

Transport accessibility of Perth's activity centres



For the better

Introduction

Perth is set to grow rapidly, with the city's population to rise to over 3.5 million by 2050. To safeguard the future mobility of Western Australians, it is essential that population and employment growth is focussed in areas which provide good access to a range of transport options. Understanding public transport accessibility across the metropolitan area, and the important relationship between this and the location of development, is crucial for the future planning of our city and transport system.

Historically, residential development to accommodate our growing population has typically occurred on previously undeveloped 'greenfield' sites in the outer suburbs and on the fringes of the metropolitan area. Such areas are often not well served by public transport, contributing to a reliance on the private car.

This pattern of urban expansion, combined with the fact that employment opportunities are largely concentrated in the Perth Central Business District (CBD), has resulted in people travelling long distances between their homes and workplaces. In fact, over one third (35 per cent) of residents in Perth travel between 10 and 20 kilometres, and a further 30 per cent travel in excess of 20 kilometres to work / study¹.

As most trips taken during the morning and afternoon peak periods are for commuting purposes, and with the high reliance on the car, Perth is experiencing increasing levels of traffic congestion on key corridors connecting to the CBD and this is set to worsen.



By 2031, it is predicted that seven of the nation's 10 most congested roads will be in Perth, and congestion will cost WA more than \$16 billion a year².

The way in which cities and transport systems are planned significantly influences the amount, and way, people travel. Future planning for Perth should not only seek to reduce the need for travel by providing more opportunities for Western Australians to work closer to where they live, but also to ensure a range of practical transport options are available.

Planning to enhance accessibility

Government and the community alike are now driving a shift towards a more compact and connected city form, which provides opportunities for higher density mixed use developments around activity centres and stations precincts, linked by high frequency public transport.

Directions 2031 and Beyond is the spatial framework and strategic plan that guides the planning and delivery of Perth's housing, infrastructure and services to accommodate future growth. The plan identifies strategically important activity centres (hubs that attract people for a variety of activities, such as shopping, working, studying and living) where development activity should be focussed. The draft Perth and Peel@3.5million suite of documents, released in May 2015, further define where growth to 2050 can best be accommodated focussing on these activity centres.

Areas that are easier to access, by a range of transport options, are more attractive places to live, work / do business and visit. As such, understanding how public transport accessibility varies across the city can help guide planning and transport infrastructure decisions. That's why RAC commissioned the Planning and Transport Research Centre (PATREC) in October 2014 to undertake a comprehensive study to explore car and public transport accessibility in the metropolitan area, with a focus on Perth's activity centres³.

Ultimately, better planning and investment in public transport will be crucial in attracting businesses to suburban activity centres and will offer residents and workers access to better transport options.



'Accessibility' can be described as the degree to which (groups of) individuals can reach activities or destinations by a particular travel mode or combination of modes.

¹Australian Bureau of Statistics, 2011. Environmental Issues: Waste Management and Transport Use. Cat. No. 4602 0 55 002 Canberra ATC.

²Infrastructure Australia, 2015. Australian Infrastructure Audit.

³This paper provides a summary of some of the analyses undertaken by PATREC. The full study report, prepared PATREC, was subject to a peer-review process.

Existing accessibility

RAC's analyses show a number of Perth's activity centres exhibit low levels of accessibility by public transport. While access by car is consistently easier, there are areas well served by public transport that provide residents and the workforce with access to better transport options.

Measuring accessibility

RAC commissioned PATREC to assess car and public transport accessibility in Perth, focusing on the 34 strategic, secondary and specialised activity centres identified in Directions 2031⁴ (refer to Figure 1).

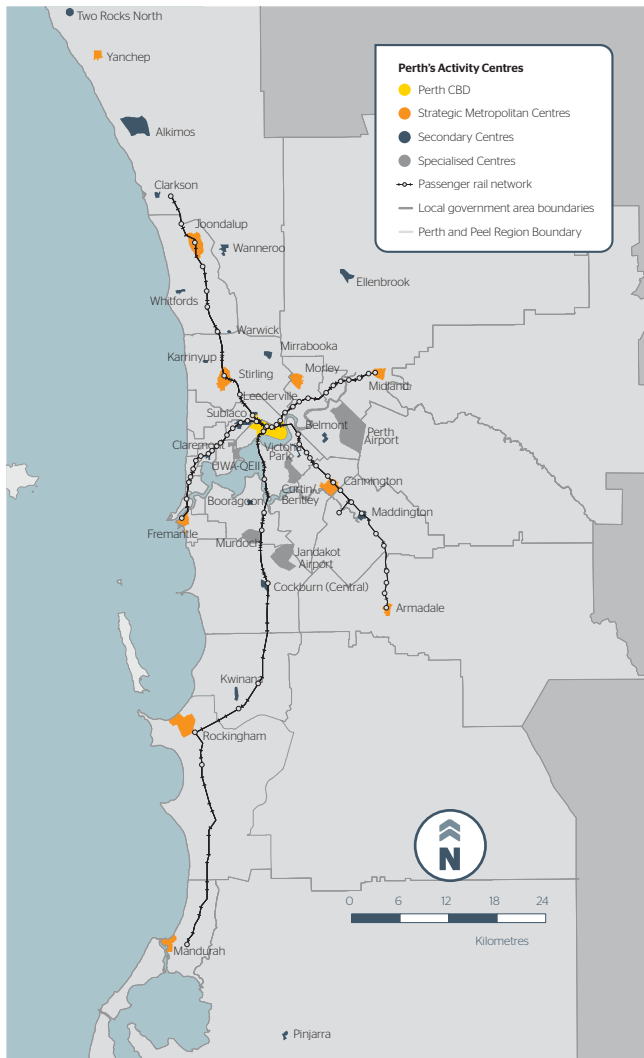


Figure 1 » Perth's Activity Centres

Isochrone measures (lines on a map connecting points relating to the same / equal time or value) were used to determine how accessibility by public transport (plus walking) and private car varies across the city.

! The measure of accessibility is the number of people and jobs that are reachable within a specified travel time or distance (generalised cost) from a location (such as an activity centre). This provides an understanding of how accessible and attractive one activity centre is, compared to others.

The analyses also allowed for the identification of other highly accessible areas, not currently designated as activity centres, which could have the potential to develop as centres.

Accessibility was modelled for the morning (7-9am) and afternoon (4-6pm) peak periods. The modelling used the most recently available travel times from the State Government's Strategic Transport Evaluation Model (STEM) and population and job data from the Metropolitan Land Use Forecasting System (MLUFS) model. The use of STEM enabled the impact of congestion on journey times to be reflected in the accessibility modelling.

A simplistic way to consider accessibility is in terms of travel times from one location to another, which reflects the availability of roads and public transport (i.e. network coverage and service availability).

However, in reality, accessibility is a product of land use as well as the transport system and the distribution of people and jobs across the metropolitan area influences how accessible a particular area is. For example, highly populated activity centres and their surrounds would have a larger pool of people within a shorter travel time and therefore access to opportunities (either people or jobs) is greater. The analyses presented in this paper take this into account.

The analyses considered the proportion of the metropolitan population that can reach an area within a 45 minute travel time⁵ by both public transport⁶ and private car. In addition, the analyses to determine the accessibility of Perth's 34 activity centres also considered the percentage of jobs in the metropolitan area that can be reached by those living in the activity centres, within the same travel time.

⁴10 strategic metropolitan centres, 19 secondary centres and five specialised centres.
⁵A 45 minute threshold has been used based on average journey to work data from PARTS 2007.
⁶This considers "door-to-door" travel time, including access / egress, transfer and wait time.

Considerations with transport modelling

STEM, which is operated by the Department of Planning, aids the assessment of land use and transport policy at a strategic level.

As with any strategic model, there are acknowledged limitations with STEM (for instance, the age and depth of source data used to determine travel behaviours) and the State Government is currently progressing a review to remedy these. Its use as a tool to inform more detailed modelling (such as that undertaken for this study) is however widely accepted.

Some key considerations with this accessibility modelling and analyses include:

- › Within STEM, the metropolitan area is divided into 472 zones, some of which cover a large area (particularly those in the outer metropolitan area where transport networks, population and jobs are sparser). This means a single travel time is assigned for each STEM zone when, in reality, travel times would likely vary to some degree within each zone.
- › As STEM is strategic in nature, the transport network in the model does not reflect every single road in the metropolitan area, only the major roads and some key local roads.
- › For consistency and to ensure a robust assessment, all of the inputs used were for 2011 (i.e. road and public transport networks, population, jobs, etc.), which was the most recently available complete dataset. Recent improvements to the transport networks, such as the extension of the Joondalup Line to Butler, are therefore not reflected in the analyses.

Activity centre accessibility

The analyses have shown that accessibility by car is significantly higher than accessibility by public transport for all 34 activity centres assessed.

In a stark comparison, 13 activity centres can be reached by less than 5 per cent of Perth residents within a 45 minute travel time by public transport, but within that time they can be accessed by 42 per cent of residents by car.





The most accessible activity centres by public transport, that is, those centres which can be accessed by more than 9 per cent of the metropolitan Perth population⁷ within 45 minutes⁸ are (also refer to Figure 2):

1. Leederville (secondary centre)
2. Subiaco (secondary centre)
3. Cannington (strategic metropolitan centre)
4. Cockburn Central (secondary centre)
5. Murdoch (specialised centre)
6. Stirling (strategic metropolitan centre)
7. Joondalup (strategic metropolitan centre)
8. Booragoon (secondary centre)
9. Warwick (secondary centre)
10. Curtin / Bentley (specialised centre)
11. Fremantle (strategic metropolitan centre)
12. Claremont (secondary centre)

For these centres, public transport accessibility ranges from 24.4 to 9.3 per cent of the population. The ranking of activity centres varies slightly when considering access by car, with Cockburn Central being the most accessible (with 67.4 per cent

of the population being able to access it within 45 minutes by car) and Fremantle being 12th (48.3 per cent).

While 12 activity centres have been identified as having high accessibility by public transport, the top two are lower order Secondary Centres and six of Perth's 10 Strategic Metropolitan Centres do not feature in this list.

According to the analysis the least accessible of Perth's 34 activity centres, by car as well as public transport, are Two Rocks (secondary centre), Yanchep (strategic centre) and Pinjarra (secondary centre).

When it comes to jobs which can be reached by the resident population of Perth's activity centres, Leederville and Subiaco also have the highest level of access by public transport (44.5 per cent and 37.8 per cent of jobs in the metropolitan area can be reached within 45 minutes). This is not surprising given their close proximity to the CBD and good bus and train connections. They are followed by Claremont (31.5 per cent), Cannington (30.0 per cent) and Stirling (29.1 per cent), all of which offer local employment opportunities.

⁷The threshold for differentiating high and low accessibility was set at 9 per cent due to the distribution, and thus skewness, of the dataset. Nine per cent equates to approximately 163,988 people based on a total metropolitan Perth population (1,822,093 people) obtained from MLUFS 2011.
⁸Based on the average of AM and PM peak periods.

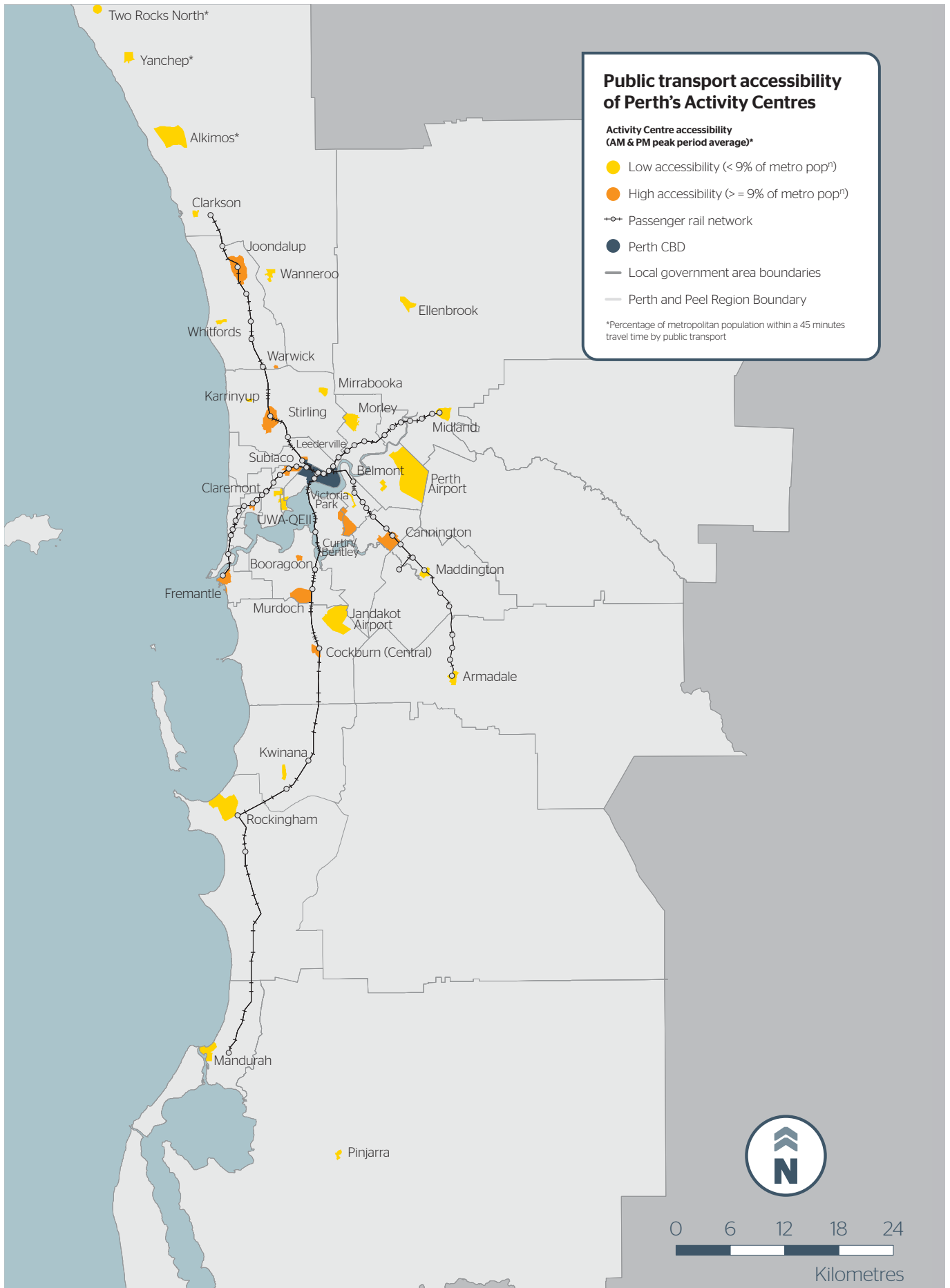


Figure 2 » Accessibility of Perth's activity centres by public transport

Other areas with high public transport accessibility

To identify potential areas not already designated as activity centres but which have high public transport accessibility, a separate analysis was undertaken for Perth's 68 train stations precincts (2km radius around the stations).

A total of 24 station precincts can be accessed by more than 9 per cent of the metropolitan Perth population within 45 minutes by public transport.

Eight of the top 10 most accessible station precincts have public transport accessibility above 17 per cent (and car accessibility above 58 per cent), which currently only one activity centre achieves (Leederville). This highlights the importance of activity centre's being developed around, or within close proximity to, train stations.

Based on this analysis, the Armadale / Thornlie Line has the most station precincts identified as having high accessibility by public transport. In fact, all stations between Perth and Cannington on this line can be accessed by more than 9 per cent of the population by public transport.

Joondalup is the only station precinct on the Joondalup Line that has a high level of accessibility by public transport.

This could perhaps reflect the low population density within the surrounding catchment. However, there are four highly accessible stations on the Mandurah Line. For the Midland and Fremantle lines, the highly accessible stations are confined to the stations near Perth (Perth - Maylands and Perth - Subiaco).

Attractiveness relative to the CBD

Understanding how the accessibility of areas across the Perth metropolitan region compare with the level of accessibility experienced in the Perth CBD provides a useful indication of the potential of areas to attract population and employment.

An analysis of the relative attractiveness of areas compared to the CBD has been undertaken based on the percentage of the population that can reach each area within 45 minutes by public transport (refer to Figure 3 overleaf). A score of 100 indicates that a zone is as attractive as the CBD, with scores of below or above 100 indicating areas which have lower or higher levels of accessibility compared to the CBD.

Unsurprisingly, areas surrounding the CBD such as West Leederville, Subiaco, West Perth, Northbridge and East Perth have the highest level of attractiveness, with scores above 60. Areas within the Town of Victoria Park (Burswood, Lathlain and Carlisle / East Victoria Park), Joondalup and Stirling are also relatively attractive.



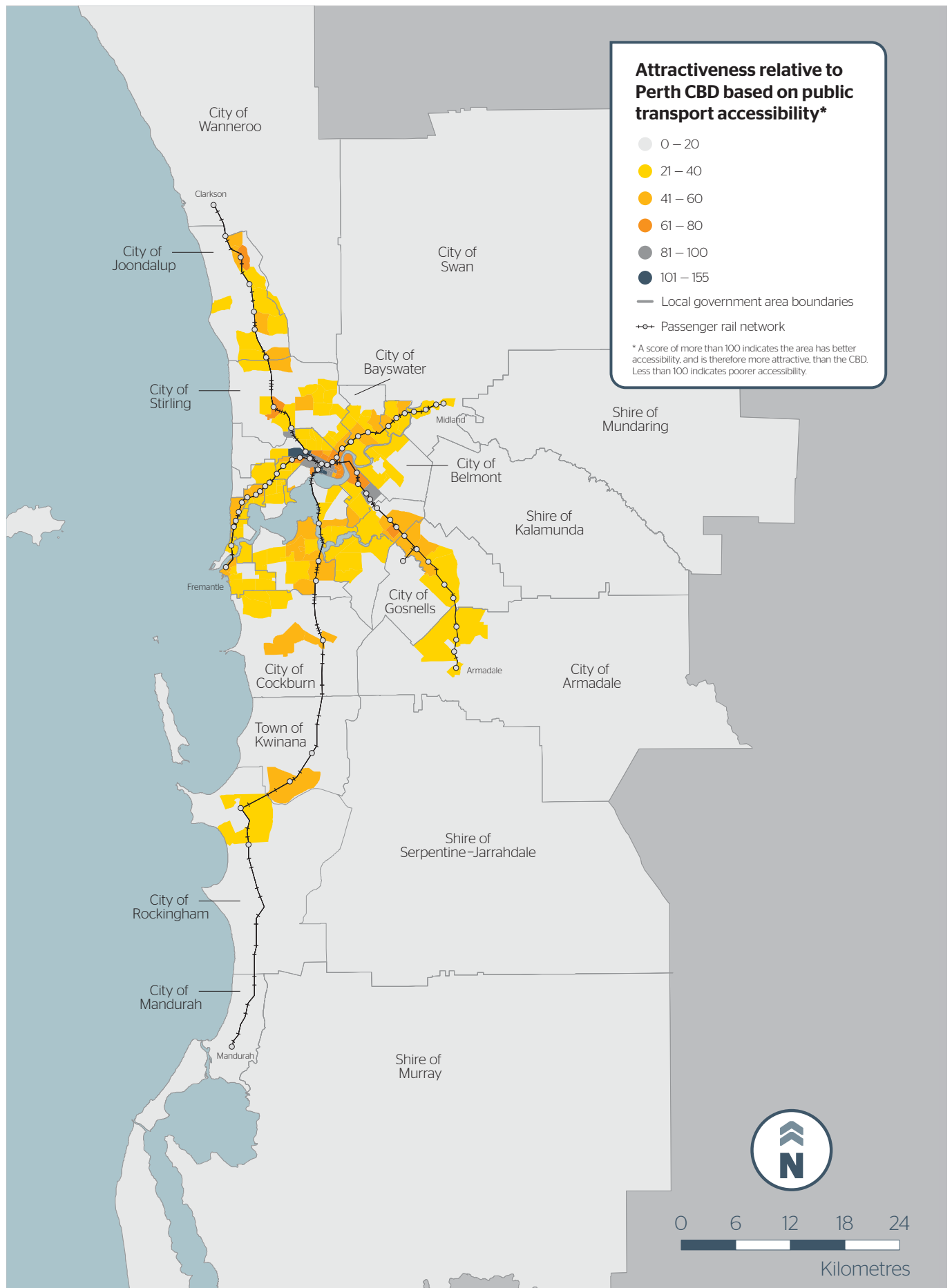


Figure 3 » Attractiveness relative to the CBD

Towards better travel options

The State's aspiration is to deliver a connected city where people can move around by a choice of efficient transport modes and as many new homes and jobs as possible are within existing activity centres, linked with efficient public transport. To achieve this, there is a need to take action now.

To create activity centres that are truly attractive to people and businesses, it is essential they are accessible by a range of transport modes. This will require more focus on public transport when making planning decisions, as well as accelerating investment in prioritised public transport projects. Given the long lead-in and delivery time for land use development and major infrastructure projects, what we do in the short-term will be crucial.

Priority actions

The following are considered to be priority actions for the Government in order to create a more connected city:

1. Finalise, release and fund the Perth Transport Plan, as part of the planning for Perth & Peel@3.5 million:

An ambitious plan is needed to provide some certainty to industry, and the community, around the transport projects to be delivered to support a city of 3.5 million people. Enhancing public transport accessibility across Perth, and in particular for activity centres, should be a key focus. It is essential the Plan is adequately funded and that there is commitment to priority projects.

2. Prioritise areas with higher public transport accessibility:

Such areas present opportunities in the short-term to encourage development where residents and workers have a range of transport options available to them. Government should utilise and go beyond the findings of this analysis to prioritise those activity centres, and other areas, which offer the highest levels of public transport accessibility. This could be achieved through ensuring planning policies and strategies, at all levels, provide the best possible conditions to facilitate appropriate land use development in these locations.

3. Accelerate investment in public transport:

Many of Perth's activity centres have comparatively low public transport accessibility. With the State's current

funding constraints it will be essential to focus investment in public transport to support the development of a number of priority centres. This should include heavy rail, light rail and bus rapid transit, as well as local bus priority measures, increased service frequencies and better timetable coordination, to help achieve accessibility levels more akin to the CBD. Better integration with land use will also be key in generating patronage necessary to support new or enhanced services.

Summary of key findings

The analyses have highlighted:

- › low levels of public transport accessibility exhibited by a number of Perth's activity centres – 13 of Perth's 34 activity centres can be reached by less than 5 per cent of Perth residents within 45 minutes by public transport, but 42 per cent in that time by car;
- › some lower order secondary activity centres have better access by public transport than many strategic centres –
 - › 12 activity centres have high accessibility, with Leederville (secondary), Subiaco (secondary), Cannington (strategic), Cockburn Central (secondary) and Murdoch (specialised) being the top five;
 - › six of Perth's 10 Strategic Metropolitan Centres have low accessibility;
 - › the importance of activity centres being developed around, or within close proximity to, train stations – eight stations are accessible by more than 17 per cent of the metropolitan population within 45 minutes by public transport, which only one activity centre achieves.

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