

Depth Study One:

Investigating Perth

- The site, situation, internal and external morphology and functions

External Morphology: is the overall shape and extent of the boundary of an urban place

- every place has its own unique external morphology defined by its natural and cultural features

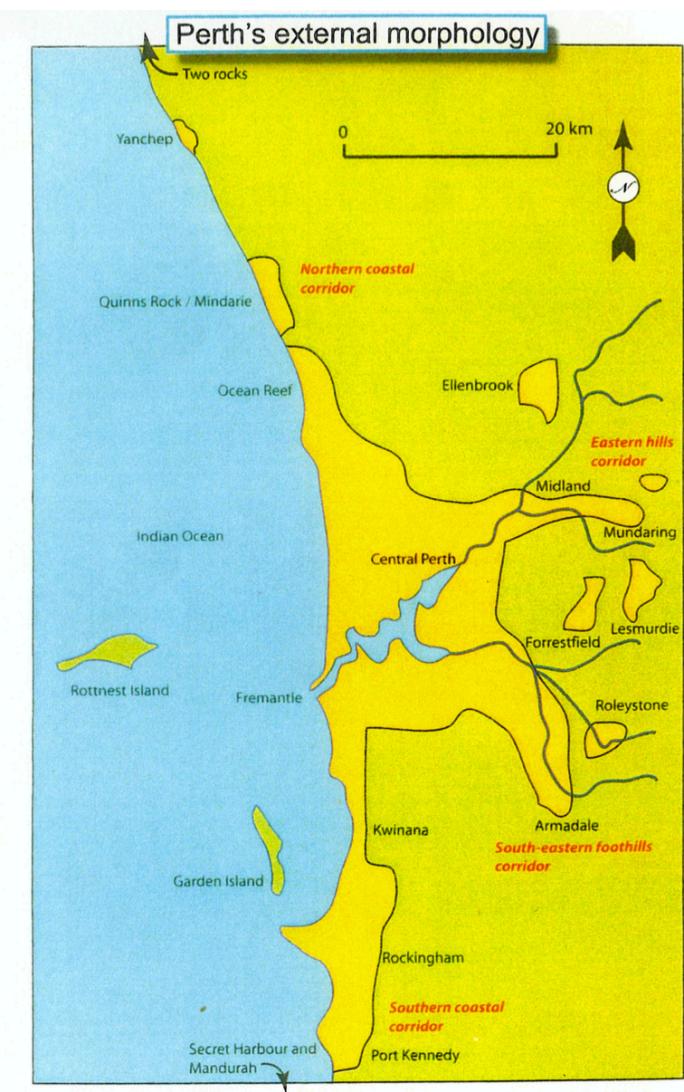
Perths External morphology

- Can be described as semi-stellate in shape, becoming more rectangular over time, due to infill taking place in the original corridors, associated with Perth and Peel @ 3 million, to reduce urban sprawl
- The north to south coastal corridor is approx. 130km from two rocks in the north to Mandurah in the south
- The east to west extent is limited to approx. 25-30km
- Metropolitan regions external morphology restricted by Indian ocean to the west, and the Darling escarpment to the east
- Compact core - radiates out from original settlement
- Swan and Canning rivers divided urban area and encourages stellate shape
- The main corridors include
 - The north-west (Mitchell freeway)
 - Eastern (great eastern highway)
 - South-west (Kwinana freeway)
 - North-east (great northern highway)
- satellite communities, are areas of smaller urban areas separated from the main centres, are now visible for example Ellenbrook, the vines and Byford

Perths Site

Site: refers to the physical characteristics of land on which a feature is located and influences a place's external morphology

- Perth is sited on Swan coastal plain - which is sandy and gently undulating, ranges in height from sea level to approx. 60m above sea level
- General stable and well drained
- Extends approx. 30km inland, bounded by the Indian Ocean and Darling river escarpment
- The undulating and sandy nature of the plain make it an attractive site for the construction of the city
- Site construction costs on the coastal plain are generally low

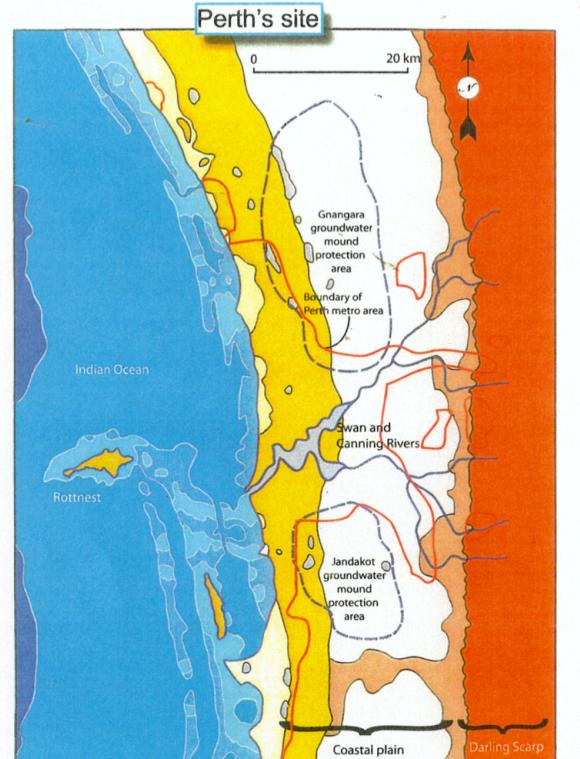


- Perth is bisected by the swan- canning river system, the river system divides the city roughly in half, north and south, and are crossed by road and rail bridges at narrow paths
- The rivers have continued to influence the semi-stellate shape of the metro area by diving the area in hand and encouraging development along the water ways
- Indian Ocean and darling escarpment, the darling scarp step raises from the coastal plain to an elevation up to 300m above sea level, with lattice soils and granite out crops discouraging growth of urban development to the east
- The Indian Ocean to the west has restricted growth in this direction and has lead to paths long, north to south orientation
- Australian places high value on coastal living and has ensured land in these areas is highly sought after
- Perth metro area is bisected by the swan and canning rivers, this resulted in early growth from drew and Perth towards the east with residential expansion in later years

Perth's Situation

Situation: situation of a settle meant is its location in relation to other significant features, both cultural and physical and influences a place's external morphology

- Perth is situated on the south west coast of Australia in western Australia
- Latitude and longitude of Perth: 31°57'S 115°51'E
- Situated 2700km west of Adelaide (closest neighbouring capital city)
- 180km north of Bunbury, 424km south-south east of Geraldton (closest regional centres)
- Mitchell and Kwinana freeway have influenced the north to south linear growth, other major roads such as the great eastern highway and Albany highway have influenced eastern and south-eastern development



Internal morphology: Is the land uses and transport patterns you see within an urban area

Perths functional zones:

- Central business district CBD
- Inner mix zone IMZ
- Established residential zone ERZ
- Newer growth zone NGZ
- Industrial zone IZ
- Rural urban fringe RUF
- Outer business districts OBD

Perth site legend	
Water features	Landforms
Estuaries and lakes	Quindalup dunes - most recent
Less than 5 metres deep	Spearwood dunes - next recent
5 to 10 metres deep	Bassendean dunes - oldest
More than 10 metres deep	Pinjara plains - alluvial fans
More than 130 metres deep	Laterite, clay and granite escarpment

- Special purpose zones SPZ

Central Business district

- centrally located on the north bank of the swan river
- Main functions include commercial and administrative
- Central transport node - all train services converge in the CBD
- High land value > high land use competition
- Vertical zone-nation > Create 'zones' on different levels of high rise buildings e.g. more retail/ entertainment on ground floors and offices on higher floors
- Horizontal zone-nation > e.g. finance institutions on St Georges terrace and Adelaide terrace and shopping/retail on hay and Murray street
- Dynamic zone which is constantly changing

Inner mix zone

- located around the boundaries of the CBD, including suburbs such as West Perth, Lederville, North Perth and Northbridge
- Mixed functions such as commercial, residential, industrial, transport and administrative
- High accessibility
- Dynamic and constantly changing, processes of invasion and succession e.g. in West Perth there in commercial land use invading due to pressures from the CBD, the main zone use used to be mainly residential
- In Northbridge, entertainment such as nightclubs, bars and restaurants invaded and succeeded what was previously residential

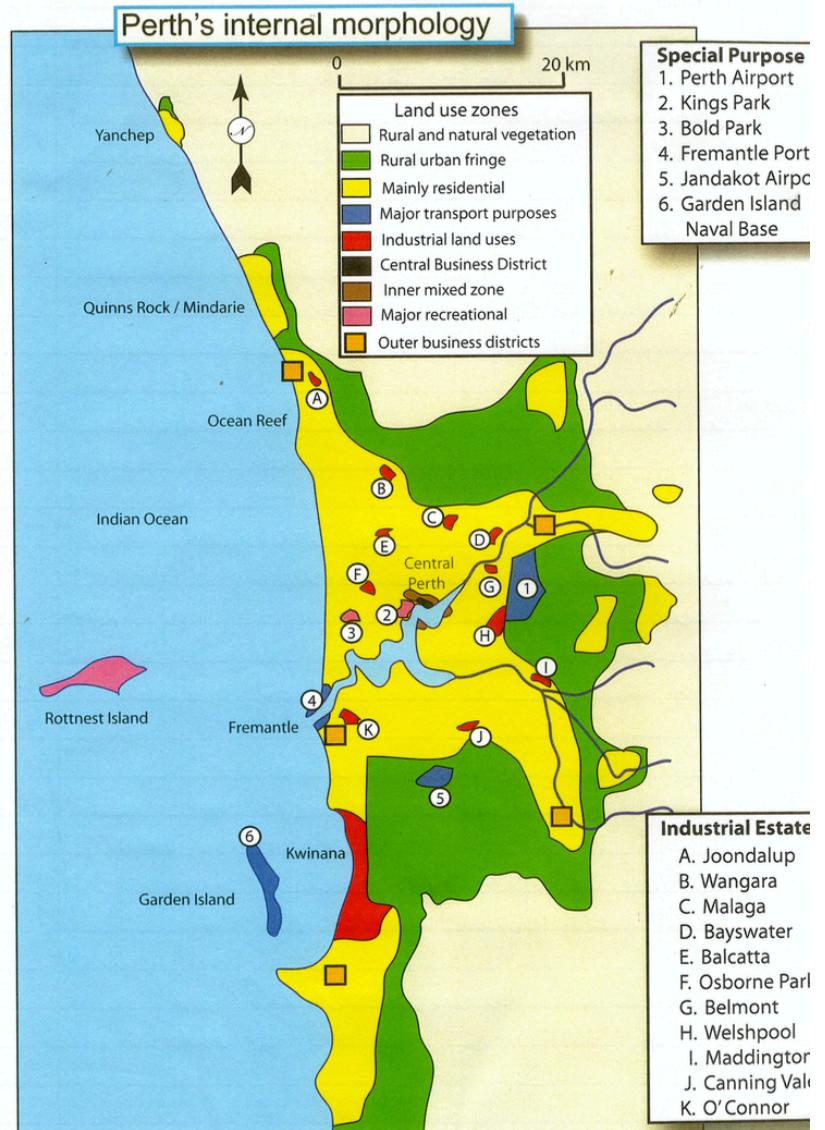


Figure 3.4. Perth's internal morphology

Established residential zone

- largest functional zone within the metropolitan area, dominated by housing
- Density of housing varies, some areas see a high density, while other see a low
- Land values also vary
- Demographics generally an older population, 'aged with suburb'

Newer growth zone

- tends to be located on the boundary of the established residential area, often adjoining with the rural fringe
- Suburbs include: Alkimos, Ellenbrook, Maldivis
- Houses are 'newer' project homes, with less established gardens
- Newer areas lack access to services and infrastructure and often have to wait for population to be substantial enough

Industrial zones

- scattered spread, tend to be located in vicinity to main transport infrastructure
- Comprised of low, medium and heavy industrial functions
- Characterised by agglomeration

Rural urban fringe

- located on the outer edge of the metropolitan area. This is where urban and rural converge such as Upper Swan and Mandurah.
- The RUF is often characterised by a mix of land uses with viticulture, recreation and rural industry to name a few

Outer business district

- dispersed throughout the metropolitan areas, often accessible locations amongst the residential zones such as Joondalup and Rockingham
- Main purpose > centralise jobs and provide services for people away from CBD

Special purpose zones

- generally scattered and unevenly distributed throughout the metropolitan area.
- Space extensive e.g. airport, parks and reserves such as Kings Park and Showgrounds.

Perth's functions:

The term function relates to land use and services within a region. It is essentially related to internal morphology.

- Perth services as the economic core of WA it is a multifunctional urban place
- It has key administrative (e.g. parliament house), commercial and financial functions for the state, mainly within the Perth CBD, e.g. along St George's Terrace
- It has a major port at Fremantle
- It is a major transport node for road (i.e. Mitchell and Kwinana Freeway and great northern, great eastern, south-western and Forrest highways), as well as rail and air connections for the state
- It has many light industrial zones and heavy industry corridor at Kwinana
- It has an important residential function for approx. 2 million people

• The demographics

Demographics: statistical data relating to the population and particular groups within it.

Generally split into age and gender, socio-economic and cultural

Age and gender

- there is a higher % of 0-14 year olds in outer suburbs such as Ellenbrook and Wanneroo
- As a % 15-64 tends to dominate central Perth and freo
- Inner city areas such as Claremont, vic park and city beach have the highest proportion of 65+
- Outer suburbs have the lowest proportion of 65+
- Overall there are more males in Perth than females. Males tend to dominate the inner suburbs and CBD
- Females dominate in Claremont, peppermint grove and Mosman park
- The ERZ has an established infrastructure and good access to public transport. This zone also has well-established health facilities. Most people in this area then tend to stay in the ERZ as it is both comfortable and familiar.
- The NGZ tends to not attract people over 65 as they lack services like healthy facilities. This age group also do not find parts of the IMZ attractive where apartments are dominant, as there is high competition for parking, and lots of noise from entertainment services.

Cultural

- approx. 35% of Australia's population is born overseas
- Indigenous groups are scattered around Perth, they tend to be located in low socio-economic areas
- 'pockets' of people b corn overseas are found within the metropolitan area as newer arrivals tend to associate with those of similar background; high NZ population in Kalamunda, Vietnamese in Mirrabooka, Indian in Girrawheen
- High proportion of those born overseas near uni's and colleges
- White Australia's tend to dominate the higher socio-economic areas

Socio-economic

- Median weekly household income: \$1,459
- Median monthly mortgage repayments: \$2,000
- Median weekly rent: \$320
- Income trends:
 - Income patterns vary greatly across the metropolitan area
 - Suburbs with desirable locations (close to the coast or river) tend to have a higher weekly income than suburbs surrounding industrial functions
 - Medina has a median weekly household income of \$836, while Cottesloe has one of \$2494
- The ERZ has higher levels of home ownership.
 - Houses have generally been owned for longer
 - Mortgages already paid off
 - Incomes tend to be higher
- The NGZ has a lower level of home ownership
 - Lower weekly income
 - Younger families - Haven't had time to pay off mortgage
- higher stressed socio-economic areas are within the inner city and the outer areas
- Lowest stressed suburbs are generally establishes residential zones such as Nedlands, City Beach, Cottesloe, Peppermint Grove

- Study **FOUR** of the following challenges: urban sprawl, traffic congestion, housing and employment,
 - in order to investigate: the nature, scope and causes of each of the four selected challenges being confronted, and the implication for the place
 - The views and attitudes of major stakeholder groups related to each of the four selected challenges
 - The range of planning strategies that have been used to address each of the four selected challenges, and how these compare with, and/or have been informed by, responses implemented in other places, both inside and outside Australia
 - The extent to which the planning strategies adopted in the selected place have been, or could be, informed by the concept of sustainability
 - Strategies adopted in the selected place to address these challenges
 - The extent to which these strategies have enhanced its sustainability and liveability State challenge
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Traffic congestion

Nature and Scope

- traffic congestion occurs when the flow of vehicles along a road network is slowed, this is a serious challenge for commuters
- Occurs during peak times (7-9am and 4-6pm)
- Commuters use freeways (especially Mitchell) and major roads (e.g. Marion avenue) - suffer long delays
- Bottlenecks occur nearer to central Perth, as well as major intersections (e.g. Horne Miller Drive and Tonkin Highway nearer the airport)
- It is estimated that Perth could have 7 of the country's 10 most congested roads by 2031

Causes

- urban sprawl has contributed to traffic congestion
- Low density sprawl = development of freeways and highways
- As people travel to work and amenities (which is lack in NGZ) = cars are necessary to complete those journeys
- Perth is a car dependant city = 80% of all trips are made by car
- Public transport system is limited -> frequency and reliability of services and lack of connections and lack of parking at train stations

Implications

- congestion is estimated to cost \$2 billion a year
- Results in a loss of revenue and productivity for local businesses
- Costs Perth economy approx. \$18mill a year

- increase emissions of GHGs

Stakeholders

A stakeholder is any person, individual or organisation that has viewpoints or that may be affected by some decision, activity or event. e.g. the police would be stakeholders in severely blighted areas of New York due to their association with crime and violence

Residents in newer growth zones

- residents in NGZ's of Perth such as Ellenbrook (25km north-east of Perth CBD) and Alkimos (45km north of Perth CBD) are negatively affected by traffic congestion
- due to lack of efficient and accessible public transport and far proximity to the city, along with centralisation of jobs in Perth's CBD (i.e. lack of jobs in outer suburbs) residents are extremely car reliant, and can incur larger costs of car maintenance and travel, particularly if they work in the CBD
- It is estimated that 90% of all journeys from the rural urban fringe are made by car -> resulting in congested major arterial routes such as Marion Avenue and Mitchell Freeway during peak time, it takes an additional 20 mins to drive to the CBD from Alkimos when leaving at 7-7:30am than if there were light traffic conditions after 10 am
- Fringe residents also have to endure long journeys which contribute to stress, exhaustion, obesity and less family time
- Residents of these NGZs and RUF support government. Strategies that lead to an increase in public transport infrastructure

Business owners in CBD

- many businesses in central Perth are negatively affected by traffic congestion
- Diverse range of businesses, 87% of 250 have voiced concerns and have experienced a loss in productivity due to traffic congestion
- Concerned with the economic and social impact it is having on their revenue and employees respectfully
- According to Perth Now in 2017, sat nav company Tom-Tom estimated the economic cost of congestion in Perth at \$433 million
- 68% of businesses have had to turn down new or more work opportunities, while others are losing money due to fuel costs, overtime payments and reduced productivity of workers
- 73% of businesses and large corporations such as Woodsides are concerned with the social impact of congestion is having on their staff, as many are working longer working hours which increases their fatigue levels and decreases their work-life balance.
- Although some businesses lack confidence in the government to find solutions they are supportive of new public transport projects to reduce car usage on the city's roads

Planning Strategies

• Activity Centres

Activity centres are community focal points which incorporate a mix of different land uses, such as commercial, retail, high-density housing, entertainment, tourism, civic community, higher education and medical services

- designed to be well serviced by public transport

E.g. Joondalup City Centre

-> development of centre has seen job growth of 26% between 2002 - 2012

-> current economy worth \$12billion

Effectiveness / Sample paragraph on Activity Centres

A significant challenge facing Perth is traffic congestion. This is when the flow of vehicles along a road network is slowed and commuters suffer, waiting long delays when travelling in peak time (7-9am and 4-6pm) on major transport networks such as the Mitchell freeway and Marion avenue. A strategy to aimed to reduce the impact of congestion Perth is activity centres. Activity centres are community focal points which incorporate a number of different land use functions such as commercial, retail, housing, entertainment, higher education and medical services. In Perth, Joondalup city centre is an example of a successful activity centre. In Joondalup, there has been an increase in jobs, they have seen a 26% growth rate from 2002-2012, and there many employment opportunities that are available for a range of different skill sets, such as professors and teachers for ECU and the north metropolitan TAFE. Additionally there are a number of government offices, hospital, police station, along with staff needed for bars, restaurants, cafes and local retail shops. This decentralisation of jobs mean less people are travelling to the CBD at peak times, and some can drive against the traffic for example if a person lived south of Joondalup they would be travelling against the traffic on public routes in peak times. In addition those travelling from further out suburbs such as Alkimos they are taking time off their travelling time because they don't need to drive all the way into the CBD. There are also a number of social and economic benefits to this strategy including an increased time spent with families, less stressed about sitting in traffic, less money spent on fuel, and due to being less stressed, employees can be more focused and more productive therefore boosting the local economy. Activity centres also increase employment opportunities in the area.

Even though activity centres have seen to be very effective, there are a few limitations to the strategy. Having everything all centred in one area can increase localised congestion in the activity centre and it can also increase land values which is not a good sight for first home buyers looking to buy in this area.

Sustainability:

Liveability: can be simply described as how good a place is to live in. It refers to the quality of space and the built environment, and can be linked to a number of factors such as stability, mobility, access to services, housing affordability, employment and social participation. Perth has been ranked in the top ten of most liveable cities in the world.

- Joondalup has its own police station located centrally, along with pilose academy and courts
- Different range of employment opportunities (of different skill sets)
- Greater range = increase standard of living
- Access to services = big range
- Education -> territory ECU, primary and high schools (LJBC and Joondalup Primary School)
- Sporting facilities, winton road (volleyball) and HBF Arena

- Transport and interconnections
- Political influence
- Health Campus which is public and private, along with a range of specialist health services located in the city
- Lake and central park -> cultural ecosystem services
- Diversity of housing -> combat social exclusion

• Transit Oriented Developments - 'TODs'

- similar scale to activity centres however they are focused on having people live close to public transport, making it a convenient method of travel as opposed to getting onto a car.
 - E.g. suburb of Subiaco
 - Aimed to encourage more people to travel on public transport during peak periods = reduces amount of traffic travelling into and out of the city during peak times
 - Seen a reduction in number of residents driving to work who live within 800m of the train stations, from 72% to 57.3%
 - Creates a higher degree of mixed land uses associated with suburbs close to the CBD = greater employment opportunities to residents of Subiaco
 - Provide a sustainable travel allowance to further encourage alternative methods of transport
- Pro's and con's
- encountered a number of successes
 - 55 thousand L if fuel saved
 - 139 tonnes of greenhouse gases not let into the atmosphere from cars

Urban Sprawl

Nature and scope

- urban sprawl is the rapid outward growth of low density urban development on the fringes of a city
- Low density developments are a detached dwelling on a single block and are seen on the fringes of the city e.g Butler 40km north of Perth's CBD and Ellenbrook 25km north-east of CBD
- Referred to as Greenfield developments meaning they involve the removal of negative vegetation of farmland for housing
- Currently the metropolitan area extends 120km from Two Rocks in the north to Mandurah in the South, and covers an area of 1600km² north to south.
- Creates many issues for the city
- Costly to the govt. Have to provide services and infrastructure such as transport, power, water, education, recreation and medical
- Cost the govt. Approx \$150,000 per lot

Causes

- Perth experiencing population growth - expected to increase from 2 mil to 3.2 mil by 2031 - this means an increase in the demand for housing
- Transport links have provided accessibility to outer suburbs, encouraging residents to seek cheaper land outside the city
- Less accessibility to central Perth = decrease in land use competition = decrease in land values = increase space to expand therefore, attractive to first home buyers

- First home owners grant (FHOG) - subsidy of \$10,000 paid to purchaser of new home, only covers newly built homes, thus encourages first home buyers to build in NGZ

Implications

Economic

- urban sprawl is creating serious implications for city in terms of economy - very costly to gov. Because they have to provide services and infrastructure e.g. transport, power, water, education, recreation and medical - a Greenfield development can cost the gov. \$150,000 per lot
- Inequity in terms of distribution of state funds between inner city and outer city areas can occur e.g. inner city areas want to raise amenity of local areas so incorporating a park or something of this type can sometimes lack funding because most money is funded to outer areas, this can lead to the running down of older inner suburbs

Environmental

- urban sprawl absorbs large areas of native vegetation
- 920 hectares of land per year is lost for greenfield developments in Perth
- Up to 70% of native vegetation on swan coastal plain has been cleared and as a result biodiversity levels decrease when habitats are fragmented (separated) e.g. Black Carnaby Cockatoo saw a 15% decrease in population every year and the major contributing factor to this is urban sprawl

Social

- as new developments, some new areas lack new services that already established residential zones have, from this people can feel a sense of social exclusion and also have to be highly dependant on car usage and road infrastructure
- When new infrastructure has not been developed people have to travel farther for work and more time spent travelling in a car means less recreation and family time as well as adding stress

Major stakeholders

Planning strategies

Urban infill and consolidation

- urban infill involves using vacant land within an area therefore increasing the density of an area and reduce the need to find new land and greenfield sites
- Urban consolidation means increasing population density within existing urban areas and making better use of existing infrastructure. Generally occurs through infill development on vacant or under-utilised land and is associated with urban renewal and redevelopment initiatives.

Sustainability and Liveability

• Brownfield redevelopment in East Perth - Claisbrook village

- in the Claisbrook development of east Perth surrounded by police stations and government offices in central city - making it a safe place
- Development does not have wide range of employment opportunities, it is close to central city where majority of Perth's employment opportunities are and close to major transport links such as Perth underground station

- Close proximity to CBD = easy for residents to access goods and service needs such as health and education
- Provision and access to services and infrastructure is not a problem
- Redevelopment = contains new services and infrastructure
- Raises surrounding land values attracts residents of a higher economic status due to area being modern
- Proximity to city residents have good access to alternative modes of transport such as bus train and bike
- e.g. royal street has a wide variety of shops services close to popular restaurants bars and open spaces, this creates opportunities for social engagement within the city

Housing

Nature and Scope

- the challenge of housing refers to the lack of availability and affordability of houses in Perth
- Affordable housing = housing that low to medium income households can obtain and afford without experiencing financial hardship
- Social inclusion -> closer to the city = more availability to services, recreation and infrastructure
- Homes closer to CBD = higher land value e.g. in South Perth med price is \$1.2mil
- NZG = lower land values e.g. Lansdale and Ellenbrook -> long distance from CBD -> less access/availability -> lack of amenity -> Urban sprawl
- Housing affordability has decreased over the past 30 years as house prices have increased
 - In 2000, medium income earners of \$40,000 could afford 4x their salary
 - In 2010, medium income earners of \$73,000 could afford 6.5x their salary

Causes

- house prices are too high
- First home buyers can't enter the market, because of too high house prices
- Banks are continuing to increase the financial requirements for a mortgage, this increases the difficulty to get a loan and therefore purchasing a first home becomes unavailable to low-moderate income earners

Implications

- households can no longer keep up with increasing interest in loans and rent payments
- The waiting list for public housing continues to increase
- Because rent is increasing, those struggling to pay rent may fear homelessness as it becomes a threat

Major stakeholders

Residents of Perth - First home buyers

State government

Employment

Nature and scope

- unemployed when actively seeking employment and currently able to work but unable to attain work
- Employed when partaking in paid work for more than two hours a week
- Unemployment rate is expressed as a percentage of people unemployed within the Labour force
- Full employment = 5% target for Aus gov.
- High unemployment creates such as anxiety, family break ups etc, increased welfare payments, decrease in tax revenue and increase in crime rates
- Perth suburbs with high employment rates include: mirrabooka 18.9%, Girrawheen 17.9%, Armadale 16.7%
- Suburbs with low unemployment rates include: Sorento 1.3%, Iluka/Burns Beach 1.3%, Jandakot 1.8%, Leeming 1.9%

Causes

Lack of public transport connections

- some areas have limited access to public transport networks
- Public transport networks allow people to access different areas and move out of their own area to gain employment
- Residential zones often have limited employment opportunities therefor people must travel to different functional zones the provide better employment opportunities
- If employment in CBD public transport networked connect much more effectively than with industrial areas
- CBD has high number of employment however only employs 10.2% of Perths metro population
- Residential and industrial areas often far from CBD, and in NGZs they do not have the infrastructure developed and yet due to lack of population, or gov. Funding and planning
- Older areas also been neglected, especially east of the metro area
- Girrawheen, mirrabooka and Barangaroo lack public transport networks that connect these areas with employment centres of Wangara and malaga, limited bus connections and this that do exist go towards translations or past shopping precinct rather then industrial areas

Implications

Major stakeholders

Government agencies - Western Australian Planning Commission (WAPC)

- numerous responsibilities including preparing state planning policies - including strategies of integrated land-use planning
- Important as different land uses provide the ability for different industries to develop
- Therefor need to look at types of employment opportunities these land uses provide and where they should be best located to ensure they cover the entire population
- Also coordinate the provision of transport and infrastructure which are needed to support the economy and in turn employment provision

Planning strategies

- refer to activity centres and TODs

Sustainability and Liveability

