Appendix 1

Retail Sustainability & Employment Assessment

TAMALA PARK LSP AMENDMENT - CATALINA GROVE

Retail Sustainability & Employment Assessment

Prepared for the Tamala Park Regional Council
November 2018

Contents

SUMMARY AND CONCLUSIONS

1. The currently approved local structure plan for Tamala Park was accompanied by supporting information and analysis on the activity centre retail floorspace and employment potential associated with the Tamala Park development. It is now proposed to amend that part of the structure plan relating to the Catalina Grove precinct, which is located east of Connolly Drive. The main purpose of this report is to review and update the previous retail and employment analyses.

Activity centre

2. The neighbourhood activity centre, originally planned to be centrally located within Catalina Grove, is now proposed to be relocated westwards to Connolly Drive.

3. The area within easy walking distance of the Clarkson railway station is being planned mainly for medium to high density residential development, and Catalina Grove is now envisaged as having an overall potential for the development of 946 dwelling units accommodating a residential population of approximately 2,400.

4. Gravity modelling described in this report confirms that:

   • The most appropriate quantity of Shop/ Retail (PLUC 5) floorspace planned for the neighbourhood activity centre should increase slightly from the previous estimate of 3,000 sqm to 3,300 sqm.

   • There are no significant negative impacts on other centres in the locality of locating the activity centre adjacent to Connolly Drive as now proposed in the structure plan amendment.

5. In addition to the proposed 3,300 sqm of Shop/ Retail floorspace the relocated neighbourhood activity centre also has the potential to accommodate some 200 sqm of Other Retail and 1,500 sqm of non-retail commercial floorspace, creating an overall neighbourhood activity centre of some 5,000 sqm.

6. Indicative employment potential within the activity centre has been estimated at 168 employees, which is between 22 and 43 more employees than the number estimated for Catalina Grove in the Economics and Employment Report prepared in support of the current Tamala Park structure plan.

Economy and Employment

7. This report presents a detailed assessment of the most appropriate role for Catalina Grove in relation to the overall implementation of the City of Wanneroo's employment policy – Local Planning Policy 3.6 – with specific reference to the main employment policy problem of increasing both Employment Self-Sufficiency (ESS) and Employment Self-Containment (ESC) within the North West sub-region.

8. Employment in population-driven urban services (shops, schools, everyday medical services, etc) is seldom problematic. If the provision for such normal urban services is well planned in

relation to demand and location, it is reasonably certain that these services will eventually be viably established at their planned locations, thus providing employment opportunities.

9. However, difficulties arise in attracting and providing for the businesses and other organisations which are not necessarily tied to servicing specific local market areas. Urban planning policy zones land for commercial and industrial purposes, but it cannot direct businesses and other organisations to locate on the zoned land, nor determine the exact nature of the uses that will eventually establish there.

10. "Footloose" businesses not tied to specific localities will tend to be established where relevant factors such as proximity to markets or export gateways, proximity to other similar and/ or complementary businesses and other services, transport linkages, corporate image and the extent of regional centrality required are able to be optimised.

11. It is essential for higher-order knowledge-based jobs, which are those needing most policy-based encouragement to increase employment self-containment, to be focussed in the very large Strategic Metropolitan activity centres, particularly in Joondalup and (in the longer term) Alkimos and Yanchep. Attempts to focus higher-end knowledge-based employment opportunities over wider areas, outside of the synergistic support frameworks of very large, complex, well-connected regional activity centres will not succeed.

12. Accordingly, within the context of the North West sub-region which, it is argued is of an appropriate scale for considering the issue of employment, the most relevant and feasible role for Catalina Grove in terms of employment policy implementation is to facilitate high density residential development within easy walking distance of Clarkson station in order to contribute to the evolution of Clarkson station as an *Origin* Transit Oriented Development (TOD), as distinct from a *Destination* TOD. The nature and roles of these two types of TOD, and why such differentiation is considered necessary, is explained in the body of this report.

INTRODUCTION

The Tamala Park Local Structure Plan 79 (LSP) was approved in March 2012 and updated in December 2015 (Figure 1). Development of the central section, between Marmion Avenue and Connolly Drive, is well advanced and development of the western section has recently commenced. Planning for the eastern section, between Connolly Drive and the Mitchell Freeway – known as Catalina Grove – has been revised and is the subject of this report.

Figure 1: Tamala Park Local Structure Plan Map
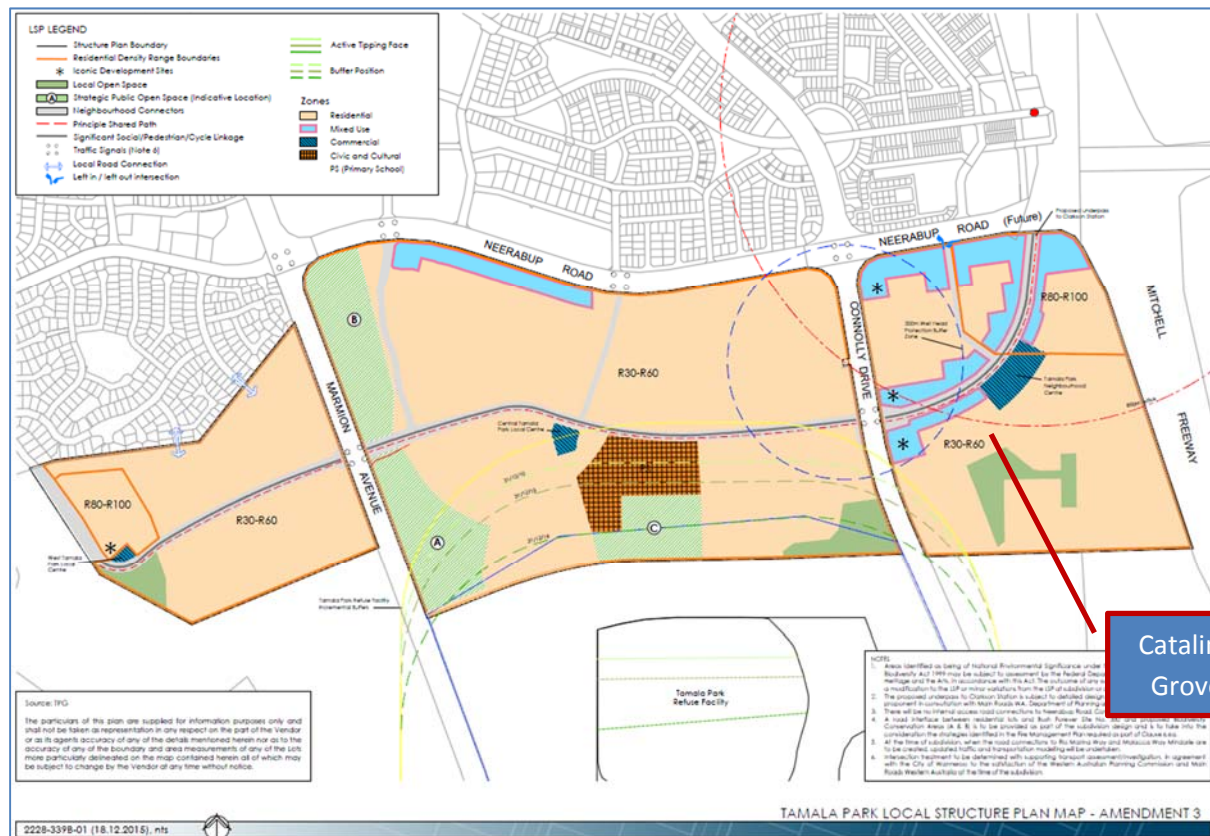
As indicated in Figure 1 the existing LSP exhibits the following main characteristics in the Catalina Grove precinct:

- A single-sweeping, northwards-curving extension of Aviator Boulevard, which is the central east-west distributor road serving the entire LSP area, planned to terminate at Clarkson Railway Station via a Neerabup Road underpass, which is currently under construction.
- A neighbourhood centre fronting the Aviator Boulevard extension centrally located within the precinct. This centre is proposed to comprise 3,000 sqm of retail floorspace, although this has the potential to be varied through due process, if required.
- Approximately 17% of the Catalina Grove precinct has been designated "Mixed Use". This land occupies all the Neerabup Road frontage and the Aviator Boulevard frontage, excluding the neighbourhood centre.
- Some 20% of the overall precinct to its north-east, which includes a considerable amount of the mixed-use area, has been identified for relatively high-density development (R80-R100) given its relative proximity to the Clarkson railway station.

The current design of the precinct is similar in its main features to an earlier Indicative Development Plan produced in 2009 (Figure 2).

Figure 2: Extract from Tamala Park Indicative Development Plan; TPG; June 2009

This plan illustrates the rationale for a neighbourhood centre being centrally located within the precinct, and mixed-use development along the length of Aviator Boulevard, which is based upon an internal road having "freeway access" offering traffic exiting from the Mitchell Freeway the option of driving directly to the centre, the mixed uses and/ or other westward destinations. It is also understood that, at the time, Aviator Boulevard was intended to be open for all traffic northwards via an underpass at Neerabup Road.

Sometime after this version of the plan was produced, the freeway access concept was abandoned, and the Neerabup Road underpass access restricted to buses travelling along Aviator Boulevard. These accessibility modifications significantly altered the potential commercial and economic dynamics of the planned neighbourhood centre and mixed-use areas, however, the current LSP maintains them more-or-less as if these significant changes had not occurred. A modified plan for the Catalina Grove precinct is therefore clearly necessary and has now been prepared. The updated version of the plan is illustrated in Figure 3.

Figure 3: Proposed modified Local Structure Plan map.

Source: CLE Town Planning + Design

This revised plan now responds to the changed accessibility conditions described above and:

- Relocates the proposed neighbourhood activity centre westwards to the NE corner of the Aviator Boulevard/ Connolly Drive intersection.
- Replaces most of the originally proposed mixed-use development in the NE quadrant of the precinct, and along the Neerabup Road frontage, with significantly higher-density residential development.
- Provides more detail than before in the planning of local streets, including the realignment of Aviator Boulevard.

Purpose of Report

The currently approved structure plan documents were accompanied by supporting information and analysis on the neighbourhood centre retail floorspace and employment potential associated with the proposed development. The purpose of this report is to review and update these analyses considering the updated local structure plan for the Catalina Grove precinct.

Terminology

The following terms may be used in this report:

Retail in its non-technical, common sense meaning is used frequently in the interests of readability.

Shop/ Retail (SHP) – Planning Land Use Category (PLUC) 5 – specifically refers to one of two Retail categories defined by the WAPC (see SPP 4.2 for details) and includes virtually all retail activities normally found within shopping centres. It *excludes* many of the uses normally referred to as "bulky goods" retail but does include some potentially bulky items such as household appliances.

Other Retail (RET) – Planning Land Use Category (PLUC) 6 – is the other specific Retail category defined in detail by the WAPC. It mostly includes outlets for those retail uses normally referred to as "bulky goods" (e.g. furniture, floor coverings, etc), but also includes hardware. Other Retail precincts often also include one or more fast food outlets, even though these are currently classified as "Shop/ Retail" by the WAPC.

Total Retail specifically refers to Shop/ Retail plus Other Retail.

Net Lettable Area (NLA) in square metres is the unit of measurement for all retail and other commercial floorspace. It includes all internal floorspace <u>except</u> stairs, toilets, lift shafts and motor rooms, escalators, tea rooms and other service areas, lobbies, and areas used for public spaces or thoroughfares[1]. Note that non-public storage areas within large shops (such as supermarkets) are generally not classified by the WAPC as "Shop/ Retail" NLA, but as "Storage" NLA.

Retail Needs Assessment (RNA): The study required under Clause 6.2.2 of SPP 4.2 to estimate the retail needs and indicative distribution of floorspace across the activity centres in a local government area; and to guide the preparation of district and activity centre structure plans.

Retail Sustainability Assessment (RSA): The study required under Clause 6.5 of SPP 4.2 to assess the potential economic and related effects of a significant retail expansion on the network of activity centres in a locality. RSA's are not required where the proposed development is in accordance with an endorsed planning strategy or structure plan that has been based on an RNA.

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[1] The related term Gross Leasable Area (GLA) includes these things.

RETAIL SUSTAINABILITY ASSESSMENT (RSA)

To reassess and confirm the retail floorspace potential of the relocated centre and estimate the extent of its potential impact on other existing and planned centres in the locality, a gravity model has been used. Technical details of this model are explained, and detailed results provided, in the Appendix to this RSA.

Study Area

The study area defined for the modelling is illustrated in Figure 4.

Figure 4: Study area
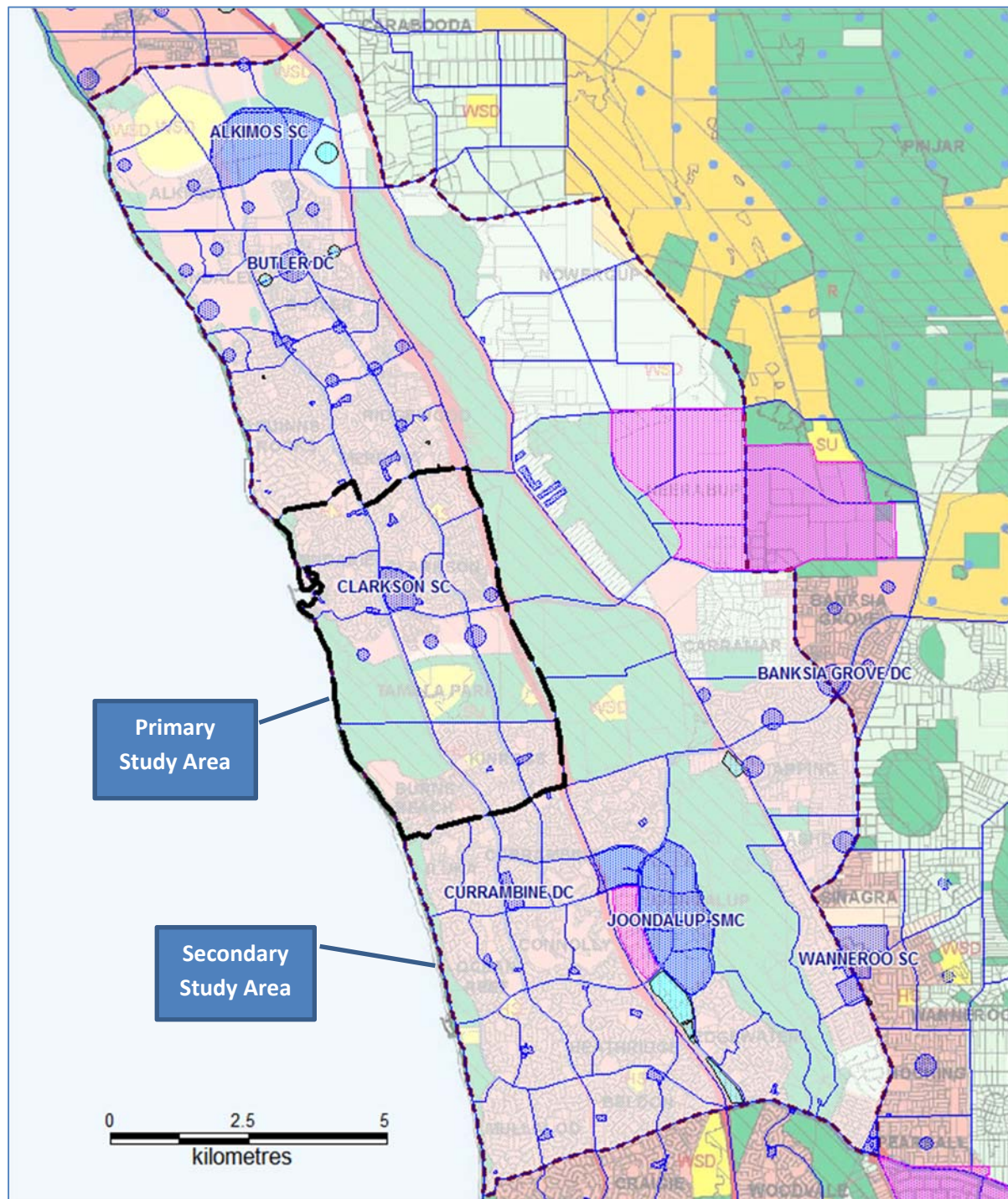
The study area is in two parts: a primary area and a secondary or "frame" area. The primary area is the main focus of interest and is the area within which the results of the modelling are reasonably accurate. The primary area includes the Tamala Park, Clarkson and Mindarie suburbs, as well as Burns Beach and Kinross to the south. A more detailed view of the primary area is presented in Figure 5.

Although the proposed activity centre the subject of this RSA is a medium-sized neighbourhood centre, the secondary study area nevertheless needs to be extensive in this case because one of the centres being modelled (Clarkson Secondary Centre), which is within the primary area and of significance to the proposed neighbourhood centre, is a large centre. When one or more large centres are located anywhere within a primary study area, an extensive frame area is necessary to ensure accurate model results within the primary area. In this project the frame area extends northwards beyond Alkimos and southwards to the borders of Kallaroo and Craigie (Figure 4).

Figure 5: Primary study area
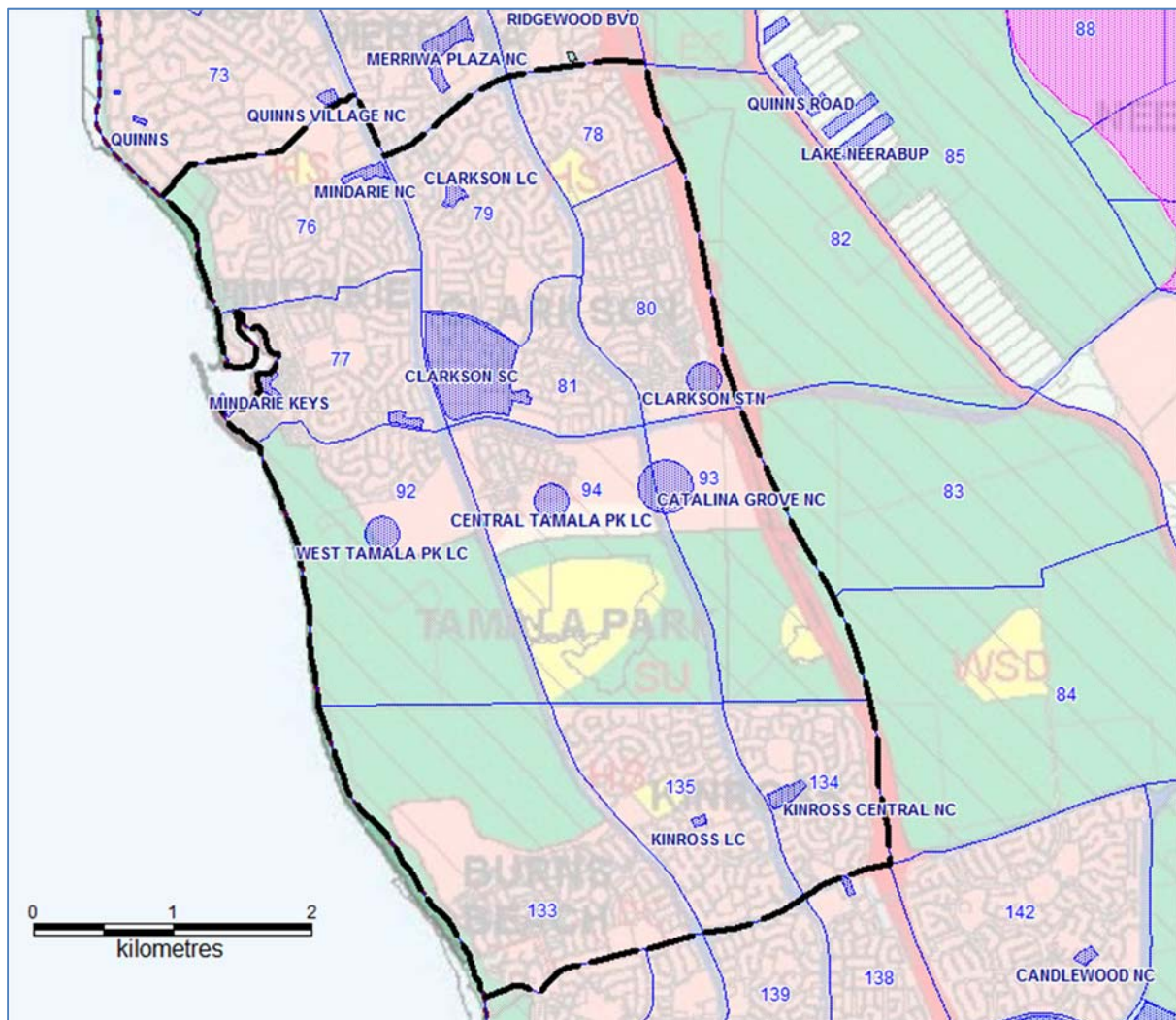
In Figure 5 existing and planned activity centres are depicted as blue circles or irregular shapes. The irregular shapes are based on existing zoning and/ or property boundaries, whereas the centres depicted by circles are diagrammatic representations that are not to scale.

Dwellings and Population

For the purposes of the modelling, each of the numbered residential precincts illustrated in Figure 5 has its own dwellings and population projection for the years being modelled – 2016 in five-yearly increments through to 2036/ "Ultimate". The projected population and dwellings growth for the entire primary study area are presented in Figure 6. Most of the indicated growth will occur in the Tamala Park LSP area, as Clarkson and Mindarie are already well-established suburbs.

Figure 6 Primary study area: occupied dwellings & population forecasts

	2011	2016	2021	2026	2031	2036	ULT
Dwellings	10,110	11,650	13,336	14,837	15,241	15,441	15,479
Population	29,464	33,542	37,563	40,985	41,556	41,660	41,427
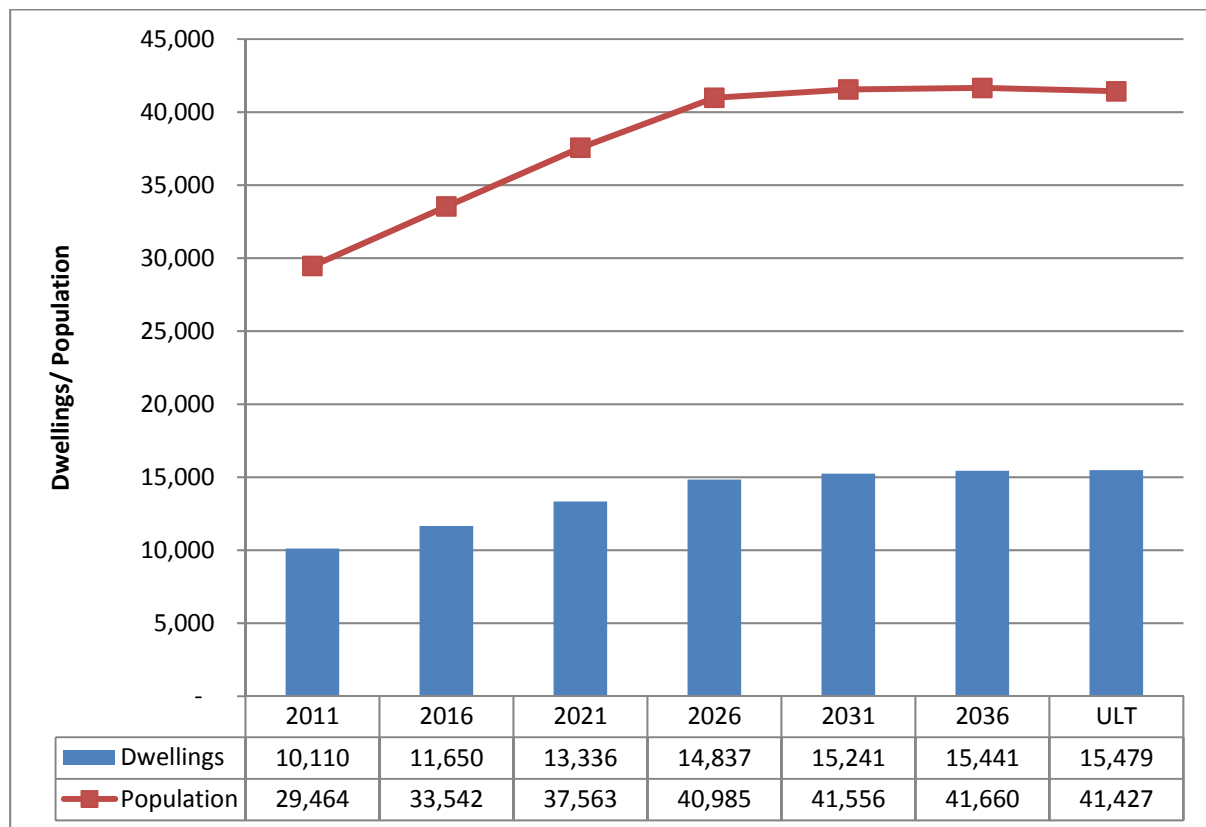
Sources: City of Wanneroo (forecast.id); Satterley Property Group

As illustrated in Figure 6, the population of the primary study area has been estimated at 33,542 persons in 2016 and is projected to increase by another 8,118 to 41,660 persons by 2036. However, as indicated in the graph, most of the proposed residential development and population growth is forecast to occur prior to 2026.

The Catalina Grove portion of the primary study area is currently envisaged as having an overall potential for the development of 946 dwelling units accommodating a residential population of approximately 2,400.

Household retail expenditure

Retail expenditure data for the primary study area supplied by MDS[2] is presented in Table 1.

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[2] MarketInfo 2014; MDS Market Data Systems Pty Ltd; May 2015.

Table 1: Primary study area retail expenditure (2014)

Retail Expenditure Category	Total	Per	Per
	$million	Hhold	Person
SHP (Convenience)	$281.40	$25,377	$8,637
SHP (Comparison)	$100.12	$9,029	$3,073
Total Shop/ Retail	*$381.52*	*$34,405*	*$11,710*
Other Retail	$149.65	$13,495	$4,593
Total Retail Expenditure	*$531.17*	*$47,901*	*$16,303*

In 2014 the primary study area's average annual Shop/ Retail and Other Retail expenditure per household was respectively 10.4% and 13.8% higher than those averages for the Perth/ Peel Region. However, the study area per person averages were a little lower than the regional per person averages (4.5% and 1.5% lower respectively), probably due to the demographics of the study area, which indicate a higher than average proportion of children living within the study area's households.

Based on an assumed overall average Shop/ Retail floorspace productivity measure of $7,400 per sqm per annum, the estimated 2014 Shop/ Retail expenditure of $381.52 million indicates that the primary area households currently require relatively convenient access to a total of some 52,000 sqm of Shop/ Retail floorspace to satisfy their retail shopping needs. Of course, this requirement includes floorspace at all levels in the activity centres hierarchy and is therefore met in the Joondalup and other regional-level centres, as well as in the secondary and neighbourhood/ local centres within, and near, the primary study area.

By 2036 the total Shop/ Retail requirement for the primary study area population will have increased to about 70,000 sqm, an increase of 18,000 sqm over the 2016 estimate. Once again, given the proximity of several major existing or planned regional centres in the Corridor, only a proportion of the required additional floorspace could reasonably be located within the primary area itself. Whatever proportion that might be, however, the only potentially feasible locations for it are in the Clarkson district centre and/or the Tamala Park centres, because Tamala Park is the only large portion of the primary study area still being developed and undergoing significant population growth.

Activity Centres

Figure 5 on Page 6 illustrates the location of each of the existing and planned activity centres within the primary study area. All but the three proposed Tamala Park centres exist already. The centres and an estimate of their Shop/ Retail floorspace in 2016 are listed in Table 2.

It is estimated that there is currently some 49,289 sqm of Shop/ Retail floorspace and 35,400 sqm of Other Retail floorspace in the primary study area. The existing retail floorspace supply is totally dominated by the Clarkson Secondary Centre; with some 89% of all retail floorspace in the primary study area being in that centre.

Table 2 Primary area activity centres and current retail floorspace (2017)

ID	Name	Hierarchy	Shop/Retail	Other Retail	Total Retail
			nla	nla	nla
TP-01	CATALINA GROVE NC	6 NHD	-	-	-
672	CLARKSON SC	4 SEC	40,000	35,000	75,000
8791	MINDARIE NC	6 NHD	1,610	200	1,810
675	MINDARIE KEYS	7 LOC	1,129	-	1,129
8792	CLARKSON LC	7 LOC	800	100	900
CL-03	CLARKSON STN	7 LOC	850	-	850
TP-02	CENTRAL TAMALA PK LC	7 LOC	-	-	-
TP-03	WEST TAMALA PK LC	7 LOC	-	-	-
KR-01	KINROSS CENTRAL NC	6 NHD	3,900	100	4,000
KR-02	KINROSS LC	7 LOC	1,000	-	1,000
Total Floorspace (net lettable area)			*49,289*	*35,400*	*84,689*

At present there is about 1.47 sqm of Shop/ Retail floorspace per capita within the primary study area, which is a very good overall supply for local households, albeit most of it being in one large centre. Due to the dominance of the Clarkson secondary centre (1.19 sqm per resident), the relative quantity of neighbourhood/ local floorspace (0.27 sqm per resident) is well below average. This type of distribution imbalance is to be expected within the general vicinity of a large higher-order centre such as Clarkson; however, in the interests of a functional hierarchy and a satisfactory level of local convenience, it would be preferable if the proportion of local/neighbourhood retail floorspace could be increased to at least around the .30 sqm per resident mark, if possible.

Modelling Results

The full set of results of the modelling process for each time horizon is presented in the Appendix. This takes the form of a series of model output summary sheets for the Census years 2016 through 2036. These sheets provide detailed estimates of retail floorspace potential and an appropriate distribution of this calculated potential amongst the activity centres in the primary study area. Indicative estimates of trading performance are also presented for each of the modelled years. The estimated Shop/ Retail floorspace and performance potential for each of the centres in the primary study area is presented in Table 3.

Table 3 Primary study area activity centres: Shop/ Retail floorspace potential 2016 - 2036 (sqm nla)

ID	Name	Hier-archy	2016 sqm nla	Calc SHP $/sqm/an	2021 sqm nla	Calc SHP $/sqm/an	2026 sqm nla	Calc SHP $/sqm/an	2036 sqm nla	Calc SHP $/sqm/an
TP-01	CATALINA GROVE NC	6 NHD	-	$0	3,300	$6,488	3,300	$8,155	3,300	$8,111
672	CLARKSON SC	4 SEC	40,000	$9,600	40,000	$9,046	40,000	$9,346	40,000	$9,352
8791	MINDARIE NC	6 NHD	1,610	$7,592	1,610	$6,894	1,610	$6,860	1,610	$6,823
675	MINDARIE KEYS	7 LOC	1,129	$6,223	1,129	$5,783	1,129	$5,854	1,129	$5,870
8792	CLARKSON LC	7 LOC	800	$5,570	800	$5,081	800	$5,083	800	$4,994
CL-03	CLARKSON STN	7 LOC	850	$5,724	850	$5,708	850	$6,303	850	$6,197
TP-02	CENTRAL TAMALA PK LC	7 LOC	-	$0	400	$6,068	400	$7,093	400	$7,283
TP-03	WEST TAMALA PK LC	7 LOC	-	$0	-	$0	250	$5,641	250	$5,983
KR-01	KINROSS CENTRAL NC	6 NHD	3,900	$9,946	3,900	$8,873	3,900	$8,990	3,900	$8,831
KR-02	KINROSS LC	7 LOC	1,000	$7,761	1,000	$6,870	1,000	$6,918	1,000	$6,768
Total Floorspace (net lettable area)			*49,289*		*52,989*		*53,239*		*53,239*	

It should be noted in relation to the floorspace performance figures presented in Table 3 that they are estimates of each centre's relative "potential" based on the parameters used in the gravity model, which have been calculated solely for urban planning purposes. Various qualitative aspects of centres are not fully accounted for in the model, and the actual economic performance of a centre will not necessarily accord with its geographic/ demographic potential as calculated by the model.

It can be seen from Table 3 that, for the purposes of the modelling, only the three Tamala Park centres (TP-01, TP-02, TP-03) have been allocated additional floorspace between the 2016 and 2036 timeframe. The following conclusions can be drawn from the modelling process (refer to Appendix A for all details):

- The currently envisaged size of the proposed Catalina Grove neighbourhood centre (3,300 sqm of Shop/ Retail floorspace) is an appropriate maximum for this centre.
- In Table 3 both Catalina (TP-01) and Tamala Park (TP-02) centres are assumed to be developed and trading by 2021. The performance figures for these two centres (compared to later years) clearly indicate that the 2021 horizon is somewhat premature; however, between 2021 and 2026 their full potential will be realised.
- The West Tamala Park centre (TP-03) should remain small. It's relatively poor performance in the modelling reflects its peripheral location in relation to catchment population; however, this could at least partially be overcome by other factors such as passing traffic bound for the beach, etc.

Although the Catalina Grove centre will enjoy the significant benefits of a Connolly Drive frontage:

- It will permanently operate in the shadow of the Clarkson secondary centre where both the Coles and Woolworths supermarkets serving this district are located.
- There is a Supa-IGA located in the Merriwa Plaza neighbourhood centre just north of the primary study area boundary and another located in Kinross Central located towards the southern boundary of the study area on Connolly Drive.
- It is therefore concluded that the most logical supermarket anchor for the Catalina Grove centre would be a standard IGA, a reasonable context for which would be a small neighbourhood centre of around the 3,000 sqm mark.

Impacts

The potential impact that the proposed Catalina Grove activity centre, and the Tamala Park centres more generally, would have on other centres within the primary study area is clearly not a particularly major issue at this stage because:

- Three centres have already been planned for Tamala Park as part of the current agreed structure plan;
- It is not proposed to change the quantity of the Shop/ Retail floorspace supply in any of these planned centres.

However, as relocation of the Catalina Grove centre is now proposed, the potential impact of its development at the new location has been checked at two planning horizons – 2021 and 2031. These assessments are presented in the following tables.

Table 4: Potential Impacts - Tamala Park Centres 2021

ID	Name	2021 Without Tamala Pk Centres			2021 With Tamala Pk Centres			2021 Change (impact)		
		SHP	RET	TOT	SHP	RET	TOT	SHP	RET	TOT
		$million	$million	$million	$million	$million	$million	Prop.	Prop.	Prop.
TP-01	CATALINA GROVE NC	$0.00	$0.00	$0.00	$21.41	$1.37	$22.78	na	na	na
672	CLARKSON SC	$368.78	$229.02	$597.80	$361.83	$228.51	$590.34	-1.9%	-0.2%	-1.2%
8791	MINDARIE NC	$11.24	$1.45	$12.69	$11.10	$1.44	$12.54	-1.3%	-0.2%	-1.2%
675	MINDARIE KEYS	$6.62	$0.00	$6.62	$6.53	$0.00	$6.53	-1.4%	na	-1.4%
8792	CLARKSON LC	$4.13	$0.46	$4.58	$4.06	$0.45	$4.52	-1.5%	-0.2%	-1.4%
CL-03	CLARKSON STN	$5.02	$0.00	$5.02	$4.85	$0.00	$4.85	-3.4%	na	-3.4%
TP-02	CENTRAL TAMALA PK LC	$0.00	$0.00	$0.00	$2.43	$0.00	$2.43	na	na	na
TP-03	WEST TAMALA PK LC	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	na	na	na
KR-01	KINROSS CENTRAL NC	$35.15	$1.08	$36.23	$34.60	$1.08	$35.68	-1.6%	-0.3%	-1.5%
KR-02	KINROSS LC	$7.00	$0.00	$7.00	$6.87	$0.00	$6.87	-1.8%	na	-1.8%
	Total Turnover ($million)	$437.93	$232.00	$669.93	$453.68	$232.85	$686.53	3.6%	0.4%	2.5%

Table 4 presents the model's 2021 estimates of annual centre turnover for each of the centres in the primary study area both without and with the Tamala Park centres proposed at that time (these exclude TP-03 as the modelling indicated that centre would not be potentially viable by 2021). Figures are presented for Shop/ Retail (SHP) and Other Retail (RET) floorspace, as well as the total of these two categories of floorspace.

The three columns to the right of the table show the estimated percentage impact that the development of the Tamala Park centres would have on the other centres in 2021, compared to no development of the Tamala Park Centres. These impacts are very low, the largest (3.4%) falling on Clarkson Station, due to its relative proximity to Catalina grove as well as its small size. The overall impact on the study area centres is a positive 3.6%, reflecting the net increase of retail dollars being spent within the study area because of the additional floorspace provided there.

Table 5: Potential Impacts - Tamala Park Centres 2031

ID	Name	2031 Without Tamala Pk Centres			2031 With Tamala Pk Centres			2031 Change (impact)		
		SHP	RET	TOT	SHP	RET	TOT	SHP	RET	TOT
		$million	$million	$million	$million	$million	$million	Prop.	Prop.	Prop.
TP-01	CATALINA GROVE NC	$0.00	$0.00	$0.00	$26.55	$1.52	$28.07	na	na	na
672	CLARKSON SC	$376.32	$217.80	$594.12	$367.36	$217.25	$584.61	-2.4%	-0.3%	-1.6%
8791	MINDARIE NC	$10.90	$1.30	$12.19	$10.74	$1.29	$12.03	-1.5%	-0.2%	-1.3%
675	MINDARIE KEYS	$6.59	$0.00	$6.59	$6.48	$0.00	$6.48	-1.6%	na	-1.6%
8792	CLARKSON LC	$4.01	$0.41	$4.42	$3.94	$0.41	$4.35	-1.7%	-0.2%	-1.6%
CL-03	CLARKSON STN	$5.48	$0.00	$5.48	$5.22	$0.00	$5.22	-4.8%	na	-4.8%
TP-02	CENTRAL TAMALA PK LC	$0.00	$0.00	$0.00	$2.88	$0.00	$2.88	na	na	na
TP-03	WEST TAMALA PK LC	$0.00	$0.00	$0.00	$1.44	$0.00	$1.44	na	na	na
KR-01	KINROSS CENTRAL NC	$34.91	$0.97	$35.88	$34.29	$0.97	$35.26	-1.8%	-0.2%	-1.7%
KR-02	KINROSS LC	$6.88	$0.00	$6.88	$6.74	$0.00	$6.74	-1.9%	na	-1.9%
	Total Turnover ($million)	$445.08	$220.48	$665.56	$465.63	$221.45	$687.08	4.6%	0.4%	3.2%

Table 5 presents the same information as Table 4, but at 2031. All three Tamala Park centres are assumed to have been developed by then. The following points are worthy of note:

- The estimated turnover of centres other than Clarkson Station and the Tamala Park centres is slightly lower in 2031 than in 2021. This is due to anticipated large increases in the floorspace of some major centres in the secondary study area, both to the north and south of the primary area.
- On the other hand, the Tamala Part centres and Clarkson Station will all perform better in 2031 compared to 2021 because:
  - As noted earlier in this report, 2021 is considered a little premature for both Catalina Grove and TP-02 centres in terms of the dwellings/ population projections.
  - By 2026 Tamala Park's population will be more-or-less fully established and the main retail benefits of this will accrue to the Tamala Park centres due to their proximity to the new households. Clarkson Station will also benefit to some degree from the urbanisation of Catalina Grove.
- The overall net effect of development of all three Tamala Park centres is positive in terms of the primary area as a whole – this time by 4.6%.

The conclusion of the impact assessment is that development of the three Tamala Park centres in the manner now proposed is highly beneficial, not only because the centres will result in a more balanced centre hierarchy by increasing the supply of neighbourhood/ local floorspace within the primary study area from its currently low figure of .27 sqm per capita to .32 sqm per capita; but also because this will be achieved with very low economic impacts on the existing centres in the locality.

Indicative Staging

It is envisaged that the main retail core of the Catalina neighbourhood centre would be created in a single first stage, with any non-retail commercial floorspace being developed at the same time and/ or evolving in due course thereafter.

Centre composition

Actual details of the proposed neighbourhood activity centre's composition and staging will need to be determined at a more detailed planning phase closer to the time development of the centre is commenced. The following table sets out an example of what would be a potentially viable composition for the neighbourhood centre.

Table 6 Indicative retail composition of neighbourhood centre

Shop/ Retail Component	Sqm NLA	Employment
Supermarket (IGA)	1,500	
Newsagent	150	
Pharmacy	250	
Hairdresser	100	
Liquor store	300	
Other specialty shops/ services	650	
Café/ coffee shop/s	350	
Total Shop/ Retail in main centre	*3,300*	*110*
Other Retail tenancies	*200*	*4*
Total Retail in Main Centre	***3,500***	***114***
Non-retail commercial (say)	1,500	54
Total Centre Floorspace	***5,000***	***168***

In addition to the Shop/ Retail and Other Retail floorspace tabulated above, the following non-retail commercial uses and/ or services could potentially be included within or immediately adjacent to the main retail core of the neighbourhood centre at an appropriate time:

- Local offices
- Child care centre
- Medical/ dental centre/s
- Health club/ gym

Neighbourhood Activity Centre Employment

Based on the indicative activity centre floorspace composition presented in Table 6 it is estimated that the Catalina Grove precinct could eventually accommodate some 168 employees – 114 in the main centre (retail core) and 54 in the non-retail commercial component. This is between 22 and 43 more employees than the number estimated for Catalina Grove in the Economics and Employment Report prepared in support of the current structure plan.

Some additional employment can, in the fullness of time, reasonably be anticipated in the mixed-use areas proposed in the north-east corner of Catalina Grove, however, the extent of this potential employment is too uncertain to include in the employment calculations at this stage. In addition to the actual employment that will specifically be located within the Catalina Grove neighbourhood activity centre, the amended structure plan is intended to address the City of Wanneroo's local employment policy objectives in other effective ways that may not be immediately obvious. This aspect of the proposed amendment is discussed in the next section of this report.

ECONOMY AND EMPLOYMENT

As required by the City of Wanneroo's Employment Policy (LPP 3.6), this section of the report considers various economic and employment implications associated with the proposed amendment to the Tamala park LSP.

City of Wanneroo Employment Policy (LPP 3.6)

The main purpose and rationale of LPP 3.6 is stated in the following terms:

> This policy is designed to establish a framework to encourage and retain local employment within the City of Wanneroo and ultimately the North West Corridor.
>
> The imperative for this policy was driven by the fact that the City of Wanneroo suffers low employment self-containment within its boundaries, which has lead to the many so-called 'dormitory suburbs'. In areas of low employment self-containment issues range from social and economic issues associated with having to spend significant time and money commuting long distances to work, the ability of the transport system to handle significant community demands, security problems, pollution and energy demands caused by transportation requirements, through to expenditure leakages out of the local economy.

Source City of Wanneroo LPP 3.6

As indicated above, low employment self-containment is the basic problem LPP 3.6 is seeking to address. The most obvious consequence of low self-containment is the impact on the transport system of excessive long-distance car-based commuting. LPP 3.6 *"requires proponents of any large-scale residential development within the City of Wanneroo to prepare a strategy to encourage local employment self-sufficiency and maximise resultant local containment of the workforce"*.

Tamala Park Economic and Employment Report

Implementation of the overall Tamala Park development to date has occurred within the framework of such an employment strategy[3]. The strategy, prepared by economics consultant Pracsys, envisaged the entire Tamala Park development accommodating a total of 3,938 sqm of retail floorspace employing 131 people; office floorspace of 4,387 sqm employing 159 people full-time and 48 part-time; and 317 sqm of "service" floorspace employing 8 people full-time and 4 part-time. Thus, the estimated employment potential within the entire Tamala Park development was 350 jobs, 59% of which were "office" jobs. The strategy did not allocate any employment figures to the proposed mixed-use areas due to the "high degree of uncertainty as to their future uses".

The strategy outlined in the previous employment report covered the entire Tamala Park development, however, most of its focus was on a "core" precinct, being the activity centre originally proposed in the geographic centre of Catalina Grove itself. In relation to this core precinct, some 3,000 sqm of retail floorspace was proposed (100 employees), as well as 700 to 1300 sqm of non-retail commercial (25 to 46 employees). The total employment potential currently specified for Catalina Grove under the existing structure plan is therefore 125 to 146 employees.

The previous section of this report (the RSA) demonstrated that relocating the neighbourhood activity centre adjacent to Connolly Drive would be a viable move that would not impose any unacceptable impacts on other centres in the locality. It would also make the centre more accessible to Tamala Park residents to the west of Catalina Grove, as well as passing traffic on Connolly Drive.

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[3] Tamala Park LSP No. 79; Part 2 – Explanatory Report; Section 18 Economy and Employment; March 2012

The balance of this report addresses employment in some detail to place this important and difficult issue within an appropriately wide context and demonstrate how the development of Catalina Grove in the manner now envisaged would contribute to an effective wider strategy for implementing of the City's LPP 3.6.

North West Sub-Region

The context for these considerations is metropolitan Perth's North West sub-region, which is comprised of the Cities of Wanneroo and Joondalup (Figure 7). Due to the dynamic and highly mobile nature of our society, urban planning-related employment policy can only sensibly be considered within the context of relatively extensive areas, such as the North West sub-region.

Figure 7 North West Sub-Region and Activity Centres (District level and above labelled)
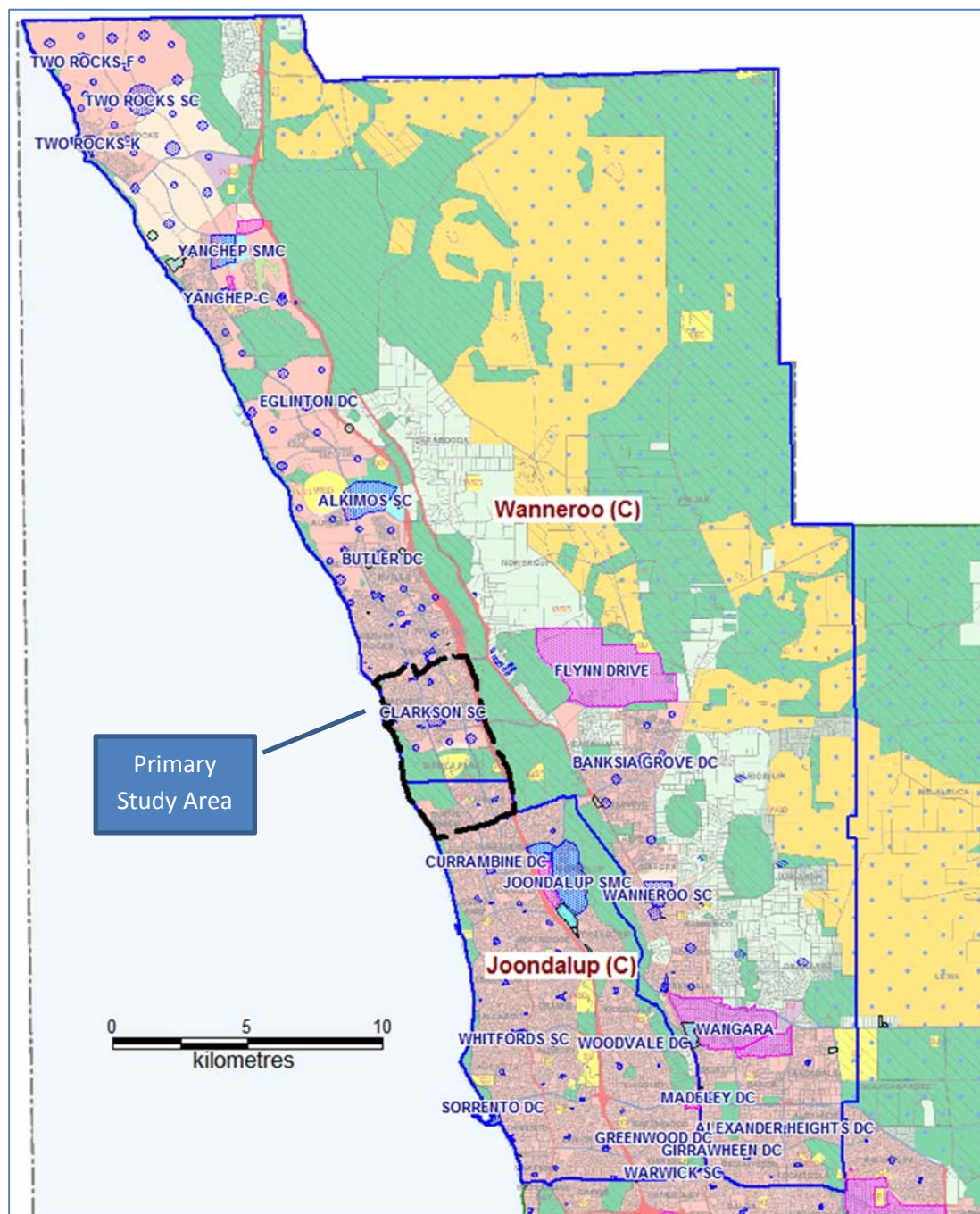
Apart from schools and a few suburban community service or recreation facilities (some of which are significant), plus about 8% of homes[4], most employment opportunities in the North West sub-region are, by clear policy-based intention, focussed on its ***commercial and industrial activity centres***. The extensive distribution of these centres, both large and small, existing and currently planned in the NW sub-region, are illustrated in Figure 7.

Employment Self-Containment and Self-Sufficiency

LPP 3.6 is unequivocally based on the desirability of achieving high levels of both employment self-containment (ESC) and employment self-sufficiency (ESS). This section examines the nature of these measures to better identify the most appropriate role for Catalina Grove in relation to the overall employment problem.

Economy.id, the firm which provides economic data to the City of Wanneroo (and many other local governments throughout Australia), now defines employment self-containment as: "the percentage of employed residents who are employed within the boundaries of the Local Government Area". Employment self-sufficiency is defined as: "the percentage of workers in the Local Government Area who also live in the area". Employment self-containment by industry data for the North West sub-region for 2006 and 2011 are presented in Table 7.

Table 7: Employment self-containment; North West sub-region; 2006 and 2011

Employment self-containment by Industry (2011) Industry	City of Joondalup			City of Wanneroo			Total NW Sub-Region		
	Employd Resids.	Res.Empl in City	% self-con -tainment	Employd Resids.	Res.Empl in City	% self-con -tainment	Tot.Empl Resids.	Res.Empl in S-R	% self-con -tainment
Agriculture, Forestry, Fishing	261	44	16.9%	725	456	62.9%	986	500	50.7%
Mining	3,520	88	2.5%	3,171	110	3.5%	6,691	198	3.0%
Manufacturing	5,590	550	9.8%	6,415	1,918	29.9%	12,005	2,468	20.6%
Electricity, Gas, Water and Waste	952	66	6.9%	812	85	10.5%	1,764	151	8.6%
Construction	9,998	2,064	20.6%	10,116	2,661	26.3%	20,114	4,725	23.5%
Wholesale Trade	2,840	343	12.1%	2,926	753	25.7%	5,766	1,096	19.0%
Retail Trade	9,021	4,031	44.7%	8,356	2,558	30.6%	17,377	6,589	37.9%
Accommodation and Food	4,310	2,249	52.2%	3,932	1,221	31.1%	8,242	3,470	42.1%
Transport, Postal and Warehousing	2,430	422	17.4%	2,684	626	23.3%	5,114	1,048	20.5%
Information Media and Telecoms	1,243	284	22.8%	819	106	12.9%	2,062	390	18.9%
Financial and Insurance Services	2,986	537	18.0%	2,340	231	9.9%	5,326	768	14.4%
Rental, Hiring and Real Estate	1,486	532	35.8%	1,138	330	29.0%	2,624	862	32.9%
Professional, Scientific & Tech	7,166	1,526	21.3%	4,268	847	19.8%	11,434	2,373	20.8%
Administrative & Support Services	2,739	724	26.4%	2,634	536	20.3%	5,373	1,260	23.5%
Public Administration and Safety	5,384	909	16.9%	4,453	602	13.5%	9,837	1,511	15.4%
Education and Training	7,891	3,329	42.2%	4,743	1,633	34.4%	12,634	4,962	39.3%
Health Care and Social Assistance	9,303	2,936	31.6%	7,846	1,444	18.4%	17,149	4,380	25.5%
Arts and Recreation Services	1,256	431	34.3%	854	195	22.8%	2,110	626	29.7%
Other Services	3,206	923	28.8%	3,420	1,001	29.3%	6,626	1,924	29.0%
Industry not classified	1,451	203	14.0%	1,734	221	12.7%	3,185	424	13.3%
All industries 2011	*83,033*	*22,191*	*26.7%*	*73,386*	*17,534*	*23.9%*	*156,419*	*39,725*	*25.4%*
All industries 2006	*81,390*	*20,728*	*25.5%*	*51,116*	*11,863*	*23.2%*	*132,506*	*32,591*	*24.6%*
Source: Economy.id on Cities of Wanneroo and Joondalup websites									

It can be seen from Table 7 that, in 2011, there were a total of 39,725 workers who both lived and worked within the North West sub-region. This figure is 25.4% of the total number of employed

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[4] ABS Cat. 6275.0 - Locations of Work, Nov 2008

residents in the sub-region (156,419 employed residents), the remaining 116,694 (74.6%) of whom therefore commuted to jobs outside the sub-region. Thus, the sub-regional ESC is a rather low 25.4%, albeit slightly higher than it was in 2006.

It is interesting to note the industries currently contributing most to ESC – shaded green in Table 7. For the purposes of this analysis, these are the industry categories in which 2,000 or more sub-region residents are employed (the corresponding figures for Wanneroo alone are also shaded). There are seven such categories out of a list of 20, which account for 73% of the combined 2011 ESC total. Interestingly, manufacturing, although in decline in Australia is well-represented in the sub-region. It features more significantly in Wanneroo than in Joondalup in terms of jobs, presumably due to the Wangara and Flynn Drive industrial areas. Very importantly, however, the highlighted categories include Australia's current top 4 growth industries[5]:

- Construction
- Professional, Scientific and Tech
- Education and Training
- Health Care and Social Assistance.

These top four growth industries combine a requirement for significant amounts of high-level knowledge-based employment with a "natural" requirement for a degree of decentralisation to effectively serve their users. Table 8 presents the equivalent employment self-sufficiency (ESS) by industry data.

Table 8: Employment self-sufficiency; North West sub-region; 2006 and 2011

Employment self-sufficiency by Industry (2011) Industry	City of Joondalup			City of Wanneroo			Total NW Sub-Region		
	Total Workers	Workers Residing	% self-sufficiency	Total Workers	Workers Residing	% self-sufficiency	Total Workers	Workers Residing	% self-sufficiency
Agriculture, Forestry, Fishing	44	44	100.0%	655	456	69.6%	699	500	71.5%
Mining	105	88	83.8%	393	110	28.0%	498	198	39.8%
Manufacturing	876	550	62.8%	4,542	1,918	42.2%	5,418	2,468	45.6%
Electricity, Gas, Water and Waste	116	66	56.9%	167	85	50.9%	283	151	53.4%
Construction	2,813	2,064	73.4%	4,817	2,661	55.2%	7,630	4,725	61.9%
Wholesale Trade	489	343	70.1%	1,590	753	47.4%	2,079	1,096	52.7%
Retail Trade	7,175	4,031	56.2%	4,213	2,558	60.7%	11,388	6,589	57.9%
Accommodation and Food	3,660	2,249	61.4%	1,772	1,221	68.9%	5,432	3,470	63.9%
Transport, Postal and Warehousing	631	422	66.9%	1,007	626	62.2%	1,638	1,048	64.0%
Information Media and Telecoms	414	284	68.6%	159	106	66.7%	573	390	68.1%
Financial and Insurance Services	899	537	59.7%	343	231	67.3%	1,242	768	61.8%
Rental, Hiring and Real Estate	848	532	62.7%	557	330	59.2%	1,405	862	61.4%
Professional, Scientific & Tech	1,941	1,526	78.6%	1,206	847	70.2%	3,147	2,373	75.4%
Administrative & Support Services	1,155	724	62.7%	753	536	71.2%	1,908	1,260	66.0%
Public Administration and Safety	2,079	909	43.7%	1,191	602	50.5%	3,270	1,511	46.2%
Education and Training	6,360	3,329	52.3%	3,685	1,633	44.3%	10,045	4,962	49.4%
Health Care and Social Assistance	6,304	2,936	46.6%	2,434	1,444	59.3%	8,738	4,380	50.1%
Arts and Recreation Services	686	431	62.8%	296	195	65.9%	982	626	63.7%
Other Services	1,670	923	55.3%	1,661	1,001	60.3%	3,331	1,924	57.8%
Industry not classified	302	203	67.2%	384	221	57.6%	686	424	61.8%
All industries 2011	*38,567*	*22,191*	*57.5%*	*31,825*	*17,534*	*55.1%*	*70,392*	*39,725*	*56.4%*
All industries 2006	*32,782*	*20,728*	*63.2%*	*23,511*	*11,863*	*50.5%*	*56,293*	*32,591*	*57.9%*
Source: Economy.id on Cities of Wanneroo and Joondalup websites									

[5] ABS catalogue 6291

As indicated in Table 8, in 2011 the 39,725 workers <u>both living and working</u> within the sub-region represented 56.4% of the total number of people working within the sub-region (70,392 workers). The remaining 30,667 workers (43.6%) therefore commuted into the sub-region from outside. The ESS is a semi-respectable 56.4%, however, considered on its own the ESS measure can be somewhat misleading. For example, a hypothetical area with an ESS of 100% could be accommodating only a single job, but if that job was filled by a local, then the ESS would be 100%.

Accordingly, although increasing both employment self-containment and employment self-sufficiency are worthwhile aims, self-containment is the factor that most needs to be addressed to better implement LPP 3.6. This point is made in LPP 3.6 and is backed up by academic research: "ESC is the appropriate measure to use to target and track progress in reducing the extent of the high proportion of outward flows by increasing the number of local employment opportunities".[6]

There is another employment measure identified by Biermann and Martinus called jobs-housing balance (JHB). This measures the "potential" for balance – i.e. total local jobs as a proportion of total resident workers, irrespective of where residents work or who fills local jobs. The purpose of the following tables is to illustrate the practical significance of these various measures. Table 9 shows how the three defined measures would respond to hypothetical changes in the number of jobs available in the North West sub-region.

Table 9: Effect of varying number of jobs in sub-region on ESS, ESC and JHB (2011)

Resids. living and working in area (a)	Total Resident Workforce (b)	Outbound Commuters	Total Jobs in Area [c]	Inbound Commuters	ESS (a/c)	ESC (a/b)	JHB (c/b)
39,725	156,419	116,694	100,000	60,275	39.7%	25.4%	63.9%
39,725	156,419	116,694	90,000	50,275	44.1%	25.4%	57.5%
39,725	156,419	116,694	80,000	40,275	49.7%	25.4%	51.1%
39,725	156,419	116,694	70,392	30,667	56.4%	25.4%	45.0%
39,725	156,419	116,694	60,000	20,275	66.2%	25.4%	38.4%
39,725	156,419	116,694	50,000	10,275	79.5%	25.4%	32.0%
39,725	156,419	116,694	40,000	275	99.3%	25.4%	25.6%
39,725	156,419	116,694	39,725	-	100.0%	25.4%	25.4%

In Table 9, the green row indicates the actual figures for the North West sub-region in 2011 presented in Table 7 and Table 8. The other rows show the effects on the employment performance measures of varying the total quantity of employment (number of jobs) in the sub-region. Other things remaining equal, the *greater* the number of jobs provided in the area:

- The lower the ESS
- The greater the number of inbound commuters
- No effect on ESC
- The higher the JHB.

Thus, increasing the number of local jobs alone <u>reduces</u> ESS and makes the commuting issue worse, because outbound commuting remains unchanged, while inbound commuting increases, unless the

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[6] Strategic Planning for Employment Self-Containment in Metropolitan Sub-Regions; S. Biermann and K. Martinus; 2013

locals can fill the additional jobs. Although JHB increases as jobs in the area increase there is no gain involved unless more locals are employed. Table 10 shows how the three defined measures would respond to hypothetical variations to *local workers employed in local jobs*.

Table 10: Effect of varying local workers in local employment on ESS, ESC and JHB

Resids. living and working in area (a)	Total Resident Workforce (b)	Outbound Commuters	Total Jobs in Area [c]	Inbound Commuters	ESS (a/c)	ESC (a/b)	JHB (c/b)
70,392	156,419	86,027	70,392	-	100.0%	45.0%	45.0%
60,000	156,419	96,419	70,392	10,392	85.2%	38.4%	45.0%
50,000	156,419	106,419	70,392	20,392	71.0%	32.0%	45.0%
39,725	156,419	116,694	70,392	30,667	56.4%	25.4%	45.0%
30,000	156,419	126,419	70,392	40,392	42.6%	19.2%	45.0%
20,000	156,419	136,419	70,392	50,392	28.4%	12.8%	45.0%
10,000	156,419	146,419	70,392	60,392	14.2%	6.4%	45.0%
-	156,419	156,419	70,392	70,392	0.0%	0.0%	45.0%

In Table 10, the green row indicates the actual figures for the North West sub-region in 2011 presented in Table 7, Table 8 and Table 9. The other rows show the effects on the employment performance measures of varying the total quantity of employment (number of jobs) performed by workers who also live within the sub-region. Other things remaining equal, the greater the number of jobs being held by members of the local workforce:

- The higher the ESS
- The higher the ESC
- Fewer inbound commuters
- Fewer outbound commuters
- JHB unchanged (this would also increase if total jobs in the area also increased).

The hypothetical scenarios presented in Table 10 serve to further emphasise the primary importance of *employment self-containment* – which can best be achieved through increases in <u>both</u> the number of jobs in the sub-region <u>and</u> the number of locals employed in these jobs. There are, however, some significant practical limitations associated with achieving employment self-containment through urban planning policy alone.

Towards an effective ESC Strategy

Employment in population-driven urban services (shops, schools, everyday medical services, etc) is seldom problematic. If the provision for such normal urban services is well planned in relation to demand and location, it is reasonably certain that these services will eventually be viably established at their planned locations, thus providing employment opportunities.

However, difficulties arise in attracting and providing for businesses and other organisations which are not necessarily tied to servicing specific local areas. Urban planning policy zones land for commercial and industrial purposes, but it cannot direct businesses and other organisations to locate on the zoned land, nor determine the exact nature of the uses that will eventually establish there. The "footloose" businesses not tied to specific localities will tend to be established where relevant factors such as proximity to markets or export gateways, proximity to other similar and/ or

complementary businesses and other services, transport linkages, corporate image and the extent of regional centrality required are able to be optimised.

The availability of an appropriately skilled local workforce is certainly a factor in such decisions, but the other location factors tend to predominate when it is a relatively simple matter for appropriately skilled employees, who may live all over the place, to commute to work. This combination of location factors therefore tends to mainly favour the Central Business Districts of most cities and their associated frame areas, usually within a 5km radius of the CBD.

However, these same factors also favour very large, well-connected regional activity centres, such as the Strategic Metropolitan Centres of Joondalup and (in the longer-term) Yanchep. These centres are, or will become, far more complex than the lower-order activity centres, even though the lower-order centres do have a very important, although more localised, service delivery role. It is nevertheless the Strategic Metropolitan Centres that provide (or will provide) most of the non-CBD employment opportunities suitable for higher-level knowledge workers, thus enabling them to be employed considerably more locally than most of them currently are. Therefore, it is only by facilitating development of a few very large, complex activity centres, that significant potential for improving ESC can reasonably be anticipated.

A critical complementary requirement for achieving this goal is facilitating easy travel for sub-regional residents to and from the Strategic Metropolitan Centres. Commuting to work will still be involved – there is no practicable way around that. However, relatively short commutes both north and south within the sub-region itself is a far better outcome than the massive one-way commute to and from Perth that typifies the current situation. For this reason, proper understanding, provision and use of transit oriented developments will also be essential for the facilitation of increased ESC over time.

Transit Oriented Development Considerations
Optimising the potential for Transit Oriented Development (TOD) is appropriate when considering any significant urban development within 800 metres or so of a railway station. The potential for TOD is particularly important within the context of Perth's NW sub-region given the need to maintain the extent of car-based commuting within sustainable limits. For this reason, the issues of TOD and employment policy are inextricably entwined. This section discusses the nature of TOD and, due to its proximity to the Clarkson railway station, seeks to place the proposed Catalina Grove urban development within the most appropriate TOD context.

TODs are planned, compact, walkable, urban areas, with a heavy emphasis on a medium/ high density residential environment, which is oriented towards a high-quality train service at their centre. This arrangement makes it possible for people to live a more convenient life without complete dependence on a car for mobility. TOD offers a practical means of addressing a range of urban sustainability issues by creating dense, walkable communities that ***reduce the need for driving***.

Development Control Policy 1.6
The WAPC Development Control Policy 1.6 "Planning to Support Transit Use and Transit Oriented Development" is based on the principle of placing several well-known fundamentals of transit oriented land use within a policy framework. The policy has a very wide view of TOD – it is mainly

based on increasing residential and other specific land use densities conveniently near virtually any form of public transport facility – including bus stops. This approach to density would appear to represent normal, efficient, strategic planning; however, the extent of land use intensity in any specific case would need to be related to a variety of factors in addition to transport. Accordingly, it is considered preferable to retain the term <u>TOD</u> for somewhat fewer, more significant, concentrations of residential/ commercial development near railway stations.

DCP 1.6 identifies numerous potential locations for TODs in the Perth Region and more-or-less requires that an effort be made to create a TOD at most railway stations. However, the policy blends various standard concepts of TOD in a somewhat contradictory way that would benefit from more detailed consideration and resolution, as the following extracts illustrate:

> *"Residential development should be encouraged close to transit facilities to help in creating a sense of place… Higher density residential development, in particular, places greater numbers of residents close to transit services, increasing the potential for those residents to look to transit as a travel option, with a corresponding increase in patronage."*

The above statement implies primarily high concentrations of residential development close to a station, thus serving mainly as a journey <u>origin</u> to facilitate convenience for residents travelling by the transit system to various destinations elsewhere; however:

> *"Other uses that are likely to be significant generators of transit trips should also be located close to transit facilities wherever possible. Relevant uses include offices and other 'high-density' employment- generating activities, intensive leisure facilities, and retailing. Similar considerations apply to uses such as aged persons development, schools and tertiary education uses, hospitals, community facilities and social services."*

This statement implies primarily a concentration of significant, numerous, non-residential, high-density employment and civic uses most of which would serve as a journey <u>destination</u> for people using the transit system (i.e. living elsewhere) to visit the various major facilities, or go to work in them, for example:

> *"Encouraging the greater use of transit services for journeys to work is an important policy objective."*

This clearly indicates that the significant employment areas are <u>destinations</u> that require the transit system to conveniently access them from elsewhere; however:

> *"Almost all transit users are pedestrians for at least a part of their journey, even if only for a short walk from a train or bus to a park-and-ride facility."*

These statements imply that TODs, in addition to being significant, high-density residential areas, should (simultaneously) comprise significant employment areas, be a major retail destination, the location for major community facilities such as hospitals, schools etc; and should <u>also</u> serve as park-and-ride facilities.

To plan TODs in the Perth Region using such a uniformly multi-purpose model would be neither appropriate nor effective; nor would it take adequate advantage of the travel potential between

residential developments and employment areas and institutional uses facilitated by transit. Although it is acknowledged that this interpretation almost certainly was not the specific intention of DCP 1.6, some refinement of the policy intent is, however, considered necessary to make this clear. What follows is an attempt to do that.

TOD models

Rather than proposing a single comprehensive TOD model incorporating as many of the features specified in DCP 1.6 as possible, it is considered that differentiating the nature of various TODs to better reflect their different strengths and roles in the scheme of things would be more beneficial. It is fully appreciated that all TODs should comprise some form of focussed mixed-use centre, but the logical role of each individual TOD should determine the degree of emphasis placed on residential vs other land uses. The following types of TOD are therefore suggested as appropriate TOD models:

- The Origin TOD is *primarily* residential – facilitating large numbers of dwelling units within an easy walk to the station, so that nearby residents can satisfy many of their everyday travel requirements, particularly the journey to work, via train. There should also be an appropriate level of local-serving retail and other non-residential uses conveniently located in the immediate vicinity of the station. Wherever park and ride facilities are available, they should clearly serve to reinforce the Origin TOD role. Ideally, at-grade park-and-ride facilities should not be located very close to the station because this displaces more appropriate, centrally-located, higher-order residential or commercial uses.

- The Destination TOD is *primarily* focussed around *significant* (district up to regional level) retail, other commercial, civic, cultural, and institutional uses. Residential developments right in the TOD should play only a modest supporting role, if any, but not at the expense of walkable accessibility between the station and the various commercial/ civic/ health/ education, etc. uses. Individual destination TODs will clearly take a very large number of potential forms, the nature of which will be driven by the predominant land use/s being served. While associated parking facilities will no doubt be provided in most of the non-residential uses, park-and-ride facilities, as such, would not be the most useful feature of a Destination TOD.

Clarkson Station and Catalina Grove

In the terms of the above discussion, Clarkson station and its immediate environs clearly represent a good opportunity for an *Origin TOD*, albeit it is currently a rather low-key, under-utilised one. Development near the station is predominantly medium-density residential and at-grade, all-day parking. Appropriately enough, commercial uses are low-key local uses, the main retail and commercial activity centre serving the Clarkson area being the large, predominantly car-oriented, Clarkson district centre, which is located some 2 km west of the station.

Under this set of circumstances, the most effective role for Catalina Grove in respect of implementing LPP 3.6 and thus contributing to the evolution of sustainable transport in the NW sub-region would be to establish medium to high-density residential development in areas within 800 metres (up to a ten-minute walk) of the Clarkson railway station. That would facilitate excellent transit-based accessibility for these residents to high level retail and other services, and of course

employment opportunities, in the major centres of Joondalup, Warwick, Stirling, Leederville, Perth CBD and (very importantly, in the longer term) Alkimos and Yanchep.

It would *not* be appropriate for Clarkson to be developed primarily as a <u>Destination TOD</u> because:

- The context of the Clarkson station and its placement in the transit system makes it a "natural" Origin TOD, rather than a Destination TOD. Both Joondalup and Yanchep will become by far the most significant Destination TODs in the NW sub-region, with Butler and Alkimos also becoming reasonably significant Destination TODs.
- The major retail and other commercial activity centre in the Clarkson district is the proximate, car-based district centre. Any significant "destination" attributes established at Clarkson station would potentially compete with and detract from the viable local and district service role of the Clarkson district centre.
- As discussed in this report, it is essential for higher-order knowledge-based jobs, which are those needing most encouragement for increased employment self-containment, to be focussed in the very large Strategic Metropolitan activity centres, particularly in Joondalup and Yanchep (in the longer term). Attempts to focus this type of employment outside the synergistic support frameworks of very large, complex, well-connected regional activity centres will not be successful.

APPENDIX
Centres Gravity Model Output Summary Sheets

APPENDIX
Centres Gravity Model Output Summary Sheets

THE RETAIL MODEL
The retail model used in this study is a form of gravity model which has been used in retail analysis for many years. The term "gravity" model is derived from an early analogy, formed in the late 1950's and early 1960's, between physics and social behavior. In the same manner that the attraction between physical bodies is related to their mass and distance between them, so too (it was hypothesized) is the attraction between certain social phenomena such as commercial centres and populations.

Though there is no true parallel between the physical and social sciences, this phenomenon of "social gravity" has been clearly demonstrated by numerous overseas and local researchers. The name "gravity model" has therefore persisted, and many useful models derived from this concept have been produced and used in various parts of the world, particularly in the United States of America and England.

SHRAPNEL URBAN PLANNING has used gravity models for retail analysis since 1982, and has produced a significant body of work for various public and private sector clients. The form of the gravity model which SHRAPNEL URBAN PLANNING has adapted for local use was originally developed by Lakshmanan and Hansen[1] to aid in the location of large new shopping centres in the Baltimore region. The model is expressed mathematically as follows:

$$P_{ij} = T_i \frac{A^a{}_j \big/ d_{ij}{}^b}{\displaystyle\sum_{j=1}^{n} A^a{}_j \big/ d_{ij}{}^b}$$

Where:

P_{ij} = The number of people living in zone *i* who are attracted to centre *j*

T_i = The total number of people living in zone *i*

A_j = A measure of the relative attractiveness of centre *j*

d_{ij} = A measure of the distance between zone *i* and centre *j*

a = An exponent applied to the attraction variable.

b = An exponent applied to the distance variable.

The basic premise of this model is that people are more likely, on the whole, to use shopping centres which are located close to where they live than they are to use centres which are located further away. This is not always the case, however, and some people will travel further to shop than they really need, sometimes passing one centre to visit a preferred one further away. Often this by-passing will be the by-passing of a smaller centre to visit a larger one. This "real world" situation is reflected in the results of the model. The older method

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[1] Lakshmanan T.R. and Hansen W.G. (1965). A Retail Market Potential Model, *AIP Journal, May 1965*.

of describing a centre's "catchment area" by a single line around the centre, and assuming that all persons or dwellings on the inside of the line are "in" the catchment and all those outside the line are "out" of the catchment is clearly artificial.

The basic data unit (*P*) is usually population grouped into identifiable zones, such as suburbs. Population counts and forecasts are reasonably easily obtained. Other data units can, however, be used. It may be decided to use households rather than population, or household income or estimates of household retail expenditure. Whichever data unit is used, the way it is processed is the same. When estimates of household expenditure are used, however, the total amount of retail dollars attracted to the centre can then be divided by the floor area of the centre to provide a calculation of the annual turnover per square metre of the centre.

The measure of attractiveness of each centre (*A*) which is used is normally the size of the centre in square metres of net lettable floor area. This most significant of inputs can be easily measured and kept up-to-date. Other measures of attractiveness can be included in the model as well (such as values representing relative "image", ease of car parking, etc); but these factors are much more difficult to reliably quantify. Unless the results of detailed empirical research are available to clearly demonstrate the reliability of measuring these types of additional variables, the model provides more useful results without them. Where such research can be done, then these additional factors will increase the sophistication of the model.

The measure of the distance between each residential zone and each shopping centre (*d*) is usually an estimate of the driving time in minutes. This estimate may be derived from measures of the straight line distances involved, or by distances along traffic routes. There is little difference in the model's results between straight line measures and road network measures where major physical impediments to direct travel are absent. A measure which takes account of the structure of the road network is superior to the straight line distance measure, however, where major geographic features (such as lakes or rivers for example) make straight line distance measures less accurate.

Thus the model relates **all the shopping centres** in a study area with **all the people** (grouped into zones) within the area. The relationship between these two sets of data is determined by the **set of driving times** - a separate measurement between each shopping centre and each residential zone. The model's main use is to estimate the future relative performance of a shopping centre given the future size and distribution of the population and all other shopping centres. The impact of creating or expanding any shopping centre, or even the effects of changing the road network, can also be estimated using the model.

It must always be remembered that the model results are a calculation, based on a mathematical formula and certain selected data inputs. When the results are presented in a way which has real meaning to a shopping centre

developer, such as dollar turnover per square metre, it is tempting to assume that the model is actually predicting the future financial performance of the centre. This is not the case, and is why other considerations must always also be taken into account by decision makers. The model is therefore an aid to decision making - not a "black box" which spits out the "right" answer.

For example, in a hypothetical urban area of 20,000 people, there might be two centres of exactly equal size - Centre A and Centre B, spaced evenly in relation to the population. The situation might be as illustrated in the following diagram:

POPULATION 5,000 (A) | POPULATION 5,000

POPULATION 5,000 | (B) POPULATION 5,000
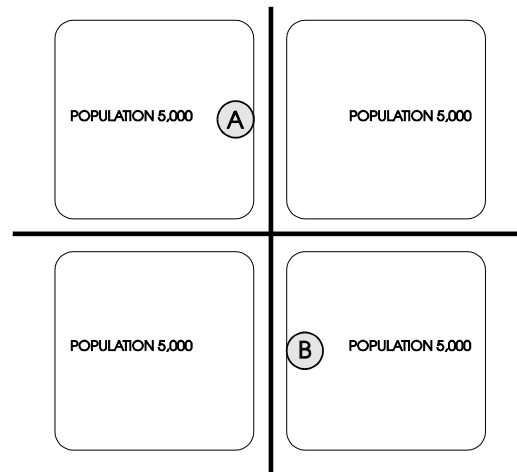
HYPOTHETICAL URBAN AREA

In this simple hypothetical situation, as common sense itself dictates, the model would distribute half the total population to Centre A and half to Centre B (though a higher proportion of the population living near Centre A would be distributed to Centre A and vice versa). This is because the two centres are equal in size, and are located equally in relation to an evenly distributed population. But if "in reality" Centre A was a clean, well managed centre containing many excellent shops; while Centre B was run down, had poor car parking and an uninteresting array of shops, Centre A would out-perform Centre B easily. The model would not indicate this difference unless the research was available to quantify the additional relative attraction factors. Thus the results of the model are a function of the inputs. They only represent the real world partially. This does not detract from the model's usefulness as an analytical tool, but it illustrates its limitations and the need for the use of sound judgment as well.

CATALINA GROVE NEIGHBOURHOOD CENTRE

Lookup	ID	Type	Name	Hierarchy	SHP nla	RET nla	TOT nla	SHP-$Mil	PerSqm	RET-$Mil	PerSqm	TOT-$Mil	PerSqm	SHP-Pers	Sqm/Cap*	RET-Pers	Sqm/Cap*
3	TP-01	C	CATALINA GROVE NC	6 NHD	40,000	35,000	75,000	$384.0	$9,600	$235.0	$6,716	$619.1	$8,254	31,662	1.26	49,746	0.70
1	672	C	CLARKSON SC	4 SEC	1,610	200	1,810	$12.2	$7,592	$1.6	$7,841	$13.8	$7,619	1,016	1.58	337	0.59
2	8791	C	MINDARIE NC	6 NHD	1,129	-	1,129	$7.0	$6,223	$0.0	$0	$7.0	$6,223	571	1.98	-	-
4	675	C	MINDARIE KEYS	7 LOC	800	100	900	$4.5	$5,570	$0.5	$4,858	$4.9	$5,491	378	2.12	108	0.93
5	8792	C	CLARKSON LC	7 LOC	850	-	850	$4.9	$5,724	$0.0	$0	$4.9	$5,724	403	2.11	-	-
6	CL-03	C	CLARKSON STN	7 LOC	-	-	-	$0.0	$0	$0.0	$0	$0.0	$0	-	-	-	-
7	TP-02	C	CENTRAL TAMALA PK LC	7 LOC	-	-	-	$0.0	$0	$0.0	$0	$0.0	$0	-	-	-	-
8	TP-03	C	WEST TAMALA PK LC	7 LOC	-	-	-	$0.0	$0	$0.0	$0	$0.0	$0	-	-	-	-
9	KR-01	C	KINROSS CENTRAL NC	6 NHD	3,900	100	4,000	$38.8	$9,946	$1.1	$11,474	$39.9	$9,985	3,195	1.22	240	0.42
10	KR-02	C	KINROSS LC	7 LOC	1,000	-	1,000	$7.8	$7,761	$0.0	$0	$7.8	$7,761	638	1.57	-	-
11	AL-949	C	ALKIMOS SC	4 SEC	5,000	-	5,000	$31.5	$6,299	$0.0	$0	$31.5	$6,299	2,612	1.91	-	-
46	BU-03	P	BUTLER-03	8 OTH C	500	2,500	3,000	$6.2	$12,458	$20.2	$8,086	$26.4	$8,815	535	0.94	4,676	0.53
47	600	C	JOONDALUP SMC	3 STR	73,000	7,100	80,100	$577.4	$7,910	$43.0	$6,052	$620.4	$7,745	45,879	1.59	8,622	0.82
48	946	C	CURRAMBINE DC	5 DIS	7,000	500	7,500	$69.4	$9,915	$5.7	$11,438	$75.1	$10,017	5,243	1.34	1,029	0.49

Dwelling Unit/ Population Projections — Primary Study Area

Year	2016	2021	2026	2031	2036	ULT
Dwellings	11,650	13,336	14,837	15,241	15,441	15,479
Population	33,542	37,563	40,985	41,556	41,660	41,427

Data Sets (this sheet)
DW2016   SHP16   RET16

Model Run Stats (this sheet)

Shop/Retail	NLA (sqm)	$million /annum	$/sqm /annum	Person (Equiv.)	Sqm/ Capita*	Sqm/ Capita~
Regional	40,000	$384.0	$9,600	31,662	1.26	1.19
District	-	$0.0	$0	-	-	-
N'hood	5,510	$51.0	$9,258	4,211	1.31	0.16
Local	3,779	$24.1	$6,380	1,990	1.90	0.11
Other Com	-	$0.0	$0	-	-	-
Industrial	-	$0.0	$0	-	-	-
Total SHP	**49,289**	**$459.1**	**$9,315**	**37,862**	**1.30**	**1.47**
crosscheck	OK	OK		OK		

Other Retail	NLA (sqm)	$million /annum	$/sqm /annum	Person (Equiv.)	Sqm/ Capita*	Sqm/ Capita~
Regional	35,000	$235.0	$6,716	49,746	0.70	1.04
District	-	$0.0	$0	-	-	-
N'hood	300	$2.72	$9,052	577	0.52	0.01
Local	100	$0.5	$4,858	108	0.93	0.00
Other Com	-	$0.0	$0	-	-	-
Industrial	-	$0.0	$0	-	-	-
Total RET	**35,400**	**$238.3**	**$6,730**	**50,431**	**0.70**	**1.06**
crosscheck	OK	OK		OK		

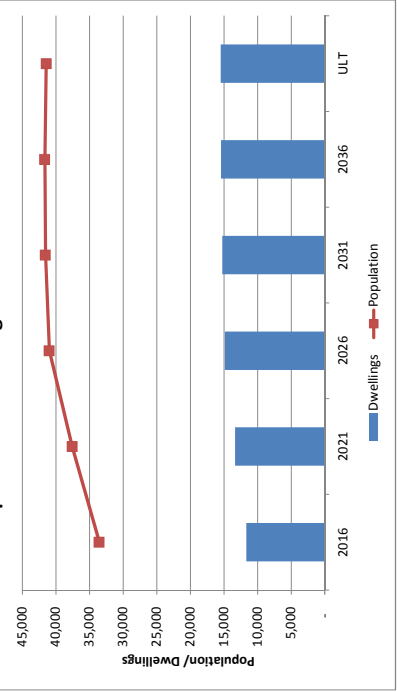| TOTAL Retail	NLA (sqm)	$million /annum	$/sqm	Person (Equiv.)	Sqm/ Capita~
Regional	75,000	$619.1	$8,254	49,746	2.24
District	-	$0.0	$0	-	0.17
N'hood	5,810	$53.7	$9,248	577	0.12
Local	3,879	$24.6	$6,340	108	-
Other Com	-	$0.0	$0	-	-
Industrial	-	$0.0	$0	-	-
Total RETAIL	**84,689**	**$697.4**	**$8,235**		**2.52**
crosscheck	OK	OK			

NOTE: Totalling of Person Equivalents for Total Retail is a double-count of population and therefore not valid.

NOTE: This page displays the calculations of a mathematical "Retail Floorspace Potential" model, which is used to estimate retail floorspace needs and impacts for urban planning purposes.

Various qualitative aspects of centres are not fully accounted for in the model, and the actual economic performance of a centre will not necessarily accord with its theoretical potential as calculated by the model.

NOTE: Centre names are a combination of DoP Complex names, LGA local names, and SUP database reference names. They may or may not accord with their commercial trading names.

* Derived from person equivalents attracted to centre
~ Derived from main study area population projection alone

Centre Performance (Shop/ Retail Floorspace) — Turnover $ per sqm per annum (TP-01, TP-02, TP-03, CL-03, KR-01, KR-02, AL-949, BU-03, 600)

Population & Dwellings 2016 - Ultimate (Dwellings, Population)

Retail Floorspace (this sheet) — Sq. metres NLA (Regional, District, N'hood, Local, Other Com, Industrial; Shop/Retail, Other Retail)

	SHP nla	RET nla	TOT nla	SHP-$Mil	PerSqm	RET-$Mil	PerSqm	TOT-$Mil	PerSqm	SHP-Pers	Sqm/Cap	RET-Pers	Sqm/Cap
District & Higher Only	40,000	35,000	75,000	$384.0	$9,600	$235.0	$6,716	$619.1	$8,254	31,662	1.26	49,746	0.70
TOTAL (This Page)	49,289	35,400		$459.1	$9,315	$238.3	$6,730	$697.4	$8,235	37,862	1.30	50,431	0.70

CATALINA GROVE NEIGHBOURHOOD CENTRE

Lookup	ID	Type	Name	Hierarchy	SHP nla	RET nla	TOT nla	PerSqm	SHP-$Mil	PerSqm	RET-$Mil	PerSqm	TOT-$Mil	SHP-Pers	Sqm/Cap*	RET-Pers	Sqm/Cap*
3	**TP-01**	**C**	**CATALINA GROVE NC**	**6 NHD**	**3,300**	**200**	**3,500**	**$6,488**	**$21.4**	**$6,835**	**$1.4**	**$6,508**	**$22.8**	**1,702**	**1.94**	**276**	**0.72**
1	672	C	CLARKSON SC	4 SEC	40,000	35,000	75,000	$9,046	$361.8	$6,529	$228.5	$7,871	$590.3	29,296	1.37	47,113	0.74
2	8791	C	MINDARIE NC	6 NHD	1,610	200	1,810	$6,894	$11.1	$7,223	$1.4	$6,930	$12.5	907	1.78	303	0.66
4	675	C	MINDARIE KEYS	7 LOC	1,129	-	1,129	$5,783	$6.5	$0	$0.0	$5,783	$6.5	515	2.19	-	-
5	8792	C	CLARKSON LC	7 LOC	800	100	900	$5,081	$4.1	$4,542	$0.5	$5,021	$4.5	339	2.36	98	1.02
6	CL-03	C	CLARKSON STN	7 LOC	850	-	850	$5,708	$4.9	$0	$0.0	$5,708	$4.9	394	2.15	-	-
7	TP-02	C	CENTRAL TAMALA PK LC	7 LOC	400	-	400	$6,068	$2.4	$0	$0.0	$6,068	$2.4	193	2.08	-	-
8	TP-03	C	WEST TAMALA PK LC	7 LOC	-	-	-	$0	$0.0	$0	$0.0	$0	$0.0	-	-	-	-
9	KR-01	C	KINROSS CENTRAL NC	6 NHD	3,900	100	4,000	$8,873	$34.6	$10,773	$1.1	$8,920	$35.7	2,774	1.41	218	0.46
10	KR-02	C	KINROSS LC	7 LOC	1,000	-	1,000	$6,870	$6.9	$0	$0.0	$6,870	$6.9	549	1.82	-	-
11	AL-949	C	ALKIMOS SC	4 SEC	15,000	5,000	20,000	$6,560	$98.4	$4,413	$22.1	$6,023	$120.5	8,098	1.85	4,733	1.06
46	BU-03	P	BUTLER-Q3	8 OTH C	1,000	5,000	6,000	$11,319	$11.3	$6,415	$32.1	$7,233	$43.4	958	1.04	7,213	0.69
47	600	C	JOONDALUP SMC	3 STR	102,000	8,000	110,000	$7,049	$719.0	$5,873	$47.0	$6,964	$766.0	55,972	1.82	9,203	0.87
48	946	C	CURRAMBINE DC	5 DIS	10,000	1,000	11,000	$8,768	$87.7	$10,937	$10.9	$8,965	$98.6	6,425	1.56	1,898	0.53
			District & Higher Only		40,000	35,000	75,000		$361.8		$228.5		$590.3	29,296	1.37	47,113	0.74
			TOTAL (This Page)		52,989	35,600	88,589		$453.7		$232.8		$686.5	36,669	1.45	48,008	0.74

Dwelling Unit / Population Projections

Primary Study Area

Year	2016	2021	2026	2031	2036	ULT
Dwellings	11,650	13,336	14,837	15,241	15,441	15,479
Population	33,542	37,563	40,985	41,556	41,660	41,427

Data Sets (this sheet): DW2021 SHP21 RET21

Model Run Stats (this sheet)

Shop/Retail	NLA (sqm)	$million /annum	$/sqm /annum	Person (Equiv.)	Sqm/ Capita*	Sqm/ Capita~
Regional	40,000	$361.8	$9,046	29,296	1.37	1.06
District	-	$0.0	$0	-	-	-
N'hood	8,810	$67.1	$7,618	5,382	1.64	0.23
Local	4,179	$24.7	$5,921	1,991	2.10	0.11
Other Com	-	$0.0	$0	-	-	-
Industrial	-	$0.0	$0	-	-	-
Total SHP	**52,989**	**$453.7**	**$8,562**	**36,669**	**1.45**	**1.41**
crosscheck	OK	OK		OK		

Other Retail	NLA (sqm)	$million /annum	$/sqm /annum	Person (Equiv.)	Sqm/ Capita*	Sqm/ Capita~
Regional	35,000	$228.5	$6,529	47,113	0.74	0.93
District	-	$0.0	$0	-	-	-
N'hood	500	$3.89	$7,778	797	0.63	0.01
Local	100	$0.5	$4,542	98	1.02	0.00
Other Com	-	$0.0	$0	-	-	-
Industrial	-	$0.0	$0	-	-	-
Total RET	**35,600**	**$232.8**	**$6,541**	**48,008**	**0.74**	**0.95**
crosscheck	OK	OK		OK		

TOTAL Retail	NLA (sqm)	$million /annum	$/sqm	Person (Equiv.)	Sqm/ Capita~
Regional	75,000	$590.3	$7,871	47,113	2.00
District	-	$0.0	$0	-	-
N'hood	9,310	$71.0	$7,626		0.25
Local	4,279	$25.2	$5,888		0.11
Other Com	-	$0.0	$0	-	-
Industrial	-	$0.0	$0	-	-
Total RETAIL	**88,589**	**$686.5**	**$7,750**		**2.36**
crosscheck	OK	OK		OK	

NOTE: Totaling of Person Equivalents for Total Retail is a double-count of population and therefore not valid.

NOTE: This page displays the calculations of a mathematical "Retail Floorspace Potential" model, which is used to estimate retail floorspace needs and impacts for urban planning purposes.

Various qualitative aspects of centres are not fully accounted for in the model, and the actual economic performance of a centre will not necessarily accord with its theoretical potential as calculated by the model.

NOTE: Centre names are a combination of DoP Complex names, LGA local names, and SUP database reference names. They may or may not accord with their commercial trading names.

* Derived from person equivalents attracted to centre
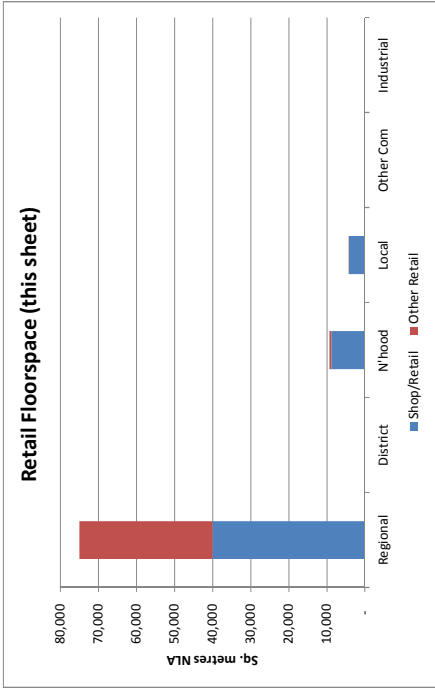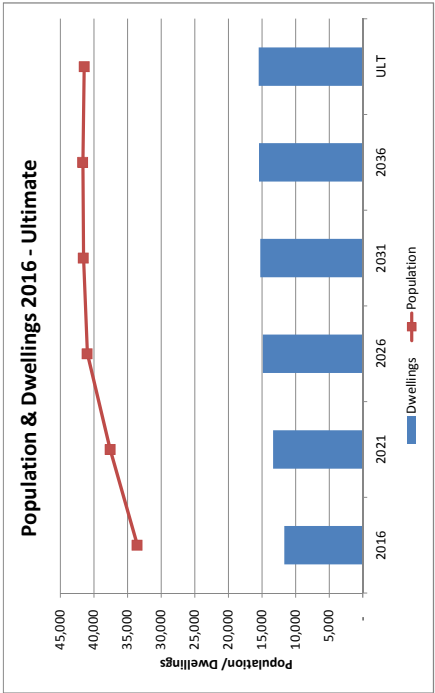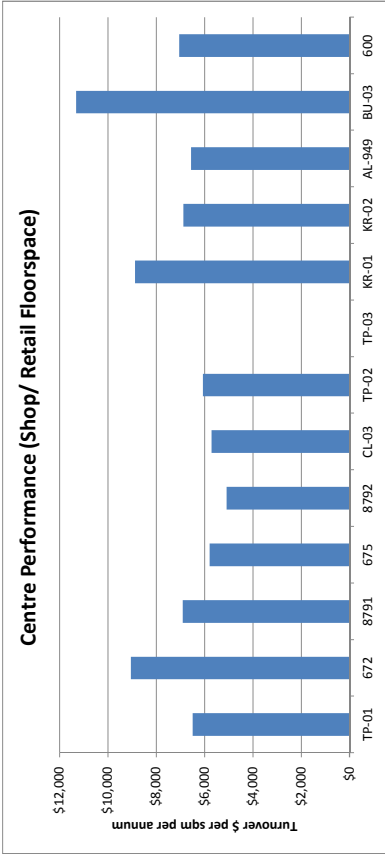~ Derived from main study area population projection alone

Centre Performance (Shop/ Retail Floorspace)

Population & Dwellings 2016 - Ultimate

Retail Floorspace (this sheet)

CATALINA GROVE NEIGHBOURHOOD CENTRE

Lookup	ID	Type	Name	Hierarchy	SHP nla	RET nla	TOT nla	SHP-$Mil	PerSqm	RET-$Mil	PerSqm	TOT-$Mil	PerSqm	SHP-Pers	Sqm/Cap*	RET-Pers	Sqm/Cap*
3	TP-01	C	CATALINA GROVE NC	6 NHD	3,300	200	3,500	$26.9	$8,155	$1.6	$7,882	$28.5	$8,139	2,067	1.60	307	0.65
1	672	C	CLARKSON SC	4 SEC	40,000	35,000	75,000	$373.9	$9,346	$224.7	$6,420	$598.6	$7,981	28,900	1.38	43,985	0.80
2	8791	C	MINDARIE NC	6 NHD	1,610	200	1,810	$11.0	$6,860	$1.4	$6,782	$12.4	$6,852	826	1.95	259	0.77
4	675	C	MINDARIE KEYS	7 LOC	1,129	-	1,129	$6.6	$5,854	$0.0	$0	$6.6	$5,854	497	2.27	-	-
5	8792	C	CLARKSON LC	7 LOC	800	100	900	$4.1	$5,083	$0.4	$4,312	$4.5	$4,997	317	2.53	86	1.16
6	CL-03	C	CLARKSON STN	7 LOC	850	-	850	$5.4	$6,303	$0.0	$0	$5.4	$6,303	420	2.02	-	-
7	TP-02	C	CENTRAL TAMALA PK LC	7 LOC	400	-	400	$2.8	$7,093	$0.0	$0	$2.8	$7,093	219	1.82	-	-
8	TP-03	C	WEST TAMALA PK LC	7 LOC	250	-	250	$1.4	$5,641	$0.0	$0	$1.4	$5,641	110	2.28	-	-
9	KR-01	C	KINROSS CENTRAL NC	6 NHD	3,900	100	4,000	$35.1	$8,990	$1.0	$10,251	$36.1	$9,021	2,752	1.42	203	0.49
10	KR-02	C	KINROSS LC	7 LOC	1,000	-	1,000	$6.9	$6,918	$0.0	$0	$6.9	$6,918	542	1.84	-	-
11	AL-949	C	ALKIMOS SC	4 SEC	25,000	10,000	35,000	$166.4	$6,658	$41.2	$4,122	$207.7	$5,933	13,355	1.87	8,556	1.17
46	BU-03	P	BUTLER-03	8 OTH C	1,000	7,000	8,000	$10.4	$10,448	$38.3	$5,471	$48.7	$6,093	860	1.16	8,236	0.85
47	600	C	JOONDALUP SMC	3 STR	102,000	9,000	111,000	$729.3	$7,150	$51.1	$5,677	$780.4	$7,030	54,923	1.86	9,684	0.93
48	946	C	CURRAMBINE DC	5 DIS	10,000	1,000	11,000	$89.6	$8,960	$10.6	$10,599	$100.2	$9,109	6,310	1.58	1,769	0.57
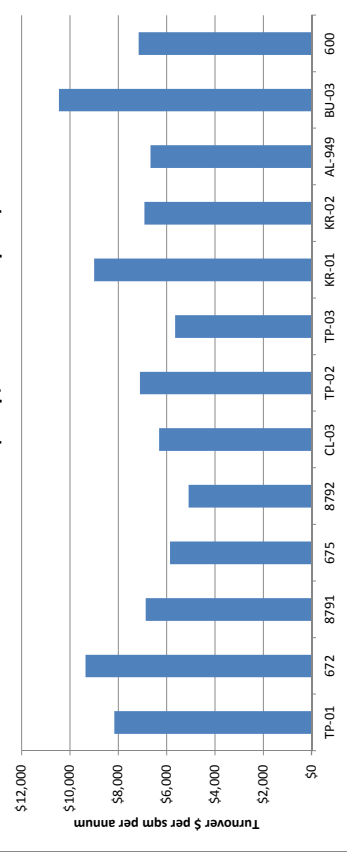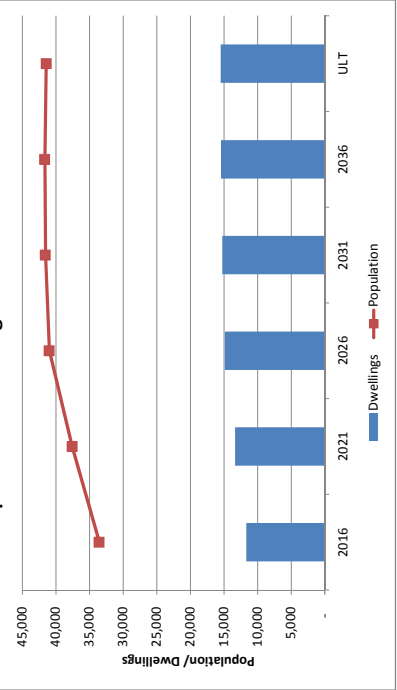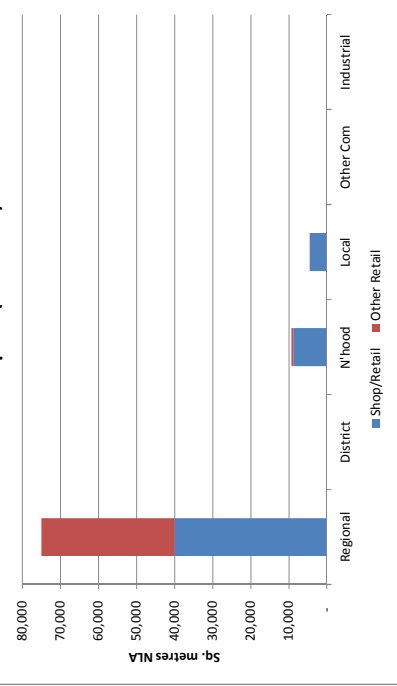
Dwelling Unit / Population Projections

Primary Study Area

Year	2016	2021	2026	2031	2036	ULT
Dwellings	11,650	13,336	14,837	15,241	15,441	15,479
Population	33,542	37,563	40,985	41,556	41,660	41,427

Data Sets (this sheet)
DW2026   SHP26   RET26

Model Run Stats (this sheet)

Shop/Retail	NLA (sqm)	$million /annum	$/sqm /annum	Person (Equiv.)	Sqm/ Capita*	Sqm/ Capita~
Regional	40,000	$373.9	$9,346	28,900	1.38	0.98
District	-	$0.0	$0	-	-	-
N'hood	8,810	$73.0	$8,288	5,645	1.56	0.21
Local	4,429	$27.2	$6,141	2,105	2.10	0.11
Other Com	-	$0.0	$0	-	-	-
Industrial	-	$0.0	$0	-	-	-
Total SHP	**53,239**	**$474.1**	**$8,905**	**36,650**	**1.45**	**1.30**
crosscheck	OK			OK		

Other Retail	NLA (sqm)	$million /annum	$/sqm /annum	Person (Equiv.)	Sqm/ Capita*	Sqm/ Capita~
Regional	35,000	$224.7	$6,420	43,985	0.80	0.85
District	-	$0.0	$0	-	-	-
N'hood	500	$3.96	$7,916	768	0.65	0.01
Local	100	$0.4	$4,312	86	1.16	0.00
Other Com	-	$0.0	$0	-	-	-
Industrial	-	$0.0	$0	-	-	-
Total RET	**35,600**	**$229.1**	**$6,435**	**44,839**	**0.79**	**0.87**
crosscheck	OK			OK		

TOTAL Retail	NLA (sqm)	$million /annum	$/sqm /annum	Sqm/ Capita~
Regional	75,000	$598.6	$7,981	1.83
District	-	$0.0	$0	-
N'hood	9,310	$77.0	$8,268	0.23
Local	4,529	$27.6	$6,101	0.11
Other Com	-	$0.0	$0	-
Industrial	-	$0.0	$0	-
Total RETAIL	**88,839**	**$703.2**	**$7,915**	**2.17**
crosscheck	OK			OK

NOTE: Totalling of Person Equivalents for Total Retail is a double-count of population and therefore not valid.

NOTE: This page displays the calculations of a mathematical "Retail Floorspace Potential" model, which is used to estimate retail floorspace needs and impacts for urban planning purposes.

Various qualitative aspects of centres are not fully accounted for in the model, and the actual economic performance of a centre will not necessarily accord with its theoretical potential as calculated by the model.

NOTE: Centre names are a combination of DoP Complex names, LGA local names, and SUP database reference names. They may or may not accord with their commercial trading names.

* Derived from person equivalents attracted to centre
~ Derived from main study area population projection alone

Centre Performance (Shop/ Retail Floorspace)

Population & Dwellings 2016 - Ultimate

Retail Floorspace (this sheet)

District & Higher Only	40,000	35,000	75,000	$373.9	$9,346	$224.7	$6,420	28,900	1.38	43,985	0.80
TOTAL (This Page)	53,239	35,600	88,839	$474.1	$8,905	$229.1	$6,435	36,650	1.45	44,839	0.79

CATALINA GROVE NEIGHBOURHOOD CENTRE

Lookup	ID	Type	Name	Hierarchy	SHP nla	RET nla	TOT nla	SHP-$Mil	PerSqm	RET-$Mil	PerSqm	TOT-$Mil	PerSqm	SHP-Pers	Sqm/Cap*	RET-Pers	Sqm/Cap*
3	TP-01	C	CATALINA GROVE NC	6 NHD	3,300	200	3,500	$26.6	$8,046	$1.5	$7,592	$28.1	$8,020	2,039	1.62	295	0.68
1	672	C	CLARKSON SC	4 SEC	40,000	35,000	75,000	$367.4	$9,184	$217.3	$6,207	$584.6	$7,795	28,785	1.39	43,018	0.81
2	8791	C	MINDARIE NC	6 NHD	1,610	200	1,810	$10.7	$6,670	$1.3	$6,471	$12.0	$6,648	853	1.89	261	0.77
4	675	C	MINDARIE KEYS	7 LOC	1,129	-	1,129	$6.5	$5,738	$0.0	$0	$6.5	$5,738	494	2.28	-	-
5	8792	C	CLARKSON LC	7 LOC	800	100	900	$3.9	$4,925	$0.4	$4,108	$4.4	$4,834	320	2.50	86	1.17
6	CL-03	C	CLARKSON STN	7 LOC	850	-	850	$5.2	$6,136	$0.0	$0	$5.2	$6,136	410	2.07	-	-
7	TP-02	C	CENTRAL TAMALA PK LC	7 LOC	400	-	400	$2.9	$7,193	$0.0	$0	$2.9	$7,193	220	1.82	-	-
8	TP-03	C	WEST TAMALA PK LC	7 LOC	250	-	250	$1.4	$5,741	$0.0	$0	$1.4	$5,741	111	2.25	-	-
9	KR-01	C	KINROSS CENTRAL NC	6 NHD	3,900	100	4,000	$34.3	$8,793	$1.0	$9,712	$35.3	$8,816	2,684	1.45	191	0.52
10	KR-02	C	KINROSS LC	7 LOC	1,000	-	1,000	$6.7	$6,742	$0.0	$0	$6.7	$6,742	527	1.90	-	-
11	AL-949	C	ALKIMOS SC	4 SEC	50,000	15,000	65,000	$306.7	$6,134	$58.9	$3,928	$365.6	$5,625	24,727	2.02	12,269	1.22
46	BU-03	P	BUTLER-03	8 OTH C	1,000	10,000	11,000	$9.7	$9,726	$49.2	$4,918	$58.9	$5,355	808	1.24	10,639	0.94
47	600	C	JOONDALUP SMC	3 STR	102,000	10,000	112,000	$719.0	$7,049	$54.7	$5,467	$773.6	$6,908	53,915	1.89	10,280	0.97
48	946	C	CURRAMBINE DC	5 DIS	10,000	1,000	11,000	$89.1	$8,914	$10.3	$10,260	$99.4	$9,036	6,182	1.62	1,684	0.59

Dwelling Unit / Population Projections
Primary Study Area

Year	2016	2021	2026	2031	2036	ULT
Dwellings	11,650	13,336	14,837	15,241	15,441	15,479
Population	33,542	37,563	40,985	41,556	41,660	41,427

Data Sets (this sheet)
DW2031 SHP31 RET31

Model Run Stats (this sheet)

Shop/Retail	NLA (sqm)	$million /annum	$/sqm /annum	Person (Equiv.)	Sqm/ Capita *	Sqm/ Capita~
Regional	40,000	$367.4	$9,184	28,785	1.39	0.96
District	-	$0.0	$0	-	-	-
N'hood	8,810	$71.6	$8,125	5,576	1.58	0.21
Local	4,429	$26.7	$6,026	2,083	2.13	0.11
Other Com	-	$0.0	$0	-	-	-
Industrial	-	$0.0	$0	-	-	-
Total SHP	**53,239**	**$465.6**	**$8,746**	**36,444**	**1.46**	**1.28**
crosscheck	OK	OK				

Other Retail	NLA (sqm)	$million /annum	$/sqm /annum	Person (Equiv.)	Sqm/ Capita *	Sqm/ Capita~
Regional	35,000	$217.3	$6,207	43,018	0.81	0.84
District	-	$0.0	$0	-	-	-
N'hood	500	$3.78	$7,568	747	0.67	0.01
Local	100	$0.4	$4,108	86	1.17	0.00
Other Com	-	$0.0	$0	-	-	-
Industrial	-	$0.0	$0	-	-	-
Total RET	**35,600**	**$221.4**	**$6,220**	**43,851**	**0.81**	**0.86**
crosscheck	OK			OK		

TOTAL Retail	NLA (sqm)	$million /annum	$/sqm /annum	Sqm/ Capita~
Regional	75,000	$584.6	$7,795	1.80
District	-	$0.0	$0	-
N'hood	9,310	$75.4	$8,095	0.22
Local	4,529	$27.1	$5,983	0.11
Other Com	-	$0.0	$0	-
Industrial	-	$0.0	$0	-
Total RETAIL	**88,839**	**$687.1**	**$7,734**	**2.14**
crosscheck	OK	OK	OK	

NOTE: Totalling of Person Equivalents for Total Retail is a double-count of population and therefore not valid.

NOTE: This page displays the calculations of a mathematical "Retail Floorspace Potential" model, which is used to estimate retail floorspace needs and impacts for urban planning purposes.

Various qualitative aspects of centres are not fully accounted for in the model, and the actual economic performance of a centre will not necessarily accord with its theoretical potential as calculated by the model.
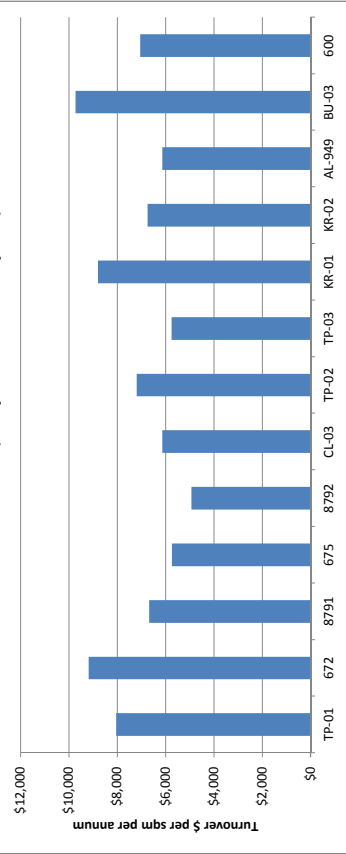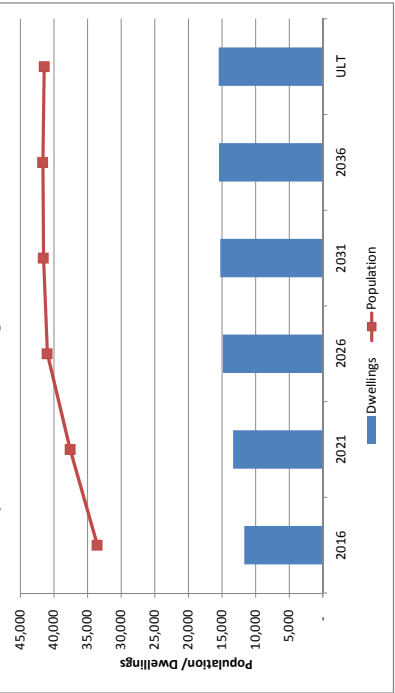
NOTE: Centre names are a combination of DoP Complex names, LGA local names, and SUP database reference names. They may or may not accord with their commercial trading names.

* Derived from person equivalents attracted to centre
~ Derived from main study area population projection alone

Centre Performance (Shop/ Retail Floorspace)

Retail Floorspace (this sheet)

Population & Dwellings 2016 - Ultimate

	SHP nla	RET nla	TOT nla	SHP-$Mil	RET-$Mil	TOT-$Mil	SHP-Pers	RET-Pers
District & Higher Only	40,000	35,000	75,000	$367.4	$217.3	$584.6	28,785	43,018
TOTAL (This Page)	53,239	35,600	88,839	$465.6	$221.4	$687.1	36,444	43,851

CATALINA GROVE NEIGHBOURHOOD CENTRE

Lookup	ID	Type	Name	Hierarchy	SHP nla	RET nla	TOT nla	SHP-$Mil	PerSqm	RET-$Mil	PerSqm	TOT-$Mil	PerSqm	SHP-Pers	Sqm/Cap*	RET-Pers	Sqm/Cap*
3	**TP-01**	**C**	**CATALINA GROVE NC**	**6 NHD**	**3,300**	**200**	**3,500**	**$26.8**	**$8,111**	**$1.5**	**$7,648**	**$28.3**	**$8,084**	**2,044**	**1.61**	**296**	**0.68**
1	672	C	CLARKSON SC	4 SEC	40,000	35,000	75,000	$374.1	$9,352	$220.8	$6,310	$594.9	$7,932	29,084	1.38	43,406	0.81
2	8791	C	MINDARIE NC	6 NHD	1,610	200	1,810	$11.0	$6,823	$1.3	$6,606	$12.3	$6,799	867	1.86	264	0.76
4	675	C	MINDARIE KEYS	7 LOC	1,129	-	1,129	$6.6	$5,870	$0.0	$0	$6.6	$5,870	505	2.23	-	-
5	8792	C	CLARKSON LC	7 LOC	800	100	900	$4.0	$4,994	$0.4	$4,165	$4.4	$4,902	322	2.48	86	1.16
6	CL-03	C	CLARKSON STN	7 LOC	850	-	850	$5.3	$6,197	$0.0	$0	$5.3	$6,197	411	2.07	-	-
7	TP-02	C	CENTRAL TAMALA PK LC	7 LOC	400	-	400	$2.9	$7,283	$0.0	$0	$2.9	$7,283	221	1.81	-	-
8	TP-03	C	WEST TAMALA PK LC	7 LOC	250	-	250	$1.5	$5,983	$0.0	$0	$1.5	$5,983	113	2.21	-	-
9	KR-01	C	KINROSS CENTRAL NC	6 NHD	3,900	100	4,000	$34.4	$8,831	$1.0	$9,747	$35.4	$8,854	2,688	1.45	191	0.52
10	KR-02	C	KINROSS LC	7 LOC	1,000	-	1,000	$6.8	$6,768	$0.0	$0	$6.8	$6,768	527	1.90	-	-
11	AL-949	C	ALKIMOS SC	4 SEC	50,000	15,000	65,000	$328.9	$6,577	$63.8	$4,251	$392.6	$6,040	26,345	1.90	13,204	1.14
46	BU-03	P	BUTLER-03	8 OTH C	1,000	10,000	11,000	$9.9	$9,944	$50.4	$5,036	$60.3	$5,482	823	1.22	10,849	0.92
47	600	C	JOONDALUP SMC	3 STR	102,000	10,000	112,000	$723.3	$7,091	$54.9	$5,489	$778.2	$6,948	54,075	1.89	10,295	0.97
48	946	C	CURRAMBINE DC	5 DIS	10,000	1,000	11,000	$89.5	$8,949	$10.3	$10,287	$99.8	$9,070	6,194	1.61	1,685	0.59
			District & Higher Only		40,000	35,000	75,000	$374.1	$9,352	$220.8	$6,310	$594.9	$7,932	29,084	1.38	43,406	0.81
			TOTAL (This Page)		53,239	35,600	88,839	$473.3	$8,891	$225.1	$6,323	$698.4	$7,862	36,781	1.45	44,244	0.80

Dwelling Unit / Population Projections

Primary Study Area

Year	2016	2021	2026	2031	2036	ULT
Dwellings	11,650	13,336	14,837	15,241	15,441	15,479
Population	33,542	37,563	40,985	41,556	41,660	41,427

Data Sets (this sheet)

DW2036   SHP36

DW2036   SHP36   RET36

Model Run Stats (this sheet)

Shop/Retail	NLA (sqm)	$million /annum	$/sqm /annum	Person (Equiv.)	Sqm/ Capita*	Sqm/ Capita~
Regional	40,000	$374.1	$9,352	29,084	1.38	0.96
District	-	$0.0	$0	-	-	-
N'hood	8,810	$72.2	$8,194	5,599	1.57	0.21
Local	4,429	$27.1	$6,111	2,099	2.11	0.11
Other Com	-	$0.0	$0	-	-	-
Industrial	-	$0.0	$0	-	-	-
Total SHP	**53,239**	**$473.3**	**$8,891**	**36,781**	**1.45**	**1.28**
crosscheck	OK	OK	OK			

Other Retail	NLA (sqm)	$million /annum	$/sqm /annum	Person (Equiv.)	Sqm/ Capita*	Sqm/ Capita~
Regional	35,000	$220.8	$6,310	43,406	0.81	0.84
District	-	$0.0	$0	-	-	-
N'hood	500	$3.83	$7,651	752	0.67	0.01
Local	100	$0.4	$4,165	86	1.16	0.00
Other Com	-	$0.0	$0	-	-	-
Industrial	-	$0.0	$0	-	-	-
Total RET	**35,600**	**$225.1**	**$6,323**	**44,244**	**0.80**	**0.85**
crosscheck	OK		OK			

TOTAL Retail	NLA (sqm)	$million /annum	$/sqm /annum	Person (Equiv.)	Sqm/ Capita~
Regional	75,000	$594.9	$7,932	43,406	1.80
District	-	$0.0	$0	-	-
N'hood	9,310	$76.0	$8,165	752	0.22
Local	4,529	$27.5	$6,068	86	0.11
Other Com	-	$0.0	$0	-	-
Industrial	-	$0.0	$0	-	-
Total RETAIL	**88,839**	**$698.4**	**$7,862**	**44,244**	**2.13**
crosscheck	OK	OK	OK		

NOTE:
Totalling of Person Equivalents for Total Retail is a double-count of population and therefore not valid.
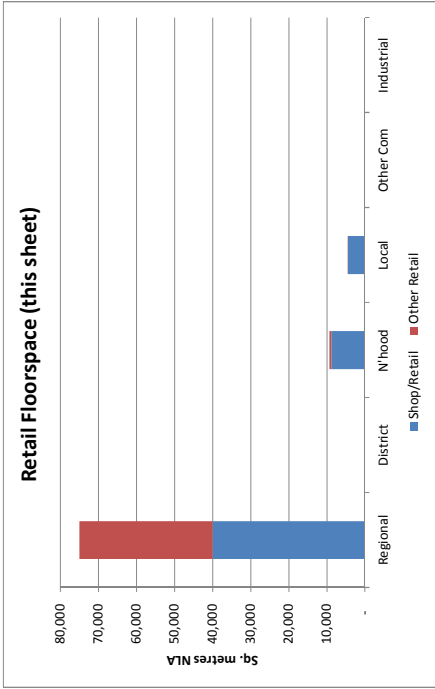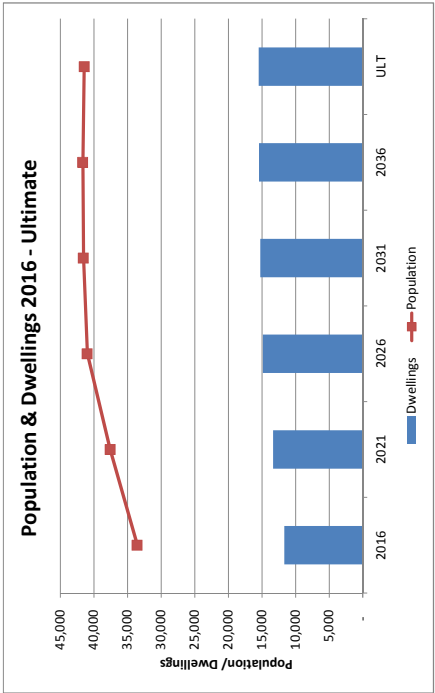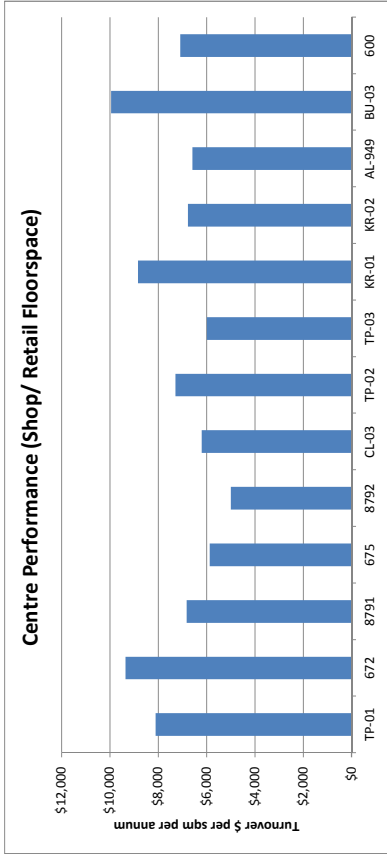
NOTE:
This page displays the calculations of a mathematical "Retail Floorspace Potential" model, which is used to estimate retail floorspace needs and impacts for urban planning purposes.

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Centre names are a combination of DoP Complex names, LGA local names, and SUP database reference names. They may or may not accord with their commercial trading names.

* Derived from person equivalents attracted to centre

~ Derived from main study area population projection alone

Centre Performance (Shop/ Retail Floorspace)

y-axis: Turnover $ per sqm per annum ($0 – $12,000); x-axis categories: TP-01, 672, 8791, 8792, 675, CL-03, TP-02, TP-03, KR-01, KR-02, AL-949, BU-03, 600

Population & Dwellings 2016 - Ultimate

y-axis: Population/Dwellings (0 – 45,000); x-axis: 2016, 2021, 2026, 2031, 2036, ULT; Legend: Dwellings, Population

Retail Floorspace (this sheet)

y-axis: Sq. metres NLA (0 – 80,000); categories: Regional, District, N'hood, Local, Other Com, Industrial; Legend: Shop/Retail, Other Retail