

# **Mega Projects in Transport and Development: Background in Australian Case Studies**

## **Perth Urban Railway**

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## 1. Introduction

This report is part of a research project to explore the treatment of complexity, uncertainty and risk in the planning of mega projects in Australian cities. It is undertaken by GAMUT on behalf of the Global Centre for Mega Projects in Transport and Development (OMEGA), Bartlett School of Planning at University College London.

The goal of the project is to provide essential background on a case study of stage 2 of the Perth Urban Railway project. This report summarises the background of the secondary research evidence obtained from the Perth Urban Railway. It is structured as follows:

- Key stages of Transport Planning in Perth
- The details of Perth Urban Railways including
  - Background and history of the railway project, in particular New Metro Rail (NMR) or South Western Metropolitan Railway (SWMR).
  - Key facts and characteristics
  - Contract information
  - Environmental policy and management information
  - Institutions responsible for SWMR

A specific bibliography of secondary research considered in relation to this project is presented at the end of the report.

## 2. Transport Planning in Perth

The first strategic plan for Metropolitan Perth was prepared in 1955 (Town Planning Commission, 1955). The plan proposed two new suburban railway lines along with an extensive road network within a 60 kilometre north-south limit (ibid). The official 1962 Metropolitan Region Scheme which evolved from this plan, opted for an extensive road network, justified by the low density life style of the Perth Metropolitan Area. On the other hand, the railway proposal in the 1955 plan was never implemented.

The 1970 Corridor Plan supported previous efforts for building freeways and provision of bus services for the new suburbs (The Metropolitan Regional Planning Authority 1970). Consequently, the Fremantle railway line was closed in 1979 to make way for a proposed freeway. It was proposed that buses would replace the railway commuters (Newman, undated).

The 1990 Metroplan which replaced the Corridor Plan proposed a ring road, an inner city bypass and widening of arterial roads in the Perth Metropolitan Area (Department of Planning and Urban Development 1990). The main aim was to concentrate employment-generating activities and higher densities served by bus-based public transport. Like the earlier plan, road proposals were implemented while land use changes proposed around rail stations had only limited implementation (Curtis 2005).

**Table 1 Key Planning and Transport Policies for Perth**

Nos.	Year	Plan	Plan prepared by
1	1955	Plan for the Metropolitan Region Perth and Fremantle Western Australia (Stephenson and Hepburn Plan)	Town Planning Commission
2	1962	Metropolitan Region Scheme Report	Town Planning Department
3	1970	The Corridor Plan for Perth	The Metropolitan Regional Planning Authority
4	1982	Transport 2000 – a Perth Study	Director General of Transport
5	1990	Metroplan: a planning strategy for the Perth Metropolitan Region	Department of Planning and Urban Development
6	1995	Perth Metropolitan Transport Strategy 1995-2029	Department of Transport
7	1996	State Planning Strategy	Western Australia Planning Commission
8	2000	Metropolitan Land Transport – directions for Western Australia	Department of Transport
9	2005	Network City: a milestone in Metropolitan Planning	Western Australia Planning Commission

The Metropolitan Transport Strategy was prepared in 1995 which aimed to move the car-dominated transport system to a more balanced transport system in favour of public transport and non-motorized transport options (Department of Transport 1995). The strategy adopted a ‘transport services’ planning approach as compared to traditional traffic planning (McKellar 1999).

‘Network City’ is the latest of 25 years of strategic plans for Metropolitan Perth (Western Australia Planning Commission 2005). *Network City* was prepared to integrate land use and transport in accordance with the requirement of the Australian National Charter on Integrated Land Use and Transport Planning. There are three key components: Activity Corridors, Activity Centers and Transport Corridors of the Network City plan. The network of activity corridors are fixed by strong regional centers served by rail-based public transport (Curtis 2005). Therefore, the New Metro Rail (NMR) project was initiated. Overall, the main aim of the development of the network of activity corridors and transport corridors is to promote sustainable urban development.

### **3. Perth Urban Railway**

#### **3.1 Background / History of Perth Railway Project**

The Perth suburban railway system was opened in 1881 along with the establishment of trams in Fremantle and Perth (Newman 1992). This rail system remained dominant in the first part of the 20<sup>th</sup> century with urban growth clustering around railway stations. However, after World War II, urban growth began to be built away from the railway and in conjunction with roads served by private vehicles. In fact, the city grew along the north and south of the Swan River instead of on its previous rail-based east-west axis.

Subsequently, as in Sydney, the tram service was terminated. For the same reasons, the Fremantle line was terminated in 1979 and replaced by a bus system. However, community efforts to restore the rail service culminated in success in 1983, when the Fremantle line

was re-opened and examined for possible electrification. In late 1985, a AU\$ 200 million project was awarded to Asea-Walker and Westrail respectively for rail car construction and electrical work and track upgrading on the Fremantle line. The electric trains attracted an increase of twenty per cent in patronage (over the operating figure before closure) immediately after their re-birth (ibid).

The apparent success story of the Fremantle line opened the debate on the northern suburbs rail option in 1988. Eventually, the State government allocated AU\$ 220 million in 1989 for the construction of northern suburban lines. The work was awarded to Asea Brown Boveri with Westrail, and began in 1990, opening in late 1992. Consequently, the patronage on the Perth rail system went from 7 million passengers a year to almost 30 million from 1992 to 1997 as show in Figure 1 (Newman, undated).

**Figure 1 Growth in Perth versus Adelaide Rail Patronage**



Source: Newman, undated

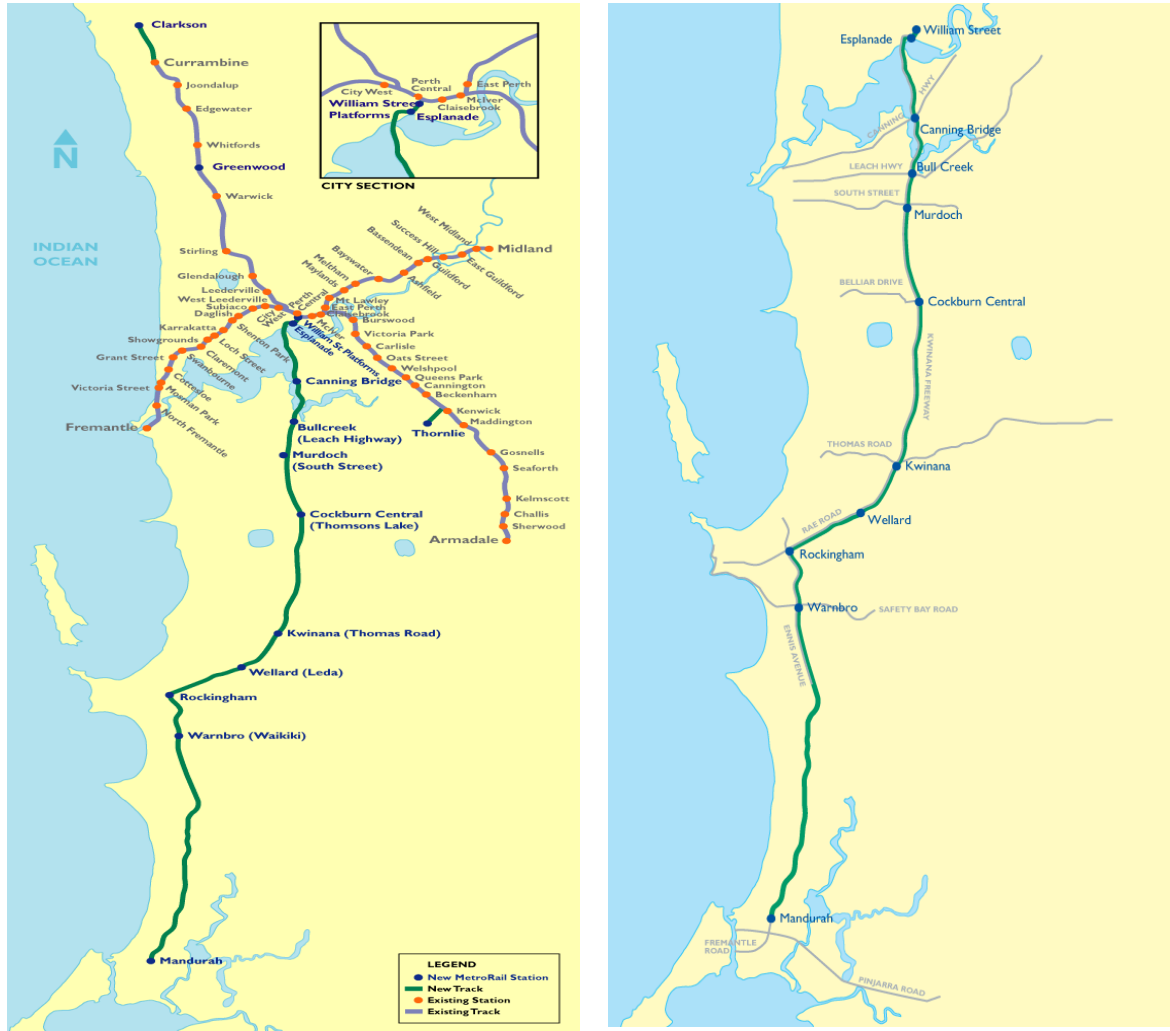
The popularity of the railway was transferred to an ambitious public transport vision based on enlarging the railway network. In the light of this vision, the South Western Metropolitan Railway (SWMR) was announced in 2000. An amount of AU\$ 1.2 billion was allocated initially for this project. A city where there was no electric railway line until 1990, will have around 200 kms of fast electric railway line by 2007. This will include 82 kms of South Western railway line to Mandurah South of Perth City. Moreover, several LRT projects have been planned to link new developments.

The main aim of the North West Metropolitan Railway (NWMR) and South West Metropolitan Railway (SWMR) was to provide alternative transport services equivalent to those provided by car. The main characteristics of the new railways were its high speed (130 km./hour) and the location of stations 2 to 3 kilometres apart.

In summary, the Fremantle line reopened in 1983, the existing railway lines were electrified in 1992, a new railway line to the northern suburbs was built in 1993 and successfully extended in 2004 and a new AU\$ 1.5 billion railway serving the southern suburbs will be completed in 2007 (Curtis 2005).

### 3.2 South Western Metropolitan Railway

#### a) *Key facts and characteristics*



Source: [www.newmetrorail.wa.gov.au](http://www.newmetrorail.wa.gov.au)

The New MetroRail (NMR) project in Perth includes: the South Western Metropolitan Railway, the Northern rail extension to Clarkson, the Thornlie spur, Victoria Park works, doubling of the railcar fleet and provision of new maintenance facilities. New MetroRail (NMR) is the largest public transport infrastructure project ever undertaken in Western Australia. It will effectively double Transperth's rail network. The main features of NMR is as follows:

- The total length of NMR is 82 kms. including 20 bridges and structures and the development of 15 new stations. This project includes, 'boring tunnels under the CBD to new underground stations and platforms, adding a railway bridge to the Narrows Bridge, widening the Mount Henry Bridge and running the railway down the centre of the Kwinana Freeway until Thomas Road where it veers south west through the Town of Kwinana and City of Rockingham on its way to Mandurah. Ten stations and new underground platforms at William Street, Perth, will be built

as part of the railway'<sup>1</sup>. It is expected that the new railway line will begin operations in 2007.

- It has been estimated that the eventual cost of the project will be \$1.61 billion.
- The South West Metropolitan Railway is a part of a comprehensive and integrated public transport proposal. Ten new stations between Perth and Mandurah will be constructed (see Appendix). The new railway is supported by buses and private car parking facilities.
- The following dates represent when Transperth services are expected to start to the new stations and travel time anticipated to Perth from the stations.

**Table 2 Southern Suburbs Railway**

Nos.	Name of Station	Date of Opening	Travel Time*
	William Street Underground	2007	
1	Esplanade	2007	
2	Canning Bridge	2007	6 min
3	Bull Creek	2007	9 min
4	Murdoch	2007	11 min
5	Cockburn Central	2007	16 min
6	Kwinana	2007	23 min
7	Wellard	2007	29 min
8	Rockingham	2007	33 min
9	Warnbro	2007	36 min
10	Mandurah	2007	48 min

\* The following are the approximate journey times to Perth from the new Stations.

**Table 3 Northern Suburbs Railway Additions**

Nos.	Name of Station	Date of Opening	Travel Time*
1	Greenwood	Jan. 29, 2005	16 min
2	Curranbine	October 4, 2004	26 min
3	Clarkson	October 4, 2004	32 min
*	Thornlie	Aug. 7, 2005	22 min
**	Victoria Park	2007	

- The anticipated patronage from the south west metropolitan area by the year 2006 is in excess of 30,000 passenger journeys per day (Department of Transport 2000).
- The total all day weekday passenger trips on the urban rail network is expected to grow by 68% - from 101,395 in 2001 to 170,500 in 2007.
- There will be 93 new railcars (making a total of 189 railcars) which can travel at speeds of up to 130 kmh and a new railcar maintenance and storage depot at Nowegup (north of Clarkson).
- NMR has extended the Northern Suburbs Railway with a 4 km extension from Currambine to Clarkson, new station at Clarkson and Greenwood.

<sup>1</sup> <http://www.newmetrorail.wa.gov.au/Default.aspx?tabid=207> visited on July 26, 2006

## **b. Contracts**

The following is a list of key organisations responsible for awarding contracts for New MetroRail works.

<b>Nos.</b>	<b>Organisations</b>	<b>Role</b>	<b>Websites Time*</b>
1	State Government Bulletin Boards (GEM)	Early tender advice and publications	<a href="http://www.gem.wa.gov.au">www.gem.wa.gov.au</a>
2	Public Transport Authority of Western Australia (PTA)	Tender manage and providing current tender information.	<a href="http://www.pta.wa.gov.au">www.pta.wa.gov.au</a>
3	State Supply Commission	Other useful information	<a href="http://www.ssc.wa.gov.au">www.ssc.wa.gov.au</a>

The following is a list of major contracts that have been awarded for various New MetroRail work.

### ***Southern Suburbs Railway***

<b>Nos.</b>	<b>Contract Details</b>	<b>Value</b>	<b>Contractor</b>	<b>Date Awarded</b>
1	Package G - Train Control System	\$5.79 million	Union Switch and Signal	July 2003
2	Package E - Freeway and Bridge works	\$99.1 million	Leighton Contractors	January 2004
3	Package F - City works	\$324.5 million	Leighton Kumagai	February 2004
4	Package A - rail spine from Narrows Bridge to Mandurah	\$310.3 million	RailLink JV	May 2004
5	Package D - Canning Bridge, Bull Creek and Murdoch Stations	\$32 million	John Holland Pty Ltd	December 2004
6	Package B - Cockburn Central, Kwinana and Wellard Stations	\$32 million	Doric Brierty Joint Venture Pty Ltd	March 2005
7	Package C - Rockingham and Warnbro Stations	\$35,001,497.30	Doric Brierty Joint Venture Pty Ltd	June 2005
8	Package C - Mandurah Station	\$6,659,600.20	JM and ED Moore	June 2005

### ***Northern Suburbs Railway Additions***

<b>Nos.</b>	<b>Contract Details</b>	<b>Value</b>	<b>Contractor</b>	<b>Date Awarded</b>
1	Bulk Earthworks	\$14 million	Brierty Contractors	March 2001
2	Burns Beach Road Bridge	\$1.7 million	Transfield Construction WA	July 2001
3	Currambine Station	\$3.1 million	John Holland Pty Ltd	March 2002
4	Infrastructure	\$17 million	Barclay Mowlem Alstom	April 2002

5	Clarkson Station	\$8.7 million	John Holland Pty Ltd	November 2002
6	Hester Avenue Bridge	\$3.5 million	Brierty Contractors	August 2003
7	Platform Extensions	\$4.8 million	Lakis Constructions	September 2003
8	Greenwood Station	\$6.8 million	John Holland Pty Ltd	February 2004
9	Refurbishment and Installation of Track Sectioning Cabin at Leederville			

### *Thornlie Spur*

<b>Nos.</b>	<b>Contract Details</b>	<b>Value</b>	<b>Contractor</b>	<b>Date Awarded</b>
1	Upgrade of Carlisle Station	\$1.2 million	WAGRC/Subcontractors	January 2003
2	Kenwick Tunnel Stage Two	\$14.2 million	John Holland Pty Ltd	March 2003
3	Beckenham Substation	\$3.02 million	Western Power Integrated Network Services	September 2003
4	Spencer Road Bridge Hydraulic Services Relocation	\$743,699	Underground Services Australia	September 2003
5	Howick Street Bridge, Miller's Crossing, and Victoria Park Rail Infrastructure	\$7.2 million	Works Infrastructure	September 2003
6	Thornlie Station, Canning River Bridge, Spencer Road Bridge, and Kenwick to Thornlie Rail Infrastructure	\$27.6 million	Barclay Mowlem	February 2004
7	Traction SCADA for Package H and Beckenham Feeder Station	\$598,790	Citect Pty Ltd	March 2004
8	Gerard Street Bridge	\$2.5 million	MRWA	April 2004

### *Railcar and Depot*

<b>Nos.</b>	<b>Contract Details</b>	<b>Value</b>	<b>Contractor</b>	<b>Date Awarded</b>
1	Railcar supply, depot construction and railcar maintenance	\$437 million	EDI Rail – Bombardier Transportation Pty Ltd	May 2002

### *Miscellaneous*

<b>Nos.</b>	<b>Contract Details</b>	<b>Value</b>	<b>Contractor</b>	<b>Date Awarded</b>
1	Consulting Services Package C comprising of Rockingham, Warnbro and Mandurah Stations	\$2.7 million	Jones Coulter Young	April 2002
2	Consultancy Services for Package B - Cockburn Central, Kwinana and Wellard Stations	\$2.3 million	Woodhead International	May 2002
3	Design Services for Package D - Murdoch, Bull Creek and Canning Bridge Stations	\$3.4 million	Woodhead International	September 2002
4	Design and Documentation of Package A Works for the SWMR	\$9.7 million	MaunsellSKM	September 2002
5	Design and Documentation of the Canning River Railway Bridge and Spencer Road Bridge (Sub Package 2B)	\$710,809	Bruechle Gilchrist & Evans Pty Ltd	February 2003
6	Supply of Lifts	\$4.4 million	Schindler Lifts Australia	February 2003
7	Supply of Escalators	\$7.4 million	Otis Elevator Company	March 2003
8	Phase 2 & 3 Geotechnical, Geophysical and Hydro-Geological Investigations for the SWMR within the Perth Central Business District	\$769,371	Worley Pty Ltd	April 2003
9	Design, Supply, Installation, Testing and Commissioning of CCTV and PA Works at five (5) NMR Stations	\$566,767	Dataline Visual Link Pty Ltd	March 2004
	Design, Fabrication, Supply and Installation of Passenger Service Enclosures at NMR Stations	\$551,259	Sign Supplies Pty Ltd	July 2004
	Supply and Installation of CCTV and PA Equipment for Southern Suburbs Railway Stations	\$1,334,598.16	Data Visual Link Pty Ltd	August 2005

<http://www.newmetrorail.wa.gov.au/Default.aspx?tabid=165>

### ***c. Environmental Policy and Management Information***

The original proposal for the South West Metropolitan Railway (SWMR) was formally assessed by the Environmental Protection Authority (EPA). As a result of this process significant changes were made to the alignment to preserve areas of high environmental value.

In 2002 the EPA set the level and criteria of assessment at Public Environmental Review (PER). The PER document was released in December 2002 for a 10 week public review period. As part of the PER approval, New MetroRail is required to prepare a number of management plans to ensure that potential environmental impacts are identified and minimized as far as possible. These include:

- Construction Management Plan
- Stakeholder Consultation Strategy
- Biodiversity and Wetland Mitigation Plan
- Environmental Management Plan for Warnbro Station
- Visual Amenity, Rehabilitation and Landscape Management Plan
- Fauna Management Plan
- Wetlands, Hydrology and Drainage Management Plan
- Noise and Vibration Management Plan
- Bushland Access Management Plan
- Contamination Assessment and Management Plan
- Vegetation Management Plan for Unexploded Ordnance Search Areas

Moreover, sustainability is interpreted in relation to the Southern Suburbs Railway as:

- Reducing car use
- Improving mobility for people without cars
- Creating jobs, particularly near regional centres
- Integrating alternative transport modes (bus, walking, cycling)
- Integrating stations with 'Liveable Neighbourhoods' (mixed use neighbourhoods where daily needs and employment opportunities are within walking distance)<sup>2</sup>

#### ***d. Institutions Responsible***

1. The Western Australian Planning Commission (WAPC) is the highest responsible body for land use planning and development in Western Australia. WAPC undertakes a major coordinating role across all aspects of the State's planning process. The WAPC is a statutory authority and is one of the agencies in the Planning and Infrastructure portfolio created by the State Government to integrate land use and transport planning.
2. The Department for Planning and Infrastructure is responsible for an accessible and safe transport system and integration of land use and transport systems.
3. The Public Transport Authority (PTA) was created in 2003 is responsible for the rail, bus and ferry services in the Perth Metropolitan Area (Transperth) regional areas (TransWA) and for designing and building transport infrastructure. Prior to the creation of the PTA, these functions were managed by the Department of Planning and Infrastructure and WA Government Railways.

New MetroRail is the name given to a PTA project to extend the metropolitan rail network. The duties of New MetroRail include:

- constructing the Southern Suburbs Railway;

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<sup>2</sup> <http://www.newmetrorail.wa.gov.au/Default.aspx?tabid=54> visited on August 3, 2006

- improving and extending the Northern Suburbs Railway line to Clarkson and construction of a new railcar depot at Nowergup;
- improving and extending the Armadale line; and
- acquiring 93 new railcars (31x 3-car train sets).

The New MetroRail project will be disbanded when these activities are completed.

4. Perth Urban Rail Development Office (PURD) under Western Australia Government Railways was established to implement
  - SWMR master Plan (1999)
  - Northern Suburbs Extension Master Plan (2000)
  - PURD Supplementary Master Plan (2002)

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### **Key Links**

<http://www.newmetrorail.wa.gov.au>

[www.pta.wa.gov.au](http://www.pta.wa.gov.au)

[www.dpi.wa.gov.au](http://www.dpi.wa.gov.au)

<http://www.patrec.org>

<http://www.patrec.org/conferences/TODJuly2005/TODJuly2005.html>

<http://www.wapc.wa.gov.au/>

## **APPENDIX A**

## **William Street Underground Platforms**

Services Commence: 2007  
Projected Patronage: 27,000  
boardings per day

### **Station facilities will include:**

- Two levels, platform and concourse
- Walk on and cycle access
- Integration with the Wellington Street Bus Station
- Station attendant
- CCTV coverage



New underground platforms will be constructed below the commercial city block bounded by the Murray Street Mall, William Street and Wellington Street. Heritage facades along William Street will be retained.

A concourse underneath the Horseshoe Bridge will connect the new underground William Street platforms with the existing Perth Station platforms. Escalators, stairs and lifts will provide access to the platforms from street level. There may be opportunity to connect with adjacent commercial developments as these are developed.

## **The Esplanade**

Services Commence: 2007

### **Station facilities will include:**

- Two levels, platform and concourse
- Walk on and cycle access
- Integration with the Bus Port
- Station attendant
- CCTV coverage

A station at The Esplanade will be located below the Mounts Bay Road/ The Esplanade/ William Street intersection. This station will provide excellent pedestrian access to the Busport, St Georges Terrace, Barrack Square and The Esplanade.

The Esplanade Station will enhance the link between the Perth CBD and Swan River foreshore. The station will play an important role for future special events on the foreshore and Esplanade.



## **Canning Bridge**

Services Commence: 2007

Journey time to Perth: 6 minutes

Services during Peak Time:

Every 10 minutes

### **Station facilities will include:**

- Walk on and cycle access
- Bus transfer
- CCTV coverage

Alterations will be made at the current Canning Bridge bus station to link local feeder buses with the new train services. Platforms will be raised to suit rail, and some additional vertical access will be provided. A public transport link between this station and Curtin University is currently being reviewed.

Buses from Canning Highway will be able to stop at the station but will continue to run into the City after commencement of the new train services. For the most part, these buses will travel with cars in the inside traffic lane. The recently completed southbound on ramp will be retained. The northbound bus ramp will be relocated, so that buses will be able to move smoothly into the inside traffic lane. Short, dedicated bus lanes will also be provided between Judd Street and the Narrows Bridge.

Targeting these two areas of delay means that bus travel time along the Kwinana Freeway will be comparable to that currently experienced with dedicated bus lanes along its full length.

Construction will begin on the station in early 2006.



## Bull Creek

Services Commence: 2007

Projected Patronage: 3,100 boardings per day

Park 'n' Ride Approximately 610 car bays.

Journey time to Perth: 9 minutes

Services during Peak Time: Every 5 minutes

### Station facilities will include:

- Walk on and cycle access (including secure lockers)
- Bus transfer
- Drop off and pick up
- Station Attendant
- Kiosk
- Public toilets
- CCTV coverage

Bull Creek Station (previously known as Leach Highway) will be located on the south side of the Leach Highway bridge over the Kwinana Freeway. This station will link local feeder buses running along Leach Highway with the new train services.

A bus transfer concourse will be elevated over the freeway carriageways to link to Leach Highway and provide access to an island platform at Freeway level.

Station construction began in Mid-2005.



## Murdoch

Services Commence: 2007

Projected Patronage: 4,980 boardings per day

Park 'n' Ride: Approximately 1,100 car bays

Journey time to Perth: 11 minutes

Services during Peak Time: Every 5 minutes

### Station facilities will include:

- Walk on and cycle access (including secure lockers)



- Bus transfer
- Drop off and pick up
- Station attendant
- Kiosk
- Public toilets
- CCTV coverage

Murdoch Station (formerly known as South Street Station) will be located south side of the South Street bridge over Kwinana Freeway. This station will link feeder buses running along South Street (including those Circle Route) with the new train services.

A bus transfer concourse will be elevated over the freeway carriageways to link to South Street and provide access to an island platform at Freeway level.

Construction of the station will begin in mid-2005.

## Cockburn Central

Services Commence: 2007  
Projected Patronage: 5,460 boardings per day  
Park 'n' Ride: Approximately 600 car bays  
Journey time to Perth: 16 minutes  
Services during Peak Time: Every 5 minutes



### Station facilities will include:

- Walk on and cycle access (including secure bike lockers)
- Bus transfer
- Drop off and pick up
- Station attendant
- Kiosk
- Public toilets
- CCTV coverage

Cockburn Central Station (previously known as Thomsons Lake Station) will be located north of the Beeliar Drive–Kwinana Freeway interchange. The station will have an island platform connected to the entry building by an elevated walkway over the freeway's northbound carriageway.

The station has been designed to integrate fully with the proposed Cockburn town centre development. It will become the main public transport focus of the area, with local and regional bus routes stopping between the station and the town centre. Construction of the station begins in mid-2005.

## Kwinana

Services Commence: 2007  
Projected Patronage: 2,560 boardings per day  
Journey time to Perth: 23 minutes  
Park 'n' Ride: Approximately 400 car bays  
Services during Peak Time: Every 10 minutes



### Station facilities will include:

- Walk on and cycle access (including secure bike lockers)

- Bus transfer
- Drop off and pick up
- Station attendant
- Kiosk
- Public toilets
- CCTV coverage

Kwinana Station (previously known as Thomas Road Station) will be located on the south side of Thomas Road, west of the Kwinana Freeway extension and Johnson Road. Road access to the site is planned from both Thomas Road and a new local feeder road to be built as part of residential development.

It will become one of two stations in the Kwinana area that will be linked to the shopping centre and town centre by local bus routes. The station will have side platforms in a cutting. The entrance building will bridge the tracks and connect both sides of the site. Construction on the station will begin in late 2005.

## Wellard

Services Commence: 2007  
 Park 'n' Ride: Approximately 300 car bays  
 Journey time to Perth: 29 minutes  
 Services during Peak Time:  
 Every 10 minutes

### Station facilities will include:

- Walk on and cycle access (including secure lockers)
- Bus transfer
- Drop off and pick up
- Station attendant
- Kiosk
- Public toilets
- CCTV coverage

Wellard Station (previously known as Leda Station) will be located within the Wellard Village development, south of Wellard Road and east of the existing Leda area.

The station is a key component of



the precinct's transit oriented development. Transit Oriented Developments (TODs) seek to maximise access to public transport with centrally-located rail and/or bus stations surrounded by relatively high-density commercial and residential development.

TODs mix residential, retail, office, open space and public uses in a walkable environment, making it convenient for residents and employees to travel by public transport, bicycle, foot or car. Construction of the station will begin in late 2005.

## Rockingham

Services Commence: 2007

Projected Patronage: 2,320 boardings per day

Park 'n' Ride: Approximately 700 car bays

Journey time to Perth: 33 minutes

Services during Peak Time: Every 10 minutes



### Station facilities will include:

- Walk on and cycle access (including secure bike lockers)
- Bus transfer
- Drop off and pick up
- Station attendant
- Kiosk
- Public toilets
- CCTV coverage

Rockingham Station will be located in the south-east quadrant of the intersection of Rae Road and Ennis Avenue. It will be one of two stations in the Rockingham area and will link the rail system to the city centre, educational facilities and the beach by local and regional bus routes. It will also link to the future city-centre transit system. Construction of the station began in August 2005.

## Warnbro

Services Commence: 2007

Projected Patronage: 2,060  
boardings per day

Park 'n' Ride: Approximately 700  
car bays

Journey time to Perth: 36 minutes

Services during Peak Time: Every  
10 minutes



### Station facilities will include:

- Walk on and cycle access  
(including secure bike  
lockers)
- Drop off and pick up
- Station attendant
- Kiosk
- Public toilets
- CCTV coverage

Warnbro Station (previously known as Waikiki Station) will be at the intersection of Safety Bay Road and Ennis Avenue on the south-east side of the flyover. It will be one of two stations in the City of Rockingham. The original concept has been redesigned to preserve an area of threatened ecological community (TEC 19b) adjacent to the car park.

Construction of the station will begin in August 2005.

## Mandurah

Services Commence: 2007

Projected Patronage: 3,490 boardings per day.

Park 'n' Ride: Approximately 850 car bays.

Journey time to Perth: 48 minutes

Services during Peak Time: Every 10 minutes



### Station facilities will include:

- Walk on and cycle access (including secure bike lockers)
- Bus transfer
- Transwa Regional coach transfer
- Drop off and pick up
- Station attendant
- Kiosk
- Public toilets
- CCTV coverage

Mandurah Station will be located on the north-west corner of the intersection of Allnutt Street and Fremantle Road. The station will have side platforms connected by a concourse at the end of the tracks.

It will be the terminal station for the train line and will be connected to the city centre by local feeder buses. Overnight stowage and cleaning facilities will be provided at the north end of the site.

The entrance buildings will include the current bus station buildings located toward the Allnutt Street end of the site.

Construction of the station began in late-2005.

Source: <http://www.newmetrorail.wa.gov.au/Default.aspx?tabid=135> Visited on July 26, 2006