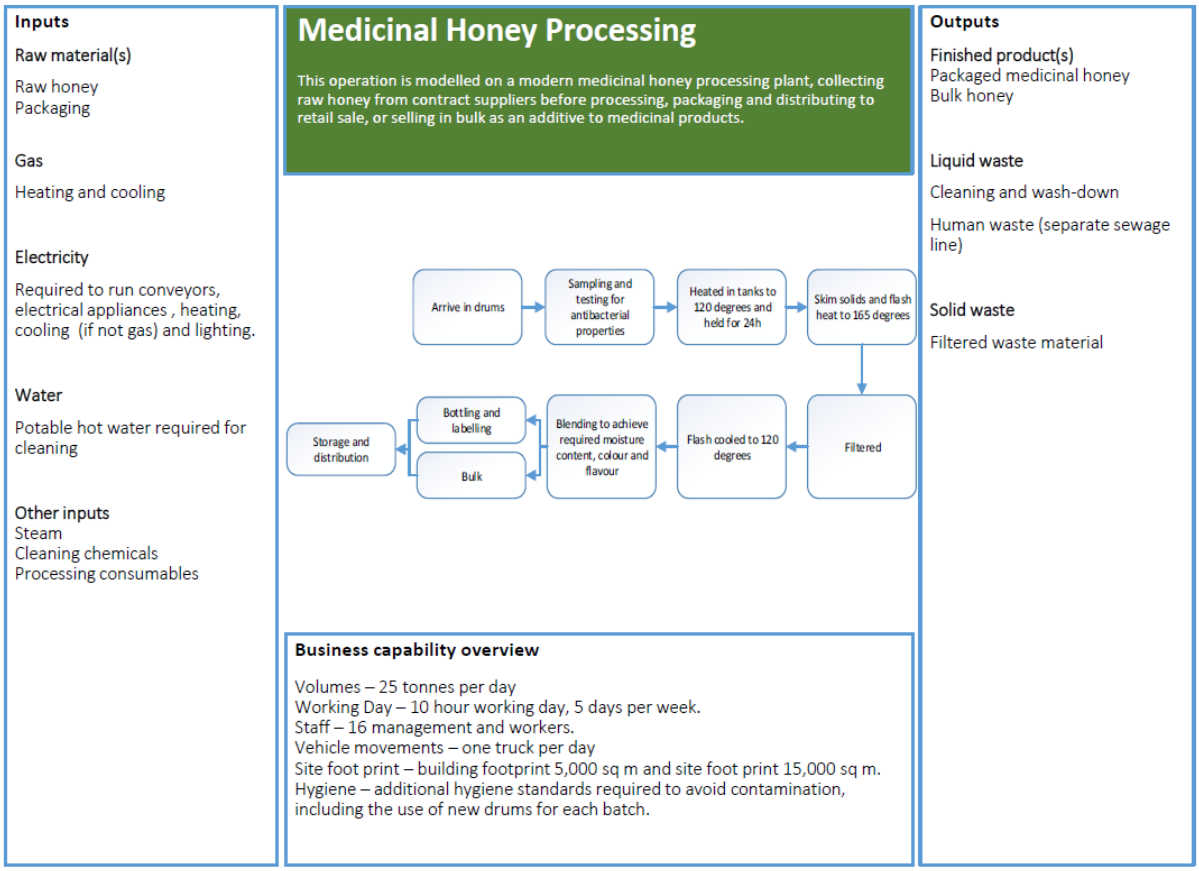
The Australian honey industry is currently experiencing rapid growth and investment driven by high export prices and global shortages due to the colony collapse disorder phenomenon.

In WA honey is produced by around 90 beekeepers operating over 3,200 apiary authorities (registered hive sites) across all land tenures (WA Department of Biodiversity, Conservation and Attractions 2017). High value opportunities exist for Manuka and Jarrah honey produced predominately in the South West Region, which both have medicinal qualities in particular antimicrobial activity.

Beekeepers typically either process and package honey themselves in small-scale facilities, or supply companies with larger processing plants supplying domestic and export markets. Capilano is the largest honey producer in Australia with an estimated market share of 60%. Capilano processes honey at a number of plants across Australia, including at Bayswater in Perth.

Medicinal honey processing follows a similar method to food grade honey, however with additional testing and stricter hygiene protocols. Following filtering, dewatering, liquefaction and pasteurisation, honey is either processed into retail ready jars or tubes, or sold in bulk drums as an additive to other medicinal products (e.g. wound dressings).

Figure 27 Profile of medicinal honey processing business



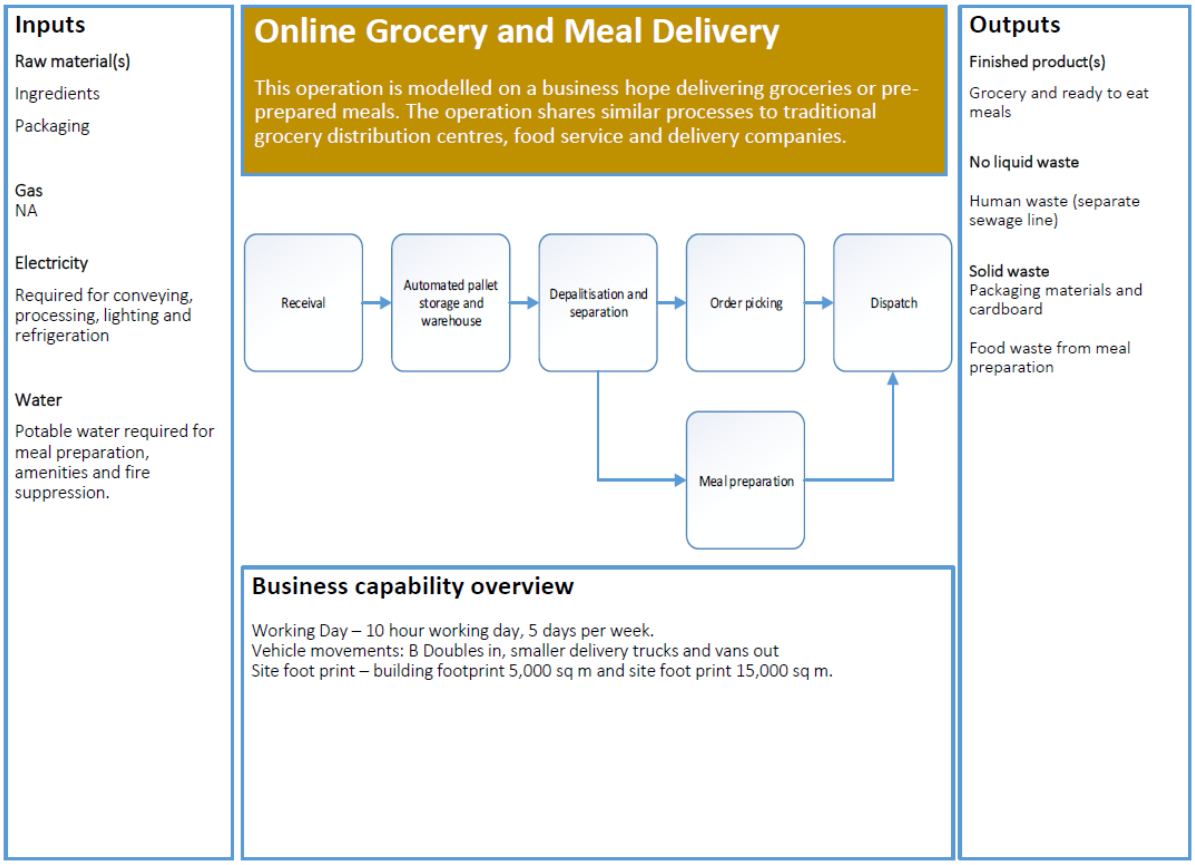
5.5 Online grocery and meal delivery

Grocery home delivery services have been steadily gaining popularity with Australian consumers. Service providers range from major supermarket chains (Coles, Woolworths) to smaller, niche service providers (Aussie Farmers Direct, Harris Farm, Lite n' Easy). Competition in this market is expected to further increase with the launch of Amazon Fresh in Australia.

In many ways, these businesses are an extension of traditional distribution centres, food service and delivery companies, with a focus on delivering smaller volumes to households rather than retail outlets.

The PBP could be an ideal location for online grocery and meal delivery businesses, due to its road transport access for incoming and outgoing deliveries. Furthermore, the proximity to other food companies in the PBP could provide opportunities for contract delivery service providers.

Figure 28 Profile of online grocery and meal delivery business



5.6 Non-meat protein

Global demand for protein is expected to rapidly increase driven by the growing Asian middle class. In order to meet this demand, the market is increasingly looking towards alternative, premium, non-meat protein sources. Some of these sources include:

- Plant based alternatives (pulses, quinoa and chia ancient grains etc.)
- Algae
- Fungi (e.g. Mycoprotein)
- Edible insect-based ingredients (e.g. flours), snacks and animal feeds that draw on crickets, meal worms, locusts and ants[6]

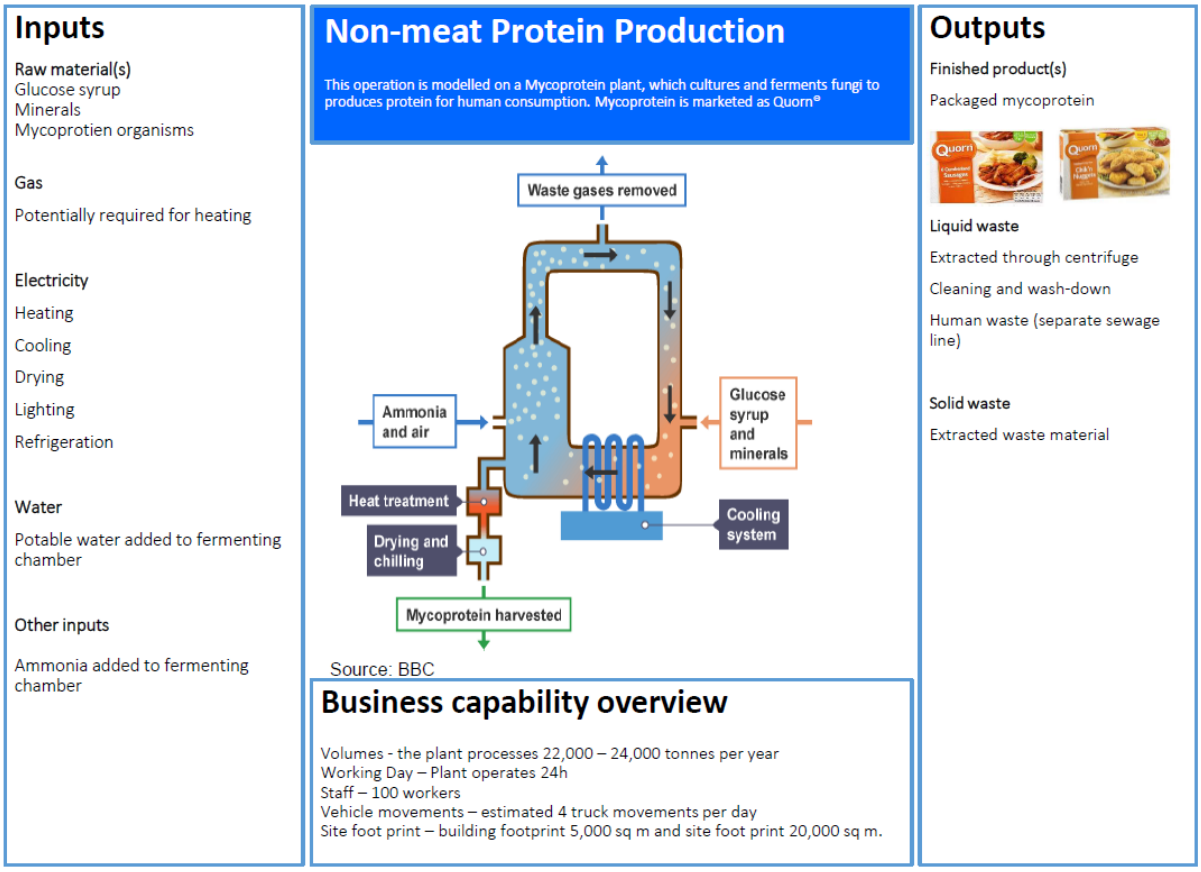
Growth in this segment is being driven by a convergence the three major food trends identified in the *Food and Agribusiness Roadmap* (CSIRO 2017); products for health and wellbeing; sustainability-driven products and processes; and premium foods. As such, these products are being marketed primarily on their perceived health benefits (superfoods), as well as environmental benefits and uniqueness.

Non-meat protein businesses within the PBP could take several forms including:

- Processing of pulses into flours, spreads, snack bars, cereals and meat replacers
- Insect production in cages, before processing into flour, baking, frying for human or livestock consumption
- In vitro production of meat or dairy products, using fermentation (Perfect Day Foods 2017)
- Fermentation of fungi to produce meat free protein, similar to Micoprotein

[6] The global edible insect market is expected to grow from US$34 million in 2015, to over US$520 million by 2023 (Global Market Insights 2016).

Figure 29 Profile of non-meat protein producing business



5.7 Nutraceuticals

The term nutraceuticals is used to describe any product derived from food sources with extra health benefits in addition to the basic nutritional value found in foods. A convergence between food and medical drugs, nutraceuticals are typically non-specific biological therapies used to promote general well-being, control symptoms and prevent ill health.

Nutraceuticals are often grouped into the following categories:

- Dietary supplements: containing nutrients derived from food products, concentrated in liquid, capsule, powder or pill form
- Functional foods: traditional foods which have fortified, enriched or enhanced dietary components providing additional general health benefits
- Medicinal foods: products formulated to treat or manage specific diseases or conditions, often under supervision of a qualified physician
- Farmaceuticals: using agricultural crops or animals as an alternative means of producing pharmaceutical compounds

Growth in this sector will be driven by the ageing population and rising affluence across Asia, which will see these regions increasingly experience the same chronic illnesses burdening western societies including diabetes, obesity, dysphagia, sarcopenia and age-related decline in cognition.

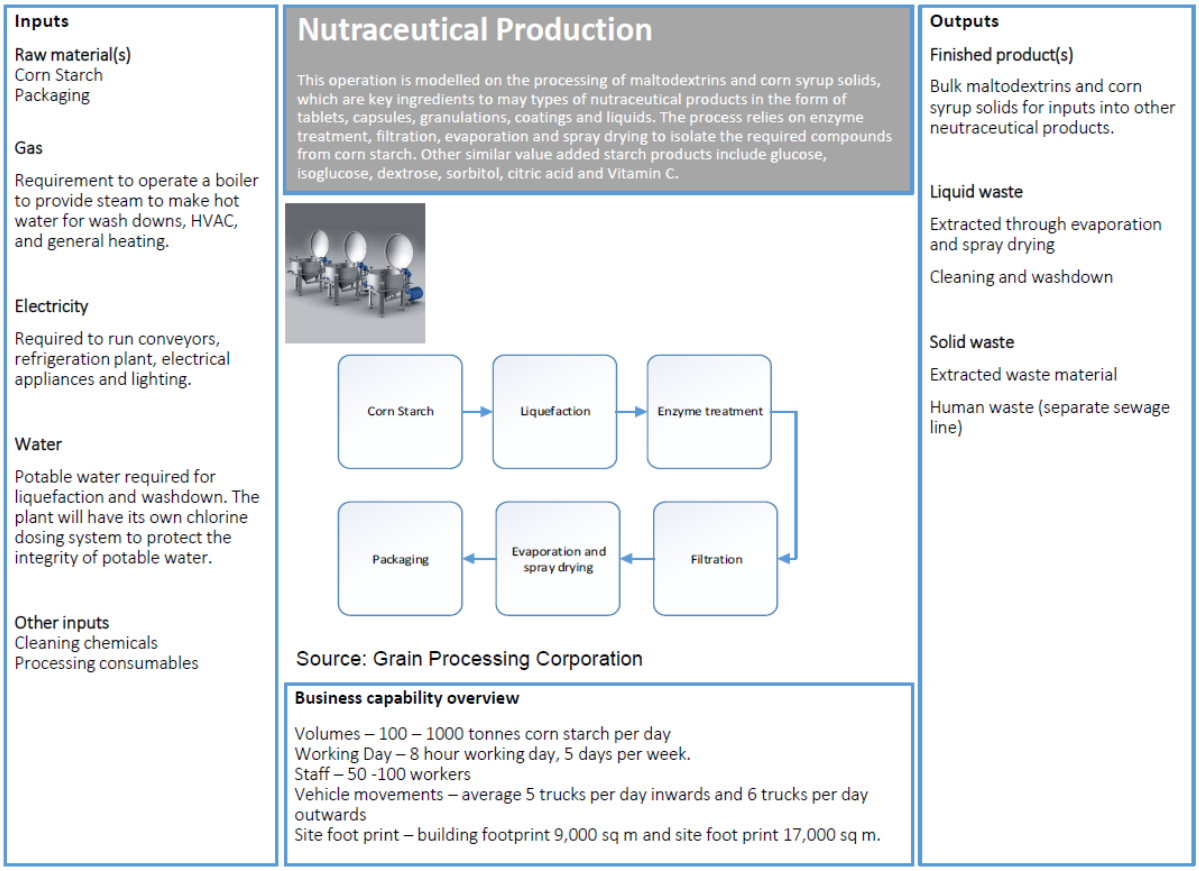
With strong regulatory standards, clear legislation around the substantiation of health claims and a global reputation for safe products, Australia possesses the high levels of trust required for F&A products consumed for health and wellbeing outcomes (CSIRO 2017).

Nutraceutical businesses are likely to share many components of traditional food processing businesses, however with a greater focus on laboratory functions, QA, extraction, refinement

and concentration. In some cases, businesses may be subject to pharmaceutical regulatory standards, which are typically higher than for traditional food processing businesses.

As nutraceuticals often only require specific extracts from food commodities, there are likely to be synergies for nutraceutical businesses working together with traditional food processors. For example, various antioxidant and antimicrobial peptides can be derived from blood collected from meat processing plants (Bah 2015).

Figure 30 Profile of nutraceutical business



5.8 Key findings

The above profiled new and emerging agri-food businesses provide a broad sample of processes, products and business models. Many of these businesses have similar needs and servicing requirements to traditional agri-food businesses (e.g. energy, water, transport) which will be provided for in the PBP. However there are also some distinctive trends which will set future businesses apart, including:

- Increased reliance on knowledge and innovation rather than physical resources
- Production and manufacturing processes which are globally transferable (can be established anywhere)
- Focus on value added/niche/premium products (low volume/high value)
- The use of more laboratory type facilities
- Increased automation

These businesses are likely to be attracted to the PBP due to the provision of traditional services (energy, water and transport) as well as access to enabling technology, knowledge and investment. The provision of suitable telecommunications, laboratory and R&D services may be highly valued, along with the opportunity to collaborate with other forward-looking agri-food businesses and service providers.

6. Transition strategy

This section presents a logical transition strategy for businesses to relocate to the PBP, based on the projected demand from different agri-food businesses (outlined in section 3) and the specific needs of existing businesses (outlined in section 4) as well as new and emerging businesses (outlined in section 5).

6.1 Proposed staging and implementation

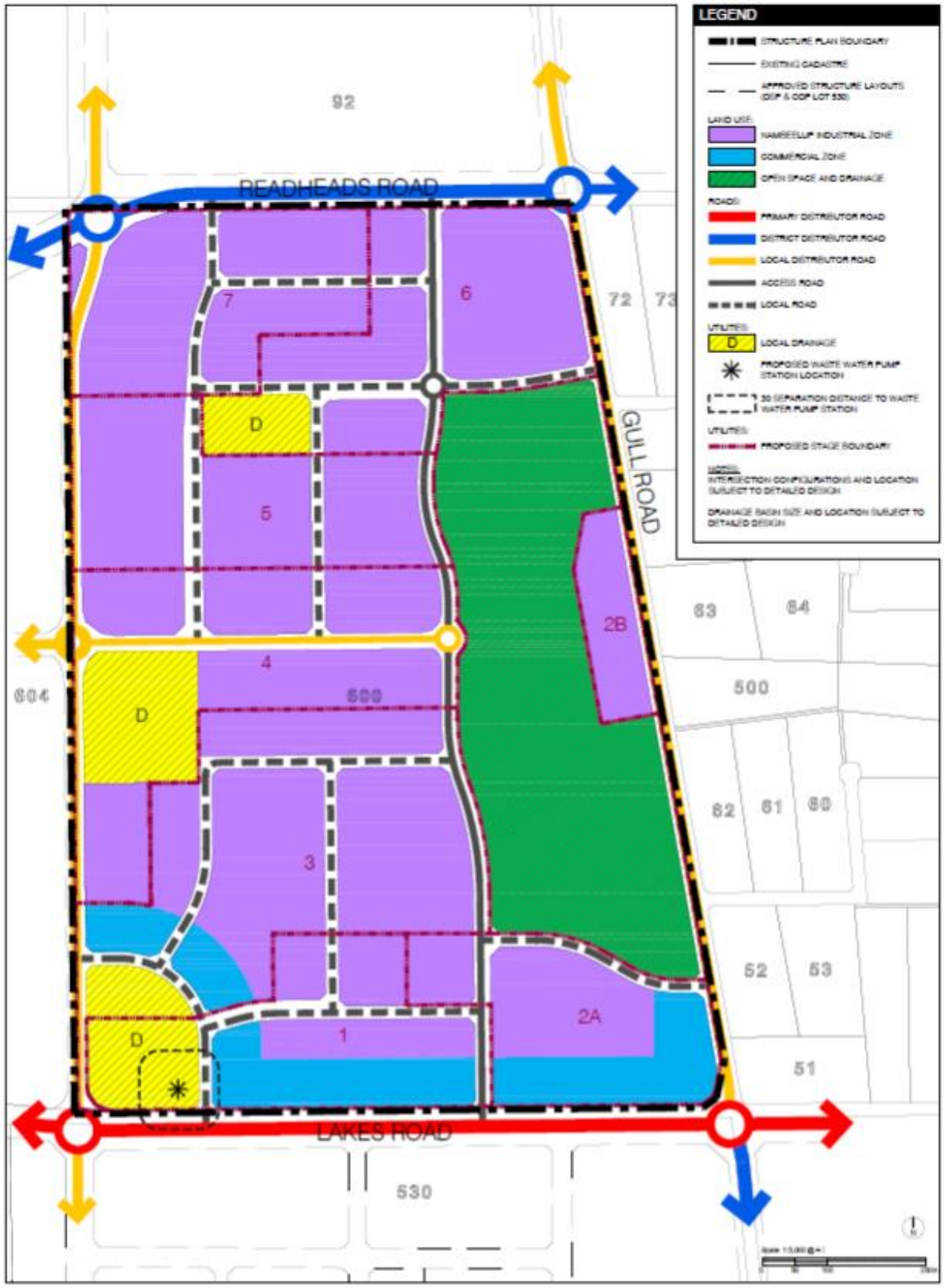
The Structure Plan for lot 600 Lakes Rd (Urbis 2017) proposed a staged development as presented in Figure 31 below, with development starting in the southern end, off Lakes Road and moving progressively north towards Readheads Road.

The indicative staging assumes a 50% build out of employment generating land uses by the 2031. The staging plan was developed based on servicing and road infrastructure, with consideration to the following:

- Undertaking the initial stages of development within land, which is easily accessible in the interim scenario and can provide a mix of lots
- Reducing the amount of servicing and infrastructure required to commence initial stages and levering off existing services and planned funds
- Reducing the amount of alternative forms of intersections required as part of initial works
- Allowing for the staged delivery of main intersections such as Lakes Road given the low volumes of traffic anticipated in the initial stages of the PBP
- Understanding that distributor level road networks along the northern and western boundaries of the site are subject to the development of adjoining sites

The servicing strategy will not prejudice the ability for other land in the area to be developed. Instead, it is hoped the development of the site will be a catalyst for the broader development of the area.

Figure 31 PBP indicative staging plan



Source: Urbis 2017

Based on the review of potential existing and new food processing businesses it is likely that demand for land within the PBP will come from a range of different business types, with distinct needs in terms of lot size, water reticulation, wastewater, energy, sewage, security etc.

While the proposed staged development can probably cater for any business type developing within any particular portion of the PBP, and businesses will invariably choose a lot within the Park that best suits their needs, there are potential benefits from grouping together certain business with similar needs (and separating certain businesses which may be less compatible). Table 6 below provides a summary of considerations for locating certain businesses within the PBP.

Table 6 Considerations for business locations

Enterprise characteristics	Example	Preferable location within PBP
High vehicle movements	Distribution centres Cold stores	Outer perimeter to reduce vehicle loads and noise on internal roads
Security sensitive	Meat processing Poultry processing	Not on the outside perimeter, single road frontage
Generating high amounts of wastewater	Meat processing	Near the western perimeter in closer proximity to the wastewater pump station, pipeline and treatment plant
Generating compostable waste	Mushroom processing Vegetable and fruit processing Diary processing	Grouped to allow for efficient collection or disposal (e.g. composting)
Generating renderable waste	Meat processing Poultry processing	Grouped to allow for efficient collection or disposal (e.g. composting)
Odour and noise generating	Seafood processing Diary processing Meat processing	Separated from more businesses with higher staff numbers
Biosecurity sensitive	Mushroom processing Chicken processing Meat processing	Separated from potential sources of biosecurity risk

Some flexibility will be required in the proposed staging of development, to ensure that first movers are catered for and appropriately located.

6.2 Servicing and critical infrastructure

This section identifies the infrastructure and services that will be critical for potential businesses, and likely to influence their decision to relocate. The section compares the proposed servicing as outlined in the Structure Plan for Lot 600 Lakes Rd (Urbis 2017) and *Engineering Servicing Report* (Cossil & Webley 2017) with the identified requirements within the industry profiling analysis of this report (Section 4).

6.2.1 Siteworks and earthworks

Currently proposed

- Clearing of scattered trees on areas outside of wetlands
- Demolition of existing structures in south west corner
- Topsoil stripping
- Treatment (neutralisation) of any acid sulphate soils present
- Where underlying clay is present, subgrade will be graded to the subsoil network
- Limited fill required to gain the equivalent of a Class A or S Site Classification, however additional fill is likely to be required over the majority of the site to satisfy drainage requirements and achieve a 1.0m to 1.5m separation distance from the natural average annual maximum groundwater level (AAMGL). Note that mapping produced by JDA suggests that the majority of the site is less than 1.0m above the AAMGL during the winter and spring months
- Fill will be imported from off site

Recommended requirements based on industry profiling

The proposed siteworks and earthworks will be suitable for the large majority of businesses. One exception is composting facilities which require a minimum 3M separation distance, in accordance with *The Draft Environmental Standard: Composting* (Department of Environmental Regulation 2016).

6.2.2 Roadworks

Currently proposed

- Developer to contribute to earthworks and one carriageway including drainage for the upgrade of Lakes Road, Gull Road and Readheads Road adjacent to the site. Works to include lighting
- Major intersections designed to accommodate B-double turning circle
- Shared access on some routes

Recommended requirements based on industry profiling

The proposed roadworks are suitable for food processing businesses. B-double access will be required for most businesses. Lighting will provide an important security and safety function.

With over 3,000 staff expected across the industrial area, shared access may be required, particularly if staff are arriving via public transport.

6.2.3 Drainage

Currently proposed

1. Management of high groundwater levels and drainage has been identified as key issue for the development, leading to the development of a Local Water Management Strategy (LWMS)

for the site (JDA 2017). Under this strategy Controlled Groundwater Levels (CGL's) will be implemented across the majority of the site.

This strategy proposes a range of measures including:

- installing soakwells under lots, with groundwater separation of between 1.0m and 1.5m
- controlling/limiting the rise of maximum groundwater levels where required by subsoil drainage systems
- earthwork fill levels for separation to groundwater
- provision of suitable foundation designs for the separation to groundwater
- updates to drainage infrastructure to provide for stormwater flows on the site and for runoff from the east
- local storage inverts (tanks) are to be set 0.2 to 0.3m above the CGL

Recommended requirements based on industry profiling

The proposed drainage works will be suitable for most businesses, with the exception of composting (as discussed above). Buildings will not be able to include basements, however this is not likely to be a significant restriction. Each building will require the instillation of soakwells, which will be a relatively minor additional cost.

6.2.4 Wastewater and sewage reticulation

Currently proposed

- Wastewater from the PBP will be designed to discharge into the Gordon Road Waste Water Treatment Plant (WWTP), west of the site
- It is proposed that initial developments would be serviced by an interim wastewater pump station, to be located at a suitable low point either to the south west of Lot 600 or on Lot 604, to the south
- Ultimately it is proposed to gravity feed the majority of the wastewater from Lot 600 to the North West, through Lot 604, to Amarillo South Pump Station A. This pump station is intended to serve as the full development pump station for the Amarillo South catchment, an area of approximately 4,100ha, as such it has a proposed long term pump rate of 701.4L/s, which is likely to require construction of one specialised pump station or two complimentary Type 350 pump stations. In addition to the significant mechanical infrastructure, the pressure main required for this flow rate is expected to be in the order of 900mm
- The Water Corporation has advised standard Headworks Contribution rates will apply to this development area
- While the site is within the Water Corporation's licensed area, there are opportunities for other private operators to apply to become licenced to provide services
- Alternative strategies may exist to service the development, for example, Alternative Treatment Units (ATU's), package treatment plants, etc.

Recommended requirements based on industry profiling

Pumping capacity

The profiling analysis estimated a peak flow rate of 196 L/s (or 706,662 L/h) this is well below the long term pump capacity of 701.4 L/s.

Treatment plant capacity

Consultation with Water Corporation has found that the Gordon Road WWTP has limited remaining capacity (1-2 ML per day) before it will reach full capacity (around 16ML per day).

The estimated total wastewater output from the eight profiled businesses was 0.76ML per day, however the estimated output once the entire 120ha site is developed was 4.2ML per day. Therefore disposal via the current Gordon Road WWTP is unlikely to be a viable option into the future.

Water Corporation has been investigating alternative disposal options for the area, including upgrading the existing plant or the construction of an ocean outfall. It is recommended LandCorp continue to engage with Water Corporation's Asset and Investment Planning Division to plan future disposal needs.

Water quality

In order to be accepted for discharge to the Gordon Road WWTP (or other facilities), trade waste will need to meet Water Corporation Trade Waste Acceptance Criteria (Water Corporation Undated). Many of these criteria (e.g. BOD, COD, phosphorous) are determined by situations at individual plants, with consideration to plant capacity and dilution levels from other streams. Consultation with Water Corporation suggested that any animal processing businesses operating in the park would need to undertake on-site treatment, which would likely involve primary screening, grease arresting, followed by either dissolved air flotation (DAF) or waste stabilisation ponds. With a potentially wide range of different waste streams, individual businesses may prefer to develop on-site treatment options to suite their specific needs, with the potential for sharing of facilities where possible.

An alternative to developing individual on-site treatment facilities for different businesses, would be to develop a shared WWTP within the PBP. The viability of this option will depend largely on the potential costs associated with alternative disposal methods proposed by Water Corporation.

Table 7 below shows the expected wastewater constituents from the businesses profiled in Section 4, as well as other types of businesses. While Table 8 shows a range of different wastewater treatment options and the resulting water quality which can typically be achieved.

Table 7 Wastewater constituents for various industries[7]

	COD[8]	TSS[9]	O&G[10]	Nitrogen	Phosphorus	TDS[11]
Profiled Businesses						
Poultry processing	X	X	X	X	X	
Mushroom processing				X	X	
Boning and packing (beef)	X	X	X	X		
Fish processing and packaging	X	X		X		X
Cold Storage						
Distribution and packaging						
Dairy processing (milk powder, cheese, yoghurt)	X		X	X	X	X
Processed Meats – Sausages	X	X	X	X		
Other Businesses						
Meat Processing	X	X	X	X	X	
Fruit & vegetable processing	X	X				X
Snackfoods	X	X	X			X
Beverage (beer, wine)	X	X				X
Beverage (soft drinks	X	X				X
Beverage (distillery)	X	X				X
Oil seed	X	X	X			X

Table 8 Wastewater treatment options and resulting water quality (approximate)[12]

Effluent treatment option	BOD[13] (PPM or % reduction)	TSS (PPM)	O&G (PPM)	Nitrogen (PPM)
Primary screening (rotary screen before discharge)	1000 – 1600 PPM	200-500	200-400	140-160
DAF (without chemicals)	30-40% reduction	200-500	50-100	120-140
DAF with Coagulation (with chemicals)	65-70% reduction	50-100	20-50	100-120
Waste Stabilisation Ponds (2 anaerobic, 1 aerobic, 28 days retention)	10-200 PPM	80-120	10-20	100 - 200

[7] Adapted from Hertle et al (no date)
[8] Chemical oxygen demand
[9] Total suspended solids
[10] Oil and grease
[11] Total dissolved solids
[12] Values based on treating abattoir wastewater
[13] Biochemical oxygen demand

Separate sewage line

Constructing a sewage line which separates human waste from processing wastewater can improve options for treatment, recovering and re-using water, generating biogas or biosolids. Consultation with Water Corporation indicated that at present there is no benefit from separating waste streams at the Gordon Road WWTP. However in the future having the ability to separate these waste sources will open up a range of alternative wastewater treatment options (either on-site, shared within PBP, or off-site).

Additional work is required to consider these options, and the likely impact on disposal costs. This will help provide certainty to businesses looking to relocate.

6.2.5 Water reticulation

Currently proposed

- Interim servicing via construction of a reticulation sized main (250mm diameter) to feed development areas connecting near Mandurah to current infrastructure
- Long-term Water Corporation to construct a 375mm diameter main from North Mandurah Water Tank based on development rate and demand
- There is potential for private operators to become licensed in this area
- Alternative water supplies such as a Managed Aquifer Recharge scheme or treated water for reuse could potentially be provided to the site

Recommended requirements based on industry profiling

The sizing of water mains is acceptable in the interim (250mm diameter) and long term (375mm diameter). The profiling analysis indicates an average flow rate of 239,493 litres per hour (67 litres per second), and a peak flow rate of 615,415 litres per hour. However the actual peak is likely to be significantly lower, as high water users (e.g. meat processing) are likely to install tank storage, to ensure security of supply and allow chlorine dosing (if required) and heating. These tanks will be continuously fed and will provide surge capacity during peak periods. These storage tanks may also collect rainwater from buildings to help augment supply.

There may be opportunities for businesses to share water storage, dosing and heating systems, rather than building and operating individual units. These arrangements could be left to individual businesses to negotiate, or a communal facility could be established as part of the PBP development.

6.2.6 Power

Currently proposed

- Access to existing 22kV lines, however no capacity within existing overhead lines or nearby Meadow Springs substation
- Therefore new underground or overhead cables from Pinjarra station to provide power for initial development
- Long-term construction of a new zone substation for power needs
- LandCorp is investigating options for providing below market electricity rates, and also the possibility of establishing an electricity micro-grid, which would enable a range of electricity generation options, including waste to energy and solar

Recommended requirements based on industry profiling

As per Western Power (WP) standard servicing requirement the maximum demand is approximately 18MVA based on 200kVA/Ha (refer to WP Underground Distribution Schemes Manual, clause 5.3.2.3). For the initial stages of the development, Lot 600 can be fed from Pinjarra substation via a new underground cable. The maximum permissible load on dedicated feeder is 15MVA as per WP's Distribution Substation Manual, clause 2.1.2. Although WP might allow an overhead service connection to Lot 600, it is not advisable because of the existing 22kV overhead line in Gull/Paterson road. Underground power would be more ideal for the PBP, to improve security, safety and aesthetics.

Further analysis will be required to understand likely demand peaks from different businesses.

6.2.7 Telecommunications

Currently proposed

- NBN Co. to expand fixed coverage wireless network to cover the whole site delivering high speed broadband
- Update to a fibre optic service would be triggered by NBN Co. under further development in the Nambeelup area
- Telstra does not have the infrastructure or plans in place to service this development

Recommended requirements based on industry profiling

Demand for telecommunications and data services will increase significantly as food processors adopt the Internet of Things (IoT) technology, which involves the inter-networking of physical devices, vehicles, buildings, and other items equipped with electronics, software, sensors, and network connectivity enabling the collection and exchange data. For food processing businesses, this technology helps to improve efficiency, productivity, safety and reduces the need for human intervention and risks of business disruption.

A future food processor will require reliable, secure and fast telecommunications and data services to enable the following:

- Security and access systems
- CCTV
- Invoicing
- Inventory management
- HVAC
- Fire suppression
- PA
- Licence plate readings
- Vehicle tracking

The NBN fixed coverage wireless network is unlikely to have the capacity to cater for the above needs across 80-100 businesses. To ensure this capacity, businesses will need to pay telecommunications providers to install improved services.

There is an opportunity for the developer to provide these services upfront as a means of attracting businesses to the PBP.

6.2.8 Gas

Currently proposed

Construction of a new Pressure Reducing Station to allow distribution across the development network from an ATCO Gas trunk main to the north of the site.

Recommended requirements based on industry profiling

The proposed servicing is likely to be acceptable in delivering the estimated demand of 580Gj per day.

6.2.9 Security

Currently proposed

No security measures outlined in report

Recommended requirements based on industry profiling

Security is becoming an important consideration for food processors, and the provision of improved security within the PBP could provide an important incentive for businesses to relocate from current urban locations.

Many businesses face increased security and public relations threats from activists or protestors (animal rights, environmental, genetic modification etc.), as well as general biosecurity and food safety risks from unauthorised visitors. As a result, many food processing businesses are seeking to maintain a lower profile (less visible) plant, with improved ability to control people and vehicle movements.

In many cases individual businesses can implement security measures to meet their individual needs, however there are some measures which could be engineered into the PBP including:

- Perimeter fencing
- Banks of trees or earth mounds to obscure plants from public sight
- Security cameras
- Lighting
- Potential for security gates or card access to precinct (although most facilities will likely install separate security card systems on individual facilities)

6.2.10 Solid waste

Currently proposed

No solid waste measures outlined in report

Recommended requirements based on industry profiling

There may be an opportunity to encourage solid waste disposal facilities/businesses as a means of reducing disposal costs and adding value.

Composting is unlikely to be permitted within the PBP due to environmental restrictions, particularly around groundwater contamination. The *Draft Environmental Standard: Composting* (Department of Environmental Regulation 2016) requires that for composting facilities producing over 1,000 tonnes per annum, a separation distance at least 3m from the base of the infrastructure to the maximum groundwater level. At present the majority of the site has a separation distance of less than 1.0m during the winter and spring months, additional fill is proposed to increase this separation distance to between 1.0m to 1.5m. In addition, composting facilities must maintain a minimum 500m separation from watercourses, drains (surface or subsurface) and wetlands.

Other forms of solid waste disposal, including rendering or biogas generation may be more suitable on the proposed nearby Eco Industrial Zone.

6.2.11 Lot size

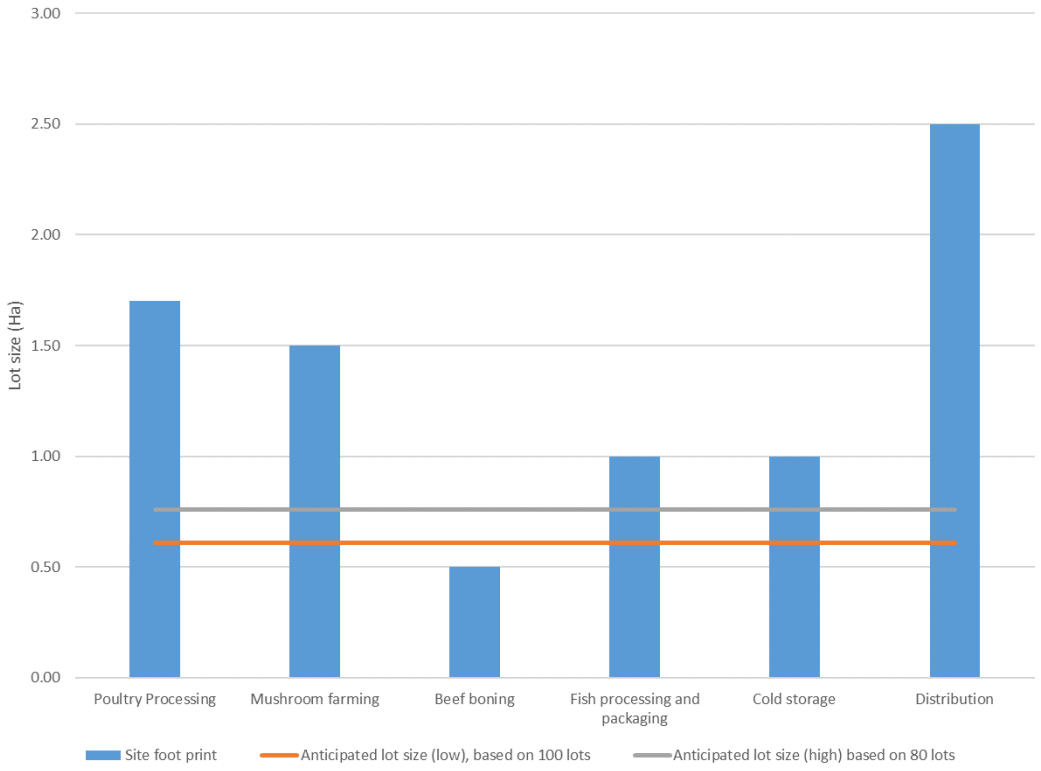
Currently proposed

The development will include 60.8ha of industrial land, which is expected to yield between 80 to 110ha lots (0.61-0.76ha per lot).

Recommended requirements based on industry profiling

Several of the businesses profiled in section 4 require more land and therefore would need to purchase multiple lots. Flexibility to vary lot size requirements based on specific business needs, subject to a minimum lot size being maintained, should be provided in any further local structure plans prepared for the area.

Figure 32 Required lot size vs anticipated supply



6.2.12 Export registration

Currently proposed

Not addressed

Recommended requirements based on industry profiling

Many of the food processing businesses to be established in the PBP will be seeking to export goods which are listed as 'prescribed' under the *Export Control Act (1982)*, including:

- Dairy products
- Eggs and egg products
- Fish and fish products
- Live animals
- Meat and meat products

- Organic and biodynamic produce
- Plants and plant products

In order to export these products, facilities will need to obtain an export permit and be registered as export premises, via the Australian Department of Agriculture and Water Resources.

Facilities will typically need to be designed and constructed to provide for adequate lighting, ventilation, cleaning, waste disposal and biosecurity, as well as sampling, office, handwashing and toilet facilities. Additional requirements may apply depending on the type of products being exported and the specific protocols of importing countries.

Consultation with the Australian Department of Agriculture and Water Resources did not identify any specific design features or services which could be incorporated into the precinct to help assist businesses becoming registered export premises, other than an overall high standard of waste disposal, water quality and supply, biosecurity, pest and weed control and dust suppression.

6.3 Incentives

This section reviews the potential incentives that may help attract businesses to the PBP, including examples of incentives provided by other states for similar developments. A previous survey of agri-food businesses (GHD 2010) identified a range of motivations likely to influence decisions to relocate or remain in the current location, outlined in Table 9 below.

Table 9 Identified factors affecting relocation decisions

Factor	Weighting	Description
Reasons to move		
Waste water treatment	Very High	Ability of the precinct to offer integrated wastewater treatment services is deemed highly attractive.
Land security	Very High	Security of tenure and room for expansion provides great platform for growth.
Occupants	Medium – Very High	The mix of businesses will influence demand as businesses such as rendering plants and skin and hide manufacturers will find co-locating with meat processing companies very appealing.
Occupancy	High	Companies are reluctant as a 'first mover' however, as occupancy increases so will demand.
Access to capital	Medium - High	Those businesses located in areas with high land value will benefit from release of capital and relocation to a cheaper, purpose designed, cost efficient site.
Urban encroachment	Low – High	Operators in the central metropolitan regions are under higher pressure to consider alternative locations.
Shared facilities	Low - High	Shared facilities offering flexible operating conditions if provided could be highly attractive to sectors with variable demand and/or supply conditions.
Noxious industries	Medium – High	Poultry and meat processing are most affected by complaints as a noxious industry type and would find the precinct that is protected from conflicting uses most attractive.
Synergies	None - Medium	Larger companies perceive no advantage through co-location and benefits may vary amongst smaller businesses.
Freight access	High	Access to Kwinana Freeway surrounding road links was deemed highly attractive to businesses.
Reasons to stay		
Relocation costs	High	Most have already invested a significant amount at the current location and relocation costs are often too large to justify the move.
Transport costs	Medium – Very High	The proposed precinct's location is likely to result in increased transport costs, especially for single, dedicated drops. Whether this increased cost

Factor	Weighting	Description
		can be offset through efficiencies in other operating expenses is debatable at this 'conceptual' stage and will be investigated by individual businesses in their decision making process.
Labour	High	Risk (actual or perceived) that local labour force is not large enough to meet staffing requirements.
Access to customers	High	The ability to quickly respond to changes in demand may be negatively impacted. Delivery on demand may become problematic as retailers send requests for urgent orders.
Industry trends	Low - High	Product demand can be stable for staple products whilst other products are more vulnerable to external supply and demand forces.
Public transport	Medium	Transport accessibility for staff important, especially given the early starts and unusual hours.
Utilities	Low - Medium	Water supply is the only concern for stakeholders as agri-food industry generally, and in particular meat and poultry processors, use significant quantities of water.

Source: GHD 2010

Potential incentives for encouraging relocation are outlined below, including relevant recent examples of where these methods have been applied.

6.3.1 Grants

The provision of grants from the WA Government could be used to encourage businesses to relocate to the precinct, to help fund the immediate relocation costs, which may be a key impediment. For example, grant funding could help cover standard headwork's contribution rates for water, wastewater and drainage services which The Water Corporation will apply to this development area.

North Adelaide Food Park Business Attraction Fund

Grants are currently being used by the North Adelaide Food Park to attract businesses. The $7m Food Park Business Attraction Fund administered by Primary Industries and Regions SA (PIRSA) is being promoted to food businesses interested in relocating, with applications closing on 30 June 2018, or once funds become fully committed (PIRSA 2017)

Outcomes

- Attract food processors, food manufacturers and supporting services into the Food Park
- Increase employment in the agribusiness, food and beverage sector in northern Adelaide
- Facilitate development of land through Stage One of the Food Park
- Leverage private sector investment into the food industry

Program structure

- Open Call
- Applications continuously assessed until all funds are fully committed
- A minimum $1 for $1 matching cash co-contribution must be provided
- Maximum funding per applicant of $1.5 million

Eligible businesses (PIRSA 2017a)

- Must be a food processor, food manufacturer or service provider that intends to physically locate their business operations to the Northern Adelaide Food Park
- Applicants must purchase or lease land within the Food Park to construct a new building; or enter into a lease agreement for a new or existing building within the Food Park

Eligible activities

Includes one-off activities that support the expansion/growth plans of a business and success of the food park, in particular costs associated with:

- Construction or refurbishment of buildings
- Required equipment and machinery
- Achieving required food Safety accreditations
- Business process reengineering

Ineligible activities include feasibility studies or business cases, land purchases, physical relocation activities, operational and maintenance, and other routine business activities.

In addition to the Food Park Business Attraction Fund, businesses can also seek funding via the State Government's $200 million Future Jobs Fund.

Outcomes to date

- Too early to determine (launched 6 weeks ago)
- Targeting first movers
- High interest levels
- Working closely with businesses, survey of needs, ongoing discussions
- Biosecurity zone opportunity (export)
- Providing education and support for businesses to develop business plan for relocation and expansion (e.g. export)

Sundrop farms

The development has been supported by the Government of South Australia, which has provided approximately $6 million in grant funding. Total project cost is an estimated $205 million.

6.3.2 Infrastructure and headworks

The provision of infrastructure and headworks can provide a key incentive to encourage businesses to relocate. As outlined in 6.2 there are opportunities to provide a higher level of servicing to the development, beyond that outlined in the *Engineering Servicing Report* (Cossil & Webley 2017). In particular, the following measures could help attract food businesses:

- Security features (perimeter fencing, landscaping, lighting, CCTV and security gates)
- Communal water storage, chlorination and heating system
- Solid waste disposal systems (composting, rendering)
- Other common use facilities including R&D, laboratory, training, cold storage and truck-wash facilities

While the provision of common use facilities may provide a key incentive for some businesses, due consideration should be given to how these facilities will be financed, governed and managed into the future.

Golden Plains Food Production Precinct

Victoria's Golden Plains Food Production Precinct relies primarily on the provision of infrastructure to attract investment. In developing the Precinct the Golden Plains Shire identified the lack of potable water as a key barrier to intensive animal production. Council worked to secure $11.78 million from across Federal, State and Local Government and Barwon Water to construct a 12 kilometre pipeline, to supply potable water to the area. Council believes the pipeline has proven to be the key incentive for businesses looking to relocate or establish in the precinct.

The lack of sewerage or natural gas services to the Precinct have not proven a major barrier to investors, however Council believes that below optimal telecommunication services is becoming a more significant barrier. Other infrastructure, including power and roads was mostly already in place.

6.3.3 Negotiated utility rates

The provision of cheaper utility rates could be a significant incentive for businesses. GHD understands that LandCorp is investigating options for providing below market electricity rates, and also the possibility of establishing an electricity micro-grid, which would enable a range of electricity generation options, including waste to energy and solar.

6.3.4 Development assistance

For many existing food processors, the process of gaining the development approval for a new plant can be a deterrent, particularly if there is uncertainty around the outcome. Companies can spend considerable time and money seeking development approval before being either rejected or having various restrictions placed on their development and business activities (e.g. hours of operation). Companies will be attracted to the PBP if it can provide assurances around the planning process, including:

- Permitted developments
- Restrictions on operating activities
- Protection from incompatible developments nearby (e.g. residential)
- Timeline for approval (check, 60 day statutory timeline)

Most of the above items are adequately addressed in the Structure Plan for Lot 600 Lakes Rd, however these assurances should be re-enforced through promotion of the PBP.

In addition there may be opportunities to provide targeted assistance to food processors, helping them to navigate the planning process.

6.3.5 Tenure and payment options

Certain businesses may be attracted to different types of tenure and payment options. Freehold tenure may be preferred for some businesses due to added security, while others may prefer lease arrangements. The options of making deferred payments against land acquisitions is likely help businesses secure finance for developments.

6.3.6 Key findings

Based on the above findings, GHD believe it will be necessary to incentivise new and existing businesses to relocate to the PBP. Rather than providing grants to individual businesses, which only addresses the relocation cost impediment (Table 9), a preferred approach would involve investing in improved infrastructure and headworks, as well as exploring the provision of discounted utility rates, development assistance and different tenure and payment options.

6.4 Municipal planning

6.4.1 Analysis of land use classifications

As part of this study for the PBP, 16 agri-food businesses are being considered for the area. Whilst the use may be a preferred business for the area, it may not be permitted under the current planning framework. To determine whether the proposed food businesses are likely to be compatible with the existing scheme, an analysis of each of the businesses was undertaken against the land use definitions specified within the Shire of Murray's local planning scheme No. 4 (LPS4).

Following the initial analysis, GHD met with the Shire of Murray to confirm the land use interpretation against their scheme. Based on the Shire's review of the land uses, the following land use classifications of the 16 agri-businesses has been developed. In some instances the land use classification cannot be confirmed without knowing details of the business practices such as emissions management and the source of the products used in the operations. Each application would need to be assessed on its merits, therefore the table below is only a guide for the land use classification and should not be taken as final.

Table 10 Land use classification of food businesses

No.	Food Business	Shire of Murray LPS4 land use
1	Poultry processing	Noxious industry
2	Mushroom processing	Rural industry
3	Dairy – Cheese, yoghurts	Light or general industry (depending on whether any emissions can be managed)
4	Frozen / ready-made meals	Light industry
5	Processed Meats and smallgoods	General industry.
6	Seafood packaging and processing	General industry (potentially light industry if emissions can be managed)
7	Cold Storage	Warehouse and storage
8	Meat processing, packing and boning	Noxious industry
9	Vegetable and fruit processing wholesaler and packing	Light or general industry (depending on whether any emissions can be managed, but potentially rural industry if the products are sourced locally)
10	Distribution and packaging	Warehouse and storage
11	Honey	Light or general industry (depending on whether any emissions can be managed, but potentially rural industry if the products are sourced locally)
12	Vertical farming	Intensive agriculture and rural industry, however potentially an unlisted use
13	Delivery / distribution / packing meals and food	Light industry
14	Premium organisms incubator business hub	Light industry
15	Pharmaceuticals / health supplements	General industry (potentially light industry if emissions can be managed)
16	Non protein	General industry (potentially light industry if emissions can be managed)

The Shire's LPS4 contains the current land use permissibilities for the abovementioned land uses for the zones currently within the Nambeelup Industrial Area. It is noted that some businesses may include a retail shop front or shop for pre-prepared take-away meals, therefore these have been included in the table below.

Table 11 Land use permissibilities for Shire of Murray LPS4

	Shire of Murray LPS4 Zone & Land Use Permissibility		
Land Use	Industrial Development	Rural	Special Use
Light industry	AA	X	#
General industry	AA	X	#
Noxious industry	X	SA	#
Rural industry	AA	AA	#
Intensive agriculture	X	AA	X
Warehouse & Storage	AA	X	#
Shop	X	IP	#
Take-away food outlet	AA	X	#

Where:

AA = Permitted at Council's discretion

SA = Permitted at Council's discretion and requires advertising

IP = Not permitted unless it is incidental to the predominant use of land

X = Not permitted

= Refer Schedule V – Special Use Zone

Based on current zonings, the following agri-businesses would not be permitted within the Nambeelup Industrial Area:

- 'Poultry processing', 'meat processing, packing and boning' and potentially 'vertical farming' in the industrial development zone
- All businesses with the exception of 'Poultry processing', 'meat processing, packing and boning' and 'mushroom processing' in the rural zone. Potentially 'vertical farming'
- Potentially 'vertical farming' in the Special Use zone

Permitted uses within the Special Use zone will be dependent on the property address and land uses specified in schedule 5 of the LPS4.

The Shire is currently in the process of reviewing its local planning scheme. As part of the review, the new scheme will need to align with the current *Planning and Development (Local Planning Scheme) Regulations 2015* (the Regulations). The Regulations provide a framework for the development of local planning schemes and standardises the zones and reserves and land use definitions across Western Australia. The land use definitions noxious industry, rural industry and general industry are not referenced in the Regulations and are unlikely to be supported as part of this scheme review. Under the Regulations, land uses such as poultry processing, meat processing, meat packing and boning and mushroom processing would fall within the land use definition of 'Industry' which is defined as:

"means premises used for the manufacturing, dismantling, processing, assembly, treating, testing, servicing, maintenance or repairing of goods, products, articles, materials or substances and includes facilities on premises for any of the following purposes:

(a) The storage of goods

(b) The work of administration or accounting

(c) The selling of goods by wholesale or retail

(d) The provision of amenities for employees

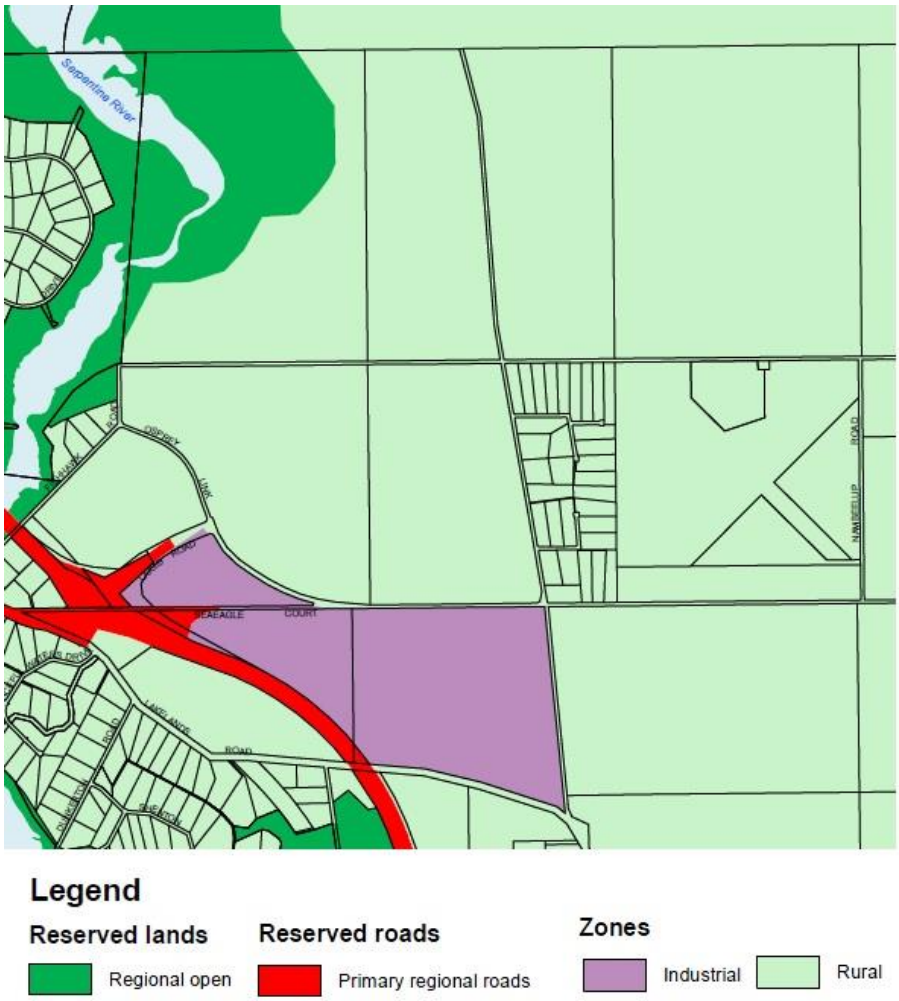
(e) Incidental purposes"

Poultry, meat and mushroom processing industries could, therefore, be uses that can be considered within industrial zones when the scheme is updated.

6.4.2 Current and future planning for the Nambeelup Industrial Area

Currently the majority of the area is zoned 'rural' with areas of 'industrial' zone, under the Peel Region Scheme (PRS) shown in Figure 33.

Figure 33 PRS extract



Source: WAPC 2016

The WAPC have prepared the *Nambeelup Industrial Area District Structure Plan* (April 2016) relating to the broader 1,000ha PBP. The District Structure Plan identifies the majority of the Nambeelup Industrial area for industrial land uses. There are pockets of open space identified throughout the area, a large pocket of rural land and the Murray Airpark is identified for airpark and related services.

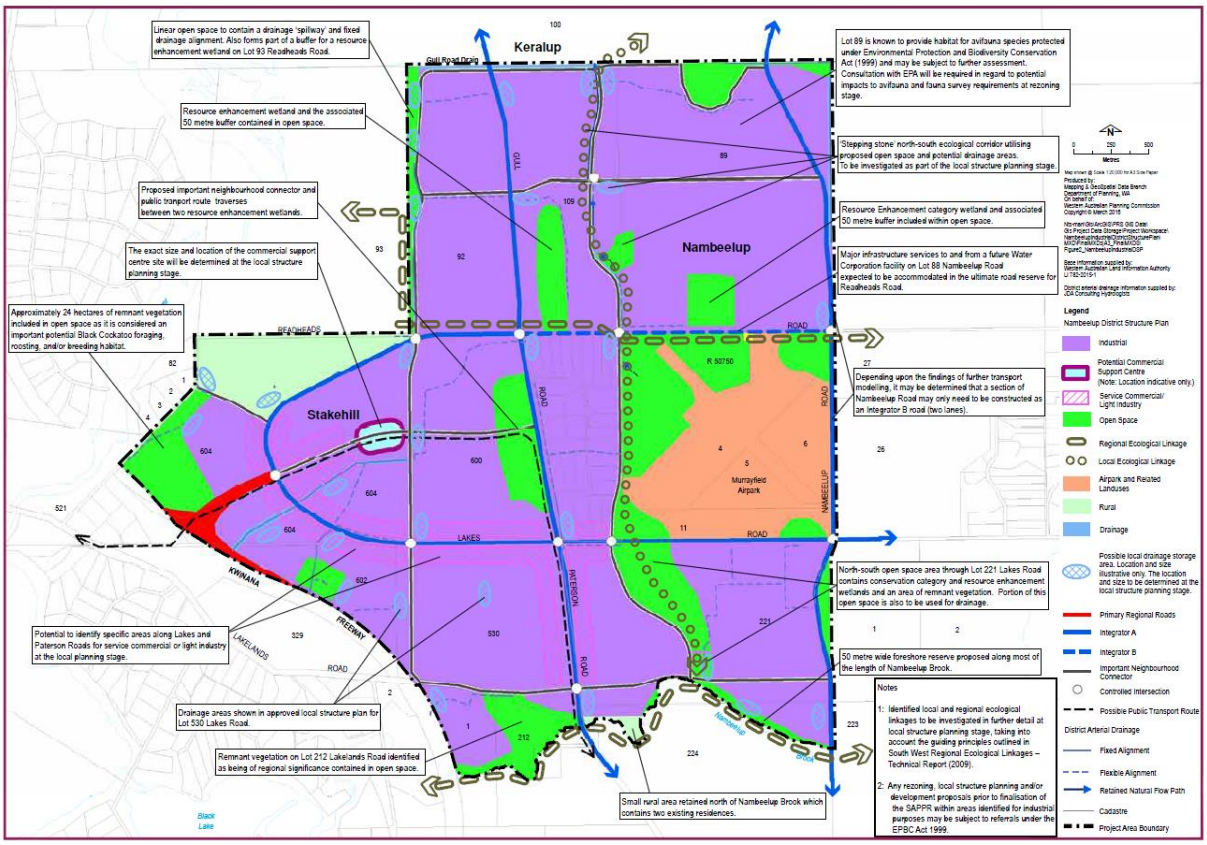
Two of the key implementation tasks for the District Structure Plan are:

2. Transferring additional land to the Industrial zone of the Peel Region Scheme in accordance with the District Structure Plan

3. Preparation of an amendment to local planning scheme, to transfer land to the Industrial Development zone and introduce provisions to implement the Development Contribution Plan

The Nambeelup Industrial Area Structure Plan is shown in Figure 34.

Figure 34 Nambeelup Industrial Area District Structure Plan



An amendment to the PRS was recently advertised for Lot 600 Lakes Road, Nambeelup to rezone the land from rural to industrial.

The Shire of Murray Local Planning Scheme No. 4 (LPS4) currently zones the majority of the Nambeelup Industrial area for rural purposes with some areas of 'industrial development' and 'special use zone'. A draft local structure plan has been prepared for lot 600 Lakes Road (Urbis 2017) to support the development of the land for industrial purposes with an agricultural focus. Additionally, the Shire of Murray has advertised an amendment to LPS4 (Amendment No. 301) which seeks to, inter alia, rezone the land from Rural to Industrial Development, create a new zone – 'Nambeelup Industrial', insert a number of additional land use definitions and assign land use permissibilities to the new Nambeelup Industrial zone.

It is noted that the amendment incorporates the same land use definitions (apart from the new additional land use definitions) as LPS4 including noxious industry, rural industry and general industry. While rural industry and general industry are designated 'P' and 'AA' respectively, noxious industries are designated 'IP' within the Nambeelup Industrial zone. This effectively restricts standalone poultry and meat processing industries from locating within the Nambeelup Industrial zone and these industries could only be considered within this zone where it could be demonstrated that these industries were incidental to the predominant use of the site. As mentioned earlier the existing LPS4 land use definitions are not entirely consistent with the Regulations and further modifications to the land use definitions and permissibilities may be required either through this amendment or the local planning scheme review process.

The proposed zoning for the PBP as outlined in the draft local structure plan for Lot 600 is shown in Figure 35 below.

Figure 35 Lot 600 Lakes Road – Local Structure Plan Map

7. Alternative site opportunities

This section provides a high level appraisal of alternative precincts being developed in other locations within Western Australia, including assessment of potential agri-food opportunities and the ability of these developments to cater for the specific infrastructure and servicing requirements of agri-food businesses, as identified sections 4, 5 and 6 of this report.

Alternative precincts in the South West, Great Northern, Grainbelt and Kimberley Regions were broadly evaluated in terms of the following key factors which may determine a precinct's success:

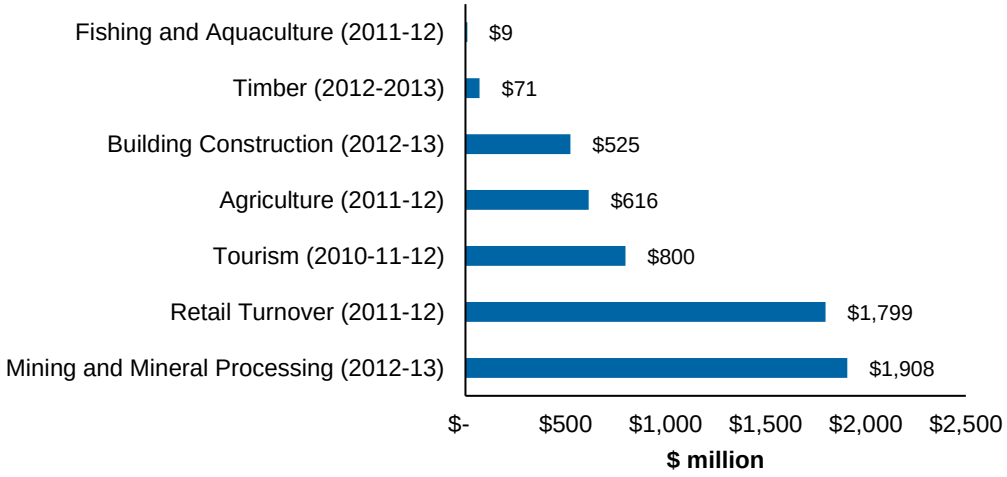
- Land status – zoning, ownership, existing approvals
- Infrastructure – electricity, gas, potable water, communications
- Transport linkages – distance to port, heavy vehicle routes, site access
- Environment – ecology, water, soils and topography
- Waste management – wastewater and solid waste
- Access to workforce – accessibility for labour force and maintenance labour
- Social impacts – noise, dust, sensitive land uses, buffers
- Strategic potential – compatibility with strategic land use plans, potential for co-location with other industries, potential for staged expansion

Note that this is a high level evaluation of the opportunities in these regions, designed to simply highlight the relative opportunities and barriers for the potential development of an agri-food precinct within each region.

7.1 South West Region

The South West Region of WA covers around 24,000 square kilometres, 12 local government areas and with 40% of the population concentrated in the cities of Bunbury and Busselton. The local economy is supported by a diverse range of industries, including mining, tourism, agriculture and forestry (Figure 36).

Figure 36 Value of industry activities in the South West (2014)



Source: Department of Regional Development 2014

Identified strengths and opportunities for food production in the region include:

- Introduction of new crop varieties such as avocados, asparagus and green tea
- Wineries
- Expansion of Myalup and Manjimup food bowls
- Aquaculture development including marron and abalone farming
- Meat and dairy processing

DPIRD records show a total of 74 food processing businesses in the South West Region. The most common business categories are fresh produce (21), meat (9), gourmet (8) and dairy (7). Businesses are most concentrated in Manjimup (11), Margaret River (6), Donnybrook (5), Harvey and Pemberton (4). [14]

Table 12 lists the future premium food opportunities for the South West Region, as identified by Coriolis (2016).

[14] This data includes food manufacturers, processors, exporters, importers and transport distributors. It does not include producers, wineries and broad scale agriculture businesses.

Table 12 Future premium food opportunities for the South West Region

Good	Better	Best
Oat Milk/Alternative Dairy	Baby Food	Organic/Biodynamic Beef
Premium Grains	Speciality Breads	Wagyu Beef
	Cures/Continental Meats	Premium Soft Drinks
	Chilled Pasta	Cheeses
	Nut Butter	Alcoholic Spirits
		Dips/Spreads
		Breakfast Muesli/Cereals
		Healthy Snacking
		Cider
		Meat Snacks
		Olives/Marinated Vegetables
		Fermented Foods
		Cooked/Smoked/Marinated Seafood

Source: Coriolis 2016

7.1.1 Potential Site: Waterloo Industrial Park

Preliminary due diligence analysis has already been completed around developing the proposed South West Food Processing Precinct, within the Waterloo Industrial Park (Cardno 2013). The precinct would cater for a range of food processing and value adding activities including meat processing, milk processing and rendering.

This site was selected over five alternate sites in the region, based on an evaluation of land status, infrastructure, transport linkages, environment, waste management, workforce, services and support business, social amenity impacts and strategic potential.

The 1 511ha site was the largest of the shortlisted sites, which provides potential for retaining buffers within site boundaries. This site will now be subject to more detailed investigations and feasibility assessments (Western Australian Planning Commission 2017).

Table 13 below summarises the opportunity for the Waterloo site.

Table 13 Summary of the Waterloo site

Criteria	Comment
Land Status	Predominately zoned rural, with 43 land parcels the majority of which are over 30 hectares
Infrastructure	Well serviced with necessary utilities and infrastructure water ✓ electricity ✓ natural gas ✓
Transport linkages	The site is accessible via major established transport routes and with the establishment of the inter-modal hub, will also be very accessible to both domestic and export markets (Cardno 2013)
Environment	The required buffers are mostly contained within the site and do not impact on any identified sensitive land uses located outside of the site area
Waste management	The site is low lying, as indicated by the fact that the whole site is mapped as a multiple use wetland
Workforce services and business support	Bunbury LGA has a labour force of 18,056 people and an unemployment rate of 7.2%, above the WA average of 6.5% (Department of Employment 2017)
Social amenity impacts	Within one kilometre there are several sensitive land uses on rural lots. However if this site is selected for a food processing precinct, the core area could be located so that likely buffer zones can be contained almost entirely within the site and without impacting any sensitive land uses beyond its borders (Cardno 2013)
Strategic potential	Very good opportunities for synergies with existing and future industries are possible. There will be ample choice for complementary industries that would not be suitable for location within the food processing precinct to establish or relocate near the precinct

Summary

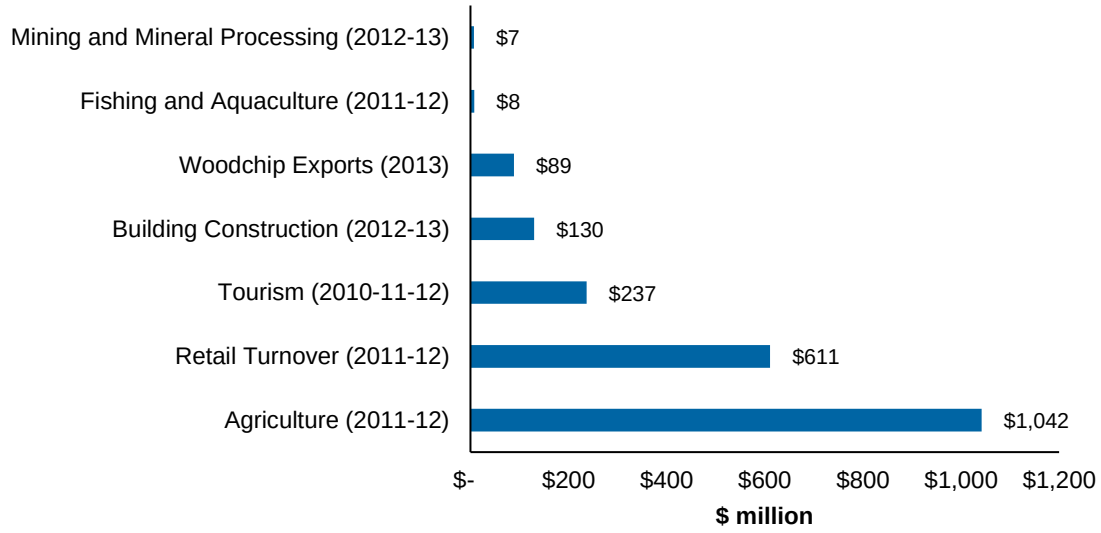
With at least 74 diverse food processing businesses already established, the South West Region is considered a suitable location for establishing an agri-food precinct.

The Waterloo Industrial Park has already been assessed and identified as a suitable location for establishing the proposed South West Food Processing Precinct. The area is particularly suitable in terms of transport linkages, infrastructure and strategic potential. Potential environmental, waste management and amenity impacts will need to be appropriately managed.

7.2 Great Southern Region

The Great Southern region is located on the southern coast of Western Australia, covering 39,007 square kilometres. The region comprises 11 local government areas with the majority of the population (61 per cent) living in the City of Albany. Primary production is the major contributor to the region's economy, through wool, broadacre cropping, livestock, timber, viticulture and fishing (Figure 37).

Figure 37 Value of industry activities in the Great Southern region (2014)



Source: Department of Regional Development 2014a

Identified strengths and opportunities for food production in the region include:

- grain for flour, premixes, noodles, pasta and stock feed. The region has excellent grain storage and handling systems
- pigs for exports of fresh pork. The region provides strategic access to Asian markets, a reliable supply of grain for feed and competitive production costs
- dairy, where there is potential for expansion based on the region's reliable rainfall and access to rapidly expanding final markets for dairy products in Asia
- horticulture, for which the competitive investment advantages include counter-seasonal production to the northern hemisphere and an established reputation for safe, high quality products

DPIRD records show a total of 32 food processing businesses in the Great Southern Region. The most common business categories are fresh produce (5), seafood (4), oils (3) and drinks (3). Businesses concentrated in Kojonup (7), Denmark (4) and Albany (4). [15]

Table 14 below lists the future premium food opportunities for the Great Southern Region, as identified by Coriolis (2016).

[15] This data includes food manufacturers, processors, exporters, importers and transport distributors. It does not include producers, wineries and broad scale agriculture businesses.

Table 14 Specific premium food opportunities for Great Southern Region

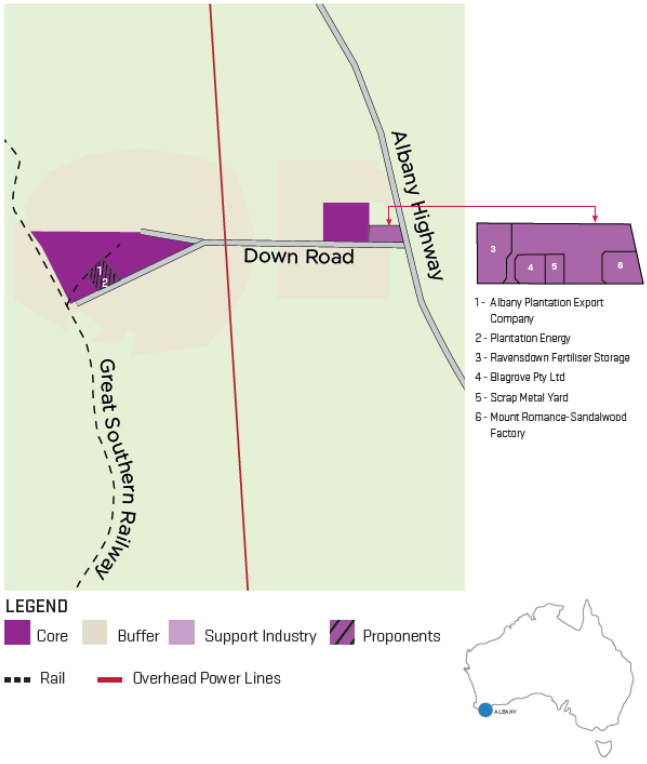
Good	Better	Best
Oat Milk/Alternative Dairy	Baby Food	Organic/Biodynamic Beef
Premium Grains	Speciality Breads	Wagyu Beef
	Premium Soft Drinks	Cheeses
	Cures/Continental Meats	Alcoholic Spirits
	Cider	Dips/Spreads
	Chilled Pasta	Breakfast Muesli/Cereals
	Fermented Foods	Healthy Snacking
	Nut Butter	Meat Snacks
		Olives/Marinated Vegetables
		Cooked/Smoked/Marinated Seafood

Source: Coriolis 2016

7.2.1 Potential Site: Mirambeena Strategic Industrial Area

LandCorp currenly own the Mirambeena Strategic Industrial Area (Figure 38) which comprises 130ha across two sites, located 14km north of Albany. This site is suitable for a range of industries associated with local resources including timber, fish, farm produce and viticulture. The precinct in already home to a selection of timber processing enterprises including a sandalwood processor, as well as a recently opened CBH grain receival depot (McKinnon, S 2016).

Figure 38 Mirambeena Strategic Industrial Area



Source: LandCorp 2017

Table 15 below summarises the opportunity for the Mirambeena site.

Table 15 Summary of Mirambeena site

Criteria	Comment
Land Status	Zoned Heavy Industry with an area zoned General Industry to the east
Infrastructure	Infrastructure is in place to support existing heavy industry, however there is no gas reticulation to the Great Southern region, with industry relying on LPG. • water ✓ • electricity ✓ • natural gas X (LPG only)
Transport linkages	Connected to major road, rail and deep water port infrastructure
Environment	The precincts are predominately cleared of vegetation, with no indications of rare or endangered species present. The main environmental concern for the precincts is the risk of groundwater and/or surface water pollution given much of the site is covered by a perched aquafer and its located within the upper catchments of the King River and Marbellup Brook. (Tingay et al. 1993)
Waste management	Neither precinct is connected to reticulated sewer, rather it is treated via ground attenuation units as required. Water Corporation has a secondary treatment plan approximately 2kms south of Down Road, and a primary treatment plant at Timewell Rd Albany approximately 7kms south of Mirambeena) which is about to undergo an upgrade
Workforce services and business support	Albany LGA has a labour force of 16,457 and an unemployment rate of 7.2%, above the WA average of 6.2% (Department of Employment 2017)
Social amenity impacts	The precincts are able to provide buffer distances of between 200m – 1km to nearby dwellings
Strategic potential	Close to skilled workforce and town amenities

LandCorp also owns the Yerrimunup Industrial Estate, which is located 25km to the north of the Mirrambeena site. This estate is approximately 130ha and zoned for strategic industrial uses.

Summary

The Great Southern Region has traditionally supported bulk agricultural and timber production and is now increasingly realising value adding opportunities with at least 32 food processing businesses across fresh produce, seafood, oils and drinks. There businesses are most concentrated in Kojonup (7), Denmark (4) and Albany (4).

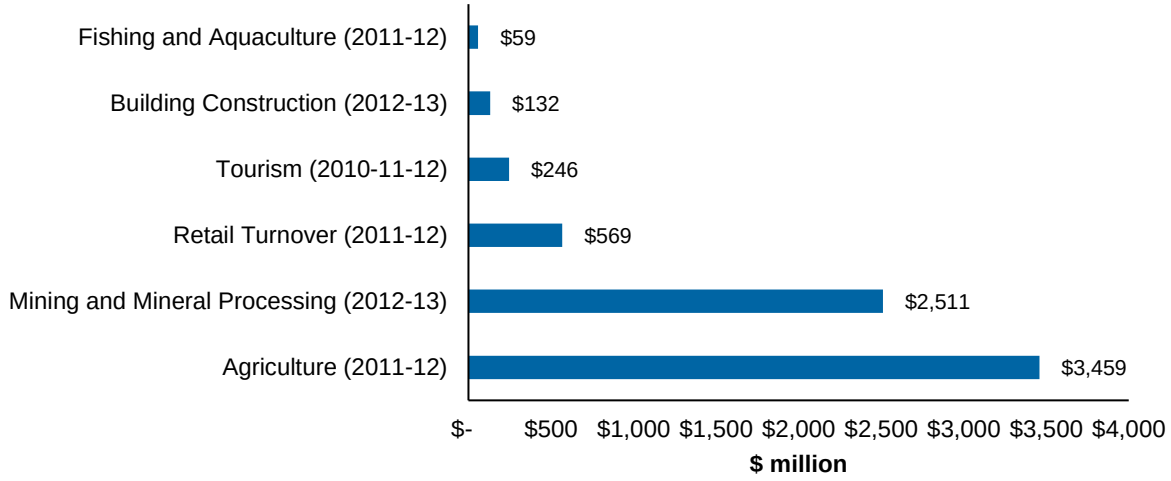
The Mirambeena Strategic Industrial Area is well advanced with several established businesses in the timber and grain sector taking advantage of the site's excellent transport linkages and infrastructure. The site is well placed to support more intensive food processing businesses alongside these established bulk storage and transport businesses. The nearby Yerrimunup Industrial Estate is less developed, however may offer an alternative for lighter industrial uses.

7.3 Wheatbelt Region

The Wheatbelt Region covers around 155,000 square kilometres across 43 local government areas, stretching from the north of Perth to the Mid West and Goldfields-Esperance regions.

Agriculture, in particular broad acre cropping is the primary driver of the Wheatbelt's economy, followed by mining, retail and tourism (Figure 39).

Figure 39 Value of industry activities in the Wheatbelt (2014)



Source: Department of Regional Development 2014b

Identified strengths and opportunities for food production in the region include:

- Broadacre agriculture
- Horticulture including olives, citrus, lettuce, carrots
- Intensive agriculture
- Industry value chain investment
- Western Rock Lobster

DPIRD records show a total of 44 food processing businesses in the Wheatbelt Region. The most common business categories are fresh produce (6), meat (6) and gourmet (6). Businesses are most concentrated in Gingin (5), Narrogin (5), William (3), York (3). [16]

Table 16 below lists the future premium food opportunities for the Wheatbelt Region, as identified by Coriolis (2016).

[16] This data includes food manufacturers, processors, exporters, importers and transport distributors. It does not include producers, wineries and broad scale agriculture businesses.

Table 16 Futrure premium food opportunities for Wheatbelt Region

Good	Better	Best
Premium soft drinks Cider	Baby Food Speciality Breads Oat Milk/Alternative Dairy Wagyu Beef Cheeses Alcoholic Spirits Dips/Spreads Breakfast Muesli/Cereals Healthy Snacking Cures/Continental Meats Chilled Pasta Fermented Foods Nut Butter	Organic/Biodynamic Beef Meat Snacks Premium Grains Olives/Marinated Vegetables Cooked/Smoked/Marinated Seafood

Source: Coriolis 2016

7.3.1 Potential site: Northern Gateway Industrial Park

The Northern Gateway Industrial Park, located at Muchea, 63km north east of Perth CBD has the potential to develop into food and agribusiness precinct within the Wheatbelt Region (Sirona Capital 2017). The site, located at the intersection of the Brand Highway and Great Northern Highway, is within the Muchea employment node, which is set aside for service-based uses such as transport, livestock, fabrication, warehousing, wholesaling and general commercial use (WAPC 2011).

Table 17 Summary of the Northern Gateway Industrial Park Site

Criteria	Comment
Land Status	The area is zoned General Industry with approved local structure plans that facilitate a wide range of industrial uses. The development will offer flexible lot sizes ranging from 1-20 ha with lease or sale optionality.
Infrastructure	The site is not currently connected to gas, however this is expected to be installed to Northern Gateway Muchea when NorthLink roadworks are complete (estimated to cost between $3-8 million depending on capacity). Northern Gateway Muchea will provide a water connection to facilitate a wide range of land uses. The remainder of the employment node may be restricted to low water users. It is recognised that there is the possibility of larger water users (1 to 5 ML) becoming established in the employment node. Where additional water, such as process water or washdown, is required for these industries, water supply may be supplemented through the establishment of measures such as rainwater collection, hardstand harvesting or wastewater re-use (Western Australian Planning Commission 2011) • water ✓ (some limitations) • electricity ✓ • natural gas X (connection expected in the future)
Transport linkages	30 kms from the Perth CBD on the Great Northern Highway and the newly commenced Perth-to-Darwin Highway (NorthLink WA). Direct access to rail and intermodal (Fremantle Port and key national links)
Environment	The site area does not lie in a public drinking water source area. Buffers will be provided around nearby conservation category wetlands. There are no known contaminated sites or acid sulphate soils.
Waste management	The site lies in the sensitive Ellen Brook catchment which has high nitrification and water quality requirements. As a result, wastewater treatment is considered to be important and has been appropriately addressed in the Local Structure Plan.
Workforce services and business support	Close to major urban and employment centres of Ellenbrook, Midland and surrounds, with access to a skilled and growing workforce Chittering LGA has a labour force of 2,546 people and an unemployment rate of 3.5%, well below the WA average of 6.2% (Department of Employment 2017)
Social amenity impacts	Buffer zones, setbacks, screening and landscaping will help reduce amenity impacts.
Strategic potential	The development offers long term industrial growth in one of Perth's fastest growing regions.

Summary

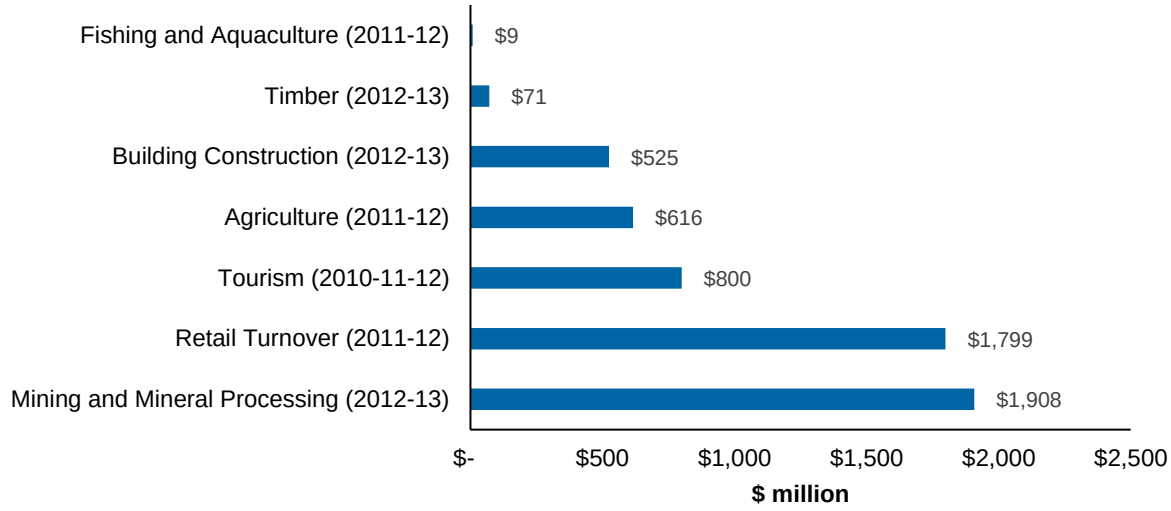
The Wheatbelt Region's economy is dominated by broadacre cropping and livestock production, with established infrastructure supporting the bulk movement of commodities to port. However the region's close proximity to Perth is creating opportunities for more value-added production and processing.

The Northern Gateway Industrial Park, located at Muchea, would be an obvious location for new Wheat belt food processing businesses, alongside bulk storage and transport facilities. However heavy water users (1 to 5 ML) may need to implement supplementary water supplies via rainwater collection, hardstand harvesting or wastewater re-use.

7.4 Kimberley Region

The Kimberley Region covers the north of WA, comprising four local government areas, with Broome being the main population centre. The region has a diverse economy with mining, agricultural production, construction, tourism and retail trade being the main contributors to local output (Figure 40). Agricultural output mostly attributed to cattle production from pastoral land, exported via Broome and Wyndham ports. Opportunities for irrigated production in the West Kimberley are being pursued, in addition to expansion of the Ord Irrigation Area.

Figure 40 Value industry activities in the Kimberley (2014)



Source: Department of Regional Development 2014c

Identified strengths and opportunities for food production in the region include:

- Irrigation: divertible surface water and ground water reserves intersecting with agricultural soils
- Opportunity to exploit out of season production windows
- Proximity to Asian food markets
- Ord-East Kimberley Expansion Project

Note that DPIRD records of food related businesses does not extend to the Kimberley Region, nor did Coriolis (2016) evaluate premium food opportunities specific to this region.

7.4.1 Potential site: Broome Road Industrial Park

The Broome Road Industrial Park is a general industrial and transport development located between Broome and the Great Northern Highway. The industrial park is designed to attract a broad range of heavy and noxious industries, including manufacturing, transport, storage and distribution. The facility will encourage relocation of these industries away from the Broome town centre, and also from the existing Port Drive Industrial Facility, which is nearing capacity

and currently supports a range of industrial uses which are not related to Port operations (Urbis 2012).

While food processing was not specifically identified as a targeted use in the *Broome Road Industrial Park Master Plan*, the site could support with a range of food businesses operating alongside complementary manufacturing, storage and transport businesses.

Source: LandCorp 2017

Table 18 below presents summarises the opportunity for the Broome site.

Table 18 Summary of Broome Road Industrial Park

Criteria	Comment
Land Status	The site was rezoned in 2000 from 'Public Purpose – Water Supply' to 'Industry'. The purpose of the change in use was to 'create an industry zone for the development of an industrial estate which can also accommodate public utilities and infrastructure' (Urbis 2012)
Infrastructure	Serviced with underground power, water and telecommunications services. No reticulated gas • water ✓ • electricity ✓ • natural gas X (LPG only)
Transport linkages	Broome Road Industrial Park has very good transport linkages (road and port). Internal roads designed to accommodate triple road trains. Land to the east of the site has been reserved for the development of the new Broome International Airport
Environment	There are no reserves or conservation areas located in or around the site. However it is located within an environmentally sensitive area deemed to be associated with Dampier Creek and Roebuck Bay (Urbis 2012)
Waste management	The site will be serviced by a planned adjoining waste treatment facility and WWTP
Workforce services and business support	Broome LGA has a labour force of 10,471 and an unemployment rate of 6.7%, above the WA average of 6.2% (Department of Employment 2017)

Criteria	Comment
Social amenity impacts	Food businesses moving to the Industrial Park will need to share with a broad range of heavy industries. Some of these industries including manufacturing, transport, storage and distribution may offer clustering benefits and efficiencies, however other more noxious industries may be incompatible
Strategic potential	The estate is primarily focused on providing Broome's industrial land supply into the medium to long-term. Less strategic potential for food industries at a regional, state or national level

Summary

The Kimberley Region has potential for increased pastoral and irrigated agricultural production as well as downstream processing opportunities (e.g. meat processing).

The Broome Road Industrial Park is designed to support general industry and transport businesses, and could be compatible for certain food processing enterprises.

8. Conclusions and recommendations

The vision to establish a food processing business park in the Peel region, while challenging, promises to bring investment, vibrancy and sustainability to the region.

Demand from existing agri-food businesses

There are 401 identified agri-food businesses located in the Perth and Peel Region. The majority (51%) are located in industrial type zones which are likely to be appropriate, however the remaining businesses are located in zones which may be less suitable including commercial (26%)[17], agricultural or rural (9%), development (7%) or residential (6%) zones. The 31 businesses currently located in development zones may be under the most pressure to relocate before their surrounding area transitions to higher density development (e.g. residential).

The most common businesses identified were classified as gourmet, fresh produce, meat, seafood, food wholesaler, baking, oils, exporter/Importer and packing. Together these businesses represented 77% of all agri-food businesses in the region.

Across the region, the following 9 areas were identified as having the most agri-food businesses under pressure to relocate:

- Tapping/Wanneroo
- Osborne Park/Innaloo
- Canning Vale
- Cockburn Central/Treeby
- Bibra Lake
- North Coogee
- Aubin Grove
- Casuarina
- Byford

The results from this analysis should be used to identify potential businesses interested in relocating, for further engagement.

Servicing

This report has found that the proposed servicing of the development is generally suitable and adequate, however in order to attract new and existing businesses to the park, additional servicing and facilities will be required. Areas requiring further consideration include:

- **Public transport:** Future planning will need to incorporate public transport to cater for staff movements
- **Lot size:** Many potential businesses will require larger lots than what is proposed, or will need to acquire multiple lots. Some flexibility will be required in local structure planning regarding lot size to allow amalgamation or subdivision in appropriate circumstances
- **Electricity:** Wherever possible electricity should be underground
- **Liquid waste:** With limited remaining capacity at the Gordon Road WWTP, alternative options will need to be considered in the longer term. Many businesses will require on-site treatment before discharge, which may provide an opportunity for a shared WWTP within the PBP. Consideration should be given to installing a separate sewage line for human waste

[17] This may include offices and headquarters rather than manufacturing facilities

- **Solid waste:** Not addressed in current planning. Consideration should be given to waste disposal opportunities via the nearby Eco Industrial Zone
- **Provision of shared services:** to reduce the need for individual businesses developing stand-alone facilities Some of the opportunities for shared services and facilities include: backup water supply tanks, chlorination and boilers, back-up electricity generator(s), telecommunications, truck wash, cold storage, security services, R&D, laboratory, admin and/or training facilities and labour hire. However, while the provision of common use facilities may provide a key incentive for some businesses, due consideration should be given to how these facilities will be financed, governed and managed into the future

Incentives

GHD believe it will be necessary to incentivise new and existing businesses to relocate to the PBP. However rather than providing grants to individual businesses, which only addresses the relocation cost impediment, a preferred approach would involve investing in improved infrastructure and headworks, as well as other incentives including:

- **Negotiated utility rates**: E.g. cheaper electricity through bulk purchase or local generation options, via waste to energy or solar
- **Development assistance:** Assistance with planning applications and certainty around permitting
- **Tenure and payment options:** Certain businesses may be attracted to different types of tenure and payment options. Freehold tenure may be preferred for some businesses due to added security, while others may prefer lease arrangements. The options of making deferred payments against land acquisitions is likely help businesses secure finance for developments

Staging and co-location

While the proposed staged development can probably cater for any business type developing within any particular portion of the PBP, and businesses will invariably choose a lot within the Park that best suits their needs, there are potential benefits from grouping together certain business with similar needs (and separating certain businesses which may be less compatible). The following characteristics should be considered when determining the appropriate location for individual businesses.

- Number of vehicle movements
- Security sensitivities
- Amount of wastewater and solid waste generated
- Odour and noise generated
- Biosecurity sensitivities
- Some flexibility will be required in the proposed staging of development, to ensure that first movers are catered for and appropriately located.

Table 19 Considerations for business locations

Enterprise characteristics	Example	Preferable location within PBP
High vehicle movements	Distribution centres Cold stores	Outer perimeter to reduce vehicle loads and noise on internal roads
Security sensitive	Meat processing Poultry processing	Not on the outside perimeter, single road frontage
Generating high amounts of wastewater	Meat processing	Near the western perimeter in closer proximity to the wastewater pump station, pipeline and treatment plant
Generating compostable waste	Mushroom processing Vegetable and fruit processing Diary processing	Grouped to allow for efficient collection or disposal (e.g. composting)
Generating renderable waste	Meat processing Poultry processing	Grouped to allow for efficient collection or disposal (e.g. composting)
Odour and noise generating	Seafood processing Diary processing Meat processing	Separated from more businesses with higher staff numbers
Biosecurity sensitive	Mushroom processing Chicken processing Meat processing	Separated from potential sources of biosecurity risk

Co-ordinated Engagement

Ongoing engagement with existing and new agri-food businesses will be required to ensure the PBP is successful in meeting their individual needs and therefore attracting investment. With multiple agencies and commercial partners involved in the development of the PBP, it will be critical to ensure that stakeholder engagement efforts are coordinated.

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10. Acronyms

AAMGL	Average Annual Maximum Groundwater Level
ATU	Alternative Treatment Unit
BOD	Biochemical oxygen demand
CBD	Central Business District
CCTV	Closed Circuit Television
CGL	Controlled Groundwater Level
COD	Chemical Oxygen Demand
DAF	Dissolved Air Flotation
DPIRD	Department of Primary Industries and Regional Development
HVAC	Heating, ventilation, and air conditioning
LGA	Local Government Area
LPG	Liquid Petroleum Gas
LWMS	Local Water Management Strategy
ML	Megalitre
NA	Not applicable
O&G	Oil and grease
PA	Public address
PBP	Peel Business Park
PDC	Peel Development Commission
PFZ	Peel Food Zone
PIRSA	Primary Industries and Regions South Australia
PPM	Parts per million
PRS	Peel Region Scheme
QA	Quality Assurance
TDS	Total dissolved solids
TSS	Total suspended solids
WA	Western Australia
WAPC	Western Australian Planning Commission
WP	Western Power
WWTP	Waste Water Treatment Plant

Appendices

Appendix A Recent studies identifying emerging opportunities in food and agribusiness

CSIRO Food and Agribusiness Roadmap

The recently released Food and Agribusiness Roadmap (CSIRO 2017) identifies the following value added opportunities for growth:

- Products for health and wellbeing, including free-from and natural foods, supplements, fortified and functional foods, and personalised nutrition
- Sustainability-driven products and processes, including those that convert waste, provide alternative protein sources, sustainable packaging and green and ethical value chains
- Premium foods, including high-quality, convenient, fresh and packaged products; luxury products and gifts; tourism; and novel tastes, smells and textures

These opportunities area summarised in Figure 41 below.

Figure 41 Opportunities for growth in Australian Food and Agriculture Sector

Source: CSIRO 2017

Premium Agri-Food Market Opportunity (Coriolis 2016)

Emerging opportunities in the premium food sector were evaluated in *Premium Agri-Food Market Opportunity* (Coriolis 2016), commissioned by DPIRD. This analysis screened 506 food categories and segments to identify 20 key premium food opportunities for WA, targeting high value and high growth markets. In addition, the analysis identified 16 addional high potential opportunities, and 11 blue sky opportunities (Figure 42).

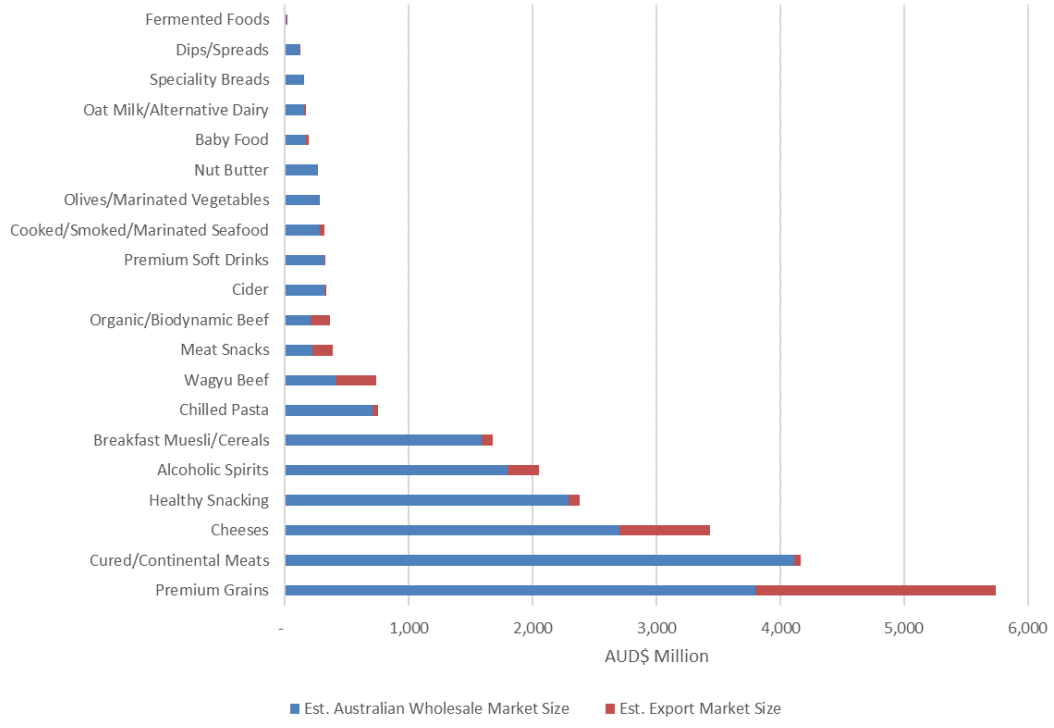
Figure 42 Identified premium food opportunities for WA

IDENTIFIED KEY OPPORTUNITIES (20)	ADDITIONAL HIGH POTENTIAL OPPORTUNITIES (16)	"BLUE SKY" OPPORTUNITIES (10)
Baby Food (excl. infant formula) Specialty Breads Organic/Biodynamic Beef Oat Milk/Alternative Dairy Wagyu Beef Premium Soft Drinks Cheeses Alcoholic Spirits Dips/Spreads Breakfast Muesli/Cereals Healthy Snacking Cured/Continental Meats Cider Meat Snacks Premium Grains Chilled Pasta Olives/Marinated Vegetables Fermented Foods Nut Butter Cooked/Smoked/Marinated Seafood	Chilled Dressings Chilli/Hot Sauces Nut Oils Coffee Flavoured Oils Porridge/Oats Crackers Dessert Sauces/Toppings Bottled Water Gluten Free/Free From Bakery Goods Marron Truffles Ethnic Meal Kits Chilled Ready Meals Chutneys/Pickles/Relishes Frozen Smoothie Mix	Breakfast Drinks Breakfast Bars/Biscuits Toddler Drinks Premium Age Care Nutritional Meals* Prepared Adult Nutritional Meals * Injury Recovery Meals* Australian Grown Tea Toddler Ready Meals Toddler Desserts Toddler Snacks
- Existing, capable producers in place in Western Australia - Can be progressed significantly within existing project timeframe		- Existing WA producers are generally unknown or have low market awareness - Can be progressed in 5+ year timeframe

Source: Coriolis 2016

The 20 key premium food opportunities have an estimated combined Australian wholesale market value of around $20 billion and export market size of around $4 billion. Figure 42 below shows the estimated size of these markets in terms of domestic wholesale and exports.

Figure 43 Identified key premium food opportunities for WA



Source: Coriolis 2016

The above opportunities were further evaluated in terms of specific opportunity within the organic sector, with consideration to success in peer countries, consumer demand in Australia, traction gained by Australian producers and support from interviewed food industry stakeholders. The results presented in Table 20 show the overall opportunity for organic production is strongest for baby food, organic/biodynamic beef, premium soft drinks, breakfast muesli/cereal, health snacks and nut butter.

Table 20 Key opportunities for organics

	Baby Food	*Specialty Breads*	*Organic/Biodynamic Beef*	*Oat Milk/Alternative Dairy*	*Wagyu Beef*	*Premium Soft Drinks*	*Cheeses*	*Alcoholic Spirits*	*Dips/Spreads*	*Breakfast Muesli/Cereals*	*Healthy Snacking*	*Cured/Continental Meats*	*Cider*	*Meat Snacks*	*Premium Grains*	*Chilled Pasta*	*Olives/Marinated Vegetables*	*Fermented Foods*	*Nut Butter*	*Cooked/Smoked/Marinated Seafood*
Succeeding in peer group countries	●	●	●	●	●	●	◑	○	◑	●	●	○	◑	◑	●	◑	○	◑	●	○
Demonstrated consumer demand in Australia	●	●	●	●	●	●	◑	○	◑	●	●	○	◑	○	●	○	○	◑	●	○
Australian producers achieving traction	●	●	●	◑	◑	●	◑	○	◑	●	●	○	○	○	◑	○	○	◑	●	○
Support from interviewees	●	◑	●	●	●	●	◑	○	◑	●	●	○	○	○	◑	◑	○	◑	●	○
Overall	●	●	●	●	●	●	◑	○	◑	●	●	○	○	○	●	○	○	◑	●	○

HIGH ● MEDIUM ◑ LOW ○

Source: Coriolis 2016

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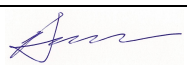
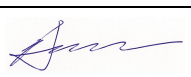
2126530-50981/https://projects.ghd.com/oc/Sydney/peelbusinessparkbusi/Delivery/Documents/2126530-REP_1_Peel Business Park Business Transition Strategy v4.docx

Document Status

Revision	Author	Reviewer		Approved for Issue		
		Name	Signature	Name	Signature	Date
1	S Hoban	S Madden		R Sinclair		19/09/2017
2	S Hoban	S Madden		R Sinclair		29/11/2017

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