



# **Transport and Employment Study**

City of Rockingham

**Final Report**

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## Executive Summary

Rockingham is designated as the main regional centre for a substantial area in the rapidly growing south-west of the Perth metropolitan area. The development areas of Peel are adjacent to the similarly rapidly growing development areas in the City of Rockingham. The population of the combined region<sup>1</sup> is forecast to grow from 232,000 in 2011 to 647,000<sup>2</sup> in 2050. This is larger than the current population of the Gold Coast – it will be a large region. By 2050, the coastal South-West Metropolitan Peel sub-region will be 27% bigger than today's Gold Coast. The population of the City of Rockingham has grown from 109,400 in 2011 to 139,700 in 2017 and is forecast by the Western Australian Planning Commission (WAPC) to grow to 196,300 by 2036 and to 236,000 by 2050. Whether this figure is achieved depends on the development strategy adopted by the City.

### Population

Population growth in the City is currently forecast to be overwhelmingly in the inland eastern areas of the City. The areas of Baldivis (north and south) and Karnup account for 86% of the forecast growth between 2016 and 2036<sup>3</sup>. The outcome will be that by 2036 around 45% of the population of the City will be in the eastern sectors of the city, in Baldivis (north and south) and Karnup. This can be assumed as the current trajectory of population growth – it reflects the current planning and policy framework and known and anticipated developer activity.

This might be modified by a housing strategy arising out of the Housing Study (currently under preparation by the City), which would see more population in the established western areas of the City. This would need to be supported by a comprehensive public transit system.

Under the current trajectory, the population would not reach the 235,935 by 2050 anticipated in the draft WAPC *South Metropolitan Peel Sub-Regional Planning Framework*. A degree of infill is expected in that document. Under the high infill scenario, by 2050 the total population of the City is 84,000 higher than with the current trajectory.

The relative distribution of the population would be quite different under each scenario. With the current trajectory, the majority of the population expansion is in the eastern residential areas (Baldivis – Karnup) and by 2050 it would have around 43% of the total City population. In the high infill scenario, the City Centre population would grow to around 48,500 (21% of the population) with the associated coastal residential areas having 49% of the total population.

### Workforce and Employment

There were an estimated 59,400 resident workers in the City in 2016. On the current trajectory, this is estimated to increase to 86,600 in 2036 and by a further 17,400 to a total of 104,000 by 2050. Rockingham has a low employment self-sufficiency ratio (the ratio of local jobs to resident workforce) of 53%. To maintain this ratio, an additional 14,600 jobs will be required in the City between 2016 and 2036 and an additional 7,700 between 2036 and 2050. Many of these jobs will be directly related to the increased population (for example, retail, education and health services jobs) but a large number of additional jobs from externally-oriented or strategic sectors (for example, tourism, media and technology applications, international education, manufacturing and processing, freight and logistics) will be required to achieve satisfactory levels of employment self-sufficiency.

Commercial centres or activity centres, particularly the Rockingham City Centre, have no effective limits to their capacity to accommodate employment growth. There is ample land suitable for intensification of land uses and for higher density development with consequent expanded employment uses in a town centre environment. However, the employment capacity of industrial estates in Rockingham is limited by the land available to it and the type of economic activity in them. Rockingham has two industrial / business estates – East Rockingham and Port Kennedy. They are quite different. East Rockingham is larger (around 2,930 employees compared

<sup>1</sup> Consisting of the LGAs of Kwinana, Rockingham, Mandurah, Murray, Waroona

<sup>2</sup> Perth & Peel @ 3.5 Million

<sup>3</sup> Forecast.id/Rockingham

with 840 for Port Kennedy) but with much lower employment densities. It is estimated that the Port Kennedy Business Enterprise Zone has a capacity on vacant and undeveloped land of 1,730 jobs and that East Rockingham has a capacity of a further 5,880 employees giving total capacity on business and industrial estates of around 7,600 additional employees.

With medium level residential intensification in the City Centre, other activity centres and along activity corridors, the City's population would grow to 213,000 by 2036 and to 248,000 by 2050, however employment growth would not keep pace with residential growth and employment self-sufficiency could decline to 44%. However, with an increase in employment growth, employment self-sufficiency could be maintained at around 53% – its current level. This would entail city centre employment of around 19,300 by 2050.

If Rockingham were to become the primary centre for the wider region, the population would be 246,000 by 2036 and 298,000 by 2050. This is only possible with substantial economic development focussed on the Rockingham City Centre. It would have between 25,300 and 34,900 employees by 2050 and the City's employment self-sufficiency ratio would be between 49% and 58%. However, even with a substantially expanded employment role for the Rockingham City Centre, these prospective employment self-sufficiency ratios are still far too low.

A clear conclusion from this is that residential intensification without employment growth will produce an outcome that is sub-optimal. However, in addition to the expanded City Centre role, more employment land is required to bring employment self-sufficiency to reasonable levels.

Two broad imperatives emerge from this:

- 1) The role of the Rockingham City Centre as primary employment centre must be greatly expanded beyond current planning expectations. Rockingham is a Strategic Metropolitan Centre – the primary centre for a large and rapidly growing region - and as such should be the location of key regional services including education (at all levels, but particularly tertiary); health services; public administration (including support to the navy); management, administration, research and product development for regional activities and high-level arts and entertainment. The greater the concentration of these services in the Rockingham City Centre, the greater the agglomeration economies and the more attractive the centre becomes for more growth. It is critical that every opportunity to increase the amount and diversity of economic activity in the centre is taken. It must provide the diversity to maximise its attractiveness to new enterprises. This means that key institutional drivers such as tertiary education and tertiary health services must be in the Rockingham City Centre and not geographically distributed around the City. Only the City Centre has the scale and urban environment to attract the types of jobs that are likely to be expanding in the future. The larger the centre, the more attractive it will be. By 2050, the broad region for which Rockingham is the largest and primary centre will have a population one-third larger than today's Gold Coast. This gives enormous possibilities for Rockingham as the main business, research, education, health services, entertainment and cultural centre for this region; and
- 2) Additional employment land is required and this should be to the east of the City. In any scenario, this area will have around half of the City's population.

North East Baldvis has been identified in the WAPC Economic and Employment Lands Strategy as the preferred site for future (medium term) industrial development in the South-west sub-region, most likely for larger lot general industrial uses with an emphasis on producer services such as warehousing and distribution; with potential for Strategic Export/ Knowledge based industry. The area has good access to the freight network route connections with road and rail opportunities that position the site as a strategic industrial location. It is a very large site, but it has some development constraints and it is possible that some of the more likely uses might not be very employment-intensive. However, at minimum it would be expected to have similar employment multipliers to East Rockingham, indicating an employment capacity of around 8,300 jobs, allowing for some environmental contingency. Detailed planning and inclusion of more employment-intensive land uses might increase that number.

There is a longer term need for additional employment land in the region and land in Karnup is very well located for this purpose. The land in question (currently identified as 'Urban' and 'Urban Expansion' in the draft *South Metropolitan Peel Sub-Regional Planning Framework*) has direct access to the freeway system and is an ideal location to meet a long-term shortage of employment land in the lower metropolitan south-west and Peel. At densities similar to those currently in the Port Kennedy Business Park, Karnup has a substantial long-term employment capacity of between 12,500 to 24,900 jobs, depending upon the extent of land allocated for employment.

The base ('business-as-usual') employment self-sufficiency for the City at 2050 is between 45% and 59%. If North East Baldivis is included and developed by 2050, this would increase to between 53% and 66%. If land in Karnup were developed to create approximately 12,500 jobs in the long-term, the employment self-sufficiency would increase to between 67% and 75% and if 24,900 jobs were achieved in the long-term, it would increase to between 80% and 85%. These are the levels of employment self-sufficiency the City must aspire to if it is to achieve good levels of liveability and transport efficiency.

Current expectations indicate that Karnup and North-East Baldivis might become industrial estates with a distinct character. One scenario is for North East Baldivis to become a low-density storage and distribution park, increasingly including automated goods handling, while Karnup would be characterised by higher order business / industrial uses. Their variety would contribute to the City's economic diversity.

This is quite a different regional scenario to that envisaged in the draft *South Metropolitan Peel Sub-Regional Planning Framework*.

The population of the City currently has quite high levels of car-dependency. If the volume and intensity of the population is to be increased under the medium or high growth scenarios, it will be necessary to encourage mode shift to avoid commensurate increase in the volume of vehicles on the City's road network. Mode shift can be encouraged by improvement to the public transport, cycling and walking networks, to provide better connections between the Rockingham City Centre and other parts of the City (including Baldivis and Karnup).

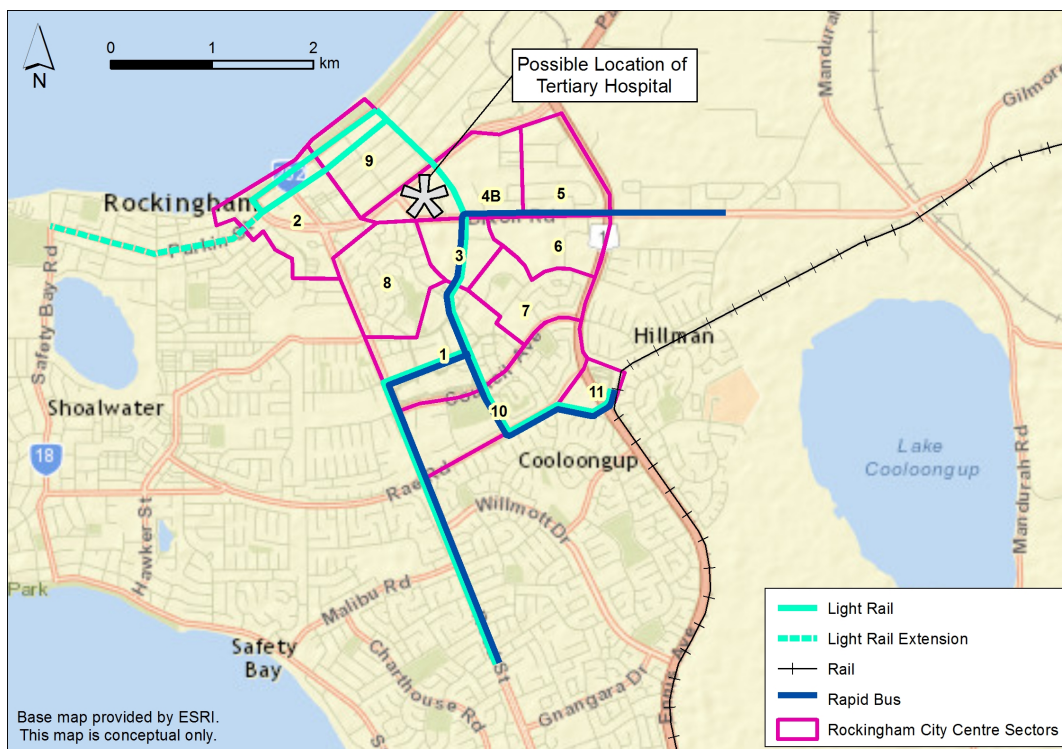
From a transport perspective the intention is to link the employment and mixed-use centres in a way that will enable more people to use public transport. In addition, a demand management plan to increase walking and cycling is proposed. At the heart of this alternative development scenario is the intention to deliver a pattern and form of land use that is more compatible with increased use of public transport, as well as providing for more and safer walking and cycling.

The suggested strategies and additions to the current planning framework to obtain optimal levels of population and employment and an efficient transport network are:

- Provide for significant intensification of the Rockingham City Centre (for all uses – business, education, health services, entertainment and cultural, residential)
- Provide for a tertiary hospital in the Rockingham City Centre;
- Provide for new employment land in North East Baldivis in the medium term;
- Provide for new employment land in Karnup in the longer term;
- Maximise TOD opportunities within the City of Rockingham;
- Implement the residential intensification strategy contained in the draft Housing Study;
- Protect existing employment land and allow for more intense uses; and
- Encourage mode shift to reduce car dependence by promoting walking, cycling and public transport; and by providing improved connections to the City Centre.

**Figure 5.2** shows a possible location for a tertiary hospital and the City Centre transport system.

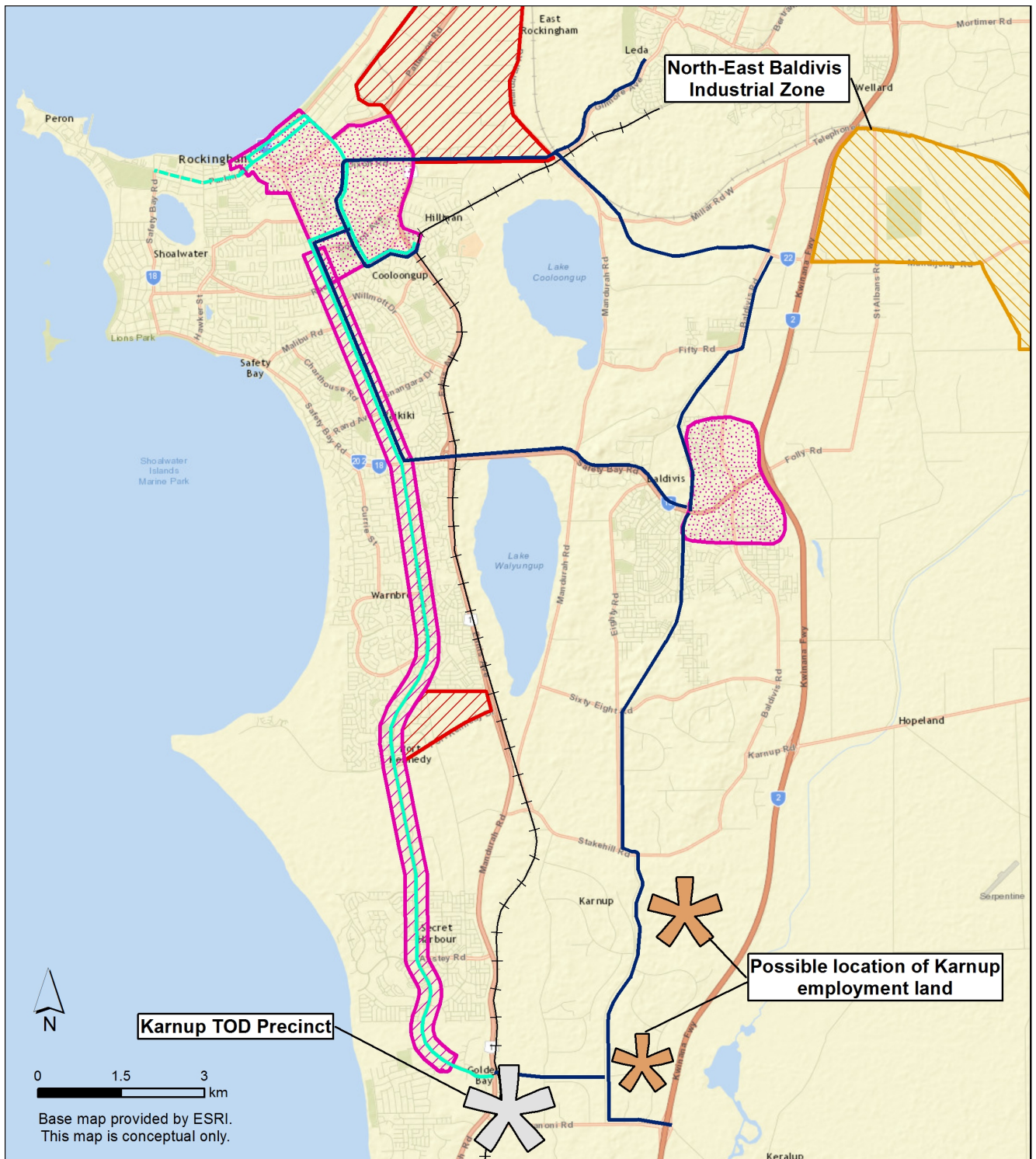
**Figure 5.2: Rockingham City Centre - Employment and Transport**



**Figure 5.3** shows the proposed North East Baldvis Industrial area, the possible location of long-term employment land in Karnup and the recommended overall transport network.



Figure 5.3: City of Rockingham - Employment and Transport



**Public Transport Routes**

- Light Rail
- - - Light Rail Extension
- + + + Rail
- Rapid Bus

**Land Use**

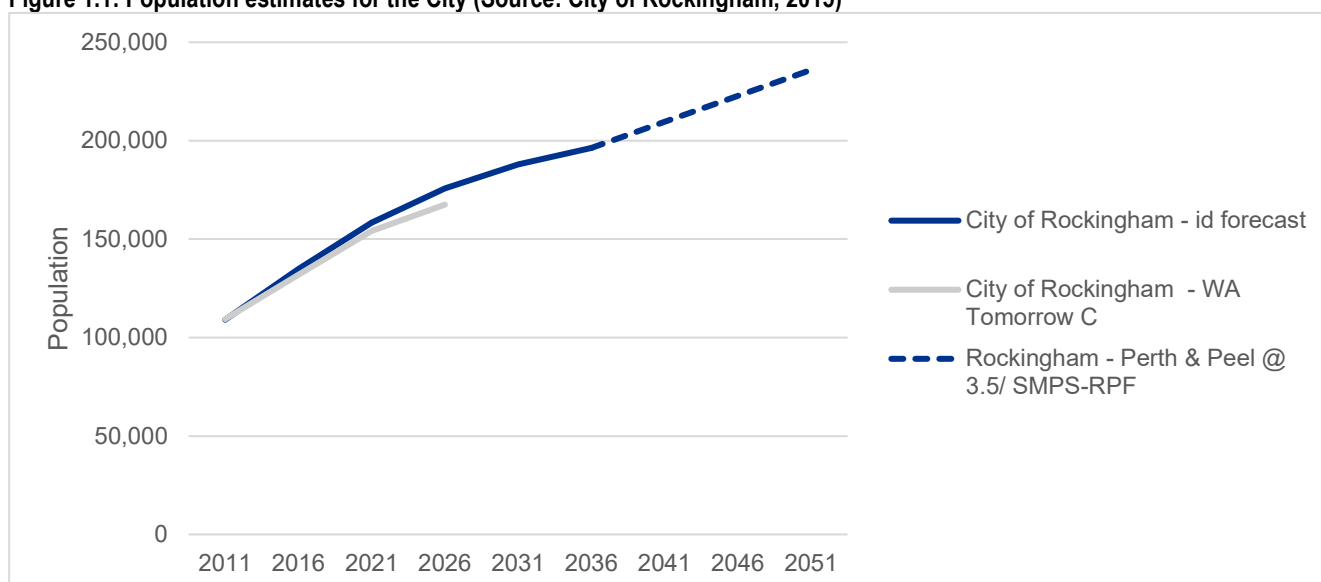
- Activity Centre/Corridor
- Industrial Zone
- Mixed Use Activity Centre
- Industry/Employment Area



# 1. Introduction

Jacobs and Syme Marmion have been appointed to undertake a transport and employment study for the City of Rockingham (the City). The City is a rapidly growing local government authority (LGA) situated south of the Perth CBD. The current estimates of population growth are shown in **Figure 1.1**.

**Figure 1.1: Population estimates for the City (Source: City of Rockingham, 2015)**



Source: City of Rockingham, [forecast.id.com.au/rockingham](http://forecast.id.com.au/rockingham) 2015/2017, SMPS-RPF, WAPC WA Tomorrow

The population of the City of Rockingham has grown from 109,400 in 2011 to 139,700 in 2017 and is forecast to grow to 196,300 by 2036. The draft South Metropolitan Peel Sub-Regional Planning Framework (an element of the *Towards Perth and Peel @ 3.5 million* suite of documents) shows expectations that the City's population will reach 236,000 by 2050. This figure will vary dependent on the development strategy adopted by the City.

To plan for this growth, the City is preparing a Local Planning Strategy (LPS). The LPS will be informed by a housing study, an environmental study and this Transport and Employment Study. The LPS will ultimately guide the update of the City's statutory Town Planning Scheme. This Transport and Employment Study will therefore be an important element in ensuring the City has the most appropriate transport system (and thus efficiency of movement) and maximises its prospects for attracting and growing employment of all types.

The study has been undertaken with a 20 to 30 year time frame in mind as this is considered appropriate when envisaging how employment provision and residential growth will impact how people travel. During the process of producing this report, the City of Rockingham has been actively involved. In the initial phase of the study a discussion paper was produced. It reviewed existing planning documents for the City and region and then identified the situation in the City with respect to transport, population and employment now and in the future, and laid out the issues to be addressed. The discussion paper presented a vision, targets and strategies to work towards to overcome the challenges that the City is facing. The consultant team held workshops with City Officers to canvass the issues as the study report was in formulation.

The remainder of this report is structured as follows:

- Chapter 2 - Planning Documents for Employment and Transport in the City of Rockingham;
- Chapter 3 - Current Planning and Future Implications;
- Chapter 4 - Identification of issues;
- Chapter 5 - Discussion on an appropriate planning response to the issues; and
- Chapter 6 - Conclusion.

## 2. Planning Documents for Employment and Transport in Rockingham and Southwest Region

The planning documents relevant to the City for employment and transport are summarised in this Chapter. At the broadest level is *Directions 2031 and Beyond*. This is the spatial framework and strategic plan for the Perth metropolitan and Peel regions. This plan looks at the desired city form for the years to 2050. Three integrated networks are envisaged within the framework:

- A hierarchical network of activity centres to allow for jobs and amenities to be spread throughout the region;
- A movement network to provide access to these activity centres; and
- A green network to provide natural amenity, environmental conservation and to protect natural resources.

In 2016, the State Government released further strategic plans for the Perth and Peel regions: *Perth and Peel @ 3.5 Million* (land use) and *Perth and Peel Transport Plan for 3.5 Million and Beyond*. These look at the strategic requirements for Perth and Peel for the period to 2050 and will be backed by more detailed implementation plans as time progresses.

Nesting under the broad level strategic plans are the more detailed strategic plans. For the City these are:

- *South Metropolitan Peel Sub-Regional Planning Framework* (draft) prepared by the Department of Planning/WAPC; and
- *Rockingham Strategic Regional Centre - Centre Plan*, prepared by the City.

The WAPC also issues state planning policies (SPPs). Relevant to this study is *SPP 4.2 Activity Centres for Perth and Peel*.

### 2.1 State Planning Policy 4.2 - Activity Centres for Perth and Peel

The WAPC's *State Planning Policy 4.2 (SPP4.2) Activity Centres for Perth and Peel* will be relevant for this study. The policy recognises that it is most efficient to service an urban form that is structured as a series of activity centres. Activity centres are defined as community focal points and may include a range of land uses such as higher density residential, commercial, education, tourism, civic, entertainment or office/medical. Activity centres are designed to be well serviced by public transport and to be easily traversed by foot or bicycle. The policy promotes activity centres as a key tool in reducing the need to travel (because people will be able to live, work and access their daily needs within a small area), thereby reducing the overall demand on the road network and the need to depend on cars as a means of transport.

This is reflected in the defined structure of activity centres. Within the City, Rockingham is a Strategic Metropolitan Centre and Baldivis, Secret Harbour, Warnbro and Karnup (proposed) are District Centres.

The aims of the Activity Centres Policy include:

- Distributing the centres so that they can be equitably accessed by the community and concentrating land uses that generate a high number of trips;
- Providing a high level of long term certainty for public authorities and private developers who develop economic and social infrastructure for the future;
- Supporting and promoting retail and commercial competition;

- Increasing the range of employment in activity centres and increasing the amount of employment self-sufficiency;
- Encouraging higher density housing;
- Reducing transport trip lengths and proportion of travel by car;
- Encouraging cycling and walking and the provision of public transport; and
- Provision of legible street network and quality public open spaces.

## 2.2 Draft South Metropolitan Peel Sub-Regional Planning Framework

The *South Metropolitan Peel Sub-Regional Planning Framework* (the Framework) is an element of the *Towards Perth and Peel @ 3.5 million* suite of documents. It identifies Rockingham as a Strategic Metropolitan Centre and the principal centre of the south-western sector. Population growth for the City is expected to be substantial – it is forecast to grow by 46% to 196,300 between 2016 and 2036<sup>4</sup>. In the draft Framework, it is expected to reach 235,935 by 2050. This figure varies dependent on the development strategy adopted by the City.

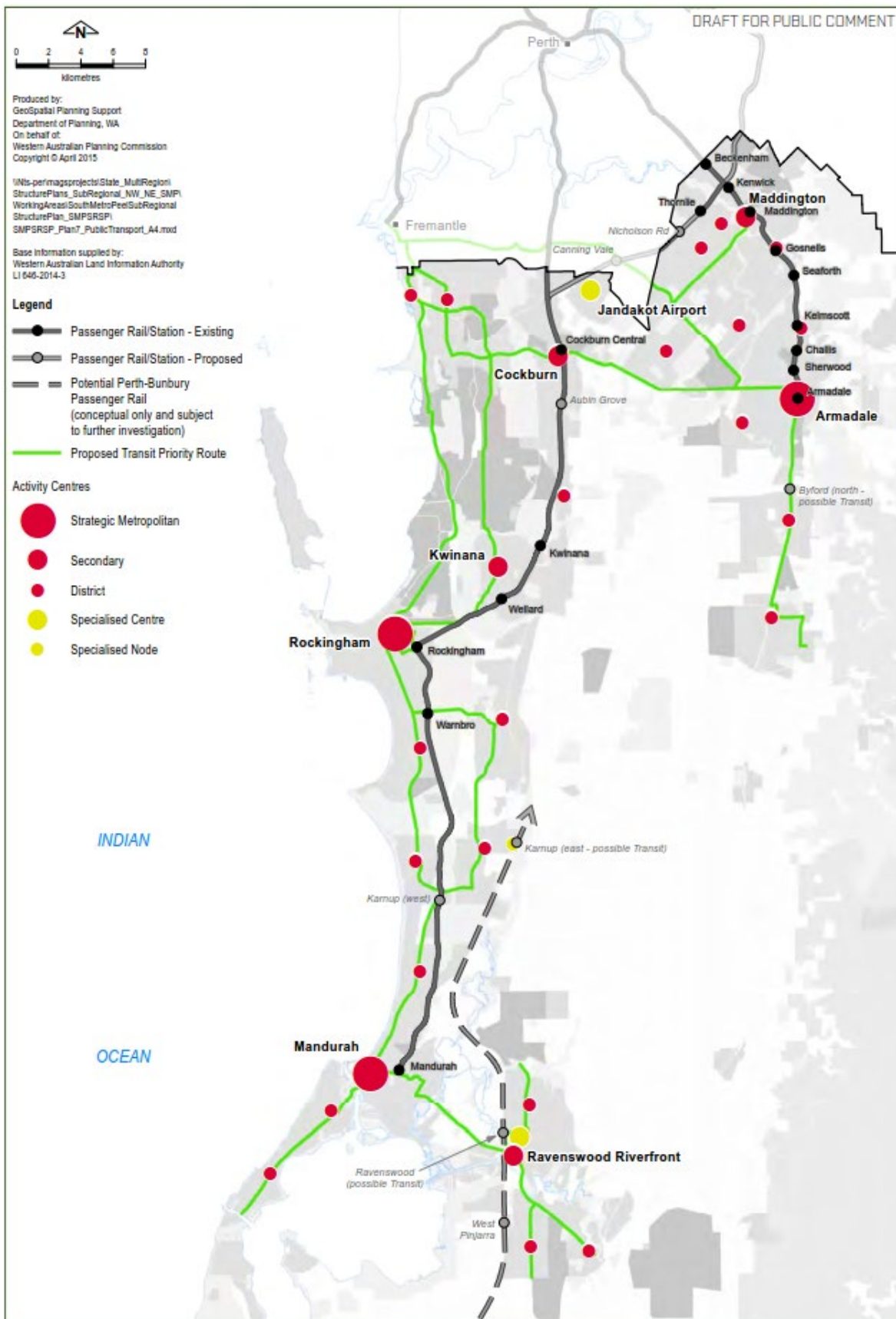
Employment expectations for the Rockingham City Centre are modest in the draft Framework. Employment in the Centre is anticipated to increase from 6,792 in 2011 to 9,849 in 2031 and 12,292 in 2050, an 81% increase between 2011 and 2050. Over the same period, in the western sector of the South Metropolitan Peel Sub-Region (the LGAs of Rockingham, Kwinana and Cockburn, roughly the main influence area for the Rockingham City Centre) the population is anticipated to grow by 103%, the labour force by 108% and the number of jobs by 164%, with the employment self-sufficiency of the sector increasing from 65% to 83%. This implies that in the draft Framework the Rockingham City Centre is seen as a contributor to regional employment growth, but not the primary provider of new employment, providing only a small proportion of new employment demand for the region.

The draft Framework also considers transport. It includes several planning principles which, if implemented, would improve transport efficiency in the region. They include support for more consolidated urban form, support for more infill development and integrated land use and transport planning. However, there is little evidence that this has been sufficiently translated in to the spatial plan, which largely appears to be a continuation of suburban planning that has delivered an inefficient and car dependent region in the past.

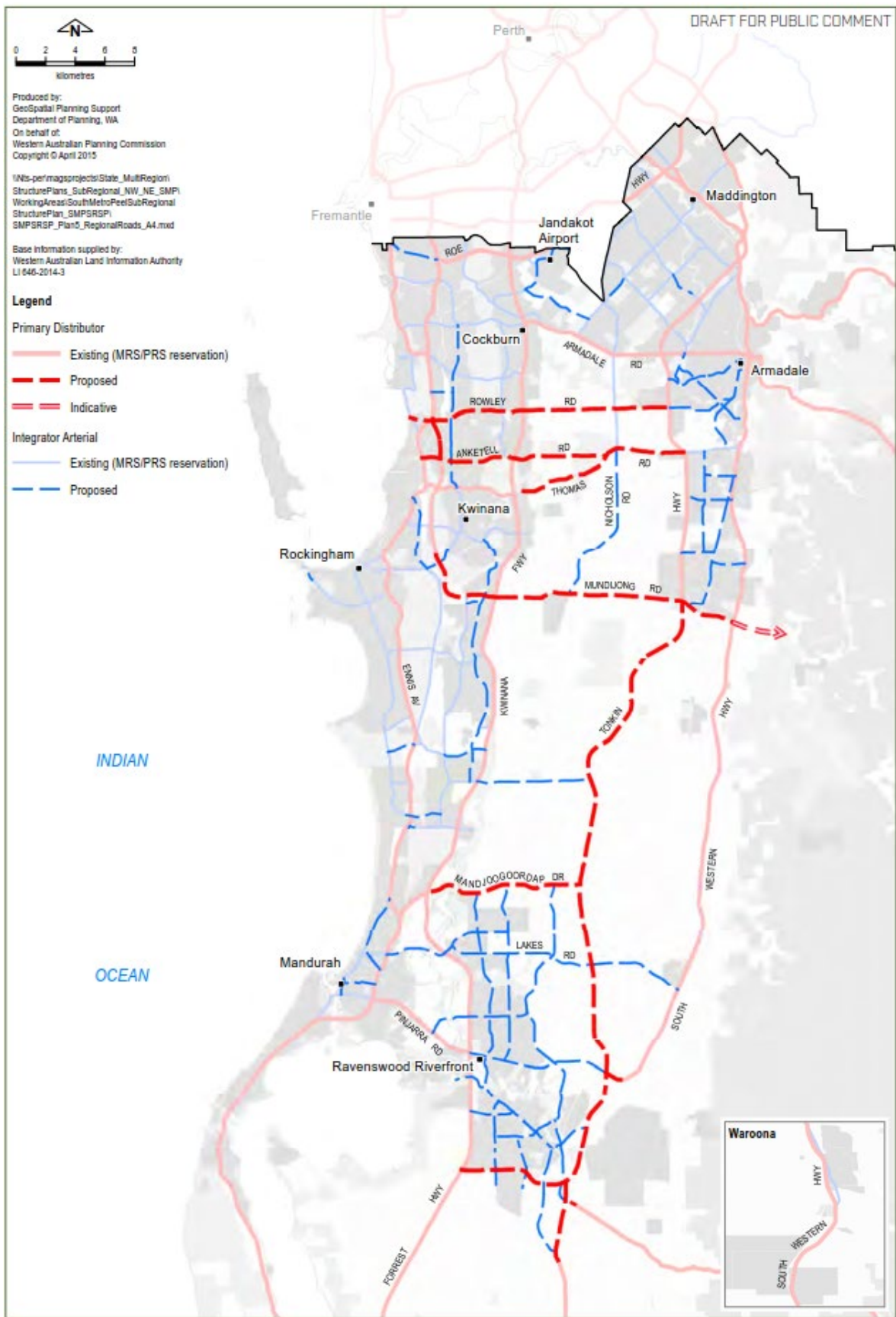
The draft Framework notes that the sub-region “is projected to grow considerably from 523,400 to 1,264,000 people.” Despite this, as shown in plan 7 of the draft Framework (reproduced as **Figure 2.1** below), the only public transit improvements foreshadowed are a series of undefined proposed transit priority routes. Plan 5 of the draft Framework shows a number of regional roads proposed for upgrade in the sub-region (see **Figure 2.2**).

<sup>4</sup> Forecast.id/Rockingham

Figure 2.1 : Public transport improvement plan from South Metropolitan Peel Sub-Regional Planning Framework



**Figure 2.2 : Regional roads improvement plan from South Metropolitan Peel Sub-Regional Planning Framework**





## 2.3 Critique of Draft South Metropolitan Peel Sub-Regional Planning Framework

A critique of the proposed draft Framework, as it applies to Rockingham and Peel was undertaken by Mackay Urban Design, Syme Marmion and Jacobs. It concluded that:

- The proposed spatial plan for the South Metropolitan and Peel planning sub-region is almost entirely inconsistent with the objectives of Liveable Neighbourhoods for the Rockingham area; and
- The spatial plan is also almost entirely inconsistent with the vision for Perth and Peel @ 3.5 Million and the principles identified within the draft Framework.

The draft Framework provides very little detail on transport system development in Rockingham or indeed in the Peel area to the south, where traffic generated will impact on Rockingham. There is a need for a more detailed integrated land use and transport plan to be developed by the WAPC in close collaboration with the local governments in the area.

An area of particular concern is that urban infill development targets for Rockingham and Peel are very low when compared with the total projected increase in population, as shown in **Table 2.1** : WAPC projections of population and urban infill growth by 2050:

**Table 2.1 : WAPC projections of population and urban infill growth by 2050**

	Rockingham	Mandurah	Murray	All Three
Population increase	127,000	75,000	149,000	351,000
Urban infill (dwellings)	14,678	14,507	1,075	30,260
Urban infill (population based on 2 persons per dwelling)	29,356	29,014	2,150	60,520
Ratio of infill population growth to total population growth	23.1%	38.7%	1.4%	17.2%

In terms of future growth in Rockingham, only 23% is targeted for urban infill. This is much less than the 39% targeted for Mandurah, but much higher than the 1.4% targeted for Murray. Within the entire Rockingham/Peel area only 17% of urban development growth is targeted for urban infill over 35 years. This will be insufficient to change how people travel in any significant way. It will not result in the level of walking, cycling and public transport that will be necessary to reduce the negative impacts of car dependency.

Modelling undertaken by Jacobs shows an almost doubling of north/south traffic through Rockingham at the northern end of the municipality, just south of Mundijong Road, to a near tripling of traffic south of Karnup Road.

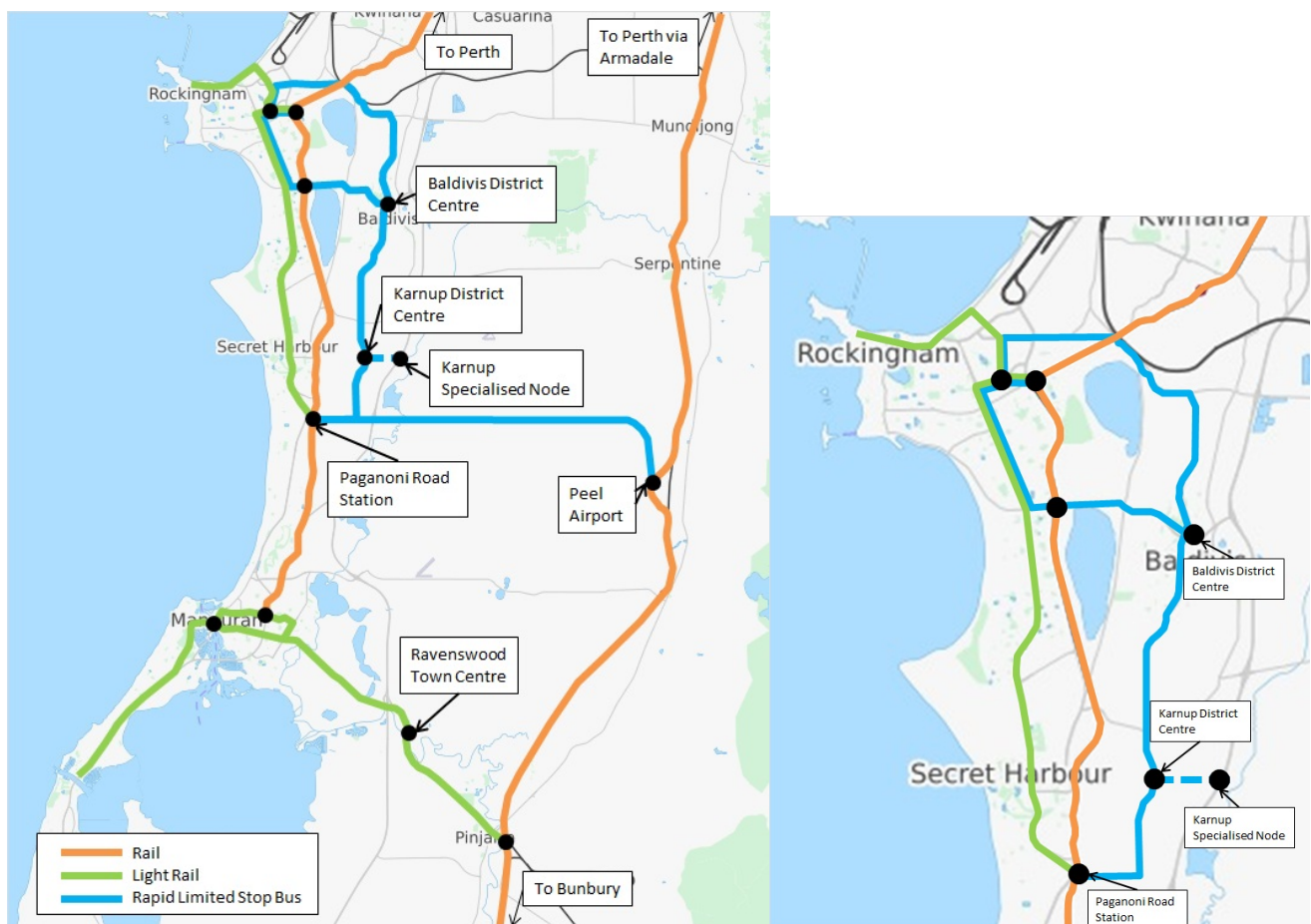
Realistically, it will not be possible to accommodate this large projected increase in traffic within and through Rockingham without extensive road expansion. Theoretically it may be possible to continue to add lanes to roads, grade separate intersections and construct new roads, but this would come at enormous cost. Furthermore, a road network of this nature would create major barriers and segregate communities as well as creating significant urban design challenges. It is considered that some additional roads will be required to complete a finer grained network. However, it is reasonable to assume that any practical expansion of the road network would not be able to accommodate the projected traffic, which would exceed the road network capacity and result in extensive congestion and delay within the sub-region.

An alternative growth strategy for Rockingham and Peel was developed by Mackay Urban Design, Syme Marmion and Jacobs and has been presented to the WAPC. The purpose of this is to demonstrate that there may be alternative development scenarios, that, combined with improvements to walking, cycling and public transport, will result in improved transport outcomes, in terms of increased accessibility, a reduction in

congestion and improved road safety. In addition, there may be broader non-transport benefits such as improved health and fitness and the ability to continue to grow populations within the area beyond 2050 and so assist in the reduction of urban sprawl. It is recognised that further work is likely to be required to develop a preferred integrated land use and transport plan for the Rockingham and Peel region and that this work should be undertaken collaboratively by the WAPC and the local governments in the region.

At the heart of this alternative development scenario is the intention to deliver a pattern and form of land use that is more compatible with increased use of public transport, as well as providing for more and safer walking and cycling. This approach can be labelled Transit Oriented Design (TOD). In the past, TOD has often been limited to relatively small development nodes around rail stations. If we are to induce the much higher levels of public transport usage (and walking and cycling) that will be necessary to improve accessibility for all and provide an improved quality of life with reduced levels of car use, a more structured and expansive approach to TOD will be required. Instead of spreading residential land use evenly across the area at low density, this alternative approach would need to involve developing high density mixed use centres linked by corridors of medium to high density of mixed residential, commercial and retail that will enable more people to access work and other activities without the use of a car. The alternative transit network plan for Perth and Peel is show in **Figure 2.3**.

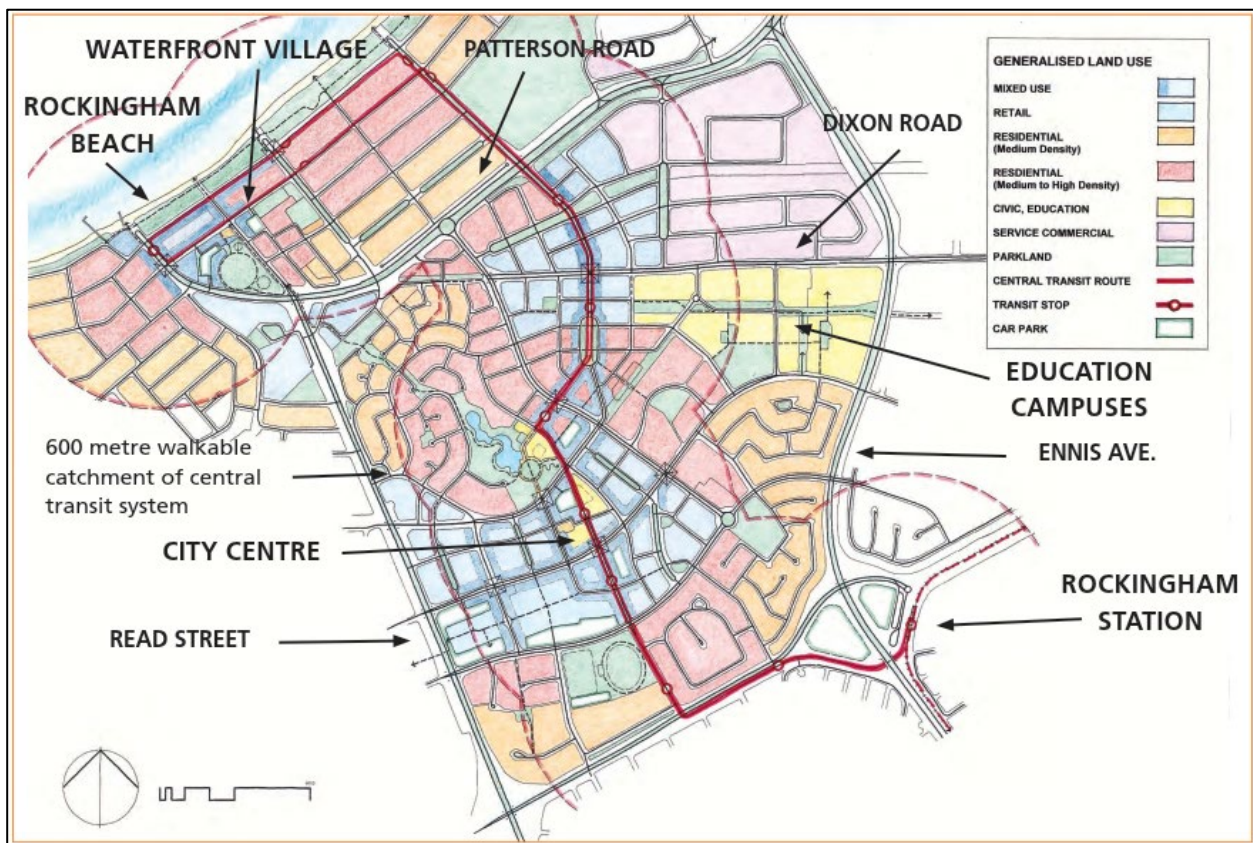
**Figure 2.3 : A possible transit network plan for Peel and Rockingham**



## 2.4 Rockingham Strategic Regional Centre - Centre Plan

The Rockingham City Centre Plan was developed over a number of years prior to 2010. A Planning Framework report was issued in January 2010. The concept plan for the Strategic Regional Centre is shown in **Figure 2.4**.

**Figure 2.4 : Rockingham City Centre concept plan**



Key features of the plan are:

- A permeable street network; and
- A transit route linking Rockingham Station to Rockingham Beach through the City Centre. This route has been designed to accommodate LRT in the future and contains sections of priority running for transit.

The transit oriented development potential for the Centre was assessed as being:

- Between 36,000 and 48,000 residents in 20,000 to 27,000 dwellings;
- 115,000m<sup>2</sup> retail;
- 100,000m<sup>2</sup> office;
- Educational institutions (TAFE and university); and
- Civic and community buildings, including a contemporary arts centre with up to 650 seats.

The City's response to the Perth and Peel @ 3.5 Million report noted that the potential for increased development includes:

- 24,000 jobs within the Rockingham Strategic Metropolitan Centre; and
- 78,000 residents in infill locations within the Rockingham Strategic Metropolitan Centre and the Read Street/Warnbro Sound Activity corridor. This compares with the urban infill target of 30,000 persons (14,678 dwellings) advised in the WAPC report and represents an infill proportion of 59% for the City between 2015 and 2050. It allows for a total population in the City around 10% greater than under the business-as-usual (BAU) Perth and Peel @ 3.5 Million scenario.

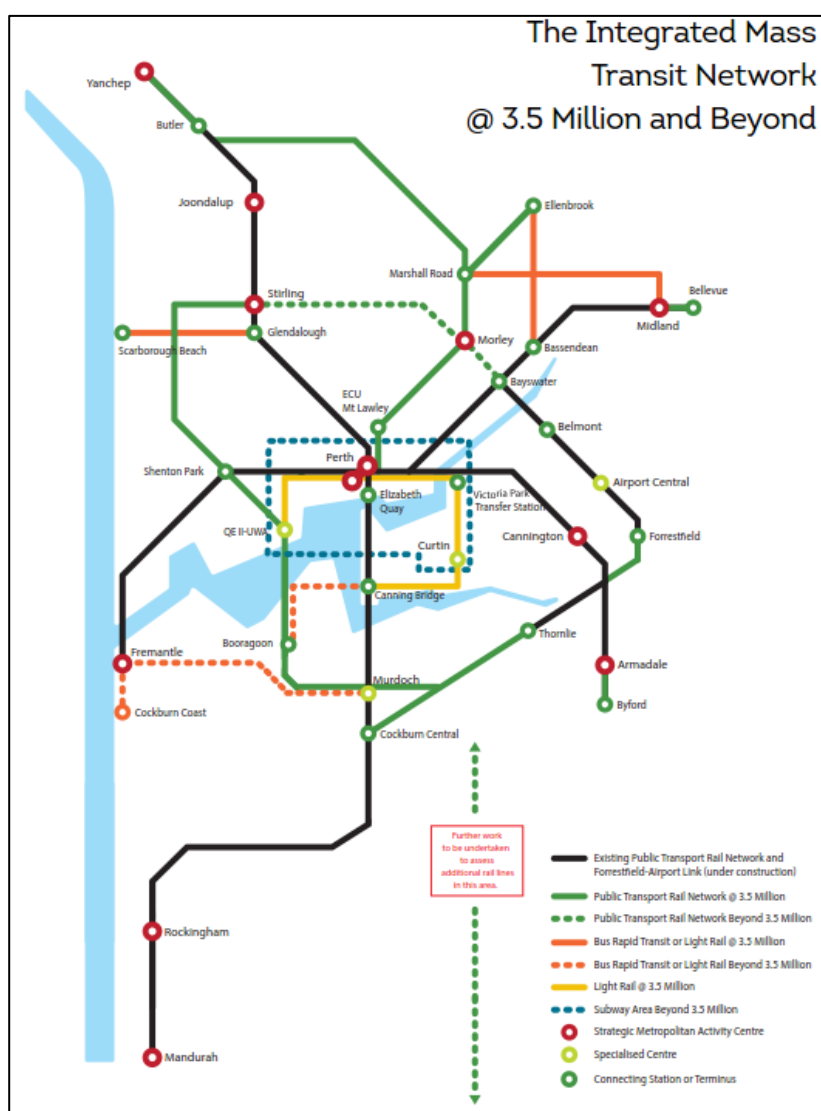
## 2.5 Perth and Peel Transport Plan for 3.5 Million and Beyond

A draft long-term transport plan for Perth and Peel was released by the WA Government for public comment late July 2016 for a period of three months. Following receipt of comments from the public, industry groups and local governments the initial plan was released with minor changes in early 2017.

The aim of the plan to provide long term stability and certainty in transport planning was widely applauded. However, many people and groups have commented there was insufficient input from the community, industry groups and local governments during the preparation and the subsequent consultation period has been too short to achieve any real consensus on the underlying policies, strategies and projects contained in the plan.

The long term integrated mass transit network @3.5 million and beyond is shown in **Figure 2.5**. The plan includes proposals to construct rail, light rail and bus rapid transit. In the SW Group area there are no plans to construct LRT and no plans to construct BRT until after 2050 (Perth at 3.5 million). There are no plans to construct any type of rapid transit in the area south of Cockburn Central within the planning timeframe (beyond Perth at 3.5 million).

Figure 2.5 : Integrated mass transit network @ 3.5 million and beyond from Perth and Peel Transport Plan



## 2.6 Economic and Employment Lands Strategy: non-heavy industrial, Perth metropolitan and Peel regions

The *Economic and Employment Lands Strategy: non-heavy industrial (EELS)*<sup>5</sup> is the State Government's response to the future of industrial land use planning for the Perth Metropolitan and Peel regions. Guided by the themes of Directions 2031 and Beyond, the Strategy aims to provide a strategic planning framework for industrial land use planning and development to 2031.

The Strategy focuses on the identification of land that is suitable for non-heavy industrial activity in the long-term and considers ways to address constraints on the land. It also considers the potential impact of large scale resource projects, such as in the iron ore and natural gas sectors. The Strategy is intended to provide a degree of flexibility, allowing stakeholders, landowners and government agencies to contribute to the development of industrial land in Perth and Peel. The key objectives of the Strategy are centred on ensuring the ongoing

<sup>5</sup> WAPC, Economic and Employment Lands Strategy: non-heavy industrial, Perth metropolitan and Peel regions, April 2012



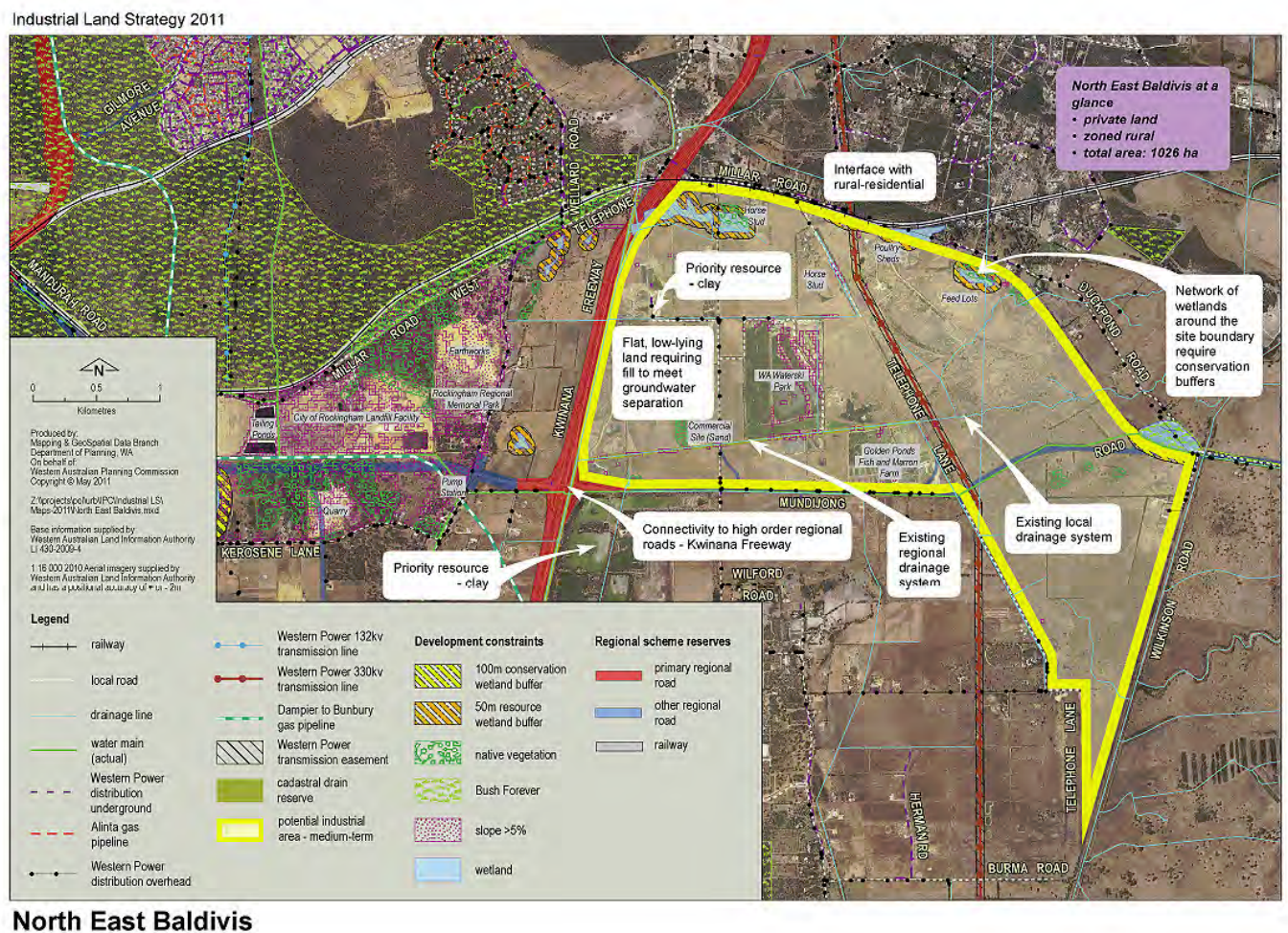
availability of industrial land, delivering a rolling 20-year land-bank and protecting existing industrial land so that industrial activities can be sustained in the long-term.

One land parcel in the City of Rockingham at North East Baldvis is identified in the EELS as the preferred site for future (medium term) industrial development in the South-west sub-region as shown in **Figure 2.6**. It notes that the site is likely to be suitable for larger lot general industrial uses.

Owing to the low-lying and flat nature of the land, it is expected that low-polluting, low water use industries would be more suited to the location. Although there may be demand for some minor consumer services within the site, and a need for light/service industry along the special rural interface, it is envisaged that most of the site will be used for general industrial uses that are not hazardous. The area has good access to the freight network route connections with road and rail opportunities, making it well located for strategic industrial uses.

Potential end users are therefore expected to be those that provide producer services such as warehousing and distribution. There may be prospects for strategic export/ knowledge based industry. It is suited to very large sites, depending upon scope of operation, and is suitable for a dedicated distribution park, with a trend towards automated goods handling and smart buildings. It has a total land area of 1,026 ha.

**Figure 2.6 : Industrial Land Strategy 2011**



## 3. Current Planning and Future Implications

This Chapter discusses the implications of the current planning framework for future employment and transport in the City.

It should be noted that the City has already undertaken a number of transport planning studies. Less analysis has been undertaken into the population trends and employment characteristics of the City. For this reason, a more detailed analysis of population and employment has been undertaken to inform this report. It is summarised in **Section 3.1**. Transport is discussed in **Section 3.2**.

### 3.1 Employment and Population

Rockingham is designated as the main regional centre for a substantial area in the rapidly growing south-west of the Perth metropolitan area. The development areas of Peel are adjacent to the similarly rapidly growing development areas in the City of Rockingham. The population of the combined region<sup>6</sup> is forecast to grow from 232,000 in 2011 to 647,000<sup>7</sup> in 2050. This is larger than the current population of the Gold Coast – it will be a large region. By 2050 the coastal South West Metropolitan Peel sub-region will be 27% bigger than today's Gold Coast. The population of the City of Rockingham has grown from 109,400 in 2011 to 139,700 in 2017 and is forecast by the WAPC to grow to 196,300 by 2036 and to 236,000 by 2050. Whether this figure is achieved depends on the development strategy adopted by the City.

#### 3.1.1 Population

In the City's *forecast.id* series, population growth in the City is currently forecast to be overwhelmingly in the inland eastern areas of the City. The areas of Baldivis (north and south) and Karnup account for 86% of the forecast growth between 2016 and 2036<sup>8</sup>. The 2018 population estimate for Baldivis (north and south) is 39,263 and is forecast to grow to 69,760 by 2036. The 2018 population estimate for Baldivis (South) is 28,001 and is forecast to grow to 39,510 by 2036.

The outcome will be that by 2036 around 45% of the population of the City will be in the eastern sectors of the city, in Baldivis (north and south) and Karnup. This can be assumed as the current trajectory of population growth – it reflects the current planning and policy framework and known and anticipated developer activity.

This might be modified by a housing strategy arising out of the Housing Study (currently under preparation by the City), which would see more population in the established western areas of the City. The Housing Study Briefing Paper<sup>9</sup> provides medium and high estimates for infill in these areas. Assuming this were to occur by 2050, under the high estimate the population of the City could be almost 300,000.

**Table 3.1** : Population Scenarios for the City shows the estimated population under various infill scenarios.

**Table 3.1 : Population Scenarios for the City**

Year	Current Trajectory	Medium Infill	High Infill
2011	109,415	109,415	109,415
2024	152,863	161,459	177,666
2036	196,311	213,504	245,916
2050	213,874	247,933	298,021

<sup>6</sup> Consisting of the LGAs of Kwinana, Rockingham, Mandurah, Murray, Waroona

<sup>7</sup> Perth & Peel @ 3.5 Million

<sup>8</sup> Forecast.id/Rockingham

<sup>9</sup> City of Rockingham, Local Planning Strategy, Housing Study Briefing Paper

Under the current trajectory, the population would not reach the 235,935 by 2050 anticipated in the draft Framework. A degree of infill is expected in that document.

Under the high infill scenario, by 2050 the total population of the City is 84,000 higher than with the current trajectory.

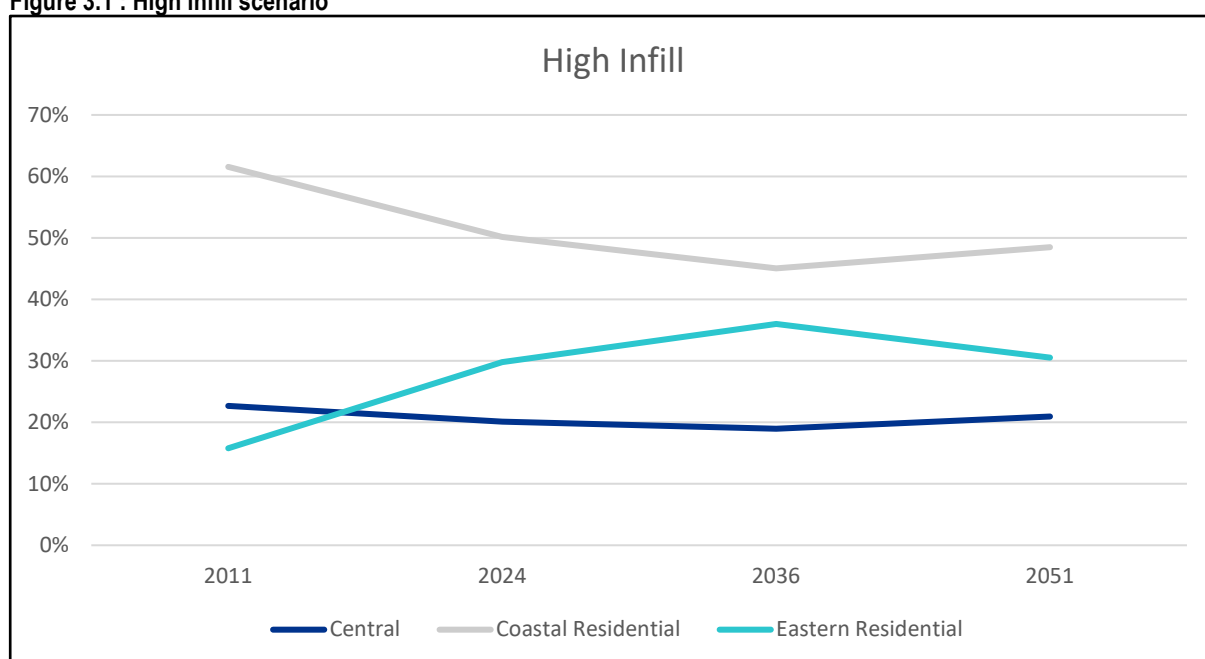
The relative distribution of the population would be quite different under each scenario.

With the current trajectory, the majority of the population expansion is in the eastern residential areas (Baldivis – Karnup) and by 2050 it would have around 43% of the total City population.

Under the medium infill scenario, the coastal residential areas would have around 45% of the population by 2050 with 37% in the eastern zones.

In the high infill scenario, the City Centre population would grow to around 48,500 (21% of the population) with the associated coastal residential areas having 49% of the total population. This is shown in the graph in **Figure 3.1 : High infill scenario below.**

**Figure 3.1 : High infill scenario**



### 3.1.2 Workforce

There were 54,838 resident workers in the City in 2016<sup>10</sup>. On the current trajectory, this is estimated to increase by 27,200 to 86,600 in 2036 and by a further 17,400 to a total of 104,000 by 2050. Rockingham has a low employment self-sufficiency ratio (the ratio of local jobs to resident workforce) of 53%. To maintain this ratio, an additional 14,600 jobs will be required in the City between 2016 and 2036 and an additional 7,700 between 2036 and 2050.

If the ratio were to increase to 70% by 2050, 24,000 additional jobs would be required in the City between 2016 and 2036 and a further 19,400 jobs between 2036 and 2050.

Many of these jobs will be directly related to the increased population (for example, retail, education and health services jobs) but a large number of additional jobs from externally-oriented or strategic sectors (for example,

<sup>10</sup> ABS census, 2016 Place of Usual Residence

tourism, media and technology applications, international education, manufacturing and processing, freight and logistics) will be required to achieve satisfactory levels of employment self-sufficiency.

Workers living in Rockingham are most likely to be in the construction, manufacturing, retail health care and public administration and safety industry sectors. The latter includes workers at the Stirling naval base.

Around 38% of Rockingham resident workers work in Rockingham. The next most common locations are the western industrial and employment areas between Kwinana and Fremantle (21%) and the City of Perth and adjacent inner area municipalities (8%). Around 15% of resident workers work in areas remote from the Perth metro area as FIFO or DIDO workers.

Rockingham is adjacent to areas of high employment in the Cities of Cockburn and Kwinana. These have high employment self-sufficiency ratios (98% and 80% respectively) and are areas of future projects and employment growth. Much of that growth will be in industrial areas. While this will provide good economic growth, in terms of value adding activity, this will be at lower rates of employment growth than in the past, as the on-going effects of the incorporation of technology and capital investment continue. Employment densities<sup>11</sup> for large employers in industrial areas (e.g. in manufacturing, processing and freight and logistics) are declining.

### 3.1.3 Employment

The main industries of employment in Rockingham are retail trade, education and training, health care and public administration and safety. The latter encompasses the naval operations at Stirling base. Industries that show the highest levels of self-containment (i.e. people living and working in Rockingham) are accommodation and food services, education, retail arts and recreation and public administration and safety.

Most people working in Rockingham live in Rockingham. The next most likely sources of labour are from adjacent and nearby municipalities of Mandurah, Kwinana and Cockburn.

### 3.1.4 Employment Locations - Rockingham

The main employment locations in the City of Rockingham are summarised in **Table 3.2**<sup>12</sup>.

<sup>11</sup> i.e. employees per ha of developed land.

<sup>12</sup> Note that these data do not show all employment in the City (for example, it excludes home-working) and because of substantial differences in collection methodology do not fully coincide with available ABS Census data. However, they do give a good picture of the relative distribution of employment across the City



**Table 3.2 : Employment, Commercial and Industrial Complexes**

	Full time	Part time	Total	FTE (est)
<b>Commercial Centres</b>				
• Rockingham City and Beach	2,641	3,545	6,186	4,414
• Baldivis Town Centre	543	1,249	1,792	1,168
• Other centres (No = 34)	1,424	2,657	4,081	2,753
<b>Total Commercial Centres</b>	<b>4,608</b>	<b>7,451</b>	<b>12,059</b>	<b>8,334</b>
<b>Industrial Centres</b>				
• East Rockingham	2,190	742	2,932	2,561
• Port Kennedy	462	375	837	650
<b>Total Industrial Centres</b>	<b>2,652</b>	<b>1,117</b>	<b>3,769</b>	<b>3,211</b>
<b>Public Purpose and Recreation Complexes</b>				
• Rockingham Hospital	947	641	1,588	1,268
• Garden Island	1,100	0	1,100	1,100
• Rockingham City Centre	1,155	925	2,080	1,618
• Secondary / Tertiary Education and other	404	152	556	480
• Primary Education / recreation complexes	438	456	894	666
<b>Total Public Purpose / Recreation Complexes</b>	<b>4,044</b>	<b>2,174</b>	<b>6,218</b>	<b>5,131</b>
<b>Total</b>	<b>11,304</b>	<b>10,742</b>	<b>22,046</b>	<b>16,675</b>

Source: WAPC Land Use and Employment Survey 2015 - 2016

Within the City, employment locations that are primarily residential (Shoalwater/ Safety Bay, Waikiki / Warnbro, Port Kennedy/ Secret Harbour, Baldivis/ Karnup) have high proportions of retail, local education and local health care jobs. These are the population driven jobs that support local communities. They are scaled linearly with population.

The primarily residential areas have a jobs per local resident ratio of between 0.124 and 0.143 jobs/resident. This equates to an employment self-sufficiency ratio of around 32% and gives an indication of the scale of jobs that can be expected to service a local population with retail, local education, local health and other services.

The areas with the greatest employment concentration – and the highest ratios of jobs/resident - are the Rockingham City Centre (regional services and tourism) East Rockingham (manufacturing) and Garden Island (naval base). Each one of these has an employment base that is not entirely dependent on the local population.

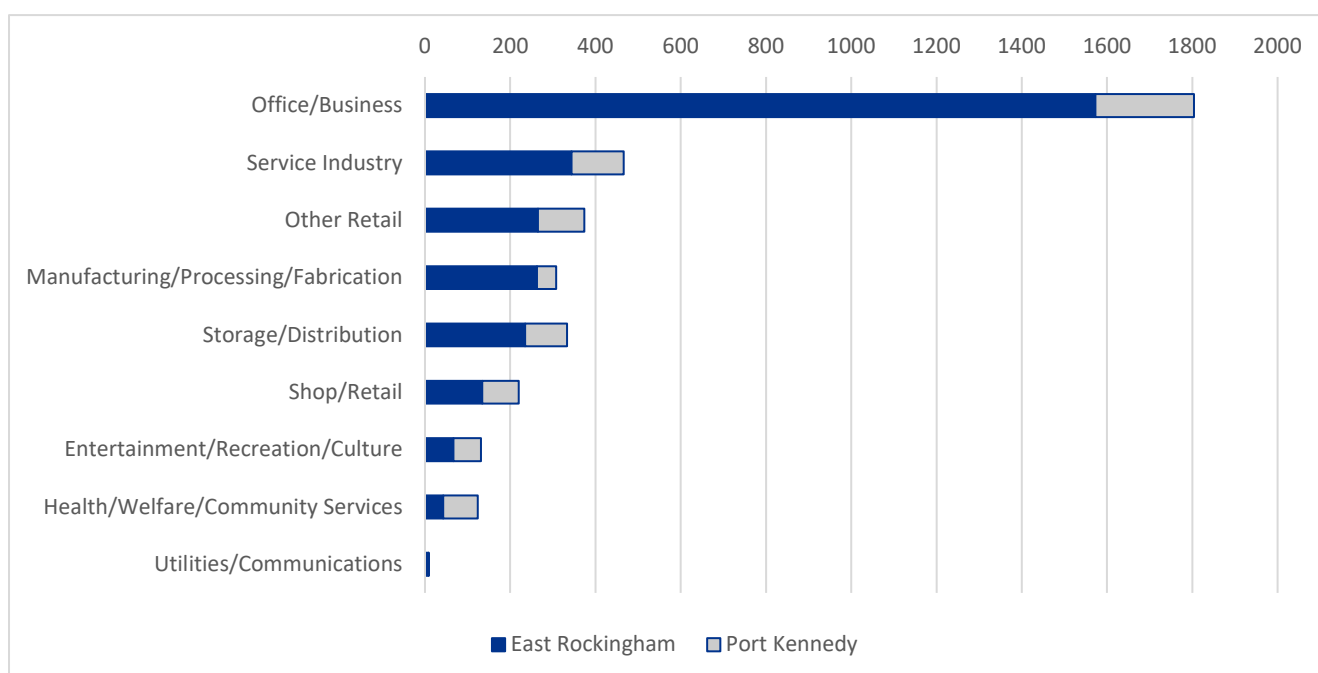
### 3.1.5 Employment Capacity

Commercial centres, particularly the Rockingham City Centre, have no effective limits to their capacity to accommodate employment growth. There is ample land suitable for intensification of land uses and for higher density development with consequent expanded employment uses in a town centre environment.

However, the employment capacity of industrial estates in Rockingham is limited by the land available to it and the type of economic activity in them. Rockingham has two industrial / business estates – East Rockingham and Port Kennedy. They are quite different. East Rockingham is larger (around 2,930 employees compared with 840 for Port Kennedy). This is illustrated Figure 3.2.



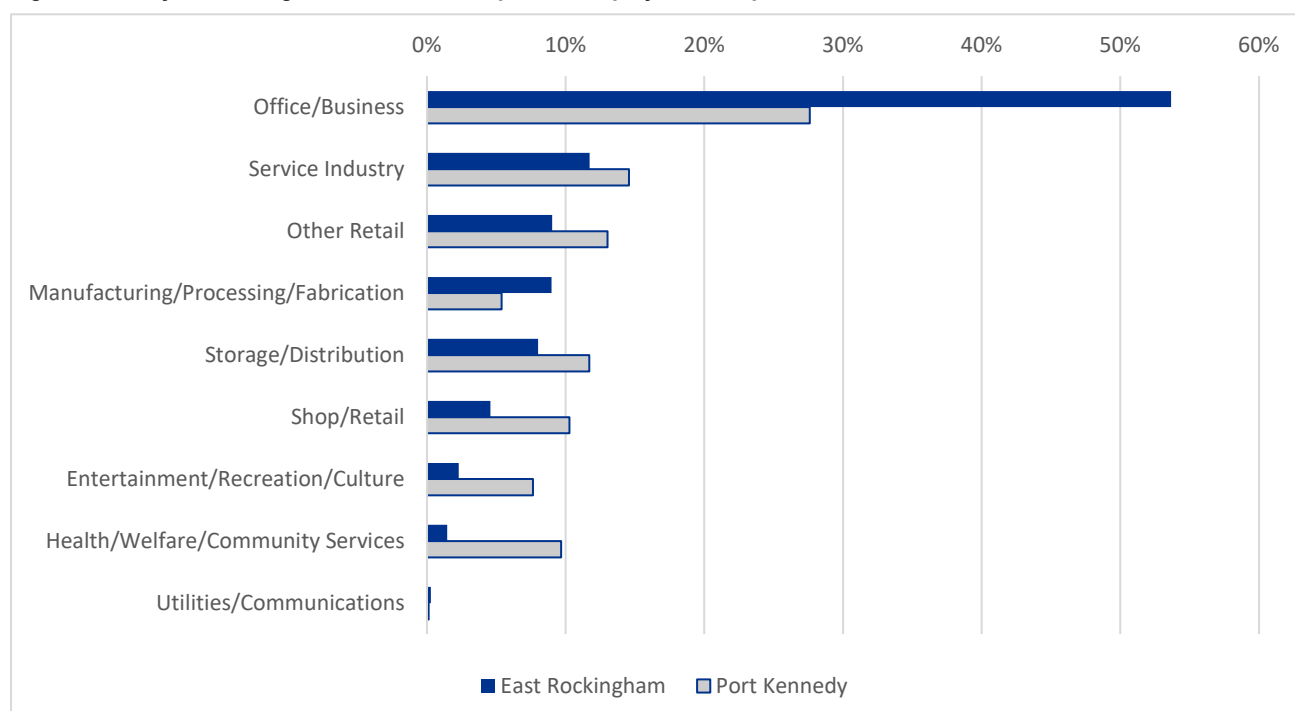
**Figure 3.2 : City of Rockingham Industrial Complexes, Total Employment**



Source: WAPC Land Use and Employment Survey 2015 - 2016

The amount of office employment in East Rockingham is high, around 54% of the total, with 12% of total employment in service industries. The proportion of office employment in Port Kennedy is lower – around 28% of the total – and this estate has employment proportions at above 10% of the total in a wide range of PLUC categories, including Service Industry, Storage/Distribution, Other Retail, Shop/Retail and Health/Welfare/Community Services. This is shown in Figure 3.3.

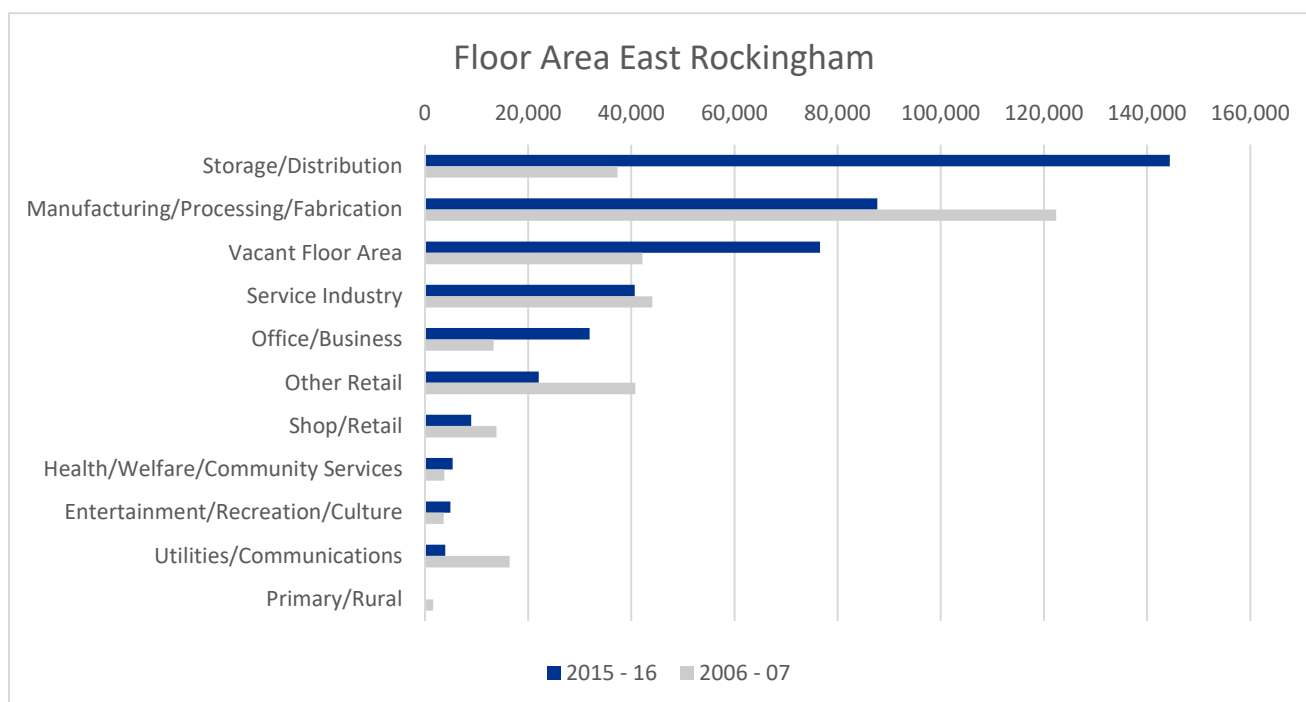
**Figure 3.3 : City of Rockingham Industrial Complexes, Employment Proportion**



Source: WAPC Land Use and Employment Survey 2015 - 2016

East Rockingham has a high proportion of storage / distribution floorspace. This has increased almost four-fold since 2006–07. Over this time the amount of office floorspace has increased by 2.4 times, but the manufacturing floorspace has reduced to 74% of its 2006-07 figure. This is shown in Figure 3.4.

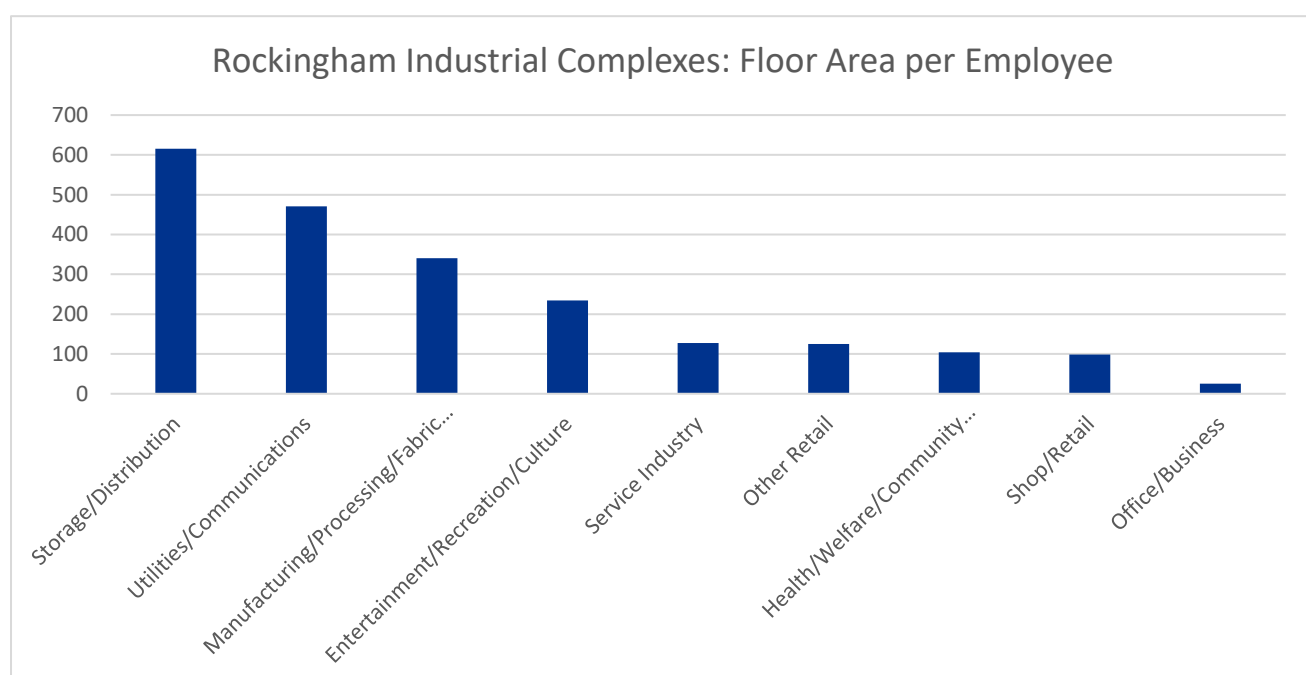
**Figure 3.4 : Floor Area, East Rockingham, 2006-07 and 2015-16**



Source: WAPC LUES 2015-16 and WAPC Commercial and Industrial Land Use Survey 2006-07

That East Rockingham has a high storage / distribution floorspace and a high office employment reflects the very low employment intensity of storage / distribution land use, as shown in Figure 3.5.

**Figure 3.5 : Rockingham Industrial Complexes, Floor Area per Employee**



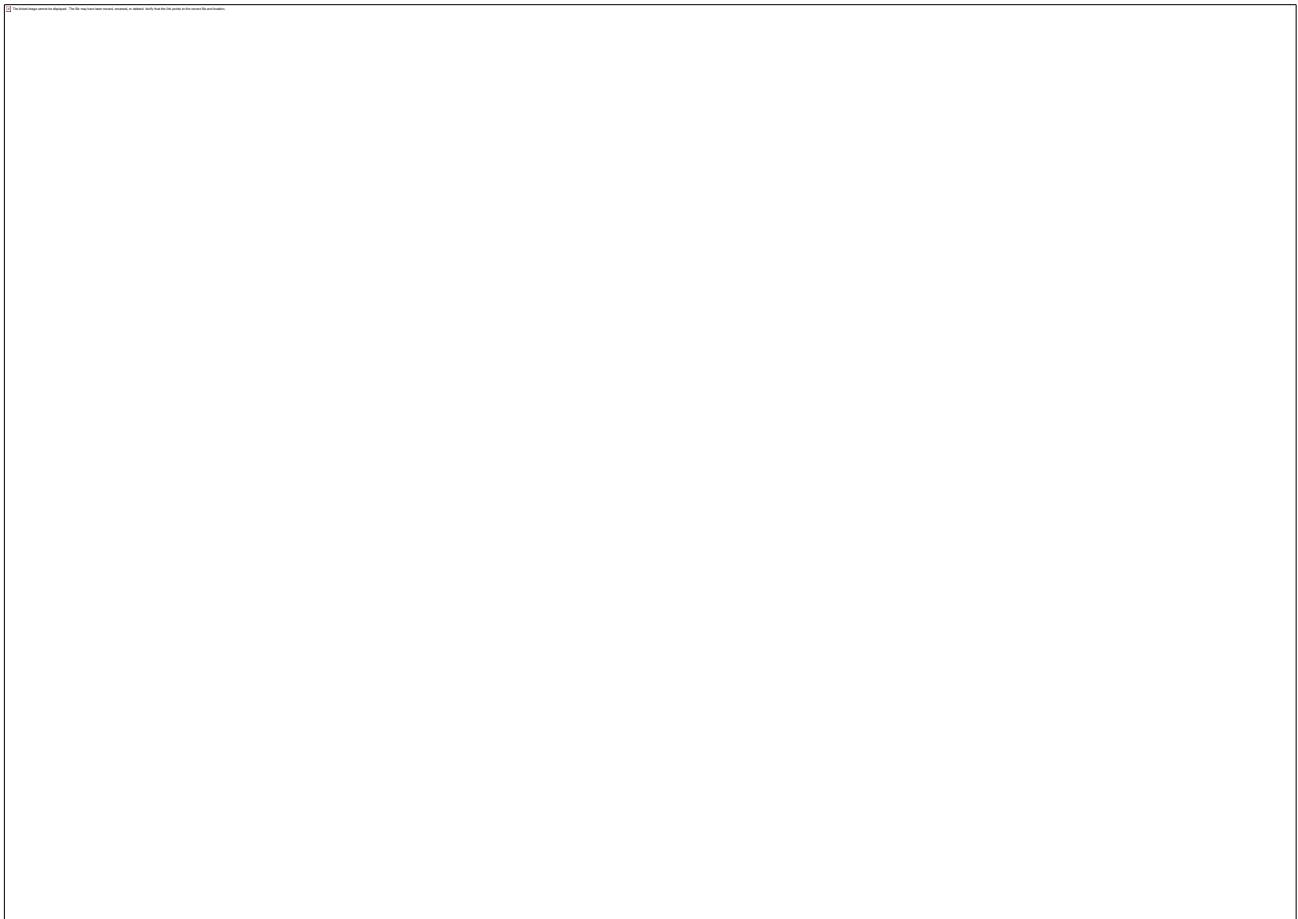
Source: WAPC Land Use and Employment Survey 2015 - 2016

Thus, while the overall floorspace in East Rockingham has increased, total employment in the estate employment has not increased at all. The 2006 - 07 estimate of total employment in East Rockingham was 3,000<sup>13</sup>; the 2015-16 estimate is 2,932<sup>14</sup>.

Port Kennedy has an employment density of around 21.9 employees per net developed hectare of land.<sup>15</sup> This is a much higher employment density than East Rockingham, which has around 9.8 employees per hectare<sup>16</sup>. This compares with a Perth metro average for all industrial estates of 17.8 employees per hectare<sup>17</sup>.

It is estimated that the Port Kennedy Business Enterprise Zone (see **Figure 3.6**) has 66.42 ha of undeveloped zoned land. At prevailing density rates and allowing for a 25% net to gross adjustment, when fully developed this has capacity for around 1,450 employees. There is a further 9.52 ha of vacant land in the developed portion of Port Kennedy estate, with capacity for a further 270 - 280 employees. This gives a total additional employment capacity of around 1,730.

**Figure 3.6 : Port Kennedy Business Enterprise Zone**



East Rockingham has a total of 401.94 ha of undeveloped land (net of environmentally constrained land) zoned, General Industry and Special Industry and 109.63 ha of vacant developed land in Light Industry, General Industry and Special Commercial zones. Applying current employment density estimates gives a capacity of a further 5,880 employees. The breakdown is shown in **Table 3.3**. It shows a total capacity for additional employment in existing industrial estates (East Rockingham and Port Kennedy) of around 7,600.

<sup>13</sup> WAPC Commercial and Industrial Land Use Survey 2006-07

<sup>14</sup> WAPC Land Use and Employment Survey 2015 -16

<sup>15</sup> WAPC Commercial and Industrial Land Use Survey 2006-07. This is the latest data available linking employment and developed land area.

<sup>16</sup> Given the large increases in Storage/Distribution floorspace at East Rockingham between 2007 and 2016 it is likely that this ratio has decreased to a lower employment density.

<sup>17</sup> For reference, In the base study for overall industrial planning and supporting the WAPC Economic and Employment Lands Study (EELS) and the Perth and Peel @ 3.5 Million suite of documents and based on earlier data used estimates of between 14.1 and 14.9 employees per ha (see: Syme Marmion & Co, Industrial Land Needs Study, August 2008)

**Table 3.3 : Industrial Complexes, Employment Capacity on Vacant and Undeveloped Sites**

	Area (ha)	Zone	Multiplier	Employment Capacity
<b>EAST ROCKINGHAM</b>				
Patterson Rd	121.30	General Industry	0.1021	1,188
Mandurah Rd	73.14	General Industry & Special Industry	0.1021	716
East Rockingham (North)	207.50	General Industry & Special Industry	0.1021	2,032
Dixon / Day Rd (net)	5.15	Light Industry	0.0503	103
Dixon Rd West (net)	58.43	Light Industry	0.0503	1,163
Patterson Rd / Ennis Ave (net)	40.95	General Industry	0.0766	535
Enterprise Way (net)	5.10	Special Commercial	0.0343	149
				<b>5,884</b>
<b>PORT KENNEDY</b>				
Port Kennedy (Net existing)	9.52	Port Kennedy Business Zone	0.0343	277
Port Kennedy (Undeveloped)	66.42	Port Kennedy Business Zone	0.0457	1,452
				<b>1,729</b>

### 3.1.6 Employment Locations - Other

#### **Western Trade Coast**

Economic activity in and around Cockburn Sound makes it a very high employment location for Rockingham residents. This area currently provides up to 20% of all jobs for Rockingham residents and is one of the most significant for the future. It has several components:

- The Western Trade Coast, a 3,900-hectare industrial region. The four primary estates within the Western Trade Coast - Kwinana Industrial Area, Latitude 32 Industry Zone, Rockingham Industry Zone and the Australian Marine Complex - employ over 11,000 people and generate more than \$15 billion per annum, accounting for two per cent of WA's Gross State Product, contributing over a third of all value added in WA's manufacturing sector. When fully developed, the Western Trade Coast is forecast to employ more than 22,000 people with a forecast value to the WA economy of \$28 billion.<sup>18</sup> With the likely expansion of defence expenditure for shipbuilding and maintenance at the Australian Marine Complex and on-going links to naval operations at Stirling base there will be increased direct and indirect employment. A high proportion of these are skilled and professional and technical services jobs and a high proportion of the indirect component could locate in Rockingham City Centre; and
- Fremantle Outer Harbour (Westport) could replace inner harbour as the primary container and general cargo port for Western Australia over time. In the first instance (i.e. before 2050) it would replace much of the general cargo movements (e.g. motor vehicles and livestock) from inner harbour and move to a scale of the current inner harbour of containerised freight (i.e. up to 1 million TEU p.a.) The timing of this is uncertain, but it would quickly add to the activity in the Western Trade Coast, in particular with the construction of an intermodal facility at Latitude 32.

However, the Cities of Kwinana and Cockburn, which contain the majority of the Western Trade Coast, also show large population growth (population increases of 44,000 and 55,000 to 2041 respectively), bringing with it employment demand for that population. Much of this demand will be targeting their own employment centres. A conclusion is that the City cannot rely on new projects and industrial estates in the Western Trade Coast in the Cities of Kwinana and Cockburn to meet all the future employment needs for its resident workforce.

#### **Inner Perth**

The *Perth and Peel @ 3.5 million* strategy shows very substantial employment growth for the Perth central areas. In scale, the projected employment growth in the Perth centre is much larger than any other location

<sup>18</sup> <http://www.westerntradecoast.wa.gov.au/about/>

and, without active intervention, the clear majority of new employment will be in the Perth inner areas. The City of Perth and the adjacent inner area municipalities currently are the location of around 8% of employment for Rockingham residents. This will increase.

A legacy of the current economic downturn in WA is a very large amount of vacant office space in the Perth central areas. This will further increase the draw to Perth central areas for new economic activity and will make new office building anywhere in the metro area, except for specific purposes, less viable. It is therefore likely that this will continue to be a main employment destination for Rockingham resident workers.

Rockingham is a residential location for a large number of FIFO and DIDO workers, currently accounting for up to 15% of the resident workforce. It is likely that the absolute numbers of FIFO and DIDO workers will endure but not grow at nearly the extent of the past decade. The proportion of these workers in the Rockingham resident population will therefore decline steadily over time.

### 3.1.7 Employment and Population Scenarios

On current estimates and projections by the City and by the WAPC, Rockingham's population will grow to around 196,000 by 2036 and to between 214,000 and 236,000 by 2050. In this scenario, even with some increase in employment, it is most likely that employment self-sufficiency ratios will decline to between 45% and 49%. These scenarios are broadly consistent with the draft Framework. In that strategy, employment in the Rockingham City Centre is anticipated to be 12,292 in 2050.

To better assist with planning decisions, a series of population and employment scenarios can be developed based on the current planning framework and zones. The position of these at 2050 are summarised in **Table 3.4**. All scenarios provide for population-driven employment in primarily residential development areas, with varying assumptions for growth in Rockingham City Centre employment and in industrial estates. The vacant land capacity discussed in Section 3.1.5 is assumed to be entirely or substantially developed by 2050, but no new industrial or business zoned land is assumed in the City.

**Table 3.4 : Population and Employment Scenarios**

Scenario	1	2	3	4	5	6
Population Growth	Low	Low	Medium	Medium	High	High
Employment growth	Low	Medium	Low	Medium	Medium	High
Population	213,874	213,874	247,933	247,933	298,021	298,021
Workforce	94,105	94,105	109,091	109,091	131,129	131,129
Jobs:						
• General development (population driven)	23,684	23,684	27,389	27,389	31,943	31,943
• Industrial & Navy	7,037	9,537	7,037	11,537	7,037	11,537
• Rockingham Centre	11,193	13,693	13,898	19,307	25,262	34,422
Total Jobs	41,914	46,914	48,324	58,233	64,241	77,901
Employment Self-Sufficiency	0.45	0.50	0.44	0.53	0.49	0.59

The Scenario 1 and Scenario 2 projections are broadly in line with current projections above and assume City Centre employment of between 11,200 and 13,700 by 2050.

With some residential intensification in the City Centre, in activity centres and along activity corridors, the City's population would grow to 213,000 by 2036 and to 248,000 by 2050. This is shown in Scenarios 3 and 4. However, under Scenario 3, employment growth would not keep pace with residential growth and employment self-sufficiency could decline to 44%. It is worth noting that this scenario is possibly unlikely as the prospect of achieving significant residential infill without substantial local employment is low.

If Rockingham were to become the primary centre for the wider region the population would be 246,000 by 2036 and 298,000 by 2050. This is only possible with substantial employment growth focussed on the Rockingham City Centre. It would have between 25,200 and 34,400 employees by 2050 and the City's employment self-sufficiency ratio would be between 49% and 59%. This is quite a different regional scenario to that envisaged in the draft Framework. It involves a very substantial increase in the role of the Rockingham City Centre as an employment location.



A clear conclusion from this is that residential intensification without complementary employment growth will produce an outcome that is sub-optimal. Only the high employment growth scenarios have employment self-sufficiency levels above 50%, and even these are low in comparison to an optimum level. As discussed above, the employment capacity in the Western Trade Coast will not come anywhere near providing sufficient jobs for the expanding population and the vast majority of new non-population-driven jobs will likely be in the Perth inner areas. This has substantial consequences on the transport system. In these circumstances, a target of 70 – 75% employment self-sufficiency for Rockingham is preferable and potentially achievable with changes in the planning framework.

## 3.2 Transport

An efficient and effective transport system and an integrated supply of land for employment are essential pre-conditions for viable growth. Together these provide the physical framework that will enable the City to grow sustainably. A well-connected transport network allows people to access the areas we go to reside, attend school, attend work, shop or recreate. The location and form of existing and planned future activity centres influences the design of the passenger transport network. Ideally, the intention will be to increase the proportion of travel by walking, cycling and public transport, reduce the proportion of car travel, and improve the overall liveability of the sub-region. There is also a need to accommodate the movement of goods in industrial and commercial areas. Sustainability of transport systems is intrinsically linked to land use.

### 3.2.1 Transport Provision

The overall transport networks as shown in the current state planning and transport strategies<sup>19</sup> provide very limited detail on both road and public transport infrastructure and services that will be required to meet the needs of Rockingham over the next 20 to 40 years. Several transport planning principles were recommended by Jacobs and Syme Marmion in the *Integrated Transport and Land Use System Review* undertaken for the City of Rockingham in August 2015. These principles are outlined for the different transport modes in the following sub-sections:

#### *Public Transport*

The City benefits from access to the Mandurah rail line. Between 2006 and 2011 (by which time the railway was built), public transport mode share to work increased from 4.5% to 10.5% in the City. Whilst this is a more than doubling, the mode share is still low when compared to other parts of the metropolitan area. Specific proposals are discussed later in this report (see Section 5).

Public transport infrastructure and services in Rockingham will need to be improved, based on the following public transport planning principles (Jacobs and Syme Marmion, 2015):

- *“Make public transport a viable travel option for a much large proportion of the community. Provide frequent public transport services along the proposed TOD corridors and to and within activity centres through an integrated network of rail, light rail and rapid bus lines, operating along priority routes.”*

A target of at least 15% of all trips in Rockingham by public transport by 2050 should be set to meet the accessibility and mobility needs of residents and visitors and to limit the growth of traffic on the road network.

Public transport patronage may be increased at the local level, through the development of Transit Oriented Developments (TODs) and by the further development of the existing transit system, including expansion of a light rail or rapid bus network. This urban form provides higher density housing in a mixed-use environment around good public transport. The concept can be built upon by extending the higher density mixed use land use along an activity corridor that is serviced by frequent public transport such as light rail or bus rapid transit. The catchment area for a TOD or transit corridor should be about 800m for heavy rail and 600m for light rail and high frequency buses. Access to TODs or railway stations can be supported by a reliable network of feeder bus services out to lower density residential areas. Tourism is an industry of growing importance in Rockingham.

<sup>19</sup> Refer to Figures Figure 2.1: Public transport improvement plan from South Metropolitan Peel Sub-Regional Planning Framework, Figure 2.2: Regional roads improvement plan from South Metropolitan Peel Sub-Regional Planning Framework and Figure 2.5: Integrated mass transit network @ 3.5 million and beyond from Perth and Peel Transport Plan

The needs of tourists, in particular the provision of a way-finding system is highly encouraged. It should focus on directing visitors utilising active transport as tourists may not have access to a car during their stay.

### *Cycling*

Cycling currently provides for a low proportion of all travel within Rockingham (less than 2%). In the future, cycling should be planned and developed to be an integral part of daily life in Rockingham, so that persons of all ages and abilities can utilise bicycles safely for all types of trips.

Cycling is a particularly suitable transport mode for trips that are less than 5km. Across the Perth metropolitan area around 50% of all trips are estimated to be less than 5km. While this figure may be less in the City, given its situation in the outer metropolitan area and its current propensity towards low density development, future land use structuring is likely to focus on increasing density in local areas and therefore cycling would become more attractive. Safety is a paramount consideration when people choose whether or not to cycle. Therefore, safe cycling routes should be developed to allow people of all ages and abilities to use bicycles. The focus should not be exclusively on facilitating commuter cyclists. In The Netherlands, where cycling is popular and well catered for, the following principles are employed for the design of cycling routes:

- Attractiveness – each route should feel attractive to use and include a feeling of personal safety for users;
- Coherence – there should be a choice of routes and the network should be legible and easy to use;
- Comfort – surfaces should be smooth and well maintained. Continuity of movement along the route should be preserved;
- Directness – direct routes with no unnecessary detours to provide journey times by bicycle that are competitive with the car; and
- Safety – separate cyclists from motorists and pedestrians where necessary, but allow mixed use along low speed, low volume streets. Design should be predictable in terms of alignment and priority.

These principles have been successfully implemented in jurisdictions outside of the Netherlands following some modification to suit local circumstances could be applied in the City.

One new type of infrastructure for cycle planning is the Bicycle Boulevard. These are standard residential streets that are converted to a 30km/hr environment where cyclists are prioritised. Cars are not excluded, but are not prioritised along the street. Bicycle Boulevards may be appropriate for consideration if the City can achieve mode shift to cycling. Cycling can also be encouraged by the provision of end of trip facilities and bicycle parking.

### *Pedestrians*

Walking is a feature of all journeys - people will have walking components to access public transport or to get from the car park to their location. It is free and highly accessible, children up to elderly people or people of limited means are all able to walk. The City can encourage more walking by the provision of a connected footpath network within and between activity centres. Providing pedestrians with safety from other road users (cars, cyclists, buses, trucks) by slowing the traffic speed and providing crossings; and comfort, through the provision of shade in the form trees or awnings and well-maintained paths also help to encourage walking.

It can be more challenging to increase the mode share of walking than it is to increase the mode share of cycling. This is because the amount of walking that can be achieved is heavily linked to the urban form and urban form changes slowly (often over several decades). More walking can be achieved if people live close to the location of their daily activities (such as school, work or shopping). Mixed use higher density areas therefore see a greater percentage mode share of walking than areas of single use and sparser density. The design of the street network is a consideration when encouraging walking. Fine grained gridded street networks typically provide greater walkability than curvilinear or poorly connected street networks. Grids minimise the distance to be covered by foot and lessen the need to use “public access ways” (PAWs).

The following principles should be adopted by the City of Rockingham in cooperation with others to achieve a future long term mode share of walking in the order of 17% (Jacobs and Syme Marmion, 2015):

- *“Create more mixed use communities along corridors and in centres with good public transport. Create a fine grained street network that provides more convenient access for pedestrians to a greater number of activities. Make streets in residential areas and in activity corridors and centres attractive for walking by providing a safe and comfortable environment (slow speed traffic, safe crossing points, shade and activities along the street network).”*

## Roads

Jacobs and Syme Marmion (2015) has proposed the following principles for road planning in the south-west metropolitan sub-region, including Rockingham:

- *“Develop the freeway network for the movement of long distance traffic and freight traffic to bypass activity centres. Limit access points to the freeway network to ensure its primary purpose remains the movement of long distance and freight traffic. Provide suitable crossing points of the freeway system to ensure it does not become too much of a barrier for local traffic, cycling, walking and public transport. Provide a well-connected network of distributor roads to link centres to each other for different transport modes and to provide access to residential neighbourhoods. Other than the freeway network, avoid construction of 6 lane roads where possible to limit severance, by designing a finer grained network. In centres, along activity centres and in residential areas, design streets to maintain low traffic speeds to provide a safe environment for all road users, but particularly pedestrians and cyclists.”*

Whilst a mode share target will be set to endeavour to reduce the amount of driving, a robust road network is still required. The City has access to the freeway system (mainly for access northwards to the Perth CBD) and this benefits fast moving, long distance traffic. However, there is a need for a further arterial connection to link Nicholson Road from Mundijong Road to south of Pinjarra Road. Currently the east-west road network is underdeveloped. The following east-west road connections are considered necessary:

- Extension of Safety Bay Road eastwards to connect with the South West and Tonkin Highways;
- Improved east/west connection from Port Kennedy to Serpentine; and
- Extension of Paganoni Road to connect to the South West and Tonkin Highways.

At a finer level of detail, a series of distributor roads will link activity centres within the City and there will be access roads into the low-density residential areas. It is important to be cognisant that roads create severance in the community and it is therefore desirable for distributor roads to be no wider than four lanes. Suitable crossing points for pedestrians and cyclists should be provided.

When planning for specific local roads, it is necessary to design the road/street cross section in line with the needs of the various road users by including cycling lanes, footpaths and medians (ideally for tree planting). Depending on the public transport system employed in the City, it will also be necessary to allow space for light rail or bus transit within specific road reserves. In activity centres and residential areas, measures should be put in place to slow the vehicle traffic and improve safety for pedestrians and cyclists.

## Freight

Freight movement also needs to be considered. There is an industrial area within the City as well as several commercial areas. In addition, the Royal Australian Navy has a presence in the area which generates a need for goods and services. Additionally, there are agricultural land uses nearby that need an efficient means to get their produce to the market, either locally or further afield for export. Freight routes play a critical role in economic development both for the City and the greater region as they facilitate the production and exchange of goods and services. They need protection and are normally planned as a “freight corridor”. Freight routes would generally be higher speed, greater volume roads and as such are generally unsuitable to be developed for residential land uses. However industrial and commercial businesses may find it desirable to locate near the freight route for ease of access.

Currently Ennis Avenue and the Kwinana Freeway are the major north/south freight roads in the area. However, this network will need to be expanded in the future to provide east-west connections, as outlined above, to provide access to the Tonkin Highway and proposed north/south arterial connection linking Nicholson Road to Pinjarra Road.

## 4. Identification of Issues

### 4.1 Employment

Current and emerging issues for the City are identified as follows:

- The changing nature of work:** Traditional employment sectors concentrated in industrial areas are steadily becoming less labour-intensive. The static employment levels in East Rockingham between 2006 and 2016, at a time when total floorspace has increased (as reported in Section 3.1.5), are illustrative of this trend. New employment sectors are largely urban based in services sectors. The current sectors of employment in the City do not match sectors projected to be in high demand in the future. Future jobs growth for the City is likely to be in health, tertiary education, public administration (including support services to the navy) and to a lesser extent, retail. Many current jobs in the City are in the traditional areas of manufacturing and freight transport which are very likely to be candidates for automation in the near future. However, this does provide opportunities for indirect employment in supporting and supply industries;
- Employment in the general economy is broadening the types of work away from mining:** The Western Australian economy is underpinned by mining (accounting for around 34% of value). This gives a robust economic base but small prospects of direct employment growth. Employment growth will be in those activities that build on the skill base and technological infrastructure supported by the mining industry and new and expanded industries that build on particular competitive advantages in the state. For Rockingham, spin-off from the marine construction and servicing complex in Cockburn Sound, servicing and supporting military (navy) operations and specialised rural activities (including the equine industry) stand out.
- Rockingham is a Strategic Metropolitan Centre:** the primary centre for a large and rapidly growing region - and as such should be the location of key regional services including education (at all levels, but particularly tertiary); health services; public administration (including support to the navy); management, administration, research and product development for regional activities and high-level arts and entertainment. The greater the concentration of these services in the Rockingham City Centre, the greater the agglomeration economies and the more attractive the centre becomes for more growth. It is critical that every opportunity to increase the amount and diversity of economic activity in the City Centre is taken. It is in direct competition with the Perth central area for some of these activities and while it will not provide the same scale, it must provide the diversity to maximise its attractiveness to new enterprises. This means that key institutional drivers such as tertiary education and tertiary health services must be in the Rockingham City Centre and not geographically distributed around the City. This is discussed further in Section 5, but the Rockingham City Centre is by far the preferable location for a tertiary health campus, for example. It is the most accessible location in the City by all forms of transport and associated and spin-off activities, such a specialist services and day-hospitals, are likely to be much greater with a concentration around the health campus in the City Centre than if it were in a more remote location. Otherwise, they might be lost to the City entirely and be in another location in the Perth metro area (most likely in the inner Perth area).
- Population growth for the City is forecast to be substantial:** on the current trajectory it is forecast to grow by 79% to 196,300 between 2011 and 2031. This will mean an increase of around 38,500 in the Rockingham resident workforce over the period and consequent need for increased local employment provision. Many of these jobs will be directly related to the increased population (for example, retail, education and health services jobs) but a large number of additional jobs from externally-oriented or strategic sectors (for example, tourism, media and technology applications, international education, manufacturing and processing, freight and logistics) will be required to achieve satisfactory levels of employment self-sufficiency.
- Population growth in the City:** Population growth in the City is currently forecast to be overwhelmingly in the inland eastern areas of the City. The areas of Baldivis (north and south) and Karnup account for



86% of the forecast growth between 2016 and 2036<sup>20</sup>. This would be modified by a new housing strategy arising out of the Housing Study, which would see more population in the established western areas of the City. With the current trajectory, the majority of the population expansion is in the eastern residential areas (Baldivis – Karnup) and by 2050 it would have around 43% of the total City population. Under the medium infill scenario, the coastal residential areas would have around 45% of the population by 2050 with 37% in the eastern zones. In the high infill scenario, the City Centre population would grow to around 48,500 (21% of the population) with the associated coastal residential areas having 49% of the total population.

- Population-driven employment (e.g. retail centres, schools) is accommodated in the eastern areas of the City, but there is very little land for other employment, for example, for business or industrial uses.
- Rockingham currently has a very low employment self-sufficiency ratio (53%) and an even lower self-containment ratio of about 30%. It is adjacent to areas of high employment in the Cities of Cockburn and Kwinana. These have high employment self-sufficiency ratios (98% and 80% respectively) and are areas of future projects and employment growth. Much of that growth will be in industrial areas. While this will provide good economic growth, in terms of value adding activity, this will be at lower rates of employment growth than in the past, as the on-going effects of the incorporation of technology and capital investment continue. Employment densities for large employers in industrial areas (e.g. in manufacturing, processing and freight and logistics) are declining. The Cities of Kwinana and Cockburn also show large population growth (population increases of 44,000 and 55,000 respectively), bringing with it employment demand for that population. Much of this demand will be targeting their own employment centres. A conclusion is that the City cannot rely on new projects and industrial estates in the Cities of Kwinana and Cockburn (i.e. the Western Trade Coast) to meet all the future employment needs for its resident workforce.
- In the current population trajectory, employment self-sufficiency will decline to levels of between 45% and 50%. Even with very substantial employment growth in the Rockingham City Centre it would get to only 59%. This is insufficient for good planning, transport and community outcomes.
- Population growth on its own will not bring enough employment to maintain employment self-sufficiency ratios. The main reason for this is the nature of local jobs that are supported by residential development. Even with higher density development, there is no reason for anything other than local jobs to locate there. It also means that for most scenarios, an increasing number of Rockingham residents will be leaving the City for employment.
- The WAPC *Perth & Peel @ 3.5million* strategy shows very substantial employment growth for the Perth central areas and this will continue to be an employment destination for Rockingham resident workers. A legacy of the current economic downturn in WA is a very large amount of vacant office space in the Perth central areas. This will further increase the draw to Perth central areas for new economic activity and will make new office building anywhere in the metro area, except for specific purposes, less viable. It is therefore likely that this will continue to be a main employment destination for Rockingham resident workers.
- The WAPC *Perth & Peel @ 3.5million* strategy also shows employment in the Rockingham Strategic Metropolitan Centre as growing by a modest amount – by around 3,000 between 2011 and 2031 and by a further 2,500 to 2050. This is only a small proportion of new employment demand for the City. A challenge for the LPS is to facilitate employment growth in the Rockingham City Centre beyond these forecasts as one of the key locations for new employment in the City.
- Increased employment ratios will only occur by building on the economic advantages of the region. A high proportion of the opportunity will respond to the amenity and proximity advantages of a city centre and this is a key consideration for the employment future of Rockingham.

<sup>20</sup> Forecast.id/Rockingham

Two broad imperatives emerge from this:

- 1) The role of the Rockingham City Centre as primary employment centre must be greatly expanded beyond current planning expectations. Only the City Centre has the scale and urban environment to attract the types of jobs that are likely to be expanding in the future. The larger the centre, the more attractive it will be. By 2050, the broad region for which Rockingham is the largest and primary centre will have a population one-third larger than today's Gold Coast. This gives enormous possibilities for Rockingham as the main business, research, education, health services, entertainment and cultural centre for this region.

It currently is developed at a very low density over a substantial area and is essentially unconstrained in its capacity for more employment growth. To give this the greatest chance of success, where there is a choice between a City Centre location or location elsewhere in the City, all key economic drivers should be in the Centre. This particularly applies to tertiary education and the proposed tertiary health campus. Karnup is proposed as alternative location for this. This site has almost no advantages for a health campus, particularly for a tertiary campus with teaching capabilities. It is poorly served by public transport. Its relative isolation from main population centres will mean that any spin-off and associate activity is much less than if it were in the centre. Simple land availability in Karnup is short term-expediency and not good justification for a major piece of community and economic infrastructure. This is so important that it demands that land be found for it in the best location. While not easy, given the long time frame for the project, this can be achieved in the Rockingham City Centre; and

- 2) Additional employment land is required and this should be to the east of the City. In any scenario, this area will have around half of the City's population. Even with a substantially expanded employment role for the Rockingham City Centre, prospective employment self-sufficiency ratios are still far too low.

## 4.2 New Employment Land

Base planning and demand analysis for industrial land in Perth and Peel was completed 9 years ago<sup>21</sup> and the subsequent key WAPC policy document, the *Economic and Employment Lands Strategy* (EELS)<sup>22</sup> planned in detail only to 2031. The EELS shows a shortfall of industrial land in 2031 in the Metropolitan South West region (i.e. including Rockingham) of 278 ha and in the Peel region of 544 ha. This accounts for known industrial land developments such as Latitude 32 and Nambeelup. No detail on future employment land demand or supply for future years is contained in the *Perth & Peel @ 3.5 Million* suite of documents and very little other new land is identified in the region for future general business and industrial employment beyond 2031. It is thus necessary to identify additional employment land to be available beyond the EELS planning time frame to meet future population growth and employment demand.

### 4.2.1 North East Baldivis

North East Baldivis has been identified in the WAPC *Economic and Employment Lands Strategy* as the preferred site for future (medium term) industrial development in the South-west sub-region, most likely for larger lot general industrial uses with an emphasis on producer services such as warehousing and distribution; with potential for Strategic Export/ Knowledge based industry. This would be a very important addition to the City of Rockingham economy. The area has good access to the freight network route connections with road and rail opportunities that position the site as a strategic industrial location. It is a very large site, but it has some development constraints and it is possible that the some of the more likely uses might not be very employment-intensive. However, at minimum it would be expected to have similar employment multipliers to East Rockingham (see Table 3.3), indicating an employment capacity of around 8,300, allowing for some environmental contingency. Detailed planning and inclusion of more employment-intensive land uses might increase that number.

<sup>21</sup> Syme Marmion & Co, Industrial Land Needs Study, LandCorp and DPI, 2008

<sup>22</sup> WAPC, Economic and Employment Lands Strategy: non-heavy industrial, Perth metropolitan and Peel regions, April 2012

### 4.2.2 Karnup

There is a general longer-term need for additional employment land in the region and Karnup is very well located for this purpose. It has direct access to the freeway system and is the ideal location to meet a general long-term shortage of employment land in the lower metropolitan south-west and Peel.

For example, immediately south of Stakehill Road there is approximately 430ha of undeveloped land which is zoned 'Development' in the City of Rockingham Town Planning Scheme No.2 (TPS No.2). The majority of this land is controlled by LandCorp. If this land were developed with uses similar to those currently in the Port Kennedy Business Park, it would have an employment capacity of approximately 12,500 jobs.

Furthermore, a significant area of land south of this site (on the western side of the Kwinana Freeway) that is identified as 'Urban Expansion' in the draft Framework is a possible long-term location for employment land. Depending upon the extent of land allocated for employment, if developed for business purposes it would have an employment capacity of up to 12,400 jobs, giving Karnup a possible employment capacity of around 24,900 jobs. This is a very substantial addition to regional employment.

These possible long-term employment areas are shown indicatively in **Figure 5.3** in Section 5.

The location and transport access to these potential employment areas make possible land uses that could extend beyond traditional industrial uses, to encompass higher-level business activities. As a local example, these might be like firms that have located at Jandakot airport. However, more pertinent examples are the business parks that are in similar locations in Sydney's north-west and Melbourne's south-east.

A Sydney example is the Norwest Business Park. This is in the Baulkham Hills area of north-west Sydney, around 36km from the Sydney CBD. It has direct access to Sydney's orbital motorway system providing easy access to the CBD, airport and Sydney's manufacturing and distribution heartland. The Business Park has grown to accommodate over 20,000 employees with expansion expected to increase capacity to over 35,000 employees. The Business Park accommodates companies such as Woolworths (head office), ResMed, BBraun, Inchcape (Subaru) and Capital Finance and many small and medium businesses. Other large-scale corporations in the Norwest Business Park include AAMI Insurance, Fitness First gym, and one of the Reserve Bank of Australia's data centres.

Perth is already a big city and, at a population in 2050 of 3.5 million, business parks of this type are expected to be demanded and easily supported. With its location adjacent to the Freeway and with reasonable future connection to commuter public transport (see Figure 5.3: City of Rockingham: Employment and Transport), the Karnup site is ideal for this use. It is a much preferable use than for a tertiary hospital, which for reasons outlined above, should be in the Rockingham City Centre.

### 4.2.3 Effect on Employment Self-Sufficiency

The effect of new employment lands on employment self-sufficiency ratios for the City in 2050 are summarised in **Table 4.1**. The employment estimates for each additional area are indicative and reflect the assumptions on land use discussed in sections 4.2.1 and 4.2.2. They will vary depending on the final land use. Nevertheless, these order-of-magnitude estimates do illustrate the importance of each initiative to employment provision in the City.

**Table 4.1: Employment Self-Sufficiency with Additional Employment Lands 2050**

Scenario	1	2	3	4	5	6
Population Growth	Low	Low	Medium	Medium	High	High
Employment growth	Low	Medium	Low	Medium	Medium	High
Total Jobs - Base	41,914	46,914	48,324	58,233	64,241	77,901
Additions						
• North East Baldivis	8,300	8,300	8,300	8,300	8,300	8,300
• Karnup (Core)	12,500	12,500	12,500	12,500	12,500	12,500
• Karnup (Business Zone North & South)	12,400	12,400	12,400	12,400	12,400	12,400
Employment Self-Sufficiency						
• Base	0.45	0.50	0.44	0.53	0.49	0.59
• with North East Baldivis	0.53	0.59	0.52	0.61	0.55	0.66
• plus Karnup (Core)	0.67	0.72	0.63	0.72	0.65	0.75
• plus Karnup (Business Zone North & South)	0.80	0.85	0.75	0.84	0.74	0.85

The base employment self-sufficiency for the City is between 45% and 59%. If North East Baldivis is added and developed by 2050, this would increase to between 53% and 66%; if the core Karnup site (the area currently zoned 'Development' in TPS No 2) were added, it would increase to between 67% and 75%; and with the inclusion of additional potential areas south of the core area, the employment self-sufficiency could increase to between 80% and 85%, depending upon the extent of land allocated for employment. These are the levels of employment self-sufficiency the City must aspire to if it is to achieve good levels of liveability and transport efficiency.

Current expectations indicate that Karnup and North-East Baldivis might become industrial estates with a distinct character. One scenario is for North East Baldivis to become a low-density storage and distribution park, including automated goods handling, while Karnup would be characterised by higher order business / industrial uses. Their variety would contribute to the City's economic diversity.

## 4.3 Transport

Issues related to transport in Rockingham have been outlined in the Integrated Transport and Land Use System Review for the City of Rockingham of Perth and Peel at 3.5 Million (Jacobs and Syme Marmion, 2015). The major concern outlined in the report is that Rockingham is very dependent on the car for travel, with over 80% of all transport trips being by car (59% as car driver). This is a major area of concern since cities with high car dependence have been shown to perform poorly in terms of overall accessibility, congestion, road safety, affordability and cost of the transport system, and health and fitness (Jacobs and Syme Marmion, 2015).

The high level of car dependence in Rockingham (and other outer municipalities of Perth) has developed over a number of years due principally to a combination of:

- Large areas of land being developed almost exclusively for low density residential use (i.e. very little mixed use development within walking distance to end uses or access to public transport); and
- The development of a transport network and system that has been designed to encourage travel by car and provides little opportunity for travel by public transport, cycling and walking.

The result is that many residents in Rockingham have little option other than to travel by car because:

- They live too far from a public transport route or the service is too infrequent. A significant proportion of public transport users travel by car to access the train (park and ride or car drop off);
- Very few people live within walking distance of jobs, shops and other services due limited mixed use and low density residential development; and
- The bicycle network remains poorly connected and most cyclists would be required to cycle on roads that carry too much traffic at too high a speed and are considered unsafe by a large proportion of potential users.

The draft Framework includes a number of planning principles, which if implemented would improve transport efficiency in the region. They include support for more consolidated urban form, support for more infill development and integrated land use and transport planning. However, there is little evidence that this has been sufficiently translated into the spatial plan, which largely appears to be a continuation of suburban planning that has delivered an inefficient and car dependent region in the past.

In terms of future growth in Rockingham, only 23% is targeted for urban infill. This is much less than the 39% targeted for Mandurah, but much higher than the 1.4% targeted for Murray. Within the entire Rockingham / Peel area only 17% of urban development growth is targeted for urban infill over 35 years. This will be insufficient to change how people travel in any significant way. It will not result in the level of walking, cycling and public transport that will be necessary to reduce the negative impacts of car dependency.

Within the City of Rockingham, there is potential for a significant increase in urban infill, particularly within the strategic regional centre and within a proposed activity corridor along Read Street / Warnbro Sound Avenue between the City Centre and the proposed Karnup train station. Both areas could be developed as medium to high density residential mixed-use areas, that would enable a substantial number of people to live, work and attend activities by walking, cycling or by using public transport.

Jacobs and Syme Marmion in its *Integrated Transport and Land Use System Review of the South Metropolitan Sub-Regional Planning Framework* (2015), considered that there is potential for urban infill mixed use development for up to 75,000 people by 2050, compared to the 30,000 proposed by the WAPC.

Modelling undertaken by Jacobs (discussed in Jacobs and Syme Marmion 2015) estimates traffic generated within the City of Rockingham would double from 225,000 to 454,000 per day by 2050 under the business as usual scenario proposed in Perth and Peel at 3.5 Million. The same modelling showed that, when growth in Mandurah and Peel was accounted for, traffic through Rockingham would grow by 133%.

The modelling shows an almost doubling of north/south traffic through Rockingham at the northern end of the municipality, just south of Mundijong Road, to a near tripling of traffic south of Karnup Road. The average speed of traffic is expected to reduce from 63 km/h and 61 km/h to 34km/h and 41km/h in the AM and PM peaks respectively, indicating a significant increase in congestion.

Realistically it will not be possible to accommodate this large projected increase in traffic within and through Rockingham without extensive road expansion. Theoretically it may be possible to continue to add lanes to roads, grade separate intersections and construct new roads, but this would come at enormous cost. Furthermore, a road network of this nature would create major barriers and segregate communities as well as creating significant urban design challenges. It is considered that some additional roads will be required to complete a more fine-grained network, however, it is reasonable to assume that any practical expansion of the road network would not be able to accommodate the projected traffic, which would exceed the road network capacity and result in extensive congestion and delay within the sub-region.

#### 4.3.1 Daily Traffic Generation

The amount of congestion on the road system is closely related to the high number of trips made by cars and the high mode share of car travel. The more trips that can be made by public transport, walking and cycling, the less trips will be made by cars. **Table 4.2** shows how cities with better public transport systems have more public transport usage, less car usage and less road deaths per person.

**Table 4.2 : Travel characteristics of 50 largest cities in the United States**

Indicator	Increase/Decrease Compared to Bus Only System Cities		
	Large Rail System (7 Cities)	Small Rail System (16 Cities)	Bus Only System (27 Cities)
Public Transport Ridership (km per person)	+500%	+50%	0%

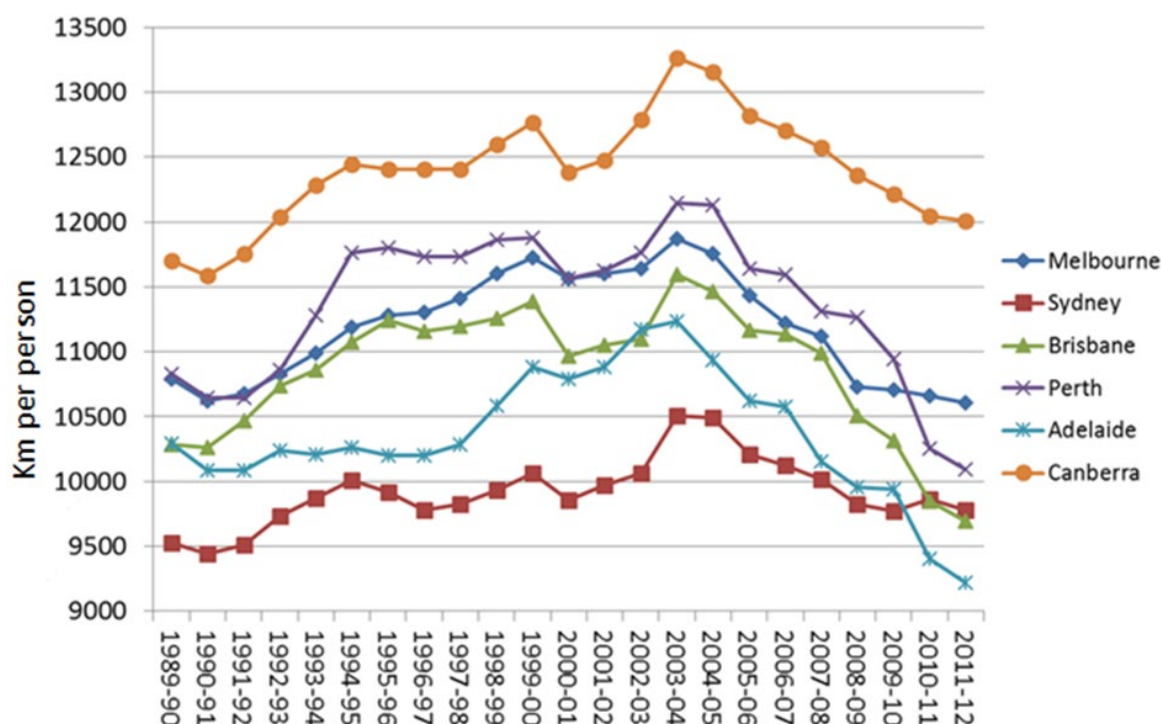


Indicator	Increase/Decrease Compared to Bus Only System Cities		
	Large Rail System (7 Cities)	Small Rail System (16 Cities)	Bus Only System (27 Cities)
Car Driver Travel (km per person)	-20%	-10%	0%
Traffic Safety (Deaths per 100,000 persons)	-35%	-15%	0%

Source: Rail Transit in America - A Comprehensive Evaluation of Benefits: Litman, T.

An overall trend of reduced car driving in Australian cities (refer **Figure 4.1**) is being driven by a number of factors including reduced congestion in the road system, some people staying connected by digital technology, increasing retail purchases over the internet and improved public transport and cycling networks in some areas.

**Figure 4.1: Car driving trends in Australian cities**



Rockingham and the Peel area are currently very car dependent. The majority of the reduction in kilometres driven per person within metropolitan Perth has occurred in inner areas, where public transport services have a higher frequency and coverage, where there are more mixed-use precincts and where more people live closer to work and other activities. Currently, public transport, walking and cycling are not feasible alternative mode choices to car travel for most trips in the outer areas of Perth, including in Rockingham and Peel and therefore the only alternative travel choice to car driving for many trips is as a car passenger. Whilst for some trips including some work trips, higher car occupancy can represent a higher level of efficiency than single car occupancy travel, for others it represents a trip by car that would not be made at all and often involves a return journey. These so-called escort trips, whereby someone drives another person to work, to school or to another destination, often result in two trips (the outward journey plus a return journey) and are the most inefficient trips of all. These trips, which are a product of car dependent development, are largely responsible for car passenger trips being very high in the outer metropolitan areas of Perth.

In Rockingham and Peel the proportion of trips by car are, on average, over 80% of all trips, with 59% as a car driver and 23% as a car passenger. Thus, although car driving has decreased on a per capita basis overall in

Perth, the efficiency dividend that this could provide on an ongoing basis in the Rockingham and Peel area is being reduced because of urban sprawl and the continued roll out of car dependent suburban development that discourages walking and cycling and makes the provision of public transport inefficient. Whilst the public transport system has improved following the construction of the Mandurah train line and feeder bus services, the level of accessibility between origins and destinations within the City remains low. Without improvement to the public transport system and cycling networks and a re-structuring of land uses to a more mixed-use development, the mode share of car driver is only expected to decrease marginally over the next 35 years (refer to **Table 4.3**).

**Table 4.3 : Car growth in Rockingham to 2050 based on business as usual**

Year	Population	Car Driver Mode Share	Car Trips Generated in Rockingham	% Increases in Car Travel from 2011
2011	109,000	59%	225,000	NA
2031	183,600	57%	366,000	+63%
2050	236,000	55%	454,000	+102%

It has been shown in other parts of Australia and overseas, that no amount of road construction will be sufficient to limit growing congestion in a growing city. As a result of the very high projected growth of population in the area, the modest reduction in car driver mode share under a business as usual scenario will make only a small impact on traffic growth. Under this scenario, traffic generated within the City of Rockingham could be expected to more than double to about 450,000 vehicles per day by 2050. Additional traffic of about 420,000 vehicles per day could be expected to be generated within the Peel area to the south. It is reasonable to assume that about 40% of the traffic generated in Peel would travel outside of that area to the north (an estimated 167,000 vehicles per day). However, about 60,000 of these vehicles are likely to travel along the Tonkin Highway that is assumed to have been constructed by this time. Therefore, the overall increase in traffic within and through Rockingham could be expected to increase by 133% with this scenario (229,000 vehicles per day generated from within Rockingham and 111,000 vehicles per day generated within Peel to the south).

As peak hour traffic on Rockingham's major road system is reasonably congested at present, the implications of this level of traffic growth are that a high level of congestion could be expected even with a substantial increase in capacity on the major road system. Whilst the Kwinana Freeway could be doubled to four lanes, increasing the capacity of arterial roads such as Ennis Avenue or Safety Bay Road is not an attractive proposition.

The level of traffic growth that can be anticipated on Rockingham's major arteries and streets will result in very significant increases in congestion over extended periods of time, even with a huge increase in road capacity in the area. The increased congestion, severance, road trauma and environmental impacts from this level of traffic increase will result in a decrease in the quality of life for the majority of Rockingham's population and visitors.

## 5. Appropriate Response

### 5.1 Why “Do Nothing” is Not Appropriate

Jacobs and Syme Marmion suggest that proactive intervention is essential to set the City on a path to more desirable and sustainable liveability outcomes. We suggest that the City workshops a number of options for future growth scenarios, with particular emphasis on the type of employment, transport and housing strategies that will be required to achieve these outcomes.

The “Do Nothing” scenario for little or no population growth within the Strategic Metropolitan Centre and along future activity corridors and no change to the type of employment or transport is a poor option. Modelling shows that it will lead to a sharp decline in employment self-sufficiency and an increasing proportion of the resident workforce will need to leave the City for employment. As previously laid out, the current statistics for journey-to-work movements for the City are at best static and at worst, already trending in the wrong direction. The magnitude of this problem is quantified in the papers in the Appendices for employment and transport. Employment self-sufficiency will go backwards as the population increases, if no additional jobs are created in the City.

Furthermore, the City should give some urgency to scenario planning and then move to implementation of strategies. At present there is good potential to attain support for the growth of Rockingham at all three tiers of government. The current State Government is placing particular emphasis on expansion of the public transport network (Metronet) and on job creation and skilling in high value trades and professions in the Perth and Peel metropolitan regions in general. However, there are no current proposals to improve public transport that are specific to Rockingham nor strategies to increase job creation in the City in particular. Initiatives from the City will do much to put these issues on the state and national agenda.

### 5.2 Setting a Vision

Visions are fundamental to engender change in the thinking around employment and transport planning and implementation for the City. Visions should be aspirational, yet achievable, providing the “end product” that everyone should be working towards.

In 2014 the City undertook community consultation and held workshops with community members to develop its Strategic Community Plan 2015-2025. This document lays out the vision for the city. The vision is backed by community aspirations and strategic objectives. The vision for the future is that by 2030 Rockingham City will:

- Be recognised and admired as a contemporary and vibrant regional destination, renowned for its thriving City Centre and Waterfront Village, natural beauty and world class coastal and marine environments;
- Enjoy a safe, relaxed and friendly tourism lifestyle, underpinned by a diverse range of community facilities, services and cultural activities all linked with a world class public transport system;
- Prosper from significant investment and employment opportunities, created by a diverse and robust economic base including retail, services, tourism, education, defence, horticulture and light and heavy industrial activity;
- Acknowledge that the climate is changing, continue to reduce its carbon footprint and the generation of waste and manage and use its natural and marine environments in a manner that preserves them for future generations; and
- Be home to a proud, welcoming and inclusive community that understands, respects and preserves its unique sense of purpose and place.

The vision is underpinned by aspirations and objectives, and each of these in turn is accompanied by strategy (either already existing or in some cases yet to be written). Table 5.1 highlights the objectives and strategies relevant to transport and employment.

**Table 5.1 : Objectives and strategies relevant to employment and transport from the Strategic Community Plan**

Objective in Strategic Community Plan	Strategy
Investment attraction	Economic Development Strategy Investment Attraction Strategy
Safety and Support	Road Safety Strategy
Infrastructure	Public Parking Strategy Integrated Transport Plan

This vision in the Strategic Community Plan recognises the need to provide for both employment and transport in the City. The vision could be further articulated in more detailed aims, consistent with the vision, to inform and measure strategic decisions:

- **Employment**
  - To expand the range of employment sectors and of employment land within the City;
  - To incorporate more roles in tourism, education and health services: and
  - To set a target for Rockingham City Centre to perform a comprehensive role as the primary centre for its extended region.
- **Transport**
  - To maintain a high level of accessibility to jobs, education and other attractors within the City: and
  - To reduce the level of car use per person by 25%.

## 5.3 Scenarios

### 5.3.1 Current Planning Framework (Business as Usual or “Do Nothing”)

Essentially this is what is currently proposed in the sub-regional plan for Rockingham. As detailed in Section 2.2, the draft Framework forecasts the population in the City to reach 235,935 by 2050, with much of this growth occurring in the eastern part of the City (Baldivis and Karnup), which is expected to have 45% of the residential population by 2036. This forecast is accompanied by a modest increase in employment to 12,292 jobs by 2050 in the Rockingham City Centre. The draft Framework also advocates integrated land use and transport planning principles, however these do not appear to have translated into the spatial plan. Here, the only public transport improvements proposed are a set of loosely defined links between the activity centres. A number of regional road improvements are proposed. If limited infill occurs and road improvements are prioritised over substantial public transport improvements, this spatial plan, if implemented, is likely to produce car dependent suburbs that are inefficient to service.

The Department of Planning, Lands and Heritage and the City are not aligned in their strategic planning for the City. The City’s Housing Strategy suggests that the forecast population of 235,935 would not be met if the population continues its current trajectory (refer to **Table 3.1** : Population Scenarios for the City). To meet this target, a level of infill in the existing residential areas of the City is required in addition to construction of dwellings in Baldivis and Karnup. If infill is encouraged, this would also influence the distribution of the population, with a greater proportion remaining in the western (coastal) side of the City, rather than shifting to the east.

The Rockingham Strategic Regional Centre Plan suggests that there could be 24,000 jobs in the Rockingham Strategic Metropolitan Centre by 2050 and that the Centre could be developed as a transit orientated development (TOD). There is potential to provide for 78,000 in infill locations, which would result in a population much greater than the 235,935 people forecast in the draft Framework. The plan also allocates retail and office space, space for a TAFE or university and space for community facilities, including an arts centre. A transit route linking Rockingham train station to Rockingham Beach via the City Centre is espoused.

### 5.3.2 Development Scenarios

Although the varieties are endless, they can be summarised into three population and three employment scenarios (as discussed in **Section 2.2**). These are:

- Current trajectory;
- Medium infill; and
- High infill.

The population estimates for each scenario at 2050 range from 214,000 to 298,000.

The employment scenarios are:

- Current trajectory;
- Medium employment growth – Rockingham attracts regionally specific strategic industries; and
- High employment growth – Rockingham as a primary centre for the region attracting jobs that otherwise would be in the Perth central area and expanded employment land in the east of the City.

Of these, six different population and employment scenarios can be usefully identified for further investigation. Those scenarios and the employment self-sufficiency (ESS) ratios at 2050 for each are shown in Table 4.1 and summarised here in Table 5.2.

**Table 5.2: Employment self-sufficiency under various scenarios**

Scenario	1	2	3	4	5	6
Population Growth	Low	Low	Medium	Medium	High	High
Employment growth	Low	Medium	Low	Medium	Medium	High
Employment Self-Sufficiency						
• Base	0.45	0.50	0.44	0.53	0.49	0.59
• with North East Baldivis	0.53	0.59	0.52	0.61	0.55	0.66
• plus Karnup (Core)	0.67	0.72	0.63	0.72	0.65	0.75
• plus Karnup (Business Zone North & South)	0.80	0.85	0.75	0.84	0.74	0.85

A conclusion is that population growth on its own will not bring enough employment to maintain employment self-sufficiency ratios. The main reason for this is the nature of local jobs that are supported by residential development. This is illustrated in the low job per person ratios for residential areas. Even with higher density development, there is no reason for anything other than local jobs to locate there.

It also means that for most scenarios, an increasing number of Rockingham residents will be leaving the City for employment.

While there is some employment in further expansion of industrial areas, these are currently limited in geographic extent and employment provision. In general, with automation, employment intensity in industrial areas is declining. The result is the expansion of economic activity in industrial areas will increase regional economic value and regional exports in value terms, but direct employment will not increase commensurately. However, it does provide opportunities for indirect employment in supporting and supply industries.

Therefore, a key implication is that increased employment ratios will only occur by building on the economic advantages of the region. For Rockingham, this means:

- An increased regional role for the Rockingham City Centre;
- Servicing the industrial and military operations in adjacent areas, taking advantage of the indirect jobs component that arise from these activities;
- Some industrial expansion in East Rockingham
- Substantial tourism expansion

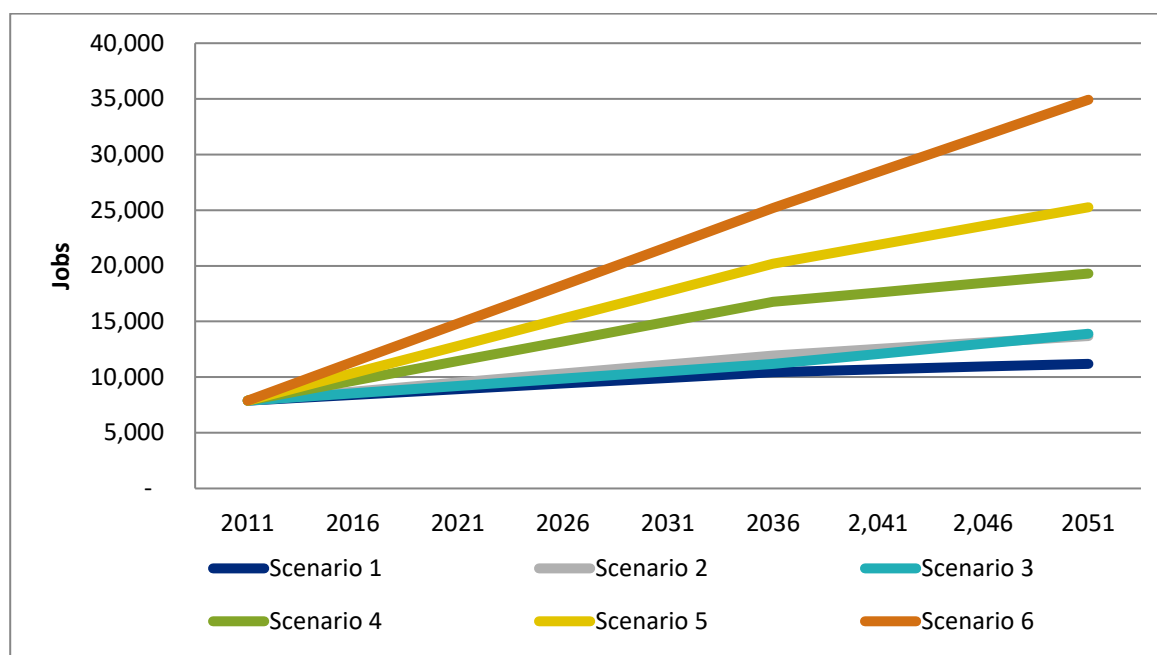
A high proportion of the opportunity will respond to the amenity and proximity advantages of a city centre and this is a key consideration for the employment future of Rockingham.



The analysis also makes clear that in addition to the expanded City Centre role, more employment land is required to bring employment self-sufficiency to reasonable levels.

City Centre employment scenarios for 2050 are graphed in **Figure 5.1** and range from 11,200 with the low scenario to 35,000 in the high scenario. Clearly the role of the City Centre and its economy is quite different between these scenarios.

**Figure 5.1 : City Centre employment under various scenarios**



Indications of the possibilities for the City Centre in the short and medium terms can be seen by comparisons with other Perth metropolitan strategic centres. Comparative analysis shows that Joondalup stands out as a large diverse centre with all the major institutional economic drivers that enable a diverse economy with substantial local employment. They include:

- A main university campus plus a specialist academy;
- A major health campus; and
- Substantial government and non-government office uses.

Including the city centre, the University, WA Police Academy, Joondalup TAFE and the Joondalup Health Campus, but excluding service industrial areas to the west of Joondalup Drive, Joondalup has around 13,700 workers<sup>23</sup>. This compares with around 7,800 in the extended Rockingham city centre (this does not include the East Rockingham / Dixon Road area) and gives an indication of a currently achievable scale for a Perth metropolitan regional centre. Joondalup centre has a very strong employment base in health and education, but also significant employees in growth and potentially externally oriented sectors such as accommodation and food services, finance and insurance, administrative services, information, media and telecommunications, professional, scientific and technical services and arts and recreation services.

For the longer term the role of Rockingham as the Primary Centre for an extended region can be explored. The development areas of Peel are adjacent to the similarly rapidly growing development areas in the City. This shows the combined region<sup>24</sup> growing from 232,000 in 2011 to 647,000 in 2050. This is larger than the current

<sup>23</sup> ABS, Census, 2016, (Place of Work)

<sup>24</sup> Consisting of the LGAs of Kwinana, Rockingham, Mandurah, Murray, Waroona

population of the Gold Coast – it will be a large region. By 2050 Peel and the Coastal SW sub-region will be 27% bigger than today's Gold Coast.

It is an appropriate comparison – the relationship of Peel/SW Coastal to Perth is very similar to the relationship of Gold Coast to Brisbane. It can be expected to feature some of the scale of life and features, although not the detail and with a slightly different economic base, of the Gold Coast. At its current scale the Gold Coast has:

- Three universities;
- A major teaching hospital;
- Tourist economy: 12 million visitors annually;
- 6 Tourist theme parks;
- Hosting Commonwealth Games 2018;
- An emerging IT and knowledge industry economy;
- Convention Centre;
- Served by an international airport; and
- Light rail infrastructure.

Rockingham-Peel has a higher proportion in its economic base industries (mining, manufacturing, public administration and safety - reflecting the effect of the Stirling naval base) but much lower proportions in tourism (accommodation and food services) professional, scientific and technical services) and arts and recreation services. These are indications of areas that can be worked on for expansion in the future in Rockingham/Peel. In particular, the latter two categories, and also tourism to some extent, in the main are city centre activities and respond to an urban environment.

### **5.3.3 Big Growth Scenario: Big City Centre, High Population and Jobs Growth, Large Expansion of Transport Infrastructure with TOD Planning Principles; Expanded Employment Land**

Under this scenario:

- Greater concentration on development of the City Centre. It currently is developed at a very low density over a substantial area and is essentially unconstrained in its capacity for more employment growth. It can easily sustain much higher development densities. As outlined below, a site for a tertiary hospital can be identified and assembled over time;
- The Strategic Metropolitan Centre would see more intensification of land uses;
- Higher population and greater residential density would be needed (increased efficiency) in the Strategic Metropolitan Centre to provide demand for increased frequency of transport services and transit infrastructure expansion;
- Development of a light rail system to link the current railway to the Strategic Metropolitan Centre;
- Job variety would be needed via an expansion of employment in a range of job sectors including education (at all levels, particularly tertiary); public administration (including the RAN); management, administration, research and product development for regional activities; tourism; health services; and arts and entertainment; and

Economic diversification and employment self-sufficiency would be underpinned by the proposed North-East Baldvies Industrial area and the inclusion of employment land at Karnup.

**Table 5.3** compares the scenarios (Note this data excludes the possible expansion of employment land at North-East Baldivis and at Karnup).

**Table 5.3 : Future growth scenarios and impact on transport**

	Business as usual scenario			Big growth scenario		
	2011	2036	2050	2011	2036	2050
Population	109,400	196,300	214,000	109,400	245,900	298,000
Jobs	28,700	40,000	42,000	28,700	61,300	75,900
Trips generated (all modes)	381,000	640,000	826,000	381,000	700,000	962,000
Car driver trips	225,000 (59%)	365,000 (57%)	454,000 (55%)	225,000 (59%)	350,000 (50%)	385,000 (40%)
% increase in car driver	NA	62%	102%	NA	55%	71%

The big growth strategy would see an increase in population of approximately 39% and in jobs of approximately 81% over the business as usual scenario. Despite this increased growth, the increase in car traffic could, with careful planning be reduced by 15%.

Rockingham would perform a comprehensive role as the primary centre for its extended region – the South Metropolitan Peel Sub-Region. In summary, it would entail:

**1. All primary regional institutions located in Rockingham**

- Tertiary education (including a full-service university of at least the scale of ECU);
- Health and community services – a major health campus with teaching capabilities;
- Government administration, including extensive co-working spaces for State Government agencies; and
- High-level arts and entertainment.

**2. Rockingham City Centre as the major regional business services base**

- Management, administration, research and product development for regional activities:
  - Ship building and maintenance, Henderson;
  - Naval support, Garden Island;
  - Freight and logistics, outer harbour and Latitude 32; and
  - Minerals processing and manufacturing, KIA and Postans.

**3. Expanded tourist activities**

- Business travel;
- Base for recreational and Visiting Friends and Relatives (VFR) tourism; and
- Complementing and building on tourism growth in Mandurah and Murray.

**4. Residential expansion focussed on Rockingham City Centre and its connected areas:**

- A higher proportion of medium and higher density development;

**5. Expanded employment land:**

- New employment land at North-East Baldivis and at Karnup.

This can be proposed as a vision for a vital, busy City with the best chance of providing a prosperous outcome for its residents.

## 5.4 Strategies and Implementation

**Sectors of employment** - The sectors of employment for an expanded City Centre include: education (at all levels, particularly tertiary); public administration (including the RAN); management, administration, research and product development for regional activities; tourism; health services; and arts and entertainment.

**Efficiency of land use** - Mixed use and higher density in the Strategic Metropolitan Centre would support improved public transport. There is also a need to consider how to encourage companies involved in management and administration in the regional economy to locate in the Rockingham City Centre (thereby supporting the "coffee economy") rather than in the industrial areas, when they are not engaged in manufacturing. One example is Raytheon (who undertake defence analysis and research) - they are currently located in the Henderson industrial area, but why not in the Rockingham City Centre? It is just an office. This would result in more efficient use of land, leaving industrial land available for companies that require their business to be located on land with this zoning;

**Tertiary training** - TAFE has a big presence in the City, but there is no other tertiary education or associated research activity. The former Murdoch University campus and surrounding precinct is ideal to attract a large university to locate in Rockingham. It could be a university currently located in Perth. ECU or Notre Dame may be promising candidates, as these institutions have a history of running multiple campuses in WA. Even more broadly a new player (perhaps an interstate or overseas university, without a current presence in Perth) could be attracted to Rockingham. In the knowledge economy business can be conducted anywhere in the world - it is liveability factors that will encourage and retain businesses in a physical location. Attracting a university is a difficult and long-term prospect. It would need for specific resources including appropriate staff to be assigned to it;

**Economic gardening** - This is business development targeted at small to medium size enterprises that wish to expand. Sponsored by the local government, it offers guidance and coaching from business specialists in areas including financial education, strategic planning, targeted marketing, internet advertising, business intelligence, that would typically be out of reach (too much of an overhead) for smaller businesses to carry. It is particularly suited to businesses that have a niche product or service and who wish to broaden their customer base/geographic reach. It is often seen as the antithesis to the "attract an anchor employer" strategy, but both may be appropriate strategies for Rockingham to consider;

**Transport system** - Focus on transport development to lessen car dependence. This will include development of walking and cycling networks, frequent public transport from the outer suburban areas to the city centre and the development of east-west connections from the freeway/heavy rail to the City Centre;

**Maximise TOD opportunities within the City of Rockingham** – The City has many opportunities for transit-oriented development (TOD). The 'Alternative Growth Strategy' in the City's draft Housing Study aims at maximising TOD opportunities between the City Centre and the Karnup Train Station; including the activity corridor between the two centres. The City is currently participating in a State government led project investigating strategic planning objectives for the future Karnup Station and precinct. It is being guided by the principle to ensure the TOD precinct is dominated by land uses that support transit and support TOD aims. Applying these principles and aims in appropriate locations across the City will maximise the planning and transport outcomes from transit infrastructure.

**Protect and expand employment land uses** - Need to reserve or protect land for future employment uses. As outlined above in Section 4.1 above, additional employment land is required and this should be to the east of the City. In any scenario, this area will have around half of the City's population. Even with a substantially expanded employment role for the Rockingham City Centre, prospective employment self-sufficiency ratios are still far too low. Land currently zoned Development and Rural in Karnup and in North-East Baldivis is very well located for this purpose. Both parcels have direct access to the freeway system and are well located to meet a general long-term shortage of employment land in the lower metropolitan south-west and Peel.

**Table 5.4 : Potential strategies for the City for employment and transport**

Category	Strategy
Land Planning	Protect land for future employment uses and expand employment land.
Land Planning	Allow for a for higher population target, more local employment and variety in employment sectors and greater housing density than current planning frameworks.

Category	Strategy
Land Planning	Maximise TOD opportunities within the City of Rockingham.
Transport	Promote walking and cycling.
Transport	Improved public transport, particularly connection between the train station and the Rockingham Strategic Metropolitan Centre.
Transport	Improved public transport connections between Karnup and Baldivis and the Rockingham Strategic Metropolitan Centre.
Transport	Support for road improvement.
Transport	Facilitation of freight movement.
Employment Growth	Work towards attracting a higher education provider to locate in the City Centre with associated teaching and research specialties.
Employment Growth	Allow for tertiary health campus, including teaching and research in the City Centre.
Employment Growth	Economic gardening strategies to grow small-medium enterprises (SMEs) in both size and profitability.
Employment Growth	Promote tourism sector.
Employment Growth	Attract arts and higher level professional services.



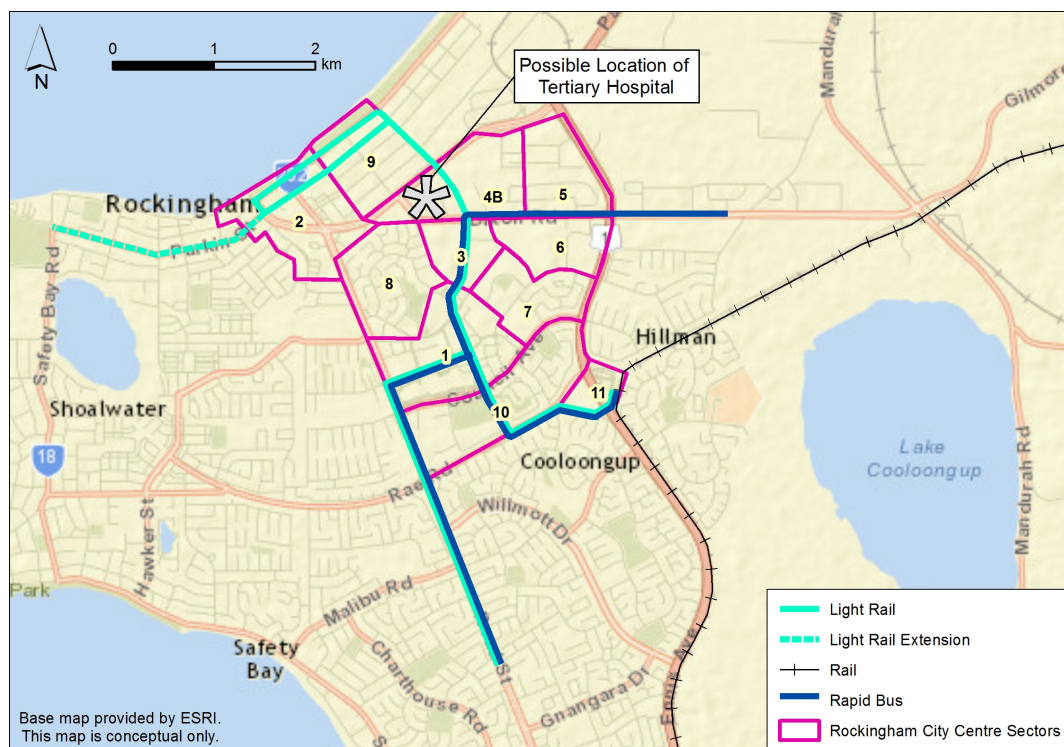
## 5.5 Preferred Scenario

The preferred land use scenario flows from the previous analysis. The key features that are additions to the current planning framework are:

- Provide for significant intensification of the Rockingham City Centre (for all uses – business, education, health services, entertainment and cultural, residential)
- Provide for a tertiary hospital in the Rockingham City Centre;
- Provide for new employment land in North East Baldivis in the medium term;
- Provide for new employment land in Karnup in the longer term;
- Maximise TOD opportunities within the City of Rockingham;
- Implement the residential intensification strategy contained in the draft Housing Study;
- Protect existing employment land and allow for more intense uses; and
- Encourage mode shift to reduce car dependence by promoting walking, cycling and public transport; and by providing improved connections to the City Centre.

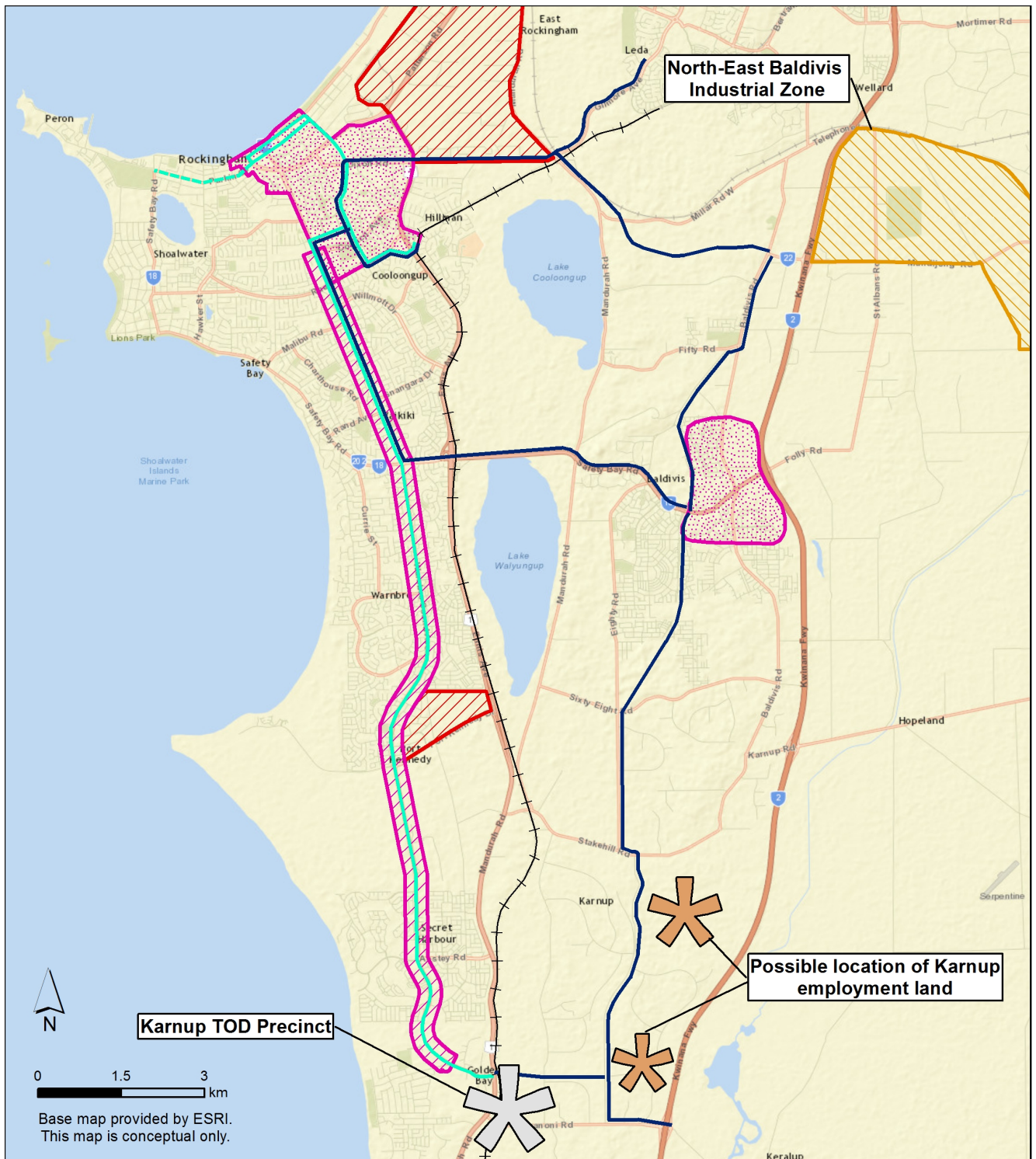
**Figure 5.2** shows a possible location for a tertiary hospital and the City Centre transport system.

**Figure 5.2 : Rockingham City Centre - Employment and Transport**



**Figure 5.3** shows the proposed North East Baldivis Industrial area, the possible location of long-term employment land in Karnup and the recommended overall transport network.

Figure 5.3 : City of Rockingham - Employment and Transport



**Public Transport Routes**

- Light Rail
- - - Light Rail Extension
- + + + Rail
- Rapid Bus

**Land Use**

- Activity Centre/Corridor
- Industrial Zone
- Mixed Use Activity Centre
- Industry/Employment Area

From a transport perspective the intention is to link the employment and mixed-use centres in a way that will enable more people to use public transport. In addition, a demand management plan to increase walking and cycling is proposed.

At the heart of this alternative development scenario is the intention to deliver a pattern and form of land use that is more compatible with increased use of public transport, as well as providing for more and safer walking and cycling. This approach can be labelled Transit Oriented Design (TOD). In the past, TOD has often been limited to relatively small development nodes around rail stations. If we are to induce the much higher levels of public transport usage (and walking and cycling) that will be necessary to improve accessibility for all and provide an improved quality of life with reduced levels car use, a more structured and expansive approach to TOD will be required. Instead of spreading residential land use evenly across the area at low density, this alternative approach would need to involve developing high density mixed use centres linked by corridors of medium to high density of mixed residential, commercial and retail that will enable more people to access work and other activities without use of a car.

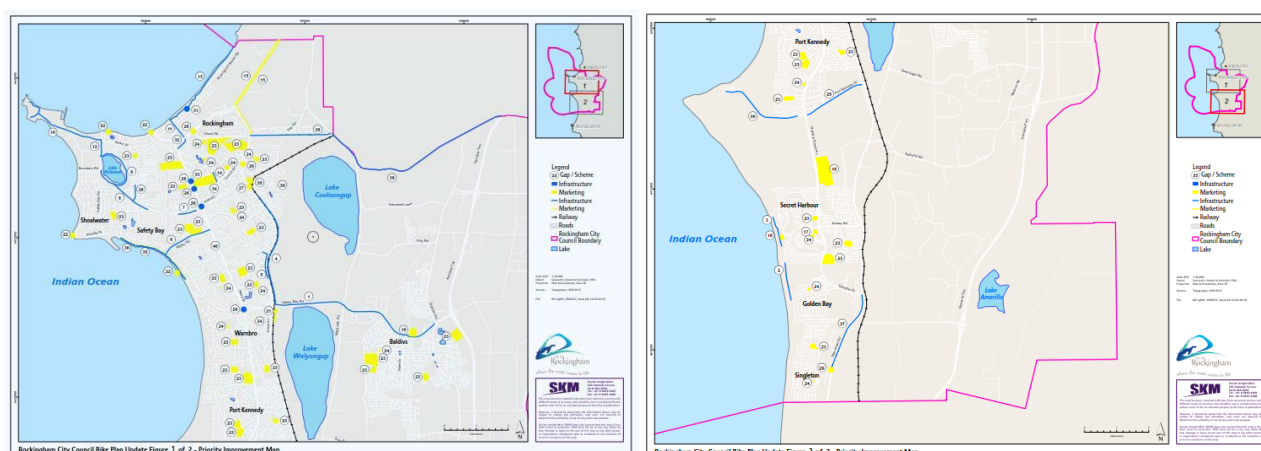
A high-quality transport system that fully integrates with the TOD is proposed. The intention is to provide a high level of accessibility for all in the community with a reduced dependency on the car and improved options for travel. Embedded in this principle is equality of access for all. People who benefit from this would include:

- Elderly or disabled people who are unable to drive or who feel uncomfortable driving in heavy traffic. By 2050 the proportion of Australians over 65 will have increased from 13.5% to 23%;
- Young people and others who prefer to spend on smart phones and computers to stay connected. Such people will often want to live in mixed use communities with good public transport and safe cycling options that enable them to travel by public transport, cycling or walking and to save money through not owning a car. For this group, the option of using shared cars will become attractive for some trips as this offering becomes more commonly available. Over the last 5 to 10 years there has been a significant drop in the 18 to 24 age group who have driving licenses; and
- Delivery personnel and others who need to drive will benefit from reduced congestion on the network, resulting from reduced driving by others.

A light rail system is proposed to link the Rockingham train station through the Rockingham City Centre to Rockingham Beach, and along the Read Street/Warnbro Sound Avenue proposed activity corridor linking the Rockingham City Centre to the Karnup rail station and proposed TOD. Bus rapid transit routes are proposed to link the Rockingham City Centre with east Rockingham, including Baldivis district centre and a proposed major employment area in Karnup. The rapid bus system will link with the rail system at Rockingham, Warnbro and Karnup stations and with the light rail in Rockingham City Centre and at Karnup station, creating an integrated system. Both the light rail and rapid bus routes will be provided with priority over cars along the route.

An improved bicycle network plan for Rockingham was proposed by Jacobs in 2013 (Rockingham Bicycle Plan 2013). The strategic bicycle routes proposed are shown in **Figure 5.4**.

**Figure 5.4 : Proposed Bicycle improvement plan**



(Source: City of Rockingham Bicycle Plan, 2013)

Modelling by Jacobs has shown that a comprehensive transport plan with extensive network improvements to public transport and cycling and a significant increase in mixed use urban infill and employment close to public transport will be effective in reducing the mode share of car driving by up to 33%. Public transport could be expected to double to 15%, cycling to quadruple to 8% and walking to increase by 50%. The projected mode share of transport in Rockingham by 2050, with the proposed network improvements, land use and employment changes and demand management policy as shown in **Table 5.5**.

**Table 5.5 Estimated Future (2050) Mode Share Outcomes – Rockingham/Mandurah/Murray**

Mode	Business as Usual Planning	Transit Oriented Structuring	Transit Plus Quality Walk, Cycling at Demand Management
Car Driver	55%	45%	40%
Car Passenger	23%	20%	17%
Public Transport	7%	15%	15%
Walking	11%	14%	17%
Cycling	2%	3%	8%
Other	2%	3%	3%
Reduced Car Driving Compared to Existing	8%	25%	33%



## 6. Conclusions

On current estimates and projections Rockingham's population will grow to around 196,000 by 2036 and to between 214,000 and 236,000 by 2050. In this scenario, even with some increase in employment growth, it is most likely that employment self-sufficiency ratios will decline to between 45% and 49%. These scenarios are broadly consistent with the draft Framework. In that strategy, employment in the Rockingham City Centre is anticipated to be 12,292 in 2050. "Business-as-usual" modelling shows City Centre employment numbers of between 11,200 and 13,700 by 2050.

With medium level residential intensification in the City Centre, other activity centres and along activity corridors, the City's population would grow to 213,000 by 2036 and to 248,000 by 2050, however employment growth would not keep pace with residential growth and employment self-sufficiency could decline to 44%. It is worth noting that this scenario is possibly unlikely as the prospect of achieving significant residential infill without substantial local employment is low. However, with an increase in employment growth, employment self-sufficiency could be maintained at around 53% – its current level. This would entail City Centre employment of around 19,300 by 2050.

If Rockingham were to become the primary centre for the wider region, the population would be 246,000 by 2036 and 298,000 by 2050. This is only possible with substantial economic development focussed on the Rockingham City Centre. It would have between 25,300 and 34,900 employees by 2050 and the City's employment self-sufficiency ratio would be between 45% and 59%. If additional employment land to the east (at North-East Baldvis and Karnup) of the City were added, this could grow to between 80% and 85%. This is quite a different regional scenario to that envisaged in the draft Framework.

A clear conclusion from this is that residential intensification without employment growth will produce an outcome that is sub-optimal. To bring employment self-sufficiency to acceptable levels, a much-expanded City Centre role is required, together with more employment land.

The population of the City currently has quite high levels of car-dependency. If the volume and intensity of the population is to be increased under the medium or high growth scenarios, it will be necessary to encourage mode shift to avoid commensurate increase in the volume of vehicles on the City's road network. Mode shift can be encouraged by improvement to the public transport, cycling and walking networks, to provide better connections between the Rockingham City Centre and other parts of the City (including Baldvis and Karnup).

The suggested strategies and additions to the current planning framework to obtain optimal levels of population and employment and an efficient transport network are:

- Provide for significant intensification of the Rockingham City Centre (for all uses – business, education, health services, entertainment and cultural, residential)
- Provide for a tertiary hospital in the Rockingham City Centre;
- Provide for new employment land in North East Baldvis in the medium term;
- Provide for new employment land in Karnup in the longer term;
- Maximise TOD opportunities within the City of Rockingham;
- Implement the residential intensification strategy contained in the draft Housing Study;
- Protect existing employment land and allow for more intense uses; and
- Encourage mode shift to reduce car dependence by promoting walking, cycling and public transport; and by providing improved connections to the City Centre.